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CF500-5B Service CF500-5C Manual

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Zhejiang CFMOTO Power Co., Ltd.
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FORWARD

This manual introduces X5 EFI version (CF500-5B/5C) maintenance information, disassembly procedure, check & adjustment methods, troubleshooting and technical specifications. There are illustrations, drawing to guide your operations.

Chapter 1 mainly introduces general operation information, tools, vehicle structure and basic specifications.

Chapter 2 mainly introduces check & adjustment methods and how to do vehicle maintenance.

Chapter 3 mainly introduces disassembly, installation, adjustment, maintenance and troubleshooting information.

CFMOTO reserves right to make improvements and modifications to the products without prior notice. Overhaul and maintenance should be done according to actual condition of vehicle.

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Conversion 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 1 l=1000cm ³
Force	12N (1.2kgf)	1kgf=9.80665N

1. Maintenance Information

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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
3. Clean the mud, dust before overhauling
2. 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.
8. Check if the disassembled rubber parts are aged and replace if necessary. Keep the rubber parts away from grease.
9. Pre-tighten the bolts, nuts and screws, then tighten according to the specified torque, from big to small and from inner side to outer side.
10. Replace aged latex parts before assembling. Do not mix volatile oil and grease on the surface, due to aggressiveness of fuel and oil.
11. Apply or inject recommended lubricant to the specified parts
12. Use special tools wherever necessary.
13. When ball bearing disassembled by pressing ball ring, it can not be reused.

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 it 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.



1. Maintenance Information

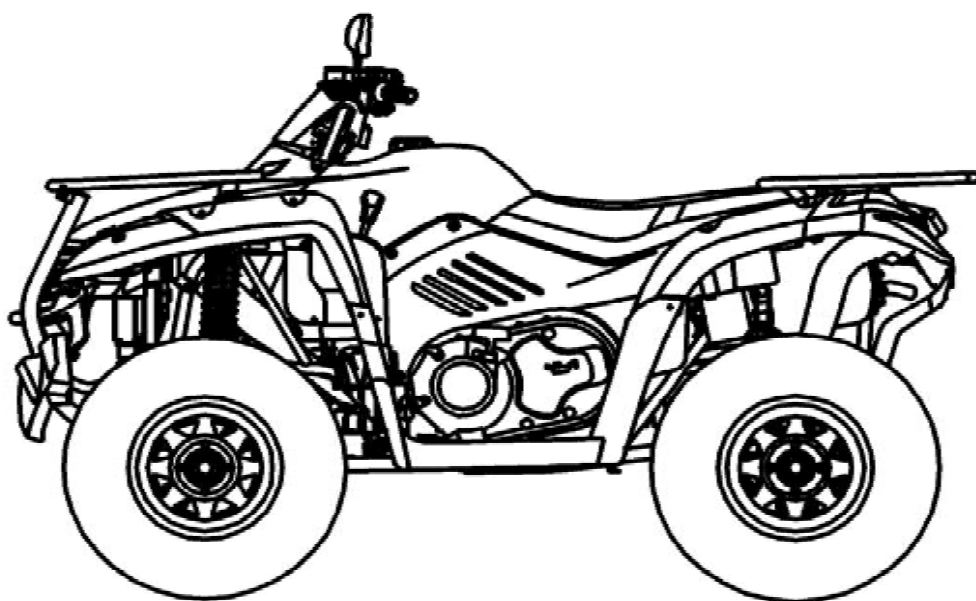
Numbers Marking Location

CF500-5B/CF500-5C

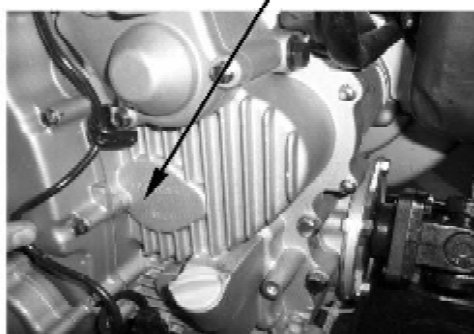
VIN Number: LCELDTS5~/LCELDTS6

Engine Number: CF188-B~

1



Engine Number Location



VIN Number Location



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Main Data Table

Item		Parameter
Model		CF500-5B/CF500-5C
Length		CF500-5B: 2100mm CF500-5C: 2300mm
Width		1180mm
Height		1230mm
Wheel base		CF500-5B: 1290mm CF500-5C: 1490mm
Engine type		CF188
Displacement		493Cm ³
Fuel type		Unleaded gasoline RQ-90or above
Dry weight		CF500-5B: 344 kg CF500-5C: 358 kg
Number of Passengers		CF500-5B: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		275mm
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

1. Maintenance Information

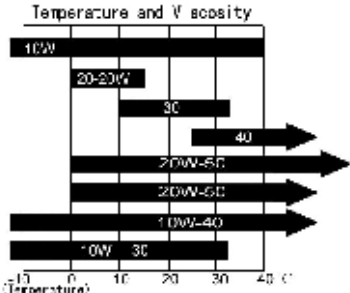
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Item			Parameter	
Fuel Device	Air Filter type		Sponge element filter	
	Valve	Type	Type: CF188-B-173000	
		Diameter of mixing valve	36mm	
Gearing	Clutch	Wet, Auto-Centrifugal		
	Operation Mode	Automatic（CVT）+Parking & Gear Shifting		
	Gears Shift	Low 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		

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Maintenance Parameters 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 body	0.03~0.1mm	0.12mm
	Oil pressure	3000r / min 时 130-170KPa	

Air Inlet System

Item		Standard
Fuel Tank Capacity	Full capacity	18L
Valve		CF188-B-173000
Inlet Pressure Sensor		CF188-B-175000
Inlet Temperature Sensor		CF188-B-177000
Air Bypass Valve		CF188-B-172000
Injector		CF188-B-171000
Idle Speed		1400±100r / min

1. Maintenance Information

Cooling System

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Item		Standard/Parameter		Service Limit	Remark
Full Capacity		2000ml			
Reservoir tank capacity		300ml			
Standard Density		50%			
Opening pressure of radiator cap		108kpa(1.1kgf/cm ²)			
Thermostat	Initial Temperature	71±3℃			
	Full opening Temperature	88℃			
	Full opening lift range	3.5~4.5mm/95?			
Temperature and Resistance of Water Temperature Sensor	Temperature(℃)	End B Resistance(Ω)	End A C Resistance(kΩ)		
	-20	---	13.71-16.94		
	25	---	1.825-2.155		
	50	176-280	---		
	80	63.4-81.4	0.303-0.326		
	110	24.6-30.6	0.138-0.145		
Temperature of Thermostat	Close -Open	88℃ Round	88℃ Round		
	Open-Close	82℃ Round	82℃ Round		
Coolant Type	-35℃ anti-frozen, antiseptis, 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

1. Maintenance Information

Battery, Charging Device, Pickup Coil

1

Item			Standard
AC Magneto Motor	Model	Permanentmagnet 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		ECU 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	0.74 Ω -0.78 Ω
	Secondary	10.1k Ω -11.1 kΩ
Peak Voltage	Ignition Coil	> 150V
	Pulse Generator	2V
Starter Relay Coil Resistance		3Ω-5Ω
Secondary Starter Relay Coil Resistance		90Ω-100Ω

Lights, Instrument, Switches

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	

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Air Inlet Device+ 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

1. Maintenance Information

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	
	2 nd Ring	R	12 round	9.5	
Piston Ring Closed Gap	Top Ring		0.15-0.30	0.60	
	2 nd Ring		0.15-0.30	0.60	
Piston Annular Fit Clearance	Top Ring		0.04-0.08	0.180	
	2 nd Ring		0.03-0.07	0.150	
Thickness Piston Ring	Top Ring		0.97-0.99	————	
	2 nd Ring		1.17-1.19	————	
Piston Annular Width	Top Ring		1.03-1.05	————	
	2 nd 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	

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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	————	

1. Maintenance Information

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	16~20	
Upper Rear Mounting Bolt, Engine	M10×1.25×110	1	40~50	
Upper Rear Mounting Bracket Bolt, Engine	M8×14	1	16~20	
Upper Front Mounting Bracket Bolt, Engine	M8×14	1	16~20	
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	16~20	
Locknut, Steering Stem	M8×55	4	16~20	
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	16~20	
Bolt, Exhaust Pipe	M8×14	1	16~20	
Mounting Bolt, Exhaust Pipe	M8×40	1	16~20	
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	16~20	

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	

1. Maintenance Information

To be continued

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	

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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 cylinder	
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			

1. Maintenance Information

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	PDA		Diagnose failures of EFI system	
20	Oetiker Clamp Catcher		Disassemble/ install fuel Pipe	
21				
22				
23				
24				
25				

1

CFMOTO

Lubricant Grease, Sealant

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

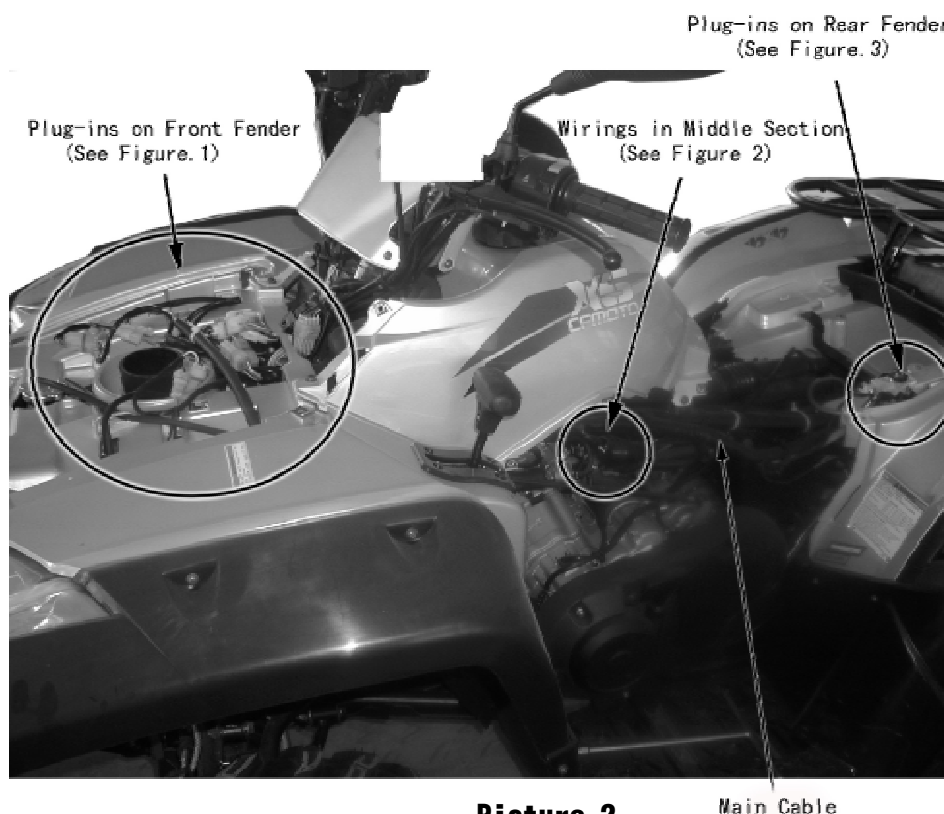
Engine operation materials include lubricant (oil), grease (lubricant grease) and coolant, installment supplementary includes plane sealant and screw thread sealant.

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 lithium 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	

1. Maintenance Information

Wiring, Pipes, Cable Layout

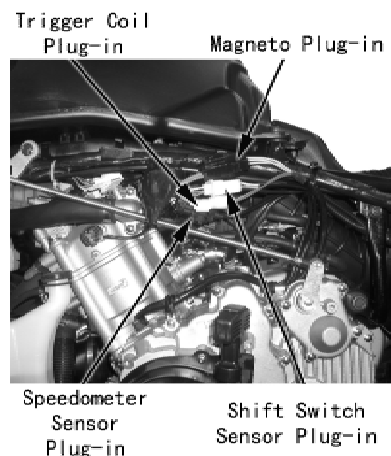
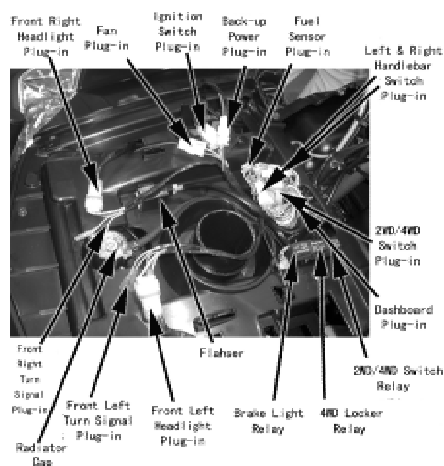
1



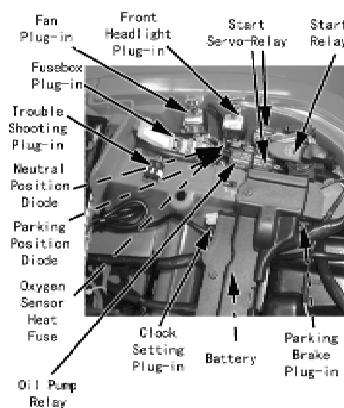
Picture 1

Picture 2

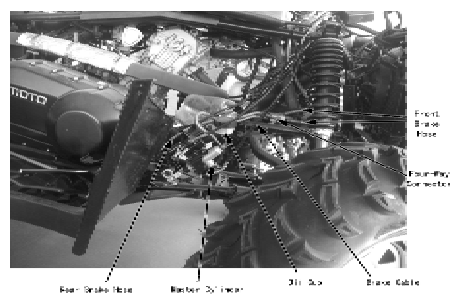
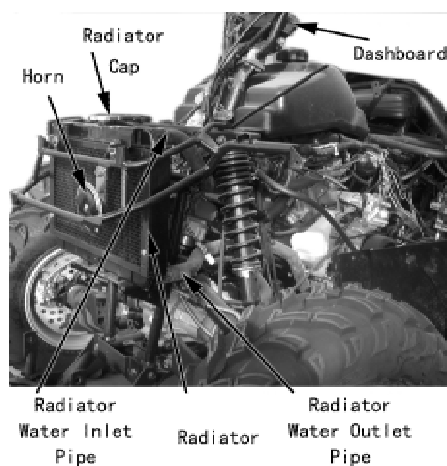
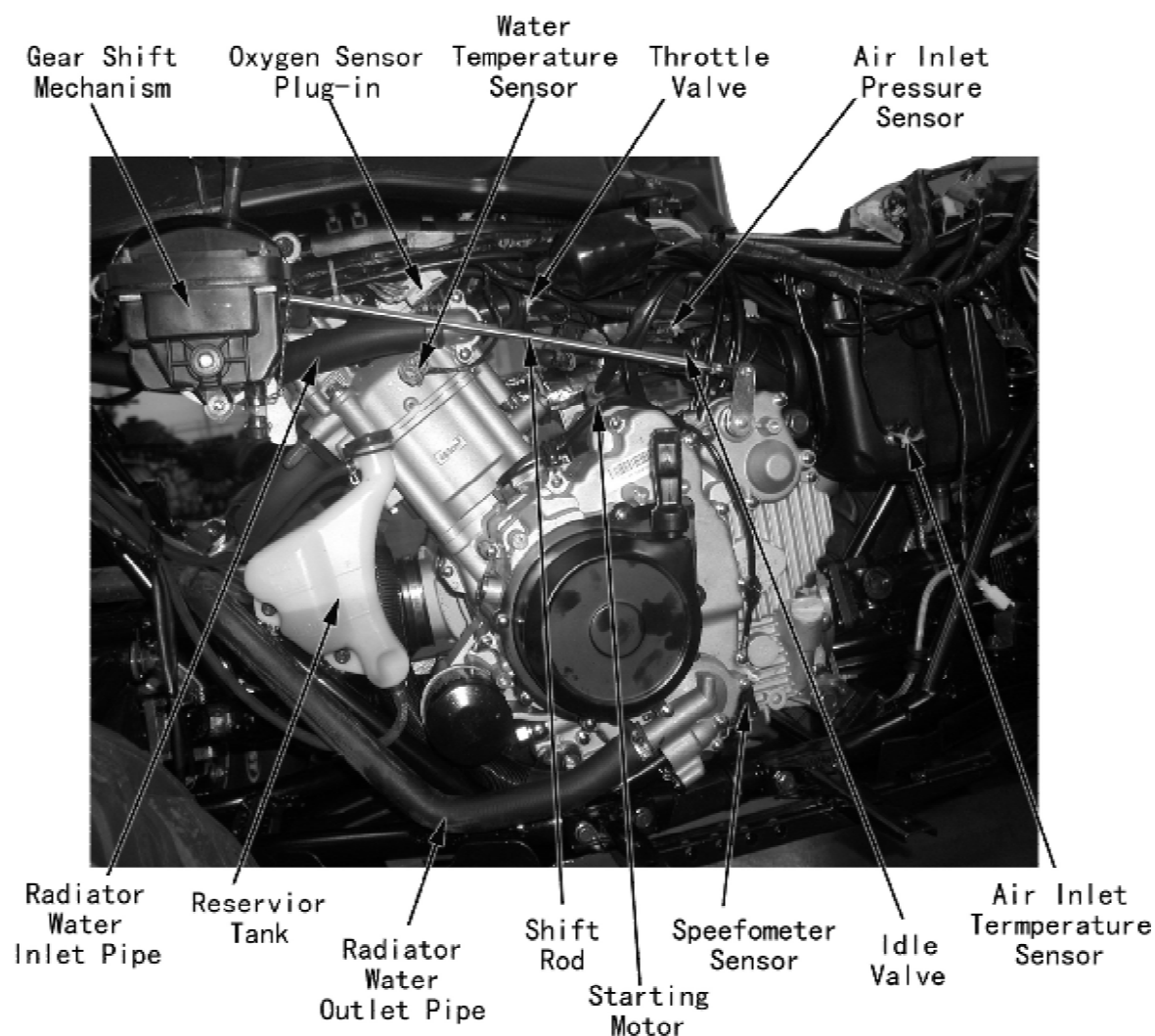
Main Cable



Picture 3

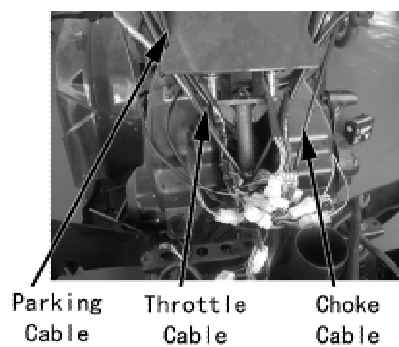
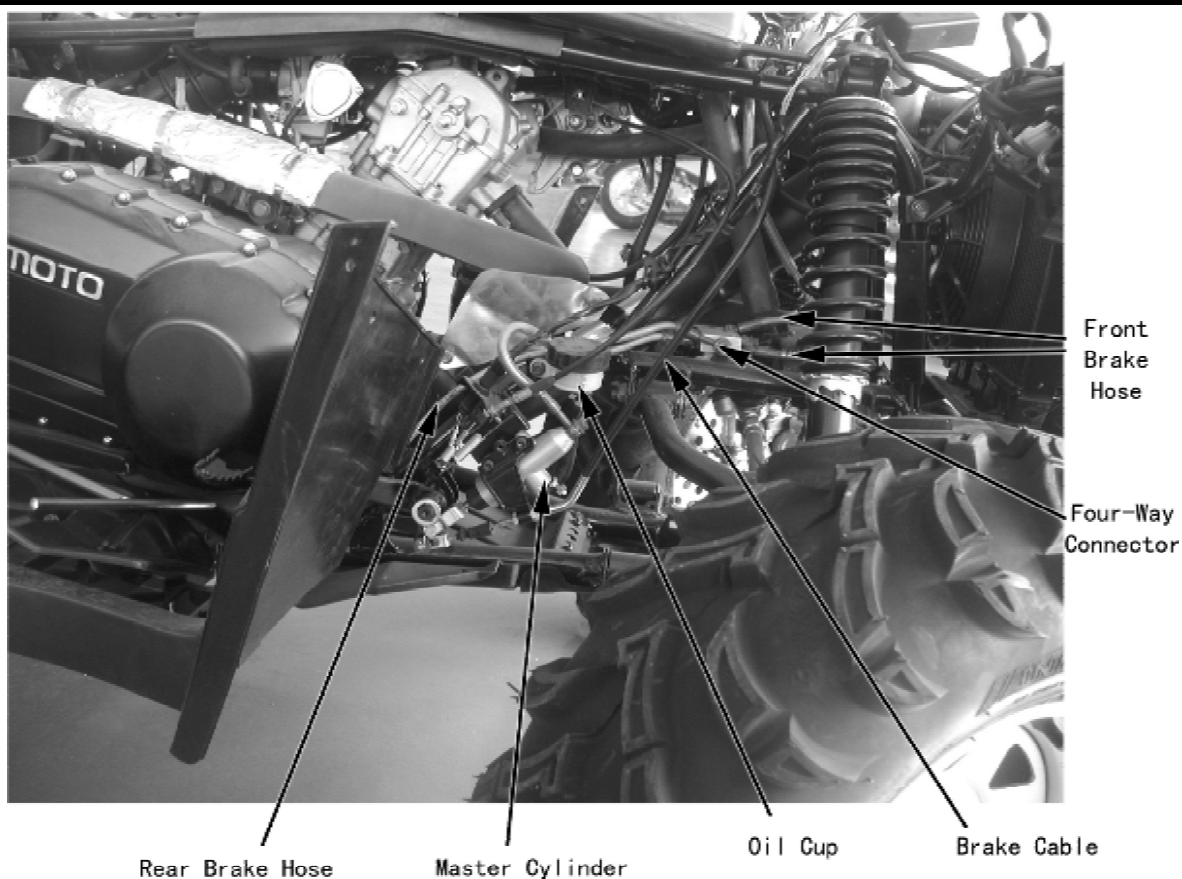


CFMOTO

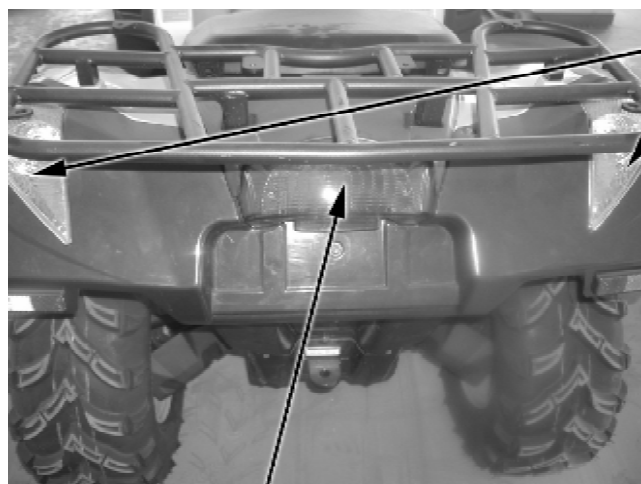


1. Maintenance Information

1

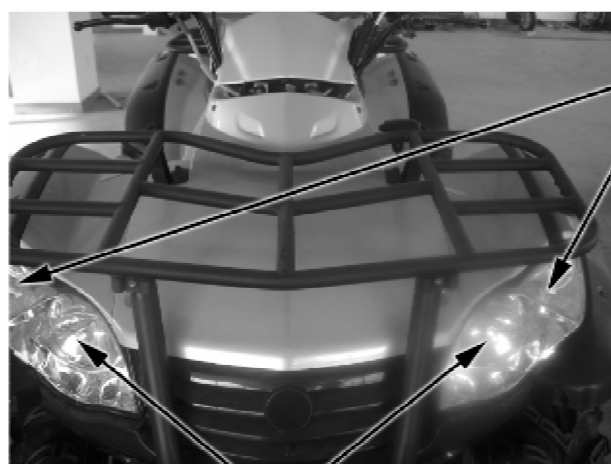


CFMOTO



Taillight

Rear Turn Signals



Front
Side lights

Front Headlights



ECU

1. Maintenance Information

Failure Indicator

Failure Indicator is located on the left top “①” of instrument.

While the indicator flashing is faulty, failure uses 4-digit flashing.

For example: 0650,

“0” flashes 10 times,

“6” flashes 6 times,

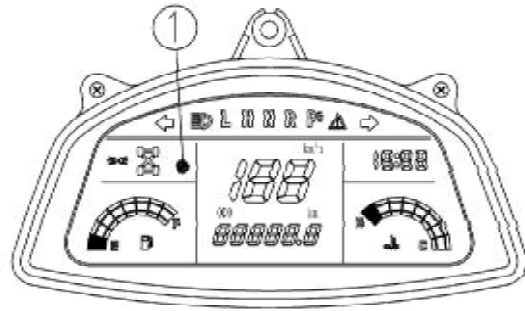
“5” flashes 5 times,

“0” flashes 10 times,

See (Page 11-27) for the meaning of Diagnostic Trouble Code.

While failure appears, use PDA to diagnose it.

Connect PDA with PDA connector, the location of PDA connector (see Page 1-19) Picture 3. the use of PDA (see Page 11-26).



1

CFMOTO

2 Vehicle Body and Muffler

Overhaul Info.....	2-1	Footrest Board (LH, RH).....	2-10
Troubleshooting.....	2-1	Rear Fender, Engine Skid Plate (Front, Center, Rear), Double Seat, Protection Plate.....	2-11
Front Rack, Bolt Cap.....	2-2	Front Inner Fender (R&H), Front Protector (RH, LH).....	2-13
Seat, Seat Support & Rear Rack.....	2-3	Rear Protector (RH,LH), Bumper, Bumper Protector.....	2-14
Front Top cover, Dashboard Cover.....	2-4	Bumper Cap.....	2-15
Side Support(LH&RH).....	2-5	Front Vent Grille, Fuel Tank.....	2-16
Rear Top Cover	2-6	Bottom Plate, Fuel Tank.....	2-17
Left Side Panel.....	2-7	Muffler.....	2-18
Right Side Panel.....	2-8	Description of Visible Parts.....	2-19
Fuel Tank Top Cover, Front Fender.....	2-9		

2

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.

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

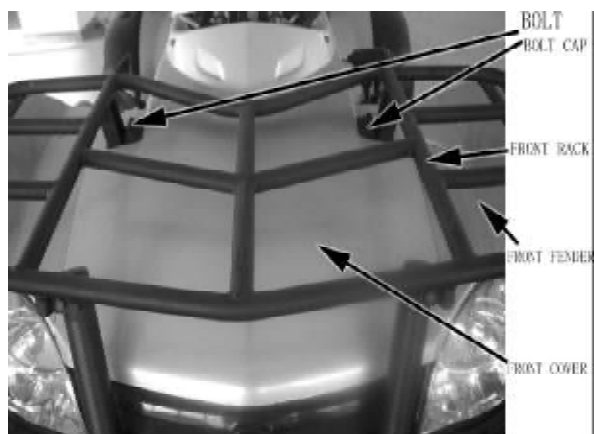
Muffler clogged

CFMOTO

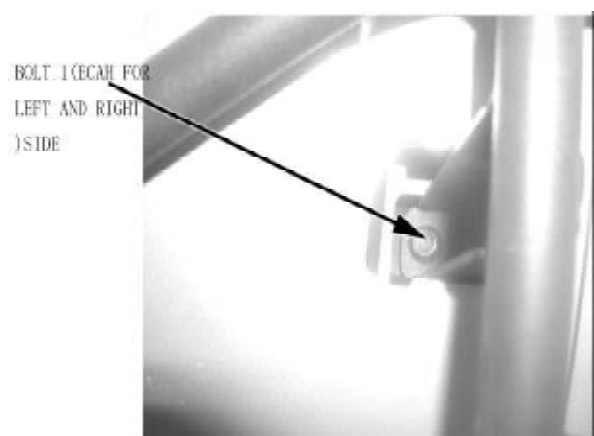
Front Rack, Bolt Cap

Remove:

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



**Remove fixing Bolt 1
(one for each on the left and right)**



**Remove fixing Bolt 2
Remove front rack**

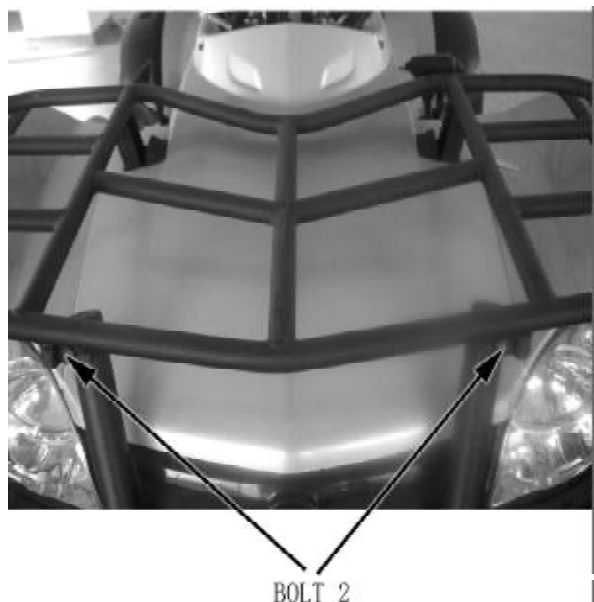
Installation:

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



2 Vehicle Body and Muffler

Seat

Remove:

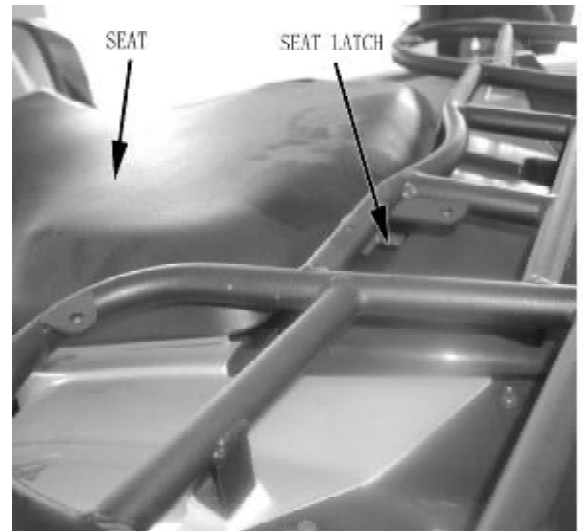
Pull upward seat buckle
Lift and push seat backward

Installation:

Press upward seat buckle
Press seat forward and down

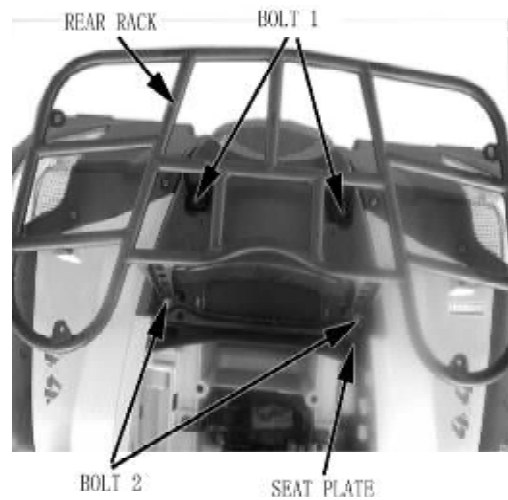
Note:

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

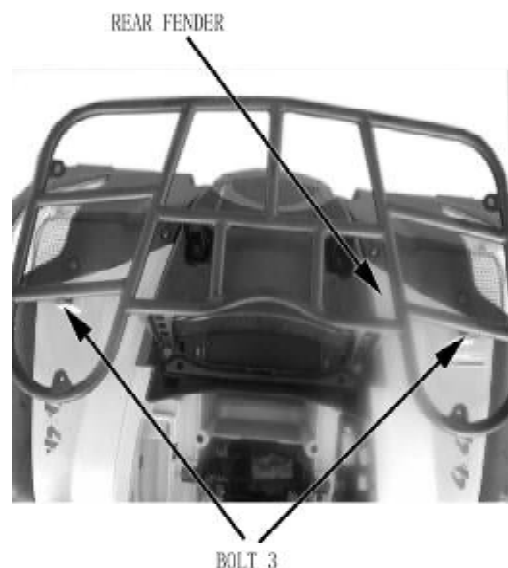
Reverse the removal procedure for installation

Tightening Torque:

Bolt 1: 35N·m-45N·m

Bolt 2: 35N·m-45N·m

Bolt 3: 8N·m-12N·m



Front Top Cover

Remove

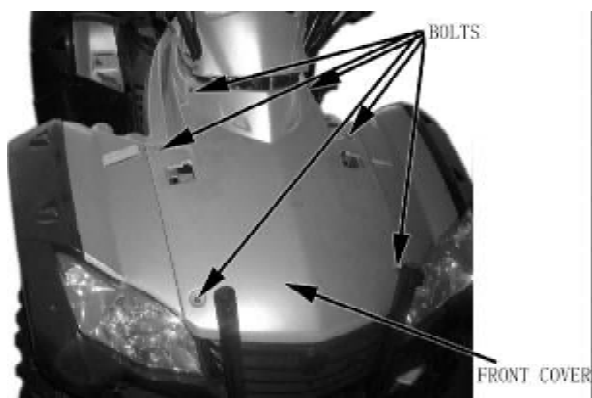
Front Rack (→ 2-2)

6 nuts,

Front Top Cover

Assemble

Reverse the removal process and direction.



Dashboard Cover

Remove

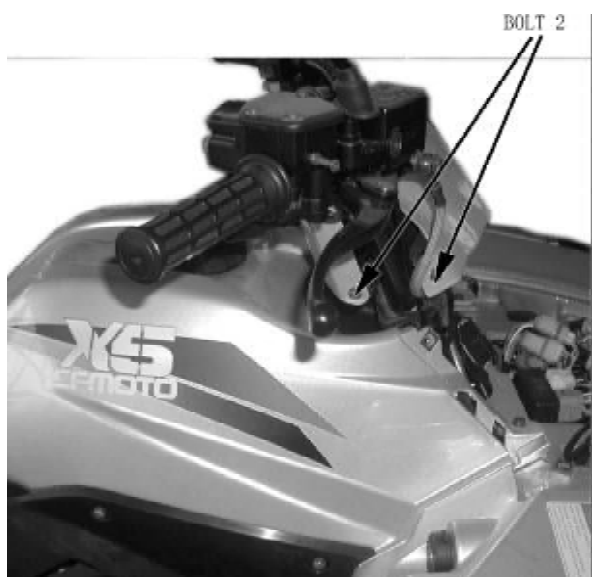
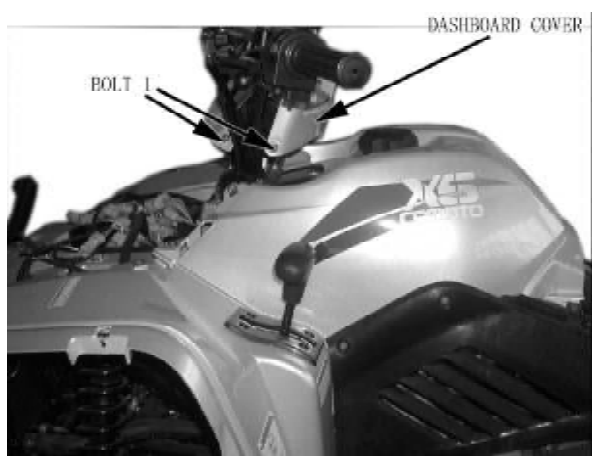
--2 pieces Bolt 1

--2 pieces bolt 2

--Dashboard Cover

Installation

Reverse the removal process and direction.



2 Vehicle Body and Muffler

Front Side Support(Left)

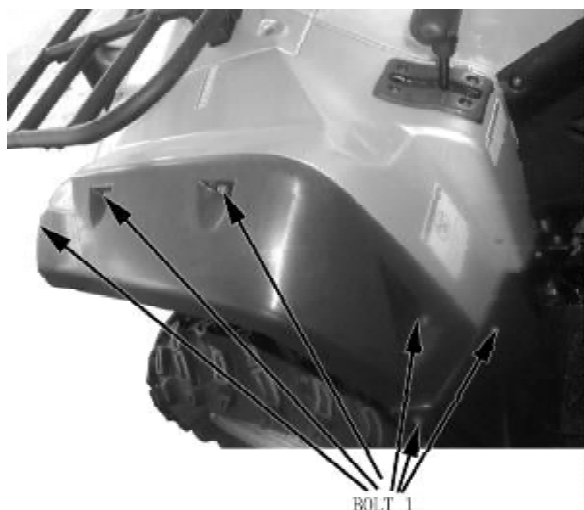
Remove

Bolt 1

Front Side Support

Assemble

Reverse the removal process and direction.



2



Front Side Support(Right)

Same as Left Side Support

CFMOTO

Rear Top Cover

Remove

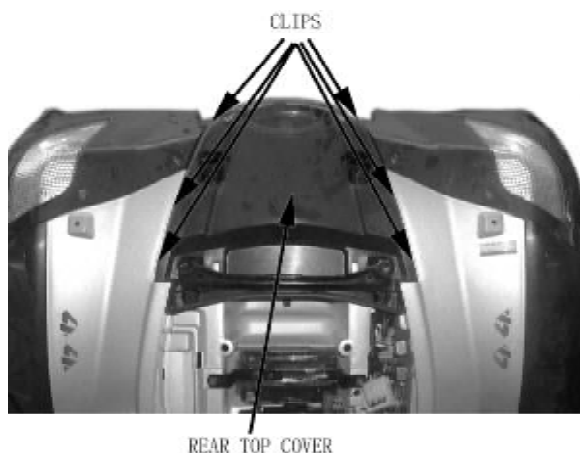
Rear Rack (→ 2-3)

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 .



2 Vehicle Body and Muffler

Left Side Cover

Remove

- Seat (→ 2-3)
- Left Side Cover fixing bolt
- Left Side Cover

Installation

Reverse the remove procedure and direction for installation .



2

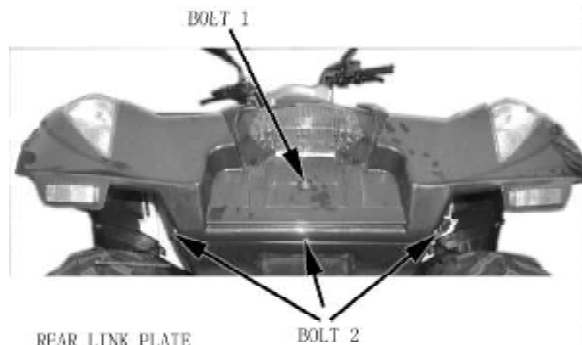
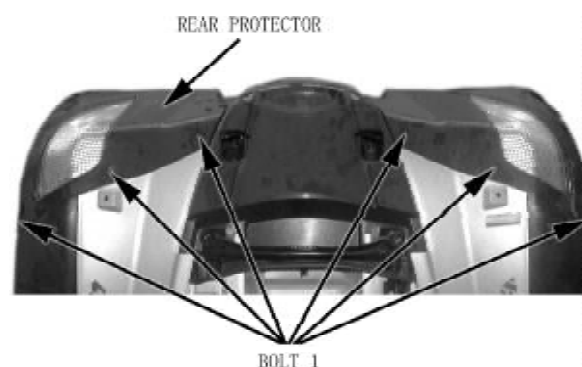
Rear Protector

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

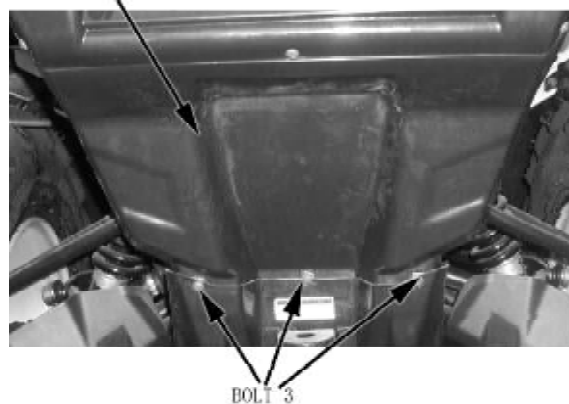
Remove

- Bolt 3

Rear Link Plate

Installation

Reverse the remove procedure and direction for installation.



CFMOTO

Rear Side Panel

Remove

--Seat (→ 2-3)

--Right Side Cover Fixing Bolt



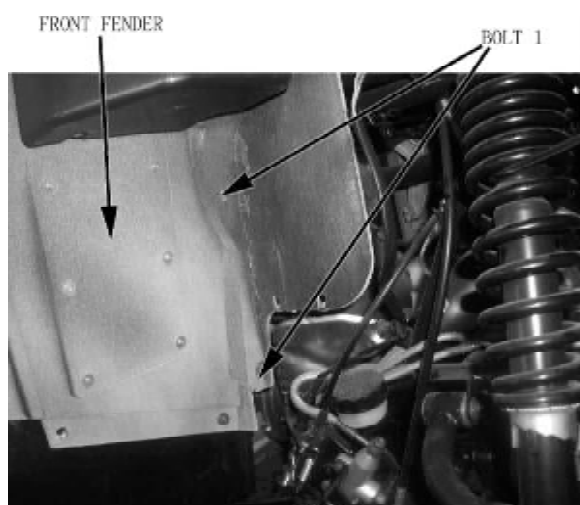
RIGHT SIDE PANEL

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 .



FRONT FENDER

BOLT 1

Rear Right Side Support

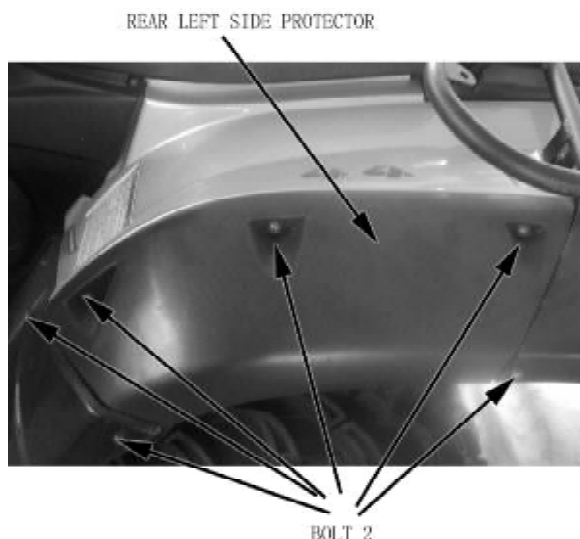
Remove

--Bolt 2

--Remove Rear Right Side Support

Installation

Reverse the remove procedure for installation



REAR LEFT SIDE PROTECTOR

BOLT 2

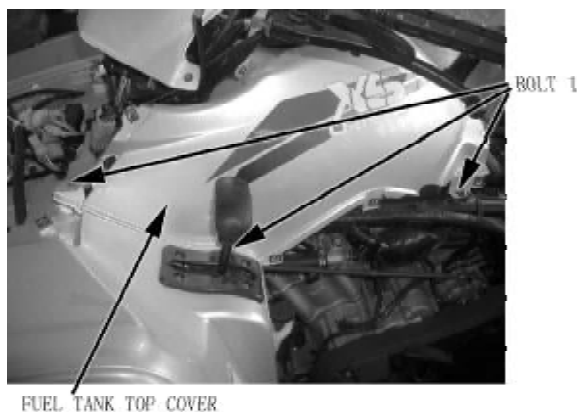
Removal and Installation and Rear Right Side Support is same with Left side.

2 Vehicle Body and Muffler

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

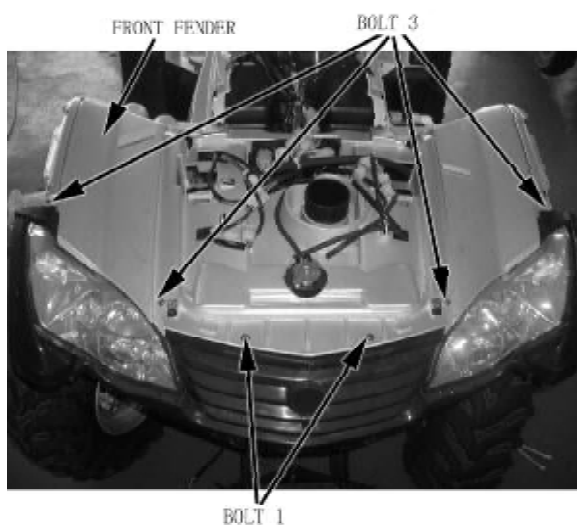
Remove

- 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

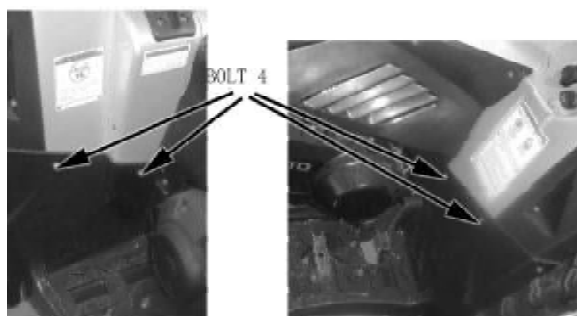


Remove 4 bolts fixed with left and right footrest

Remove Front Fender

Installation

Reverse the remove procedure for installation

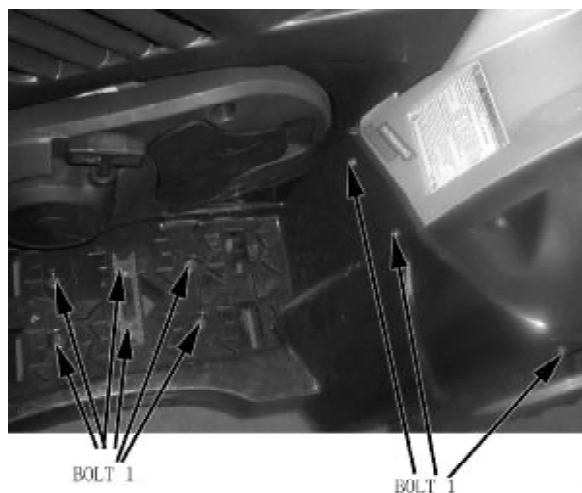


Footrest, Left Side

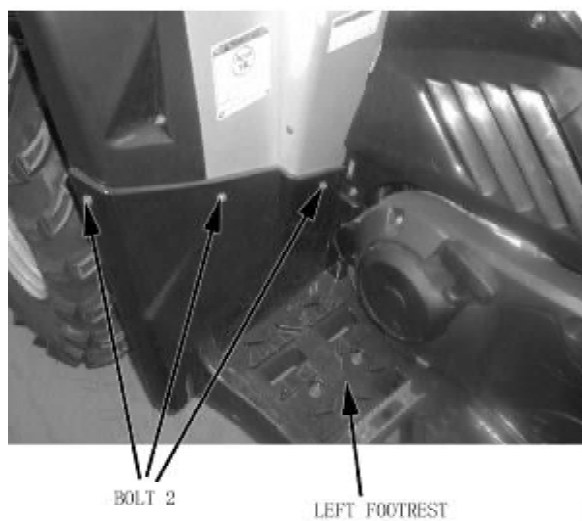
Remove

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.

2 Vehicle Body and Muffler

Rear Fender

Remove

- Seat (→ 2-3)
- Rear Rack (→ 2-3)
- Rear Top Cover (→ 2-6)
- 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

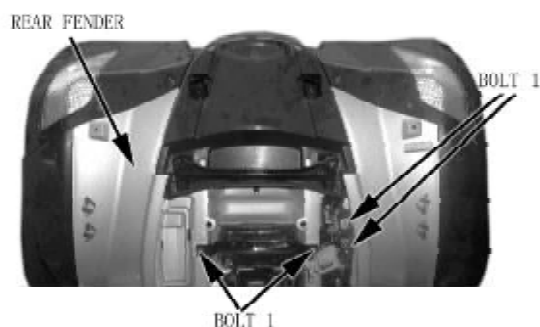
Remove Nut 1

Remove Electronic Parts from Rear Fender

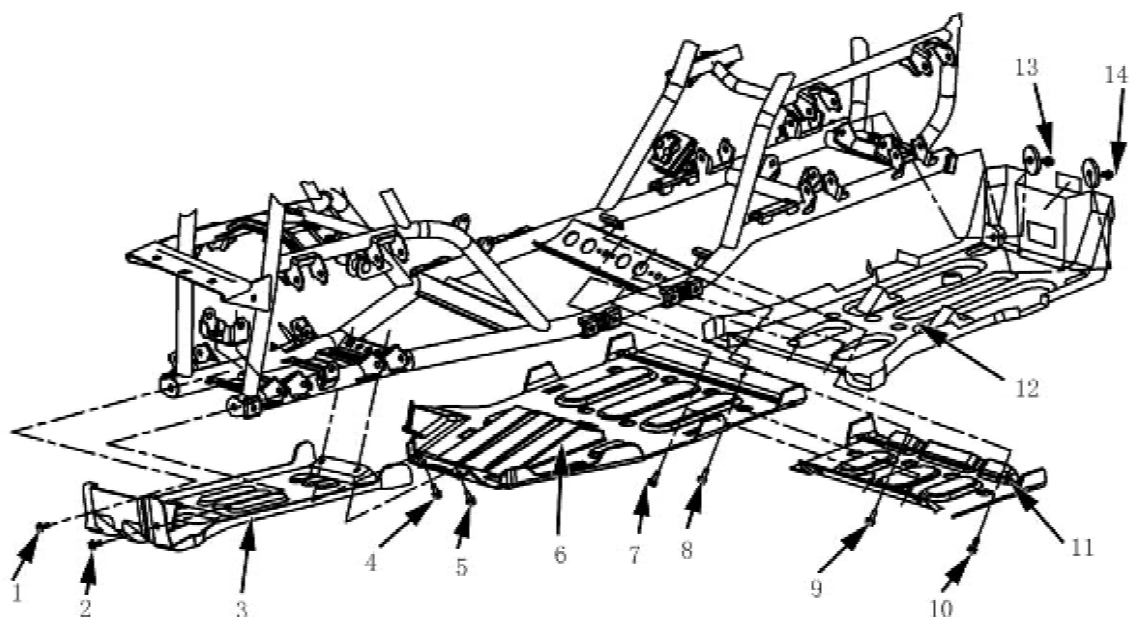
Loosen Cable Connector from Rear Fender

Upwardly Remove Rear Fender

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



2



- | | | |
|-----------------------------|------------------------------|------------------------------------|
| (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 | |

CFMOTO

Disassembly

NOTE:Side skid Plate(Front,Middle, Rear) and Double Seat Protection are located at bottom of vehicle. The maintenance person should work under bottom of vehicle when disassemble the above parts. For safety , 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

2 Vehicle Body and Muffler

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.



2

Left Front Inner Fender

Removal

Remove Bolt 1 ,and remove Left Front Inner Fender

Installation

Reverse the remove procedure for Installation



Front Left Protector

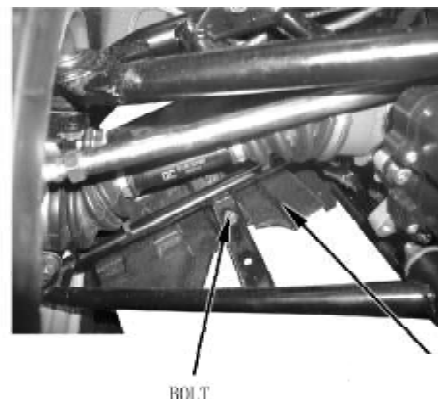
Remove

--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.

CFMOTO

Front Left Inner Fender

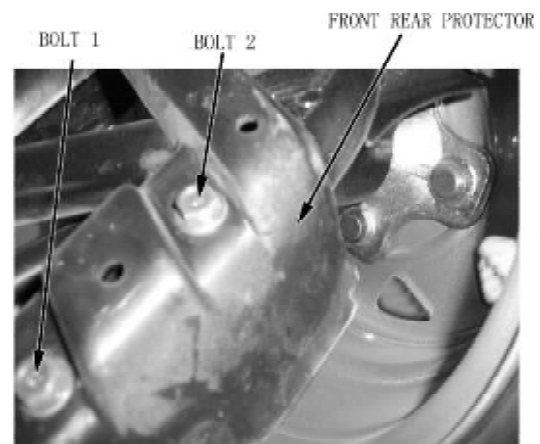
Removal

Remove Bolt 1 and 2;

Remove Front Left Inner Fender

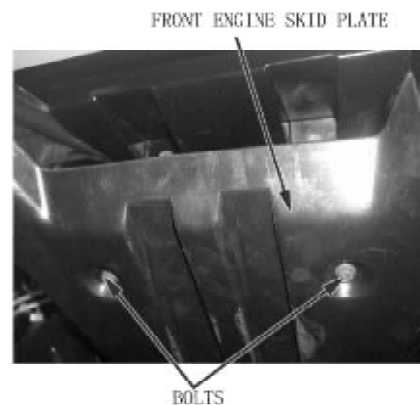
Installation

Reverse the remove procedure for Installation



Front Right Inner Fender

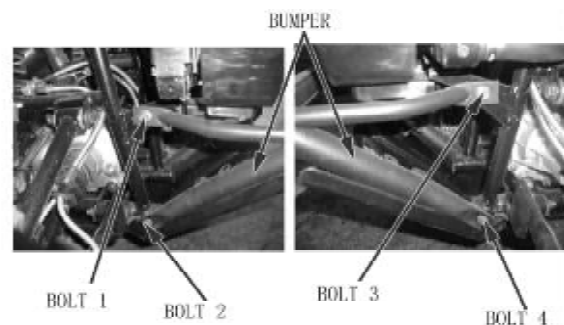
Removal and Installation same as Left Side.



Bumper, Bumper Protector

Remove

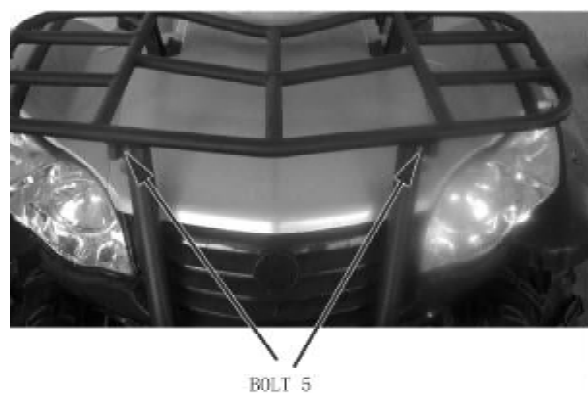
Remove two Bolts of Engine Front Skid Plate fixing into the Bumper.



Remove Bolt 1, 2, 3 and 4.

Remove Bumer and Bumper Protector

Remove Bolt 5 connecting Bumper and Rack.



2 Vehicle Body and Muffler

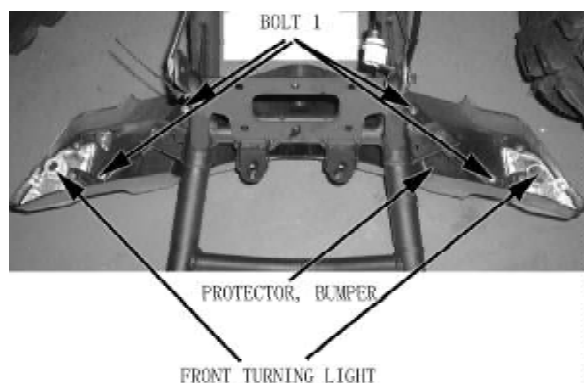
Bumper Protector

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



2

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.

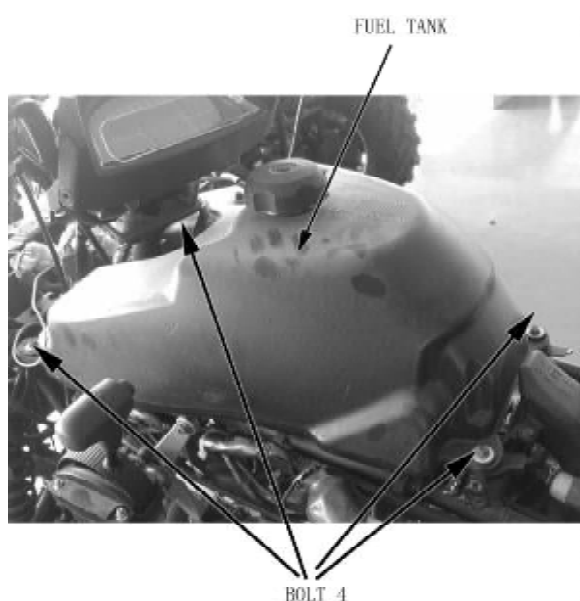
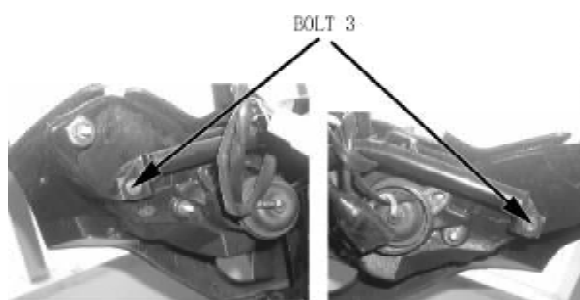
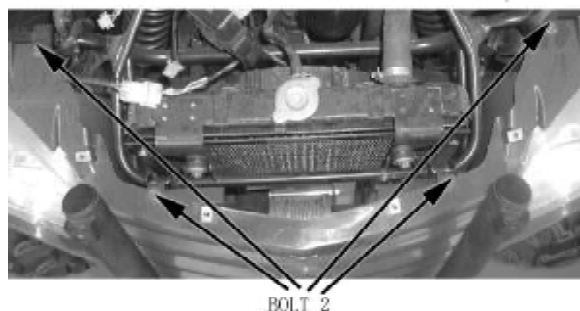
Remove Left and Right Side Panel (→ 2-7)

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 1

Remove:

- Fuel tank (→ 2-16)
- Bolt 1
- Bolt 2
- Fuel tank top cover

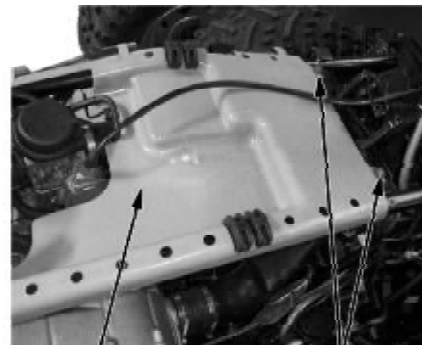
Installation:

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

FUEL PIPE (CIRCLIP)



BOTTOM PLATE, FUEL TANK

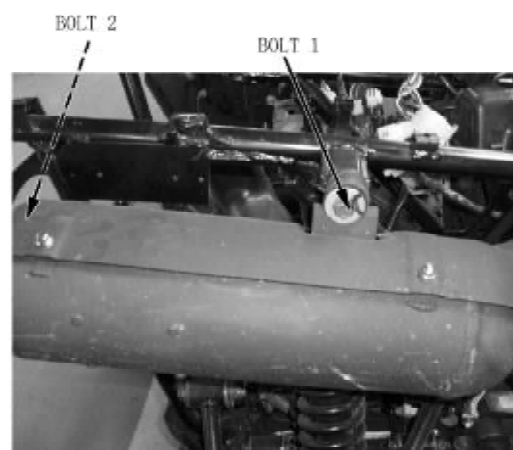
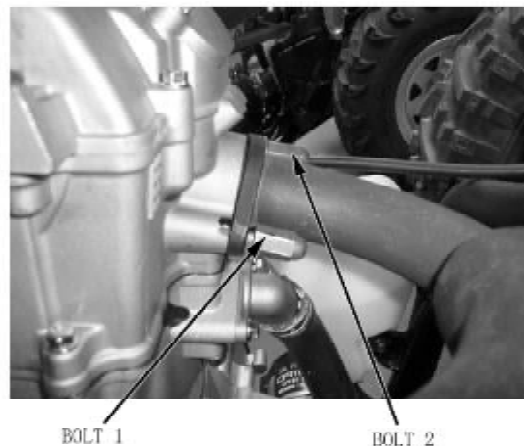
BOLT

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

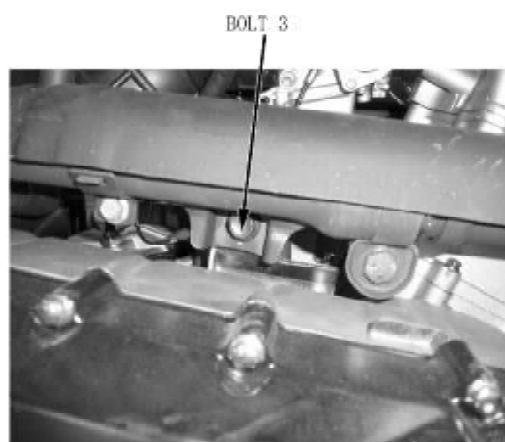


Remove Bolt

Remove Bolt 2, Bolt 3
Remove muffler

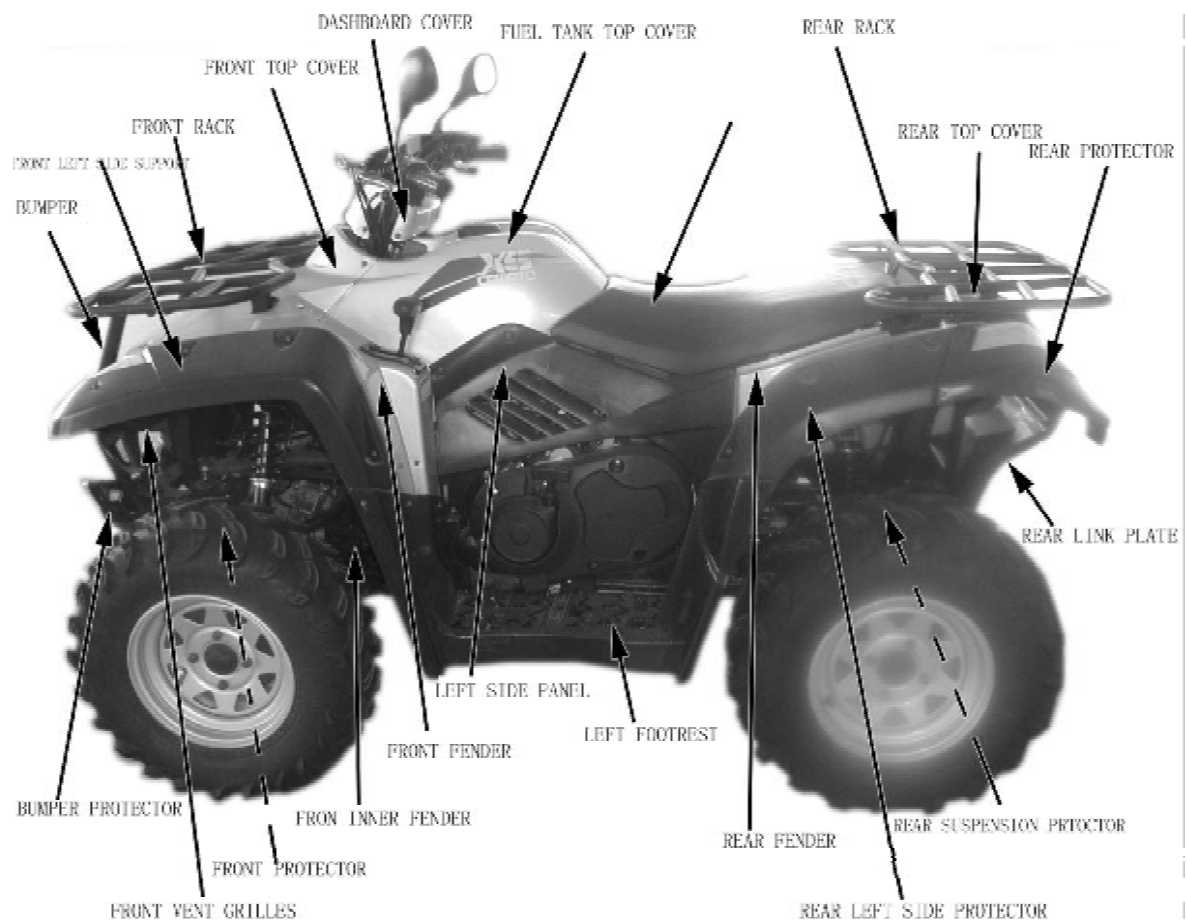
Installation:
Reverse the removal procedure for installation.

Note:
Replace sealing gasket when installing the muffler.



Visible Parts

2



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3. Checks & Adjustment

Overhaul Info.....	3-1	Cooling System.....	3-13
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		Inspection of Clutch Engagement and Lock-up.....	3-26

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	—	1400±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
High-Pressure Fuel Hose		—	—	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=Inspection and adjust, or replace if necessary

R=Replace

C=Clean

3. Checks & Adjustment

Inspection & Maintenance

○: Interval

		Item	Intervals			Standard
Part		Item	Daily	1/2 Year	Annual	
Steering System	Handlebar	Operation agility	○			
		Damage	○			
	Steering system	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				

3

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		Item	Intervals			Standard
Part		Item	Daily	1/2 Year	Annual	
Drive train	Final shaft	Looseness of joint parts	O	O		
	(Drive shaft)	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	

3. Checks & Adjustment

Part	Item	Intervals			Standard
		Daily	1/2 Year	Annual	
Lighting device and turning indicators	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.	○			

3

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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.

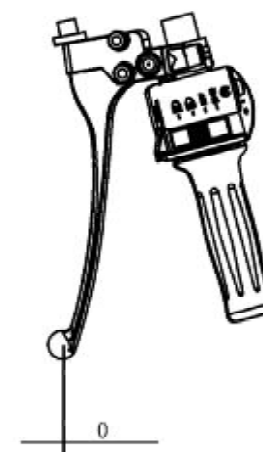
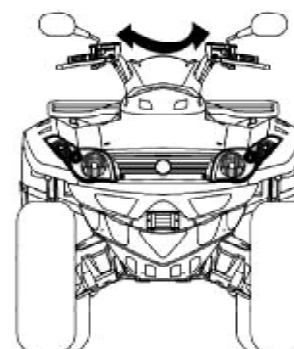
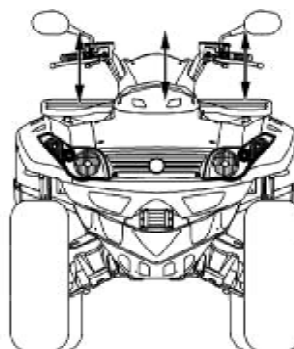
Brake system

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.

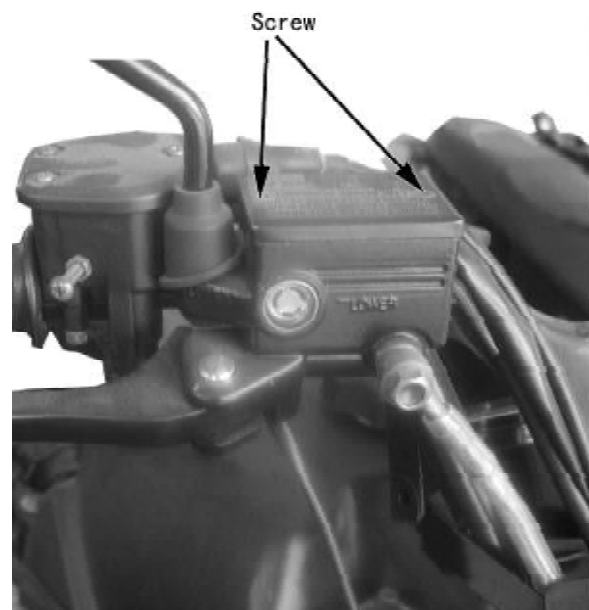
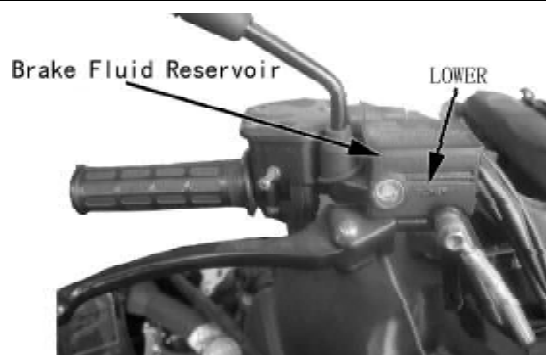
-Do not mix with dust or water when adding brake fluid.

-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.

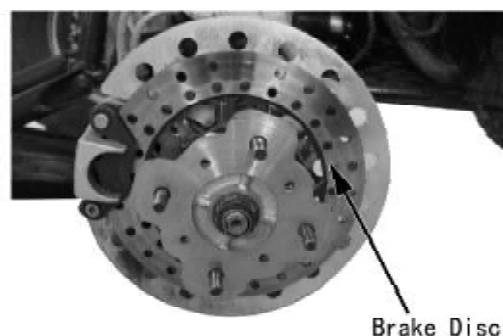
Checking and replacing the brake disc

Front brake disc thickness: ≤ 2.5 mm $\rightarrow$ Replace

Rear brake disc: ≤ 6.5 mm $\rightarrow$ Replace

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.

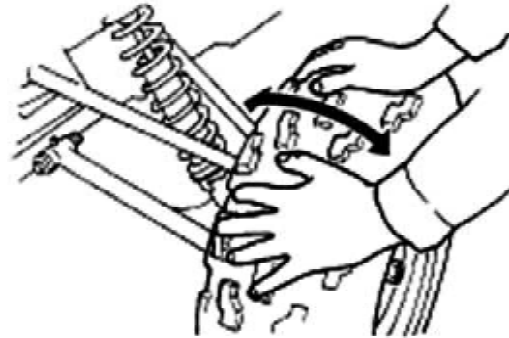
Wheels

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: → Tighten it

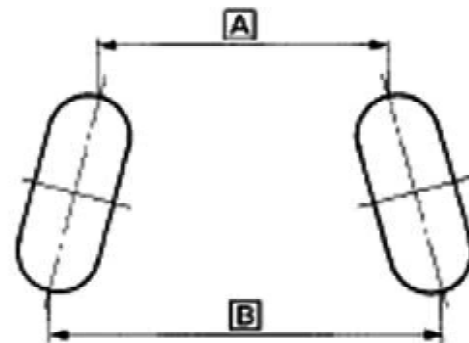
Sway: → Replace the rocker arm



Front Toe-in size

Park the vehicle on level place, measure the front toe-in

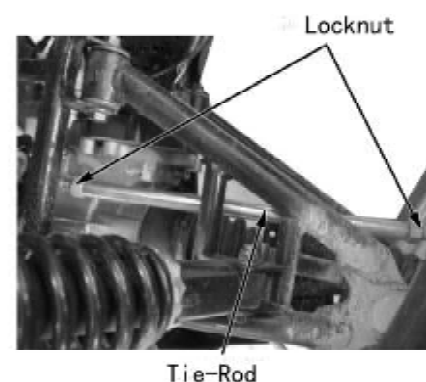
Toe-in: $B - A = 0 - 10\text{mm}$



Toe-in out of the range: → 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.



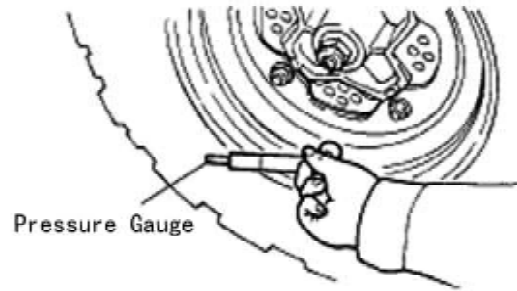
Tire Pressure

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.



3

Specified pressure /tire

	Front wheel	Rear wheel
Pressure	35kPa(.035kgf/cm ²)	30kPa(0.30kgf/cm ²)
Tire Size	AT25 × 8-12	AT25 × 10-12

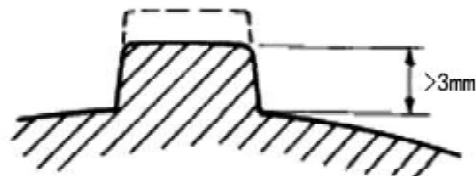
Tire Tread

Check the tire tread.

Tread Height: < 3mm → Replace 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)



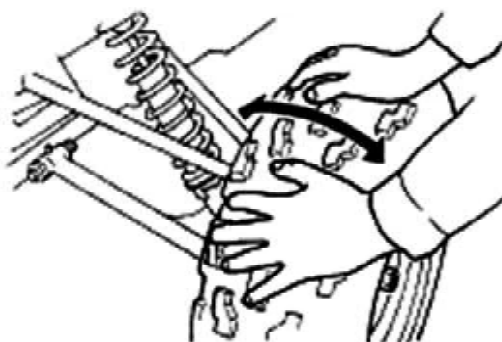
Axle Nut

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



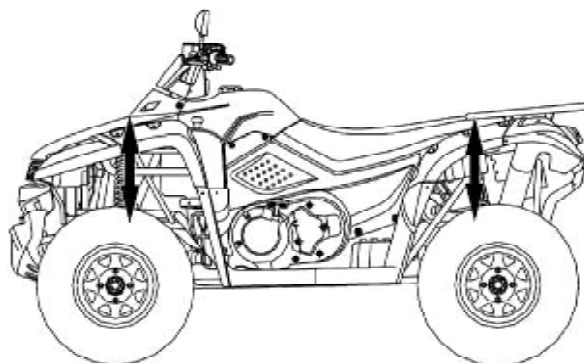
In case of any sway,

disassemble the front wheel and check the bearing

Suspension System

Park the vehicle on level 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.



3. Checks & Adjustment

Adjusting the Absorber

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

Turn clockwise to adjust from high to low



Absorber

Adjust Gear

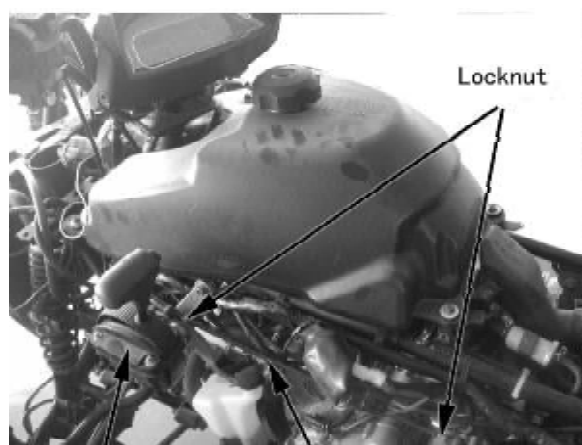
3

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



Gearshift

Gearshift Rod

Locknut

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



Fuel Pipe

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Checking the Throttle Lever

Check the free play of throttle lever

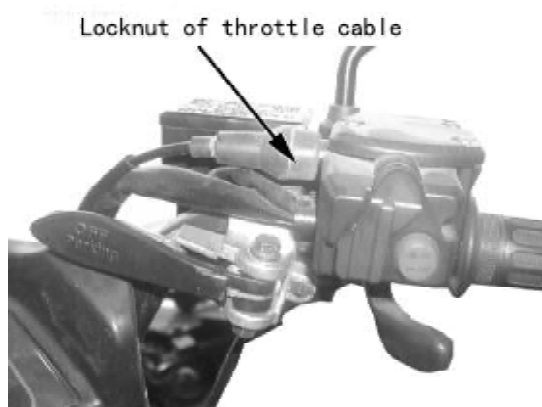
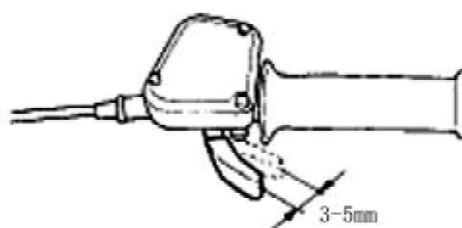
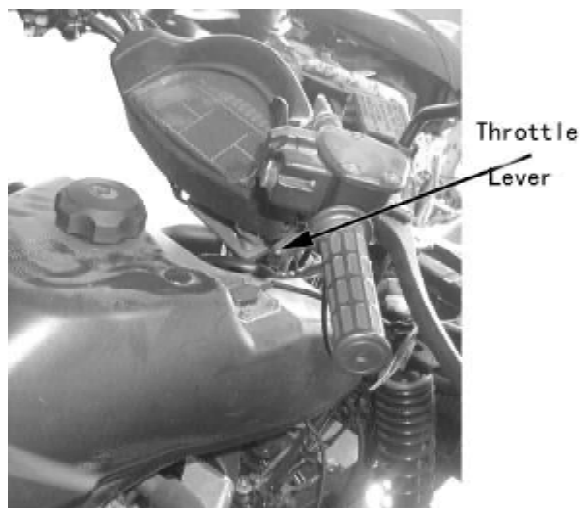
Free play: 3-5mm

Out of range: → Adjust

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

After adjusting, tighten locknuts and in-
stall 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: $a=12\text{mm}$

Adjust with a cross driver.

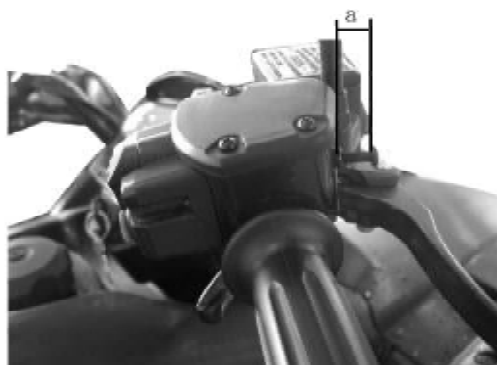
Note:

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°C), 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.

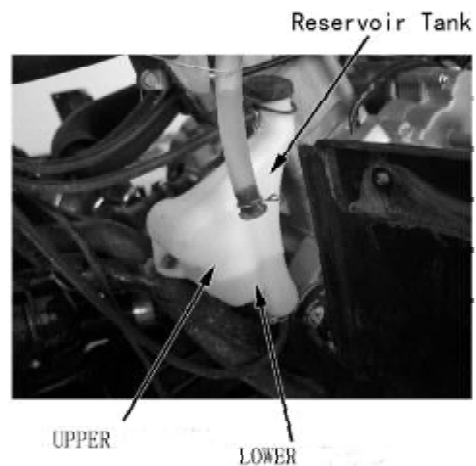
-Check the coolant after the engine is warmed up.

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.



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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).

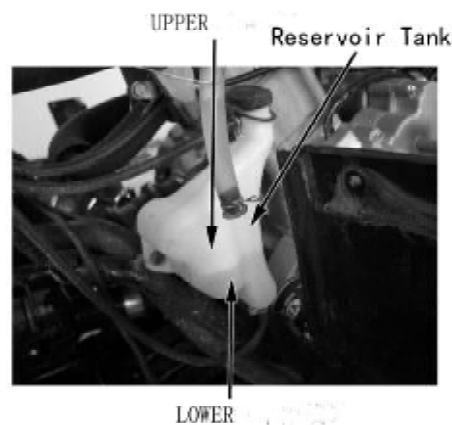
Recommended coolant: CFMOTO coolant

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.

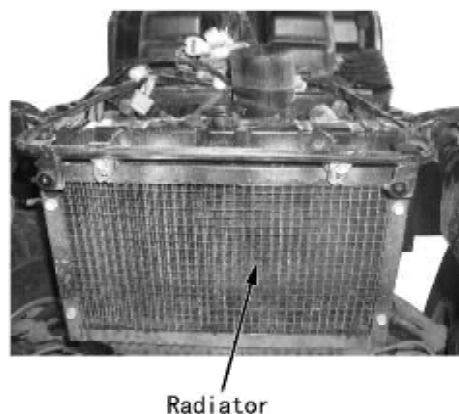
In case of any abnormal, replace with a new hose.

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 cap ① and reservoir tank cap ②.

-Place a pan below water pump, and drain coolant by removing drain plug ③ and water hose ④.

-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 hose ④ and tighten drain bolt ③ securely.

-Fill the specified coolant into the radiator.

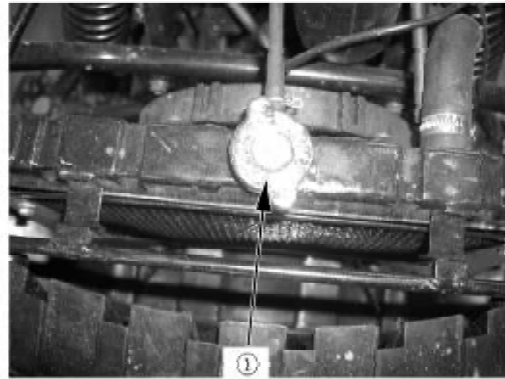
-Loosen bleed bolt ⑤ on water pump, when coolant flow from bleed bolt, tighten the bolt. Install radiator cap ① securely after filling coolant.

-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.

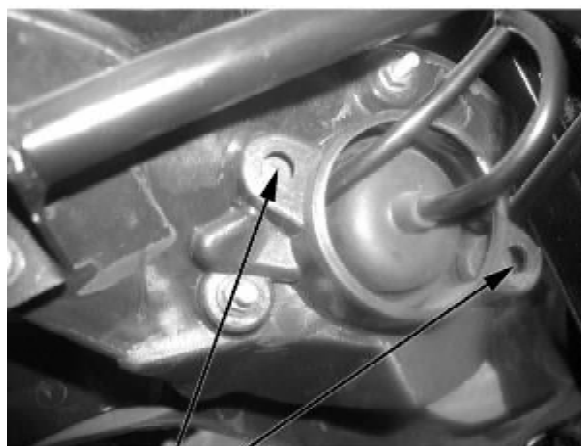


Instrument Water temperature Gauge

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 plate ①, recoil starter ②
- Remove inspection cap ③ on left crankcase.
- Remove 2 valve adjusting cover ④
- Turn the crankshaft until the line ⑤ of T. D.C. on rotor is aligned with mark ⑥ of 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)

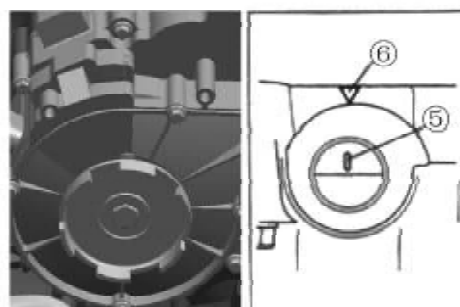
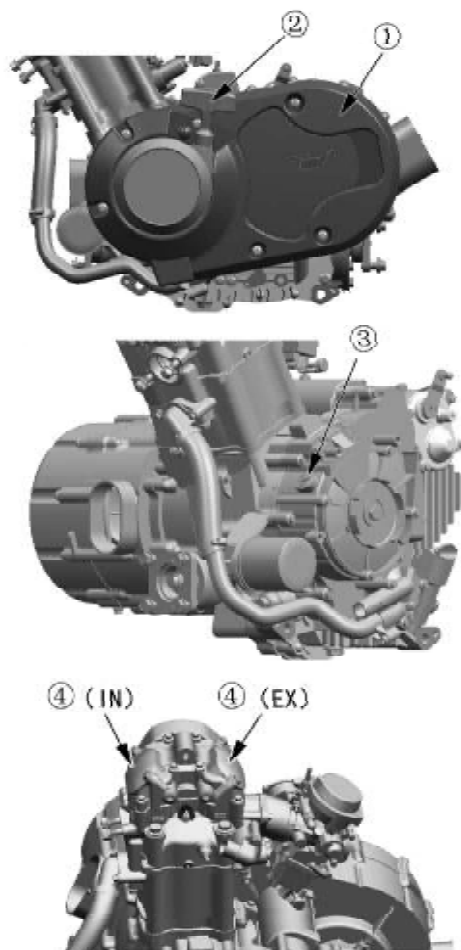
IN: 0.05-0.10mm EX: 0.17-0.22mm

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.



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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

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 1300~1500 r/min by turning the throttle stop screw of carburetor.

Engine idle speed: 1400r/min $\pm$ 100r/min

Note:

Make this adjustment when the engine is hot

Tool: Tachometer

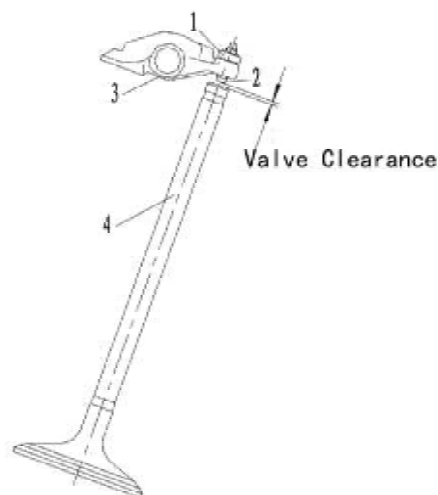
SPARK PLUG

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.



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

To: Ignition Coil



3. Checks & Adjustment

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: → 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 clamp ① and top cover ②

Note:

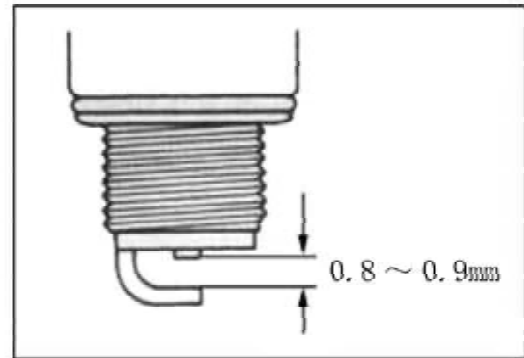
Be careful not to drop the o-ring into the air filter top box that is attached to the air filter top cover.

Loosen screw ③, remove filter element ④, separate support ⑤, filter element ⑥ and filter element seat ⑦.

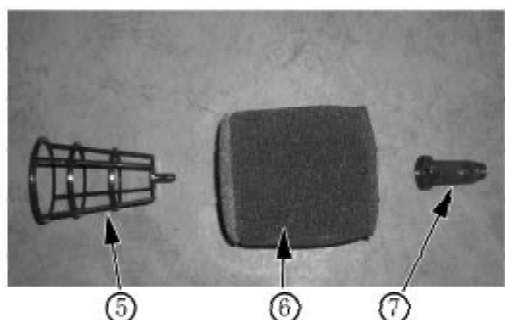
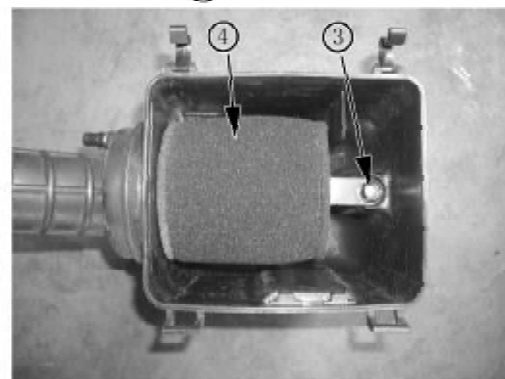
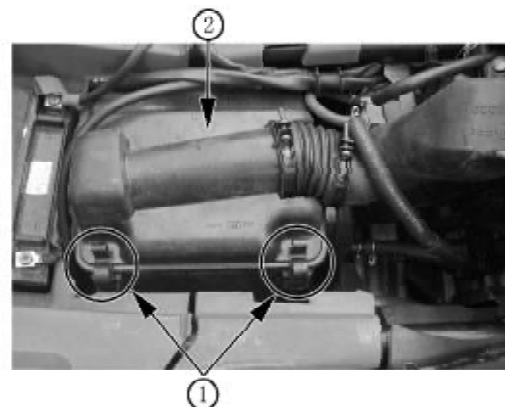
-Fill a wash pan of a proper size with a non-flammable cleaning solvent A. Immerse the filter element in cleaning solvent and wash it.

-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.



3



CFMOTO

A--Non-flammable cleaning solvent

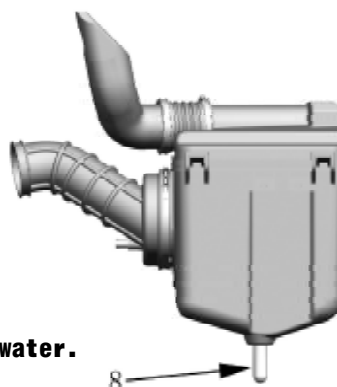
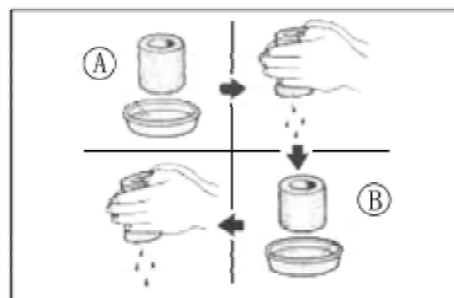
B—Engine oil SAE#30 or SAE15W/40.

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 plug ⑧ 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

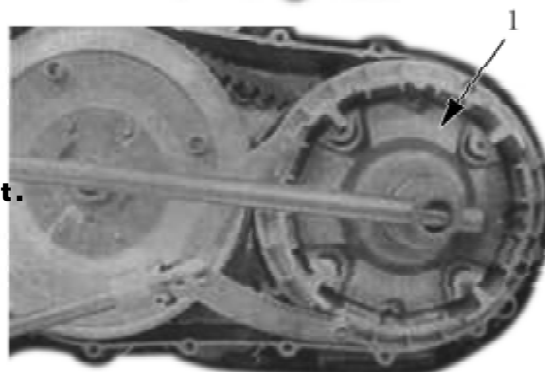
**Hold the primary sheave with special tool and
loosen primary sheave nut.**

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

Remove drive belt from secondary sheave



3.Checks & Adjustment

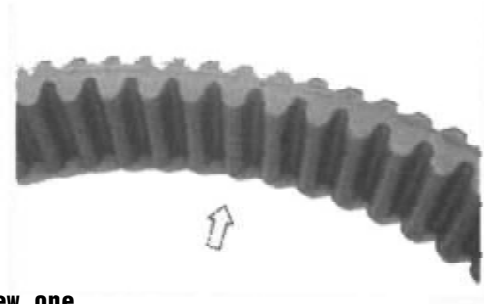
Inspection:

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



3

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.

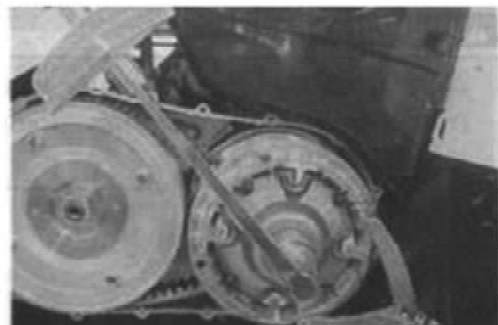
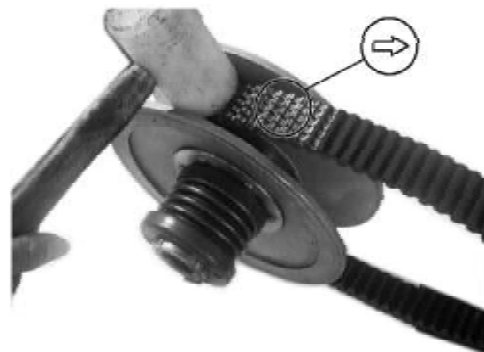
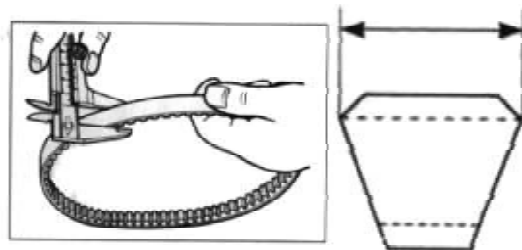
Hold secondary sheave with a special tool and
tighten the nut to the specified torque.

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: 115 N.m

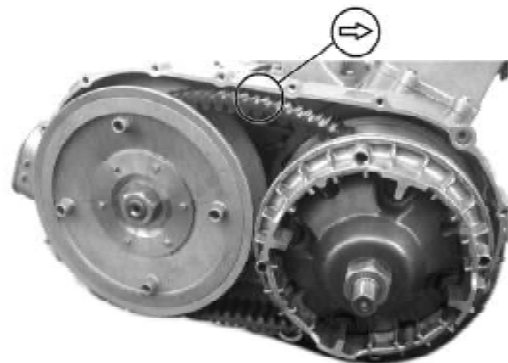
Turn primary sheave, until the drive belt is
properly seated and both the primary and
secondary sheaves rotate together smoothly
and without slipping.



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



CFMOTO

Inspection of Lubrication System

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

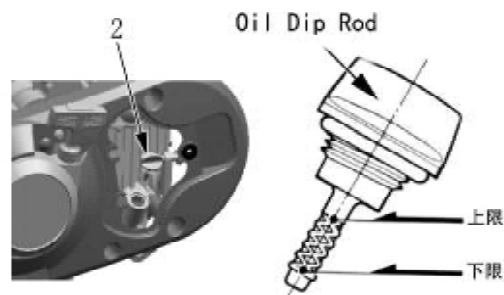
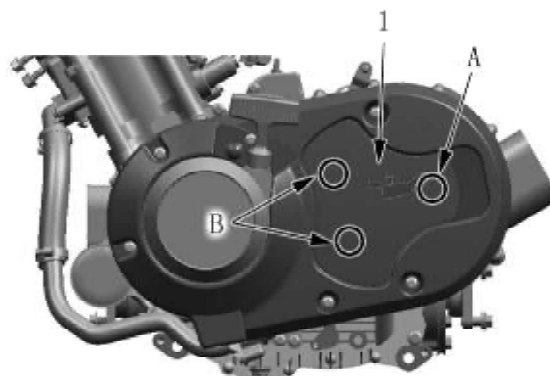
Inspect the engine oil at every 10 hours.

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

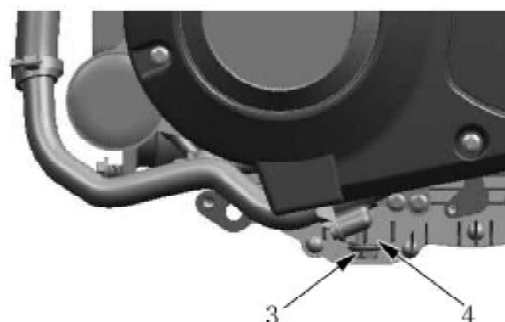


Replacing Engine Oil

- 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 filter ① 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 filter: 2.0 L

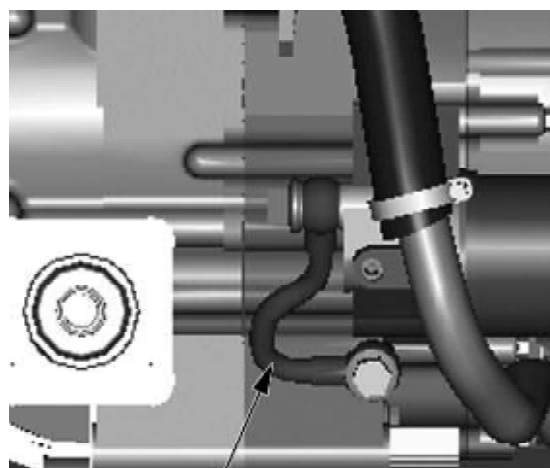
Engine overhaul: 2.2 L



Inspection of External Oil Pipe

Check external oil pipe for leakage or damage.

Leakage or Damage: → Replace



外机油管

Inspection of cylinder pressure

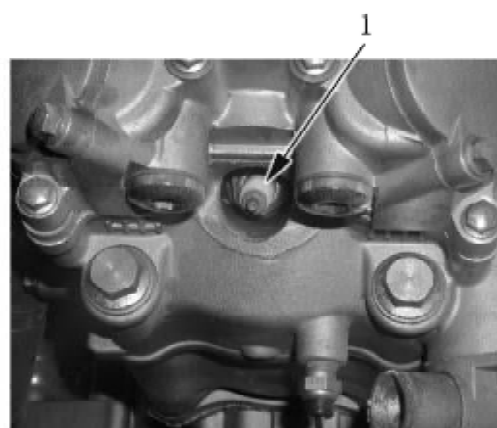
Check cylinder pressure is necessary.

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.

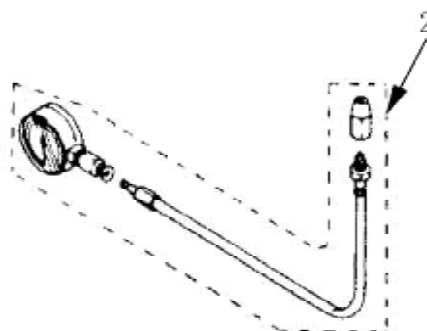


Testing Cylinder Pressure

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 bolt ①;
- Connect tachometer ② with ignition coil
- Install oil pressure gauge ③ 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

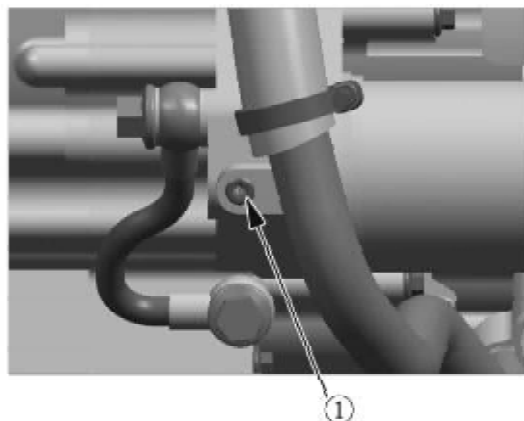
After warming up, increase engine speed to 3000r/min, and record readings of oil pressure gauge.

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

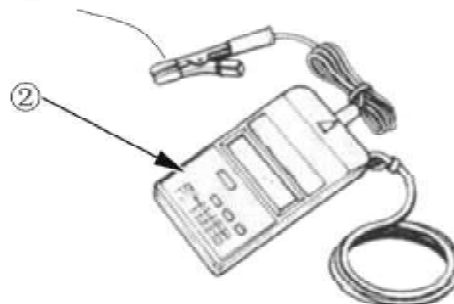
Tighten torque: 23N.m

Tools: Oil pressure gauge

Tachometer



To: Ignition Coil



Inspection of Clutch Engagement and Lock-up

CF188-B 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.

To: Ignition Coil



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 “High” 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

4 Cooling and Librication System

Overhaul Info	4-1	Radiator and water hose check and clean.....	4-9
Trouble Shooting	4-2	Cooling fan check.....	4-10
Performance Overhaul	4-3	Water temperature transducer check.....	4-11
Reservoir Tank	4-5	Water pump	4-12
Adding Coolant	4-6	Water pump check	4-14
Cooling system chart	4-7	Water pump assembly and installation.....	4-15
Engine Coolant	4-8	Lubrication system chart	4-19

Overhaul Info

Caution:

- If the radiator cap is opened when the coolant temperature is above 100 °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, thoroughly wash your eyes with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, vomit immediately and see a physician.
- 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 be 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/cm ²)
Thermostat	Valve open temperature	71 ± 3°C
	Full open lift	under 95°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

4 Cooling and Lubrication System

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.

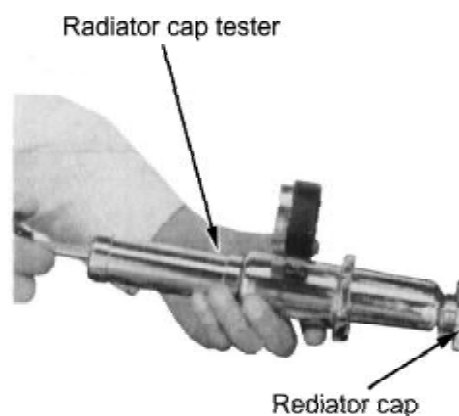
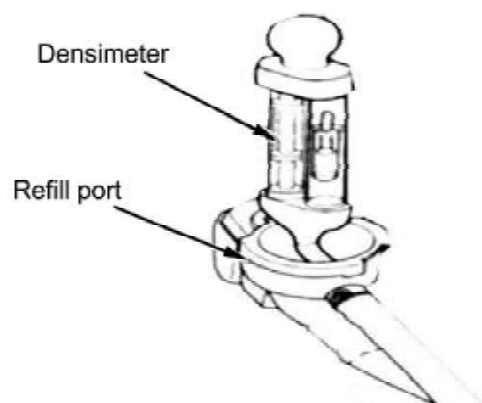
Opening pressure of radiator cap:

108kPa (1.1 kgf/cm²)



Radiator cap

4



CFMOTO

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/cm²)],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)



Densimeter

Radiator cap

Replacing Coolant,Air Discharge**Preparation of coolant****Caution:**

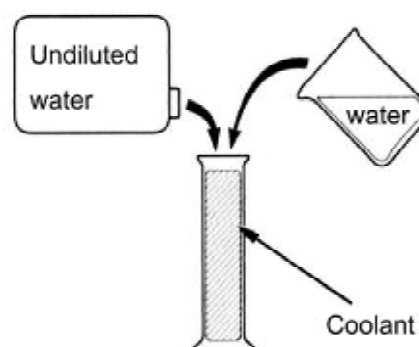
Coolant is poisonous,DO NOT drink or splash it to skin,eyes and clothes

-If coolant splashed in your eyes,thoroughly 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°C 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)



Radiator cap

Drainage of coolant

Remove the radiator cap

Caution

Open the radiator cap after the coolant is cooled down.

Remove:

-Front top cover(→ 2-8)

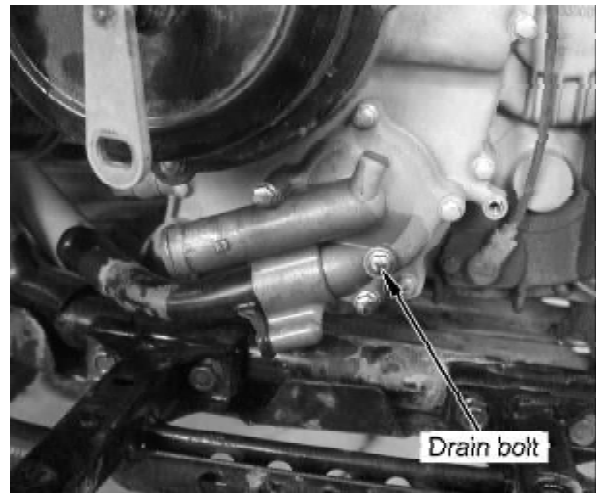
-Radiator Cap(→ 4-3)

4 Cooling and Librication System

Remove drain bolt

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

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



4

Reservoir Tank

Remove:

- Seat(→ 2-3)**
- Left Side Cover(→ 2-6)**
- Two bolts of reservoir tank**
- Water hoses of reservoir tank**

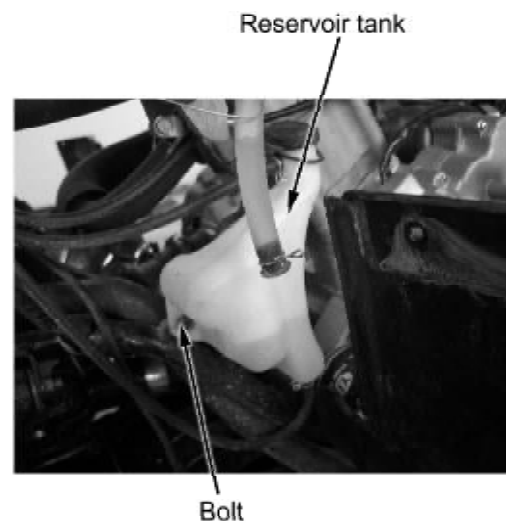
Remove reservoir tank

Drain collant of reservoir tank

Wash clean the reservoir tank

Install:

- reservoir tank**
- water hoses of reservoir tank**

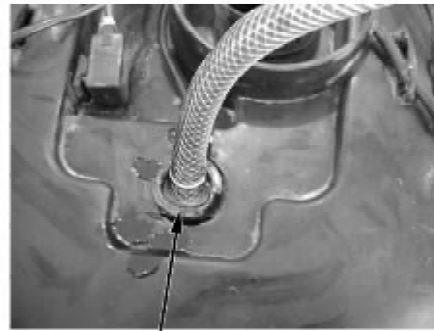


Adding Coolant

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 tank cap and add coolant till the upper limit



Refill port

Caution:

Check 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

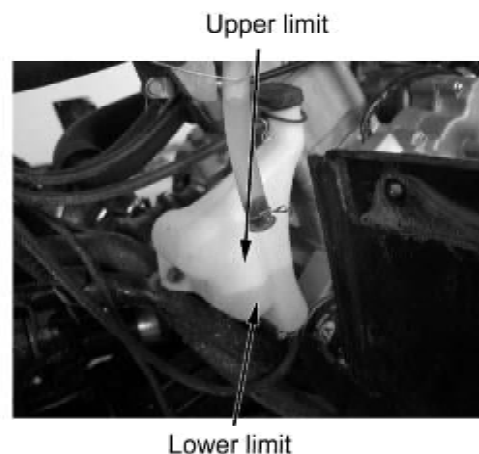
2.Start the engine and run it several minutes at idle speed

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

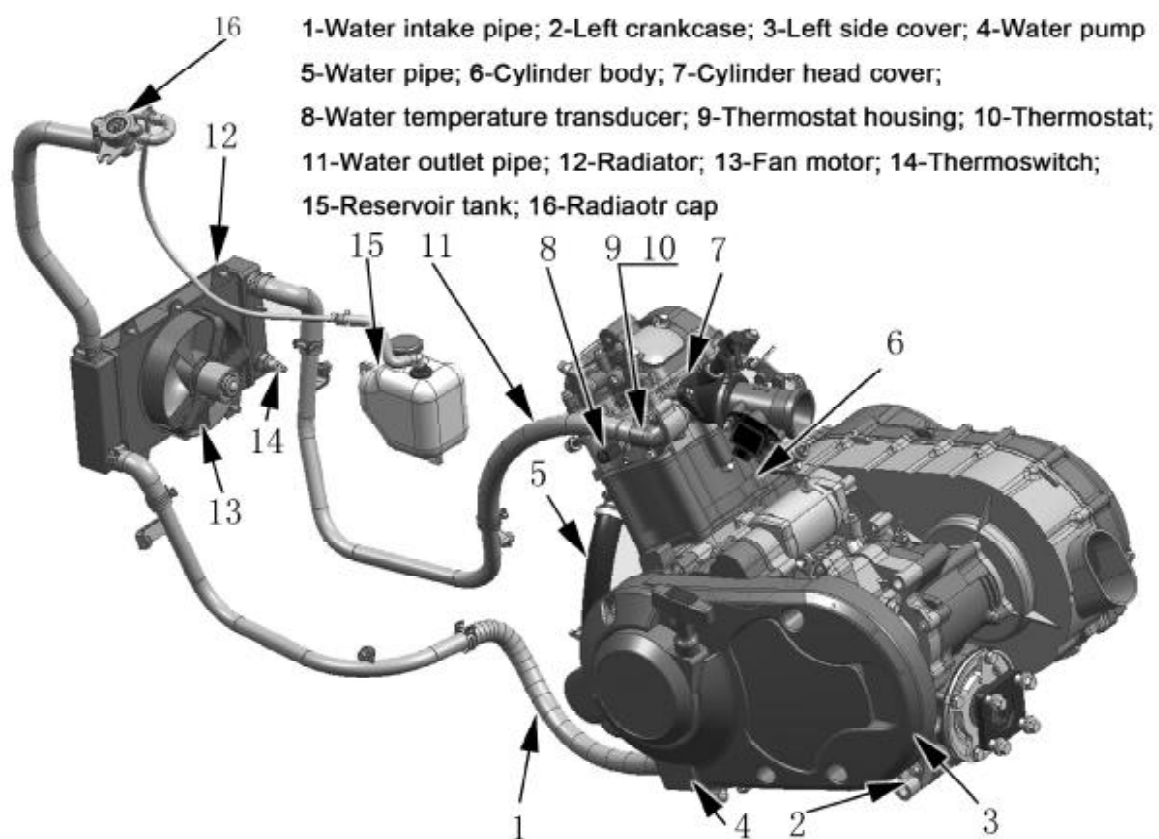
6.Check coolant level in reservoir tank and refill till upper limit,install reservoir tank cap



Lower limit

4 Cooling and Lubrication System

Cooling System



△ 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 resistance and fine heat protection. The coolant will protect the cooling system from freezing at temperature above -30°C , the mixing ratio of coolant should be increased to 55% or 60% according to the figure on the right.

Note:

- Use high quality ethylene glycol base antifreeze and mixed with distilled water. Never mix alcohol base antifreeze and different brands of antifreeze
- The ratio 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 cap ① and connect tester
- ② filler

Warning!

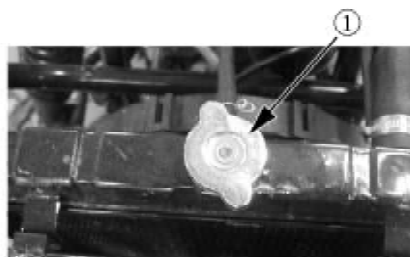
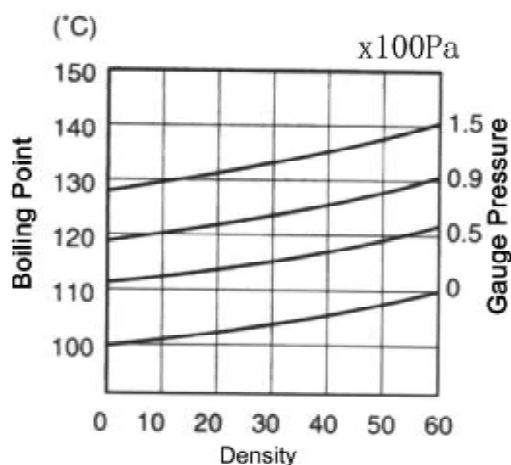
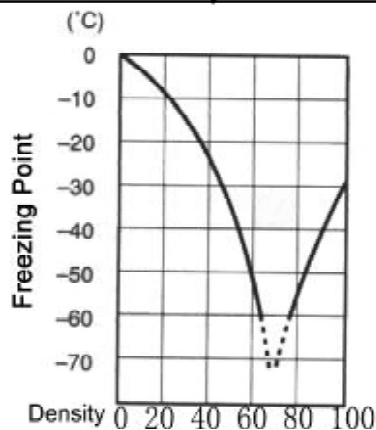
DO NOT open the radiator when the engine is still hot

- 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 leakage 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

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

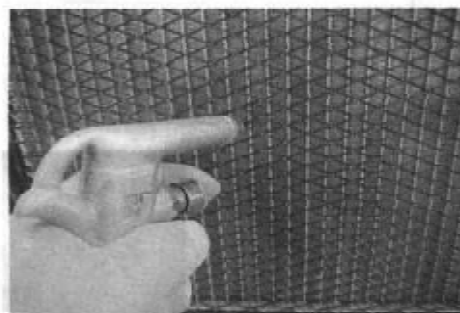


4 Cooling and Lubrication System

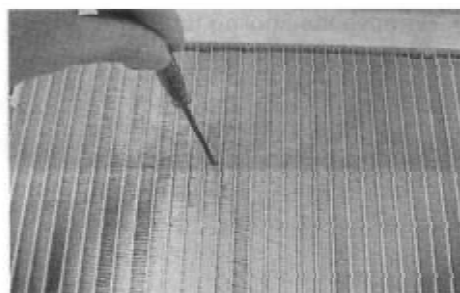
△ Inspection and Cleaning of Radiator and Water Hoses

Radiator Cap

- Remove radiator cap ①
- Install radiator cap to cap tester ②
- 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, replace 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 leaked 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

Inspection of Thermoswitch

- Remove thermoswitch
- Check the thermoswitch for closing or opening by testing it at the bench as illustrated. Connect the thermoswitch ① to 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:

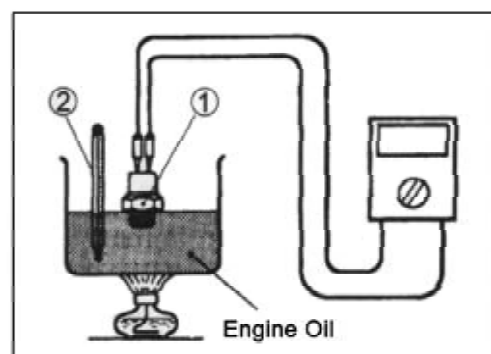
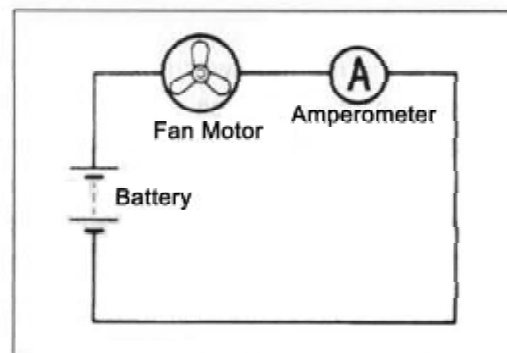
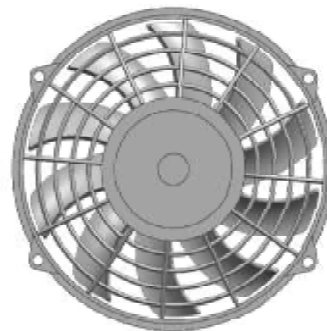
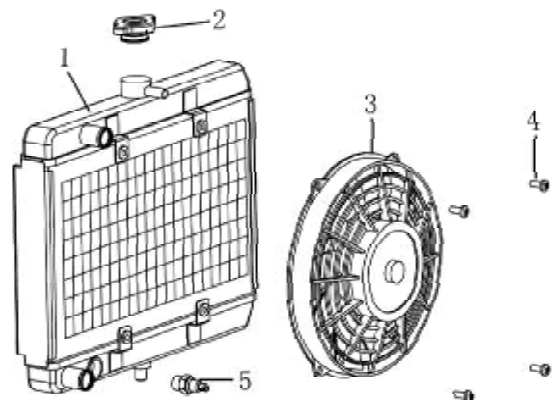
Standard: (OFF-ON): Approx. 88℃

(ON-OFF): Approx. 82℃

Note:

- Avoid sharp impact on thermoswitch
- Avoid contact of thermoswitch with thermometer or vessel
- Installation: Use a new O-ring ③ and tighten the thermoswitch to the specified torque:
Thermoswitch Tightening Torque: 17N.m
- Check coolant level after installation of thermoswitch. Fill coolant if necessary.

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



4 Cooling and Lubrication System

△ Inspection of Water Temperature Sensor

- Place a rag under water temperature sensor ① and remove it from cylinder head

- Check the resistance of water temperature sensor as illustrated on the right. Connect the temperature sensor ② 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 ohmmeter ④ and thermometer ③.

B Resistance and Water Temperature

Temperature (°C)	50	80	100
Resistance (Ω)	154 ± 16	52 ± 4	27 ± 3

A, C Resistance and Water Temperature

Temperature (°C)	-20	25	80	110
Resistance (kΩ)	13.71-16.94	1.825-2.155	0.303-0.325	0.1383-0.1451

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

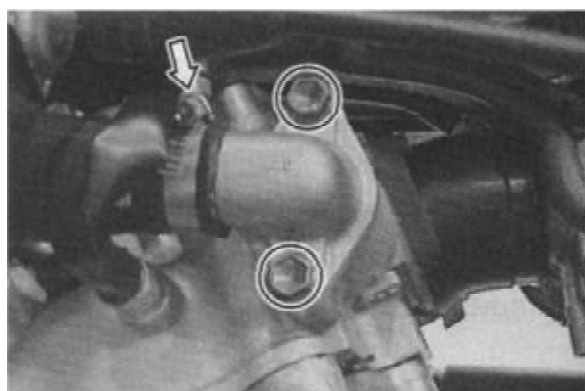
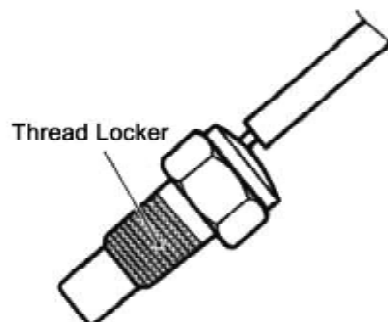
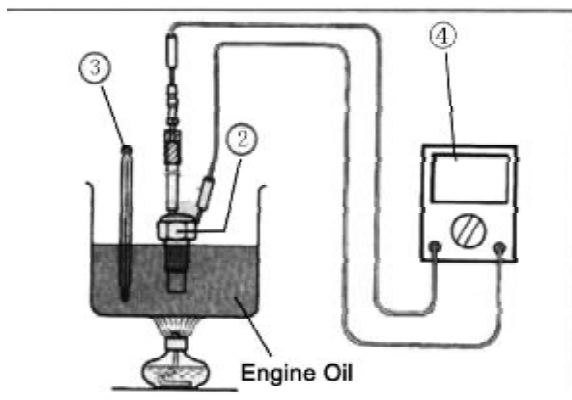
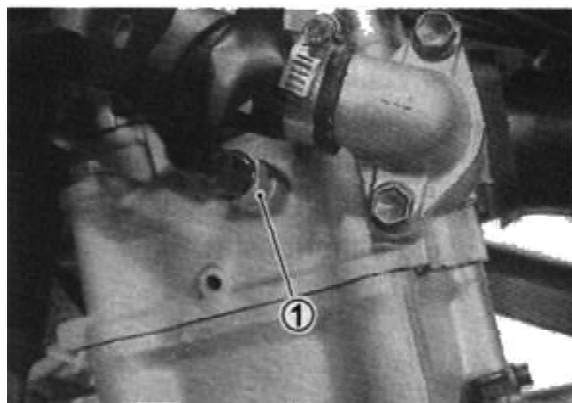
Water Temperature Sensor Tightening Torque: 10N.m

Note:

- Avoid sharp impact on temperature 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. If necessary, replace it.

● 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:

$71 \pm 3^{\circ}\text{C}$

Tool: Thermometer

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

Lift standard of thermostat valve:

water temperature 95°C , lift standard is 3.5-4.5mm

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

● Install 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: $10\text{N} \cdot \text{m}$

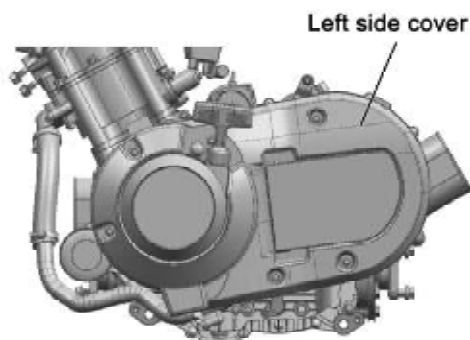
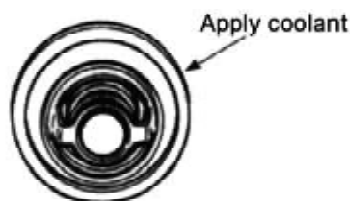
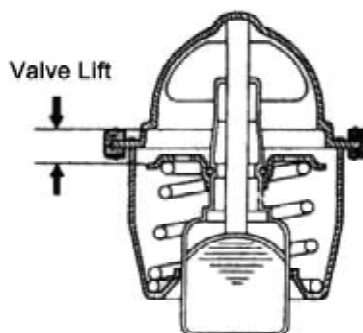
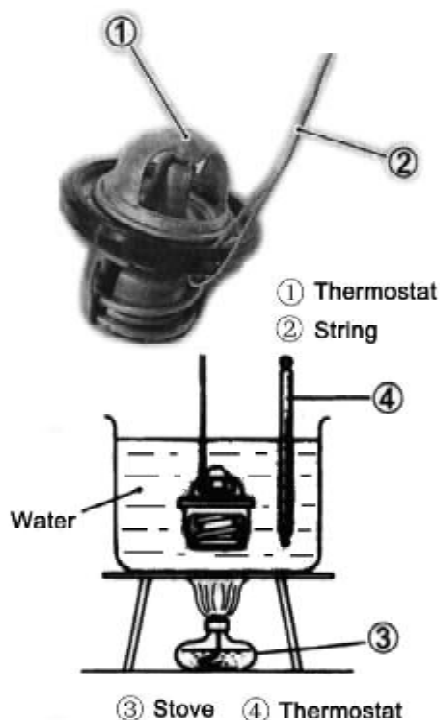
△ Water Pump

Removal and Disassembly

● Remove engine left side cover

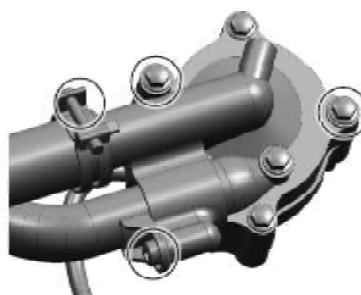
● Drain coolant

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



4 Cooling and Lubrication System

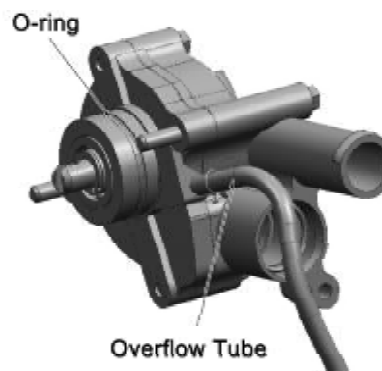
- Remove clamps and water hoses



- Release bolts and remove water pump

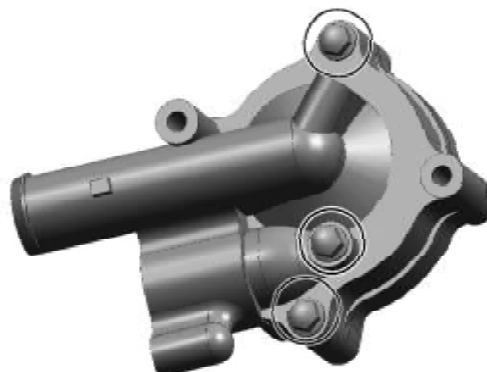
- Remove O-ring

Note: Do not reuse the O-ring



- Remove the overflow tube

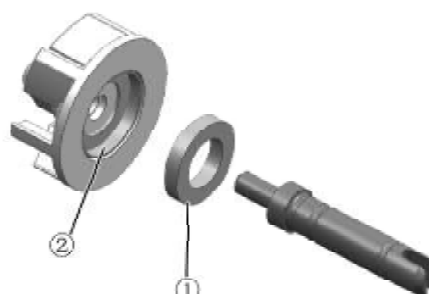
- Release water pump cover screws, water pump cover and gasket



- Remove ring and impeller



- Remove seal ring ① and rubber seal ②



● 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 mechanical seal

● Put a rag on the water pump body

● Remove 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

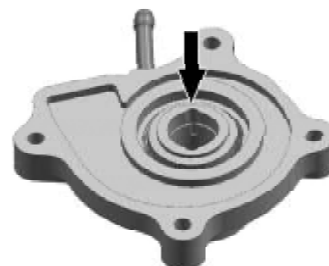
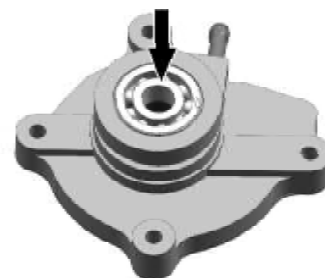
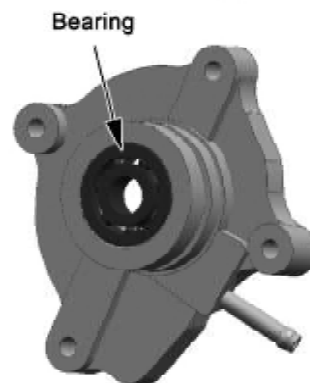
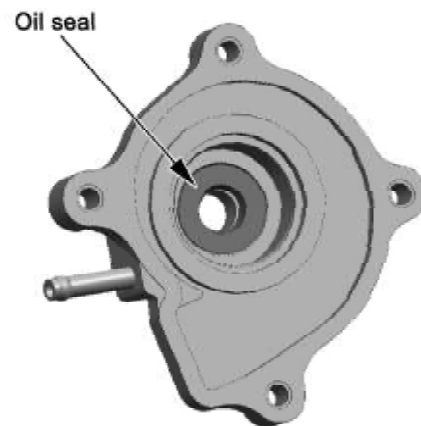
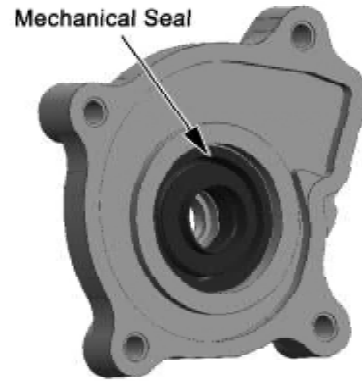
Inspection of Water Pump

☆ 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 necessary, also replace the seal ring.



4 Cooling and Lubrication System

☆ Oil Seal

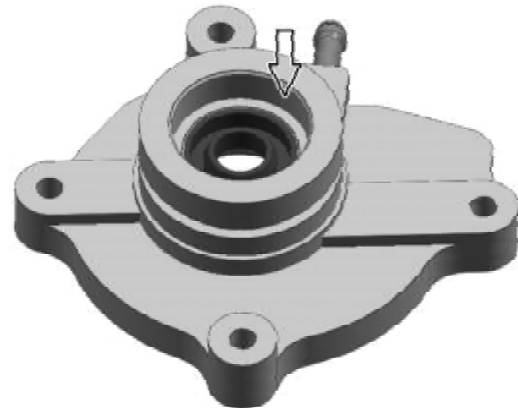
● Check oil seal for damaged. Pay attention to the oil seal lip.

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



☆ Water Pump Body

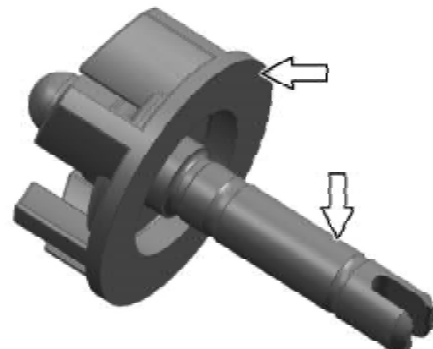
● Check the mating face of water pump body with bearing and mechanical seal. If damage, replace it



☆ Water Pump Impeller

● Check the impeller and shaft for damage.

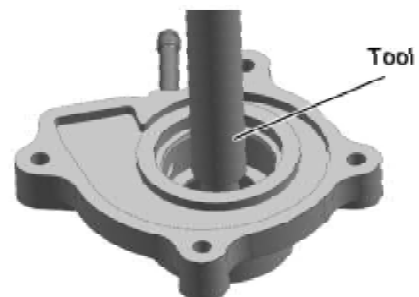
● If the impeller or shaft are damaged, replace a new part



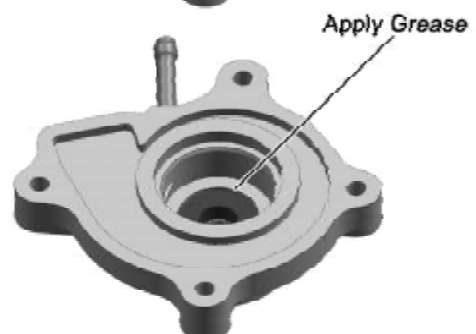
Assembly and Installation of Water Pump

● 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.

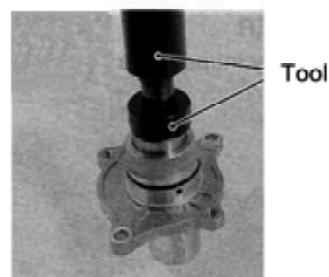
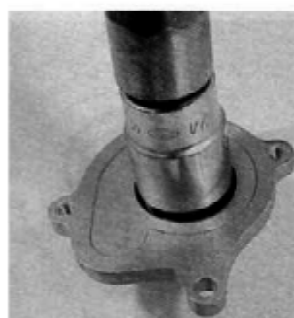
Note: Apply sealant to side “A” of mechanical seal



- Install bearing with special tool

Tool: Bearing Installer

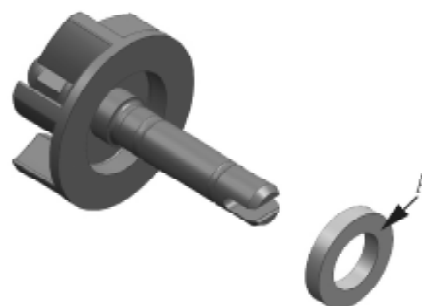
Note: The stamped mark on the bearing faces outside.



- Install seal ring to impeller

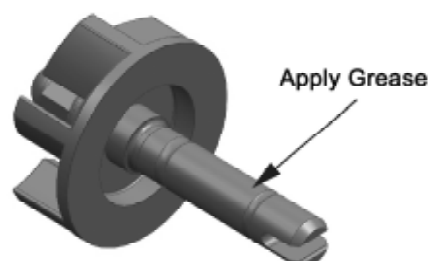
- Clean off the oil and grease from mechanical seal and install into the impeller

Note: “A” side of mechanical seal faces impeller



- Apply grease to impeller shaft

- Install impeller shaft to water pump body



4 Cooling and Lubrication System

- Install ring to water pump shaft

- Install new gasket to water pump body



4

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

Water Pump Cover Bolts Tightening
Torque: 6N · m

- Check impeller for smooth turning

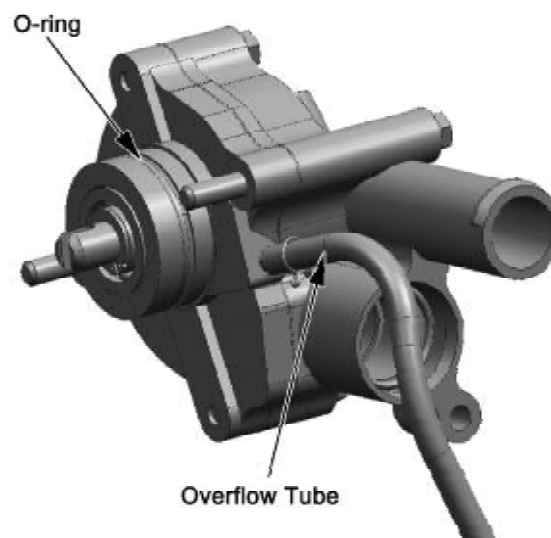


- Install the new O-ring

Note:

- Use the new O-ring to prevent leakage
- Apply grease to O-ring

- Install the overflow tubes

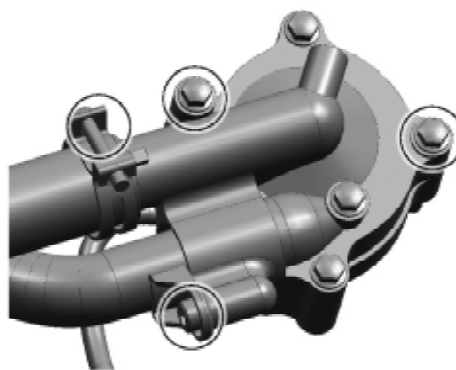


CFMOTO

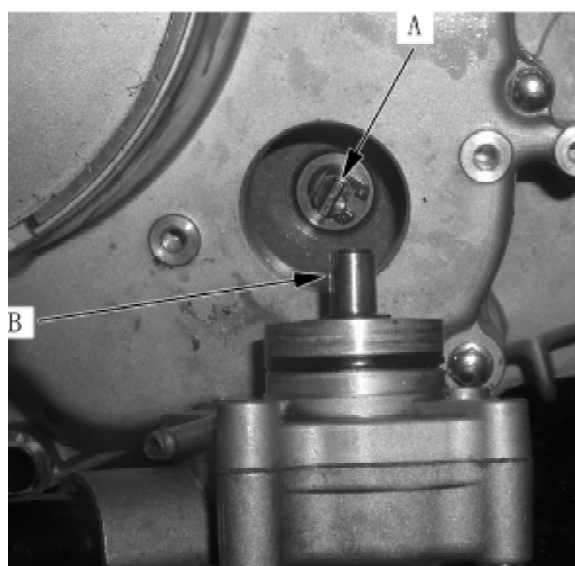
- Install water pump and tighten the bolts to the specified torque

Water pump bolts tightening torque:

10N·m



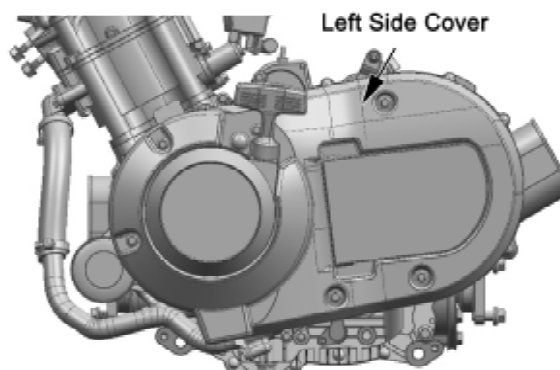
Note: Set the water pump shaft slot end “B” to oil pump shaft flat side “A”.



- Connect water hoses

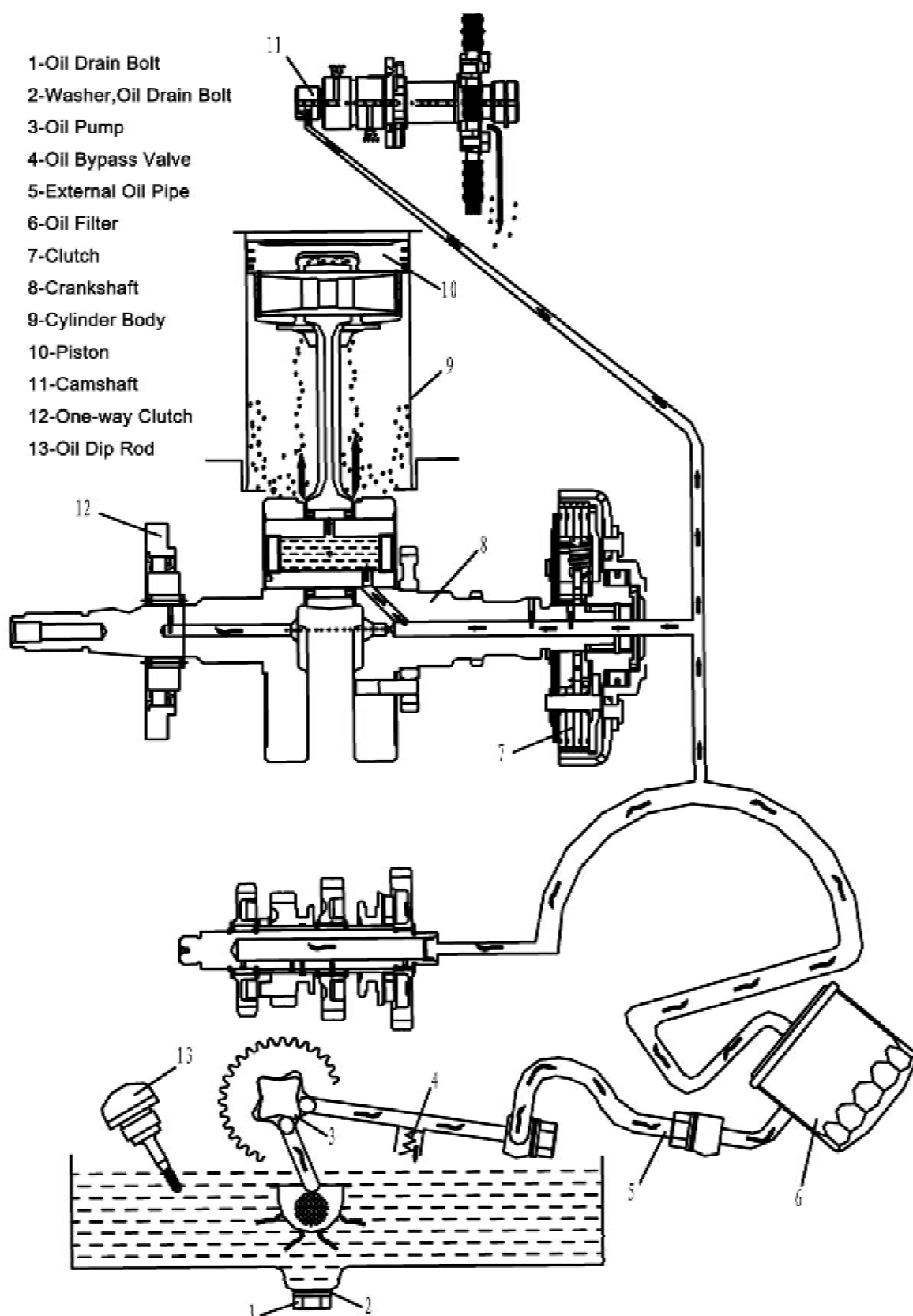
- Add coolant

- Install left side cover



4 Cooling and Librication Svstem

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.

Inspection of Lubrication system (→ 3-22)

Inspection of engine oil pump and limit pressure valve (→6-41)

5 Removal and Installation of Engine, Drive Train and Gearshift Unit

Overhaul Info.....	5-1	Removal and Installation of Front and Rear Alex	5-5
Engine Removal and Installation.....	5-2	Removal and Installation of Gearshift Unit.....	5-7

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 any 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



Water Inlet hose,Engine

Clamp

Remove screw

Remove gearshift rod



Gear shaft Rod

Screw

Remove clamp

Remove water outlet hose



Water Outlet Hose,Engine

Clamp

Remove Sleeve.

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

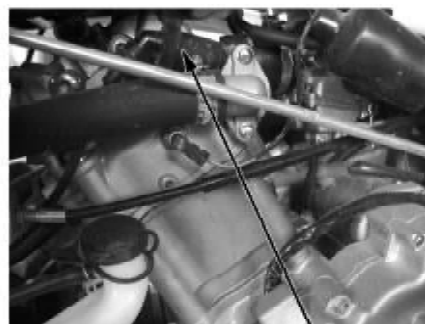


Sleeve

connectors

5 Removal and Installation of Engine, Drive Train and Gearshift Unit

Remove spark plug cap from cylinder

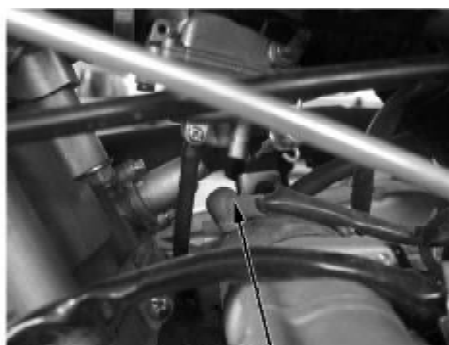


Spark Plug cap

Remove protection sleeve of starter relay.

Remove Nut.

Disconnect positive wire of starter relay.



Positive Wire, Starting Motor

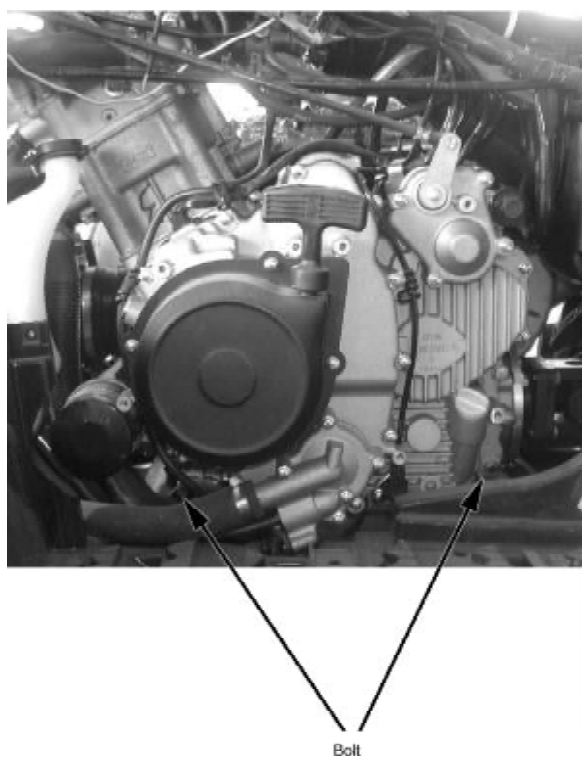
Remove nut.

Remove negative wire of starter relay.



Negative Wire, Starting Motor

Removal Bolt(4 units) of Engine.



5 Removal and Installation of Engine, Drive Train and Gearshift Unit

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:

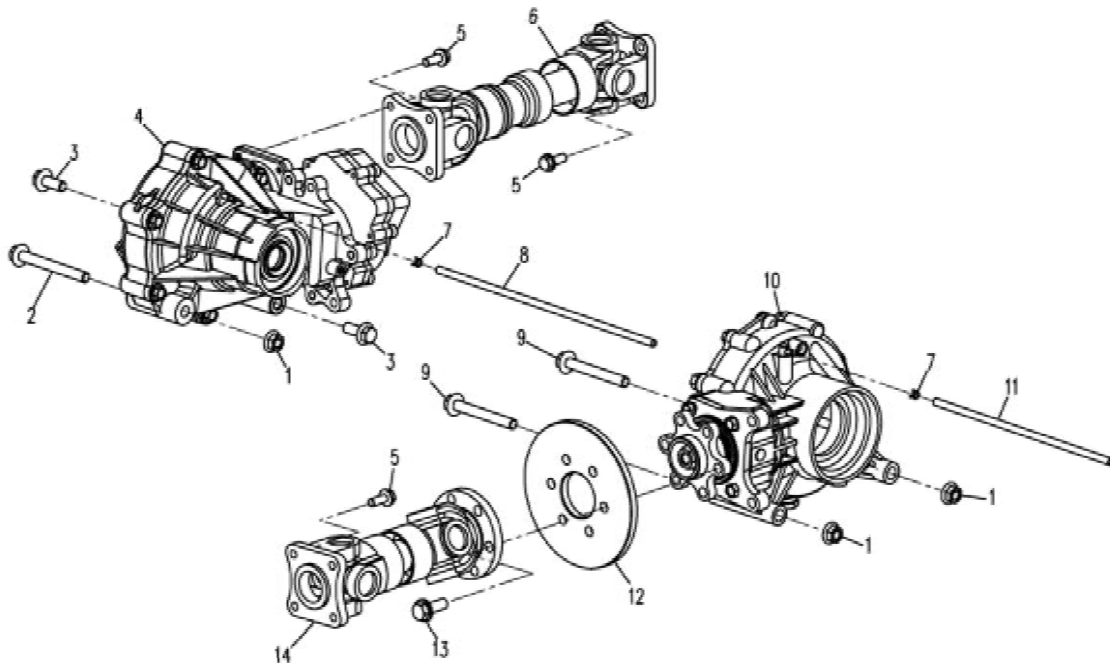
Plastic parts for frame(→ Chapter 2)

Front and rear wheels and arms (→ Chapter 8)

Air filter (→ Chapter 7)

Carburetor (→ Chapter 7)

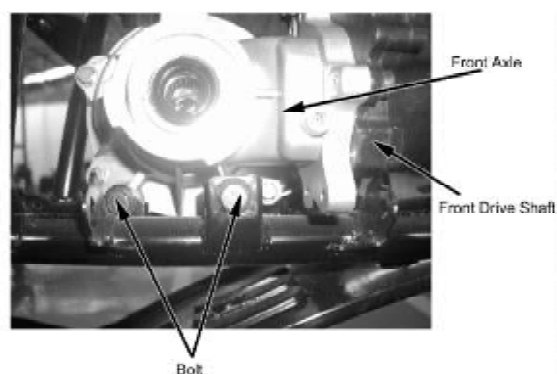
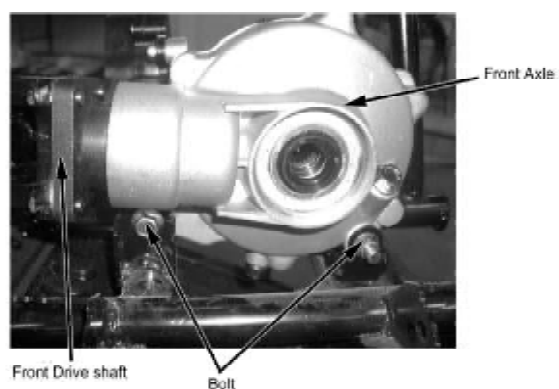
Engine



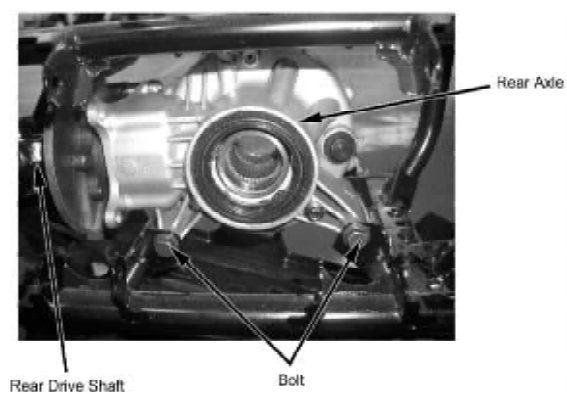
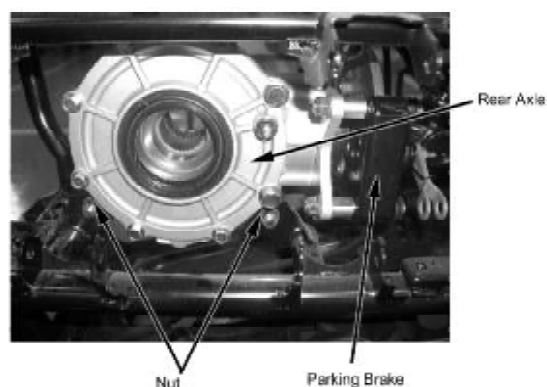
1. Nut 2. Bolt 1 3. Bolt 2 4. Front Axle 5. Bolt 3 6. Front Drive Shaft

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.



5 Removal and Installation of Engine, Drive Train and Gearshift Unit

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

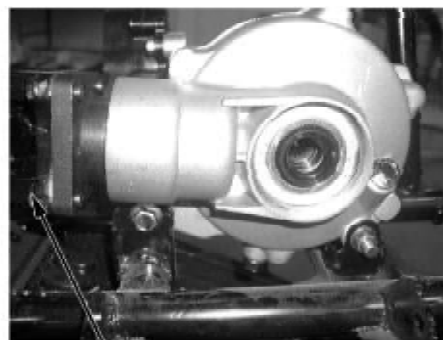
Reverse the removal procedure for installation

Tightening torque:

Bolt, front axle: 40-50N·m

Bolt, rear axle: 40-50N·m

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



Bolt



Gear Shift Rod

Screw

Gearshift Unit

Remove

left and right side panel (→ 2-6)

Fuel tank top cover (→ 2-8)

Front fender (→ 2-8)

Bolt 1

Gearshift rod



Gear Shift Unit

Remove the 3 bolts

Remove gearshift unit

Bolt



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

6 Engine Removal, Inspection and Installation

△Engine Removal/Installation Orders and the Relative Page Numbers

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

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

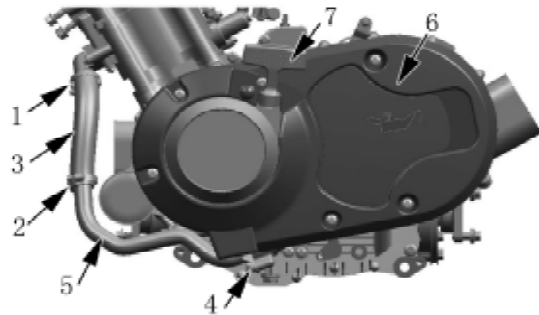
I Engine Removal

△ 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 clamp ①、②, Remove water hose ③
- Remove screw ④ and water hose ⑤

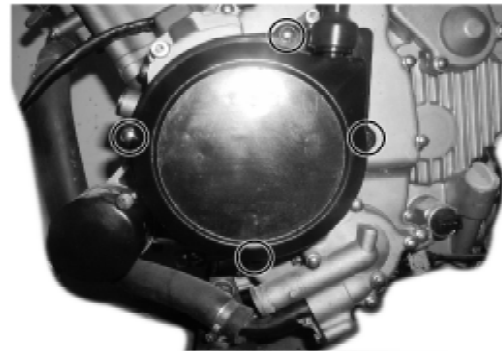


Left Side Cover

- Remove 6 bolts(M6X20) of left side cover ⑥
- (M6 × 20), Remove left side cover ⑥

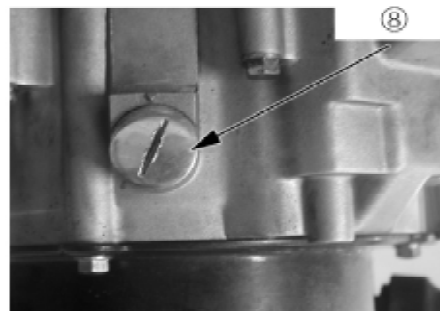
Recoil Starter

- Remove 4 bolts (M6 × 12) of recoil starter
- Remove recoil starter ⑦



Inspection Plug

- Remove inspection plug ⑧ with screwdriver

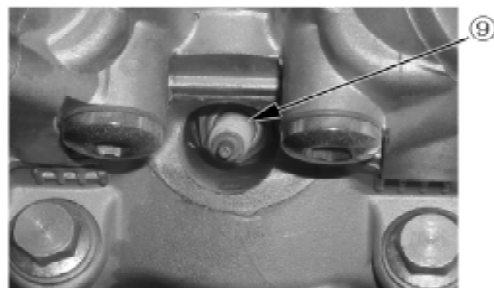


△ Engine Front Side

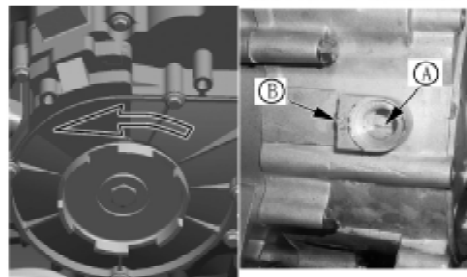
Spark Plug

- Remove spark plug ⑨ with special wrench

Tool: Spark Plug Wrench



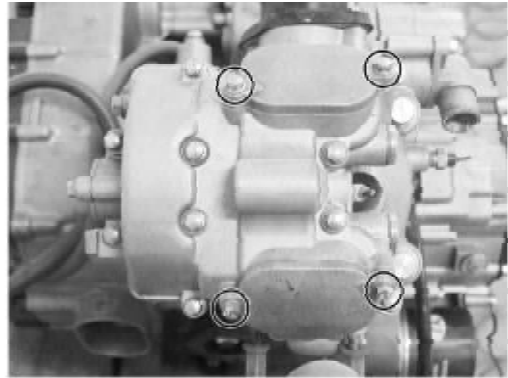
- Turn crankshaft, align T.D.C. line A on magneto rotor with mark B of left crankcase
(piston on T.D.C)



6 Engine Removal, Inspection & Installation

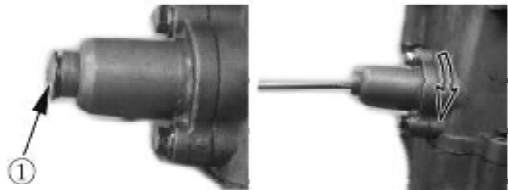
Cylinder Head Cover

- Remove valve adjusting cover
- Remove 12 bolts of cylinder head cover
- Remove cylinder head cover



Timing Chain Tensioner

- Remove screw plug ①, insert a flat screwdriver 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;

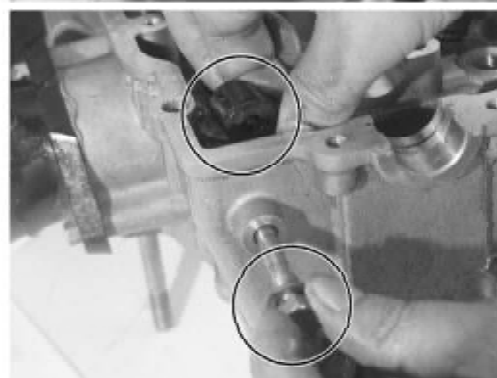


- Remove C-ring①
- Remove timing sprocket from camshaft, remove camshaft

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

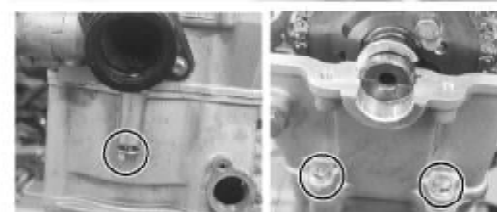


- Remove tensioner plate



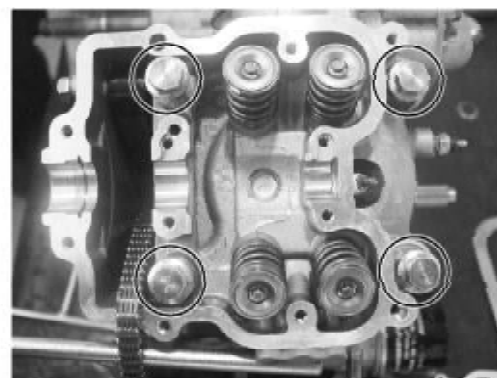
Cylinder Head

- 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



6 Engine Removal, Inspection & Installation

- Remove cylinder bolt
- Remove cylinder

Note: Take care not to drop dowel pin into crankcase

- Remove dowel pin and cylinder gasket

Note: When performing above removal process, be sure to hook up timing chain to prevent it from falling into crankcase

Piston

- Remove piston pin circlip ① with long nosed pliers

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

- Remove piston pin ② and piston ③

Note:

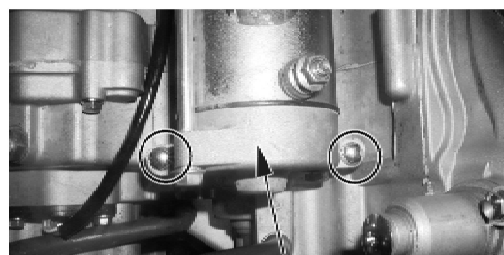
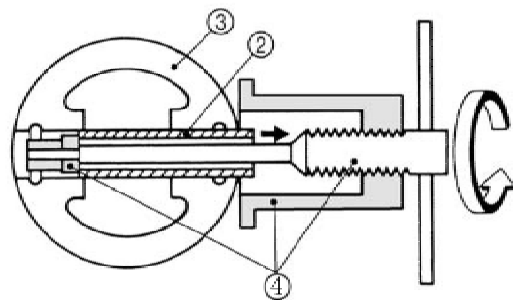
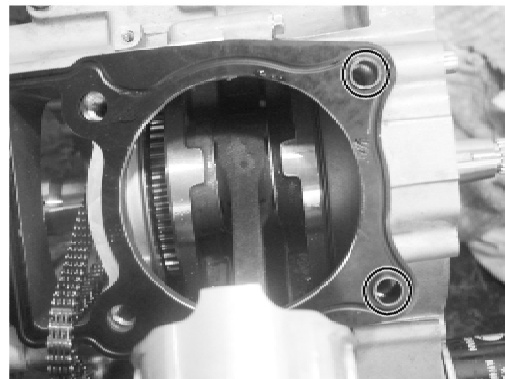
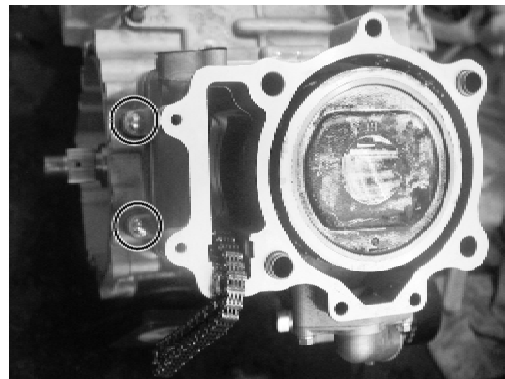
- When installing piston, make sure its identification conforms to that of cylinder
- When removing piston pin, clean off burrs of piston pin hole and groove. If it is difficult to remove the piston, DO NOT hammer, use a special remover ④

Tool: Piston Pin Remover

△ Engine Left Side

Starting Motor

- Remove 2 bolts of starting motor
- Remove starting motor

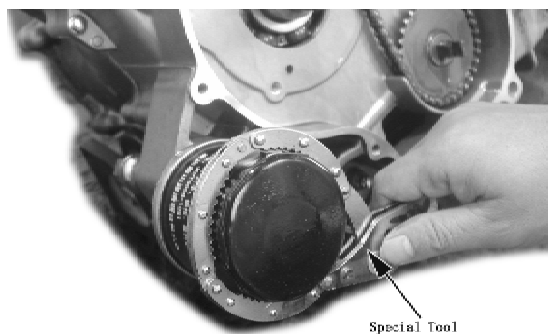


Starting Motor

Oil Filter

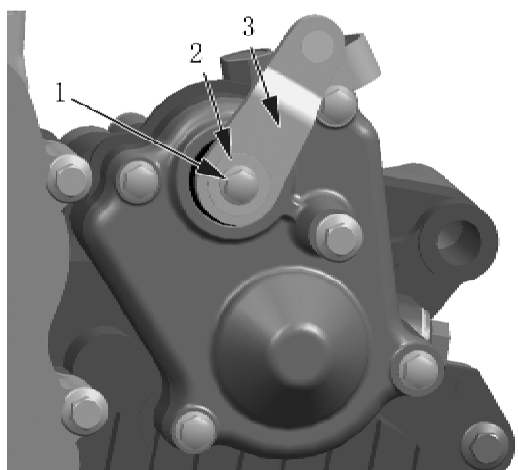
- Remove oil filter with special tools

Tool: Oil filter Remover

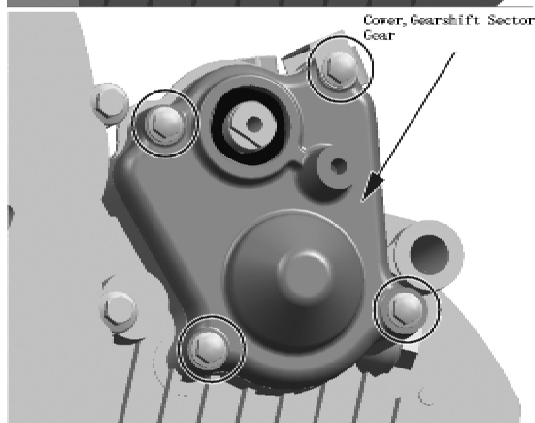


Sector Gear

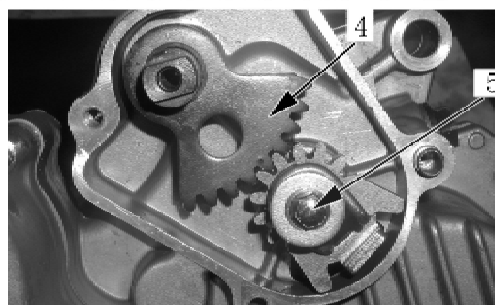
- Remove bolt 1 of gearshift rocker arm
- Remove gasket 2 and gearshift rocker arm 3



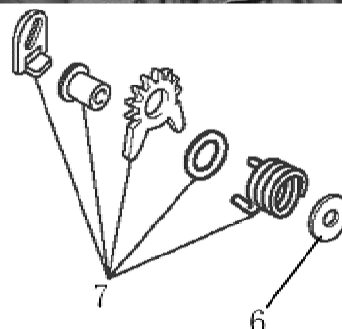
- Remove bolt of sector gear housin cover
- Remove wire clip and sector gear housing cover



- Remove dowel pin and gasket
- Remove drive sector gear 4
- Remove bolt 5 of driven sector gear



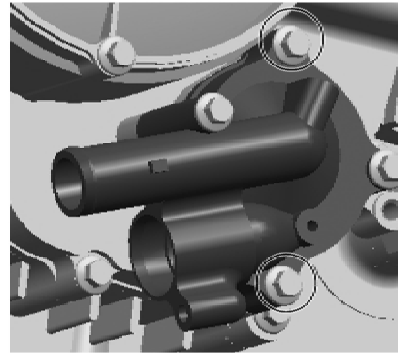
- Remove washer 6 and driven sector 7



6 Engine Removal, Inspection & Installation

Water Pump

- Screw out bolt of water pump
- Remove water pump



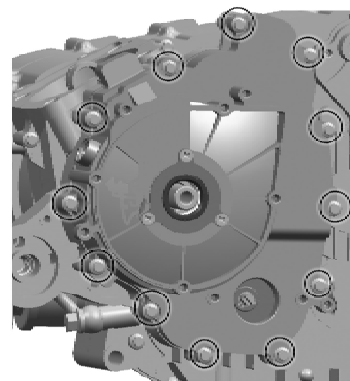
Sheave Drum

- Remove the sheave drum by using a suitable bar;
- Remove washer and sheave drum



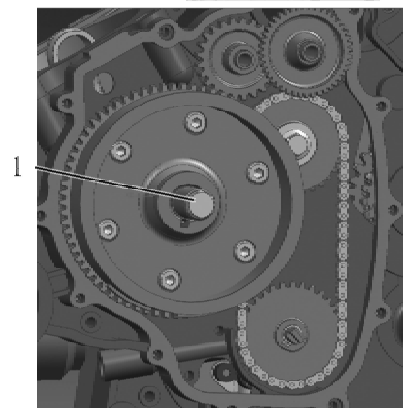
Left Crankcase Cover

- Remove bolts;
- Remove left crankcase cover
- Remove dowel pin and gasket



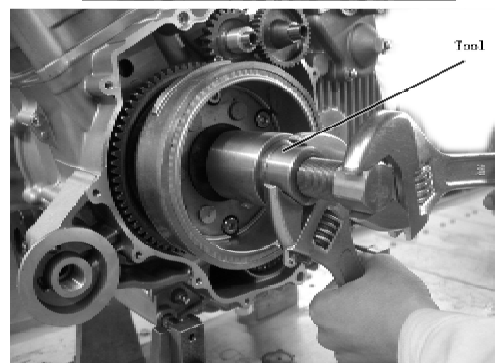
Magneto Rotor

- Install attachment 1 to crankshaft end



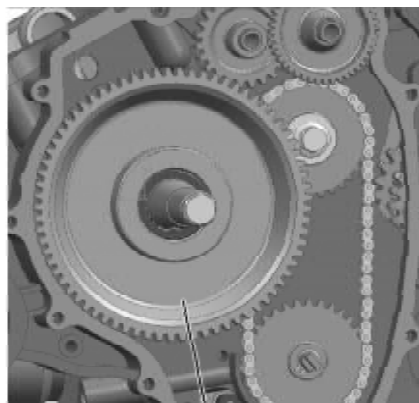
- Install special tool to rotor thread;
Remove rotor and woodruff key

Tool: Rotor Remover

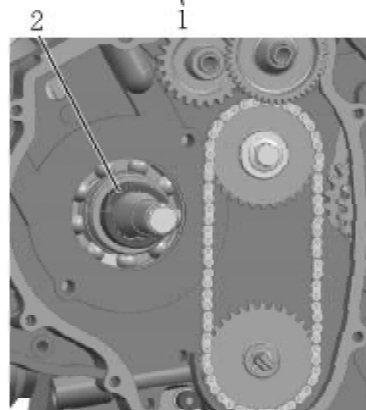


Starting Motor Gear

- Remove driven gear 1 and needle bearing

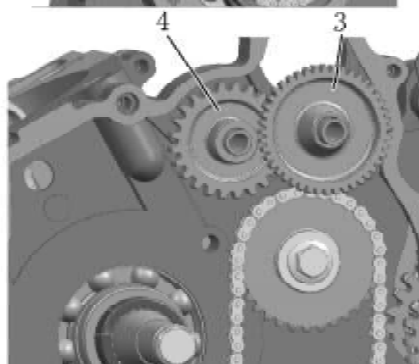


- Remove spacer 2

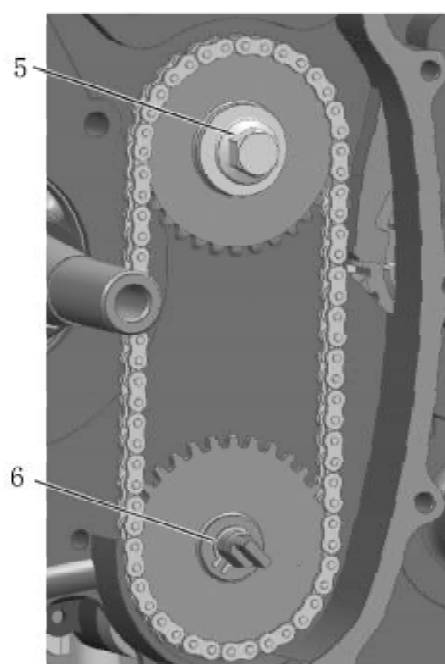


- Remove dual gear and shaft 3

- 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



6 Engine Removal, Inspection & Installation

△ Engine Right Side

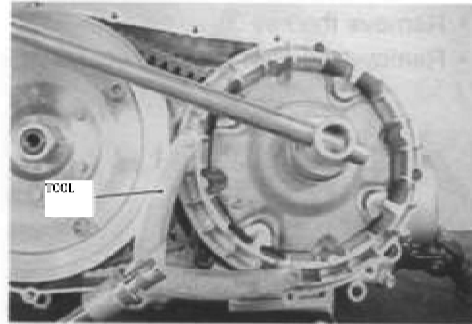
CVT Cover

- Remove bolt of CVT cover
- Remove CVT cover
- Remove gasket and dowel pin

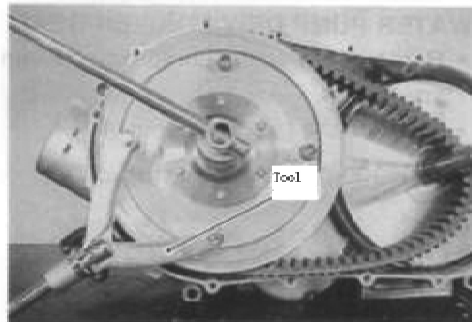


CVT(Continuously Variable Transmission)

- Remove primary sheave nut with special tool
- Remove primary sliding sheave

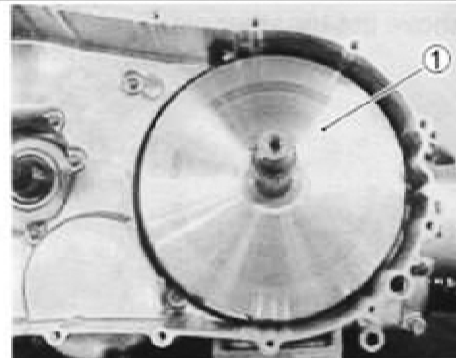


- Remove secondary sheave nut with special tools
- Remove secondary sheave
- Remove drive belt



Tool: Sheave Holder

- Remove primary fixed sheave①

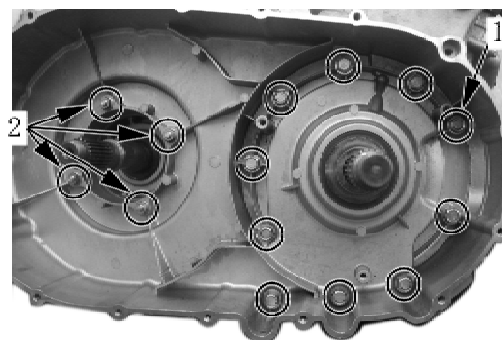


- Remove bolt for air guide plate, Remove air guide plate



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

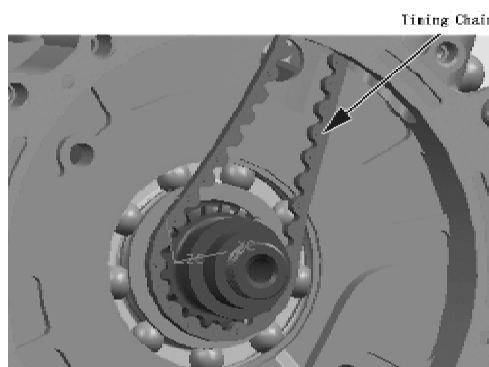
Note: The clutch shoe nut has left-hand threads



TOOL

Timing Chain

- Remove timing chain



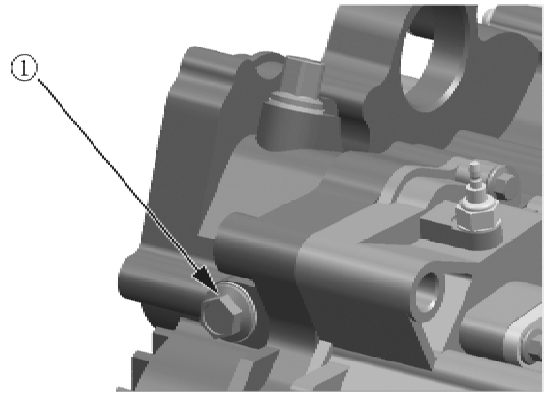
Timing Chain

6 Engine Removal, Inspection & Installation

△ Engine Center

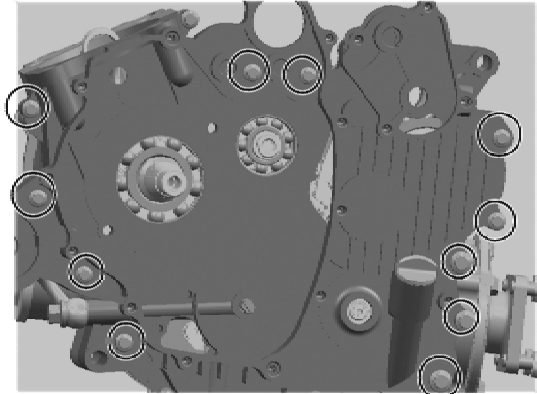
Gear position bolt

- Remove gear position bolt ①
- Remove spring and steel ball

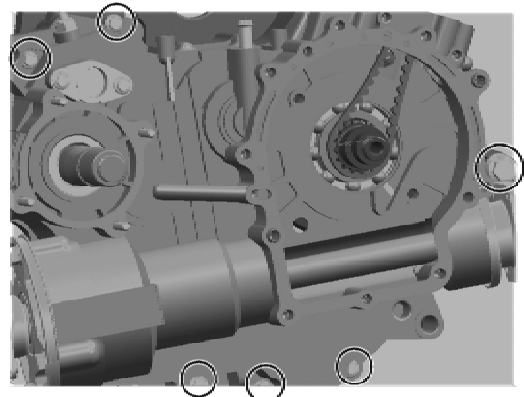


Right Crankcase

- Remove left crankcase bolts



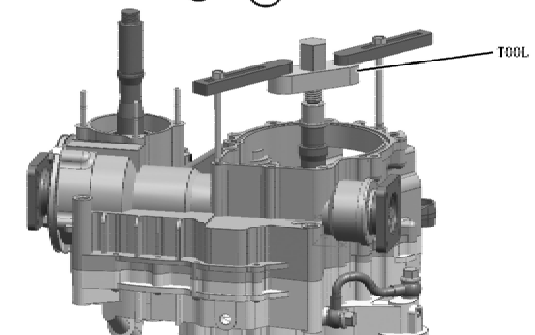
- Remove right crankcase bolts



- Separate right crankcase with special tool

Caution

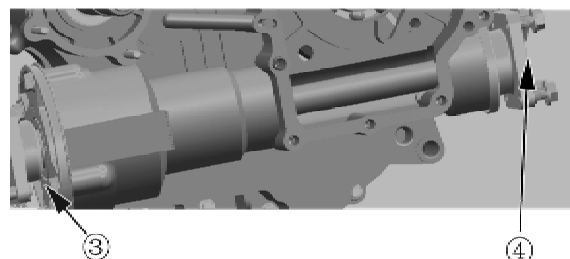
- The Crankcase separator plate should be parallel with the end face of crankcase
- Crankshaft should remain in the left crankcase half.



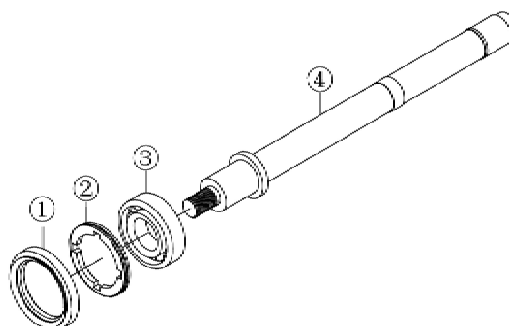
Tool: Crankcase separator

Driven Bevel Gear, Front Output Shaft

- Remove bevel gear cover bolt
- Remove driven bevel gear ③
- Remove front output shaft nut ④



- Remove Oil seal ①、Bearing limit nut ②
(**left roll**)
- Remove Front Output Shaft ④



Shift Cam, Fork/Shaft

- Remove Shift Cam ⑤、Fork /Shaft ⑥;



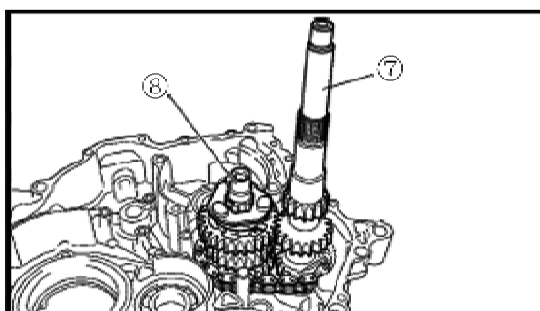
Drive Bevel Gear

- Remove left crankcase from driven bevel gear



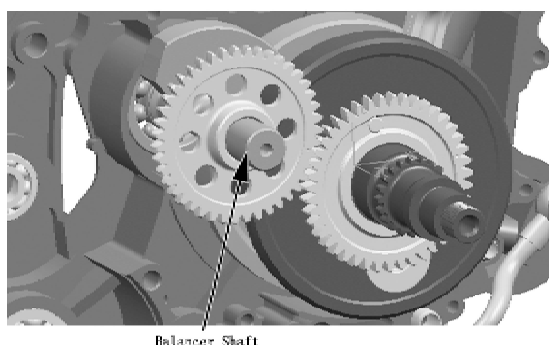
Drive Shaft, Drive Shaft

- Remove drive shaft ⑦ and driven shaft ⑧



Balancer Shaft

- Remove balancer shaft;

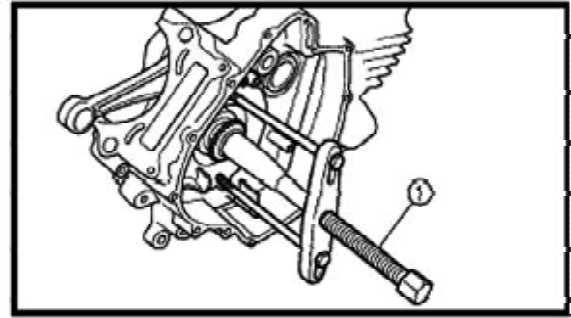


6 Engine Removal, Inspection & Installation

Crankshaft

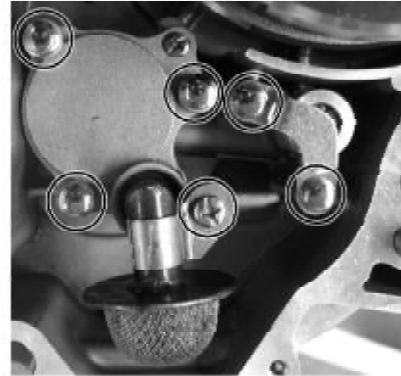
- Separate crankshaft from left crankcase with special tool

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 parts 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 (A)

● Remove rocker arm shaft by using M6 bolts (B)

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.

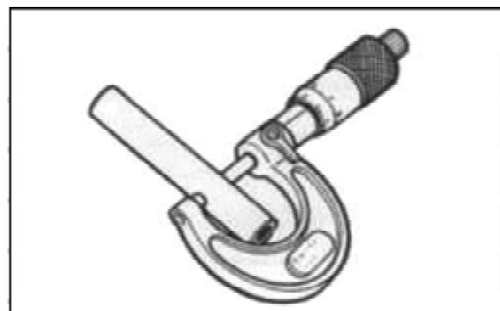
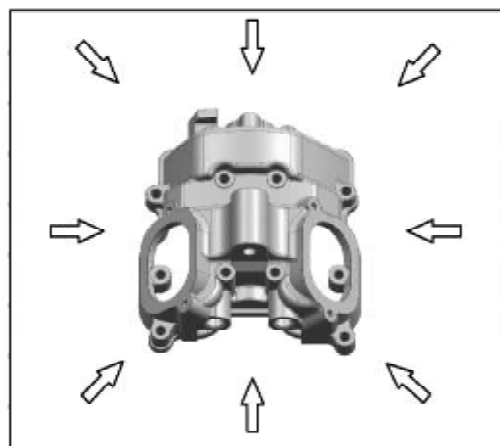
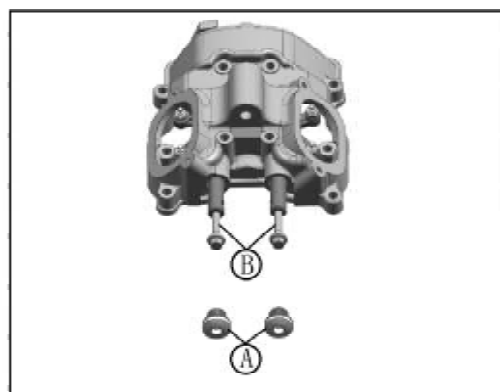
Rocker Arm Shaft

● 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)



6 Engine Removal, Inspection & Installation

Rocker Arm

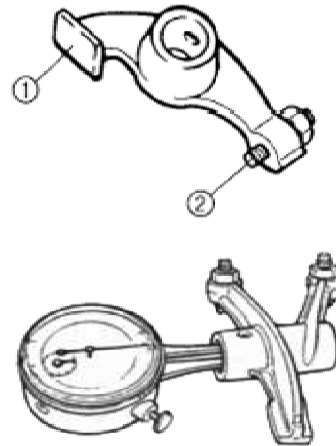
● When checking the rocker arm, check the inner diameter of the valve rocker arm and wear of the camshaft contact surface.

● **Rocker Arm I.D. :** .000~12.018mm

Tool: Dial Calipers

△ Assembly

Note: Intake rocker arm shaft A has oil holes.



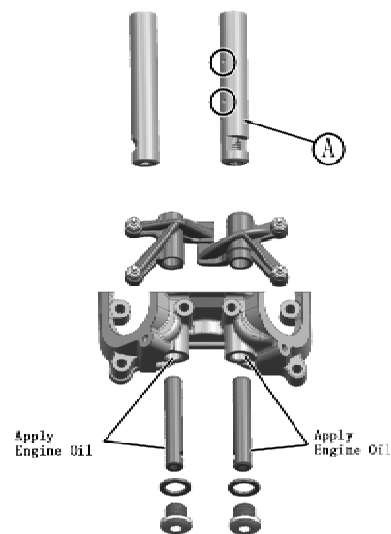
- Apply engine oil to rocker arms and shafts;
- Install rocker arms and tighten rocker arm shaft to the specified torque:

Rocker Arm Shaft Bolt: 28N.m

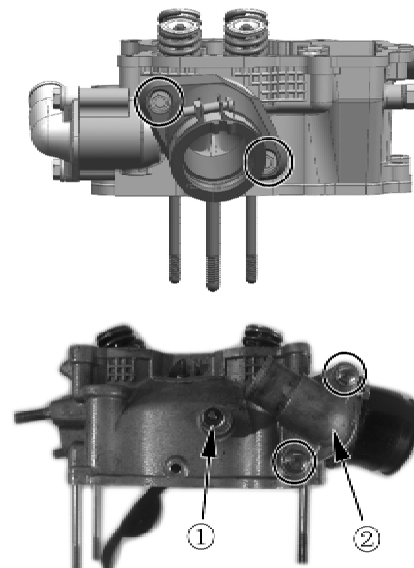
Cylinder Head

△ Disassembly

- Remove intake pipe



- Remove water temperature sensor ① and thermostat cover ②

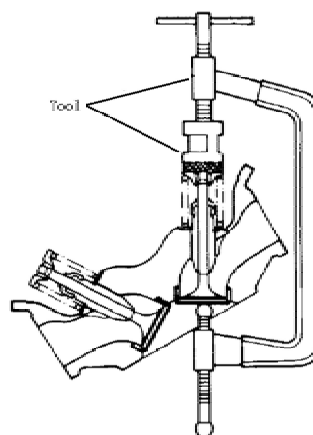


- Remove thermostat



- 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.



6 Engine Removal, Inspection & Installation

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

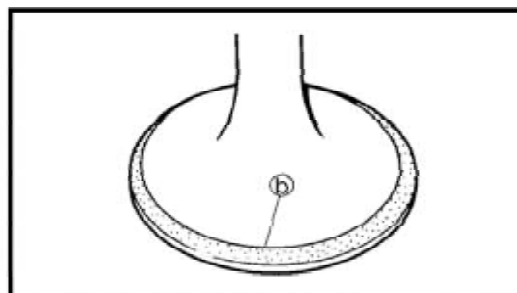
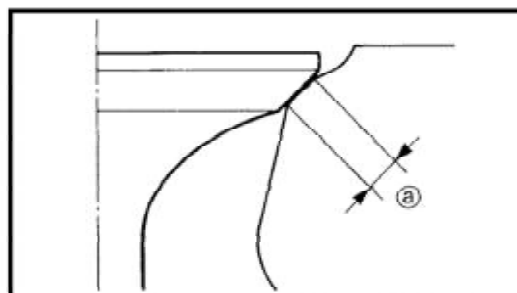
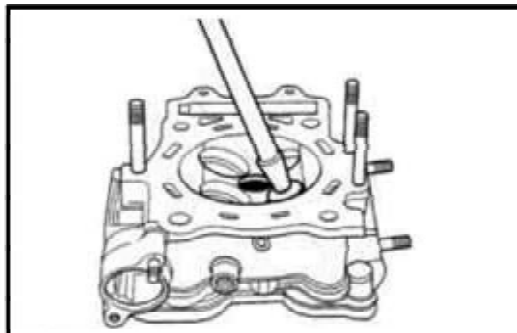
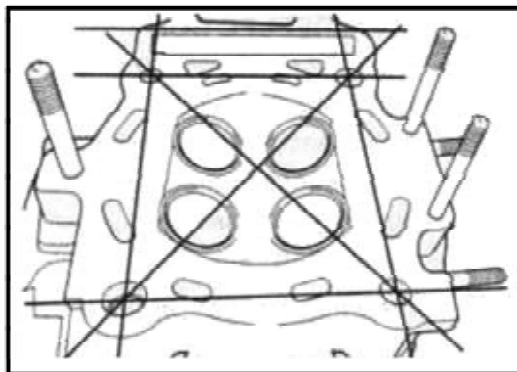
Valve Stem and Valve Guid

- 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

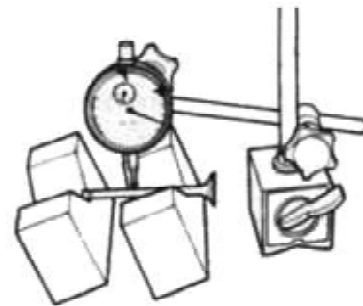
- Support valve stem with V block as illustrated on the right. Check the run-out with a dial gauge.

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.**

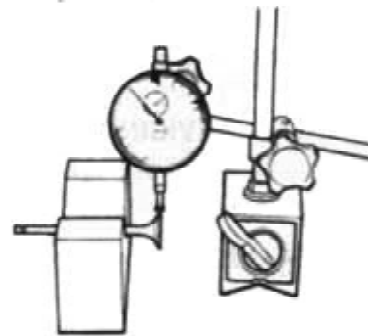
Valve head Radial Run-out out of range:--Replace

Service Limit: 0.03mm

Tool: Dial Gauge (1/100)

Magnetism 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

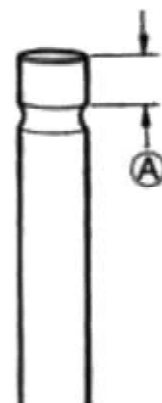
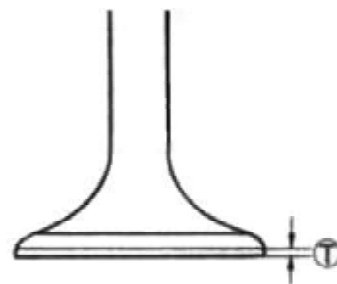
Valve Stem End

- 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



6 Engine Removal, Inspection & Installation

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: --Replace

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)

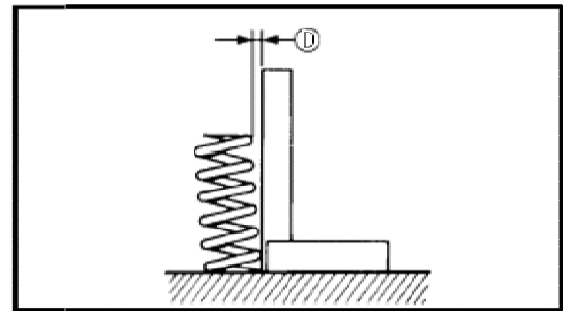
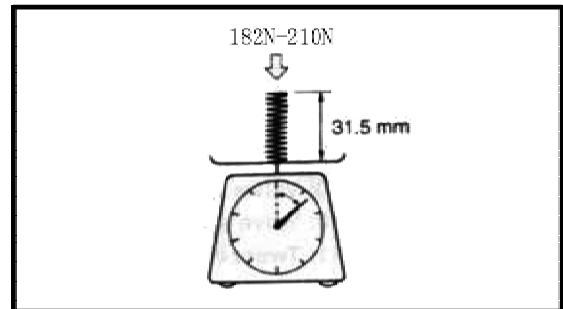
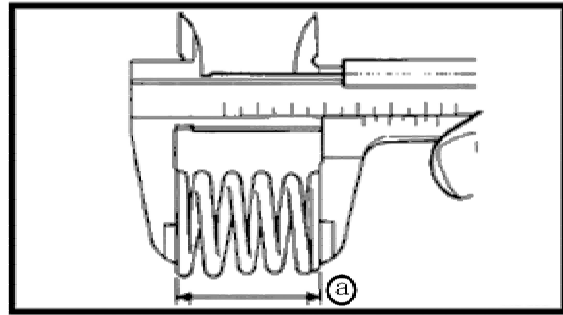
182N-210N/31.5mm

Tool: Spring Scale.

- Measure valve spring incline.

Spring incline out of range:--Replace

Valve Spring Incline Limit: 2.5o/1.7mm

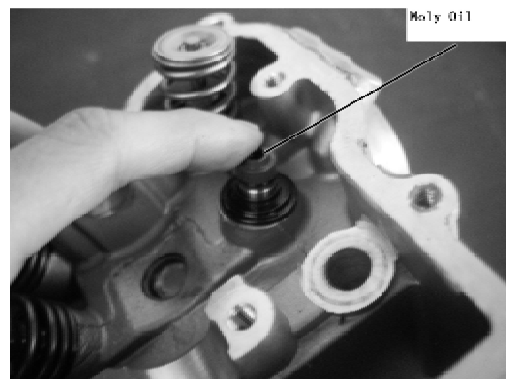


△ Assembly of Cylinder Head

- Install each valve spring seat;
- Apply moly oil to valve stem seal and fit into position.

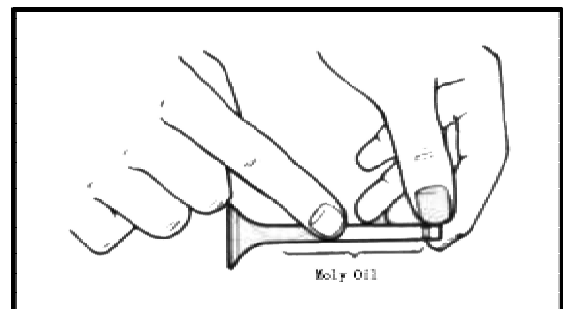
Material: Moly oil

Note: Do not reuse the valve stem seal.

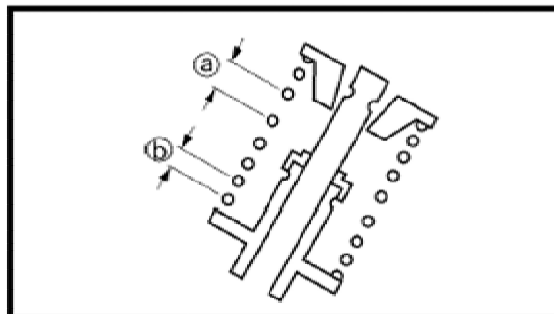


- Insert the valves, with stems coated with moly oil all around.

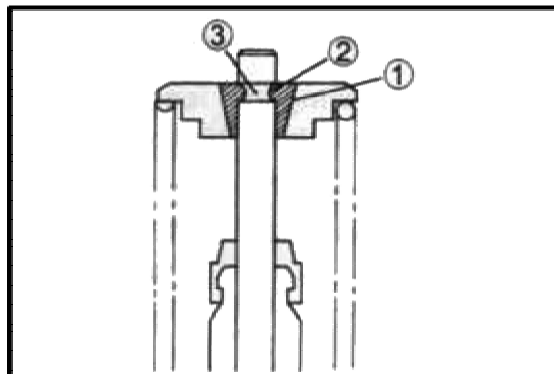
Note: When inserting the valve, be careful not to damage the lip of the stem seal.



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



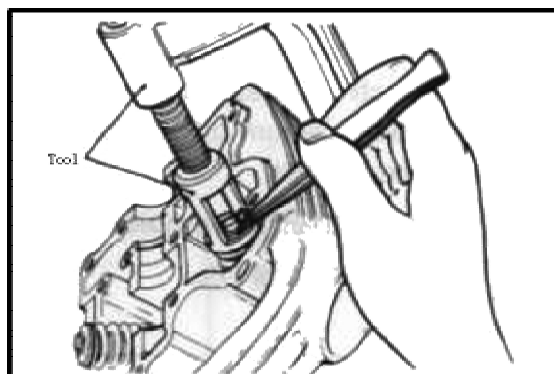
● Put on the valve spring retainer. Use the valve spring compressor to press down the spring. Fit the two cotter halves to the stem end and release compressor to allow the cotter ① to wedge in between seat and stem. Make sure that the rounded lip ② of the cotter fits into the groove ③ in the stem end.



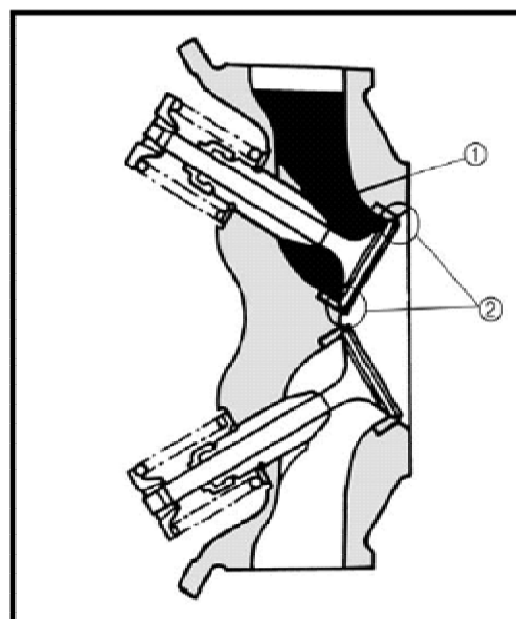
Tool: Valve Spring Compressor

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/EX ① and check for any leakage of valve seat ② after a few minutes.



6 Engine Removal, Inspection & Installation

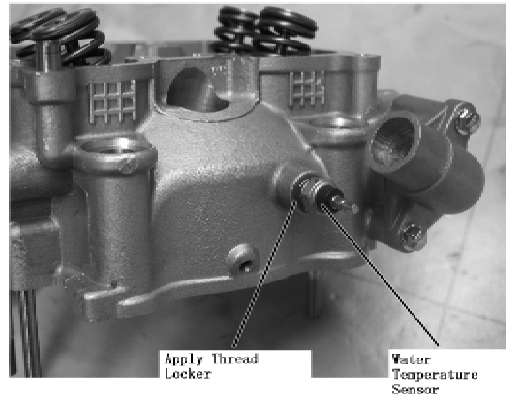
- Install thermostat



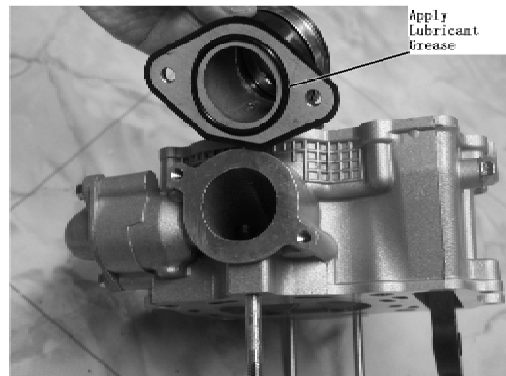
- Install thermostat cover
- Install water temperature sensor, apply thread locker to the thread part, tighten it to the specified torque.

Water temperature sensor

Tightening torque: 10 N.m



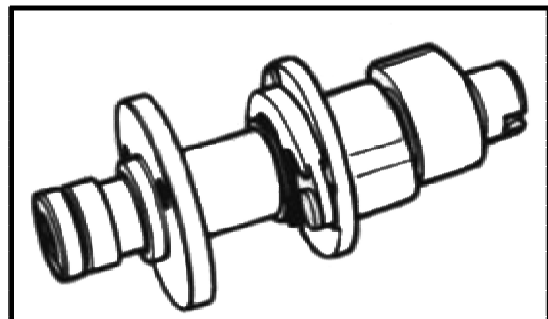
- Install intake pipe, apply lubricant to O-ring.



Camshaft

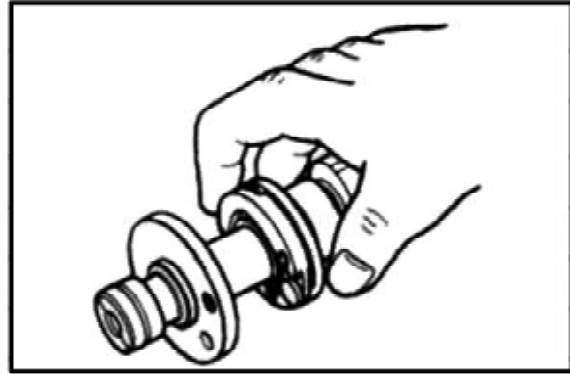
Check camshaft for wear and run-out of cams and journals if the engine produces abnormal noise or vibration or lacks power output. Any of these symptoms could be caused by wear of camshaft.

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

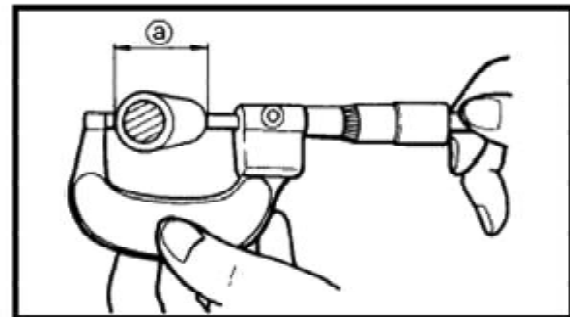
Worn cams can often cause mistimed valve operation resulting in reduced power output. The limit of cam wear is specified for both IN and EX cams in terms of cam height “a” Measure with a micrometer the cam height.

Cam height 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: 0.15mm

Check according to the following steps:

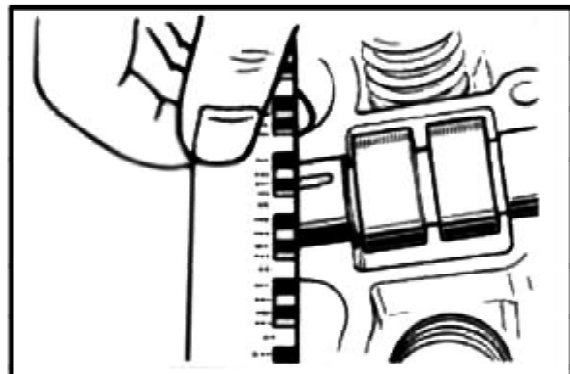
- Clean off materials from cylinder head and cover;
- Install camshaft with plastic gauge;
- Install cylinder head cover and tighten bolts evenly and diagonally to the specified torque:

Tightening torque: 10N · 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.

6 Engine Removal, Inspection & Installation

● 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

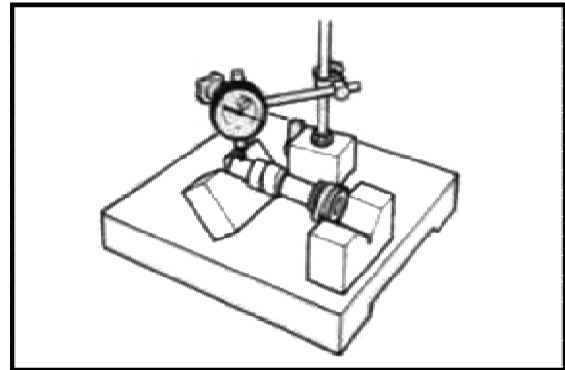
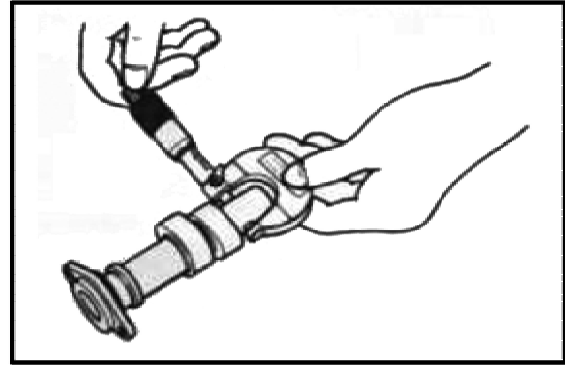
Measure the run-out with a micrometer. Replace camshaft if the run-out is out of range.

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.

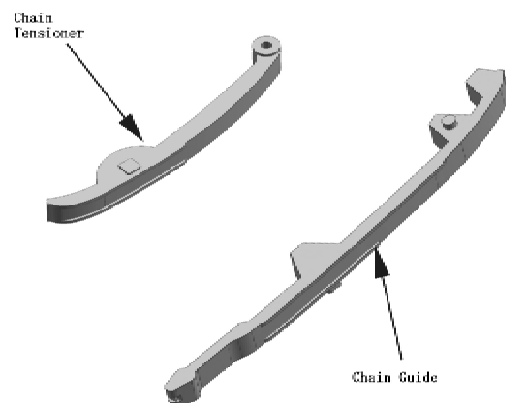


6

● Tensioner and Chain Guide

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

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



CFMOTO

Chain Tensioner Inspection

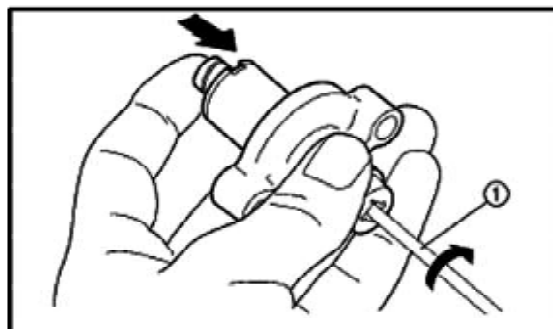
● Check tensioner for any damage or poor function.
Damage, poor function:—Replace

inspect way of working stability

■ Insert screw driver ① 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: Straight edge
Thickness Gauge**

Cylinder Bore

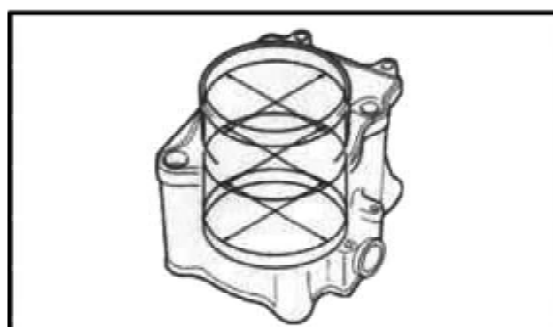
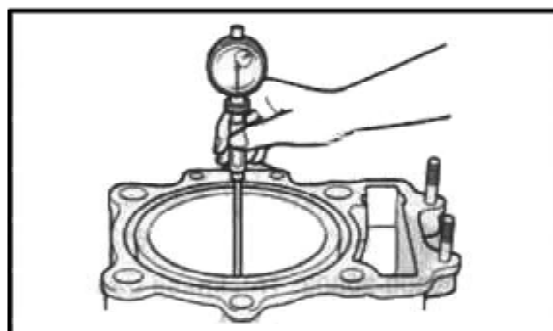
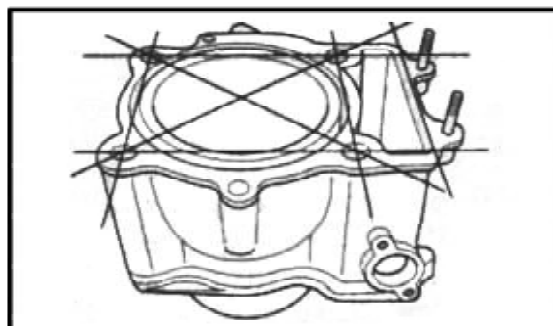
● Check cylinder wall for scratches, nicks or other damage. Replace with a new one if any

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

Standard Cylinder Bore:

87.500-87.522mm

Tool: Cylinder Gauge Set



6 Engine Removal, Inspection and Installation

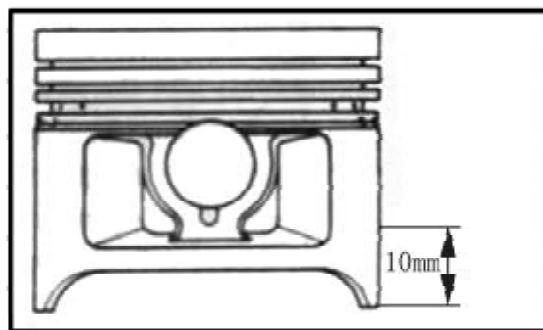
Piston

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 than the limit, replace the piston

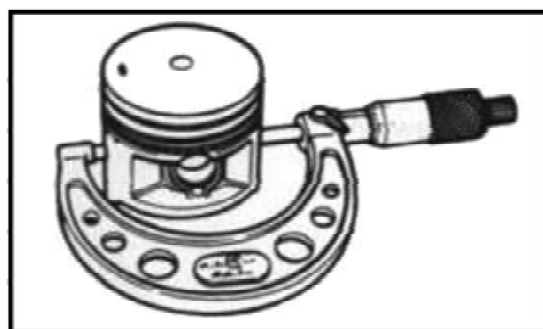
Standard: 87.460-87.480mm

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

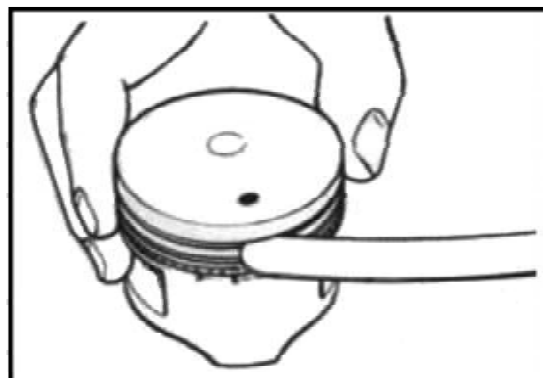
Use a thickness gauge to measure the side clearance of top ring and 2nd ring.

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

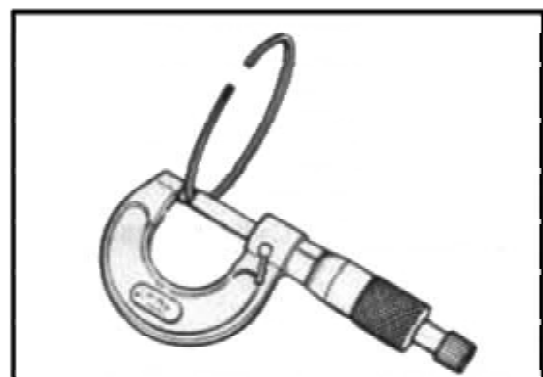
Oil ring: 2.51-2.53mm

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

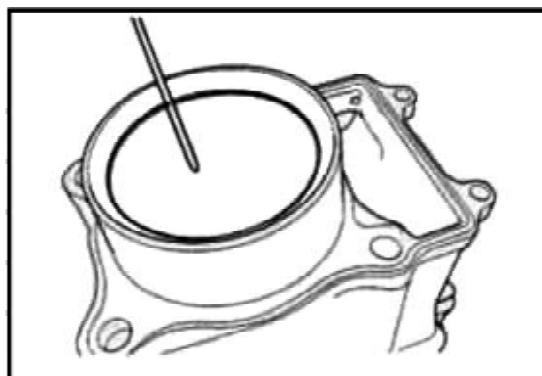
Piston ring end gap limit:

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.

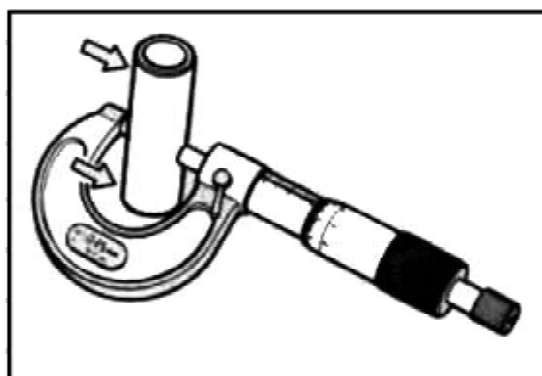
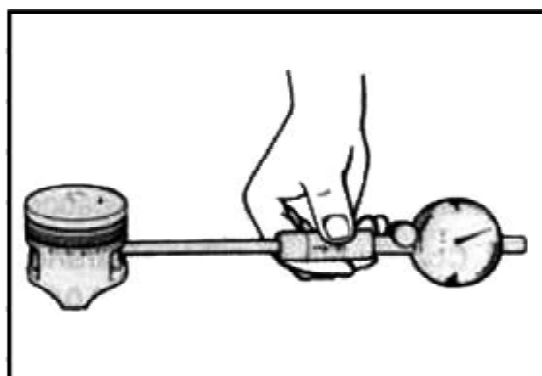
Piston pin bore limit: 23.030mm

● 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)



6Engine Removal, Inspection and Installation

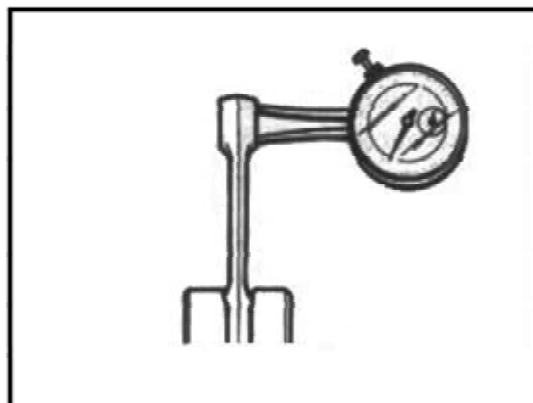
Connecting Rod/Crankshaft

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

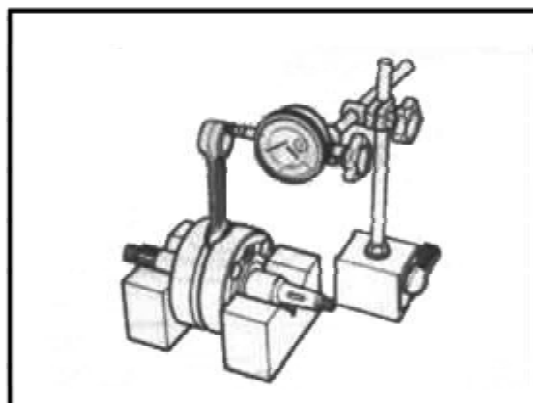
● Check the movement of the small end of the rod and inspect the wear of the small end. This method is also applicable to check and inspection of big end

Connecting Rod Deflection: 3.0mm

Tools: Dial Gauge

Magnetic stand

V-block

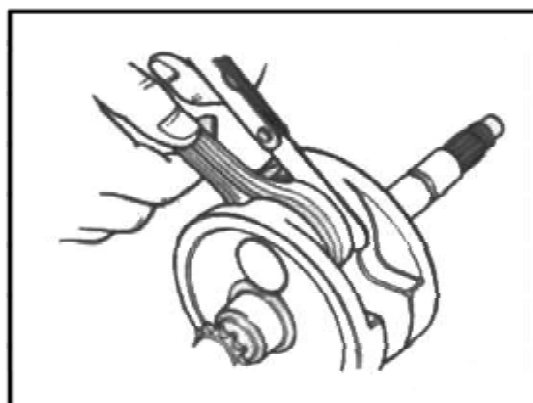


Connecting Rod Big End Side Clearance

● 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

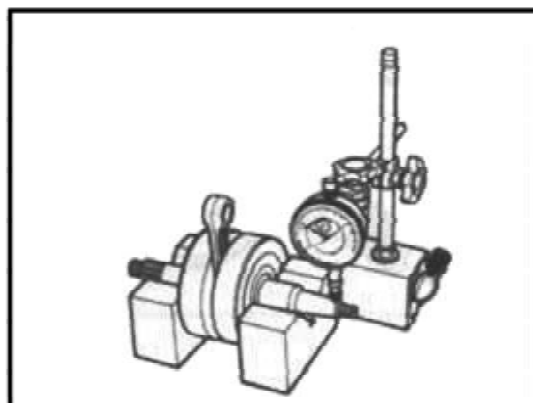
● Support crankshaft with blocks as illustrated. Put the dial gauge, slowly turn the crankshaft and measure run-out with a dial gauge. If the run-out exceeds the limit, correct or replace the crankshaft.

Run out limit: 0.08mm

Tools: dial gauge

Magnetic stand

V-block



Clutch inspection

● 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 aset.

Clutch Wheel

● Check the inner clutch wheel ① for scratches, scuffs or bluediscoloration or unevenwear. If anydamageis found, replace the clutch wheel with a newone.

● for scratches, scuffs or blue discoloration or un-even 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

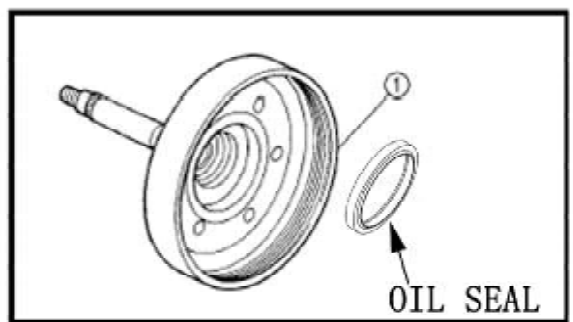
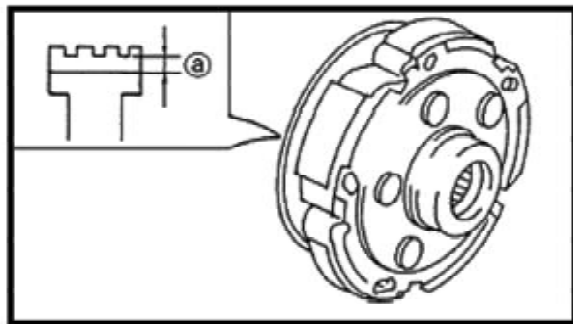
Tool: Oil seal installer set

■ Check the turning of bearing.

Abnormal damage: —Replace

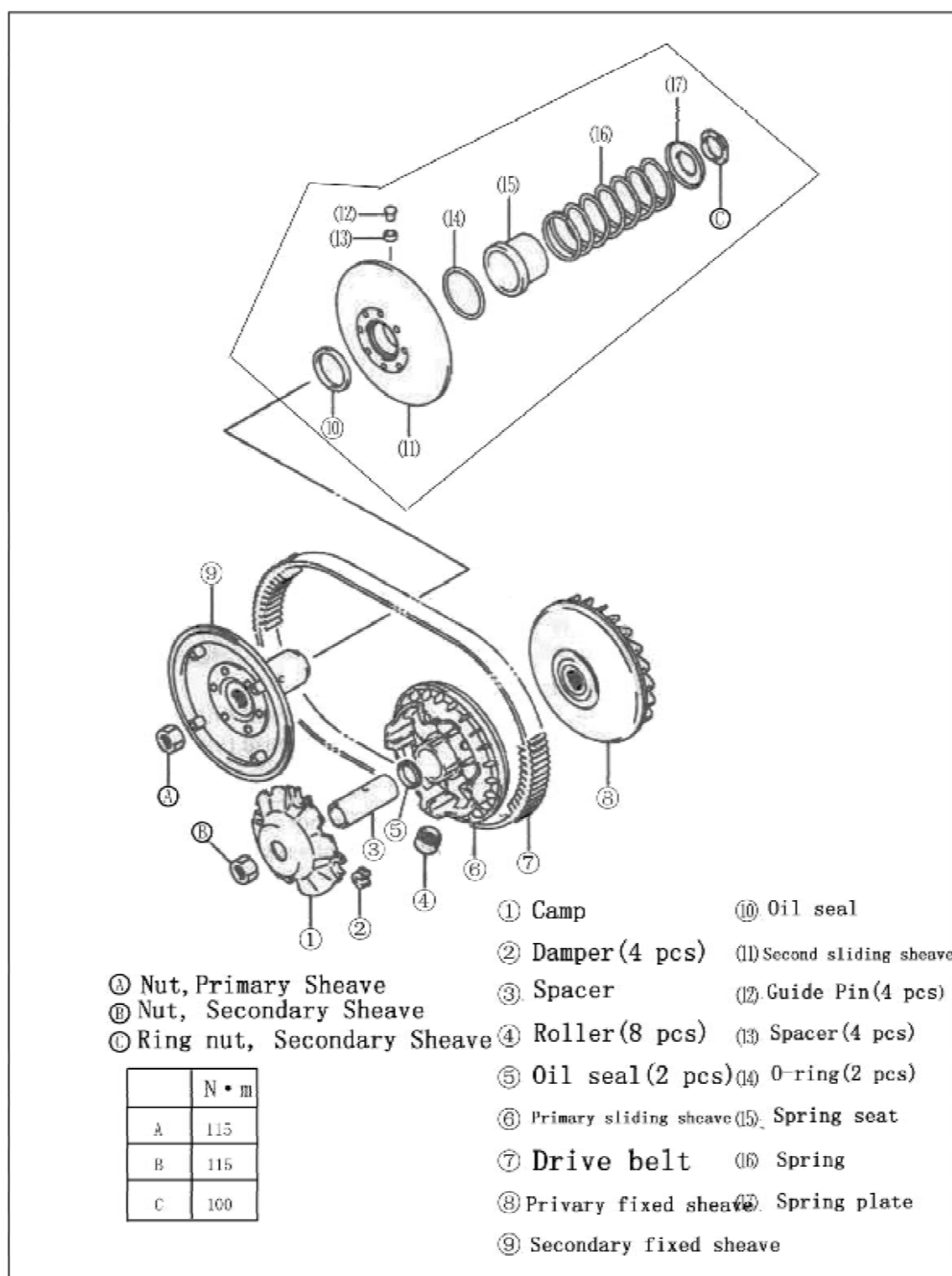
Assembly

Apply lubricant grease to oil seal when assembling.



6Engine Removal, Inspection and Installation

Primary and Secondary Sheave



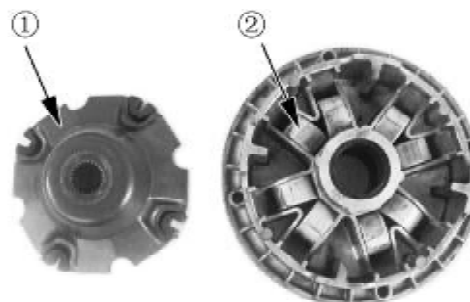
Primary Sliding Sheave

Disassembl

- Remove spacer



- Remove Cam ① **roller** ②



Roller inspection

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

Wear and damage:—Replace

Note: rollers should be replaced as a set.



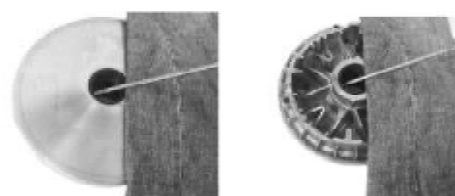
Oil Seal inspection

- Check oil seal lip for wear and damage.

Wear and damage: —Replace



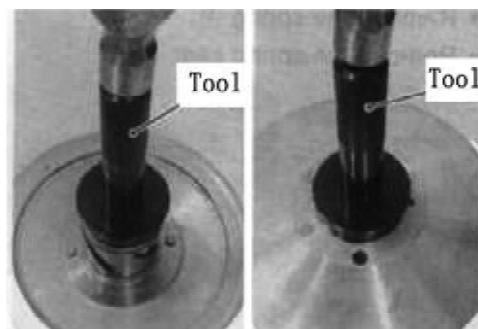
- Remove the oil seal



6 Engine Removal, Inspection and Installation

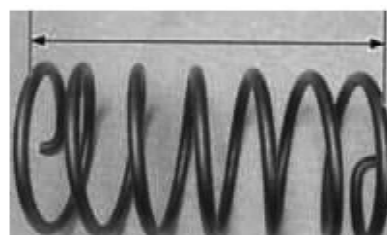
Primary Sliding Sheave and Fixed Sheave

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



● 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.

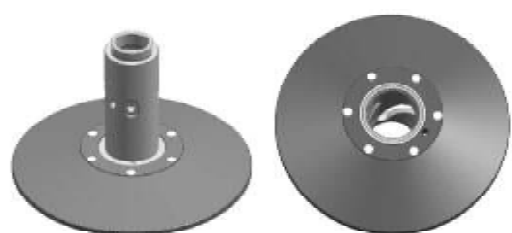
Material: Lubricant grease

● Position 8 rollers ① on the primary sliding sheave

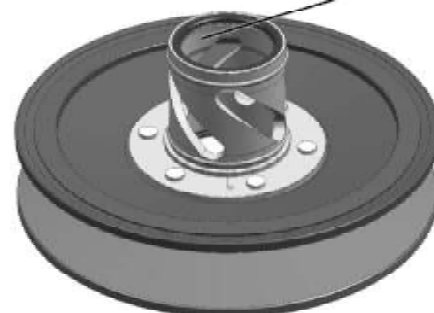
● Install 4 dampers ② to cam ③;

● Install cam to primary sliding sheave.

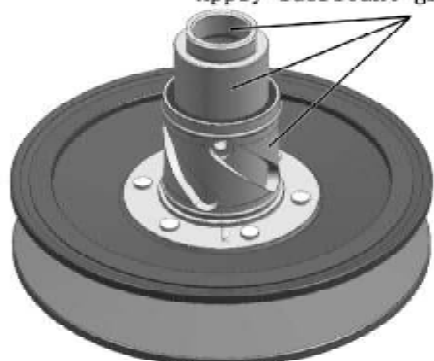
Note: When inserting the spacer, press down the cam so that the rollers will not come out of position.



Apply lubricant grease



Apply lubricant grease



● Install spacer

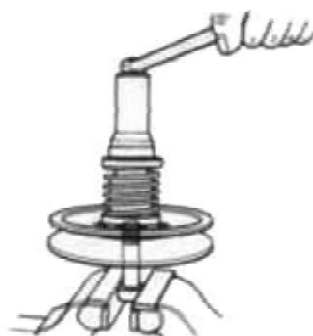
Secondary Sheave

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:

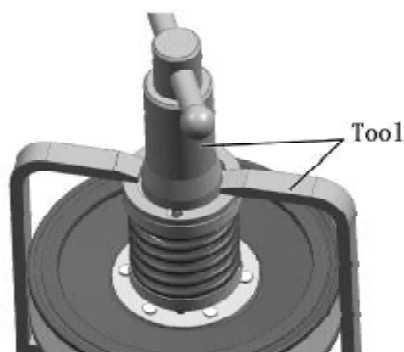
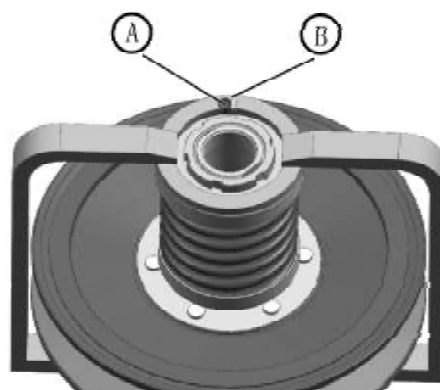
Make sure that spring end A is inserted into slot B of the tool handle

● Remove ring nut.

; **Tool: Secondary sliding sheave spring compressor**

Note:

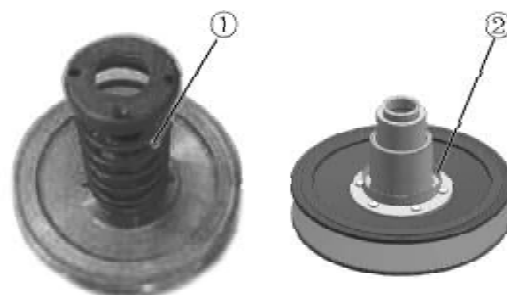
Since a high spring force applies to the secondary sliding sheave, take special care that the secondary sliding sheave will not come off abruptly



● Slowly loosen tool handle and remove the special tool.

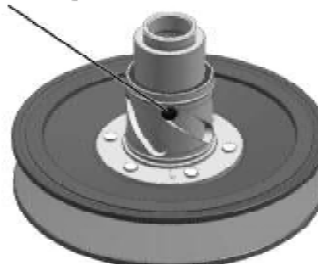
6 Engine Removal, Inspection and Installation

- Remove spring ①;
- Remove spring seat ②;

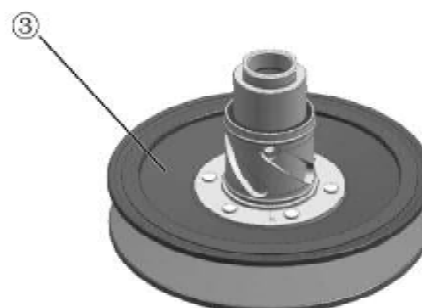


- Remove guide pin and spacer;

Guide pin & Spacer



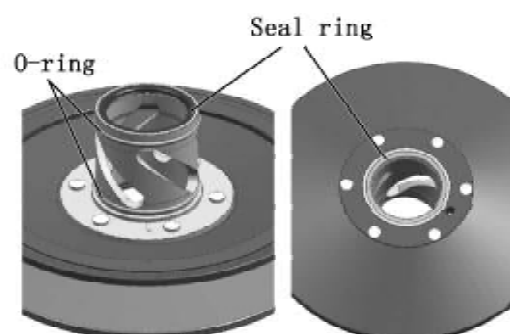
- Remove secondary sliding sheave ③;



O-ring and Oil Seal

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

Wear and Damage: —Replace

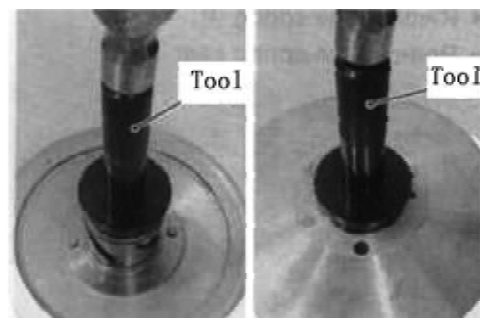


- Remove Oil Seal;



- Install oil seal with special tool.

Tool: Bearing install set



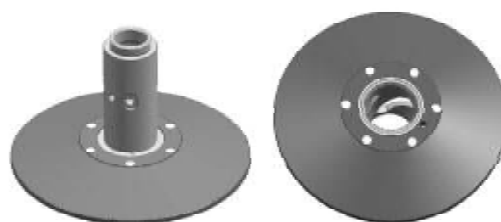
- Use vernier caliper to check the spring free length. If the length is shorter than the service limit, replace with a new one.

Service Limit: 145.4mm



Secondary Sliding and Fixed Sheave:

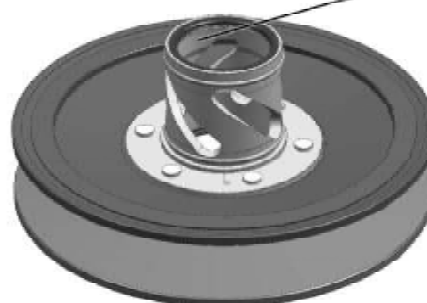
- Check drive face for any abnormal condition such as stepped wear or damage. Replace if necessary.



Assembly

- Install a new O-ring

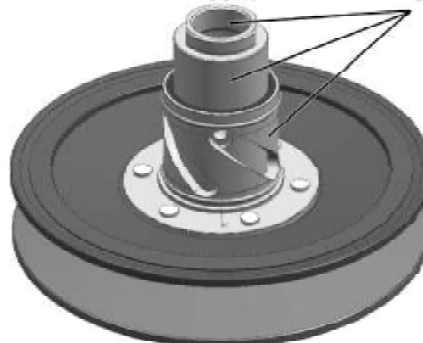
Apply lubricant grease



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

Material: lubricant grease

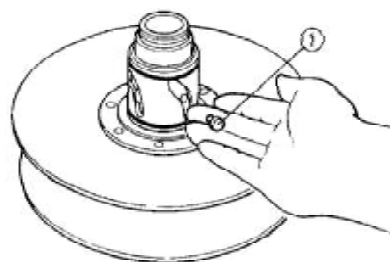
Apply lubricant grease



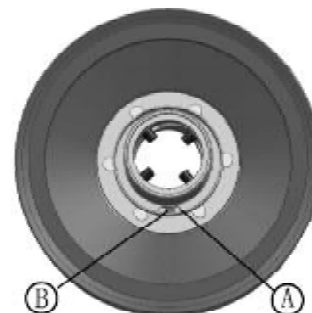
6 Engine Removal, Inspection and Installation

- Install guide pin and spacer ①

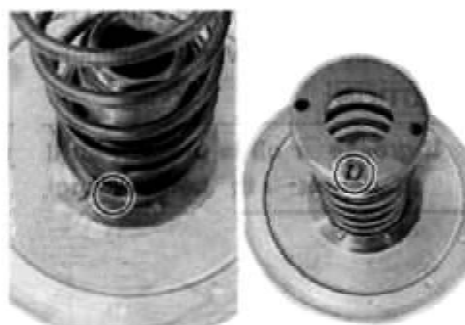
Note: To avoid damage to the oil seal lip during assembly, slide the lip with a 0.1mm steel sheet as guide.



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



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

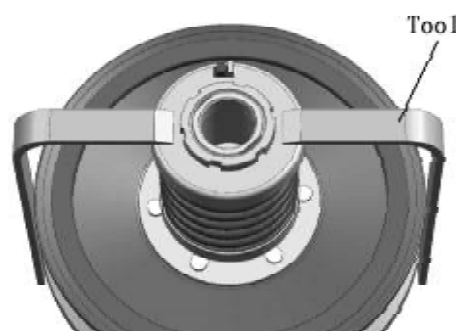


- Compress spring with special tool.
- Align the secondary sheave end with spring plate hole

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

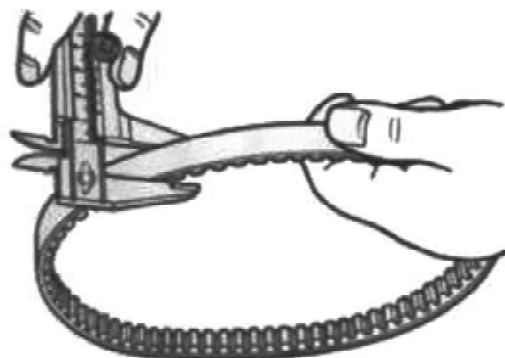
Sheave holder



Drive belt

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

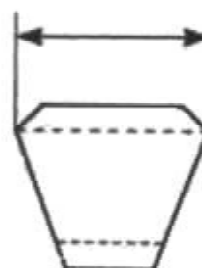
In casse of damage, width out of range,
replace with new one.



Belt width service limit:33.5mm

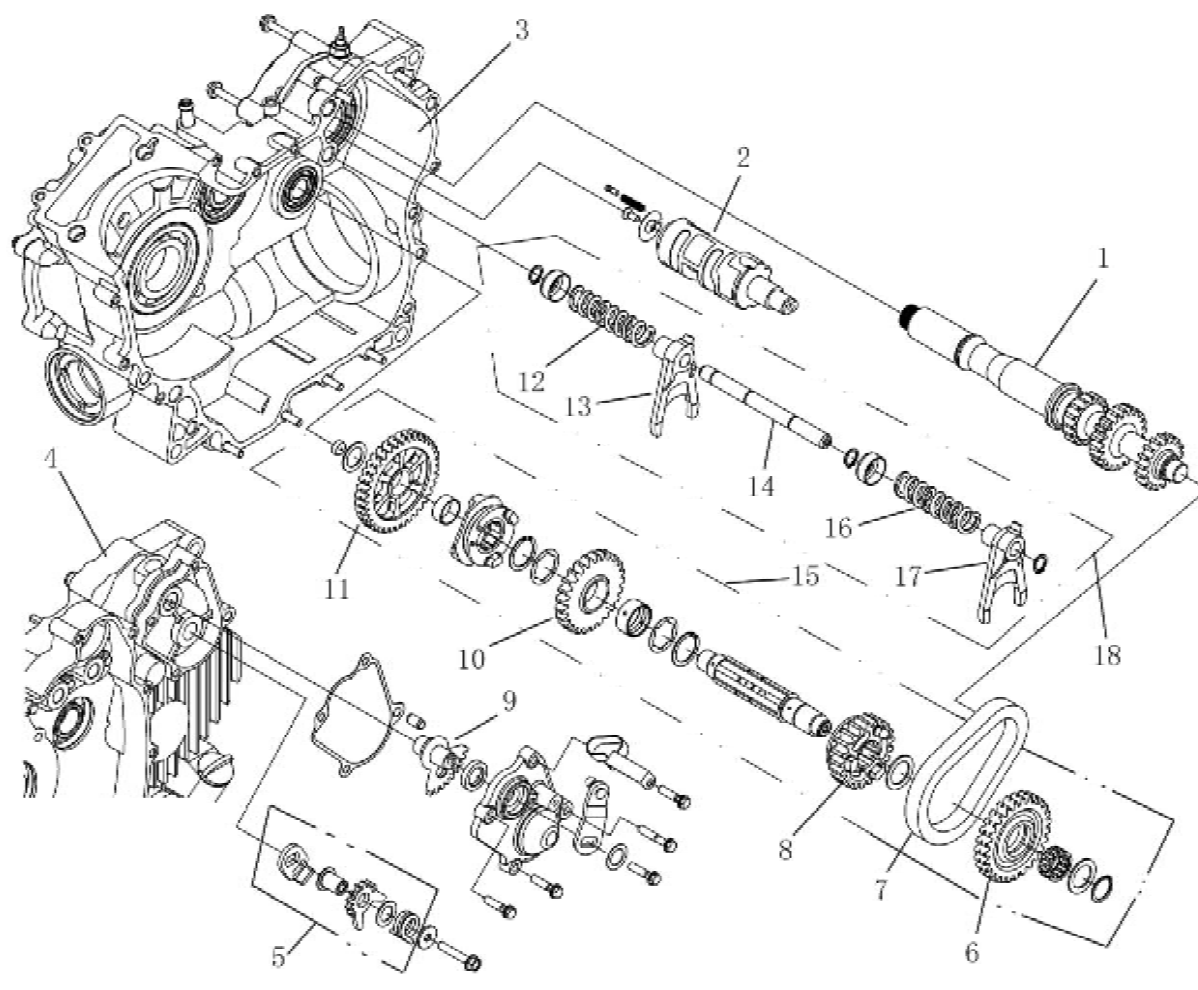
Tool: vernire caliper

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



6Engine Removal, Inspection and Installation

Transmission Disassembly



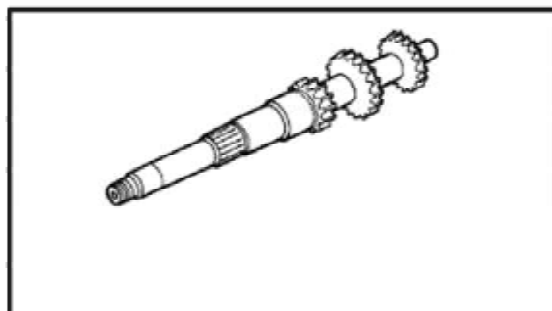
6

Item	Description	Qty		Item	Description	Qty
1	MAINSHAFT. GEARSHIFT	1		10	DRIVENGEAR, HIGH RANG	1
2	SHIFT CAM	1		11	DRIVENGEAR, LOWRANGE	1
3	RIGHTCRANKCASE	1		12	SPRING, SHIFT FORK	1
4	LEFT CRANKCASE	1		13	RIGHT SHIFT FORK	1
5	DRIVENSECTORGEAR	1		14	GUIDE BAR	1
6	SPROCKET, REVERSEGEAR	1		15	DRIVEN SHAFT	1
7	CHAIN, REVERSEGEAR	1		16	SPRING, SHIFT FORK	1
8	DRIVENOUTPUTGEAR	1		17	LEFT SHIFT FORK	1
9	DRIVE SECTORGEAR	1		18	SHIFT FORK ASSEMBLY	1

CFMOTO

Inspection

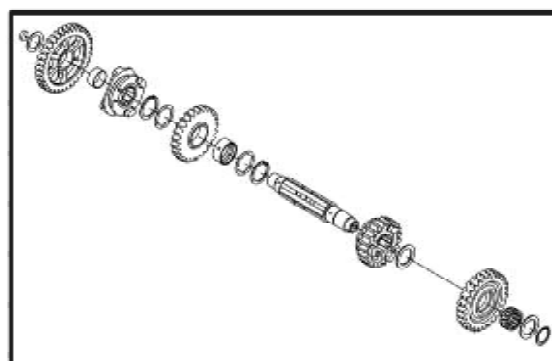
● Inspect drive bevel gear and sprocket for stains, scratch or damage, replace if necessary.



● 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.

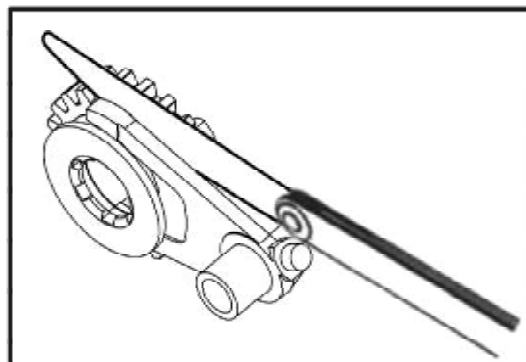
6 Engine Removal, Inspection and Installation

- 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

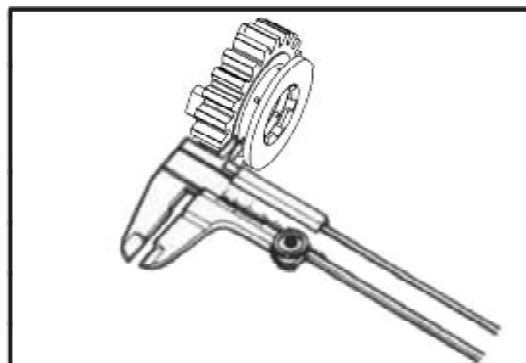
Service Limit: 0.50mm



- Measure shift fork groove width with vernier caliper;

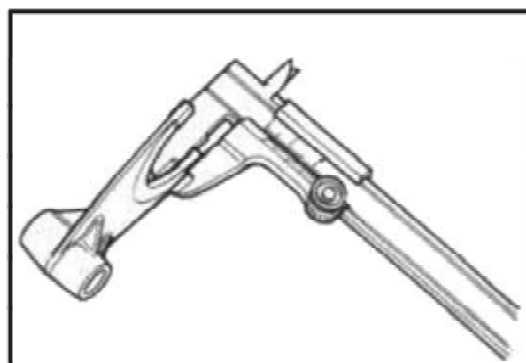
Standard shift fork groove width:

: 6.05-6.15mm

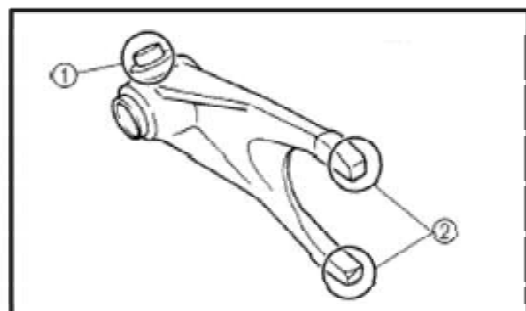


- Measure shift fork thickness with vernier calipers;

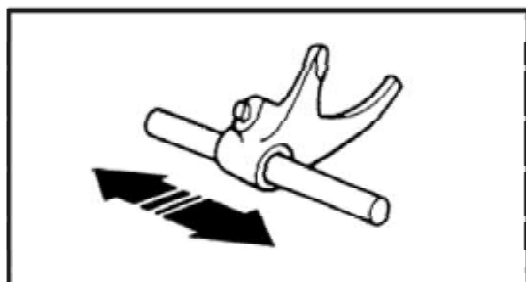
Standard fork thickness: 5.80-5.90mm



- Check shift fork ① and ② for damage or bend, replace if necessary.

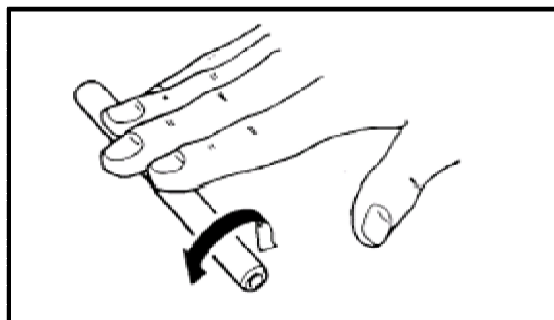


- Install shift fork to guide bar and move left and right. In case of any unsmooth moving, replace with a new one.

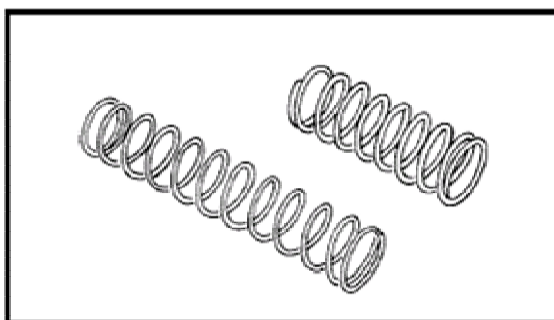


- Put the guide bar on a flat place and roll it. In case of any bend, replace with a new one;

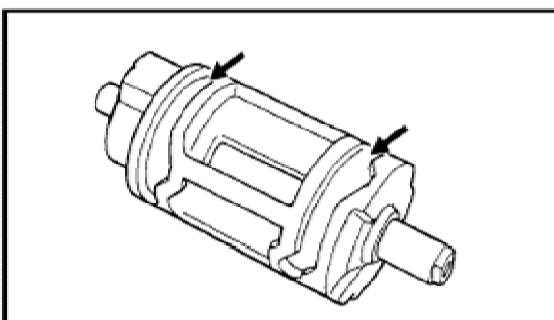
Note: DO NOT attempt to correct a bent guide bar.



- Check shift fork spring for damage, replace if necessary;



- Check shift cam groove for scratches, damage. Replace if necessary;



Assembly

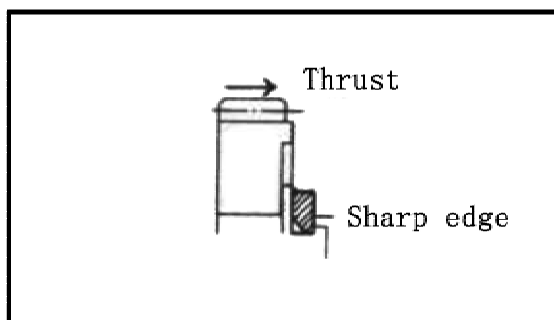
Reverse the removal procedure for assembly. Pay attention to the following:

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.

Warning:

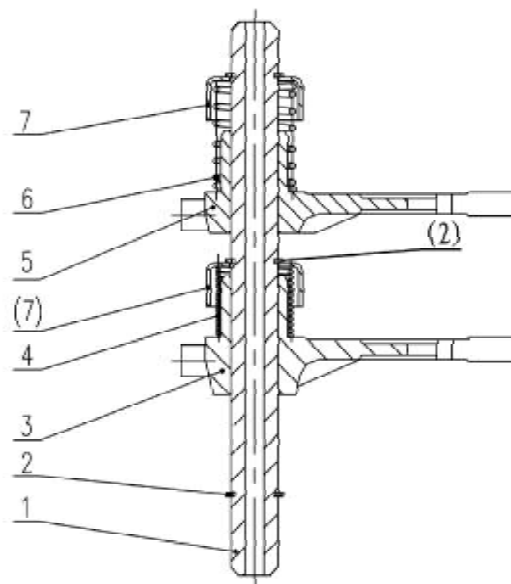
- Do not reuse the retainers;
- Do not expand of the gap end of new retainers too wide when assembling.
- Make sure that all the retainers are properly fitted.



6 Engine Removal, Inspection and Installation

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

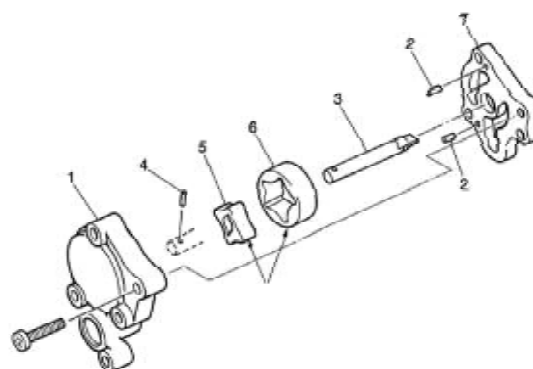
- 1 Guide bar; 2 Retainer 12;
3 Left shift fork;
4 Shift fork spring(small);
5 Right shift fork;
6 Shift fork spring(big);
7 Spring seat



Oil pump

- Disassemble 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.

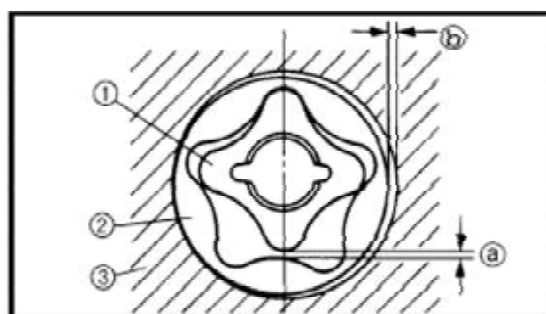
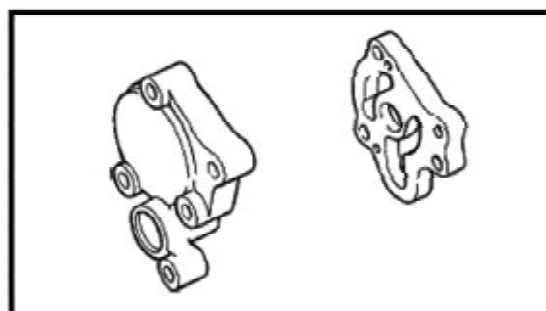
- Measure the top clearance a between inner and outer rotors and side clearance b between outer rotor and oil pump housing. If the clearance exceeds the limit, replace with new one.

Top clearance: 0.03-0.10mm

Service limit: 0.15mm

Side clearance: 0.03-0.10mm

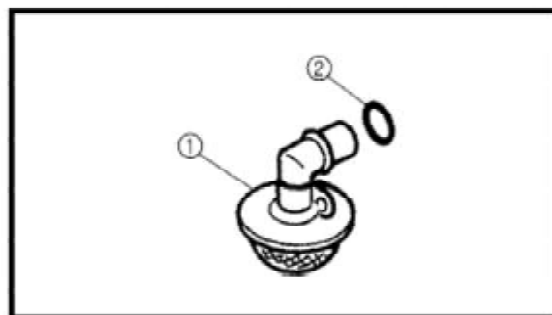
Service limit: 0.12mm



Oil strainer inspection

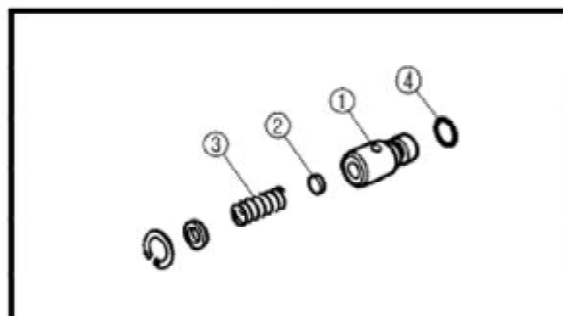
● Check oil strainer ① and O-ring ② for damage, replace if necessary;

● Clean the surface of oil strainer with engine oil.



Relief valve

● Check the valve body ①, valve ②, spring ③, O-ring ④ for damage or wearing. Replace if necessary;



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;

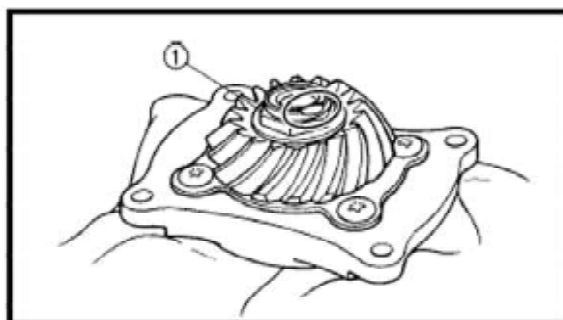
● Check the drive bevel gear 4 and output driven gear 2 for rust, scratch, wear or damage. Replace if necessary.;

● Check if the bearing 8 turns smoothly, replace with a new bearing if necessary.

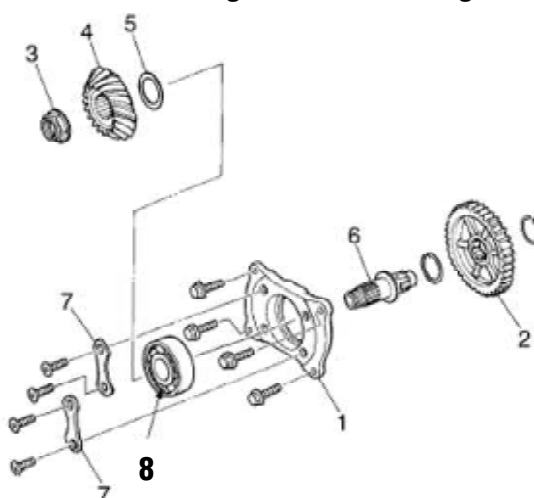
● Adjust Washer 5 if any of right crankcase, drive bevel gear 4, or drive bevel gear cover 1 is replaced. Refer to bevel gear adjustment for details;

● Apply engine oil to bearing 8 when assembling and tighten nut 3 to the specified torque;

Drive bevel gear nut tightening torque
145N.m



- 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



6 Engine Removal, Inspection and Installation

Front Output Shaft

- Check bearing 7 for smooth turning and abnormal wear. Check oil seal 5 for damage. Replace if necessary;
- 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.(80N.m)

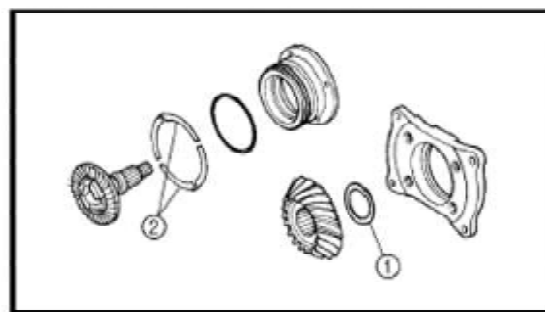
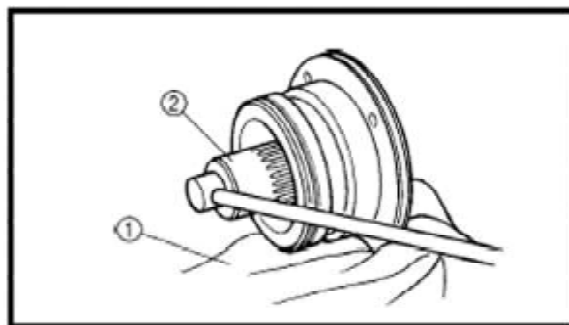
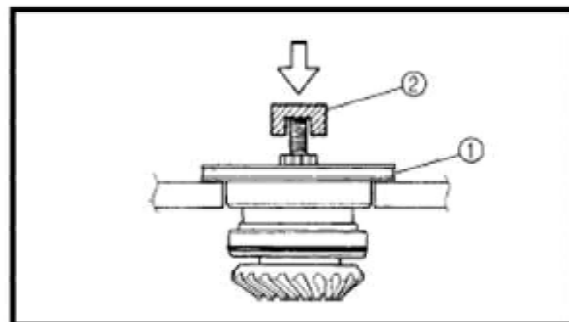
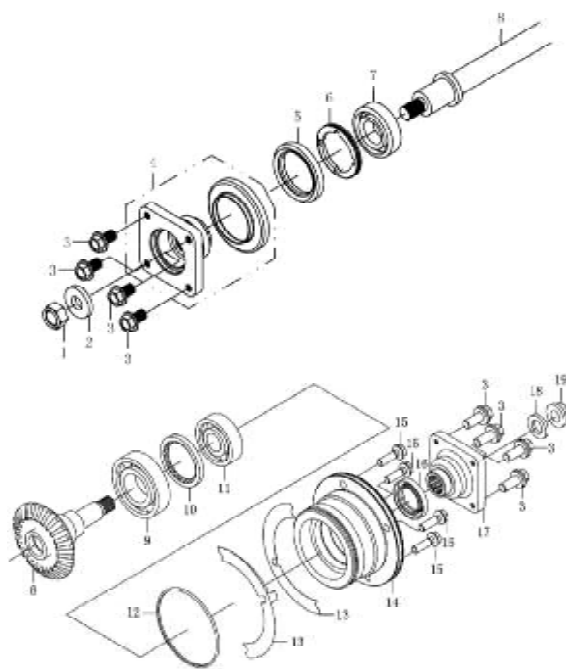
Tighten Nut 1 to the specified torque, front output shaft nut tightening torque: 97N.m

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 rag ① 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 if necessary;
 - 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.(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 & tooth contact are within the proper range

△ Bevel gear backlash

● **Install drive and driven gears to the crankcase. Wrap a (-) screwdriver③ with a rag ② and insert it into the speed sensor hole① of left crankcase to fix the drive bevel gear;**

● **Install special tool ③ and micrometer ④**

Tool: level gear side clearance

dial gauge micrometer

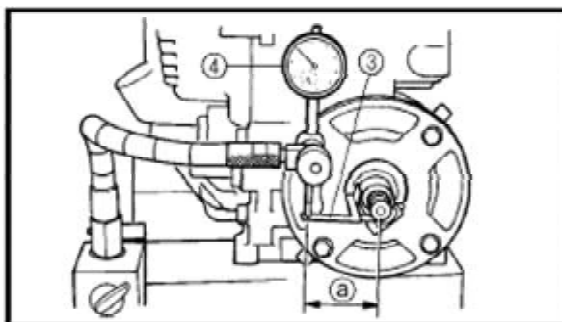
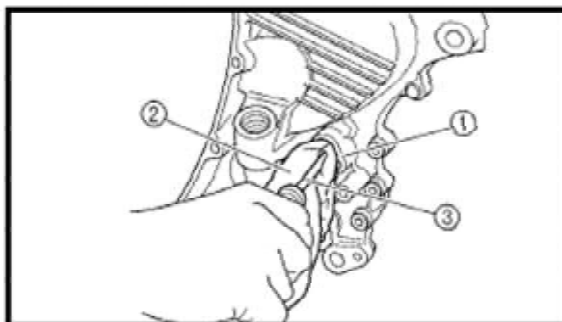
a=46mm

● **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:

Backlash	Washer thickness adjustment
< 0.1mm	Washer thickness adjustment
0.1~0.2mm	OK
> 0.2mm	Increase 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 paster;
- 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;

Contact ①	tooth top	Incorrect
Contact ②	Middle	Correct
Contact ③	Bottom	Incorrect

- If tooth contact is correct (Contact ②), continue next procedure;
- If tooth contact is incorrect (Contact ① & Contact ③), adjust the thickness of washer of drive gear. Repeat above steps to check tooth contact until correct.

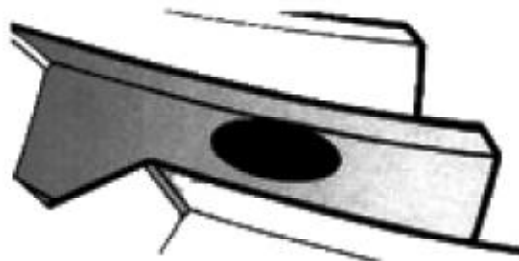
Adjustment

Tooth contact	Thickness adjustment
Contact ①	Decrease thickness
Contact ③	Increase thickness

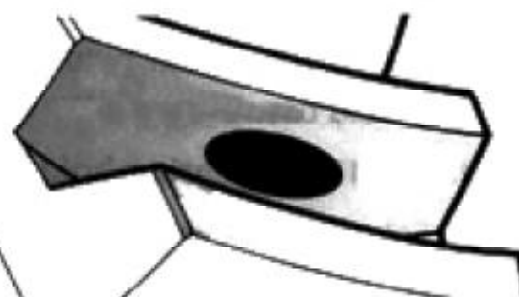
Note:

- 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 backlash should be within the required specification.

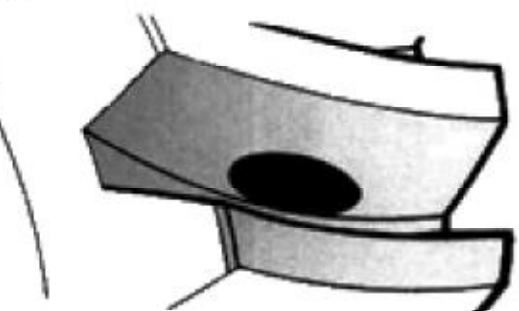
①



②



③

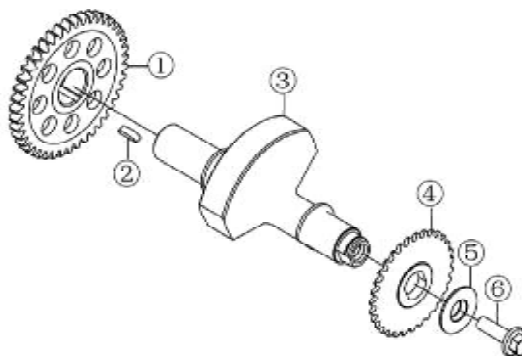


Balance shaft

- Remove the parts as illustrated on the right.

Check each part for abnormal wear or damage.

Replace if necessary.



- ① Balance shaft gear
- ② woodruff key
- ③ Balance shaft;
- ④ Balance shaft sprocket
- ⑤ Washer
- ⑥ Bolt

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.

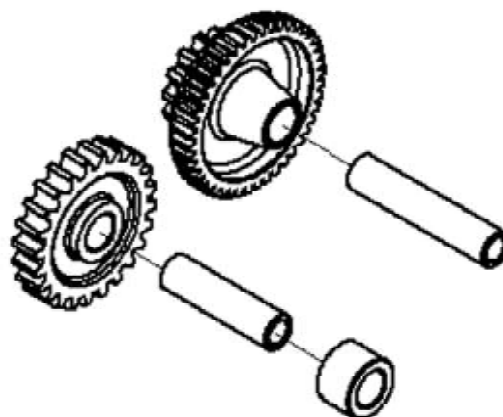
● Install starter driven gear bearing with special tool.

Tool: Bearing installer/Remover



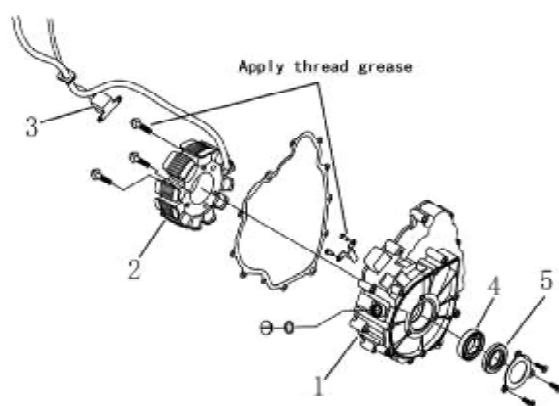
Electric Starter Gear

- Check the gear surface for scrap or damage, replace if necessary;



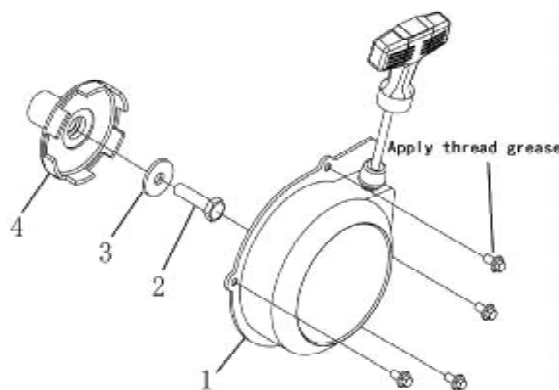
Left crank case cover:

- Check magneto stator coil 2, pickup coil 3 for damage, replace circuit if necessary.
- Check bearing 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 lubricating oil to bearing 4 and lubricant grease to lip of oil seal 5 when assembling.

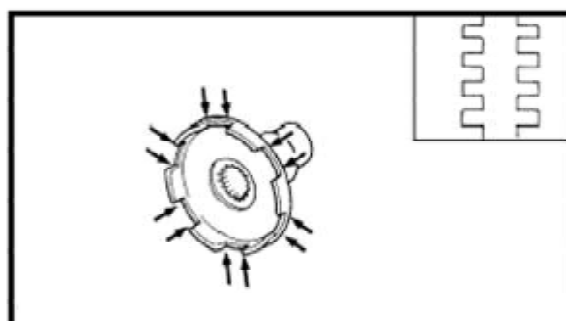


Recoil starter disassembly:

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

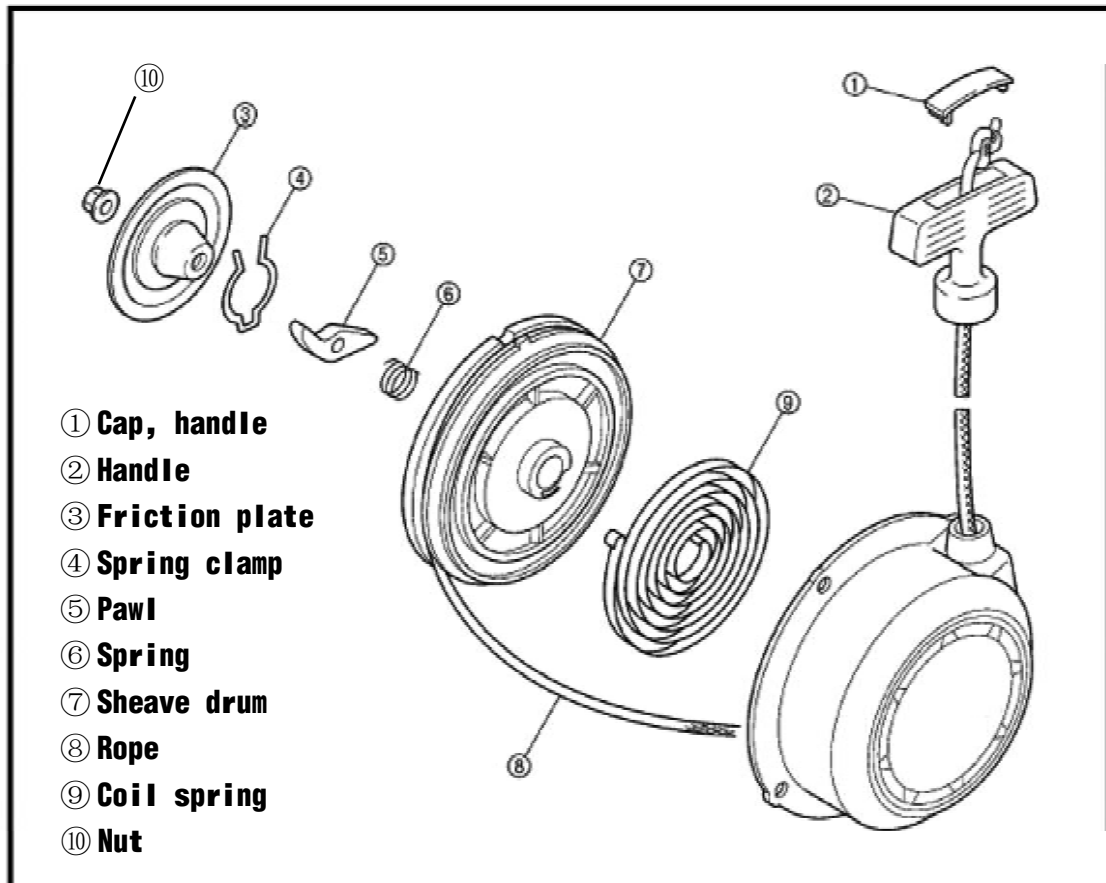
Inspection

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



Recoil Starter

● Disassembly is unnecessary if recoil starter works 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. Replace if necessary.

Assembly

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

Install sheave drum ①, rope ②, coil spring ③, Damper ④.

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 spring ① and sheave drum ②;

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.

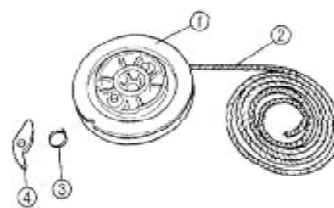
Install spring clamp ①, friction plate ② and bolt

Put the end of spring clamp in the groove near the damper.

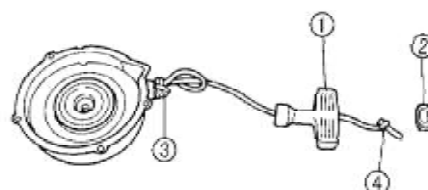
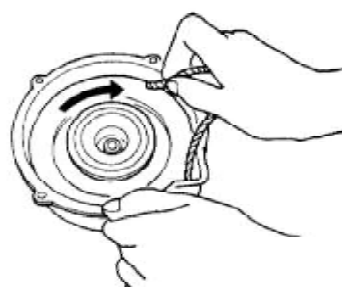
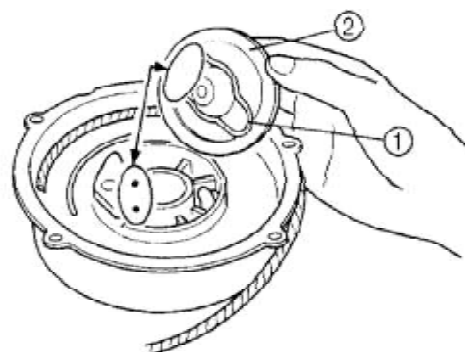
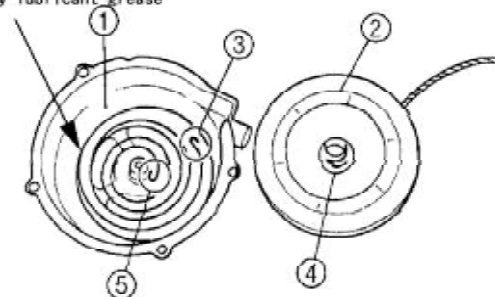
Turn sheave drum clockwise three times to tighten the coil spring.

Install handle ① and handle cap ②

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 tie ④, draw back previous one ③.



Apply lubricant grease



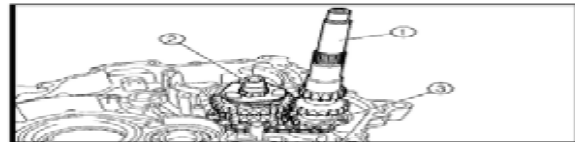
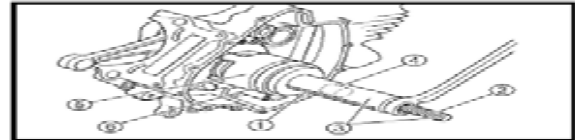
CVT COVER

- Remove screw 5, oil seal limiter 4 . Remove oil seal 3 with special 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

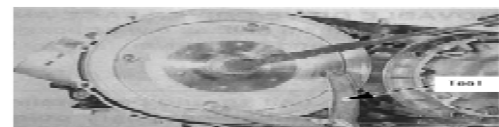
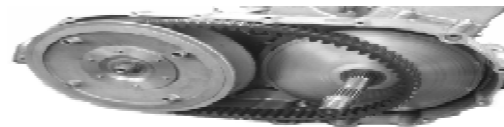
- Install oil seal limiter and tighten screw after applying thread locker.

Tool: Bearing remover
Oil seal remover
Bearing installer

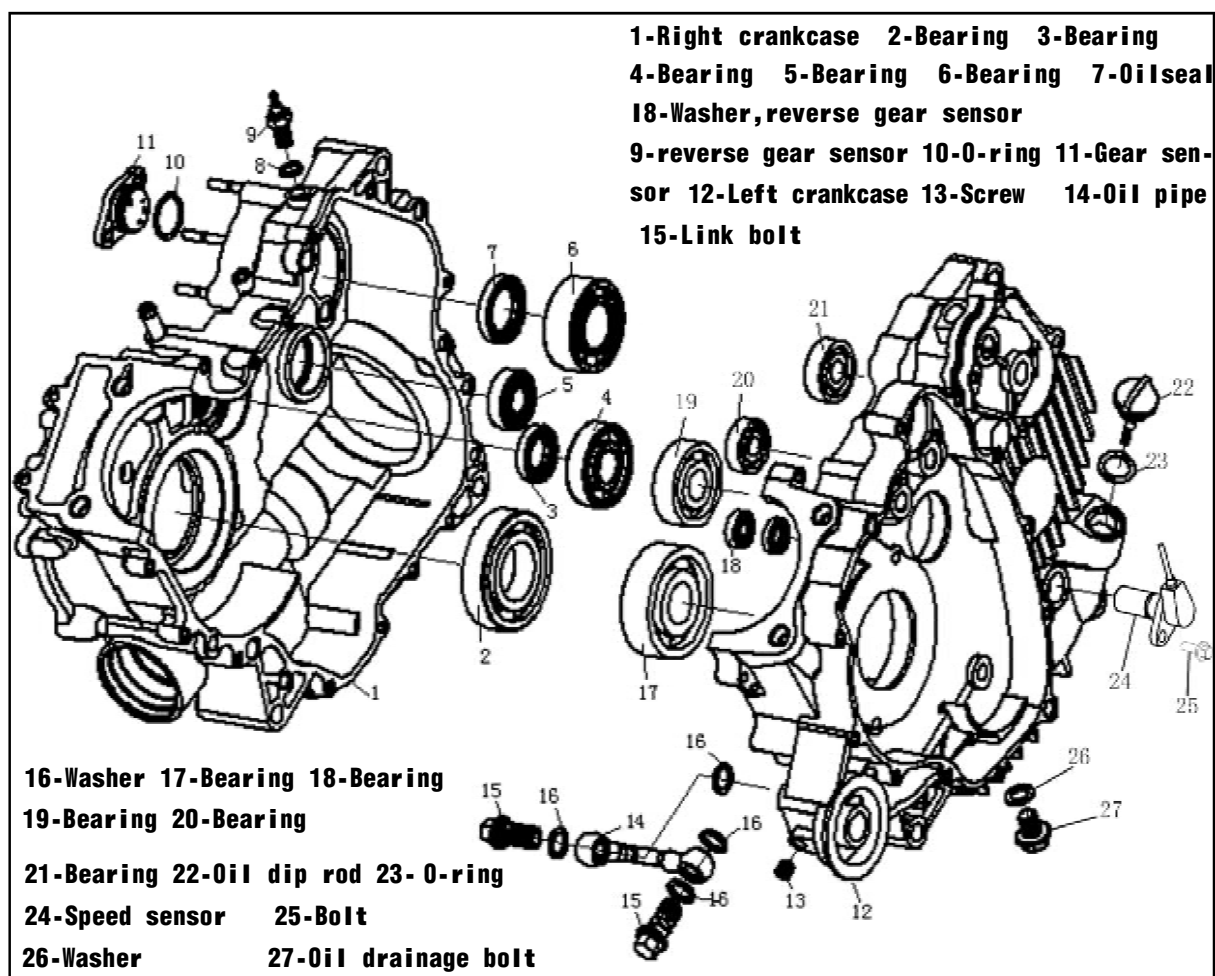
**CVT case**

- 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;

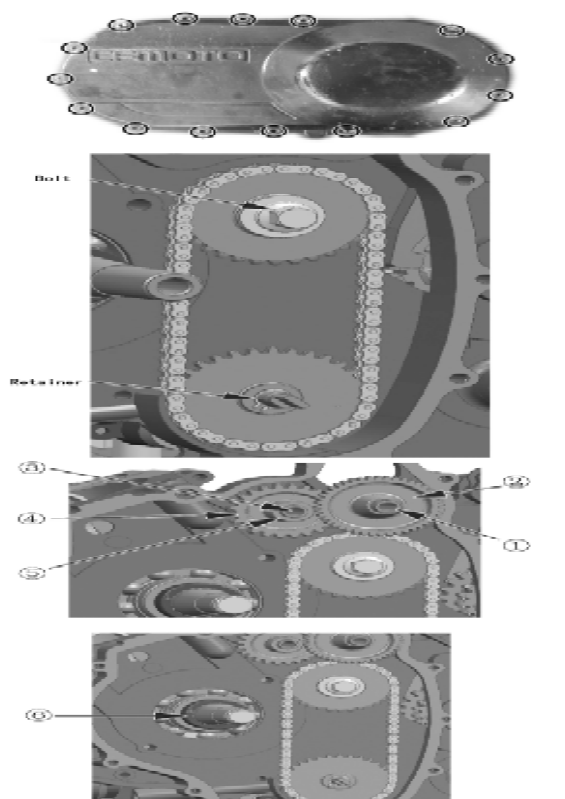
● Remove gear sensor 11 and check for continuity with reverse gear sensor 9 with a multimeter

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

● Remove drainage bolt 27&clean it;

● Use special tools to assemble bearing or oil seals. 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 sensor;
- Install reverse gear sensor 9 and tighten to the specified torque

Tightening torque: $20\text{N} \cdot \text{m}$

- Install speed sensor 24
- Install oil pipe and tighten the link bolt to the specified torque:

Tightening torque: $18\text{N} \cdot \text{m}$

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

Tightening torque: $30\text{N} \cdot \text{m}$

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.

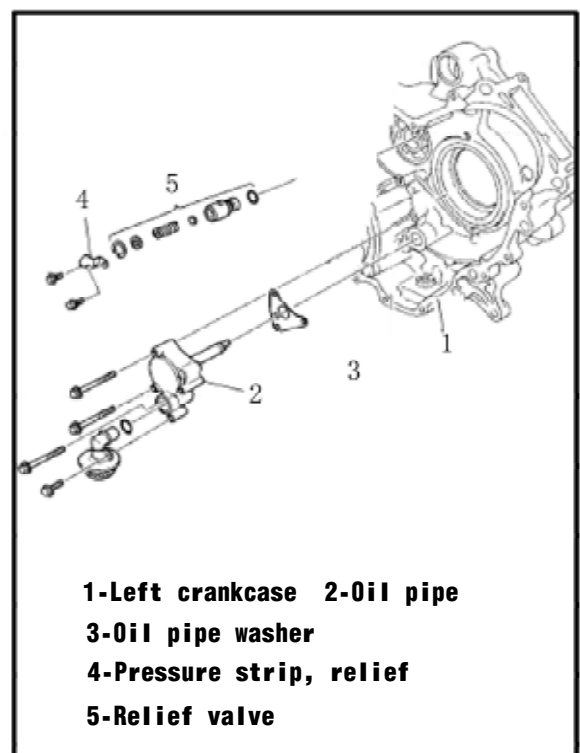
Engine Center

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: $10\text{N} \cdot \text{m}$

Relief valve bolt: $10\text{N} \cdot \text{m}$



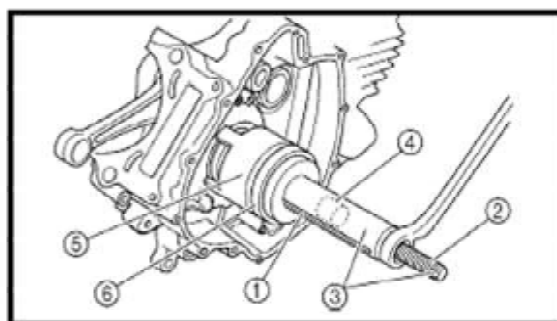
Connected Rod

- 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

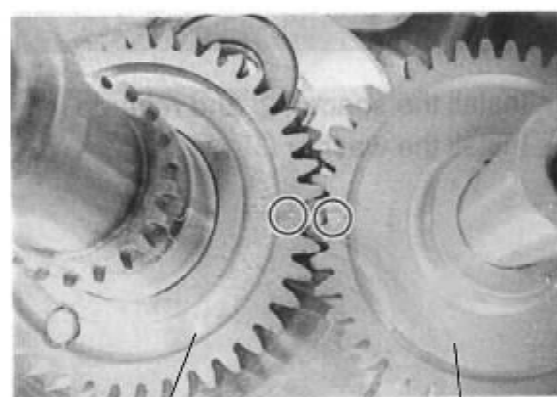
Tool:control installer



Balance Shaft

- Install balance shaft

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

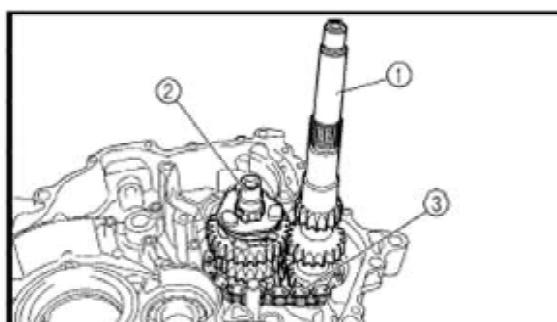


Balancer shaft drive gear

Balancer shaft driven gear

Main Shaft,Counter Shaft

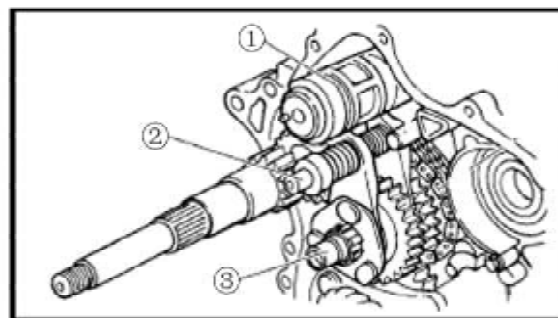
- Install main shaft and counter shaft;



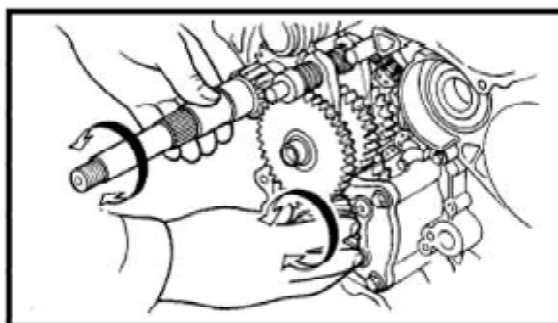
Shift Cam, Shift Fork

- Install shift cam ① and shift fork ②

- Check each part for smooth turning;
- Install low range driven gear to counter shaft ③



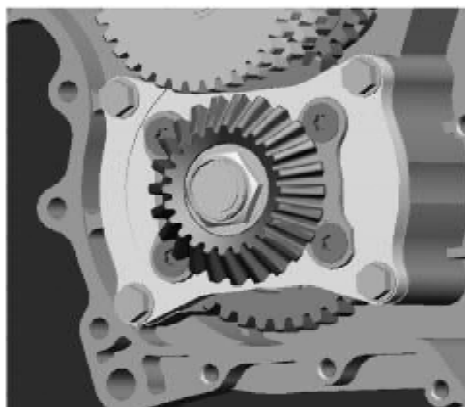
- Spray adequate engine oil to each part;



Drive Bevel Gear

- Install drive bevel gear and tighten to the specified torque;

Drive bevel gear tightening
torque: 32N · m



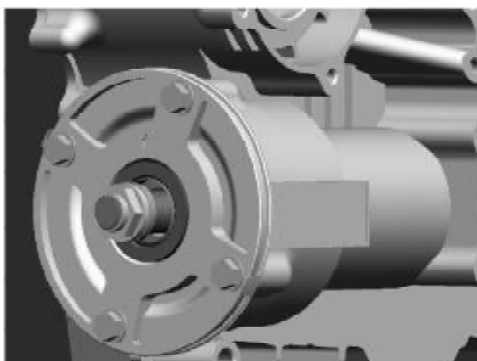
Right Crankcase

Driven Bevel Gear

- Install driven bevel gear and tighten to the specified torque;

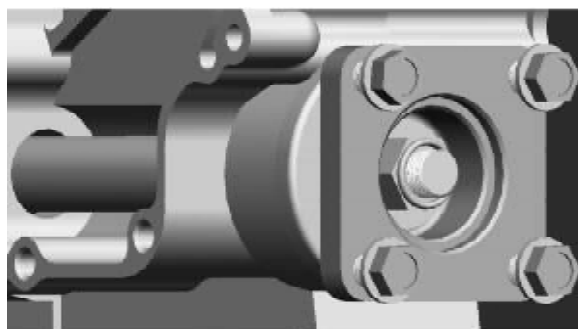
Driven bevel gear tightening
torque: 25N · m

- Check bevel gear backlash
(Refer to 6-44)



Front Output Shaft

- Install front output shaft to right crankcase;



- Apply sealant ① to the mating face of right crankcase;

Note: Apply sealant evenly in a uninterrupted thin line

- Install 2 dowel pins ②;
- Assemble crankcase and tap slightly with a rubber hammer for proper 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

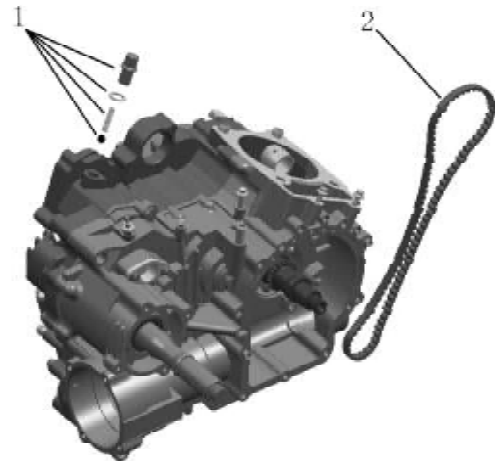
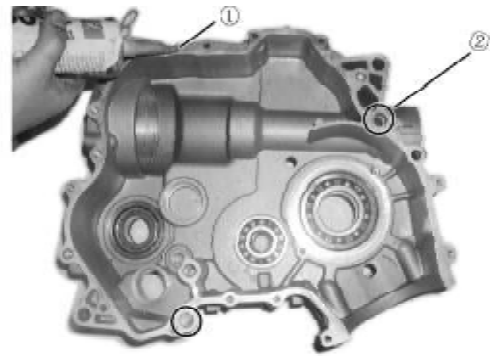
- Place the steel ball and install gear positioning bolt 1 and tighten the bolt to the specified torque

Tightening torque: 18N • m

Engine Right

Timing Chain

- Put on timing chain 2

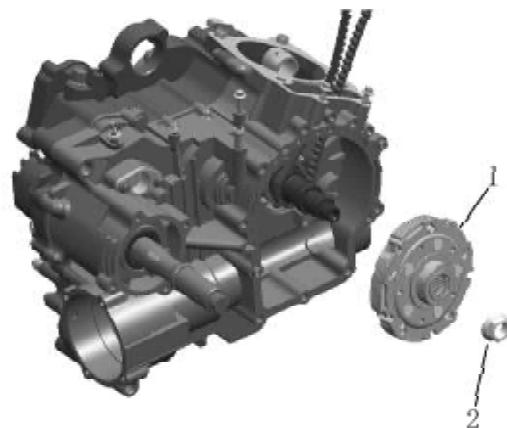


Clutch

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

Clutch nut tightening

torque: 70N • m



- Install new O-ring ⑥ in spacer ⑧
- Install spacer ⑧ onto the clutch housing shaft, then install into CVT case ⑦

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

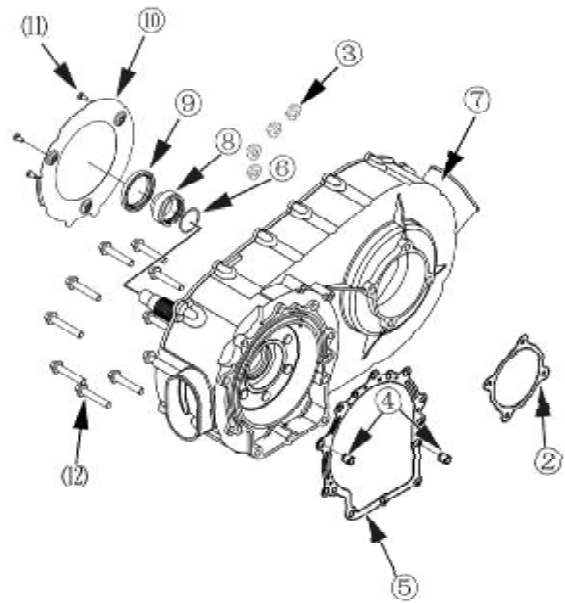
CVT Case

- Install dowel pin ④, gasket ② gasket ⑤, install CVT case assembly to the right crank-case
- Install bolt ⑫ and nut ③

Note:

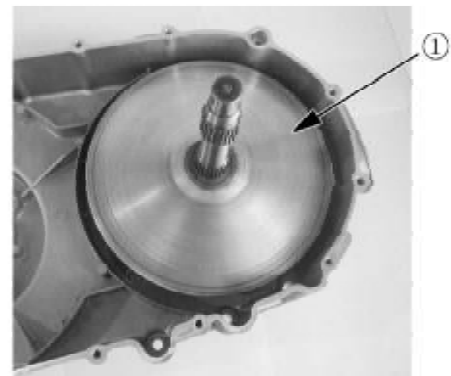
- Tighten bolt/nut diagonally
- Use a new gasket

- Install guide plate ⑩ and screw ⑪



Primary sheave, secondary sheave, drive Belt

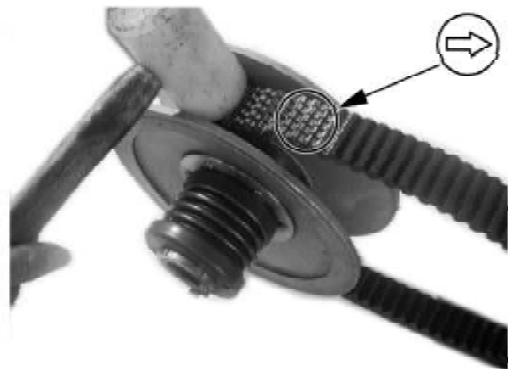
- Install primary fixed sheave ① as illustrated on the right;



- Install drive belt on secondary sheave and tap with a plastic hammer to keep the belt as low as possible;

Note:

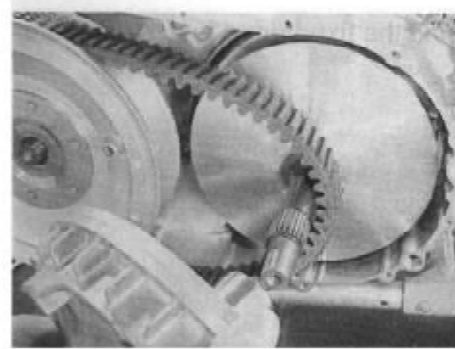
- Install the drive belt with the arrow on the belt turn in the clockwise direction;
- Drive belt contact surface should be free from any stains



- Install secondary sheave;

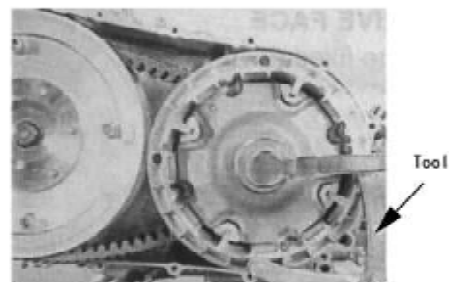


- Install primary sliding sheave



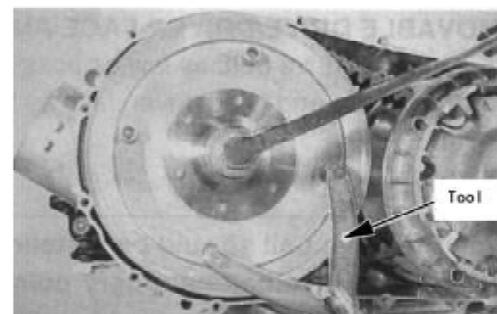
- Tighten primary sheave nut with special tool to the specified torque;

Primary sheave nut tightening
torque: 115N·m
Tool: CVT Holder



- Tighten secondary sheave nut with special tool to the specified torque;

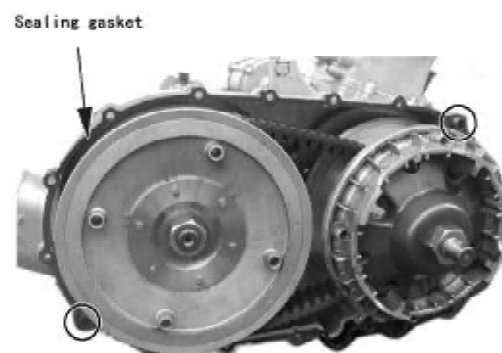
Secondary sheave tightening
torque: 115N·m
Tool: Rotor holder



Note: Turn the primary sheave until the belt is seated in and both primary and secondary sheaves move together smoothly.

CVT case cover

- Install the new gasket and dowel pins;



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

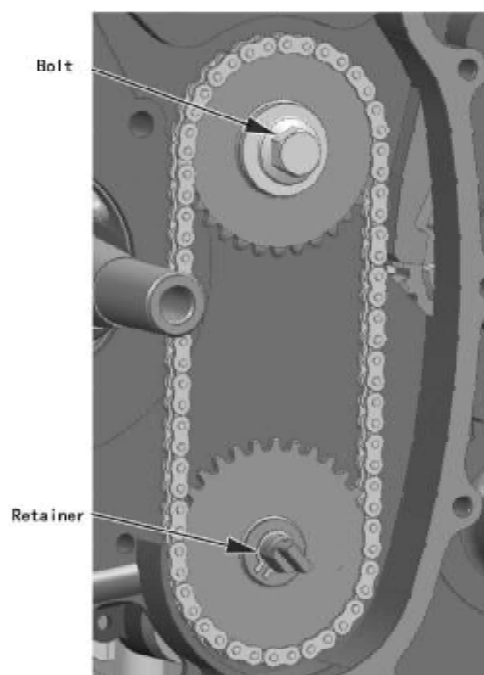


Engine left

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;

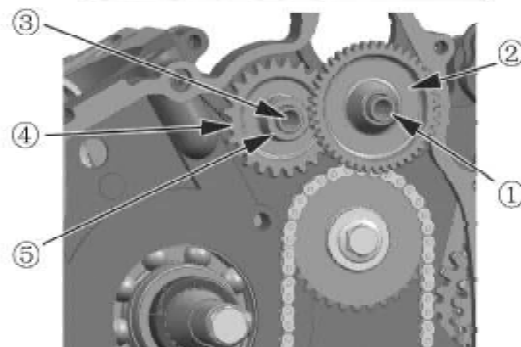
Tool: Long nose pliers



Dual gear/idler gear

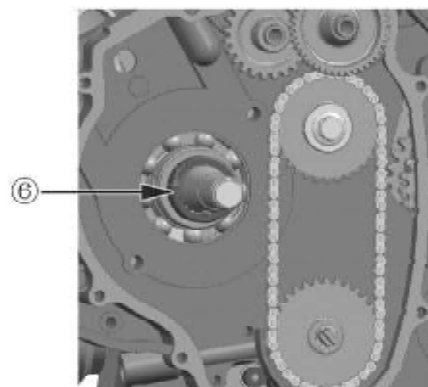
- Install dual gear shaft ① and dual gear ② ;

- Install idler gear shaft ③、idler gear ④ and bush ⑤;

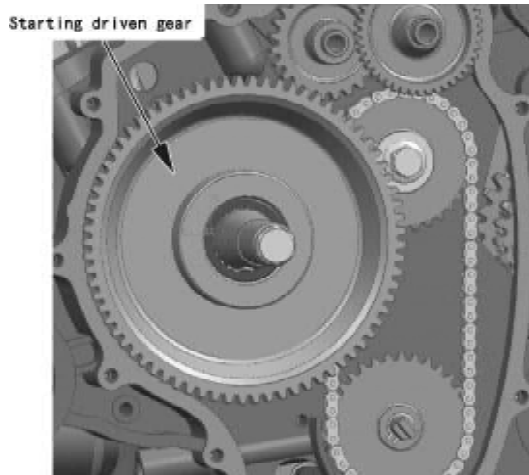


Starter driven gear

- Install starting driven gear bush ⑥;



- Install starting driven gear;



Magneto rotor

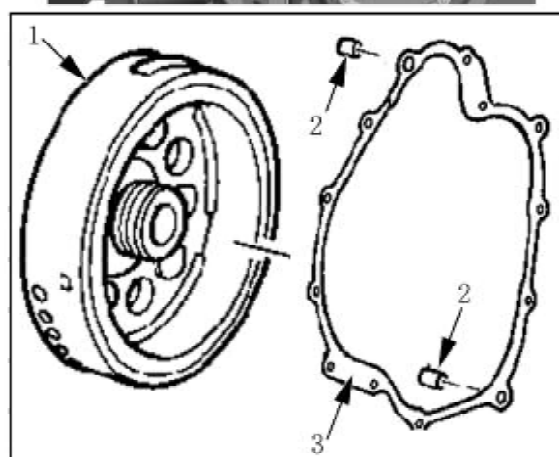
- Install woodruff key into crankshaft groove;
- Install magneto rotor 1;

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.

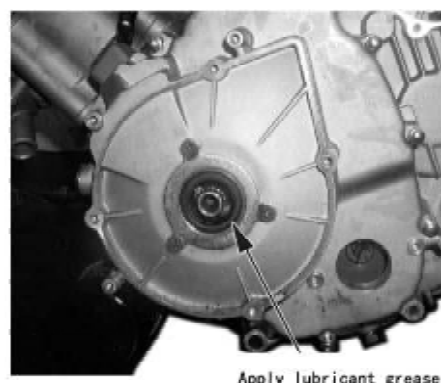
Left crankcase cover

- Install dowel pin 2 and gasket 3;

Note: Use a new gasket



- Apply lubricant grease to oil lip;
- Install left crankcase cover;
- Install bolts



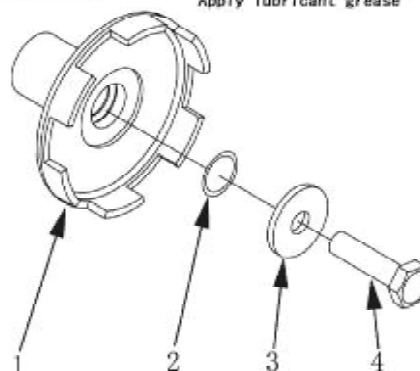
Recoil starter

- 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.

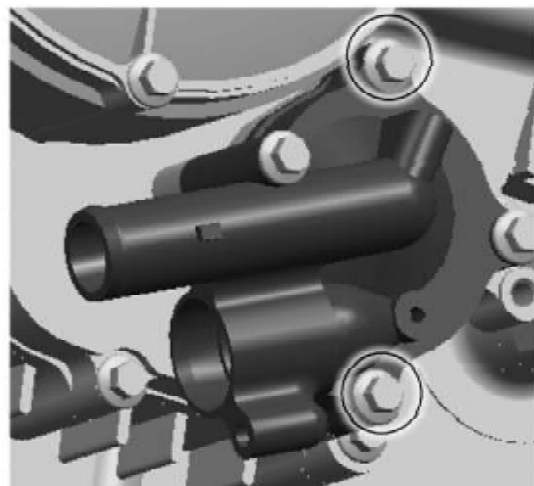
Recoil starter bolt
tightening torque: 55N·m



Water pump

- Install water pump;
- Install water pump fixing bolts;

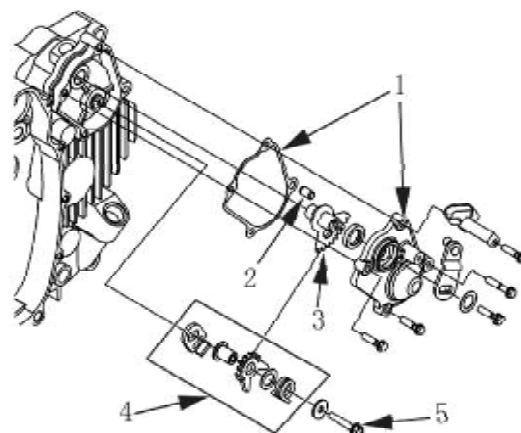
Note: Before tightening the bolts, be sure to insert oil pump shaft into groove of water pump shaft



Sector gear

Install the parts as illustrated on the right

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



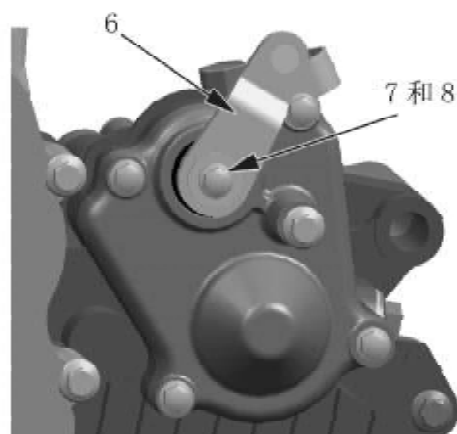
Note:

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:
14 N · m



- Install gearshift rocker arm 6;
- Install rocker arm bolt 7 and washer 8;



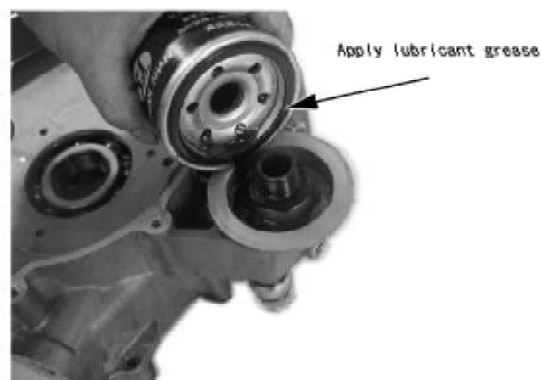
Oil filter

Install oil filter bolt and tighten to the specified torque.

Tightening torque: $63\text{N}\cdot\text{m}$

- Apply engine oil to O-ring;
- Install oil filter, turn it by hand until the filter gasket contacts the mating surface. Tighten the bolts.

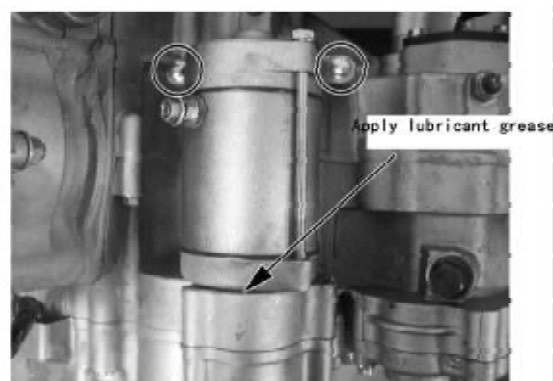
Tool: Oil filter wrench



Starting motor

- Apply engine oil to new O-ring;
- Install starting motor;
- Install bolt and tighten to the specified torque

Tightening torque: $10\text{N}\cdot\text{m}$

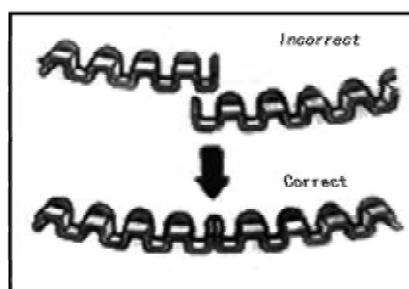
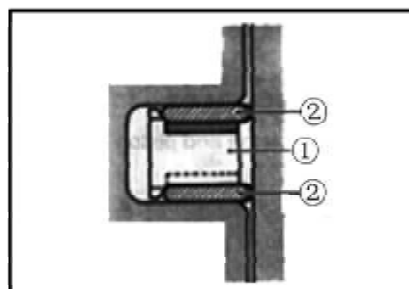


Engine top side

Piston

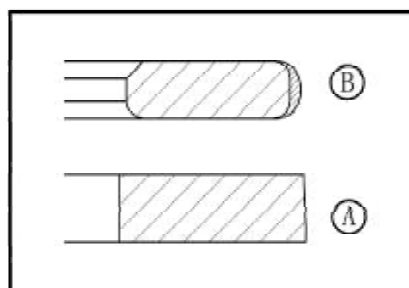
- Install the piston rings in the order of oil ring, ② ring and ① ring;
- The first member to go to the oil ring groove is spacer ①, after placing the spacer, fit the two side rails ②;

Warning: when installing the spacer ①, do not overlap its two ends in the groove.

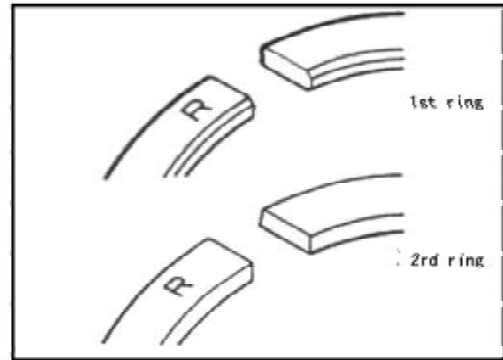


- Install the second ring A and first ring B.

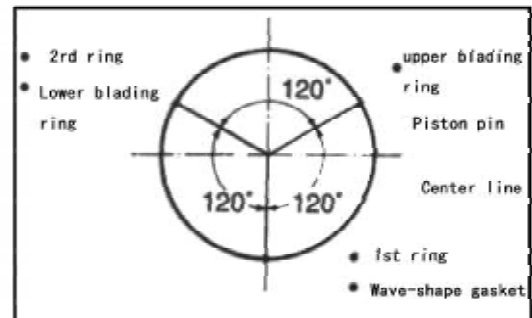
Note: 1st ring and 2nd ring differ in shape



● 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

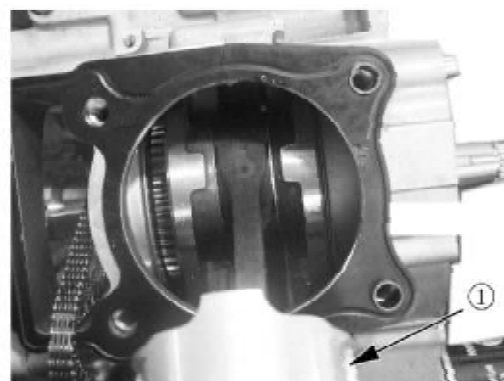


● Place a clean rag beneath piston and install piston pin circlip ①

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 guide ①;
- Fit the dowel pin and new cylinder cover gasket;

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

Cylinder

- 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;

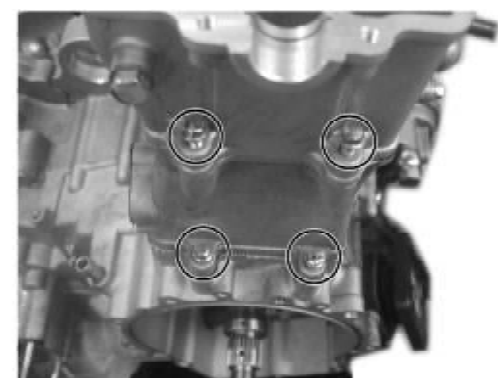
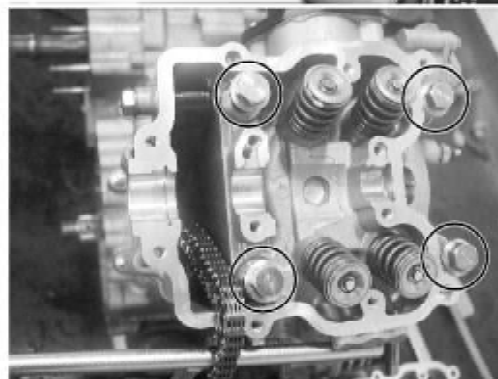
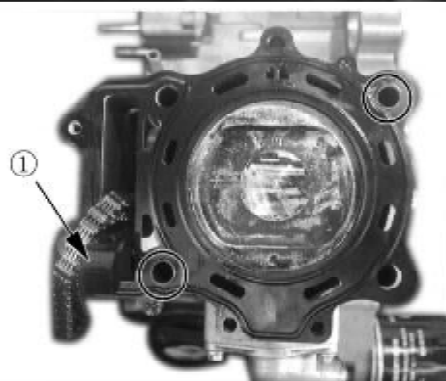
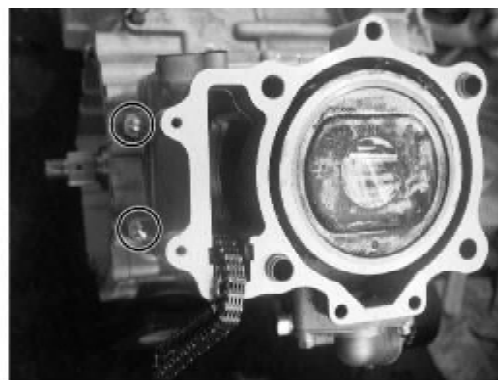
Cylinder head nuts tightening torque:

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;

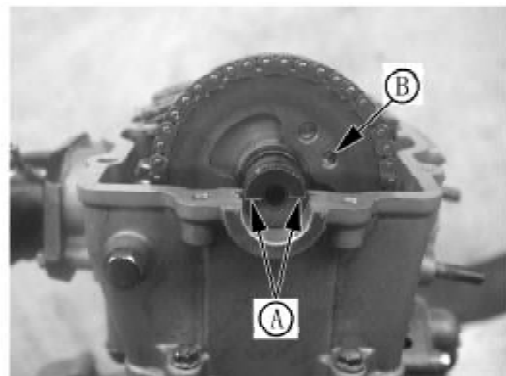
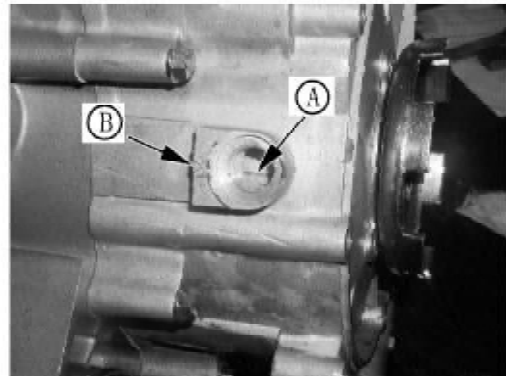
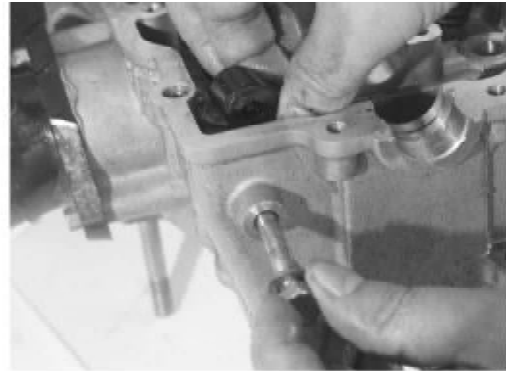
Note: while rotating crankshaft, pull the cam chain upward, or the chain will be caught between sprocket and crankcase.

- 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-ring ①;

- 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
: 15 N · m

- Bend up the lock washer to lock the bolts;

Cylinder head cover

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

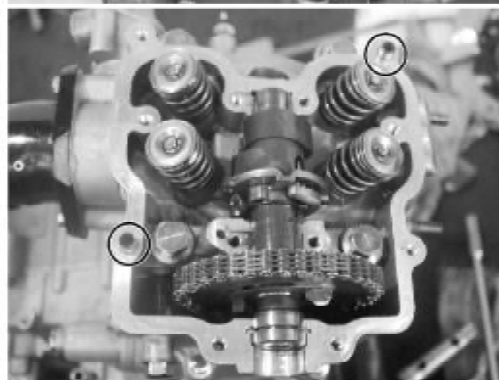
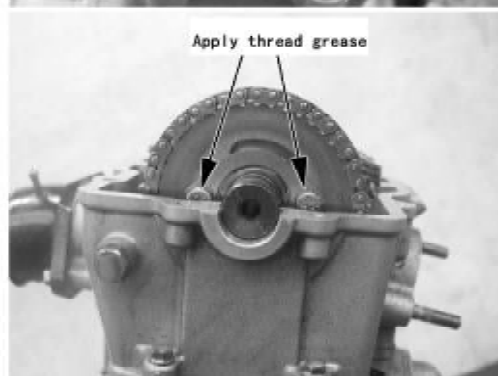
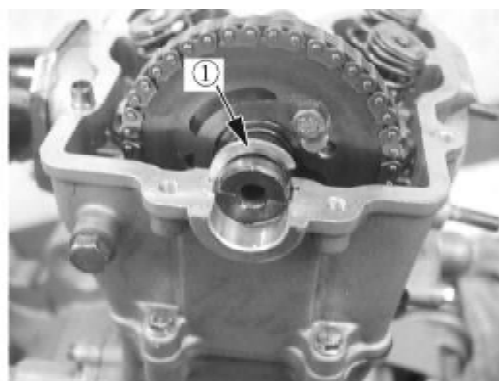
- Install dowel pin to the cylinder head

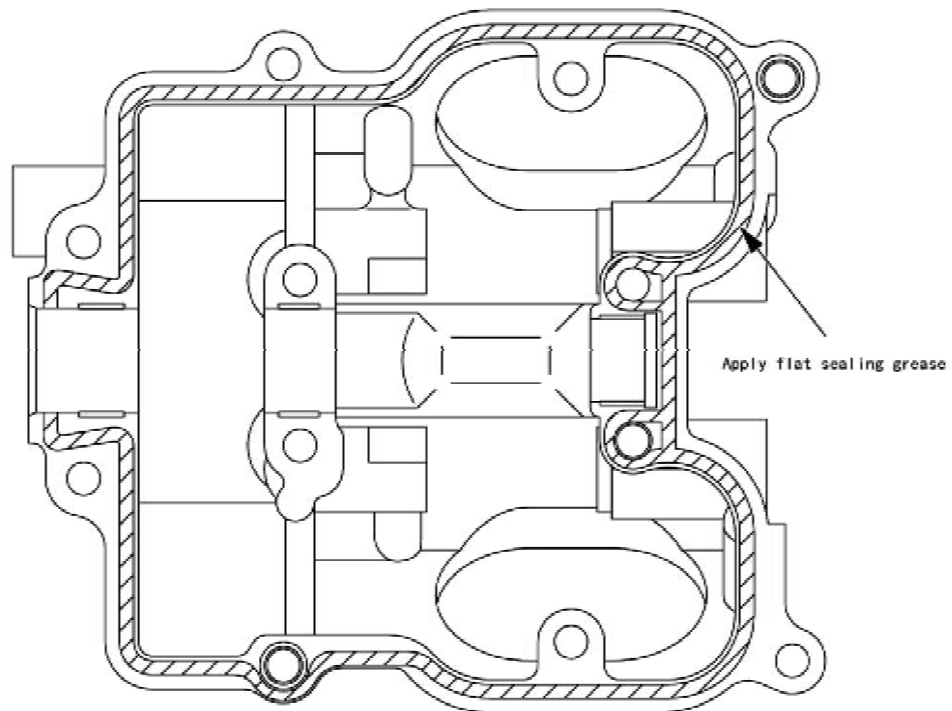
- Apply sealant to the mating surface of the cylinder head cover;

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

Cylinder head cover bolt tightening torque: 10 N · 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**

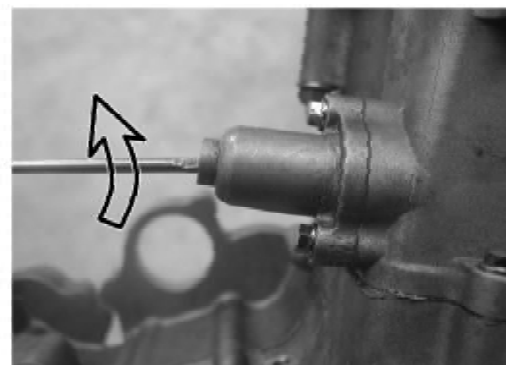
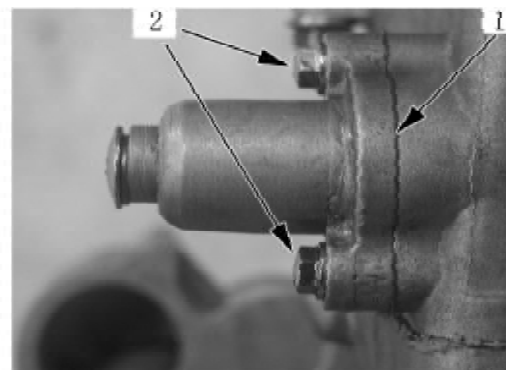
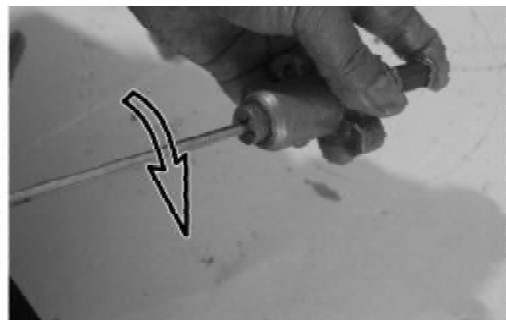
● Insert (--) screwdriver into slotted end of chain tension adjuster, turn it clockwise to lock the tensioner spring;

● Install the chain tensioner and the new washer 1 ;

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

Chain tensioner bolt tightening torque: $10\text{N} \cdot \text{m}$

● 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: $8\text{ N} \cdot \text{m}$

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: $18\text{ N} \cdot \text{m}$
Tool: Spark Plug Wrench

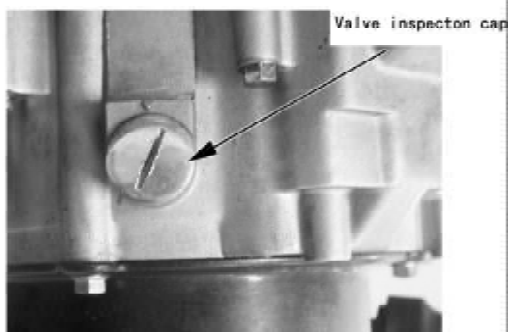
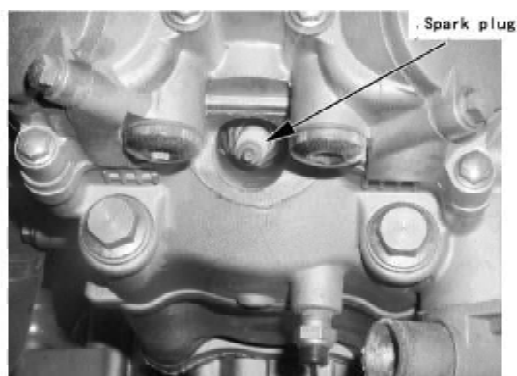
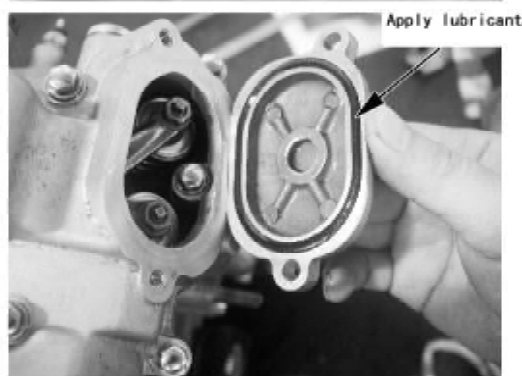
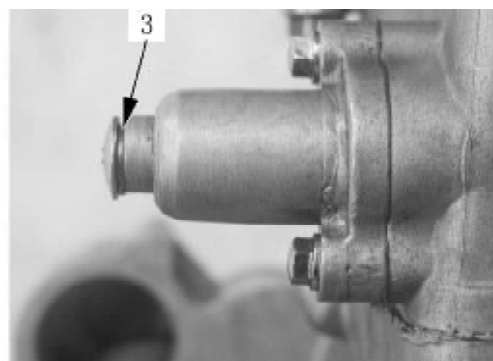
Engine periphery

Recoil starter

- Install recoil starter;
- Apply thread locker to the bolts and then tighten;

Valve inspection cap

- Install valve inspection cap;

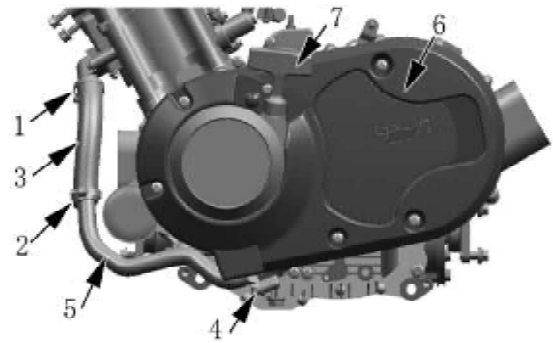


Left plastic cover

- Install left plastic cover 6

Water pipe and hose

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



Overhaul info.....	7-2
Troubleshooting.....	7-3
High pressure oil pipe Disassembly/ Installation...	7-4
Throttle Valve Disassembly/Installation.....	7-5
Fuel Injector Assy Disassembly/Installation.....	7-6
Fuel injector Assy Removal/Assembly.....	7-6
Idle Air control valve Disassembly/Installation.....	7-6

Overhaul info**Caution****Note**

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.

- Do not over twist or bend the cables. The twisted cables may cause poor operation.
- Loose the high pressure oil pipe before disassembly, discharge the fuel in the high pressure oil pipe and put it in a container.
- When the body of throttle valve is disassembled, the air intake shall be covered by dishcloth or tape, for avoiding the entry of other objects into the engine from the air intake side of the engine.
- When the vehicle will be stored for more than one month, the gasoline in the high pressure oil pipe and cap of the fuel injector must be discharged. Otherwise, the gasoline will age and form colloidal elements which may block the nozzle of fuel injector, therefore the engine cannot start or the rotate speed is unstable.

Overhail Info**Engine starting failure**

- Too much fuel in the engine
 - Air filter clogged
 - Idle air pipe clogged
- No fuel in the injector
 - fuel filter clogged
 - high pressure oil pipe clogged
 - fuel injector clogged

Hard starting/shut down after starting,**Unsteady idle speed**

- Idle air pipe clogged
- fuel system clogged
- Ignition system not functioning properly
- Fuel tank cap clogged

No fire when accelerating

- ignition system not functioning properly
- Incorrect Spark Plug clearance

High pressure oil pipe Disassembly
Loosen the special fuel pipe clamp on fuel injector cap, loosen the special fuel pipe clamp on fuel tank.

Disassemble High pressure oil pipe

Note

Use container to keep the remaining fuel from high pressure oil pipe, when loosening the special fuel pipe clamp

High pressure oil pipe Installation

Reverse the disassembly procedure for installation.

Use OETIKER clamp calliper to install the special fuel pipe clamp.

Throttle valve body Disassembly

Loosen the strap and remove throttle valve connector.

Loosen locknut, remove adjust nut and remove the throttle cable from throttle rotary sleeve.

Disassemble idel air outlet pipe on throttle valve.

Loosen air intake connect clamp, air cleaner connect clamp, and remove throttle valve body.

Notes

Donot adjust the bolt on throttle valve.
Donot remove the cap on throttle valve body.

Throttle valve body Installation

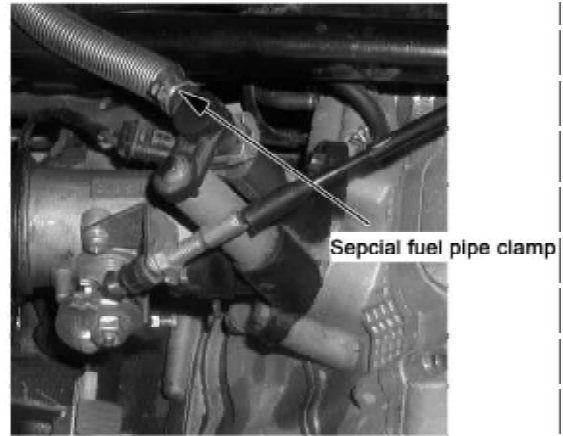
Reverse the disassembly procedure for installation.

Fuel Injector Assy Disassembly

Disassemble the special high pressure oil
Remove the strap and fuel injector connector.
Disassemble bolts and remove fuel injector cap and injector.

Fuel Injector Assy Installation

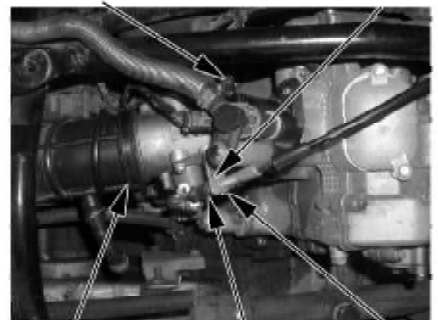
Reverse the disassembly procedure for installation



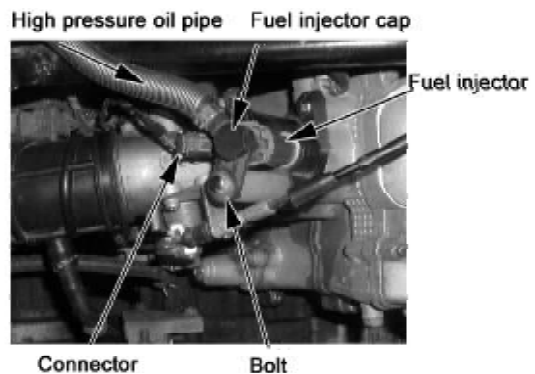
Throttle valve connector idel air outlet pipe



Fuel injector seat clamp Throttle rotary sleeve



air cleaner connect clamp Locknut Adjust nut



High pressure oil pipe Fuel injector cap
Connector Bolt

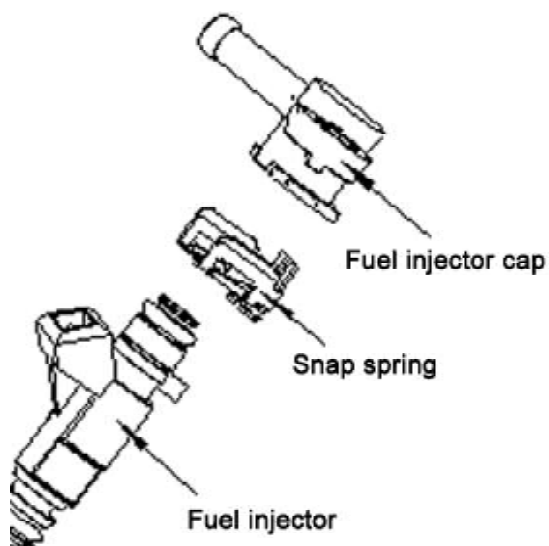
Fuel Injector Assy. Removal

Use thumbs of both hands to push two side of fuel injector cap snap spring, and then remove it.

Seperate fuel injector cap and fuel injector.

Fuel Injector Assy. Assembly

Install fuel injector cap on the fuel injector, Align the groove of fuel injector cap snap spring to edge of fuel injector cap; and press the snap spring into it.

**Idle air control valve Disassembly**

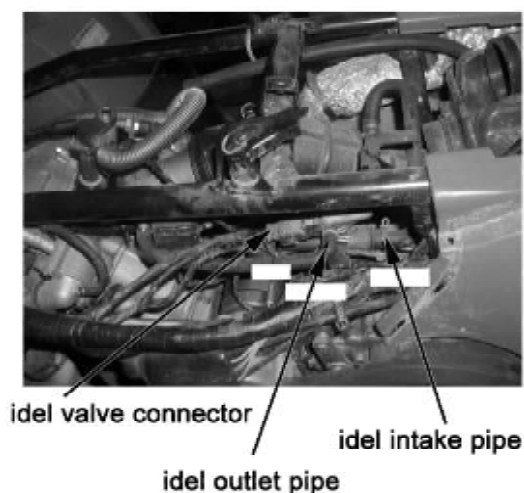
Disassemble idle intake pipe and idle outlet pipe.

Loosen the strap, disassemble idle air control valve and check idle air control valve. Replace it when there is abnormal noise or it doesnot work.

Idle air control valve Installation

Reverse the disassembly procedure for installation.

Pay attention not to bend the intake and outlet pipe of idle air control valve.



8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

Overhaul	8-1	Brake system	8-4
Fault diagnosis	8-2	Front suspension system	8-7
Front wheel	8-3	Steering system	8-12

Overhaul

Operation notice

Attention

- The frame must be hold up firmly when overhauling front wheel, suspension system.
- Light, meter, switch' s overhaul or inspection refers to section 10.
- 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	—

8

Tightening torque

steering tie-rod nut	40-50 N · m
steering shaft lock nut	100-120 N · 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

CFMOTO

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 unmatched
- 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 effect poor

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

8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

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

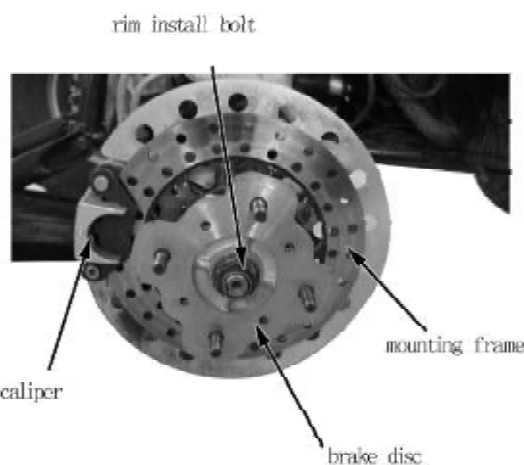
Radial direction: 2.0mm

Installing

Press the rim in the tyre on special matchin.

Fix the rim in hub

Rim install nut torque: 50-60 N·m



8

Front wheel hub disassemble

Disassemble

remove front wheel(→ 8-3)

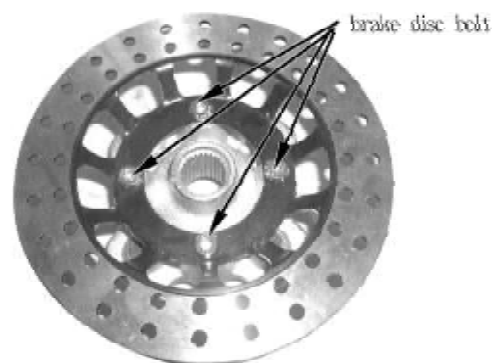
remove front brake caliper(→ 8-4)

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.

CFMOTO

Brake system

Front brake caliper

Disassemble

remove front wheel (→ 8-3)

remove the 2pcs nuts installed on the arm

remove brake caliper

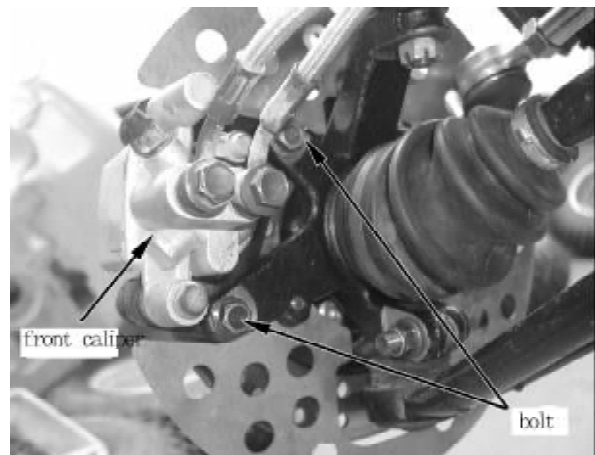
Inspection

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

Installing

Brake caliper holding bolt torque: 40-

50N • m



8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

Brake disc

Disassemble

remove front wheel (→ 8-3)

remove brake caliper (→ 8-4)

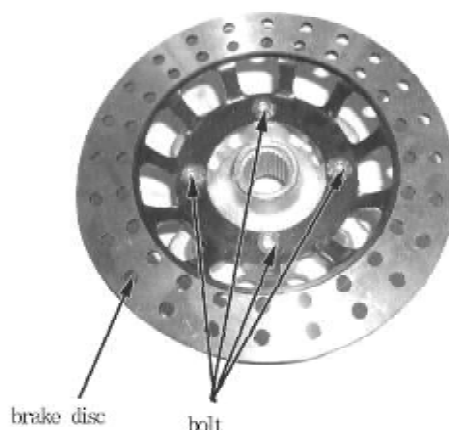
take away brake disc together with front wheel hub.

remove brake disc's 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.

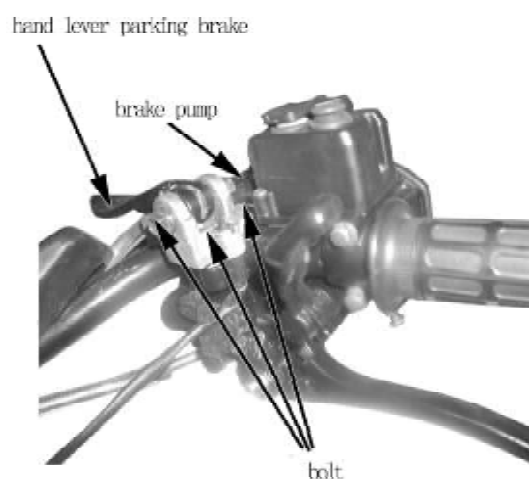
Attention

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

separate 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 can be removed from 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.

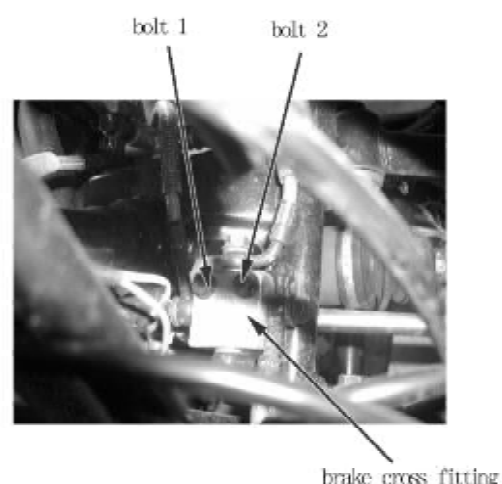
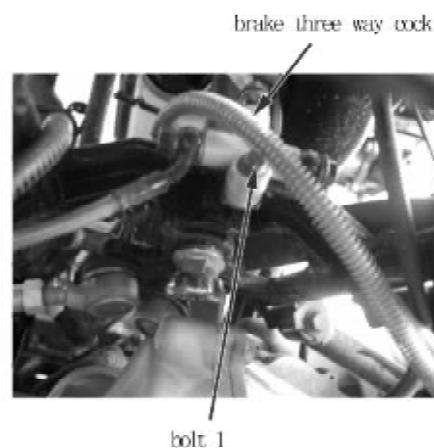
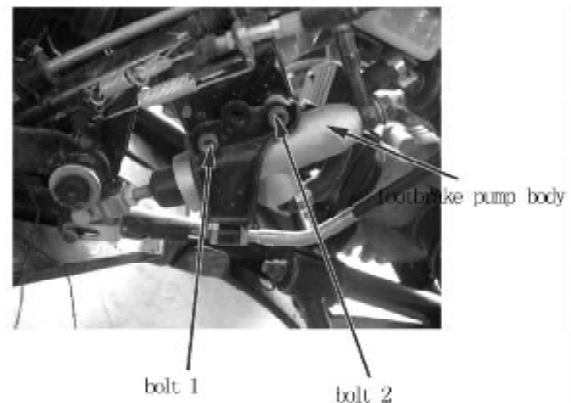
Brake force checking is required when complete the brake system installation. If it cannot control the brake system, check if the stem T-junction, brake force checking is required after finish the brake system installation.

Brake cross joint plug

Disassembling

remove front inner fender RH (2 → 12)

remove bolt 1, bolt 2, then the cross joint plug can be removed from the body.



8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

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.

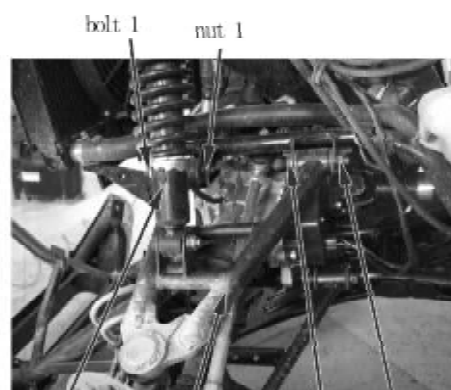
remove front left lower arm bolt 3 and tightening bolt 3' s nut 3, bolt 4 and tightening bolt 4' s nut4 installed in the frame.

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.



nut. absorber bolt.

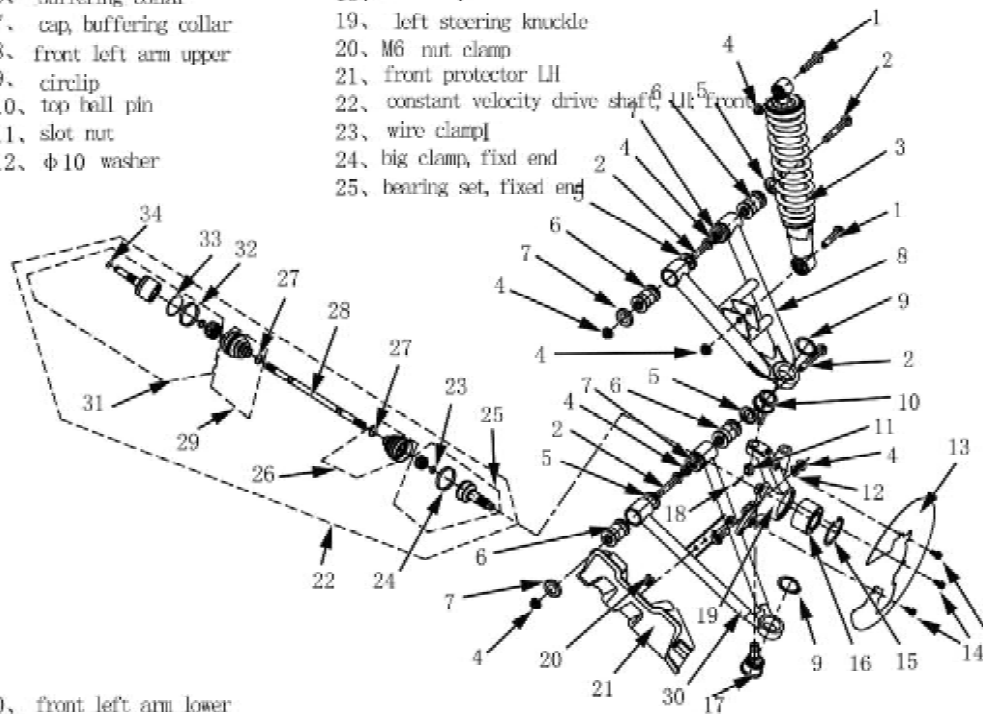


front left absorber right front upper traverse bolt 2 nut 2



bolt 4 nut 4 left front down traverse nut 3 bolt 3

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



- | |
|-------------------------------|
| 30、front left arm lower |
| 31、bearing set, motion end LH |
| 32、big clamp, motion end |
| 33、wire clampII |
| 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.

8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

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.

8

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.

CFMOTO

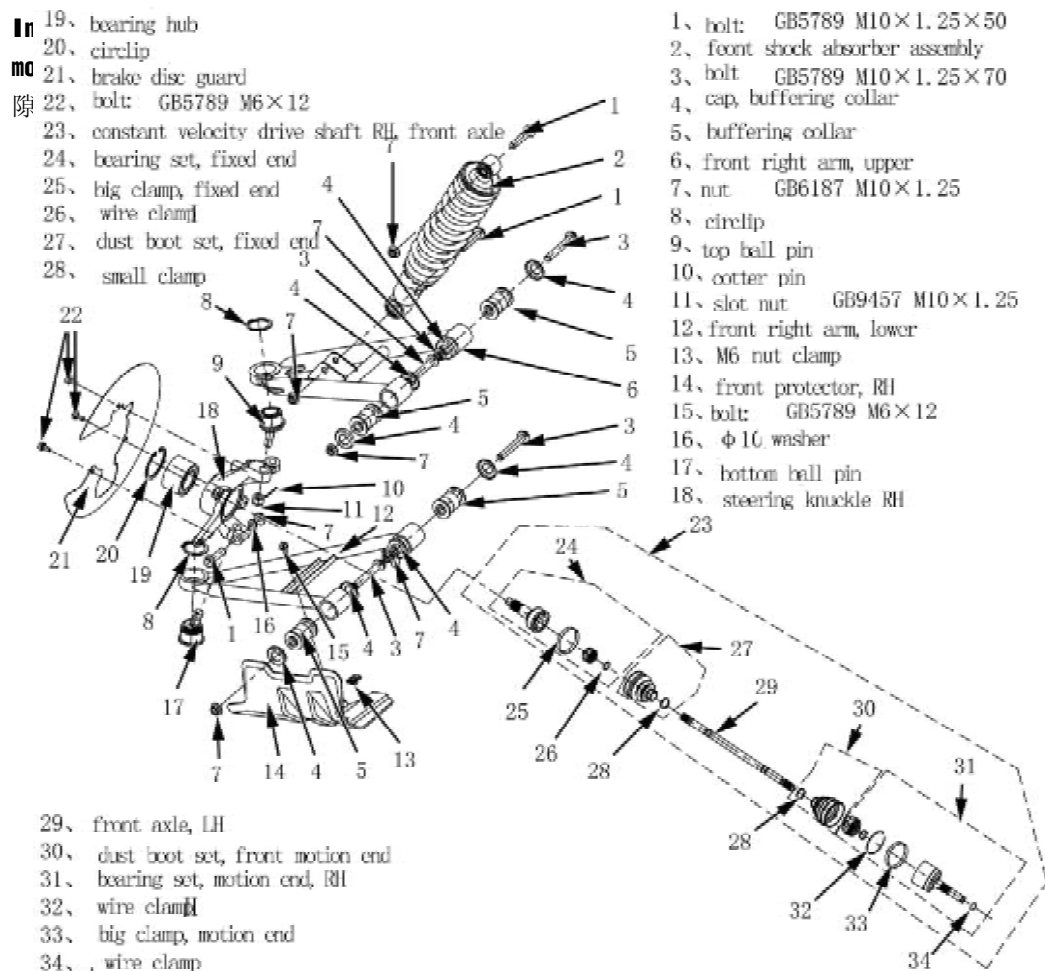
Inspection

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 destroy, replace it if need.



8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

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 do not need to remove the front suspension assy from the vehicle if you only repair the front axle constant velocity drive shaft, LH.

remove front left wheel (→ 8-3)

remove front left brake caliper (→ 8-4)

remove front left rim hub (→ 8-3)

Examine duct boot, replace with new ones if destroy.

constant velocity drive shaft 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.

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

Assembling

Mounting torque: 40~50N·m

Use special tool to press the ball pin into the arm assy.

Assembling carry on according to the opposite sequence of disassembling.

Steering system

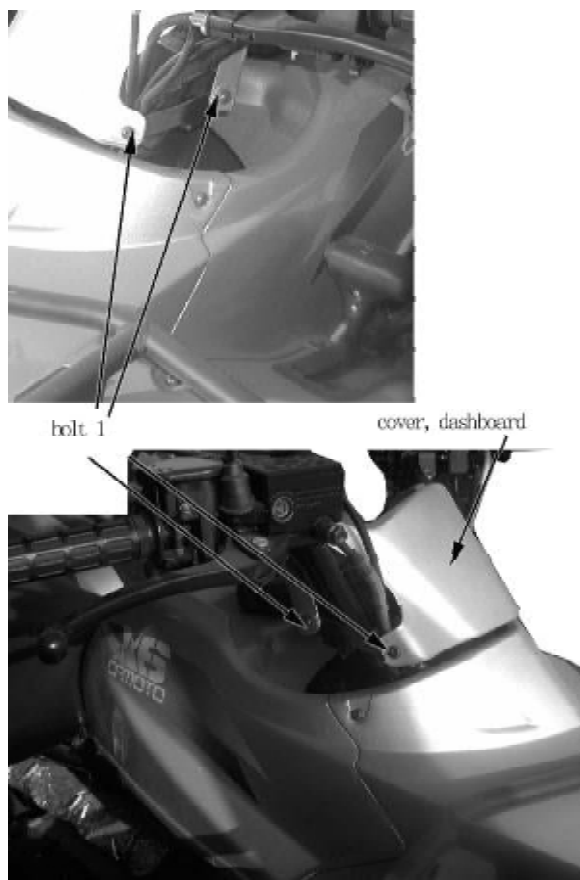
Handlebar

Dashboard cover

disassembling

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)

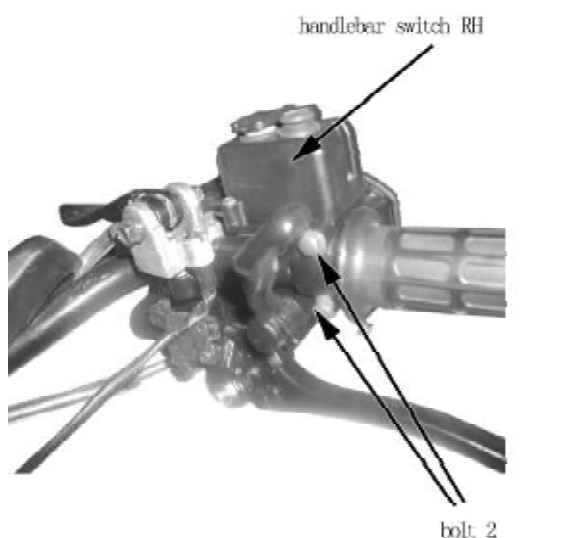
remove RH handlebar switch connector

remove the two bolts installed in handlebar tube.

remove handlebar switch, RH.

Installation

Install the handlebar switch, RH (→ 8-15)



8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

Handlebar switch, LH

disassembling

remove 2 screws



remove LH handlebar switch connector

remove handlebar switch, LH

Install

Install the LH handlebar switch (→ 8-15)



handlebar switch connector

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.

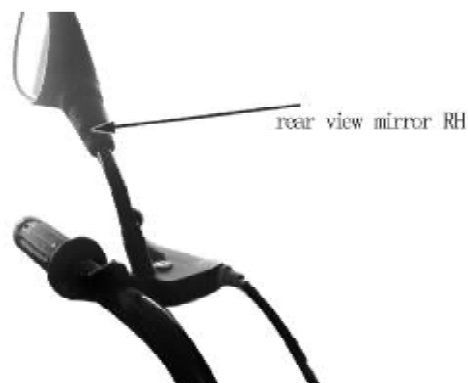
Attention: Left hand rear view mirror is right hand screw thread, turn it in counter-clockwise direction when dismantling.

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

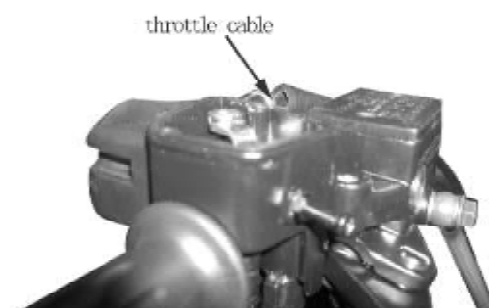
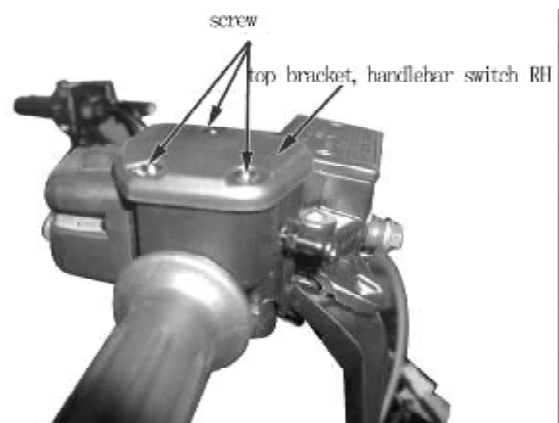
Main cable assy,、throttle cable,brake oil pipe, cable hut according to the drawing correctly.

Install throttle cable

remove the three screws, remove RH handlebar s

Install throttle cable

install RH handlebar switch cover

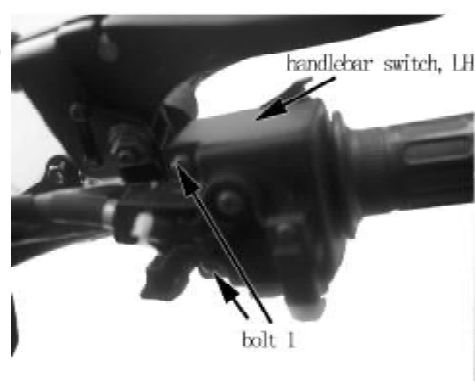


8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

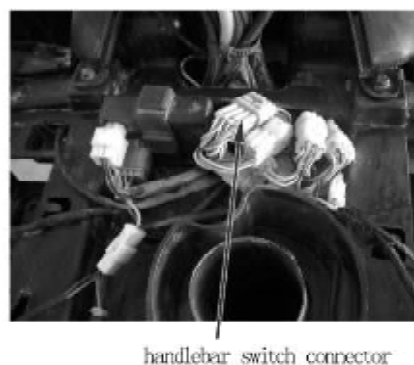
Install LH handlebar switch

Pair the LH handlebar switch stopped onto the handlebar location hole.

use bolt 1 tightening from the bottom.

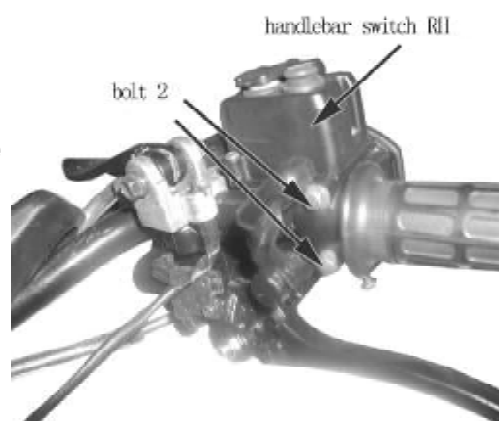


Insert the LH handlebar switch's connector into the main cable.



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's 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.

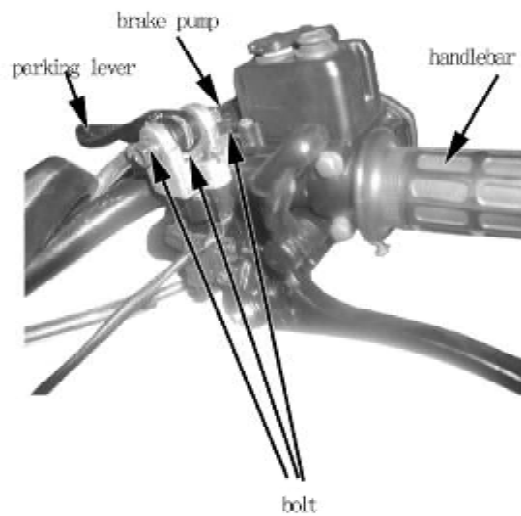
Install brake pump

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

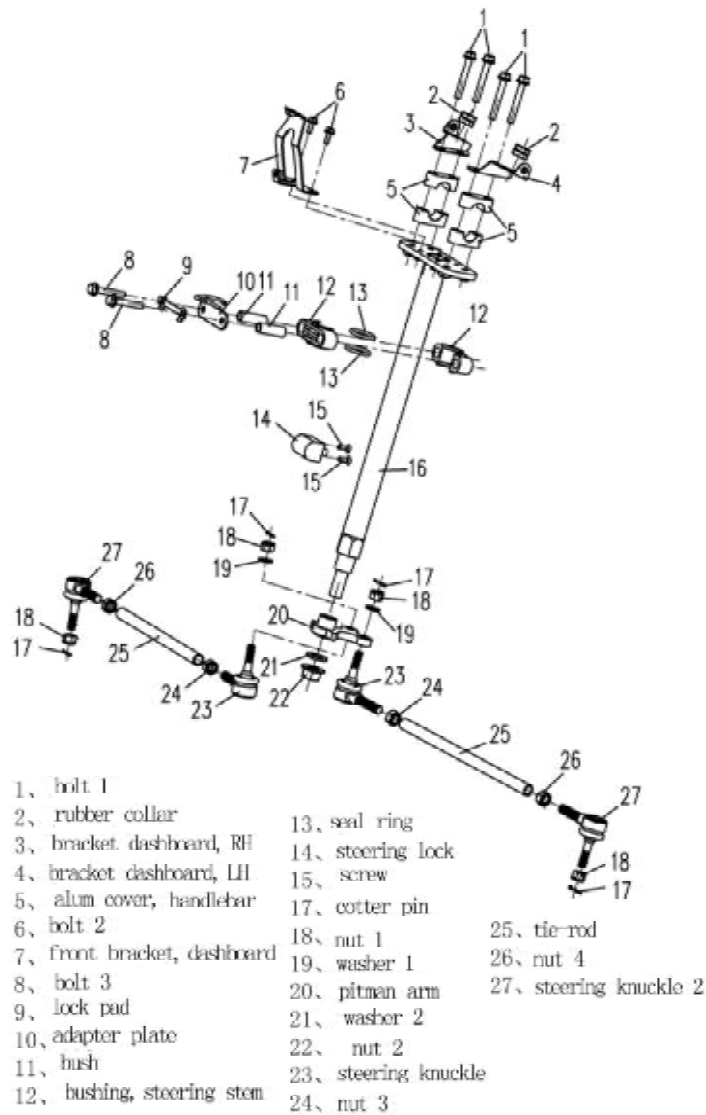
install the rear view mirror (→ 8-13)

install the dashboard (→ 8-10)

install the dashboard cover (→ 8-12)

8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

Steering system



Steering stem

Disassembling

remove dashboard front cover

(→ 8-12)

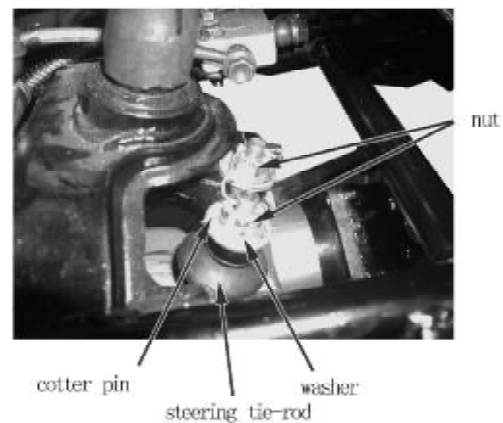
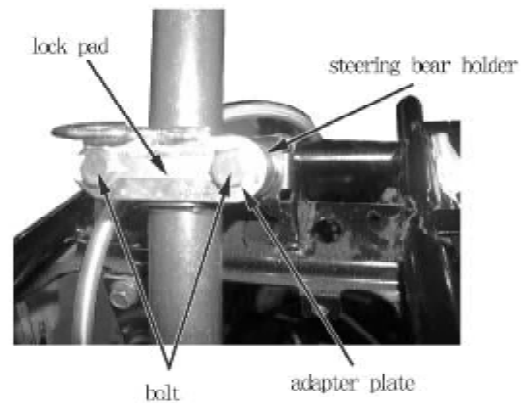
remove front wheel (→ 8-2)

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.

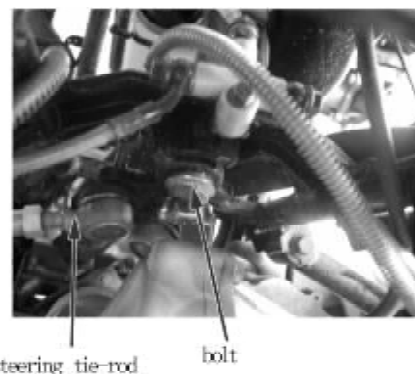


Remove cotter pin

Remove steering tie-rod installation nut, washer

Press and separate the steering tie-rod from the steering stem.

Remove steering stem installation bolt



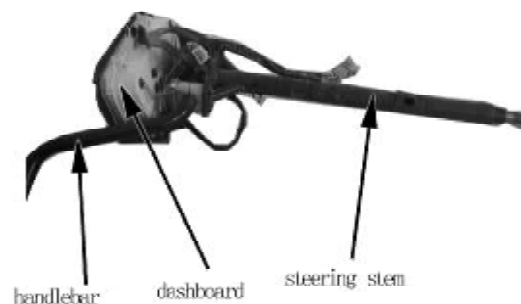
Raise up the steering stem and the handlebar together, then you can remove the steering stem.

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.



8 FRONT WHEEL, BRAKE SUSPENSION, STEERING SYSTEM

Steering bearing, oil seal

Dismantling

remove front wheel (→ 8-2)

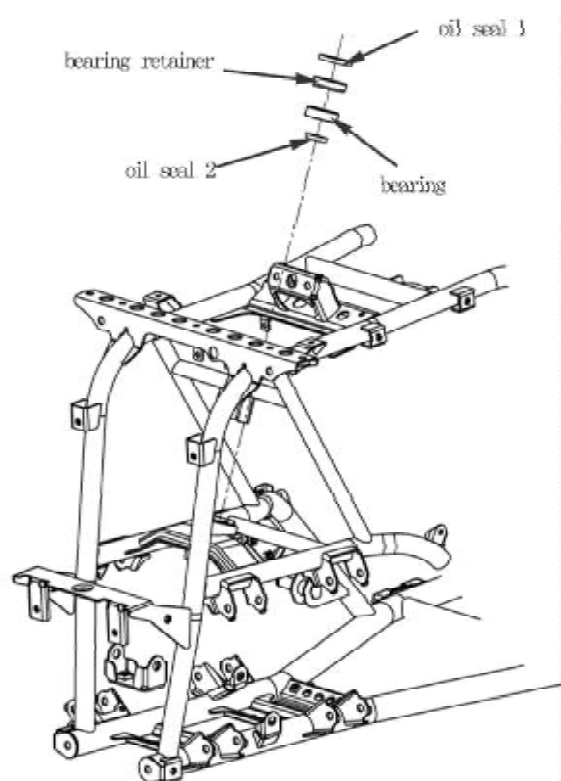
remove steering stem (→ 8-18)

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 Info.....	9-1
Troubleshooting.....	9-2
Rear Wheel.....	9-3

Rear Brake System.....	9-4
Rear Suspension System.....	9-5

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	—

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**

9 Rear Wheel, Rear Brake, Suspension

Rear Wheel

Removal

Refer to Front Wheel Removal (→ 8-3)

Inspection

Rim

Damage, warpage, serious scrapes:→ Replace

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

Service Limit: Axial:2.0mm
Radial:2.0mm

Installation

Refer to Front Wheel Installation (→ 8-3)

Wheel Hub

Remove:

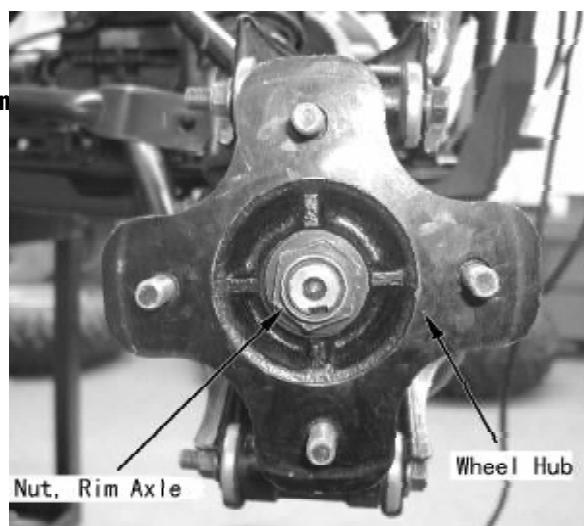
- Rear Wheel (→ 9-3)
- Rim Axle Nut
- Wheel Hub

Installation:

Reverse the removal procedure for installation

Tightening Torque, Rim Axle Nut:

110-130N・m



Rear Brake

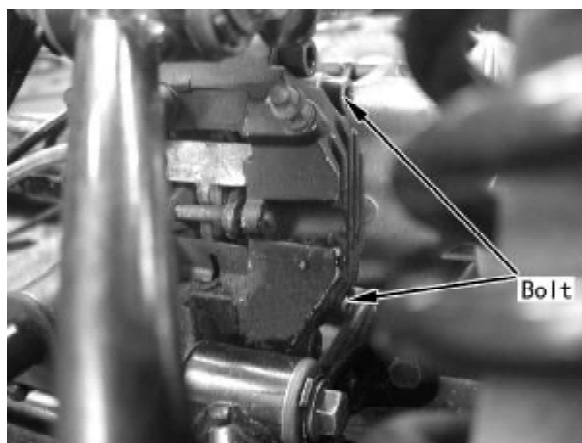
Rear Brake Caliper

Remove:

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

Inspection

Brake Caliper: Cracks, Oil Leakage: → Replace



Installation

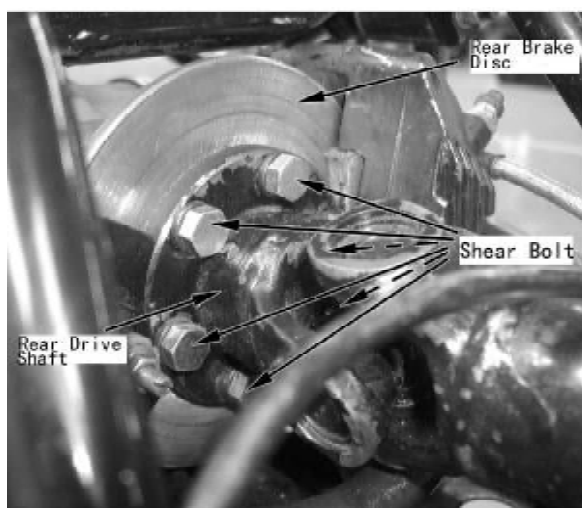
Reverse the removal procedure for installation.

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 → Replace

Installation

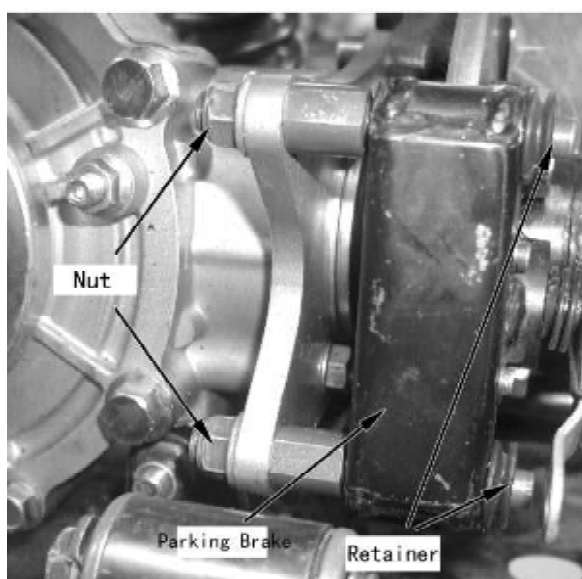
Reverse the removal procedure for installation.

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

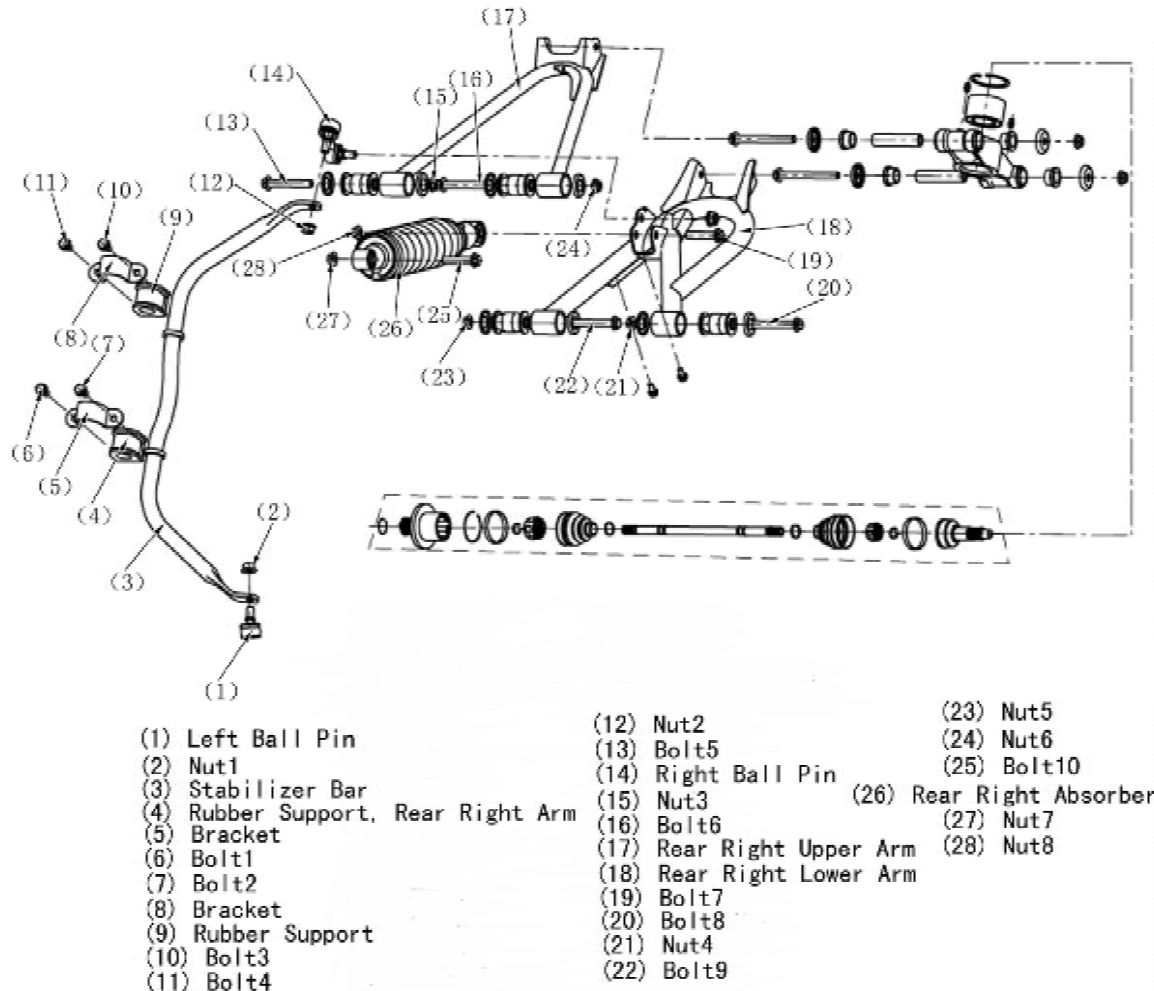


9 Rear Wheel, Rear Brake, Suspension

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.



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				
Item	Type	Capacity	Interval	
			Initial	Next
Front axle	SAE15W/40 SF 或 SAE80W/90 GL-4	Initial: 0.33L/Replace: 0.28L	350km	5000km
Rear axle		Initial: 0.30L/Replace : 0.25L		

Tightening torque table				
Item	Pcs	Specification	Torque(N.m)	Remark
Front axle case bolt	6	M8 × 28	25	
Front axle motor screw	4	M8 × 20	13	
Pinion shaft screw	1	M8 × 10	13	With fastening glue
Front axle nut	1	M14 × 1.5	62	
Diff. gear 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	1	M64 × 1.5 × 7	80	
Rear axle case bolt	2	M10 × 1.25 × 25	40	
Rear axle case bolt	6	M8 × 25	25	
Nut,input shaft,R/A	1	M12 × 1.25	70	
Bolt,input shaft,R/A	4	M8 × 30	25	
Retainer, R/A	1	M65 × 1.5 × 10	70	
Nut	1	M8	16	
Oil bolt,rear axle	1	M20 × 1.5 × 12	25	
Drain bolt,front 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

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

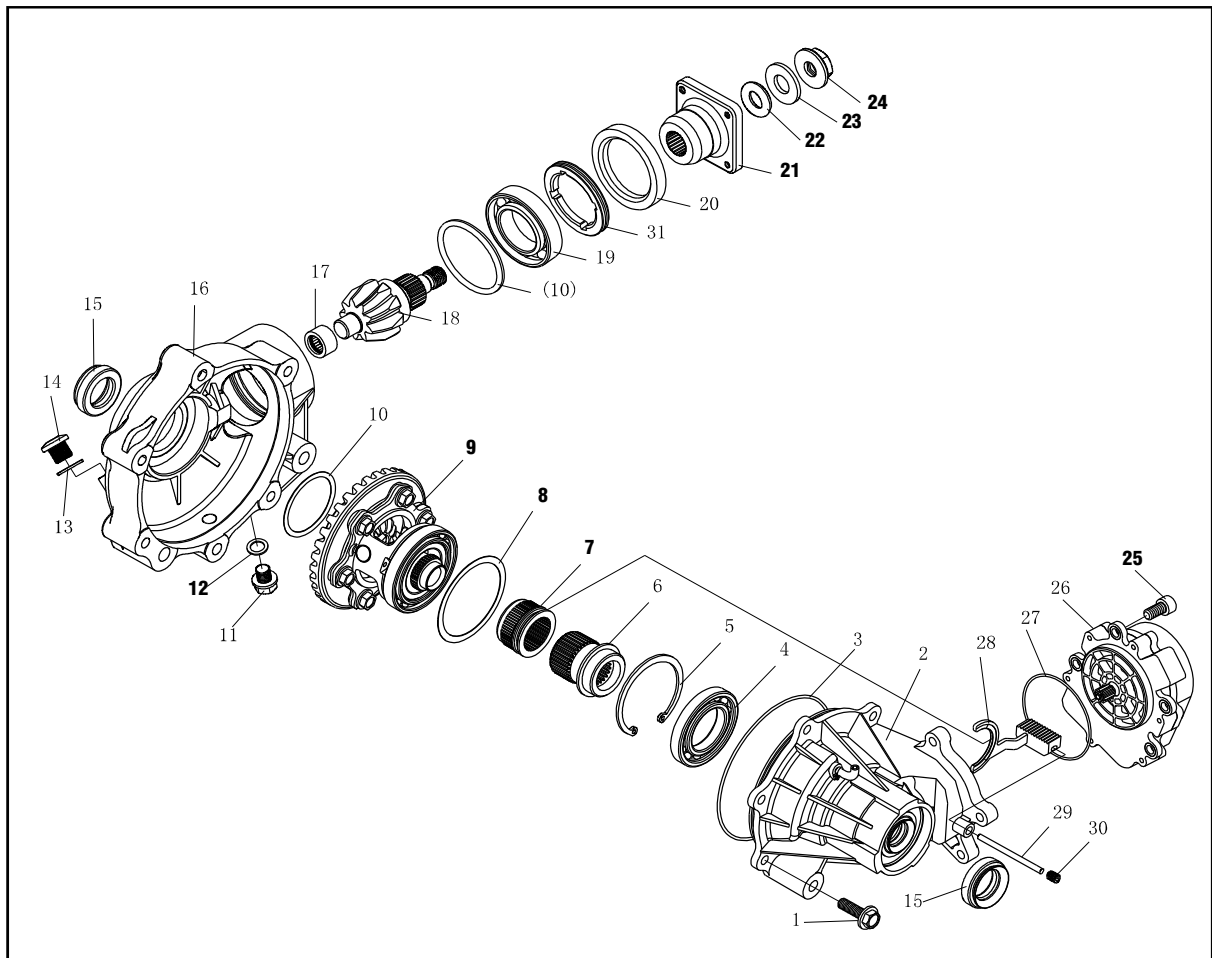
2.Check lubrication if it' s under normal condition;

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.

Front axle exploded view



Item	Part Name	Qty	Item	Part Name	Qty
1	Bolt M8 × 28	6	17	Bearing F1512	1
2	Front axle 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 48 × 65 × 9	1
5	Circlip 62	1	21	Coupler	1
6	Drive clutch cover	1	22	O-ring 14 × 6.8	1
7	Drive clutch	1	23	Nut washer	1
8	Adjust washer ϕ 83 × 71	1~2	24	Nut M14 × 1.5	1
9	Differential. gear assy	1	25	Screw M8 × 20	4
10	Adjust washer ϕ 61 × 48	2~4	26	Gear motor	1
11	Bolt M10 × 1.25	1	27	O-ring 81.2 × 1.9	1
12	Washer 10	1	28	Rack	1
13	Washer 14	1	29	Pinion shaft	1
14	Bolt M14 × 1.25	1	30	Screw M8 × 10	1
15	Oil seal 24 × 38 × 8	2	31	Retainer M64 × 1.5 × 7	1
16	Front axle case cover	1			

10

CFMOTO

Inspection after front axle disassembly

● Check if there is damage or crack on the front differential 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 cylindrical 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 outside 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 if necessary.

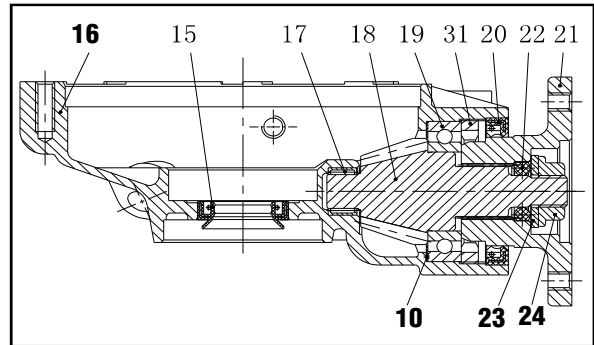
Front axle assembly and adjustment

● Front axle casecover asselbly

Item "31" Tightening torque 80Nm

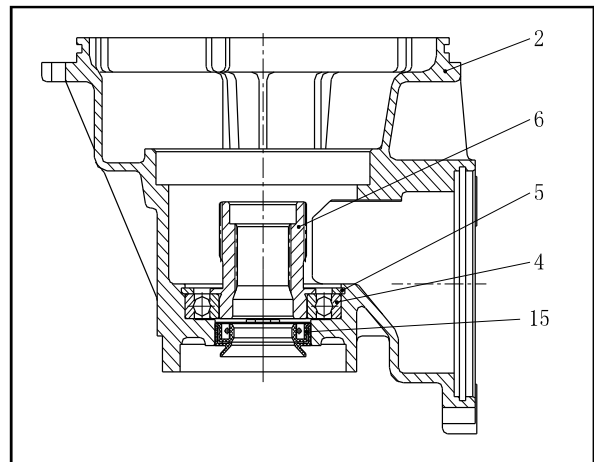
Item "24" Tightening torque 62Nm

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.

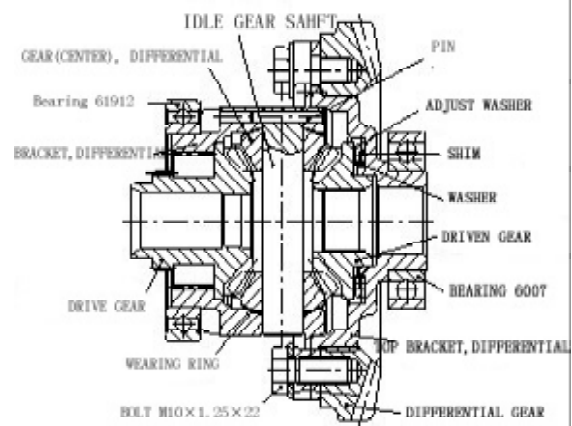


● Differential gear assembly

Bolt M10 × 1.25 × 22 Tightening torque 45Nm

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

	0.1	0.2	0.3	0.4
Washer thickness	0.5	1.0		



10

● Front axle assembly and adjustment

As illustration shown:

Tightening torque	
Item “1”	25Nm
Item “25”	13Nm
Item “30”	13Nm
Bolt	25Nm
Bolt	25Nm

Use fastening glue for item “30” assembly

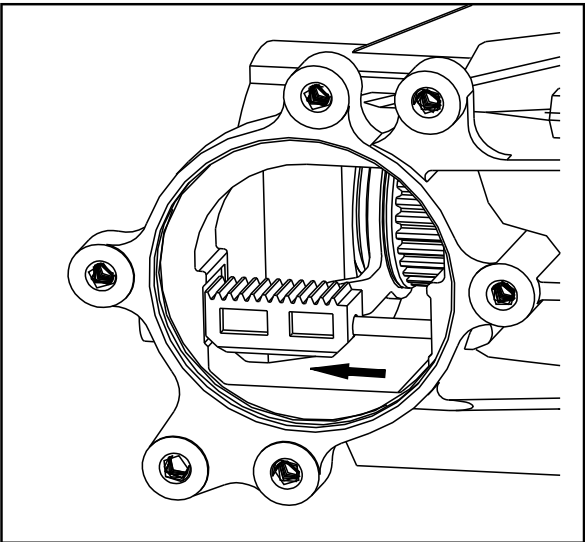
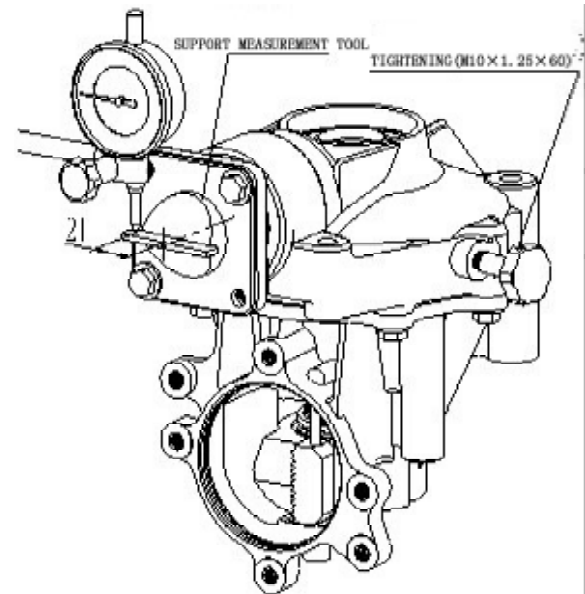
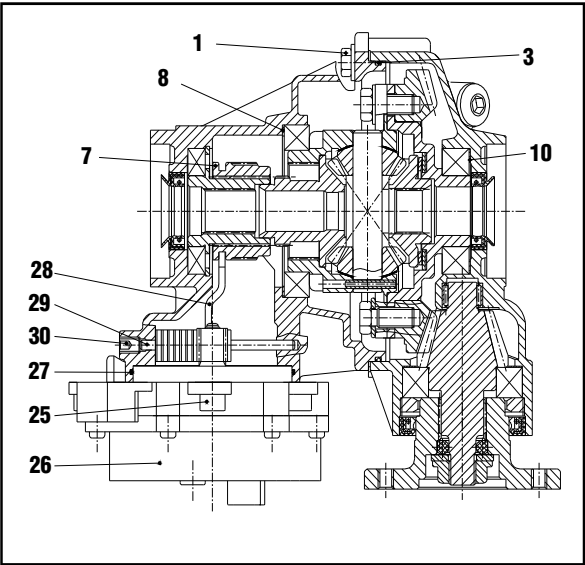
a Use proper washer 8 and 10 thick ness to adjust gear side clearance between drive pinion gear and differential gear

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

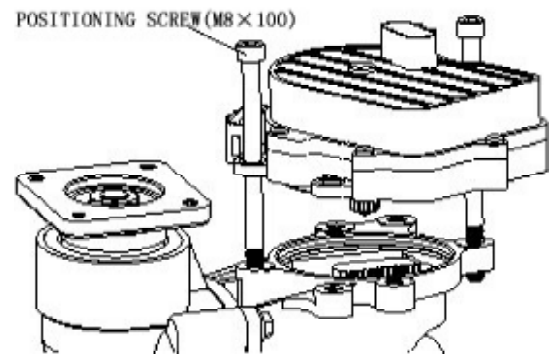
Washer thickness	0.1	0.2	0.3	0.4
	0.5	1.0		

b Shift fork and drive clutch assembly should be against tightly to the arrow shape illustration when assembly of front axle motor.

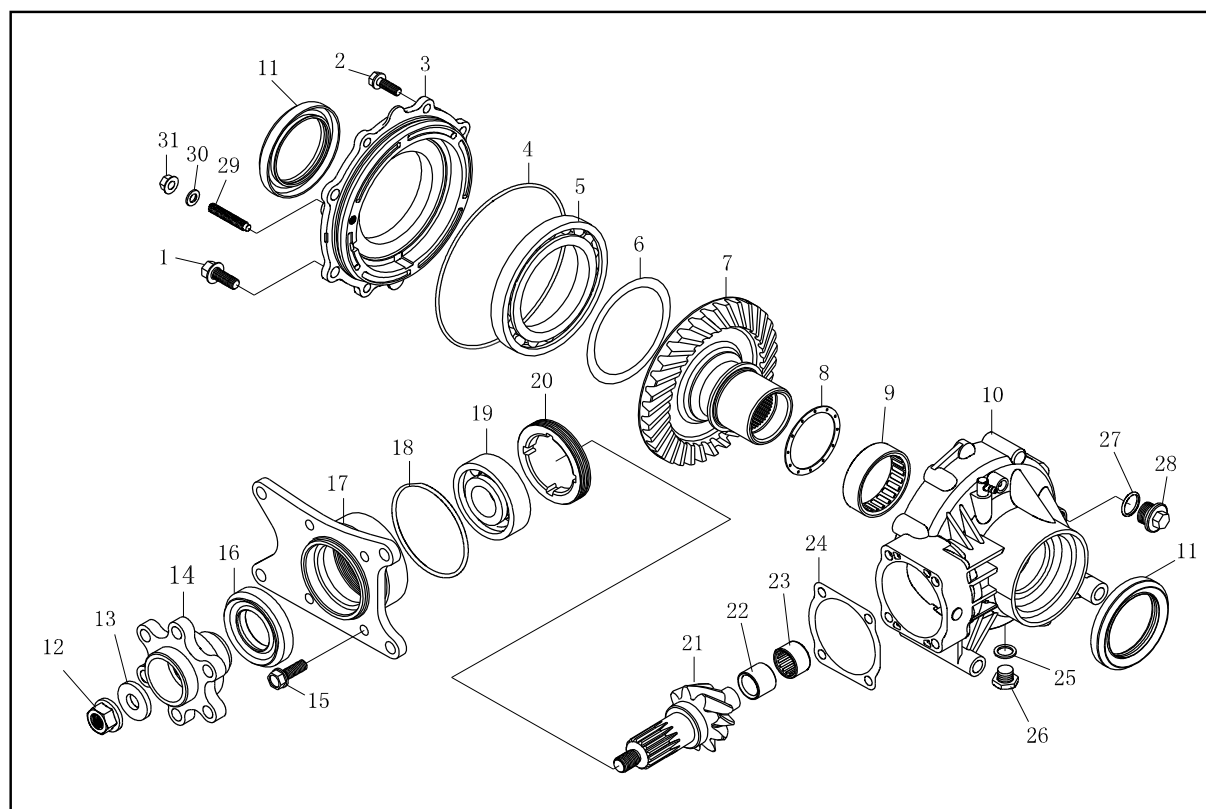


C Use special equipment or vehicle control circuit into 2WD position before gear motor assembly

d Make sure b and c is assembled properly and using illustrated positioning screw to assemble gear motor and front axle.



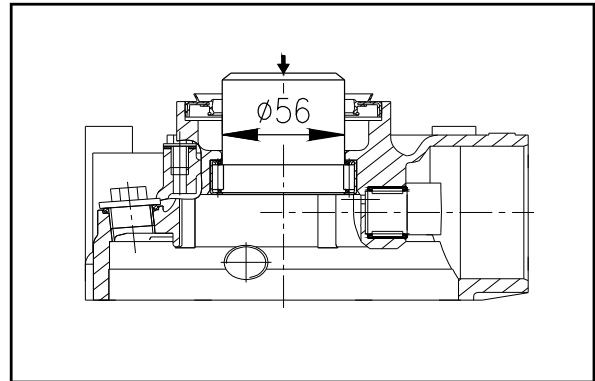
Rear axle exploded view



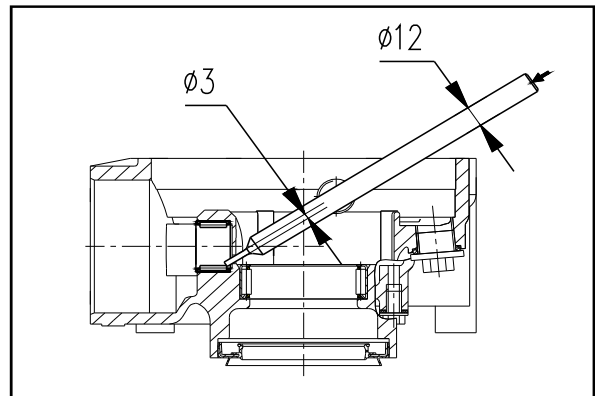
Item	Part Name	Qty	Item	Part Name	Qty
1	Bolt M10 × 1.25 × 25	2	18	O-ring 64.5 × 3	1
2	Bolt M8 × 25	6	19	Bearing 6305	1
3	Rear axle bearing housig	1	20	Bearing reteiner	1
4	O-ring 151 × 3	1	21	Drive gear, rear axle	1
5	Bearing 16017/C2	1	22	Bearing inner race	1
6	Adjust washer (2)	1~2	23	Bearing outer race	1
7	Driven gear, rear axle	1	24	Adjust gasket	1~3
8	Adjust washer (1)	1	25	Washer 14.5 × 21 × 1.5	1
9	Needle bearing	1	26	Bolt M14 × 1.25 × 12	1
10	Rear gear case	1	27	O-ring 19 × 2.5	1
11	Oil seal SD4 65 × 90 × 9	NS 2	28	Bolt M20 × 1.5 × 12	1
12	Nut M12 × 1.25	1	29	Screw M8 × 45	1
13	Washer 12.5 × 30 × 4	1	30	Washer 8.2 × 15 × 1.5	1
14	Coupler, rear axle	1	31	Nut M8	1
15	Bolt M8 × 35	4			
16	Oil seal	1			
17	Bevel gear bearing housing	1			

Disassembly of bearing

a Disassemble needle bearing as left drawing shown when necessary.



b When make needle bearing replacement, rear bearing housing should be heated to 150°C, then disassemble it.



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 turning stability, rollway, steel ball, needle 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 cylindrical surface of rear axle and oil seal lips. Replace if necessary;

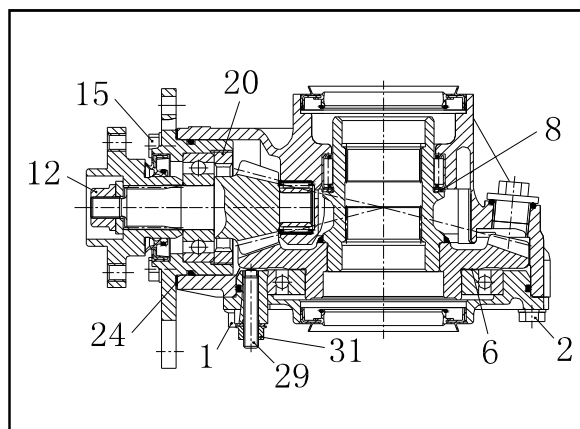
● Check inner and outside spline. Replace if necessary;

● 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 and clearance adjustment of

drive gear of rear axle

a By choosing “24” washer to adjust installing clearance

b By choosing “6” washer to adjust clearance

c By coating color to check contact surface if it's ok for mating;

d Inspect installing clearance by checking bevel gear clearance; By using assistant measurement tool to check its clearance

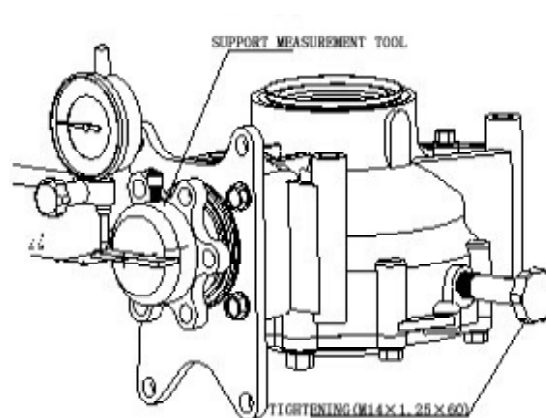
Standard: 0.1~0.2

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

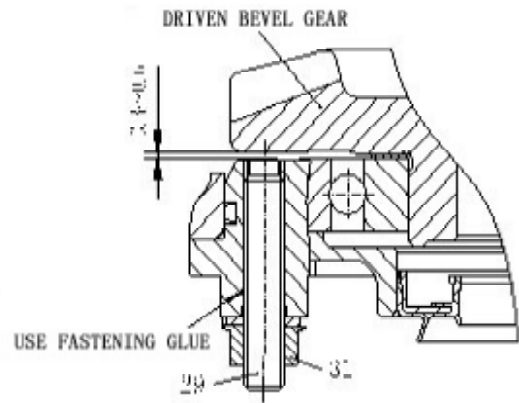
Washer “6”	Thickness: 0.2 0.3 0.4
------------	------------------------

Washer “8”	Thickness 1.0 1.2 1.4 1.6 1.8
------------	-------------------------------

Wahser “24”	Thickness 0.4 0.5 0.6
-------------	-----------------------

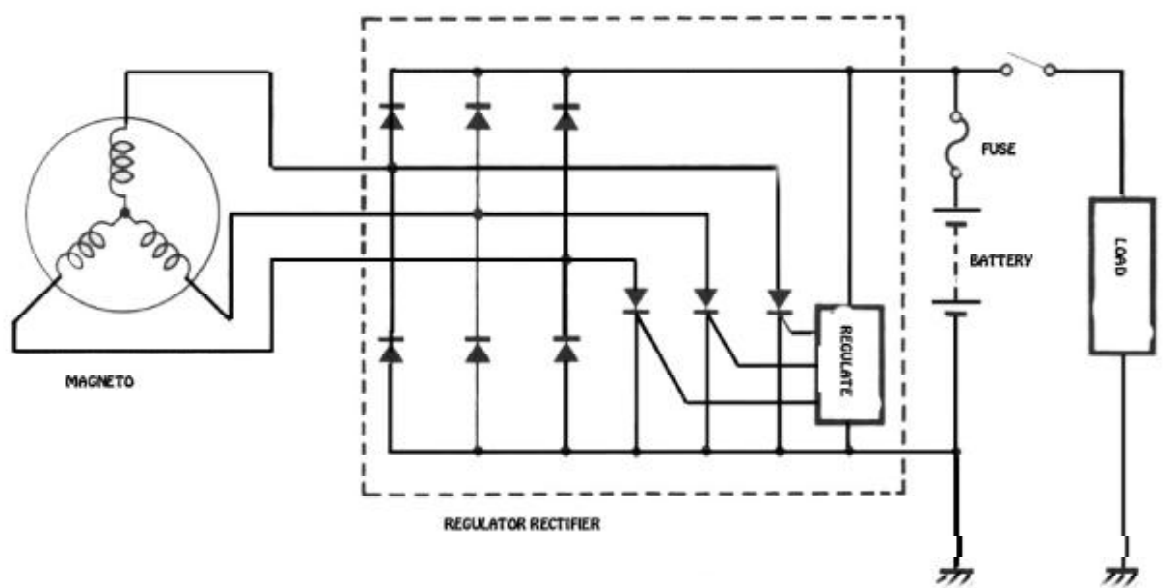


f Adjust item 29 as illustrated, and make sure its end and back clearance of drive gear is 0.3~0.6. Tighten item 31.



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CHARGING CIRCUIT DIAGRAM



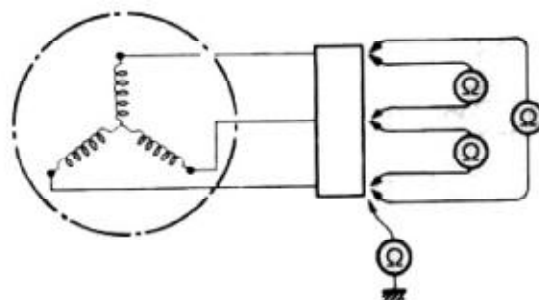
MAGNETO COIL RESISTANCE

- MEASURE TRIPHASE MAGNETOR STATOR COIL RESISTANCE
- IF THE RESISTANCE VALUE OUT OF PRESCRIBED VALUE, REPLACE THE STATOR COIL.
- INSPECT IF THE STATOR COIL AND STATOR CORE INSULATION.

TURN MULTIMETER TO $1 \times 10 \Omega$

MAGNETO COIL RESISTANCE: $0.5-1.5 \Omega$ (YELLOW-YELLOW)

INSULATING RESISTANCE: $\infty \Omega$ (YELLOW-GROUND)



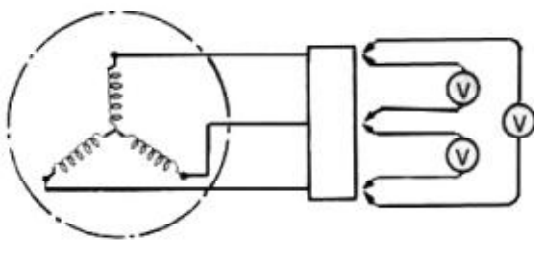
MAGNETOR NON-LOADED PERFORMANCE

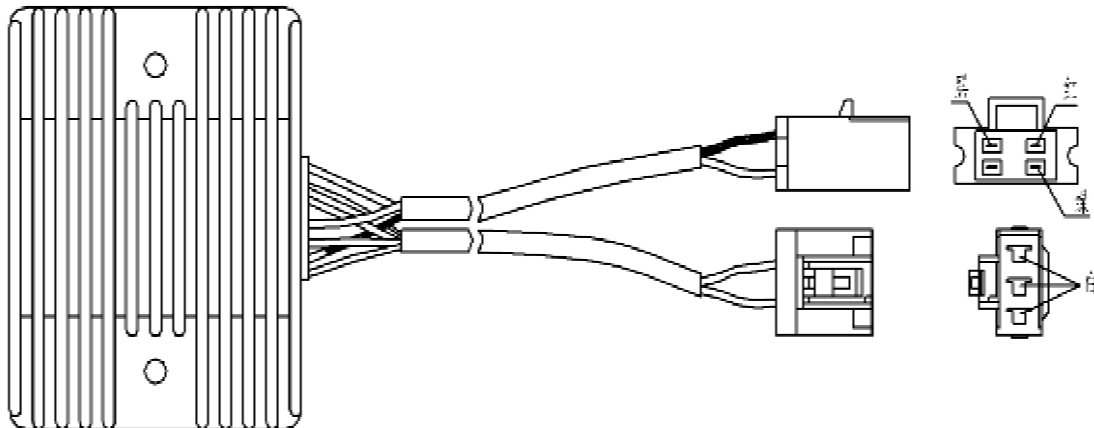
- START THE ENGINE LET IT GOES TO 5000r/min
USE MULTIMETER MEASURE MAGNETOR STATOR COIL THREE OUTPUT LINE VOLTAGE.
- IF THE RESULT VALUE BELOW THE SETTING VALUE, CHANGE A NEW MAGNETOR.

ADJUST MULTIMETER TO ALTERNATING VOLTAGE GRADE

MAGNETOR NON-LOADED STATE COIL VOLTAGE VALUE:

5000r/min $> 200V$ (ALTERNATING CURRENT)





●USE MULTIMETER MEASURE THE RESISTANCE BETWEEN THE TERMINALS,AS BELOW FORM SHOWS,IF THERE IS ONE DATA OUT OF THE SETTING VALUE,REPLACE WITH A NEW ONE.

●AFTER ENGINE RUNNING, BATTERY FULL POWER, IF VOLTAGE BETWEEN RED LINE, GREEN LINE EXCEED 15V OR UNDER 12V,REPLACE WITH A NEW ONE.

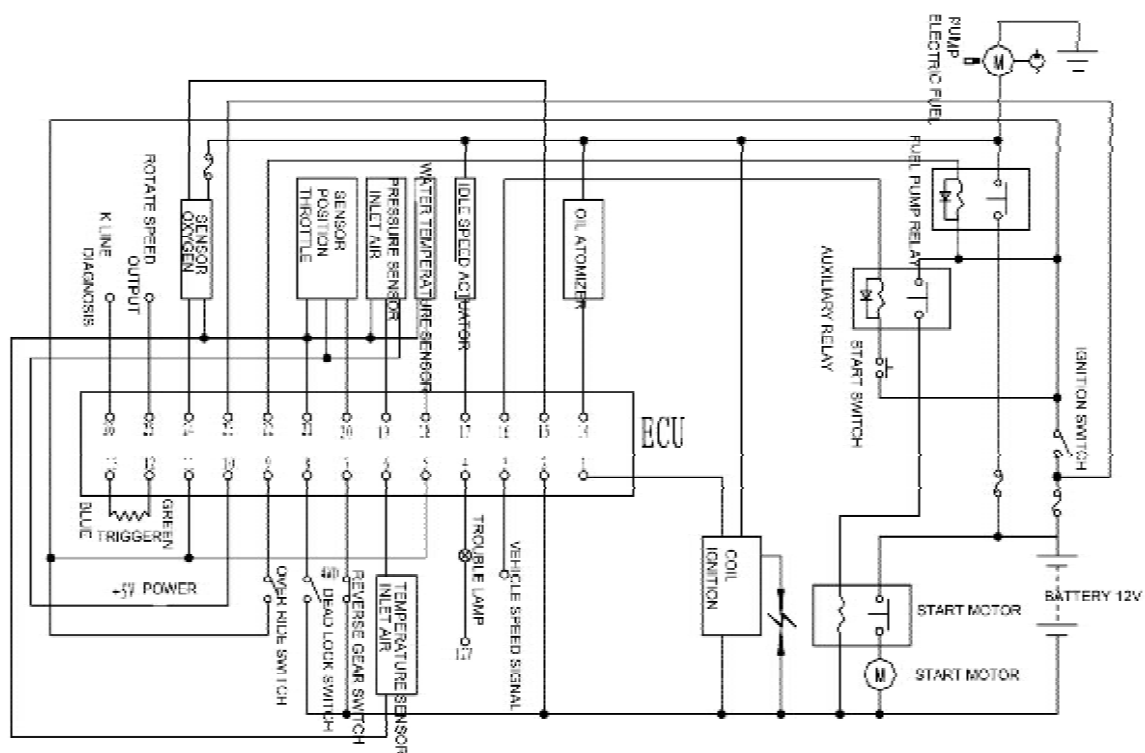
ADJUST MULTIMETER TO DIODE

ATTENTION:

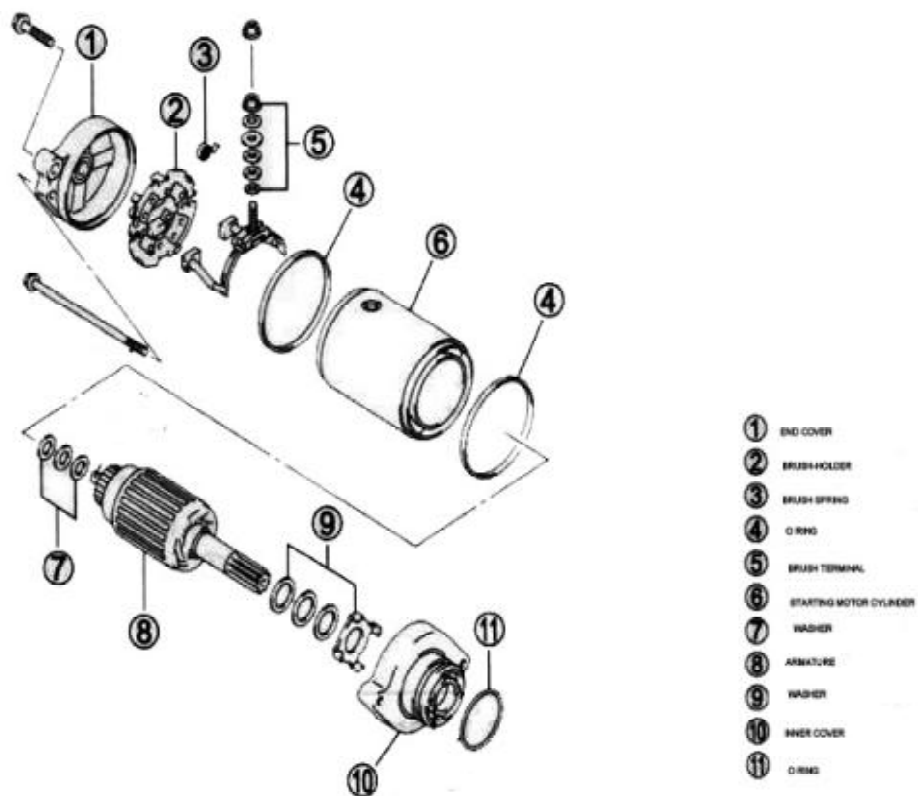
WHEN MULTIMETER PROBE UNCONNECTED,IF THE MULTIMETER SHOWS BELLOW 1.4V, THEN REPLACE IT' S BATTERY.

		RED (+)					
BLACK		YELLOW	YELLOW	YELLOW	GREEN	RED	BLACK
	YELLOW		∞	∞	400-500	∞	∞
	YELLOW	∞		∞	400-500	∞	∞
	YELLOW	∞	∞		400-500	∞	∞
	GREEN	∞	∞	∞		∞	∞
	RED	400-500	400-500	400-500	750-850		∞
	BLACK	∞	∞	∞	∞	∞	

TRIGGER CIRCUIT DIAGRAM



STARTING DYNA MO



ELECTRIC BRUSH

- CHECK IF THE ELECTRIC BRUSH PERMANENT SEAT ABNORMAL, CRACK, UNSMOOTH
- IF THERE IS ANY BROKEN, CHANGE THE WHOLE ELECTRIC BRUSH ASSEMBLY



COMMUTATOR

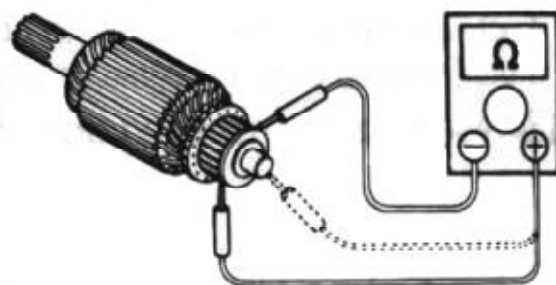
- CHECK IF THE COMMUTATOR CHANGE COLOR, ABNORMAL DAMAGE OR OVER WEAR.
- IF THERE IS ABNORMAL DESTROY, REPLACE WITH A NEW ARMATURE.
- IF THE COMMUTATOR SURFACE DISCOLOURATION, POLISH WITH SEND PAPER AND WIPE UP WITH DRY CLOTH.
- IF OVER WEAR, CUT PART OF B INSULATOR WITH BLADE, KAME THE DISTANCE BETWEEN A AND B TO d



$$d \geq 1.5\text{mm}$$

ARMATURE COIL

- USE MULTIMETER CHECKING IF IT IS INTERCOMMUNICATION BETWEEN THE TERMINALS, BETWEEN TERMINALS AND ARMATURES
- .IF THEY NOT COMMUNICATION, REPLACE WITH A NEW ARMATURE.



OIL SEAL

- CHECKING IF OIL SEAL LIP DESTROY OR OIL LEAK.
- IF THERE IS ANY DESTROY OR LEAKAGE, REPLACE WITH A NEW STARTING DYNAMO.



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INITIATING RELAY

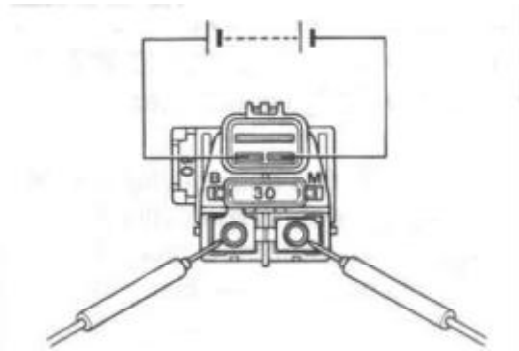
● LOAD 12V VOLTAGE TO INITIATING' S ANODE AND CATHODE;MEASURING WITH MULTIMETER IF THE EXTREMES MEET.

● IF THE START RELAY CONTACT SOUND TICKTOCK AND ALSO CONNECT,

● WHEN COIL TWO TERMINALS NON -LOADED 12V VOLTAGE, THE TWO CONTACTS UNCOMMUNICATE

● ABOVE TWO ITEMS BOTH OK,IT SHOWS THE RELAY IS OKAY.

ADJUST MULTIMETER TO DIODE GRADE.



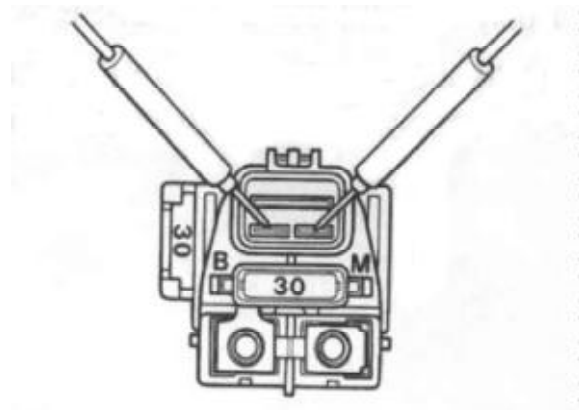
ATTENTION:

RELAY VOLTAGE LOADED CANNOT EXCEED 2MINS,OR ELSE, IT WILL CAUSE THE RELAY OVERHEAT AND BURNT THE RELAY COIL.

● USE MULTIMETER MEASURING STARTING RELAY COIL RESISTANCE,IF THE VALUE OUT OF THE SETTING RANGE, REPLACE WITH A NEW ONE.

● ADJUST MULTIMETER TO $1 \times 10 \Omega$ GRADE

START AUXILIARY RELAY COIL RESISTANCE:3-5 Ω



START AUXILIARY RELAY、FULE PUMP RELAY

● LOAD 12V VOLTAGE TO THE THE ANODE AND CATHODE OF THE STARTING RELAY COIL.USE MULTIMETER MEASURE IF CON-TACTS A,B IS MEET.

ADJUST MULTIMETER TO DIODE GRADE.

● IF THE STARTING RELAY SOUND TICK AND CONNECTION,

● WHEN NON-LOADED 12V VOLTAGE,THE TWO CONTACTS UNCONNECTED

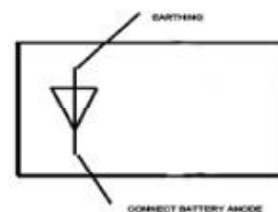
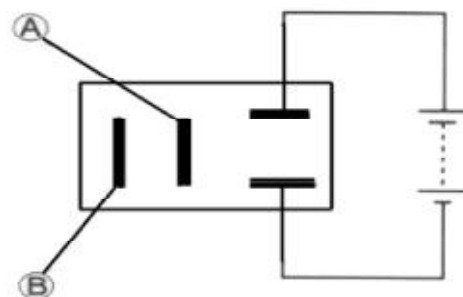
● EITHER OF THE ABOVE TWO ITEMS IS SHOWS THE RELAY IS FINE.

● ADJUST MULTIMETER TO $1 \times 100 \Omega$,MEASURING THE COIL RESISTANCE

AUXILIARY RELAY COIL RESISTANCE: 90-100 Ω

ATTENTION:

AT THE BACK OF AUXILIARY RELAY,PARALLEL TO THE DIODE DIRECTION, IT IS THE RELAY COIL' S ANODE.



STARTING ENGINE NOTICE

- JOINT LINES ACCORDING TO TRIGGER CIRCUIT.
- BEFORE STARTING, CHECK IF ALL THE PARTS ARE CORRECT JOINTED.ELECTRICITY SPRAYING JOINT SEE BELOW:
- CHECK IF GAS CIRCUIT NORMAL.
- CHECK IF OIL CHANNEL AT FAULT.
IF BLOCK,CLEAR BLOCK PART, SECURE OIL CHANNEL SMOOTH.
IF LEAKAGE,RELINK LEAK SECTION, SECURE THE OIL CHANNEL NO LEAKAGE.
- USE OIL PRESSURE GAGE MEASURE OIL PRESSURE.
FULE PUMP OUTPUT PORT PRESSURE: 0.3 ± 0.01 Bar;
- CHANGE ENGINE SHIFT HAND LEVER TO NEUTRAL
- USE DIAGNOSTIC EQUIPMENT CHECK IF AT FAULT, IF YES, CLEARING OF FAULT ACCORDING TO DIAGNOSTIC TROUBLE CODE.
- CLOSE THROTTLE,TURN OFF THE IGNITION SWITCH,PRESS START SWITCH 3-5 SECONDS:
- START THE ENGINE, WARM UP TO IDLE SPEED STABLE, EXAMINE IDLING SPEED:

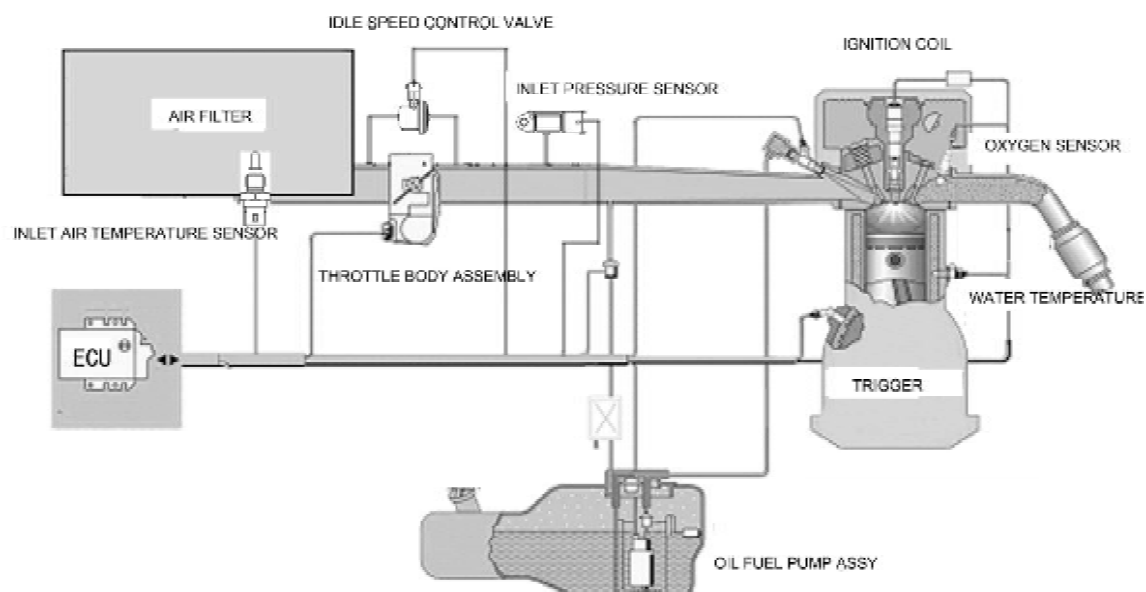
IDLING SPEED: 1400 ± 100 rpm;



FUEL PRESSURE GAUGE

CFMOTO

△ ELECTRONIC SPRAYING SYSTEM ELECTRONIC SPRAYING SYSTEM STRUCTURE



**ENGINE ELECTRONIC SPRATING SYSTEM INCLUD-
ING THREE PARTS:**
(1)SENSOR:

TRANSFORM THE ENGINE NON-ELECTRICITY PHYSICAL QUANTITY TO ELECTRICITY QUANTITY,AND PROVIDE ALL THE INFORMATIONS TO THE ELECTRONIC CONTROL UNIT. IT IS THE ELECTRONIC CONTROL ' S SPY. INCLUDING THE FOLLOWING SENSORS:

- INLET PRESSURE SENSOR (LOADING INFORMATION)
- THROTTLE POSITION SENSOR (LOADING INFORMATION)
- INLET AIR TEMPERATURE SENSOR (AIR DENSITY, LOADING RANGE INFORMATION,ACCELERATION AND DECELERATION INFORMATION)
- TRIGGER (BENT AXLE PHASE POSITION INFORMATION)
- WATER TEMPERATURE SENSOR (ENGINE TEMPERATURE INFORMATION)
- ODOMETER SENSOR (OUTPUT SHAFT SPEED INFORMATION)
- GEAR SENSOR (GEAR INFORMATION)
(INCLUDING GEAR SENSOR AND REVERSE GEAR SENSOR)
- OXYGEN SENSOR(EXCESS AIR COEFFICIENT ABOVE 1 OR LOWER THAN 1)
- FOUR WHEEL DEAD LOCK (4WD DEAD LOCK INFORMATION)
- ASSISTOR SWITCH (RELIEF SPEED LIMIT INFORMATION)

(2)ECU:

ELECTRONIC CONTROL UNIT, IT IS THE BRAIN OF THE ENGINE MANAGEMENT SYSTEM.IT ANALYZE AND PROCESS KINDS OF INFORMATIONS PROVIDE BY THE SENSORS, REACH A CONCLUSION, AND THEN TRANSMIT THE CONCLUSION TO THE ACTUATOR, SO AS TO ENSURE THE ENGINE OPERATION UNDER

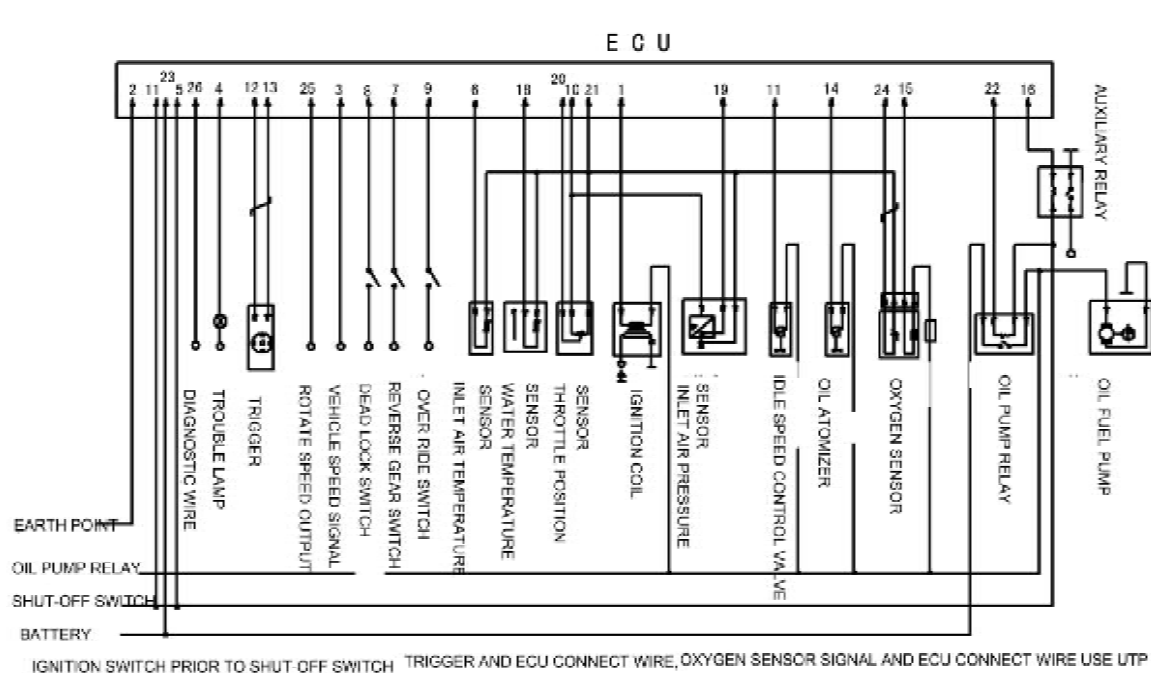
(3)ACTUATOR:

EXECUTE THE ECU INSTRUCTION. THE ACTUATOR IS THE HAND OF ECU, THE MAIN ACTUATORS ARE:

- OIL FUEL PUMP ASSY(SUPPLY HIGH PRESSURE FUEL)
- OIL ATOMIZER(SPRAY QUOTAL FUEL,MAKE FUEL SPRAY EXCELLENT)
- IGNITION COIL(PROVIDE HIGH PRESSURE IGNITION ENERGY TO SPARK PLUG)
- IDLE SPEED CONTROL VALVE(PROVIDE IDLE SPEED AIR INPUT)

OPTIMAL STATE.

ELECTRONIC SPRAYING SYSTEM DIAGRAM



ELECTRONIC SPRAYING SYSTEM MAINTENANCE NO-

USE QUALITY COMPONENTS FOR SERVICE, OR ELSE IT CANNOT GUARANTEE THE ELECTRONIC SPRAYING SYSTEM NORMAL OPERATION.

● **IN THE COURSE OF MAINTENANCE, NEVER TRY TO BREAK DOWN THE ELECTRONIC PARTS!**

● **IN THE COURSE OF MAINTENANCE, THE ELECTRONIC COMPONENTS MUST BE HANDLED CAREFULLY.**

● **WHEN CUT DOWN OR CONNECT OF PLUG CONNECTOR, YOU MUST TURN OFF THE IGNITION SWITCH, OR ELSE THE ELECTRONIC SPRAYING COMPONENTS WILL BE DESTROYED.**

● **WHEN TAKE DOWN THE ELECTRIC OIL FUEL PUMP, DONOT ENERGIZE THE OIL PUMP, IT CAN GENERATE SPARK AND**

● **OIL FUEL PUMP NOT PERMITTED DO OPERATION TEST UNDER DRY STATE OR IN WATER. OR ELSE WILL SHORTEN IT S LIFE. BESIDES, THE OIL FUEL PUMP TWO EXTREMES CANNOT REVERSE CONNECTION.**

● **ELECTRONIC SPRAYING SYSTEM OIL SUPPLY PRESSURE IS HIGH (AROUND 300kPa), THE FUEL PIPE ALL APPLY HIGH PRESSURE RESISTANCE PIPE, SO DONOT DISMANTLE THE PIPE EASILY.**

WHEN THE FUEL SYSTEM NEED TO BE REPAIRE, YOU HAVE TO DO OIL PIPE PRESSURE RELIEF BEFORE DISMANTLE THE OIL PIPE. PRESSURE RELIEF METHOD IS AS FOLLOWING:

REMOVE OIL PUMP RELAY, STARTING THE ENGINE AND LET IT IDLE RUNNING, UNTILL THE ENGINE GO OUT ITSELF.

OIL PIPE' S DISMANTLE AND FUEL FILTER' S REPLACEMENT SHOULD BE CARRY ON BY PROFESSIONAL PERSON IN WELL-VENTILATED PLACE.

● **WHEN INSPECTING THE IGNITION SYSTEM, ONLY IF IN NECESSARY, DO SPARKING TEST, AND SHOULD BE AS FAST AS POSSIBLE, DONOT OPEN AIR SAMPER WHEN TESTING, OR ELSE PLENTY OF UNBURNED OIL WILL ENTER THE VENT-PIPE AND DAMAGE THE TRIPLET CATALYST.**

● **IDLE SPEED REGULATION COMPLETELY CARRY OUT BY ELECTRONIC SPRAYING SYSTEM, THROTTLE VALVE GUN LIMIT SCREW ALREADY SETTED WHEN IT LEAVE THE FACTORY, IT INITIAL POSITION CANNOT BE CHANGED EASILY.**

● **WHEN JOIN THE BATTERY, THE ANODE AND THE CATHODE CANNOT BE WRONG JOINTED. THIS SYSTEM APPLY MINUS EARTH.**

● **WHEN ENGINE RUNNING, PROHIBIT TO DISMANTLE THE BATTERY CABLE.**

● **BEFORE CARRY OUT ELECTRONIC WELDING ON THE VEHICLE, YOU REQUIRED TO DISMANTLE THE BATTERY POSITIVE TERMINAL, NEGATIVE TERMINAL AND ECU**

● **DONOT USE METHOD IMPALE LEAD CUTICULAR TO TEST COMPONENTS' S INPUT AND OUTPUT ELECTRICAL SIGNAL.**

● **SET UP ENVIRONMENTAL PROTECTION CONSCIOUSNESS. TREATING THE WASTE AFTER MAINTENANCE.**

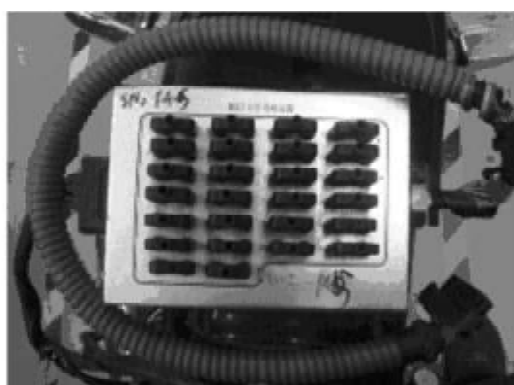
CFMOTO SERVICE TOOLS



TOOL NAME:DIAGNOSTIC EQUIPMENT

FUNCTION:

READ CLEAR ELECTRONIC SPRAYING SYSTEM TROUBLE CODE,OBSERVE DATA STREAM,COMPONENETS MOTION TESTS.



TOOL NAME:COMMUTATOR

FUNCTION:

INSPECT ECU EACH SUTURAL ELECTRICAL SIGNAL,INSPECT CIRCUIT STATES ETC.



TOOL NAME:DIGITAL MULTIMETER

FUNCTION:

INSPECT ELECTRONIC SPRAYING SYSTEM VOLTAGE, CURRENT, RESISTANCE ETC.



TOOL NAME:VACUUM METER

FUNCTION:

INSPECT INLET PIPE PRESSURE STATE.



TOOL NAME: ELECTRONIC SPARK TIMING

FUNCTION:
INSPECT ENGINE ELECTRONIC SPARK TIMING



TOOL NAME: CYLINDER PRESSURE GAUGE

FUNCTION:
INSPECT ENGINE CYLINDER PRESSURE STATE.



TOOL NAME: FUEL PRESSURE GAUGE

FUNCTION:
INSPECT FUEL SYSTEM PRESSURE STATE, JUDGE THE FUEL SYSTEM FUEL PUMP AND FUEL PRESSURE REGULATING VALVE WORK STATE.



TOOL NAME: OIL ATOMIZER WASHING ANALYZER

FUNCTION:
WASHING AND ANALYZING OIL ATOMIZER.

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ELECTRONIC SPRAYING PARTS STRUCTURE AND FUNCTION

(1) ECU:

ECU, IT IS THE BRAIN OF THE ENTIRE ELECTRONIC SPRAYING SYSTEM. IT ANALYZE AND PROCESS THE INFORMATIONS PROVIDED BY THE SENSOR, REACH A CONCLUSION, THEN TRANSMIT THE CONCLUSION TO THE ACTUATOR AS INSTRUCTION, SO AS TO MAKE THE ENGINE OPERATION IN OPTIMAL STATE.

ECU EACH SWITCH FUNCTION:

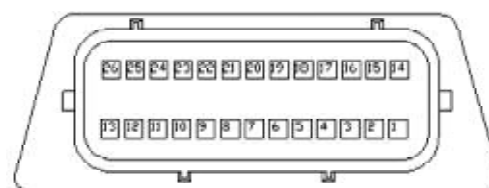
1. IGNITION COIL CONTROL SIGNAL
2. EARTHING CONTACT
3. VEHICLE SPEED SIGNAL
4. TROUBLE LAMP
5. IGNITION SWITCH POWER+
6. INTAKE AIR TEMPERATURE SENSOR SIGNAL
7. REVERSE GEAR
8. 4WD DEAD LOCK SWITCH SIGNAL
9. ASSISTOR SWITCH SIGNAL
10. +5V POWER OUTPUT
11. IGNITION SWITCH POWER+
12. TRIGGER SIGNAL A
13. TRIGGER SIGNAL B
14. OIL ATOMIZER
15. OXYGEN SENSOR HEATING
16. SUPPLEMENTARY RELAY
17. IDLE SPEED CONTROL VALVE (CARBON TANK CONTROL VALVE)
18. WATER TEMPERATURE SENSOR SIGNAL
19. INLET PRESSURE SENSOR SIGNAL
20. AIR DAMPER POSITION SENSOR SIGNAL
21. SENSOR
22. OIL PUMP
23. BATTERY POWER+
24. OXYGEN SENSOR
25. ENGINE SPEED OUTPUT
26. KWIRE DIAGNOSIS

LIMIT DATA:

QUANTITY		VALUE			UNIT
		MIN	TYPICAL	MAX	
BATTERY VOLTAGE	NORMAL OPERATION	9.0	14.0±0.1	16.0	V
	LIMITED FUNCTION	6.0 - 9.0		16.0 - 18.0	V
ENDURANCE OF BATTERY OVER PRESSURE LIMIT VALUE AND PERIOD	26.0V	KEEP PARTIAL FUNCTION ,CAN EXECUTE FAULT DIAGNOSIS			5 min
WORKING TEMPERATURE		-40		+70	°C
STORAGE TEMPERATURE		-40		+90	°C



ECU PROFILE

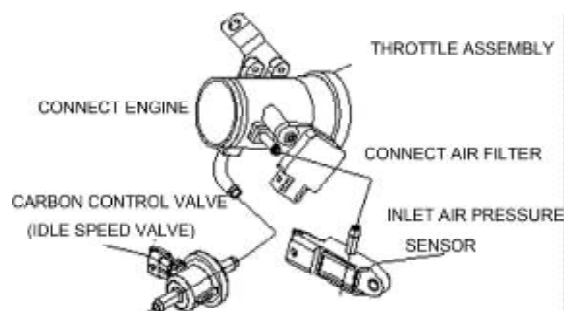


ECU CONNECTOR PROFILE

- DISALLOW TO ADD LOAD ON CRUST OR COVER BOARD.
- HANDLED CAREFULLY AND AVOID TO DROP ON THE FLOOR.

(2)THROTTLE VALVE ASSY:

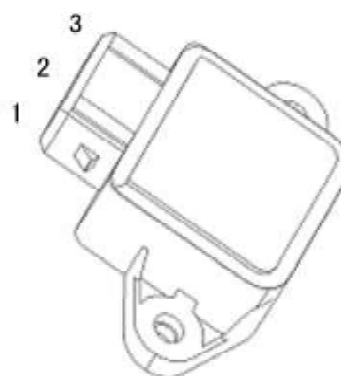
JOIN THE AIR CLEANER AND ENGINE,CONTROL THROTTLE VALVE OFF AND ON ANGLE THROUGH THROTTLE CABLE. AIR DAMPER POSITION SNEsor TRANSMIT ANGLE SIGNAL TO ECU.



THROTTLE ASSEMBLY CONNECTION DIAGRAM

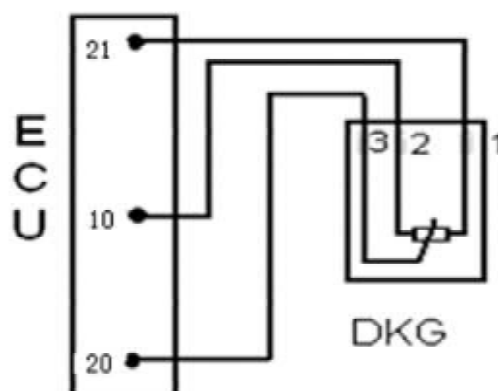
EACH PIN FUNTION:

- 1.CONNECT 5V POWER
- 2.GROUNDING
- 3.OUTPUT VOLTAGE SIGNAL



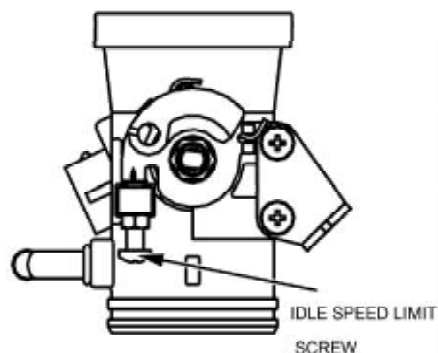
THROTTLE POSITION SENSOR

THE RIGHT DRAWING IS THE WIRING DIAGRAM WITH ECU



THROTTLE POSITION SENSOR CONNECTION DIAGRAM

IDLE SPEED LIMIT SCREW NOT ALLOWED TO BE ADJUSTMENT.
 ●ENGINE IDLE SPEED COMPLETELY DEPEND UPON ELEC-TRONIC SPRAYING SYSTEM ADJUSTMENT. PROHIBIT MANUAL ADJUST THE IDLE SPEED SCREW.



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(3) INLET PRESSURE SENSOR:

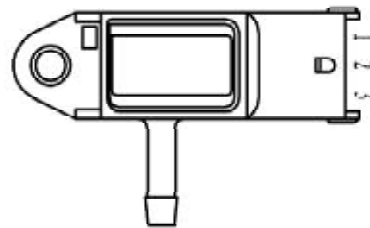
MONITOR INLET PIPE PRESSURE, PROVIDE ENGINE LOAD INFORMATION TO ECU.

EACH STITCH FUNCTION:

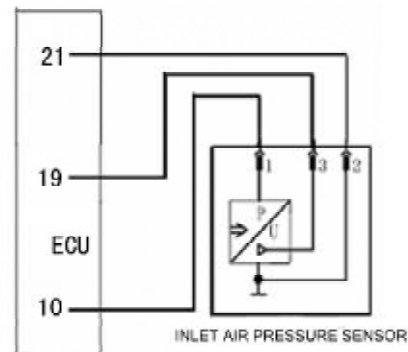
1. CONNECT 5V POWER

2. GROUNDING

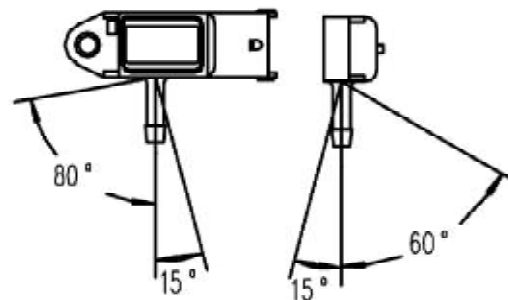
3. OUTPUT VOLTAGE SIGNAL



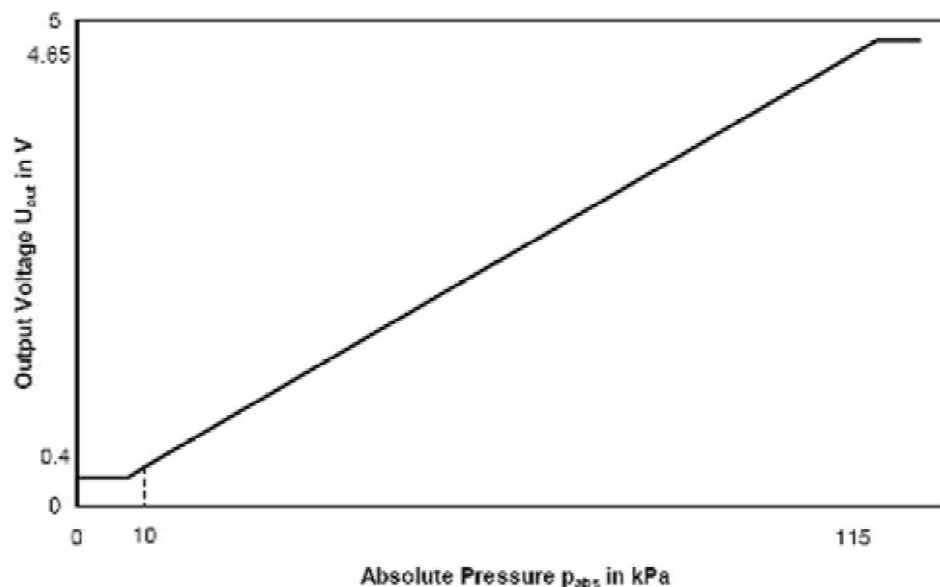
THE RIGHT DRAWING IS THE CONNECTION DRAWING FOR SENSOR & ECU.



THE RIGHT DRAWING IS THE PERMIT FITTING LIMIT, IN THIS WAY CAN ENSURE THERE IS NO CONDENSED WATER INSIDE THE SENSOR, THE CONDENSED WATER CAN DESTROY SENSOR INNER PRESSURE-SENSING DEVICE.

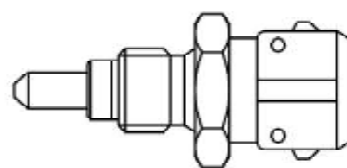


THE PICTURE BELOW IS THE RECIPROCAL DIAGRAM DRAWING FOR PRESSURE AND OUTPUT VOLTAGE.
MONITOR PRESSURE RANGE: 10-115kPa



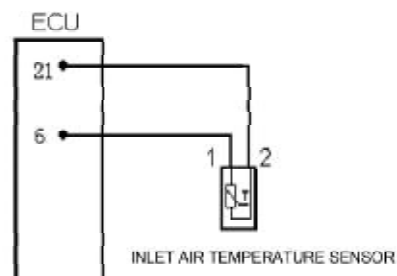
(4) INTAKE AIR TEMPERATURE SENSOR:

THIS SENSOR IS A NEGATIVE TEMPERATURE COEFFICIENT (NTC) THERMISTANCE, IT'S RESISTANCE VALUE DECREASE WHEN THE COOLANT TEMPERATURE INCREASE, BUT IT IS NOT LINEAR RELATION. THE SENSOR HAVE 2 PINS, AND THEY CAN BE EXCHANGED USING.



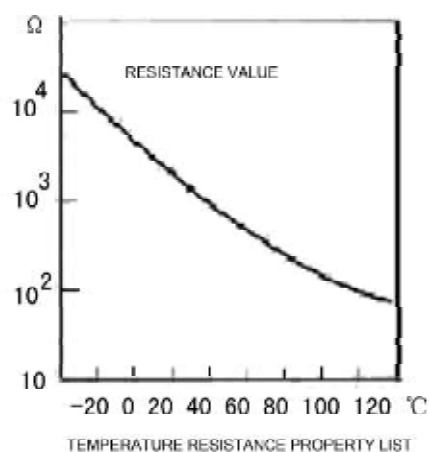
INLET AIR TEMPERATURE SENSOR OUTSIDE VIEW

THE RIGHT DRAWING IS THE WIRING DIAGRAM FOR SNEOR&ECU.



INLET AIR TEMPERATURE SENSOR

THE RIGHT DRAWING IS FOR SENSOR TEMPERATURE-RESISTANCE PROPERTY LIST.



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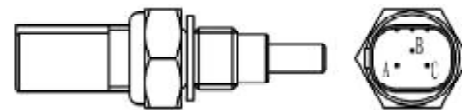
(5)WATER TEMPERATURE SENSOR:

THIS SENSOR IS A NEGATIVE TEMPERATURE COEFFICIENT (NTC) THERMISTANCE,IT'S RESISTANCE VALUE DECREASE WHEN THE COOLANT TEMPERATURE INCREASE,BUT IT IS NOT LINEAR RELATION.ONE GROUP PROVIDE TO ECU,MONITOR ENGINE HEAT CONDITION.THE OTHER GROUP PROVIDE TO THE METER,MONITOR WATER TEMPERATURE.

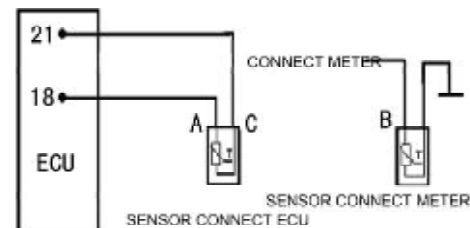
A AND C IN ONE GROUP, THEY PROVIDE WATER TEMPERATURE TO ECU.

B AND THREADED PORTION IN ONE GROUP,THEY PROVIDE WATER TEMPERATURE TO THE METER.

THE RIGHT DRAWING IS THE WIRING DRAWING FOR SENSOR,ECU AND METER.



WATER SENSOR OUTSIDE VIEW



THE RIGHT DRAWING IS B END AND CRUST TEMPERATURE PROPERTY LIST,SIGNAL PASS TO THE METER.

TEMPERATURE RANGE (°C)	B TO CASE END RESISTANCE (Ω)
50 ± 0.2	176-280
80 ± 0.2	63.4-81.4
110 ± 0.2	24.6-30.6

THE RIGHT DRAWING IS END A,C AND THE TEMPERATURE PROPERTY LIST, SIGNAL PASS TO THE ECU.

TEMPERATURE RANGE (°C)	A, C POINT RESISTANCE (KΩ)
-20 ± 0.1	13.71-16.94
25 ± 0.1	1.825-2.155
80 ± 0.1	0.303-0.326
110 ± 0.1	0.1383-0.1451

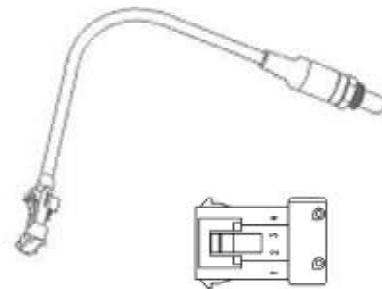
(6) OXYGEN SENSOR:

THIS SENSOR USED IN ELECTRONIC CONTROL FUEL INJECTION EQUIPMENT FEEDBACK SYSTEM, TO REALIZE CLOSED-LOOP CONTROL, RAISE ECU CONTROL THE AIR-FUEL DELIVERY RATIO.

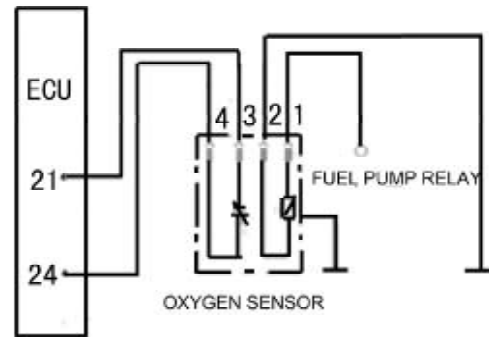
IT INSTALLED IN THE VENT-PIPE, MEASURING WASTE GAS OXYGEN CONTENT, DEFINITE IF THE GAS AND AIR COMPLETE BURNT, SO AS TO ENSURE UNIT TRIPLET CATALYTIC CONVERTER HAVE MAXIMUM CONVERSION EFFICIENCY TO EXHAUST HC, CO AND NO_x

THE PINS FUNCTION:

1. CONNECT HEATING POSITIVE SOURCE (WHITE)
2. CONNECT HEATING NEGATIVE SOURCE (WHITE)
3. OUTCOMING SIGNAL NEGATIVE POLE (GRAY)
4. OUTCOMING SIGNAL POSITIVE POLE (BLACK)



THE RIGHT DRAWING IS THE WIRING DIAGRAM FOR SENSOR AND ECU



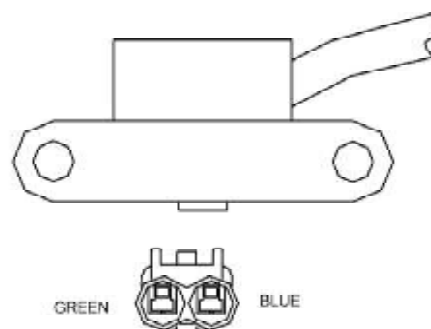
THE BELOW SHEET IS THE SENSOR PERFORMANCE CHARACTERISTIC VALUE

QUANTITY	NEW		AFTER 500 HOURS BENCH TEST	
PERFORMANCE DATA ESTABLISH EXHAUST TEMPERATURE	350°C	850°C	350°C	850°C
$\lambda=0.97$ (CO=1%) 时 SENSOR ELEMENTS VOLTAGE (mV)	840 ± 70	710 ± 70	840 ± 80	710 ± 70
$\lambda=1.10$ 时 SENSOR ELEMENT VOLTAGE (mV)	20 ± 50	55 ± 30	20 ± 50	40 ± 40
SENSOR ELEMENT INTERNAL RESISTANCE (kΩ)	≤1.0	≤0.1	≤1.5	≤0.3
RESPONSE TIME (ms) (600mV 至 300mV)	≤150	≤150	≤300	≤200
RESPONSE TIME (ms) (300mV 至 600mV)	≤150	≤150	≤300	≤200

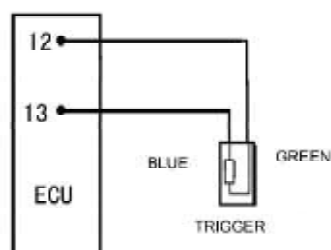
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(7) TRIGGER:

PROVIDE ENGINE ROTATE SPEED INFORMATION TO ECU,
ECU DETERMINE IGNITION ANGLE,OIL SPRAY ANGLE ACCORD-
ING TO THIS INFORMATION.



THE RIGHT DRAWING IS THE WIRING DIAGRAM FOR
TRIGGER AND ECU.



TESTING THE THRIGGER RESISTANCE VALUE.

- ADJUST MULTIMETER TO 1X100 Ω ;
TRIGGER WINDING RESISTANCE:100-130 Ω (20 $^{\circ}\text{C}$)
- IF THE TRIGGER RESISTANCE DONOT IN ABOVE RANGE,
REPLACE WITH A NEW ONE.

MEASURING TRIGGER PEAK VOLTAGE VALUE

- CONNECT MULTIMETER AND PEAK VOLTAGE ADAPTER AC-
CORDING TO THE RIGHT DRAWING:

- +PROBE: GREEN LEAD WIRE
- PROBE: BLUE LEAD WIRE

ATTENTION:

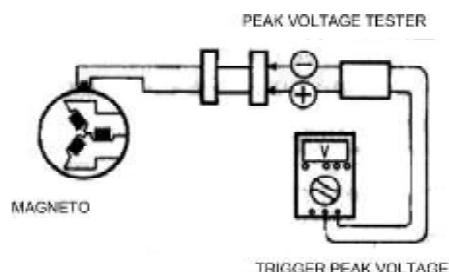
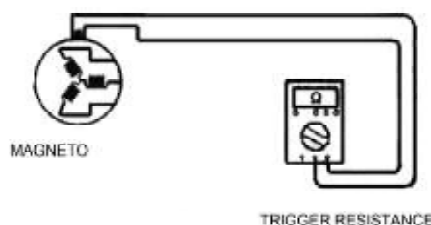
WHEN USE PEAK VOLTAGE ADAPTER,REFERS TO OPERATION
MANUAL,

- ADJUST MULTIMETER TO ALTERNATE V
- ADJUST THE GEAR TO NEUTRAL,ADJUST IGNITION SWITCH
TO "ON";
- PRESS ON STARTING BUTTON AND LET THE ENGINE RUN-
NING FOR FEW SECONDS,THEN START TO MEASURE:

TRIGGER COIL PEAK VOLTAGE:

- IF THE TRIGGER PEAK VOTAGE DONOT IN THE ABOVE
- REPEATED TIMES MEASURE, GET THE HIGHEST TRIGGER
COIL PEAK VOLTAGE VALUE.;

TRIGGER COIL PEAK VOLTAGE: $\geq 2\text{V}$ (300rpm)

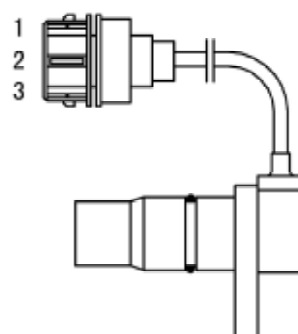


(8) ODOMETER SENSOR:

PROVIDE ENGINE OUTPUT SHAFT SPEED TO ECU, ECU JUDGE VEHICLE SPEED ACCORDING TO THIS INFORMATION. IT IS A KIND OF HALL SWITCH COMPONENTS, IT OUTPUT SQUARE WAVE VIA INDUCTION FIELD.

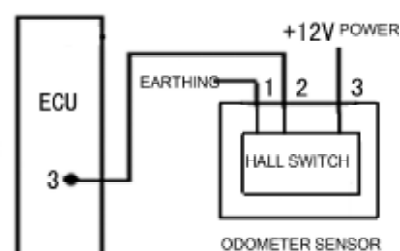
PINS FUNCTION:

1. GROUNDING
2. OUTPUT SQUARE WAVE VOLTAGE SIGNAL, (> INPUT POWER VOLTAGE 80%)
3. POWER +DC12V



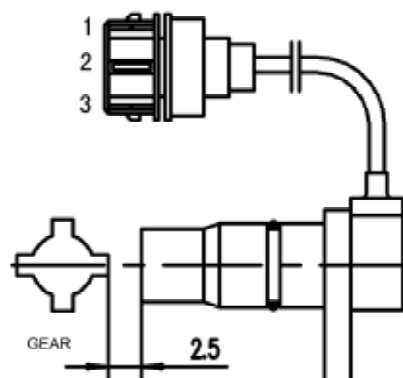
ODOMETER SENSOR OUTSIDE VIEW

THE RIGHT IS THE WIRING DRAWING OF SENSOR AND ECU.



ODOMETER SENSOR TESTING

- GROUNDING FOOT 1, CONNECT FOOT 3 +12V;
- FIXED ONE GEAR TO ODOMETER ACCORDING TO THE RIGHT DIAGRAM DISTANCE (2.5mm);
- ADJUST MULTIMETER TO DCV;
- ROTATE THE GEAR SLOWLY, MEASURE THE VOLTAGE VALUE BETWEEN FOOT 2 AND FOOT 3 TO SEE IF IT IS VARY FROM 0V、12V;
- IF NO CHANGES, THEN THE SENSOR HAS BROKEN, YOU REQUIRED TO REPLACE WITH A NEW ONE.



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(9) GEAR SENSOR CLUSTER:

PROVIDE GEAR INFORMATION TO THE METER, SO AS TO AT THE SAME TIME, COORDINATE WITH CABLE AS STARTING PROTECTION.

FUNCTIONS OF THE FOOTS:

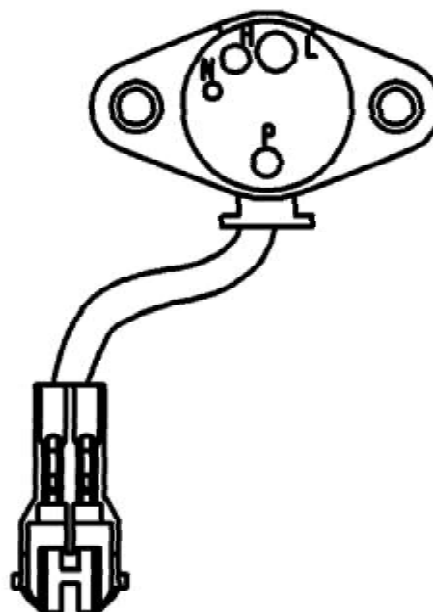
YELLOW/BLUE-L (UNDERDRIVE)

ORANGE/BLUE-H (HIGH POSITION)

YELLOW/BLACK-P (PARK POSITION)

WHITE/YELLOW-N (NEUTRAL POSITION)

● WHEN EACH OF THE FOUR GEAR IN A CERTAIN POSITION, GEAR CORRESPONDING FOOT CONDUCT TO THE ENGINE COVER, OR ELSE IT NON-CONDUCTION WITH THE ENGINE COVER.



GEAR SENSOR OUTSIDE VIEW

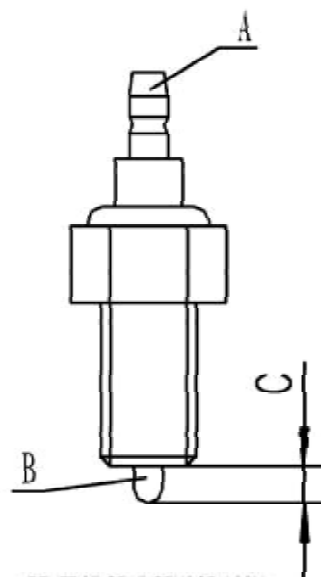
(10) REVERSE GEAR ASSEMBLY:

PROVIDE GEAR REVERSE INFORMATION TO ECU AND METER, THE ECU RESTRICT VEHICLE SPEED ACCORDING TO THIS INFORMATION.

● NORMALLY, A、B POINT CONDUCTION, DONOT CONDUCT WITH THE CASE;

● NORMALLY, C LENGTH IS 为 3.5mm. IF C LENGTH < 3mm, OR IF B SLIDE BLOCK, YOU HAVE TO CHANGE IT TO A NEW ONE.

● WHEN ENGINE BACK GEAR, A POINT NON-CONDUCTION WITH THE ENGINE CASE, OR ELSE IT IS CONDUCT WITH THE CASE.



REVERSE GEAR SENSOR ASSY

(11)OIL FUEL PUMP ASSY:

THE OIL FUEL PUMP ASSY COMBINED OF OIL FUEL PUMP, PLASTIC BRACKET,PREFILTRATION,PRESSURE REGULATING VALVE.IT DELIVER THE FUEL TO THE ENGINE WITH A CERTAIN OIL PRESSURE AND FLOW.

FUNCTIONS OF THE FOOT:

- 1.BLUE(GROUNDING)
- 2.RED(CONNECT THE OIL PUMP RELAY OUTPUT ENDING)

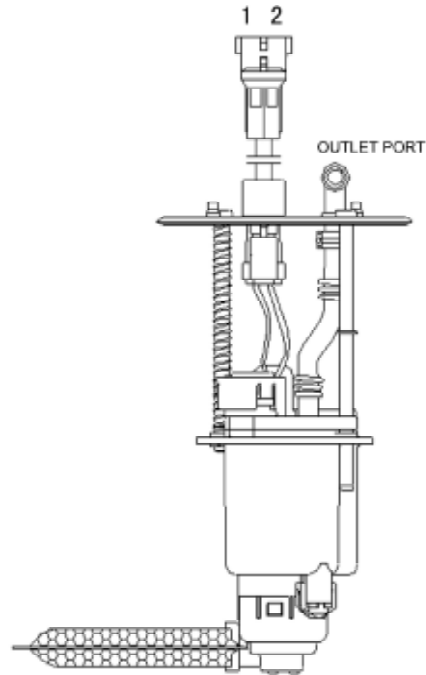
PERFORMANCE PARAMETER:

PRESSURE REGULATING VALVE OPENING PRESSURE: 0.3 ± 0.05 MPa
FLOW:3L/h

●THIS OIL PUMP ASSY ALL USED INSIDE THE OIL BOX:

●DONOT RUNNING THE OIL PUMP ASSY IN DRY;

●HANDLE GENTLY, DONOT DROP THE OIL PUMP ASSY ONTO THE GROUND.



OIL FUEL PUMP ASSEMBLY OUTSIDE VIEW

THE RIGHT DIAGRAM IS THE WIRING DIAGRAM OF THE OIL PUMP ASSY,OIL PUMP RELAY,ECU.

●BATTERY SUPPLY POWER VIA OIL PUMP RELAY,ELECTRIC OIL FUEL PUMP CIRCUIT CLOSE ONLY WHEN STARTING AND THE ENGINE RUNNING.

MEASURING THE OIL PRESSURE:

●CONNECT OIL PRESSURE GATE TO THE OIL FUEL PUMP FUEL DISCHARGE PORT,LOCK WITH CLAMP,ENSURE THERE IS NO LEAKAGE IN CONNECT AREA:

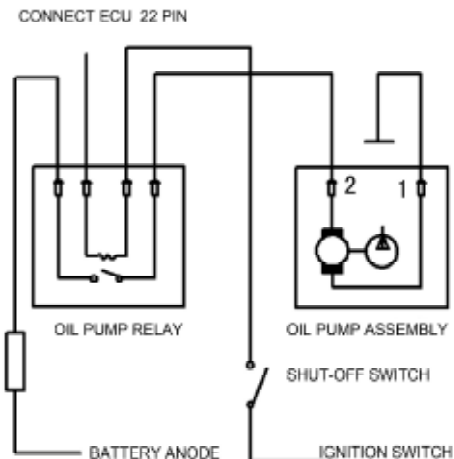
- LINK THE CIRCUIT ACCORDING TO THE ABOVE DIAGRAM;
- TURN OFF THE IGNITION SWITCH,FLAMEOUT SWITCH;
- AT THIS MOMENT,THE OIL FUEL PUMP WILL WORKING FOR 5 SECONDS,WHEN IT STOP,THE OIL PRESSURE SHALL REACH THE AUTHORIZED PRESSURE,OR ELSE,REPLACE THE ENTIRE OIL FUEL PUMP ASSY;

●WHEN STOPED OPERATION,PRESSURE HOLDING AT LEAST 0.3MPa 5 MINUTES,IF NOT,REPLACE THE OIL FUEL PUMP ASSY.

BECAUSE OF THE HIGH PRESSURE OF OIL SUPPLY,THE FUEL PIPES ARE ALL HIGH PRESSURE RESISTANCE PIPE.EVEN IF THE ENGINE DOES NOT WORK,THERE IS STILL HIGH PRESSURE ON THE OIL CHANNEL,THEREFOR,DONOT DISMANTLE THE OIL PIPE DURING SERVICING EASILY.

BEFORE SERVICE THE FUEL SYSTEM,YOU REQUIRED TO DO OIL PRESSURE RELIEF,THE METHOD IS AS BELOW:

REMOVE OIL PUMP RELAY,START THE ENGINE AND RUN ENGINE ON IDLE UNTILL THE ENGINE GO OUT IT SELF.



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(12)OIL ATOMIZER:

OIL ATOMIZER ONE END INSTALLED IN SEAT,THE OTHER END CONNECT WITH THE OIL PIPE VIA OIL ATOMIZER CAP.ACCORDING TO THE ECU INSTRUCTION, IT SPRAY OIL IN FIXED TIME.SO AS TO SUPPLY OIL TO THE ENGINE AND ATOMIZING.

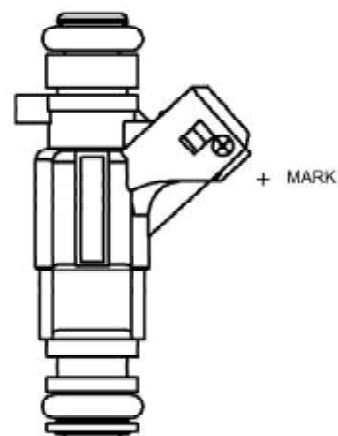
THIS OIL ATOMIZER APPLY QUADRIPOINTAL,DONOT TURN AFTER FIXED THE CLAMP.

FUNCTION OF PINS:

● ONE SIDE OF THE PLUG MARK+: CONNECT OIL PUMP RELAY OUTPUT END,
WITHOUT MARK SIDE CONNECT ECU PIN 14.

OIL ATOMIZER RESISTANCE: $12 \pm 1 \Omega$ (20℃)

CONNECT OIL ATOMIZER CAP

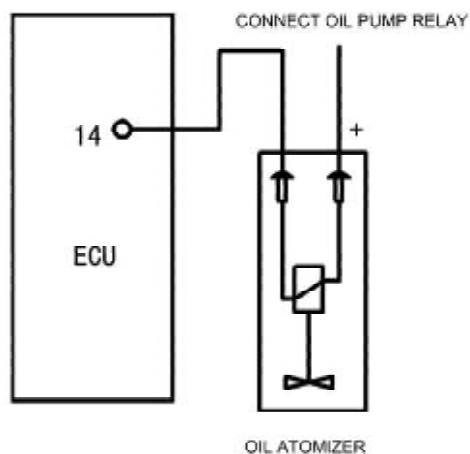


CONNECT OIL ATOMIZER SEAT

THE RIGHT IS THE WIRING DIAGRAM FOR OIL ATOMIZER AND ECU.

OIL ATOMIZER INSTALLATION:

- INSTALL THE OIL ATOMIZER WITH MANUL, FORBID KNOCK WITH HAMMER OR SUCH KIND OF THINGS.
- WHEN DISASSEMBLE AND ASSEMBLING THE OIL ATOMIZER, YOU MUST REPLACE THE O RING.
- WHEN DISMANTLE OIL ATOMIZER, IF NECESSARY, DO PRESSURE RELIEF IN ADVANCE.
- DO LEAK TIGHTNESS AFTER INSTALLED THE OIL ATOMIZER TO ENSURE NO LEAKAGE;



(13) IDLE SPEED CONTROL VALVE(CARBON TANK CONTROL VALVE):

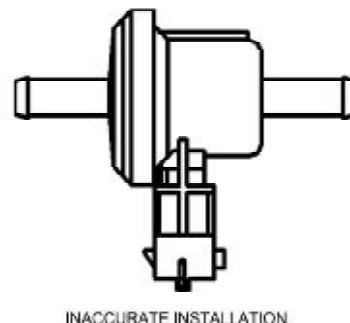
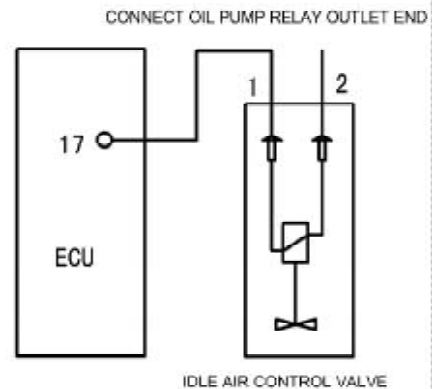
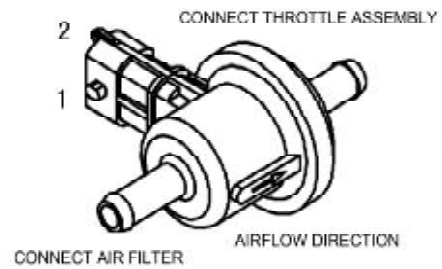
CONTROL PASS-BY AIR FLOW. ECU CONTROL THE IDLE SPEED VALVE ACCORDING TO THE INFORMATION OF ENGINE LOAD,THE ELECTRICAL PULSE DURATION AND FREQUENCY: (DUTY RATIO).THE IDLE SPEED VALVE HAS DIFFERENT AIR FLOW UNDER DIFFERENT ORESSURE DIFFERENCE,SO IT MUST BE CONNECTED ACCORDING TO PRESCRIPTIVE METHOD,OR ELSE WILL CAUSE INCORRECT IDLE SPEED,WHEN WITHOUT ELECTRICAL PULSE,IDLE SPEED VALVE CLOSE.

FUNCTION OF PINS:

1.CONNECT PIN 17;

2.CONNECT OIL PUMPRELAY OUTLET END;

THE RIGHT IS THE WIRING DIAGRAM FOR IDLE SPEED VALVE AND ECU.



●WHEN FIXING THE IDLE SPEED CONTROL VALVE,IT CANNOT BE INSTALLED LIKE THE RIGHT DIAGRAM(CONNECTOR VERTICALLY DOWNWARD) TO AVOID DESTROY THE ELECTRONIC COMPONENT.

● TO AVOID SOLID-BORNE SOUND TRANSMISSION,YOU CAN INSTALL THE IDLE AIR CONTROL VALVE SUSPENDED IN THE TUBE,OR USE RUBBER BOOT TO FIX IT TO THE ENGINE OR THE FRAME.

IDLE SPEED CONTROL VALVE PARAMETER LIST:

QUANTITY	VALUE			UNIT
	MIN	TYPICAL	MAX	
RATED VOLTAGE		13.5		V
+20°C RESISTANCE		16		Ω
CURRENT FLOW UNDER RATED VOLTAGE		0.85		A
CONTROL PULSE FREQUENCY			30	Hz
TYPICAL CONTROL PULSE WIDTH		≅8		ms
PRESSURE DIFFERENCE =700 mbar SHARE AIR RATION 100% FLOW		5.00		m ³ /h

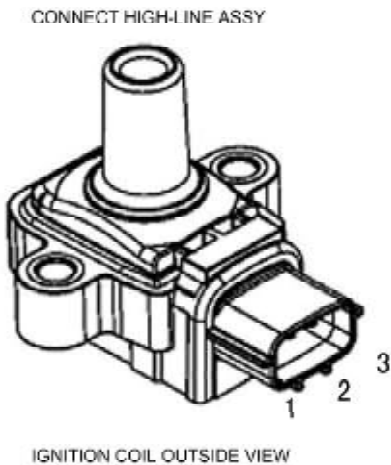
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(14)IGNITION SWITCH COIL:

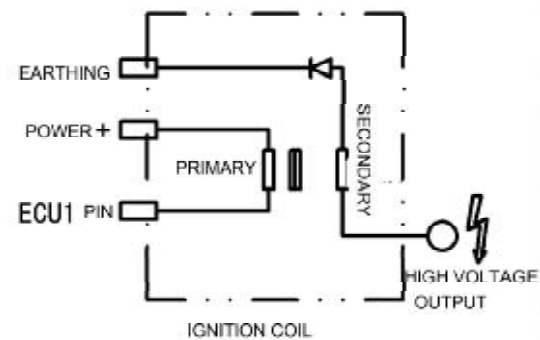
IGNITION SWITCH COIL AHANGE THE PRIMARY WINDING LOW VOLTAGE INTO SECONDARY WINDING HIGH VOLTAGE, THROUGH SPARK PLUG DISCHARGE TO CREAT SPARK,FIRING THE FUEL AND GAS MIXTURE.

FUNCTION OF PINS:

- 1.GROUNDING;
- 2.CONNECT POWER+;
- 3.CONNECT ECU 1 POINT;

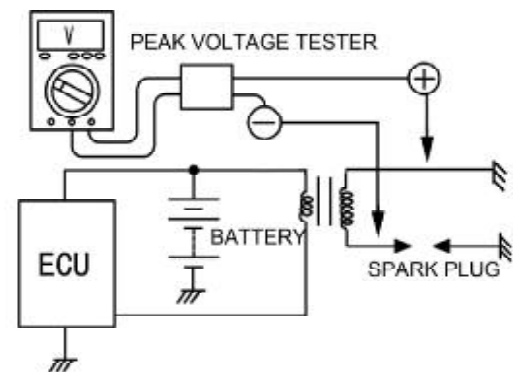


THE RIGHT IS THE CONNECTION CIRCUIT DIAGRAM OF IGNITION COIL AND ECU.



MEASURING SECONDARY IGNITION VOLTAGE:

- CONNECT THE ENGINE ACCORDING TO THE ELECTRONIC-SPRAY ELEMENTARY DIAGRAM;
- CONNECT THE PEAK VOLTAGE GAUGE ACCORDING TO THE RIGHT DIAGRAM;
- START THE ENGINE;
- AFTER STARTS,THE SECONDARY IGNITION VOLTAGE SHOULD BE > 15000V;



IGNITION COIL PARAMETER LIST:

QUANTITY		VALUE			UNIT
		MIN	TYPICAL	MAX	
NOMINAL VOLTAGE			14		V
RUNNING VOLTAGE		6		16.5	V
RESISTANCE (20 至 25°C)	PRIMARY WINDING	0.74	0.76	0.78	Ω
	SECONDARY WINDING	10.1	10.6	11.1	kΩ
PRIMARY CURRENT			7		A

ELECTRONIC SPRAY SYSTEM FAULT SELF-DIAGNOSIS

ECU CONTINUOUSLY MONITOR THE SENSOR,ACTUATOR,RELEVANT CIRCUIT,TROUBLE LAMP,BATTERY VOLTAGE ETC,EVEN THE ECU ITSELF.ALSO THE SENSOR OUTPUT,ACTUATOR DRIVING SIGNAL,INTERNAL SIGNAL(SUCH AS CLOSED-LOOP CONTROL , COOLANT TEMPERATURE,IDLING SPEED CONTROL,BATTERY VOLTAGE CONTROL ETC),DO THE RELIABILITY MEASUREMENT.ONCE DISCOVER SOME WHERE BREAK DOWN,OR SOME SIGNAL VALVE UNTRUSTED,THE ECU WILL IMMEDIATELY SET UP FAULT RECORD INFORMATION IN RAM TROUBLE MEMORY.THE FAULT INFORMATION STORE AS TROUBLE CODE,AND DISPLAY THE FAULT IN IT S EMERGENCE SEQUENCE.

THE FAULT CANBE DIVIDED INTO TWO TYPES “STEADY FAULT” AND “RANDOM FAILURE” ACCORDING TO IT’ S EMERGENCE FREQUENCY(SUCH AS CAUSED BY BRIEF WIRE TURNOFF OR BAD CONNECTION OF THE CONNECTOR.)

THROUGH DIAGNOSTIC EQUIPMENT AND THE TROUBLE LAMP YOU CAN FIND THE TROUBLE PART QUICKLY.

ELECTRONIC SPRAY SYSTEM FAULT DIAGNOSIS MAINLY APPLY TROUBLE LAMP AND DIAGNOSTIC EQUIPMENT.

(1) TROUBLE LAMP (MILLAMP):

TROUBLE LAMP FIXED IN THE METER DESPLAY BOARD, ADOPTING LED,BY MEANS OF DIFFERENT FREQUENCY STAND FOR THE TROUBLE CODE.

THE RIGHT IS THE WIRING DIAGRAM FOR TROUBLE LAMP AND ECU.CURRENT FLOW INTO ECU 4 PIN SHOULD BE LESS THAN 0.5A.

TROUBLE LAMP BLINK PRINCIPLE:

a: IN BLINK CODE MODE,AND ALSO THE TROUBLE MEMOY TROUBLE FREE:

IF ECU MONITOR THAT THE MIL LAMP IN BLINK CODE MODE,THE TROUBLE LIGHT WILL FLICKER TO SHOW THE TROUBLE CORRESPONDING Pcode CODE. SINCE IGNITE ECU, MIL WILL CONTINUE BLINK 4 SECONDS,THEN HAVE A 1 SECOND SPAN,MIL BLINK WITH 2 HZ FREQUENCY TO SAY TROUBLE FREE.UNTILL START THE ENGINE,FIND OUT THE ROTATE SPEED

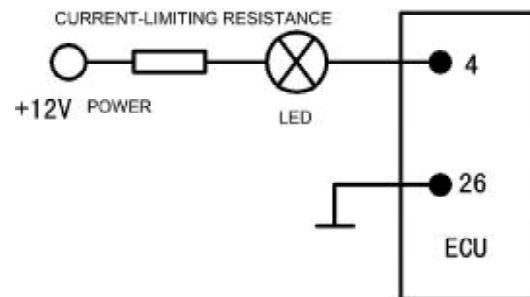
b: IN CODE BLINK MODE,AND THE TROUBLE MEMORY SHOWS AT FAULT.

IF ECU MONITOR THAT THE MIL LAMP IN CODE BLINK MODE,THE TROUBLE LAMP WILL BLINK TO SHOW THAT THE TROUBLE MEMORY CORRESPONDING Pcode CODE.SINCE IGNITE ECU INITIALIZATION,MIL WILL LIGHT 4 SECONDS,THEN HAVE A 1 SECOND SPAN,MIL SHOW THE MEMORY TROUBLE CODE THROUGH BLINK CODE Pcode.IF ALL THE TROUBLES ENTERED THE MEMORY SHOWED BY MIL LAMP VIA BLINK CODE MODE,MIL EXTINGUISH,UNTILL EXIT BLINK CODE MODE.

BLINK CODE MODE REQUIRES K LINE GROUNDING.

C:READ TROUBLE INFORMATION THROUGH THE BLINK CODE

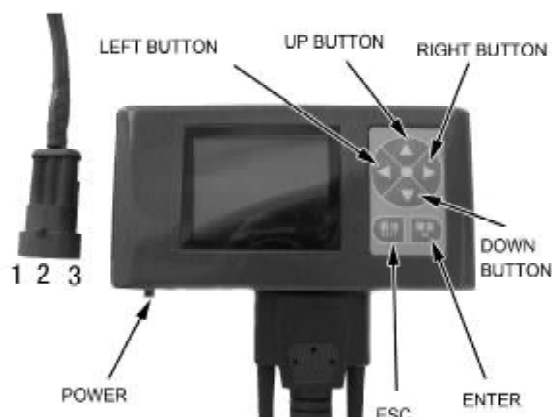
THRN ON THE IGNITION SWITCH,K LINE GROUND AFTER 2. 5 SECONDS,IF ECU TROUBLE MEMORY HAVE TROUBLE CODE,AT THE MOMENT, ENGINE MIL TROUBLE LAMP OUTPUT P-CODE VALUE.SUCH AS:P0203 BLINK MODE IS:BLINK 10 TIMES CONTINUOUSLY-INTERMISSION-BLINK 3 TIMES CONTINUED.



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(2) **DIAGNOSTIC EQUIPMENT:**IT HAVE THREE PINS, POWER,GROUNDWIRE AND DATA K LINE,CONNECT WITH THE CORRESPONDING PINS IN ECU.

THE RIGHT IS THE DIAGNOSTIC EQUIPMENT OPERATION FUNCTIONS INDICATOR DIAGRAM.SPECIFIC OPERATION AND IT' S FUNCTIONS PLEASE REFERS TO THE DIAGNOSTIC EQUIPMENT OPERATING MANUAL.



1.ECU 26PIN

2.GROUNDWIRE

3.+12V POWER

KEY-PRESS FUNCTIONS:

LEFT-HAND BUTTON:UPWARD TURN OVER;

UPPER KEY:MENU SELECTION,UPWARD ROLLING TEXT:

RIGHT-HAND BUTTON:BACKWARD TURN OVER;

DOWN KEY:MENU SELECTION,DOWNWARD ROLLING TEXT;

CONFIRMATION KEY:ENTER OR START CURRENT OPERATION;

SELECT CURRENT MENU SELECTION;

ESC ESCAPE:CANCEL OR STOP CURRENT OPERATION;
RETURN TO PREVIOUS PAGE;

DIAGNOSTIC EQUIPMENT FUNCTION:

(1) **EDITION INFORMATION DISPLAY:**

ENGINE INFORMATION,ECU HARDWARE,ECU SOFTWARE.

(2) **TROUBLE DISPLAY**

INLET PRESSURE SENSOR,INTAKE AIR TEMPERATURE SENSOR,ENGINE TEMPERATURE SENSOR,THROTTLE POSITION SENSOR, OXYGEN SENSOR,OXYGEN SENSOR HEATING CIRCUIT,AIR-FUEL DELIVERY RATIO,OIL ATOMIZER,OIL FUEL PUMP RELAY, REVOLUTION SPEED SENSOR,VEHICLE SPEED SIGNAL,IDLING SPEED,IDLE AIR CONTROL,SYSTEM VOLTAGE,ECU,TROUBLE LAMP.

(3) **ENGINE PARAMETER DISPLAY**

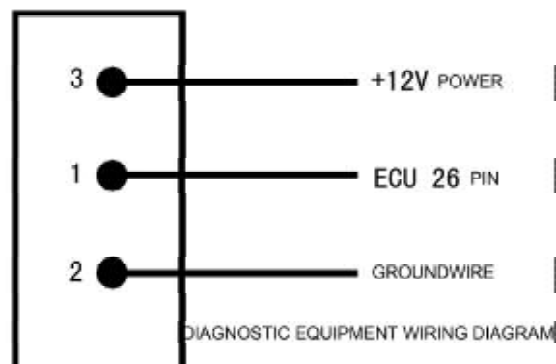
BATTERY VOLTAGE,ENGINE SPEED,IDLE SPEED,VEHICLE SPEED,ENGINE TEMPERATURE,ENGINE TEMPERATURE SENSOR SIGNAL VOLTAGE,INLET TEMPERATURE,INLET AIR TEMPERATURE SENSOR,INLET PRESSURE,AIR INPUT,MAGNETIC STEPPING MOTOR TARGET LOCATION,THROTTLE POSITION SENSOR SIGNAL PRESSURE,THROTTLE OPENING,RELATIVE THROTTLE POSITION, CARBON TANK CONTROL VALVE DUTY RATIO,CHARGING TIME,OIL SPOUT PILSE WIDTH,IGNITION ADVANCE ANGLE,OXYGEN SENSOR SHORT-TERM CORRECTION,OXYGEN SENSOR VOLTAGE,OXYGEN SENSOR LONG TERM CORRECTION,ENGINE RELATIVE LOAD, CARBON TANK CONTROL RELATIVE FUEL DELIVERY,CARBON PURIFYING,CARBON LOAD,IDLING ACTUATOR TEV OPENING, AMBIENT PRESSURE,ELEVATION CORRECTION FACTOR,OIL SPOUT PHASE,RUNTIME.

(4) **ELECTRONIC SPRAY SYSTEM STATUS DISPLAY**

IGNITION TERMINAL OPEN UP,MAIN RELAY OPERATION,OIL FUEL PUMP OPERATION,REACH IDLING ROTATE SPEED,REACH ENGINE WORK TEMPERATURE,VEHICLE RUNNING,IDLE SPEED WORKING CONDITION,FULL LOAD WORKING CONDITION,ACTIVE DECELERATE OIL REDUCTION,ACTIVATE ACCELERATION CROWDING,OIL SPOUT CLOSED-LOOP CONTROL ACTIVATION,DECELERA- TION OIL-BREAK,lambd CONTROL ACTIVATE,MIXTURE GAS SELF-LEARNING ACTIVATION,TROUBLE LAMP STATE,MIL BLINK.

(5) **ACTUATOR EXPERIMENT FUNCTION**

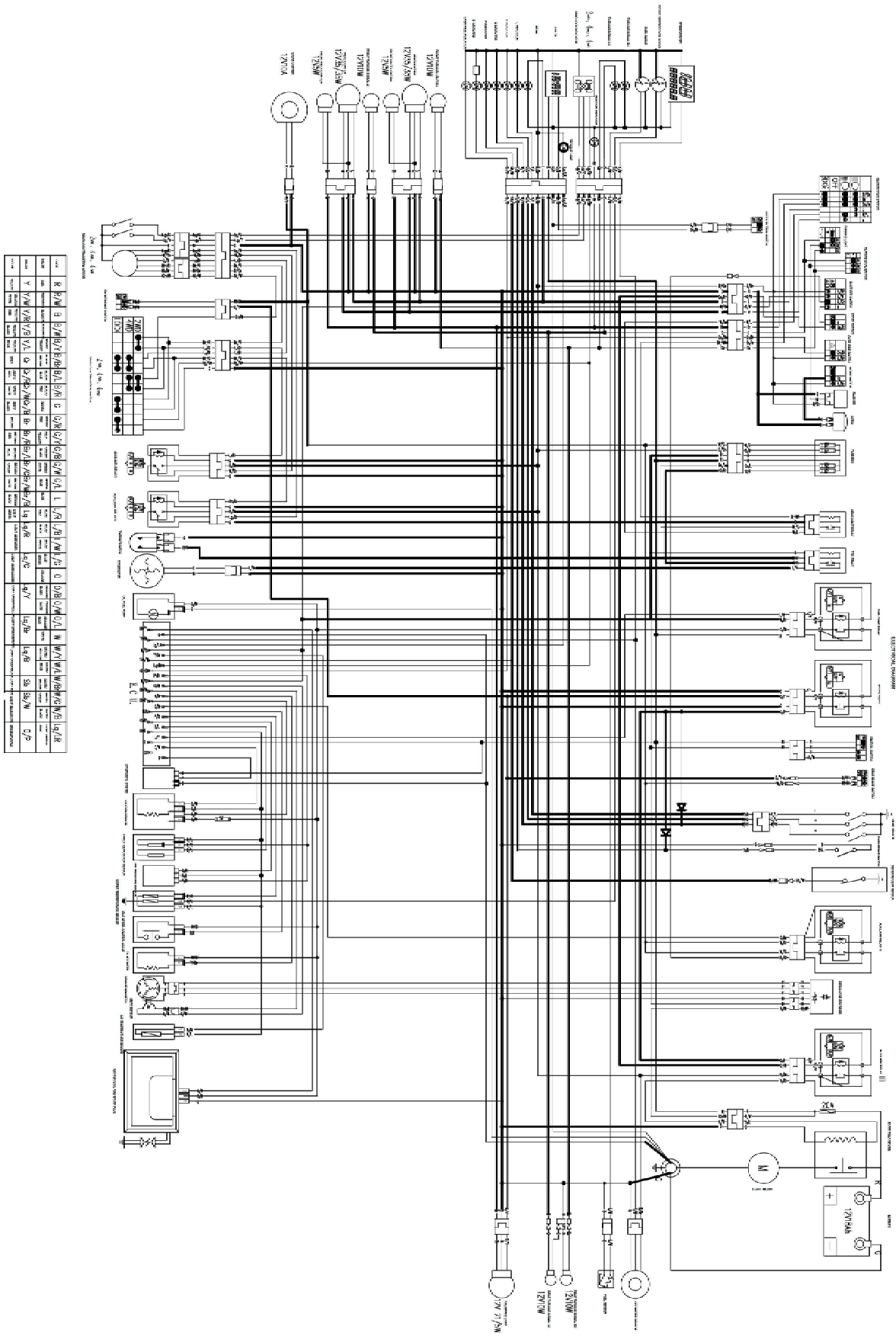
TROUBLE LAMP,OIL FUEL PUMP,MAGNETIC STEPPING MOTOR,CARBON TANK CONTROL VALVE,IGNITION,OIL SPOUT.



TROUBLE CODE LIST:

REF	TROUBLE CODE	INSTRUCTION
1	P0030	OXYGEN SENSOR HEATING CONTROL CIRCUIT OPEN CIRCUIT
2	P0031	OXYGEN SENSOR HEATING CONTROL CIRCUIT SHORT TO EARTH
3	P0032	OXYGEN SENSOR HEATING CONTROL CIRCUIT SHORT CIRCUIT TO POWER
4	P0053	OXYGEN SENSOR HEATING INTERNAL RESISTANCE UNREASONABLE
5	P0105	INLET PRESSURE SENSOR SIGNAL NO CHANGE (ICE UP)
6	P0106	INLET PRESSURE SENSOR UNREASONABLE
7	P0107	INLET PRESSURE SENSOR SHORT CIRCUIT TO GROUND
8	P0108	INLET PRESSURE SENSOR SHORT CIRCUIT TO POWER
9	P0112	INLET AIR TEMPERATURE SENSOR SIGNAL VOLTAGE TOO LOW
10	P0113	INLET AIR TEMPERATURE SENSOR SIGNAL VOLTAGE TOO HIGH
11	P0116	ENGINE COOLANT TEMPERATURE SENSOR UNREASONABLE
12	P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT VOLTAGE TOO LOW
13	P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT VOLTAGE TOO HIGH
14	P0122	THROTTLE POSITION SENSOR CIRCUIT VOLTAGE UNDER LIMINAL VALUE
15	P0123	THROTTLE POSITION SENSOR CIRCUIT VOLTAGE EXCEED LIMINAL VALUE
16	P0130	OXYGEN SENSOR SIGNAL UNREASONABLE
17	P0131	OXYGEN SENSOR SIGNAL CIRCUIT VOLTAGE TOO LOW
18	P0132	OXYGEN SENSOR SIGNAL CIRCUIT VOLTAGE TOO HIGH
19	P0134	OXYGEN SENSOR CIRCUIT SIGNAL TROUBLE
20	P0201	1 CYLINDER OIL ATOMIZER CONTROL CIRCUIT OPEN CIRCUIT
21	P0261	1 CYLINDER OIL ATOMIZER CONTROL CIRCUIT SHORT CIRCUIT TO EARTH
22	P0262	1 CYLINDER OIL ATOMIZER CONTROL CIRCUIT SHORT CIRCUIT TO POWER
23	P0321	TRANSIENT SPEED SIGNAL REFERENCE POINT TROUBLE
24	P0322	NO TRIGGER (VEHICLE SPEED) PULSE SIGNAL (OPEN CIRCUIT OR SHORT CIRCUIT)
25	P0501	VEHICLE SPEED SENSOR SIGNAL UNREASONABLE

COMPLETE SCHEMATIC CIRCUIT DIAGRAM



13 Lights, Instrument, Switches

Overhaul Info.....	10-1	Horn.....	10-8
Troubleshooting.....	10-2	Dashboard.....	0-9
Bulb replacement.....	10-3	Fuel Sensor.....	10-
Headlight.....	10-5	WaterTemperature sensor.....	10-12
Ignition Switch.....	10-6		
Handlebar Switch.....	10-7		
Brake Light Switch.....	10-8		

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 will cause 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

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	φ 5 LED
	Indicators	LCD

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TROUBLESHOOTING

Head Light Cannot Turn On

- Broken fuse
- Open circuit with main cable
- Burnt Bulb
- Faulty Switch

13 Lights, Instrument, Switches

Replacing Bulb

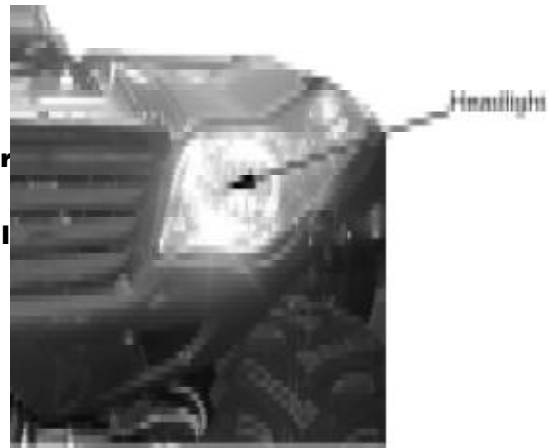
Headlight Bulb

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.

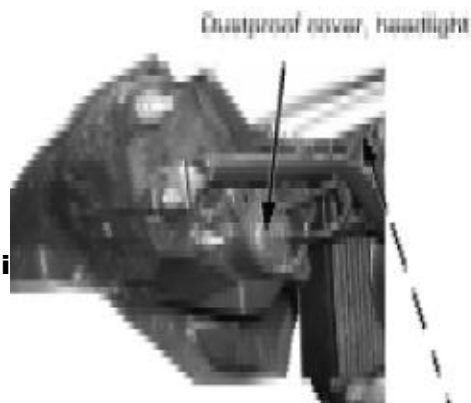
Remove headlight

(→ 13-5)



Disconnect headlight.

Remove dust-proof cap, headlight connector, 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.

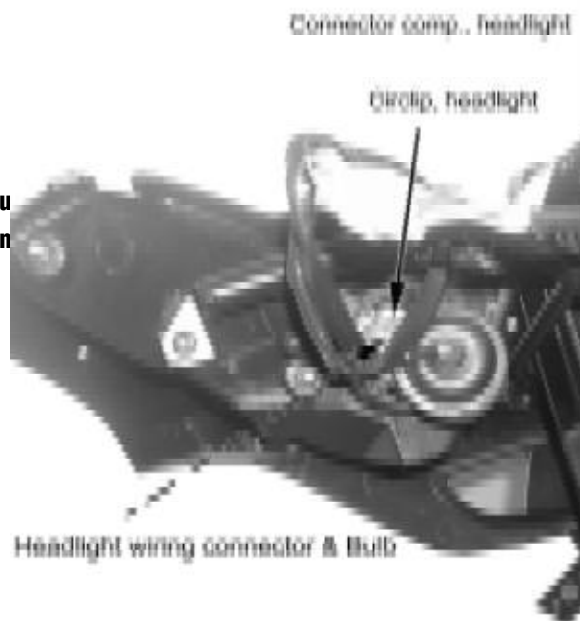
Make sure that the three pins of the bulb should be in line with the three positioning holes in the socket when replacing the bulb.

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

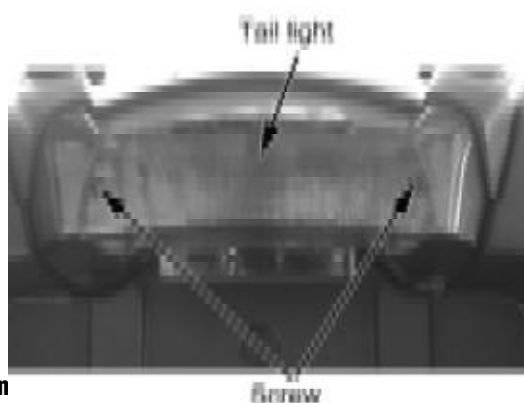
Remove tail light cover.

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



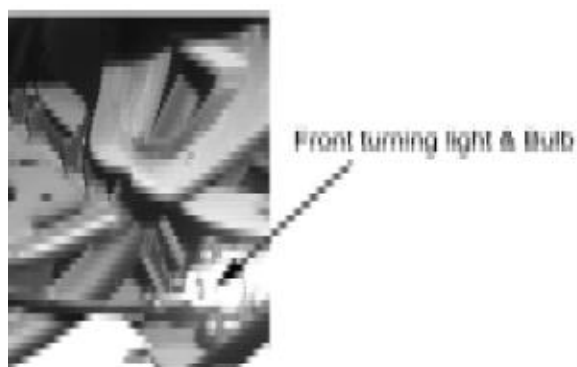
Front Turning Indicator Bulbs

Remove headlight(→ 13-5)

Remove cover of front turning light

Replace front turning light bulbs

Bulb Specification: 12V-10W



Rear Turning Indicator Bulbs

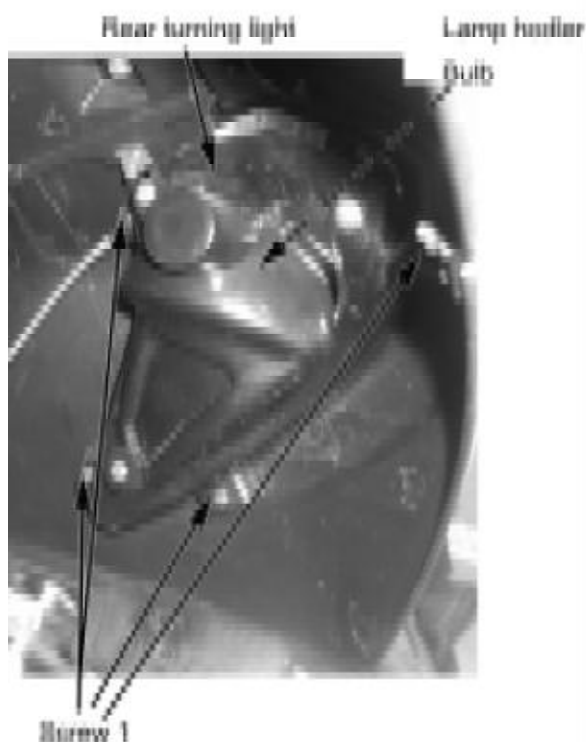
Remove screw1.

Remove rear turning indicator cover.

Replace rear turning indicator bulbs.

Bulb Specification: 12V-10W.

Reverse the removal procedure for installation.



13 Lights, Instrument, Switches

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



Dashboard assembly

Headlight

Remove nuts as picture shown

Disconnect headlight connector

Disassemble headlight comp.

Reverse the removal procedure for installation

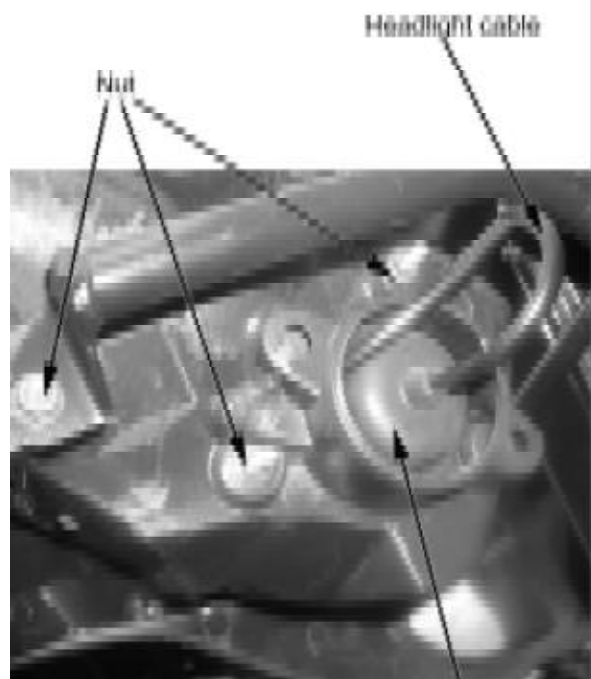
Note:

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.(



Headlight

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Ignition Switch

Inspection

Remove front & rear top cover

(→ 2 - 4)

Disconnect 4P connector of ignition switch



Ignition switch lock

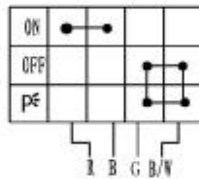
Ignition switch connector



13 Lights, Instrument, Switches

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.

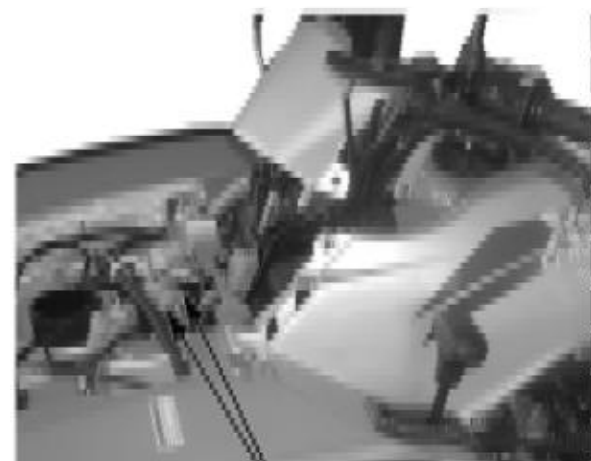
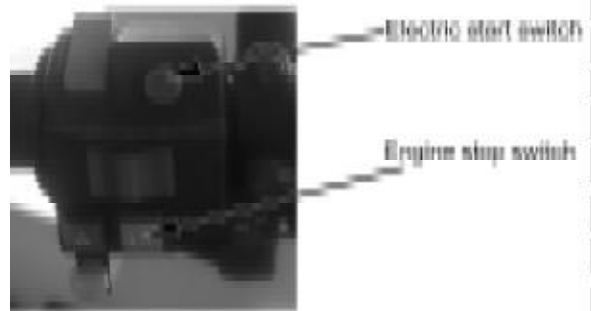
Check according to the following table if the connector terminals are in continuity.

- ● continuity

	Black/Brown	Brown	Brown/White	Blue	White/Blue	White
	●	●	●	●	●	
	●	●	●		●	●
OFF						
	●	●	●			

	Black/White	Green	Black/Brown	Yellow
	●	●		
			●	●

	Yellow	Grey/Red
	●	●

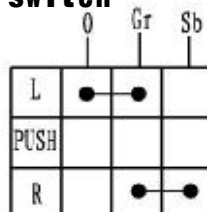


13

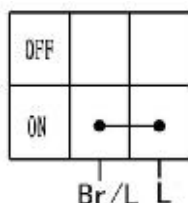
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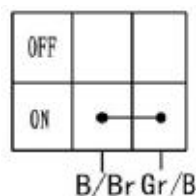
Turn switch



Horn switch



Acceleration switch

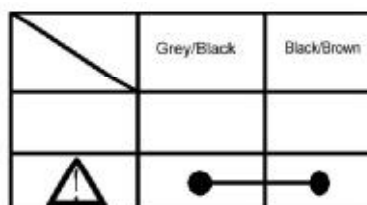


2WD/4WD switch

	Br/R	L/C	L/B	Br/G	Gr/W	L/C	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

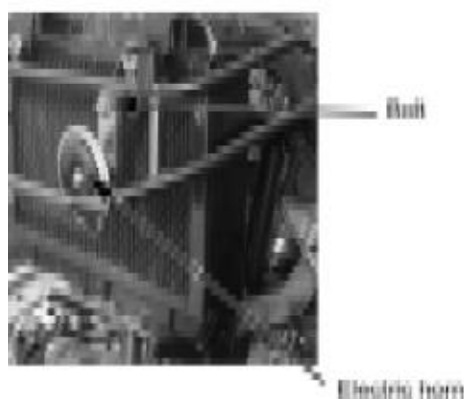
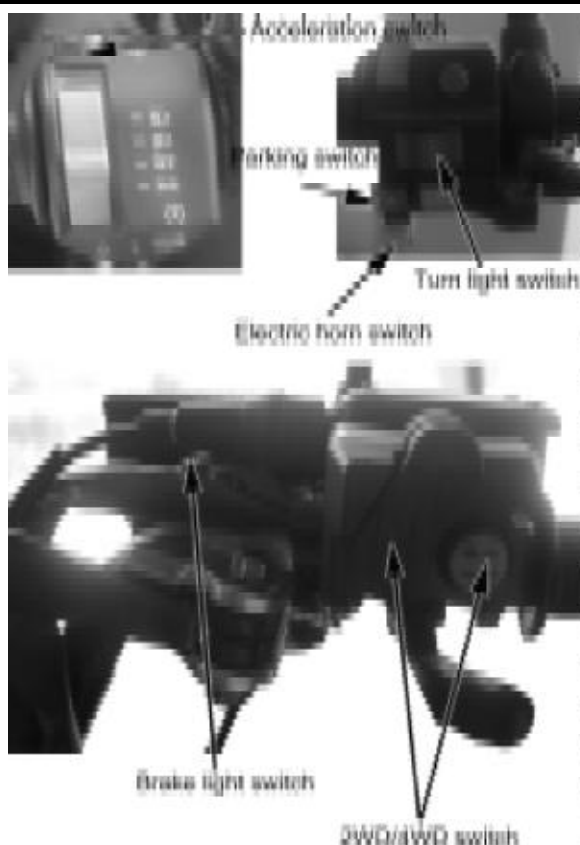
Inspection:

Remove front vent grille (→ 2-15)

Disconnect horn.

Connect with a fully charged 12V battery and check if the horn sounds.

Faulty Horn: Replace



13 Lights, Instrument, Switches

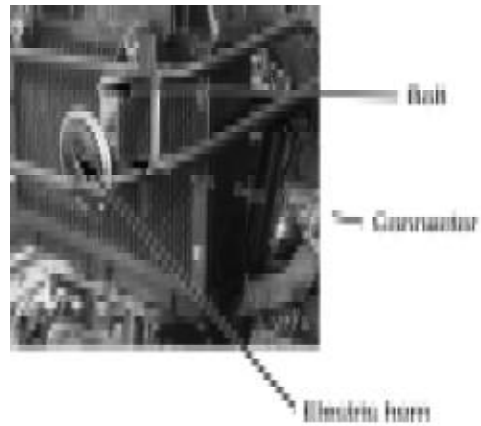
Disassemble

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

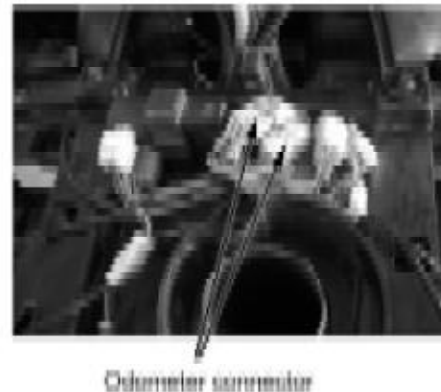


Remove fixing nut and remove dashboard in the direction as illustrated on the right

Reverse the removal procedure for installation.

Note:

Main cables and wires shall be routed properly.



Fuel Sensor

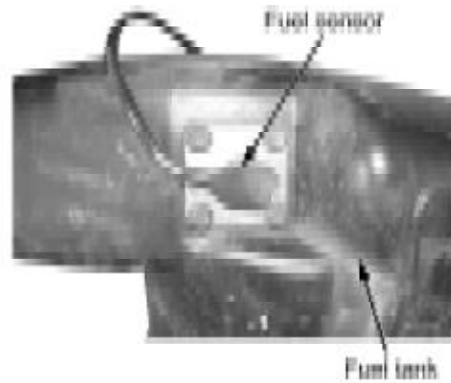
Remove:

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.



Fuel sensor connector

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.



Fuel sensor

Connection Terminal:

Upper: Blue/White-Green:

: 4 - 10 Ω (20 $^{\circ}\text{C}$)

Lower: Blue /White-Green:

90 - 100 Ω (20 $^{\circ}\text{C}$)

Faulty fuel sensor: Replace

13 Lights,Instrument,Switches

Installation

Put fuel sensor into installation hole of fuel

**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.**

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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.

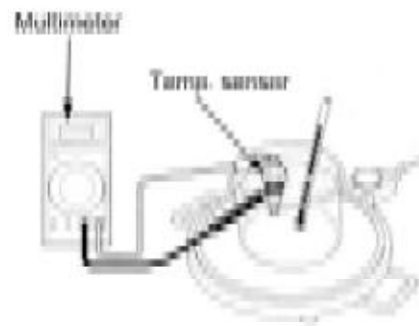


Water temp. sensor

Disassembly:

Remove right side panel (→ 2-8)

Disconnect and remove temp. sensor



Put the sensor into a vessel with coolant, slo heat up the liquid and measure the sensor resistance.

Temperature	Resistance
50℃	154 $\Omega \pm 16 \Omega$
80℃	52 $\Omega \pm 4 \Omega$
100℃	27 $\Omega \pm 3 \Omega$
120℃	16 $\Omega \pm 4 \Omega$

Out of range: Replace

Install transducer

Connect water temperature transducer connector

Fill coolant and discharge air.

Reverse the removal procedure for installation plastic parts and seat.

13 Troubleshooting

- 1 Engine troubleshooting-----13-2
- 2 Diagnosis troubles according to EFI system Trouble Code
-----13-5
- 3 Diagnosis troubles according to engine fault phenomena
-----13-14

1.Engine troubleshooting

Complaint	Symptom and Possible Causes	Remedy
Engine will not start or is hard to start	Compression is Too Low 1. Worn cylinder 2. Worn piston ring 3. Leakage with cylinder gasket 4. Wear valve guide or improper valve seating 5. Loose spark plug 6. Slow cranking of starting motor 7. Faulty valve timing 8. Improper valve clearance	Replace Replace Replace Repair or Replace Tighten Check electrical part Adjust Adjust
	No Sparking from Spark Plug 1. Fouled spark plug 2. Wet spark plug 3. Defective ignition coil 4. Open or short circuit with pickup coil 5. Faulty generator	Clean or Replace Clean and dry or replace Replace Replace Replace
	No Fuel Reach Into Carburetor 1. Clogged fuel tank vent tube 2. Clogged or faulty fuel valve 3. Faulty carburetor needle valve 4. Clogged fuel hose 5. Clogged fuel filter	Clean or Replace Clean or Replace Replace Replace 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 2. Improper valve seating 3. Faulty valve guide 4. Worn rocker arm or rocker arm shaft 5. Fouled spark plug 6. Improper spark plug gap 7. Faulty ignition coil 8. Clogged idle-valve inlet & exhaust pipe 9. Faulty magneto	Adjust Replace or Correct Replace Replace Replace Replace or Adjust Replace Adjust Fuel level Replace

13 Troubleshooting

Complaint	Symptom and Possible Causes	Remedy
Poor engine running in high-speed range.	1. Weak valve spring 2. Worn camshaft 3. Fouled spark plug 4. Insufficient spark plug gap 5. Improper valve timing 6. Faulty ignition coil 7. Weak high pressure oil pump, resulting in poor fuel supply 8. Dirty air filter	Replace Replace Clean or replace Adjust or replace Replace Adjust Adjust or replace Clean or replace
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. Air leakage from air intake pipe 6. Incorrect engine oil 7. Faulty cooling system(7-5)	Clean Check level, add or drain Replace Clean Tighten or replace Change engine oil

Complaint	Symptom and Possible Causes	Remedy
Engine is noisy	Valve Chatter - Excessive valve clearance - Worn or broken valve spring - Worn rocker arm or camshaft	Adjust Replace Replace
	Noise from Piston - Worn piston - Worn cylinder - Carbon deposit in combustion chamber - Worn piston pin or pin hole - Worn piston ring or piston ring groove	Replace Replace Clean Replace Replace
	Noise from Timing chain - Stretched chain - Worn sprocket wheel - Faulty chain tensioner	Replace chain & sprocket Replace chain & sprocket Repair or replace
	Noise from Clutch - Worn or damaged crankshaft spline - Worn inner race spline	Replace crankshaft Replace inner race
	Noise from Crankshaft - Rattling bearing - Worn or burnt crank pin bearing - Excessive thrust clearance	Replace Replace Replace
	Noise from CVT - Worn or slipping drive belt - Worn rollers in primary sheave	Replace Replace
	Noise from Transmission - Worn or damaged gear - Worn or damaged input or output shafts - Worn bearing - Worn bushing	Replace Replace Replace Replace
Slipping Clutch	- Worn or damaged clutch shoes - Weakened clutch shoe spring - Worn clutch housing - Worn or slipping drive belt	Replace Replace Replace Replace

2 Diagnosis troubles according to EFI system Trouble Code

Note:

1. Only start inspection and fixation when trouble is steady-state; otherwise diagnosis would probably wrong
2. The “multimeter” mentioned below are numerical multimeter; it is forbidden to use pointer type multimeter to make EFI system inspecting.
3. When Trouble Code tells “Low Voltage”, means probably it’s Short Circuit to Ground or Broken Circuit;
When Trouble Code tells “High Voltage”, means probably it’s Short Circuit to Power;
When Trouble Code tells “Circuit Error”, means Circuit Broken or Various Errors Exist.

Diagnosis Help:

1. Trouble Code cannot be cleared, means trouble is steady-state;
Focusing on the connector wires’ possible loosen if trouble is incidental,
2. When making inspections, do not ignore possible affect from vehicle maintenance condition, cylinder pressure, mechanism timing.
3. If Trouble Code is cleared, it means defective on ECU;
If Trouble Code is not cleared, put back original ECU and repeat inspecting procedure to start again overhaul inspections.

Following are implications of EFI System Trouble Code, Diagnosis Measurements, Possible Reasons and their Solutions as references.

Trouble Code: P0030 Oxygen Sensor Heating Control Circuit Broken

Note Possible Troubles are as below 1) Circuit broken between ECU Pin and Oxygen Sensor Pin 2. 2) Circuit broken between Oxygen Sensor Pin 1 and Main Relay. 3) Circuit broken between Oxygen Sensor Pin 1 and Pin 2.	Note Inspect as below 1) Check if resistance between ECU Connector Pin and Oxygen Sensor Pin 2 is normal or not. 2) Check if resistance between Oxygen Sensor Pin 1 and Main Relay is normal or not. 3) Check if resistance between Oxygen Sensor Pin 1 and Pin 2 is normal or not.
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Trouble Code: P0031 Oxygen Sensor Heating Circuit Short to Ground.

Note Possible Troubles are as below 1) Circuit connect to ECU Pin are short-to-ground.	Note Inspect as below 1) Check if resistance of ECU Pin to ground is normal or not.
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Trouble Code: P0032 Oxygen Sensor Heating Circuit Short to Power

Note Possible Troubles are as below 1) Short Circuit between ECU Pin and Oxygen Sensor Pin 1. 2) Short Circuit between ECU Pin and other circuit.	Note Inspect as below 1) Check if resistance of ECU is normal or not. 2) Check if resistance between ECU Pin and Oxygen Sensor Pin 1 circuit is normal or not.
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Trouble Code: P0053 Inner Resistance of Oxygen Sensor Heating not correct

Explanation: ECU system measure the Oxygen Sensor Heating Resistance to decide if heating output is correct or not. In some conditions, Heated Oxygen Sensor would be damaged by precipitate, especially while making cold start.

Note Possible Troubles are as below 1) Oxygen Sensor Heating function disable; Replace Oxygen Sensor.	Note Possible Troubles are as below 1) Check if resistance between Oxygen Sensor Pin 1 and Pin 2 is normal or not.
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Trouble Code: Air Inlet Pressure Sensor no signal variable

Note Possible Troubles are as below 1) Air Inlet Pressure Sensor frozen or jammed. 2) Air Inlet Pressure Sensor seriously aging.	Note Possible Troubles are as below 1) Re-install the Air Inlet Pressure Sensor after ice melted with indoor temperature.
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13 Troubleshooting

Trouble Code: P0106 Air Inlet Pressure Sensor Signal irrationally failure

Note Possible Troubles are as below 1) Air leakage of Air Inlet Pressure Sensor. 2) Air Inlet Pressure Sensor broken. 3) Air leakage from assemble point. 4) Air Inlet Pressure Sensor characteristically defluxion.	
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Trouble Code: P0107 Low Voltage of Air Inlet Pressure Sensor Circuit

Note Possible Troubles are as below 1) ECU found Air Inlet Pressure Sensor signal circuit short to ground.	Note Inspect as below 1) Resistance between ECU Pin and Ground.
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Trouble Code: P0108 High Voltage of Air Inlet Pressure Sensor Circuit

Note Possible Troubles are as below 1) ECU found Air Inlet Pressure Sensor signal circuit short to power.	Note Inspect as below 1) Resistance of ECU Pin.
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Trouble Code: P0112 Air Inlet Temperature Sensor Signal Voltage Low.

Note Possible Troubles are as below 1) Circuit between ECU Pin and Air Inlet Temperature Sensor Signal short to ground.	Note Inspect as below 1) Check Resistance of circuit between ECU Pin Sensor Signal and Ground.
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Trouble Code: P0113 Air Inlet Temperature Sensor Signal Voltage High.

Note Possible Troubles are as below 1) Circuit between ECU Pin and Air Inlet Temperature Sensor Signal short to power.	Note Inspect as below 1) Check if voltage of Sensor Signal of ECU Pin is normal or not.
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Trouble Code: Engine Water Temperature Sensor Indicated Temperature irrationally failure

Note Possible Troubles are as below 1) Water Temperature Sensor need replacement	
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Trouble Code: P0117 Engine Water Temperature Sensor Circuit Voltage low.

Note Possible Troubles are as below 1) Circuit between ECU Pin and ground short.	Note Inspect as below 1) Check resistance between ECU Pin and Ground.
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Trouble Code: P0118 Engine Water Temperature Sensor Circuit Voltage high.

Note Possible Troubles are as below 1) Short Circuit between ECU circuit and other circuit.	Note Inspect as below 1) Check if voltage connected to ECU pin is normal or not.
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Trouble Code: P0122 Voltage of Throttle Control Positioning Sensor Circuit lower than the lower limit

Note Possible Troubles are as below 1) ECU Pin short to ground.	Note Inspect as below 1) Check resistance between ECU pin and ground.
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Trouble Code: P0123 Voltage of Throttle Control Positioning Sensor Circuit higher than the higher limit

Note Possible Troubles are as below 1) Circuit between ECU Pin and other power circuit short.	Note Inspect as below 1) Check if ECU Pin voltage is normal or not.
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Trouble Code: P0130 Oxygen Sensor Signal irrationally failure

Explanation: When Oxygen Sensor Signal happens with situations as below, System decide Oxygen Sensor Signal irrationally failure

Oxygen Sensor Signal Circuit coupling with Heating Circuit.

Note Possible Troubles are as below 1) Check if Oxygen Sensor Connector is correct or not. 2) Check if Oxygen Sensor Signal Circuit coupling with Heating Circuit.	
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Trouble Code: P0131 Oxygen Sensor Circuit Voltage Low

Note Possible Troubles are as below 1) Signal Circuit connected with ECU Pin is short circuit to ground.	Note Inspect as below 1) Check resistance between Signal Circuit connected with ECU Pin and ground.
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Trouble Code: P0132 Oxygen Sensor Circuit Voltage High

Explanation: When engine starts, ECU check the Oxygen Sensor Circuit Voltage; When voltage is continuously higher than 1.5 Volt, system decides Oxygen Sensor Circuit Voltage is short to power.

Note Possible Troubles are as below 1) Short Circuit between Signal Circuit connect to ECU Pin and Oxygen Sensor Oxygen Sensor Pin 1. 2) Short Circuit between Signal Circuit connect to ECU Pin and other power circuit.	Note Inspect as below 1) Check resistance between Signal Circuit connect to ECU Pin and Oxygen Sensor Oxygen Sensor Pin 1 2) Check resistance of Signal Circuit connect to ECU Pin
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Trouble Code: P0133 Oxygen Sensor Aging

Explanation: Normally Air Fuel Ratio of Fuel and Air is shifting between Dense and Dilute; accordingly Oxygen Sensor signal variate among different values. When Oxygen Sensor is aging, it goes less sensitive to Fuel-Air-Mixture, which makes signals variate lower. ECU makes average cycle calculations to Signal Variation; when it finds cycling slower as set, it decides Oxygen Sensor Aging.

Note Possible Troubles are as below 1) Oxygen Sensor Aging, need replacement.	
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Trouble Code: P0134 Oxygen Sensor Signal Failure

Explanation: When engine starts, ECU check the Oxygen Sensor Circuit Voltage; When ECU finds voltage stays between 0.4-0.6 volt, it decides Oxygen Sensor Signal Circuit Short.

Note Possible Troubles are as below 1) Short Circuit between Oxygen Sensor connected to ECU Pin. 2) Bad connection of Oxygen Sensor Connectors.(Socket Oxidized)	Note Inspect as below 1) Check resistance between ECU connector and Oxygen Sensor 4.
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Trouble Code: P0170 Self Studying found Closing Loop control Air Fuel Ratio irrational when making End of Line Testing.

Trouble Code: P0171 Self Studying found Closing Loop control Air Fuel Ratio too dilute when making End of Line Testing.

Trouble Code: P0172 Self Studying found Closing Loop control Air Fuel Ratio too dense when making End of Line Testing.

(Note: This Inspection Process is only suitable when Air Inlet Pressure Sensor, Canister Control Valve and Oxygen Sensor and so on has not shown with Trouble Code; If there is any other Trouble Code, solve other Troubles first and then inspect Fuel Route correct or not)

Trouble Code: P0201 Cylinder Injector Control Circuit Open

Note Possible Troubles are as below 1) Injector Coil Open Circuit 2) Injector Connector Socket to ECU Pin bad connection 3) Injector Connector Socket to Main Relay bad connection	Note Inspect as below 1) Check resistance of Injector 2) Check cable is connected or not
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Errors coding: P0261 Control circuit of single cylinder injector short to ground

Maintenance Tips: The possible faults may exists as follow: 1) All drivers ECU pin connected short to ground	Maintenance Tips: Check the item as follow: 1) Measure ECU pin connected resistance to ground
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Errors coding: P0262 Control circuit of single cylinder injector short circuit

Maintenance Tips: The possible faults may exists as follow: 1) Short circuit between circuit ECU connected and other electrical source circuits	Maintenance Tips: Check the item as follow: 1) Measure the voltage of circuit ECU pin connected
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Errors coding: P0321 reference point of rotate speed sensor fault

Maintenance Tips: The possible faults may exists as follow: 1) Circuits connect intermittently short circuit or intermittently open circuit. 2) Fixed position of crankshaft signal ring deviation declination. 3) Fixed position of rotate speed sensor declination.	Maintenance Tips: Check the items as follow: 1) Check the connection or breaking of cable related connection. 2) Check the quantity of magneto flywheel.
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Errors coding: P0322 Non-rotate speed sensor pulse signal (short circuit or open circuit)

Explanation: After starting engine, ECU will measure signal of trigger and other signals together, judging the losing of trigger signal by signal rationality system.

Maintenance Tips: The possible faults may exists as follow: 1) Trigger rotate speed sensor ECU cable connected open circuit 2) Trigger circuit ECU connected short circuit. 3) Trigger coil open circuit.	Maintenance Tips: 1) Measure resistance between trigger and ECU cable connected 2) Measure resistance of trigger 3) Measure trigger peak value voltage
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Errors coding: P0444 Control circuit voltage of idle air control valve open circuit

Maintenance Tips: The possible faults may exists as follow: 1) Open circuit between ECU circuit connected and no.2 pin of idle air control valve. 2) The circuit that no.1 pin of idle air control valve connected to main relay open way. 3) Electromagnetism coil between no.1 pin and no.2 pin open way.	Maintenance Tips: 1) Check the connection or breaking of cable related connection. 2) Measure resistance of idle speed valve.
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Errors coding: P0458 Control circuit voltage of idle air control valve too low

Maintenance Tips: The possible faults may exists as follow: 1) Circuit ECU connected is short circuit	Maintenance Tips: Check the item as follow: 1) Measure connected to the ECU pin-to-ground resistance whether proper or not
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Errors coding: P0459 Control circuit voltage of idle air control valve too high

Maintenance Tips: The possible faults may exists as follow: 1) Short circuit between ECU circuit connected and No.1 pin of idle air control valve. 2) Short circuit between circuit ECU pin connected and other electrical source circuits	Maintenance Tips: Check the item as follow: 1) Measure the voltage of ECU pin whether normal or not 2) Measure resistance between ECU pin and No.1 pin of idle air control valve
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Errors coding: P0501Speed sensor signal improper.

Explanation: When loose throttle and keep direct to free-wheel, ECU measure engine rotate speed and vehicle speed together. If engine lasting higher speed but vehicle speed display "0" or too low obviously, system will judge that vehicle speed signal faults.

Maintenance Tips: The possible faults may exists as follow: 1) The signal circuit ECU connected and vehicle speed sensor short to ground or open to ground.	Maintenance Tips: Check the item as follow: 1) Check circuit resistance that connector of ECU joint to vehicle speed signal sensor. 2) Check resistance to ground of ECU pin.
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Errors coding: P0506 Rotate speed of idle air control valve slower than target idle speed

Explanation: Engine rotate speed of idle speed control valve works by closed-loop control. And it indicates fault if ECU performs idle speed controlling after a certain time, but the actual engine speed still slower than target idle speed.

Maintenance Tips: The possible faults may exists as follow: 1) Idle air control valve not work. 2) Check adjust bolt of throttle valve, throttle cable, throttle operating condition etc. whether are in condition or not. 3) Too dirty inside of throttle valve body	
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Errors coding: P0507**Rotate speed of idle speed control valve faster than target idle speed**

Introduction of theory and fault reason: Engine rotate speed of idle speed works by closed-loop control. And it indicates fault if ECU performs idle speed controlling after a certain time, but the actual engine speed faster than target idle speed.

Maintenance Tips:

The possible faults may exists as follow:

- 1) Check adjust bolt of throttle valve、throttle cable 、 throttle operating condition etc. whether are in condition or not.
- 2) Too dirty inside of throttle valve body
- 3) Check crankcase enforced-air flue whether breaks off or leaks

Errors coding: P0560 Voltage signal of system battery illogicality**Errors coding: P0562 Voltage signal of system battery is too low****Errors coding: P0563 Voltage signal of system battery is too high****Maintenance Tips:**

The possible faults may exists as follow:

- 1) Magneto damaged and disable to starting or battery electric leakage
- 2) Magneto stator coil open circuit
- 3) Regulator of Magneto damaged

Maintenance Tips:

Check the item as follow:

- 1) Check the capability of generate electricity of Magneto(measure voltage of Magneto after starting)

Errors coding: P0627 Control circuit of oil pump relay open circuit**Errors coding: P0628 Control circuit of oil pump relay short to ground****Errors coding: P0629 Control circuit of oil pump relay short circuit****Maintenance Tips:**

The possible faults may exists as follow:

- 1) Open circuit/short to ground/short circuit between control circuit of oil pump relay connected to ECU and oil pump.
- 2) Open circuit between relay and main relay
- 3) Magnet coil of relay open circuit

Maintenance Tips:

Check the items as follow:

- 1) Measure resistance or voltage of oil pump relay control circuit connected to ECU.
- 2) resistance between relay and main relay
- 3) resistance between the toes of relay

Errors coding: P0650 MIL lamp-driver circuit fault**Maintenance Tips:**

The possible faults may exists as follow:

- 1) Open circuit/short to ground/short circuit on circuit of MIL lamp-driver connected to ECU.
- 2) Open circuit between MIL and main relay.
- 3) MIL lamp burnout

Maintenance Tips:

Check the item as follow:

- 1) Measure resistance or voltage of MIL lamp-driver control circuit connected to ECU.

Errors coding: P2177

Self-learning value of air-fuel ratio, closed-loop control exceeds upper limit

Errors coding: P2178

Self-learning value of air-fuel ratio, closed-loop control exceeds lower limit

Introduction of theory and fault reason: In order to make catalytic converters for HC, CO and NO_x to maximize conversion efficiency, the air-fuel ratio of mixture should be 14.7:1. When the engine occurs, parts manufacturing deviation, deposition of fuel colloid on fuel injector, intake or back of valve, gas leak of intake and exhaust system, will cause the air-fuel ratio(14.7:1) deviation in various degrees(partial dilute or partial concentration) which will lead to emission deterioration and poor engine performance. Engine control system will amend and self-learning fuel charge based on the extent and characteristics of air-fuel ratio deviation. When self-learning value reach the limit of system setting (gas mixture partial dilute or partial concentration, system amends the fuel charge constantly till Max), system will judge that self-learning value transfinite fault.

Maintenance Tips:

The possible faults may exists as follow:

- 1) Injector clog needs cleaning
- 2) Intake and exhaust system leaks
- 3) Inlet or back of intake valve that fuel colloid accumulation of excessive need to be cleaned
- 4) Engine parts deviation
- 5) Valve clearance deviation
- 6) Fuel system pressure deviation

3、Diagnosis troubles according to engine fault phenomena

Before start to diagnosis fault, please take the primary inspection first:

- 1、Engine failure indicator light works regularly.
- 2、Affirm that no errors Code have been found by Diagnosis Analyze.
- 3、Affirm the fault that user complaint is exist, and affirm the condition of fault happened.

Then, take external inspection:

- (1) Check fuel pipe whether has oil leak phenomena or not.
- (2) Check vacuum tube if rupture, kink or incorrect connect.
- (3) Check air intake pipe whether clogged, leaked, been staved or damaged or not.
- (4) Check ignition coil of ignition system whether rupture, aged or not, firing sequence whether correct or not;
- (5) Check ground pole of wiring harness whether clean or fast or not;
- (6) Check joints of sensor or actuator whether loose or poor contacts or not.

Notice: Please maintain the faults as above in advance. If not, the further fault diagnosis will be affected.

Diagnosis help:

- 1、Engine has no fault records;
- 2、Affirm the complaint of fault happened;
- 3、Do not ignore vehicle maintenance working, cylinder pressure, mechanism timing, fuel etc effect against system during overhaul
- 4、Replace ECU and test it.

If Trouble Code is cleared, it means defective on ECU;

If Trouble Code is not cleared, put back original ECU and repeat inspecting procedure to start again overhaul inspections.

Troubleshooting:

Starting Failure/Hard Starting

Engine can rotate but starting failure

Hard Starting in heating engine

Hard Starting in cold engine

Regularly rotate speed, but engine starting hard at any time

Engine works regularly, but unsteady idle speed at any time

Engine works regularly, but unsteady idle speed when engine is in warming-up

Engine starting normally, but idle speed unsteady after warming-up.

Engine starting normally, but unsteady idle speed or power off when engine in partly loading(such as: opening head light)

Engine starting regularly, but idle speed is too high.

Rotate speed can not increase or engine power off when in acceleration.

Reaction slowly when in acceleration.

No power and poor performance when in acceleration

13 Troubleshooting

(1) Starting Failure/Hard Starting

Possible defective part: 1、Battery; 2、Starter motor; 3、Wiring harness or ignition switch; 4、engine mechanism part.

Overhaul:

Ref No.	Operation	Test result	Next Steps
1	Check the voltage between the two poles of battery by multimeter, the voltage whether around 8-12V or not when engine starting.	yes	next
		no	Replace battery
2	Keep ignition switch in engine starting station. Check positive pole of Starter motor by multimeter, the voltage whether above 8V or not.	yes	next
		no	Repair or replace wiring harness
3	Remove starter motor and check its work condition, if circuit break or starter motor locked because of improper lubricate.	yes	Repair or replace Starter Motor
		no	next
4	Fault only happens on winter, please check lubricating oil if is improper for engine which caused high resistance of starter motor.	yes	Replace appropriate grade of lubricating oil
		no	next
5	Check the resistance inside of engine mechanism whether is high or not, which makes starter motor stop rotates or rotate slowly.	yes	Overhaul the resistance inside of engine mechanism
		no	Repeat above steps

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(2) Engine can rotate but starting failure

Possible defective part: 1、no gasoline in tank; 2、Fuel pump; 3、Trigger; 4、Ignition coil; 5、engine mechanism part.

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Contact fuel pressure meter(contact front point of oil input pipe of injector), open ignition switch and repeat it if possible, or starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
2	Contact Electronic injection diagnostic meter, observe item of "engine rotate speed", starting engine, and observe the rotate speed signal if is normally output.	Yes	next
		no	examine and repair sensor wiring of rotate speed
3	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm with body of engine, starting engine and check it whether has blue-white high pressure fire or not.	yes	next
		no	Examine and repair ignition system.

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4	Check air pressure of cylinder and observe the pressure if is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
5	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch, the power whether supply normally or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(3) Hard Starting in normal status

Possible defective part: 1、fuel containing water; 2、fuel pump; 3、engine water temperature sensor; 4、 ignition coil

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
2	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm with body of engine, starting engine and check it whether has blue-white high pressure fire or not.	yes	next
		no	Examine and repair ignition system.
3	Pull out connector of engine water temperature sensor, starting engine, observe engine whether succeed starting or not at this moment. (or in series a 300 Ω resistant instead of engine water temperature sensor, observe engine whether succeed starting or not at this moment.)	Yes	Examine and repair wiring or replace sensor
		No	Next
		No	Next
4	Check fuel and observe the fault if caused after fueling	yes	Replace fuel
		no	next
5	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch the power whether supply normally or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(4) Hard Starting in cold status

Possible defective part: 1、fuel containing water; 2、fuel pump; 3、engine water temperature sensor; 4、 injector; 5、 ignition coil; 6、 throttle valve body and idle speed side air duct; 7、 engine mechanism part .

Overhaul:

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Ref no	Operation	Test result	Next Steps
1	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
2	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm away of body of engine, starting engine and check it whether has blue-white high pressure fire or not.	yes	next
		no	Examine and repair ignition system.
3	Pull out connector of engine water temperature sensor, starting engine, observe engine whether succeed starting or not at this moment. (or in series a 2500 Ω resistant instead of engine water temperature sensor, observe engine whether succeed starting or not at this moment.)	Yes	Examine and repair wiring or replace sensor
		no	next
4	Draw accelerograph gently, observe it whether starting engine easily or not.	yes	Clean throttle valve body and idle speed air duct
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks or clogs	yes	Replace
		no	next
6	Check fuel and observe the fault if caused after fueling	yes	Replace fuel
		no	next
7	Check air pressure of cylinder and observe the pressure if it is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
8	Contact EFI commutator, open ignition switch, check ECU5#, 10#, 13# stitch, the power whether supply normally or not, check 2#, 21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(5) Regularly rotate speed, but engine starting hard at any time

Possible defective part: 1、fuel containing water; 2、fuel pump; 3、engine water temperature sensor; 4、injector; 5、ignition coil; 6、throttle valve body and idle speed side air duct; 7、input air duct; 8、ignition timing; 9、spark plug; 10、engine mechanism part

Overhaul::

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next

2	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
3	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm away with body of engine, starting engine and check it whether has blue-white high pressure fire or not.	yes	next
		no	examine and repair ignition system
4	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
5	Pull out connector of engine water temperature sensor, starting engine, observe engine whether succeed starting or not at this moment.	yes	Examine and repair wiring or replace sensor
		no	next
6	Draw accelerograph gently, observe it whether starting engine easily or not.	yes	Clean throttle valve body and idle speed air duct
		no	next
7	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks or clogs	yes	replace
		no	next
8	Check fuel and observe the fault if caused after fueling	yes	Replace fuel
		no	next
9	Check air pressure of cylinder and observe the pressure if is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
10	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
11	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch the power whether supply normal or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(6) Engine works regularly, but unsteady idle speed at any time

Possible defective part: 1、fuel containing water; 2、injector; 3、spark plug; 4、throttle valve body and idle speed side air duct; 5、input air duct; 6、idle speed valve; 7、ignition timing; 8、engine mechanism part

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next

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2	Check idle speed valve whether clogged or not.	Yes	Clean or replace
		no	next
3	Check spark plug, look its type and gap if accords with standard.	Yes	next
		no	Adjust or replace
4	Check throttle valve body and idle speed side air duct whether have carbide accumulated or not.	Yes	Clean
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	Yes	Fault replacement
		no	next
6	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
7	Check air pressure of cylinder and observe the pressure if is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
8	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
9	Contact EFI commutator, open ignition switch, check ECU5#, 10#, 13# stitch, the power whether supply normal or not, check 2#, 21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(7) Engine works regularly, but unsteady idle speed when engine is in warming-up

Possible defective part: 1、fuel containing water 2、engine water temperature sensor; 3、spark plug; 4、throttle valve body and idle speed side air duct; 5、input air duct; 6、idle speed valve; 7、engine mechanism part

Overhaul::

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next
2	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
3	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
4	Pull out connector of engine water temperature sensor, starting engine, observe idle speed whether is unsteady or not when engine is in warming-up.	yes	Examine and repair wiring or replace sensor
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next

6	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
7	Check air pressure of cylinder and observe the pressure if it is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
8	Contact EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(8) Engine starting normally, but idle speed unsteady after warming-up.

Possible defective part: 1、fuel containing water 2、engine water temperature sensor; 3、spark plug; 4、throttle valve body and idle speed side air duct; 5、input air duct; 6、idle speed valve; 7、engine mechanism part

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next
2	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
3	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
4	Pull out connector of engine water temperature sensor, starting engine, observe idle speed whether is unsteady or not when engine is in warming-up.	yes	Examine and repair wiring or replace sensor
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
6	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
7	Check air pressure of cylinder and observe the pressure if it is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
8	Contact EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(9) Engine starting normally, but unsteady idle speed or power off when engine in partly loading(such as: opening head light)

13 Troubleshooting

Possible defective part: 1、idle speed valve; 2、injector

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
2	Observe output power whether is increasing or not when begin loading work, namely observe the movement of ignition advance angle、injection pulse width and air intake flowrate by EFI diagnosis instrument	yes	Turn step no.4
		no	next
3	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
4	Contact EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is putting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(10) Engine starting regularly, but idle speed is too high.

Possible defective part: 1、throttle valve body and idle speed side air duct; 2、injector seat; 3、idle speed valve; 4、engine water temperature sensor; 5、ignition timing.

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check the throttle cable if is clipped or too tight.	yes	adjust
		no	next
2	Check air intake system and connector of injector seat, the air if is leaking.	yes	Examine and repair air intake system
		no	next
3	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
4	Pull out connector of engine water temperature sensor, starting engine, observe idle speed whether is unsteady or not when engine is in warming-up.	yes	Examine and repair wiring or replace sensor
		no	next
5	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing

6	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is putting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(11) Rotate speed can not increase or engine power off when in acceleration.

Possible defective part: 1、fuel containing water; 2、air intake pressure sensor and throttle position sensor; 3、spark plug; 4、throttle valve body and idle speed side air duct; 5、input air duct; 6、idle speed valve; 7、fuel injector; 8、ignition timing; 9、muffler

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check air cleaner if is clogged.	yes	Examine and repair air input system
		no	next
2	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
3	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
4	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
5	Check air intake pressure sensor、throttle position sensor and their wiring whether works regularly or not.	yes	next
		no	examine and repair wiring or replace sensor
6	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
7	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
8	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
9	Check the exhaust gas from muffler if exhausts smoothly	yes	next
		no	Repair or replace muffler
10	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is putting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

13 Troubleshooting

(12) Reaction slowly when in acceleration.

Possible defective part: 1、fuel containing water; 2、air intake pressure sensor and throttle position sensor; 3、spark plug; 4、throttle valve body and idle speed side air duct; 5、input air duct; 6、idle speed valve; 7、fuel injector; 8、ignition timing; 9、muffler

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check air cleaner if is clogged.	yes	Examine and repair air input system
		no	next
2	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
3	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
4	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
5	Check air intake pressure sensor、throttle position sensor and their wiring whether works regularly or not.	yes	next
		no	examine and repair wiring or replace sensor
6	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
7	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
8	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
9	Check the exhaust gas from muffler if exhausts smoothly	yes	next
		no	Repair or replace muffler
10	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is putting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

(13) No power and poor performance when in acceleration.

Possible defective part: 1、fuel containing water; 2、air intake pressure sensor and throttle position sensor; 3、spark plug; 4、ignition coil; 5、throttle valve body and idle speed side air duct; 6、input air duct; 7、idle speed valve; 8、fuel injector; 9、ignition timing; 10、muffler

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check the faults if exist clutch skid, low tyre pressure, lagged brake, improper tyre size etc.	yes	repair
		no	next
2	Check air cleaner if is clogged.	yes	Examine and repair air input system
		no	next
3	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
4	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm away with body of engine, starting engine and check the high pressure fire whether is normal or not.	yes	next
		no	examine and repair ignition system
5	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
6	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
7	Check air intake pressure sensor, throttle position sensor and their wiring if works regularly.	yes	next
		no	examine and repair wiring or replace sensor
8	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks and clogs.	yes	Fault replacement
		no	next
9	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
10	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
11	Check the exhaust gas from muffler if exhausts smoothly	yes	next
		no	Repair or replace muffler
12	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is putting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring