



ETON America

70-90cc FOUR STROKE SERVICE MANUAL

Covering Models:

Viper 70M (RX4-70M)

Viper 70 (RX4-70)

Viper 90R (RX4-90R)

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1. INFORMATION

1.1 Safety



Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow sparks or flames in your work area.



Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.



The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. If you contact it, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.



Engine and exhaust pipe become very hot and will remain hot for one hour after the engine is shut off. Do not perform service on parts that are hot.



Used engine oil and gear oil may cause personal damage after repeated or long exposure to skin. Keep out of reach of children. Recycle or dispose of engine and gear oil properly at a proper facility.

1.2 Notes

All information, illustrations, directions and specifications included in this publication are base on the latest product information available at the time of approval for printing.

These symbols will appear throughout the manual to indicate important information or tasks.



CAUTION – Safety notification. Proceed carefully.



ADJUSTMENTS – Requires inspection, adjustment, or torque.



FLUIDS – Lubrication or check and replace fluids.



MULTIMETER – Diagnostics and electrical testing.



MEASUREMENT – Gap and size measurements.



SPECIAL TOOL – Uncommon tools may be required.



GENERAL MAINTENANCE PART – These parts may need to be replaced often. Part numbers will be provided when applicable.

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1.3 Specifications

		Viper 70M-4 (RX4-70M)	Viper 70-4 (RX4-70)	Viper 90R-4 (RX4-90R)
Engine				
Type		Four cycle liquid cooled	Four cycle liquid cooled	Four cycle liquid cooled
Displacement		69.3cc	69.3cc	88.4cc
Bore / Stroke		φ47.0 * 40mm	φ47.0 * 40mm	φ47.0 * 51mm
Compression Ratio / Pressure		9 : 1	9 : 1	10.2 : 1
Torque / BHP		4.8N m @ 6500rpm / 6.0BHP	4.8hp @ 6500rpm / 6.0BHP	6.5hp @ 6500rpm / 48BHP
Starting		Electrical with Kick start backup	Electrical with Kick start backup	Electrical with Kick start backup
Transmission				
Type		Automatic (C.V.T. V-Belt)	Automatic (C.V.T. V-Belt)	Automatic (C.V.T. V-Belt)
Chassis				
Overall Length		1430mm / 56.3"	1480mm / 58.3"	1500mm / 59.0"
Overall Width		820mm / 32.3"	850mm / 33.5"	850mm / 33.5"
Overall High		800mm / 31.5"	860mm / 33.9"	940mm / 37.0"
Wheel Base		930mm / 36.1"	930mm / 36.1"	1030mm / 40.6"
Seat High		640mm / 25.1"	670mm / 26.4"	680mm / 26.8"
Ground Clearance		80mm / 3.15"	100mm / 3.94"	120mm / 4.7"
Dry Weight		110kg / 243lbs	112kg / 247lbs	115kg / 254lbs
Suspension				
Front		Single A-arm Dual Adjustable Shocks	Single A-arm Dual Adjustable Shocks	Dual A-arm Dual Adjustable Shocks
Rear		Swing Arm Adjustable Shock	Swing Arm Adjustable Shock	Swing Arm Adjustable Shock
Brakes				
Front		N/A	Dual Mechanical drum	Dual Mechanical drum
Rear		Hydraulic Disc	Hydraulic Disc	Hydraulic Disc
Tires				
Front		145/70-6	16/8-7	18/7-8
Rear		145/70-6	16/8-7	18/9-8
Tire Pressure	Front	Min	3.2psi / 0.23kg/cm2	3.2psi / 0.23kg/cm2
		Max	4.0psi / 0.28kg/cm2	4.0psi / 0.28kg/cm2
	Rear	Min	3.2psi / 0.23kg/cm2	3.2psi / 0.23kg/cm2
		Max	4.0psi / 0.28kg/cm2	4.0psi / 0.28kg/cm2
Wheels				
Bolt Pattern		Direct attach	4 x 110mm	4 x 110mm (P.C.D)
Carburetor				
Make/Size		SW 18mm (Manual Choke)	SW 18mm (Manual Choke)	TK SVR 22mm (Manual Choke)
Main Jet		0.95mm	0.95mm	0.1mm
Pilot Jet		0.32mm	0.32mm	0.32mm
Air Mixture Adjustment		Back out 1 1/2 – 1 3/4 turns	Back out 1 1/2 – 1 3/4 turns	Back out 1 1/2 – 1 3/4 turns
Idle Speed		Idle 1700 - 1900rpm	Idle 1700 - 1900rpm	Idle 1700 - 1900rpm
Sprockets				
Front		520x13t	520x13t	520x13t
Rear		520x28t	520x28t	520x28t

Specifications are subject to change without notice.

Chain		#520	#520	#520
Battery Size				
Jell Acid (Maintenance Free)		12V-4AH/5AH - GTX5L	12V-4AH/5AH - GTX5L	12V-4AH/5AH - GTX5L
Fluids				
Fuel	Type	Unleaded Gasoline 89 octane	Unleaded Gasoline 89 octane	Unleaded Gasoline 89 octane
	Volume	4.5liters / 1.2gal	4.5liters / 1.2gal	4.5liters / 1.2gal
Engine Oil	Type	SAE 20W - 40	SAE 20W - 40	SAE 20W - 40
	Volume	0.8liters / 0.84gt	0.8liters / 0.84gt	0.8liters / 0.84gt
Transmission	Type	SAE 80/90 weight	SAE 80/90 weight	SAE 80/90 weight
	Volume	120cc / 4.1oz	120cc / 4.1oz	300cc / 10.2oz
Spark Plug				
NGK		CR7HSA/NGK	CR7HSA/NGK	CR7HSA/NGK
Nipendenso		U22FS-U	U22FS-U	U22FS-U
Champion		Z9Y (Not recommended)	Z9Y (Not recommended)	Z9Y (Not recommended)
	Electrode Gap	0.6-0.7mm / 0.023"	0.6-0.7mm / 0.023"	0.6-0.7mm / 0.023"
Safety Features				
Remote Control Stop/Start		Standard equipment	Optional kit	Optional kit (Stop only)
Safety Tether Switch		Standard equipment	Standard equipment	N/A
Enclosed Foot Rest Area		Standard equipment	Standard equipment	Standard equipment
Enclosed Engine compartment		N/A	N/A	N/A
Carrying Capacity				
Rack Capacity	Front	N/A	N/A	N/A
	Rear	N/A	N/A	N/A
Towing Capacity	Trailer Wgh	N/A	N/A	N/A
	Tongue Wgh	N/A	N/A	N/A
Maximum Rider Weight		68.2kg / 190lb	68.2kg / 190lb	68.2kg / 190lb
Minimum Rider Age		6 years	6 years	12 years

Specifications are subject to change without notice.

1.4 VIN & Engine Number

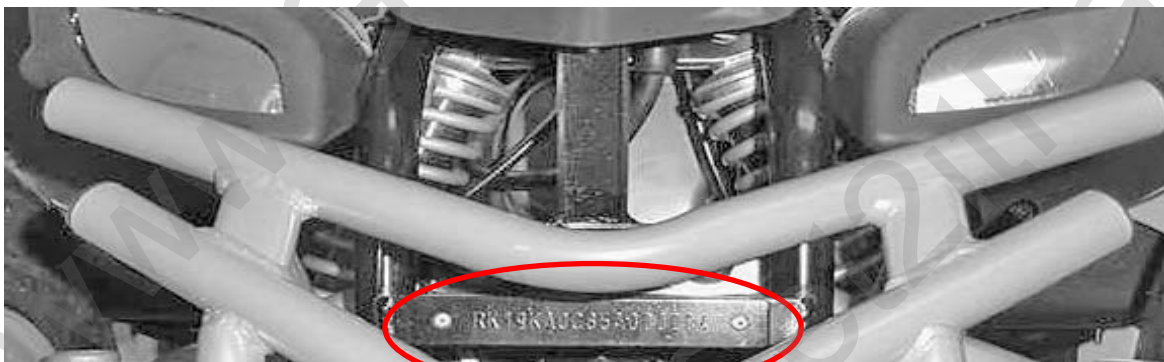
The ATV's serial numbers are available directly on the ATV. See the pictures below.

The frame VIN number is stamped on the front of the frame.

The engine VIN number is stamped on the left side of the crankcase.



Engine Number



Frame Number

1.5 Standard Torque Values



The torque values shown are the same for the Viper 70M, 70, and 90R models.



NOTE: Maximum metric torque value is shown. *Do not exceed maximum torque value.*

ENGINE

Cylinder head nut	25 N/m (13.3 – 18.4 lbf-ft)
Spark plug	12 N/m (5.2 - 8.9 lbf-ft)
Cylinder head bolt	30 N/m (14.8 - 22.1 lbf-ft)
Alternator bolt	12 N/m (5.9 - 8.9 lbf-ft)

FRAME

Handlebar upper holder bolt	24-30 N/m (17.7-22.1 lbf-ft)
Steering shaft nut	50-60 N/m (36.9-44.3 lbf-ft)
Steering shaft bushing holder nut	24-30 N/m (17.7-22.1 lbf-ft)
Wheel rim bolt	18-25 N/m (13.3-18.4 lbf-ft)
Tie rod lock nut	35-43 N/m (25.8-31.7 lbf-ft)
King pin nut	30-40 N/m (22.1-29.5 lbf-ft)
Handlebar lower holder nut	40-48 N/m (29.5-35.4 lbf-ft)
Front wheel bolt	24-30 N/m (17.7-22.1 lbf-ft)
Front axle nut	30-35 N/m (22.1-25.8 lbf-ft)
Front brake arm nut	4-7 N/m (3.0- 5.2 lbf-ft)
Rear brake arm nut	7-12 N/m (5.2- 8.9 lbf-ft)
Rear axle nut	60-80 N/m (44.3-59.0 lbf-ft)
Rear wheel bolt	24-30 N/m (17.7-22.1 lbf-ft)
Exhaust muffler mounting bolt	30-35 N/m (22.1-25.8 lbf-ft)
Engine hanger bolt	24-30 N/m (17.7-22.1 lbf-ft)

WP-0027

Maintenance Schedule Four Stroke Vehicles

Scheduled Maintenance		300KM	Every 1000KM	Every 3000KM	Every 6000KM	Every 12000KM
		200 Miles	600 Miles	2000 Miles	3700 Miles	7500 Miles
		NEW	1 Month	3 Months	6 Months	1 Year
1	Air cleaner element	I *	C *		R(paper)	R(sponge)
2	Air cleaner	I				
3	Oil filter (Screen)	C			C	
4	Engine oil	Change	I	Change		
5	Tire, pressure	I	I			
6	Battery	I	I			
7	Spark plug	I		I		R
8	Carburetor (idle speed)	I			I	
9	Steering bearing and handles	I		I		
10	Check transmission for leakage	I	I			
11	Check crankcase for leakage	I	I			
12	Transmission oil	Change			Change	
13	Drive belt/roller				I	R
14	Fuel tank switch and lines	I		I		
15	Throttle valve operation and cable	I	I			
16	Engine bolts and nuts	I		I		
17	Cylinder head, cylinder, and piston				I	
18	Exhaust system/cleaning carbon				I	
19	Cam Chain/ignition time	I		I		
20	Valve clearance	I	I	I	I	I
21	Shock absorbers	I			I	
22	Front/Rear suspension	I			I	
23	Main/Side stands	I			I/L	
24	Crankcase (PCV) Valve	I		I		
25	Brake mechanism/brake lining (pad)	I	I			
26	Tighten all Bolts/Nuts & Fasteners	I	I			

Code:

I = Inspection, clean, and adjust

R = Replace

C = Clean (replaced if necessary)

L = Lubricate

* = Clean or replace the air cleaner element more often when the vehicle is operated on dusty roads or in a heavily polluted environment.

= Maintenance should be performed more often if the vehicle is frequently operated at high speed for prolonged time and after the vehicle has accumulated 50,000 miles.

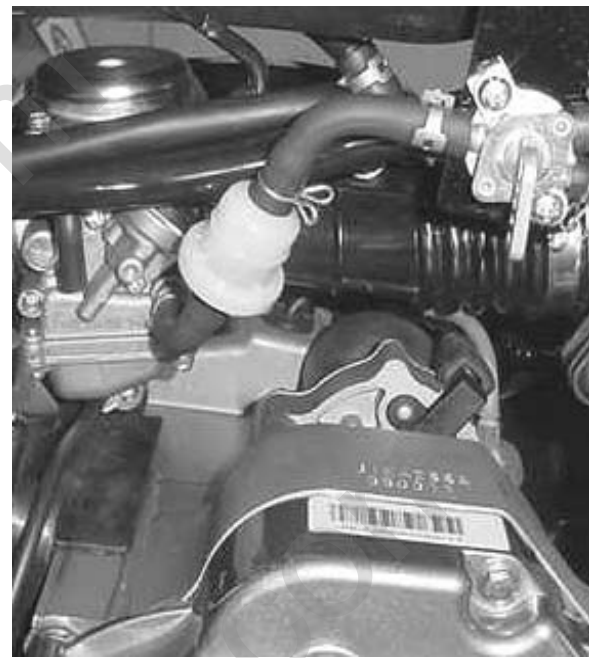
2.3 Fuel Lines & Filter

Inspect the fuel lines for deterioration, damage, or leakage, and replace if necessary.

Check the fuel filter for accumulated dirt and debris. Replace as needed. Filter replacement is also recommended at the beginning of each riding season.



Filter assembly: Part # 811629
Filter element: Part # 800002
Main fuel line: Part # 811006
Reserve fuel line: Part # 811628



2.4 Throttle Operation

- Inspect the throttle for smooth operation in all open and closed positions. Ensure that there is no wear, damage, or kinking in the throttle cable; replace it if necessary.
- Check the throttle lever slack. It should be between 5-10 mm (or 0.197-0.394 in) at the tip of the throttle lever.
- To lubricate cable, disconnect the throttle cable at the upper end. Lubricate the cable with commercially available lubricant to prevent premature wear and binding of the cable in the case.
- To replace a damaged or worn cable, order part # 811632.



2.5 Throttle Cable Adjustment



Slide the rubber cap on the adjuster off the throttle connection. Loosen the lock nut and adjust the slack of the throttle lever by turning the adjuster on the throttle housing. Check the slack of the throttle lever. Ensure it is set to 5-10 mm (or 0.197-0.394 in).



2.6 Air Cleaner

- Unscrew the air cleaner cover screws.
- Pull out the air filter element from the air cleaner case. Wash the element in non-flammable solvent and squeeze out the solvent thoroughly.
- Let it dry.
- Soak the filter element in gear oil, and then squeeze out the excess oil.
- Install the element into air cleaner carefully.



2.7 Spark Plug

To change the spark plug, do the following:

1. Stop the engine and wait for it to cool, 30-60 min. (Never work on a hot engine. A hot engine and exhaust can present a fire and burning hazard.)
2. Locate the spark plug at the front of the engine.
3. Remove the Spark plug lead wire by gently pulling on the plug wires boot. (Do not pull on the wire itself as this could cause damage to the wire).
4. Remove the old spark plug using the supplied plug wrench and screwdriver by turning the plug counter clockwise.
5. Set the electrode gap on the new plug to 0.6mm-0.7mm / 0.023" using a feeler gauge.
6. Insert the new plug by hand and tighten finger tight by turning the plug in a clockwise direction. Use caution not to cross thread the plug in the head.
7. Use the plug wrench to tighten the plug another 1/4 to 1/2 turn. **Caution:** over tightening the plug can cause the thread in the engine head to be stripped; under tightening the plug can cause compression loss and possible cylinder head failure.
8. Reinstall the plug wire by pressing the wire boot over the plug until it is completely seated on the spark plug.



ETON recommends that you replace your spark plug at the beginning of each riding season.

Note: ETON recommends the use of NGK CR7HSA

Plug MFG	MFG Num	Plug Gap	Part
NGK	CR7HSA	0.6-0.7mm / 0.023"	# 650013
Champion	Z9Y	0.6-0.7mm / 0.023"	



Electro Gap Set to
0.6-0.7mm / 0.023"



2.8 Idle Speed

Air/Fuel Ratio adjusting procedure:

Step 1: Air adjusting screw.

Turn adjusting screw all the way in then back off $\frac{3}{4}$ to $1\frac{1}{4}$ turn on 70cc engine.
1 to $1\frac{1}{2}$ turns on 90cc engine.

Step 2: Adjust idle RPM. (Warm Engine)

Connect an RPM gauge. Turn the adjustment screw in or out to adjust the engine idle speed to between 1700—1900 RPM. Turning the idle adjustment screw clockwise will raise the RPM; turning it counterclockwise will lower the RPM.

Idle Speed: 1800 ± 100 RPM



2.9 Drive Chain

Inspect the chain slack. The standard is 10-25mm or 0.394-0.984 in.

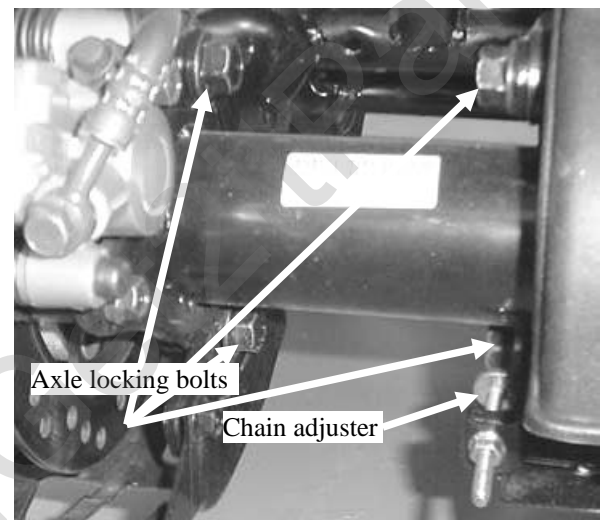
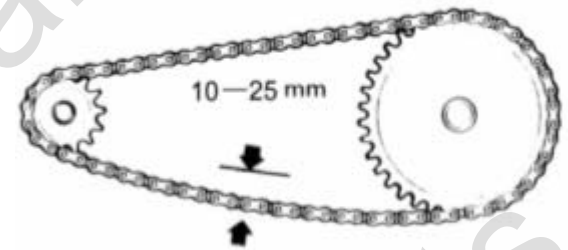
The drive chain will stretch with use and will require periodic adjustments. To check the chain tension, remove the chain guard and measure the slack. The amount of slack in the chain should not exceed 10-25mm (or 0.394-0.984 in).

Inspect the drive and axle sprockets for damaged or broken teeth. Replace as needed. Inspect the chain links for damaged, worn or loose rivets. Repair or replace as needed.

Chain Slack Adjustment:

Loosen the axle position lock bolts slightly and turn the chain adjuster nut to take up the excess slack in the chain. Once the chain has been adjusted to the proper tension retighten the axle position locking bolt.

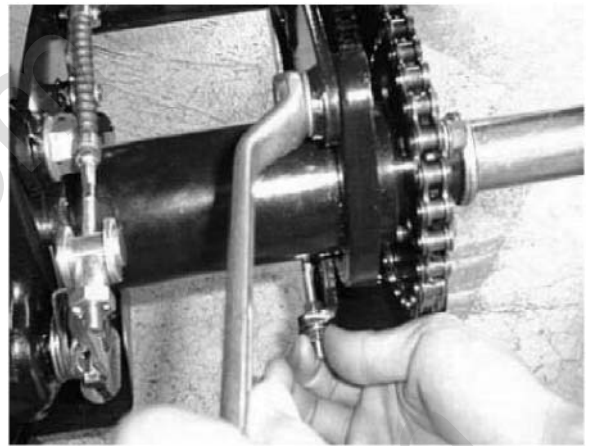
The chain should be kept well lubricated to prevent excess wear and premature failure. We recommend that you lubricate the chain every 20 hours of operation, or more frequently if needed, with a high quality chain lubricant.





When the drive chain becomes very dirty, it should be removed, cleaned, and lubricated. Use commercial chain lubricant to lubricate the drive chain.

Clean the drive chain with kerosene and wipe it dry. Inspect the drive chain for worn or damaged links and rivets. Replace the chain if it is worn excessively or damaged.



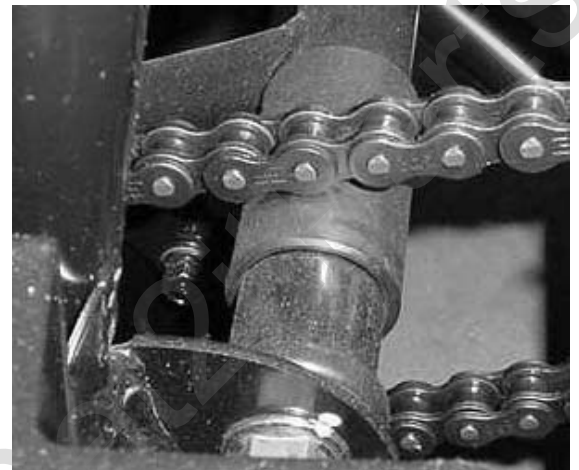
Inspect the sprocket teeth. If there is excessive wear or damage, replace the sprocket.

Engine Sprocket - Part #: 811662

Drive Axle Sprocket - Part #: 610037 (520x28t)



Inspect the chain-tensioned roller. Replace it, if necessary.



2.10 Braking Systems

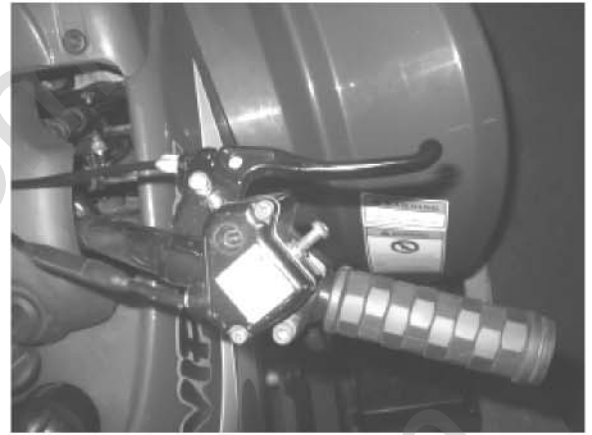
Inspect the front brake lever (the right hand lever) and cable for excessive wear or other damage. Replace or repair if necessary.

Measure the slack of the brake lever at the end of the brake lever. The standard of slack is 15-25 mm (or 0.591-0.984 in).

(For RX470 & 90R; the RX470M RH level is the parking brake.)



For RX470M, parking brake in rear axle, the brake switch is located on the (RH) brake lever.



- Inspect the rear brake lever (the left hand lever) and cable for excessive wear or other damage.
- Replace or repair if necessary.
- Measure the slack of the rear brake lever at the end of the lever. The standard is 15-25 mm (or 0.591-0.984 in). (For all models)



2.11 Wheels & Tires

- Inspect the tire surfaces for cuts, nails, or other sharp objects.
- Check the tire surfaces at cold tire condition. The standard tire pressure is 2.2 ± 0.3 psi. (or 0.15 kg/cm^2)



2.12 Steering System

Check the slack of the steering shaft with the front wheels facing straight ahead. When there is excessive slack, inspect the tie-rod, kingpin bushing and ball joint.

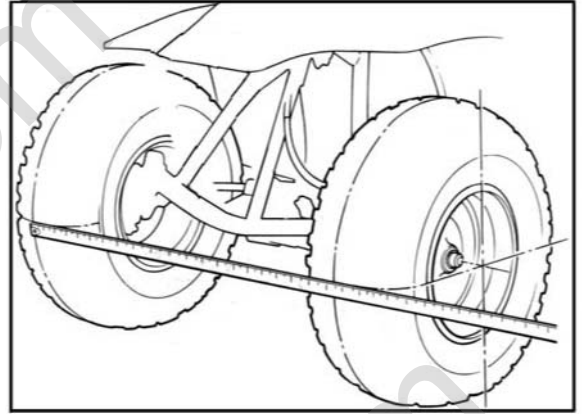


CAUTION – This procedure should be performed on all ATVs during setup.

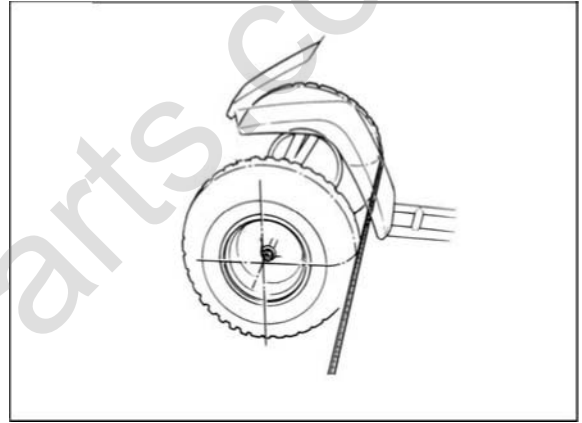


2.13 Toe-In

- Park the vehicle on level ground and leave the front wheels facing straight ahead.
- Mark the centers of the tires to indicate the axle center height.
- Measure the distance between the marks.



- Carefully move the vehicle back, and rotate the wheels 180°, so the marks on the tires are aligned with the axle center height on the other side.
- Measure the distance between the marks. Calculate the difference in the front and rear measurements.
- Toe-in: $5 \pm 10\text{mm}$ (or 0.197 ± 0.394 in)



If the toe-in is out of standard, adjust it by changing the length of the tie-rods equally. Loosen the locking nuts and turn the tie-rod while holding the ball joint.

Tighten the lock nuts.

Torque: 35-43 N/m (or 2.40-2.95 lb/ft)



2.14 Gear Oil

Gear oil needs to be changed every year.

1. Place an oil catch pan under the unit directly below the transmission box.
2. Remove the transmission box drain plug located on the bottom of the transmission box on the underside of the unit.
3. Remove the transmission box fill hole plug located on top of the transmission box near the oil tank bracket on the left hand side of the unit.
4. Allow the oil to drain completely (15-30 min).



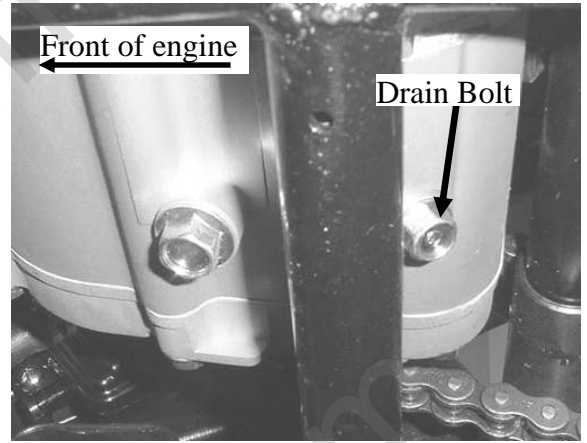
5. Reinstall the drain plug and tighten. Torque to 7-10lbf-ft



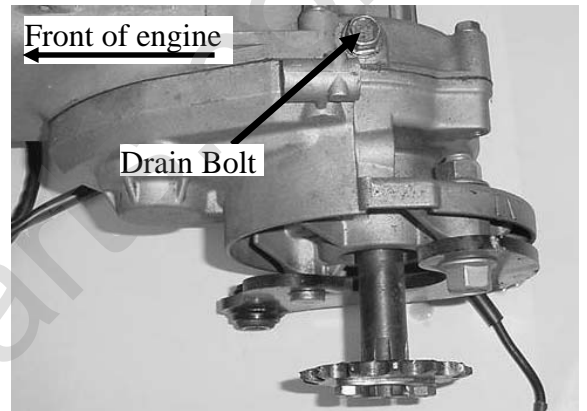
6. Fill the transmission box with of SAE 80-90 gear oil
 - 70cc Engine = 100cc / 3.4oz
 - 90cc Engine with Reverse = 300cc / 10.2oz

7. Reinstall the fill hole plug finger tight (90R only) or torque the fill bolt 7-10lbf-ft (70 and 70M only)

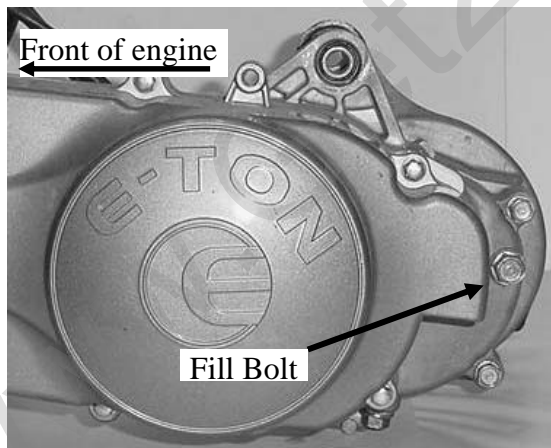
8. Dispose of used oil at a proper recycling station as required by law.



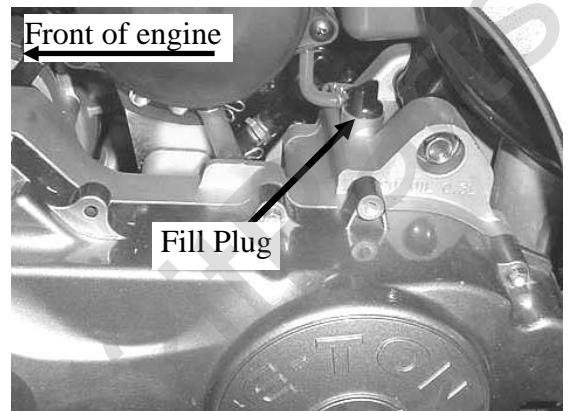
Bottom of engine for RX4-90R



Bottom of engine for RX4-70/70M



LH (clutch) side of engine for RX4-70/70M



Top of engine for RX4-90R

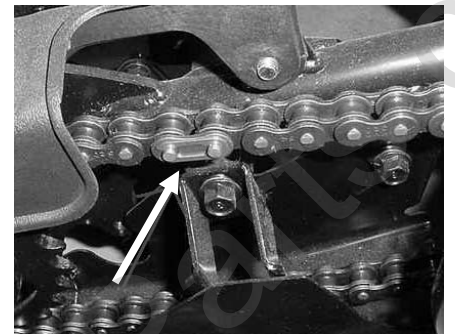
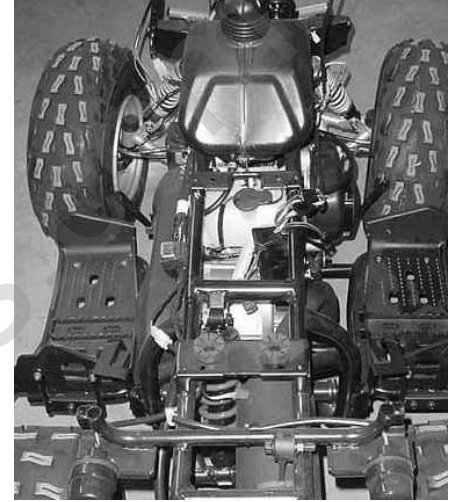
3. ENGINE REMOVAL AND INSTALLATION

3.1 Service Information

NOTE: The engine should only be removed when repair conditions warrant its removal. Engine removal is a complex task that should be performed only by a qualified technician or mechanic.

3.2 Engine Removal

1. Remove the seat, side panels and fenders. (See Section 11)
2. Disconnect the spark plug cap from spark plug.
3. Remove the exhaust muffler assembly.
4. Disconnect the throttle cable from the carburetor by removing the two screws on top of the carburetor.
5. Disconnect the oil pump cable from the oil pump control plate, located under the right side of engine.
6. Disconnect the wire connections:
 - a. Carburetor auto-choke (If installed)
 - b. Carburetor manual choke cable (If installed)
 - c. Starter motor
 - d. A/C generator
 - e. C.D.I. Leads (Label before disconnecting)
 - f. Disconnect the shifting motor (Viper 90R)
 - g. Label & disconnect the shift sensor leads (Viper 90R)
 - h. Disconnect the engine ground wire on the (LH) side of the engine
7. Disconnect the fuel line from the carburetor.
8. Remove the drive chain cover.
9. Remove the drive chain retaining clip and master link.
10. Remove the drive chain.
11. Remove the three engine hanger nuts and bolts.
12. *Carefully* remove the engine from the right side of frame.

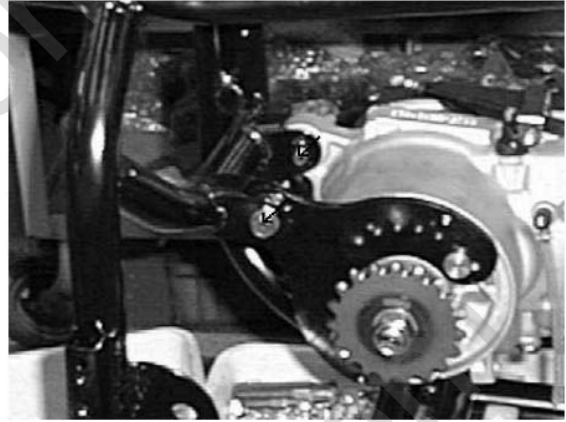


3.3 Engine Installation

Engine installation is basically removal in reverse.



1. Replace the engine in the frame from the right side.
2. Reinstall the engine hanger bolts and torque to 24-30 N/m (1.64-2.06 lb/ft).
3. Reinstall the drive chain, and connect with the master link and retaining clip.
4. Reinstall the chain guard.
5. Reconnect the wire connections:
 1. Carburetor auto-choke (if installed)
 2. Carburetor manual choke cable (if installed)
 3. Starter motor
 4. A/C generator
 5. Reconnect C.D.I. leads
 6. Reconnect the engine ground wire on the (LH) side of the engine (Viper 90R-4)
 7. Reconnect the shift motor
 8. Reconnect the shift sensor leads



- Note: Use care when rerouting the cables and wires so as not to pinch or bend them.*
6. Reconnect the oil pump cable.
 7. Reconnect the throttle cable.
 8. Reinstall the exhaust muffler assembly.
Note: Replacement of the exhaust gasket with a new gasket is recommended.
 9. Reconnect the fuel line.
 10. Replace the spark plug cap.
 11. Test-start the engine.
 12. Test the shifting function. (Viper 90R-4 only)
 13. Reinstall fenders, side panels, and seat.

4. FUEL AND LUBRICATION SYSTEMS

4.1 Trouble Shooting

Engine does not start.

- No fuel in tank
- No fuel to cylinder
- Too much fuel going into cylinder
- No spark at plug
- Air cleaner clogged

Engine idles roughly, stalls, or runs poorly.

- Improper adjustment of the idle speed screw
- Ignition malfunction
- Bad fuel/air mixture ratio
- Air filter dirty
- Intake leaks
- Fuel tank cap breather clogged
- Fuel jet of carburetor clogged
- Fuel filter clogged
- Fuel flows restricted
- Float level in carburetor set too low
- Lean mixture/rich mixture
- Faulty float needle valve
- Float level set too high
- Carburetor air duct is clogged

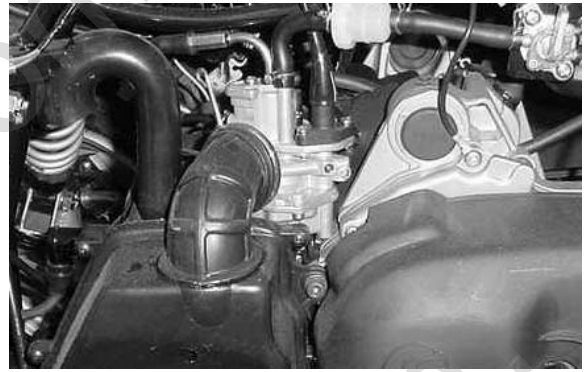
4.2 Fuel Tank

REMOVAL

- Remove the seat and rear fender.
- Disconnect the fuel line from the carburetor.
- Remove the fuel tank cap and front fender.
- Unscrew the fuel tank mounting bolts.



Warning: Gasoline is highly flammable
Note: Keep gasoline away from flames or sparks.
Wipe up spilled gasoline at once.



4.3 Carburetor

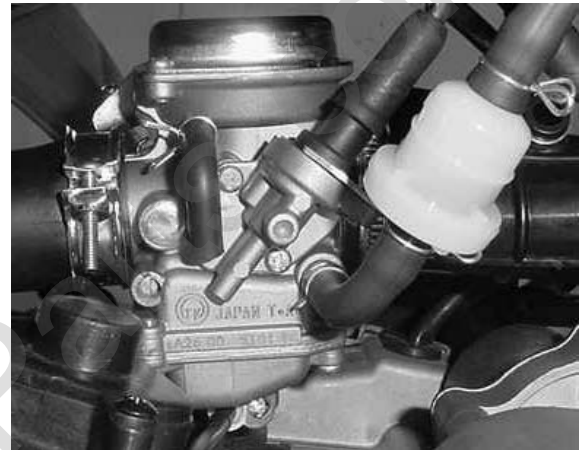
REMOVAL

Note: Turn fuel petcock to "off" position

- Remove the air filter assembly.
- Disconnect the fuel line and choke cable or lead wire.
Unscrew the intake pipe mounting bolts at the carburetor
- Remove the carburetor

DISASSEMBLY

- Remove the carburetor cap.
- Remove the throttle cable from the throttle valve while depressing the throttle valve spring.



- Remove the needle clip retainer, the jet needle, and needle clip.
- Inspect the throttle valve and jet needle surface for wear, scratches or dirt.



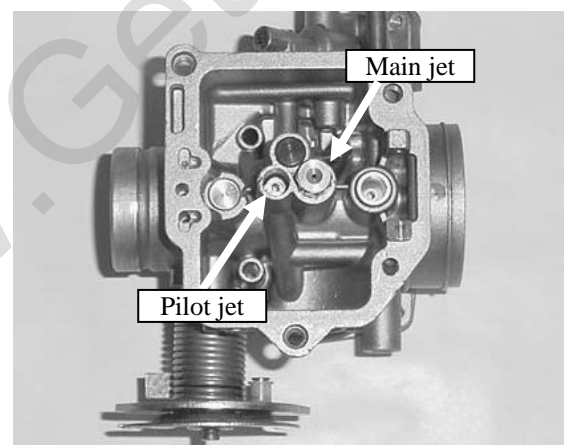
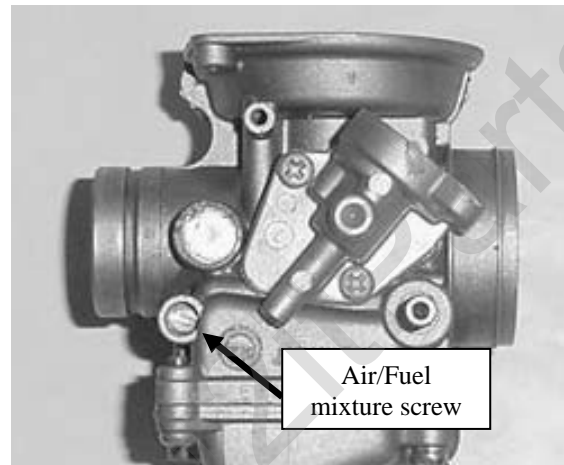
- Unscrew the float chamber screws and remove the float chamber.



- Remove the float arm pin, float, and float needle valve.
- Inspect the seat of the float needle valve for wear or damage.
- Inspect the float for signs of leakage (fluid inside of float)
- Replace all worn or damaged parts



Disassemble the idle jet, main jet, idle speed adjustment, and idle mixture adjustment screws. Inspect all the jets and screws for wear or damage. Replace as needed. Clean the passages and jets with compressed air.

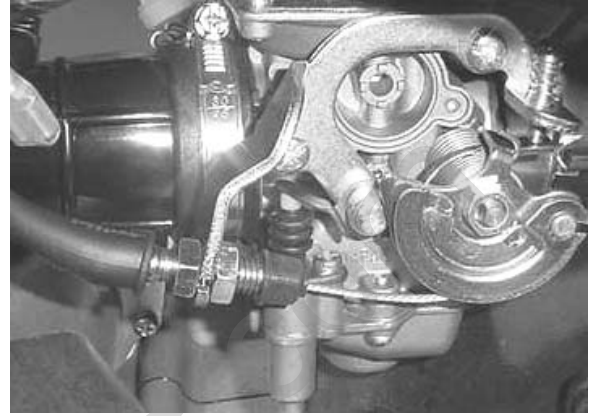


ASSEMBLY

Clean all parts in solvent and blow it dry with compressed air. Assembly is basically disassembly in reverse. E-TON recommends that the bowl gasket be replaced during assembly.

THROTTLE VALVE ASSEMBLY

- Install the needle clip on the jet needle.
- Install the jet needle in the throttle valve.
- Assemble the throttle cable, spring, and throttle valve. Align the throttle valve groove with the idle speed adjust screw, and install the carburetor cap on the carburetor.



Carburetor rebuilds kits:

RX4-70M/70 – Part # 811312

RX4-90R – Part # 812316

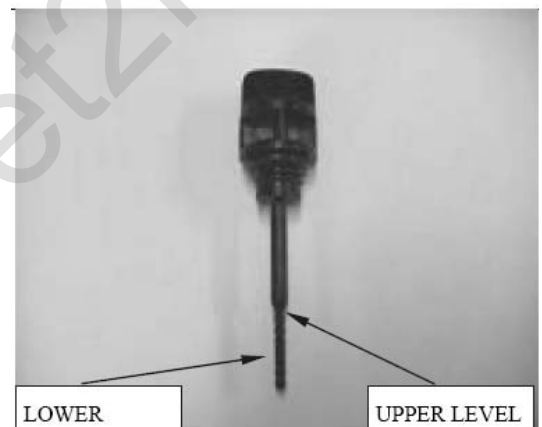
4.4 Engine Oil Level & Changing

Checking the level:

Place the unit on a level plane.

Check the oil level with the oil level gauge. Do not screw it in when making this check.

Add the recommended oil up to the upper level if the oil level is below or near lower level line on the gauge.



Draining the oil:

Remove the oil filter cap and the oil drain bolt.

NOTE: Drain the oil while the engine is warm to ensure complete draining.

Remove the oil filter cap, spring and oil filter screen.
Check the O-ring for damage or fatigue.



Install a new oil filter screen and spring. Then, install the cap.

Install the oil drain bolt with sealing washer.



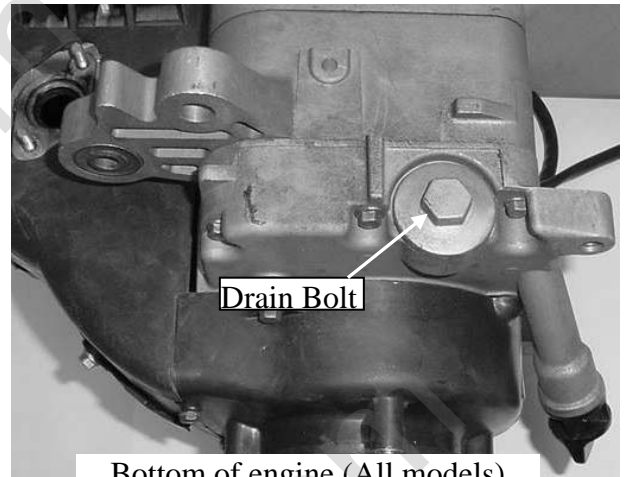
TORQUE: 12-19 N-m (9.0/14 lbf-ft)



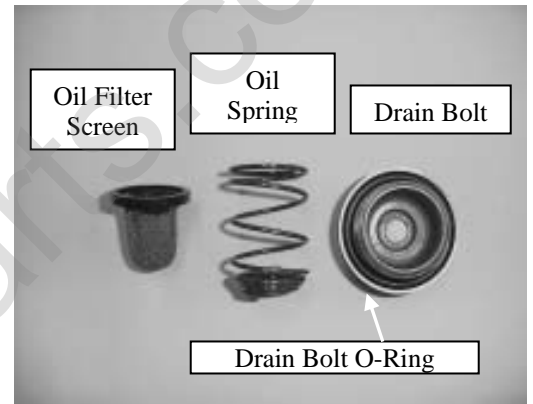
Fill the crankcase with recommended oil.

ENGINE OIL CAPACITY: 0.8 liter at draining.

- Install the oil filter cap.
- Install the oil level gauge.
- Start the engine and let it idle for 2 to 3 minutes.
- Stop the engine and check that the oil level is at the upper line on the gauge. Make sure there are no oil leaks.



Bottom of engine (All models)



SPECIFICATION

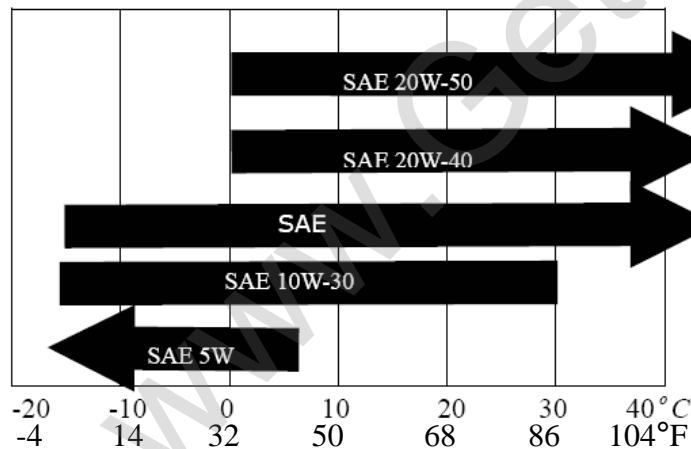


ENGINE OIL CAPACITY
API service classification: SE or SF

0.8 liter
ENGINE OIL RECOMMENDATION
Viscosity: SAE 20w/40

- When the average temperature in your riding area is within the indicated range, you should use the correct engine oil viscosity that is shown in the chart.

ENGINE OIL VISCOSITIES



4.5 Oil Pump removal / Installation

Remove the fan cover assembly.



Remove the cooling fan.



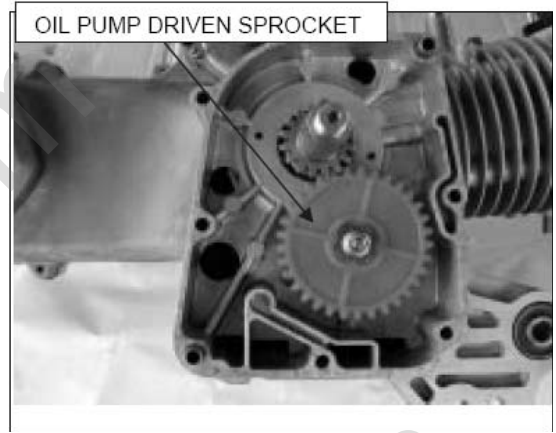
Remove the flywheel and A/C Generator.



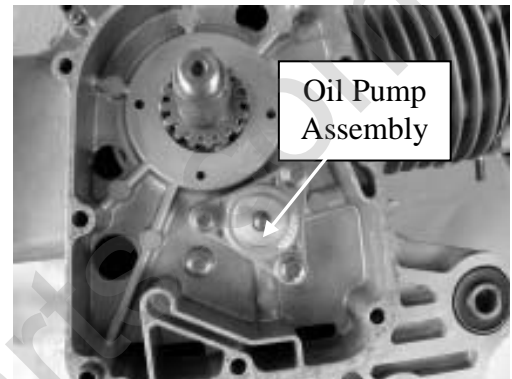
Remove the right crankcase cover.



Remove the oil pump driven sprocket.



Remove the oil pump assembly.



Disassemble the oil pump.



ITEM		STANDARD	SERVICE
OIL PUMP	Body-to-rotor clearance	-----	0.12
	Rotor tip clearance	-----	0.12
	End clearance	0.05 – 0.10	0.2

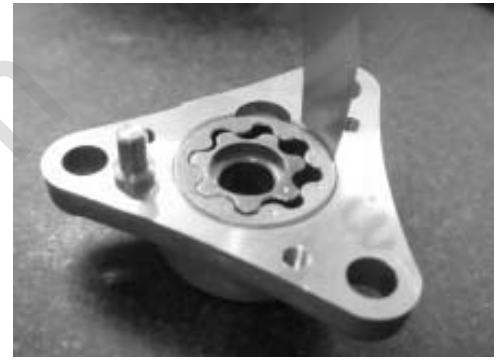
Units in mm.

Inspection:

Measure the oil pump body-to-rotor clearance with a feeler gauge.



SERVICE LIMIT: 0.12 mm



Install the oil pump shaft and measure the pump rotor tip clearance with a feeler gauge.



SERVICE LIMIT: 0.12 mm.



Remove the oil pump shaft and measure the pump end clearance with a feeler gauge.

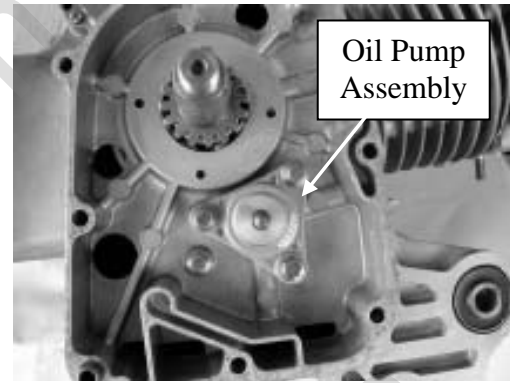


SERVICE LIMIT: 0.2 mm.

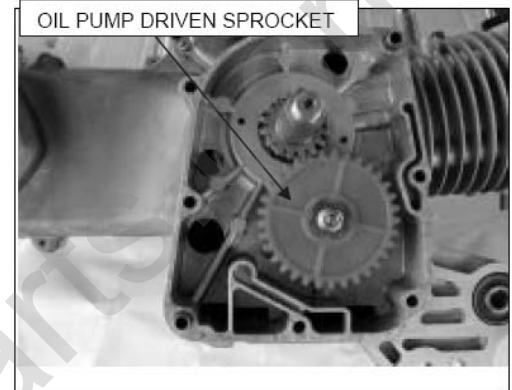


Installation:

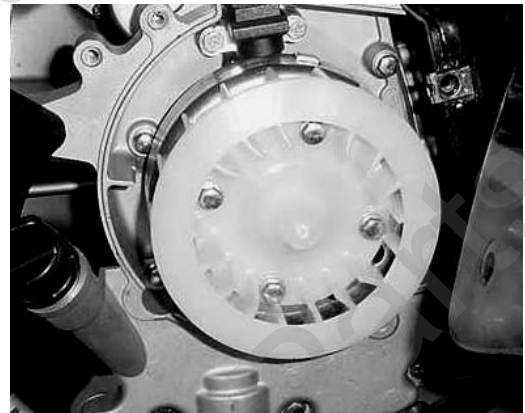
Install the oil pump assembly.



Install the oil pump driven sprocket.



Install the A/C Generator, flywheel, and cooling fan.



5. ENGINE COMBUSTION SYSTEM

5.1 Service & General Information

This section describes cylinder head, valves, camshaft and the other parts maintenance.

- The engine must be removed from the frame to service cylinder head.
- Camshaft lubrication oil is fed to the cylinder head through an oil orifice in the engine case.
- Before installing the cylinder head make sure the orifice is not clogged and the gasket, O-ring, and dowel pins are in place.



SPECIFICATIONS

ITEM		STANDARD	(mm) SERVICE LIMIT
Cylinder compression		170 PSI 12±0.5 kg/cm ²	-----
Cam lobe height	IN	25.763	25.683
	EX	25.605	25.241
Rocker arm I.D.		10.000-10.015	10.10
Rocker arm shaft O.D.		9.972-9.987	9.91
Cylinder head warpage		-----	0.05
Valve spring free length	IN	30.0	27.0
	OUT	33.5	30.5
Valve stem O.D.	IN	4.975-4.990	4.90
	EX	4.955-4.970	4.90
Valve guide I.D.	IN/EX	5.000-5.012	5.30
Stem-to-guide clearance	IN	0.010-0.037	0.08
	EX	0.030-0.057	0.10
Valve seat width	IN	1.0	1.8
	EX	1.0	1.8

5.2 Trouble Shooting

Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test, or by tracing engine noise to the top end with a sounding rod or stethoscope.

Low compression

- Cylinder head gasket leaking or damaged
- Warped or cracked cylinder head
- Cylinder or piston rings worn or damaged

High compression

- Excessive carbon build-up on piston head or in combustion chamber

Excessive noise

- Excessive wear of piston or cylinder
- Excessive carbon build-up in cylinder
- Excessive wear of piston rings

Excess smoke

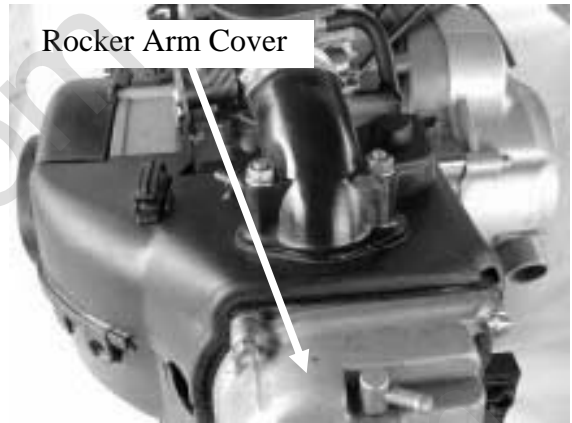
- Improper installation of piston rings
- Piston or cylinder wall scored or scratched
- Oil pump cable adjusted to high fuel/oil ratio

Overheating

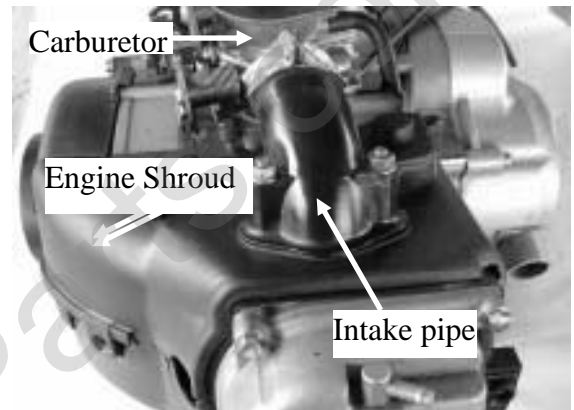
- Excessive carbon build-up on the piston or in the combustion chamber
- Engine cooling system fan damaged
- Engine cooling air intake blocked
- Cylinder fins dirty or clogged
- Insufficient oil supply
- Ignition timing out of sync

5.3 Top End Removal

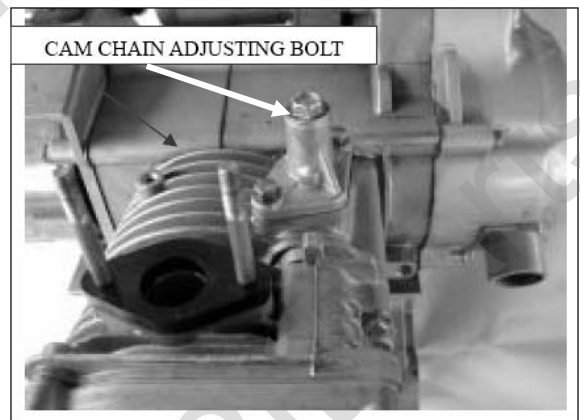
Remove the rocker arm cover.



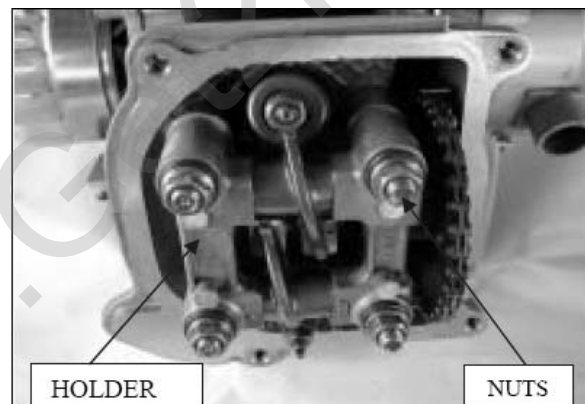
- Remove the air cleaner and carburetor.
- Remove the intake pipe assembly.
- Remove the engine shroud.



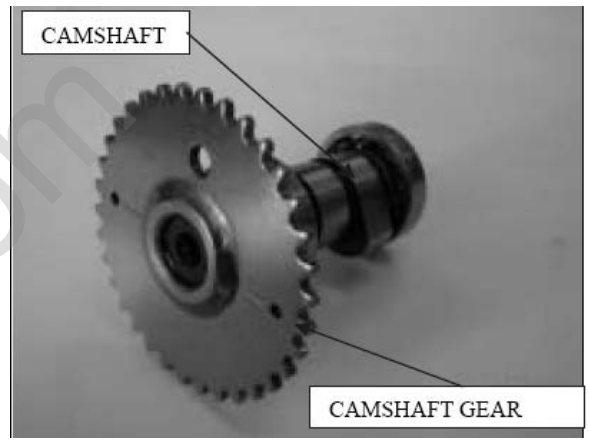
Loosen the cam chain adjuster screw.



- Remove the nuts and washers.
- Remove the camshaft holder and dowel pins.



Loosen the camshaft gear from cam chain and remove the camshaft.



Inspection

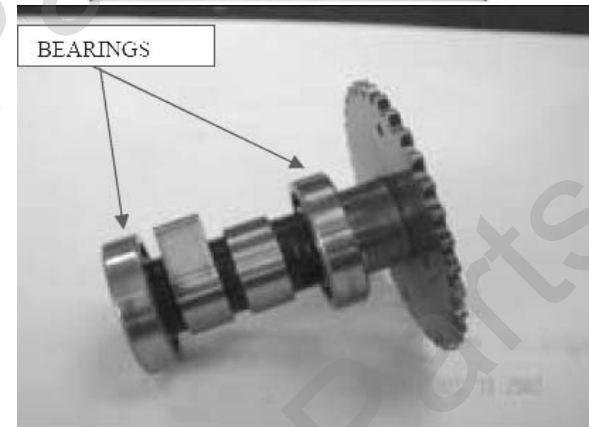
Inspect the cam lobes' surface and height of cam lobes for wear or damage.



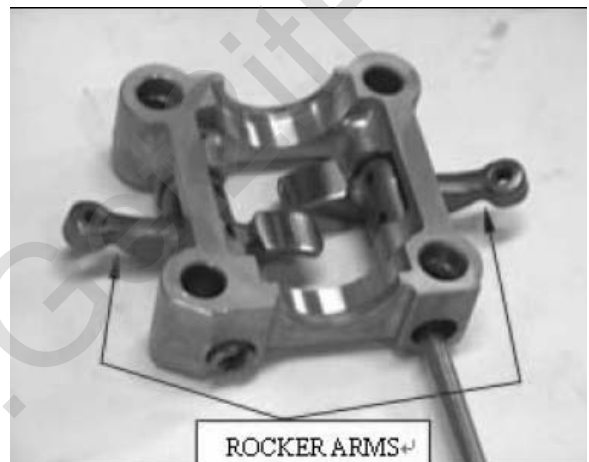
SERVICE LIMIT:
IN: 25.683mm / 1.008"
EX: 25.241 mm / 0.994"



Inspect the camshaft and bearings for wear or damage and replace them if necessary.



Unscrew the 5mm bolt threaded in the rocker arm shaft end. Pull on the bolt to remove the shafts and rocker arms.



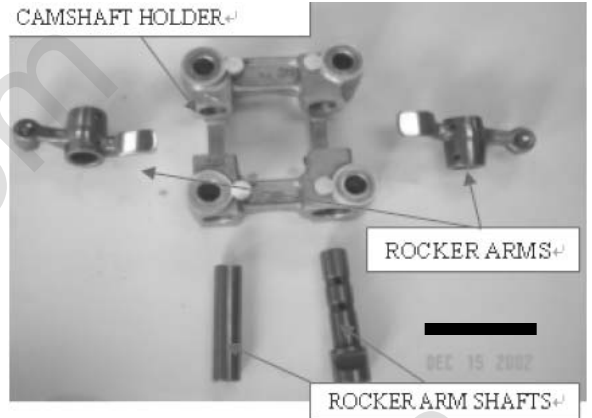
Inspect the camshaft holder, rocker arms and rocker arm shafts for wear or damage.



Measure the I.D. of each rocker arm.
SERVICE LIMIT: 10.10 mm / 0.398"

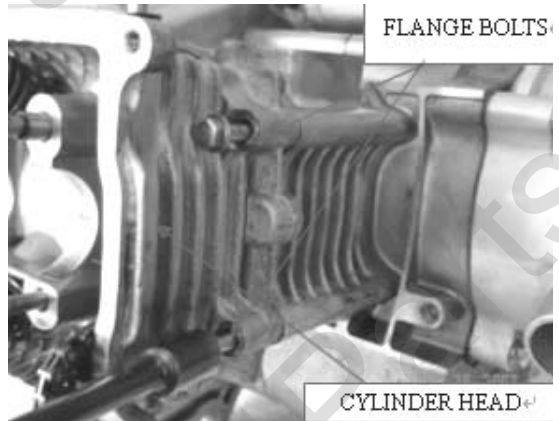


Measure the O.D. of each rocker arm shaft.
SERVICE LIMIT: 9.91 mm / 0.390"

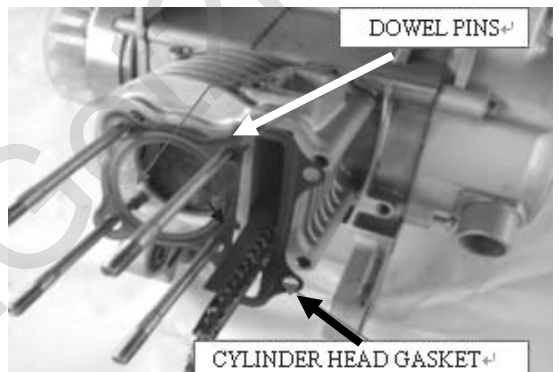


5.4 Cylinder Head Removal

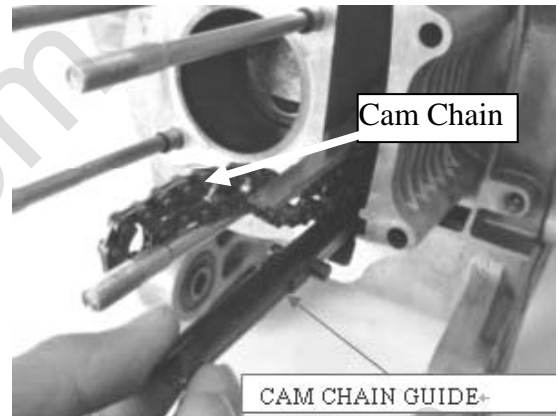
Remove the flange bolts and cylinder head.



Remove the cylinder head gasket and dowel pins.



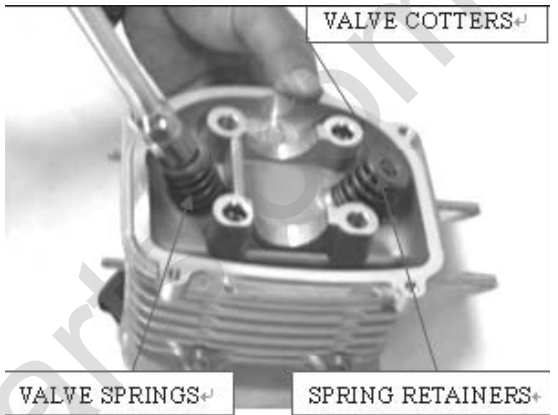
Remove the cam chain guide.



Cylinder Head Disassembly



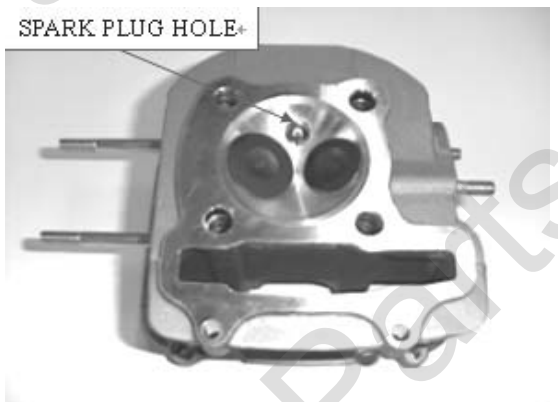
Remove the valve cotters, spring retainers, and valve springs with a valve spring compressor.



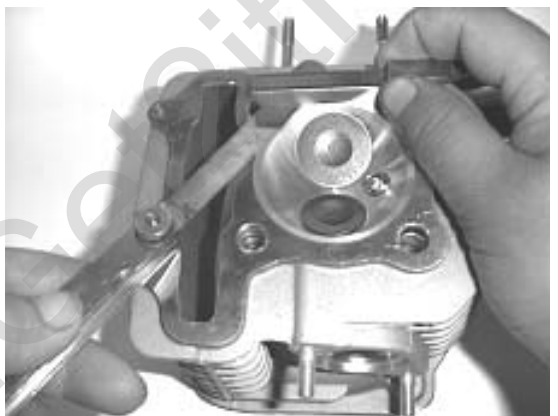
Inspection



- Clean off all carbon deposits from the combustion chamber. *Be sure not to damage the gasket surface.*
- Check the spark plug hole and valve area for cracks.



Measure the cylinder head diagonally for warping with a straight edge and feeler gauge.

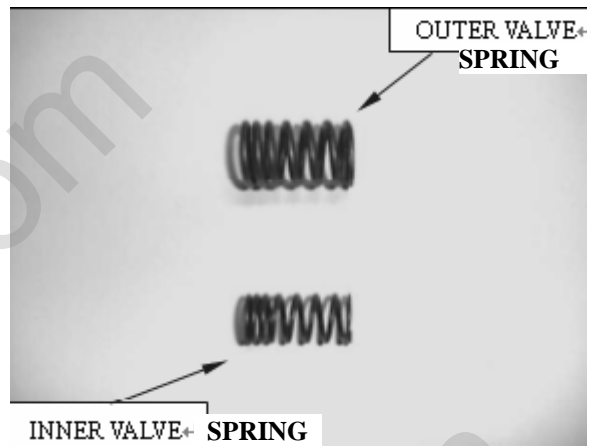


Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:



Inner 27.0mm / 1.063"
Outer 30.5mm / 1.201"



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



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



SERVICE LIMIT: 4.90 mm / 0.193"



Measure and record the valve guide I.D.



SERVICE LIMIT: IN / EX 5.30 mm / 0.209"

Calculate the stem-to-guide clearance.



**SERVICE LIMIT: IN 0.08 mm / 0.003"
EX 0.10 mm / 0.00394"**

NOTE: If the stem-to-guide clearance exceeds the service limit dimensions would bring the clearance within tolerance. If so if the valve guide is replaced, the valve seat must be refaced



5.5 Cylinder Head Assembly



- Lubricate each valve stem with oil.
- Insert the valves into guides.
- Install the valve springs, retainers and the cotters.



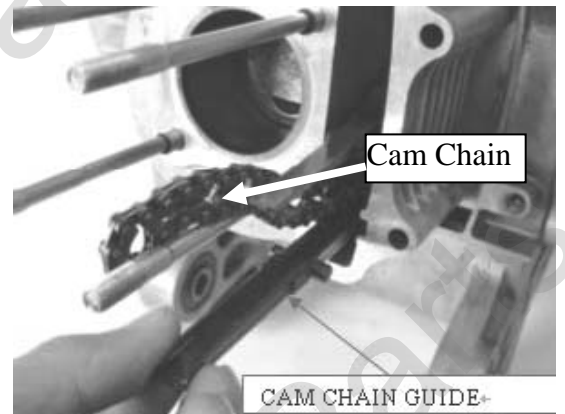
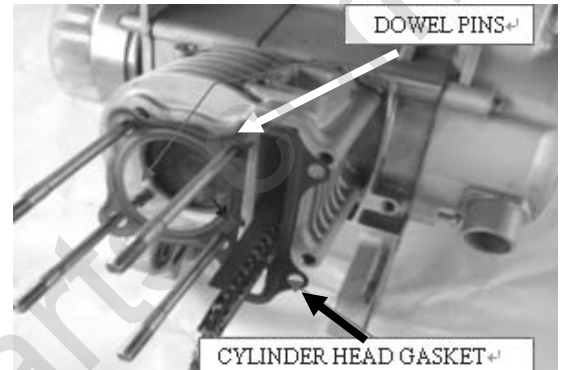
NOTE: To prevent loss of tension, don't compress the valve springs more than necessary.

Installation

Install the new gasket and dowel pins.

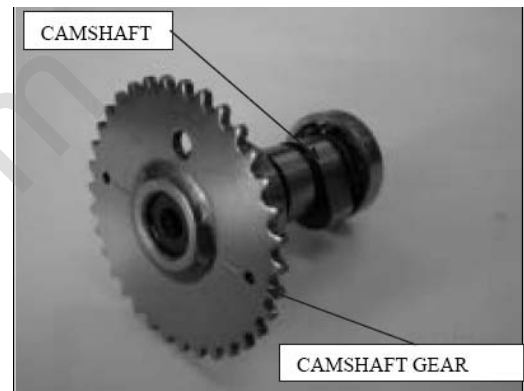
Install the cam chain guide.

Install the cylinder head.



Camshaft and Rocker Arm Installation

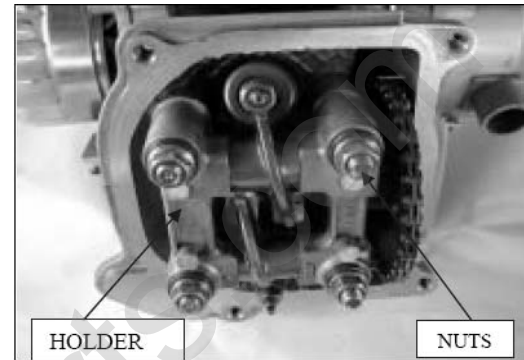
Install the cam shaft and cam chain.



Install the rocker arms and rocker arm shafts into the camshaft holder.



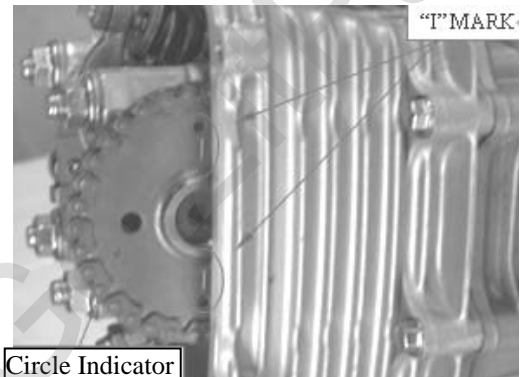
TORQUE: 15 N-m (10 lbf-ft)



Align the "T" mark on the flywheel with the index mark on the alternator cover by turning the flywheel counter-clockwise. This will indicate that the engine is at top dead center.



Position the camshaft gear with cam chain so that its "I" mark aligns vertically with the cylinder head surface and the circle points away from the cylinder head.

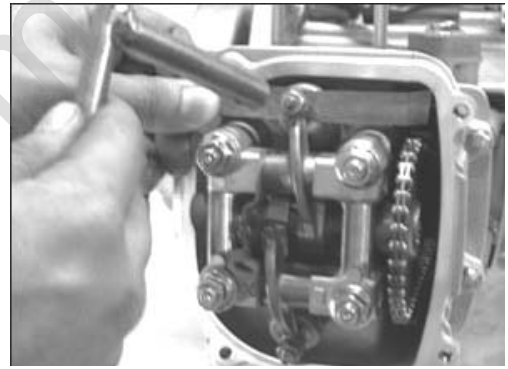




Using a feeler gauge, measure the clearance between the rocker arm and valve stem. Adjust if necessary.

Standard value: IN: 0.07mm / 0.0028"

EX: 0.07 mm / 0.0028"



Loosen the cam chain adjusting bolt by turning it in a counterclockwise direction. Install the O-ring and screw.



Install the cylinder head cover. Screw on and install the carburetor cap onto the carburetor.



6. CYLINDER & PISTON

6.1 Service Information



Camshaft lubrication oil is fed to the cylinder head through an oil hole in the cylinder head and engine case. Before installing the cylinder head make sure the hole is not clogged and the gasket, O-ring, and dowel pins are in place.

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I.D.	47.0~47.01	47.1	
	Taper	-----	0.05	
	Out of round	-----	0.05	
	Warpage across top	-----	0.05	
Piston Piston pin Piston rings	Piston O.D.	46.97~46.99	46.98	
	Piston pin bore	13.002~13.008	13.04	
	Piston pin O.D.	12.996~13	12.96	
	Piston-to-pin clearance	0.002 ~ 0.014	0.02	
	Piston ring-to-ring groove clearance	TOP/SEC	0.015~0.055	0.09
		TOP	0.1~0.25	0.45
	Piston ring end gap	SECOND	0.25~0.4	0.45
OIL		0.2 ~0.7	-----	
Cylinder-to-piston clearance		0.01~0.04	0.1	
Connecting rod small end I.D.		13.01~13.028	13.06	

Units in mm

6.2 Trouble Shooting

Low or unstable compression

- Worn cylinder or piston rings

Overheating

- Excessive carbon build-up on piston or combustion chamber wall.

Knocking or abnormal noise

- Worn piston and cylinder.
- Excessive carbon build-up.

Excessive smoke

- Worn cylinder, piston, or piston rings.
- Improper installation of piston rings.
- Scored or scratched piston or cylinder wall.
- Damaged valve stem seal.

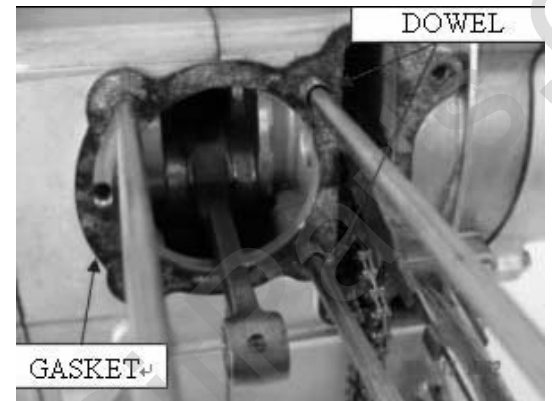
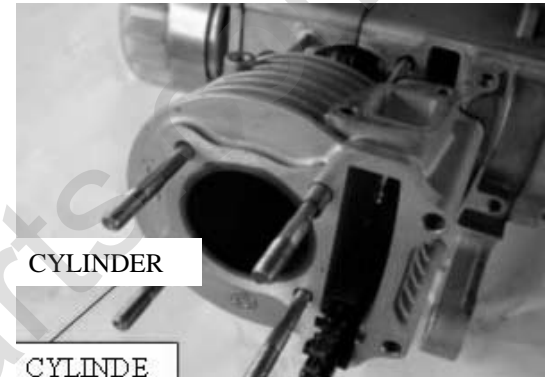
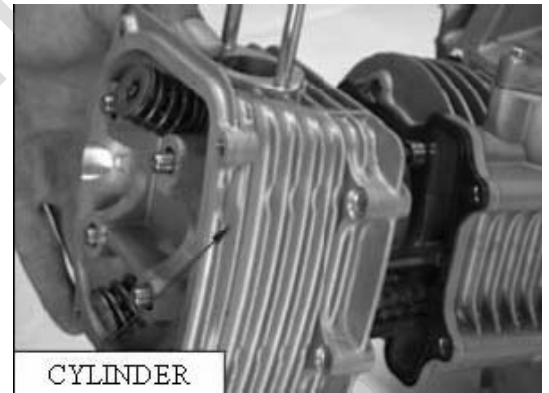
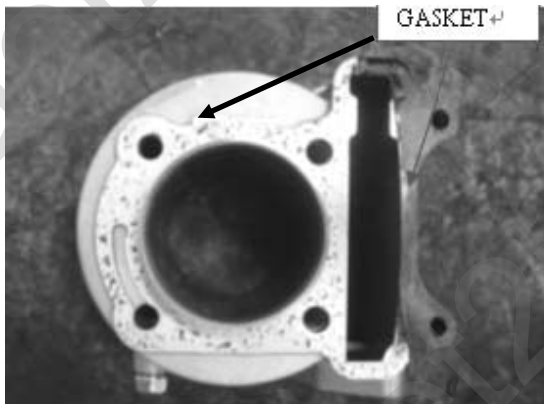
6.3 Cylinder & Piston Removal

1. Remove the seat, rear fender, and exhaust.
2. Remove the spark plug cap.
3. Disconnect the wiring.
4. Pull out the engine. (see engine removal – section 3)
5. Remove the air cleaner and carburetor.
6. Remove the intake pipe mounting bolts.
7. Remove the cylinder bolt nuts.
8. Remove the cylinder head.
9. Remove the cylinder *carefully*.
10. Remove one piston pin clip.
11. Remove the piston pin and piston.
12. Spread each piston ring and remove it by lifting up at a point just opposite the gap.



Caution: Don't let the clip or other foreign objects drop into engine crankcase

13. Remove the base gasket and dowel pins.
14. Clean off any gasket materials from the gasket surface. *Be careful not to damage the gasket surface.*

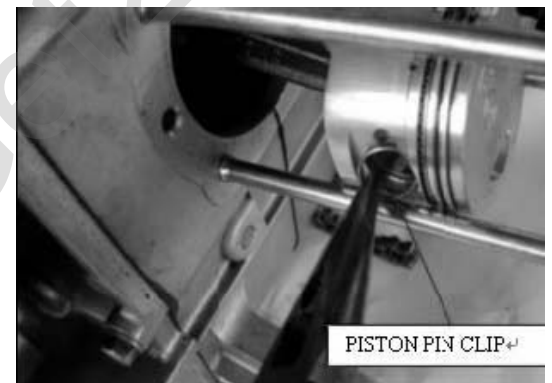


Piston Removal - Detailed

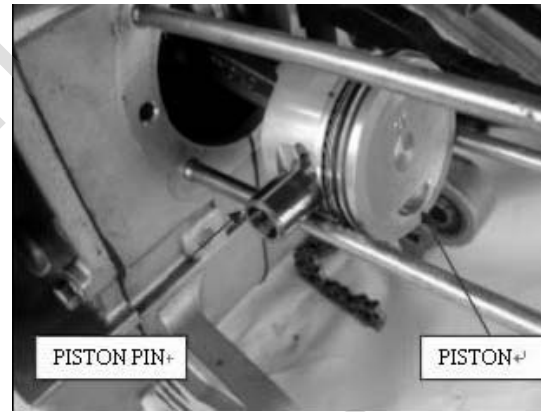
- Stuff a shop towel into the crankcase.
- Remove the piston pin clip with needle nose pliers.



Do not allow the clip fall into the crankcase.



- Remove the piston pin from the piston.
- Remove the piston.



Spread each piston ring and remove it by lifting up at a point opposite the gap.



Inspection

Inspect the cylinder walls for scratches or wear.



Measure and record the cylinder I.D. at three levels in both an X and Y axis. Take the maximum reading to determine the cylinder wear.



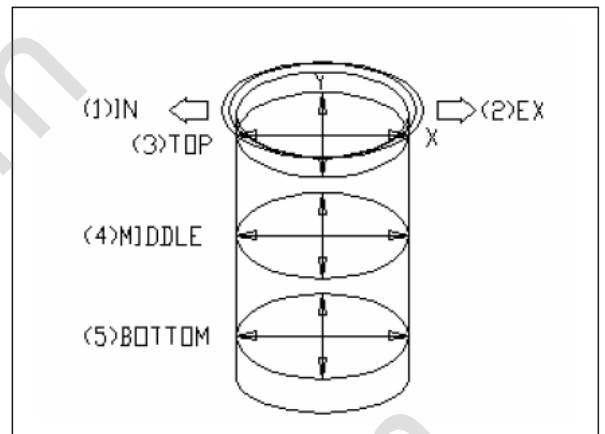
SERVICE LIMIT: 47.1 mm / 1.854"



Calculate cylinder taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.



SERVICE LIMIT: 0.05 mm / 0.00196"



Calculate the cylinder out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the out-of-round.



SERVICE LIMIT: 0.05 mm / 0.00196"

Inspect the top of the cylinder for warping.



SERVICE LIMIT: 0.05 mm / 0.00196"

Use a feeler gauge to determine the flatness.



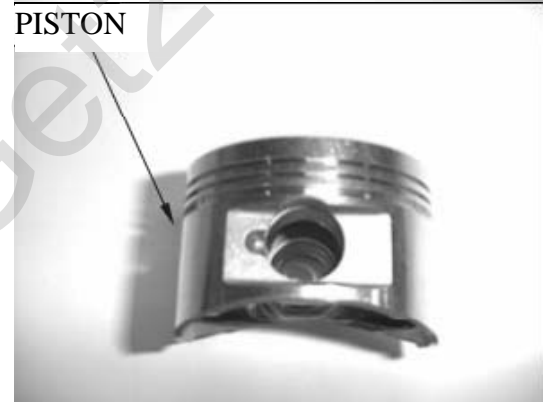
Measure the piston ring-to-groove clearance with a feeler gauge.



**SERVICE LIMITS: TOP 0.09 mm / 0.00354"
SECOND 0.09 mm / 0.00354"**



Inspect the piston for wear or damage.



Insert each piston ring into the cylinder and measure the ring end gap.



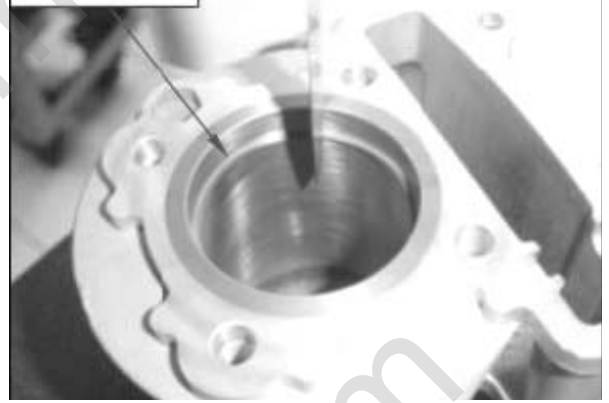
NOTE: Push the rings into the cylinder with the top of the piston to be sure they are squarely set in the cylinder.



SERVICE LIMITS: TOP 0.45 mm / 0.0177"
SECOND 0.45 mm / 0.0177"



PISTON RING↕



Measure the piston pin O.D.



SERVICE LIMIT: 12.98 mm / 0.511"

PISTON PIN↕



Measure the piston pin bore.



SERVICE LIMIT: 13.04 mm / 0.513"



Calculate the piston-to-piston pin clearance.



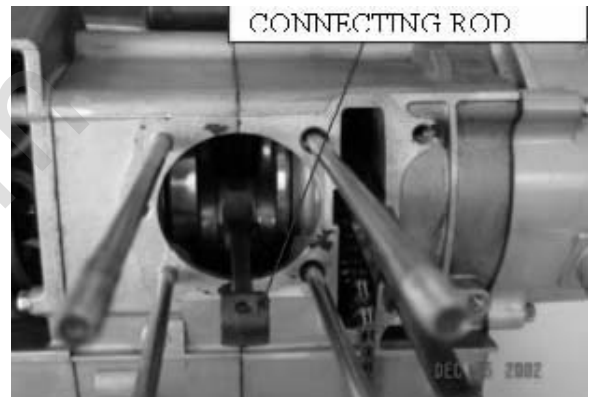
SERVICE LIMIT: 0.02 mm / 0.00079"



Measure the connecting rod small end I.D.



SERVICE LIMIT: 13.06 mm / 0.514"



6.4 Piston Installation

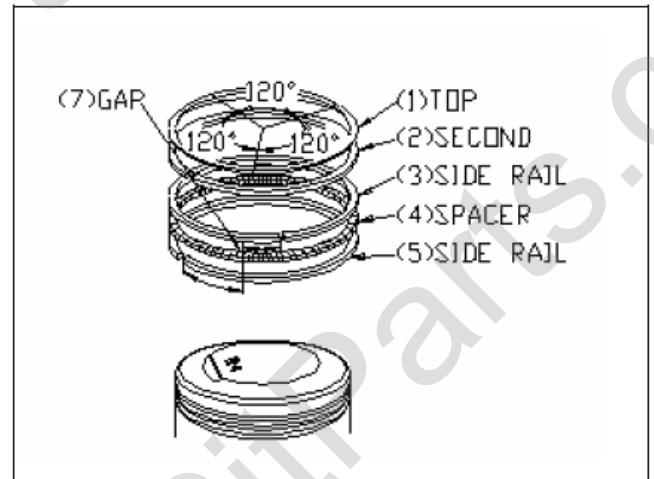
Clean the piston ring grooves thoroughly and install the piston ring with the mark facing up.



NOTE: Don't interchange the top and second rings.
Avoid piston and piston ring damage during installation.



Space the piston ring end gaps 120 degrees apart.



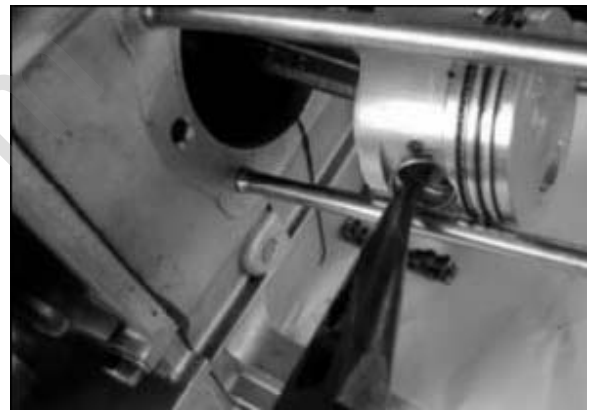
Install the piston with its "IN" mark on the intake valve side.



- Install the piston pin with new pin clips.
- Do not align the piston pin clip end gap with the piston cutout.



NOTE: Do not allow the clip to fall into the crankcase.

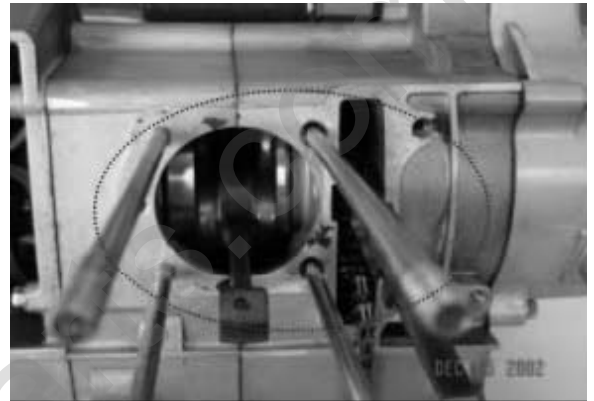


6.5 Cylinder Installation

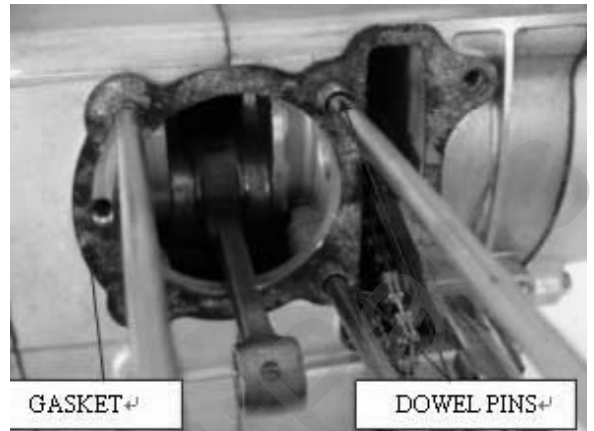
Clean any gasket material from the crank case surface.



NOTE: Be careful not to damage the gasket surface.



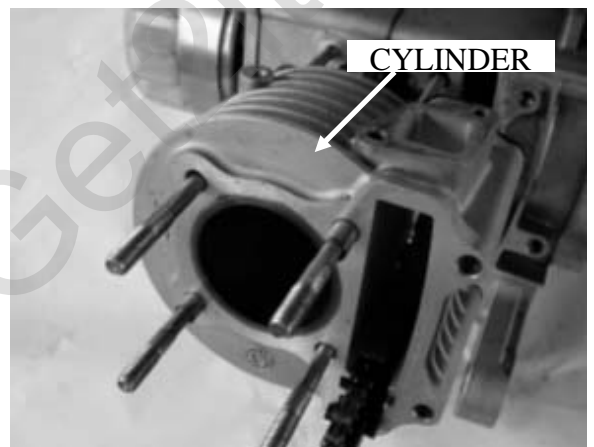
Install the dowel pins and a new gasket.



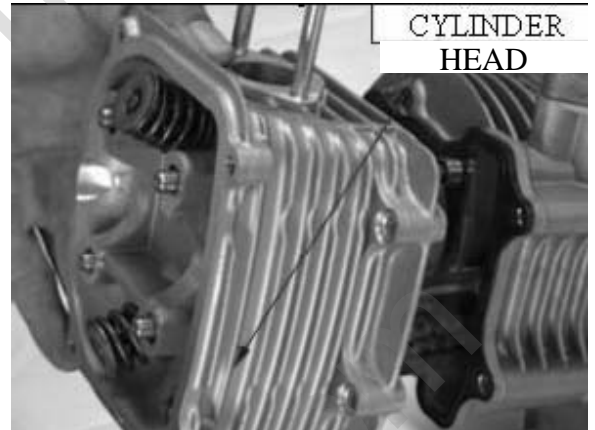
Coat the cylinder bore and piston rings with engine oil and install the cylinder.



NOTE: Be careful to not damage the cylinder wall surface when installing the piston rings. Use a screwdriver to hold the cam chain tightly. *Do not allow the cam chain to fall into the crankcase.*



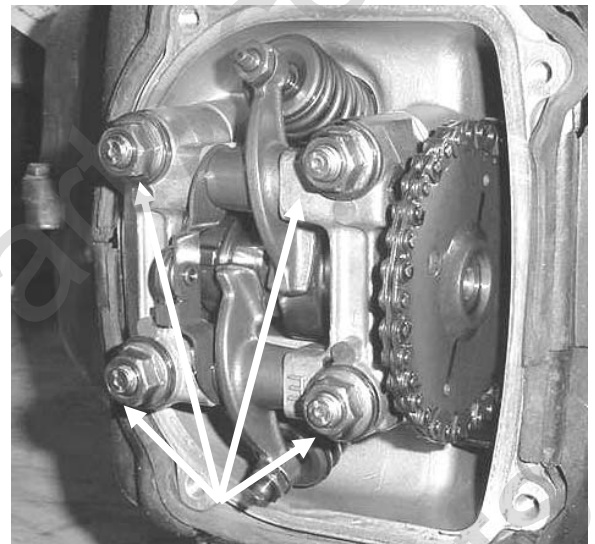
Install the cylinder head.



Torque the cylinder head nuts.



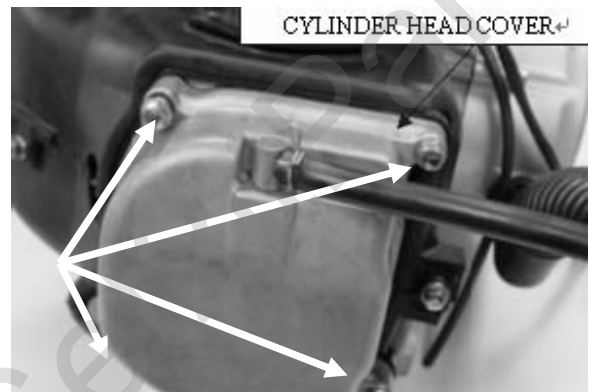
Torque value: 25 N/m (13.3 – 18.4 lbf-ft)



Install the cylinder head cover



Torque value: 30 N/m (14.8 - 22.1 lbf-ft)



7. TRANSMISSION SYSTEM

7.1 Service Information

Troubleshooting

Abnormal shifting or will not reset

- Abnormal speed limited function
- Faulty C.D.I.

Will not move after engine is started

- Faulty shift motor
- Faulty shift spring or gear
- Faulty sensor (F, N1)

Does not run at high speed

- Belt worn
- Front pulley worn or broken
- Clutch lining worn
- Faulty shift spring
- Rollers worn
- Rear pulley spring distorted

Sensor N2

Engine stop after successful shift

- Faulty sensor (F, N1)
- Faulty C.D.I.

Sensor R

Sensor N1

Sensor F

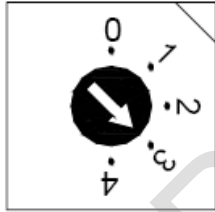
Specifications

ITEM	STANDARD	SERVICE LIMIT
Driven belt width	18	17
Weight roller O.D.	14.9~15.1	14.6
Movable drive face I.D.	20.989~21.052	21.24
Drive face boss O.D.	20.96~20.972	20.94
Clutch outer I.D	107-107.2	107.5
Clutch weight lining thickness	-----	2.0
Driven face spring length	87.9	82.6

Units in mm

7.2 Shift Mechanism (For RX4 90R) C.D.I.

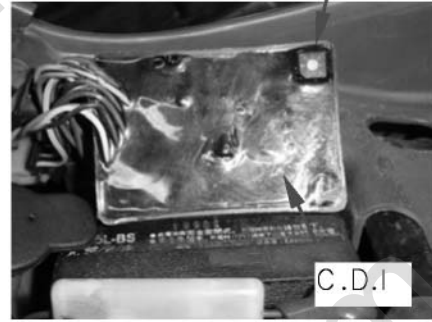
The C.D.I. is located below the seat. It includes the shift control system. Replace it if the control system is functioning improperly. There is also a speed-limit adjuster in the corner. Adjust speed-limited as follows:



Speed Limit Adjuster

Position	t
0	4900 ±50
1	5900 ±50
2	6900 ±50
3	8000 ±50
4	9500 ±50

Speed-Limited Adjuster



Sensor

Inspect wire for break or damage and check the contact. Measure sensor.

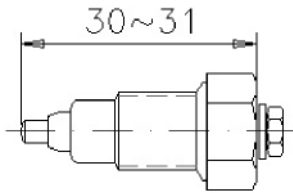


fig-1

If the length of the sensor is below 30mm (1.18 in), it must be replaced.

SERVICE LIMITS: 30 mm (1.18 in)



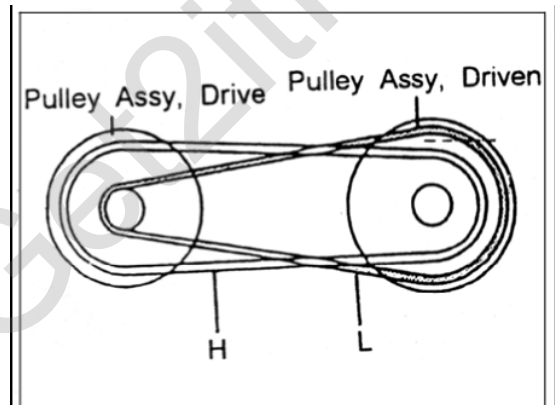
7.3 Automatic Variable Speed Transmission (C.V.T.)

This transmission is a combination of an automatic centrifugal clutch and V-belt continuous variable transmission, which changes the transmission ratio automatically.

When engine speed increases, the drive pulley will push the belt by centrifugal force from six rollers. This causes the pitch circle of the belt in the drive pulley to increase. The belt at the driven pulley is forced to move to the center of the shaft, causing the radius of the pitch circle to decrease.

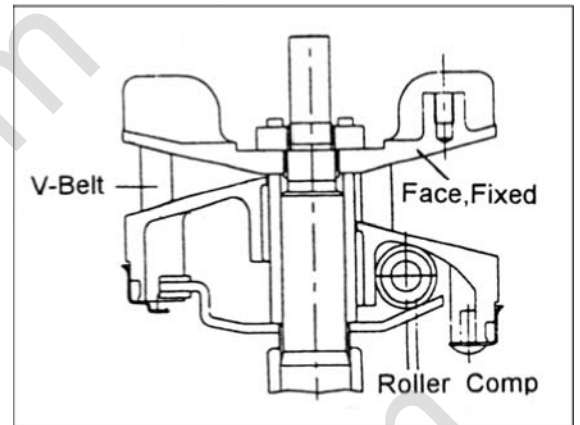
The transmission ratio is therefore altered by the alteration of the pitch circle's radius.

(NOTE: In the drawing, "H" means high speed; "L" means low speed.)



Driven Pulley

Because the revolving radius of the V-Belt at the Drive End is increased, the Face Comp Movable Drive is forced out by the V-Belt at the Driven End to shorten the revolving radius. There is a Torque Cam on the Movable Drive Face. The Torque Cam is loaded from outside. When the outside load is higher than the engine's output, the pulley of the fixed shaft and belt slip to make the Movable Drive Face move along the inner side of the Cam and compensate to increase to high torque (toward low speed) and makes the engine run smoothly.

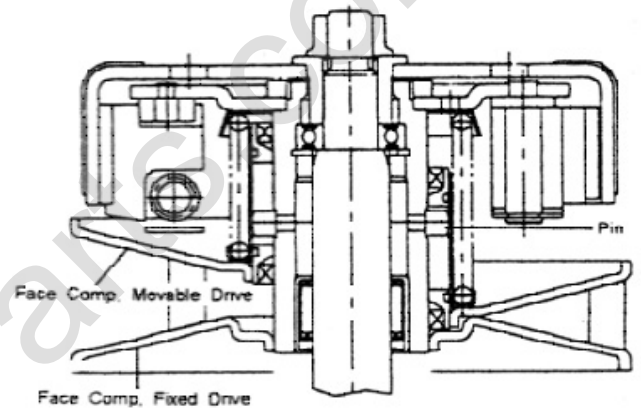


7.4 C.V.T. Belt

Made of rubber fiber, it is resistant to heat, pressure, and abrasion. The inner side of the belt is toothed to provide flexibility for radial diameter changes.

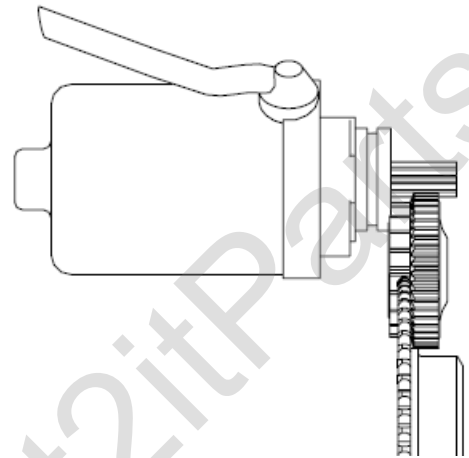
Drive Pulley

When the engine speed increases, the rollers push the movable drive face by centrifugal force. This applies pressure to the belt which increases its turning radius. The aluminum fan is installed on the exterior of fixed drive face. This creates an air flow through the C.V.T. case to remove excess heat caused by the friction of the drive belt.

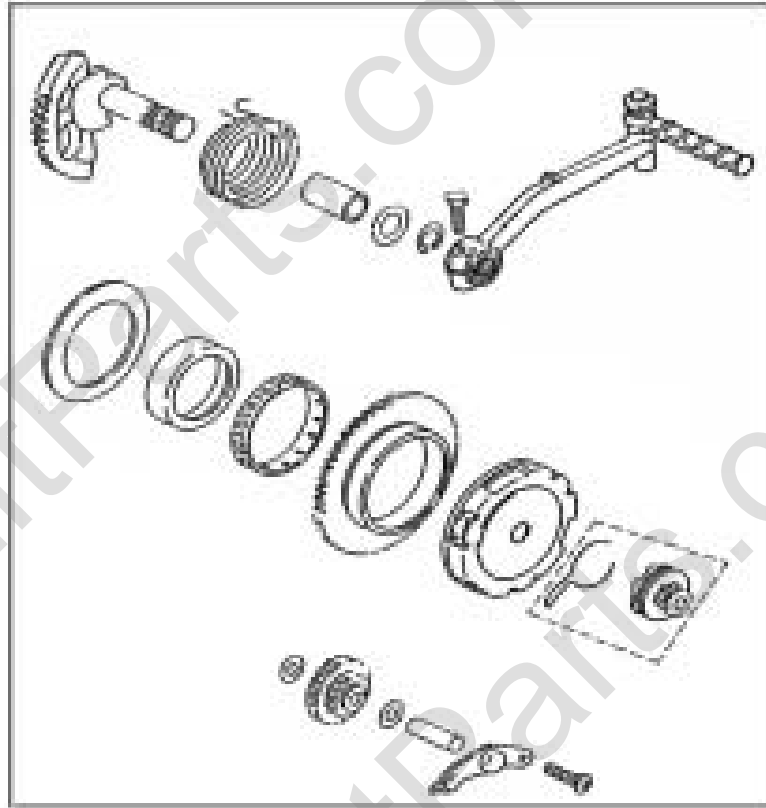


7.5 Electrical Starter Mechanism

The Starter Motor is installed on the upper side of engine. The starter motor can only be activated when the left hand brake is applied, the transmission is in neutral position, and the ignition switch is in the on position.



7.6 Kick Starter System



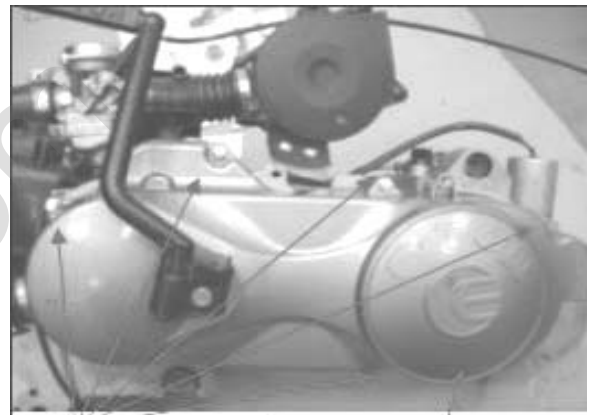
This kick-starter arm is on the left side of engine. When the kick-starter arm is kicked, the gear of the start shaft will drive the kick-starter to revolve the crankshaft to start the engine. After the engine is started, the kick-started will stop transferring the power to the kick-starter-driven gear. When the kick-starter lever is released, the kick-starter gear will go back to its original position.

7.7 C.V.T. Disassembly – (LH) Crankcase Removal

Loosen the band screw and remove the CVT inlet duct.



Remove the bolts and LH crankcase cover.

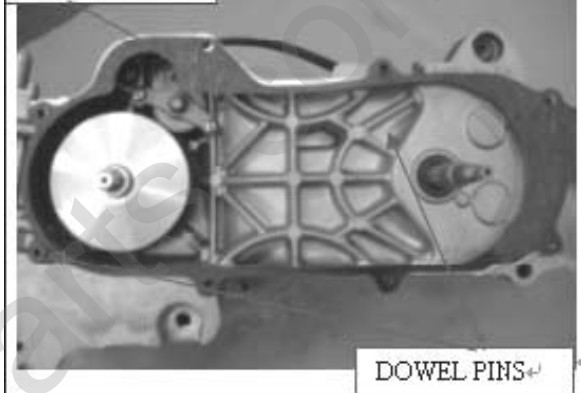


BOLTS*8+

L CRANK CASE COVER+

Remove the gasket and dowel pins. Clean off any gasket material from the LH crankcase surface.

GASKET+



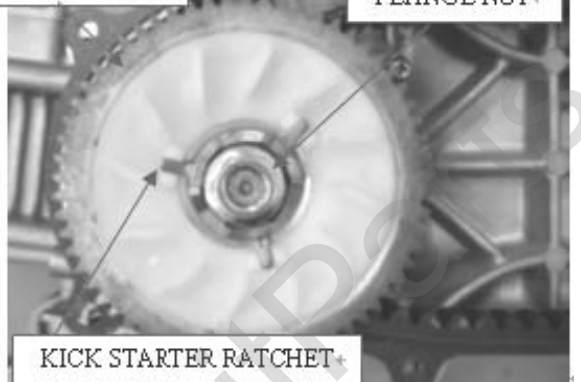
DOWEL PINS+

CVT Removal

- Loosen the flange nut and remove the kick-starter ratchet.
- Remove the drive face.

DRIVE FACE+

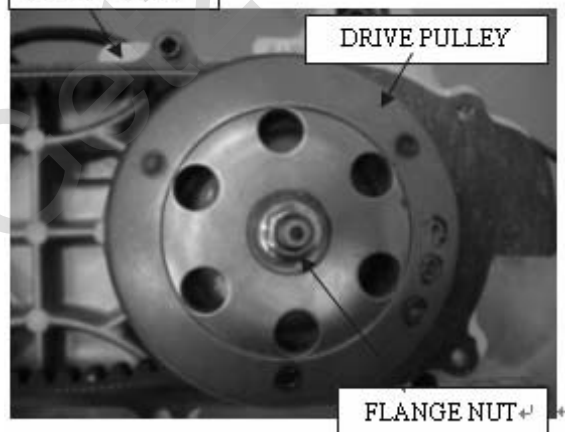
FLANGE NUT+



KICK STARTER RATCHET+

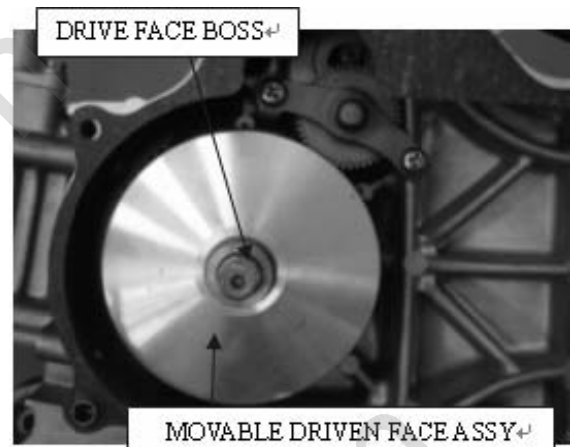
- Loosen the flange nut.
- Remove the drive pulley assembly and driven belt.

DRIVEN BELT+

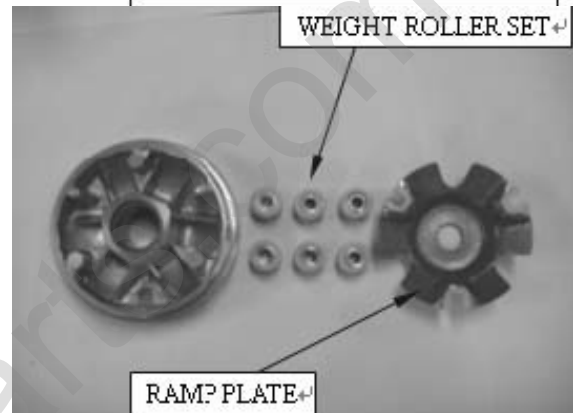


FLANGE NUT+

Remove the drive face boss and movable driven face assembly.



Remove the ramp plate and weight roller set.



Inspection

- Inspect the driven belt for wear, tearing, or damage.
- Measure the width of driven belt.



SERVICE LIMIT: 17.0 mm / 0.669"



- Inspect the weight roller for wear or damage and replace them if necessary.
- Measure the O.D. of weight rollers.



SERVICE LIMIT: 14.6 mm / 0.575"



- Measure the I.D. of movable driven face.



SERVICE LIMIT: 21.24mm / 0.836"

- Inspect the drive face collar for wear or damage.



- Inspect the drive face boss for wear or damage.
- Measure the O.D. of drive face boss.



SERVICE LIMIT: 20.94mm / 0.824"



- Inspect the clutch outer for wear or damage.
- Measure the I.D. of clutch outer.



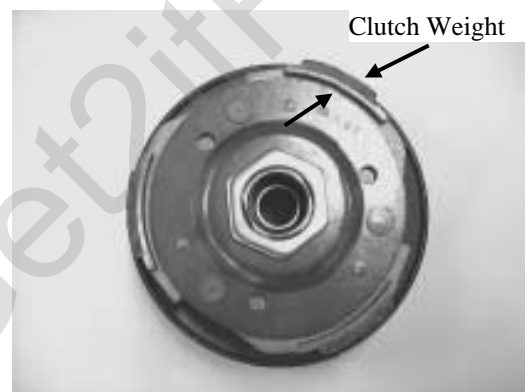
SERVICE LIMIT: 107.5 mm / 4.232"



- Inspect the clutch weight set for wear or damage.
- Measure the thickness of clutch weight lining.



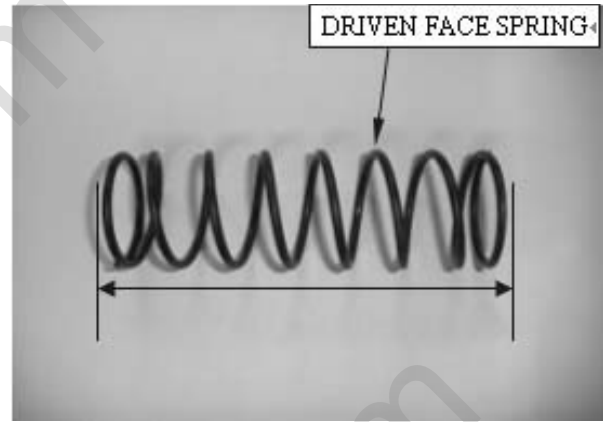
SERVICE LIMIT: 2.0mm / 0.0787"



Measure the length of driven face spring in a relaxed position.



SERVICE LIMIT: 82.6 mm / 3.25"

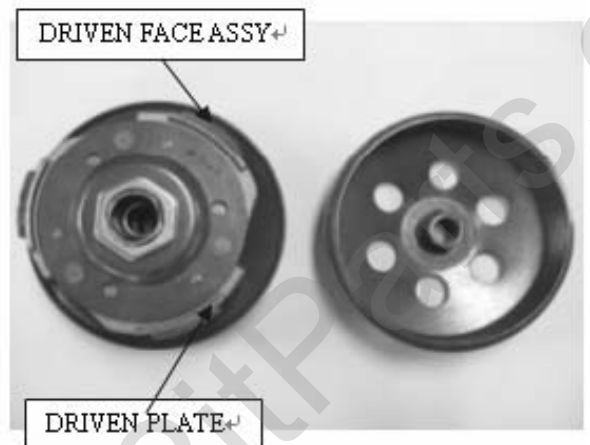


Inspect the driven face assembly and replace if necessary.

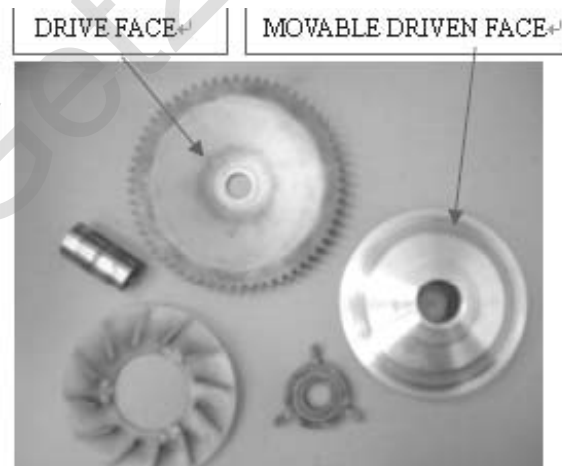


7.8 C.V.T. Reassembly

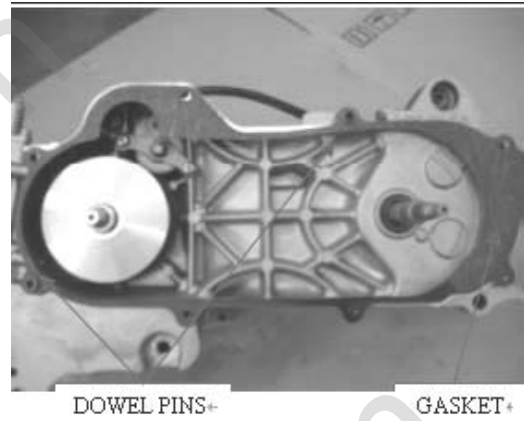
Assemble the driven face assembly, spring, and driven plate.



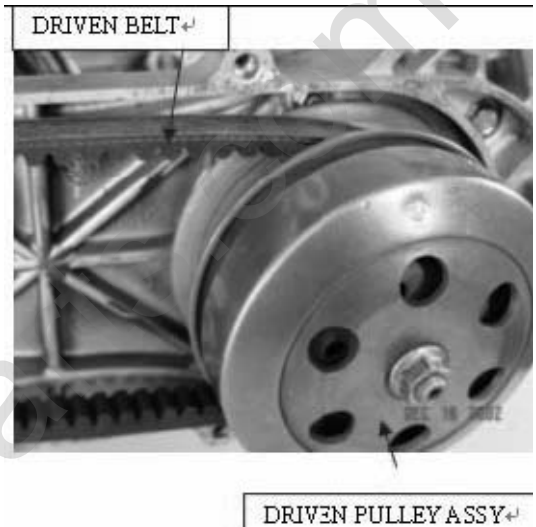
Assemble the movable driven face composition, weight roller set, and drive face.



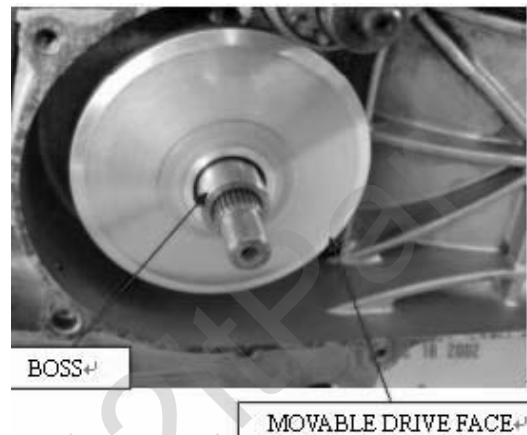
Install the dowel pins and gasket.



Install the driven belt and driven pulley assembly.



Install the movable drive face assembly and boss.



- Install the drive face and kick starter ratchet.
- Apply red Lock-Tite and torque the locking flange nut.



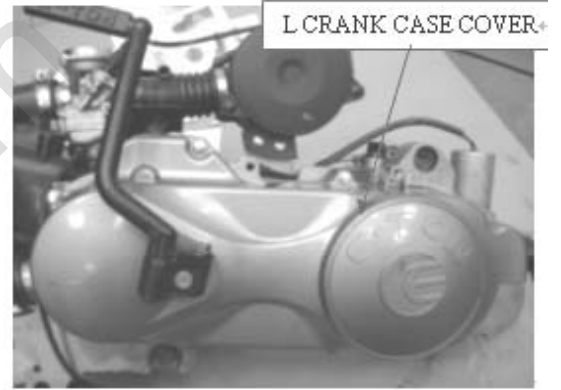
Torque: 27 N-m (20 lbf-ft)

- Install the LH crankcase cover and kick crank assembly.



7.9 Kick Starter Disassembly

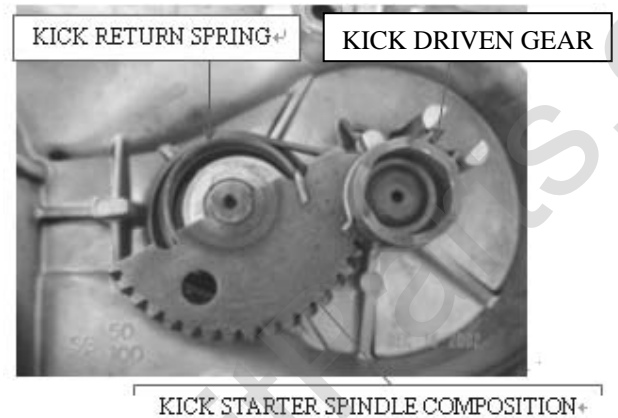
- Remove the LH crankcase cover.
- Remove the kick crank assembly.



Remove the exterior cir clip and washer from the kick starter spindle shaft assembly (as shown in picture).



- Rotate the kick starter spindle composition to remove the kick driven gear and spring.
- Remove the kick starter spindle composition and return spring.
- Remove the kick spindle bushing.

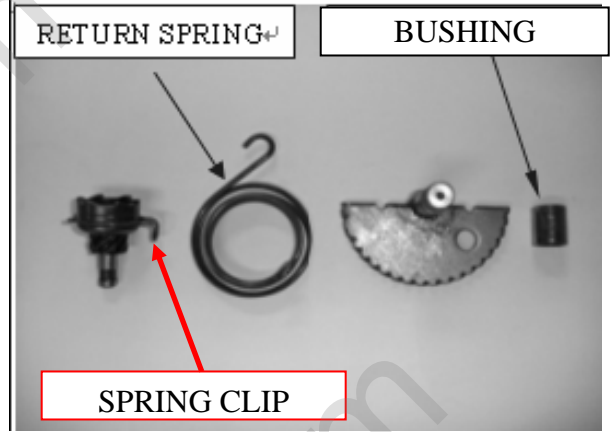


Inspection

Inspect the kick starter spindle assembly for wear or damage.



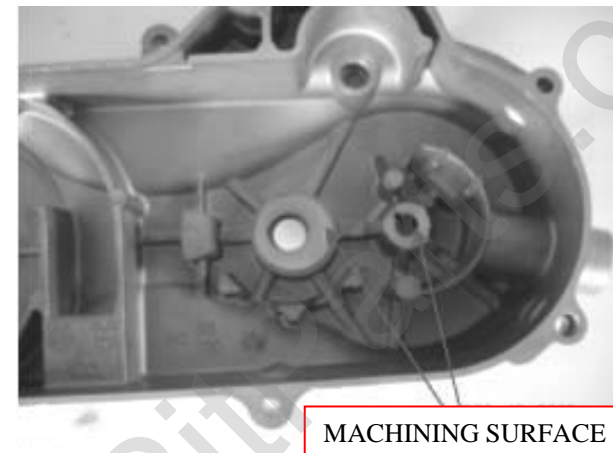
- Inspect the kick return spring for wear or damage.
- Inspect the kick spindle bushing for wear or damage.



Inspect the kick driven gear and spring for wear or damage.

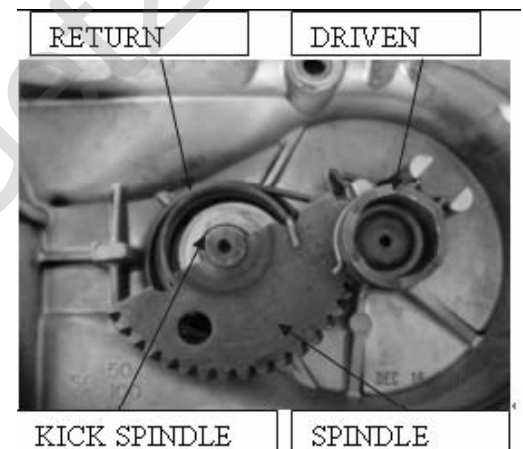


Inspect the machining surface for wear or damage.



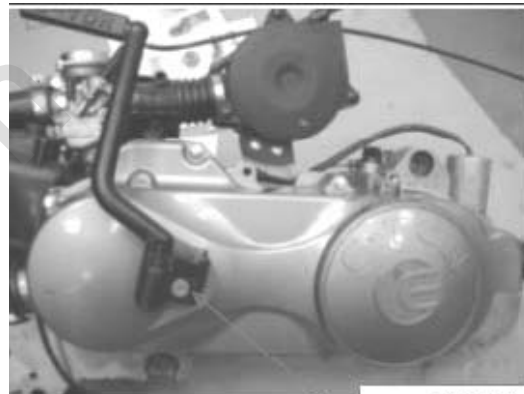
7.10 Kick Starter Reassembly

- Install the kick spindle bush, return spring, and spindle assembly.
- Install the kick driven gear and spring.



Install the LH crankcase cover and gasket.

- Install the kick starter.



KICK

8A. TRANSMISSION GEAR SET

8A.1 Service Information

- For transmission repairs, the engine must be removed from the frame.
- Drain oil from the transmission case before disassembly. Refill with recommended oil after reassembly.
- Always bring the vehicle to a full stop before shifting into forward or reverse.
- Shifting while in motion can cause damage to the transmission gears.

8A.2 Trouble Shooting

Difficulty shifting

- Shift fork bent
- Shift fork shaft bent
- Speed too high

Transmission jumps out of gear

- Gear indicator worn
- Shift fork bent or damaged

Excessive noise from gears

Worn transmission gear

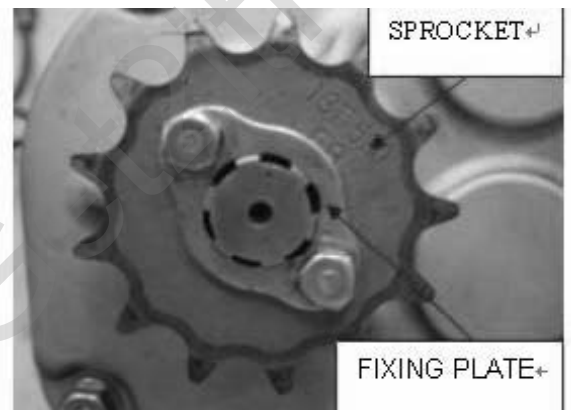
8A.3 Gear Removal



Remove the drain bolt to drain the oil from the transmission case.



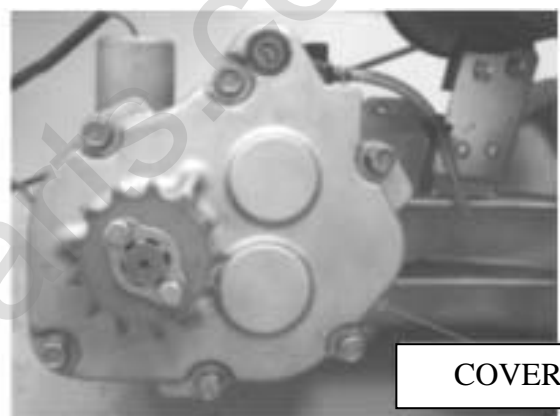
Remove the fixing plate bolts, fixing plate, and sprocket from the final shaft.



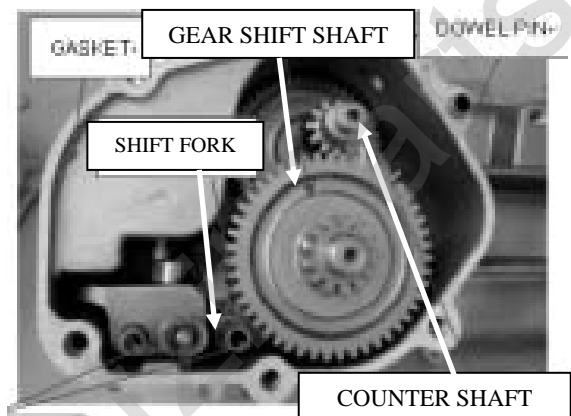
Remove the cir clip. Then, the final shaft can be removed from the transmission cover.



Loosen the bolts and remove the transmission cover.



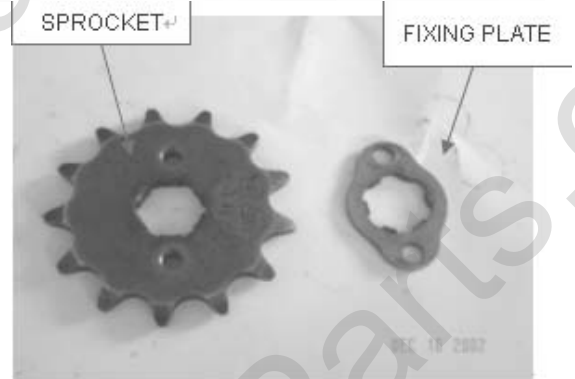
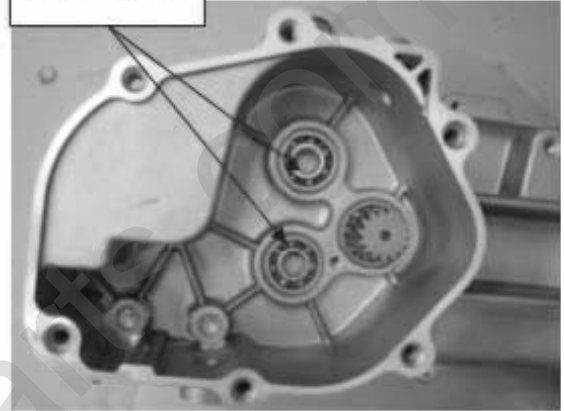
Remove the dowel pins and gasket. Disassemble the transmission. Inspect and clean.



8A.4 Gear Set and Bearing Inpection

Turn the inner race of the bearing with your finger.

- The bearing should turn smoothly and quietly, with no restrictions.
- Ensure that the outer races of the bearings fit tightly in the crankcase.
- Replace the bearings if necessary.



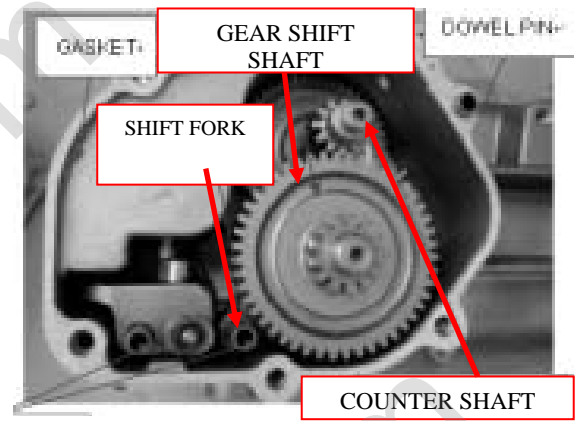
Check the sprocket and fixing plate for wear or damage. Replace if necessary.

8A.5 Gear Set Installation

Install the transmission cover and final shaft. Secure in place with the cir clip.



- Install the counter shaft and reverse shaft in the LH crankcase.
- Install the gear shift shaft and shift fork.
- Install a new gasket and dowel pins.

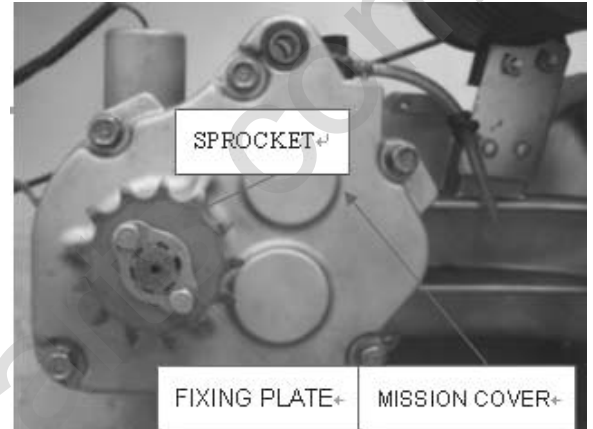


Assemble the transmission cover, sprocket, and fixing plate.



Fill the transmission cover with the recommended oil.

70/70M - 100cc / 3.4oz
 90R - 300cc / 10.2oz



8B. SHIFTING GEAR BOX

8B.1 Service Information

- For transmission repairs, the engine must be removed from the frame.
- Drain oil from the transmission case before disassembly. Refill with recommended oil after reassembly.
- Always bring the vehicle to a full stop before shifting into forward or reverse. Shifting while in motion can cause damage to the transmission gears.

8B.2 Trouble Shooting

Engine dies after shifting

- Faulty CDI
- Faulty shift motor
- Faulty F/N/R sensor
- Faulty shift spring or gear
- Faulty A/C generator

No power when throttle applied

- Belt worn
- Front pulley worn or broken
- Lining of clutch worn
- Faulty shift spring

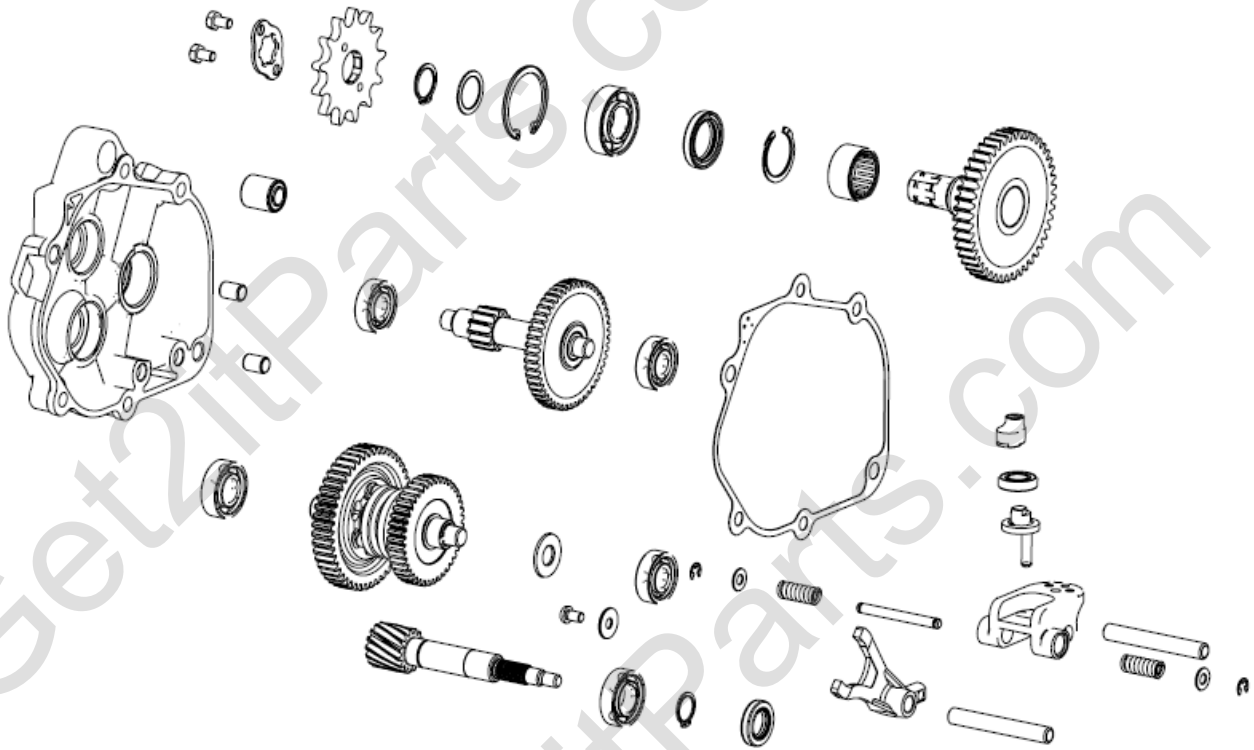
Unit runs poorly at high speed

- Belt worn
- Rollers worn
- Rear pulley spring damaged

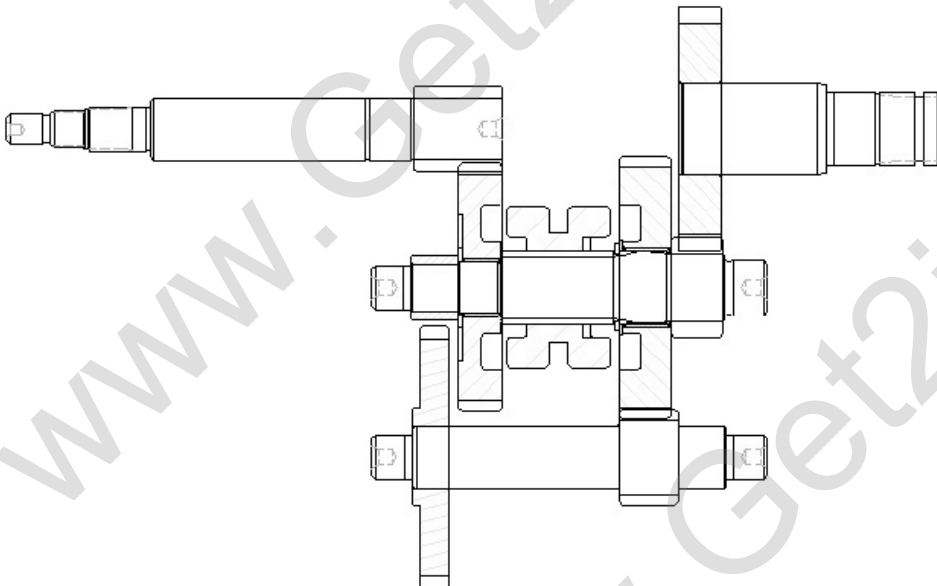
Rev limiter is malfunctioning

- Faulty CDI

8B.3 Transmission Assembly Drawing



Shift Mechanism



8B.4 Shift Mechanism

Gear box disassembly

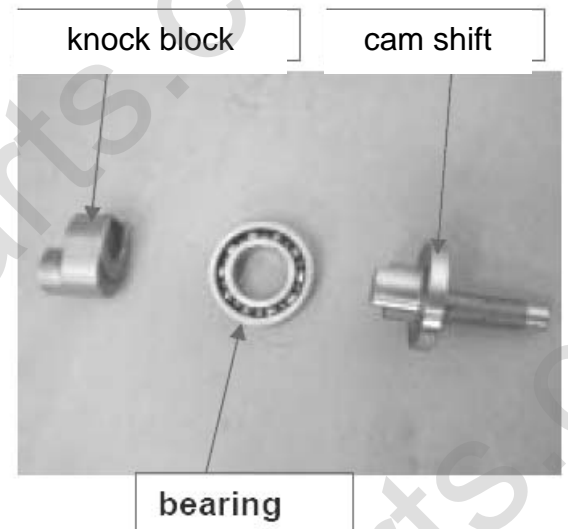
- Remove the transmission cover and gears
- Remove and inspect the shift push, fixed shaft, and for
- Measure the fixed shift spring.



SERVICE LIMIT: 24mm / 0.945"



Check the knock block, bearing, and cam shift for wear or damage. Replace if necessary.

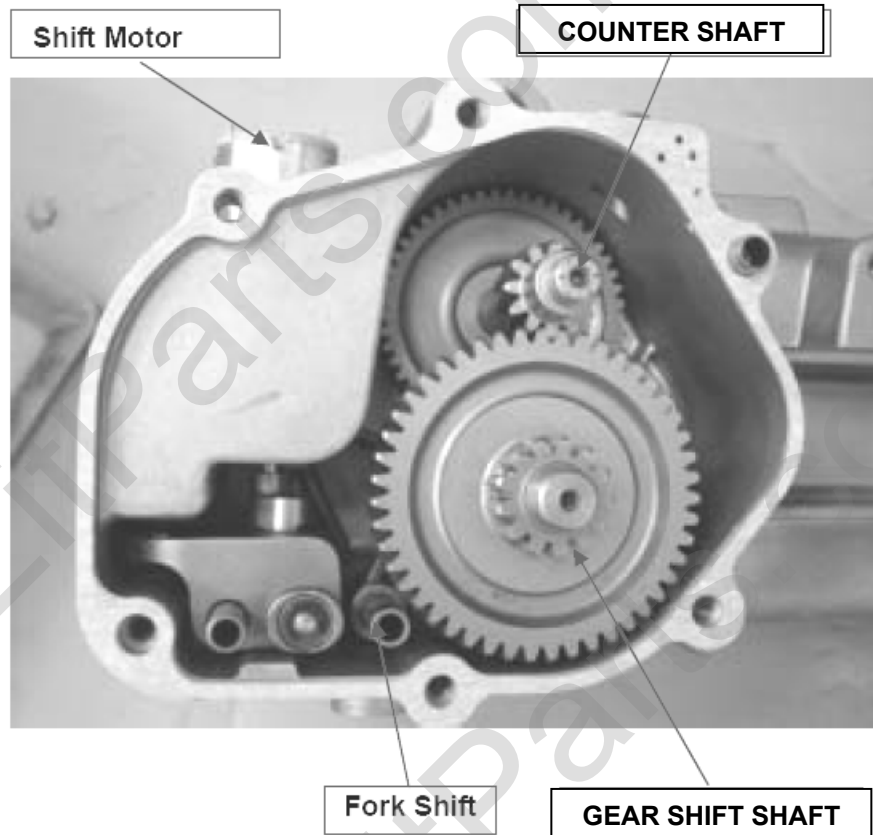


Check the shift motor for proper functionality by referring to this table:

	Voltage(v)	Current(mA)	torque (kg-cm)	rpm
loaded	12	≤800	6.0	54
No load	12	≤390	---	60



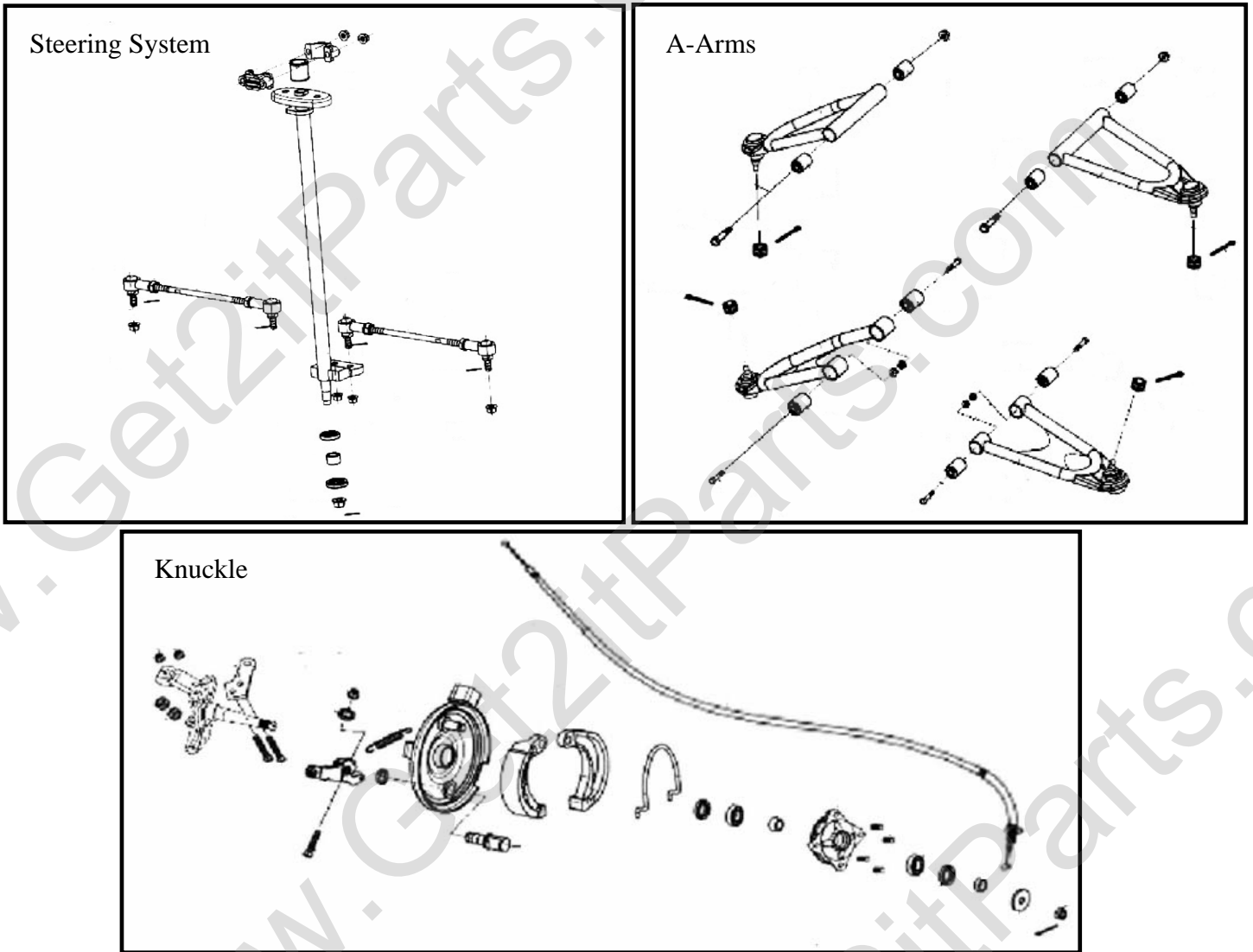
8B.5 Gear Box Assembly



- Remove the transmission cover and gears.
- Inspect gears for wear, scoring, chipping, or breaking. Replace if necessary.

9. STEERING SYSTEM

9.1 Steering System Drawing



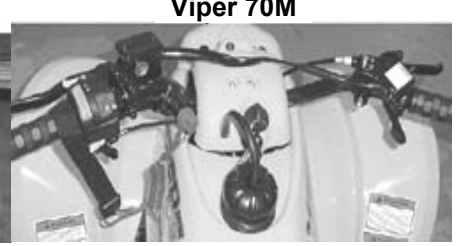
9.2 Trouble Shooting

Hard Steering

- Faulty tire(s)
- Steering shaft holder too tight
- Insufficient tire pressure
- Faulty or damaged steering shaft bearings

9.3 Handlebar Removal

Remove the throttle lever housing on the right handle bar. Then, remove brake lever bracket.



INSTALLATION

- Place the handlebar on the lower holders.
- Make sure to align the handlebar punch mark with the tops of the handlebar lower clamps.
- Install the handlebar upper clamps with the L or R marks facing forward.
- Tighten the front bolts first, and then the rear bolts.
- Install the handlebar upper clamp cover.
- Install the switch housing, aligning the boss with the hole. Tighten the upper screw first; then, tighten the lower one.
- Install the rear brake lever bracket, aligning the boss with the hole. Tighten the screw securely.
- Align the split line of the throttle housing and holder with the punch mark. Tighten the screw securely.



9.4 Steering System Removal

- Remove the front wheels and brake plates.
- Remove the carter key and the two self-locking nuts from the tie rod ball joint ends.
- Remove the tie rod.

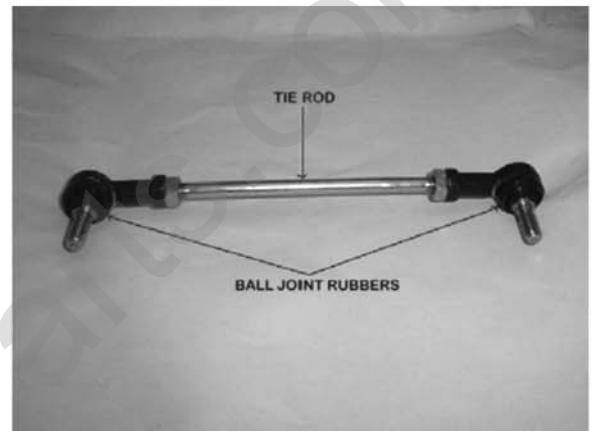


- Remove the rubber cap on the kingpin and remove the cotter pin.
- Unscrew the castle nut and remove the kingpin.



TIE-ROD INSPECTION

- Inspect the tie-rod for damage or bending.
- Inspect the ball joint rubbers for damage, wear or deterioration.
- Turn the ball joints with fingers. The ball joints should turn smoothly and quietly.
- Replace as needed.



KINGPIN INSPECTION

- Inspect the kingpin for damage or cracks.
- Measure the kingpin outer diameter.

Upper minimum limit: 15.40 mm (0.606 in")

Lower minimum limit: 16.90 mm (0.665 in")

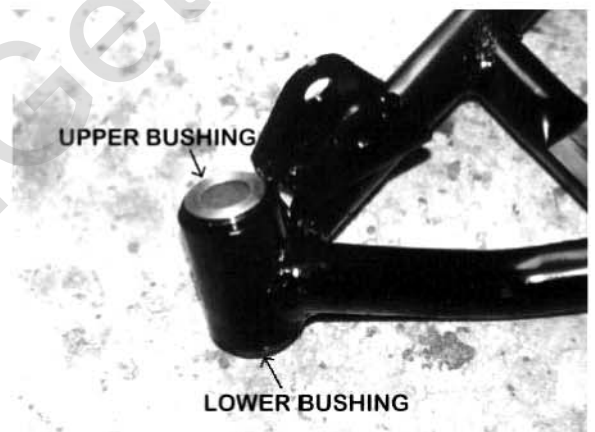


KINGPIN BUSHING INSPECTION

There are two bushing in the sleeve of front swing arm, the upper and lower bushing. Check the kingpin bushings for wear or damage. Measure the inner diameter of the bushings.

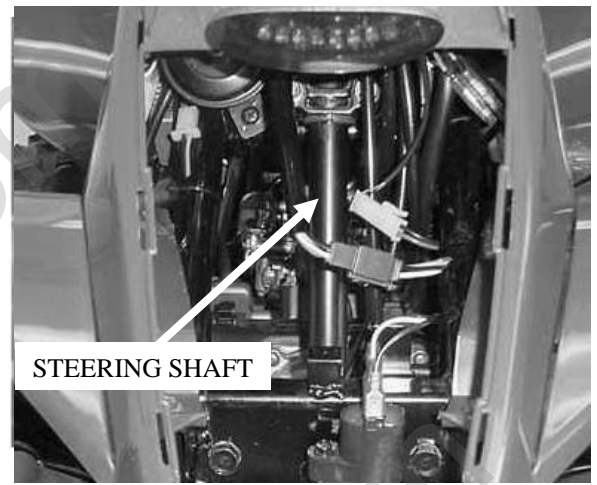
Upper minimum limit: 15.69 mm (0.618 in")

Lower minimum limit: 17.19 mm (0.677 in")



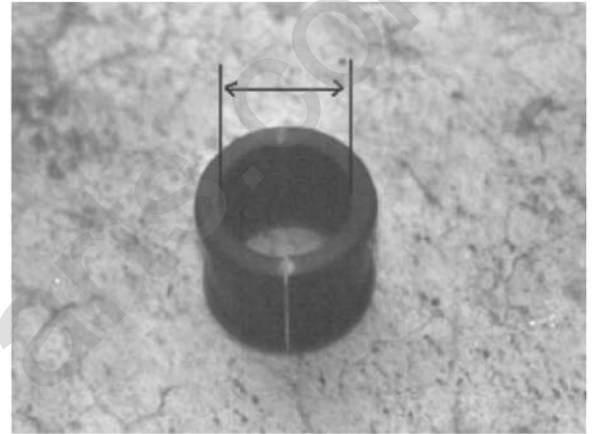
STEERING SHAFT REMOVAL

- Remove the handle bar and handle bar cover (see paragraph 8-1).
- Remove the front fender (see section 11-1).
- Remove attaching nut from the bottom of the steering shaft.
- Pull steering shaft carefully.



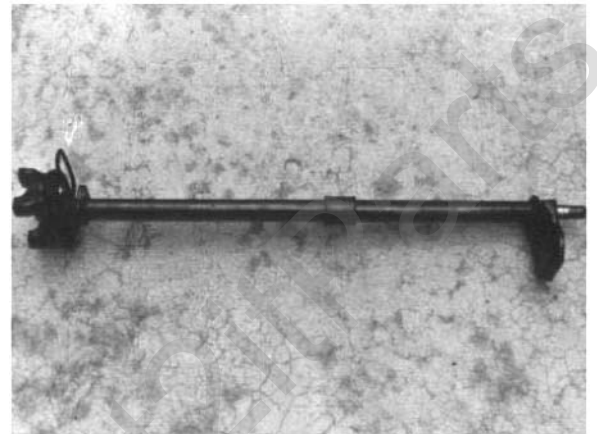
BUSHING INSPECTION

- Remove the steering shaft.
- Remove the bushing from the shaft.
- Inspect the bushing for damage or wear, replace if necessary.
- Measure the bushing inner diameter. Maximum limit: 22.8 mm (0.898 in")



STEERING SHAFT INSPECTION

- Inspect the steering shaft for damage or cracks. Measure the steering shaft outer diameter at the bushing seat.
- Minimum limit: 22.0 mm (0.866 in")



STEERING SHAFT BEARING INSPECTION

- Turn the shaft bearing with your finger.
- The bearing is on the front part of frame. It should turn smoothly and quietly.
- Inspect the bearing races for wear or damage and for proper fit.
- Replace the bearing if necessary.

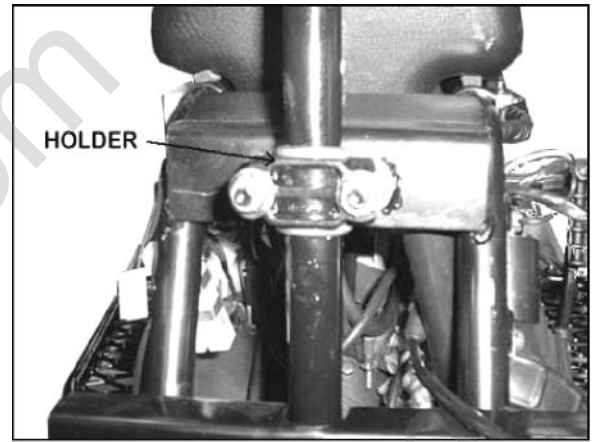


INSTALLATION OF STEERING SHAFT

- Apply grease to the steering shaft bushing.
- Insert the steering shaft through the bushing.
- Ensure the shaft is properly seated in the bearing at the bottom of the shaft.



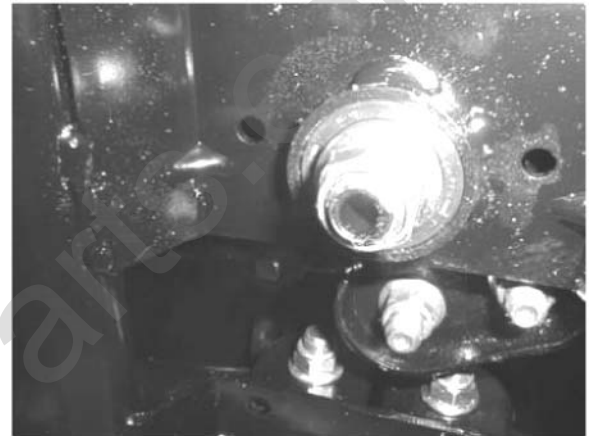
Torque: 24-30 N/m (17-22 lbf-ft)



Install the steering shaft nut at the bottom of the steering shaft and tighten it.

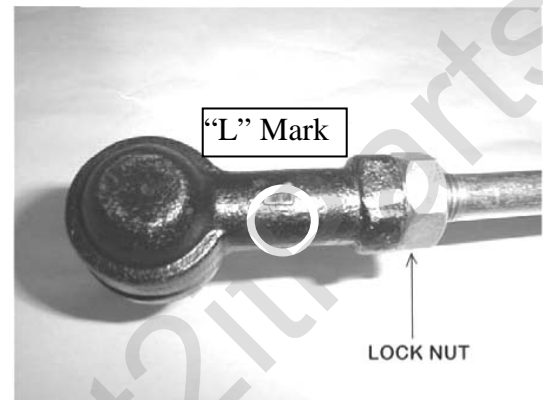


Torque: 50-60 N/m (37-44 lbf-ft)

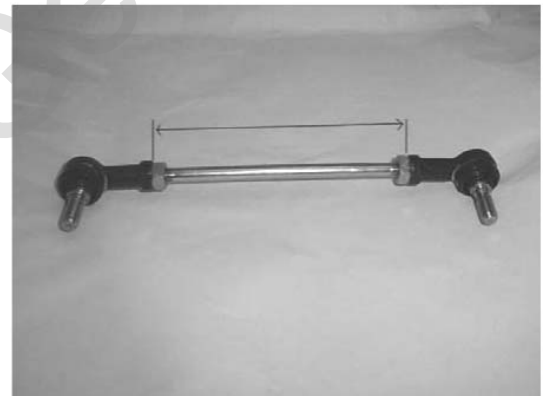


INSTALLATION OF TIE-ROD

- Install the ball joint with the “L” mark on the steering shaft side.
- Install the tie-rod with the mark on the wheel side.



Set the distance between the ball joints to 164 mm (or 6.46 in). This is a temporary setting.



INSTALLATION OF KINGPIN

- Apply grease on the kingpin lower dust seal lips and install.
- Grease the bushing and install the kingpin.
- Tighten the kingpin nut.
- The torque setting is 30-40 N/m (2.06-2.74 lb/ft).
- Fix the waterproof rubber cap.



- Temporarily set the distance to 147mm (or 5.79 in) between the ball joints.

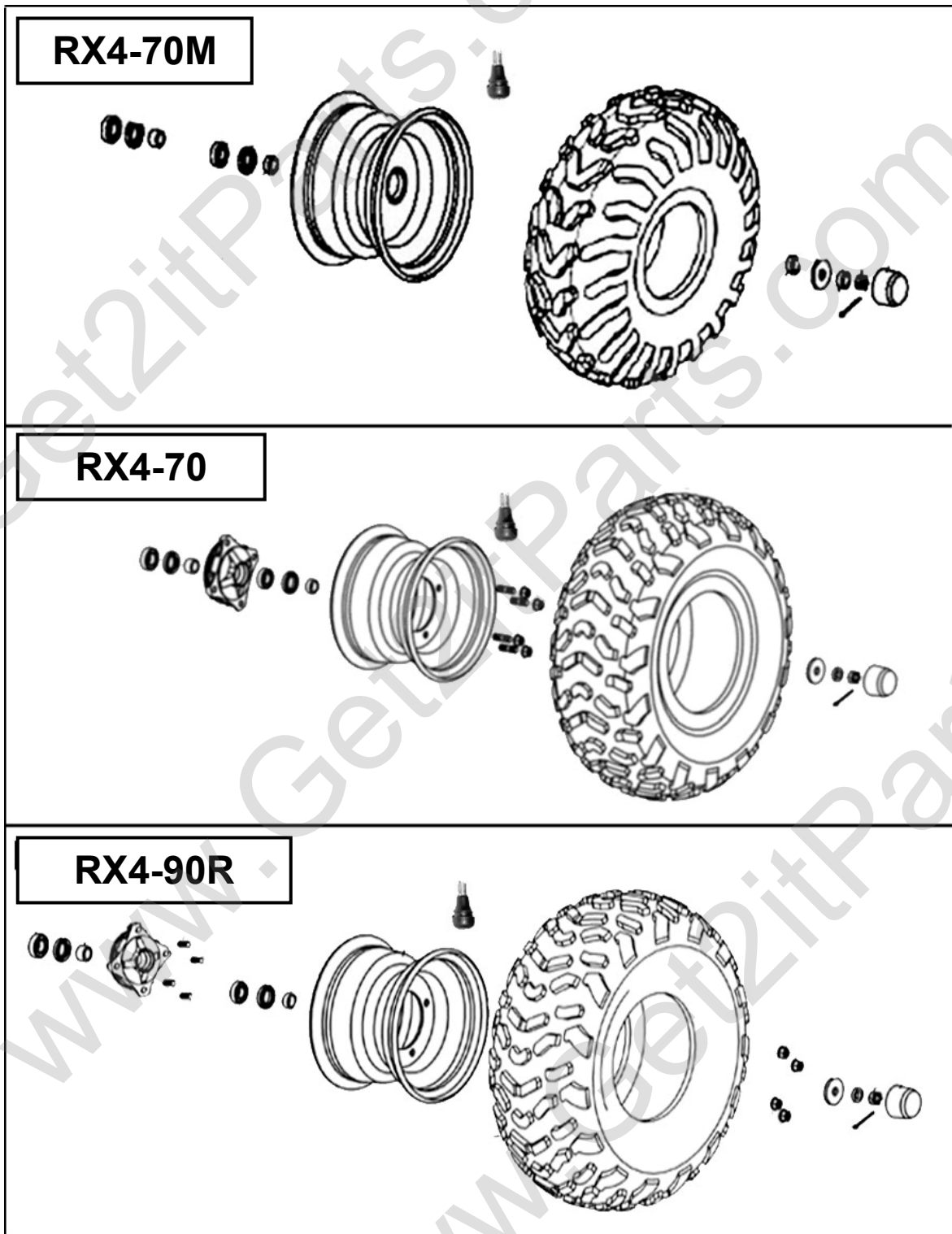


- Install the tie-rod and tighten the nuts.
- The torque setting is 35-43 N/m (or 2.40-2.95 lb/ft).
- Install the front brake.
- Install the front wheel.
- Adjust the toe in.



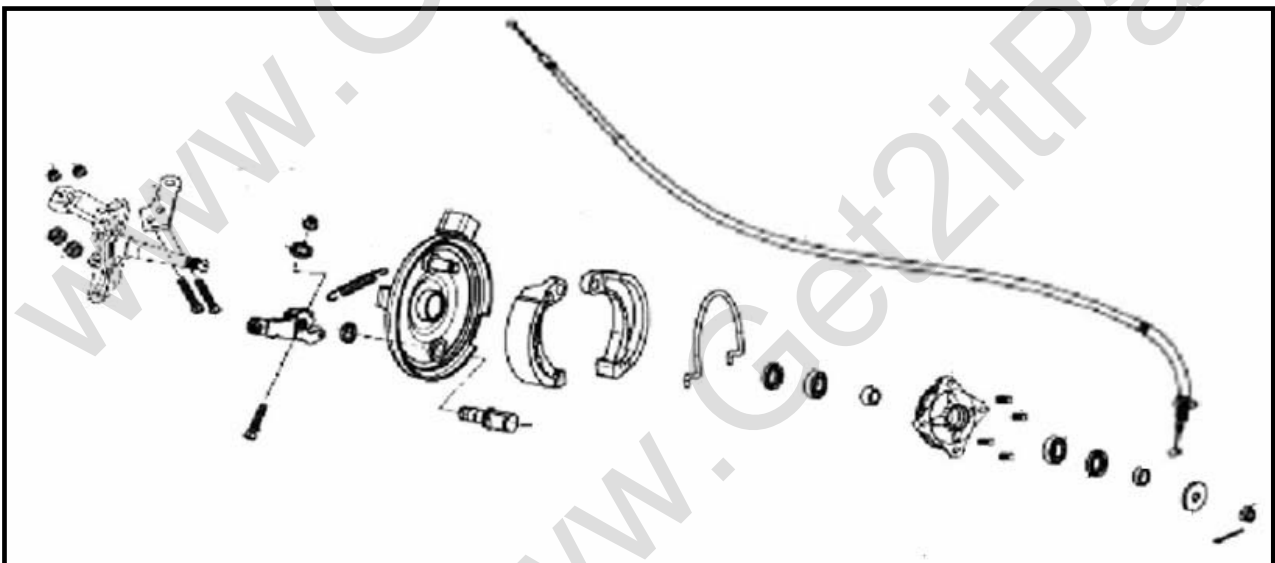
10. FRONT WHEELS AND TIRES

10.1 Front Wheel System Drawings



10.2 Trouble Shooting

<p><u>FRONT WHEEL WOBBLING</u></p>	<ul style="list-style-type: none"> • Damaged Tire • Bent Wheel Rim • Worn Front Brake Drum • Loose Axle Nut • Improper Brake Adjustment • Worn or Damaged Wheel Bushings and/or Spacers • Bent or Damaged Spindle Axle • Worn or Damaged A-Arm Bushings
<p><u>BRAKE DRAG</u></p>	<ul style="list-style-type: none"> • Improper Brake Adjustment • Worn or Damaged Brake shoes • Worn or Damaged Brake Drum • Foreign Material, (Sand or Mud), in Brake Drum • Rusted Brake • Drum Worn or Damaged Brake Return Spring
<p><u>POOR BRAKE PERFORMANCE</u></p>	<ul style="list-style-type: none"> • Worn Brake Shoes • Worn or Damaged Brake Drum • Brake Lining Contamination <ul style="list-style-type: none"> ● Oil ● Grease ● Dirt ● Mud ● Water • Improper Brake Adjustment • Brake Cable Damaged, Bent, Kinked, or Under Lubricated • Worn or Damaged Brake Return Spring



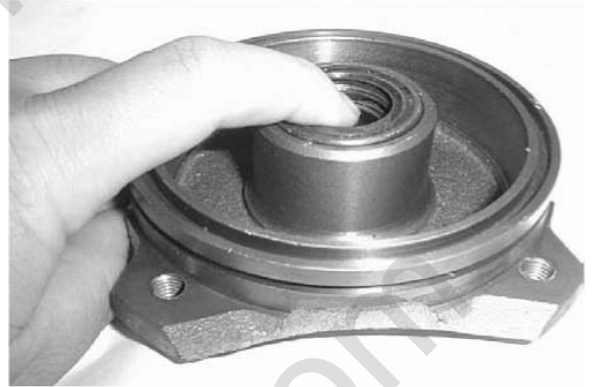
10.3 Front Wheel System

REMOVAL

Raise the front wheels off the ground by placing a block under the frame.

Remove:

- Rubber Dust Cover
- Cotter pin
- Castle Nut
- Axle Washer
- Wheel



INSTALLATION

Install components in this order:

- Oil Seal
- Bearing
- Inter Spacer
- Bearing
- Oil Seal
- Outer Spacer
- Wheel Rim
- Outer Spacer
- Axle Washer
- Castle nut : Torque 30-35 N/m (22.1-25.8 lbf-ft)
- Cotter Pin (New Cotter Pin recommended)
- Rubber Dust Cover



10.4 Front Brakes

FRONT BRAKE INSPECTION (Note: does not apply to RX4-70M)

Remove the front wheel (Section 10.3)

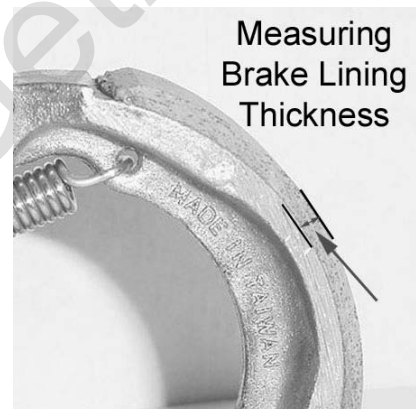
Remove the brake drum.



Measure the brake lining thickness at its thinnest point
The minimum limit: 1.5 mm (0.06")



Replace brake shoes if measurement is below service standard.

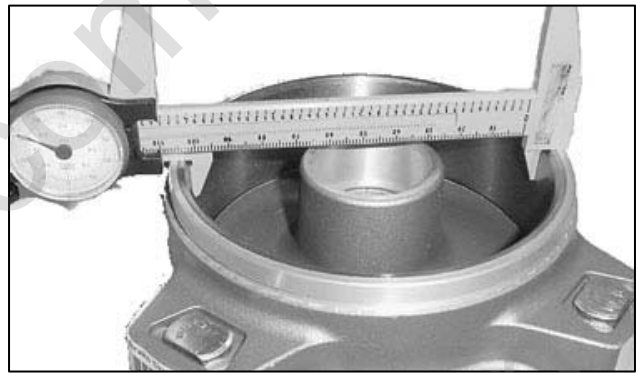




- Measure the brake drum inner diameter
Using a set of calipers and measure across the diameter

Maximum limit: 86 mm (3.39")

- Clean the drum of all dirt, oil, grease, or other contaminants.
- Inspect the surface for deep scratches or scoring.
- Remove any scratches or scoring by resurfacing the drum on a drum turning machine. *Caution: When resurfacing a drum, do not exceed the service limit.*



Turn the inner race with your fingers. The bearings should turn smoothly and quietly. If the race does not turn smoothly or quietly, remove and replace the bearings.

BRAKE PANEL REMOVAL

Disconnect the brake cable from the brake arm.
Remove the brake panel from the knuckle.



Remove brake arm and cam. Remove return spring.
Remove indicator plate and felt seal.

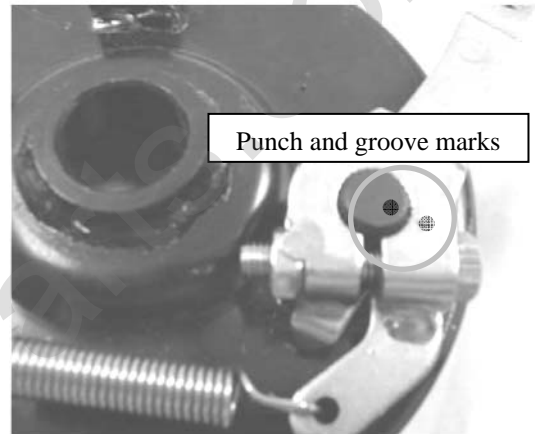


BRAKE PANEL INSTALLATION

Apply grease to the brake cam and anchor pin and install the cam in the brake panel. Soak the felt seal in the engine oil and install the seal on the brake cam.



- Install the brake arm on the cam by aligning the punch mark and the groove on the cam. Tighten the brake arm bolt and nut.
Torque: 4-7 N/m (2.95-5.16 lbf-ft)
- Install the return spring.

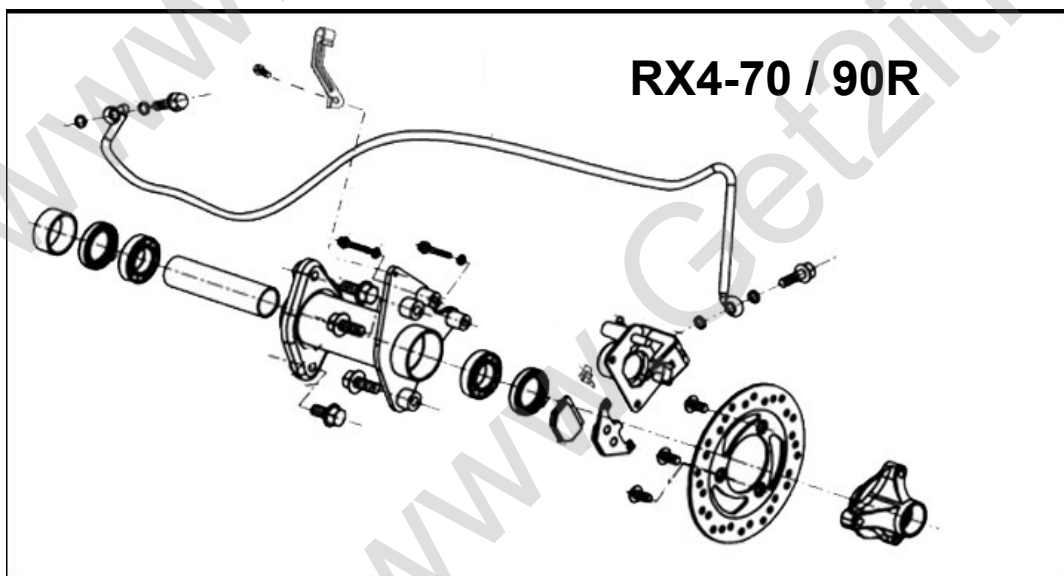
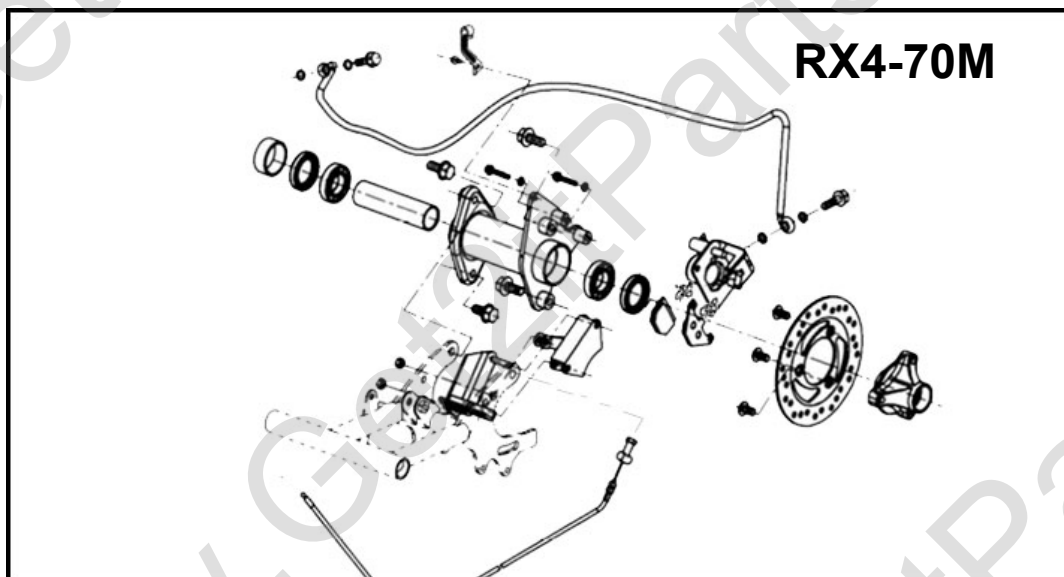
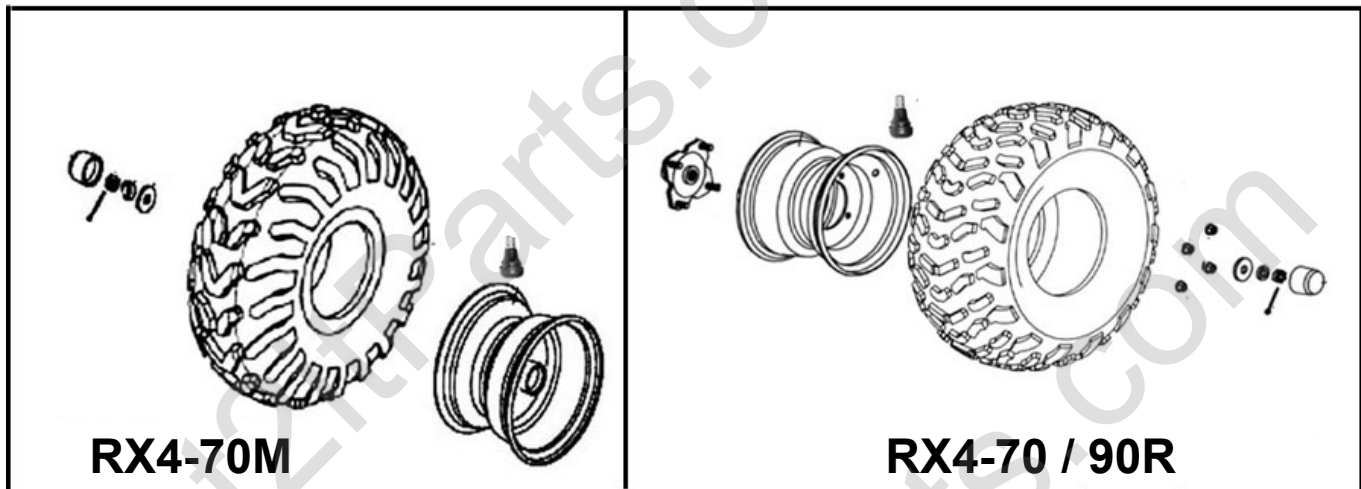


- Install the brake panel on the knuckle. Connect the brake cable to the brake arm. Install the brake arm cover.
- Tighten the screws securely.
- Position the brake shoes in their original locations and install the brake shoe spring. Install the brake drum and front wheel. Install the castle nut and cotter pin.



11. REAR WHEEL AND BRAKE SYSTEM

11.1 Rear Wheel and Brake System Drawings



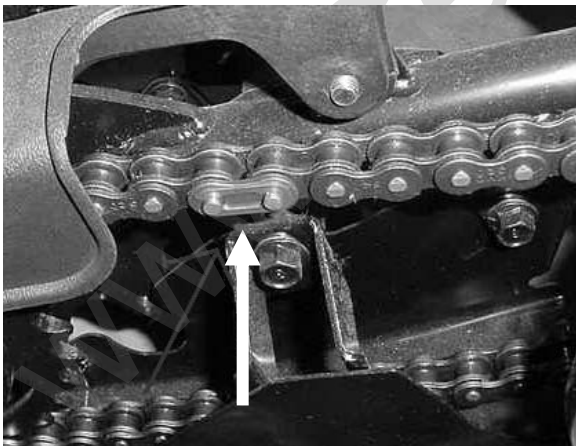
11.2 Trouble Shooting

Bad brake performance	<ul style="list-style-type: none">▪ Brake shoes are worn▪ Bad brake adjustment▪ Brake linings are oily, greasy, or dirty▪ Brake drums are worn▪ Brake arm setting is improperly engaged▪ Axle is not tightened well
Vibration or wobble	<ul style="list-style-type: none">• Bent rim• Axle bearings are worn• Faulty tires• Rear axle bearing holder is faulty
Brake drag	<ul style="list-style-type: none">• Incorrect brake adjustment• Sticking brake cam• Sticking brake cable

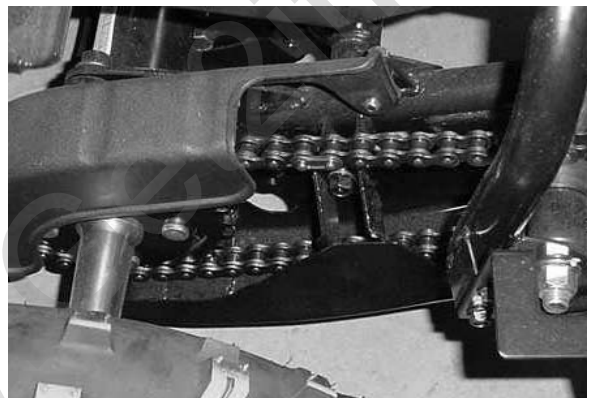
11.3 Drive Mechanism

Removal and inspection:

- Remove the rear wheel
- Raise the rear wheels off the ground.
- Remove the cotter pin, axle nut and washer. Remove the wheel and wheel hub. Remove the drive chain under the cover.

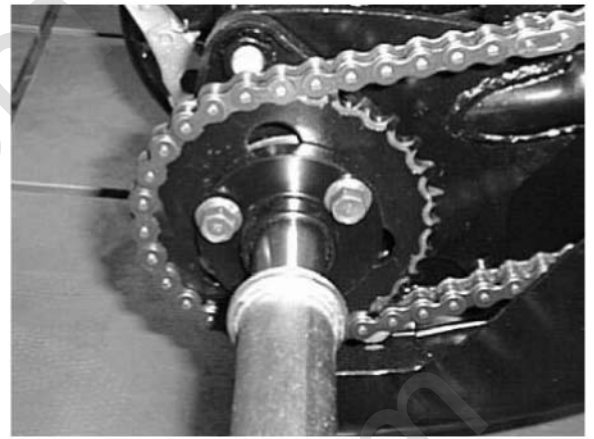


Disassemble the chain, retaining clip, and master link.

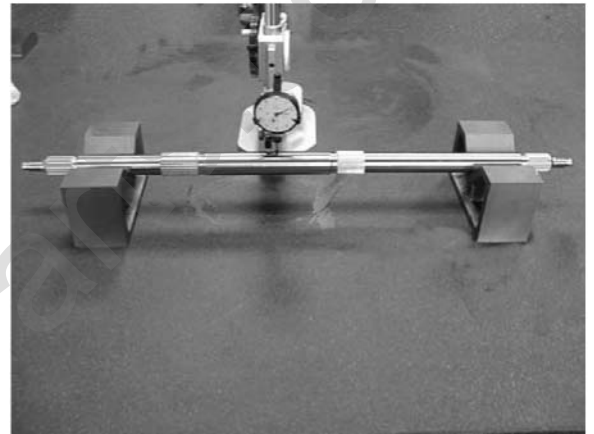


Disassemble the driven sprocket, axle, and sprocket collar.

Check the driven sprocket for damage or wear.



Place the rear axle on V-blocks and check the run out. The run out limit is 0.5 mm (0.0197 in)



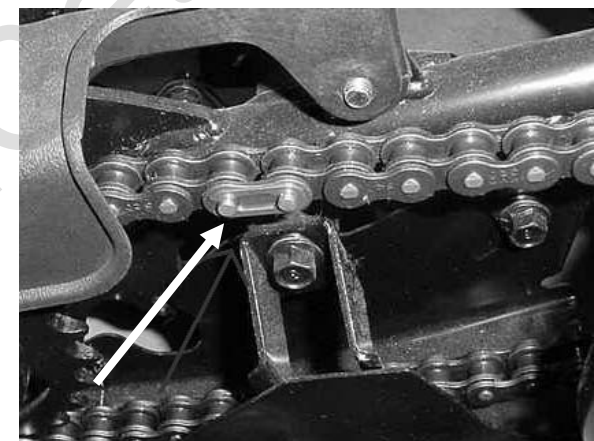
Check the bearing by turning with your fingers. The bearings should turn smoothly and quietly. Replace if necessary.

INSTALLATION

Add grease to the dust seal lips and install dust seals. Assemble the rear axle and the driven sprocket.



- Assemble the drive chain on the driven sprocket. Assemble the master link and retaining clip. Note the retaining clip's direction. Install the drive chain cover.
- Assemble the chain cover.





- Assemble the wheel.
- Tighten the rear axle nut with 30-35 N/m (22.1-25.8 lbf-ft). Install a new cotter pin.
- Adjust the rear brake slack. Adjust chain slack.



11.4 Hydraulic Disc Brake System

- To the replace brake disc, first remove the rear left tire.

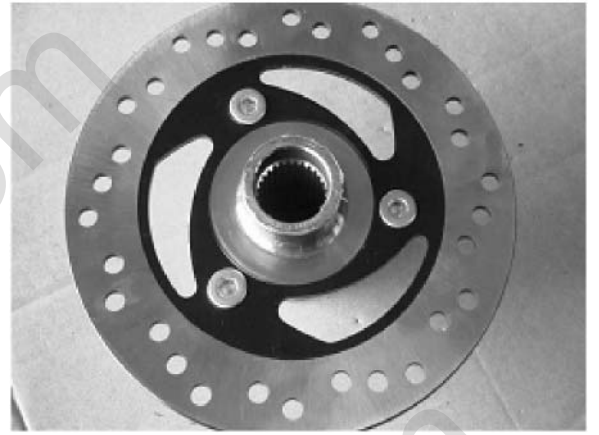


- Unscrew the two bolts shown on the photo and remove the caliper. Unscrew the rear wheel axle nut and remove the mounting seat of the disc.





Unscrew the bolts and remove the brake disc.
Check the thickness of disc and replace with a new one if the thickness less than 3mm (0.118 in”).

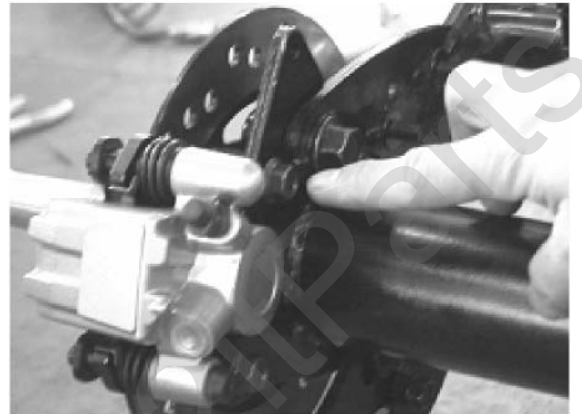


REPLACE THE BRAKE PADS:

First, remove the rear left tire.



- Unscrew the two bolts shown on the photo and remove the caliper.



- Press the plate to the end.



- Remove the brake pad as shown.



- Check the thickness of the brake pad and replace with a new one if the thickness less than 1mm (0.039”).

Take great care as to not contaminate the brake pads or rotor with oil, grease, or brake fluid during the installation.

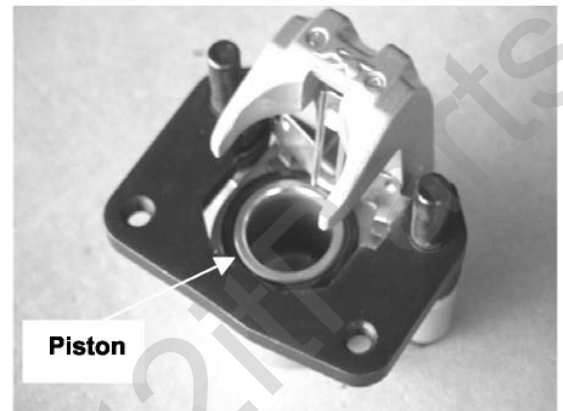


To begin reinstallation of the brakes, replace the brake rotor on the mounting seat. Reinstall the mounting seat over the axle and secure with the two large axle nuts. Torque to 60-80 N/m (44.3-59.0 lbf-ft).



- Press the caliper piston in fully and place the piston pad over the retaining pins and piston. Replace the static pad in the retaining clip and ensure that it is fully engaged and in the proper location.

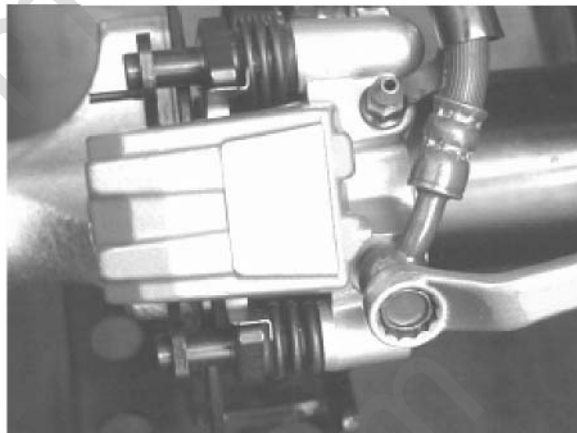
Slide the caliper back into position over the rotor and replace the two caliper retaining bolts and tighten the torque to 30-40 N/m (22-30 lbf-ft).



- **REPLACING BRAKE HYDRAULIC OIL:**
First, unscrew the bolts and open the cover.



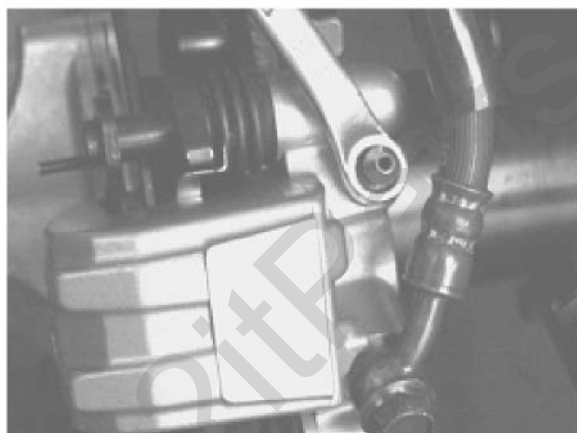
- **Unscrew the bolt and drain the used oil.**
- **Fasten the bolt after the used oil has been drained out completely.**



- **Loosen the bleeder valve on the caliper and depress the brake lever to expel any air in the line. Tighten the bleeder valve before releasing the brake lever. Repeat the process until all air has been purged from the brake line. Tighten the bleeder valve and fill the reservoir with (Dot 3 or Dot 4) brake fluid to a half full level.**



Reinstall the reservoir cap and cap bolts. Test the brake system and check for any leaks in the brake line connections.

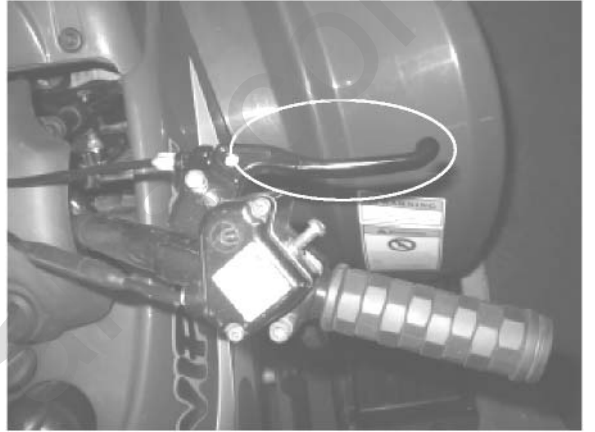




PARKING BRAKE ASSEMBLY (RX4 70M):

The Viper 70M parking brake is a mechanical caliper on the rear brake rotor. This caliper is controlled via the right hand brake lever.

The Viper 70 and 90R parking breaks utilize the front drum brakes as the parking brake and are controlled by the right hand brake lever.

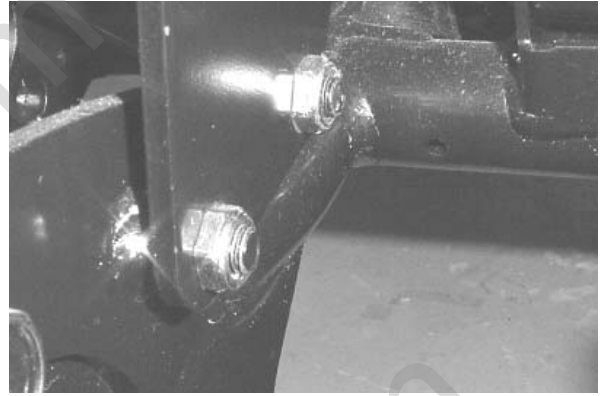


PARKING BRAKE PAD REMOVAL:

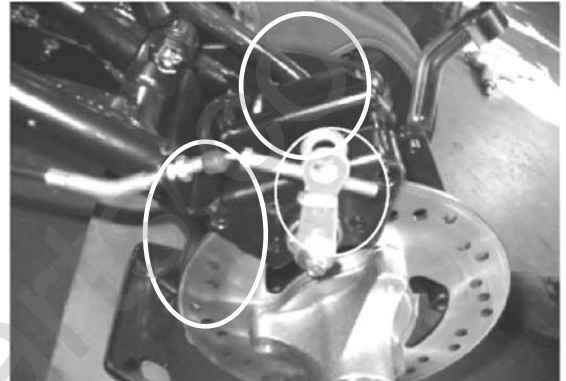
First, remove the tire.



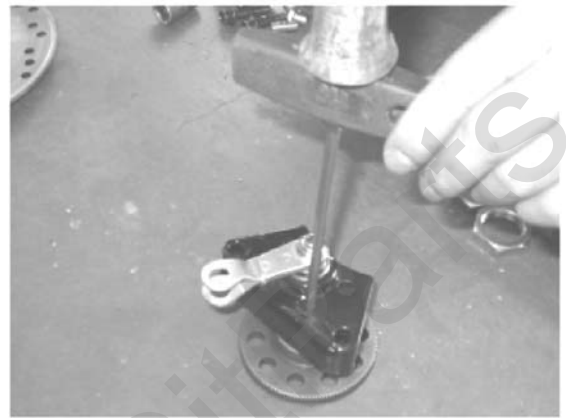
There are two brake caliper fixing bolts on the back of the plate. Use a wrench to remove those two bolts; you can now take the whole caliper out.



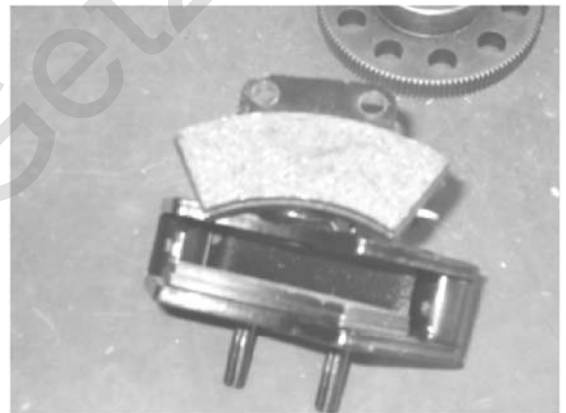
After removing the rear brake caliper, release the brake cable nut. Then, you can take apart the parking brake caliper.



When replacing the brake pads, you must use a hammer and punch to push the pins out. This will release the pad for replacement.

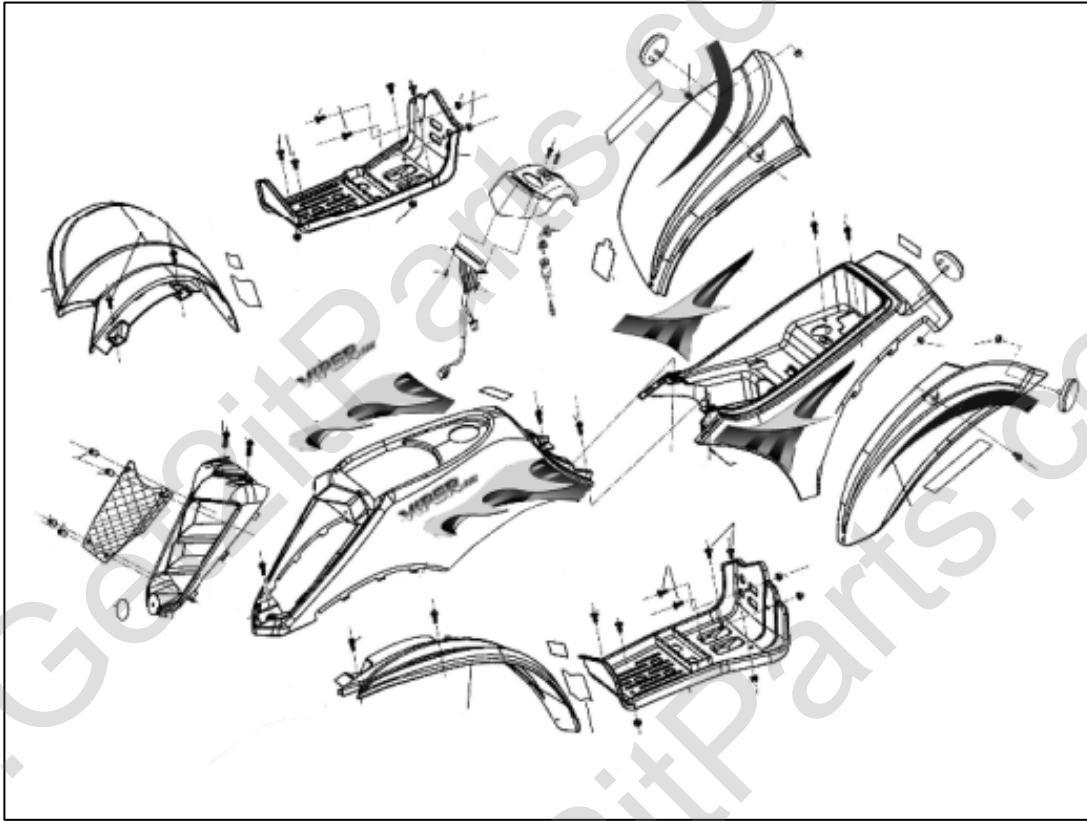


Reassemble the brake caliper using the reverse order of removal.



12. BODY COVERS AND EXHAUST SYSTEMS

12.1 Body Cover Drawings

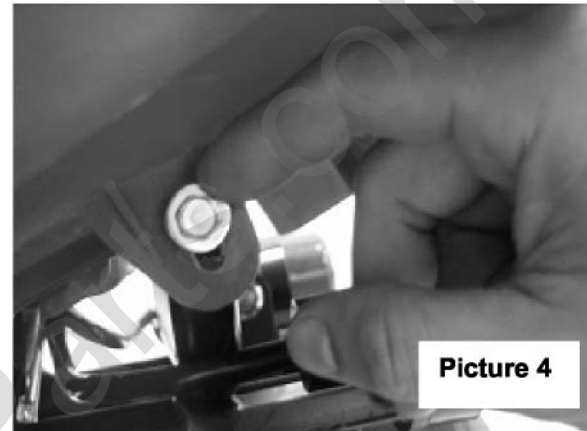
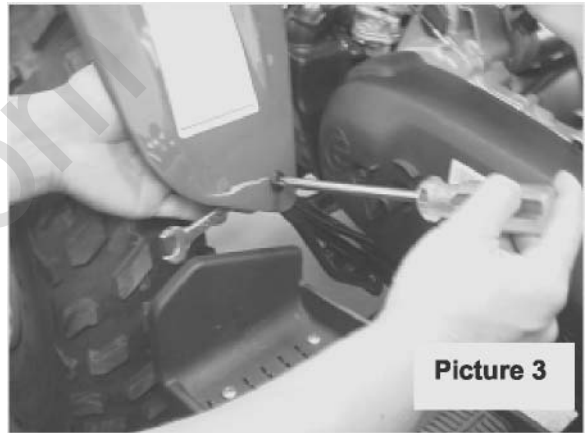


12.2 Body Cover Removal

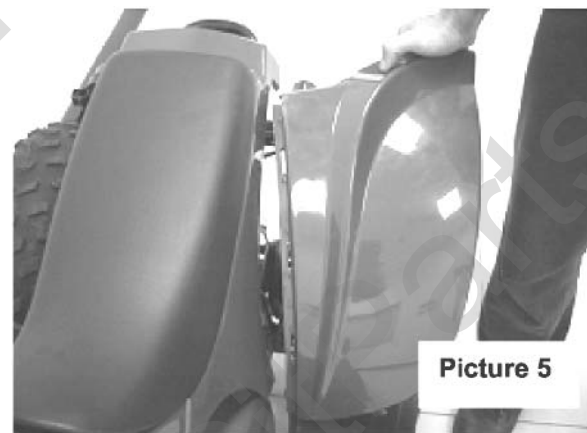
The rear fender panels must be removed prior to removing the rear body cover. Remove the seat assembly by releasing the latch located at the rear of the unit under the seat.



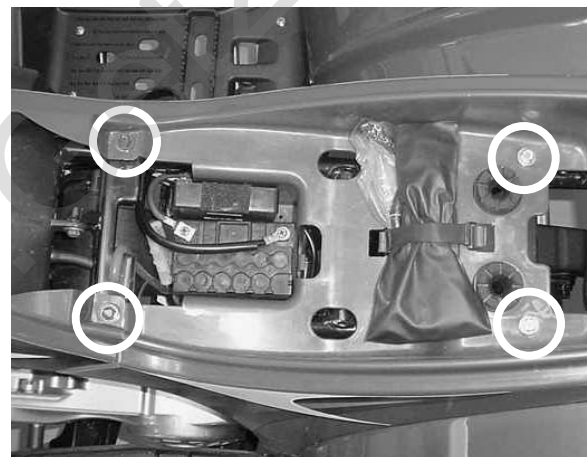
Remove the fender panel retaining bolts as shown in pictures 3 & 4 from both the LH & RH panels. Gently lift the fender panels up to disengage the locking tabs located on the body cover. Use caution when removing the fender panels to make sure you do not break the locking tab located on the bottom edge of the body cover.



Gently tilt the panel up toward the unit until the locking tabs disengage from the body panel (see picture 5).



To remove the body cover, remove the four body cover retaining bolts located in the seat well (picture 6). Gently slide the rear cover tabs from under the front cover by pulling the rear cover toward the rear of the unit.

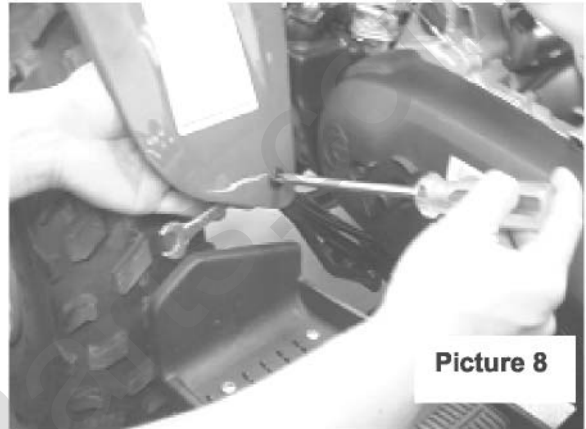
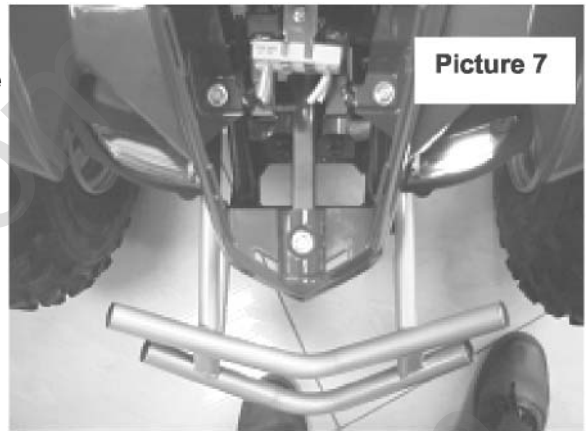


To remove the front body cover:
(The front body cover must be removed prior to removal of the front fender panels):

1. Remove the front grill assembly by removing the two retaining clips located at the top of the grill panel. Gently tilt the grill cover forward to disengage the locking tabs located on the sides and at the bottom of the grill cover, taking care not to break the locking tabs or slots.
2. Loosen the handle bar cover by removing the two retaining bolts located in the middle of the cover, just under the handlebar.
3. Remove the body cover retaining bolt located at the front of the unit behind the grill panel.
4. Remove the two retaining bolts located under the seat toward the gas tank.
5. Remove the body cover by lifting upwards to disengage the locking tabs from the fender panels, then slide the body cover forward to clear the handlebars.

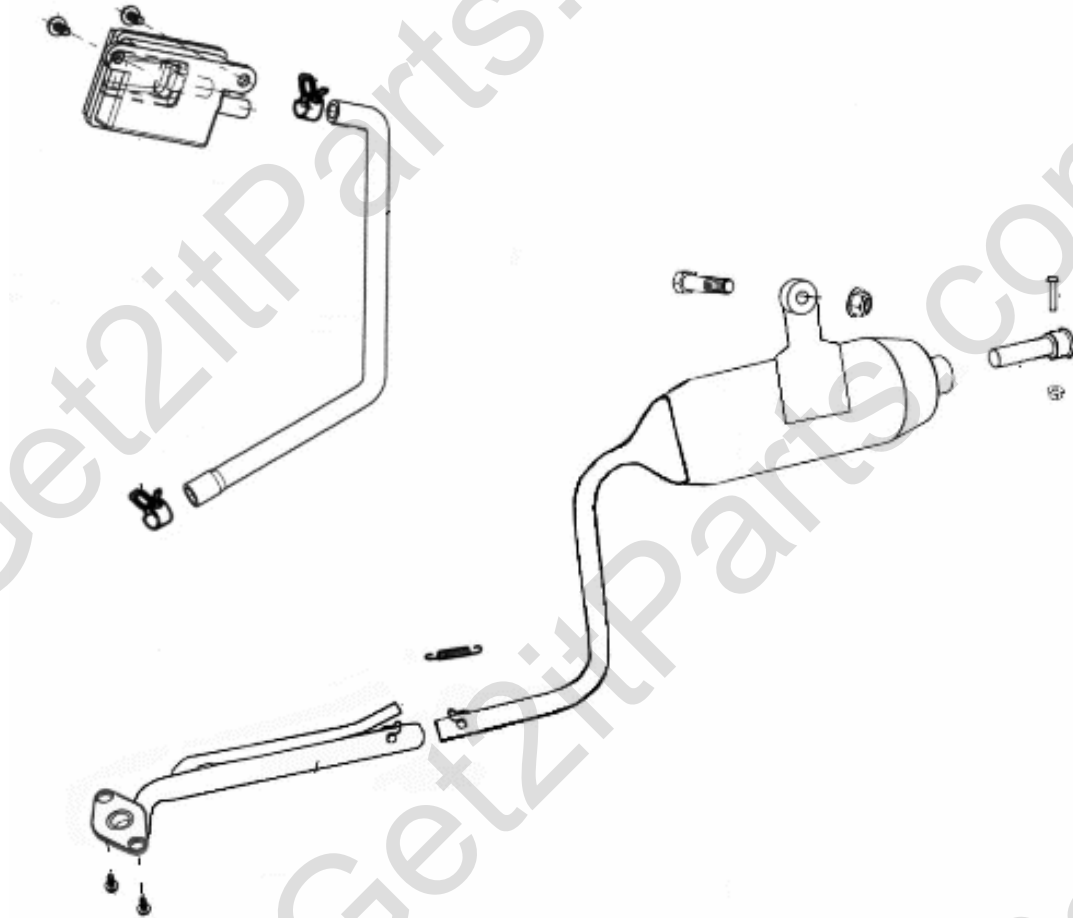
To remove the front fender panels (LH and RH):

1. Remove the three retaining bolts located on the inner edge of the fender panel (one is at the front of the footrest, one is at the mid point of the fender panel, and one is in the front behind the grill panel).
2. Lift the fender panel up and away from the unit.



12.3 Exhaust System Drawing

This is the two-piece exhaust system (exhaust reed system and pipe) for the RX4 70 / 70M / 90.



12.4 Exhaust System Removal



- **Caution:** Do not attempt to perform maintenance on a hot exhaust system. Hot exhaust pipe and muffler pose a serious risk of burn and/or fire hazard.
- Remove the two mounting bolts that attach the exhaust pipe to the exhaust port on the under side of the engine cylinder.
- Remove the two (2) exhaust pipe hanger mounting bolt from the frame and remove the exhaust pipe/muffler assembly by tilting the front down and sliding the assembly to the rear of the unit.



- Clean the exhaust gasket material from the cylinder head exhaust port completely using a wire brush and scraper. **DO NOT scratch the gasket seat.**
- When reinstalling the exhaust system, always use a new muffler gasket to ensure there are no exhaust leaks between the cylinder and muffler.



Muffler gasket – Part # 650243

12.5 Servicing the Spark Arrestor

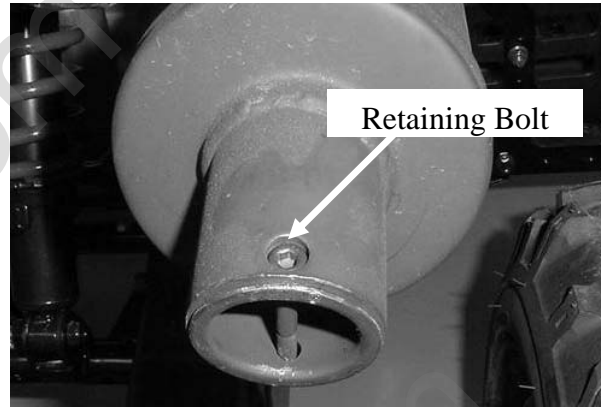
After every 100 hours of operation, the muffler should be cleaned. Remove the clean out bolt using a 12mm wrench.



After every 20 hours of operation, the spark arrestor has to be cleaned. Remove the allen bolt using a 4mm allen wrench.

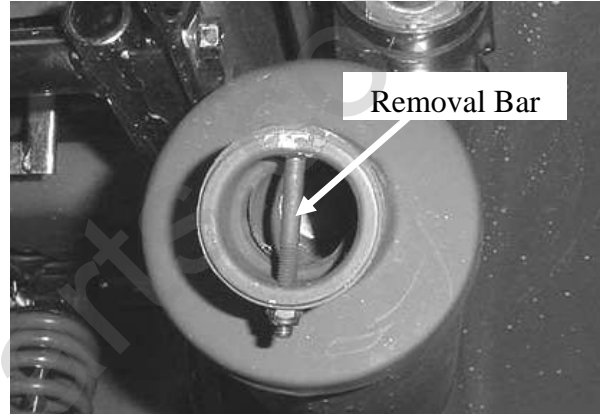
Use pliers on the removal bar to turn the sleeve of the spark arrestor counterclockwise while applying an outward pressure until the screen is removed.

Clean the screen with an exhaust cleaning solution and replace, securing it by tightening the retaining nut.



After every 200 hours of operation, the Spark Arrestor has to be replaced by removing the retaining bolt using a 4mm allen wrench.

Use pliers on the removal bar to turn the sleeve of the Spark Arrestor counterclockwise while applying an outward pressure until the screen is removed.



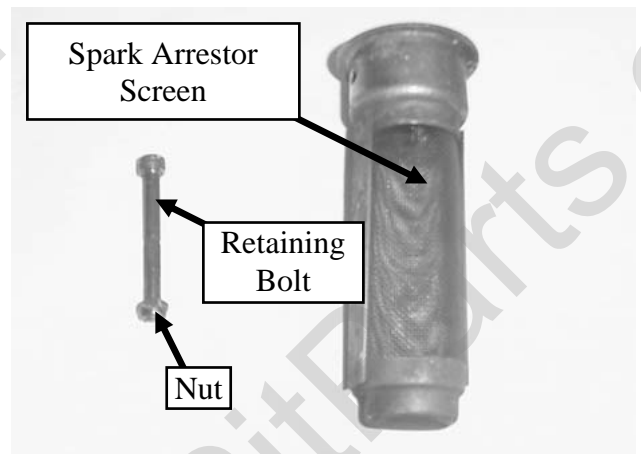
Replace with a new Spark Arrestor Screen and secure it by tightening the retaining bolt.



Spark Arrestor Screen – Part # 811008



NOTE: Failure to maintain a clean exhaust system will cause loss of power and can eventually lead to engine damage and/or failure.



13. ELECTRICAL SYSTEM

13.1 Trouble Shooting

Engine starts but dies

- Fuel petcock not in ON position
- Dirty or clogged fuel filter
- Improper ignition timing
- Faulty spark plug

No spark at plug

- Engine stop switch in OFF position
- Remote control switch in OFF position
- Ignition switch in OFF position
- Safety tether switch disengaged
- Faulty spark plug
- Faulty ignition switch
- Faulty ignition coil
- Faulty CDI module
- Improper gapping on pickup coil
- Faulty A/C generator
- Poor connection:
 - Between CDI and ignition coil
 - Between alternator and CDI unit
 - Between CDI and engine stop switch
 - Between ignition coil and spark plug
 - Between generator and CDI unit

Engine starts but runs poorly

- Exhaust system clogged
- Fuel petcock not fully opened
- Fuel filter clogged or dirty
- Air filter clogged or dirty
- Carburetor vacuum leak
- Carburetor main jet, pilot jet, or needle valve dirty
- Ignition primary circuit:
 - Poor connection of primary contact
 - Improper gap adjustment of pickup coil
 - Faulty ignition coil
 - Faulty A/C generator
 - Faulty CDI module
- Ignition secondary circuit:
 - Poor connection of ignition coil to spark plug
 - Faulty or damaged spark plug
- Improper ignition timing:
 - Faulty A/C generator
 - Faulty CDI module
- Loose battery connection
- Loose charger connection
- Poor ground wire connection

Intermittent engine power

Charging system failure

- Loose connection of battery terminal
- Corrosion of battery terminal leads
- Loose or poor connection of frame ground wire
- Loose connection of A/C generator wires
- Abnormal high current draw on battery
- Faulty A/C generator
- Faulty rectifier
- Faulty battery

Starter motor does not turn

- Ignition switch in OFF position
- Brake lever is not engaged
- Engine stop switch in OFF position
- Discharged battery or low battery charge
- Faulty starter relay
- Starter switch wires disconnected
- Faulty starter switch
- Starter motor wires disconnected
- Faulty starter motor

Starter motor turns, but engine does not start

- Fuel tank empty
- Fuel petcock in OFF position
- Fuel filter dirty or clogged
- Dirty air filter
- Spark plug wire disconnected
- No spark at plug (see "No Spark" above)
- Dirty main jet, pilot jet, or needle valve in carburetor
- Loose or poor main ground wire connection
- Improper gap adjustment of pickup coil
- Faulty A/C generator
- Faulty ignition coil
- Faulty CDI module

Remote stop switch inoperable

- Remote control battery low or discharged
- Remote receiver antenna wire broken or not arrayed
- Remote receiver leads disconnected
- Remote receiver out of range (30 feet)
- Remote receiver obstructed
- Loose or poor main ground wire connection
- Remote receiver and transmitter not on same frequency
- Faulty remote receiver
- Faulty remote transmitter

13.2 Ignition Coil

Testing the ignition coil:

- Remove the coil wire cap from the spark plug
- Unplug the ignition coil primary leads
- Test the primary coil as shown in the picture. Primary coil resistance should range between 0.1-0.3 Ω .



- Test the secondary coil as shown in this picture. Secondary coil resistance should range between 7.4-12.0 k Ω .



- If the test results fall outside the stated ranges, replace the ignition coil assembly (part # 610189).




13.3 Ignition Timing

The preprogrammed ignition advance is $15^{\circ} \pm 3^{\circ}/4000\text{rpm}$.

Ignition timing is controlled by the CDI (Capacitive Discharge Ignition) module and is set at the factory via a RCP (ROM Chip Program). The timing cannot be manually adjusted.

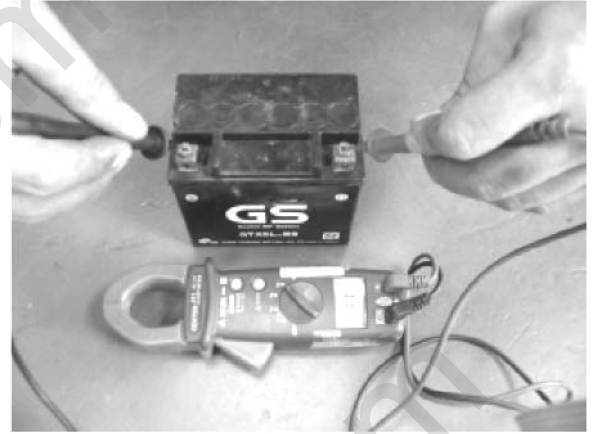
13.4 Battery Inspection and Maintenance

 **CAUTION:** The battery emits flammable and explosive fumes during normal operation. Keep away from sparks, open flame, and other possible sources of ignition. Always provide adequate ventilation during charging and maintenance of the battery. The battery contains sulfuric acid (an electrolyte). Contact with skin or eyes may cause severe burns or blindness. Always wear protective clothing and eye protection when servicing the battery. The electrolyte is toxic. If swallowed, drink large quantities of water or milk and seek medical attention immediately, or contact a poison control center.

The battery is located under the seat in the battery compartment.

Battery removal:

- Remove the battery retainer strap
- Disconnect the negative (BLACK) battery lead first
- Disconnect the positive (RED) battery lead next
- *Use caution when disconnecting lead so as not to cause a spark*
- Remove the battery from the battery compartment



Testing the battery:

- Measure the battery voltage using a multi-meter set to Voltage
- A fully charged battery should read 13.0-13.5V. An under charged or faulty battery will be below 12.0V.
- If the battery is showing under charge condition, charge the battery using a trickle charger at 7 amps for 10 hours. When charging the battery, it should be removed from the unit. Connect the charger lead to the battery before turning on the charging unit. Turn the charging unit off before disconnecting the charging leads from the battery. Retest the battery voltage. If the battery voltage shows an under charge condition after charging, replace the battery (Part # 750173).



New battery preparation:

- The new battery is shipped dry with the electrolyte in a separate container. Remove the battery cell caps and install the electrolyte in the battery cells. **CAUTION: Electrolyte contains sulfuric acid that can cause severe burns if contact is made with the skin or eyes.**
- Allow the battery to completely absorb the electrolyte (approximately one (1) hour). The battery should have a full charge. The battery is a gel acid battery and will not show any liquid electrolyte when fully absorbed.

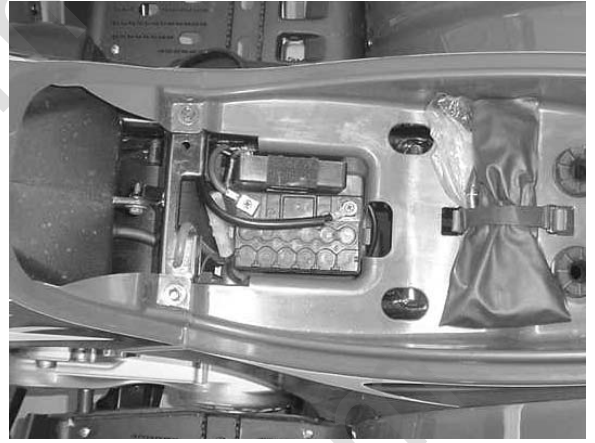


DO NOT place the new battery on a charger as this can damage the cell plates and make the battery unusable.



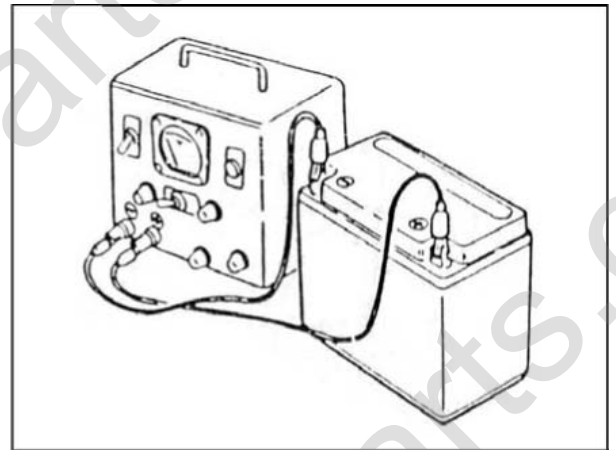
Battery installation:

- Place the battery in the battery compartment.
- Clean the battery terminals and lead connectors of all dirt and corrosion.
- Attach the positive (RED) lead to the [+] positive terminal of the battery first.
- Attach the negative (BLACK) lead to the [-] negative terminal of the battery next.
- Check the lead routing to ensure they are clear of obstruction and do not fall between the battery and unit body where they could be abraded or otherwise damaged.
- Attach the battery retainer strap to secure the battery in place.



Battery charging:

- If the battery become discharged or shows low voltage you can recharge the battery using a 12 volt battery trickle charger.
- Connect the positive lead of the charger to the positive terminal of the battery.
- Connect the negative lead of the charger to the negative terminal of the battery.
- Turn on the charger and allow the battery to charge from 4 to 6 hours.
- Test the battery voltage after charging it should give a reading of between 12-and 13 volts.
- If after charging the battery is still indication a low voltage or the battery will not hold the charge for more than a day or two the battery should be replaced.



ETON recommends replacing the battery every two years for optimal performance.

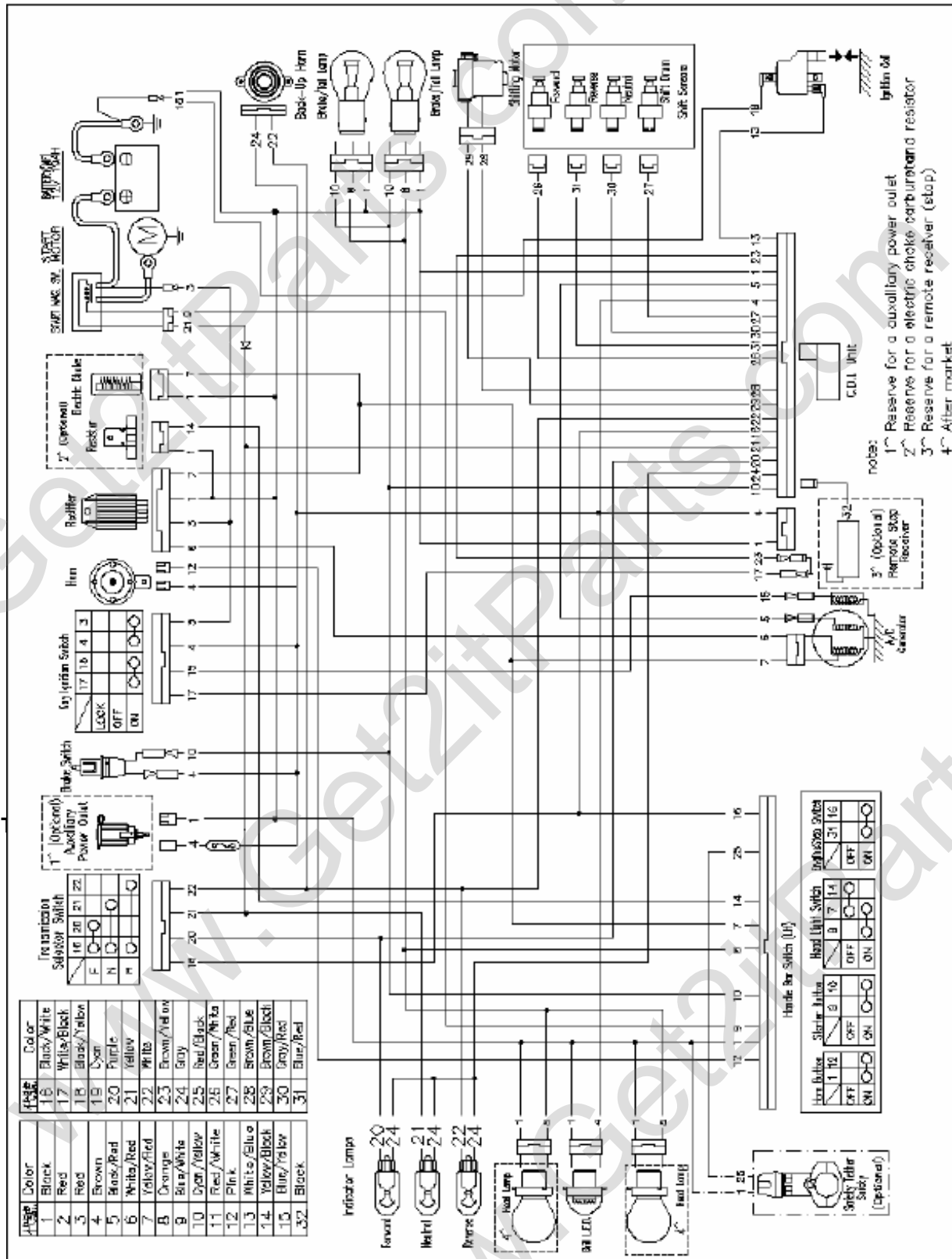
Battery Storage:

If the vehicle will not be in use for an extended period of time, the battery should be removed and stored in a location that will ensure that battery will not freeze.

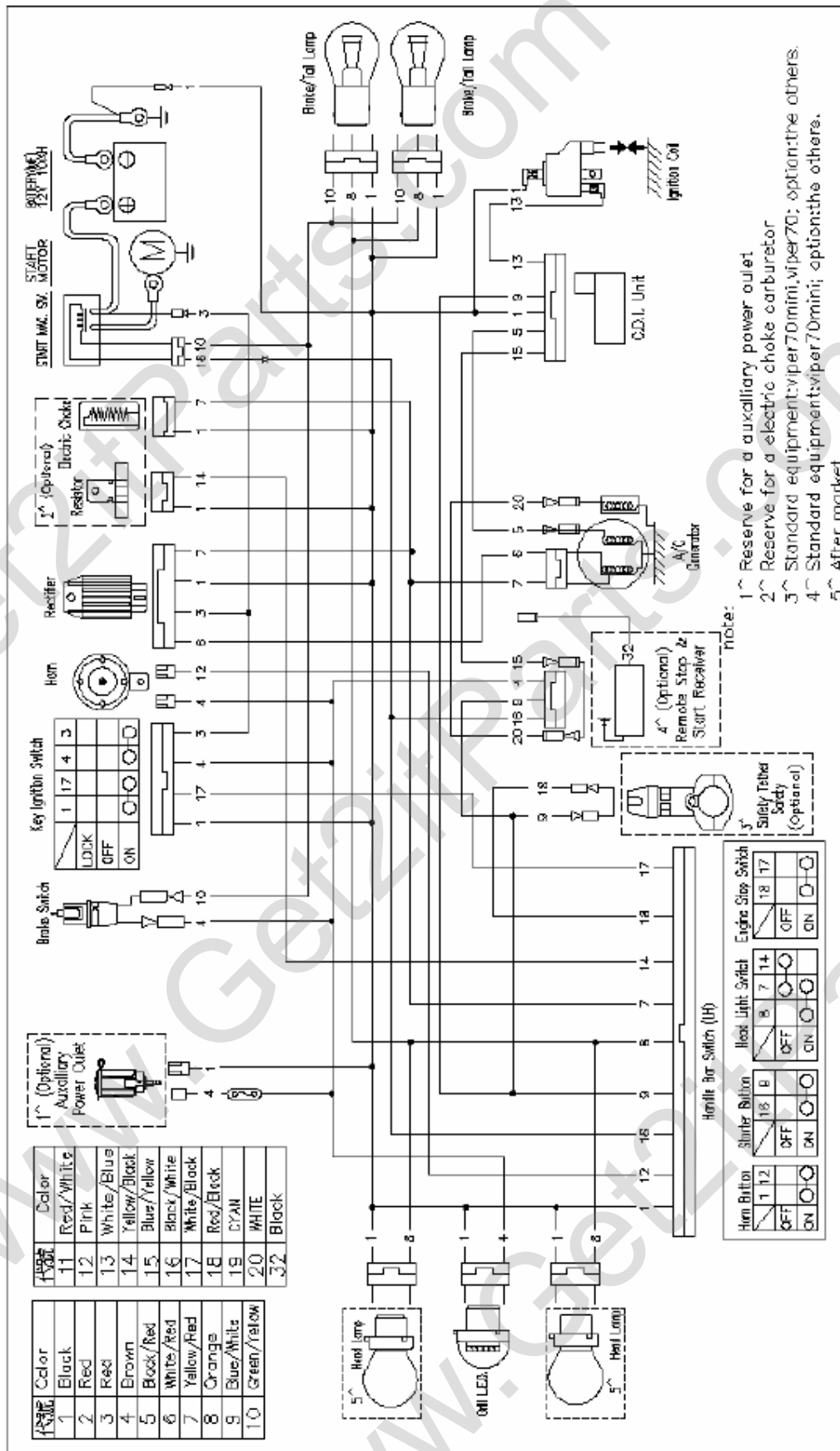


DO NOT store the battery on a concrete surface as it can draw the charge from the battery and damage the battery plates.

13.5 Wiring Diagrams



Wiring diagram for RX4 90R

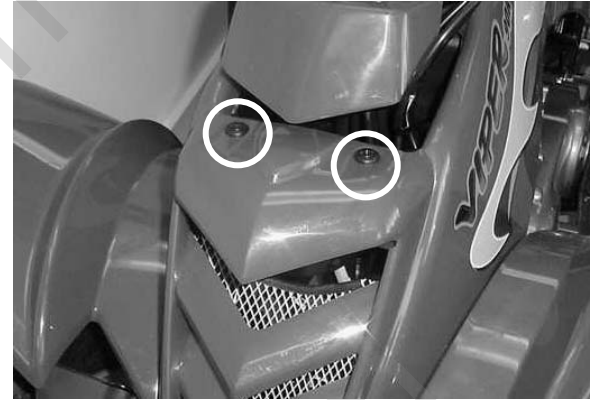


Wiring diagram for RX4 70 / 70M

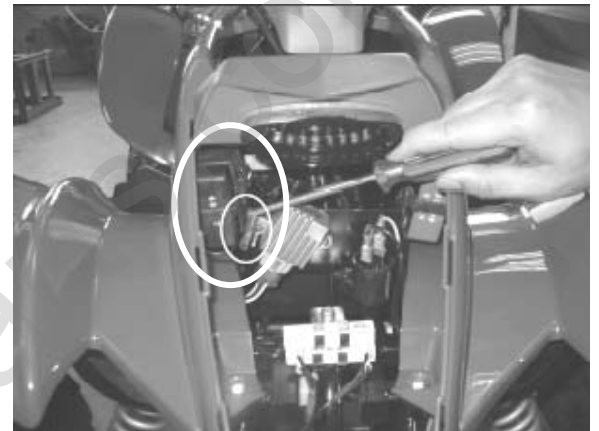
13.6 Remote Control Stop System

If the remote controller is not functioning, first check the batteries in the controller. If it is dead, replace with a new 12-volt A23 alkaline battery. The controller will have to be reprogrammed when the battery is replaced (see the Reprogramming section on the next page). If the controller is lost, or still faulty, the controller and receiver must be replaced.

To remove the receiver, first turn the ignition switch to the OFF position. Next, remove the front grill by removing the top two screws.



With the front grill removed, the receiver box is on the left hand side (facing the front), next to the voltage regulator as show in the picture.



Remove the receiver. Ensure the code on the side of the receiver box is the same as the code on the controller (see picture). If they differ, replace the receiver and transmitter set (part number 811163).

Remote and receiver are standard on the RX4-70M and optional on the RX4-70/90R.



Reprogramming

The remote receiver must be reprogrammed after replacing batteries in the controller. The receiver box must be installed on the unit to be reprogrammed.

Install the box onto the mounting tab. Install the male and female connectors and a three-prong plug. The BLACK female ground wire should remain unplugged.

To reprogram the receiver, take the BLACK female ground wire to ground (i.e. the frame). Turn the left hand handlebar switch to the ON position. Hold both buttons on the controller simultaneously for at least 5 seconds. This will link the transmitter to the receiver.



14. TROUBLESHOOTING

14.1 Engine Does Not Start

No fuel flow to carburetor	<ul style="list-style-type: none">• No fuel in fuel tank• Clogged float valve• Clogged fuel tank cap breather hole• Clogged at fuel tube
Weak or no spark	<ul style="list-style-type: none">• Faulty spark plug• Fouled spark plug• Faulty CDI unit• Faulty alternator• Faulty engine stop switch• Poorly connected, broken, or shorted wires• Broken or shorted ignition coil• Broken or shorted spark plug wire• Faulty pulse generator• Faulty ignition switch
Low compression	<ul style="list-style-type: none">• Worn cylinder and piston rings• Damaged cylinder head gasket
Engine does not fire	<ul style="list-style-type: none">• Auto choke off or damaged• Auto choke power wire disconnected• Improperly adjusted air screw• Improperly ignition timing• Fuel / air mixture ratio is too lean
Engine starts but dies	<ul style="list-style-type: none">• Carburetor flooded• Improperly adjusted air screw• Fuel / air mixture ratio too rich• Auto choke stuck or damaged• Air cleaner dirty

14.2 Poor Performance at Low Idle

Bad ignition timing	Faulty CDI unit or pulse generator
Restricted fuel flow	Improperly adjusted air screw
Leaking intake pipe	Deteriorated insulator o-ring Loose carburetor
Weak or intermittent spark	Loose or disconnected ignition system wires Faulty, wet, or fouled spark plug Faulty alternator Faulty CDI unit Faulty ignition switch Faulty ignition coil Faulty pulse generator Broken or shorted spark plug wire Faulty engine stop switch

14.3 Poor Performance at High Speed

Bad ignition timing	<ul style="list-style-type: none"> ▪ Faulty CDI unit ▪ Faulty pulse generator
Restricted fuel flow	<ul style="list-style-type: none"> ▪ Lack of fuel in tank ▪ Clogged fuel line ▪ Clogged fuel valve ▪ Clogged fuel tank breather hole
Dirty air filter	<ul style="list-style-type: none"> ▪ Clean with high pressure air gun
Clogged carburetor jets	<ul style="list-style-type: none"> ▪ Clean the filter

14.4 Loss of Power

Wheels do not spin freely	<ul style="list-style-type: none"> • Brake dragging • Drive chain too tight • Damaged wheel bearing • Wheel bearing needs lubrication
Low tire pressure	<ul style="list-style-type: none"> • Punctured tire • Faulty tire valve
Engine speed does not increase when accelerated lightly	<ul style="list-style-type: none"> • Fuel / air mixture ratio too rich or lean • Clogged in air cleaner • Clogged in muffler • Restricted fuel flow • Clogged fuel tank cap breather hole • Clean and adjust
Bad ignition timing	<ul style="list-style-type: none"> • Faulty pulse generator • Faulty CDI unit •
Cylinder compression too low	<ul style="list-style-type: none"> • Leaking head gasket • Worn cylinder and piston rings
Clogged carburetor	<ul style="list-style-type: none"> • Clean and Adjust
Fouled or discolored spark plug	<ul style="list-style-type: none"> • Clean the spark plug • Spark plug is incorrect heat range
Engine overheating	<ul style="list-style-type: none"> • Excessive carbon deposited in Combustion chamber • Wrong type of fuel • Fuel / air mixture ratio is lean • Use of poor quality fuel
Engine knocking at high speed	<ul style="list-style-type: none"> • Worn piston and cylinder • Fuel / air mixture ratio is lean • Wrong type of fuel • Ignition timing too advanced • Excessive carbon deposited in Combustion chamber

14.5 Poor Handling

Steering is heavy	<ul style="list-style-type: none">• Damaged steering bearing• Damaged steering shaft bushing
One wheel is wobbling	<ul style="list-style-type: none">• Bent rim• Improperly installed wheel hub• Excessive wheel bearing play• Bent swing arm• Bent frame• Swing arm pivot bushing excessively worn
Vehicle pulls to one side	<ul style="list-style-type: none">• Bent tie-rod• Incorrect tie-rod adjustment• Rear tire pressure incorrect• Improper wheel alignment• Bent frame

14.6 “Viper 90R-4 Dies After Shifting or Indicator Lights Blink” Solution Checklist

Problem: Unit will not shift into gear or engine dies when shifting into

- (1) i. Turn on the ignition switch.
 selector switch to neutral (N) position.
 stop switch to ‘O’ position.

Apply LH rear brake lever and press the starter button.

- (2) With the brake lever applied, shift to forward or reverse. Verify that the indicator light is steady and not flashing. If the engine dies, continue to 3.

- (3) Perform a continuity test on the left hand brake safety switch. The switch is normally open. Break lights should deactivate if the lead is unplugged. Test for continuity when the brake lever is applied by probing the switch leads. If this fails, replace the broken switch and return to step 1.

- (4) Replace the CDI unit. If the problem persists, replace with the original CDI unit and continue to step 5.

- (5) Check the engine idle RPM using a tachometer. Idle must be below 3200 RPM before shifting or the engine will die.

- (6) Check the wiring harness sensors and connections for corrosion, and correct color codes. Verify that it follows one of these sequences:

Reverse:	Blue
Neutral:	Gray
Forward:	Green/White

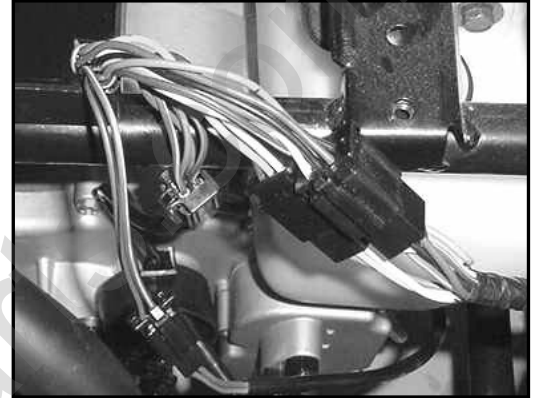


(7) Next, test the sensors by performing the following.

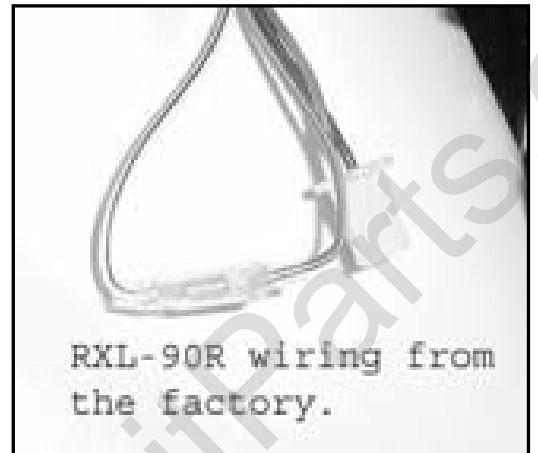
NOTE: (Always apply the LH brake when using the selector switch)

- a. Turn ignition switch to 'O'.
- b. Place shift selector in F.
- c. Probe the F sensor to ground and check for continuity. If none exists, verify the sensor size limits and replace as necessary.
- d. Place shift selector in N.
- e. Probe the N sensor to ground and check for continuity. If none exists, verify the sensor size limits and replace as necessary.
- f. Place shift selector in R.
- g. Probe the R sensor to ground and check for continuity. If none exists, verify the sensor size limits and replace as necessary.

(8) Check all connections, starting at the CDI box, and all grounds. Also, check the remote receiver loop (white/black to brown/yellow).

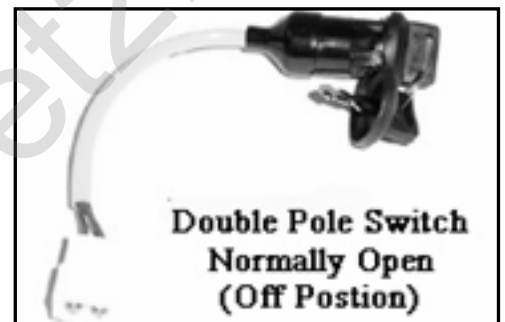


Bypass the remote switch, if installed, by connecting the two leads to each other and removing the switch from the loop.



9) Check the operation of the selector switch. Perform a continuity test by the color codes of your sensors (as in step 5).

- a. **Test the ignition switch.**
With the ignition switch in the off position, test across the red and brown leads. If current is read, replace the switch.
- b. **With the ignition switch in the on position, test across the red and brown leads. If NO current is read, replace the switch.**
- c. **Apply dielectric grease to the ignition connection.**
- d. **Check each connection pin by probing from switch side to harness side. If you do not have continuity, determine the failing pin and replace.**



Check operation of the shift motor without the unit running.

- a. Place the selector in the N position.
- b. Turn ignition key on.
- c. Apply the LH rear brake.
- d. Turn selector from neutral (N) to forward (F).
- e. Indicator light should change to 'F' and remain steady.
- f. Motor shift should be heard. If either of these tests fails, perform an ohms test on the shift motor by probing the motor's leads. (reading: 2—5 Ω).
- g. Turn the selector back to neutral (N).
- h. Turn selector from neutral (N) to reverse (R). Indicator light should change to 'R' and remain steady.
- i. Motor shift should be heard. If either of these tests fails, perform an ohms test on the shift motor by probing the motor's leads (reading: 2—5 Ω).



(10) Symptoms for faulty generator: Weak or intermittent spark, no spark battery continually discharging, slow throttle response.

- 1) Clean the flywheel. Flywheel puller tool is part number 650660.
- 2) Set the Pick-up Coil air gap to 0.025" / 0.635mm.



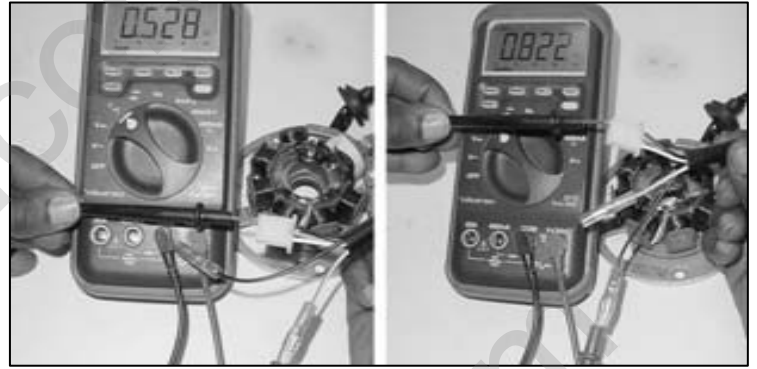
a. Testing the generator:

To test the generator, set the multi-meter to a 1k ohms scale. Check the ohms from the white/red wire to the generator case or ground. Ohms reading should be between 105-115 Ω ; replace if 100 Ω or less. To check the output voltage the generator must be installed and multi-meter set to AC small scale. Probe the red lead to the white/red wire and the black lead to battery or chaise ground. Push the starter button with the flywheel turning. The voltage should read 0.5 to 1.5 volts AC. If reading is low, replace the A/C generator.



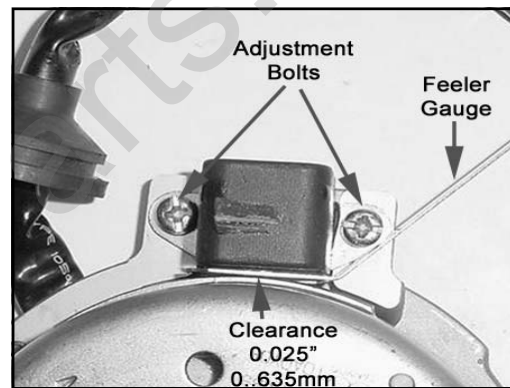
b. Testing the exciter coil:

To test the exciter coil, set the multi-meter to a 1k ohms scale. Check the ohms from the white/red wire to the generator case or ground. The reading should be 0.520—0.535 k Ω . To test the auxiliary coil, check from the black/red wire to generator case or ground as shown. Reading should be 0.815—0.830 k Ω . If the readings are outside this range, replace the A/C generator.



To test the output voltage, probe the white/red wire to ground and hit the starter button. With the Flywheel turning the reading should be .4 –1.0 A/C Volts.

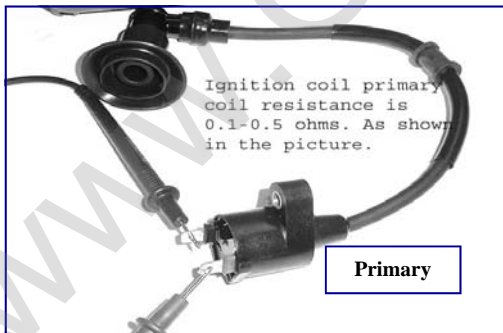
Check the pickup coil air gap.
Set to 0.025" / 0.635mm.



Coil resistance.

Primary coil resistance is 0.1-0.5 Ω .

Secondary coil resistance is 8-11k Ω .





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Service Bulletin

Bulletin No:	0036
Date:	01/06/06

RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

There is an engineering change affecting the 2006 Viper 90R 4 cycle ATV with Engine Numbers below JIExxxxxxxxx751. The Shift Push block has been reengineered to reduce friction, allowing the shifting motor to complete the shift process. Units with out this upgrade may display some or all of the following symptoms:

1. Incomplete shifting causing blinking indicator lights
2. Grinding noise from shift motor
3. Engine stalling during shifting
4. Starter motor reduction gear failure

Part required for engineering change:

Qty	Part No.	Description
1	811674	Shift Push Assembly



Labor Codes	
713	Shift Motor
714	Shift Push assembly

Step 1



Remove the plastic floorboard.

Step 2



Remove the metal floorboard.



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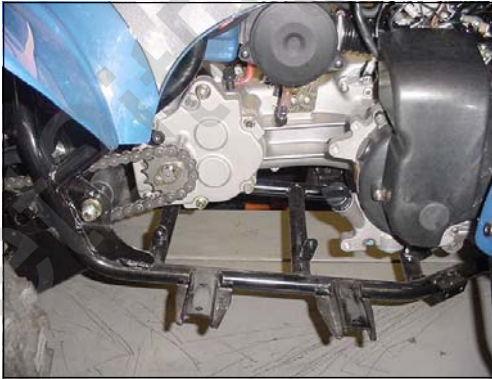


Service Bulletin

Bulletin No: 0036
Date: 01/06/06

RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

Step 3



Remove the exhaust pipe and chain guard.

Step 4



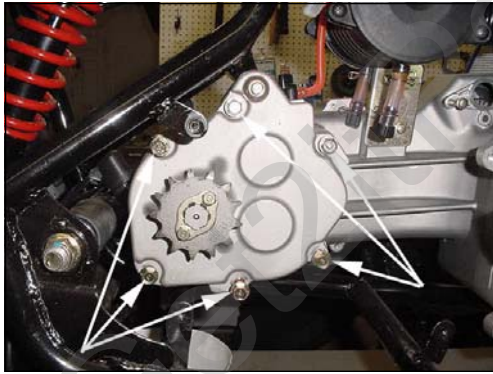
Disconnect the battery and the CDI box. Also remove the rear fender and the drive chain.

Step 5



Drain the gear oil from the transmission as shown in picture

Step 6



Remove the six bolts from the transmission cover. Remove the engine hanger nut.



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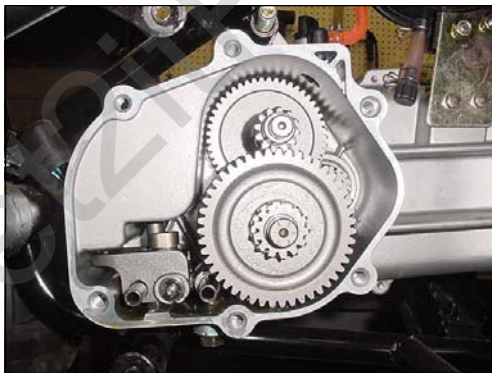


Service Bulletin

Bulletin No: 0036
Date: 01/06/06

RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

Step 7



Remove the transmission cover and the gasket.

Step 8



Next remove the two Phillips head screws from the shift motor cover. This will expose the shift motor.

Step 9



Remove the shift motor as shown in picture.

Step 10



Now remove the 3 screws from the top of the shift motor. Inspect the reduction gears for damage; replace as needed



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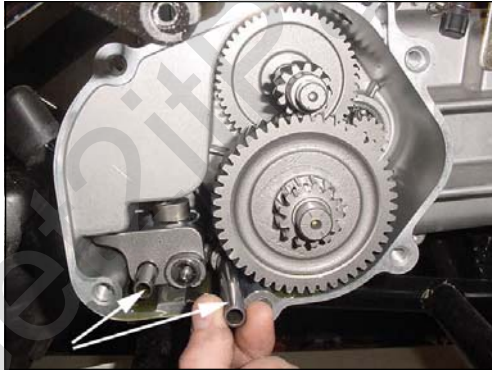


Service Bulletin

Bulletin No: 0036
Date: 01/06/06

RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

Step 11



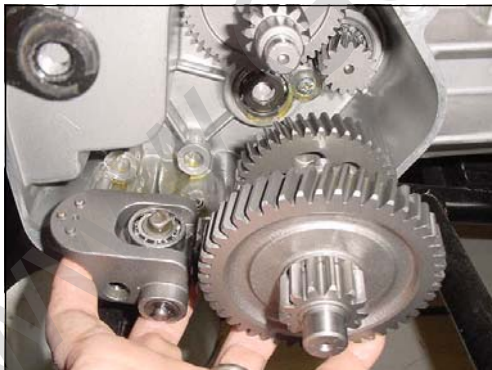
Remove the 2 pins from the shift push and the shift fork.

Step 12



Unscrew the bolt on the bottom of the transmission. This will release the spring and ball bearing. This bolt is located just in front of the drain bolt.

Step 13



Disassemble the transmission. First, remove the knock block, then remove the shift push and shift shaft as one piece as shown in picture.

Step 14



Once the shift push is out of the transmission, remove the c-clip and washer, and the pin and springs will slide out from the shift fork as shown.



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Service Bulletin

Bulletin No: 0036
Date: 01/06/06

RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

Step 15



The new shift push has a black insulator piece installed. Also, the length of the cam area is increased. This will allow less stress on the shift motor reduction gears.

Step 16



Now, install the new shift push with the shift fork. Insert the pin and springs. Depress the fork until the c-clip can be installed. We recommend using a press, but it is not necessary for this installation.

Step 17



Now, reassemble the shift fork with the gear shift shaft, making sure that the washer is on the front side of this shaft as shown in picture.

Step 18



Make sure the cam is in this position as shown in picture when installing. This will make it easier to install the knock block once the assembly is in the transmission.



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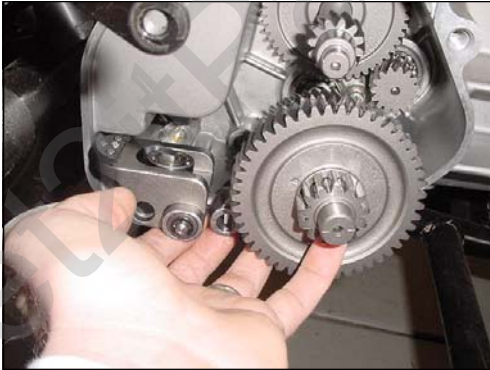


Service Bulletin

Bulletin No: 0036
Date: 01/06/06

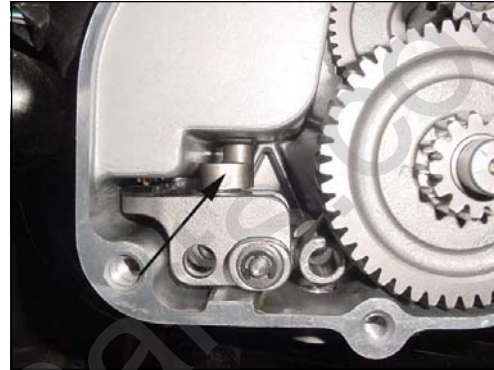
RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

Step 19



Install the shift push and the gear shift shaft as one assembly as shown. The cam needs to be aligned into the indicator hole in the case. This will lock the shift push in place. Also, reinstall the pins as shown in step 11.

Step 20



Once the gears are installed, the knock block can be installed with a pair of needle nose pliers. Align it as shown in picture.

Step 21



Install the gasket and the shift motor. The motor has a "D" shaped keyway that is keyed to the knock block. Make sure this is aligned.

Step 22



Connect the wires to the shift motor. The red wire connection has a red dot to ensure correct polarity. Now, install the shift motor cap in reverse order as shown in step 8.



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Bulletin No: 0036
Date: 01/06/06

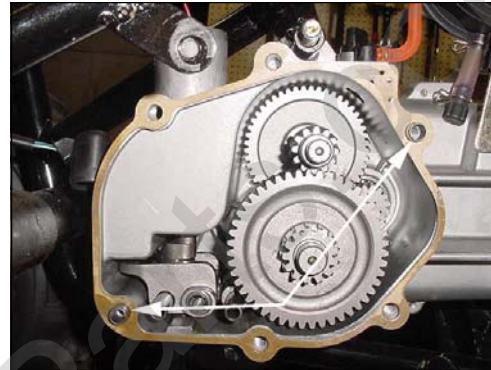
RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

Step 23



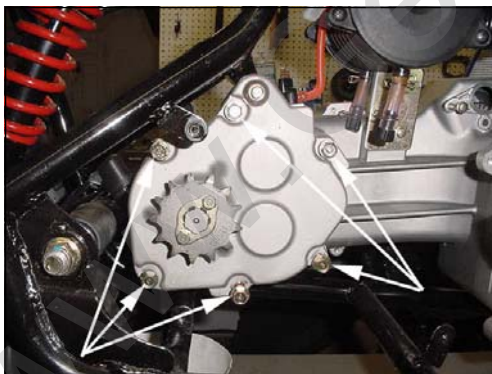
Reinstall the ball bearing the spring and the bolt in reverse order from step 12. Also, reinstall the drain bolt as shown in step 5.

Step 24



Clean the transmission gasket surface. Install the two indicator pins as shown in picture. Now, reinstall the gasket and the transmission cover.

Step 25



Tighten the six cover bolts and the engine hanger bolt and nut as shown. Torque to 15-18ft lbs.

Step 26



Remove the filler plug and fill the transmission with 10.2oz of 80-90weight gear oil.



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Service Bulletin

Bulletin No: 0036
Date: 01/06/056

RX4-90R Not shifting properly, shift motor making noise, or indicator lights blinking.

Step 27



Now reinstall the following parts in reverse order of their removal. Start with the drive chain, the chain guard and the exhaust pipe. Install the rear fender and the RH footrest.

Step 28



Reinstall the battery, the CDI box, and the shift motor. Test the operation of the shift motor to make sure it is engaging in each gear.



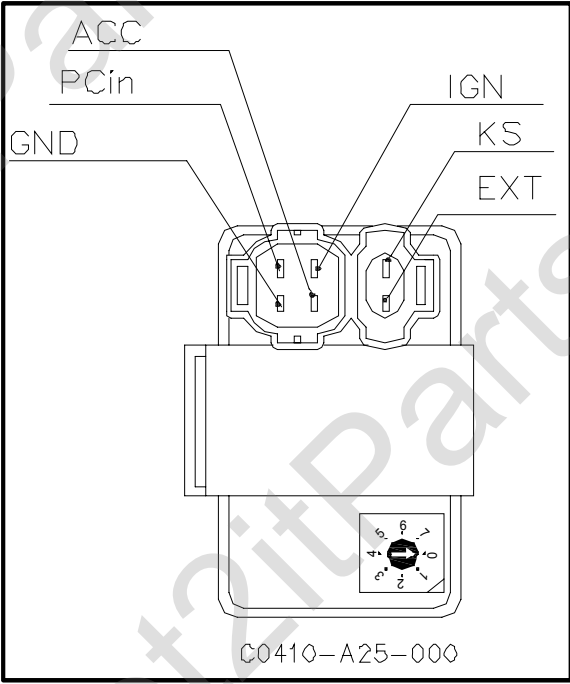
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Service Bulletin

Bulletin No.: **SB-0043**
 Date: 05/01/2006

C.D.I. Module Specifications Viper 70 & 70M (4 Cycle)



RX4-70 & RX4-70M -- C0410-A25-0000

Electric resistance(Ω) specification

	ACC	Pcin	IGN	GND	EXT	KS
ACC		200-500K	∞	10-20K	20-40K	500K-1M
Pcin	30K-∞		∞	50-70	80-100K	500K-1M
IGN	30K-∞	80-100K		1-3K	5-7K	100-300K
GND	30K-∞	60-70K	∞		1-3K	100-300K
EXT	∞	300-500K	∞	100-200K		100-200K
KS	∞	∞	∞	∞	∞	

Specifications highlighted in yellow are the suggested critical testing points. Test points should be tested first.

We suggest using analogy type multi-meter to test the electric resistance. We have found using digital type meter produces to many inaccurate readings.



ETON America, LLC



Service Bulletin

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E-TON ATV, Scooter and Utility Kart Headlight Wattages

Head Light Wattages

Model	Factory	Maximum
Viper 70-4	10w	12w
Viper 90-4	10w	12w
Viper 150	20w	50w
Yukon 150	20w	50w
Vector 250	35w	90w
Beamer II	18w	24w
Beamer III	18w	24w
Beamer Matrix	18w	24w
Beamer R2	18w	24w
Beamer R4	18w	50w
Rover	N/A	12w
Rover GT	N/A	24w

Per: JI-EE Engineers

5/24/2007

