VECTOR 300

Service Manual

Contents

17. ELECTRICAL SYSTEM

18. TROUBLESHOOTING

1. INFORMATION

1-1 Safety

GASOLINE

Gasoline is extremely flammable and is explosive under certain condition.

Do not smoke or allow sparks or flames in your work area.

● CARBON MONOXIDE

Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

● BATTERY ELECTROLYTE

The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. If you contact it, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.

● HOT PARTS

Engine and exhaust pipe become very hot and remain hot for one hour after the engine is run. Wear insulated gloves before handling these parts.

● USED ENGINE/GEAR OIL

Used engine oil and gear oil may cause skin disease if repeatedly contact with the skin for long periods.

Keep out of reach of children.

1-2 Notes

All information, illustrations, directions and specifications included in this publication are base on the latest product information available at the time of approval for printing.
JI-EE Dynamic Technology Industry Co., Ltd. reserves the right to make changes at any time without notice and without incurring any obligation whatever.

1-3 Engine Specifications

Type	4 Stroke，Single Cylinder, Water cooled
Displacement	287.2c.c.
Bore and Stroke	75 mm x 65 mm
Compression	10.0:1
Maximum Hp	20ps / 6500
Maximum Torque	(Nm/rpm) 24.6 Nm / 5000
Carburetor	
Ignition	DC-CDI
Starting	Electric
Lubrication	Auto oil injection
Transmission	Automatic (C.V.T. V-belt + Reverse)

CHASSIS	
Overall Length	**1815mm**
Overall Width	**1062mm**
Overall Height	**1130mm**
Wheel base	**1193mm**
Ground Clearance	**150mm**
Dry Weight	**225Kg**
Fuel Tank Capacity	**12L**

SUSPENSION	
Front	**Double A-Arm & Adjustable**
Rear	**Swing Arm & Adjustable Shock**
BRAKES	
Front	**Front Hydraulic Disc*2**
Rear	**Rear Hydraulic Disc*1**
TIRES	
Front	**21x7-10**
Rear	**22x10-10**
PRESSURE【 psi (kgf/cm2)】	
Front	**12(0.8)**
Rear	**12(0.8)**

COLORING

Specifications subject to change without notice.

1-4 Serial Number

The frame serial number is stamped on the front of the frame.

The engine serial number is stamped on the left side of the crankcase.

Frame serial number

1-5 Torque Values

STANDARD	
● 5 mm bolt and nut	5 N.m (3.5 lbf.ft)
● 6 mm bolt and nut	10 N.m (7.2 lbf.ft)
● 8 mm bolt and nut	22 N.m (16 lbf.ft)
●10 mm bolt and nut	35 N.m (25 lbf.ft)
●12 mm bolt and nut	55 N.m (40 lbf.ft)
ENGINE	
● Cylinder head nut	38 N.m (27.4 lbf.ft)
● Spark plug	12 N.m (8.9 lbf.ft)
● Cylinder head bolt	15 N.m (10.1 lbf.ft)
● Alternator bolt	8 N.m (5.9 lbf.ft)

FRAME

● Handlebar upper holder bolt	24 N.m (17.7 lbf.ft)
● Throttle housing cover screw	4 N.m (2.9 lbf.ft)
● Steering shaft nut	50 N.m (36.9 lbf.ft)
● Steering shaft holder bolt	33 N.m (24 lbf.ft)
● Wheel rim bolt	18 N.m (13.3 lbf.ft)
● Tie rod lock nut	35 N.m (25.8 lbf.ft)
● King pin nut	40 N.m (29 lbf.ft)
● Handlebar lower holder nut	40 N.m (29.5 lbf.ft)
● Front wheel bolt	24 N.m (17.7 lbf.ft)
● Front axle castle nut	40-60 N.m (30-45 lbf.ft)
● Front brake arm nut	4 N.m (3.0 lbf.ft)
● Rear brake arm nut	7 N.m (5.2 lbf.ft)
● Rear axle castle nut	40-60 N.m (30-45 lbf.ft)
● Rear wheel bolt	24 N.m (17.7 lbf.ft)
● Exhaust muffler mounting bolt	30 N.m (22.1 lbf.ft)
● Engine hanger bolt	30 N.m (22 lbf.ft)
● Rear axle holder bolt	90 N.m (65 lbf.ft)
● Swing arm pivot nut	90 N.m (65 lbf.ft)
● Rear shock absorber mounting nut	45 N.m (33 lbf.ft)

Nuts, Bolts Tightness

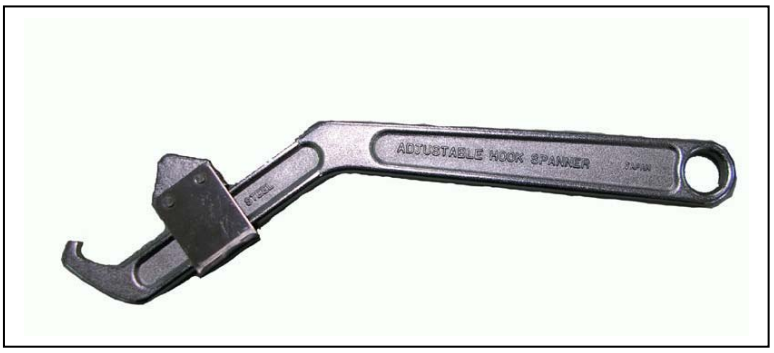
Perform periodical maintenance in accord with the Periodical Maintenance Schedule Check if all bolts and nuts on the frame are tightened securely.

Check all fixing pins, snap rings, hose clamp, and wire holders for security.

1-6 Special Tools

For Frame

1. Adjustable Hook Spencer
(E1105-LRA0-FT1)
Purpose: Adjusting of suspension



2. Ball Joint Puller(E0205-LRA0-FT1)

Purpose: Taking out the ball joint from front knuckle as repairing.

For Engine

1. TACKING ACG FLY WHEEL TOOL

(C1110-RB1-FT1)

2. COUNTER SHIFT IMPLEMENT (I1003-RB1-FT1)

3. ADJUST TAPPET IMPLEMENT

(A4721-HMA-FT1)

4. SLEEVE OF FABRICATING TRANSMISSION

SHAFT & OIL SEAL (I1202-RB1-FT1)

5. SLEEVE OF FABRICATING L CRANK & OIL SEAL (I1201-HMA-FT1)

6. TAKING 6205 BRG. TOOL (I6150-6205-FT1)

7. 6205 BRG. KNOCK TOOL (I6150-6205-FT2)

8. L CRANK CASE COVER 6006 BRG. FABRICATING TOOL (I6150-6006-FT1)

9. FABRICATING R CRANK CASE COVER 6201 BRG. TOOL (I6140-6201-FT1)

10. TAKING BRG. RB1 TOOL (I6150-RB1-FT1)

11. PNEUMATIC TAKING BRG. 6205 TOOL (I6150-6205-FT3)

12. TAKING TAPPET PIN TOOL (A4451-HMA-FT1)

13. ASSEMBLING DRIVE SHAFT TOOL

(B3411-RB1-FT1)

14. TAKING TRANSMISSION SHAFT BRG. 6305

TOOL (I6100-6305-FT1)

15. KNOCKING BRG.(6901) WATER PUMP IMPLEMENT
(I1001-KJ9-FT1)

16. KNOCKING WATER PUMP OIL SEAL IMPLEMENT (INSIDE)
(I1205-KF0-FT1)

17. KNOCKING WATER PUMP OIL SEAL(IRON) IMPLEMENT
(A9217-H9A-FT1)

18. TAKING & LOCKING SPECIAL NUT 36MM SLEEVE
(I0202-HMA-FT1)

19. TAKING & FABRICATING IN. VALVE TOOL
(A4711-HMA-FT1)

I6100-6204-FT3

20. TAKING BRG. 62040 LARGE-SIZE TOOL (I6100-6204-FT3)

21. ALL-PURPOSE FIXER (B2101-HMA-FT1)

22. KNOCKING BRG.(6204) IMPLEMENT (I6100-6204-FT2)

2. MAINTENANCE

2-1 Maintenance Data

SPECIFICATION

SPARK PLUG

SPARK PLUG GAP	0.8 mm
RECOMMENDED SPARK PLUGS	NGK CR8E
THROTTLE LEVER FREE PLAY	5-10 mm
IDLE SPEED	1700±100 rpm
BRAKE LEVER FREE PLAY	15-25 mm
DRIVE CHAIN SLACK	10-25 mm
TOE-IN	5±10 mm

TORQUE VALUES	
SPARK PLUG	12-19 N.m
TIE-ROD LOCK NUT	35-43 N.m
ENGINE OIL	1.4 Liter (1.2Liter for change)
GEAR LUBRICATION OIL	750cc (650cc for change)

2-2 Maintenance Schedule

The internal maintenance in the following table is based on average riding, normal conditions.
Riding in unusually dusty areas, require more frequent servicing.

	300KM	Every	Every	Every	Every	Notes
	1 Month	3 Months	6 Months	1 Year	2 Years	
Fuel Lines	I		I		R	
Throttle Operation	I	I				
Air Filter	I	C	R			
Fuel Filter				R		
Spark Plug	I	I	R			
Drive Chain	I, L	Lubricate for every 1 month				
Brake Shoes		I				
Brake System	I	I				
Brake Fluid	I				R	
Nuts, Bolts & Fasteners	I					
WHEEL/TIRES	I		I			
Wheels	I	I				
Steering System	I		I			
Suspension System	I			I		
C.V.T Drive belt			I		R	
Transmission Oil	R	Replace for every 3,000km or 6 Months				
Engine Oil	R	Replace for every 3,000km or 6 Months				
Battery	I	I,C		I,C		
Oil Filter (Screen)	C	C				
Valve Clearance	I		I			
Coolant	I	I			R	
Cooling Fan	I	I				
Carburetor (Idle Speed)	I	I				
Choke	I					

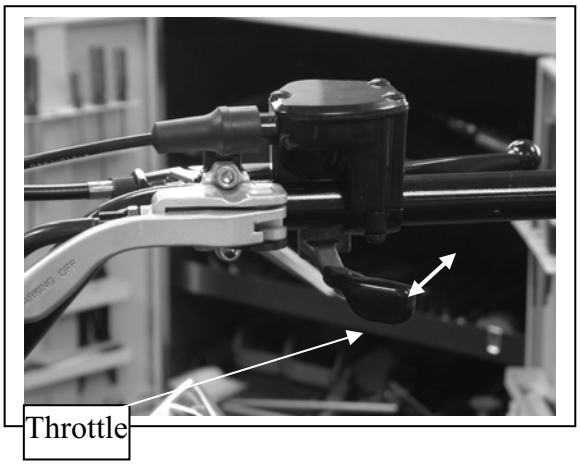
Note – I: Inspect and Clean, Adjust, Lubricate or Replace, if necessary

C: Clean **L: Lubricate** **R: Replace**

2-3 Fuel Tube

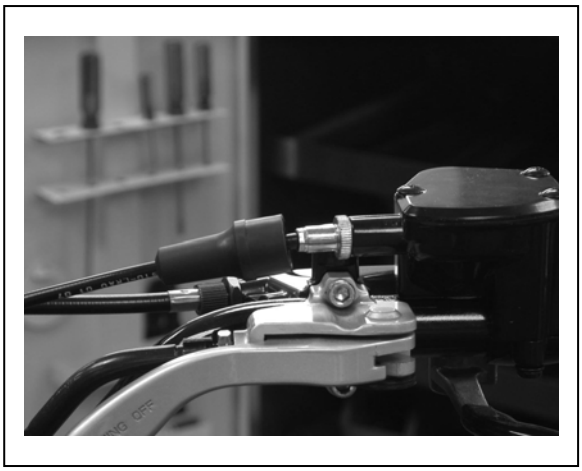
Inspect the fuel lines for deterioration, damaging or leakage and replace if necessary.

2-4 Throttle Operation



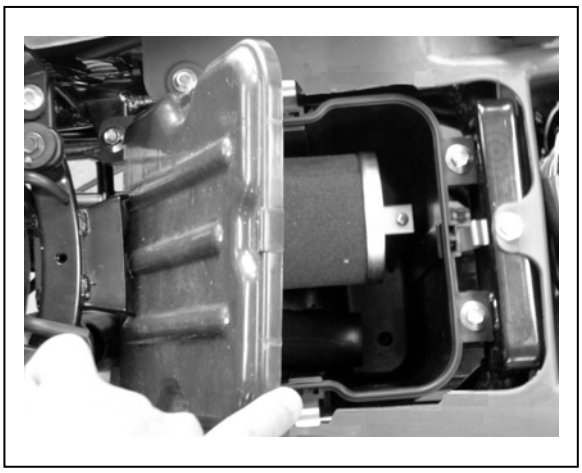
Inspect for smooth throttle lever full opening and automatic full closing in all steering positions.
Inspect if there is no deterioration, damage or kink in the throttle cable, replace it if necessary.
Check the throttle lever, free play is 5-10 mm at the tip of the throttle lever.
Disconnect the throttle cable at the upper end.
Lubricate the cable with commercially lubricant to prevent premature wear.

2-5 Throttle Cable Adjustment



Slide the rubber cap of the adjuster off the throttle Housing, loosen the lock nut and adjust the free play of the throttle lever by turning the adjuster on the throttle housing.
Inspect the free play of the throttle lever.

2-6 Air Cleaner



Please remove the four hooks, and then disassemble two screws inside the air cleaner case.
Pull out the air filter element from the air cleaner case.
Washing the element in non-flammable solvent, squeeze out the solvent thoroughly.
Let it dry.
Soak the filter element in gear oil and then squeeze out the excess oil.
Install the every component into air cleaner in the reverse order of removal.
Note: for more detail please check chapter 5-10

2-7 Spark Plug

This spark plug is located at the front of the engine.
Disconnect the spark plug cap and unscrew the spark plug.
Check the condition of spark plug electrodes wear.

Change a new spark plug if the electrodes and insulator tip appear unusually fouled or burned.
Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped.
The spark plug gap shall keep in **0.8mm**
With the sealing washer attached, thread the spark plug in by hand to prevent crosses threading.
Tighten the spark plug with **1.0~1.2kgf-m**

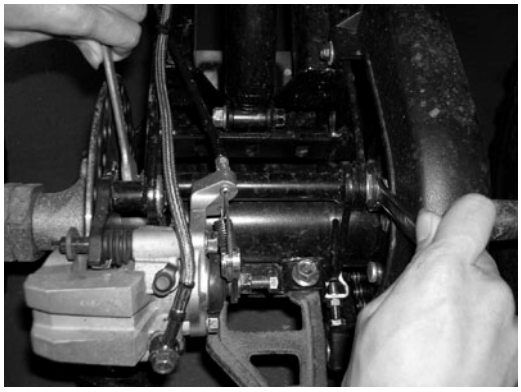
2-8 Idle Speed

Connect an engine speed meter.
Warm up the engine, 10 minutes are enough.
Turn the idle-speed adjust screw on the carburetor to obtain the idle speed. “Turn in” (clockwise) will get higher speed. “Turn out” (counter clockwise) will get lower speed.
IDLE SPEED: 1700±100 rpm

2-9 Drive Chain

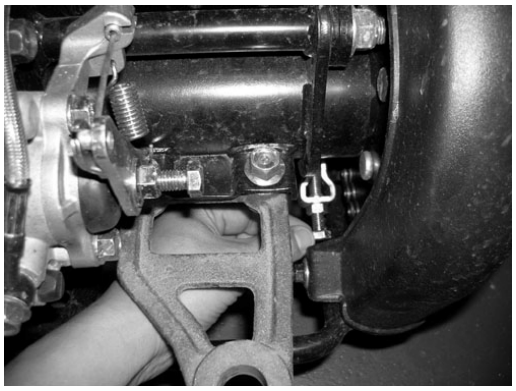
Stopping the ATV and shift the transmission into neutral(N) .
Measure the drive chain slack midway between the sprockets.

Chain slack =15~25mm (5/8~1 inch)



Adjust the chain slack.
Loosen the lock nuts and turn drive chain adjusting nuts until get the correct slack.
Tighten the axle holder bolts.

Torque = 90N.m (65 lbf.ft)



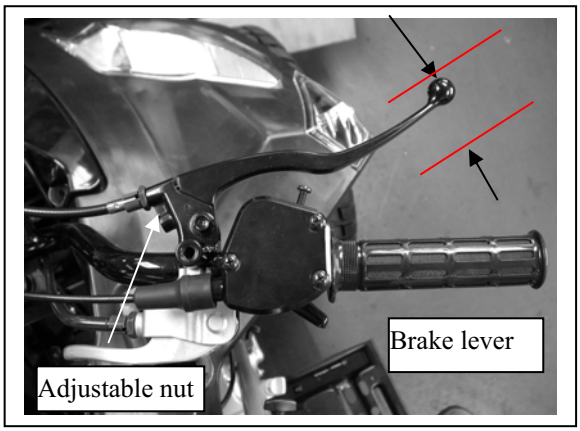
When the drive chain becomes very dirty, it should be removed, cleaned and lubricated by specify lubricator.
Please use special chain oil to lubricate the drive chain.
Clean the drive chain with kerosene and wipe it dry.
Inspect the drive chain for any possible wearing or damaging.
Replace the chain, if it is worn excessively or damaged.

Inspect the sprocket teeth, if it is excessive wearing or damaging, please replace it.

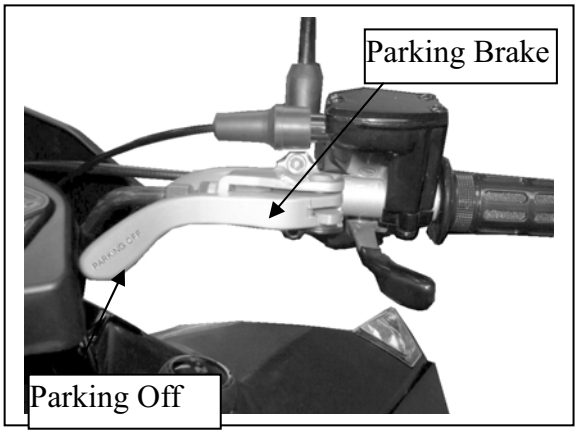
2-10 Brake System

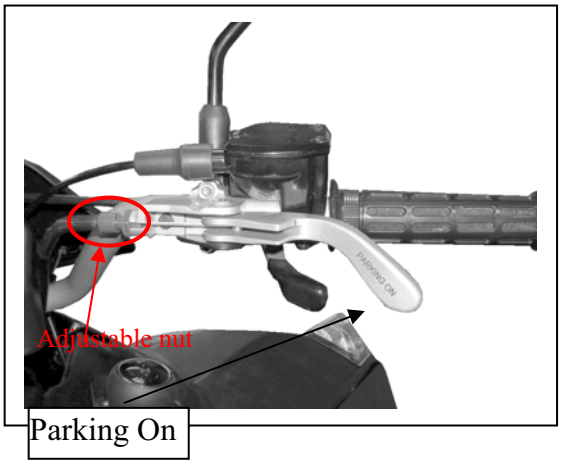
Inspect the front brake lever and cable for excessive play or other damage.
Replace or repair if necessary.
Measure the brake lever free play at the end of the brake lever trip.

Front Brake lever free play is 15-25 mm.



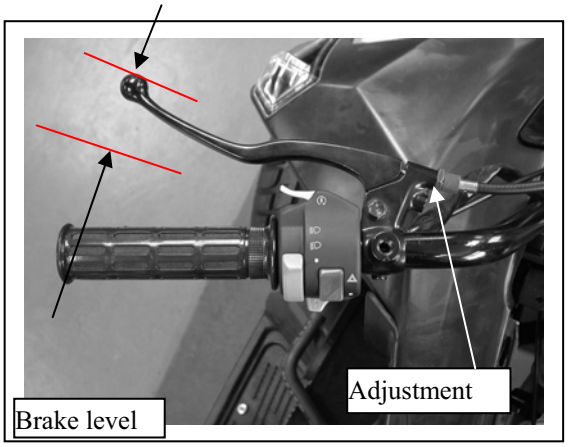
Turn the parking brake to the left side is “parking off”, while turn to right side is “parking on”. As you found out the parking brake which has been decreased its brake ability, you might screw the adjustable nut to modify the clearance of brake shoe to the correct position. Also, another method of adjustment of parking brake, please refer to next page.





Inspect the rear brake lever and cable for excessive play or other damage.
Replace or repair if necessary.
Measure the rear brake lever free play at the end of the lever trip.

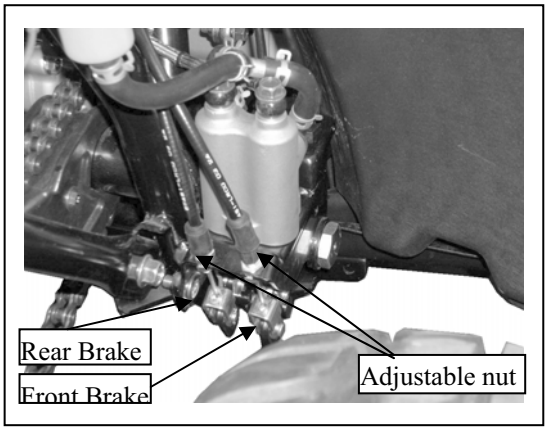
Rear Brake lever free play is 15-25 mm.



NOTE:

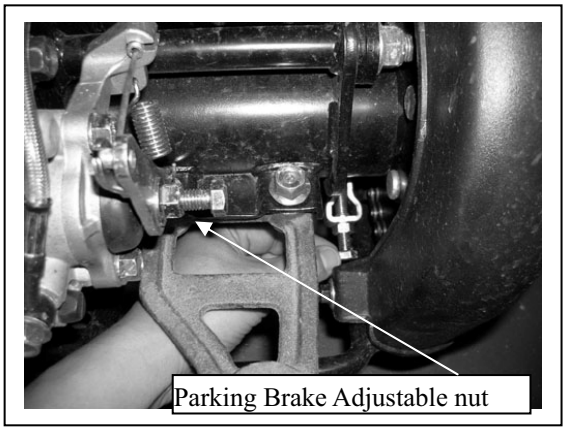
- The second method to adjust brake level is under the driver seat and rear brake component.

- In order to avoid a pre-load occurred between brake disk and lining. After all adjusting of brake system are completed, please check the small clearance between brake disk and lining.



Loosen the adjustable nut near the rear brake caliper. Screw the adjustable bolt by hand with C.W. turn to the end, then back to a quarter turn. Tighten the nut to complete the parking brake adjustment.

Also, as you fount out the brake ability which is a bit insufficient, you can screw the adjustable nut of parking Brake.

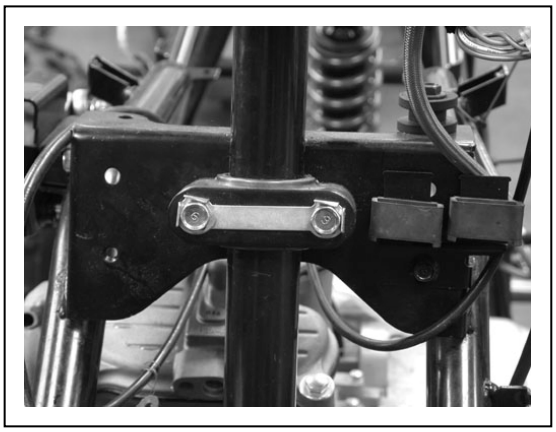


2-11 Wheels And Tires

Inspect the tire surfaces for cuts, nails or other sharp objects.
Check the each tire surface at cold tire condition.

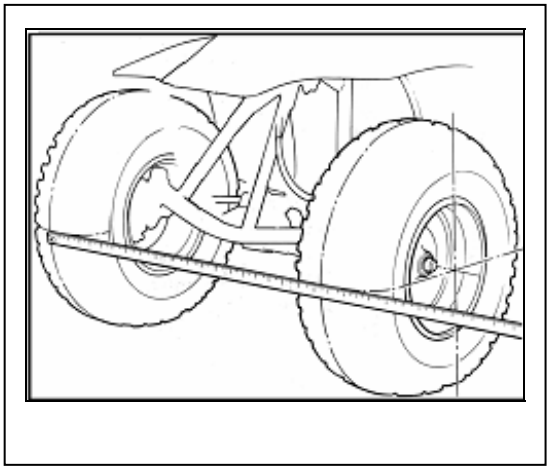
***The standard of tire pressure is 12(0.8) psi (kgf/cm2)**

2-12 Steering Shaft Holder Bushing

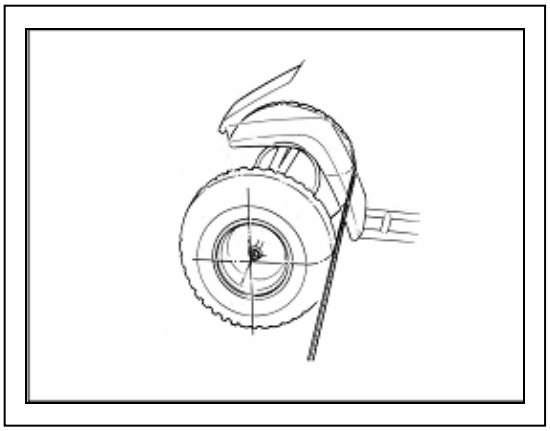


Remove the front fender first.
Remove the steering shaft holder and check the steering shaft bushing for wears or damage.
If the bushing is worn or damaged, please change a new one.
Grease the steering shaft bushing and install the parts
in the reverse order of removal.
Torque: steering shaft holder bolt: 33 N.m (24 lbf.ft)

2-13 Toe-In



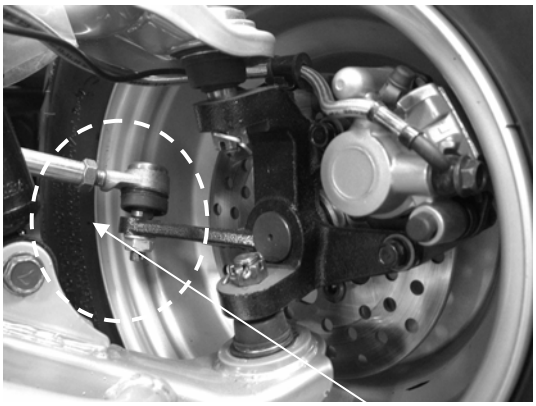
Keep the vehicle on level ground and the front wheels facing straight ahead.
Mark the centers of the tires to indicate the axle center height.
Measure the distance between the marks.



Carefully to move the vehicle back, let the wheels turn 180 degree, so the marks on the tires are aligned with the axle center height.
Measure the distance between the marks.
Calculate the difference in the front and rear measurements.
Toe-in: 5±10mm

If the toe-in is out of standard, adjust it by changing the length of the tie-rods equally by turning the tie-rod while holding the ball joint.
Tighten the lock nuts.

Torque: 35-43 N.m



3. ENGINE REMOVE AND INSTALLATION

3.1 General Information

ENGINE SHALL BE REMOVED IN THE CONDITIONS OF NECESSARY REPAIRMENT OR ADJUSTMENT TO THE TRANSMISSION AND COMBUSTION SYSTEM ONLY

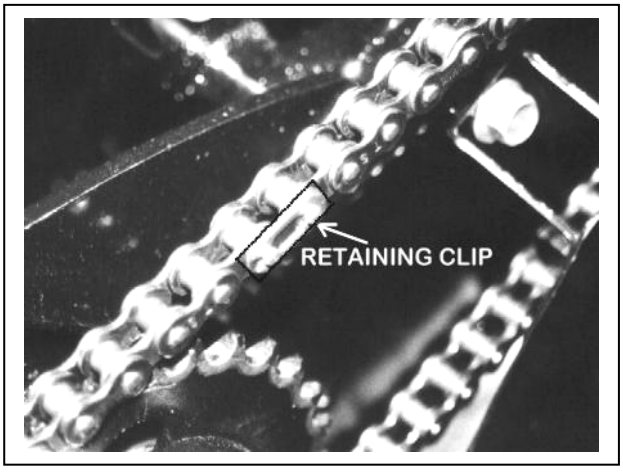
3-2 Engine Removal

Before removing engine, you need to remove all of components such as seat, front and back fender, fuel tube, exhaust pipe, carburetor cable and drive chain…etc. You can then see three hanger bolts which have screwed on engine.

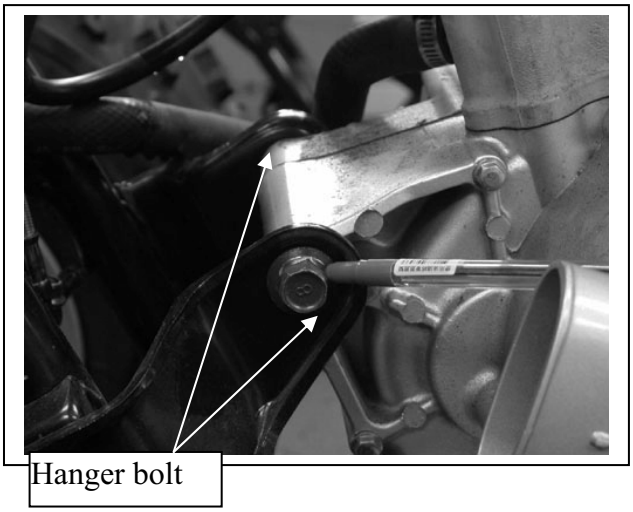
Loosen these three hanger bolts. You have succeeded to remove this engine.

There are some pictures to describe main step of removing engine.

Disconnect the wire connectors. There are three connectors for carburetor auto-choke, starter motor and generator respectively.



Remove the drive chain cover.
Remove the drive chain retaining clip and master link, and remove the drive chain.

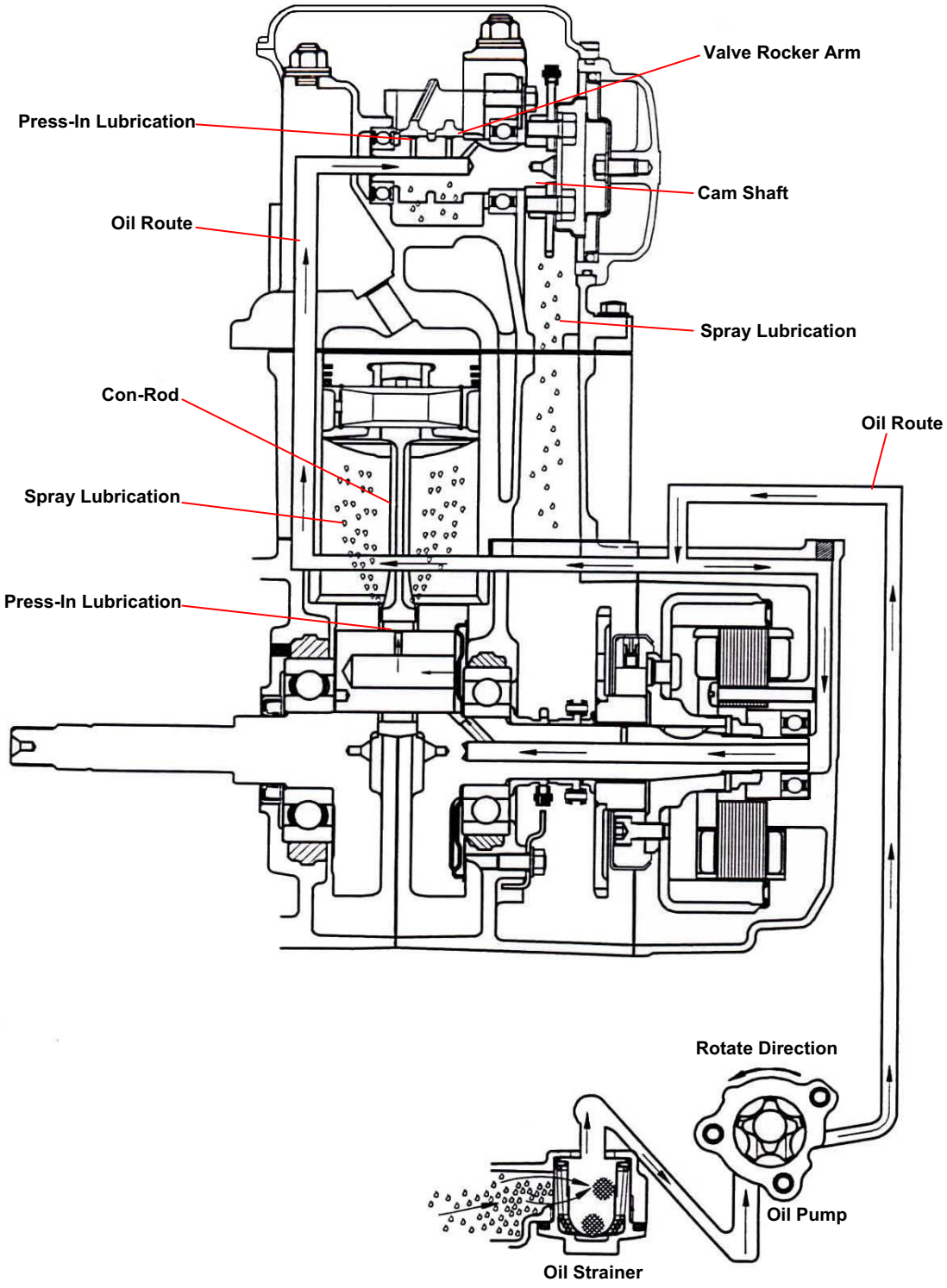


3-3 Engine Installation

The Engine installation is essentially in the reverse order of removal.
The torque of engine hanger bolt is **30 N.m**
Route the wires and cable in reverse order properly.

4. LUBRICATION SYSTEM

4-1 Mechanism Diagram



4-2 Precautions In Operation

General Information:

- This chapter contains maintenance operation for the engine oil pump and gear oil replacement.

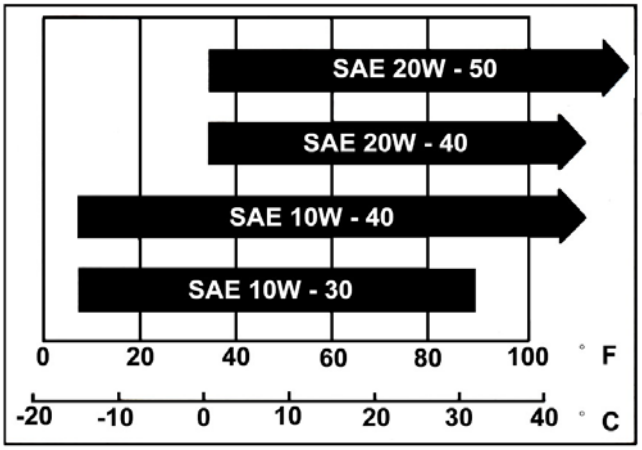
Specifications

Engine oil quantity Disassembly: 1400 c.c.
Change: 1200c.c.

Oil viscosity SAE 10W-30 (Recommended King serial oils)

Gear oil Disassembly: 750c.c.
Change: 650c.c.

Gear oil viscosity SAE 140
(Recommended SYM Hypoid gear oils)



單位:mm

Items		Standard (mm)	Limit (mm)
Oil pump	Inner rotor clearance	0.15	0.20
	Clearance between outer rotor and body	0.15~0.20	0.25
	Clearance between rotor side and body	0.04~0.09	0.12

Torque value

Torque value oil strainer cap	1.5~3.0kgf-m
Engine oil drain bolt	1.9~2.5kgf-m
Gear oil drain bolt	1.0~1.5kgf-m
Gear oil join bolt	1.0~1.5kgf-m
Oil pump connection bolt	0.8~1.2kgf-m

4-3 Troubleshooting

Low engine oil level

- Oil leaking
- Valve guide or seat worn out
- Piston ring worn out

Low oil pressure

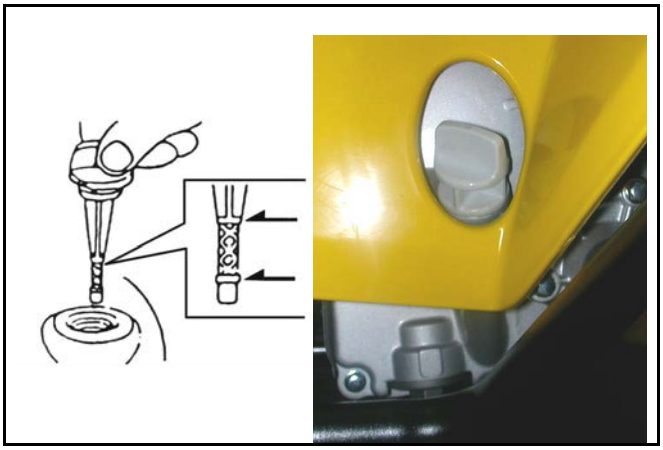
- Low engine oil level
- Clogged in oil strainer, circuits or pipes
- Oil pump damage

Dirty oil

- No oil change in periodical
- Cylinder head gasket damage
- Piston ring worn out

4-4 Engine Oil

Turn off engine, and park the ATV in flat surface with main stand.
Check oil level with oil dipstick.
So not screw the dipstick into engine as checking.
If oil level is nearly low level, fill out recommended oil to upper level.



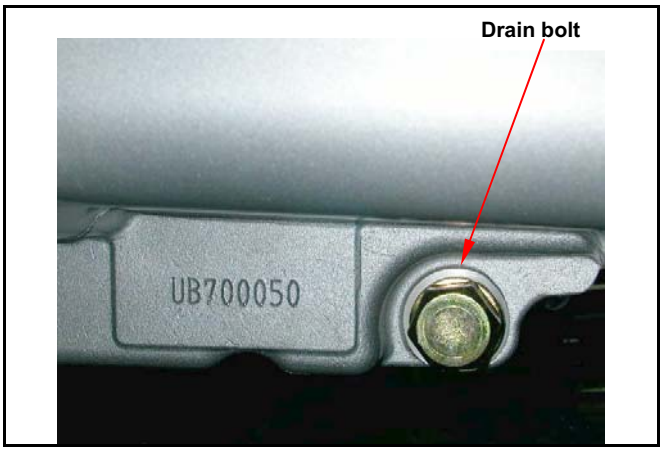
Oil Change

⚠ Caution

Drain oil as engine warmed up so that makes sure oil can be drained smoothly and completely.

Place an oil pan under the ATV, and remove oil drain bolt.
After drained, make sure washer can be re-used.
Install oil drain bolt.

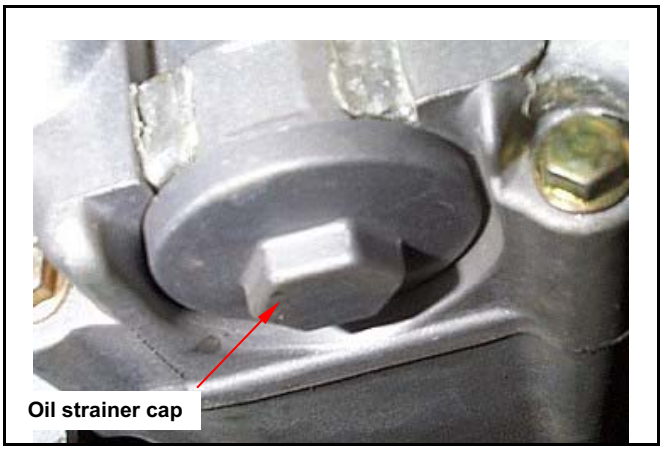
Torque value：1.9~2.5kgf-m



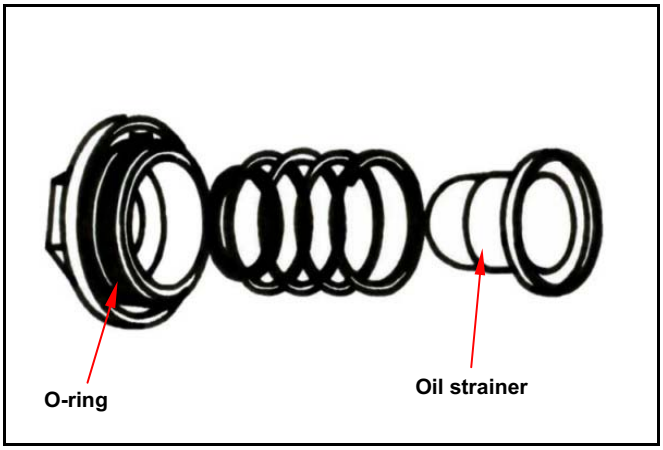
4-5 Engine Oil Strainer Clean

Drain engine oil out.
Remove oil strainer and spring.
Clean oil strainer.
Check if O-ring can be re-used.
Install oil strainer and spring.
Install oil strainer cap.

Torque value：1.5~3.0kgf-m



Add oil to crankcase (oil viscosity SAE 10W-30)
Recommended using King serial oil.
Engine oil capacity: 1200c.c. when replacing
Install dipstick, start the engine for running several minutes.
Turn off engine, and check oil level again.
Check if engine oil leaks.

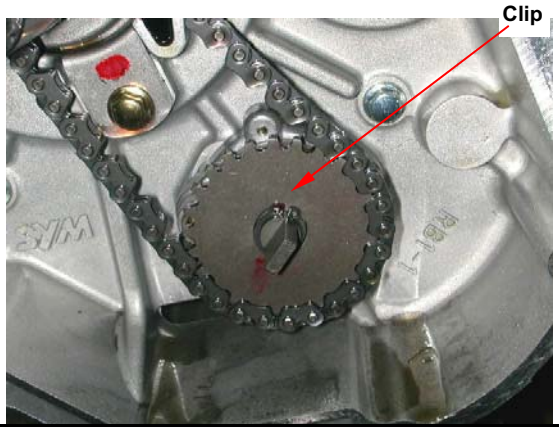


4-6 Oil Pump

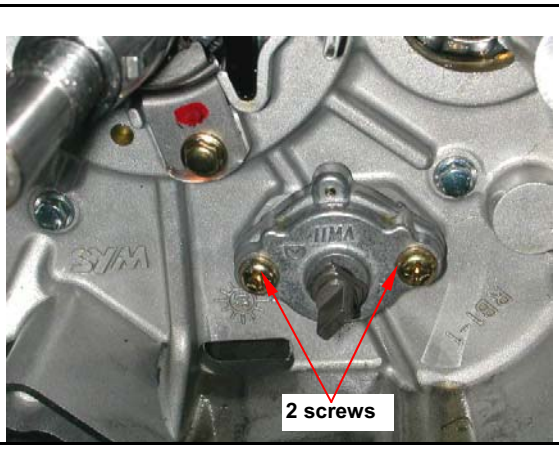
Oil Pump Removal

Remove generator and starting gear. (Refer to chapter 10) 。

Remove cir clip and take out oil pump driving chain and sprocket.

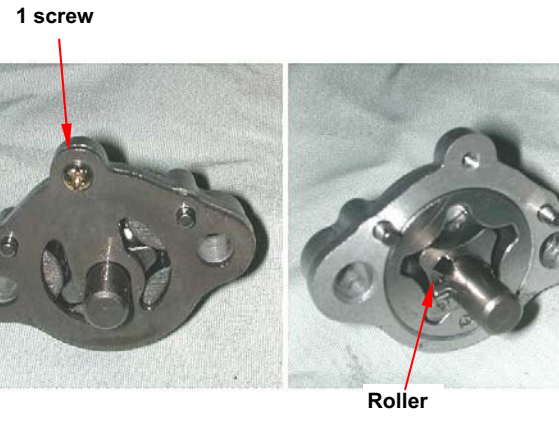


Make sure that pump shaft can be rotated freely. Remove 2 screws on the oil pump, and then remove oil pump.



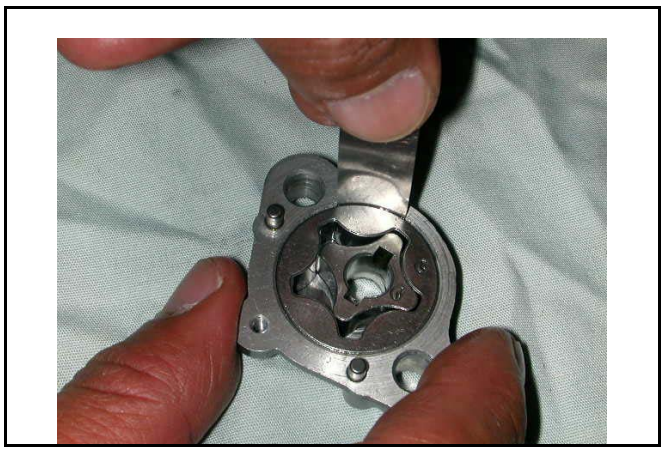
Oil Pump Disassembly

Remove the screws on oil pump cover and remove the cover.
Remove oil pump shaft roller and shaft.

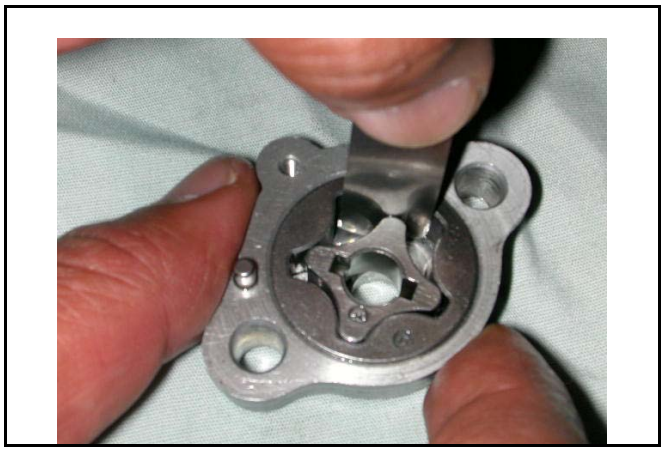


Oil Pump Inspection

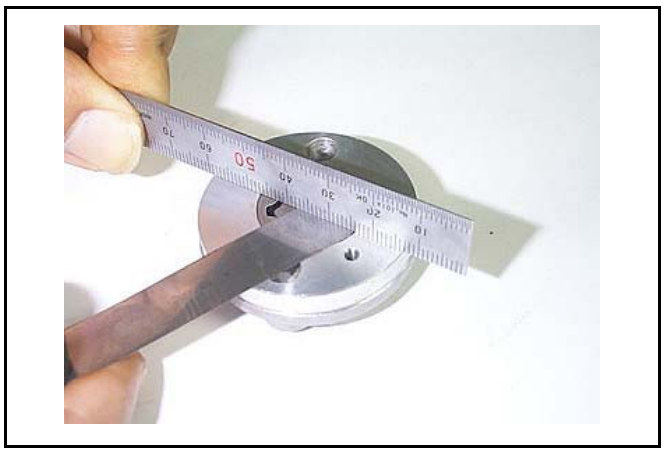
Check the clearance between oil pump body and outer rotor.
Limit: 0.25 mm



Check clearance between inner and outer rotors.
Limit: 0.20 mm

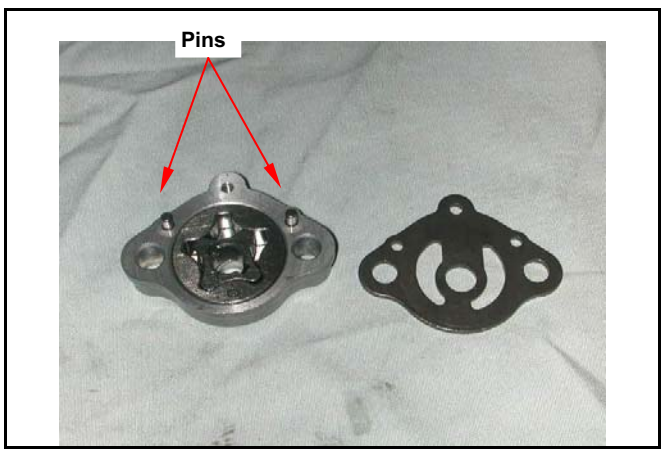


Check clearance between rotor side face and pump body
Limit: 0.12 mm

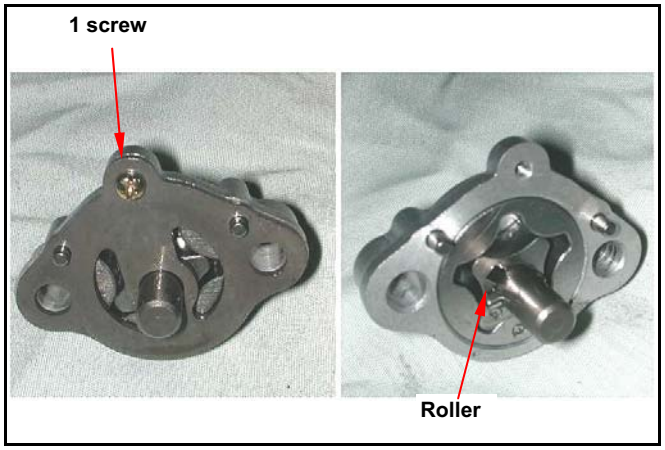


Oil Pump Re-assembly

Install inner and outer rotors into the pump body.
Align the indent on driving shaft with that of inner rotor.
Install the oil pump shaft and roller.
Install the oil pump cover and fixing pins properly.



Tighten the oil pump screw.

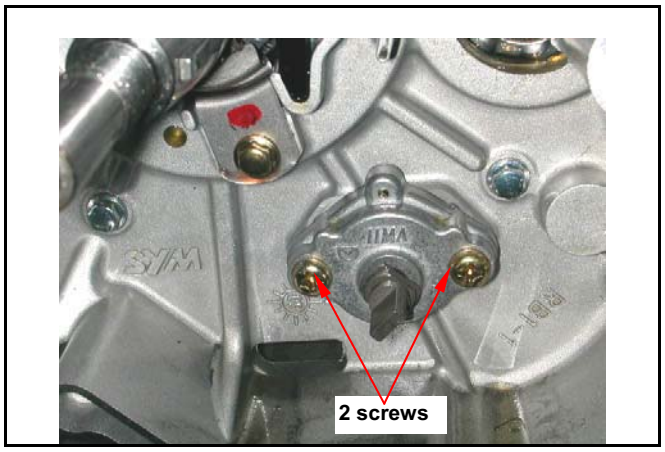


Oil Pump Installation

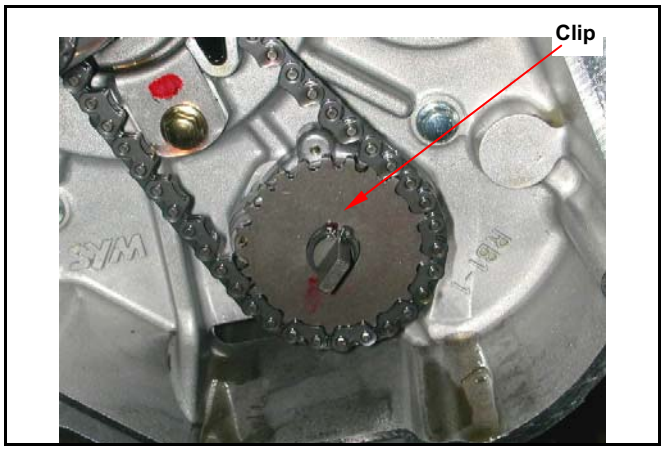
Install the oil pump, and then tighten screws.

Torque value：0.8~1.2kgf-m

Make sure that oil pump shaft can be rotated freely.



Install oil pump drive chain and sprocket, and then install cir clip onto oil pump shaft.

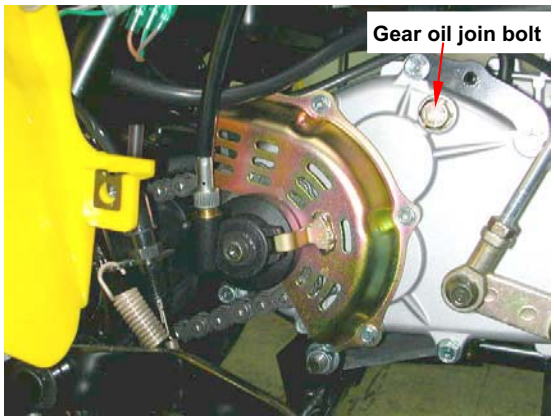


Install starting gear and generator.
(Refer to chapter 10)

4-7 Gear Oil

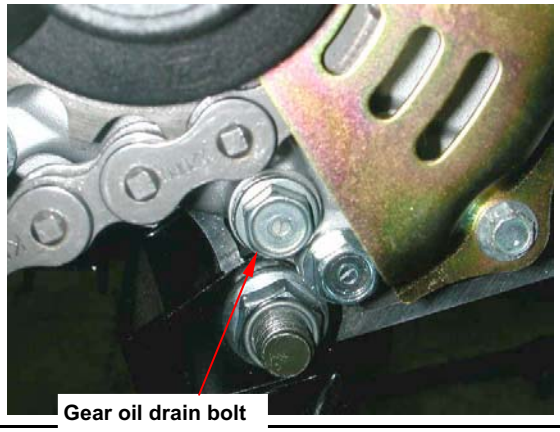
Gear Oil Change

Remove oil join bolt.
Remove drain bolt and drain gear oil out.
Install the drain bolt after drained.
Torque value: 1.0~1.5kgf-m



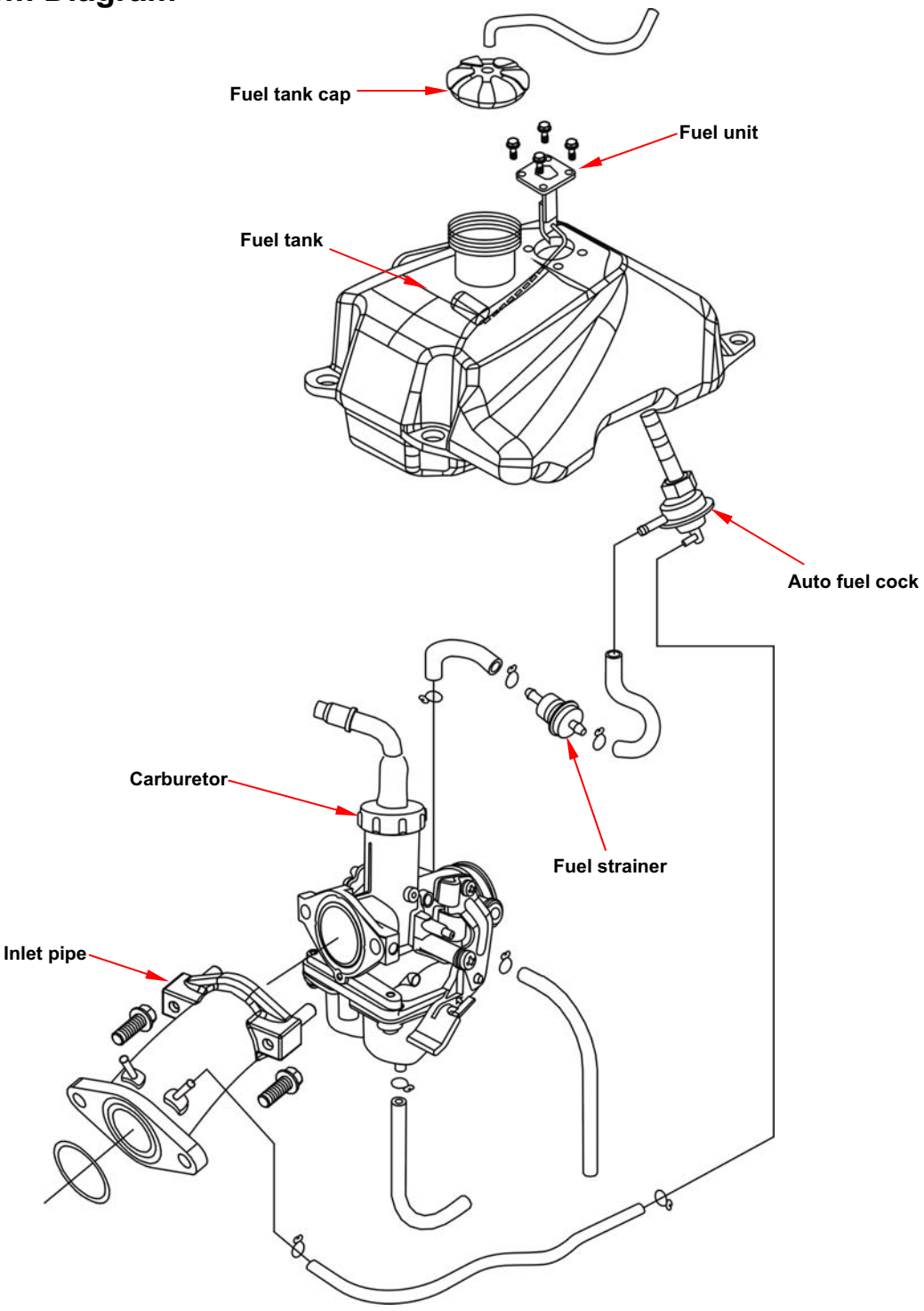
Make sure that the drain bolt washer can be re-used.
Add oil to specified quantity from the join hole.
Gear Oil Quantity: 650c.c. when replacing

Make sure that the join bolt washer can be re-used, and install the bolt.
Start engine and run engine for 2-3 minutes.
Turn off engine and make sure that oil level is in correct level.
Make sure that no oil leaking.



5. FUEL SYSTEM

5-1 Mechanism Diagram



5-2 Precautions In Operation

General Information

⚠ Warning

Gasoline is a low ignition point and explosive materials, so always work in a well-ventilated place and strictly prohibit flame when working with gasoline.

⚠ Cautions

- Do not bend off throttle cable. Damaged throttle cable will make unstable drive-ability.
- When disassembling fuel system parts, pay attention to O-ring position, replace with new one as re-assembly
- There is a drain screw in the float chamber for draining residual gasoline.
- Do not disassemble air cut valve arbitrarily.

Tool

Special service tools

O Vacuum/air pressure pump

O Fuel level gauge

Specification of CARBURETOR

ITEM	UA25A
Carburetor diameter	Ø22mm
I.D. number	PTG 050
Fuel level	14.8mm
Main injector	# 110
Idle injector	# 35
Idle speed	1700 ± 100rpm
Throttle lever clearance	1~3 mm
Air screw	2 turns

5-3 Trouble Diagnosis

Poor engine start
- No fuel in fuel tank
- Clogged fuel tube
- Too much fuel in cylinder
- No spark from spark plug(malfunction of ignition system)
- Clogged air cleaner
- Malfunction of carburetor chock
- Malfunction of throttle operation

Stall after started
- Malfunction of carburetor chock
- Incorrect ignition timing
- Malfunction of carburetor
- Dirty engine oil
- Air existing in intake system
- Incorrect idle speed

Rough idle
- Malfunction of ignition system
- Incorrect idle speed
- Malfunction of carburetor
- Dirty fuel

Intermittently misfire as acceleration
- Malfunction of ignition system

Late ignition timing
- Malfunction of ignition system
- Malfunction of carburetor

Power insufficiency and fuel consuming
- Fuel system clogged
- Malfunction of ignition system

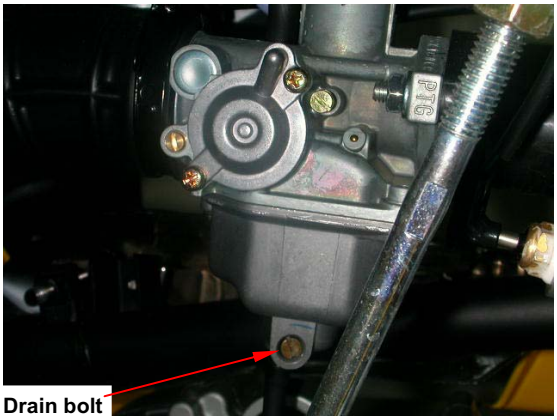
Mixture too lean
- Clogged fuel injector
- Vacuum piston stick and closed
- Malfunction of float valve
- Fuel level too low in float chamber
- Clogged fuel tank cap vent
- Clogged fuel filter
- Obstructed fuel pipe
- Clogged air vent hose
- Air existing in intake system

Mixture too rich
- Clogged air injector
- Malfunction of float valve
- Fuel level too high in float chamber
- Malfunction of carburetor chock
- Dirty air cleaner

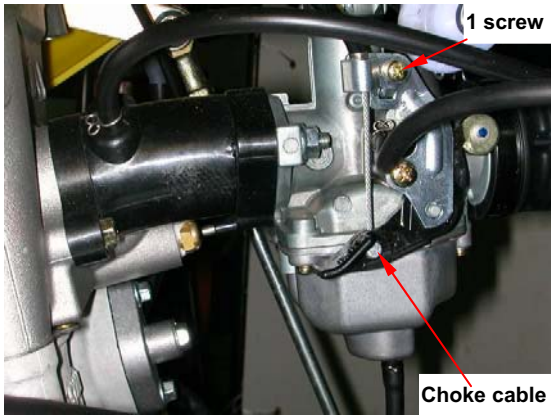
5-4 Carburetor Remove / Install

Removal

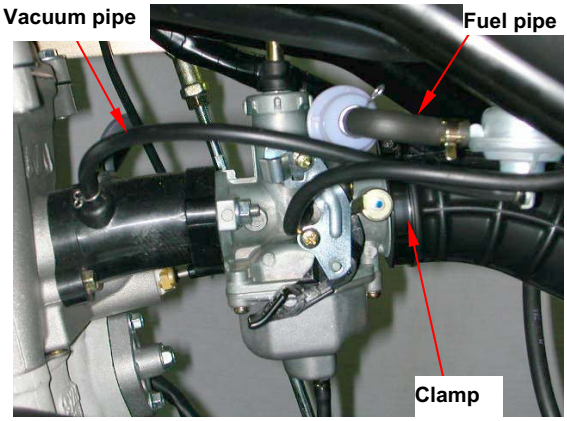
Drain out fuel in the float chamber.



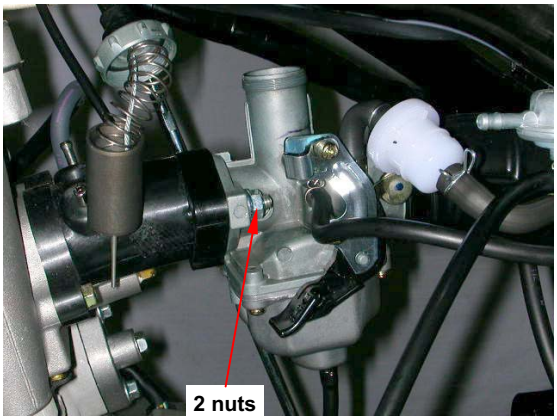
Loosen the choke cable fixed iron sheet screw from plate.
Remove the choke cable.



Disconnect the fuel hose.
Release the clamp strip of air cleaner.



Remove the carburetor upper parts from the carburetor.
Release the 2 nuts of carburetor insulator, and then remove the carburetor.



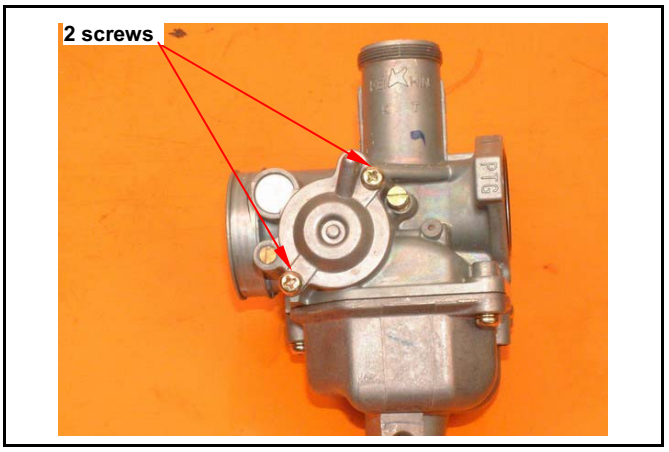
Installation

Install in reverse order of removal procedures.

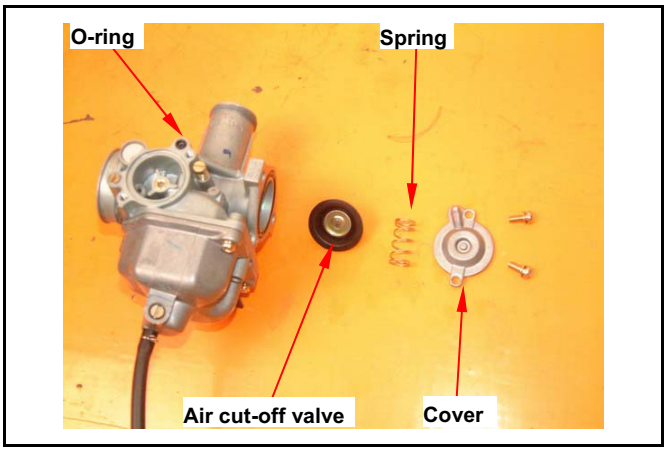
5-5 Air Cut-Off Valve

Disassembly

Remove 2 screws.



Remove air cut-off valve cover, spring and valve.

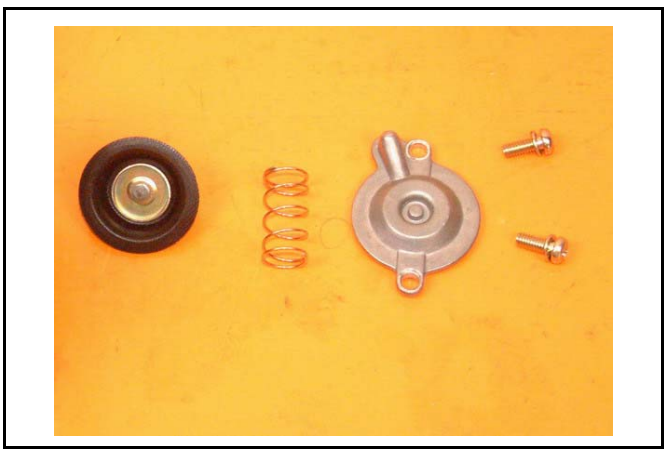


Inspection

Check the valve is in normal.
If the valve is in normal, it will restrict air-flow.
If air-flow is no restricting, replace carburetor assembly.
Check the vacuum pipe o-ring is in normal.

Assembly

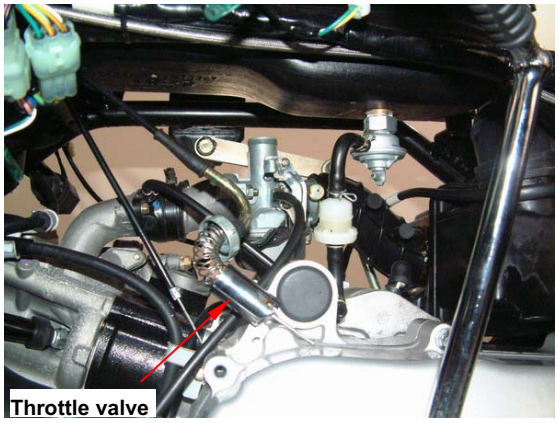
Install in reverse order of removal procedures.



5-6 Throttle Valve

Disassembly

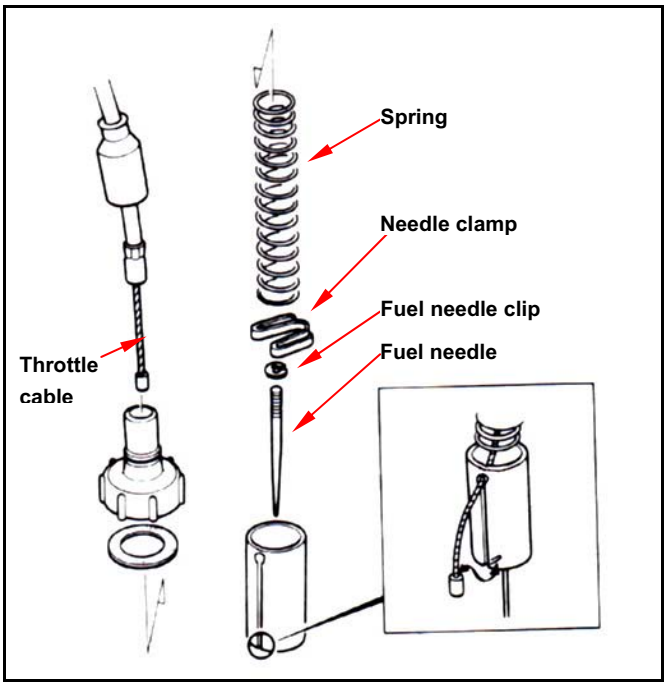
Remove carburetor upper parts, and then remove throttle valve and throttle cable.



Disconnect the throttle cable from the throttle valve and remove the valve spring.
Remove the fuel needle clamp and fuel needle.

Assembly

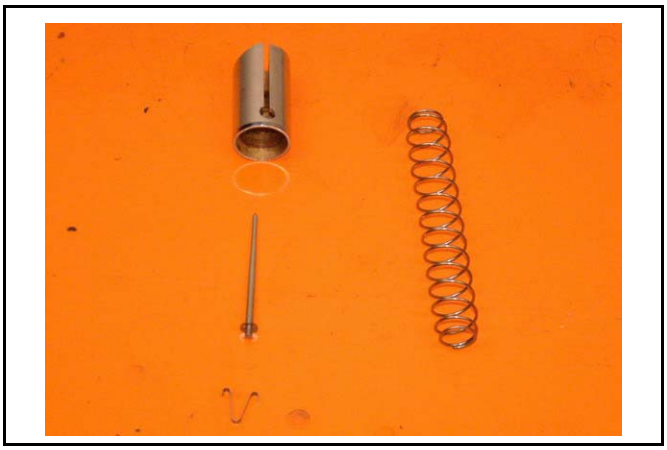
Place the fuel needle onto the throttle valve and clip it with needle clamp.
Install the sealed cap, carburetor upper part, and throttle valve spring.
Connect the throttle valve cable to the throttle valve.
Install the throttle valve into the carburetor body.



⚠ Caution

Align the groove inside the throttle valve with the throttle stopper screw of the carburetor body.

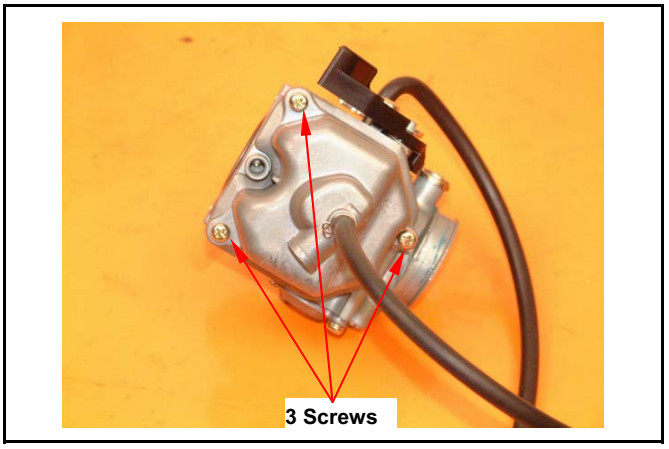
Tighten the carburetor upper part.
Adjust the free play of throttle valve cable.



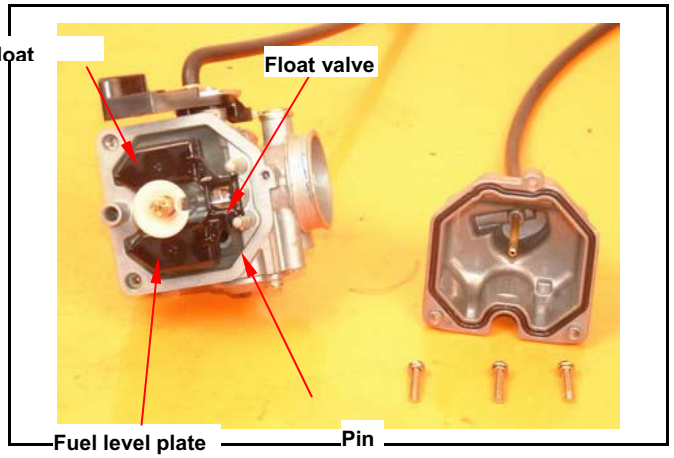
5-7 Float Chamber

Disassembly

Remove 3 mounting screws and remove float chamber cover.



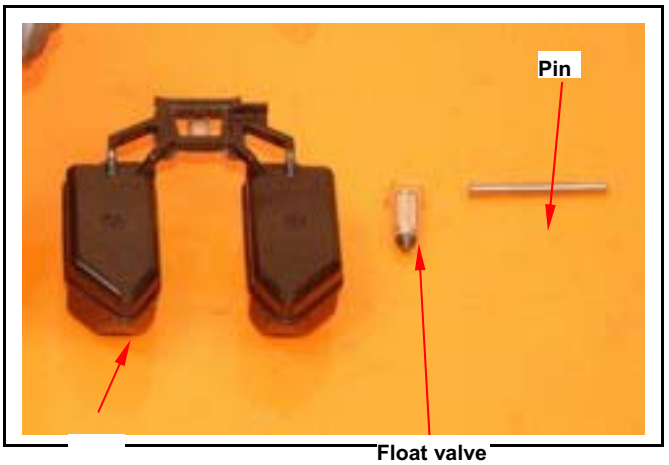
Remove the fuel level plate, float pin, float and float valve.



Inspection

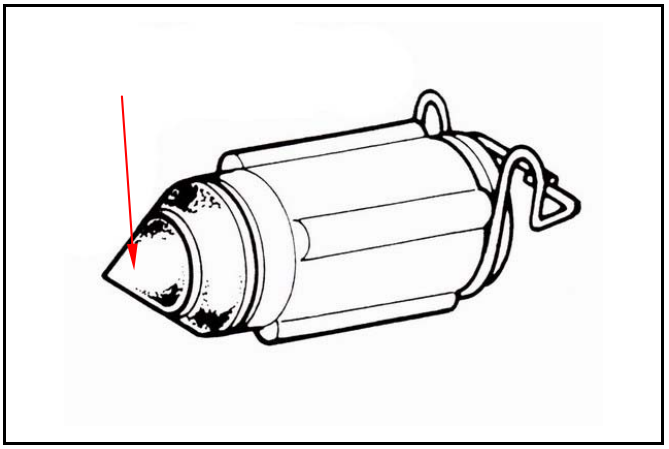
Check float valve and valve seat for damage, blocking.

Check float valve for wearing, and check valve seat face for wear, dirt.

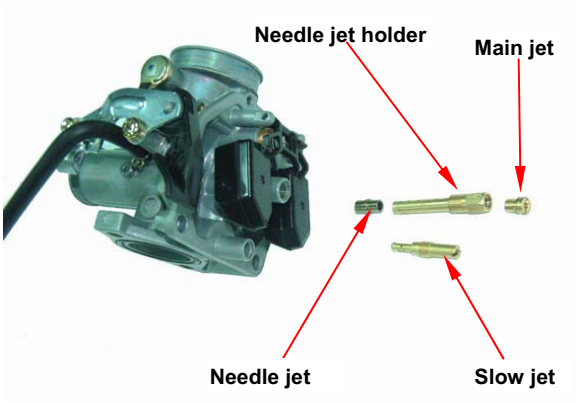


⚠ Caution

In case of worn out or dirt, the float valve and valve seat will not tightly close causing fuel level to increase and as a result, fuel flooding. A worn out or dirty float valve must be replaced with a new a new one.



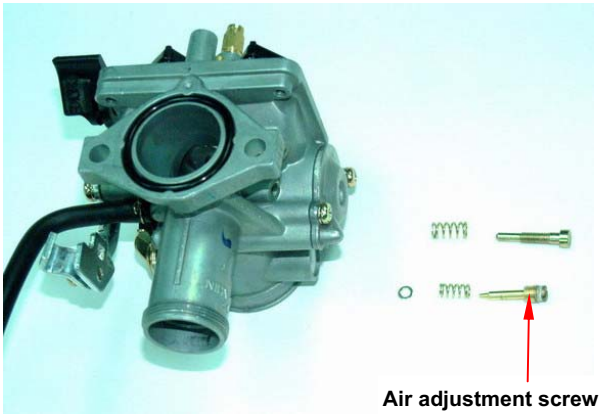
Remove main jet, needle jet holder, needle jet, slow jet and air adjustment screw.



⚠ Caution

Take care not to damage jets and adjust screw.
- Before removing adjustment screw, turn it all the way down and note the number of turns.
- Does not turn adjust screw forcefully to avoid damaging valve seat face.

Clean jets with cleaning fluid. Then use compressed air to blow the dirt off.
Blow carburetor body passages with compressed air.



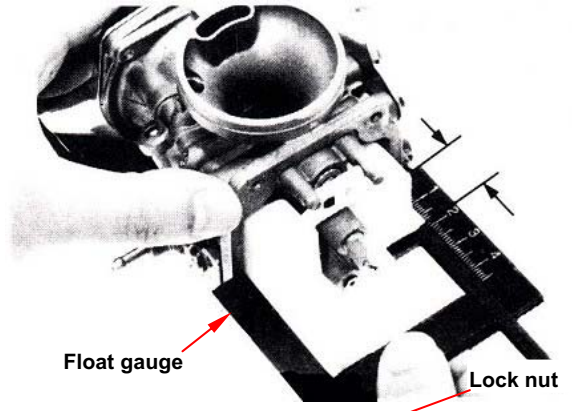
Assembly

Install main jet, needle jet holder, needle jet, slow jet and air adjustment screw.

⚠ Caution

Set the air adjustment screw in according to number of turns noted before it was removed.

Install the float valve, float, and float pin.

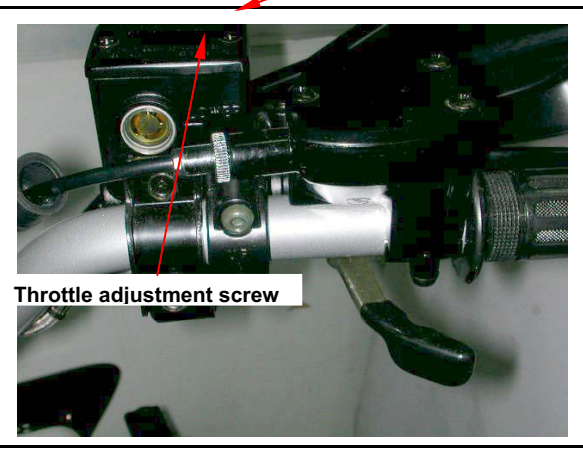


Checking fuel level

⚠ Caution

- Check again to ensure float valve, float for proper installation.
- To ensure correct measurement, position the float meter in such a way so that float chamber face is vertical to the main jet.

Fuel level: 14.8mm



Installation of carburetor

Install carburetor in the reverse order of removal.
Following adjustments must be made after installation.
- Throttle cable adjustment.
- Idle adjustment

5-8 Adjustment Of Idle Speed

⚠ Caution

- Inspection & adjustment for idle speed have to be performed after all parts in engine that needed adjustment have been adjusted.
- Idle speed check and adjustment have to be done after engine is being warm up. (It is enough that operates engine from stop to running for 10 minutes.)

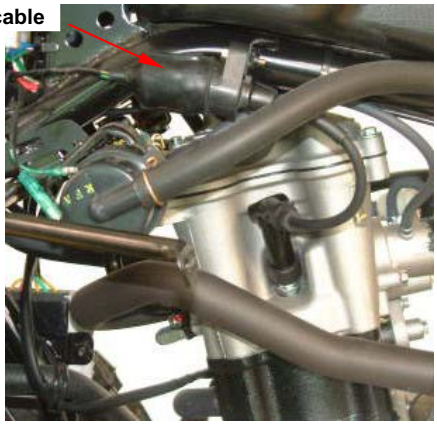
Park the ATV warm up engine.
Connect tachometer (the wire clamp of tachometer is connected to the high tension cable).
Turn the throttle valve stopper screw to specified idle speed.
Specified idle speed: 1700 ± 100 rpm

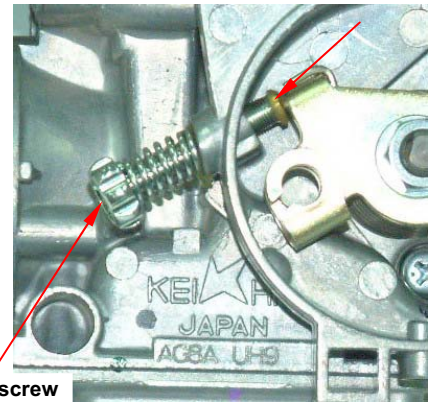
Emission adjustment in idle speed

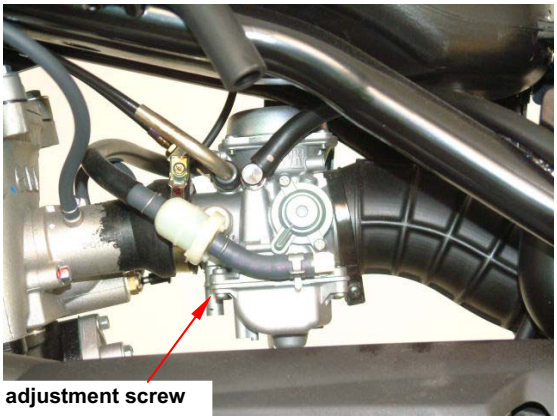
Warm up the engine for around 10 minutes and then conduct this adjustment.

1. Connect the tachometer onto engine.
2. Adjust the throttle valve stopper screw and let engine runs in 1600±100 rpm.
3. Insert the exhaust sampling pipe of exhaust analyzer into the front section of exhaust pipe. Adjust the air adjustment screw so that emission value in idle speed is within standard.
4. Slightly accelerate the throttle valve and release it immediately. Repeat this for 2~3 times.
5. Read engine RPM and value on the exhaust analyzer. Repeat step 2 to step 4 procedures until measured value within standard.

Emission standard **CO: below 0,8~1.5%**
HC: below 900ppm



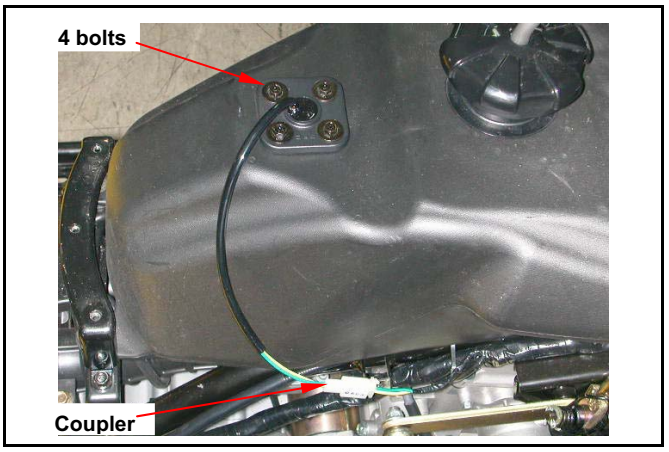




5-9 Fuel Tank

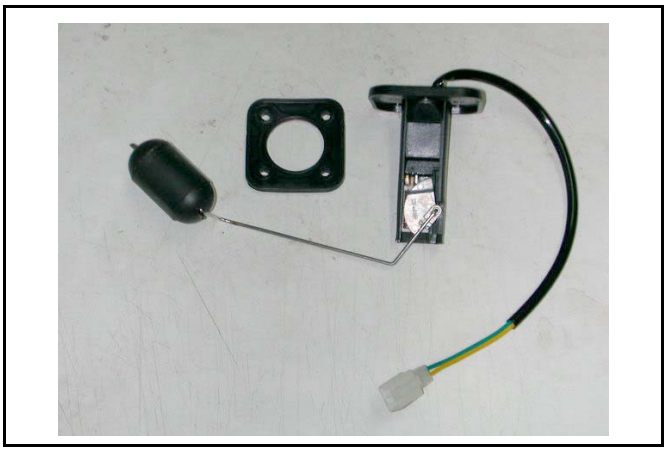
Fuel unit removal

Open the seat.
Remove the front cover and fuel tank.
Remove the side covers and lower side covers.
Remove the front fender.
(Covers remove please refer chapter 13)
Disconnect fuel unit coupler.
Remove fuel unit (4 bolts).



⚠ Caution

- Do not bend the float arm of fuel unit
- Do not fill out too much fuel to fuel tank.



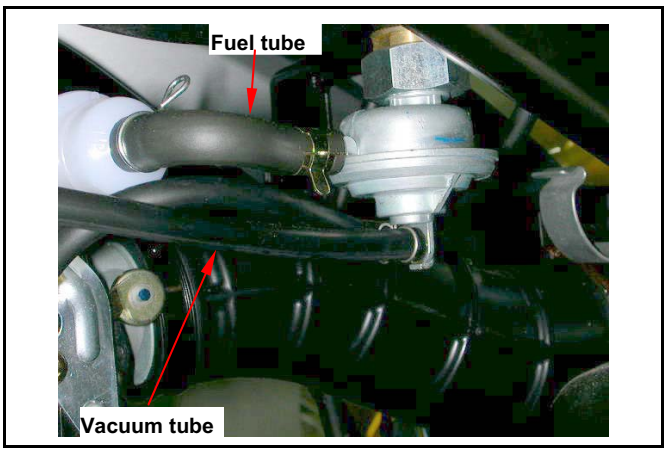
Fuel unit inspection (Refer to electrical equipment chapter 17).

Fuel unit installation

Install the gauge in the reverse order of removal.

⚠ Caution

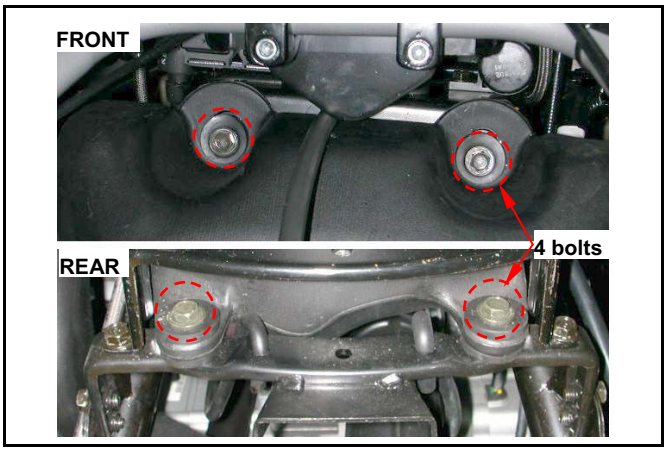
Do not forget to install the gasket of fuel unit or damage it.



Fuel tank removal

Open the seat.
Remove the front cover and fuel tank.
Remove the side covers and lower side covers.
Remove the front fender.
(Covers remove please refer chapter 13)
Disconnect fuel unit coupler.
Remove fuel unit (4 bolts).
Remove the fuel tube.
Remove the vacuum tube.

Remove fuel tank front and rear side 4 bolts, and then remove fuel tank.



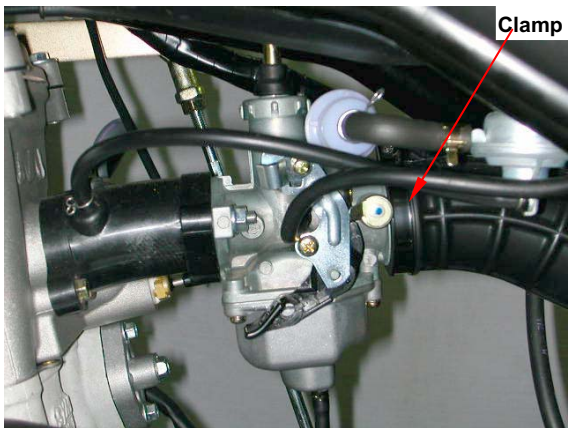
Installation

Install the tank in the reverse order of removal.

5-10 Air Cleaner

Removal

Loosen the clamp strip of air cleaner and carburetor, and then remove the vapor hose.



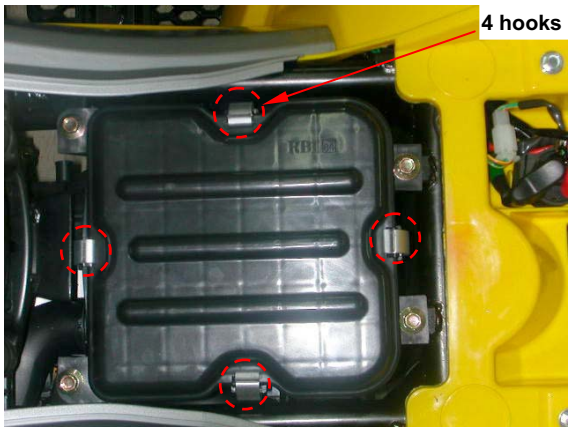
Loosen the clamp strip of air cleaner, and then remove the air cleaner vapor hose.
Remove the air cleaner (4 bolts).

Installation

Install the tank in the reverse order of removal.

Cleaning air cleaner element

Remove the air cleaner cover (4 catch hooks).

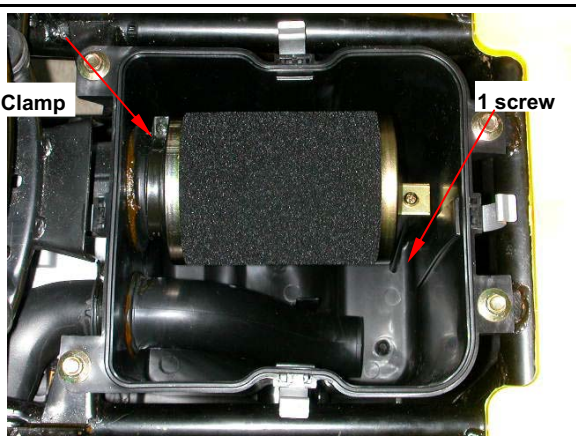


Remove element mounting screw.
Loosen the clamp strip of air cleaner element, and then remove the air cleaner element.
Clean the element with non-flammable or high-flash point solvent and then squeeze it for dry.

⚠ Caution

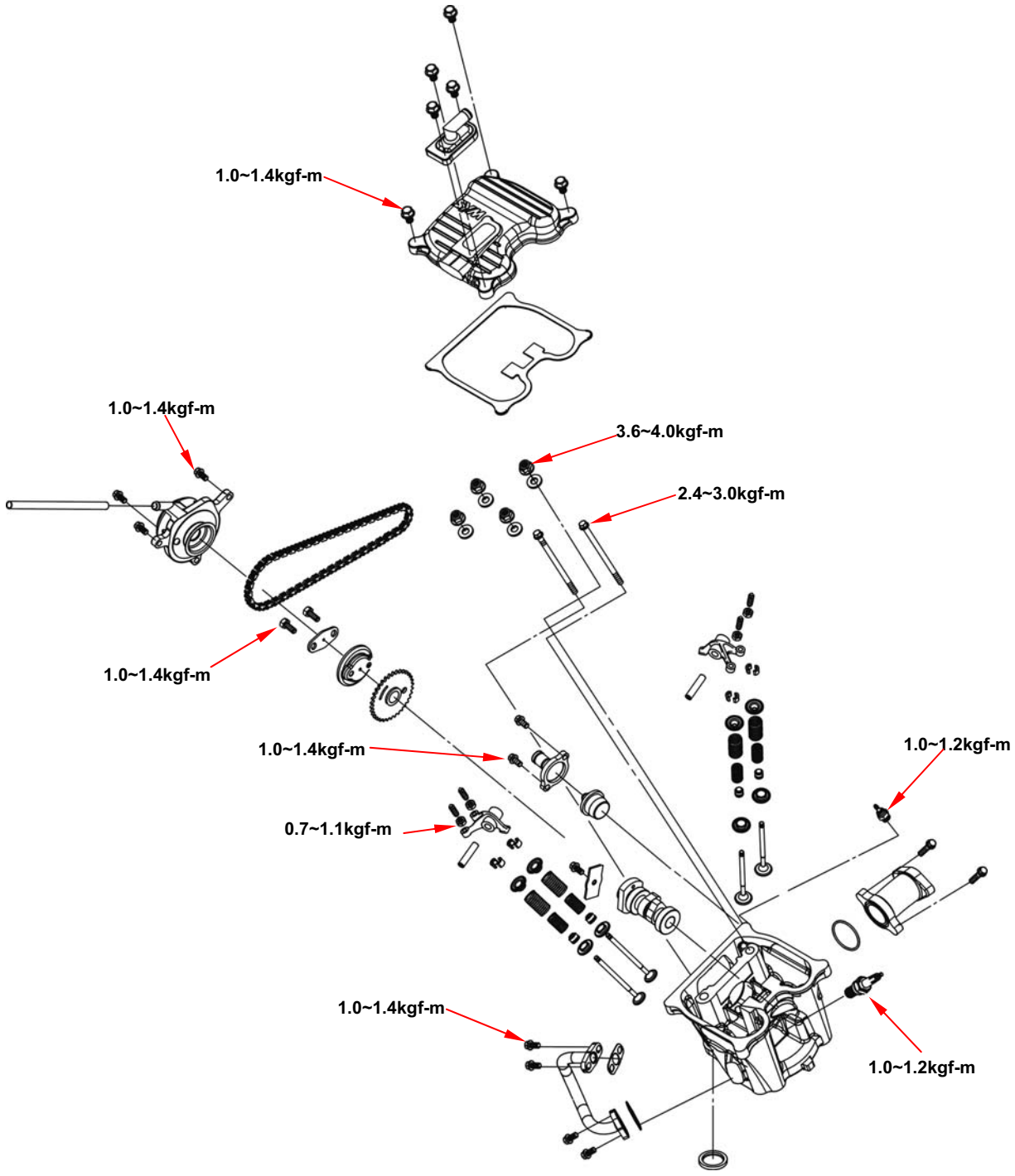
Never use gasoline or acid organized solvent to clean the element.

Soap the element into cleaning engine oil and then squeeze it out. Install the element onto the element seat and then install the air cleaner cover.



6. CYLINDER HEAD/VALVE

6-1 Mechanism Diagram



6-2 Precautions In Operation

General Information

- This chapter is contained maintenance and service for cylinder head, valve, and camshaft as well as rocker arm.
- Cylinder head service can be carried out when engine is in frame.

Specification of CYLINDER HEAD

Item			Standard	Limit
Compression pressure			12±2 kg/cm2	---
Camshaft	Height of cam lobe	Intake	5.90	5.85
		Exhaust	5.70	5.65
Rocker arm	ID of valve rocker arm		11.982~12.000	12.080
	OD of valve rocker arm shaft		11.966~11.984	11.936
Valve	OD of valve stem	Intake	4.975~4.990	4.900
		Exhaust	4.950~4.975	4.900
	ID of valve guide		5.000~5.012	5.030
	Clearance between valve stem and guide	Intake	0.010~0.037	0.080
		Exhaust	0.025~0.062	0.100
	Free length of valve spring	Intake	38.700	35.200
		Exhaust	40.400	36.900
	Valve seat width		3.400	4.000
	Valve clearance	Intake	0.10±0.02mm	-
		Exhaust	0.15±0.02mm	-
Tilt angle of cylinder head			---	0.050

Torque Value

Cylinder head cover bolt	1.0~1.4kgf-m
Exhaust pipe stud bolt	2.4~3.0kgf-m
Cylinder head bolt	1.0~1.4kgf-m
Cylinder head Nut	3.6~4.0kgf-m
Sealing bolt of cam chain auto-tensioner	0.8~1.2kgf-m
Bolt of cam chain auto-tensioner	1.2~1.6kgf-m
Cylinder side cover bolt	1.0~1.4kgf-m
Cam sprocket bolt	1.0~1.4kgf-m
Tappet adjustment screw nut	0.7~1.1kgf-m
Spark plug	1.0~1.2kgf-m

Tools

Special service tools

Valve reamer: 5.0mm
Valve guide driver: 5.0mm
Valve spring compressor

6-3 Troubleshooting

Engine performance will be affected by troubles on engine top parts. The trouble usually can be determined or by performing cylinder compression test and judging the abnormal noise generated.

Low compression pressure

1. Valve

- Improper valve adjustment
- Burnt or bent valve
- Improper valve timing
- Valve spring damage
- Valve carbon deposit.

2. Cylinder head

- Cylinder head gasket leaking or damage
- Tilt or crack cylinder

3. Piston

- Piston ring worn out.

High compression pressure

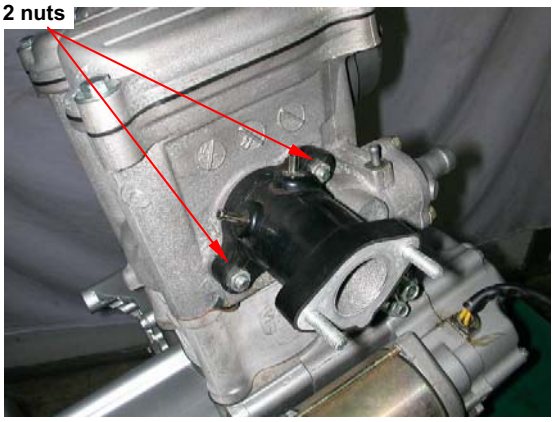
- Too much carbon deposit on combustion chamber or piston head

Noise

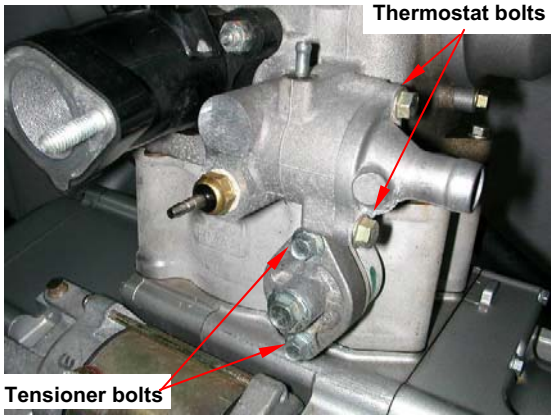
- Improper valve clearance adjustment
- Burnt valve or damaged valve spring
- Camshaft wear out or damage
- Chain wear out or looseness
- Auto-tensioner wear out or damage
- Camshaft sprocket
- Rocker arm or rocker arm shaft wear out

6-4 Cylinder Head Removal

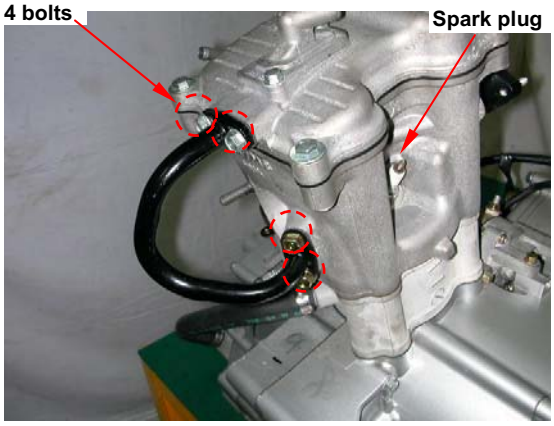
Remove engine. (Refer to chapter 5)
Remove the inlet pipe (2 nuts).



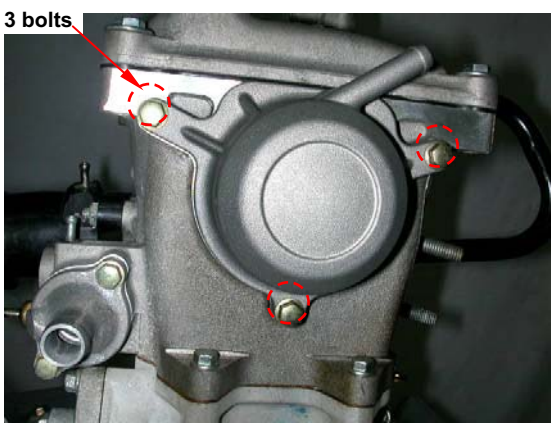
Remove 1 bolt of thermostat and then remove the thermostat.
Remove hole bolt and spring for the cam chain tensioner.
Loosen 2 bolts, and then remove tensioner.
Remove thermostat (2 bolts).



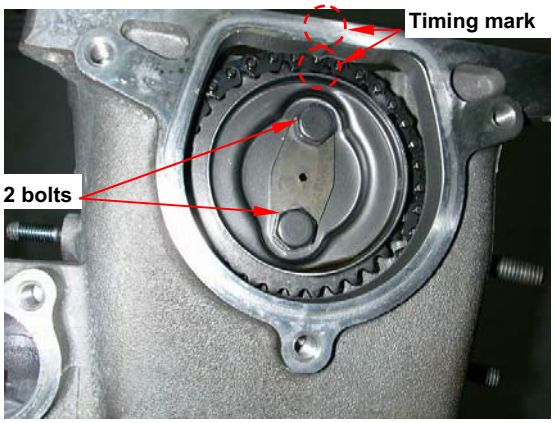
Remove Air Injection system (AI) pipe mounting bolts.
Remove spark plug.



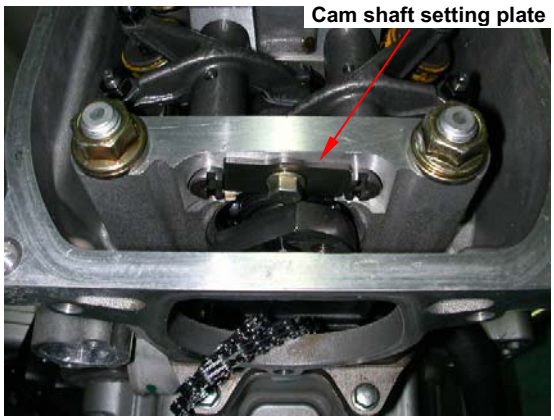
Remove the side cover mounting blots of cylinder head, and then take out the side cover.



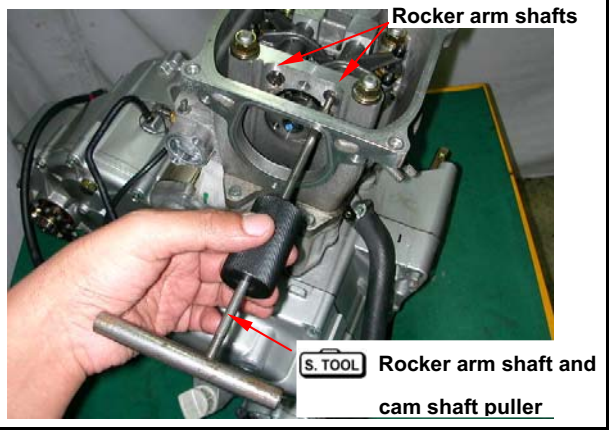
Remove left crankcase cover, and turn the
Turn the drive face, and align the timing mark on the sprocket with that of cylinder head, piston is at TDC position.
Remove cam sprocket bolts and then remove the sprocket by prying chain out.



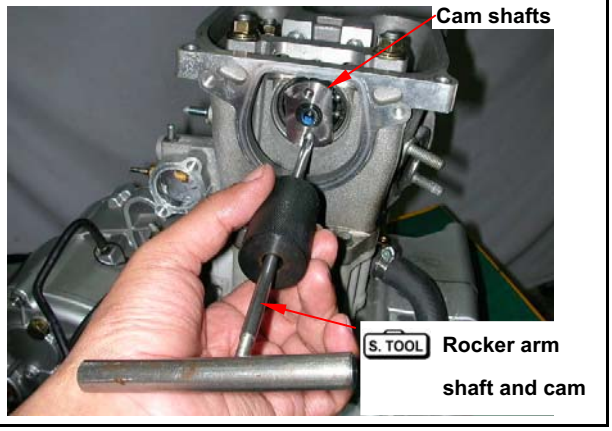
Remove cam shaft setting plate (1 bolt).



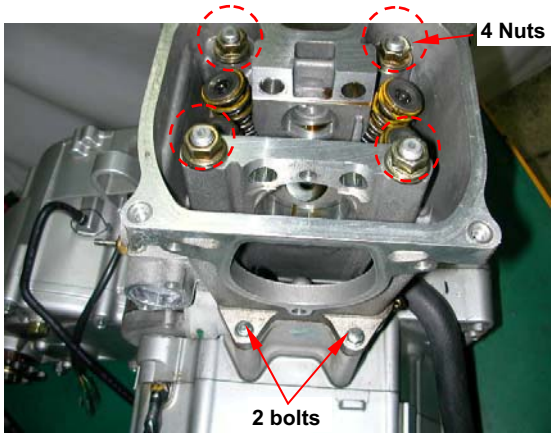
Remove rocker arm shafts and rocker arms.
Special Service Tool:
Rocker arm and cam shaft puller



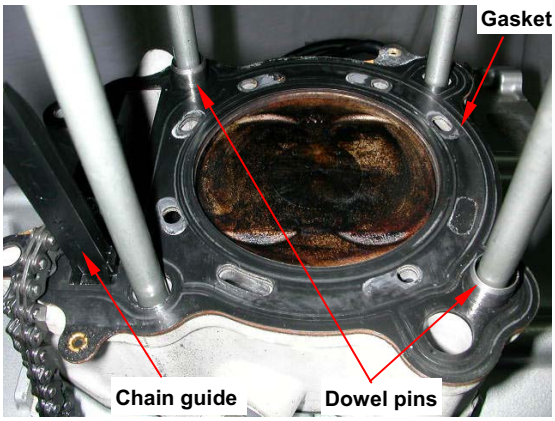
Remove cam shafts.
Special Service Tool:
Rocker arm and cam shaft puller



Remove the 2 cylinder head mounting bolts from cylinder head right side, and then remove 4 nuts and washers from cylinder head upper side.
Remove the cylinder head.



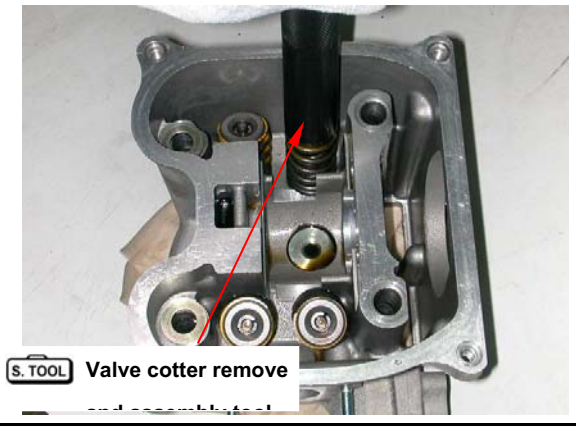
Remove cylinder head gasket and 2 dowel pins.
Remove chain guide.
Clean up residues from the matching surfaces of cylinder and cylinder head.



⚠ Caution

- Do not damage the matching surfaces of cylinder and cylinder head.
- Avoid residues of gasket or foreign materials falling into crankcase as cleaning.

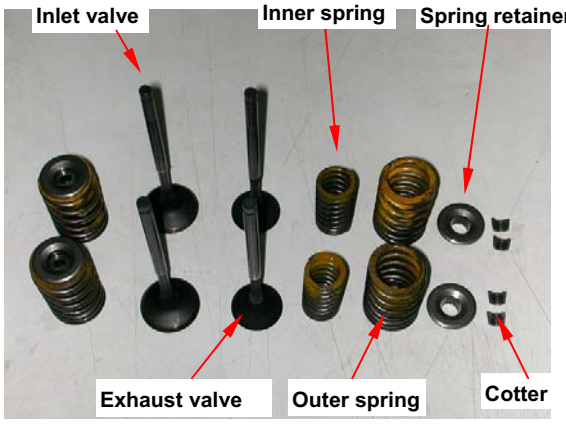
Use a valve cotter remove & assembly tool to press the valve spring, and then remove valves.



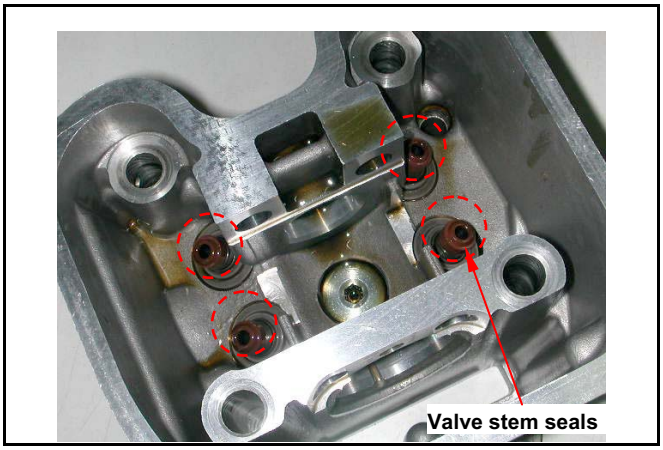
⚠ Caution

- In order to avoid loosing spring elasticity, do not press the spring too much. Thus, press length is based on the valve cotter in which can be removed.

Special Service Tool:
Valve cotter remove & assembly tool



Remove valve stem seals.

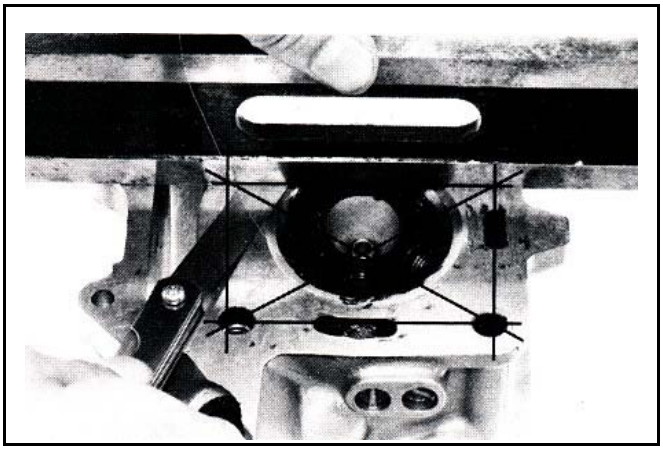


Clean carbon deposits in combustion chamber.
Clean residues and foreign materials on cylinder head matching surface.

⚠ Caution

Do not damage the matching surface of cylinder head.

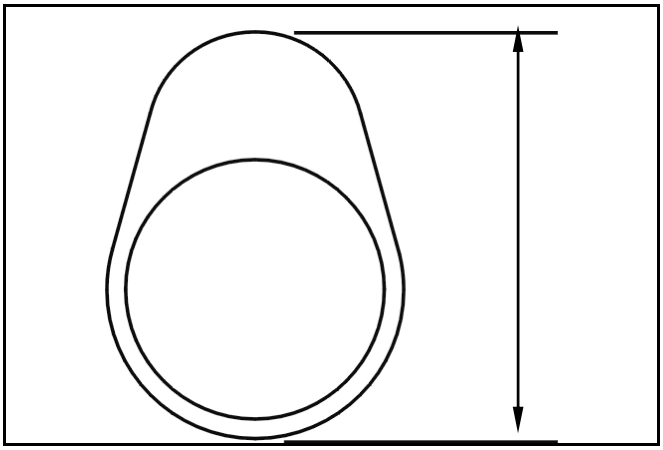
6-5 Cylinder Head Inspection



Check if spark plug and valve holes are cracked.
Measure cylinder head warp with a straightedge and thickness gauge.
Service limit: 0.5 mm

Camshaft

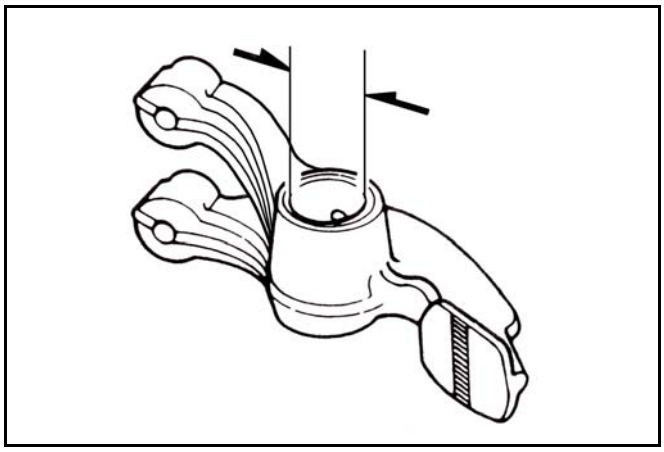
Inspect cam lobe height for damaged.
Service Limit:
IN: Replacement when less than 34.45mm
EX: Replacement when less than 34.30mm
Inspect the camshaft bearing for looseness or wear out. If any damage, replace whole set of camshaft and bearing.



Rocker Arm

Measure the cam rocker arm I.D., and wear or damage, oil hole clogged?

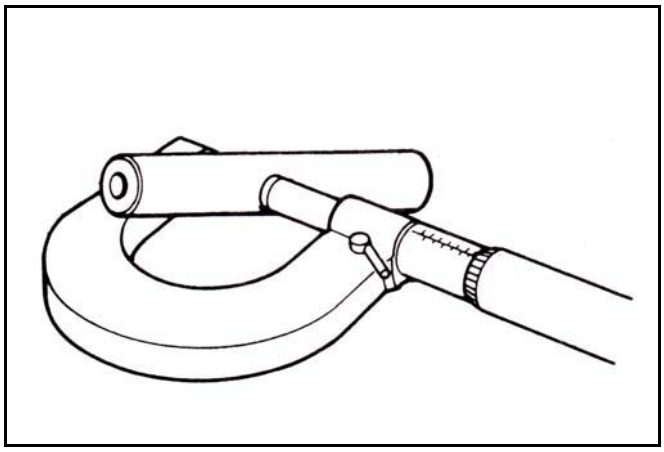
Service Limit: Replace when it is less than 12.10 mm.



Rocker Arm Shaft

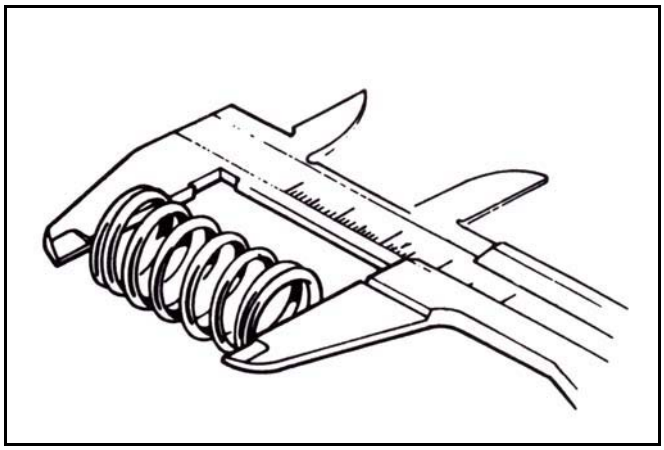
Measure the active O.D. of the cam rocker arm shaft and cam rocker arm.

Service Limit: Replace when it is less than 11.91 mm.



Calculate the clearance between the rocker arm shaft and the rocker arm.

Service Limit: Replace when it is less than 0.10 mm.



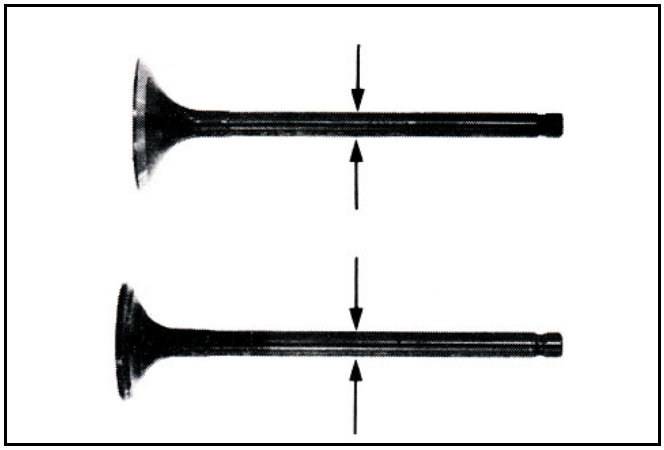
Valve spring free length

Measure the free length of intake and exhaust valve springs.

Service limit:

Inner spring 35.00 mm

Outer spring 39.00 mm



Valve stem

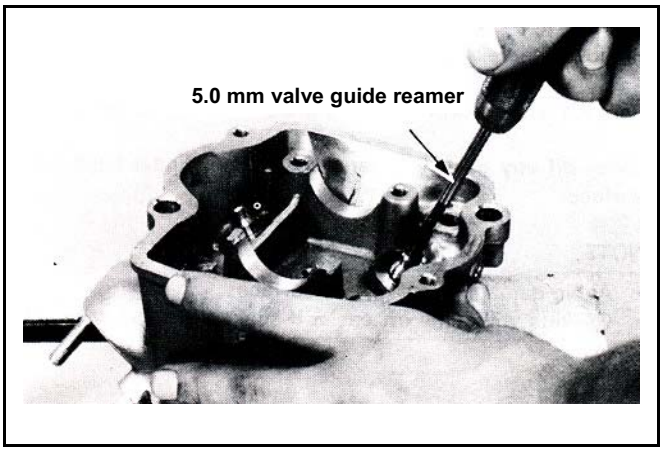
Check if valve stems are bend, crack or burn.

Check the operation condition of valve stem in valve guide, and measure & record the valve stem outer diameter.

Service Limit: IN: 4.90 mm

EX: 4.90 mm

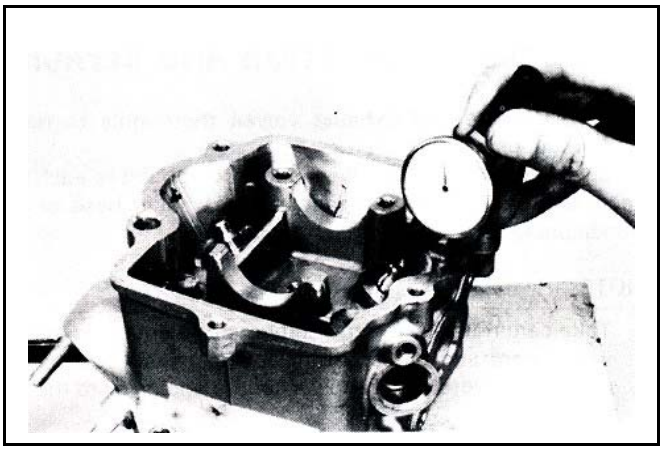
Valve guide



⚠ Caution

Before measuring the valve guide, clean carbon deposits with reamer.

Tool: 5.0 mm valve guide reamer



Measure and record each valve guide inner diameters.

Service limit: 5.03 mm

The difference that the inner diameter of valve guide deducts the outer diameter of valve stem is the clearance between the valve stem and valve guide.

Service Limit: IN→0.08 mm

EX→0.10 mm

⚠ Caution

If clearance between valve stem and valve guide exceeded service limit, check whether the new clearance that only replaces new valve guide is within service limit or not. If so, replace valve guide.

Correct it with reamer after replacement.

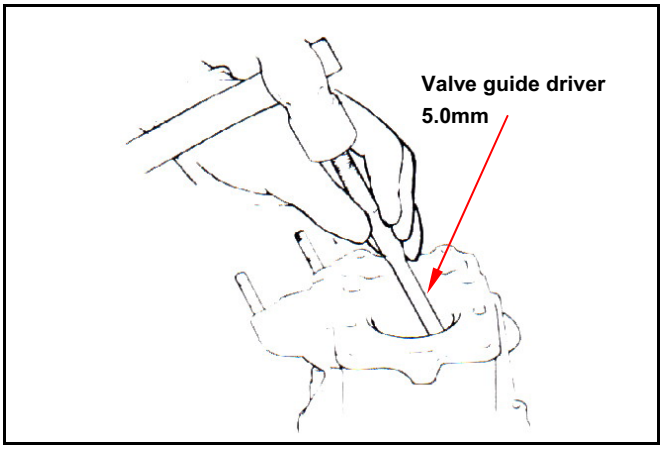
If clearance still exceeds service limit after replaced valve guide, replace valve stem too.

⚠ Caution

It has to correct valve seat when replacing valve guide.

6-6 Valve Stem Replacement

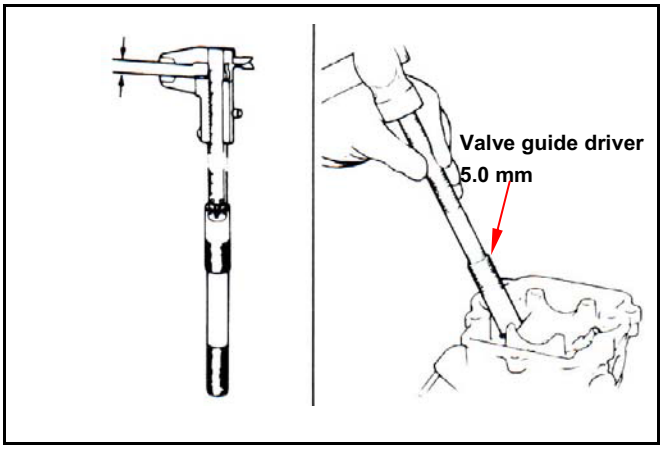
Heat up cylinder head to 100~150 ℃ with heated plate or toaster.



⚠ Caution

- Do not let torch heat cylinder head directly. Otherwise, the cylinder head may be deformed as heating it.
- Wear on a pair of glove to protect your hands when operating.

Hold the cylinder head, and then press out old valve guide from combustion chamber side.



Tool: Valve guide driver: 5.0 mm

⚠ Caution

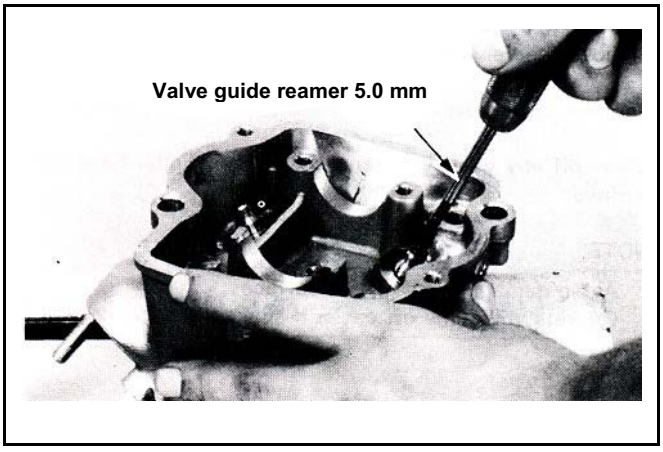
- Check if new valve guide is deformation after pressed it in.
- When pressing in the new valve guide, cylinder head still have to be kept in 100~150℃.

Adjust the valve guide driver and let valve guide height is in 13 mm.

Press in new valve guide from rocker arm side.

Tool: Valve guide driver: 5.0 mm

Wait for the cylinder head cooling down to room temperature, and then correct the new valve guide with reamer.



⚠ Caution

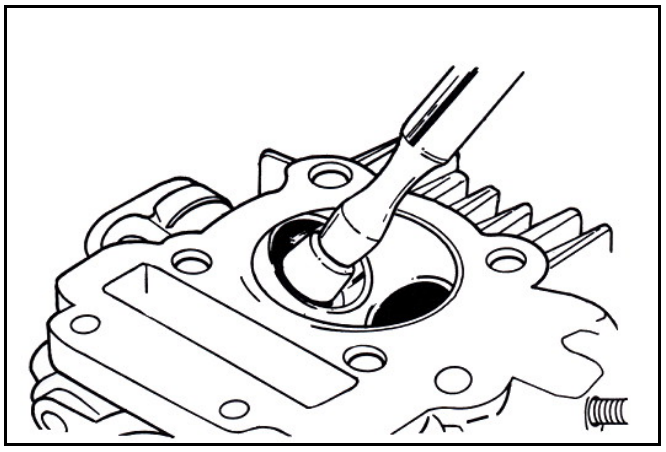
- Using cutting oil when correcting valve guide with a reamer.
- Turn the reamer in same direction when it be inserted or rotated.

Correct valve seat, and clean up all metal residues from cylinder head.

Tool: Valve guide reamer: 5.0 mm

6-7 Valve Seat Inspection And Service

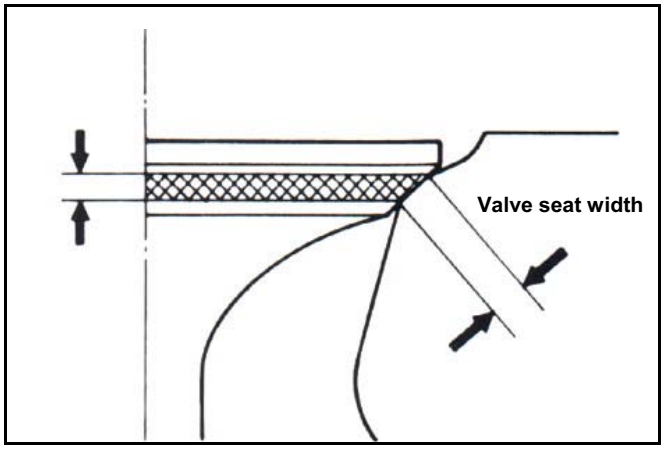
Clean up all carbon deposits onto intake and exhaust valves.
Apply with emery slightly onto valve contact face.
Grind valve seat with a rubber hose or other manual grinding tool.



⚠ Caution

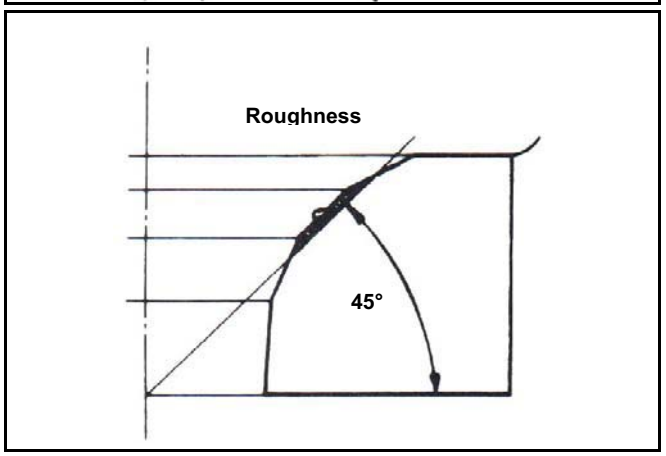
- Do not let emery enter into between valve stem and valve guide.
- Clean up the emery after corrected, and apply with engine oil onto contact faces of valve and valve seat.

Remove the valve and check its contact face.



⚠ Caution

Replace the valve with new one if valve seal is roughness, wear out, or incomplete contacted with valve seat.



Valve seat inspection

If the valve seat is too width, narrow or rough, corrects it.

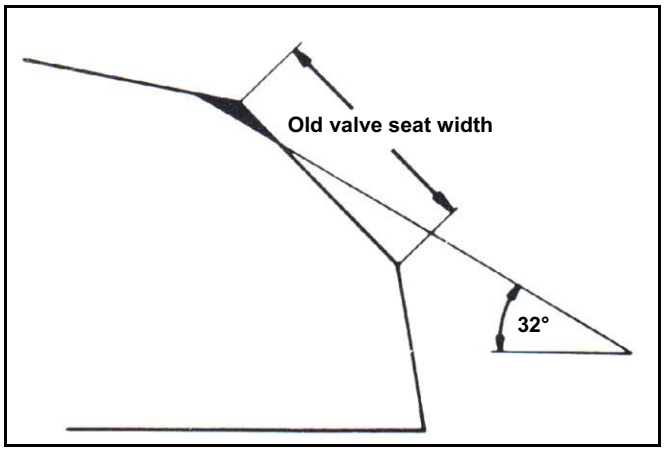
Valve seat width

Service limit: 1.6mm

Check the contact condition of valve seat.

Valve seat grinding

The worn valve seat has to be ground with valve seat chamfer cutter.
Refer to operation manual of the valve seat chamfer cutter.
Use 45° valve seat chamfer cutter to cut any rough or uneven surface from valve seat.



⚠ Caution

After valve guide had been replaced, it has to be ground with 45° valve seal chamfer cutter to correct its seat face.

Use 32° cutter to cut a quarter upper parts out.