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## IMPORTANT SAFETY NOTICE

- WARNING** Indicates a strong possibility of severe personal injury or death if instructions are not followed.
- CAUTION:** Indicates a possibility of equipment damage if instructions are not followed
- NOTE:** Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains some warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service whether or not recommended by manufacturer, might be done or of the possibly hazardous consequences of each conceivable way, nor could manufacturer investigate all such ways. Anyone using service procedures or tools, whether or not recommended by manufacturer, must satisfy himself thoroughly that neither personal safety nor vehicle safety will be jeopardized by the service methods or tools selected.

### HOW TO USE THIS MANUAL

This service manual describes the service procedures for the Thumpstar Off Road Range

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operation condition and the emission levels are within the standards set by the California Air Resources Board.

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates what may be required to perform service described in the following sections. Section 4 through 14 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of the section.

Most sections have an assembly or system illustration, service information and troubleshooting for the section.

The subsequent pages give detailed procedures. If you don't know the source of the trouble, go to section 16, troubleshooting

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## SYMBOLS

The symbols used through out this manual show specific service procedures. If supplementary information is required it would be explained specifically in the text without the use of the symbols.

Replace the part (s) with new one (s) before assembly.
Use recommended engine oil, unless otherwise specified.
Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1:1)
Use multi-purpose grease (Lithium based multi-purpose grease NLG1#2 or equivalent).
Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLG#2 or equivalent) Example: Molykote BR-2 plus manufactured by Dow Corning, U. S. A. Multi-purpose M-2 manufactured by Mitsubishi oil, Japan
Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLG#2 or equivalent). Example: Molykote G-N paste manufactured by Dow Corning, U.S.A. Manufacture Moly 610 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan.
Use silicone grease.
Apply a locking agent. Use a middle strength locking agent unless otherwise specified.
Apply sealant.
Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.
Use Fork or Suspension Fluid.

## 1. GENERAL INFORMATION

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### GENERAL SAFETY

#### CARBON MONOXIDE

If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area.

#### WARNING

The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.

Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

#### GASOLINE

Work in a well ventilated area. Keep cigarettes, flames or sparks away from the work area or where gasoline is stored.

#### WARNING

Gasoline is extremely flammable and is explosive under certain conditions. **KEEP OUT OF REACH OF CHILDREN.**

### HOT COMPONENTS

#### WARNING

Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.

### USED ENGINE OIL

#### WARNING

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. **KEEP OUT OF REACH OF CHILDREN.**

## GENERAL INFORMATION

### SERVICE RULES

1. Use genuine Manufacturer's recommended parts and lubricants or their equivalent. Parts that do not meet Manufacturer's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws.
4. Install new gaskets, O-ring, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-14 through 1-16, Cable and Harness Routing.

### MODEL IDENTIFICATION



ENGINE SERIAL  
NUMBER

(2) The engine serial number is stamped on the lower left of the crankcase.

VEHICLE  
IDENTIFICATION

(3) The vehicle identification number (VIN) is located on the right side of the steering head.

GENERAL	ITEM	SPECIFICATIONS
	Overall Length Overall width Overall height Wheelbase Seat height Foot peg height Ground clearance Dry weight	1,430mm(71.0 in) 760mm(30.0 in) 950mm(37.4 in) 990mm(38.9in) 700mm27.6 in) 215mm(8.5 in) 240mm(9.4 in) 60 kg (180.8 lbs)
FRAME	Frame type Front suspension Rear suspension Rear damper Front tyre size Rear Tyre Caster angle Trail length Fuel tank capacity Fuel tank reserve capacity	Back bone Telescopic fork Swingarm Conventional type oil damper 2.50-10/12/14 2.50/2.75/3.00-10/12 Front/Rear: C-183A-3 Internal expanding shoe Internal expanding shoe 26° 35mm(1.4 in) 3.0&(0.79 US gal, 0.66 Imp gal 0.9&(0.24 US gal, 0.20 Imp gal)
ENGINE	Bore and stroke Displacement Compression ratio Valve train Intake valve opens at 1mm closes (0.04in) Exhaust valve opens lift closes Lubrication system Oil pump type Air filtration Crankshaft type Engine dry weight Cylinder arrangement	90cc 47mmx49.5mm 110cc 52.4mmx49.5mm 125cc 52.4mmx57mm 90cc= 86ml 110cc=107ml 125cc=122.7ml 90cc 9.0 1 110cc 9.7.1 125cc 9.0.1 Chain driven OHC with rocker arm 7.5° BTDC 12.5° ABDC 22.5° BBDC 2.5° BTDC Forced pressure and wet sump Trochoid Foam Style Oiled polyurethane foam Assembled type 21kg (46.3lbs)

## GENERAL INFORMATION

ITEM		SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	Piston valve
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Final reduction	Multi-plate, wet Automatic centrifugal 4-speed 4.059(69/17) 2.866(37/14) 1.706(36/11)
ELECTRICAL	Ignition system Starting system	CDI (Capacitive Discharge Ignition) Kickstarter and electric

LUBRICATION SYSTEM		STANDARD	SERVICE LIMIT
ITEM			
Engine oil capacity	At draining	0.6(0.6US qt, 0.5Imp qt)	-----
	At disassembly	0.8(0.8US qt, 0.7Imp qt)	-----
Recommended engine oil		GN4 4-stroke oil or equivalent Motor oil APL service classification SF or SG Viscosity: SAE 10W-30	-----
Oil pump rotor	Tip clearance	0.15(0.006)	0.12(0.005)
	Body clearance	0.02-0.07(0.001-0.003)	0.12(0.005)
	Side clearance	0.10-0.15(0.004-0.006)	0.20(0.008)

### FUEL SYSTEM

ITEM		SPECIFICATIONS
Carburetor identification number		VM22-38 VM16-486B
Main jet		125cc= 95# #95=110cc #85=90cc
Jet needle clip positioning		4th groove from top (Different in each country)
Air screw initial opening		1-1/2turns out
Float level		19mm(0.75in)
Idle speed		1,500±100rpm
Throttle grip free play		2.0-6.0mm(1/16-1/4in)

### CYLINDER HEAD/VALVES

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			981-1, 177kpa (10.0-12.0kgf/cm <sup>2</sup> , 142-171psi)at 1,000 rpm	-----
Cylinder head warpage				0.05(0.002)
Valve, Valve guide	Valve clearance	IN	0.05±0.02(0.002±0.001)	-----
		EX	0.05±0.02(0.002±0.001)	-----
Valve stemO.D.	IN	4.970-4.985(0.1957-0.1963)	4.92(0.194)	
	EX	4.955-4.970(0.1951-0.1957)	4.92(0.194)	
Valve guide I.D	IN/EX	5.000-5.012(0.1969-0.1973)	5.03(0.198)	
	IN	0.015-0.042(0.0006-0.0017)	0.08(0.003)	
Stem to guide clearance	EX	0.030-0.057(0.0012-0.0022)	0.10(0.004)	
Valve seat width	IN/EX	1.0-1.3(0.04-0.05)	2.0(0.08)	
Valve spring free length	IN/EX	33.34(1.313)	31.8(1.25)	
Rocker arm	Rocker arm I.D.	IN/EX	10.000-10.015(0.3937-0.3943)	10.10(0.398)
	Rocker arm shaftO.D.	IN/EX	9.978-9.987(0.3928-0.3932)	9.91(0.390)
Camshaft	Cam lobe height	IN	20.003-20.123(0.7875-0.7922)	19.66(0.774)
		EX	19.994-20.114(0.7872-0.7919)	19.65(0.774)

### LUBRICATION SYSTEM

ITEM		STANDARD	SERVICE ITEM
Cylinder	I.D.	THUMPSTAR	47.05(1.8524)
		THUMPSTAR	52.45(2.650)
	Out of round	-----	0.10(0.004)
	Taper	-----	0.10(0.004)
	Warpage	-----	0.05(0.002)
Piston, Piston rings	Piston mark direction	"IN"mark facing toward the intake side	-----
	Piston O.D.	38.975-38.995(1.5344-1.5352)	38.90(1.531)
	Piston O.D.measurement point	8mm(0.3in)from bottom of skirt	-----
	Piston pin bore I.D.	13.002-13.008(0.5119-0.5121)	13.06(0.514)
	Piston pin O.D.	12.994-13.000(0.5116-0.5118)	12.98(0.511)
	Piston-to-piston pin clearance	0.002-0.014(0.0001-0.0006)	0.08(0.003)
	Piston ring-to-ring	0.015-0.050(0.0006-0.0020)	0.12(0.005)
	Groove clearance	Top Second	
	Piston ring end gap	Top 0.05-0.015(0.002-0.006)	0.5(0.02)
		Second 0.05-0.20(0.002-0.008)	0.5(0.02)
Oil(side rail)		0.3-0.9(0.01-0.04)	1.1(0.04)
Cylinder-to-piston clearance		0.010-0.040(0.0004-0.0016)	0.15(0.006)
Connecting rod small end I.D.		132.016-13.034(0.5124-0.5131)	13.08(0.515)
Connecting rod-to-piston pin clearance		0.016-0.040(0.0006-0.0016)	0.12(0.005)

**CLUTCH/GEARSHIFT LINKAGE**

Unit:mm(in)

ITEM		STANDARD	SERVICE LIMIT
Clutch disc thickness	A	2.52-2.68(0.099-0.106)	2.3(0.09)
	B	3.32-3.48(0.131-0.137)	3.0(0.12)
Clutch plate warpage			0.20(0.008)
Centrifugal clutch spring free length		22.4(0.88)	19.4(0.76)
Primary drive gear I.D.		21.000-21.021(0.8268-0.8276)	21.05(0.829)
Clutch centre guide	I.D.	16.988-17.006(0.6688-0.6695)	17.04(0.671)
	O.D.	20.930-20.950(0.8240-0.8248)	20.90(0.823)
Crankshaft O.D. at clutch centre guide		16.966-16.984(0.6680-0.6687)	16.90(0.665)

Unit:mm(in)

**ALTERNATOR/CAM CHAIN TENSIONER**

ITEM		STANDARD	SERVICE LIMIT
Cam chain tensioner	Push rod O.D.	11.985-12.000(0.4718-0.4724)	11.94(0.470)
	Spring free length	111.3(4.38)	100(3.9)

**CRANKSHAFT/TRANSMISSION/KICKSTARTER**

ITEM		STANDARD	SERVICE LIMIT
Crankshaft	Side clearance	0.010-0.350(0.0004-0.0138)	0.60(0.024)
	Radial clearance	0-0.012(0-0.0005)	0.05(0.002)
	Run out	-----	0.10(0.004)
Transmission	Gear I.D.	M2 17.016-17.043(0.6699-0.6710)	17.10(0.673)
		C1 23.020-23.053(0.9063-0.9076)	23.10(0.909)
		C3 20.020-20.053(0.7882-0.7895)	20.10(0.791)
	Bushing O.D.	C1 22.979-23.000(0.9047-0.9055)	22.93(0.903)
	Bushing I.D.	C1 20.000-20.021(0.7874-0.7882)	20.08(0.791)
	Gear-to-bushing clearance	C1 0.020-0.074(0.0008-0.0029)	0.10(0.004)
	Mainshaft O.D.	M2 16.966-16.984(0.6680-0.6687)	16.95(0.667)
	Countershaft O.D.	C1 19.959-19.980(0.7858-0.7866)	19.94(0.785)
	Gear-to-shaft clearance	M2 0.032-0.077(0.0013-0.0030)	0.10(0.004)
Shift fork	Gear bushing-to-shaft clear	C1 0.020-0.062(0.008-0.0024)	0.10(0.004)
	I.D	34.075-34.100(1.3415-1.3425)	34.14(1.344)
	Claw thickness	4.86-4.94(0.191-0.194)	4.60(0.181)
Shift drum O.D.		33.950-33.975(1.3366-1.3376)	33.93(1.336)

Unit:mm(in)

**FRONT WHEEL/BRAKE/SUSPENSION/STEERING**

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth			3.0(0.12)
Cold tyre pressure		175kpa(1.75kgf/cm <sup>2</sup> ,26.25psi)	
Axe run out		-----	0.20(0.008)
Wheel rim	Radial	-----	
	Axial	-----	2.0(0.08)
Brake	Brake lever free play	10-20(3/8-13/16)	2.0(0.08)
Fork	Spring free length	376(14.8)	373.5(14.70)

**REAR WHEEL/BRAKE/SUSPENSION**

Unit:mm(in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		-----	3.0(0.12)
Cold tyre pressure		175kpa(1.75kgf/cm <sup>2</sup> ,29.25psi)	-----
Axe run out		-----	0.20(0.008)
Wheel rim run out	Radial	-----	2.0(0.08)
	Axial	-----	2.0(0.08)
Drive chain	Size/Link	DID420MBK1/88	-----
	Slack	15-25(9/16-1)	-----
Brake	Brake pedal free play	10-20(3/8-13/16)	-----
			-----

**SPECIFICATIONS**

Spark plug	Standard	CR6HSA(NGK)	U20FSR-U(DENSO)
	For cold climate/below41oF/50C	CR5HSA(NGK)	U16FSR-U(DENSO)
	For extended high speed riding	CR7HSA(NGK)	U22FSR-U(DENSO)
Spark plug gap		0.60-0.70mm(0.024-0.028in)	
Ignition coil peak voltage		100Vminimum	
Ignition coil generator peak voltage		0.7Vminimum	
Alternator exciter coil peak voltage		100Vminimum	
Ignition timing ("F" mark)		15 BTDC at idle	

TORQUE VALUES		
STANDARD		
FASTENER TYPE	TORQUE N.m(kgf:m,ibf.ft)	TORQUE N.m(kgf:m,ibf.ft)
5mm hex bolt and nut	5(0.5,3.6)	4(0.4,2.9)
6mm hex bolt and nut	10(1.0,7)	9(0.9,6.5)
8mm hex bolt and nut	22(2.2,16)	10(1.0,7)
10mm hex bolt and nut	34(3.5,25)	12(1.2,9)
12mm hex bolt and nut	54(5.5,40)	12(1.2,9)
		26(2.7,20)
		39(4.1,29)

Torque specifications listed below are for important fasteners.  
 Others should be tightened to standard torque values listed above.  
 NOTES:  
 1. Apply oil to the threads.  
 2. Apply grease to the seating surface.  
 3. U-nut.  
 4. ALOC bolt; replace with a new one.

ITEM	Q'TY	THREAD DIAMETER (mm)	TORQUE N.m(kgf.m,ibf.ft)	REMARKS
<b>MAINTENANCE:</b>				
Spark plug	1	10	12(1.2,9)	
Oil drain bolt	1	12	25(2.5,18)	
Valve adjuster hole cap	2	30	12(1.2,9)	
Valve adjuster lock nut	2	5	9(0.9,6.5)	
Clutch adjuster lock nut	1	8	12(1.2,9)	
<b>LUBRICATION SYSTEM:</b>				
Oil pump mounting screw	3	6	8(0.8,5.8)	
Oil pump cover screw	3	5	5(0.5,3.6)	
<b>ENGINE REMOVAL/INSTALLATION:</b>				
Drive sprocket fixing plate bolt	2	6	12(1.2,9)	
<b>CYLINDER HEAD/VALVES:</b>				
Cylinder head nut	4	6	11(1.1,8)	
Cylinder head right side cover bolt	2	6	10(1.0,7)	
Cam sprocket bolt	2	5	9(0.9,6.5)	
<b>CYLINDER/PISTON:</b>				
Cam chain guide roller pin bolt	1	8	10(1.0,7)	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Clutch outer cover screw	4	5	5(0.5,3.6)	
Clutch lock nut	1	14	42(4.3,31)	
Clutch assembly screw	4	5	6(0.6,4.3)	
Shift drum stopper arm bolt	1	6	13(1.3,9)	
Shift return spring pin	1	8	29(3.0,22)	
Gearshift can bolt	1	6	17(1.7,12)	
<b>ALTERNATOR/CAM CHAIN TENSIONER</b>				
Flywheel nut	1	10	41(4.2,30)	
Cam chain tensioner sealing bolt	1	14	23(2.3,17)	
Cam chain tensioner pivot bolt	1	8	16(1.6,12)	
<b>CRANKSHAFT/TRANSMISSION/KICKSTARTER</b>				
Shift drum bolt	1	6	12(1.2,9)	

**FRAME**

ITEM	QTY	THREAD DIAMETER (mm)	TORQUE N.m(kgf-m,lbf.ft)	REMARKS
<b>FRAME/BODY PANELS/EXHAUST SYSTEM</b>				
Side stand pivot bolt	1	10	----	
Muffler mounting bolt	1	8	26(2.7,20)	
Exhaust pipe protector bolt	3	6	15(1.5,11)	
Exhaust pipe cover screw	4	5	6(0.6,4.3)	
<b>MAINTENANCE:</b>				
Fuel valve mounting bolt	2	6	9(0.9,6.5)	
<b>FUEL SYSTEM:</b>				
Connecting tube band screw	1	4	1(0.1,0.7)	
<b>ENGINE REMOVAL/INSTALLATION:</b>				
Engine hanger nut	2	8	31(3.2,23)	
<b>FRONT WHEEL/BRAKE/SUSPENSION/STEERING:</b>				
Handlebar mounting nut	2	8	20(2.0,14)	
Engine stop switch/throttle housing screw	2	5	3(0.3,2.2)	
Brake lever pivot bolt	1	5	3(0.3,2.2)	
Brake lever pivot nut	1	5	3(0.3,2.2)	
Spoke nipple	28	BC2.3	2(0.2,1.4)	
Front axle nut	1	12	47(4.8,35)	NOTE 3
Front brake arm pinch bolt	1	5	6(0.6,4.3)	NOTE 4
Fork protector bolt	4	6	10(1.0,7)	
Steering stem nut	1	22	74(7.5,54)	
Steering stem top thread	1	22	----	Page 12-17
<b>REAR WHEEL/BRAKE/SUSPENSION</b>				
Spoke nipple	28	BC2.3	2(0.2,1.4)	
Rear axle nut	1	12	47(4.8,35)	NOTE 3
Driven sprocket nut	4	8	32(3.3,24)	NOTE 3
Rear brake arm pinch bolt	1	5	6(0.6,4.3)	NOTE 4
Swingarm pivot nut	1	10	39(4.0,29)	NOTE 2,3
Shock absorber mounting nut	2	10	34(3.5,25)	NOTE 3
Drive chain slider nut	1	6	12(1.2,9)	NOTE 3
<b>IGNITION SYSTEM</b>				
Ignition coil mounting bolt	1	5	6(0.6,4.3)	

**TOOLS**

NOTES:1.Equivalent commercially available in U.S.A

2.Not available in U.S.A

3.Alternative tool.

DESCRIPTION	TOOL NUMBER	REMARKS	REF.SEC
Carburetor float level gauge	07401-0010000		5
Spoke wrench, 4.1x4.5mm	07701-0020100	NOTE1	3,12,13
Pin spanner	07702-0020001		12
Valve adjusting wrench,8x9mm	07708-0030100	NOTE1	3
Valve adjuster B	07708-0030400	NOTE3 07908-KE90200(U.S.A.only)	3
Lock nut wrench,20x24mm	07716-0020100		9
Extension bar	07716-0020500	NOTE1	9
Universal holder	07725-0030000		10
Flywheel holder	07725-0040000	NOTE1	9
Attachment, 31x35mm	07746-0010100		12,13
Attachment, 37x40mm	07746-0010200		11,12
Pilot,12mm	07746-0040200		12,13
Pilot,17mm	07746-0040400		11
Bearing remover shaft	07746-0050100	NOTE1	12,13
Bearing remover head,12mm	07746-0050300	NOTE1	12,13
Drive	07749-0010000		11,12,13
Valve spring compressor	07757-0010000		7
Valve seat cutter		NOTE1	7
Seat cutter,24mm(45° IN)	07780-0010600		
Seat cutter,20.5mm(45° EX)	07780-0011000		
Flat cutter,24mm(32° IN)	07780-0012500		
Flat cutter,21.5mm(32° EX)	07780-0012800		
Interior cutter,22mm(60° IN/EX)	07780-0014202		
Cutter holder,5mm	07781-0010400		
Flywheel puller	07933-GE0000	NOTE2,3:07933-0010000	10
Valve guide driver,5.0mm	07948-MA60000		7
Ball race remover	07944-1150001		12
Steering stem driver	07946-GC40000	NOTE3:07946-MB00000	12
Valve spring compressor attachment		07946-GC4000A(U.S.A.only)	
Valve guide reamer,5.0mm	07959-KM30101		7
	07984-MA60001	NOTE3:07984-MA6000C	7
Peak voltage adaptor	07HGJ-0020100	NOTE3:Peak voltage tester	14

## LUBRICATION AND SEAL POINTS

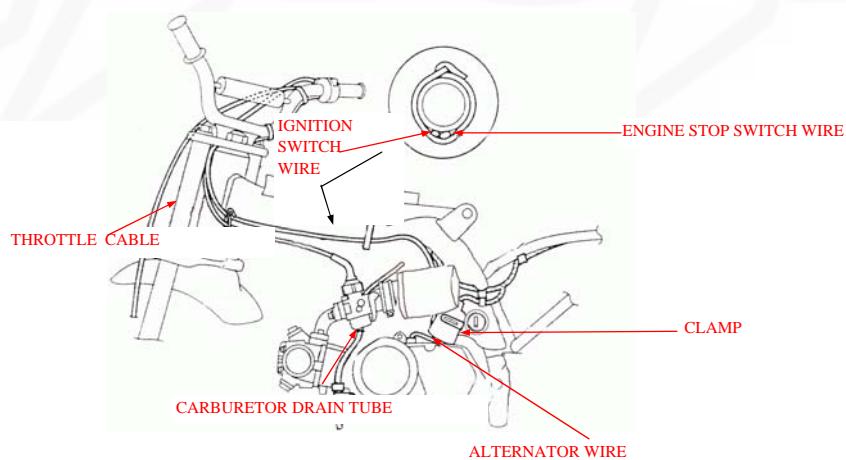
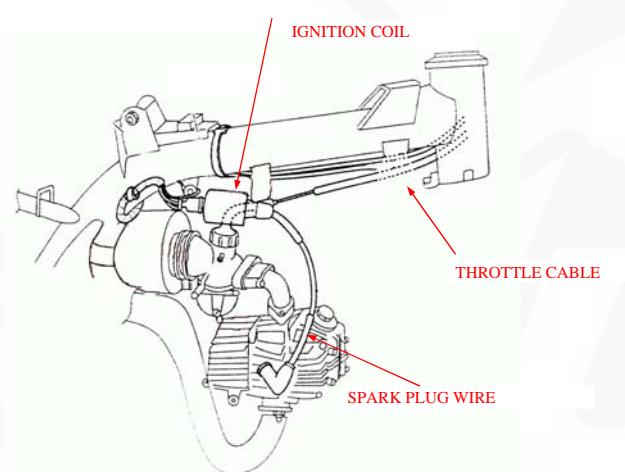
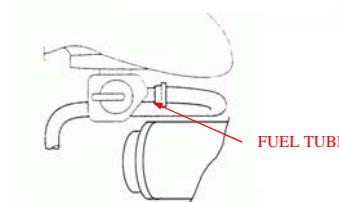
### ENGINE

LOCATION	MATERIAL	REMARKS
Cylinder bore surface	Engine oil	
Valve adjuster hole cap threads		
Connecting rod small end bearing		
Connecting rod small end inner surface		
Piston outer surface, piston pin hole and ring grooves		
Piston pin outer surface		
Valve stem sliding surface		
Camshaft lobes		
Cam chain		
Cam chain guide roller inner surface		
Rocker arm inner and slipper surfaces		
Cam chain tensioner push rod (inside)		
Oil pump rotors		
Clutch centre guide (whole surfaces)		
Clutch discs		
Primary drive gear teeth and inner surface		
Primary driven gear teeth		
Mainshaft sliding surface		
Countershaft sliding surface		
Transmission gear sliding surface, gear teeth and shifter groove		
Shift drum outer surface		
Kickstarter spindle sliding surface		
Other rotating and sliding area		
Each bearing rotating area		
Each oil seal lips		
Each O-ring		

### FRAME

LOCATION	MATERIAL	REMARKS
Air cleaner housing cover mating groove	Multi-purpose grease	
Throttle grip pipe flange		
Steering head bearing and race sliding surface		
Wheel hub dust seal lips		
Wheel bearing cavities		
Brake panel anchor pin sliding surface		
Brake cam spindle and sliding surfaces		
Brake pedal pivot		
Fork dust seal lips		
Fork slider outer surface (slider guide sliding surface)		Apply 5-6g
Fork slider guide outer groove		Apply 5-6g
Fork spring whole surface		Pack with 14g
Swingarm pivot nut seating surface		
Side stand pivot and sliding surface		
Brake cam dust seal	Engine oil	
Throttle cable outer inside	Cable lubricant	
Brake cable outer inside		
Handlebar grip rubber inside	MANUFACTURE bond A or equivalent	
Air cleaner connecting tube-housing mating area		

## CABLE & HARNESS ROUTING



## EMISSION CONTROL SYSTEMS

The California Air Resources Board (CARB) requires manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided.

### SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Controlling hydrocarbon emissions is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Manufacturer Motor Co.,Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

### EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of a lean carburetor setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

## 2.FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION-----	2-1	NUMBER PLATE-----	2-3
TROUBLESHOOTING-----	2-1	FRONT FENDER-----	2-3
SEAT-----	2-2	EXHAUST SYSTEM-----	2-4
FUEL TANK-----	2-3	SIDE STAND-----	2-5

### SERVICE INFORMATION

#### WARNING

Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.

Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.

Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.

This section covers removal and installation of the body panels, fuel tank and exhaust system.

Always replace the exhaust pipe gasket after removing the exhaust system from the engine.

When installing the exhaust system, loosely install all of the fasteners. Always tighten the exhaust pipe joint nuts first, then tighten the mounting. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.

Always inspect the exhaust system for leaks after installation.

### TORQUE VALUES

Side stand pivot bolt see page2-5

Muffler mounting bolt 26N.m(2.7kgf.m,20lbf.ft)

### TROUBLESHOOTING

#### Excessive exhaust noise

Broken exhaust system

Exhaust gas leak

#### Poor performance

Deformed exhaust system

Exhaust gas leak

Clogged muffler

## FRAME/BODY PANELS/EXHAUST SYSTEM

### SEAT

#### REMOVAL

Remove the two bolts.

Remove the two screws and bolts.

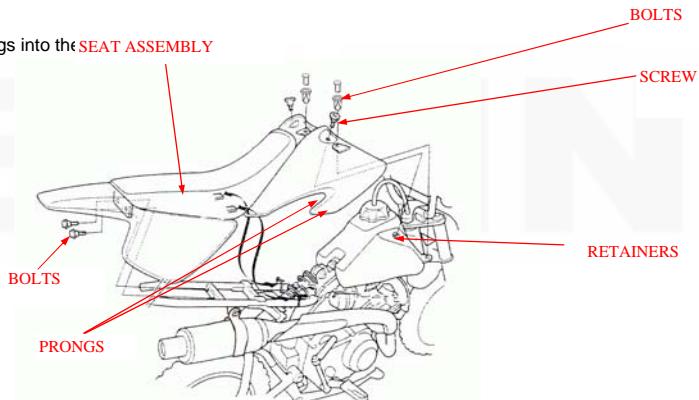
Pull the seat assembly back and remove it

#### INSTALLATION

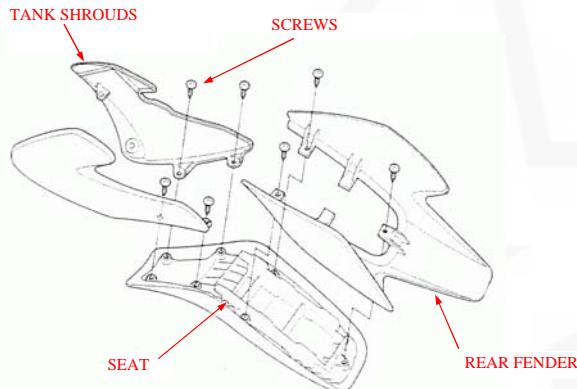
Install the seat assembly by inserting the prongs into the **SEAT ASSEMBLY** retainers on the frame

Install the bolts and screws and tighten them

Install the bolts and lock them  
by pushing the centre pin flush.



#### DISASSEMBLY/ASSEMBLY



## FRAME/BODY PANELS/EXHAUST SYSTEM

### FUEL TANK

#### WARNING

Gasoline is extremely flammable and is explosive  
under certain conditions. **KEEP OUT OF REACH OF  
CHILDREN.**

Remove the seat assembly(page2-2)

Remove the breather tube from the number plate.

Turn the fuel valve OFF and disconnect the fuel tube from  
the fuel valve.

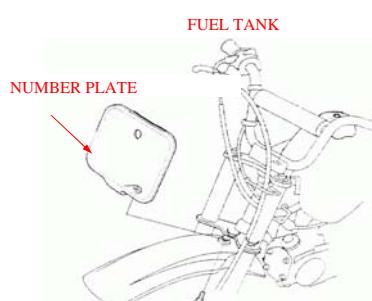
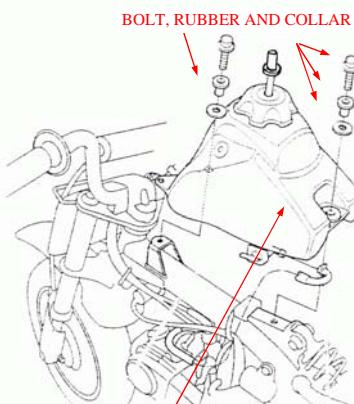
Remove the two bolts, washer and collar

Remove the fuel tank

Installation is in the reverse order of removal.

For fuel strainer service.

see page3-4



### NUMBER PLATE

Remove the breather tube from the number plate.

Remove the fender mounting bolt.

Remove the number plate from the steering stem nut and  
front fender.

Installation is in the reverse order of removal.

## FRONT FENDER

Remove the three bolts and the front fender,  
Installation is in the reverse order of removal.

## FRAME/BODY PANELS/EXHAUST SYSTEM

---

### EXHAUST SYSTEM

#### WARNING

Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.

#### REMOVAL

Remove the seat assembly (page2-2)

Remove the exhaust pipe joint nuts.

Remove the mounting bolt and the muffler.

Remove the exhaust pipe joint gasket.

For spark arrester  
maintenance,  
refer to page3-17

#### INSTALLATION

Install a new joint gasket into the exhaust port.  
Set the exhaust pipe onto the engine by aligning the exhaust pipe flange with the cylinder head studs,

then install the joint nuts and the mounting bolt.

Tighten the joint nuts

Tighten the mounting bolt

TORQUE:26N.m(2.7kgf.m,20lbf.ft)

Install the seat assembly(page2-2)

MOUNTING BOLT  
26N.m(2.7kgf.m,20lbf.ft)

GASKET

JOINT NUTS

## FRAME/BODY PANELS/EXHAUST SYSTEM

---

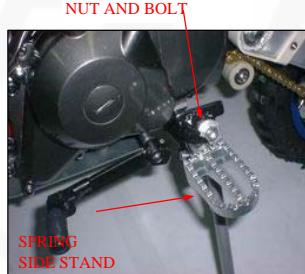
### SIDE STAND

#### REMOVAL

Support the motorcycle securely with a hoist or equivalent.

Retract the side stand and remove the following:

- return spring
- pivot nut
- pivot bolt
- side stand



#### INSTALLATION

Apply grease to the side stand pivot and sliding surfaces.

Install the side stand with the pivot bolt.

Tighten the pivot bolt.

TORQUE:10N.m(1.0kgf.m,7lbf.ft)

Loosen the pivot bolt 45-90.

Install the pivot nut and tighten it while holding the pivot bolt.

Install the return spring as shown.

Check the side stand operation for freedom of movement.



### 3.MAINTENANCE

SERVICE INFORMATION	3-1	ENGINE IDLE SPEED	3-11
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN	3-12
FUEL LINE	3-4	DRIVE CHAIN SLIDER	3-14
THROTTLE OPERATION	3-4	BRAKE SYSTEM	3-16
AIR FILTER	3-5	CLUTCH SYSTEM	3-16
SPARK PLUG	3-6	SIDE STAND	3-16
VALVE CLEARANCE	3-7	SUSPENSION	3-17
ENGINE OIL	3-8	WHEELS/TYRES	3-18
ENGINE OIL STRAINER SCREEN	3-10	STEERING HEAD BEARINGS	3-18
ENGINE OIL CENTRIFUGAL FILTER	3-10		

#### SERVICE INFORMATION

##### GENERAL

##### WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area.

Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.

When the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

Place the motorcycle on a level ground before starting any work.

##### SPECIFICATIONS

ITEM			SPECIFICATIONS
Spark plug	Standard	CR6HSA(NGK)	U20FSR-U(DENSO)
	For cold climate/below41f/5C	CR5HSA(NGK)	U16FSR-U(DENSO)
	For extended high speed riding	CR7HSA(NGK)	U22FSR-U(DENSO)

#### MAINTENANCE

ITEM		SPECIFICATIONS
Engine oil capacity	At draining	0.6L(0.6US qt,0.5Imp qt)
	At disassembly	0.8L(0.8US qt, 0.7Imp qt)
Recommended engine oil		MANUFACTURE GN4 4-stoke oil or equivalent motor oil
		API service classification SF or SG
		Viscosity: SAE 10W-30
Engine idle speed		1,500+100rpm
Throttle grip free play		2.0-6.0mm(1/16-1/14in)
Valve clearance	IN	0.05+0.02mm(0.002+0.001in)
	EX	0.05+0.02mm(0.002+0.001in)
Drive chain slack		15-25mm(5/8-1in)
Drive chain size/link		DID420MBK1/78
Brake lever free play		10-20mm(3/8-1313/16in)
Brake pedal free play		10-20mm(3/8-1313/16in)
TORQUE VALUES		
Fuel valve mounting bolt		9N.m(0.9kgf.m, 6.5ibf.ft)
Spark plug		12N.m(1.2kgf.m,9ibf.ft)
Valve adjuster hole cap		12N.m(1.2kgf.m,9ibf.ft)Apply engine oil to the threads
Valve adjuster lock nut		9N.m(0.9kgf.m,6.5ibf.ft)
Oil drain bolt		25N.m(2.5kgf.m,18ibf.ft)
Clutch adjuster lock nut		12N.m(1.2kgf.m,9ibf.ft)
Rear axle nut		47N.m(4.8kgf.m,35ibf.ft) U-nut

##### TOOLS

Valve adjusting wrench,8x10mm 07708-0030100 Equivalent commercially available in U.S.A.  
Valve adjuster B 077087-0030400 or 07908-KE90200(U.S.A.only)  
Spoke wrench,4.1x4.5mm 07701-0020100 Equivalent commercially available in U.S.A.

Clutch adjuster lock nut 12N.m(1.2kgf.m,9ibf.ft)  
Rear axle nut 47N.m(4.8kgf.m,35ibf.ft) U-nut

## MAINTENANCE

### MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION in the Owner's Manual at each scheduled maintenance period.

1:Inspect and Clean, Adjust, Lubricate or replace if necessary.

C:Clean R:Replace A:Adjust L:Lubricate

### FREQUENCY

#### ITEMS

Refer to page	WHICHEVER COMES FIRST	NOTE	INITIAL MAINTENANCE
		NOTE	MONTH
3-4	FUEL LINE		
3-4	THROTTLE OPERATION		
3-5	AIR CLEANER	NOTE1	
3-6	SPARK PLUG		
3-7	VALVE CLEARANCE		1
3-8	ENGINE OIL		R
3-10	ENGINE OIL STRAINER SCREEN		
3-10	ENGINE OIL CENTRIFUGAL FILTER		
3-11	ENGINE IDLE SPEED		1
3-12	DRIVE CHAIN	NOTE1	1,L
3-14	DRIVE CHAIN SLIDER		
3-14	BRAKE SHOES WEAR		
3-14	BRAKE SYSTEM		1
3-14	CLUTCH SYSTEM		1
3-16	SIDE STAND		
3-16	SUSPENSION		
3-17	SPARK ARRESTER		C:Every 1000mi(1600km)or Every 100 operating hours
3-18	NUTS,BOLTS,FASTENERS		1
3-18	WHEELS/TYRES		1
3-19	STEERING HEAD BEARINGS		1

Should be serviced by your dealer,unless the owner has proper tools and service data and is mechanically qualified.

In the interest of safety, we recommend these items be serviced only by your dealer.

#### NOTE

Service more frequently when ridden in wet or dusty conditions.

## MAINTENANCE

### FUEL LINE

Check the fuel line for deterioration, damage or leakage.  
Replace the fuel line if necessary.



### FUEL STRAINER SCREEN

#### WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking where the gasoline is stored can cause a fire or explosion.

Wipe spilled gasoline at once.

Turn the fuel valve OFF and disconnect the fuel tube. Place a drain pan under the fuel tube and turn the fuel valve ON to drain the fuel tank.

After the tank has drained completely, remove the two bolts and collars, and remove the fuel valve and strainer screen.

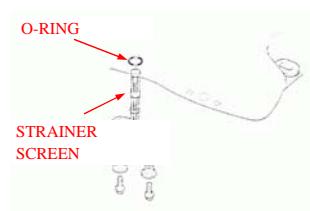
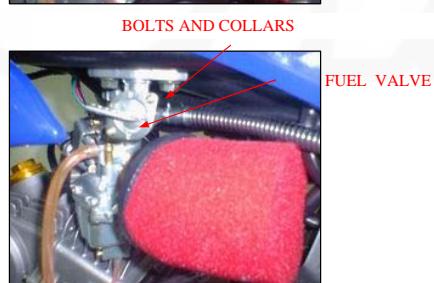
Wash the fuel strainer screen in non-flammable or high flash solvent.

Check the O-ring is in good condition, reinstall the fuel valve.

Tighten the fuel valve mounting bolts to the specified torque.

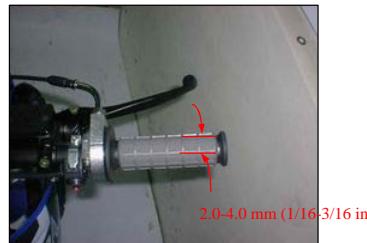
TORQUE:9N.m(0.9kgf.m,6.5lbf.ft)

After installation, check for fuel leaks.



### THROTTLE OPERATION

Check for smooth throttle grip full opening and automatic full closing in all steering positions.  
Check the throttle cable and replace it ,if it is deteriorated, kinked or damaged.  
Lubricate the throttle cable ,if throttle operation is not smooth.  
Measure the free play at the throttle grip flange.  
FREE PLAY:2.0~4.0mm(1/16~3/16 in)

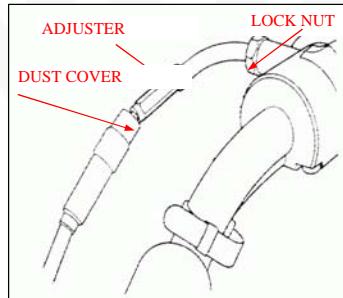


## MAINTENANCE

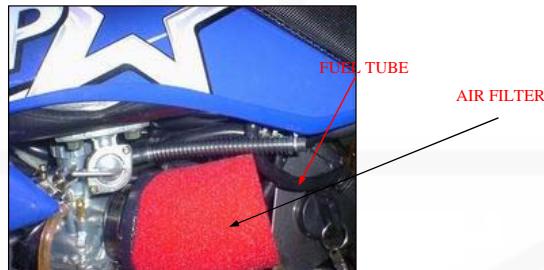
Throttle grip free play can be adjusted at the upper end of the throttle cable.

Remove the dust cover from the adjuster.  
Adjust the free play by loosening the lock nut and turning the adjuster.  
Tighten the lock nut and install the dust cover properly

Recheck the throttle operation.



### AIR FILTER



## MAINTENANCE

### SPARK PLUG

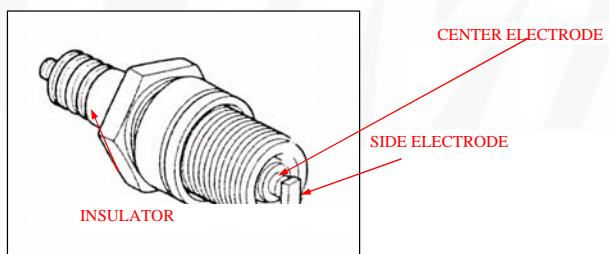
#### REMOVAL

Disconnect the spark plug cap.  
Remove the spark plug using a spark plug wrench or an equivalent.  
Inspect or replace as described in the maintenance schedule(page3-3)  
Clean around the spark plug base with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.



#### INSPECTION

Check the following and replace if necessary (recommended spark plug:page3-1)  
Insulator for damage  
Electrodes for wear  
Burning condition  
-dark to light brown indicates good condition.  
-excessive lightness indicates malfunctioning ignition system or lean mixture.  
-wet or black sooty deposit indicates over-rich mixture



#### REUSING A SPARK PLUG

Clean the spark plug electrodes with a wire brush or special plug cleaner.  
Check the gap between the center and side electrodes with a wire type feeler gauge.  
If necessary, adjust the gap by bending the side electrode carefully.

#### SPARK PLUG GAP:

0.6-0.7mm(0.024-0.028 in)



## MAINTENANCE

### CAUTION:

To prevent damage to the cylinder head, hand tighten the spark plug before using a wrench to tighten to the specified torque.

Reinstall the spark plug in the cylinder head and hand tighten, then torque it using a spark plug wrench.

TORQUE:12N·m(1.2kgf·m,9lbf·ft)



### REPLACING A SPARK PLUG

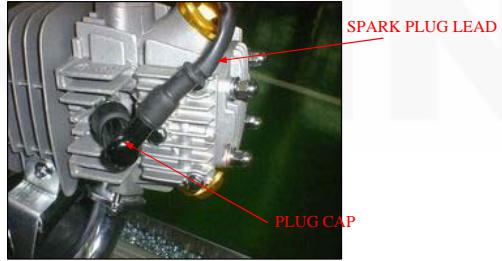
Set the plug gap to specification with a wire type feeler gauge see previous page).

### CAUTION:

DO not over tighten the spark plug.

Install and hand tighten the new spark plug, then tighten it about 1/2 of a turn after the sealing washer contacts the seat of the plug hole.

Install the spark cap.



### VALVE CLEARANCE

#### INSPECTION

Remove the valve adjuster hole caps.

Inspect and adjust the valve Clearance while The engine is cold (below 95 F/35C)



Remove the left crankcase cover(page10-2).

Turn the crankshaft counterclockwise and align the "T" mark on the flywheel with the index notch on the left crankcase.

Mark on the flywheel with the index notch on the left crankcase.

Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

This position can be obtained by confirming that there is slack in the rocker arm.

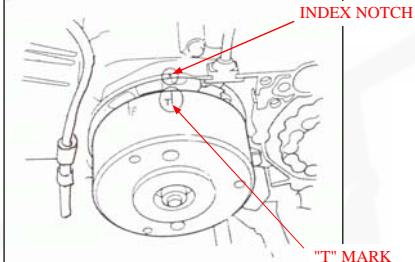
If there is no slack, rotate the crankshaft one full turn counterclockwise and match up the "T" mark again.

## MAINTENANCE

Check the valve clearance by inserting a feeler gauge between the valve adjusting screw and valve stem.

### VALVE CLEARANCE

IN/EX:0.05 0.02MM(0.002 0.001IN)



## ADJUSTMENT

Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on a feeler gauge.

Hold the adjusting screw and tighten the nut.

### TOOLS:

Valve adjusting wrench,8x9mm 07708-0030100  
(equivalent commercially available in U.S.A)

Valve adjuster B 07708-0030400 or  
07908-KE90200

TORQUE:9.N·m(0.9kgf·m,6.5lbf·ft)



Recheck the valve clearance.

Check the valve adjuster hole cap O-ring is in good condition, replace if necessary.

Coat the O-ring with clean engine oil and install them in the valve adjuster hole caps.

Apply clean engine oil to the threads. Install and tighten the valve adjuster hole caps to the specified torque.



**TORQUE:12N.m(1.2kgf-m,9lb.ft)**

Install the left crankcase cover (page 10-8).



## ENGINE OIL

### OIL LEVEL INSPECTION

Support the motorcycle in an upright position on level ground.

Remove the oil filler cap/dipstick and wipe it clean. Check the oil level by inserting the oil filler cap/dipstick into the oil filler hole without screwing it in.



## MAINTENANCE

The engine contains a sufficient amount of oil if the oil level is between the upper and lower level marks on the dipstick.

If the level is near or below the lower level mark, fill with the recommended oil up to the upper level mark.

### RECOMMENDED ENGINE OIL:

4-stroke oil or equivalent motor oil

API service classification:SF or SG

Viscosity 10W-30

#### NOTE:

Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

Reinstall the filler cap/dipstick.

## ENGINE OIL CHANGE

### WARNING

When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

Warm up the engine



Stop the engine and remove the oil filler cap/dipstick and drain bolt.

Drain the oil completely.



Used oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis. It is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. **KEEP OUT OF REACH OF CHILDREN.**

## MAINTENANCE

Check that the sealing washer on the drain bolt is in good condition, replace if necessary. Install and tighten the drain bolt.

**TORQUE:25N.m(2.5kgf-m,18lb.ft)**



Fill the crankcase with recommended engine oil (page3-8)

### OIL CAPACITY:

0.6L(0.6USqt,0.5Imp qt) at draining

0.8L(0.8USqt,0.7Imp qt) at disassembly

Install the oil filler cap/dipstick

Start the engine and let it idle for 2 to 3 minutes.

Stop the engine and recheck the oil level.

Make sure there are no oil leaks.



## ENGINE OIL STRAINER SCREEN

### CLEANING

Remove the right crankcase cover(page9-3)

Remove the oil strainer screen and the sealing rubber  
Check the screen for damage and the sealing rubber for  
damage or deterioration.

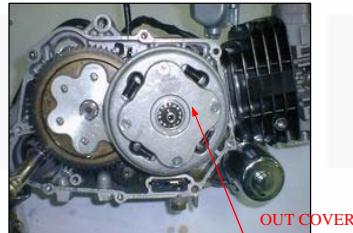
Reinstall the oil strainer screen and right crankcase  
cover(page9-17)



## ENGINE OIL CENTRIFUGAL FILTER CLEANING

Remove the right crankcase cover, ball retainer and clutch  
lifter lever(page9-3).

Remove the four screws and clutch outer cover.



---

## MAINTENANCE

---

Clean the clutch outer cover and inside the clutch outer cover  
using a clean lint-free cloth.

### CAUTION:

Do not allow dust and dirt to enter the crank shaft  
oil passage.

Do not use compressed air.



Reinstall the clutch outer cover using a new gasket  
(page9-13).



## ENGINE IDLE SPEED

### WARNING

When the engine must be running to do some work  
make sure the area is well ventilated.  
Never run the engine in an enclosed area. The exhaust  
contains poisonous carbon monoxide gas that may  
cause loss of consciousness and lead to death. Run  
the engine in an open area or with an exhaust evacuation  
system in an enclosed area.



### NOTE:

Inspect and adjust the idle speed after all other  
engine maintenance items have been performed and  
are within specifications.  
The engine must be warm for accurate idle speed  
inspection and adjustment.

Warm up the engine for about ten minutes.

Connect a tachometer.

Turn the throttle stop screw as required to obtain the  
specified idle speed.

**IDLE SPEED:**1,700±100 rpm.

## MAINTENANCE

### DRIVE CHAIN

#### DRIVE CHAIN SLACK INSPECTION

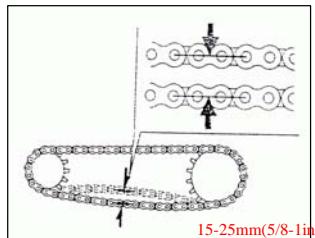
##### WARNING

Never inspect and adjust the drive chain while the engine is running.

Turn off the engine, place the motorcycle on its side stand and shift the transmission into neutral.

Check the slack in the lower drive chain midway between the two sprockets.

CHAIN SLACK:15-25mm(5/8-1in)



##### CAUTION:

Excessive chain slack,40mm(1-1/2in) or more, may damage the frame.

##### ADJUSTMENT

Loosen the axle nut.

Loosen the adjuster lock nuts and turn both adjusting nuts an equal number of turns until the correct drive chain slack is obtained.

Make sure the index marks on both adjusters are aligned with the index lines on the swingarm.

Tighten the rear axle nut to the specified torque.

TORQUE:47N.m(4.8kgf.m,345ibf.ft)

Tighten both lock nuts

Recheck the drive chain slack and free wheel rotation.

Check the rear brake pedal free play(page3-15),adjust if necessary.

Lubricate the drive chain.

Wipe off the excess oil.

##### CLEANING INSPECTION AND LUBRICATION

If the drive chain becomes extremely dirty, it should be removed and cleaned prior to lubrication

Carefully remove the retaining clip with pliers.

Removed the link plate and then the master link and now the drive chain can be removed from the sprockets.

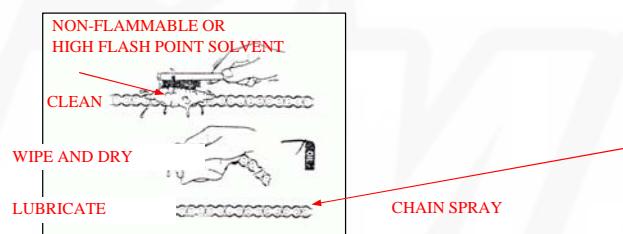
## MAINTENANCE

Clean the chain with non-flammable or high flash point solvent and wipe it dry.

Be sure the chain has dried completely before lubricating.

Lubricate the drive chain with #80-90 gear oil.

Wipe off the excess gear oil.

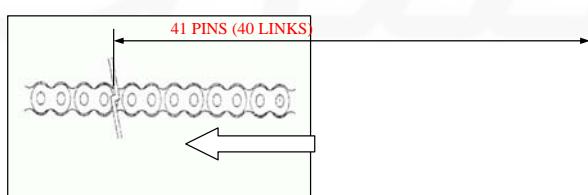


Inspect the drive chain for possible damage or wear.

Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable

Measure the drive chain length between a span of 41 pins (40 links) from pin center to pin center with the chain held taut and any kinked joint straightened.

SERVICE LIMIT:511mm(20.1in)



Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.

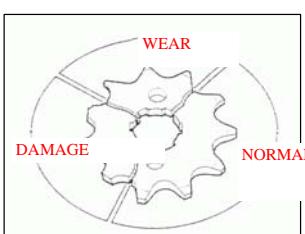
Inspect the teeth on both sprockets for wear or damage. Replace if necessary

Never use a new drive chain on worn sprockets.

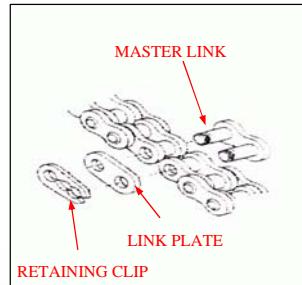
Both chain and sprockets must be in good condition, or the new replacement parts will wear rapidly.

Check the attaching bolts and nuts on both sprockets.

If any are loose, torque them.



Install the drive chain onto the sprockets.  
Install the master link and link plate.  
Install the retaining clip so that its open end is opposite the normal rotation of the chain.



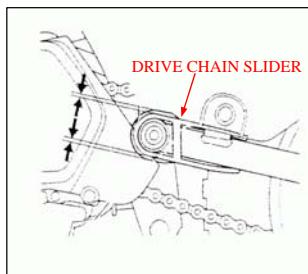
## MAINTENANCE

---

### DRIVE CHAIN SLIDER

Check the drive chain slider for wear or damage.

Replace the drive chain slider if the wear limit guide lug is worn out or it has been damaged.



## BRAKE SYSTEM

### FRONT BRAKE

Measure the front brake lever free play at the tip of the lever.

**FREE PLAY:**10-20mm(3/8-13/16IN)

### REAR BRAKE

Check the brake pedal free play.

**FREE PLAY:**10-20MM(3/8-13/16IN)

Adjust the brake pedal free play by turning the adjusting nut.

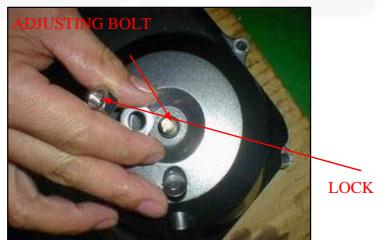
**Make sure the cutout on the adjusting nut seated on the joint pin.**

## MAINTENANCE

---

### CLUTCH SYSTEM

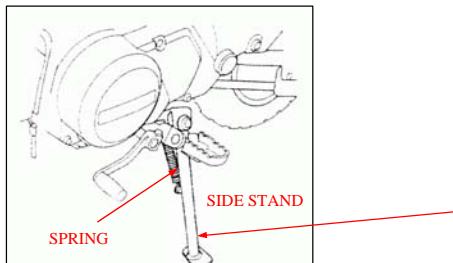
If the clutch does not operate properly, adjust by doing the following:  
Loosen the clutch adjuster lock nut and turn the adjusting bolt one full turn counter clockwise.



### SIDE STAND

Support the motorcycle on level surface.

Check the side stand spring for damage or loss of tension.  
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.



## SUSPENSION

### WARNING

Loose, worn or damaged suspension parts impair motorcycle stability and control. Repair or replace any damaged components before riding. Riding a motorcycle with faulty suspension increases your risk of an accident and possible injury.



### FRONT SUSPENSION INSPECTION

Check the action of the fork legs by operating the front brake and compressing the front suspension several times. Check the entire assembly for signs of leaks, damage or loose fasteners. Replace damaged components which cannot be repaired. Tighten all nuts and bolts.

Refer to section 12 for fork service.

## MAINTENANCE

---

### REAR SUSPENSION INSPECTION

Support the motorcycle on safety stand or box and raise the rear wheel off the ground.

Hold the swingarm and move the rear wheel sideways with force to see if the wheel bearings are worn.



Check for worn or loose suspension pivot components by grabbing the swingarm and attempting to move the swingarm side to side.

Check each fastener on the swingarm and shock absorber, if any looseness is noted.



Check the action of the shock absorber by compressing it several times.

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired. Tighten all nuts and bolts.



## MAINTENANCE

---

### WHEELS/TYRES

#### RECOMMENDED TYRE PRESSURE AND TYRE SIZE:

	FRONT	REAR
Tyre pressure kPa (kgf/cm <sup>2</sup> ,psi)	175(1.75,15)	175(1.75,18)

Tyre pressure should be checked when the TYRES are COLD.

Check the tyres for cuts, embedded nails, or other damage.

Check the front and rear wheel for trueness (refer to section 12 and 13)

Measure the tread depth at the center of the tyres.

Replace the tyres when the tread depth reaches the following limits.

#### MINIMUM TREAD DEPTH:

FRONT/REAR:3.0mm(0.12in)



Tighten any loose spokes.

**TOOL:**

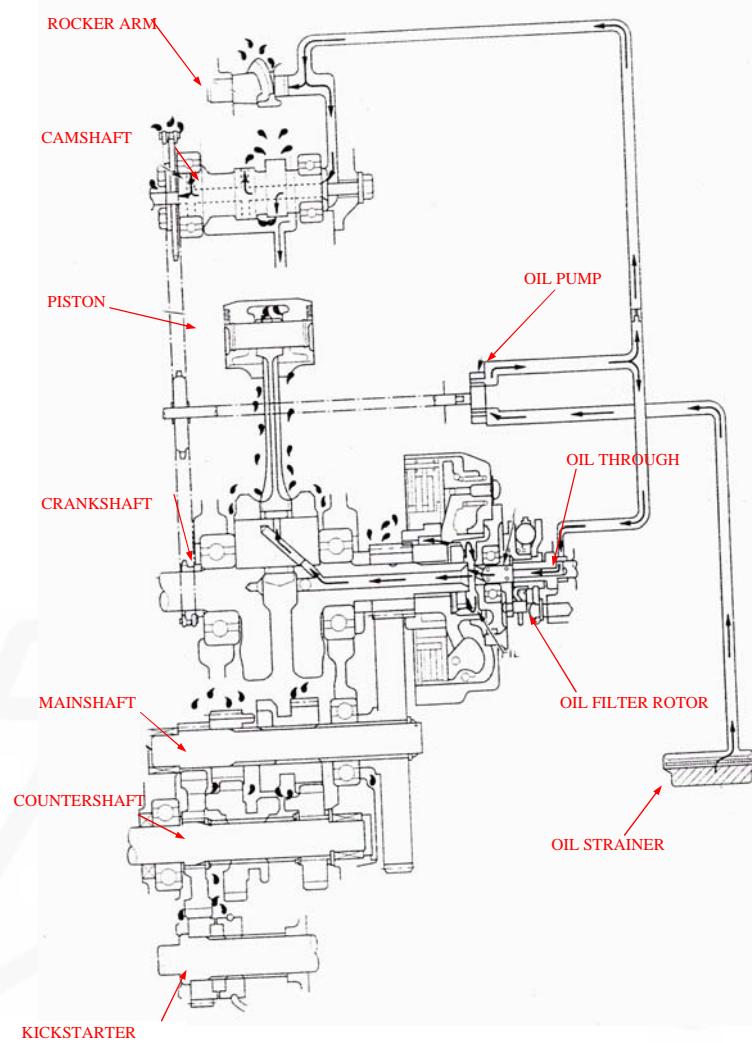
Spoke wrench,4.1\*4.5 mm 07701-0020100

**STEERING HEAD BEARINGS**

Support the motorcycle securely and raise the front wheel off the ground.

Check that the handlebar moves freely from side to side. If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearing (pages 12-15).

Check that the control cables do not interfere with handlebar rotation.

**LUBRICATION SYSTEM DIAGRAM****4.LUBRICATION SYSTEM**

LUBRICATION SYSTEM DIAGRAM.....4-0

TROUBLESHOOTING.....4-1

SERVICE INFORMATION.....4-1

OIL PUMP.....4-2

## SERVICE INFORMATION

### GENERAL

#### WARNING

When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area. Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.

The oil pump can be serviced with the engine installed in the frame.

The service procedures in this section must be performed with the engine oil drained.

If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.

After the oil pump has been installed, check that there are no oil leaks.

### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	0.6L(0.6US qt, 0.5Imp qt)	-----
	At disassembly	0.8L(0.8US qt, 0.7Imp qt)	-----
Recommended engine oil		4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-30	-----
Oil pump rotor	Tip clearance	0.15(0.006)	0.20(0.008)
	Body clearance	0.02-0.07(0.001-0.003)	0.12(0.005)
	Side clearance	0.10-0.15(0.004-0.006)	0.20(0.008)

### TORQUE VALUES

Oil pump mounting screw 8N.m(0.8kgf.m,5.8lbf.ft)

Oil pump cover screw 5N.m(0.5kgf.m,3.6lbf.ft)

### TROUBLESHOOTING

#### Engine oil level too low or high oil consumption

Normal oil consumption

External oil leak

Worn piston ring or incorrect piston ring installation

Worn cylinder

Worn valve guide or stem seal

Oil pump worn or damaged

#### Oil contamination

Oil not changed often enough

Worn piston ring or incorrect piston ring installation

Worn valve guide or stem seal

Clogged oil strainer screen

## LUBRICATION SYSTEM

### OIL PUMP

#### REMOVAL

Remove the clutch assembly(page9-4)



When the oil pump is ready to be disassembled, loosen the pump cover screws.

Remove the three screws and oil pump assembly.



#### DISASSEMBLY

Remove the three screws and oil pump cover

Remove the oil pump shaft, then remove the inner and outer rotors from the oil pump body.

## INSPECTION

Temporarily install the outer and inner rotors into the oil pump body.  
Install the oil pump shaft.

Measure the tip clearance between the inner and outer rotors.

If any portion of the oil pump is worn beyond the specified service limit, replace the oil pump as an assembly.

**SERVICE LIMIT:**0.20mm(0.008in)



Measure the pump body clearance between the outer rotor and pump body.

**SERVICE LIMIT:**0.12mm(0.005in)

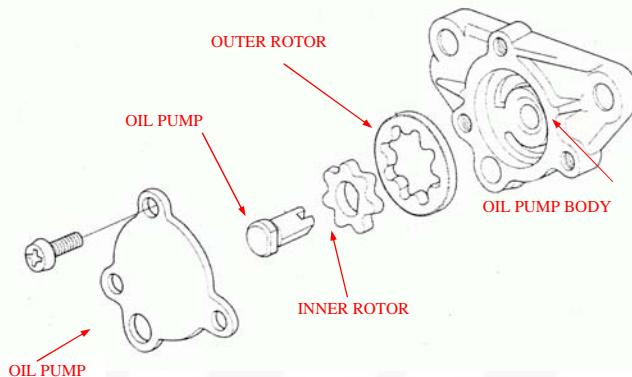


## LUBRICATION SYSTEM

Measure the side clearance using a straight edge and feeler gauge.

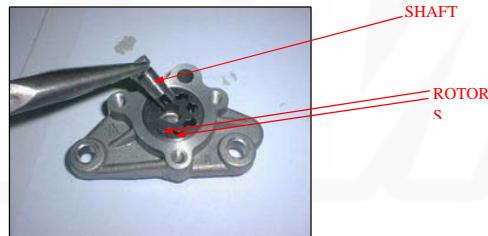
**SERVICE LIMIT:**0.20MM(0.008in)

## ASSEMBLY



Install the inner and outer rotors into the oil pump body.  
Install the oil pump shaft aligning the flat surfaces of the shaft and inner rotor.

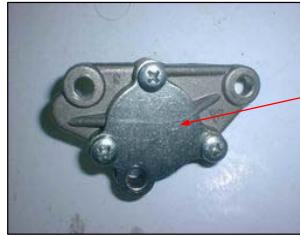
Fill the oil pump with 0.5-1cm<sup>3</sup>of engine oil.



## LUBRICATION SYSTEM

Install the oil pump cover and tighten the screws to the specified torque.

TORQUE:5N.m(0.5kgf.m,3.6lbf.ft)



### INSTALLATION

Install the rotor shaft collar into crankcase  
Install a new gasket onto the oil pump body.

Install the oil pump into the crankcase while aligning the pump shaft groove with the cam chain guide spindle lug



Install and tighten the three screws to the specified torque.

TORQUE:8N.m(0.8kgf.m,5.8lbf.ft)

Install the clutch assembly(page9-12)



## 5.FUEL SYSTEM

SERVICE INFORMATION-----5-1	CARBURETOR ASSEMBLY-----5-6
TROUBLESHOOTING-----5-2	CARBURETOR INSTALLATION-----5-8
AIR CLEANER HOUSING-----5-3	AIR SCREW ADJUSTMENT-----5-10
CARBURETOR REMOVAL-----5-3	CRANKCASE BREather-----5-11
CARBURETOR DISASSEMBLY-----5-5	

### SERVICE INFORMATION

#### GENERAL

#### WARNING

Gasoline is extremely flammable and is explosive under certain conditions. **KEEP OUT OF REACH OF CHILDREN**  
Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bind  
resulting in loss of vehicle control.

Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored  
can cause a fire or explosion.

Refer to section 2 for fuel tank removal and installation.

When disassembling fuel system parts, note the location of the O-ring. Replace them with new ones on reassembly  
Before disassembling the carburetor, place a suitable container under the carburetor drain tube. Loosen the screw  
and drain the carburetor.

After removing the carburetor, wrap the intake port of the engine with a towel or cover it to prevent any  
foreign material from dropping into the engine.

#### NOTE:

If the vehicle is to be stored for more than one month, drain the float bowl. Fuel left in the float bowl may cause clogged  
jets, resulting in hard starting or poor drivability.

## FUEL SYSTEM

### TROUBLESHOOTING

Engine will not start

- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetor
- Intake air leak
- Fuel contaminated or deteriorated
- No fuel to carburetor
  - Fuel strainer clogged
  - Fuel tube clogged
  - Float level maladjusted
  - Fuel tank breather tube clogged

Engine stall, hard to start, rough idling

- Fuel line restricted
- Ignition malfunction
- Fuel mixture too lean or too rich
- Fuel contaminated or deteriorated
- Idle speed maladjusted
- Float level maladjusted
- Fuel tank breather tube clogged
- Air screw maladjusted
- Slow circuit clogged

#### Lean mixture

- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Carburetor air vent tube clogged
- Intake air leak
- Throttle valve faulty

#### After burn when engine braking is used

- Lean mixture in slow circuit

#### Backfiring or misfiring during acceleration

- Ignition mixture in slow circuit
- Fuel mixture too lean

#### Poor performance and poor fuel economy

- Fuel system clogged
- Ignition system malfunction

#### Rich mixture

- Choke lever in CLOSED position
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner element contaminated
- Flooded carburetor

## FUEL SYSTEM

### AIR CLEANER HOUSING

#### REMOVAL AND INSTALLATION

##### NOTE:

Refer to page 3-5 for air cleaner element service

Loosen the connection tube band screw

Remove the bolt and the air cleaner housing assembly



Installation is in the reverse order of removal

At installation secure the ground eyelet with the air cleaner housing mounting bolt.

### CARBURETOR REMOVAL

#### WARNING

Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN



### THROTTLE VALVE

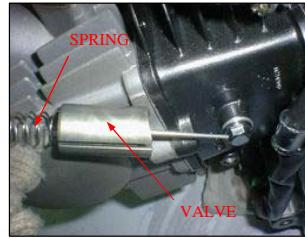
Loosen the carburetor top

Remove the carburetor top and throttle valve from the carburetor.



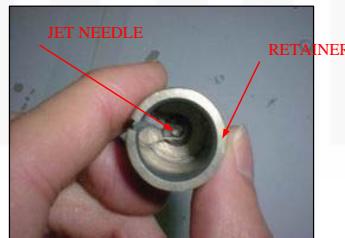
## FUEL SYSTEM

Remove the throttle cable from the throttle valve while compressing the throttle valve spring



Remove the jet needle retainer and jet needle

Check the throttle valve and jet needle for scratches or wear or damage



### CARBURETOR BODY

#### WARNING

**Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.**

Loosen the drain screw and drain the fuel from the float chamber into an approved gasoline container.

Disconnect the fuel tube and air vent tube and drain tube from the carburetor body

Loosen the carburetor connecting tube band screw.  
Remove the carburetor mounting bolts, carburetor and insulator



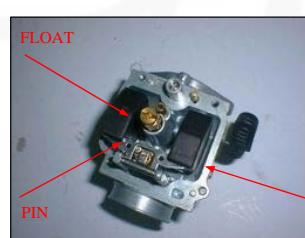
## FUEL SYSTEM

### CARBURETOR DISASSEMBLY

Remove the screws and float chamber



Remove the float pin and float and float valve.  
Inspect the float for deformation or damage.



Inspect the float valve seat for scores, scratches, clogging and damage.

Check the tip of the float valve where it contacts the valve seat for stepped wear or contamination.

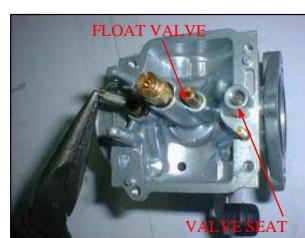
Replace the valve if the tip is worn or contaminated  
Check the operation of the float valve.

Remove the following:

- Main jet
- Needle jet
- Throttle stop screw and spring

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

Remove the air screw and spring



**CAUTION:**

Damage to the air screw seat will occur if the air screw is tightened against the seat.

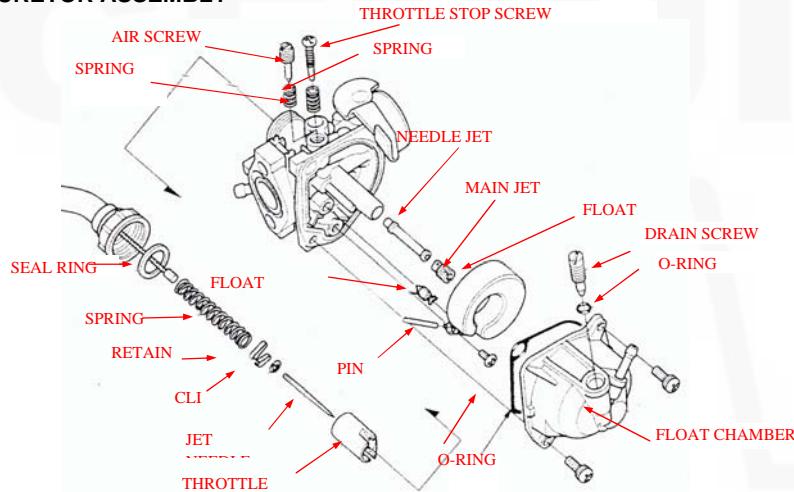
Inspect each jet for wear or damage and replace if necessary.

Clean the jets with cleaning solvent and blow with compressed air.



## FUEL SYSTEM

### CARBURETOR ASSEMBLY



Blow open each air and fuel passage in the carburetor body with compressed air.



Install the following:

- Throttle stop screw and spring
- Needle jet
- Main jet

**CAUTION:**

Handle all jets with care. They can easily be scored or scratched.

Install the air screw with the spring and return it to its original position as noted during removal.

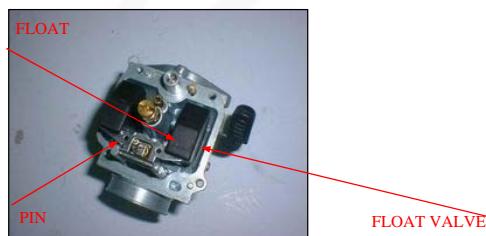
Perform the air screw adjustment procedure if a new air screw is installed (page 5-10).



## FUEL SYSTEM

Hang the float valve onto the float arm lip.

Install the float and float valve in the carburetor body, then install the float pin through the body and float.



#### FLOAT LEVEL INSPECTION

##### NOTE:

Set the float level gauge so that it is perpendicular to the float chamber face and in line with the main jet.

With the float valve seated and the float arm just touching the valve, measure the float level with the special tool as shown.

**FLOAT LEVEL:**19mm(0.75in)

##### TOOL:

Carburetor float level gauge 07401-001000

The float cannot be adjusted.

Replace the float assembly if the float level is out of specification.

Install a new o-ring into the carburetor groove properly.  
Install the float chamber.

Install and tighten the float chamber screws.



#### FUEL SYSTEM

##### CARBURETOR INSTALLATION

##### CARBURETOR BODY

Install new o-ring into the insulator and carburetor body grooves.



Install the carburetor body into the air cleaner connection tube and the insulator between the manifold and carburetor, then install the mounting bolts.

Tighten the connecting tube band screw and mounting bolts.

##### TORQUE:

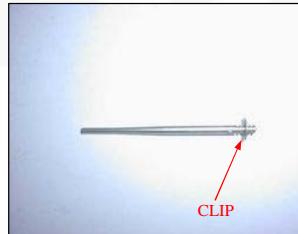
Connecting tube:1N.m(01kgf.m,0.7lbf.t)



##### THROTTLE VALVE

Install the needle clip on the jet needle

STANDARD POSITION:3rd groove from top (CR70)  
4th groove from top(CR107)



## FUEL SYSTEM

Install the jet needle into the throttle valve and secure it with the needle clip retainer.



Check the seal ring is in good condition, replace if necessary.

Install the throttle valve spring onto the throttle cable.



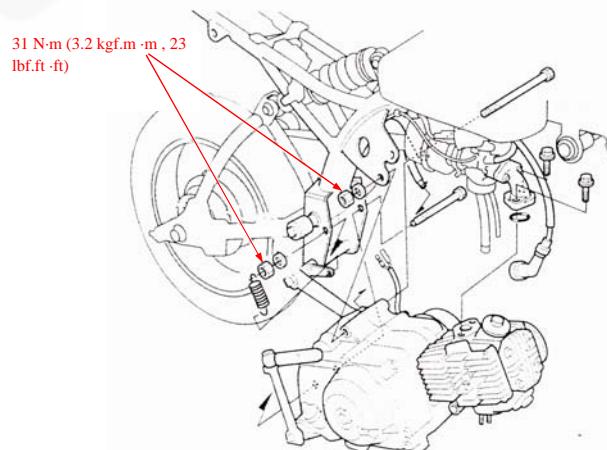
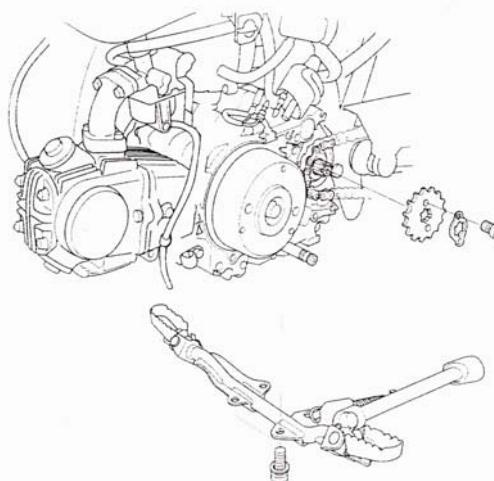
Connect throttle cable to the throttle valve while compressing the throttle valve spring.



Install the throttle valve into the carburetor body, aligning its cut-out with the throttle stop screw.



## 6. ENGINE REMOVAL AND INSTALLATION



## 6.ENGINE REMOVAL AND INSTALLATION

SERVICE INFORMATION-----6-1

ENGINE INSTALLATION-----6-4

ENGINE REMOVAL-----6-2

### SERVICE INFORMATION

#### GENERAL

During engine removal and installation, support the motorcycle securely using a hoist or equivalent.

Support the engine using a jack or other adjustable support for ease of engine hanger bolts removal.

The following components can be serviced with the engine installed in the frame.

-alternator/cam chain tensioner (section 10)

-clutch (section 9)

-cylinder/piston(section8)

-cylinder head/valves (section 7)

-gearshift linkage(section9)

-oil pump (section4)

The crankshaft, transmission and kickstarter require engine removal for service(section11).

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	21kg(46.3lbs)

### TORQUE VALUES

Drive sprocket fixing plate bolt	12N.m(1.2kgf.m,9lbf.ft)
Engine hanger nut (upper)	31N.m(3.2kgf.m,23lbf.ft)
(lower)	31N.m(3.2kgf.m,23lbf.ft)

## 6.ENGINE REMOVAL AND INSTALLATION

#### ENGINE REMOVAL

Drain the engine oil(page3-9)

Remove the following:

-exhaust system(page2-5)

-left crankcase cover(page10-2)

Disconnect the following:

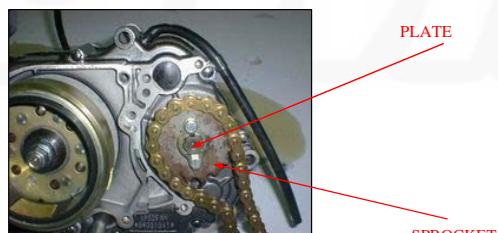
-spark plug cap

-crankcase breather tube

Remove the following from the clamp:

-carburetor drain tube

Loosen the rear axle nut and drive chain adjusters to loosen the drive chain (page 3-12)



Remove the following:

-fixing plate bolts

-fixing plate

-drive sprocket

-intake manifold bolts  
-O-ring



-brake pedal return spring

-four bolts and foot peg bar

support the  
motorcycle  
securely.

## 6.ENGINE REMOVAL AND INSTALLATION

-engine hanger nuts and washers

Place the floor jack or other adjustable support under the engine

Remove the hanger bolts and the engine from the frame

**CAUTION:**

**During engine assembly removal , hold the engine  
securely and be careful not to damage the frame and  
engine.**

### ENGINE INSTALLATION

Install the engine into the frame in the reverse order of removal.

**NOTE:**

- Note the installation of the hanger bolts. All bolts are installed from left side.
- The jack height must be continually adjusted to relieve stress from the hanger bolts.

Tighten the hanger nuts to the specified torque

**TORQUE:**31N·m(3.2kgf·m,23lbf·ft)

Install the removed parts from engine removal procedure (page 6-2 to 6-3)in the reverse order of removal.

**NOTE:**

- Replace the intake manifold o-ring with a new one.
- Note the installation of the brake pedal return spring.

**TORQUE:**

**Fixing plate bolt :**12N·m(1.2kgf·m,9lbf·ft)

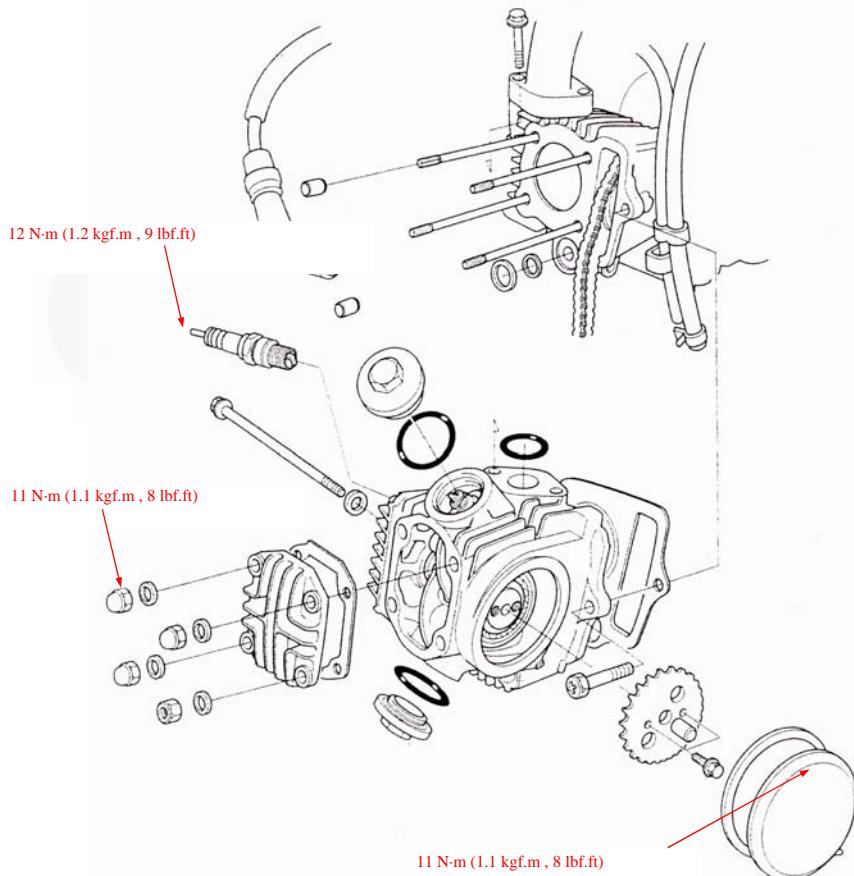
Install the following:

- left crankcase cover (page 10-8)
- exhaust system (page 2-5)

Adjust the drive chain slack (page 3-12)

Fill with the recommended engine oil (page 3-9)

## CYLINDER HEAD/VALVES



## 7.CYLINDER HEAD/VALVES

SERVICE INFORMATION-----	7-1	CAMSHAFT REMOVAL-----	7-3
TROUBLESHOOTING-----	7-2	CYLINDER HEAD-----	7-4
CYLINDER COMPRESSION-----	7-3	CAMSHAFT INSTALLATION-----	7-15

### SERVICE INFORMATION

#### GENERAL

This section covers service of the cylinder head, valves and camshaft.

The cylinder head, valves and camshaft services can be done with the engine installed in the frame.

When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.

Clean all disassembled parts with cleaning solvent and dry them off with compressed air before inspection.

Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.

Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

Refer to section 10 for cam chain tensioner service.

### SPECIFICATIONS

ITEM		STANDARD	
Cylinder compression		981-1,177kpa(10.0-12.0kgf/cm <sup>2</sup> , 142-17psi)at 1,000 rpm	
Cylinder head warpage			
Valve, valve guide	Valve clearance	IN	0.05±0.02(0.002±0.001)
		EX	0.05±0.02(0.002±0.001)
	Valve stem O.D.	IN	4.970-4.985(0.1957-0.1963)
		EX	4.955-4.970(0.1951-0.1957)
	Valve guide I.D.	IN/EX	5.000-5.012(0.1969-0.1973)
	Stem-to-guide clearance	IN	0.015-0.042(0.0006-0.0017)
		EX	0.030-0.057(0.0012-0.0022)
Valve seat width		IN/EX	1.0-1.3(0.04-0.05)
Valve spring free length		IN/EX(1)32.78 IN/EX(D)35.55	
Rocker arm/shaft	Rocker arm I.D.	IN/EX	10.000-10.015(0.3937-0.3943)
	Rocker arm shaft O.D.	IN/EX	9.978-9.987(0.3928-0.3932)
Camshaft	Cam lobe height	90/110cc	IN26.563-26.683(1.046-1.051)
			EX26.326-26.446(1.036-1.041)
	125cc	IN26.507-26.637(1.044-1.048)	
			EX26.321-26.441(1.036-1.041)

## TORQUE VALUES

Cylinder head nut	11N.m(1.1 kgf.m, 8 lbf.ft. ft)
Cylinder head right side cover bolt	10N.m(1.0 kgf.m, 7 lbf.ft. ft)
Cam sprocket bolt	9N.m(0.9 kgf.m, 6.5lbf.ft)

## 7.CYLINDER HEAD/VALVES

---

### TOOLS

Valve spring compressor	07757-001000
Valve spring compressor attachment	07959-KM30101
Valve guide reamer,5.0mm	07742-MA60000
Valve guide reamer,5.0mm	07984-MA60001 or 07984-MA6000C(U.S.A. only)
Valve seat cutters	--These are commercially available in
Seat cutter,24mm (45 IN)	07780-0010600
Seat cutter,20.5mm(45 EX)	07780-0011000
Flat cutter ,24mm(32 IN)	07780-0012500
Flat cutter ,21.5mm(32 EX)	07780-0012800
Interior cutter.22mm(60 IN/EX)	07780-0014202
	07781-0010400

### TROUBLESHOOTING

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

If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky check for a seized piston ring (Section 8).

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

Valves:

- Incorrect valve clearance
- Burned or bent valve
- Incorrect valve timing
- Broken valve spring
- Uneven valve seating

Cylinder head:

- Leaking or damaged head gasket
- Warped or cracked cylinder head

Worn cylinder, piston or piston rings (section 8)

#### Excessive noise

Cylinder head:

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Loose or worn cam chain
- Worn or damaged cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Worn rocker arm and/or shaft

Worn cylinder, piston or piston rings (section 8)

#### Rough idle

Low cylinder compression

#### Compression too high, overheating or knocking

Excessive carbon build-up on piston crown or on combustion chamber

#### Excessive smoke

Cylinder head:

- Worn valve stem or valve guide
- Damaged stem seal

Worn cylinder, piston or piston rings (section 8)

## 7.CYLINDER HEAD/VALVES

---

### CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

Stop the engine and remove the spark plug (page 3-6)

Install a compression gauge.

Shift the transmission into neutral and open the choke lever (OFF).

Open the throttle all the way and crank the engine with the kickstarter until the gauge reading stops rising.

#### COMPRESSION PRESSURE:

981-1,177kPa(10.0-12.0kgf/cm<sup>2</sup>,142-171psi)at 1,000 rpm.

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head

#### CAMSHAFT REMOVAL

Drain the engine oil(page3-9)

Remove the following:

- Valve adjuster hole cap (page 3-7)
- Left crankcase cover (page 10-2)
- Sealing bolt, tensioner spring and tensioner push rod to loosen the cam chain tensioner (page 10-4)

Disconnect the spark plug cap.

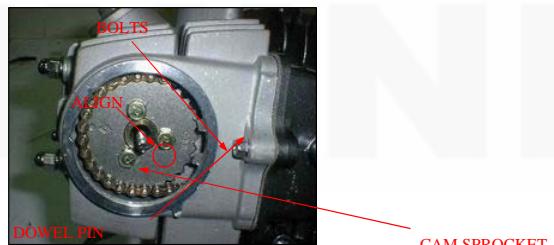
Loosen the cylinder head side cover 6 mm bolt.

Tap the head of the 6mm bolt and release the cylinder head left side cover from the cylinder head. Remove the 6 mm bolt ,sealing washer and cylinder head left side cover.

Turn the crankshaft counter clockwise, and align the "O" mark on the cam sprocket with the index notch on the cylinder head.

Remove the bolts, cam sprocket and dowel pin.

Secure the cam chain with a piece of wire to prevent it from falling into the cylinder.



## 7.CYLINDER HEAD/VALVES

Loosen the valve adjusting screw fully to make a valve clearance maximum(page3-8).

Temporarily install the cam sprocket bolts into the camshaft and remove the camshaft from the cylinder head while holding the rocker arms.



#### INSPECTION

Turn the outer race of each camshaft bearing with your finger.

The outer race should turn smoothly and quietly.

Also check that the bearing inner race fits tightly on the camshaft.

Replace the camshaft assembly if the outer race does not turn smoothly and quietly, or if it fits loosely on the camshaft.



Using a micrometer, measure each cam lobe height.

#### SERVICE LIMITS:

90/110/125cc :IN:26.22mm(1.032in)  
EX:25.98mm(1.023in)



#### CYLINDER HEAD REMOVAL

Remove the following:

- Muffler (page 2-4)
- Camshaft (page 7-3)

Remove the intake manifold bolts.



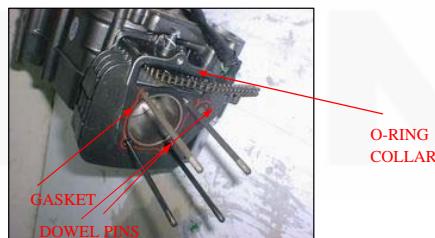
## 7.CYLINDER HEAD/VALVES

Remove the following:  
-Cap nuts/seating washers  
-Nut/sealing washer  
-Cylinder head cover  
-Gasket

Remove the cylinder head mounting bolt and cylinder head.



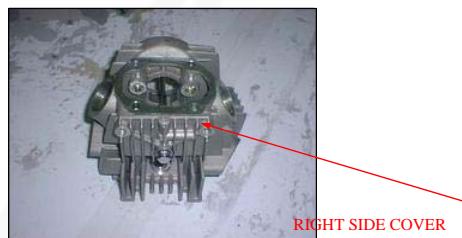
Remove the following:  
-Gasket  
-Dowel pins  
-Collar  
-O-ring



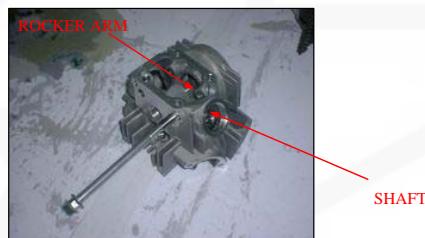
### DISASSEMBLY

Remove the spark plug.

Remove the bolts and cylinder head right side cover.



Temporarily install a 8 mm bolt to the rocker arm shaft and remove the rocker arm shafts and rocker arms.



## 7.CYLINDER HEAD/VALVES

Remove the valve springs using the special tools as shown.

### TOOLS:

Valve spring compressor 07757--0010000.  
Valve spring compressor attachment 07959--KM30101

### CAUTION:

To prevent loss of tension ,do not compress the valve springs more than necessary to remove the cotters.

Remove the following :  
-Spring retainer  
-Valve spring  
-Valve  
-Stem seal  
-Valve spring seat  
-Cotters

Mark all parts during disassembly so they can be placed back in their original locations.



### INSPECTION

#### CYLINDER HEAD

Remove carbon deposits from the combustion chamber.

Check the spark plug hole and valve areas for cracks.

Avoid damaging the gasket surface.

Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT:0.05mm(0.002 in)

## 7.CYLINDER HEAD/VALVES

---

### ROCKER ARM

Inspect the rocker arm slipper surfaces for wear or damage.  
Also check that the oil holes are not clogged.

Measure the rocker arm I.D.

If either rocker arm requires service or replacement, inspect the cam lobes for scoring, chipping or flat spots.

SERVICE LIMIT: IN/EX>10.10mm(0.398 in)



Inspect the rocker arm shafts for wear or damage.

Measure the O.D. of the rocker arm shaft.

SERVICE LIMIT: IN/EX:9.91mm(0.390 in)

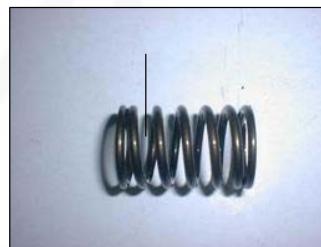


### VALVE SPRING

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

SERVICE LIMITS: IN/EX:31.8mm(1.25 in)

Replace the springs if they are shorter than the service limits.



### VALVE

Inspect each valve for bending, burring or abnormal stem wear.

Check valve movement in the guide.

Measure and record each valve stem O.D.

SERVICE LIMIT: IN/EX:4.92mm(0.194 in)



## 7.CYLINDER HEAD/VALVES

---

Ream the guides to remove any carbon deposits before measuring the guide.

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

### TOOL:

Valve guide reamer, 5.0 mm 07984-MA60001 or  
07984-MA6000C  
(U.S.A only)



Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX"5.03mm (0.198 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

### SERVICE LIMITS:

IN:0.08mm (0.003in)  
EX:0.10mm(0.004in)

If the stem-to-guide clearance is out of specification, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit. If the stem-to-guide clearance is out of specification with a new guide also replace the valve.

Reface the valve seats whenever the valve guides are replaced (page7-9)

#### VALVE GUIDE REPLACEMENT

Chill new valve guides in the freezer section of a refrigerator for about an hour.  
Heat the cylinder head to 212-302(100-150.C)with a hot plate or oven.

#### WARNING

To avoid burns, wear heavy gloves when handling the heated cylinder head.

#### CAUTION:

Do not use a torch to heat the cylinder head ;it may cause warping.



Support the cylinder head and drive out the valve guides out of the cylinder head from the combustion chamber side.

#### TOOL:

Valve guide driver,5.0mm 07492-MA60000

## CYLINDER HEAD/VALVES

Coat new O-ring with engine oil and install them onto new valve guides.

While the cylinder is still heated, drive the guides in the cylinder head from the camshaft side until they are fully seated.

#### TOOL:

Valve guide driver,5.0mm07942-MA60000

Let the cylinder head cool to room temperature.



Ream the new valve guide after installation.

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

#### TOOL:

Valve guide reamer,5.0mm 07984-MA600001or 07984-MA60000C



#### NOTE:

Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles.

Reface the valve seat (see below)

#### VALVE SEAT INSPECTION/REFACING

Clean the intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to the valve seats.  
Lap the valves and seats using a rubber the hose or other hand-lapping tool.



Remove and inspect the valves.

#### CAUTION:

The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.

Inspect the width of each valve seat.

STANDARD: 1.0--1.3 mm (0.04--0.05 in)

SERVICE LIMIT:2.0mm (0.08in)

If the seat is too wide, too narrow or has low spots, the seat must be ground.

## CYLINDER HEAD/VALVES

### VALVE SEAT REFACING

Valve seat cutters/grinders equivalent valve seat refacing equipment are recommended to correct worn valve seats.

#### NOTE:

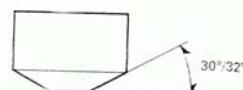
Follow the refacing manufacturers operation instructions.

Use a 45-degree cutter to remove any roughness or irregularities from the seat.

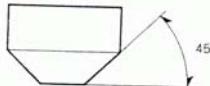
Reface the seat with a 45-degree cutter whenever a valve guide is replaced.

Use a 32-degree (IN:30) cutter to remove the top 1/4 of the existing valve seat material.

### VALVE SEAT CUTTERS



IN: 07780-0012500 (24 mm/30°)  
EX: 0778-0012800 (21.5 mm/32°)

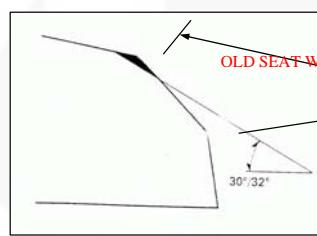
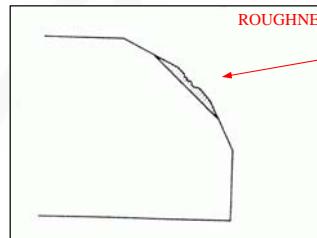


IN: 07780-0010600 (24 mm/30°)  
EX: 0778-0011000 (21.5 mm/32°)



IN: 07780-0014202 (22 mm)

### ROUGHNESS



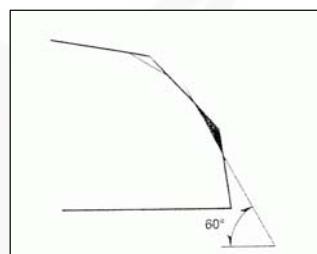
## CYLINDER HEAD/VALVES

Use a 60-degree cutter to remove the bottom 1/4 of the old seat.

Remove the cutter and inspect the area you have refaced.

Install a 45-degree finish cutter and cut the seat to the proper width.

Make sure that all pitting and irregularities are removed.  
Refinish if necessary.



Apply a thin coating of Prussian Blue to the valve seat.  
Press the valve through the valve guide and onto the seat to make a clear pattern.

#### NOTE:

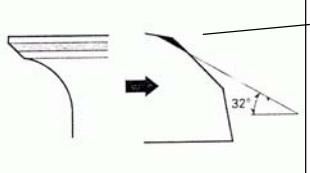
The location of the valve seat in relation to the valve face is very important for good sealing.

If the contact area is too high on the valve, the seat must be lowered using a 32-degree flat cutter.

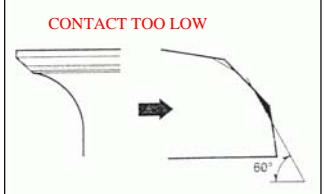
If the contact area is too low on the valve, the seat must be raised using a 60-degree inner vutter.

Refinish the seat to specifications using a 45-degree finish cutter.

### CONTACT TOO HIGH



### CONTACT TOO LOW



## CYLINDER HEAD/VALVES

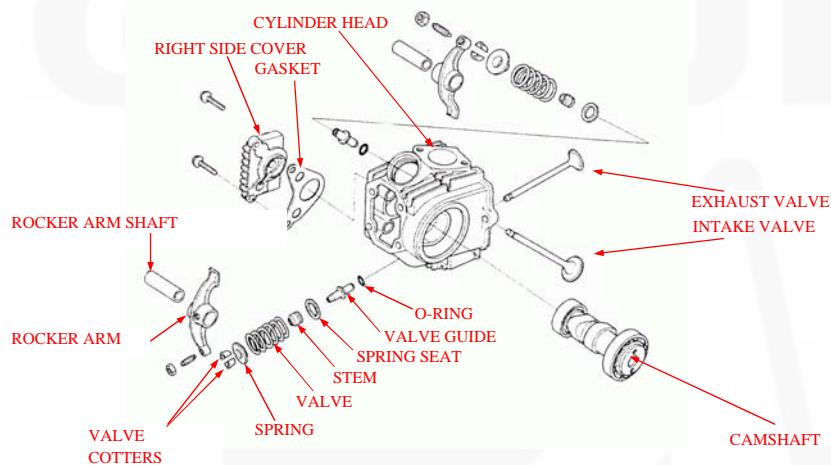
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

Do not allow lapping compound to enter the guides.



After lapping, wash all residual compound off the cylinder head and valve.

### ASSEMBLY



Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the valve stems with engine oil and insert the valve into the valve guide.

To avoid damage to the stem seal, turn the valve slowly when inserting.

Install the valve springs with the tightly wound coils facing the combustion chamber.

Install the valve spring retainer.



## CYLINDER HEAD/VALVES

Install the valve cotters using the special tool as shown.

### TOOL:

Valve spring compressor 07757-0010000

Valve spring compressor attachment 07959-KM30101

### CAUTION:

Support the cylinder head above the work bench so that the valve heads will not contact anything that cause damage.



Apply engine oil to the rocker arm inner and slipper surfaces.

Install the rocker arms and rocker arm shafts.

Install the rocker arm shaft with its threaded end facing the right side.

Install a new gasket onto the cylinder head right side cover.

Install the right side cover onto the cylinder head.

## CYLINDER HEAD/VALVES

Install the right side cover bolts.



### INSTALLATION

Clean off the gasket material from the cylinder surface.

Install the following.

- New O-ring
- Collar
- Dowel
- New gasket



Route the cam chain through the cylinder head and install the cylinder head.



Install a new gasket onto the cylinder head and then install the cylinder head cover.

Install the cylinder head cover with its arrow mark facing down.



## CYLINDER HEAD/VALVES

Install the following:

- Cap nuts/new sealing washers
- Nut/new sealing washer

### NOTE:

Note the position of the washers and nuts.

Tighten the cylinder head cover nuts to the specified torque.



TORQUE:11N.m(1.1 kgf.m , 8lbf.ft)

Install and tighten the cylinder head mounting bolt.

If the cylinder was removed, tighten the cylinder mounting bolt.

Install a new O-ring into the groove in the intake manifold.



Install and tighten the intake manifold bolts.

Install the following.

- Spark plug (page3-7).
- Muffler (page 2-4)
- Camshaft (see below)



#### CAMSHAFT INSTALLATION

Apply clean engine oil to the camshaft lobes and bearings. Install the camshaft into the cylinder head with its cam lobes facing the combustion chamber while holding the rocker arms.



#### CYLINDER HEAD/VALVES

Turn the crankshaft counterclockwise and align the "T" mark with the index notch on the left crankcase.



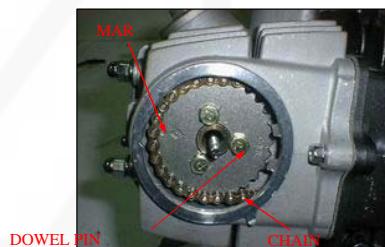
Install the dowel pin and cam sprocket.

**NOTE:**

Install the cam sprocket with its "O" mark with the index notch on the cylinder head.

Install and tighten the cam sprocket bolts to the specified torque.

**TORQUE:**9N.m(0.9kgf.m ,6.5lbf.ft)



Install the cylinder head left side cover onto the cylinder head with a new gasket.



Set the tab on the side cover against the left side of the stopper on the cylinder head.

Install the 6mm bolt with a new sealing washer into the cylinder head tighten it.

Tighten the two right side cover bolts if the cylinder head was disassembled.

Install the spark plug cap.

**TORQUE:**10N.m(1.0kgf.m, 7lbf.ft)

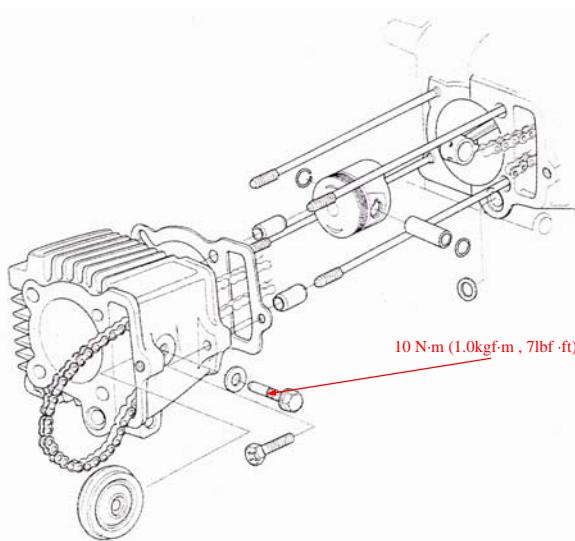


#### CYLINDER HEAD/VALVES

Install the tensioner push rod, spring and sealing bolt (page 10-5).

Adjust the valve clearance (page3-7).  
Pour the recommended engine (page 3-9)

## CYLINDER/PISTON



### 8.CYLINDER/PISTON

SERVICE INFORMATION-----	8-1	CYLINDER/PISTON INSPRCTION-----	8-4
TROUBLESHOOTING-----	8-2	PISTON INSTALLATION-----	8-7
CYLINDER REMOVAL-----	8-3	CYLINDER INSTALLATION-----	8-7
PISTON REMOVAL-----	8-3		

#### SERVICE INFORMATION

##### GENERAL

The cylinder and piston service can be done with the engine installed in the frame. Camshaft lubrication oil is fed to the cylinder head through an orifice in the cylinder head, cylinder and crankcase. Make sure that orifice is not clogged and that the O-ring and dowel pins are in place before installing the cylinder.

##### SPECIFICATIONS

ITEM			STANDARD	
Cylinder	I.D	39.005-39.015(1.5356-1.5360)		
	Out of round	-----		
	Taper	-----		
	Warpage	-----		
	Piston mark direction	"IN" mark facing toward the intake side		
piston rings	Piston O.D. measurement point	8mm(0.3in)from bottom of skirt		
	Piston pin bore I.D.	13.002-13.008(0.5119-0.5121)		
	Piston pin O.D.	12.994-13.000(0.5116-0.5118)		
	Piston-to-piston pin clearance	0.002-0.014(0.0001-0.0006)		
	Piston ring-to-ring groove clearance	0.015-0.050(0.0006-0.0020)		
	Piston ring end gap	Top	0.05-0.15(0.002-0.0016)	
		Second	0.05-0.20(0.002-0.0016)	
		Oil side rail)	0.3-0.9(0.01-0.04)	
Cylinder-to-piston clearance		0.010-0.040(0.0004-0.0016)		
Connecting rod small end I.D		13.016-13.034(0.5124-0.5131)		
Connecting rod -to-piston pin clearance		0.016-0.040(0.0006-0.0016)		

#### TORQUE VALUES

Cam chain guide roller in bolt

10N.m(1.0kgf.m, 7lbf.ft)

## CYLINDER/PISTON

### TROUBLESHOOTING

If the performance is poor at low speeds, check for white smoke in the crankcase breather tube.  
If the tube is smoky, check for a seized piston ring.

Cylinder compression is too low, or engine is hard to start.

Blown cylinder head gasket

Worn, stuck or broken piston ring.

Worn or damaged cylinder or piston.

Piston sounds

Worn cylinder, piston and/or piston ring.

Worn piston pin hole and piston pin.

Worn connecting rod small end.

Cylinder compression is too high, or engine overheats or knocks  
Carbon deposits on the cylinder head and /or piston crown.

Excessive smoke

Worn, stuck or broken piston ring.

### CYLINDER REMOVAL

Remove the cylinder head page 7-4)



Remove the cam chain guide roller bolt, washer and guider roller.

Remove the mounting bolt and cylinder.



### PISTON REMOVAL

Remove the piston in clip with pliers.



Press the piston pin out of the piston and remove the piston.

Do not let the piston pin clips fall into the crankcase.

Remove the piston rings.

Do not damage the piston rings during removal.



### CYLINDER/PISTON INSPECTION

Inspect the cylinder bore for wear or damage.

Measure the cylinder I.D. in X and Y axis at three levels.

Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 39.05mm(1.537in)

Calculate the piston-to-cylinder clearance.

Take a maximum reading to determine the clearance.

Refer to page 8-5 for measurement of piston O.D.

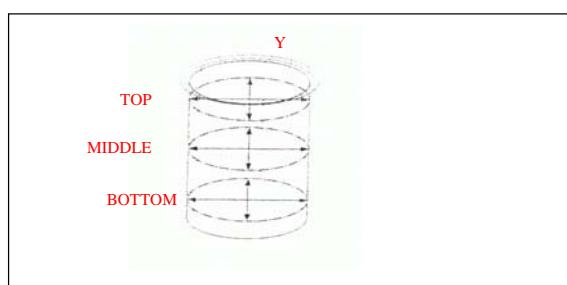
SERVICE LIMIT: 0.15mm(0.006in)

Calculate the taper and out of round at three levels in X and Y axis. Take the maximum reading to determine them.

SERVICE LIMIT:

Taper:0.10mm(0.004in)

Out of round:0.10mm(0.004in)



The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:

0.25mm(0.010in)  
0.50mm(0.020in)

The piston to cylinder clearance for the oversize piston must be:0.010-0.040mm(0.0004-0.0016in).

Inspect the top of the cylinder for warpage.

SERVICE LIMIT:0.05mm(0.002in)

Remove any carbon deposits from the piston ring grooves, using an old piston ring as shown.



---

## CYLINDER/PISTON

---

Temporarily install the piston to their proper position with the mark facing up.

Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

SERVICE LIMITS:

Top:0.12mm(0.005in)  
Second:0.12mm(0.005in)



Inspect the piston for wear or damage.

Measure the diameter of the piston at 8mm(0.3in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT:38.90mm(1.531in)

Measure the piston pin bore.  
SERVICE LIMIT:13.06mm(0.514in)



Measure the O.D. of the piston pin.

SERVICE LIMIT:12.98mm(0.511in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT:0.08mm(0.003in)



---

## CYLINDER/PISTON

---

Measure the connecting rod small end I.D.

SERVICE LIMIT: 13.08MM(0.515in)

Calculate the connecting rod-to-piston pin clearance

SERVICE LIMIT:0.12mm(0.005in)



Insert the piston rings squarely into bottom of the cylinder and measure the ring end gap.

#### SERVICE LIMITS:

Top:	0.5mm(0.02in)
Second:	0.5mm(0.02in)
Oil side rail):	1.1mm(0.04in)

Push the ring into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

#### PISTON RING INSTALLATION

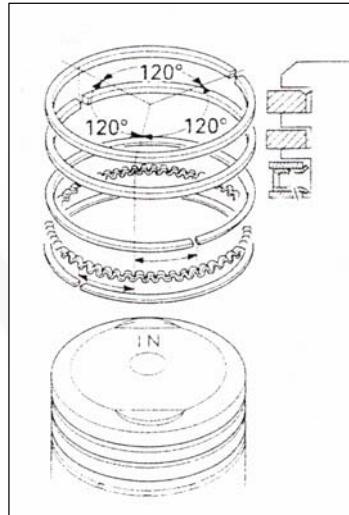
Clean the piston ring grooves thoroughly and install the piston rings.

##### NOTE:

Apply oil to the piston rings.  
Avoid piston and piston ring damage during installation.  
Install the piston rings with their marking facing up.  
Do not confuse the top and second rings.

Space the piston ring end gaps 120 degrees apart.  
Do not align the gaps in the oil rings side rails).

After installation, the rings should rotate freely in the ring grooves.



#### PISTON INSTALLATION

Apply oil to the piston pin outer surface.  
Install the piston with its: "IN" mark facing the intake side.  
Install the piston pin and secure it with new piston pin clips.

##### NOTE:

Do not align the piston pin clips end gap with the piston cut-out.  
Do not let the piston pin clips fall into the crankcase.



#### CYLINDER INSTALLATION

Clean off any gasket materials from the crankcase surface.



Install the dowel pins, new gasket and new rubber packing



Coat the cylinder bore, piston outer surface and piston ring grooves with clean engine oil.  
Route the cam chain through the cylinder and install the cylinder while compressing the piston rings.

##### NOTE:

Avoid piston ring damage during installation.  
Do not let the cam chain fall into crankcase.



Apply engine oil to the guide roller inner surface.  
Install the cam chain guide roller, new sealing washer and pin bolt.  
Tighten the cam chain guide roller pin bolt go the specified torque.

**TORQUE:10N.m(1.0kgf.m,7lbf.ft)**

Install the cylinder mounting bolt but do not tighten it yet.  
Install the cylinder head (page 7-14).



## 9.CLUTCH /GEARSHIFT LINKAGE

SERVICE INFORMATION-----	9-1	CLUTCH-----	9-4
TROUBLESHOOTING-----	9-2	GEARSHIFT LINKAGE-----	9-14
RIGHT CRANKCASE-----	9-3	RIGHT CRANKCASE-----	9-17
COVER REMOVAL		COVER INSTALLATION	

### SERVICE INFORMATION

#### GENERAL

This section covers service of the clutch and gearshift linkage. All service can be done with the engine installed in the frame.

Use care not to allow dust or dirt to enter the engine.

Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

#### SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Clutch disc thickness	A		:A:1.52-1.68(0.060-0.066)	1.3(0.051)
			B:3.42-3.58(0.135-0.141)	3.2(0.126)
	B		:A:2.67-2.83(0.105-0.114)	2.45(0.096)
			B:3.42-3.58(0.135-0.141)	3.2(0.126)
Clutch plate warpage	A		3.32-3.48(0.131-0.137)	3.0(0.12)
				0.20(0.008)
	B			19.4(0.76)
				21.05(0.829)
Centrifugal clutch spring free length	L.D		21.0000-21.021(0.8268-0.8276)	17.04(0.671)
	O.D		16.988-17.006(0.6688-0.6695)	20.9(0.823)
Crankshaft O.D. at clutch center guide			20.930-20.950(0.8240-0.8248)	16.9(0.665)
			16.966-16.984(0.6680-0.6687)	

#### TORQUE VALUES

Clutch outer cover screw	5N.m(0.5kgf.m, 3.6lbf.ft)
Clutch lock nut	42N.m(4.3kgf.m, 31lbf.ft)
Clutch assembly screw	6N.m(0.5kgf.m, 3.6lbf.ft)
Shift drum stopper arm bolt	13N.m(1.3kgf.m,9lbf.ft)
Shift return spring pin bolt	29N.m(3.0kgf.m,22lbf.ft)
Gearshift cam plate bolt	17N.m(1.7kgf.m,12lbf.ft)

#### TOOLS

Flywheel holder	07725-0040000
Lock nut wrench,20*24mm	07716-0020100
extension bar	07716-0020500

## CLUTCH /GEARSHIFT LINKAGE

### TROUBLESHOOTING

#### Clutch slips when accelerating

Incorrect clutch adjustment  
Worn clutch disc  
Weak clutch spring  
Faulty clutch weight  
Transmission oil mixed with molybdenum or graphite additive.

#### Hard to shift

Incorrect clutch adjustment  
Loose stopper plate bolt  
Damaged stopper plate bolt  
Damaged stopper plate and pin

#### Transmission jumps out of gear

Worn shift drum stopper arm  
Weak or broken shift arm return spring  
Loose stopper plate bolt

#### Gearshift pedal will not return

Weak or broken gearshift spindle return  
Bent gearshift spindle

#### Motorcycle creeps with clutch disengaged

Incorrect clutch adjustment  
Clutch plate warped  
Faulty clutch lifter  
Faulty clutch weight  
Incorrect engine oil weight

### RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil(page3-9)

Remove the foot peg bar page 6-3)

Remove the bolt kickstarter pedal.

Unhook the brake pedal return spring.  
Loosen the rear brake pedal adjusting nut and lower the brake pedal.

Remove the eight bolts and right crankcase cover.





Remove the gasket and dowel pins.



Remove the clutch adjusting nut, washer and o-ring  
Remove the clutch lifter/adjusting bolt assembly.

## CLUTCH /GEARSHIFT LINKAGE

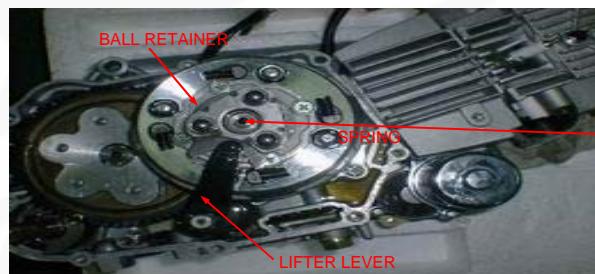
Check the kickstarter oil seal for damage, replace if necessary.



CLUTCH

### REMOVAL

Remove the ball retainer and spring.  
Remove the clutch lifter lever.



Remove the oil through and spring.  
Remove the clutch lifter cam plate.

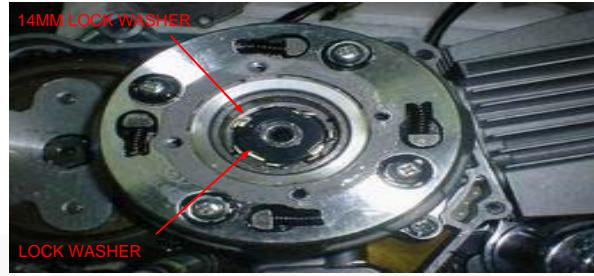


Remove the screws and clutch outer cover and bearing.



## CLUTCH /GEARSHIFT LINKAGE

Straighten the tab of the lock washer.



Hold the clutch outer with the flywheel holder and remove the lock nut using the special tools as shown.

TOOLS: 07725-0040000  
Flywheel holder

Lock nut wrench,20x24mm 07716-0020100  
Extension bar 07716-0020500



Remove the lock washer B,14mm lock washer and clutch assembly.

Remove the primary drive gear.

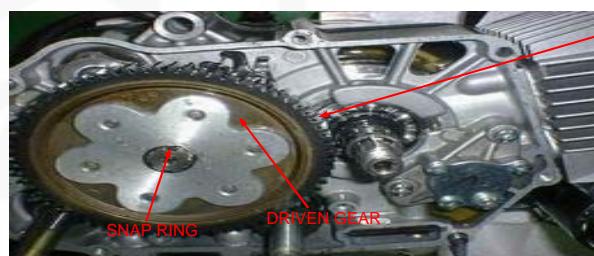
## CLUTCH /GEARSHIFT LINKAGE

Remove the clutch center guide.



Remove the snap ring and primary driven gear from the mainshaft.

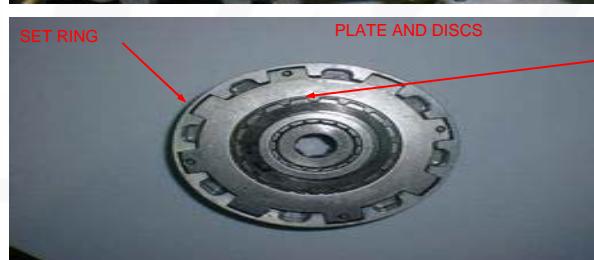
Remove the collar from the crankshaft.



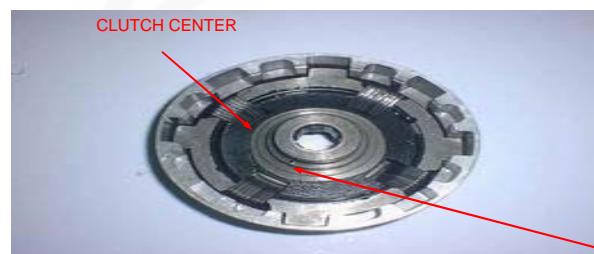
## DISASSEMBLY

Remove the following:

- Set ring
- Clutch plate B
- Clutch disc A
- Clutch disc B
- Clutch disc A
- Free springs
- Clutch plate A



Remove the clutch center and drive gear outer.



## CLUTCH /GEARSHIFT LINKAGE

---

Remove the four damper springs.  
Remove the four screws and plain washers.



Remove the drive plate assembly and clutch springs.



Remove the clutch weight stopper ring.  
Remove the clutch weight/center ring.



### INSPECTION

#### Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.  
The bearing should turn smoothly and freely without excessive play.  
Also check that bearing fits tightly in the clutch outer cover.  
If necessary replace the bearing.



## CLUTCH /GEARSHIFT LINKAGE

---

#### Clutch spring

Measure the clutch spring free length.

**SERVICE LIMIT:** 19.4mm(0.76in)



#### Clutch disc

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of disc.

#### SERVICE LIMITS:

Clutch disc A:2.3mm(0.09 in)  
Clutch disc B:3.0mm(0.12 in)



#### Clutch plate

Check each disc plate for warpage on a surface plate using a feeler gauge.  
SERVICE LIMIT:0.20mm(0.008in)



#### Primary drive gear/clutch center guide

Check the primary drive gear and clutch center guide for excessive wear or damage.

Measure the I.D. of the primary drive gear.

SERVICE LIMIT:21.05mm (0.829 in)

Measure the O.D. and I.D of the clutch center guide.  
SERVICE LIMITS:

I.D.:17.04mm(0.671 in)

O.D.:20.90mm(0.823in)



## CLUTCH /GEARSHIFT LINKAGE

#### Crankshaft

Measure the crankshaft O.D at clutch center guide.

SERVICE LIMIT:16.90mm(0.665 in)

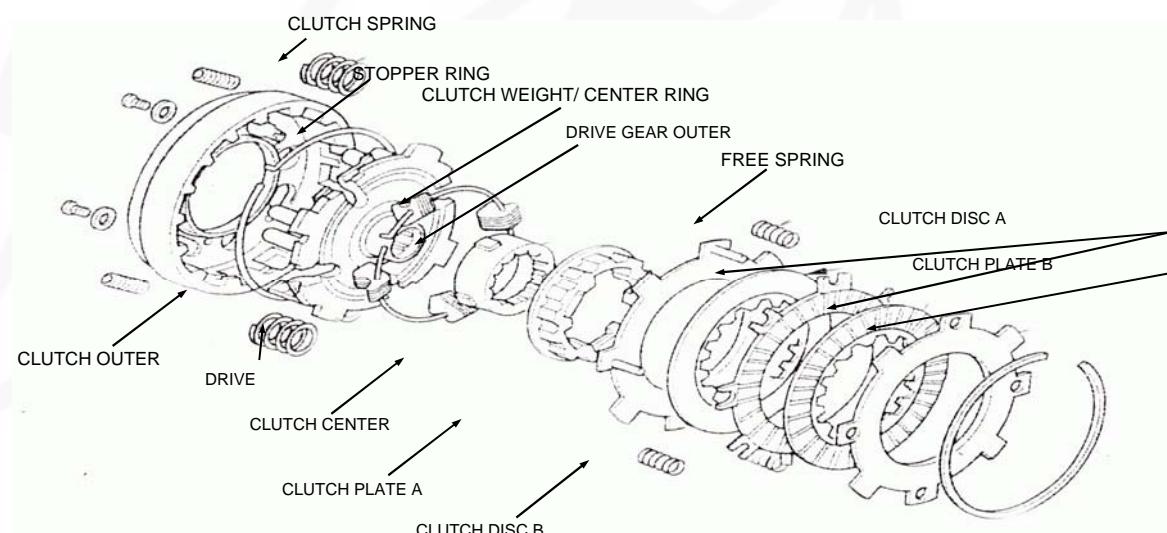


#### Drive gear outer/clutch center

Check the drive gear outer and clutch center for excessive wear or damage.



## ASSEMBLY



## CLUTCH /GEARSHIFT LINKAGE

Install the clutch weight/center ring onto the drive plate by aligning the ring end with the plate hole.

Install the stopper ring by aligning the ring end with the plate groove.



Install the clutch spring onto the clutch outer holes.  
Install the drive plate assembly into the clutch outer aligning its bosses with the clutch springs.



Install the plain washers and screws.  
Tighten the screws in a crisscross pattern in 2-3 steps.  
**TORQUE:6 N.m(0.6kgf.m,4.3 lbf.ft)**



Install the damper springs as shown.



## CLUTCH /GEARSHIFT LINKAGE

Install the drive gear outer and clutch center.



Install the following:  
-Clutch plate A  
\_Free springs

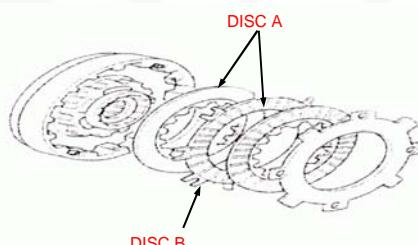


-Clutch disc A  
-Clutch disc B  
-Clutch disc A  
-Clutch plate B

### NOTE:

Install the clutch disc A with its flat surface facing the clutch disc B.

Install the clutch plate with its chamfered side facing the clutch disc A.



Install the clutch set ring with its chamfered side facing the clutch plate B.

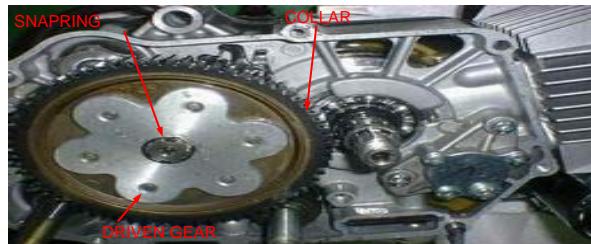


## CLUTCH /GEARSHIFT LINKAGE

### INSTALLATION

Install the collar onto the crankshaft.

Install the primary driven gear onto the mainshaft and secure it with the snap ring.



Apply engine oil to the clutch center guide and install it onto the crankshaft.



Install the primary drive gear.



Install the clutch assembly onto the crankshaft.

Install a new 14mm lock washer by aligning its short tabs with the grooves in the drive plate.



## CLUTCH /GEARSHIFT LINKAGE

Install the lock washer B with its "OUT SIDE" mark facing out.



Install the lock nut.

Hold the clutch outer with the flywheel holder and tighten the lock nut to the specified torque using the special tools as shown.

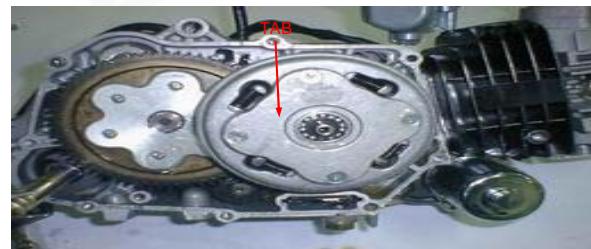
TOOLS: 07725-0040000  
Flywheel holder

Lock nut wrench,20x24mm 07716-0020100  
Extension bar

TORQUE:42N.m(4.3kgf.m,31 lbf.ft)

If the lock nut groove does not align with the lock washer tab, further tighten the lock nut and align.

Bent up the tab of the 14mm lock washer into the groove of the lock nut.



Clean the inside of the clutch outer and outer cover (page 3-10)  
Install the bearing and a new gasket onto the clutch outer cover.



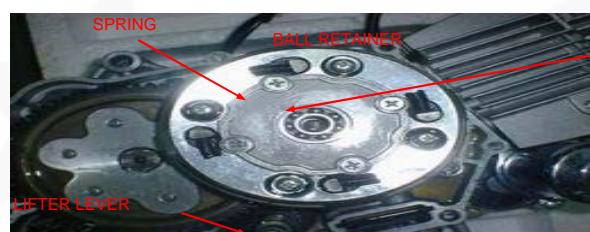
## CLUTCH /GEARSHIFT LINKAGE

Install the clutch outer cover and tighten the screws to the specified torque.  
TORQUE:5N.m(0.5kgf.m,3.6lbf.ft)

Install the clutch lifter cam plate  
Install the oil through spring and oil through.



Install the spring ,ball retainer and clutch lifter lever.  
Install the right crankcase cover(page9-17)



**GEARSHIFT LINKAGE  
REMOVAL**  
Remove the clutch and primary driven gear(page9-4)  
Remove the bolt and gearshift pedal.

Clean the gearshift spindle end  
to prevent dirt from entering the  
crankcase.



## CLUTCH /GEARSHIFT LINKAGE

Remove the bolt ,stopper arm and return spring.



Pull down the gearshift arm ,then pull out the gearshift spindle from the crankcase.



Remove the bolt and shift cam plate.



Remove the dowel pins and gearshift drum pins.



## CLUTCH /GEARSHIFT LINKAGE

### INSPECTION

Check the gearshift spindle or bends or other damage.



### INSTALLATION

Install the four gearshift drum pins and two dowel pins.



Install the cam plate and tighten the bolt to the specified torque.

TORQUE:17N.m(1.7kgf.m, 12lbf.ft)



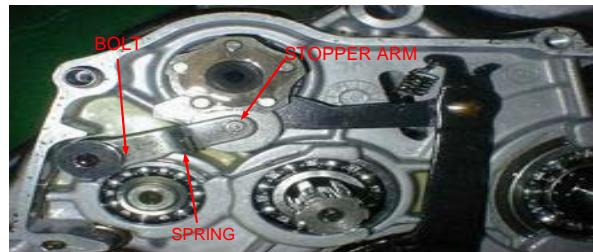
Install the gearshift spindle into the crankcase by aligning the return spring ends with the spring pinwheel pushing down the gearshift arm and set the gearshift arm to the shift drum pins.



## CLUTCH /GEARSHIFT LINKAGE

Install the return spring and stopper arm as shown and tighten the bolt to the specified torque.

TORQUE:13N.m(1.3kgf.m, 9lbf.ft)



Install the gearshift pedal so that it is same height as the foot peg.

Install the pinch bolt and tighten it.

Install the driven gear and clutch assembly (page9-12).



## RIGHT CRANKCASE COVER

### INSTALLATION

Install the clutch lifter plate/adjusting bolt into the right crankcase cover by aligning is pin with the hole in the crankcase cover.

Coat a new O-ring with engine oil and install it into the cover groove properly.  
Install the washer and lock nut.



## CLUTCH /GEARSHIFT LINKAGE

Install the dowel pins and a new gasket.



Install the right crankcase cover.  
Install and tighten the eight cover bolts in a crisscross pattern several steps.



Install the kickstarter as shown and tighten the bolt.  
Hook the return spring to ten brake pedal and spring holding pin as shown.

Install the foot peg bar (page6-4).  
Adjust the brake pedal free play (page 3-15).

Pour the recommended engine oil (page 3-9).  
Adjust the clutch (page 3-16).



## 14.IGNITION SYSTEM

SYSTEM DIAGRAM-----	14-0	IGNITION COIL-----	14-6
SERVICE INFORMATION-----	14-1	IGNITION CONTROL MODULE-----	14-6
TROUBLESHOOTING-----	14-2	ENGINE STOP SWITCH/IGNITION SWITCH---	14-7
IGNITION SYSTEM INSPECTION-----	14-3	IGNITION TIMING-----	14-7

### SERVICE INFORMATION

#### GENERAL

#### WARNING

When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death .Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 14-3.

The CDI ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.

The ICM may be damage if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module.

A faulty ignition system is often related to poor connections. Check those connections before proceeding/

Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.

For alternator and ignition pulse generator removal and installation, see section 10.

### SPECIFICATIONS

ITEM			SPECIFICATIONS
Spark plug	Standard	CR6HSA(NGK)	U20FSR-U(DENSO)
	For cold climate/below 41 F/5 C	CR5HSA(NGK)	U16FSR-U(DENSO)
	For extended high speed riding	CR7HSA(NGK)	U22FSR-U(DENSO)
Spark plug gap	0.60-0.70mm(0.024-0.028in)		
Ignition coil peak voltage	100 V minimum		
Ignition pulse generator peak voltage	0.7 V minimum		
Alternator exciter coil peak voltage	100 V minimum		
Ignition timing ("F" mark)	27 BTDC at idle		

### TORQUE VALUES

Ignition coil mounting bolt 6N.m(0.6 kgf.m,4.3lbf.ft)

### TOOLS

Peak voltage tester (U.S.A.only ) or 07HGJ-0020100(not available in U.S.A.) with commercially  
Peak voltage adaptor available digital multimeter (impedance 10M/DCV minimum)

## IGNITION SYSTEM

### TROUBLESHOOTING

Inspect the following before diagnosing the system

- Faulty spark plug
- Loose spark plug cap or spark plug wire connections
- Water got into the spark plug cap (leaking the ignition coil secondary voltage)

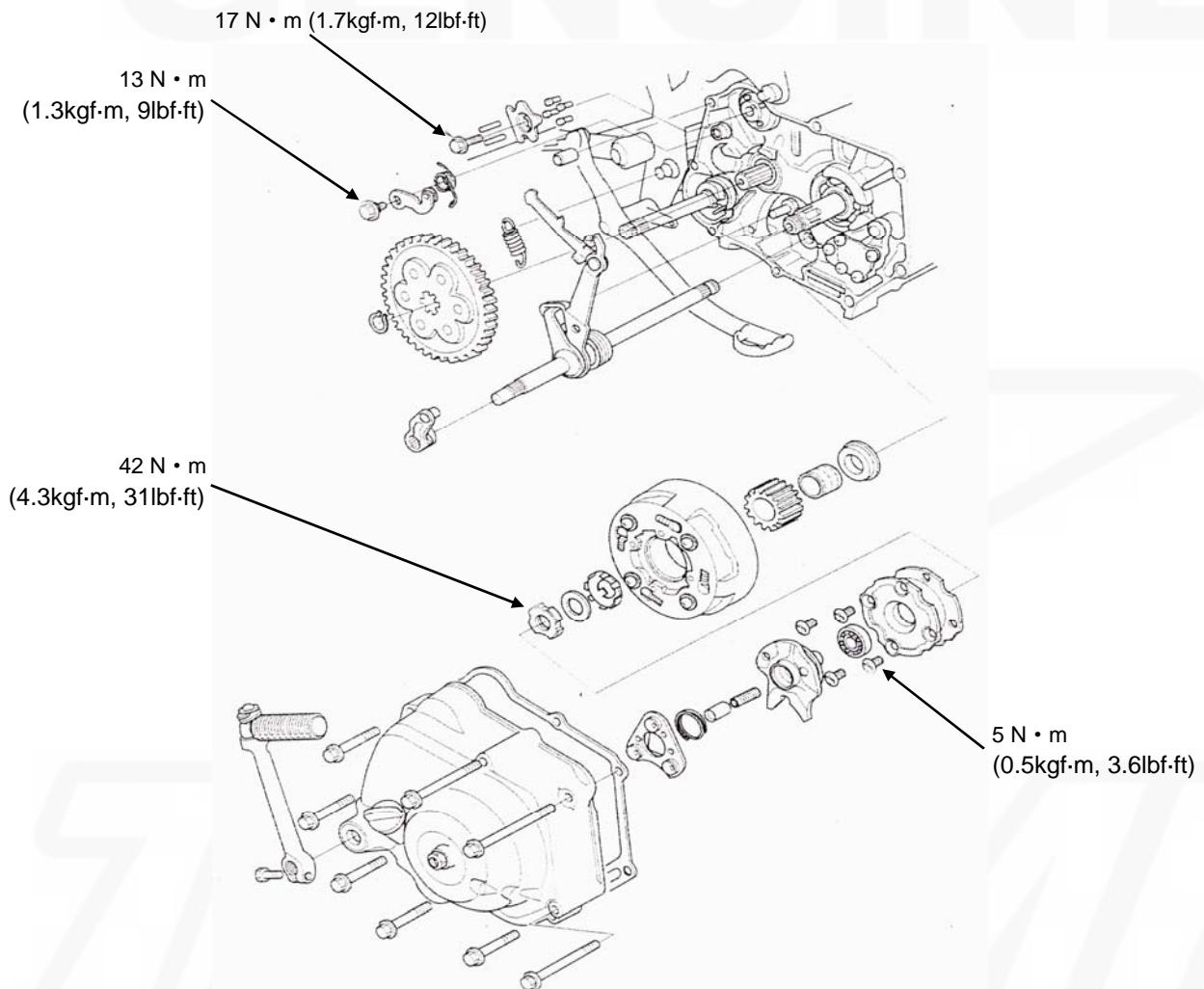
No spark at spark plug

usual condition		Probable cause Check in numerical order)
Ignition coil primary voltage	Low peak voltage	1.Incorrect peak voltage adaptor connections (system is normal if measured voltage is over the specifications with reverse connections). 2.The multimeter impedance is too low;10MO/DCV. 3.Cranking speed is too low (operating force of the kickstarter is weak). 4.The sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once). 5.Poorly connected connectors or an open circuit in ignition system 6.Faulty exciter coil (Measure peak voltage.) 7.Faulty ignition coil. 8.Faulty ICM (in case when above no.1-7 are normal).
	No peak voltage	1.Incorrect peak voltage adaptor connections (system is normal if measured voltage is over the specifications with reverse connections). 2.Short circuit in ignition switch wire or engine stop switch wire (black/white.) 3.Faulty ignition switch wire or engine stop switch wire (black/white). 4.Loose or poorly connected ICM connectors. 5.Open circuit or poor connection in ground wire (green )of the ICM> 6.Faulty peak voltage adaptor. 7.Faulty exciter coil (measure peak voltage.) 8.Faulty ignition pulse generator (measure peak voltage.) 9.Faulty ICM (in case when above no.1-8 are normal).
	Peak voltage is no but no spark jumps	1.faulty spark plug or leaking ignition coil secondary current ampere. 2.faulty ignition coil.
Exciter coil	Low peak voltage	1.the multimeter impedance is too low;10MO/DCV. 2.cranking speed is too slow (operation force of the kickstarter is weak.) 3.the sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once). 4.Faulty exciter coil (in case when above no.1-3 are normal).
	No peak voltage	1.Faulty peak voltage adaptor. 2.Faulty exciter coil.
Ignition pulse Generator	Low peak voltage	1.The multimeter impedance is too low;10MO/DCV. 2.Cranking speed is too slow (operating force of the kickstarter is weak). 3.The sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once). 4.Faulty ignition pulse generator (in case when above no. 1-3 are normal).
	No peak voltage	1.Faulty peak voltage adaptor. 2.Faulty ignition pulse generator.

### IGNITION SYSTEM INSPECTION

#### NOTE:

If there is no spark at plug, check all connections for loose or poor contact before measuring each peak voltage.



## 9.CLUTCH /GEARSHIFT LINKAGE

SERVICE INFORMATION-----	9-1 CLUTCH-----	9-4
TROUBLESHOOTING-----	9-2 GEARSHIFT LINKAGE-----	9-14
RIGHT CRANKCASE-----	9-3 RIGHT CRANKCASE-----	9-17
COVER REMOVAL	COVER INSTALLATION	

### SERVICE INFORMATION

#### GENERAL

This section covers service of the clutch and gearshift linkage. All service can be done with the engine installed in the frame.

Use care not to allow dust or dirt to enter the engine.

Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

#### SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Clutch disc thickness	A	SUPER :A:1.52-1.68(0.060-0.066	1.3(0.051)
		B:3.42-3.58(0.135-0.141)	3.2(0.126)
		JNR: A:2.67-2.83(0.105-0.114)	2.45(0.096)
		B:3.42-3.58(0.135-0.141)	3.2(0.126)
	B	3.32-3.48(0.131-0.137)	3.0(0.12)
Clutch plate warpage		-----	0.20(0.008)
Centrifugal clutch spring free length		SUPER :19.5(0.77)/JNR:20(0.79)	19.4(0.76)
Primary drive gear		21.0000-21.021(0.8268-0.8276)	21.05(0.829)
Clutch center guide	L.D.	16.988-17.006(0.6688-0.6695)	17.04(0.671)
	O.D.	20.930-20.950(0.8240-0.8248)	20.9(0.823)
Crankshaft O.D. at clutch center guide		16.966-16.984(0.6680-0.6687)	16.9(0.665)

#### TORQUE VALUES

Clutch outer cover screw	5N.m(0.5kgf.m, 3.6lbf.ft)
Clutch lock nut	42N.m(4.3kgf.m, 31lbf.ft)
Clutch assembly screw	6N.m(0.5kgf.m, 3.6lbf.ft)
Shift drum stopper arm bolt	13N.m(1.3kgf.m,9lbf.ft)
Shift return spring pin bolt	29N.m(3.0kgf.m,22lbf.ft)
Gearshift cam plate bolt	17N.m(1.7kgf.m,12lbf.ft)

#### TOOLS

Flywheel holder	07725-0040000
Lock nut wrench,20*24mm	07716-0020100
extension bar	07716-0020500

## TROUBLESHOOTING

### Clutch slips when accelerating

Incorrect clutch adjustment  
Worn clutch disc  
Weak clutch spring  
Faulty clutch weight  
Transmission oil mixed with molybdenum or graphite additive.

### Motorcycle creeps with clutch disengaged

Incorrect clutch adjustment  
Clutch plate warped  
Faulty clutch lifter  
Faulty clutch weight  
Incorrect engine oil weight

### Hard to shift

Incorrect clutch adjustment  
Loose stopper plate bolt  
Damaged stopper plate bolt  
Damaged stopper plate and pin

### Transmission jumps out of gear

Worn shift drum stopper arm  
Weak or broken shift arm return spring  
Loose stopper plate bolt

### Gearshift pedal will not return

Weak or broken gearshift spindle return  
Bent gearshift spindle

## RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil(page3-9)

Remove the foot peg bar (page 6-3)

Remove the bolt kickstarter pedal.

Unhook the brake pedal return spring.

Loosen the rear brake pedal adjusting nut and lower the brake pedal.

Remove the eight bolts and right crankcase cover.



Remover the gasket and dowel pins.

Remove the clutch adjusting nut, washer and o-ring



Remove the clutch lifter/adjusting bolt assembly.



## CLUTCH /GEARSHIFT LINKAGE

Check the kickstarter oil seal for damage, replace if necessary.

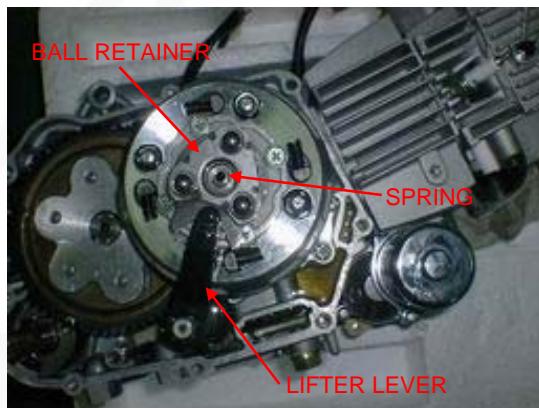


### CLUTCH

#### REMOVAL

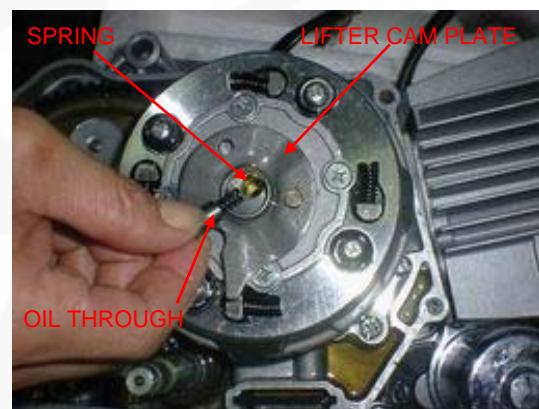
Remove the ball retainer and spring.

Remove the clutch lifter lever.

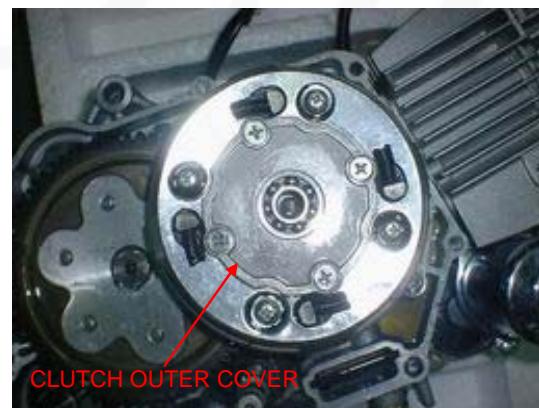


Remove the oil through and spring.

Remove the clutch lifter cam plate.



Remove the screws and clutch outer cover and bearing.



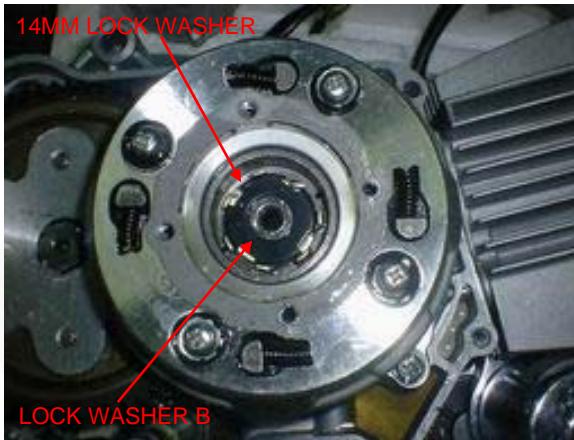
## CLUTCH /GEARSHIFT LINKAGE

Straighten the tab of the lock washer.

Hold the clutch outer with the flywheel holder and remove the lock nut using the special tools as shown.

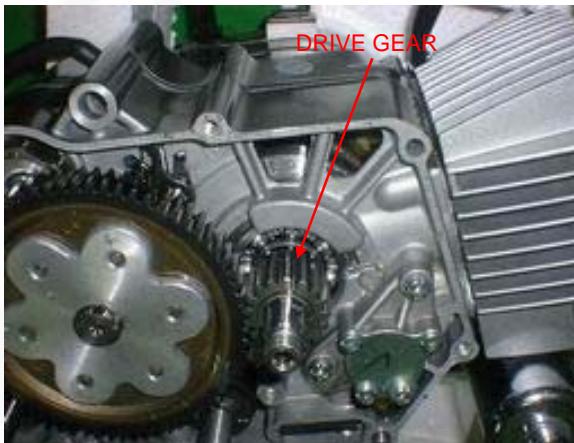
TOOLS: 07725-0040000  
Flywheel holder

Lock nut wrench,20x24mm 07716-0020100  
Extension bar 07716-0020500



Remove the lock washer B,14mm lock washer and clutch assembly.

Remove the primary drive gear.

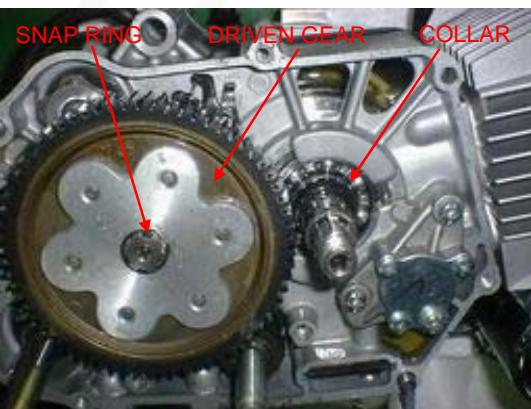


Remove the drive gear.



Remove the snap ring and primary driven gear from the mainshaft.

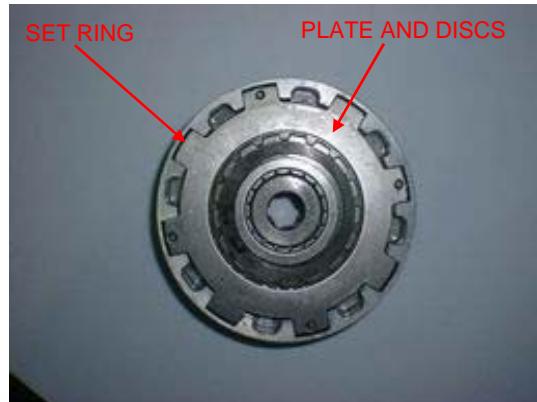
Remove the collar from the crankshaft.



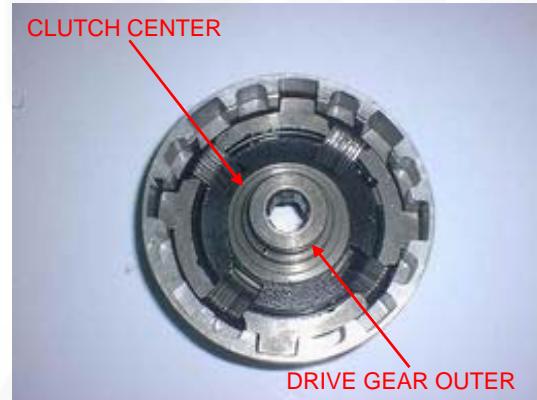
## DISASSEMBLY

Remove the following:

- Set ring
- Clutch plate B
- Clutch disc A
- Clutch disc B
- Clutch disc A
- Free springs
- Clutch plate A



Remove the clutch center and drive gear outer.



Remove the four damper springs.

Remove the four screws and plain washers.



Remove the drive plate assembly and clutch springs.



Remove the clutch weight stopper ring.

Remove the clutch weight/center ring.



## INSPECTION

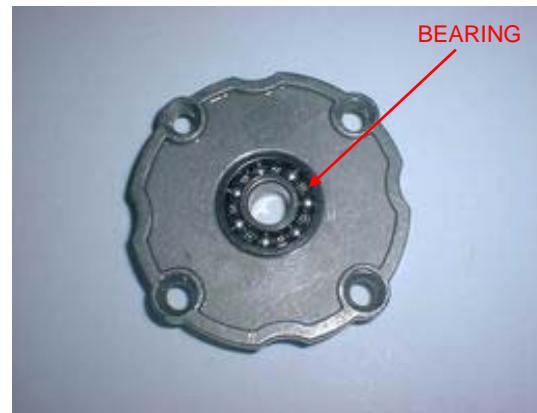
### Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and freely without excessive play.

Also check that bearing fits tightly in the clutch outer cover.

If necessary replace the bearing.



### Clutch spring

Measure the clutch spring free length.

**SERVICE LIMIT:** 19.4mm(0.76in)



### Clutch disc

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of disc.

#### **SERVICE LIMITS:**

**Clutch disc A:** 2.3mm(0.09 in)

**Clutch disc B:** 3.0mm(0.12 in)



### Clutch plate

Check each disc plate for warpage on a surface plate using a feeler gauge.

**SERVICE LIMIT:** 0.20mm(0.008in)



### Primary drive gear/clutch center guide

Check the primary drive gear and clutch center guide for excessive wear or damage.

Measure the I.D. of the primary drive gear.

**SERVICE LIMIT:** 21.05mm (0.829 in)

Measure the O.D. and I.D. of the clutch center guide.

#### **SERVICE LIMITS:**

I.D.: 17.04mm(0.671 in)

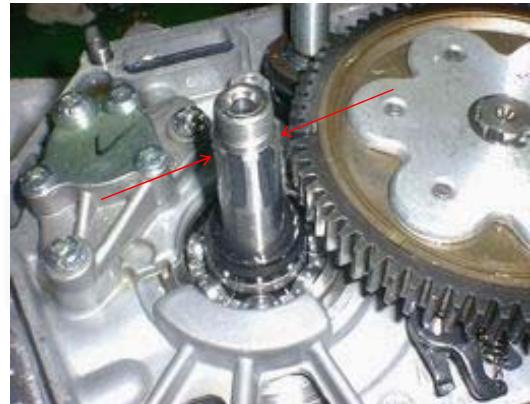
O.D.: 20.90mm(0.823in)



### Crankshaft

Measure the crankshaft O.D at clutch center guide.

**SERVICE LIMIT:** 16.90mm(0.665 in)

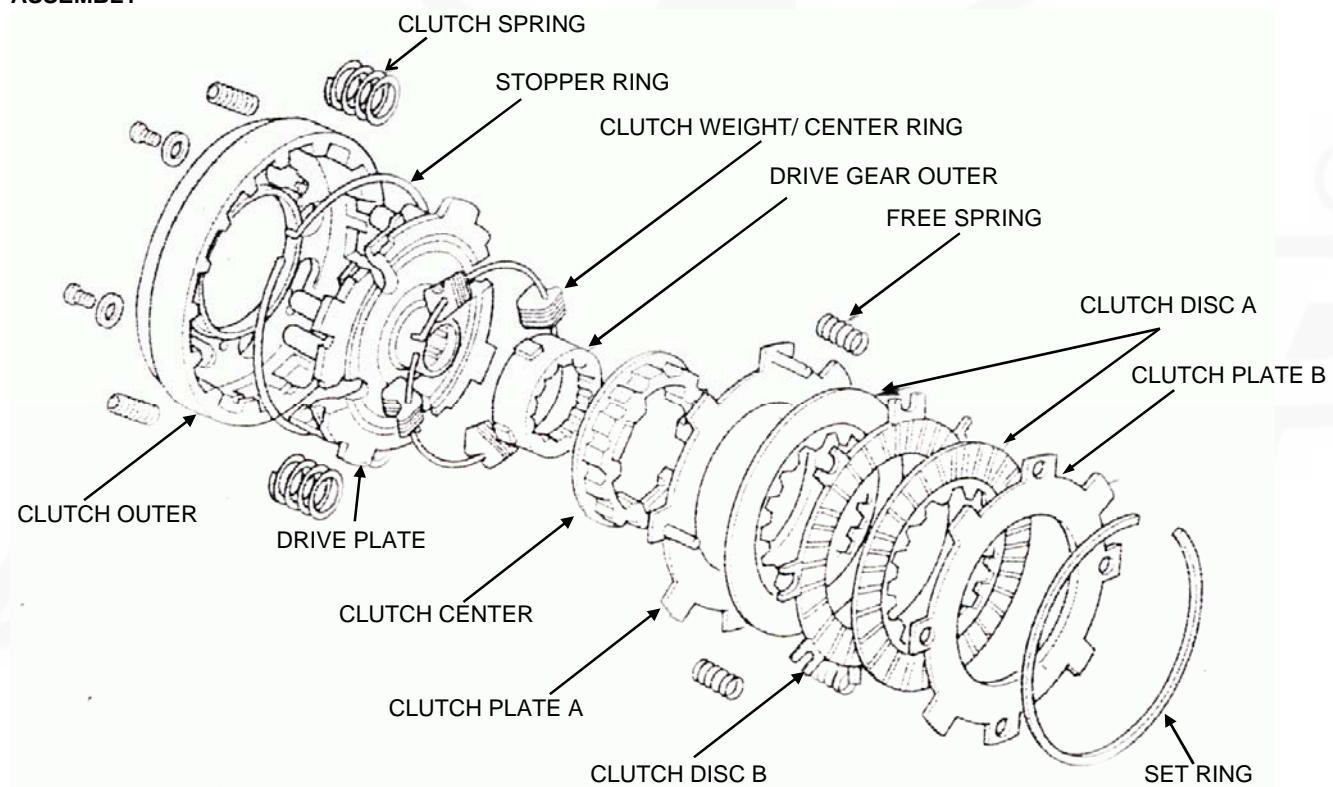


### Drive gear outer/clutch center

Check the drive gear outer and clutch center for excessive wear or damage.

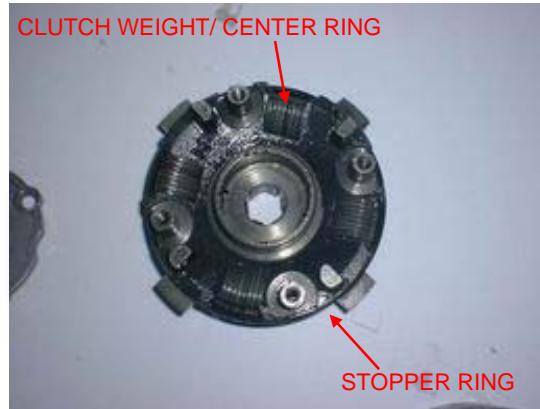


### ASSEMBLY



Install the clutch weight/center ring onto the drive plate by aligning the ring end with the plate hole.

Install the stopper ring by aligning the ring end with the plate groove.



Install the clutch spring onto the clutch outer holes.

Install the drive plate assembly into the clutch outer aligning its bosses with the clutch springs.



Install the plain washers and screws.

Tighten the screws in a crisscross pattern in 2-3 steps.

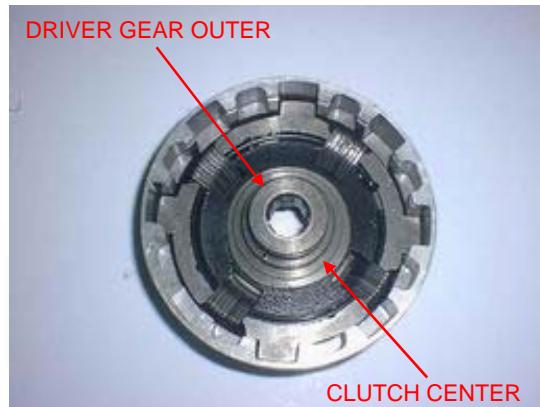
**TORQUE:6 N.m(0.6kgf.m,4.3 lbf.ft)**



Install the damper springs as shown.



Install the drive gear outer and clutch center.



Install the following:

- Clutch plate A
- \_Free springs

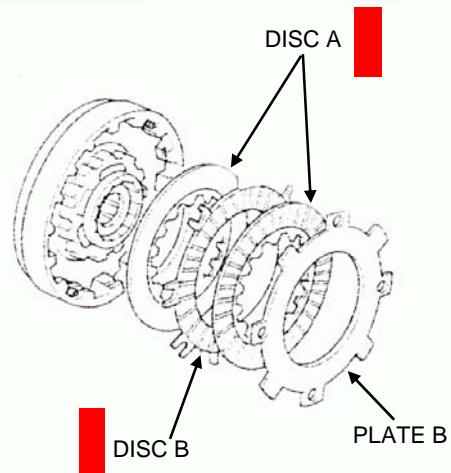


- Clutch disc A
- Clutch disc B
- Clutch disc A
- Clutch plate B

**NOTE:**

Install the clutch disc A with its flat surface facing the clutch disc B.

Install the clutch plate B with its chamfered side facing the clutch disc A.



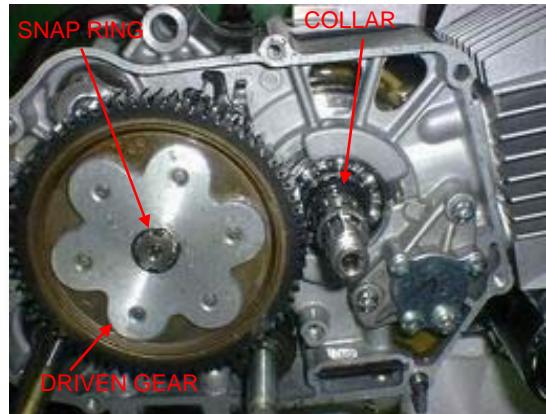
Install the clutch set ring with its chamfered side facing the clutch plate B.



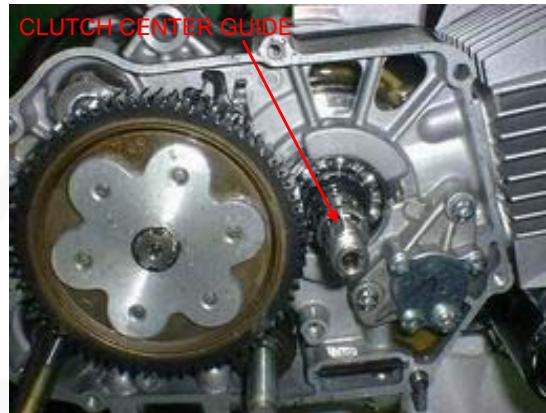
## INSTALLATION

Install the collar onto the crankshaft.

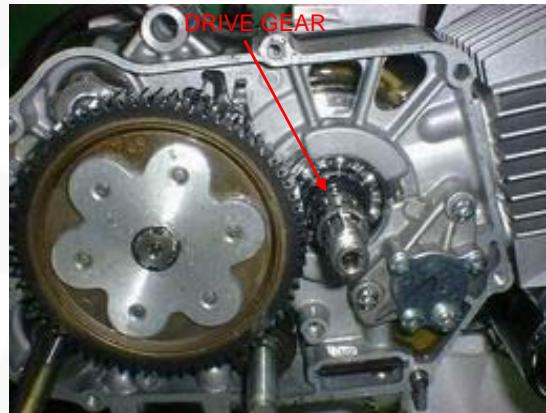
Install the primary driven gear onto the mainshaft and secure it with the snap ring.



Apply engine oil to the clutch center guide and install it onto the crankshaft.



Install the primary drive gear.



Install the clutch assembly onto the crankshaft.

Install a new 14mm lock washer by aligning its short tabs with the grooves in the drive plate.



Install the lock washer B with its "OUT SIDE" mark facing out.

Install the lock nut.

Hold the clutch outer with the flywheel holder and tighten the lock nut to the specified torque using the special tools as shown.

**TOOLS:** 07725-0040000  
**Flywheel holder**

**Lock nut wrench,20x24mm** 07716-0020100  
**Extension bar**

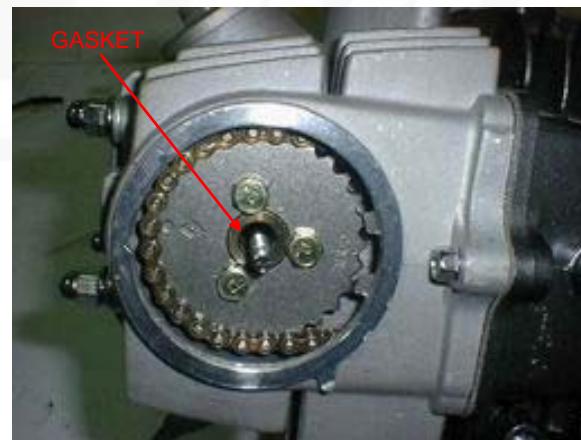
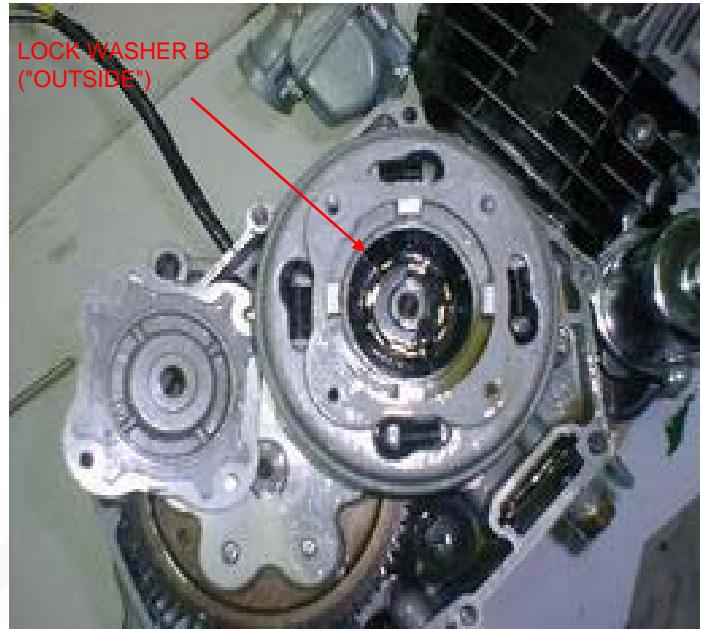
**TORQUE:**42N.m(4.3kgf.m,31 lbf.ft)

If the lock nut groove does not align with the lock washer tab, further tighten the lock nut and align.

Bent up the tab of the 14mm lock washer into the groove of the lock nut.

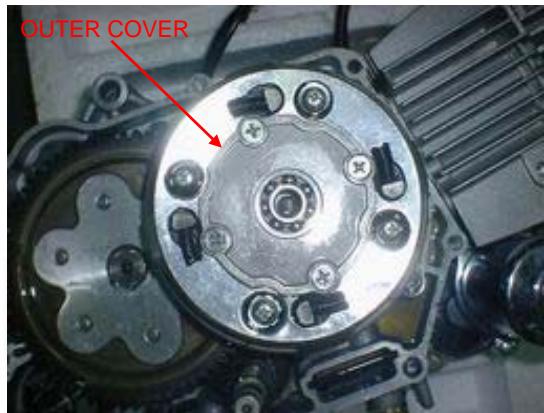
Clean the inside of the clutch outer and outer cover (page 3-10)

Install the bearing and a new gasket onto the clutch outer cover.



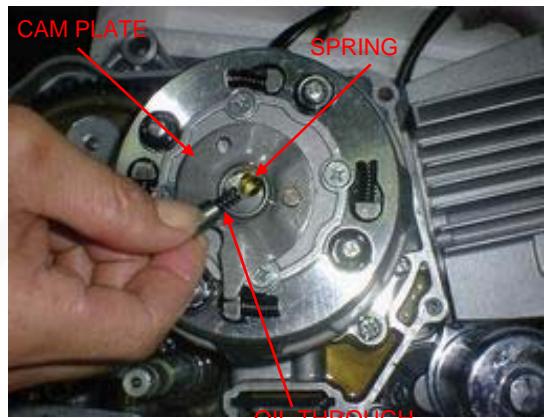
Install the clutch outer cover and tighten the screws to the specified torque.

**TORQUE:**5N.m (0.5kgf.m,3.6lbf.ft)



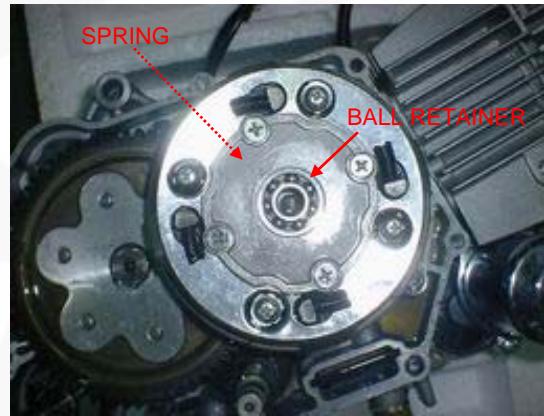
Install the clutch lifter cam plate

Install the oil through spring and oil through.



Install the spring ,ball retainer and clutch lifter lever.

Install the right crankcase cover(page9-17)



## GEARSHIFT LINKAGE

### REMOVAL

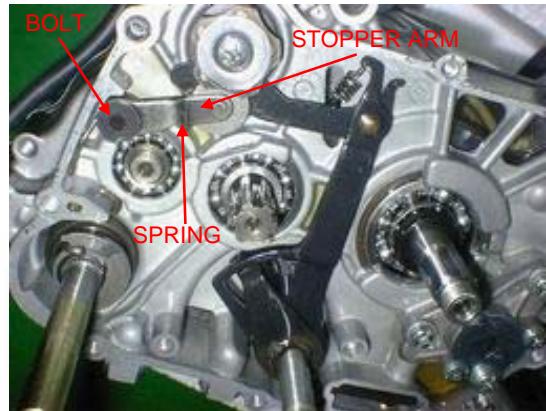
Remove the clutch and primary driven gear(page9-4)

Remove the bolt and gearshift pedal.

Clean the gearshift spindle end  
to prevent dirt from entering the  
crankcase.



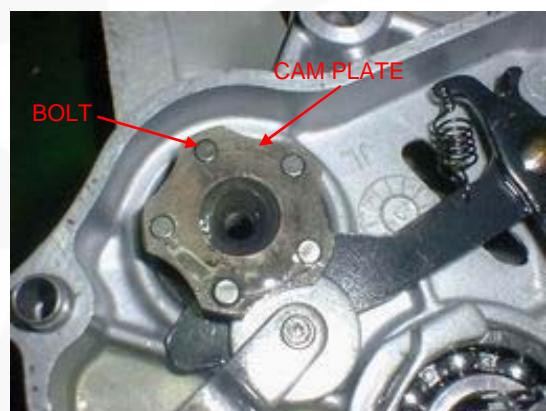
Remove the bolt ,stopper arm and return spring.



Pull down the gearshift arm ,then pull out the gearshift spindle from the crankcase.



Remove the bolt and shift cam plate.



Remove and gearshift drum pins.



## INSPECTION

Check the gearshift spindle or bends or other damage.



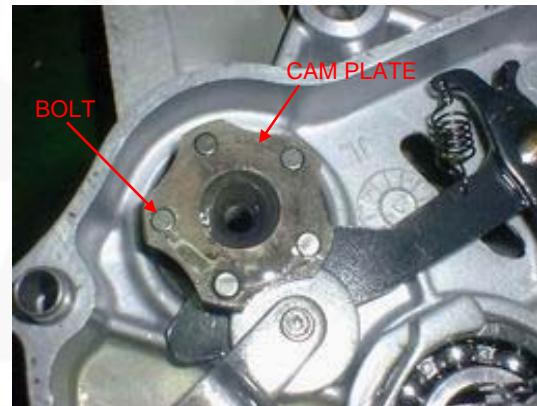
## INSTALLATION

Install the four gearshift drum pins

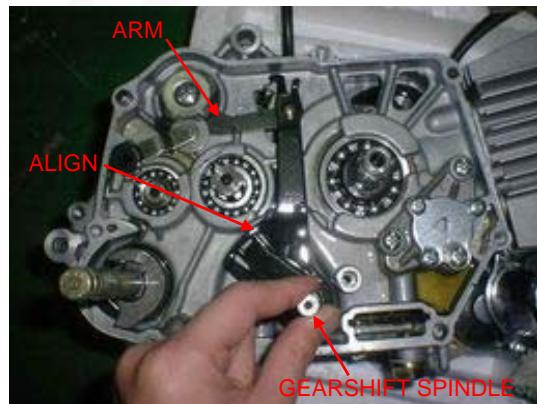


Install the cam plate and tighten the bolt to the specified torque.

**TORQUE:** 17N.m (1.7kgf.m, 12lbf.ft)

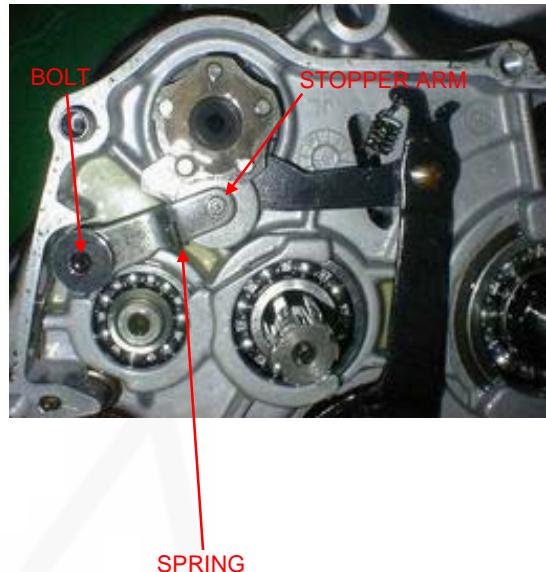


Install the gearshift spindle into the crankcase by aligning the return spring ends with the spring pin while pushing down the gearshift arm and set the gearshift arm to the shift drum pins.



Install the return spring and stopper arm as shown and tighten the bolt to the specified torque.

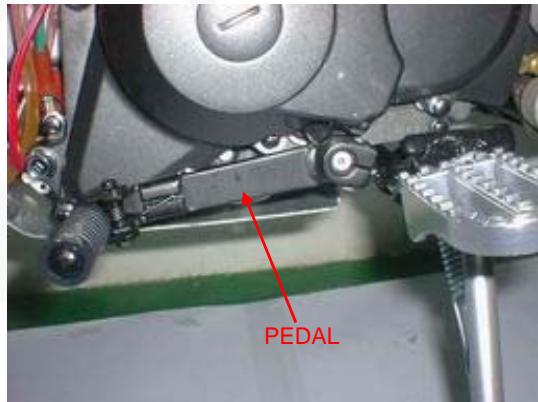
**TORQUE:**13N.m (1.3kgf.m, 9lbf.ft)



Install the gearshift pedal so that it is same height as the foot peg.

Install the pinch bolt and tighten it.

Install the driven gear and clutch assembly (page9-12).



## RIGHT CRANKCASE COVER INSTALLATION

Install the clutch lifter plate/adjusting bolt into the right crankcase cover by aligning is pin with the hole in the crankcase cover.

Coat a new O-ring with engine oil and install it into the cover groove properly.

Install the washer and lock nut.

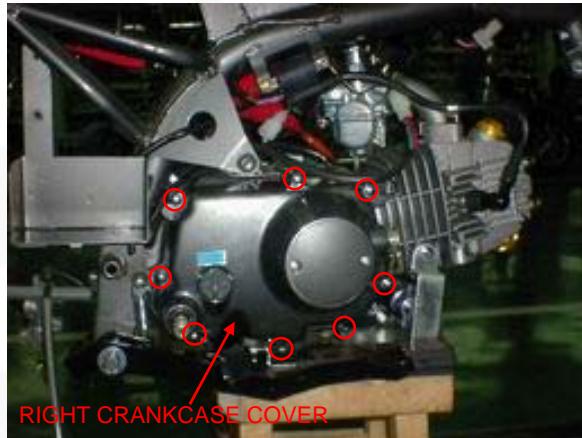


Install the dowel pins and a new gasket.



Install the right crankcase cover.

Install and tighten the eight cover bolts in a crisscross pattern several steps.



Install the kickstarter as shown and tighten the bolt. Hook the return spring to ten brake pedal and spring holding pin as shown.

Install the foot peg bar (page 6-4).

Adjust the brake pedal free play (page 3-15).

Pour the recommended engine oil (page 3-9).

Adjust the clutch (page 3-16).



# 10. ALTERNATOR/CAM CHAIN TENSIONER

SERVICE INFORMATION-----	10-1	CAM CHAIN TENSIONER-----	10-4
TROUBLESHOOTING-----	10-1	STARTER/FLYWHEEL INSTALLATION---	10-6
FLYWHEEL/STATOR REMOVAL---		10-2	

## SERVICE INFORMATION

### GENERAL

This section covers service of the flywheel, alternator and cam chain tensioner.

All service can be done with the engine installed in the frame.

Refer to section 14 for alternator stator inspection.

## SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Cam chain tensioner	Push rod O.D	11.985-12.000(0.4718-0.4724)	11.94(0.470)
	Spring free length	111.7(4.40)	100(3.9)

## TORQUE VALUES

Flywheel nut	41N.m(4.2kgf.m, 30lbf.ft)
Cam chain tensioner sealing bolt	23N.m(2.3kgf.m, 17lbf.ft)
Cam chain tensioner pivot bolt	16N.m(1.6kgf.m, 12lbf.ft)

## TOOLS

Universal holder	07725-0030000
Flywheel puller	07933-GE0000 Only available in U.S.A or 07933-0010000U.S.A

## TROUBLESHOOTING

### Excessive engine noise

- \* Worn or damaged chain tensioner
- \* Clogged one-way valve
- \* Weak or damaged cam chain tensioner spring

### Loose cam chain

- \* Weak or damaged cam chain tensioner spring
- \* Improper push rod operation
- \* Clogged one-way valve
- \* Air in cam chain tensioner chamber

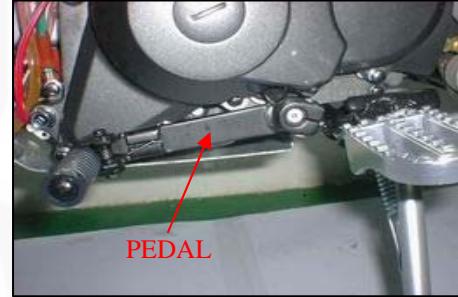
# ALTERNATOR/CAM CHAIN TENSIONER

## FLYWHEEL/STATOR REMOVAL

Disconnect the alternator and ignition pulse generator connectors.



Remove the bolt and gearshift pedal.



Remove the three bolts and left crankcase cover.



Hold the flywheel using the universal holder and remove the flywheel nut.

### TOOL:

Universal holder

07725-0030000

Remove the washer



## **ALTERNATOR/CAM CHAIN TENSIONER**

---

Remove the flywheel using the special tool.

TOOL:

Flywheel puller	07933-GE00000 (Not available in U.S.A.)
Flywheel puller	07933-0010000 (U.S.A. only)

Remove the woodruff key.

Remove the bolt and wire clamp.

Release the wire grommet from the crankcase groove.

Remove the four mounting bolts and wire clamp, and the ignition pulse generator and stator as an assembly.

# ALTERNATOR/CAM CHAIN TENSIONER

Drain the engine oil (page 3-9)

Remove the screws and stator base.



Remove the O-rings.



## CAM CHAIN TENSIONER

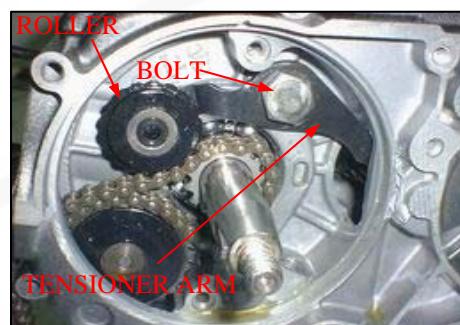
### REMOVAL

Remove the stator base (page 10-2)

Remove the sealing bolt, tensioner spring and push rod.



Remove the pivot bolt, tensioner arm and tensioner roller.



# ALTERNATOR/CAM CHAIN TENSIONER

## INSPECTION

Measure the tensioner spring free length.

**SERVICE LIMIT:** 100mm (3.9in)



Check the push rod for wear or damage.

Measure the push rod O.D.

**SERVICE LIMIT:** 11.94 mm(0.470in)

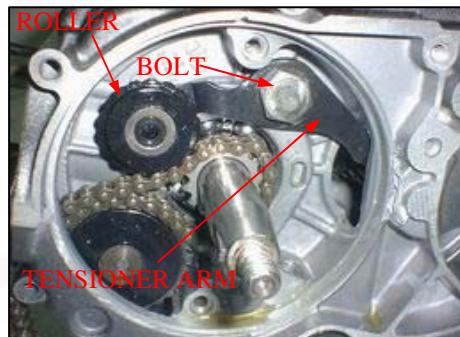


## INSTALLATION

Install the cam chain tensioner roller, tensioner arm and pivot bolt.

Tighten the pivot bolt to the specified torque.

**TORQUE:** 16N.m(1.6kgf.m,12lbf.ft)

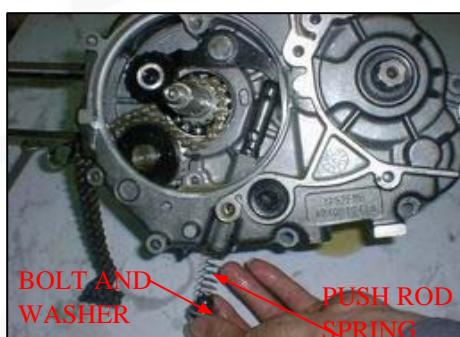


Check the sealing washer is in good condition, replace if necessary.

Install the push rod, spring, washer and sealing bolt.

Tighten the sealing bolt to the specified torque.

**TORQUE:** 23N.m(2.3kgf.m,17lbf.ft)



# ALTERNATOR/CAM CHAIN TENSIONER

Remove the crankcase sealing bolt and washer.

Fill the push rod with 1-2 cm<sup>3</sup> of engine oil through the filler hole.



Check the sealing washer is in good condition and install the sealing washer and bolt.

Tighten the bolt securely.



## STATOR/FLY WHEEL INSTALLATION

Check the stator base oil seal for damage, replace if necessary.

Apply engine oil to the lip of the oil seal.

Apply engine oil to new O-rings, install them into the crankcase grooves and stator base groove.



Install the stator base and tighten the screws securely.

### **CAUTION:**

Be careful not to damage the oil seal lips.



## ALTERNATOR/CAM CHAIN TENSIONER

---

Install the stator and ignition pulse generator with the wire clamp and tighten the bolts securely.

Set the wire grommet into the crankcase groove.

Install the wire clamp and tighten the bolt.

Clean any oil from the tapered portion of the crankshaft and flywheel.

Install the woodruff key into crankshaft.

Install the flywheel by aligning the key way in the flywheel with woodruff key on the crankshaft.

Install the washer and flywheel nut.

# ALTERNATOR/CAM CHAIN TENSIONER

Hold the flywheel using the universal holder and tighten the nut to the specified torque.

## TOOL:

**Universal holder** 07725-0030000



**TORQUE:** 41N.m(4.2kgf.m,30lbt.ft)

Install the left crankcase cover and tighten the two bolts.



Install the gearshift pedal so that same height as the footpeg.

Install the pinch bolt and tighten it.



Connect the ignition pulse generator and alternator connectors.



## 11. CRANKSHAFT/TRANSMISSION/KICKSTARTER

---

### SERVICE INFORMATION

#### GENERAL

- \* The crankcase must be separated to service the crankshaft, transmission and kickstarter.
- \* The following parts must be removed before separating the crankcase.
  - Alternator/cam chain tensioner (Section 10)
  - Clutch/gearshift linkage (Section 9)
  - Cylinder head (Section 7)
  - Cylinder/piston (Section 8)
  - Engine (Section 6)
  - Oil pump (Section 4)

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Crankshaft	Side clearance	0.010-0.350(0.0004-0.0138)
	Radial clearance	0-0.012(0-0.005)
	Run out	0.10(0.004)
Shift fork	I.D	34.075-34.100(1.3415-1.3425)
		34.14(1.344)

### TORQUE VALUES

Shift drum bolt 12N.m(1.2kgf-m,9lbf-ft)

# CRANKSHAFT/TRANSMISSION/KICKSTARTER

---

## TOOLS

Driver	07749-0010000
Attachment, 37*40mm	07746-0010200
Pilot,17mm	07746-0040400

## TROUBLE SHOOTING

### Hard to shift

- \* Incorrect clutch adjustment
- \* Bent shift fork
- \* Bent fork claw
- \* Damaged shift drum cam groove
- \* Incorrect transmission oil weight

### Transmission jumps out of gear

- \* Worm gear dogs and slots
- \* Bent fork shaft
- \* Broken shift drum stopper

### Excessive noise

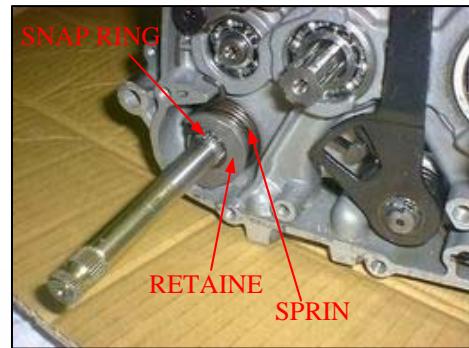
- \* Worn crankshaft big end bearing
- \* Worn crankshaft journal bearing

# CRANKSHAFT/TRANSMISSION/KICKSTARTER

## CRANKCASE SEPARATION

### NOTE:

Refer to Service Information (page 11-1) for removal of necessary parts before separating the crankcase



Remove the snap ring from the kickstarter spindle.  
Unhook the return spring and remove the retainer  
And return spring.



Remove the rubber cap.



Remove the shift drum bolt and washer.



Remove the cam chain.

Loosen the seven crankcase bolts in a crisscross  
Pattern in 2-3 steps and remove them.

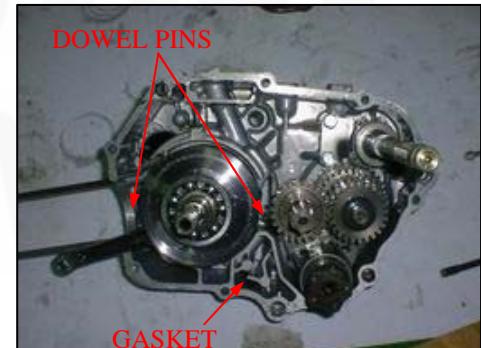
# CRANKSHAFT/TRANSMISSION/KICKSTARTER

Place the crankcase with the left side down.

Separate the right and left crankcase halves.



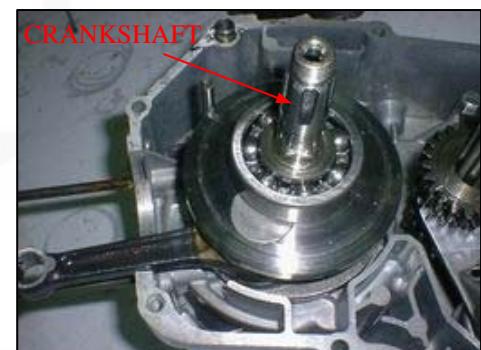
Remove the gasket and dowel pins.



## CRANKSHAFT

### REMOVAL

Remove the crankshaft from the left crankcase.



If necessary, remove the cam chain guide spindle And guide sprocket.



# CRANKSHAFT/TRANSMISSION/KICKSTARTER

## INSPECTION

Measure the connecting rod big end side clearance with a feeler gauge.

**SERVICE LIMIT:** 0.6 mm(0.024 in)

Measure the connecting rod big end radial clearance at symmetrical points as shown.

**SERVICE LIMIT:** 0.05mm(0.002in)

Turn the outer race of the crankshaft bearing with Your finger.

The bearing should turn smoothly and quietly.

Also check that the inner race of the bearing fits tightly on the crankshaft.



Check the timing sprocket for wear or damage.

If you replacing the timing sprocket, aline the center of the sprocket teeth with the center of woodruff key groove as shown.

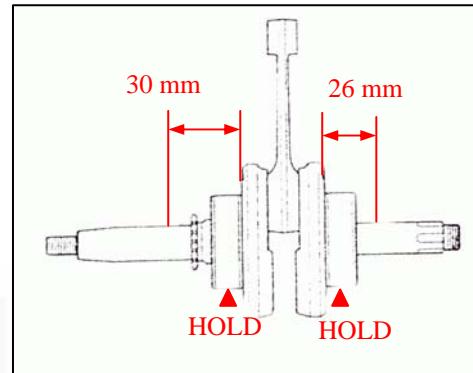


# CRANKSHAFT/TRANSMISSION/KICKSTARTER

Place the crankshaft on a stand or V-blocks and Measure the runout using a dial gauge.

The measuring locations are shown in the illustration

**SERVICE LIMIT:** 0.10mm (0.004 in)



## INSTALLATION

Install the guide sprocket and guide spindle.



Pour 1-2cm<sup>3</sup> of engine oil into the connecting rod big end bearing.

Install the crankshaft into the left crankcase, being careful not to interfere the connecting rod with the crankcase.

Assemble the crankcase halves (page 11-14)



## TRANSMISSION

### REMOVAL

Remove the kickstarter spindle (page 11-12)

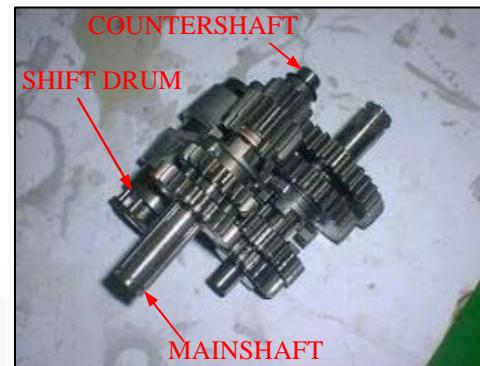
Remove the mainshaft, countershaft and shift drum as an assembly.



# CRANKSHAFT/TRANSMISSION/KICKSTARTER

## TRANSMISSION DISASSEMBLY

Disassemble the mainshaft, countershaft and shift drum.



## TRANSMISSION INSPECTION

Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.

Measure the I.D. of each gear

### SERVICE LIMITS:

**M2:** 17.10mm(0.673 in)

**C1:** 23.10mm(0.909 in)

**C3:** 20.10mm(0.791 in)



Measure the I.D. and O.D. of C1 gear bushing.

**SERVICE LIMIT:** O.D:22.93mm(0.903in)  
I.D:20.08MM(0.791in)

Calculate the CI gear-to-bushing clearance.

**SERVICE LIMIT:** 0.10mm(0.004in)



Check the shifter groove of the shifter gear for excessive wear or damage.

Measure the O.D.of the mainshaft and countershaft

### SERVICE LIMITS:

At M2 gear: 16.95 mm(0.667 in)

At C1 gear: 19.94 mm(0.785 in)

Calculate the M2 gear-to-shaft clearance.

**SERVICE LIMITS:** 0.10 mm(0.004 in)

Calculate the C1 gear bushing-to-shaft clearance.

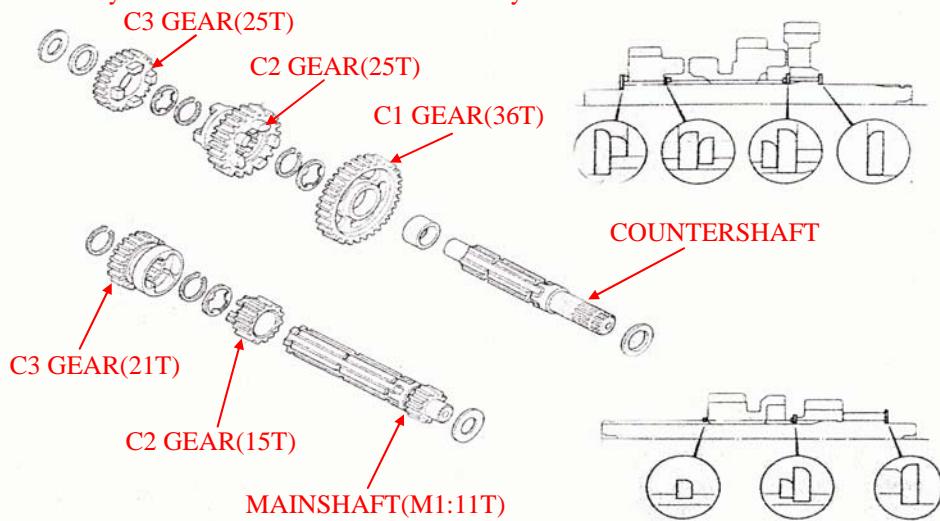
**SERVICE LIMITS:** 0.10 mm(0.004 in)



# CRANKSHAFT/TRANSMISSION/KICKSTARTER

## TRANSMISSION ASSEMBLY

Assembly is in the reverse order of disassembly



## GEARSHIFT DRUM DISASSEMBLY

Remove the guide pin clips.

Remove the guide pins, then remove the shift forks.



Inspect the shift drum grooves for wear or damage.

Measure the O.D. of the shift drum.

**SERVICE LIMIT:** 33.93mm(1.336 in)

## CRANKSHAFT/TRANSMISSION/KICKSTARTER

Measure the shift fork I.D.

**SERVICE LIMIT:** 34.14mm (1.344 in)

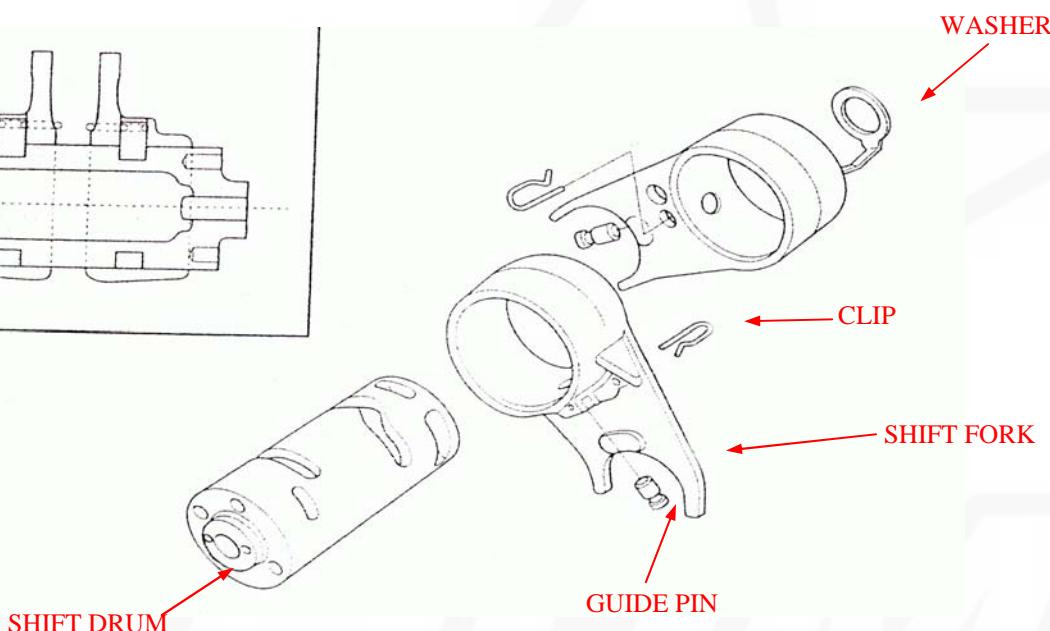
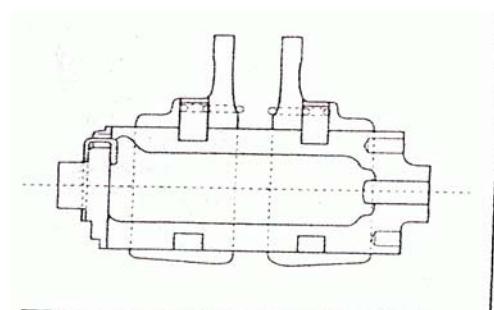


Measure the shift fork claw thickness.

**SERVICE LIMIT:** 4.60mm (0.181 in)



## SHIFT DRUM ASSEMBLY



## CRANKSHAFT/TRANSMISSION/KICKSTARTER

Apply engine oil to the shift drum outer surface.  
Install the shift forks onto the gearshift drum.  
Install the guide pins and secure them with the clips.

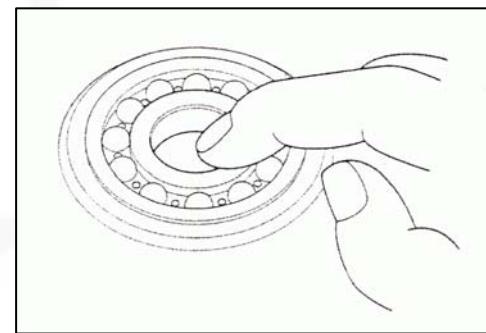


If the washer has been removed. Install a new washer and bend the tab to lock the washer.



### TRANSMISSION BEARING REPLACEMENT

Turn the inner race of each bearing with your finger.  
The bearings should turn smoothly and quietly.  
Also check that the bearing outer race fits tightly in the crankcase.  
Remove and discard the bearing if the race does not turn smoothly, quietly ,or fits loosely in the crankcase.



Remove the countershaft oil seal.

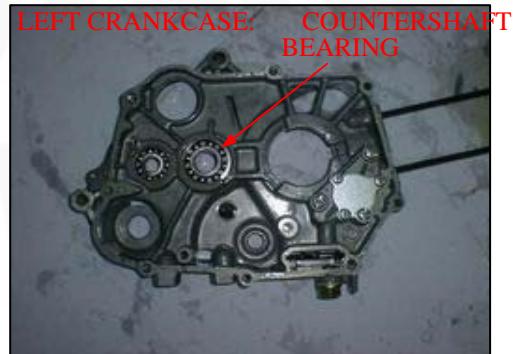


# CRANKSHAFT/TRANSMISSION/KICKSTARTER

Drive the mainshaft bearing out of the right crankcase.



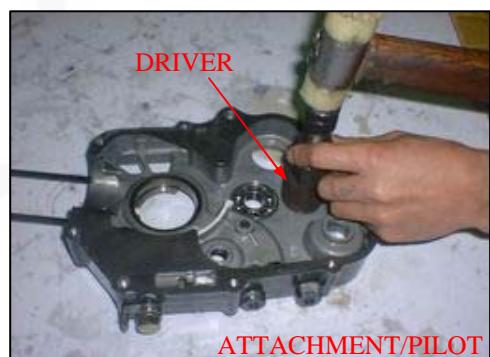
Drive the countershaft bearing out of the left crankcase.



Drive new bearings into the crankcases using the special tools as shown:

## TOOLS:

Drive	07749--001000
Attachment, 37*40mm	07746--0010200
Pilot,17mm	07746--0040400



Apply engine oil to a new countershaft oil seal lip.

Install the countershaft oil seal.



# CRANKSHAFT/TRANSMISSION/KICKSTARTER

## TRANSMISSION INSTALLATION

Apply clean engine oil to the transmission gears and shift drum.

Set the right fork into the M3 gear and the left fork into the C2 gear to assemble the mainshaft, Countershaft and shift drum as shown.



Install the mainshaft, countershaft and shift drum as an assembly into the left crankcase.

Rotate the shift drum to check the transmission operation.

Install the kickstarter spindle (page 11-14)



## KICKSTARTER

### REMOVAL

Remove the kickstarter spindle from the right crankcase.



## DISASSEMBLY

Remove the washer.

Remove the snap ring and starter ratchet/spring.



# CRANKSHAFT/TRANSMISSION/KICKSTARTER

Remove the snap ring, washer and starter pinion gear.



## INSPECTION

Check the kickstarter spindle for bending.

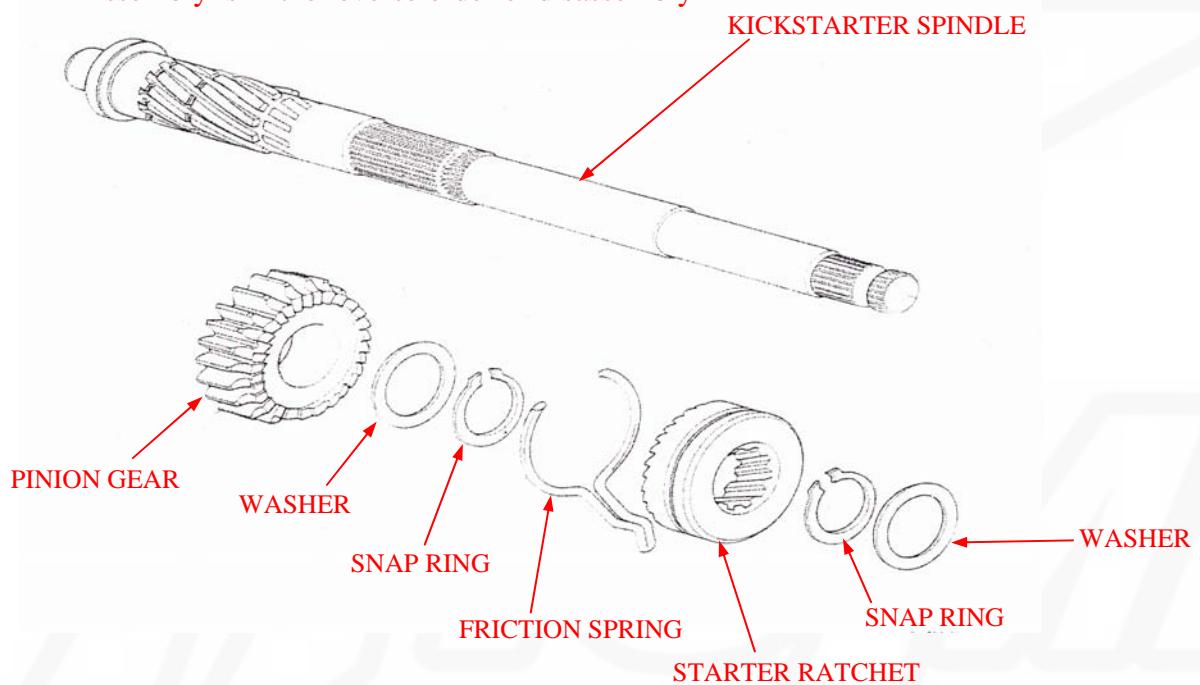
Check the friction spring for fatigue.

Check each part for wear or damage, replace if necessary.



## ASSEMBLY

Assembly is in the reverse order of disassembly

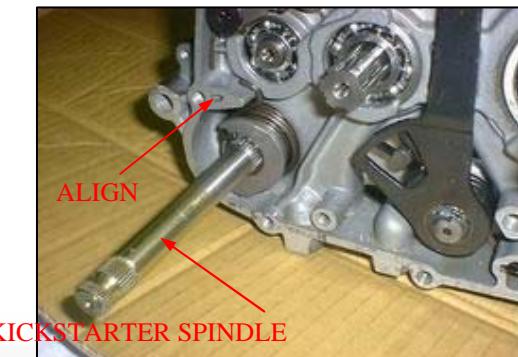


# CRANKSHAFT/TRANSMISSION/KICKSTARTER

## INSTALLATION

Install the kickstarter spindle by aligning its friction spring with the groove in the left crankcase as shown.

Assemble the crankcase halves.



## CRANKCASE ASSEMBLY

Clean the crankcase mating surfaces before assembling.

### NOTE:

Dress the surfaces with an oil stone if necessary to correct any minor roughness or irregularities.

Install the dowel pins and a new gasket onto the left crankcase.



Install the right crankcase over the left crankcase.

Make sure that the gasket stays in place



Install the seven bolts with the clamp and tighten them in a crisscross pattern in 2-3 steps.

Apply engine oil to the cam chain and install it.



## CRANKSHAFT/TRANSMISSION/KICKSTARTER

Install the washer and bolt to the shift drum, then tighten the bolt to the specified torque.  
**TORQUE:** 12N.m(1.2 kgf.m, 9lbf.ft)



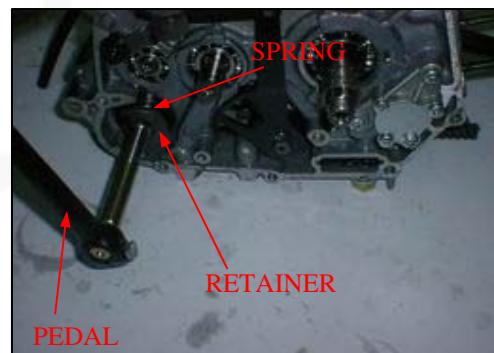
Install the rubber cap.



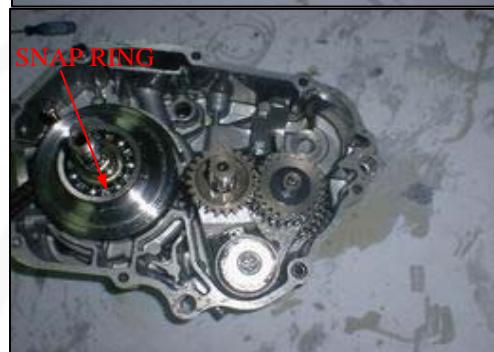
Install the return spring and retainer onto the kickstarter spindle.

Temporarily install the kickstarter pedal.

Install the spring ends onto the retainer and crankcase lug as shown and press the retainer to set its edge against the stepped part of the crankcase while turning the pedal counterclockwise.



Install the snap ring into the groove in the kickstarter spindle securely.



## 12. FRONT WHEEL/BRAKE/SUSPENSION/STEERING

### SERVICE INFORMATION

#### GENERAL

A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and a contaminated drum with a high quality brake degreasing agent.

\* When servicing the front wheel, brake, fork or steering stem, support the motorcycle using a safety stand or ho

### SPECIFICATIONS

Unit:mm(in)

ITEM	STANDARD	SERVICE LIMIT
Minimum tire tread depth	-----	3.0(0.12)
Cold tire pressure	100kpa(1.0kgf/cm <sup>2</sup> ,15psi)	-----
Axle runout	-----	0.20(0.008)
Wheel rim-to-hub distance	6.3±1.0(0.25±0.04)	-----
Wheel rim runout	Radial	2.0(0.08)
	Axial	2.0(0.08)
Brake	Brake lever free play	10-20mm(3/8-13/16in)
	Brake plate	4
Fork	Spring free length	376(14.8)
		373.5(14.7)

### TORQUE VALUES

Handlebar mounting nut	20N.m(2.0kgf.m, 14ibf.ft)
Engine stop switch holder screw	3N.m(0.3kgf.m, 2.2lbf.ft)
Brake lever pivot nut	3N.m(0.3kgf.m, 2.2lbf.ft)
Brake lever pivot nut	3N.m(0.3kgf.m, 2.2lbf.ft)
Spoke nipple	2N.m(0.2kgf.m, 1.4lbf.ft)
Front axle nut	47N.m(4.8kgf.m, 35ibf.ft)
Front brake arm pinch bolt	6N.m(0.6kgf.m, 4.3lbf.ft)
Steering stem nut	74N.m(7.5kgf.m, 54lbf.ft)
Steering stem top thread	See Page 12-17

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## TOOLS

Spoke wrench,4.1*4.5Mm	07707-0020100
Bearing remover shaft	07746-0050100
Bearing remover head,12mm	07746-0050300
Driver	07749-0010000
Attachment, 32*35mm	07746-0010100
Pilot,12mm	07746-0040200
Pin spanner	07702-0020001
Ball race remover	07944-1150001
Attachment, 37*40mm	07746-0010200
Steering stem driver	07946-gc40000
	or Steering stem driver 07946-MB00000 with Steering stem driver attachment 07946-GC4000a(U.S.A. only)

## TROUBLESHOOTING

### Hard steering

- \* Faulty or damaged steering head bearings.
- \* Insufficient tire pressure
- \* Steering stem top thread too tight

### Wheel turns hard

- \* Faulty wheel bearing
- \* Bent front axle
- \* Brake drag

### Steers to one side or does not track straight

- \* Bent fork
- \* Bent axle
- \* Wheel installed incorrectly
- \* Faulty steering head bearings
- \* Bent frame
- \* Worn wheel bearing
- \* Worn swingarm pivot components

### Soft suspension

- \* Weak fork springs
- \* Tire pressure too low

### Hard suspension

- \* Bent fork tubes

### Front suspension noisy

- \* Damaged or bent fork tubes
- \* Loose fork fasteners

### Front wheel wobbling

- \* Bent rim
- \* Worn front wheel bearings
- \* Faulty tire
- \* Unbalanced tire and wheel

### Improper brake performance

- \* Incorrect adjustment of lever
- \* Contaminated brake shoes
- \* Worn brake shoes
- \* Worn brake cam
- \* Worn brake drum
- \* Improperly engaged brake arm serrations

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

---

## HANDLEBAR

### REMOVAL

Remove the fuel tank breather tube from the number plate and the number plate from the steering stem nut.



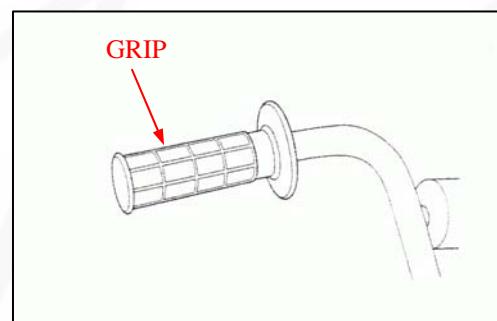
Remove the wire bands.



Remove the two screws and engine stop switch/throttle housing from the handlebar.



Disconnect the throttle cable and remove the throttle grip.



Remove the left handlebar grip.

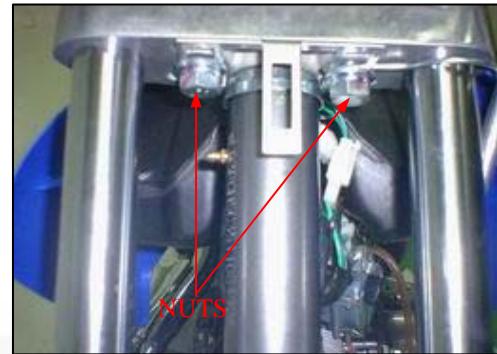
# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Remove the two nuts and handlebar.

## INSTALLATION

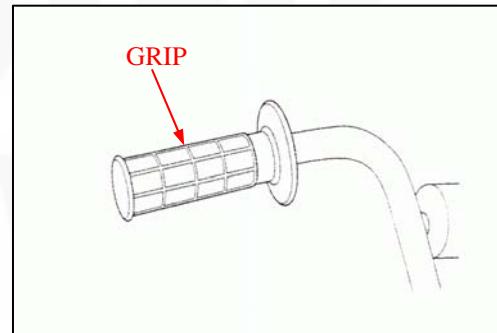
Install the handlebar into the fork top bridge and tighten the mounting nuts.

**TORQUE:** 20N.m(2.0kgf.m,14lbf.ft)



Clean the inside surface of the left handlebar grip and the outside surface of left handlebar.

Apply Manufacture Bond a or equivalent to the inside surface of the left handlebar grip and to the outside surface of the left handlebar. Wait 3-5 minutes and install the grip.



Rotate the grip for even application of the adhesive.

### NOTE:

Allow the adhesive to dry for an hour before using.

Apply grease to the throttle grip pipe flange and install the throttle grip onto the right handlebar.

Connect the throttle cable to the throttle grip pipe flange.



Install the engine stop switch/throttle housing onto the handlebar, aligning the mating surface with the punch mark on the handlebar.

Tighten the forward screw first, then the rear screw.

**TORQUE:** 3N.m(0.3kgf.m,2.2lbf.ft)



## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Secure the engine stop switch wire with the wire bares properly.



Install the number plate over the steering stem nut and insert the breather tube into the hole in the number plate.

Check the throttle grip operation and free play  
(page 3-4)

### FRONT WHEEL REMOVAL

#### WARNING

A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent...



Support the motorcycle securely using safety stand or a hoist.

Remove the axle nut, axle and front wheel.



Remove the side collar from the wheel hub.

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

---

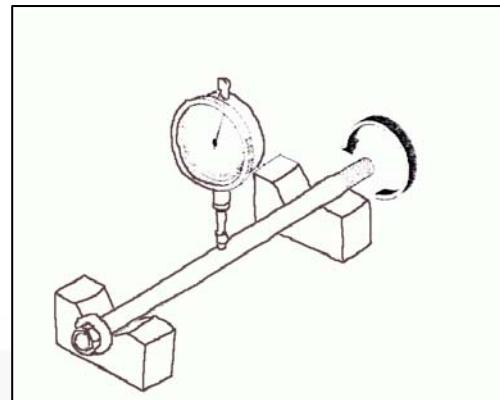
## INSPECTION

### Axle

Set the axle in v-blocks and measure the runout.

Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT:** 0.20mm(0.008in)



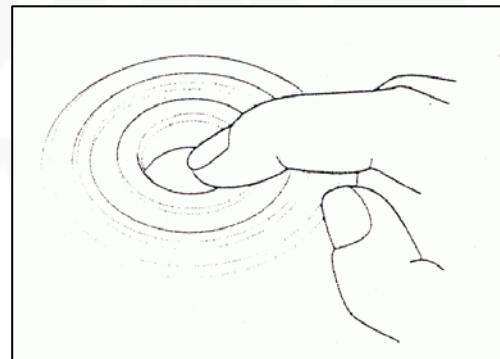
### Wheel bearing

Turn the inner race of each bearing with your finger.

The bearing should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

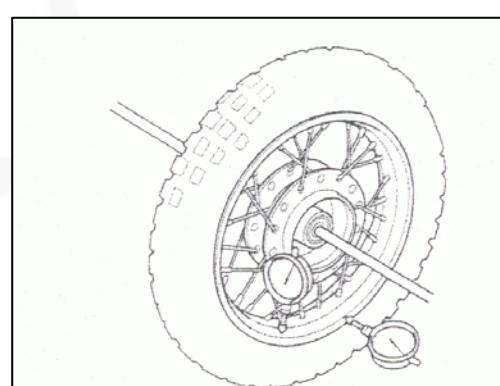


### Wheel rim runout

Check the rim runout by placing the wheel in a turning stand.

Spin the wheel by hand, and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.



### SERVICE LIMITS:

**Radial:** 2.0mm(0.08in)

**Axial:** 2.0mm(0.08in)

### DISASSEMBLY

Remove the dust seal.



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the bearing remover head into the bearing. From the opposite side, install the bearing remove shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

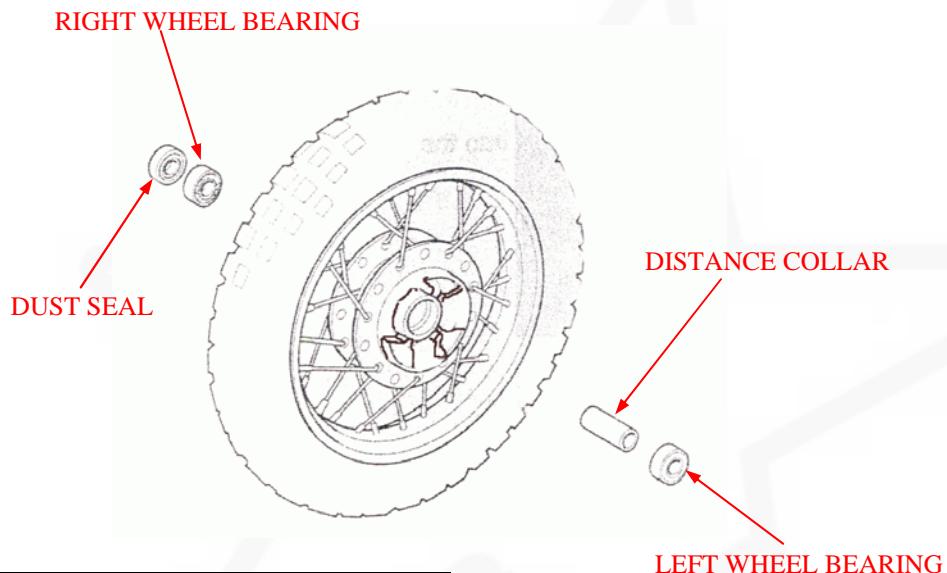


## TOOLS:

**Bearing remover head, 12mm** 07746-0050300  
(equivalent commercially available in U.S.A.)

**Bearing remover shaft** 07746-0050100  
(equivalent commercially available in U.S.A.)

## ASSEMBLY



## CAUTION:

Never install the old bearing once the bearings have been removed, the bearings must be replaced with new ones.

Pack each wheel bearing cavities with grease. Drive each wheel bearing cavities with grease. Drive in a new left bearing squarely with its sealed side facing out. Install the distance collar and drive in a new right bearing using the same tools.



## TOOLS:

**Driver** 07749-0010000  
**Attachment,32\*35mm** 07746-0010100  
**Pilot,12mm** 07746-0040200

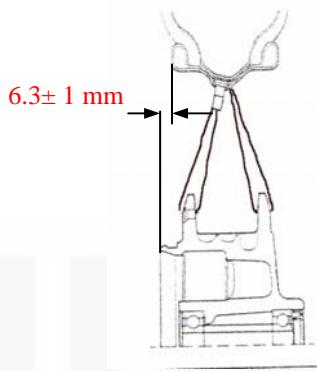
# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## Wheel center adjustment

Place the rim on the work bench.

Place the hub with the right side down and begin lacing with new spokes.

Adjust the hub position so that the distance from the hub left end surface to the side of rim is  $6.3\pm 1\text{ mm}$  ( $0.25\pm 0.04\text{ in}$ ) as shown.



## TOOL

Spoke wrench, 4.1\*4.5mm

07701-0020100

(Equivalent commercially available in U.S.A.)



**TORQUE:** 2N.m(0.2kgf,1.4lbf.ft)

Check the rim runout (page 12-8)

Apply grease to a new dust seal lips, then install it into the right wheel hub.



Install the side collar into the right wheel hub.

## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

---

Install the front wheel between the fork legs.



Apply a thin layer of grease to the front axle surface.

Install the front axle from the right side.

Hold the axle and temporarily tighten the axle nut.



With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation.



Tighten the axle nut to the specified torque.

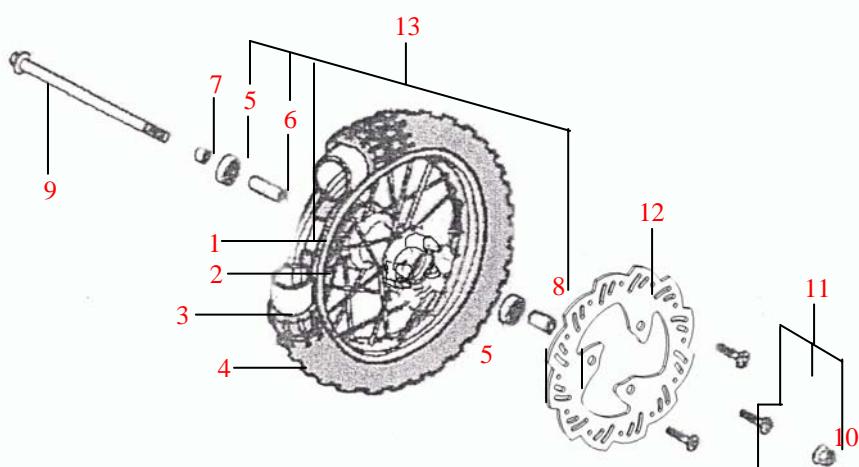
**TORQUE:** 47N.m(4.8kgf.m, 35lbf.ft)

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

## FRONT BRAKE

### ASSEMBLY

1. FR. Wheel Rim Comp
2. Flap. FR. Wheel
3. Inner Tire 2.50-10
4. Outer Tire 2.50-10
5. Bearing
6. Distance Collar
7. Bush A
8. Bush B
9. FR. Wheel Axle
10. Grip Nut M12
11. Bolt
12. FR. Brake Disk
13. FRONT WHEEL ASSY
14. Spoke

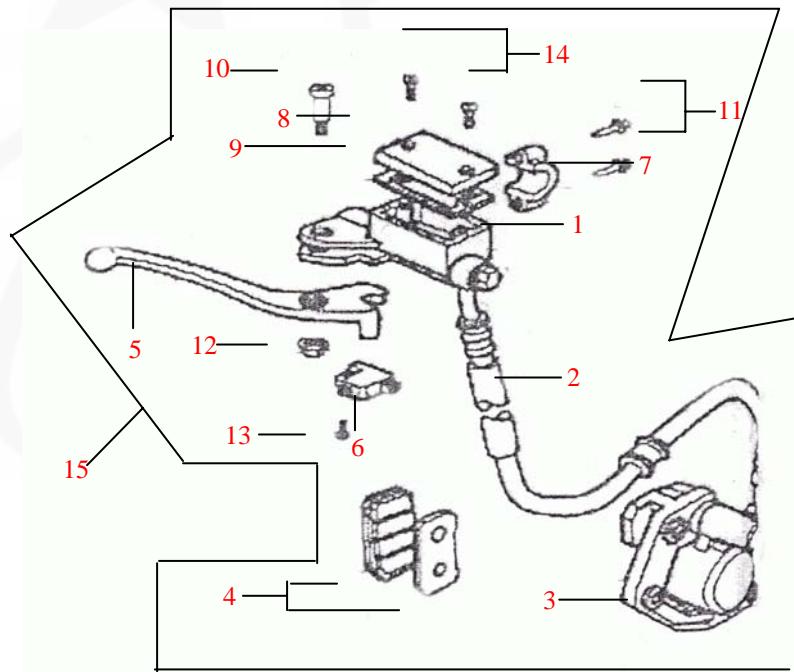


Apply grease to the brake cam spindle.

Install the brake cam into the brake panel.

**NOTICE:** need check the brake liquid every times when you drive it.

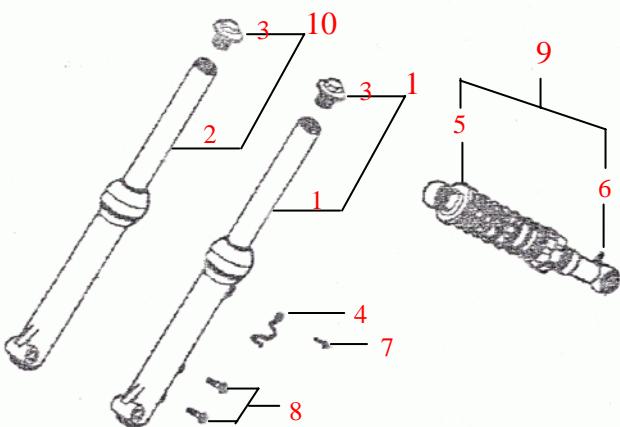
1. Master Cylinder Body
2. Oil Pipe
3. Brake Clamp Assembly
4. Friction Pad
5. FR. Brake lever
6. FRONT BRAKE SWITCH
7. Holder, Master Cylinder
8. Lid, Master Cylinder
9. Gasket
10. Fixing Bolt
11. Bolt M6\*25
12. Nut M6
13. SCREW
14. Screw
15. FRONT BRAKE ASSY



# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

**NOTICE:** need check the Friction Pad when you drive it

1. FR. L. Shock Absorber
2. FR. R. Shock Absorber
3. Bolt
4. Holder, FR. Pipe
5. RR. Shock Absorber
6. Rubber Cap
7. Flange Bolt M6\*12
8. Flange Bolt M8\*25
9. REAR SHOCK ABSORBER
10. R.FRONT SHOCK ASSY
11. L.FRONT SHOCK ASSY



## INSTALLATION

Install the front wheel (page12-8)

## FORK DISASSEMBLY

Remove the front wheel (page 12-5)

Loosen the brake cylinder bolt and remove the brake cylinder from the fork stem.

Remove front wheel axle from the fork.

Remove the front wheel.

Remove the fork top bolt and washer and pull the fork slider down to remove the fork assembly.

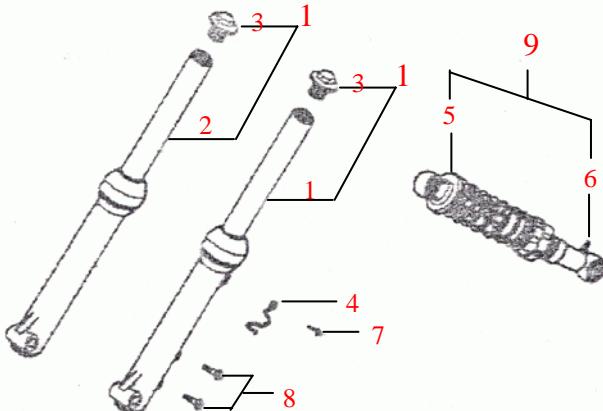
## FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Drive out the bolt.

Remove the following from the fork slider

- spring
- others parts

1. FR.L. Shock Absorber
2. FR.R. Shock Absorber
3. Bolt
4. Holder, FR. Brake Pipe
5. RR. Shock Absorber
6. Rubber Cap
7. Flange Bolt M6\*12
8. Flange Bolt M8\*25
9. REAR SHOCK ABSORBER
10. R.FRONT SHOCK ASSY
11. L.FRONT SHOCK ASSY



### INSPECTION

Visually inspect each part for excessive wear or damage

Measure the fork spring free length

### ASSEMBLY

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the following onto the fork slider

- new dust seal ( apply grease to the lips)
- stopper ring (with the chamfered side facing up)
- back up ring
- slider guide ( apply 5-6g of grease to the slider guide) sliding surface of the fork slider)

1.FR. L. Shock Absorber

2.FR.R. Shock Absorber

3.Bolt

4.Holder, FR. Brake Pipe

5.RR.Shock Absorber

6.Rubber Cap

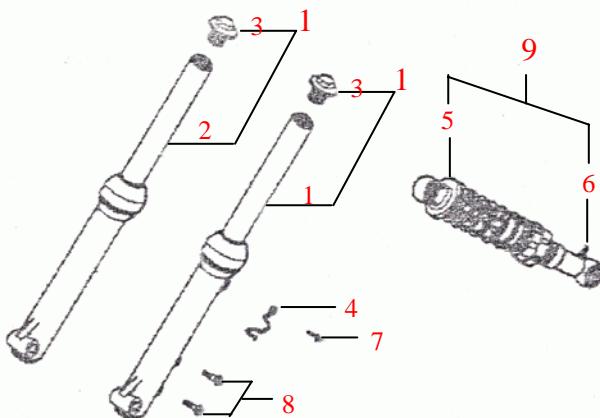
7.Flange Bolt M6\*12

8.Flange Bolt M8\*25

9.REAR SHOCK ABSORBER

10.R.FRONT SHOCK ASSY

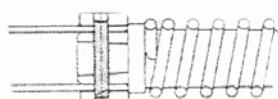
11.L.FRONT SHOCK ASSY



Install the slider piston and fork spring/holder as shown.

Align the pin holes in the piston, fork slider and spring holder so that the locating pin on the upper spring holder is facing inside of the fork slider and drive the spring pin to secure them, using a 4mm pin driver.

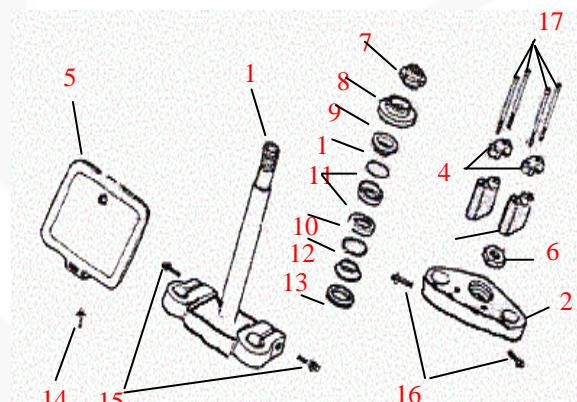
Be sure that the spring pin do not project out of the piston outer surface



Apply 5-6g of grease to the slider guide outer groove.

Pack the fork spring with 14g of grease.

Install the fork assembly by aligning the locating pin with the groove in the outer tube.



1. Steering Column Comp

2. Upper Panel

3. Lower Holder, Handle Pipe

4. Upper Holder, Handle Pipe

5. Front Cover

6. Nut

7. Adjusting Nut

8. Dust Cap

9. Upper Cone Race

10. Ball

11. Ball Race

12. Bottom Cone Race

13. Dust Seal

14. Flange Bolt M6×12

15. Flange Bolt M8×25

16. Flange Bolt M8×25

17. Bolt M8×30

Install the fork top bolt and washer and tighten it.

Wipe any excess grease of the outer tube.

# FRONT WHEEL/BRAKE/SUSPENSION/STEERING

Install the stopper ring into the groove in the outer tube properly

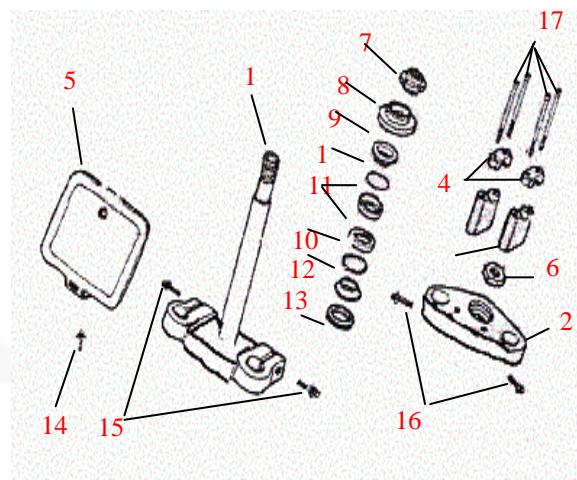
Install the dust seal over the outer tube

Wipe any excess grease of the fork slider.

Install the brake cable onto the fork slider and secure it by tightening the cable nut.

Install the front wheel (page 12-10)

- |                              |                       |
|------------------------------|-----------------------|
| 1. Steering Column Comp      | 12. Bottom Cone Race  |
| 2. Upper Panel               | 13. Dust Seal         |
| 3. Lower Holder, Handle Pipe | 14. Flange Bolt M6*12 |
| 4. Upper Holder, Handle Pipe | 15. Flange Bolt M8*25 |
| 5. Front Cover               | 16. Flange Bolt M8*25 |
| 6. Nut                       | 17. Bolt M8*30        |
| 7. Adjusting Nut             |                       |
| 8. Dust Cap                  |                       |
| 9. Upper Cone Race           |                       |
| 10. Ball                     |                       |
| 11. Ball Race                |                       |



## STEERING STEM REMOVAL

Remove the following:

- Number plate (page 2-3)
- handlebar (page 12-3)
- Front wheel (page 12-5)
- Front fender (page 2-3)
- Steering stem nut and washer
- Fork top bolts and washers
- Top bridge

Remove the steering stem top thread using the special tool.

### TOOL:

Pin spanner

07702-0020001

Remove the following

- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing

**BEARING REPLACEMENT**

Drive out the upper and lower bearing outer races using the special tool.

**TOOL:**

Ball race remov~~07944~~ 1150001

Always replace the bearing and races as a set .

Drive new upper and lower bearing outer races into the steering head pipe using the special tools as shown.

**TOOLS:**

**Driver** 07749-0010000

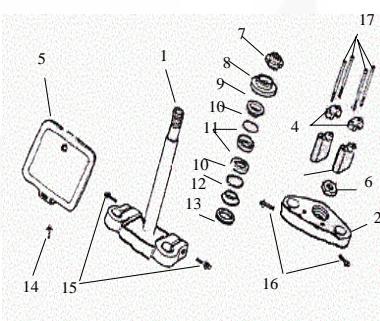
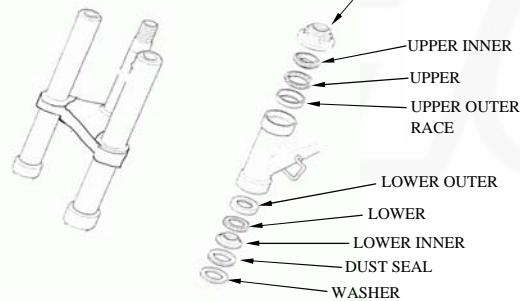
**Attachment** ,37x07746-0010200

Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem .

Remove the dust seal and washer.

1.Steering Column Comp	12.Bottom Cone Race
2.Upper Panel	13.Dust Seal
3.Lower Holder, Handle Pipe	14.Flange Bolt M6x12
4.Upper Holder, Handle Pipe	15.Flange Bolt M8x25
5.Front Cover	16.Flange Bolt M8x25
6.Nut	17.Bolt M8x30
7.Adjusting Nut	
8.Dust Cap	
9.Upper Cone Race	
10.Ball	
11.Ball Race	

**INSTALLATION**

Apply grease to upper and lower bearings and races.

Install the lower bearing onto the lower bearing race.

Insert the steering stem into the steering head pipe.

Install upper bearing, inner race and top thread.

Hold the steering stem and tighten the stem top thread to the initial torque.

**TORQUE:25 N.m(2.5 kgf.m,18 lbf.ft)**

move the steering stem right and left, lock-to -lock several times to seat the bearings.

Loosen the top thread.

Retighten the top thread to the specified torque.

## **TORQUE:3N.m(0.3kgf.m,2.2lbf.ft)**

Install the top bridge.

Install the stem nut and fork top bolts with the washers and tighten them

## **TORQUE: stem nut:74 N.m 7.5 kgf.m, 54 lbf.ft)**

Make sure that the steering stem moves smoothly or binding.

- 1. Steering Column Comp
- 2. Upper Panel
- 3. Lower Holder, Handle Pipe
- 4. Upper Holder, Handle Pipe
- 5. Front Cover
- 6. Nut
- 7. Adjusting Nut
- 8. Dust Cap
- 9. Upper Cone Race
- 10. Ball
- 11. Ball Race
- 12. Bottom Cone Race
- 13. Dust Seal
- 14. Flange Bolt M6×12
- 15. Flange Bolt M8×25
- 16. Flange Bolt M8×25
- 17. Bolt M8×30

Install the following:

- Front fender
- Front wheel
- Handlebar
- Number plate

## **REAR WHEEL/BRAKE/SUSPENSION**

### **SERVICE INFORMATION**

#### **GENERAL**

#### **⚠ WARNING**

- When servicing the rear wheel, support the motorcycle using a safety stand or hoist.

### **SPECIFICATIONS**

ITEM	STANDARD	SERVICE LIMIT
Minimum tire tread depth	—	3.0(0.12)
Cold tire pressure	125kpa(1.25kgf/cm <sup>2</sup> ,18psi)	—
Axle run out	—	0.20(0.008)
Wheel rim run out	Radial	2.0(0.08)
	Axial	2.0(0.08)
Drive chain	Size/link	DID420MBK1/88
	Slack	15-25 (9/16-1)
Brake	Brake pedal free play	10-20 (3/8-13-16)
		—
		—

### **TORQUE VALUES**

Spoke nipple	2N.m(0.2kgf.m,1.4lbf.
Rear axle nut	47N.m(4.8kgf.m,35lbf.ft) U-nut
Driven sprocket nut	32N.m(3.3kgf.m,24lbf.ft) U-nut
Swingarm pivot nut	39N.m(4.0kgf.m,29lbf.ft) Apply grease to the seating surface/U-nut
Shock absorber mounting nut	34N.m(3.5kgf.m,25lbf.ft) U-nut
Drive chain slider nut	12N.m(1.2kgf.m,9lbf.ft) U-nut

### **TOOLS**

Spoke wrench,4.1×4.5mm	07701-0020100	Equivalent commercially available in U.S.A.
Bearing remover shaft	07746-0050100	Equivalent commercially available in U.S.A.
Bearing remover head,12mm	07746-0050300	
Drive	07749-0010000	
Spanner,32×35mm	07746-0010100	
Pilot,12mm	07746-0040200	

### **TROUBLESHOOTING**

#### **Soft suspension**

- Weak shock absorber spring
- Oil leakage from sampler unit
- Tire pressure too low

#### **Rear wheel wobbling**

- Bent rim
- Worn rear wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Tire pressure too low
- Faulty swingarm pivot bushings

#### **Hard suspension**

- Bent damper rod
- Damaged swingarm pivot bushings
- Bent swingarm pivot
- Tire pressure too high

#### **Steers to one side or does not track straight**

- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

### **REAR WHEEL**

#### **REMOVAL**

Support the motorcycle securely using a hoist or equivalent and raise the rear wheel off the ground



Loosen the drive chain adjuster lock nuts and adjusting nuts  
Remove the axle nut and drive chain adjuster

Push the rear wheel forward and derail the drive chain from the driven sprocket

Remove the axle from the left side and remove the rear wheel.

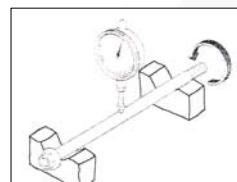
Remove the left side collar the left wheel hub.



### INSPECTION

#### Axle

Place the axle in V-blocks and measure the run out  
Actual run out is 1/2 the total indicator reading



**SERVICE LIMIT** 0.20mm(0.008 in)

#### Wheel bearing

Turn the inner race of each bearing with your finger  
Bearings should turn smoothly and quietly .Also check that the bearing outer race first tightly in the hub.

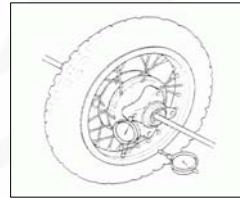
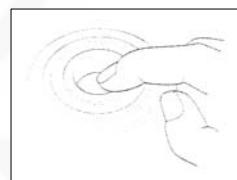
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.  
replace the wheel bearings in pairs.

#### Wheel rim run out

Check the rim run out by placing the wheel in a turning stand

Spin the wheel slowly and read the run out using a dial indicator.

Actual run out is 1/2 the total indicator reading



**SERVICE LIMITS:** Radial: 2.0 mm(0.08in)  
Axial: 2.0 mm(0.08in)

#### Driven sprocket

Check the condition of the final driven sprocket teeth.

Replace the sprocket if worn or damaged

#### NOTE:

- If the final driven sprocket requires replacement inspect the drive chain and drive sprocket
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly

#### DISASSEMBLY

Remove the nuts .bolts and driven sprocket

Remove the left dust seal.



#### Wheel bearing removal

Install the bearing remover head into the bearing  
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.  
Remove the distance collar and drive out the other bearing

#### TOOLS:

##### Bearing remover head ,12mm

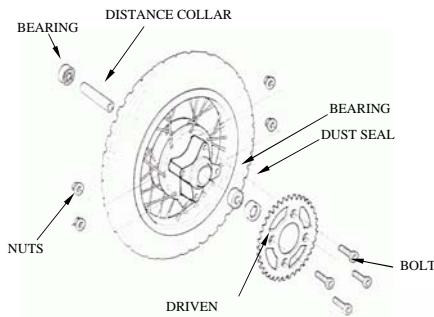
07746-0050300(Equivalent

##### Bearing remover shaft 07746-0050100(Equivalent



#### ASSEMBLY

DISTANCE COLLAR



### Wheel bearing installation

#### CAUTION:

Never install the old bearings ,once the bearings has been removed, the bearing must be replaced with new ones.



Pack each wheel bearing cavity with grease  
Drive in a new right bearing squarely with the sealed side facing up using the special tools as shown.



#### TOOLS:

Driver	07749-0010000
Attachment ,32x35mm	07746-0010100
Pilot ,12mm	07746-0040200

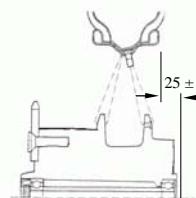
Install the distance collar and drive in a new left bearing using the same tools.

#### Wheel center adjustment

Place the rim on the word bench

Place the hub with the left side down and begin lacing with new spokes.

Adjust the hub position so that distance from the hub right end surface to the side of rim is  $25 \pm 1$  mm ( $1.0 \pm 0.04$  in) as shown



#### TOOL:

Spoke wrench ,4.107701-0020100 (equivalent

**TORQUE:**2N.m(0.2kgf.m,1.4lbf.ft)

Check the rim run out (page 13-4)

Apply grease to new dust seal and install it into the left wheel hub  
Install the driven sprocket ,bolts and nuts and tighten them



**TORQUE:**32N.m(3.3kgf.m,24lbf.ft)

#### INSTALLATION

Install the left side collar into the left wheel hub.



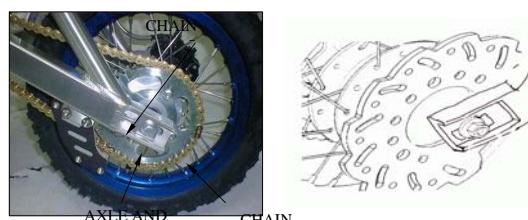
Place the rear wheel into the swingarm.

Install the drive chain over the driven sprocket

Apply thin layer of grease to the axle

Install the axle with the right drive chain adjuster from the right side

Install the left drive chain adjuster and axle nut.



## REAR SUSPENSION

### SHOCK ABSORBER

#### REMOVAL

Support the motorcycle securely using a hoist or equivalent and raise the rear wheel off the ground .

Remove the seat (page 2-2)

Remove the shock absorber lower mounting nut and bolt



Remove the upper mounting nut and bolt and the shock absorber

#### INSPECTION

Visually inspect the following :

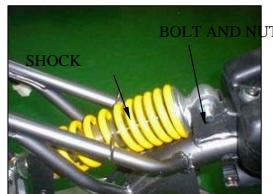
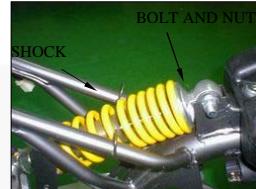
- Spring for fatigue or damage
- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Bump rubber for wear or damage
- Mounting bushings for damage

Replace the shock absorber assembly if necessary

#### INSTALLATION

Install the shock absorber into the frame and swingarm

Install the upper and lower mounting bolts from the left side install the nuts and tighten them to the specified torque



**TORQUE:**34N.m(3.5kgf.m,25lbf.ft)

### SWINGARM REMOVAL

Remove the following

Rear wheel (page 13-3)

Drive chain (page 3-12)

Remove the bolts and drive chain cover

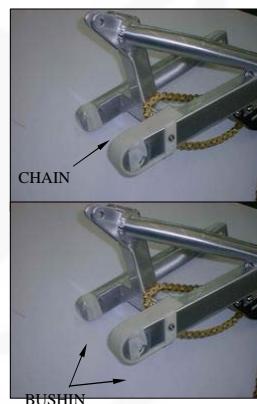
Remove the bolts .nuts and drive chain guard



Remove the shock absorber lower mounting nut and bolt

Remove the swingarm pivot nut ,bolt and swingarm .

Remove the nut and bolt and the drive chain slider.



#### INSPECTION

Inspect the swingarm for wear or damage.

Inspect the pivot bushings for wear or damage.



#### INSTALLATION

Install the drive chain slider and tighten the nut.

**TORQUE:**12N.m(1.2kgf.m,9lbf.ft)

Install the swingarm over the frame .then install the pivot bolt from the right side and the shock absorber lower mounting bolt from the left side

Apply grease to the seating surface of the swingarm pivot nut

Install an tighten the nuts to the specified torque



**TORQUE:swingarm:39N.m(4.0kgf.m,29lbf.ft)**  
**Shock absorber:34N.m(3.5kgf.m,25lbf.ft)**

#### BRAKE PEDAL

#### REMOVAL

Remove the rear brake adjusting nut.

Remove the cotter pin ,joint pin.

Unhook the brake pedal return spring from the spring holding pin.

Remove the cotter pin ,washer and brake pedal.



#### INSTALLATION

Apply grease to the pivot groove and install the brake pedal.



Install the washer and a new cotter pin to secure the brake pedal.



Install the return spring as shown.

Install the spring onto the brake rod the joint pin into the brake arm

Install the rod to the brake arm with the adjusting nut.

Connect the brake rod to the pedal with the joint pin and secure it with a new cotter pin .

Adjust the brake pedal free play (page 3-15).

## 14.IGNITION SYSTEM

#### SERVICE INFORMATION

#### GENERAL

#### ⚠WARNING

When the engine must be running to do some work, make sure the area is well -ventilated. Never run the engine in an enclosed area .The exhaust contains poisonous carbon monoxide gas that may cause low of consciousness and lead to death Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

- When servicing the ignition system ,always follow the steps in the troubleshooting sequence on page 14-3.

The CDI ignition system uses an electrically controlled ignition timing system .No adjustments can be made to the ignition timing

- The CDI may be damage if dropped. Also if the connector is disconnected when current is flowing ,the excessive voltage may damage the module.

A faulty ignition system is often related to poor connections. Check those connections before proceeding .

Use spark plug of the correct heat range .Using spark plug with an incorrect heat range can damage the engine .

For alternator and ignition pulse generator removal and installation ,see section 10.

#### SPECIFICATIONS

ITEM	SPECIFICATIONS		
Spark plug	Standard	CR6HSA (NGK)	U20FSSR-U (DENSO)
	For cold climate/below 4 <sup>0</sup> F/5 <sup>0</sup> C	CR5HSA (NGK)	U16FSSR-U (DENSO)
	For extended high speed riding	SR7HSA (NGK)	U22FSSR-U (DENSO)
Spark plug gap	0.60-0.70mm (0.024-0.028 in)		
Ignition coil peak voltage	100 V minimum		
Ignition pulse generator peak voltage	0.7 V minimum		
Alternator exciter coil peak voltage	100 V minimum		
Ignition timing ("F"mark)	27 <sup>0</sup> BTDC at idle		

#### TORQUE VALUES

Ignition coil mounting bolt 6N.m (0.6 kgf.m , 4.3lbf.ft)

#### TOOLS

Peak voltage tester ( U.S.A. only ) or 07HGJ-0020100 (not available in)  
 Peak voltage adaptor available digital multimeter (impede)

#### TROUBLESHOOTING

Inspect the following before diagnosing the system.

- Faulty spark plug
- Loose spark plug cap or spark plug wire connections
- Water got into the spark plug cap (leaking the ignition coil secondary voltage )

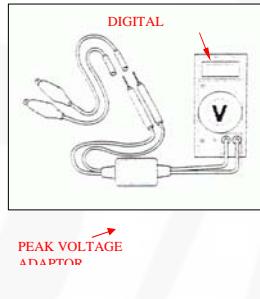
## No spark at spark plug

Unusual condition		Probable cause (Check in numerical order )
Ignition coil primary voltage	Low peak voltage	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections (system is normal if measured voltage is over the specifications with reverse connections ).</li> <li>2. The multimeter impedance is too low ; 10M /DCV.</li> <li>3. Cranking speed is too low (operating force of the kickstarter is weak ).</li> <li>4. The sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once).</li> <li>5. Poorly connected connectors or an open circuit in ignition system .</li> <li>6. Faulty exciter coil (Measure peak voltage ).</li> <li>7. Faulty ignition coil .</li> <li>8. Faulty ICM (in case when above no . 1-7 are normal ).</li> </ol>
	No peak voltage	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections (System is normal if measured voltage is over the specifications with reverse connections ).</li> <li>2. Short circuit in ignition switch wire or engine stop switch wire (black/white).</li> <li>3. Faulty ignition switch or engine stop switch .</li> <li>4. Loose or poorly connected ICM connectors .</li> <li>5. Open circuit or poor connection in ground wire (green )of the ICM.</li> <li>6. Faulty peak voltage adaptor .</li> <li>7. Faulty exciter coil (measure peak voltage ).</li> <li>8. Faulty ignition pulse generator (measure peak voltage ).</li> <li>9. Faulty ICM (in case when above no. 1-8 are normal ).</li> </ol>
	Peak voltage is normal but spark jumps at low speed	<ol style="list-style-type: none"> <li>1. faulty spark plug or leaking ignition coil secondary current ampere .</li> <li>2. faulty ignition coil .</li> </ol>
Exciter coil	Low peak voltage	<ol style="list-style-type: none"> <li>1. the multimeter is too low ; 10M /DCV.</li> <li>2. cranking speed is too slow ( operation force of the kickstarter is weak ).</li> <li>3. the sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once).</li> <li>4. Faulty exciter coil (in case when above no . 1-3 are normal ).</li> </ol>
	No peak voltage	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor .</li> <li>2. Faulty exciter coil .</li> </ol>
Ignition pulse Generator	Low peak voltage	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low ; 10M DCV.</li> <li>2. Cranking speed is too slow ( operation force of the kickstarter is weak ).</li> <li>3. the sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once).</li> <li>4. Faulty ignition pulse generator (in case when above no . 1-3 are normal ).</li> </ol>
	No peak voltage	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor .</li> <li>2. Faulty ignition pulse generator.</li> </ol>

## IGNITION SYSTEM INSPECTION

### NOTE:

- If there is no spark at plug ,check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercial available digital multimeter with an impedance of 10M /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using peak voltage tester (U.S.A. only ),follow the manufacturer's instructions.



Connect the peak voltage adaptor to the digital multimeter, or use the peak voltage tester

### TOOLS:

peak voltage tester

Peak voltage adaptor 07HGJ-0020100

(not available in U.S.A.) with commercially available digital multimeter (impedance 10M /DCV minimum)

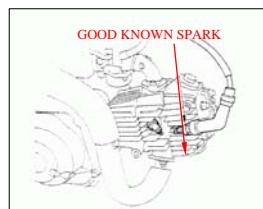
## IGNITION COIL PRIMARY PEAK VOLTAGE

### WARNING

Avoid touching the spark plug and tester probes to prevent electric shock.

### NOTE:

- Check all system connections before inspection if the system is disconnected ,incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plug is installed correctly.



Disconnect the spark plug cap from the spark plug .  
Connect a known good spark plug to the spark plug cap and ground the spark plug to the cylinder as done in a spark test.

with the ignition coil primary wire connected ,connect the peak voltage adaptor or peak voltage tester probes to the ignition coil primary wire terminal and found .

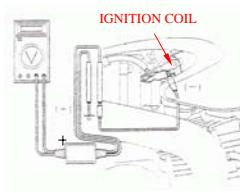
#### CONNECTION:

Black / yellow terminal (-)-Body ground (+)  
Turn the ignition switch ON and engine stop switch to "RUN" .

Shift the transmission into neutral .  
Crank the engine with the kickstarter and read ignition coil primary peak voltage .

**PEAK VOLTAGE:**100V minimum

If the peak voltage is abnormal, follow the checks described in the troubleshooting chart (page 14-2).



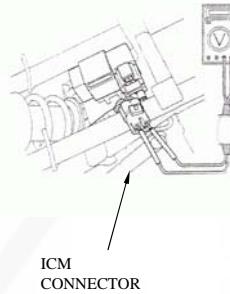
#### IGNITION PULSE GENERATOR PEAK VOLTAGE

##### NOTE:

Check cylinder compression and check that the spark plug is installed correctly.

Remove the seat assembly (page 2-2) .

Disconnect the 4P connector from the ICM .  
Connect the peak voltage adaptor or peak voltage tester probes to the connector terminals of the wire harness side.



#### TOOLS:

Peak voltage tester  
Peak voltage adaptor 07HGJ-00210100  
(not available in U.S.A.) with commercially available digital multimeter (impedance 10M /DCV minimum )

#### CONNECTION

Blue /Yellow terminal(+) -Green (-)

Shift the transmission into neutral .  
Crank the engine with the Kickstarter and read the peak voltage .

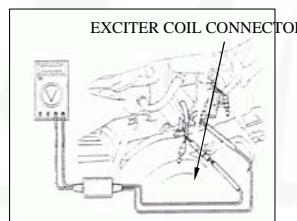
**PEAK VOLTAGE:**0.7V minimum

If the peak voltage measured at ICM connector is abnormal. measure the peak voltage at the pulse generator connector .

Disconnect the ignition pulse generator connector (blue / yellow ) and connect the peak voltage adaptor or tester probes to the connector terminal of the ignition pulse generator side and ground .

In the same manner as at the ICM connector ,measure the peak voltage and compare it to the voltage measured at the ICM connector .

- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal , the wire harness has an open circuit or loose connection .
- If both peak voltages are abnormal .follow the checks described in the troubleshooting chart (page 14-2) .



#### ALTERNATOR EXCITER COIL PEAK VOLTAGE

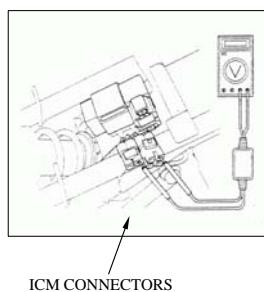
##### WARNING

Avoid touching the spark plug and tester probes to prevent electric shock .

##### NOTE :

Check cylinder compression and check that the spark plug is installed correctly.

Remove the seat assembly (page 2-2)



Disconnect the 3p and 2p connectors from the ICM .  
Connect the peak voltage adaptor or peak voltage tester probes to the connector terminals of the wire harness side .

#### TOOLS:

**Peak voltage tester**  
**Peak voltage adaptor** 07HGJ-0020100  
(not available in us. A. ) with commercially available digital multimeter ( impedance 10M /DCV minimum )

**CONNECTION** :Black /Red terminal (+)-Green (-)

Shift the transmission into neutral .  
Crank the engine with kickstarter and read the peak voltage

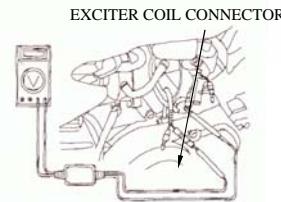
**PEAK VOLTAGE** :100v minimum

If the peak voltage measured at ICM connector is abnormal , measure the peak voltage at the alternator exciter coil connector.

Disconnect the alternator exciter coil connector (black /red ) and connect the peak voltage adaptor or tester probes to the connector terminal of the exciter coil side and ground .

In the sane manner as at the ICM connector , measure the peak voltage and compare it to the voltage measured at the ice connector .

If the peak voltage measured at the ICM is abnormal and the one measured at the alternator exciter coil is normal. the wire harness has an open circuit or loose connection . If both peak voltages are abnormal ,follow the checks described in the troubleshooting chart (page 14-2).



#### IGNITION COIL

#### REMOVAL/INSTALLATION

Disconnect the spark plug cap from the plug .  
Disconnect the wires from the ignition coil .

Remove the bolt and ignition coil .

Installation is in the reverse order of removal .

**TORQUE**:6N .m (0.6kgf . M , 4.3 lbf.ft )

#### IGNITION CONTROL MODULE

#### REMOVAL/INSTALLATION

Remove the seat assembly (page 2-2)

Disconnect the Ignition Control Module (ICM )connectors .  
Remove the ICM from the frame .

Install action is in the reverse order of removal .

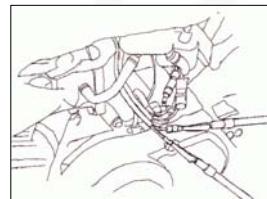
#### ENGINE STOP SWITCH /IGNITION

#### SWITCH

#### INSPECTION

Disconnect he switch connectors

Check for continuity between the black / white and green wire terminals of the switch side connectors .



There should be continuity with the switch OFF and there should be no continuity when the engine stop switch is RUN or the ignition switch is ON .

#### IGNITION TIMING

#### WARNING

When the engine must be running to do some work , make sure the area is well-ventilated .never run the engine in an enclosed area .The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine

in an open area or with an exhaust evacuation system  
in an enclosed area .

Warm up the engine .

Stop the engine and remove the left crankcase cover  
(page 10-2).

Connect the timing light to the spark plug wire .

Start the engine and let it idle .

**IDLE SPEED** :1,700±100rpm

Read the instructions for  
timing light operation .

The ignition timing is correct the \*F\*mark aligns with the  
index notch on the left crankcase .

Increase the engine speed by turning the throttle stop  
screw and make sure the "F" mark begins to move  
clockwise .

Install the left crankcase cover (page 10-8)

#### **ENGINE DOES NOT START OR IS HARD TO START**

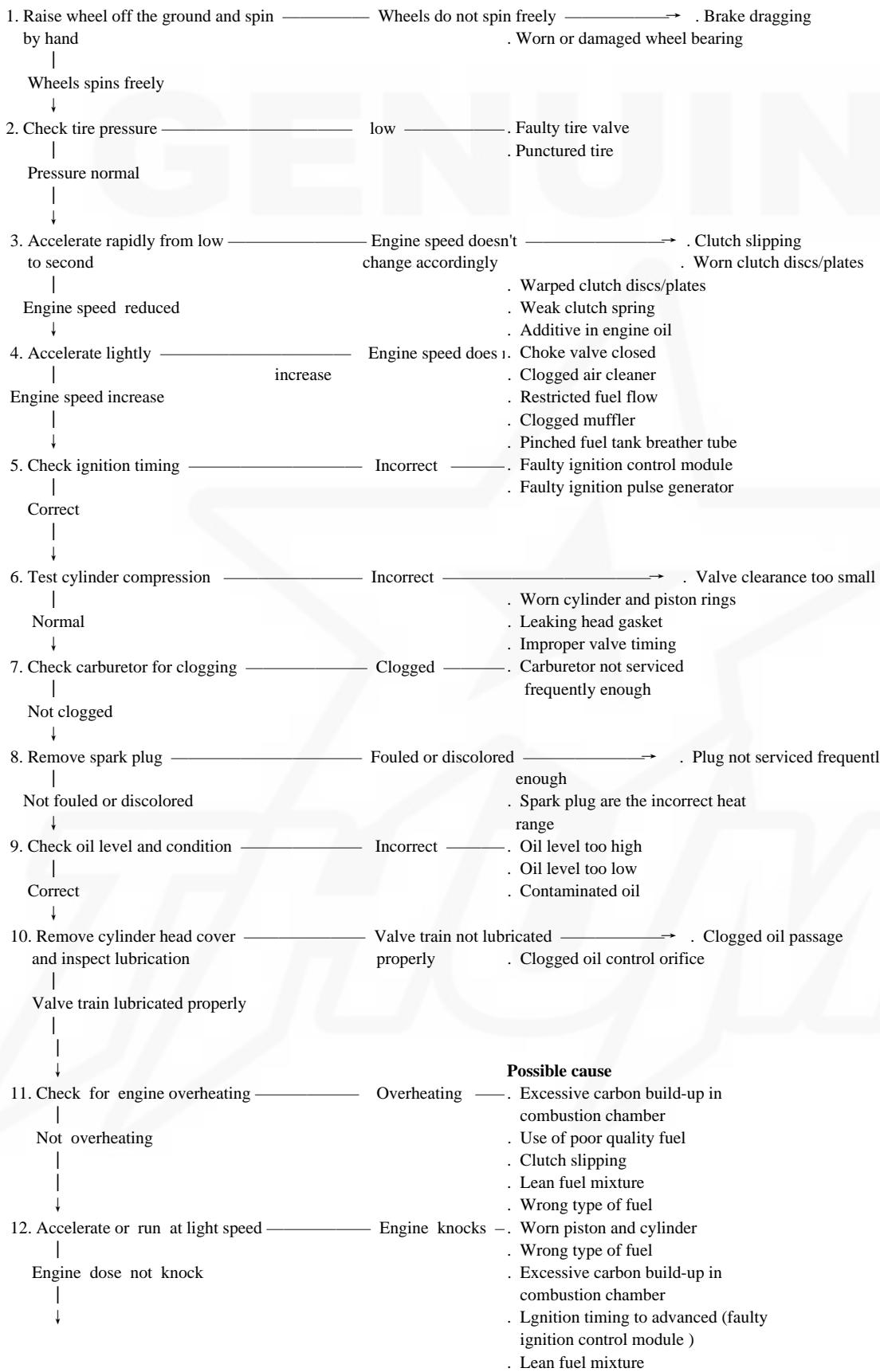
##### **Possible cause**

1. Check the flue flow to carburetor ————— Not reaching carburetor . Clogged fuel line and strainer  
| . Clogged fuel tank breathe tube  
Reaching carburetor  
↓
2. Perform a spark test ————— Weak or no spark —————→ . Faulty spark plug  
| . Fouled spark plug  
Good spark  
| . Faulty ignition control module  
| . Broken or shorted spark plug  
| . Wire  
| . Faulty ignition pulse generator  
| . Faulty engine stop switch or  
| . Ignition switch  
| . Loose or disconnected ignition  
| . System wires  
↓
3. Remove and inspect spark ————— W e t ————— . Flooded carburetor  
| . Choke valve closed  
Good  
| . Air cleaner dirty  
↓
4. Start by following normal ————— Engine starts but . Improper choke operation  
| . Carburetor incorrectly adjusted  
Eng I ne d oes not  
| . Intake pipe leaking  
| . Improper ignition timing (faulty  
| . Ignition coil or ignition pulse  
| . Generator  
| . Fuel contaminated  
↓
5. Test cylinder ————— L o w ————— . Valve clearance too small  
| . Valve stuck open  
| . Worn cylinder and piston ring  
| . Damaged cylinder head gasket  
| . Seized valve  
| . Improper valve timing

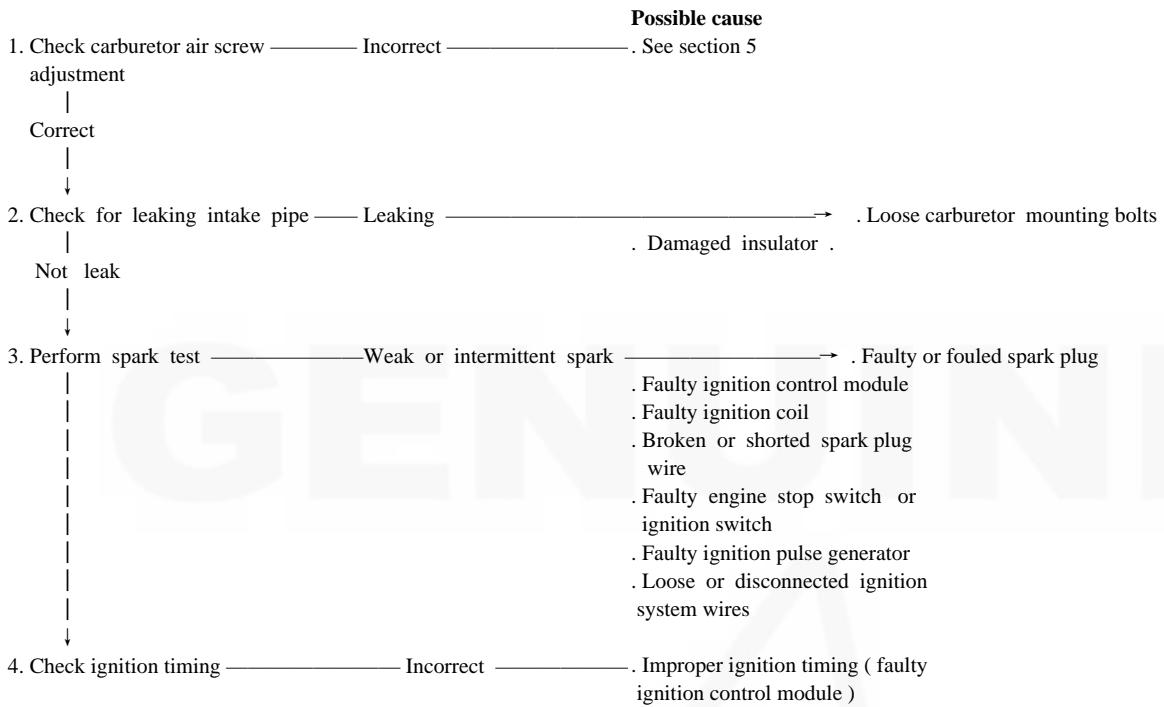
## TROUBLESHOOTING

### ENGINE LACKS POWER

#### Possible cause



## POOR PERFORMANCE AT LOW AND IDLE SPEED



## POOR PERFORMANCE AT HIGH SPEED

1. Disconnect fuel tube and check the \_\_\_\_\_ Fuel flow restricted \_\_\_\_\_ → . Clogged fuel line  
fuel flow  
fuel flows freely . Clogged fuel tank breather tube  
. Faulty fuel valve  
. Clogged fuel strainer

2. Remove the carburetor and check \_\_\_\_\_ Clogged \_\_\_\_\_ → . Clean  
for clogging  
Not clogged

3. Check valve timing \_\_\_\_\_ incorrect \_\_\_\_\_ → . Cam sprocket not  
correct

4. Check ignition timing \_\_\_\_\_ incorrect \_\_\_\_\_ → . Faulty ignition con  
correct . Faulty ignition pulse generator

5. Check valve spring \_\_\_\_\_ weak \_\_\_\_\_ → . Faulty spring

## POOR HANDLING

- |   | Possible cause   |
|---|--|
| 1. If steering is heavy —                 | <p>→ . Steering stem adjusting nut too tight</p> <p>. Damaged steering head bearings</p>   |
| 2. If either wheel is wobbling —          | <p>. Excessive wheel bearing play</p> <p>. Bent rim</p> <p>. Improper installed wheel hub</p> <p>. Swingarm pivot bushing excessively worn</p> <p>. Bent frame</p> |
| 3. If the motorcycle pulled to one side — | <p>. Faulty shock absorber</p> <p>. Front and rear wheel not aligned</p> <p>. Bent fork</p> <p>. Bent swingarm</p> <p>. Bent axle</p>                              |

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