CFMOTO

CF500-5 SERVICE
CF500-5A MANUAL

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FOREWORD

This manual contains an introductory description of procedures for inspection maintenance,overhaul,disassembly & assembly,removal and installation of components and parts,troubleshooting and service data together with illustrations of our All Terrain Vehicle Model
CF500-5 and CF500-5A

Chapter 1 general service information, tools, vehicle structure and technical data.
Chapter 2:key points for inspection and adjusting,service guide.

Chapter 2 and after Chapter 3 disassembly of parts and components,installation,overhaul and
troubleshooting.

The manufacturer reserves the right to make improvements or modifications to the products without prior notice. Overhaul and maintenance should be done according to the actual state and condition of the ATV.

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Zhejiang CFMOTO Power Co., Ltd.
April. 2009

Converion table

Item	Example	Conversion
Pressure	200 kPa(2.00kgf/cm^2) 33kPa (250mmHg)	1kgf/cm^2=98.0665kPa 1kpa=1000Pa 1mmHg=133.322Pa=0.133322kPs
Torque	18N.m(1.8kgf-m)	1kgf.m=9.80665N.m
Volume	419ml	1ml=1cm^3=1cc 1l=1000cm^3
Force	12N(1.2kgf)	1kgf=9.80665N

Cautions

Safety Cautions

1. Hazardous components in exhaust. Do not run the engine in a enclosed or poorly ventilated place for long time.

2. Do not touch the engine or muffler with bare hands after the engine has just stopped to avoid scalding. Wear long-sleeve work clothes and gloves for operation.

3.Battery liquid (dilute sulfuric acid) is highly caustic and may cause burns to skin and eyes. Flush with water if splashed to skin and get immediate medical attention. Flush with water if splashed to clothes to avoid burns. Keep battery and liquid away from reach of children

4.Coolant is poisonous. Do not drink or splash to skin, eyes or clothes. Flush with plenty of soap water if splashed to skin. If splashed into eyes, flush with water and consult the doctor. If drinking the coolant, induce vomit and consult the doctor. Keep coolant away from reach of children.

5. Wear proper work clothes, cap and boots. If necessary, were dust-glass, gloves and mask.

6. Gasoline is highly flammable. No smoking or fire. Also keep against sparks. Vaporized gasoline is also explosive. Operate in a well-ventilated place.

7.When charged, Battery may generate hydrogen which is explosive. Charge the battery in a well-ventilated place.

8. Be careful not to get clamped by the turning parts like wheels and clutch.

9. When more than two people are operating, keep reminding each other for safety purpose.

Cautions for Disassembling and Assembling

1. Use genuine CFMOTO parts, lubricants and grease
2. Clean the mud, dust before overhauling
3. Store the disassembled parts separately in order for correct assemble.
4. Replace the disassembled washers, o-rings, piston pin retainer, cotter pin with new ones.
5. Elastic retainers might get distorted after disassembled. Do not use the loosened retainers.
6. Clean and blow off the detergent after disassembling the parts. Apply lubricants on the surface of moving parts. Measure the data during disassembly for correct assembling.
7.If you do not know the length of screws, install the screws one by one and make sure they are screwed in with same depth.

14.Turn the inner and outer rings of ball bearing to make sure the bearing will turn smoothly.

- Replace if the axial or radial play is too big.
- If the surface is uneven, clean with oil and replace if the cleaning does not help.When pressing the bearing into the machine or to the shaft

15. Install the one-side dust-proof bearing in the right direction. When assembling the open type or double-side dustproof bearing, install with manufacturer¡¯s mark outward.

16. Keep the bearing block still when blowing dry the bearing after washing clean. Apply oil or lubricant before assembling.

17. Install the elastic circlip properly. Turn the circlip after assembling to make sure is has been installed into the slot.

18. After assembling, check if all the tightened parts are properly tightened and can move smoothly.

19. Brake fluid and coolant may damage coating, plastic and rubber parts. Flush these parts with water if splashed.

20. Install oil seal with the side of manufacturer¡¯s mark outward.

- Do not fold or scratch the oil seal lip.
- Apply grease to the oil seal lip before assembling

21. When installing pipes, insert the pipe till the end of joint. Fit the pipe clip, if any, into the groove. Replace the pipes or hoses that cannot be tightened.

22. Do not mix mud or dust into engine and/or the hydraulic brake system.

23. Clean the gaskets and washers of the engine casing before assembling. Remove the scratches on the joint faces by polishing evenly with an oilstone.

24. Do not twist or bend the cables too much. Distorted or damaged cables may cause poor

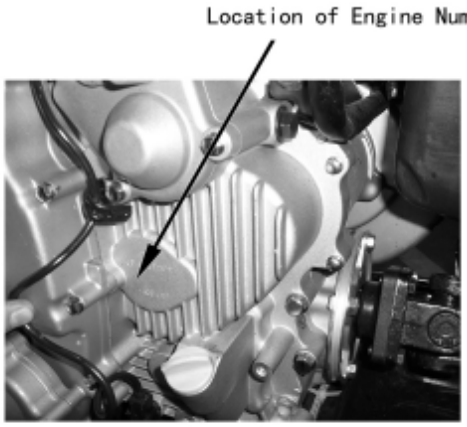
25. When assembling the parts of protection caps, insert the caps to the grooves, if any.

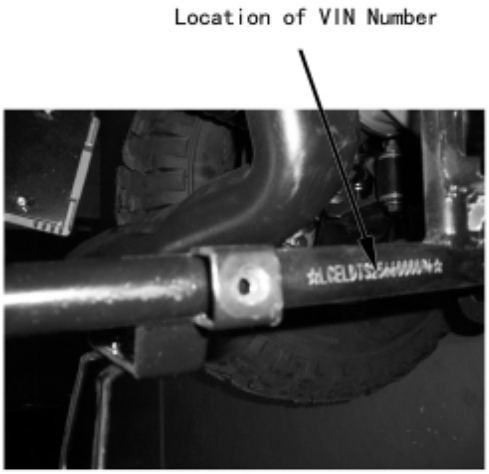
VIN Number and Engine Number

CF500-5/CF500-5A

VIN Number: LCELDTZ~

Engine Number:CF188~





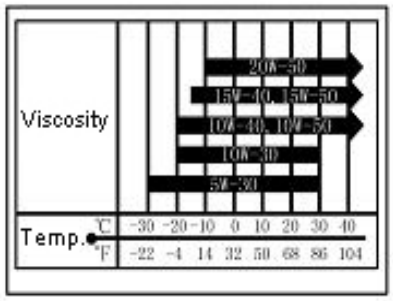
Main Data Table

Item			Parameter
Model			CF500-5/CF500-5A
Length			CF500-5: 2100mm CF500-5A: 2300mm
Width			1180mm
Height			1230mm
Wheel base			CF500-5: 1290mm CF500-5A: 1490mm
Engine type			CF188
Displacement			493Cm^3
Fuel type			Unleaded gasoline RQ-90or above
Dry weight			CF500-5: 344 kg CF500-5A: 358 kg
Number of Passengers			CF500-5:2 （Include driver）
Max. Load			210 kg
Tire		Front Tire	25×8-12 40J
			185/80-12 40J
		Rear Tire	25×10-12 47J
			270/60-12 47J
Min. Ground Clearance			Min. Ground Clearance
Turning Diameter			Turning Diameter
Engine	Starting		Electrical starting, Manual Starting
	Engine Type		Single cylinder, 4-stroke, Liquid-cooled, 4 valves, OHC
	Combustion Chamber Type		Triangle
	Valve Driving Type		SOHC /Chain Drive
	Bore ×Stroke		87.5mm×82.0mm
	Compression Ratio		10.2:1
	Lubrication Type		Pressure & Splash
	Oil Pump Type		Rotor
	Lubricant Filter Type		Full flow filter screen
	Oil Type		SAE15W-40/SF
	Cooling Type		Closed coolant circulation
	Coolant Type		-35℃ anti-rust coolant

Item				Parameter
Fuel Device	Air Filter type			Sponge element filter
	Carburetor	Type		Vacuum Diaphragm type MIKUNI BSR36-89
		Diameter of mixing valve		36mm
Gearing	Clutch	Wet, Auto-Centrifugal		
	Operation Mode	Automatic（CVT）+Parking & Gear Shifting		
	Gears Shift	Low Gear, High Gear & Reverse Gear		
	Shift Mode/order	Manual /L-H-N-R		
	（CVT）Transmission Ratio	2.88～0.70		
	Gear Ratio	Final Ratio	1.333（24/18，Bevel Gear）	
		Secondary Ratio	1.952（41/21）	
		Gears	Low Gear：2.25(36/16)；High Gear：1.350(27/20)；Reverse Gear：1.471(25/17)	
		Total	Low Gear5.857；High Gear：3.514；Reverse Gear：3.828	
	Axle Ratio	Front Axle	33 / 9 = 3.667	
		Rear Axle	33 / 9 = 3.667	
	Engine Output Mode	Front/Rear Shaft		
	Direction of Output Rotation	Clockwise on forward shift		
Steering Device	Steering Angle	Inner	31°	
		Outer	31°	
Brake Type		Front	Hydraulic Disc	
		Rear	Hydraulic Disc	
Bumper Device	Suspension	Swing Arm		
Frame Type		Welded Steel Tube and Plate		

Maintenance Data Table

Lubrication System

Item		Standard	Service Limit
Engine Oil Capacity	Volume when replacing	1900mL	—
	Volume when replacing filter	2200mL	—
Recommended Oil（See Original） 		·Specially for 4-stroke motorcycle SAE-15W-40 Substitutes must be used in the following range. API type: SE or SF grade SAE type: Choose from the left chart according to the environmental temperature	
Oil Pump Rotor	Gap between Inner and Outer Rotors	0.03～0.1mm	0.15mm
	Gap between Outer rotor and boday	0.03～0.1mm	0.12mm
	Oil pressure	130-170KPa at 3000r / min	

Fuel System

Item		Standard
Fuel Tank Capacity	Full capacity	19L
Carburetor	Type	MIKUNI BSR36-89
	Jet Number	07G0
	Mixing Valve Diameter（mm）	36mm
	Main Jet	N102221-130#
	Main air Jet	MD13/24 -35#
	Needle	J8-5E26
	Main Nozzle	785-401011-P-0M
	Idle Jet	N224103-22.5#
	Idle Adjusting Screw	604-16013-1A
	Idle Speed	1300±100r / min

Cooling System

Item		Standard/ Parameter	Service Limit	Remark
Coolant Capacity	Full Capacity	2000ml		
	Reservoir tank capacity	300ml		
	Standard Density	50%		
Opening pressure of radiator cap				
Thermostat	Initial Temperature	72±2℃		
	Full opening Temperature	88℃		
	Full opening lift range	3.5～4.5mm/95?		
Temperature and Resistance of Water Temperature Sensor	Temperature（℃）	Resistance （Ω）		
	50	154±16		
	80	52±4		
	100	27±3		
	120	16±2		
Temperature of Thermostat	Close-Open	88℃Round		
	Open-Close	82℃Round		
Coolant Type	-35℃ anti-frozen, antisepsis, high-boil coolant			

Front Wheel

Item			Standard	Operation Limit
Front Wheel	Play of wheel rim	Vertical	1.0mm	2.0mm
		Horizontal	1.0mm	2.0mm
	Tire	Groove	—	3.0mm
		Pressure	35kPa （ 0.35kgf / cm^2）	—

Rear Wheel

Item			Standard	Operation Limit
Rear Wheel	Play of wheel rim	Vertical	1.0mm	2.0mm
		Horizontal	1.0mm	2.0mm
	Tire	Groove	—	3.0mm
		Pressure	30kPa（0.30kgf / cm^2）	—

Brake System

Item		Standard	Operation Limit
Front Brake	Brake End Play	0mm	—
	Brake Disc Thickness	3.5mm	2.5mm
Rear Brake	Brake End Play	5-10 mm	—
	Brake Pedal Play	0mm	—
	Brake Disc Thickness	7.5mm	6.5mm

Battery, Charging Device, Pickup Coil

Item			Standard
AC Magneto Motor	Model		Permanent magnet AC Type
	Output		3-phase AC
	Charging Coil Resistance（20？）		0.2Ω-0.3Ω
	Pickup Coil Resistance		110Ω-140Ω
	Magneto without Load Voltage/(Idle Speed)		＞100V（AC），5000r/min
	Max. Output Power		300W，5000r/min
	Rated Voltage		13.5V-15.0V, 5000r/min
	Peak Voltage of Pickup Coil		＞120V
Rectifier			Three-phase annular rectification, Silicon controlled parallel-connected regulated voltage
Battery	Capacity		Capacity
	Terminal Point Voltage	Fully Charged	12.8V
		Insufficient Charged	<11.8V
	Charging Current/time	Standard	0.9A / 5～10H
		Quick	4A / 1H

Ignition Device

Item		Standard
Ignition		CDI ignition
Spark Plug	Type	Resistance Spark plug
	Standard	DPR7EA-9(NGK)
	Optional	DR8EA 、D7RTC
	Spark plug gap	0.8-0.9mm
	Spark Characteristic	＞8mm，1mpa
Ignition Timing	BTDC10°CA 1500r/min	
Ignition Coil Resistance	Initial	0.1Ω-0.5Ω
	Secondary	12KΩ-22KΩ
Peak Voltage	Ignition Coil	＞150V
	Pulse Generator	2V
Starter Relay Coil Resistance		3Ω-5Ω
Secondary Starter Relay Coil Resistance		90Ω-100Ω

Lights Dashboard, Switch

Item		Standard
Fuse	Main	20A
	Auxiliary	10A×2 15A×2
Light, Bulb Fuse	Head Light（Hi / Lo）	12V—35W/35W×2
	Brake Light/ Tail Light	12V—5W×2
	Turning Light	12V—21W/5W
	Dashboard Indicator Light	12V—10W×4
	Indicators	φ5 LED
	Main	LCD

Valve System + Cylinder Head **(mm)**

Item	Standard		Operation Limit
Valve Diameter	Intake	30.6	———
	Exhaust	27.0	———
Valve Clearance(Idle Speed)	Intake	0.05-0.10	———
	Exhaust	0.17-0.22	———
Fit Clearance between Valve Guide and Valve Stem	Intake	0.010-0.037	———
	Exhaust	0.030-0.057	———
Internal dia. of Valve Guide	Intake & Exhaust	5.000-5.012	———
Exterior dia. of Valve Stem	Intake	4.975-4.990	———
	Exhaust	4.955-4.970	———
Valve Stem Run-out	Intake & Exhaust	———	0.05
Length of Valve Stem End	Intake & Exhaust	2.9-3.1	2.3
Thickness of Valve Head	Intake & Exhaust	———	0.5
Valve Head Seal Run-out	Intake & Exhaust	———	0.03
Width of Valve Seats Seal	Intake & Exhaust	0.9-1.1	———
Length of Valve Spring	Intake & Exhaust	40	38.8
Valve Spring Tension	Intake & Exhaust	Tension182-210N /Length31.5mm	———
Cam Height	Intake	33.430-33.490	33.130
	Exhaust	33.500-33.560	33.200
Fit Clearance between Camshaft Exterior dia. &Bore.	φ22	0.032-0.066	0.150
	φ17.5	0.028-0.059	0.150
Camshaft Exterior dia.	φ22	21.959-21.980	———
	φ17.5	17.466-17.484	———
Camshaft Bore Internal dia.	φ22	22.012-22.025	———
	φ17.5	17.512-17.525	———
Camshaft Run-out	———		0.10
Rocker Arm Internal dia.	Intake & Exhaust	12.000-12.018	———
Rocker Arm Shaft Exterior dia.	Intake & Exhaust	11.973-11.984	———
Plainness of Cylinder Head Adjoining Plant	0.03		0.05
Plainness of Cylinder Head Cover Adjoining Plant	0.03		0.05

Cylinder + Piston + Piston Ring+ Crankshaft **(mm)**

Item	Standard			Operation Limit	Remark
Cylinder Pressure	1000kPa			———	
Fit Clearance between Piston and Cylinder	0.030-0.051			0.15	
Piston Skirt dia.	87.460-87.480 Testing the point away skirt end 10mm			87.380	
Internal dia. of Cylinder	87.500-87.522			———	
Plainness of Cylinder Adjoining Plant	0.015			0.05	
Piston Ring Free Gap	Top Ring	R	11.7 round	8.9	
	2nd Ring	R	12 round	9.5	
Piston Ring Closed Gap	Top Ring		0.15-0.30	0.60	
	2nd Ring		0.15-0.30	0.60	
Piston Annular Fit Clearance	Top Ring		0.04-0.08	0.180	
	2nd Ring		0.03-0.07	0.150	
Thickness Piston Ring	Top Ring		0.97-0.99	———	
	2nd Ring		1.17-1.19	———	
Piston Annular Width	Top Ring		1.03-1.05	———	
	2nd Ring		1.22-1.24	———	
	Oil Ring		2.51-2.53	———	
Internal dia. of Piston Pin Bore	23.002-23.008			23.030	
Exterior dia. Piston Pin	22.995-23.000			22.980	
Rod Small End Inner dia.	23.006-23.014			23.040	
Rod Big End Gap	0.10-0.55			1.0	
Rod Big End Thickness	24.95-25.00				
Crankshaft Run-out	0.03			0.08	

Clutch + Transmission **(mm)**

Item	Standard	Limit	Remark
Clutch Friction plate inner dia.	140.00-140.15	140.50	
Clutch Joint Rotation	1800-2400r/min	———	
Clutch lock-up Rotation	3300-3900r/min	———	
Drive Belt Width	35.2	33.5	
Driven Disc Spring Free Length	168	160	
Shifter and fit flute gap	0.10-0.40	0.50	
Left Shifter Sliding Thickness	5.8-5.9	———	
Right Shifter Sliding Thickness	5.8-5.9	———	
Plunging Flute Width	6.0-6.2	———	
Driven Output Gear Sliding Width	6.0-6.2	———	

Tightening Torque

Item	Torque N·m(kgf·m)	Item	Torque N·m(kgf·m)
5mm Bolt, nut	5(0.5)	5mm Screw	4(0.4)
6mm Bolt, nut	10(1.0)	6mm Screw	9(0.9)
8mm Bolt, nut	22(2.2)	6mmSH Bolt with flange,	10(1.0)
10mm Bolt, nut	34(3.5)	6mm Bolt with flange, nut	12(1.2)
12mm Bolt, nut	54(5.5)	8mm Bolt with flange, nut	26(2.7)
		10mm Bolt with flange, nut	39(4.0)

For others not listed in the chart, refer to the standard tightening torque.
Notes: Apply some engine oil on the part of screw thread and adjoining surface.

Item	Thread Dia. (mm)	Quantity	Torque N·m(kgf·m)	Remark
Upper Front Mounting Bolt, Engine	M8×60	1	35～45	
Upper Rear Mounting Bolt, Engine	M10×1.25×110	1	40～50	
Upper Rear Mounting Bracket Bolt, Engine	M8×14	1	35～45	
Upper Front Mounting Bracket Bolt, Engine	M8×14	1	35～45	
Low Mounting Bolt, Engine	M12×1.25×140	2	50～60	
Bolt, Swing Arm	M10×1.25×70	16	40～50	
Bolt, Rear Absorber	M10×1.25×50	4	40～50	
Bolt, Front Absorber	M10×1.25×50	4	40～50	
Bolt, Rear Wheel Shaft Holder	M10×1.25×100	4	40～50	
Mounting Nut, Rim	901-07.00.02 M20	16	50～60	
Nut, Rim Shaft	901-07.00.03 M10	4	110～130	
Mounting Screw, Rear Brake Caliper	M6×25	2	18～22	
Bolt, Rear Brake Caliper	M10×1.25×20	2	40～50	
Bolt, Front Brake Disc	901-08.00.03 M8×	8	25～30	
Bolt, Front Brake Caliper	M8×14	4	35～45	
Locknut, Steering Stem	M8×55	4	20～30	
Nut, Steering Stem	M10×1.25	4	40～50	
Locknut, Steering Shaft	M14×1.5	1	100～120	
Rear Mounting Bolt, Muffler	M8×30	1	30～35	
Bolt, Exhaust Pipe	M8×14	1	30～35	
Mounting Bolt, Exhaust Pipe	M8×40	1	30～35	
Mounting Bolt, Rear Axle	M10×1.25×110	2	40～50	
Mounting Bolt, Front Axle	M10×1.25×90	1	40～50	
Mounting Bolt, Front Axle	M10×1.25×25	2	40～50	
Back End Bolt, Rear Trans Shaft	901-30.00.01	6	40～50	
Front End Bolt, Rear Trans Shaft	901-29.00.01	4	35～45	
Bolt, Front Trans Shaft	901-29.00.01	8	35～45	
Thermo Switch	CF250T-420500	1	9～12	
Mounting Bolt 1, Front Rack	M8×14	2	35～45	
Mounting Bolt 2, Front Rack	M6×12	2	25～30	
Mounting Bolt , Rear Rack	M8×14	4	35～45	

Engine Tightening Torque Table

Item	Q'ty	Screw dia.（mm）	Torque （N.m）	Remark
Sensor, Reverse Gear	1	M10×1.25	20	
Spark Plug	1	M12×1.25	18	
Water Temperature Sensor	1	Rc1/8	8	Apply screw thread sealant
Valve Clearance Adjusting Nut	4	M5	10	
Drive Disc Nut	1	M20×1.5	115	
Driven Disc Nut	1	M20×1.5	115	
Circle Nut, Driving Disc	1	M30×1	100	
Nut, Front Output Shaft	1	M14×1.5	97	
Nut, Drive Bevel Gear	1	M22×1	145	
Nut, Driven Bevel Gear	1	M16×1.5	150	
Fixing Nut, Clutch	1	M18×1.5	70	Left handed
Limiting Nut, Driven Bevel Gear Shaft	1	M60	110	Apply screw thread sealant
Limiting Nut, Front Output Shaft	1	M55	80	Apply screw thread sealant, left handed
Bolt, Swing Arm Shaft	2	M14×1.25	28	
Drain Bolt	1	M12×1.5	30	
Mounting Bolt, Overriding Clutch	6	M8	26	Apply screw thread sealant
Mounting Bolt, Magneto Stator	3	M6	10	Apply screw thread sealant
Bolt, CVT Windshield	3	M6	10	Apply screw thread sealant
Link Bolt, Oil Pipe	2	M14×1.5	18	
Mounting, Oil Pump	3	M6	10	
Mounting Bolt, Pressure Limiting Valve	2	M6	10	
Bolt, Drive Bevel Gear Cover	4	M8	32	
Bolt, Driven Bevel Gear Cover	4	M8	25	
Locating Bolt, Shift	1	M14×1.5	18	
Flange Bolt, Fan	1	M10×1.25	55	

Item	Quantity	Diameter（mm）	Torque （N.m）	Remark
Bolt, Crankcase	14	M6	10	
	3	M8	25	
Bolt, Driven Sector Gear	1	M6	12	
Mounting Bolt, Oil Filter	1	M20×1.5	63	
Oil Filter	1	3/4？（ 16 /in	18～20	
Bolt, Starting Motor	2	M6	10	
Bolt, Cylinder Head	4	M10	38	
Bolt, Cylinder Head(2 sides)	2	M6	10	
	1	M8	25	
Upper and Lower Bolt, Cylinder	4	M6	10	
Bolt, Cylinder Head Cover	12	M6	10	
Bolt, Chain Tensioner	2	M6	10	
Nut, Chain Tensioner	1	M8	8	
Bolt, Radiator Fan	3	M6	10	
Thermostat Bolt	2	M6	10	
Bolt, Water Pump Cover	3	M6	6	
Mounting Bolt, Water Pump	2	M6	10	
Fixed Bolt, Timing Sprocket	2	M6	15	Apply screw thread sealant
Bolt without remarks		M5	4.5-6	
		M6	8-12	
		M8	18-25	

Engine Tools

Measuring Tools				
No	Name	Type	Function	Remark
1	Vernier Calipers	0-150mm	measure length and thickness	
2	Micrometers	0-25mm	measure the outer diameters of swing arm, valve rod and camshaft	
3	Dial gauge	25-50mm	Measure max. lift range of camshaft	
4	Dial gauge	75-100mm	Measure piston skirt	
5	Inner dia. Gauge, Cylinder		Measure inner dia. of cylinder head	
6	Inner dia. Gauge,	10-34mm	Inner dia. of swing arm, piston pin hole, and rod head hole	
7	Dial Test Indicator	1/100	Run-out	
8	Knife Straight Edge		plainness	
9	Feeler Gauge		Plainness, adjusting valve clearance	
10	Fuel Level Gauge		Fuel level length of carburetor	
11	Plastic gauge		Fit clearance	
12	pull tension gauge		Spring bounce	
13	Tachometer		Engine rotation rate	
14	Cylinder Pressure Meter		pressure in cyclinder	
15	Oil Pressure Gage		Oil pressure	
16	Barometer		Opening pressure of radiator cover	
17	Ohmmeter		Resistance and voltage	
18	Amperemeter		Opening of currency / switch	
19	Thermometer		Liquid temperature	
20	Timing Lights		Test spark timing	
21	Torque Tester	One Set	Tightening torque	
Auxiliary Measuring Instrument				
22	Alcohol Burner		Warming up	
23	Magnet Stand		Install dialgauge	
24	Slab		Auxiliary measure supplementary	
25	V-Block		Run-out supplementary	
26	Forcep		Install valve clip	
27	Plier		Disassemble and install circlip	
28	Joint Plier		Disassemble and install flange	
29	Impact Driver		Disassemble cross recessed bolt	
30	Slot Type Driver			
31	Cross Type Driver			

Special Purpose Tools

No	Name	Type	Function	Remark
1	Spark Plug Wrench	172MM-022400-922-004	Disassemble/ install spark plug	
2	CVT Wrench	CF188-051000-922-001 CF188-052000-922-001	Disassemble/install CVT drive/driven disc nut	
3	Oil Filter Wrench	CF188-011300-922-001	Disassemble/ install oil filter	
4	Piston Pin Remover	CF188-040004-922-002	Disassemble piston pin	
5	Magneto stator Remover	CF188-031000-922-001	Disassemble magneto stator	
6	Crankcase Dissociator		Divide L/R crank case	
7	Crank Remover		Disassemble crank shaft from left crankcase	
8	Crank Tool		Install crank shaft on left crankcase	
9	Valve Spring Compressor	CF188-022006-922-001	Disassemble/ install valve spring	
10	Valve Former	CF188-022004-922-001	Grind valve	
11	Circle Nut Wrench	CF188-052000-922-003	Disassemble CVT driven disc	
12	Driven Disc Clamp	CF188-052000-922-004	Disassemble CVT driven disc	
13	Driven Disc Former	CF188-052000-922-002	Disassemble CVT driven disc	
14	Limiting nut Wrench	CF188-062204-922-001	Disassemble driven bevel gear bearing limiting nut	
15	Bearing Tool	One full set	Install bearing and oil ring	
16	Bearing Remover	One full set	Disassemble bearing	
17	Oil Ring Remover		Disassemble bearing	
18	Limiting Nut Wrench	CF188-060008-922-001	Disassemble front output shaft bearing limiting nut	
19	Fixing Wrench	CF188-A-180003-922-003	Disassemble fan connector flange, adjust valve clearance	

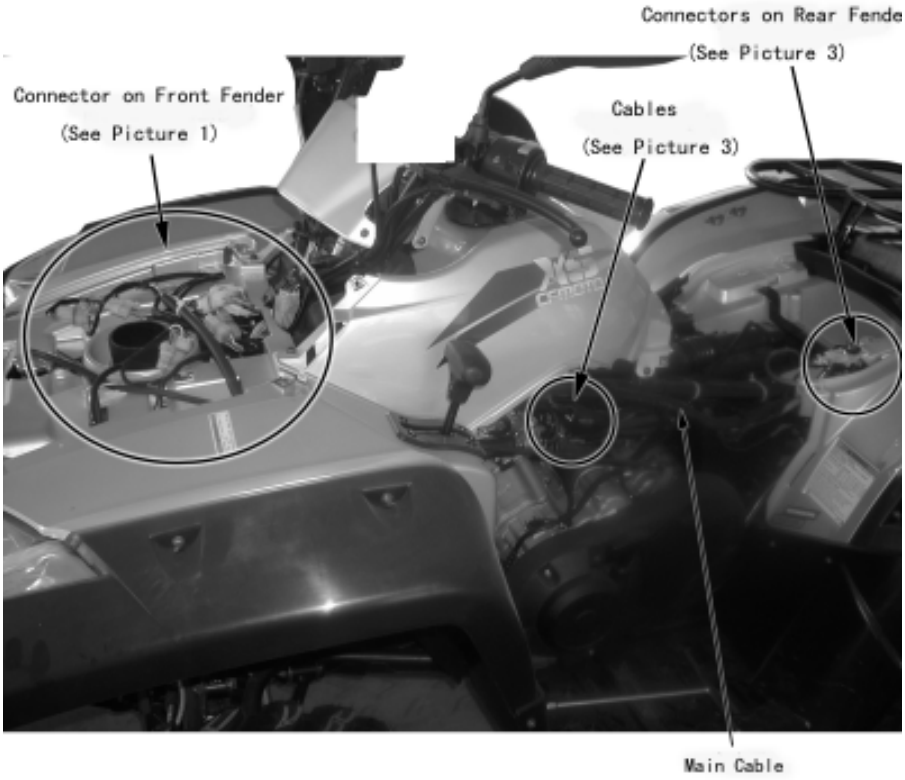
Lubricant goose, Sealing Oil

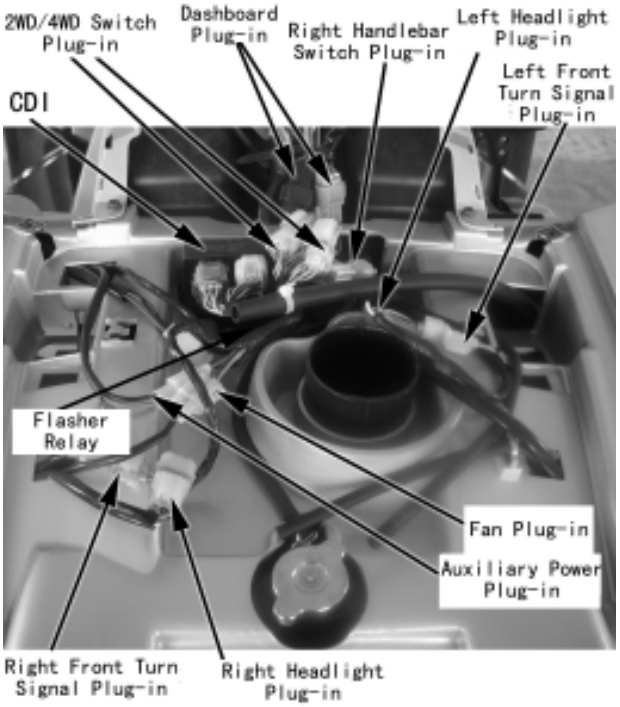
Coated Section	Attention	Grease
Turning Bearings Throttle Cable Connecting Portion Throttle Pedal Movable Parts Brake Pedal Movable Parts Swing Arm Movable Parts Steering Inner Circle Surface Seat Lock Movable Parts Transmission Movable Parts		Multi-purpose grease

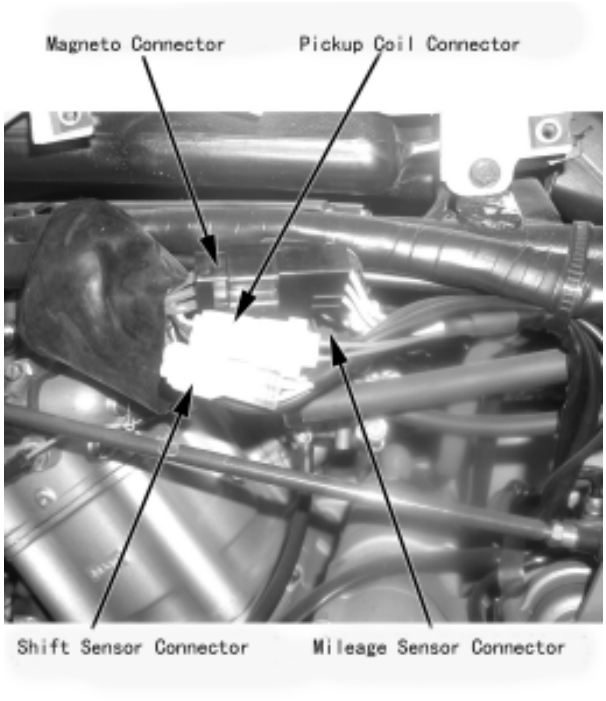
Operation Material and Installment Supplementary of Engine

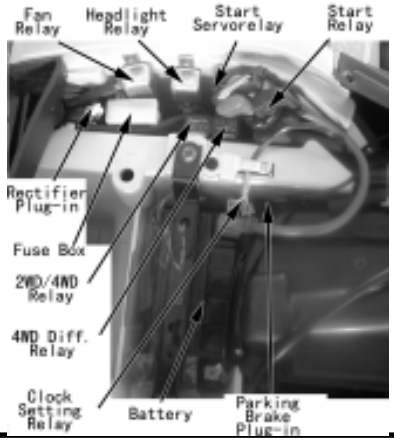
Engine operation materials include lubricant (oil), grease (lubricant grease) and coolant, installment supplementary includes plane sealant and screw thread sealant.

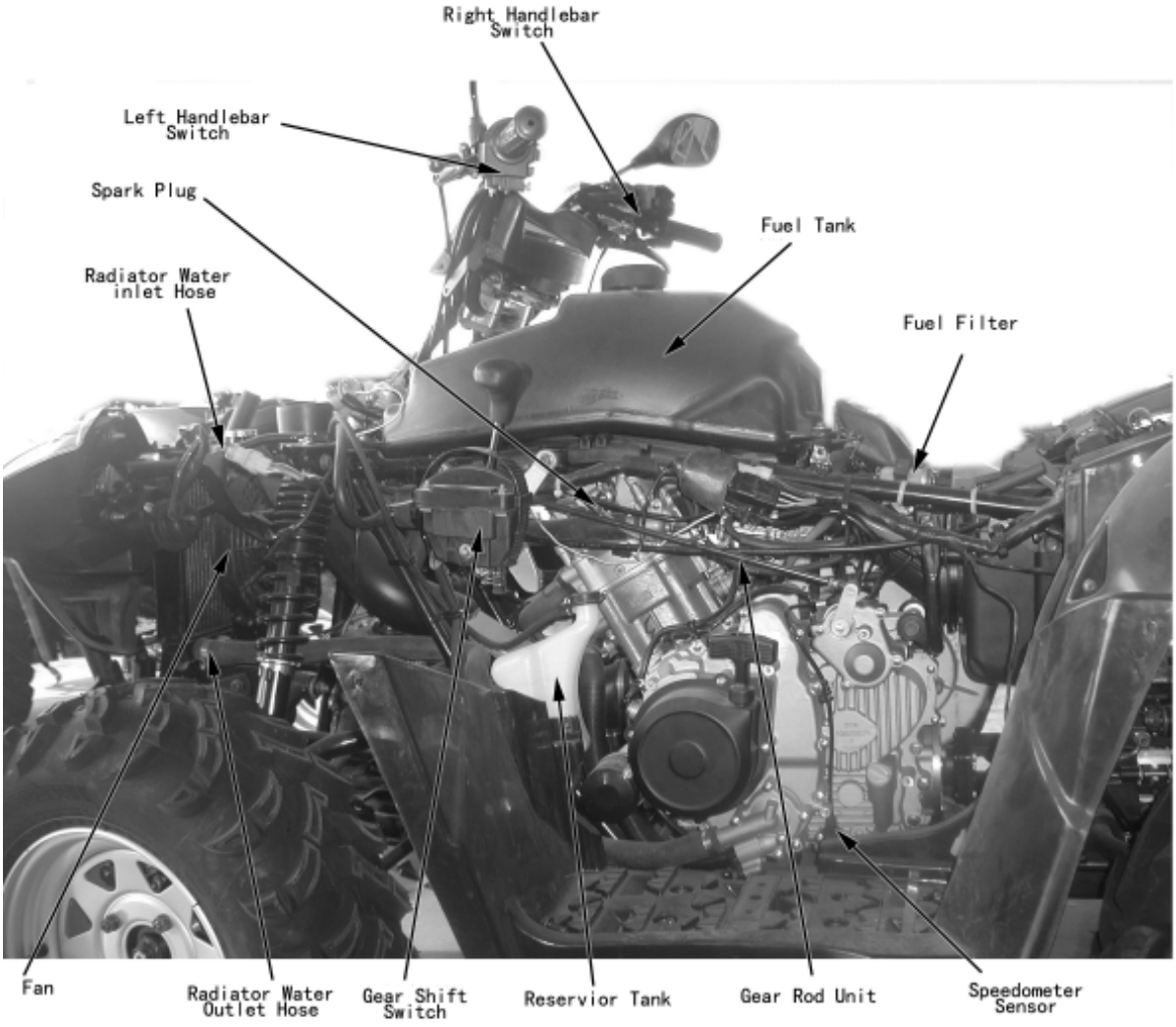
Name	Type	Parts	Remark
lubricant /oil	Specially for 4-stroke motorcycle SAE-10W-40、20W-50 Substitutes must be used in the following range. API type: SE or SG grade （Replacement see 1-3）	Rotating section and carriage in cylinder, Rotating section and carriage in crankcase Rotating section and carriage in cylinder head See Lubrication Systems Diagram（5-14）	capacity 2200m L（replace oil） 2300 m L（replace oil filter） 2600 m L（engine overhaul）
Lubricant with molybdenum		Piston pin, valve rod part, valve ring, cam shaft	
Grease/lubricant grease	# 3 MoS_2 l ithium based grease	Oil seal lip, O ring and other latex sealing, bearing with seals, and CVT bearing/housing	
Coolant	-35℃ anti-frozen, anti-rust, high –boiled coolant	Cooling system, water seals	Capacity based on radiator pipe system
Plane sealant		Coupling surfaces of cases, cases and cylinder, cylinder head and cylinder head cover	
Screw thread sealant		Some screw thread	

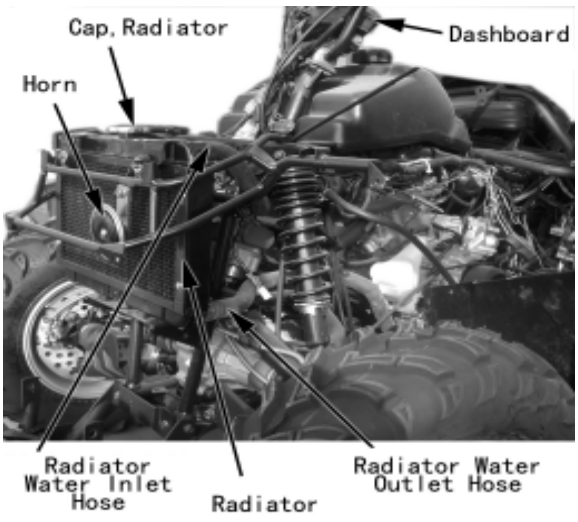

Connectors on Rear Fende
(See Picture 3)
Connector on Front Fender
(See Picture 1)
Cables
(See Picture 3)
Main Cable


2WD/4WD Switch
Plug-in
Dashboard
Plug-in
Right Handlebar
Switch Plug-in
Left Headlight
Plug-in
Left Front
Turn Signal
Plug-in
CDI
Flasher
Relay
Fan Plug-in
Auxiliary Power
Plug-in
Right Front Turn
Signal Plug-in
Right Headlight
Plug-in

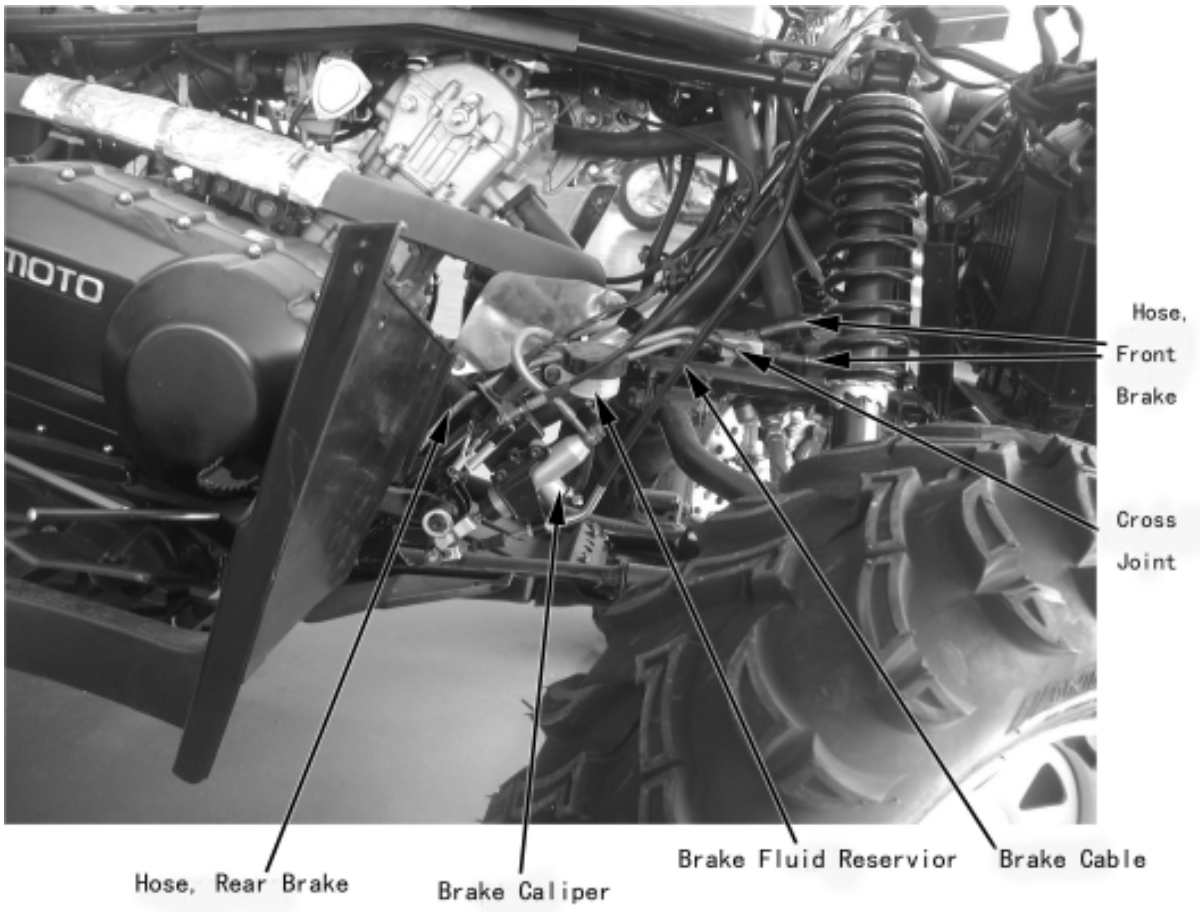

Magneto Connector
Pickup Coil Connector
Shift Sensor Connector
Mileage Sensor Connector


Fan
Relay
Headlight
Relay
Start
Servorelay
Start
Relay
Rectifier
Plug-in
Fuse Box
2WD/4WD
Relay
4WD Diff.
Relay
Clock
Setting
Relay
Battery
Parking
Brake
Plug-in

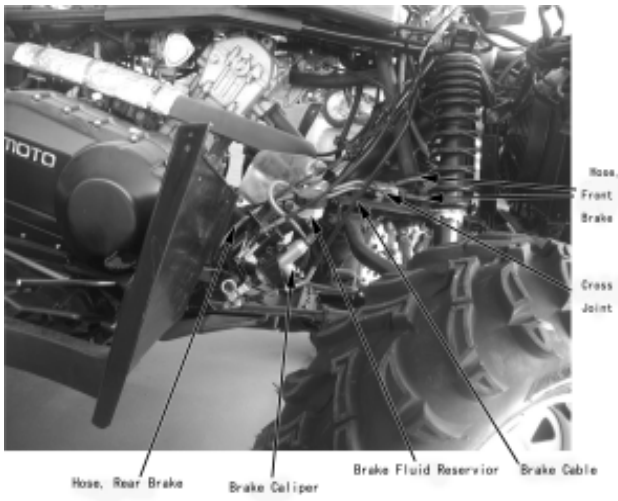

Right Handlebar Switch
Left Handlebar Switch
Spark Plug
Fuel Tank
Radiator Water inlet Hose
Fuel Filter
Fan
Radiator Water Outlet Hose
Gear Shift Switch
Reservior Tank
Gear Rod Unit
Speedometer Sensor

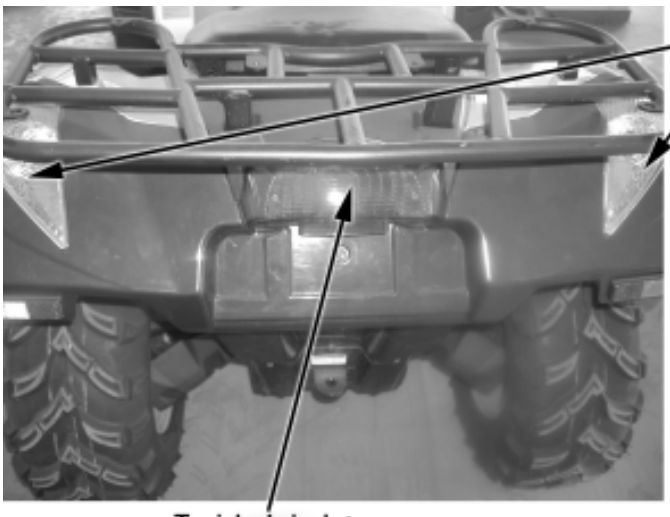

Cap, Radiator
Dashboard
Horn
Radiator Water Inlet Hose
Radiator
Radiator Water Outlet Hose

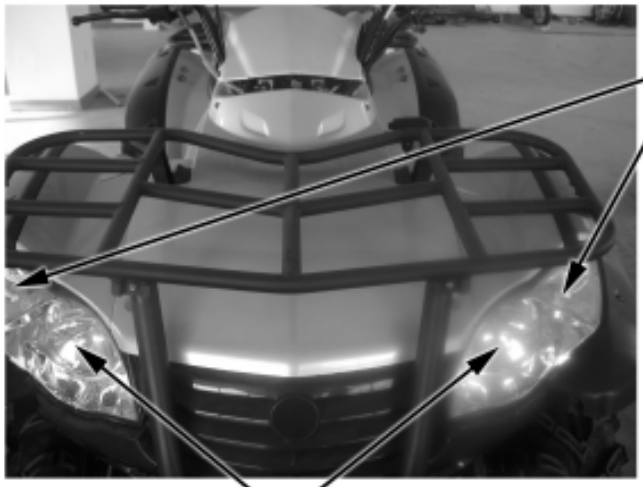

High Tension Coil


Hose, Front Brake
Cross Joint
Hose, Rear Brake
Brake Caliper
Brake Fluid Reservior
Brake Cable


Ignition Switch
Subsidiary Power Connector


Hose, Front Brake
Cross Joint
Hose, Rear Brake
Brake Caliper
Brake Fluid Reservior
Brake Cable


Rear Signal Light
Tail Light


Front Position Light
Head Light


Carbu-retor
Air Cleaner
Intake Pipe, Air Cleaner
CFMOTO

Valve System + Cylinder Head **(mm)**

Item	Standard		Operation Limit
Valve Diameter	Intake	30.6	———
	Exhaust	27.0	———
Valve Clearance(Idle Speed)	Intake	0.05-0.10	———
	Exhaust	0.17-0.22	———
Fit Clearance between Valve Guide and Valve Stem	Intake	0.010-0.037	———
	Exhaust	0.030-0.057	———
Internal dia. of Valve Guide	Intake & Exhaust	5.000-5.012	———
Exterior dia. of Valve Stem	Intake	4.975-4.990	———
	Exhaust	4.955-4.970	———
Valve Stem Run-out	Intake & Exhaust	———	0.05
Length of Valve Stem End	Intake & Exhaust	2.9-3.1	2.3
Thickness of Valve Head	Intake & Exhaust	———	0.5
Valve Head Seal Run-out	Intake & Exhaust	———	0.03
Width of Valve Seats Seal	Intake & Exhaust	0.9-1.1	———
Length of Valve Spring	Intake & Exhaust	40	38.8
Valve Spring Tension	Intake & Exhaust	Tension182-210N /Length31.5mm	———
Cam Height	Intake	33.430-33.490	33.130
	Exhaust	33.500-33.560	33.200
Fit Clearance between Camshaft Exterior dia. &Bore.	φ22	0.032-0.066	0.150
	φ17.5	0.028-0.059	0.150
Camshaft Exterior dia.	φ22	21.959-21.980	———
	φ17.5	17.466-17.484	———
Camshaft Bore Internal dia.	φ22	22.012-22.025	———
	φ17.5	17.512-17.525	———
Camshaft Run-out	———		0.10
Rocker Arm Internal dia.	Intake & Exhaust	12.000-12.018	———
Rocker Arm Shaft Exterior dia.	Intake & Exhaust	11.973-11.984	———
Plainness of Cylinder Head Adjoining Plant	0.03		0.05
Plainness of Cylinder Head Cover Adjoining Plant	0.03		0.05

Engine Tightening Torque Table

Item	Q'ty	Screw dia.（mm）	Torque （N.m）	Remark
Sensor, Reverse Gear	1	M10×1.25	20	
Spark Plug	1	M12×1.25	18	
Water Temperature Sensor	1	Rc1/8	8	Apply screw thread sealant
Valve Clearance Adjusting Nut	4	M5	10	
Drive Disc Nut	1	M20×1.5	115	
Driven Disc Nut	1	M20×1.5	115	
Circle Nut, Driving Disc	1	M30×1	100	
Nut, Front Output Shaft	1	M14×1.5	97	
Nut, Drive Bevel Gear	1	M22×1	145	
Nut, Driven Bevel Gear	1	M16×1.5	150	
Fixing Nut, Clutch	1	M18×1.5	70	Left handed
Limiting Nut, Driven Bevel Gear Shaft	1	M60	110	Apply screw thread sealant
Limiting Nut, Front Output Shaft	1	M55	80	Apply screw thread sealant, left handed
Bolt, Swing Arm Shaft	2	M14×1.25	28	
Drain Bolt	1	M12×1.5	30	
Mounting Bolt, Overriding Clutch	6	M8	26	Apply screw thread sealant
Mounting Bolt, Magneto Stator	3	M6	10	Apply screw thread sealant
Bolt, CVT Windshield	3	M6	10	Apply screw thread sealant
Link Bolt, Oil Pipe	2	M14×1.5	18	
Mounting, Oil Pump	3	M6	10	
Mounting Bolt, Pressure Limiting Valve	2	M6	10	
Bolt, Drive Bevel Gear Cover	4	M8	32	
Bolt, Driven Bevel Gear Cover	4	M8	25	
Locating Bolt, Shift	1	M14×1.5	18	
Flange Bolt, Fan	1	M10×1.25	55	

Overhaul Information

Operation Cautions

Warning

Gasoline is highly flammable, therefore smoke and fire are strictly forbidden in the work place. Special attention should also be paid to sparks. Gasoline may also be explosive when it is vaporized, so operation should be done in a well-ventilated place.
Remove and Install muffler after it is fully cold.

- This chapter is on the disassembly and installation of rack, visible parts, exhaust pipe, muffler and fuel tank.
- Hoses, cables and wiring should be routed properly.
- Replace the gasket with a new one after muffler is removed.
- After muffler is installed, check if there is any exhaust leakage.

Tightening torque

Muffler Rear Fixing Bolt: 35-45N.m
Muffler Exhaust Pipe Bolt: 35-45N.m
Muffler Body Fixing Bolt: 35-45N.m

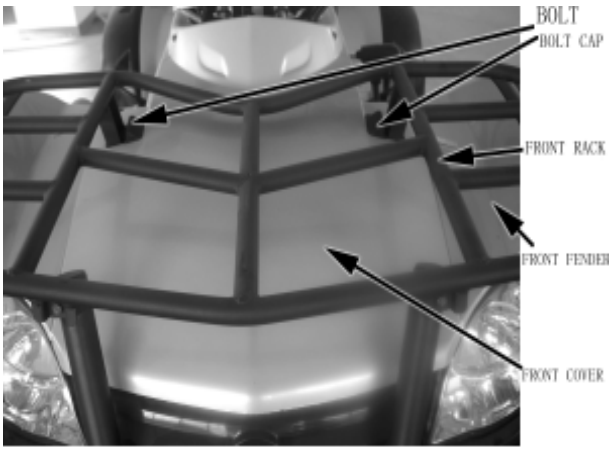
Troubleshooting

- Loud exhaust noise
- Broken muffler
- Exhaust leakage

Insufficient power

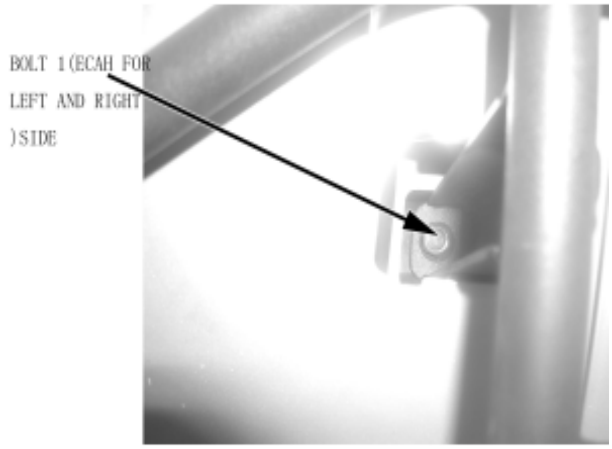
- Distorted muffler
- Exhaust leakage
- Muffler clogged

Front Rack, Bolt Cap



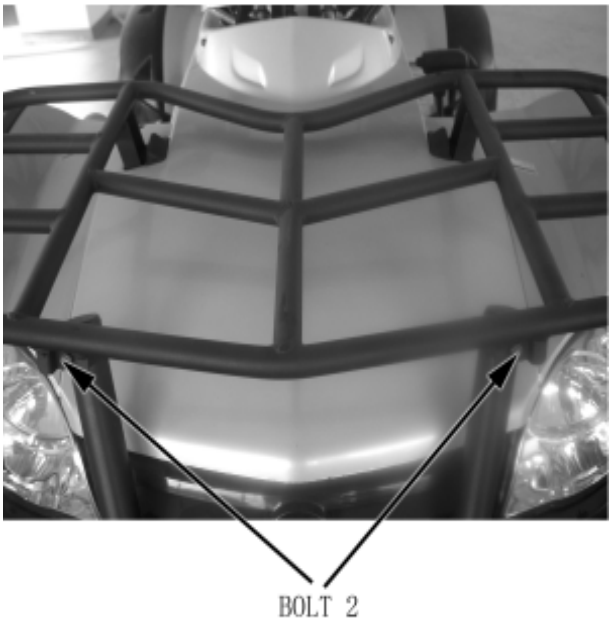
Remove:

Upwardly remove Bolt cap hard; two assembly bolts of front rack shall be seen.



Remove fixing Bolt 1
(one for each on theleft and right)

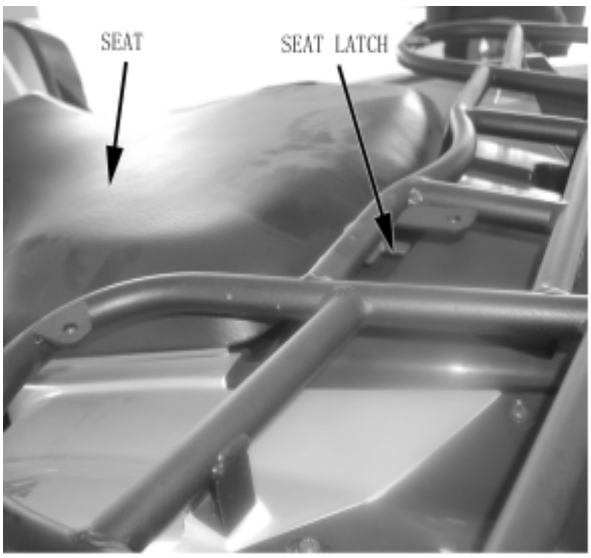
Romove fixing Bolt 2
Remove front rack



Installation:
Reverse the removal procedure for installation
Tightening Torque:

Fixing Bolt 1, Bolt 2	35 N.m -45N.m
Fixing Bolt 3, Bolt 4	25 N.m -30N.m

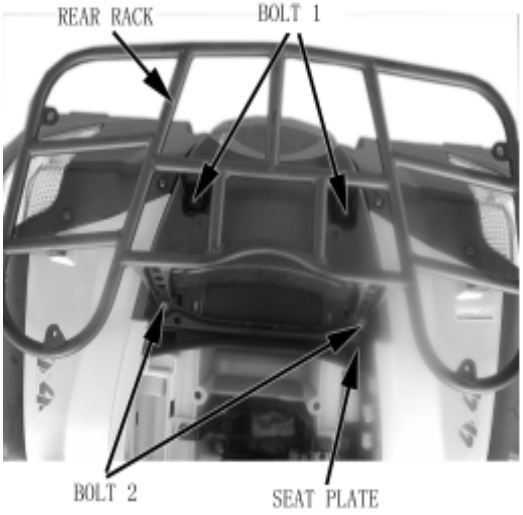
Seat



Remove:
Pull upward seat buckle
Lift and push seat backward

Installation:
Press upward seat buckle
Press seat forward and down

Note:
Shake seat left,right, front and back to make sure that the seat is firmly installed.



Remove:
-seat (2-3)
—Bolt 1, bolt 2

Remove seat support

Remove Bolt 3 for rear rack and rear fender from rear fender bottom
Remove Bolt 1
Remove Rear Rack

Installation
Reverse the removal procedure for installation

Tightening Torque:
Bolt 1:35N.m-45N.m
Bolt 2:35N.m-45N.m
Bolt3:8N.m-12N.m

Front Top Cover

Remove

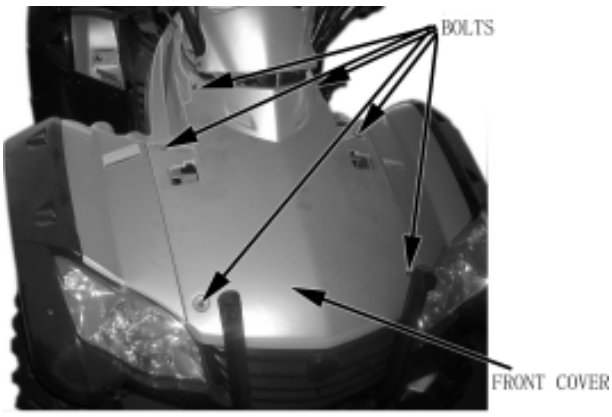
Front Rack(2-2)

6 nuts,

Front Top Cover

Assemble

Reverse the removal process and direction.



Dashboard Cover

Remove

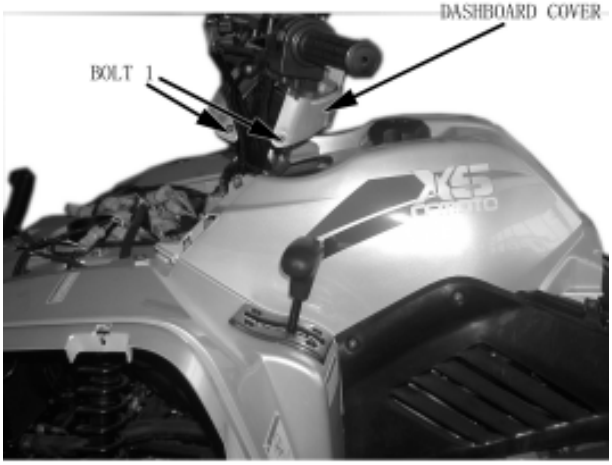
--2 pieces Bolt 1

--2 pieces bolt 2

--Dashboard Cover

Installation

Reverse the removal process and direction.



Front Side Support(Left)

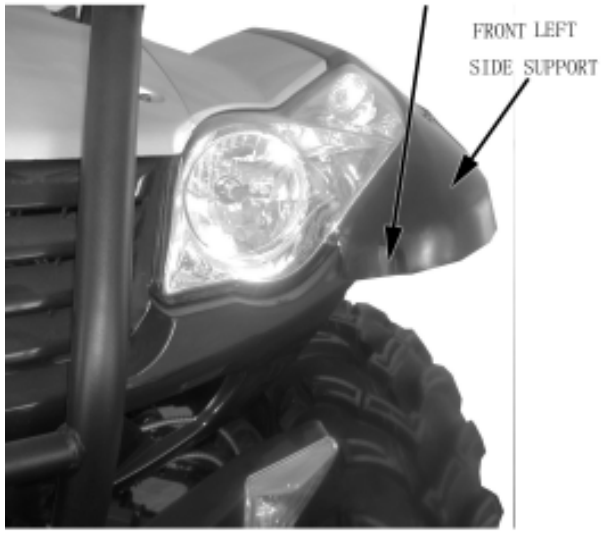
Remove

Bolt 1

Front Side Support

Assemble

Reverse the removal process and direction.



Front Side Support(Right)

Same as Left Side Support

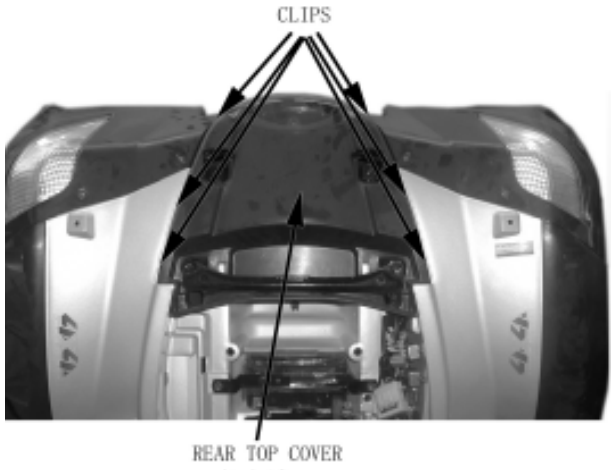
Rear Top Cover

Remove

Rear Rack(2-3)

Seperate clasps of rear top cover from rear fender;

Remove Rear Top Cover



Installation

Reverse the remove procedure and direction for installation .

Gear Shift Unit Fender

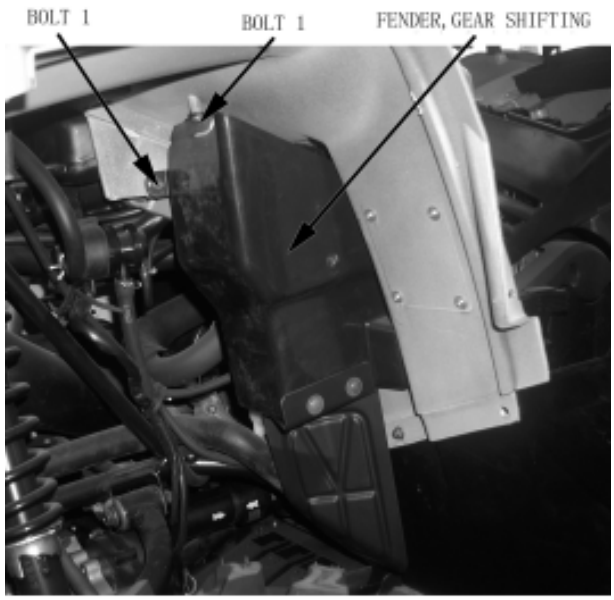
Remove

--Bolt 1

--Bolt 1

--Bolt 2

Remove Gear Shift Unit Fender



Installation

Reverse the remove procedure and direction for installation .

Left Side Cover

Remove

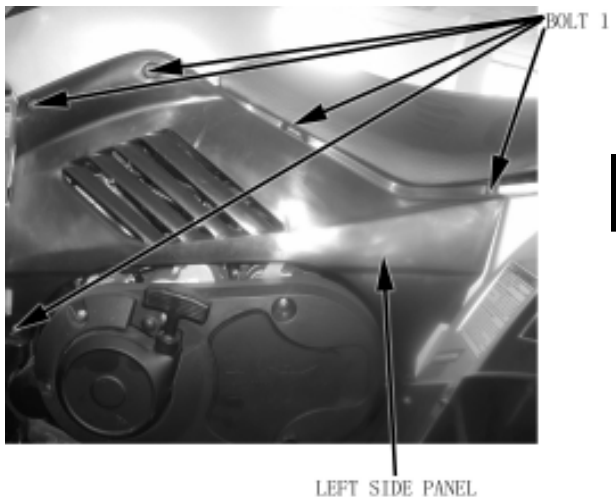
--Seat(2-3)

--Left Side Cover fixing bolt

--Left Side Cover

Installation

Reverse the remove procedure and direction for installation .



Rear Protector

Remove

--Rear Rack(2-3)

--Rear Top Cover(2-6)

--Rear Link Plate(2-7)

--Rear Left Side Support(2-8)

--Rear Right Side Support(2-8)

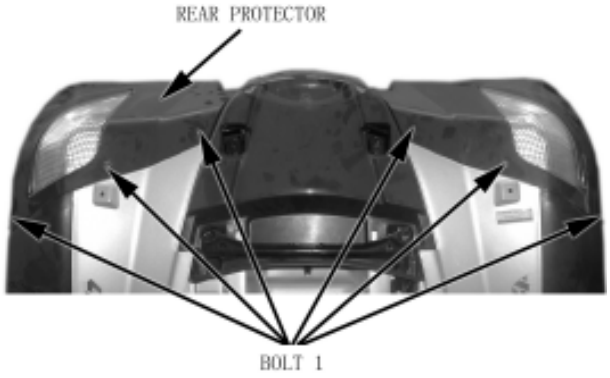
--Rear Turning Light Connector

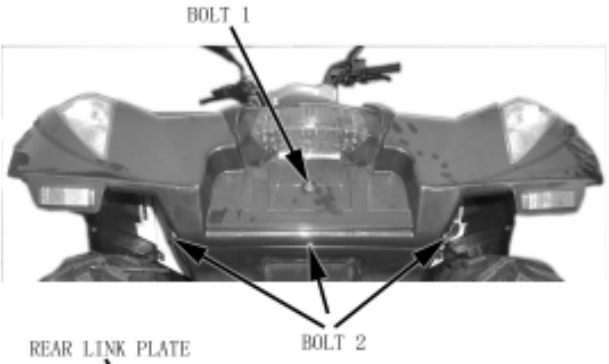
--Bolt 1,2,1

--Rear Protector

Installation

Reverse the remove procedure and direction for installation.





Rear Link Plate

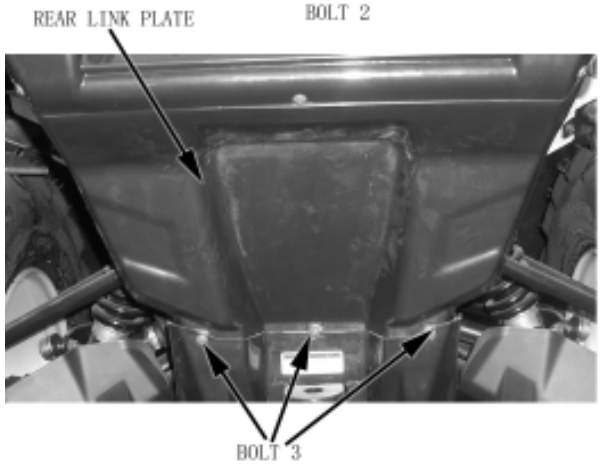
Remove

--Bolt 3

Rear Link Plate

Installation

Reverse the remove procedure and direction for installation.

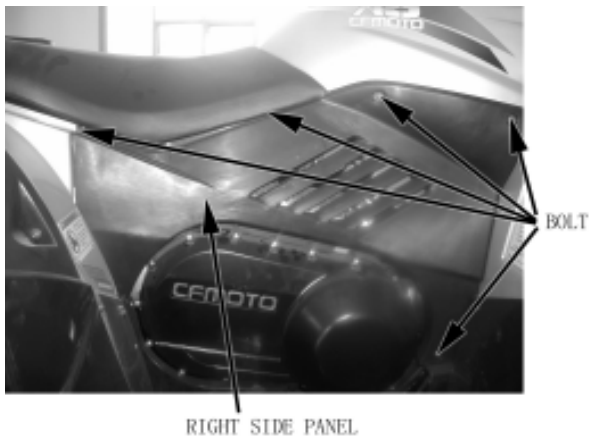


Rear Side Panel

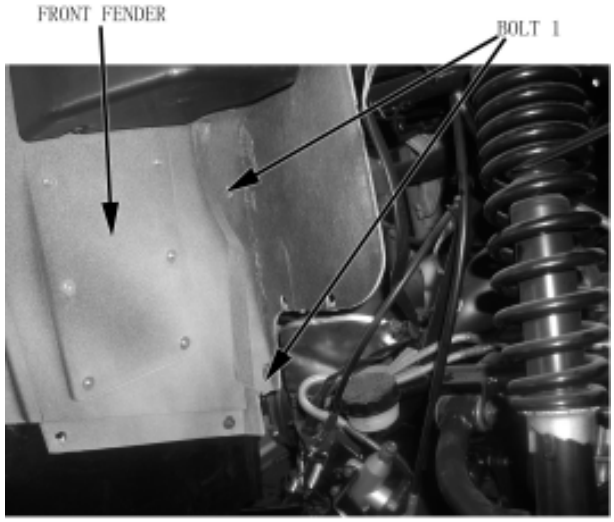
Remove

--Seat(2-3)

--Right Side Cover Fixing Bolt



Remove connecting Bolt 1 between Right Side Panel and Front Fender at bottom of Front Fender



Remove Right Side Panel

Installation

Reverse the remove procedure and direction for installation .

Rear Right Side Support

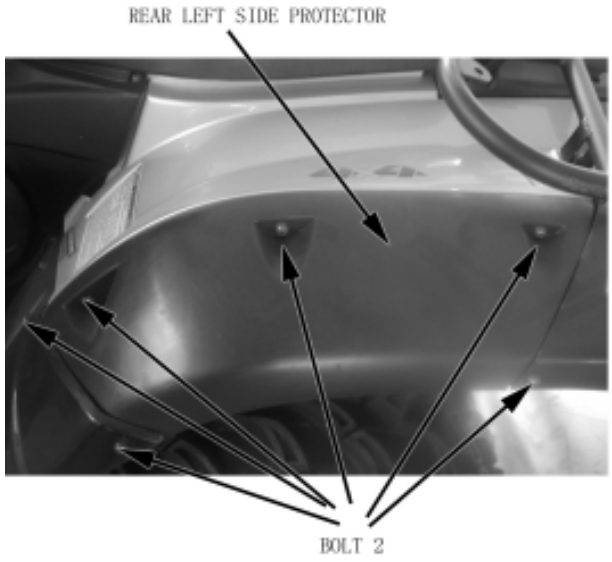
Remove

--Bolt 2

--Remove Rear Right Side Support

Installation

Reverse the remove procedure for installation



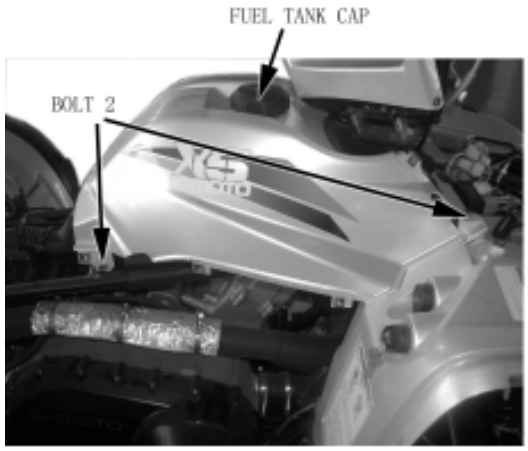
Removal and Installation and Rear Right Side Support is same with Left side.

Top Cover, Fuel Tank

Remove

--Seat(2-3)
--Front Rack(2-2)
--Front Top Cover(2-4)
--Left Side Panel(2-7)
--Right Side Panel(2-8)
--Bolt 1, 2

--Bolt 3, 4
--Fuel Tank Cap



Remove Fuel Tank Top Cover

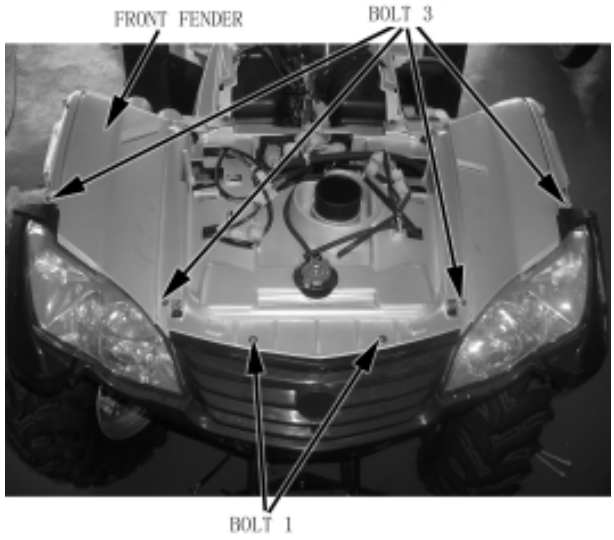
Installation

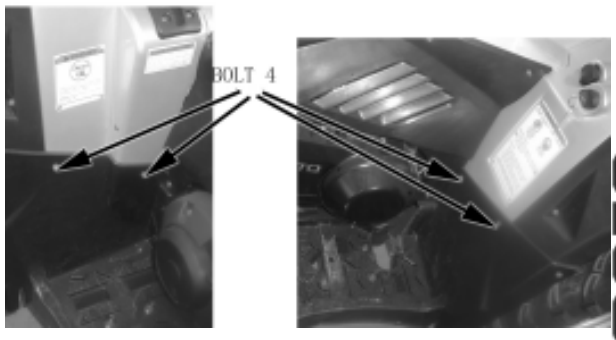
Reverse the remove procedure and direction for installation .

Front Fender

Remove

--Front Rack(2-2)
--Front Top Cover(2-4)
--Left, Right Side Panel(2-7)(2-8)
--Fuel Tank Top Cover(2-8)
--Left,Right Side Support(2-5)
Loosen Cable Connector of Front Fender
Remove Electronics Parts of Front Fender
Remove 3 Front Fender bolts fixed in Frame





Remove 4 bolts fixed with left and right footrest
Remove Front Fender

Installation

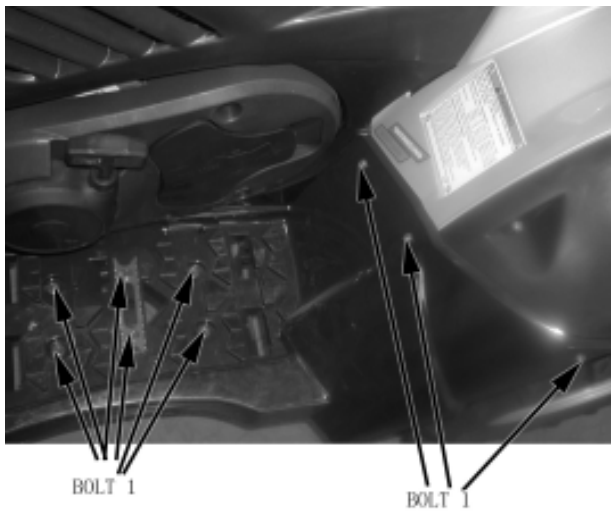
Reverse the remove procedure for installation

Footrest,Left Side

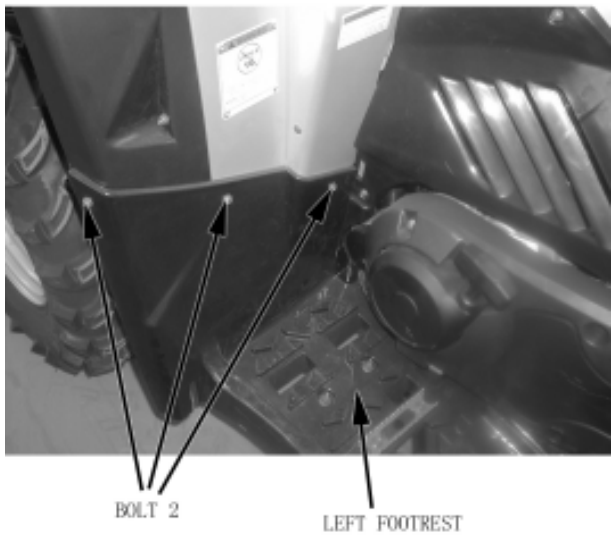
Remove

Left Side Panel(2-7)

Remove three Bolt 1 and 3 nuts connecting with Front Fender



Remove three Bolt 2 and 3 nuts connecting with Rear Fender



Remove Bolt 1

Remove Left Footrest

Installation

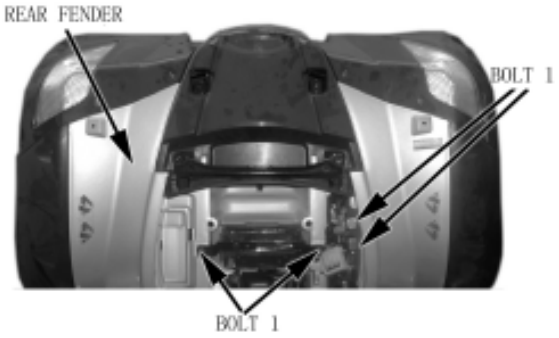
Reverse the remove procedure for Installation.

Footrest,Right Side

Removal and Installation same with Left side.

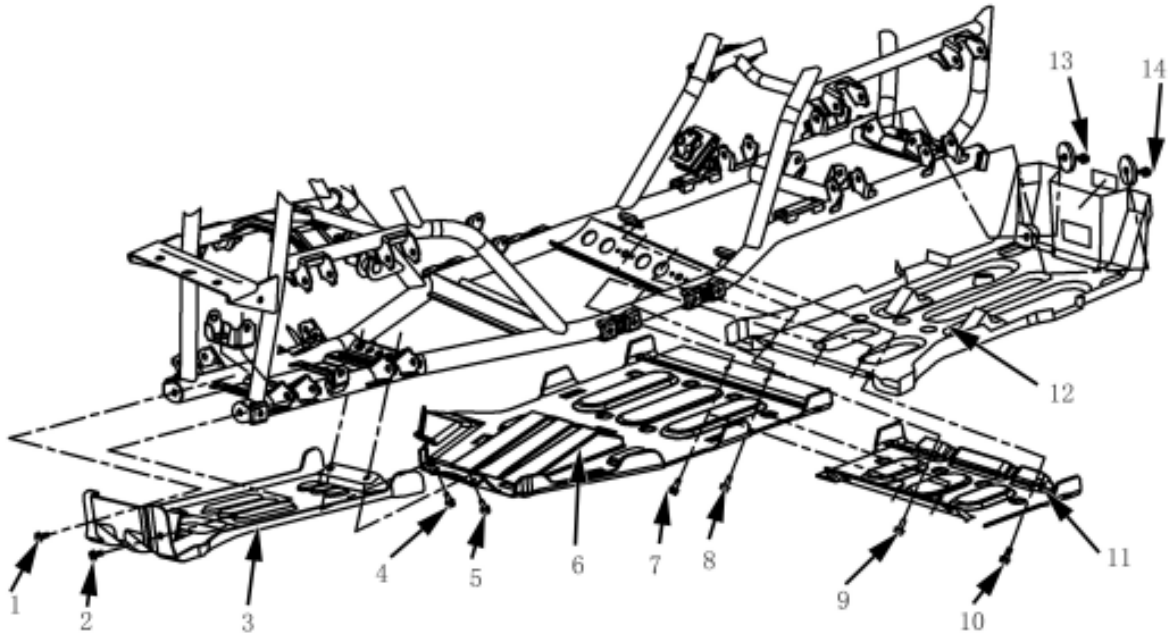
Rear Fender

Remove



--Seat(2-3)
--Rear Rack(2-3)
--Rear Top Cover92-60
--Left,Right Side Panel(2-7)(2-8)
--Lef,RightSide Support(2-8)
--Rear Protector(2-7)
Remove Battery Bracket and Fixing Plate(8-4)
Remove Battery(8-4)
Remove Bolt 1
Remove Nut 1
Remove Electonic Parts from Rear Fender
Loosen Cable Connector from Rear Fender
Upwardingly Remove Rear Fender

Engine Front,Middle and Rear Skid Plate; Protector Plate of Double Seat



(1) BOLT 1	(6) MIDDLE ENGINE SKID PLATE	(11) PROTECTION PLATE, DOUBLE SEAT
(2) BOLT 2	(7) BOLT 5	(12) REAR ENGINE SKID PLATE
(3) FRONT ENGINE SKID PLATE	(8) BOLT 6	(13) BOLT 9
(4) BOLT 3	(9) BOLT 7	(14) BOLT 10
(5) BOLT 4	(10) BOLT 8	

Disasembly

NOTE:Side skid Plate(Front,Middle, Rear) and Double Seat Protection are located at bottom of vehicle. The mainteanace person should work under bottom of vehicle when disassemble the above parts.
For safty , make sure the vehicle is firmly parked.

Engine Skid Plate(Front)

Remove Bolt 1, 2, 3,and 4;
Remove Engine Front Skid Plate

Installation

Reverse the remove procedure for Installation

Engine Skid Plate(Middle)

Remove Bolt 5 and 6;
Remove Middle Engine Skid Plate.

Installation
Reverse the remove procedure for Installation

Double-Seat Protection Plate

Remove Bolt 7 and 8;
Remove Double-Seat Protection Plate.
NOTE: No Protection Plate for single-seat .

Installation
Reverse the remove procedure for Installation

Engine Skid Plate(Rear)

Removal

Remove Bolt 9 and 10;
Remove Rear Engine Skid Plate.

Installation

Reverse the remove procedure for Installation

Right Front Inner Fender

Removal

Remove Bolt 1 ,and remove Right Front Inner Fender

Installation

Reverse the remove procedure for Installation

NOTE: Hook Water Pump with Clip of Right Inner Side Fender during Installation.

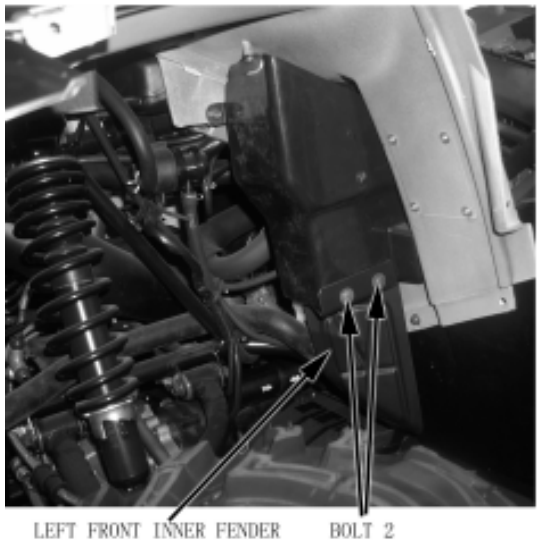
Left Front Inner Fender

Removal

Remove Bolt 1 ,and remove Left Front Inner Fender

Installation

Reverse the remove procedure for Installation



Front Left Protector

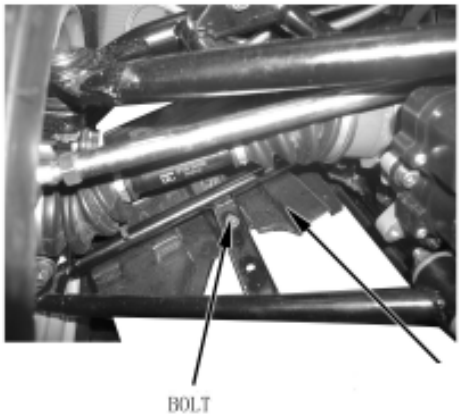
Remove

--Bolt 1

Pull backward and remove front Front Left Protector

Installation

Reverse the remove procedure for Installation



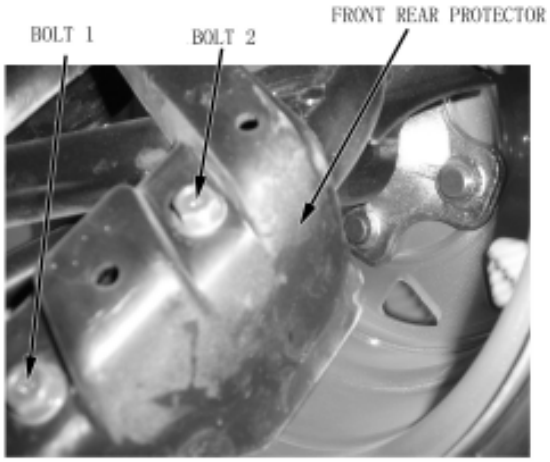
Front Right Protector

Removal and Installation same with Left Side.

Front Left Inner Fender

Removal

Remove Bolt 1 and 2;
Remove Front Left Inner Fender

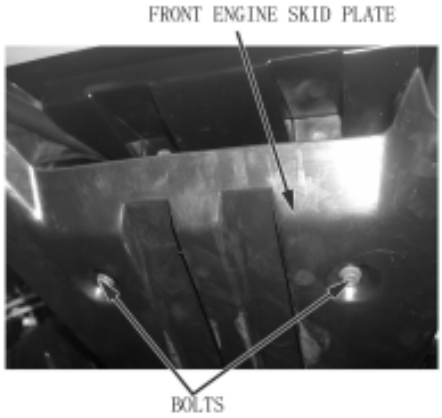


Installation

Reverse the remove procedure for Installation

Front Right Inner Fender

Removal and Installation same as Left Side.

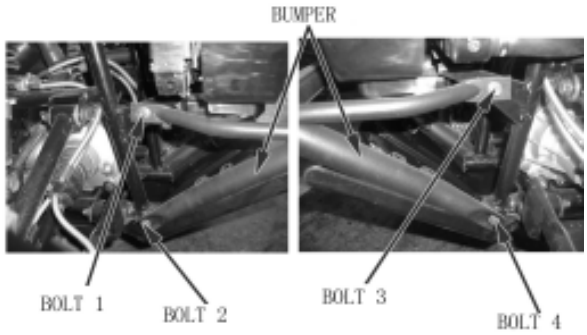


Bumper, Bumper Protector

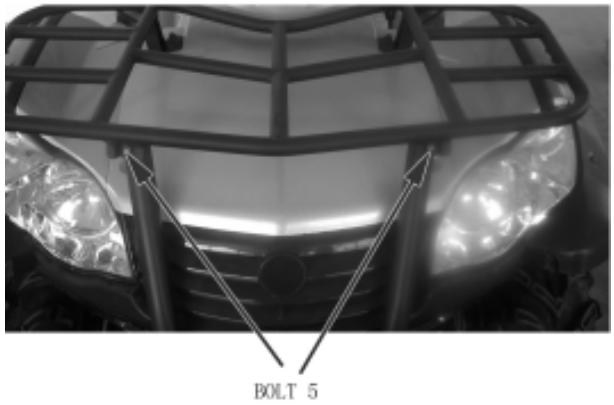
Remove

Remove two Bolts of Engine Front Skid Plate fixing into the Bumper.

Remove Bolt 1, 2, 3 and 4.
Remove Bumer and Bumper Protector



Remove Bolt 5 connecting Bumper and Rack.



Bumper Protector

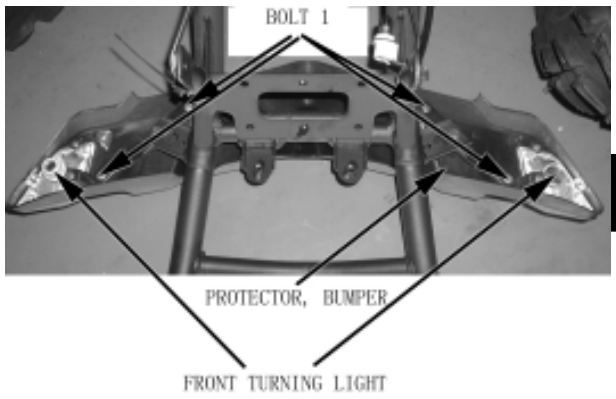
Remove

--Loosen Front Turning Light Connector.

--Remove Bumper and Bumper Protector.

Remove tapping screw 1 from Bumper;

Remove Bumper Protector.



Installation

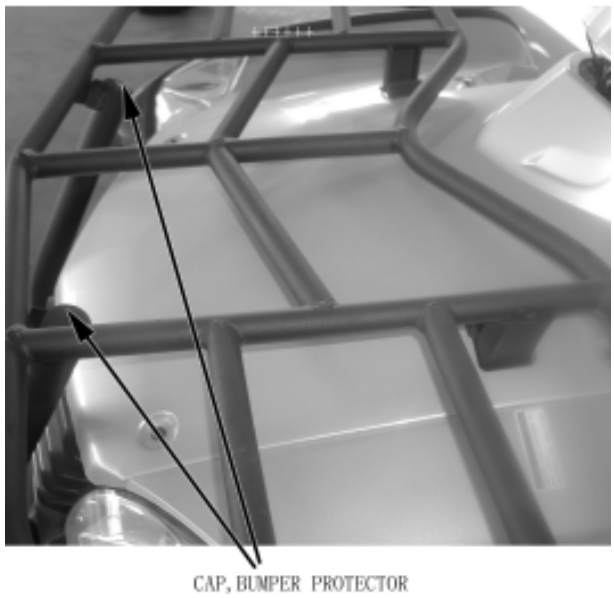
Reverse the remove procedure for Installation

Bumper Protector Cap

Remove

Pull the two Caps from Bumper

(There are only 2 caps in this vehicle)



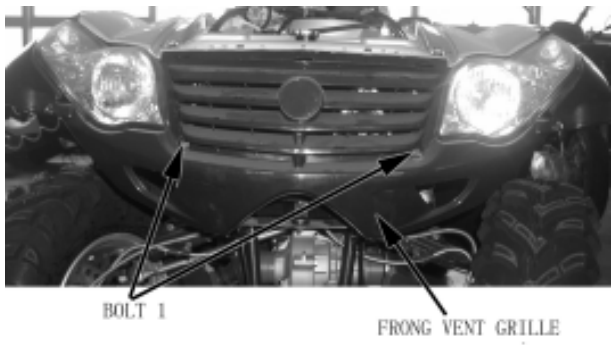
Installation

Press Caps into Bumper Pipe

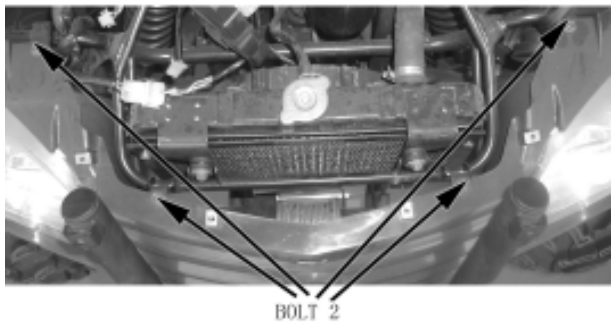
Front Vent Grill

Remove

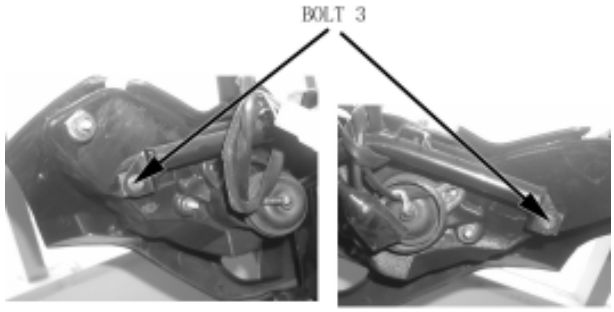
--Loosen Connector of Front Head Light
--Remove Front Fender(2-9)
--Remove Bumper(2-14)
--Remove Bolt 1, 2 and 3;
--Remove Vent Grill



Note: For removal of front vent grille only, Just remove 2 fixing bolts of bumper and 2 center fixing bolts, then pull bumper down



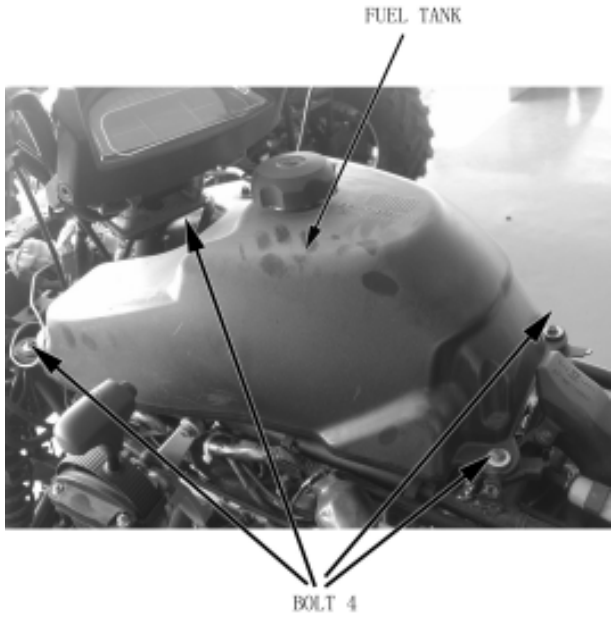
Installation:
Reverse the removal procedure for installation



Warning: Gasoline is highly flammable, therefore smoke and fire are strictly forbidden in the work place.
Special attention should also be paid to sparks.
Gasoline may also be explosive when it is vaporized,
so operation should be done in a well-ventilated place.

Remove Left and Right Side Panel(2-7)
Remove Front Fender(2-9)
Remove Fuel Tank Top Cover(2-9)
Remove Bolt 4

Loosen Fuel Sensor 3P Connector.



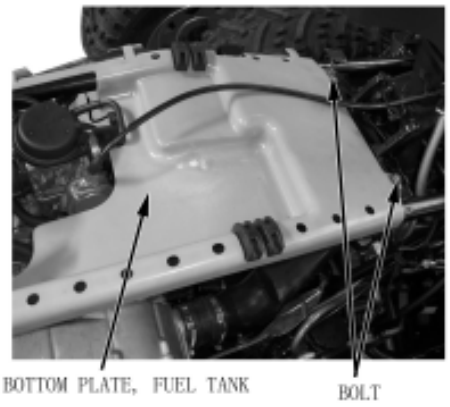
Remove Fuel Pipe 1 and Circlip
Remove Fuel Tank

Installation:
Reverse the removal procedure for installation

Note:
Be careful not to damage main cable, pipes and hoses. Main cable, cables, pipes and hoses should be routed properly according to the routing drawing.
Take precaution against fuel leakage when removing fuel Fuel Hose I

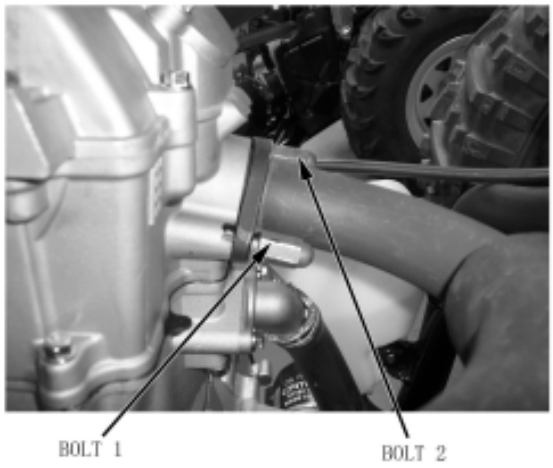
Remove:
--Fuel tank (2-16)
--Bolt 1
--Bolt 2
--Fuel tank top cover

Installation:
Reverse the removal procedure for installation.
Note:
Be careful not to damage main cable, pipes and hoses. Main cable, cables, pipes should be routed properly according to the routing drawing



Muffler

Caution: Perform disassembly only after the muffler is cooled down.

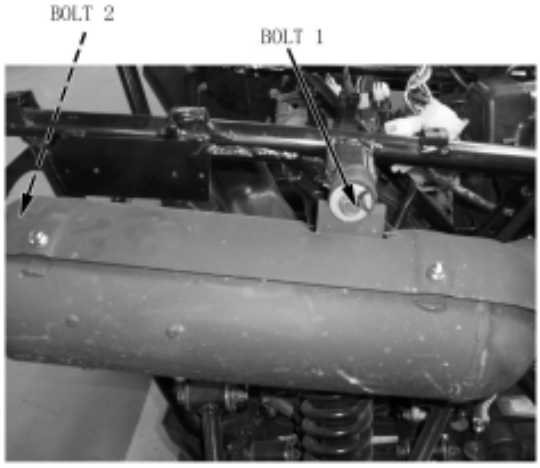


Remove:

--Seat (2-3)

--Right side panel (2-8)

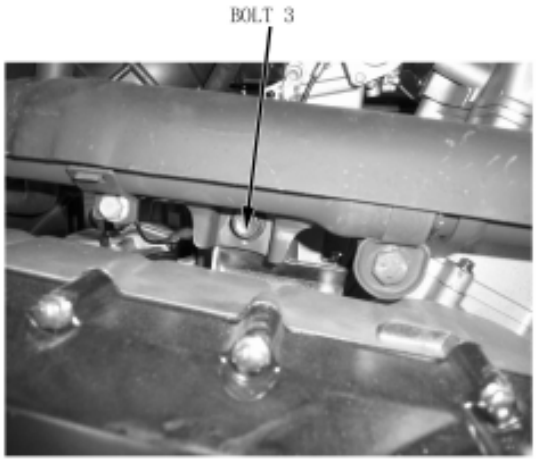
--Nut1, Nut 2 for exhaust pipe elbow



Remove Bolt

Remove Bolt 2, Bolt 3

Remove muffler



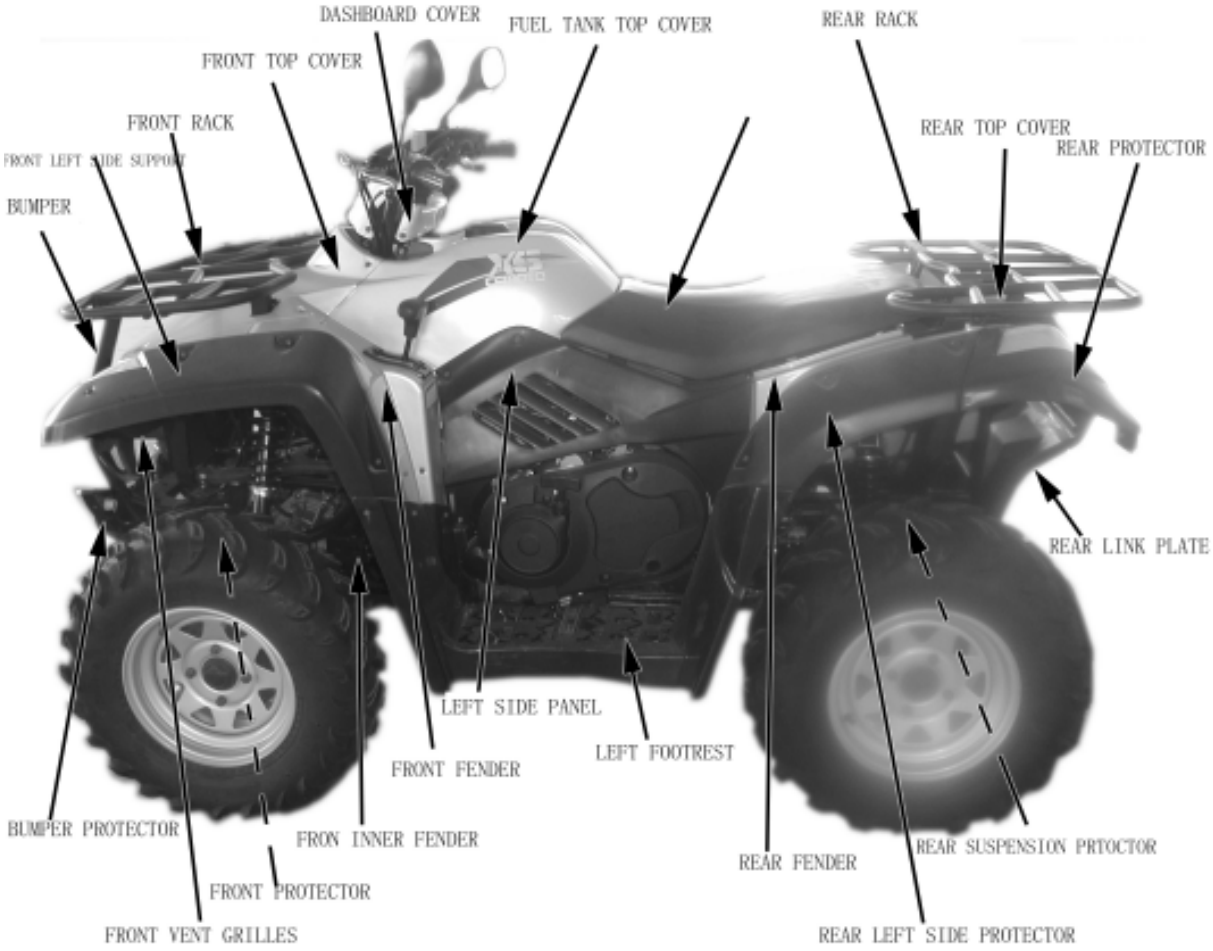
Installation:

Reverse the removal procedure for installation.

Note:

Replace sealing gasket when installing the muffler.

Visible Parts



Overhaul info

Operation Cautions

Note

- DO NOT keep the engine running for long time in a poorly ventilated or enclosed place because of the harmful components like CO, etc, in the exhaust gas.
- The muffler and engine are still very hot when the engine is just stopped. Careless contact may cause serious burn. Be sure to wear fatigue dress with long sleeves and gloves if the work has to be done after the engine is just stopped.
- Gasoline is highly flammable, smoking is strictly forbidden in the work place. Keep alert on the electrical sparks. Besides, vaporized gasoline is highly explosive, so work should be done in a well-ventilated place.
- Be careful that your hands or clothes not get nipped by the turning or movable parts of the driving system.

Note

The vehicle should be parked on hard and level ground.

Maintenance Interval

The table below lists the recommended intervals for all the required periodic maintenance work necessary to keep the engine at its best performance and economy. Maintenance intervals are expressed in terms of kilometer, miles and hours, whichever occurs first.

Note: Maintenance interval should be shortened on engines that are used in severe conditions.

Interval / Item					
	Km	Initial 250km	Every 500 km	Every 1000 km	Remark
	Hours	Initial 20 hours	Every 50 hours	Every 100 hours	
Valve Clearance		I	—	I	IN: 0.05~0.10 EX:0.17~0.22
Idle Speed		I	I	—	1300±100r/Min
Spark Plug		I	—	I	No carbon deposit Gap: 0.8~0.9mm
		Replace every 6000Km			
Air Filter		—	I	C	Replace every 20000 Km
Fuel Hose, Carburetor		—	—	I	Replace every 4 years
Clutch		—	—	I	
Drive Belt		—	I	—	Replace every 2000Km
Engine Oil		R	—	R	
Oil Filter		R	—	R	
Coolant Level		I	I	—	
Water Hose & Pipes		I	—	I	
Coolant		Replace every 2 years			

I=Inpection and adjust, or replace if necessary
R=Replace
C=Clean

Inspection & Maintenance ○: **Interval**

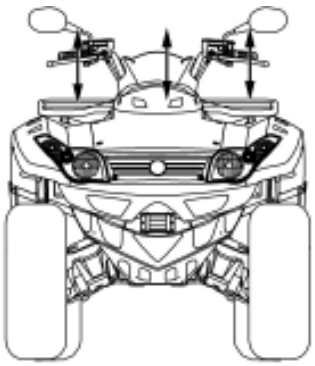
Item			Intervals			Standard
Part		Item	Daily	1/2 Year	Annual	
Steering System	Handlebar	Operation agility	○			
	Steering system	Damage	○			
		Installation condition of steering system	○			
		Sway of ball stud	○			
Brake System	Brake lever	Free play	○	○		Front: lever end 0mm Rear : lever end 0mm
		Brake Efficiency	○	○		
	Connecting rod, oil pipe & Hose	Looseness, Slack and damage	○		○	
	Hydraulic brake and brake disc	Front and rear brake fluid level	○	○		Brake fluid should be above LOWER limit
		Brake disc damage and wear	○	○		Replace when the thickness of front brake disc is less than 2.5mm, rear brake less than 6.5mm.
Driving System	Wheel	Tire pressure	○	○		Front tire: 35kPa ($0.350kgf/cm^2$) Rear tire: 30kPa ($0.30kgf/cm^2$)
		Chap and damage	○		○	
		Groove depth and abnormal wear	○		○	No wear indication on the surface of tire (the remained depth of groove should not be less than 1.6mm)
		Loosened wheel nut and axle	○	○		
		Sway of front wheel bearing	○		○	
		Sway of rear wheel bearing	○		○	
Buffer System	Suspension arm	Sway of Joint parts, rocker arm damage	○		○	
	Shock absorber	Oil leakage and damage	○		○	
		Function			○	
Drive Train	Front axle	Transmission, lubrication	○		○	
	Rear axle	Transmission, lubrication	○		○	
	Gear box	Transmission, lubrication	○		○	Remove filling bolt, add oil till oil level reaches edge of filling hole.
	Final shaft	Looseness of joint parts				
	(Drive shaft)	Sway of Spline				

Item			Intervals			Standard
Part		Item	Daily	1/2 Year	Annual	
Drive train	Final shaft (Drive shaft)	Looseness of joint parts	O	O		
		Sway of Spline			O	
Electrical System	Ignition Device	Spark plug		O		Spark plug gap: 0.8-0.9mm
		Ignition timing		O		
	Battery	Terminal Joint			O	
	Wiring	Looseness and damage of joints			O	
Fuel device		Fuel leakage		O		
		Throttle			O	Throttle grip clearance: 3~5mm
Cooling system		Coolant level	O	O		
		Coolant leakage			O	

Part	Item	Daily	1/2 Year	Annual	Standard
Lighting device and turning indictors	Function	○	○		
Alarm and lock device	Function			○	
Instruments	Function			○	
Exhaust pipe and muffler	Looseness or damage caused by improper installation			○	
	Function of muffler			○	
Frame	Looseness and/or damage			○	
Others	Lubrication & grease of frame parts			○	
Abnormal parts which can be determined when driving	Make sure if there is any abnormal with relative parts.	○			

Steering Stem

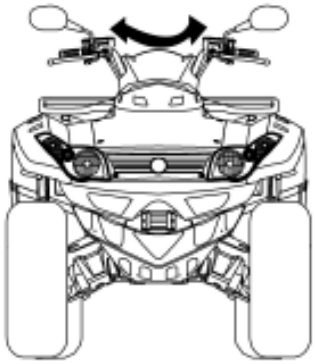
Park the vehicle on level place, hold steering handlebar, and shake in the direction as illustrated on the right and see if there is any sway.



In case of any sway, check if it is the problem of the steering stem or other parts and then do the maintenance accordingly.

In case of sway of the steering stem, tighten the locknut or disassemble the steering stem for further check.

Park the vehicle on level place, slowly turn the handlebar left and right to see if it can turn freely.



In case there is any hindrance, check if it is from the main cable assembly or other cables.

If no, check the steering tie-rod end, and check if the steering stem bearing is damaged.

Note:

Make sure the steering can be operated freely.
An accident may occur
if the handlebar is out of control.

Brake system

Front brake lever free play

Operate front brake lever and check brake efficiency and brake lever function.
Check free play of front lever end.

Free play: 0mm

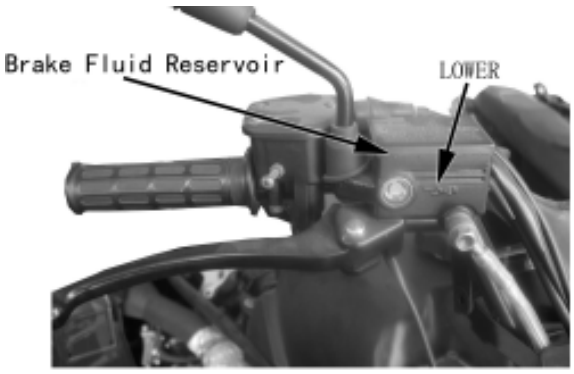
Master Cylinder

<Fluid level>

Check the brake fluid level

When the brake fluid level is near to the lower limit line, check master cylinder, brake hoses and joints for leakage. Remove the two mounting screws on fluid reservoir cap.

Remove the cap, add DOT3 or DOT4 brake liquid till the upper limit line.

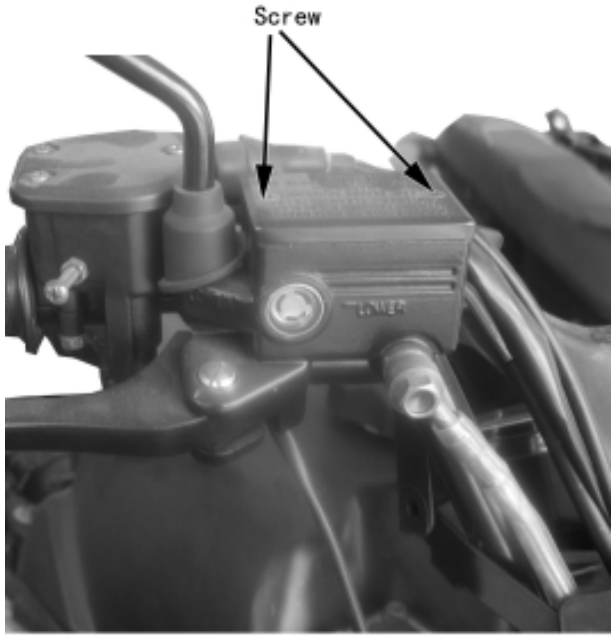


-Do not mix with dust or water when adding brake fluid.

-Use only the recommended of brake fluid to avoid chemical reaction.

-Brake fluid may cause damages to the surface of the plastic and rubber parts. Keep the fluid away from these parts.

-Slightly turn the handlebar left and right till the master cylinder is in horizontal, then remove the fluid reservoir cap.



Brake Disc, Brake Pad

< Wear of brake pad>

Check the brake pad wears from the mark as indicated. Replace the brake pad if the wear has reached position of wear limit trough.

Note The brake pad must be replaced with a whole set.

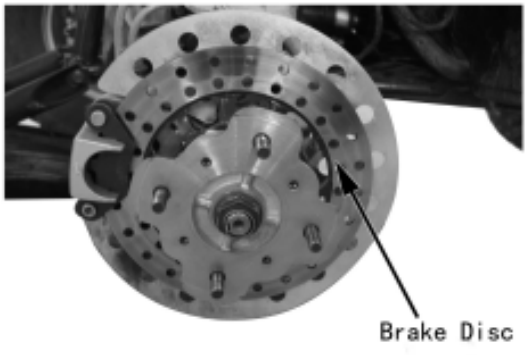
Checking and replacing the brake disc

Front brake disc thickness: ¡Ü2.5 mm ¡úReplace

Rear brake disc: ¡Ü6.5 mm ¡úReplace

Min. limited thickness of the front brake disc: 2.5mm

Min. limited thickness of the rear brake disc: 6.5mm



Change the Brake Fluid

< Changing Brake Fluid>

Change the brake fluid once every year.

Wheels

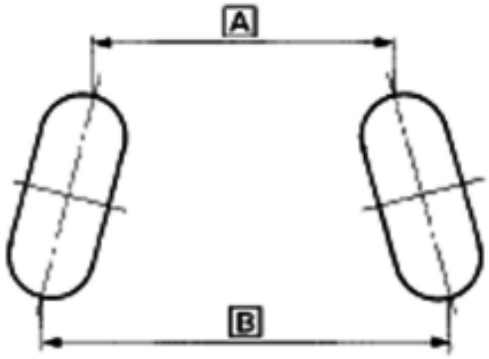
Lift front wheel on level place, and make sure there is no loading on the wheels.

Shake the front wheel left and right to check whether the joint of front wheel is tightened and check whether it sways.

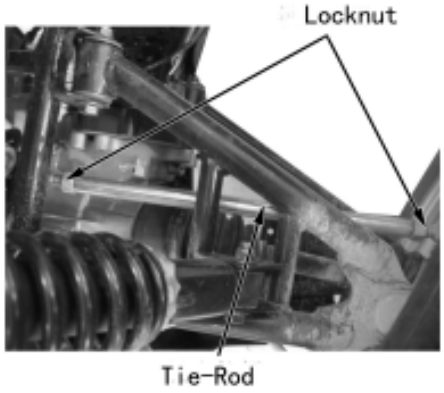
Not tighten enough: ¡úTighten it
Sway: Replace the rocker arm

Front Toe-in size

Park the vehicle on level place, measure the front toe-in
Toe-in: B-A=0-10mm



Toe-in out of the range: ¡ú Adjust the locknut of tie-rod

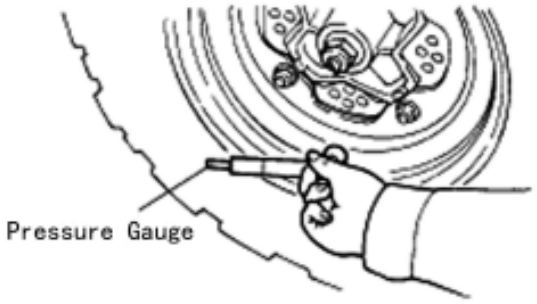


Note:

After the toe-in has been adjusted, slowly run the vehicle to check whether the direction of vehicle can be controlled by handlebar.

Tire Pressure

Check the pressure of the tires with a pressure gauge.



Note

Check the tire pressure after tires are cooled.
Driving under improper tire pressure will reduce the comfort of operation and riding, and may cause deflected wear of the tires.

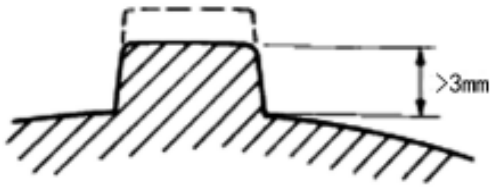
Specified pressure /tire

	Front wheel	Rear wheel
Pressure	35kPa(.035kgf/cm2)	30kPa(0.30kgf/cm2)
Tire Size	AT25¡Á8-12	AT25¡Á10-12

Tire Tread

Check the tire tread.

Tread Height: < 3mm¡úReplace with new tires
Note:
When the tread height is less than 3mm, the tire should be replaced immediately.



Wheel Nut and Wheel Axle

Check front and rear wheel axle nuts for looseness
Loosened axle nuts: Tighten
Tightening Torque:
Front wheel axle nut:
110-130N.m(11.2kgf.m-13.3kgf.m)
Rear wheel axle nut:
110-130N.m(11.2kgf.m-13.3kgf.m)

Sway of Wheel Bearing

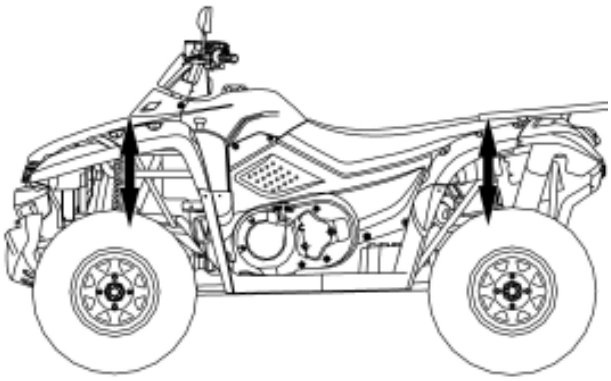
Lift the front wheel
Make sure there is no loading on the vehicle
Shake the wheel in axial direction for any sway

In case of any sway,
disassemble the front wheel and check the bearing

Suspension System

Park the vehicle on lever place, press the vehicle Several times up and down as illustrated on the right.

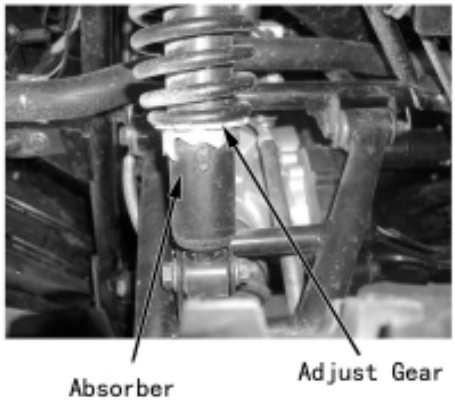
In case of any rocking or abnormal noise, check whether there is any oil leakage from absorbers, or any damage or looseness of tightening parts.



Adjusting the Absorber

Use special tools to adjust the length of absorber according to loading requirement

Turn clockwise to adjust from high to low

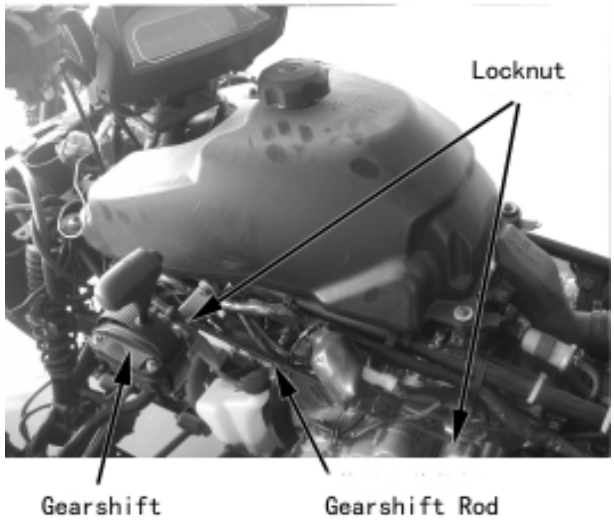


Gear Shifting

Shift the gear to check for flexibility and gear engagement

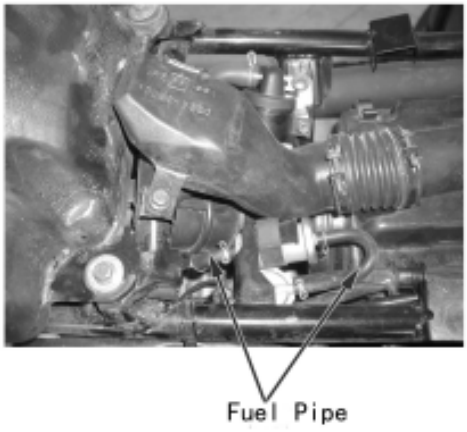
Adjust the gearshift rod if necessary

Release the locknut to adjust the length of gearshift rod

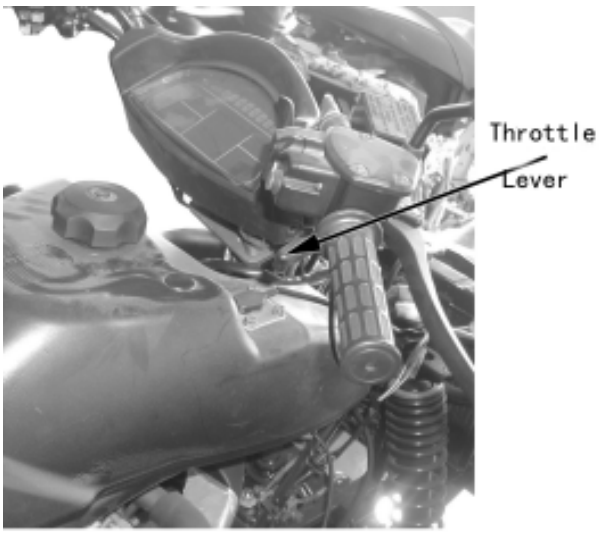


Fuel Device

Status of the fuel system
Remove the seat (2-3)
Check the fuel hose for any aging or damage.
Aged or damaged fuel hose: Replace
Check if there is cracks or bending with the vacuum tube.
Cracked or bended vacuum tube: Replace



Checking the Throttle Lever



Check the free play of throttle lever

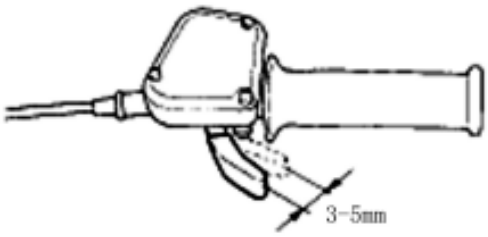
Free play: 3-5mm

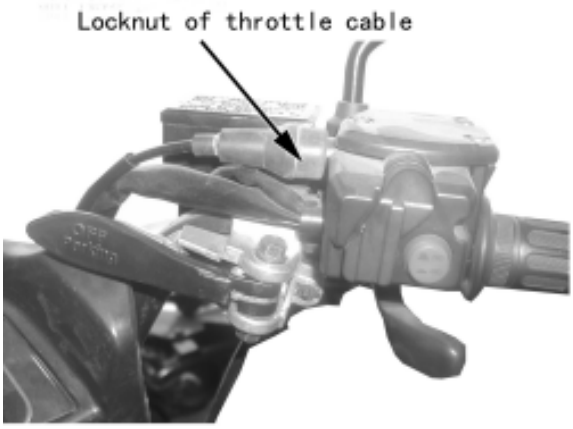
Out of range: Adjust

Loosen locknut of throttle cable
turn the regulator and adjust free play of throttle lever

After adjusting, tighten locknuts and install throttle cable sleeve

Replace with a new throttle cable if the specified free play could not be acquired by adjusting the regulator or if there is still stickiness with the throttle.





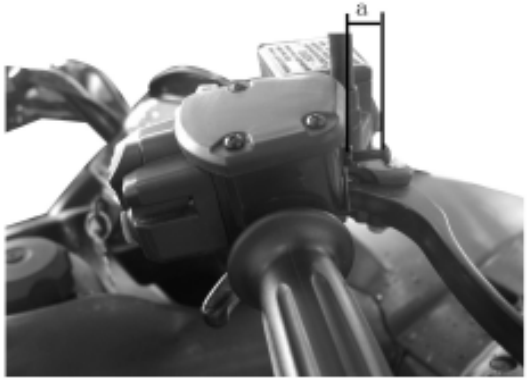
Adjusting the Speed Limiter

The speed limiter is to limit the opening of throttle
Check the maximum length of limiter screw thread
Maximum screw thread: a=12mm
Adjust with a cross driver.

Note:

For beginners, the speed limit should be fully tightened.
Drivers with certain skills may adjust
the throttle with speed limiter

Maximum length of screw thread is 12mm.
It is recommended to adjust the thread length to 3-5mm.



Cooling System

Note

Check coolant level from reservoir tank.
Do not check from radiator.

If the radiator cap is opened while the engine is hot (over 100¡æ), the pressure of the cooling system will drop down and the coolant will get boiled rapidly.

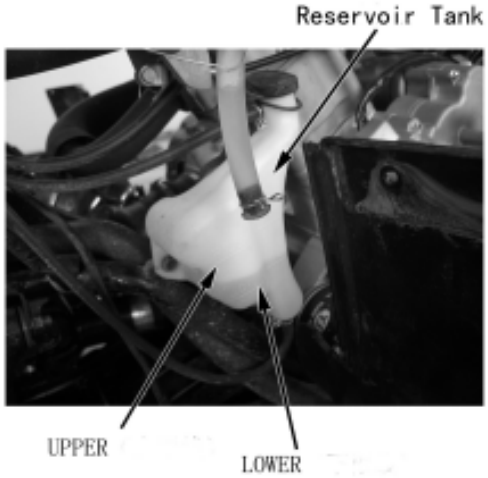
DO NOT open the radiator cap until the coolant temperature drops down.
-Coolant is poisonous, DO NOT drink or splash it to skin, eyes, and clothes.
-In case the coolant gets to the skin and clothes, wash with soap immediately.
-In case the coolant gets into eyes, rinse with plenty of water and go to consult the doctor
-In case of swallowing the coolant, induce vomit and consult the doctor.
-Keep the coolant in a safe place and away from reach of children.

Coolant level

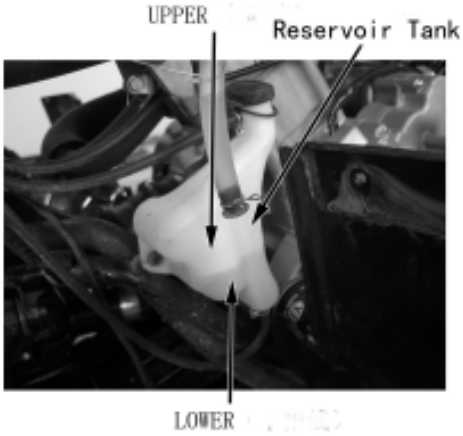
Coolant might reduce due to natural evaporation.
Check the coolant level regularly.

Note

-freeze. Ordinary water may cause engine rust or cracks in winter due to freezing.
-Park the vehicle on level ground for checking of the coolant.
Inclined vehicle body will cause incorrect judging of the coolant level.
-Check the coolant after the engine is warmed up.
Start and warm up engine.
Stop the engine.
Remove left side panel (2-6)
Check if the coolant level is between the upper and lower limit.



When the coolant level is below the LOWER limit, remove reservoir tank cap and add coolant till upper limit.
(Add coolant or diluted original liquid).
Recommended coolant: CFMOTO coolant
Standard density: 50%
(Freezing temperature of coolant varies according to the different mixture ratio. Adjust the mixture ratio according to the lowest temperature in the place where the vehicle is used.)
If the coolant reduces very fast, check if there is any leakage.
The cooling system may be mixed with air when there is no
coolant in the reservoir tank and the air should be discharged
before adding coolant.



Coolant Leakage

Check radiator hose, water pump, water pipes and joints for leakage.
In case of any leakage, disassemble and do further check.
(Refer to Chapter 4)

Check the radiator hose for aging, damages or cracks.

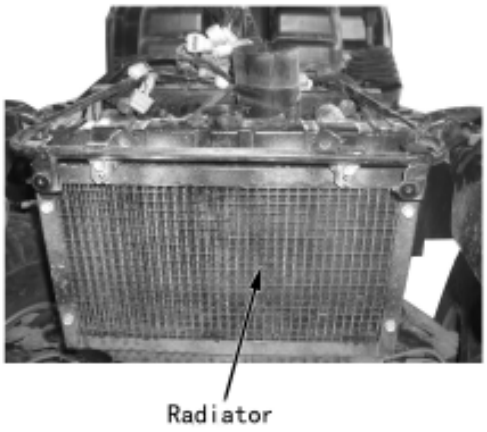
The rubber hose will naturally get aged after a period of service time. The aged hose may get cracked when the cooling system is heated. Nip the hose with fingers and check if there are any tiny cracks.

In case of any abnormal, replace with a new hose.

Check the clamps of the coolant pipes and hose. Tighten properly in case of any looseness.

Check radiator fins for mud and dust clog or damage.

Correct the bent fins; clean the mud with water and compressed air. When the damaged area of the radiator fin is over 20%, replace with a new radiator.



Inspection of Cooling System

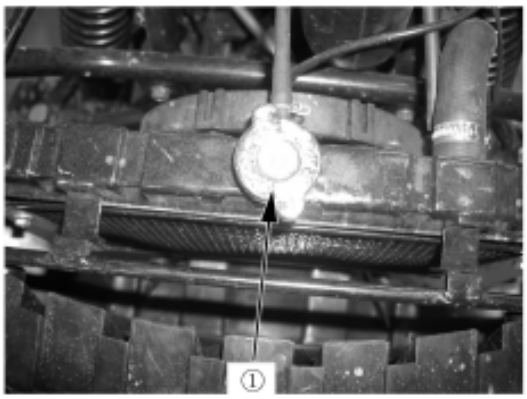
Check initially at 50 hours or 500km, replace coolant every 2 years.

Check radiator, reservoir tank and water hoses.

Leakage or Damage: Replace

Check coolant level by observing the upper and the lower limit on the reservoir tank.

If the level is below lower limit, fill coolant until the level reaches the upper limit.

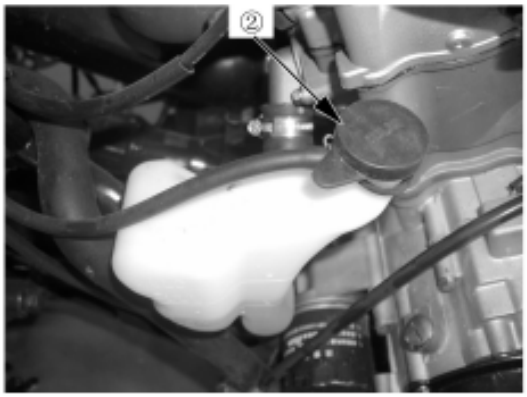


Replacing Coolant

-Remove radiator cap1 and reservoir tank cap2.

-Place a pan below water pump, and drain coolant by removing drain plug3 and water hose4.

-Drain coolant from reservoir tank.

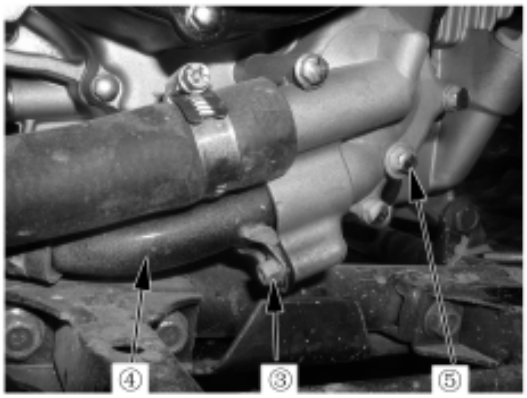


Warning !

-Do not open radiator cap when engine is hot, you may be injured by escaping hot liquid or vapor.

-Engine coolant is harmful. If coolant splashes in your eyes or clothes, thoroughly wash it away with water and consult a doctor. If coolant is swallowed, induce vomiting and get immediate medical attention.

-Keep coolant away from reach of children



-Clean radiator with fresh water, if necessary.

-Connect water hose4 and tighten drain bolt3 securely.

-Fill the specified coolant into the radiator.

-Loosen bleed bolt5 on water pump, when coolant flow from bleed bolt, tighten the bolt. Install radiator cap 1securely after filling coolant.

-Start the engine and keep it running for several minutes. After warm up and cooling down the engine, open radiator cap and check coolant. Fill the specified coolant until the level is between the upper and lower lines on the reservoir tank.

Caution:

Repeat the above procedures several times and make sure the radiator is filled with coolant and air is discharged.

Inspection of Cooling System

Check Water Temperature Gauge

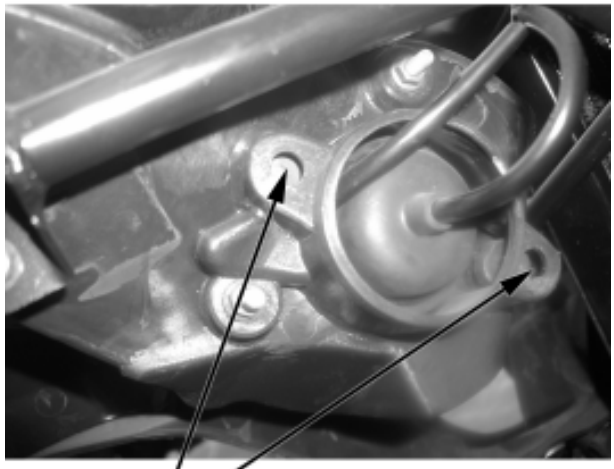
When engine is not working, the water temperature should be in the “0” position. Start the engine to check if the indicator works. If the indicator is not working, do the maintenance in time.

Instrument Water temperature Gauge

Lighting System

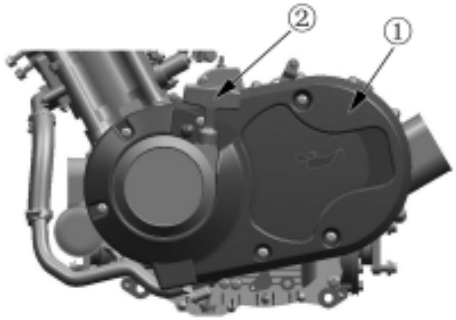
Adjusting headlight light beam

Turn the headlight beam adjusting screw with a cross screwdriver and adjust the high/low beam to meet the requirement.

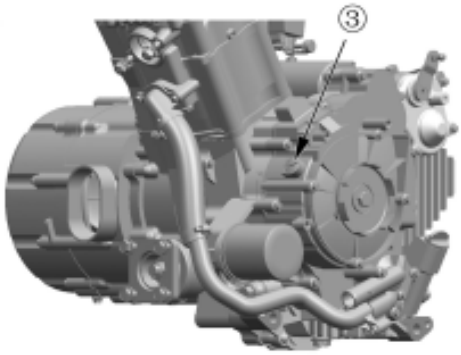


Headlight Beam Adjusting Screw

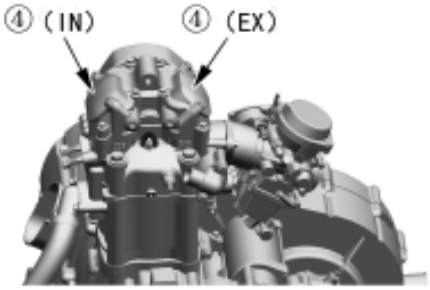
VALVE CLEARANCE



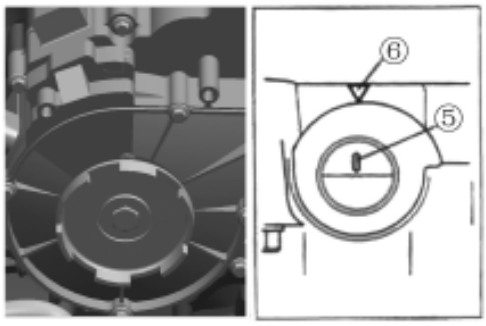
Inspect initially at 20-hour break-in and every 100 hours or every 1000km thereafter. Inspect the clearance after removing cylinder head.



Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power.
Check the valve clearance at the period indicated above and adjust the valve clearance to specification, if necessary.
-Remove cover plate1, recoil starter2
-Remove inspection cap 3on left crankcase.
-Remove 2 valve adjusting cover 4
-Turn the crankshaft until the line5 of T.D.C. on rotor is aligned with mark6of inspection hole on left crankcase.
-Insert feeler gauge to check the clearance between the valve stem end and the adjust bolt on the rocker arm.
Valve Clearance (When cold)
IN: 0.05-0.10mm EX: 0.17-0.22mm



Note:
-The valve clearance must be adjusted when the engine is cold.
-Adjust the valve clearance when the piston is at the Top Dead Center (T.D.C.) on the compression stroke.



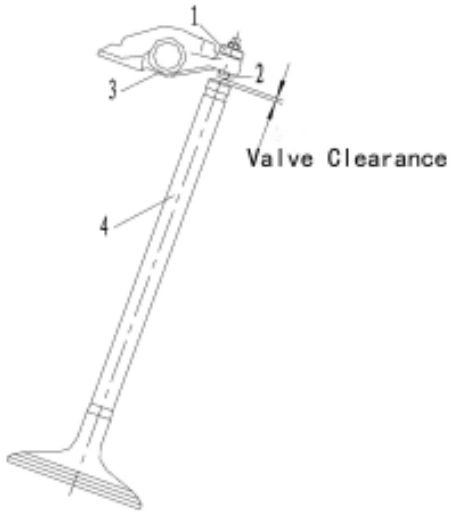
If the clearance is incorrect, bring it into the specified range using the special tool.

Loosen valve adjust bolt and nut, insert a feeler gauge (IN: 0.1mm, EX:0.2mm）between the valve stem end and valve adjusting bolt, tighten valve adjust bolt, make sure it slightly contacts the feeler gauge, tighten bolt and nut.

Take out the feeler gauge, measure the clearance.
If the clearance is incorrect, repeat the above steps until the proper clearance is obtained.
Locknut: 10 N.m

Caution:

Securely tighten the locknut after completing adjustment



1. Nut; 2. Valve Adjust Screw;
3. Rocker Arm; 4. Valve

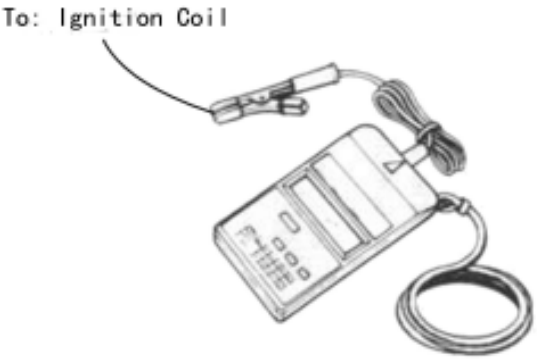
Install:
2 valve adjusting cover;
Inspection cap;
Recoil starter;
Cover plate;
Apply a small quantity of THREAD LOCKER to recoil starter fixing bolts.

Tools:

Valve adjuster
Feeler gauge
Material:
Thread Locker

ENGINE IDLE SPEED

Inspect initially at 20 hours run-in and every 50 hours or 500km thereafter.
Start the engine and warm it up for several minutes, measure engine speed with a tachometer. Set the engine idle speed between 1200~1400 r/min by turning the throttle stop screw of carburetor.
Engine idle speed: 1300r/min¡À100r/min
Note:
Make this adjustment when the engine is hot
Tool: Tachometer



SPARK PLUG

Inspect initially at 20 hours run-in and every 100 hours or 1000km thereafter. Replace every 6000km.
Remove the spark plug with a special tool
Specification: DER7EA-9(NGK)

If the electrode is extremely worn or burnt, or spark plug has a broken insulator, damaged thread, etc, replace the spark plug with a new one.

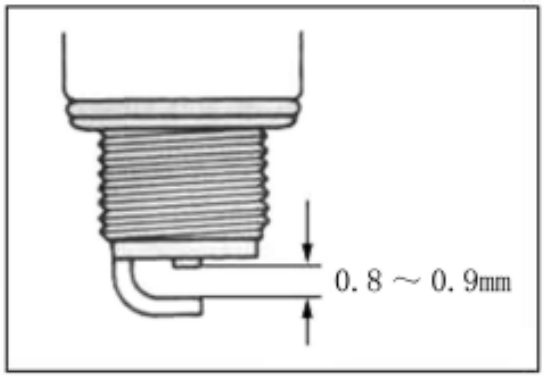
In case of carbon deposit, clean with a proper tool.

SPARK PLUG GAP

Measure the spark plug gap with a feeler gauge.

Out of specification: ¡ú Adjust

Spark plug gap: 0.8-0.9mm



Caution:

Check the thread size and reach when replacing the spark plug. If the reach is too short, carbon will be deposited on the screw portion of the spark plug hole and engine damage may result.

Installation:

Caution:

To avoid damaging the cylinder head threads; first, tighten the spark plug with fingers, and then tighten it to the specified torque using the spark plug wrench.

Tightening Torque: 18 N.m

Tool: Spark Plug Wrench, Feeler Gauge

Air Filter

Inspect every 50 hours or 500 km, clean it every 1000km if necessary.

If the air cleaner is clogged with dust, intake resistance will be increased, with a resultant decrease in power output and an increase in fuel consumption.

Check and clean the air filter as following:

Remove fixing clamp1 and top cover2

Note:

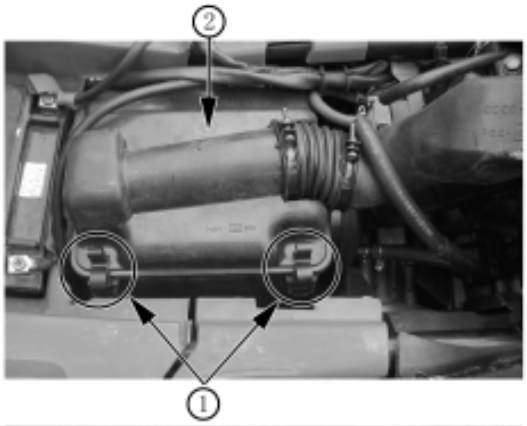
Be careful not to drop the o-ring into the air filter box that is attached to the air filter top cover.

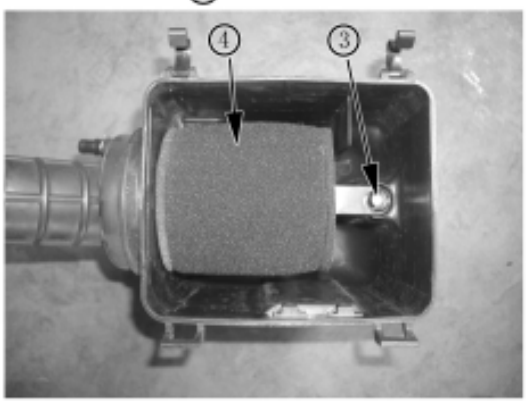
Loosen screw3, remove filter element4, separate support5, filter element6 and filter element seat7.

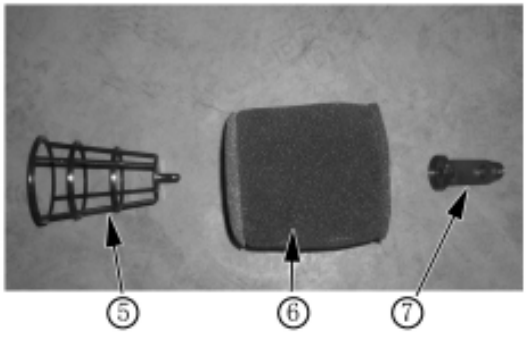
-Fill a wash pan of a proper size with a non-flammable cleaning solvent A. Immerse the filter element in cleaning solvent and wash it.

-Press the filter element between the palms of both hands to remove the excess solvent. Do not twist or wring the element or it will tear.

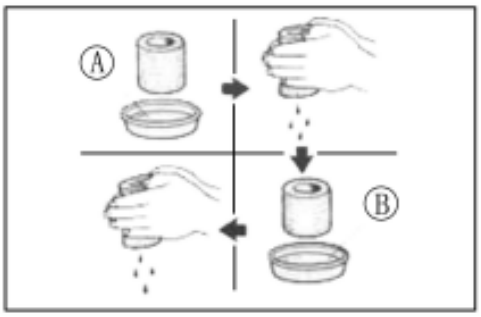
-Immerse the element in engine oil B, and then squeeze out the excess oil leaving the element slightly wet.





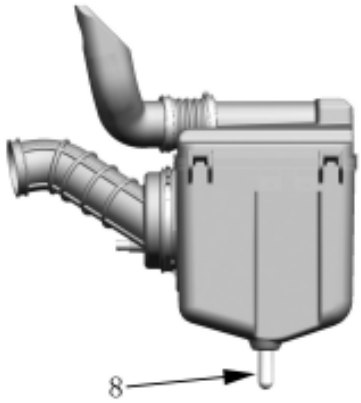


A-Non-flammable cleaning solvent
B-Engine oil SAE#30 or SAE15W/40.
Never use with gasoline or low flash point solvents to clean the filter element



Inspect the filter element for tears.
torn element must be replaced.

Note:
The surest way to accelerate engine wear is to operate the engine without the element or with torn element. Make sure that the air filter element is in good condition at all times.
If driving under dusty conditions, clean the air filter element more frequently.



Remove the drain plug8 of air box to drain out any water.

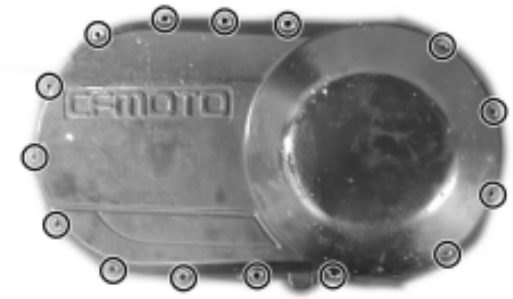
Fuel Hose

Inspect every 100 hours or 1000 km,
replace every 4 years.
Inspect the fuel hose for damage and fuel leakage.
If any damages are found, replace the fuel hose with a new one.

Drive Belt

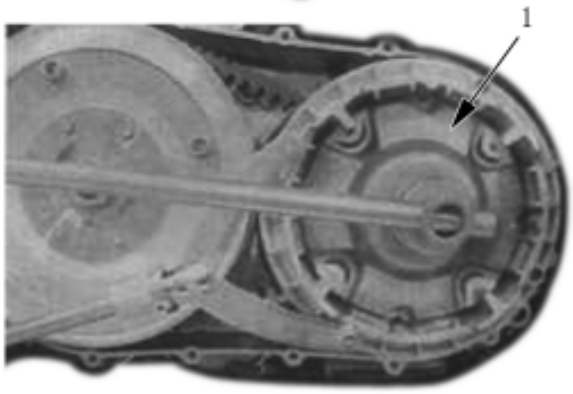
Removal:

Remove CVT cover



Hold the primary sheave with special tool and loosen primary sheave nut.

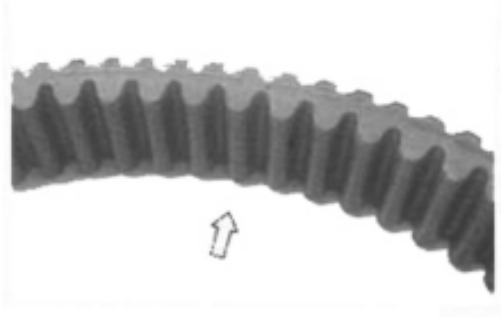
Special Tool: Rotor Holder



Remove primary sliding sheave 1;
Hold the secondary sheave with special tool and loosen secondary sheave nut.
Remove secondary sheave together with drive belt.

Special Tool: Rotor Holder

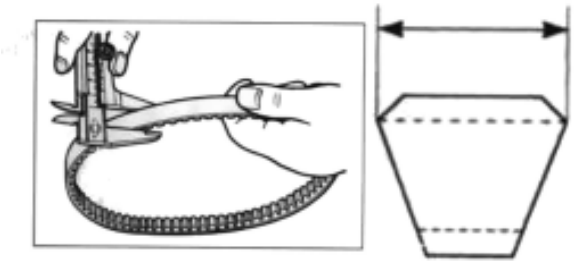
Inspection:



Inspect drive belt for wear and damage.
If any cracks or damages are found,
replace drive belt with a new one.

Inspect drive belt for width, if width is
out of service limit, replace drive belt with a new one.
Service Limit: 33.5mm
Tool: Vernier Caliper

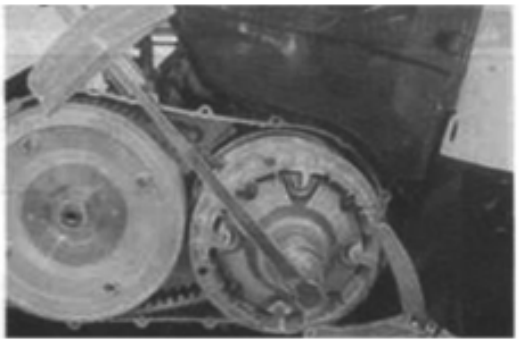
Installation



Reverse the removal procedure for installation.
Pay attention to the following:
Insert drive belt, as low as possible,
between secondary sliding sheave and primary
fixed sheave.
Hold secondary sheave with a special tool and
tighten the nut to the specified torque.
Nut, Secondary Sheave: 115 N.m

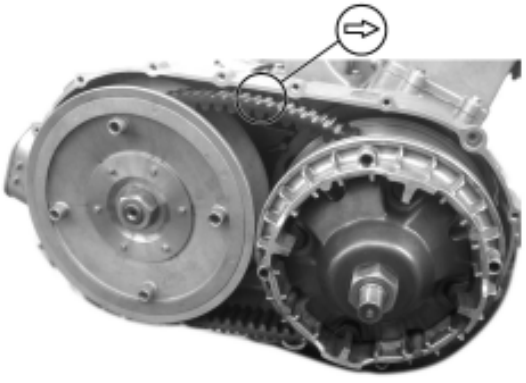
Install primary sheave and nut. Hold the primary
sheave with a special tool and tighten the nut
to the specified torque.
Nut, Primary Sheave:115N.m

Turn primary sheave, until the drive belt is
properly seated and both the primary and
secondary sheaves rotate together smoothly
and without slipping.



Caution:

-Fit the drive belt with the arrow on the drive
belt points toward normal turning direction.
-The drive belt contact surface of the driven
face should be thoroughly cleaned.

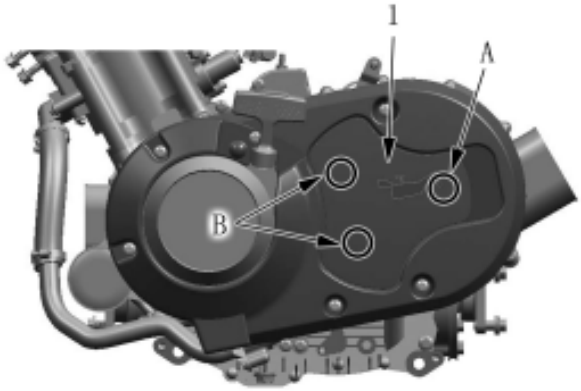


Install CVT cover

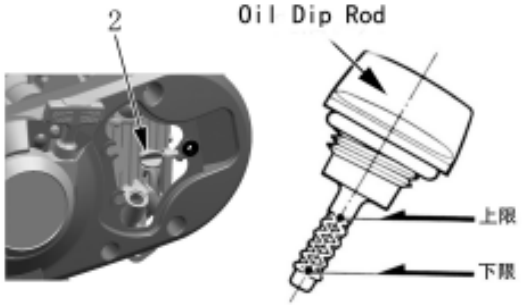
Inspection of Lubrication System

Replace engine oil and oil filter initially at 20 hours or 250km and every 100 hours or 1000km thereafter.
Inspect the engine oil at every 10 hours.

Check Engine Oil Level



-Keep the engine in a plan position.
-Remove the fixture A, fixture B, then remove the left side cover 1.
-Remove oil dip rod 2
-Clean oil dip rod, insert oil dip rod but do not tighten it.
-Take out oil dip rod and check if oil is between upper and lower limit.
-If the engine oil is insufficient, fill more oil until the sufficient oil is obtained.
Engine Oil: SAE15W/40 classification SF or SG

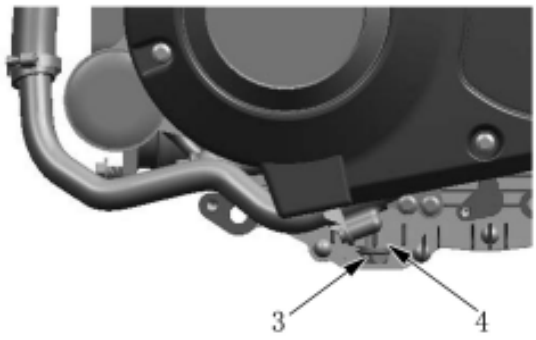


Note:

-Keep the engine in a plan position
-Do not tighten oil dip rod when measuring oil level

Replacing Engine Oil

-Remove left side cover 1, oil dip rod 2, drain bolt 3 and washer 4.
-Drain out the engine oil while the engine is still warm.
-Clean oil dip rod, drain bolt and washer with solvent.
-Install washer and drain bolt.



Drain Bolt: 30 N.m

-Fill engine oil. (about 1900ml)

-Install oil dip rod, start the engine and allow it to run for several minutes at idling speed.
-Turn off the engine and wait for about 3 minutes, and then check the oil level on the dipstick.
Caution:
The engine oil should be changed when the engine is warm. If the oil filter should be replaced, replace engine oil at the same time.

Replacing Oil Filter

-Remove relative parts (see Replacing Engine Oil)
-Remove oil filter1 with the special tool
-Install washer and drain bolt
-Install new oil filter with the special tool
-Fill engine oil (about 2000ml) and check (see Replacing Engine Oil)

Tool: Oil Filter Wrench

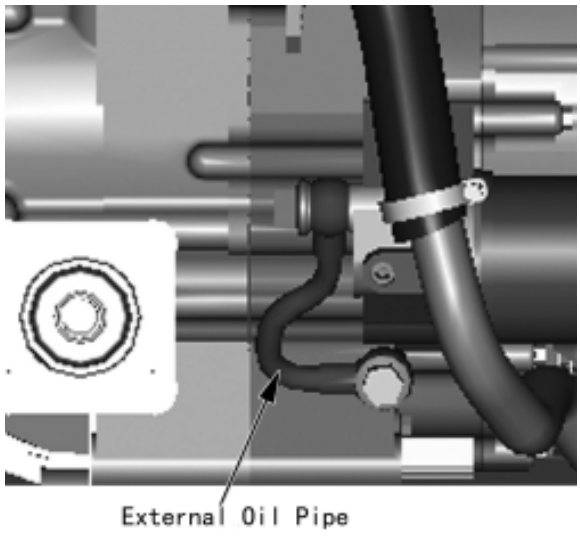
Engine Oil Capacity

When replacing oil: 1.9L
When replacing oil filer: 2.0 L
Engine overhaul:2.2 L

Inspection of External Oil Pipe

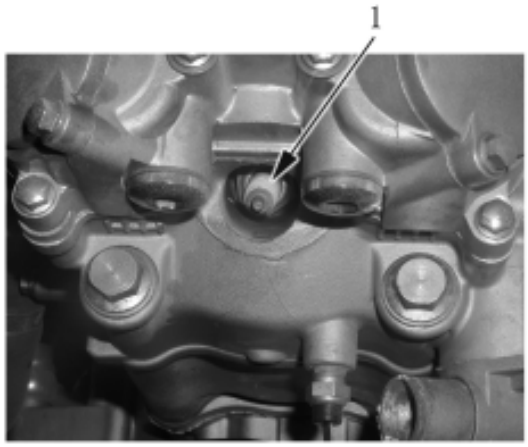
Check external oil pipe for leakage or damage.

Leakage or Damage: Replace



Inspection of cylinder pressure

Check cylinder pressure is necessary.
Cylinder Pressure: 1000kpa

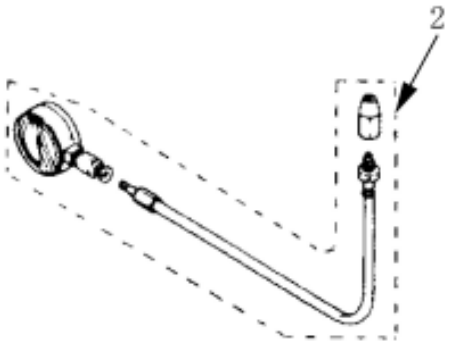


A lower cylinder pressure may be caused by:
-Excessive wear of cylinder;
-Wear of piston or piston ring;
-Piston ring jam in groove;
-Poor closure of valve seat;
-Damaged cylinder gasket or other defects

Note: When cylinder pressure too low, check the above items.

Testing Cylinder Pressure

Note: Before testing of cylinder pressure, make sure that cylinder head bolts are tightened to the specified torque and valve clearance has been properly adjusted.



-Warm up the engine before testing;
-Make sure battery is fully charged;
-Remove spark plug 1;
-Install cylinder pressure gauge 2 in spark plug hole and tighten nut;
-Keep throttle full open;
-Press start button crank the engine a few seconds.
Record the maximum reading of cylinder pressure.
Tools: Cylinder Pressure Gauge
Adaptor

Inspection of Oil Pressure

Oil Pressure: 130~170kpa at 3000r/min

Lower or higher oil pressure may be caused by:

I Oil pressure is too low

-Clogged oil filter;

-Leakage from oil passage;

-Damaged O-ring;

-Oil pump failure;

-Combination of above items;

II Oil pressure is too high

-Oil viscosity is too high;

-Clogged oil passage;

-Combination of above items;

Testing Oil Pressure

-Remove bolt1;

-Connect tachometer2with ignition coil

-Install oil pressure gauge3 and joint seat to main oil gallery.

-Warm up engine as per following:

Summer: 10 minutes at 2000r/min

Winter: 20 minutes at 2000r/min

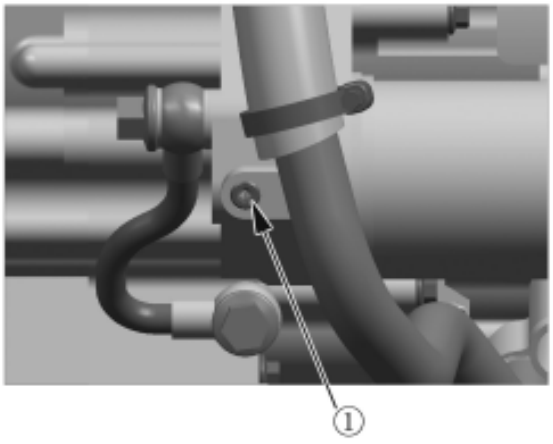
After warming up, increase engine speed to 3000r/min, and record readings of oil pressure gauge.

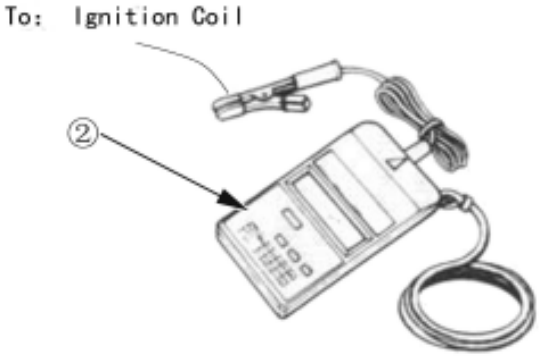
-After testing, apply thread locker to the thread in the hole of main oil channel. Install bolt and tighten to the specified torque.

Tighten torque:23N.m

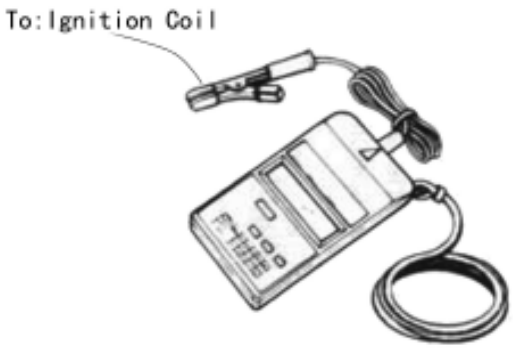
Tools:Oil pressure gauge

Tachometer





Inspection of Clutch Engagement and Lock-up



CF188 engine is equipped with a centrifugal type automatic clutch.
Before checking the initial engagement and clutch lock-up two inspection checks must be performed to thoroughly check the operation of the drive train.

I Initial Engagement Inspection
-Connect tachometer to ignition coil
-Start engine
-Shift gear lever to ¡°High¡± position
-Slowly increase throttle and note down the engine speed (r/min) when the vehicle starts to move forward.
Engagement speed:1800r/min¡«2400r/min
If the engagement speed is out of the above range, check the following:
-Clutch shoes
-Clutch shoe wheel
-Primary and secondary sheave
Refer to Chapter 12 for inspection of clutch

II Clutch Lock-up Inspection
-Connect the tachometer to ignition coil;
-Start the engine;
-Shift gear lever to “Hi”position;
-Apply front and rear brakes as firmly as possible;
-Fully open the throttle for a brief period and note the maximum engine speed obtained during the test cycle.
Lock-up Speed: 3300r/min¡«3900r/min
Warning:
Do not apply full power for more than 5 seconds or damage to clutch or engine may occur.
If the lock-up speed is out of the above range, check the following:
-Clutch shoes
-Clutch wheel
-Primary and secondary sheave
Refer to Chapter 12 for inspection of clutch

Tool: Tachometer

Overhaul Info

Caution:

.If the radiator cap is opened when the coolant temperature is above 100degrees(C),the pressure of coolant temperature will go down and get boiled rapidly. The steam jet may cause danger and injury. Cover the cap with a piece of cloth after the coolant temperature goes down and open the cap.

.Inspection of coolant should be done after the coolant is fully cooled.

.Coolant is poisonous. Do not drink or splash it to skin,eye or cloth.

-If coolant splashes in eyes, throughly wash your eyes with water and consult a docter.

-If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.

-If coolant is swallowed, voimt immediately and see a physician.

-Store the coolant properly and keep it away from reach of the children.

.Check radiator fins for mud block and/or damage. Correct the bent fins. Clean off the mud with water and compressed air. Replace with a new one, if the damaged fin area reached 20%

.The overhauling of the water pump can done without removing the engine.

.Coolant filling is carried through reservoir tank. Do not open the radiator cap except when disassembling the cooling system for filling or drainage of coolant.

.Don't stain the painting parts with coolant. In case of any coolant stains, flush with water immediately.

.After disassembly of the cooling system, check the joints for leakage with a radiator cap tester(available in the market).

.Refer to Chapter 10 for overhauling of temperature transducer¡£

Inspection standard

Item		Standard
Coolant capacity	Full capacity	1140ml
	Reservoir tank	300ml
	Standard density	50%
Opening pressure of radiator cap		108kpa(1.1kgf/cm²)
Thermostat	Valve open temperature	71±3degrees（c）
	Full open lift	under 95 degrees（c），3.5—4.5mm

Tightening torque:

Drainage bolt,water pump: 8N.m(0.8kgf.m)

Water pump impeller: 10N.m(1.0kgf.m)

Trouble shooting

Water temperature rises too fast

- Improper radiator cap
- Air in the cooling system pipe
- Malfunction of water pump
- Malfunction of thermostat£¨thermostat is not open£©
- Clogged of radiator pipe of cooling pipe
- Damaged or clogged radiator fins
- Coolant is not enough
- Faulty or malfunction of fan motor

No rise or slow rise of water temperature

- Malfunction of thermostat(thermostat isn't closed)
- Faulty circuit of water temperature display

Water leakage

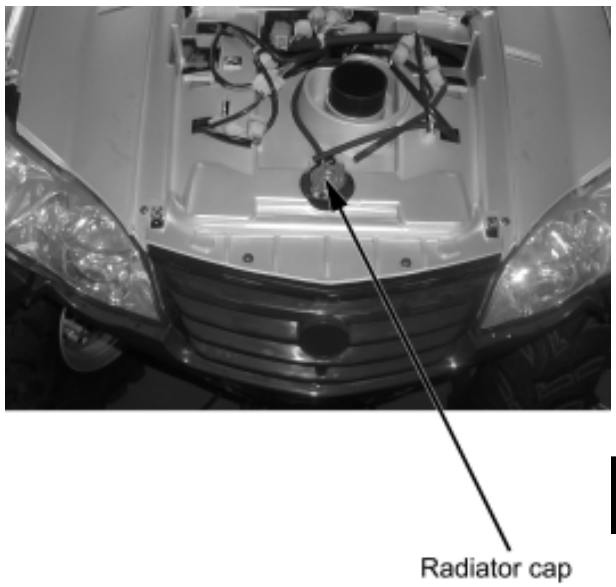
- Poor water seal
- O-rings are aged, damaged or improperly sealed
- Washers are aged, damaged or improperly sealed
- Improper installation of pipes
- Pipes are aged, damaged or improperly sealed.

Performance Overhaul

Inspection of coolant density

Caution:
Be sure to open the radiator cap after coolant is cooled.

Remove:
Front top cover(2-4)
Radiator cap(counter clockwise)



Check with a densimeter if the density of coolant fits the temperature of using place;
Check coolant for stains

Inspection of the radiator cap

Caution
Be sure to open the radiator cap after coolant is cooled

Remove:
-Front top cover(2-4)
-Radiator cap(4-3)

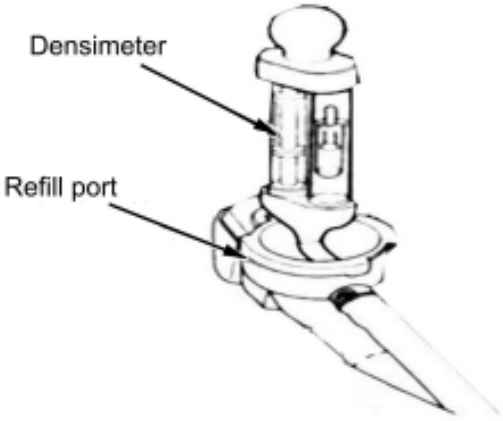
Caution

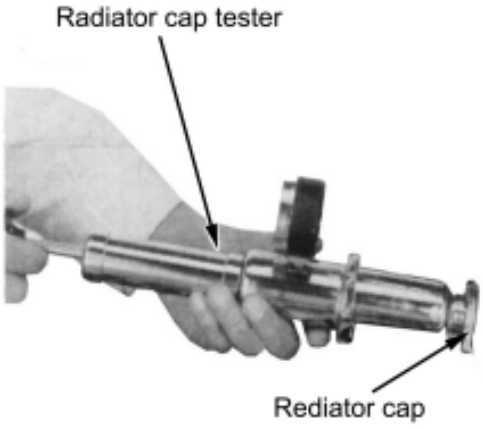
Apply water on the sealing surface of radiator cap, when attaching the tester to the radiator cap

Apply the specified pressure(radiator cap opening pressure) for 6 seconds and make sure there is no pressure drop.

Opening pressure of radiator cap:

108kPa(1.1 kgf/cm²)





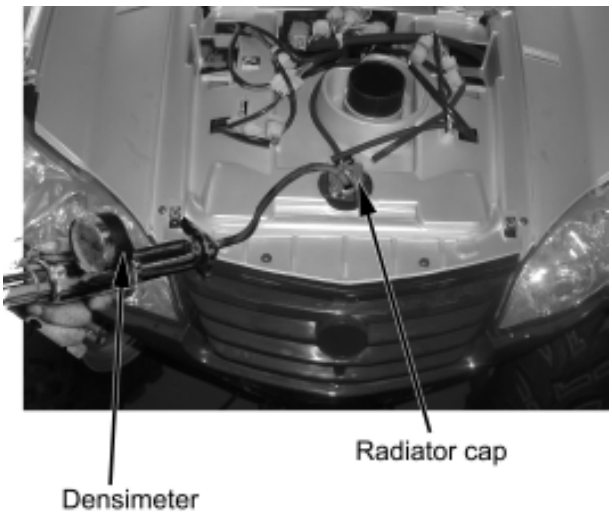
Pressure testing of cooling system

Apply the specified pressure(radiator cap opening pressure) for 6 seconds and make sure that there is drop in pressure

Caution

Do not apply pressure over the specified pressure [108kPa(1.1 kgf/cm^2)],or the cooling system may be damaged.

In case there is any pressure leakage,check the pipe, joint parts,joints of water pump and drainage(4-5)



Replacing Coolant,Air Discharge

Preparation of coolant

Caution:

Coolant is poisonous,DO NOT drink ot splash it to skin,eyes and clothes

-If coolant splashed in your eyes,throughly wash your eyes with water and consult a doctor

-If coolant splashed on your clothes,quickly wash it away with water then with soap and water

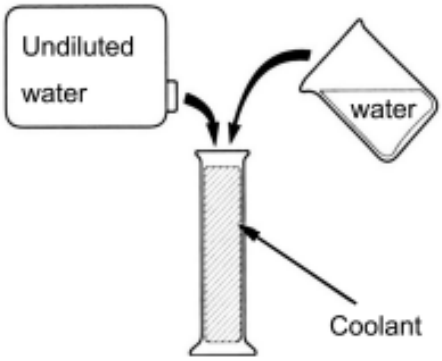
-If coolant is swallowed,induce vomit immediately and see a physician

-Store the coolant properly and keep it away from reach of children

Caution:

Mix the coolant(undiluted) with soft water according to the temperature 5¡æ lower than the actual lowest temperature in the operation area.

Coolant should be made from undiluted coolant with soft water.



Standard density of coolant: 50%

Recommended coolant: CFMOTO coolant (Direct application without having to be diluted)

Drainage of coolant

Remove the radiator cap

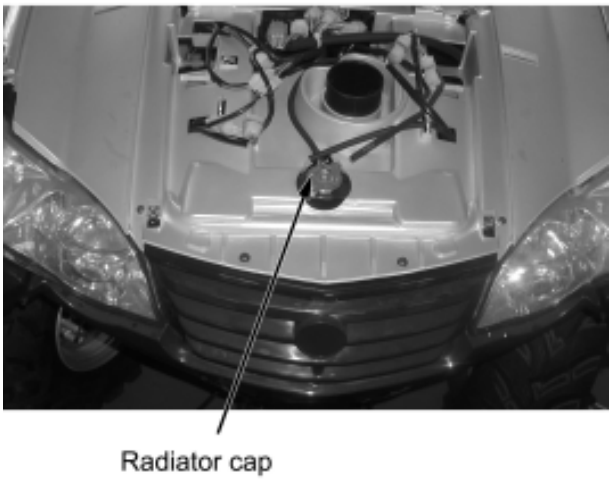
Caution

Open the radiator cap after the coolant is cooled down.

Remove:

-Front top cover(2-8)

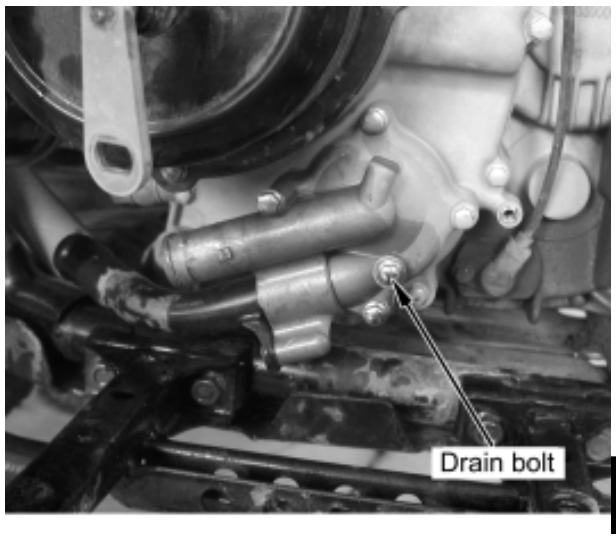
-Radiator Cap(4-3)



Remove drain bolt

Remove drain bolt, seal gasket from water pump, drain coolant.

After drainage, assemble new seal gasket and drain bolt and tighten.



Reservoir Tank

Remove:

-Seat(2-3)

-Left Side Cover(2-6)

-Two bolts of reservoir tank

-Water hoses of reservoir tank

Remove reservoir tank

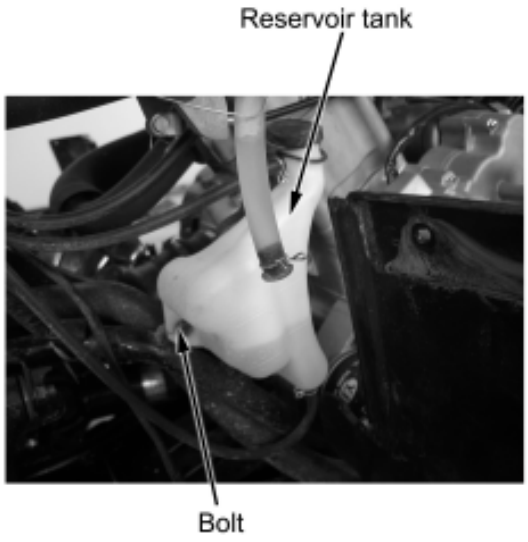
Drain collant of reservoir tank

Wash clean the reservoir tank

Install:

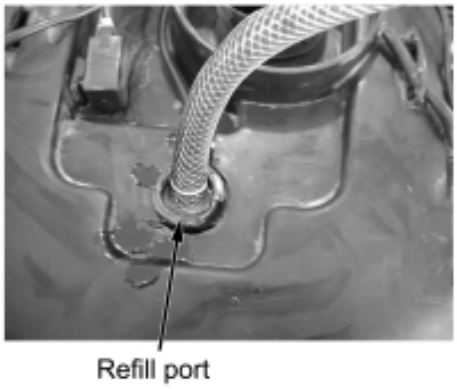
-reservoir tank

-water hoses of reservoir tank



Adding Coolant

Add coolant through filling port



Start the engine and discharge air from cooling system. Check from filling port that air is fully discharge from cooling system and install the radiator cap

Remove reservoir tanl cap and add doolant till the upper limit

Caution:

Chen coolant level when the vehicle is on an even ground

Discharge

Discharge the air from cooling system according to the following steps:

1.Remove drain bolt(4-5),discharge air and install it

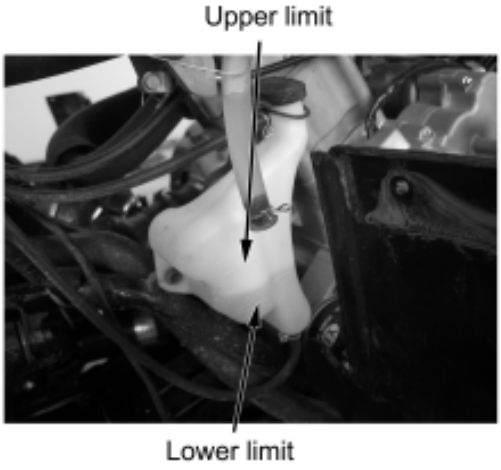
2.Start the engine and run it several minutes at idle speed

3.Quickly increase throttle 3~4 times to discharge air from cooling system

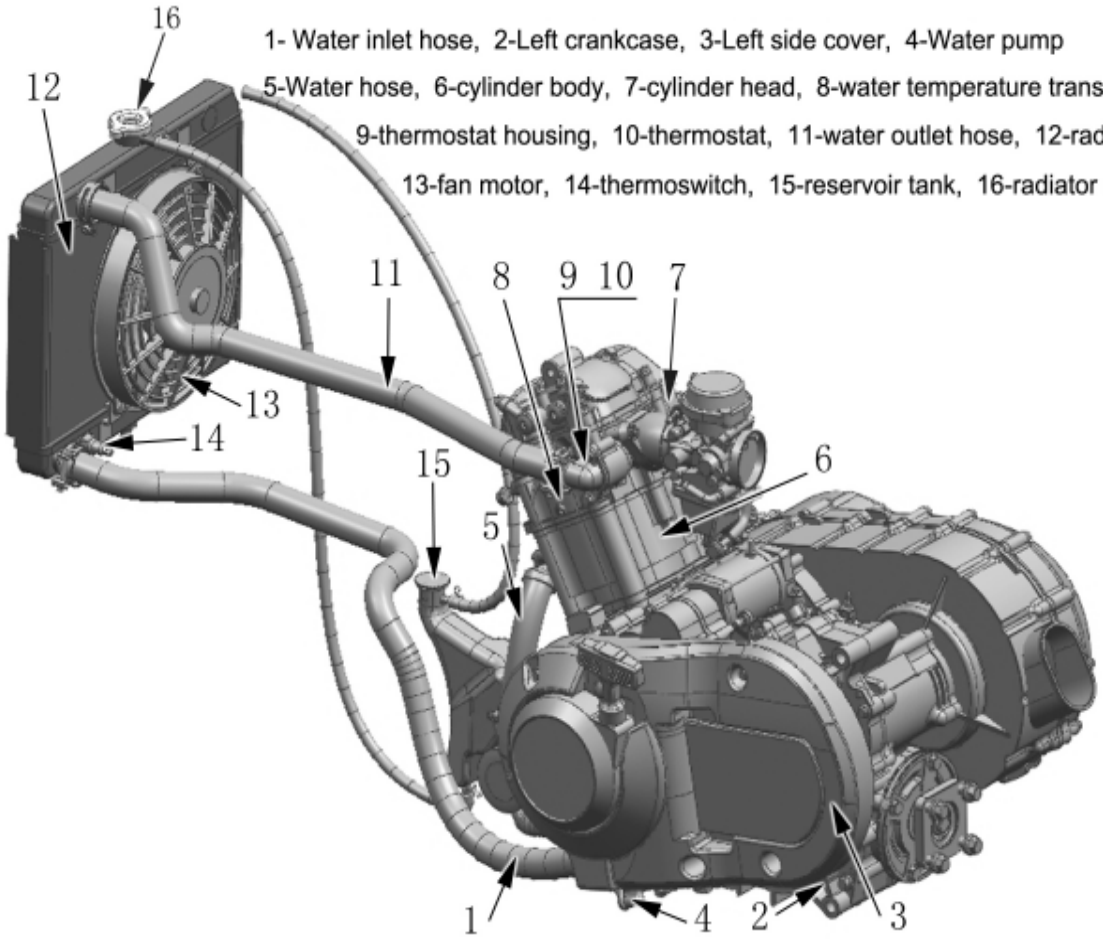
4.Add coolant till filling port

5.Repeat step 2&3 till no more coolant can be refilled

6.Check coolant level in reservoir tank and refill till upper limit,install reservoir tank cap



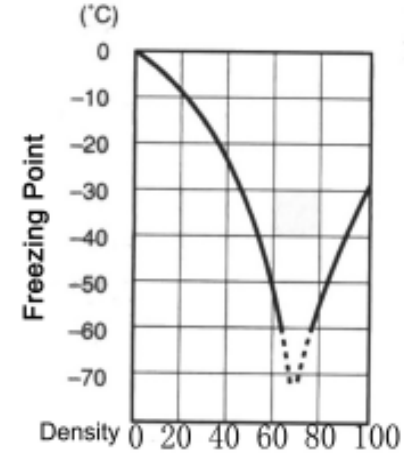
Cooling System Chart

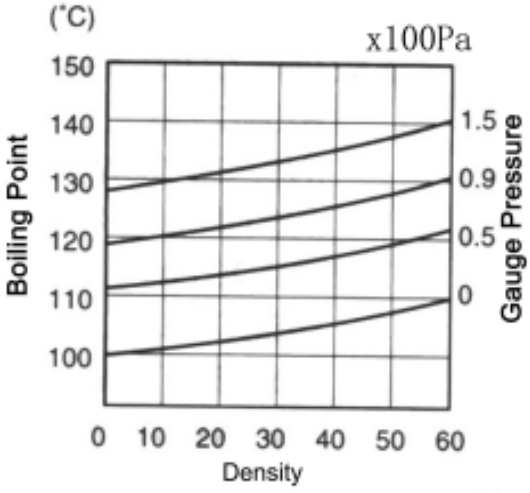


Engine Coolant

The cooling used in cooling system is mixture of 50% distilled water and 50% ethylene glycol antifreeze. This 50:50 mixture provides the optimized corrosion resistaance and fine heat protection.The coolant will protect the cooling system from freezing at temperature above -30degrees (C) ,the mixing ratio of coolant should be increased to 55% or 60% according to the figure on the right.

Anti-Freeze Density	Freezing Point
50%	-30℃
55%	-40℃
60%	-55℃





Note:

- Use high quality ethylene glycol base antifreeze and mixed with distilled water.Never mix alcohol base antifreeze and different brands of antifreeze
- Theratio of antifreeze should not be more than 60% or less than 50%
- Do not use anti-leak additive

Warning!

- DO NOT open radiator cap when the engine is still hot.Or you may be injured by scalding fluid or steam;
- Coolant is harmful.DO NOT swallow or stain your skin or eyes with coolant.In case of accidental swallow or stain,flush with plenty of water and consult the doctor immediately;
- Keep coolant away from reach of children

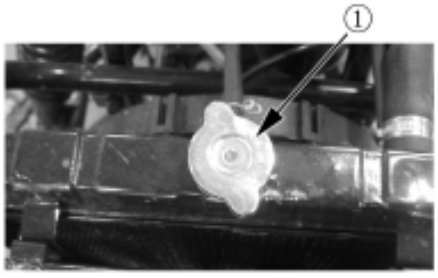
Inspection of Cooling Circuit

- Remove radiator cap1and connect tester2 filler

Warning!

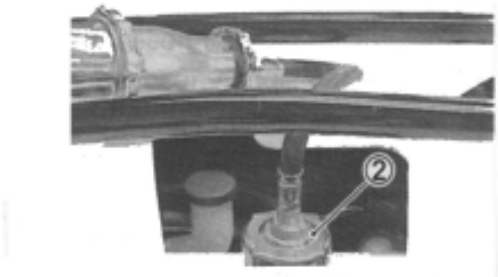
DOT NOT open the radiator when the engine is still hot

- Give a pressure of 105kPa and check if the cooling system can hold this pressure for 10 seconds.
- If the pressure drops during 10 seconds,it indicates that there is leaakage with the cooling system.In this case,check the complete system and replace the leaking parts or components.



Warning!

- When removing the radiator cap tester,put a rag on the filler to prevent splash of coolant
- DO NOT allow a pressure to exceed the radiator cap release pressure

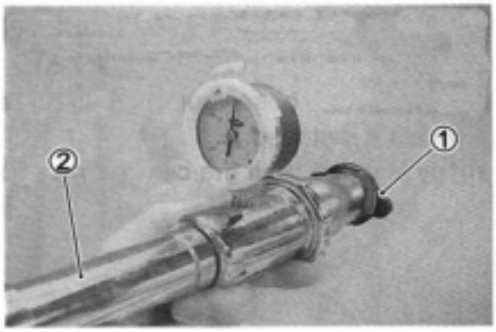


Inspection and Cleaning of Radiator and Water Hoses

Radiator Cap

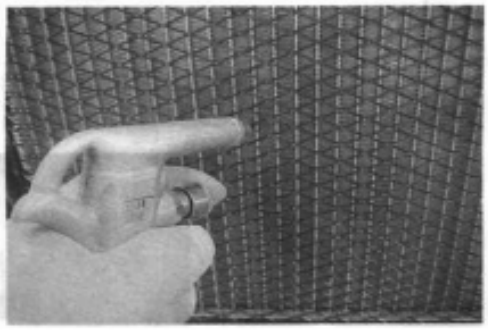
●Remove radiator cap1

●Install radiator cap to cap tester2

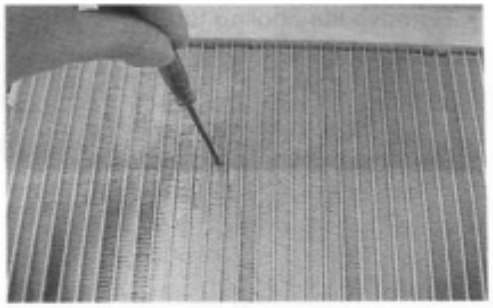


●Slowly increase pressure to 108kPa and check if the cap hold the pressure for at least 10 seconds

●If the cap can not meet the pressure requirement, repalce it



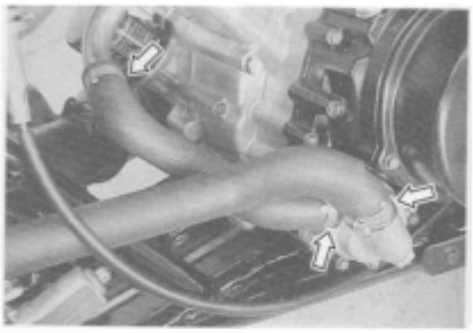
Radiator Cap Valve Opening Pressure:
Standard:108kPa
Tool:Radiator Cap Tester



Radiator Inspection and Cleaning

●Remove dirt or trash from radiator with compressed air

●Correct the radiator fins with a small screwdriver

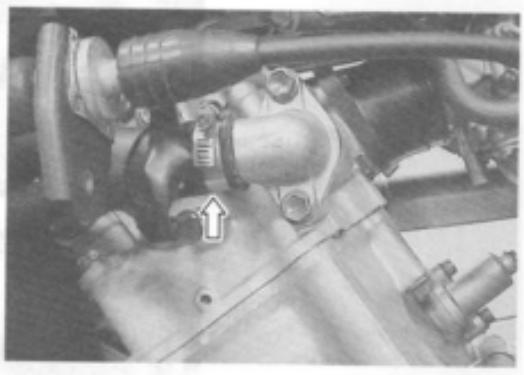


Radiator Hose Inspection

●Check radiator hoses leakage or damage.If the hoses are leakaged and damaged,replace them

●Check tightening of clamps.Replace the clamps if necessary

●After inspection and cleaning of radiator and hoses, check coolant level.Fill coolant if necessary



Inspection of Fan Motor

●Remove fan motor from radiator

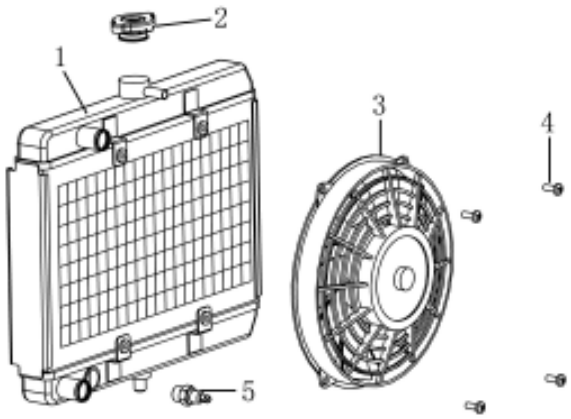
●Turn the vanes and check if they can turn smoothly

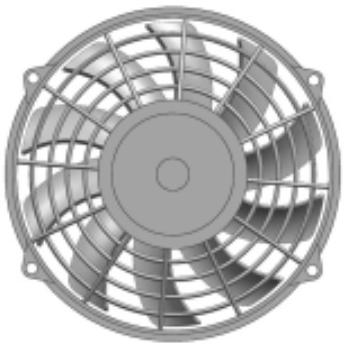
●Check fan motor.Make sure that the battery applies 12 volts to the motor and the motor will run at full speed while the ammeter will indicate the ampere not more than 5A.
If the motor does not work or the ampere exceeds the limit,replace the motor

●Installation:Apply a little thread locker to the bolts and tighten to the specified torque.

Fan Motor Bolt Tightening Torque:10N.m

1-Radiator; 2-Radiator cap
3-Fan Motor; 4-Mounting Bolt,Fan Motor;
5-Thermoswitch



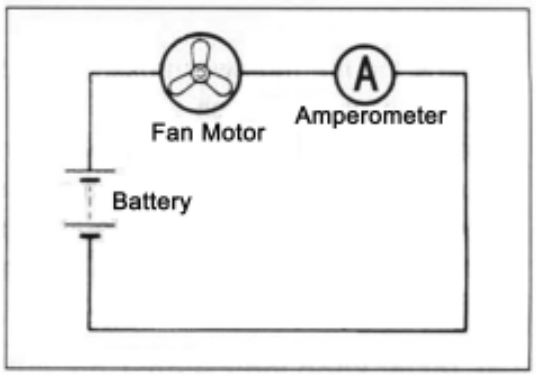


Inspection of Thermoswitch

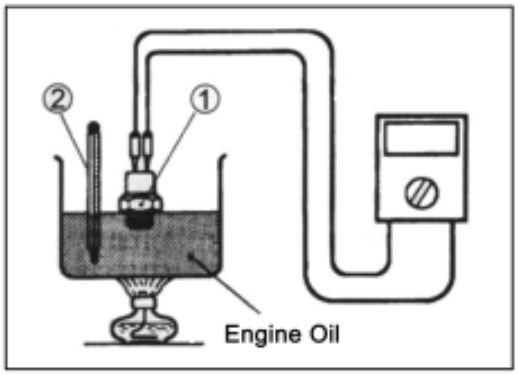
●Remove thermoswitch

●Check the thermoswitch for closing or opening by testing it at the bench as illustrated. Connect the thermoswitch1to the circuit tester,place it in a vessel with engine oil. Place the vessel above a stove.

●Heat the oil to raise the temperature slowly and take the reading from thermostat 2 when the thermoswitch closes and opens.



Tool:ammeter
Thermoswitch Operating Temperature:
Standard:(OFF-ON):Approx.88 degrees(C)
(ON-OFF):Approx.82degrees(C)



Note:

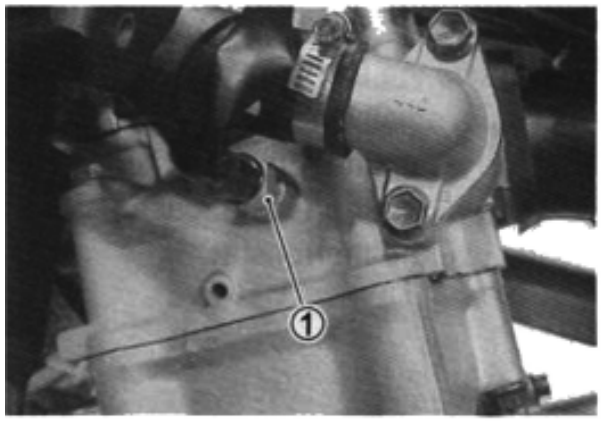
●Avoid sharp impact on thermoswitch

●Avoid contact of thermoswitch with thermometer or vessel

● Installation:Use a new O-ring3 and tighten the thermoswitch to the specified torque:
Thermoswitch Tightening Tirque:17N.m

●Check coolant level after installation of thermoswitch. Fill coolant if necessary.

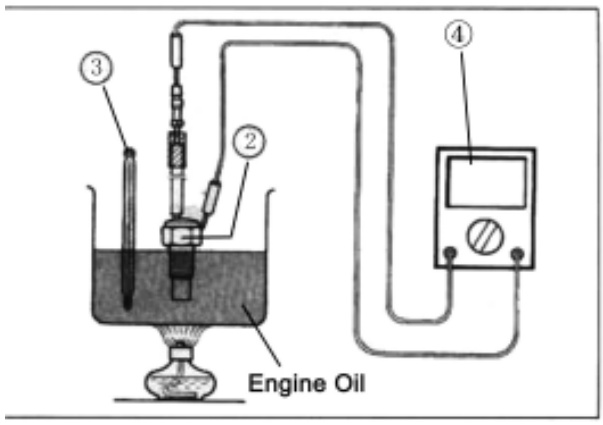
Inspection of Water Temperature Sensor



●Plcae a rag under water temperature sensor1 and remove it from cyclinder head

●Check the resistance of water temperature sensor as illustrated on theright. Connect the temperature sensor2 to the circuit tester,place it in a vessel with engine oil.Place the vessel above a stove.

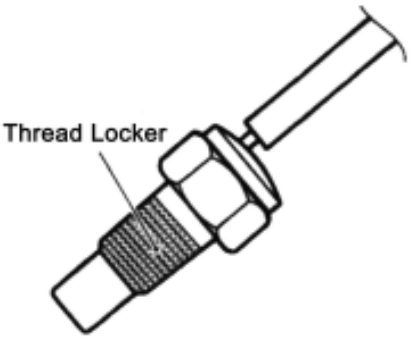
Tool: ohmmeter, thermometer



●Heat the oil to raise the temperature slowly and take the reading from ohmmeter4 and thermometer3.

Water Temperature and Resistance

Temperature (℃)	50	80	100	120
Resistance (Ω)	154±16	52±4	27±3	16±2



●Installation:Apply a little thread locker and install it to the cylinder head by tightening to the specified torque.

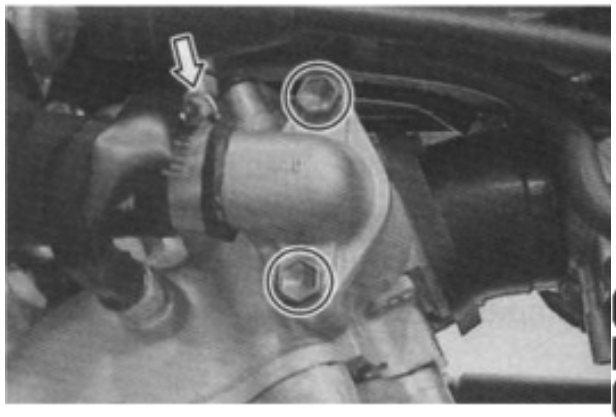
Water Temperature Sensor Tightening Torque: 10N.m

Note:

●Avoid sharp impact on terperature sensor

●Avoid contact of temperature sensor with thermometer or vessel

●After installation,check the coolant level.Fill coolant if necessary.

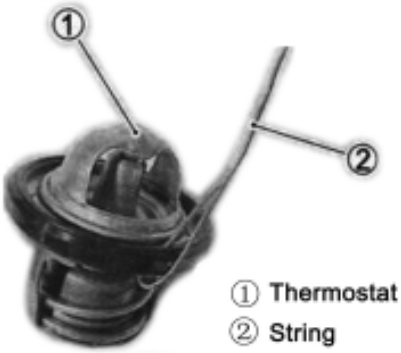


Inspection of Thermostat

●Remove thermostat case

●Remove thermostat

●Check thermostat pellet for cracks



●Test the thermostat according to the following steps:

Pass a string between thermostat flange as illustrated on the right

Immerse the thermostat in a beaker with water.Make sure that the thermostat is in the suspended position without contact to the vessel.Heat the water by placing the beaker above a stove and observe the temperature rise on a thermometer

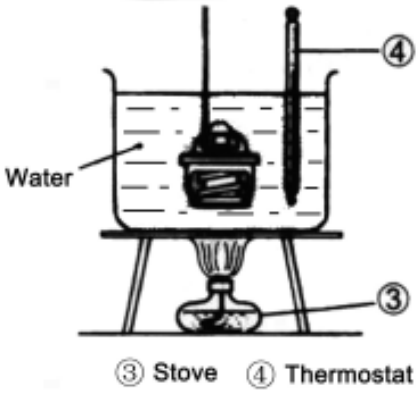
Take the temperature reading from thermometer when the thermostat valve opens

Thermostat Valve Opening Temperature:

68-74degrees,C

Tool:Thermometer

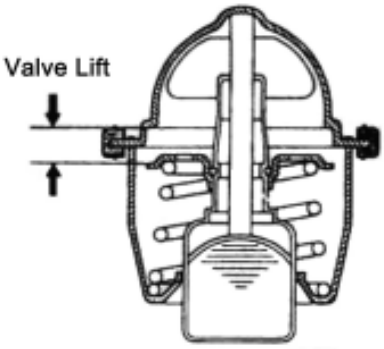
Keep heating the water to raise the water temperature.When the water temperature reaches the specified valve, the thermostat valve should have been lifted by 3.5-4.5mm



Lift standard of thermostat valve:

water temperature 95degrees(C)，lift standard is 3.5-4.5mm

If thermotat valve opening temperature or thermostat velve lift does not reach the standards,replace it.

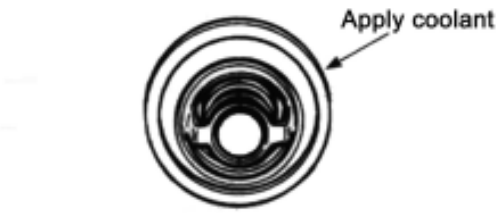


●Inatall thermostat:Reverse the removal procedure for installation

Apply coolant to the rubber seal of thermostat

Install thermostat case.Tighten to the specified torque:

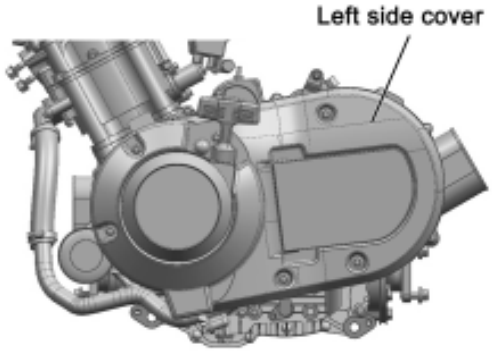
Tightening Torques:10N.m



Water Pump

Removal and Disassembly

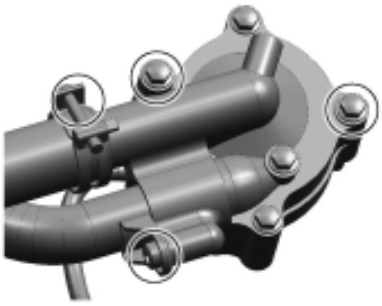
●Remove engine left side cover



●Drain coolant

Note: Before draining coolant, check water pump for oil or coolant leakage. In case of oil leakage, check the water pump oil seal, O-ring. In case of coolant leakage, check the water seal

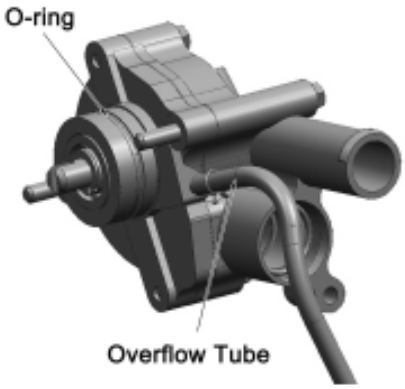
IRemove clamps and water hoses



IRelease bolts and remove water pump

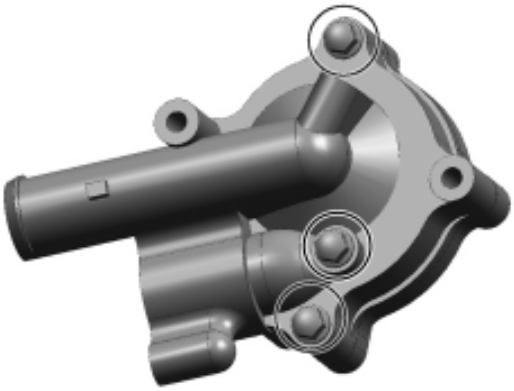
IRemove O-ring

Note:Do not reuse the O-ring



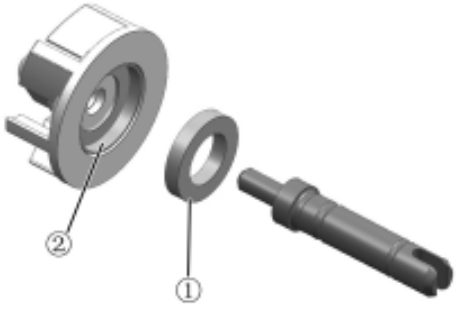
●Remove the overflow tube

●Release water pump cover screws,water pump cover and gasket

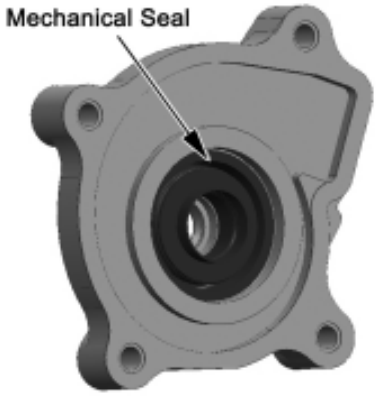


●Remove ring and impeller

●Remove seal ring1 and rubber seal2



●Remove mechanical seal with special tool



Note: The mechanical seal does not need to be moved, if there is no abnormal condition.

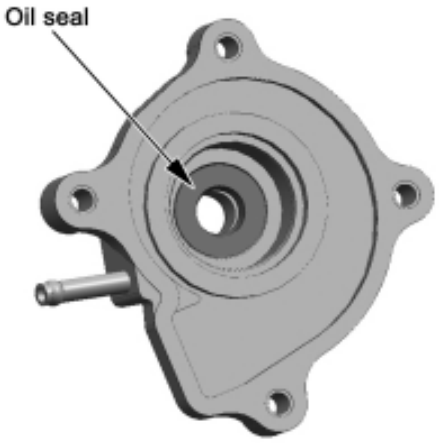
Note: Do not reuse a removed mechanicalseal

●Put a rag on the water pump body

●Reomve oil seal

Note: The oil seal does not need to be removed,if there is no abnormal condition

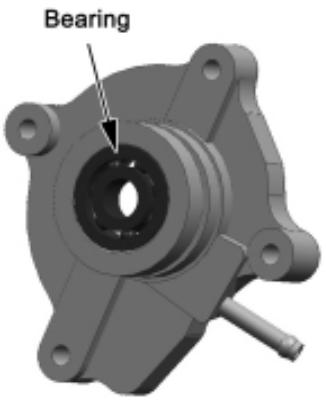
Note: Do not reuse a removed oil seal



●Remove bearing with special tool

Note: The bearing does not need to be removed,if there is no abnormal noise

Note: Do not reuse a removed bearing



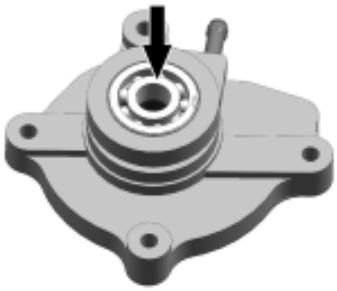
Inspection of Water Pump

Bearing

●Check the bearing clearance by hand,while it is still in the water pump body

●Turn inner race of bearing to check for abnormal noise and smooth rotation

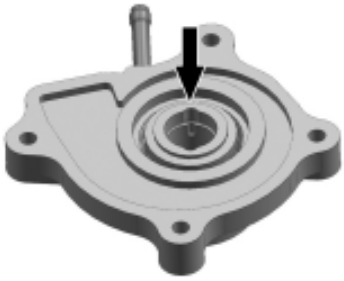
●Replace the bearing,if there is abnormal condition



Mechanical Seal

●Check mechanical seal for damage,pay attention to the seal face

●In case of leakage or damage,replace the mechanical seal. If nesessary,also replace the seal ring.

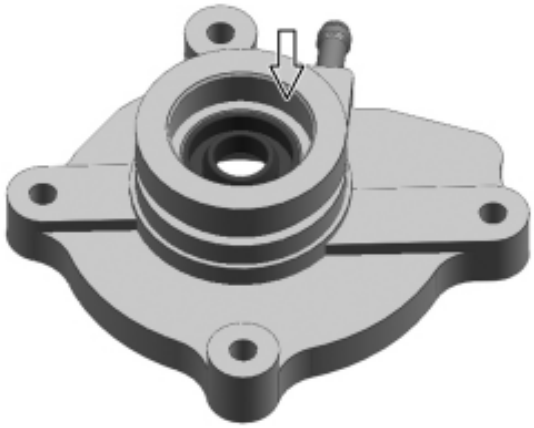


Oil Seal

●Check oil seal for damaged. Pay attention to the oil seal lip.

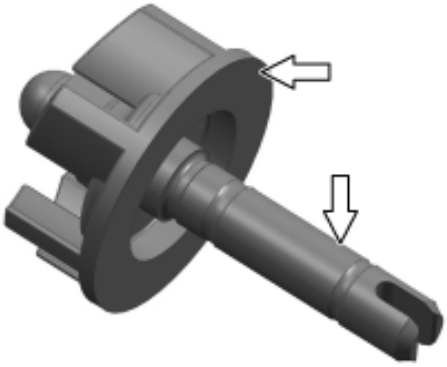
●In case of damage or leakage, replace the oil seal

Water Pump Body



●Checl the mating mace of water pump body with bearing and mechanical seal.If damage,replace it

Water Pump Impeller



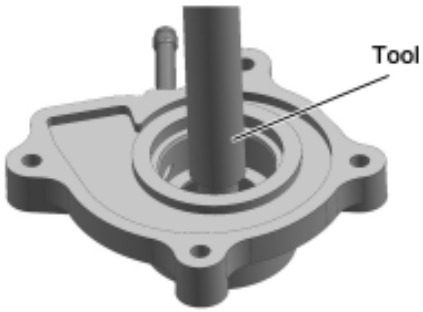
●Check the impeller and shaft for damage.

●If the impeller or shaft are damaged,replace a new part

Assembly and Installation of Water Pump

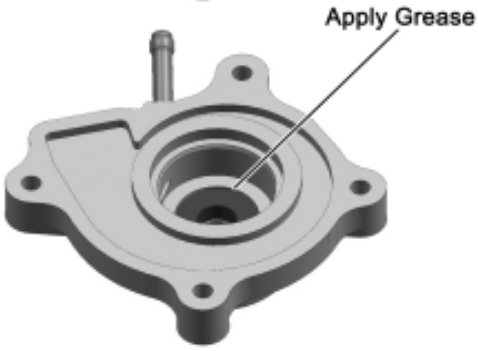
●Install oil seal with special tool;

Tool:Oil Seal Installer



Note: The stamped mark on the oil seal faces outside.

●Apply a little grease to the oil seal lip



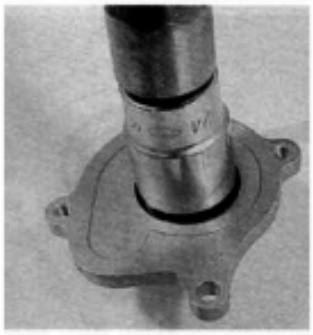
●Install mechanical seal with a suitable socket wrench.

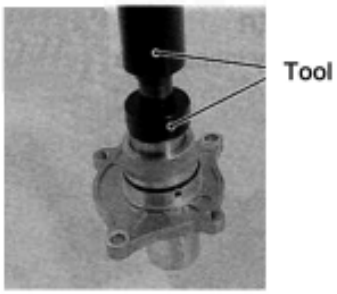
Note: Apply sealant to side"A"+ of mechanical seal

●Install bearing with special tool

Tool:Bearing Installer

Note: The stamped mark on the bearing faces outside.

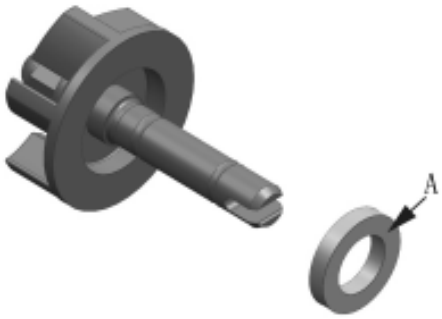




●Install seal ring to impeller

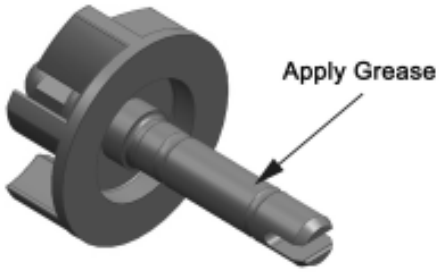
●Clean off the oil and grease from mechanical seal and install into the impeller

Note:"A"side of mechanical seal faces impeller



●Apply grease to impeller shaft

●Install impeller shaft to water pump body

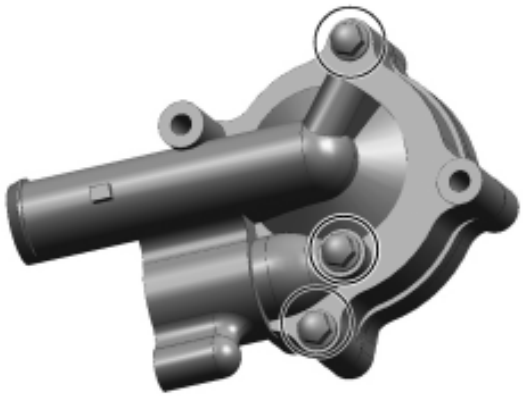


●Install ring to water pump shaft

●Install new gasket to water pump body

●Install water pump cover and tighten the bolts and bleed bolt

Water Pump Cover Bolts Tightening Torque:6N.m



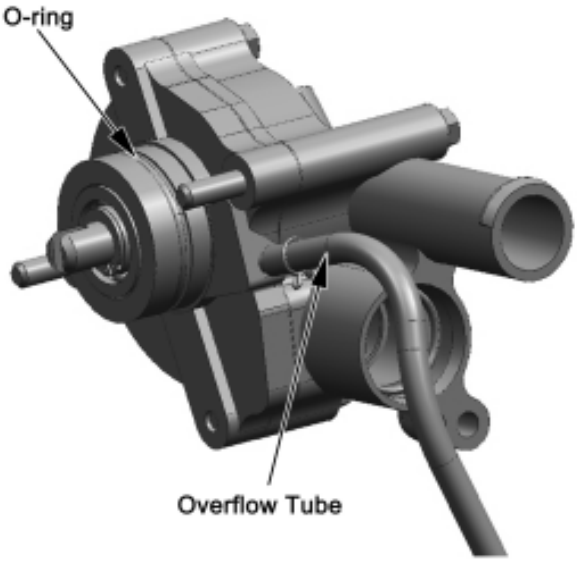
●Check impeller for smooth turning

●Install the new O-ring

Note:

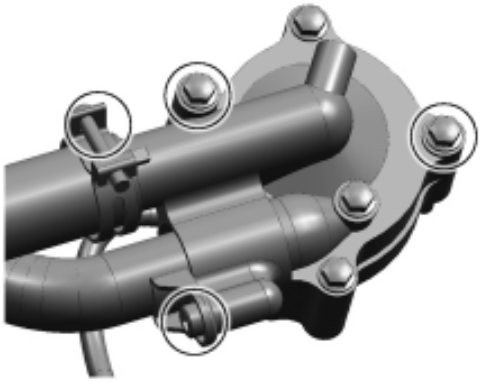
●Use the new O-ring to preventleakage

●Apply grease to O-ring



●Install the overflow tubes

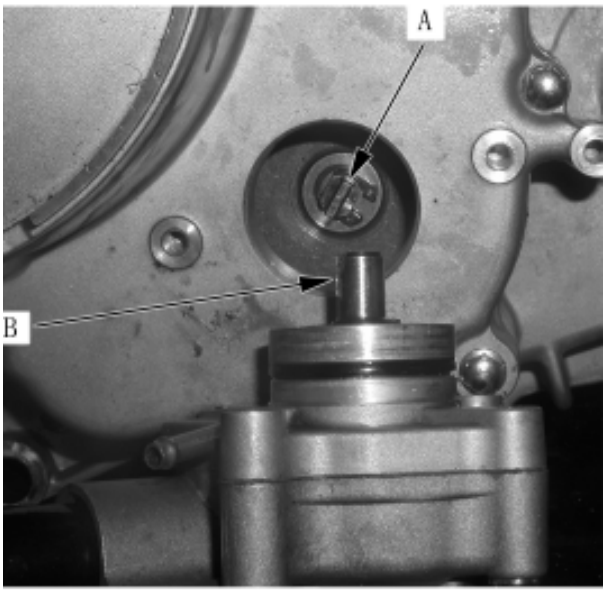
●Install water pump and tighten the bolts to the specified torque



Water pump bolts tightening torque:

10N.m

Note: Set the water pump shaft slot end ¡°B¡± to oil pump shaft flat side"A"



●Connect water hoses

●Add coolant

●Install left side cover

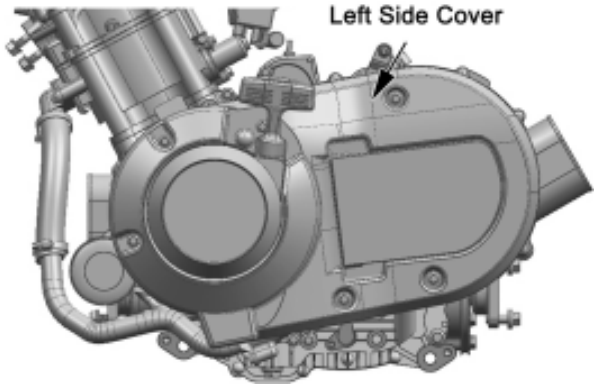
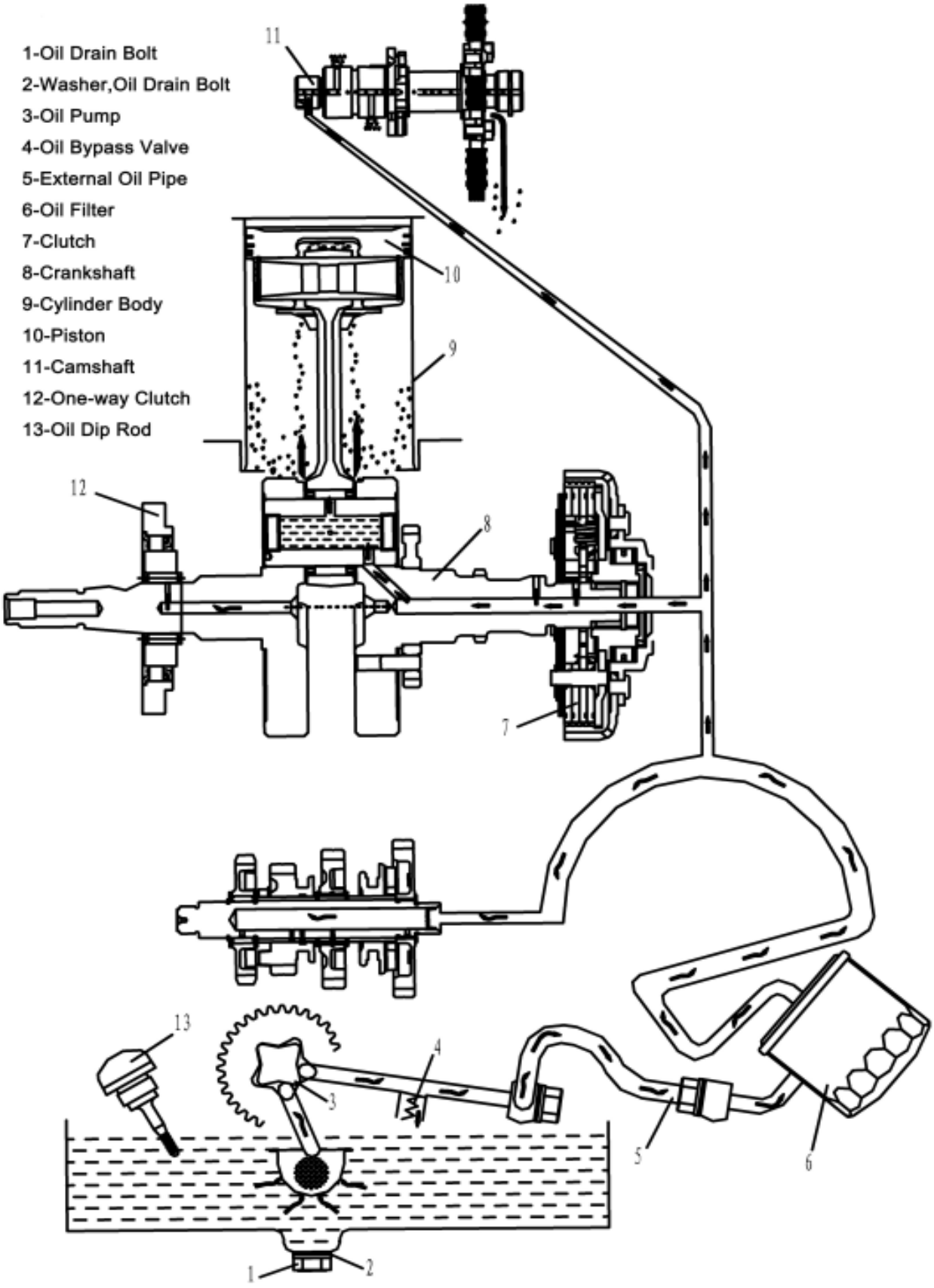


Illustration of CF188 Engine Lubrication System



Add grease to the engine parts(piston,cylinder body, camshaft and so on) which run at high speed
Engine lubrication should be special oil. Engine oil is not only used as lubrication, but also used to wash, rustproof,seal and cool.

Overhaul Info

Operation Cautions

●Securely support the ATV with bracket when removing or installing engine.Take care not to damage frame,engine body,bolts and cables¡£

●Warp the frame to avoid anyy possible damage when removing or installing the engine¡£

●Following operation doesn't require removal of engine from the vehicle:

Oil pump

Carburetor, air filter

Cylinder head cover, cylinder head, cylinder body, camshaft

CVT system, CVT cover

Gearbox

Right side cover, AC magneto, water pump

Piston, piston ring, piston pin

Following operation require removal of engine from vehicle:

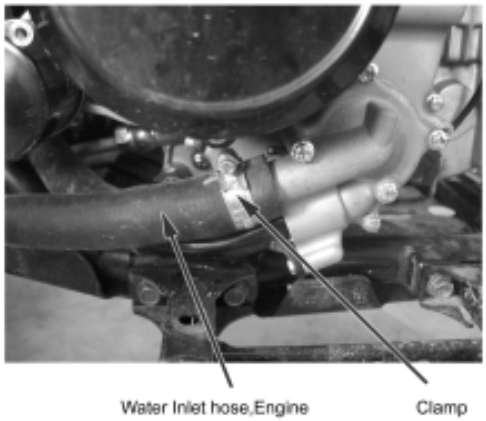
Crankshaft

Tightening torque:

Engine front upper mounting bolt:	35N~45N.m
Engine front rear mounting bolt:	40~50N.m
Bolt, engine front rear mounting bracket	35~45N.m
Bolt, engine front upper mounting bracket	35~45N.m

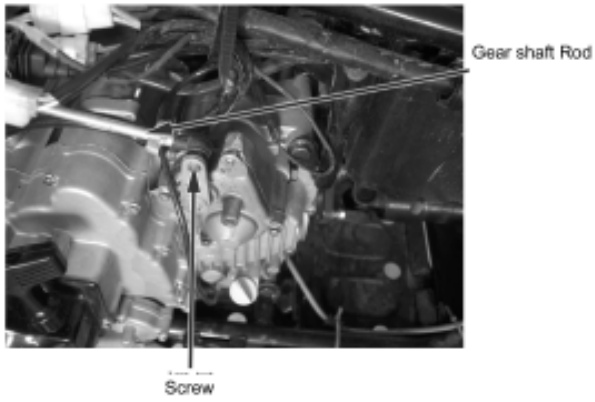
Engine Removal

Remove:
—Plastic(¡--Chapter 2)
—Air Filter(¡-Engine service chapter)
—Carburetor (-Engine service chapter)
—Clamp
—Water Inlet Hose



Remove screw

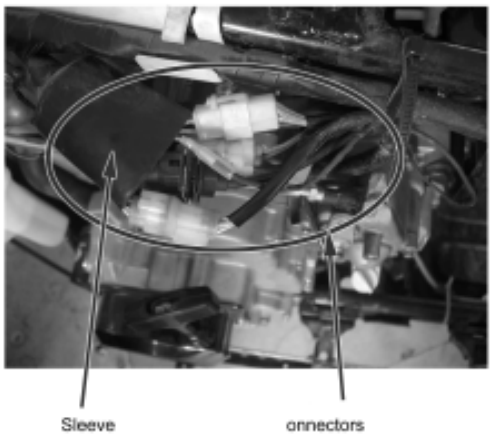
Remove gearshift rod



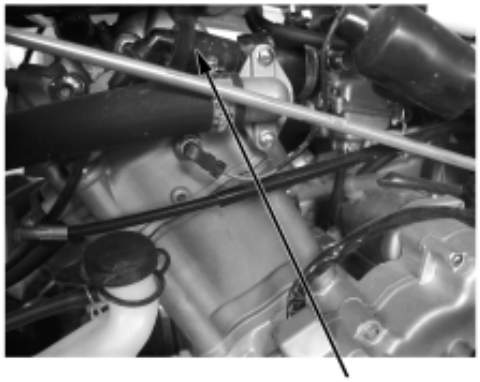
Remove clamp

Remove water outlet hose

Remove Sleeve.
Remove connectors of magneto, enriching device lead, pickup, water temperature transducer, gear sensor as illustrated on the right.



Remove spark plug cap from cylinder

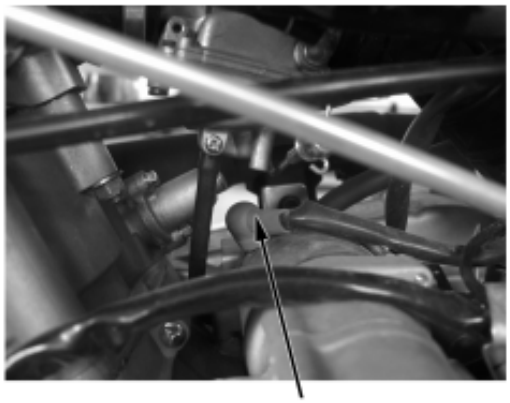


Spark Plug cap

Remove protection sleeve of starter relay.

Remove Nut.

Disconnect positive wire of starter relay.



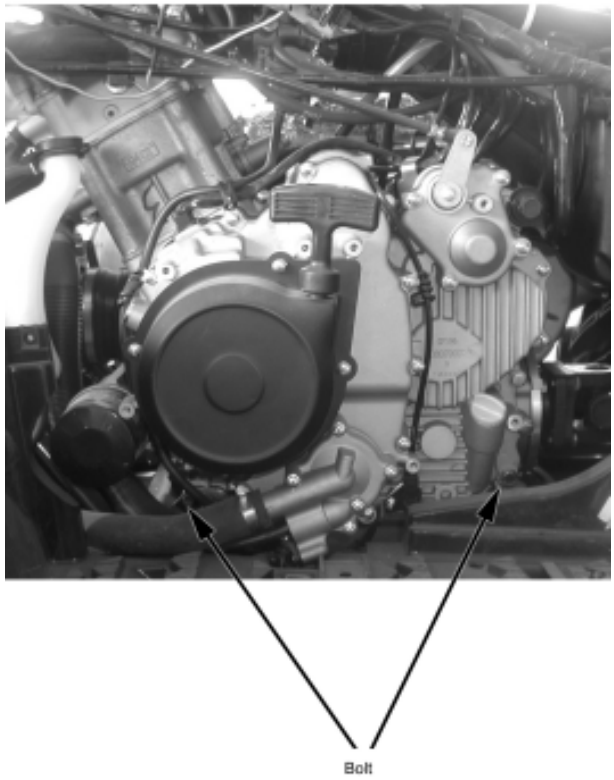
Positive Wire,Starting Motor

Remove nut.

Remove negative wire of starter relay.

Negative Wire,Starting Motor

Removal Bolt(4 units) of Engine.



Engine Installation

Put engine onto the frame,install the two lower mounting bolts and nuts

Tightening torque:

Engine lower hanger bolt:50~60N.m

Install:

—Water outlet and inlet hoses to engine with proper clamps.

—Positive and negative starting wires to engine.

—Connect all the connectors.

—Spark plug cap.

—Gearshift rod to engine.

—Air filter, carburetor and removed parts.

Removal and Installation of Front and Rear Axle

Support the vehicle with jack, make sure the vehicle will not fall.

Remove:

Plastic parts for fram(Chapter 2)

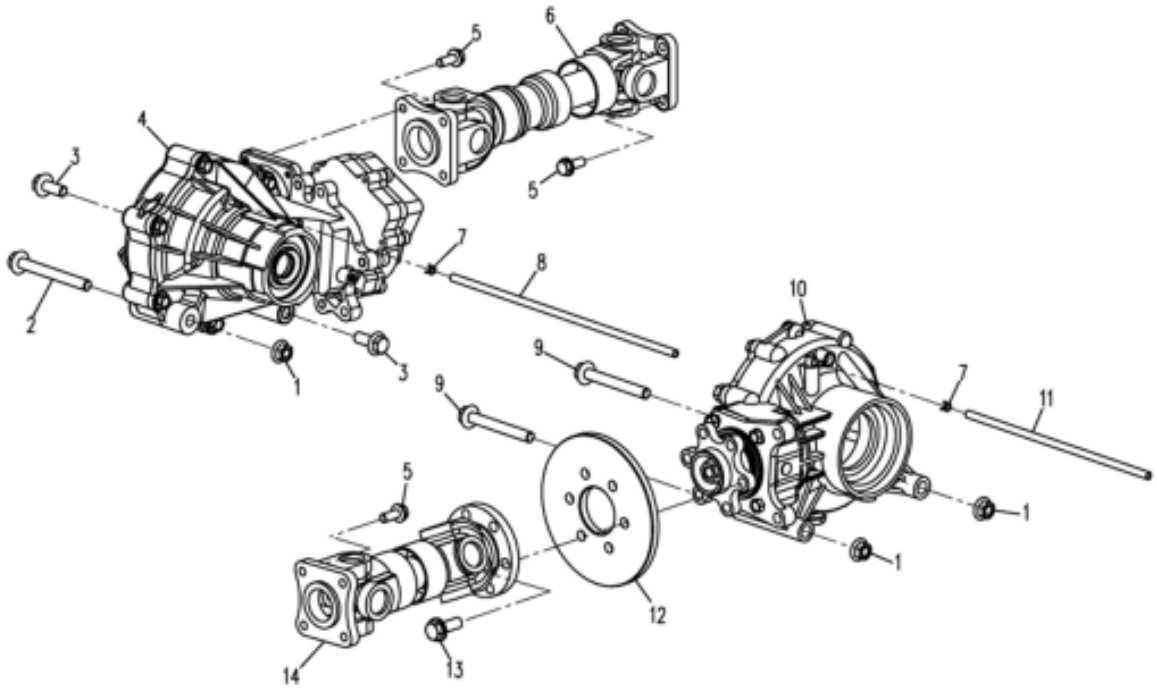
Front and rear wheels and arms(Chapter 8)

Air filter(Chapter 7)

Carburetor(Chapter 7)

Engine

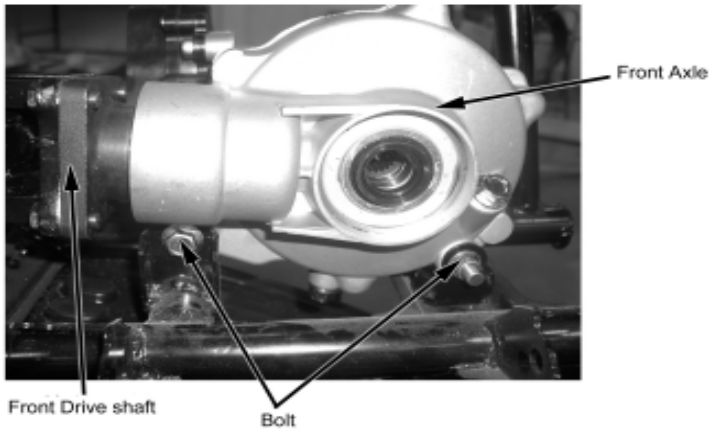
Rear brake Caliper(Chapter 7)

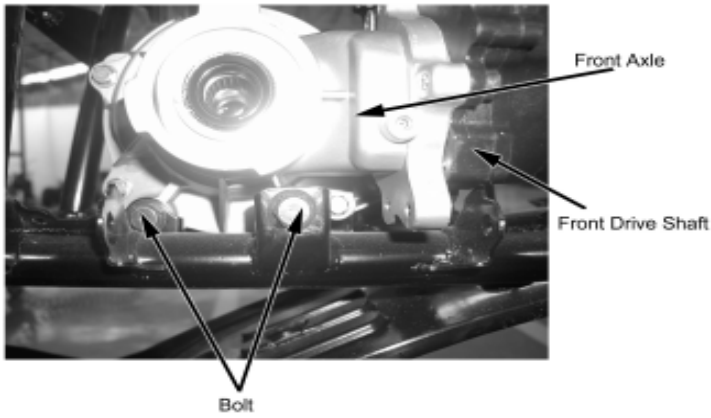


1.Nut 2.Bolt 1 3.Bolt 2 4 .Front Axle 5. Bolt 3 6. Front Drive Shaft

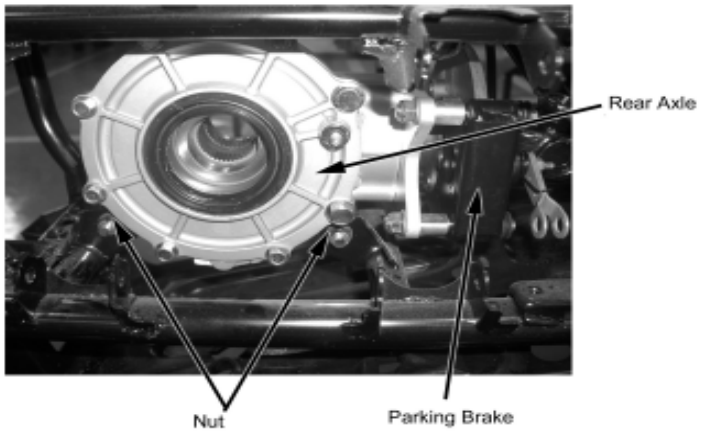
7.Clamp 8. Breather Hose,Front Axle 9.Bolt 4 10.Rear Axle. 11. Breather Hose,Rear Axle 12. Rear Brake Disk 13.Bolt 5, 14. Rear Drive Shaft

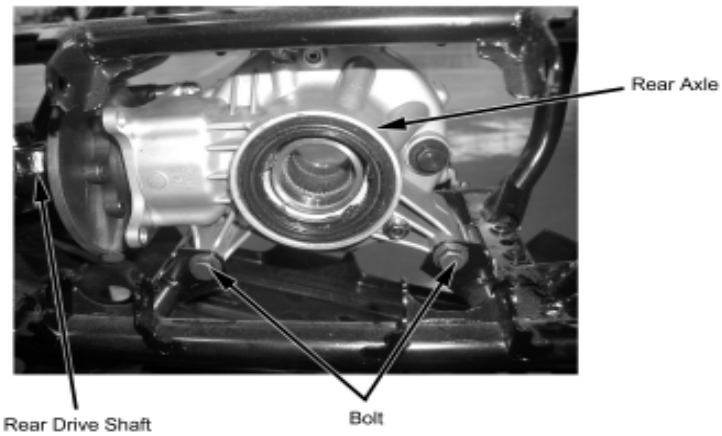
Remove nut and bolt of front axle from frame.



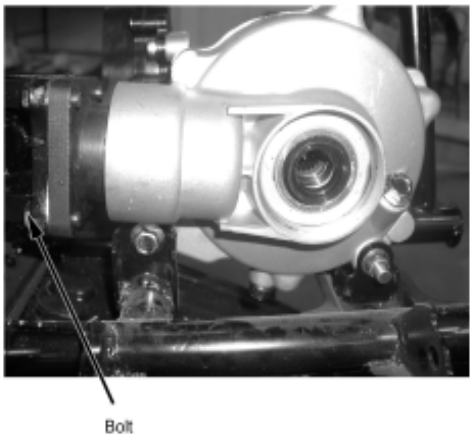


Remove nut and bolt of rear axle from frame.





Remove the 18 bolts for drive shafts and front and rear axles(Refer to 5,bolt 3)
Remove
Front and rear axles,drive shafts,rear brake disc



Installation

Reverse the removal procedure for Installation
Tightening torque:

Bolt,front axle:40-50N.m

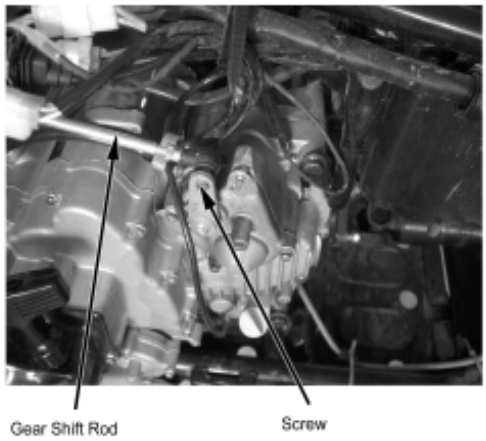
Bolt,rear axle:40-50N.m

Bolt,front and rear drive shafts:40-50N.m

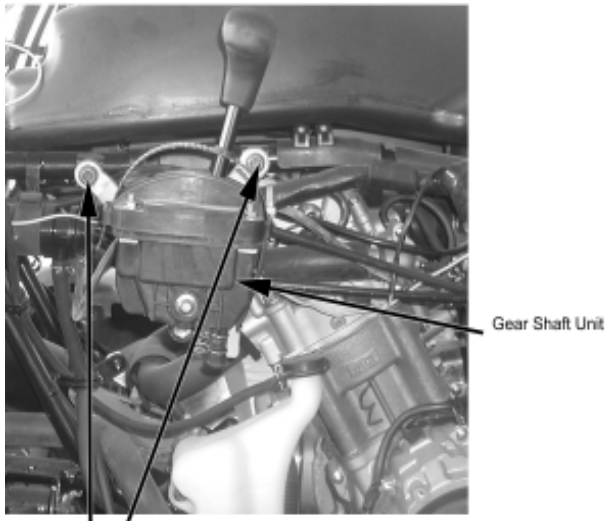
Gearshift Unit

Remove

left and right side panel (2-6)
Fuel tank top cover(2-8)
Front fender(2-8)
Bolt 1
Gearshift rod

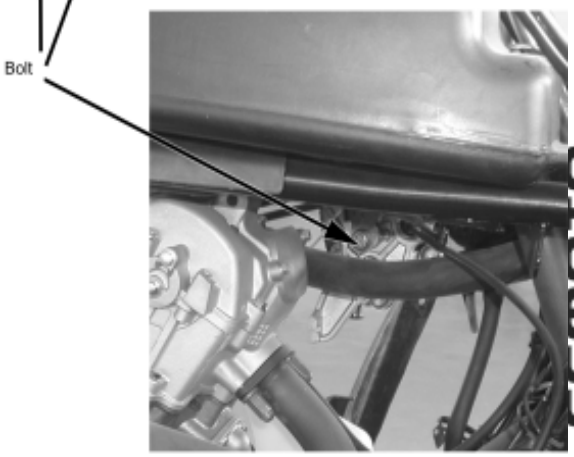


Remove the 3 bolts
Remove gearshift unit



Installation:

Reverse the removal procedure for installation
Make sure that gearshift is flexible.



In case of any inflexibility,adjust the gearshift rod to ensure the gear engagement

6 Engine Removal, Inspection & Installation

△**Engine Removal/Installation Orders and the Relative Page Numbers**

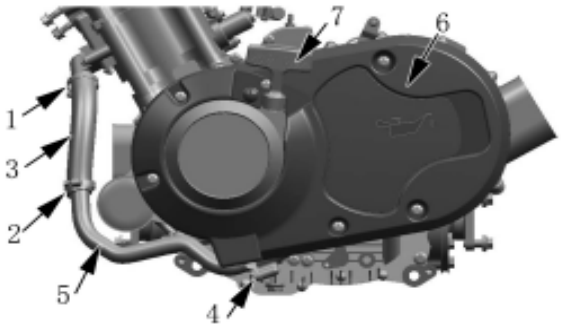
Item	Description	Disassembly	Inspection / Maintenance	Assembly	Remarks
Engine Periphery	Water Hose/Pipe	6-2	3-15	6-69	
	Left Side Cover	6-2	——	6-69	
	Recoil Starter	6-2	6-49	6-68	
Engine Front Side	Spark Plug	6-2	3-18	6-68	
	Cylinder Head Cover	6-3	6-14	6-66	
	Tensioner	6-3	6-24	6-67	
	Camshaft	6-3	6-21	6-65	
	Cylinder Head/Tensioner Plate	6-4	6-15/6-23	6-64	
	Cylinder/Timing Chain Guide	6-4	6-24/6-23	6-64	
	Piston	6-5	6-25	6-62	
Engine Left Side	Starting Motor	6-5	6-3	6-62	
	Oil Filter	6-6	3-23	6-62	
	Sector Gear	6-6	——	6-61	
	Water Pump	6-7	4-14	6-61	
	Sheave Drum	6-7	6-48	6-60	
	Left Crankcase Cover/ Magneto Stator	6-7	6-48	6-60	
	Magneto Rotor	6-7	6-47	6-60	
	Starting Driven Gear	6-8	6-47	6-59	
	Starting Dual Gear/Idle Gear	6-8	6-48	6-59	
	Oil Pump Sprocket and Chain	6-8	——	6-59	
Engine Right Side	CVT Cover	6-9	6-51	6-58	
	Drive Belt	6-9	6-36	6-57	
	Primary Sheave/Secondary Sheave	6-9	6-30	6-57	
	CVT Housing/Clutch Outer Face	6-10	6-51	6-57	
	Clutch	6-10	6-28	6-56	
	Timing Chain	6-10	6-23	6-56	
Engine Center	Gear Position Bolt	6-11	——	6-56	
	Right Crankcase	6-11	6-52	6-56	
	Front Output Shaft Components	6-11	6-43	6-55	
	Driven Bevel Gear Components	6-11	6-43	6-55	
	Shift Cam	6-12	6-40	6-55	
	Guide Bar, Fork	6-12	6-39	6-55	
	Drive Bevel Gear Components	6-12	6-42	6-55	
	Main Transmission Shaft	6-12	6-38	6-54	
	Transmission Counter Shaft	6-12	6-38	6-54	
	Balancer Shaft	6-12	6-46	6-54	
	Crankshaft	6-13	6-27	6-54	
	Oil Pump, Pressure-limiting Valve	6-13	6-41	6-53	
	Left Crankcase		6-52		

Notes: Arrowhead direction is for engine removal orders. Reverse the direction for assembly and installation

I Engine Removal

Preparation before engine removal

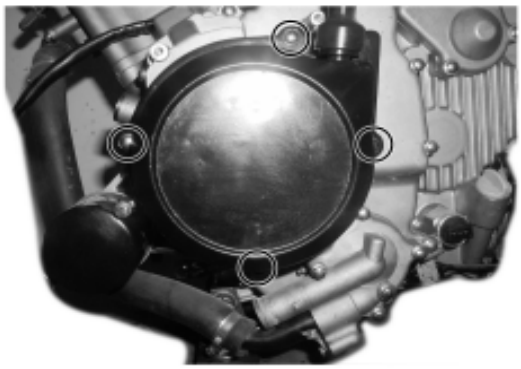
- Prepare a proper tray used for load of components
- Prepare necessary removal and assembly tools
- Drain up engine oil(3-22)
- Drain up coolant(3-15)



Engine Periphery

Water Hose/Pipe

- Remove water hose clamp1 and2
  Remove water hose3
- Remove screw4 and water hose5

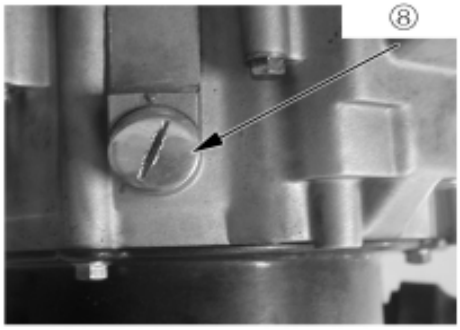


Left Side Cover

- Remove 6 bolts(M6X20) of left side cover6
  Remove left side cover6

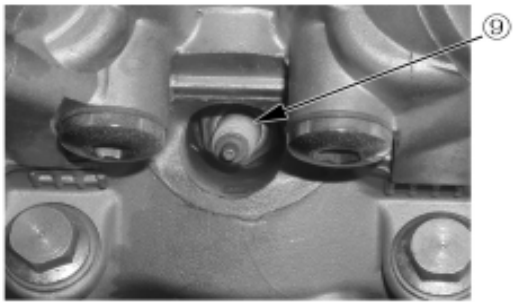
Recoil Starter

- Remove 4 bolts(M6X12)of recoil starter
  Remove recoil starter7



Inspection Plug

- Remove inspection plug8 with screwdriver

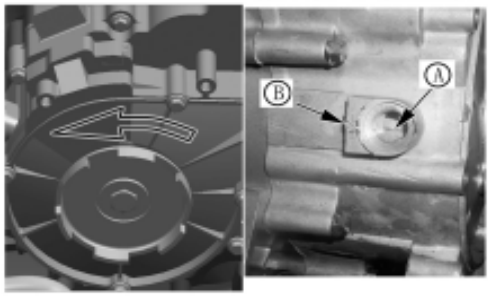


Engine Front Side

Spark Plug

- Remove spark plug9 with special wrench

Tool: Spark Plug Wrench



- Turn crankshaft, align T.D.C. line A on magneto rotor with mark B of left crankcase

Cylinder Head Cover

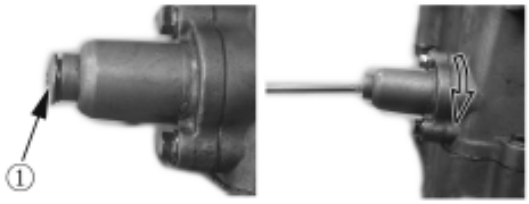
●Remove valve adjusting cover

●Remove12 bolts of cylinder head cover

●Remove cylinder head cover

Timing Chain Tensioner

●Remove screw plug1, insert a flat screw-driver into slot of timing chain tensioner adjuster , turn it clockwise to lock tensioner spring;



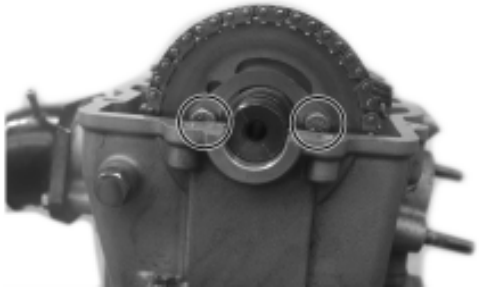
●Remove tensioner fix bolt

●Remove tensioner and gasket

Camshaft

●Loosen timing sprocket bolt

●Remove timing sprocket bolt and lock

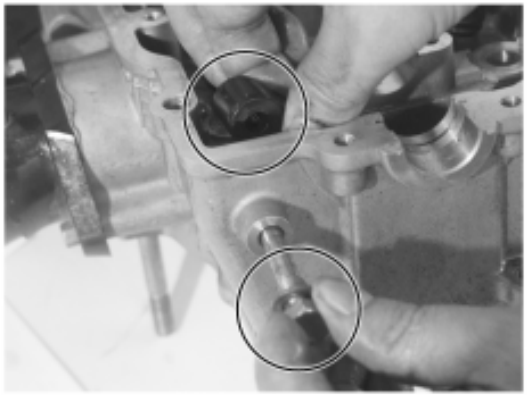


●Remove C-ring1

●Remove timing sprocket from camshaft, remove camshaft

Note: Take care not to drop spacer, bolt, bolt lock and C-ring into crankcase.

●Remove tensioner plate



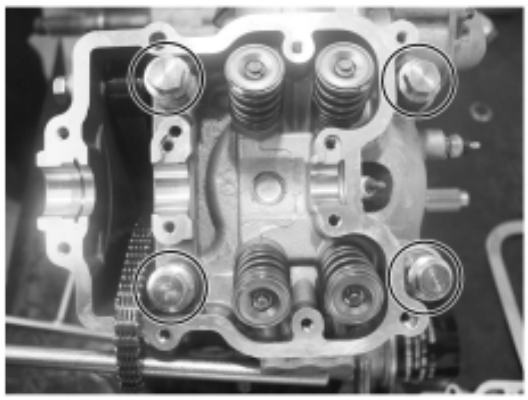
Cylinder Head

●Remove cylinder head bolt

●Remove cylinder head bolts diagonally

●Remove cylinder head

Note: Take care not to drop dowel pin into crankcase



Cylinder

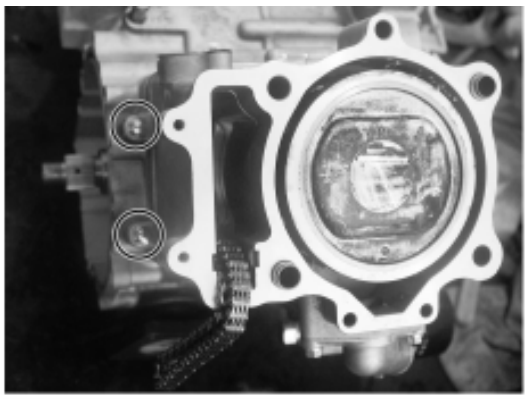
●Remove dowel pin and cylinder head gasket

●Remove timing chain guide1

●Remove cylinder bolt

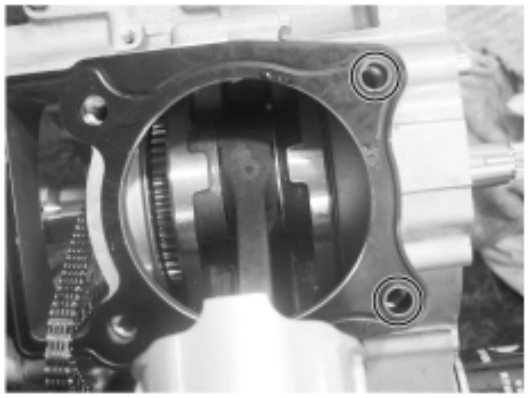
●Remove cylinder

Note:Take care not to drop dowel pin into crankcase



●Remove dowel pin and cylinder gasket

Note:When perfoming above removal process be sure to hook up timing chain to prevent it from falling into crankase



Piston

●Remove piston pin circlip with long nosed pliers1

Note:Put a clean rag under piston so as not to drop piston pin circlip into crankcase

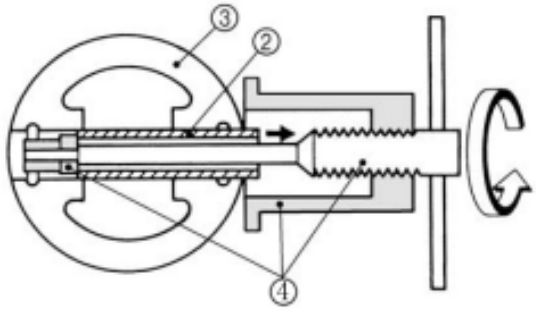
●Remove piston pin2and piston3

Notes:

●When installing piston,make sure its identification conforms to that of cylinder

●When removing piston pin, clean off burrs of piston pin hole and groove. If it's difficult to remove the piston, DO NOT hammer, use a special remover4

Tool: Piston Pin Remover



Engine left side

Starting Motor

●Remove 2 bolts of starting motor

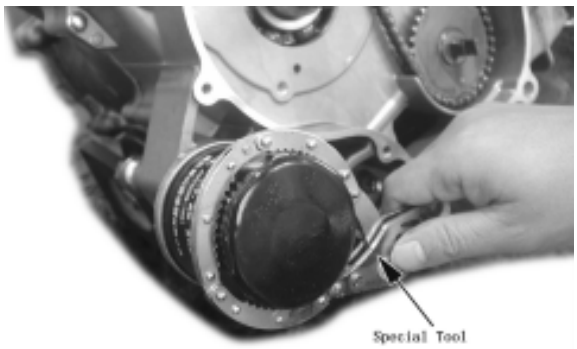
●Remove starting motor

Starting Motor

Oil Filter

●Remove oil filter with special tools

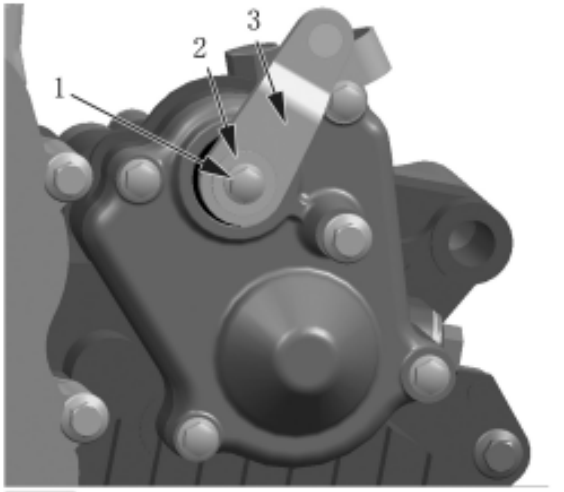
Tool:oil filter Remover



Sector Gear

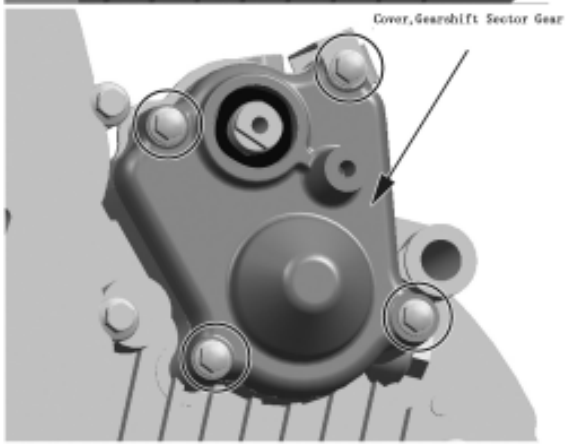
●Remove bolt 1of gearshift rocker arm

●Remove gasket 2and gearshift rocker arm 3



●Remove bolt of sector gear housing cover

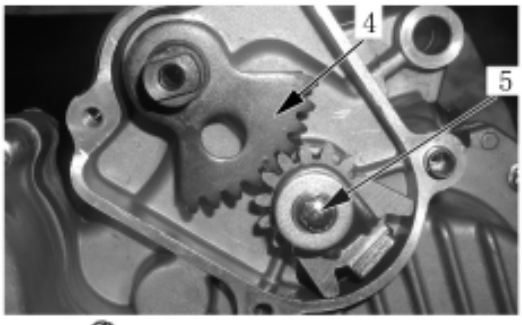
●Remove wire clip and sector gear housing cover



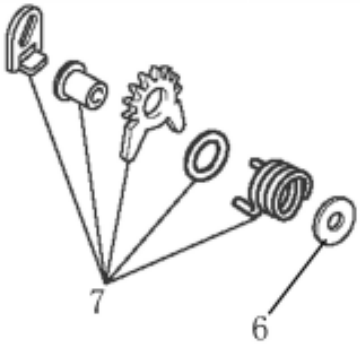
●Remove dowel pin and gasket

●Remove drive sector gear 4

●Remove bolt 5 of driven sector gear



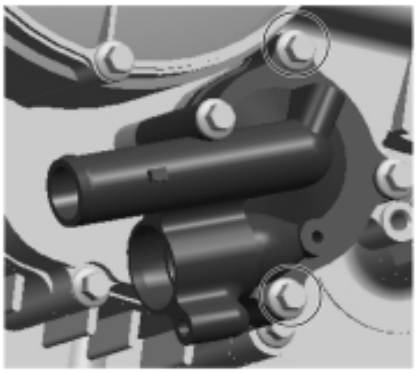
●Remove washer 6 and driven sector 7



Water Pump

●Screw out bolt of water pump

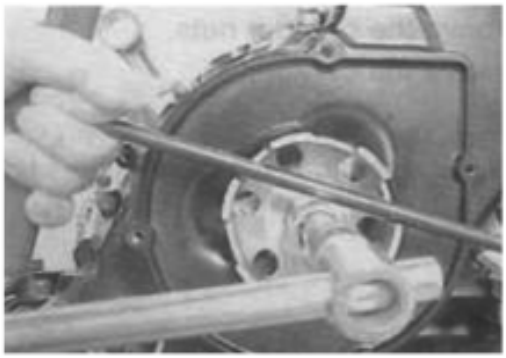
●Remove water pump



Sheave Drum

●Remove the sheave drum by using a suitable bar;

●Remove washer and sheave drum



Left Crankcase Cover

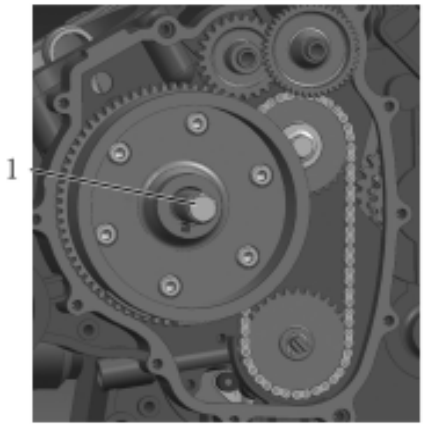
●Remove bolts;

●Remove left crankcase cover

●Remove dowel pin and gasket

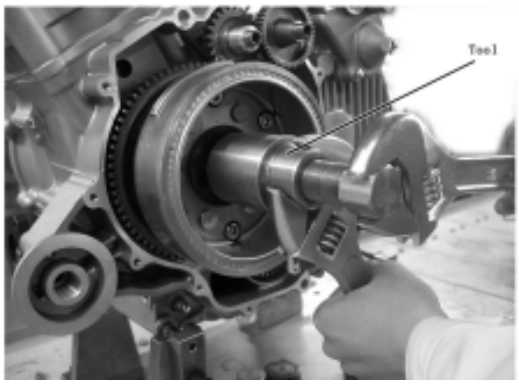
Magneto Rotor

●Install attachment 1 to crankshaft end



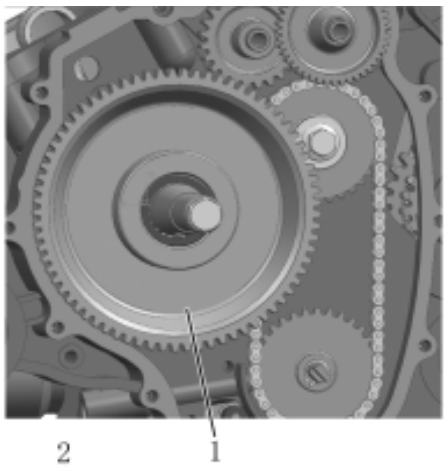
●I Install special tool to rotor thread;
Remove rotor and woodruff key

Tool: Rotor Remover

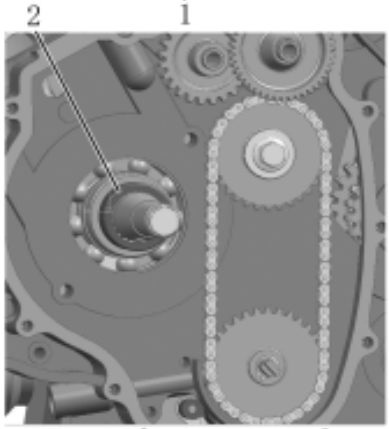


Starting Motor Gear

●Remove driven gear 1 and needle bearing

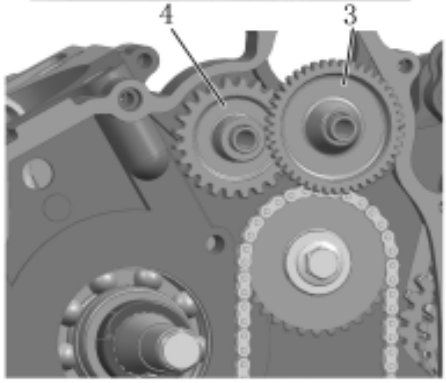


●Remove spacer 2



●Remove dual gear and shaft 3

●Remove idle gear and shaft 4

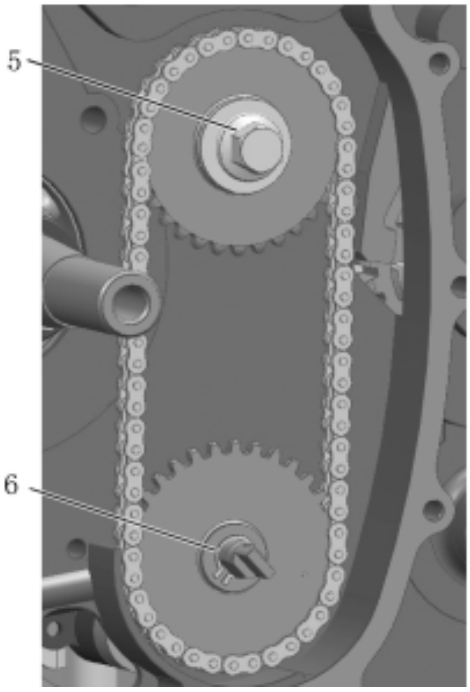


Oil Pump Sprocket and Chain

●Remove drive sprocket nut 5

●Remove C-ring 6

●Remove oil pump drive and driven sprockets and chain



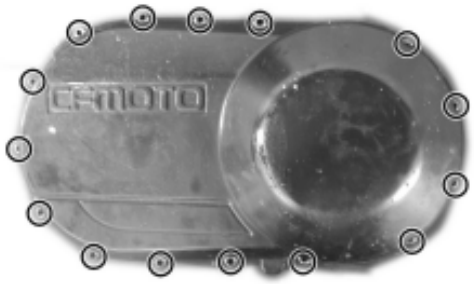
Engine Right Side

CVT Cover

●Remove bolt of CVT cover

●Remove CVT cover

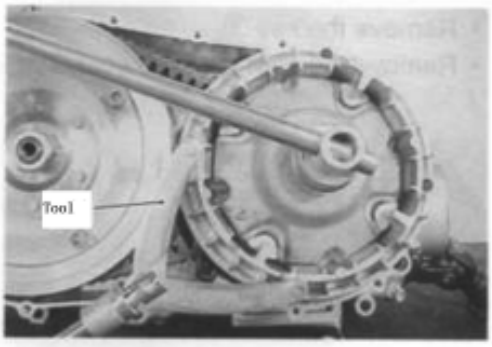
●Remove gasket and dowel pin

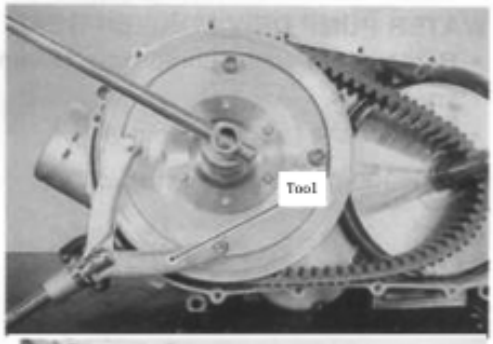


CVT(Continuously Variable Transmission)

● Remove primary sheave nut with special tool

●Remove primary sliding sheave



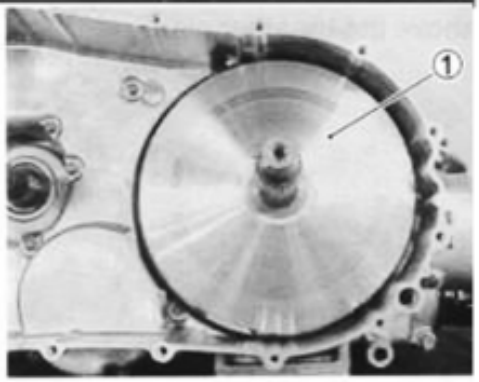


●lRemove secondary sheave nut with special tools

●lRemove secondary sheave

●lRemove drive belt

Tool: Sheave Holder



●Remove primary fixed sheave 1

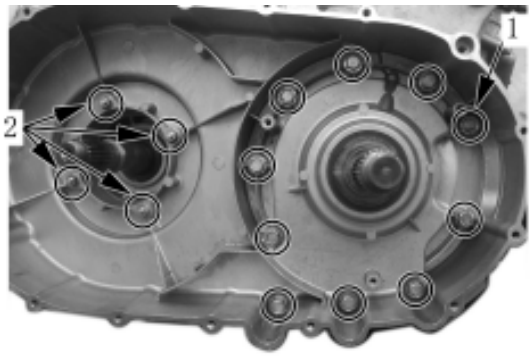
●Remove bolt for air guide plate.

●Remove air guide plate

CVT Case

●Remove bolt 1 of CVT case

●Remove nut 2 of CVT case



●Remove outer clutch face and CVT case

●Remove dowel pin, front and rear gasket

Clutch

●Remove clutch shoe fixing nut with special tool

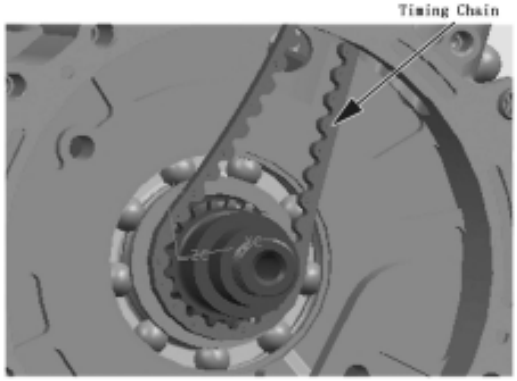
●Remove clutch shoe.

Note: The clutch shoe nut has left-hand threads.

Tool

Timing Chain

●Remove timing chain

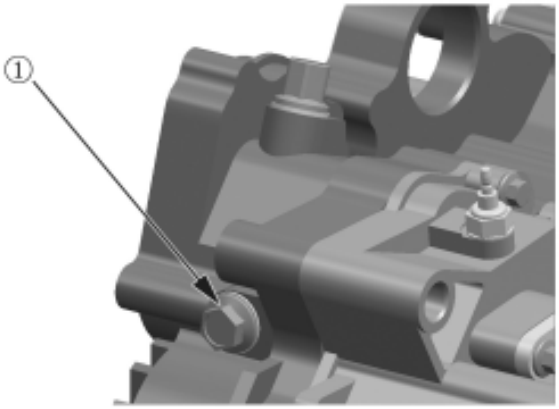


Engine Center

Gear position bolt

●Remove gear position bolt 1

●Remove spring and steel ball

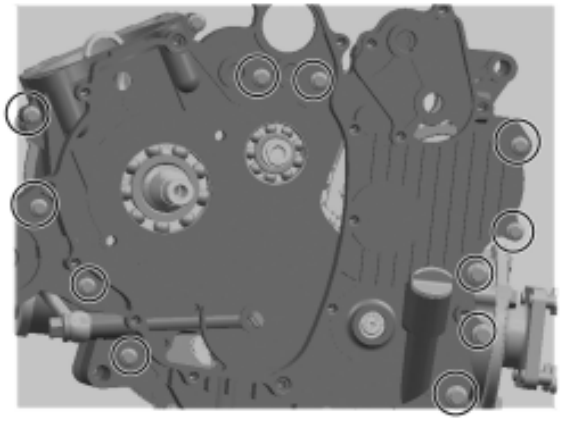


Right Crankcase

●Remove left crankcase bolts

●Remove right crankcase bolts

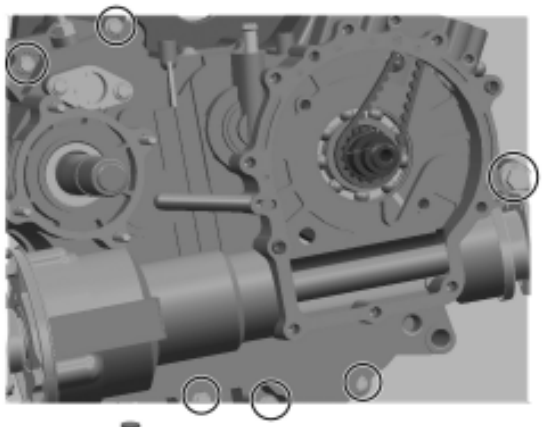
●Separate right crankcase with special tool



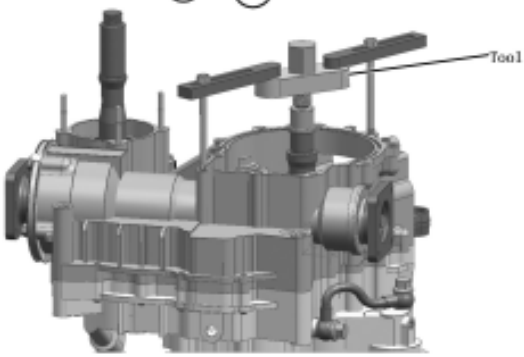
Caution

●The Crankcase separator plate should be parallel with the end face of crankcase

●Crankshaft should remain in the left crankcase half.



Tool: Crankcase separator

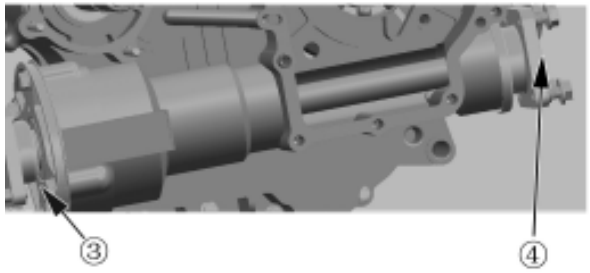


Driven Bevel Gear, Front Output Shaft

●Remove bevel gear cover bolt

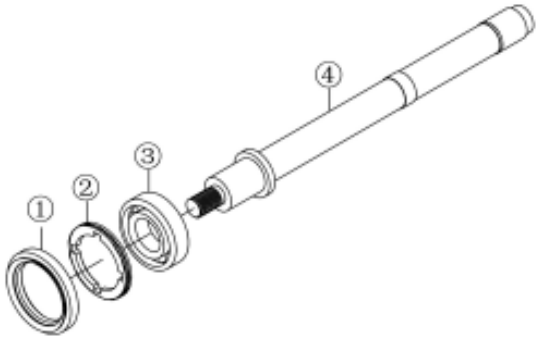
●Remove driven bevel gear3

●Remove front output shaft nut4



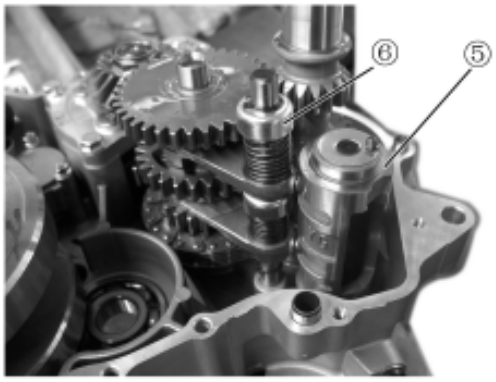
● Remove Oil seal1 , Bearing limit nut (levorotation)2

●Remove Front Output Shaft4



Shift Cam, Fork/Shaft

●Remove Shift Cam 5,Fork /Shaft;

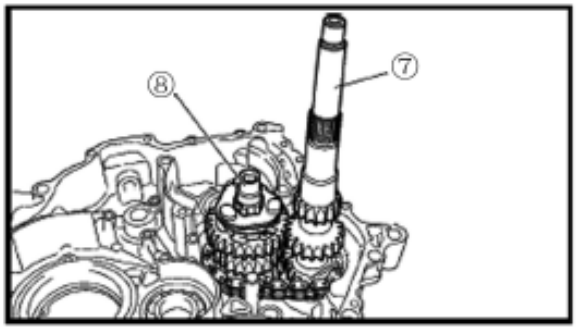


Drive Bevel Gear

●Remove driven bevel gear from left crank-case

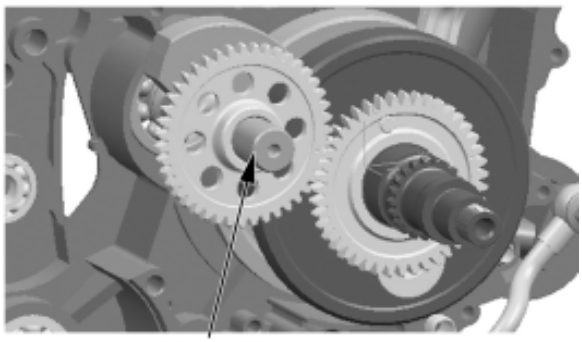
Drive Shaft, Driven Shaft

●Remove drive shaft7and driven shaft8



Balancer Shaft

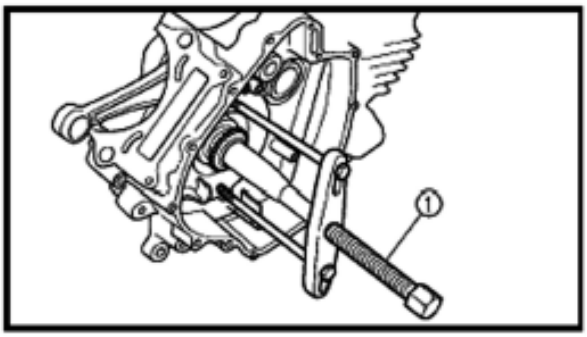
●Remove balancer shaft;



Crankshaft

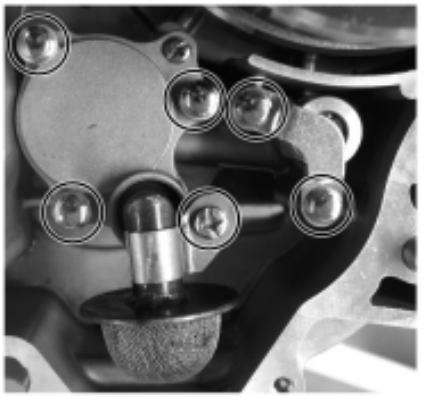
●Separate crankshaft from left crankcase with special tool

Tool: Crankshaft Separator



Oil bump, Relief Valve

●Remove oil bump and relief valve

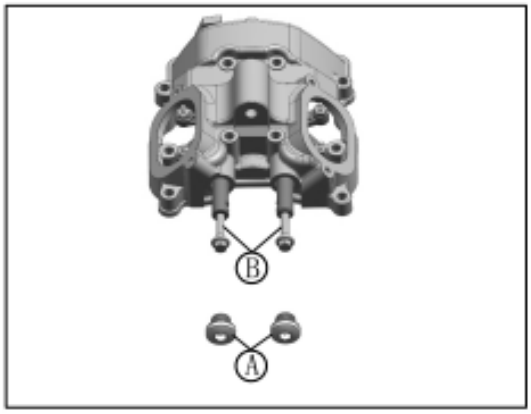


Ⅱ Engine Components Inspection

Cylinder Head Cover

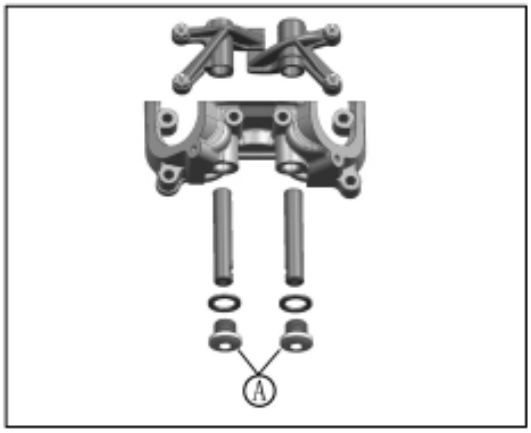
Disassembly

Caution: Each removed part should be identified to its location, and the pars should be laid out in groups designated as"Exhaust", "Intake", so that each will be restored to the original location during assembly.



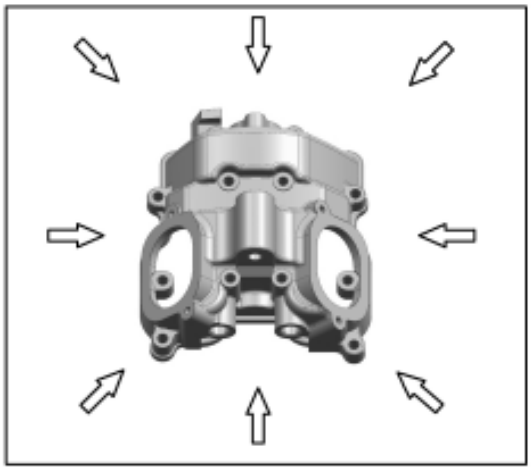
●Remove rocker arm shaft bolts Ⓐ

●Remove rocker arm shaft by using M6 bolts Ⓑ



Cylinder Head Cover Distortion

Clean off sealant from the fitting surface of cylinder head cover, place cylinder head cover on a surface plate and measure distortion with a thickness gauge.



Cylinder head Cover Distortion
Limit: 0.05mm
Tool: Thickness Gauge

Distortion out of range: Replace

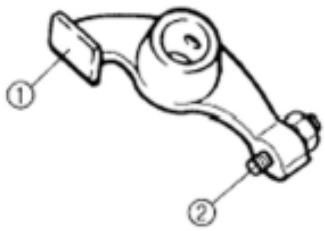
Note: Cylinder head cover and cylinder head should be replaced together.

Rocker Arm Shaft

●Measure out diameter of rocker arm shaft with a micrometer.

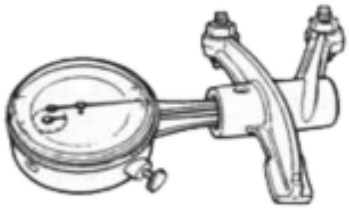
Rocker Arm Shaft O.D.: (IN, EX)
Limit: 11.973~11.984mm
Tool: Micrometer (0~25mm)

Rocker Arm



●When checking the rocker arm, check the inner diameter of the valve rocker arm and wear of the camshaft contact surface.

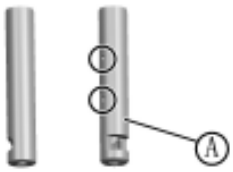
●**Rocker Arm I.D. :**12.000¡«12.018mm



Tool: Dial Calipers

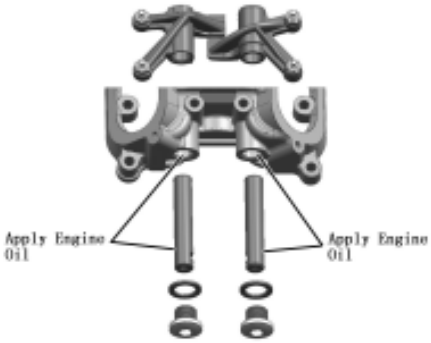
Assembly

Note: Intake rocker arm shaft A has oil holes.



●Apply engine oil to rocker arms and shafts;

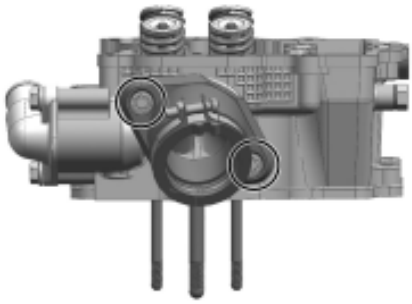
● Install rocker arms and tighten rocker arm shaft to
the specified torque:
Rocker Arm Shaft Bolt: 28N.m



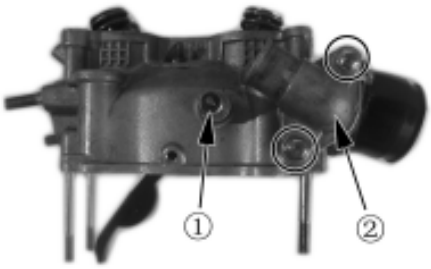
Cylinder Head

Disassembly

●Remove intake pipe

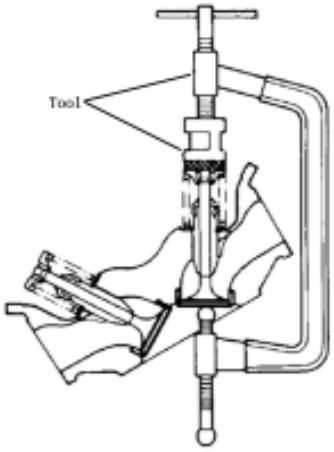


●Remove water temperature sensor1and thermostat cover2

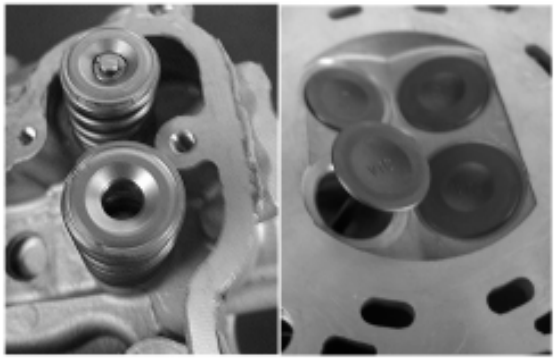


●Remove thermostat

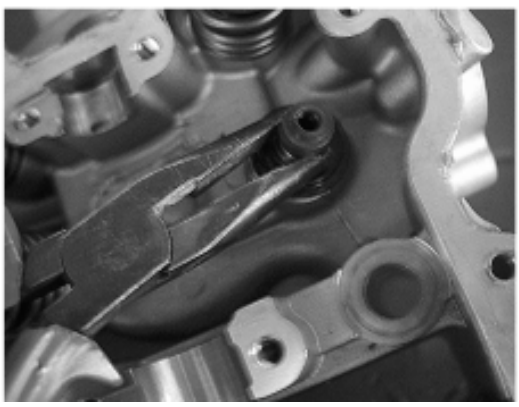
●Compress the valve spring and remove valve cotter
with tweezers.
Tools: Valve Spring Compressor
Tweezers



● Remove valve spring upper seat and valve spring
●Remove valve from the other side.



●Remove valve stem seal ring and valve lower seat.

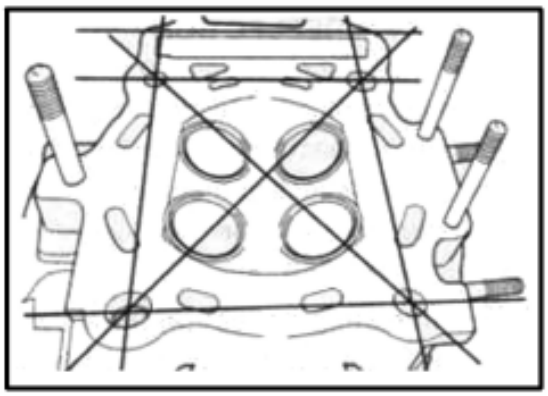


Cylinder Head Distortion

●Clean off carbon deposit from combustion chamber;

●Check the gasket surface of the cylinder head for distortion with a straightedge and thickness gauge. Take clearance readings from several places. If any clearance reading is out of the service limit, replace with a new cylinder head.

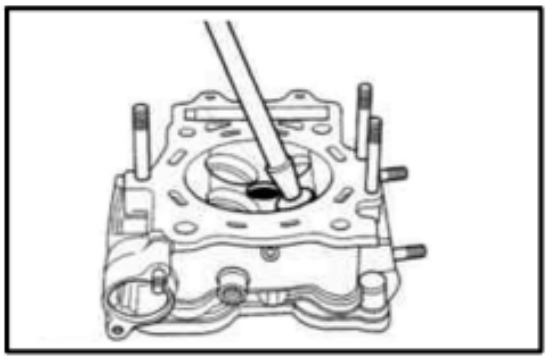
Cylinder Head Distortion Service Limit: 0.05mm
Tool: Thickness Gauge

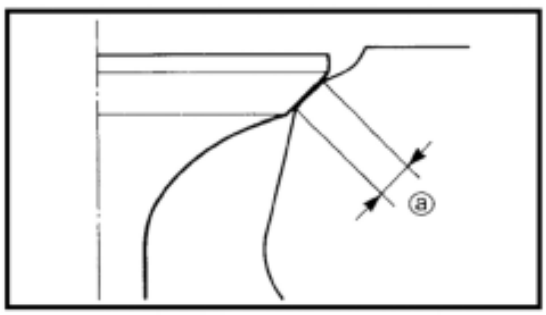


Valve Seat Width

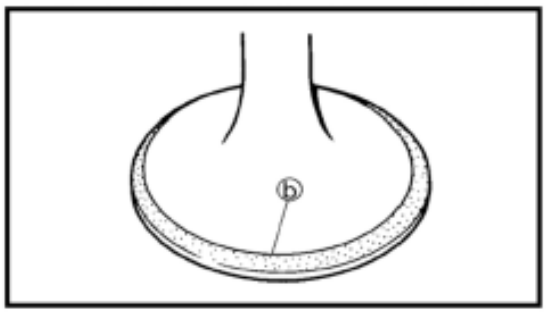
●Coat the valve seat with color uniformly. Fit the valve and tap the coated seat with the valve face in a rotating manner. To get a clear impression of the seating contact, use a valve lapper to hold the valve head.

●The ring-like dye impression on the valve face should be continuous, without any break. The width of the dye ring, which is the visualized seat width, should be within the following range:

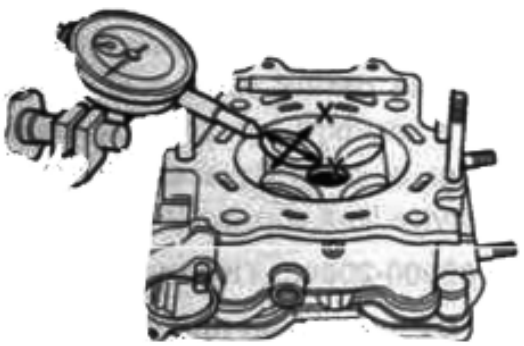




Valve Seat Width: 0.9-1.1mm
Tool: Valve Lapper



●Lift the valve about 10mm from valve seat. Check the valve stem deflection in the directions of X and Y perpendicular to each other, with a dial gauge. If the deflection measured is out of the limit, replace either the valve or the valve guide. (If the valve stem is worn to the limit and the clearance is found to be in excess of the limit, replace the valve. If the valve stem is within the limit, replace the valve guide. Double check the clearance after replacing the valve stem or the guide).
Valve Stem Deflection (IN & EX): 0.35mm
Tool: Micrometer
Magnetic Stand



Valve Stem O.D

●Measure valve stem O.D with a micrometer

Service Limit

IN: 4.975-4.990mm

EX: 4.955-4.970mm

Tool: Micrometer (0-25mm)

Valve Stem Run-out

●Support valve stem with V block as illustrated on the

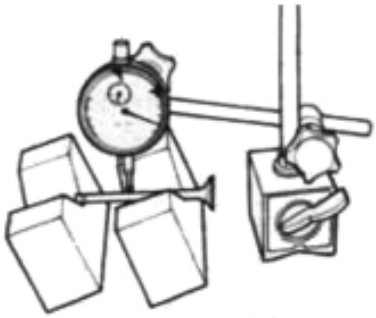
right. Check the run-out with a dial gauge.

Service Limit: 0.05mm

Tool: Magnetism Stand

Dial Gauge (1/100)

V block



Valve Head Radial Run-out

●Measure the valve head radial run-out as illustrated

on the right.

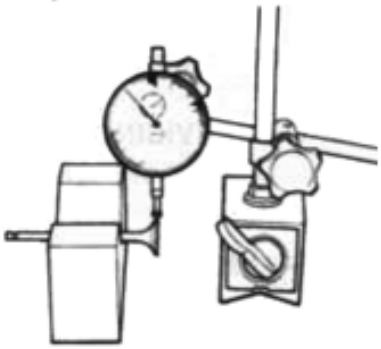
Valve head Radial Run-out out of range:--Replace

Service Limit: 0.03mm

Tool: Dial Gauge (1/100)

Magnetic Stand

V Block



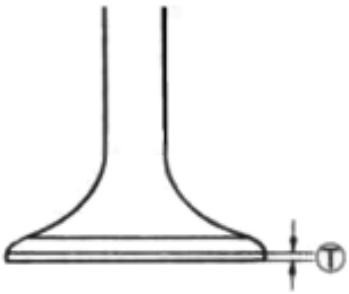
Valve Face Wear

●Check each valve face for wear or damage. Replace valve with a new one if it is found to have abnormal wear. Measure valve head thickness T.

Valve head thickness T out of range: --Replace

Service Limit: 0.5mm

Tool: Vernier Caliper



Valve Stem End

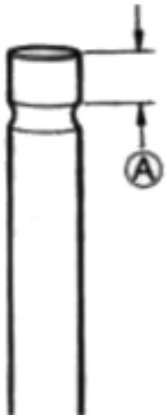
●Check valve stem end for pitting or wear. In case of

any pitting or wear, resurface the valve stem end. If the length T is less than service limit, replace valve with a new one.

Valve Stem End Length

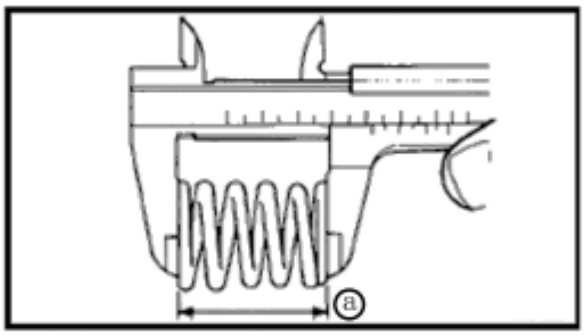
Service Limit: 2.1mm

Tool: Vernier Caliper



Valve Spring

Valve Spring keeps valve and valve seat tight. Weakened spring results in reduced engine power output and chattering noise from valve mechanism.

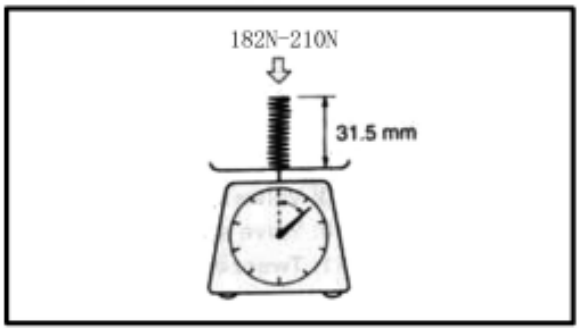


●Measure the spring free length.

Spring free length out of range: ¡úReplace

Service Limit: 38.8mm

Tool: **Vernier Caliper.**



●Measure the force to compress the spring to the specified length.

Valve spring tension out of range: Replace

Service Limit: (IN/EX)

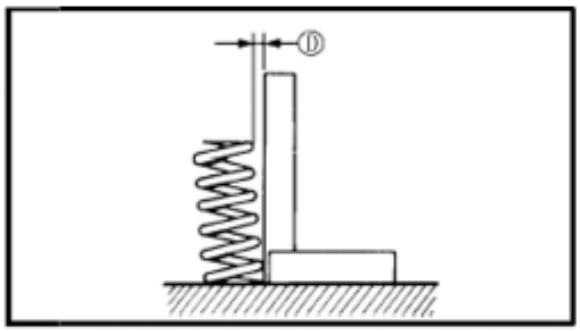
182N-210N/31.5mm

Tool: Spring Scale.

●Measure valve spring incline.

Spring incline out of range: Replace

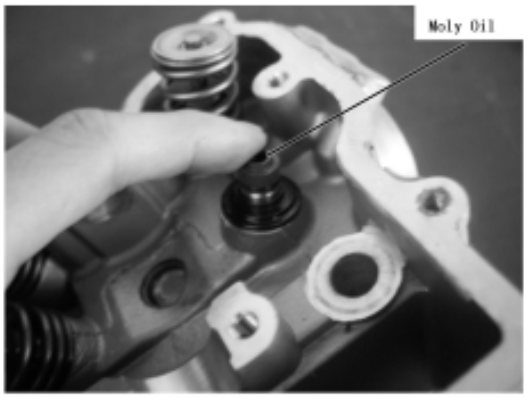
Valve Spring Incline Limit: 2.5o/1.7mm



Assembly of Cylinder Head

●Install each valve spring seat;

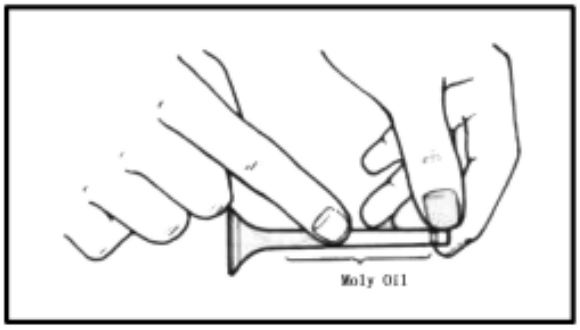
●Apply moly oil to valve stem seal and fit into position.



Material: Moly oil

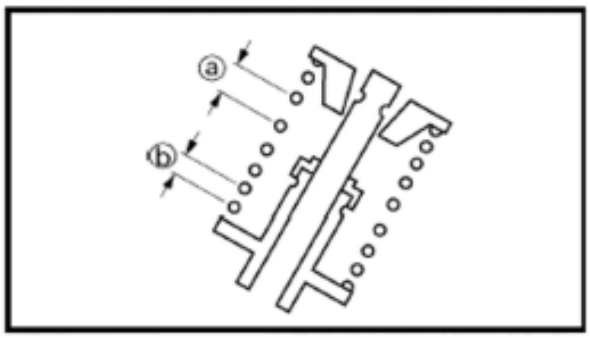
Note: Do not reuse the valve stem seal.

●Insert the valves, with stems coated with moly oil allaround.

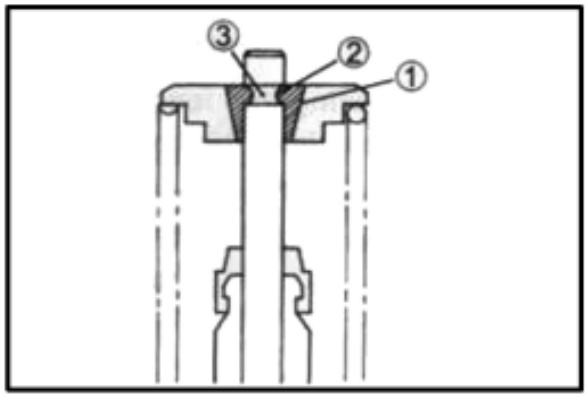


Note: When inserting the valve, be careful not to damage the lip of the stem seal.

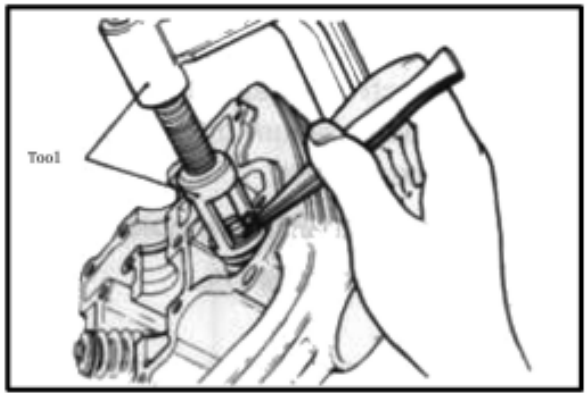
●Install valve spring with small-pitch end b facing cylinder head. Big-pitch end a is marked.



●Put on the valve spring retainer. Use the valve spring compressor to press down the spring. Fit the two cotter halves to the stem end and release compressor to allow the cotter 1to wedge in between seat and stem. Make sure that the rounded lip2of the cotter fits into the groove 3in the stem end.

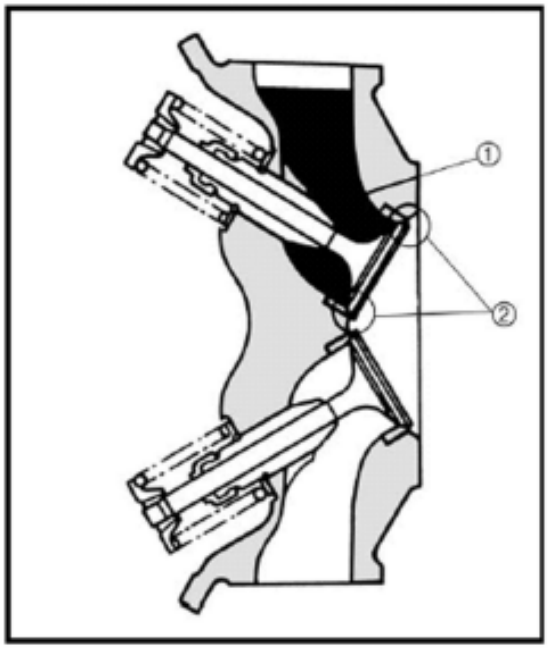


Tool: Valve Spring Compressor
Tweezers



NOTE: Knock the valve end with rubber hammer. Make sure valve cotter is fit into groove.

●Check the sealing effectiveness of cylinder head. Dip clean solution into valve IN/EX1and check for any leakage of valve seat2after a few minutes.

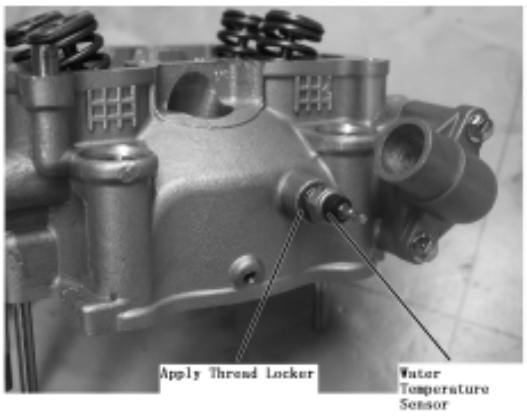


●Install thermostat

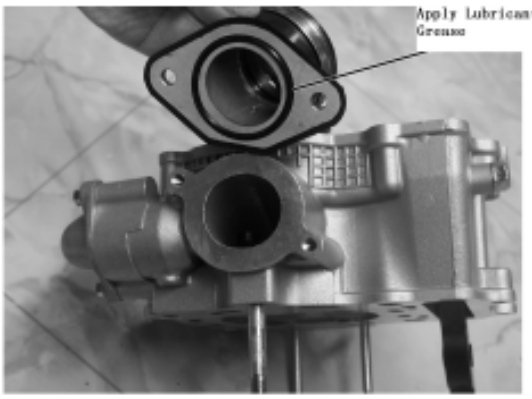
●Install thermostat cover

●Install water temperature sensor, apply thread locker to the thread part, tighten it to the specified torque.

Water temperature sensor
Tightening torque: 10 N.¤m

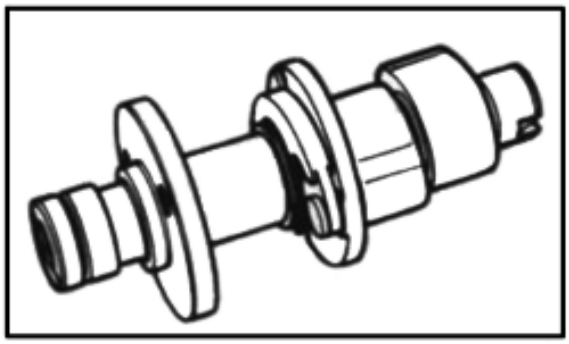


●Install intake pipe, apply lubricant to 0-ring.



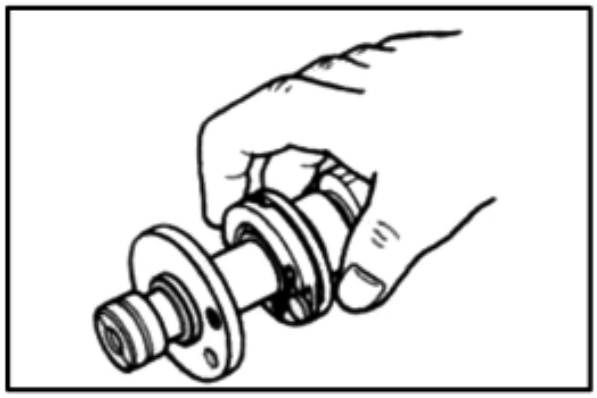
Camshaft

Check camshaft for wear and run-out of cams and
journals if the engines produces abnormal noise or
vibration or lacks power output. Any of these symptoms could be caused by wear of camshaft.



Note: Do not try to disassemble the camshaft/ automatic decompression assembly. It is not serviceable.

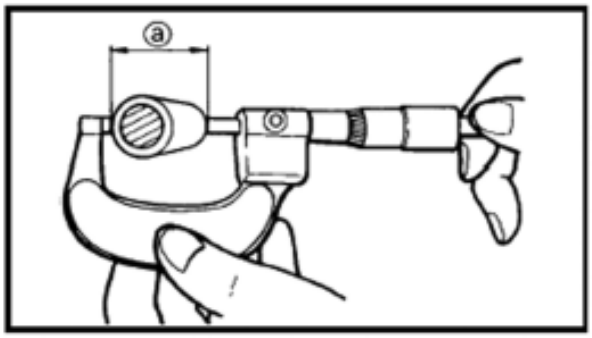
Automatic Decompression



●Move the automatic decompression weight with hand and check if it is operating smoothly. If it is not working smoothly, replace with a new camshaft/ automatic decompression assembly.

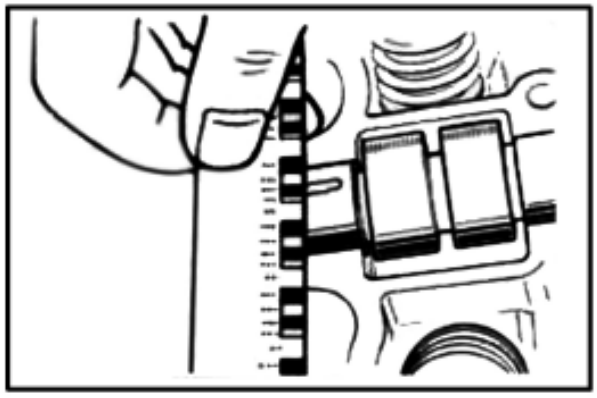
●Cam Wear

Worn cams can often cause mistimed valve operation resulting in reduced power output. The limit of cam wear is specified for both IN and EX cams in terms of cam height ¡°a¡± Measure with a micrometer the cam height. Cam height out of range:--Replace



Cam height service limit:
IN: 33.130mm
EX: 33.200mm
Tool: **micrometer (25-50mm)**

●Camshaft Journal Wear



Check whether each journal is worn to the limit by measuring camshaft journal oil clearance with the camshaft installed.

Camshaft journal oil clearance

Service limit: 0.15mm

●Clean off materials from cylinder head and cover;

●Install camshaft with plastic gauge;

●Install cylinder head cover and tighten bolts evenly and diagonally to the specified torque:

Tightening torque: 10 N.m

●Remove cylinder head cover, read the width of the compressed plastic gauge with envelop scale. The reading should be taken from the widest part.

Tool: Plastid Gauge

Note: Do not turn the camshaft with plastic gauge in place.

If the camshaft journal oil clearance exceeds the limit, measure the outer diameter of camshaft; Replace either cylinder head set or the camshaft if the clearance is not correct.

●**Camshaft Journal O.D.**

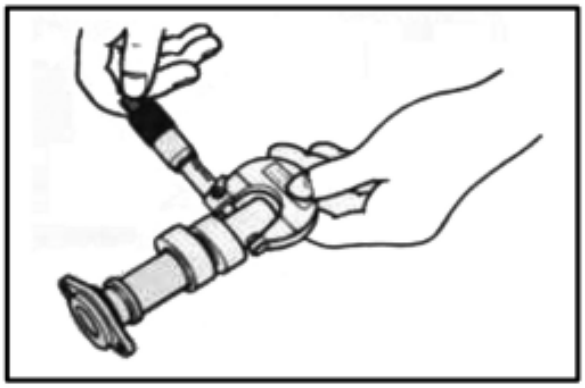
Measure camshaft journal O.D. with a micrometer. If the O.D. is out of range, replace camshaft with a new one.

Camshaft journal O.D. service limit:

Sprocket end: 22.959 mm--21.980mm

Other end: 17.466mm--17.484mm

Tool: micrometer (0-25mm)

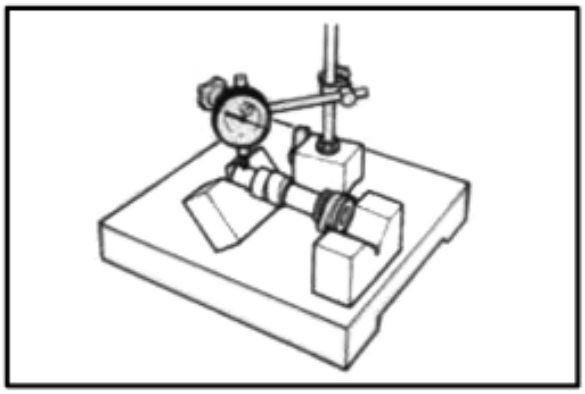


●Camshaft Run-out

Measure the run-out with a micrometer. Replace camshaft is the run-out is out of range.

Camshaft Run-out

Service limit: 0.10mm



●**Timing Sprocket and Chain**

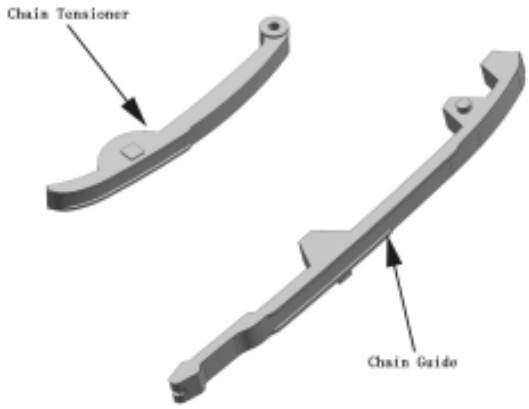
Check timing sprocket and chain for wear or damage.

Replace with new parts if abnormal wear or damage is found.

●**Tensioner and Chain Guide**

Check contact surface of tensioner and chain guide for wear and damage.

Replace with news parts if abnormal wear or damage is found.



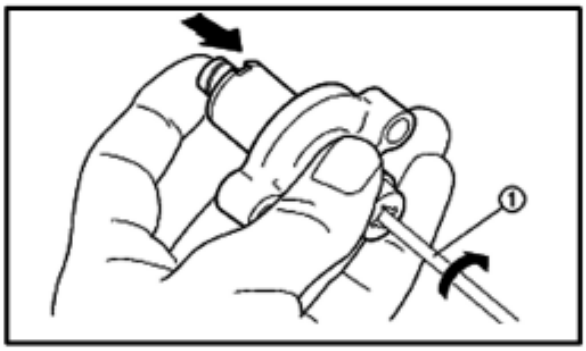
Chain Tensioner

Inspection

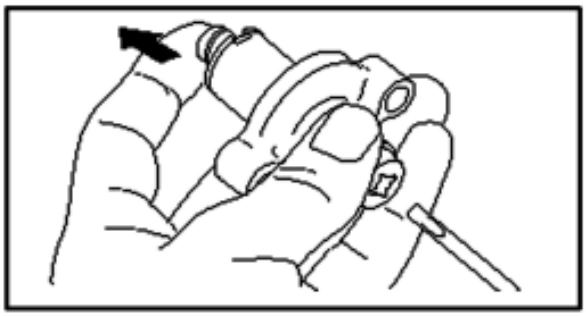
●Check tensioner for any damage or poor function. Damage, poor function:--Replace

●inspect way of working stability

■Insert screw driver into the slotted end of adjusting screw, turn it clockwise to loosen the tension and release the screwdriver.



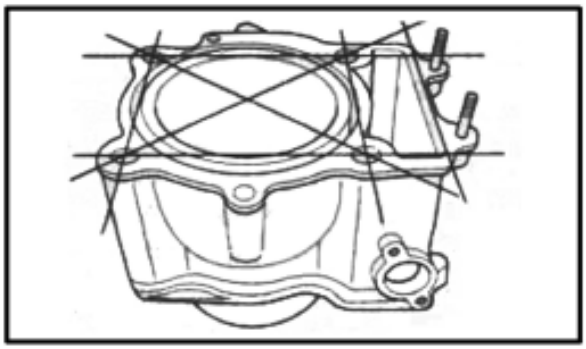
■Check the push rod movement. If the push rod is stuck or there is a failure with spring mechanism, replace the chain tensioner with a new one.



Cylinder

Cylinder Distortion

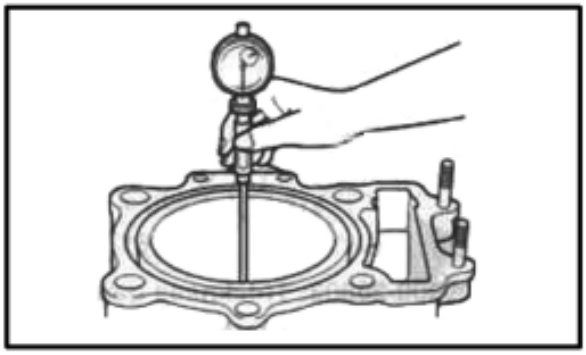
●Check the gasket face of cylinder for distortion with a straightedge and thickness gauge and take clearance readings at 7 points as illustrated. If the largest reading at any of the 7 points of the straightedge is out of the range, replace the cylinder.



Cylinder Distortion Service Limit: 0.05mm

Tool: Straightedge

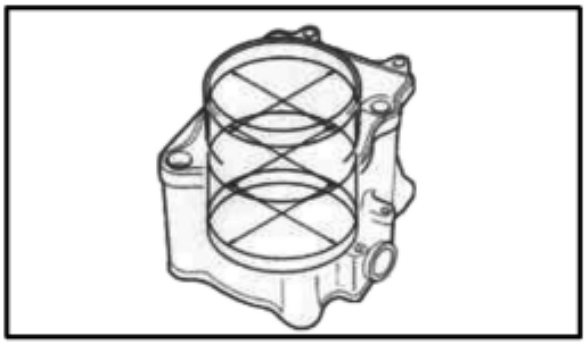
Thickness Gauge



Cylinder Bore

●Check cylinder wall for scratches, nicks or other damage. Replace with a new one if any.

●Measure cylinder bore diameter at three points of upper, middle and lower.



Standard Cylinder Bore: 87.500-87.522mm

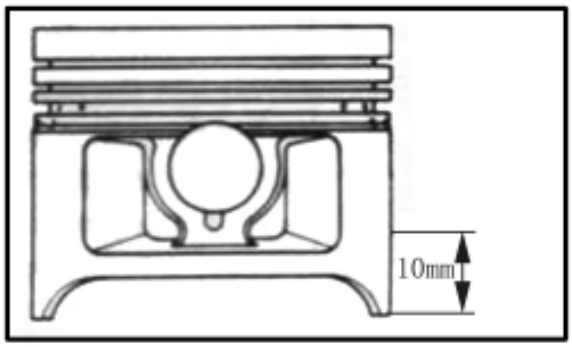
Tool: Cylinder Gauge Set

Piston

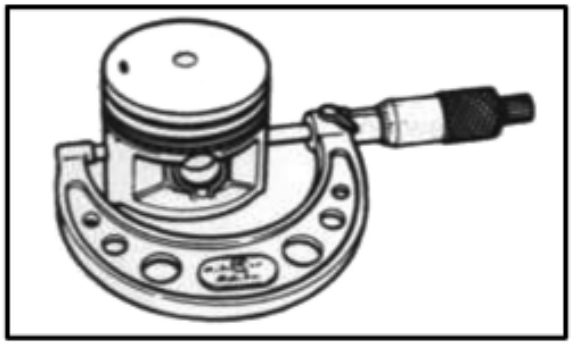
Piston Diameter

Use a micrometer to measure the diameter at the point 10mm above the piston end, as illustrated on the right. If the measurement is less that the limit, replace the piston

Standard: 87.460-87.480mm
Limit: 87.380mm
Tool: Micrometer (75-100mm)

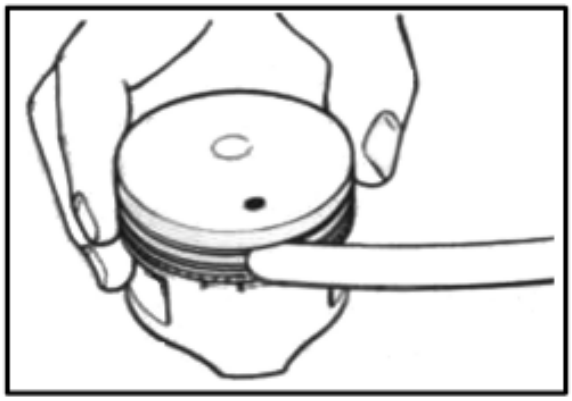


Calculate the piston to cylinder clearance according to the above measurement.
If the clearance is more than 0.15mm, replace the cylinder or piston, or both.



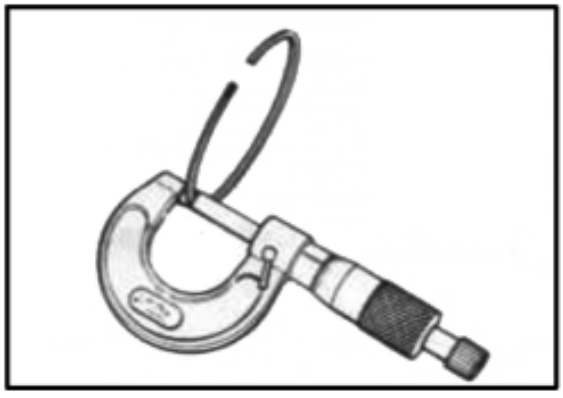
Piston Ring to Groove Clearance

Use a thickness gauge to measure the side clearance of top ring and 2nd ring.
If the clearance exceeds the limit, replace both piston and piston rings.



Service Limit:
Top ring: 0.18mm
2nd ring: 0.15mm

Standard width of piston ring groove
Top ring: 1.03-1.05mm
2nd ring: 1.22-1.24mm
Oil ring: 2.51-2.53mm



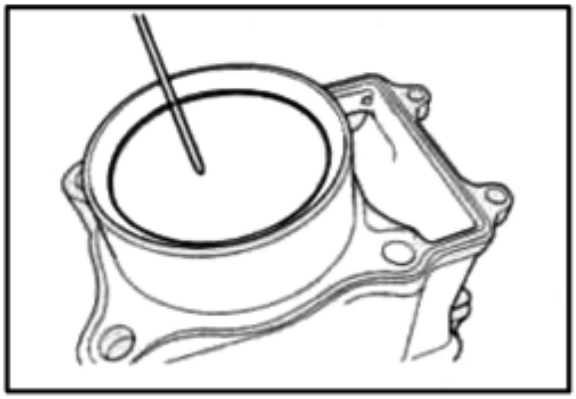
Standard thickness of piston ring
Top ring: 0.970-0.990mm
2nd ring: 1.170-1.190mm
Tools: Thickness gauge
Micrometer (0-25mm)

Piston Ring Free End Gap and End Gap

Before installing piston rings, use vernier caliper to measure the free end gap of each ring, and then fit ring into the cylinder.
Use thickness gauge to measure each ring end gap, if any ring has an excess end gap, replace the piston ring.

Piston ring free end gap limit:
Top ring: 8.9mm
2nd ring: 9.5mm

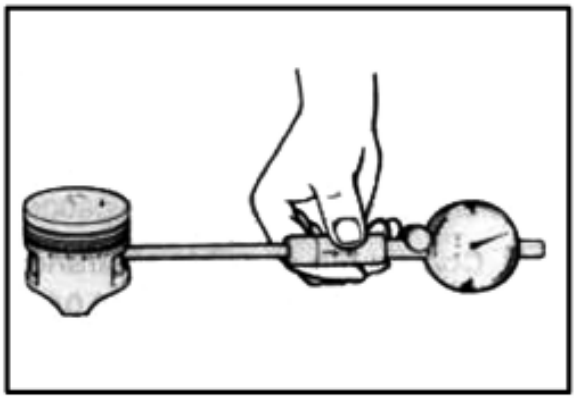
Piston ring end gap limit:
Top Ring: 0.60mm
2nd ring: 0.60mm
Tool: Vernier caliper
Thickness gauge



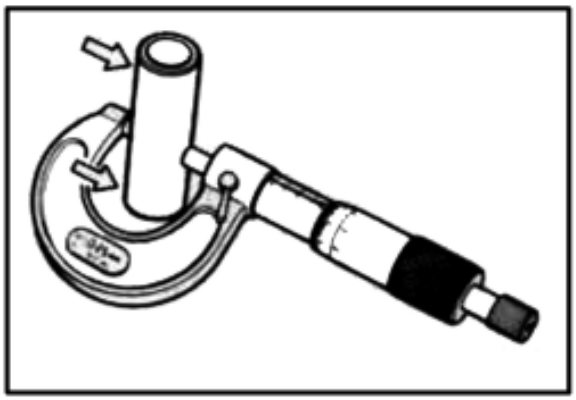
Piston Pin and Pin Bore

●Use a bore gauge to measure the inner diameter of piston pin bore.Use micrometer to measure outer diameter of piston pin.If out of limit, replace both piston and piston pin.

Piston pin bore limit: 23.030mm



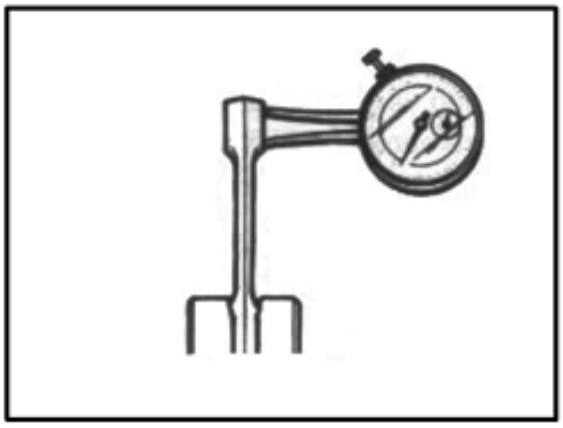
●Use micrometer to measure piston pin outer diameter at three points
Piston pin outer diameter limit: 22.980mm
Tools: Bore gauge (18-35mm)
Micrometer (0-25mm)



Connecting Rod/Crankshaft
Connecting rod small end I.D.

●Use a dial gauge to measure the I.D. of connecting rod small end. If the measurement exceeds the limit, replace the connecting rod.

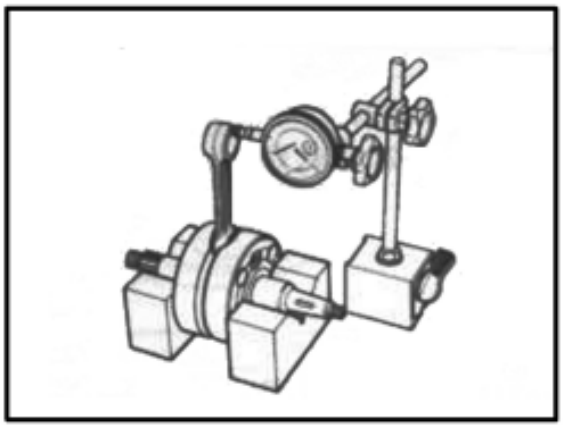
Connecting rod small end I.D. : 23.040mm
Tool: Dial Gauge (18-35mm)



Connecting Rod Deflection

●Check the movement of the small end of the rod and inspect the wear of the small end. This method is also applicable to check and inspection of big end.

Connecting Rod Deflection: 3.0mm
Tools: Dial Gauge
Magnetic stand
V-block

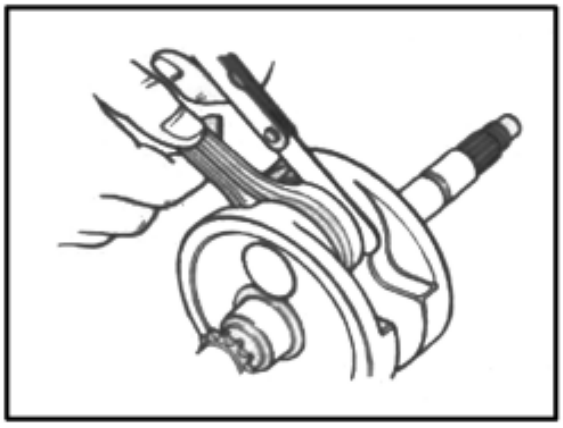


Connecting Rod Big End Side Clearance

●Push the big end to one side, and use thickness gauge to measure the other side clearance.
If out of limit, replace with a new crankshaft.

Connecting Rod big end side clearance: 1.0mm

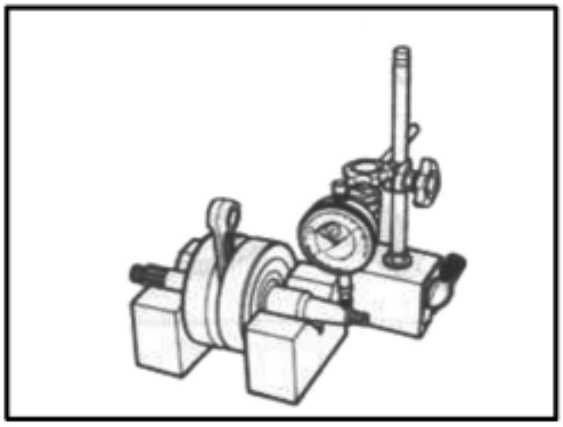
Tool: Thickness Gauge



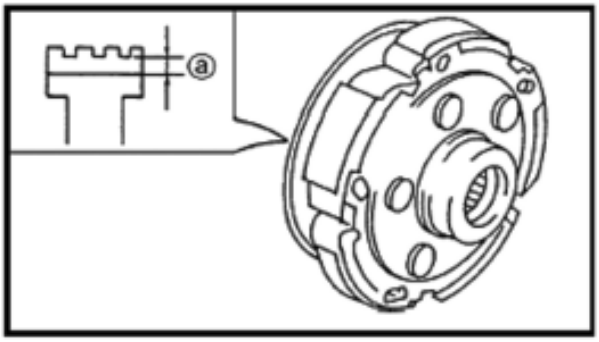
Crankshaft Run-out

●Support crankshaft with “V” blocks as illustrated. Put the dial gauge, slowly turn the crankshaft and measure run-out with a dial gauge.
If the run-out exceeds the limit, correct or replace the crankshaft.

Run out limit: 0.08mm
Tools: dial gauge
Magnetic stand
V-block



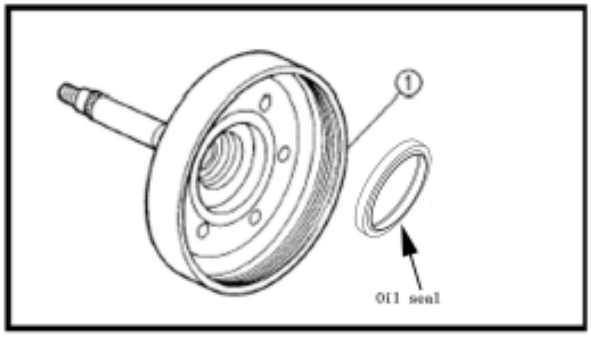
Clutch



●Check clutch for chipping, scrape, uneven wear or heat discoloration. At the same time check depth of the grooves of clutch shoes. If any of the clutch shoes has no groove, replace the clutch.

Note: clutch should be replaced as a set

Clutch Wheel



●Check the inner clutch wheel1for scratches, scuffs or blue discoloration or uneven wear. If any damage is found, replace the clutch wheel with a new one.

●for scratches, scuffs or blue discoloration or uneven wear. If any damage is found, replace the clutch wheel with a new one.

■Use special tool to remove oil seal

Tool: Oil seal remover

■Use special tool to assemble oil seal

Tool: Oil seal installer set

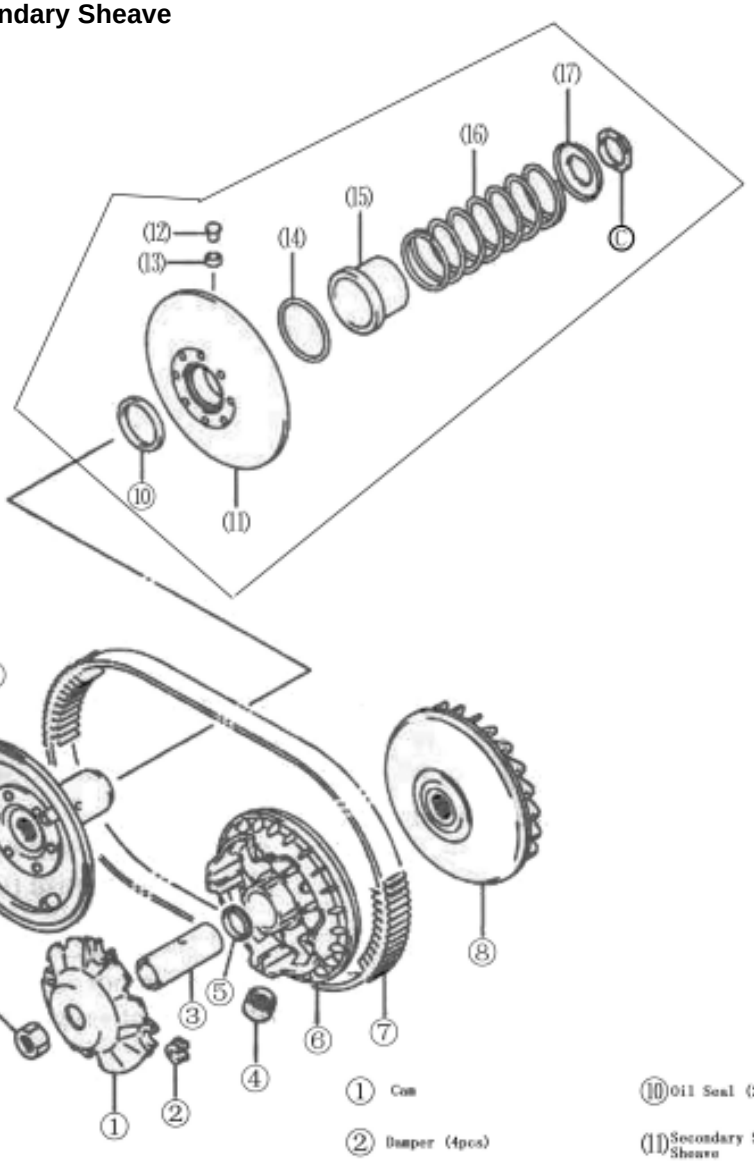
■Check the turning of bearing.

Abnormal damage: --Replace

Assembly

Apply lubricant grease to oil seal when assembling.

Primary and Secondary Sheave



Ⓐ Nut, Primary Sheave
Ⓑ Nut, Secondary Sheave
Ⓒ Ring Nut, Secondary sheave

	N • m
A	115
B	115
C	100

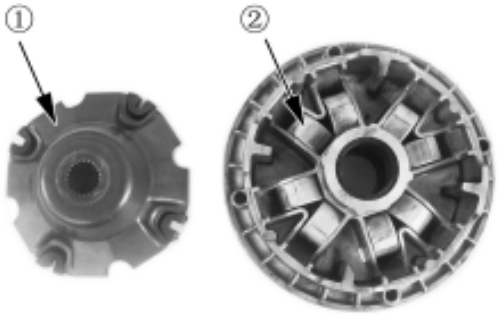
① Cam
② Damper (4pcs)
③ Spacer
④ Roller (8pcs)
⑤ Oil Seal (2pcs)
⑥ Primary Sliding Sheave
⑦ Drive Belt
⑧ Primary Fixed Sheave
⑨ Secondary Fixed Sheave
⑩ Oil Seal (2pcs)
⑪ Secondary Sliding Sheave
⑫ Guide Pin (4pcs)
⑬ Spacer (4pcs)
⑭ O-Ring (2pcs)
⑮ Spring Seat
⑯ Spring
⑰ Spring Plate

Primary Sliding Sheave

Disassembly

●Remove spacer

●Remove Cam1and Roller2



Roller

●Check each roller and sliding face for wear and damage.

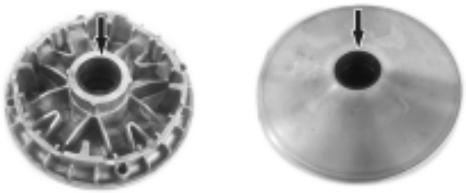
Wear and damage:--Replace

Note: rollers should be replaced as a set.

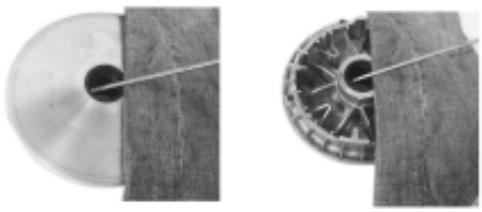
Oil Seal

●Check oil seal lip for wear and damage.

Wear and damage: --Replace



●Remove the oil seal



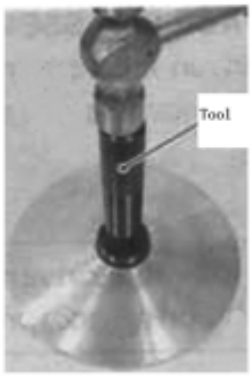
Primary Sliding Sheave and Fixed Sheave

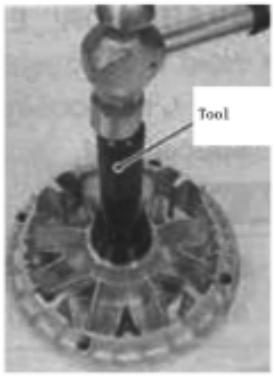
●Check the drive face for any abnormal conditions such as damage or stepped wearing.

Damage or wearing: --Replace

●Install oil seal with special tool.

Tool: Bearing install set

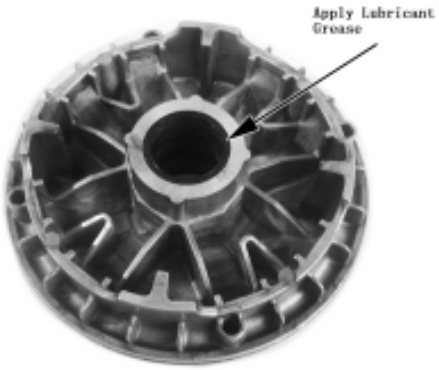




Assembly

Reverse the removal procedure of primary sliding and fixed sheave for installation.
Pay attention to the following:

●Apply grease to inner bore and oil seal lip.



Note£ °■Wipe off any excessive grease thoroughly.

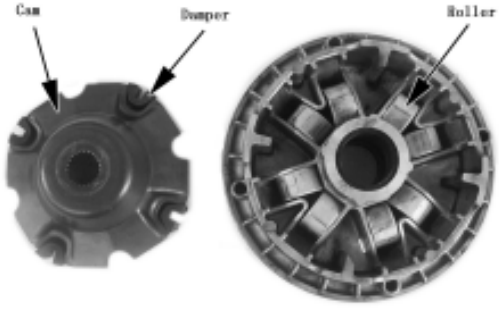
■Take care not to attach any lubricant grease to contact surface of drive belt.

Material: Lubricant grease

●Position 8 rollers1on the primary sliding sheave

●Install 4 dampers2to cam3

●Install cam to primary sliding sheave.



Notes:
When inserting the spacer, press down the cam so that the rollers will not come out of position.

●**Install spacer**

Secondary Sheave
Disassembly

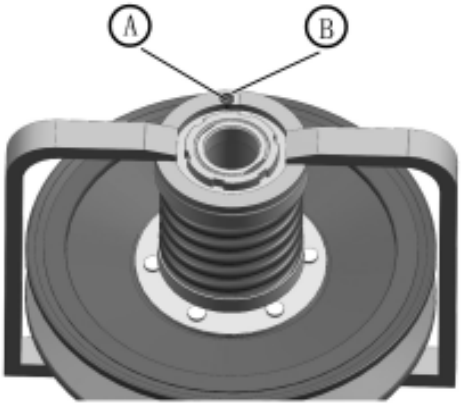
●Use special tool and holder to hold the secondary sheave. Remove secondary sheave nut with special tool.

Caution:
Do not remove the ring nut before attaching the clutch spring compressor.

Tool: Nut Wrench
Sheave Holder

●Attach special tool to the secondary sliding sheave and compress it by turning in the tool handle.

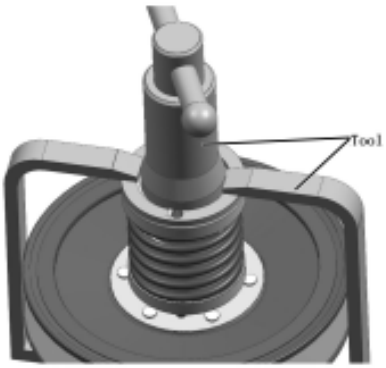
Note:
Make sure that spring end A is inserted into slot B of the tool handle.



●Remove ring nut.

Tool: Secondary sliding sheave spring compressor

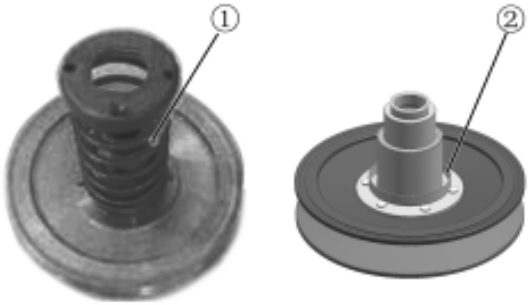
Note:
Since a high spring force applies to the secondary sliding sheave, take special care that the secondary sliding sheave will not come off abruptly.



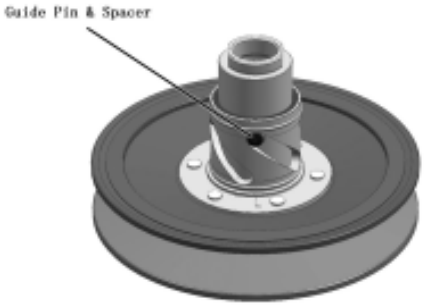
●Slowly loosen tool handle and remove the special tool.

●Remove spring1;

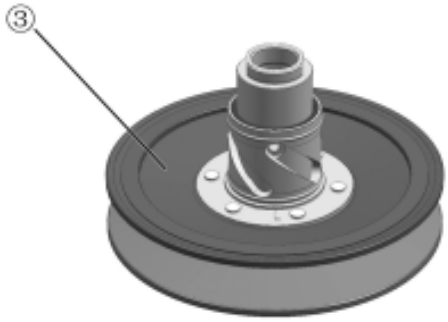
●Remove spring seat2;



●Remove guide pin and spacer.



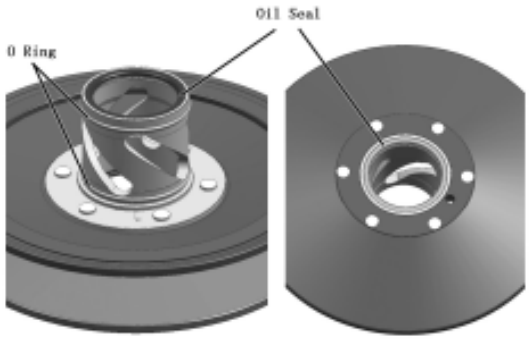
●Remove secondary sliding sheave3；



O-ring and Oil Seal

Check the O-ring and oil seal for wear and damage.

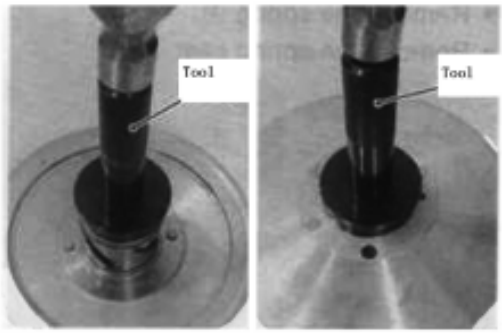
Wear and Damage: --Replace



●Remove Oil Seal

●Install oil seal with special tool.

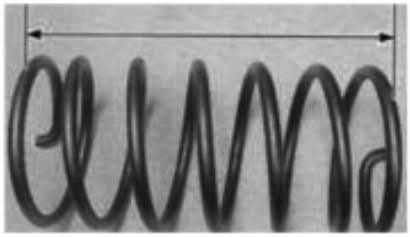
Tool: Bearing install set



●**Secondary Sheave Spring**

Use vernier caliper to check the spring free length. If the length is shorter than the service limit, replace with a new one.

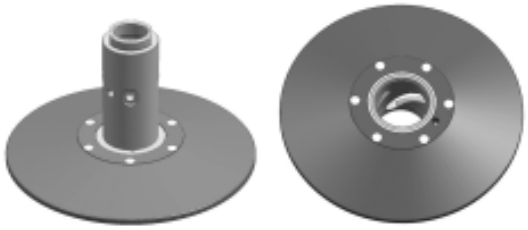
Service Limit: 145.4mm



●**Secondary Sliding and Fixed Sheave**

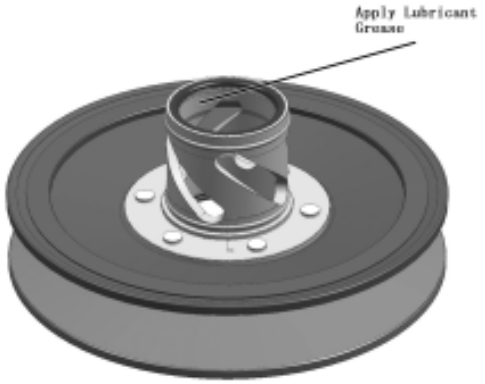
Check drive face for any abnormal condition such as stepped wear or damage.

Wear or damage: --Replace



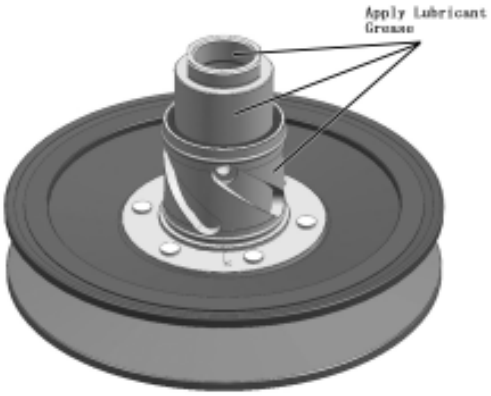
Assembly

●Install a new O-ring



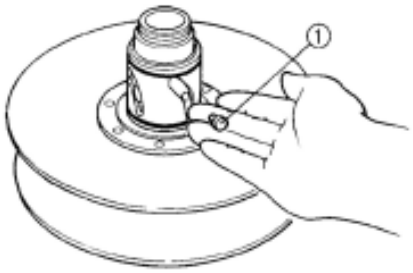
●Apply lubricant grease to O-ring, oil seal lip and guide pin groove.

Material: lubricant grease

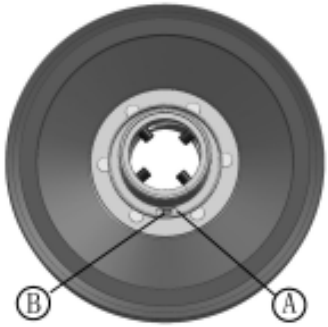


●Install guide pin and spacer1

Note: To avoid damage to the oil seal lip during assembly, slide the lip with a 0.1mm steel sheet as guide.



●Install spring seat. Align hole A with hole B.



●Install spring and spring plate. Insert spring end into the hole.

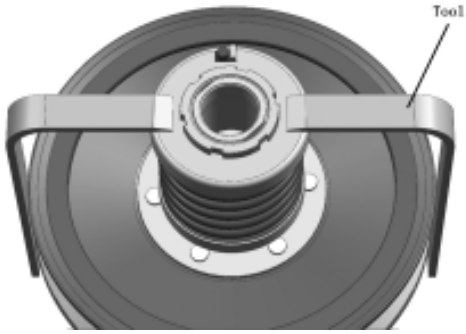
●Compress spring with special tool.

●Align the secondary sheave end with spring plate hole.

Tool: Secondary sheave spring compressor

●Tighten ring nut temporarily.

●Remove the special tool from secondary sheave.



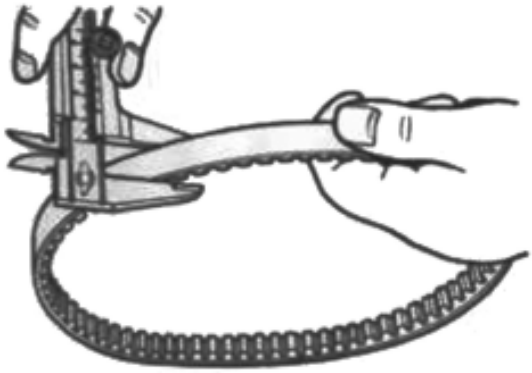
- Tighten the ring nut with special tool to the specified torque.

Ring Nut Tightening Torque:**100N.m**

Tool: Ring nut wrench
Sheave holder

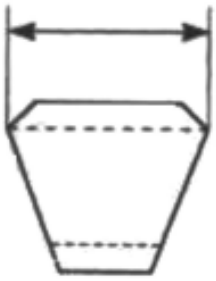
Drive belt

- Check belt for any greasy substance.
- Check contact surface of belt for any cracks and damage;
- Check belt width with venire caliper



Damage, width out of range:
Replace

Belt width service limit: 33.5mm
Tool: vernire caliper

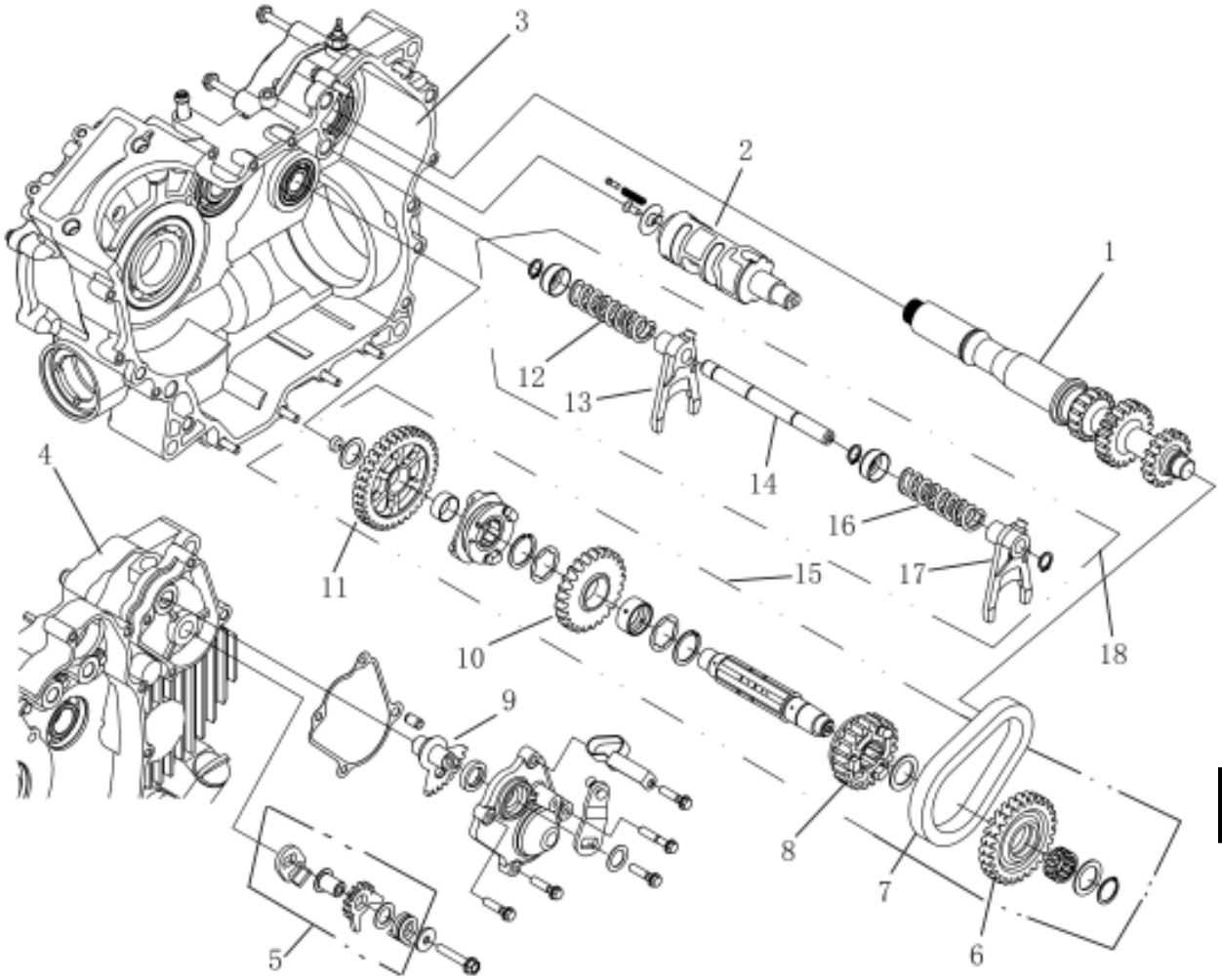


Caution:

If belt surface is stained with grease or oil,degrease the belt thoroughly.

Transmission

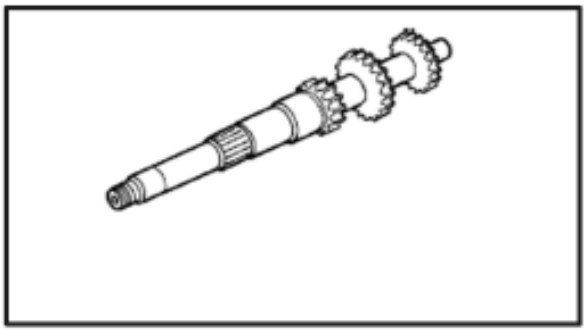
Decomposition



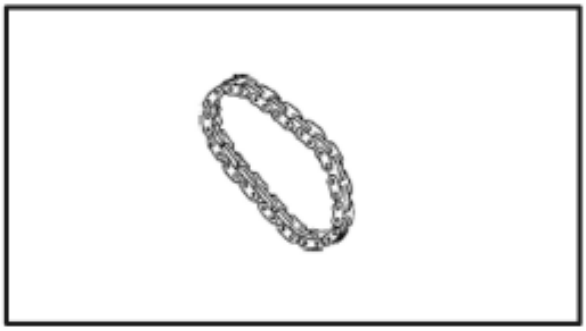
No	Description	Qty		No	Description	Qty
1	MAIN SHAFT. GEARSHIFT	1		10	DRIVEN GEAR, HIGH RANGE	1
2	SHIFT CAM	1		11	DRIVEN GEAR, LOW RANGE	1
3	RIGHT CRANKCASE	1		12	SPRING, SHIFT FORK	1
4	LEFT CRANKCASE	1		13	RIGHT SHIFT FORK	1
5	DRIVEN SECTOR GEAR	1		14	GUIDE BAR	1
6	SPROCKET, REVERSE GEAR	1		15	DRIVEN SHAFT	1
7	CHAIN, REVERSE GEAR	1		16	SPRING, SHIFT FORK	1
8	DRIVEN OUTPUT GEAR	1		17	LEFT SHIFT FORK	1
9	DRIVE SECTOR GEAR	1		18	SHIFT FORK ASSEMBLY	1

Inspection

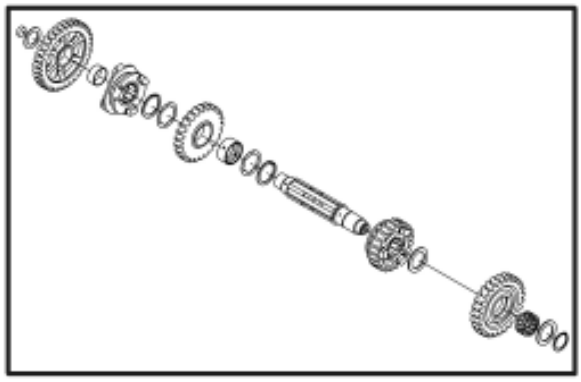
●Inspect drive bevel gear and sprocket for stains, scratch or damage, replace if necessary.



●Inspect reverse gear chain for damage, wear,replace if necessary.

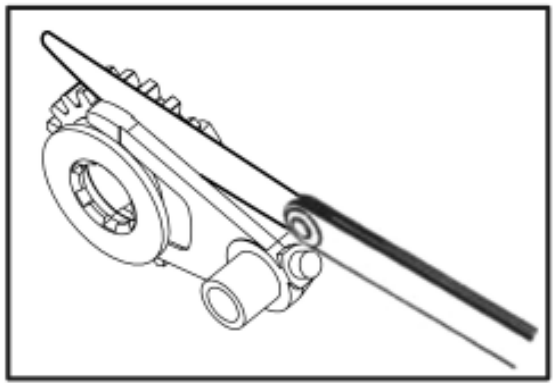


●Disassemble counter shaft as illustration.



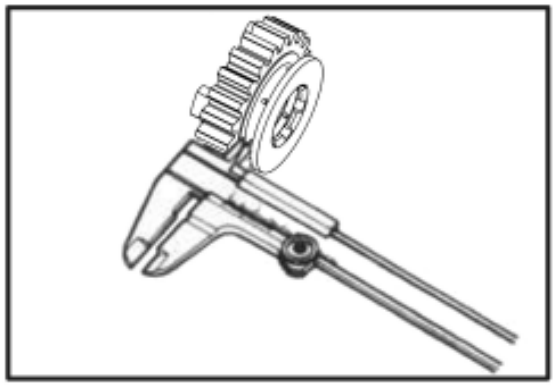
●Inspect bearing surfaces for stains, damage or wear and also for bearing gaskets. Replace if necessary.

●Check the shift fork clearance with a thickness gauge in the groove of its gear.Replace if clearance exceeds the limit.



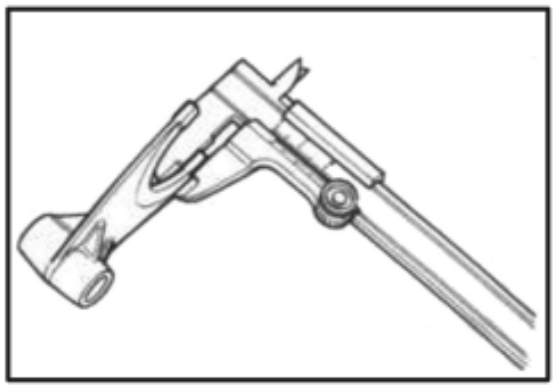
Shiftfork to Groove clearance
standard: 0.10-0.30mm
Service limit:0.50mm

● Measure shift fork groove width with vernier caliper



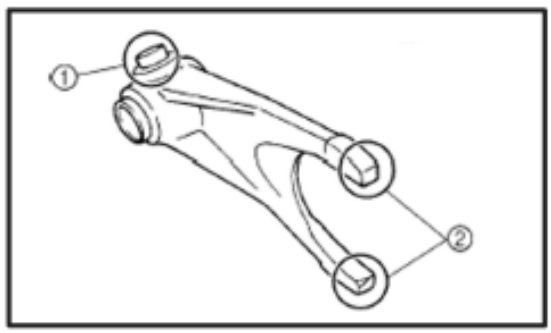
Standard shift fork groove width£º
6.05-6.15mm

●Measure shift fork thickness with vernier calipers;



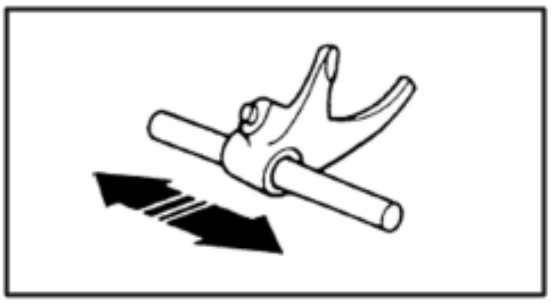
Standard fork thickness: 5.08-5.90mm

●Check shift fork 1 and 2 for damage or bend

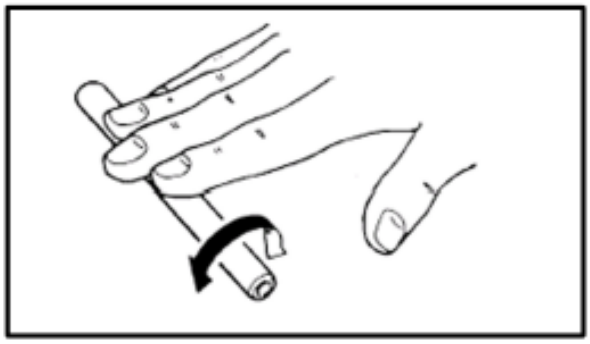


Damage, bend: Replace

●Install shift fork to guide bar and move left and right.In case of any unsmooth moving, replace with a new one.

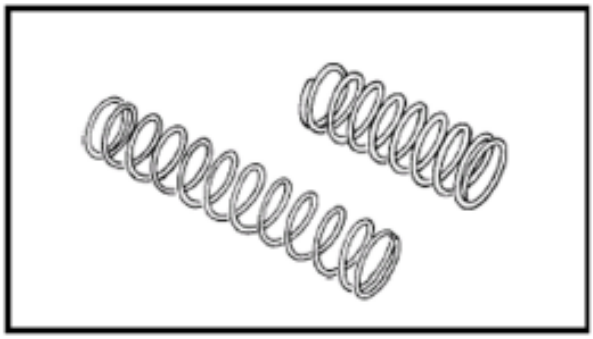


●Put the guide bar on a flat place and roll it. In case of any bend, replace with a new one.



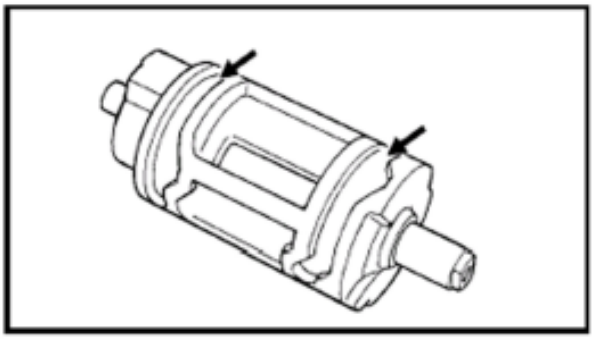
Caution:DO NOT attempt to correct a bent guide bar.

●Check shift fork spring for breakage, damage.



Broken or damaged: Replace

●Check shift cam groove for scratches, damage.



Scratch or damage: Replace

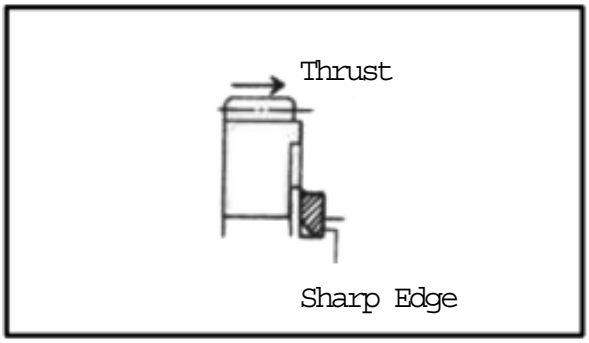
Assembly

Reverse the removal procedure for assembly. Pay attention to the following:

Note:

●Use new retainers. Pay attention to the direction of the retainers. Fit to the side where the thrust is as illustrated.

●Coat the gears and shafts with engine oil before assembly.

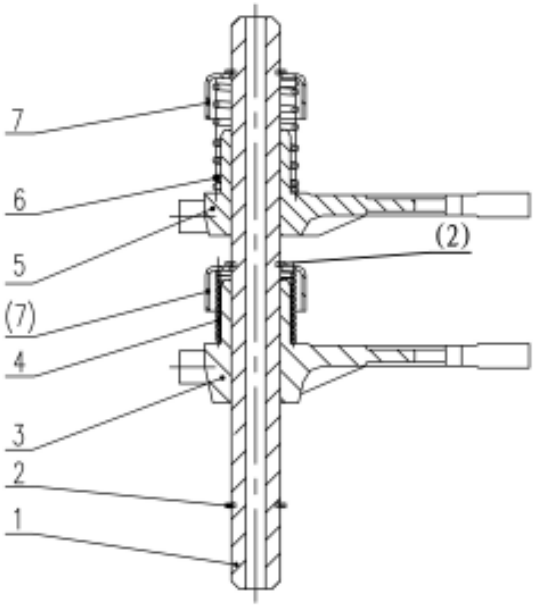


●Do not reuse the retainers

●Do not expand of the gap end of new retainers too wide when assembling.

●Make sure that all the retainers are properly fitted.

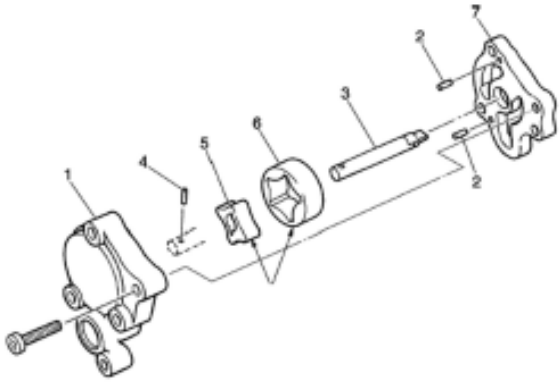
●When assembling the guide bar, take care not to assemble the two shift forks and springs in the opposite direction..



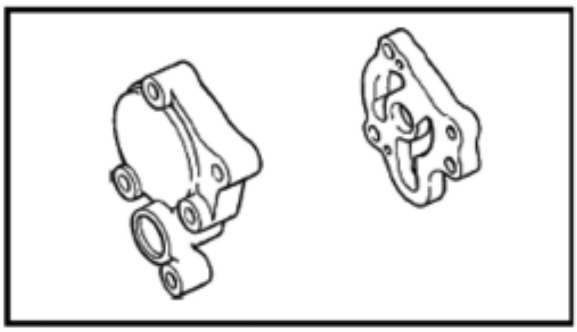
1. Guide bar 2. Retainer 12
3. Left shift fork
4. Shift fork spring(small)
5. Right shift fork
6. Shift fork spring(big)
7. Spring seat

Oil pump

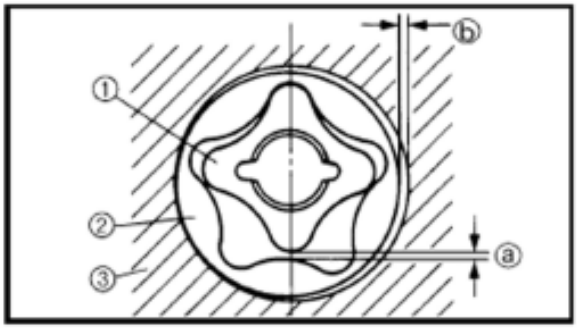
●Disasseble oil pump as illustrated:
1 Oil pump housing; 2 Dowel pin
3 Oil pump shaft; 4 Straight pin;
5 Inner rotor, oil pump;
6 Outer rotor, oil pump;
7 Oil pumper cover



●Check oil pump housing and cover for cracks and damage. Replace if necessary.



●Measure the top clearance a between inner and outer rotors and side clearance b between outer rotor and oil pump housing. If the clearance exceeds the limit, replace with new one.



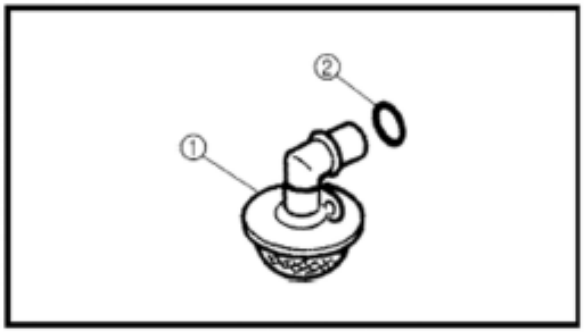
Top clearance:0.03-0.10mm
Service limit:0.15mm

Side clearance:0.03-0.10mm
Service liimit:0.12mm

Oil strainer inspection

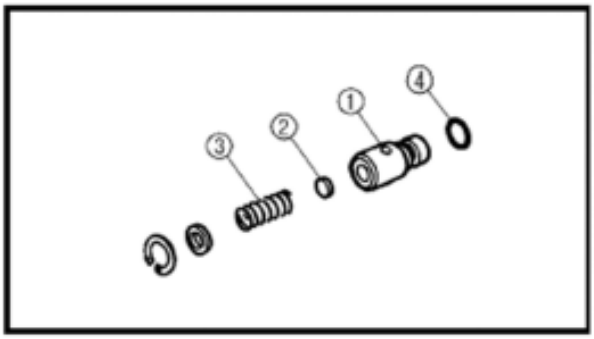
●Check oil strainer1 and O-ring 2 for damage. Replace if necessary;

●Clean the surface of oil strainer with engine oil;



Relieft valve

●Check the valve body1,valve2,srping3 and 0-ring4 for damage or wear;

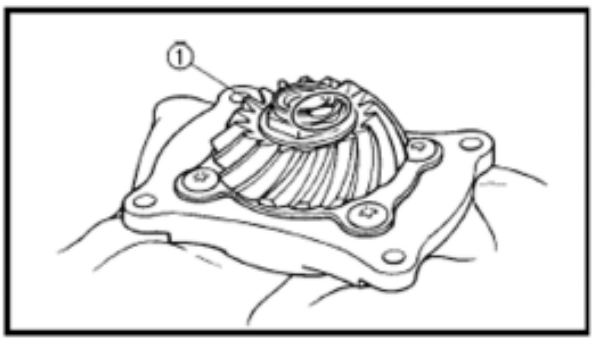


Drive bevel gear

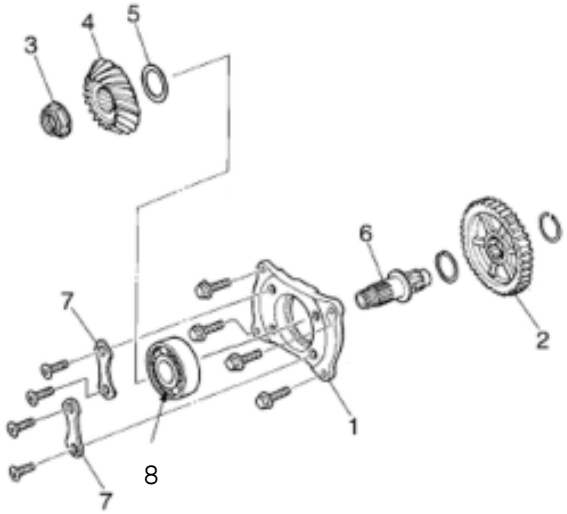
●Use a clean rag to protect the drive bevel gear shaft, clamp it to the pliers;

●Loosen drive bevel gear nut 3, remove the drive bevel gear 4 and adjust washer 5

- Check the drive bevel gear 4 and output driven gear 2 for rust, scratch, wear or damage. Replace if necessary.
- Check if the bearing 8 turns smoothly, replace with a new bearing if necessary.
- Adjust Washer 5 if any of right crankcase, drive bevel gear 4, or drive bevel gear cover 1 is replaced. Refer to bevel gear adjustment for details.
- Apply engine oil to bearing 8 when assembling and tighten nut 3 to the specified torque.



1-Drive bevel gear cover 5-Washer
2-Output driven gear 6-Drive bevel gear shaft
3-Drive bevel gear nut 7. Bearing nut
4-Drive bevel gear 8. Bearing



Drive bevel gear nut tightening torque:**145N.m**

Front Output Shaft

- Check bearing 7 for smooth turning and abnormal wear. Check oil seal 5 for damage.
  Wear or damage: Replace
- Apply lubrication oil to bearing 7 and oil seal 5 lip before assembly.
- Apply thread locker to bearing limit nut 6 (left thread) and tighten to the specified torque.
  Bearing limit nut
  Tightening torque: 80N.m

Tighten Nut 1 to the specified torque, front output shaft nut tightening torque: 97N.m

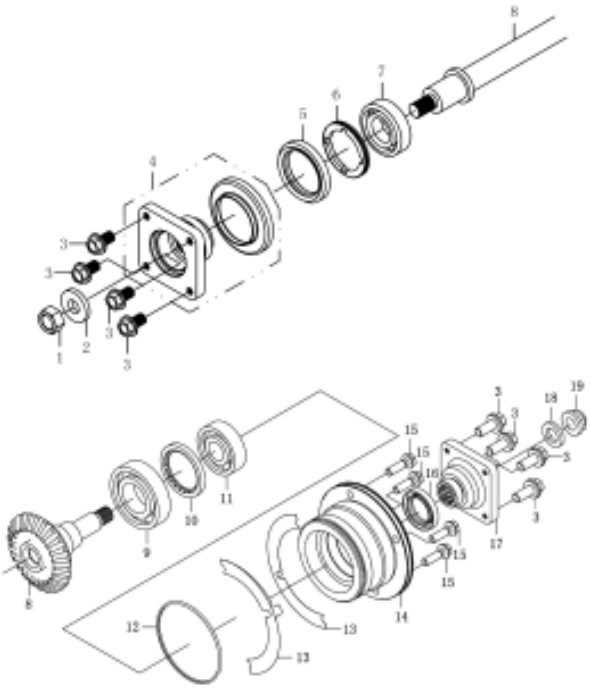
Driven Bevel Gear

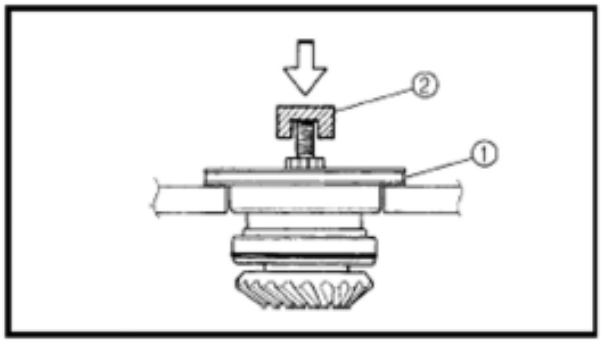
Remove nut 19, washer 18, coupler 17 and oil seal 16.

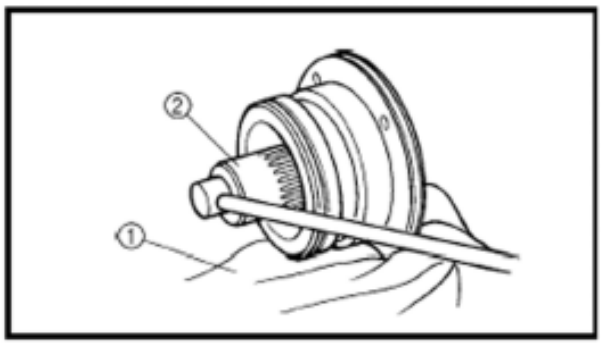
- Protect end thread of driven bevel gear with proper device 2. fix bevel gear cover 14 and press out driven bevel gear.
- Place a clean rag1 under bevel gear cover. Remove bearing limit nut 10 with special tool 2 and remove bearing.
- Check driven bevel gear 8 surface for scratches, wear. Scratch or wear: Replace
- Check free turning of bearing 9 and 11. Replace with a new one if any abnormal is found.
- Use new oil seal 16 and O-ring 12 when assembling.
- Adjust washer 13 if any of right crankcase, driven bevel gear 8 or driven bevel gear cover 14 is replaced. Refer to bevel gear adjustment for details.
- Apply lubrication oil to bearing 9 and 11 and oil seal 16, O-ring. Apply thread locker to nut 10 and tighten to the specified torque.
  Tightening torque :110N.m
  Tool: driven bevel gear nut wrench
  Driven bevel gear nut tightening torque: 150N.m

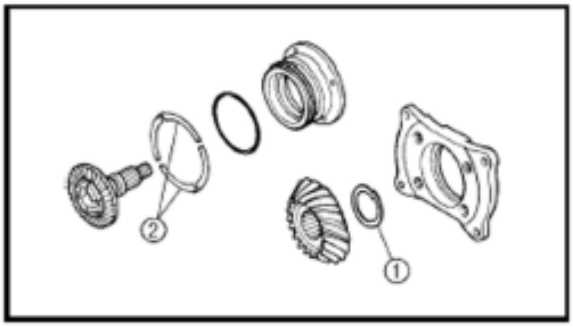
Bevel Gear Washer Adjustment

- Adjust washer 1 and 2 when replacing crankcase and/or bevel gear and/or bevel gear cover.



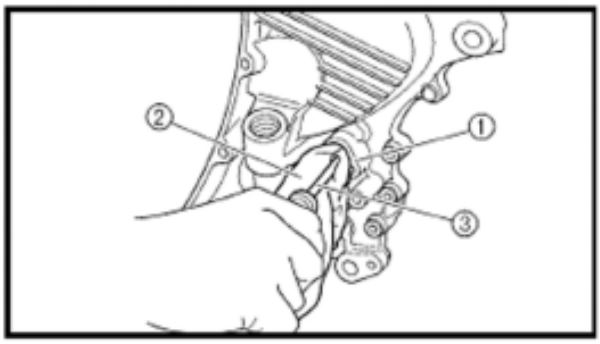






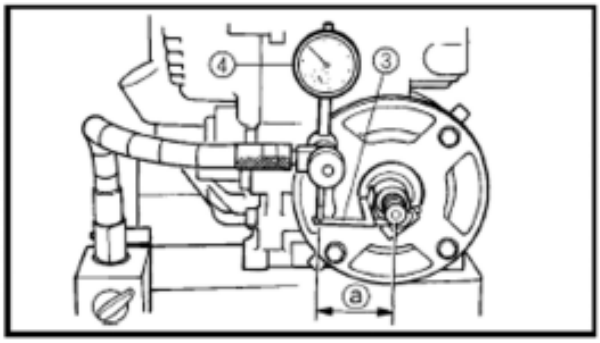
Bevel gear

Note: Proper bevel gear engagement depends on that the gear backlash and tooth contact are within the proper range.



Bevel gear backlash

● Install drive and driven gears to the crankcase. Wrap a (-) screwdriver 3with a rag 2 and insert it into the speed sensor hole 1 of left crankcase to fix the drive bevel gear.



●Install special tool3 and micrimeter 4

Tool:Bevel gear side clearance dial gauge micrometer

a=46mm

●Turn the driven bevel gear in each direction and measure the backlash.

NOTE: Measure four points in the mutual vertical direction

●If the backlash is not within the specification, adjust the thickness of the driven bevel gear adjust washer. Re-check the backlash until the backlash is correct

Bevel gear backlash:**0.1-0.2mm**

Adjustment:

Measuredbacklash	Washer thickness adjustment
<0.1mm	Decrease washer thickness
0.1~0.2mm	Correct
>0.2mm	Increase washer thickness

Tooth contact inspection

After adjusting the backlash, check the tooth contact according to the following procedures

● Remove drive and driven bevel gear shafts from crankcase;

●Clean and degrease every tooth of drive and driven bevel gear;

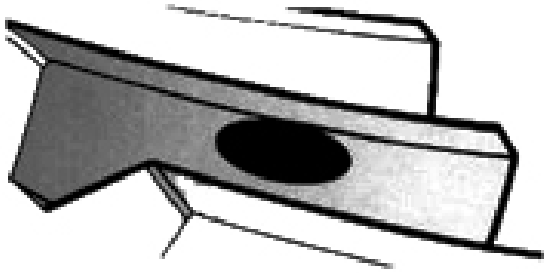
●Coat the driven bevel gear with machinist's layout dye or paste;

●Install drive and driven bevel gear;

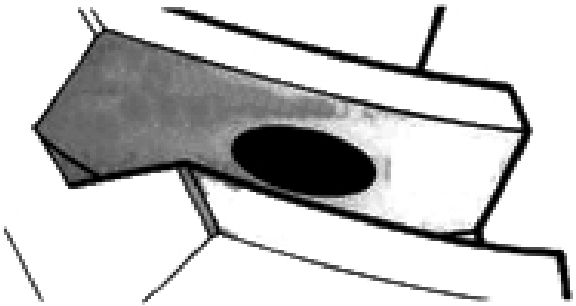
●Rotate the driven bevel gear several turns in both directions

●Remove drive and driven bevel gear shafts and check the coated teeth of the drive bevel gear;

①



②

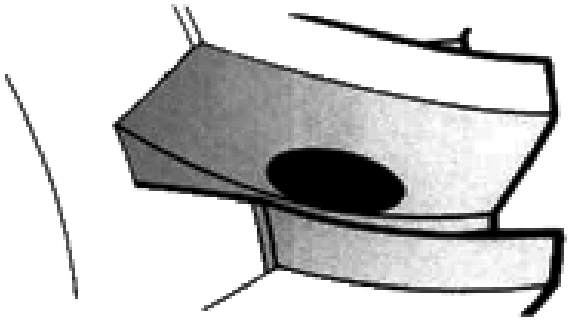


Contact 1	tooth top	Incorrect
Contact2	tooth middle	Correct
Contact3	tooth bottom	Correct

●If tooth contact is correct(Contact2, continue next procedure;)

●If tooth contact is incorrect（1and 3）, adjust the thickness of washer of drive gear. Repeat above steps to check tooth contact until correct.

③



Adjustment

Tooth contact	Washer adjustment
At tooth top 1	Increase thickness
At tooth bottom3	Decrerase thickness

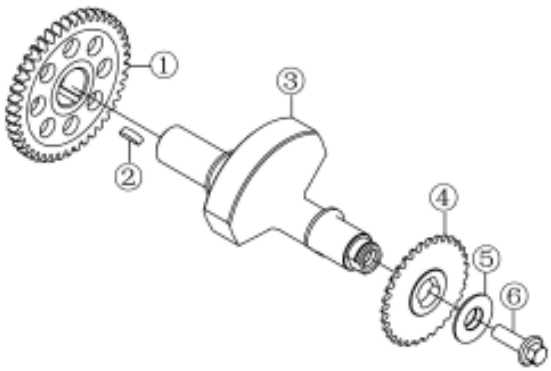
Note:

●After adjusting the tooth contact, the backlash must be checked again;

●If the backlash is adjusted but tooth contact is still out of specification, replace the drive and driven bevel gears;

●Both tooth contact and backlashshould be within the required specification.

Balance shaft



●Remove the parts as illustrated on the right.
Check each part for abnormal wear or damage.
wear or damage: Replace

1Balance shaft gear 2woodruf key
3Balance shaft
4Balance shaft sprocket
5Washer 6Bolt

Magneto Rotor

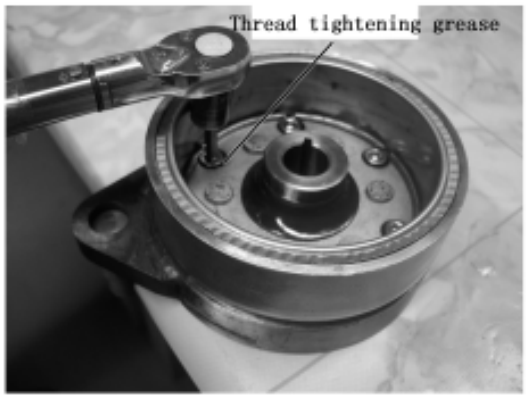
●Remove starter clutch nut.

●Check starter clutch roller and holder for abnormal wear or damage,replace if necessary.

●Replace the starter clutch in the right direction.

Note:

When install the starter clutch to the magneto rotor, make sure side A is in the right direction.



■Face arrow mark B to the engine side;

■Apply engine oil to starter clutch;

■Apply thread locker to bolt and tighten to the specified torque.

Tightening torque of starter clutch bolt: 26N. m. Material: Thread locker

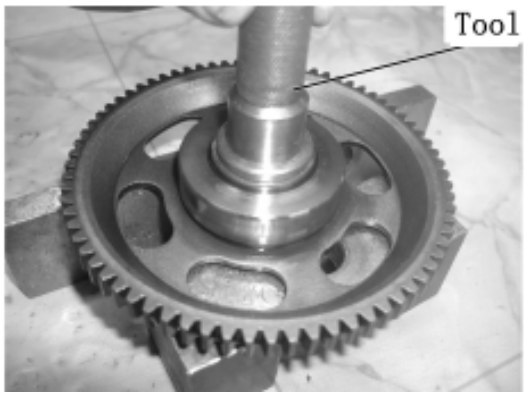
●Install the starter driven gear.

●Make that the starter driven gear turns in the opposite direction of the arrow mark B The gear cannot turn in the direction of the arrow.

●Check starter driven gear bearing. In case of anything unusual, replace the bearing.

●Remove starter driven gear bearing with special tool.

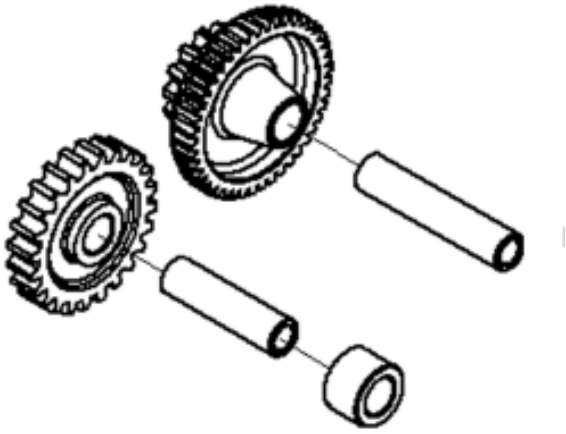
●Install starter driven gear bearing with special tool.



Tool:Bearing installer/Remover

Electric Starter Gear

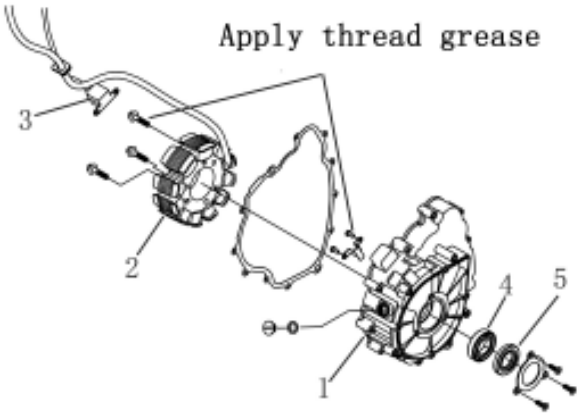
●Check the gear surface for scrap or damage, repalce if necessar£»



Left crank case cover:

●Check magneto stator coil 2, pickup coil 3 for damag,replace circuit if necessary;

●Check bear 4 for smooth turning. If it is stuck, replace with a new one;

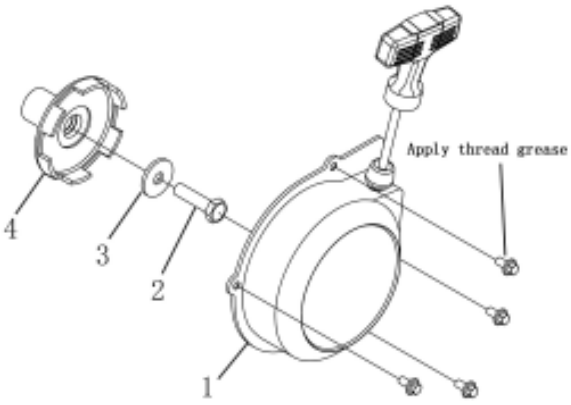


●Check oil seal 5 for damage. Replace if it is damaged.

●Apply thread locker to the bolt when assembling;

Tightening torque for magneto coil bolt:**10N**.**m**

●Apply lubrication oil to bearing 4 and lubricant grease to lip of oil seal 5 when assembling.

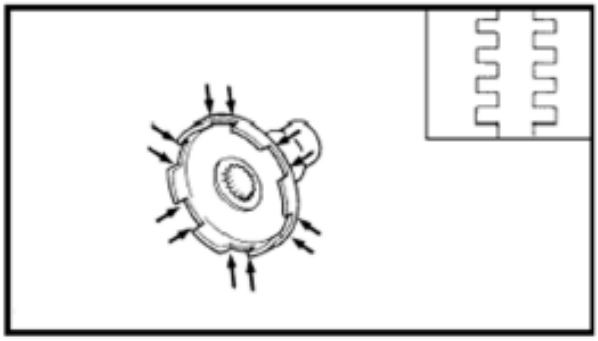


Recoil starter disassembly:

1-Recoil starter
2-Bolt
3-Washer
4-Starter pully

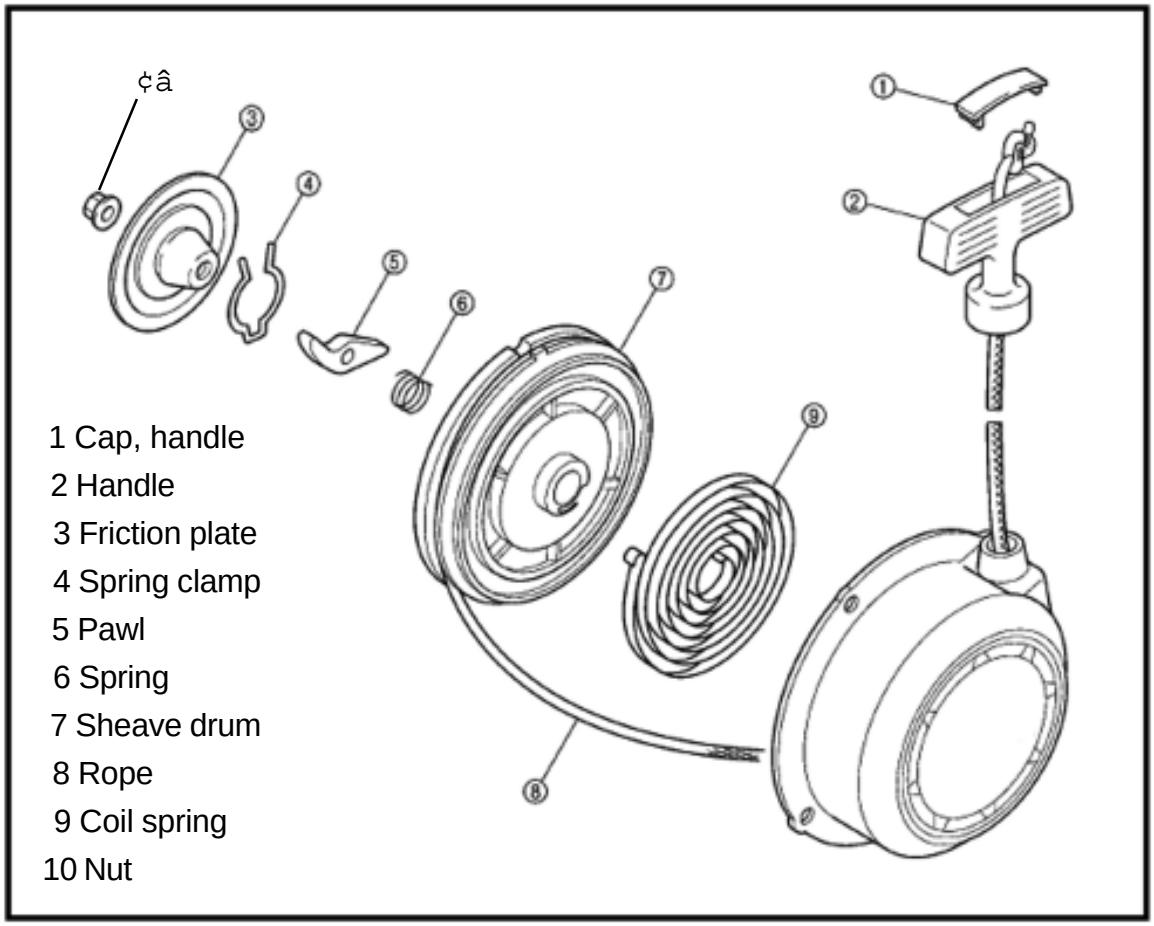
Inspection

●Check sheave drum for burrs, cracks or rust. In case of any abnormal, replace.



Recoil starter

●Disassembly is unnecessary if recoil starter wokrs well.



Disassembly

●Remove nut 10 and the parts from the starter housing.

Warning! The coil spring may quickly unwind and cause injury when the sheave drum is opened. Wear proper hand and eye protection beforehand.

Inspection:

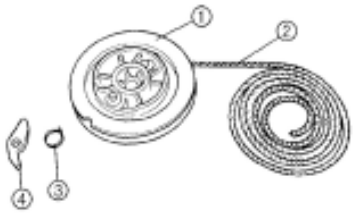
●Check all parts for damage. Repalce if necessary.

Assembly

Reverse the removal procedure for installation and pay attention to the following:

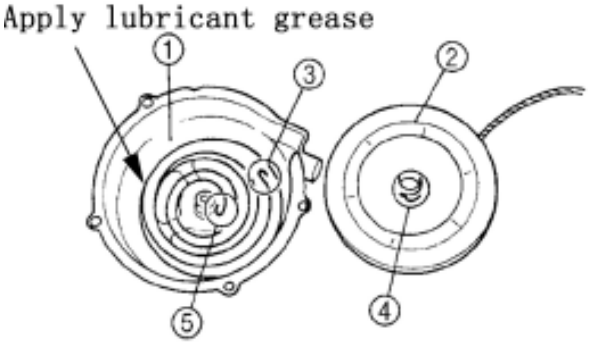
Install sheave drum1£¬rope2£¬coil spring3£¬Damper4

Wind the rope clockwise around the sheave drum three times and hook the rope at “a”of sheave drum.



Warning!The coil spring may quickly unwind and cause injury when the sheave drum is opened. Wear proper hand and eye protection beforehand.

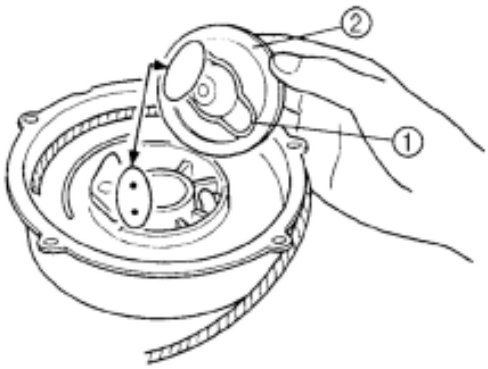
Install coil spring1and sheave drum2;



Apply lubricant grease to spring;

Hook coil spring end 3 to the starter housing, wind the coil spring clockwise

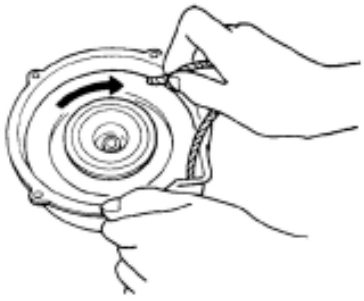
Hook the other end 5 of coil spring to hook part 4 of sheave drum.



Install spring clamp1,friction2 and bolt

Turn sheave drum three times for pretention of coil spring.

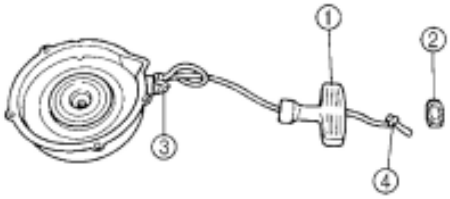
Move the sheave drum 3 to tighten spring.



Install handle1and handle cap2

Lead the rope through the hole of the starter housing and tie a knot 3 so that the rope would not be drawn back.

After making a tie4,draw back previous one3.



CVT cover

●Remove screw 5, oil seal limitator 4 .Remove oil seal 3 with sepecial tool;

●Check bearing 2 for free turning. In case of any abnormal, remove with special tool and replace with a new bearing;

●Apply lubrication oil to outer ring of bearing and install bearing with special tool. Check bearing for smooth turning.

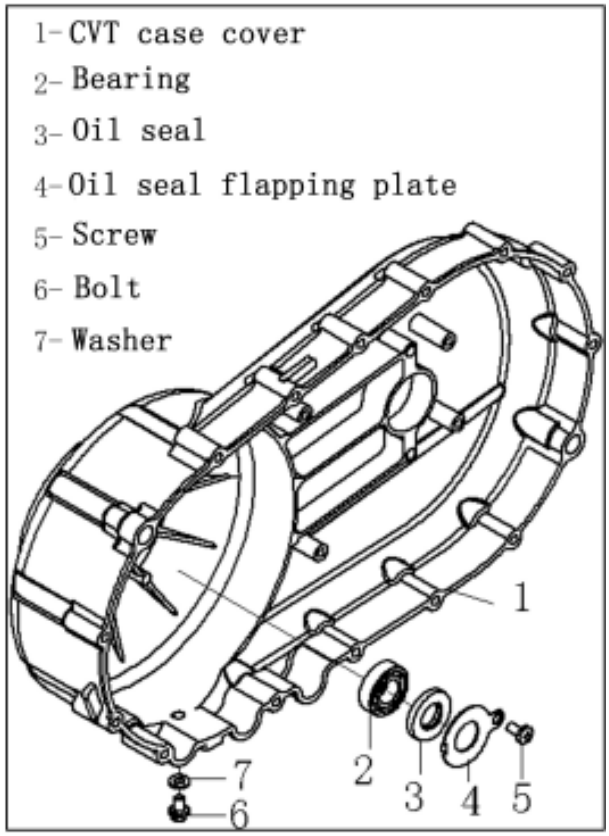
●Apply grease to bearing inner side

●Apply grease oil seal lip and install bearing with special tool. Check bearing for smooth turning;

Note: Use a new oil seal

●Install oil seal limitator and tighten screw after applying thread locker.

Tool:Bearing remover
Oil seal remover
Bearing installer



CVT case

●Check bearing 5 for smooth turning. In case of any abnormal, remove screw 3 and bearing retainer 4 and replace with a new bearing.

●Check oil seal 7. In case of any damage, replace it.

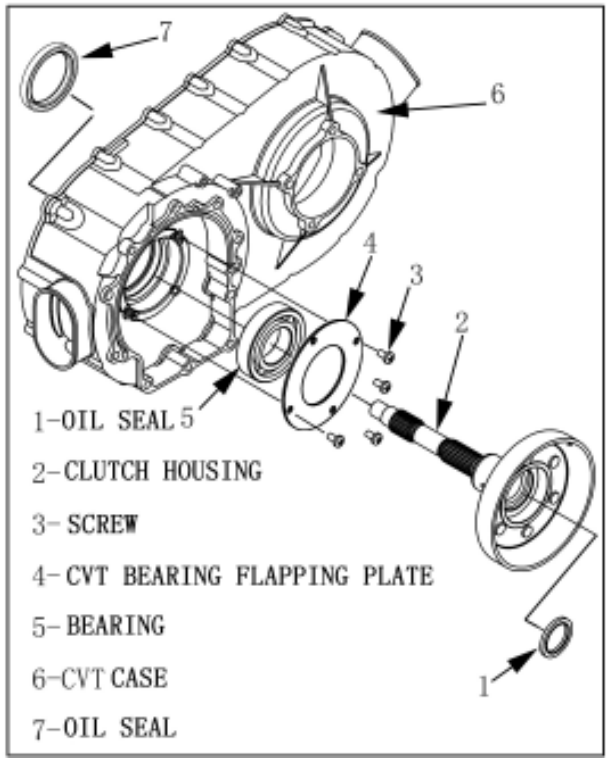
●Apply grease to oil seal lip and install with special tool;

●Apply lubrication oil to bearing 5 and install with special tool; Check bearing for smooth turning. The seal side of bearing 5 should face bearing retainer 4.

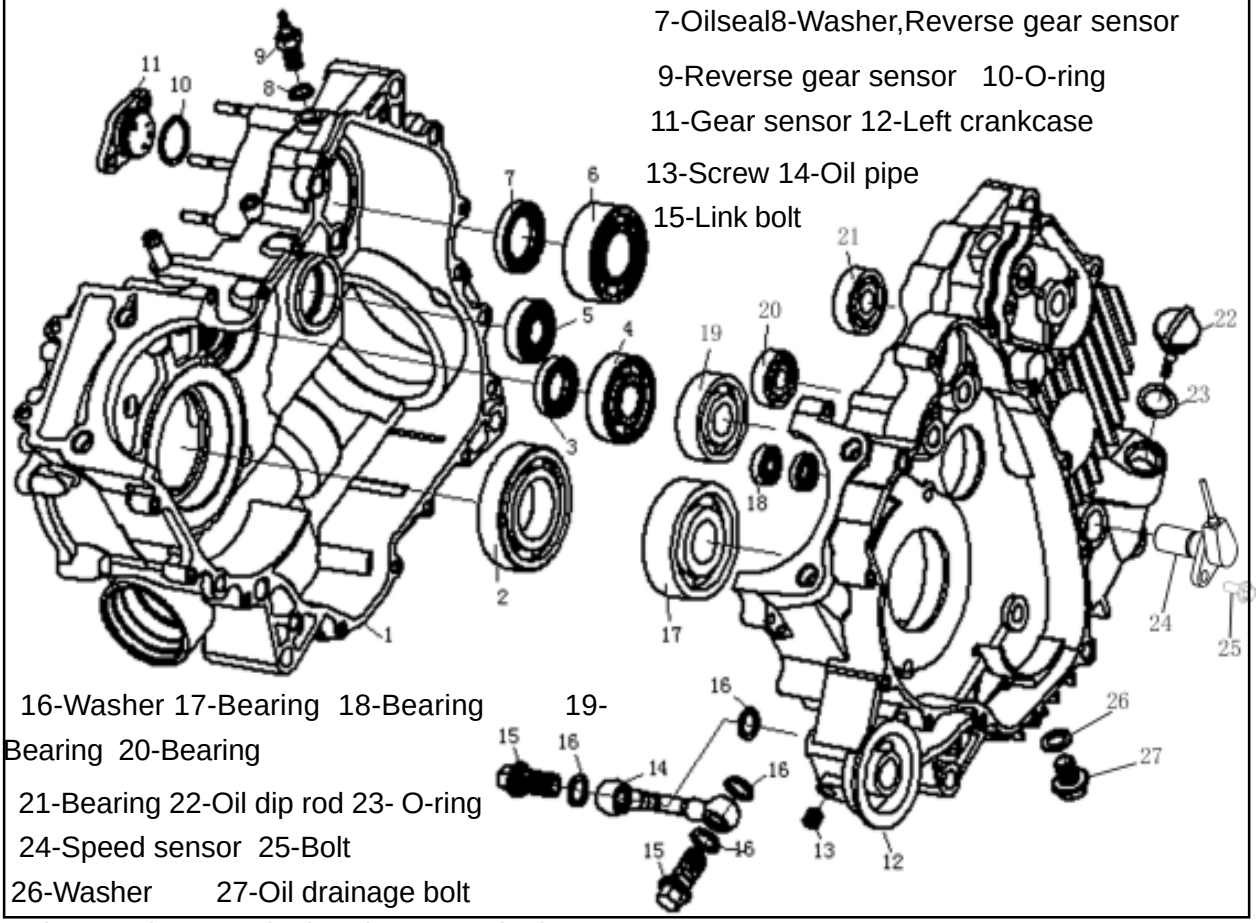
●Install bearing retainer 4 and screw 3;

●Install oil seal 1 into clutch housing 2 with special tool;

Tool:Oil seal installer
Bearing installer



Crankcase



●Clean and grease the bearings, turn the inner race of bearing and check the play, noise and smooth turning. In case of any abnormal, remove bearing with special tool and replace;

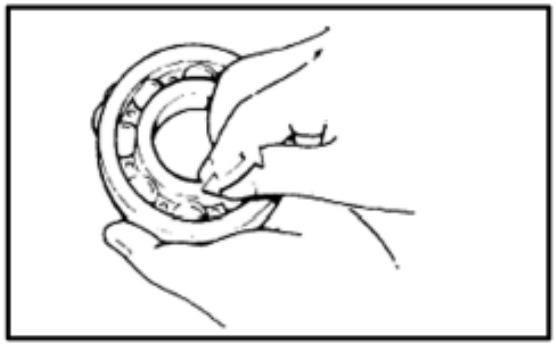
●Check all the oil seals for over wear or damage. In case of any over wear or damage, remove with special tool and replace with a new oil seal;

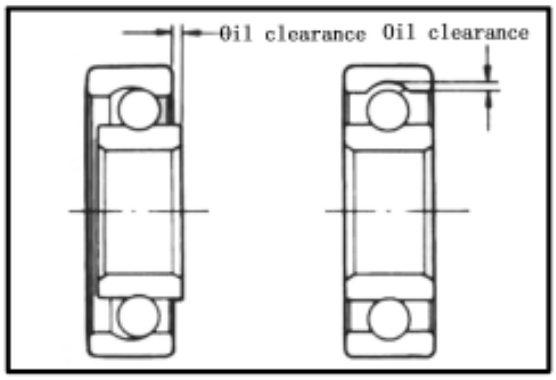
●Remove gear sensor 11 and check for continuity with reverse gear sensor 9 with a multimeter

●Remove link bolt and oil pipe 14 and check oil pipe for crack or clog. Replace with a new one if any;

●Remove drainange bolt 27&clean it;

●Use special tools to assemble bearnig or oil selas.Lubricant oil is applied for bearing and oil seal lips.





Check bearing smooth turning after installation

Note:Check bearing for smooth turning after installing.

●Install new o-ring and apply grease£»

●Install gear seasor;

●Install reverse gear sensor 9 and tighten to the specified torque

Tightening torque:**20N.m**

●Install speed sensor 24

●Install oil pipe and tighten the link bolt to the specified torque:

Tightening torque:**18N.m**

●Install washer 26 and oil drainage bolt 27 and tighten to the specified torque;

Tightening torque:**30N.m**

Tool:Bearing remover
Bearing installer
Multimeter

III Engine assembly

Reverse the engine removal procedure for installation:

Note:

■Clean all the parts before assembly;

■Make sure that the parts are in good condition without any damage;

■Apply engine oil to the moving parts before assembly;

■Apply grease to oil seal-lip&O-ring

Caution: Make sure that drive belt, primary and secondary sheaves are not stained with grease.

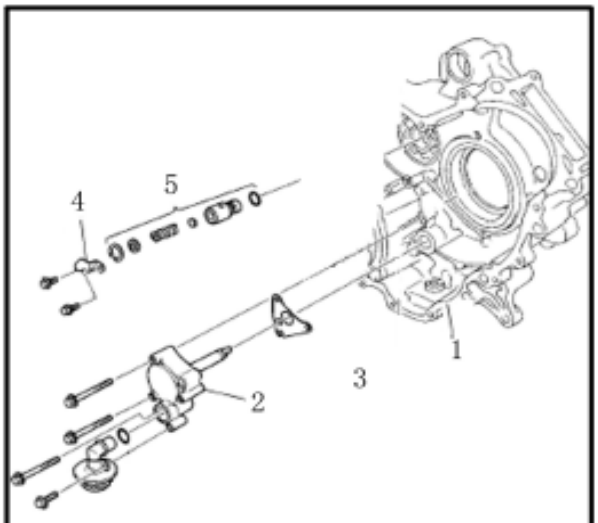
Engine center

Oil pump and relief valve

●Install oil pump and relief valve to left crankcase, as illustrated on the right. Tighten to the specified torque:

Oil pump bolt:**10N.m**

Relief valve bolt:**10N.m**



1-Left crankcase 2-Oil pump
3-Oil pump washer
4-Pressure strip, relief
5-Relief valve

Connected rod

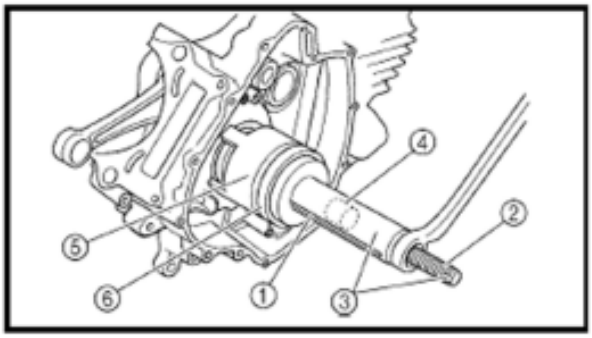
●Install connecting rod to left crankcase with special tool

Note:

■Do not hammer the conrod into crankcase with plastic mallet

■Use special tool to avoid affect of conrod precision

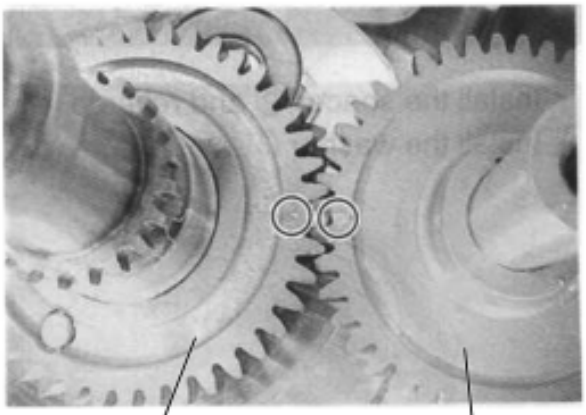
Tool:control installer



Balance shaft

●Install balance shaft

Caution: Balancer shaft driven gear should be aligned to the mark as illustrated.

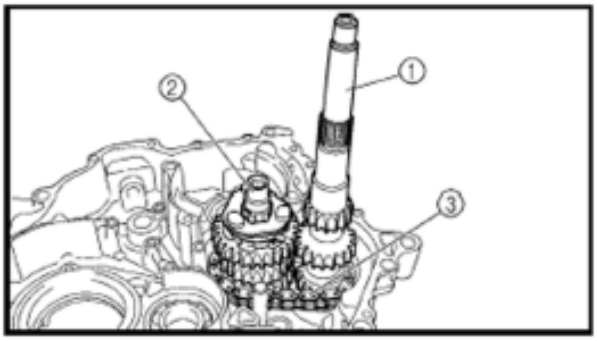


Drive bevel gear, crankcase balace

Balance bevel gear balance

Main shaft, counter shaft

●Install main shaft and counter shaft



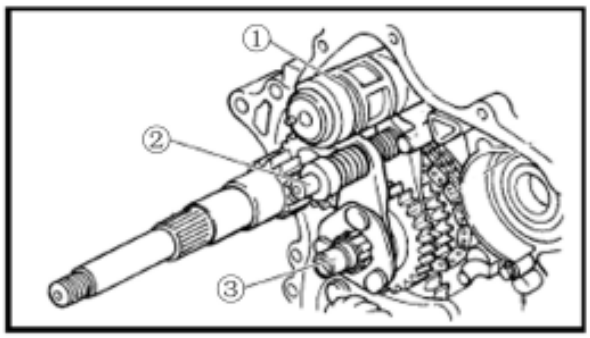
¢ÙMain shaft

¢ÚCounter shaft

¢ÛChain

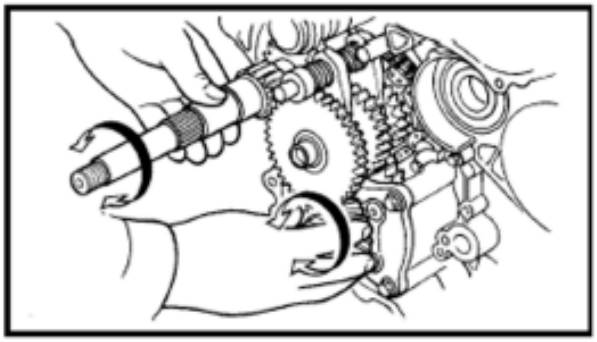
Shift cam, shift fork

●Install shift cam1and shift fork2



●Install low range driven gear to counter shaft3

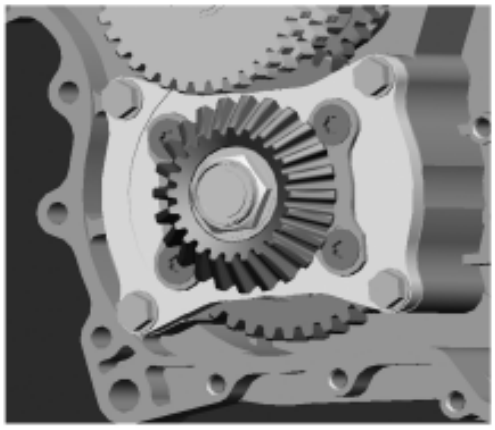
●Check each part for smooth turning;



●Spray adequate engine oil to each part;

Drive bevel gear

●Install drive bevel gear and tighten to the specified torque

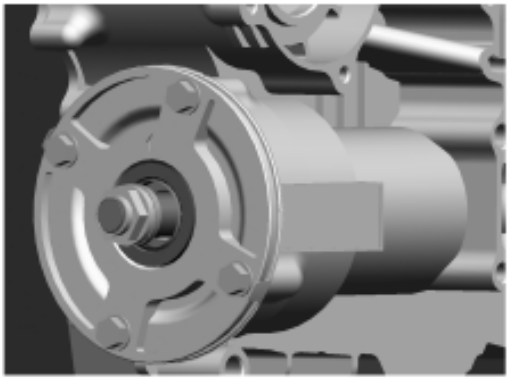


Drive bevel gear tightening torque:**32N.m**

Right crankcase
Drive bevel gear

●Install driven bevel gear and tighten to the specified torque:

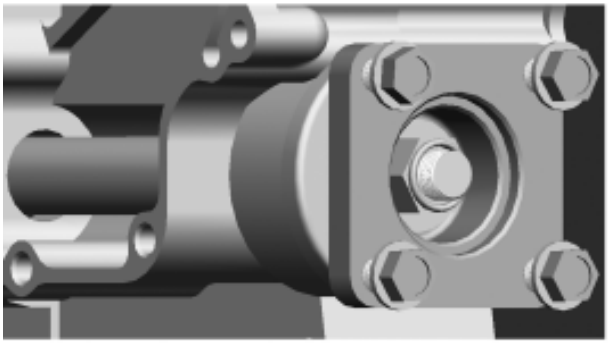
Driven bevel gear tightening torque:**25N.m**

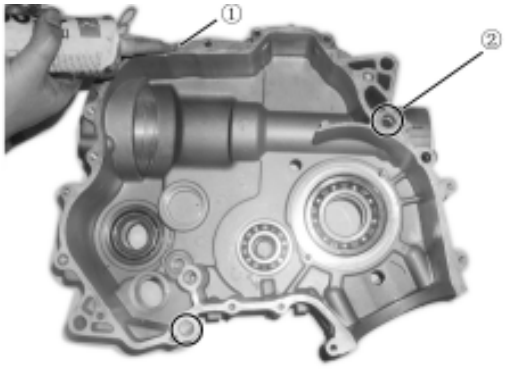


●Check bevel gear backlash (Refer to 12-44)

Front output shaft

●Install front output shaft to right crankcase;





●Apply sealant1to the mating face of right crankcase;

Note: Apply sealant evenly in a uninterrupted thin line

●Install 2 dowel pins2;

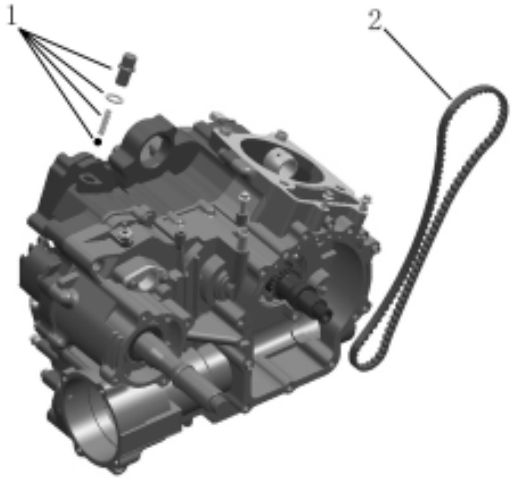
●Assemble crankcase and tap slightlywith a rubber for prpter fitting;

●Install bolt and tighten to the specified torque:

M6:**10N.m**

M8:**25N.m**

Note: Crankcase bolts should be tightened diagonally in several steps.



Gear positioning bolt

●Place the steel ball and install gear positioning bolt and tighten the bolt to the specified torque

Tightening torque:**18N.m**

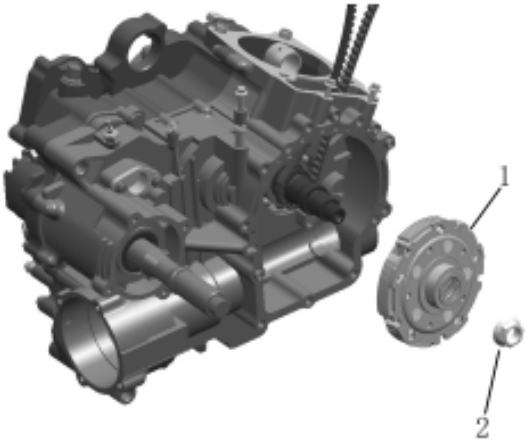
Engine right

Timing chain

●Put on timing chain 2

Clutch

●Install clutch 1 and nut 2. Tighten the nut to the specified torque(left thread)

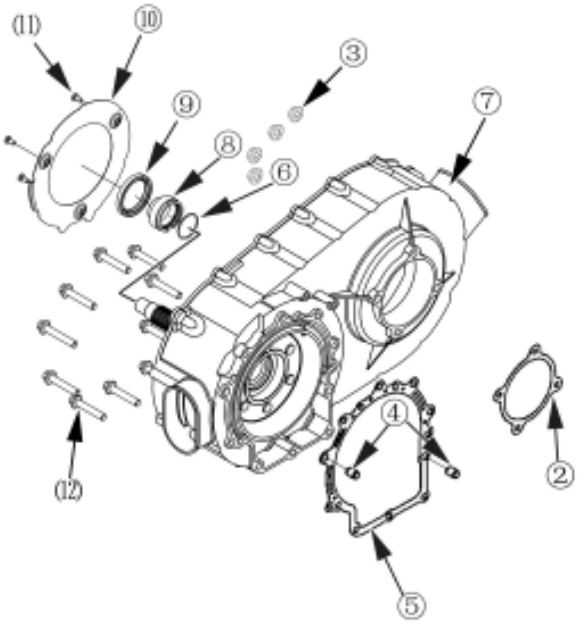


Clutch nut tightening torque:**70N.m**

●Intall new O-ring6in spacer8

●Install spacer8onto the clutch housing shaft, then install into CVT case7

Note: align oil nick on spacer with oil hole on the shaft



CVT Case

●Install dowel pin4¡¢gasket2gasket5£¬intall CVT case assembly to the right crankcase

●Install bolt12 and nut3

Note:

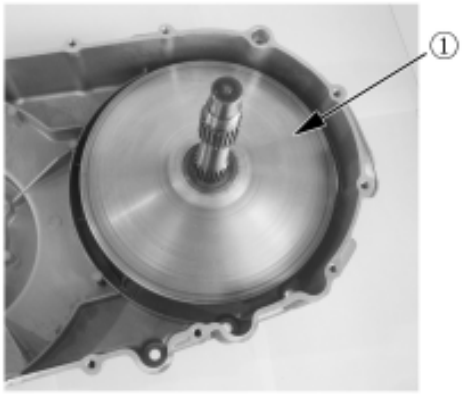
■Tighten bolt/nut diagonally

■Use a new gasket

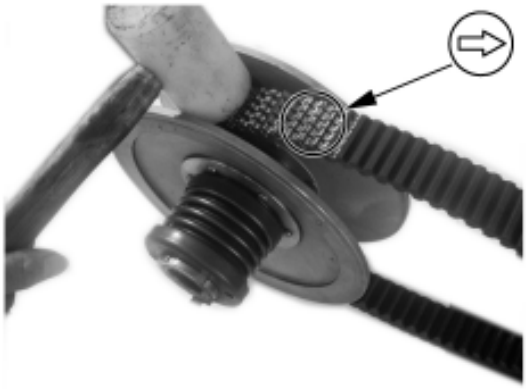
■Install guide palte10and screw11

Primary sheave, secondary sheave, drive belt

■Install primary fixed sheave1 as illustrated on the right;



■Install drive belt between secondary sliding/ fixed sheave and tap with a plastic hammer to keep the belt as low as possible;



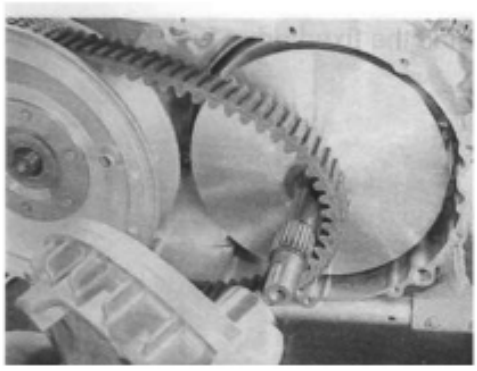
Note:

■Install the drive belt with the arrow on the belt turn in the clockwise direction;

■Drive belt contact surface should be free from any stains

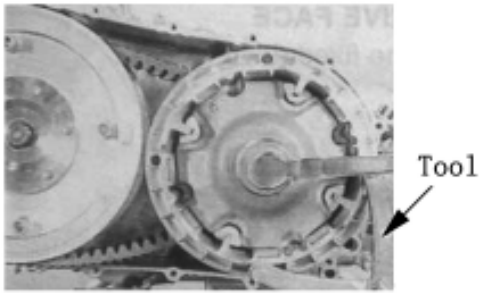
●Install secondary sheave

●Install primary sliding sheave



●Tighten primary sheave nut with special tool to the specified torque

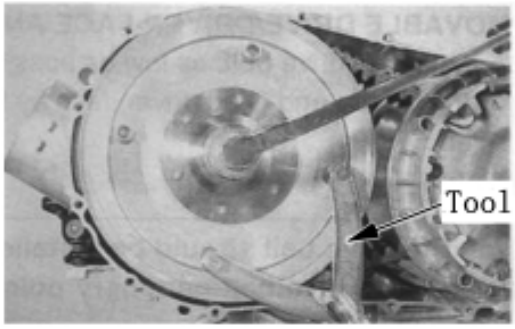
Primary sheave nut tightening torque: **115N.m**



Tool:Rotor Holder

●Tighten secondary sheave nut with special tool to the specified torque

Secondary sheave tightening torque:**115N.m**

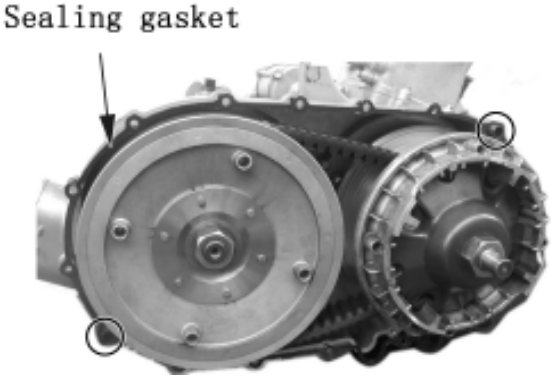


Tool:Rotor holder

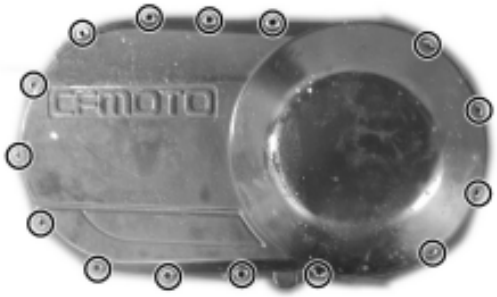
Note: Turn the primary fixed sheave until the belt is seated in and both primary and secondary sheaves move together smoothly without slip.

CVT case cover

●Install the new gasket and dowel pins



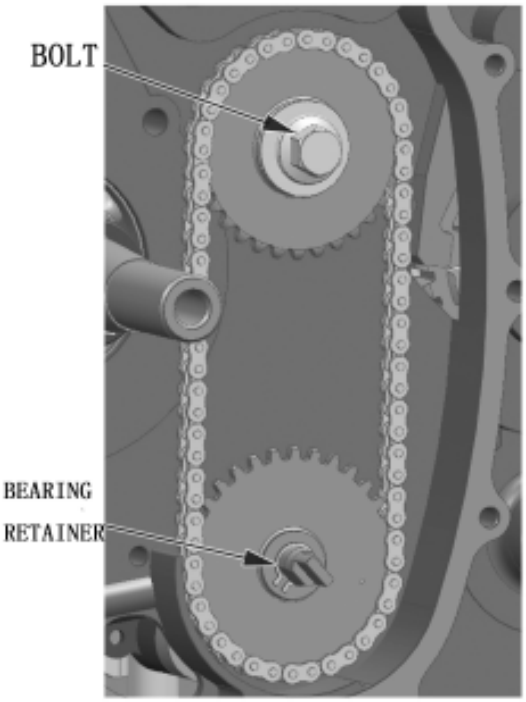
●Install CVT case cover bolts and tighten diagonally in several steps.



Engine left

Oil pump sprocket and chain

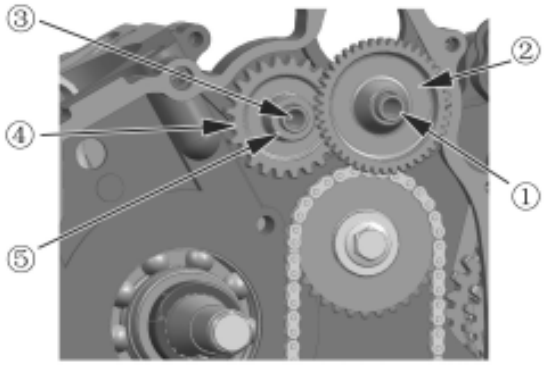
●Install oil pump drive sprocket;
●Install oil pump driven sprocket;
●Install oil pump drive chain;
●Tighten oil pump sprocket bolt;
●Install sprocket retainer with a long nose pliers;
Tool:Long nose pliers



Dual gear/idel gear

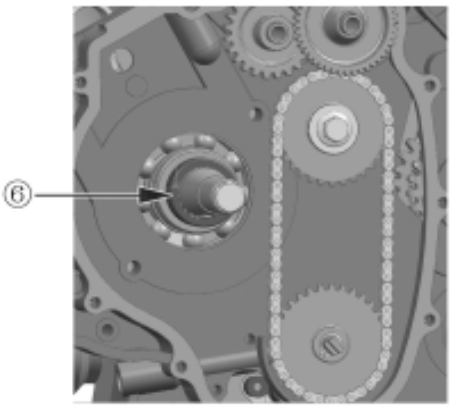
●Install dual gear shaft1and dual gear2;

●Install dual gear3,dual gear4and bush5;

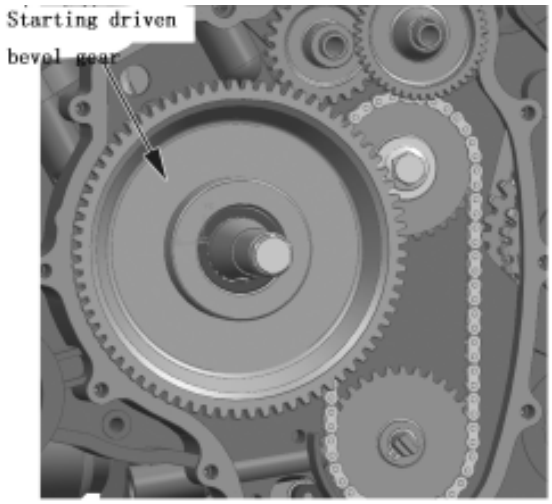


Starter driven gear

●Install starting driven6



●Install starting driven gear;

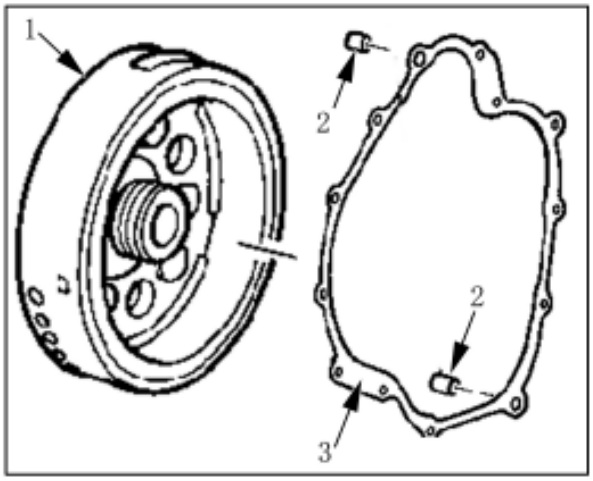


Magneto Rotor

●Install woodruf key into crankshaft groove

●Intall magneto rotor 1

Note: Degrease the tapered part of rotor and crankshaft. Use nonflammable solvent to clean off the oily or greasy matter and fully dry the surfaces.



Left crankcase cover

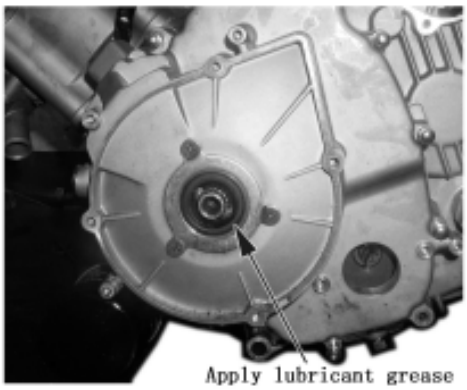
●Install dowel pin 2 and gasket 3

Note: Use a new gasket

●Apply lubricant grease to oil lip

●Install left crankcase cover

●Install bolts



Recoil starter

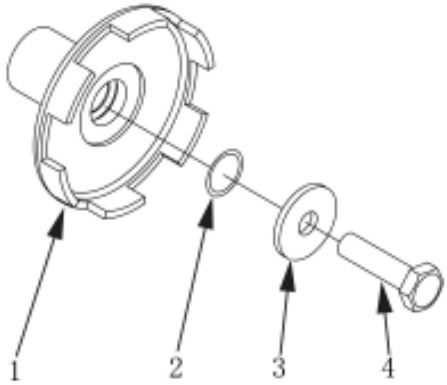
●Install recoil starter 1

●Install O-ring 2

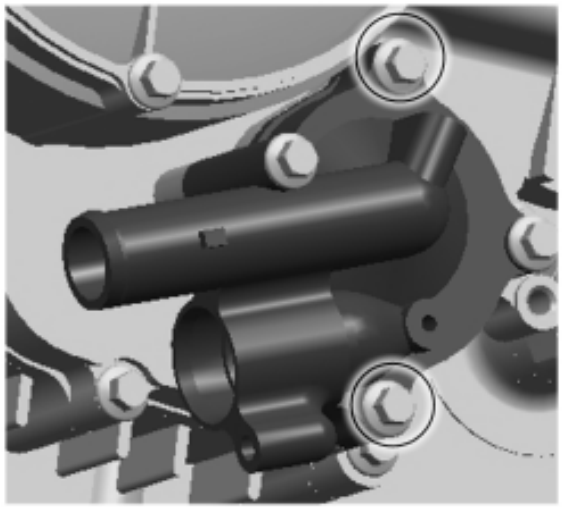
Note: Use a new O-ring and apply lubricant grease to the O-ring

●Install washer 3 and bolt 4, tighten to the specified torque .

Recoil starter bolt tightening torque:**55N.m**



Water pump



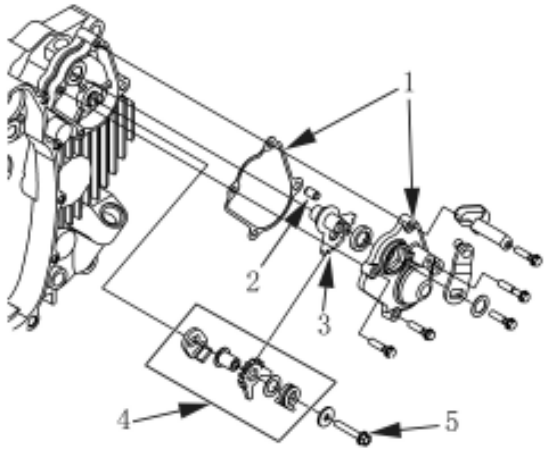
●Install water pump

●Install water pump fixing bolts

Note: Before tightening the bolts, be sure to insert oil pump shaft into groove of water pump shaft

Sector gear

Install the parts as illustrated on the right



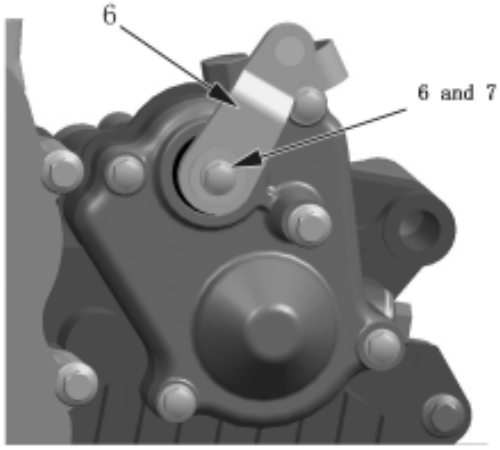
1-Sector gear cover and gasket
2-Dowel pin
3-Driven sector gear
4-Driven sector gear
5-Driven sector gear

Note:
When the shift cam is in the neutral position, the mark of drive sector gear should be between the two marks of the driven sector gear

Driven sector gear tightening torque:14N.m

●Install gearshift rocker arm6

●Install rocker arm bolt 7 and washer 8



Oil filter

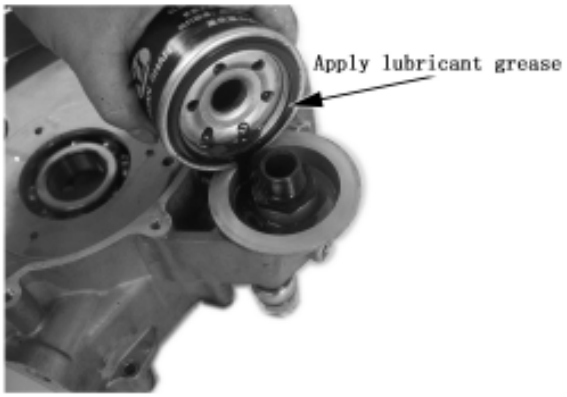
●Install oil filter bolt and tighten to the specified torque.

Tightening torque:**63N.m**

●Apply engine oil to O-ring

●Install oil filter, turn it by hand until the filter gasket contacts the mating surface. Tighten the bolts.

Tool:Oil filter wrench



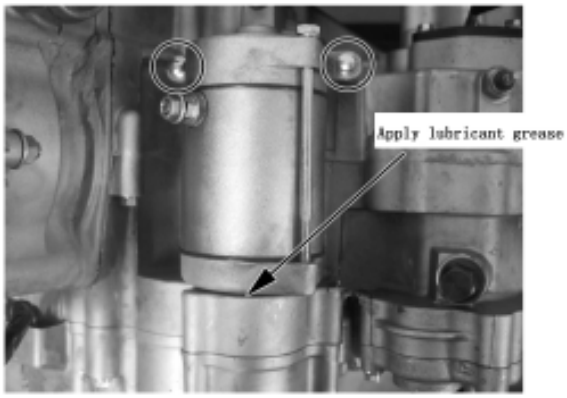
Starting motor

●Apply engine oil to new O-ring

●Install starting motor

●Install bolt and tighten to the specified torque

Tightening torque: 10N.m

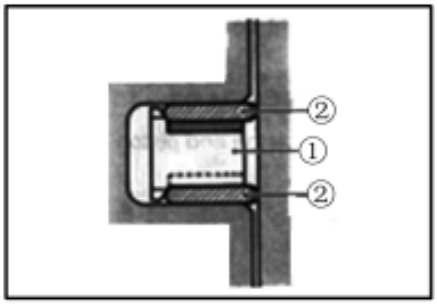


Engine top side

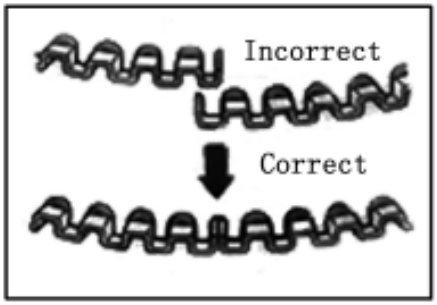
Piston

●Install the piston rings in the order of oil ring, 2ring and 1ring

●The first member to go to the oil ring groove os spacer1, after placing the spacer, fit the two side rails2

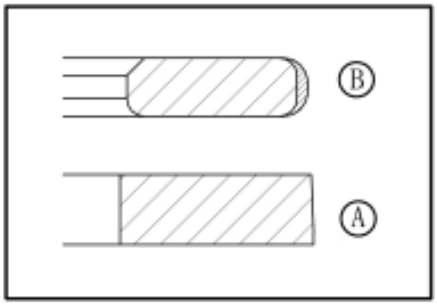


Warning:when installing the spacer1, do not overlap its two ends in the groove.

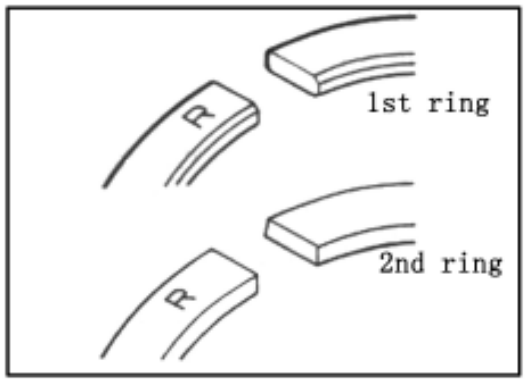


●Install the secong ring A and firts ring B.

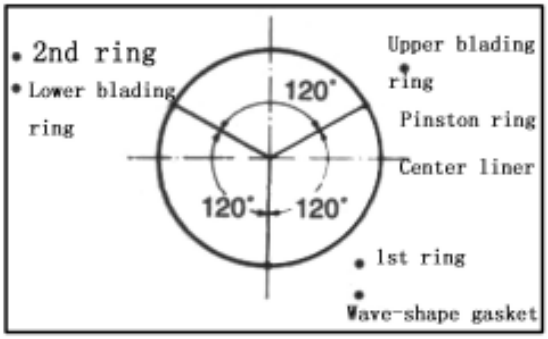
Note:1st ring and 2nd ring differ in shape



●1st and 2nd rings have letter R marked on the side. Be sure to bring the marked side to the top when fitting them to the piston



●Position the gaps of the three rings as illustrated on the right. Before installing the piston into the cylinder, check that the gaps are so located



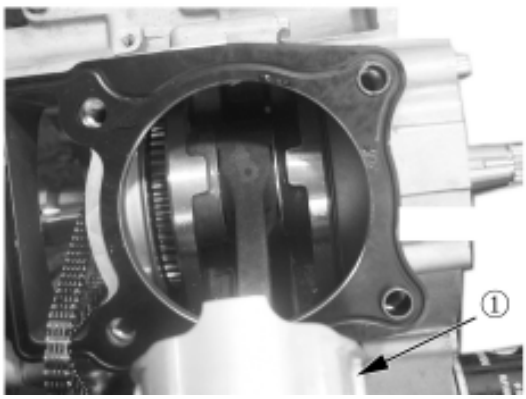
●Apply a light coat of moly oil to the piston pin;

●Install piston pin into holes of piston and conrod small end

Note: When installing the piston, the IN mark on piston top is located to the intake side

●Place a clean rag beneath piston and install piston pin circlip 1

Note: while rotating crankshaft, pull the cam chain upward, or the chain will be caught between sprocket and crankcase.



●Install the dowel pins and the new cylinder gasket

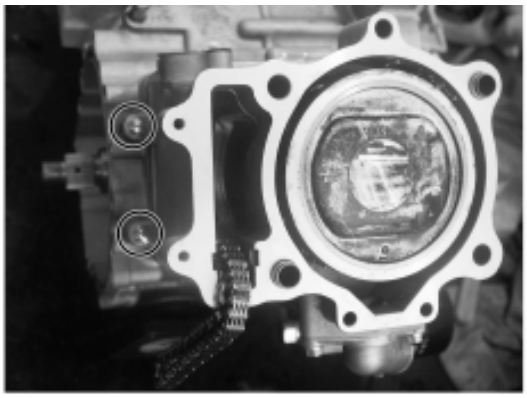
Note: Use a new cylinder gasket to prevent oil leakage

Cylinder

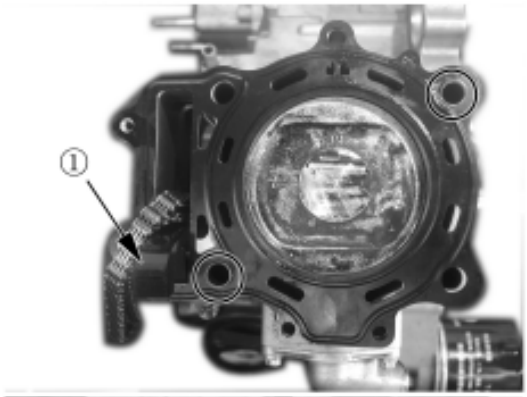
●Apply engine oil to piston skirt and cylinder wall

●Hold each piston ring with proper position, insert piston into the cylinder

●Tighten the cylinder base bolts temporarily



Note: When installing the cylinder and cylinder head, pull the cam chain upward, or the chain will be caught between sprocket and crankcase.

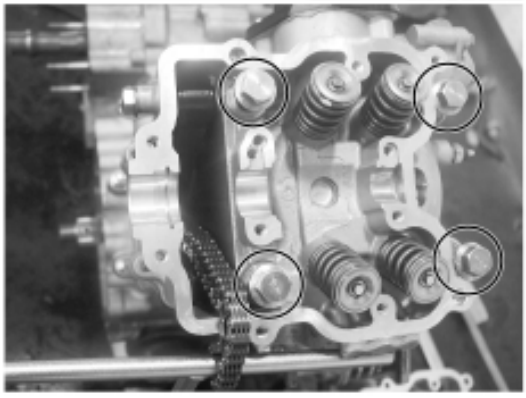


●Install chain guide1

●Fit the dowel pin and new cylinder cover gasket

Note: Use a new cylinder cover gasket to prevent oil leakage

Cylinder head



●Install the cylinder cover, tighten the cylinder head bolts diagonally to the specified torque

Cylinder head bolt tightening torque

Initial:**25N.m**

Final:**38N.m**

●Tighten the cylinder head nuts to the specified torque

Cylinder head nuts tightening torque:

M6: **10N.m**

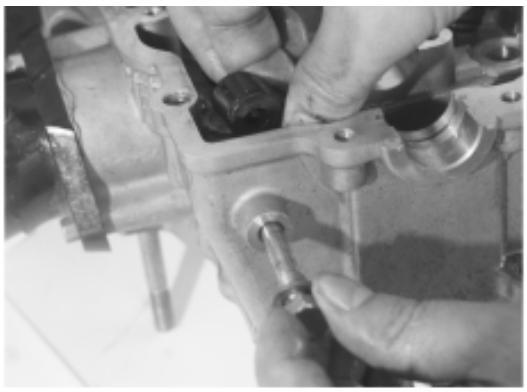
M8: Initial **10N.m**

Final **25N.m**

●Tighten the cylinder top nuts and cylinder base to the specified torque

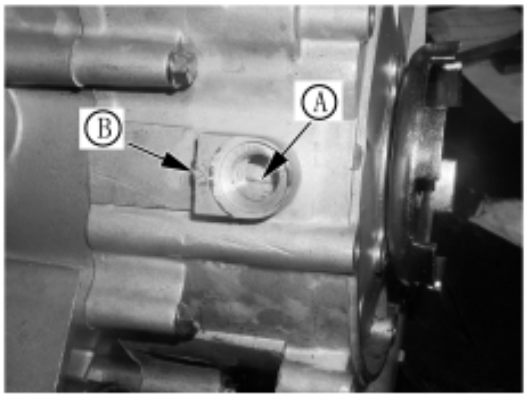
Tightening torque:**10N.m**

●Install chain tensioner



Camshaft

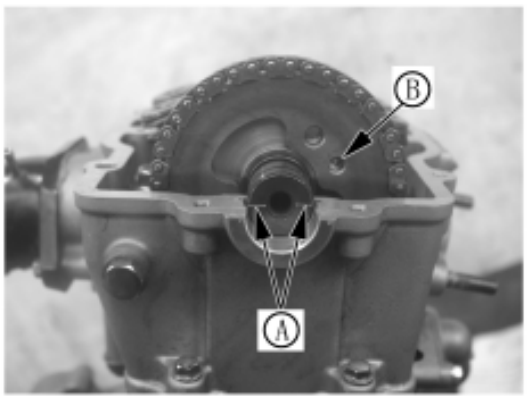
●Align mark A on magneto rotor with mark B on crankcase



Note:while rotating crankshaft, pull the cam chain upward, or the chain will be caught between sprocket and crankcase.

●Align the mark A on the camshaft so that they are parallel with the mating surface of the cylinder head

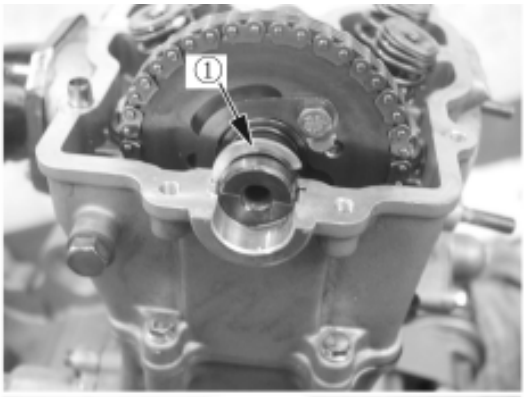
Note: Do not rotate the magneto rotor while doing this. when the sprocket is not positioned correctly, turn the sprocket;



●Engage the chain on the sprocket with the locating pin B as illustrated on the right

●Recheck if the position of mark A and C is correct. If not, reassemble until it is correct.

●Install crankshaft C-ring1



●Install lock washer so that it covers the locating pin

●Apply thread locker to the bolts before installing, and tighten them to the specified torque

Sprocket bolt tightening torque:15N.m

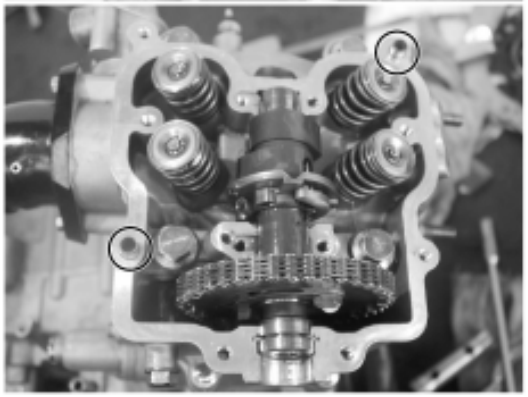
●Bend up the lock washer to lock the bolts;

Cylinder head cover

●Clean the mating surface of cylinder head and cylinder head cover

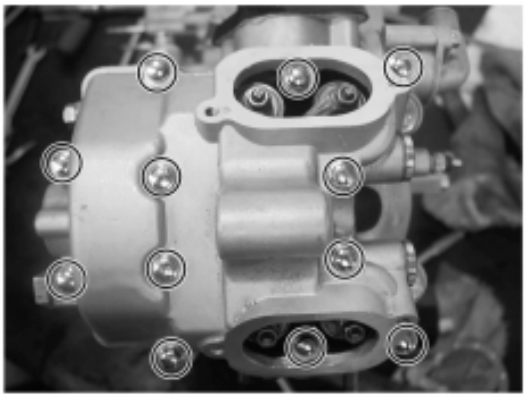
●Install dowel pin to the cylinder head

●Apply sealant to the mating surface of the cylinder head cover



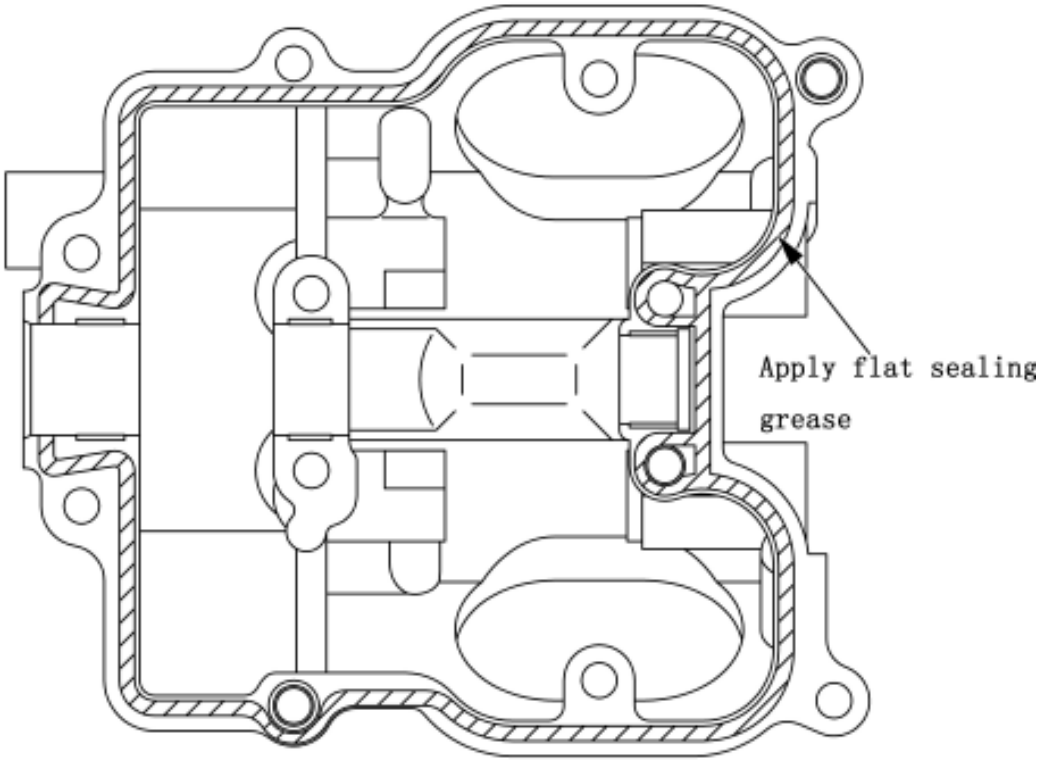
●Install cylinder head cover bolts, tighten diagonally to the specified torque

Cylinder head cover bolt tightening torque:**10N.m**



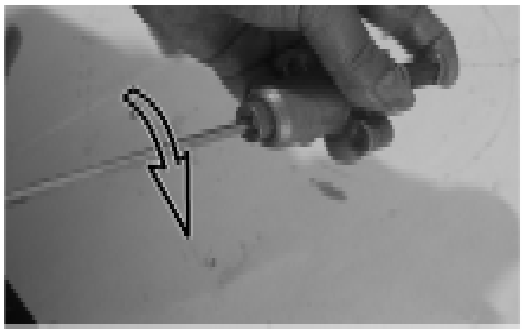
Note: When tightening the cylinder head cover bolts, the piston must be at top dead center on the compression stroke.

Gasket sealant applying place



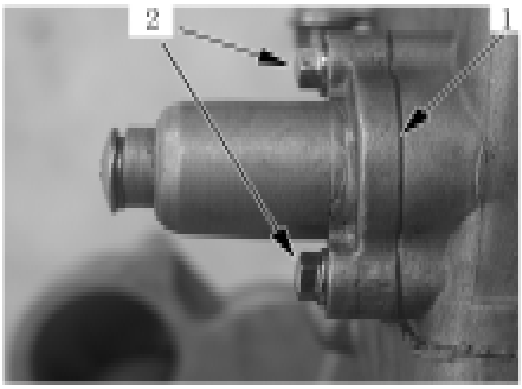
Chain tensioner

●Insert (--) screwdriver into slotted end of chain tension adjuster, turn it clockwise to lock the tensioner spring



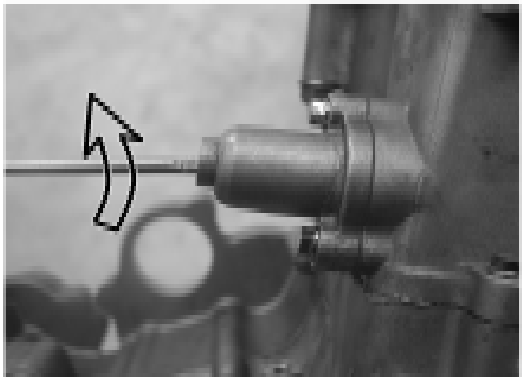
●Install the chain tensioner and the new washer 1

●Install the bolt 2, tighten it to the specified torque



Chain tensioner bolt tightening torque: **10N.m**

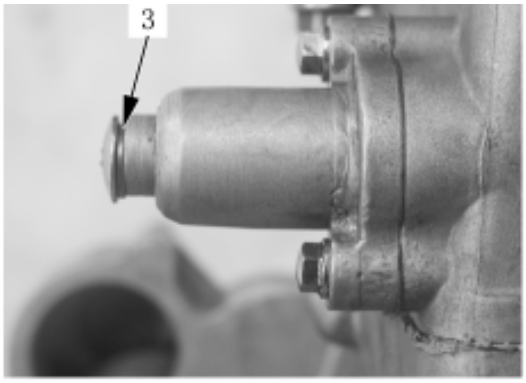
●After chain tensioner is installed, turn the (--) screwdriver counter clockwise. The tensioner rod will be advanced under spring force and push tensioner against chain.



●Install the new gasket 3

●Install chain tensioner screw, tighten it to the specified torque

Chain tensioner screw tightening torque:8N.m



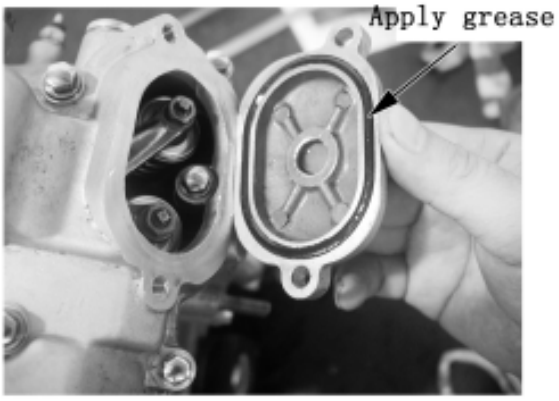
Valve adjuster cover

●Refer to 2-3 for valve clearance

●Use new rubber gasket and apply grease

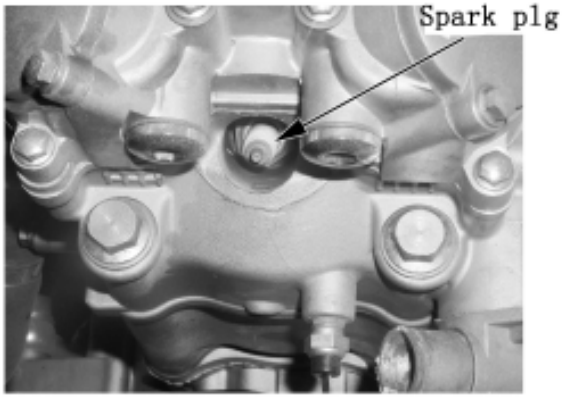
●Install Valve Inspection Cap

●Install valve inspection cap bolt



Spark plug

●Install spark plug with special tool and tighten to the specified torque;



Note: To avoid damage to the cylinder head thread, screw in the spark plug with hand first, then tighten it to the specified torque with spark plug wrench.

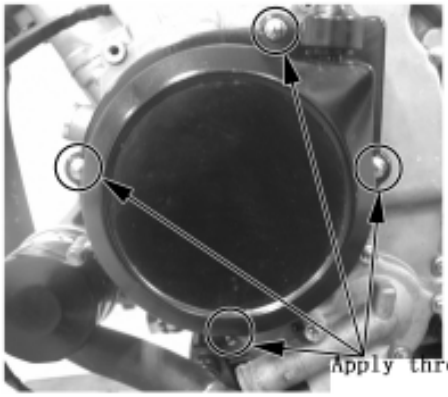
Spark plug tightening torque:18N.m
Tool: Spark Plug Wrench

Engine periphery

Recoil starter

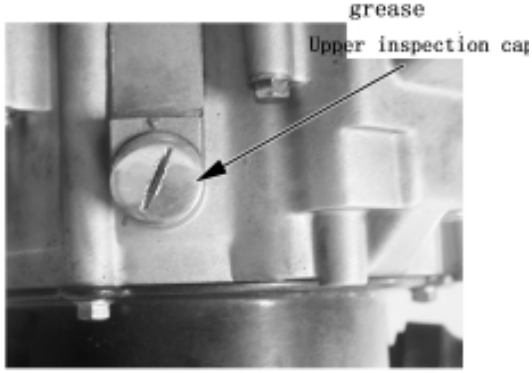
●Install recoil starter

●Apply thread locker to the bolts and then tighten



Valve inspection cap

●Install valve inspection cap

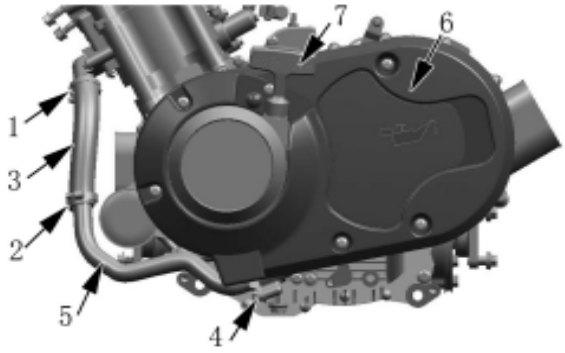


Left plastic cover

- Install left plastic cover 6

Water pipe and hose

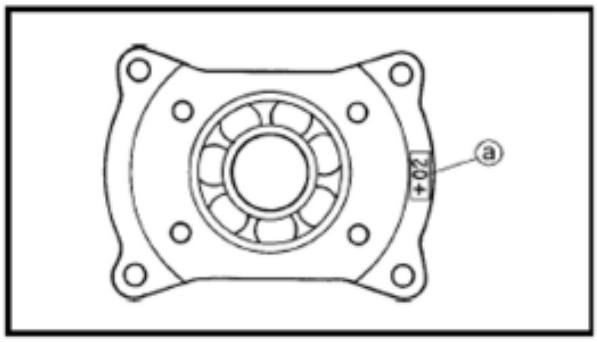
- Install water hose 5
- Install bolt 4
- Install water hose 3
- Install clamp 1,2



● **Drive bevel gear adjustment washer choosing:**

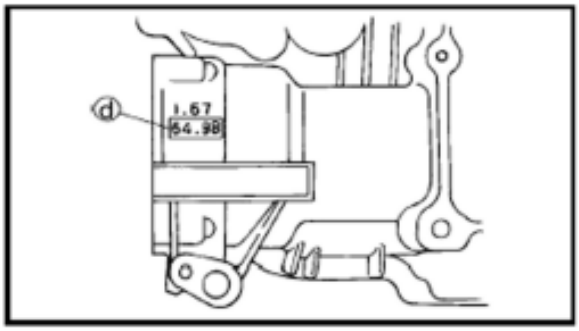
Washer thickness:A=a+d-b-c

a-Drive bevel gear cover marking data£¬minus from 7.5,eg marking is +02, then a =7.52



b=17.0 c=55.0

d-Thickness marking data on left crankcase



E.g:

If drivel bevel gear cover marking data is +02, then

a=7.52

b=17.0 c=55.0

If marking data on left crankcase cover is 64.98,then

d=64.98

A=7.52-17.0-55.0+64.98=0.50

Drive bevel gear provides following spcs of thickness:

0.15\0.20\0.25\0.30\0.35

So,when the result is just 0 or 5, requirement is to be met through washer adjustment.If round sum is not 0 or 5,round integer as follow

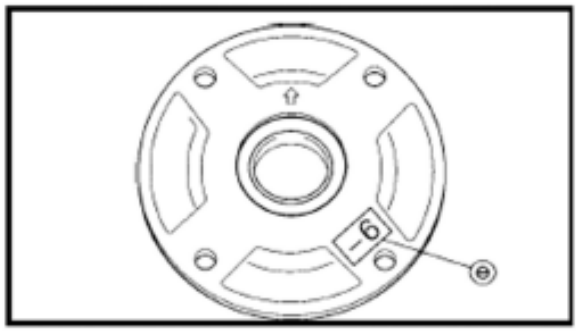
mantissa	round integer
1,2	0
3,4,6,7	5
8,9	10

●Driven bevel gear washer adjustment**:**

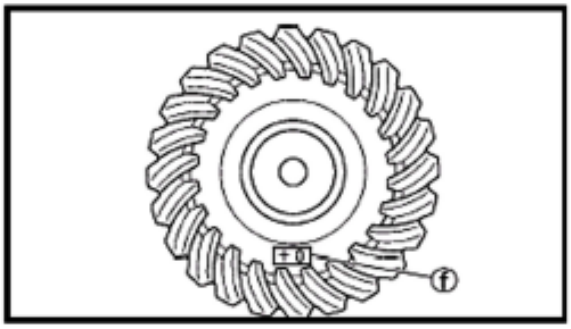
Driven bevel gear washer thickness**:**

B=e-f+g-h+i-0.05

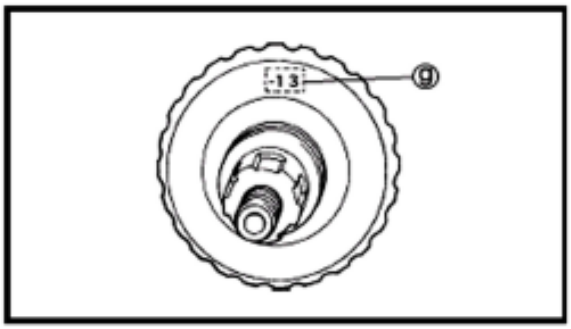
e-Marking assembly data on driven bevel gear cover,minus or plus from 76，eg. if marking data is -6, then e= 75.94



f-Driven bevel gear front face assembly marking data, minus from 60

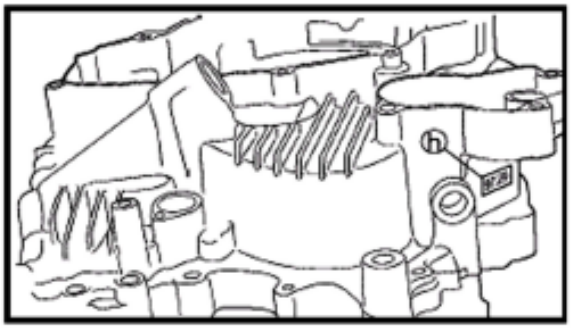


g-Driven bevel gear back face assembly marking data£¬minus from 80.5



h-Left crankcase assembly marking data;

i-Right crankcase assembly marking data£»



e.g:

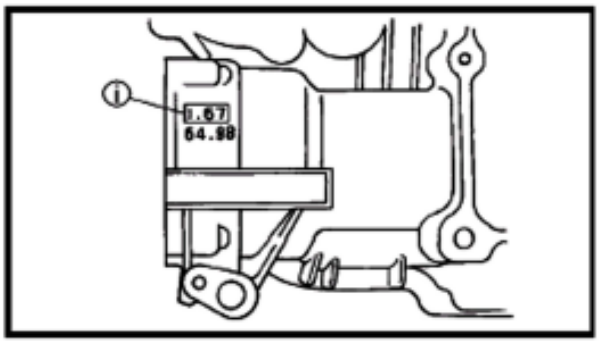
Driven bevel gear marking data is -6, then e=75.94

Driven bevel gear front face marking data is +0, then f=60.00

Driven bevel gear front face data is -13, then g=80.37

Marking data on leftcrank is 97.29, then h=97.29

Marking data on right crankcase is 1.67, then i=1.67



After round integer, its washer thickness is0.65；Round interger method the sane as drive bevel gear adjustment washer.

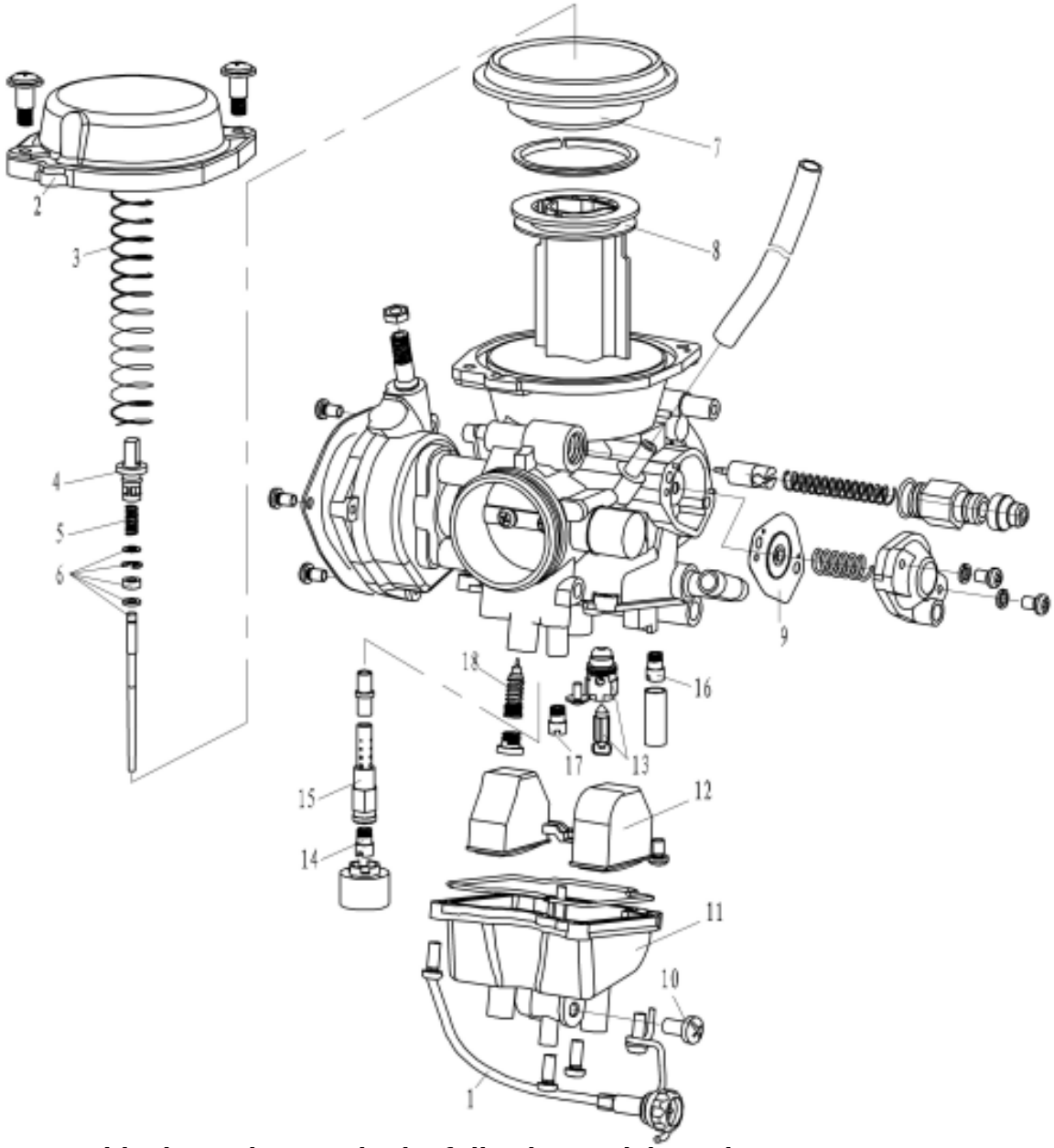
Driven bevel gear provides following spcs:

0.15\0.20\0.25\0.30\0.35

Requirements will met through adjusting washer thickness.

Chapter 7 Carburetor

1 Carburetor Removal

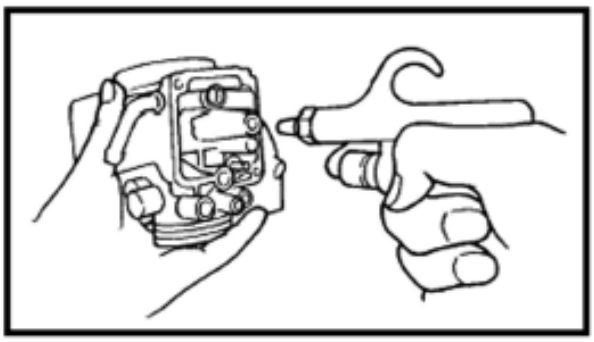


Disassemble the carburetor in the following serial number:

Serial No.	Description	Qty.	Serial No.	Description	Qty.
1	Idle adjust shaft	1	10	Drain Screw	1
2	Vacuum chamber cover	1	11	Float Chamber	1
3	Spring	1	12	Float	1
4	Jet needle holder	1	13	Needle Valve Set	1
5	Spring	1	14	Main Jet (MJ)	1
6	Jet needle set(JN)	1	15	Needle Jet (NJ)	1
7	Vacuum Diaphragm	1	16	Pilot Jet (PJ)	1
8	Piston Valve	1	17	Starter Jet (GS)	1
9	Enriching Diaphragm	1	18	Pilot Adjust Screw (PS)	1

2 Inspection

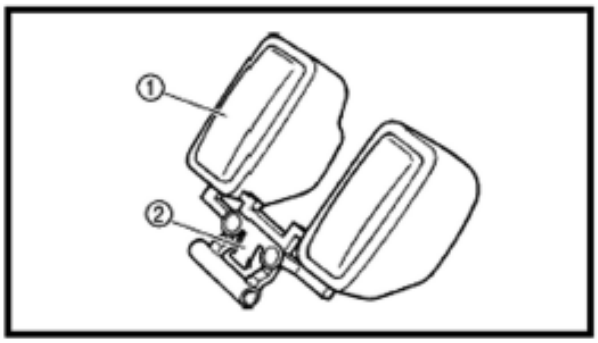
●Check carburetor body for cracks or damage.



●**Cracks or damage:Replace**

Check carburetor float chamber, fuel passage for dirt or clog. Clean these parts.

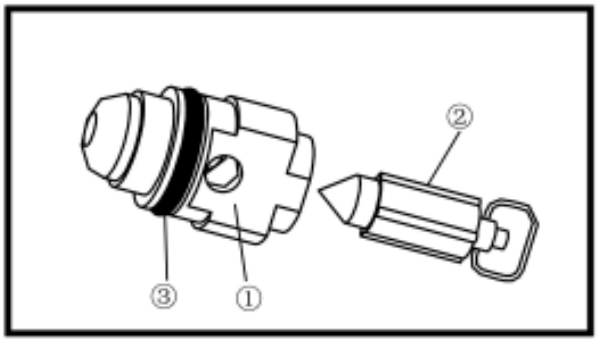
Check float1, float tang 2 for damage.



Damage: Replace

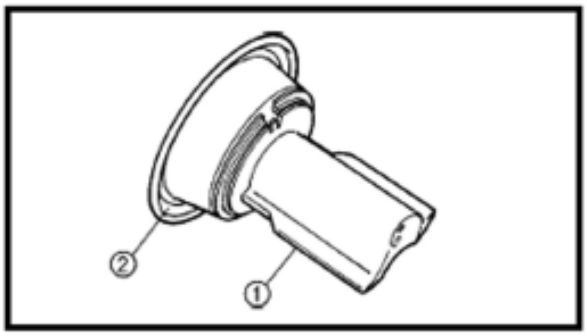
●Check valve seat1, needle valve2, O-ring3 for damage, abnormal wear or dirt.

Damage or wear or dirty: Replace



Note: Valve set1, needle valve2 should be replaced as a set

●Check piston valve1 for scratches, abnormal wear or damage.

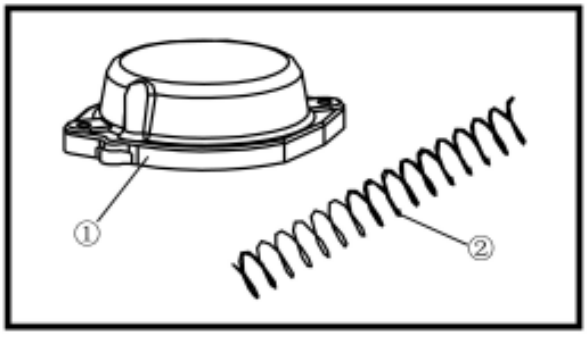


Scratches, wear or damage: Replace

●Check diaphragm2 for tears.

Tears: Replace

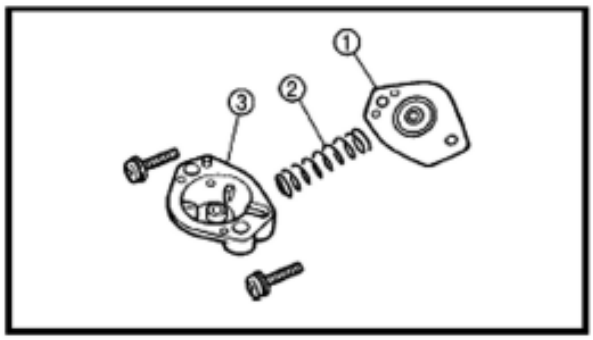
●Check vacuum chamber cover1, spring2 for damage or cracks



Damage or cracks: Replace

Check the diaphragm 1for tears.

Tears: Replace

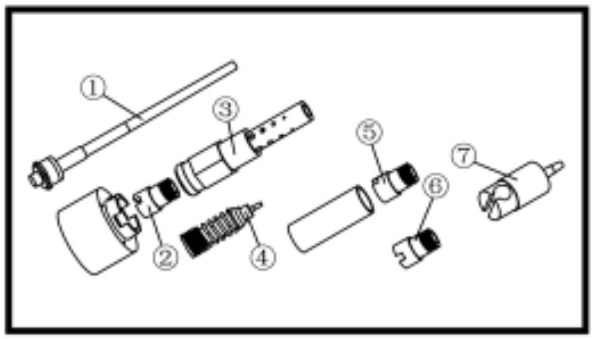


●Check the spring2 ,cover3 for damage and tears;

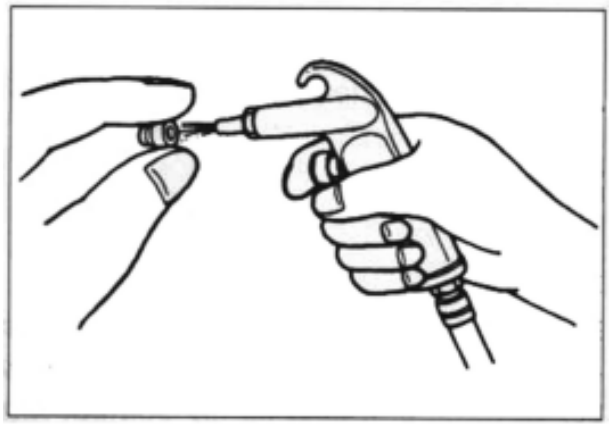
Damage or tears: Replace

●Check the jet needle1, mail jet2, needle jet3, pilot adjust screw4, pilot jet5, starter jet6 and starter plunger 7for wear and bends.

Wear or bends: Replace

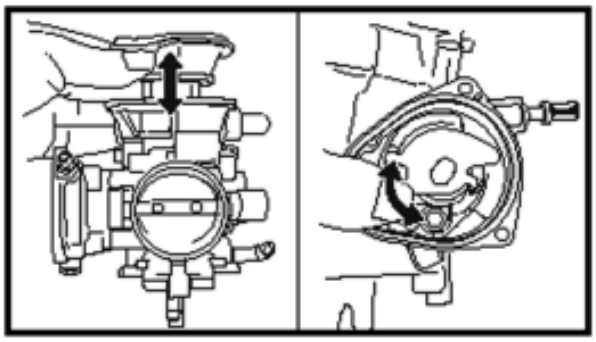


● Check above jets for clog. Blow out the jets with compressed air.



●Insert piston valve into carburetor body and check the free movement;

●Check free movement of throttle valve. Replace with a new one if it's stuck;

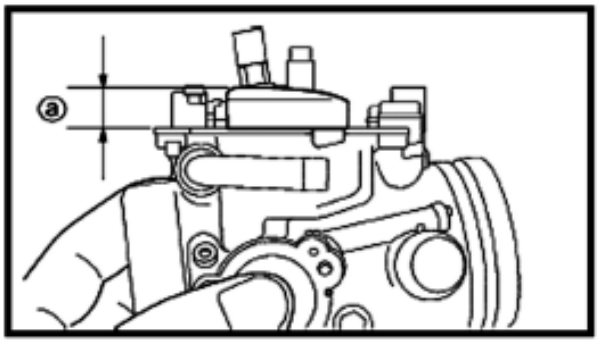


3 Measurement and Adjustment

■Float Height

●Keep the carburetor in a upside down position. Measure distance "a" from the mating surface of float chamber (without gasket) to the top of float.

Note: The float arm should rest on the needle valve. Do not compress the needle valve.



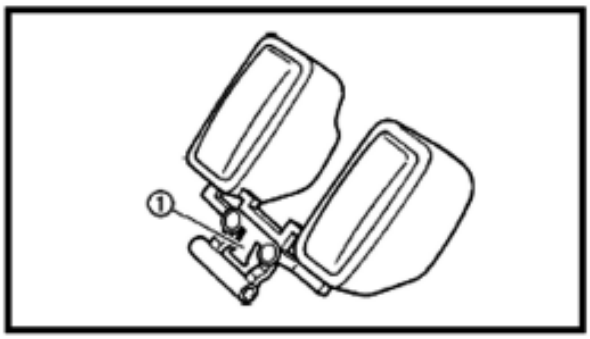
Float Height: 10+ -1mm

■If float height is not within the specification, check the valve seat and needle valve;

▲If either of valve seat or needle valve is worn, replace both;

¡ øIf both are fine, adjust float height by bending the float tang ¢Ùon the float;

●Measure float height again till it's within the specification



■**Fuel Level**

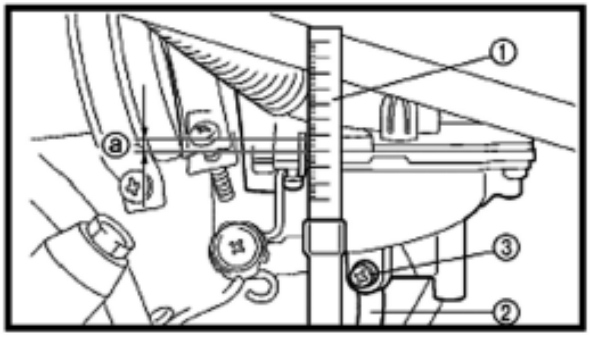
●Place carburetor on a level surface. Connect fuel level gauge1 with drain pipe2;

Tool: Fuel Level Gauge

Loosen drain screw 3

●Keep fuel level gauge vertical next to the float chamber line and read the fuel level "a"

Fuel Level: 3.5 ¡À0.5mm



●If the fuel level is not within the specification, adjust the fuel level;

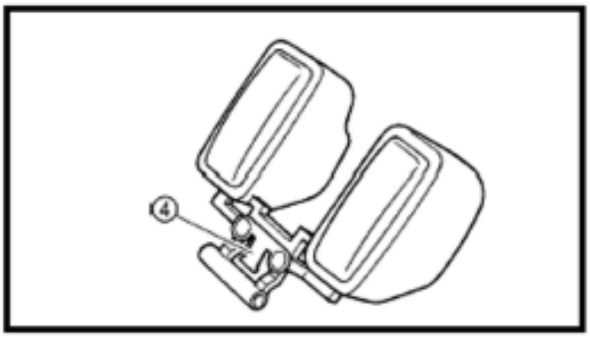
▲Remove carburetor

▲Check valve seat and needle valve

▲If both are fine, adjust float height by bending the float tang 1on the float;

▲If either of valve seat or needle valve is worn, replace both;

▲ Install carburetor



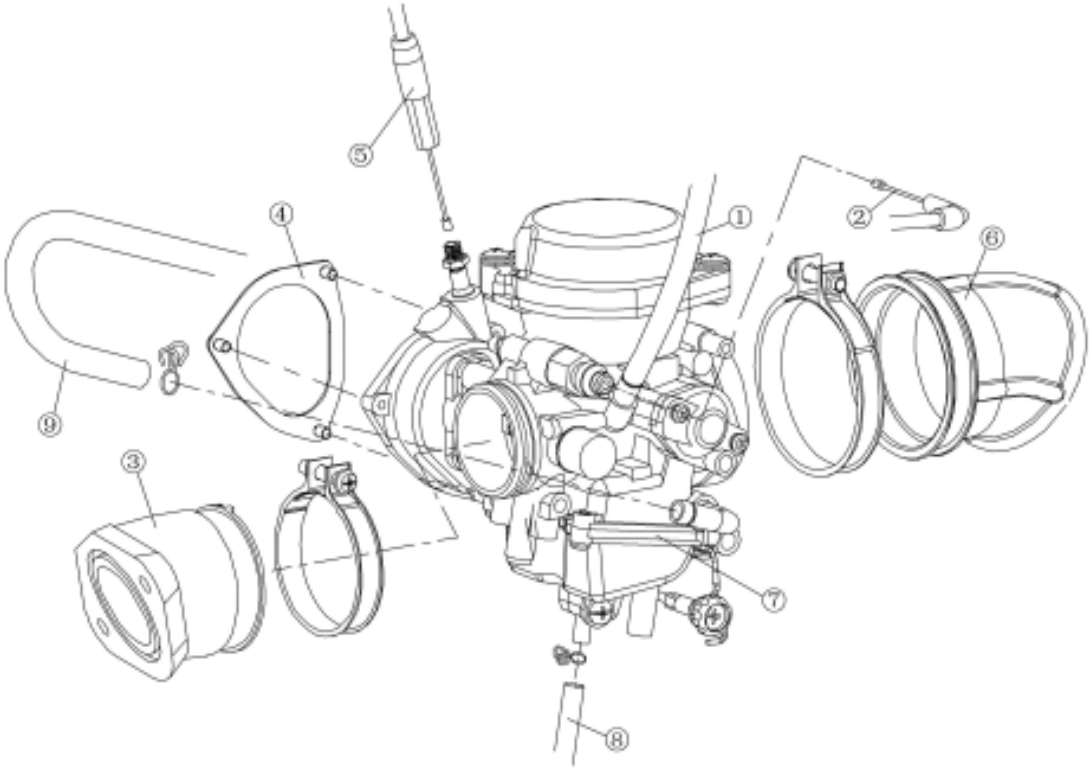
●Check again the fuel level

4 Carburetor Assembly

Reverse the disassembly procedure for assembly

5 Carburetor Installation

1-vacuum breather hose 2 -starter cable 3-carburetor joint (engine intake manifold))
4-throttle valve cover 5-throttle cable 6-Carburetor joint (air filter) 7-carburetor
8-drain hose 9-fuel inlet hose



Note: Align the installation mark of carburetor and carburetor joint

6 Carburetor Parameters

	Parameters
Type	MIKUNI BSR36-89
Aperture No.	07G0
Throat size (mm)	36 mm
Pilot (r/min)	1300 r/min+ -100 r/min
Float height (mm)	10+ -1
Fuel level (mm)	3.5+ -0.5
Main jet (MJ)	N102221-130#
Main air jet (MAJ)	MD13/24-35#
Jet needle (JN)	J8-5E26
Needle jet (NJ)	785-401011-P-0M
Pilot jet (PJ)	N224103-22.5#
Pilot screw (PS)	604-16013-1A
Pilot air jet1 (PAJ1)	MD13/24-65#
Pilot air jet2 (PAJ2)	N211100-165#

Overhaul

Operation notice

Attention

●The frame must be hold up firmly when overhauling front wheel, suspention system.
●Light,meter,switch overhaul or inspection refers to section10.
●Donot overpower on the tyre, be careful not to destroy the tyre.
●When disassemble the tyre on the rims, to avoid destroy the rim, you required to use special tyre-lever and rim-protector.

Overhaul standard

Item			Standard	Service limits
	Rim jump	Portrait	0.8mm	2.0mm
		Cross	0.8mm	2.0mm
	Tyre	Remain groove	—	3.0mm
		Air pressure	35kPa（0.35kgf / cm^2）	—
Front disc	Brake lever windage		0mm	—

Tightening torque

steering tie-rod nut 40-50 N.m
steering shaft lock nut 100-120N.m
front wheel shaft nut 110 N.m
suspension fixed bolt/nut 40-50 N.m
rim install nut 50-60 N.m
rim shaft nut 110-130 N.m

Special tools

Bearing disassemble tooling bar
Bearing disassemble tooling nod 10mm
Press in tooling leverA
Press in tooling coat28*30
Guide tool,10mm
Lock nut spanner
Bearing disassemble tools
Rotor puller
Disassemble tooling bar
Disassemble heavy punch
Assemble tooling bar

Fault diagnosis

Handlebar heavy

- upper screw over tonging.
- steering shaft destroy, worn.
- Bearing inner, external race destroy, worn, step.
- steering column deform.
- tyre lower pressure
- tyre worn out

Handlebar shake

- steering shaft destroy,bad tightening
- left and right absorber unmatch
- tyre deflection
- frame deform
- tyre destroy
- wheel shaft shaft

Front wheel jump

- rim deform
- wheel shaft bad
- tyre bad
- wheel balance bad
- wheel shaft round bad tightening

wheel rotation dumb

- wheel shaft bad
- front wheel shaft bend
- brake drag

Front suspension too soft

- front suspension bounce weaken
- tyre air too lower

Front suspension too hard

- front suspension bend
- tyre air too high

Front suspension abnormal noise

- front suspension bad
- suspension tightening parts loosen

Brake effet poor

- brake adjustment bad
- brake disc surface deface
- brake block destroy

Front wheel

Disassemble

Set up front wheel with tool, ensure without any force on the front wheel.
remove steer cap
remove the four nuts installed in the front wheel hub, remove front wheel.

Inspection

Rim

Inspect if the rim destroy, deform, speck, replace the rim if needed.

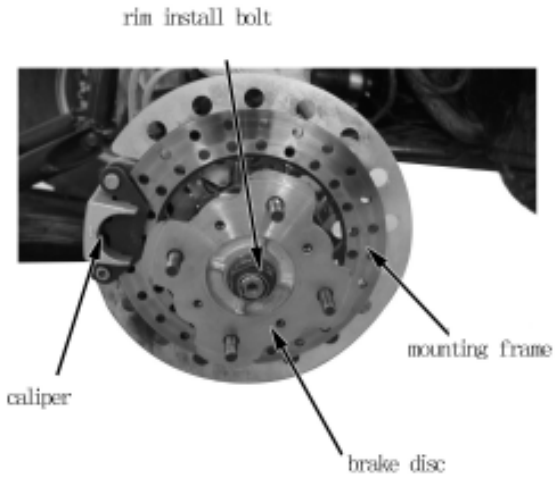
Turn the wheel slowly, use centimeter measure rim jump.

Service limit:axial direction: 2.0mm

Radial direction:2.0mm

Installing

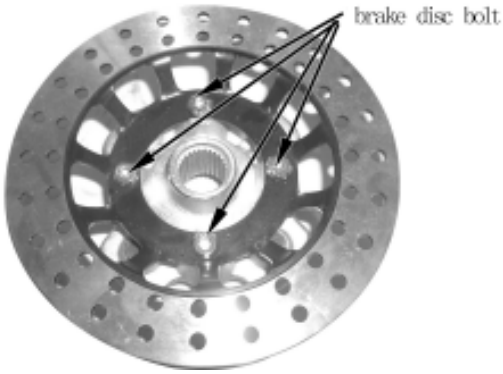
Press the rim in the tyre on special matchin.
Fix the rim in hub
Rim install nut torque:50-60 N.m



Front wheel hub disassemble

Disassemble

remove front wheel(8-3)
remove front brake caliper(8-4)
remove rim shaft nut
take away brake disc and hub together
remove front brake disc 4pcs brake bolts
remove front wheel hub



Installing

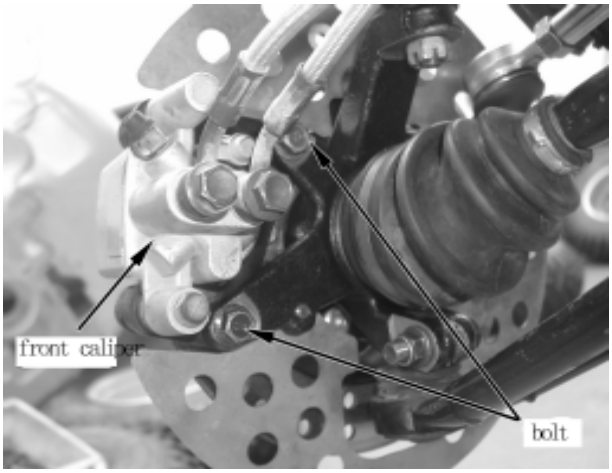
Installing carry on according to the opposite sequence.
Rim shaft installnut torque:110-130N.m

Brake system

Front brake caliper

Disassemble

remove front wheel(8-3)
remove the 2pcs nuts installed on the arm
remove brake caliper



Inspection

Check if the brake caliper crack,
if the tightening area oil leakage,
replace if needed.

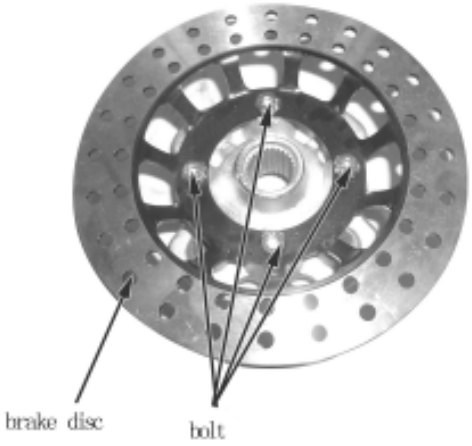
Installing

Brake caliper holding bolt torque:40-50N.m

Brake disc

Disassemble

remove front wheel(8-3)
remove brake caliper(8-4)
take away brake disc together with front wheel hub.
remove brake discs 4pcs nut installed in front wheel hub.
remove the brake disc.



Inspection:

brake disc thickness: replace when less than 2.5mm.

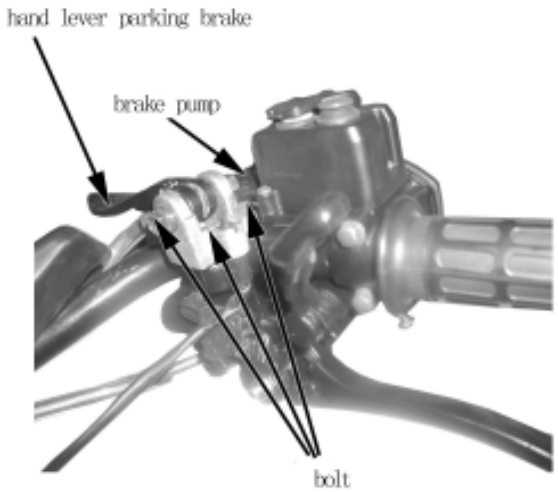
Installing
Install the brake disc well
Brake disc holding bolt torque:25-30N.m

Hand brake master cylinder, front brake

Disassemble
remove bolt
remove parking lever
Seperate front hand brake master cylinder handlebar, it is not need to remove the front hand brake master cylinder if not replace the brake pump assembly.

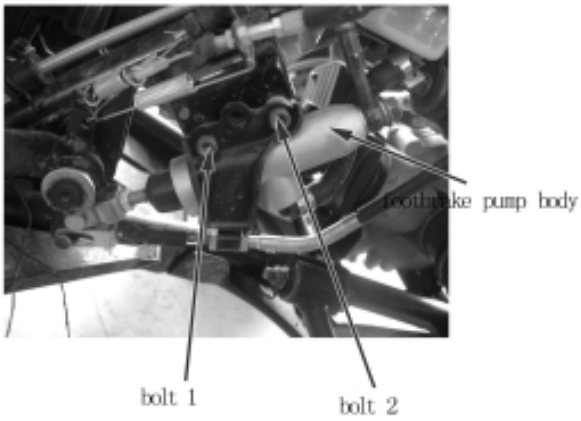
Attention

Donot use brake tube hang the brake pump,to prevent front hand brake master cylinder backdate,so keep installing position, at the same time, fix it in the handlebar.
Oil tube trend according to Sction 1 cable, wire traces.
Must keep the oil line smooth.
Complete the brake system installation,brake effort must be checked.



Disassemble

remove foot rest(2-9)
remove front inner fender RH(2-12)
remove bolt1, bolt2
seperate pedal brake master cylinder from the body



Assembling

Assembling carry on according to the opposite sequence of disassemble.

Attention

To avoid air inlet the brake pump, thus you must to keep the assemble position, at the same time, fix it in the vehicle body.
Oil tube trend refers to Section1 cable, wire traces. It must ensure the brake oil line smooth. After complete the brake system installation, checking the brake effort is required.

Brake Y-joint

Disassembling

remove front inner fender RH(2-12)
remove bolt 1 then the brake Y-joint canbe remove form the body.

Assembling

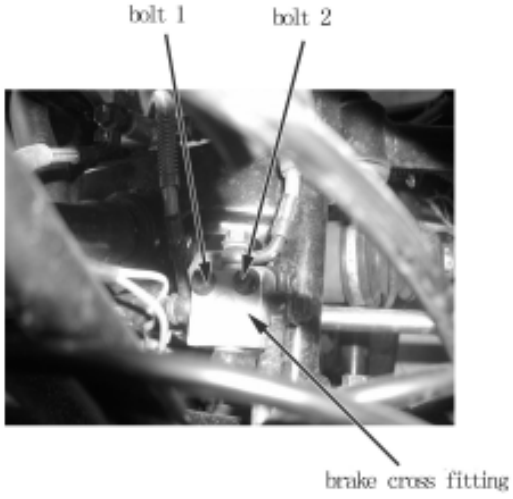
Assembling carry on to the opposite sequence of disassembling.

Attention:Oil tube trend refers to section 1, cable and wire traces, the brake oil line must be smooth. Brake force checking is required when complete the brake system installation. If it cannot gang control the brake system, check if the stem T-junction, brake force checking is required after finish the brake system installation.

Brake cross joint plug

Disassembling

remove front inner fender RH(2-12)
remove bolt 1, bolt 2, then the cross joint plug canbe remove from the body.



Assembling

Assembling carry on according to the oppsite sequence of disassembling.

Attention:Oil tube trend refers to section 1 cable, wire line traces, brake oil line must be smooth. Brake force checking is needed after finish the brake system installation, if it cannot join control, check the cross plug.

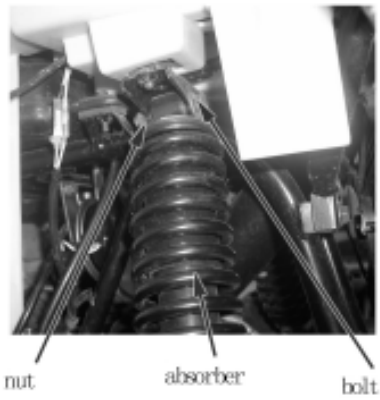
Front suspension system

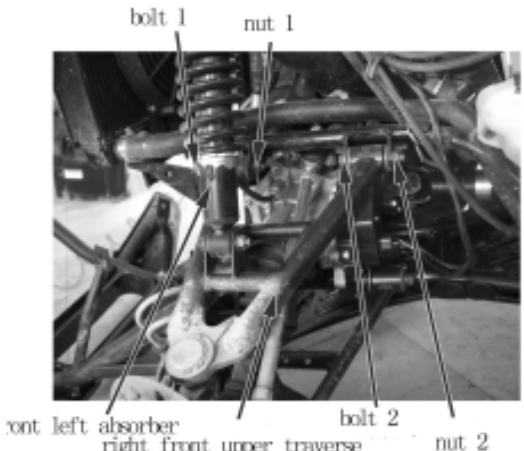
Front left suspension assemble

Attention: when repairing suspension, you must not remove both LH and RH suspension at one time, or else the body will fall down because lack of holding power.

Disassemble

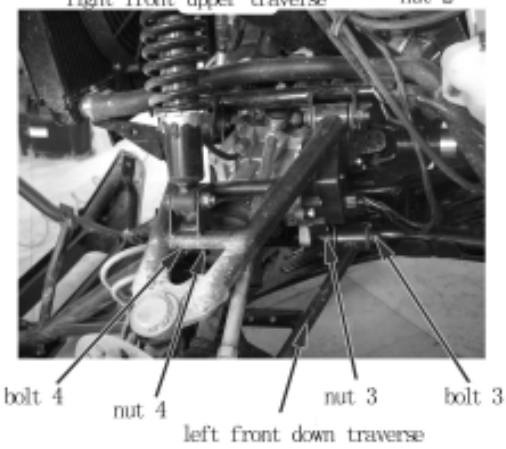
Put vehicle body into horizontal position, use jack hold the wheel front firmly.
remove front wheel(8-3)
remove front rim hub(8-3)
remove caliper(8-4)
remove front left absorber bolt 1 and tightening nut 1 installed on the body.





remove front left upper arm bolt 1 and tightening bolt 1,nut 1; bolt 2 and bolt 2, nut 2 installed in the frame.

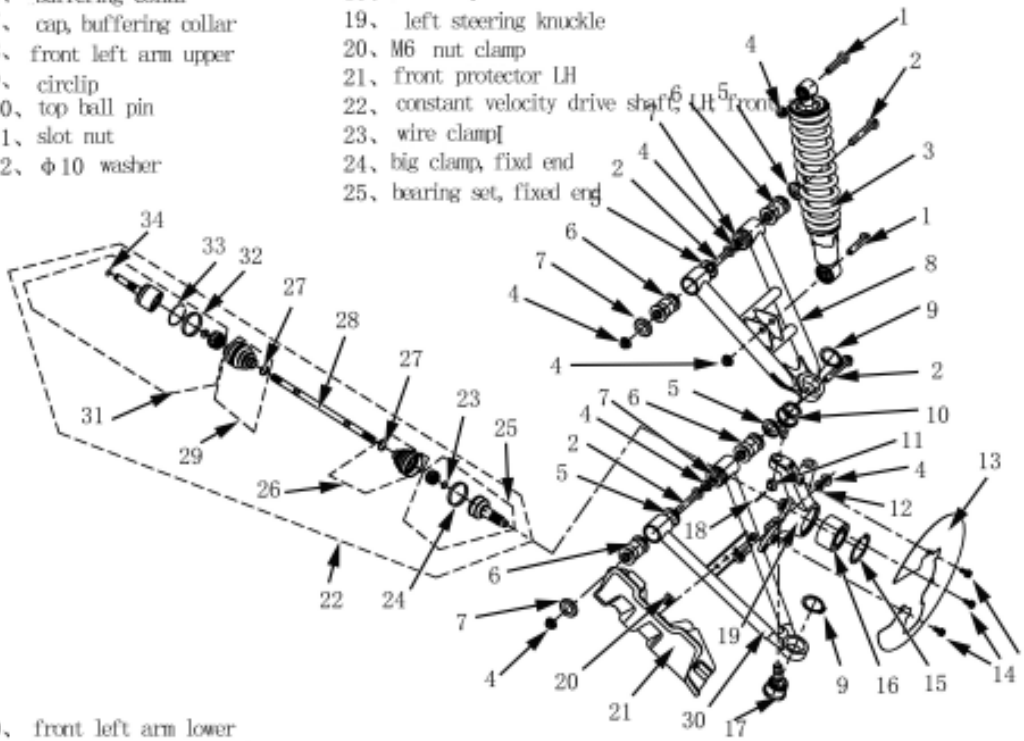
remove front left lower arm bolt 3 and tightening nut 3, bolt 4 and tightening nut4 installed in the frame.



remove steering tie-rod ball pin slot nut, remove the steering pie-rod

pull up joint knuckle from the driveshaft, remove front left suspension assy.

1、bolt: GB5789 M10×1.25×10
2、bolt GB5789 M10×1.25×70
3、front shock absorber assembly
4、nut: GB6187 M10×1.25
5、cap, buffering collar
6、buffering collar
7、cap, buffering collar
8、front left arm upper
9、circlip
10、top ball pin
11、slot nut
12、Φ10 washer
13、brake disc guard
14、bolt: GB5789 M6×12
15、circlip
16、bearing, hub
17、bottom ball pin
18、cotter pin
19、left steering knuckle
20、M6 nut clamp
21、front protector LH
22、constant velocity drive shaft, LH front
23、wire clamp[
24、big clamp, fixd end
25、bearing set, fixed end
26、dust boot set, fixed end
27、small clamp
28、front shaft LH
29、dust boot set, front motion end



30、front left arm lower
31、bearing set, motion end LH
32、big clamp, motion end
33、wire clamp[[
34、wire clamp

Dismantling

Front shock absorber

Dismantling

Attention:You donot need to remove any other parts if you only replace the front suspension.

Remove front left absorber¡¯s bolt 1,nut 1 installed in arm.

Remove front right shock absorber.

Inspection

Inspect if the absorber oil leakage, oil seal age, destroy, replace if needed.

Assembling

Assembling carry on according to the opposite sequence of disassembling.

Front left absorber's disassembling, assembling, inspection as same as front right absorber.

Arm assemble

Attention:There are 8 suspension arms in the vehicle, they dismantle,discompose,inspection and assemble in the same way.So here only introduce the way to dismantle,discompose,inspection and assemble the front left upper arm and the front right lower arm. Other arm assemble refers to the above.

Front right arm assy

Disassemble

Remove front right absorber(6-8)
Remove front right upper arm's bolt 3 and tightening nut 7, bolt 1, tightening bolt 1 and nut 7.

Remove front right lower arm's bolt 3 and tightening bolt 7's nut 7 installed in the frame.
Before disassembling the absorber, you have to remove the wheels, brake caliper and rim hub.
Before disassembling the bolts, you need to remove the steering tie-rod.
Before disassembling front right lower arm assy, you need to pull up the knuckle from the driveshaft.

Remove front right arm assy.

Inspection

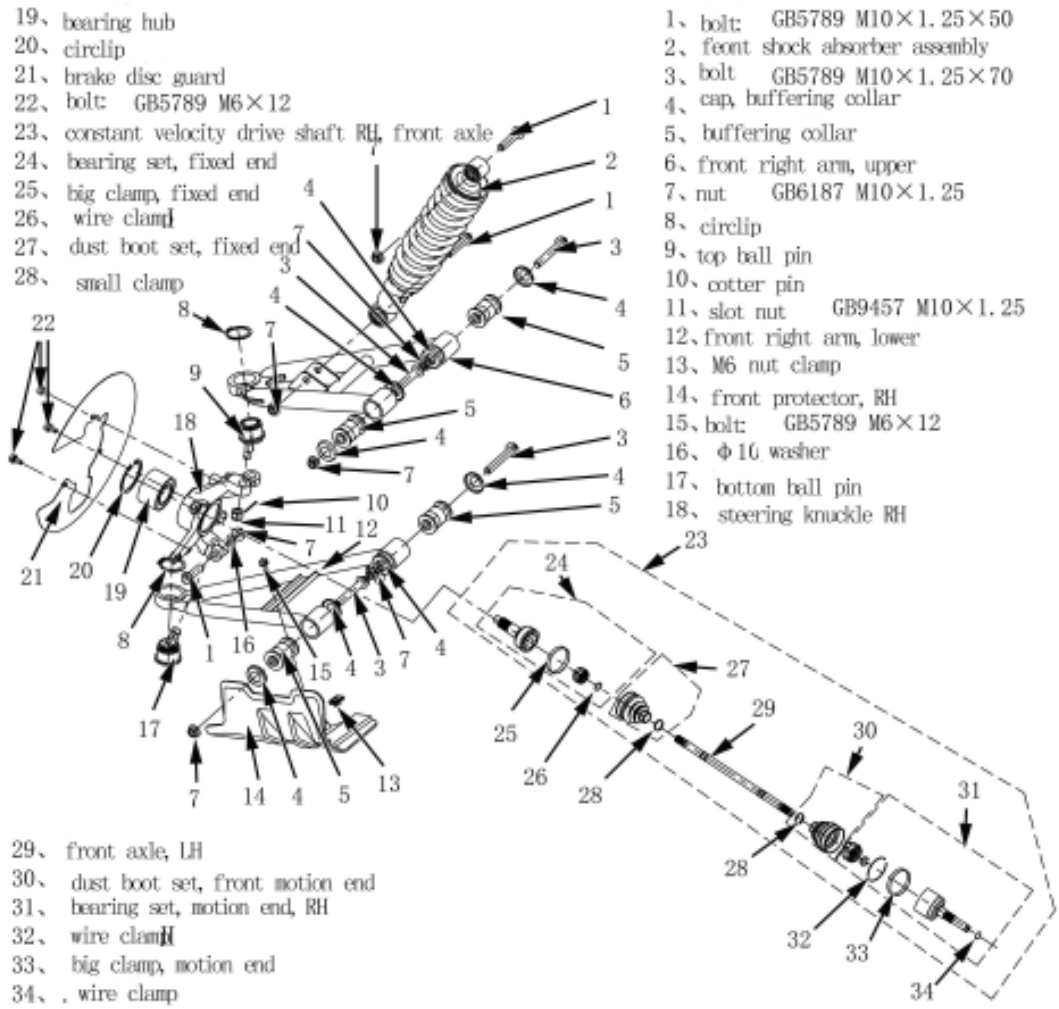
Ball pin

Inspect if it can rotate flexible between top ball pin 9 and front right upper arm 6,bottom ball pin 17 and front right lower 12. Besides, the gap between top ball pin and bottom,if it cannot move freely or the gap too big, ball pin replacement is needed.

Right knuckle

Inspect if the right knuckle is damaged, replace it if needed.

Check if the bearing,hub,steering knuckle ,RH rotates smoothly or has free pay,if the bearing is stuck or has too big free play,replce.



Constant velocity drive shaft

Attention:For this vehicle, inspection,disassembling and assembling the front&rear axle LH&RH constant velocity drive shaft are in the same way.

(55)Constant velocity drive shaft, LH. Front axle

Disassembling

Attention:You donot need to remove the front suspension assy from the vehicle if you only repair the front axle costant velocity drive shaft, LH.

remove front left wheel(8-3)
remove front left brake caliper(8-4)
remove fornt left rim hub(8-3)
Examine duct boot, replace with new ones if destroy.
costant velocity drive shake£¬inspect if the universal joint move freely, the bearing move freely, if there is gap between joint and spline.

Replace with new ones if dumb,abnormal sound,gap.

Attention:Double offset universal joint must can be move freely, or else,it cannot control the tyres and result in accident.

Assembling

Use special tool to press the ball pin into the arm assy.
Assembling carry on according to the opposite sequence of disassembling.

Attention: Replacement is required if the right&left arm shake after installation.

Mounting torque:**40~50N.m**

Steering system

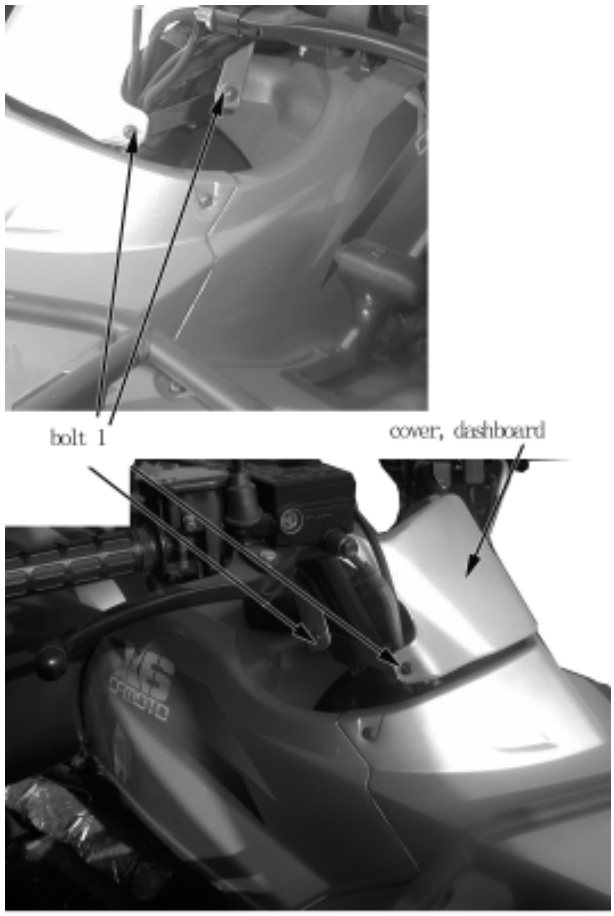
Handlebar

Dashboard cover

disassembing

remove dashboard cover bolt1

remove dashboard cover



Assembling

Assembling carry on the opposite sequence of disassembling.

RH handlebar switch

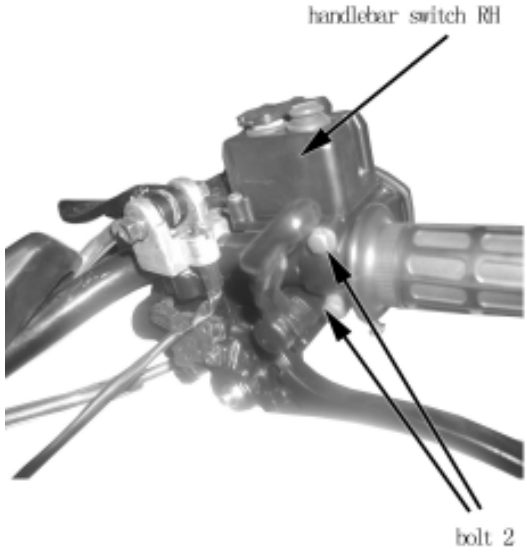
Disassembling

remove front top cover(2-4)

remove RH handlebar switch connector

remove the two bolts installed in handlebar tube.

remove handlebar switch, RH.



Installation

Install the handlebar switch, RH(8-15)

Handlebar switch, LH

disassembling

remove 2 screws

remove LH handlebar switch connector
remove handlebar switch, LH

Install

Install the LH handlebar switch(8-15)

Rear view mirror

Disassembling

loosen the nut in counter-clockwise direction, then turn the rear mirror in counter-clockwise and you can take off the rear view mirror.

Attention:Left hand rear view mirror is right hand screw thread, turn it in counter-clockwise direction when dismantling.

Loosen the nut in clockwise direction, turn the RH rear view mirror then you can take down the RH rear view mirror.

Attention: RH rear view mirror is left hand thread, you required to turn it in clockwise direction when take it down.

Installation

Installing carry on according to the opposite sequence, direction of uninstallation.

Handlebar pipe

Disassembling

remove the dashboard cover(8-12)
remove RH&LH handlebar switch(8-12)
Seperate the right and left brake pump from the hanlebar pipe.

remove the four installation bolt, take down the handlebar.

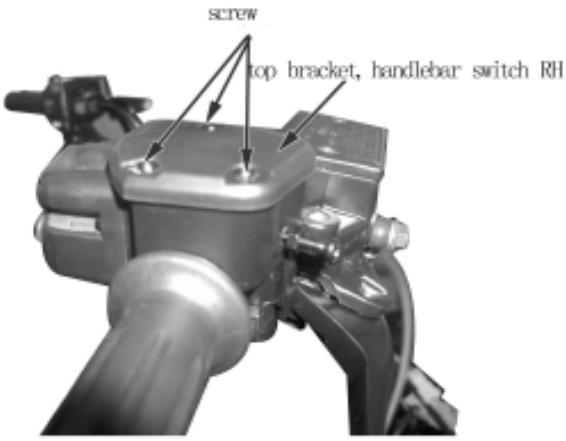
Assembling

Assembling carry on according to the opposite sequence of disassembling.

Torque:20-30N.m(2.0-3.0kgf.m)

Attention

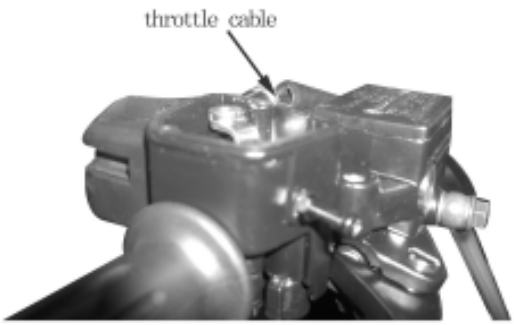
Main cable assy,throttle cable,brake oil pipe, cable hut according to the drawing correctly.



Install throttle cable

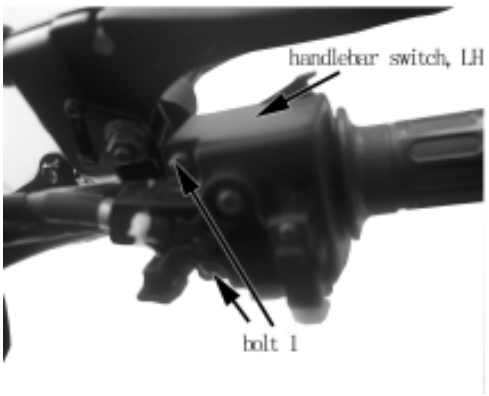
remove the three screws, remove RH handlebar switch c

Install throttle cable
install RH handlebar switch cover

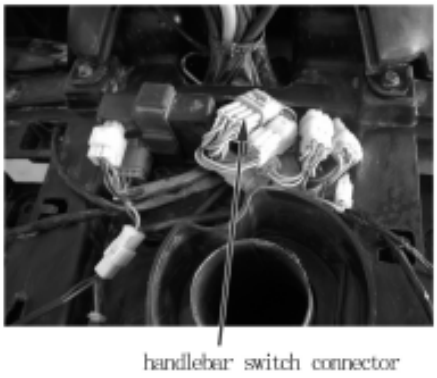


Install LH handlebar switch

Pair the LH handlebar switch stopped onto the handlebar location hole.
use bolt 1 tightening from the bottom.

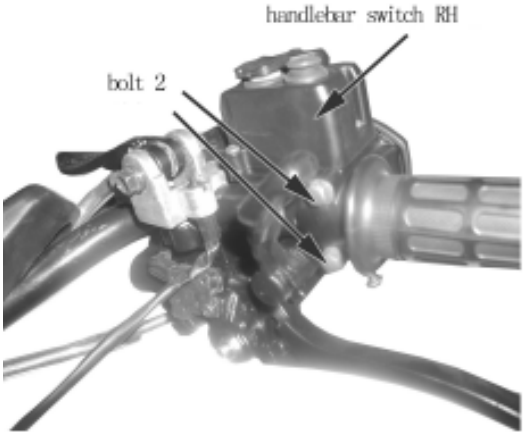


Insert the LH handlebar switch connector into the main cable.

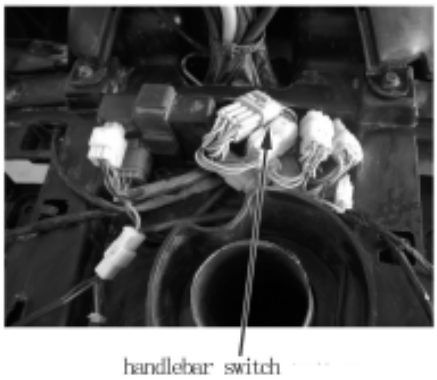


Install RH handlebar switch

Pair the RH handlebar switch stopped onto the handlebar location hole. Tightening through the bolt 2 from the bottom.



Insert the RH handlebar switch connector into main cable.

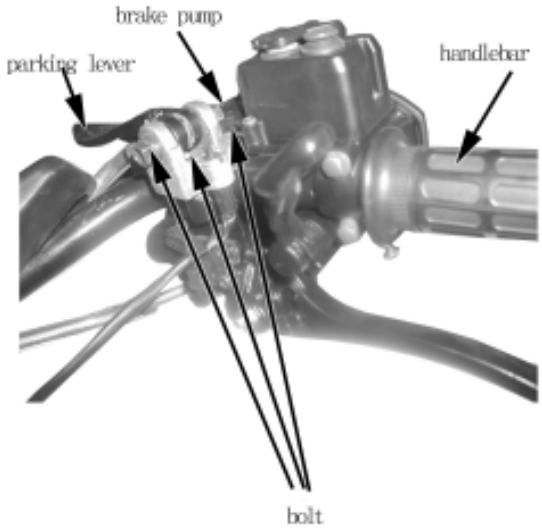


Install RH&LH grip

remove dirty inner LH grip and dry it. coat the connection with joint cement between handlebar and LH grip, put in the RH&LH grips.

Attention

The installed RH&LH grips must be placed for hours for dry the joint cement.



Install brake pump

upward the brake pump base"UP" mark, then install the brake pump.

eyeballing the distance between brake pump and handlebar switch, handlebar under hood to equality.

Attention:

Main cable assy,throttle cable, brake oil pipe, cable hut shall according to the drawing correctly.

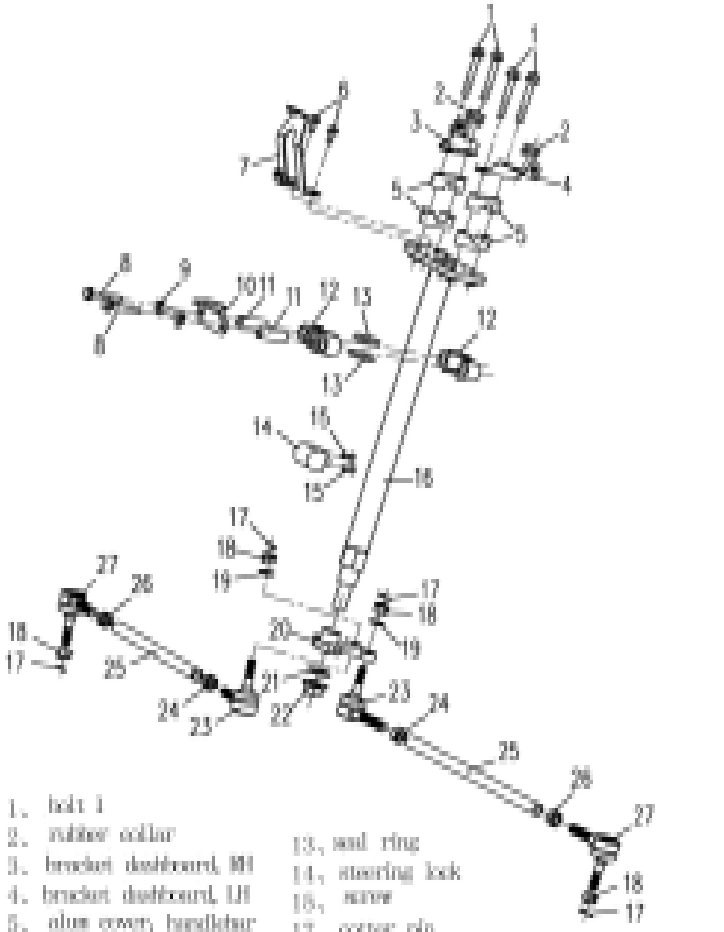
Install the parking lever

install the rear view mirror(8-13)

install the dashboard(8-10)

install the dashboard cover(8-12)

Steering system



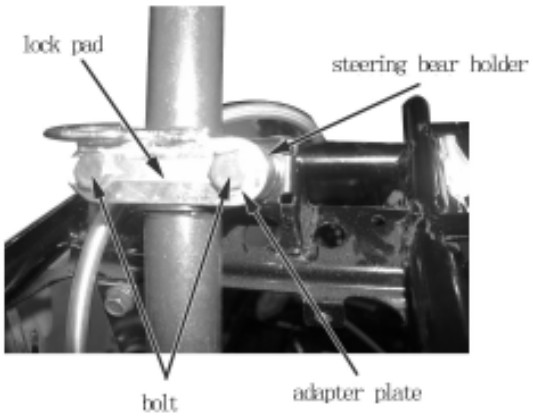
1、bolt 1
2、rubber collar
3、bracket dashboard, RH
4、bracket dashboard, LH
5、alum cover, handlebar
6、bolt 2
7、front bracket, dashboard
8、bolt 3
9、lock pad
10、adapter plate
11、bush
12、bushing, steering stem
13、seal ring
14、steering lock
15、screw
17、cotter pin
18、nut 1
19、washer 1
20、pitman arm
21、washer 2
22、nut 2
23、steering knuckle
24、nut 3
25、tie-rod
26、nut 4
27、steering knuckle 2

8

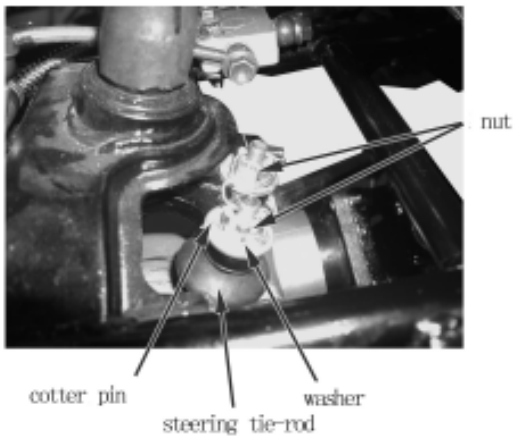
Steering stem

Disassembling

remove dashboard front cover(8-12)
remove front wheel(8-2)
take down handlebar switch connector
Use straight screwdriver and hammer hammer out the lock pad.
remove bolt1,bolt2
remove steering stem seat, plate and bush.

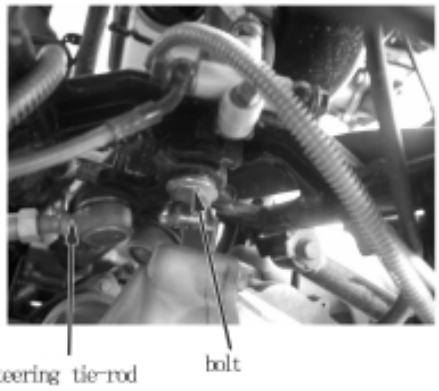


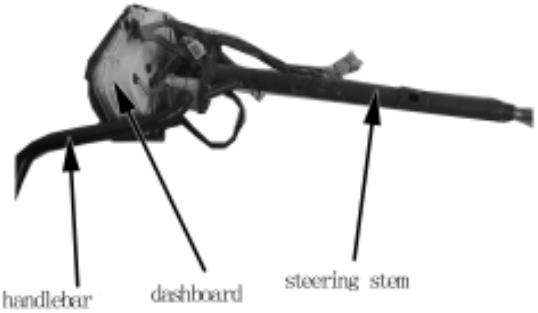
Remove cotter pin
Remove steering tie-rod installation nut, washer
Press and separate the steering tie-rod from the steering stem.



Remove steering stem installation bolt

Raise up the steering stem and the handlebar together,then you can remove the steering stem.





Installing

Installing carry on according to the opposite sequence of uninstalling.
Attention:Check the maneuverability after finish the installation.(3-3)
Cable, inhaul cable trace refers to section 1 cable, inhaul cable trace drawing.

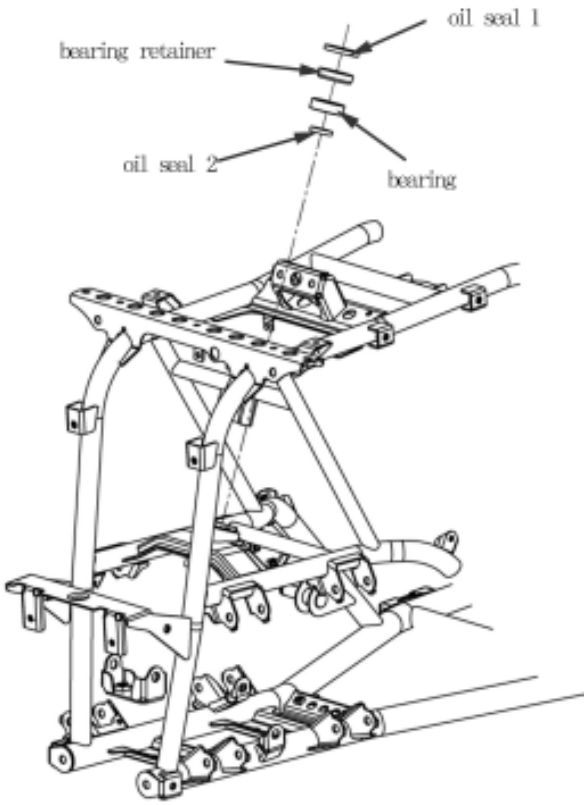
Steering bearing, oil seal

Dismantling

remove front wheel(8-2)
remove steering stem(8-18)
remove front ADWS arm assy(8-9)
Use special tool separate the steering stem and the oil seal from the body.

Special tool:

bearing remover component
rotor puller
remover axle
remover heavy bob



Installation

Installation carry on according to the opposite sequence of uninstallation.

Special tool:

Bearing race installation tool A

Assembling tooling bar

Attention:Special tool must be used when install the bearing.

Steering system install according to the opposite sequence of uninstallation.

Attention:Check the maneuverability after finish the installation.

9 Rear Wheel, Rear Brake, Suspension

Overhaul Information

Operating Notice

Note

- Securely support the vehicle when overhauling the rim and suspension system.
- Use genuine parts of bolts and nuts for rear rim and suspension.
- Do not overexert on the wheels to avoid possible damage to the wheels.
- When removing tires from rim, use special tire lever and rim protector to avoid damage to the rim.

Overhaul Standard

Item			Standard	Limit
Rear Wheel	Rim Vibration	Longitudinal	—	2.0mm
		Horizontal	—	2.0mm
	Tire	Remained Tire Tread	—	3.0mm
		Tire Pressure	30kPa	—
Rear Brake	Brake Lever Free Play		10－20mm	—

9

Tightening Torque

Rear Wheel Axle Nut 110-130N.m
Rim Mounting Bolt 50-60N.m
Upper Mounting Bolt, Shock Absorber 40-50N.m
Lower Mounting Bolt, Shock Absorber 40-50N.m

Troubleshooting

Rear Wheel Wobbles

- Rim Warpage
- Faulty Tire
- Tire Pressure Too Low
- Improper Wheel Balance
- Improper Tightening of Wheel Axle Nut
- Loosened Wheel Nut

Rear Shock Absorber is Too Soft

- Weak Spring
- Oil Leakage from Rear Shock Absorber

Rear Shock Absorber is Too Hard

- Bent Rear Shock Absorber
- Tire Pressure is Too High

Poor Brake Efficiency

- Improper Brake Adjustment
- Stained Brake Pad or Brake Disk
- Worn or Damaged Brake Pad

Rear Wheel

Removal

Refer to Front Wheel Removal(8-3)

Inspection

Rim

Damage, warpage, serious scrapes:Replace

Slowly turn the wheel, measure the rim vitration with a dial gauge.

Service Limit: Axial:2.0mm

Radial:2.0mm

Installation

Refer to Front Wheel Installation(8-3)

Wheel Hub

Remove:

-Rear Wheel(9-3)

-Rim Axle Nut

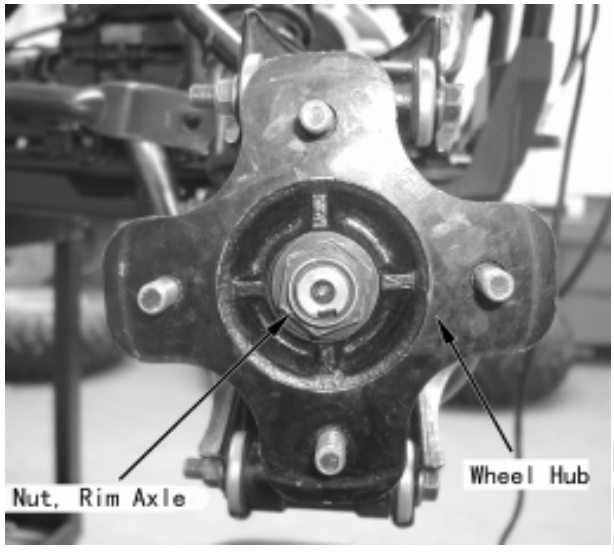
-Wheel Hub

Installation:

Reverse the removal procedure for installation.

Tightening Torque, Rim Axle Nut:

110-130N.m

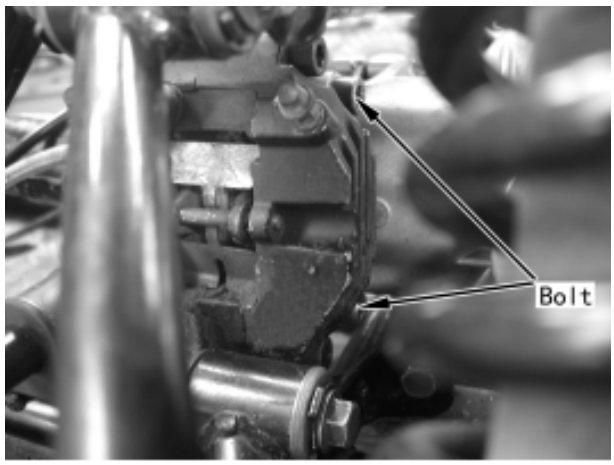


Rear Brake

Rear Brake Caliper

Remove:

-Rear Left Wheel(9-3)
-2 Bolts from Arm
-Brake Caliper



Inspection

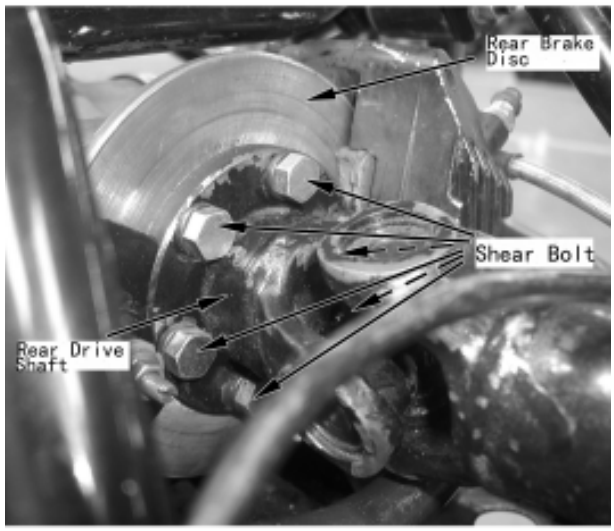
Brake Caliper: Cracks, Oil Leakage:Replace

Installation

Reverse the removal procedure for installation.
Note: Refer to Chapter 1 for brake hose routing.

Rear Brake Disc

Remove:
-Rear Left Wheel(9-3)
-Rear Drive Shaft
-Rear Brake Caliper(9-4)
-6 Shear Bolts
-Parking Brake(9-4)
-Rear Brake Disc(8-3)



Inspection

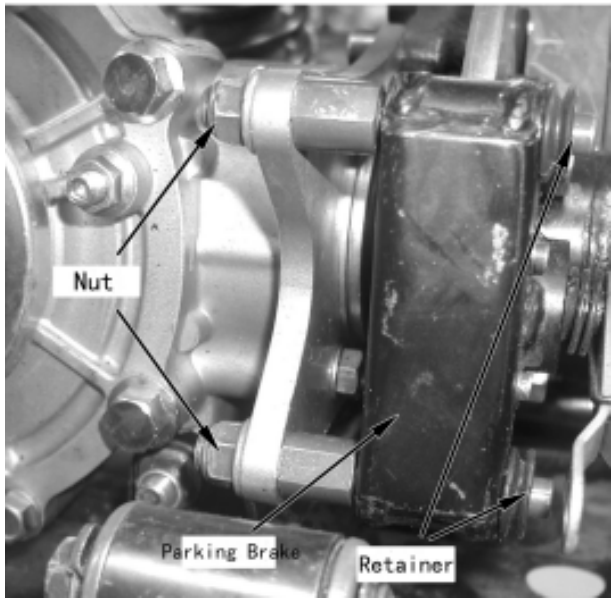
Brake Disc: Thickness<6.5mm¡úReplace

Installation

Reverse the removal procedure for installation.
Note: Refer to Chapter 1 for brake hose routing.

Parking Brake

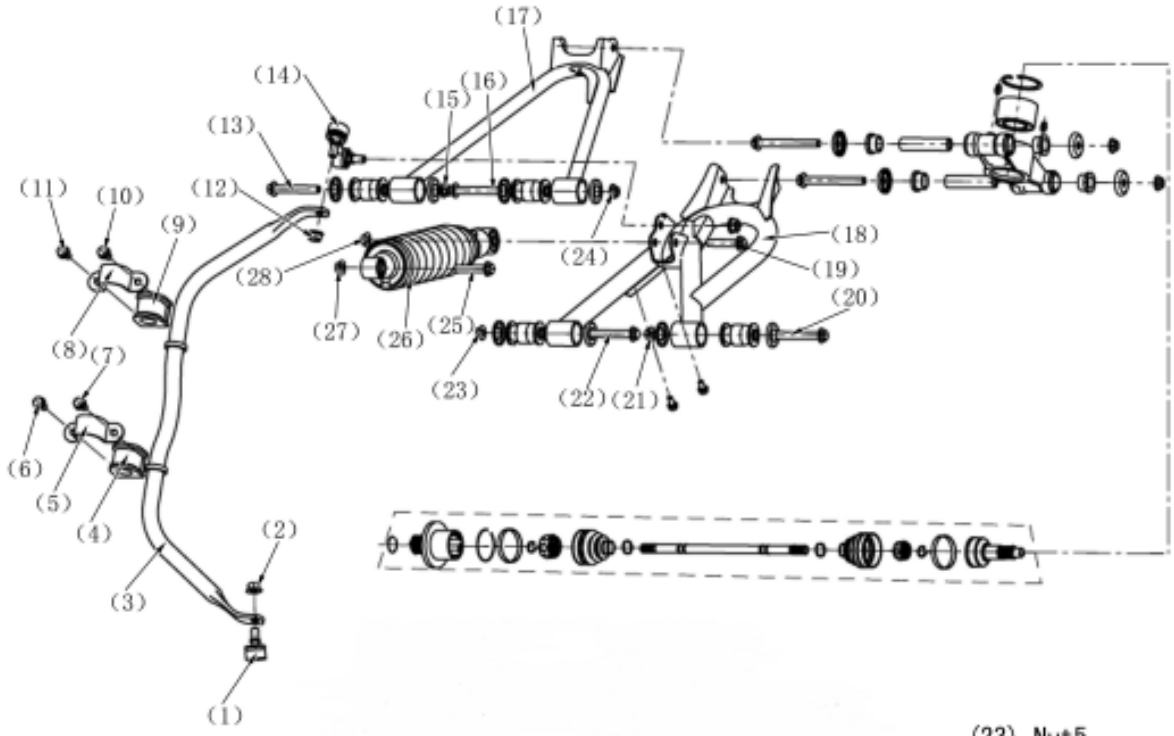
Remove:
-Rear Left Wheel(9-3)
-Rear Drive Shaft
-Rear Brake Caliper(8-4)
-6 Shaft Bolts
-Parking Brake



Rear Suspension System

Rear Right Suspension

Note:DO NOT remove both left and right suspension at the same time to avoid fall down of the vehicle.



(1) Left Ball Pin
(2) Nut1
(3) Stabilizer Bar
(4) Rubber Support, Rear Right Arm
(5) Bracket
(6) Bolt1
(7) Bolt2
(8) Bracket
(9) Rubber Support
(10) Bolt3
(11) Bolt4
(12) Nut2
(13) Bolt5
(14) Right Ball Pin
(15) Nut3
(16) Bolt6
(17) Rear Right Upper Arm
(18) Rear Right Lower Arm
(19) Bolt7
(20) Bolt8
(21) Nut4
(22) Bolt9
(23) Nut5
(24) Nut6
(25) Bolt10
(26) Rear Right Absorber
(27) Nut7
(28) Nut8

Disassembly

Stabilizer Bar

Remove:

Bolt1(6), Bolt2(7), Bolt3(10), Bolt4(11), Bracket(8)and (5), Rubber Support(4)and(9), Nut2(2), Nut10(12),Left Ball Pin(1), Right Ball Pin(14)

Remove: Stabilizer Bar(3)

Installation

Reverse the removal procedure for installation.

Rear Right Absorber

Removal

Note:Securely support the vehicle when removing rear left and right absorbers. Suspend wheels from ground.

Maintenance of rear absorbers only does not require removal of rear suspension.

Remove the following parts from rear right shock absorber:

-Bolt10(25)

-Nut7(27)

-Bolt7(19)

-Nut8(28)

Remove rear right shock absorber

Installation

Reverse the removal procedure for installation.

Rear Right Arm

Refer to Front Left Upper Arm in Chapter13 for the removal, inspection and installation of Rear Right Arm.

Rear Left Suspension

Refer to Rear Right Suspension for the removal, inspection and installation of Rear Left Suspension.

Overhaul Information

●Standards

Lubricating Period				
Items	Model	Capacity	Interval	
			Initial	
Front Axle	SAE15W/40 SF or SAE80W/90 GL-4	I:0.33L/R:0.28L	350km	5000km
Rear Axle		I:0.30L/R:0.25L		

I= initial, R=replace

Tightening Torque Table				
Item	Qty	Specification	Torque(N.m)	Remarks
Front axel bolt	6	M8×28	25	
Screw,front axle motor	4	M8×20	13	
Screw,front axle wrist	1	M8×10	13	With glue
Nut,front axle	1	M14×1.5	62	
Differential bolt	6	M10×1.25×22	45	
oil bolt,front axle	1	M14×1.25×12	25	
Drain bolt,front axle	1	M10×1.25	25	
Retainer,front axle	1	M64×1.5×7	80	
Bolt,rear axle	2	M10×1.25×25	40	
Bolt,rear axle	4	M8×25	25	
Input bearing nut,rear axle	1	M12×1.25	70	
Output bearing seat bolt,rear axle	4	M8×30	25	
Retainer limit,rear axle	1	M65×1.5×10	70	
Nut	1	M8	16	
oil bolt,rear axle	1	M20×1.5×12	25	
Drain bolt,rear axle	1	M14×1.25×12	25	

Inspection & Overhaul

Inspection and overhaul is needed if any of problems below happens to front and rear axle.

Descriptions	Causes
1.Unstable moving during accelerating, decerating or constant speed. 2.Abnormal sound in front rear axle; 3.Engine power tranmission failure to front or rear wheels.	A.Bearing broken; B.Gear clearance over/under size; C.Gear severely worn; D.Gear blocked; E.Drive shaft broken F.lack of lubricant G.Foreiggn matter in front or rear gear

Note:A,B,C problems are hard to distinguish. Analysis is needed based on actual break-down catagories.Make sure engine works all right before disassembly of front or rear axle

Obsernvation and Judgement

1.Never ignore abnormal sound:

a.Abnormal sounds during accelerating,decelerating have little to do with engine working, but possibly with gear worn.

b.Constant abnormal sounds during accelerating or decelerating might be cause by gear clearance wrongly adjusted during assembling.

Note: Wrong assembly or adjustment of the front or rear axle will aggravate gear worn and block;

c.Slight sounds will be noticed during low-speed driving, and shound not be heard during high-speed driving.This is caused by gear bolck.

Note**:**In case of above mentioned itmes, stop the vehicle immediately for inspection until they are solved, or will cause accident.

2.Check lubrication;

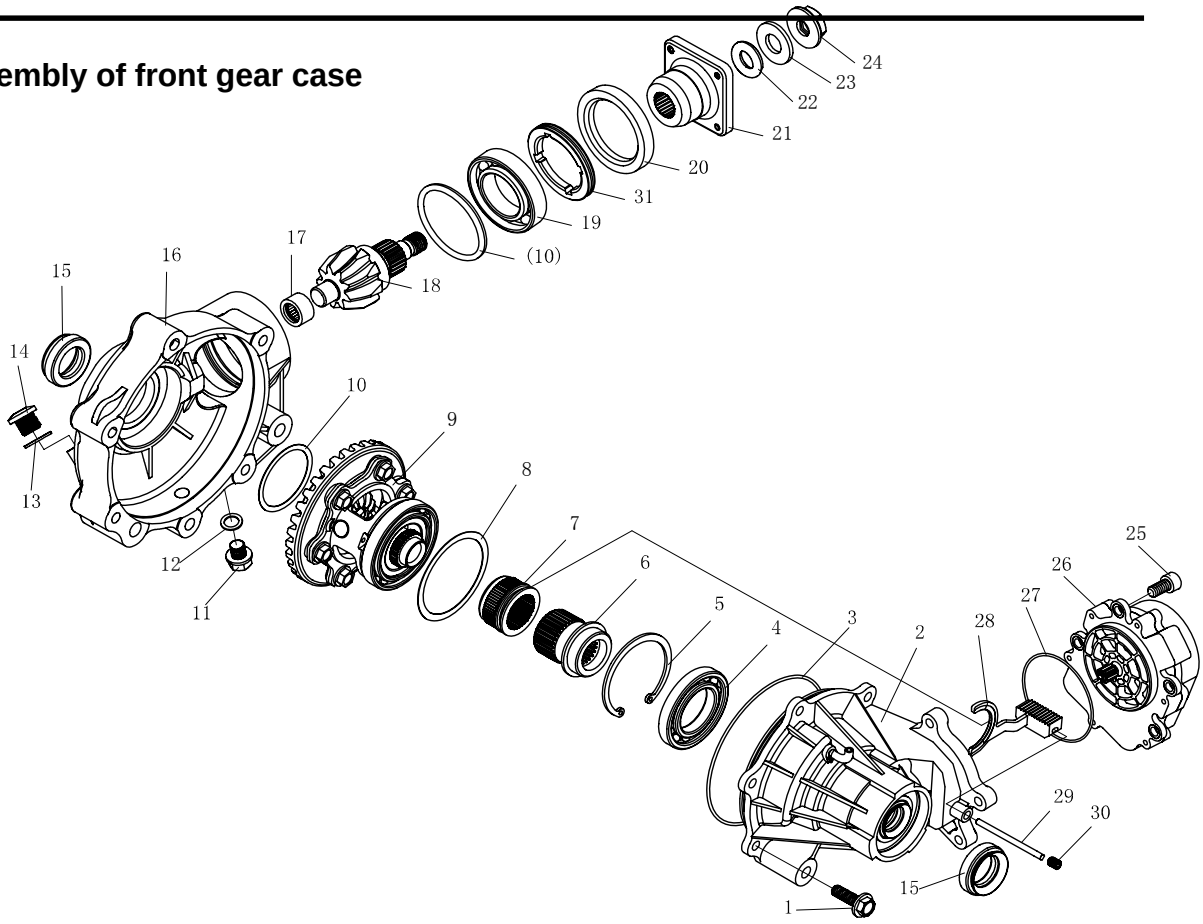
3.Chcek lubricant leakage;

a.Rear axle surface oil stain inspection before through inspection;

b.Oil stain on ground on the parking lot

c.Lubricant splash inspection.Check if there is gear case or oil seal leakage. Replace broken parts if necessary.

Disassembly of front gear case



Ref. No	Description	QTY	Ref. No.	Description	QTY
1	Bolt M8×28	6	17	Needle bearing 1512	1
2	Front gear case	1	18	Drive pinion gear	1
3	O-Ring 141×2.4	1	19	Bearing 6007	1
4	Bearing 16007	1	20	Oil seal 18×65×9	1
5	Cir clip 62	1	21	Coupler	1
6	Drive clutch cover	1	22	O seal 14×6.8	1
7	Drive clutch	1	23	Nut washer	1
8	Washer ∅83×71	1~2	24	Nut washer M14×1.5	1
9	Dif. gear assembly	1	25	Bolt M8H20	4
10	Washer ∅61×48	2~4	26	Gear motor	1
11	Bolt M10×1.25	1	27	O seal 81.2×1.9	1
12	Washer 10	1	28	Rack	1
13	Washer 14	1	27	Pin roll	1
14	Bolt M14×1.25	1	30	Screw M8×10	1
15	Oil seal 24×38×8	2	31	Bearing M64×1.5×7	1
16	Cover, front gear case	1	32		

Inspection after front axle disassembly

●Check if there is damage or crack on the front diffrential gear casecover and
●bearing assembling hole is ok.Replace casecover if necessary;

●Check if front axle bearing clearance ok or turning stable,and roll way,steel ball,needle and plate are ok. Replace bearing if necessary.(Using special tools)

●Check if oil seal lips and O-ring shape are ok. Replace if necessary;

●Check cylndrical surface of front axle and oil seal lips. Replace broken parts if necessary;

●Check drive pinion gear and differential gear, inspect worn surface. Replace broken if necessary;

●Check driven gears surface,gear(center)differential,bracket differential wearing situation on the differential gear assembly. Replace parts if necessary;

●Check inside and out side spline washer wearing status in front axle. Replace parts if necessary;

●Check gear motor working status. Replace with new parts if necessary;

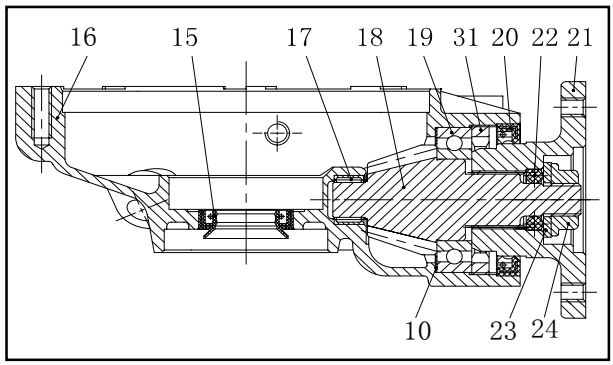
Gear motor inspection must be carried out with special equipment or acted on the vehicle;

●Check other parts. Replace broken parts of necessary.

Front axle assembly and adjustment

●Front axle casecover asselbly

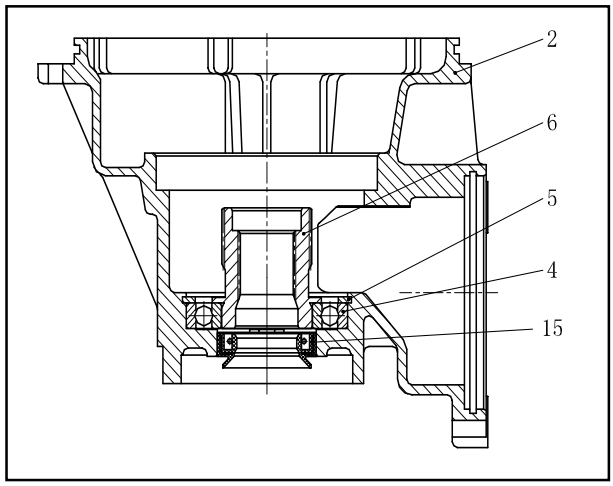
tem”31” tightening torque80Nm
tem”24”tightening torque62Nm



Note:Use engine oil for oil seal, bearing and drive clutch assembly;
“24”Use screw thread fastening glue;

●Frong axle case assembly

Note: Use engine oil for oil seal or bearing assembly.

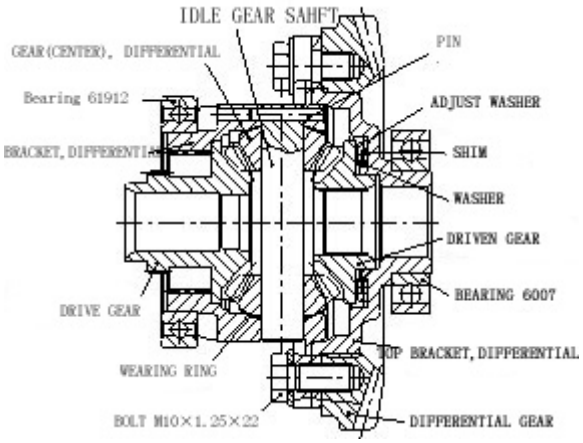


●Differential gear assembly

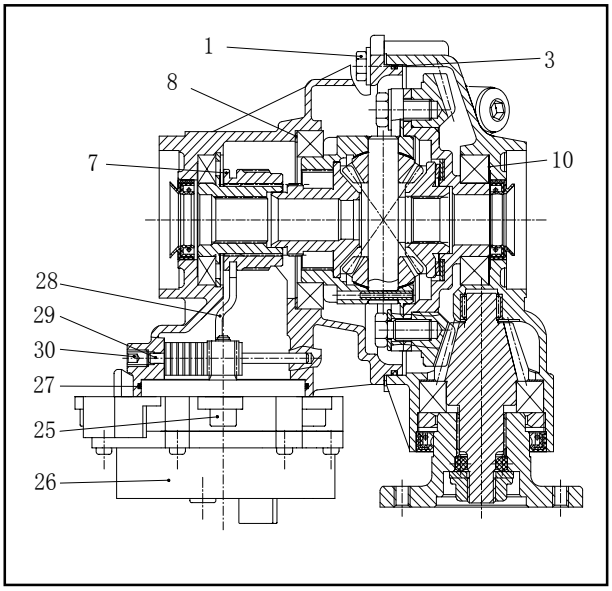
M10×1.25×22Tightening torque45Nm

Note : Use engine for bearing and differential gear;Use proper washer to make gear working freely;

Adjust washer thickness	0.1 0.2 0.3 0.4 0.5 1.0



●Front axle assembly and adjustment Illustration:

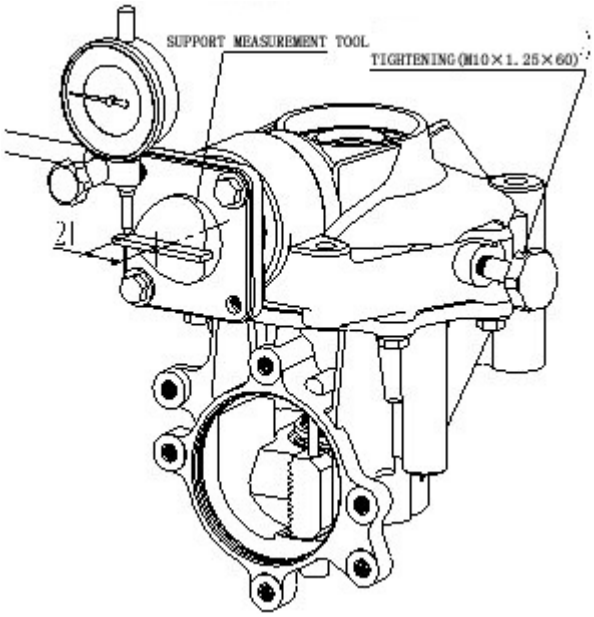


Tightening Torque	
Item"1"	25Nm
Item"25"	13Nm
Item"30"	13Nm
Bolt	25Nm
Bolt	25Nm

Use fastening glue for item"30" assembly.

a Use proper washer 8 and 10 thick ness to adjust gear side clearance between drive pinion gear and differential gear,

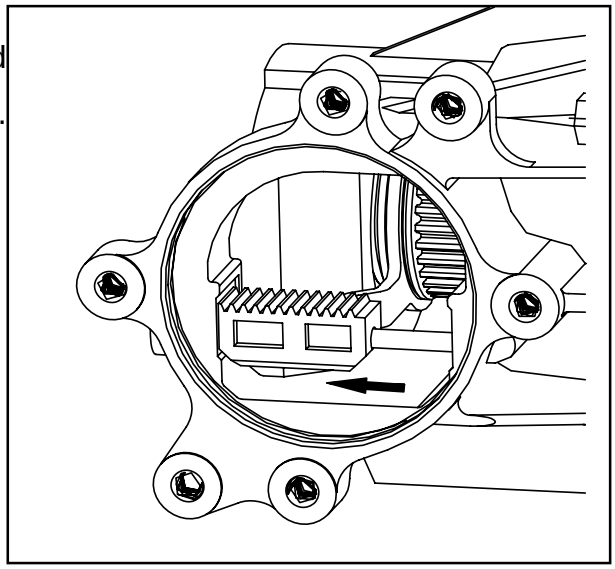
Drive bevel gear clearance measurement; Install support tools, tighening bolts(M10X1.25X60) put up dial indicator, make sure 21 mm is between measuring point and support tools. Turn support tools counter-clock and read the data.



Standard: 0.10-0.25

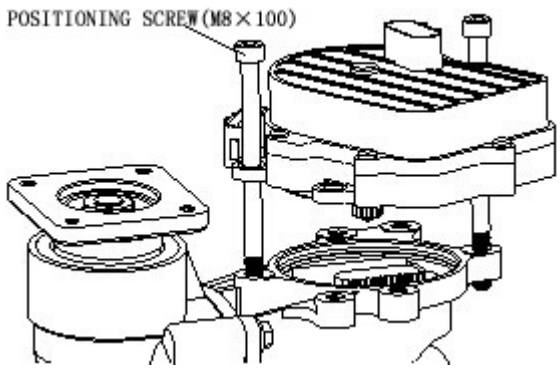
Adjust washer thickness	0.1 0.2 0.3 0.4 0.5 1.0

b Shift fork and drive clutch assembly should be against tightly to the arrow shape illustration.

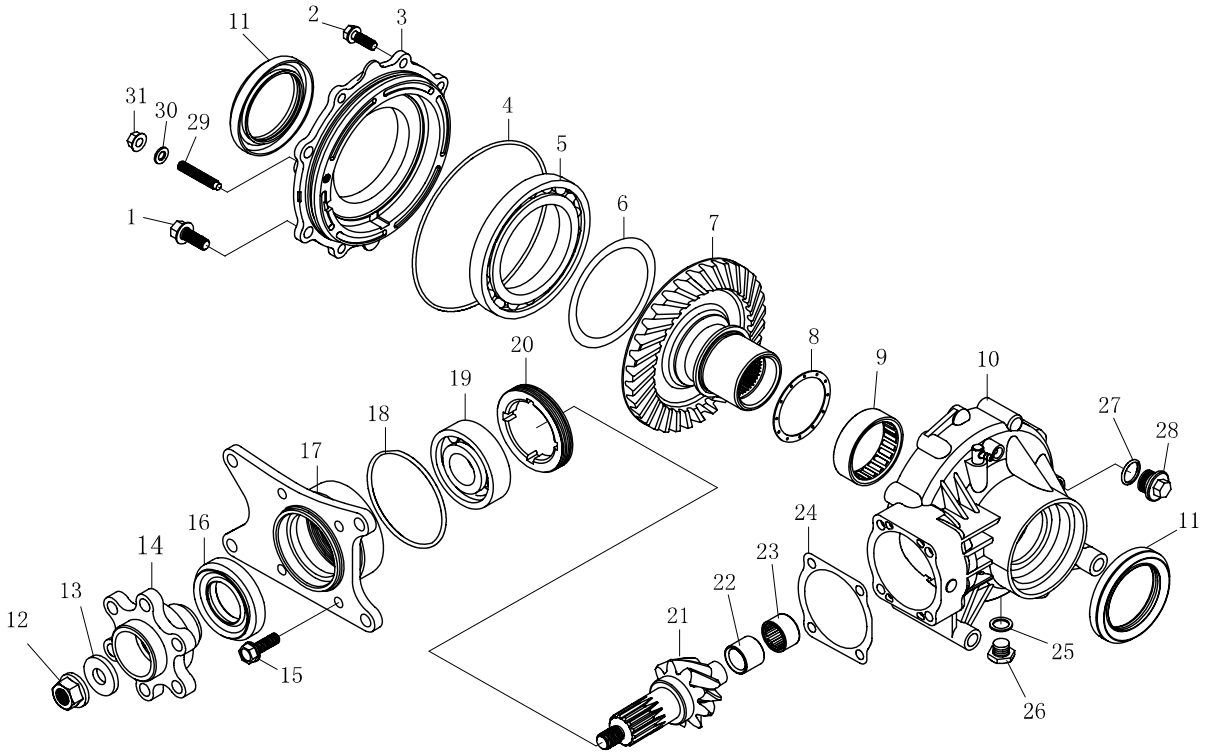


c Use special equipment or vehicle control circuit into two stroke position before gear motor assembly;

d Make sure b and c is assembled using illustrated positionging bolt before gear motor and front axle.



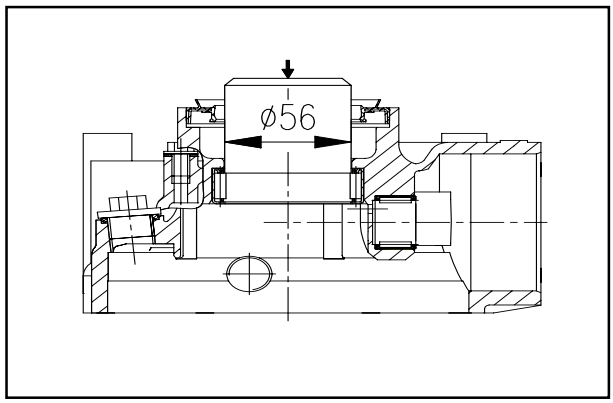
Disassembly of rear axle



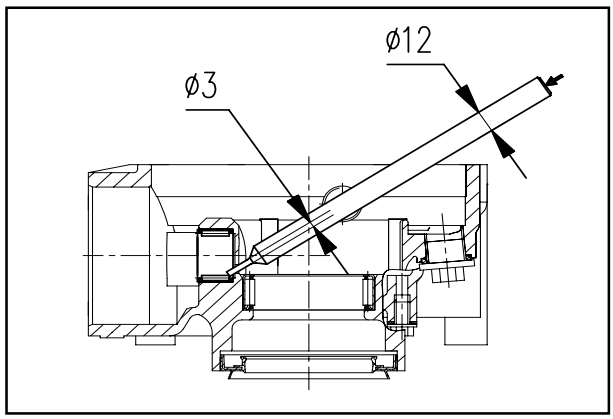
Ref.No	Description	QTY	Ref.No	Description	QTY
1	Bolt M10×1.25×25	2	18	O-ring 64.5×3	1
2	Bolt M8×25	4	19	Bearing 6305	1
3	Rear gear case cover(R)	1	20	Bearing retainer	1
4	O-Ring 151×3	1	21	Drive bevel gear	1
5	Bearing 16017/C2	1	22	Inner race NA5903	1
6	Adjust washer (2)	1~2	23	Outer race NA5903	1
7	Ring gear, rear axle	1	24	Adjust gasket	1~3
8	Adjust washer(1)	1	25	Washer 14.5×21×1.5	1
9	Needle bearing55BTM6720A	1	26	Bolt M14×1.25×12	1
10	Rear gear case	1	27	O-ring 19×2.5	1
11	Oil sealSD4 65×90×9 NS	2	28	Bolt M20×1.5×12	1
12	Nut M12×1.25	1	29	HE× Screw M8×45	1
13	Washer12.5×30×4	1	30	Washer 8.2×15×1.5	1
14	Coupler, rear axle	1	31	Screw M8	1
15	BoltM8×35	4			
16	Oil seal 35×61×9.5(14)	1			
17	Bevel gear bearing hous.	1			

Needle bearing removal

a Disassemble needle bearing 55BTM6720
as illustration if necessary



b Disassemble needle bearing NA5903
as illustration after heating upto 150°C



Rear axle inspection after disassembly

●Check if there is crack or damage in rear gear case, see mounting hole is ok . Replace gear case or right cover if necessary;

●Check if bearing clearance is normal,and turing stability, rollway, stellball, neddle bearing as well. Replace bearing if necessary.(Special tools are required)

●Check worn status of drive bevel gear and ring gear rear axle. Replace if necessary;

●Check oil seal lips, o-ring shape. Replace parts if necessary;

●Check cylndrical surface of rear axle and oil seal lips. Replace if necessary;

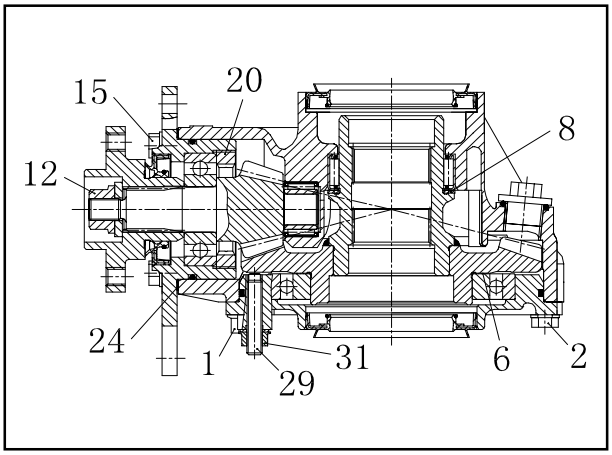
●Check inner and outsider spline. Replace if necessary;

●Check other parts. Replace if necessary.

Rear axle assembly and adjustment

●Illustration

Tightening torque	
Item”1”	40Nm
Item”2”	25Nm
Item”12”	70Nm
Item”15”	25Nm
Item”20”	70Nm
Item”31”	16Nm
Bolt	25Nm
Bolt	25Nm



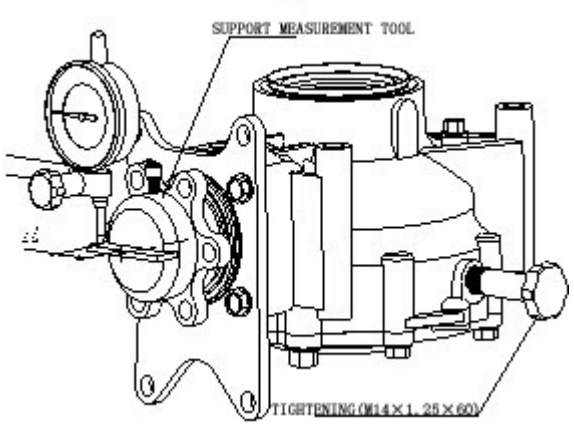
Use glue for Item”29” assembly

●Assembly clearance and adjustment of drive bevel gear assembly rear axle.

a. Adjust installing by “24” thickness

b. Adjust gear clearance by choosing”6”thickness.

c. Inspect installing clearance by checking bevel gear clearance.



Standard:0.1~0.2

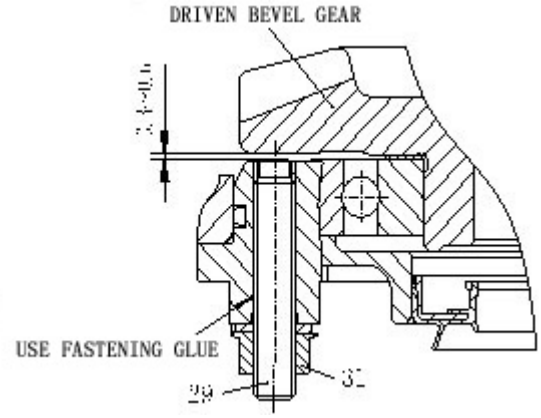
e Keep installing point bearing clearance 0.1~0.2 by choosing”8”thickness.

Adjust “6” thickness	0.2 0.3 0.4

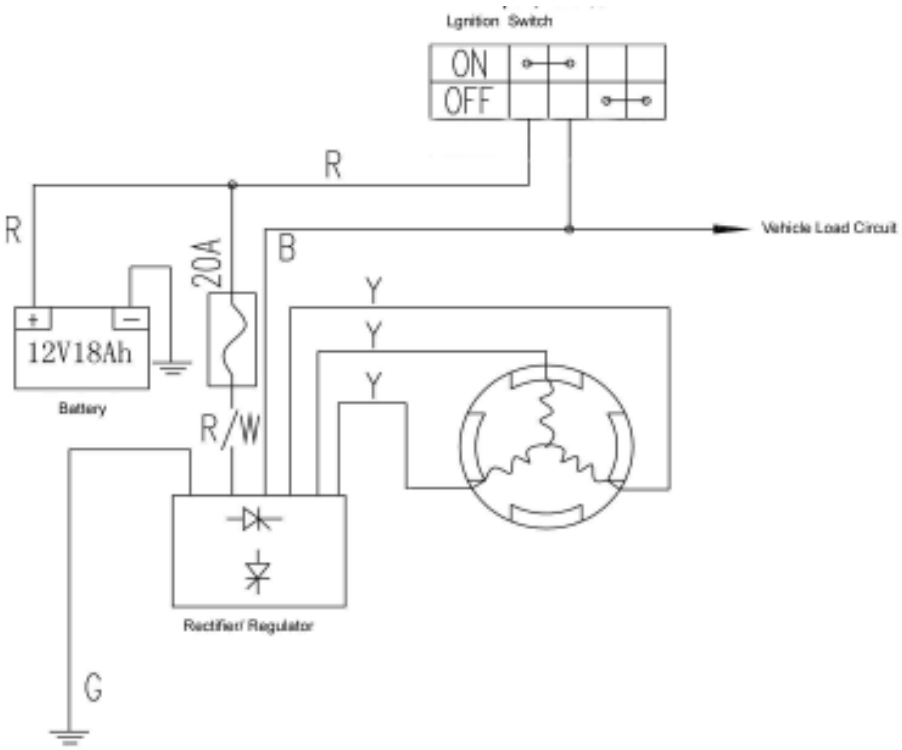
Adjust “8” thickness	1.0 1.2 1.4 1.6 1.8

Adjust “24” thickness	0.4 0.5 0.6

f Adjust item 29 as illustrated, and make sure its end and back clearance of drive gear is 0. 3~0.6. Tighten item 31.



Charging System Layout



Note

- Usually no hydrogen will be generated during charging except when overcharged. Keep away from fires when charging.
- uElectrolyte is highly corrosive, splash to clothes, skin or eyes will cause burn or loss of sight. Wash with plenty of water if splashed. In case of splash into eyes, wash with plenty of water and consult the doctor. The electrolyte on the clothes may contact the skin as well, it will cause damage to the clothes if stained for a long time. Change a clothes and wash away the electrolyte.

- **Note**
- Spark arc may be generated when removing or joining the electrical parts with switch on and will damage the electrical parts such as rectifier. Operation should be done with ignition switch OFF.
- Remove battery from vehicle for charging and do not open the electrolyte cover.

Note

Replace if the battery service life expired.

●Keep the ignition switch OFF when removing electrical parts.

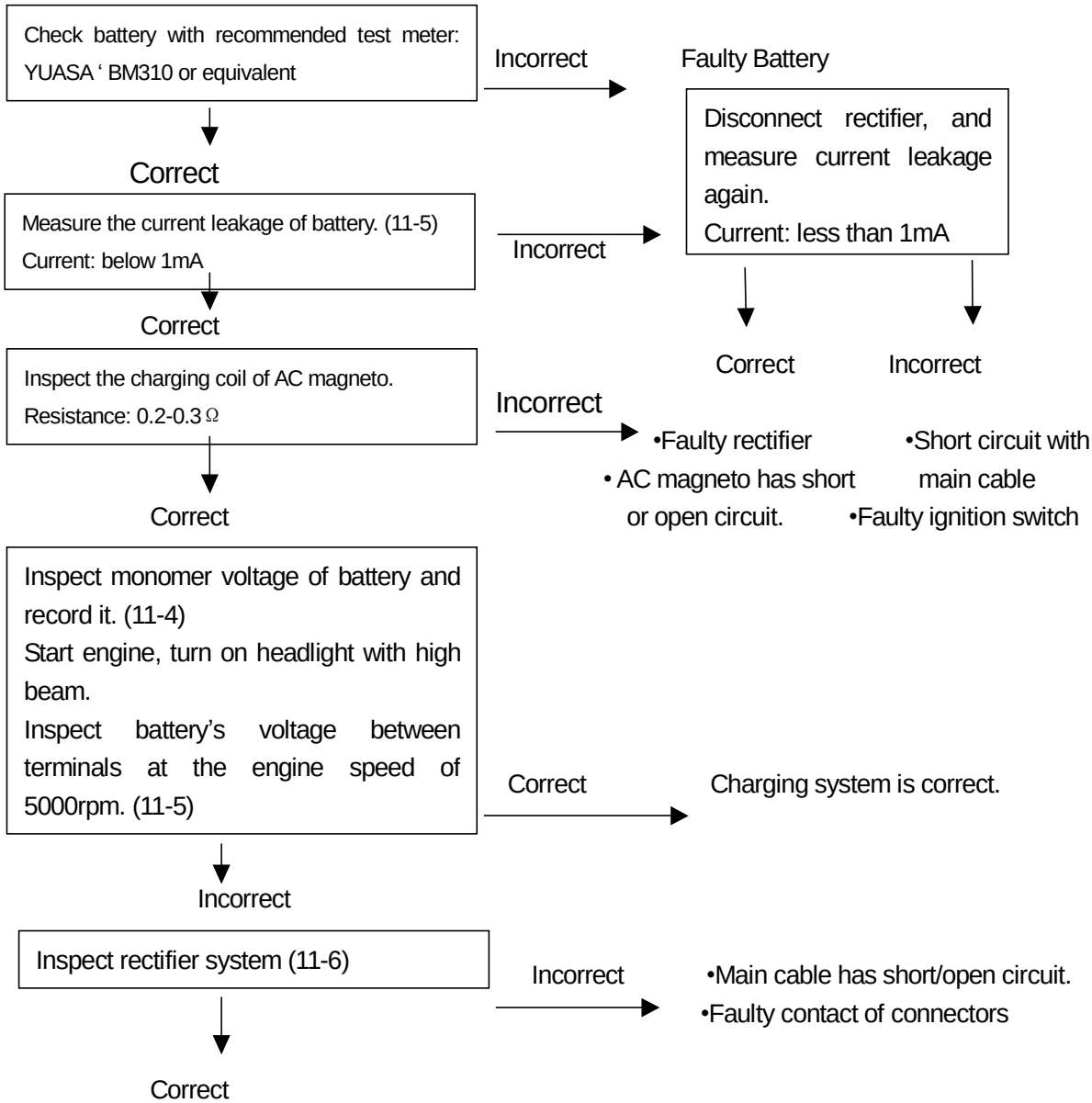
- Disconnect the negative connection of battery if it is stored on the vehicle
- Fast charging is not recommended as it may reduce the battery life.
- If battery is repeatedly charged and discharged fully (fully-charged and fully-discharged), it may cause damage to the battery or shorten the service life or lower the capacity of battery. In addition, the capacity of battery will also lower in 2~3 years even under normal use. So the battery should also be replaced.
- If the open voltage is less than 12.4V, charge the battery normally to raise the open voltage up to 12.4V.
- Refer to troubleshooting table (--8-3) for inspection of charging system
- Refer to layout of Electric parts for charging system
- Refer to Engine Maintenance for removal and installation of AC magneto
- Inspection of battery should be done following the owner's manual of battery tester.

Overhaul standard

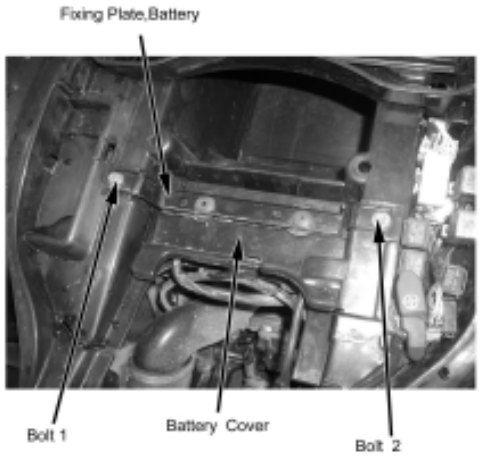
Item			Standard
AC magneto	Model		Permanent magnet alternator
	Output		3-phase AC
	Resistance of charging coil (20?)		0.2～0.3Ω
Rectifier Type			3-phase loop rectification, controllable parallel connection, regulated voltage
Battery	Capacity		12V18Ah
	Current Leakage		Less than1mA
	Voltage between terminals	Fully-charged	12.8V
		Insufficient charge	Less than 11.8V
	Charging current/time	Standard	0.9A/5~10hours
		Fast charge	4A/60minutes

Troubleshooting

Battery overflow

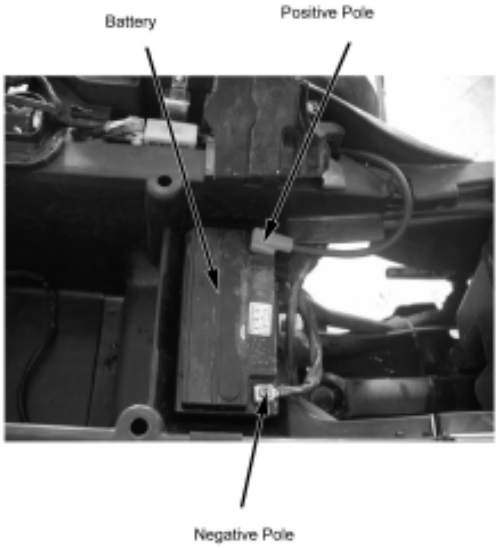


Battery



Note:
Keep the ignition switch at OFF before operation.
Remove:
—Seat (-2-3)
—Bolt1&Bolt2
—Battery fixing plate
—Battery cover
Loosen negative pole screw and
disconnect negative lead.
Remove positive pole cap and screw.
Disconnect positive lead.

Installation:
Reverse the removal procedure for installation.
Note:
Apply clean lubricant grease to the
pole after installation.
Install cap firmly on the positive pole
after installation.



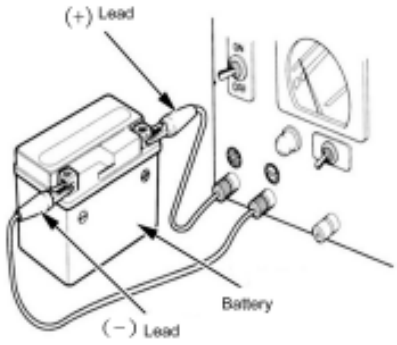
Inspection:
Measure voltage between battery terminals, and
check test status.
Complete test: 12.8V
Insufficient test: <11.8V
Insufficient charge: --- Recharge
Note:
When recharging after normal charging,
measure the voltage between terminals
after 30 minutes. Measuring immediately
after recharging will not gain the correct
test due to the sharp voltage changes
between the terminals.

Battery

Note:
Usually no hydrogen will be generated during
charging except when overcharged.
Keep away from fires when charging.
Charge according to the current and time
specified on the label of battery.
Remove battery from vehicle. (Refer to above content)

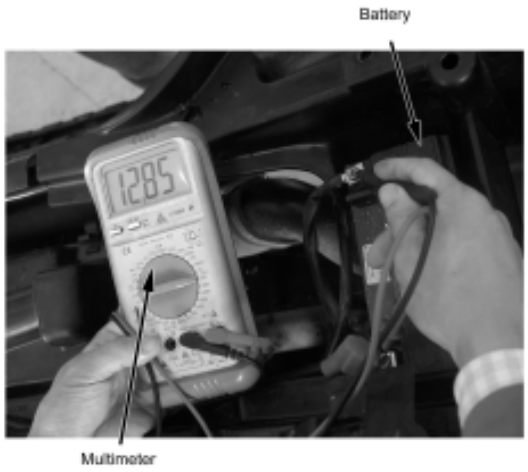
Connect charger's positive wire to battery's positive pole.
Connect charger's negative wire to battery's negative pole.

Charging current/time: Standard: 0.9A/5~10hours
Fast charge: 4.0A/60mins



Note:

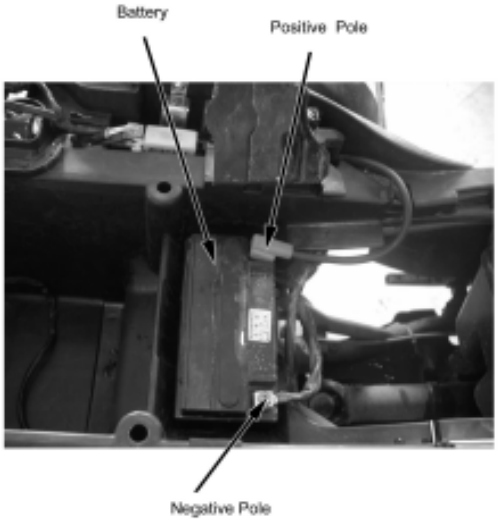
Keep the electrolyte temperature under 45¡æ
Reduce current to adjust the temperature if it is too high.
Fast charge will reduce battery's life or cause damage to battery. Do not use fast charge unless in em



Inspection of Charging System

Inspect charging status
Remove battery (-15-4) and install a fully charged battery.
Keep ignition switch at "OFF" position.
Connect voltmeter between battery's terminals after engine is started and warmed up.

Note:
Avoid short circuit when measuring
Overvoltage may be generated when removing or joining the battery terminals with switch ON and will damage the multimeter and the electrical parts
Operation should be done with ignition switch OFF

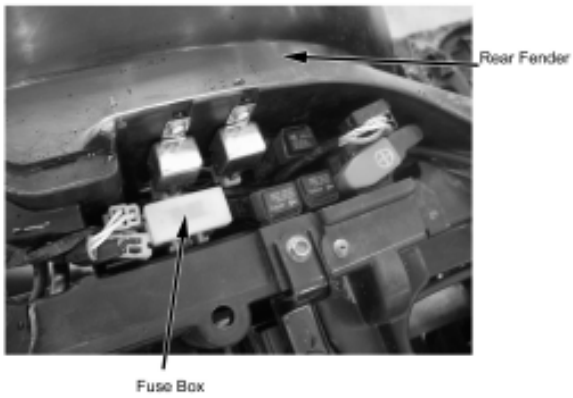


Use a fully charged battery for inspection.

Start engine and turn on high beam.

Increase engine speed slowly. Check voltage between battery terminals.
Voltage between terminals at engine speed of (5000r/min): 13.5-15V
Standard:
Battery's monomer voltage
<charging voltage<15V (5000rpm)
Electric Leakage Test
Remove seat (-2-3)
Remove battery fixing plate (--2-3)
Open battery cover
Keep ignition switch at the "OFF" position, and remove negative wire from battery.

Remove fuse box from inside of rear fender.



t amperemeter between battery negative pole and negative lead

Measure current leakage with ignition switch at the “OFF” position.

Note:

- If the measured current is higher than the maximum limit, the multimeter will be burnt. Therefore, measure the current by shifting from the high to the low range.
- Do not turn on the ignition switch when measuring the current.

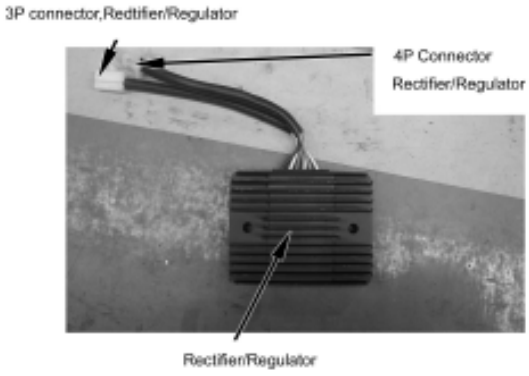
Current Leakage: less than 1mA

When current leakage is higher than specified limit, there is fault with the return circuit.

Disconnect terminals and connectors while measuring current to check out the faults.

Rectifier/Regulator

System inspection



Note:

Inspection can be done without removing the AC magneto from engine.

Remove:

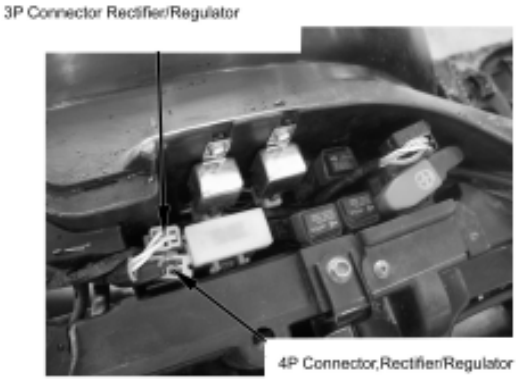
Seat

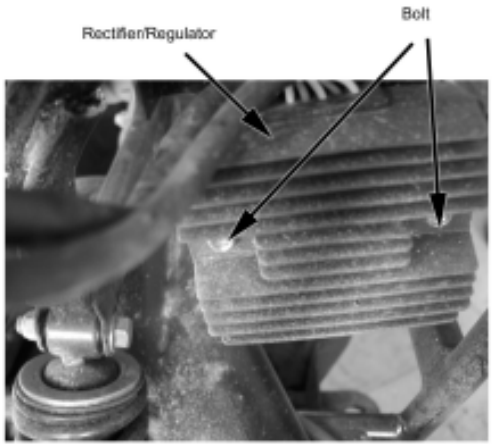
Battery cover and battery (11-4)

Disconnect the 2 connectors of rectifier/ Regulator

Check the connector terminals for loosening, bending, rust or come-off.
Check the following items of the main cable terminals of the two rectifier connectors:

Item	Result
Battery wire (red)	There should be voltage between red terminal (+) and frame body earth wire
Earth wire (green)	Green terminal must be connected with frame body earth wire
Charging coil (yellow, yellow, yellow)	Resistance between yellow terminals is: 0.2-0.3 (at 20℃)
Ignition switch lead wire (black)	Black lead wire must be connected with black terminal.





Installation:

Reverse the removal procedure for installation.

Note:

Wires, hoses and cables should be routed properly. (Charpter1)

Check the resistance of wire connector by Multimeter as following table. if data is not accrding to standard,pls changed by new one

Put the multimeter in the scope of diode.

Note:

pls change the battery of Multimeter if it is display below 1.4 V when bougie of Multimeter is not be connected

⊖ \ ⊕	Yellow	Yellow	yellow	Blue	Red	Black
Yellow		∞	∞	400–500	∞	∞
Yellow	∞		∞	400–500	∞	∞
Yellow	∞	∞		400–500	∞	∞
Blue	∞	∞	∞		∞	∞
Red	400–500	400–500	400–500	750–850		∞
Black	∞	∞	∞	∞	∞	

Inspection of AC magneto

Remove Engine cover¡(2-8)

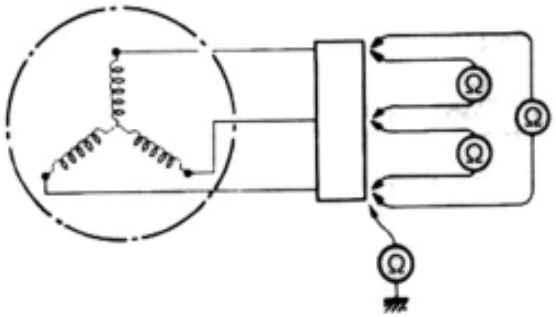
Disconnect AC magneto(yellow¡/yellow¡/yellow)and pickup coil(black/white/green)

Resistance of magneto winding

●Measure the resistance between the yellow terminals of the AC magneto 3P connector.

●Change the stator winding if it is not according to the standard of resistance

●whether it is insulated for stator winding and the center of stator.

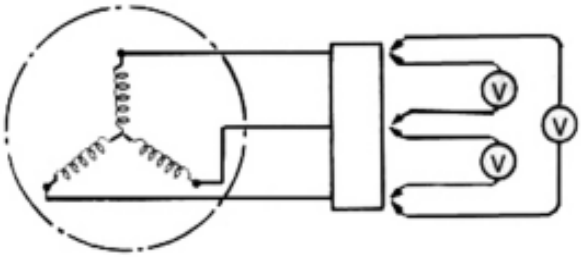


Data of Multimeter:1 × 10 Ω

resistance of terminals : **0.1 — 0.4 Ω (20℃/hours)**

Insulated resistance: ∞Ω (correspondingly for terminals)

Test: Whether it is connected for yellow terminals of the AC magneto 3P connector between the terra line of vehicle body.



Performance of Magneto as unload situation

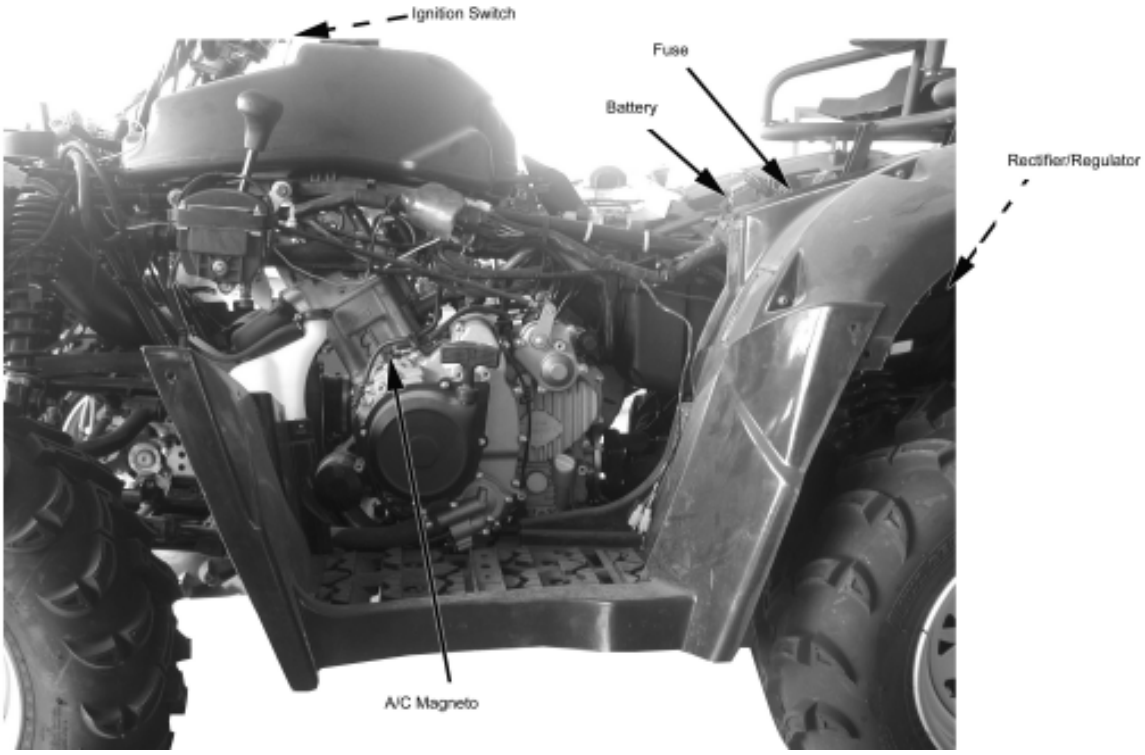
●Engine working state :5000r/min, test the voltage of output wire of Magneto stator winding by Multimeter.

●Change the magneto if the voltage is below standard

Multimeter state: Alternating current position.

Voltage of Magneto as unload situation for 5000r/min is exceed 200V (Alternating current)

Layout of Electric parts



Overhaul Information

Operating Note

Note

Exhaust gas contains toxicant, DO NOT keep the engine run for a long time in a closed or poorly ventilated place.

- Inspect ignition system in the order of the content in troubleshooting table.
- Refer to(12-10)for ignition system diagram.
- Ignition advance is integrated in the CDI, so the ignition system will automatically adjust ignition time.
- Be careful with CDI overhaul. Dropping or strong impact may cause damage to CDI. In addition, overvoltage may be generated on CDI and cause damage to return circuit when removing or joining the connectors and terminals with switch ON. Always shut the ignition switch when overhauling.
- Most of the failures of ignition system are caused by faulty contacts between connectors and terminals. Check all the connections for any faults before overhauling.
- Select spark plug of proper heat value. Improper spark plug may cause malfunction or damage of engine.
- Refer to Chapter13 for inspection of switches.

Overhaul Standard

Item		Standard
Ignition		CDI, Battery DC Digital Ignition
Spark Plug	Type	Resistor Type Spark Plug
	Standard	DPR7EA-9（NGK）
	Optional	DR8EA、D7RTC
	Spark Plug Gas	0.8－0.9mm
Ignition Timing	Maximum Advance Angle	32° CA
Peak Voltage	Ignition Coil	>200V
	Impulse Generator	2V

Special Tool:

Peak Voltage Oscillograph 07HGJ-0020100

(Use together with digital multimeter available in the market with input resistance over 10M Ω /DCV.)

Troubleshooting

- Engine cannot be started. Check fuel and aire channels for any faults; if the fuel and air channels are normal, check the ignition system.
- Inspect ignition system for the following items:

1，Spark inspection:

Check in the following steps: Remove spark plug, remove spark plug cap, set high tension flexible cable end to earth, check spark arc. It is normal if spark arc is more than 8mm, while is is weak if it is less than 5mm.

If the spark is normal, check the spark plug.

A faulty spark plug may be caused by the following reasons:

⑴ Spark plug is too wet and drowned. This is because the gas mixture is too thick. Cut the fuel and start the engine several times.

⑵ Carbon deposit on spark plug--Mixture too thick or oil combustion in the combustion chamber. Clean and burnish the spark plug.

⑶ Cracks with spark plug insulator.

⑷ Spark plug electrodes have short circuit or it is obstructed between negative pole and thread or positive pole and input end.

2，Faulty spark includes: no spark and weak spark.

Inspect the following aspects if there is no spark:

⑴ Inspect ignition coil with multimeter or measurement in the following steps:

- Measure primary bobbin resistance, usually it is about 0.1～1.5 Ω.
- Measure secondary bobbin resistance, usually it is about 4.2K.
- Measure damp resistance, usually it is about 5K.

⑵ Check CDI if it is out of service.

(3)Check ignition circuit. Usually the voltage between black wire and earth wire (green) should be 12V. If there is no voltage, check from the battery possitive terminal to the end of black wire.

(4)Check the cable: check if there are any faults from the input of trigger signal (output of magneto pickup) to output (CDI terminal) and ignition output wire (black/yellow).

(5)Check stop switch. When switch is at the ignition position, black/white wire should be cut with green wire.

In case of weak spark, check the following:

- Check CDI.
- Check ignition coil and secondary coil whether there is short circult, or fault with the damp resistance.

(6)Check if the input of trigger signalis reverse.

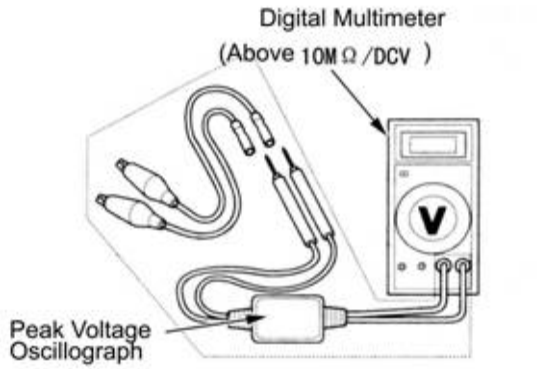
Inspection of Ignition System

Note:

•If the spark plug generates no spark, check first if there is come-off, loosening or poor contact with the wiring, then measure the peak voltage.

•Different multimeter has different input resistance and shows different readings. Measure with digital multimeter with input impedance over

10M Ω /DCV.



Connect peak voltage oscillograph with digital multimeter.

Special Tool:

Peak Voltage Oscillograph 519-922-150000

(Use together with digital multimeter available from the market with input impedance over

10M Ω / DCV.)

Ignition Coil Primary Voltage

Note:

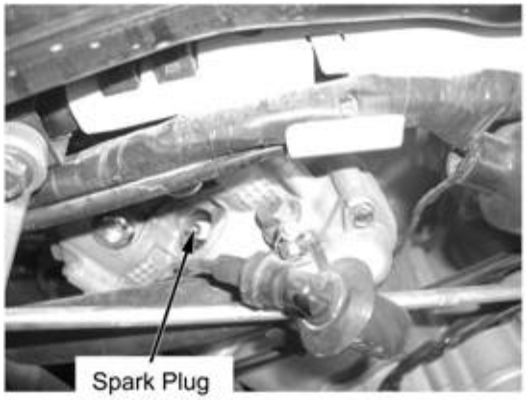
•Measure after all the wires are correctly connected.

•Inspection should be done when the spark plug and spark plug cap are properly installed. If the spark plug is removed, the peak voltage will rise.

Remove left side panel.(2-8)

Keep spark plug in the cylinder head, install qualified spark plug on the spark plug cap and earth the engine.

Open rubber cover of ignition coil, keep the ignition wire connected, and connect peak voltage oscillograph between primary wire terminal and frame body earth wire.



Special Tool:

Peak Voltage Oscillograph

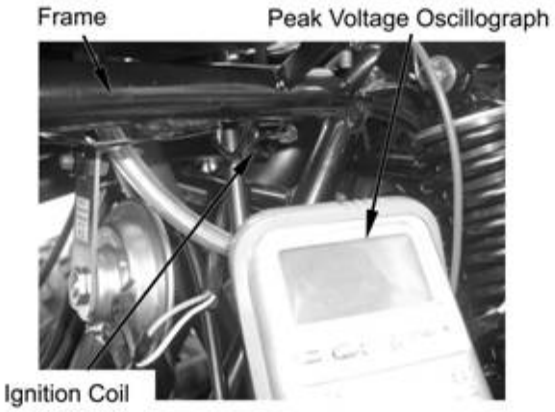
(Use together with digital multimeter available from the market with input impedance over

10M Ω / DCV.)

Connecting terminals: black/yellow(-)-frame earth wire (+)

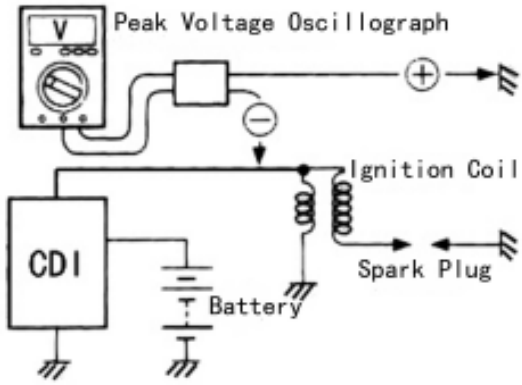
Turn ignition switch to the ON position, and start engine.

Peak voltage: above 150V



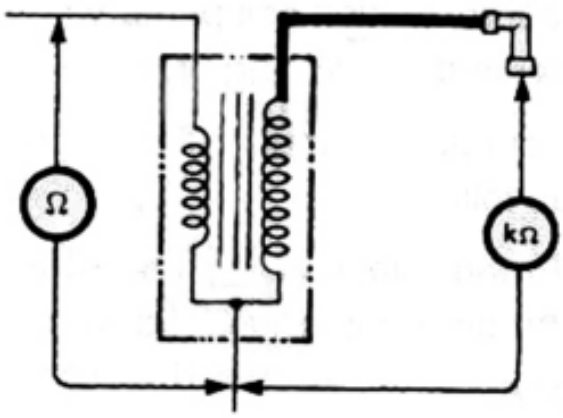
Ignition Primary Coil Voltage Test Wiring Connecting Diagram
Notes:

Make sure the battery voltage is ≥ 12V,Ig nition coil wiring is connected. Refer to Owner's Manual when using multimeter and peak voltage adapter.



Ignition Coil Resistance Test Wiring Connecting Diagram.

Do not touch test probe head and spark plug when testing to avoid electric shock.

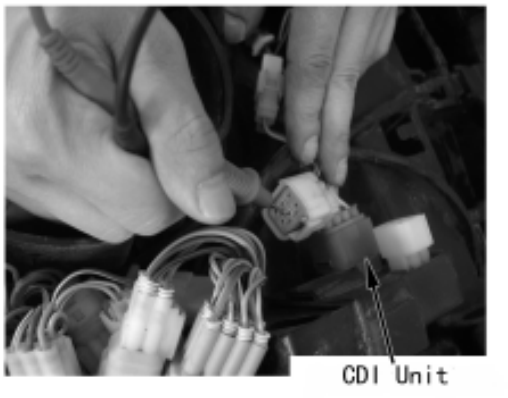


Pickup Coil

Note:

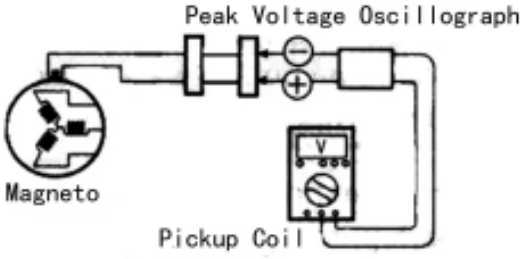
• Measure after all the wires are correctly connected.

• Inspect with compression pressure in the cylinder, spark plug and spark plug cap are properly installed. If the spark plug is removed and then do the measurement, the peak voltage will rise.



Remove left side panel.(2-8)

Remove front cover(2-2)
Disconnect CDI unit connector.
Connect peak voltage oscillograph terminal with the following terminal of main cable.



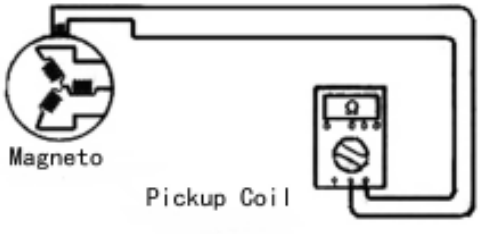
Special Tool:
Peak Voltage Oscillograph 07HGJ£-0020100
(Use together with digital multimeter available from the market with input impedance over 10M Ω / DCV.)

Connecting terminal: blue/yellow(-)-green(+)
Turn ignition switch to the ON position, and start engine.
Peak Voltage: Over 2V

Note:

When measuring the voltage, do not touch the terminal with finger to avoid electric shock.
If peak voltage obtained from CDI unit connector is improper, measure again the peak voltage on the AC magneto 2P connector.

Pickup Coil Resistance
When multimeter is on 1 × 100 Ω
Pickup Coil Resistance: 110-140 Ω
Replace it if the pickup coil resistance is not within the specified range.



Pickup Coil

Removal

Remove:

-AC magneto connector

-Water pump inlet hose and outlet hose, and drain coolant. (Chapter 4)

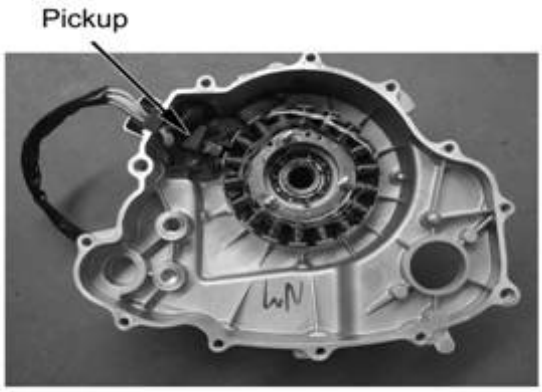
-Crankcase breather hose(Engine Service£)

-Muffler(Chapter 2)

-Engine right side cover.

Note:

Stator is installed on the right side cover and is attached by the magnet of rotor. Be careful not to hurt the fingers when removing.



Loosen bolt, remove AC magneto stator and pickup.

Pickup resistance value: 110~140 Ω

Inatallation

Reverse the removal procedure for installation.

Ignition Coil

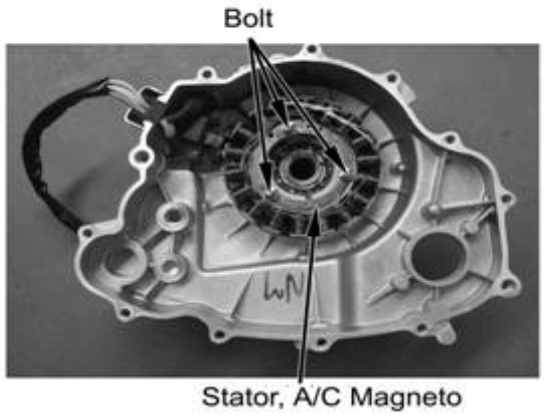
Removal

Remove left side panel(2-8)

Remove spark plug cap from spark plug.

Disconnect primary terminal of ignition coil.

Loosen bolt, and remove ignition coil.

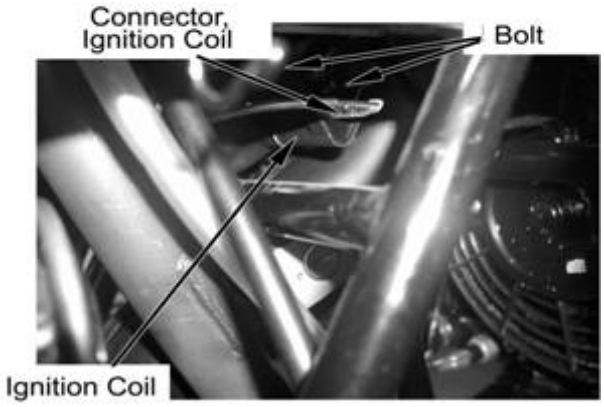


Inatallation

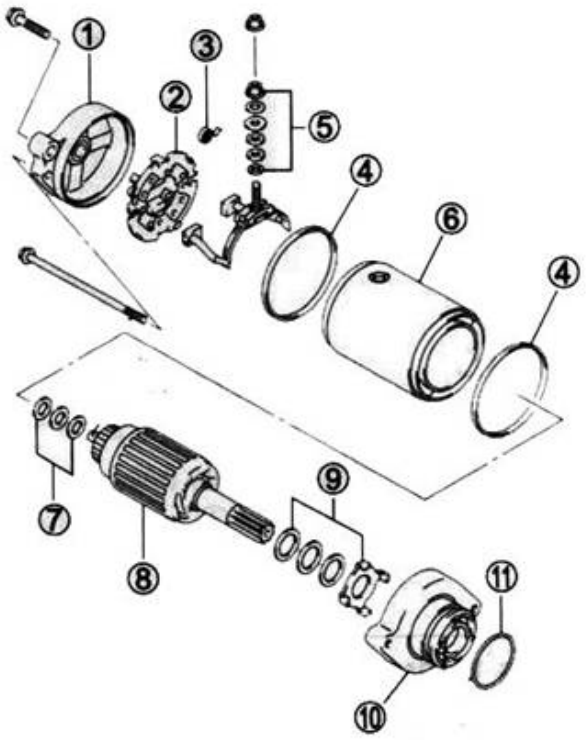
Reverse the removal procedure for installation.

Note:

Wires, cables and hosed should be routed properly. (Chapter 1)



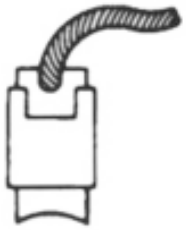
Starting Motor



① Bracket
② Brush Seat
③ Brush Spring
④ O-ring
⑤ Shims
⑥ Motor Housing
⑦ Washers
⑧ Armature Coil
⑨ Washer Kit
⑩ Inner Bracket
⑪ O-ring

Brush

- Check if brush has abnormal damage, crack or tough in brush carrier block.



- Replace brush assy. if any damage.

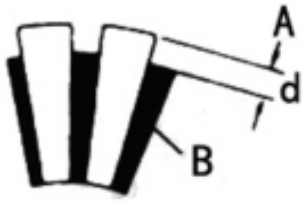
Commutator

- Check if commutator has discoloration, abnormal damage or overwear.

- Replace a new commutator if any abnormal damage.

- If there is discoloration on commutator surface, polish it using sand paper and cleanse it using clean and dry cloth.

- If there is overwear, saw it using saw blade.

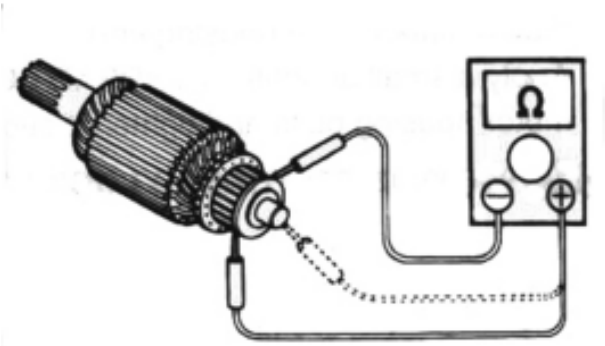


Insulator B£¬the distance between B and A is d

$$d \geqslant 1.5mm$$

Armature Coil

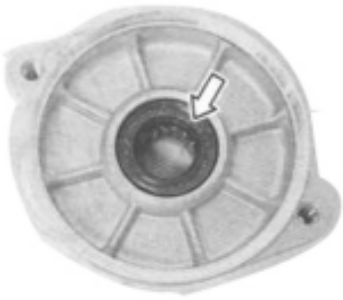
Using multimeter to check if there is connection among terminals and armature shaft.



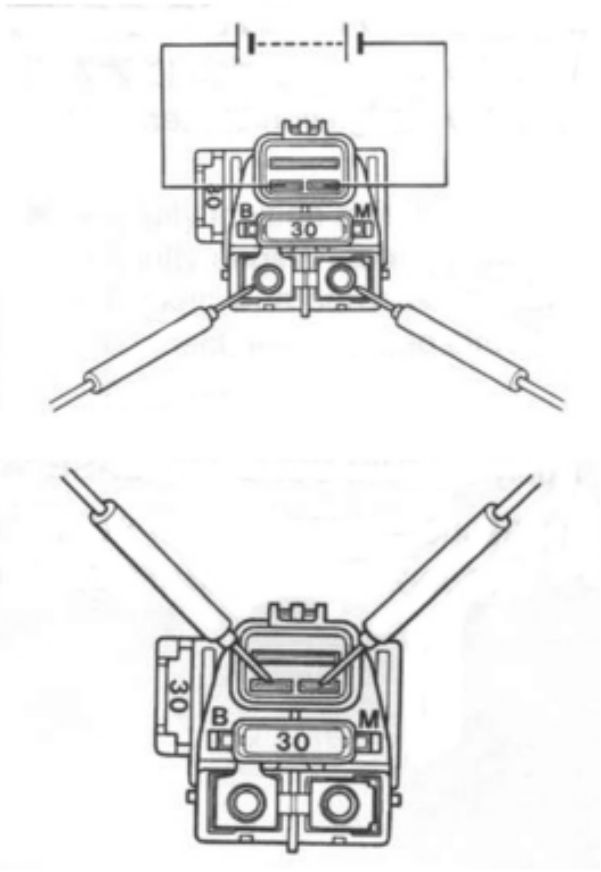
Replace a new Armature if the terminals are not connected or the terminals are connected to the shaft.

Oil Seal

Check if there is damage or oil leakage on oil seal. Replace a new oil seal if any damage or oil leakage.



Starter Relay



- Apply 12V to the terminals and check for continuity between positive and negative terminals using multimeter.
- If starter relay clicks and continuity is found, the starter relay is OK.
- If there is no continuity without 12V voltage, the starter relay is OK.

Note:

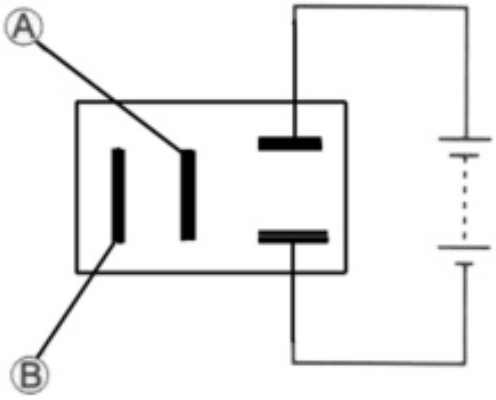
Do not apply the battery vboltage to the starter relay for more than 2 seconds. This may cause overheat and damage the relay coil.

¡ñMeasure resistance between coils of starter relay using multimeter. Replace the starter relay with a new one if the resistance is not within the specified value.

- Set multimeter to 1X10 Ω position.

Starter Relay Coil Resistance: 3-5 Ω

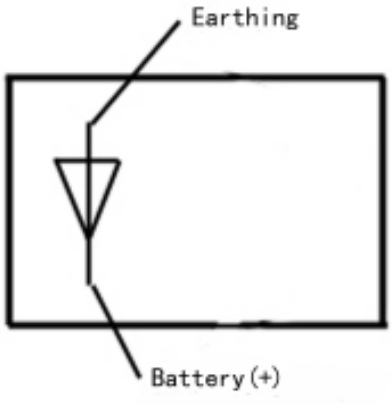
Auxiliary Starter Relay



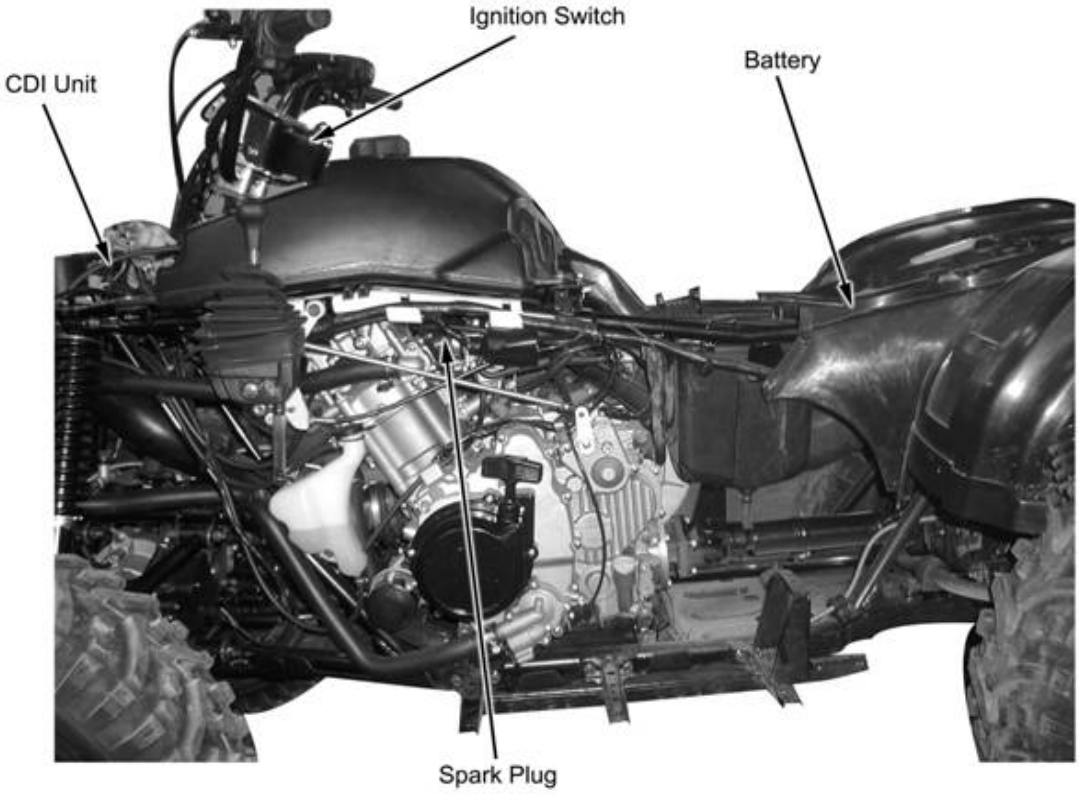
- Apply 12V voltage to the positive and negative terminals of starter relay coil and check for continuity between A and B using multimeter.
- If starter relay clicks and continuity is found, the starter relay is OK.
- If there is no continuity without 12V voltage, the starter relay is OK.

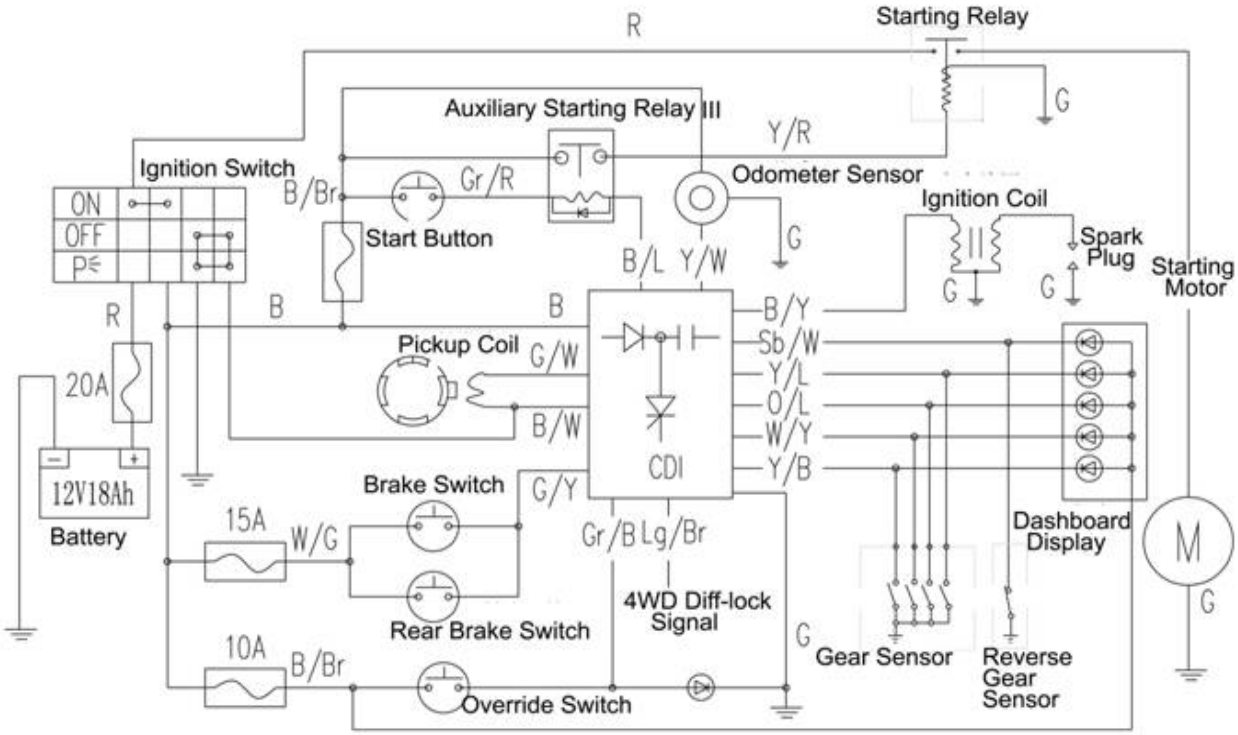
- Set multimeter to 1X100 Ω position.

Auxiliary Starter Relay Coil Resistance: 90-100 Ω



Ignition System Diagram





Overhaul Information

Operation instructions

Warning

- Headlight bulb will be very hot when it is turned on. Do not touch it after it is just turned off. Operation should be done when the bulb is cooled down.
- Inspection of water temperature alarm may use fire source and liquid of high temperature. Do not put flammable matters nearby and take care not to get burnt.
- The temperature of headlight is quite high when turned on. Replacing with bare hand or stained glove willcause oil stains on the glass face which may form hot spot and cause deformation of glass face and damage to bulb.

- Pay attention to the following when replacing the bulb.

-Do not replace the bulb when it is turned on. Keep ignition switch in the OFF position, and replace after the bulb is cooled down.

-Replace the bulb with hands in clean gloves to avoid oil stains on the glass surface.

-Clean the glass with a clean rag dipped in alcohol or isoamyl acetate in case of any oil stains on the glass surface.

- If the Inspection has to be done with battery, check if the battery is normal.
- Inspection of switch continuity can be done without removing the switches from the vehicle.
- After the inspecting and overhauling of each part, cables and wires should be routed properly (chapter 1)
- Refer to Chapter 2 for removal and installation of taillight and rear turning lights

13

Check standard

Item		Standard
Fuse	Main	20A
	Sub-fuse	10A×2 15A×2
Light、Bulb	Headlight（Hi / Lo）	12V-35/35W
	Brake light / Taillight	12V-21/5W
	Turning light	12V-10W×4
	Dashboard indicator	φ5 LED
	Indicators	LCD

CFMOTO

TROUBLESHOOTING

Head Light Cannot Turn On

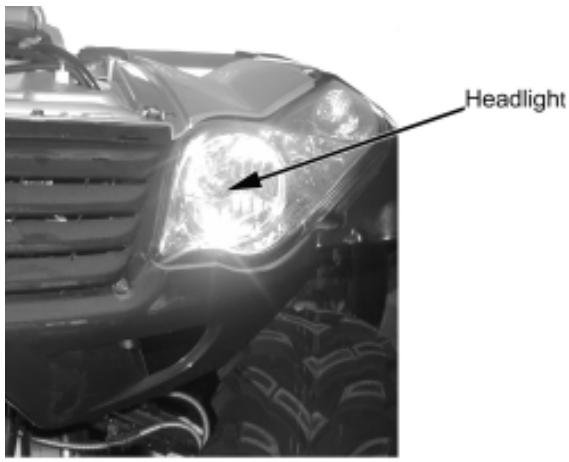
- Broken fuse
- Open circuit with main cable
- Burnt Bulb
- Faulty Switch

Replacing Bulb

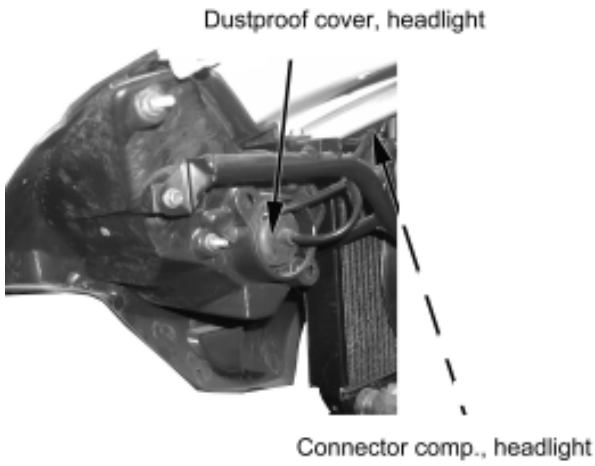
Headlight Bulb

Cautions

Headlight bulb will be very hot when it is turned on. Do not touch it after it is just turned off. Operation should be done when the bulb is cooled down.



Remove headlight
(13-5)

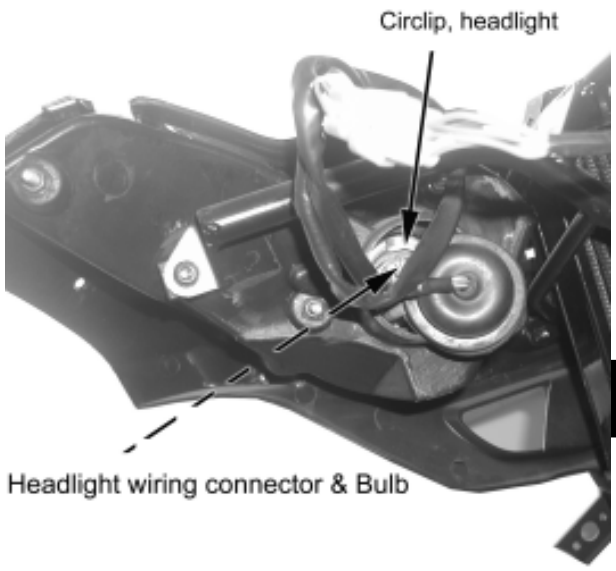


Disconnect headlight.

Remove dust-proof cap, headlight connector, circlip and replace with a new bulb.

Warning:

Wear clean gloves when replacing bulb.
Oil stains on the glass surface may cause break of bulb. Clean the stained surface with alcohol or isoamyl acetate.
Make sure that the three pins of the bulb should be in line with the three positioning holes in the socket when replacing the bulb.



Bulb specification£°12V-35/35W

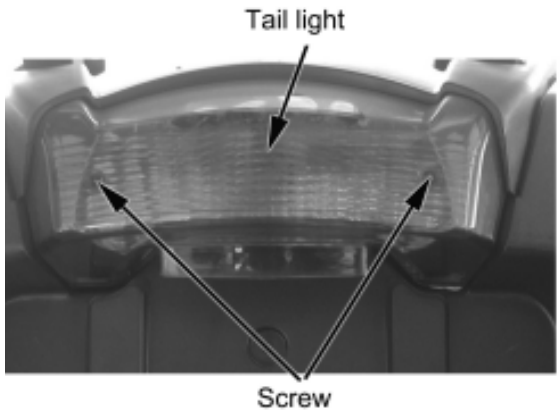
Reverse the removal procedure for installation
After replacing the bulb, adjust headlight beam
(3-14)

Inspection of Headlight

Turn the ignition switch to ON position, turn light switch to the illuminating position and check if the headlight is on.
-ON: Normal
-Still off: short circuit of main cable or broken main cable

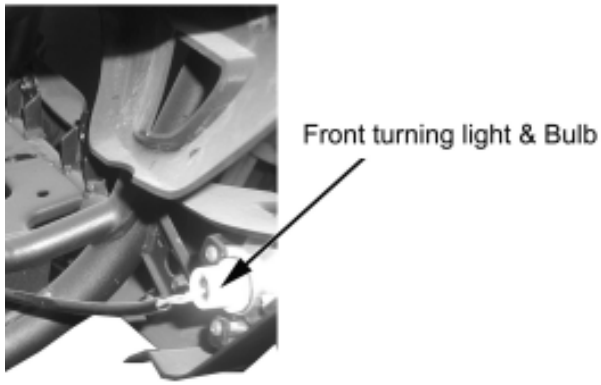
Brake Light/Tail Light Bulb

Remove 2 tapping screws
Remove tail light cover.
Turn brake light/tail light bulb counter clockwise and remove it.
Replace brake light/tail light bulb
Bulb Specification：12V-21/5W
Reverse the removal procedure for installation



Front Turning Indicator Bulbs

Remove headlight(13-5)
Remove cover of front turning light
Replace front turning light bulbs
Bulb Specification:12V-10W



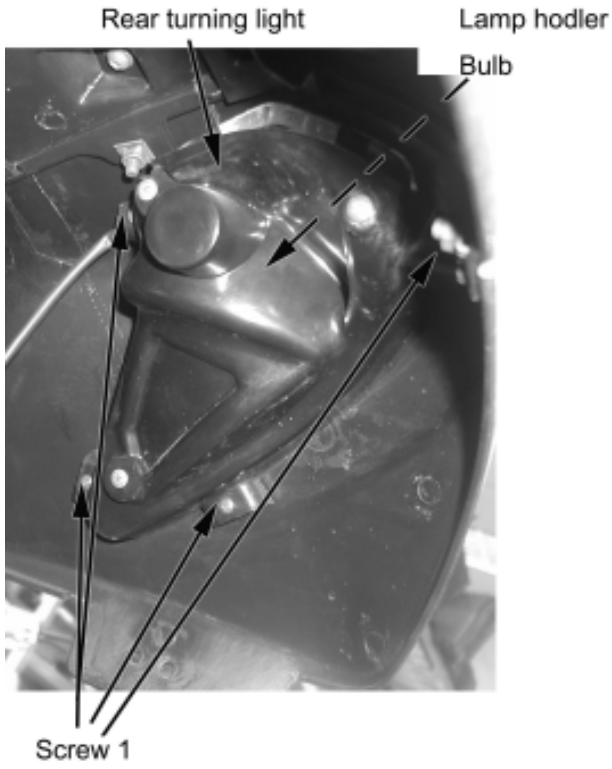
Rear Turning Indicator Bulbs

Remove screw1 ,
Remove rear turning indicator cover.

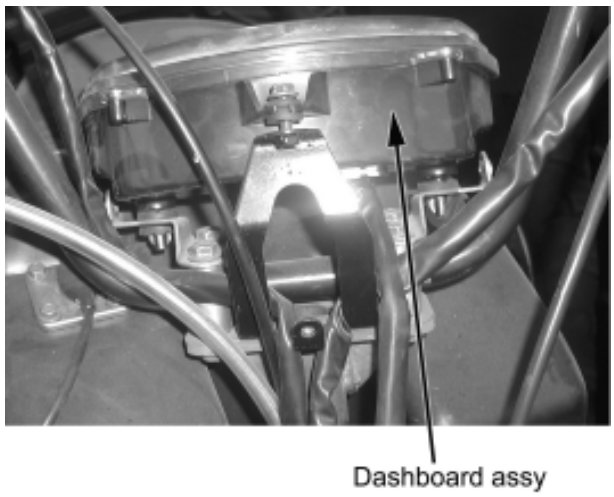
Replace rear turning indicator bulbs.

Bulb Specification：12V-10W

Reverse the removal procedure for installation.



Note
Main cable,wiring and tube should be routed properly(chapter 1)



Dashboard Light Bulb

Remove dashboard(13-9)
Remove dashboard indicator socket¡£
Dashboard indicator(LCD)

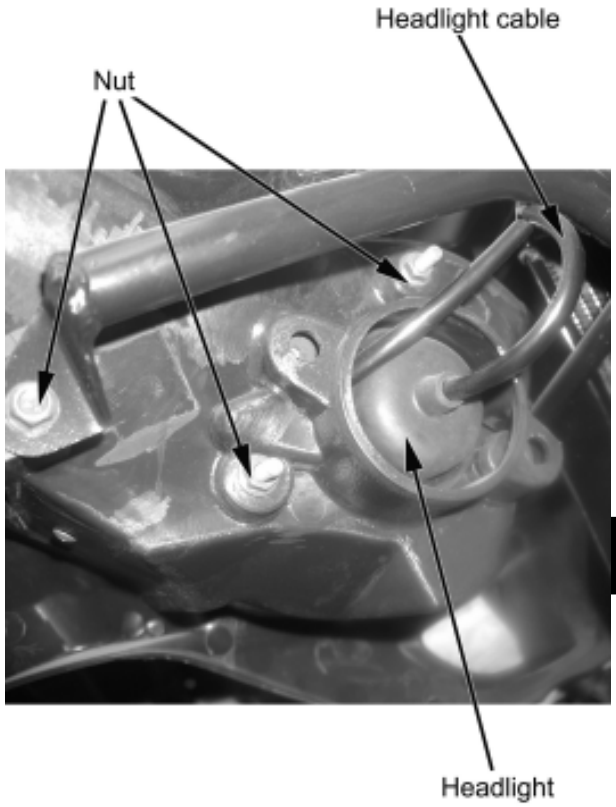
Note: If dashboard has something wrong,
it's recommended to replace whole dashboard.

Reverse the removal procedure for installation

Headlight

Remove nuts as picture shown
Disconnect headlight connector
Disassemble headlight comp.

Reverse the removal procedure for installation



Note:
Be careful not to damage main cable when assembling.

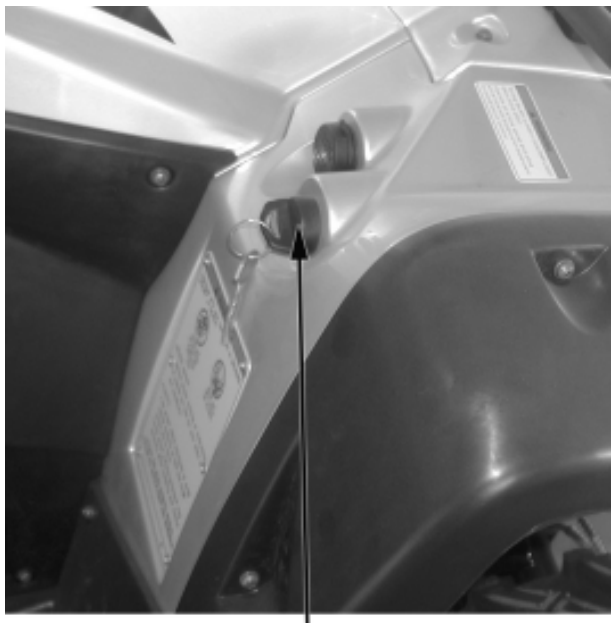
After replacing, adjust the headlight beam.
(3-14)
Note
Main cables and wires should be routed properly.

Ignition Switch

Inspection

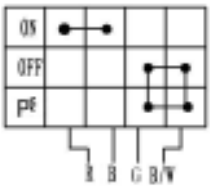
Remove front & rear top cover
(2-4)

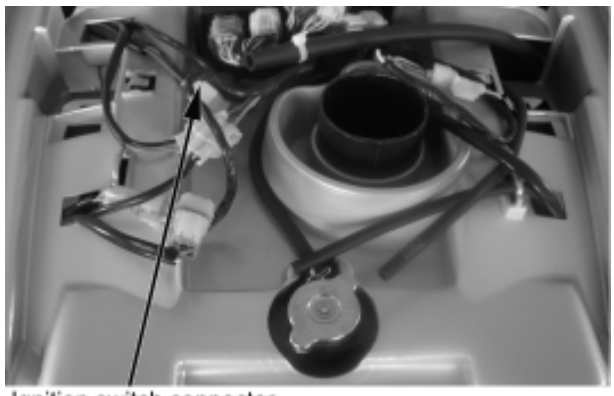
Disconnect 4P connector of ignition switch



Check according to the following table if the connector terminals are in continuity.

● - ● continuity

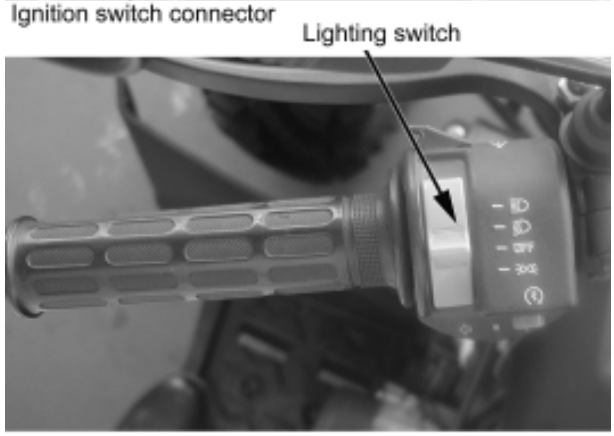




Disassemble:
Remove front cover(2-4)
Disconnect 4P connector of ignition switch

Loosen bolt and remove ignition switch

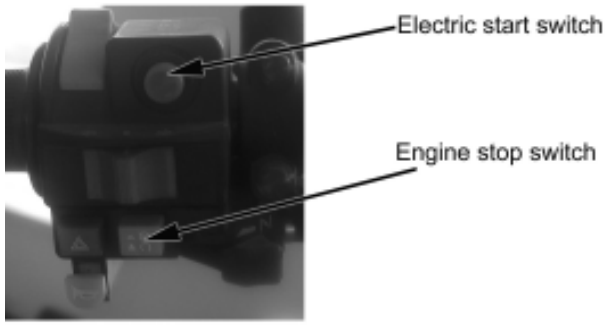
Reverse the removal procedure for installation



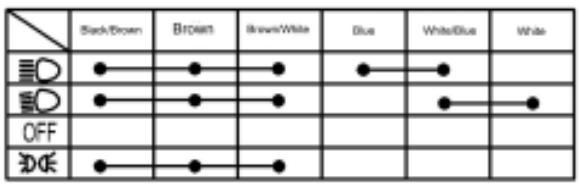
Handlebar switch

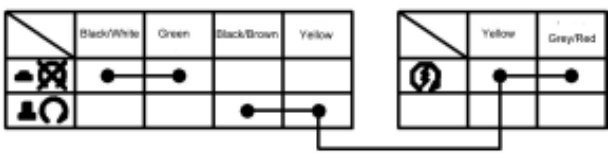
Remove front cover(2-4)
Disconnect left and right handlebar switch connector.
Check according to the following table if the connector terminals are in continuity.

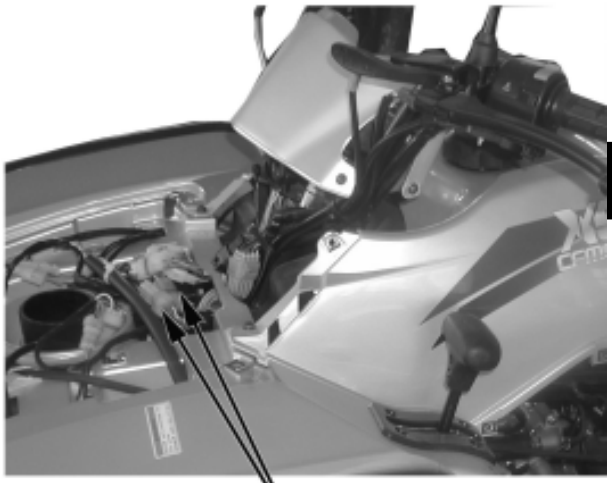
○⇧—● continuity



Lighting switch



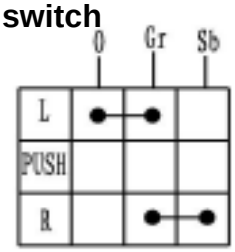




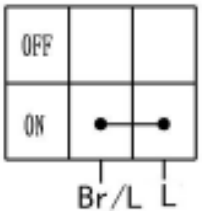
13

CFMOTO

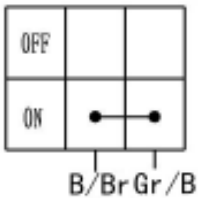
Turn switch



Horn switch



Acceleration switch

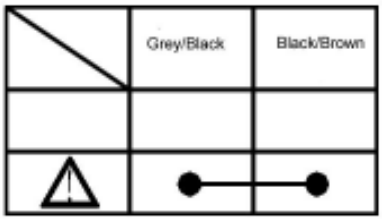


2WD/4WD switch

	Br/R	L/G	L/B	Br/G	Gr/W	L/G	Br/R	Br/G	Lg/Br	G
2WD	●	●			●	●				
4WD			●	●	●	●				
LOCK			●	●			●	●	●	●

If something wrong, please replace handlebar switch(6-12)

Parking switch

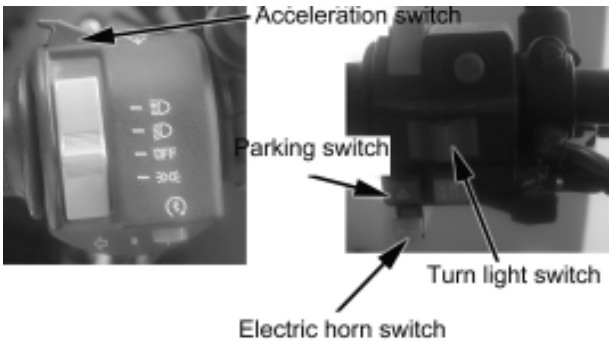


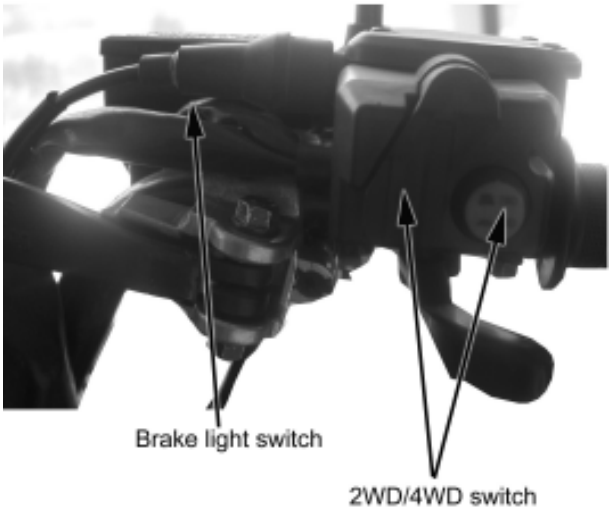
Brake light switch

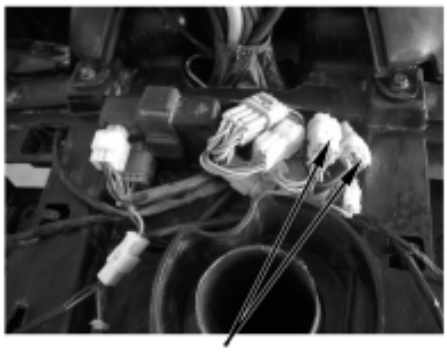
Disconnect brake light switch connector and check terminators for continuity.
Hold the brake lever..Continuity
Release the brake lever. No continuity
No continuity: Replace brake light switch

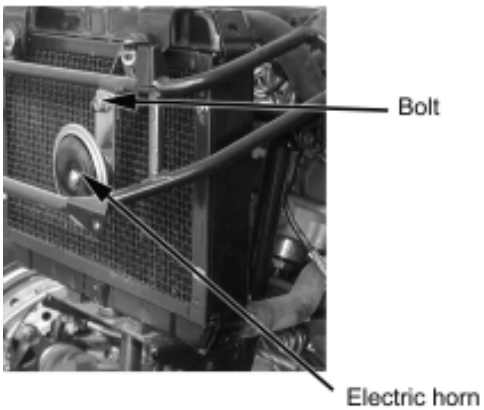
Horn
Inspection:
Remove front vent grille(2-15)
Disconnect horn.
Connect with a fully charged 12V battery and check if the horn sounds.

Faulty Horn: Replace





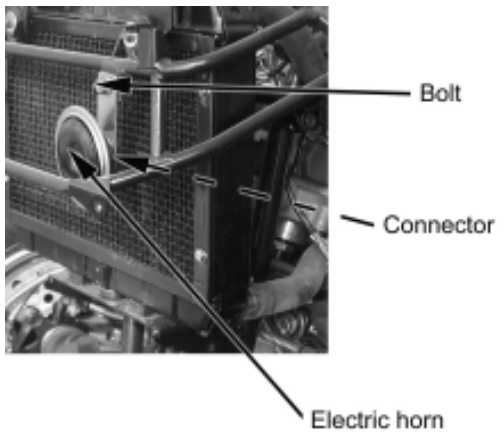




Disassemble

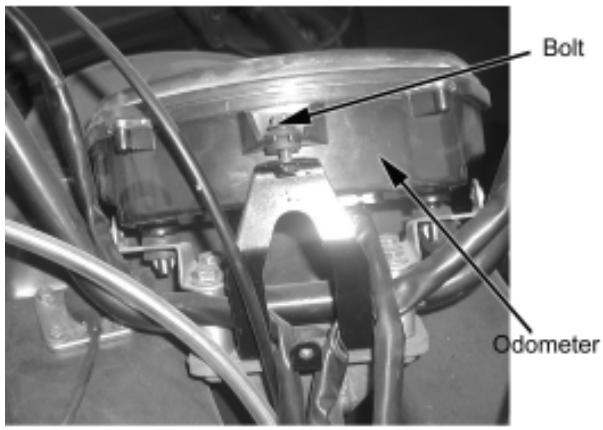
Disconnect horn connector
Remove bolt
Remove horn

Reverse the removal procedure for installation



Dashboard

Run the vehicle at low speed and check if the speed indicator moves
Faulty speedometer: Replace

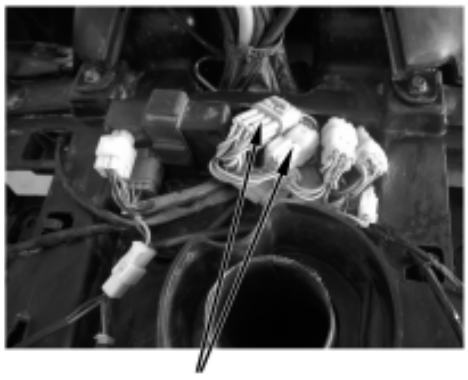


Removal and Installation

Remove front top cover(2-4)
Remove front cover of dashboard(2-4)

Disconnect dashboard wire connector

Remove fixing nut and remove dashboard in the direction as illustrated on the right

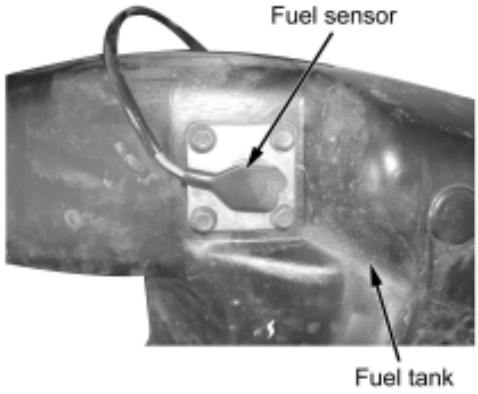


Reverse the removal procedure for installation.

Note:
Main cables and wires shall be routed properly.

Fuel Sensor

Remove:
Fuel tank top cover with key(2-9);
4 fixing bolts
Fuel sensor



Disconnect 2P connector

Inspection
Remove fuel sensor (refer to above steps)

Connect 2P connector

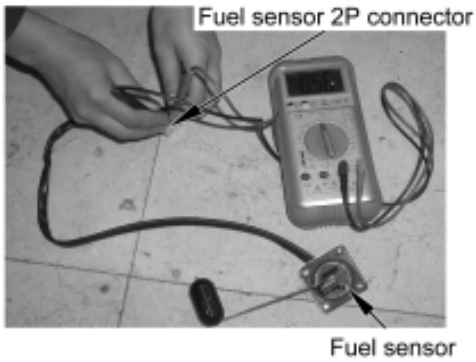
Turn ignition switch to ON

Shake fuel sensor float with hand, locate the float position and check if it conforms to the fuel gauge reading.

Non-conformity: -check main cable for damage or short circuit
-Check fuelsensorandfuelgauge

Remove fuel sensor 2P connector.

Connect multimeter between 3P connector terminals.



Shake float with hand and measure the resistance of float at different positions.

Connection Terminal:
Upper: Blue/White-Green:
4-10 Ω (20℃)

Lower: Blue /White-Green:
90-100 Ω (20℃)

Faulty fuel sensor: Replace

Installation

Put fuel sensor into installation hole of fuel tank.

Fuel sensor should be fitted properly.
No fuel leakage is allowed.

Connect 2P connector

Fuel sensor connector

Inspection of Fuel Gauge

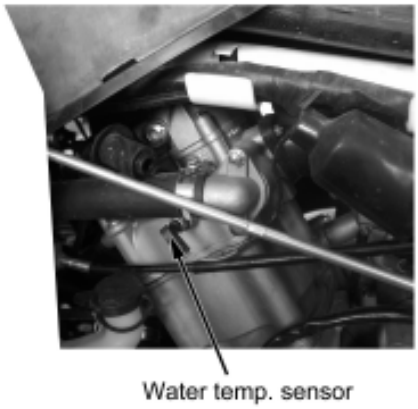
Switch on power supply and check if fuel level gauge functions normally.

If fuel gauge works normally,
Reverse the removal procedure for installation of plastic parts and seat.

Water Temperature Sensor

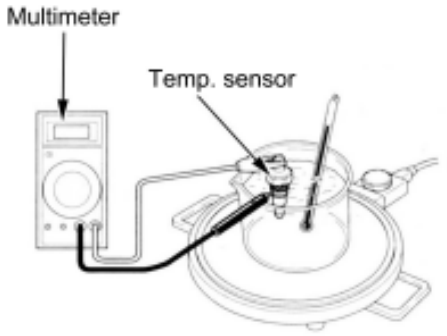
Warning:

Be careful not to get scalded and do not place flammables nearby.



Warning:

- Coolant must reach the switch thread, and the depth from vessel bottom to sensor top should be over 40mm.
- Keep liquid temperature for three minutes before measuring, and do not raise temperature sharply.
- The thermometer should not contact the vessel bottom.



Disassembly:

Remove right side panel(2-8)
Disconnect and remove temp. sensor

Put the sensor into a vessel with coolant, slowly heat up the liquid and measure the sensor resistance.

Temperature	Resistance
50℃	154 Ω ± 16 Ω
80℃	52 Ω ± 4 Ω
100℃	27 Ω ± 3 Ω
120℃	16 Ω ± 4 Ω

Out of range: Replace

Install transducer
Connect water temperature transducer connector.
Fill coolant and discharge air.
Reverse the removal procedure for installation of plastic parts and seat.

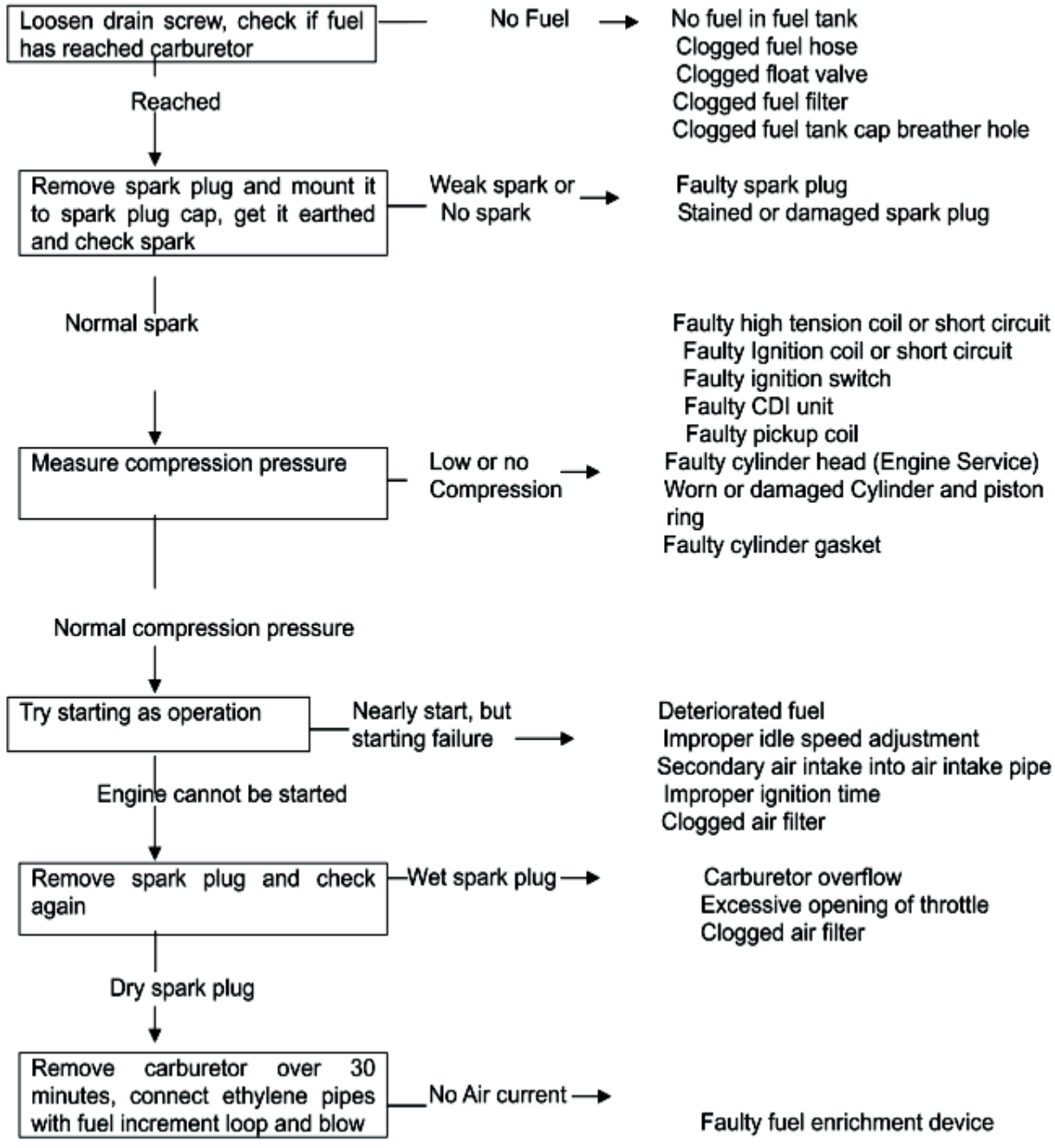
Operating Notice

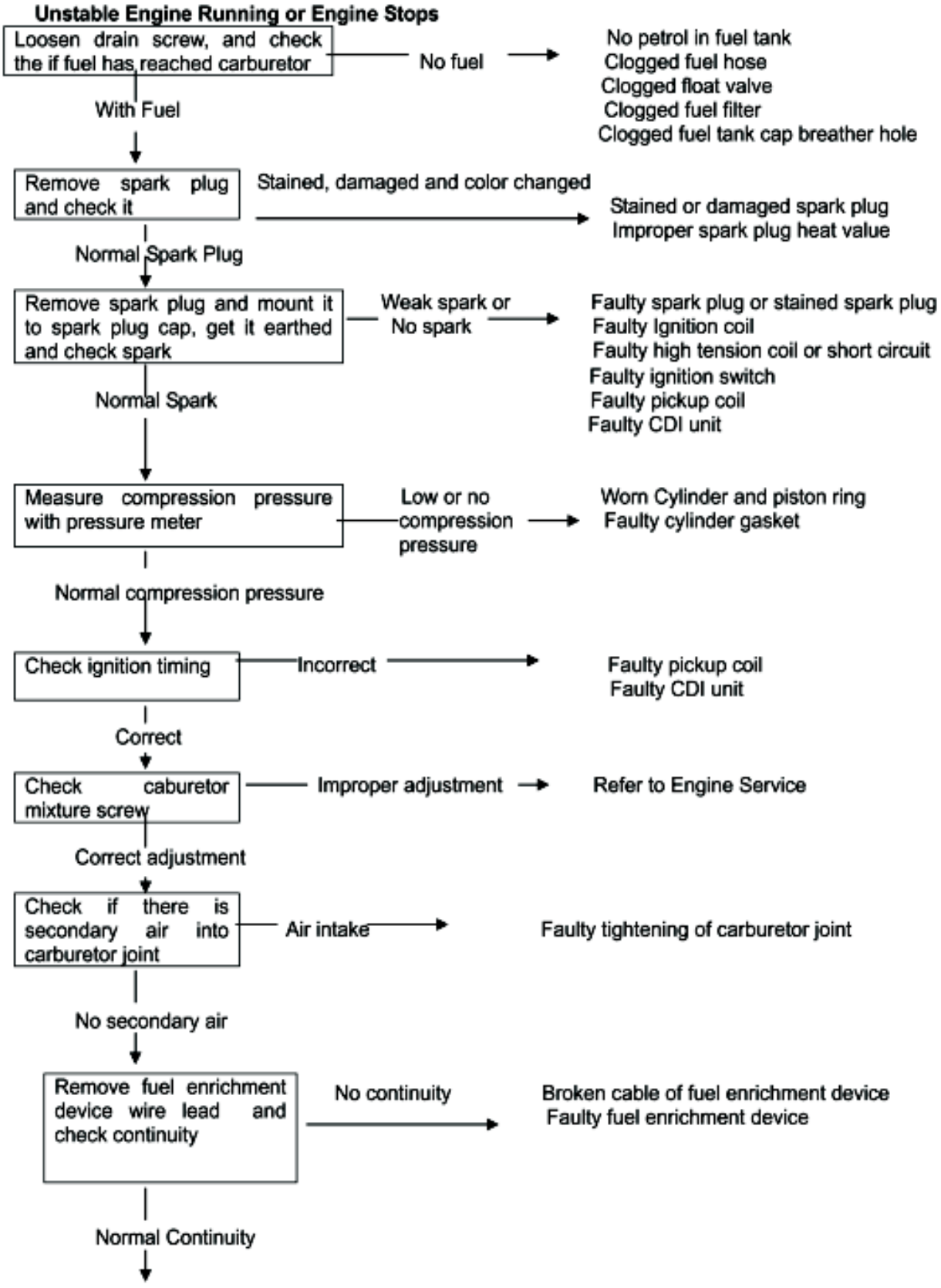
This chapter is a general explanation of major troubleshooting of the whole engine.

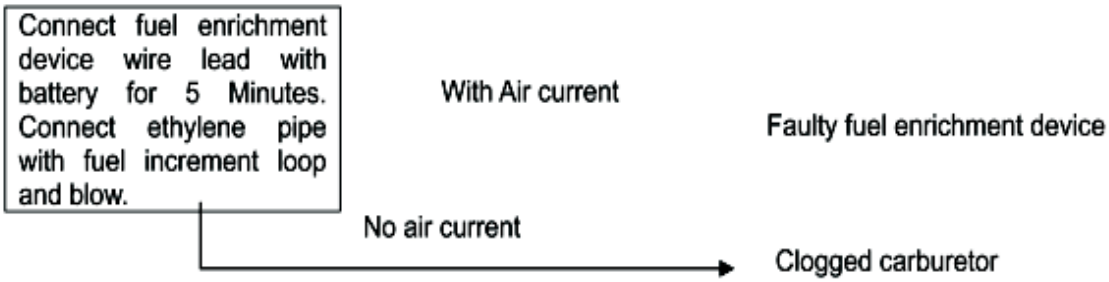
Refer to the relevant chapters for troubleshooting not listed in this chapter.

Starting Failure/Hard Starting

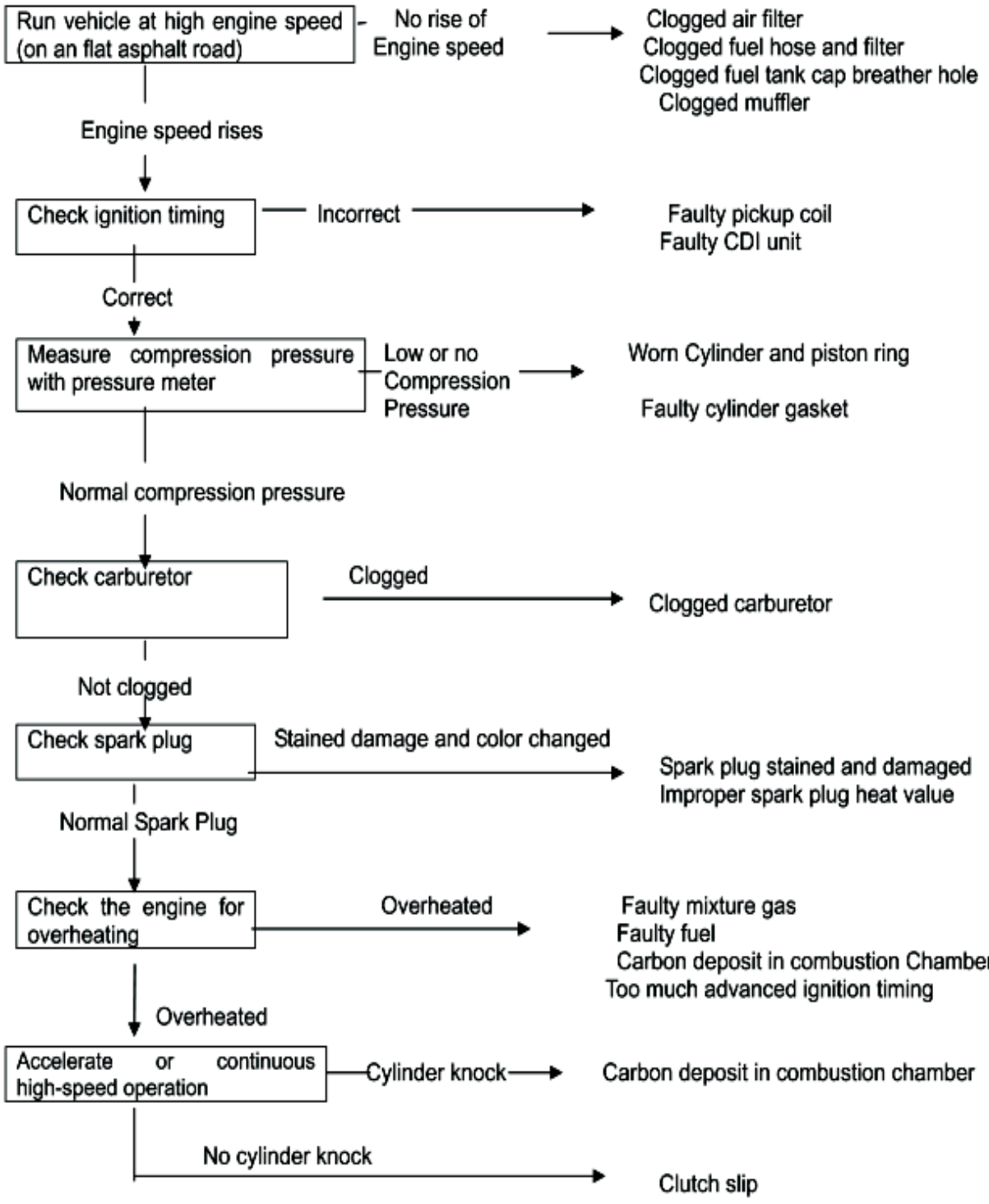
In case of starting failure or hard starting, refer to chapter of starting system (Engine maintenance notebook) for troubleshooting and check the starting system whether have problems or not.



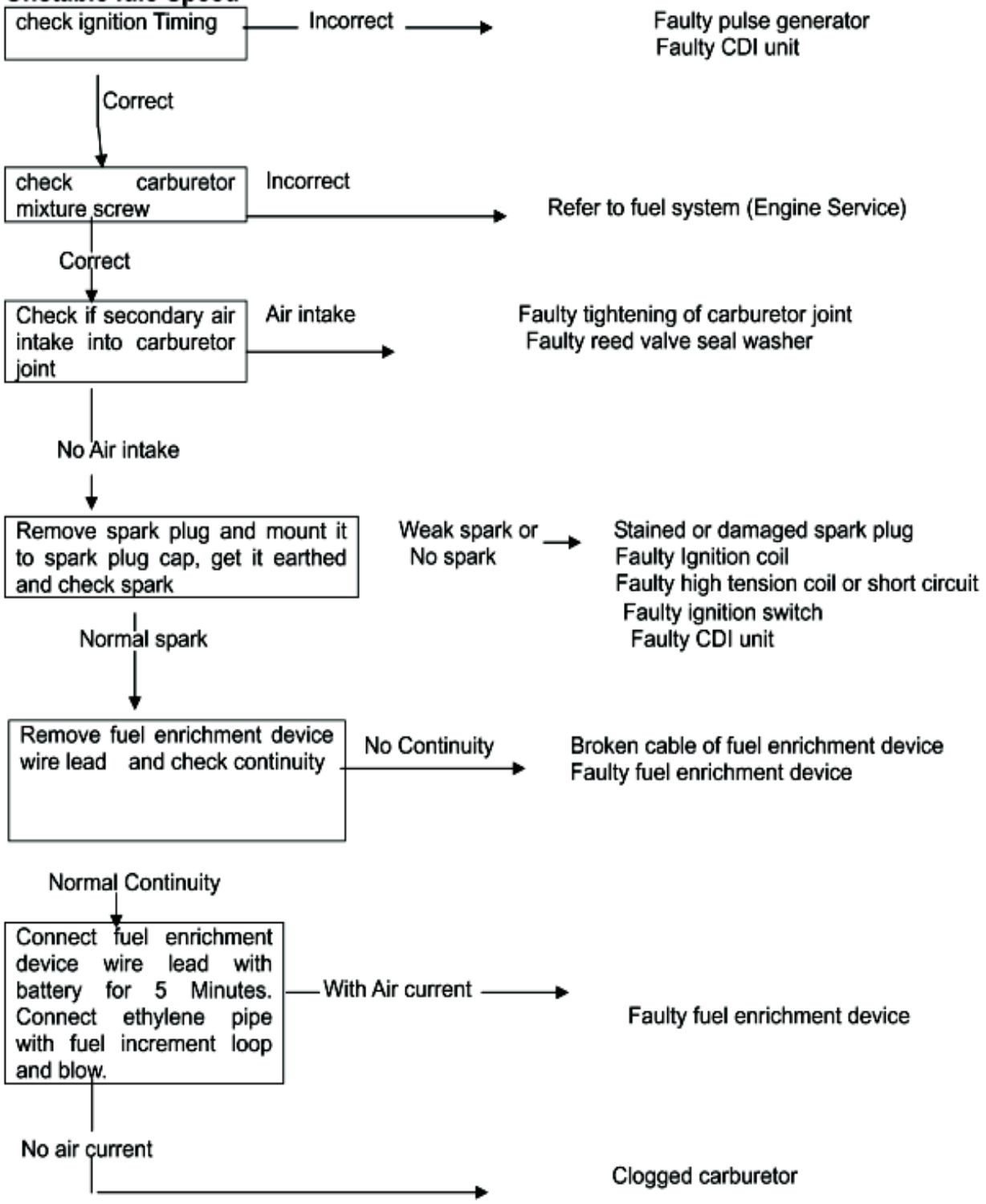

Unstable Engine Running or Engine Stops
Loosen drain screw, and check the if fuel has reached carburetor
No fuel
No petrol in fuel tank
Clogged fuel hose
Clogged float valve
Clogged fuel filter
Clogged fuel tank cap breather hole
With Fuel
Remove spark plug and check it
Stained, damaged and color changed
Stained or damaged spark plug
Improper spark plug heat value
Normal Spark Plug
Remove spark plug and mount it to spark plug cap, get it earthed and check spark
Weak spark or No spark
Faulty spark plug or stained spark plug
Faulty Ignition coil
Faulty high tension coil or short circuit
Faulty ignition switch
Faulty pickup coil
Faulty CDI unit
Normal Spark
Measure compression pressure with pressure meter
Low or no compression pressure
Worn Cylinder and piston ring
Faulty cylinder gasket
Normal compression pressure
Check ignition timing
Incorrect
Faulty pickup coil
Faulty CDI unit
Correct
Check caburetor mixture screw
Improper adjustment
Refer to Engine Service
Correct adjustment
Check if there is secondary air into carburetor joint
Air intake
Faulty tightening of carburetor joint
No secondary air
Remove fuel enrichment device wire lead and check continuity
No continuity
Broken cable of fuel enrichment device
Faulty fuel enrichment device
Normal Continuity



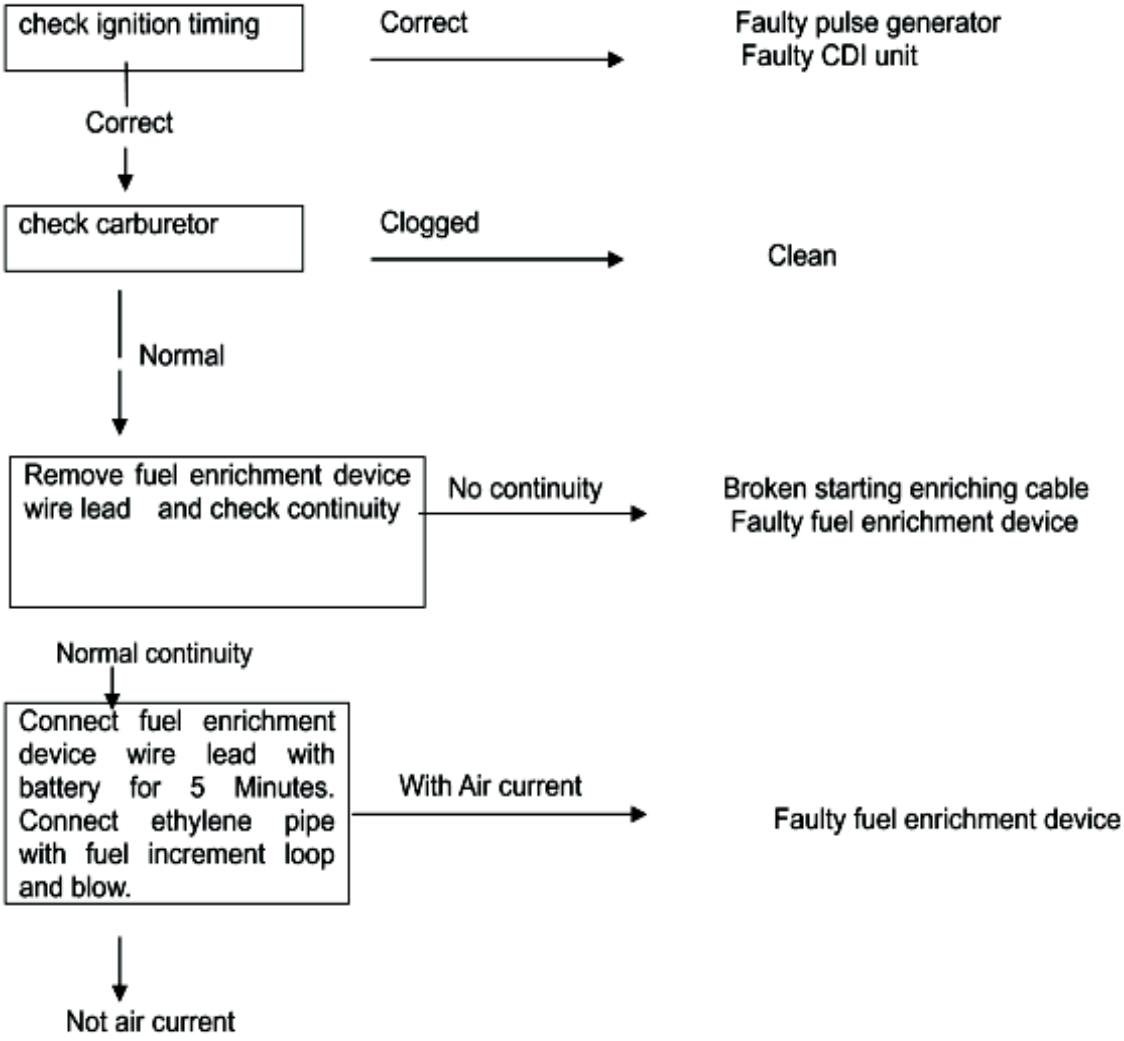
Poor Engine Performance in Hi-speed Range or Slow Speed Rising



Unstable Idle Speed



Poor Engine Performance in Middle or High Range



Engine Troubleshooting

1. Engine

Complaint	Symptom and Possible Causes	Remedy
Engine will not start or is hard to start	**Compression is Too Low**	
	1. Worn cylinder	Replace
	2. Worn piston ring	Replace
	3. Leakage with cylinder gasket	Replace
	4. Wear valve guide or improper valve seating	Repair or Replace
	5. Loose spark plug	Tighten
	6. Slow cranking of starting motor	Check electrical part
	7. Faulty valve timing	Adjust
	8. Improper valve clearance	Adjust
	No Sparking from Spark Plug	
	1. Fouled spark plug	Clean or Replace
	2. Wet spark plug	Clean and dry or replace
	3. Defective ignition coil	Replace
	4. Open or short circuit with pickup coil	Replace
	5. Faulty generator	Replace
	6. Faulty CDI	Replace
	No Fuel Reach Into Carburetor	
	1. Clogged fuel tank vent tube	Clean or Replace
	2. Clogged or faulty fuel valve	Clean or Replace
	3. Faulty carburetor needle valve	Replace
	4. Clogged fuel hose	Replace
	5. Clogged fuel filter	Clean or Replace
	Transfer is not in Neutral position	Set to Neutral position
Engine stalls easily or has unstable idle speed	1. Improper valve clearance	Adjust
	2. Improper valve seating	Replace or Correct
	3. Faulty valve guide	Replace
	4. Worn rocker arm or rocker arm shaft	Replace
	5. Fouled spark plug	Replace
	6. Improper spark plug gap	Replace or Adjust
	7. Faulty ignition coil	Replace
	8. Faulty CDI	Replace
	9. Faulty generator	Replace
	10. Improper fuel level in float chamber	Adjust Fuel level
	11. Clogged carburetor jet	Clean
	12. Faulty fuel valve	Replace
	13. Improper adjustment or idle screw	Adjust

Complaint	Symptom and Possible Causes	Remedy
Poor engine running in high-speed range.	1. Week valve spring 2. Worn camshaft 3. Fouled spark plug 4. Insufficient spark plug gap 5. Improper valve timing 6. Faulty ignition coil 7. Low fuel level in float chamber 8. Dirty air filter 9. Clogged fuel hose, resulting in poor fuel supply 10. Clogged fuel valve	Replace Replace Clean or replace Adjust or replace Replace Adjust float chamber fuel level Clean or replace Clean Clean Clean
Exhaust smoke is dirty or thick	1. Excessive engine oil 2. Worn piston ring 3. Worn valve guide 4. Scored or scuffed cylinder wall 5. Worn valve stem 6. Worn valve stem oil seal	Check oil level and drain Replace Replace Replace Replace Replace
Engine lacks power	1. Improper valve clearance 2. Weak valve spring 3. Improper valve timing 4. Worn cylinder 5. Worn piston ring 6. Improper valve seating 7. Fouled spark plug 8. Improper spark plug gap 9. Clogged carburetor jet 10. Improper fuel level in fuel chamber 11. Dirty air filter 12. Worn rocker arm or rocker arm shaft 13. Air leakage from air intake pipe 14. Excessive engine oil	Adjust Adjust Adjust Replace Replace Replace or Correct Clean or replace Clean or replace Clean or replace Adjust fuel level Clean or replace Replace Tighten or replace Check oil level and drain
Engine overheats	1. Carbon deposit on piston top 2. Insufficient or excessive engine oil 3. Faulty oil pump 4. Clogged oil passage 5. Fuel level in float chamber is too low 6. Air leakage from air intake pipe 7. Incorrect engine oil 8. Faulty cooling system	Clean Check level, add or drain Replace Clean Adjust fuel level Tighten or replace Change engine oil

Complaint	Symptom and Possible Causes	Remedy
Engine is noisy	**Valve Chatter** 1. Excessive valve clearance 2. Worn or broken valve spring 3. Worn rocker arm or camshaft	 Adjust Replace Replace
	Noise from Piston 1. Worn piston 2. Worn cylinder 3. Carbon deposit in combustion chamber 4. Worn piston pin or pin hole 5. Worn piston ring or piston ring groove	 Replace Replace Clean Replace Replace
	Noise from Timing chain 1. Stretched chain 2. Worn sprocket wheel 3. Faulty chain tensioner	 Replace chain & sprocket Replace chain & sprocket Repair or replace
	Noise from Clutch 1. Worn or damaged crankshaft spline 2. Worn inner race spline	 Replace crankshaft Replace inner race
	Noise from Crankshaft 1. Rattling bearing 2. Worn or burnt crank pin bearing 3. Excessive thrust clearance	 Replace Replace Replace
	Noise from CVT 1. Worn or slipping drive belt 2. Worn rollers in primary sheave	 Replace Replace
	Noise from Transmission 1. Worn or damaged gear 2. Worn or damaged input or output shafts 3. Worn bearing 2. Worn bushing	 Replace Replace Replace Replace
Slipping Clutch	1. Worn or damaged clutch shoes 2. Weakened clutch shoe spring 3. Worn clutch housing 4. Worn or slipping drive belt	Replace Replace Replace Replace
Difficulty or locked gearshift	1. Broken drive or driven bevel gear teeth 2. Distorted shift fork 3. Worn shift cam 4. Improper gearshift rod	Replace Replace Replace Adjust

2. Carburetor

Complaint	Symptom and Possible Causes	Remedy
Starting Difficulty	1. Clogged starter jet 2. Clogged starter jet passage 3. Air leakage from joint between starter body and carburetor 4. Faulty starting plunger	Clean Clean Clean, adjust or replace gasket Adjust
Idling or low-speed trouble	1. Clogged slow jet 2. Clogged slow jet passage 3. Clogged air intake 4. Clogged bypass port 5. Starter plunger not fully closed 6. Improper set of idle screw 7. Improper float height	Clean Clean Clean Clean Adjust Adjust Adjust
Medium or high speed trouble	1. Clogged main jet 2. Clogged main air jet 3. Clogged needle jet 4. Faulty throttle valve 5. Clogged fuel filter 6. Improper float height 7. Starter plunger not fully closed	Clean Clean Clean Adjust Clean Adjust Adjust
Overflow and fuel level fluctuation	1. Worn or damaged needle valve 2. Damaged needle valve spring 3. Improper working float 4. Foreign matter in needle valve	Replace Replace Adjust or Replace Clean

3. Cooling System/Radiator

Complaint	Symptom and Possible Causes	Remedy
Engine overheats	1. Clogged water passage or radiator 2. Air in the cooling system; insufficient coolant 3. Faulty water pump 4. Incorrect coolant 5. Faulty thermostat 6. Faulty fan motor or thermoswitch	Clean Discharge air and add coolant Check and replace Replace Replace Check and/or replace
Engine coolant overcools	1. Faulty thermoswitch 2. Extremely cold weather 3. Faulty thermostat	Replace Put on radiator cover Replace

4. Ignition System

Complaint	Symptom and Possible Causes	Remedy
No Sparking or Weak Sparking	1. Faulty CDI 2. Faulty spark plug 3. Faulty Generator 4. Insufficient battery voltage 5. Faulty ignition coil 6. Faulty pickup coil	Check and replace Check and replace Check and replace Check and replace Check and replace Check and replace