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PREFACE

This service manual describes the servicing procedures and special inspection/adjustment instructions for the KYMCO SNIPER 100/50.

In this manual, many illustrations and drawings are used for better understanding. The information and contents included in this manual may be different with the motorcycle in case specifications are changed.

**KWANG YANG MOTOR CO., LTD.
SERVICE DIVISION
EDUCATION SECTION**

SPECIFICATIONS

KBN100 GAK50



Name & Model			
Overall Length (mm)		1725	
Overall Width (mm)		625	
Overall Height (mm)		1040	
Wheel Base (mm)		1180	
Engine Type		Single Cylinder 2-Stroke	
Displacement (cc)		101.3 cc	
Weight (Kg)	Front Wheel	35.5 kg	
	Rear Wheel	51.5 kg	
	Total	87 kg	
Seating Capacity		(110kg)	
Dry Weight(Kg)	Front Wheel	70 kg	
	Rear Wheel	127 kg	
	Total	197 kg	
Tires	Front Wheel	3.00-10-4PR	
	Rear Wheel	90/90-10(50J)	
Ground Clearance (m)			
Braking Distance (m) (Initial Speed Km/h)			
Min. Turning Radius			
Starting System		Starting Motor and Kick Starter	
Fuel Type		Gasoline, 2-stroke Motor Oil	
Cylinder Arrangement			
Combustion Chamber Type			
Valve Arrangement		Reed Valve used with piston	
Bore x Stroke (mm)		51 x 49.6	
Compression Ratio		7.1:1	
Compression Pressure(kg/cm ² rpm)		13kg/cm ² 6000	
Max. Output (ps/rpm)		8.8/6750 ps/rpm	
Max. Torque(kg m/rpm)		0.977/5500 kg m/rpm	
Port Timing	Intake	Open	Automatic Controlled
		Close	Automatic Controlled
	Exhaust	Open	_____
		Close	_____
	Scavenge	Open	_____
		Close	_____
Idle Speed (rpm)		1800 ± 100rpm	
Lubrication Type		Separate Type	
Oil Pump Type		Plunger Type	
Oil Filter Type		Full-flow Filtration	

Lubrication Oil Capacity(ℓ)		1.2ℓ
Air Cleaner Type & No.		
Fuel Capacity (ℓ)		6.8 ℓ
Carbure- tor	Type	PB2AC
	Piston Dia. (mm)	_____
	Venturi Dia. (mm)	16mm equivalent
Ignition System Type		Electromagnetic CDI Ignition
Ignition Timing F Mark		14° ± 2BTDC/1800rpm
Spark Plug	NGK	BR6-4SA
	ND	_____
Spark Plug Gap (mm)		0.6~0.7mm
Battery Capacity(AH)		12V5AH
Power to Transmission Gear		Power - Transmission Gear - Clutch
Reduction Ratio of Power to Transmission Gear		_____
Clutch Type		Dry Multi-disc Clutch
Transmission Gear Operation Type		Automatic Centrifugal Type
Transmission Ratio 1 Speed		
Reduction Gear	Type	2-speed Reduction
	1st Reduction Ratio	_____
	2nd Reduction Ratio	_____
Transmission Gear Type		Non-stage Transmission
Tire Pressure (kg/cm ²)	Front	1.50kg/cm ²
	Rear	1.75kg/cm ²
Turning Angle		Right & Left
Brake System Type	Front	Expanding Type, Hydraulic Type
	Rear	↑
Suspension Type	Front	TEDESCOPIC
	Rear	UNIT SWING
Shock Absorber Type	Front	Cylinder Type
	Rear	Simple Single Action
Frame Type		Back Bone
Exhaust Emission Concentration	Particulates Emission	— %
	CO	Below 4.5%
	HC	Below 7000 ppm

SPECIFICATIONS

KBN100 GAK50

Name & Model			
Overall Length (mm)		1725	
Overall Width (mm)		620	
Overall Height (mm)		1040	
Wheel Base (mm)		1180	
Engine Type		Single Cylinder, 2-stroke	
Displacement		49.4 cc	
Weight (kg)	Front Wheel	35.5 kg	
	Rear Wheel	48.5 kg	
	Total	84 kg	
Seating Capacity		2人(110kg)	
Dry Weight(kg)	Front Wheel	70 kg	
	Rear Wheel	124 kg	
	Total	194 kg	
Tires	Front Wheel	3.00-10-4PR	
	Rear Wheel	90/90-10(50J)	
Ground Clearance (m)			
Brake Distance (m) (Initial Speed km/h)			
Min. Turning Radius (m)			
Starting System		Starting Motor and Kick Starter	
Fuel Type		Gasoline, 2-stroke Motor Oil	
Cylinder Arrangement			
Combustion Chamber Type			
Valve Arrangement		Reed Valve used with Piston	
Bore x Stroke (mm)		39 x 41.4	
Compression Ratio		7.2:1	
Compression Pressure(kg/cm ² rpm)		12kg/cm ² 6000	
Max. Output (ps/rpm)		5.6/7500 ps/rpm	
Max. Torque (kg m/rpm)		0.550/7000 kg m/rpm	
Port Timing	Intake	Open	Automatic Controlled
		Close	Automatic Controlled
	Exhaust	Open	_____
		Close	_____
	Scavenge	Open	_____
		Close	_____
Idle Speed (rpm)		1800 ± 100rpm	
Lubrication Type		Separate Type	
Oil Pump Type		Plunger Type	
Oil Filter Type		Full-Flow Filtration	

Lubrication Oil Capacity(ℓ)		1.2 ℓ
Air Cleaner Type & No.		Wet, Single element
Fuel Capacity (ℓ)		6.8 ℓ
Carburetor	Type	PB2BB
	Piston Dia (mm)	_____
	Venturi Dia.	14 mm equivalent
Ignition System Type		Electromagnetic CDI Ignition
Ignition Timing F Mark		17° ± 2BTDC/3000rpm
Spark Plug	NGK	BR8HSA
	ND	_____
Spark Plug Gap (mm)		0.6~0.7mm
Battery Capacity (AH)		12V4AH
Power to Transmission Gear		Power- Transmission Gear- Clutch
Reduction Ratio of Power to Transmission Gear		_____
Clutch Type		Dry Multi-disc Clutch
Transmission Gear Operation Type		Automatic Centrifugal Type
Transmission Ratio		1 speed
Reduction Gear	Type	_____
	1st Reduction Ratio	_____
	2nd Reduction Ratio	_____
Transmission Gear Type		Non-stage Transmission
Tire Pressure (kg/cm ²)	Front	1.50kg/cm ²
	Rear	1.75kg/cm ²
Turning Angle		Right & Left
Brake System Type	Front	Expanding Type, Hydraulic Type
	Rear	Expanding Type
Suspension Type	Front	TEDESCOPIC
	Rear	UNIT SWING
Absorber Type	Front	Cylinder Type
	Rear	Cylinder Single Action
Frame Type		Back Bone
Exhaust Emission Concentration	Particulates Emission	— %
	CO	Below 4.5%
	HC	Below 7000 ppm

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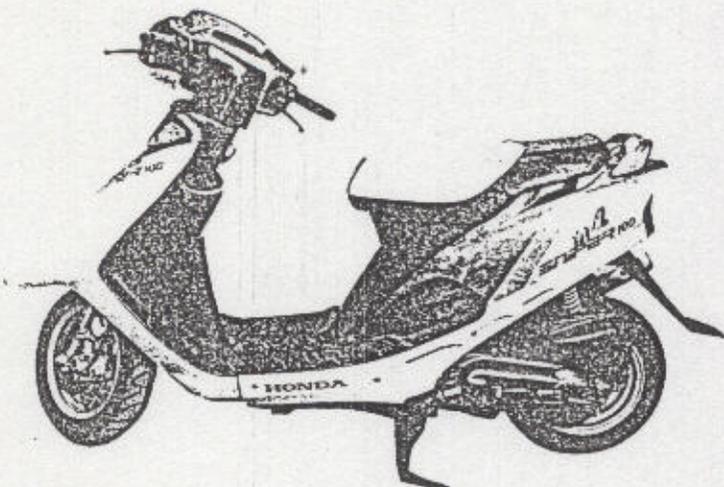
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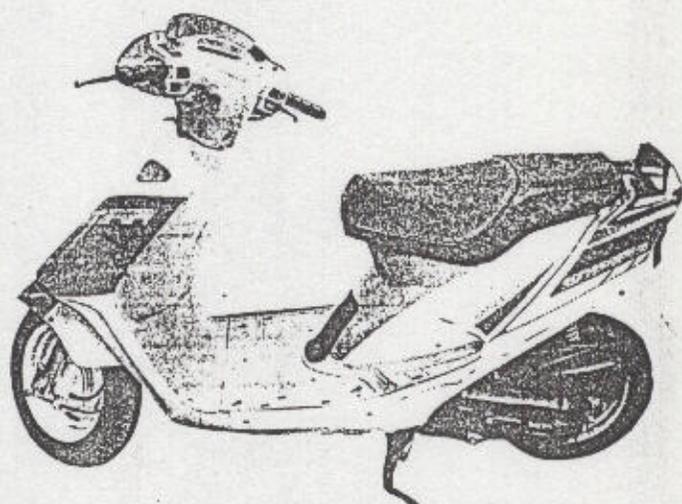
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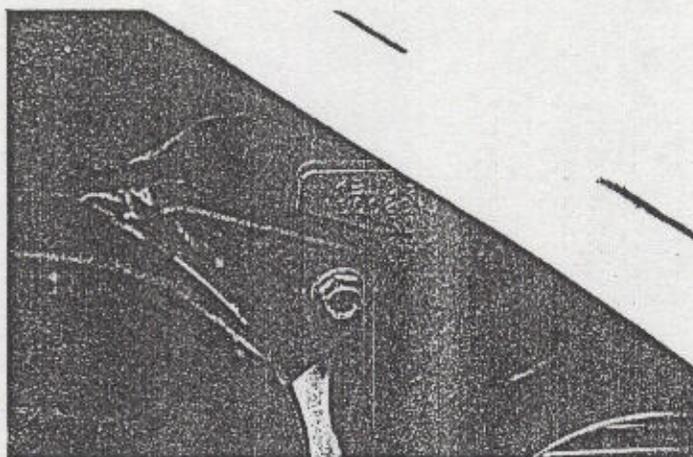
● ENGINE SERIAL NUMBER/IDENTIFICATION



SNIPER 100



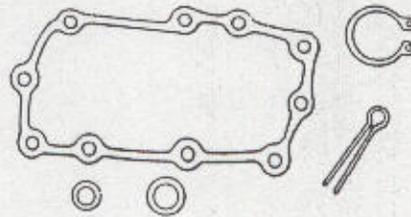
SNIPER 50



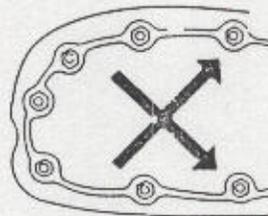
Location of Engine Serial Number

OPERATION PRECAUTIONS

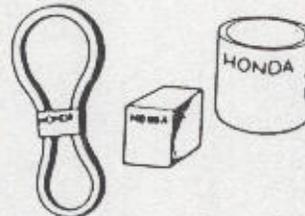
- Make sure to install new gaskets, O-ring, ring clamps, cotter pins, etc. when reassembling.



- When tightening bolts or nuts, begin with larger-diameter to smaller ones at several times, and tighten to the specified torque diagonally.

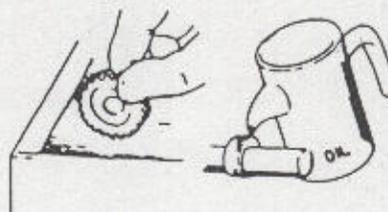


- Use genuine parts and lubricants.

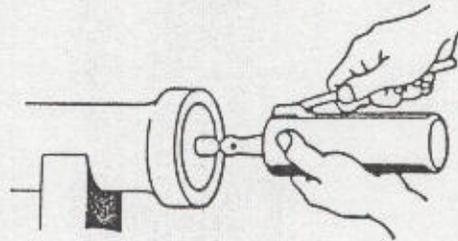


- When servicing the motorcycle, be sure to use special or common tools for removal and installation.

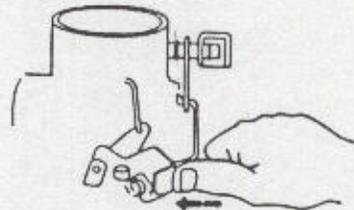
- After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.



- Apply or add designated greases and lubricants to specified lubrication points.



- After reassembly, check all parts for proper installation and operation.

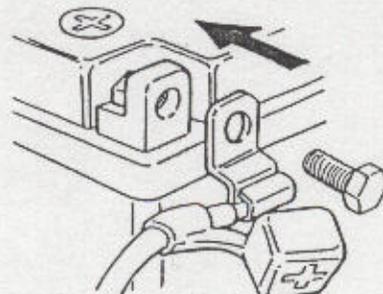
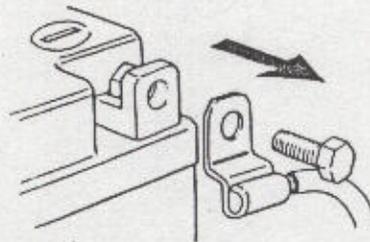


- When two persons work together, pay attention to the mutual working safety.

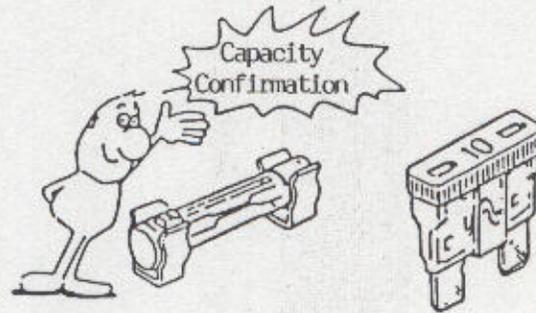
- Disconnect battery negative (-) terminal before operation.
- When using spanner and other tools, make sure not to damage the motorcycle surface.



- After operation, check all connecting points, fasteners and lines for proper connection and installation.
- When connecting the battery, the positive (+) terminal shall be connected first.
- After connection, apply grease to battery terminals.
- Terminal caps shall be securely installed.



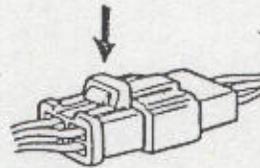
- If the fuse is burned out, find the cause and repair it. Replace with a new fuse according to designated specification.



- After operation, terminal caps shall be securely installed.

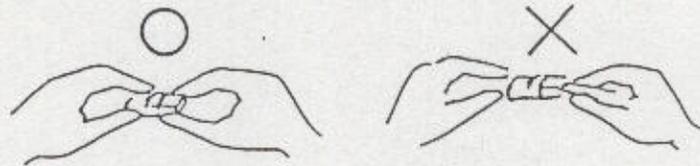


- When taking out the connector, the lock on connector shall be released before operation.

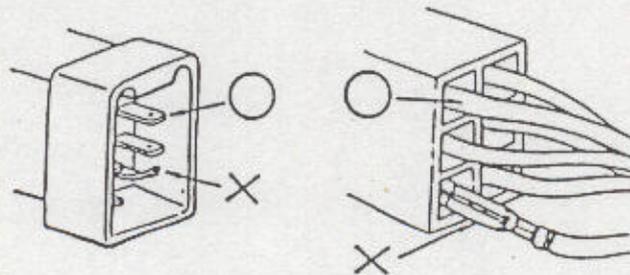


- Hold the connector body when connecting or disconnecting it.

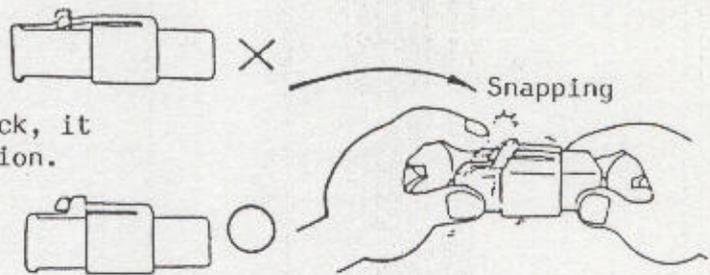
- Do not pull the connector wire.



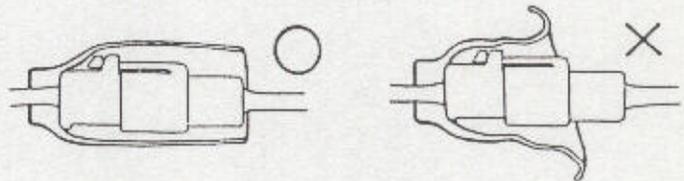
- Check if any connector terminal is bending, protruding or loose.



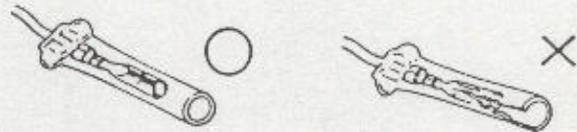
- The connector shall be completely inserted.
- If the double connector has a lock, it shall be locked at correct position.
- Check if there is any loose wire.



- Check the double connector cover for proper coverage and installation.



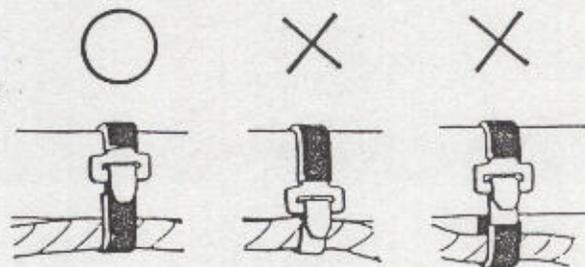
- Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



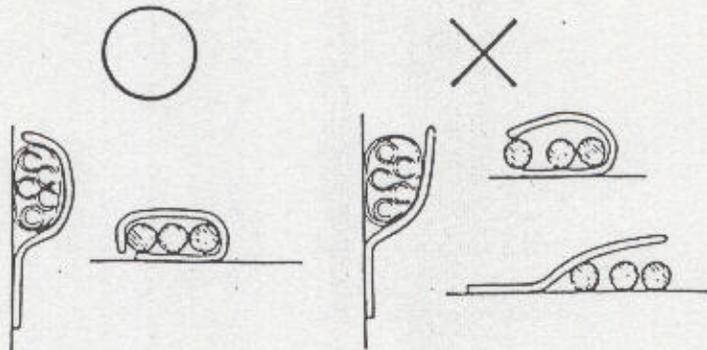
- Completely insert the terminal.
- Check the terminal cover for proper coverage.
- Do not make the opening of terminal cover face up.



- The wire harness binding belt shall be securely fastened on the specified position. The insulator on the aluminium binding belt shall be fixed with the wire harness.



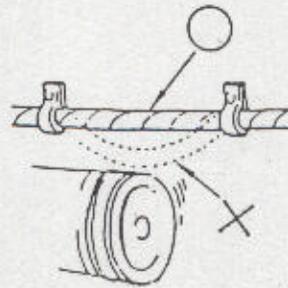
❑ The wire harness shall be firmly held by clips.



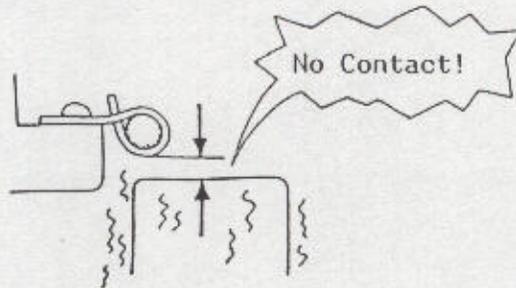
❑ For any clip welded on the motorcycle, do not make it hold wire at the welding point.



❑ When fixing the wire harness, do not make it contact the rotary, vibrating or movable parts.

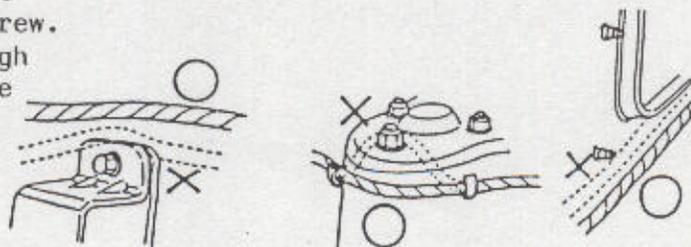


❑ When fixing the wire harness, do not make it contact the parts which will generate high heat.

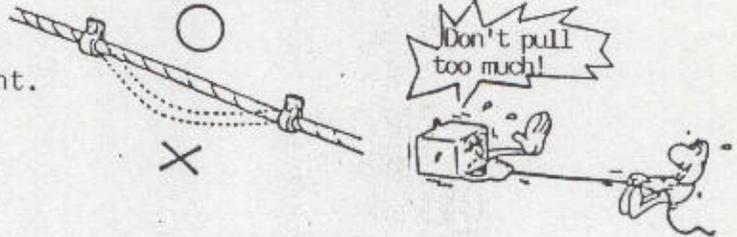


❑ The wire harness shall pass through the side of sharp angle and do not place it on the pointed top of screw.

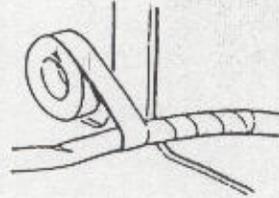
❑ The wire harness shall pass through the side of screw and do not place it on the pointed top of screw.



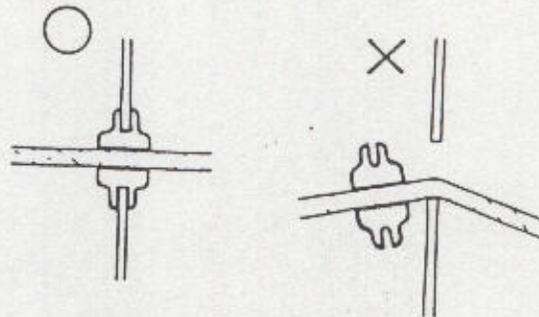
■ The wire harness shall not be installed too loose or too tight.



■ When wire harness has to contact sharp edge or angle, it shall be wrapped by tube or tape for protection.

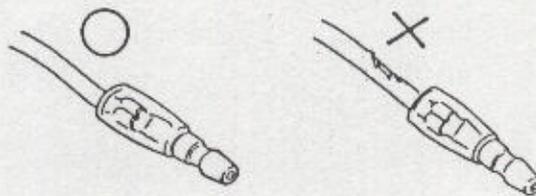


■ When rubber protecting cover is used to protect the wire harness, it shall be securely fixed.

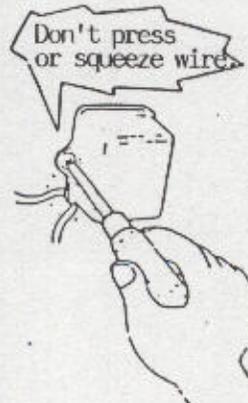


■ Do not break the sheath of wire.

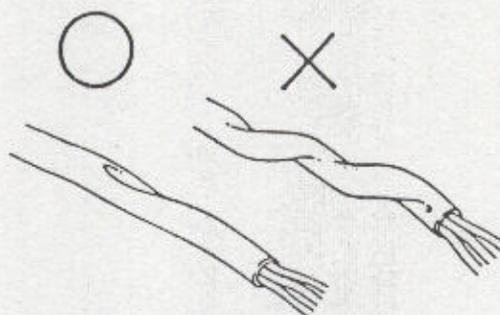
■ If wire sheath is broken, wrap it with tape or replace it with a new one.



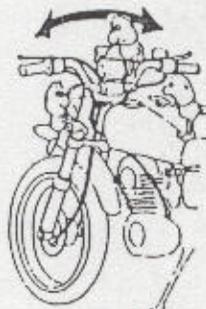
■ When installing other parts, do not press or squeeze the wire.



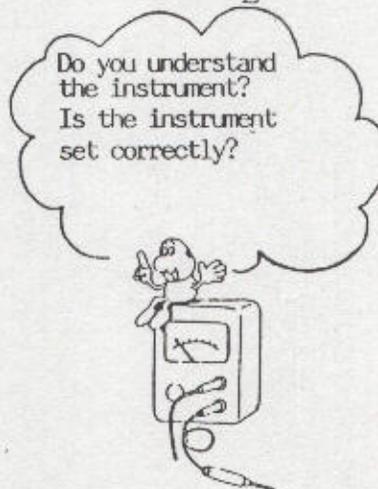
- Do not twist the wire harness during installation.



- Check if the wire harness is too loose, too tight, bending or rubbing sharp angle when the handlebar is turned right and left.



- When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.



- Be careful not to drop any parts.



- When rust is found on a terminal, remove the rust with sand paper or equivalent before connecting.



■ Symbols:

The following symbols represent the servicing methods and cautions included in this service manual.



Apply engine oil to the specified points (Use designated engine oil for lubrication)



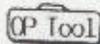
:Use common tool



:Apply grease for lubrication



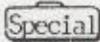
:Caution



:Use OP tool



:Warning



:Use special tool

(→ 12-3.)

:Refer to Page 12-3

⊙ SERVICE INFORMATION

⊙ ENGINE

Item	Standard (mm)		Service Limit (mm)	
	SNIPER 100	SNIPER 50	SNIPER 100	SNIPER 50
Cylinder head warpage	—	—	0.10	0.10
Piston O.D. (4mm from bottom of piston skirt)	50.955~ 50.97	38.970 38.955	50.90	38.90
Cylinder-to-piston clearance	0.03~0.07	←	0.10	0.10
Piston pin hole I.D.	14.002~ 14.008	12.002 12.008	14.03	12.03
Piston pin O.D.	13.994~ 14.0	11.994~ 12.0	13.98	11.98
Piston-to-piston pin clearance	0.002~ 0.014	←	0.03	←
Piston ring end gap (top/second)	0.30~0.40	0.10~0.25	0.50	0.40
Connecting rod small end I.D.	19.005~ 19.017	17.005 17.017	19.03	17.03
Cylinder bore	51.0~ 51.25	39.0 39.025	51.05	39.05
Drive belt width	17.5	18	16.5	17
Drive pulley bushing I.D.	23.989~ 24.052	←	24.24	←
Drive pulley boss O.D.	23.974~ 23.960	20.010 20.025	23.934	19.97
Weight roller O.D.	16.08	13.0	15.4	12.4
Clutch outer I.D.	112.0~ 112.2	107.0 107.2	112.5	107.5
Driven pulley spring free length	154.6	98.1	149.3	92.8
Driven pulley bushing O.D.	33.965~ 33.985	←	33.94	←
Driven pulley bushing I.D.	34.0~ 34.25	←	34.06	←
Connecting rod big end side clearance				
Connecting rod big end radial clearance				
Crankshaft runout A/B				

	SNIPER 100	SNIPER 50
Venturi dia.	16mm equivalent	14mm equivalent
Identification number	PB2AC	PB2BB
Float level	16.3mm	16.3mm
Main jet	88 #	78 #
Idle jet	35 #	40 #
Air screw opening	$1\frac{1}{4} \pm \frac{1}{4}$	$1\frac{1}{4} \pm \frac{1}{4}$
Idle speed	rpm 1800 ± 100	2000 ± 100
Throttle grip free play	2~6mm	2~6mm
Jet needle clip notch	1st notch	1st notch

● FRAME		Standard (mm)		Service Limit (mm)	
		SNIPER 100	SNIPER 50	SNIPER 100	SNIPER 50
Axle shaft runout		—	—	0.2	0.2
Front wheel rim runout	Radial			2.0	
	Axial			2.0	
Front shock absorber spring free length		1963	1963	193.2	193.2
Rear wheel rim runout				2.0	2.0
Brake drum I.D.	Front/Rear	110	110	111	111
Brake lining thickness	Front/Rear	4.0/4.0	4.0/4.0	2.0/2.0	2.0/2.0
Brake disc runout	Front/Rear	—	—	0.30	0.30
Rear shock absorber spring free length		232	232	225	225

● ELECTRICAL EQUIPMENT

Battery	Capacity		SNIPER 100	SNIPER 50
	Voltage		13.0~13.2V	13.0~13.2V
	Charging rate	Standard	0.5A/5H	0.4A/5H
Quick		5A/0.5H	4A/0.5H	
Spark plug	(NGK)		BR8ESA	BR8ESA
Spark plug gap			0.6~0.7	0.6~0.7
Ignition coil resistance	Primary coil		0.2~0.3Ω	0.2~0.3Ω
	Secondary coil (with spark plug cap)		7.8~9.0KΩ	8.0~9.3KΩ
	Secondary coil (without spark plug cap)		3.0~4.2KΩ	3.0~4.2KΩ
Pulser coil resistance (20°C)			90~150Ω	90~150Ω
Ignition timing			14° ±2BTDC/1800rpm	17° ±2BTDC/3000rpm

GENERAL INFORMATION

KBN100 GAK50

● TIGHTENING TORQUE

● ENGINE

Item	Thread Dia (mm)	Torque (kg-m)	Remarks
Cylinder head bolt	BF7 × 115	1.5~1.7	(cold)
Driven pulley nut	NH12	5.0~6.0	
Clutch outer nut	NH10	3.5~4.5	
Drive face nut	10	3.5~4.0	
Oil level check bolt	10	1.0~1.5	
Engine lock nut	BF10 × 70	4.5~5.5	
Engine hanger lock nut	BF10 × 50	4.5~5.5	
Exhaust pipe joint lock nut	NC 6mm	1.0~1.4	
Exhaust pipe lock bolt	BF8 × 35	3.0~3.6	
Spark plug		1.1~1.7	(cold)

● FRAME

Item	Thread Dia (mm)	Torque (kg-m)	Remarks
Handlebar lock nut	10	4~5	Flange bolt/U-nut
Steering stem nut	25.4	8.0~12.0	
Top ball race lock nut	25.4	0.5~1.3	
Front axle nut	12	5.0~7.0	Flange U-nut
Rear axle nut	14	10~12.0	Flange U-nut
Rear brake arm nut			Flange Nut
Front shock absorber bolt	8	2.4~3.0	Flange bolt/U-nut
Front shock absorber bottom bolt			Cross head
Front shock absorber bottom nut			
Front damper lock nut	8	1.5~2.5	Apply bolt locking agent
Front rocker shaft bolt			Flange bolt/U-nut
Front shock absorber nut	10	3.5~4.5	Flange nut
Rear shock absorber bottom bolt	8	2.4~3.0	
Rear damper lock nut	8	1.5~2.5	

Torque specifications listed above are for important fasteners. Others should be tightened to standard torque values below.

● STANDARD TORQUE VALUES

SH bolt: 8mm flange 6mm bolt

Item	Torque (kg-m)	Item	Torque (kg-m)
5mm bolt and nut	0.45~0.6	5mm screw	0.35~0.5
6mm bolt and nut	0.8~1.2	6mm screw and SH bolt	0.7~1.1
8mm bolt and nut	1.8~2.5	6mm flange bolt and nut	1.0~1.4
10mm bolt and nut	3.0~4.0	8mm flange bolt and nut	2.4~3.0
12mm bolt and nut	5.0~6.0	10mm flange bolt and nut	3.5~4.5

● SPECIAL AND COMMON TOOLS

● SPECIAL TOOLS

Tool Name	Tool No.	Remarks	Ref. Page
Universal bearing puller	07631-0010000	Crankshaft bearing removal	
Lock nut wrench 39mm	07916-187002	Drive face disassembly/assembly	
Lock socket wrench	07916-1870100	Top ball race holding	
Lock nut wrench	07916-KM10000	Steering stem nut removal/ installation	
Crankcase puller	07935-GK80000	Crankcase disassembly	
Crankcase puller	07935-KG80000	Crankcase disassembly	
Bearing remover set 12mm (Remover set 12mm) (Block)	07936-1660001 (07936-1660100) (07741-0010201)	Drive shaft bearing removal/ installation	
Bearing remover set 15mm (Remover set 15mm) (Remover head 15mm) (Remover shaft 15mm)	(07936-KC10000) (07936-KC10500) (07936-KC10200) (07936-KC10100)	Drive shaft bearing removal	
Bearing outer driver 28x30mm	07946-1870100	Bearing installation	
Bearing driver	07945-GC80000	Driven outer bearing installation	
Clutch spring compressor	07960-KM10000	Driven pulley disassembly/ assembly	
Crankshaft assembly socket	07965-GM00100	Driven shaft, crankshaft and crankcase assembly	
Rear shock absorber remover A	07967-GA70101	Front shock absorber dis- assembly/assembly	
Ball race driver	07946-GA70000	Steering stem bearing race	
Rear shock absorber remover B	07967-GA70200	Rear shock absorber dis- assembly/assembly	
Rear shock absorber remover	07967-KM10100	Front shock absorber dis- assembly/assembly	

● COMMON TOOLS

Tool Name	Tool No.	Remarks	Ref. Page
Float level gauge	07401-0010000	Carburetor fuel level check	
Universal holder	07725-0030000	Flywheel holding	
Flywheel puller	07733-0010000	Flywheel removal	
Driver pilot 12mm	07746-004200	Drive shaft bearing installation	

Tool Name	Tool No.	Remarks	Ref. Page
Bearing outer driver 32x35mm	07746-0010100	Drive shaft bearing and final drive shaft bearing installation	
Driver pilot	07746-0040300	Final drive shaft bearing installation	
Bearing outer driver 37x40mm	07746-0010200	Drive shaft bearing, final drive shaft bearing and crankshaft bearing installation	
Outer remover 24x26mm	07746-0010700	Drive pulley bearing installation	
Driver pilot 10mm	07746-0040100	Front wheel bearing installation	
Bearing driver pilot 17mm	07746-0040400	Drive pulley bearing installation	
		Drive shaft bearing, final drive shaft bearing and crankshaft bearing installation	
Bearing outer driver 42x47mm	07746-0010300	Crankshaft bearing installation	
Driver pilot 20mm	07746-0040500	Crankshaft bearing installation	
Bearing outer driver handle (A)	07749-0010000	Bearing installation Drive in ball race	
Bearing puller head 10mm	07746-0050100	Front wheel bearing removal	
Absorber spring compressor	07746-0050200	Front/rear shock absorber disassembly/assembly	
Bearing puller	07959-3290001	Front wheel bearing removal	
Pressure Tester Set	07410-0010000 (07410-0020100) (07410-0020200)	Cylinder compression gauge	

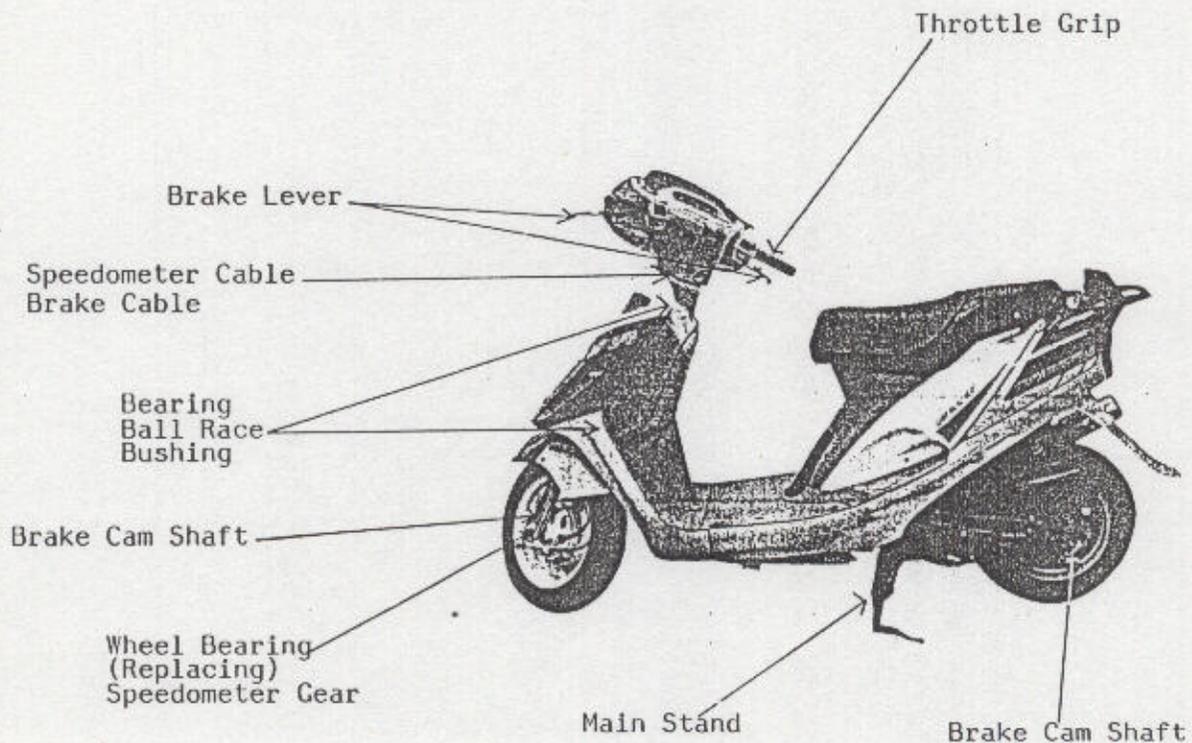
● LUBRICATION CHART

● ENGINE

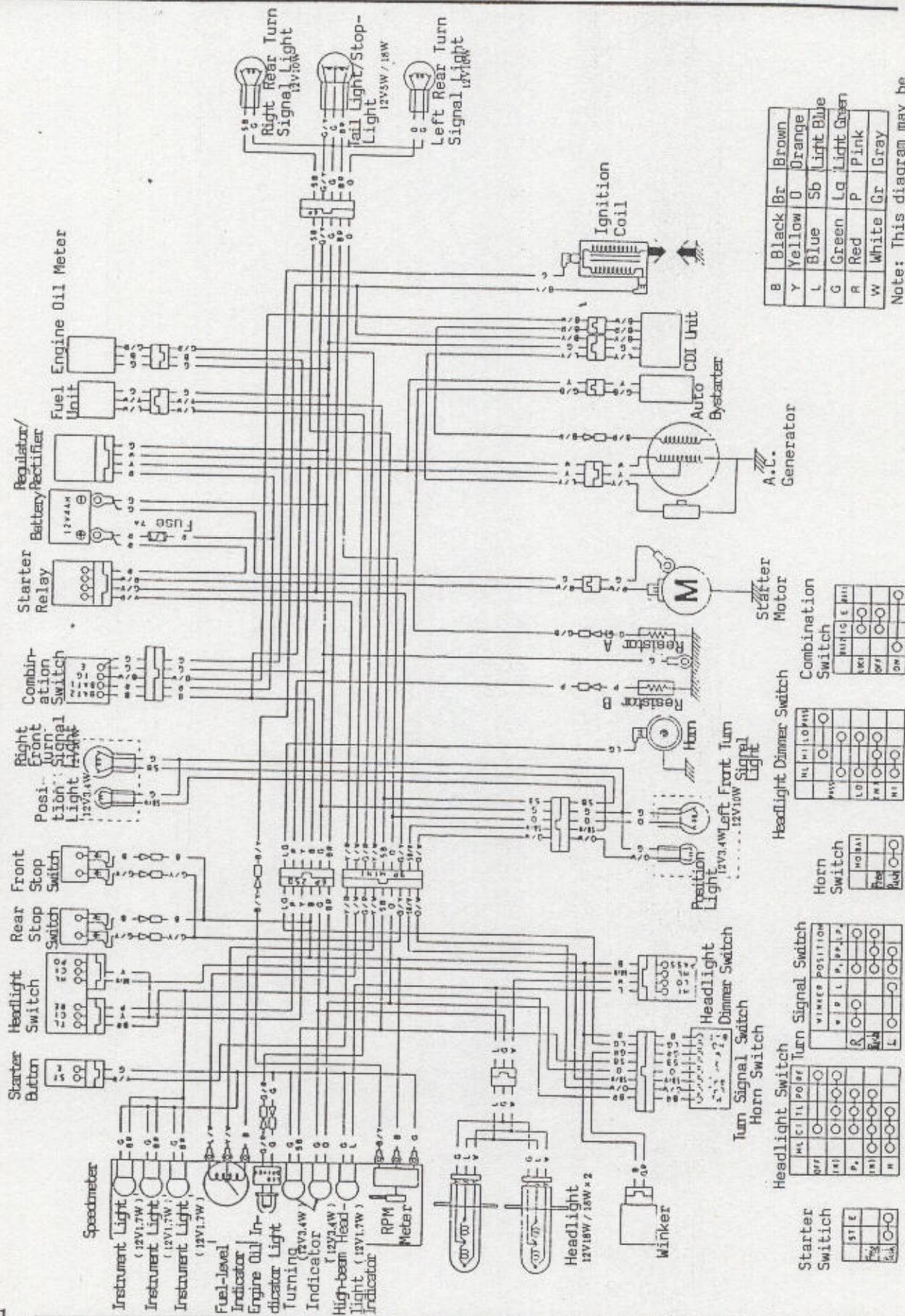
NO	Lubrication Points	Lubricant	Remarks
1	Crankcase sliding & movable parts	KYMCO ULTRA 2-stroke Motor Oil	
2	Cylinder sliding parts		
3	Drive gearbox (Final gear)	KYMCO SIGMA Gear Oil 90#	
4	Kick starter spindle bushing	Grease	
5	Drive pulley sliding parts	Grease	
6	Drive pinion sliding parts	Grease	

● FRAME

Apply clean engine oil or grease to movable parts not specified. This will avoid abnormal noise and rise the durability of the motorcycle.



WIRING DIAGRAM OF SNIPER 100



B	Black	Br	Brown
Y	Yellow	O	Orange
L	Blue	Sb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Grey

Note: This diagram may be different with the motorcycle.

ST	E	ON	OFF
ON	OFF	ON	OFF
OFF	ON	OFF	ON
OFF	OFF	ON	ON

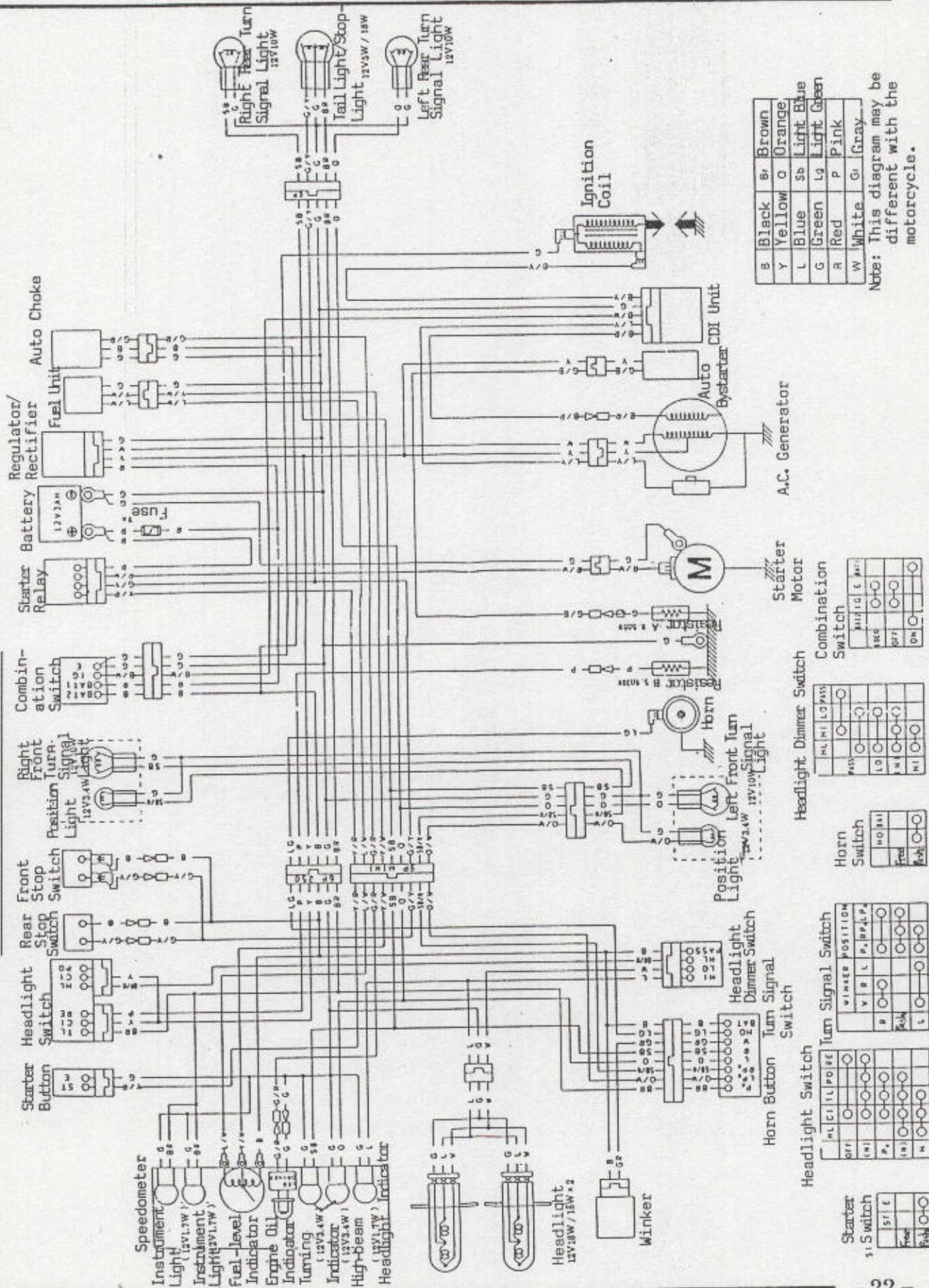
W	L	P	R	OFF
OFF	ON	ON	ON	ON
ON	ON	ON	ON	ON
ON	ON	ON	ON	ON

H	O	ON	OFF
ON	OFF	ON	OFF
OFF	ON	OFF	ON
OFF	OFF	ON	ON

H	L	ON	OFF
ON	OFF	ON	OFF
OFF	ON	OFF	ON
OFF	OFF	ON	ON

ON	OFF	ON	OFF
OFF	ON	OFF	ON
ON	ON	ON	ON
OFF	OFF	ON	ON

WIRING DIAGRAM OF SNIPER 50



B	Black	Br	Brown
Y	Yellow	O	Orange
L	Blue	S	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

Note: This diagram may be different with the motorcycle.

HL	MI	LO	PASS
ON	OFF	ON	OFF

HL	MI	LO	PASS
ON	OFF	ON	OFF

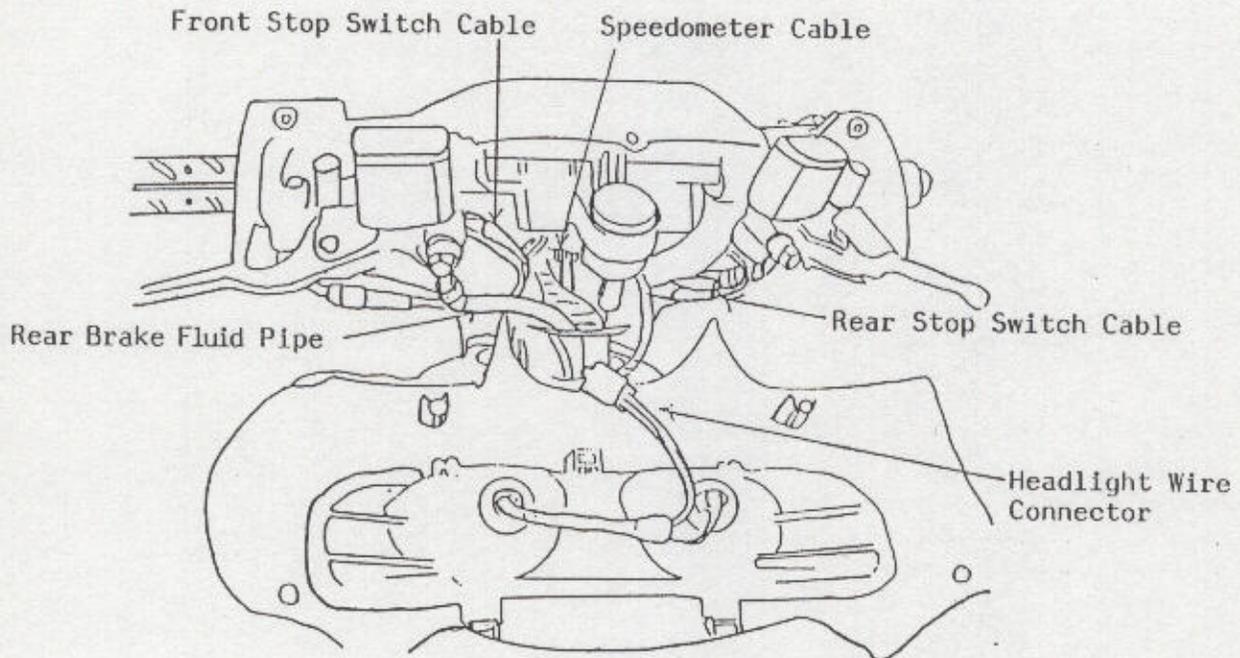
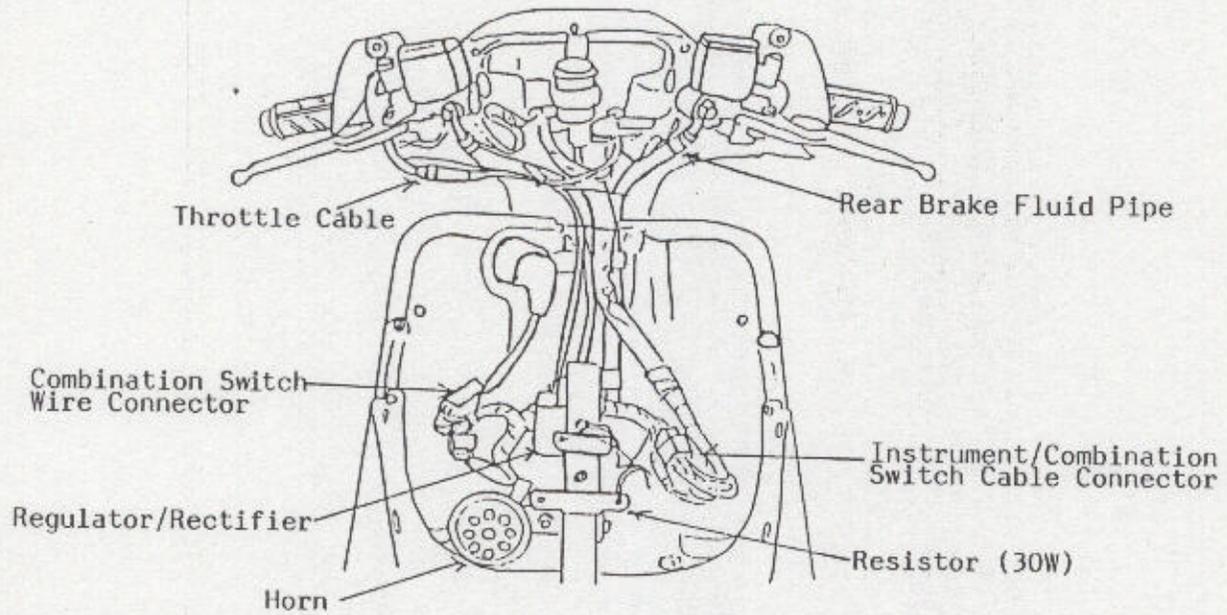
HL	MI	LO	PASS
ON	OFF	ON	OFF

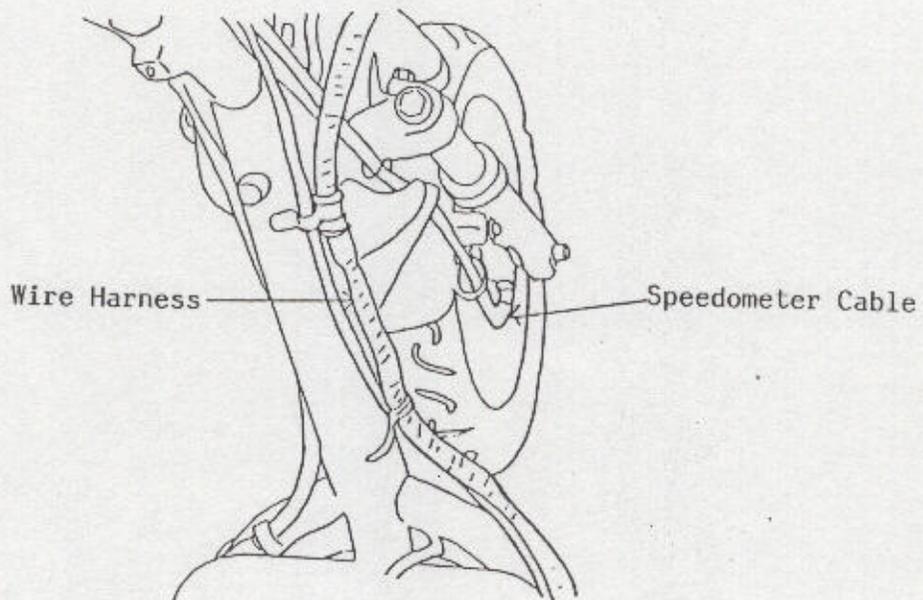
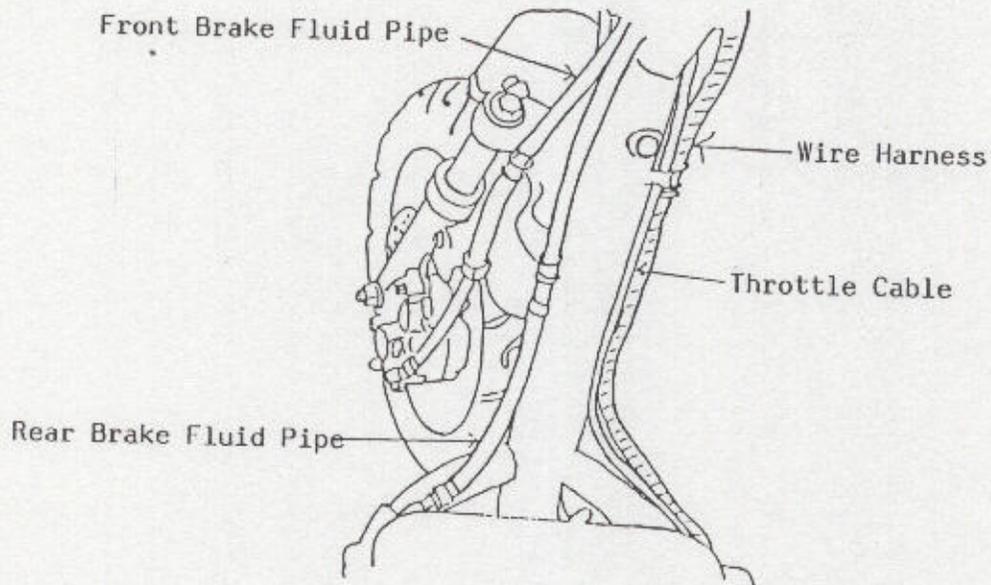
HL	MI	LO	PASS
ON	OFF	ON	OFF

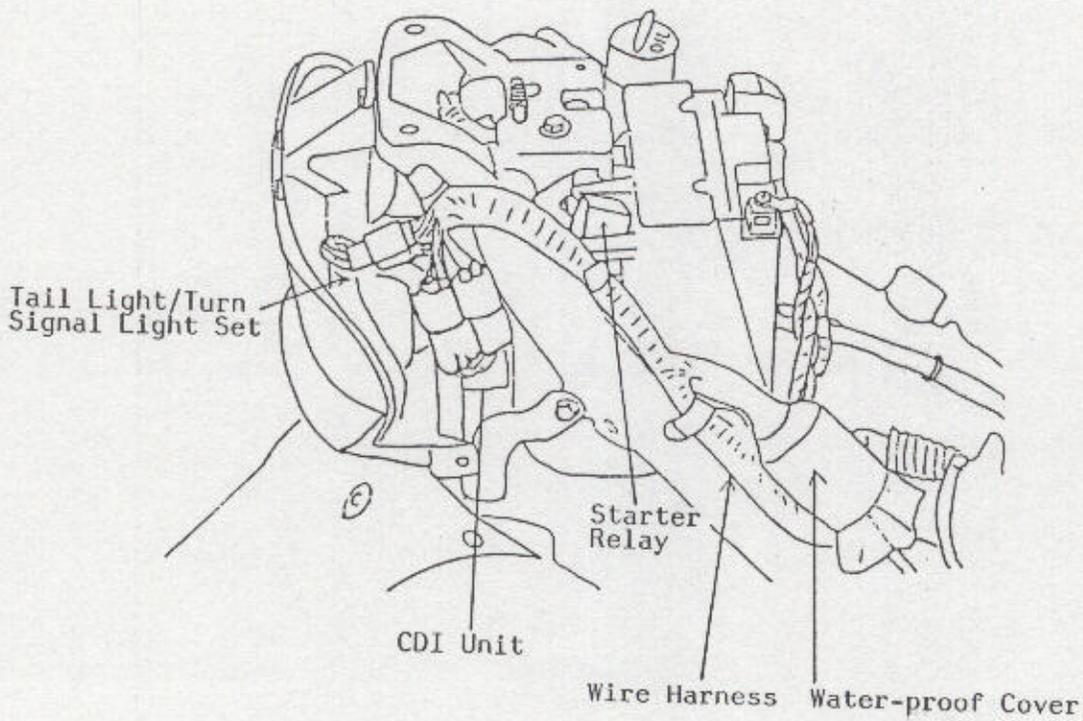
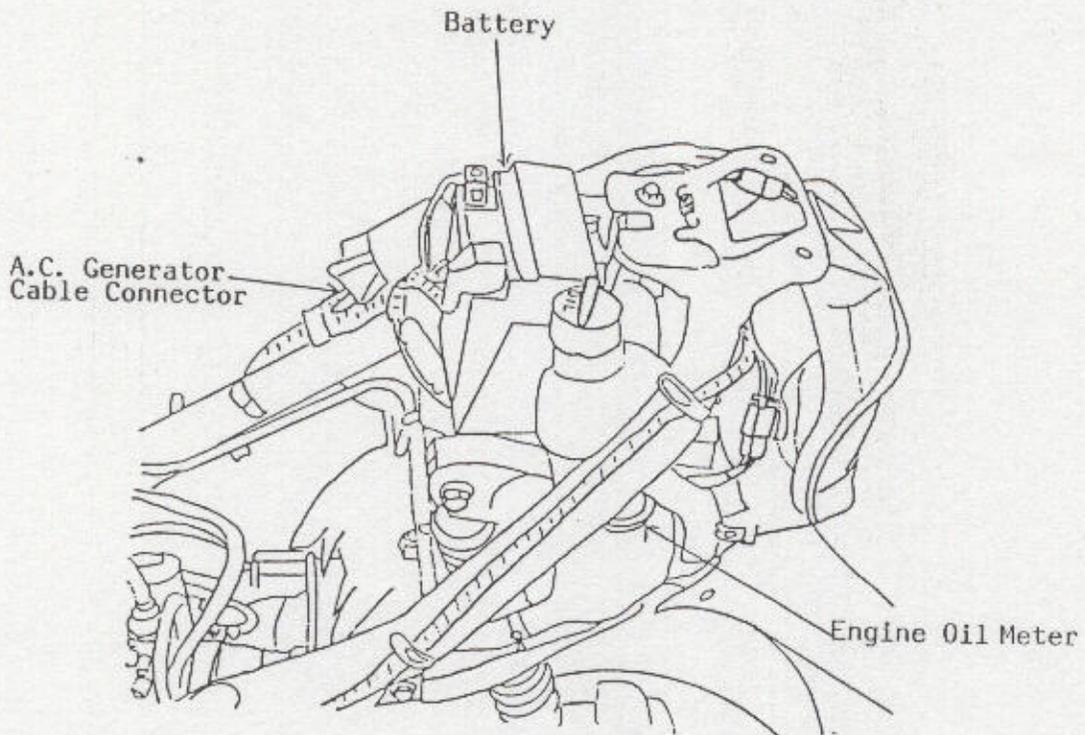
HL	MI	LO	PASS
ON	OFF	ON	OFF

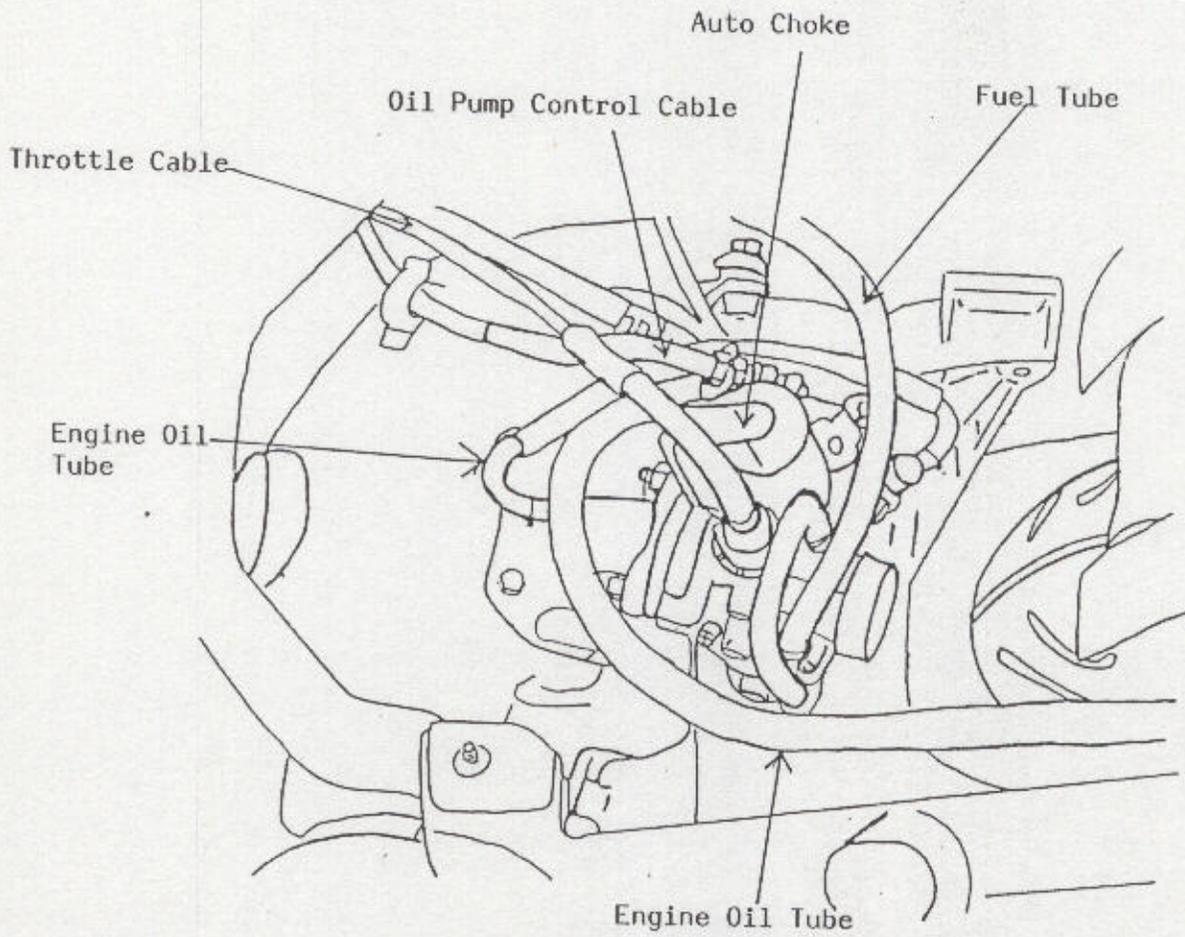
HL	MI	LO	PASS
ON	OFF	ON	OFF

CABLE & HARNESS ROUTING



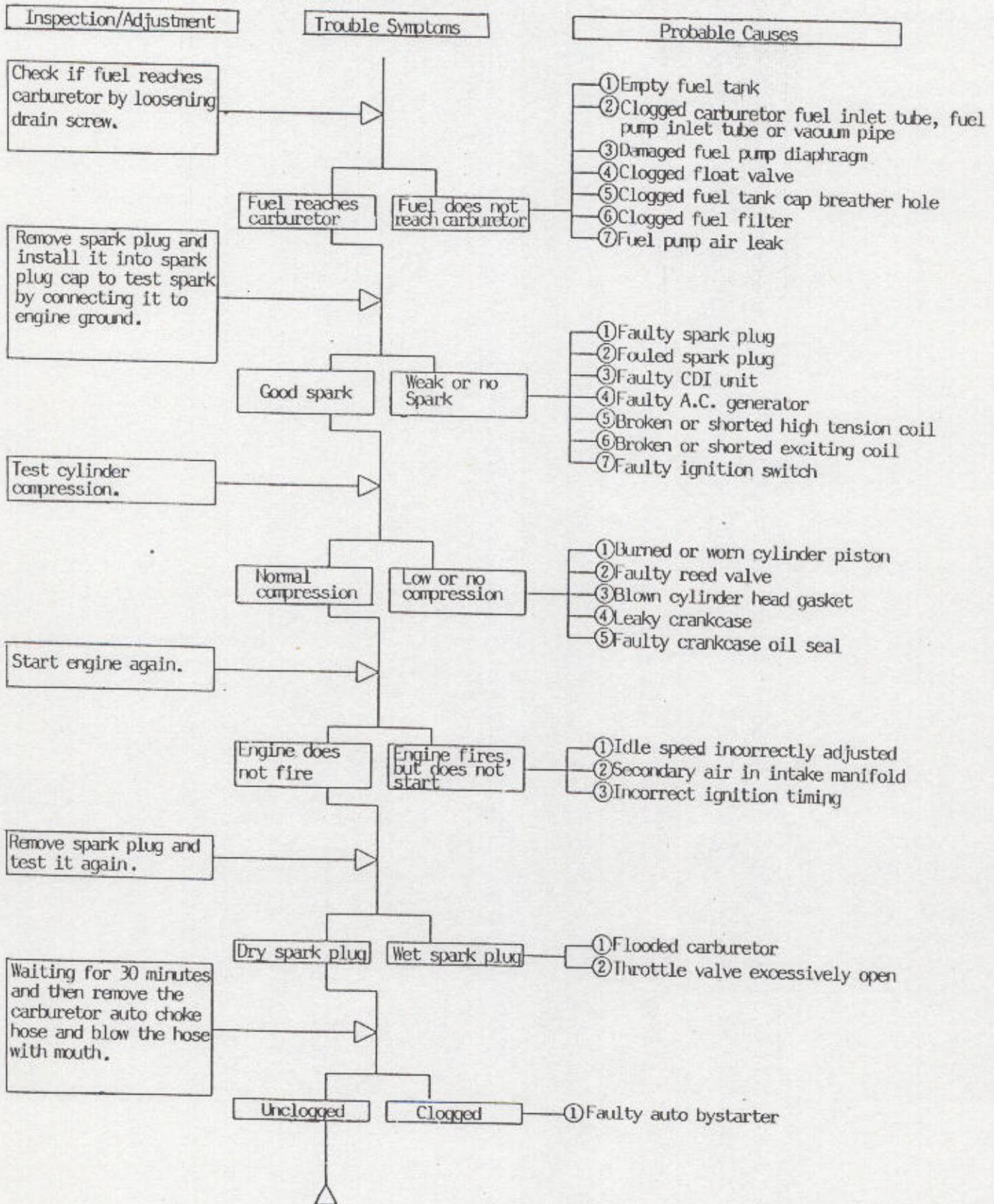




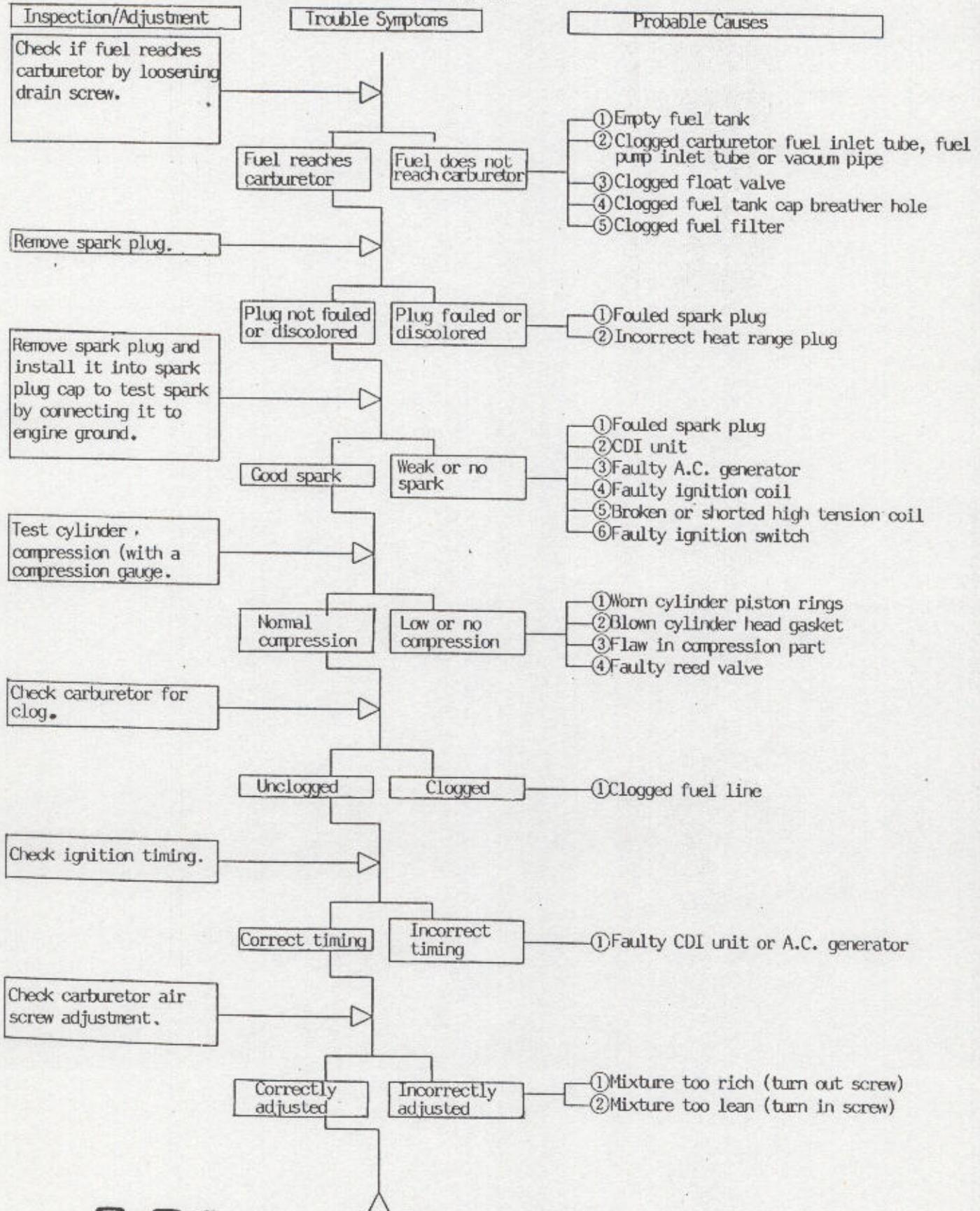


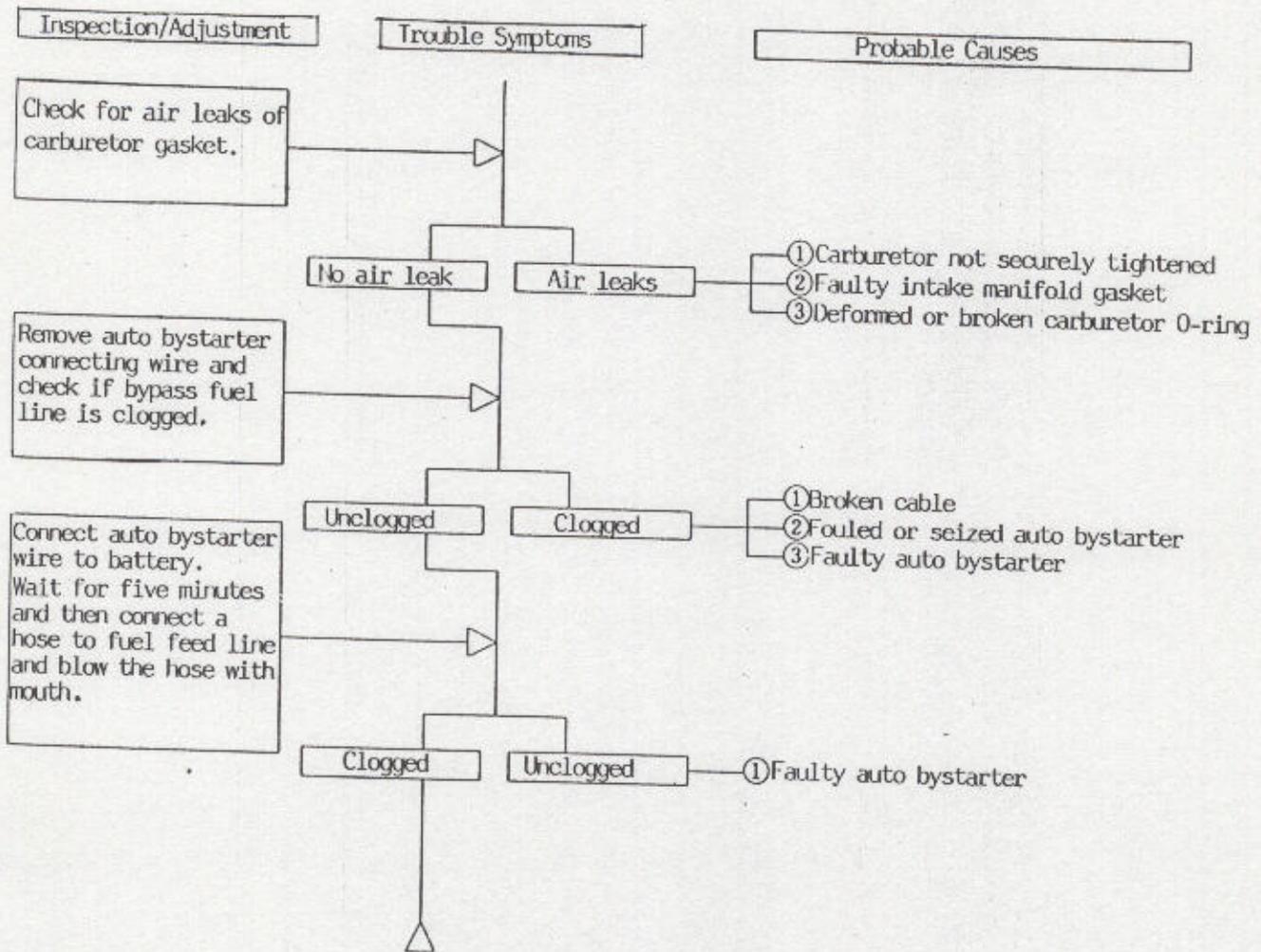
● TROUBLESHOOTING

● ENGINE WILL NOT START OR IS HARD TO START

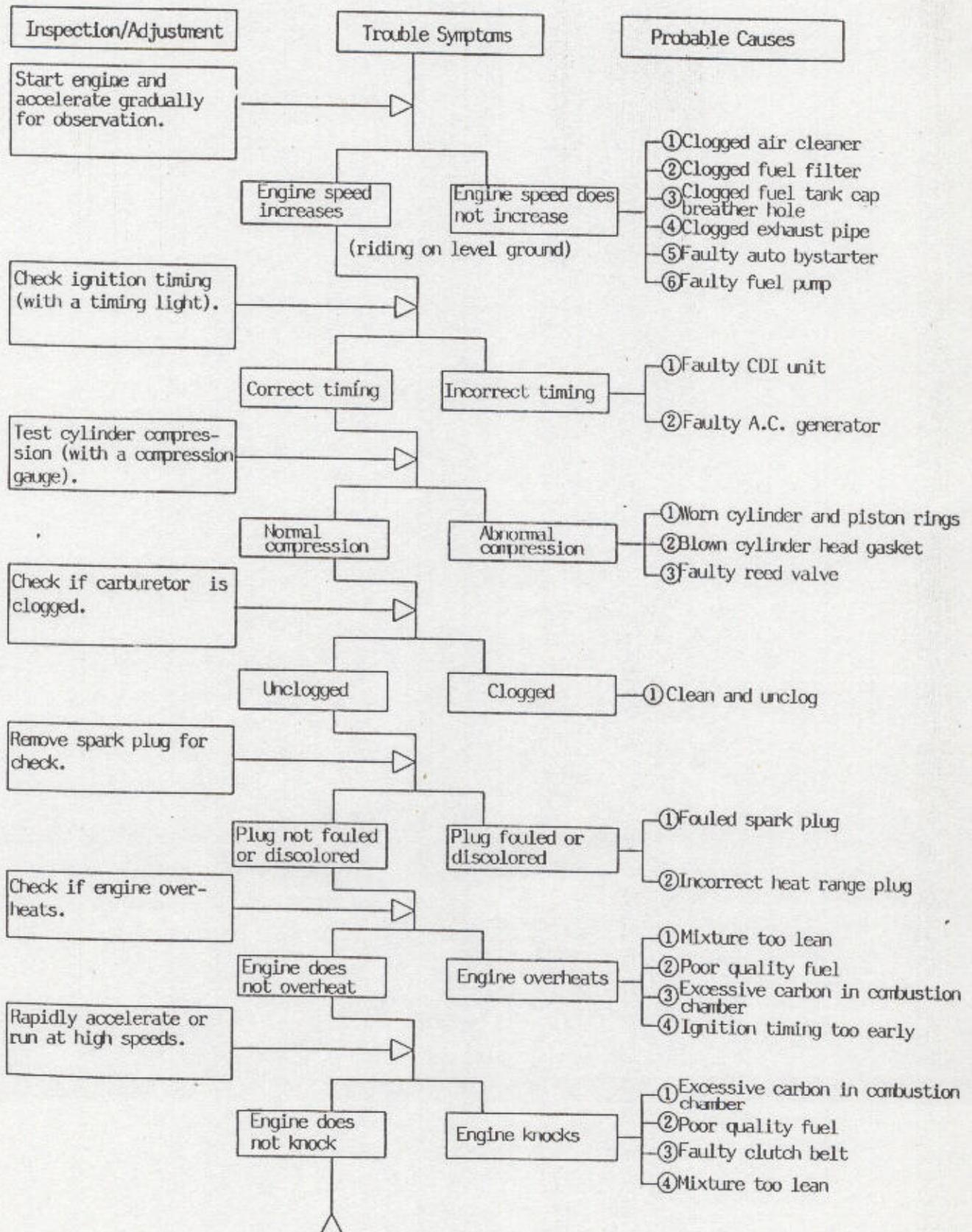


●ENGINE STOPS IMMEDIATELY AFTER IT IS STARTED

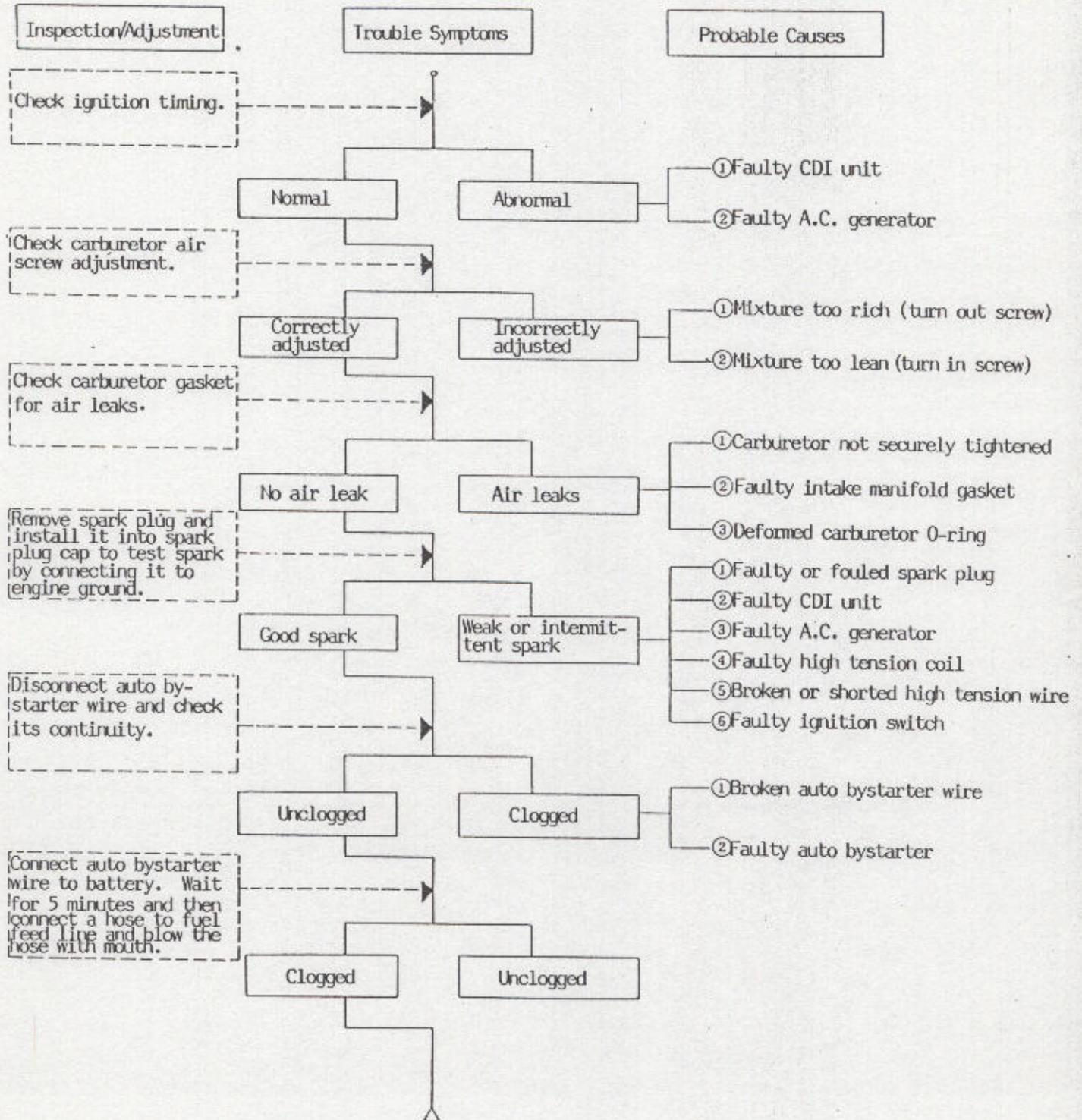




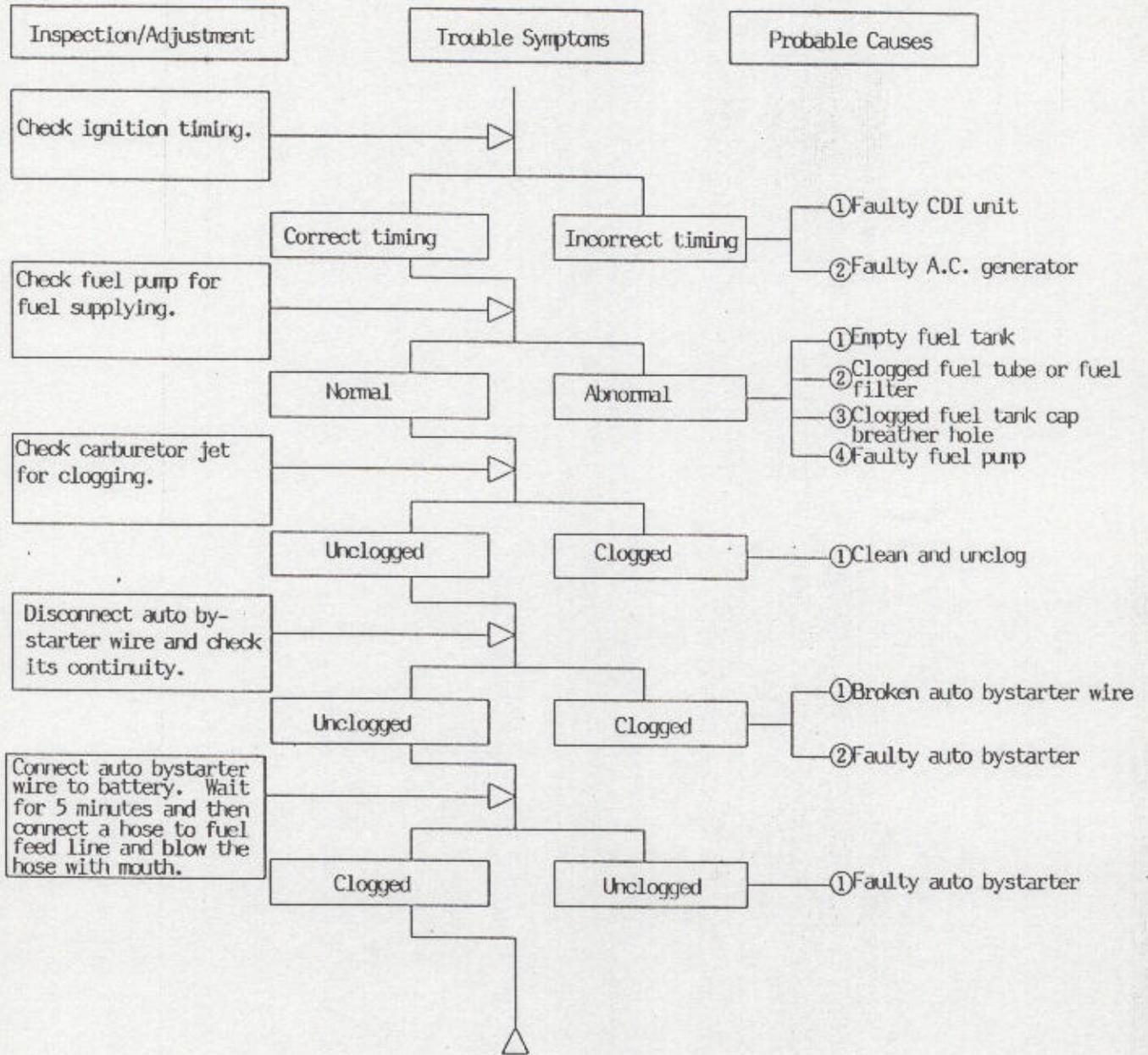
● ENGINE LACKS POWER



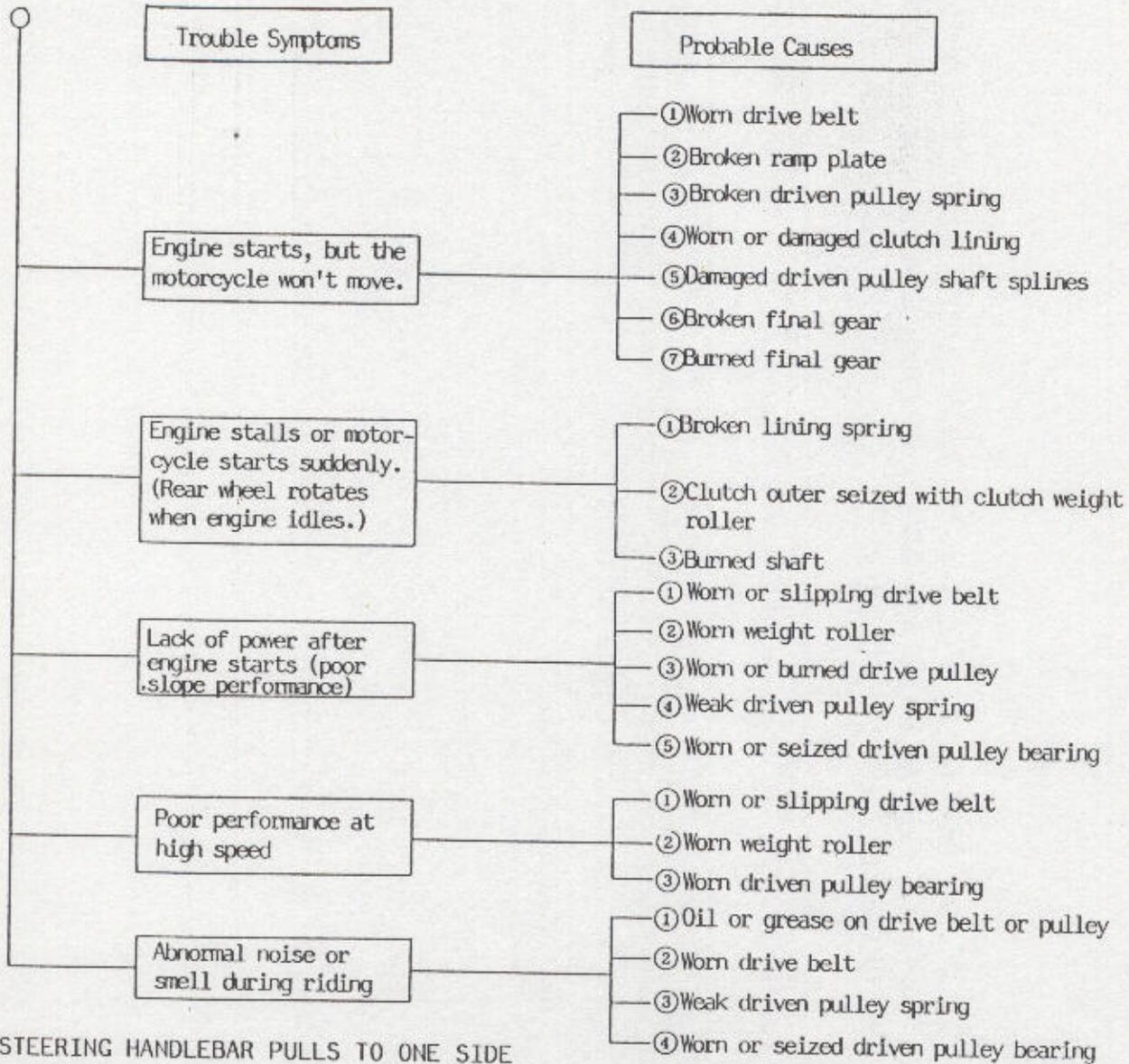
● POOR PERFORMANCE (ESPECIALLY AT IDLE AND LOW SPEED)



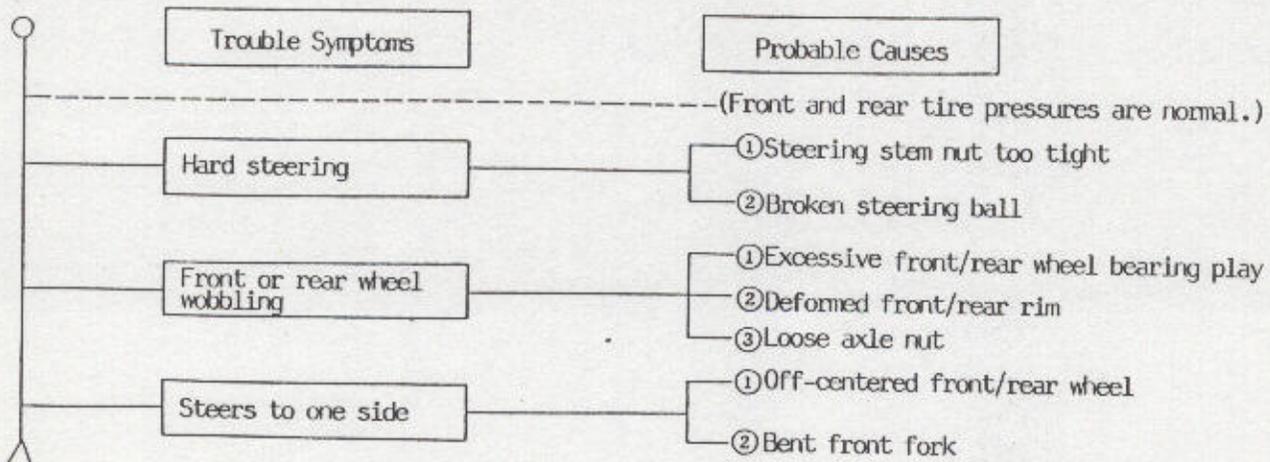
● POOR PERFORMANCE (HIGH SPEED)



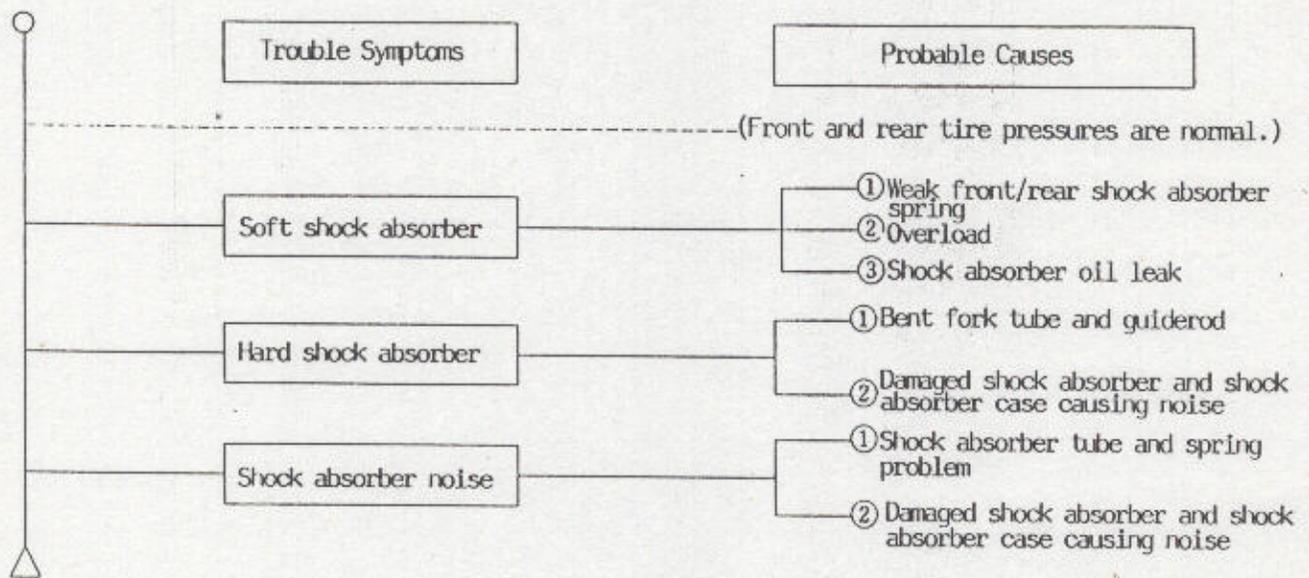
● CLUTCH, DRIVE PULLEY AND DRIVEN PULLEY



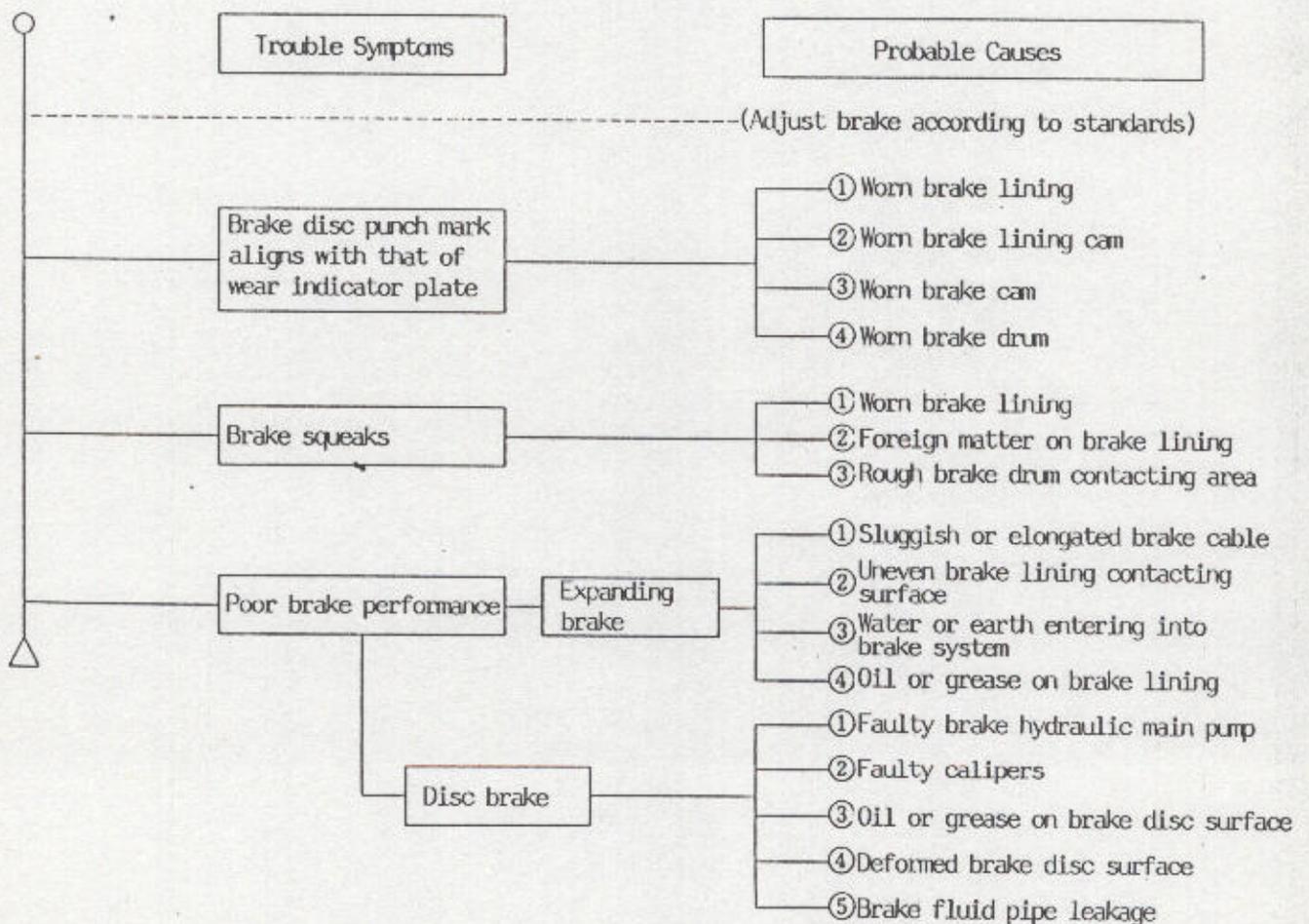
● STEERING HANDLEBAR PULLS TO ONE SIDE



●UNEVEN FRONT OR REAR SHOCK ABSORBER

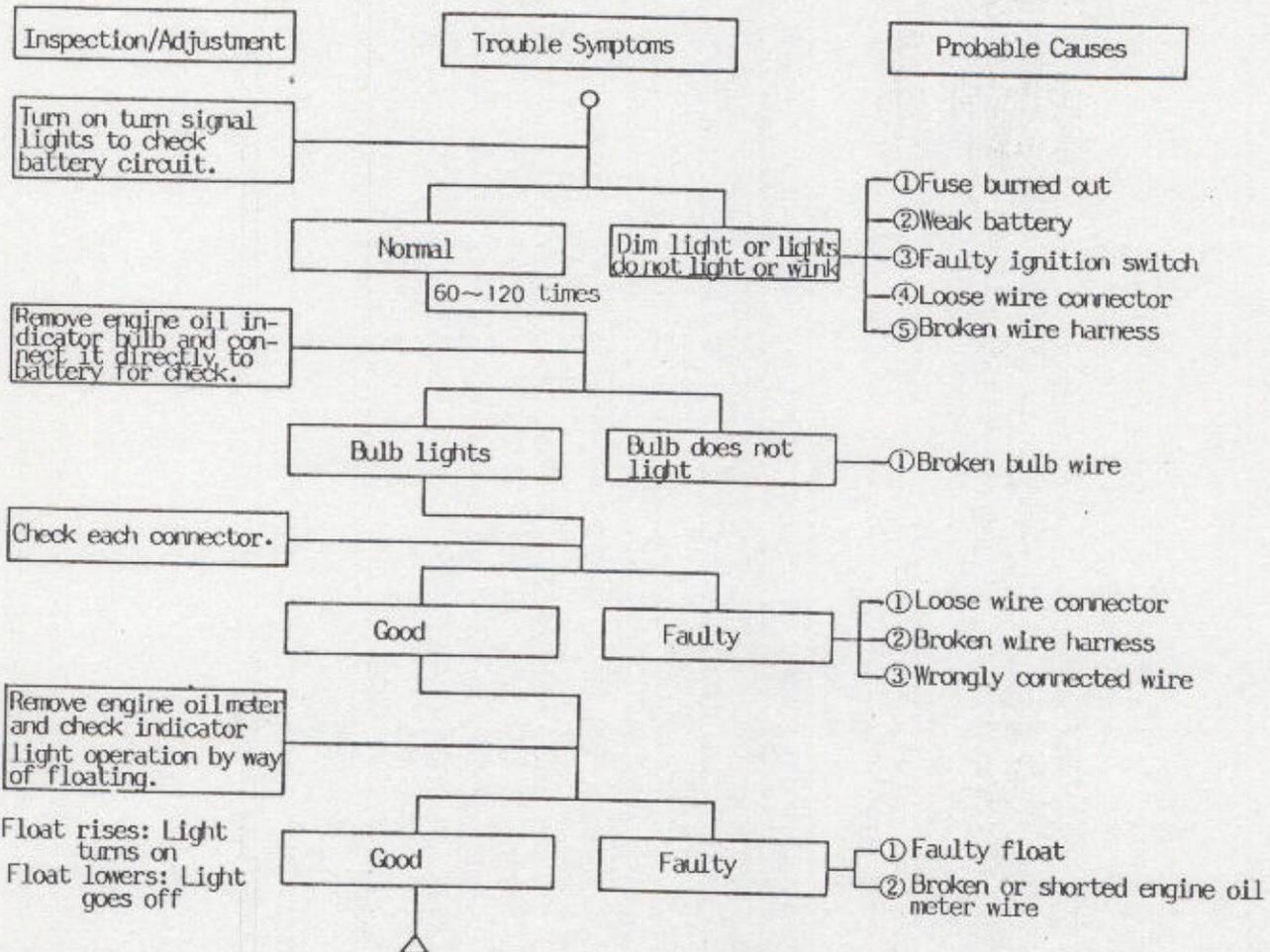


●POOR BRAKE PERFORMANCE

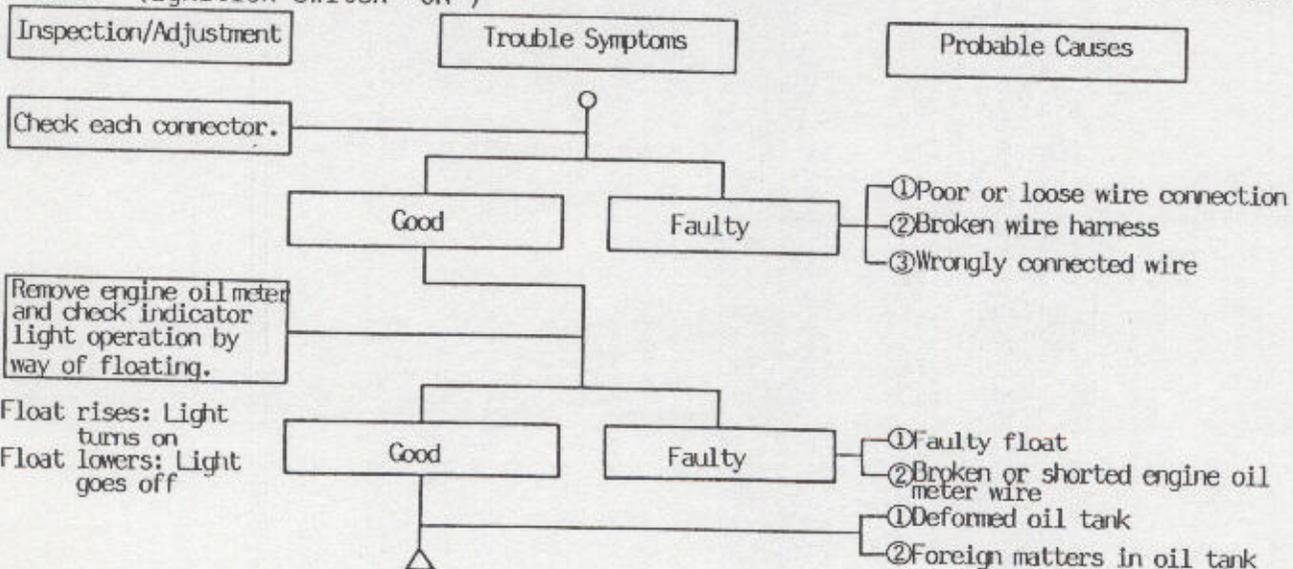


●ENGINE OIL INDICATOR

1.Engine oil indicator light does not display.(Ignition switch "ON")

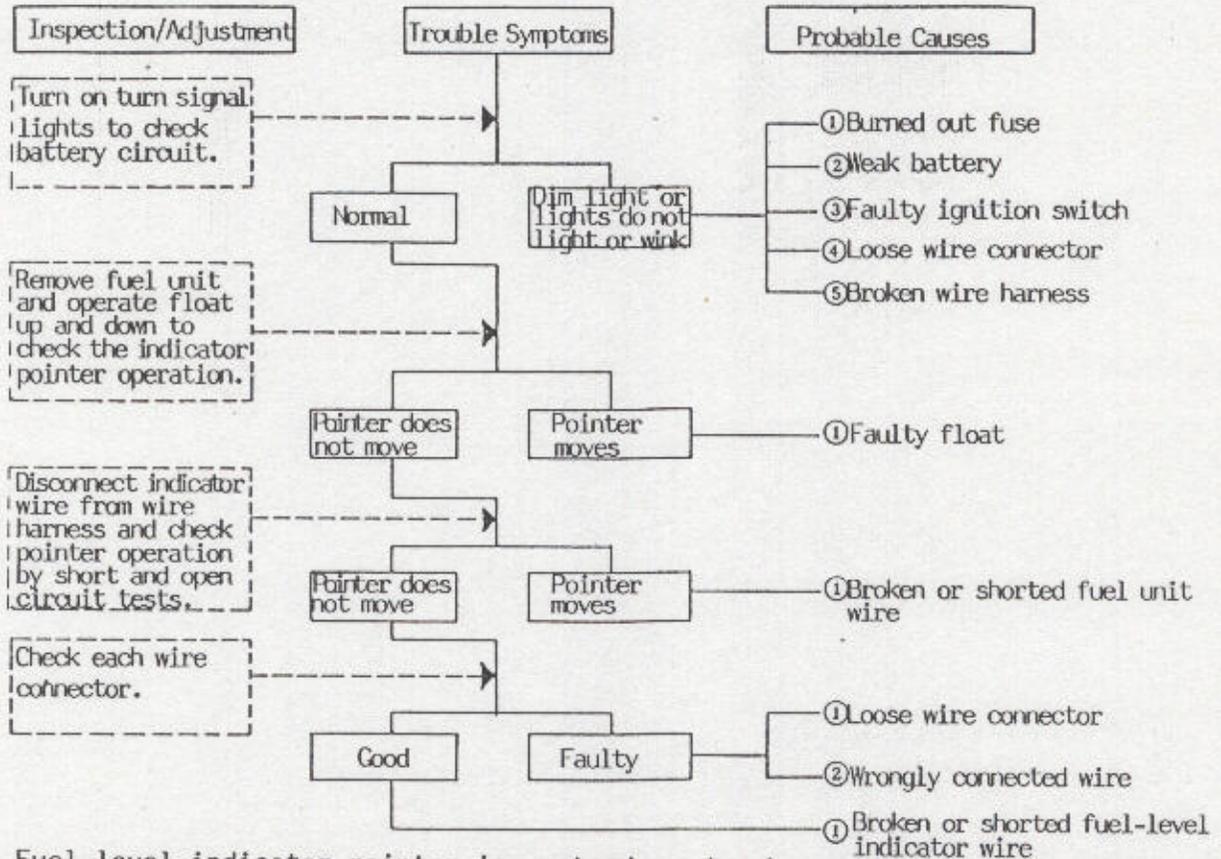


2.Engine oil indicator light continuously displays when there is sufficient engine oil. (Ignition switch "ON")

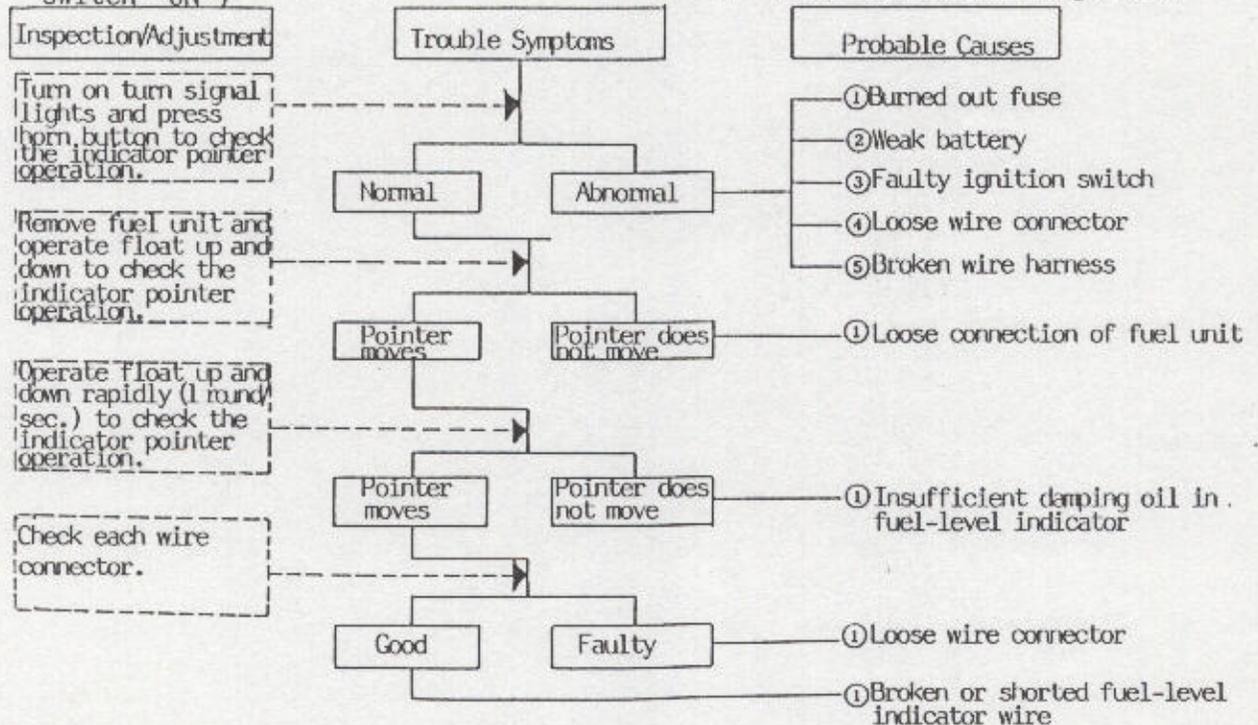


● FUEL-LEVEL INDICATOR

1. Fuel-level indicator pointer shows incorrect gasoline volume. (Ignition switch "ON")

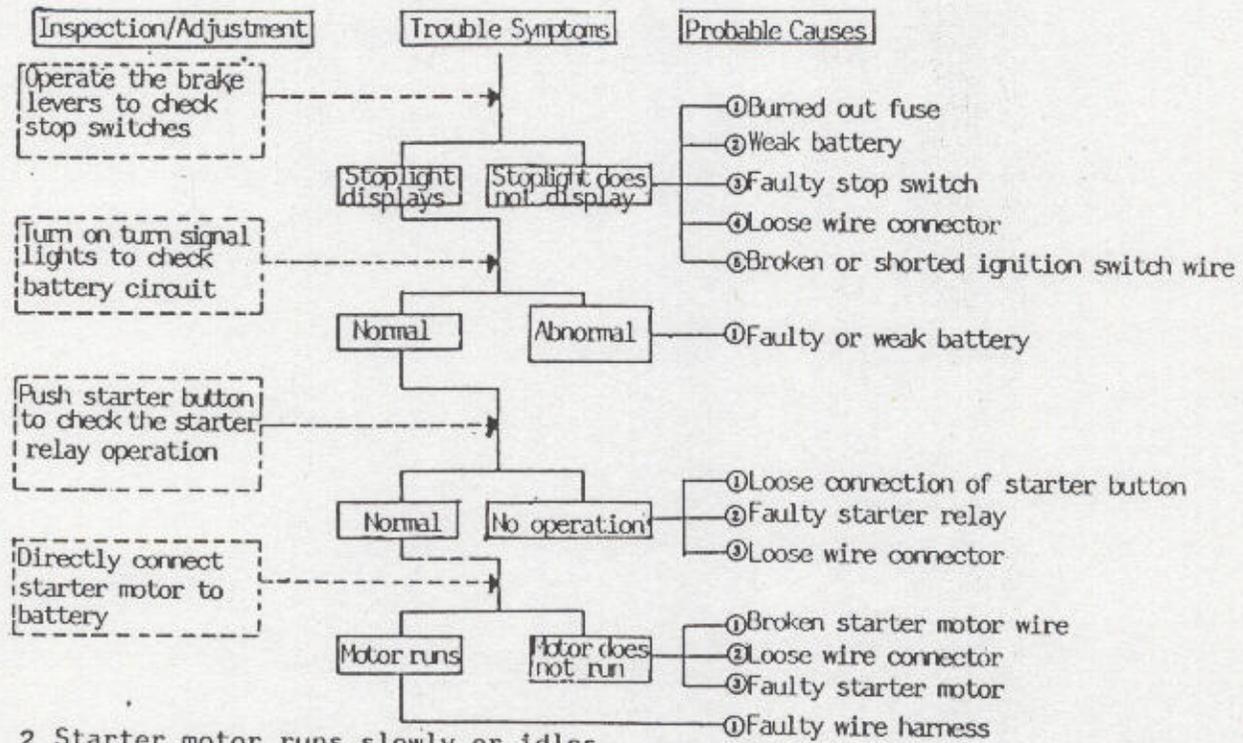


2. Fuel-level indicator pointer is unsteady and swings sometimes. (Ignition switch "ON")

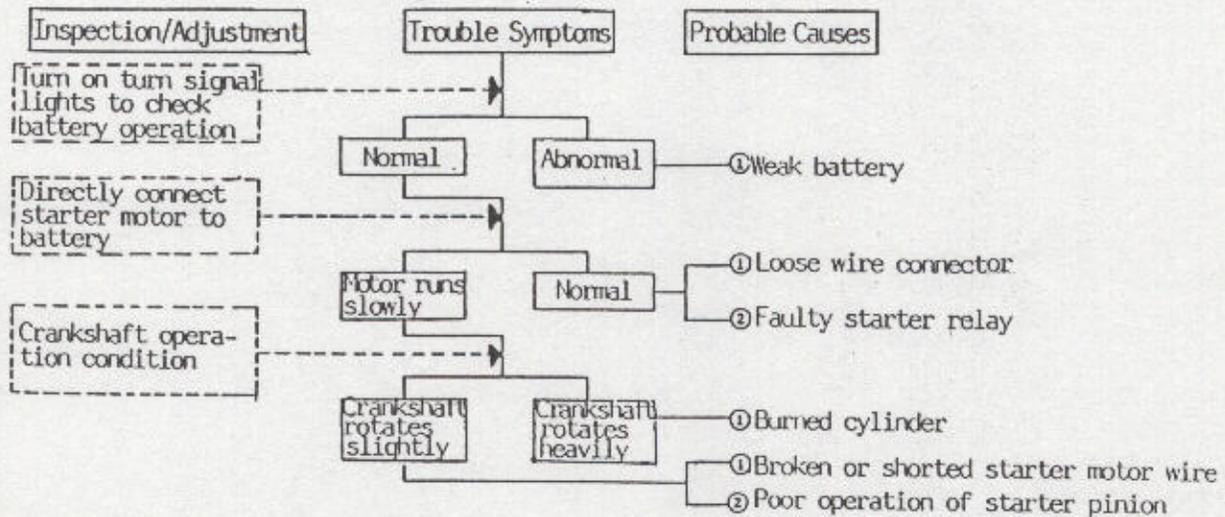


STARTER MOTOR

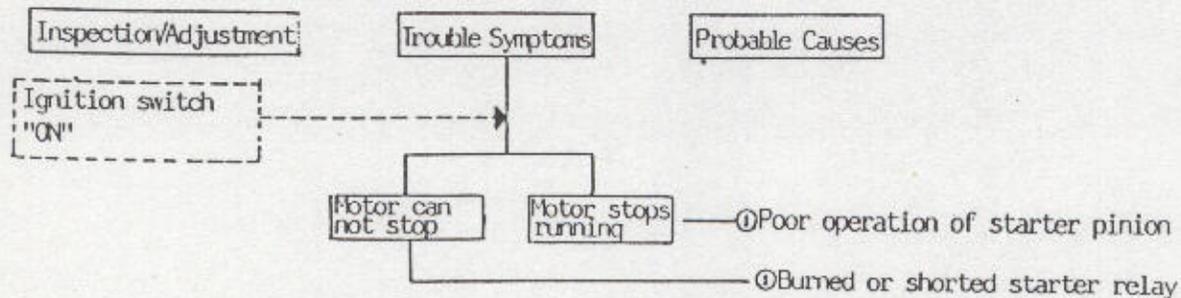
1. Starter motor won't run.



2. Starter motor runs slowly or idles.



3. Starter motor does not stop.



INSPECTION/ADJUSTMENT

● INSPECTION AND MAINTENANCE SCHEDULE..... 3-1

● BRAKE SYSTEM..... 3-5

● MOVING DEVICE..... 3-6

● DAMPING DEVICE..... 3-7

● POWER DRIVE SYSTEM..... 3-7

● ELECTRICAL EQUIPMENT..... 3-8

● ENGINE..... 3-9

● OTHERS..... 3-13

INSPECTION AND MAINTENANCE SCHEDULE

(Note) 1. ○ means that it is the time for inspection.

2. ☆ means regular replacement for the specified parts.

This inspection and maintenance schedule is based upon average riding conditions. Machines subjected to severe use, or ridden in unusually dusty areas, require more frequent servicing.

Inspection & Maintenance Items		Service Period				Judgement Standards	Remarks									
		Pre-ride	1st month	6th month	12th month											
Suspension	Steering Handlebar	Check for looseness & swing			○											
		Operating performance			○											
	Front Fork	Right/left turning angle			○											
		Damage			○	○										
		Front fork shaft installation			○	○	Check steering stem									
		Check front fork shaft for looseness and abnormal noise				○	Check steering stem									
Brake System	Brake Lever	Front/rear brake lever free play			○	○	Free play 10-20mm									
		Brake lever operation		○												
		Brake performance			○	○	○									
	Lever/Cable	Looseness, abnormal noise and damage			○	○										
		Clearance between drum & lining			○	○										
	Brake Drum/Shoe	Brake shoe & lining wear				☆	Wear indicator plate									
		Brake drum wear and damage			○		Standard Front: 110mm Rear: 110mm Service Limit: Front: 110mm Rear: 111mm									
Moving Device	Tire	Tire pressure		○	○	○	<table border="1"> <tr> <td></td> <td>Front</td> <td>Rear</td> </tr> <tr> <td>1 rider kg/cm²</td> <td>1.50</td> <td>1.75</td> </tr> <tr> <td>Tire Size</td> <td colspan="2">3.00-10-4PR</td> </tr> </table>		Front	Rear	1 rider kg/cm ²	1.50	1.75	Tire Size	3.00-10-4PR	
	Front	Rear														
1 rider kg/cm ²	1.50	1.75														
Tire Size	3.00-10-4PR															

Inspection & Maintenance Items		Service Period				Judgement Standards	Remarks	
		Pre-ride	1st month	Every 6 months	Every 12 months			
Moving Device	Motorcycle	Tire crack and damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
		Tire groove and abnormal wear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Groove Front: about 0.8mm Rear : about 0.8mm		
		Imbedded objects, gravel, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
		Axle nut looseness			<input type="checkbox"/>	<input type="checkbox"/>	Torque Front axle nut 5.0-7.0kg-m Rear axle nut 10.0-12.0kg-m	Axle nut torque
		Wheel rim, rim edge and spoke plate for damage		<input type="checkbox"/>		<input type="checkbox"/>	Rim runout at rim end: Front: Axial below 2.0mm Radial below 2.0mm Rear : Axial below 2.0mm Radial below 2.0mm	
		Check front wheel bearing for looseness and abnormal noise				<input type="checkbox"/>		
		Check rear wheel bearing for looseness and abnormal noise				<input type="checkbox"/>		
Damping Device	Frame-Spring	Damage					Absorber spring	
	Suspension Arm	Connecting part looseness and arm damage			<input type="checkbox"/>			
	Shock Absorber	Oil leakage and damage			<input type="checkbox"/>			
Assembly parts looseness and abnormal noise				<input type="checkbox"/>				
Power Drive System	Clutch	Operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	Transmission Case	Oil leakage and oil level		<input type="checkbox"/>	<input type="checkbox"/>	Oil level Oil level check hole at lower hole edge	Rear wheel transmission case	
Electric Equipment	Ignition Device	Spark plug condition		<input type="checkbox"/>	<input type="checkbox"/>	Plug gap 0.6-0.7mm		
	Battery	Terminal connection			<input type="checkbox"/>			
	Wires	Loose connection or damage			<input type="checkbox"/>			

Inspection & Maintenance Items		Service Period				Judgement Standards	Remarks
		Pre-ride	1st month	Every 6 months	Every 12 months		
Engine	Body	Performance & abnormal noise			○	○	
		Conditions at low & high speed		○	○	○	SNIPER 100/1800rpm; SNIPER 50/2000rpm
		Exhausted smoke			○	○	
		Air cleaner			○	○	
	Lubrication System	Oil quantity & oil quality			○	○	<input type="checkbox"/> Oil-level indicator type The indicator light will display when oil is insufficient.
		Oil leakage			○	○	
		Oil level	○				
		Oil filter screen				○	
		Fuel System	Fuel leakage				
		Carburetor, throttle valve and auto bystarter				○	
		Fuel filter screen				○	
		Fuel level	○				
		Fuel tube replacement					☆every 4 years
	Lights & Winker	Operation					
		Winking action, dirt and damage	○				
Buzzer & Steering Lock	Operation				○		
Rearview Mirror & Reflector	Rearview mirror position	○				Rearview mirror	
Reflector & License Plate	Dirt and damage	○					
Counter	Operation				○		
Exhaust Pipe	Joint looseness and damage				○		
	Exhaust muffler performance				○		
Body & Frame	Looseness and damage				○		
Abnormal Conditions Happened last time	Check if the abnormal conditions occur again	○					
Others	Lubrication points			○	○		
	Remove carbon deposits on combustion chamber, breather hole and exhaust pipe				○		

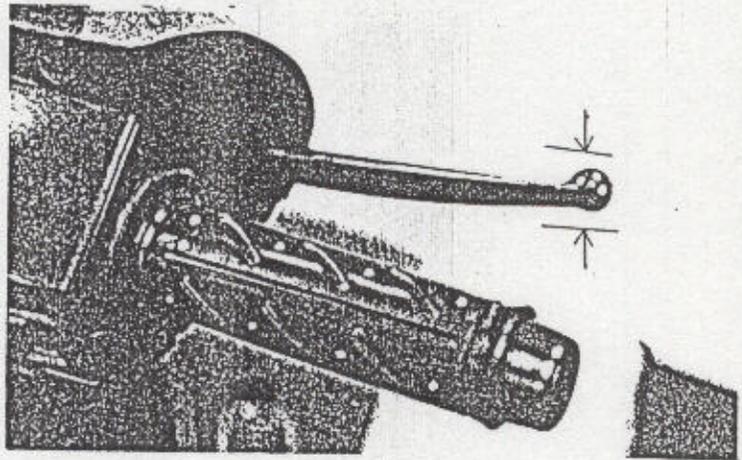
● BRAKE SYSTEM

● Brake Lever
«Free Play»

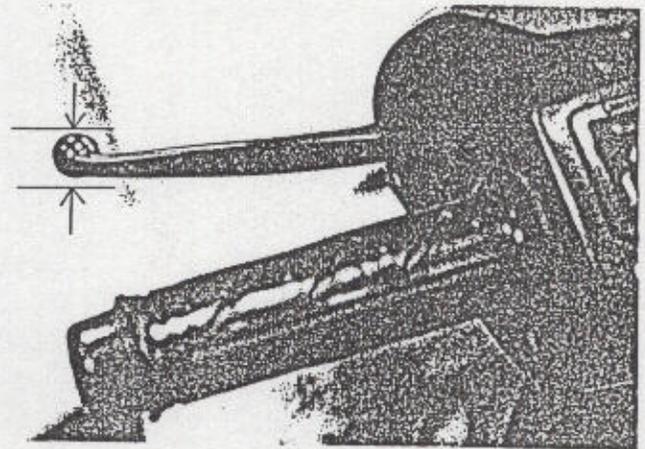
Measure the front and rear
brake lever free plays.

Free Play: Front 10-20mm
Rear 10-20mm

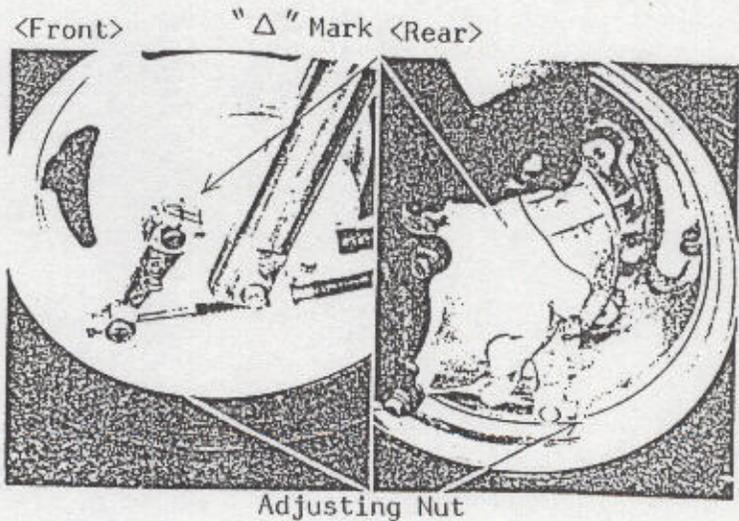
Front 10~20mm



Rear 10~20mm



If the free plays do not fall
within the limits, turn the
adjusting nuts for adjustment.



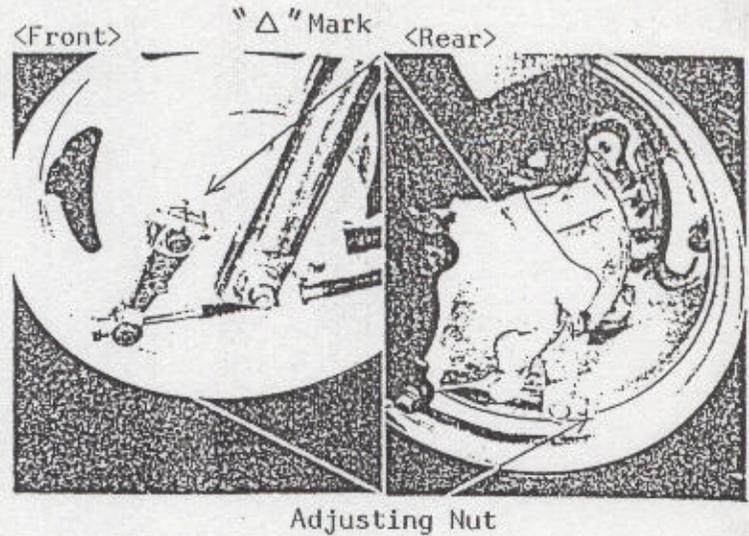
● Brake Drum/Brake Lining

«Brake Lining Movable Part and Lining Wear»

If the arrow on the brake arm aligns with the "Δ" mark on full application of the front or rear brake, replace the brake linings with new ones.

«Brake Drum Wear/Damage»

Check the brake drum appearance for damage. Check if the brake linings are within the specified service limits. Check brake operation for abnormal noise and Check the brake drum inside for wear and damage.



● Brake Disc/Brake Lining

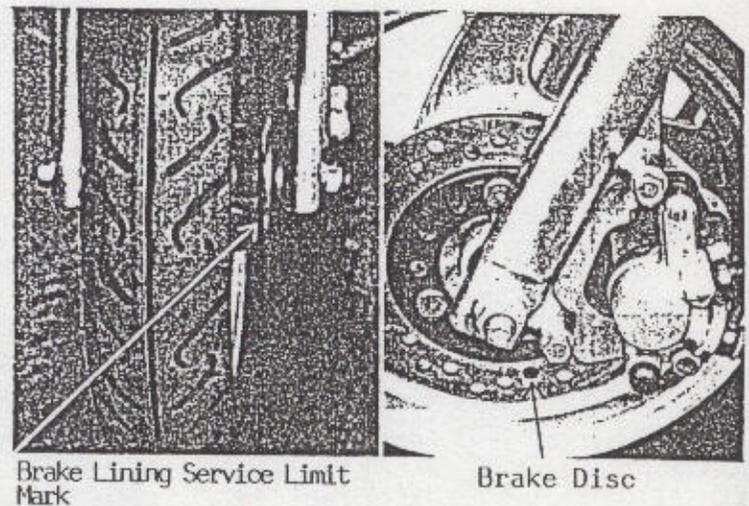
«Brake Disc Surface and Brake Lining Wear»

Check the brake disc surface for uneven scratch.

Check if the brake linings are within the specified service limits.

«Brake Disc Runout Inspection»

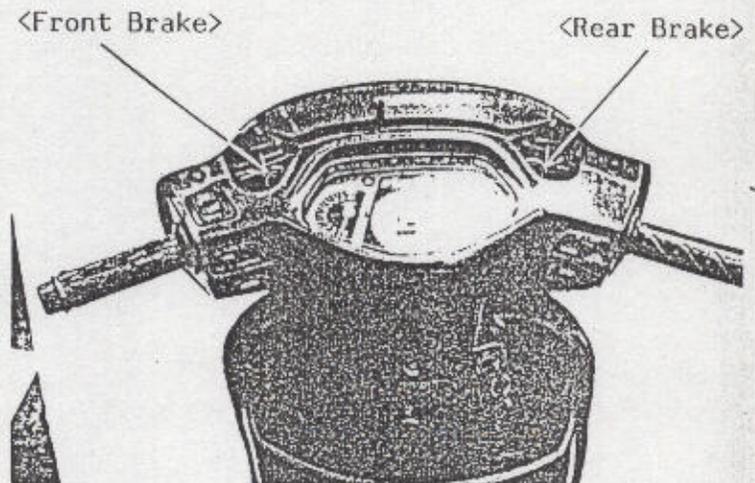
Jack the motorcycle wheels off the ground and check if the brake disc runout is within the specified service limit.



● Brake Fluid Level Inspection

«Brake Master Cylinder Fluid-level Inspection»

Turn the steering handlebar upright and check if the front/rear brake fluid is within the specified limits through the brake master cylinder check hole.



● MOVING DEVICE

● Tires

《Tire Pressure》

Measure the tire pressure.



Tire pressure should be checked when the tires are cold.

Tire Pressure (One rider)

Front: 1.50kg/cm²

Rear: 1.75kg/cm²

Tire Size

Front	300-10-4PR
Rear	90/90-10(50J)

《Axle Nut/Axle Shaft Looseness》

Check the front and rear axle nuts for looseness.

If the axle nuts are loose, tighten them to the specified torques.

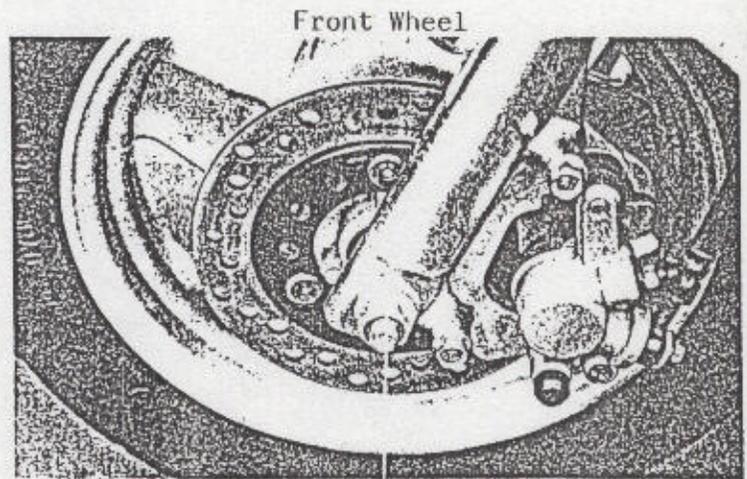
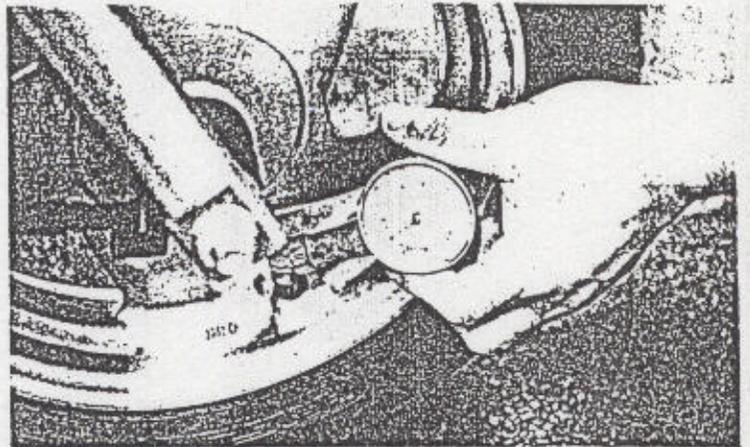
Torques:

Front : 5.0~7.0 kg-m

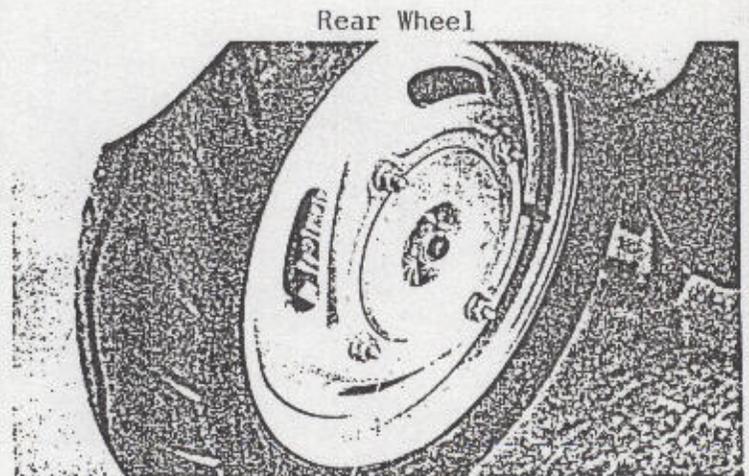
Rear : 10~12.0 kg-m

《Wheel Rim/Spoke Plate Damage》

Check the wheel rim for wear or damage and measure the rim runout.



Axle Nut



Axle Nut

● DAMPING DEVICE

● Shock Absorbers

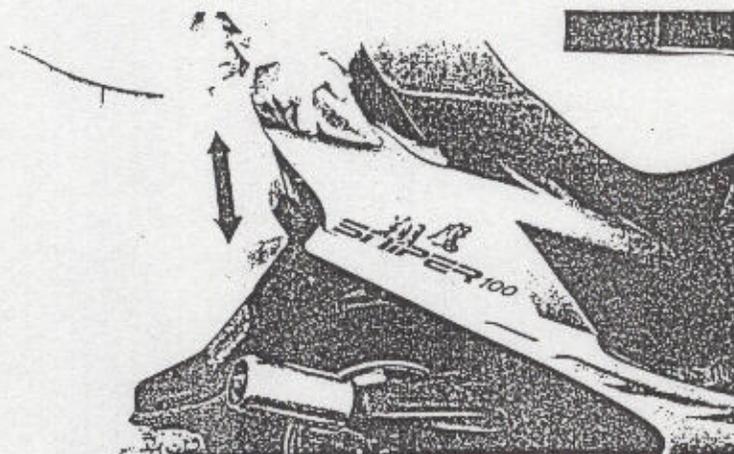
《Oil Leak/Damage》

Fully apply the front brake lever and check the action of the front shock absorber by compressing it up and down several times.

Check each part of the front shock absorber for looseness and damage.



Check the action of the rear shock absorber by compressing it up and down several times. Check each part of the rear shock absorber for looseness and damage.



● POWER DRIVE SYSTEM

● Transmission Case

Check rear wheel transmission case surrounding area for oil leaks.

Stop the engine and remove the oil level check bolt.

* Place the motorcycle on its main stand on level ground.

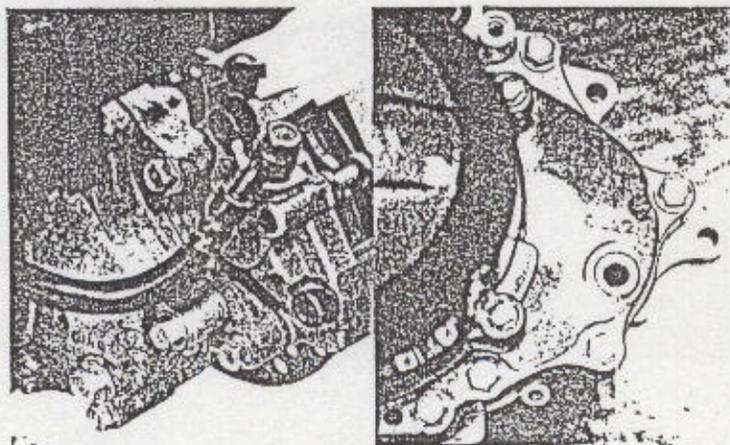
The gear oil level should be flush with the oil level check bolt hole. Add the specified gear oil to the proper level, if necessary.

Specified Oil: KYMCO SIGMA Gear Oil (SAE90#)

Install and tighten the oil level check bolt.

Torque : 1.0~1.5 kg-m

Start the engine and check for oil leaks.



Oil Level Check Bolt

Oil Level Check Hole

● ELECTRICAL EQUIPMENT

● Ignition Apparatus

«Spark Plug»

Open the fuel filler cap.
Remove the spark plug.
Check the spark plug for wear, fouling and carbon deposits.
Remove the fouling and carbon deposits with a spark plug cleaner or a wire-brush.

Specified Spark Plug

NGK		ND	
SNIPER100	SNIPER 50	SNIPER100	SNIPER 50
BR6ESA	BR8ESA	—	—

Plug Gap : 0.6~0.7mm

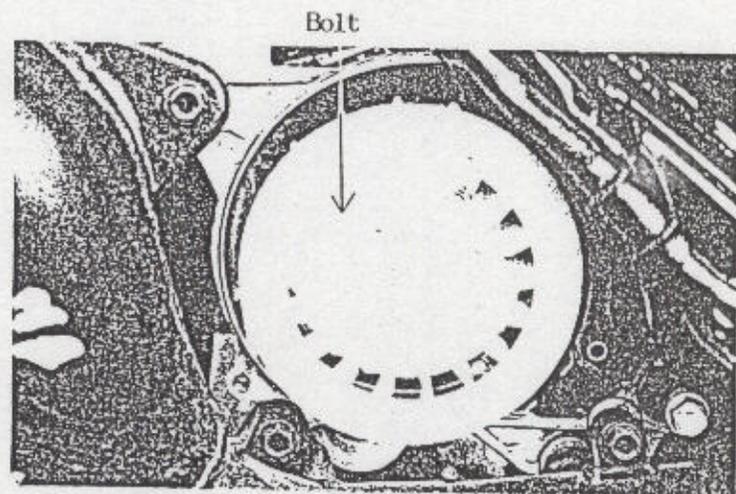
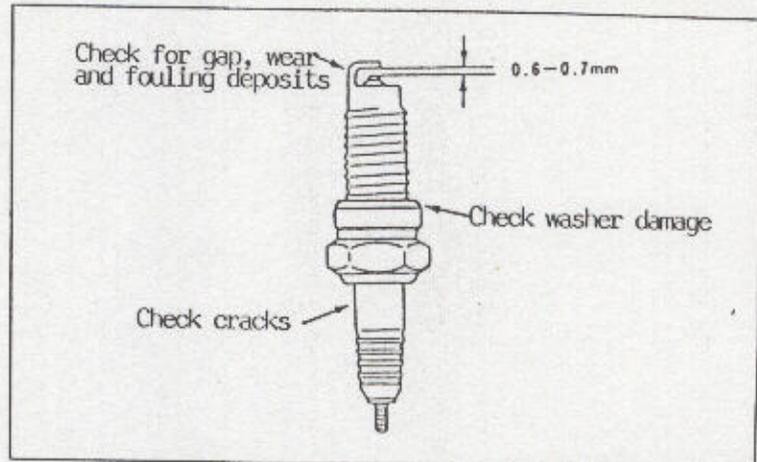
«Ignition Apparatus»

* The CDI ignition timing is not adjustable.
If the ignition timing is incorrect, check the CDI unit, ignition coil or A.C. generator and replace any faulty parts.

Remove the right side strip.
(P147)

Remove the A.C. generator fan cover.
(P75)

Remove the 4 fan attaching bolts and then remove the fan.



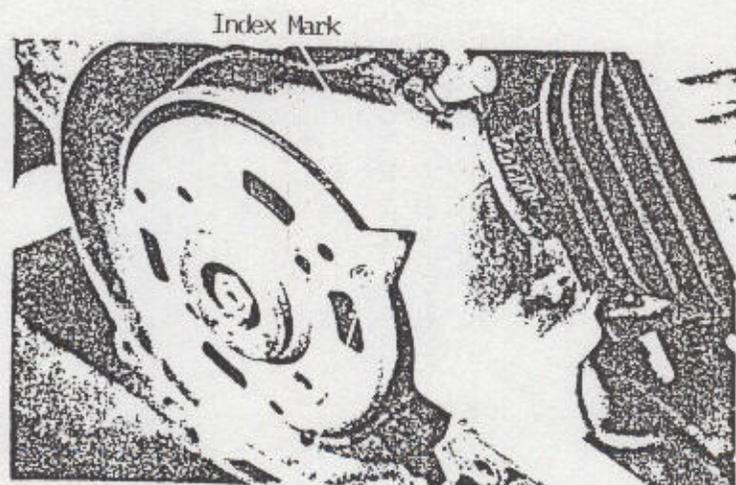
Warm up the engine and check the ignition timing with a timing light.

When the engine is running at the specified rpm, if the "F" mark aligns the index mark on the crankcase within $\pm 2^\circ$, the timing is correct.

Ignition Timing:

SNIPER 100: $14^\circ \pm 2\text{BTDC}/1800\text{rpm}$

SNIPER 50 : $17^\circ \pm 2\text{BTDC}/3000\text{rpm}$



●ENGINE

●Engine Body

«High Speed and Low Speed»



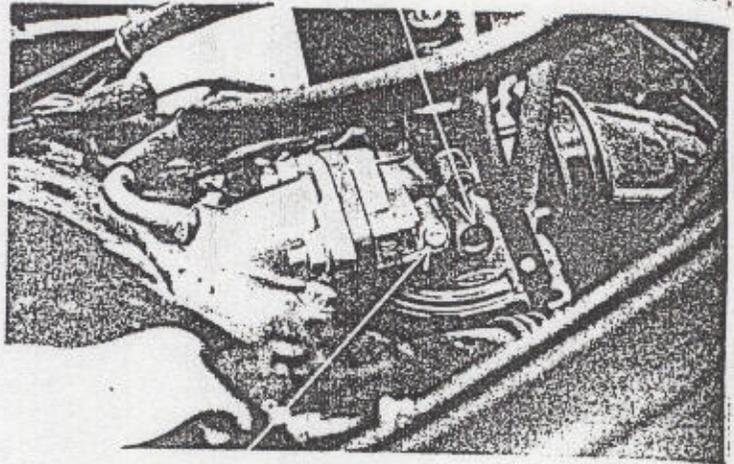
The engine must be warm for accurate adjustment.

Adjust the idle speed to the specified rpm through the idle speed adjusting hole on the left side cover.

Idle Speed:

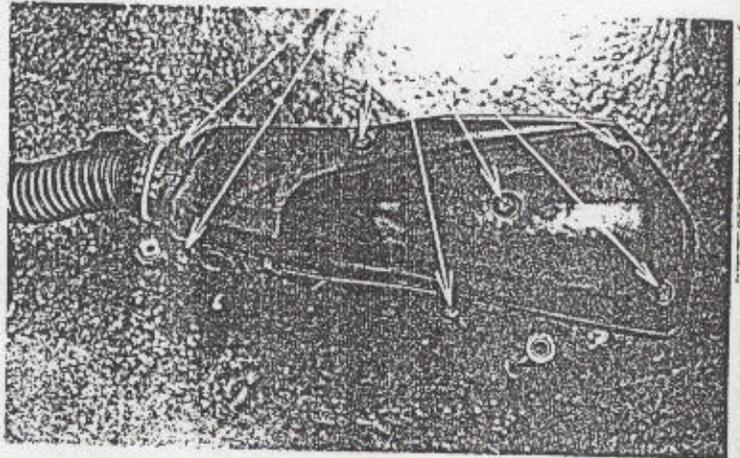
SNIPER 100 :1800±100 rpm

SNIPER 50 :2000±100 rpm

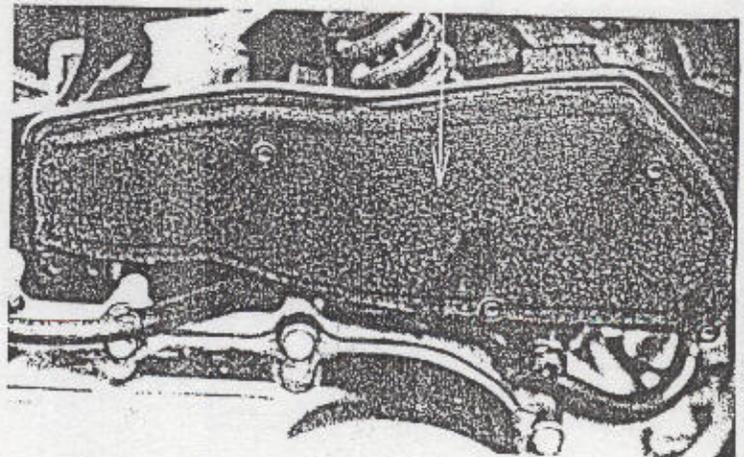


«Air Cleaner»

Remove the 7 air cleaner cover attaching screws and remove the air cleaner cover.



Remove the air cleaner.

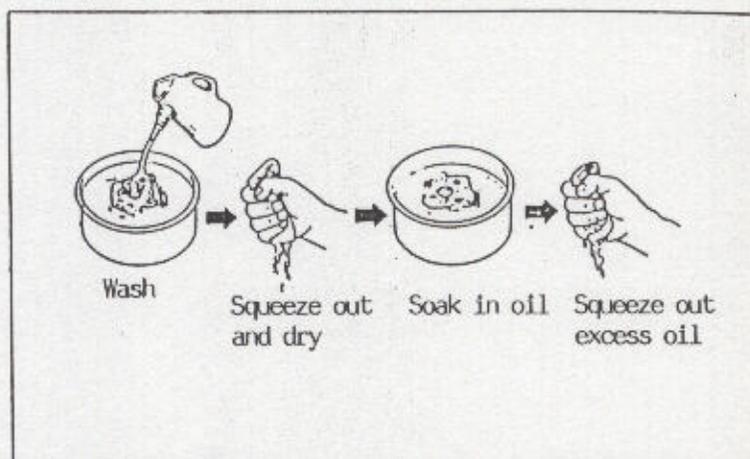


Wash the air cleaner element in detergent oil, squeeze out and allow to dry.



Never use gasoline or organic vaporable oil with acid or alkali for washing.

After washing, soak the element in clean engine oil of SAE 10W-30 and squeeze out the excess oil. Reinstall the element and air cleaner.



«Cylinder Compression»



Warm up the engine before compression test.

Open the fuel filler cap.
Remove the spark plug and install a compression gauge.
Open the throttle valve fully and push the starter button for 7-8 seconds to test the cylinder compression.

Compression:

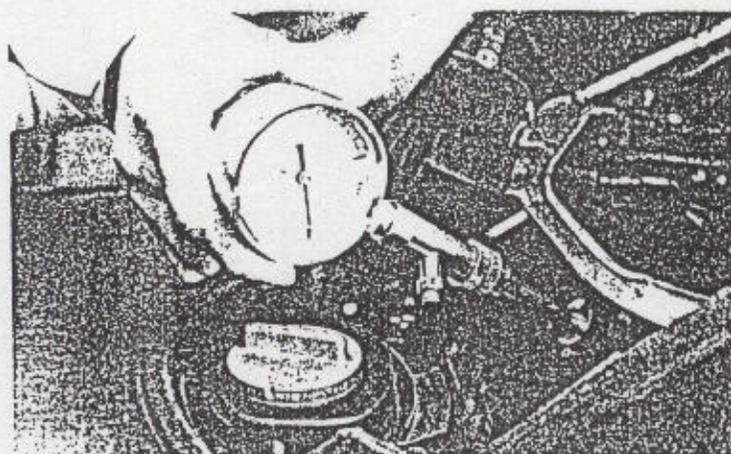
SNIPER100: 13kg/cm²-6000 rpm

SNIPER 50: 12kg/cm²-6000 rpm

If the compression is too low, inspect the following items.

- Damaged cylinder head gasket
- Worn piston and cylinder

If the compression is too high, there are carbon deposits in the combustion chamber or on piston head.



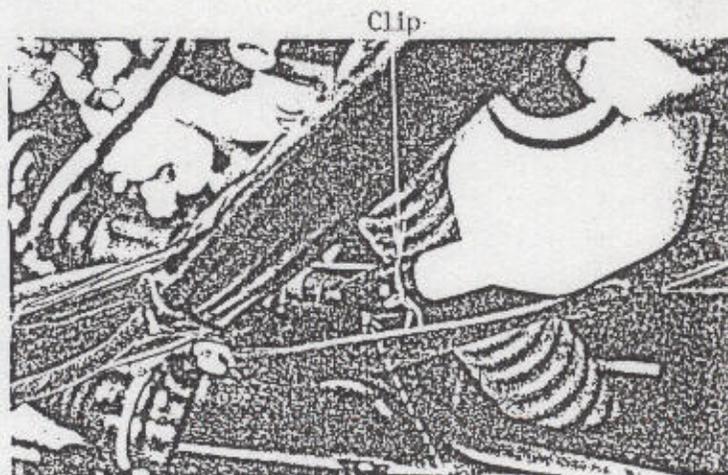
● Lubrication System

«Oil Filter Cleaning»

Remove the right and left side covers.

Disconnect the oil hose from the oil pump side and allow the oil to drain into a clean container. Loosen the clip on the oil hose on the oil tank side and remove the oil line.

Remove the oil filter.



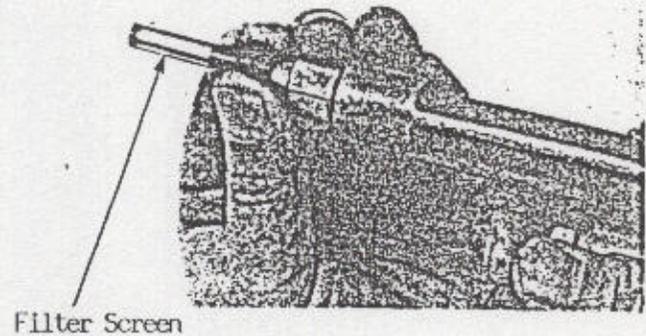
Oil Filter

Clean the oil filter screen with compressed air.

Install the oil filter in the reverse order of removal. Fill the oil tank with the specified oil up to the proper level. Bleed air from the oil pump and oil lines.

*

- Connect the oil lines securely.
- Install the oil hose clip (on the oil tank side) and be sure to install the clip onto the lower side oil line connected to the oil pump.
- After completing the above procedures, check for oil leaks.

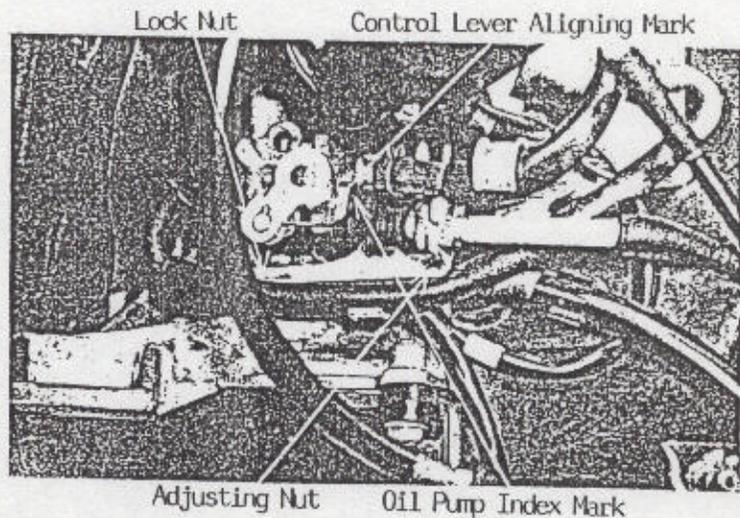


«Oil Pump Condition»

*

Perform the following after the throttle grip free play is adjusted.

Open the throttle valve fully and check if the index mark on the pump body aligns with the aligning mark on the oil pump control lever. Start and idle the engine, then slowly open the throttle to increase the engine rpm and check the oil pump control lever operation. Adjust the pump control cable by loosening the control cable lock nut and turning the adjusting nut.



*

The aligning mark on the control lever within 1mm on the open side of index mark is acceptable. The aligning mark must never be on the closed side of the index mark, otherwise engine damage will occur due to lack of oil for lubrication.

If the oil pump is not synchronized properly, the following will occur:

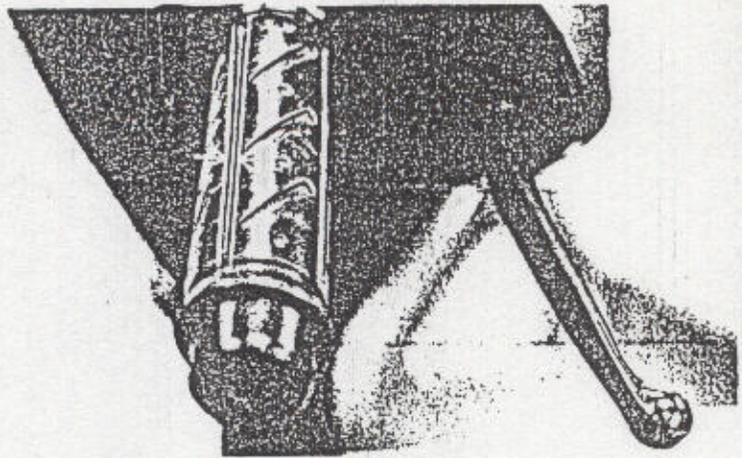
- Excessive white smoke or hard starting due to pump control lever excessively open
- Seized piston due to pump control lever insufficiently open

● Fuel System

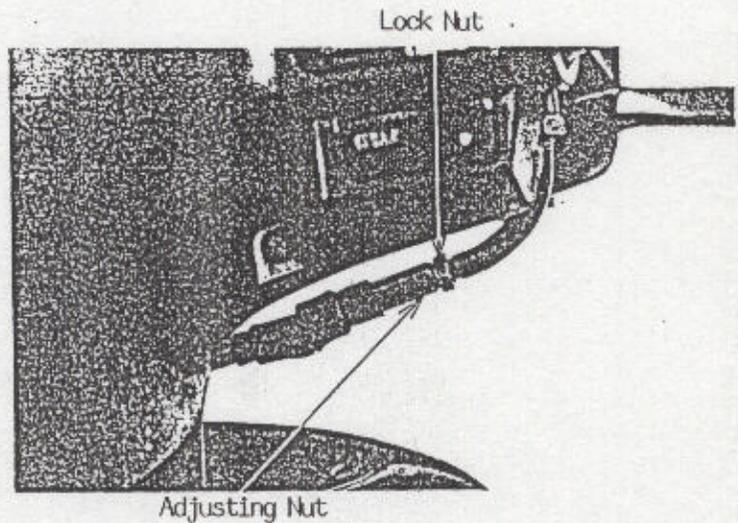
《Throttle Grip Free Play》

Measure the throttle grip free play.

Free Play: 2-6mm



If the throttle grip free play exceeds the specified value, loosen the lock nut and turn the adjusting nut for adjustment.

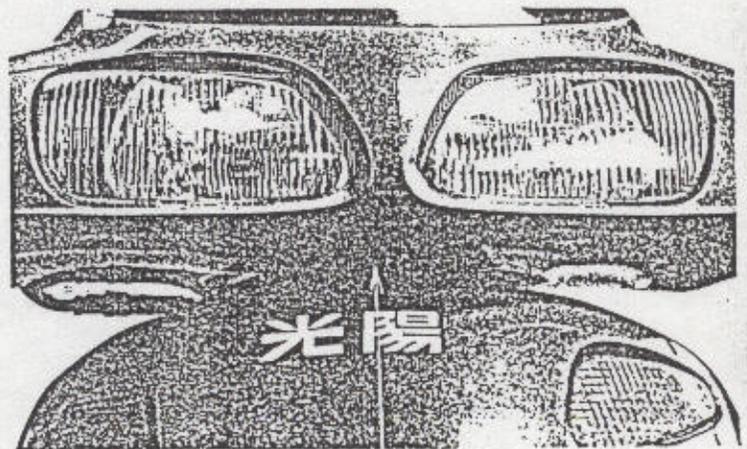


● OTHERS

● Lights

《Headlight》

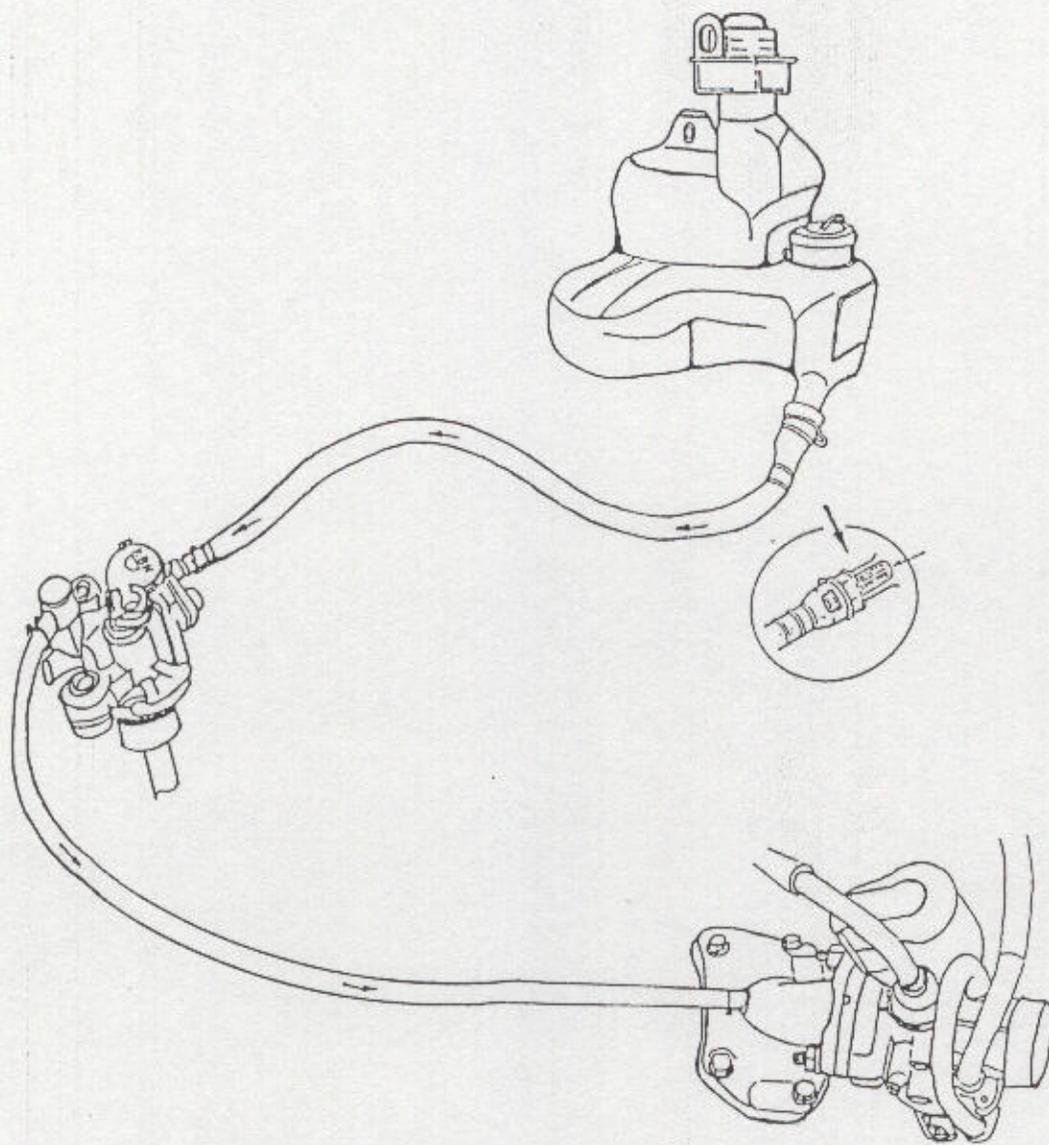
Loosen the headlight mounting screw and move the headlight right and left for adjustment.



Headlight Adjusting Screw

LUBRICATION SYSTEM

- TROUBLESHOOTING 4-3
- SERVICE INFORMATION..... 4-3
- OIL PUMP REMOVAL..... 4-4
- OIL PUMP INSPECTION..... 4-4
- OIL PUMP INSTALLATION..... 4-5
- OIL PUMP BLEEDING..... 4-6
- OIL TANK..... 4-7



● TROUBLESHOOTING**⊙ Excessive white smoke or carbon deposits on spark plug**

- Pump not properly synchronized (excessive oil)

- Poor quality engine oil

⊙ Engine overheating

- Oil pump not adjusted properly (insufficient oil)

- Poor quality engine oil

⊙ Seized piston

- No oil in tank or clogged oil line

- Oil pump not adjusted properly (insufficient oil)

- Air in oil line

- Faulty oil pump

⊙ Oil not flowing out of tank to engine

- Clogged oil tank cap breather hole

- Clogged oil strainer

● SERVICE INFORMATION**⊙ GENERAL INSTRUCTIONS**

- Use care when removing and installing the oil pump not to allow dust and dirt entering the engine and oil line.

- Do not attempt to disassemble the oil pump.

- Bleed air from the oil pump if there is air between the oil pump and oil line.

- If the oil line is disconnected, refill the oil line with engine oil before connecting it.

⊙ SPECIFICATIONS

- Specified Engine Oil: KYMCO ULTRA 2-stroke Motor Oil (separate oiling)

- Oil Capacity : 1.2 ℓ

- Light Display : 0.2 ℓ

● OIL PUMP REMOVAL

* Do not allow foreign matters to enter the crankcase.
Before removing the oil pump, clean the oil pump and crankcase surfaces.

Remove the met-in box. (P147)

Disconnect the oil pump control cable from the pump body.
Disconnect the oil inlet line from the oil pump.
Then, disconnect the oil outlet line.

* Before disconnecting the oil line, clip the oil line to avoid oil flowing out and then plug the oil line after it is disconnected.

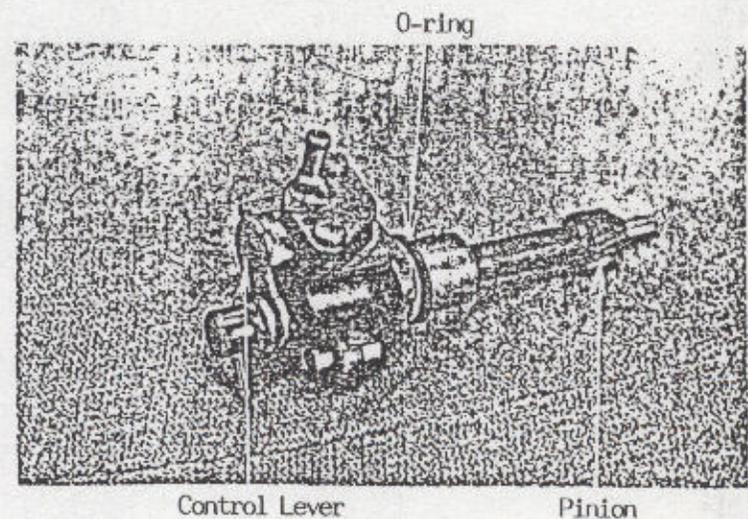
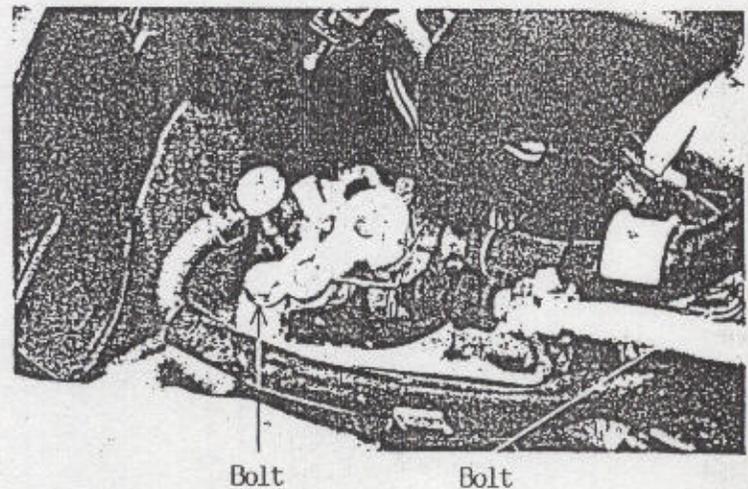
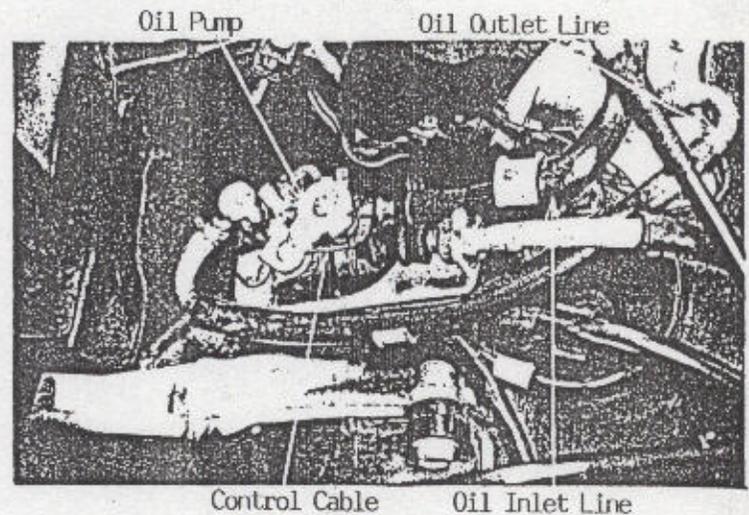
Remove the oil pump control cable plate bolt and copper washer.
Remove the oil pump from the crankcase.

● OIL PUMP INSPECTION

Remove the oil pump and inspect the following items:

- Weakened O-ring
- Damage to crankcase mating surface
- Damage to pump body
- Control lever operation
- Oil leaks from oil seals
- Broken or damaged pinion

* Do not disassemble the oil pump which can not be used after disassembly.

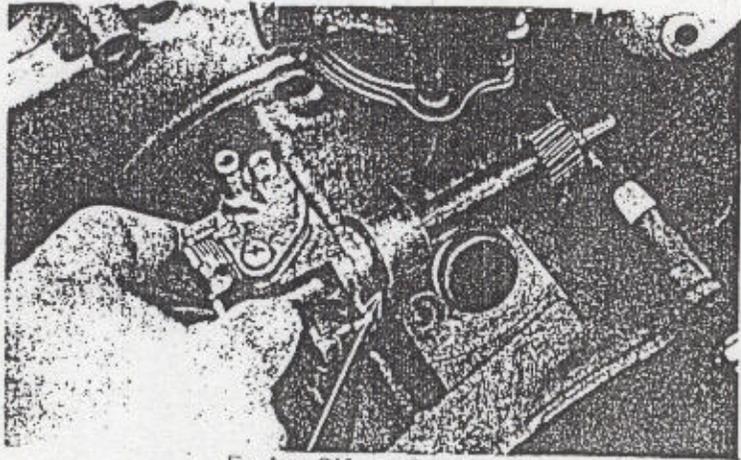


● OIL PUMP INSTALLATION

Install the oil pump onto the crankcase.

*

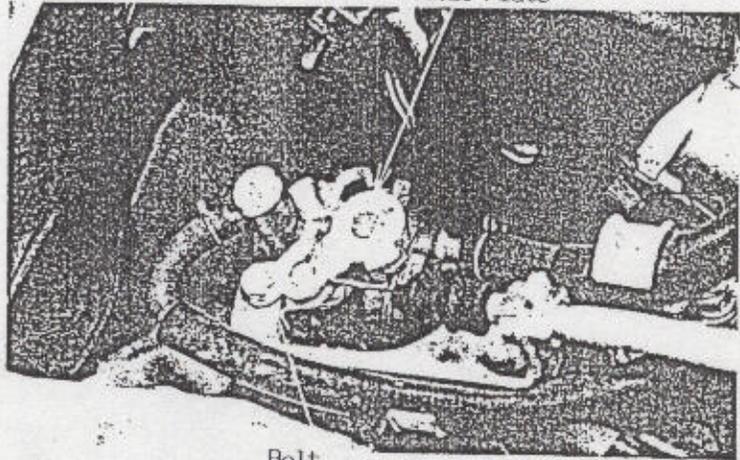
- Apply grease or engine oil to O-ring and then install the oil pump.
- Make sure that the oil pump is inserted into the crankcase properly.
- Lubricate the pump gear with grease or molybdenum disulfide.



Engine Oil or Grease

Install the oil pump control cable plate.

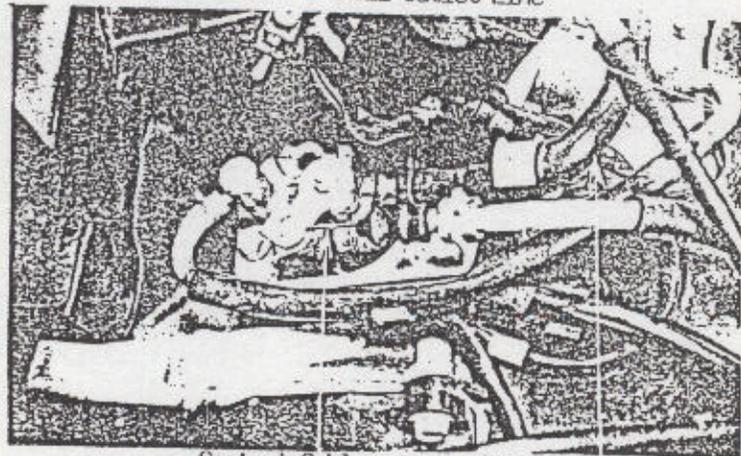
Control Cable Plate



Bolt

Connect the oil inlet line and oil outlet line properly.
Connect the oil pump control cable.
Bleed air from the oil pump.

Oil Outlet Line



Control Cable

Oil Inlet Line

● OIL PUMP BLEEDING



- Air in the oil lines will block oil flow and may result in severe engine damage.
- Bleed air from the oil lines and oil pump whenever the oil lines or pump have been removed or there is air in the oil lines.

● Oil Inlet Line/Oil Pump Bleeding

Fill the oil tank with recommended motor oil.

Place a towel around the oil pump. Disconnect the oil inlet line and clip it.

Fill the oil pump with motor oil by squirting clean oil through the pump inlet hole. (About 3cc) After the oil inlet line is full of oil, connect the oil inlet line.



Bleed air from the oil inlet line first, then bleed air from the oil outlet line.

● Oil Outlet Line Bleeding

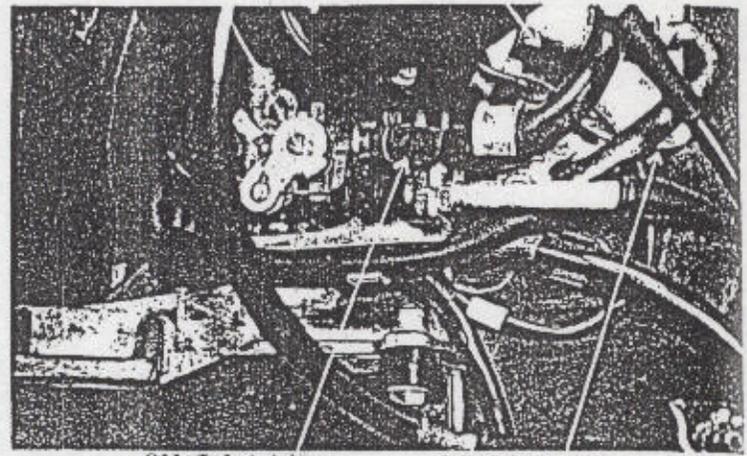
1. Disconnect the oil outlet line and bend it into U shape.
2. Start the engine and allow it to idle with the oil control level in the fully open position. Visually check the oil flow.
3. If there is no oil flowing out within 1 minute, bleed air from the oil line or oil pump.



- Never run the engine in a closed area.
- Do not increase the engine rpm at will.

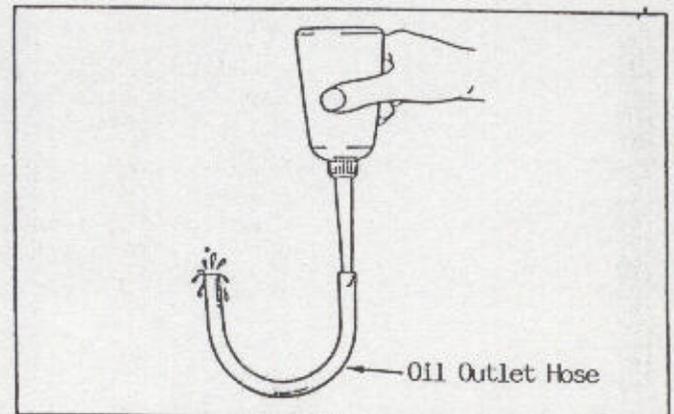
Oil Pump

Intake Manifold



Oil Inlet Line

Oil Outlet Line



Oil Line

● OIL TANK

● Oil Tank Removal

Remove the frame covers.
(P147, 148)

Remove the battery holder
attaching bolt.

Remove the oil tank attaching
bolt.

Remove the taillight holder
attaching bolt.

Remove the 2 screws and the
taillight holder.

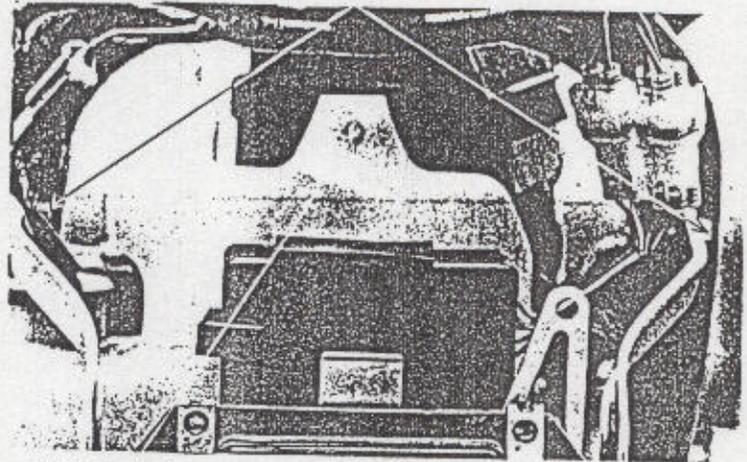
Disconnect the oil lines and
oil unit connector.

Drain the oil inside the oil
tank into a clean container.

Remove the oil tank.

Install the oil tank in the
reverse order of removal.

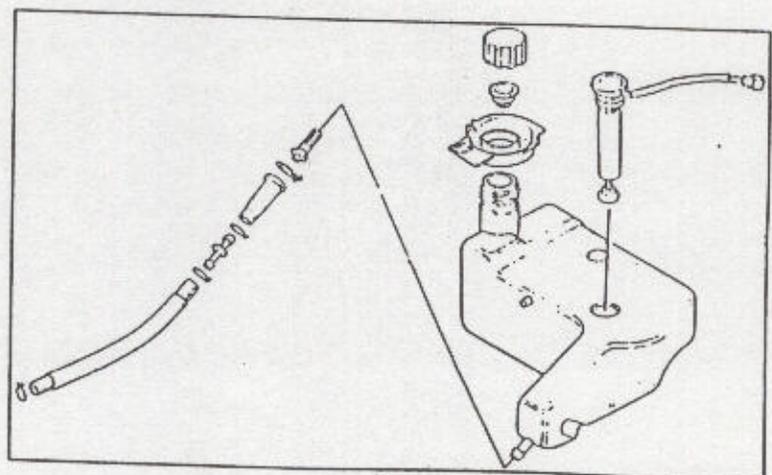
Rear Fender Attaching Bolt



Oil Tank Attaching Bolt



- Install the oil lines properly.
- After installation, bleed air from the oil pump.
- When installing the oil line clip (on the oil tank side), it should be locked from inside.





ENGINE REMOVAL/INSTALLATION

• SERVICE INFORMATION..... 5-2

• ENGINE REMOVAL..... 5-3

• ENGINE INSTALLATION..... 5-5

SERVICE INFORMATION

⊙GENERAL INSTRUCTIONS

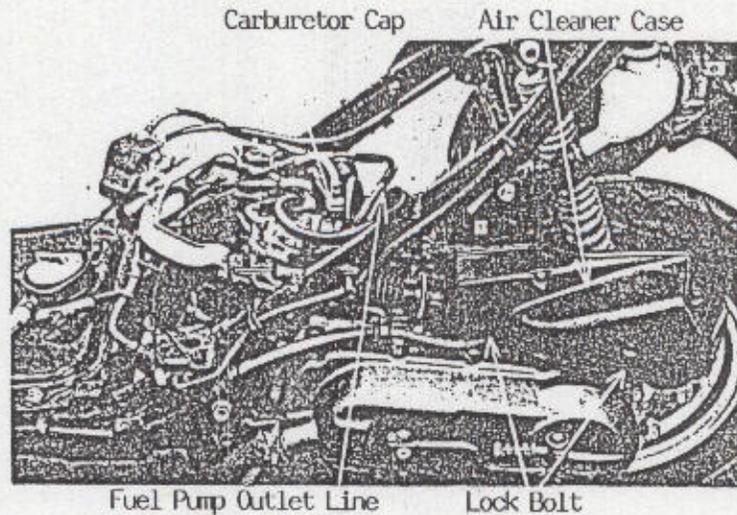
- Parts requiring engine removal for servicing:
Crankcase
Crankshaft

⊙TORQUE VALUES

Engine Lock Bolt	3.2 - 4.5 kg-m
Rear Shock Absorber Bottom Bolt	2.0 - 3.0 kg-m
Engine Hanger Bolt	3.5 - 4.5 kg-m

ENGINE REMOVAL

- Remove the central cover.
(P147)
- Remove the right and left side covers. (P147)
- Remove the air cleaner case.
(P48)
- Remove the met-in box. (P147)
- Remove the rear lever. (P148)
- Remove the frame right and left covers. (P147)
- Remove the fuel pump and disconnect the fuel pump outlet line and vacuum tube.
- Remove the carburetor cap.

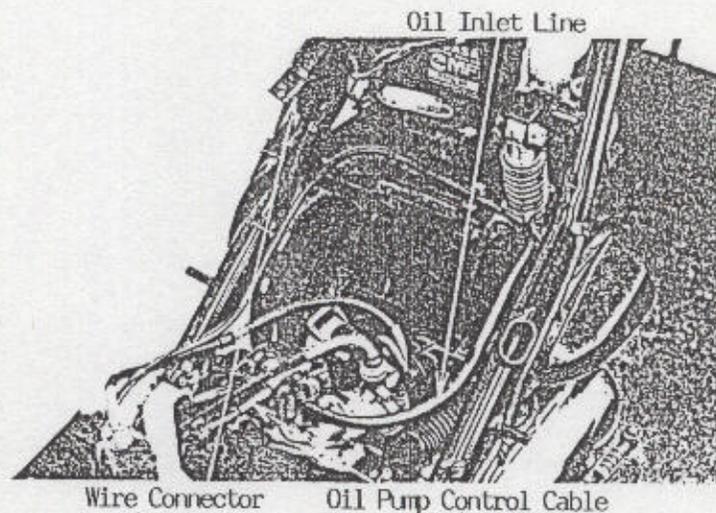


- Remove the control cable from the oil pump body.
- Remove the oil inlet line.

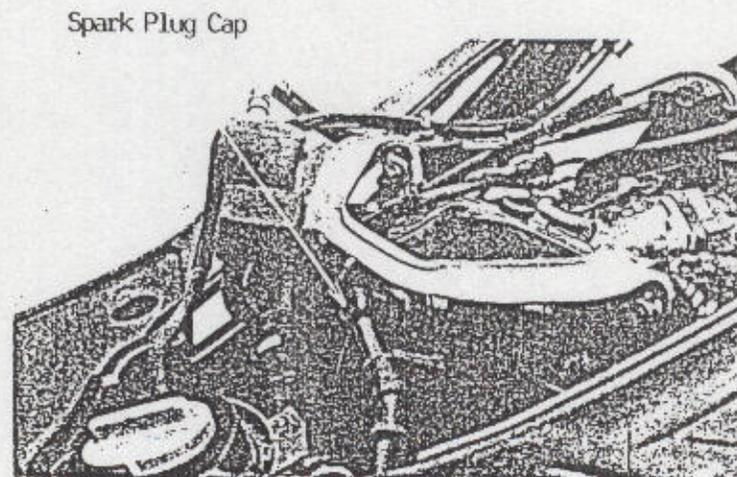
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Plug the end of the oil outlet line to prevent oil from flowing out of the line after disconnected.

- Disconnect the auto bystarter, A.C. generator and starter motor cable connectors.

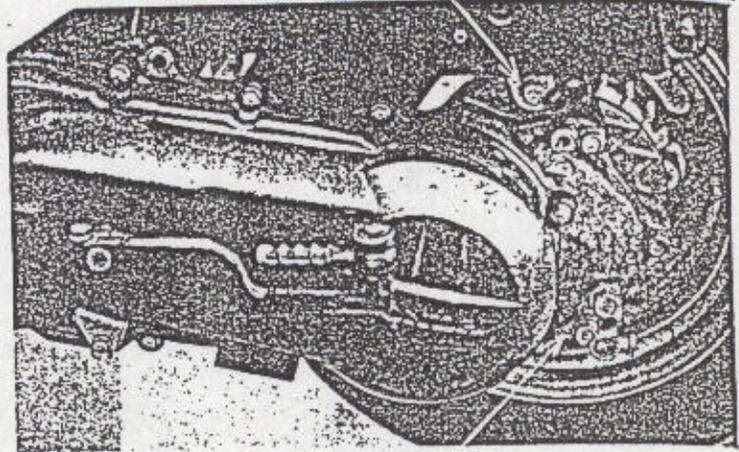


- Remove the spark plug cap.



Remove the rear brake adjusting nut and disconnect the rear brake cable from the crankcase. Remove the rear shock absorber bottom bolt.

Rear Shock Absorber Bottom Bolt



Rear Brake Cable

«Disc Brake»

Remove the rear brake caliper from the crankshaft. Remove the hydraulic brake fluid pipe clamp. Remove the rear shock absorber bottom bolt.

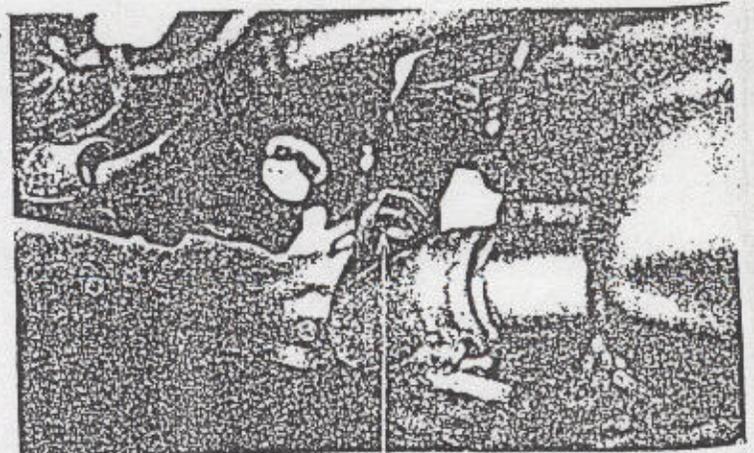
Clamp Rear Shock Absorber Bottom Bolt



Lock Bolt

Brake Caliper

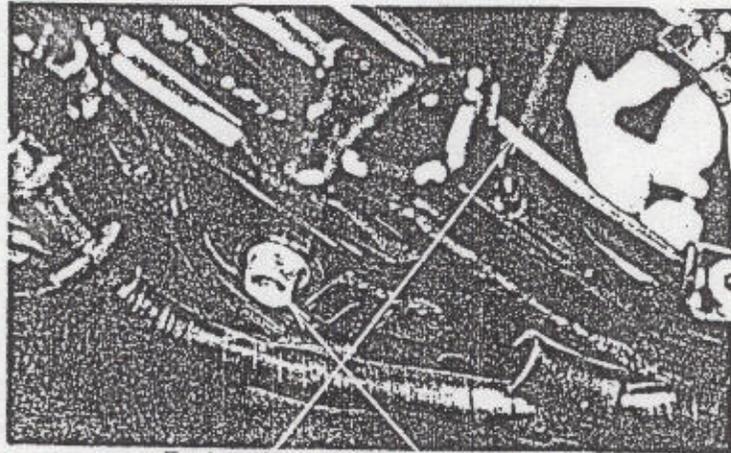
Remove the engine hanger right and left lock nuts. Remove the engine hanger right and left bolts. Lift the engine hanger forward and be careful not to damage the rear fender.



Engine Lock Nut

Engine Hanger Removal

Remove the hanger bolt and the hanger.
Install in the reverse order of removal.
Torque: 3.5 - 4.5 kg-m



Engine Hanger Hanger Nut

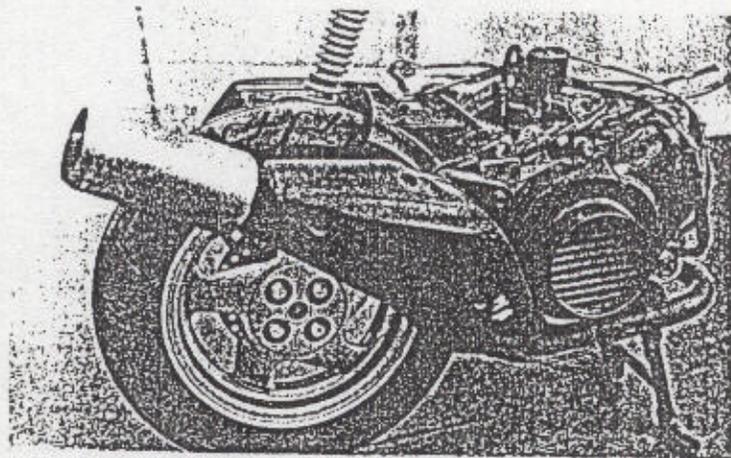
ENGINE INSTALLATION

Install in the reverse order of removal.

* Cables and wires should be arranged properly.

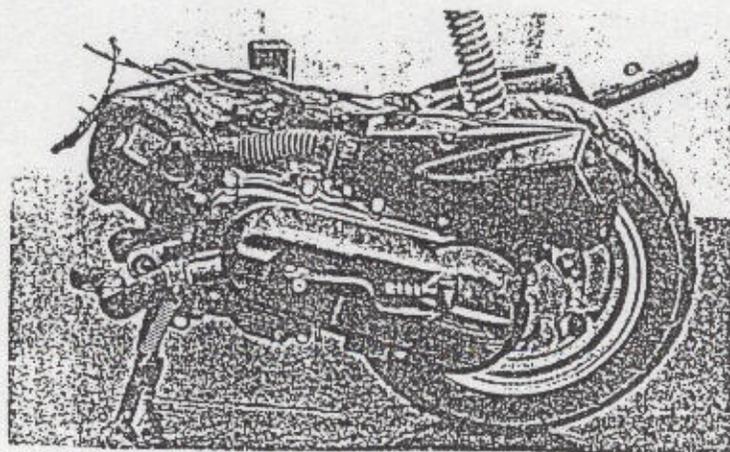
Torque:

Engine Hanger Nut: 3.2 - 3.8 kg-m
Rear Shock Absorber Bottom Bolt: 2.0 - 3.0 kg-m



Perform the following inspections and adjustments after installation.

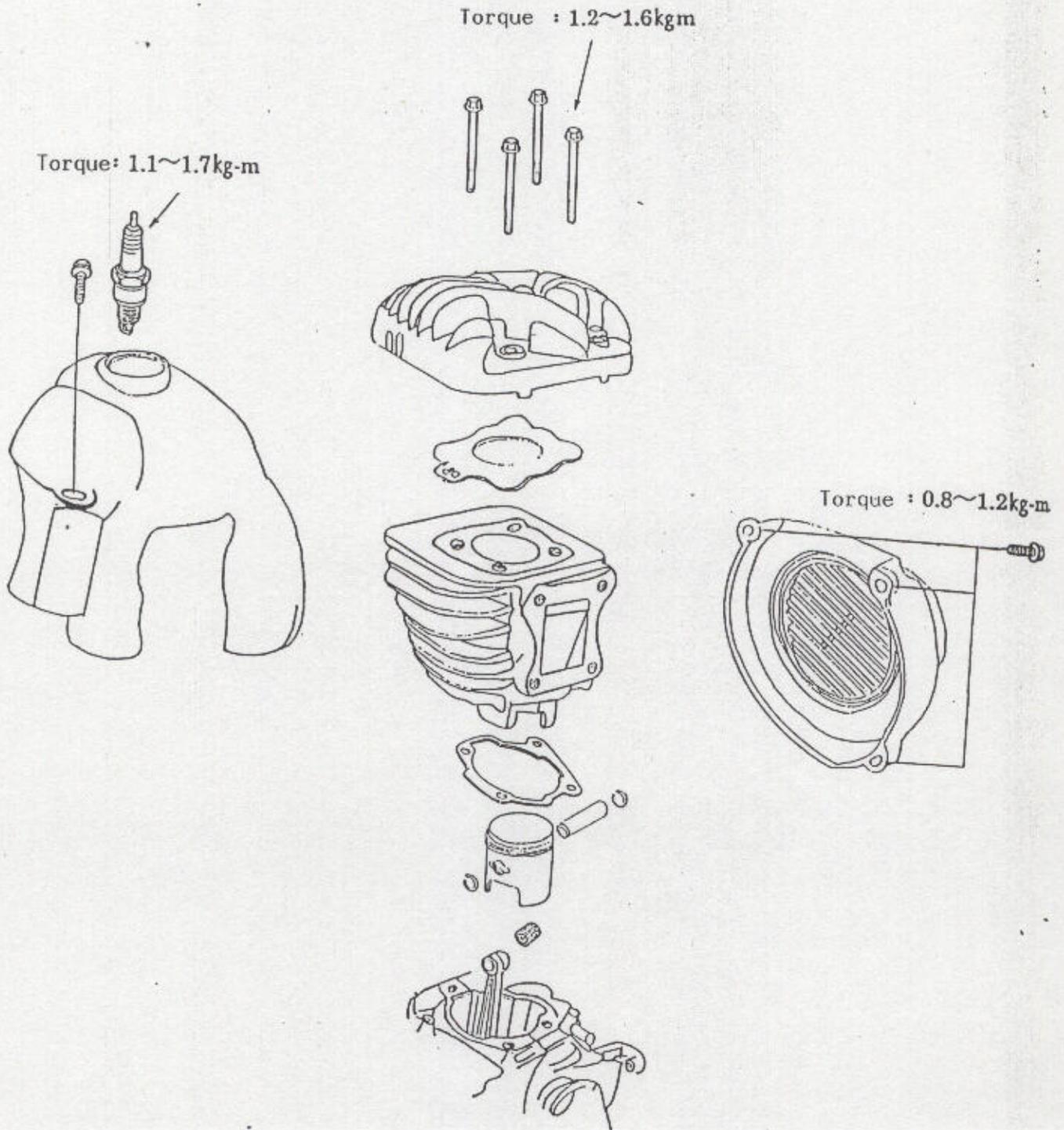
- .Throttle cable
- .Oil pump control cable (P57)
- .Rear brake cable, hydraulic brake fluid pipe (P64)
- .Oil pump bleeding (P58)





CYLINDER HEAD/CYLINDER/PISTON

- TROUBLESHOOTING..... 6-3
- SERVICE INFORMATION..... 6-3
- CYLINDER HEAD..... 6-4
- CYLINDER/PISTON..... 6-7



● TROUBLESHOOTING

⊙ Compression too low, hard starting or poor performance at low speed

- Blown cylinder head gasket
- Loose spark plug
- Worn, stuck or broken piston and piston rings
- Worn or damaged cylinder and piston

⊙ Compression too high, overheating or knocking

- Excessive carbon buildup in cylinder head or on piston head

⊙ Abnormal noise-piston

- Worn cylinder and piston
- Worn piston pin and piston pin hole
- Worn connecting rod small end bearing

⊙ Abnormal noise-piston rings

- Worn, stuck or broken piston rings
- Worn or damaged cylinder

● SERVICE INFORMATION

⊙ GENERAL INSTRUCTIONS

- All cylinder head, cylinder and piston maintenance and inspection can be accomplished with the engine installed.
- Before disassembly, clean the engine to prevent dirt from entering the engine.
- Remove all gasket material from the mating surfaces.
- Do not use a driver to pry between the cylinder and cylinder head, cylinder and crankcase.
- Do not damage the cylinder inner face and piston surface.
- After disassembly, clean the removed parts before inspection. When assembling, apply designated engine oil to movable parts.

⊙ SPECIFICATIONS

Item	Standard (mm)		Service Limit (mm)	
	SNIPER 100	SNIPER 50	SNIPER 100	SNIPER 50
Cylinder head warpage	—	—	0.10	0.10
Piston O.D. (4mm from bottom of piston skirt)	50.955~50.97	38.970~38.955	50.90	38.90
Cylinder-to-piston clearance	0.03~0.07	←	0.10	0.10
Piston pin hole I.D.	14.002~14.008	12.002~12.008	14.03	12.03
Piston pin O.D.	13.994~14.0	11.994~12.0	13.98	11.98
Piston-to-piston pin clearance	0.002~0.014	←	0.03	←
Piston ring end gap	0.30~0.40	0.10~0.25	0.50	0.40
Connecting rod small end I.D.	19.005~19.017	17.005~17.017	19.03	17.03
Cylinder bore	51.0~51.025	39.0~39.025	51.05	39.05

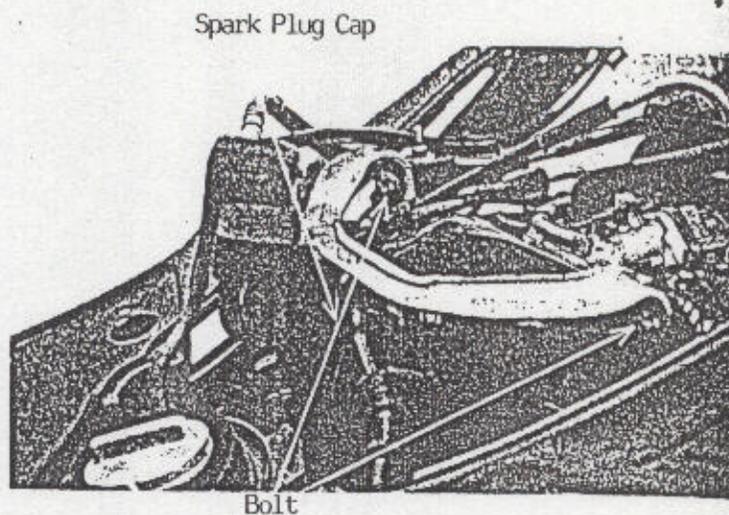
● Torque

- Cylinder head bolt 1.5~1.7 kg-m
- Exhaust pipe joint lock nut 1.0~1.4 kg-m
- Exhaust pipe lock bolt 2.4~3.0 kg-m
- Spark Plug 1.1~1.7 kg-m

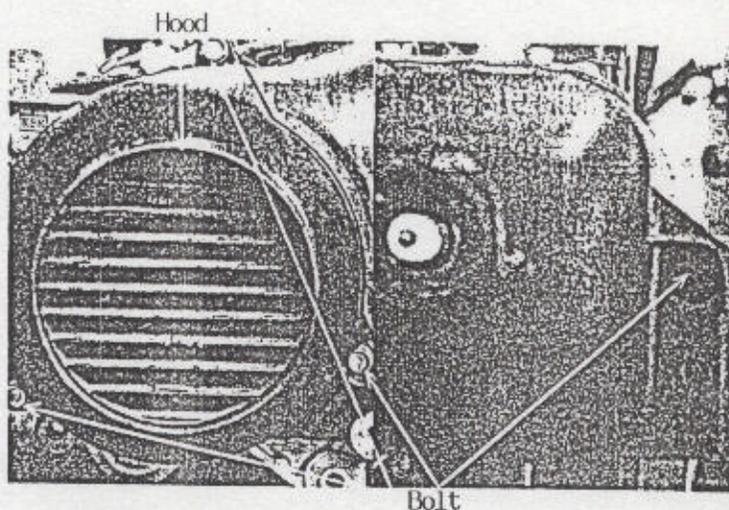
● CYLINDER HEAD

● Removal

Remove the met-in box and seat cushion. (P147, 148)
Remove the frame right and left covers. (P147, 148)
Remove the fuel pump fixing plate.



Remove the 3 bolts attaching the fan lower cover and then remove the fan lower cover.
Remove the bolt attaching the fan upper cover and then remove the fan upper cover.

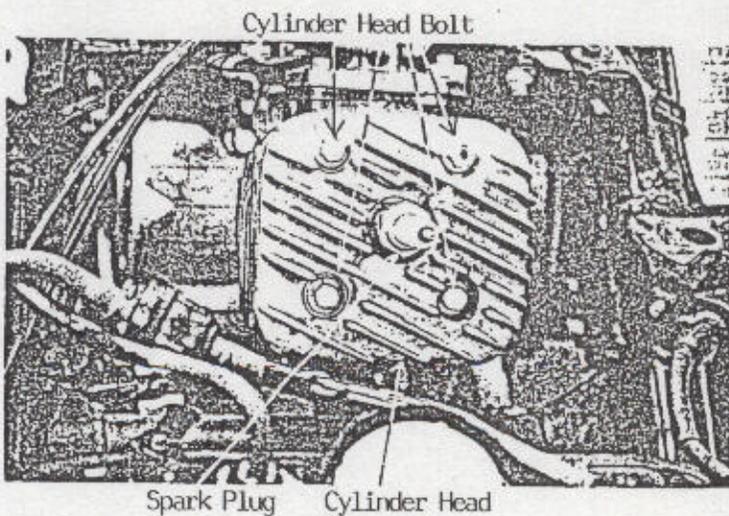


Remove the spark plug.
Remove the cylinder head bolts and the cylinder head.

*

Loosen bolts diagonally in 2 or 3 times.

Remove the cylinder head gasket.

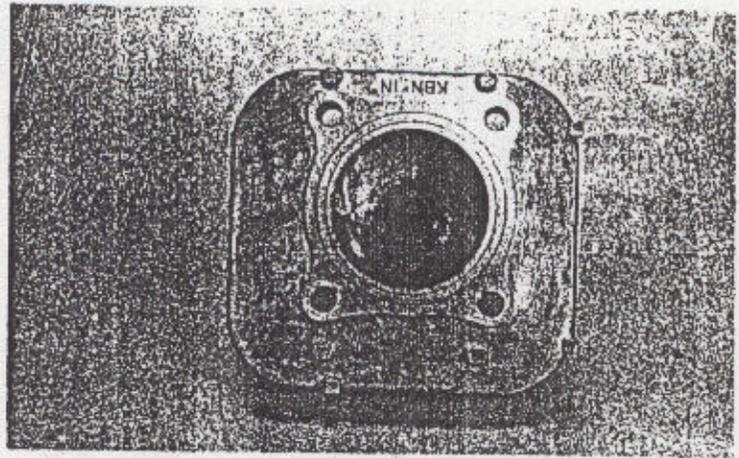


④ Cylinder Head Decarbonizing

Remove the carbon deposits from the combustion chamber.

*

Do not damage the combustion chamber and cylinder mating surfaces.



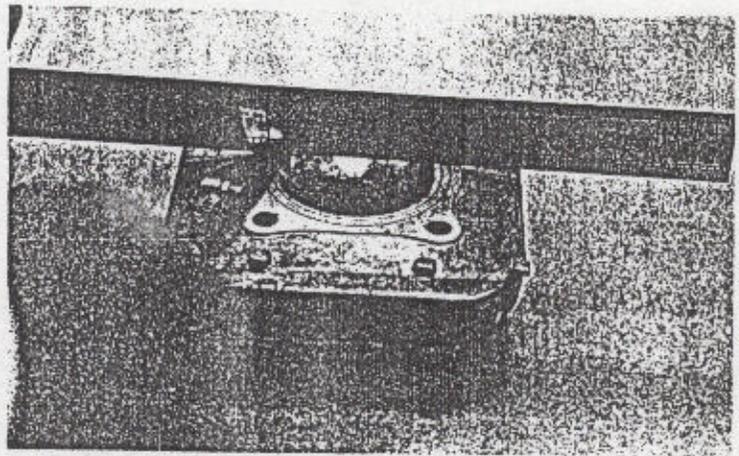
④ Cylinder Head Inspection

Check the cylinder head for warpage.

Service Limit:

SNIPER 100: 0.10mm replace if over

SNIPER 50: 0.10mm replace if over



Cylinder Head Gasket

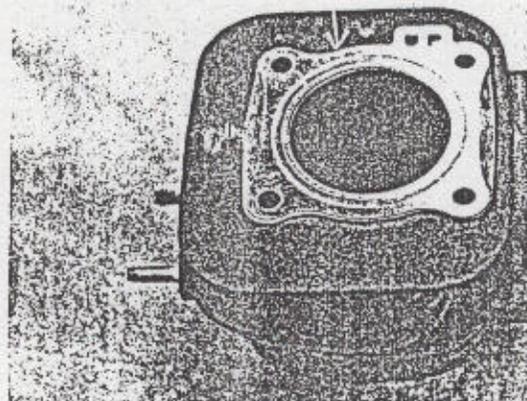
④ Cylinder Head Installation

The mating surfaces between the cylinder head and cylinder should be properly installed.

*

Be careful not to damage mating surfaces.

Install a new gasket onto the cylinder head.



● Cylinder Head Installation

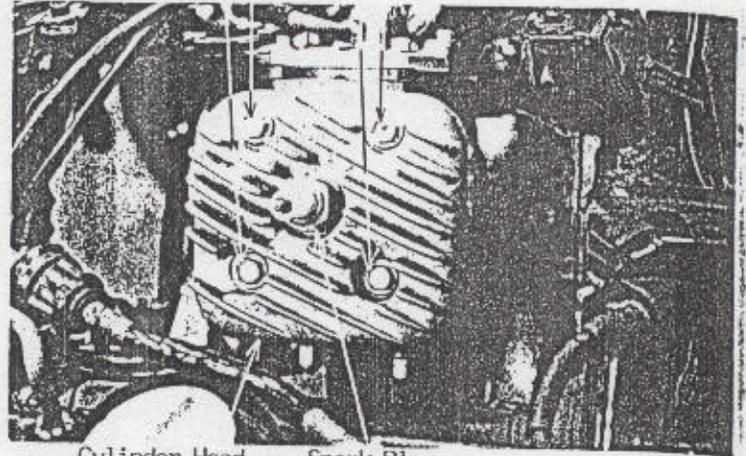
Tighten the cylinder head bolts diagonally in 2 or 3 times.

Torque: 1.5 - 1.7 kg-m

Install the spark plug.

Torque: 1.1 - 1.7 kg-m

Cylinder Head Bolt



Cylinder Head

Spark Plug

● Engine Hood Installation

Install the engine hood.

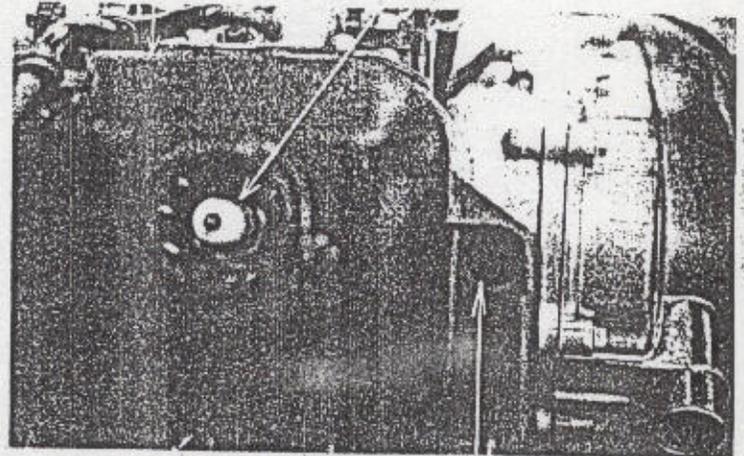
Install the spark plug.

Perform the following inspections after installation:

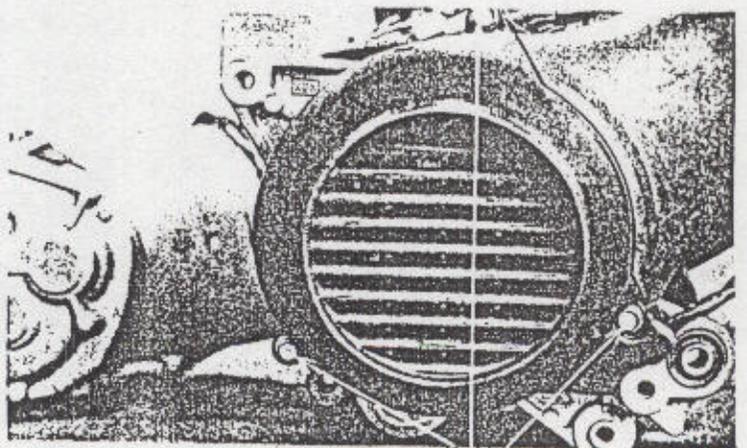
- Compression test
- Abnormal engine noise
- Secondary air leaks

Hood

Spark Plug



Bolt



Bolt

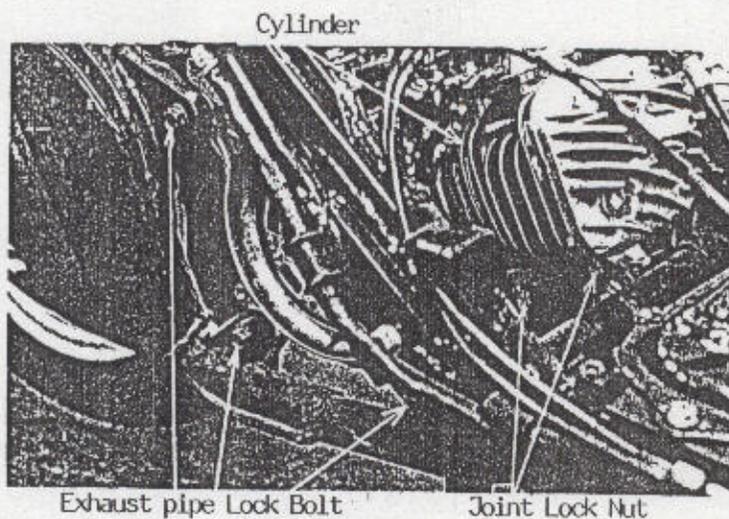
●CYLINDER/PISTON

●Cylinder Removal

- Remove the met-in box and seat cushion.
- Remove the left side cover.
- Remove the fuel pump fixing plate.
- Remove the cylinder head. (P70)
- Remove the 2 exhaust pipe joint lock nuts and 2 exhaust pipe lock bolts.
- Remove the exhaust pipe.
- Remove the cylinder.

* Do not strike the cylinder radiating fins too much.

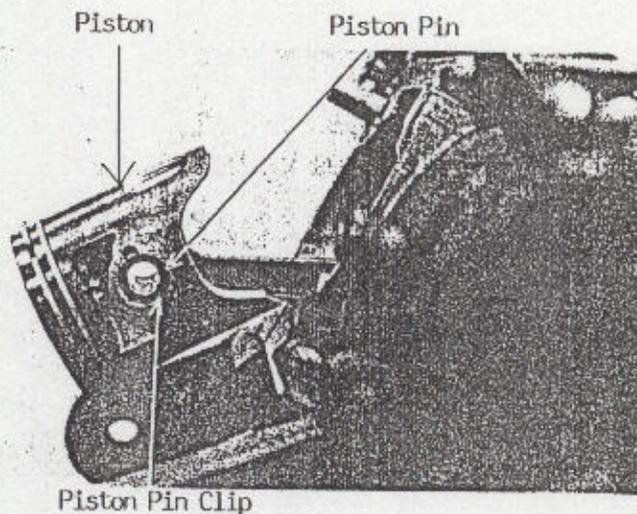
Remove the cylinder head gasket.



●Piston Removal

- Remove the piston pin clip.
- Remove the piston pin and piston.

* Do not damage or scratch the piston.
 • Do not apply side force to the connecting rod when removing the piston pin.
 • Place a piece of clean cloth under the piston to avoid the clip falling into the crankcase.



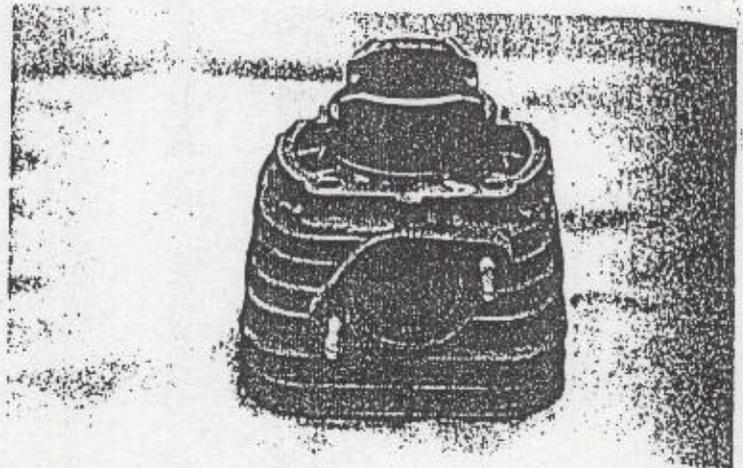
Spread each piston ring and remove by lifting it up at a point just opposite the gap. Remove the expander.



① **Cylinder/Piston Inspection**

Check the cylinder and piston for wear or damage.
Clean carbon deposits from the exhaust port area.

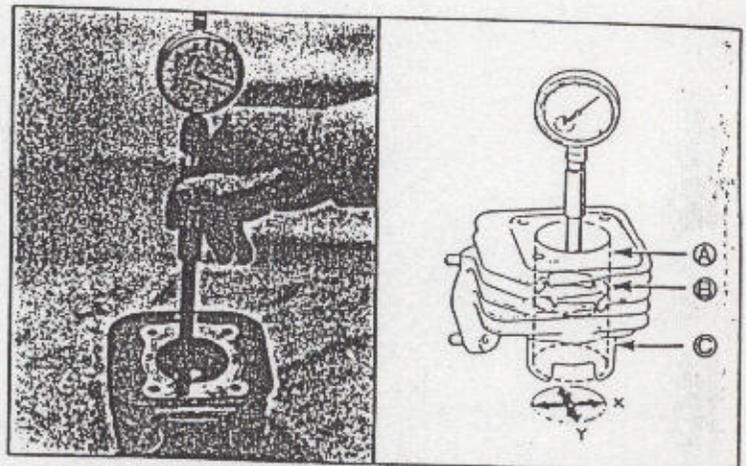
* Be careful not to damage the cylinder inner face.



Measure the cylinder bore.
Avoid the port area. Inspect the cylinder bore for wear at three levels A, B and C in X and Y directions. Take the maximum figure measured to determine the cylinder wear.

Service Limit:

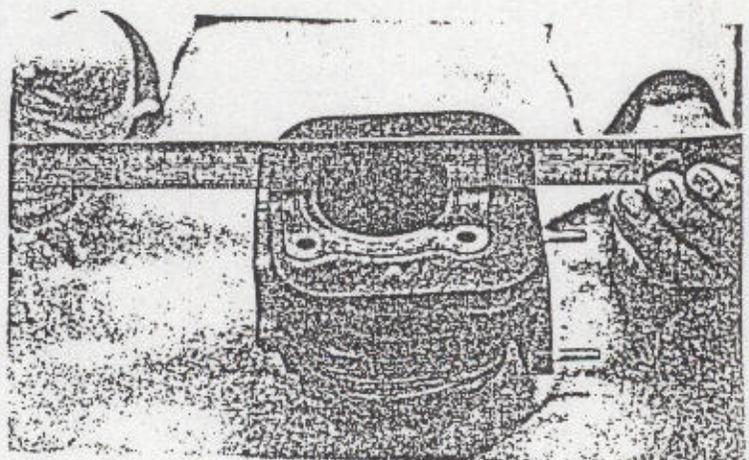
SNIPER 100: 51.05mm replace if over
SNIPER 50 : 39.05mm replace if over



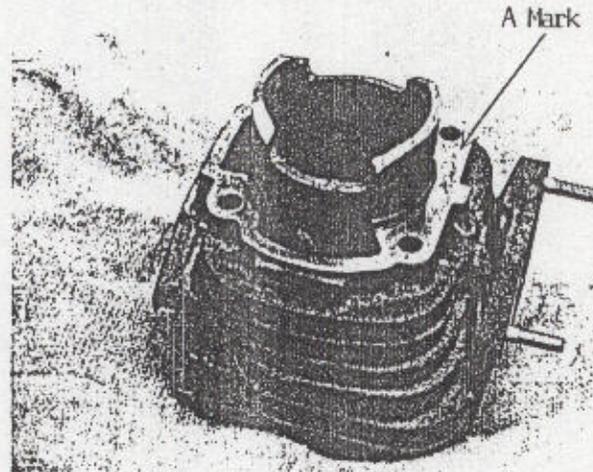
Inspect the cylinder mating surface for warpage.

Service Limit:

SNIPER 100: 0.10mm replace if over
SNIPER 50 : 0.10mm replace if over



*The cylinder has an A mark or has no mark on it. When the cylinder is to be replaced with a new one, use a cylinder which is same as the old one.



Piston O.D. Measurement

Measure the piston O.D. at a point 4mm from the bottom of the piston skirt.

Service Limit:

SNIPER 100: 50.90mm replace if below

SNIPER 50 : 38.90mm replace if below

Measure the piston-to-cylinder clearance.

Service Limit:

SNIPER 100: 0.10mm replace if over

SNIPER 50 : 0.10mm replace if over

Measure the piston pin hole I.D.

Service Limit:

SNIPER 100: 14.03mm replace if over

SNIPER 50 : 12.03mm replace if over

Measure the piston pin O.D.

Service Limit:

SNIPER 100: 13.98mm replace if over

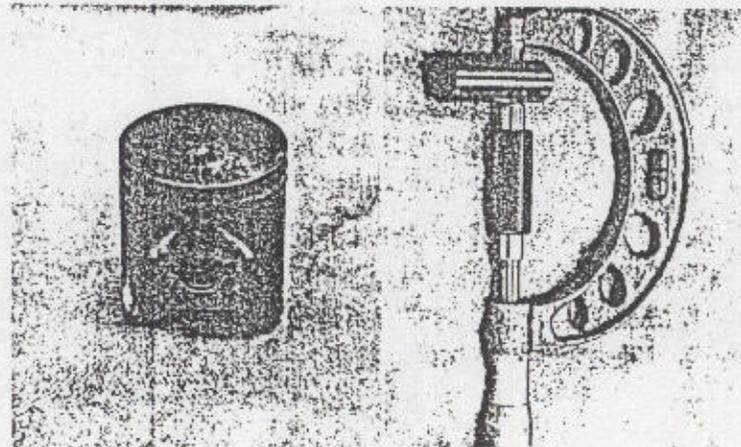
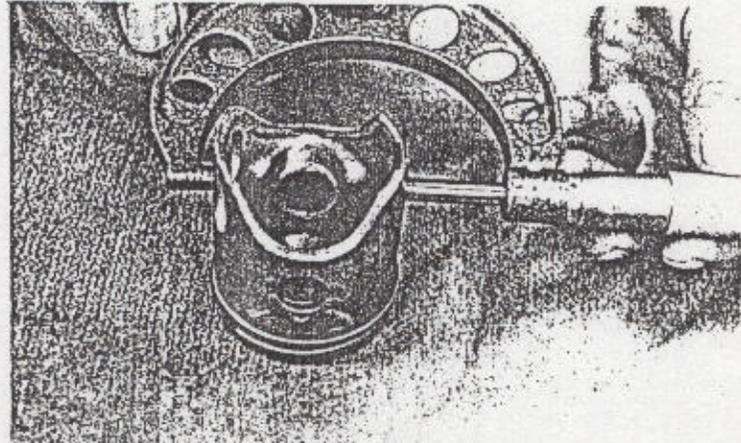
SNIPER 50 : 11.98mm replace if over

Measure the piston-to-piston pin clearance.

Service Limit:

SNIPER 100: 0.03mm replace if over

SNIPER 50 : 0.03mm replace if over



● **Piston Ring Inspection**

Measure each piston ring end gap.

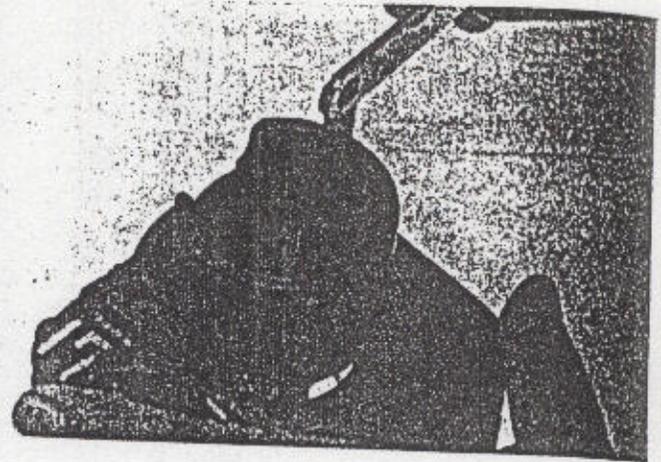
Service Limit: Top/Second

SNIPER 100: 0.50mm replace if over

SNIPER 50: 0.40mm replace if over



Press each piston ring into the cylinder in the direction of piston vertical to the cylinder wall and measure the end gap.



● **Connecting Rod Small End Inspection**

Install the piston pin and bearing in the connecting rod small end.

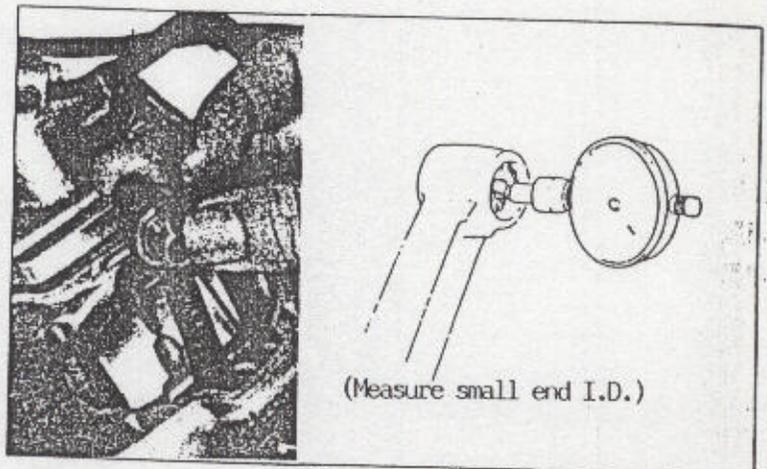
Check the piston pin for looseness.

Measure the connecting rod small end I.D.

Service Limit:

SNIPER 100: 19.03mm replace if over

SNIPER 50 : 17.03mm replace if over

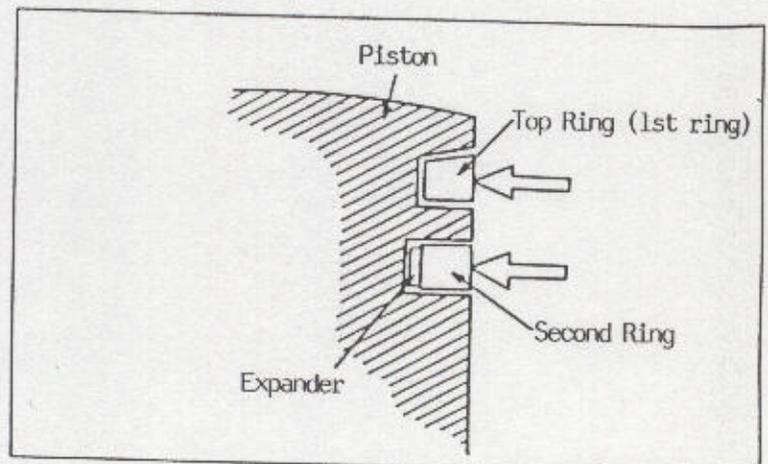


◀Measure Small End I.D.▶

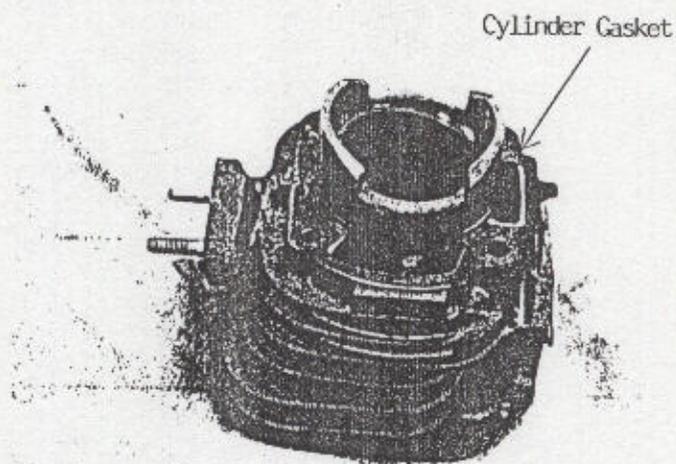
● **Piston/Cylinder Installation**

First install the expander in the second ring groove and then install the top and second rings in their respective ring grooves. The piston rings should be pressed into the grooves with even force. After installation, check and make sure that each ring is flush with the piston at several points around the ring.

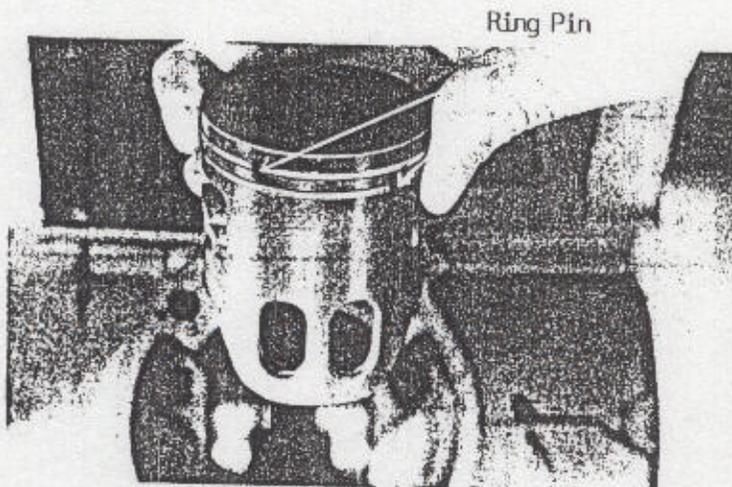
A ring that will not compress means that carbon deposits in the ring groove should be cleaned.



Install a new cylinder gasket on the mating surface between the cylinder and crankcase.



Make sure that the ring end gaps are aligned with the piston ring pins in the ring grooves.



Lubricate the cylinder inner face and piston rings with engine oil and install the piston into the cylinder while compressing the piston rings.

* Be careful not to damage the piston.

Install the cylinder head.
(P72)

Install the exhaust pipe and tighten the exhaust pipe joint lock nuts.

Torque: 1.5 - 1.7 kg-m

Tighten the exhaust pipe lock bolt.

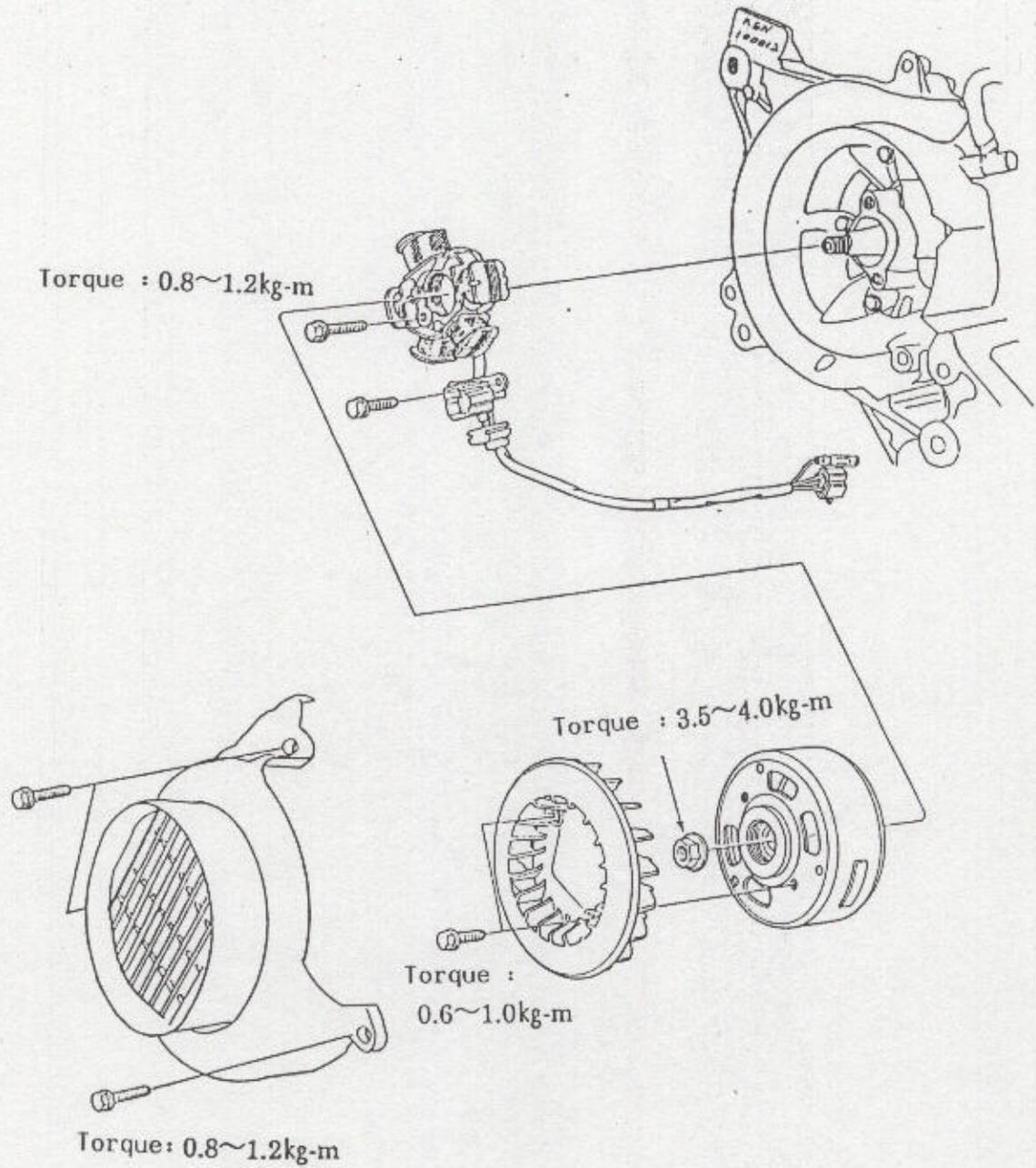
Torque: 2.4-3.0 kg-m

Install the frame covers.

A.C. GENERATOR



- SERVICE INFORMATION..... 7-3
- A.C. GENERATOR REMOVAL..... 7-4
- A.C. GENERATOR INSTALLATION..... 7-5



● SERVICE INFORMATION

● GENERAL INSTRUCTIONS

- A.C. generator maintenance can be made with the engine installed.
- Refer to Chapter 15 for A.C. generator inspection.

● TORQUE VALUES

Flywheel Lock Nut : 3.5~4.0 kg-m

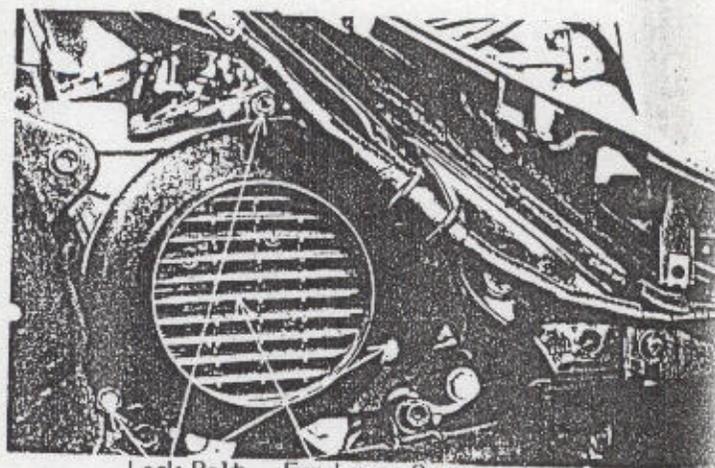
● TOOLS

COMMON TOOLS

Flywheel Puller 077330-0010000

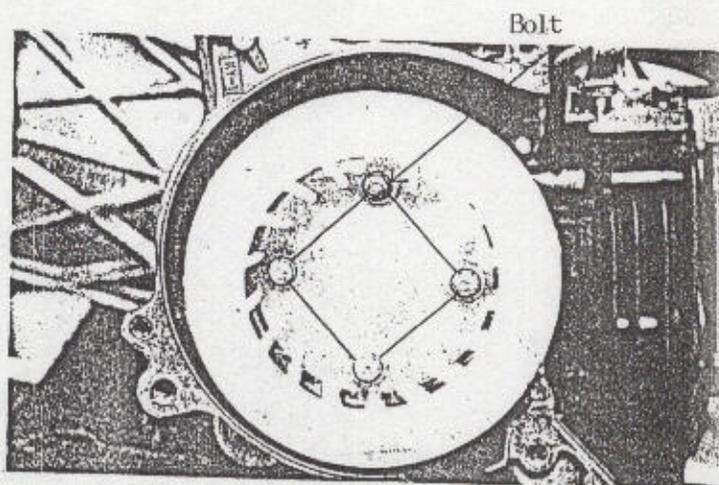
Universal Holder 077250-0030000

- **A.C. GENERATOR REMOVAL**
 Remove the left side cover.
 Remove the 3 lock bolts attaching
 the fan lower cover.



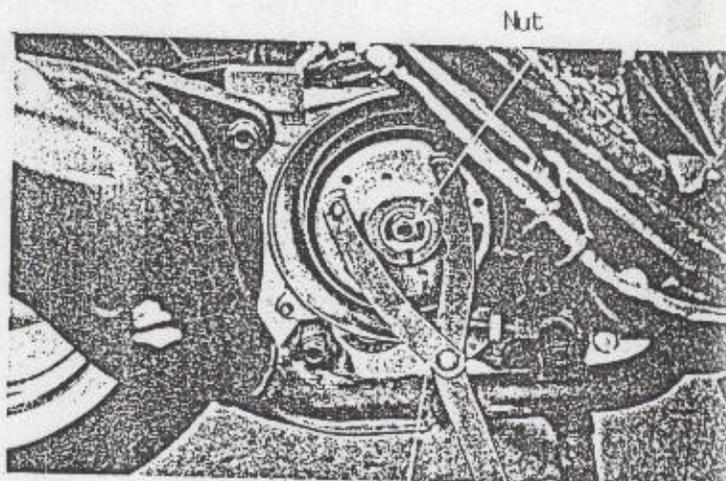
Lock Bolt Fan Lower Cover

Remove the 4 bolts and then
 remove the cooling fan.



Bolt

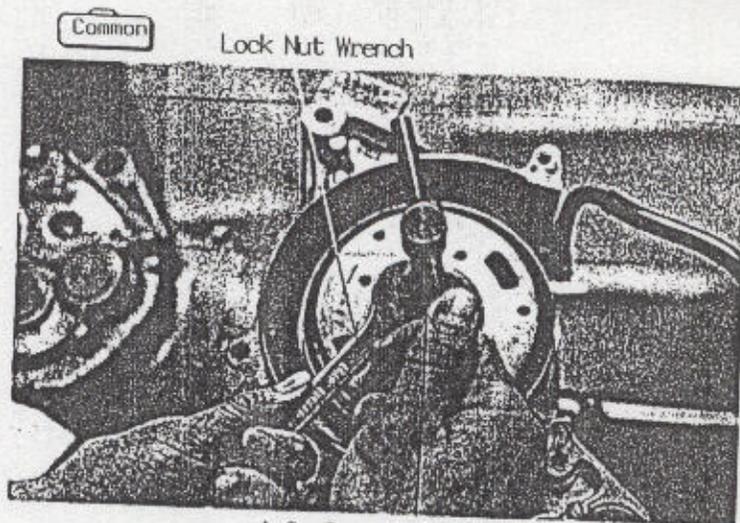
Hold the flywheel with a universal
 holder and then remove the 10mm
 nut.



Nut

Universal Holder 07725-003000

Remove the A.C. generator flywheel with a flywheel puller.

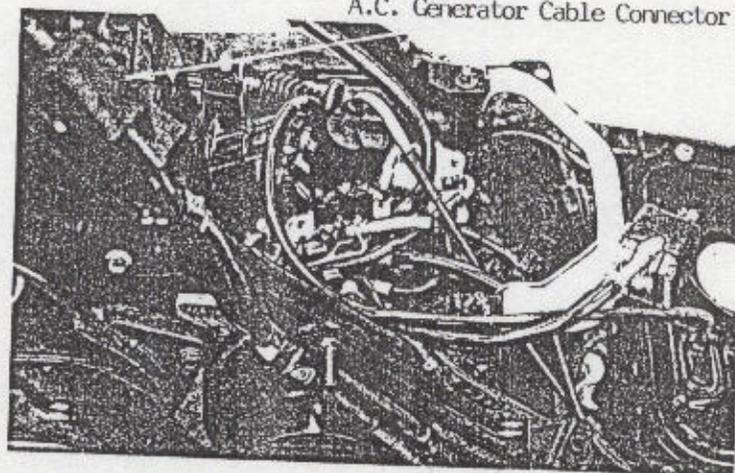


Common

Lock Nut Wrench

A.C. Generator Flywheel Puller

Disconnect the A.C. generator cable connector.



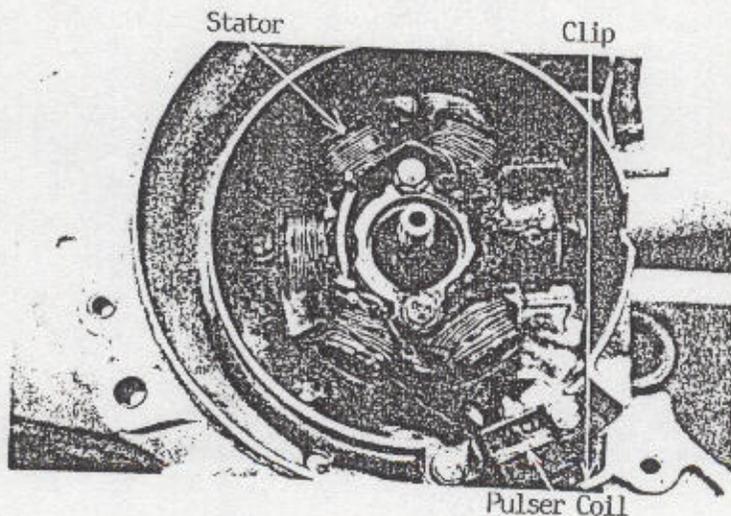
A.C. Generator Cable Connector

Remove the 2 pulser coil attaching bolts and then remove the pulser coil from the right crankcase. Remove the A.C. generator pulser coil cable clip from the right crankcase. Remove the 2 lock bolts attaching the A.C. generator stator.

* Do not damage the disconnected cable.

● A.C. GENERATOR INSTALLATION

Install the A.C. generator stator and pulser coil cable clip onto the right crankcase, and then install the pulser coil.



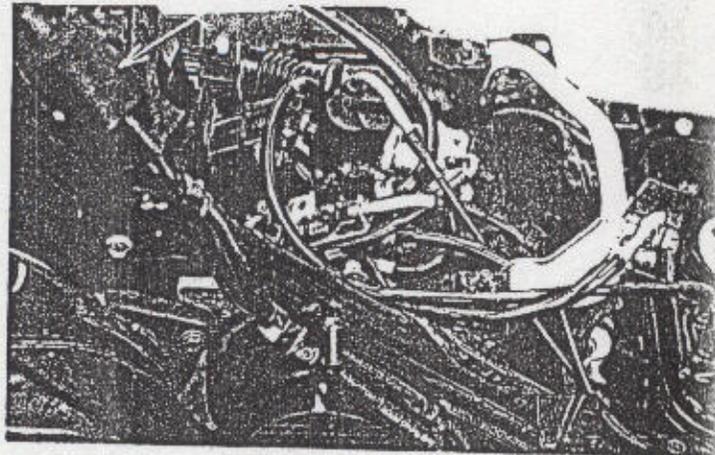
Stator

Clip

Pulser Coil

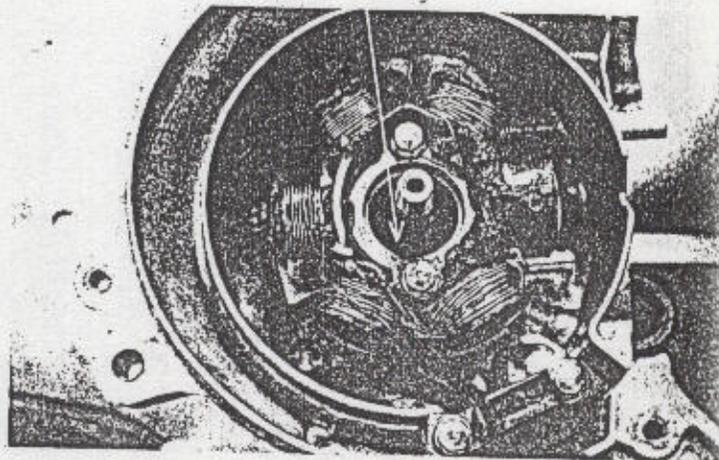
Connect the A.C. generator cable connector.

A.C. Generator Cable Connector



If the A.C. generator flywheel and the cone-shaped part of crankshaft are damaged, repair if necessary.
Install the woodruff key in the crankshaft keyway.

Woodruff Key



Install the flywheel onto the crankshaft with flywheel woodruff keyway aligned with the crankshaft woodruff key.

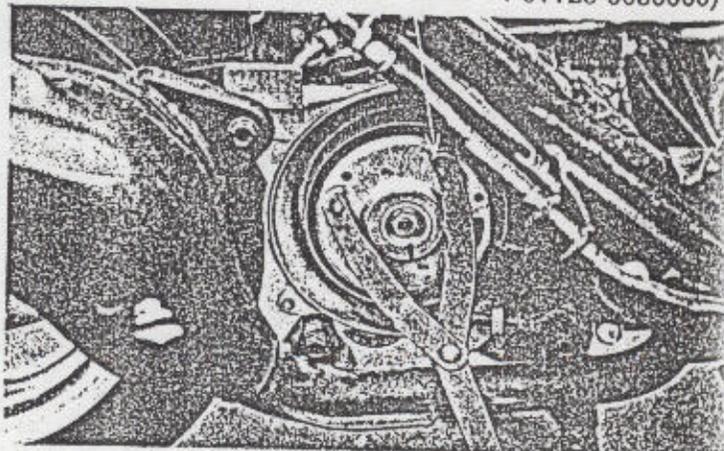
Hold the flywheel with a universal holder and install the 10mm flange nut.

Torque: 3.5-4.0 kg-m

Start the engine and check the ignition timing. (P47)

The installation sequence is in the reverse order of removal.

Universal Holder (07725-0030000)



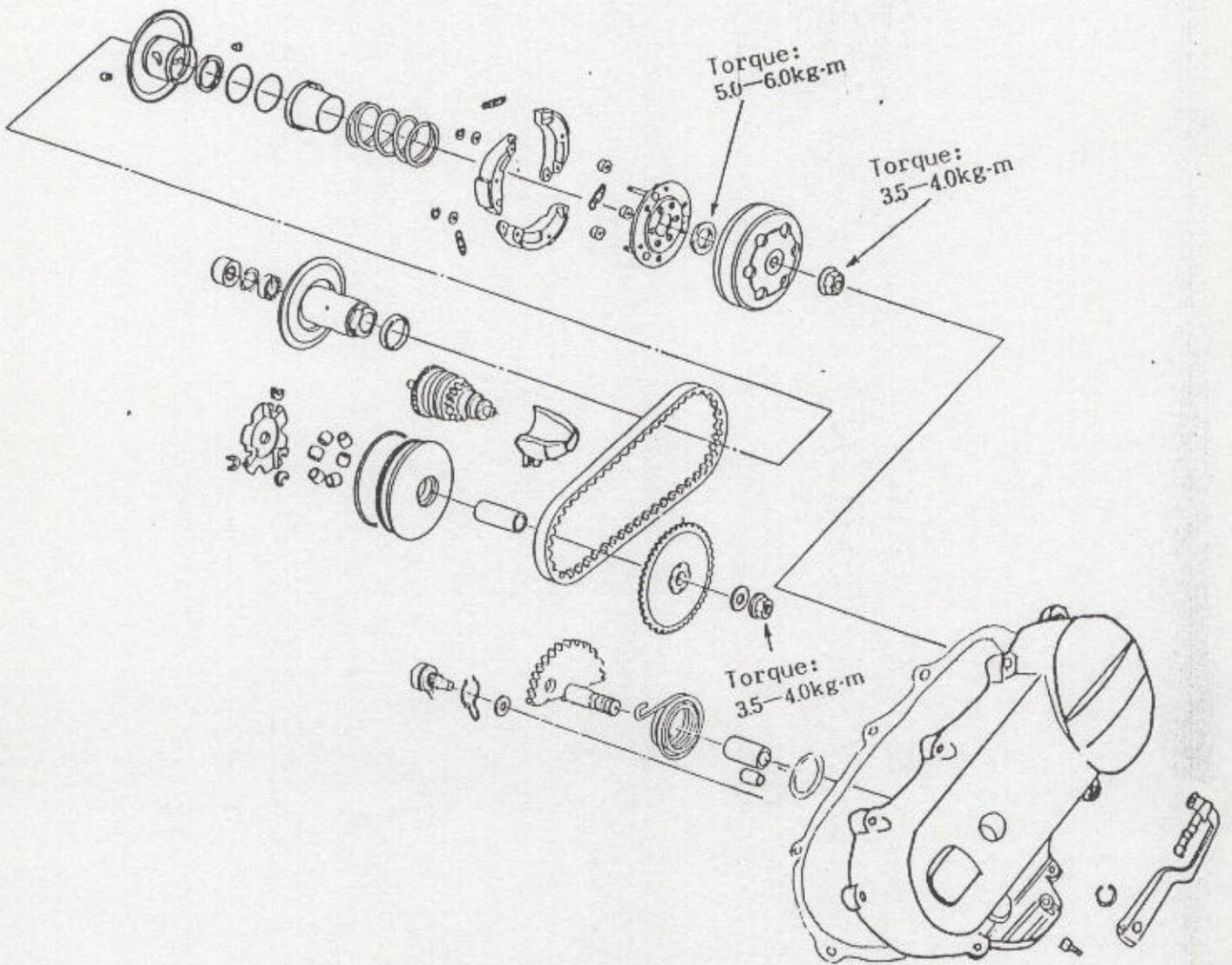
KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY

● TROUBLESHOOTING.....	8-3
● SERVICE INFORMATION.....	8-3
● KICK STARTER.....	8-4
● DRIVE BELT.....	8-8
● DRIVE PULLEY.....	8-10
● STARTER PINION.....	8-15
● CLUTCH/DRIVEN PULLEY.....	8-15



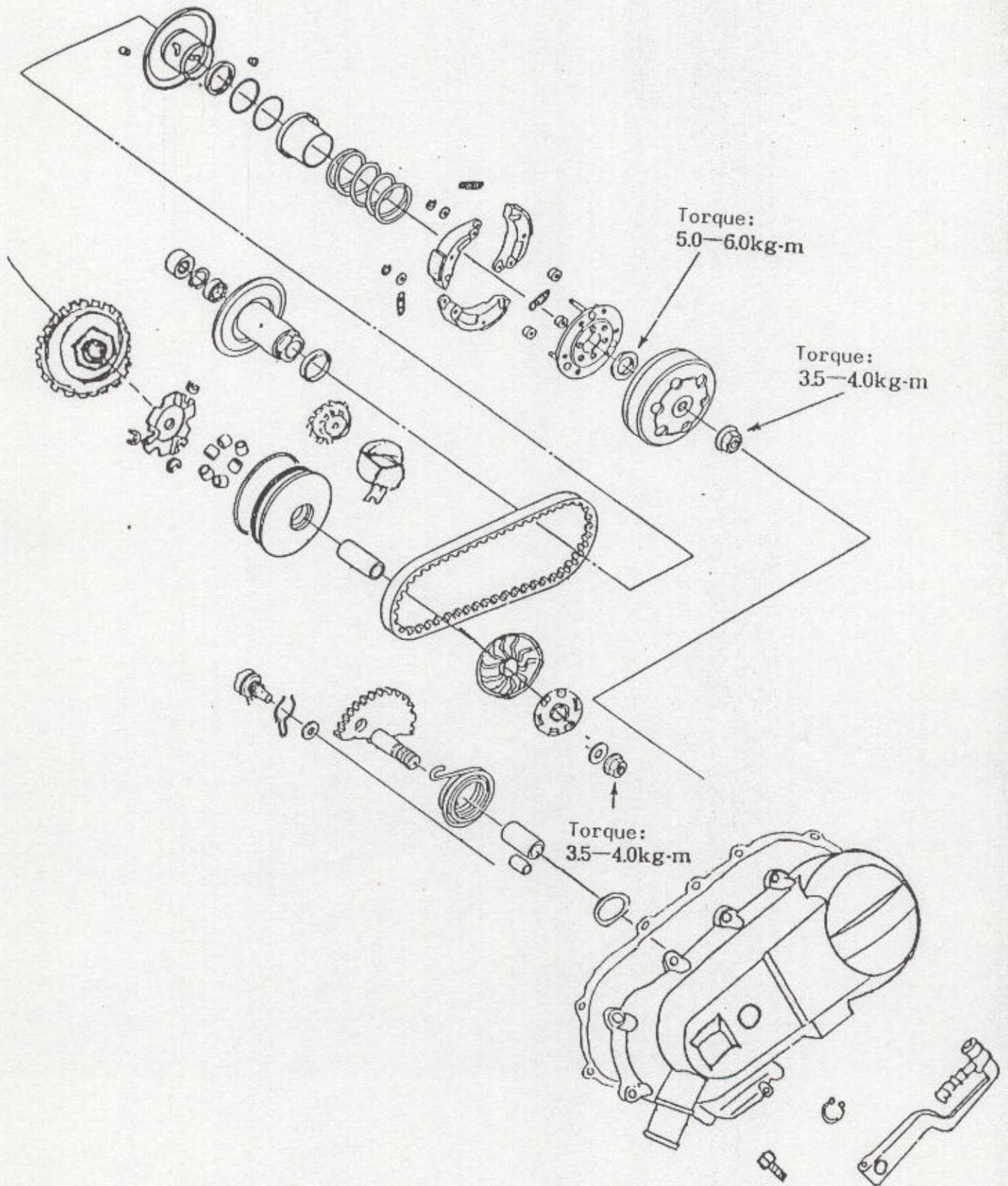
KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY **KBN100 GAK50**

SNIPER 50



KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY **KBN100 GAK50**

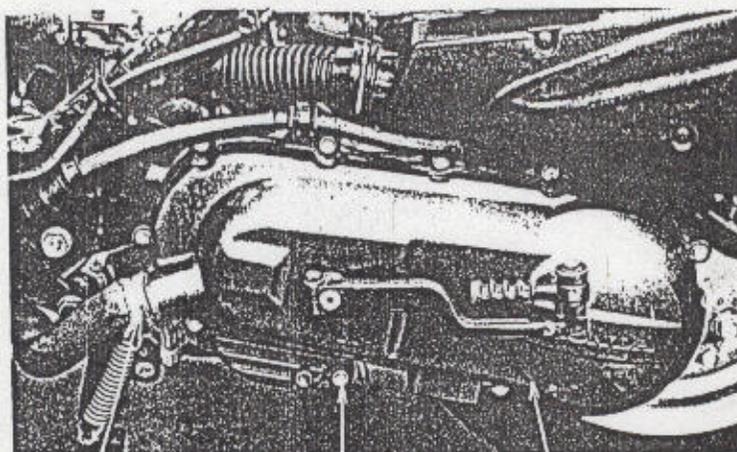
SNIPER 100



● **KICK STARTER**

● **Left Crankcase Cover Removal**

Remove the clip on the cooling pipe joint.
 Remove the 10 bolts from the left crankcase.
 Remove the left crankcase cover and lock pin.
 Check the left crankcase cover gasket for wear and damage.

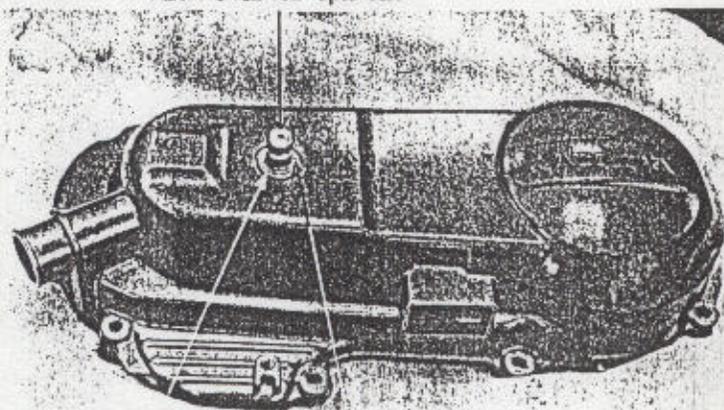


Clip Lock Bolt Left Crankcase Cover

● **Kick Starter Spindle Removal**

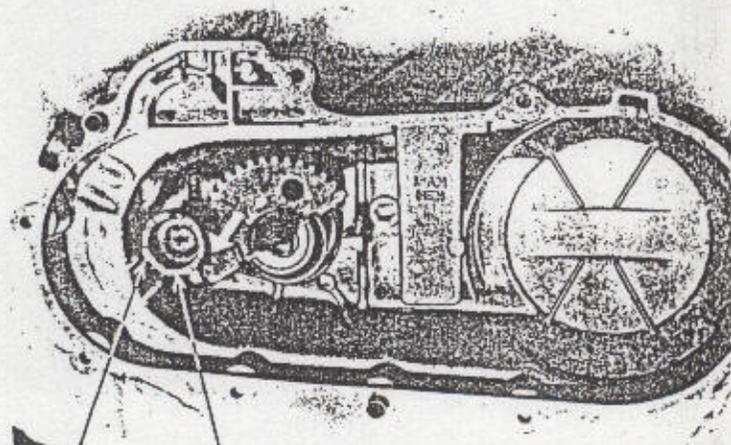
Remove the kick lever from the kick starter spindle.
 Remove the lock clip and washer from the kick starter spindle.

Kick Starter Spindle



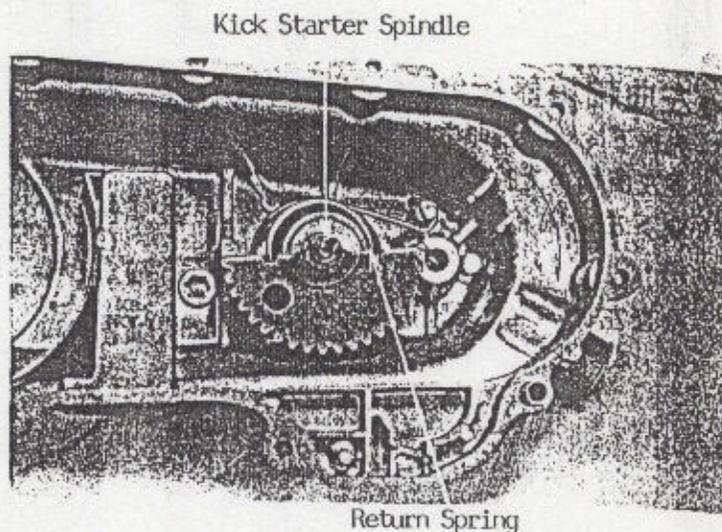
Washer Lock Clip

Slightly rotate the kick starter spindle to remove the kick starter driven gear and friction spring.

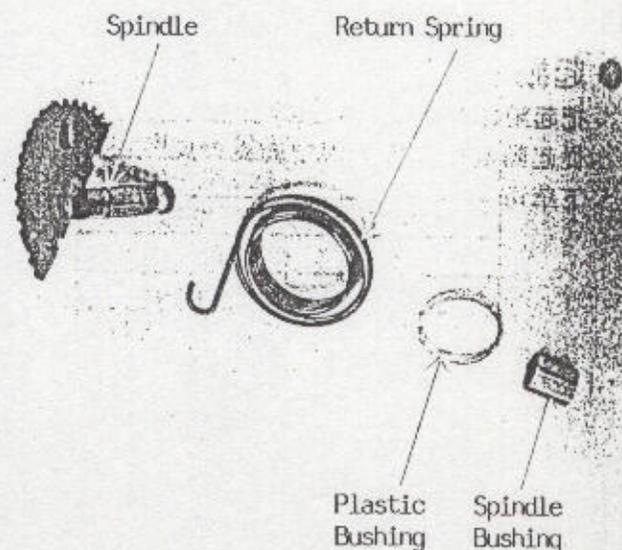


Friction Spring Kick Starter Driven Gear

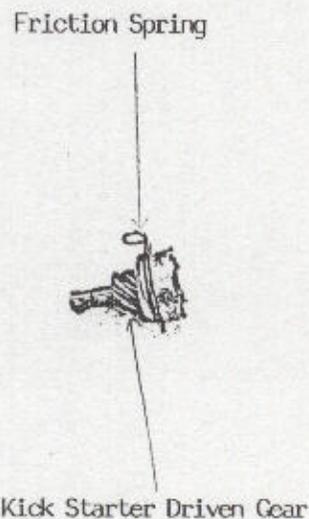
Remove the kick starter spindle and return spring from the left crankcase cover.
Remove the kick starter spindle bushing.



● Kick Starter Spindle Inspection
Check the kick starter spindle and gear for wear or damage.
Inspect the starter return spring for weakness or damage.
Inspect the kick starter spindle bushing for wear or damage.

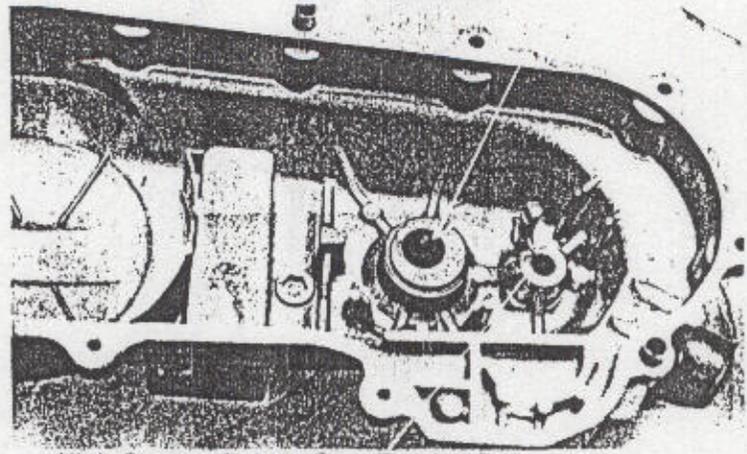


Check the kick starter driven gear for wear or damage.
Check the friction spring for wear or damage.



Check the kick starter spindle and driven gear forcing parts for wear or damage.

Kick Starter Spindle Forcing Part



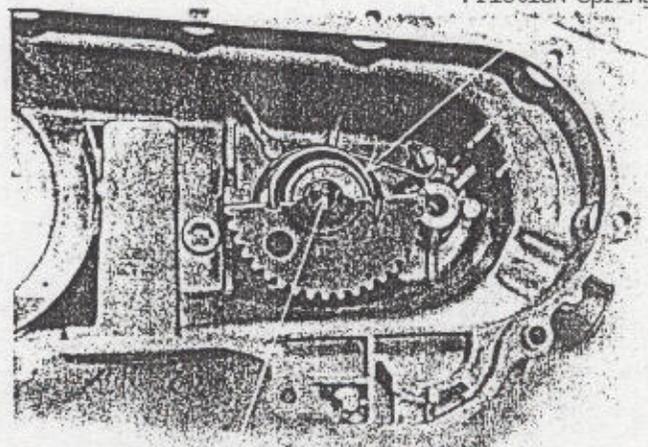
Kick Starter Driven Gear Forcing Part

● Kick Starter Installation

Install the kick starter spindle bushing and return spring onto the left crankcase cover.

* If the return spring two end hooks are not inserted in the kick starter spindle, use a screw driver to press them into the spindle respectively.

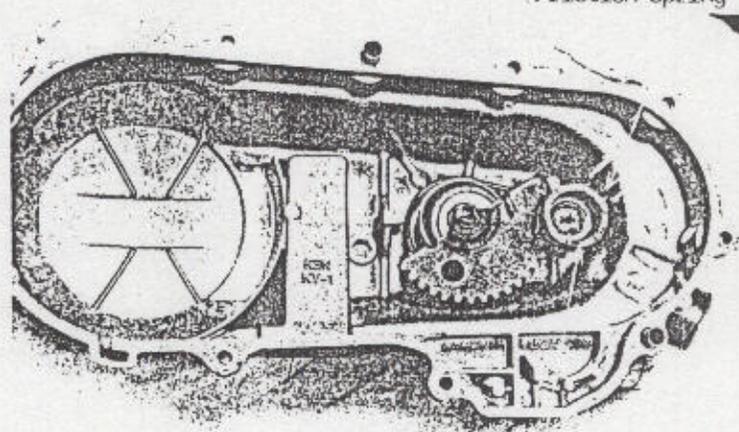
Friction Spring



Kick Starter Spindle

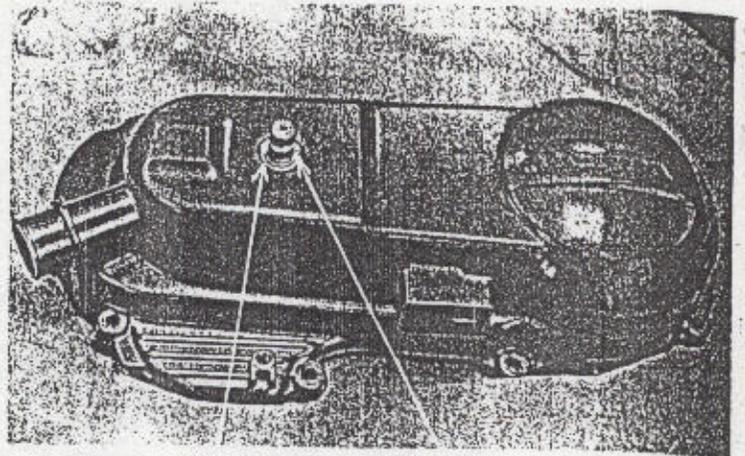
Properly install the kick starter driven gear and friction spring as the figure shown.

Friction Spring



Kick Starter Driven Gear

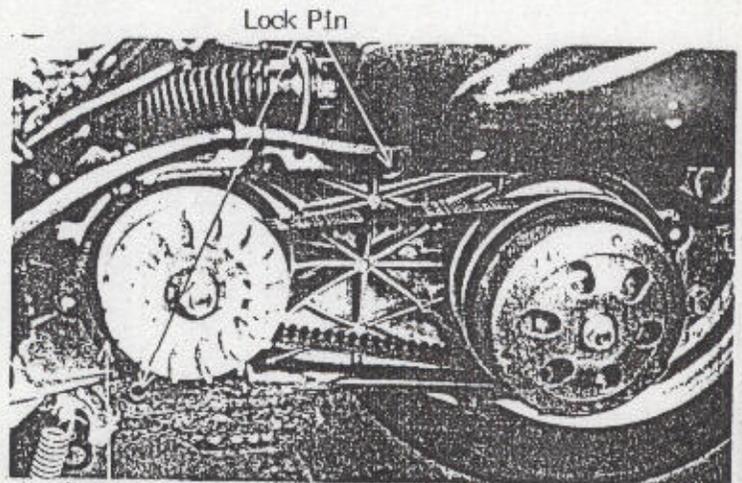
First install the washer and then the lock clip on the kick starter spindle. Install the kick lever.



Washer

Lock Clip

● Left Crankcase Cover Installation
Install the lock pins.

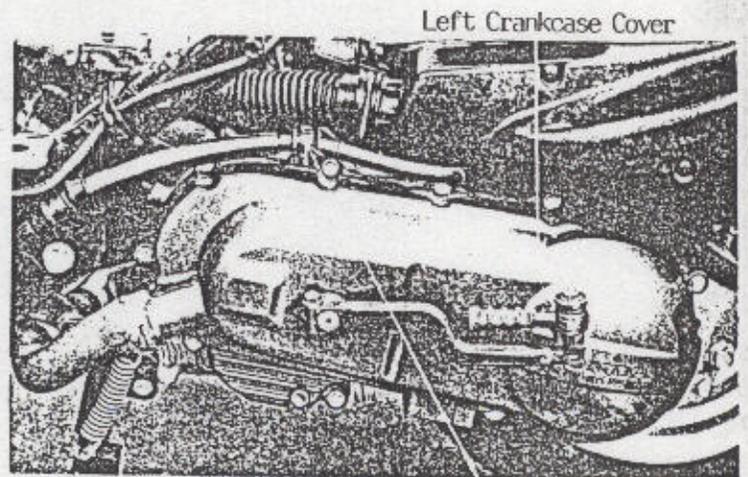


Lock Pin

Gasket

Install the left crankcase cover and tighten the 10 attaching bolts diagonally. Connect the drive belt cooling pipe and install the clip.

* For drum brake, be careful to install the rear brake cable into the fixing holder and install the clip.



Left Crankcase Cover

Rear Brake Cable Clip

KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY KBN100 GAK50

●DRIVE BELT

Remove the left crankcase cover.

●Inspection

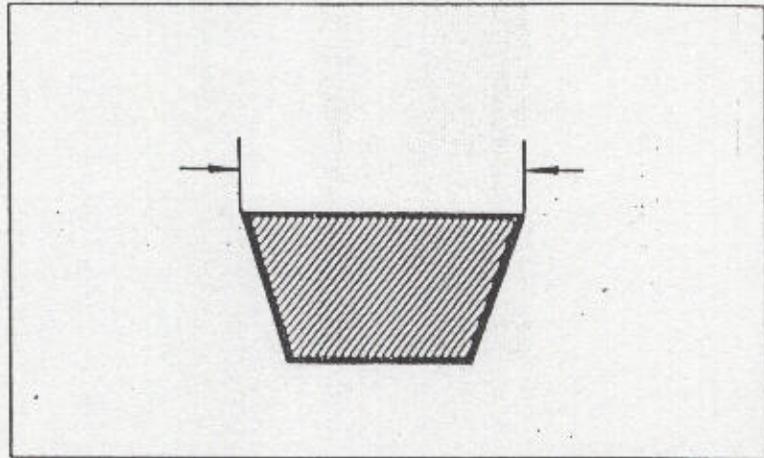
Check the drive belt for cracks, separation or abnormal or excessive wear.

Measure the drive belt's width.

Service Limit:

SNIPER 100: 17mm replace if over

SNIPER 50 : 16.5mm replace if over

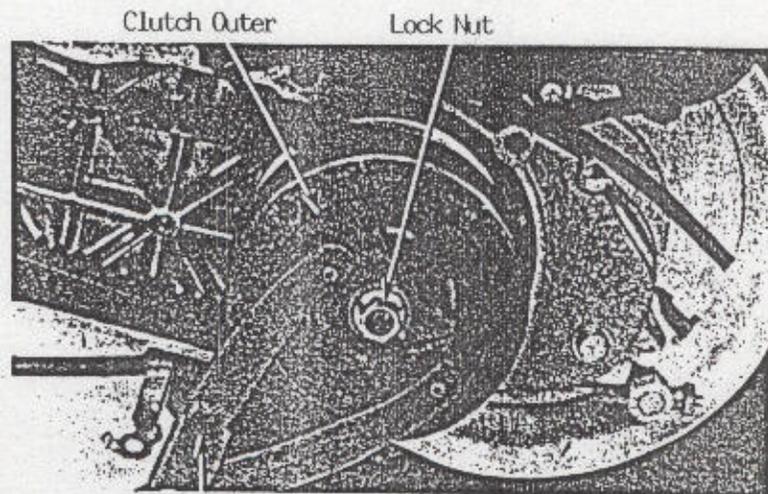


* Use specified genuine part for replacement.

●Replacement

Remove the 10 bolts attaching the left crankcase cover.

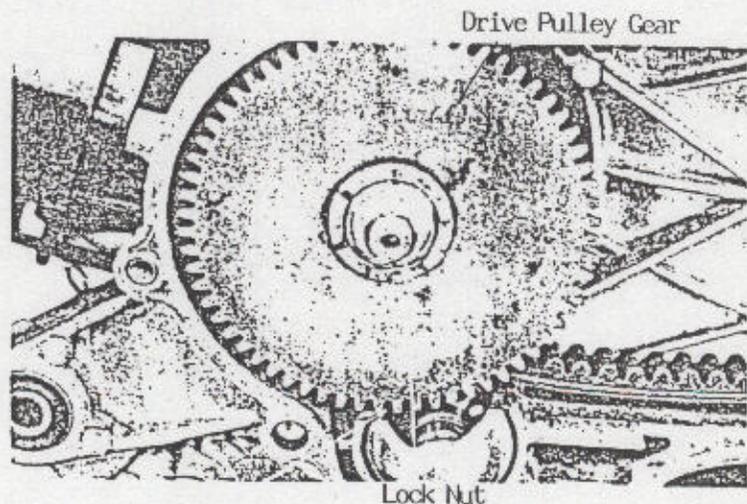
Remove the left crankcase cover.
(P89)



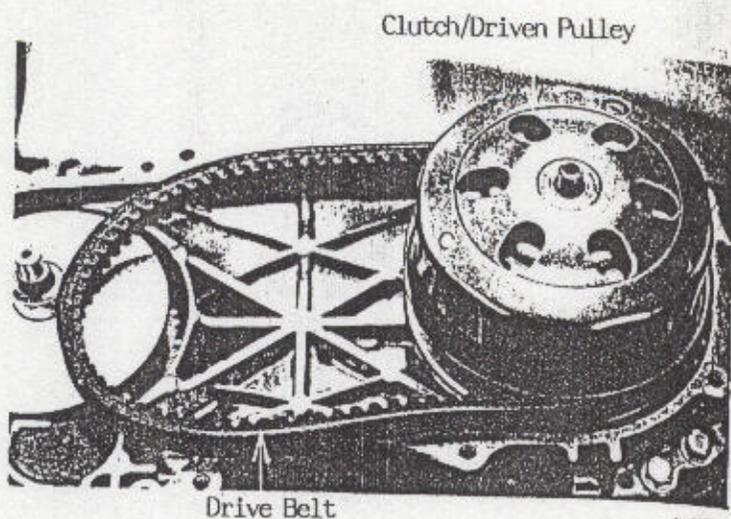
Common Universal Holder
07725-0030000

Hold the drive pulley gear with an universal holder and then remove the 10mm lock nut.

Remove the drive pulley gear.



Remove the drive belt from the clutch/driven pulley.

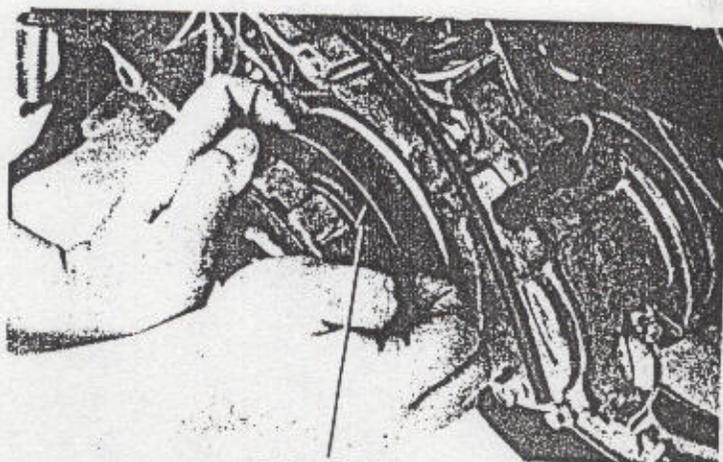


Clutch/Driven Pulley

Drive Belt

● Drive Belt Installation

Turn the clutch/driven pulley counterclockwise to expand the drive belt groove and then install a new drive belt.

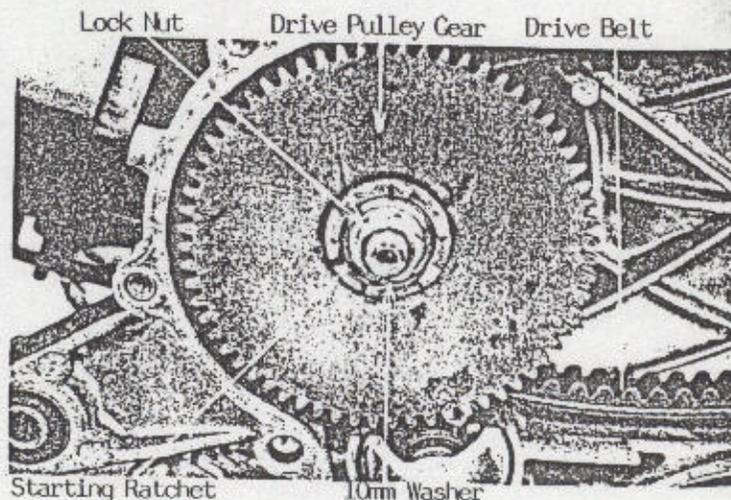


Drive Belt

Install the drive belt on the drive pulley.
Install the drive pulley gear, ratchet and 10mm washer and then tighten the 10mm lock nut.
Torque: 3.5-4.0 kg-m



When installing, be sure the tooth grooves of drive pulley gear and starting ratchet are aligned with the teeth of crankshaft before tightening the lock nut.



Lock Nut

Drive Pulley Gear

Drive Belt

Starting Ratchet

10mm Washer

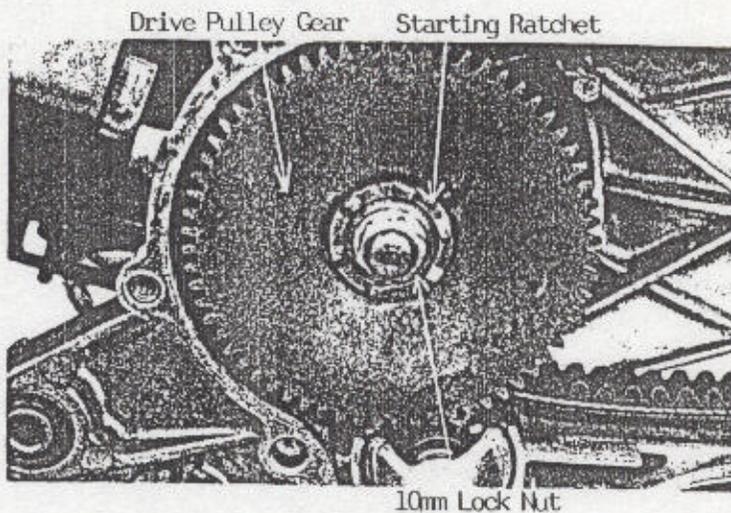
KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY **KBN100 GAK50**

● DRIVE PULLEY

● Removal

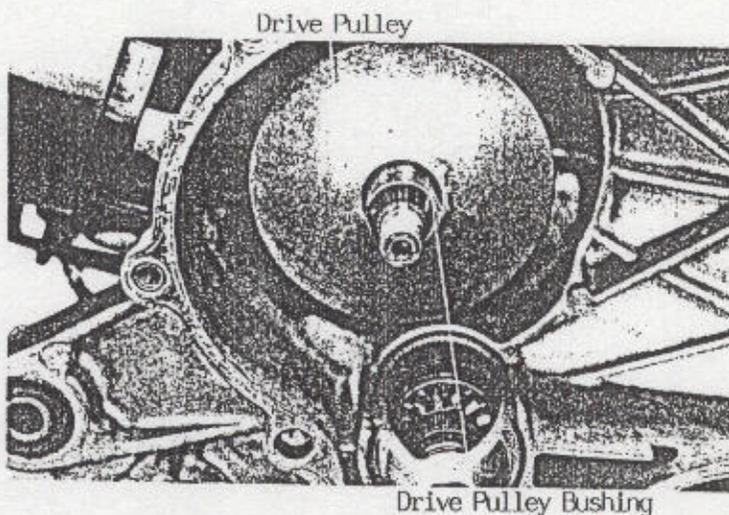
Hold the drive pulley gear with an universal holder and remove the 10mm lock nut.

Remove the starting ratchet, 10mm washer and drive pulley gear.

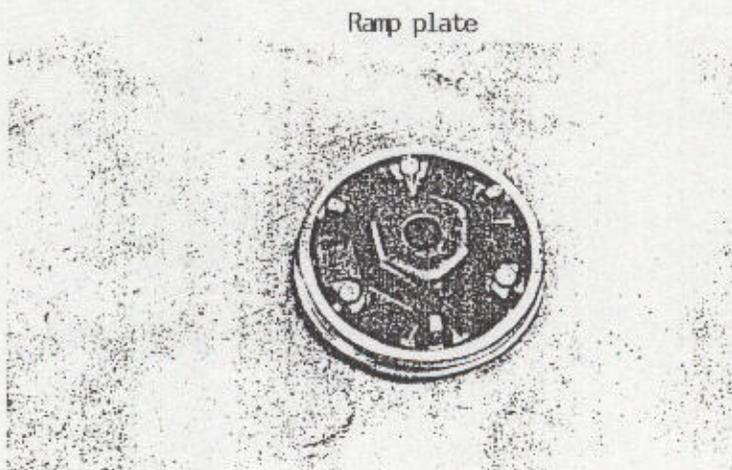


● Drive Pulley Disassembly

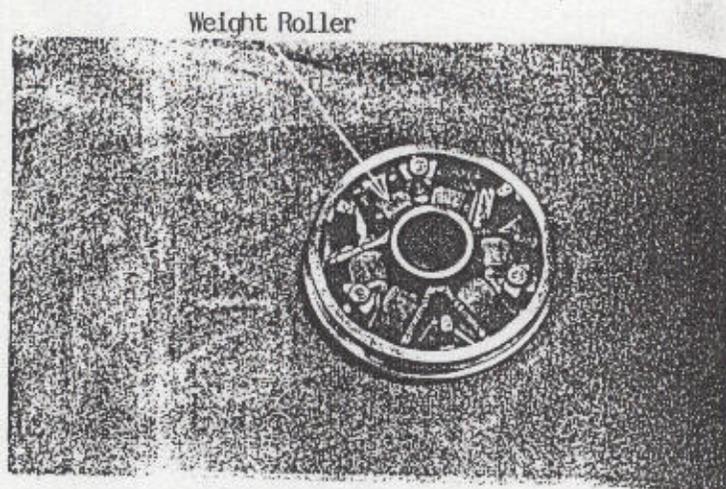
Remove the drive pulley and bushing from the crankshaft.



Remove the ramp plate.



Remove the weight rollers.



● **Drive Pulley Inspection**

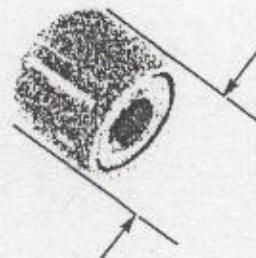
Check each weight roller for wear or damage.

Measure each roller O.D.

Service Limit:

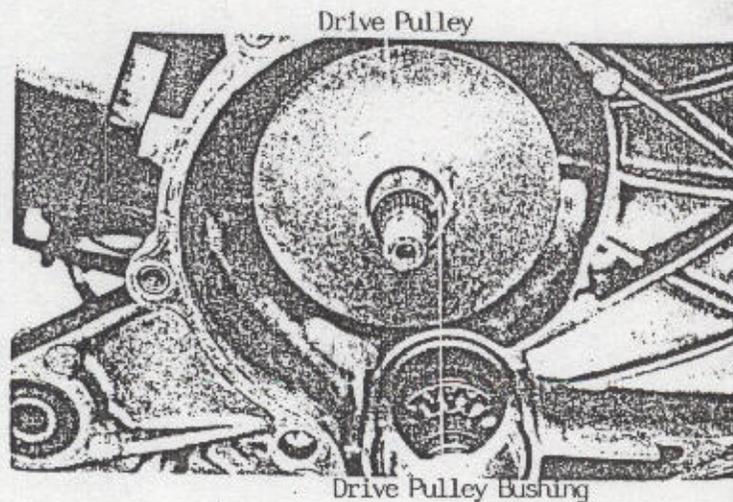
SNIPER 100: 15.4mm replace if below

SNIPER 50 : 12.4mm replace if below



● **Drive Pulley Installation**

Install the drive pulley bushing and drive pulley onto the crankshaft.

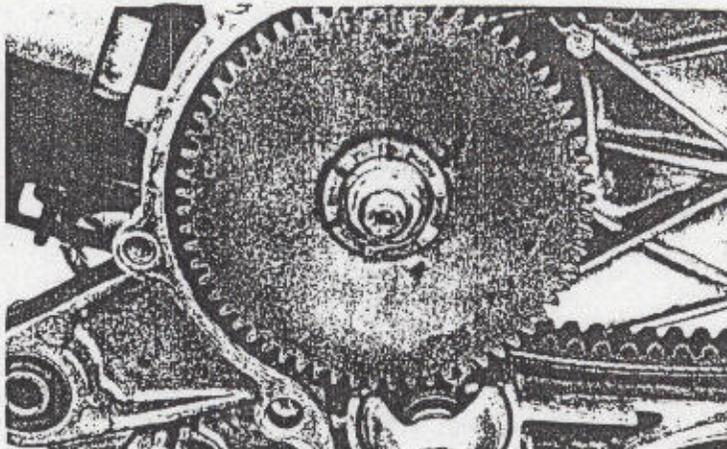


Install the drive belt on the crankshaft.

Install the drive pulley gear and washer and then tighten the 10mm nut. (P93)

Torque: 3.5 - 4.0 kg-m

*
Keep grease or oil off the drive belt and drive pulley.



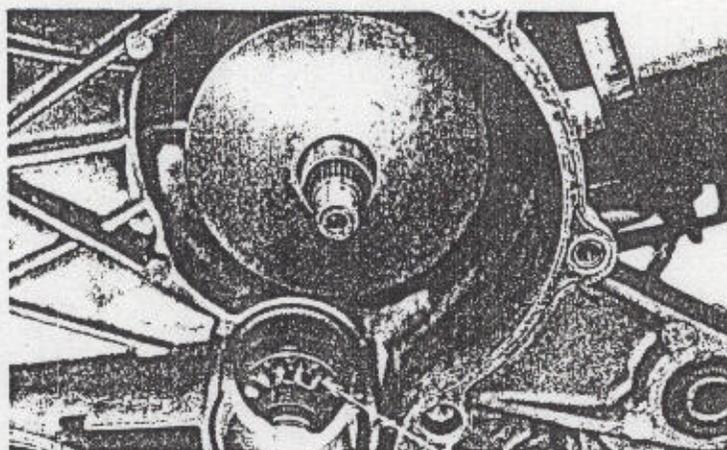
● **STARTER PINION (GAK50)**

● **Removal**

Remove the left crankcase cover. (P82)

Remove the drive pulley gear. (P87).

Remove the starter pinion seat.
Remove the starter pinion.



Starter Pinion Seat Starter Pinion

Inspection

Inspect the starter pinion seat forcing part for wear or damage.

Inspect the starter pinion for proper operation.

Inspect the teeth and shaft forcing part for wear or damage.

Shaft Forcing Part

● **Installation**

Apply grease to the starter pinion.

Install it in the reverse order of removal.



Starter Pinion Seat

●STARTER SINGLE-ACTING CLUTCH
DRIVE GEAR (KBN100)

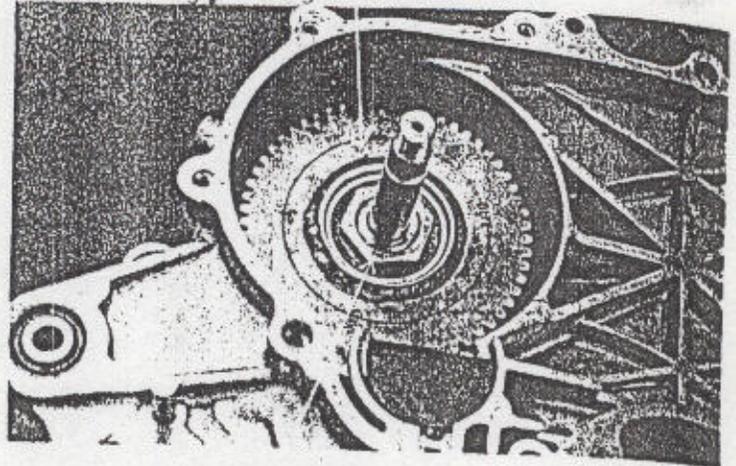
●Removal

Remove the left crankcase cover.

(P89) *

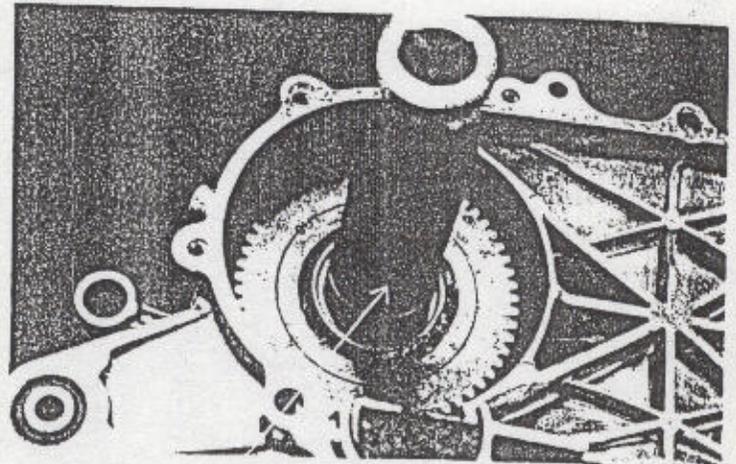
Remove the drive pulley. (P93)

Starter Single-acting Clutch Drive Gear



32mm Lock Nut

Use a special tool to remove the
32mm lock nut.

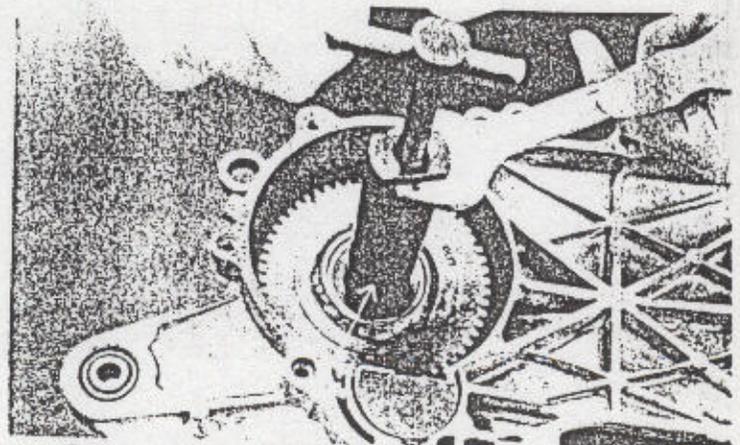


Special Tool 32mm Socket

Use the starter drive gear puller
to remove the starter single-
acting clutch drive gear.

●Installation

Install it in the reverse order
of removal.

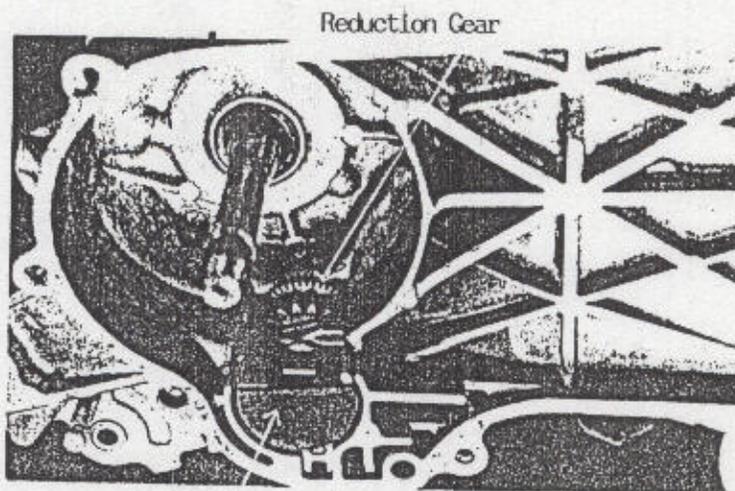


Starter Drive Gear Puller

KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY **KBN100 GAK50**

● Starter Reduction Gear

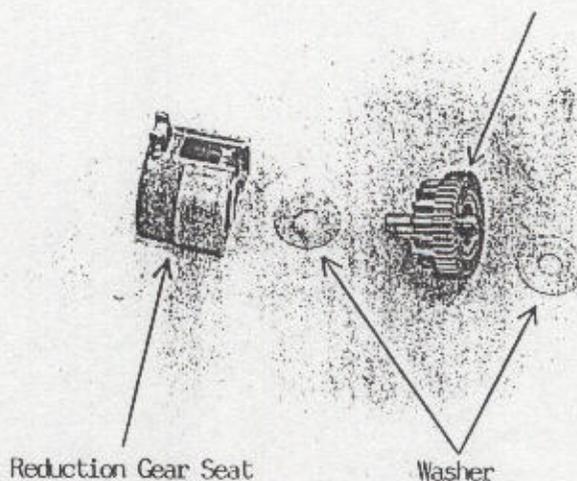
- Remove the left crankcase cover. (⇨P89)
- Remove the drive pulley. (P93)
- Remove the starter single-acting clutch drive gear.
- Remove the reduction gear seat.
- Remove the reduction gear.



Reduction Gear Seat

● Installation

- Respectively install a washer to the top and bottom of the reduction gear.
- Apply grease to the reduction gear.



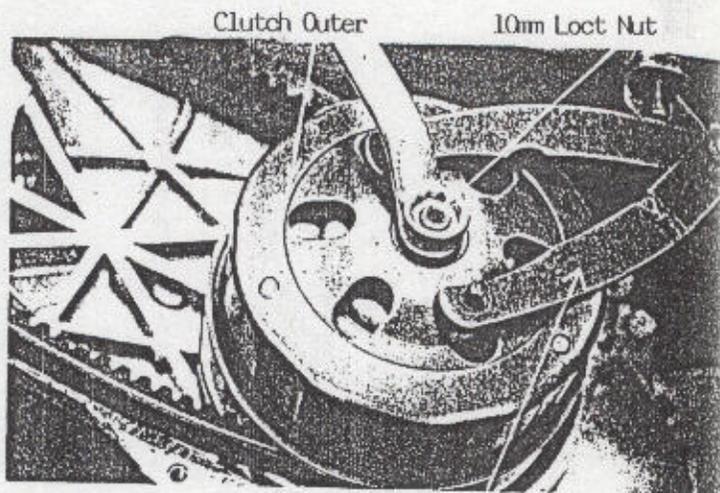
● CLUTCH/DRIVEN PULLEY

● Clutch/Driven Pulley Removal

First remove the drive pulley.
(P93)

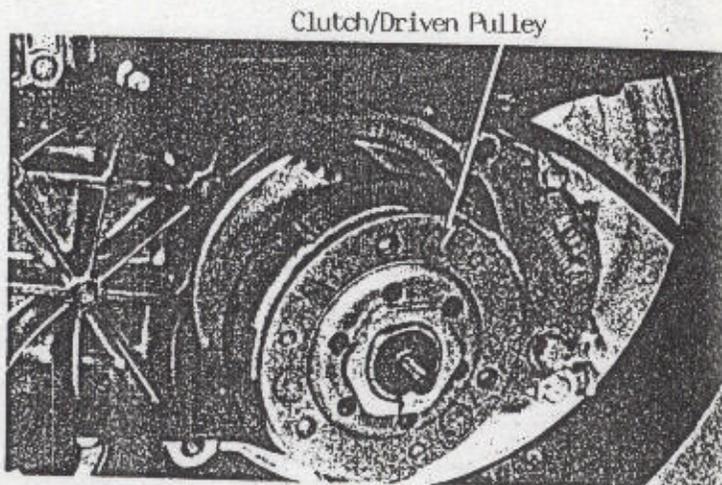
Hold the clutch outer with an
universal holder and then remove
the 10mm lock nut.

Remove the clutch outer.



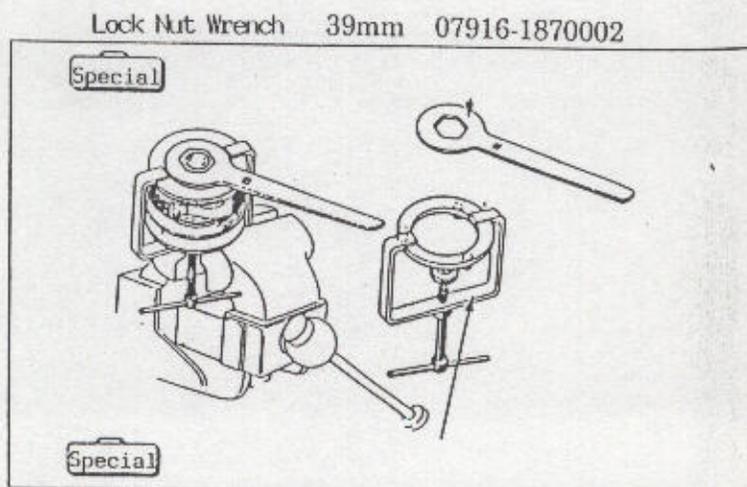
Universal Holder 07725-003000

Remove the clutch/driven pulley.
Remove the drive belt from the
clutch/driven pulley.



● Clutch/Driven Pulley Disassembly

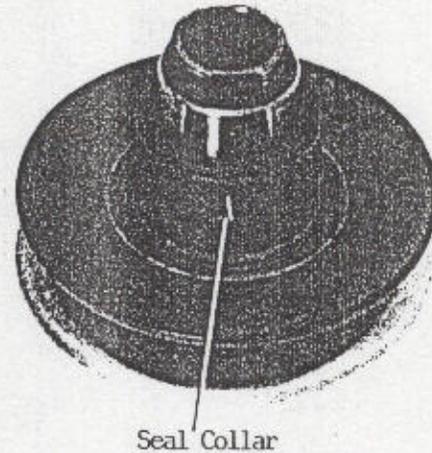
Compress the driven pulley spring
to remove the 28mm nut with the
clutch spring compressor.
Remove the clutch spring.



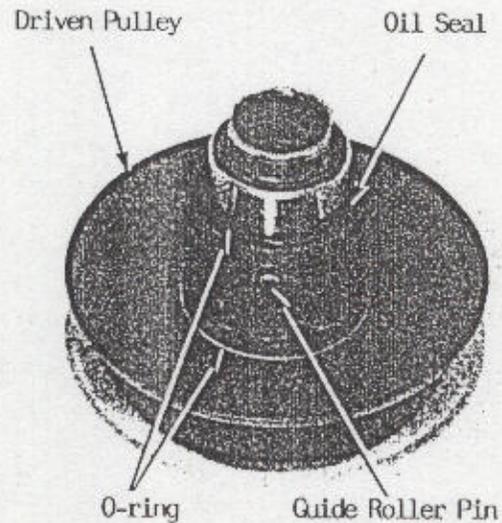
Clutch Spring Compressor 07960-KM10000

KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY **KBN100 GAK50**

Remove the seal collar.



Withdraw the guide roller pin from the driven pulley and then remove the O-rings and oil seal from the driven pulley.



●Clutch/Driven Pulley Inspection

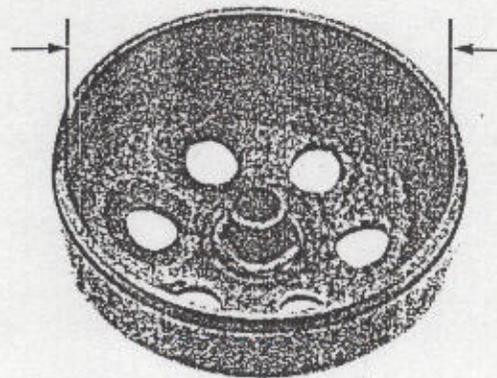
Inspect the clutch outer for wear or damage.

Measure the clutch outer I.D.

Service Limit:

SNIPER 100: 112.5mm replace if below

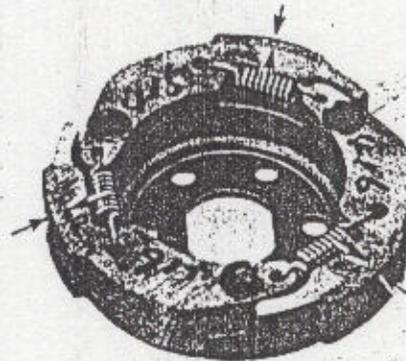
SNIPER 50 : 107.5mm replace if below



Inspect the clutch linings for wear or damage.
Measure the thickness of each lining.

Service Limit:

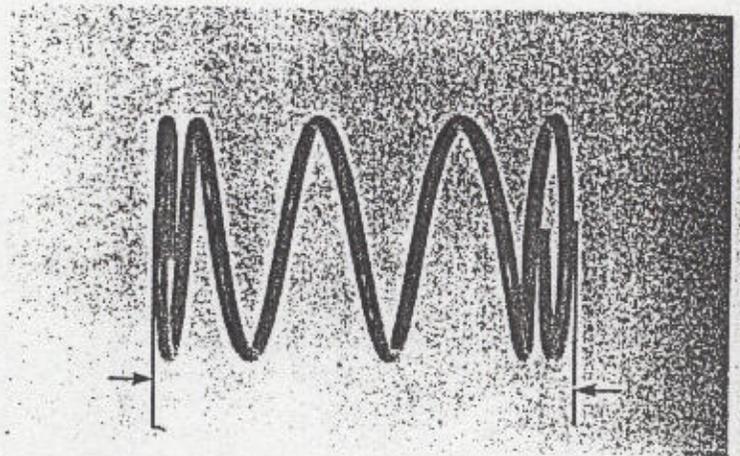
SNIPER 100: 2.0mm replace if below
SNIPER 50 : 2.0mm replace if below



Measure the driven pulley spring free length.

Service limit:

SNIPER 100: 149.3mm replace if below
SNIPER 50 : 92.8mm replace if below



Inspect the driven pulley for wear or damage.
Measure the driven pulley bushing O.D.

Service Limit:

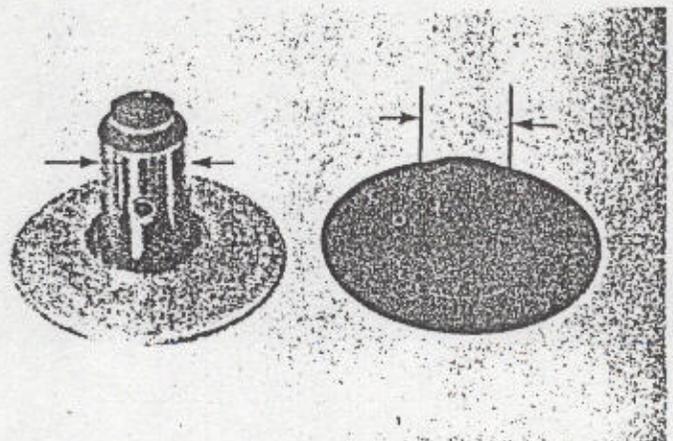
SNIPER 100: 33.65mm replace if below
SNIPER 50 : 33.65mm replace if below

Inspect the driven pulley for wear or damage.
Measure the driven pulley bushing I.D.

Service Limit:

SNIPER 100: 34.035mm replace if over
SNIPER 50 : 34.035mm replace if over

Check the guide roller pin groove for wear or damage.

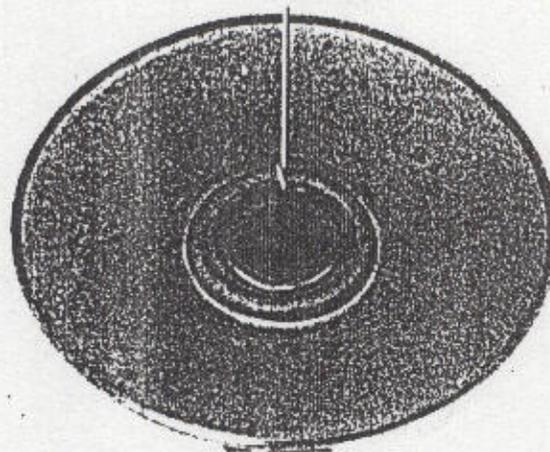


● **Driven Pulley Bearing Replacement**

Check the driven pulley inner needle bearing for looseness, damage or abnormal noise. Replace it with a new one if necessary.

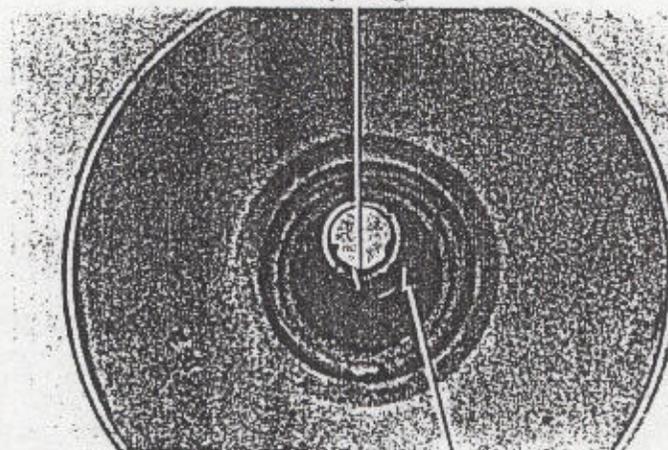
Remove the inner bearing.

Inner Bearing



Remove the snap ring and outer bearing.

Snap Ring

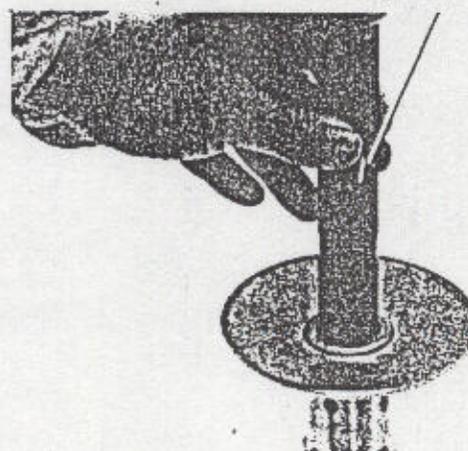


Outer Bearing

Drive in a new outer bearing with the cover facing up.

Special

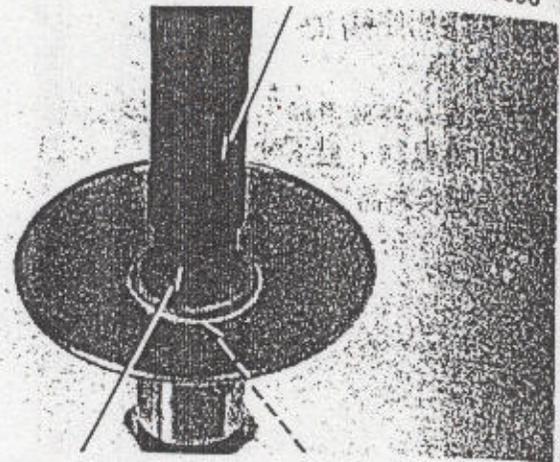
Bearing Driver 07945-GC80000



* Apply 5.0 - 5.6g grease.
Specified grease:
Idemitsu: オートレツフB

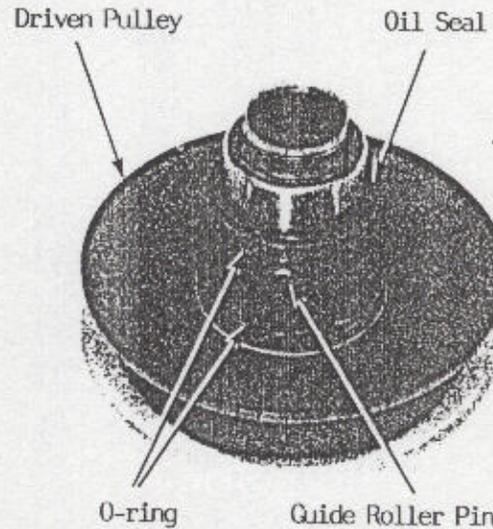
Drive in a new needle bearing with the mark facing up.

Special Bearing Outer Driver Handle A
07749-001000

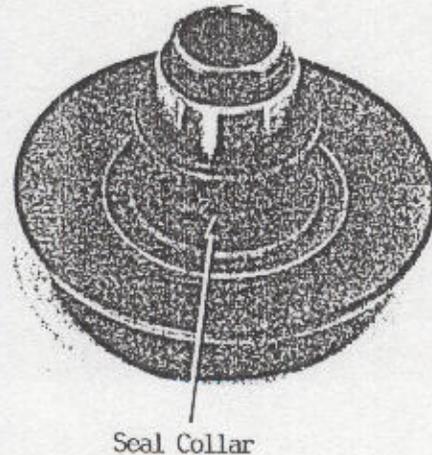


Special Outer Remover 24 x 26mm Bearing Driver Pilot 17mm
07746-001700 07746-0040400

- **Clutch/Driven Pulley Assembly**
Install the driven pulley and guide roller pin.
Then install a new oil seal.



Install the seal collar.



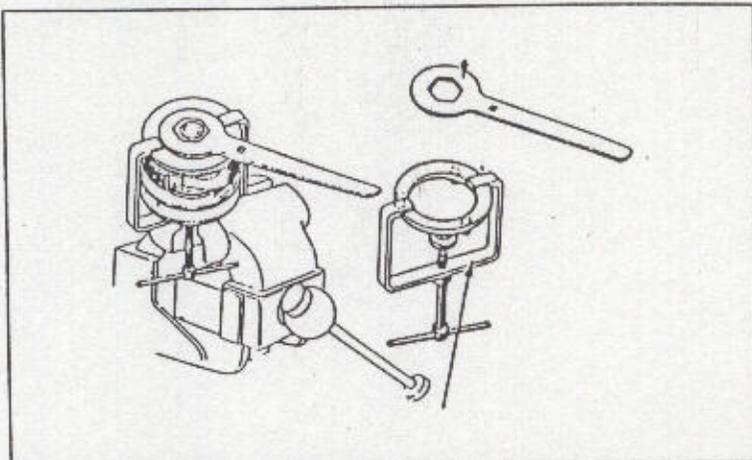
KICK STARTER, DRIVE PULLEY AND CLUTCH/DRIVEN PULLEY **KBN100 GAK50**

Install the driven pulley and spring into the clutch by using the clutch spring compressor to compress.

Install and tighten the 28mm lock nut.

Torque: 5.0 – 6.0 kg-m

Special Lock Nut Wrench 39mm 07916-1980002

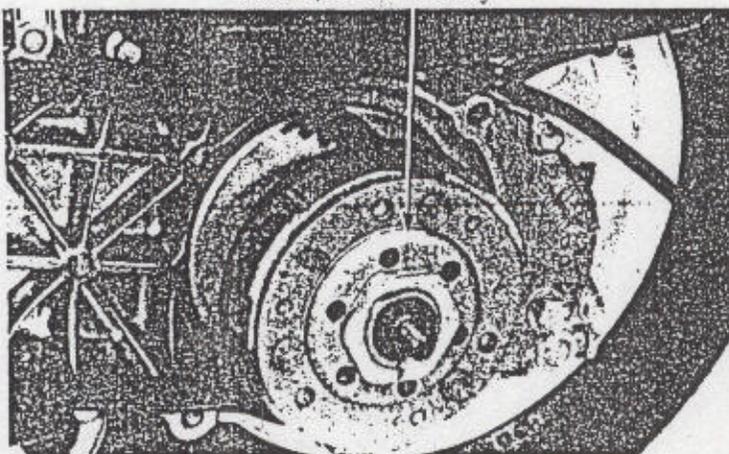


Special Clutch Spring Compressor 07960-KM10000

Clutch/Driven Pulley Installation

Install the drive belt on the clutch/driven pulley and install the driven pulley on the drive shaft.

Clutch/Driven Pulley

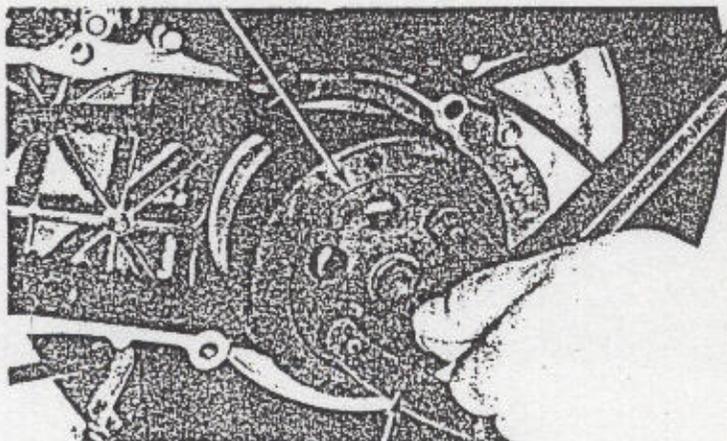


Install the clutch outer.
Hold the clutch outer with an universal holder.

Install and tighten the 10mm nut.
Torque: 3.5 – 4.0 kg-m

Install the left crankcase cover.
(P86)

Clutch Outer



Common Universal Holder 07725-0030000

FINAL REDUCTION

● TROUBLESHOOTING..... 9-3

● SERVICE INFORMATION..... 9-3

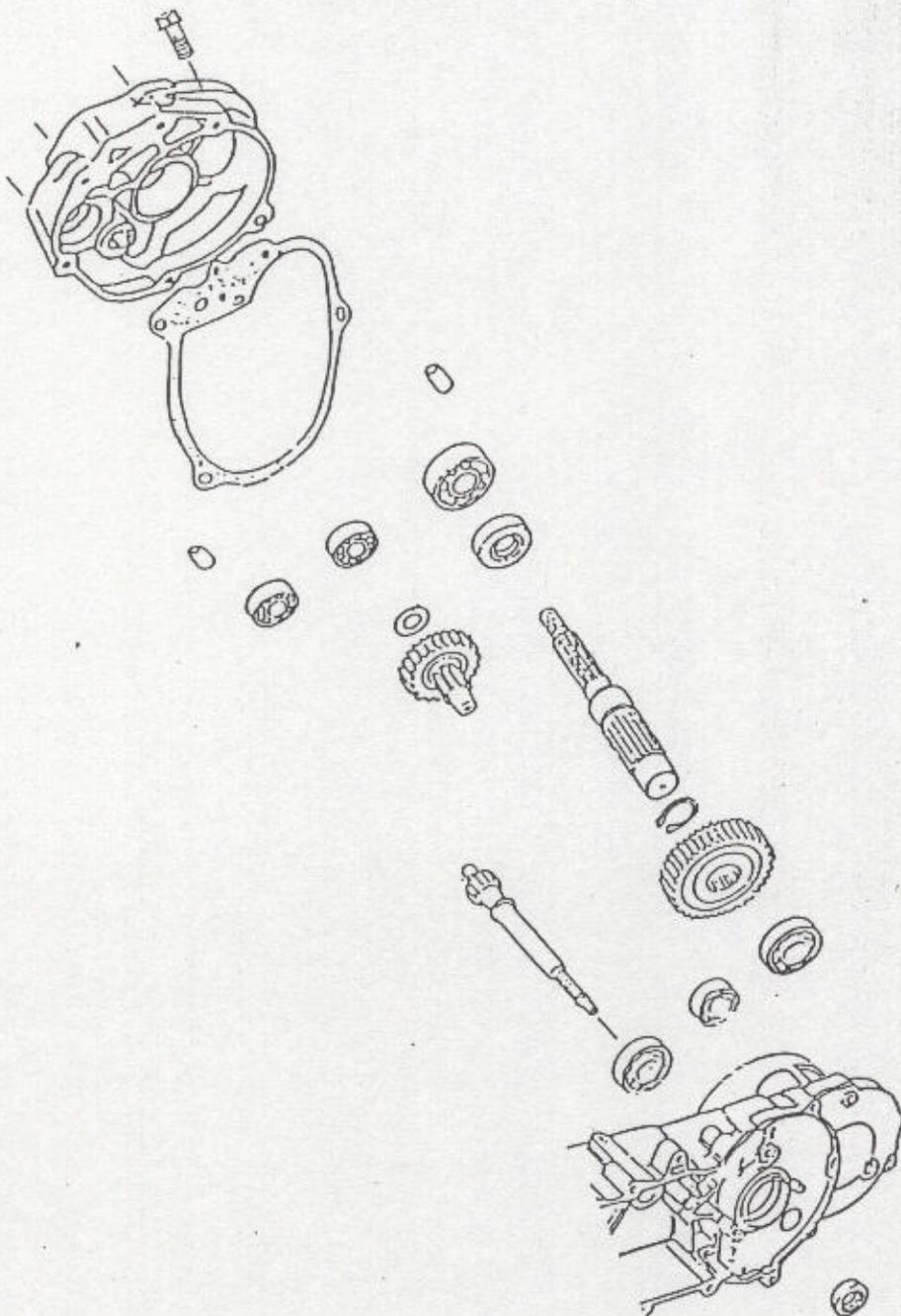
● FINAL REDUCTION DISASSEMBLY..... 9-4

● FINAL REDUCTION INSPECTION..... 9-4

● FINAL REDUCTION ASSEMBLY..... 9-7



Torque : 2.4~3.00kg-m



● TROUBLESHOOTING

⊙ Engine starts, but motorcycle won't move

- Damaged transmission
- Burned transmission gear

⊙ Abnormal noise

- Worn, burned or chipped gears
- Worn or loose bearing

⊙ Oil leaks

- Oil level too high
- Worn or damaged oil seal

● SERVICE INFORMATION

Specified Oil: KYMCO SIGMA Gear Oil 90#

Degradation: 0.12 l

Change : 0.1 l

⊙ TOOLS

SPECIAL TOOLS

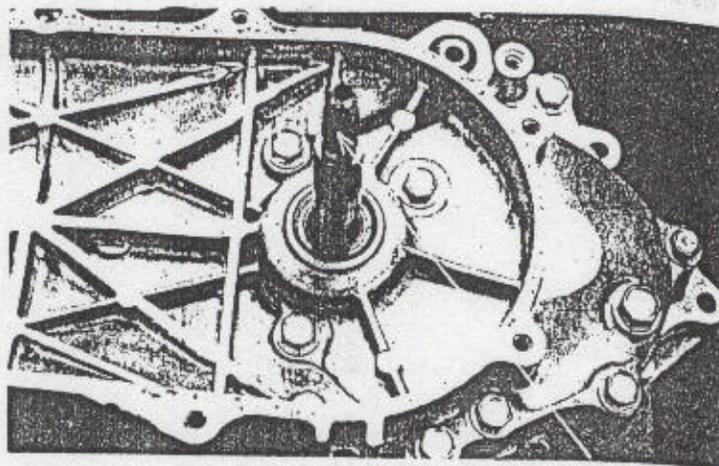
Bearing Remover Set 12mm	07936-1660001
Bearing Remover Set 15mm	07963-KC10000
Crankshaft Assembly Socket	07965-GM00300
Crankshaft Assembly Shaft	07965-GM00300

COMMON TOOLS

Bearing Outer Driver 37x40mm	07746-0010200
Bearing Outer Driver 32x35mm	07746-0010100
Bearing Driver Pilot 17mm	07746-0040400
Bearing Driver Pilot 15mm	07746-0040300
Bearing Driver Pilot 12mm	07746-0040200
Bearing Outer Driver Handle A	07749-0010000

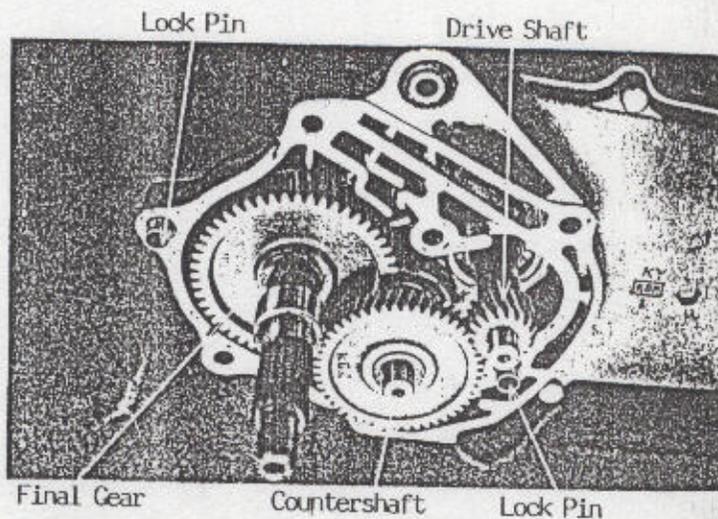
FINAL REDUCTION DISASSEMBLY

- Remove the rear brake caliper. (P185)
- Remove the rear wheel. (P182)
- Remove the left crankcase cover. (P89)
- Remove the clutch/driven pulley. (P100)
- Drain the transmission gear oil into a container.
- Remove the transmission cover bolts.
- Remove the transmission cover.
- Remove the gasket and lock pins.



Final Drive Gear

- Remove the final gear and countershaft.



Final Gear

Countershaft

Lock Pin

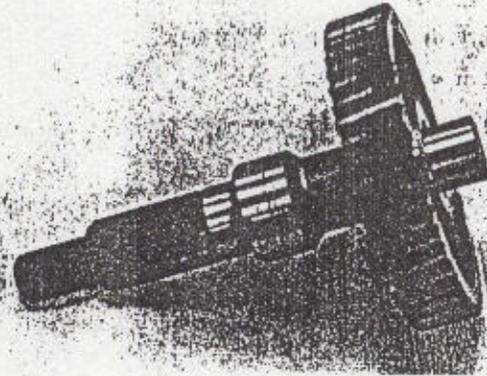
FINAL REDUCTION INSPECTION

- Inspect the countershaft and gear for wear or damage.

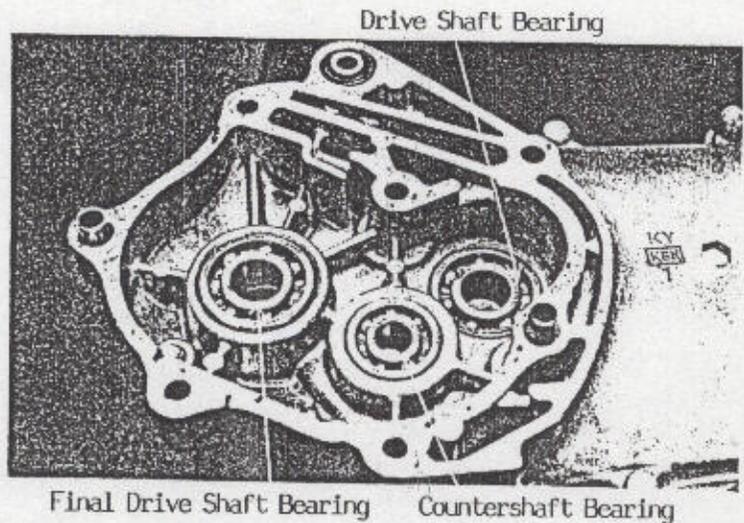


Countershaft

Inspect the final gear for wear or damage or signs of seizure.



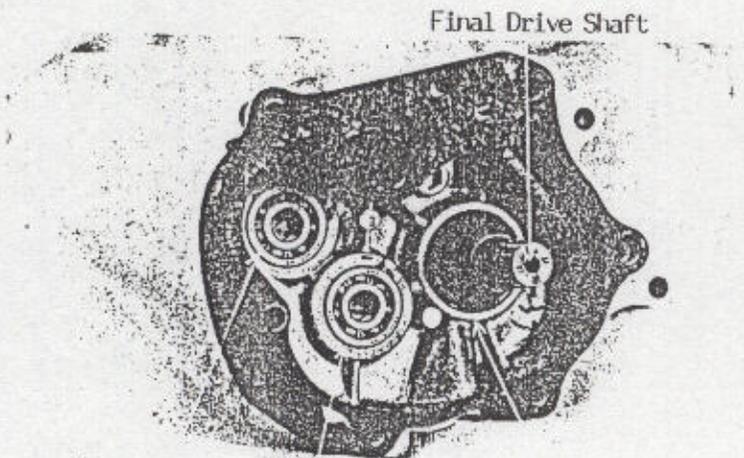
Check the left crankcase bearing and oil seal for wear or damage.



Final Drive Shaft Bearing Countershaft Bearing

Check the drive shaft and gear for wear or damage.
 Check the transmission cover bearing and final drive shaft bearing oil seal for wear or damage.

* Do not remove the transmission cover except for necessary replacing of parts. When replacing the drive shaft, the bearing and oil seal should also be replaced.

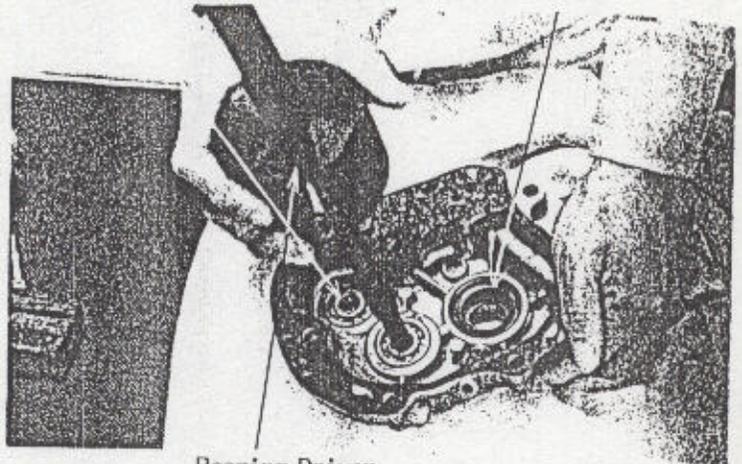


Drive Shaft Bearing Countershaft Oil Seal

● **Bearing Replacement (Transmission Cover Side)**

Remove the transmission cover bearing with bearing removers. Remove the final drive shaft oil seal.

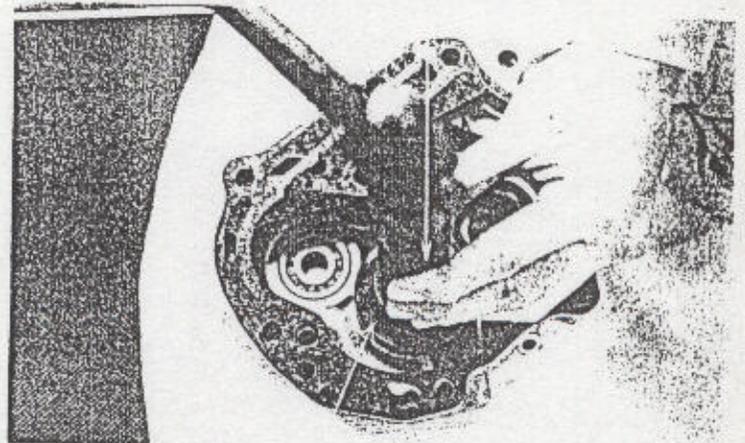
Drive Shaft Bearing Final Drive Shaft Bearing



Bearing Driver

Drive a new bearing in the transmission cover.

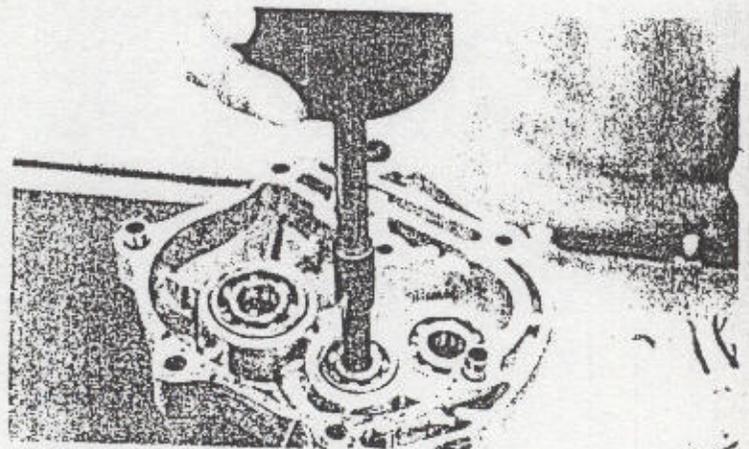
Common Bearing Outer Driver Handle A 07749-0010000



Common Bearing Outer Driver 32x35mm
07746-0010100

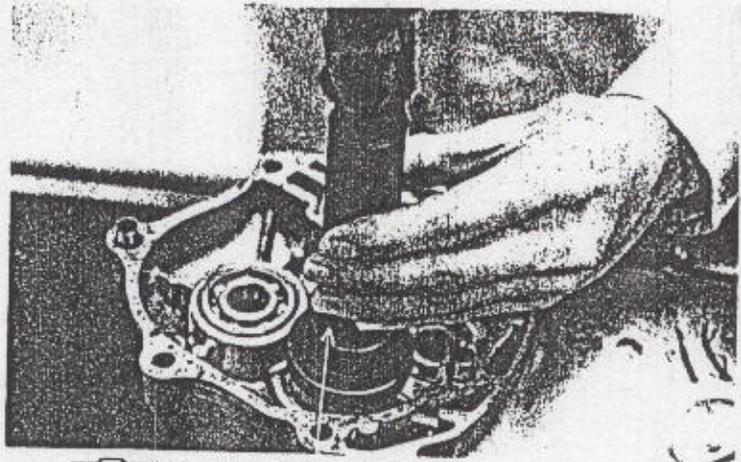
● **Bearing Replacement (Crankcase Side)**

First remove the drive shaft. Remove the drive shaft oil seal. Remove the crankcase transmission cover bearing with bearing removers.



Special Bearing Remover Set 12mm
(07946-1660001)

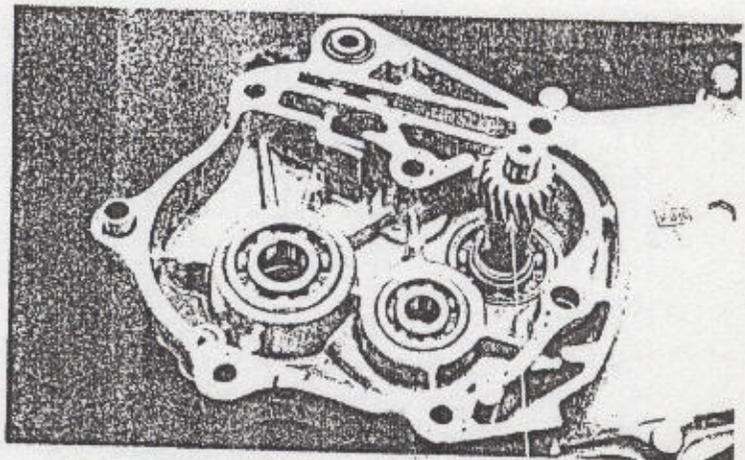
Drive a new bearing in the crankcase transmission cover.
Install a new drive shaft oil seal.



Common Bearing Driver Pilot

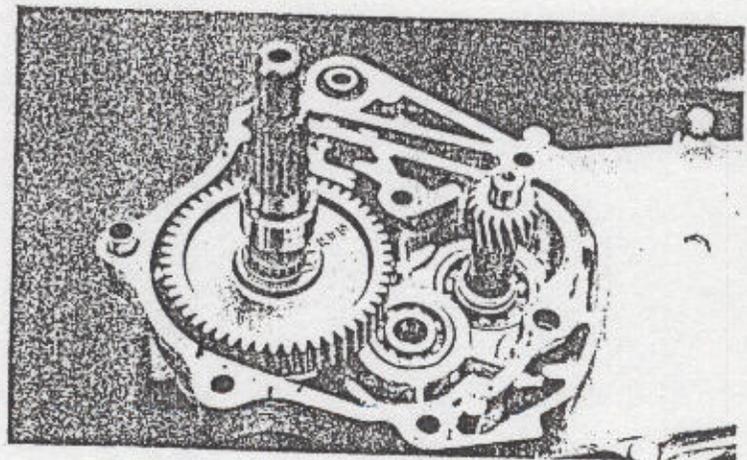
④ FINAL REDUCTION ASSEMBLY

Install the drive shaft in the crankcase transmission cover.

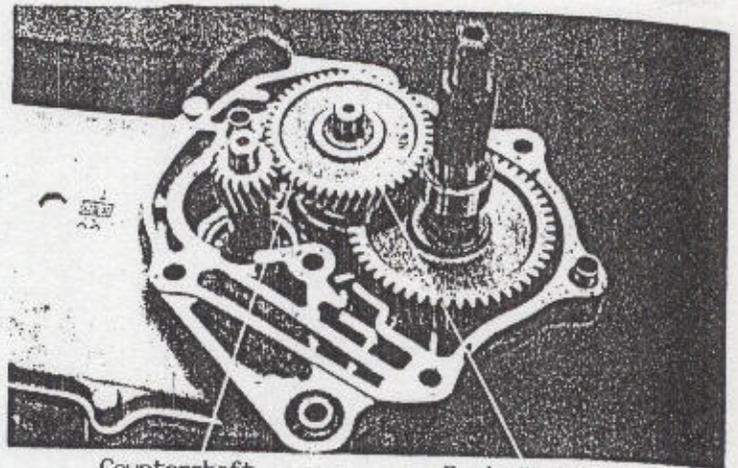


Drive Shaft

Install the final gear in the crankcase transmission cover.



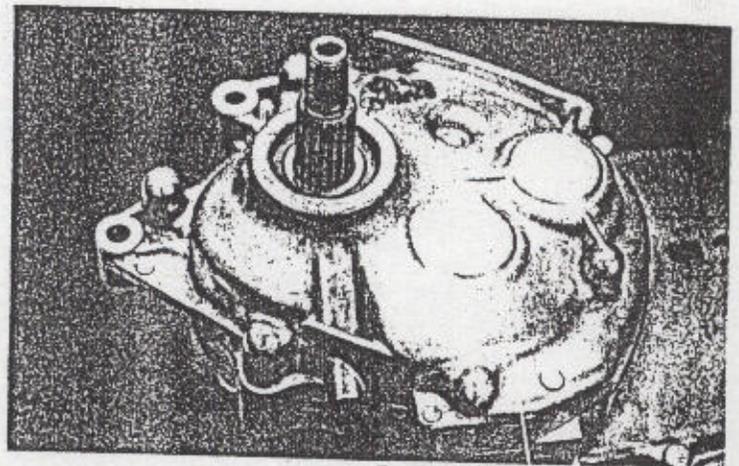
Install the countershaft into the crankcase transmission cover.
 Install the resin washer onto the countershaft.
 Install the lock pins and a new gasket.



Countershaft

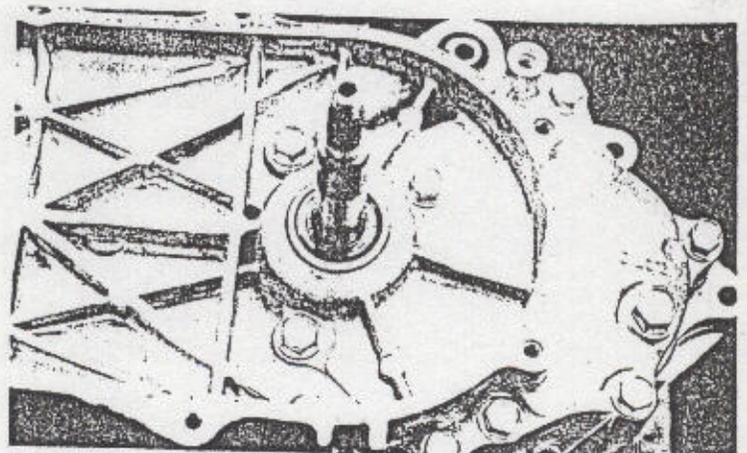
ResIn Washer

Install the transmission cover.



Transmission Cover

Tighten the transmission cover bolts.
 Install the clutch/driven pulley.
 (P97)



Lock Bolt

After installation, add the transmission gear oil to proper level. (P46)

*

- Place the motorcycle on its main stand on level ground.
- Check the oil seal and washer for wear or damage.

Add the specified gear oil:
KYMCO SIGMA GEAR OIL 90#

Oil Quantity:

Degradation: 0.12

Change : 0.1

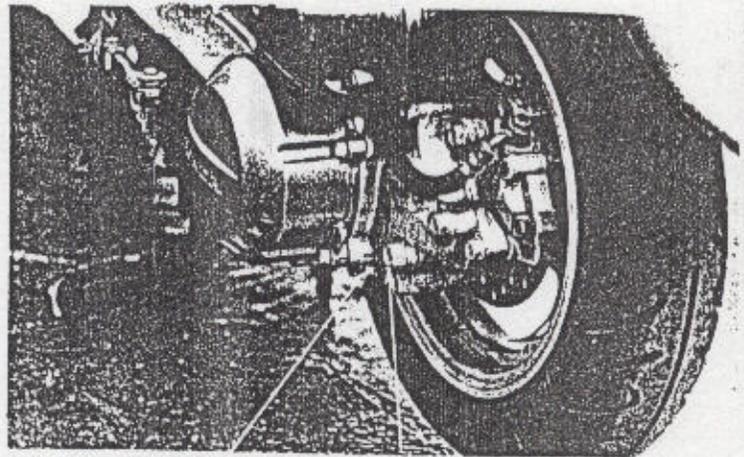
Install and tighten the oil level check bolt.

Torque: 1.0 – 1.5 kg-m

Start the engine and check for oil leaks.

Check the oil level.

Check the oil level from the oil level check bolt hole and add the specified oil if necessary.

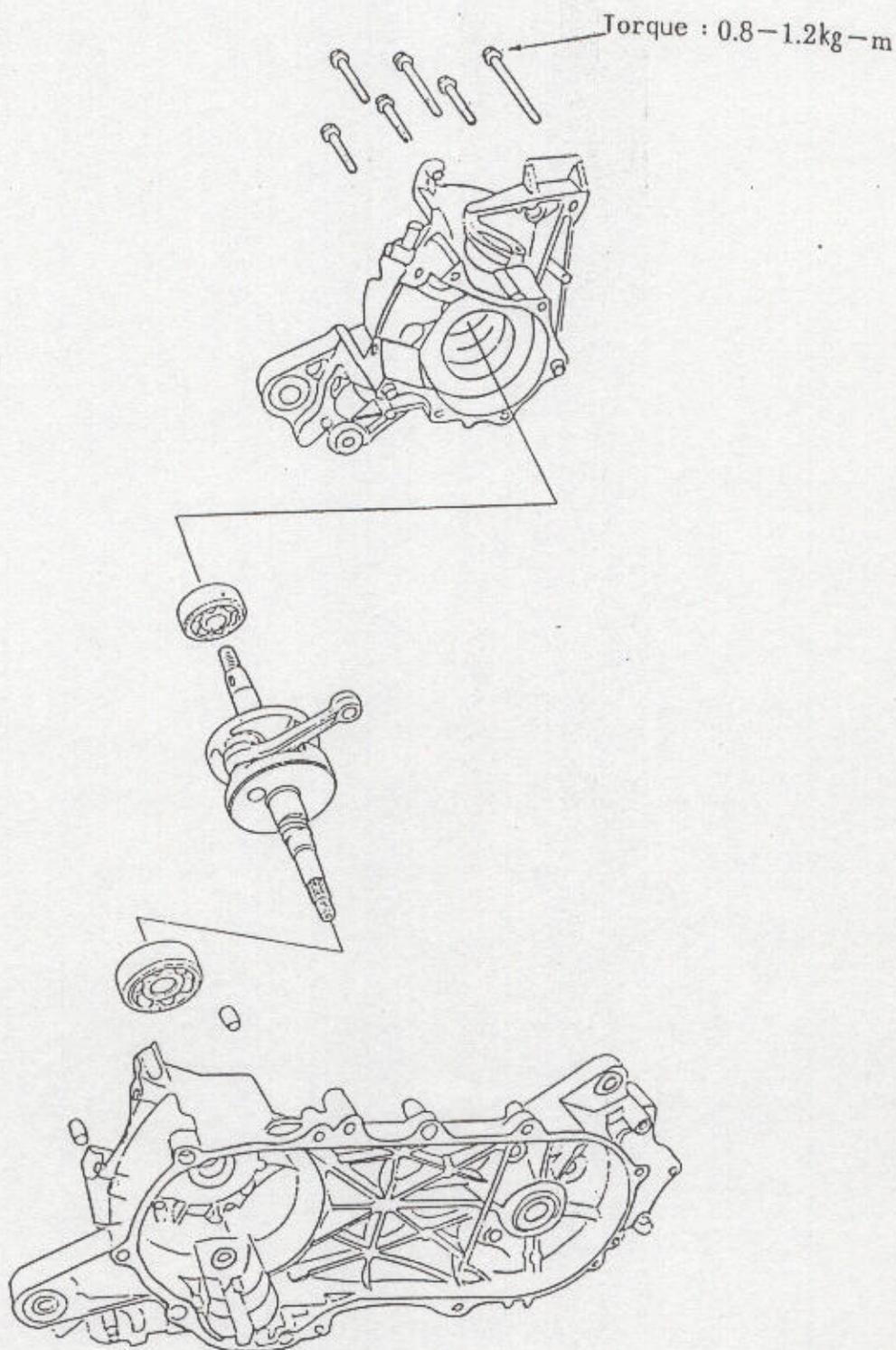


Drain Screw Oil Level Filler/Check Bolt Hole

CRANKCASE/CRANKSHAFT

- TROUBLESHOOTING..... 10-3
- SERVICE INFORMATION..... 10-3
- CRANKCASE DISASSEMBLY..... 10-4
- CRANKSHAFT REMOVAL..... 10-4
- CRANKSHAFT INSPECTION..... 10-5
- CRANKSHAFT INSTALLATION..... 10-6
- CRANKCASE ASSEMBLY..... 10-8





● TROUBLESHOOTING

⊙ Abnormal engine noise

Loose crankshaft journal bearing noise

- Loose crankpin bearing
- Loose transmission bearing

● SERVICE INFORMATION

⊙ GENERAL INSTRUCTIONS

- This chapter is the servicing procedures for the crankshaft and the operation instructions for the crankcase disassembly.
- The following parts must be removed before disassembling the crankcase.

Engine	(Chapter 5)
Carburetor	(Chapter 11)
Oil Pump	(Chapter 4)
Reed Valve	(P128)
Driven Pulley	(Chapter 8)
A.C. Generator	(Chapter 7)
Cylinder Head, Cylinder	(Chapter 6)

- When the left crankcase must be replaced, remove it according to the following methods and servicing procedures specified in each chapter.
- Final Reduction Removal
- Special tools should be used for crankshaft and crankcase assembly. When disassembling the crankshaft, the bearing will remain in the crankcase and it should be removed. When installing the crankshaft, drive a new bearing in the crankcase and then install a new oil seal.

⊙ SPECIFICATIONS

Item	SNIPER 100		SNIPER 50	
	Standard (mm)	Service Limit(mm)	Standard (mm)	Service Limit.(mm)
Connecting rod big end side clearance	—	0.6	—	0.6
Connecting rod big end radial clearance	—	0.04	—	0.04
Crankshaft runout A/B	—	0.15/0.10	—	0.15/0.10

● TOOLS

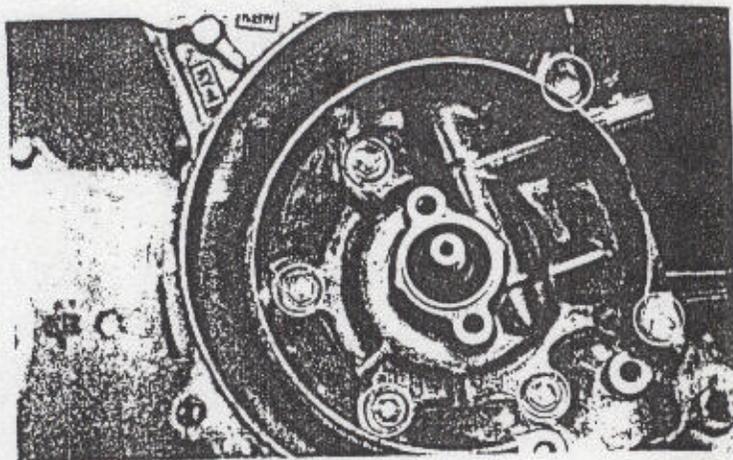
SPECIAL TOOLS

Crankcase Puller	07935-GK80000
Crankcase Puller	07935-KG80000
Universal Bearing Puller	07631-0010000
Crankshaft Assembly Socket	07965-GM00100
Crankshaft Assembly Shaft	07965-GM00300

COMMON TOOLS

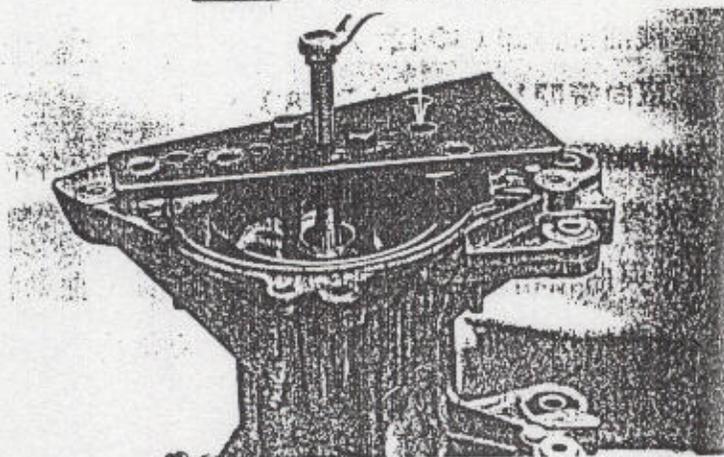
Bearing Outer Driver Handle A	07749-0010000
Bearing Outer driver 42x47mm	07746-0010300
Driver Pilot 20mm	07746-0040500
Bearing Driver Pilot 17mm	07746-0040400

- **CRANKCASE DISASSEMBLY**
Remove the crankcase attaching bolts.



Attach the crankcase puller on the right crankcase and remove the right crankcase from the left crankcase.

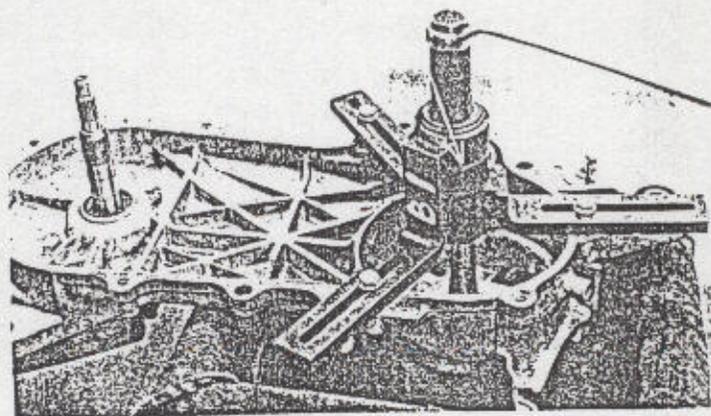
Special Crankcase Puller
07935-GK80000



Special Crankcase Puller
07935-GK80000

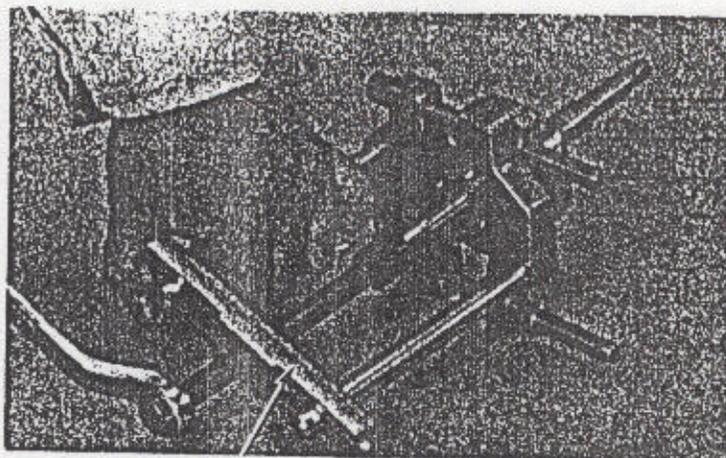
- **CRANKCASE REMOVAL**
Attach the crankcase puller on the left crankcase and remove the crankshaft from the left crankcase.

* When removing the crankshaft, do it slowly and slightly.



Use the bearing puller to remove the remaining bearing on the crankshaft side.

* When disassembling the crankcase, oil seals must be removed. Do not reuse the removed oil seals.



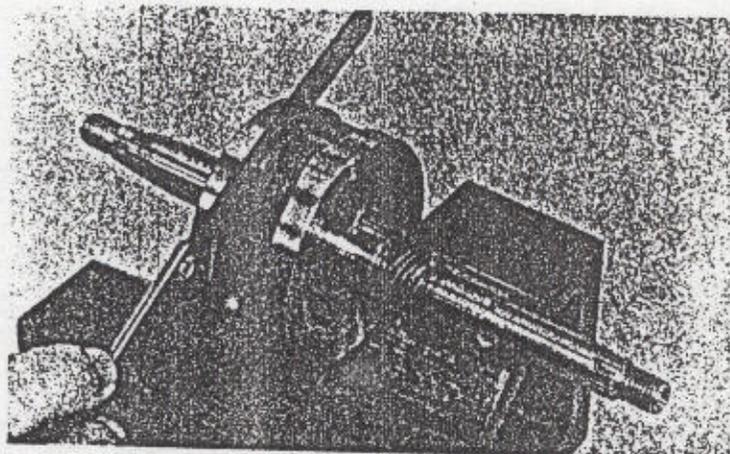
Special

Universal Bearing Puller
07631-0010000

④ CRANKSHAFT INSPECTION

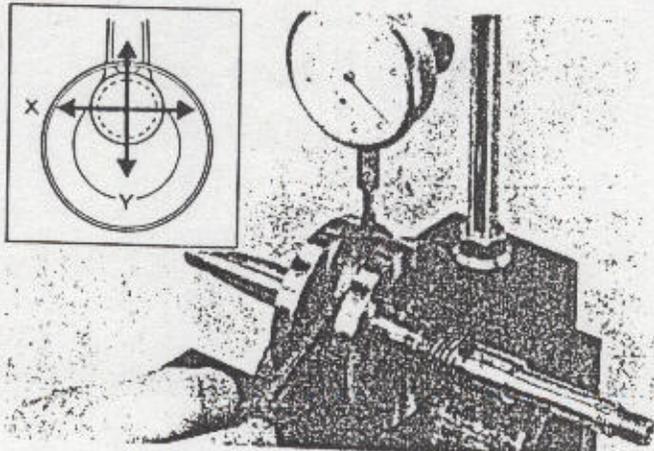
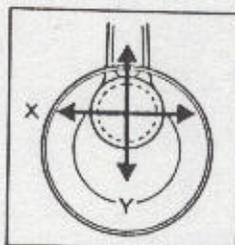
Measure the connecting rod big end side clearance.

Service Limit: 0.6mm replace if over



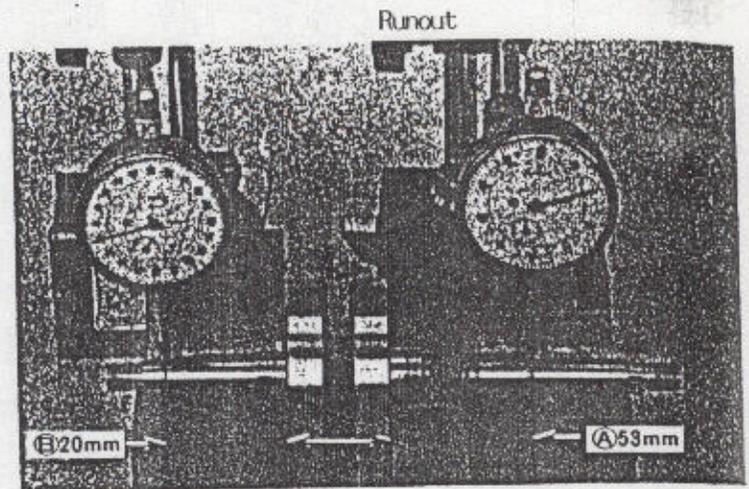
Measure the connecting rod big end radial clearance at two points in the X and Y directions.

Service Limit: 0.04mm replace if over

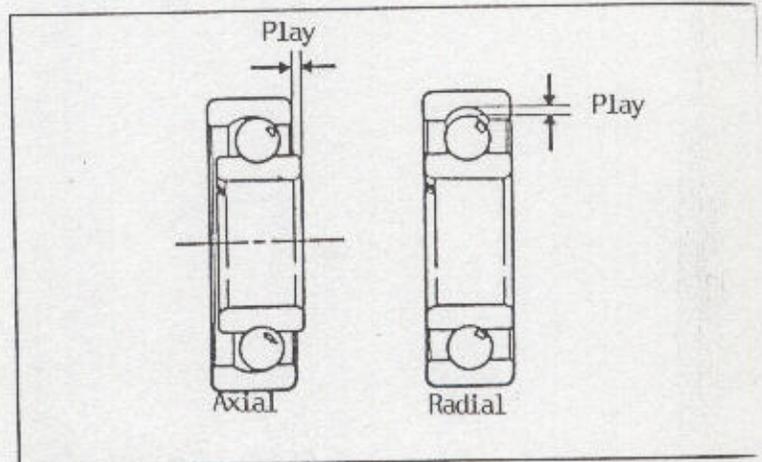


Measure the crankshaft runout.

Service Limit	
A	B
0.150mm replace if over	0.100mm replace if over



Check the crankshaft bearing for play. Replace it with a new one if it has excessive play.

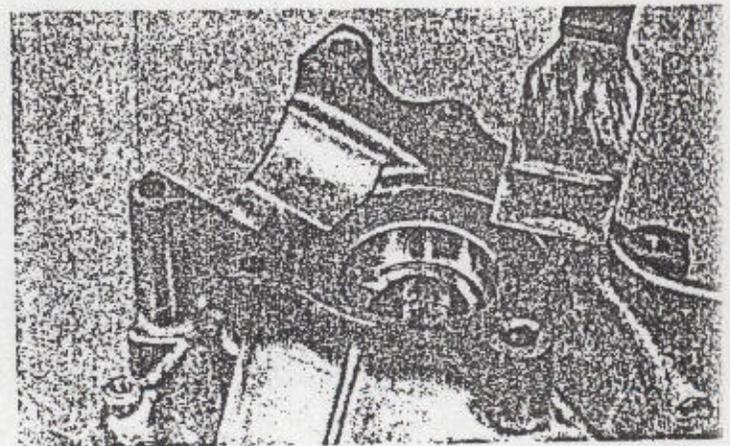


③ CRANKSHAFT INSTALLATION

Wash the crankcase with detergent oil and then check for cranks or damage.

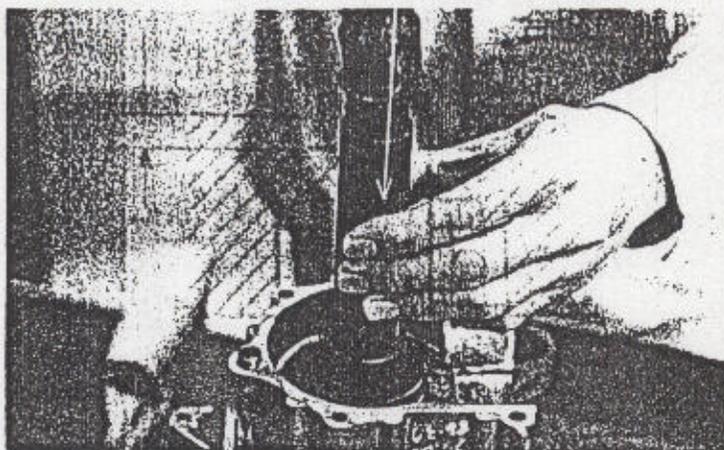


- After check, apply clean engine oil to all moving and sliding surfaces.
- Remove all gasket material from the crankcase mating surface and gasket surface. Dress any roughness or irregularities with an oil stone.



Drive a new crankshaft bearing in the right crankcase.

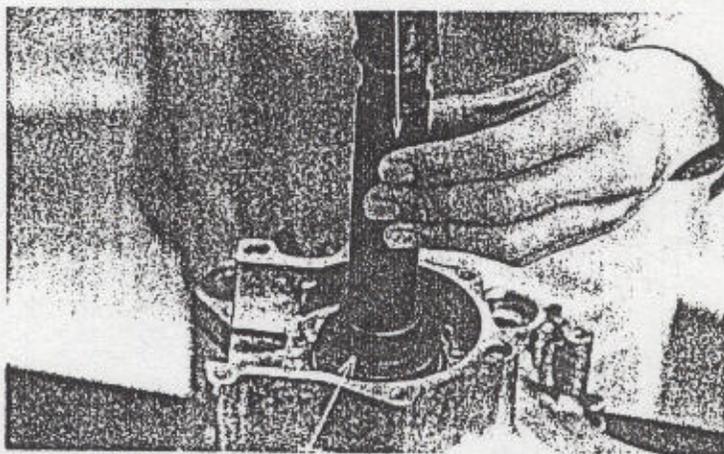
Common Bearing Outer Driver Handle A 07749-0010000



Common Bearing Outer Driver 37x40mm 07746-0010200
Bearing Driver Pilot 17mm 07746-0040400

Drive a new crankshaft bearing in the left crankcase.

Common Bearing Outer Driver Handle A 07749-0010000



Common Bearing Outer Driver 42x47mm 07746-0010300
Bearing Driver Pilot 20mm 07746-0040500

Special Crankshaft Assembly Socket 07965-GK00100

Install the crankshaft into the left crankcase.

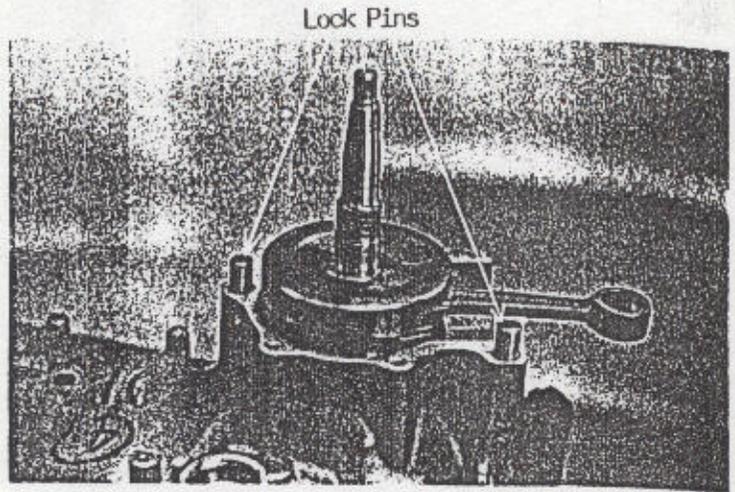
- *
 • Apply KYMCO ULTRA 2-stroke motor oil or molybdenum disulfide to the crankshaft bearing and the connecting rod big end.
 • Apply grease to the lip of each oil seal and then install oil seals.



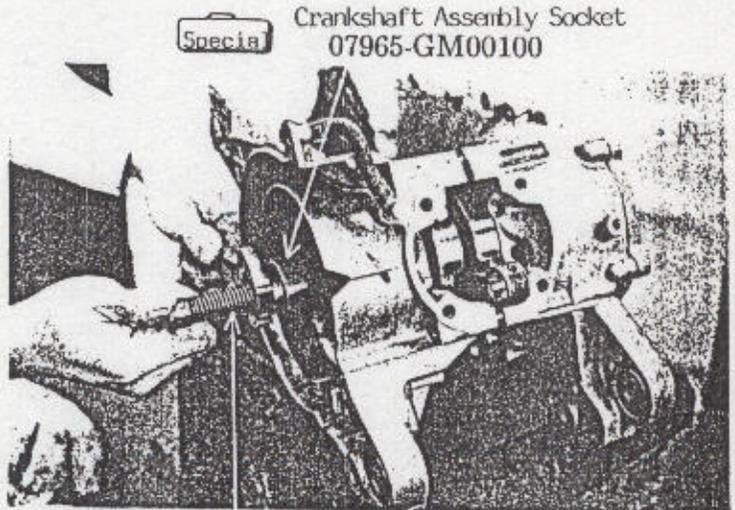
Special Crankshaft Assembly Shaft 07965-GM00300

● CRANKCASE ASSEMBLY

Install the lock pins and a new gasket to the crankcase mating surface.



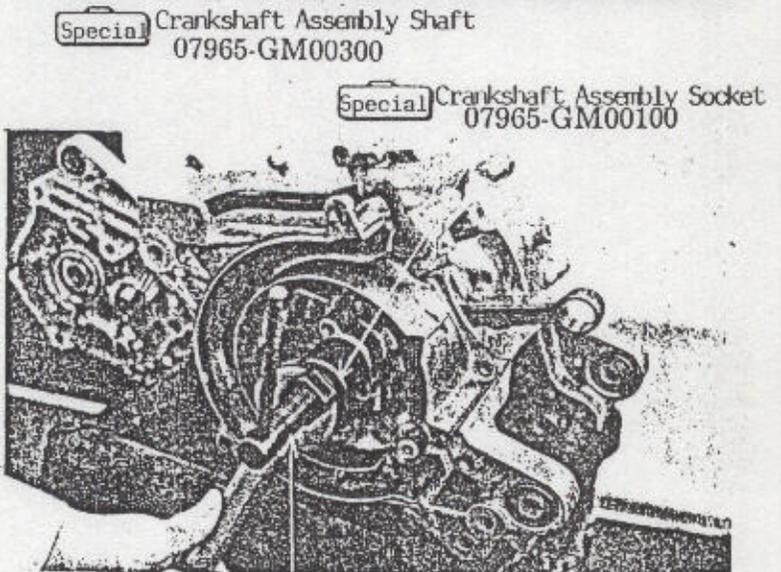
Assemble the crankcase.



The distance between the right crankcase oil seal and crankcase surface is about 12.5 ± 0.5 mm.

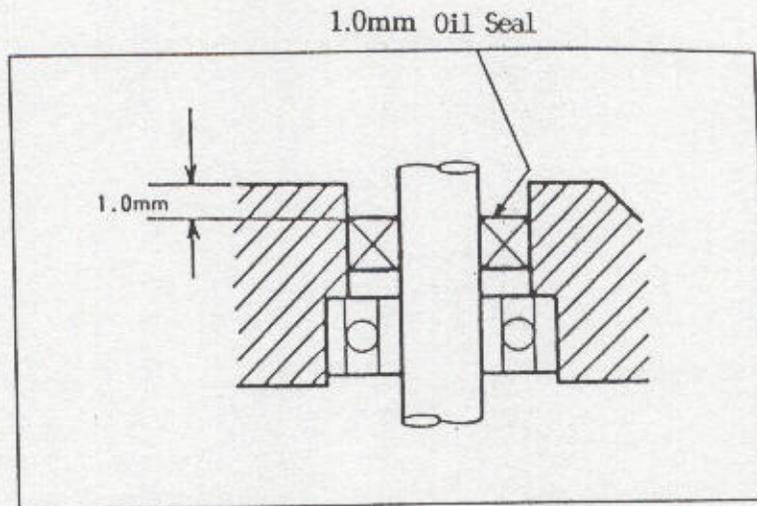
*

- When install oil seals, be careful to press them with even force.
- The installing method of SNIPER 100 is the same as SNIPER 50.



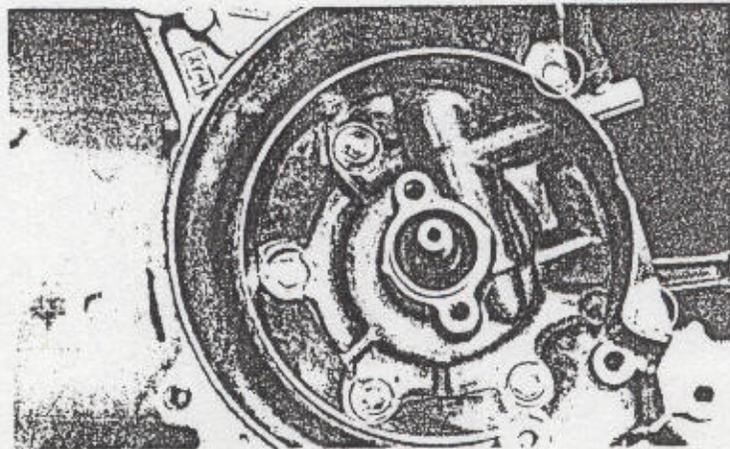
Special Crankshaft Assembly Shaft 07965-GM00300

The distance between the left crankcase oil seal and crankcase surface is about 1.0mm.



Tighten the crankcase attaching bolts.

After assembly, check the crankshaft for smooth operation.



CARBURETOR

● TROUBLESHOOTING..... 11-3

● SERVICE INFORMATION..... 11-3

● THROTTLE VALVE DISASSEMBLY..... 11-4

● THROTTLE VALVE INSTALLATION..... 11-5

● CARBURETOR REMOVAL..... 11-6

● AUTO BYSTARTER..... 11-7

● FLOAT CHAMBER..... 11-9

● FLOAT LEVEL INSPECTION..... 11-11

● CARBURETOR INSTALLATION..... 11-12

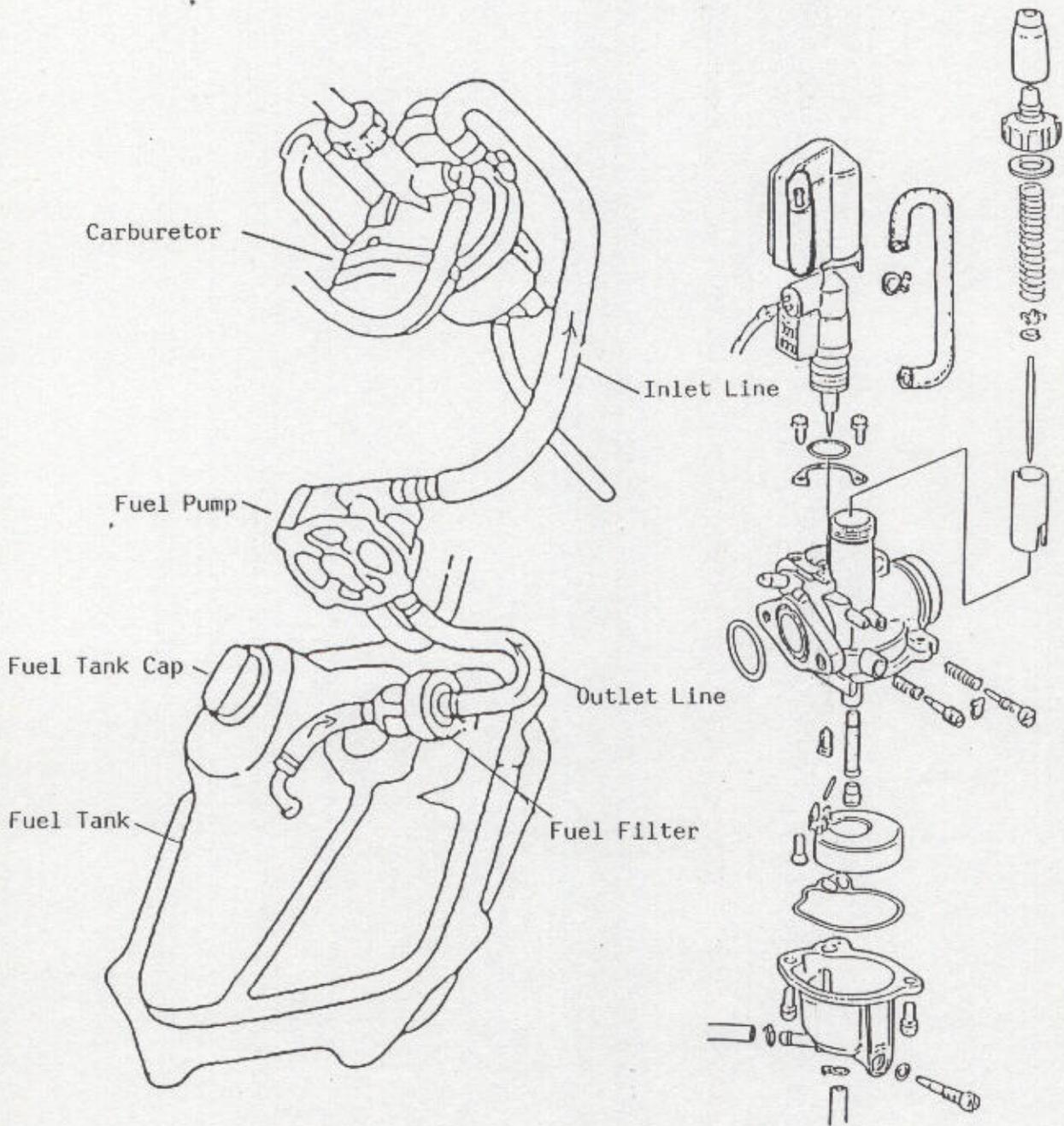
● AIR SCREW ADJUSTMENT..... 11-12

● REED VALVE..... 11-13

● FUEL TANK..... 11-14

● FUEL PUMP..... 11-





● TROUBLESHOOTING

⊙ Engine does not start ⊙ Lean mixture

- No fuel in tank
- Faulty fuel pump
- Too much fuel getting to cylinder
- Clogged fuel filter
- Clogged air cleaner
- Clogged fuel jets
- Clogged fuel cap vent
- Clogged fuel filter
- Bent, kinked or restricted fuel hose
- Faulty fuel pump, too little fuel output
- Faulty float valve
- Float level too low
- Clogged air cleaner

⊙ Engine idles roughly, stalls or runs poorly

- Incorrect idle speed
- Incorrect ignition timing
- Compression too low
- Air screw incorrectly adjusted
- Incorrect float level
- Clogged air cleaner
- Secondary air leaks
- Poor fuel quality
- Faulty reed valve
- Clogged idle fuel line or jets

⊙ Rich mixture

- Faulty float valve
- Float level too high
- Clogged air jets

● SERVICE INFORMATION

⊙ GENERAL INSTRUCTIONS

- When working with gasoline, keep away from sparks and flames.
- Note the location of the O-rings and replace them with new ones during assembly.
- All cables, fuel lines and wires should be fixed at correct locations.
- Bleed air from the motor oil line whenever it is disconnected.

● SPECIFICATIONS

	SNIPER 100	SNIPER 50
Venturi dia.	16mm	14mm
Identification number	PB2AA	PB2AB
Float level	16.3mm	16.3mm
Main jet	88 #	78 #
Idle jet	35 #	40 #
Air screw opening (turns)	1 3/4 ± 1/4	2 ± 1/4
Idle speed	1800 ± 100	1800 ± 100
Throttle grip free play	2-6mm	2-6mm

● TOOLS

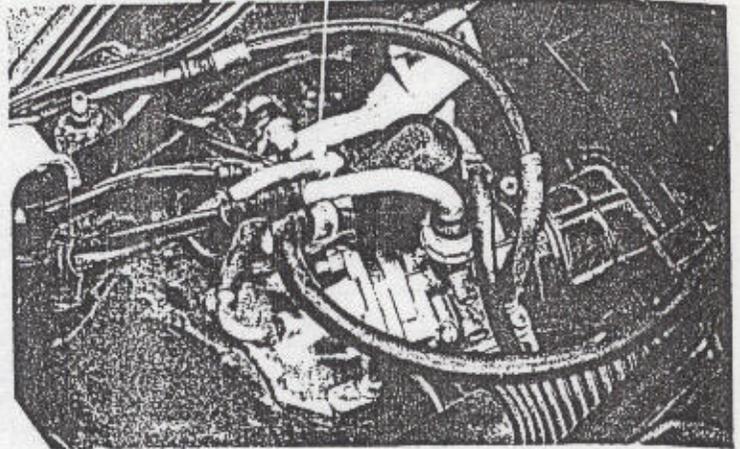
COMMON TOOL

Float Level Gauge 07401-0010000

● THROTTLE VALVE DISASSEMBLY

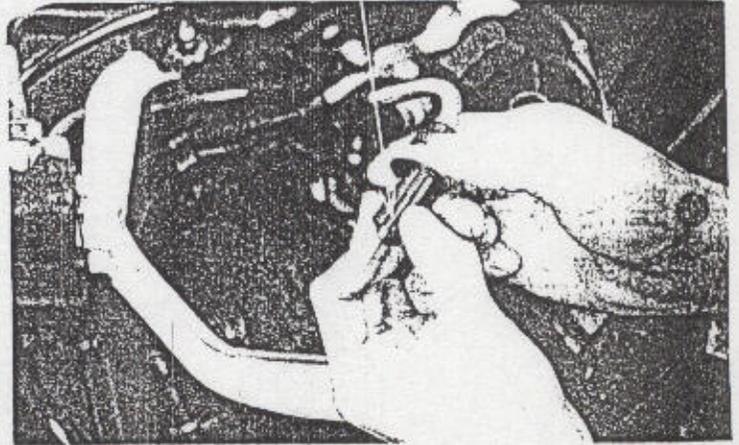
Remove the met-in box. (P147)
Loosen the carburetor cap and
remove the throttle valve.

Carburetor Cap



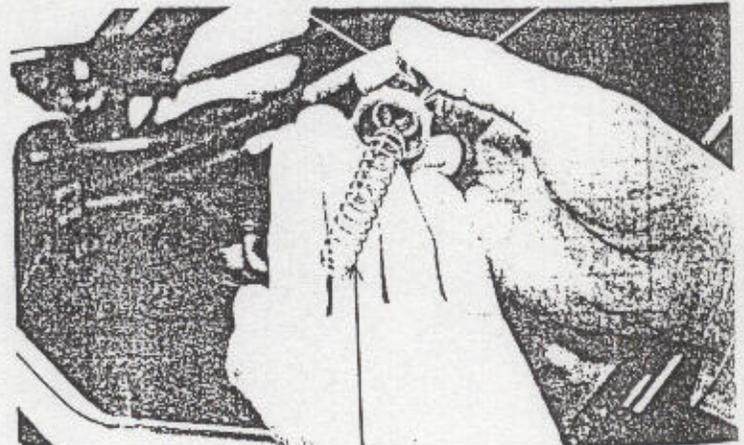
Disconnect the throttle cable
from the throttle valve.

Throttle Valve



Remove the throttle valve spring,
carburetor cap and cable seal
cover.

Cable Seal Cover Carburetor Cap

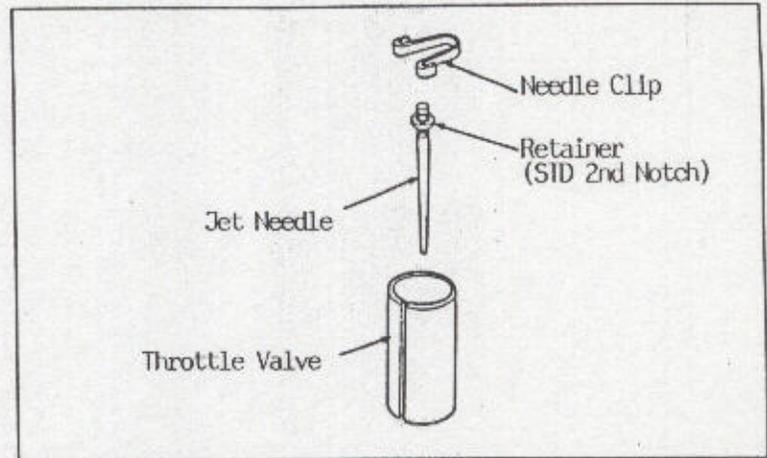


Spring

Remove the jet needle from the needle clip.

● **Fuel Jets, Jet Needle and Throttle Valve Inspection**

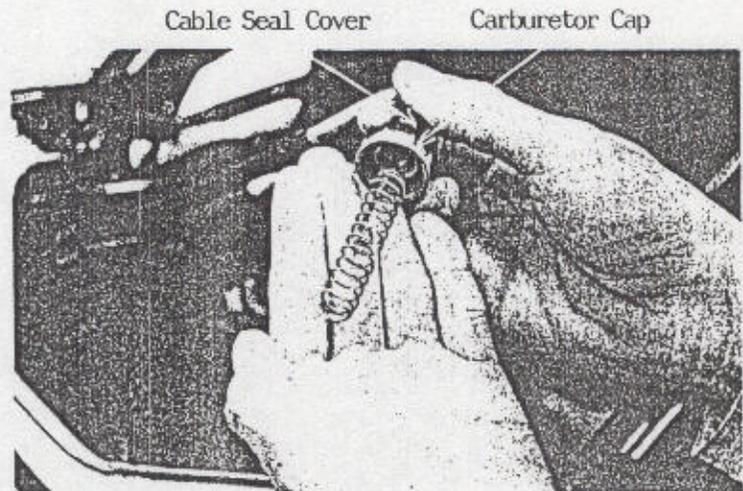
Check the fuel jets, jet needle and throttle valve for wear or damage.



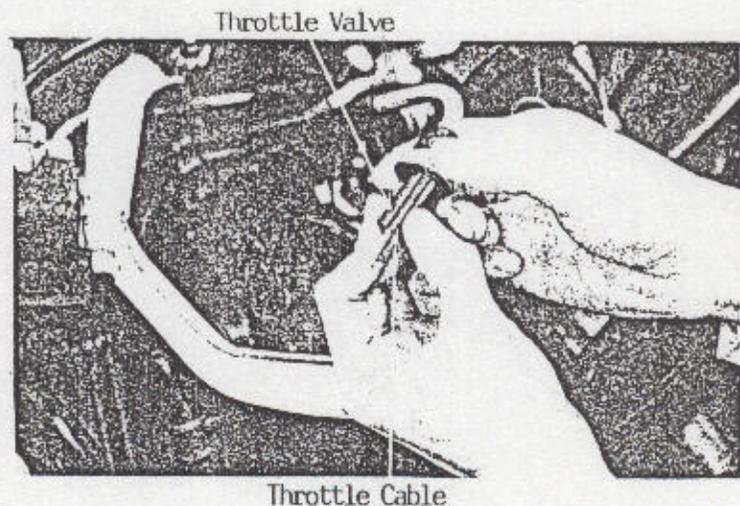
● **THROTTLE VALVE INSTALLATION**

Install the jet needle on the throttle valve and secure with the needle clip.

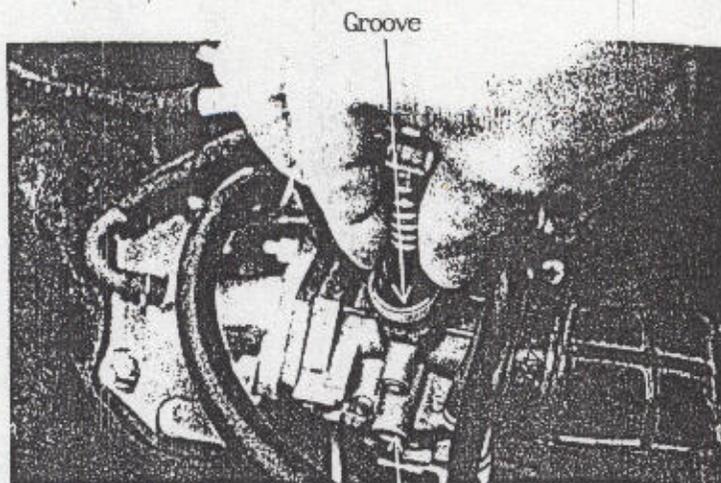
Install the cable seal cover on the cable and then install the carburetor cap and throttle valve spring.



Connect the throttle cable to the throttle valve.



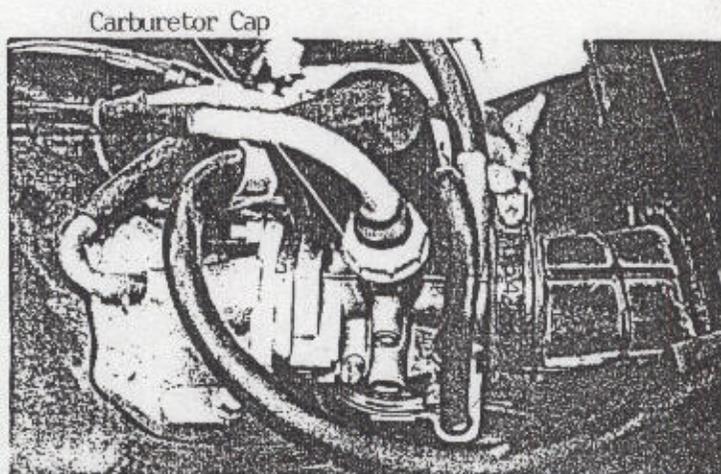
Align the groove in the throttle valve with the throttle adjusting screw and then install the throttle valve.



Throttle Adjusting Screw

Tighten the carburetor cap. After installation, perform the following adjustments:

- Throttle cable (P50)
 - Idle speed adjustment (P48)
- Install the met-in box.

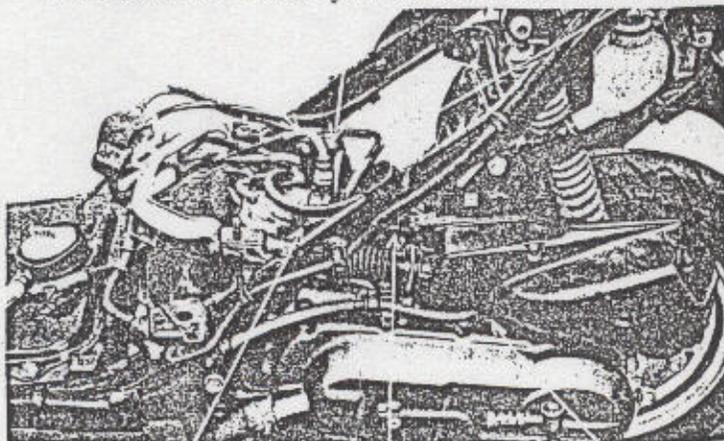


Carburetor Cap

● CARBURETOR REMOVAL

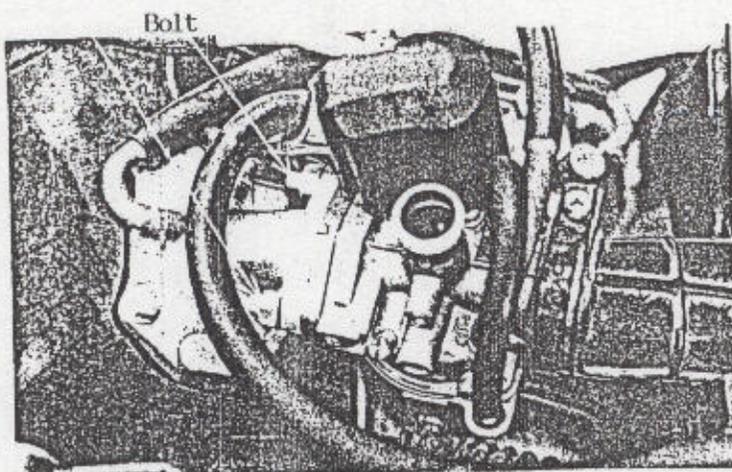
- Remove the met-in box. (P147)
- Remove the air cleaner clip ring screw and lock bolt and then remove the air cleaner.
- Disconnect the fuel tube.
- Loosen the drain bolt to drain fuel from the carburetor.
- Disconnect the auto bystarter cable connector and remove the cable.
- Remove the 2 carburetor lock nuts.

Throttle Cable Auto Bystarter Connector Fuel Tube



Drain Bolt Clip Ring Lock Bolt

Remove the carburetor attaching bolts and remove the carburetor.



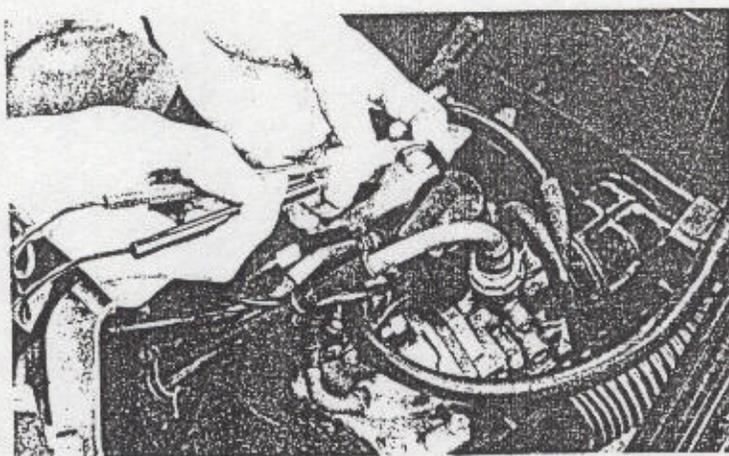
●AUTO BYSTARTER

●Auto Bystarter Inspection

Check the resistance between the auto bystarter cable terminals.

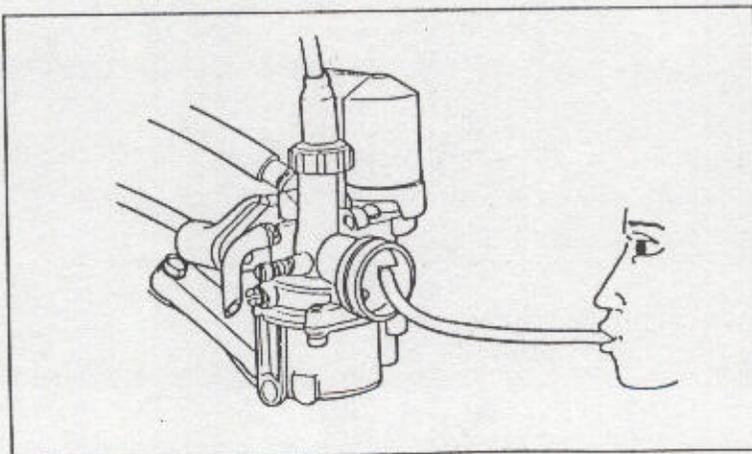
Resistance: Below 50Ω (Engine stops for over 10 minutes.)

If the resistance is over 10Ω , replace the auto bystarter with a new one.



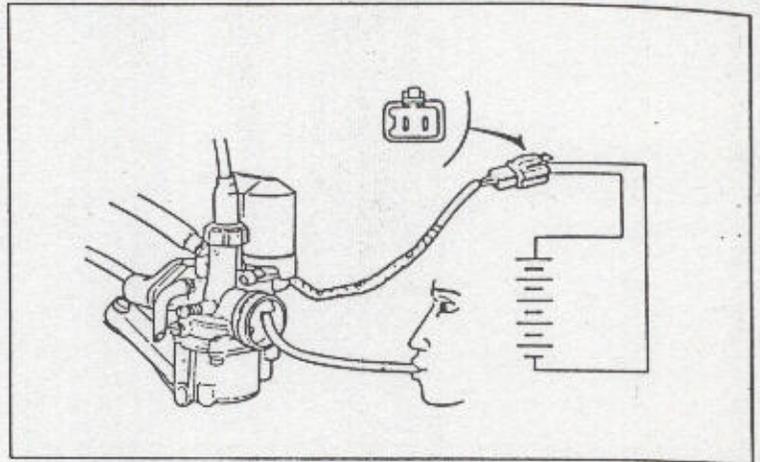
After the engine stops for 30 minutes, connect a hose to the bypass fuel line and blow the hose with mouth.

If air cannot be blown into the hose, the auto bystarter is faulty. Replace it with a new one.



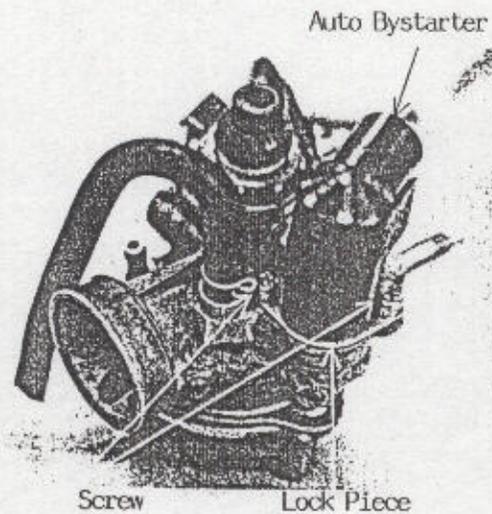
Connect the auto bystarter yellow lead to the battery positive (+) terminal and green/black lead to the negative (-) terminal for 5 minutes.

Connect a hose to the bypass fuel line and blow the hose with mouth. If air can be blown into the hose, the auto bystarter is faulty. Replace it with a new one.

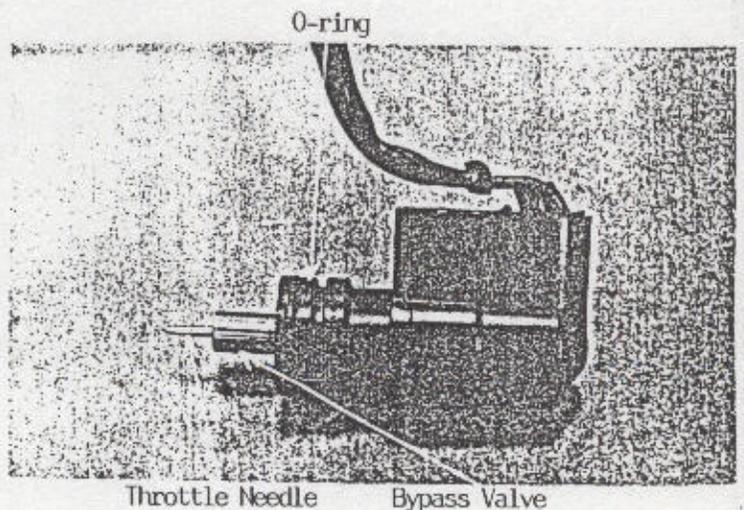


●Auto Bystarter Removal

- Remove the bystarter cover.
- Remove the 2 screws attaching the bystarter lock piece.
- Remove the bystarter.

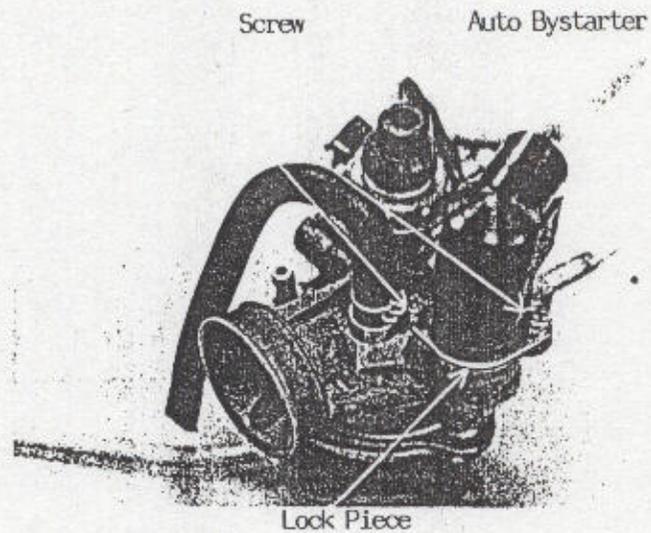


Check the bypass valve and throttle needle for wear or damage.
Check the 0-ring for wear or damage.



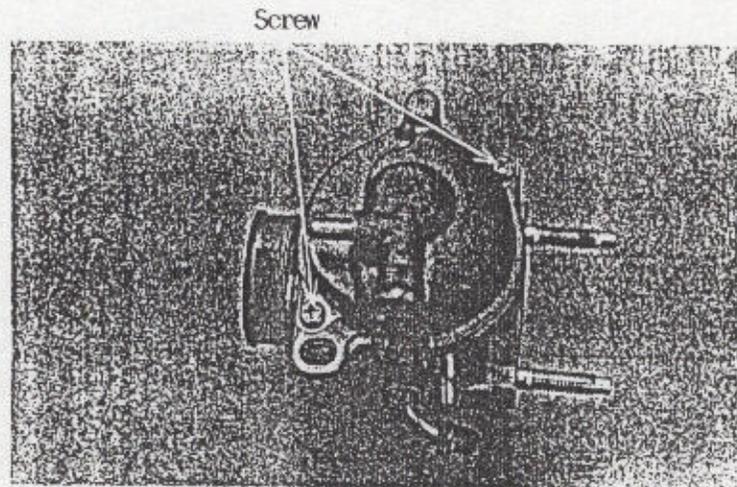
① Auto Bystarter Installation

Install the auto bystarter on the carburetor with the groove in the bystarter body flushing with the carburetor face. Install the lock piece and tighten the 2 attaching screws.

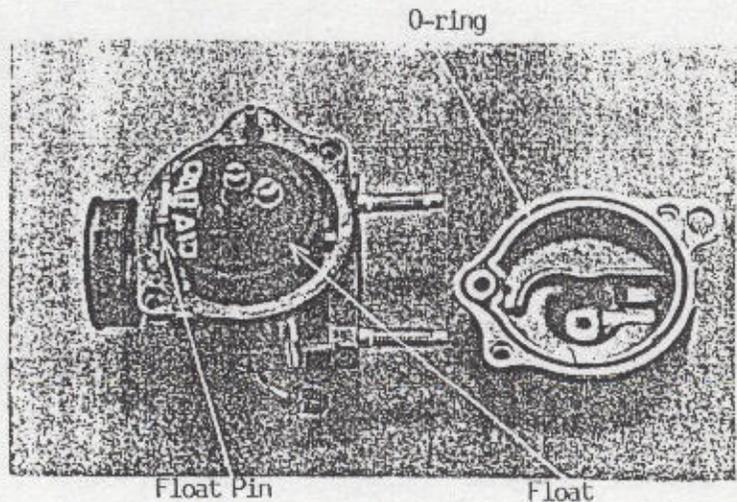


② FLOAT CHAMBER

Remove the 2 attaching screws and the float chamber.



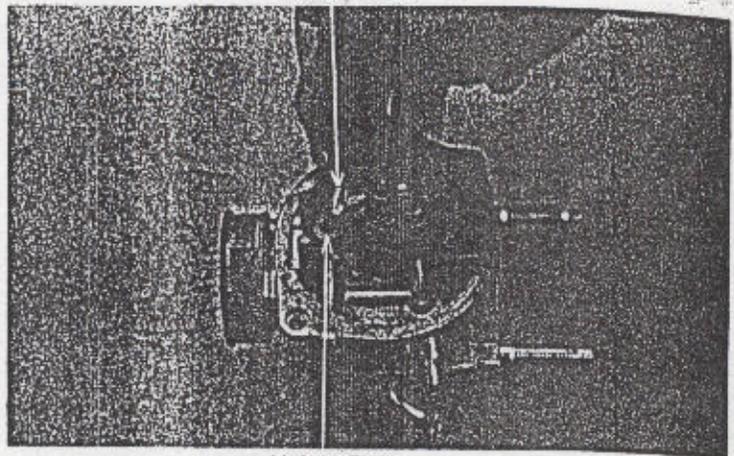
Remove the screw and O-ring. Remove the float pin and then remove the float and float valve.



● **Float/Float Valve Inspection**

Check the float for damage or fuel inside the float. Check the float valve seat for wear or damage.

Float Valve



Valve Seat

● **Jets/Screws Removal**

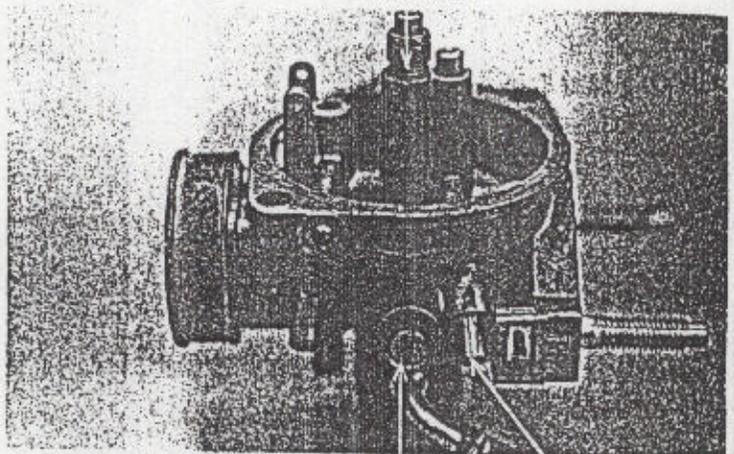
Before removing the throttle adjusting screw and air screw, tighten them fully and record the rotating turns. Then remove them.

*

Do not force the air screw against its seat to prevent damage.

Remove the main jet and jet holder.

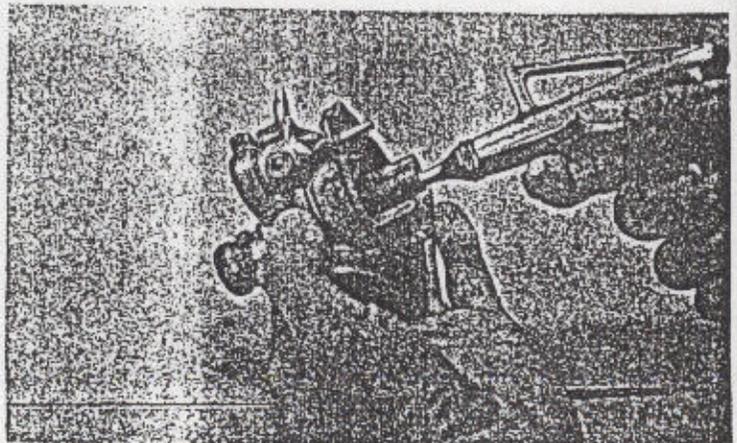
Main Jet



Throttle Adjusting Screw Air Screw

● **Carburetor Openings Cleaning**

Blow open the carburetor body openings with an air gun and clean any clogged opening.



● Float Chamber Assembly

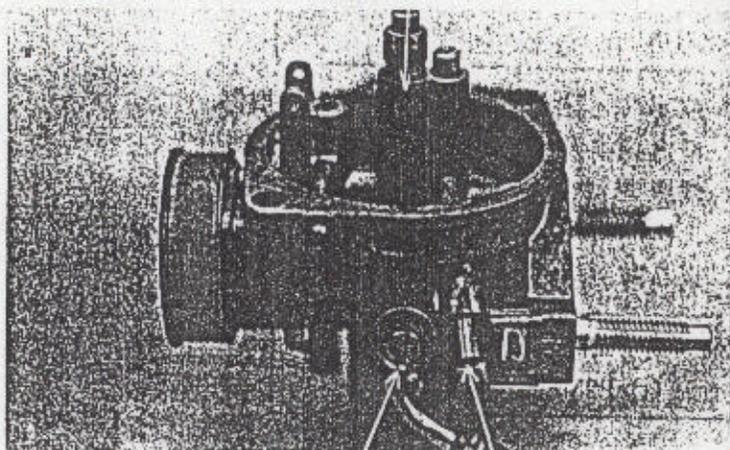
Install the main jet and jet holder.

Install the air screw and throttle adjusting screw according to the recorded rotating turns.

*

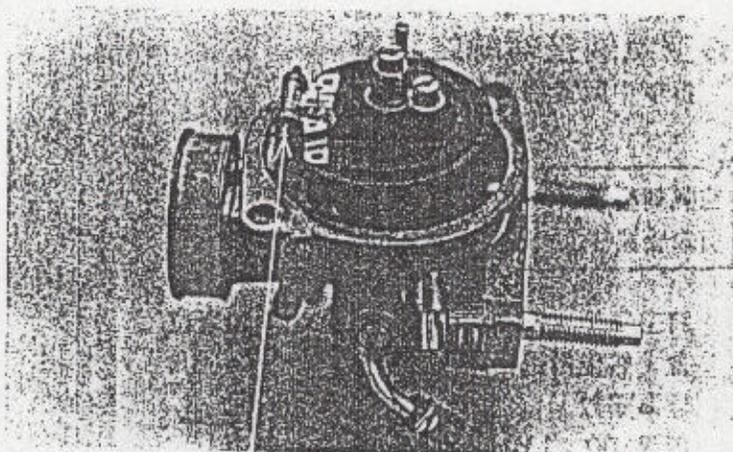
If the air screw should be replaced, perform the air screw adjustment once more.

Main Jet, Jet Holder



Throttle Adjusting Screw Air Screw

Install the float valve, float and float pin.
Tighten the float screw securely.



Float Pin

● FLOAT LEVEL INSPECTION

Slightly incline the carburetor and measure the float level when the float valve contacts the float arm.

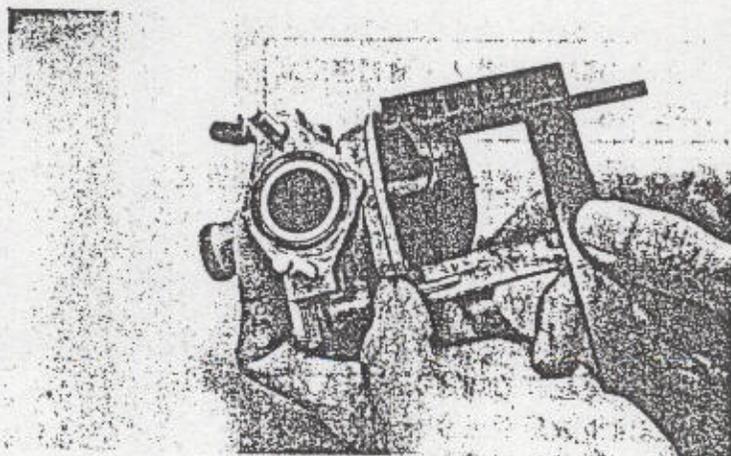
Float Level: 16.30mm

Replace the float if it exceeds the specified float level.

Install the O-ring.

Check the float operation and then install the float chamber.

Tighten the attaching screws.



● CARBURETOR INSTALLATION

* When installing, do not allow foreign particles entering the carburetor.

Check the carburetor insulating gasket and O-ring for wear or damage. Install the carburetor and insulating gasket to the intake manifold and tighten the 2 nuts. Connect the fuel hose. Connect the auto bystarter cable.

* Place the bystarter cable on the correct location.
(P23)

Install the carburetor cap. (P121)
Install the air cleaner on the carburetor and tighten the clip ring.
Install the met-in box. (P135)

● AIR SCREW ADJUSTMENT

Remove the met-in box. (P135)

* Warm up the engine before adjusting the air screw.

Lightly turn the air screw to the tightened position and then turn it out to the standard turns.

Air Screw Opening:

SNIPER 100: $1\frac{1}{2} \pm \frac{1}{4}$ turns

SNIPER 50 : $2 \pm \frac{1}{4}$ turns

Start the engine and slightly turn the air screw right and left to obtain the maximum engine rpm.

* Do not force the air screw against its seat to prevent damage.

Then adjust the throttle adjusting screw to obtain the specified idle speed.

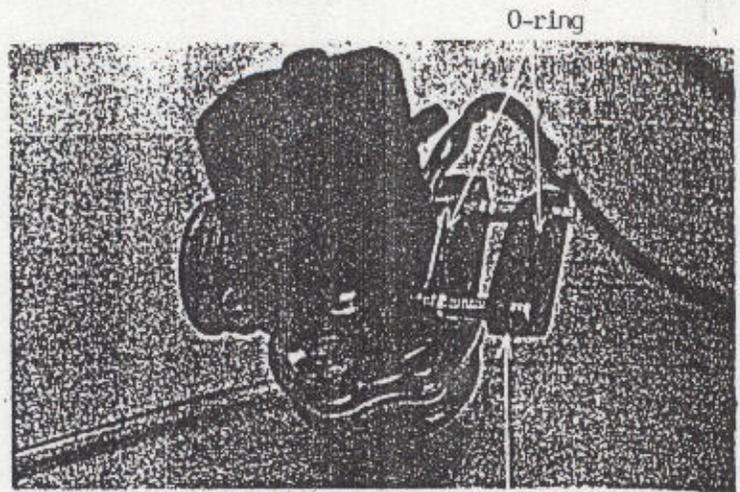
Specified Idle Speed:

SNIPER 100: 1800 ± 100 RPM

SNIPER 50 : 2000 ± 100 RPM

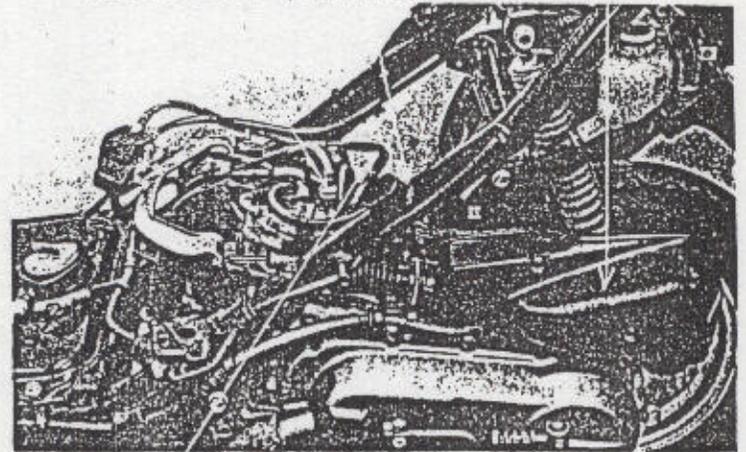
When the engine is idling, lightly increase the idle speed to make sure the engine operation is smooth and the idle speed is normal.

If the air screw is unadjustable within the range of $\pm \frac{1}{4}$ turn, check other related items.



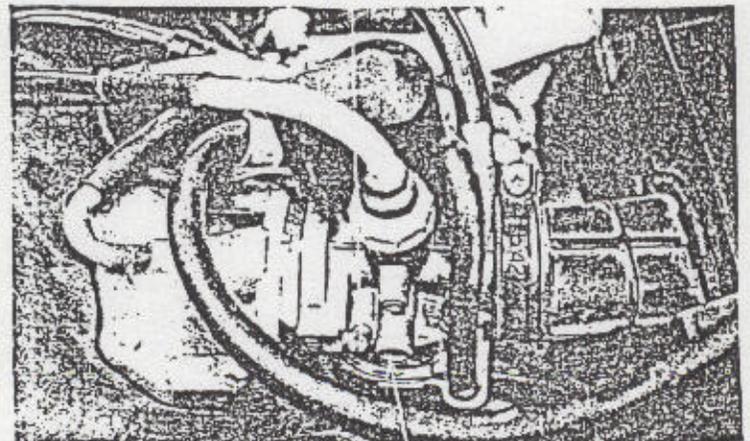
Insulating Gasket

Carburetor Cap , Clip Ring Air Cleaner



Fuel Tube

Air Screw

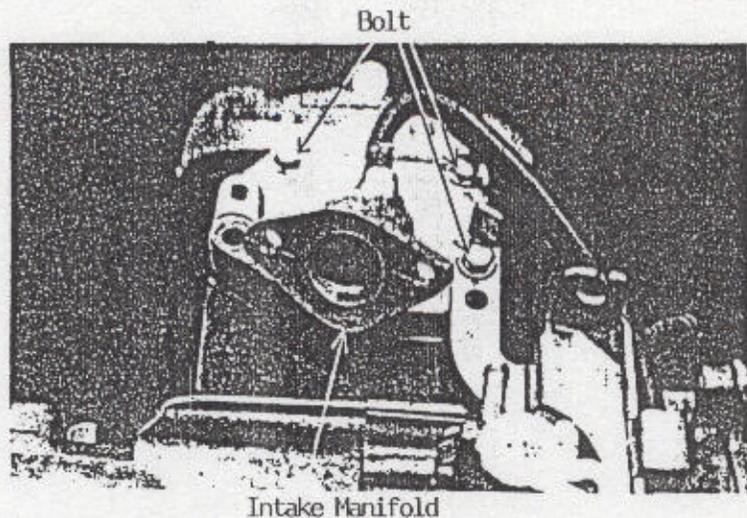


Throttle Adjusting Screw

● REED VALVE

● Removal

- Remove the met-in box. (P147)
- Remove the 4 intake manifold bolts and gasket.
- Remove the reed valve and gasket.

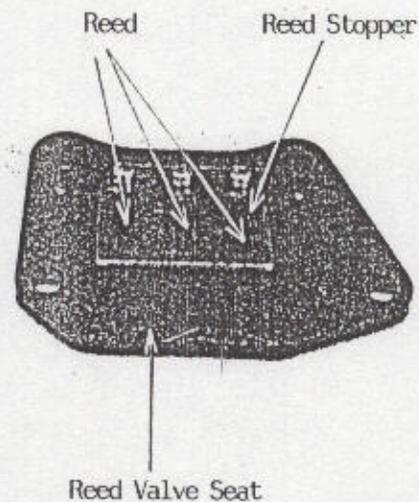


● Inspection

- Check the reed valve for damaged or weak reeds. Replace them with new ones if necessary.
- Check the valve seat for cracks, damage or clearance between the seat and reed. Replace if necessary.



Do not disassemble or bend the reed valve. To do so can cause loss of power and engine damage. If any part is faulty, replace it as a unit.



● Installation

- The installation sequence is the reverse of removal.



- Install a new gasket with the gasket indentation aligning with the reed valve position.
- After installation, check for secondary air leaks.

● FUEL TANK



No Smoking !

● Removal

- Remove the met-in box. (P147)
- Remove the central cover. (P147)
- Remove the frame covers. (P148)
- Remove the foot rest. (P148)
- Remove the front tool box. (P136)
- Remove the 2 lock bolts attaching the tank bridge plate.
- Disconnect the fuel tube.
- Remove the air vent pipe.
- Disconnect the fuel unit cable connector.
- Remove the 2 fuel tank attaching bolts and then remove the fuel tank.

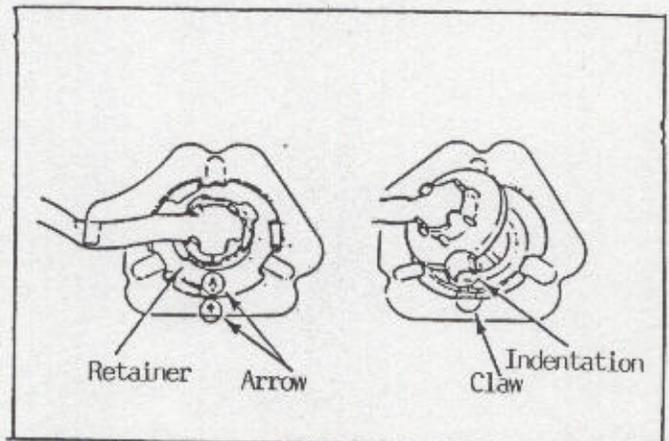
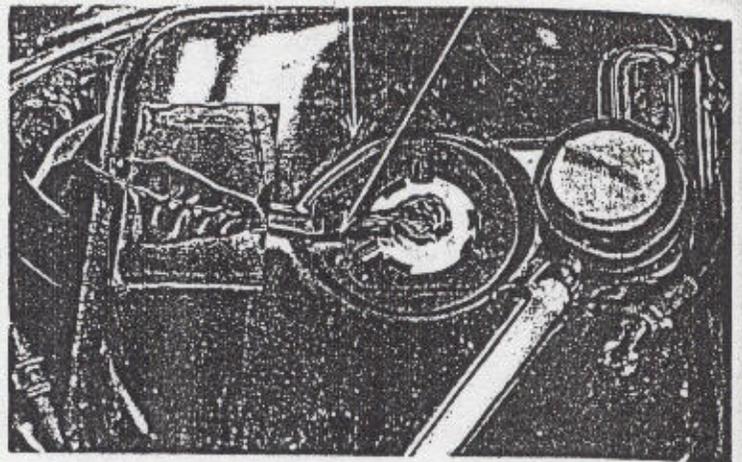
● Fuel Unit Removal

- Turn the fuel unit retainer to the left and remove the fuel unit.



Be careful not to bend the fuel tank float arm.

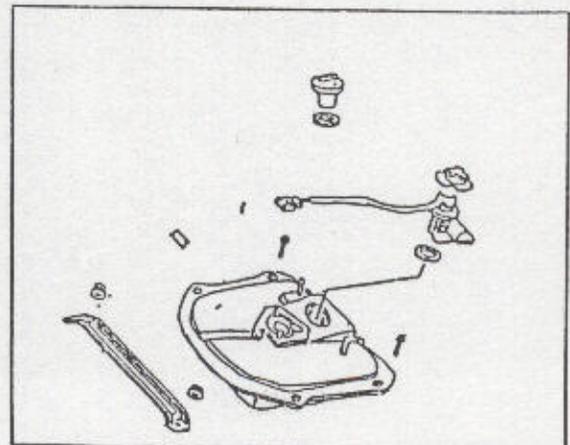
Fuel Tank Fuel Unit Cable



● Installation

The installation sequence is the reverse of removal.

- The indentation of fuel unit should align with the claw of fuel tank.
- When installing, the arrow on retainer should align with the arrow on fuel tank.
- Turn the retainer left to the stop point and fix it securely.
- After installation, add gasoline and check for fuel leaks.

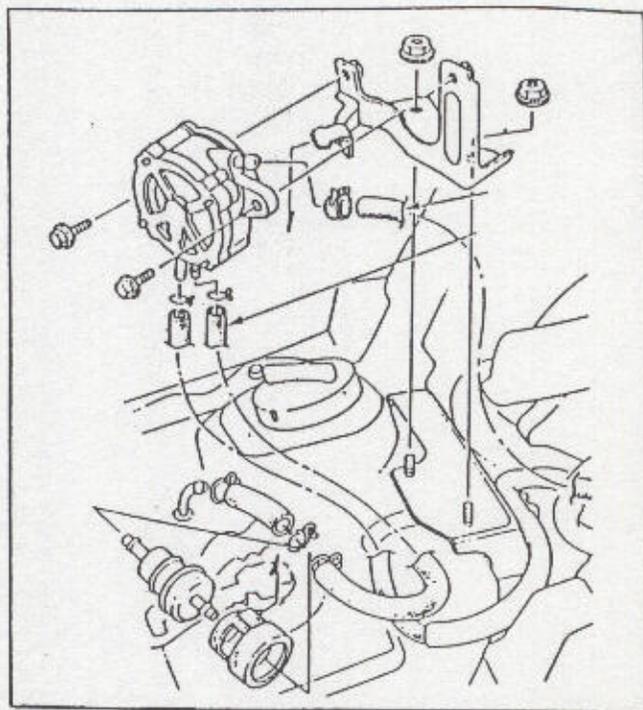


● FUEL PUMP

Remove the met-in-box. (P147)
Remove the central cover. (P147)
Disconnect the fuel inlet and outlet
lines and vacuum pipe.
Remove the 2 lock bolts.



No Smoking !

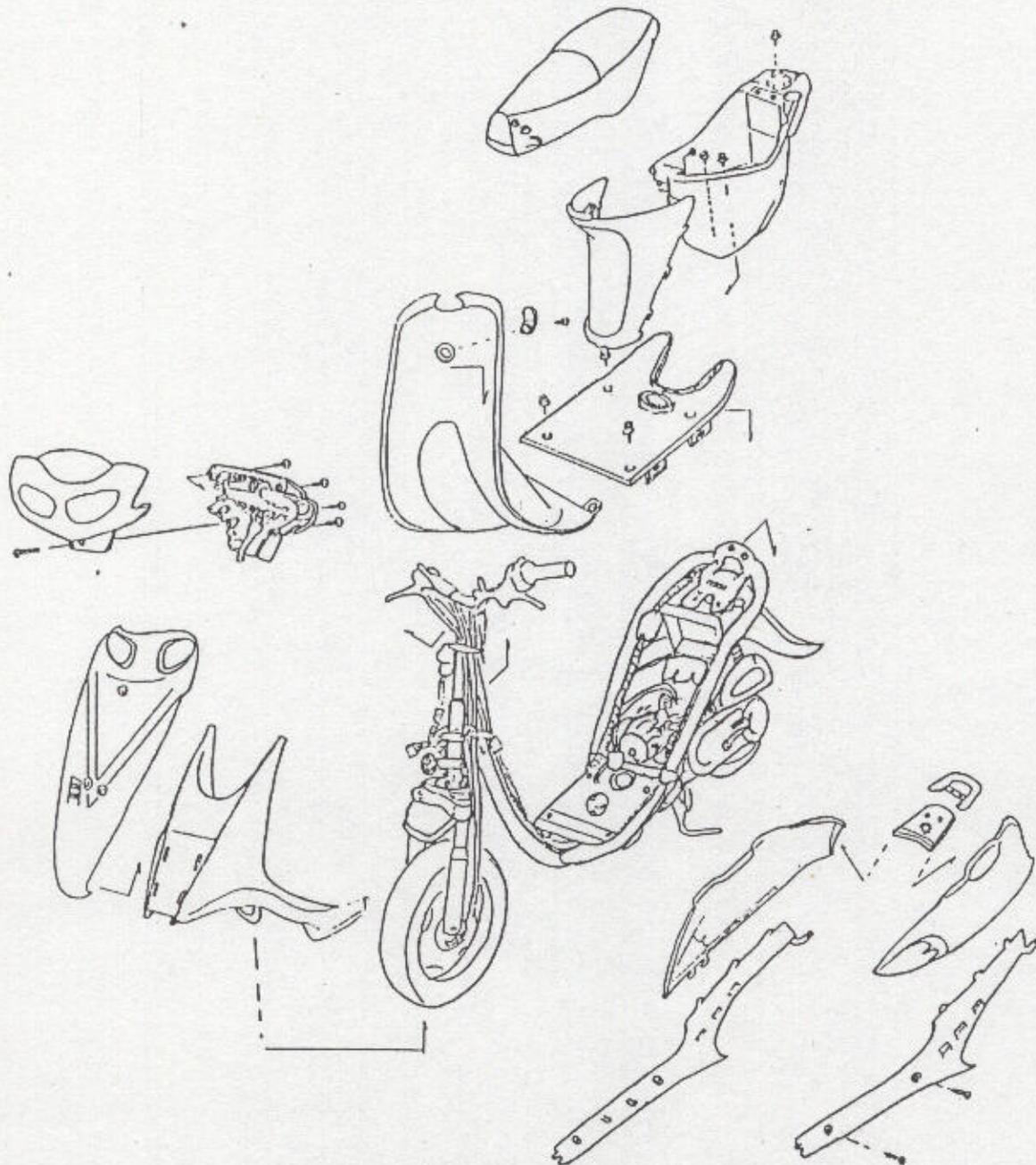


FRAME COVERS

●SERVICE INFORMATION..... 12-3

●FRAME COVERS REMOVAL..... 12-4

●FRAME COVERS INSTALLATION..... 12-9



● SERVICE INFORMATION

● Use care when removing the frame external covers not to pull them by force because the claws on the joint part of each cover may be damaged.

Parts should be removed together

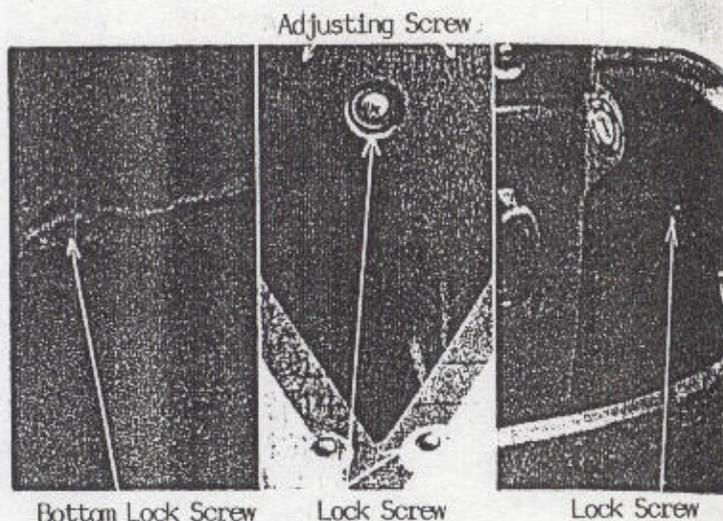
- Handlebar front cover ————— Handlebar Rear Cover
Headlight Cable Connector
- Handlebar rear cover ————— Speedometer Cable and instrument
light Cable Connectors
- Rear Cover ————— Met-in Box, Central Cover
Rear Lever
- Foot Rest ————— Right and Left Side Covers
Central Cover
- Front Inner Cover ————— Front Cover, Foot Rest

●FRAME COVERS REMOVAL

●Front Cover Removal

- Remove the 3 front cap nuts and washers.
- Remove the 2 upper adjusting screws.
- Remove the rear right and left lock screws.
- Remove the bottom lock bolt.
- Remove the front cover downwards and disconnect the turn signal light cable connector.

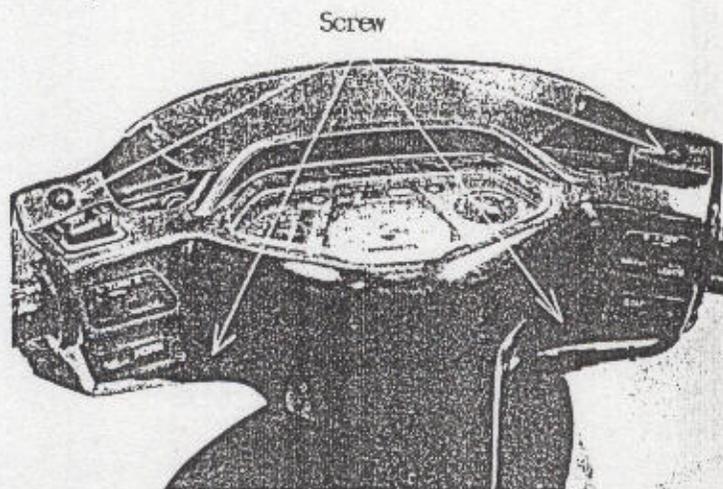
* Remove the front cover downwards to avoid damaging the joint parts of the right and left inner covers.



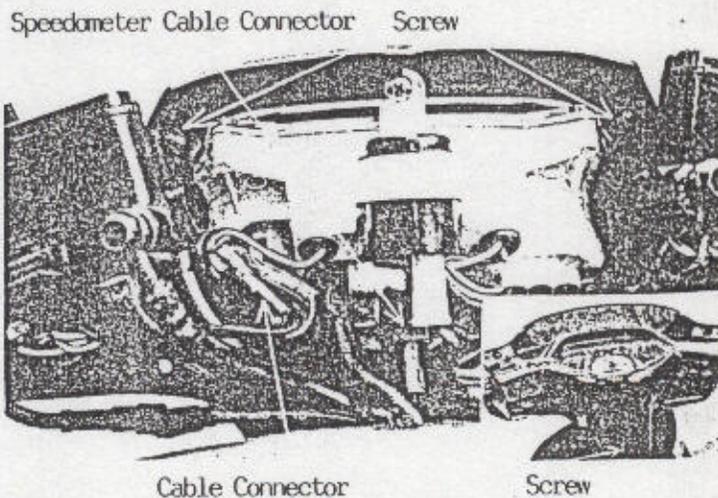
●Handlebar Front/Rear Cover Removal

- First remove the front cover.
- Remove the 4 screws attaching the handlebar front cover.
- Remove the handlebar front cover and disconnect the headlight cable connector.

* During removal, be careful not to damage the claws and cavities on the handlebar front and rear cover joint parts.

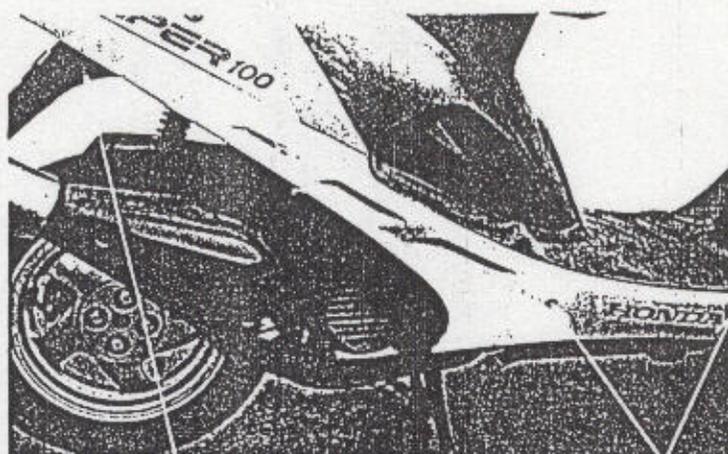


- Remove the 3 screws attaching the handlebar rear cover.
- Disconnect the speedometer cable.
- Disconnect the instrument cable connector.
- Remove the front and rear stoplight connector.
- Remove the handlebar rear cover.



● Side Strips Removal

Remove the 3 lock screws attaching the frame right and left side strips and then pull the right and left side strips backwards to remove them.

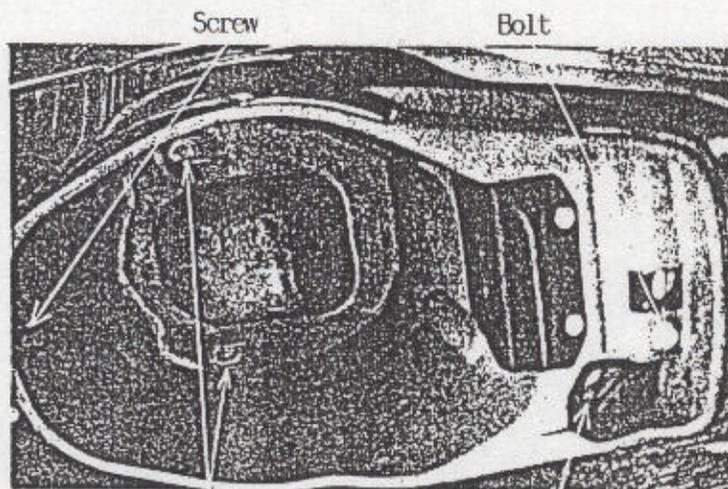


Screw

Screw

● Met-in Box Removal

Remove the 4 lock screws and nuts attaching the met-in box. Remove the oil tank cap and rubber gasket. Remove the met-in box.



Screw

Bolt

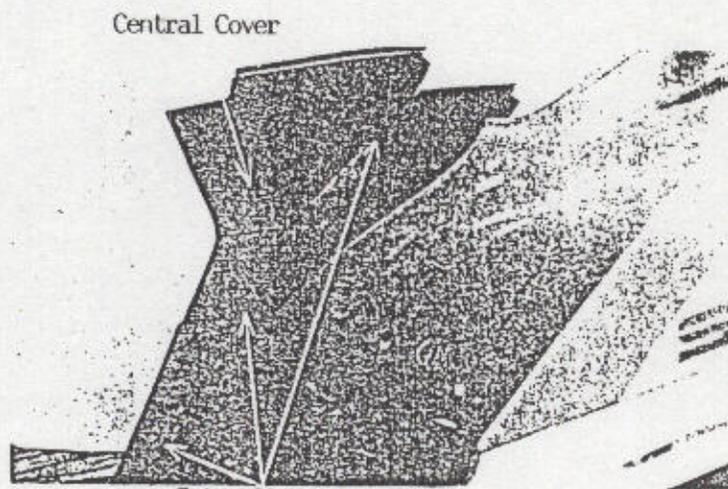
Nut

Oil Tank Cap

● Central Cover Removal

Remove the central cover by lifting it upwards.

* Do not damage the right and left joint claws.



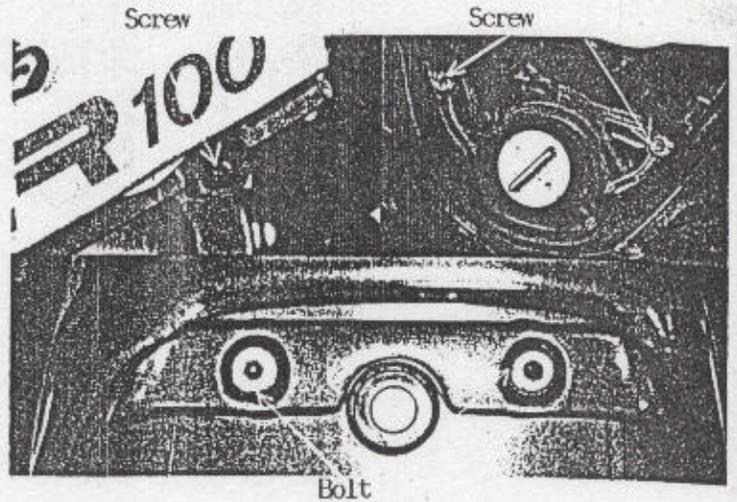
Central Cover

Joint Claw

● **Right/Left Side Cover Removal**

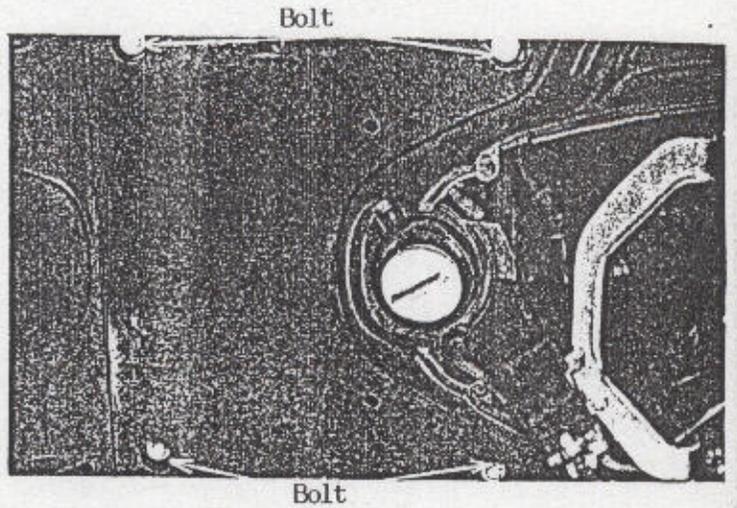
Remove the 2 rear lever hexagon bolts and remove the rear lever. Remove the 4 front and rear lock screws. Remove the right and left side covers.

* **Caution:**
When removing, do not damage the right and left joint claws.



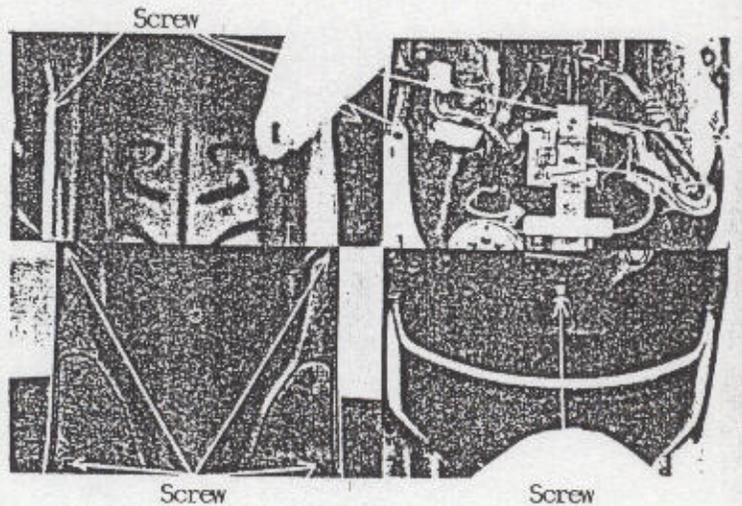
● **Foot Rest**

Remove the right and left bolts attaching the foot rest. Remove the foot rest.



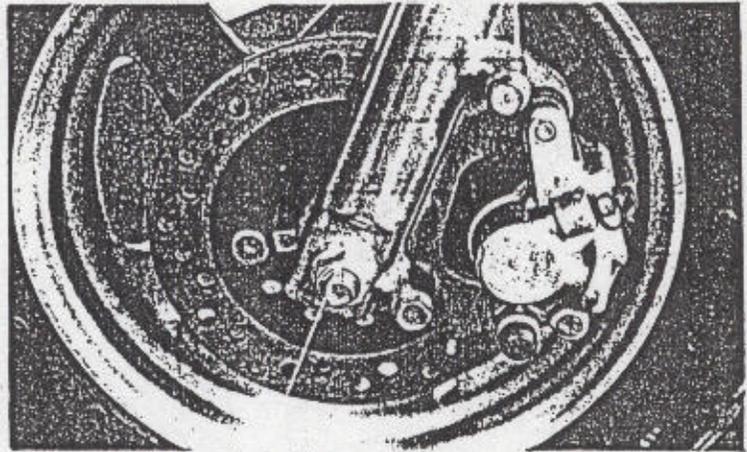
● **Front Tool Box**

Remove the 9 screws attaching the front tool box. Remove the front tool box.



● Front Bottom Cover Removal

Remove the front axle nut and then remove the axle shaft. Remove the front wheel and front bottom cover.



Axle Nut

● FRAME COVERS INSTALLATION

Install the frame covers in the reverse order of removal. During installation, pay attention to the following points.

- * During installation, the joint parts should be matched properly. Do not force the joint claws and cavities to avoid damage.
- Wires and cables should be properly arranged at their respective locations.

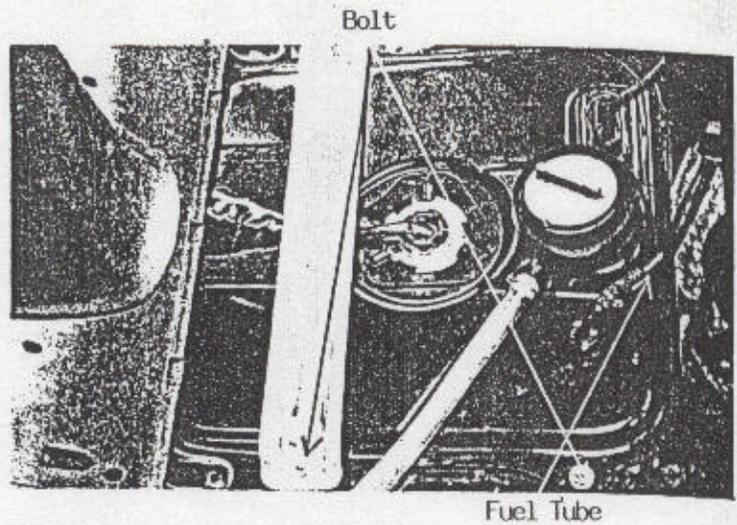
● Fuel Tank



No Smoking !

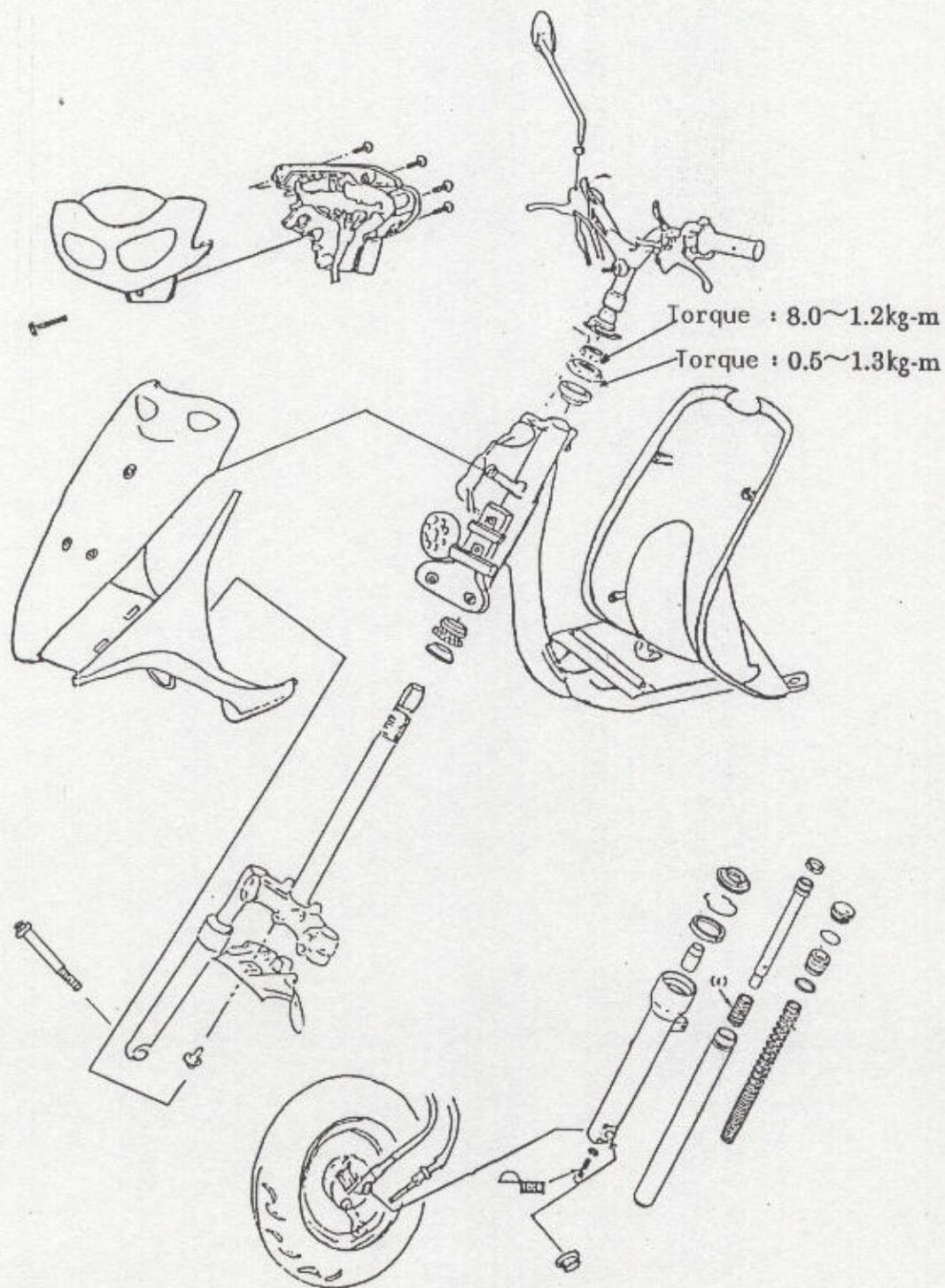
● Removal

- Remove the 4th lock bolt of the fuel tank.
- Disconnect the fuel tube.
- Remove the fuel tank.



**STEERING HANDLEBAR/FRONT WHEEL/FRONT BRAKE/
FRONT SHOCK ABSORBER/FRONT FORK**

● TROUBLESHOOTING.....	13-3
● SERVICE INFORMATION.....	13-3
● STEERING HANDLEBAR.....	13-4
● FRONT WHEEL.....	13-6
● FRONT BRAKE (DISC BRAKE).....	13-10
● FRONT SHOCK ABSORBER.....	13-12
● FRONT FORK.....	13-15



● TROUBLESHOOTING

● Hard steering (Heavy)

- Excessively tightened steering stem top ball race
- Broken steering stem balls
- Insufficient tire pressure

● Steers to one side

- Uneven right and left absorbers
- Bent front fork
- Bent front axle or unevenly worn tire

● Poor brake performance

- Brake incorrectly adjusted
- Worn brake lining
- Contaminated brake lining surface

● Worn brake camshaft

● Worn brake drum

● Poorly connected brake arm

● Poor brake performance (Disc Brake)

- Air in brake system
- Deteriorated brake fluid
- Contaminated disc brake pad and brake disc
- Worn brake liner
- Worn brake master cylinder piston oil seal
- Clogged brake fluid line
- Deformed brake disc
- Worn one-side caliper

● Front wheel wobbling

- Bent rim
- Loose front axle
- Bent front spoke plate
- Faulty tire
- Axle not tightened properly

● Soft front shock absorber

- Weak absorber spring
- Insufficient oil in Absorber

● Front shock absorber noise

- Slider bending
- Loose front fork fasteners
- Lack of lubrication

● SERVICE INFORMATION

● SPECIFICATIONS

Item	Standard (mm)	Service Limit (mm)
Axle shaft runout	—	0.2
Front wheel rim runout	Radial	2.0
	Axial	2.0
Front brake drum I.D.	80.0	80.5
Front brake lining thickness	4.0	2.0
Front shock absorber spring free length	196.9	193.2
Brake disc thickness	3.5~3.8	3.0
Brake disc off-center	—	0.30
Brake master cylinder I.D.	12.700~12.743	12.75
Brake master cylinder piston O.D.	12.657~12.684	12.64
Brake caliper piston O.D.	25.400~25.405	25.45
Brake caliper piston I.D.	25.318~25.368	25.30

● TORQUE VALUES

- Steering Stem 4.0 - 5.0 kg-m
- Steering Stem Lock Nut 8.0 - 12.0 kg-m
- Steering Stem Top Ball Race 0.5 - 1.3 kg-m
- Front Shock Absorber Nut 2.0 - 2.5 kg-m
- Front Axle Nut 4.5 - 5.0 kg-m
- Brake Arm Bolt 0.4 - 0.7 kg-m

- Rear Shock Absorber Remover A 07967-CA70101
- Absorber Compressor 07967-KM10100
- Ball Race Driver 07946-CA70000
- Expander 07914-3230001

COMMON TOOLS

- Driver Handle A 07749-0010000
- Outer Driver 37x40mm 07746-0010200
- Driver Pilot 10mm 07746-0040100
- Bearing Puller 07746-0050100
- Bearing Puller Head 10mm 07746-0050200
- Absorber Spring Compressor 07959-3290001

● TOOLS

SPECIAL TOOLS

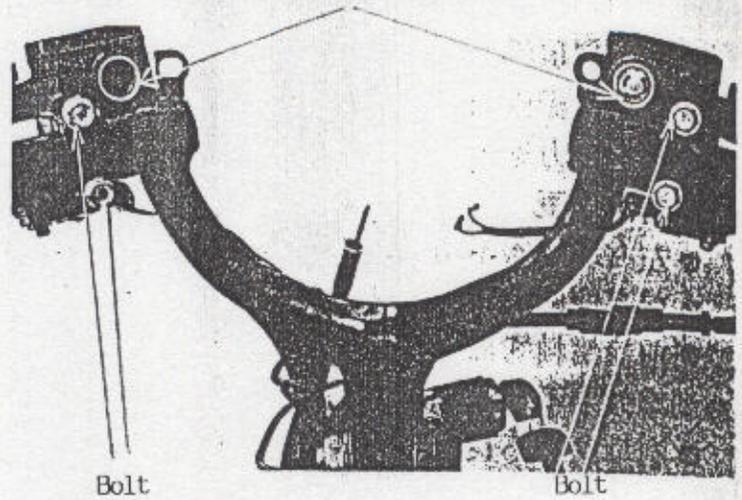
- Lock Nut Wrench 07916-KM10000
- Lock Socket Wrench 07716-1870100
- Outer Driver 28x30mm 07946-1870100

●STEERING HANDLEBAR

●Removal

Remove the handlebar front and rear covers. (P146)
Remove the front cover and met-in box. (P148)
Remove the 4 bolts attaching the front and rear brake levers.
Remove the bolts attaching the front and left brake master cylinders (disc brake).

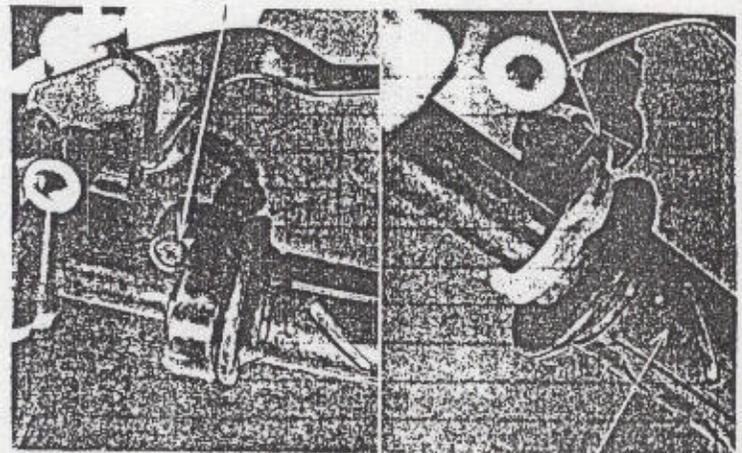
Hydraulic Brake Master Cylinder



Remove the bolt attaching the throttle valve seat.
Remove the throttle valve and disconnect the throttle cable.
Then, remove the throttle tube from the handlebar.

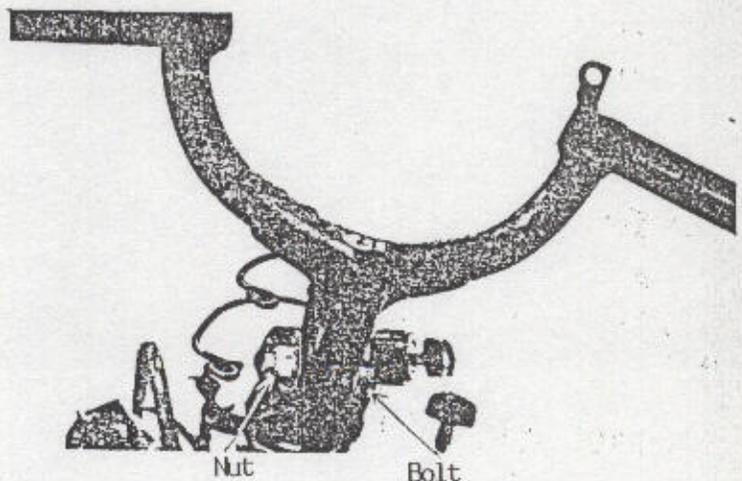
Screw

Throttle Cable



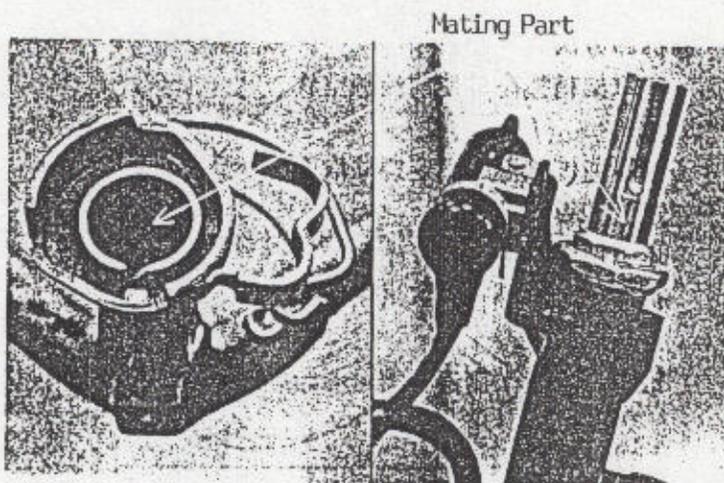
Throttle Tube

Remove the handlebar lock bolt and then remove the handlebar.

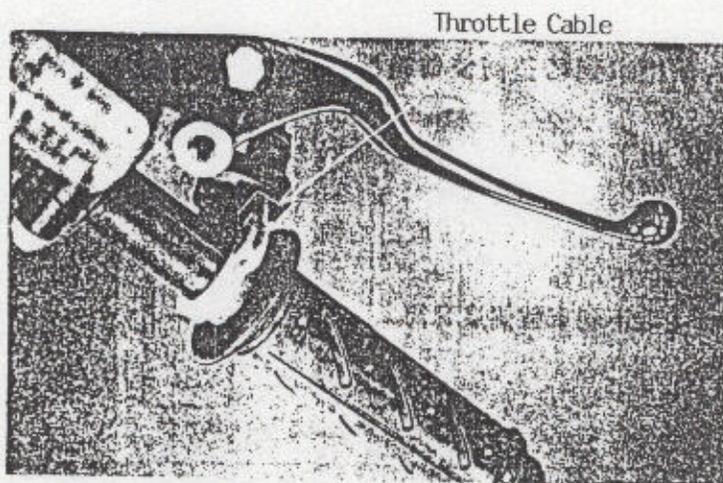


● Installation

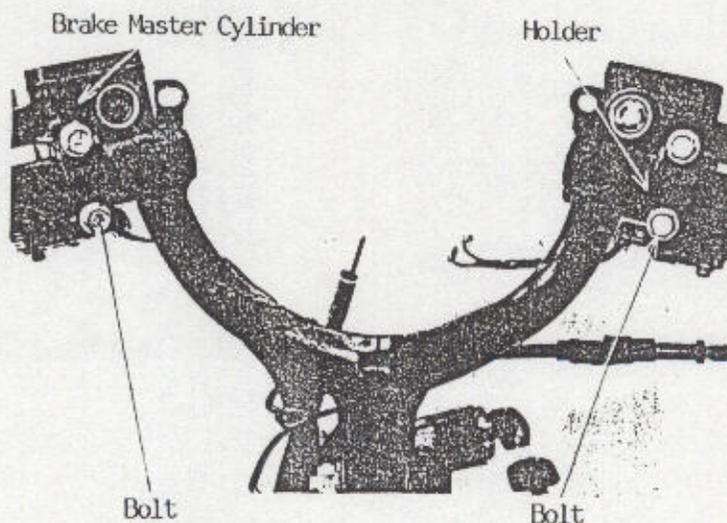
Install the handlebar on the steering stem by aligning the tab of the handlebar with the groove in the steering stem. Tighten the handlebar lock bolt. Torque: 4.0 - 5.0 kg-m



Lubricate the throttle tube front end with grease. Install the throttle valve and connect the throttle cable.



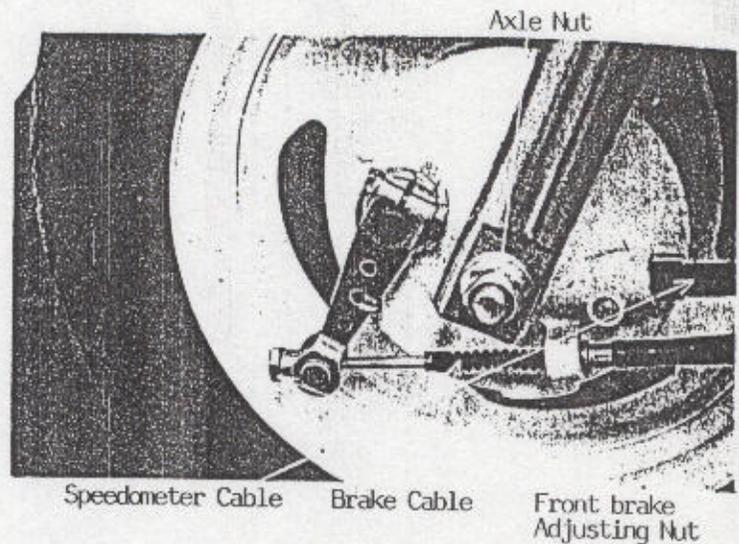
The installation sequence is the reverse of removal. Install the front and rear brake lever holders. Install the front and rear brake master cylinders (disc brake).



● FRONT WHEEL

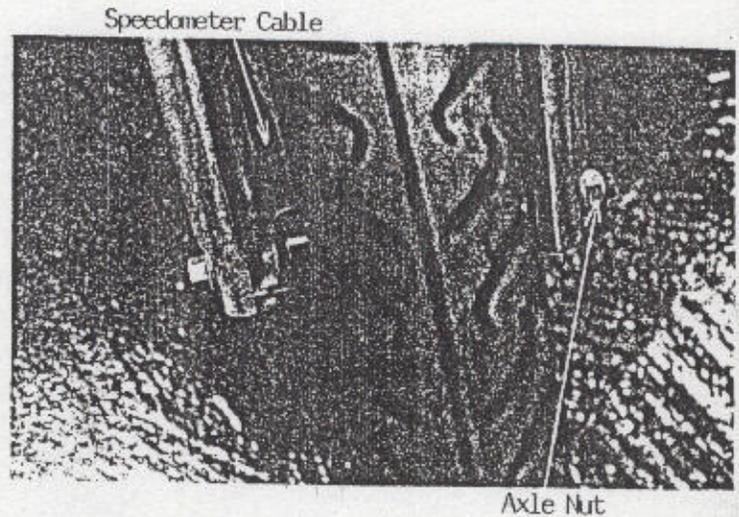
● Removal

Support the motorcycle chassis with a jack to raise the front wheel off the ground.
Remove the speedometer cable attaching screw to remove the speedometer cable.
Disconnect the front brake cable.
Remove the front axle nut and pull out the axle.
Remove the front wheel.
Remove the brake disc and axle collar.



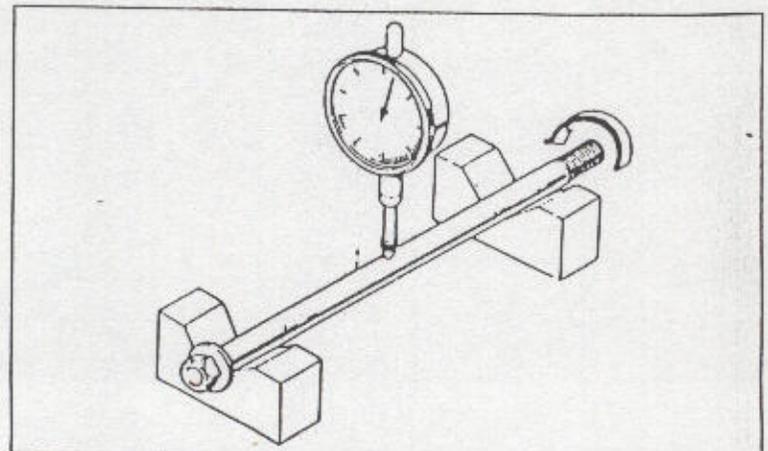
(Disc Brake)

Support the motorcycle chassis with a jack to raise the front wheel off the ground.
Remove the speedometer cable attaching screw to remove the speedometer cable.
Remove the front axle nut and pull out the axle.
Remove the front wheel.
Remove the brake disc and axle collar.



● Inspection

Measure the axle shaft runout.
The actual runout is $\frac{1}{2}$ of the total indicator reading.
Service Limit: 0.2mm replace if over

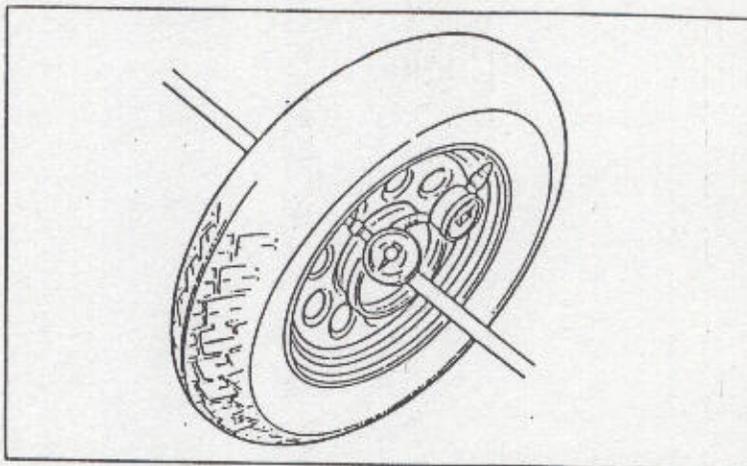


Check the wheel rim runout.

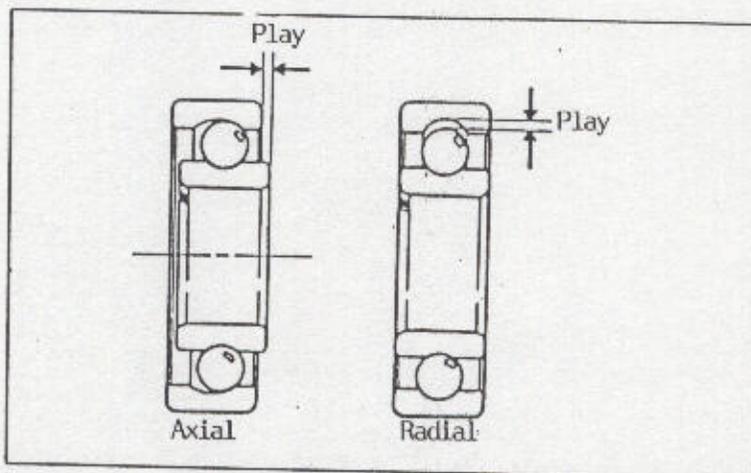
Service Limit:

Radial: 2.0mm replace if over

Axial : 2.0mm replace if over

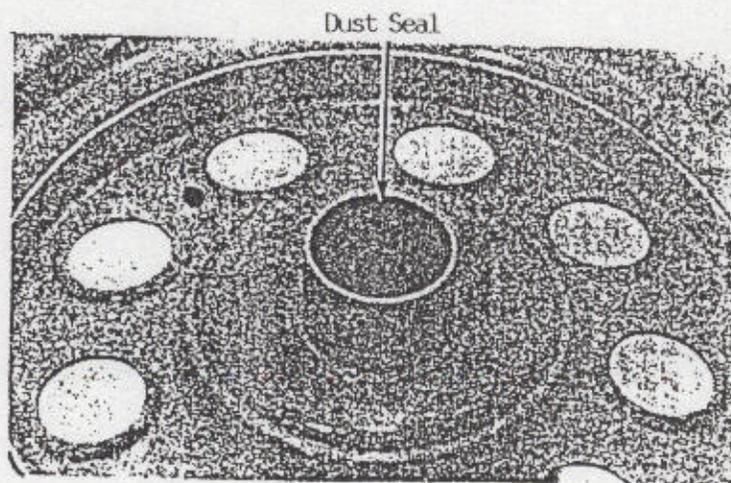


Rotate the wheel bearing and replace it with a new one if there is abnormal noise or looseness.

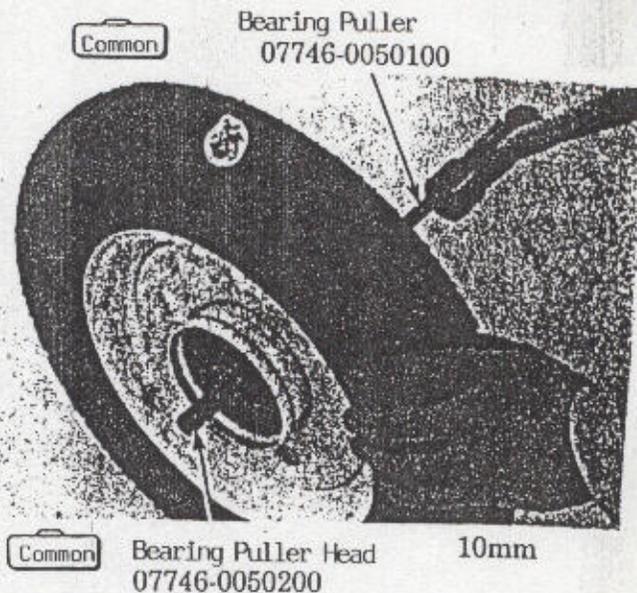


Disassembly

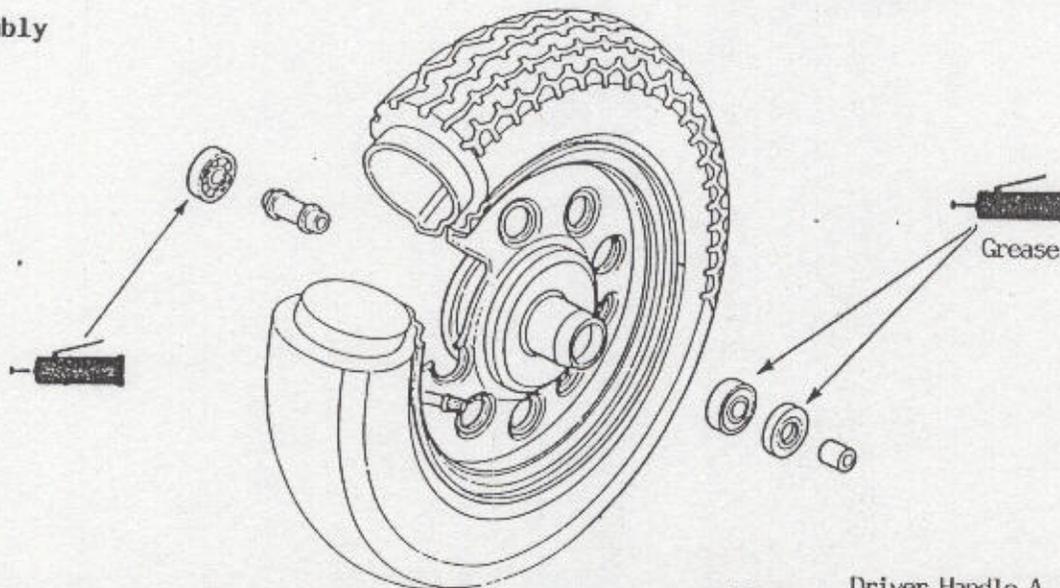
Remove the dust seal.



Remove the wheel bearings and distance collar.

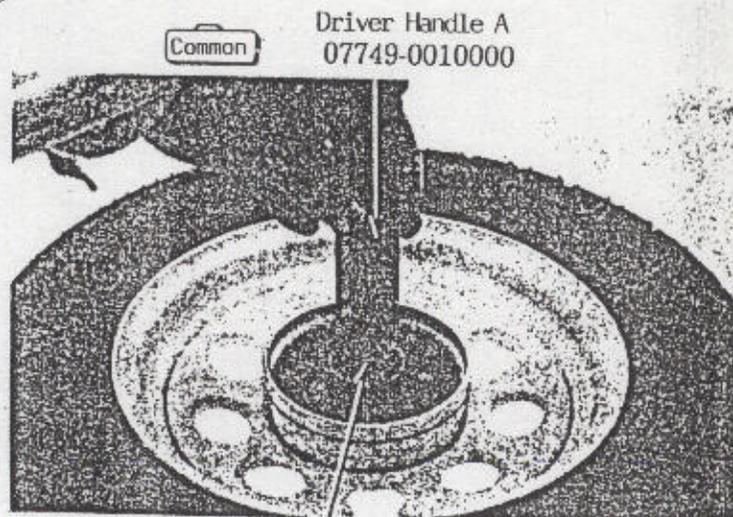


Assembly



Pack all bearing cavities with grease.
Drive in the right bearing and dust seal.
Install the distance collar.
Drive in the left bearing.

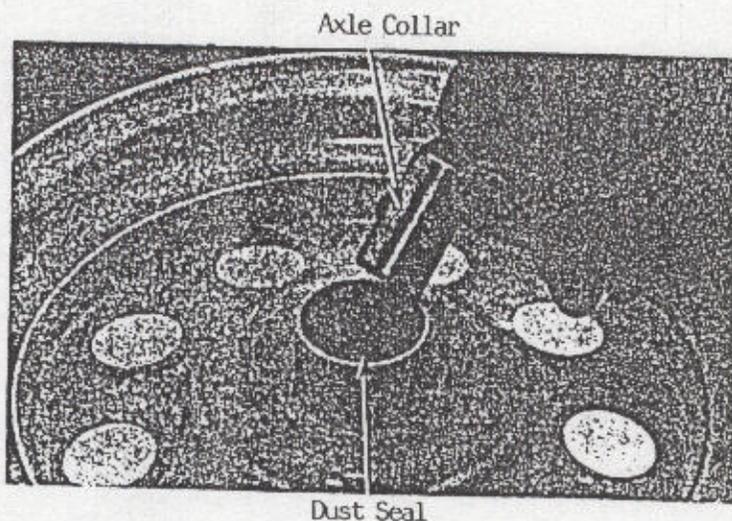
* Drive in the bearings squarely with the dust seal facing out.



Outer Driver 28 x 30mm 07956-1870100

Drive Pilot 28 x 10mm 07746-0040100

Apply grease to the dust seal lip
and install the dust seal.
Install the axle collar.

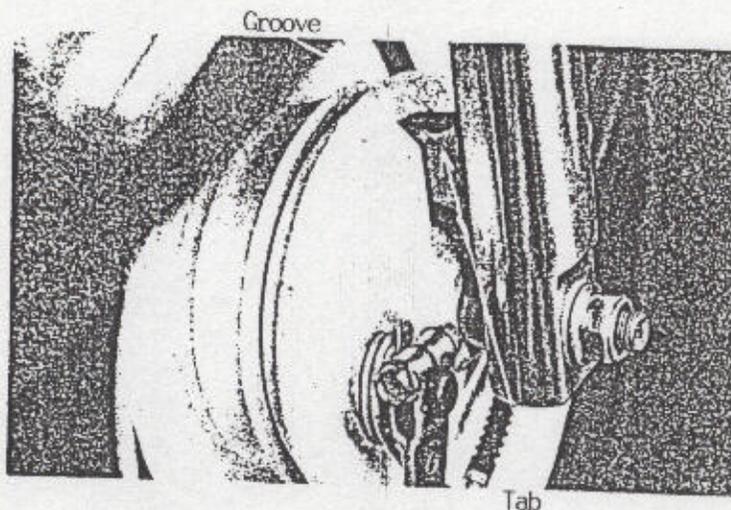


Front Wheel Installation

Install the front wheel by aligning
the groove in the front brake disc
with the tab on the front fork
tube.

Torque: 5.0 – 7.0 kg-m

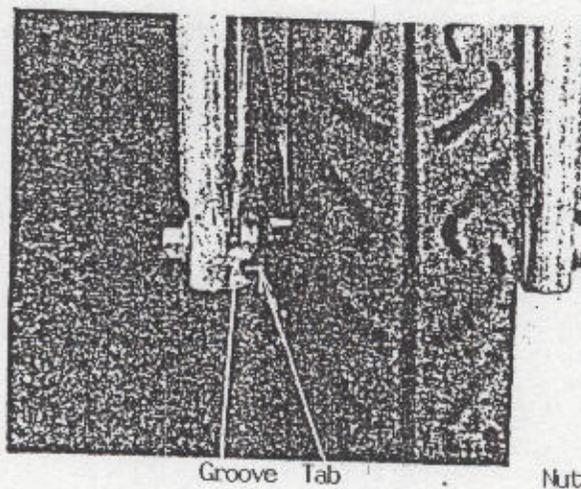
Connect the speedometer cable.
Connect the front brake cable
and adjust the front lever free
play.



(Disc Brake)

Install the front wheel by aligning
the speedometer gear tab with the
groove in the front fork tube.
Install the speedometer cable.

Torque: 5.0 – 7.0 kg-m

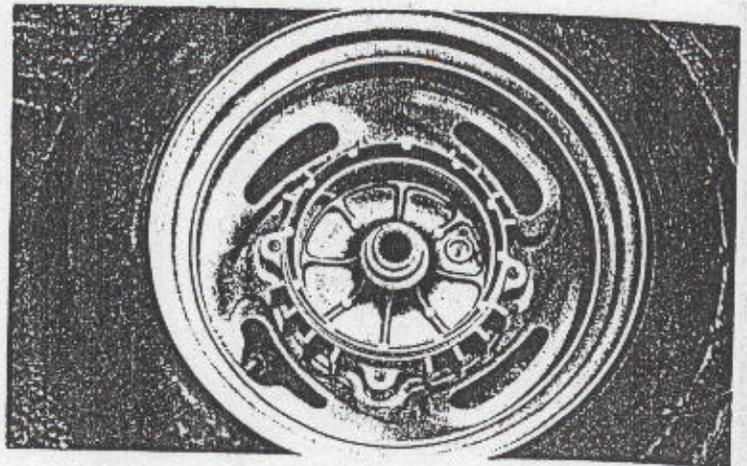


● FRONT BRAKE

Remove the front wheel. (P156)
Remove the brake disc.

● Inspection

Measure the brake drum I.D.
Service Limit: 111mm replace
if over



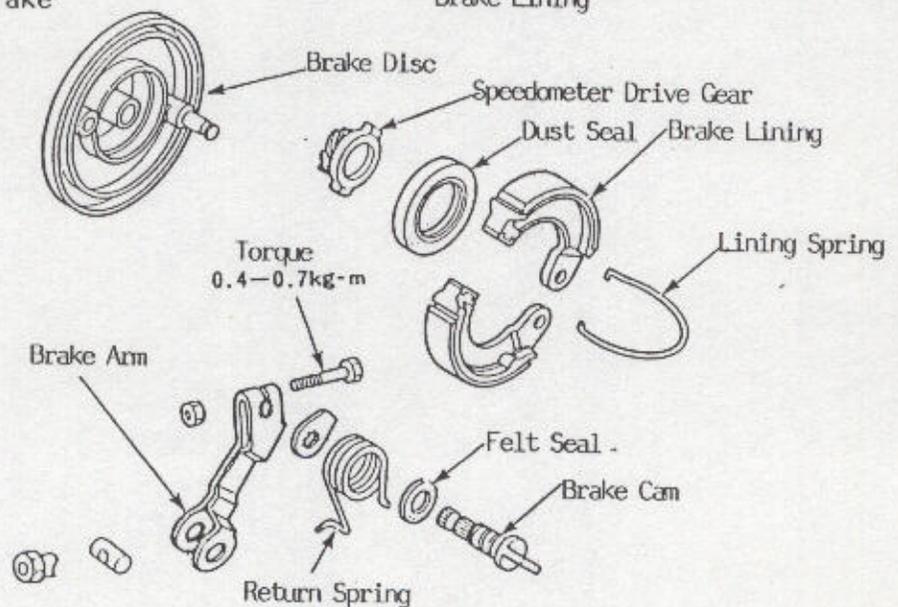
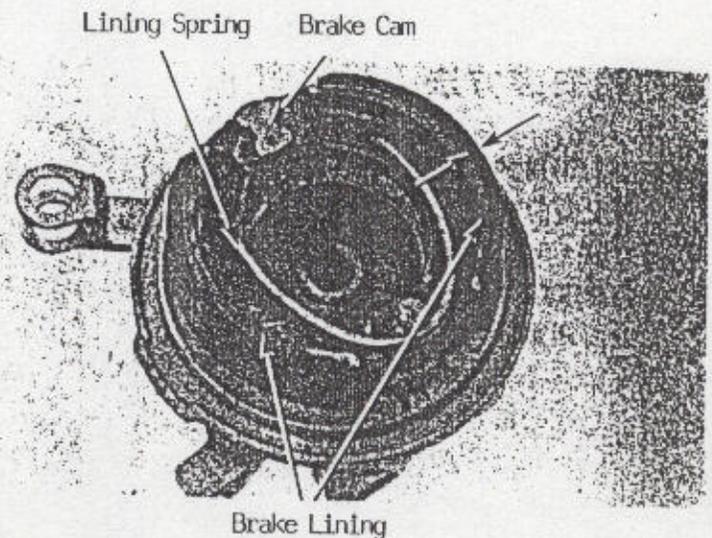
Measure the brake lining thickness.
Service Limit: 2.00mm replace if
below



Be careful to keep oil or
grease off the brake
linings.

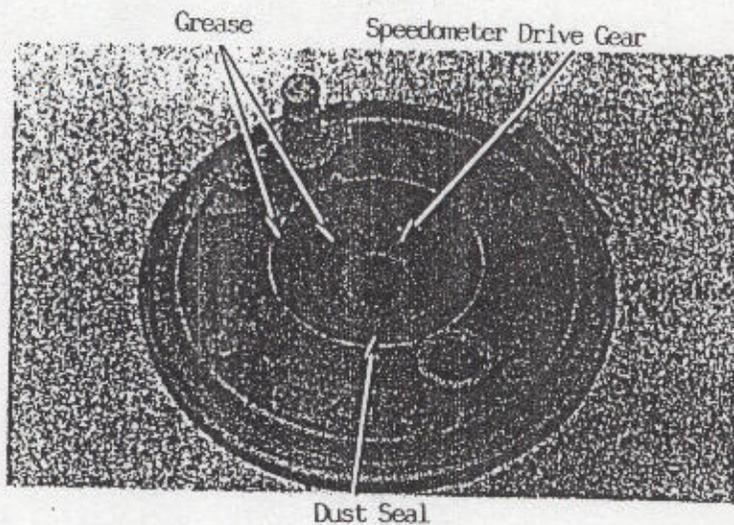
● Disassembly

Do not swing the brake arm. To
do so may expand the brake linings.
Use a screw driver to remove the
brake lining spring from the lock
pin and then remove the brake
lining.
Remove the brake arm and
brake cam.
Remove the dust seal and
speedometer drive gear.

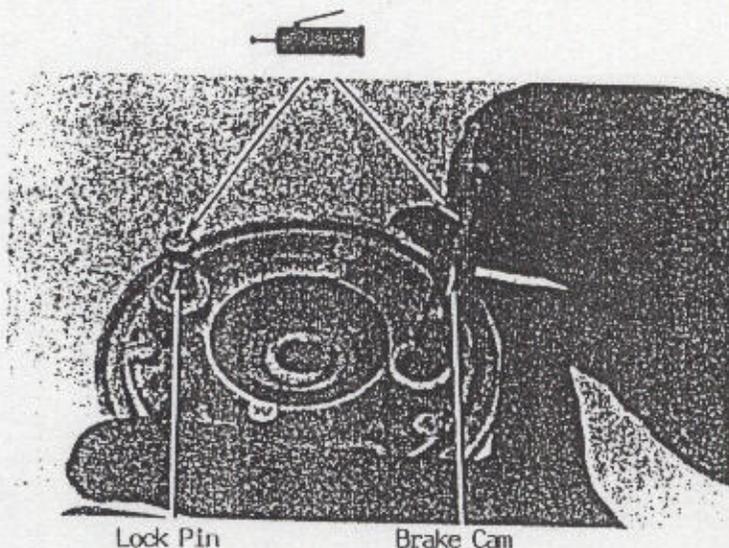


●Assembly

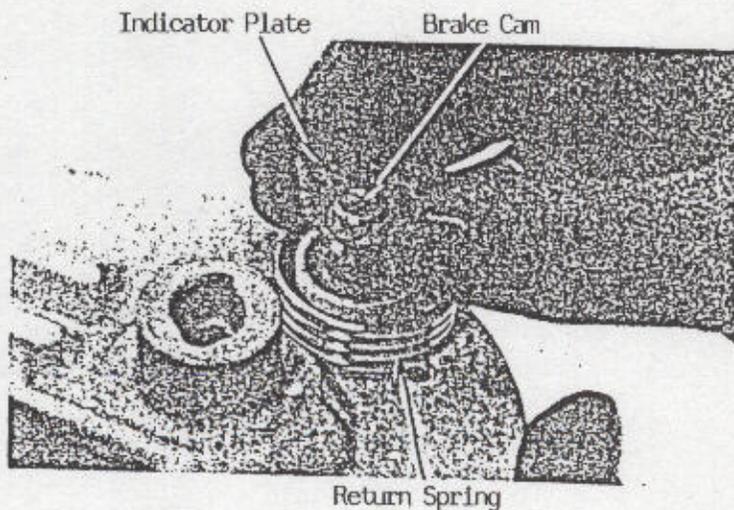
Apply grease to the speedometer drive gear and install it into the brake disc.
Apply grease to the dust seal lip and then install it.



Apply grease to the lock pin and brake cam.
Install the brake cam.

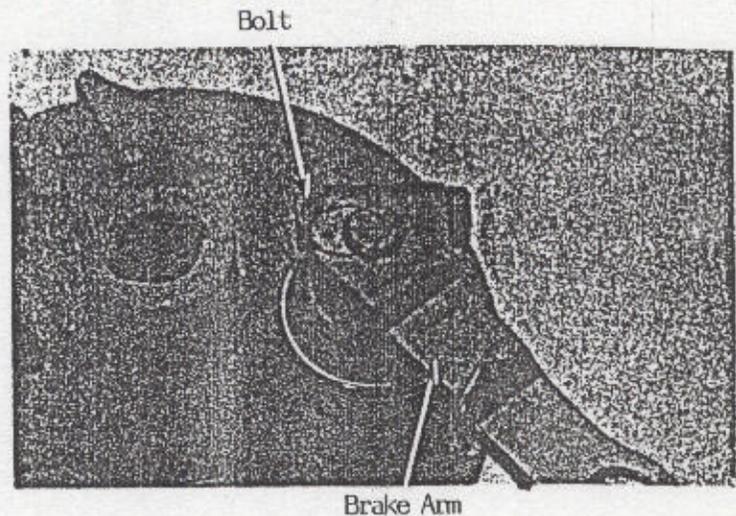


Align the end of the brake arm spring with the brake disc cavity and then assemble them.
Add a small quantity of engine oil into the felt seal and then install it.
Install the wear indicator plate on the brake camshaft by aligning the tooth on the plate with the groove on the camshaft.



Install the brake arm on the brake camshaft by aligning the punch mark on the brake arm with the punch mark on the camshaft. Install and tighten the brake arm bolt.

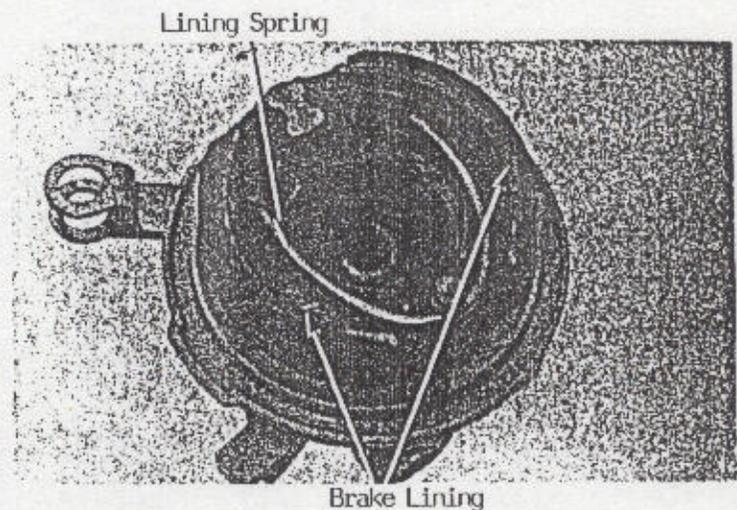
Torque: 0.4 – 0.7 kg-m



Remove the brake linings and lining springs. Swing the brake arm to expand the brake linings. Install the lining springs onto the lock pin.

● **Installation**

Install the brake disc onto the front wheel.
Install the front wheel. (P159)
Adjust the front brake lever free play.

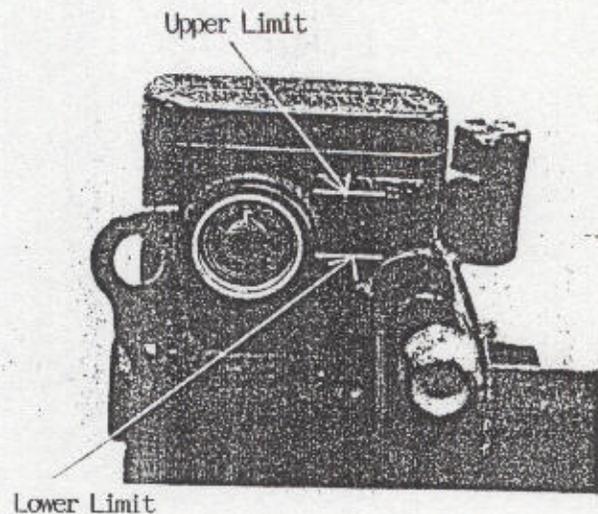


● Hydraulic Brake (Front Brake)

● Brake Fluid Replacement/Air Bleed

Check the brake fluid level on a level ground.

- When operating the brake lever, the brake fluid tank cap should be tightened securely to avoid splash of brake fluid.
- When servicing the brake system, use cloth to cover plastic parts and coating surfaces to avoid splash of brake fluid.



● Brake Fluid Drain

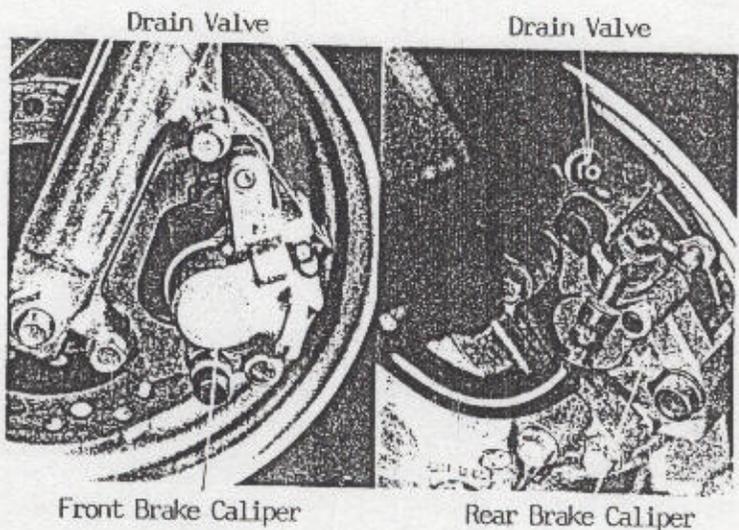
In order to avoid splash of brake fluid, connect a transparent hose to the drain valve.



Warning

Splash of brake fluid on the brake lining or brake disc will reduce braking effect. Clean the brake lining and brake disc with a high-quality brake degreaser.

Fully apply the brake lever and then loosen the caliper release valve to drain the brake fluid until there is no air bubbles in the brake fluid. Tighten the release valve. Repeat these steps until the system is free of air.



● Brake Fluid Refilling

Add the DOT-3 brake fluid to the brake fluid tank.

- When bleeding air, be careful to avoid air in the brake fluid tank flowing into the brake system.
- When using a brake air releaser, follow the manufacturer's instructions.
- Do not use dirty or unspecified brake fluid or mix different brake fluids because it will damage the brake system.

Make sure to bleed air from the brake system.

● **Brake Lining/Disc Replacement**

Replace the brake linings as a set to secure the balance of the brake disc.

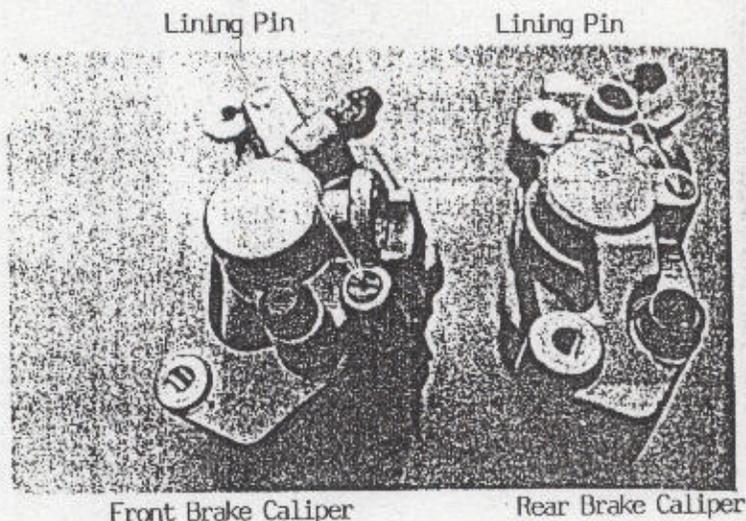
Remove the 2 bolts attaching the brake caliper.
Remove the brake caliper.

Remove the brake lining pin and the brake lining.

Install the brake lining in the reverse order of removal.
Tighten the lining pin bolt.
Torque: 1.5 - 2.0 kg-m

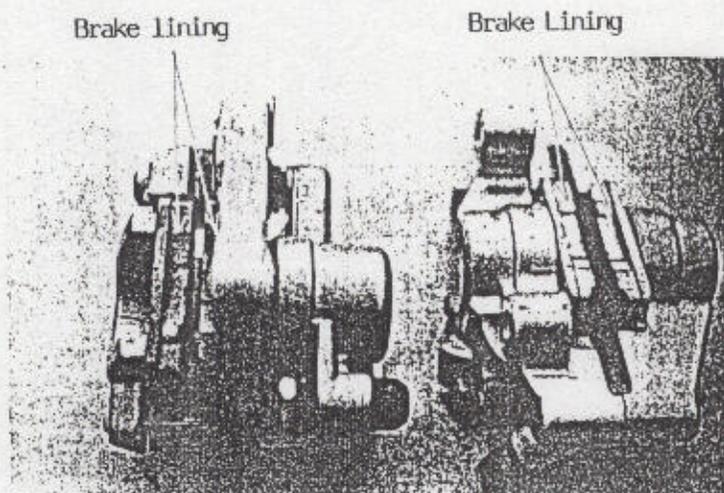
Keep grease or oil off the brake lining to avoid brake failure.

- **Brake Disc Thickness Measurement**
Measure the brake disc thickness.
Service Limit: 3.0mm
Measure the brake disc bending.
Service Limit: 0.3mm



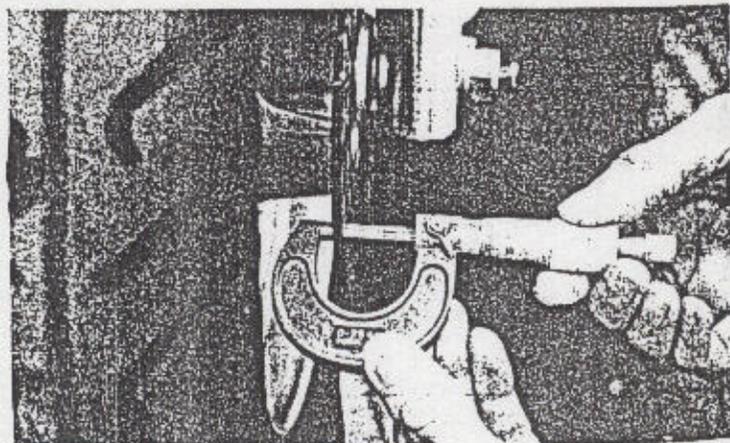
Front Brake Caliper

Rear Brake Caliper



Front Brake Caliper

Rear Brake Caliper



⊗ Brake Master Cylinder

● Removal

First drain the brake fluid from the hydraulic brake system.

- When servicing the brake system, place a cloth on the rubber, plastic parts and coating surface to avoid splash of the brake fluid.
- When removing the brake fluid tube, plug the tube end and cover it to avoid the leakage of brake fluid.

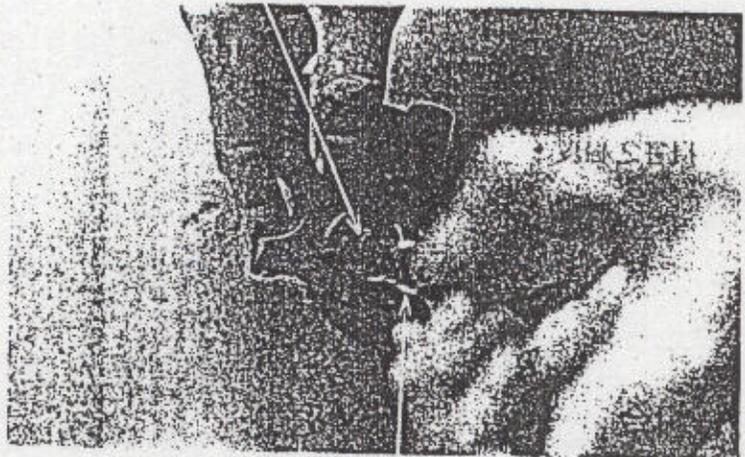
Master Cylinder Bolt



● Disassembly

Remove the piston rubber cover and snap ring.

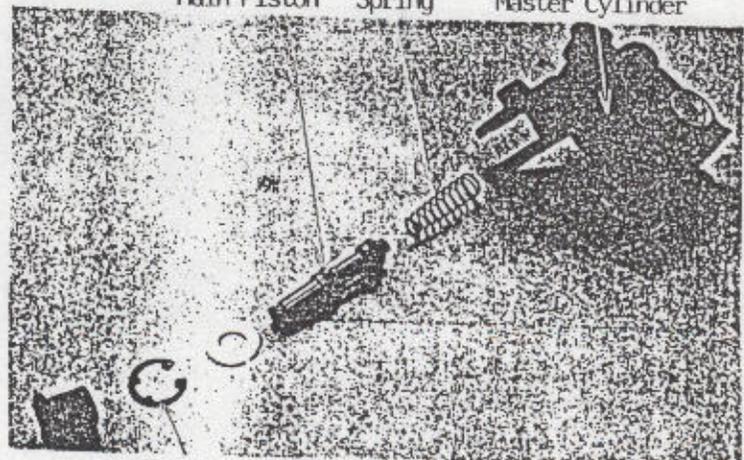
Snap Ring



Snap Ring Expander 07914-3230001

Remove the washer, main piston, and spring from the brake master cylinder. Clean the brake master cylinder and brake fluid tank with brake fluid.

Main Piston Spring Master Cylinder



Snap Ring Washer

● **Inspection**

Measure the brake master cylinder
I.D.

Inspect the master cylinder for
scratch or damage.

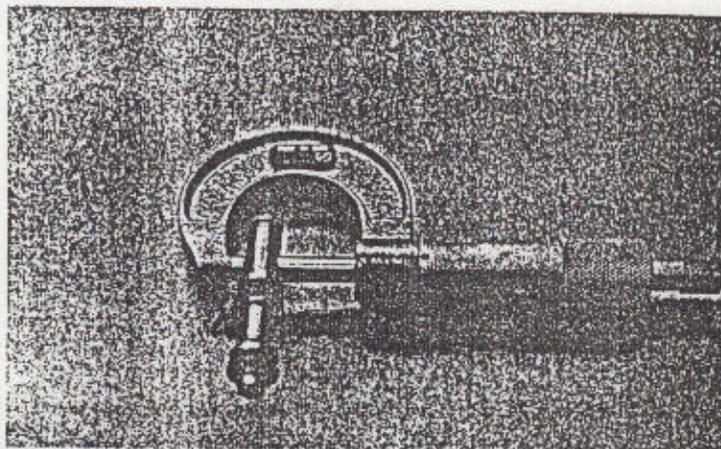
Service Limit: 12.75mm



Measure the brake master cylinder
piston O.D.

Service Limit: 12.6mm

Before assembly, check the 1st
and 2nd cups for wear.



● **Assembly**

Assemble the brake master cylinder.
Before assembly, apply brake fluid
to all removed parts. Install the
spring together with the 1st cup.



When assembling the brake master
cylinder, the main piston and
spring should be installed as a
set without confusion.

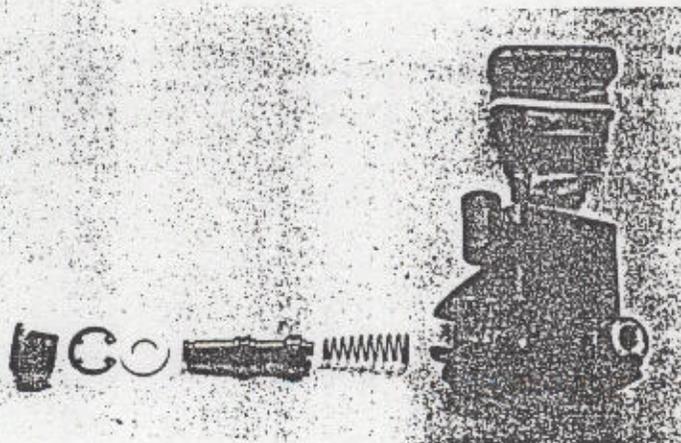
When assembling the piston, soak
the cups in the brake fluid for
a while.

When installing the cup, do not
make the cup lip inside turn
outside.

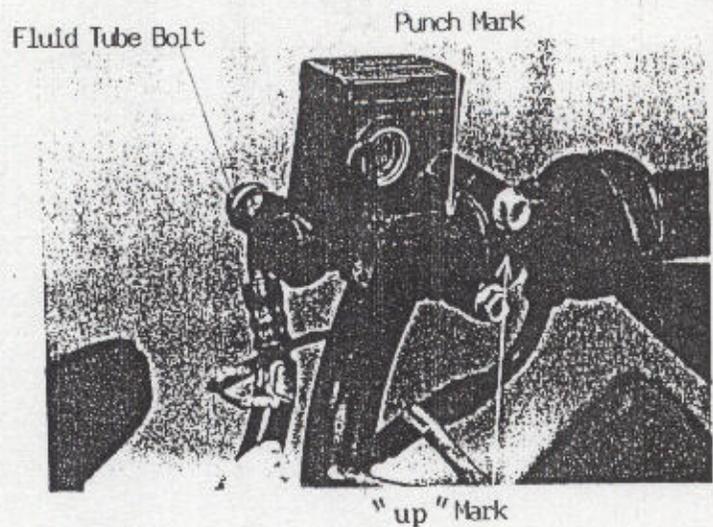
Install the main piston, spring
and snap ring.

Install the rubber cover.

Install the brake lever.



Place the brake master cylinder on the steering handlebar and then install the holder with the "up" mark facing up and align the punch mark with the holder join.
First tighten the upper bolt and then tighten the lower bolt.
Torque: 1.0 - 1.4 kg-m



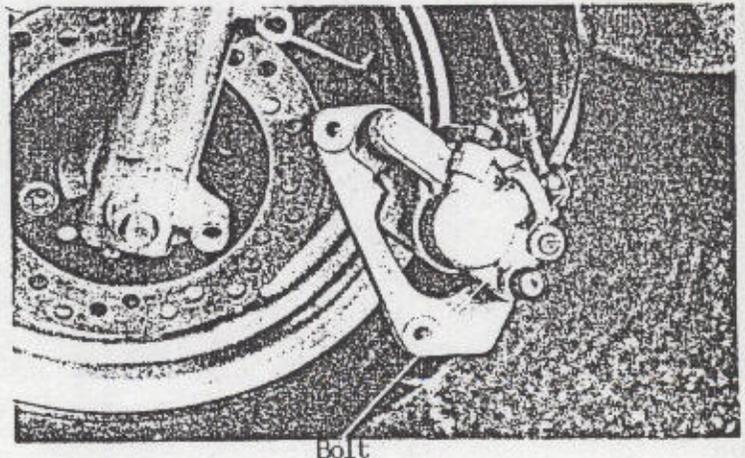
Install the fluid tube bolt with a bolt and two washers.
Install the handlebar covers. (P146)
Connect the front and rear stop switch connectors.
Fill the fluid tank with specified brake fluid to the upper limit and bleed air according to the method stated in P152.

● Brake Caliper (Front Brake Caliper)

Removal

Remove the brake caliper and lining spring. (P164)
Place a clean container under the brake caliper and disconnect the brake fluid tube from the brake caliper.

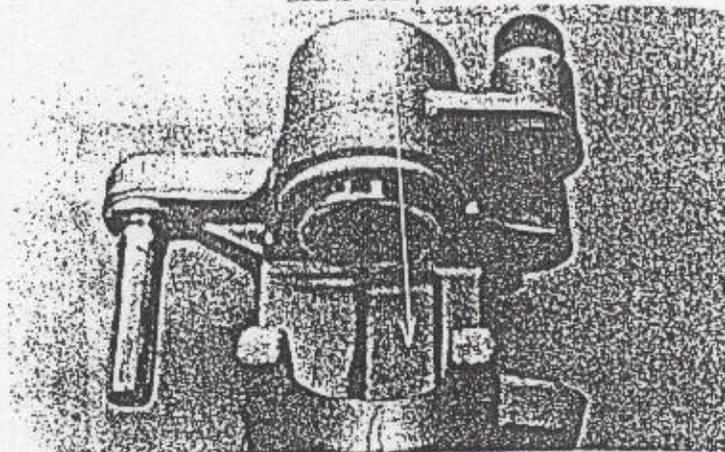
* Do not splash brake fluid on coating surfaces.



⊕ Disassembly

Remove the brake caliper seat from the brake caliper.

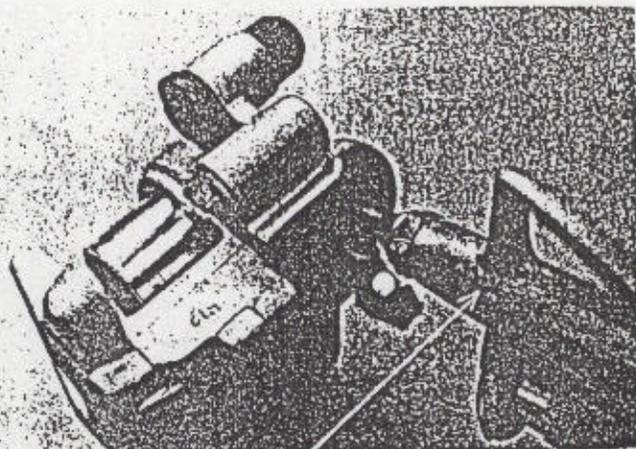
Brake Caliper Seat



Remove the piston from the brake caliper.

If necessary, use compressed air to squeeze out the piston through the brake fluid filler and place a rag under the caliper to avoid contamination caused by the removed piston.

Check the cylinder and piston for scratch or wear. Replace if necessary.

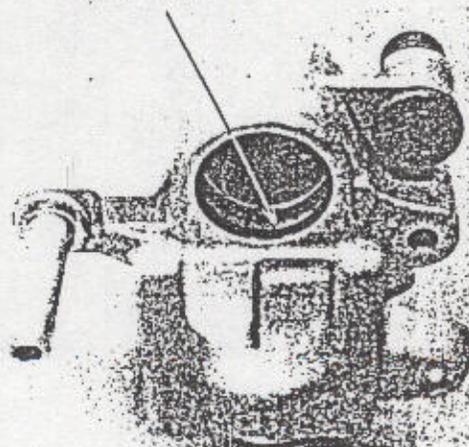


Compressed Air

Push the piston oil seal to out to remove it.

Clean the oil seal groove with brake fluid.

Piston Oil Seal

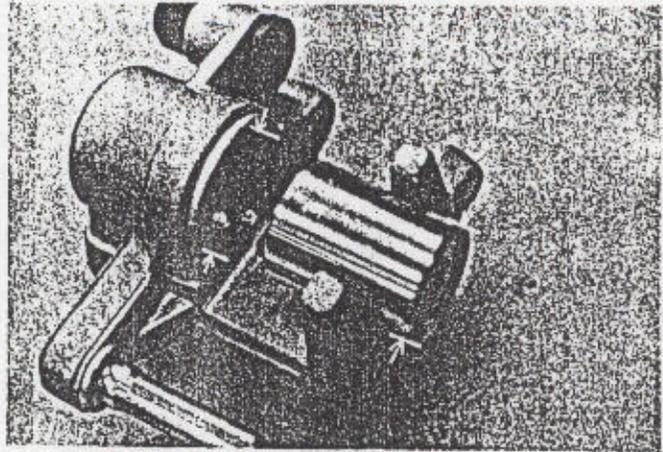


* Be careful not to damage the piston surface.

Check the piston for scratch or wear.

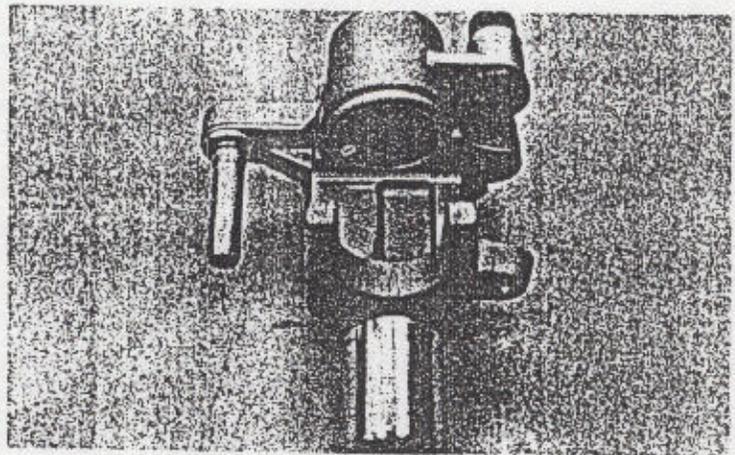
Measure the piston O.D. with a feeler gauge.

Service Limit: 26.90mm



Check the caliper cylinder for scratch or wear and then measure the cylinder I.D.

Service Limit: 26.45mm



● **Assembly**

Clean all removed parts.

Apply silicon grease to the piston and oil seal. Lubricate the brake caliper cylinder inside wall with brake fluid.

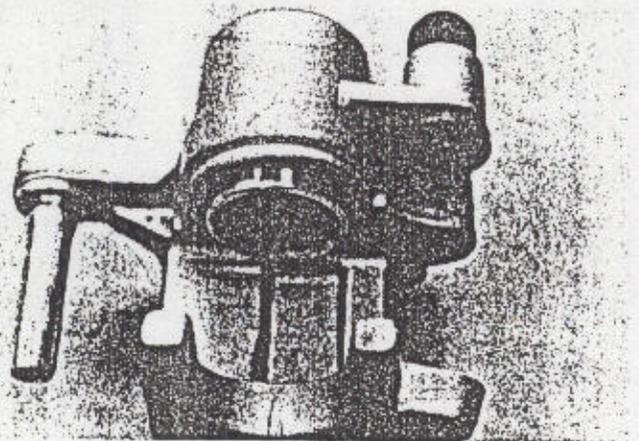
Install the brake caliper with the grooved side facing outside.

*

When installing the piston, its outside should protrude 3-5mm off the brake caliper.

Wipe off excessive brake fluid with a clean cloth. Apply silicon grease to the brake caliper seat pin and caliper inside.

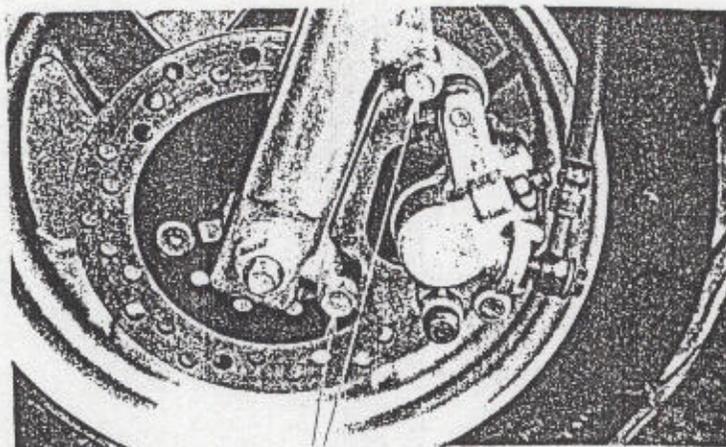
Install the brake caliper seat.



● Installation

Install the caliper and tighten the bolt.

Torque: 2.9 - 3.5 kg-m

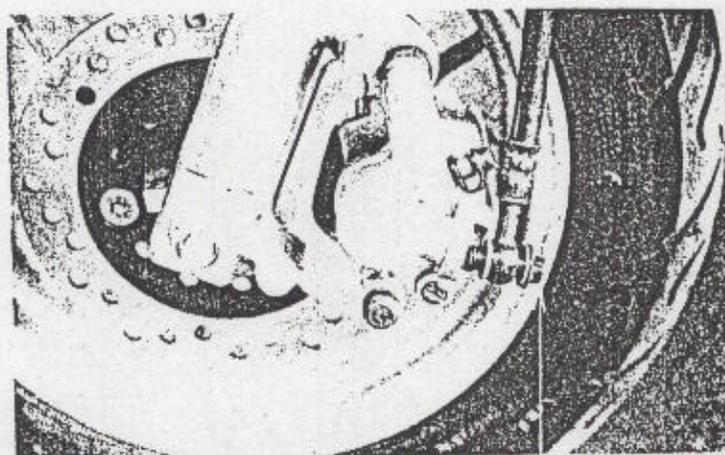


Bolt

Connect the brake fluid tube to the brake caliper and tighten the bolt.

Torque: 2.5 - 3.5 kg-m

Fill the brake fluid tank with brake fluid and then bleed air from the brake system. (P152)

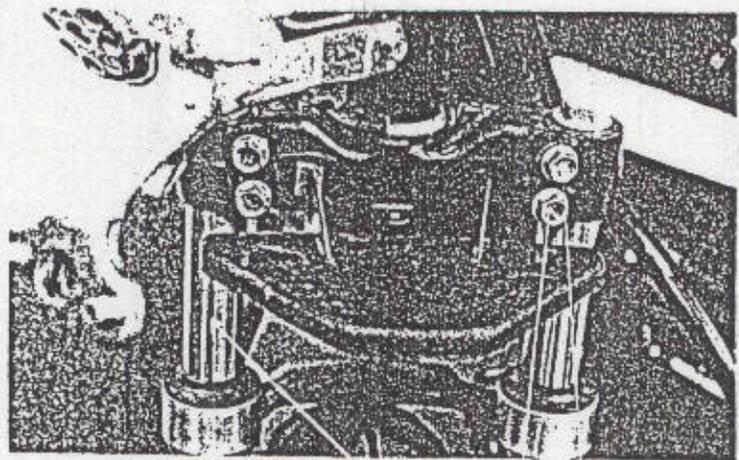


Bolt

●FRONT SHOCK ABSORBER

Removal

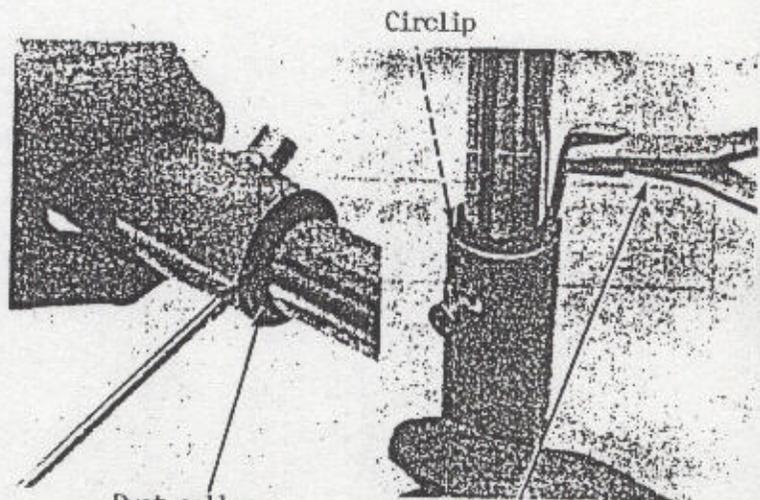
- Remove the front wheel.
(P156)
- Remove the upper lock bolts.
- Loosen the lower lock bolts to
remove the front shock absorber.



Front Shock Absorber Lock Bolt

●Left Front Shock Absorber
Disassembly

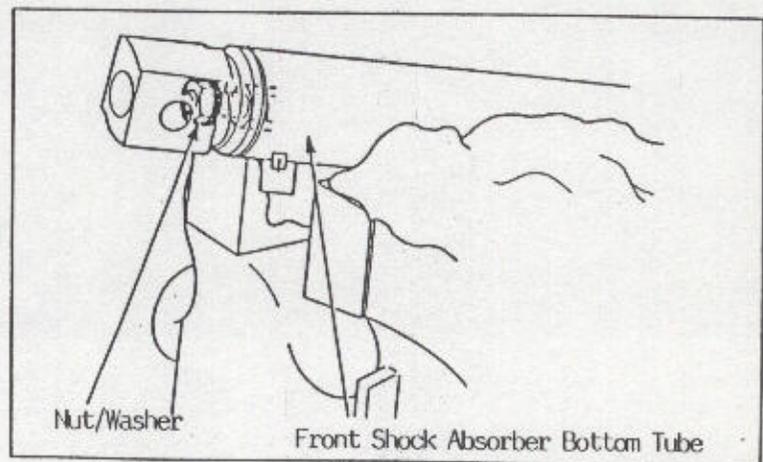
- Remove the dust collar.
- Remove the circlip.



Dust collar

Special Expander
07946-323001

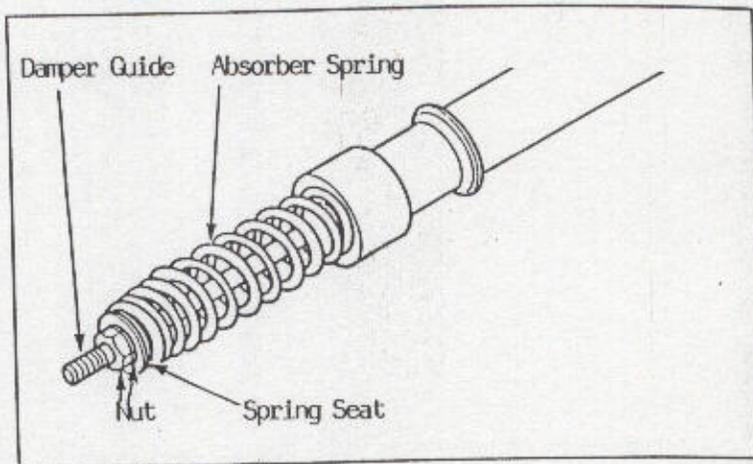
Use a vise to fix the front
shock absorber bottom tube and
remove the damper guide, hexagon
nut and copper washer.



Nut/Washer

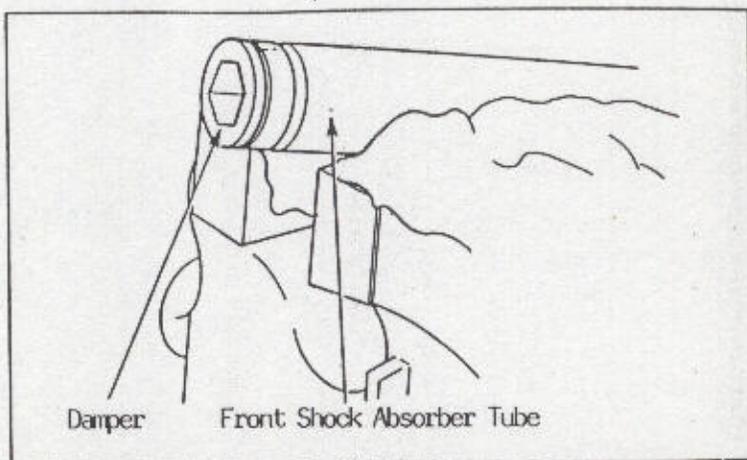
Front Shock Absorber Bottom Tube

Remove the front shock absorber tube, damping spring and spring seat from the front shock absorber bottom tube.



Use a vise to fix the front shock absorber tube and remove the damper from the absorber tube.

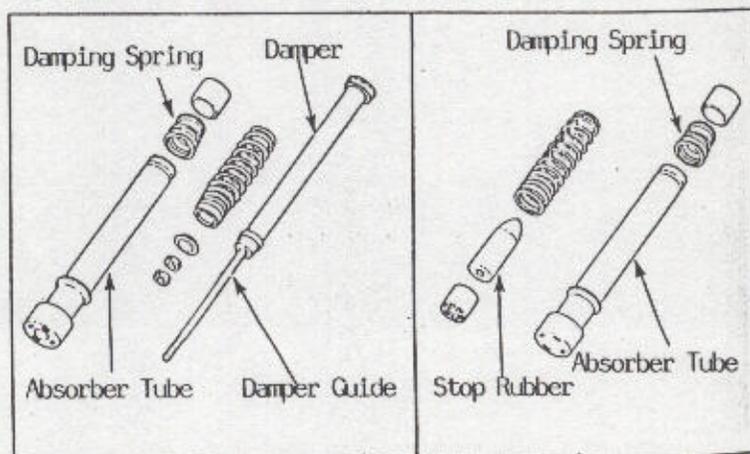
When fixing the absorber tube, put cloth under it and do not apply too much force.



● Inspection

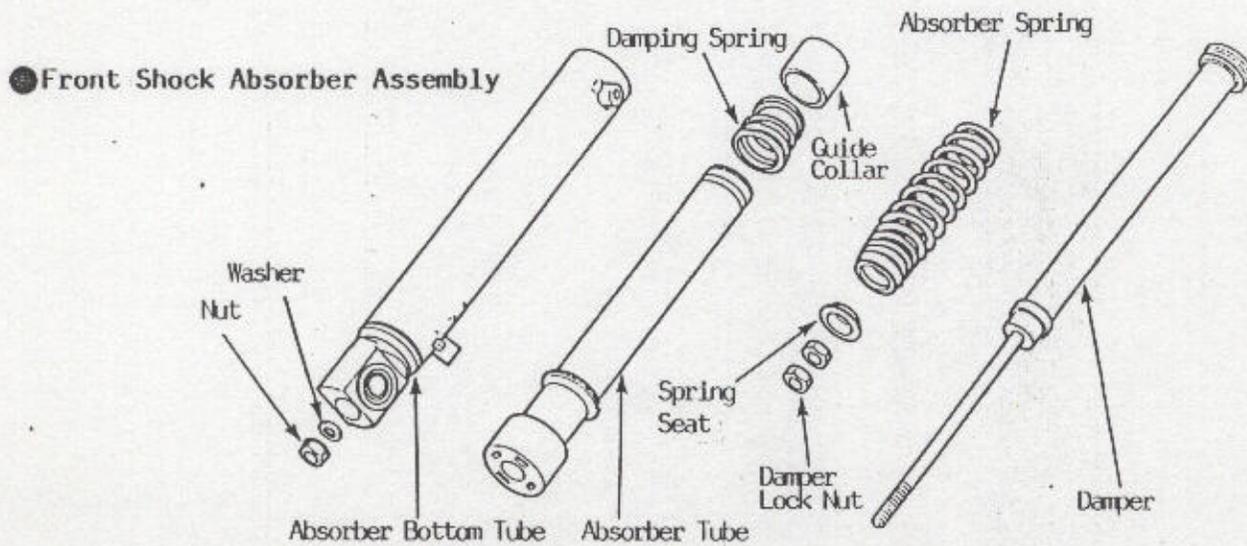
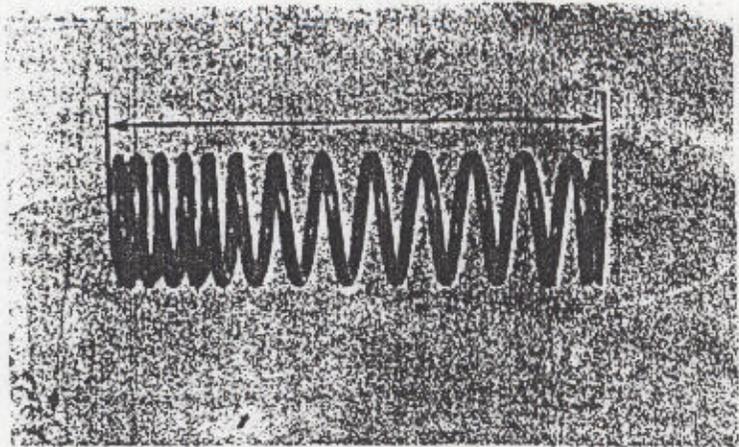
Inspect the following items and replace with new parts if necessary.

- Front shock absorber tube bending or damage
- Weak damping spring
- Damper and damper guide bending, damage or oil leaks
- Weak stop rubber



Measure the front shock absorber
spring free length.

Service Limit: Right: 193.2mm
Left : 193.2mm

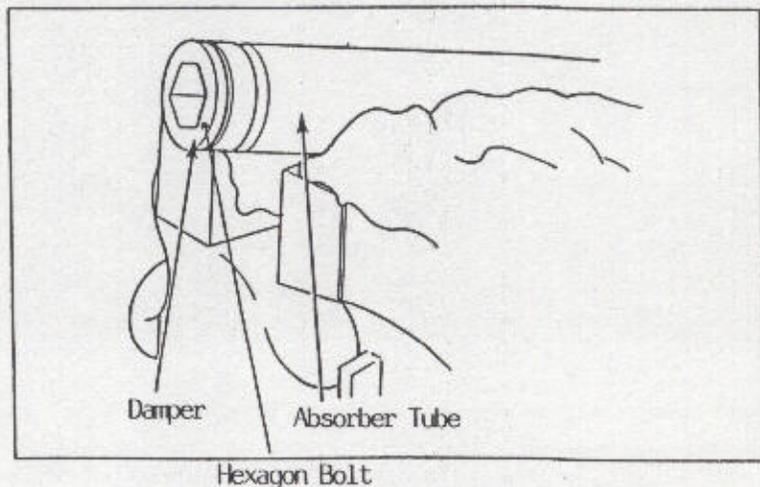


Install the damping spring to
the damper guide and then install
them into the front shock absorber
tube. Install the absorber spring
and tighten the nut.

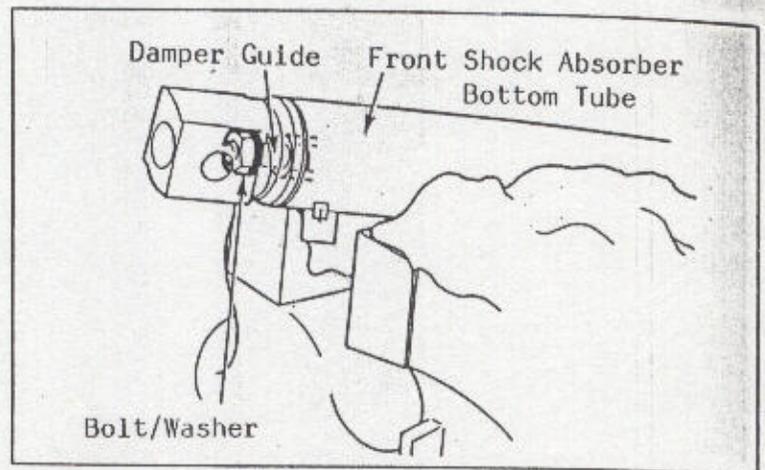
*
Install the absorber spring with
its cone-shaped end facing up.

Install the spring seat to the
damper guide and then install them
into the front shock absorber
bottom tube.

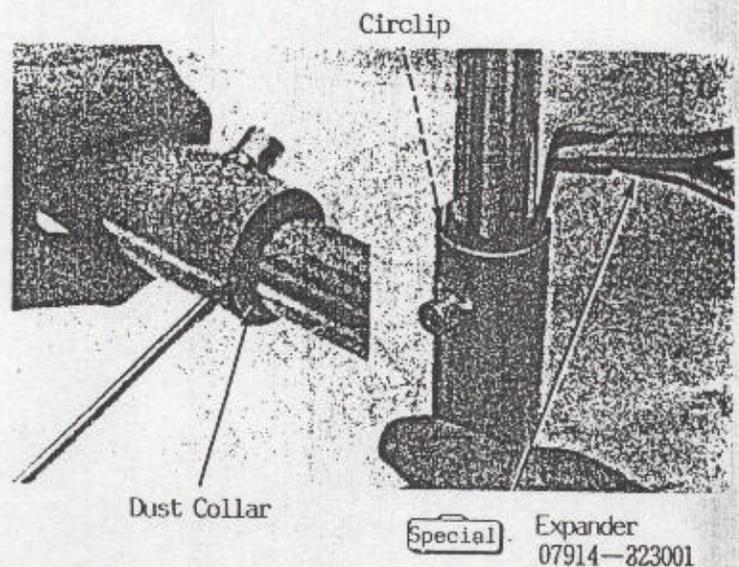
Push down the front shock absorber
to compress the absorber spring
and then install the hexagon bolt
to the bottom tube.



Use a vise to fix the absorber bottom tube.
Tighten the hexagon bolt.
(Apply thread locking agent to the washer and hexagon bolt and install them together.)
Torque: 1.5 - 3.0 kg-m
Specified Engine Oil: ss #8
Engine Oil Capacity: 41.5±0.5cc



Install the circlip.
Install the dust collar.



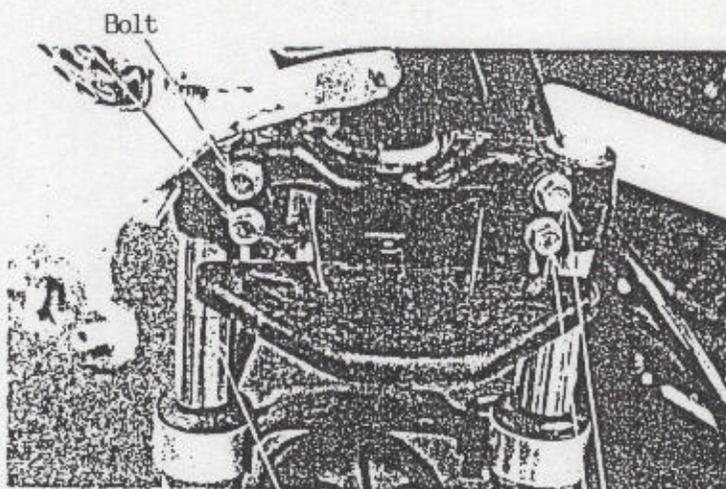
●Installation

Install the front shock absorber onto the steering stem. First install the upper lock bolts and then the lower lock bolts.



The bolt hole should align with the groove on the front shock absorber.

Install the front wheel. (P159)



Front Shock Absorber

Lock Bolt

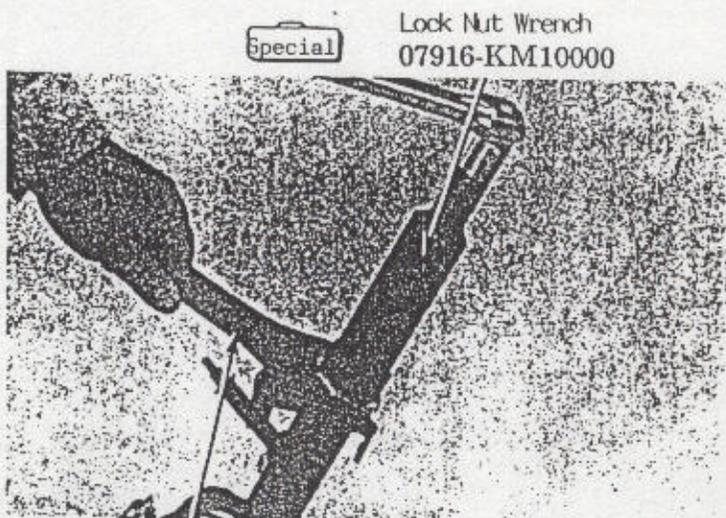
●FRONT FORK

●Front Fork Removal

Remove the steering handlebar. (P154)

Remove the front wheel. (P156)
Disconnect the speedometer cable, and remove the front and rear brake fluid tubes and the front brake caliper.

Fix the steering stem top nut and remove the steering stem lock nut.



Special Lock Nut Wrench
07916-KM10000

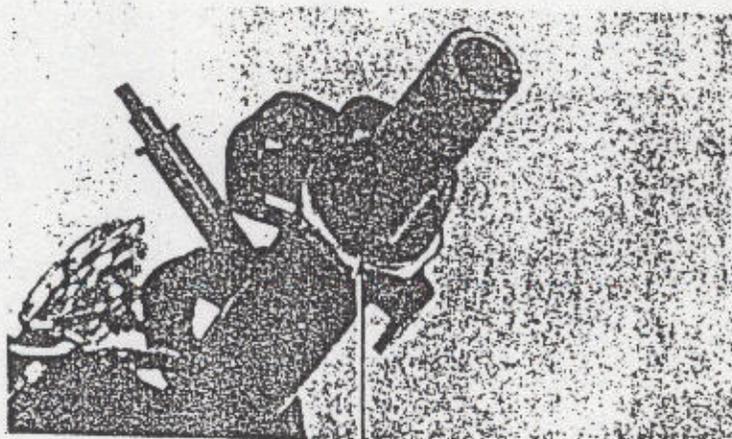
Special Lock Socket Wrench
07916-1870100

Remove the steering stem top ball race and the steering stem.



Do not lose the steel balls. (26 in top race and 26 in bottom race).

Inspect the ball races and cone races for wear or damage. Replace if necessary.

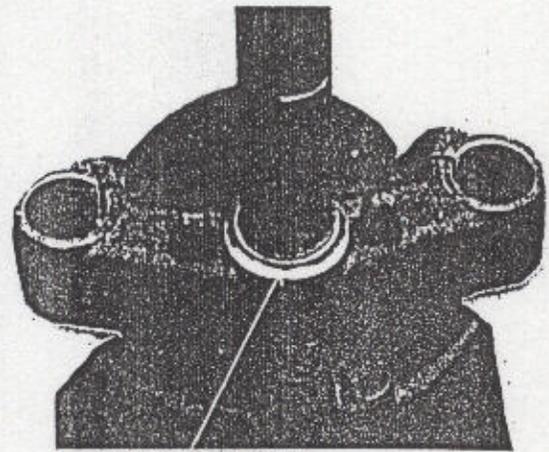


Top Ball Race

- Bottom Ball Race Replacement
Remove the bottom ball race with
a driver.

*
Be careful not to damage the
steering stem and front fork.

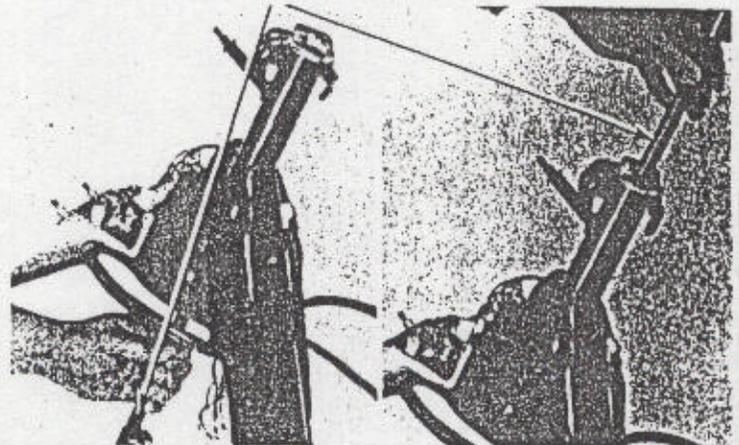
Drive in a new bottom ball race
with a proper driver.



Bottom Ball Race

Special 07946-GA70000
Ball Race Driver

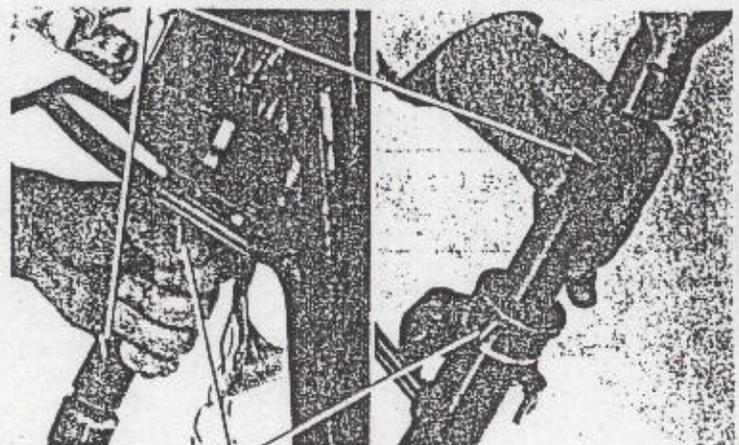
- Ball Race Replacement
Drive out the ball race.



Drive in the ball race.

*
Drive in the ball race
completely.

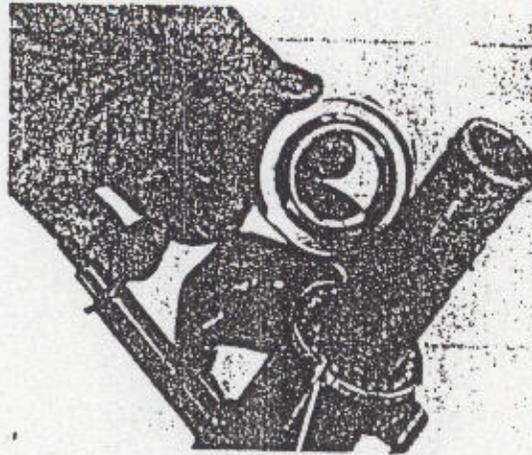
Driver Handle A 07749-0010000



Common Outer Driver 37 x 40mm, 07746-0010200

●Installation

Lubricate the ball races with grease and install the steel balls (26 in top race and 26 in bottom race). Apply grease to the races and then install the steering stem.



Steel Ball

Apply grease to the top ball race and install it. Screw in the steering stem top nut and turn the stem right and left several times to make balls contact each other closely.

Check that the steering stem rotates freely without vertical play.



Top Ball Race

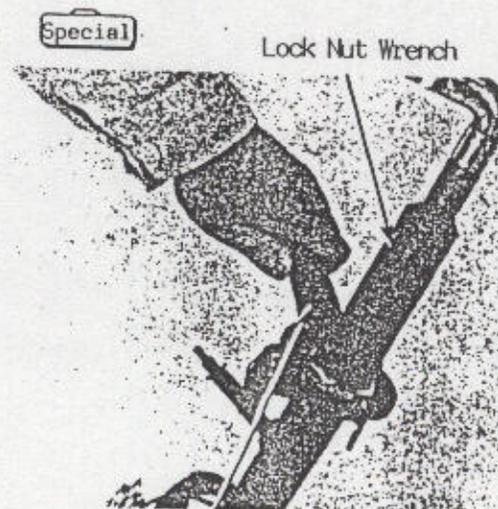
Fix the steering stem top nut and tighten the steering stem lock nut to the specified torque.

Torque: 8.0 - 12.0 kg-m

Install the front wheel. (P159)

Install the handlebar. (P155)

Install the cables. (P156)



Special

Lock Nut Wrench

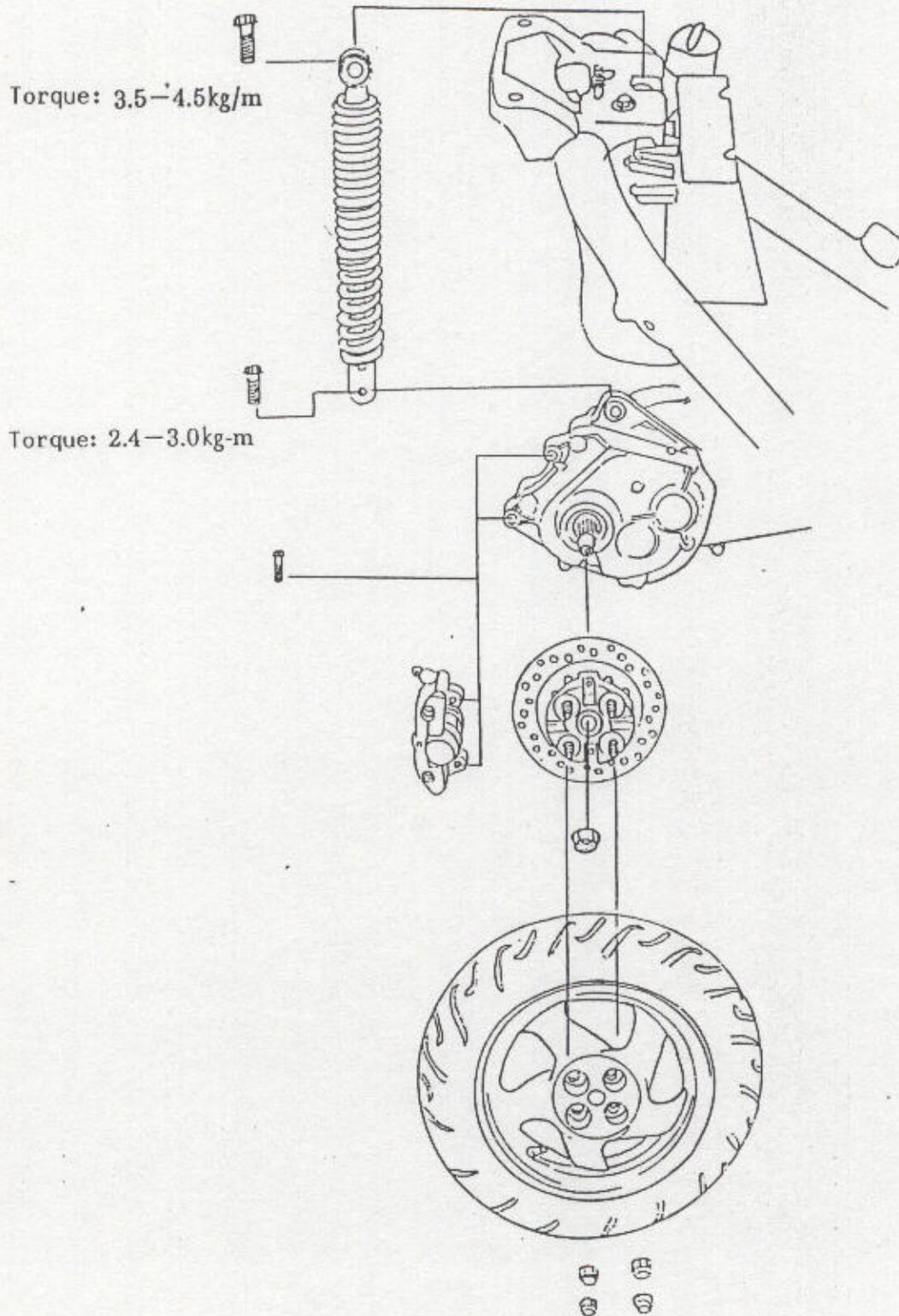
07916-KM10000

Special

Lock Socket Wrench
07916-1870100

REAR WHEEL/REAR BRAKE/REAR SHOCK ABSORBER

● TROUBLESHOOTING..... 14-3
● SERVICE INFORMATION..... 14-3
● REAR WHEEL..... 14-4
● REAR BRAKE..... 14-5
● REAR SHOCK ABSORBER..... 14-8



● TROUBLESHOOTING

● Rear wheel wobbling

- Distorted rim
- Faulty tire
- Axle not tightened properly

● Soft rear shock absorber

- Weak spring

● Poor brake performance

- Brake incorrectly adjusted
- Contaminated brake lining surface
- Worn brake lining
- Worn brake cam

- Worn brake camshaft

- Poorly connected brake arm wear indicator plate

● Poor brake performance (Disc Brake)

- Air in brake system
- Deteriorated brake fluid
- Contaminated brake pad and brake disc
- Worn brake liner
- Worn brake master cylinder piston oil seal
- Clogged brake fluid line
- Deformed brake disc
- Worn one-side caliper

● SERVICE INFORMATION

Item	Standard (mm)	Service Limit (mm)
Rear wheel rim runout		2.0
Rear brake drum I.D.	110	111
Rear brake lining thickness	4.0/4.0	2.0/2.0
Rear shock absorber spring free length	232	225
Brake disc thickness	3.5~3.8	3.0
Brake disc off-center	—	0.30
Brake master cylinder I.D.	12.700~12.743	12.75
Brake master cylinder piston O.D.	12.657~12.684	12.64
Brake caliper piston O.D.	25.400~25.405	25.45
Brake caliper piston I.D.	25.318~25.368	25.30

● TORQUE VALUES

- Rear Axle Nut 8.0-10.0 kg-m
- Rear Shock Absorber Top Lock Bolt 3.0-4.5 kg-m
- Rear Shock Absorber Bottom Lock Bolt 2.0-3.0 kg-m
- Rear Shock Absorber Damper Lock Nut 1.5-2.5 kg-m
(Apply thread locking agent)
- 1.0-1.4 kg-m

● TOOLS

SPECIAL TOOL

- Rear Shock Absorber Remover 07967-GA70200

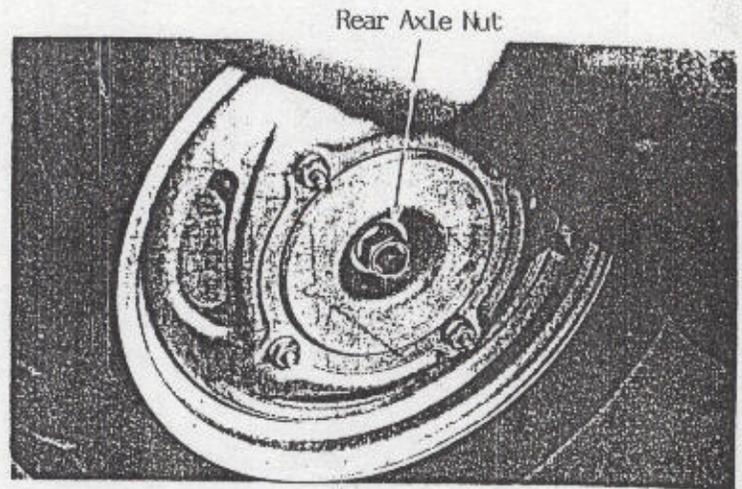
COMMON TOOL

- Absorber Spring Compressor 07959-3290001

●REAR WHEEL

●Removal

Remove the rear axle nut and then remove the rear wheel.



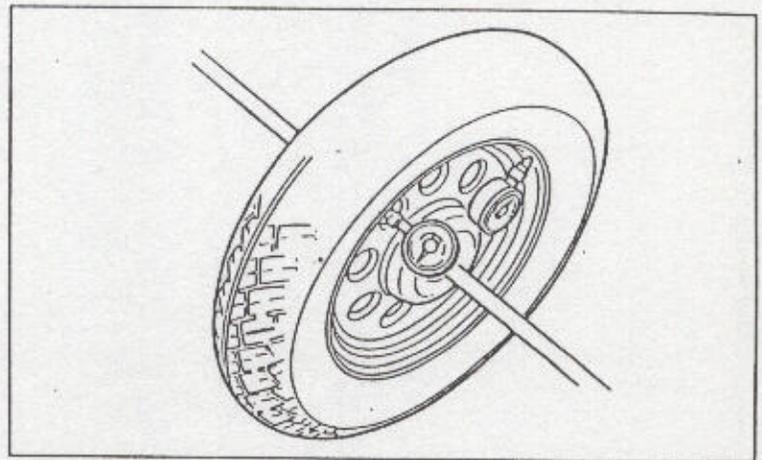
●Inspection

Check the rear wheel rim runout.

Service Limit:

Radial: 2.0mm replace if over

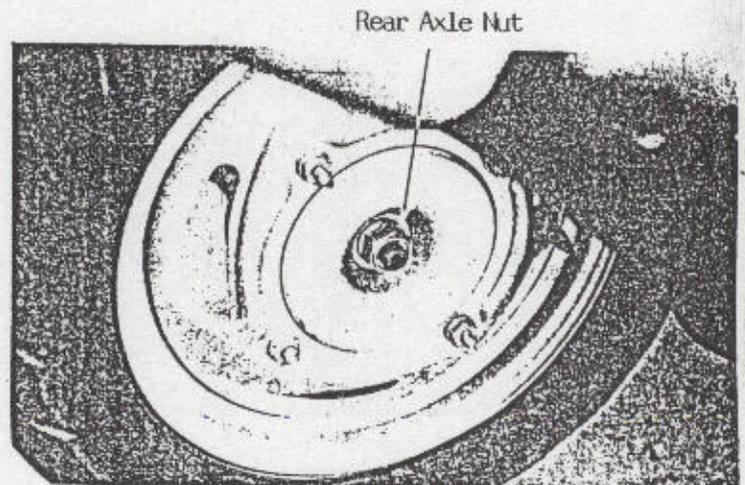
Axial : 2.0mm replace if over



●Installation

Install the rear wheel and apply SAE 30# engine oil to the thread of the rear axle. Then, tighten the rear axle nut.

Torque: 11.0 - 13.0 kg-m



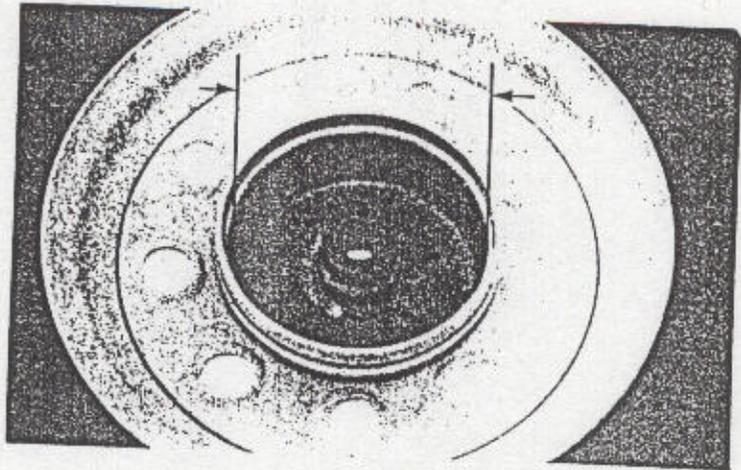
● REAR BRAKE

Remove the rear wheel. (P182)

Check the rear brake drum.

Measure the rear brake drum I.D.

Service Limit: 95.5mm replace if over



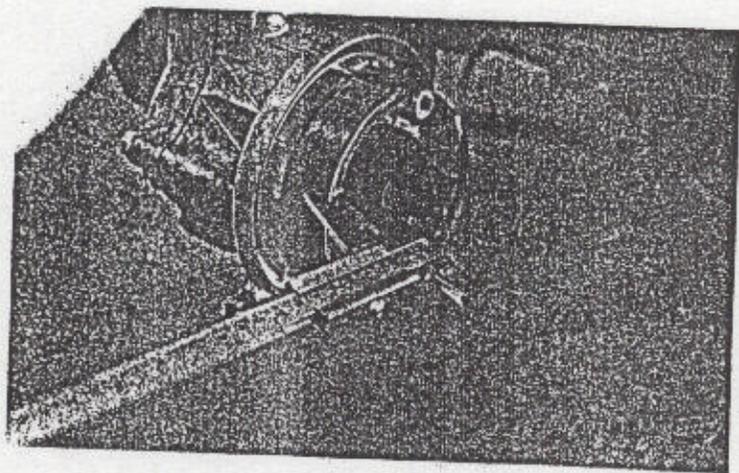
● Rear Brake Lining Inspection

Measure the brake lining thickness.

Service Limit: 2.0mm replace if over

*

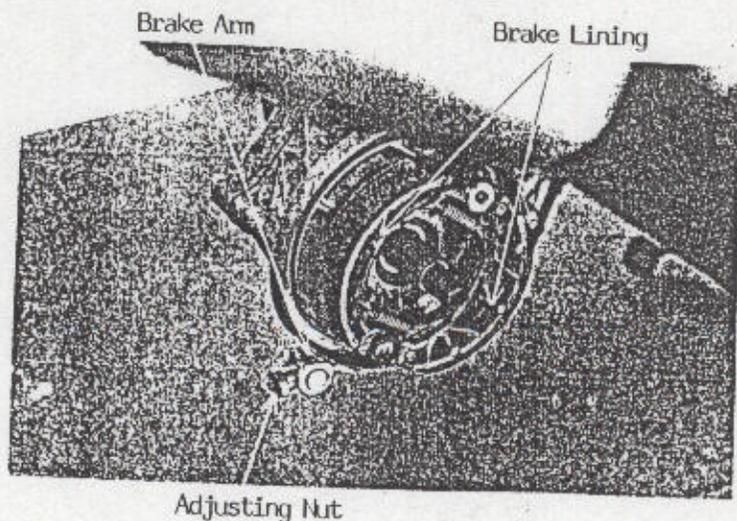
Be careful to keep oil or grease off brake linings.



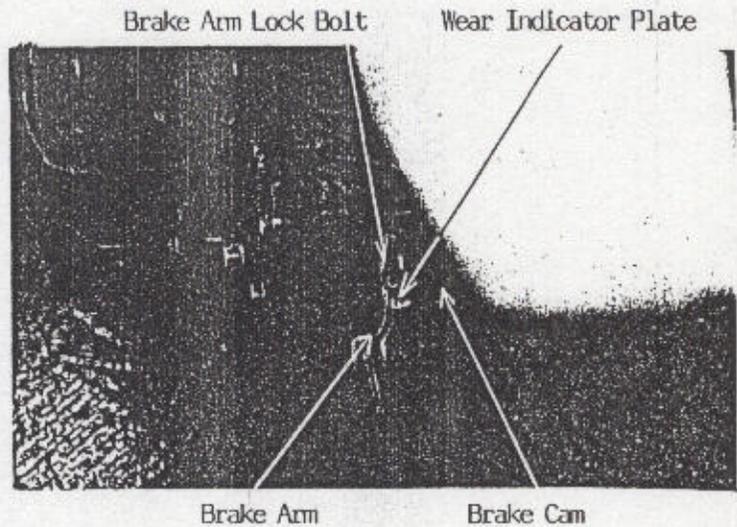
● Rear Brake Disassembly

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

Remove the rear brake linings.

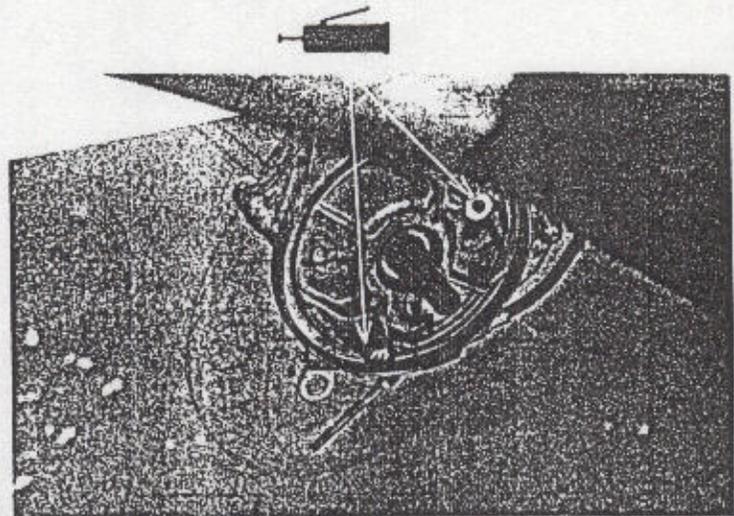


Remove the brake arm lock bolt and remove the brake arm, wear indicator plate and felt seal. Remove the brake camshaft.



● Rear Brake Assembly

Apply grease to the lock pin and lining movable parts. Apply grease to the brake camshaft movable parts and then install it. Install the brake linings.



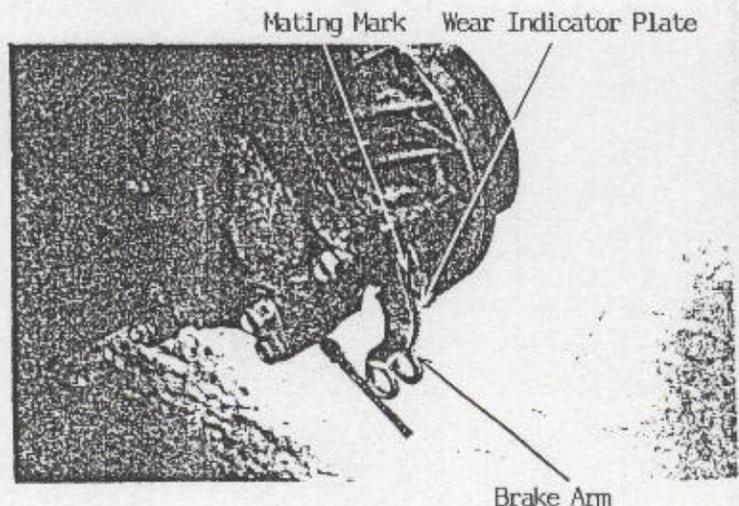
Add a small quantity of engine oil into the felt seal and install it on the brake camshaft. Install the wear indicator plate on the brake arm.

* Align the wide tooth on the indicator plate with the wide groove on the camshaft.

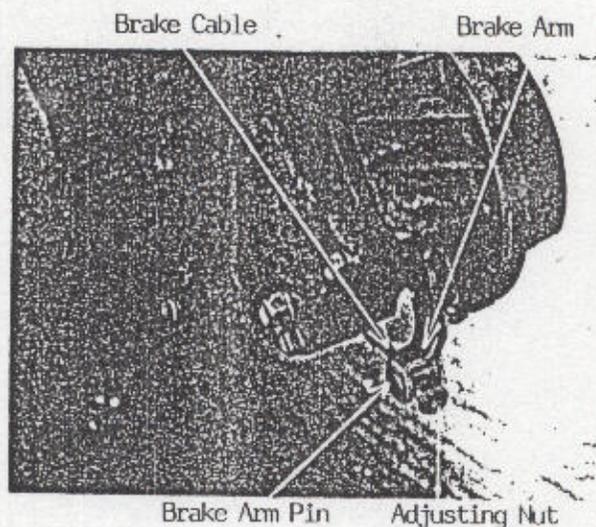
Install the brake arm and brake camshaft.

* Align the mark on the brake arm with the punch mark on the brake camshaft.

Install and tighten the brake arm lock bolt. Install the brake arm return spring.

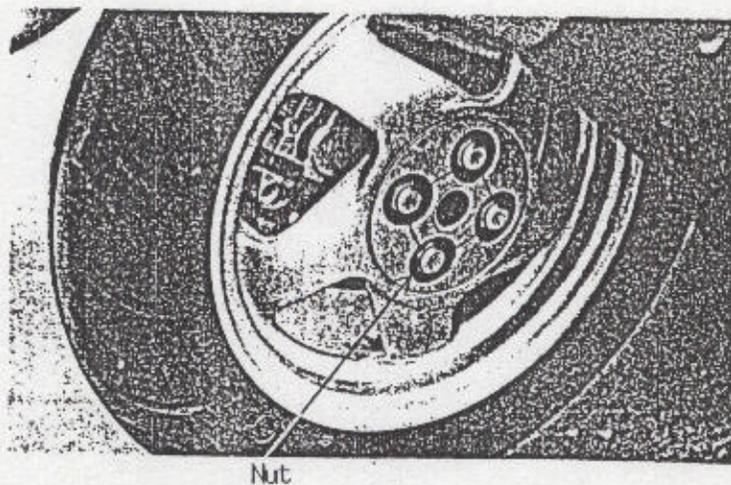


Install the brake arm pin.
 Install the brake cable adjusting nut.
 Install the rear wheel. (P182)
 Adjust the brake lever free play. (P43)



Disc Brake

Remove the 4 rear wheel lock nuts.

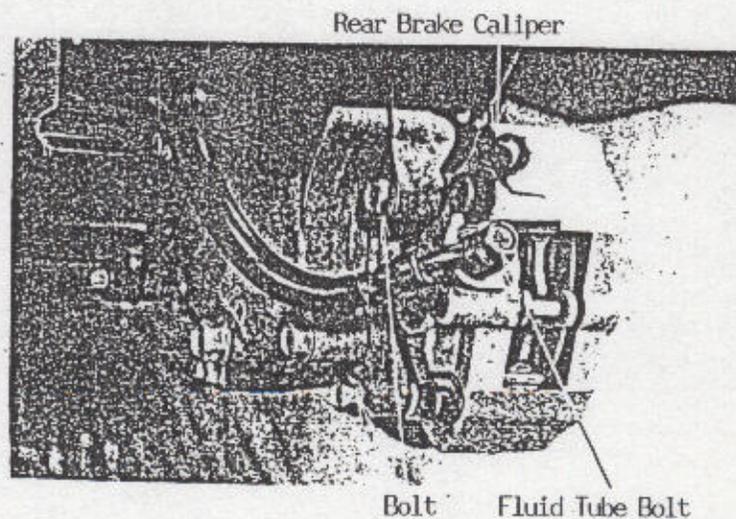


Rear Brake Caliper Removal

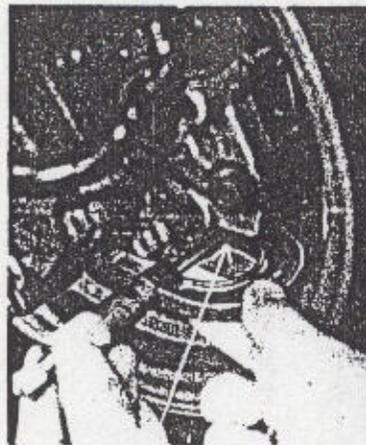
Remove the rear brake caliper fluid tube bolt.

Remove the 2 bolts attaching the rear brake caliper.

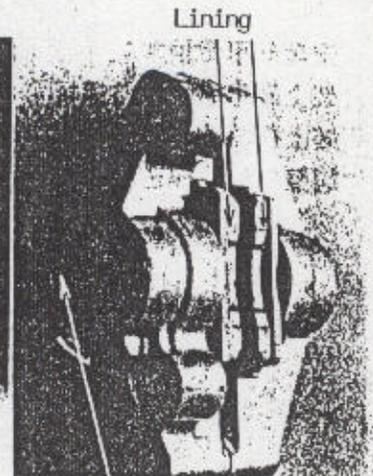
* When removing the fluid tube, use towels to cover and protect coating surface.



- **Brake Lining/Disc Replacement**
Replace the brake lining. (P164)
Measure the brake disc thickness.
(P164)



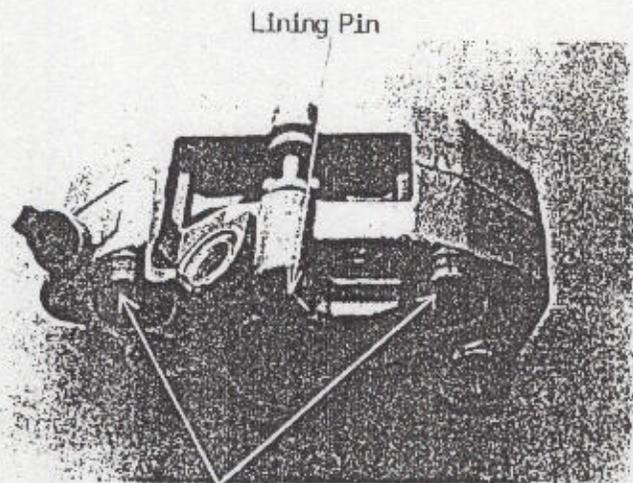
Brake Disc



Lining Pin

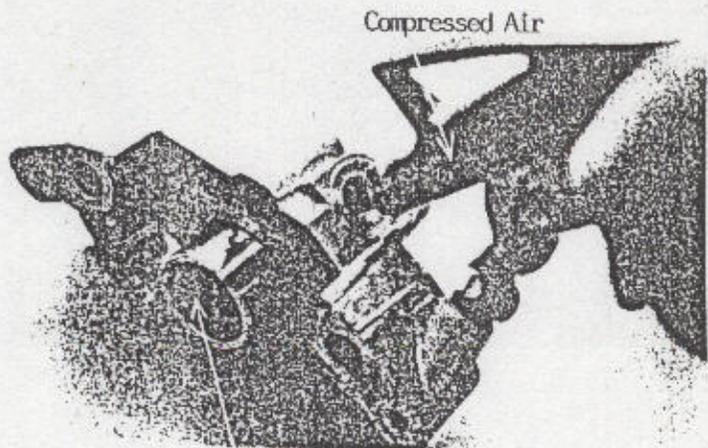
- **Rear Brake Caliper**

- **Disassembly**
Remove the 2 joint bolts.
Separate the brake caliper.



Joint Bolt

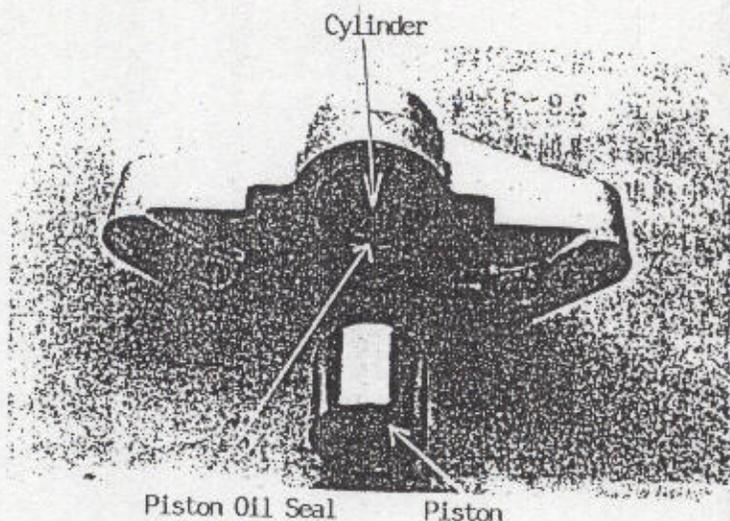
Remove the brake piston.
(P168)



Piston

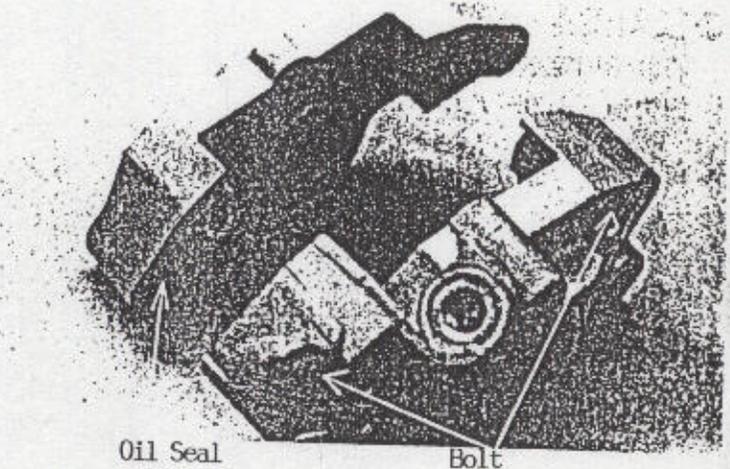
● Inspection

- Check the piston for scratch or wear. (P169)
- Check the brake cylinder for scratch or wear. (P169)
- Check the piston oil seal for wear or damage.



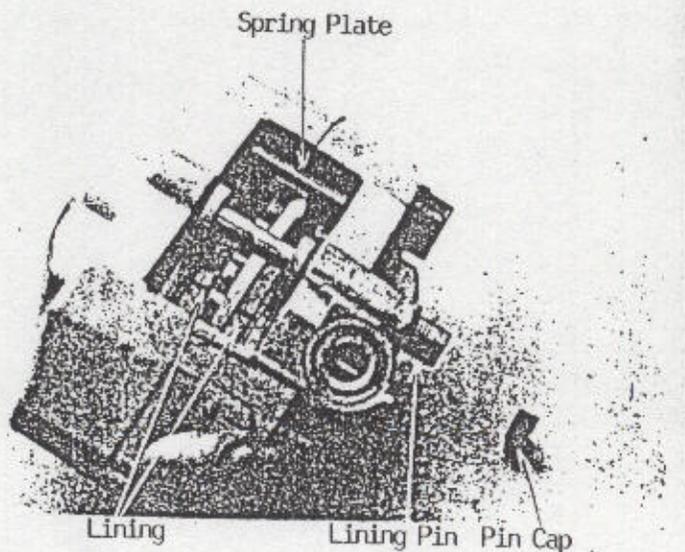
● Assembly

- Assemble the caliper. (P169)
- When assembling, check the oil seals on the mating surfaces for deformation, wear or damage. Replace if necessary.
- Torque: 2.9 – 3.5 kg-m



● Brake lining Installation

- First install the linings and spring plate.
- Insert the lining pin and then install and tighten the pin cap.



● **Rear Brake Caliper Installation**

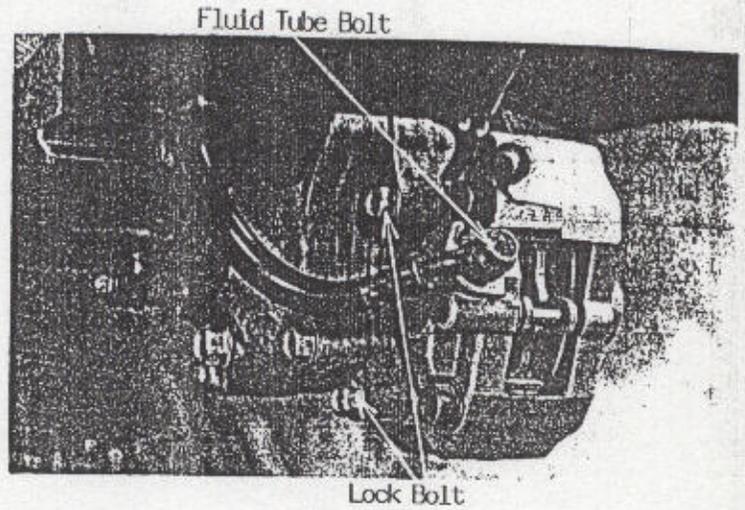
Install the rear brake caliper on the crankcase.

Torque: 2.9 – 3.5 kg-m

Install the brake fluid tube.

Add brake fluid into the master cylinder fluid tank.

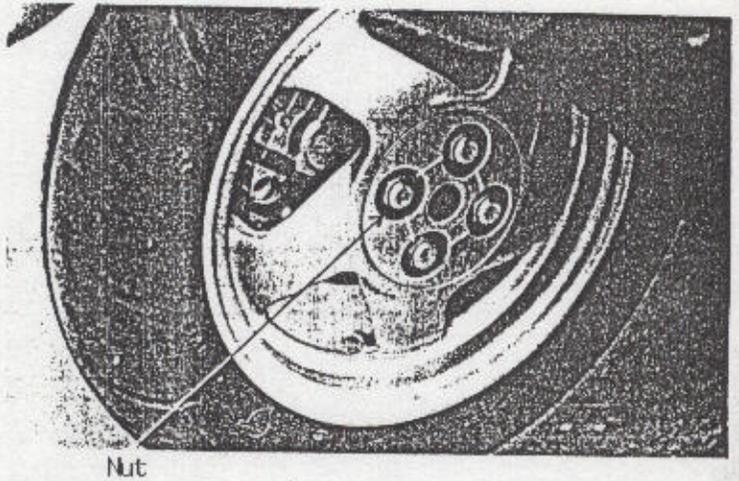
Bleed air from the brake fluid line.



● **Rear Wheel Installation**

Tighten the rear wheel lock nuts.

Torque: 6.0 – 7.0 kg-m



●REAR SHOCK ABSORBER

●Removal

Remove the frame side strips.

(P147)

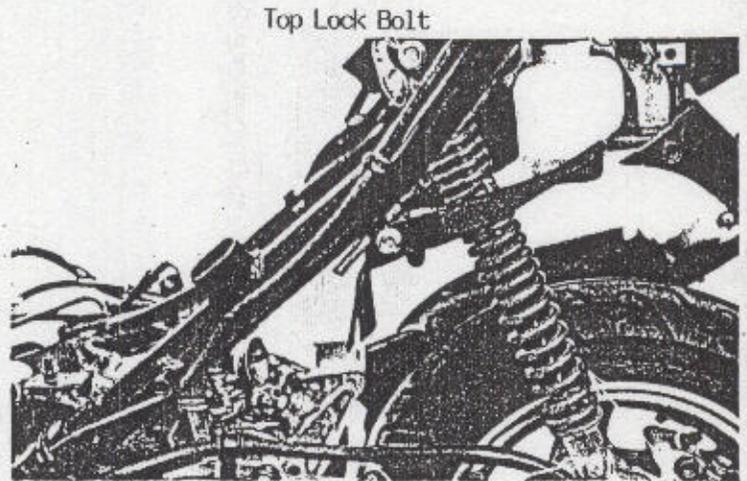
Remove the frame covers.

(P147 - 148)

Remove the air cleaner.

(P132)

Remove the rear shock absorber top and bottom lock bolts and then remove the rear shock absorber.



Bottom Lock Bolt Rear Shock Absorber

●Disassembly

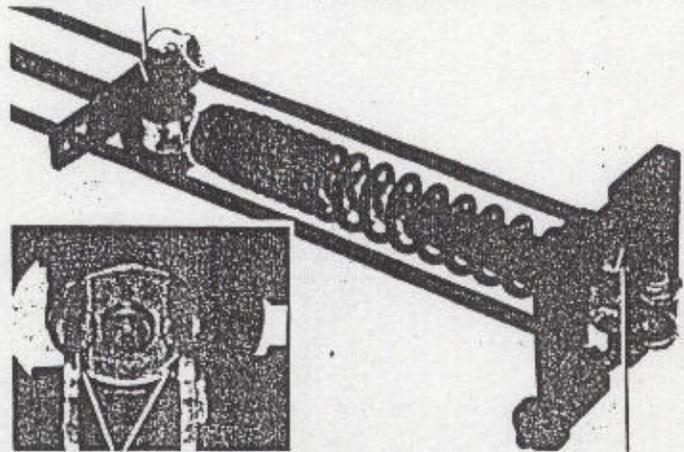
Install the rear shock absorber remover as the figure shown.

*

Install the shock absorber bottom joint on the rear shock absorber remover.

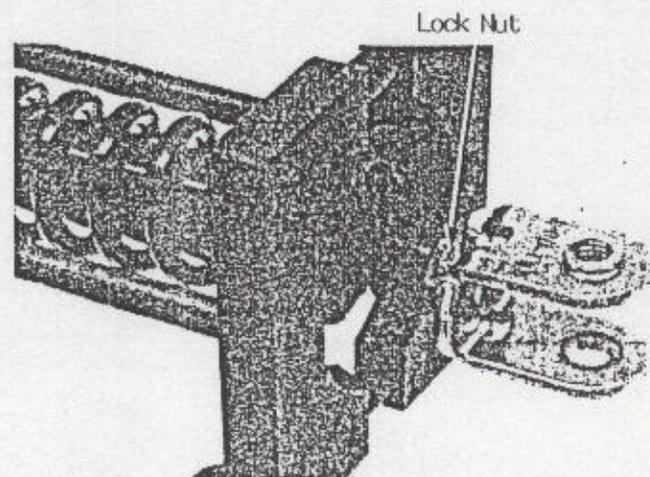
Then, compress the absorber.

Common Absorber Spring Compressor 07956-329001



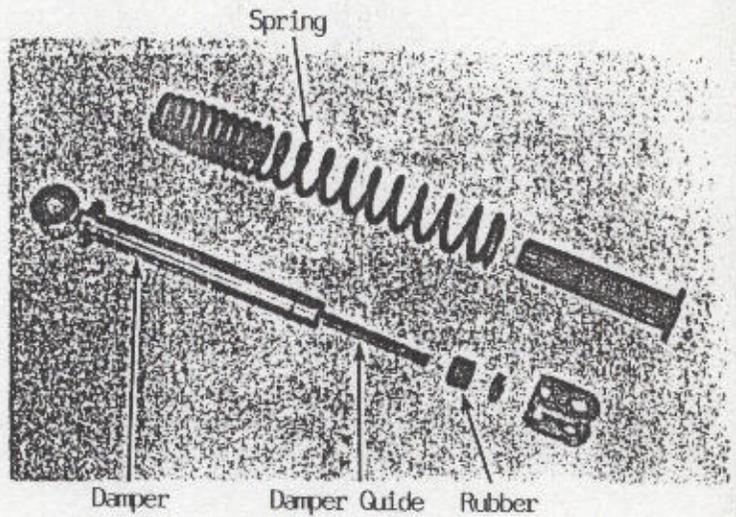
Special Rear Shock Absorber Remover 07967-GA70200

Loosen the bottom joint lock nut.
Remove the bottom joint.
Remove the lock nut, rubber and damper.

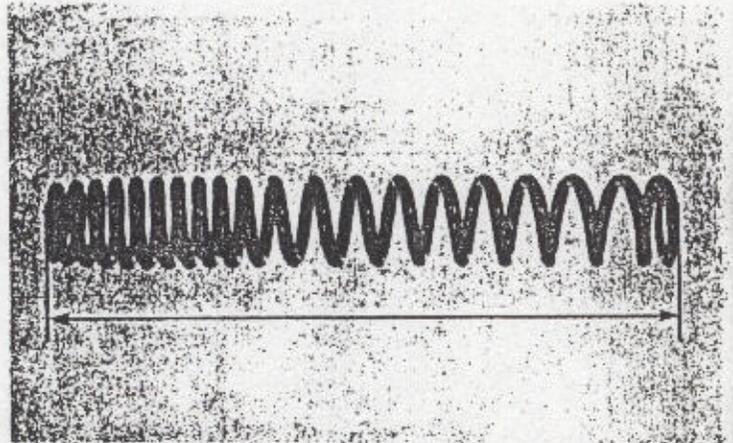


● Inspection

Inspect the damper guide for bending or damage.
 Inspect the damper for oil leaks.
 Inspect the damper rubber for deterioration, or damage.



Measure the rear shock absorber spring free length.
Service Limit: 232mm replace if below

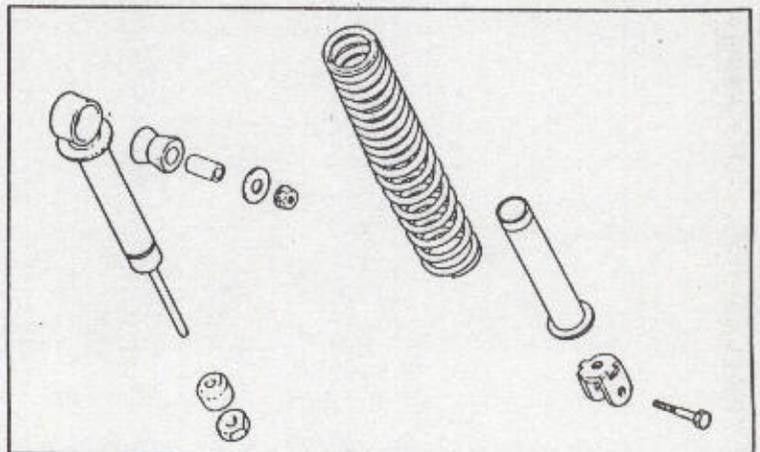


● Assembly

Assemble the rear shock absorber in the reverse order of disassembly.

- * Install the spring with tightly wound coils facing up.
- Apply locking agent to the lock nut thread and then install the lock nut.

Tighten the lock nut.
Torque: 3.5 – 4.5 kg-m



● Installation

Install the rear shock absorber.
First install the top lock bolt
and then the bottom lock bolt.
Tighten the top and bottom lock
bolts.

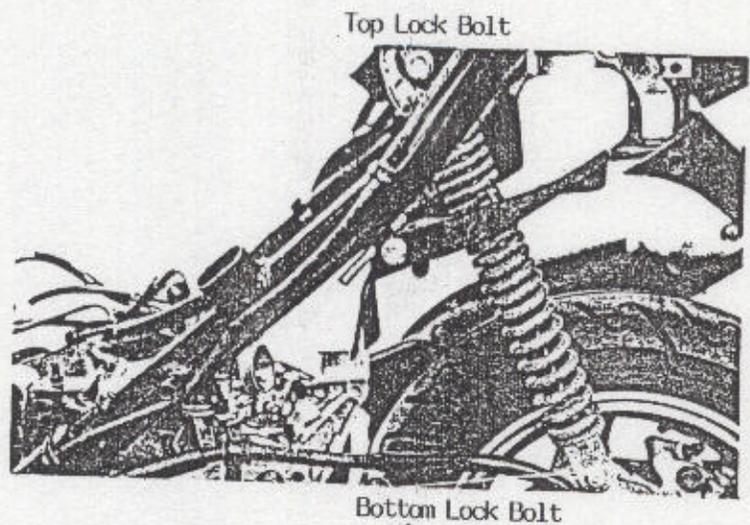
Torque:

Top Lock Bolt : 3.5 - 4.5 kg-m

Bottom Lock Bolt: 2.4 - 3.0 kg-m

Install the frame covers.

(P147)



Top Lock Bolt

Bottom Lock Bolt

ELECTRICAL EQUIPMENT

● TROUBLESHOOTING	15-2
● SERVICE INFORMATION	15-3
● BATTERY	15-4
● CHARGING SYSTEM	15-5
● IGNITION SYSTEM	15-7
● STARTING SYSTEM	15-12
● FUEL UNIT	15-13
● ENGINE OIL INDICATOR	15-15
● SWITCHES/HORN	15-15
● INSTRUMENT	15-17
● HEADLIGHT	15-20
● BULB REPLACEMENT	15-21

● TROUBLESHOOTING

● Charging System

● NO POWER

- Overcharged battery
- Disconnected battery cable
- Fuse burned out
- Faulty ignition switch

● LOW VOLTAGE

- Weak battery
- Loose battery connection
- Charging system failure
- Faulty regulator/rectifier

● Ignition System

- Weak spark
- Poorly connected, broken or shorted wire
 - between A.C. generator and CDI unit
 - between CDI unit and high tension coil
 - between CDI unit and ignition switch
 - between high tension coil and spark plug
- Faulty ignition switch
- Faulty high tension coil
- Faulty CDI unit
- Faulty A.C. generator

● Starting System

- Starter motor won't run
- Weak battery
- Faulty ignition switch
- Faulty starter button
- Faulty front or rear stop switch

- Faulty starter relay
- Poorly connected or broken wire
- Faulty starter motor

● Intermittent Power

- Loose battery cable
- Loose charging system connection
- Loose ignition system connection or shorted wire
- Loose lighting system connection or shorted wire

● Faulty Charging System

- Loose connector, broken or shorted wire
- Faulty rectifier
- Faulty A.C. generator

● Engine starts but runs poorly

- Ignition primary circuit
 - Faulty high tension coil
 - Loose wire or connector
- Ignition secondary circuit
 - Faulty high tension coil
 - Faulty spark plug
 - Poorly insulated plug cap
- Improper ignition timing
 - Faulty A.C. generator
 - Stator not installed properly
 - Faulty CDI unit

● Starter motor lacks power

- Loose connector
- Foreign matter stuck in starter motor or gear
- Starter motor runs but engine won't run

- Faulty starter pinion
- Reverse rotation of starter motor
- Faulty clutch
- Faulty battery

● SERVICE INFORMATION

● GENERAL INSTRUCTIONS

<MF Battery>

- It is unnecessary to check the battery electrolyte or refill distilled water.
- Remove the battery from the motorcycle for charging. Do not remove the electrolyte refilling cap.
- Do not quick charge the battery. Quick charging should only be done in an emergency.
- Charge the battery according to the charging rate and time specified on the battery.
- When charging (open circuit voltage), check the voltage with an electric tester.
- When replacing the battery, do not use a traditional battery.

● SPECIFICATIONS

● Charging System

Item		SNIPER 100	SNIPER 50
Battery	Capacity	12V5AH	12V4AH
	Voltage	13.0~13.2V	
	Charging rate	STD: 0.5A Quick: 5A	STD: 0.4A Quick: 4A

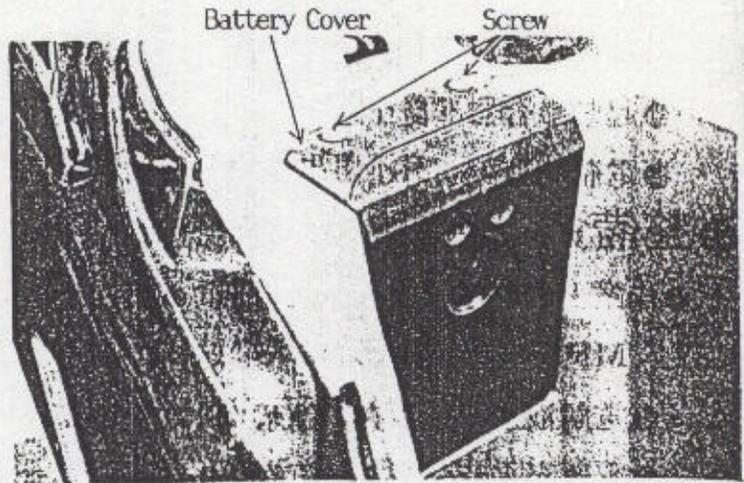
● Ignition System

Item		SNIPER 100	SNIPER 50
Spark plug		BR6HS	BR8HS
Spark plug gap		0.6~0.7mm	
High tension coil	Primary coil	0.2~9.3Ω	
	Secondary coil (with spark plug cap)	8.0~9.3KΩ	
	Secondary coil (without spark plug cap)	3.0~4.2KΩ	
Ignition timing		14° ±2BTDC/1800rpm	17° ±2BTDC/1800rpm

BATTERY

Battery Removal

Lift the seat and remove the 2 screws attaching the battery. Disconnect the battery terminal cables.



* First disconnect the negative (-) cable and then the positive (+) cable.

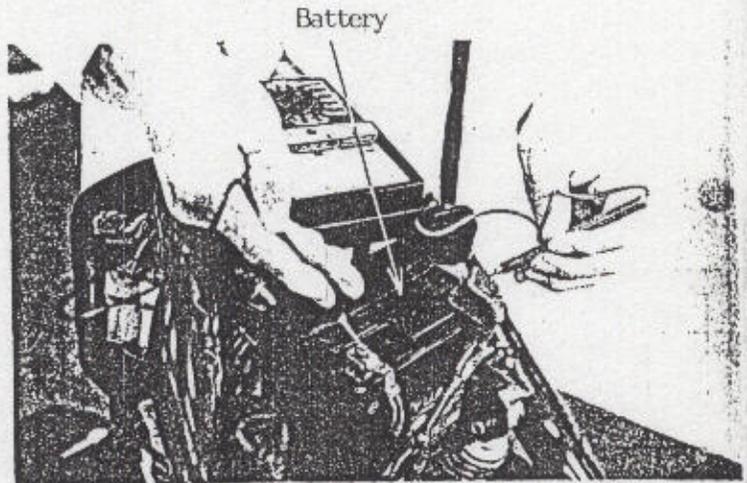
Remove the battery. Installation of the battery is the reverse of removal.

Charging (Open Circuit Voltage)

Inspection

Measure the battery voltage.
Fully Charged: 13.0-13.2V
Undercharged : 12.3V or below

* Battery charging inspection should be performed with a voltmeter.
Voltmeter: 07411-0020000



Charging (Connecting Method):

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

- Keep flame and sparks away from a charging battery.
- Turn power ON/OFF at the charger not at the battery terminals to prevent sparks near the battery to cause explosion.
- Charge the battery according to the charging rate specified on the battery surface.

SNIPER 100 SNIPER 50

Charging Rate

Standard :	0.5	0.4
Quick :	5A	4A

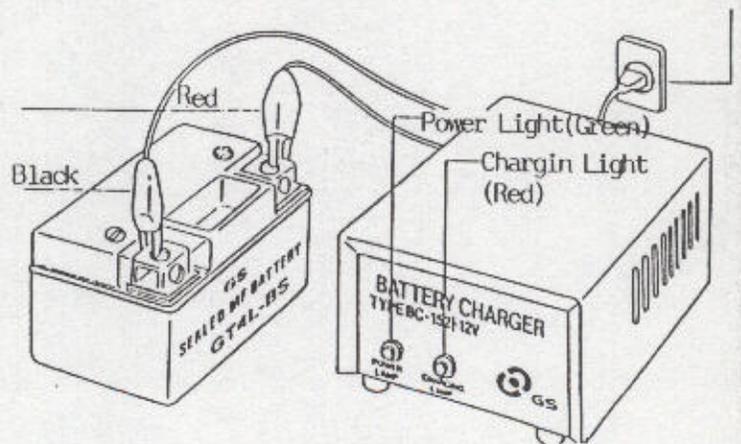
Charging Time

Standard :	5 hours	5 hours
Quick :	0.5 hours	0.5 hours

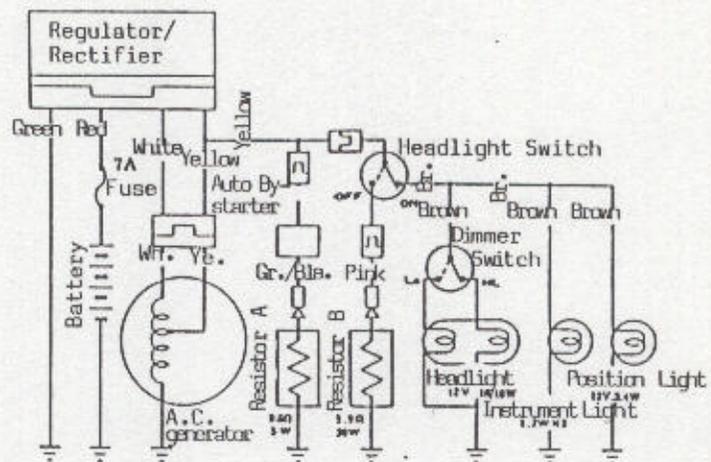
After Charging: Open Circuit Voltage :
over 12.8V

* Quick charging should only be done in an emergency.

- During quick charging, the battery temperature should not exceed 45°.
- Measure the voltage 30 minutes after the battery is charged.



⊕ CHARGING SYSTEM



⊕ Performance Test

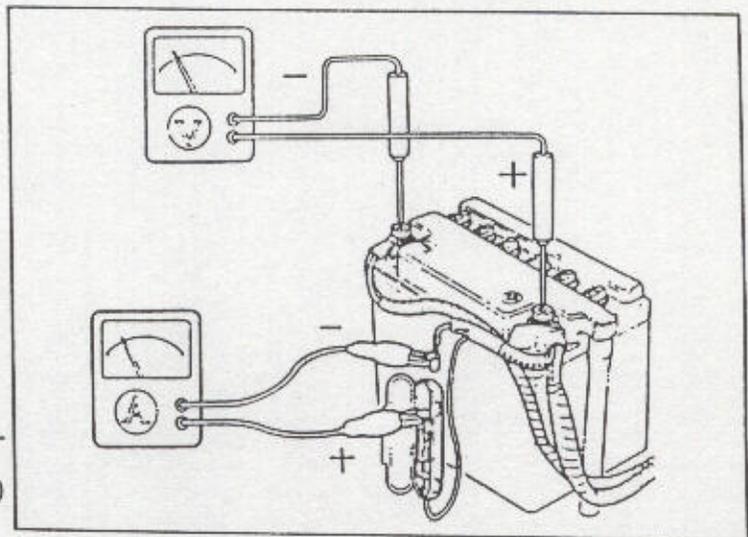
Warm up the engine before taking readings.

Lift the seat and remove the battery cover.

Use a fully charged battery to check the charging system.

Stop the engine and open the fuse box. Disconnect the two ends of fuse and connect the ammeter negative (-) terminal to the fuse end at the battery side and the ammeter positive (+) terminal to the fuse end at the main harness side.

Connect the battery positive (+) terminal to the voltmeter positive (+) terminal and the battery negative (-) terminal. Start the engine to slowly increase engine rpm and check the charging system output as follow:



Position RPM	SNIPER 100		SNIPER 50	
	Night	Day	Night	Day
2500	Over 0.5A	Over 0.7A	Over 0.5A	Over 0.7A
6000	Over 1.3A	Over 1.3A	Over 1.3A	Over 1.3A

Charging Limited Voltage:
14.5±0.5V/8000rpm

If the Limited Voltage is not within the specified range, check the regulator/rectifier.

● A.C. Generator (Charging Coil)

● Inspection



Inspect with the engine installed.

Remove the met-in box. (P 147)
Disconnect the A.C. generator connector and then measure the resistances between the charging coil terminals (white-green) and lighting coil terminals (yellow-green).

Charging Coil	White-Green	0.2~1.2Ω
Lighting Coil	Yellow-Green	0.3~1.0Ω

Refer to P75 for A.C. generator removal.

● Resistor Inspection.

Remove the front cover. (P 146)
Measure the resistance between the resistor B pink wire and ground wire.

Measure the resistance between the Resistor A green/black wire and ground wire.

Resistance : Resistor A 9.2-9.8Ω
Resistor B 5.6-6.2Ω



Faulty resistor will affect the operation of the auto bystarter.

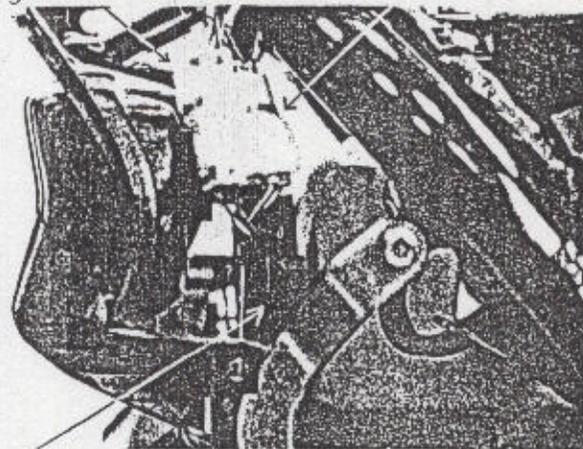
● Regulator/Rectifier Inspection

Remove the front cover. (P 146)

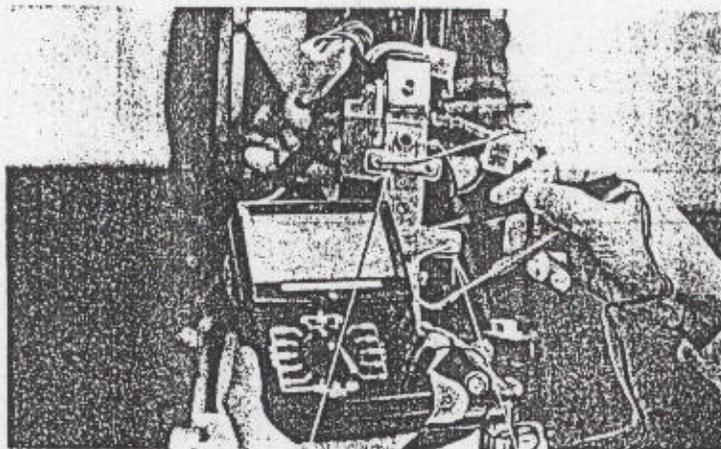
Disconnect the connector and remove the lock nut.

Remove the regulator/rectifier.

Exciting Coil Connector Pulsar Coil Connector



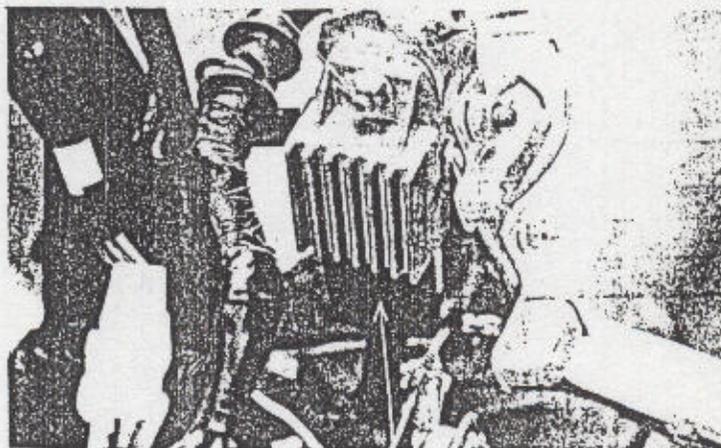
CDI Unit



Resistor A

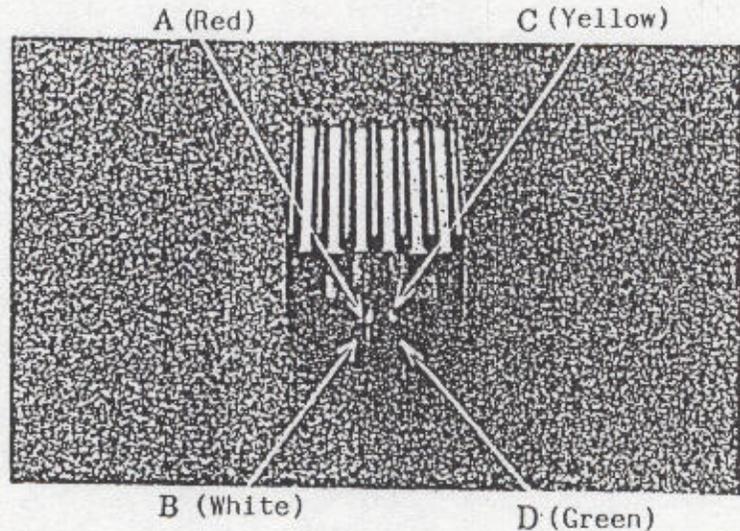
Resistor B

Bolt



Connector

Measure the resistances between the terminals.
If the resistances exceed the range specified in the list, replace the regulator/rectifier.



- Due to the semiconductor in circuit, different electric testers will have different testing results.
- Use Sarwa electric tester (07208-0020000) or Kova (TH-5H) electric tester to obtain correct testing results. The testing position is shown as follows :

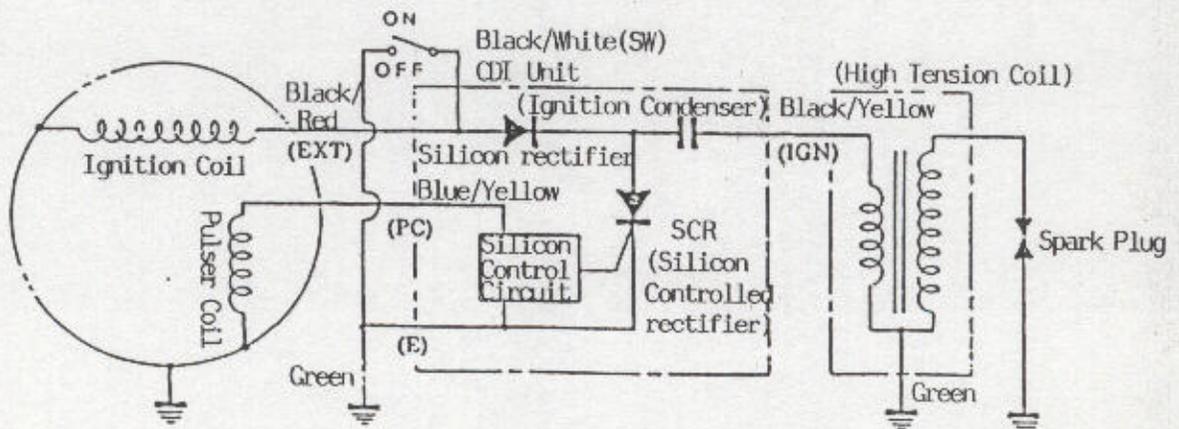
Model	Brand	Position
SP-10D	Sarwa	KΩ
TH-5H	Kova	100Ω

• Specifications : Unit KΩ

Probe [⊕]	A (Red)	B (White)	C (Yellow)	D (Green)
A (Red)		∞	∞	∞
B (White)	8-10KΩ		∞	∞
C (Yellow)	∞	∞		33-35KΩ
D (Green)	∞	∞	33-35KΩ	

④ IGNITION SYSTEM

● Ignition Circuit



ELECTRICAL EQUIPMENT

● **High Tension Coil Inspection**

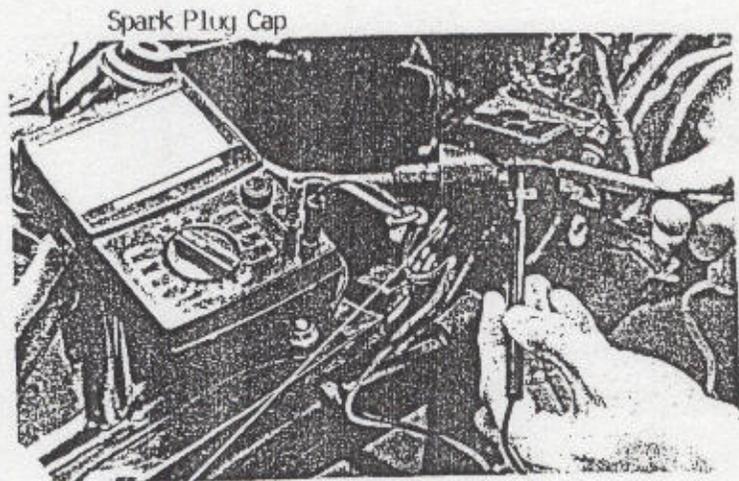
● **Continuity Test**

* This is to test the continuity. Performance test of high tension coil is stated in the following page.

Remove the right side strip (P 147)

Measure the primary coil resistance between the high tension coil terminals.

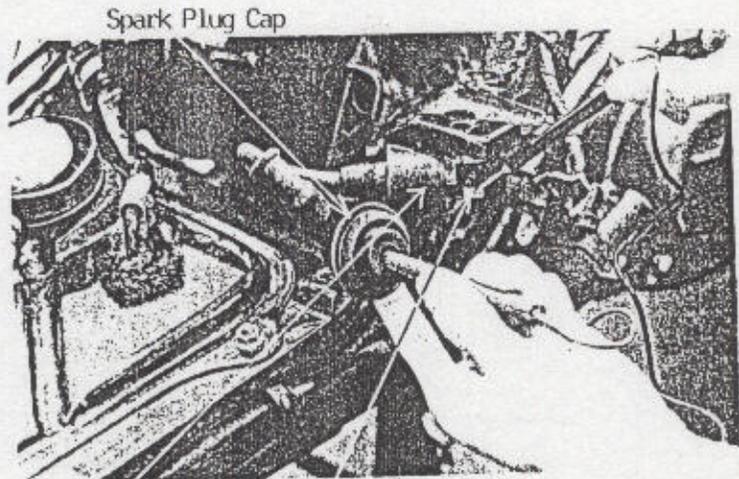
Primary Coil Resistance: 0.2-0.3Ω



High Tension Coil

Measure the secondary coil resistance between the spark plug and positive (+) terminal.

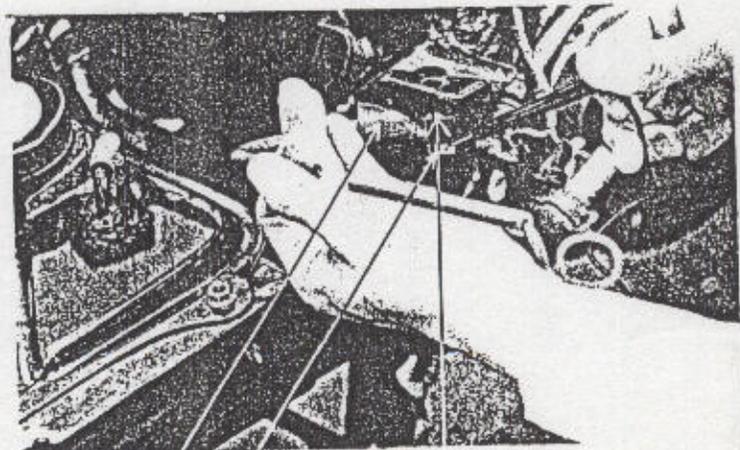
Secondary Coil Resistance:
 SNIPER 100 (20°C) 7.8-9.0KΩ
 SNIPER 50 (20°C) 8.0-9.3KΩ(with spark plug cap)



High Tension Coil Green

Remove the spark plug cap and measure the resistance between the high tension cable and the secondary coil.

Secondary Coil Resistance:
 SNIPER 100 : (20°C) 3.0-4.2KΩ
 SNIPER 50 : (20°C) 3.0-4.2KΩ
 (without spark plug cap)

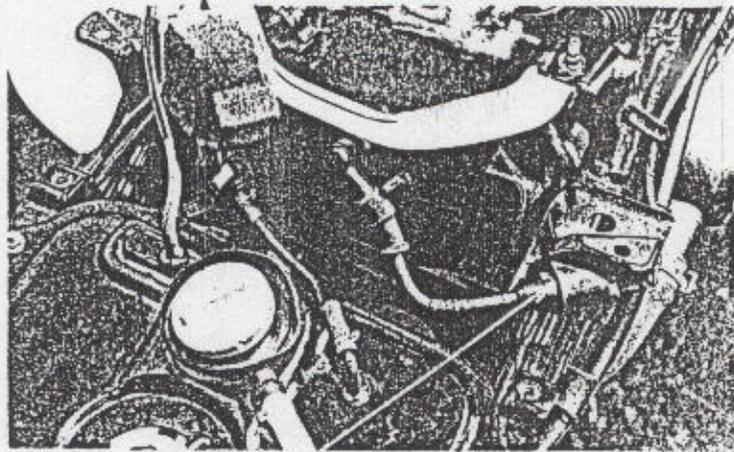


High Tension Coil Green Black/Yellow

● Performance Test

Remove the high tension coil.

Check the high tension coil condition with a high tension coil tester (07508-0070100).



High Tension Coil

*

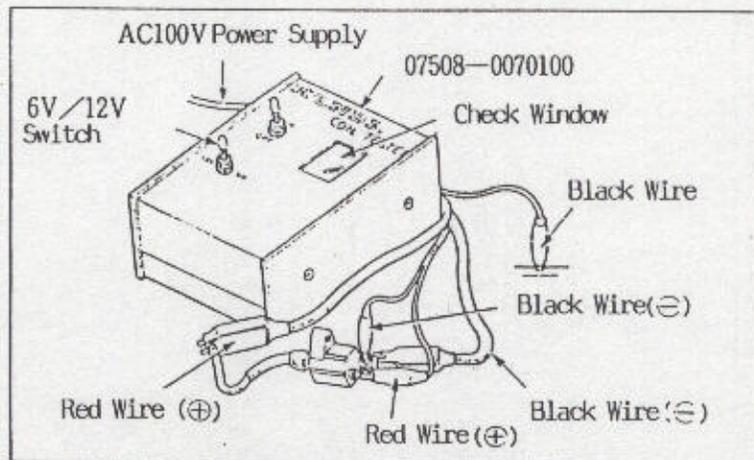
Follow the tester manufacturer's instructions.

1. Turn the tester switch to 12V and connect the ignition coil.
2. Turn the power switch to "ON" and check the spark from the check window.

- . Good : Normal and continuous spark.
- . Faulty : Weak or intermittent spark.

*

The test of the ignition coil should be performed on both cold and hot conditions.



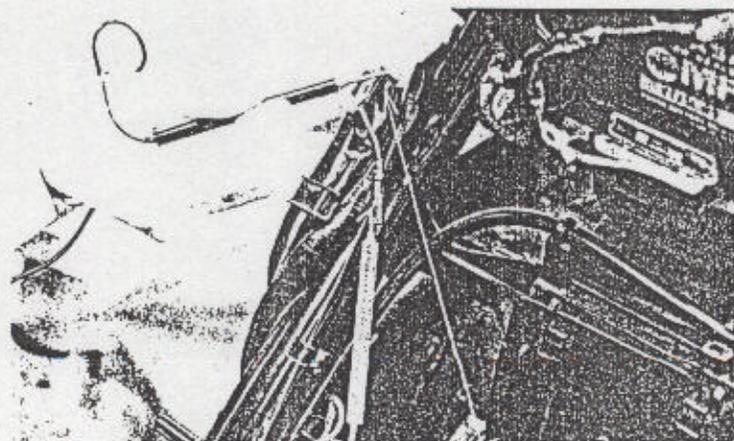
● A.C. Generator (Exciting Coil/ Pulser Coil) Inspection

*

Inspect with the engine installed.

Remove the met-in box. (⇒ P 147)
Measure the exciting coil resistance between the A.C. generator black/red terminal and engine ground.

Exciting Coil Resistance:
(20°C) 400-700Ω

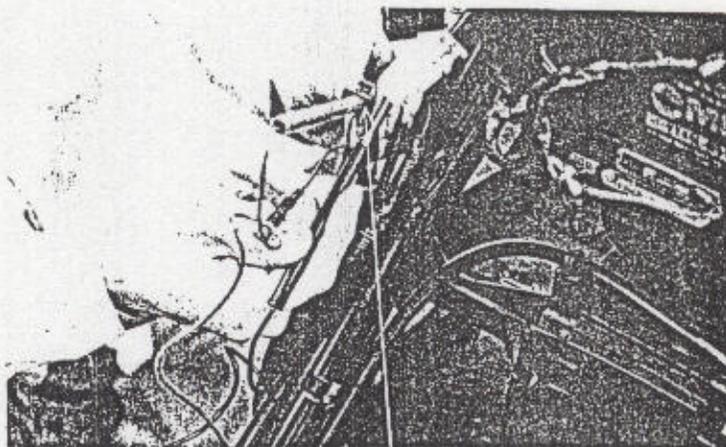


Black/Red

Blue/Yellow

Measure the pulser coil resistance between the A.C. generator blue/yellow terminal and the engine ground.

Pulser Coil Resistance:
(20°C) 50-200

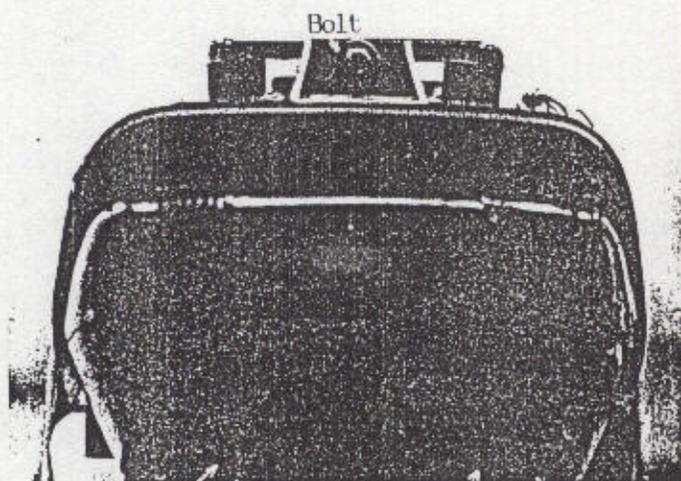


Blue/Yellow Terminal

● **C.D.I. Unit Inspection**

Remove the right and left side covers. (⇒ P 148)

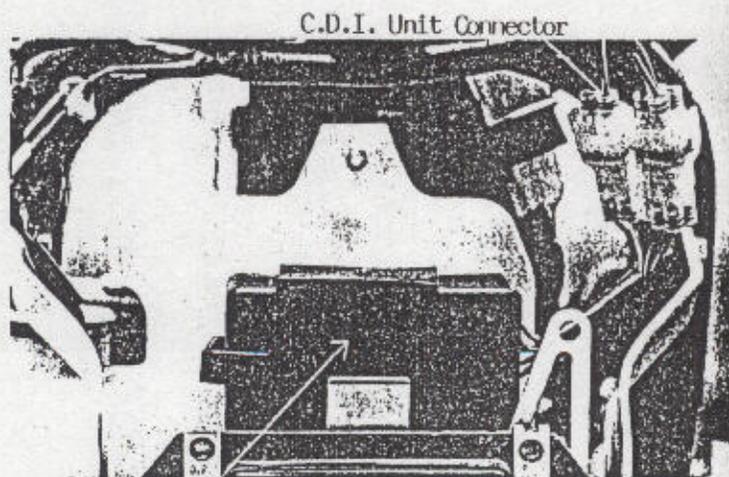
Remove the bolt and 3 screws attaching the taillight holder.



Screw

Screw

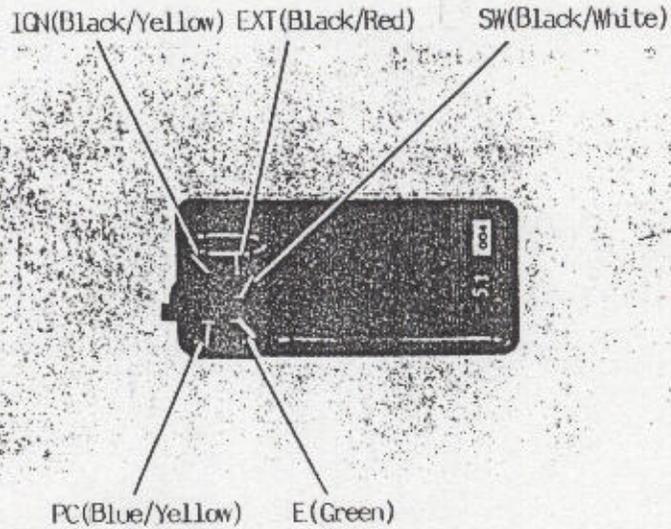
Disconnect the C.D.I. unit connector and the C.D.I. unit.



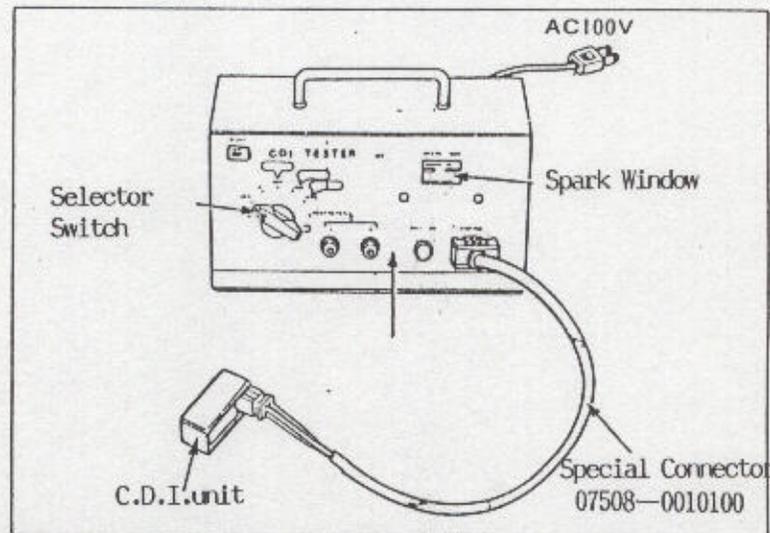
C.D.I. Unit

- **C.D.I. Circuit Inspection**
Measure the resistance between the terminals.
Replace the C.D.I. unit with a new one if the readings do not fall within the specified limits shown in the following.

* Due to the semiconductor in circuit, different electric tester will have different testing results.
Use Sanwa electric tester (07308-0020000) or Kowa (TH-5H) electric tester to obtain correct testing results.
During testing, "Needle swings then returns" indicates that there is a charging current applied to a condenser in the CDI unit. The needle will then remain at "∞" unless the condenser is discharged.



Sanwa reading (Testing Position x KΩ)
Kowa reading (Testing Position x 100Ω)

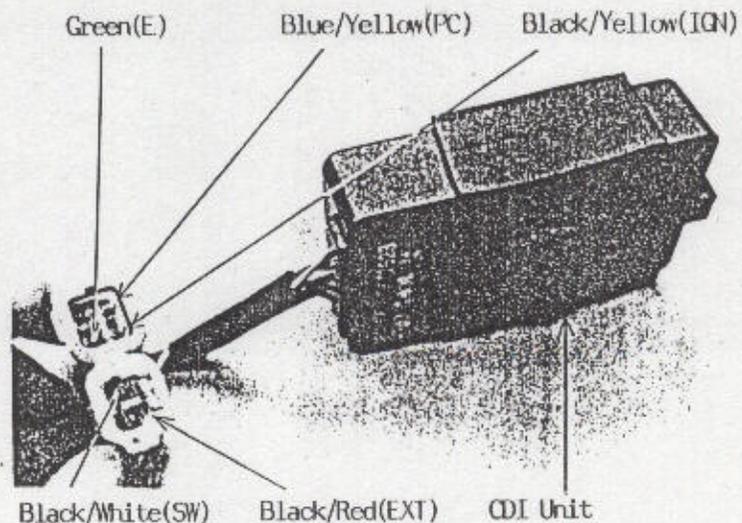


C.D.I. Specifications(SNIPER 50)

Probe	Black/White (SW)	Black/Red (EXT)	Blue/Yel (PC)	Green (E)	Black/Yel (IGN)
Black/White (SW)	∞	∞	∞	∞	∞
Black/Red (EXT)	4~6	∞	∞	∞	∞
Blue/Yellow (PC)	80~100	25~45	∞	15~25	∞
Green (E)	10~20	4~6	∞	∞	∞
Black/Yellow (IGN)	∞	∞	∞	∞	∞

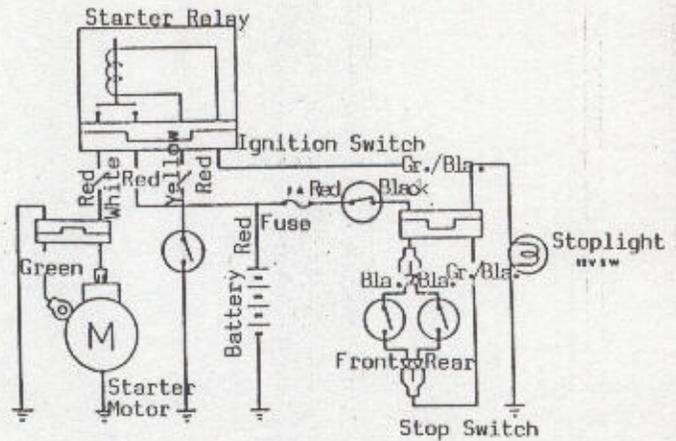
C.D.I. Specifications(SNIPER 100)

Probe	Black/White (SW)	Black/Red (EXT)	Blue/Yel (PC)	Green (E)	Black/Yel (IGN)
Black/White (SW)	∞	∞	∞	∞	∞
Black/Red (EXT)	4~6	∞	120~140	40~60	∞
Blue/Yellow (PC)	400~600	130~150	∞	50~70	∞
Green (E)	10~30	4~6	40~60	∞	∞
Black/Yellow (IGN)	∞	∞	∞	∞	∞



● STARTING SYSTEM

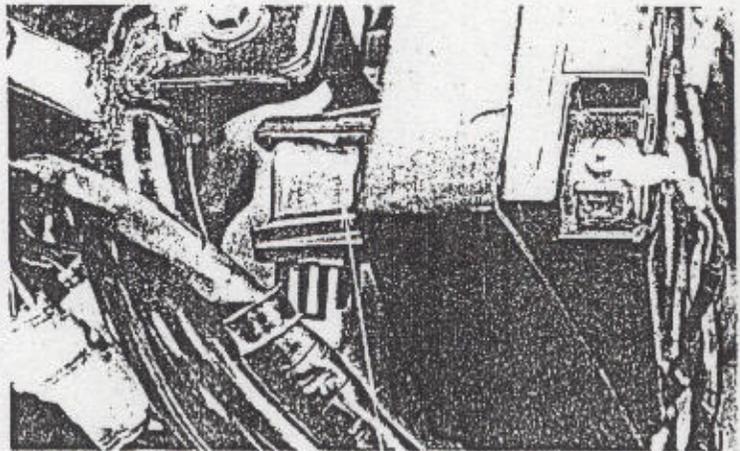
● Starting Circuit



Starting System Circuit Diagram

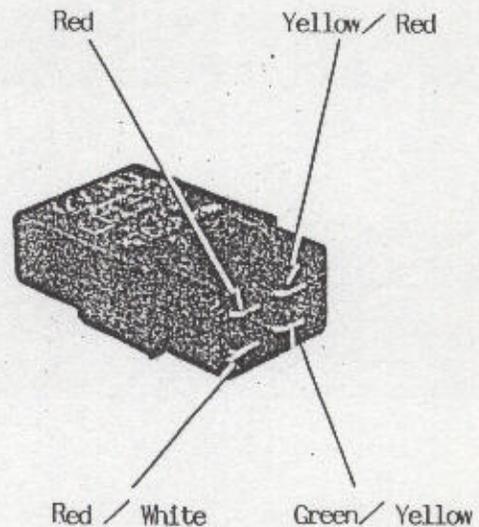
● Starter Relay Inspection

Remove the met-in box. (P.147)
 Remove the right and left side covers. (P.148)
 Disconnect the starter relay connector to remove the starter relay.



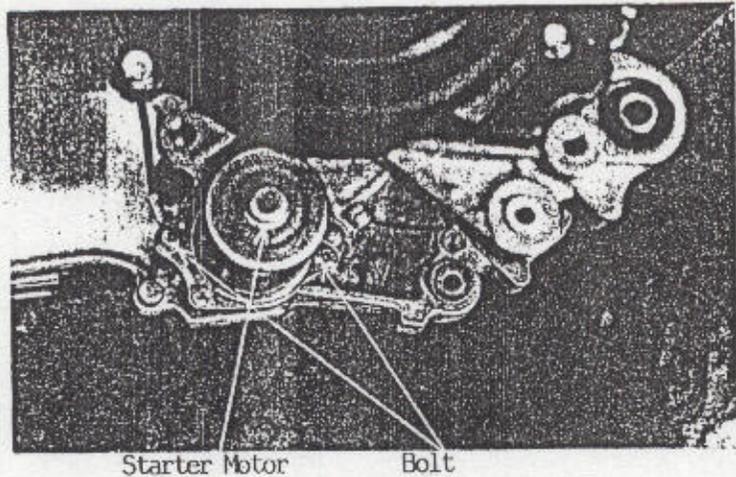
Starter Relay

Connect a 12V battery positive (+) terminal to the starter relay green/yellow terminal and battery negative (-) terminal to the starter relay yellow/red terminal. Check for continuity between the starter relay red and red/white terminals with an electric tester.



● Starter Motor Removal

Disconnect the starter motor cable.
Remove the 2 bolts attaching the starter motor.
Remove the starter motor.
The installation sequence is the reverse of removal.



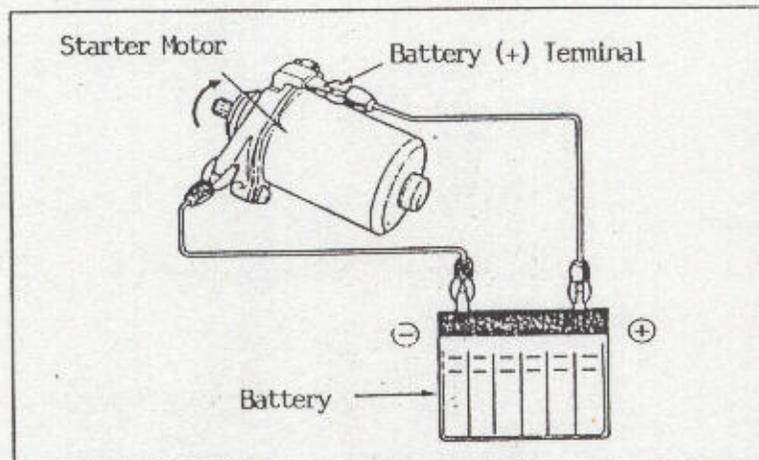
● Starter Motor Inspection

Connect the starter motor to the battery and check the motor operation.

(Visually check if the pivot turns toward the left.)

*

1. Do not run the starter motor for a long time.
2. The inspection should be done with a fully charged battery.



● FUEL UNIT

*

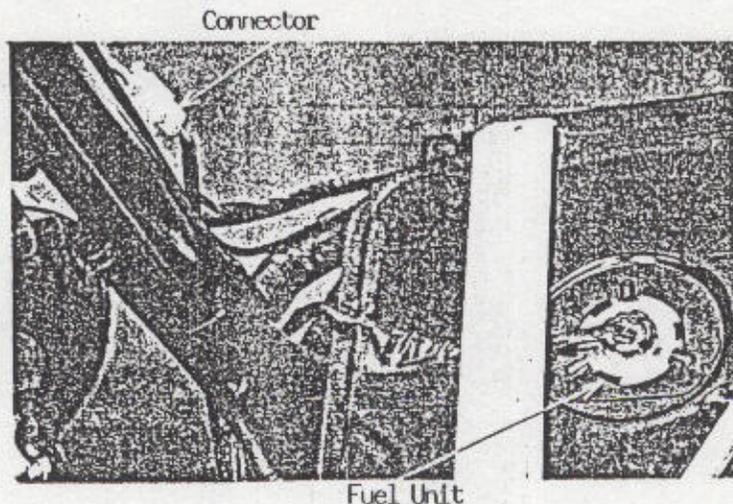
NO SMOKING !

● Removal

Remove the central cover. (P147)
Remove the foot rest. (P148)
Remove the met-in box. (P148)
Disconnect the fuel unit cable.
Turn the fuel unit left to take out it.

*

Be careful not to bend the float of the fuel unit.



Install the fuel unit in the reverse order of removal.
Install the fuel unit by aligning the punch mark on the fuel unit with the arrow on the fuel tank.

● Inspection

Move the fuel unit float up and down to measure the resistances between the terminals.

Terminals	Upper Position	Lower Position
Green-Yellow/White	33Ω	685Ω
Green-Blue/White	566Ω	146Ω
Yellow/White Blue/White	600Ω	600Ω

* Move the float up and down to check the electric tester pointer for proper operation.

● Fuel-Level Indicator Inspection

Connect the fuel unit cable and turn the ignition switch to "ON"

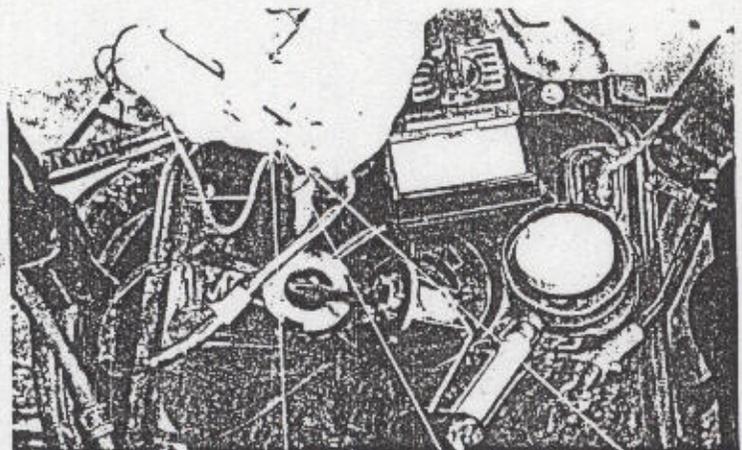
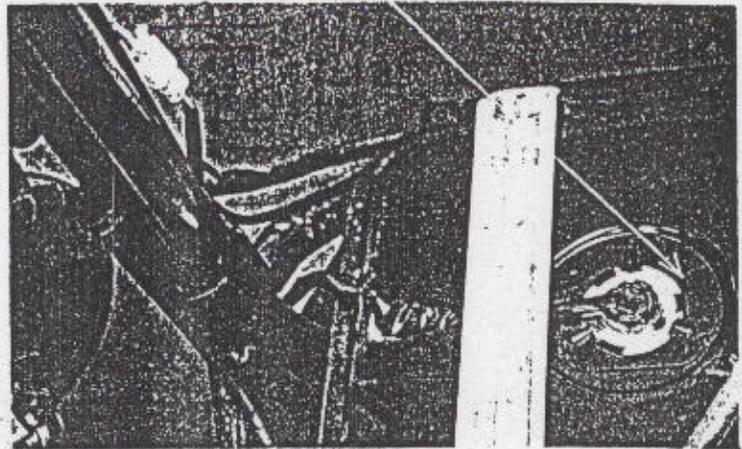
* Turn on the turn signal lights to make sure the circuit is normal.

Move the fuel unit float up and down to check the operation of fuel-level indicator pointer.

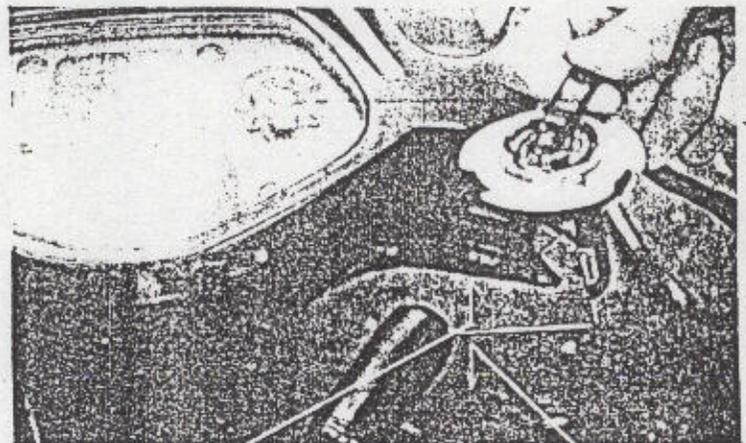
Float	Indicator Pointer
Upper Position	"F" Position
Lower Position	"E" Position

* Move the float up and down to check the fuel-level indicator pointer for proper operation.

Arrow



Blue/White Yellow/White Green



Up

Down

● ENGINE OIL INDICATOR

Engine Oil Meter Removal

Remove the left side strip.
(P147)

Remove the right and left side covers. (P147)

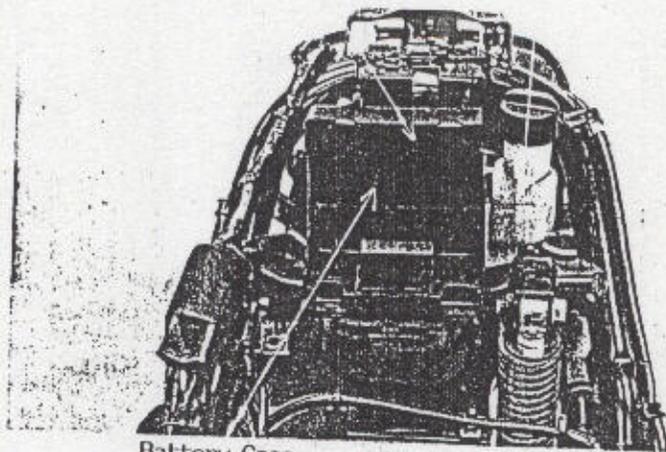
Remove the battery and the battery case lock bolts. Remove the battery case and engine oil tank.



- No Smoking!
- Before removing the oil tank, drain the engine oil into a clean container.

Disconnect the engine oil meter cable connector and remove the engine oil meter.

Bolt Engine Oil Tank



Battery Case

● Engine Oil Meter Inspection

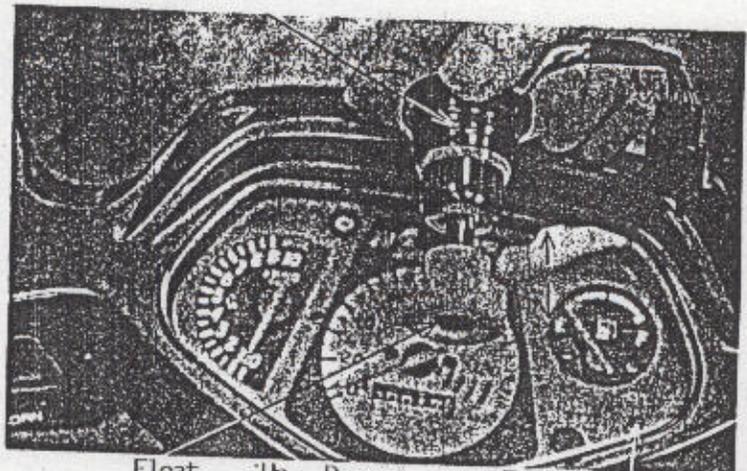
Connect the engine oil meter cable connector.

Turn on the ignition switch and move the float up and down to see if the engine oil indicator light will light or go out.



- If the indicator light will not light or go out, check the bulb for burning-out.

Engine Oil Meter



Float Up Down

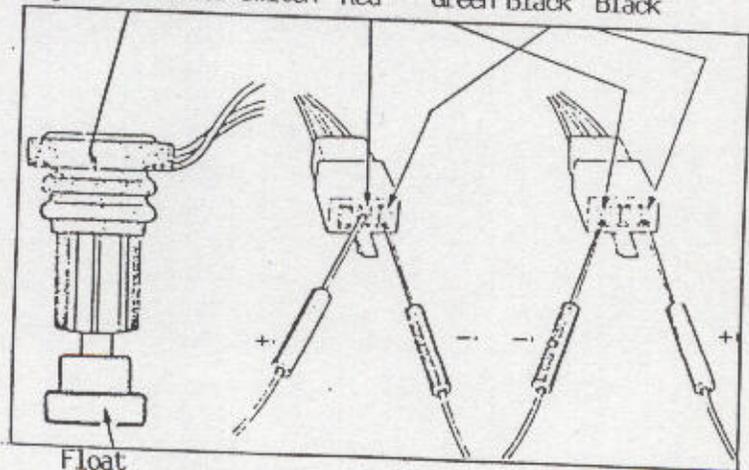
Engine Oil Indicator Light

● Inspection

Disconnect the engine oil meter cable connector and measure the resistances between terminals.

Float Position	Wire Color	Resistance
Upper(Full)	G/R - Black	∞
Lower (Empty)	G/R - Black	320 Ω
	⊕ ⊖	
	Green-Black	∞
	⊖ ⊕	

Engine Oil Meter Switch Green/Red Green Black Black



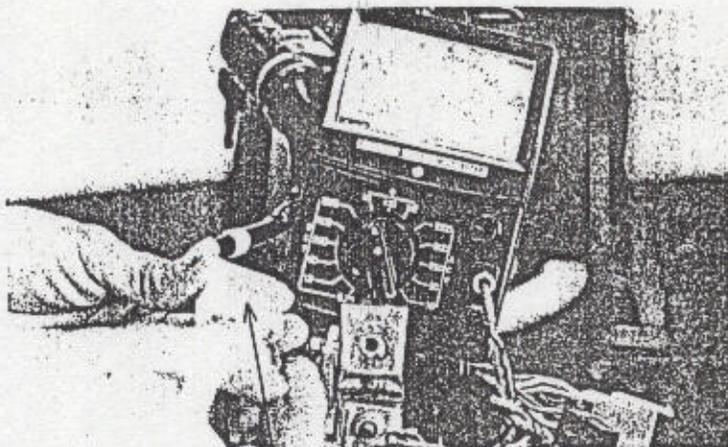
Float

● SWITCHES/HORN

● Combination Switch Inspection

Remove the front cover. (P146)
Disconnect the combination switch cable and check for continuity between the terminals.

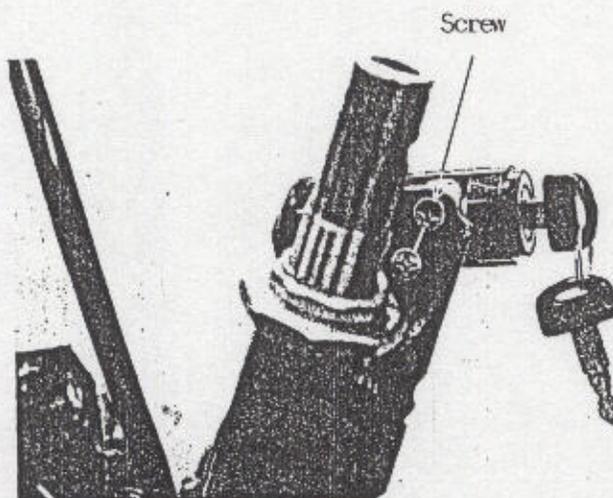
Color	Red	Black	Black/white	Green
Mark	BAT1	BAT2	IG	E
ON	○	○		
OFF			○	○



Combination Switch Connector

● Combination Switch Replacement

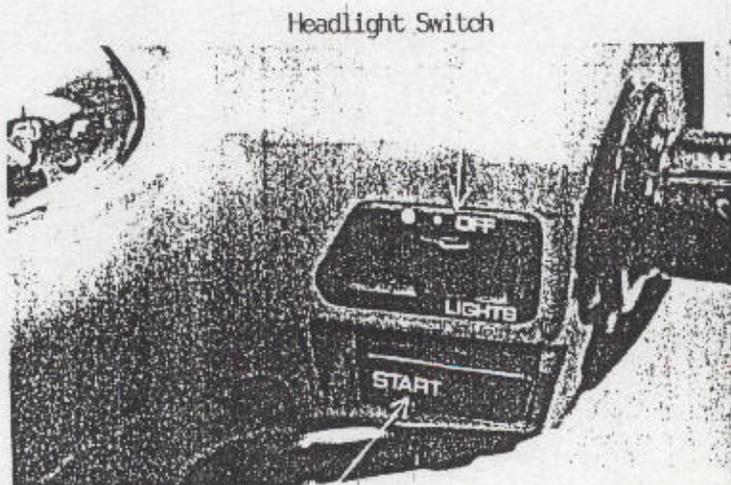
Remove the front cover. (P146)
Disconnect the cable connector and remove the 2 lock screws.
Remove the combination switch.
The installation sequence is the reverse of removal.



Screw

● Headlight Switch

Color	Brown/white	Brown	Yellow	Pink
Mark	HL	TL	CI	RE
OFF			○	○
•		○	○	
●	○	○	○	

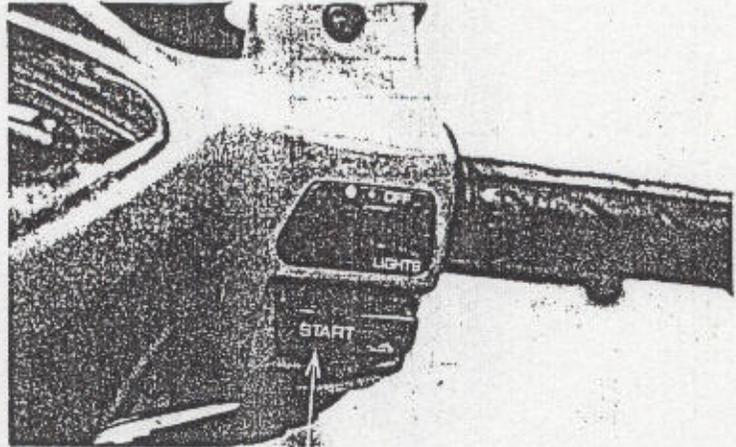


Headlight Switch

Starter Switch

● Starter Switch

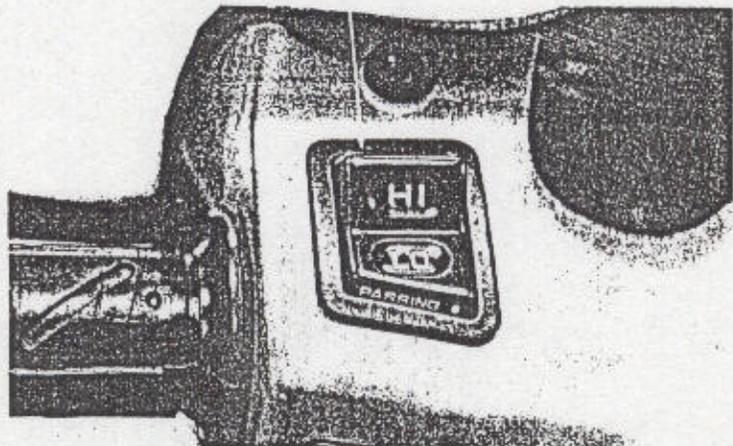
Color	Yellow/Red	Green
Mark	ST	E
Free		
Push	○	○



Starter Switch

● Headlight Dimmer Switch

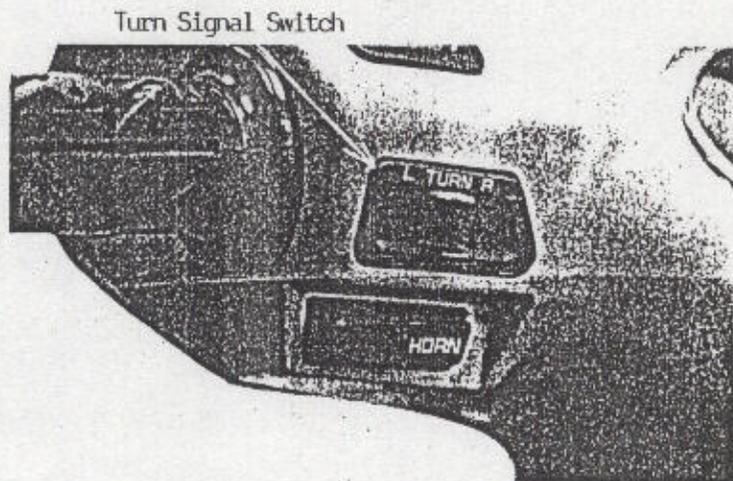
Color	Brown/White	Blue	White	Black
Mark				PASSING
HI	○	○		
LO	○		○	
PASSING		○		○



Headlight Dimmer Switch

● Turn Signal Switch

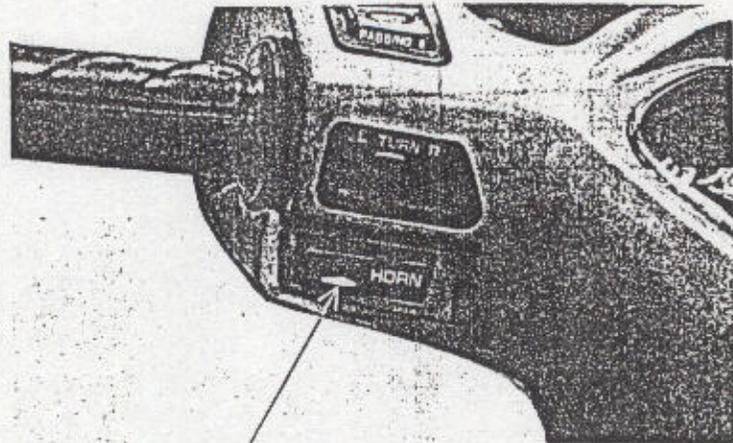
Color	Gray	Light Blue	Orange
Mark	W	R	L
R	○	○	
L	○		○



Turn Signal Switch

● Horn Switch

Color	Light Green	Black
Mark	HO	BAT
Free		
Push	○	○



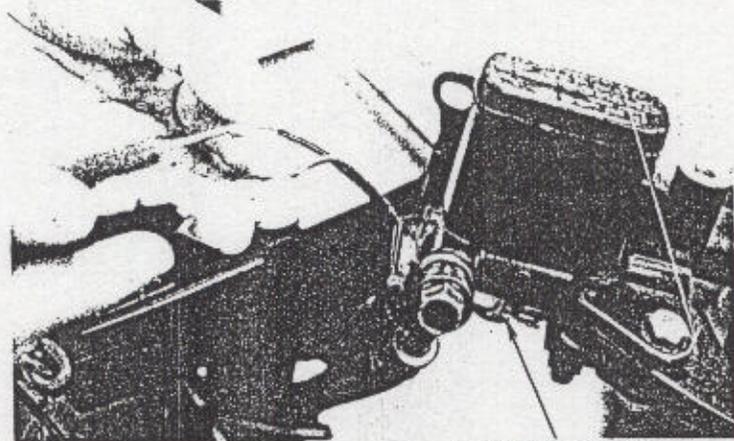
Horn Switch

● Stoplight Switch Inspection

Remove the handlebar front cover. (P146)

Disconnect the front and rear stoplight cable connector.

Operate the front and rear brake levers and check for the continuity between the stoplight switch terminals.



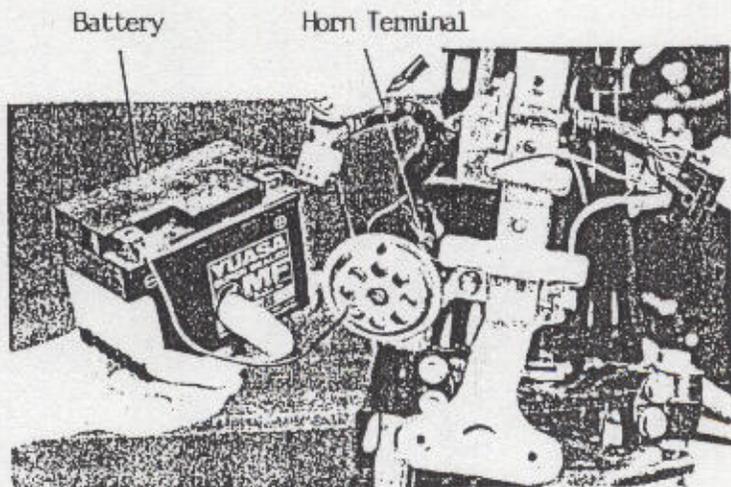
Brake Lever

Stoplight Switch

● Horn Inspection

Remove the front cover. (P146)

Disconnect the horn cable and then connect the horn terminal to a 12V battery and check if the horn sounds properly.



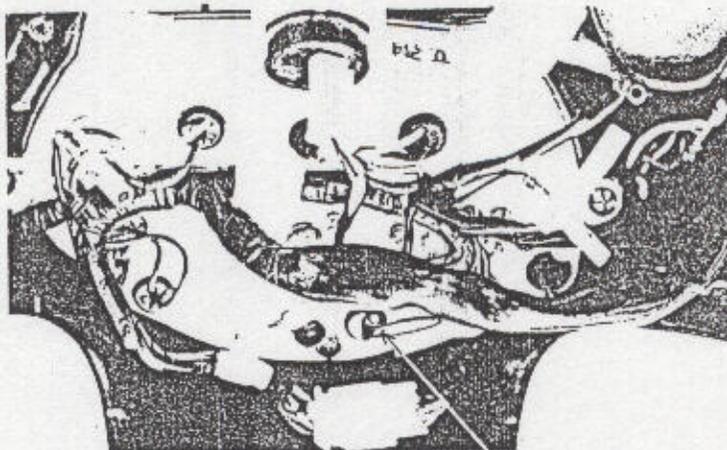
Battery

Horn Terminal

INSTRUMENT

● Instrument Light Replacement

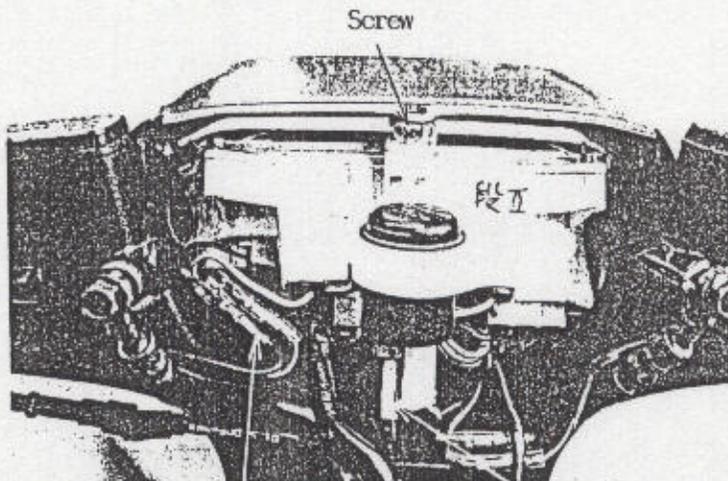
- Remove the handlebar front cover. (P146)
- Remove the handlebar rear cover. (P146)
- Remove the bulb and replace it.



Bulb Holder

● Speedometer Removal

- Disconnect the speedometer cable.
- Disconnect the speedometer connecting wire connector.
- Remove the 2 screws attaching the speedometer.
- Remove the speedometer.
- The installation sequence is the reverse of removal.



Connecting Wire Connector Speedometer Cable

● HEADLIGHT

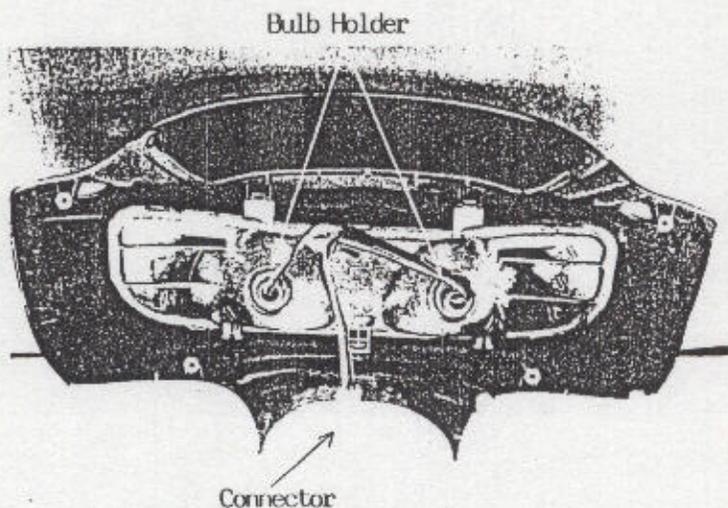
● Removal/Bulb Replacement

- Remove the handlebar front cover. (P146)
- Remove the headlight bulb holder and bulb.

*

- This model adopts Krypton bulb. When installing it, do not use hand to touch the bulb glass.
- When replacing, use a new bulb with the same specification.

The installation sequence is the reverse of removal.



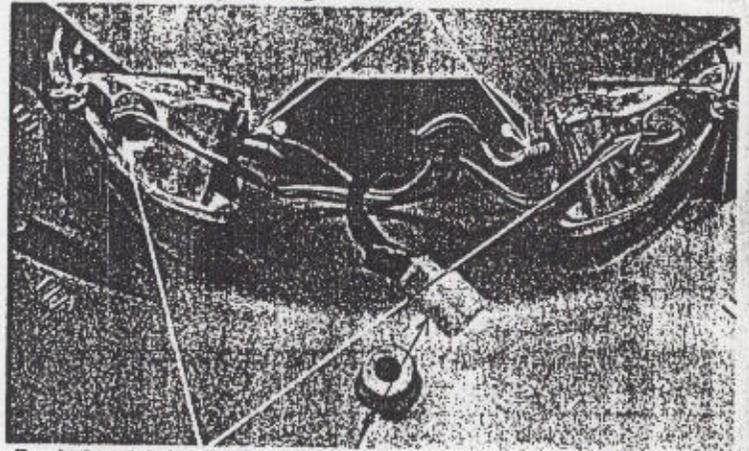
Connector

BULB REPLACEMENT

Front Turn Signal Light Bulb Replacement.

Remove the front cover. (P146)
 Remove the front turn signal light bulb holder and then remove the front turn signal light bulb.
 Remove the position light bulb holder and remove the position light bulb.

Turn Signal Light Bulb Holder

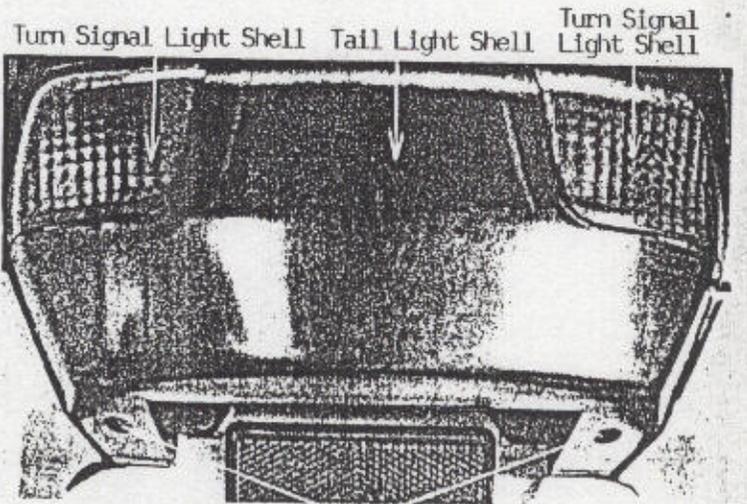


Position Light Bulb Holder Connector

Tail Light/Stoplight and Rear Turn Signal Light Bulb Replacement

Tail Light Shell Removal

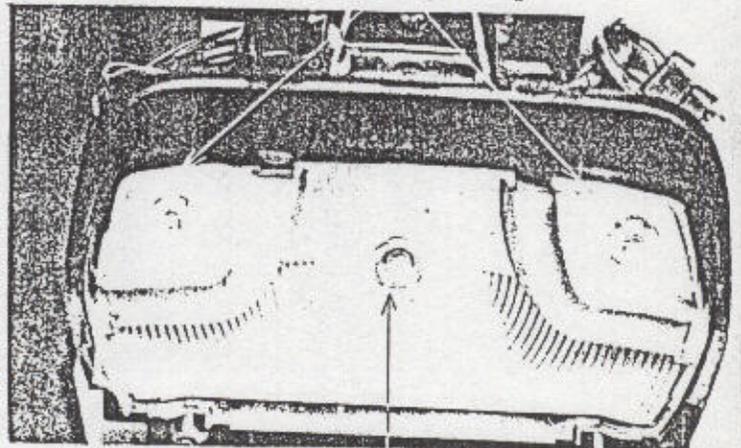
Remove the 2 screws attaching the tail light shell.
 Remove the tail light shell and the stoplight bulb.
 Remove the rear turn signal light bulb.
 The installation sequence is the reverse of removal.



Turn Signal Light Shell Tail Light Shell Turn Signal Light Shell

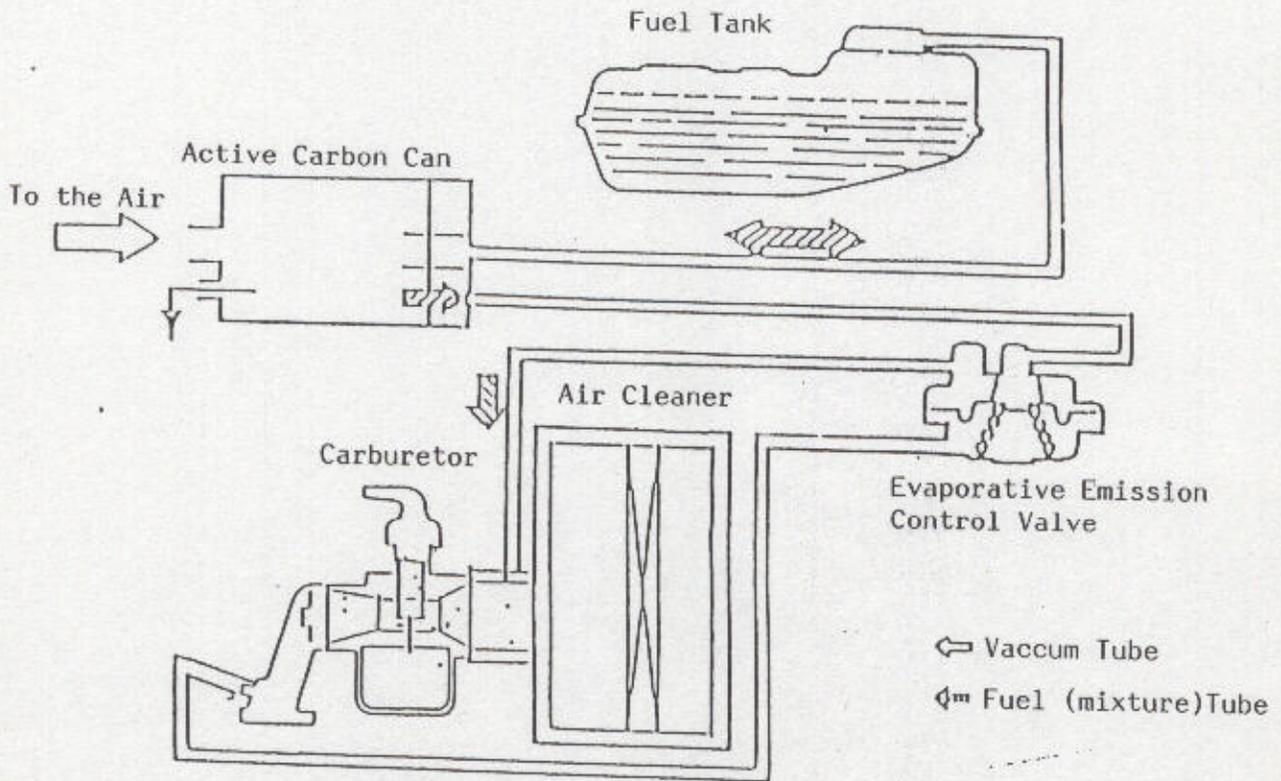
Screw

Rear Turn Signal Light



Tail Light/Stoplight

EVAPORATIVE EMISSION CONTROL SYSTEM DIAGRAM



FOREWORD:

The evaporative emission control system is abbreviated to E.E.C. system. This device collects the vaporized fuel from the carburetor and fuel tank leading to the engine for re-burning in order to avoid air pollution caused by the vaporized fuel.

● Functions

Item	Purpose	Function
Evaporative Emission Control Valve	Control vaporized HC from the fuel tank not to diffuse to the air.	The active carbon can will absorb vaporized HC from the fuel tank. When the engine starts, the evaporative emission control valve will lead the vaporized fuel into the engine for re-burning.
Active Carbon Can	Absorber and store the vaporized HC from the fuel tank and carburetor.	The vaporized HC is collected and absorbed by the active carbon can and the specified volume of HC in the emission should not exceed 2g.

● TROUBLESHOOTING**● Engine runs erratic at idle speed and high speed**

1. Faulty evaporative emission control valve
2. Evaporative emission control valve connecting pipe leaks
3. Clogged or faulty active carbon can

● Engine lacks power or accelerates roughly

1. Clogged air cleaner
2. Faulty evaporative emission control valve
3. Loose or broken E.E.C. system piping

A. EVAPORATIVE EMISSION CONTROL SYSTEM MAINTENANCE SCHEDULE

Item		Inspection	Service Mileage (KM)						
			300	1000	3000	5000	7000	9000	11000
Engine Parts	Drive belt	Belt thickness					○		
	Drive chain	Chain tension & length		○	○	○	○	○	○
	Manifold & cylinder head bolts	Lock bolt	○			○			○
	Air cleaner	Clean or replace air cleaner element	Clean at every 3000km and replace if necessary						
	Cooling water	Engine cooling	Replace at every 10000 km or every year						
Fuel System	Fuel filter	Clean or replace fuel filter screen							○
	Choke system	Operation			○	○		○	
	Fuel line connection	Leakage, clog and breakage		○	○	○			
	Carburetor idle speed	Inspect, clean or adjust		○	○	○	○	○	○
	Gear oil	Replace or inspect lubricating oil	○			○			○
	Engine oil filter	Clean filter screen	○			○			○
	Oil pump	Clean/adjust oil pump				○			
Ignition Parts	Ignition timing	Ignition timing		○	○	○	○	○	○
	Spark plug	Clean, adjust or replace		○	○	○	○	○	○
	Ignition wire	Connecting points		○	○	○	○	○	○
Exhaust Emission Control System	Secondary air injection system piping	Leakage, clog or loose connection		○	○	○	○	○	○
	Catalytic Converter	Exhaust pipe abnormal condition or noise			○		○		○
	Intake manifold bolt	Replace loose or broken connector		○	○	○	○	○	○
Evaporative Emission Control System	Engine line connector	Leakage, clog, looseness or breakage		○	○	○	○	○	○
	Active carbon can	Check for damage or clean air vent hole		○	○	○	○	○	○
	PCV valve	Loose or broken tube connector		○	○	○	○	○	○

B. IRREGULAR MAINTENANCE

Item	Contents
•Burned crankshaft bearing	Before riding, inspect the engine for engine oil leakage to avoid crankshaft bearing burning during riding.
•Burned cylinder and piston	Long-time or serve use may cause worn or seized cylinder or piston. Clean and replace them with new ones.

● SERVICE INFORMATION

● GENERAL INSTRUCTIONS

- Do not smoke or allow flames or sparks in your working area.
- Pay attention to the location of each tube for installation.
- Replace any damaged tube with a new one.
- Make sure to tighten each tube connector.

● TOOLS

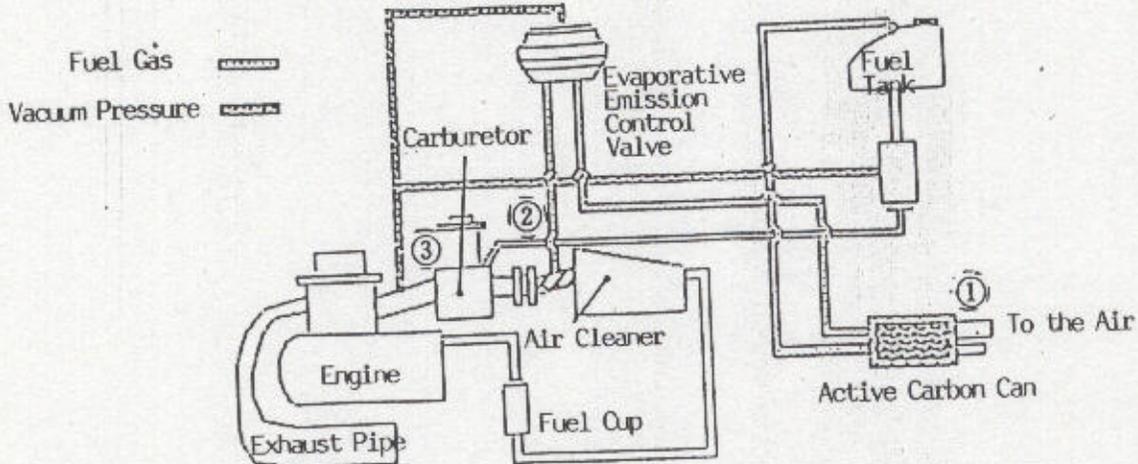
- Vacuum pump — A937X-041-xxxx
- Pressure pump —

● SPECIFICATIONS

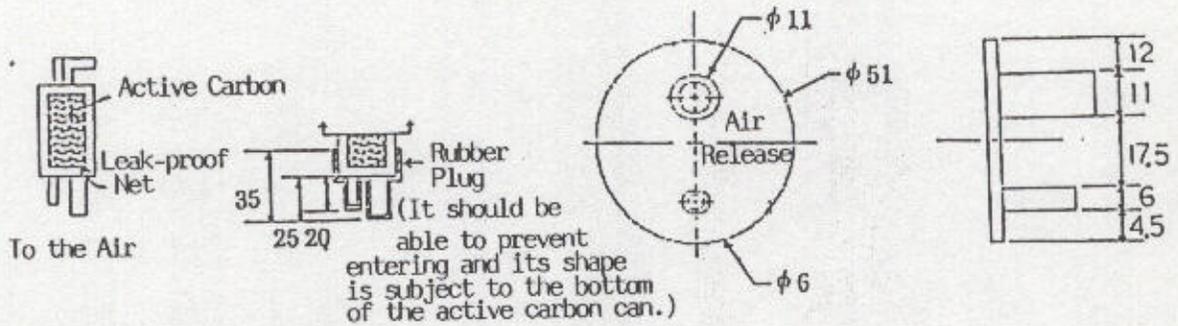
Evaporative emission control valve vacuum pressure	45m/mHg
Active carbon can capacity	90cc

MOTORCYCLE ENGINE EVAPORATIVE EMISSION CONTROL SYSTEM TEST

A. Leakage Test Piping Diagram (Simple)



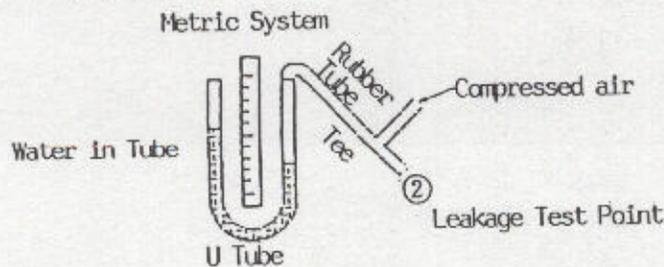
1. Active Carbon Can Plug (Point ①)



B. Leakage Test Location (Simple)

1. Active carbon can, fuel tank (Point ②)
Add compressed air into the tube at point ② to test leakage.
2. Vacuum tube (Point ③)
Add compressed air into the tube at point ③ to test leakage.

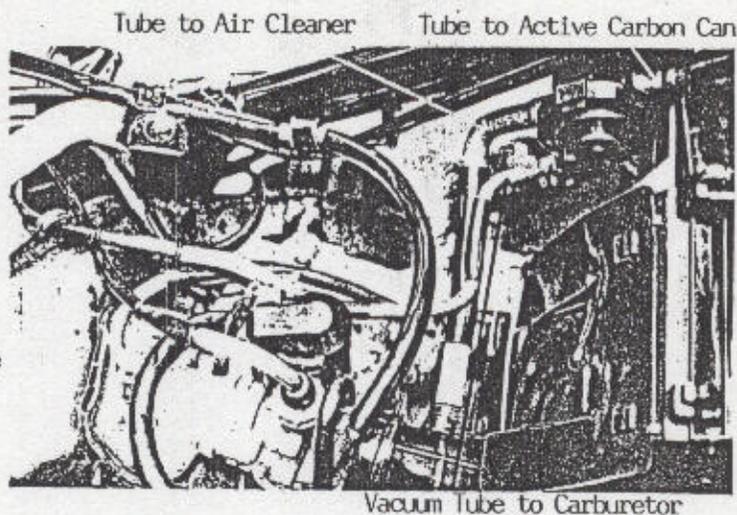
C. Leakage Test Diagram (Simple)



● EVAPORATIVE EMISSION CONTROL VALVE REMOVAL

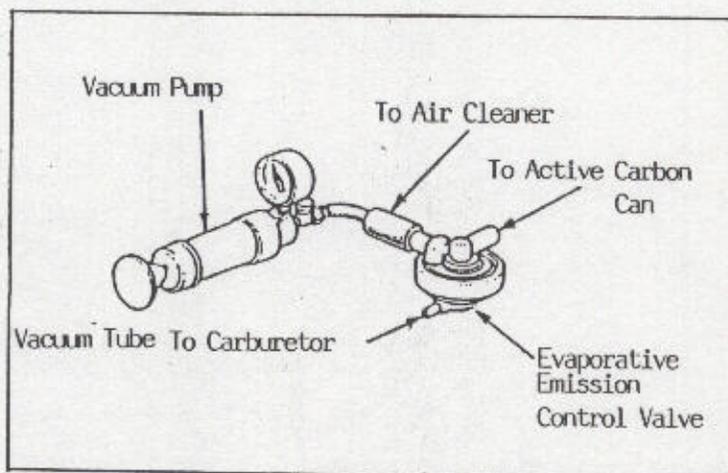
● Evaporative Emission Control Valve Removal

1. Remove the met-in box and central cover. (See 12-5)
2. Remove the vacuum tube connecting the evaporative emission control valve with the carburetor and the tubes to the active carbon can and air cleaner. Remove the evaporative emission control valve.



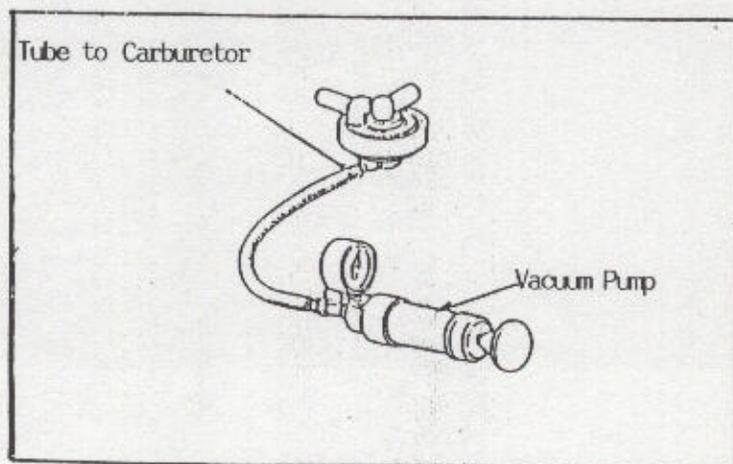
● Evaporative Emission Control Valve Inspection

Connect a vacuum pump to the evaporative emission control valve tube connecting to the air cleaner and then apply a pressure of 250m/mHg. If the pressure can be kept for one minute, it means the valve is good. If no, replace it with a new one.



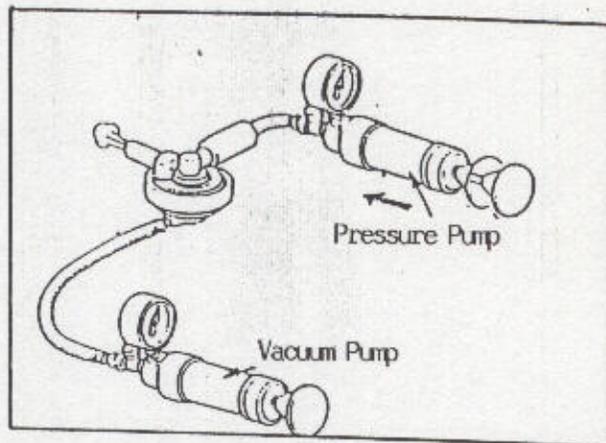
● Evaporative Emission Control Valve Vacuum Pressure Inspection

Connect a vacuum pump to the evaporative emission control valve tube connecting to the carburetor and then apply a vacuum pressure of 45m/mHg. If the pressure can be kept for one minute, it means the valve is good. If no, replace it with a new one.



● Evaporative Emission Control Valve Flow Inspection

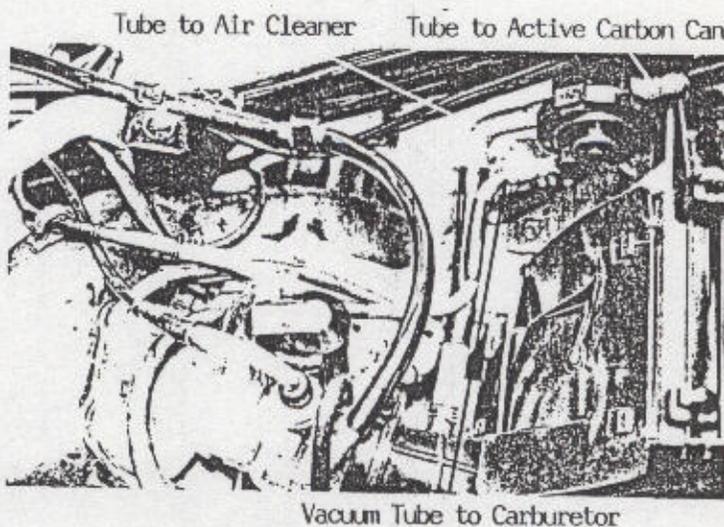
1. Connect the evaporative emission control valve vacuum tube with a vacuum pump and apply a vacuum pressure of 45m/mHg.
2. Connect a pressure pump to the evaporative emission control valve tube connecting to the active carbon can and apply a pressure. If the flow is over 9.4 liters per minute, it means the valve is good. If no, replace it with a new one.



* Do not apply high pressure air for testing to avoid damage of the evaporative emission control valve. Use hand pressure pump for operation.

● Evaporative Emission Control Valve Installation

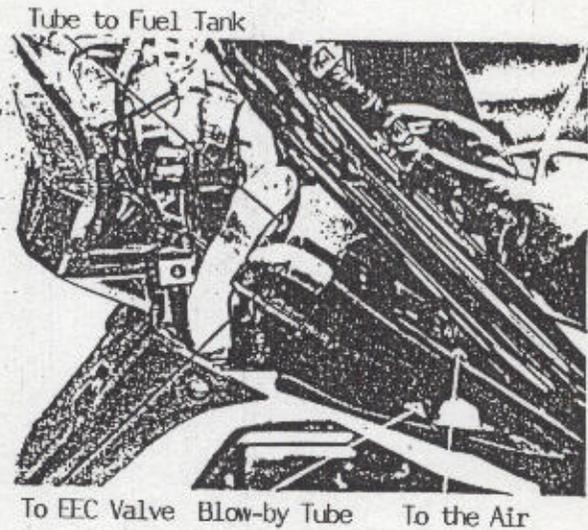
1. Install the evaporative emission control valve in the reverse order of removal.
2. Properly connect each tube of the evaporative emission control valve.



* Properly connect each tube and do not bend or twist them,

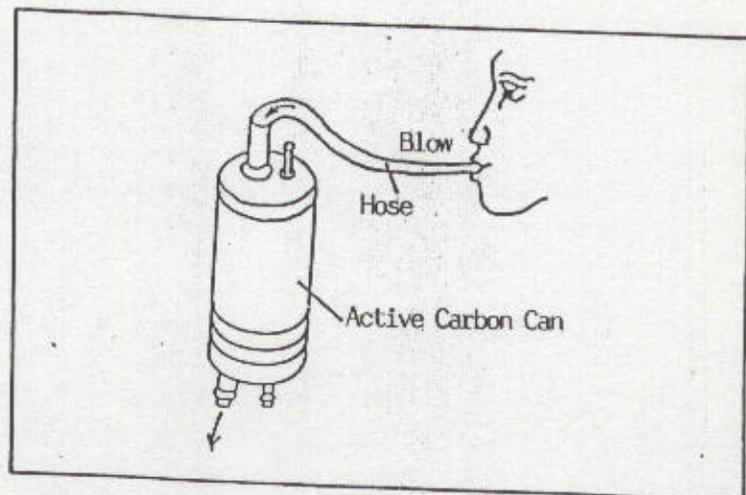
● ACTIVE CARBON CAN REMOVAL

1. Remove the side strips.
(See 12-5.)
3. Remove the right and left side covers. (See 12-5.)
3. Remove the central cover.
(See 12-5.)
4. Remove the tubes connecting the active carbon can with the fuel tank and evaporative emission control valve.
5. Remove the active carbon can.



● ACTIVE CARBON CAN INSPECTION

1. Plug the fuel tank connecting tube and blow-by tube and then connect the active carbon can to a hose. Blow the hose with mouth and the can is good if air can be blown into it. If clogged, replace the can with a new one.
2. Check the active carbon can for cracks. Replace if necessary.



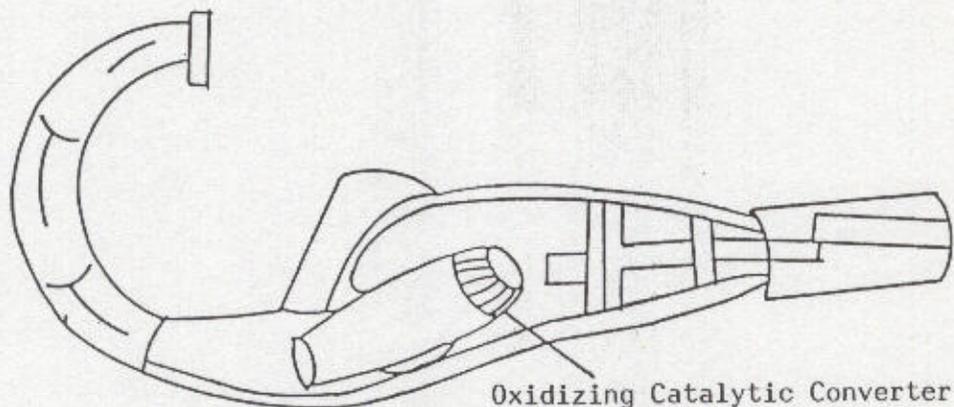
● ACTIVE CARBON CAN INSTALLATION

1. Install the active carbon can in the reverse order of removal.

- * 1. When installing the active carbon can, the blow-by tube should be located at the lowest position.
2. Do not bend or twist tube or pipe.

The exhaust emission control system adopted by this model is an oxidizing catalytic converter which is installed within the middle part of the exhaust muffler to reduce the pollutants in the exhaust gas.

● Exhaust Pipe Diagram



● Functions

Item	Purpose	Function
Oxidizing Catalytic Converter	Reduce the HC and CO content in the exhaust emission.	Use the precious metal in the oxidizing catalytic converter to oxidize the HC and CO in the exhaust emission into CO ₂ and H ₂ O to avoid air pollution.

④ TROUBLESHOOTING

● Lack of power and high CO & HO

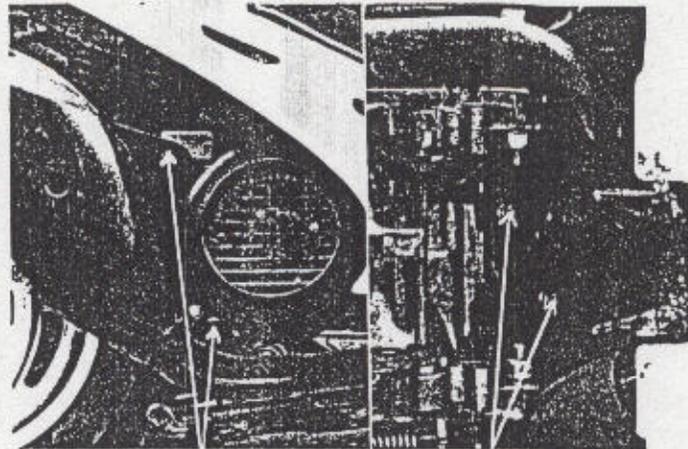
1. Clogged exhaust pipe
2. Faulty oxidizing catalytic converter
3. Incorrectly adjusted carburetor
4. Clogged air cleaner
5. Faulty spark plug
6. Incorrect ignition timing

● Engine runs erratic at idle speed and fuel-consuming

1. Clogged exhaust pipe
2. Clogged carburetor
3. Clogged air cleaner
4. Faulty spark plug
5. Incorrect ignition timing

● EXHAUST PIPE REMOVAL

1. Remove the 2 exhaust pipe joint lock nuts.
2. Remove the 3 exhaust pipe lock bolts.
3. Remove the exhaust pipe.



Lock Bolt

Joint Lock Nut

* The temperature of the exhaust pipe is very high. Be careful to avoid burns.

● EXHAUST PIPE INSPECTION

1. Check the exhaust pipe and joint for damage or crack. Replace if necessary.
2. Check the exhaust pipe joint washer for deformation or damage. Replace if necessary.

● EXHAUST PIPE INSTALLATION

1. Install the exhaust pipe in the reverse order of removal.

- * A large amount of unburned mixture flowing into the high-heat catalytic converter will reburn in the converter and damage the converter due to overheat. Pay attention to the following items.
- Use 92# or 95# nonleaded gasoline only. (Leaded gasoline will cause the catalytic converter failure.)
 - During riding, do not turn off the ignition switch to avoid a large amount of unburned mixture flowing into the exhaust pipe.
 - Faulty ignition system or fuel system will cause overheat and damage to the catalytic converter.