SERVICE MANUAL

ATV-300S/U(Ⅰ)



OCTOBER, 2006 High Power Engine HER

CHEE INDUSTRIAL CO., LTD.

Foreword

This service manual contains information on servicing ATV-300

This manual is written for use as a guideline only. It is recommended that any mechanic, with or without sufficient experience, thoroughly read through the manual and only attempt to service those areas that are fully understood in accordance with the guidelines provided by this manual. For fully qualified mechanics, this manual supplies service data necessary for repairs and maintenance. It is highly recommended that a qualified mechanic, regardless of technical level, should study the service manual in full before attempting service on ATV-300

All the data and diagrams provided in this service manual are valid at the time of publication. Information may be updated without notice due to improvements or upgrades.

No quotation, reproduction, or reprint of the service manual, as a whole or in part, will be permitted without the express written consent from **ADLY** Motor sports.

I N D E X

Assembly Instruction / Pre-Delivery Information ----------0

Information for Preparation----------1

Check and Adjust----------2

Cover parts / Muffler----------3

Engine-

Lubrication System----------4

Fuel System----------5

Engine remove and installation----------6

Cylinder Head / Valve----------7

Cylinder / Piston----------8

Clutch / Starting System----------9

Crank case / Crank shaft----------10

Chassis-

Front wheel / Brake / Suspension / Steering----------11

Rear wheel / Brake / Suspension ----------12

Electrical devices----------13

Wiring diagram----------14

MAINTENANCE SPECIAL TOOLS



Install crankshaft tool
(TLH3-01)



Bearing puller set
(TLH3-04)



Fly wheel puller
(TLH3-02)



Valve install / remove tool
(TLH3-03)



Valve adjustment tool
(TLH3-05)

ASSEMBLY INSTRUCTION

1. Take out the battery and fill with acid liquid.
   Pre-charge the battery will extend its life.
   The preparation and charge procedure is based on the battery's instruction.

2. Install the front and rear wheels and parts in the following order:
   A. 18×40×4.5mm washer
   B. 18mm hex-bolt (torque 14 kg-m, 135 N-m)
   C. Cotter pin (open up the end after installed)
   D. Rubber cap.

3. Install the front bumper.

4. Set the handle bar into the lock-pin of the steering base.
   Tie-up the 4 hex-socket bolts.
   Install the front cover into the handlebar.

5. Install battery with the red wire to positive (+) first and the black wire to the negative (-).
   Use rubber strip to fix the battery onto frame.

6. Check the oil gage to see if the oil quantity is on the upper position.
   The oil type is 10W/40 for normal condition.
   It would be better for the engine to choose synthetic type.
   Fill up unleaded gasoline to operate.
   Be sure the arrow mark on the fuel valve arm（petcock）is set into the correct position.(ON).

7. Turn on the main switch and try to start-up the engine.
   In order to use the electric starter, you need to check the following:
   A. Check the neutral indication light should be on.
   B Press the electric starter bottom to start.

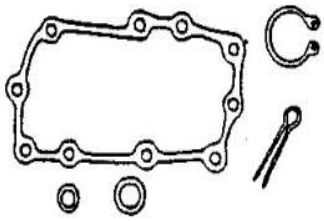
P.D.I. (Pre-Delivery Inspection)

- ☐ 1. Record the frame and engine number into the owner's manual.
- ☐ 2. Check that all tires have correct pressure specified on the tire or in the owner's manual.
- ☐ 3. Engine oil is enough.
- ☐ 4. Battery is installed properly.
- ☐ 5. All cables are adjusted properly. (brake, throttle, choke)
- ☐ 6. Fuel tank has enough gasoline to operate.
- ☐ 7. Check the suspension and drive chain for proper setup.
- ☐ 8. Check all electrical components and lights are working properly.
- ☐ 9. Make sure that the owner's manual and tool bag are installed on left side of the seat in the tool box.

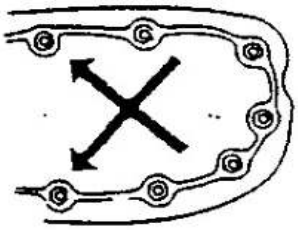
INFORMATION FOR PREPARATION

Attention on Operation

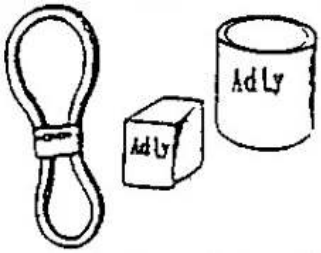
- All washers, oil rings, clamp rings, opening pins shall be duly replaced by a new item when dismounted.



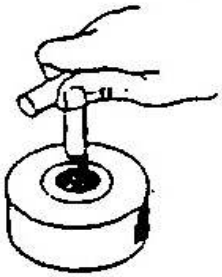
- Locking of all screws, nuts, cross screws shall be performed in the order of first the large screws and then the small ones and from inside to outside in opposite angles by tightening the torque locks.



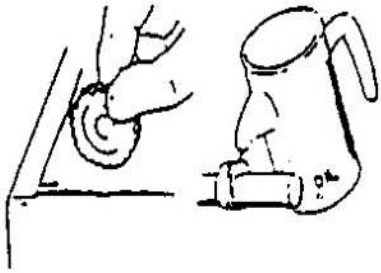
- All items must use original parts, pure oil and greases.



- All service shall use special tools and general tools to repair.



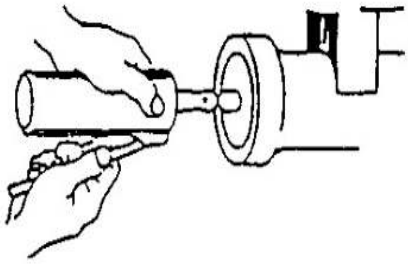
- All dismounted items requiring for checks shall be duly cleaned and for assembly, all items shall be duly lubricated.



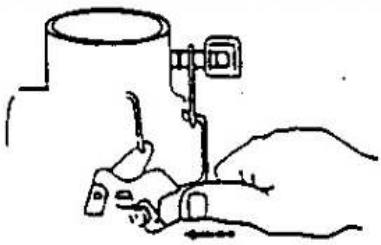
INFORMATION FOR PREPARATION

Attention on Operation

- Certified lubricants in cans shall be used on all the elements to be lubricated.



- After assembly, performance of all elements shall be duly checked and the locking shall be duly verified.



- In case of an operation is performed by over 2 people, the assignment shall be conducted in coordination and safety shall be the first priority.

- Definition of signs:

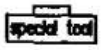
The sign given in the Service Manual shall refer to the operation methods and observation.



OIL: Lubrication by designated lubricant.



GREASE: Lubrication by grease



Special Tool: Parts on which special tools shall be used



General Tool: General tools shall be used



New: Replace by new items after dismounting



Attention



Dangerous and important operations

INFORMATION FOR PREPARATION

SPECIFICATION (UTILITY)

TYPE	ATV-300U (92/61)
LENGTH	1800 mm
WIDTH	1030 mm
HEIGHT	930 mm
SEAT HEIGHT	800 mm
WHEEL BASE	1150 mm
NET WEIGHT	200 kg
ENGINE TYPE	4-STROKE, Single Cylinder
COOLING	AIR COOLED
DISPLACEMENT	282 c.c.
BORE×STROKE	Ø 74 × 65.5 mm
TRANSMISSION	Manuel , 5 speed First gear 0.095 Second gear 0.139 Third gear 0.190 Forth gear 0.242 Fifth gear 0.299 Reverse gear 0.065
CLUTCH TYPE	Wet, Multi-disc
ENGINE OIL (CHANGE)	10W/40 (Standard), 2.0 Lit
ENGINE IDLE SPEED	1400±100 rpm
VALVE CLEARANCE	0.08～0.12 mm
STARTING	Electric starter and pull start
SPARK PLUG	NGK DR8EA
SPARK PLUS GAP	0.6~0.7 mm
IGNITION	C.D.I
SUSPENSION	Front：Double A-Arm with preload adjustable shock Rear：Swing arm with preload adjustable shock
BRAKE	Front : Double Disc , Rear: Disc
BATTERY	8 Amps/h, Maintenances Free
FINAL DRIVE	Chain
FRONT TIRE	21×7-10 (Optional 22x8-10)
REAR TIRE	21×10-8 (Optional 22x11-10)
FRONT BUMPER (LOAD))	30kg
REAR BUMPER (LOAD))	45kg

INFORMATION FOR PREPARATION

SPECIFICATION (SPORTY)

TYPE	ATV-300S (92/61)
LENGTH	1740 mm
WIDTH	1050 mm
HEIGHT	1080 mm
SEAT HEIGHT	820 mm
WHEEL BASE	1150 mm
NET WEIGHT	190 kg
ENGINE TYPE	4-STROKE, Single Cylinder
COOLING	AIR COOLED
DISPLACEMENT	282 c.c.
BORE×STROKE	Ø 74 × 65.5 mm
TRANSMISSION	Manuel , 5 speed First gear 0.095 Second gear 0.139 Third gear 0.190 Forth gear 0.242 Fifth gear 0.299 Reverse gear 0.065
CLUTCH TYPE	Wet, Multi-disc
ENGINE OIL (CHANGE)	10W/40 (Standard), 1.6 Lit
ENGINE IDLE SPEED	1400±100 rpm
VALVE CLEARANCE	0.08～0.12 mm
STARTING	Electric starter and pull start
SPARK PLUG	NGK DR8EA
SPARK PLUS GAP	0.6~0.7 mm
IGNITION	C.D.I
SUSPENSION	Front：Double A-Arm with preload adjustable shock Rear：Swing arm with preload adjustable shock
BRAKE	Front : Double Disc , Rear: Disc
BATTERY	8 Amps/h,, Maintenances Free
FINAL DRIVE	Chain
FRONT TIRE	21×7-10 (Optional 22x8-10)
REAR TIRE	21×10-8 (Optional 22x11-10)

INFORMATION FOR PREPARATION

LOCKING TORQUE

The standard locking torque shall apply in case of no specification.

STANDARD TORQUE：

Type	Locking Torque (kg-m)	Type	Locking Torque (kg-m)
5mm Bolt, Nut	0.5	5 mm Screw	0.4
6mm Bolt, Nut	1.0	6 mm Screw	0.9
8mm Bolt, Nut	2.2	6 mm Flange Bolt, Nut	1.2
10mm Bolt, Nut	3.5	7 mm Flange Bolt, Nut	2.1
12mm Bolt, Nut	5.5	8 mm Flange Bolt, Nut	2.7
18mm Bolt, Nut	15.0	10 mm Flange Bolt, Nut	4.0
18mm Lock nut	11.0		

CHASSIS：

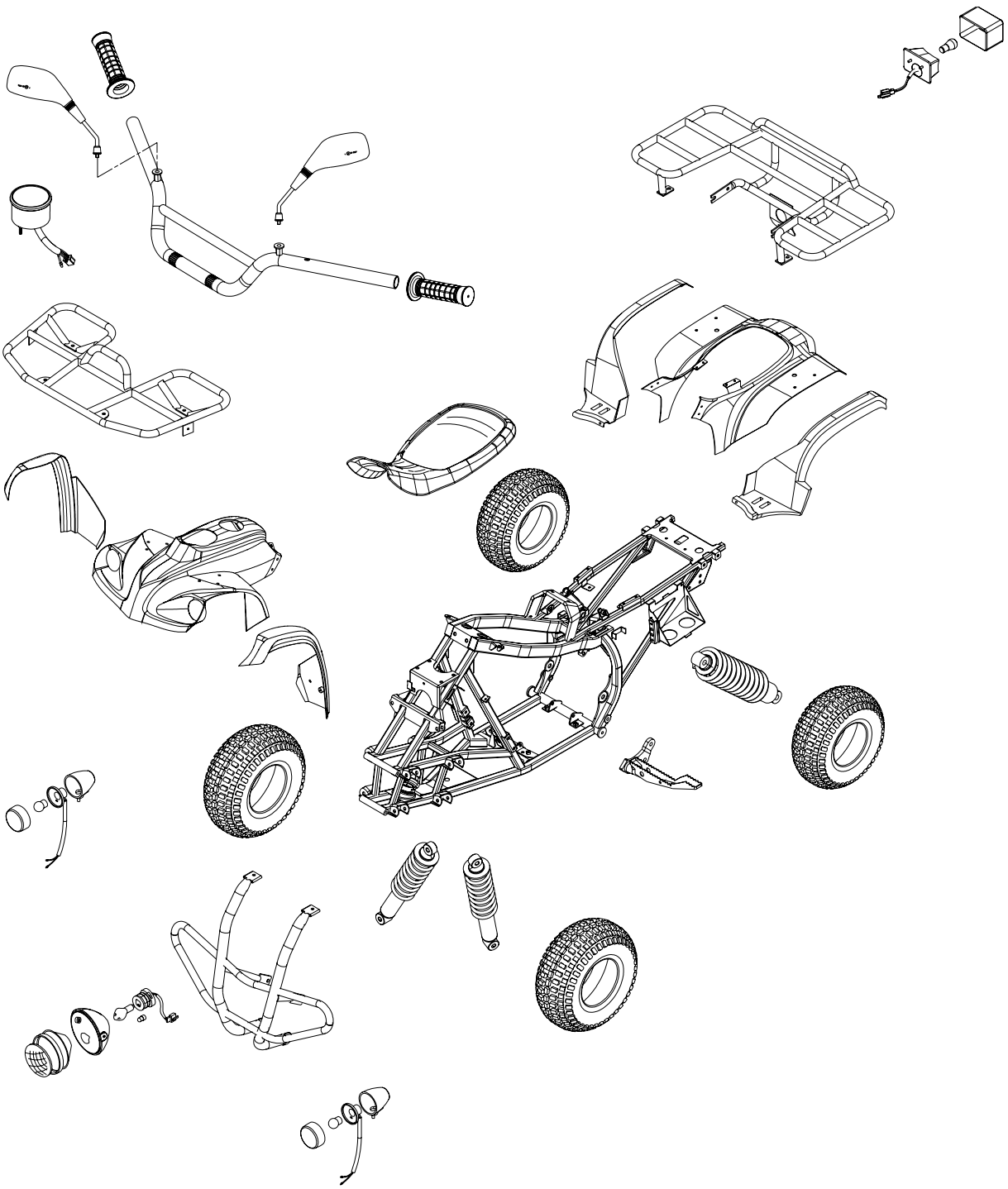
Locking Place	Quantity	Dia. (mm)	Torque (kg-m)	Remark
Handle bar bottom flange nut	2	10	4.0	Nylon insert type
Ball joint fixed nut	4	10	4.0	Nylon insert type
Engine mounting flange nut	4	8	3.5	
Engine mounting bracket bolt	2	10	4.0	
Foot rest flange bolt	6	8	4.0	
Rear swing arm fixed nut	1	14	9	Nylon insert type
Rear brake panel flange bolt	4	12	7	
Front suspension fixed nut	4	10	4.0	Nylon insert type
Rear suspension flange bolt	2	10	4.0	
Front rim nut	2	18	15	
Rear rim nut	2	18	15	

ENGINE：

Locking Place	Quantity	Dia. (mm)	Torque (kg-m)	Remark
Breather separator Allen bolt	1	6	1.2	Hex socket flange bolt
Cam chain tensioner mounting bolt	2	6	1.2	Hex flange bolt
Cam sprocket bolts	2	7	2.1	Hex flange bolt
Clutch center locknut	1	18	11.0	Locknut
Clutch lifter plate bolts	4	6	1.2	Hex bolt
Crankcase cover bolts (L/R)	24	6	1.0	
Crankcase bolts	14	6	1.2	Hex flange Bolt
Cylinder base bolts	2	6	1.0	
Cylinder head cover flange bolts	13	6	1.2	Hex flange Bolt
Cylinder head cap nuts	4	10	4.0	Hex acorn washer face nut
Oil pipe bolts	1	6	1.0	
	1	7	1.2	
Gearshift return spring pin	1	8	2.2	
Gearshift drum shifter pin	2	8	2.2	

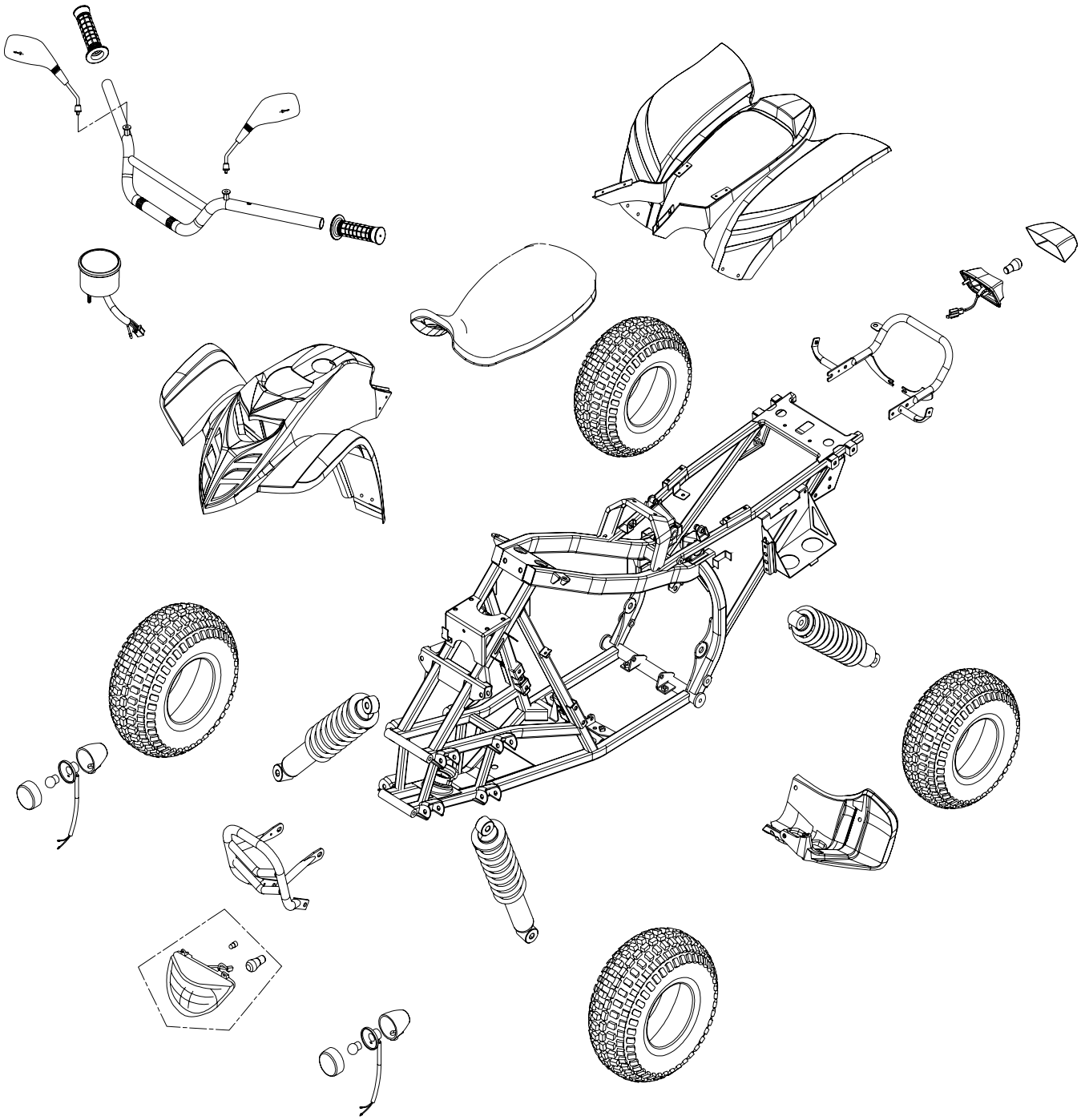
INFORMATION FOR PREPARATION

The following drawing that shows the disassembling situation of the cover parts for ATV-300U.

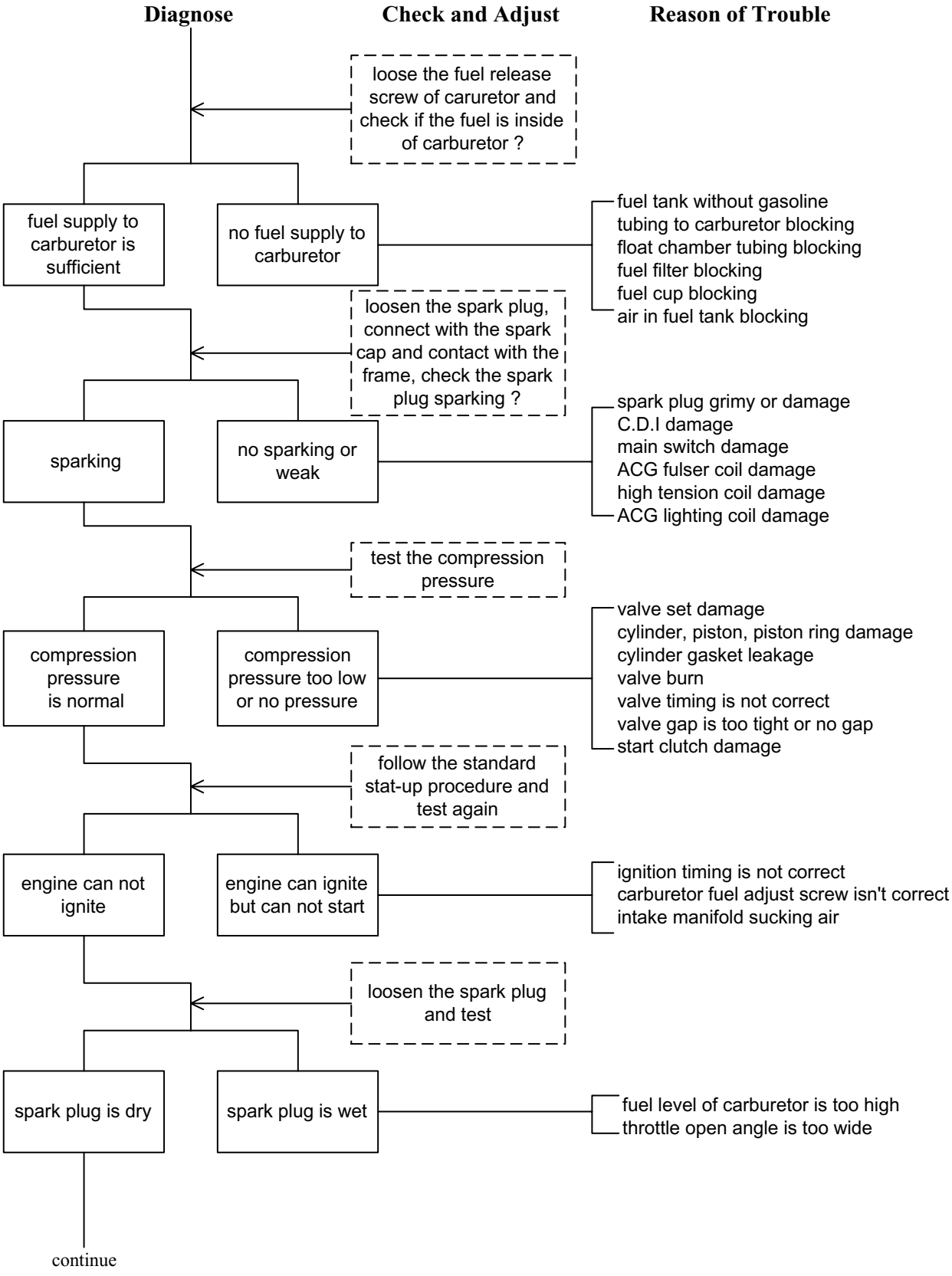


INFORMATION FOR PREPARATION

The following drawing that shows the disassembling situation of the cover parts for ATV-300S.

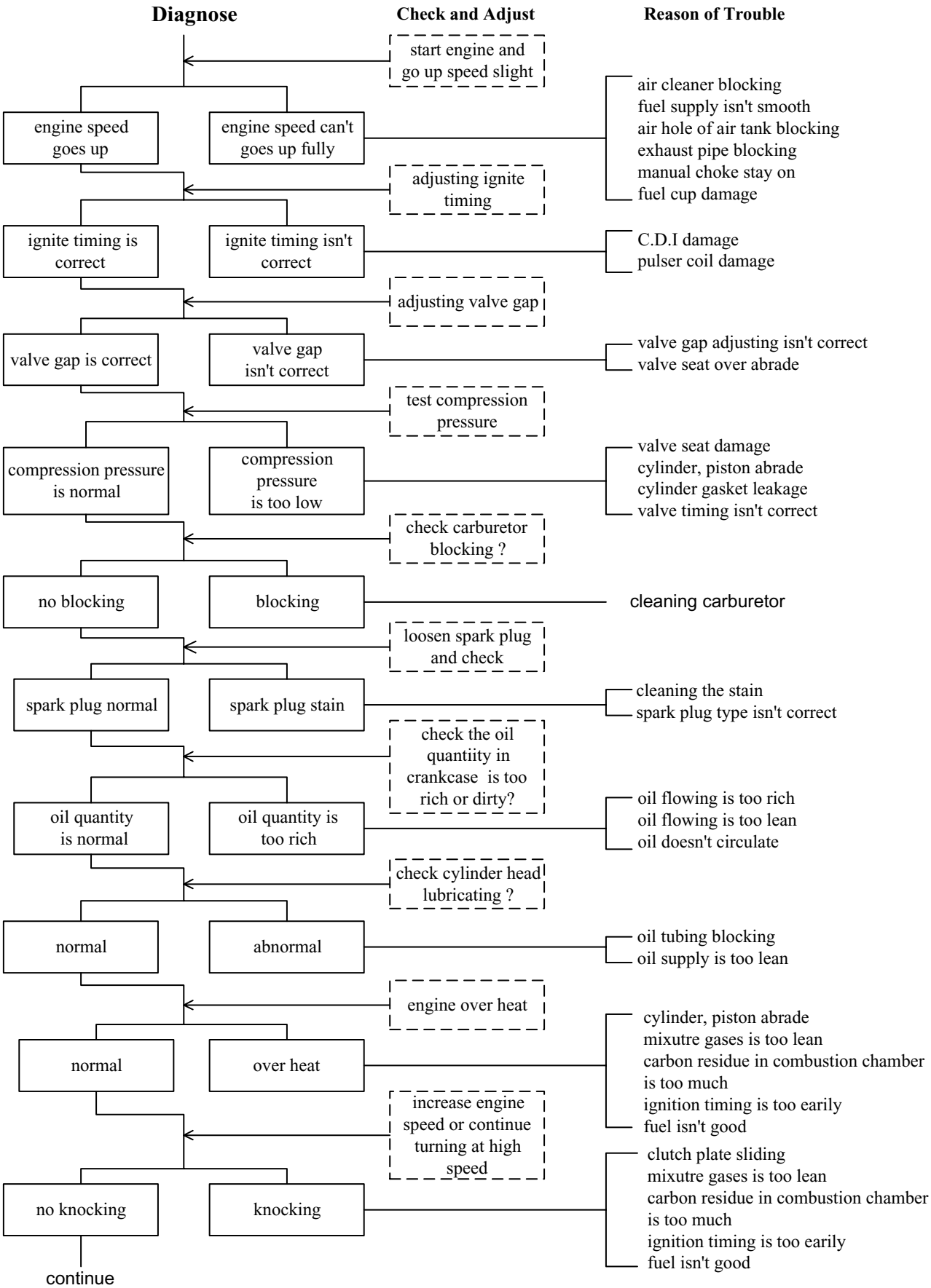


INFORMATION FOR PERPARATION
DIFFICULT START OR CANN'T START

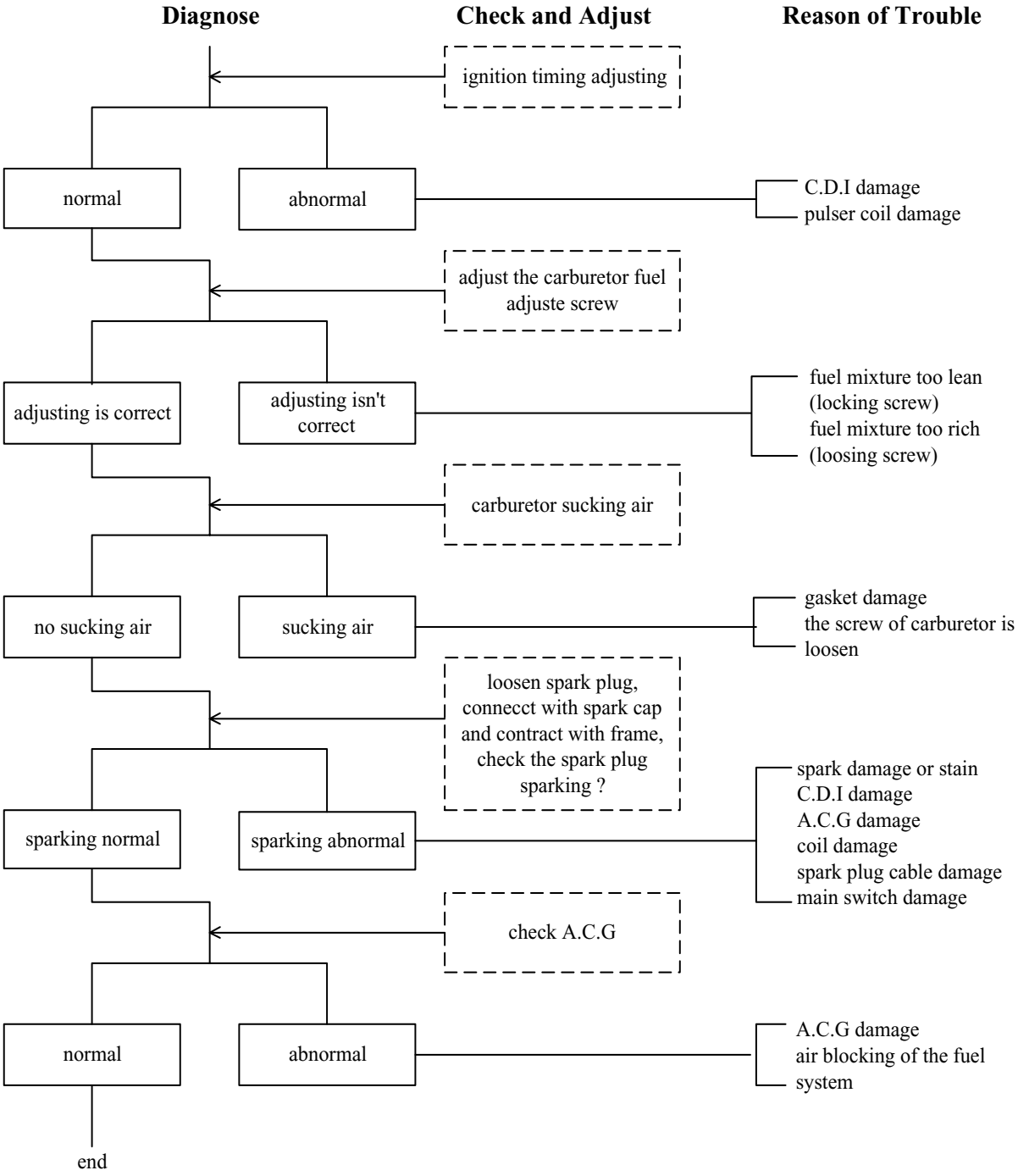


INFORMATION FOR PREPARATION

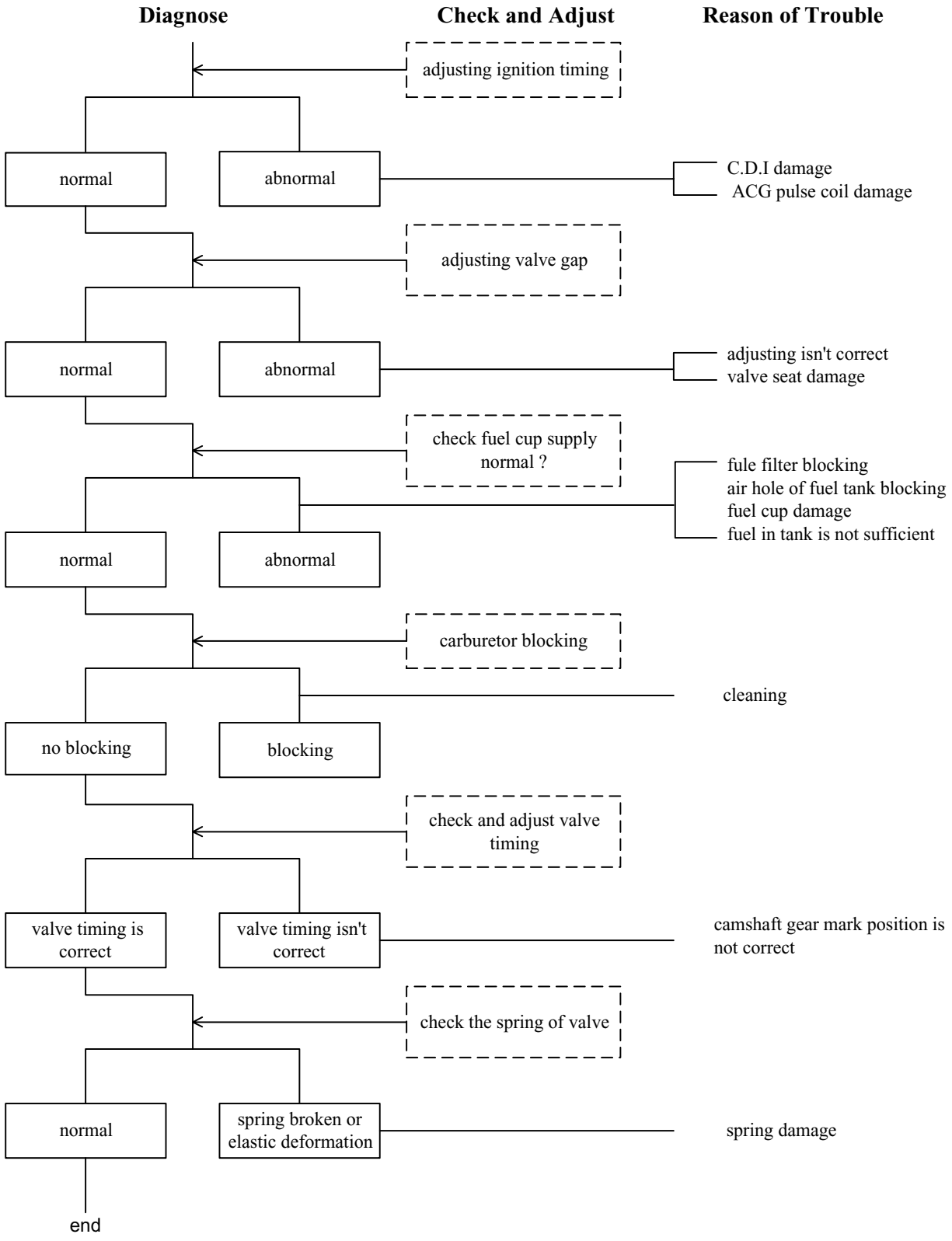
REVOLUTION NOT SMOOTH , LOST POWER



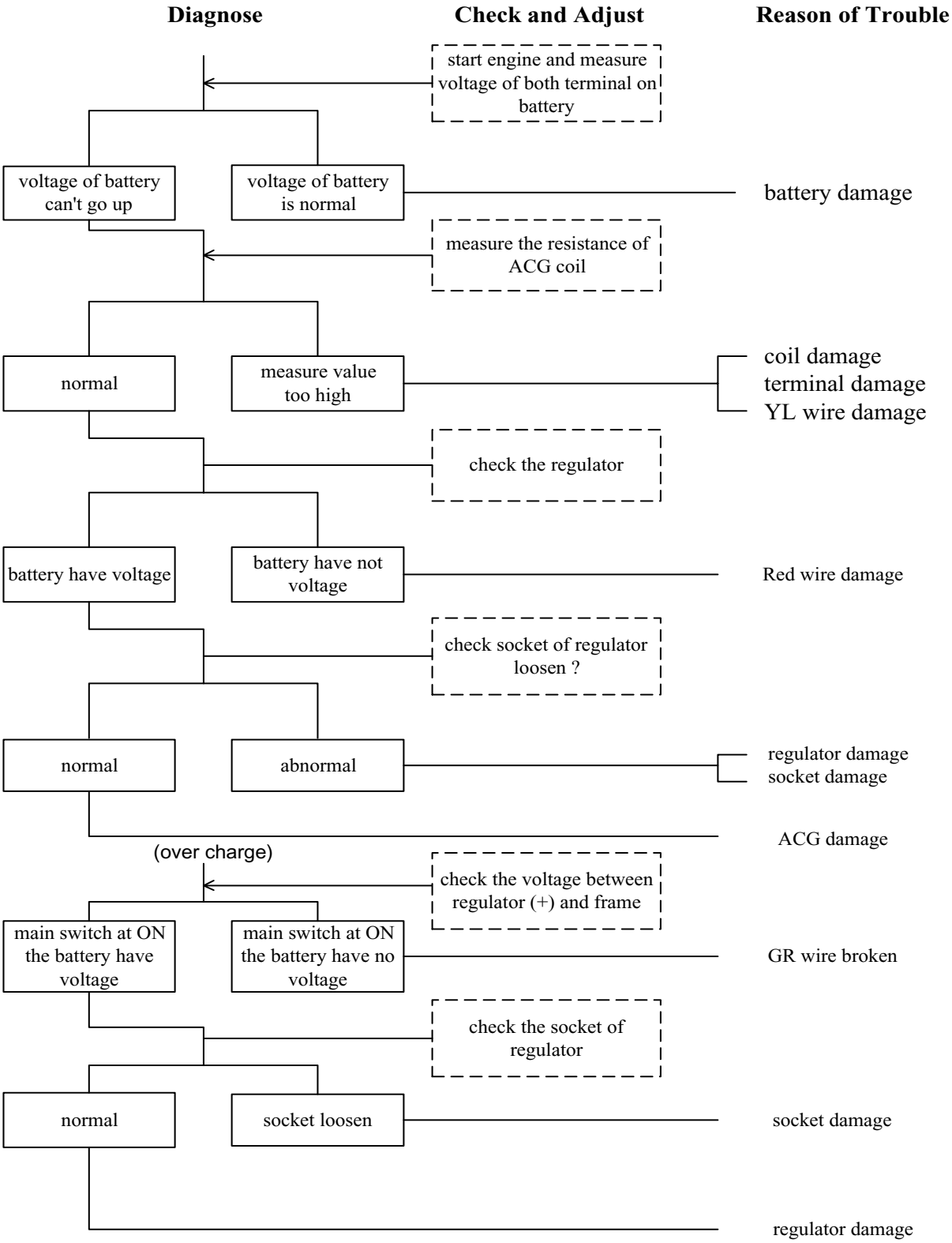
INFORMATION FOR PREPARATION
REVOLUTION NOT STABLE (LOW R.P.M.)



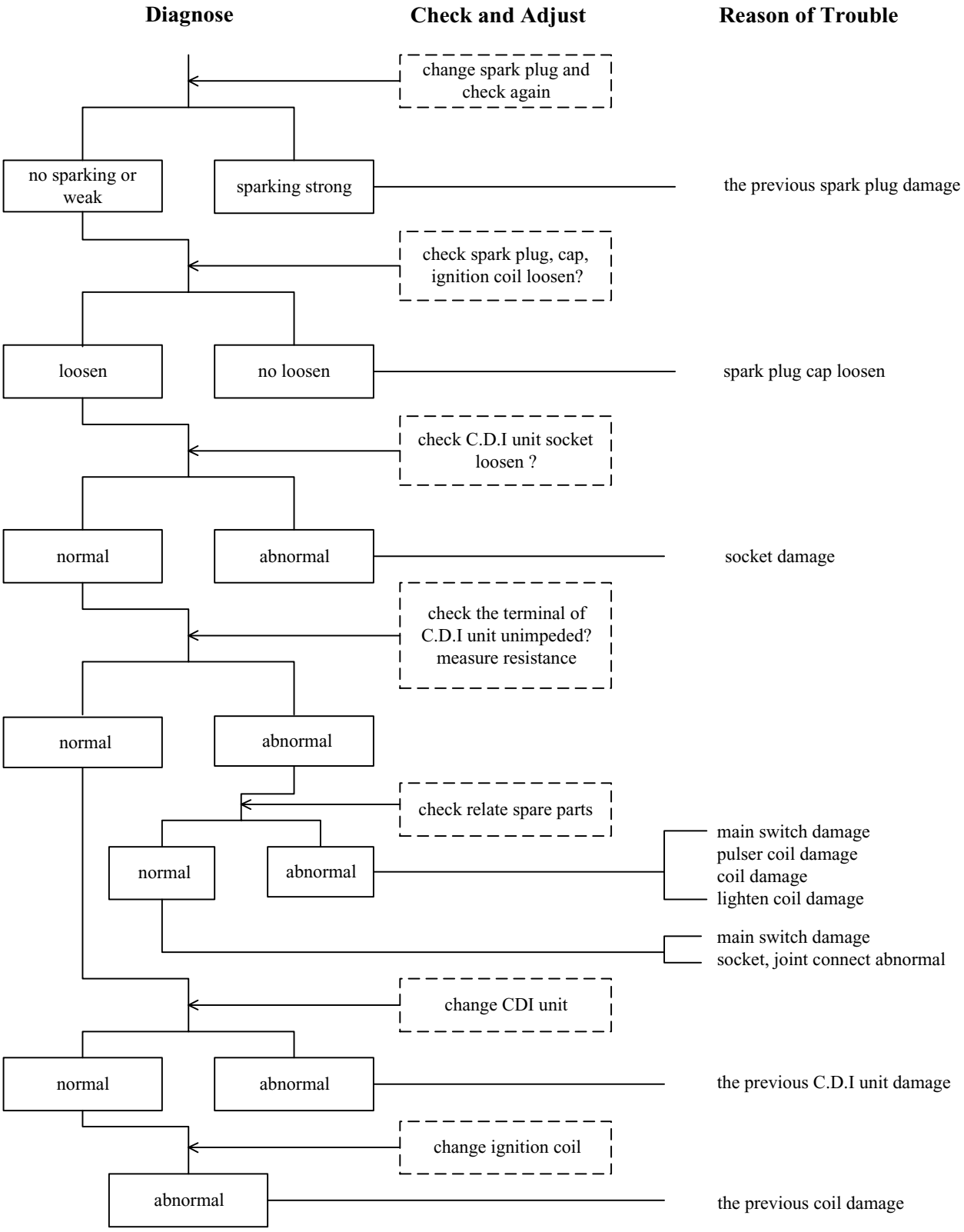
INFORMATION FOR PREPARATION
REVOLUTION NOT SMOOTH(HIGH SPEED)



INFORMATION FOR PREPARATION
CHARGE ABNORMAL



INFORMATION FOR PREPARATION
SPARK PLUG NO SPARKING



CHECK AND ADJUST

INFORMATION

WARNNING

※ Do not start the engine at a close zone, because the exhaust gases from the engine including some noxious emission such as CO, HC, NOx... etc. that can result serious damage for health.

※ Strictly prohibit using any flammable thing in the working zone, because that can rise fire easily.

ENGINE：

ITEM	SPECIFICATION	REMARK
Spark Plug Gap	0.6~0.7 mm	
Spark Plug Type	DR8EA	without resistance
Valve Gap	0.08mm	intake valve
	0.12mm	exhaust valve
Idle Speed	1400±100 rpm	
Engine oil type	SAE 10W/40	Synthetic
Engine Oil Capability	1.6 L	At oil change
	2.0 L	After engine overhaul
Compression Pressure	13 kg/cm^2	1400 rpm
Ignite Timing	17° BTDC	1400±100 rpm

CHASSIS：

ITEM	SPECIFICATION	REMARK
Parking brake lever free play	10~20 mm	
Left lever free play	5~10 mm	
Throttle free play	2~6 mm	
Front Tire Pressure	10 psi	Check the mark on tire
Rear Tire Pressure	10 psi	Check the mark on tire
Torque of Front Rim Nut	14 kg-m	
Torque of Rear Rim Nut	14 kg-m	

＊ Detailed tire pressure specification please check the marking on tires.

CHECK AND ADJUST

MAINTENANCE SCHEDULE

Please follow the maintenance schedule to do the routine maintenance.

Service Interval
C：Clean up
L：Lubricate or Grease
R：Replace
I：Inspection, check, adjust and replace if necessary
D：Need some special tools or techniques, suggest to be serviced on dealers site.

Inspection parts / System	**(1)**	**(2)**	**(3)**	**Ref.**
Air cleaner element		C	C	(Note 1)
Spark plug		I	I	
Petrol filter/Fuel tube	I		I	D
Valve clearance	I	I	I	D
Engine oil	R	R	R	
Eng. oil filter screen			C	D
Engine idle speed	I	I	I	
Drive chain	I,L		I,L(Note 3)	(Note 1,2)
Brake shoe wear / Brake system		I	I	(Note 2)
Clutch system	I	I	I,D	
Suspension		I	I	
Re-tighten up bolts and nuts	I		I	
Tire and Wheel	I	I	I	
Steering system and shaft bearing			I	

Service Interval
(1) Initial Service…20 hours or 150km either earlier time for new vehicle
(2) Regular Check…Every 100 hours or 1000km, earlier time
(3) Regular Check…Every 200 hours or 2000km, earlier time

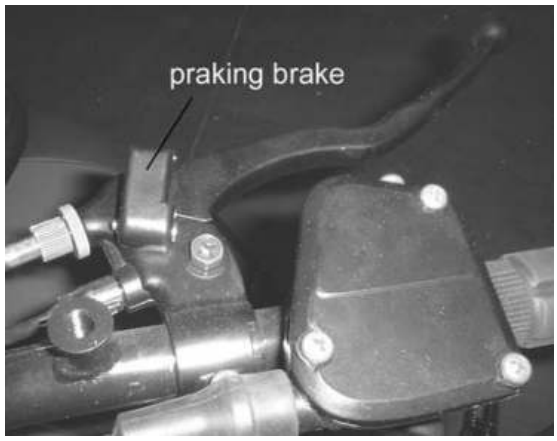
Note 1：Used in dusty, sandy, snow area need to be inspected.
Note 2：Used in rainy, muddy condition need to be inspected.
Note 3：Used after 50 hours or 500km need to be inspected.

Note：
(1) If the ATV is new then the motor oil have to replace at the first initial service.
(2) For safety reason, we suggest the maintenance should be done at local service center.
(3) If the driving condition is very abominable such as rainy, dust zone or heavy load...that we suggest operating maintenance more frequency.

CHECK AND ADJUST

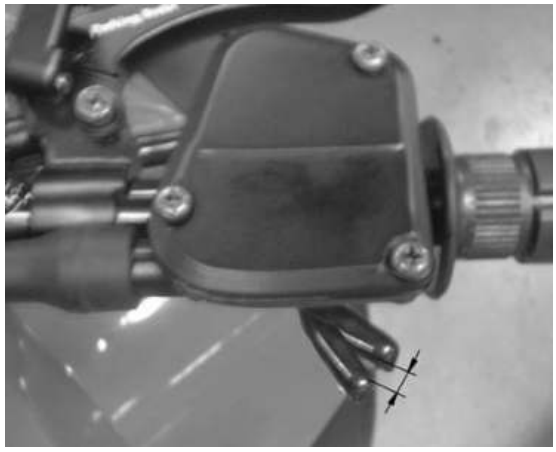
PARKING BRAKE LEVER

- Pull the right brake lever will perform brake function.
- Push the locking will lock the brake.

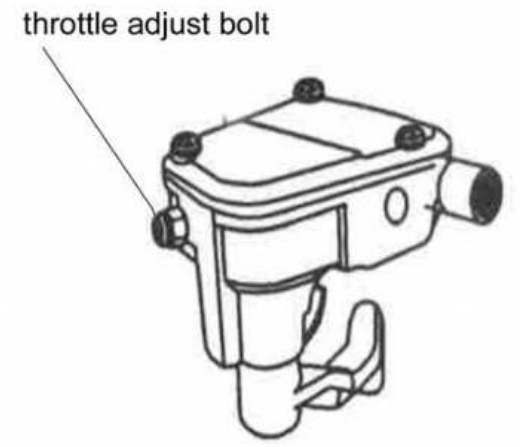


The main adjusting nut for throttle play is located under the handle bar

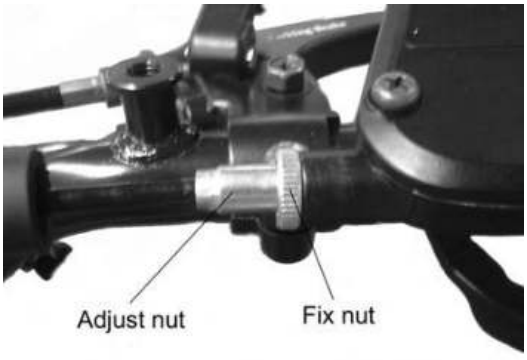
- Loose the fixed nut and adjust the play nut to proper position.



The throttle lever control bolt is located on the throttle base.
The throttle lever free play：2~6 mm



- Loose the fixed nut and adjust the screw to get proper position.



CHECK AND ADJUST

SPARK PLUG

- Pull to remove the spark plug cap.
- Use tools come with the vehicle to remove the spark plug.
- If the spark plug grimy or with carbon residue then using the copper brush to clean it.

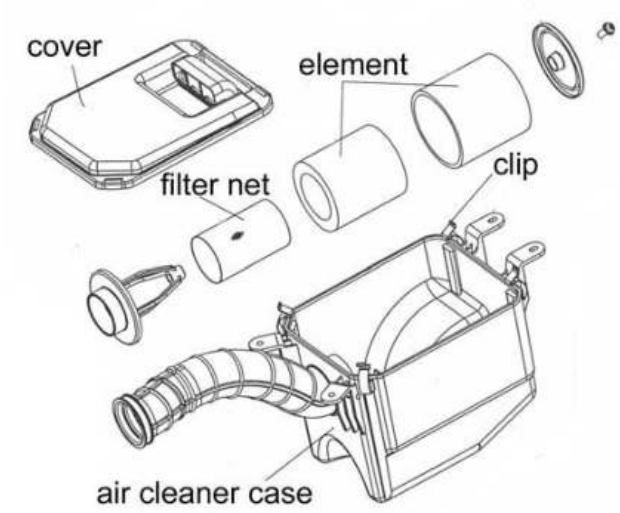


Spark plug specification
DR8EA：Resistance

Check the gap of spark plug
Gap：0.6~0.7 mm

AIR CLEANER

- Remove the seat.
- Pull to open 4 clips on air cleaner cover and remove the cover.
- Take-out the air filter.
- Check the filter whether is dirty or damaged. If it's dirty or damaged then clean it or change a new one.



Attention：

※ Clean the element and frame in a high flash point solvent，squeeze the solvent out of the foam and let the guide and element dry completely.

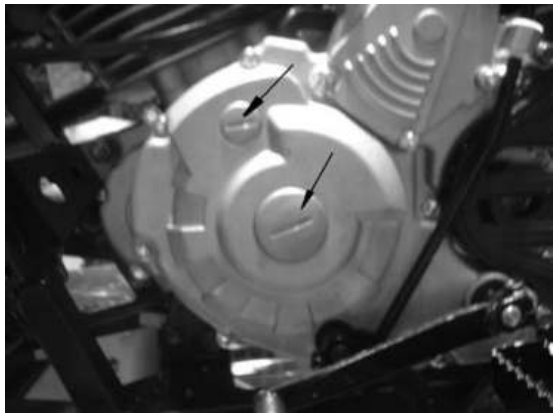
Check period：

※ If the ATV often driving at the rainy or abominable surroundings, please check the filter more frequently.

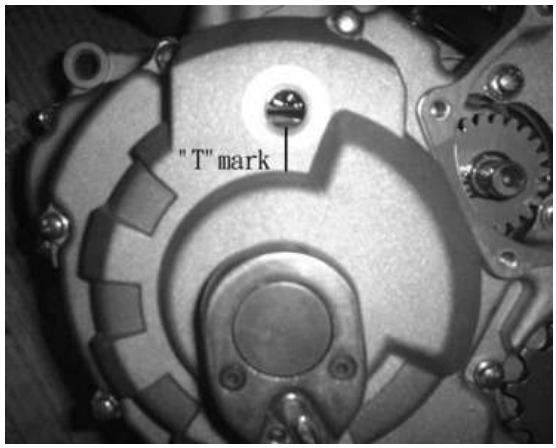
CHECK AND ADJUST

VALVE ADJUSTING

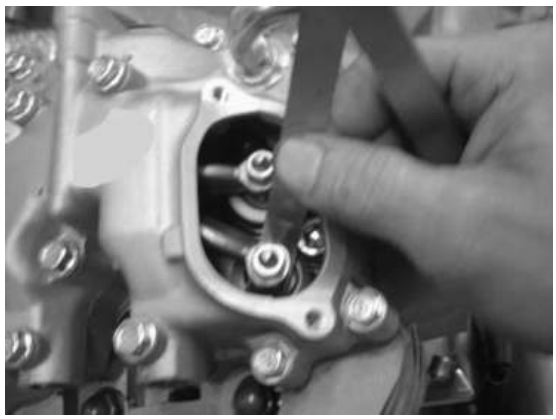
Attention：
※ When you check or adjust the valve, do it when the engine temperature is low (below 35°C)



- Remove the timing hole plug and the crankshaft hole plug with screwdriver.



- Rotate the flywheel and keep the “T” line aim at the centerline of the inspection hole.



- Measure valve clearance with a feeler gauge of the specified thickness.

- To adjust the valve clearance, loosen the locknut and turn the adjuster.

Attention：
※ When you adjusting the valve, don’t invert the crankshaft, otherwise cannot adjust the exhaust valve.

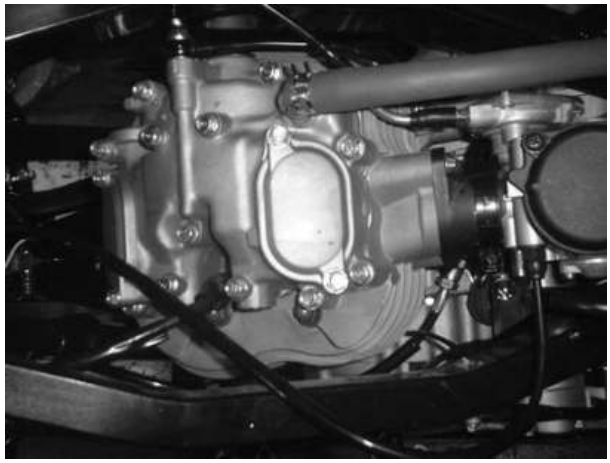


Valve gap check and adjust
Valve gap： IN. ：0.08 mm
EX. ：0.12 mm

- Loose the fixed nut and rotating the adjusting nut reach to the proper gap.
- Tie up the fixing nut and check the gap again.
- Using the valve gap tool to adjust the valve gap.

CHECK AND ADJUST

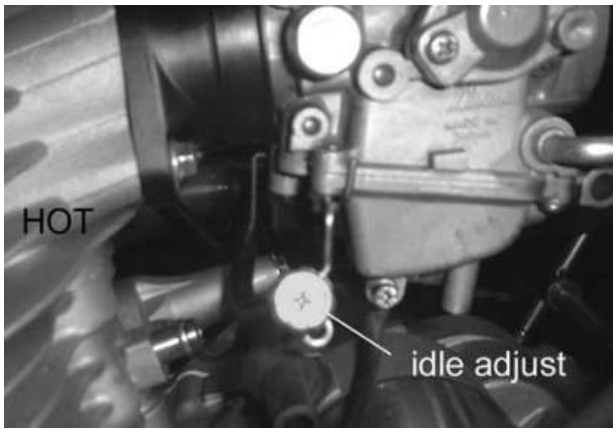
ADJUSTING IDLE SPEED



※ Engine idle speed adjustment has to do it when the engine is warm.

- Connect with the rpm meter then starting the engine.

- Before adjusting the idle speed, make sure the spark plug gap is correct. Also, turn the handlebars from left to right and note whether the idle speed changes. If it does, the throttle cable may be incorrectly routed. Be sure to correct this problem before proceeding.

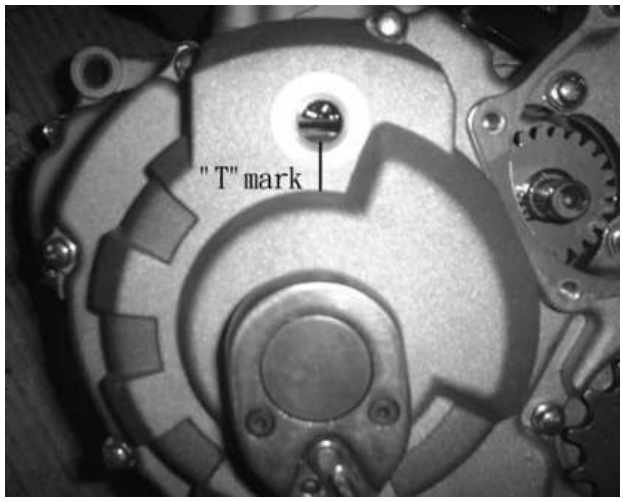


Warning：
Use screw driver to adjust the idle speed to avoid injury.

- Adjust the idle speed adjust screw reach to the normal idle speed.

The idle speed is about
1400±100 rpm.

IGNITION TIMING

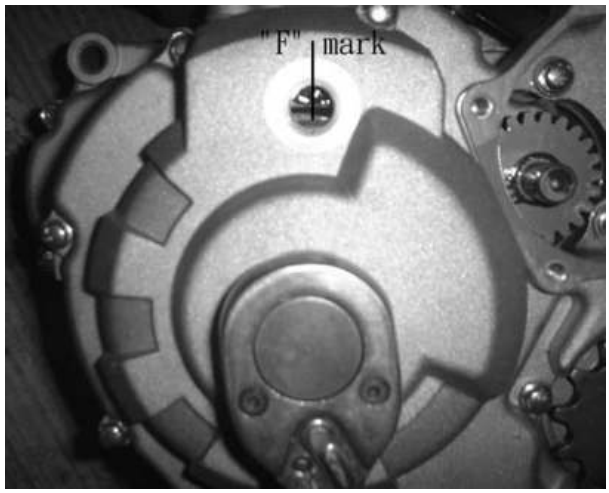


The ignition system of this ATV is controlled by C.D.I unit, thus don‘t need to adjust anything. If the ignition timing isn’t correct then checking the ignition system whether normally.

- Remove the 14 mm A.C.G. cap.
- Using the timing light to check the ignition timing. When the engine speed running at idle, the “F” mark of flywheel should aim at the inspection hole.

CHECK AND ADJUST

IGNITION TIMING



- Using the timing light to check the ignition timing.
- Keep the engine speed about 4000 rpm, if 2 mark-lines on flywheel aim at center of inspection hole then the ignition timing is correct.

CYLINDER PRESSURE



- Remove the spark plug cap and spark plug.
- Install the pressure gauge.
- Rotate the throttle and press the electric start button.

The normal cylinder pressure is 12~14 kg/cm^2.

If the cylinder pressure is too low then check the following items：

- Valve leakage?
- Valve gap is too tie?
- Cylinder head gasket is damage?
- Piston ring wear-out?
- Piston, cylinder wear-out?



If the cylinder pressure is too high then check the combustion chamber and the top face of piston whether with too much carbon residue.

CHECK AND ADJUST

ENGINE OIL

※ When you check the quantity of oil, the vehicle has to stay at the ground (flat) level.

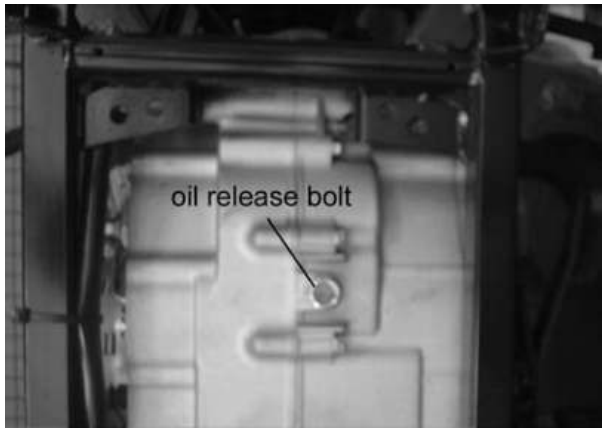


- Stop the engine and remove the oil level gauge.
- Unscrew the engine oil filler cap from the right front corner of the engine and pull out the dipstick.

If the oil level is stay within bottom mark of the gauge, then the oil quantity is enough.

Refill the engine oil if it's too less.

The standard oil type is SAE 10W/40
Re-install the oil level gauge.



Change the engine oil：

- Take-out the oil level gauge.
- Remove the oil-release bolt underneath the engine and release the oil.
- Install the oil-release bolt.
- Fill the engine oil.

※ Confirm the washer of the bolt whether damaged.

Engine oil quantity：
disassemble：2.0 Lit
change：1.6 Lit

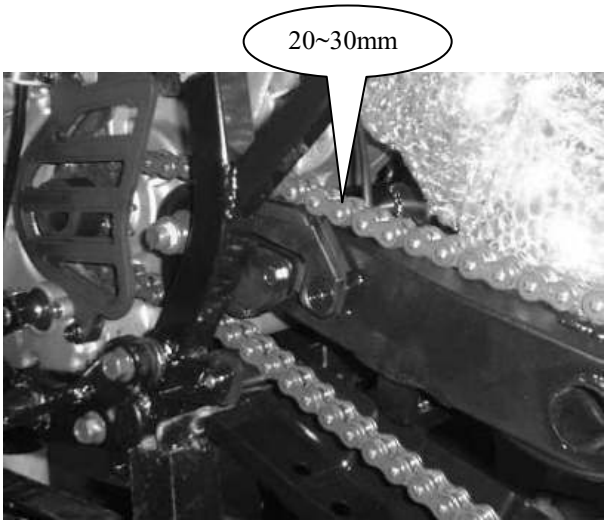
- Check all parts whether leaking, after assembly.

DRIVE CHAIN

Check the drive chain condition.

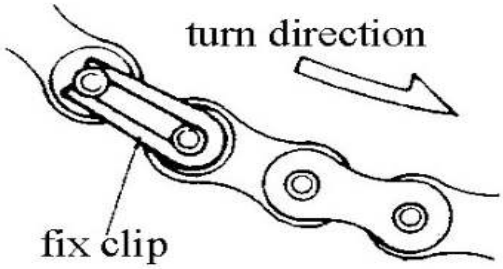
- The drive chain should be check, adjust, and lubricate regularly.
- Inspect the drive chain at a point on the lower run about halfway between the sprockets.

The free play of the drive chain should be between 20~30mm up and down.

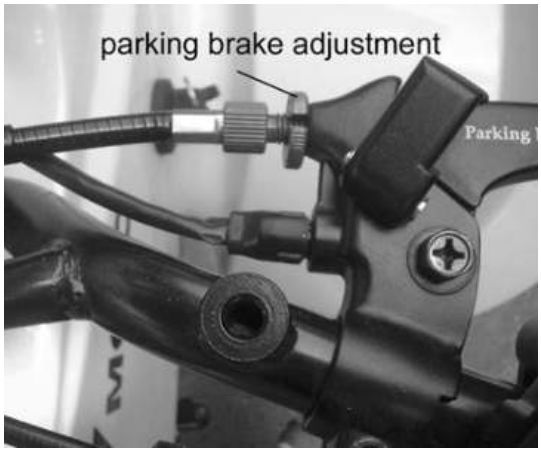


CHECK AND ADJUST

- Inspect the front sprocket teeth for excessive wear; mark sure there's no play in the sprocket.



- When install the chain clip, beware the clip direction.



BRAKE SYSTEM

Parking brake and rear brake

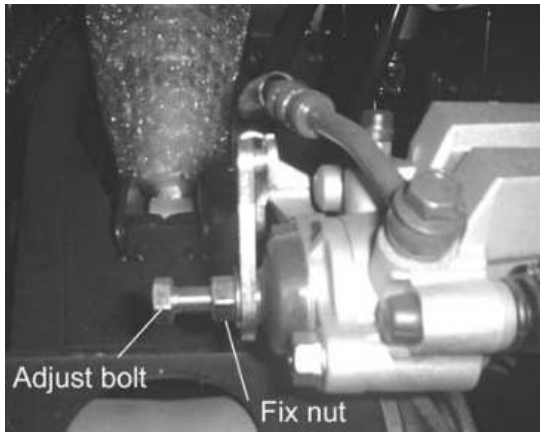
- Check all the brake shoes. If the brake shoes have any dint or wearing very serious then change it.

Check the play of brake lever

normal play：10~20 mm

- If the brake lever play is too much, adjust the fix bolts on right brake lever.
- If the play of the rear brake over the normal value then adjust the adjusting nut of rear brake caliper on swing arm.

※ Adjusting nut must be aligned with pin, any slight deviation may result in braking play change cause danger as brake applied.



STEERING

- Turning the steering from right side to left side, check the steering operation.

Be sure the wiring and cable does not affect the steering handle.



CHECK AND ADJUST

FIXING OF NUTS AND BOLTS

- Check the fixing nuts, bolts on all parts.

If the nuts, bolts loosen then tie-up with certain locking torque.



SUSPENSION

Front

- Holding the brake lever and push the handle bar. Check the fork movement and other parts if is loose or oil leaking.

Rear

- Check the damping of rear suspension
- Check the suspension bush function normally.



※ Inspect all suspension fasteners before riding.

TIRE, RIM

- Check the tires whether have any nail, broken…etc.
- Check tire pressure with a gauge that will read accurately at the low pressure used in ATV tires.



- The tire pressure can be very depends on different operation condition. Please check the mark on tire for operation pressure tolerance.

CHECK AND ADJUST

- Checking the shaft and nut of front wheel whether loosen.
- Checking the nut of rear wheel whether loosen.



Locking Torque:

Front wheel 18mm nut：14 kg-m

Rear wheel 18mm nut：14 kg-m

MENO

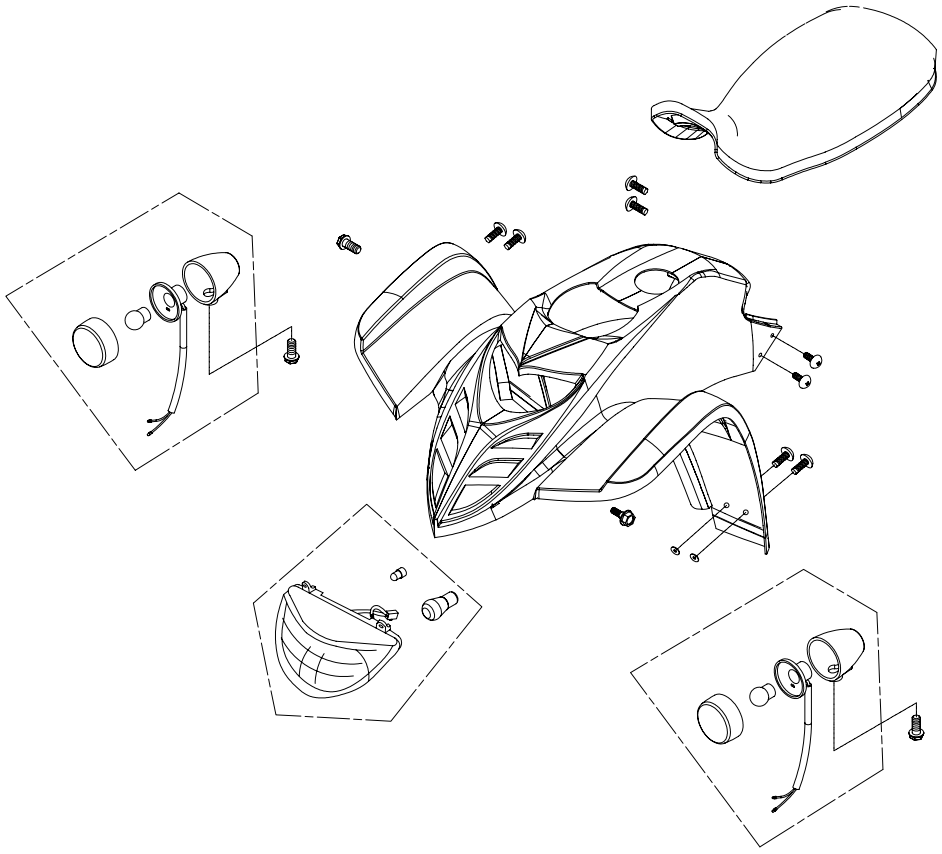
COVER PARTS, MUFFLER

Information for preparation

- Don‘t enforce to remove the cover parts of the ATV, otherwise will cause the connecting nail of cover parts broken.
- Please according to the operating instruction when assembling the cables and wires

Remove cover parts of the ATV-300S

Front cover

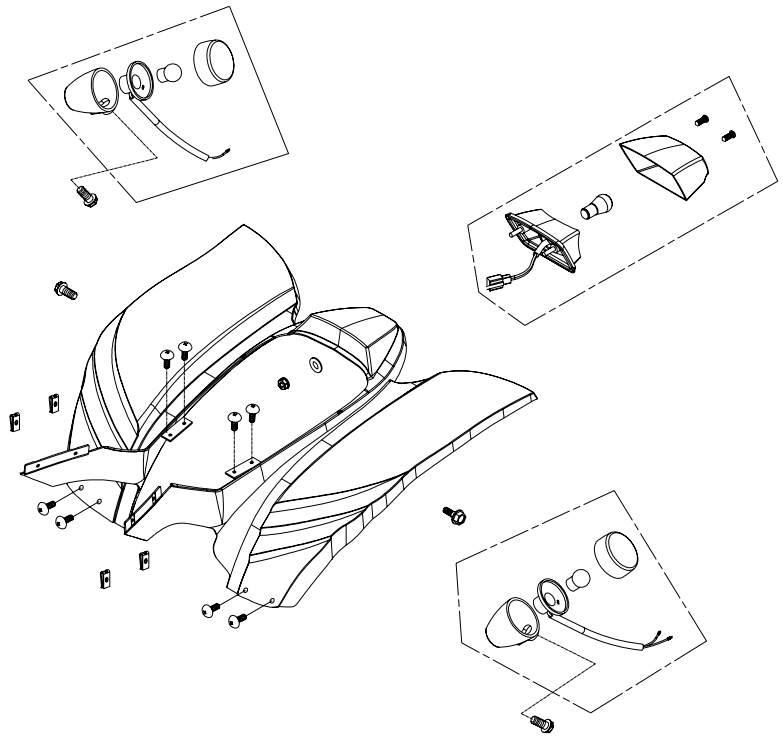


- Pull the Seat Releaser Unit and take off seat assembly.
- Release the brake and throttle cables from handle bar then disconnect handle switch wires.
- Release the L/R signal wires.
- Disassembly speedometer connection and taking off 2 nylon nuts then disconnect speedometer assembly.
- Taking off 4 hex-socket bolts and remove the handle bar.
- Remove 6 pan-phillips bolts and 2 ladder bolts.
- Disconnect the head light wire.
- Remove the front cover.

Note: When you assembling the above parts that follow the opposite sequence of disassembling.

COVER PARTS, MUFFLER

Rear cover

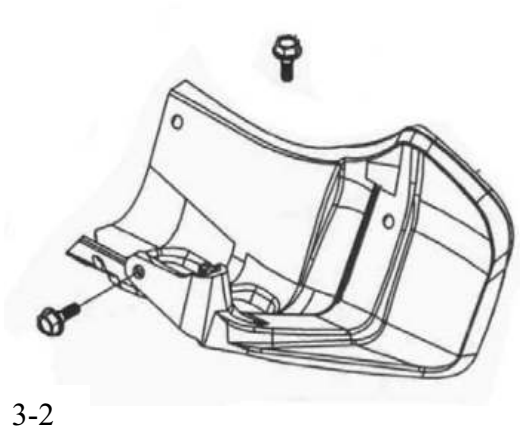


- Release the L/R signal wires and light bracket then disconnect signal assembly.
- Taking off 2 nylon nut and release tail light connection then disconnect the tail light assembly.
- Taking off 8 pan-phillips bolts and 2 ladder bolts.
- Remove the rear cover.

Attention:
∗ When assembling the above parts, please confirm the connecting status of join parts.

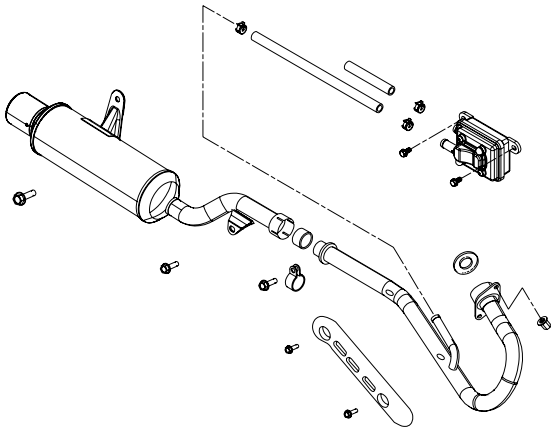
L/R Rear fender

- Remove 2 ladder bolts and 2 hex washer face bolt.
- Taking-off the L/R rear fender.



COVER PARTS, MUFFLER

Muffler



Locking Torque:
Muffler fixed bolt：3.5 kg-m
Muffler connect nut：1.2 kg-m

Trouble Diagnose:
Exhaust sound level is too high
- Muffler broken
- Muffler leakage

Power isn‘t enough
- Muffler leakage
- Muffler blocking
- Muffler with dent

Remove the muffler:
- Taking-off the 2 nuts that connect to the cylinder.
- Taking-off the 1 hex flange bolts and 2 hex washer face bolts that fix to the frame.
- Pull to open 1 exhaust clip and to loose the reed valve comp EX. Pipe.
- Remove the muffler and gasket.

Note: When you assembling the muffler, don't forget to put gasket on muffler first.
Replace a new gasket after dismounting the muffler.

MEMO

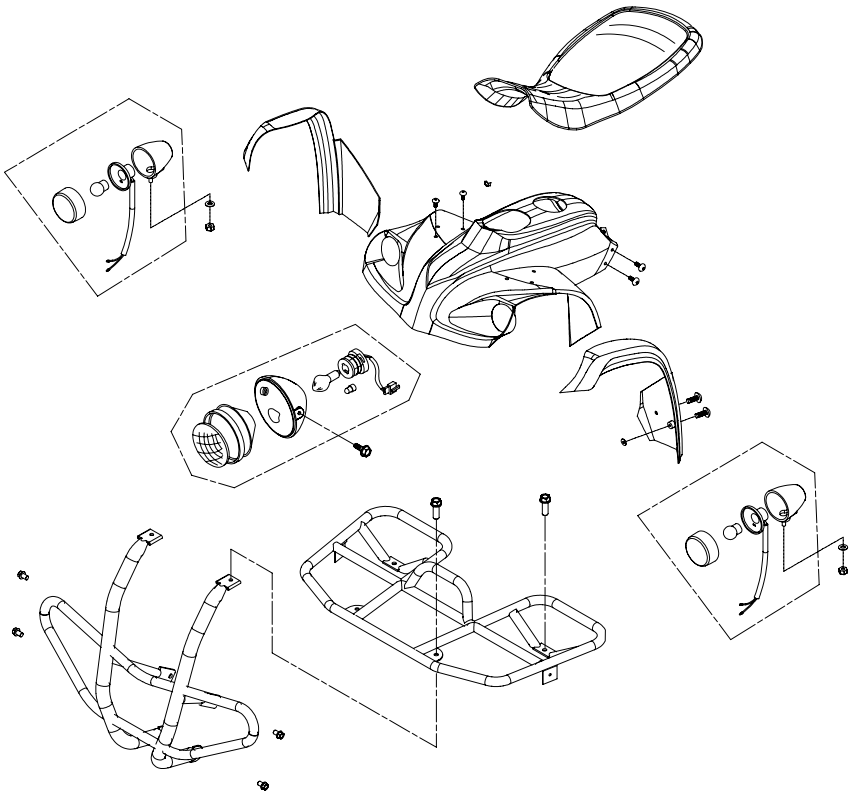
COVER PARTS, MUFFLER

Information for preparation

- Don‘t enforce to remove the cover parts of the ATV, otherwise will cause the connecting nail of cover parts broken.
- Please according to the operating instruction when assembling the cables and wires

Remove cover parts of the ATV-300U

Front cover

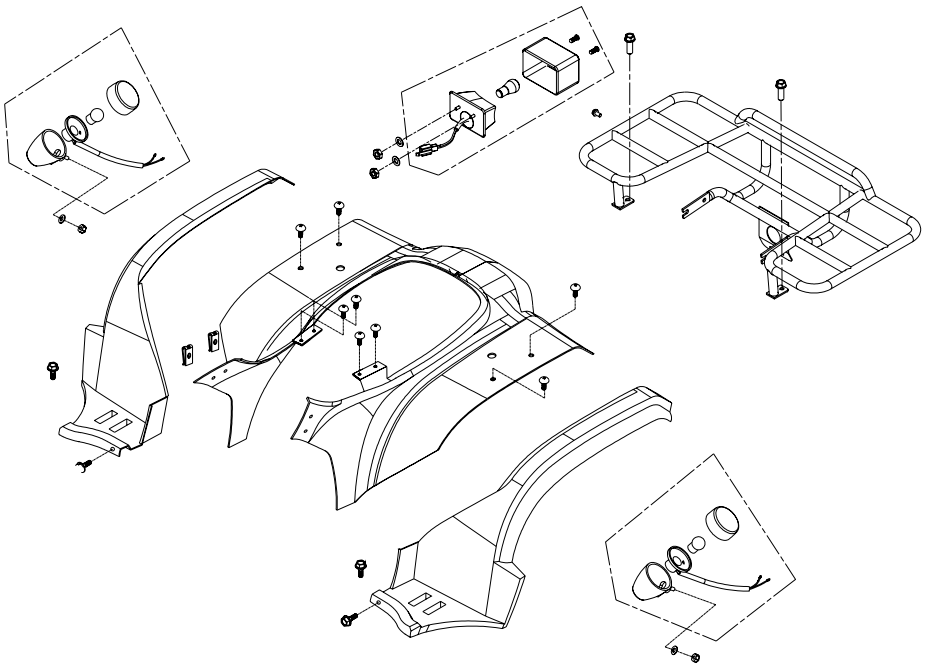


- Pull the Seat Releaser Unit and take off Seat assembly.
- Taking off 8 hex flange bolts then remove front bumper and luggage rack.
- Release the brake and throttle cables then disconnect handle switch wires.
- Release the L/R signal wires and light bracket then disconnect signal assembly.
- Disassembly speedometer connection and taking off 2 nylon nuts then disconnect speedometer assembly.
- Taking off 4 hex-socket bolts and remove the handle bar.
- Remove 6 pan-phillips bolts and 2 ladder bolts.
- Disconnect the head light wire.
- Remove the front cover.

Note: When you assembling the above parts that follow the opposite sequence of disassembling.

COVER PARTS, MUFFLER

Rear cover



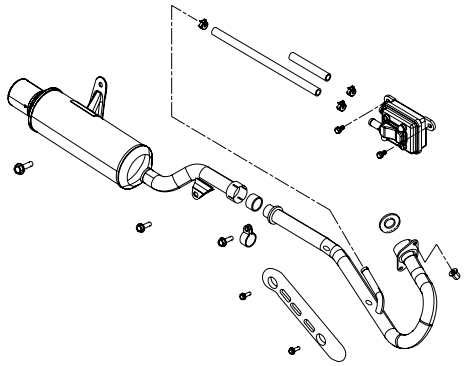
- Taking off 4 hex flange bolts then disconnect rear bumpers.
- Release the L/R signal wires and light bracket then disconnect signal assembly.
- Taking off 2 nylon nut and release tail light connection then disconnect the tail light assembly.
- Taking off 8 pan-phillips bolts and 2 ladder bolts.
- Remove the rear cover.

Attention:
∗ When assembling the above parts, please confirm the connecting status of join parts.

COVER PARTS, MUFFLER

Muffler

Locking Torque:
Muffler fixed bolt：3.5 kg-m
Muffler connect nut：1.2 kg-m



Trouble Diagnose:
Exhaust sound level is too high
- Muffler broken
- Muffler leakage

Power isn‘t enough
- Muffler leakage
- Muffler blocking
- Muffler with dent

Remove the muffler:
- Taking-off the 2 nuts that connect to the cylinder.
- Taking-off the 1 hex flange bolts and 2 hex washer face bolts that fix to the frame.
- Pull to open 1 exhaust clip and to loose the reed valve comp EX. Pipe.
- Remove the muffler and gasket.

Note: When you assembling the muffler, don't forget to put gasket on muffler first.
Replace a new gasket after dismounting the muffler.

MEMO

LUBRICATION SYSTEM

TROUBLE DIAGNOSE

Oil quantity reduced

- Normal consumption
- Oil leaking
- Piston ring wear-out or installed wrong
- Valve seal wear-out

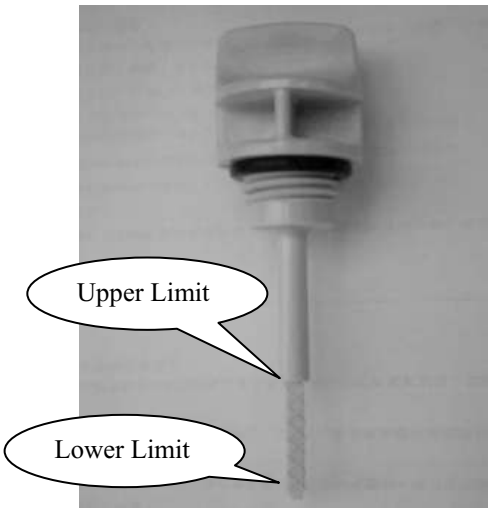
Engine burn

- No oil pressure or pressure too low
- Oil thoroughfare blocking
- Oil type incorrect

ENGINE OIL & FILTER

Oil quantity

∗ When you check the oil quantity, the vehicle has to stand on flat ground.
∗ Starting the engine about 2~3 min. then stop it. After 2~3 min. check the oil quantity.

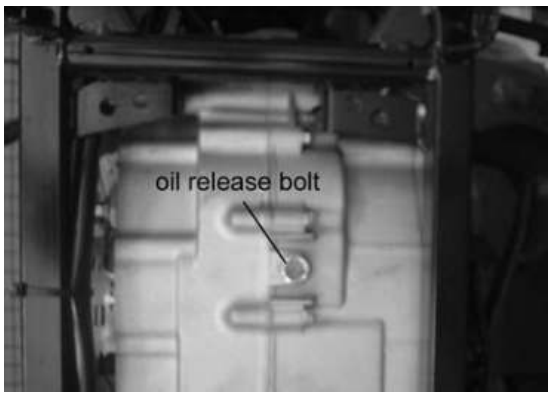


- Remove the oil level gauge and check if the oil level under the lower limit then adds the standard oil to upper limit of gauge.

Oil Exchange

∗ The motor oil will flow more easily if the engine is warm.
∗ The oil release bolt is under R crankcase.

Locking torque： 1.5 kg-m



- Remove the right crankcase cover to check and clean the oil filter. Replace new filter if it's damaged.

- Adding the proper oil quantity
  Engine disassembly：2.0L.
  Oil change：1.6L

- Check the engine oil whether leaking. If not then starting the engine at idle speed for few minutes and checking the oil level again.

LUBRICATION SYSTEM

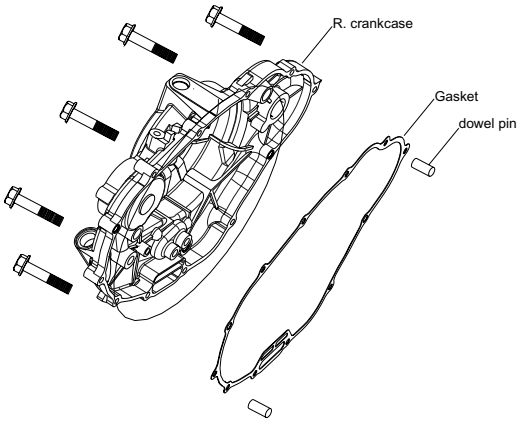
CLUTCH

Remove

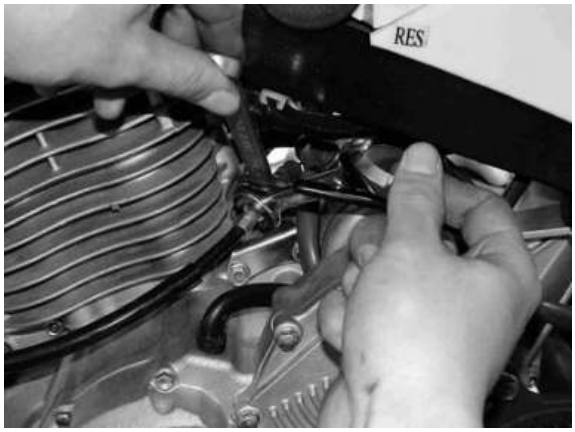
- Remove the seat and body cover. (see 3-1, 3-2)



- Remove 2×10mm Hex-flange bolts on left step bar (foot peg) and 2 Pan-Philips bolts on the rear foot fender. Remove foot peg and fender together.



- Take-off 12 bolts on R. crankcase cover and remove the cover.
- Remove the gasket and 2 dowel pins.



- Release the clutch cable fix nut from the left side of the engine. Pull out the cable from the clutch lever on top of right crankcase cover.

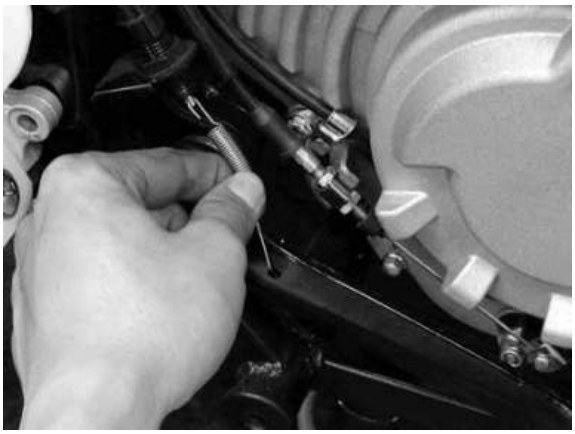


LUBRICATION SYSTEM

- Remove 2×M8-25mm hex-flange bolts on master cylinder assembly. This is to lower down the brake pedal for easier. disassembly.



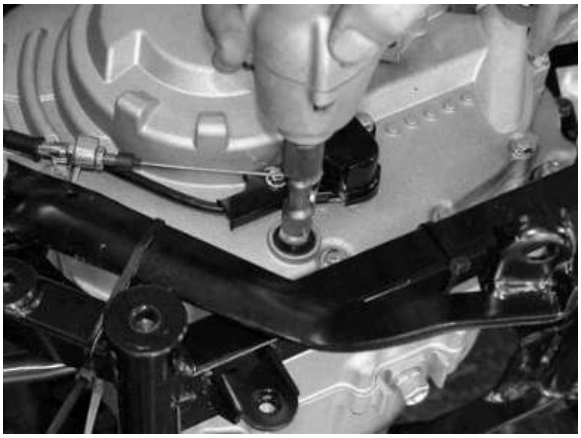
- Release brake pedal reset spring.



- Lift the vehicle from right side and flip over to left side. Then remove the oil tube fix bolt on top of right crankcase cover.
  ※Beware not to lost the copper washers.

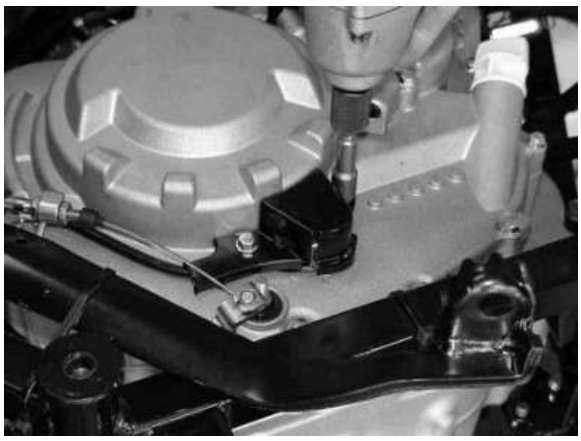


- Remove the nylon insert bolt on reverse stopper lever.

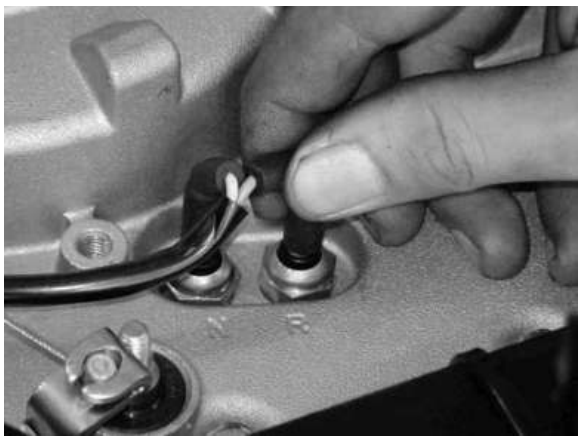


LUBRICATION SYSTEM

- Remove 2×M6-12mm hex-flange bolts together with the switch cover.



- Un-plug the contact switch connectors.



Attention：
* Beware the light green wire is for the neutral signal, the gray wire is for the reverse signal.

- Remove 10×M6-32mm, 1×M6-40mm and 1×M6-50mm hex-flange bolts.



- Put away all wires, cables. Slightly hit the right crankcase cover from side way and pull out to remove the cover.



LUBRICATION SYSTEM

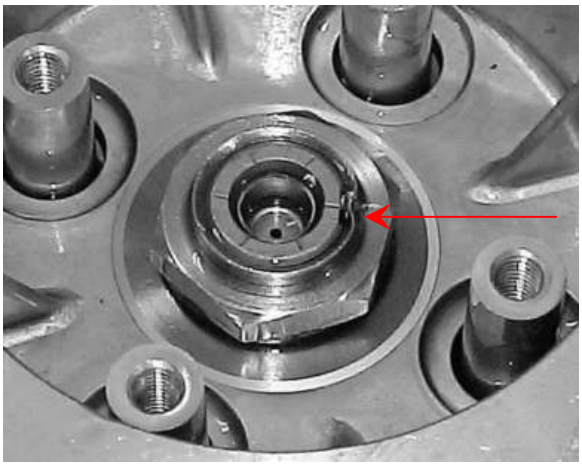
- Remove the right crankcase cover gasket and beware not to lost the dowel pins.



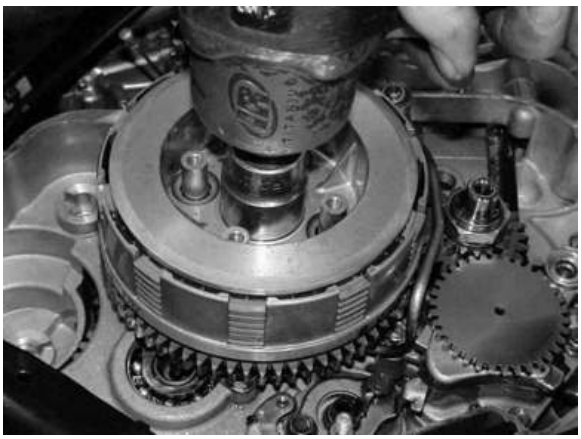
- Remove 4×M6-28mm hex bolts and 4 springs under the clutch lifter plate. Hold the lifter plate together with the needle roller bearing.



- Before remove the locknut, punch out the lock section on the nut.

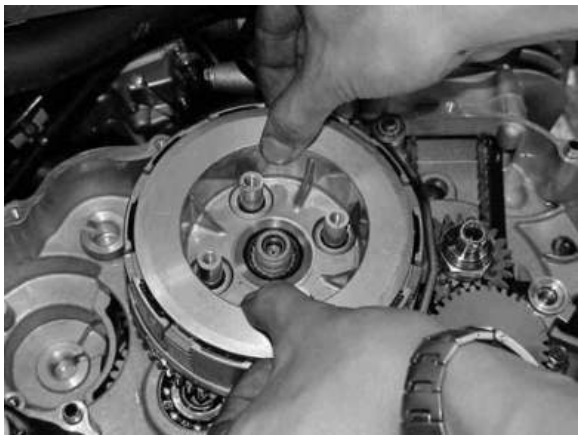


- Remove the locknut and clutch center.



LUBRICATION SYSTEM

- Take off the clutch center.



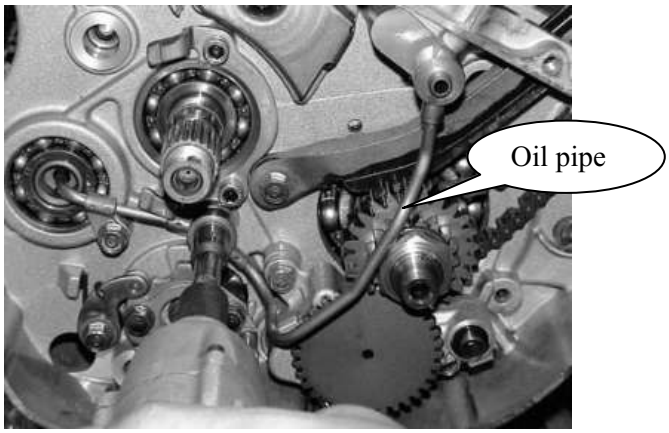
Use reversed procedure to setup the parts that has been removed.

Attention：
* Beware all dowel pins are located into the crankcase.
* Replace new gasket of the right crankcase cover after dis-assembly.

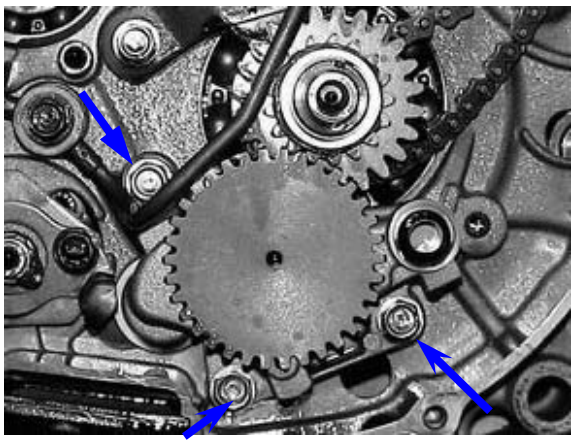
OIL PUMP

Remove

- Remove the O-ring from the oil pipe.
- To detach the oil pipe from the crankcase, remove these 2 bolts.
- Carefully pull the oil pipe off the crankcase.
- Remove this dowel pin and O-ring from the oil pipe.

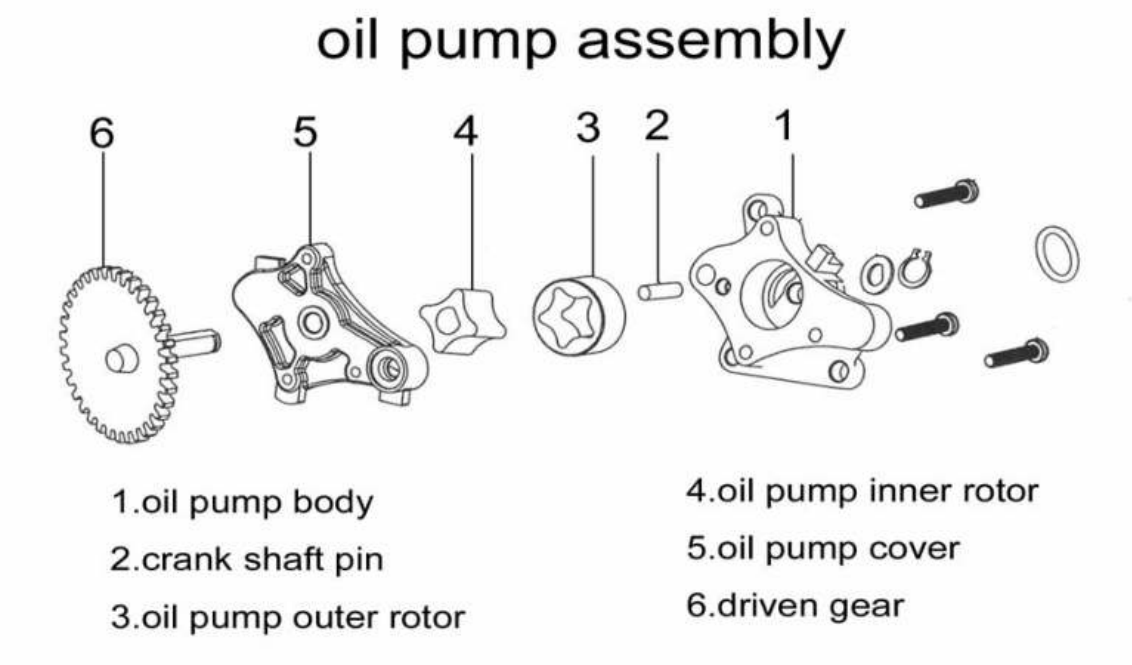


- Remove the oil pump mounting bolts.



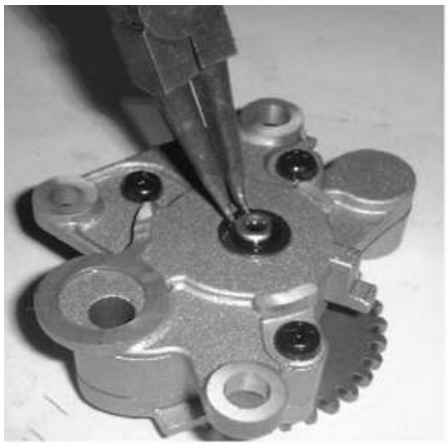
Use reversed procedure to setup the parts that has been removed.

LUBRICATION SYSTEM

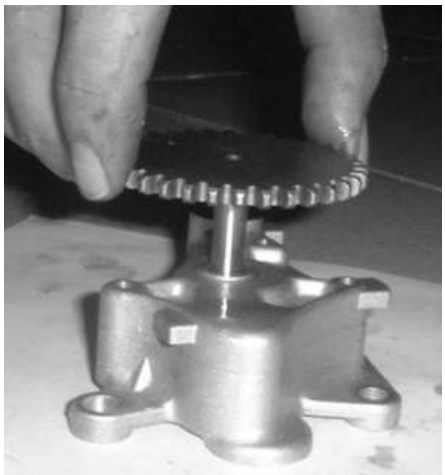


Oil Pump Disassembling:

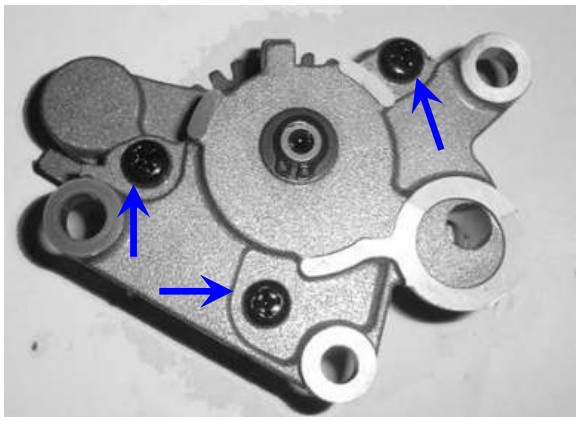
- Remove the snap-ring and washer.



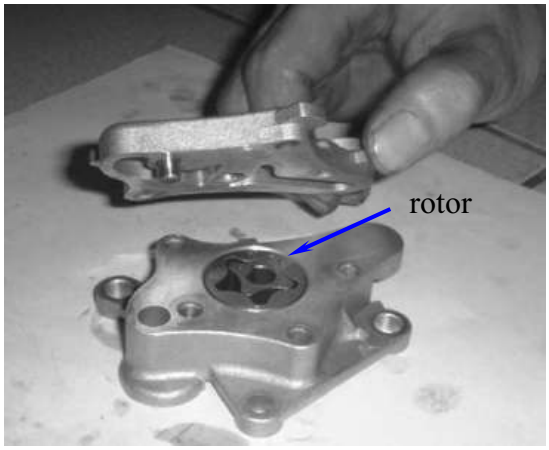
- Remove the pump driven gear and shaft.



- Remove the pump cover bolts and separate the cover from the pump body.



- Remove the rotors , wash all the components in solvent.



LUBRICATION SYSTEM

Check:

- Check the gap between the pump body and outer rotor.

The gap limit is 0.25 mm.



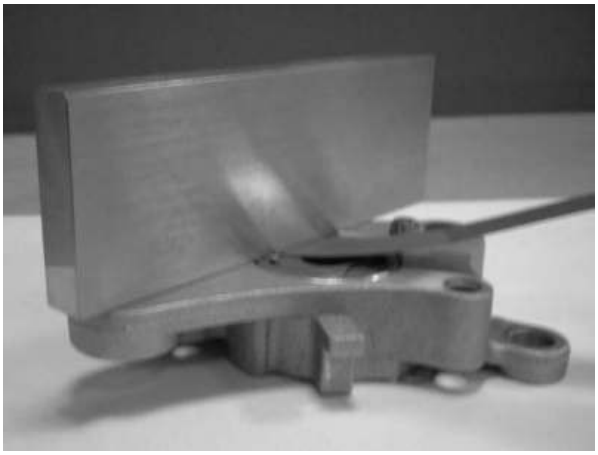
- Check the gap between inner and outer rotor.

The gap limit is 0.2 mm.



- Check the gap between the rotors and a straightedge laid across the pump body.

The gap limit is 0.1 mm.



LUBRICATION SYSTEM

Assembling:

- Mounting the inner and outer rotor, then install the pump shaft.

When install the pump shaft, beware the dot mark on inner rotor point to the outer rotor dot mark.

- Locking the screw.

After installed, turning the pump slightly and confirm the function is normal.
Add the standard oil in pump then install it.

Installation:

- Install the pump back to crankcase based on reversed sequence.
- Install the dowel pin.
- Discard the old gasket and replace with new R. case cover gasket.

MENO

FUEL SYSTEM

TROUBLE DIAGNOSE

Start-up function abnormal

- No spark of spark plug
- Compression pressure too low
- No fuel in carburetor
- Air stock inside air cleaner
- Stock of fuel pipe
- Defect of rubber film in carburetor
- Bad adjustment of fuel level

Too much fuel inside combustion chamber

- Air stock inside air cleaner
- Too much fuel cause over flow
- By passed air sock into fuel system
- Degeneration of gasoline
- Starter plunger defect
- Stock of idle system or chock system

Too thick of Fuel/Air mixture

- Starter plunger defect
- Choke cable clagged
- Float needle valve abnormal
- Too much fuel cause over flow
- Stock of airflow inside carburetor
- Stock of air cleaner
- Fuel level too high

Muffler make explore noise when deceleration

- Too much air, too lean fuel
- Air stop valve abnormal
- Too thin of F/A mixture at idle speed.

Ignition not continuously when accelerate

- Ignition system abnormal
- Too thin of F/A mixture

Difficult to start, Engine stops after start-up, Idle speed not stable

- Stock of fuel system
- Ignition system abnormal
- Fuel/Air mixture too rich or lean
- Degeneration of gasoline
- Bad adjustment of idle speed
- Bad adjustment of fuel quantity
- Fuel or airflow stock of idle speed
- Too much fuel cause over flow
- Stock of starter plunger system
- Bad adjustment of fuel level

Too thin of Fuel/Air mixture

- Stock of nozzles inside carburetor
- Stock of float valve
- Fuel level too low
- Stock of fuel system
- Throttle valve abnormal

FUEL SYSTEM

CARBURETOR SET UP

- Before remove the A/F adjusting screw, remember turns of setup into the end position. The normal setup is：1 to 1 1/4 turns out

- After engine warm up, adjust the throttle valve adjusting screw to setup the standard idle speed. Idle engine rev.：1400±100 rpm

- Slightly increase the engine speed for few times and release the throttle at idle engine speed.
- If the engine rev. is not stable, repeat above adjust procedure on fuel adjusting screw and throttle adjusting screw until the engine speed is normal.

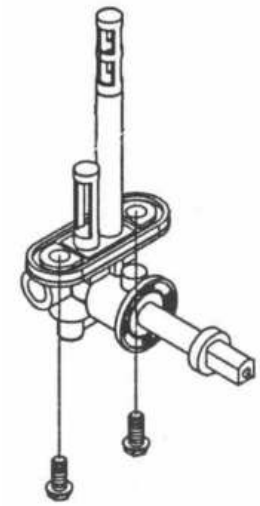
Warning： Smoking prohibited

FUEL CUP

- Remove the fuel tube from carburetor.

Check

Check the function of fuel cup is normal or not.

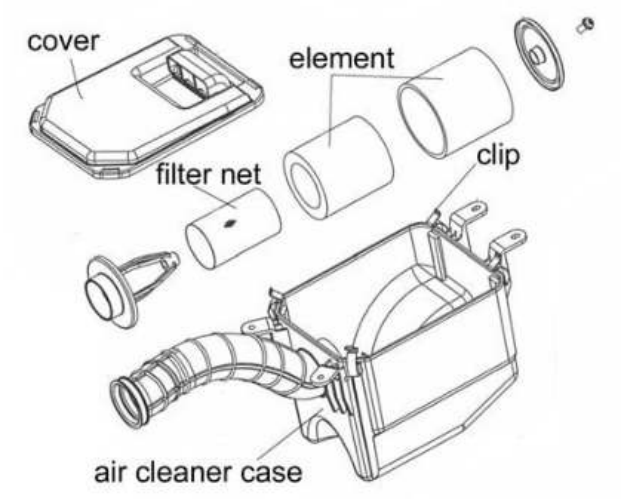


AIR CLEANER ASSEMBLY

- Pull to open 4 clips on air cleaner cover and remove the cover.
- Loose 4 fixed bolts on the frame to dismount the air cleaner.

Check

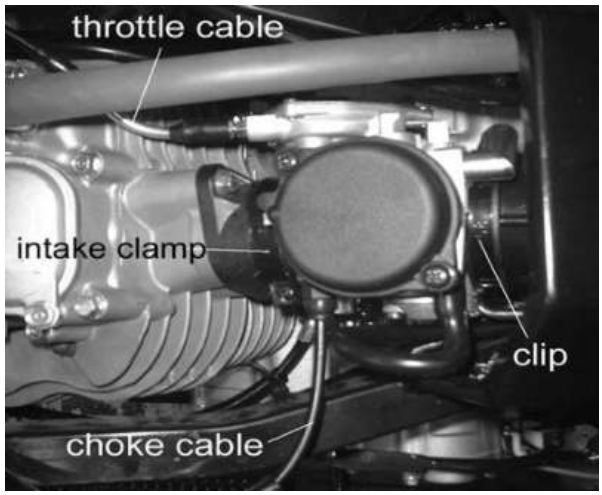
- Check the cleaner element to see if any dirt or blocking.
- Replace the filter element if necessary.
- Install with the reverse procedure.
- Clean the element with solvent and sock with clean engine oil.



FUEL SYSTEM

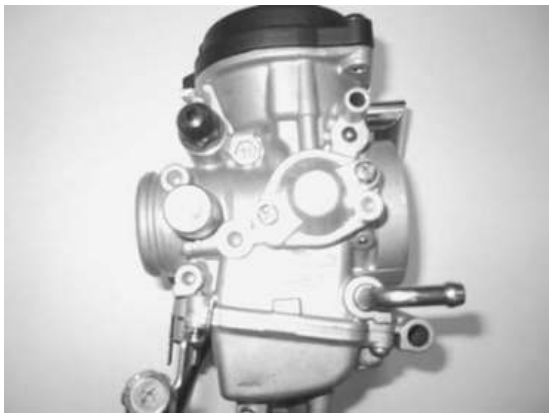
Remove the Carburetor

- Loose the fuel releasing screw of the carburetor and release the fuel in float chamber.
- Remove the fuel tube and vacuum (-) pressure tube.
- Taking off the intake clamp.
- Taking off the guide pipe clip.
- Remove the choke cable from carburetor.
- Remove the throttle cable.



Disassembly of carburetor

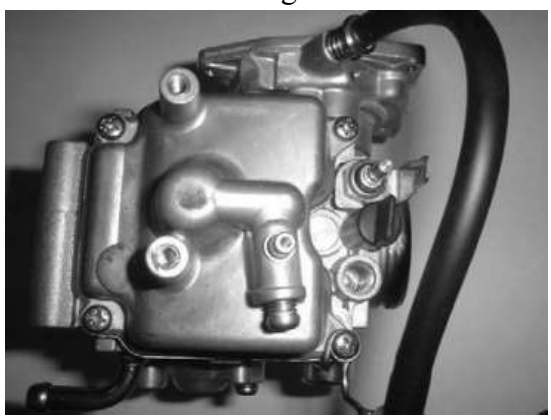
- Remove the float chamber drain plug, O-ring and accelerator pump cover screws



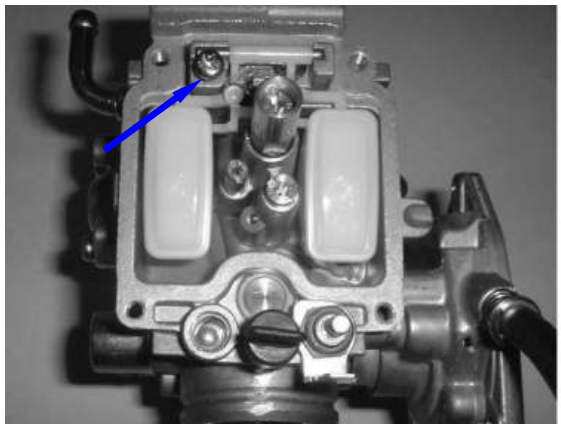
- Remove the accelerator pump cover, diaphragm spring and diaphragm



- Remove the float chamber screws, the float chamber and its O-ring



- Remove the screw and float pin, then remove the float.

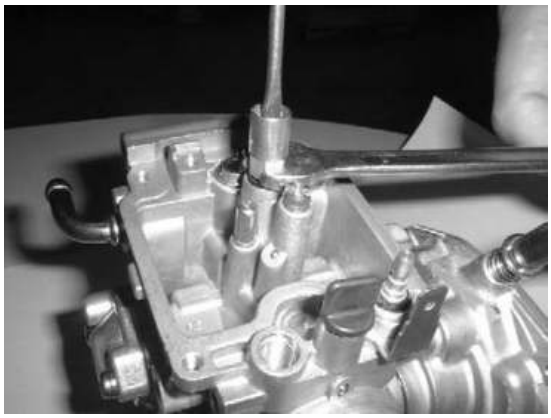


FUEL SYSTEM

- Remove the needle valve

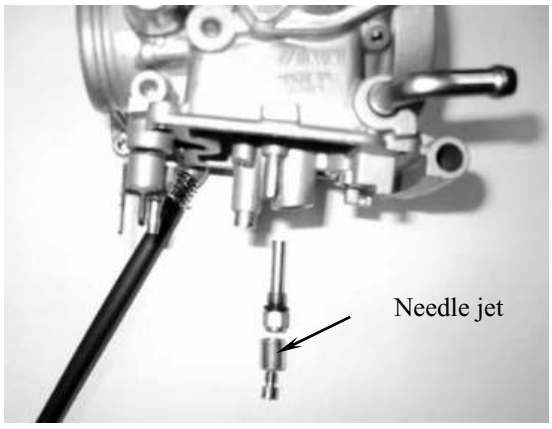


- Using a backup wrench on the needle jet holder, unscrew the main jet, then the needle jet holder and nut.



Warning：
Be ware not to damage the main jet.

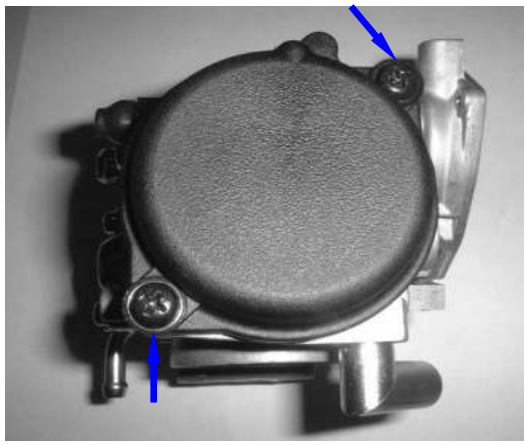
- Remove the needle jet



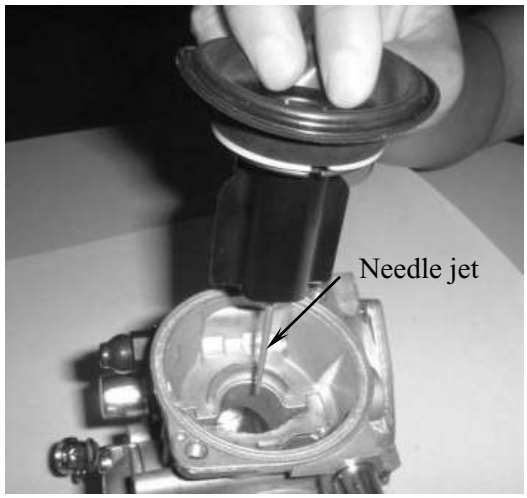
- Unscrew and remove the slow jet



- Remove the throttle valve cover screws, then open the cover

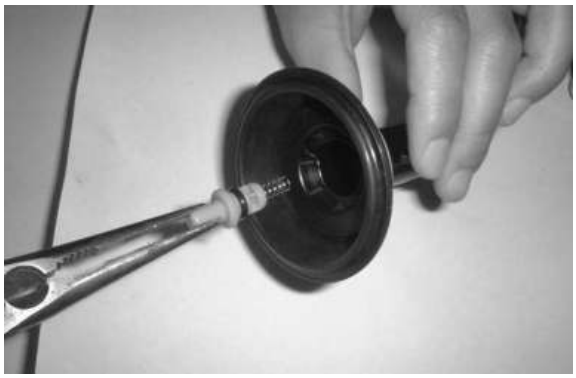


- Remove the throttle valve

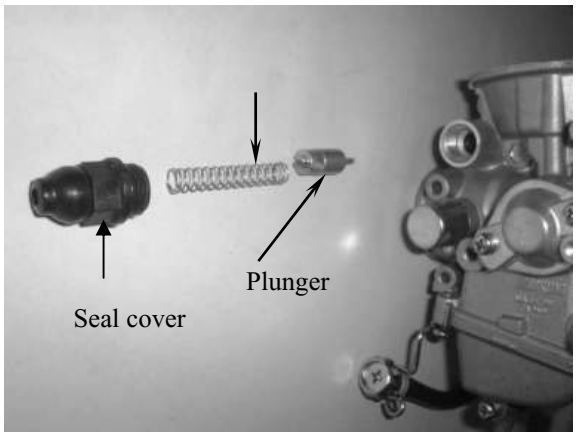


FUEL SYSTEM

- Remove the jet needle
- Set the cir-clip position to adjust the jet needle.



- Remove the seal cover, spring and plunger

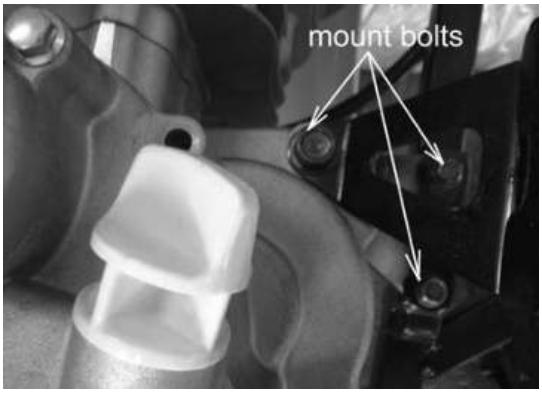


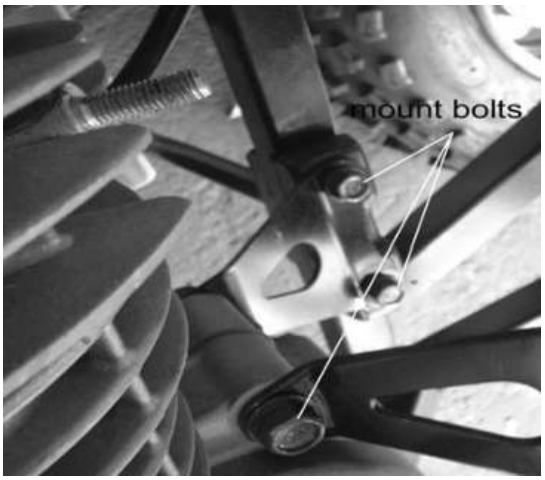
ENGINE REMOVE AND INSTALLATION

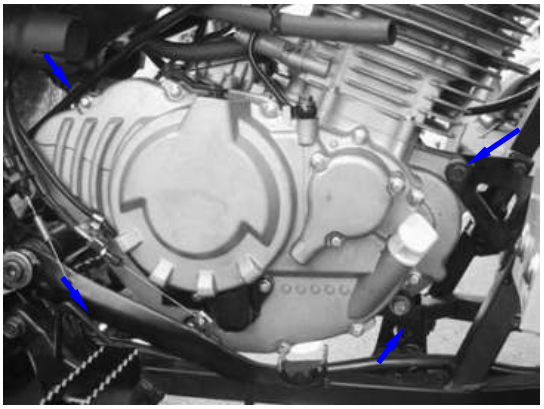
ENGINE REMOVAL

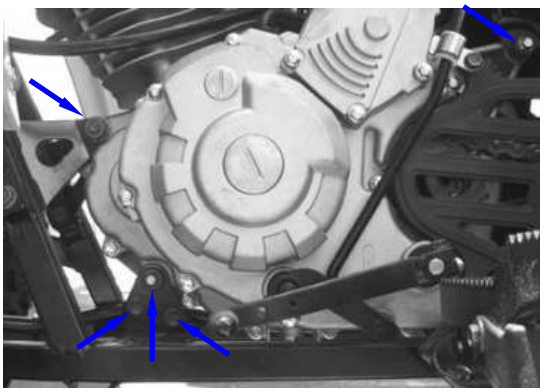
Remove Engine

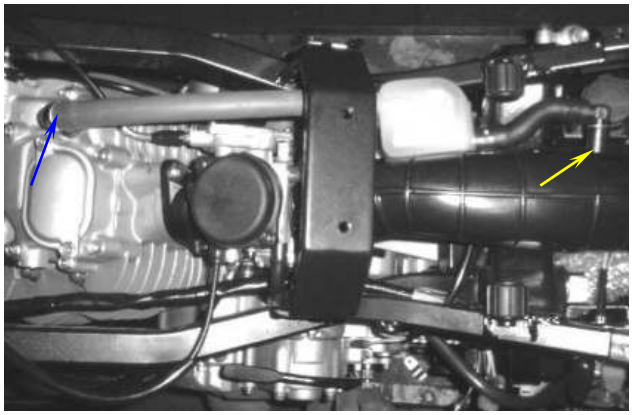
- Drain the engine oil.
- Remove the seat and the left footpeg assembly.
- Remove the body cover assembly.
- Disconnect the negative battery cable.
- Remove the fuel tank.
- Disconnect the crankcase breather tube from cylinder head cover and on cylinder.
- Remove the carburetor.
- Remove the exhaust system.
- Label and disconnect the following wires:
  Spark plug wire
  Alternator (there-pin connector)
  Reverse and neutral switches
  Starter cable
- Disconnect the reverse cable.
- Remove the shift pedal.
- Disconnect the clutch cable from the lifter arm and detach the cable from the bracket.
- Remove the drive sprocket cover, remove the drive sprocket and pull the drive chain back so that it doesn't interfere with engine removal.
- Remove the engine mounting bolts, nuts and brackets at the upper front, upper rear, lower front and lower rear.
- Have an assistant help you lift the engine and remove it from the left side.
- Slowly lower the engine to a suitable working area.
- Remove the external oil pipe on cylinder head cover for bigger clearance to remove the engine.











ENGINE REMOVE AND INSTALLATION

INSTALLATION

- Mounting the engine and tie-up fixed nuts with standard locking torque.

Locking torque：

Fixed M10 nuts on bracket： 4.0 kg-m

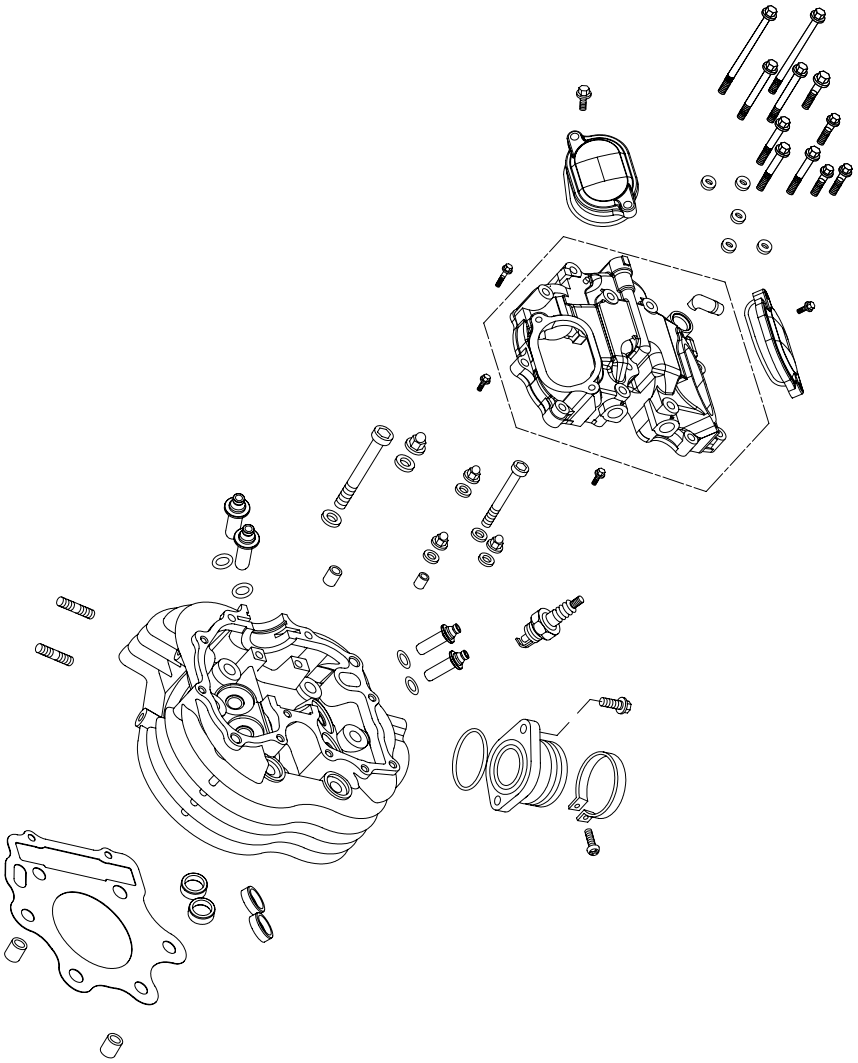
- Place a floor jack under the engine. Again, be sure to protect the engine from the jack head with a block of wood. Lift the engine to align the mounting bolt holes, then install the brackets, bolts and nuts.
- The remainder of installation is the reverse of the removal steps, with the following additions:
  a) Use new gaskets at all exhaust pipe connections.
  b) Adjust the clutch cable and the throttle cable.
  c) Fill the engine with oil. Run the engine and check for leaks.
- Finish mounting the engine; be sure to check the throttle cable tolerance.

Use reversed procedure to setup the parts that has been removed.

NOTE：

※ All cables and wiring has to be set into correct position

CYLINDER HEAD, VALVE



TROUBLE DIAGNOSE

Idle Speed not Stable
- Compression pressure too low
- Bad adjustment of valve clearance
- Valves banded or burn
- Valve timing not correct
- Damage of valve spring
- Sealing of valves and seats abnormal
- Leaking of cylinder head gasket
- Bottom of cylinder head damaged
- Wrong installation of spark plug

Valve gap adjustment 0.08 mm

Compression Pressure too high
- Too much carbon-residue inside combustion chamber.

Emission with White Smoke
- Valves or valve guide attrition
- Oil seal on valve attrition
- Piston ring attrition

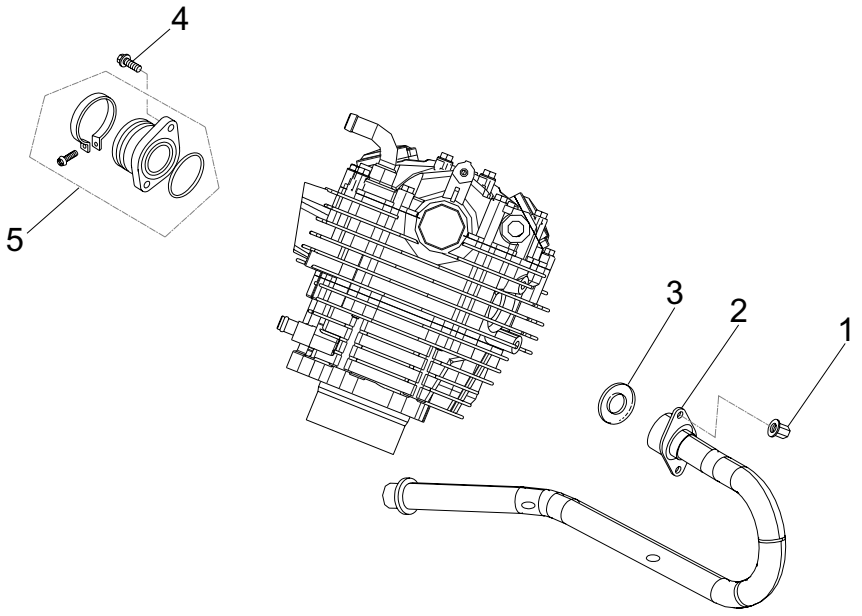
Noise
- Bad adjustment of valve gap
- Valve burn or spring damaged
- Camshaft or rock arm attrition
- Attrition of cam-chain guide comp.

CYLINDER HEAD / VALVE

Attention of Operation

- Can be operated when engine installed on vehicle.
- Must cleaning before operating, avoiding dust enter the engine.
- Remove the gasket dust stay on joint face.
- Avoid to use screwdriver harm the joint face when remove the cylinder & cylinder head.
- Cleaning before check parts, and smear motor oil appointed in sliding face before installing.

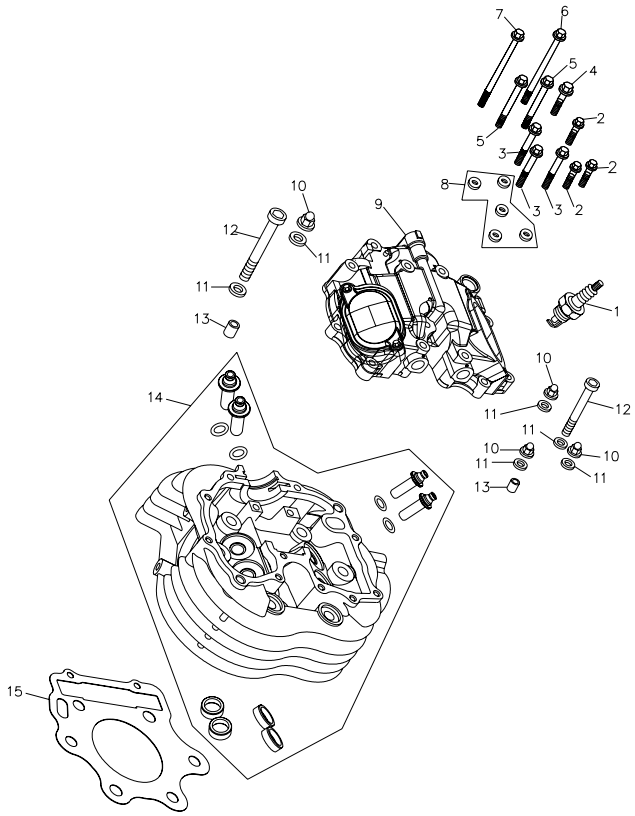
Remove Cylinder Head



SEQ	Operation / Parts Name	Q'ty	Remarks
	Disassembly		
1	Cap nut of exhaust pipe (8mm)	2	
2	Exhaust pipe of front section	1	※ Unscrew the bolts cross-wise for 2~3 times.
3	Exhaust pipe gasket	1	
4	Hex flange bolt	2	※ ***WARNING:*** Don't knock cooling fin.
5	Intake manifold assembly	1	
	Assembly		※ Operation with sequence in reverse of disassembly.
	5→1		※ Tie-up nuts on cylinder head cover 2~3 times.

CYLINDER HEAD / VALVE

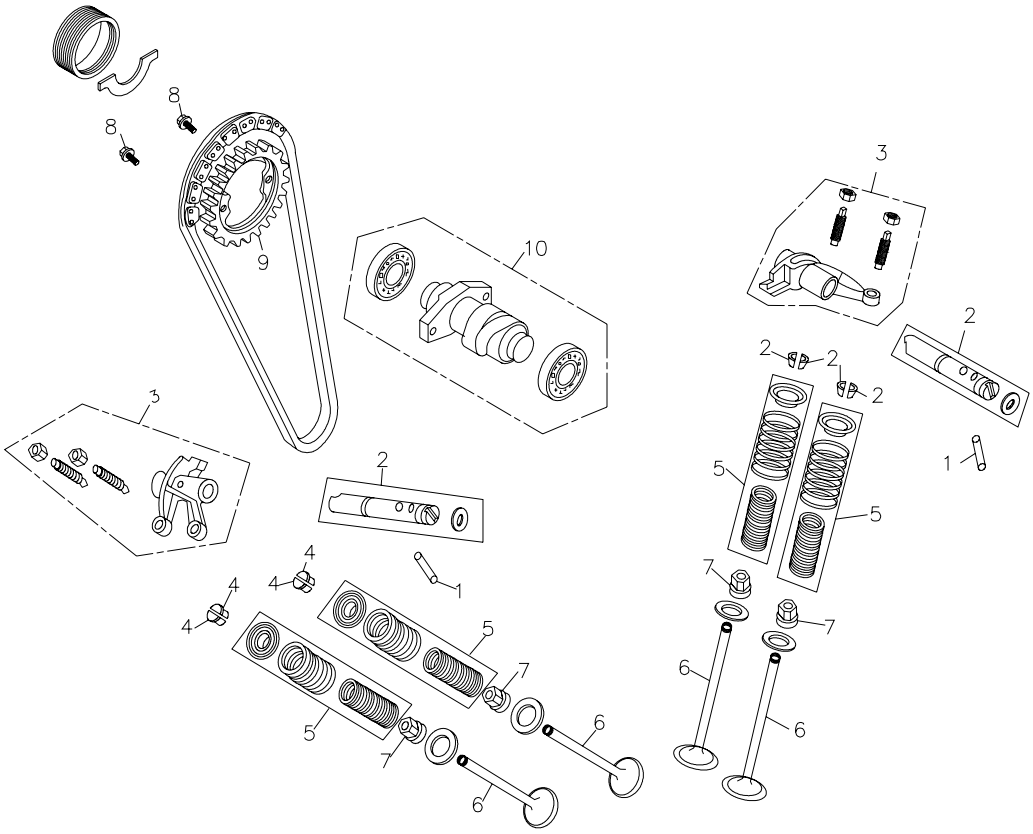
Disassembly the cylinder head



SEQ.	Operation / Parts Name	Q'ty	Remarks
	Disassembly		
1	Spark plug	1	
2	Hex flange bolt	3	※ 6×28
3	Hex flange bolt	3	※ 6×52
4	Hex flange bolt	1	※ 6×35
5	Hex flange bolt	2	※ 6×80
6	Hex flange bolt	1	※ 6×115
7	Hex flange bolt	1	※ 6×136
8	Plain washer	5	※ 6.5×14×1.6
9	Cylinder head cover assembly	1	
10	Hex acorn washer face nut	4	※ M10×P1.5
11	Plain washer	6	※ 10×20×2
12	Hex socket bolt	2	※ 10×105×P1.25
13	Dowel pin	2	※ 8×12
14	Cylinder head	1	
15	Cylinder head gasket	1	※ Check the gasket if wear out or damaged
	Assembly 15→1		※ Operation with sequence in reverse of disassembly.

CYLINDER HEAD / VALVE

Remove the camshaft and valve



SEQ.	Operation / Parts Name	Q'ty	Remarks
	Disassembly		
1	Dowel pin	2	※ The dowel pins are located underneath the
2	Rocker arm shaft comp.	2	cylinder head cover.
3	Valve arm rocket assembly	2	※ Using 8mm bolt to pull out the shaft from R
4	Valve cotter	8	side.
5	Valve spring assembly	4	
6	Inlet/Exhaust valve	4	
7	Valve stem seal	4	
8	Hex flange bolt	2	
9	Camshaft sprocket	1	※ 38T
10	Camshaft comp	1	
	Assembly		
	10→1		※ Operation with sequence in reverse of disassembly.

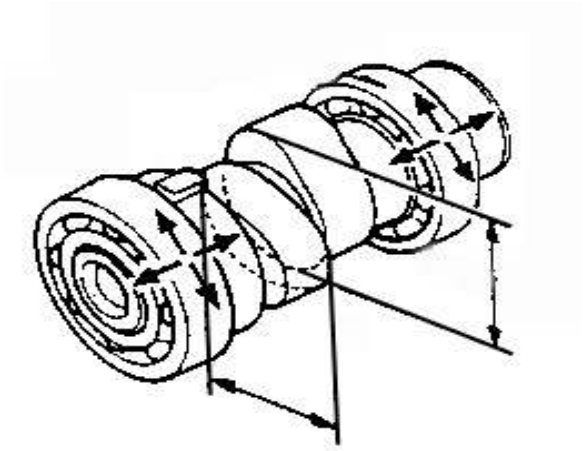
CYLINDER HEAD, VALVE

damaged?

- Check the cam surface to see if it's wear out or

Working limit:

Replace if IN. cam under 35.57 mm
EX. cam under 35.58 mm



- Check the camshaft bearings to see if it's wear out or loose. If it's loose or damaged then change whole set of camshaft

- Check the rock arm and shaft
- Check rock arm inside diameter

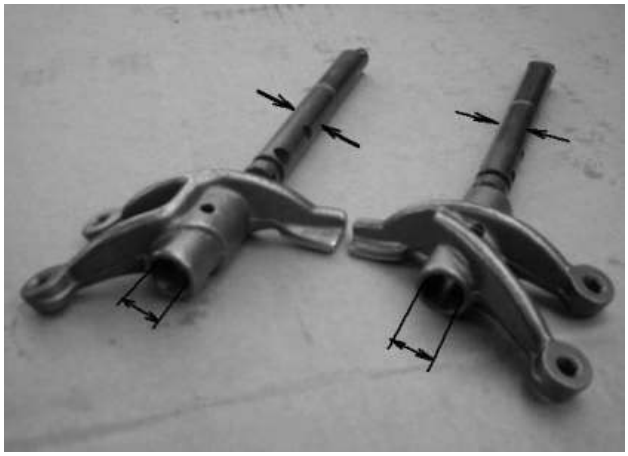
Working Limit:

Replace if over 12.04mm

- Check the rock arm shaft outside diameter.

Working Limit:

Replace if under 11.92mm



Note：

※ If the sliding face of rock arm wear out then check the cam surface of the cam shaft

- Check the gap between rock arm and shaft.

Working Limit:

Replace if over 0.07 mm



Remove valves

Use valve spring holder tool to remove the spring holder, cotter, spring, valve, and seal.

Note：

※ Valve spring must use special tool to disassembly.

※ Parts removed have to place in certain order, assembly in opposite order.

special

Valve spring holder tool：TLH3-03

CYLINDER HEAD, VALVE

Check cylinder head

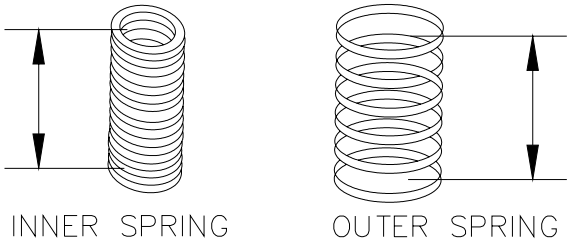
- Check the hole of spark plug and valve guide to see if it's damaged.

Check valve spring free length

Working limit:

Outer spring: Replace under 39.8 mm

Inner spring: Replace under 37.8 mm



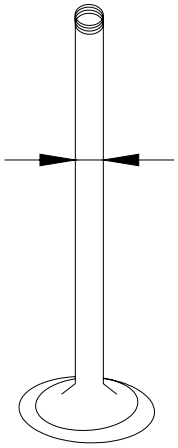
Check valve and valve guide

- Check valve to see if it's burned or banded.
- Check the movement between valve and guide is smooth or not.

Valve outside diameter working limit:
Replace under 5.45 mm

Valve guide inside cylinder head working limit:

Replace if over 5.53 mm



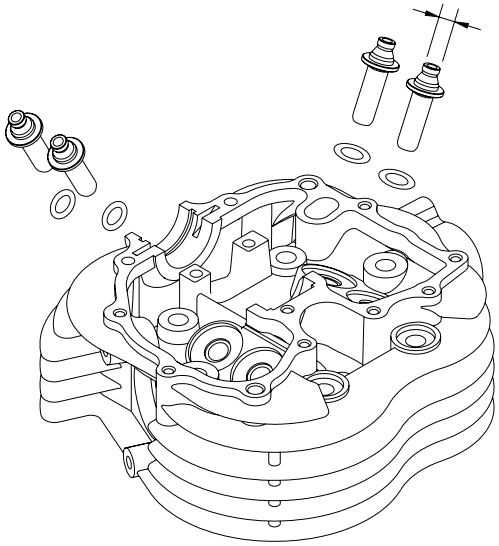
Cylinder head assembly

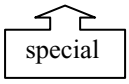
- Install valve seal, spring seat

> **Note：**
> ※ Install new valve seal after removed.

- Install valve into cylinder head with some lubrication oil on seal and spring seat
- Install springs, spring holder, cotter and use special tool to assembly.

> **Note：**
> ※ Must use the special tool.
> ※ Valve cotter sharp edge face toward cylinder head bottom.





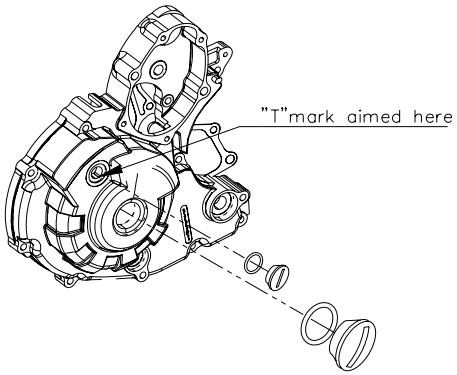
Valve spring holder tool：TLH3-03

- Use rubber hammer hit the valve top for 2 ~ 3 times to have better contact between valve and cotter.

CYLINDER HEAD, VALVE

Camshaft adjustment

- After install the cylinder head, it's necessary to setup the camshaft timing.
- Before put the timing chain on cam sprocket, turn the "T" mark on ACG flywheel aim at the crankcase sign.



CYLINDER, PISTON

TROUBLE DIAGNOSE

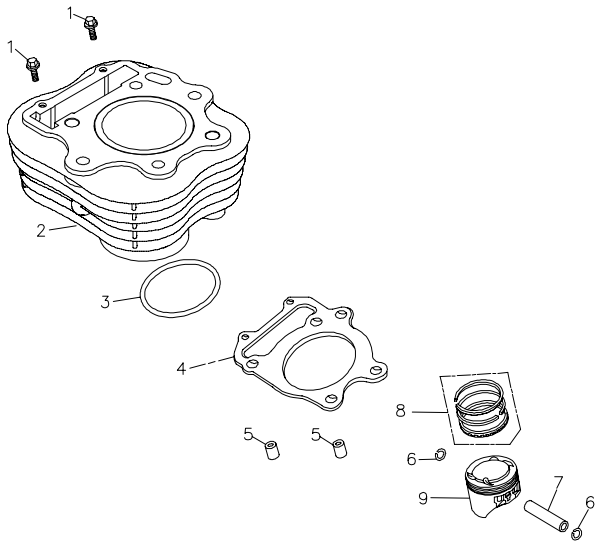
Low compression pressure
- Piston ring wear-out, burn, or broken
- Cylinder, piston wear out or damaged.

Compression pressure too high
- Piston or combustion chamber stocks with carbon material.
- Avoid to harm the cylinder inner surface and piston face.

Exhaust with white smoke
- Piston ring wear-out, burn, or broken
- Cylinder, piston wear out or damaged.

Piston noise
- Piston, cylinder, or piston ring damaged.
- Piston pin and piston wear out

Disassembly of Cylinder / Piston



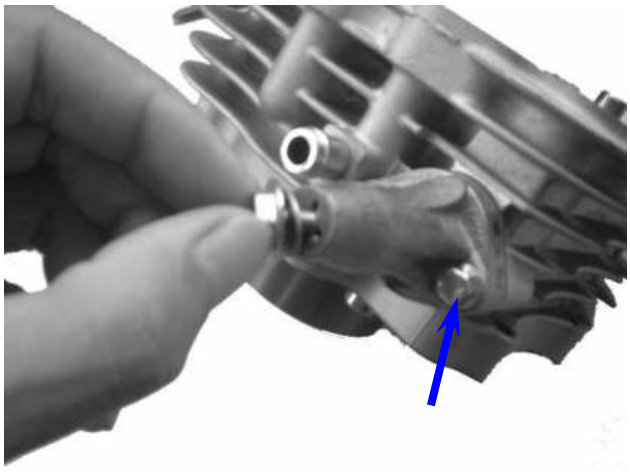
	Operation / Parts Name	Q'ty	Remarks
	Disassembly Cylinder		
	Cylinder and gasket		
1	Hex flange bolt	2	
2	Cylinder	1	※ ***WARNING:*** Don't knock the cooling fin.
3	Oil ring	1	
4	Cylinder gasket	1	※ Clean the gasket stick on crank case.
5	Dowel pin	2	※ Replace if necessary
			※ Replace if deformed
	Disassembly Piston		
6	Piston pin clip	2	※ ***WARNING:*** Don't knock the piston when remove the pin.
7	Piston pin	1	
8	Piston ring set	1	※ Check the piston, piston pin, and piston rings.
9	Piston	1	※ Clean the carbon residual on ring and ditch on piston.
			※ Beware not to break or damage the piston rings.
	Assembly		※ Operation with sequence in reverse of disassembly.
	9→1		

CYLINDER, PISTON

Cam chain tensioner

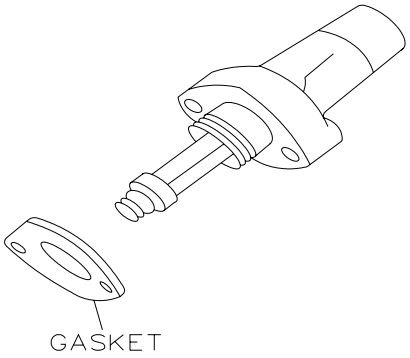
Removal

- Loosen the cam chain tensioner sealing bolt and washer.
- The cam chain tensioner lifter shaft must be retracted and locked into place before removing the tensioner.
- Remove the tensioner mounting bolts and detach the tensioer from the cylinder block.
- Clean all old gasket material from the tensioner body and from its mating surface on the cylinder block.



Installation

- Lubricate the friction surfaces of the components with moly-based grease.
- Install a new tensioner gasket on the cylinder.
- Cut the cable tie and remove the coat hanger wire.
- Install the tensioner sealing bolt and a new sealing washer and tighten the sealing bolt to toque.



Disassembly of Piston

- The piston should have an IN mark on its crown that goes toward the intake side of the engine.



CYLINDER, PISTON

- Wear eye protection and pry the cir-clip out of its groove with a pointed tool.



- Push the piston pin part-way out, then pull it the rest of the way.



Inspection of Piston

- Remove the top and second piston rings.



- Remove the upper oil ring side rail and expander, then remove the lower side rail.



＊Warning：

Be-ware not to scratch the piston during ring removal.

CYLINDER, PISTON

- Measure the piston ring-to-groove clearance with a feeler gauge.



Working limit:

Top ring: replace above 0.11mm
2nd ring: replace above 0.09 mm

- Take-off piston rings and put into the bottom of cylinder.

Note：
＊Use piston to press the ring into cylinder.

- Measure the opening gap of the piston ring when pressed into cylinder.

Working limit:

Top ring: replace above 0.5mm
2nd ring: replace above 0.5mm



- Measure the hole of the piston pin.

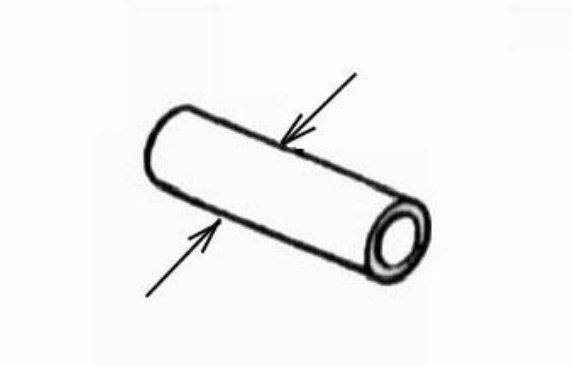
Working limit:

Replace if inside diameter is over 17.04 mm

- Measure outside diameter of piston pin.

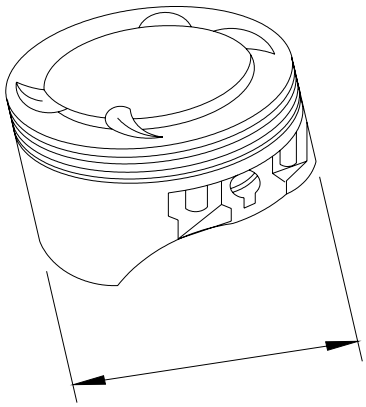
Working limit:

Replace if under 16.96 mm



CYLINDER, PISTON

- Measure outside diameter of piston.

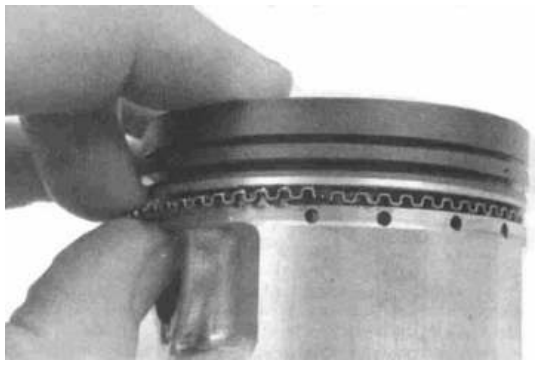


Note：
∗ It's important to measure the outside diameter with vertical position. The measure point is about 5mm away from the bottom.

Working limit:
Replace if under 73.9 mm

Piston rings installation
- Each ring should be greased with oil.

Warning：
∗ Do not scratch piston and do not band piston rings.
∗ The mark on piston ring must face up.
∗ Be sure the rings rotate freely after install into piston.



Piston installation
- Clean the gasket stick on top of crankcase.
- Install piston, piston pin, and clips.

Warning：
∗ The "IN" mark on top of cylinder must aim at the intake valve direction.
∗ Piston pin clip must not drop into crankcase. Use cloth to seal the crankcase.
∗ Check the piston clips is located in fix position

CYLINDER, PISTON

Cylinder Installation

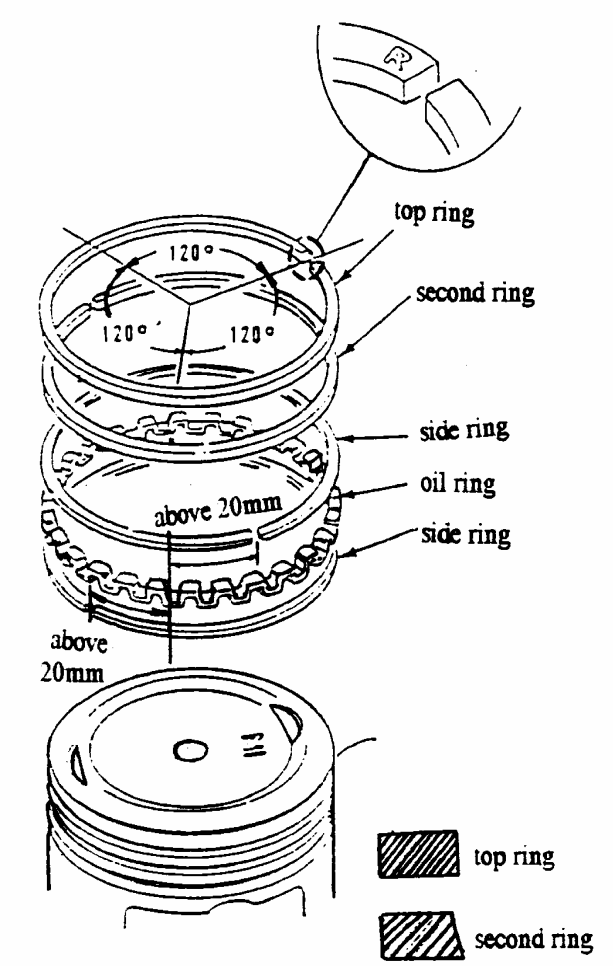
- Put the dowel pins and gasket on top of crankcase.

- Cylinder inside surface, piston, and piston rings must be greased with oil.
- Beware of the pressure from piston ring when install into cylinder.

Warning：

* Be careful not to damage or band the piston ring.
* The opening section of piston rings should not be the same with piston pin and set into 120° to each other.

- Fit the cylinder into correct position.



CLUTCH, STARTING SYSTEM

Trouble Diagnose

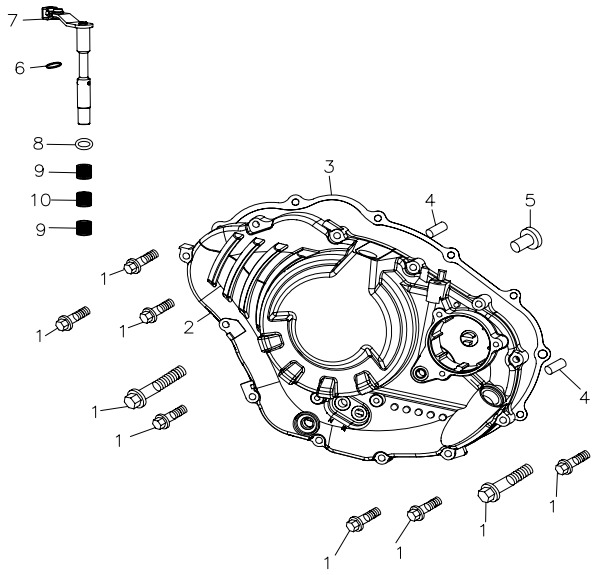
Clutch sliding at accelerating
- Clutch plate wearing.
- Resilience of spring is fatigue.
- Without the free play.

L. side level is too tight
- Clutch wire is damage.
- Connecting-rod institution is damage.

Gear shafting is difficult
- Clutch gap is not setup properly.
- Clutch plate banded.

Clutch plate not opening
- The free play is too big.
- Clutch plate banded.

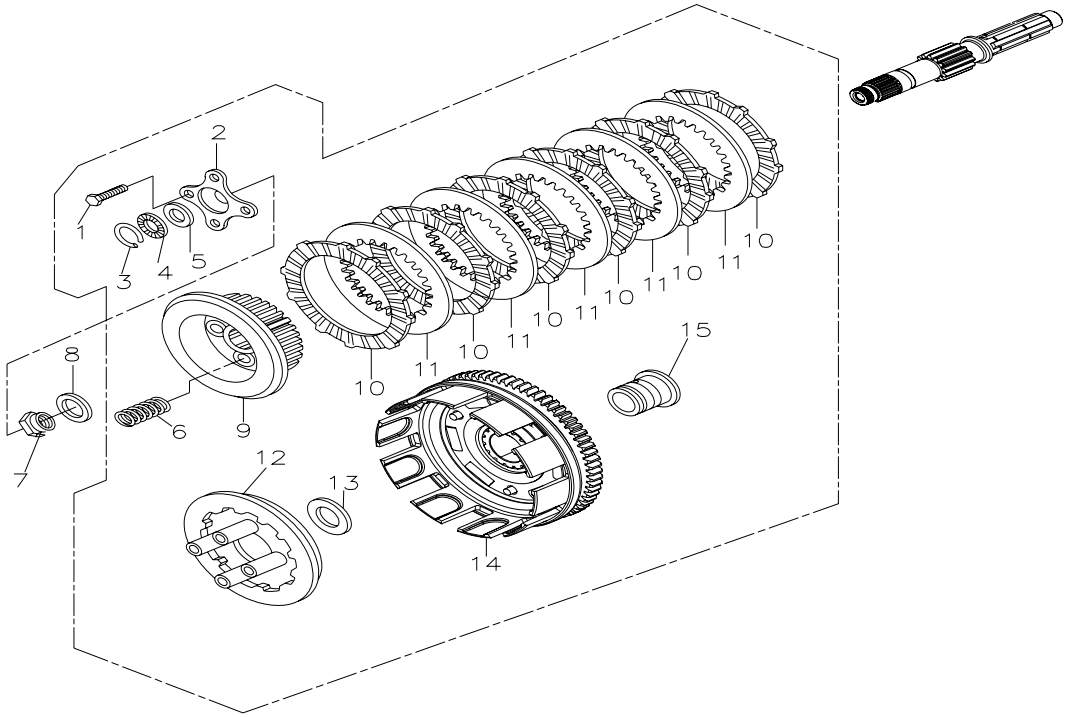
Disassembly of right crankcase cover and clutch lever



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly		
1	Hex flange bolt	12	
2	R. crankcase cover	1	※ Use rubber hammer slightly hit the cover from
3	R. crankcase cover gasket	1	side way for easier removal.
4	Dowel pin	2	※ Replace new gasket after disassembly.
5	Clutch lifter guide pin	1	※ Beware not to damage the pin.
6	Split spring pin	1	
7	Clutch lever comp.	1	
8	Oil seal	1	※ Clean the plate if there is any grimy or dusty
9	Needle bearing	2	material.
10	Clutch lever spring	1	※ Beware not to damage the spring.
	Assembly		※ Operation with sequence in reverse of
	10→1		disassembly.

CLUTCH, STARTING SYSTEM

Disassembly of Clutch system

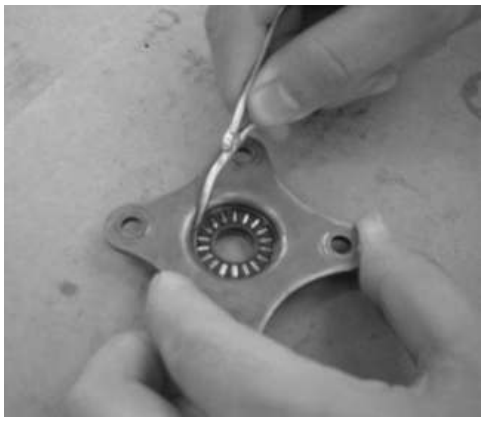


SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly		
1	Hex bolts	4	
2	Clutch lifter plate	1	
3	Cir clip	1	
4	Needle bearing	1	
5	Thrust washer	1	※ Beware not to damage the washer, replace if damaged.
6	Clutch spring	4	
7	Lock nut	1	※ Open the lock section on the nut before removal.
8	Disc spring washer	1	
9	Clutch center	1	※ Band the washer open from the spanner nut first.
10	Clutch friction disk	6	
11	Clutch plate	5	
12	Clutch pressure plate	1	※ Check the friction plate wear out or not.
13	Plain washer	1	
14	Clutch cover comp assembly	1	
15	Oil bush	1	
	Assembly 15→1		※ Operation with sequence in reverse of disassembly.

CLUTCH, STARTING SYSTEM

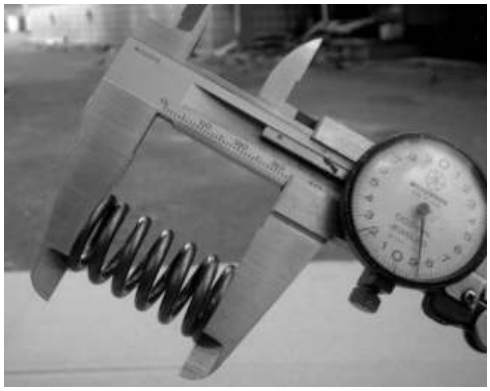
Inspection of clutch

- To replace the needle bearing in the lifter plate, taking out this stop-ring.



- Measure the clutch spring free length.

Spring free length limit: 34.9mm



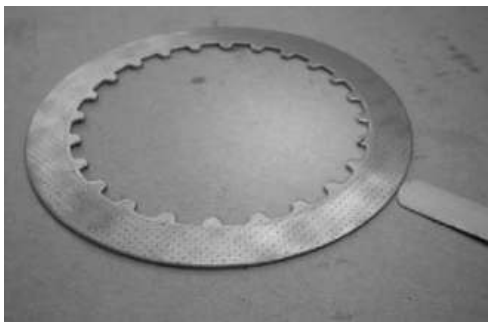
- Measure the thickness of the friction plates.

Working thickness limit:
Replace if under 2.6mm



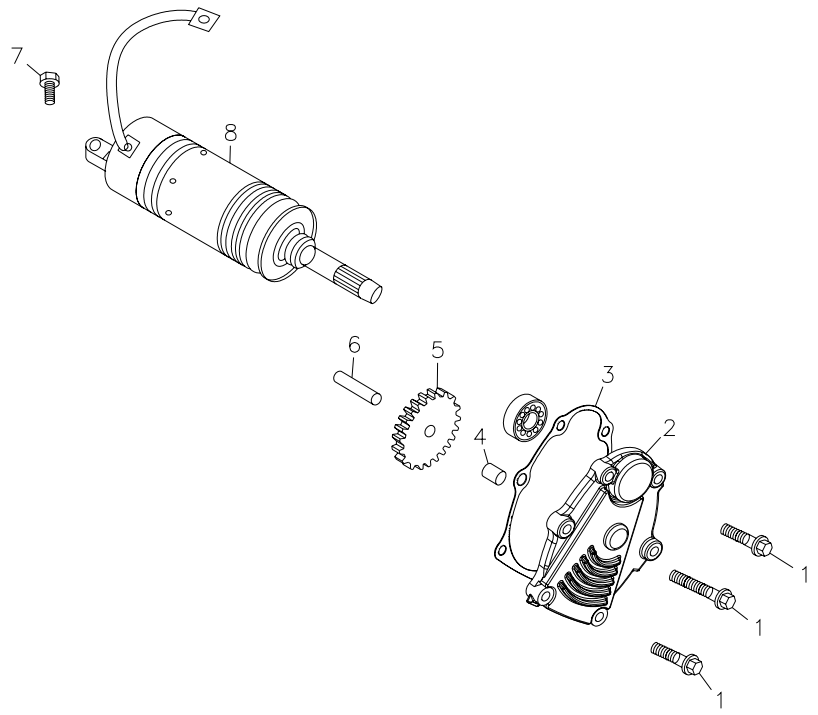
- Check the metal plates for warpage.

Clutch metal plate warpage limit: 0.20mm



CLUTCH, STARTING SYSTEM

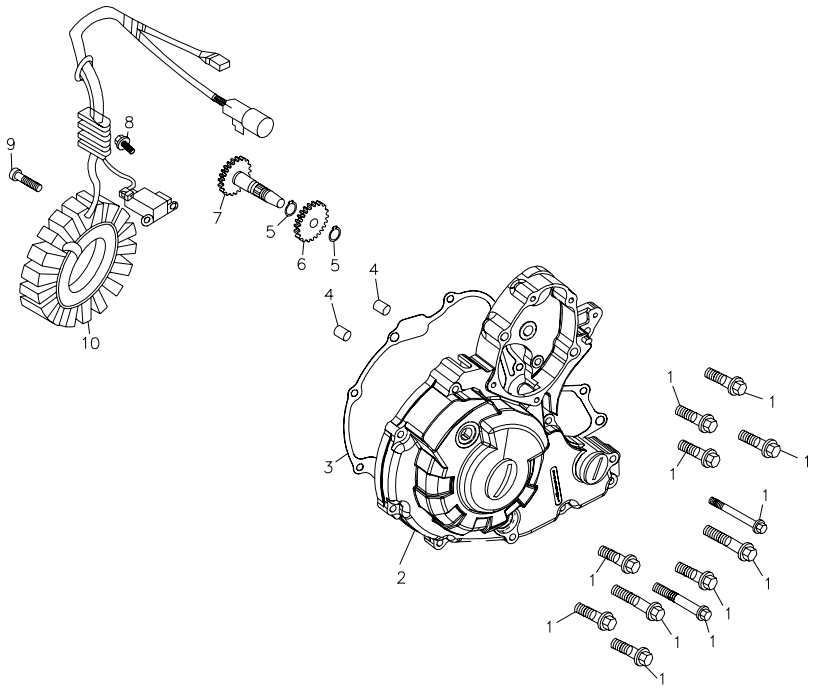
Disassembly of Starter Reduction Gear and Starting Motor



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly		
1	Hex flange bolt	6	※ M6×32, M6×25
2	Reduction cover	1	
3	Starter gear cover gasket	1	
4	Dowel pin	2	※ Do not damage the dowel pins
5	Starter reduction gear comp.	1	
6	Starter reduction gear shaft	1	
7	Hex flange bolt	2	※ M6×25
8	Starter motor assembly	1	
	Assembly		
	8→1		※ Operation with sequence in reverse of disassembly.

CLUTCH, STARTING SYSTEM

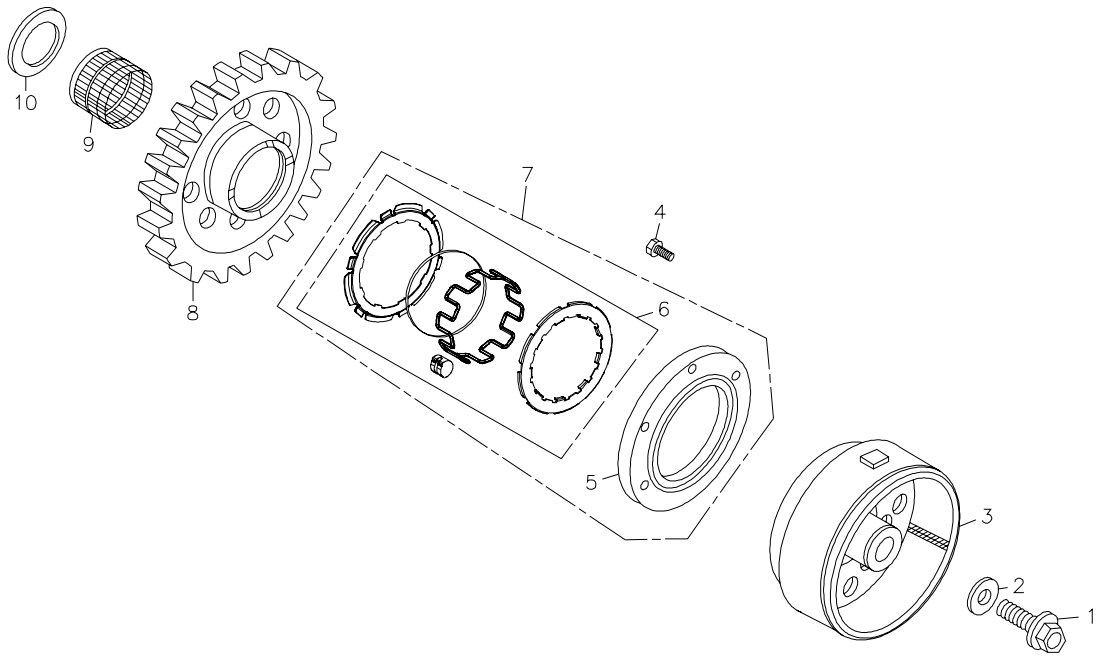
Disassembly of Starter Gear and Generator



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly		
1	Hex flange bolt	12	※ M6×20
2	L. crankcase cover	1	
3	L cover gasket	1	
4	Dowel pin	2	
5	External cir-clip	2	※ STW-15
6	Starter gear	1	
7	Starter reduction gear	1	
8	Hex socket bolt	2	※ M5×14
9	Hex socket bolt	3	
10	Stator comp.	1	※ M6×30
	Assembly		
	10→1		※ Operation with sequence in reverse of disassembly.

CLUTCH AND STARTING SYSTEM

Disassembly of Starter Driven Gear and Starter Clutch assembly



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly		
1	Hex flange bolt	1	※ M12×45
2	Plain washer	1	※ When pull out the flywheel, beware not to lost the
3	Generator flywheel	1	semi-cycle key on crankshaft.
4	Star socket bolt	6	※ Use special tool (TLH3-02) to pull out the
5	Starting clutch outer comp.	1	flywheel
6	Roller assembly	1	※ Start socket bolt：M6×20
7	Starter clutch assembly	1	※ Replace starter clutch set if the roller is damage.
8	Starter driven gear comp.	1	
9	Needle bearing	1	※ 26x31x24
10	Plain washer	1	※ 26.5x40x2.5
	Assembly		
	10→1		※ Operation with sequence in reverse of disassembly.

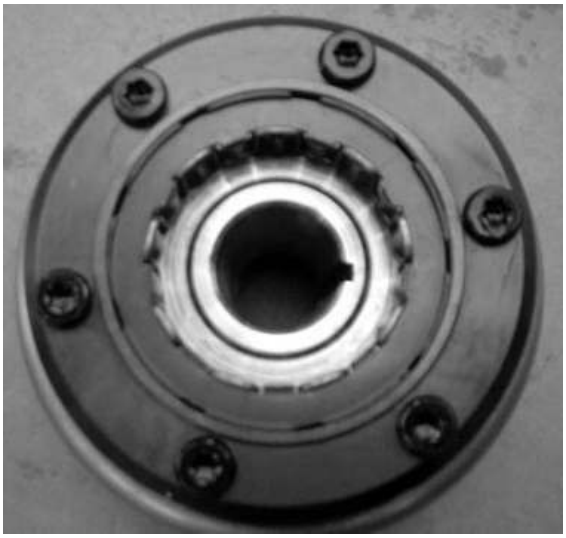
CLUTCH, STARTING SYSTEM

Disassembly the starter clutch

- While holding the rotor, the gear should turn smoothly clockwise, but not all counter clock wise.
- Lift the driven gear off the rotor.



- Remove the 6 star socket bolts then remove the outer clutch and the roller assembly.



- Check the outer clutch and one-way clutch for wear and damage and replace them if any problems are found.



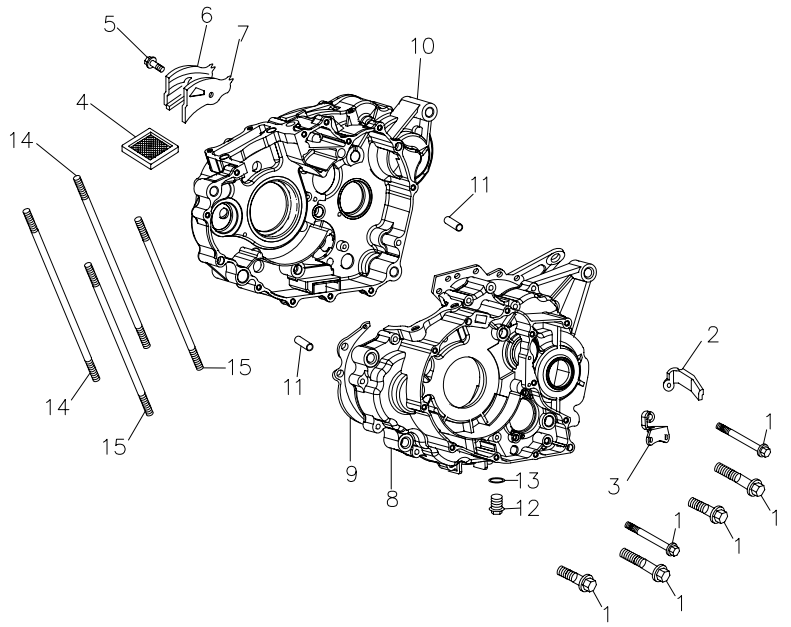
CRANKCASE, CRANKSHAFT

TROUBLE DIAGNOSE

Engine noise

- Loose of crankshaft bearings.
- Loose of bearings inside crankshaft connecting rod.

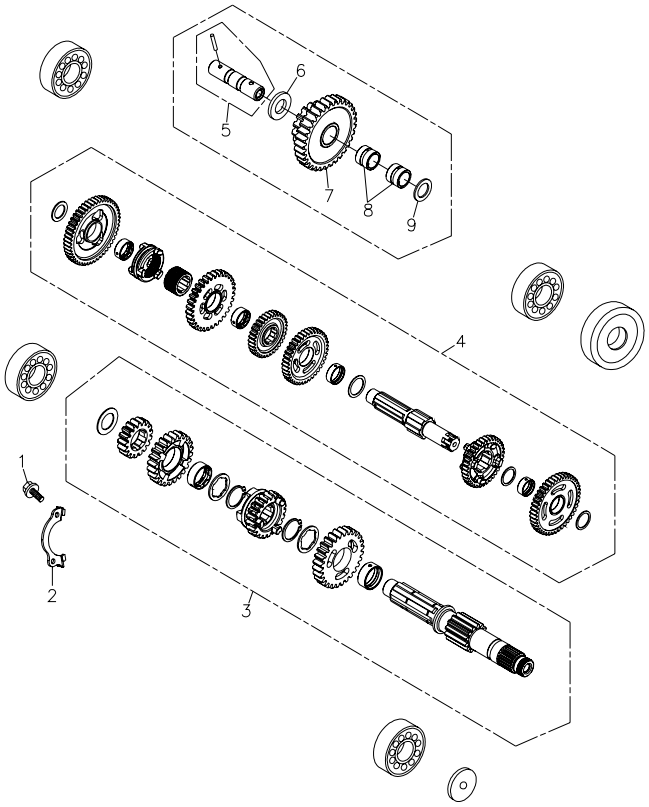
DISASSEMBLY OF THE CRANKCASE



SEQ	Parts Name	Q'ty	Remarks
	Disassembly		
1	Hex flange bolt	14	※ M6×35, M6×45, M6×65
2	Breather tube clamp	1	
3	Clutch wire receiver	1	
4	Oil filter screen	1	
5	Hex socket flange bolt	1	※ M6×12
6	Breather plate	1	
7	Breather plate gasket	1	※ Use rubber hammer slightly hit the gear to remove the crankcase.
8	Left crankcase	1	
9	Crankcase gasket	1	※ Scratch off the gasket which between crankcases and use new gasket after disassembly.
10	Right crankcase	1	※ Do not damage the crankcase surrounding edge.
11	Dowel pin	2	※ Check the oil seal is attrition or not.
12	Hex flange bolt	1	※ M12×15
13	Plain washer	1	※ 12.5×20×2
14	Stud bolt	2	※ The stud bolts are not necessary to remove unless it's banded or defect
15	Stud bolt	2	
	Assembly		
	15→1		※ Operation with sequence in reverse of disassembly.

CRANKCASE, CRANKSHAFT

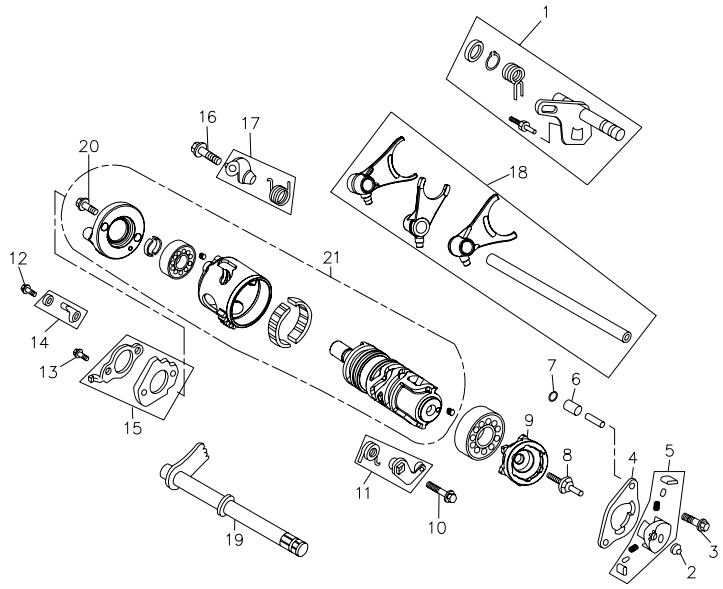
DISASSEMBLY OF THE TRANSMISSION GEAR



SEQ	Parts Name	Q'ty	Remarks
	Disassembly		
1	Hex socket bolt	1	
2	Bearing setting plate	1	
3	Main shaft assembly	1	※ The gear assembly should pull out at the same time with drum shaft assembly.
4	Counter shaft assembly	2	
5	Reverse idle gear shaft	1	※ Beware keep the washer and cir-clip in original order.
6	Thrust washer	2	
7	Reverse idle gear	1	※ The ball and needle bearings are located on crankcase. Check the bearing is functioning well or not.
8	Reverse idle gear bush	1	
9	Thrust washer	1	※ Be-ware of the gear set sequence and assembly direction.
	Assembly		
	9→1		※ Operation with sequence in reverse of disassembly.

CRANKCASE, CRANKSHAFT

DISASSEMBLY OF THE GEAR SHAFT MECHANISM

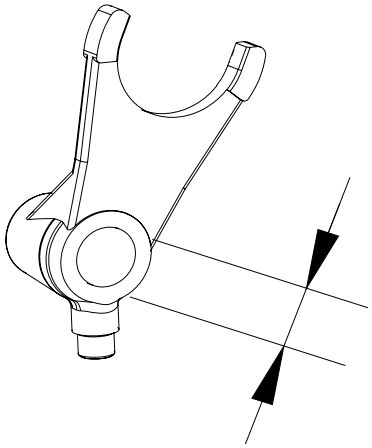


SEQ.	Parts Name	Q'ty	Remarks
	Disassembly		
1	Gear shift arm assembly	1	※ Parts from sequence 1 to 11 are removed during previous L crankcase disassembly.
2	Shifter collar	1	
3	Hex flange bolt	1	※ Parts from sequence 12 to 17 are removed during previous R crankcase disassembly.
4	Guide plate	1	
5	Rotor assembly	1	
6	Bushing	1	
7	Bearing holder plate	2	
8	Shift pin	1	
9	Shift drum center	1	
10	Hex flange bolt	1	
11	Gear shift drum stopper assembly	1	
12	Hex socket bolt	2	
13	Hex washer face bolt	1	
14	Neutral switch rotor comp.	1	
15	Reverse stopper cam comp.	1	
16	Hex flange bolt	2	
17	Reverse shift stopper comp.	1	
18	Gear shift fork assembly	2	※ Check the tolerance between the forks and drum.
19	Gear shift spindle comp	1	
20	Hex socket bolt	1	
21	Gear shift drum assembly	1	
	Assembly		※ Operation with sequence in reverse of disassembly.
	21→1		※ Apply oil during assembly.

CRANKCASE DISASSEMBLY

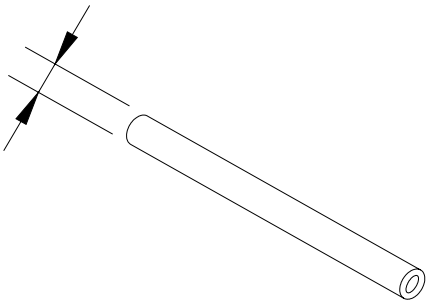
GEAR SHIFT MECHANISM

- Check the small spring locates on the gearshift arm to see if it's too loose or not.
- Check the stopper plate is loose or not.
- Check the roller guide.



Working diameter limit:
Replace if under 5.7mm

- Check the inside diameter of the forks.

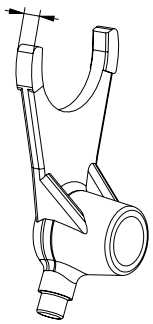


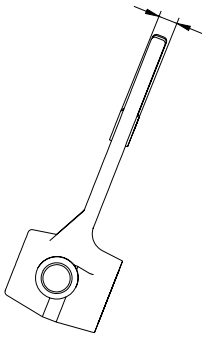
Working diameter limit:
Replace if over 13.04mm

- Check the outside diameter of the forks.

Working diameter limit:
Replace if over 12.96mm

- Check the fork ear thickness applied to gear shaft area.

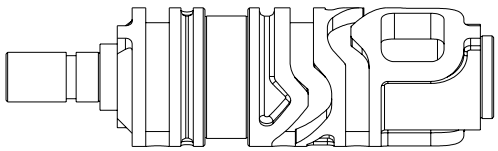




Center gear shift fork R/L gear shift fork

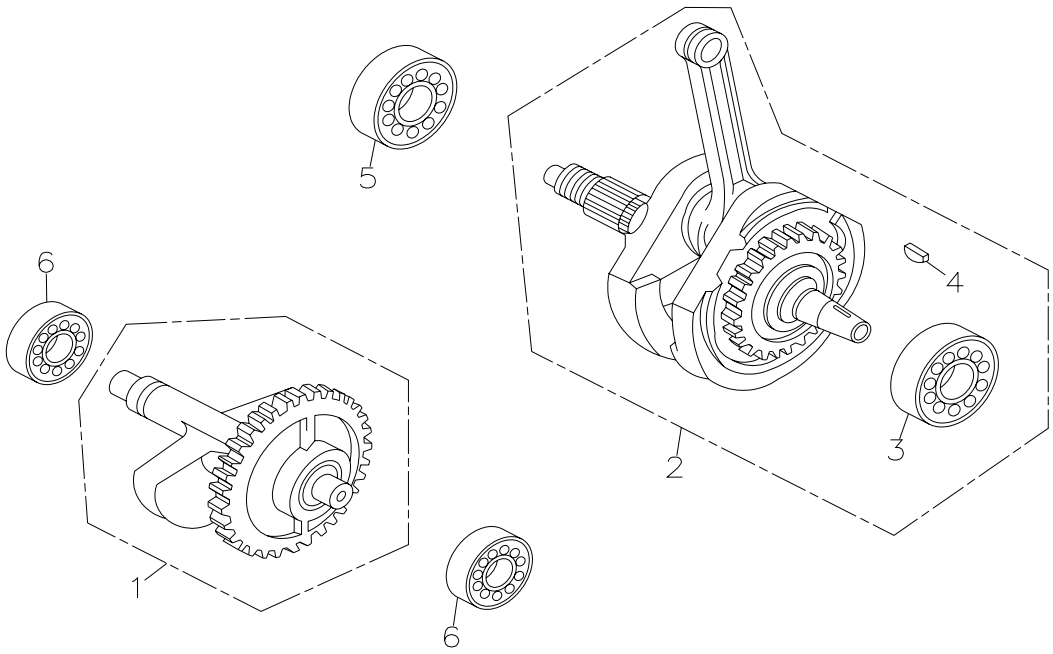
Working diameter limit:
Replace if under 4.50mm

- Check the shift drum grooves for wear, especially at the points.



CRANKCASE, CRANKSHAFT

REMOVE OF THE CRANK SHAFT



SEQ	Parts Name	Q'ty	Remarks
	Disassembly		
1	Shaft comp assembly	1	※ The crankshaft assembly normally is not for disassembly. It will generate more problems if the L/R cranks are disassembled.
2	Crank shaft assembly	1	
3	Radial ball bearing	1	
4	Semi-cycle key	1	※ The semi-cycle key normally was took out when disassembly the flywheel. Beware keep it in certain place to avoid lost.
5	Radial ball bearing	1	
6	Radial ball bearing	1	
	Assembly		
	6→1		※ Operation with sequence in reverse of disassembly.

CRANKCASE, CRANKSHAFT

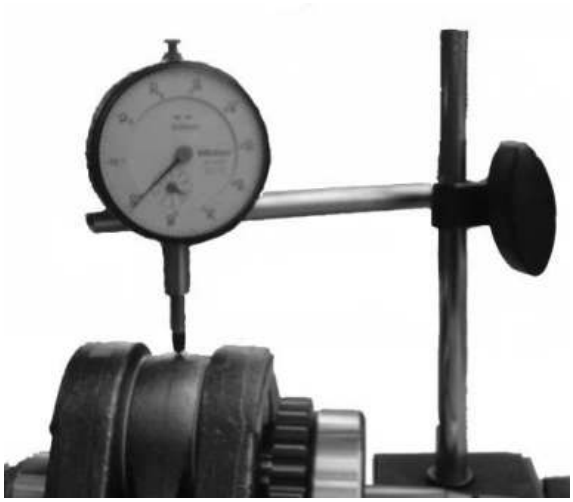
- Check the connecting rod side clearance with a feeler gauge.

The connecting rod side clearance limit is 0.80mm

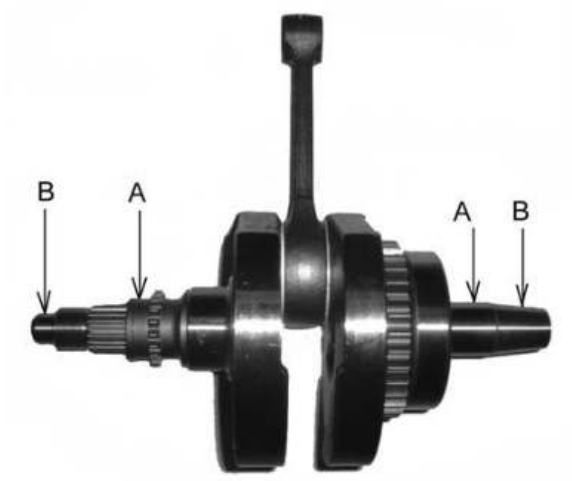


- Check the connecting rod radial clearance with a dial indicator.

The connecting rod big end radial clearance limit is 0.05mm



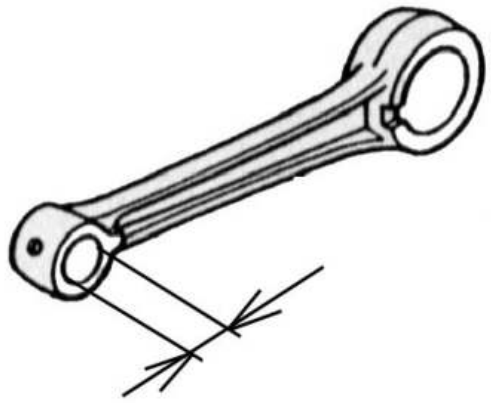
- Place a V-block on each side of the crankshaft (A) and measure run-out at the ends (B)



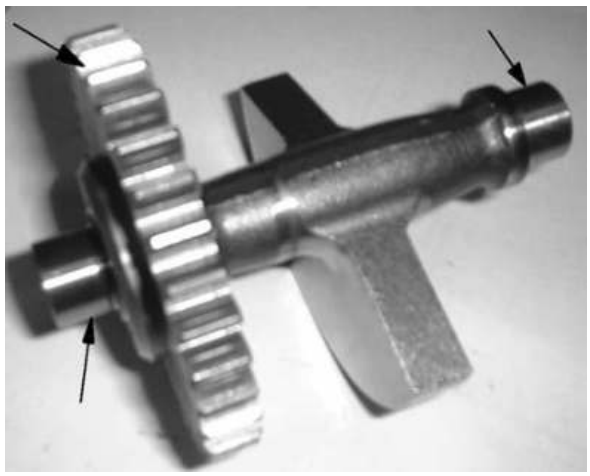
CRANKCASE, CRANKSHAFT

- Check the connecting rod.

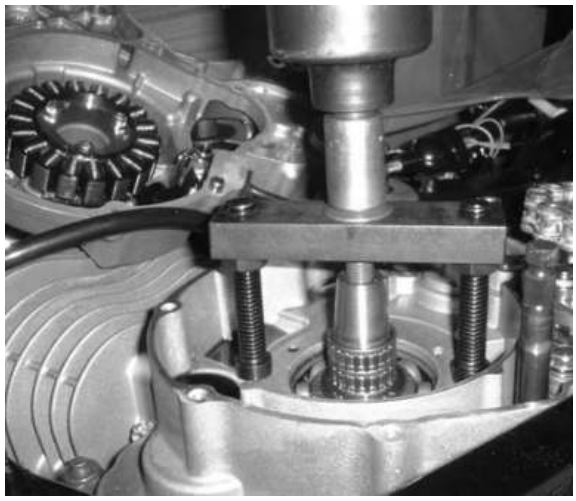
Working diameter limit:
Replace if over 17.10mm



- Check the balancer gear and bearing journals for wear or damage.



- Use a special tool (TLH3-01) to pull the crankshaft and push the left crankcase onto the crankshaft.



FRONT WHEEL / SUSPENSION / STEERING

Attention of Operation

・Remove the body cover and support the frame body bottom before remove the front wheel, don't invert the front wheel when front wheel depart ground.

Diagnosis of Trouble

Heavy steering movement

- Air pressure too low of front tire.
- Rim radial ball bearing broken.

Brake efficiency abnormal

- Brake lining wear-out.
- Brake pads adjust not correct or wear out.
- Brake drum wear-out.
- Tire wear-out.

Steering handle not straight

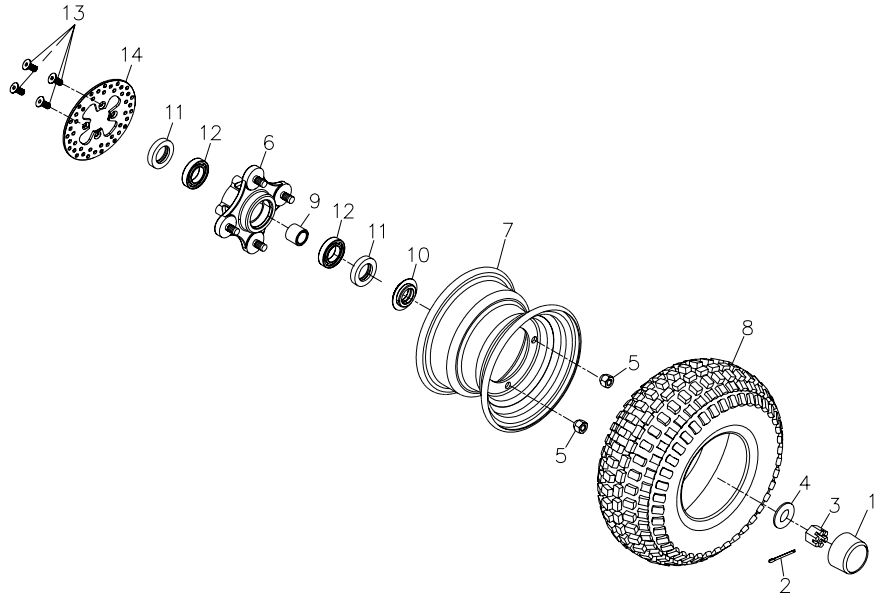
- Loose, not correct adjustment or damaged, right (or left) link Assembly.
- Steering shaft bended.
- Suspension arm, knuckle damaged.

Front wheel shaking or deviation

- Front rim defected.
- Loose or damaged of front rim bearings.
- Tire defect.
- Bad adjustment or defected of the right (or left) link assembly.
- Bad adjustment or defected of the right (or left) knuckle.

FRONT WHEEL / SUSPENSION / STEERING

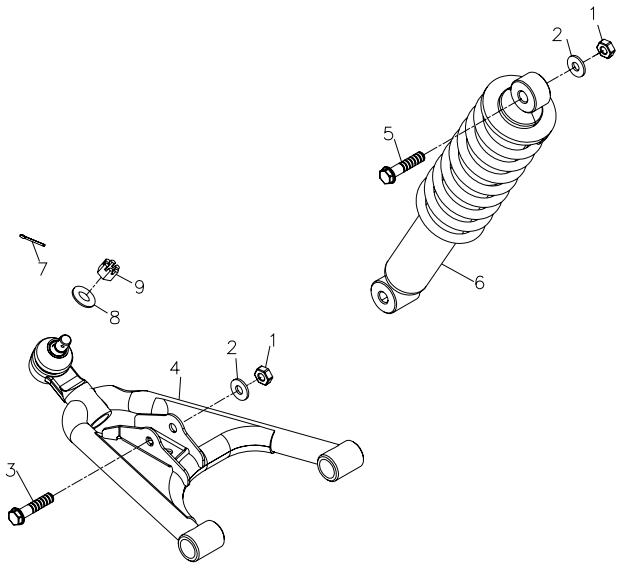
Disassembly of Front Wheels



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly front wheels (L/R)		
1	Rubber cover	2	
2	Cotter pin	2	
3	Scotch nut	2	※ M18
4	Plain washer	2	※ 18×40×4.5
5	Wheel nut	8	※ M10×15
6	Front shaft hub	2	
7	Front rim	2	
8	Front tire	2	
9	Collar	2	
10	Collar	2	
11	Oil seal	4	※ 29.3×43.6×4.5
12	Radial ball bearing	4	※ 6004ZZCM/2A-TO
13	Hex socket bolt	8	
14	Brake disc	2	※ Diameter=164mm
	Assembly wheels 14→1		※ Assembling with sequence in reverse of disassembly. ***WARNING:*** Change the R/L bearing set if necessary.

FRONT WHEEL / SUSPENSION / STEERING

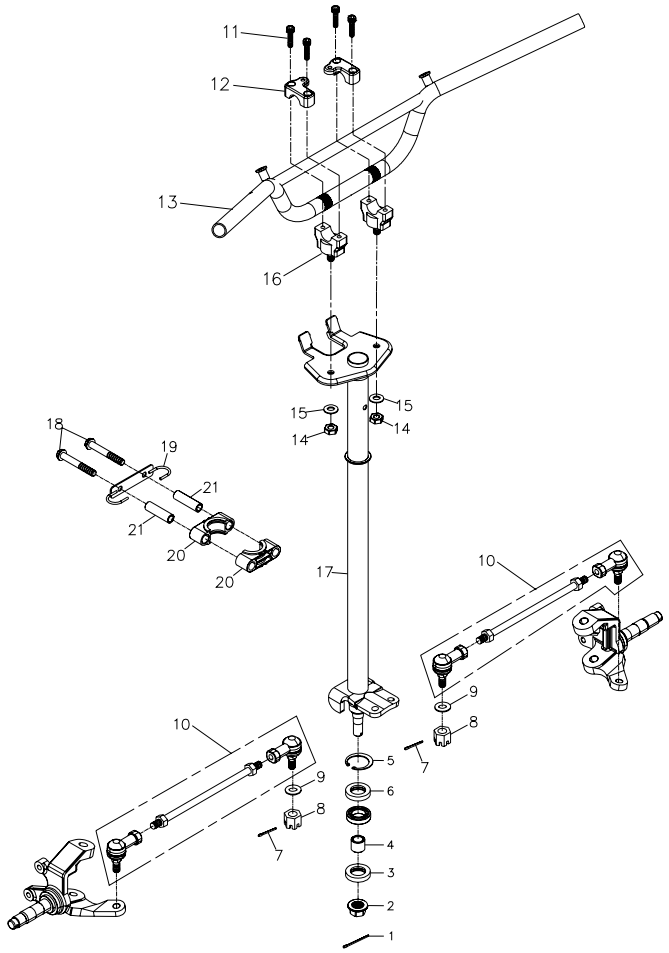
Disassembly of Suspension Arm



	Operation / Parts name	Q'ty	Remarks
	Disassembly (L/R)		
1	Hex flange lock nut	2	※ M10
2	Plain washer	2	※ 10×20×2
3	Hex washer face bolt	1	※ 10×55
4	L/R down suspension arm	2	
5	Hex flange bolt	1	※ M10×40
6	Front cushion assembly	2	※ 3×32
7	Cotter pin	2	※ 12×22×2
8	Plain washer	2	※ M12
9	Scotch nut	2	
	Assembly 9→1		※ Assembling with sequence in reverse of disassembly.

FRONT WHEEL / SUSPENSION / STEERING

Disassembly of Steering Shaft Assembly



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly steering shaft Ass'y		
1	Cotter pin	1	
2	Nylon nut	1	
3	Oil seal	1	
4	Steering shaft bushing	1	
5	Internal cir-clip	1	
6	Oil seal	1	
7	Cotter pin	2	
8	Scotch nut	2	※ M10
9	Plain washer	2	※ 10x20x2
10	Tie-rod assembly	2	
11	Hex socket bolt	4	※ 6x25
12	Handle bar clamp	2	
13	Handle bar	1	
14	Nylon nut	2	※ M10xP1.25
15	Plain washer	2	※ 10x22x2.5

FRONT WHEEL / SUSPENSION / STEERING

Disassembly of Steering Shaft Assembly

SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly knuckles		
16	Handle bar bottom clamp	2	
17	Steering shaft assembly	1	
18	Hex washer face bolt	2	※ 10×65
19	Bracket	1	
20	Steering shaft holder	2	
21	Holder spacer collar	2	
	Assembly steering shaft Ass'y 21→1		※ Assembling with sequence in reverse of disassembly. ※ ***WARNING:*** Adjusting gap of throttle.

REAR WHEEL / SUSPENSION / BRAKES

Diagnosis of Troubles

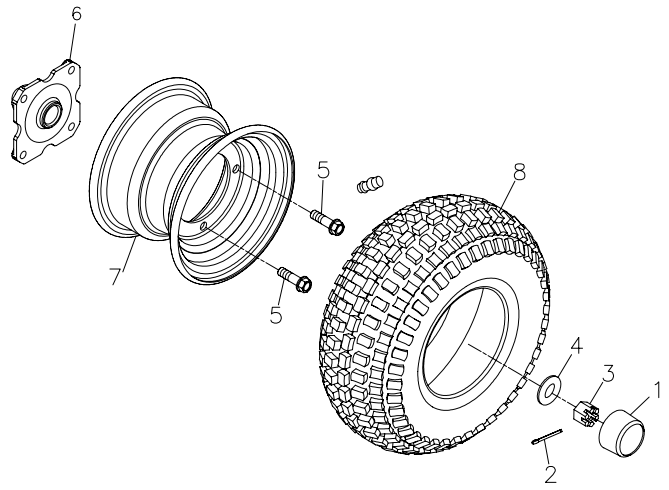
Rear wheel shaking or deviation

- The shape of rear rim damaged.
- Rear wheel axle damaged.
- Swing arm sub Ass'y damaged
- Rear rim bearing defected.
- Rear suspension too soft
- Spring too soft or adjust not correct.

Brake efficiency abnormal

- Brake lining wear-out.
- Brake pads adjust not correct or wear out.
- Brake drum wear-out.
- Tire wear-out.

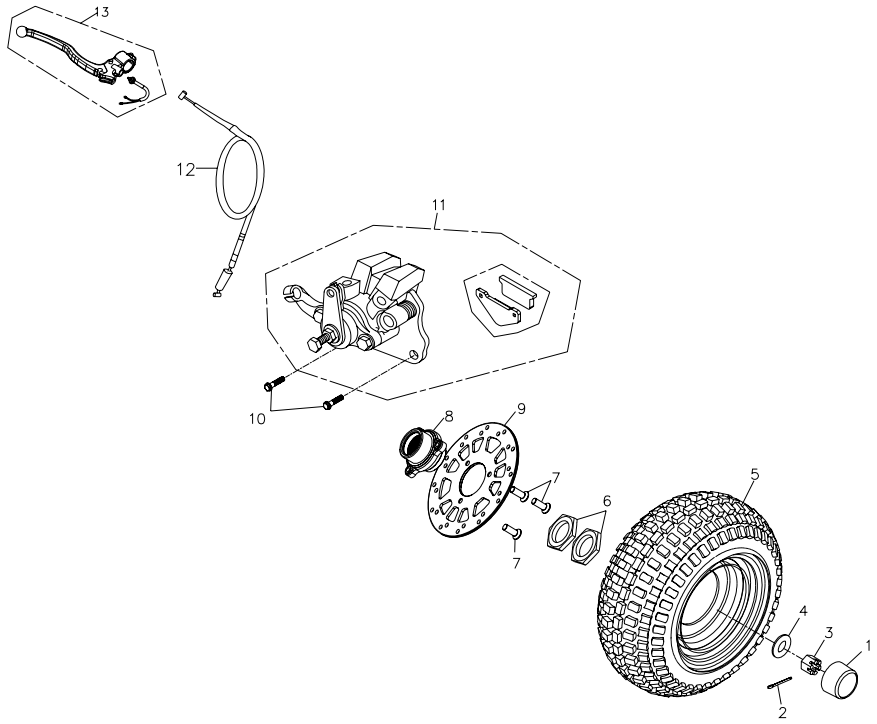
Assembly/Disassembly Rear Wheel



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly Wheels		
1	Rubber cover	2	
2	Cotter pin 3*32	2	
3	Scotch nut	2	
4	Plate washer 18*40*4.5	2	
5	Hex washer face bolt 10*20	4	
6	Shaft connector	2	
7	Rear rim	2	
8	Rear tire	2	
	Assembly 8→1		※ Assembling with sequence in reverse of disassembly.

REAR WHEEL / SUSPENSION / BRAKES

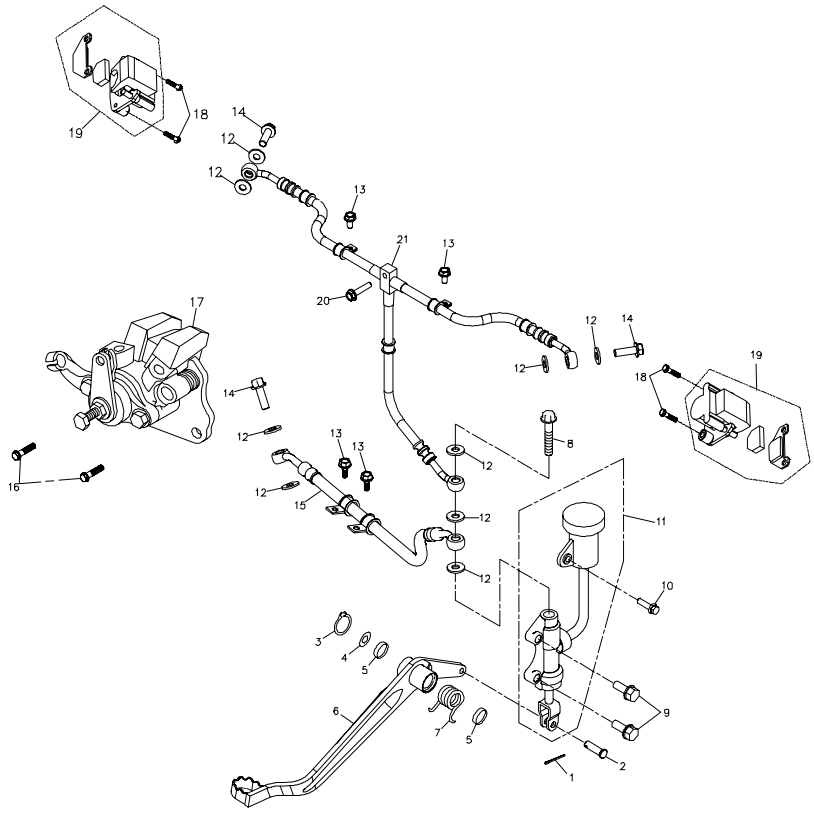
Disassembly of Parking Brake and Rear Disc



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly parking brake		
1	Rubber cover	1	
2	Cotter pin	1	
3	Scotch nut	1	
4	Plain washer	1	
5	Rear wheel assembly	1	
6	Hex nut	2	
7	Hex socket bolt	3	※ M8×18
8	Rear brake panel connector	1	
9	Rear brake disk	1	
10	Hex washer face bolt	2	※ 10×28
11	Rear brake caliper assembly	1	
12	Parking brake cable	1	
13	Right lever assembly	1	
	Assembly 13→1		※ Assembling with sequence in reverse of disassembly.

REAR WHEEL / SUSPENSION / BRAKES

Disassembly of Brake System



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly brake system		
1	Cotter pin	1	※ 2x20
2	Fix pin	1	
3	External cir-clip	1	※ STW-16
4	Plain washer	1	
5	Oil ring	2	
6	Brake pedal comp	1	
7	Return spring	1	
8	Oil tube fixing bolt	1	※ 10x35
9	Hex flange bolt	2	※ M8x25
10	Hex washer face bolt	1	※ 6x15
11	Rear master cylinder sub assembly	1	※ 10.2x15x1
12	Copper plain washer	9	※ 6x12
13	Hex washer face bolt	5	※ 10x22
14	Brake hose hex bolt	3	
15	Rear brake hose	1	
16	Hex washer face bolt	2	※ 10x28
17	Rear brake caliper assembly	1	

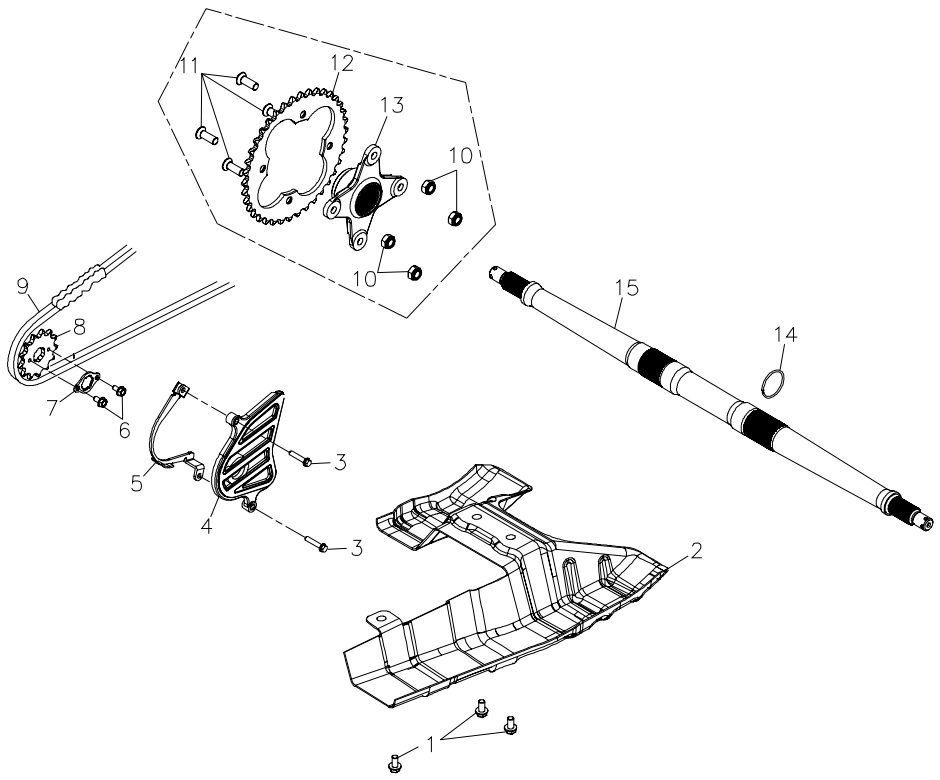
REAR WHEEL / SUSPENSION / BRAKES

Disassembly of Brake System

SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly brake system		
18	Hex flange bolt	4	※ M8×22
19	Front brake caliper assembly	2	
20	Hex flange bolt	1	※ M6×20
21	Back hose	1	
	Assembly 21→1		※ Assembling with sequence in reverse of disassembly.

REAR WHEEL / SUSPENSION / BRAKES

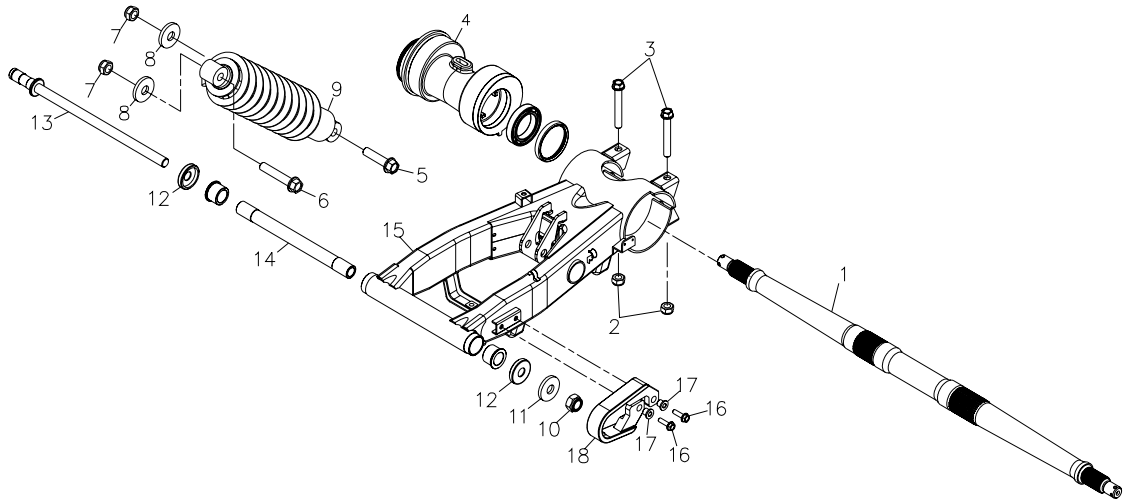
Disassembly / Assembly of Rear sprocket Assembly



SEQ	Operation / Parts name	Q'ty	Remarks
	Disassembly Rear Brake		
1	Hex flange bolt M8*15	3	
2	Chain protect cover	1	
3	Hex flange bolt 6*30	2	
4	Front chain protect	1	
5	Drive chain guide	1	
6	Hex bolt 6*10	2	
7	Drive sprocket fixing plate	1	
8	Drive sprocket assembly	1	
9	Drive chain assembly	1	
10	Nylon nut M10*P1.25	4	
11	Hex socket flat head bolt	4	
12	M10*27	1	
13	Drive sprocket	1	
14	Rear sprocket flange	1	
15	External cir-clip	1	
	Rear wheel axle		
	Assembly 15→1		※ Assembly with sequence in reverse of disassembly.

REAR WHEEL / SUSPENSION / BRAKES

Disassembly / Assembly of Swing arm sub Assembly & Rear Cushion



SEQ	Operation / Parts name	Q'ty	Remarks
1	Rear wheel axle	1	
	Disassembly rear cushion Ass'y		
2	Nylon nut	1	
3	Hex flange bolt	1	
4	Rear axle holder	1	
5	Hex flange bolt	1	
6	Hex flange bolt	1	
7	Nylon insert lock nut	2	
8	Plain washer	2	
9	Rear cushion assembly	1	
	Disassembly swing arm sub Ass'y		
10	Nylon nut	1	
11	Plain washer	1	
12	Swing arm seal cover	2	
13	Swing arm bolt	1	
14	Collar	1	
15	Swing arm sub assembly	1	
		2	
16	Hex flange bolt	2	
17	Bushing	1	
18	Rubber bushing		
	Assembly		
	Rear cushion 9→2		※ Assembly with sequence in reverse of disassembly.
	Swing arm sub 15→10		

ELECTRICAL DEVICE

Attention of Operation

WARNING：

∗ Battery electrolyte contains sulfuric acid, which can cause severe burns. Avoid contact of skin, eyes, or clothing

∗ When sulfuric acid water spill into clothing will stick to skin. Take off the clothing and flush with water.

- Battery can be charged and discharged. Without charging, the battery will have less lifetime.
- If the battery have short circuit inside, both terminal will not have voltage existed. Besides, the regulator rectifier lost the function and shorter lifetime.
- If the battery stay too long without use, it will lost power and have less capacity. The battery need to charge each 2~3 months.
- After fill up the electrolyte, the new battery will generate voltage. It's necessary to recharge if the voltage is low. It's necessary to leave the battery for more than 20 minutes before sealing the cap. It will increase the lifetime of new battery if recharged before installed.
- Do not unplug the electrical components from wire hardness when the current is working. This will cause too high of voltage and damage other compounds such as rectifier, light bulbs…etc. Turn off the main switch to OFF before the operation.
- The Maintenance Free battery does not need to refill electrolyte or water.
- All charge system needs to be installed before check.
- Do not use quick charge unless it's in urgent.
- The battery needs to be taking out from vehicle when doing charge work.
- When checking the voltage, must use the electrical meter.

Diagnosis of troubles

No Electrical Power

- Over discharged of the battery
- Wire hardness did not connected to the battery
- Fuse broken
- Main switch defect

Low Voltage

- Battery charges insufficient
- Bad connection
- Regulator rectifier defect

No Continues Current

- Bad contact of battery with main wire hardness
- Bad connection of charge system
- Bad contact of the lighting system cause short circuit

Charge System no function

- Bad connection of the wire hardness connectors
- Main wire hardness broken or short-circuit
- Regulator rectifier defect
- AC Generator defect
- Fuse broken

ELECTRICAL DEVICE

Check Voltage of Battery

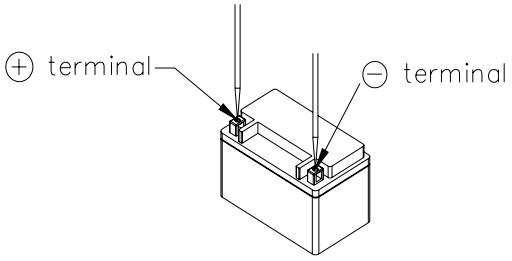
- Remove rubber strap on battery , disassembly connection wires of battery , check voltage between battery terminals.

Charging sufficiently: over 12.8 V

Charging insufficiently: 11.5-12.8V

※ ***WARNING:***

- Must check battery voltage with digital voltmeter.
- Remove the negative (-) cable first.



Check Charging Status

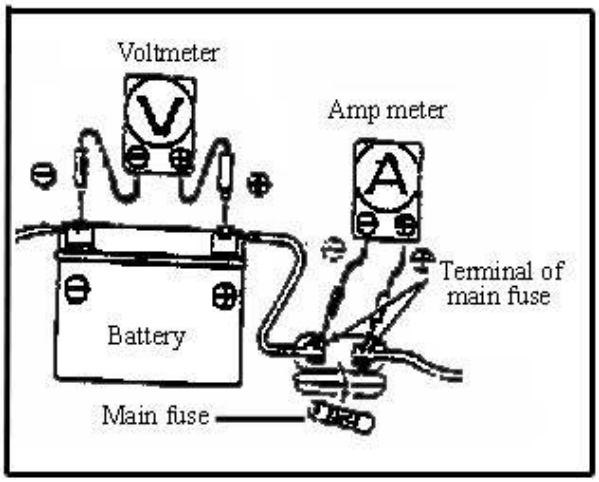
NOTICE:

- Check battery voltage when battery charged completely, over 12.8 V.
- Engine starting will consume a lot power of battery.
- Assembly voltmeter to terminal of main fuse, start engine, open light, raising RPM and check charging voltage & current.

Charging current: 0.5~2 Amp/5000rpm

Voltage of charging control:

14~15V/5000rpm



Check Voltage of Head Light

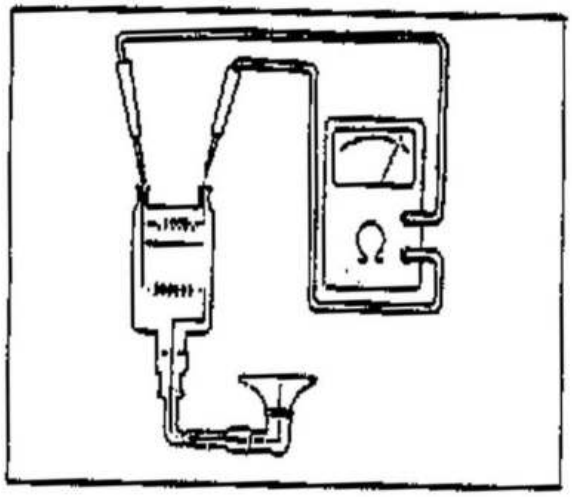
※ ***Operation procedure:***

Check head light with wires connecting.

- Start engine, turn “ON“ light switch, open high beam.
- Check voltage between green (+) & black (-) guide wires.
- Control Voltage: 11~15V.AC/5000rpm

ELECTRICAL DEVICE

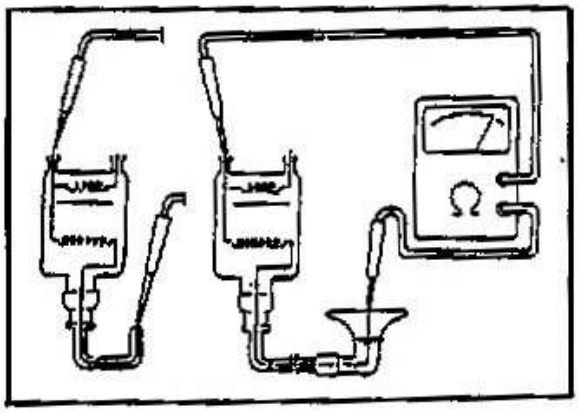
Ignition Coil Conduction Test



• Check first coil resistance of ignition terminal.

Standard valve (20℃): 0.1~0.3Ω

> ***WARNING:***
> Check ignition status with performance tester due to this test has its own standard.



- Check second coil resistance between spark plug cap & (-) terminal.
  Standard valve : 10.5~15.5 kΩ
  (spark plug cap installed)
- Remove spark plug cap from high tension coil.
- Check second coil resistance between high voltage & (-) terminal.
  Standard valve : 2.5~4 kΩ
  (without spark plug cap)

Remove main switch

- Disconnect main switch wire.
- Pull the main switch Bracket inside front cover.
- Push the stopper on main switch underneath front cover then push out the main switch.

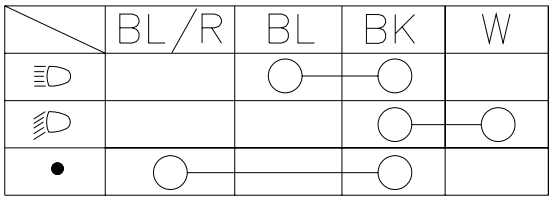
Check main switch

Remove connector of main switch wire, check conductivity between each terminal.

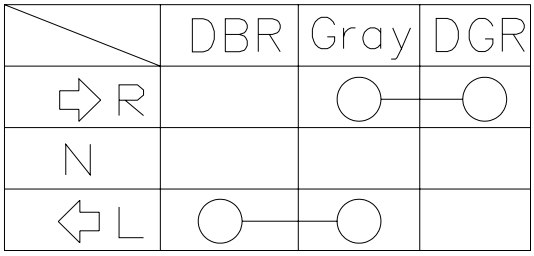
Color	R	Bk
OFF		
ON	○———	———○

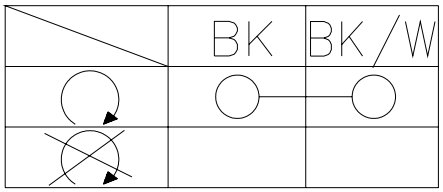
ELECTRICAL DEVICE

- **Head light and position light**



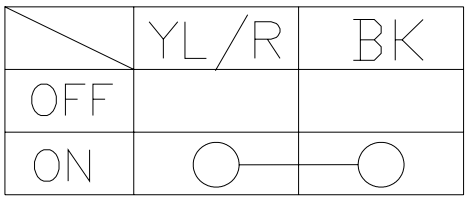
- **Signal light switch**



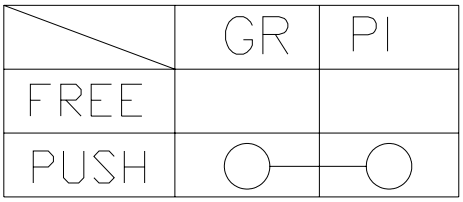


- **Engine stop switch**

- **Start switch**



- **Horn switch**



Exchange of Bulbs

Head light bulb

- Remove handle bar and front cover
- Press down the bulb base and turn left to change head light bulb.

ATV-300S/U ELECTRICAL DIAGRAM

