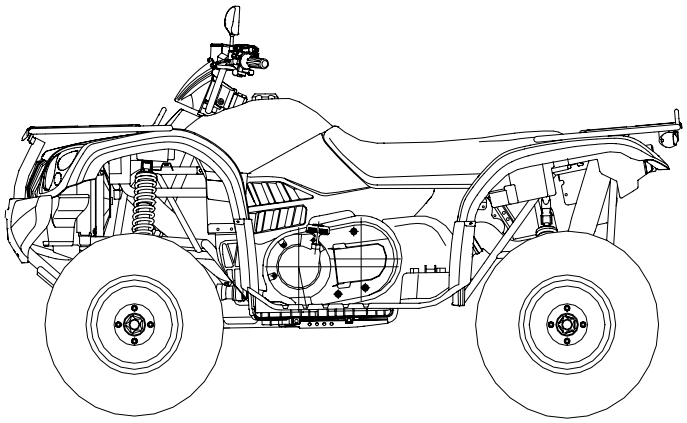
SUZUKI QUADZILLA

CF500/CF500-A

Service Manual



First Edition, August 2006

Front Wheel

Item			Standard	Service 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^3)	--

Rear Wheel

Item			Standard	Service Limit
Rear wheel	Play of wheel rim	Vertical	1.0mm	2.0mm
		Horizontal	1.0mm	2.0mm
	Tire	Groove	--	3.0mm
		Pressure	35kpa(0.35kgf/cm^3)	--

Brake System

Item		Standard	Service Limit
Front brake	Brake lever play	0mm	--
	Brake disc thickness	3.5mm	4mm
Rear brake	Brake lever play	5-10mm	--
	Brake Pedal Play	0mm	
	Brake disc thickness	7.5mm	6.5mm

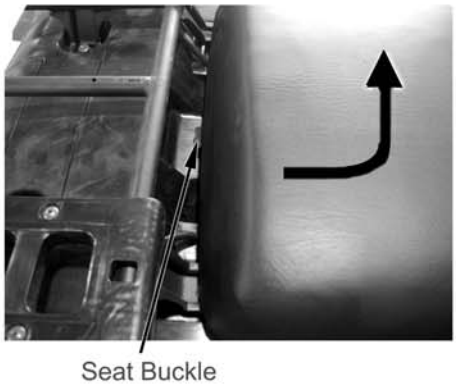
Battery、Charging System

Item			Standard
AC magneto Motor	Model		Permanent magnet AC type
	Output		3- phase AC
	Charging coil Resistance (20℃)		0.2-0.3Ω
Rectifier	Three-phase annular rectification, Silicon controlled parallel-connected regulated voltage		
Battery	Capacity		12V18Ah
	Terminal point voltage	Fully charged	12.8V
		Insufficient charge	<11.8V
	Charging current/time	Standard	0.9A/5~10H
		Quick	4A/1H

Ignition system

Item		Standard
Ignition		CDI ignition
Spark Plug	Type	DPR7EA-9(NGK)
	Optional	DR8EA, D7RTC
	Spark plug gap	0.8-0.9mm
Ignition timing	Max. advanced angle	32° CA
Peak voltage	Ignition coil	Above 200V
	Pulse generator	150V

Seat

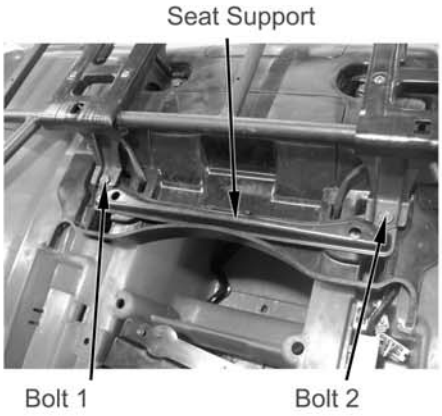


Remove:
Pull upward seat buckle
Lift and push seat backward

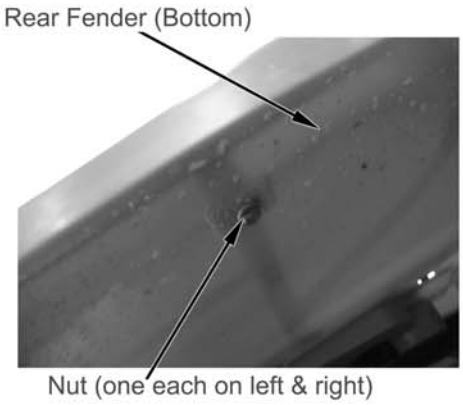
Installation:
Press upward seat buckle
Press seat forward and down

Note:
Make sure that the seat is firmly installed.

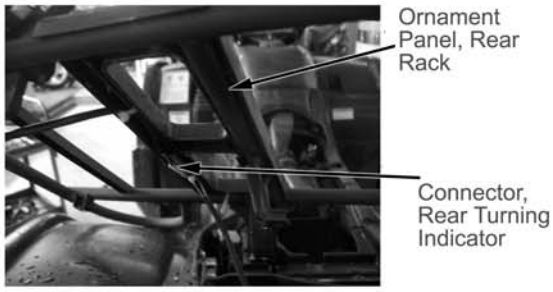
Seat Support, Rear Rack



Remove:
--Seat (→2-3)
--Bolt 1, bolt 2
Remove seat support



Remove the 2 nuts for rear rack and rear fender from rear fender bottom



Disconnect connectors of rear turning indicator

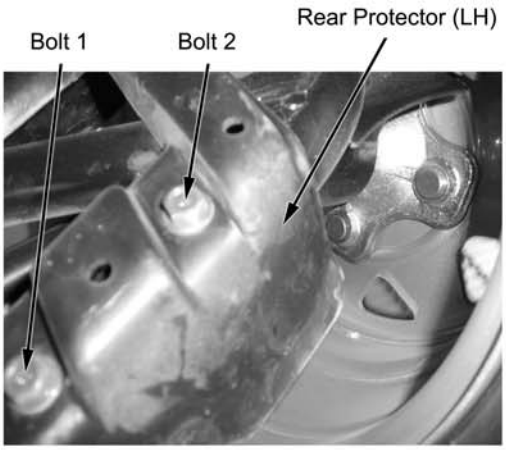
Rear Left Protector

Remove:

--Bolt 1

--Bolt 2

--Rear left protector



Installation:

Reverse the removal procedure for installation.

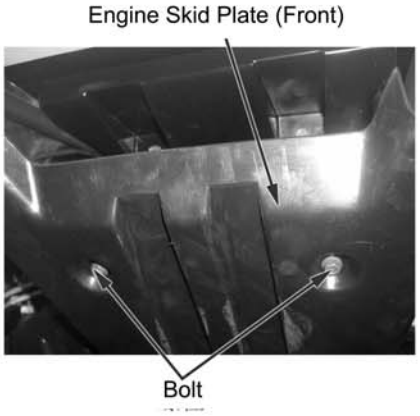
Rear Right Protector

Repeat the above procedure of removal and installation for rear right protector.

Bumper, Bumper Protector,

Remove:

--2 bolts from engine skid plate (front)



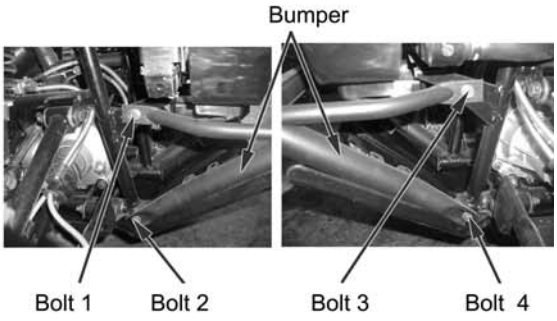
--Bolt 1

--Bolt 2

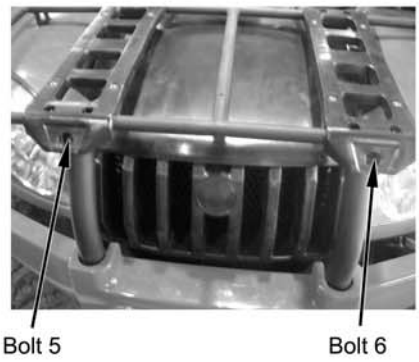
--Bolt 3

--Bolt 4

Remove bumper with bumper protector



Remove Bolt 5 and Bolt 6 for bumper and front rack



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.

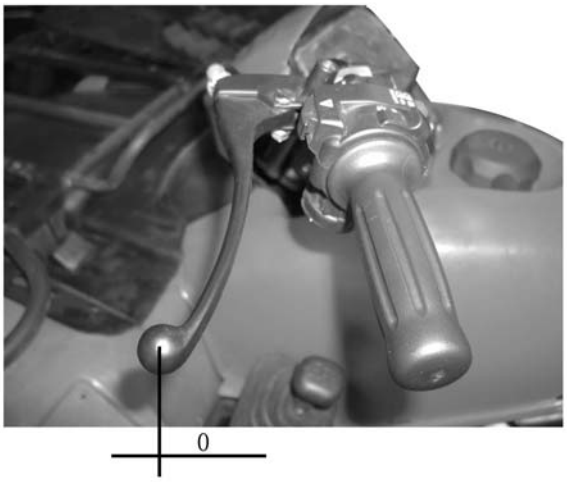
Note:
Make sure the steering can be operated freely.
An accident may occur
if the handlebar is out of control.

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

Overhaul Information

Note

- **If the radiator cap is opened when the coolant temperature is above 100℃, the pressure of coolant will drop and get boiled rapidly. The steam jet may cause danger and injury. Cover the cap with a piece of rag after the coolant temperature goes down and open the cap slowly.**

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

- **Coolant is toxic. Do not drink or splash it to skin, eyes or cloth.**

—**If coolant splashes in your 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, induce vomit immediately and see a physician.**
—**Store the coolant properly and keep it away from reach of 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.
- Add coolant through reservoir tank. Do not open the radiator cap except when disassembling the cooling system for adding or drainage of coolant.
- Do not stain the plastic 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 capacity	340ml
	Standard density	30%
Opening pressure of radiator cap		108kpa(1.1kgf/cm^2)
Thermostat	Valve open temperature	72±2℃
	Full open Temperature	88℃
	Full open lift	3.5-4.5mm

Tightening torque

Drainage bolt, water pump: 8N • m(0.8kgf • m)
Thermoswitch 10N • m(1.0kgf • m)

Remove Bolt 2 and Nut 2 of upper engine hanger.

Remove Bolt 1 and Nut 1 of lower engine hanger.

Remove Bolt 2 and Nut 2 of lower engine hanger.

Installation

Reverse the removal procedure for installation.

NOTE
Note:

Check front and rear brake linkage after installation.

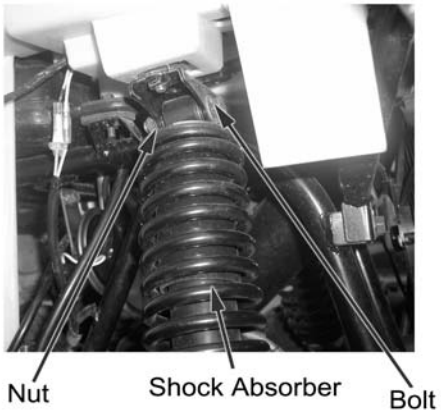
Front Suspension system

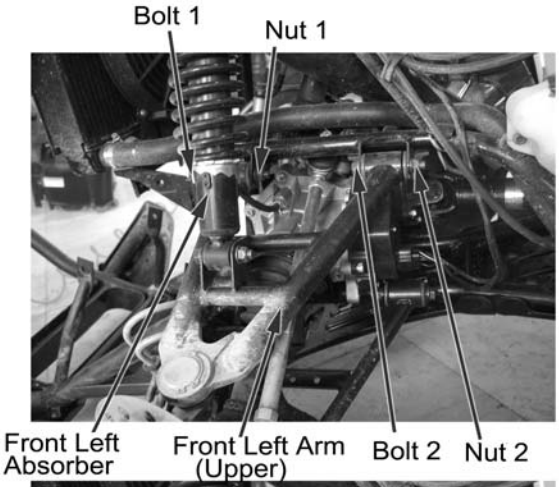
Front left Suspension

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

Park the vehicle on a level ground and securely support front part of the vechicle.

Removal:
--Front wheel (→6-3)
--Front wheel hub (→6-3)
--Front brake caliper(→6-4)
--Bolt 1, Nut 1





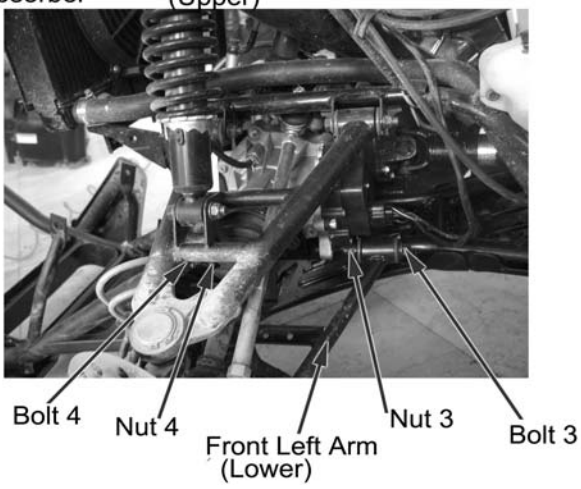
--Bolt 2, Nut 2

--Bolt 3, Nut 3, Bolt 4, Nut 4

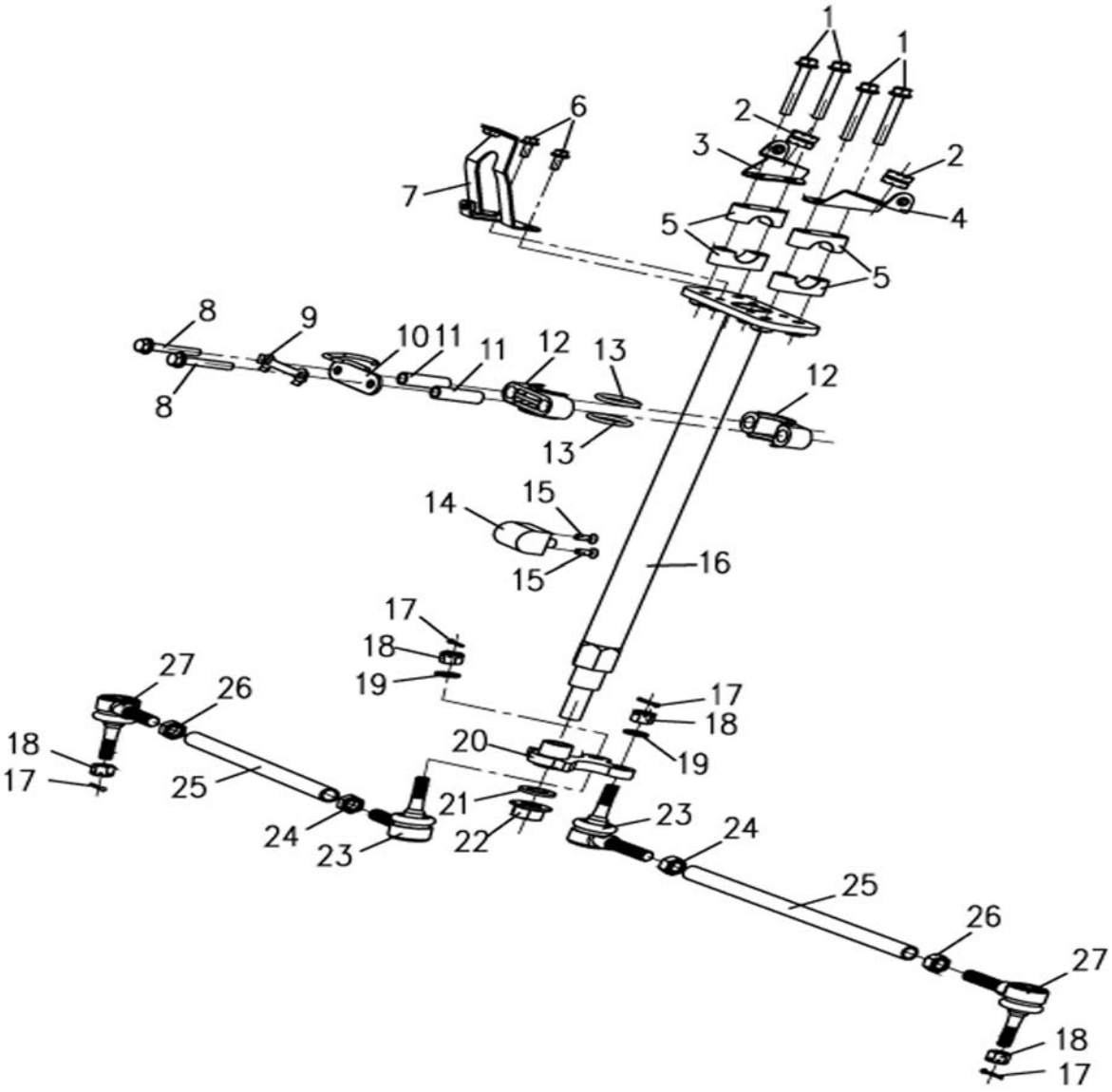
Remove slotted nut.
Remove tie-rod.

Pull out steering knuckle from CV joint.

Remove front left suspension.



Steering System



1 Bolt 1
2 Rubber
3、Right Bracket，Dashboard
4、Left Bracket，Dashboard
5、Alum Cover，Handlebar
6、Bolt 2
7、Front Bracket，Dashboard
8、Bolt 3
9、Lock Pad
10、Adapter Plate
11、Bush
12、Bushing，Steering Stem
13、Seal Ring
14、Steering Lock
15、Screw 2
17、Cotter Pin
18、Nut 1
19、Washer 1
20、Pitman Arm
21、Washer 2
22、Nut 2
23、Steering Knuckle 1
24、Nut 3
25、Tie-Rod
26、Nut 4
27、Steering Knuckle 2

Overhaul information

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

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

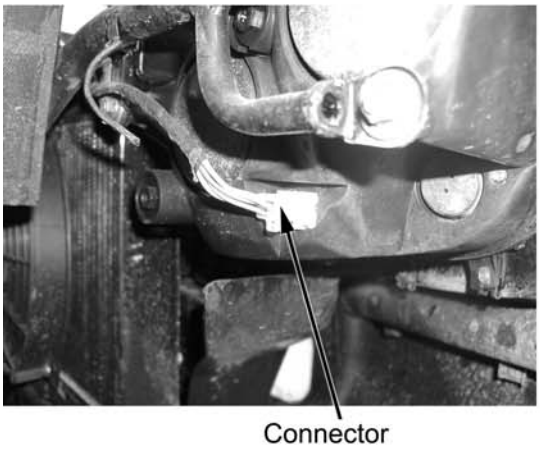
Note
Replace if the battery service life expired.

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

Troubleshooting

- ◆ Engine cannot be started.
- ◆ Check fuel and air channels for any faults; If the fuel and air channels are normal, check the ignition system.
- ◆ Inspect ignition system for the following items:

1. Spark inspection:
   Check in the following steps:
   Remove spark plug
   Remove spark plug cap
   Set high tension flexible cable end to earth
   Check spark arc
   It is normal if spark arc is more than 8mm，while it is weak if it is less than 5 mm.
   If the spark is normal, check the spark plug.
   A faulty spark plug may be caused by the following reasons:
   (1) Spark plug is too wet and drowned. This is because the gas mixture is too thick. Cut the fuel and start the engine several times..
   (2) Carbon deposit on spark plug---Mixture too thick or oil combustion in the combustion chamber. Clean and burnish the spark plug.
   (3) Cracks with spark plug insulator.
   (4) Spark plug electrodes have short circuit or it is obstructed between negative pole and thread or positive pole and input end.
2. Faulty spark includes: no spark and weak spark.
   Inspect the following aspects if there is no spark.
   (1). Inspect ignition coil with multimeter or measurement in the following steps:
   1) Measure primary bobbin resistance, usually it is about 1Ω.
   2) Measure secondary bobbin resistance, usually it is about 4.2K.
   3) Measure damp resistance, usually it is about 5K.
   (2). Check CDI if it is out of service.
   (3). Check ignition circuit. Usually the voltage between black wire and earth wire (green) should be 12V. If there is no voltage, check from the battery positive terminal to the end of black wire.
   (4). Check the cable: check if there are any faults from the input of trigger signal (output of magneto pickup) to output (CDI terminal) and ignition output wire (black/yellow).
   (5). Check stop switch. When switch is at the ignition position, black/white wire should be cut with green wire.
   In case of weak spark, check the following:
   (1). Check CDI .
   (2). Check ignition coil and secondary coil whether there is short circuit, or fault with the damp resistance.



Disconnect headlight connector.

Reverse the removal procedure for installation.

Note:

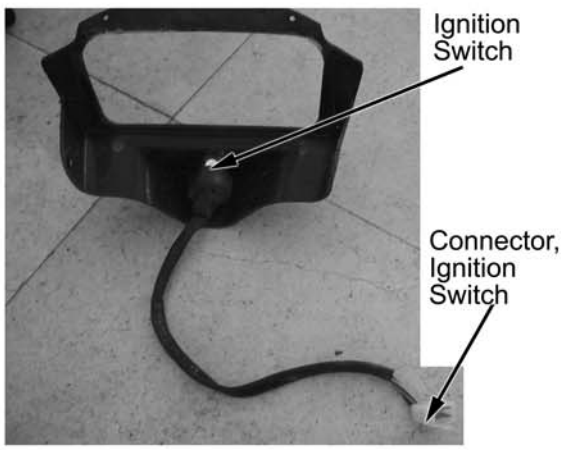
Be careful not to damage main cable when assembling.

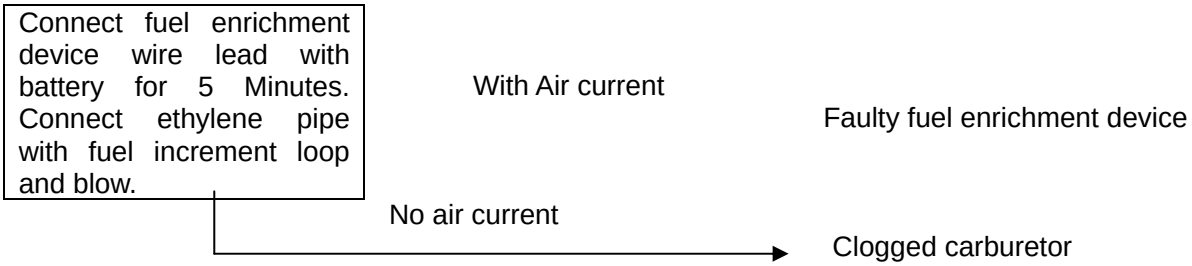
After replacing, adjust the headlight beam. (→3-14)

Note
Main cables and wires should be routed properly.

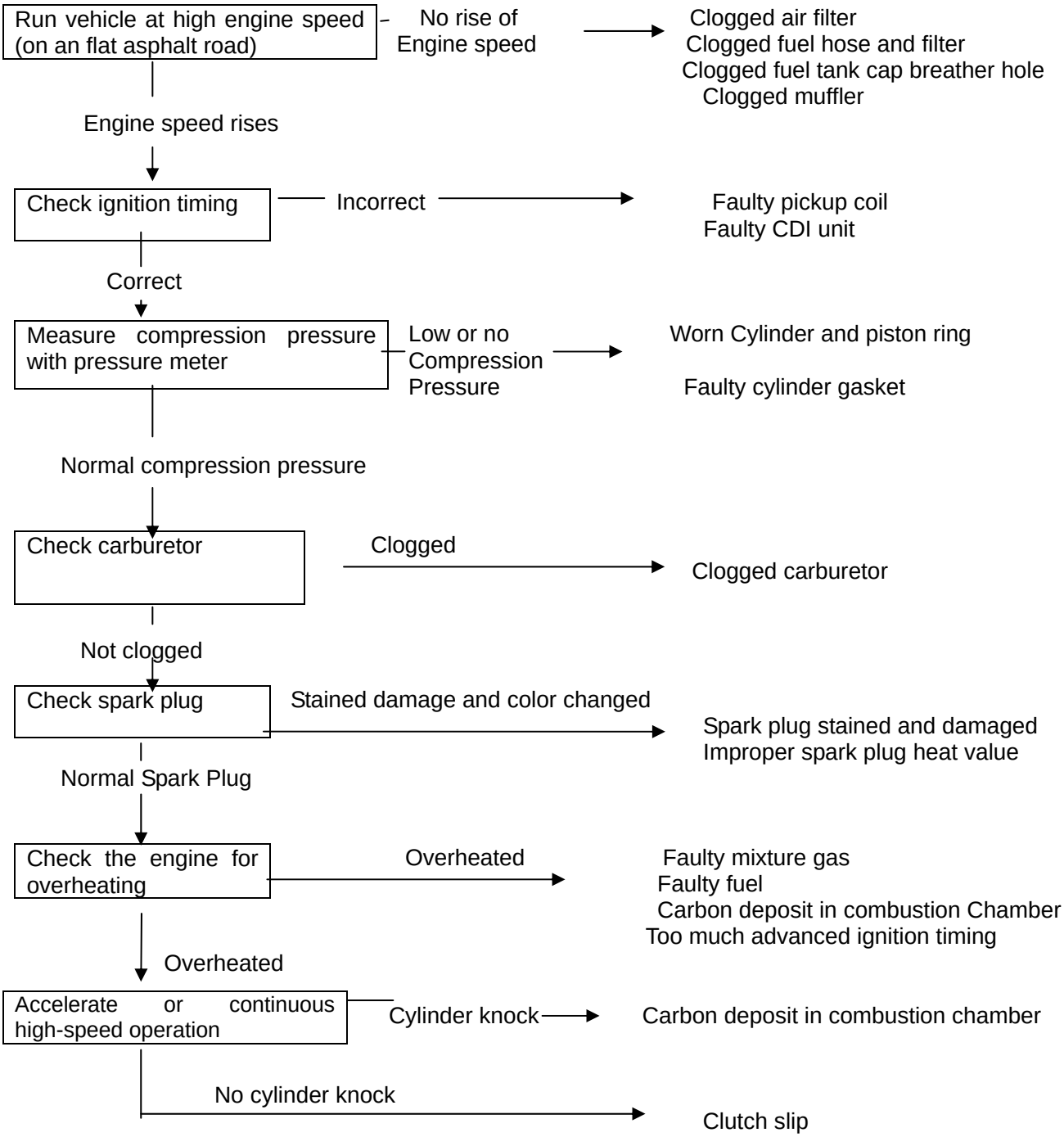
Ignition Switch
Inspection
Remove front top cover

Disconnect 4P connector of ignition switch





Poor Engine Performance in Hi-speed Range or Slow Speed Rising



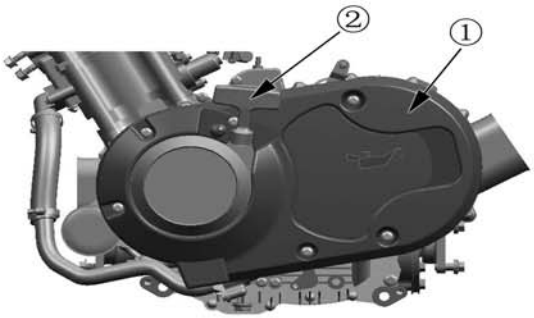
Cylinder + Piston + Piston Ring + Connecting Rod

Item	Standard			Service Limit	Remark
Cylinder Pressure	1000KPa			----------	
Cylinder-Piston Clearance	0.030-0.051			0.15	
Piston Skirt Diameter	87.460-87.480 (10mm form skirt end)			87.380	
Inner Diameter of Cylinder	87.500-87.522			----------	
Cylinder Joint Face Distortion	0.015			0.05	
Piston Ring Free Gap	Top Ring	R	About 11.7	8.9	
	2ND Ring	R	About 12	9.5	
Piston Ring Gap In Bore	Top Ring		0.15-0.30	0.60	
	2ND Ring		0.15-0.30	0.60	
Piston Ring Groove Clearance	Top Ring		0.04-0.08	0.180	
	2ND Ring		0.03-0.07	0.150	
Piston Ring Thickness	Top Ring		0.97-0.99	----------	
	2ND Ring		1.17-1.19	----------	
Piston Ring Groove Width	Top Ring		1.03-1.05	----------	
	2ND Ring		1.22-1.24	----------	
	Oil Ring		2.51-2.53		
Inner Diameter of Piston Pin Hole	23.002-23.008			23.030	
Outer Diameter of Piston Pin	22.995-23.000			22.980	
Inner Diameter of Connecting Rod Small End	23.006-23.014			23.040	
Clearance of Connecting Rod Big End	0.10-0.55			1.0	
Thickness of Connecting Rod Big End	24.95-25.00				
Crankshaft Play	0.03			0.08	

Lubrication

Item	Standard		Service Limit	Remark
Clearance between Inner and Outer Rotors	0.03mm-0.10mm		0.15mm	
Clearance between Outer Rotor and Oil Pump Body	0.03mm-0.10mm		0.12mm	
Oil Pressure	130Kpa-170Kpa (3000r/min)		---------	
Oil Type	SAE10W-40, API SF or SG		---------	
Oil Capacity	When changing	1900ml	----------	
	When Replacing Filter	2000ml	----------	
	Engine Repair	2200ml	---------	

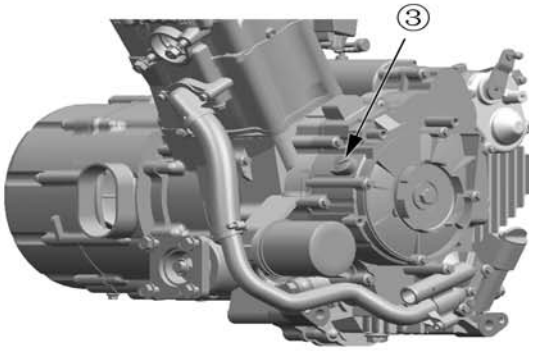
Procedures of Maintenance & Adjustment



This section describes the maintenance procedures for each item mentioned in the Periodic Maintenance Chart.

VALVE CLEARANCE

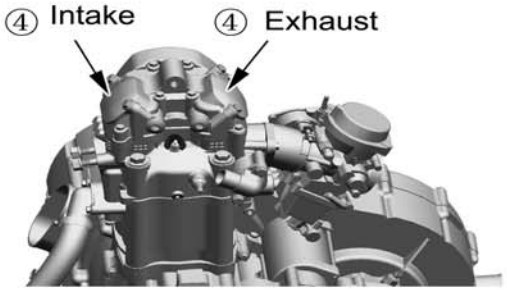
Inspect initially at 20-hour break-in and every 40 hours or every 1000km thereafter. Inspect the clearance after removing cylinder head.



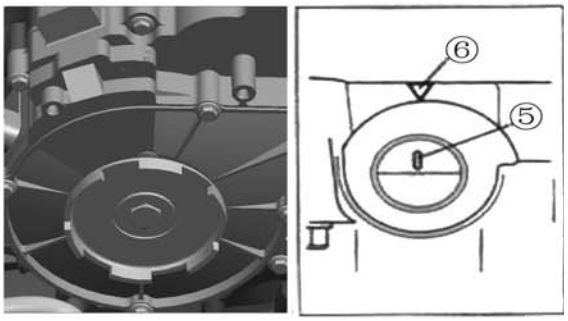
Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power.

Check the valve clearance at the period indicated above and adjust the valve clearance to specification, if necessary.

- Remove cover plate①, recoil starter②
- Remove inspection cap ③on left crankcase.
- Remove 2 valve adjusting cover ④
- Turn the crankshaft until the line⑤ of T.D.C. on rotor is aligned with mark⑥ 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.

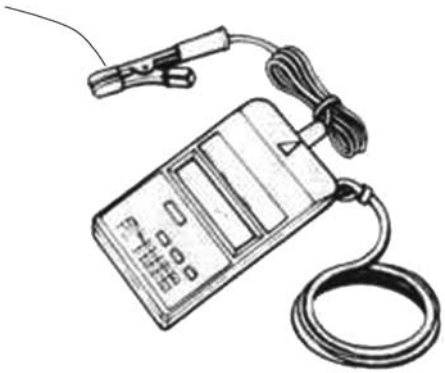
Loosen valve adjust bolt and nut, insert a feeler gauge between the valve stem end and valve adjusting bolt, tighten valve adjust bolt, make sure it slightly contacts the feeler gauge, tighten bolt and nut.

Inspection of Clutch Engagement and Lock-up

CF188 engine is equipped with a centrifugal type automatic clutch.

Before checking the initial engagement and clutch lock-up two inspection checks must be performed to thoroughly check the operation of the drive train.

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:

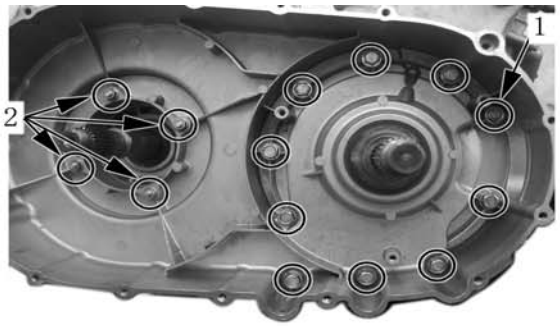
- Clutch shoes
- Clutch wheel
- Primary and secondary sheave

Refer to Chapter 12 for inspection of clutch

Tool: Tachometer

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 one-way clutch

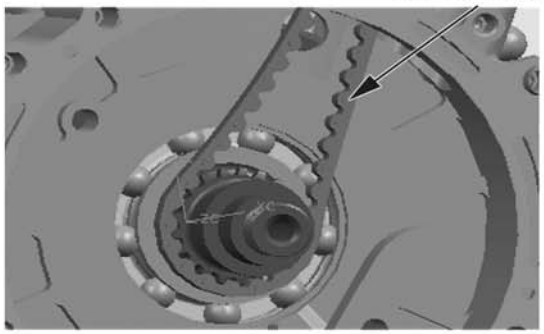
- Remove clutch shoe fixing nut with special tool

- Remove clutch shoe.

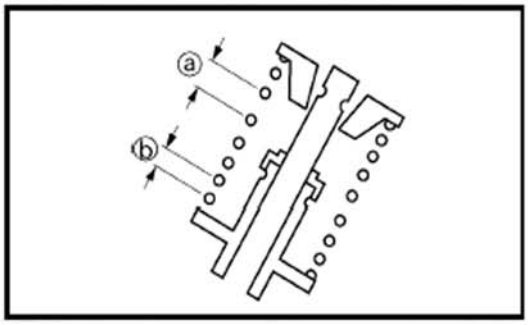
Note: The clutch shoe nut has left-hand threads.

Timing Chain

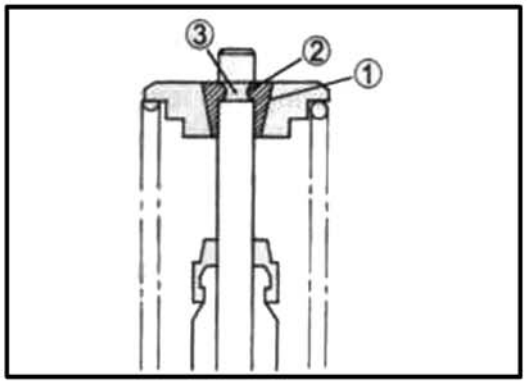
- Remove timing chain



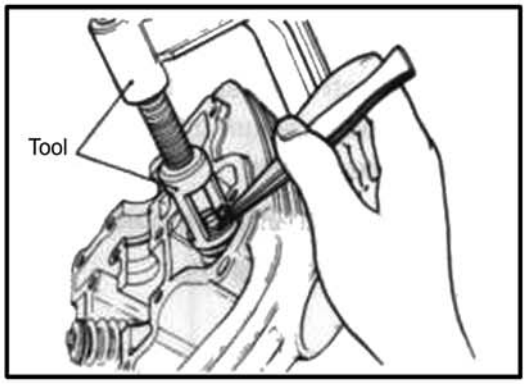
- Install valve spring with small-pitch end “b” facing cylinder head. Big-pitch end “a” is marked.



- 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 lip② of the cotter fits into the groove③ in the stem end.

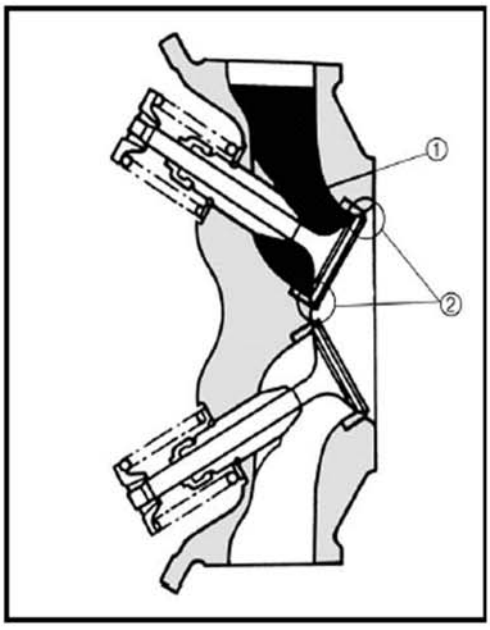


Tool: Valve Spring Compressor
Tweezers



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.



Primary Sliding Sheave

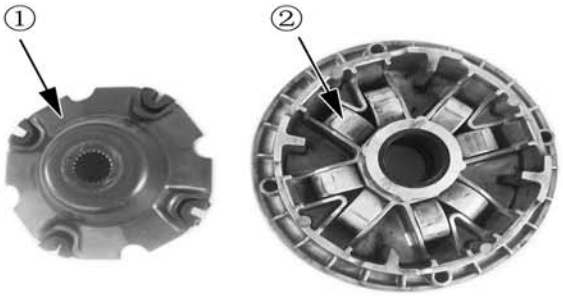
Disassembly

- Remove spacer
- Remove Cam ①and Roller②

Roller

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

Wear and damage: →Replace



Note: rollers should be replaced as a set.

Oil Seal

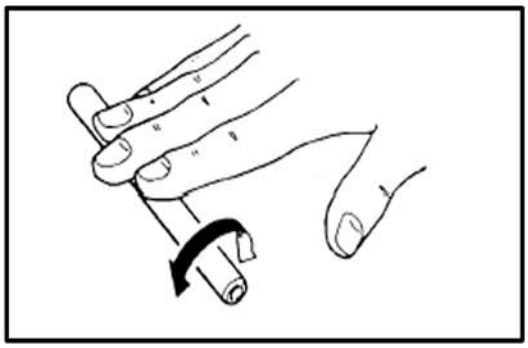
- Check oil seal lip for wear and damage.

Wear and damage: →Replace

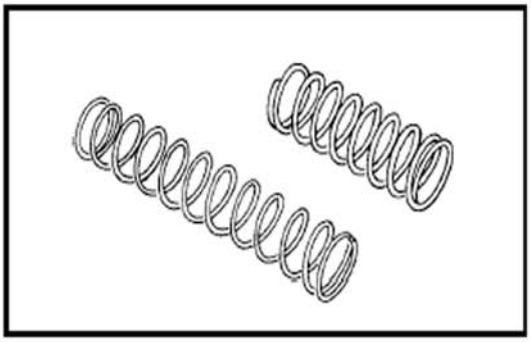
- Remove the oil seal

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

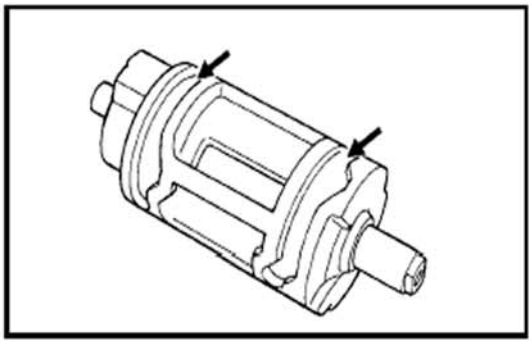
NOTE:DON NOT attempt to correct a bent guide bar.



- Check shift fork spring for breakage, damage
  Broken or damaged: → Replace



- Check shift cam groove for scratches, damage.
  Scratch or damage: → Replace

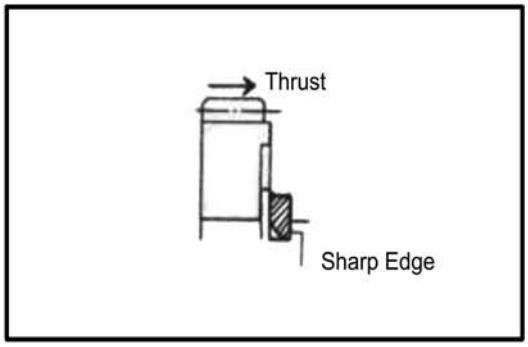


Assembly

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

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

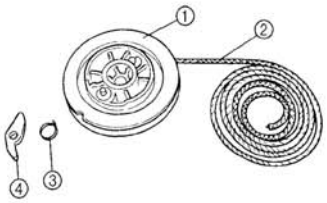
- Coat the gears and shafts with engine oil before assembly.



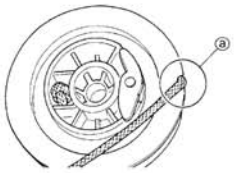
Note:
- Do not reuse the retainers
- Do not expand of the gap end of new retainers too wide when assembling.
- Make sure that all the retainers are properly fitted.

Assembly

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

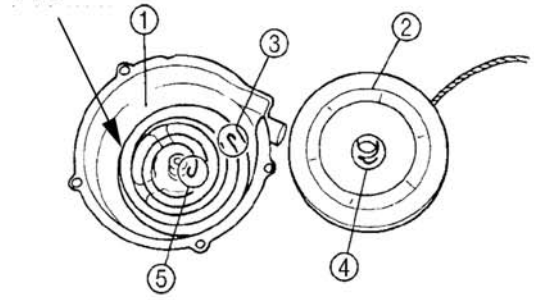


- Install sheave drum①, rope②, coil spring③, damper④
- Wind the rope clockwise around the sheave drum three times and hook the rope at “a” of sheave drum.



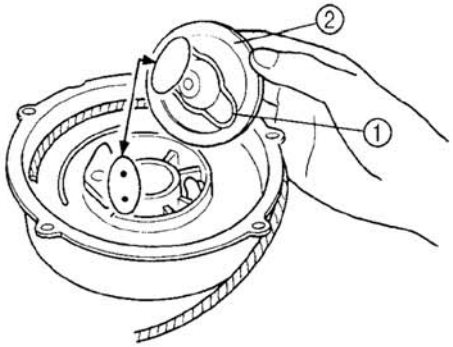
WARNING !:
The coil spring may quickly unwind and cause injury when the sheave drum is opened. Wear proper hand and eye protection beforehand.

Apply Lubricant Grease



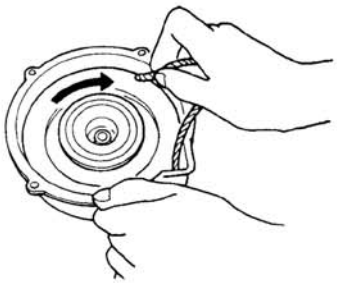
- Install coil spring ①and sheave drum ②
- Apply lubricant grease to spring
- Hook coil spring end ③ to the starter housing, wind the coil spring clockwise.
- Hook the other end ⑤of coil spring to hook part ④ of sheave drum.

- Install spring clamp①, friction plate ② and bolt.



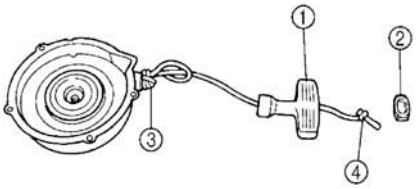
- Turn sheave drum three times for pretension of coil spring.

- Install handle① and handle cap②

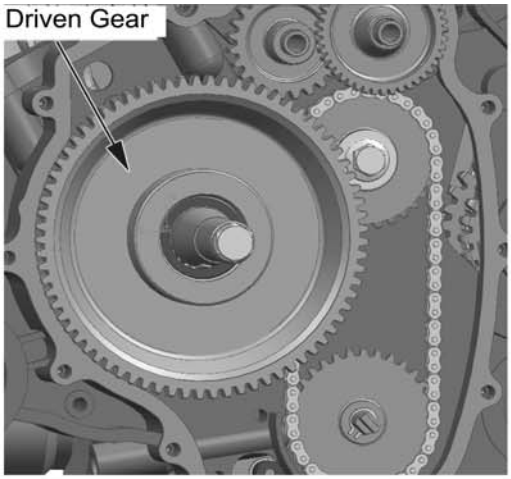


- Tie a knot④ on handle and release knot ③

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



- Install starting driven gear;



Magneto Rotor

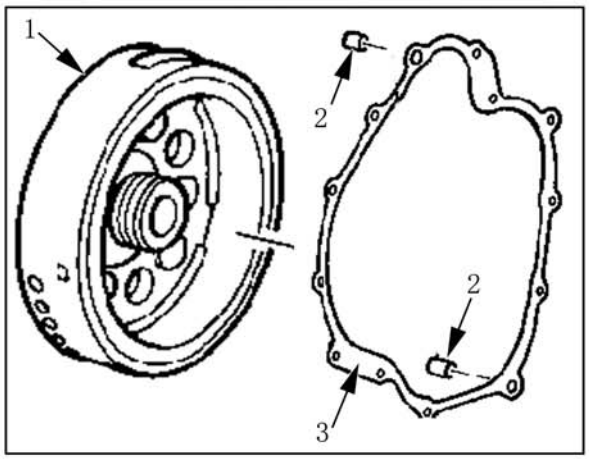
- Install woodruff key into crankshaft groove;
- Install magneto rotor 1;

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.

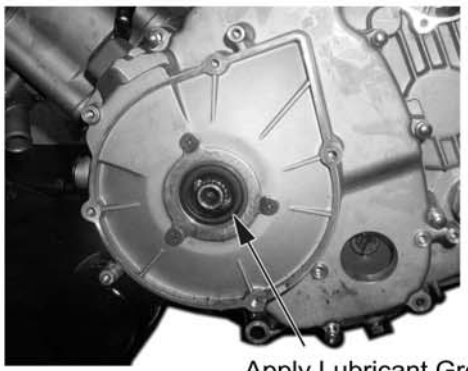
Left Crankcase Cover

- Install dowel pin2 and gasket 3

Note: Use a new gasket



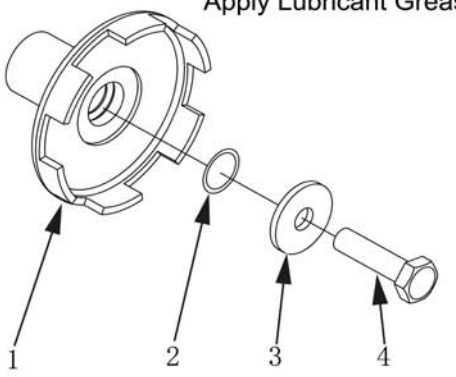
- Apply Lubricant grease to oil sea lip;
- Install left crankcase cover;
- Install bolts;



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

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 shall indicate the ampere not more than 5A.
- If the motor does not run 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 thermoswitch① 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 thermometer ② when the thermoswitch closes and opens.

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

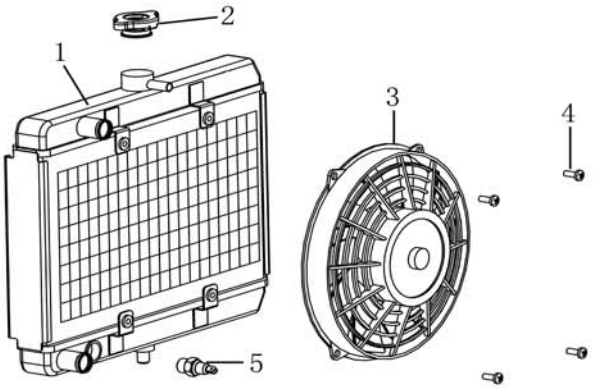
Note:
- Avoid sharp impact on thermoswitch.
- Avoid contact of thermoswitch with thermometer or vessel

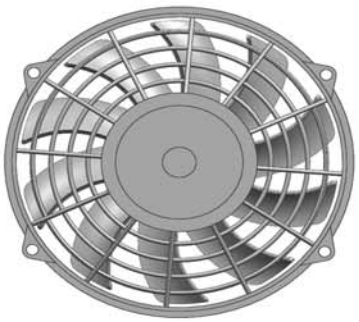
- **Installation:** Use a new O-ring③ and tighten the thermoswitch to the specified torque:

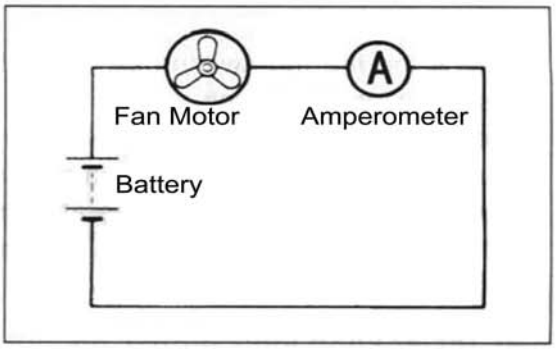
  Thermoswitch Tightening Torque: 17N.m

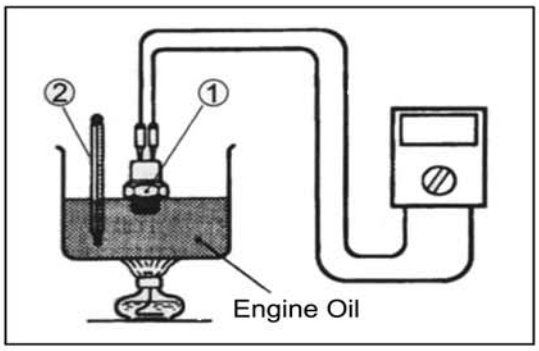
- Check coolant level after installation of thermoswitch. Fill coolant if necessary.

1. Radiator
2. Radiator Cap
3. Fan Motor
4. Mounting Bolt, Fan Motor
5. Thermoswitch









Inspection of Lubrication System (→11-8)

Inspection of Oil Pump and Relief Valve(→12-41)