2026

PATHCROSS（ATV525）
SERVICE MANUAL

This manual is general version, the pictures in manual book are little difference compared with real part, so please check real part accordingly.

SAFETY NOTICE

This manual has been prepared as a guide to servicing and repair the ATV525.

This edition was primarily published to be used by mechanical technicians who are already familiar with all service procedures relating to AODES products. Mechanical technicians should attend training courses given by AODES.

Please note that the instructions in this manual will apply only if proper hand tools and special service tools are used.

The contents of this manual depict parts and/or procedures applicable to a particular product at the time of writing. Service and warranty bulletins may be published to update the content of this manual. Dealer modifications that were carried out after manufacturing of the product, whether or not authorized by AODES, are not included.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of AODES parts is most strongly recommended when considering replacement of any component. Dealer and/ or distributor assistance should be sought in case of doubt.

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

It is understood that certain modifications may render use of the vehicle illegal under existing federal, provincial and state regulations.

This manual emphasizes particular information which, is denoted by the following wording and symbols:

▲WARNING
Indicates a potential hazard that, if not avoided, could result in serious injury or death.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Indicates an instruction which, if not followed, could result in severe damage to vehicle components or other property.

NOTE: Indicates supplementary information required to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information provided will promote its correct use.

Always observe common shop safety practice.

Unless otherwise noted, the engine must be stopped and the tether cord must be removed prior to perform any services.

Torque wrench tightening specifications must be strictly adhered to. Use the torque values and service products as in the exploded views or in the procedures when noted.

Locking devices when removed must be replaced (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

Hoses, cables and locking ties removed during a procedure must be reinstalled as per factory standards.

When ordering parts always refer to the specific model PARTS CATALOGS.

We strongly recommend that any services be carried out and/ or verified by a highly skilled professional mechanic.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the English version shall prevail.

AODES disclaims liability for all damages and/or injuries resulting from the improper use of the contents of this publication.

IMPORTANT SAFETY PRECAUTIONS

We do not provide warnings about many basic shop safety practices (e.g.: Use Grinding Wheel-wear safety glasses). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practices, we recommend that you do not attempt to perform the procedures described in AODES service manuals.

You should have a clear understanding of all basic shop safety practices. You should be wearing the appropriate clothing, using appropriate safety equipment and taking all necessary safety precautions. Please be especially careful of the following:

- Read and understand all instructions before you begin a procedure or repair.
- Ensure you have the proper tools, any necessary replacement parts and the skills to perform the tasks safely and completely.
- Protect your eyes by using approved and properly fitted safety glasses.
- Use other protective equipment when necessary, for example safety shoes and gloves.
- Unless the service procedure requires that the engine remain running, make sure the engine is off before beginning service.
- Be sure there is adequate ventilation whenever you run the engine, to avoid the risk of Carbon Monoxide poisoning.
- To avoid injury from moving parts, make sure your hands, fingers and clothing are out of the way when the engine is running.
- Gasoline vapors and hydrogen gases from batteries are explosive. Keep all cigarettes, sparks and flames away from the battery, fuel-related components and other enclosed compartments.
- Never use gasoline to clean parts, always use an approved nonflammable solvent.
- Never drain or store gasoline in an open container.

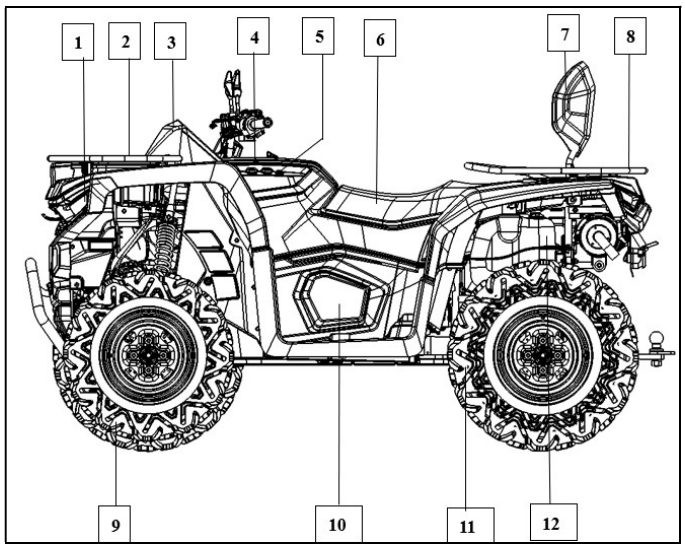
▲WARNING
The foregoing list represents general safety practices. For details on workplace health and safety requirements in your area, consult your local workplace health and safety agency or association.

We have provided you with some of the most important general service safety precautions, above. We cannot, however, warn you of every conceivable hazard that can arise in performing the service and repair procedures depicted in AODES manuals. Only you can decide whether or not you should perform a given task.

1. GENERAL INFORMATION

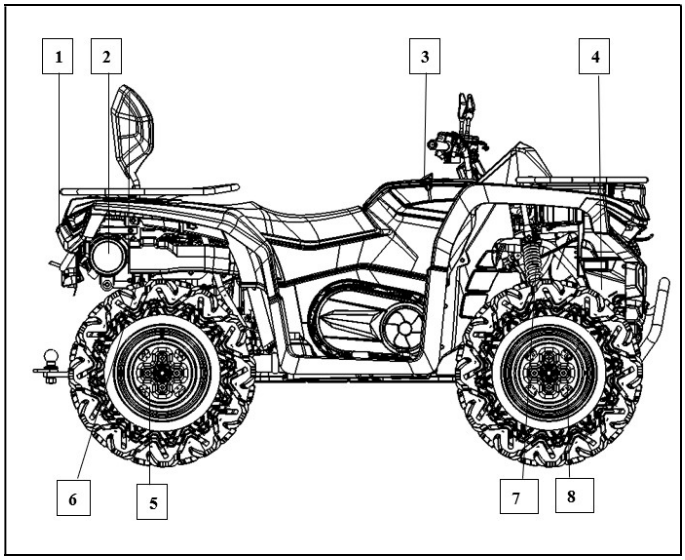
1.1 VEHICLE APPEARANCE

ATV525 Vehicle left-hand view



1. Headlight	2. Front rack	3.Instrument	4. Auxiliary DC jack
5. Ignition switch	6. Front seat	7. Rear seat back	8. Rear rack
9. Front wheel	10. Engine	11. Rear wheel	12. Fuel Tank

ATV525 Vehicle right-hand view

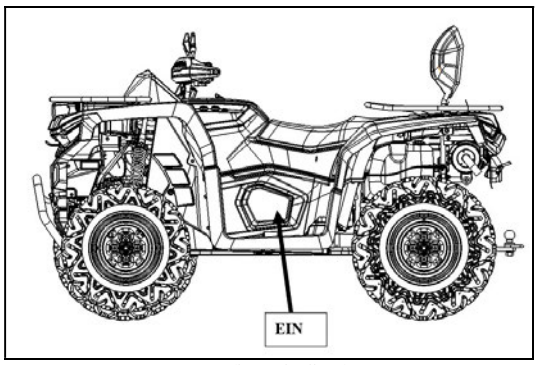


1. Tail light	2.Mufflmuer	3. Shifting lever	4.Radiator
5. Rear brake	6. Rear shock absorber	7. Front shock absorber	8. Front brake

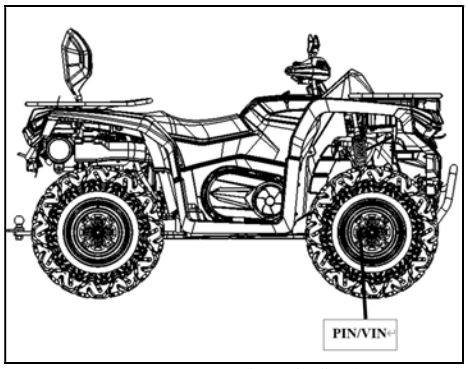
1.2 MARKER INFORMATIVENESS

Numbers of frame (or VIN code), engine and transmission case are major information numbers of a motorcycle. When ordering components or authorizing special services, these numbers are able to assist distributors to serve you better.

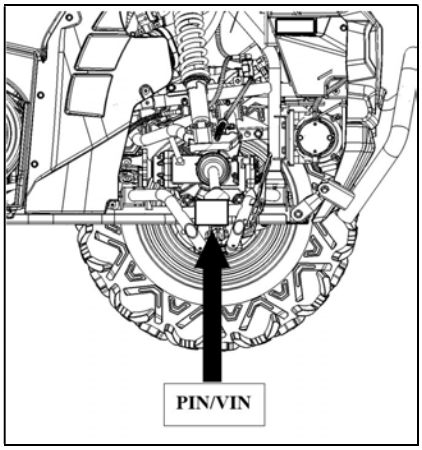
Motorcycle mark information is shown as follows:

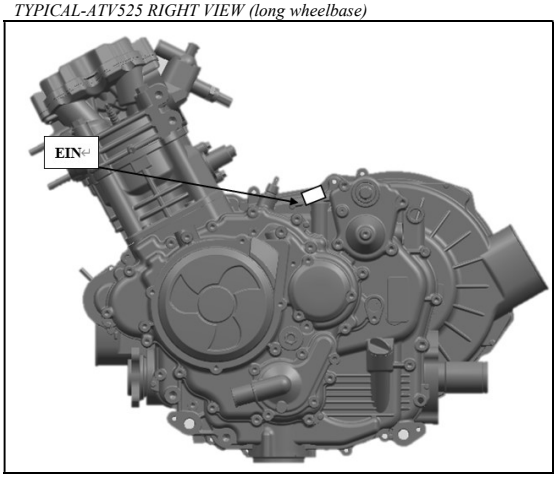


TYPICAL-ATV525 LEFT VIEW (long wheelbase)



TYPICAL-ATV525 RIGHT VIEW (long wheelbase)





TYPICA
1. PIN/VIN (Vehicle Identification Number on right side/anterior portion on the frame)
2. EIN (Engine Identification Number on left side/posterior portion on the crankcase)

1.3 PRECAUTIONS

1. Do not make engine under operation at a closed place or place with poor ventilation for a long time.
2. If engine stops operation, please do not touch it or muffler to avoid burning.
3. Due to high corrosiveness, battery fluid may cause burns to skin and eyes. In case of splashing to skin, please clean it with water and contact the doctor immediately. In case of splashing to clothes, please wash it with water immediately. Keep battery fluid far away from children.
4. Cooling liquid is toxic. Do not drink it or splash it to skin, eyes and clothes. Once splashing it to skin, please wash it with a lot of soapy water. In case of splashing to eyes, please wash eyes immediately and contact the doctor. In case of drinking cooling liquid, resulting in vomit, please contact the doctor. Keep cooling liquid far away from children.
5. Wear proper working suit, boots and hat. If necessary, please wear long-sleeve working suit and gloves for operation.
6. Gasoline is highly inflammable. No smoking or firing. At the same time, fire sparks shall be avoided. Vaporized gasoline is explosive as well. Operation shall be carried out at places with good ventilation.
7. Battery may produce explosive hydrogen in charging. Please ensure charging at places with good ventilation.
8. Use legal parts, lubricating oil and lubricating grease.
9. Before overhauling, please clean soil and dust.
10. Keep accessories of each part well for correct assembly.
11. Replace dismantled gasket, O-ring, piston pin retainer and cotter pin.
12. Retainer of rubber ring may be deformed after dismantling. So, please do not use loose and soft retainer.
13. Please wash and dry dismantled parts. Use lubricant on the surface of moving parts. For correct installation, please measure data well in dismantling process.
14. If do not know length of screw, please install screws one by one to ensure their corresponding depth.
15. Pre-tighten bolts and nuts and then tighten them with designated torque from the big to the small and from the inside to the outside.
16. Check whether rubber parts are aged. If necessary, replace them. Keep rubber parts far away from grease.
17. If necessary, special tools can be used.
18. Rotate inside and outside races of bearing to ensure flexibility of balls.
    a) If axial or radial resistance is too large, please replace it. If there is concave-convex on the surface, please use oil for washing. If no effect is achieved with washing, please replace it.
    b) If bearing cannot be clamped tightly in pressing into machine or axle, please replace bearing.
19. Please install a side dust proof bearing at correct direction. In installation of open or double-face dust proof bearing, pay attention to that marks of manufacturer shall be outward.
20. In cleaning and drying bearing, please keep bearing support still. Before installation, please carry out lubrication with oil or lubricating oil.
21. Please correct install elastic retaining ring. Assembling after opening can ensure installation of snap ring into slot.
22. After assembly, please check whether all parts are of perfect tightening and flexible movement.
23. Brake fluid and coolant may damage shell and plastic and rubber parts. In case of being splashed by them, please use water to wash.
24. In installing pipe, please insert them to bottom of connecting pipeline. In installing pipe clamp, please install them to groove if there is. As for

pipeline or pipe clamp that cannot be tightened, please replace them.
25. Do not mix soil or dust into engine and/or hydraulic braking system.
26. Before installation, please clean gasket and spacer of engine shell. Use oil stone to polish scratch of joint face evenly.
27. Do not twist or bend too much cable. Twisted or damaged cables may cause inflexible operation.
28. In assembling protective caps of parts, insert cap into groove if any.

1.4 Engine brake-in steps

Though quality material has been used for motorcycle manufacturing and all components are conforming to high quality standard, all components and parts shall subject to brake-in process before engine reaching maximum load. The reason behind this is that cooperation of components has not reached the best status after their assembling. This leads to damping force of engine and unnecessary mechanical loss. The ideal cooperation can be reached after operation for some time. In this case, mechanical loss can be minimized, reaching the best status and bringing the output power to maximum value. As a result, engine performance directly relates to initial maintenance. Regulation of running-in process is shown as follows:
-Please follow the restriction requirements for engine speed in the brake-in period below:

The first 150km	Below 5000 rpm
Till 800km	Below 5500 rpm
Till 1600km	Below 6500 rpm
Above 1600km	Below 8500 rpm

-Do not fully open the accelerator before the reading of the odometer reaching 1000km.
Attention: the speed shall not exceed 6500 rpm no matter what in brake-in period.
-During the brake-in period, the engine shall not work at the same speed with the same gear position for a long time. Try to shift gear position and speed to facility running-in of components.
-After 1000km of operation, transmission and crank cases shall be cleaned thoroughly.

1.5 TIGHTENING TORQUE

Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, etc.) must be installed or replaced with new ones, where specified. If the efficiency of a locking device is impaired, it must be renewed.
In order to avoid a poor assembling, tighten screws, bolts or nuts in accordance with the following recommended torque value:

Grade	Torque(N·m)					
	M6	M8	M10	M12	M14	M16
4.6	4～5	10～12	20～25	36～45	55～70	90～110
5.6	5～7	12～15	25～32	45～55	70～90	110～140
6.8	7～9	17～23	33～45	58～78	93～124	145～193
8.8	9～12	22～30	45～59	78～104	124～165	193～257
10.9	13～16	30～36	65～78	110～130	180～201	280～330
12.9	16～21	38～51	75～100	131～175	209～278	326～434

CAUTION: Be sure to use the proper tightening torque for the proper strength grade. Always torque screws, bolts and/or nuts in a crisscross sequence.

2. PERIODIC MAINTENANCE

2.1 MAINTENANCE SCHEDULE

In order to maintain the best performance and economical performance of vehicles, suggestions on intervals for necessary regular maintenance are listed. Following maintenance is calculated in km, mile and hour based on firstly appeared data.
However, keep in mind that if the vehicle isn't used for a long period of time, the month maintenance intervals should be followed.
Items marked with an asterisk should be performed by a dealer as they require special tools and technical skills.
In case of complicated road conditions, regular maintenance shall be carried for vehicles.

ITEM	ROUTINE	Whichever Comes first ⇨		INTIAL			EVERY	
			month	1	3	6	6	12
			Km (mi)	320 (200)	1,200 (750)	2,400 (1,500)	2,400 (1,500)	4,800 (3,000)
			hours	20	75	150	150	300
Valves*	● Check vale clearance. ● Adjust if necessary.			O		O	O	O
Cooling system	● Check coolant leakage. ● Repair if necessary. ● Replace coolant every 24 months.			O	O	O	O	O
Spark plug	● Check condition. ● Adjust gap and clean. ● Replacement every 24 months			O	O	O	O	O
Air filter elements	● Clean. ● Replacement every 24 months			Every 20-40 hours (More often in wet or dusty areas.)				
Crankcase breather system*	● Check breather hose for cracks or damage. ● Replace if necessary.					O	O	O
Exhaust system*	● Check for leakage. ● Tighten if necessary. ● Replace gasket(s) if necessary.					O	O	O
Fuel line*	● Check fuel hose for cracks or damage. ● Replacement fuel hose every 48 months ● Replacement fuel filter every 24 months					O	O	O
Engine oil	● Replace (Check oil level every month).			O		O	O	O
Engine oil filter	● Replace.			O		O		O
Differential oil	● Check oil level/oil leakage. ● Replacement every 24 months.			O				O
Brake*	●Check operation/brake pad wear/fluid leakage. ●Brake fluid needs to be above the lowest position. ●Correct if necessary. Replace pads/disk if worn to the limit.			O	O	O	O	O
Throttle lever*	●Check operation and free play.			O	O	O	O	O
Wheels*	●Check balance/damage/ run out ●Repair if necessary.			O		O	O	O
Wheel bearings*	●Check bearing assemblies for looseness or damage. ●Replace if damaged.			O		O	O	O
Front and rear Suspension*	●Check operation and for leakage. ●Correct if necessary.					O		O
Steering system*	●Check operation and for looseness/Replace if damage. ●Check toe-in/Adjust if necessary.			O	O	O	O	O
Rear knuckle pivots and suspension arms*	●Lubricate with lithium-soap-based grease.					O	O	O
Drive shaft universal joint*	●Lubricate with lithium-soap-based grease.					O	O	O
Engine mount*	●Check for cracks or damage. ●Correct bolt tightness.					O	O	O
Front and rear axle boots*	●Check operation. ●Replace if damage.			O				O
Stabilizer bushings*	●Check for cracks or damage.					O	O	O
Fittings and fasteners*	●Check all chassis fittings and fasteners.			O	O	O	O	O

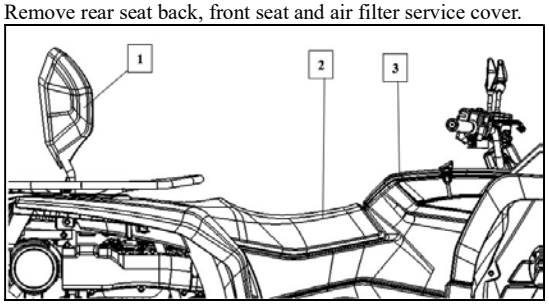
	●Correct if necessary.					
Battery	●End connection	O		O	O	O
Lamp and steering indication	●Operation	O	O	O	O	O

2.2 AIR CLEANER

In case of driving in dusty environment, air filter shall be cleaned regularly. It is of great possibility to accelerate wear to engine if there is not filtering element or worn filtering element is used. So, please keep air filter under good conditions all the time. If vehicle is used in dusty area, inspect more frequently than specified in MAINTENANCE SCHEDULE.

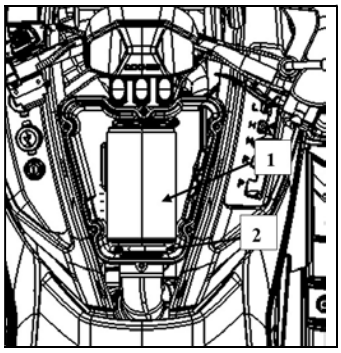
If the air cleaner is clogged with dust, intake resistance will be increased, with a resultant decrease in power output and an increase in fuel consumption. never remove or modify any component in the air filter housing. The engine management system is calibrated to operate specifically with these components. Otherwise, engine performance degradation or damage can occur. Check and clean the air filter element in the following manner:

Remove rear seat back, front seat and air filter service cover.



TYPICAL
1. Rear seat back
2. Front seat
3. Air filter service cover

Remove air filter cover. Unscrew the clamp. Remove air filter.

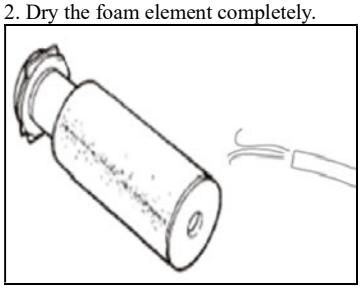


TYPICAL
1.Air filter
2.clamp

CAUTION: Always wear appropriate skin and eye protection. Chemicals can cause a skin rash and eye injury.

1.Spray the foam filter element inside and out with a good air filter cleaner and follow manufacturer's instructions.

2. Dry the foam element completely.



Properly reinstall removed parts in the reverse order of their removal. Pay attention to the seal gasket of air filter housing is not skew.

CAUTION: 1. If liquid /deposits are found, squeeze and dry the foam filter. Replace filter element if damaged.

2.Do not start engine if liquid or deposit is found. If there is oil in the air filter housing, check engine oil level. Oil level may be too high.

3.Inspect the air cleaner element for tears, a torn element must be replaced.

2.3 VALVE CLEARANCE

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

Check the intake and exhaust valve clearances at the distances indicated above and adjust the valve clearances to specification, if necessary.

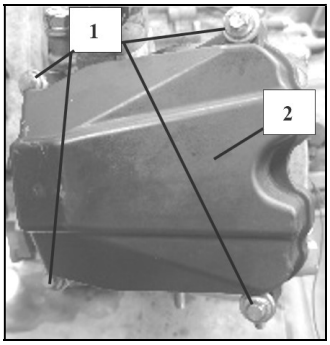
Valve clearance is to be checked when the engine is cold. The intake and exhaust valve must be checked an adjusted when the piston is at TOP DEAD CENTER(TDC) on the compression stroke.

Remove seats, gear shift lever and air filter service cover.

Remove relevant accessories around an engine, with relevant contents referring to Chapter 5 Vehicle Dismantling.

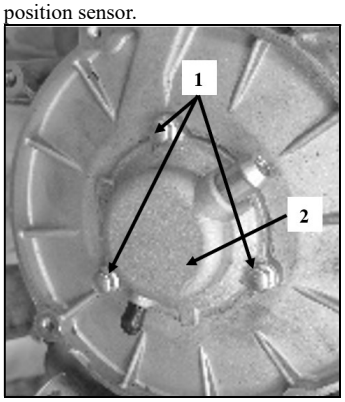
Remove spark plug cable and spark plug.

Remove the bolts and valve cover.

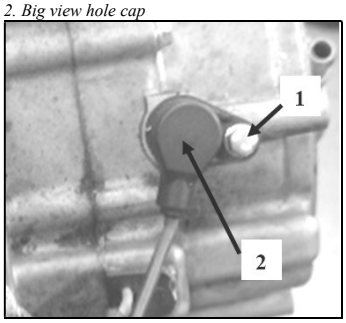


TYPICAL
1.4xM6 bolt
2.Valve cover

Remove the M6 bolts, the big view hole cap and crankshaft position sensor.



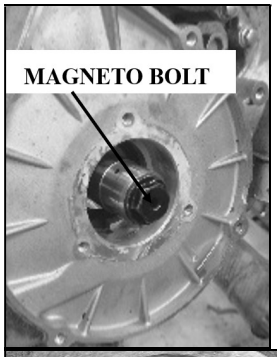
TYPICAL
1. 3xM6 bolt
2. Big view hole cap

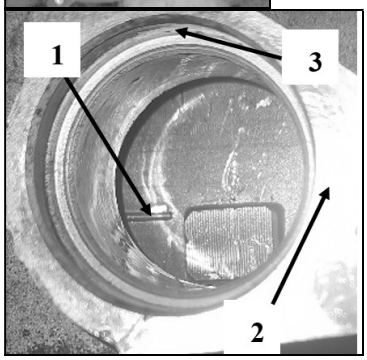


TYPICAL
1. M6 bolt
2. Crankshaft position sensor

Valve clearance of cylinder

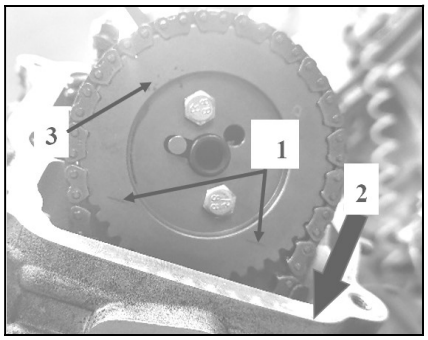
Turn the magneto bolt until mark "T" on magneto flywheel and dot mark on the left crankcase cover are aligned.





1. Mark "T" on magneto flywheel
2. Dot mark on left crankcase cover
3. Location of crankshaft position sensor

At TDC ignition, the printed marks on the camshaft timing gear have to be parallel to cylinder head base as per following illustration.



1. Printed marks on camshaft timing gear
2. Cylinder head base
3. Camshaft timing gear

Insert the feeler gauge between the valve stem end and adjusting screw on the rocker arm to check the clearance.

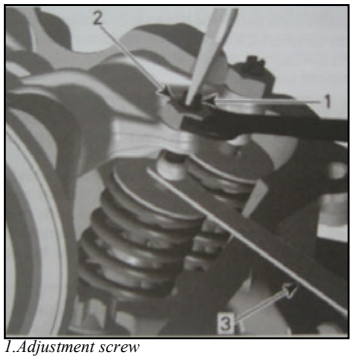
If the valve clearance is out of specification, adjust valves as follows.

Valve clearance	
Intake	0.08 to 0.10mm
Exhaust	0.08 to 0.10mm

Use mean valve of exhaust/intake to ensure a proper valve adjustment.

Hold the adjustment screw at the proper position and torque the locking nut.

Repeat the procedure for each valve.



1.Adjustment screw
2.Adjustment nut
3.Feeler gauge

Valve clearance adjuster lock nut:7-8N.m

CAUTION: Securely tighten the locknut after completing adjustment.

Install the valve cover, spark plug cable and spark plug, the plug screw and gasket of left crankcase cover and the crankshaft position sensor.

2.4 SPARK PLUG

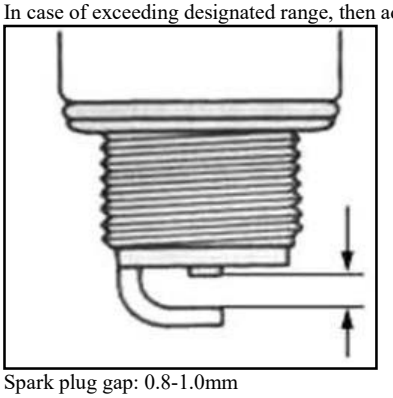
In case of serious wear or burn to electrode or burn to insulator by spark plug or damage to thread etc., please replace it with new spark plug

In case of carbon deposit, please use proper tools for cleaning.

Spark plug gap

Use feeler gauge to measure clearance of spark plug.

In case of exceeding designated range, then adjust the gap.



Spark plug gap: 0.8-1.0mm

Spark plug heat range

Check the spark plug heat range by observing the electrode color. If the electrode of the spark plug is appearing wet or dark color, replace the spark plug with a hotter type one. If it is white or appearing glazed, replace the spark plug with a colder type one.

Standard type: DCPR8E / NGK

Colder type: DCPR9E / NGK

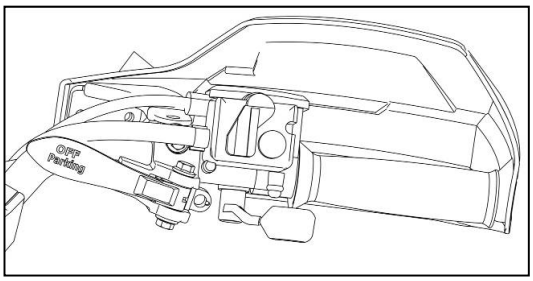
Hotter type: DCPR7E / NGK

CAUTION: In order to avoiding damaging cylinder cap thread, firstly use hands to tighten spark plug and then use spark plug wrench to tighten cylinder cap with designated torque.

2.5 THROTTLE CABLE PLAY

Before starting the engine, check the throttle handle to ensure the correct operation, and ensure that the throttle handle can be completely restored to the idle position without the external force.

Check the free play and adjust, if needed, press the accelerator to ensure that the movement of the smooth and not sticky buckle back when the check throttle handle correctly. It must run smoothly, fully spring back to the free position.



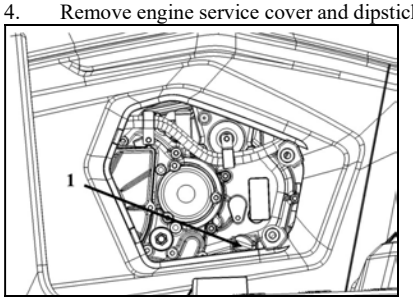
From the gate line (support), turn the regulator, regulate the solar term door handle free play.
After adjustment, tighten nut.
If free play after adjustment cannot reach designated requirement or there is viscosity for throttle valve, replace it with new throttle cable.

2.6 ENGINE OIL

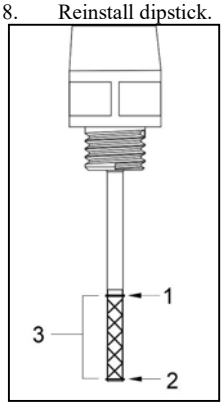
Oil level verification

Strictly follow this procedure, otherwise wrong oil level may be indicated.

1. Ensure vehicle is on a level surface.
2. Start engine and let idle for a few minutes.
3. Stop engine. Wait a few minutes to allow oil to flow down to crankcase then check oil level.
4. Remove engine service cover and dipstick.



5. Fully screw in dipstick to check oil level.
6. Remove dipstick and read oil level. Oil level must be between minimum (2) and maximum (1) marks on dipstick.
7. There is a capacity of 300 ml between the two marks. Refill oil as necessary. Do not overfill.
8. Reinstall dipstick.



1.Full
2.Add
3.Operating range

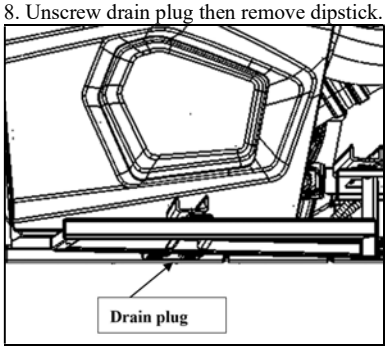
Replace engine oil

Prior to change the oil, ensure vehicle is on a level surface. Oil and oil filter must be replaced at the same time. Oil change and oil filter replacement should be done with a warm engine.

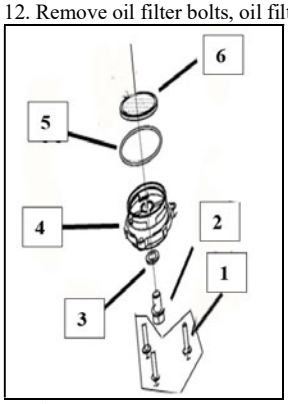
▲WARNING
The engine oil can be very hot. Wait until engine oil is warm.

CAUTION: Dispose oil and filter as per your local environmental regulations.

1. Ensure vehicle is on a level surface.
2. Start engine and let idle for a few minutes.
3. Stop engine. Wait a few minutes to allow oil to flow down to crankcase then check oil level.
4. Remove the engine service cover.
5. Remove dipstick.
6. Raise the vehicle, support it securely. Place a drain pan under the engine drain plug area.
7. Clean the drain plug area.
8. Unscrew drain plug then remove dipstick.



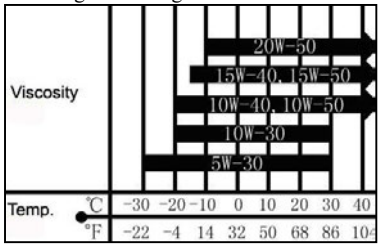
9. Allow oil to drain completely from crankcase.
10. Clean the magnetic drain plug from metal shavings and residue.
11. Install a new washer on drain plug. Torque drain plug to 20 N.m.
12. Remove oil filter bolts, oil filter cap, O-ring and oil filter.



1. Bolt
2. Oil drain Plug
3. Washer
4. Oil filter Cap
5. O-ring
6. Oil filter

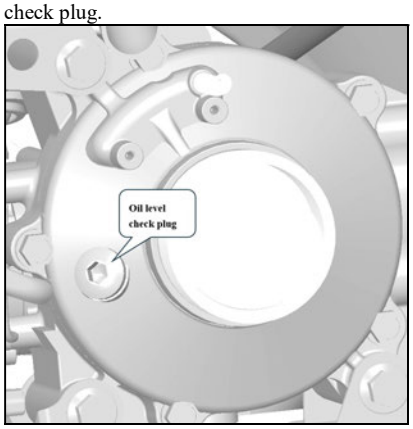
13. Check and clean the oil filter inlet area for dirt and other contaminations.
14. The installation is the reverse of the removal procedure. Pay attention to install a new gasket on oil filter cover.
15. Refill engine with a SAE5W-40 SJ classification engine oil, Oil change capacity with filter 2450mL.
16. Check the oil level with the dipstick. Refer to OIL LEVEL VERIFICATION above.
17. Run engine to ensure oil filter and drain plug areas are not leaking.

CAUTION: In order to expand service life of vehicle, please use grade SJ standard engine oil conforming to API with its viscosity indication being SAE5W-40 SJ. If viscosity of engine does not reach SAE5W-40 SJ, make corresponding selection according to drawing.

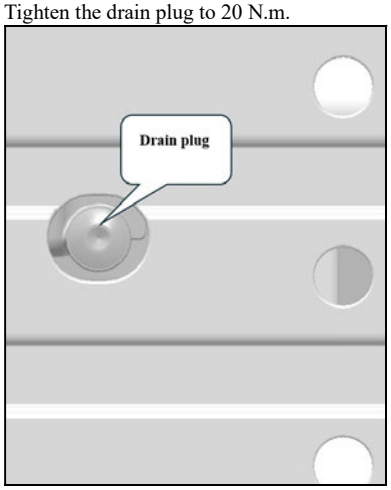


2.7 FRONT DIFFERENTIAL OIL

To change the front differential oil, locate the vehicle on a level position and carry out the following steps.
Clean the oil level check plug area and remove the oil level check plug.



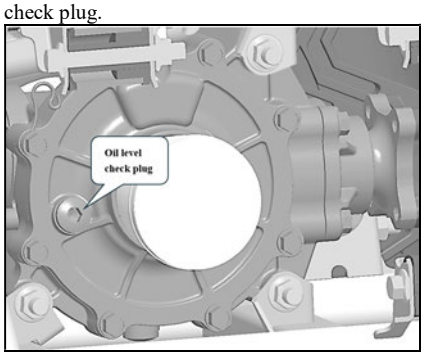
Clean the drain plug area.
Place an oil pan under the front differential case, and then drain oil completely by removing the drain plug.
Tighten the drain plug to 20 N.m.



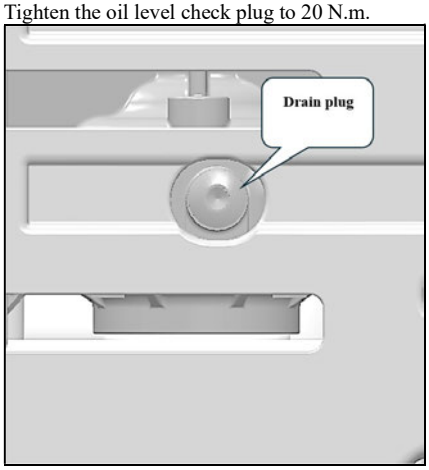
Pour the specified oil (GL-4-90) about 230mL by syringe through the oil level check plug hole until the oil over flows.
Tighten the oil level check plug to 20 N.m.

2.8 REAR DIFFERENTIAL OIL

To change the rear differential oil, locate the vehicle on a level position and carry out the following steps.
Clean the oil level check plug area and remove the oil level check plug.

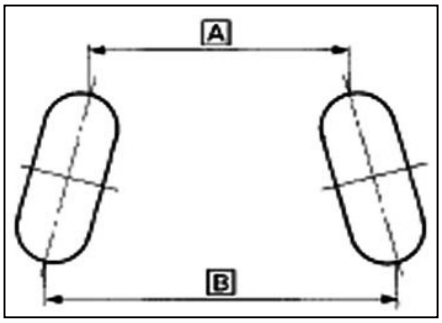


Clean the drain plug area.
Place an oil pan under the front differential case, and then drain oil completely by removing the drain plug.
Tighten the drain plug to 20 N.m.
Pour the specified oil (GL-4-90) about 230mL by syringe through the oil level check plug hole until the oil over flows.
Tighten the oil level check plug to 20 N.m.

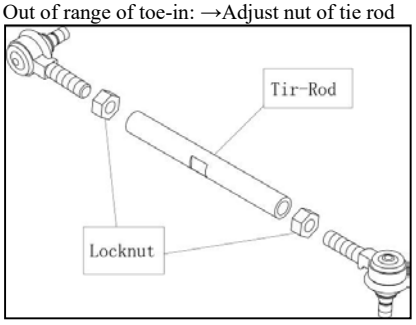


2.9 STEERING SYSTEM

Keep handlebar in horizontal status on flat ground and check whether the handlebar is loose from four directions (top, bottom, left and right); tighten nut or dismantle steering column for further checking, if any.
Park vehicle on flat ground and rotate handlebar leftwards and rightwards to check whether it is able to be rotated flexibly. If any stuck, check whether it is caused by installation of main wire ground or other wiring; if not, please check the bottom of steering bar to check whether steering column bearing is damaged.
Park vehicle on flat ground, make sure the tire pressure for right and left tires is same and set to the proper specification, set the front wheels in the straight position, then place a load of 75kg on the seat.
Measurethe distance A and B of the front wheels and calculate the difference.



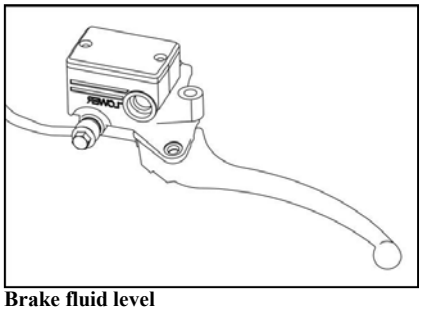
TYPICAL
A: front of front wheel
B: rear of front wheel
Toe-in.: B-A= 5mm
Out of range of toe-in: →Adjust nut of tie rod



CAUTION: After adjusting toe-in, fist rotate steering wheel from center position to the left and right, to ensure that is the same corner, then slowly run vehicle to see whether its direction can be controlled.

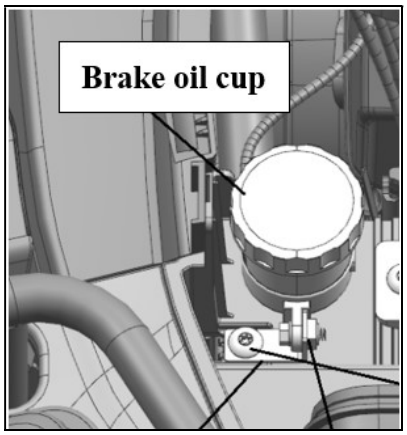
2.10 BRAKING SYSTEM

Check if any brake fluid is leaking out of the pipe joints or the brake fluid reservoir. Apply the brakes firmly for one minute. If there is any leakage, have the vehicle inspected by an authorized dealer.
Test the brakes at slow speed after starting out to make sure they are working properly.
If the brakes do not provide proper braking performance, inspect the brake system.
If needed, have the vehicle inspected by an authorized dealer.



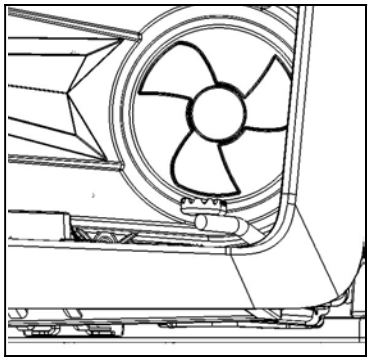
Brake fluid level

Check brake fluid level by observing upper pump of front brake and upper and lower limit line of rear brake fluid.
When brake fluid level is lower than lower limit, supplement brake fluid DOT4 in time.



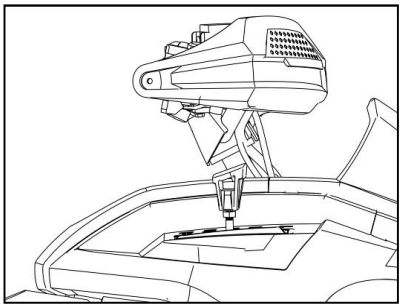
Brake pedal adjustment

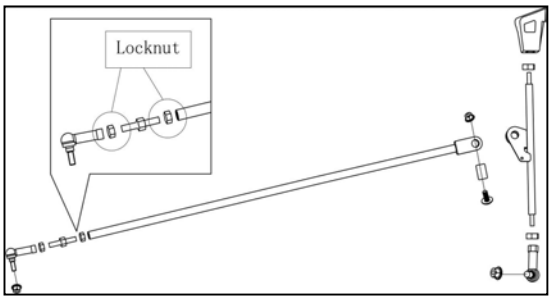
The brake pedal stroke is 30～40mm. If less than equal 30mm, it will be a hidden dangers, must adjust the brake pin connecting the brake pedal.



2.11 GEAR SHIFT

Check the shift lever as to change shift from P to R/N/H/L and reverse smoothly. Also, the meter display is correct.
The shift lever should be vertical when the gear is in neutral. If not, adjust the shift cable and then tighten the nuts of the shift cable.



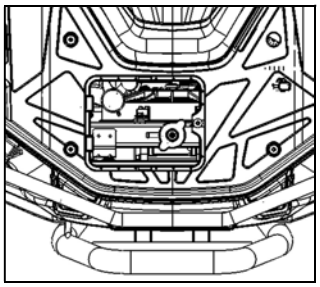


2.12 COOLING SYSTEM

To prevent rust formation or freezing condition, always replenish the system with the premixed coolant or with 50% antifreeze and 50% water. Do not use tap water, straight antifreeze or straight water in the system. Tap water contains minerals and impurities which build up in the system. During cold weather, straight water causes the system to freeze while straight antifreeze thickens and does not have the same efficiency. Always use ethylene glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.
Cooling liquid may be reduced by natural evaporation. Regularly check horizontal position of cooling liquid.

Coolant level verification

Park vehicle at flat ground and check horizontal line of cooling liquid.
Open the front storage box cover.
Remove the water tank cover in the front storage box.

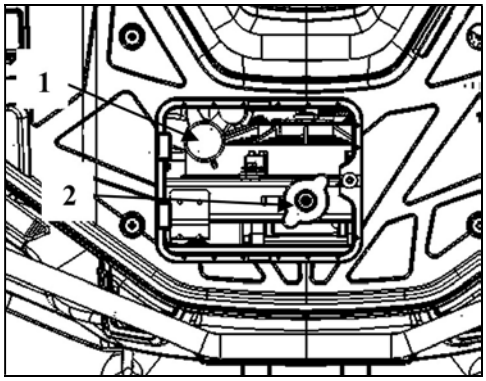


Check the level of cooling water in fluid reservoir (auxiliary radiator) is between upper and lower critical levels.

▲WARNING
To avoid potential burns, do not remove the radiator cap or loosen the cooling drain plug if the engine is hot. Never drain or refill cooling system when engine is hot.

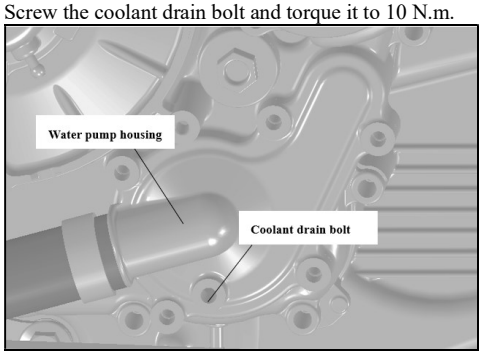
Coolant replacement

Park vehicle at flat ground and check horizontal line of cooling liquid.
Remove the front storage box cover and water tank cover. Remove auxiliary tank cover and radiator cover.

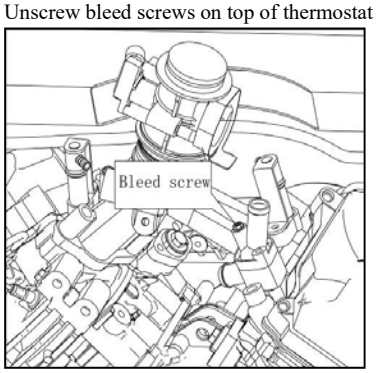


TYPICAL
1.Auxiliary tank cover
2.Radiator cover

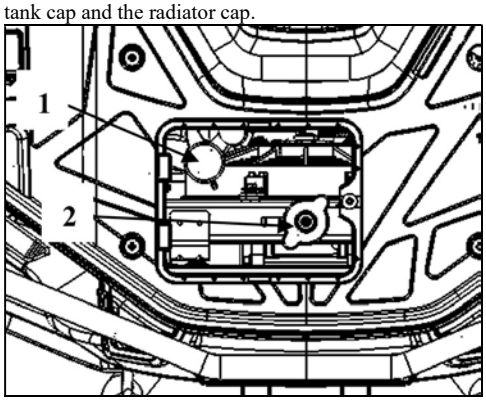
T Partially unscrew coolant drain plug located below water pump housing.
When coolant is drained completely, remove cooling drain plug completely and install a new gasket ring.
Screw the coolant drain bolt and torque it to 10 N.m.



Unscrew bleed screws on top of thermostat housing.



Fill up the radiator with coolant, when the coolant comes out by the thermostat housing hole, install the bleed screws with its gasket ring and torque to 10 N.m.
Refill coolant tank up to upper-level mark. Install the coolant tank cap and the radiator cap.

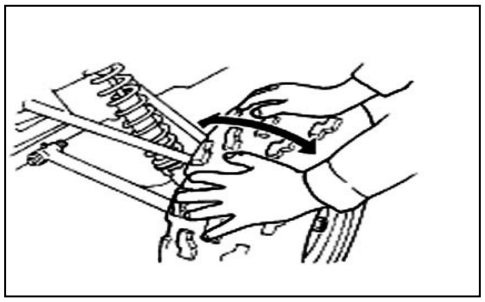


TYPICAL
1. Auxiliary tank cap
2. Radiator cap

Run engine until radiator fan opens then stop engine.
When engine has completely cooled down, recheck coolant level in radiator and coolant tank. Top up if necessary.

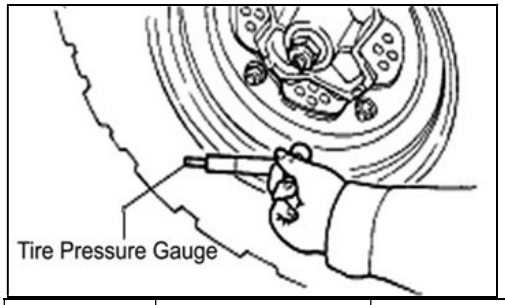
2.13 WHEELS

Lift wheels up at horizontal position and ensure no load to each wheel.
Shake wheels to left and right to see whether their connecting parts are installed tightly and check whether they can be swung.
No adequate tightening: → tightening
Swing: → replace rocker arm



Tire pressure

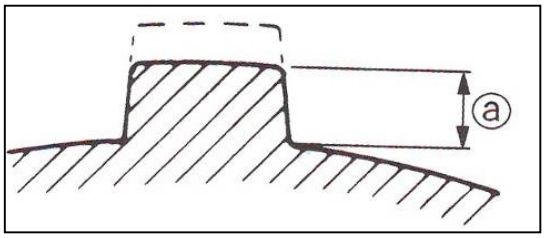
Improper tire pressure will lower comfort of operation and driving and may lead to wear to side edges of tires.



	Front wheel	Rear wheel
Rated pressure	45kPa(0.46kgf/cm^2)	45kPa(0.46kgf/cm^2)
Dimension of tire	25×8-12	25×10-12

Tire thread.

When the tire groove decreases to 3 mm (0.12 in) due to wear, replace the tire.



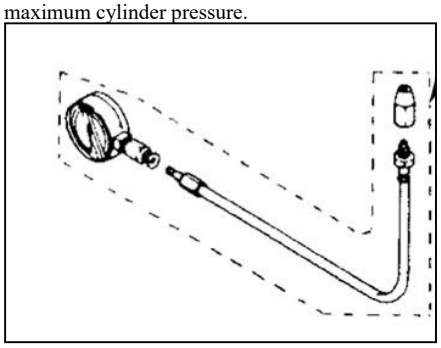
2.14 ENGINE COMPRESSION PRESSURE

The compression pressure reading of a cylinder is a good indicator of its internal condition. The decision to overhaul the cylinder is often based on results of a compression test.
Before measuring cylinder pressure, ensure installation and tightening of cylinder cap bolt with designated torque and reasonable clearance of valve.
Standard cylinder pressure: 0.9～1.2Mpa
Too low cylinder pressure may cause the following:
1. Excessive wear to cylinder;
2. Wear to piston or piston ring;
3. Blockage of piston ring in groove;

4. Close valve seat;
5. Damage to cylinder lining or faults of other parts

Measure engine compression pressure:

1. Warm up engine.
2. Ensure full charging of battery.
3. Remove the relevant plastic parts and accessories from the outside of the engine
4. Dismantle spark plugs.
5. At spark plug hole, install cylinder pressure meter.
6. Press button of start for several seconds. Record indication of maximum cylinder pressure.

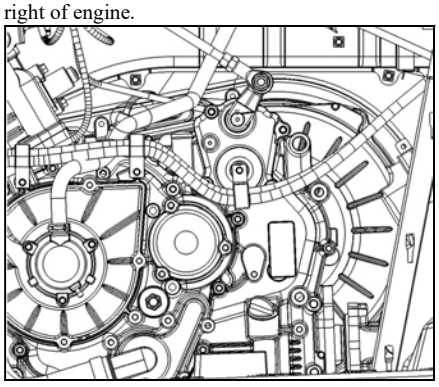


2.15 ENGINE OIL PRESSURE

Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts. The engine oil pressure test should be done with a warm engine 90℃ and the recommended oil.

Remove the relevant plastic parts and accessories from the outside of the engine.

Remove the oil pressure switch wire connector and switch on the right of engine.



Install oil pressure gauge and adapter hose.

Start engine on idle speed. The engine oil pressure should be within the following values.

Oil pressure	1600 RPM	6000 RPM
Minimal	70 KPa	350 KPa
Nominal	180 KPa	420 KPa
Maximal	300 KPa	550 KPa

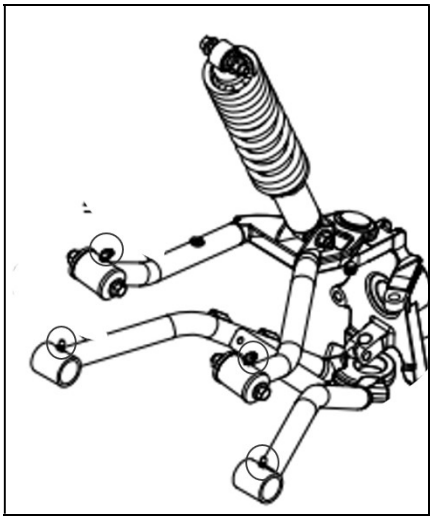
Remove oil pressure gauge and adapter hose.

Installation oil pressure switch to 12N.m and the oil pressure switch wire connector.

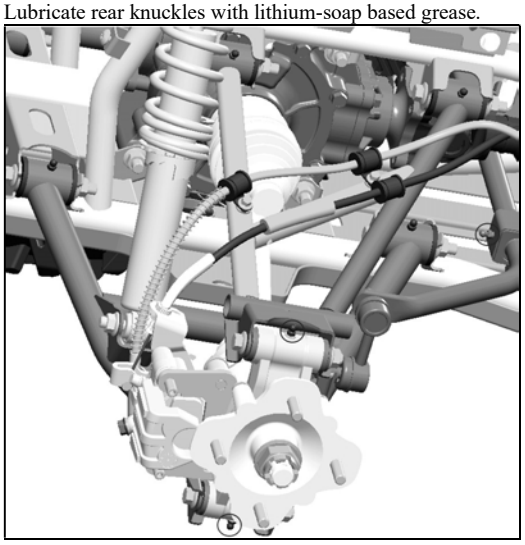
2.16 SUSPENSION SYSTEM

Lubricate both suspension arms with lithium-soap based grease. There are two grease fittings on each suspension arm. Check operation and for leakage.

Grease fitting location of front suspension arms.



Lubricate rear knuckles with lithium-soap based grease.



3. ENGINE

▲WARNING
Torque wrench tightening specifications must strictly be adhered to. Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be installed or replaced with new ones where specified. If the efficiency of a locking device is impaired, it must be repaired.

When diagnosing an engine problem, always perform a cylinder leak test. This will help pin-point a problem. Refer to the instructions included with your leak tester and to LEAK TEST section for procedures.
Always place the vehicle on level surface.
NOTE: For a better understanding, the many illustrations are taken with engine out of vehicle. To perform the following instructions, it is not necessary to remove engine from vehicle.
Always disconnect BLACK (-) cable from the battery, then RED (+) cable before working on the engine.
Even if the removal of many parts is not necessary to reach another part, it is recommended to remove these parts in order to check them.
When disassembling parts that are duplicated in the engine, (e.g.: valves), it is a strongly recommended to note their position (PTO/MAG side) and keep them as a "group". If you find a defective component, it would be must easier to find the cause of the failure among it group of parts (e.g.: you found a worn valve guide. A bent spring could be the cause and it will be easy to know which one among the springs is the cause to replace it if you grouped them at disassembly). Also, since used pars have matched together during the engine operation, they will keep their matched fit when you reassemble them together within their "group".

3.1 ENGINE REMOVAL

To avoid potential burns, let engine and exhaust system cool down before performing any servicing.

Place vehicle on a work station that will have access to an engine-lifting hoist. Then start with initial preparation of vehicle.

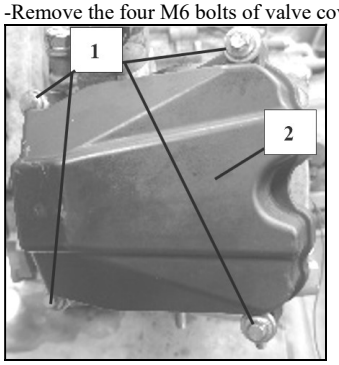
Disconnect the BLACK (-) cable from battery, then the RED (+) cable.

Drain coolant from engine cooling system. Drain engine oil only if engine overhaul is necessary. To work on gearbox the removal is necessary but do not drain engine oil.

3.2 VALVE COVER

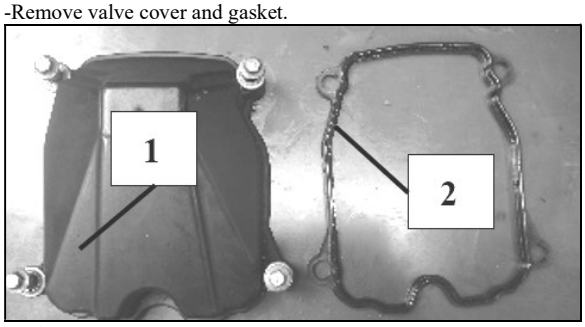
Removal

-Remove the four M6 bolts of valve cover.



1.4xM6 Bolt
2. Valve cover

-Remove valve cover and gasket.



1.Valve cover
2.Gasket

Inspection

Check the gasket on the valve cover if it is brittle, cracked or hard. If so, replace the gasket.

Installation

For installation, reverse the removal procedure.

Torque the bolts for valve cover in a crisscross sequence.

Bolt tightening torque for valve cover: 10-12 N.m.

3.3 TIMING CHAIN TENSIONER

NOTE: Before removal and installation, make sure that the cylinder is set to TDC ignition. Refer to CAMSHAFT.

Tensioner removal

▲WARNING
Never perform this operation immediately after the engine has been turn because the exhaust system can be very hot. Wait until exhaust system is warm or cold.

Remove:

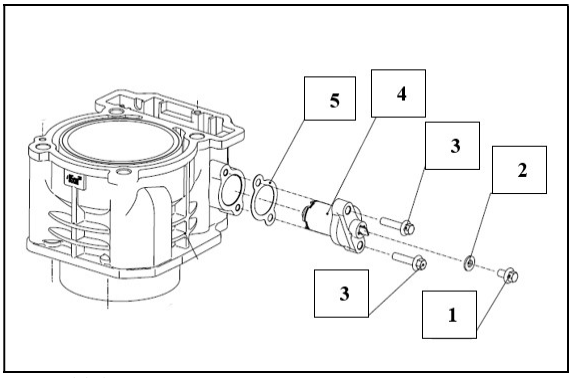
-Lock bolt

-Washer

-Bolt

-Chain tensioner

-Gasket



1.M6 Lock bolt
2.Washer
3.2xM6 Bolt
4.Chain tensioner
5.Gasket

Tensioner Inspection

Check the chain tensioner for cracks or other damages. Replace if necessary.

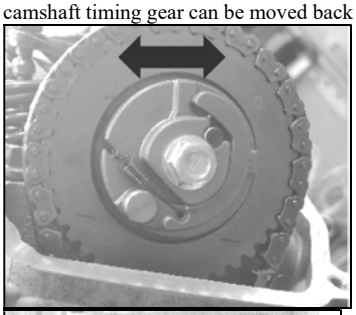
Check push rod of chain tensioner for free movement by sheet.

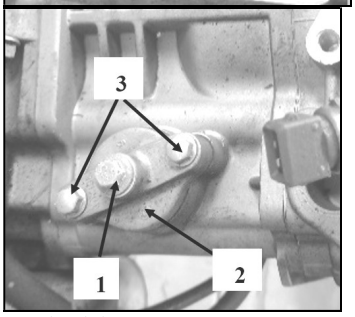
Check if washer is brittle, cracked or hard. Replace if necessary.

Check gasket. Replace if broken or worn.

Tensioner Installation

NOTE: Before installing the chain tensioner make sure that the camshaft timing gear can be moved back and forth.





1. Locking bolt
2.Chain tensioner
3.Bolt

Turn push rod of chain tensioner clockwise to shortest position by sheet.

Install the chain tensioner with gasket to the cylinder block. Tighten the bolt for chain tensioner to 10-12N.m.

Push out the rod of chain tensioner counterclockwise by sheet, then tighten the lock bolt to 6-8N.m.

NOTE: Do not forget to place the washer on lock bolt and gasket on the chain tensioner.

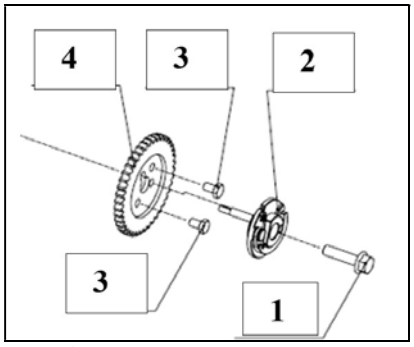
3.4 CAMSHAFT TIMING GEAR

Gear Removal

Turn crankshaft to TDC ignition of the cylinder.

Unscrew timing chain tensioner.

Remove the bolt and pressure release valve.



1. M8 Bolt
2. Pressure release valve
3. 2xM6 Bolt
4. Camshaft timing gear

Remove bolts and camshaft timing gear.

NOTE: Secure timing chain with a retaining wire.

Gear Inspection

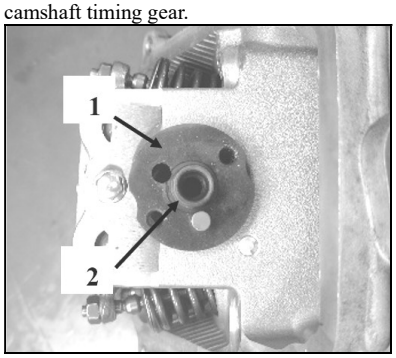
Check camshaft timing gear for wear or deterioration. If gear is worn or damaged, replace it as a set (camshaft timing gear and timing chain).

Check pressure release valve for crack or damage. If damaged, replace it.

Gear Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Clean mating surface and threads of camshaft, prior to assemble camshaft timing gear.



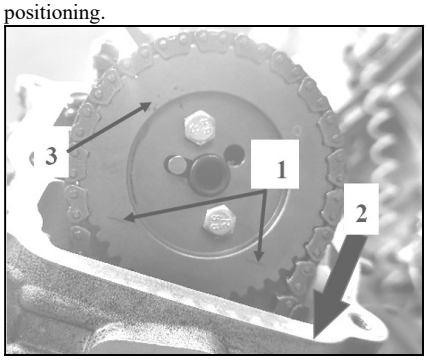
1. Mating surface on camshaft
2.Threads for camshaft screw

Camshaft timing gear and crankshaft must be at TDC ignition position before installing the timing chain.

CAUTION: Crankshaft and camshaft must be locked on TDC ignition position to place camshaft timing gear and timing chain in the proper position.

Install camshaft timing gear so that the timing gear tabs are located into the flat area of the camshaft.

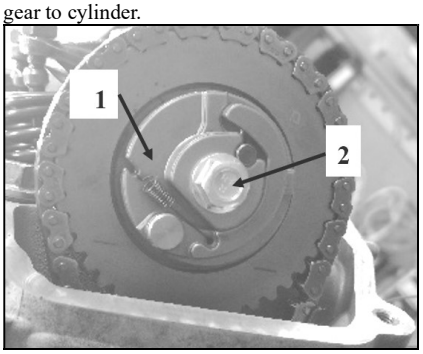
The printed marks on the camshaft timing gear must be parallel to the cylinder head base. See the following illustration for a proper positioning.



1. Printed marks on camshaft timing gear
2. Cylinder head base
3. Camshaft timing gear

Tighten the two M6 bolts for camshaft timing gear to 10-12N.m.

Install pressure release valve and bolt through camshaft timing gear to cylinder.



1. Pressure release valve
2. M8 bolt

Apply Loctite 222 on the front 2 teeth of M8 bolt.

Tighten the M8 bolt for pressure release valve to 18-22N.m.

NOTE: Before installing the bolt adjust the chain tension and check again if marks on the timing gear are parallel to cylinder head base.

3.5 ROCKER ARM

Rocker Arm Removal

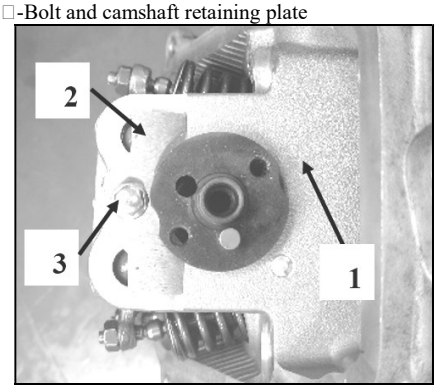
Remove:

□-Valve cover

□-Chain tensioner

□-Camshaft timing gear

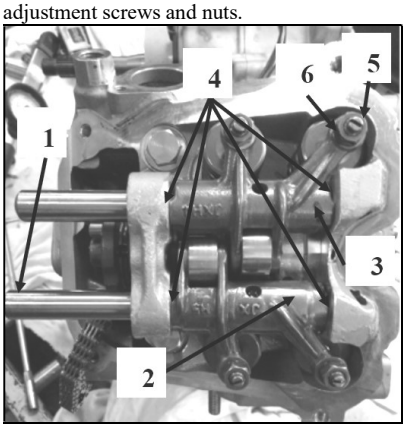
□-Bolt and camshaft retaining plate



1. Cylinder head
2. Camshaft retaining plate
3. M6 Bolt

□-Rocker arm shafts

□-Rocker arm assembly (exhaust side and intake side) with adjustment screws and nuts.



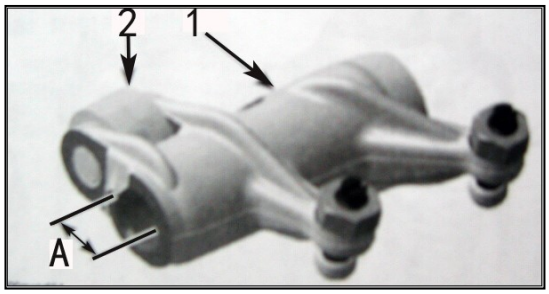
1. Rocker arm shaft
2. Rocker arm (exhaust side)
3. Rocker arm (intake side)
4. Washer
5. Adjustment screw
6. Locking nut

-Washers

CAUTION: Pay attention not to lose washers or drop them into the timing chain compartment.

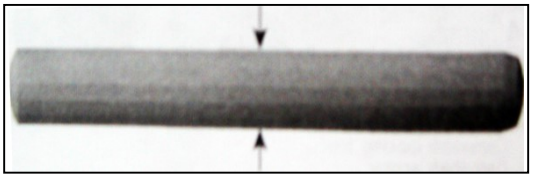
Rocker Arm Inspection

Inspect each rocker arm for cracks and scored friction surfaces. If so, replace rocker arm assembly.
Check the rocker arm rollers for free movement, wear and excessive radial play. Replace rocker arm assembly if necessary.



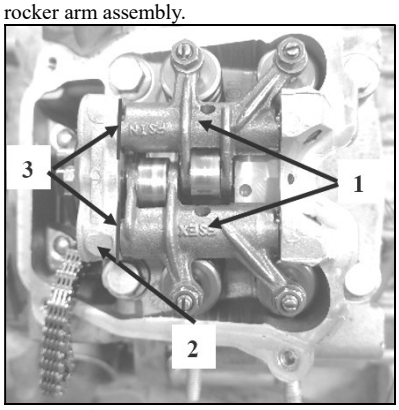
1. Rocker arm (exhaust side)
2. Roller
A- Rocker arm bore diameter

Measure rocker arm bore and shaft diameter. If radial play is out of specification, change the rocker arm assembly.



Radial play of rocker arm bore and shaft	
new	0.013 to 0.046 mm
Service limit	0.046mm

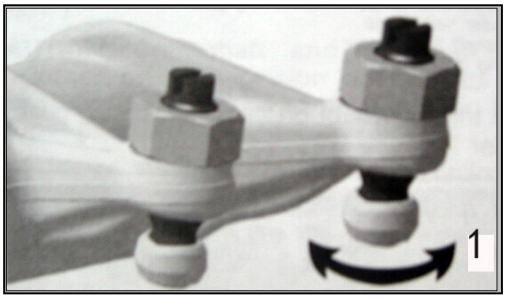
Measure axial play of rocker arm and cylinder head axial play using a feeler. If axial play is out of specification, change the rocker arm assembly.



1. Rocker arm
2. Cylinder head
3. Axial play

Axial play of rocker arm and cylinder head	
new	0.04 to 0.46 mm
Service limit	0.50mm

Check adjustment screws for free movement, cracks and/or excessive play.



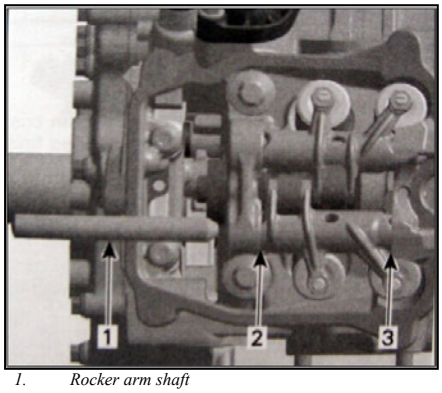
1. Free movement of adjustment screw top

Check rock arm shaft for wear or damage, if so, replace parts.
Check washer for wear or damage, if so, replace parts.

Rocker Arm Installation

NOTE: Use the same procedure for exhaust and intake rocker arm.
Apply engine oil on rocker arm shaft.
Install the rocker arm shafts with the cone edge facing inside and use following procedure:

- -Insert a rocker arm pin through rocker arm pin bore.
- -Install a washer then the proper rocker arm.
- -Push in rocker arm shaft until its chamfer reaches the end of rocker arm bore.



1. Rocker arm shaft
2. Washer (timing chain side)
3. Washer (spark plug side)

-Place the other washer and push rocker arm shaft to end position.
-Install the camshaft retaining plate.
Tighten the M6 bolt for camshaft retaining plate to 10-12N.m.

3.6 CYLINDER HEAD

Cylinder Head Removal

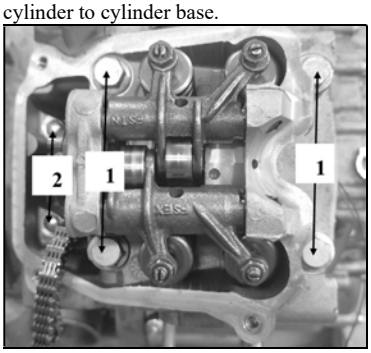
Drain coolant.
CAUTION: Before removing cylinder head, blow out remaining coolant by air pressure. During cylinder head removal, the remaining coolant in cylinder head could overflow into the engine and a little quantity of coolant could drop into the engine. In this case, the engine oil will be contaminated.
Disconnect:

- -Spark plug wire
- -Temperature sensor connector, located at cylinder head

Remove:

-spark plug

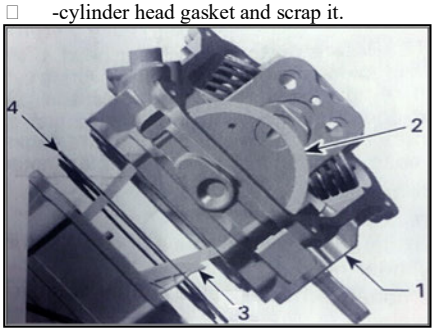
- -exhaust pipe spring
- -exhaust pipe nuts
- -radiator intake hose
- -air filter box and throttle body
- -chain tensioner
- -valve cover and gasket
- -camshaft timing gear
- -cylinder head bolts M6
- -cylinder head bolts M10 retaining cylinder head and cylinder to cylinder base.



1. 4xM10 cylinder head bolt
2. 2xM6 cylinder head bolt

Pull up cylinder head.
Remove:

-chain guide
-cylinder head gasket and scrap it.



1. Cylinder head
2. Timing chain
3. Chain guide
4. Cylinder head gasket

Cylinder Head Inspection

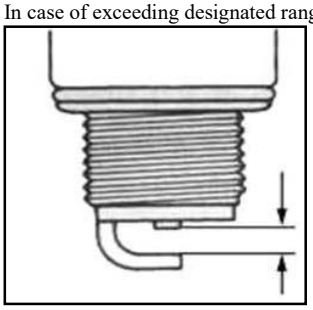
Inspect timing chain guide for wear, cracks or other damages. Replace if necessary.

Check for cracks between valve seats and spark plug hole, if so, replace cylinder head.

Check the carbon deposit for spark plug. If so, replace spark plug.

Use clearance gauge to measure clearance of spark plug.

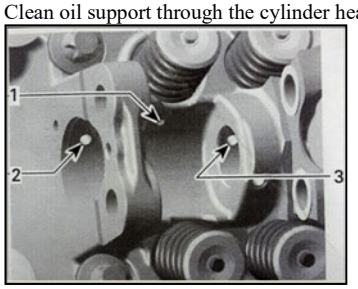
In case of exceeding designated range, then adjust the gap.



Spark plug gap: 0.8-1.0mm

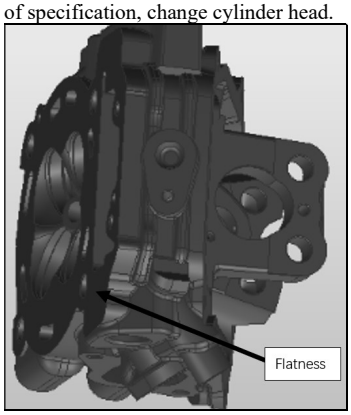
Check mating surface between cylinder and cylinder head for contamination. If so, clean both surfaces.

Clean oil support through the cylinder head from contamination.



1. Oil port to lubricate camshaft lobes intake/exhaust
2. Oil supply to camshaft bearing journal timing chain side
3. Oil supply to camshaft bearing journal spark plug side

Check cylinder head for deformation. Measure the flatness of cylinder head using knife straight edge and feeler. If flatness is out of specification, change cylinder head.



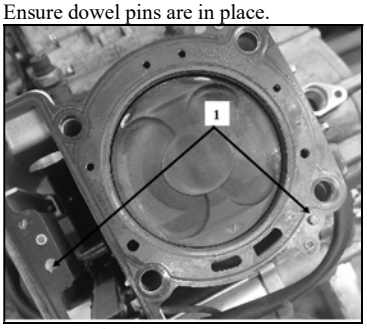
Flatness of cylinder head	
new	0 to 0.04mm
Service limit	0.04mm

Cylinder Head Installation

NOTE: The cylinder heads are not identical in design. Do not invert the cylinder heads at assembly.

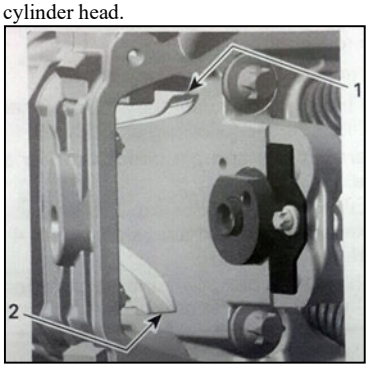
For installation, reverse the removal procedure. Pay attention to the following details.

Ensure dowel pins are in place.



1. Dowel pin

CAUTION: Chain guide has to be fixed between cylinder and cylinder head.



1. Chain guide (fixed between cylinder and cylinder head)
2. Chain tensioner guide (mounted in crankcase)

Install a new cylinder head gasket.

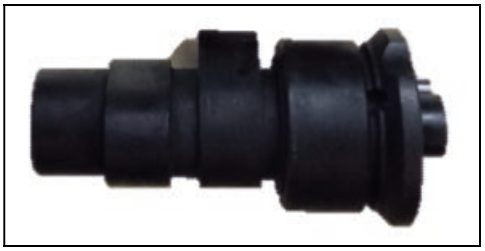
NOTE: Do not forget to place the washer on cylinder head M10 bolt. First, torque cylinder head M10 bolts in crisscross sequence to 18-22N.m, then finish by tightening to 45-50N.m.

Install cylinder head M6 bolts. Tighten M6 bolts to 10-12N.m.

Check chain guide for movement.

Tighten spark plug to 20-25N.m.

3.7 CAMSHAFT



1. Camshaft of cylinder

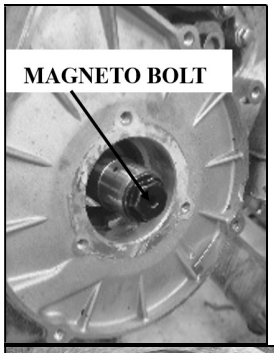
Camshaft Timing Cylinder

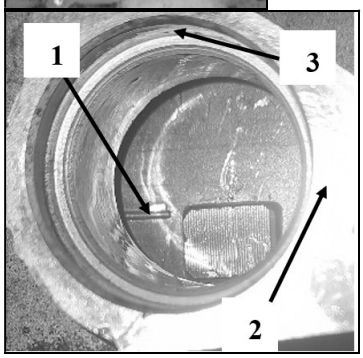
Turn crankshaft until piston is at TDC ignition as follows.

Remove:

-spark plug cable and spark plug
-valve cover
-crankshaft position sensor
-bolt and big view hole cap

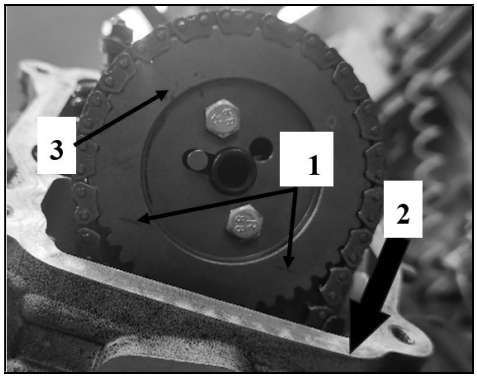
Turn the magneto bolt until mark “T” on magneto flywheel and dot mark on the left cover are aligned.





1. Mark "T" on magneto flywheel
2. Dot mark on left crankcase cover
3. Location of crankshaft position sensor

NOTE: At TDC ignition, the printed marks on the camshaft timing gear have to be parallel to cylinder head base as per following illustration.



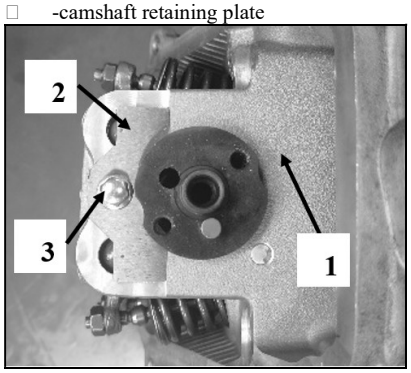
1. Printed marks on camshaft timing gear
2. Cylinder head base
3. Camshaft timing gear

CAUTION: Crankshaft cannot be locked at cylinder TDC ignition.

Camshaft Removal

Remove:

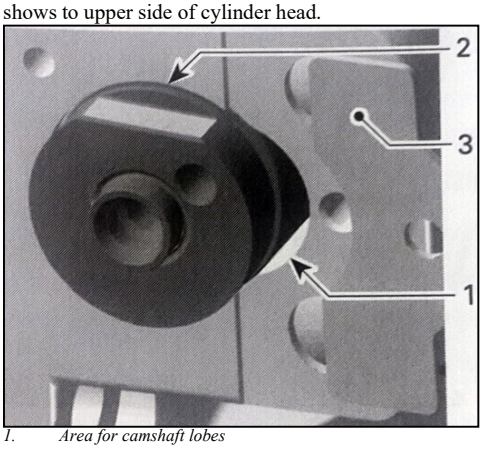
-spark plug cable and spark plug
-valve cover (see VALVE COVER above)
-chain tensioner (see CHAIN TENSIONER above)
-camshaft timing gear (see CAMSHAFT TIMING GER above)
-camshaft retaining plate



1. Cylinder head
2. Camshaft retaining plat
3. Bolt

-rocker arms (see ROCKER ARM above)
-camshaft.

NOTE: For removal rotate camshaft so that intake/exhaust lobe shows to upper side of cylinder head.

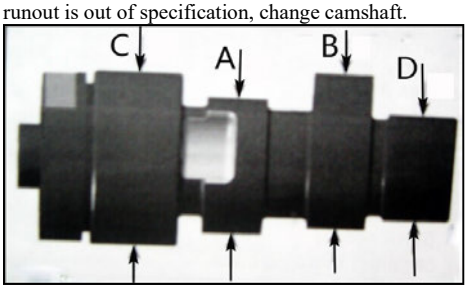


1. Area for camshaft lobes
2. Camshaft
3. Camshaft retaining

Camshaft Inspection

Check each lobe and bearing journal of camshaft for scoring, scuffing, cracks or other signs of wear.

Measure camshaft base circular runout using the indicator. If runout is out of specification, change camshaft.



A. Camshaft lobe (exhaust valves)
B. Camshaft lobe (intake valves)
C. Camshaft journal timing chain side
D. Camshaft journal spark plug side

Camshaft base circular runout	
New	0 to 0.02mm
Service limit	0.02mm

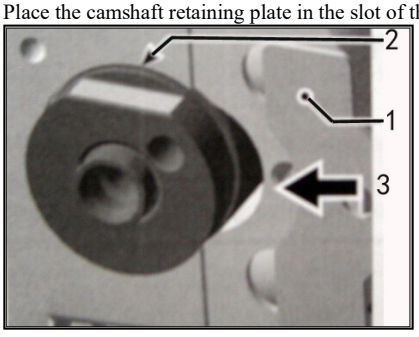
Camshaft Installation

For installation, reverse the removal procedure. Pay attention to the following details.

CAUTION: the camshafts are not identical in design. Do not invert the camshafts during assembly. Any mix-up of the components will lead to engine damage.

Apply engine oil on the camshaft.

Place the camshaft retaining plate in the slot of the camshaft.



1. Camshaft retaining plate position
2. Slot retaining camshaft
3. Direction of movement

For other parts, refer to proper installation procedure.

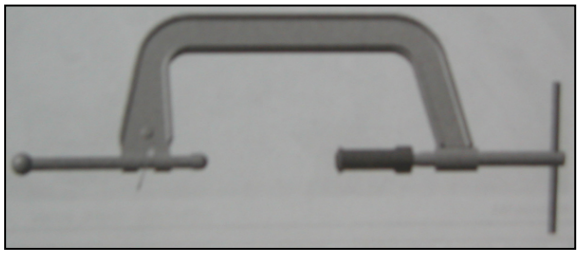
3.8 VALVE SPRING

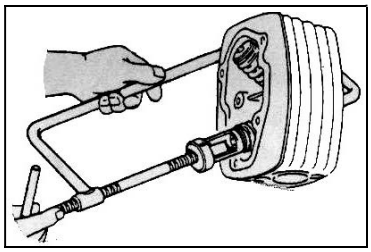
Valve Spring Removal

Remove:

- -rocker arms (see ROCKER ARM above)
- -cylinder head (see CYLINDER HEAD above).

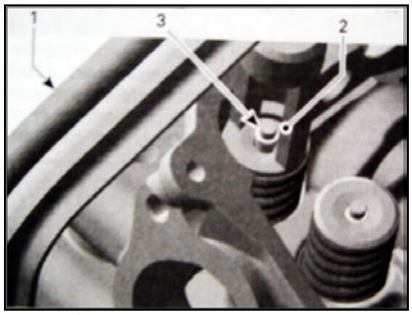
Compress valve spring using valve spring compressor clamp and vale spring compressor cup.





▲WARNING
Always wear safety glasses when disassembling valve springs. Be careful when unlocking valves. Components could fly away because of the strong spring preload.

Remove valve cotters.



1. Valve spring compressor clamp
2. Valve spring compressor cup
3. Valve cotter

Withdraw valve spring compressor, then remove valve spring retainer and valve spring.

Valve Spring Inspection

Check valve spring for visible damages. If so, replace valve spring.

Check force of valve spring for different lengths using tension meter. Replace valves springs if out of specifications.

Force of valve spring at length-22.7mm	
New	530±5% N
Service limit	503N
Force of valve spring at length-32.5mm	
New	192.7±8% N
Service limit	183N

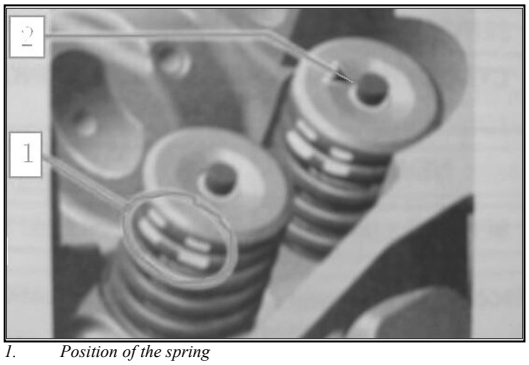
Valve Spring Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Colored area of the valve spring must be placed on top.

To ease installation of cotters, apply oil or grease on them so that they remain in place while releasing the spring.

NOTE: Valve cotter must be properly engaged in valve stem grooves.



1. Position of the spring
2. Valve cotter

After spring is installed, ensure it is properly locked by tapping on valve stem end with a soft hammer so that valve opens and closes a few times.

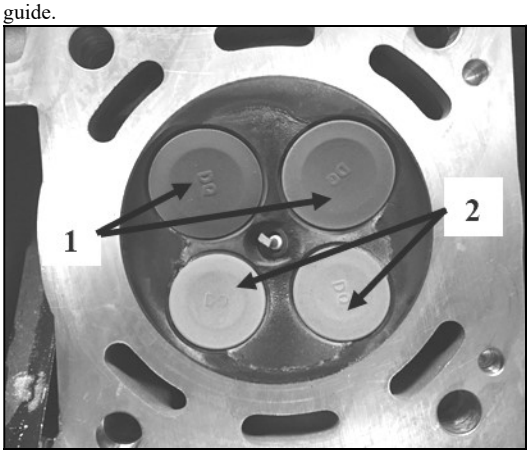
CAUTION: An improperly locked valve spring will cause engine damage.

3.9 VALVE

VALVE Removal

Remove valve spring, see VALVE SPRING above.

Push valve stem, then pull valves (intake and exhaust) out of valve guide.



1. Intake valves
2. Exhaust valve

Remove valve stem seal with Snap-On pliers and discard it.

Valve Inspection

Valve Stem seal

Always install new seals whenever valves are removed.

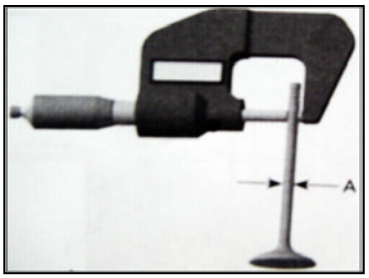
Valve

Inspect valve surface, check for abnormal stem wear and bending.

Valve Stem and Valve Guide Clearance

Measure valve stem and valve guide in three places using a micrometer and a small bore gauge.

Change valve if valve stem is out of specification or has other damages such as wear or friction surface.



A-Valve stem diameter

Valve stem diameter	
Exhaust valve	
New	Φ 4.950 to Φ 4.965 mm
Service limit	Φ 4.950 mm

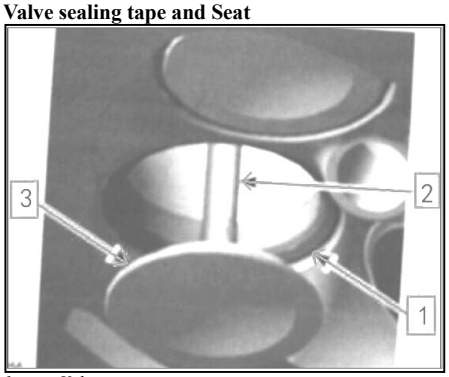
Intake valve	
New	Φ 4.965 to Φ 4.980 mm
Service limit	Φ 4.965mm

Replace valve guide out of cylinder head if valve guide inner diameter is out of specification or has other damages such as wear or friction surface (see VALVE GUIDE below).

Valve guide inner diameter (intake and exhaust valves)	
New	Φ 5.00 to Φ 5.012 mm
Service limit	Φ 5.012 mm

NOTE: Clean valve guide to remove carbon deposits before measuring valve guide inner diameter.

Valve sealing tape and Seat

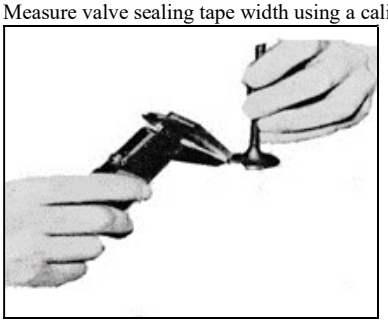


1. Valve seat
2. Exhaust valve
3. Valve sealing tape (contact surface to valve seat)

Check valve face and seat for burning or pitting, and replace valve or cylinder head if there are signs of damage.

Ensure to seat valve properly.

Measure valve sealing tape width using a caliper.



Valve sealing tape width (intake and exhaust valves)	
New	0.85 to 1.15mm
Service limit	0.85 mm

NOTE: The location of contact area should be in center of valve seat.

If valve seat contact width is too wide or has dark spots, replace the cylinder head.

Valve installation

For installation, reverse the removal procedure. Pay attention to the following details.

Install a NEW seal valve stem. Make sure valve stem is installed before installing seal.

Apply engine oil on valve stem and install it.

To ease installation of cotters, apply oil or grease on them so that they remain in place while releasing the spring.

After spring is installed, ensure it is properly locked by tapping on valve stem end with a soft hammer so that valve opens and closes a few times.

CAUTION: An improperly locked valve spring will cause engine damage.

3.10 VALVE GUIDE

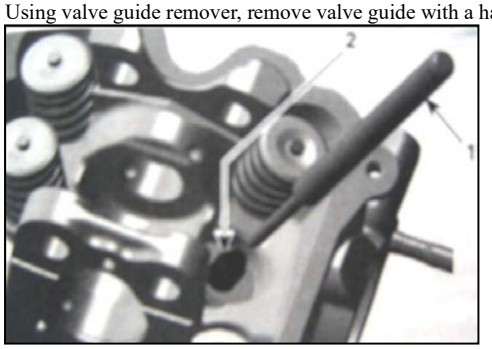
Valve Guide Removal

Remove:

- -cylinder head (see CYLINDER HEAD above)
- -valve spring (see VALVE SPRING above)
- -valves (see VALVE above)

NOTE: Clean valve guide area from contamination before removal.

Using valve guide remover, remove valve guide with a hammer.



1. Valve guide remover
2. Valve guide

Valve Guide Inspection

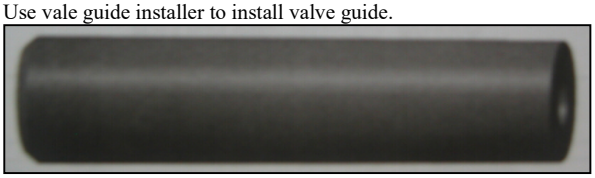
Always replace valve stem seals whenever valve guides are removed.

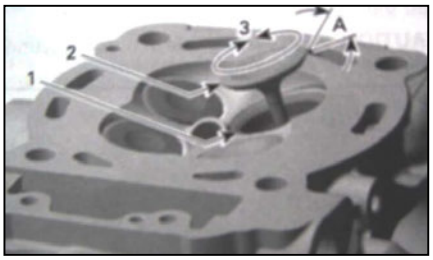
Clean the valve guide bore before reinstalling the valve guide into cylinder head.

Valve Guide Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Use vale guide installer to install valve guide.





1. Valve seat
2. Valve face (contact surface to valve seat)
3. Turn valve while pushing against cylinder head

NOTE: Ensure to seat valves properly. Apply marking paste to ease checking contact patter. Repeat procedure until valve seat/valve face fits together.

3.11 CYLINDER

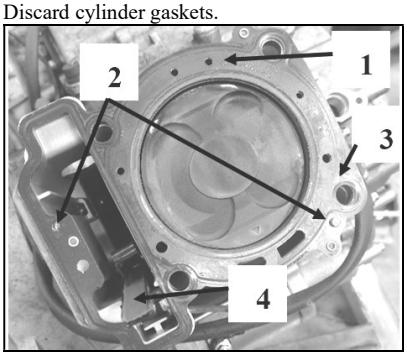
Cylinder removal

Remove:

-Chain tensioner (see CHAIN TENSIONER)
-Camshaft timing gear (see CAMSHAFT TIMING GEAR)
-Cylinder head (see CYLINDER HEAD)
-Dowel Pins, gasket and chain guide

Pull out cylinder.

Discard cylinder gaskets.



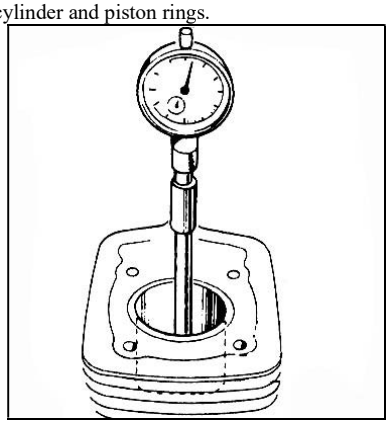
1. Cylinder
2. Pin

3. Cylinder gasket
4. Chain guide

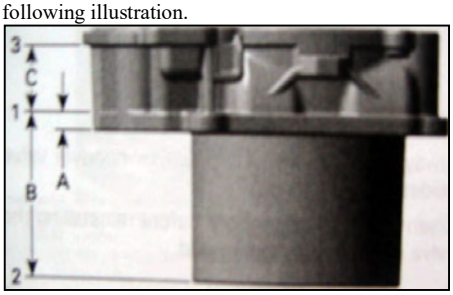
Cylinder Inspection

Check cylinder for cracks, scoring and wear, ridge on the top and bottom of the cylinder. If so, replace cylinder.

Measure cylinder bore and if it is out of specifications, replace cylinder and piston rings.



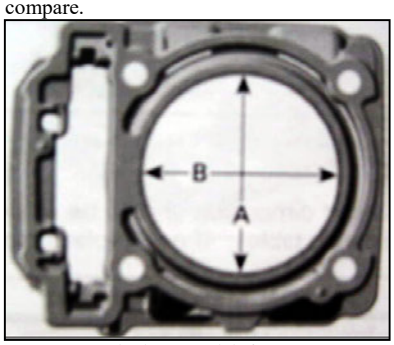
Measure cylinder bore at 3 recommended positions. See the following illustration.



1. First measuring of diameter
2. Second measuring of diameter
3. Third measuring of diameter
A. 7mm from cylinder bottom
B. 68mm
C. 32mm

Distance between measurements should not exceed the service limit mentioned above.

Measure cylinder diameter in piston axis direction from top of cylinder. Take another measurement 90° from first one and compare.



A. Perpendicular to crankshaft axis
B. Parallel to crankshaft axis

Cylinder diameter measurement	
Size “A”	
New	91 to 91.01mm
Service limit	91.01mm
Size “B”	
New	91.01 to 91.02 mm
Service limit	91.02mm

Cylinder Installation

For installation, reverse the removal procedure. Pay attention to the following details.

CAUTION: Always replace cylinder base gasket before installing the cylinder.

Turn magneto bolt. Crank the engine further and position piston at TDC. Then mount cylinder.

Apply engine oil on cylinder bore and also on the band of the piston ring compressor tool.

NOTE: Put timing chain through the chain pit then put the cylinder in place.

NOTE: At installation, do not damage the piston rings.

CAUTION: Chain guide has to be fixed between cylinder and cylinder head.

NOTE: After cylinder is installed, turn crankshaft until piston of cylinder is at TDC ignition and lock crankshaft. Install cylinder head and the other parts in accordance with the proper installation procedures.

3.12 PISTON

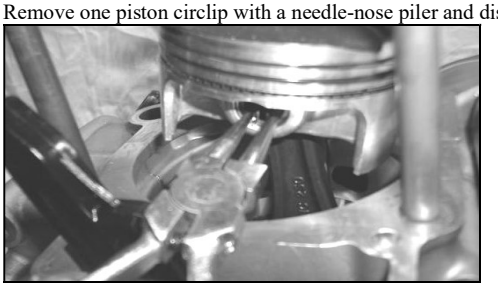
Piston Removal

Remove:

- -cylinder head (see CYLINDER HEAD above)
- -cylinder (see CYLINDER above).

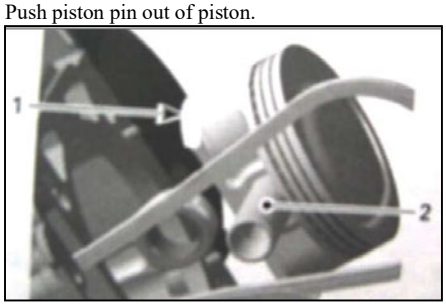
Place a rag under piston and in the area of timing chain compartment.

Remove one piston circlip with a needle-nose piler and discard it.



NOTE: The removal of both piston circlips is not necessary to remove piston pin.

Push piston pin out of piston.



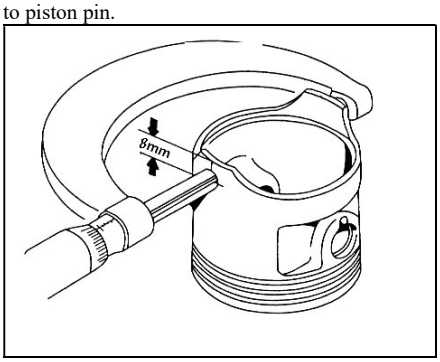
1. Piston
2. Piston Pin

Detach piston from connecting rod.

Piston and Pin Inspection

Inspect piston for scoring, cracking or other damages. Replace piston and piston rings if necessary.

Using a micrometer, measure piston at 8mm perpendicularly (90°) to piston pin.

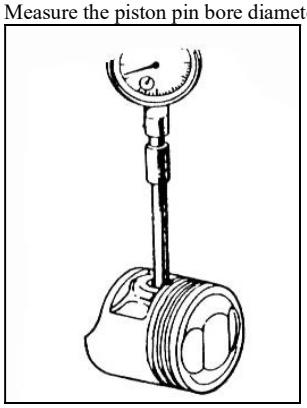


The measured dimension should be as described in the following tables. If not, replace piston.

Piston diameter measurement	
Size “I”	
New	90.94 to 90.95mm
Service limit	90.94mm
Size “II”	
New	90.95 to 90.96 mm
Service limit	90.95mm

Piston Pin and Piston Pin Bore

Measure the piston pin bore diameter.



Piston pin bore diameter	
New	22.004 to 22.010 mm
Service limit	22.010mm

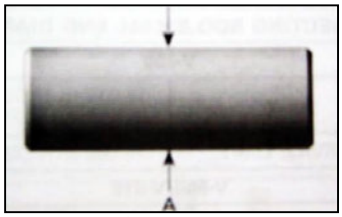
Using synthetic abrasive woven clean piston pin from deposits.

Inspect piston pin for scoring, cracking or other damages.

Measure piston pin diameter using a micrometer.

Replace piston pin if diameter is out of specifications.

See the following illustration for the proper measurement positions.



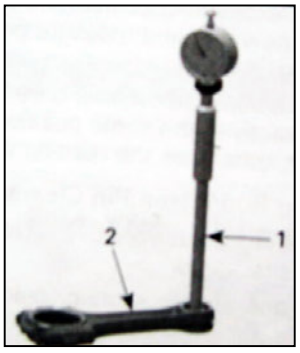
A-Piston pin diameter

Piston pin diameter	
New	21.994 to 22.00 mm
Service limit	21.994mm

If piston pin bore and piston pin exceed specified tolerance; replace piston by a new piston or piston pin.

Connecting Rod

Measure inner diameter of connecting rod small end bushing.



1. Bore gauge

2. Connecting rod

Connecting rod small end diameter	
New	22.01 to 22.02 mm
Service limit	20.02 mm

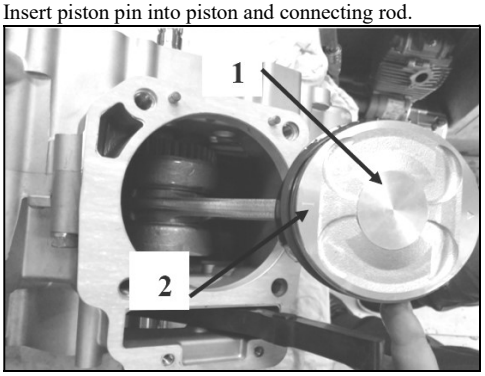
Replace connecting rod if diameter of connecting rod small end is out of specifications.

Piston Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Apply engine oil on the piston outer circle.

Insert piston pin into piston and connecting rod.



1. Piston of cylinder

2. Mark “IN” on piston

CAUTION: Mark “IN” on top of piston must show to intake side. Place gap of piston circlip parallel with piston motion.

CAUTION: Always replace disassembled piston circlip(s) by new ones. Place a rag on cylinder base to avoid dropping the circlip inside the engine.

3.13 PISTON RINGS

Ring Removal

Remove:

- -cylinder head
- -cylinder
- -piston pin
- -piston rings

Ring Inspection

Inspect ring grooves on piston for scoring, cracking or other damages. Replace piston and piston rings if necessary.

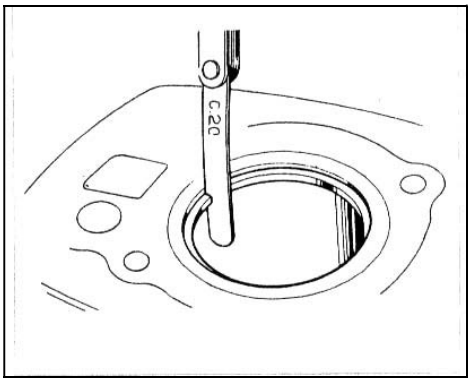
Ring end Gap

Using a feeler gauge measure each ring/piston groove clearance. If the clearance is too large, the piston and the piston rings should be replaced.

To measure the ring end gap, place the ring in the cylinder in the area of 8 to 16 mm from top of cylinder.

NOTE: In order to correctly place the ring in the cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. Replace ring if gap exceeds the above tolerance.



Ring end gap	
Upper compression ring	
New	0.15 to 0.30mm
Service limit	0.30 mm
Lower compression ring	
New	0.30 to 0.45mm
Service limit	0.45 mm
Oil scraper ring	
New	0.20 to 0.70 mm
Service limit	0.7mm

Compression Ring Thickness

Measure compression ring thickness using a caliper. Replace ring if exceeds the above thickness.

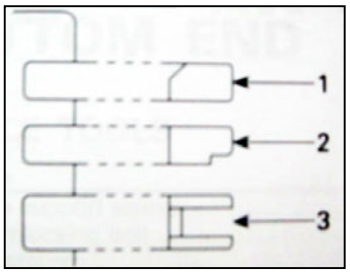
Compression ring thickness	
Upper compression ring	
New	1.17 to 1.19mm
Service limit	1.17 mm
Lower compression ring	
New	1.47 to 1.49mm
Service limit	1.47 mm

Ring Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Clean the ring groove on the piston before ring installation.

NOTE: Install the oil scraper ring first, then the lower compression ring with the word "DY" facing up, then the upper compression ring with the word "D" facing up.

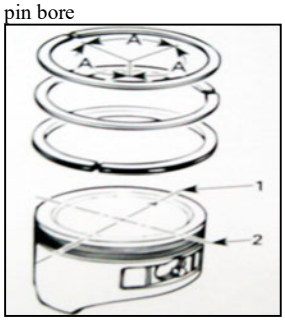


1. Upper compression ring
2. Lower compression ring
3. Oil scraper ring

CAUTION: Ensure that top and second rings are not interchanged. The gap of upper compression ring is faced to the intake side. The gap of lower compression ring is faced up to the exhaust side.

NOTE: Use a ring expander to prevent breakage during installation. The oil ring must be installed by hand.

Check that rings rotate smoothly after installation. Space the piston ring end gaps 120 apart and do not align the gaps with the piston pin bore



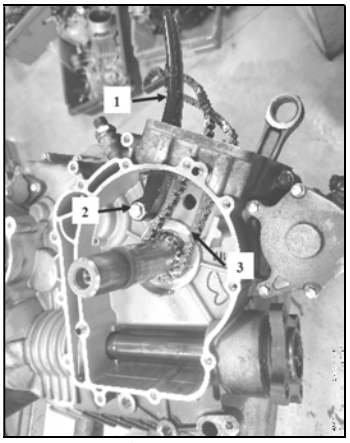
1. DO NOT align gap with piston thrust side axis
2. DO NOT align ring with piston pin bore axis
A.--120°.

3.14 TIMING CHAIN

Removal of Timing Chain

Remove:

- -valve cover, chain tensioner and camshaft timing gear (refer to CYLINDER AND HEAD section)
- -CVT (refer to TRANSIMISSION)
- - Bolt, timing chain guide and tension plate.



1. Tension plate
2. Bolt
3. Timing chain

Carefully pull the timing chain sideward and down from the crankcase.

NOTE: Mark the operating direction of the timing chain before removal.

Timing Chain Inspection

NOTE: Check timing chain on camshaft timing gear for excessive radial play.

Check chain condition for wear and teeth condition.

If chain is excessively worn or damaged, replace it as a set (camshaft timing gear and timing chain).

Timing Chain Installation

The installation is essential the reverse of the removal procedure, but pay attention to the following details.

NOTE: Ensure to perform proper valve timing. Lock crankshaft (see CRANKSHAFT) and camshaft at TDC ignition (refer to CYLINDER AND HEAD section).

Install timing chain with camshaft timing gear then, adjust chain tension (refer to CYLINDER AND HEAD section).

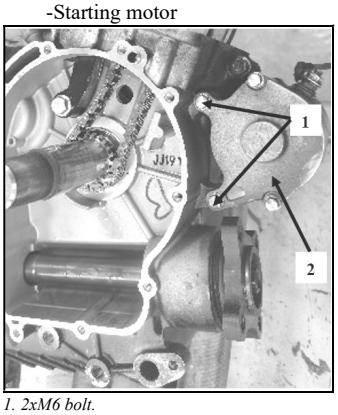
CAUTION: Improper valve timing will damage engine components.

3.15 CRANKCASE

Crankcase Dismantling

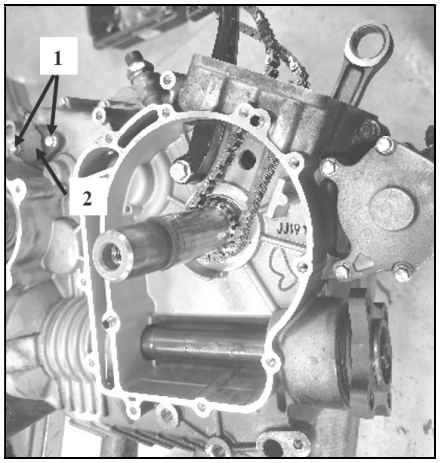
Remove:

- -Front/rear drive shaft (refer to VEHICLE DISMANTING)
- -CVT (refer to TRANSIMISSION) and gaskets
- -Starting motor



1. 2xM6 bolt.
2. Starting motor

- M6 bolts and gearshift switch.



1. 2xM6 Bolt
2. Gearshift switch

-Left crankcase cover (refer to LEFT CRANKCASE COVER)

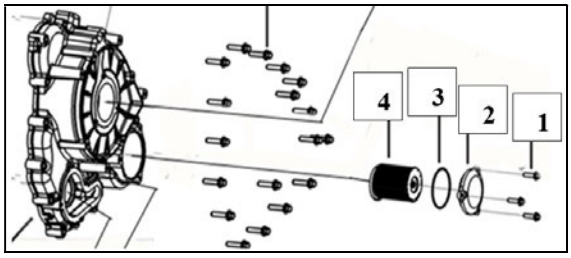
- gear shift arm

-magneto motor and sprag clutch

-oil pump

□ -water pump cover (refer to COOLING SYSTEM section)

□ -oil filter

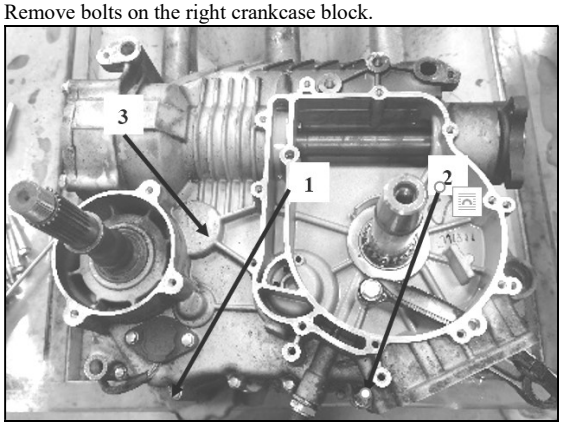


1. 3xM6 Bolt
2. Oil filter cap
3. O-ring
4. Oil filter

□ -cylinder head, cylinder and piston (refer to CYLINDER AND CYLINDER HEAD section)

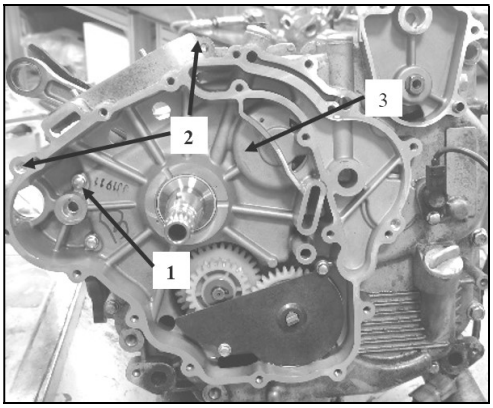
□ -timing chains and timing chain guides (refer to TIMING CHAIN and TIMING CHAIN GUIDE).

Remove bolts on the right crankcase block.



*1. 7x M6*60 bolt*
*2. 2x M8*50 bolt*
3. Right crankcase block

Remove bolts on the left crankcase block.

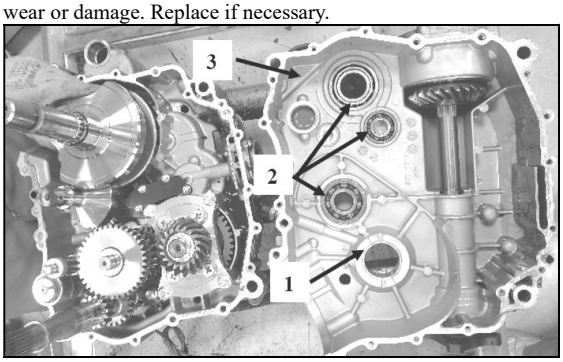


*1. 8xM6*50bolt*
*2. 2xM8*50 bolt*
3. Left crankcase block

Separate the left/right crankcase block.

Inspection

Check bearing and crankshaft bearing on right crankcase block for wear or damage. Replace if necessary.



1. Crankshaft bearing
2. Bearing
3. Right crankcase block.

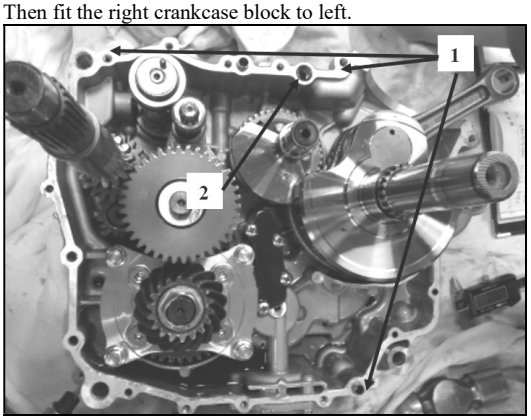
Installation

The installation is essential the reverse of the removal procedure, but pay attention to the following details.

Apply sealant continuous regular on contact face of left crankcase block.

Do not forget to put dowel pins and O-ring to left crankcase block.

Then fit the right crankcase block to left.



1.3xDowel pin
2. O-ring

Tighten M6 bolts in crisscross sequence to 10-12N.m.

Tighten M8 bolts to 18-22N.m.

CAUTION: Apply oil on the gearshift switch hole before installing. The harness of switch is upward.

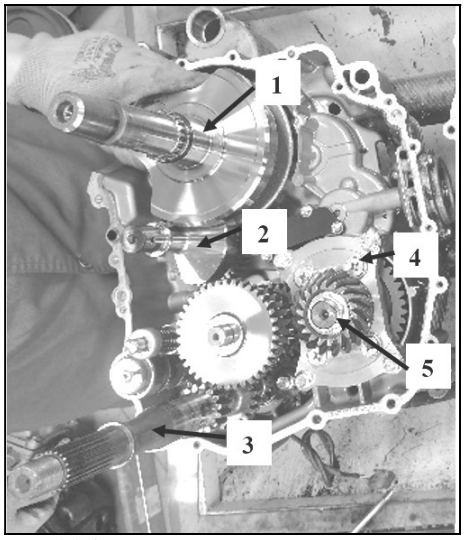
Tighten M6 bolts for gearshift switch to 10-12N.m.

3.16 GEAR

Removal

Remove right crankcase block (refer to CRANKCASE).

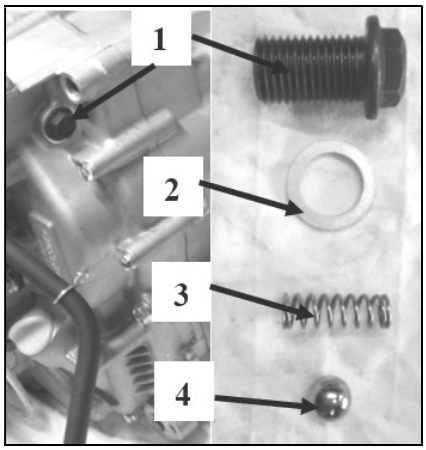
Remove balance shaft, crankshaft and main shaft from the left crankcase block.



1. Crankshaft
2. Balance shaft
3. Main shaft
4. 4xM8 bolt
5. Active cone

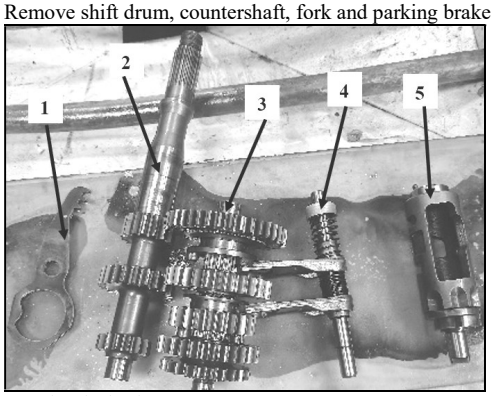
Remove four M8 bolts and active cone.

Remove bolts, washer, spring and steel ball for the shift drum from left crankcase block.



1.M14 Bolt
2.Washer
3.Spring
4.Steel ball

Remove shift drum, countershaft, fork and parking brake plate.



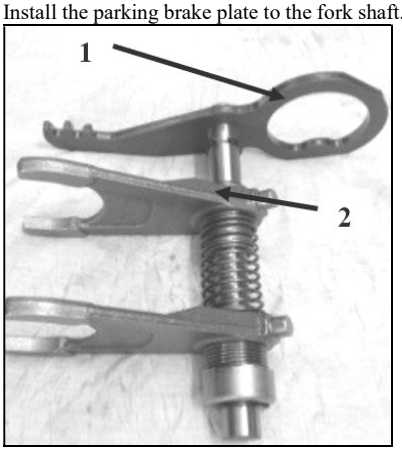
1. Parking brake plate
2. Main shaft
3. Countershaft
4. Fork
5. Shift drum

Inspection

Check crankshaft, balance shaft, main shaft, countershaft, shift drum, bearing and crankshaft bearing for wear or damage. Replace if necessary.

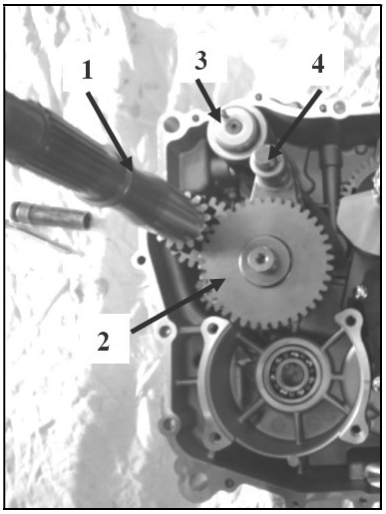
Installation

Install the parking brake plate to the fork shaft.



1. Parking brake plate
2. Fork

Install main/counter shaft, fork, shift drum to the left crankcase block.

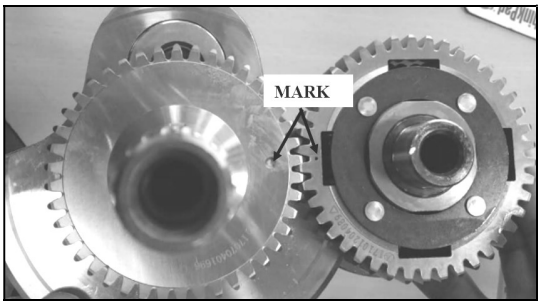


1. Main shaft
2. Countershaft
3. Shift drum
4. Fork

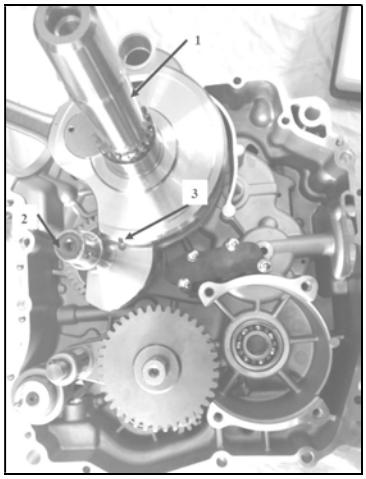
Install bolts, washer, spring and steel ball to the left crankcase block. Tighten the M14 bolt for shift drum to 28-32N.m.

NOTE: Install countershaft, fork and shift drum at the same time. Apply thread-locker on the M14 bolt for shift drum before installation. Check shifting smooth or not. Check the steel ball slide smooth or not in the bolt hole.

Install crankshaft and balance shaft to left crankcase block with the marks in a line.



CAUTION: Apply engine oil on the crankshaft bearing and crankshaft journal. After installation, turn the crankshaft to check the groove on crankshaft and mark on balance shaft in a line or not at TDC position.



1.Crankcase shaft
2. Balance shaft
3. Groove

Install M8 bolts and active cone. Tighten bolts for active cone to 18-22N.m.

3.17 CRANKSHAFT

Removal

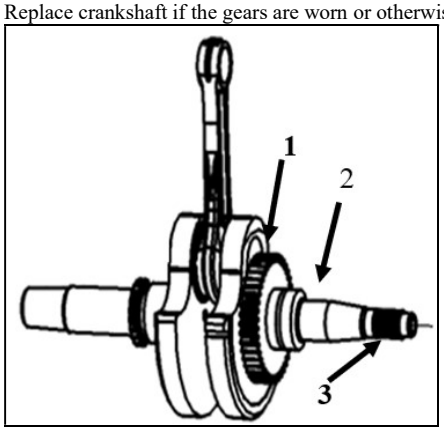
Refer to GEAR.

Inspection

Check each bearing journal of crankshaft for scoring, scuffing, cracks or other signs of wear.

Check woodruff keyway and spline on the crankshaft for wear or damages.

Replace crankshaft if the gears are worn or otherwise damaged.



1. Gear
2. Woodruff keyway
3. Spline

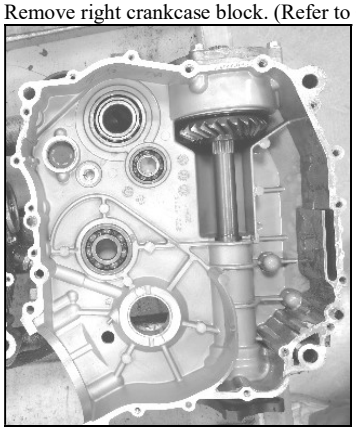
Installation

For installation of crankshaft in crankcase reverse the removal procedure.

3.18 REAR ENWHEEL SHAFT

Removal

Remove right crankcase block. (Refer to CRANKCASE)

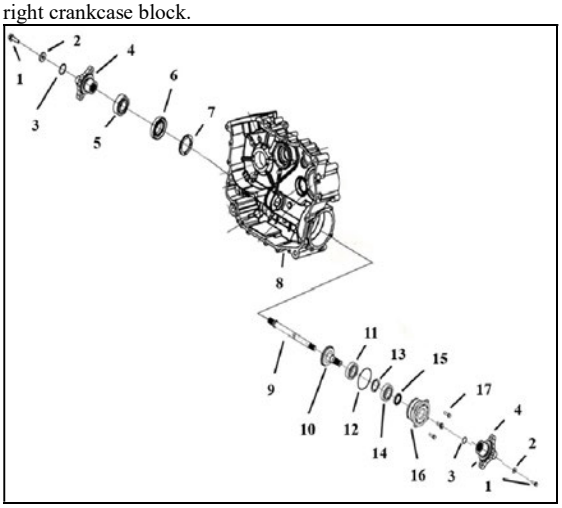


Remove M10 bolt, washer, O-ring, connecting flange at front and rear side of right crankcase block.

Remove the bearing, oil seal, lock nut and rear wheel shaft from the right crankcase block.

Remove M8 blots on the end cover and then remove end cover.

Remove the bearing, oil seal, lock nut and output driven cone from right crankcase block.



1. 2xM10 bolt
2. Washer
3. O-ring
4. Connecting flange
5. Bearing
6. Oil seal
7. M55 lock nut
8. Right crankcase block
9. Rear wheel shaft
10. Output driven cone
11. Bearing
12. O-ring
13. M65 lock nut
14. Bearing
15. Oil seal
16. End cover
17. 3xM8 bolt

Inspection

Check washer, O-ring, bearing and oil seal for wear or damages. Replace if damaged.

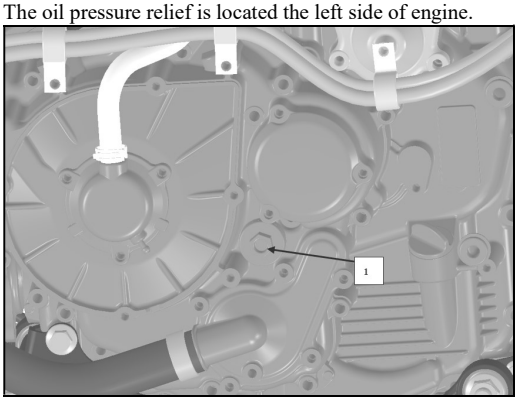
Check driven cone, splines on wheel shaft/connecting flange for wear or damages. Replace if damaged.

Installation

For installation of crankshaft in crankcase reverse the removal procedure.

3.19 OIL PRESSURE RELIEF

The oil pressure relief is located the left side of engine.

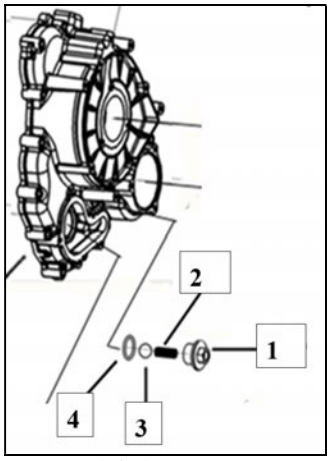


1. Engine pressure relief

NOTE: The oil pressure relief system works when the oil pressure exceeds 450kPa (65psi).

Removal

Remove relief valve cover and pull oil out.



1.Pressure relief valve cover
2.Spring
3.Steel ball
4.O-ring

Inspection

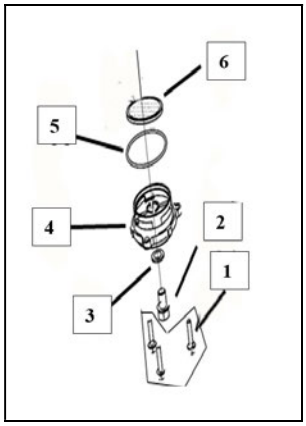
Inspect spring and O-ring for scoring or other damages.
Check spring for free length.
NOTE: Replace worn or damaged components.
Clean pressure relief valve cover from metal shavings and other contaminations.

Installation

For installation, reverse the removal procedure.
Pay attention to the following details.
NOTE: At installation, always replace the O-ring of the plug screw.

3.20 OIL DRAIN

Prior to change the engine oil, ensure vehicle is on a level surface.
Place a drain pan under the drain plug area.
Clean drain plug area and remove magnetic drain plug with its washer to drain oil.
Remove oil filler including its O-ring.
CAUTION: Pay attention not to lose washer on oil drain plug.
Wait a while to allow oil flow out of gearbox.



1.Bolt
2. Oil drain Plug
3. Washer
4. Oil filter Cap
5.O-ring
6.Oil filter

Dispose oil as per your local environmental regulations.

Inspection

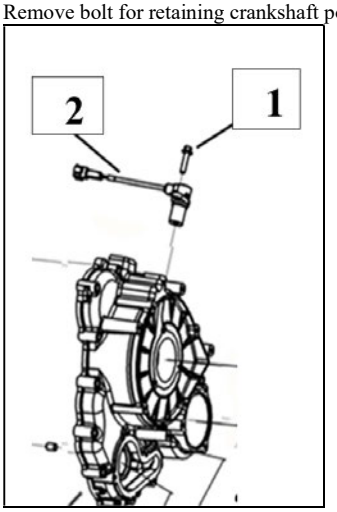
Oil condition gives information about the teeth condition inside the gearbox.
Clean the magnetic drain plug from metal shavings and dirt. Presence of debris gives an indication of failure inside the gearbox. Check gearbox to correct problem.
Change washer on the magnetic drain plug if damaged.
Replace O-ring if brittle, hard or otherwise damaged.

3.21 CRANKSHAFT POSTION SENSOR

NOTE: The gearbox removal is not necessary to reach the crankshaft position sensor.

Removal

To reach the crankshaft position sensor, remove the engine service cover.
Remove bolt for retaining crankshaft position sensor.



1. M6 Bolt
2. Crankshaft position sensor

Remove crankshaft position sensor with O-ring.

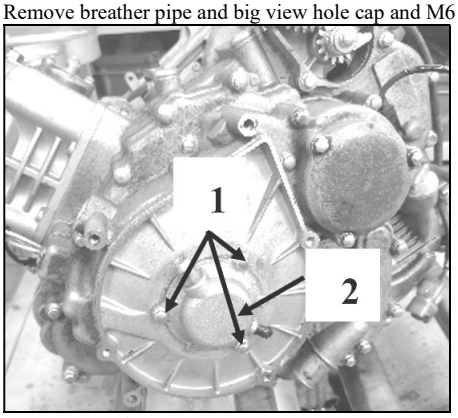
Installation

For installation, reverse the removal procedure.
Pay attention not to lose O-ring on crankshaft position sensor. Apply oil on the O-ring before installation.
Tighten M6 bolt on crankshaft position sensor to 10-12N.m.

3.22 LEFT CRANKCASE COVER

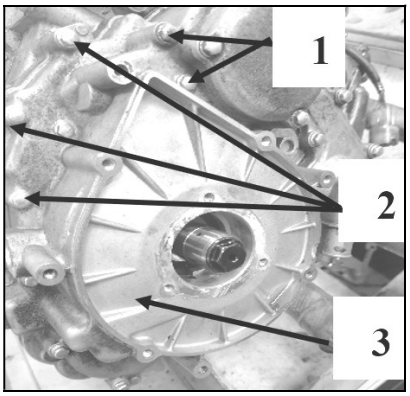
Left Crankcase Cover Removal

Drain engine oil.
Remove breather pipe and big view hole cap and M6 bolt.



1. 3xM6 Bolt
2. Big view hole cap

Disconnect crankshaft position sensor (CPS) connector and water intake pipe.
Remove left crankcase cover and bolts.

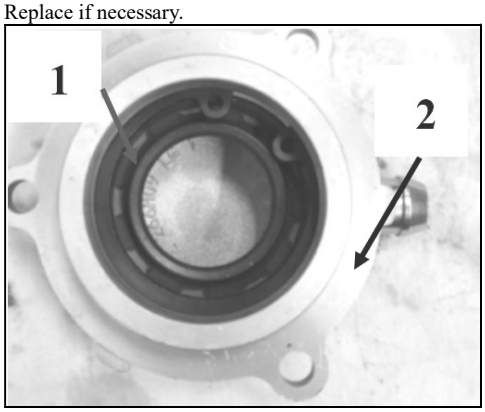


*1. 2xM6*75 Bolt*
*2. 16xM6*40 Bolt*
3. Left crankcase cover

Pull out left crankcase cover.

Left Crankcase Cover Inspection and Cleaning

Check the oil seal of big view hole cap for cracks or damage. Replace if necessary.



1. Oil seal
2. Big view hole cap face contacted with left crankcase cover

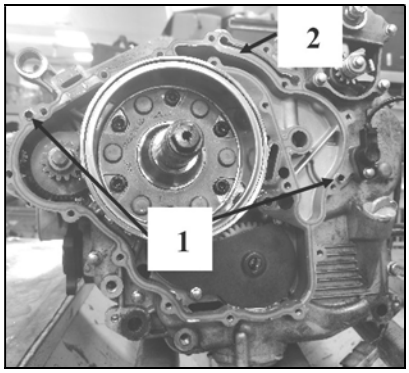
Check left crankcase cover for cracks or damage. Replace if necessary.

Left Crankcase Cover Installation

For installation, reverse the removal procedure. However, pay attention to the following.

NOTE: At installation replace gasket for left crankcase cover.

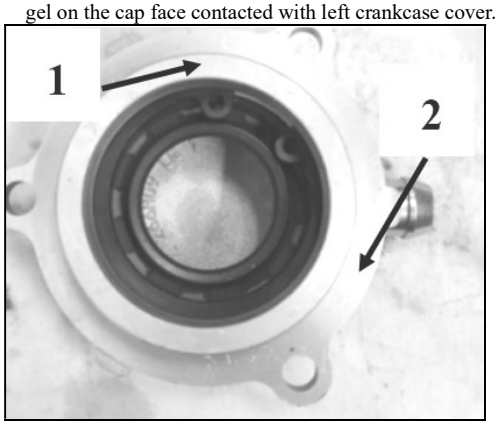
Align the left crankcase cover to the dowel pin on the left crankcase block.



1.Dowel pin
2.Gasket

Tighten M6 bolts on left crankcase cover in a crisscross sequence to 10-12N.m.

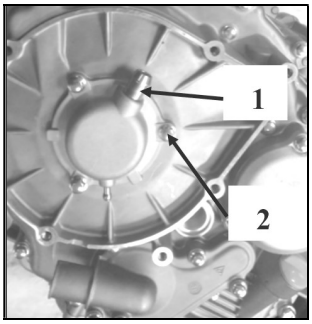
Apply lubricant on the oil seal of big view hole cap. Apply silica gel on the cap face contacted with left crankcase cover.



1. Big view hole cap
2. Face contacted with left crankcase cover

Install big view hole cap with air vent upward.

Tighten M6 bolts for big view hole cap to 10-12N.m.



1. Air vent
2. 3xM6 Bolt

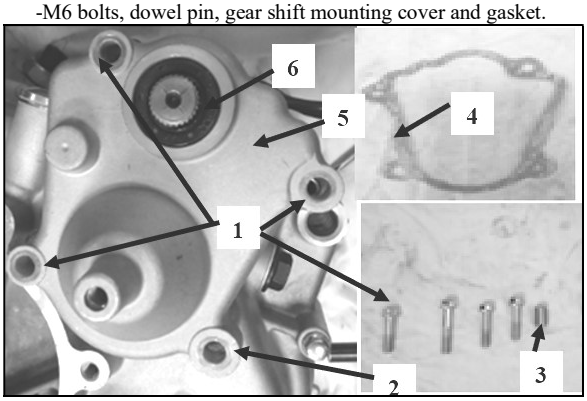
3.23 GEAR SHIFT ARM

Removal

Remove:

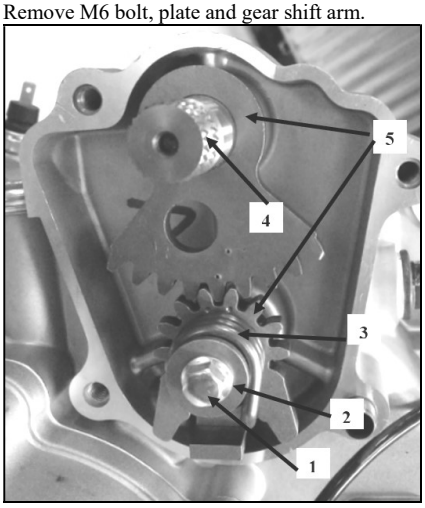
-Engine service cover and shift lever arm

-M6 bolts, dowel pin, gear shift mounting cover and gasket.



*1. 3xM6*25 Bolt*
*2. M6*32 Bolt*
3. Dowel pin
4. Gasket
5. Gear shift mounting cover
6. Oil seal

Remove M6 bolt, plate and gear shift arm.



*1. M6*35 Bolt*
2. Plate
3. Spring
4. Spline
5. Gear shift arm

Inspection

Check the oil seal for wear or damage. If damaged replace it.

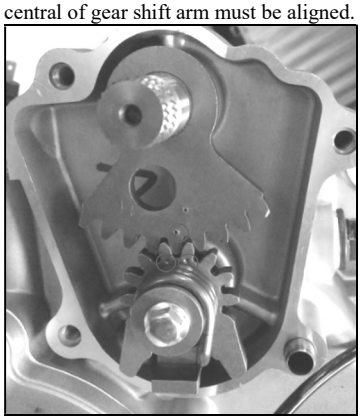
Check spring and spline on the gear shift arm for wear or damage. If damaged replace gear shift arm.

Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Install the bolt through the plate to the left crankcase. Tighten M6 bolt to 10-12N.m.

CAUTION: Before installation the engine is in neutral. The central of gear shift arm must be aligned.

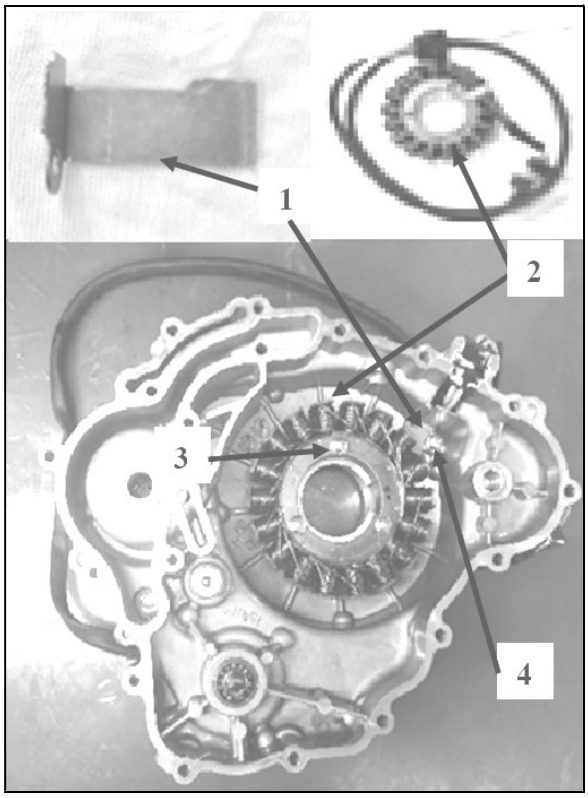


Install the dowel pin and gasket. Install the gear shift mounting cover. Tighten M6 bolts to 10-12N.m.

3.24 MAGNETO STATOR

Stator Removal

Remove left crankcase cover.
Remove stator retaining bolts.
Remove blot, washer and holding strip.
Remove the stator.



1. Handing strip
2. Magneto stator
3. 3xM6 bolt
4. M6 bolt and washer

Stator Inspection

Check stator condition. If damaged replace it.
Check if stator wires are brittle, bad or otherwise damaged.
For electrical inspection, refer to CHARGING SYSTEM.

Stator Installation

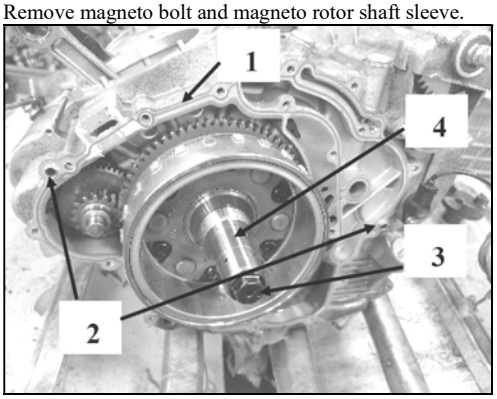
For installation, reverse the removal procedure. However, pay attention to the following.

CAUTION: When installing the stator take care that the cable is in place (guide for wire).

3.25 MAGNETO ROTOR

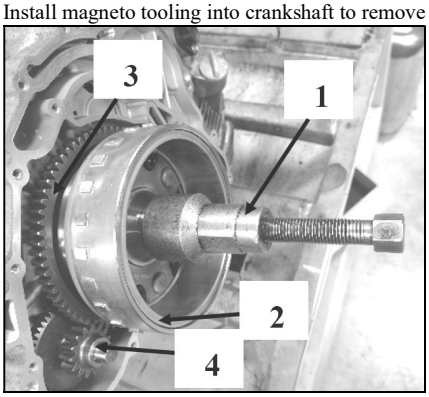
Rotor Removal

Remove left crankcase cover. Refer to LEFT CRANKCASE COVER above.
Remove gasket and dowel pins.
Remove magneto bolt and magneto rotor shaft sleeve.



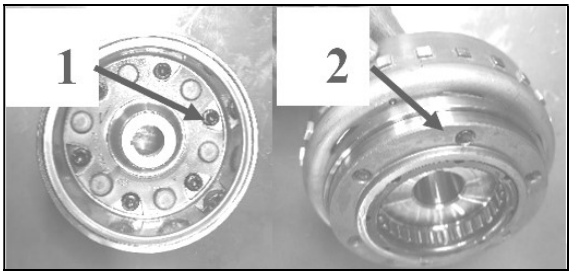
1. Gasket
2. Dowel pin
3. M10 magneto bolt
4. Magneto rotor shaft sleeve

Install magneto tooling into crankshaft to remove magneto rotor.



1. Magneto tooling
2. Magneto rotor
3. Plate gear
4. Twin gear and shaft

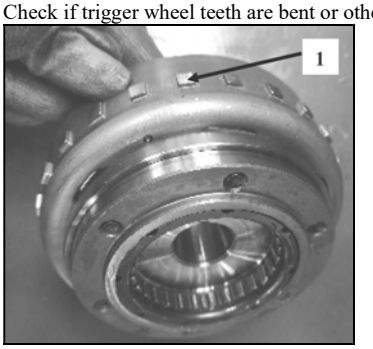
Remove the twin gear, twin gear shaft and plate gear.
Remove the screws for sprag clutch and then remove the sprag clutch.



1. 6xM8 Screw
2. Sprag clutch

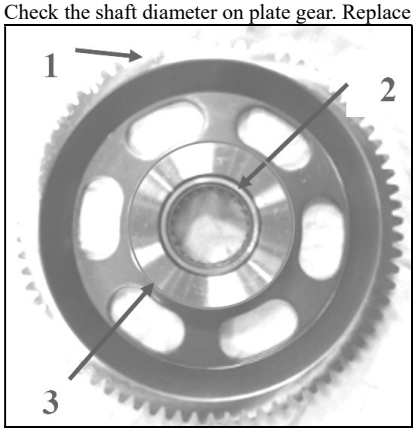
Rotor Inspection

Check inner side of rotor for scratches or other damage.
Check keyway on the rotor for wear or damages.
Check if trigger wheel teeth are bent or otherwise damaged.



1. Rotor with trigger wheel

Check woodruff keyway on the crankshaft for wear or damages.
Check the teeth on plate gear and bearing for wear or damages.
Check the shaft diameter on plate gear. Replace parts as necessary.



1. Plate gear teeth
2. Bearing
3. Shaft diameter

Shaft Diameter	
Service limit	63.295 mm

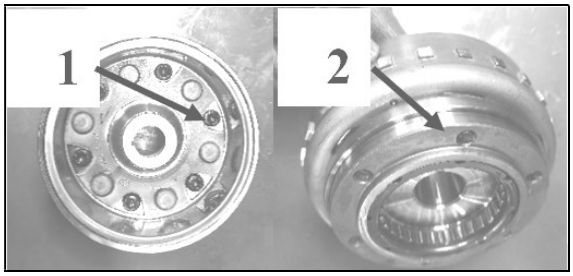
Rotor Installation

For installation, reverse the removal procedure. However, pay attention to the following.
Install the plate gear with lug boss facing outside to crankshaft.
Clean crankshaft and rotor with pulley flange cleaner.
Note: Do not drop the woodruff key from the crankshaft.
Align the woodruff keyway on the rotor to woodruff key on the crankshaft.
Apply LOCTITE 222 and thread-locker on the front 2 teeth of magneto bolt. Tighten magneto bolt to 50-55N.m.
Place the small gear facing outside when installing twin gear.
Apply engine oil on hole for the twin gear shaft before installing twin gear.

3.26 SPRAG CLUTCH

Sprag Clutch Removal

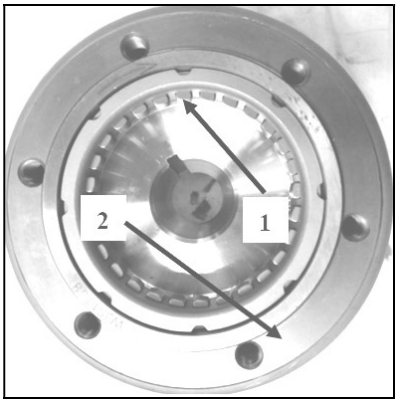
Remove left crankcase cover
Remove rotor (refer to ROTOR above)
Remove the M8 bolts for sprag clutch and then remove the sprag clutch.



1. 6xM8 bolt
2. Sprag clutch

Sprag Clutch Inspection

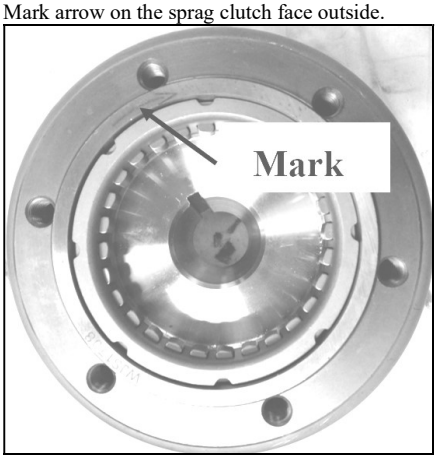
Inspect sprag clutch and wedge on the sprag clutch for wear and damage.



1. Wedge
2. Sprag clutch

Sprag Clutch Installation

For installation, reverse the removal procedure. Pay attention to the following details.
Apply LOCTITE 263 and thread-locker on threads of sprag clutch bolt. Tighten M8 bolts for sprag clutch to 22-30N.m.
Mark arrow on the sprag clutch face outside.

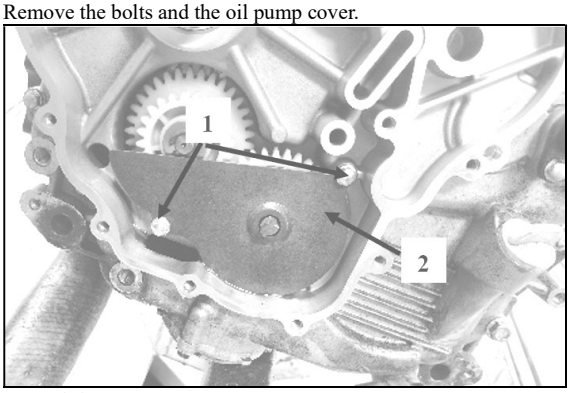


3.27 OIL PUMP

The oil pump is located on the left side of left crankcase block.

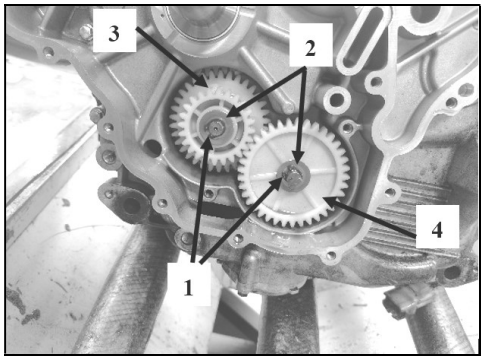
Removal

Remove left crankcase cover.
Remove the bolts and the oil pump cover.



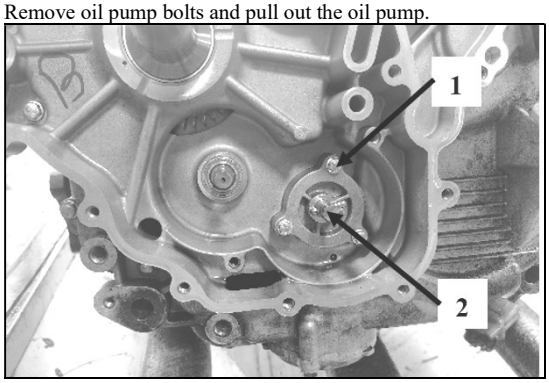
1 2xM6 bolt
2. Oil pump cover

Remove retaining rings using an expander. Then remove washers, oil pump gear and bridge gear.



1.Retaining ring
2. Washer
3. Bridge gear
4.Oil pump gear

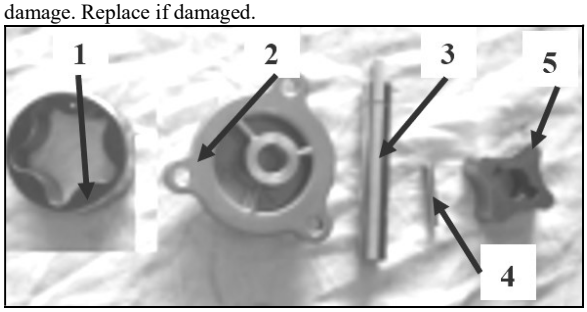
Remove oil pump bolts and pull out the oil pump.



1. 3xM5 bolt
2. Oil pump cap

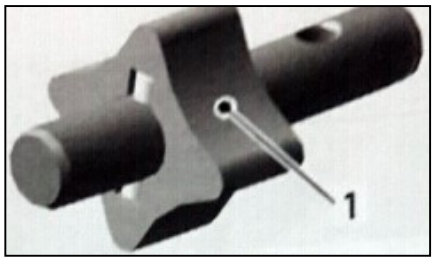
Inspection

Inspect oil pump, oil pump gear and bridge gear for wear or damage. Replace if damaged.



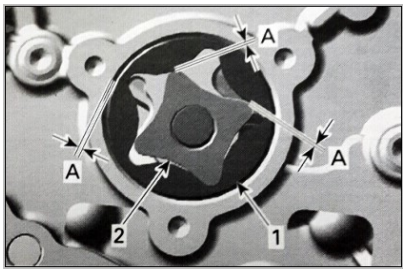
1. Outer rotor
2. Oil pump cap
3. Oil pump shaft
4. Dowel pin
5. Inner rotor

Check inner rotor for corrosion pin holes or other damages. If so, replace oil pump shaft assembly.



1. Pitting on the teeth

Using a feeler gauge, measure the clearance of inner and outer rotors as shown.



1. Outer rotor
2. inner rotor
A.--SERVICE LIMIT:0.25mm(0.09in)

If clearance of inner and outer rotors exceeds the tolerance, replace oil pump shaft assembly. Ensure to also check oil pump cover. If damaged, replace the complete oil pump assembly.

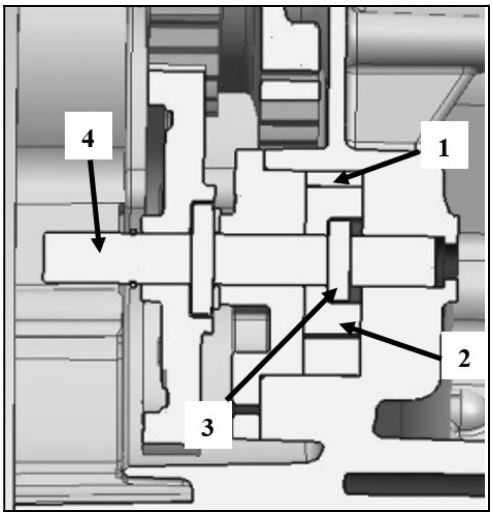
If clearance between outer rotor and its bore in crankcase exceeds the tolerance, replace the complete oil pump assembly and/ or the crankcase.

Installation

Install the outer rotor to the rotor hole of left crankcase block.

Put the inner rotor to oil pump shaft. Place dowel pin in the groove on oil pump shaft through hole on the inner rotor.

Install the inner rotor and shaft to shaft hole of the left crankcase.



1. Outer rotor
2. Inner rotor
3. Dowel pin
4. Oil pump shaft

Tighten the M5 bolts for retaining oil pump cap to 7-9N.m.

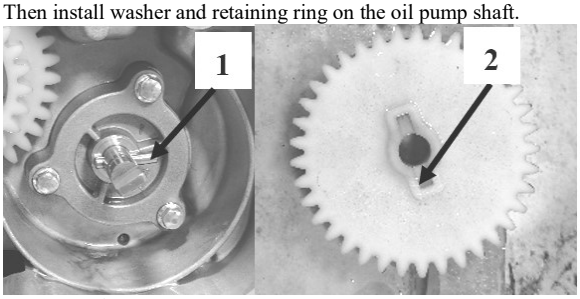
NOTE: The pin groove on the inner rotor faces up the inside

Clean the rotor hole and apply engine oil before installation.

Install the bridge gear to crankcase. Then install washer and retaining ring on the bridge gear shaft.

NOTE: Do not drop the bearing of the bridge gear.

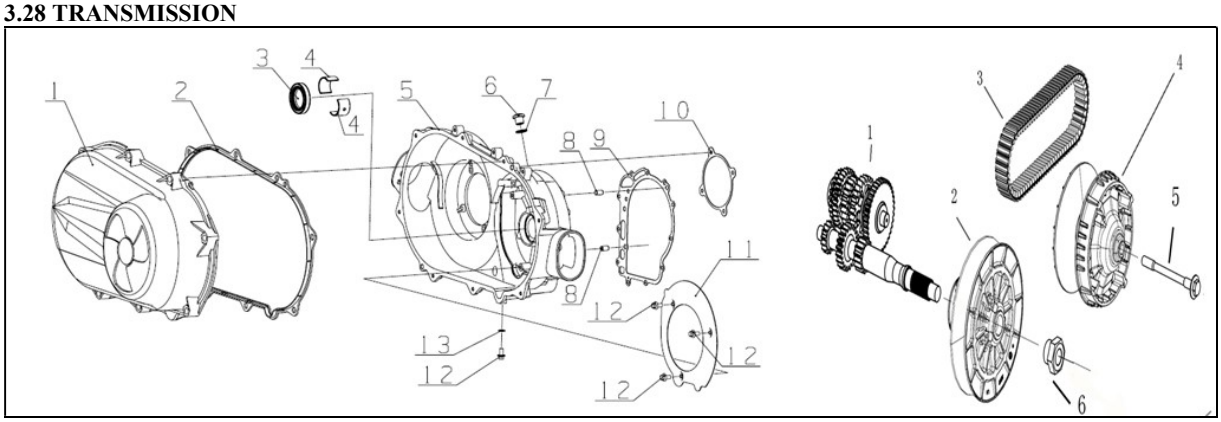
Put dowel pin to oil pump shaft through the hole. Install the oil pump gear, make sure the dowel pin in the groove of oil pump gear. Then install washer and retaining ring on the oil pump shaft.



1. Dowel pin
2. Groove on oil pump gear

Tighten the M6 bolts for oil pump cover to 10-12N.m.

3.28 TRANSMISSION



Never touch CVT while engine is running.
Never drive vehicle when pulley cover is removed.
Subcomponent installation and assembly tolerances require strict adherence to procedures detailed.
Never use any type of impact wrench at drive pulley removal and installation.
The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly
These pulleys have metric threads. Do not SAE threads puller. Always tighten puller by hand to ensure that the drive pulley has the same type of threads prior to fully tightening.

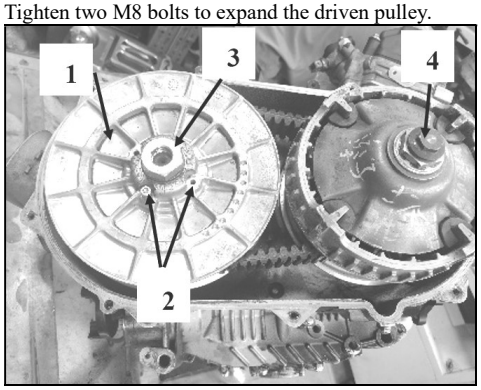
3.28.1 REMOVAL

Remove:

- -M6 bolts
- -Right crankcase cover and gasket.

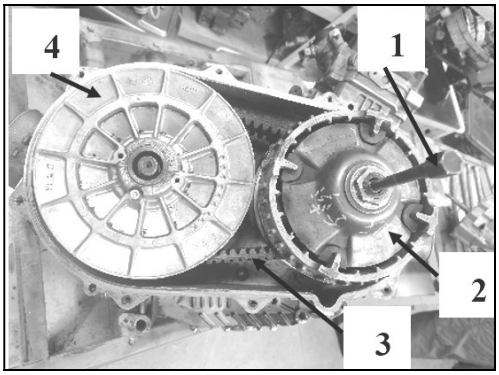
1. Right crankcase cover
2. 8xM6 bolt
3. Gasket

Tighten two M8 bolts to expand the driven pulley.



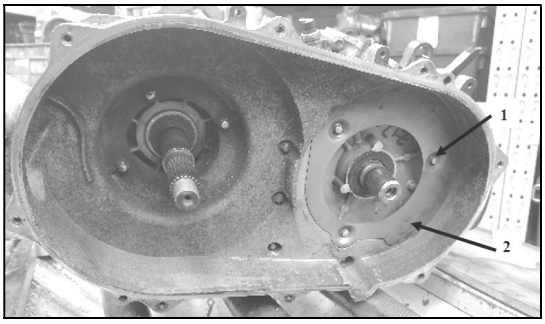
1.Driven pulley
2. 2x M8 bolt
3. M20 bolt
4. M12 bolt

Remove the M20 bolt from the driven pulley.
Remove the M12 bolt from the driven pulley.
Use special tooling to pull drive pulley out.



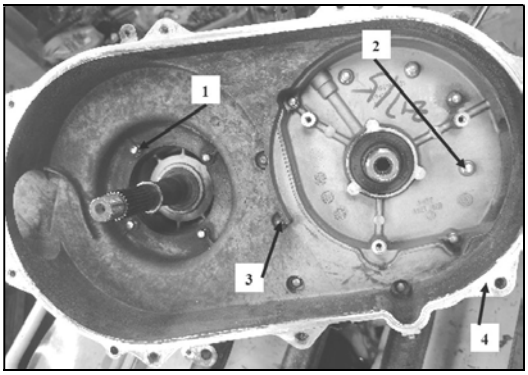
1.Special tooling
2. Drive pulley
3. Belt
4. Driven pulley

Remove the drive pulley and driven pulley from left crankcase block liner.
Remove the belt from pulley.
Unscrew the clamps retaining the intake/exhaust air hoses.
Remove the bolts and shroud.



1. 3xM6 Bolt
2. Shroud

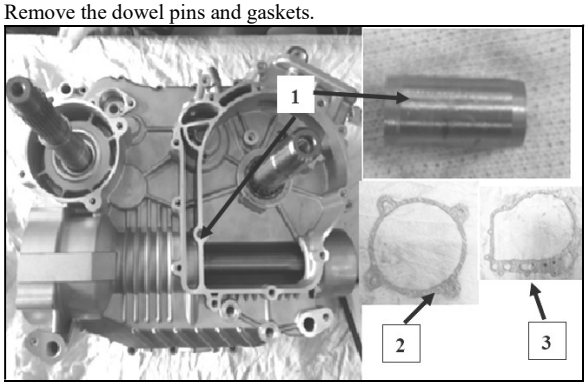
Remove the bolt and left crankcase block liner.



*1. 4xM6*20 Bolt*
*2. 4xM6*30 Bolt*

*3. 4xM6*40 Bolt*
4. Left crankcase block liner

Remove the dowel pins and gaskets.

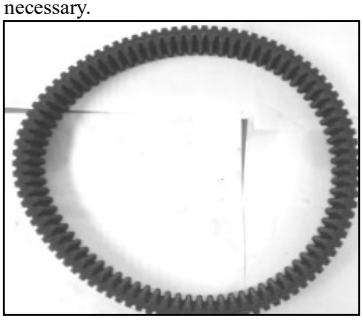


1. Dowel pin
2. Rear gasket
3. Front gasket

3.28.2 INSPECTION

Belt

Inspect belt for cracks, fraying or abnormal wear. Replace if necessary.



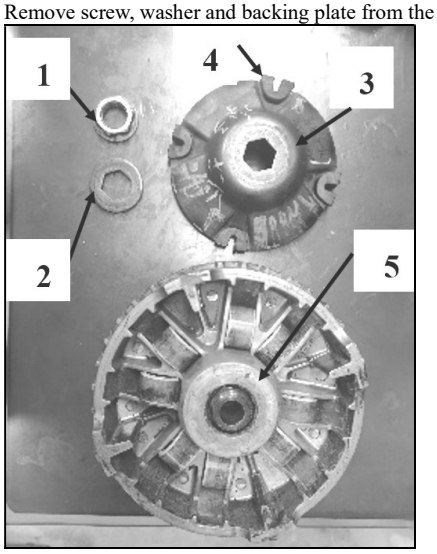
Drive belt perimeter	
Service limit	906.5mm

Drive Pulley

Drive pulley should be inspected annually for wear or damages.

Check drive pulley for cracks and sliding contact surface for excessive wear. Replace it if necessary.

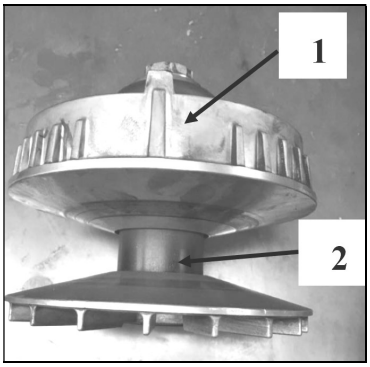
Remove screw, washer and backing plate from the drive pulley.



1. M12 screw
2. Washer
3. Backing plate
4. Guiding block
5. Drive Pulley

Check screw, washer and roller for wear or damages. Replace drive pulley if necessary.

Check guiding block on the backing plate for wear or damages. Replace drive pulley if necessary.



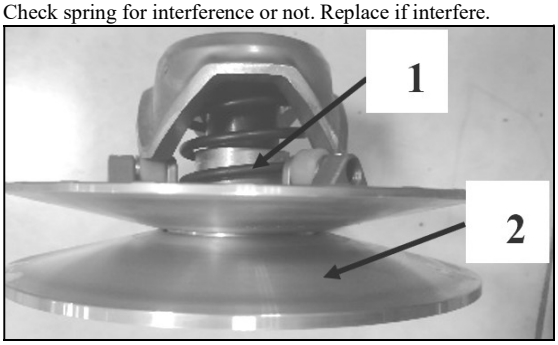
1. Drive pulley
2.Bearing

Check spring, spring stem and bearing on the drive pulley for wear or damages. Replace drive pulley if necessary.

Driven Pulley

The driven pulley face contacted with belt should be inspected annually for wear or damages. Replace sliding sheave if necessary.

Check spring for interference or not. Replace if interfere.

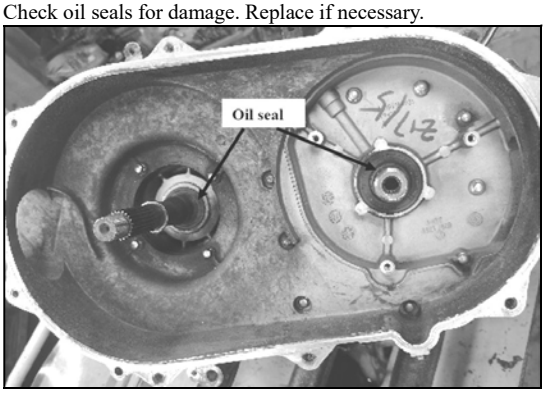


1. Spring
2. Face contacted with belt

Left Crankcase Block Liner

Clean left crankcase block liner.

Check oil seals for damage. Replace if necessary.

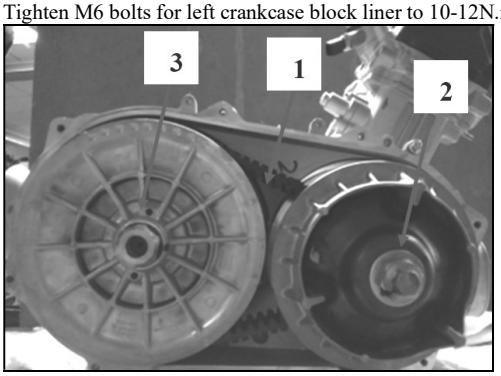


Check the front/rear gaskets if damaged. Replace if necessary.

3.28.3 INSTALLATION

For installation, reverse the removal procedure. Pay attention to following details.

Tighten M6 bolts for left crankcase block liner to 10-12N.m.



1. Word printed on back of belt
2. Drive pulley (front)
3. Driven pulley (rear)

The maximum drive belt life span is obtained when the drive belt has the proper rotation direction. Install it so that the word printed on the back of belt is pointing towards front of the vehicle, viewed from right cover.

Do not apply any lubricant on shaft and pulley.

Clean pulley faces and shaft with dry cloth.

Install drive pulley on crankshaft extension.

Install driven pulley on main shaft extension.

When the driven pulley is blocked, tighten M20 screw to 100-110N.m.

To block the drive pulley, torque M12 bolt to 80-85N.m.

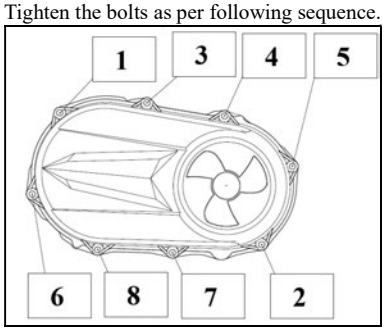
Check the bearing of drive pulley turning smooth. If not, replace or reinstall it.

Remove the two M8 bolt from driven pulley, then run the drive pulley until the belt tension.

Install gasket and right crankcase cover.

Install the center top screw in first.

Tighten the bolts as per following sequence.



Tighten the M6 bolts to 10-12N.m.

3.29 ENGINE INSTALLATION

The engine installation is the reverse of the removal procedure. However, pay attention to the following.

1. Prior to install engine, inspect condition of engine mounts. If necessary, replace the engine mounts, you can insert a punch in hole of engine mount bushing and push the other bushing out of the housing.
2. Make sure coolant and oil drain plugs are reinstalled and tight.

Refill engine oil and check the oil level with the dipstick.

4. COOLING SYSTEM

4.1 Fault overhauling

1. If cover of radiator is open and temperature of cooling liquid is over 100℃, pressure of cooling liquid will be reduced rapidly and boiled. Vapor injection may cause danger and injuries. After drop of temperature of cooling liquid, use one cloth to cover the cover of radiator and then slowly open the cover. Cooling liquid can only be tested after complete cooling.
2. Cooling liquid is toxic. Do not drink it or splash it to skin, eyes or clothes. In case of splashing cooling liquid to your eyes, use clean water to wash your eyes completely and contact the doctor. In case of splashing cooling liquid to your clothes, use soapy water to wash it rapidly. In case of drinking cooling liquid, vomit will be caused immediately. Please see the internist physician immediately. Store cooling liquid well and keep it out of reach of children.
3. Check whether soil of fins is blocked or damaged. Correct curved fins. Use water and compressed air to clean soil. If damaged area reaches 20%, please replace radiator.
4. Pump overhauling can be carried out before dismantling engine.
5. Add cooling liquid to water tank. In addition to adding or exhausting cooling liquid, please do not open cover of radiator.
6. Do not splash cooling liquid to plastic parts. Once splashed, please use clean water for washing.
7. After dismantling cooling system, check leakage situation of joint.

Sharp rise of water temperature

-Faults of radiator cover
-There is air in cooling system.
-Faults of water pump
-Faults of thermostat (thermostat is not open)
-Blockage of radiator tube or cooling tube
-Damage or blockage to radiator
-Incomplete cooling liquid
-Failure or faults of fan motor

No rise or slow rise of water temperature.

- Faults of thermostat (thermostat is not closed)
- Faults of line of water temperature display

Leakage of cooling liquid.

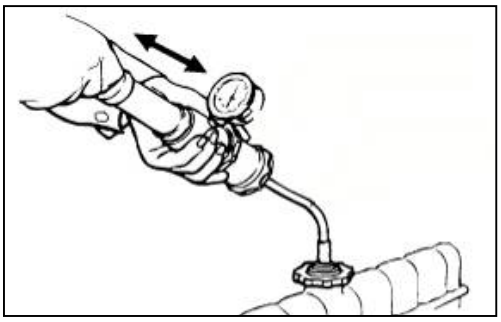
-Faults of water seal
-Aging, damage or improper sealing to O-ring.
-Aging, damage or improper sealing to gasket
-Improper installation of pipe or hose
-Aging, damage or improper sealing to pipe and/or hose

▲WARNING
Never start engine without coolant. Some engine parts such as the rotary seal on water pump shaft can be damaged.

4.2 COOLING SYSTEM TEST

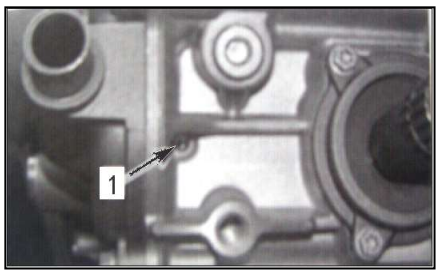
▲WARNING
To avoid potential burns, do not remove the radiator cap or loosen the cooling drain plug if the engine is hot.

Open the water tank cover in the front storage box and remove the radiator cap.
Install the test cap and a small hose pincher on overflow hose.
Using pressure/vacuum pump, pressurize system to 100 kPa.
Check all hoses, radiator and cylinder/base for coolant leaks or air bubbles.



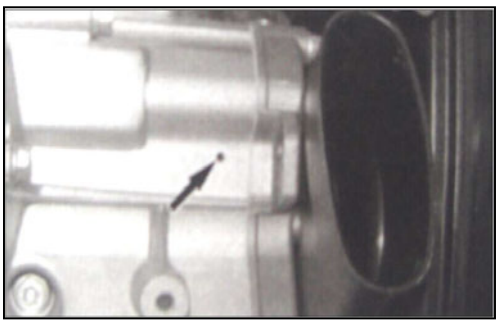
Inspection

Check general condition of hoses and clamps tightness.
Check the leak indicator hole if there is oil or coolant.
NOTE: Flowing coolant indicates a defective rotary seal. Oil indicates a defective inner oil seal. If either seal is leaking, both seals must be replaced at same time. Refer to *WATER PUMP SHAFT AND SEAL* in this section.



1.leak indicator hole

Another leak indicator hole is visible on the PTO side. It indicates if the PTO gasket is in good condition. If a liquid leaks by this hole, the PTO gasket replacement is necessary.

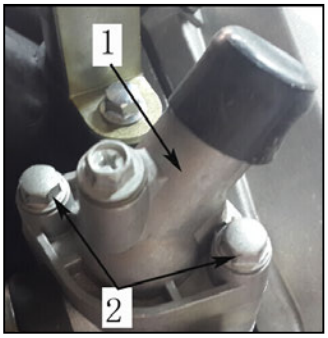


4.3 THERMOSTAT

The thermostat is a single action type. The thermostat is located on the top of cylinder head, on intake side.

Remove:

-thermostat housing screws and pull thermostat cover



TYPICAL
1. Thermostat cover
2. Screws

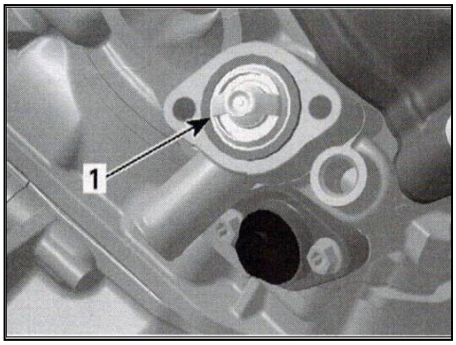
–thermostat with gasket out of the hole.

Thermostat Test

To check thermostat, put in water and heat water.

Thermostat should open when water temperature reaches 65°C(149°F).

Check if the gasket is brittle, hard or damaged. If damaged, replace gasket.



Thermostat Installation

For installation, reverse the removal procedure, pay attention to the following details.

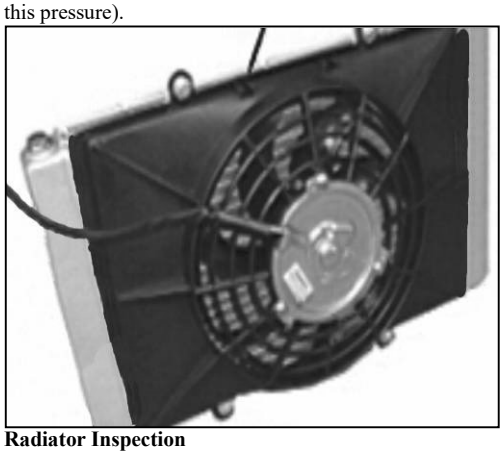
Install the thermostat cover then torque screws to 6N.m.

Check coolant level in radiator and coolant tank and top up if necessary.

Do not forget to bleed the cooling system. Refer to *COOLANT REPLACEMENT*.

4.4 RADIATOR AND CAP

Using a pressure cap tester, check the efficiency of radiator cap. If the efficiency is feeble, install a new 100 kPa cap (do not exceed this pressure).



Radiator Inspection

Check radiator fins for clogging or damage.

Remove insects, mud or other obstructions with compressed air or low-pressure water.

Radiator Removal

Drain cooling system.

Remove front storage box and cover.

Remove front grille.

Remove:

-Radiator inlet and outlet hoses
-Overflow hose.
-Coolant tank support bolt.
-Remove radiator.

Radiator Installation

For installation, reverse the removal procedure.

Pay attention to the following detail.

Fill up the radiator. Refer to *COOLANT REPLACEMENT*, in this section.

Check for any coolant leakage from radiator and hoses.

Tighten the M6 bolts for retaining radiator to 9-12N.m.

4.5 COOLANT TANK

The coolant expands as the temperature (up to 100-110°C) and pressure rise in the system. If the limiting system working pressure cap is reached 110kPa, the pressure relief valve in the pressure cap is lifted from its seat and allows coolant to flow through the overflow hose into the overflow coolant tank.

Tank Removal

Remove:

-The front storage box and cover.
-The front grille.
-Coolant tank support bolt.
-Overflow hose and clamp.

Tank Installation

The installation is the reverse of the removal procedure.

4.6 RADIATOR FAN

Radiator Fan Removal

Remove bolts**.**

Separate the radiator and fan.

Radiator Fan Test

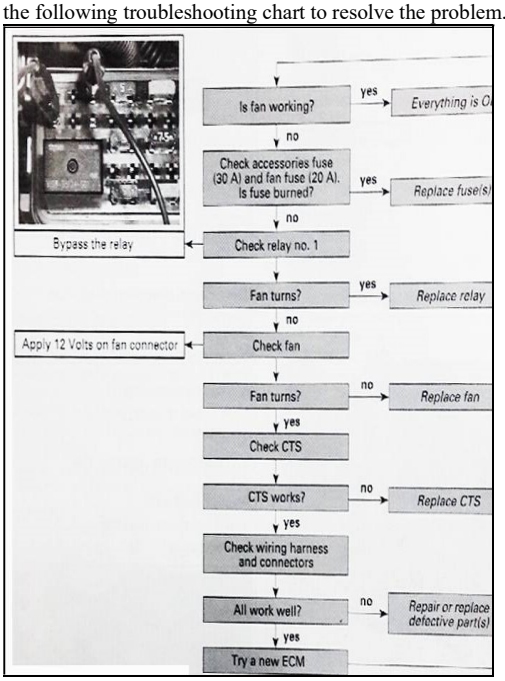
NOTE: The ECU controls the radiator fan by the input of the coolant temperature sensor (CTS). The radiator fan should turn on when coolant temperature reaches 98°C and should turn off when the coolant cools down at 95°C(203°F).

Connect the vehicle to Diagnostic Tool. Refer to ENGINE MANAGEMNT for procedure and connector location.

In ACTIVATION folder, press COOLANT FAN button.

If fan turns, check CTS, wiring harness and connectors. If all parts are good, replace the ECU.

If fan does not turn when COOLANT FAN button is pressed, use the following troubleshooting chart to resolve the problem.



Radiator Fan Installation

For the installation, reverse the removal procedure.

4.7 WATER PUMP COVER

It is located on the left crankcase cover.

Water Pump Cover Removal

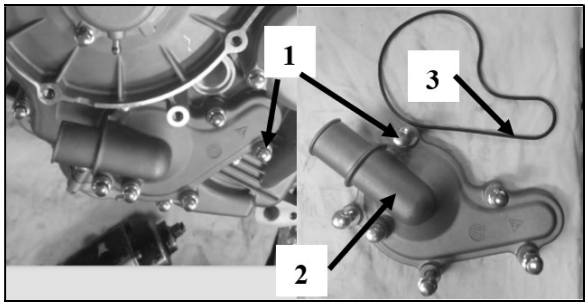
▲WARNING
To avoid potential burns, do not remove the radiator cap or loosen the cooling drain plug if the engine is hot.

Remove engine side cover and service cover.

Drain cooling system.

Remove radiator outlet hose from water pump cover.

Remove bolts retaining water pump cover.



TYPICAL
1. 5xM6 bolt
2.Water pump cover
3.Sealing ring

Pull water pump cover to remove it.

Water Pump Cover Inspection

Check if sealing ring is brittle, hard or damage and replace as necessary.

Water Pump Cover installation

The installation is the opposite of the removal procedure.

CAUTION: To prevent leaking, take care that the sealing ring is exactly in groove when you reinstall the water pump cover.

Tighten M6 bolts for water pump cover in the crisscross sequence to 10-12N.m.

4.8 WATER PUMP IMPELLER AND SHAFT

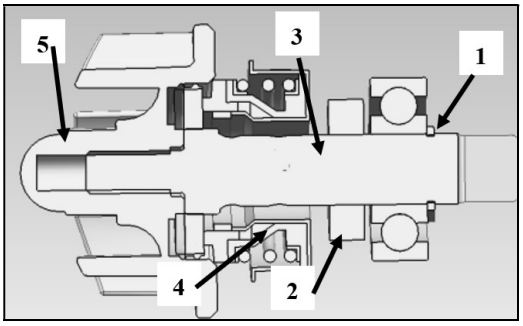
Removal

Remove water pump cover.

Remove left crankcase cover.

Use the expander to remove the retaining ring on the shaft.

Remove the water pump shaft and impeller.



1. Retaining ring
2. Oil seal
3. Water pump shaft
4. Water seal
5. Water pump impeller

Inspection

Check water pump impeller and shaft for wear or damage. Replace if damaged.

CAUTION: Water pump shaft and impeller have right-hand threads. Remove by turning counterclockwise and install by turning clockwise.

Check oil seal and water seal on the left crankcase for wear or damage. Replace if damaged.

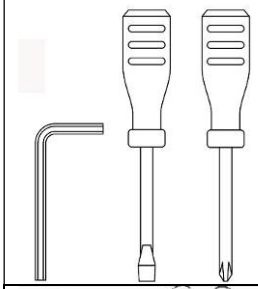
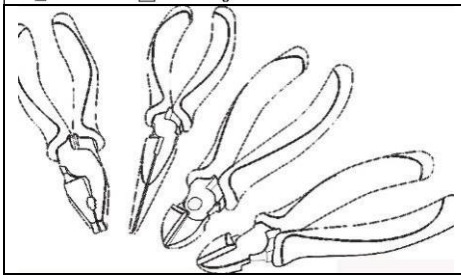
Impeller Installation

The installation is the opposite of the removal procedure. Be careful not damage impeller wings during installation.

Install the water pump shaft to the impeller.

Inatall the shaft to the left crankcase cover. Then use retaining ring to retain the shaft.

Preparation of tools for routine maintenance of vehicle

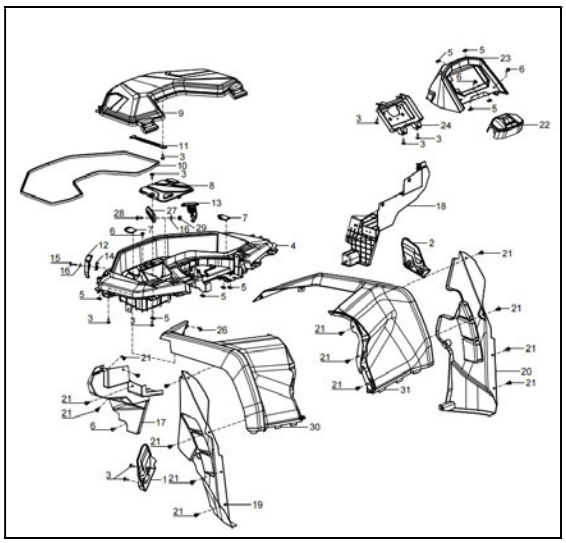
General tool	Name	Operation
	Electronic runner, Spanner	Be use to disassemble and tighten bolts
	Hexagon socket wrench, Screwdriver	Be use to remove cover bolts and screws
	Pliers	Be use to tighten component

5. Vehicle dismantling

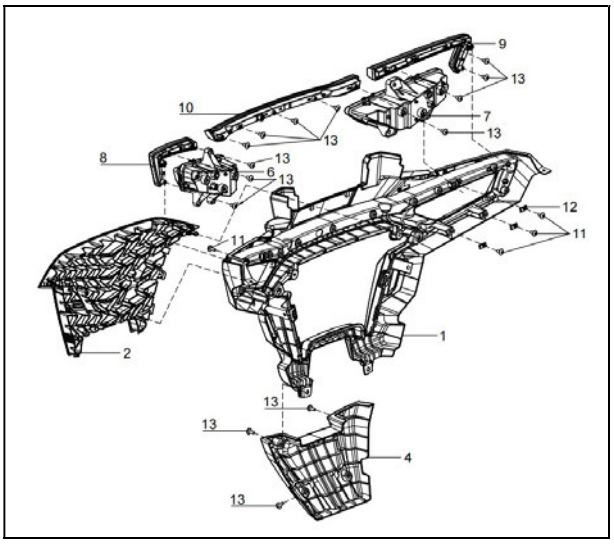
5.1. External components

5.1.1 Structure

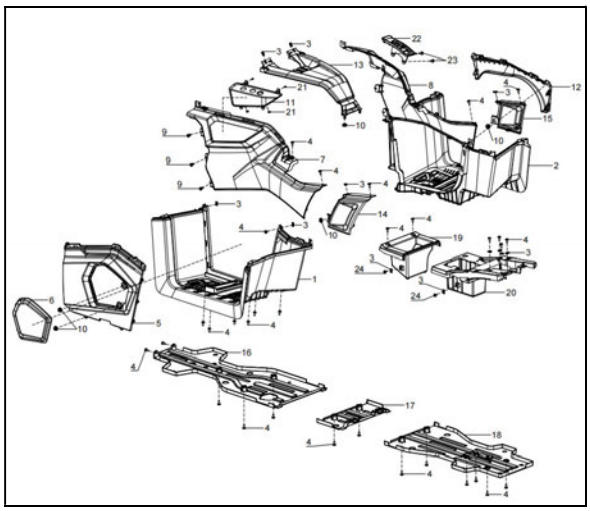
Front panel combination-1



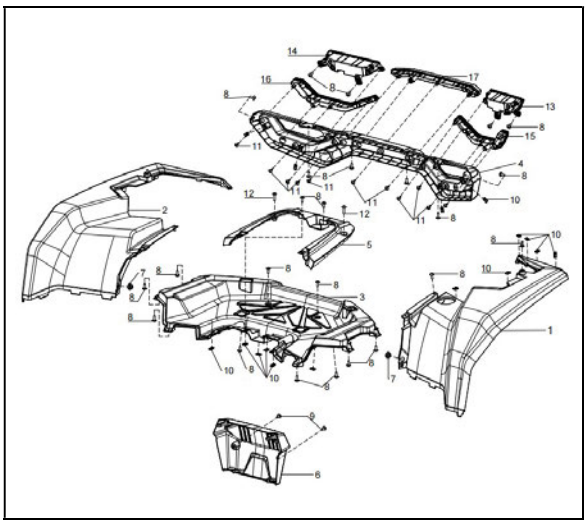
Front panel combination-2



Foot rest combination



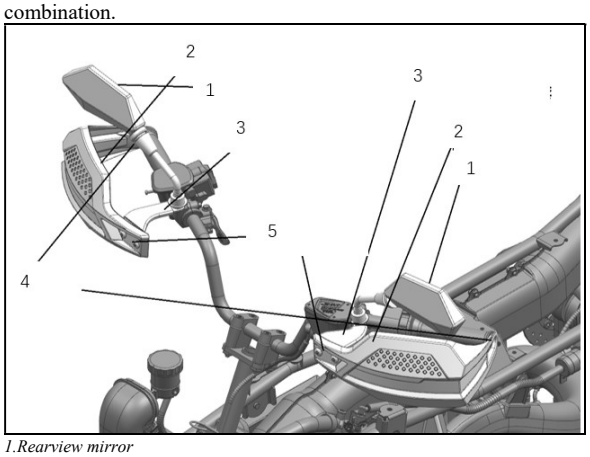
Rear plastic part combination



5.1.2 Dismantling

Rearview mirror and handlebar cover

Loose lock nuts of handlebar cover, rotate main body of rearview mirror anticlockwise to remove left and right rearview mirror combination.



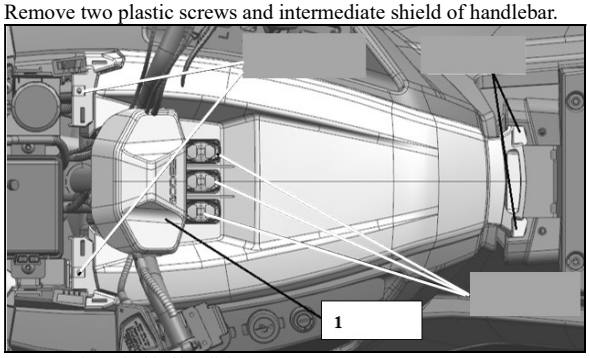
1.Rearview mirror
2.Handlebar cover
3.Handlebar cover mounting board
4. 2xM6 screw
5. 4xM6 screw

Tightening screw torque of handlebar cover: 9-12N.m.

Available overhaul: replace rearview mirror.

Intermediate shield of handlebar

Remove two plastic screws and intermediate shield of handlebar.

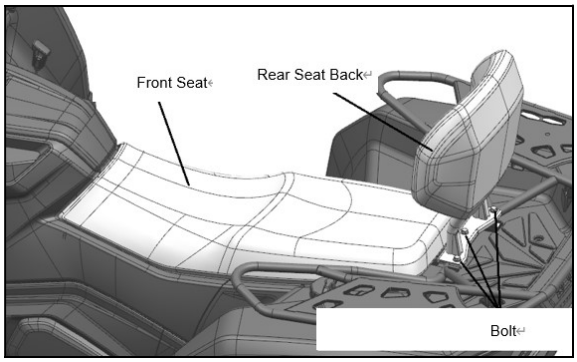


1. intermediate shield of handlebar.

Available overhaul: replace intermediate shield of handlebar

Rear seat back

Loose three bolts for rear seat back. Remove the rear seat back.



Tightening torque of bolt for rear seat back: 22-30N.m.

Available overhaul: replace rear seat back.

Front seat

Note：Before remove the front seat, it must remove the rear seat back.

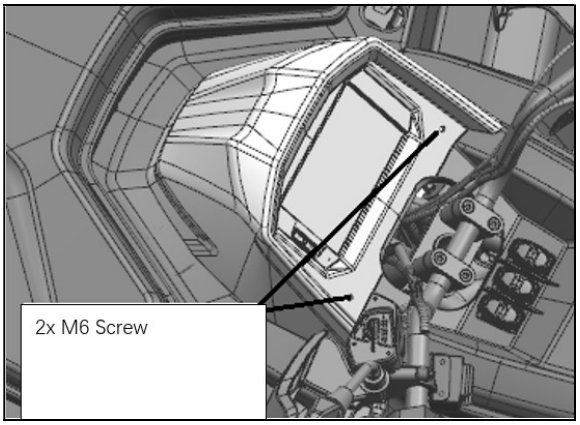
Lift up lock catch at the rear of front seat by the left hand, and pull up and remove front seat by the right hand.

Available overhaul: replace front seat.

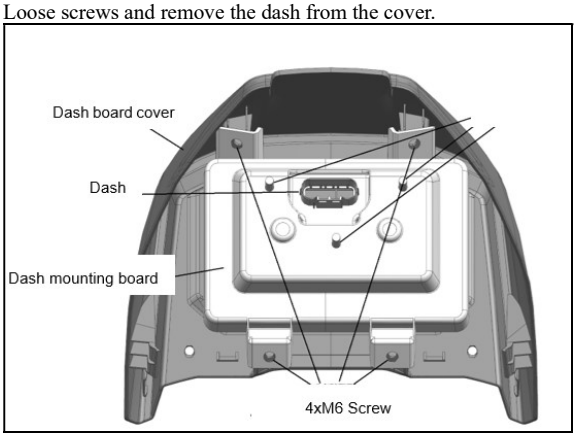
Available overhaul: replace front seat and battery.

Dash board cover

Loose M6 screws and remove dash board cover from frame.



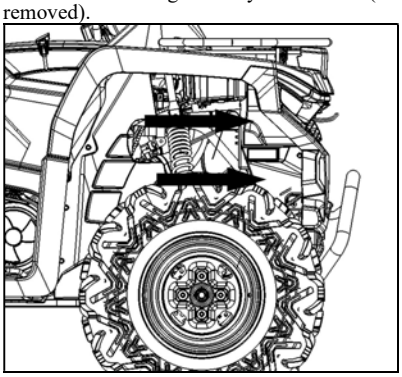
Loose screws and remove the dash from the cover.



Tightening torque of M6 blots: 9-12N.m.

Mudguard

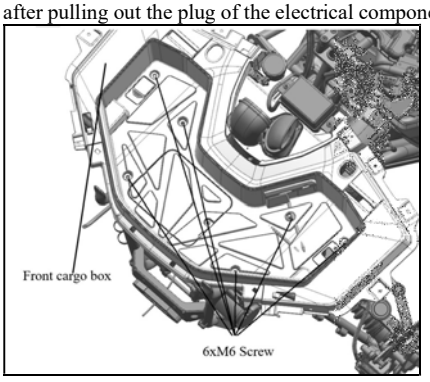
Remove two mudguards by the arrow (both sides need to be removed).

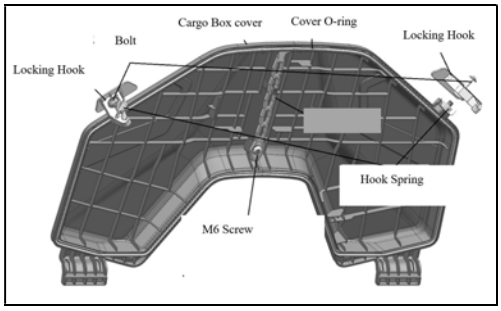


Available overhaul: replace two mudguards.

Front cargo box and cover

Loose the bolts at the front cargo box and cover, remove the front cargo cover and box. Then, the cooling system can be removed after pulling out the plug of the electrical components.

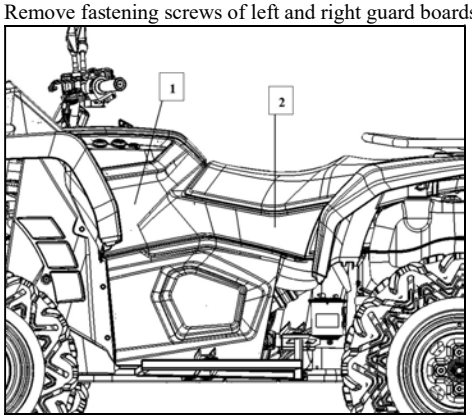




Available overhaul:
Replace front plastic covers combination

Left and right guard board

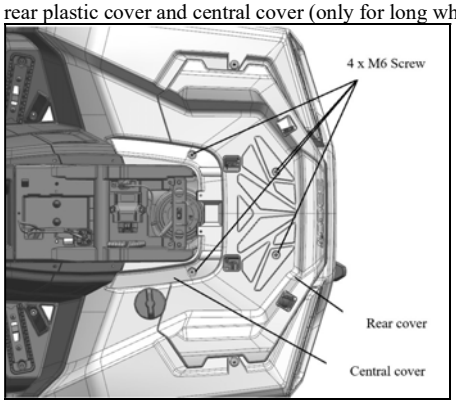
Remove fastening screws of left and right guard boards.



When disassembling the guard board on one side, lift the front and rear three side board up at the same time and then push forward.
Available overhaul: replace left and right guard boards.

Rear plastic covers combination.

First remove the rear cargo rack, then loose the four screws on the rear cover. Pull out the plug of the electrical parts and remove the rear plastic cover and central cover (only for long wheelbase).

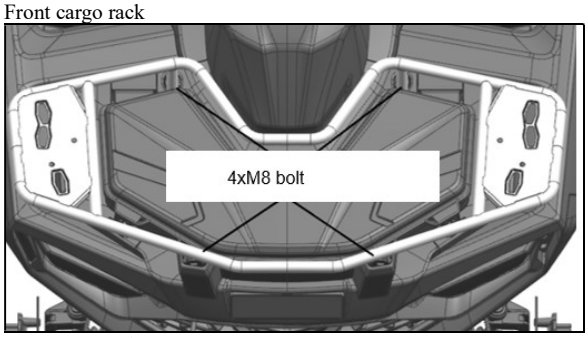


Tightening torque of M6 screws for rear cover: 9-12N.m.

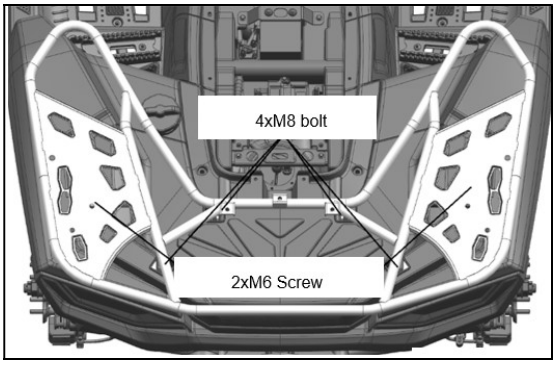
Cargo Rack

Remove screws holding the rack and remove the rack and set aside.

Front cargo rack



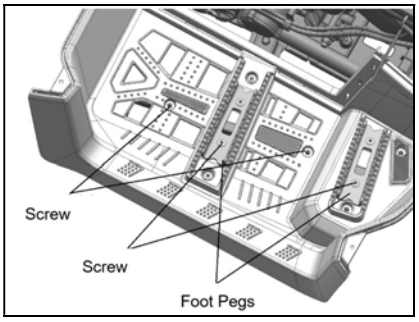
Rear cargo rack



Tightening torque of M6 screw: 9-12N.m.
Tightening torque of M8 bolts: 22-30N.m.
Available overhaul: Replace rack.

Foot rest

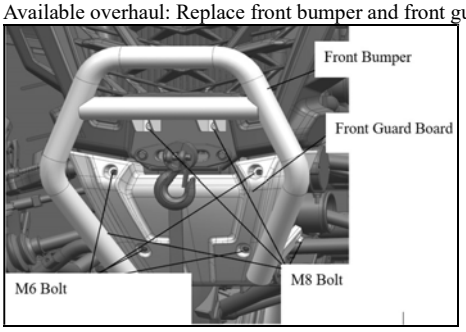
Remove the 10 screws fixed between the foot rest and the frame, and remove the foot rest from the frame after removal.



Tightening torque of M6 screws for foot pegs: 9-12N.m.
Available overhaul: Replace foot rest.

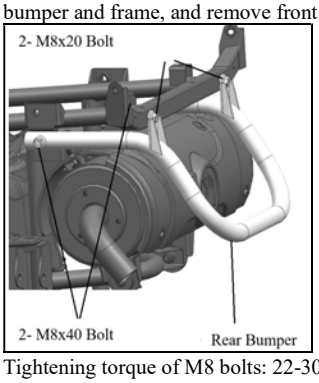
Front Bumper and guard board

1.Loose and remove the four M8 bolts fixed between the front bumper and frame, and remove front bumper.
Loose and remove the four M6 bolts fixed between front guard board and frame, and remove front guard board.
Tightening torque of M6 bolts: 9-12N.m.
Tightening torque of M8 bolts: 22-30N.m.
Available overhaul: Replace front bumper and front guard board.



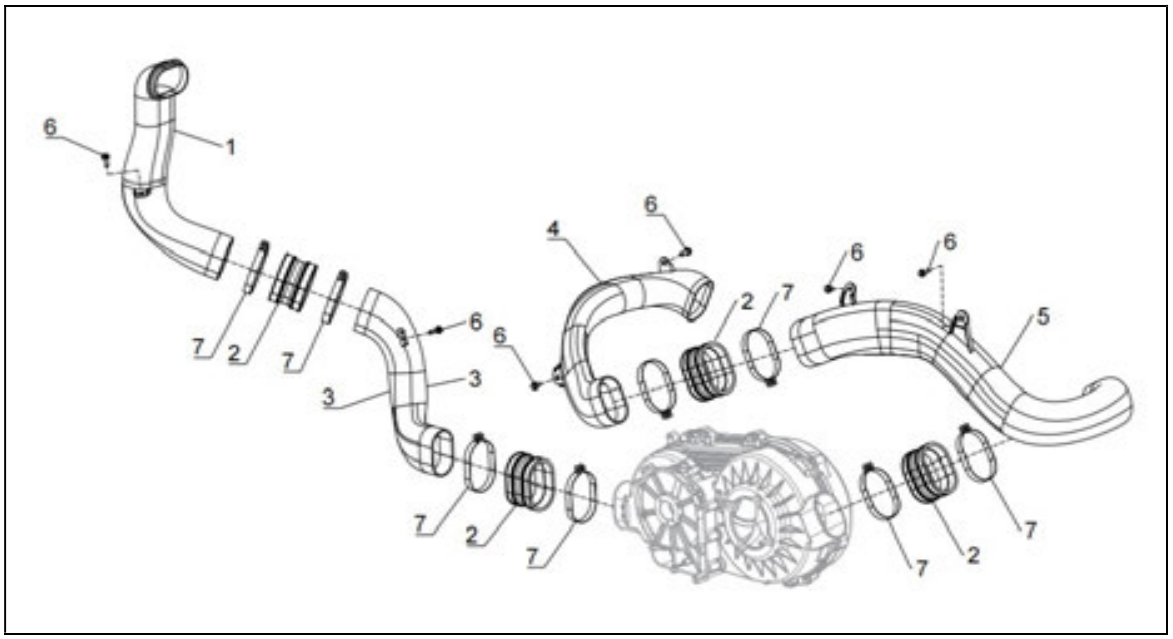
Rear Bumper

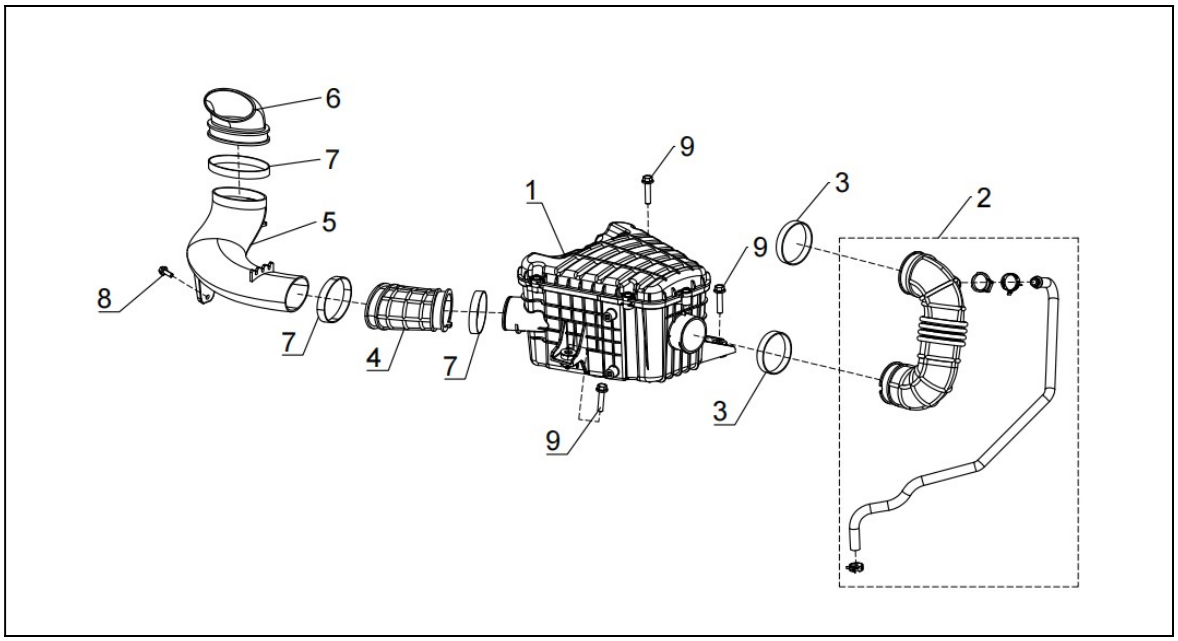
Loose and remove the four M8 bolts fixed between the rear bumper and frame, and remove front bumper.



Tightening torque of M8 bolts: 22-30N.m.
Available overhaul: Replace rear bumper.

5.2. Air inlet and exhaust system
5.2.1. Structure

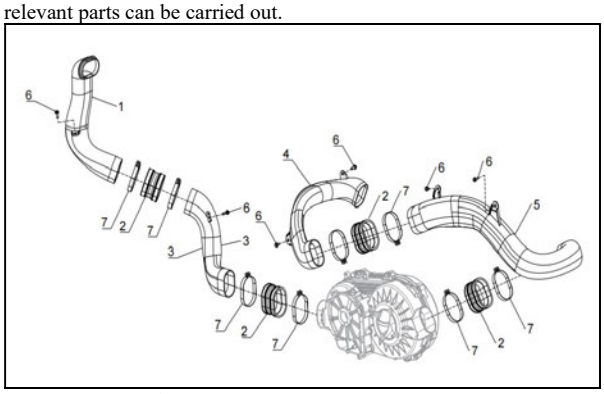




5.2.2 Dismantling

CVT air intake pipe combination

Loosen the bolts of 4 clamps of the CVT air inlet pipe combination at one time. After loosening, maintenance and replacement of relevant parts can be carried out.



1. CVT Air Front Intake Pipe
2. CVT Intake and Outlet Pipe joint
3. CVT Air Rear Intake Pipe
4. CVT Air Front Outlet Pipe
5. CVT Air Rear Outlet Pipe
6. 8x M6 bolt
7.Clamp

Available overhaul: replace CVT intake pipe combination.

CVT outlet pipe combination

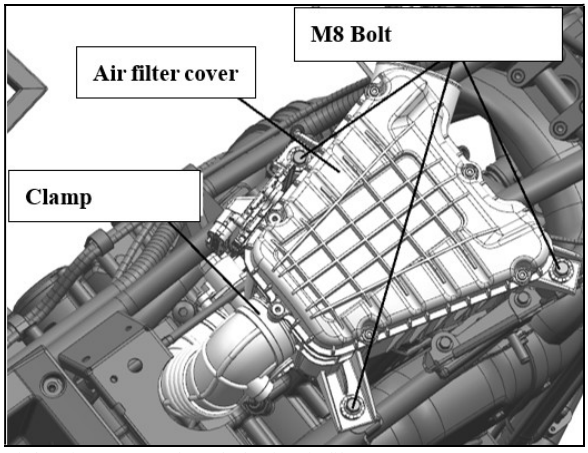
Remove the bolts and loosen the clamps. Then the relevant components of outlet pipe combination can be maintained.

Available overhaul: replace CVT air outlet pipe combination.

Tightening torque of M6 bolts for clamp: 9-12N.m.

Air filter combination

First loosen the clamp between the throttle valve and the air filter, then remove the three bolts connecting the air filter and the frame, and finally remove air filter. Complete the above steps to maintain the air filter.

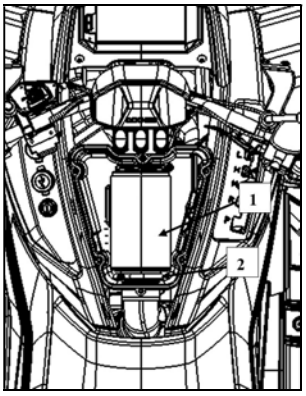


Tightening torque of M8 bolts for air filter: 22-30N.m.

Air filter element combination

Remove the air filter cover.

Loose the clamp of the air filter element, and then remove out the filter element. The filter element can be cleaned or replaced after removal.

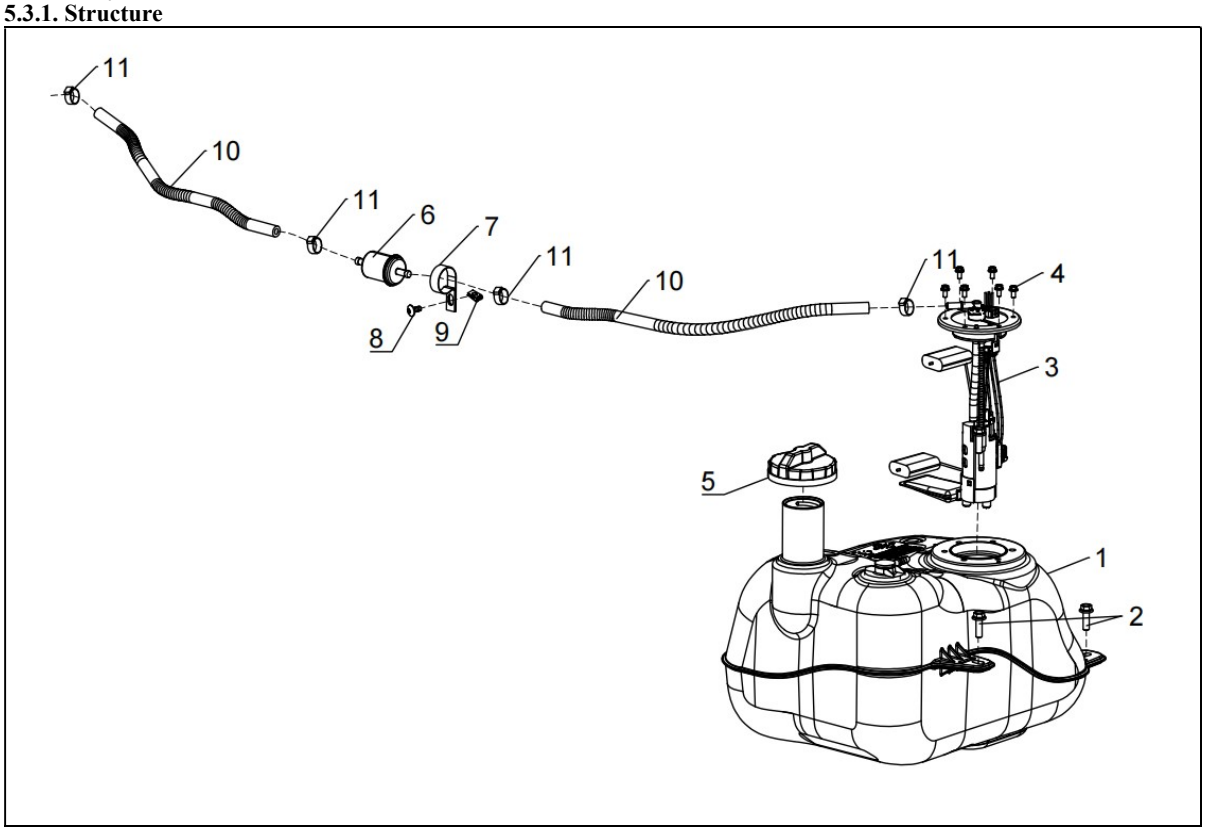


TYPICAL
1.Air filter
2.clamp

Available overhaul:

Replace and conduct daily maintenance of air filter combination.

5.3. Fuel system
5.3.1. Structure



Names of components:

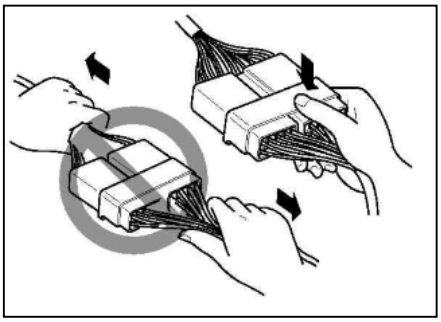
1.Fuel Tank	2. M8 Bolt	3.Fuel Pump	4. M5 Bolt	5.Tank Cap	6.Fuel Filter
7.Fuel Filter Bracket	8. M6 Bolt	9. River Nut	10.Fuel Hose	11.Hose Clamp	

5.3.2. Dismantling

Fuel tank combination

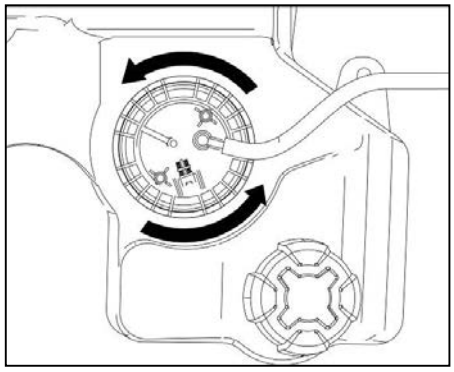
1.Disconnect wire group plug-in of fuel sensor, separating fuel sensor from wire group.

Note: Do not pull the plug directly when you pull it out. Press the plug by hand and pull it out at both ends.



▲WARNING
Special attention should be paid to explosive gasoline.

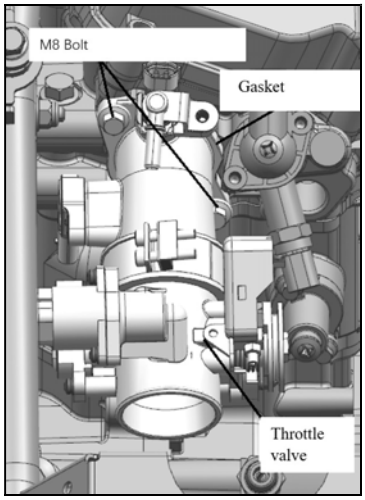
2.Unplug the tubing and tank vent after releasing the hose clamp, and then rotate the oil pump cap in the direction of the arrow. After completing the above steps, the oil pump can be removed from the tank for repair or replacement.



Note: Clamp should not be used repeatedly; new clamp should be used upon installation.

When pulling out fuel pipe, attention should be paid to pressure inside fuel pipe, splash proof measures should be taken and vessel should be prepared to discharge fuel inside fuel pipe in advance.

3.Loose the clamp and bolt for the throttle valve, unplug the relevant connector, and remove the throttle valve from the body for maintenance.



Tightening torque of M8 bolt for throttle valve: 22-30N.m

Unplug the high voltage coil and remove the spark plug with a tool.

Available overhaul:

Replace and conduct daily maintenance of spark plug.

4.After removing the screw with a screwdriver, open the throttle valve cover and remove the pin of the throttle cable head from the throttle cable. Then separate the throttle cable and throttle valve.

Available overhaul:

Replace and conduct daily maintenance of throttle valve combination and accelerator cable combination.

5.Disconnect cylinder fuel nozzle, crankshaft position sensor and starting motor plug-in separately.

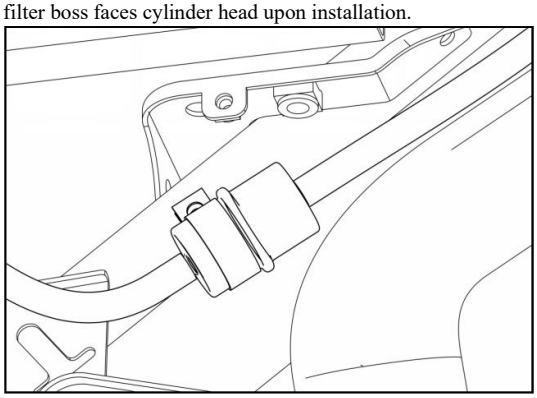
Remove the hose clamp and pull out the fuel hose connected to the fuel injector.

Available overhaul:

Replace and conduct daily maintenance of fuel pipe.

Fuel pipe combination

Remove one screws, fuel filter support and fuel filter. one end of filter boss faces cylinder head upon installation.



Note: Clamp should not be used repeatedly; new clamp should be used upon installation.

After completing dismantling fuel system, check fuel pipe, fuel filter and fuel pump filter element for block and crack. Replace the component with a new one, if necessary.

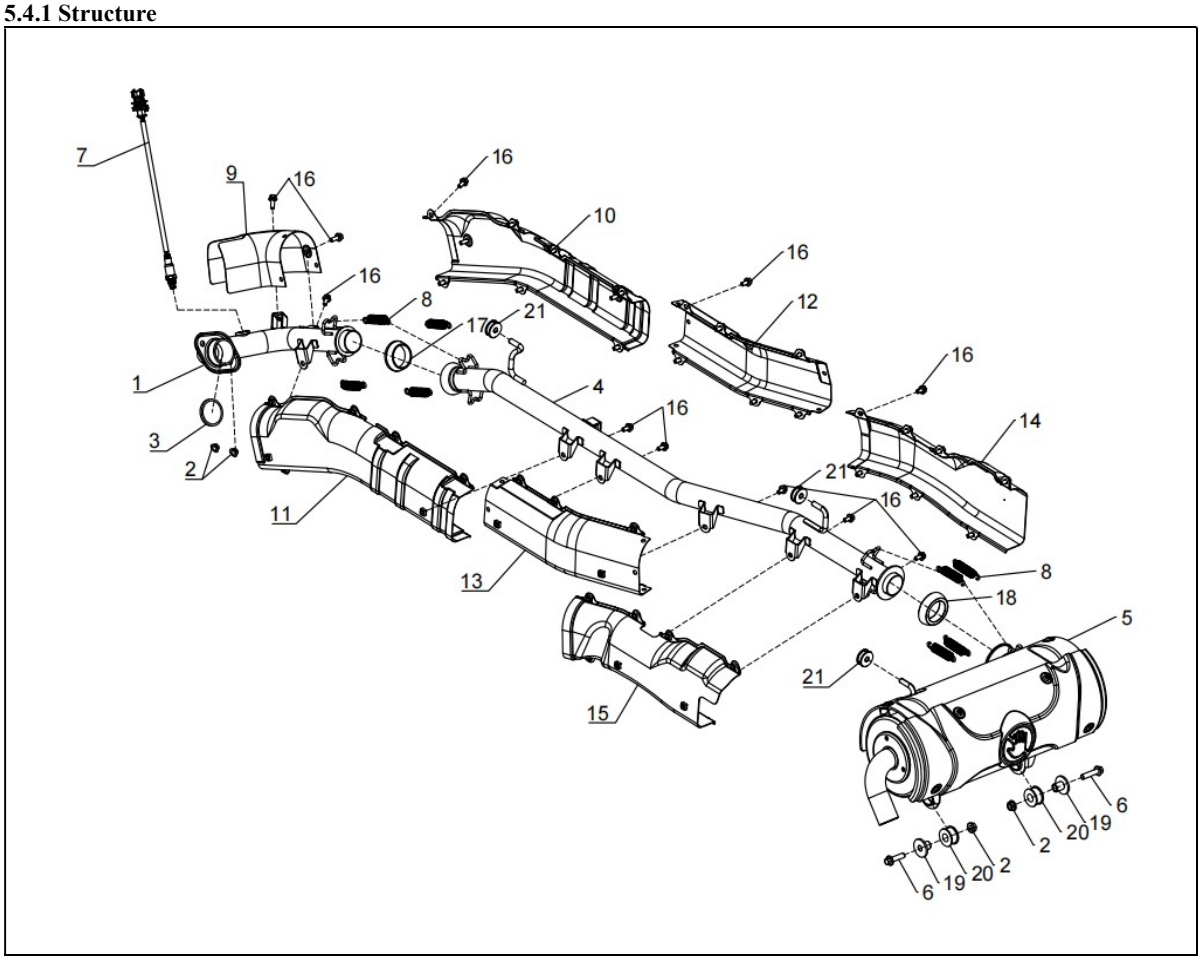
Installation

Conduct installation based on reversed sequence of dismantling.

▲WARNING
To prevent fuel leakage, seal gasket, O-ring and ear clamp should be replaced upon installation. Fuel pipe should be replaced once every two years.

Do not smoke or near an open flame when performing maintenance on the fuel system.

5.4 Muffler combination
5.4.1 Structure



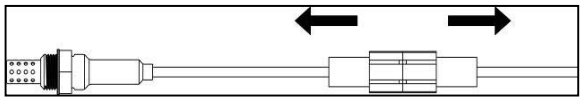
Names of components:

1. Front Cylinder Exhaust Pipe	2. Locking Nut	3. Exhaust gasket
4. Rear Exhaust Pipe	5. Muffler	6. M8 Hex Flange Bolt
7. O_2 sensor	8. Spring	9. Front Exhaust Pipe Insulation Board
10. Rear Cylinder Exhaust Pipe Insulation Board-1	11. Rear Cylinder Exhaust Pipe Insulation Board-2	12. Rear Cylinder Exhaust Pipe Insulation Board-3
13. Rear Cylinder Exhaust Pipe Insulation Board-4	14. Rear Cylinder Exhaust Pipe Insulation Board-5	15. Rear Cylinder Exhaust Pipe Insulation Board-6
16.M6 Hex Flange Bolt	17. Graphite Seal Cartridge	18. Graphite Seal Cartridge
19.Muffler Hang Neck Bushing	20.Muffler Hang Rubber Sleeve	21. Muffler Top Cushion

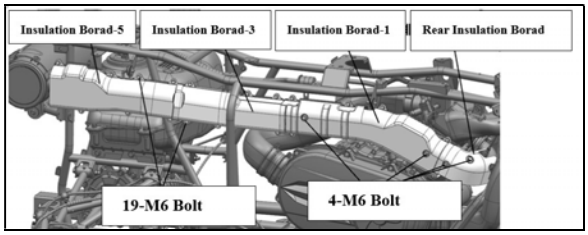
5.4.2 Dismantling

Separate the O_2 sensor from the front exhaust pipe and the rear exhaust pipe, and then separate the O_2 sensor from the connector of the main cable.

(Refer to relevant contents in section I of the chapter for dismantling vehicle plastic parts)



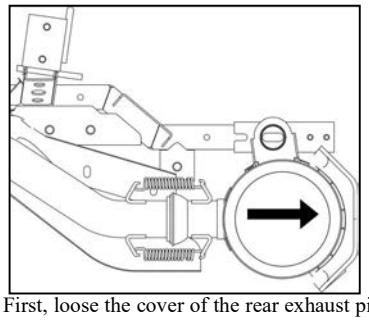
Remove the exhaust pipe insulation board as shown on the right, 23 bolts in total.



Tightening bolt torque of exhaust pipe insulation board: 9-12N.m.

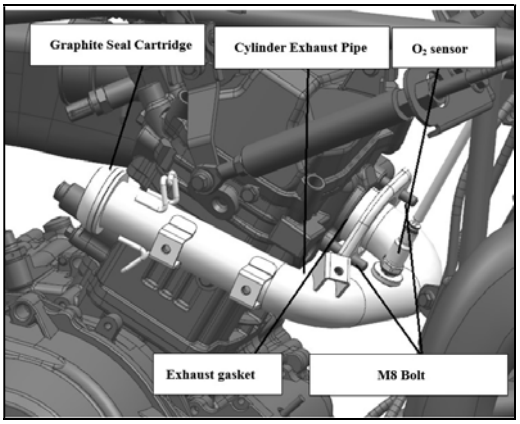
First remove the tension springs on the hook (remove all four springs at the rear exhaust pipe at the same time), then remove the two bolts at the upper end of the muffler, finally remove the muffler and graphite seal gasket according to the direction of the arrow.

Available overhaul: Maintenance and replacement of muffler.



First, loose the cover of the rear exhaust pipe, then remove the two M8 lock nuts of the rear exhaust pipe, and finally remove the rear exhaust pipe from the vehicle.

Finally, remove the two M8 locking nuts of the front exhaust pipe and remove the front exhaust pipe from the vehicle.

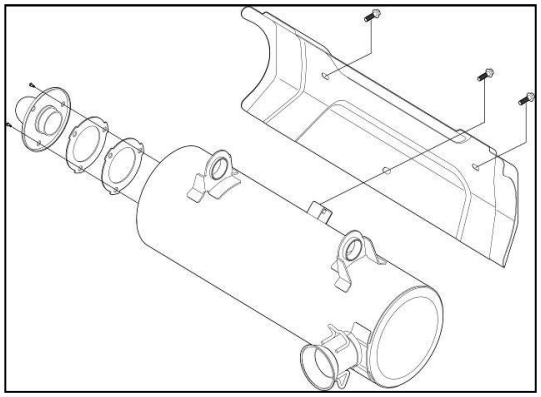


Tightening bolt torque of cylinder exhaust pipe: 22-30N.m.

Remove the three heat insulation plates on the inside of the exhaust pipe, M6 hex flange bolts.

Available overhaul: Replace and conduct daily maintenance of cylinder exhaust pipe.

Remove muffler trim cover, total four M6 hex flange bolts. Remove three countersunk allen screws on muffler tail cover.



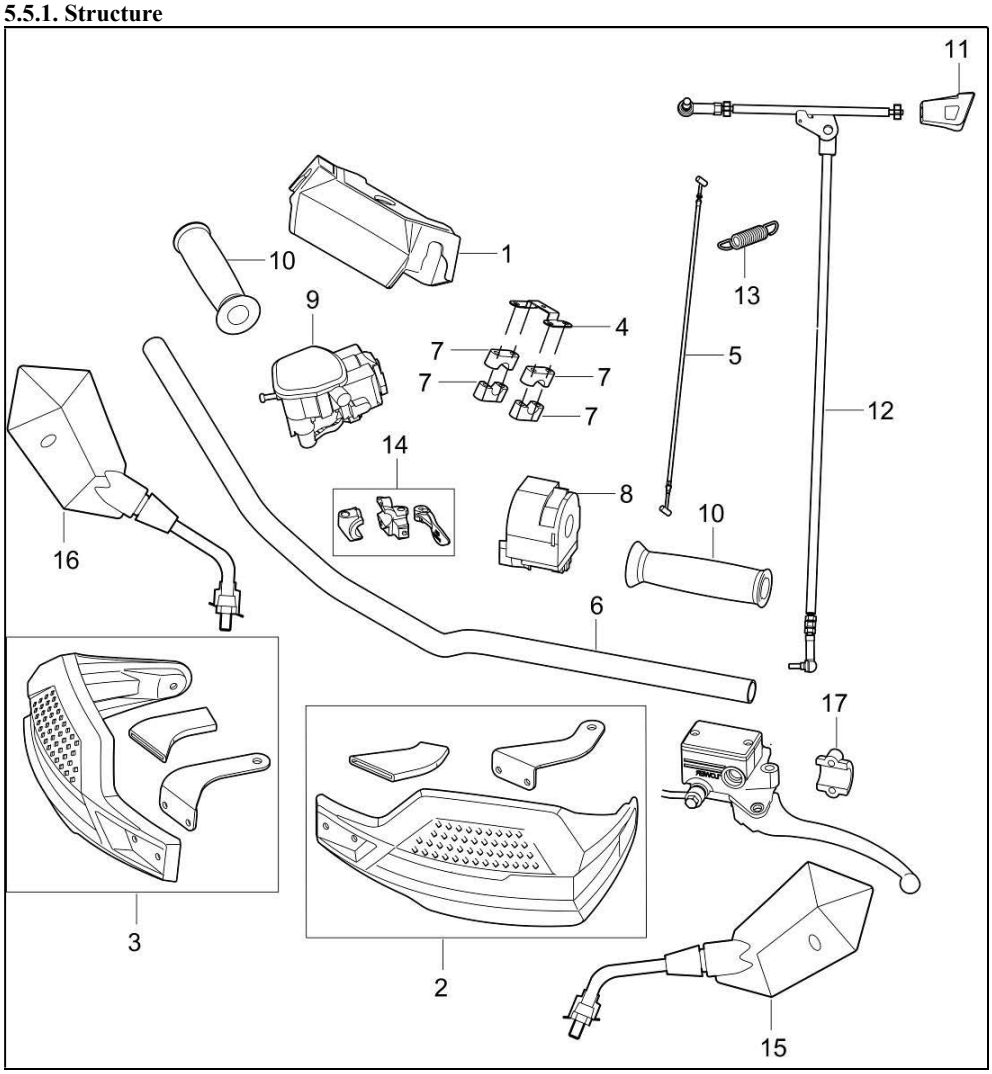
Available overhaul: Daily maintenance of muffler.

Re-installation

Conduct reinstallation based on the reversed sequence of dismantling.

▲WARNING
After dismantling muffler, seal gasket of exhaust pipe should not be used repeatedly; new component should be used upon installation. To prevent exhaust pipe leakage, high polymer sealant should be applied to cylinder exhaust pipe port and surface of exhaust pipe seal gasket upon muffler assembly installation.

5.5. Gear shift lever and handler bar combination
5.5.1. Structure



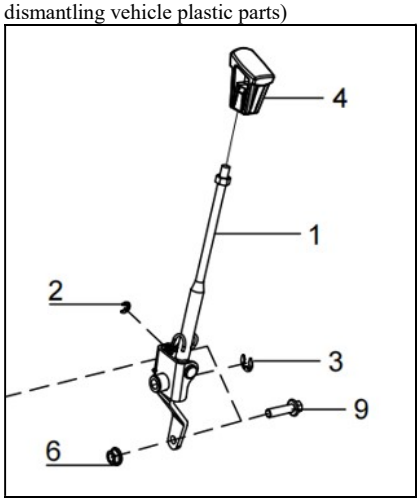
Names of components:

1. Intermediate shield of handlebar	2. Left handlebar cover	3. Right handlebar cover	4.Handle Bar Middle Cover Location Board
5. Throttle cable	6. Handlebar	7. Handlebar block	8. Combination switch
9. Accelerator	10. Handle grip	11. Shifting ball	12. Shift assembly
13. Gear shifting spring	14.Hand brake lever assembly	15.Left rearview mirror	16.Right rearview mirror
17.Brake Lever Half Cover			

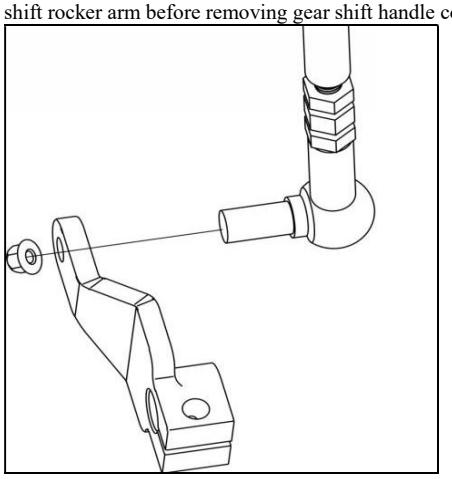
5.5.2. Dismantling

Shift assembly

1.Remove lock nut of shifting lever on the right side of a vehicle, separating the upper part of gear shift assembly from a vehicle. (Refer to relevant contents in section I of the chapter for dismantling vehicle plastic parts)



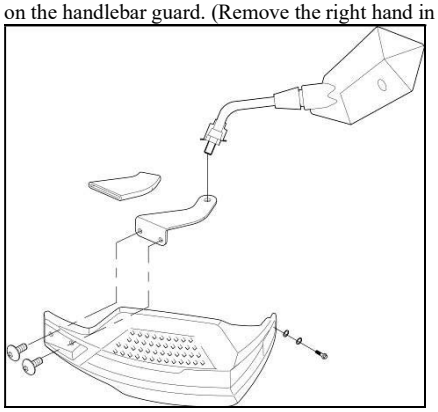
2.Remove M8 lock nut of gear shift handle combination at gear shift rocker arm before removing gear shift handle combination.



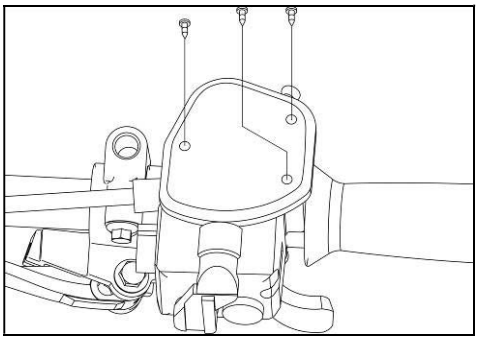
Available overhaul: Replace gear shift handle combination.

Handlebar combination

First remove the left rear-view mirror and then remove the 3 bolts on the handlebar guard. (Remove the right hand in the same way)

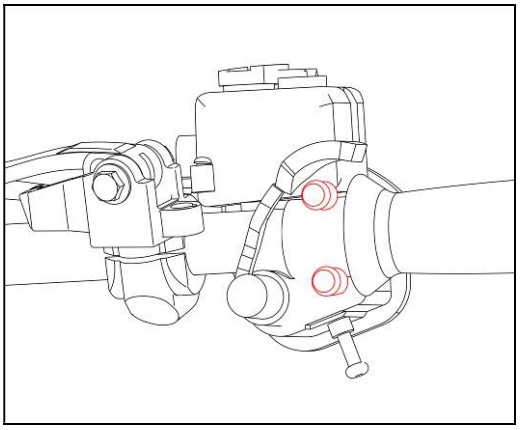


1.Remove three screws and upper cover of accelerator. Separate the throttle cable.



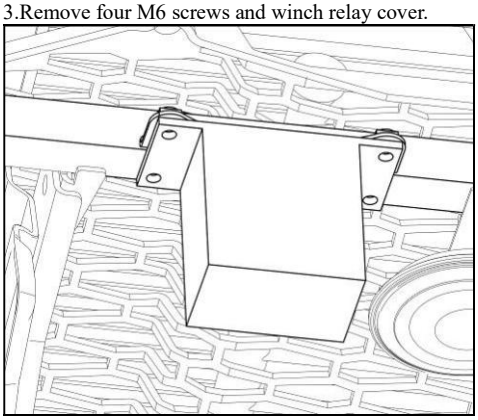
Available overhaul: Replace and adjust accelerator cable and manual brake master cylinder.

2.Remove two screws and accelerator.



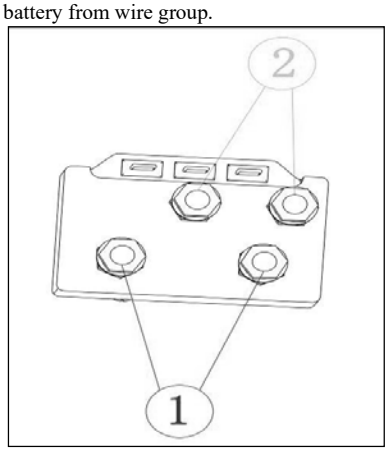
Available overhaul: Replace accelerator.

3.Remove four M6 screws and winch relay cover.

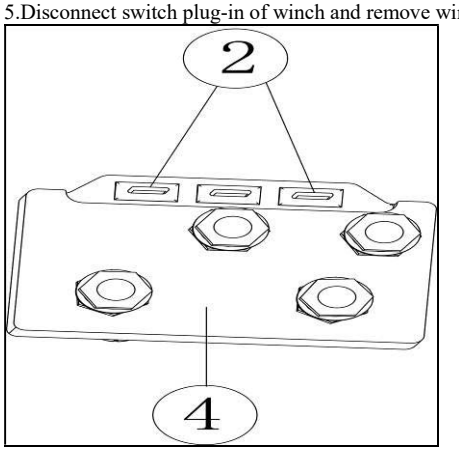


Tightening bolt torque of winch relay cover: 9-12N.m.

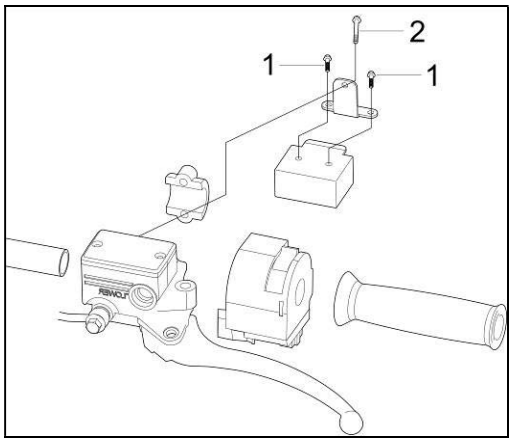
4.Remove four lock nuts of winch relay, separating positive and negative electrode ① of winch, positive and negative cable ② of battery from wire group.



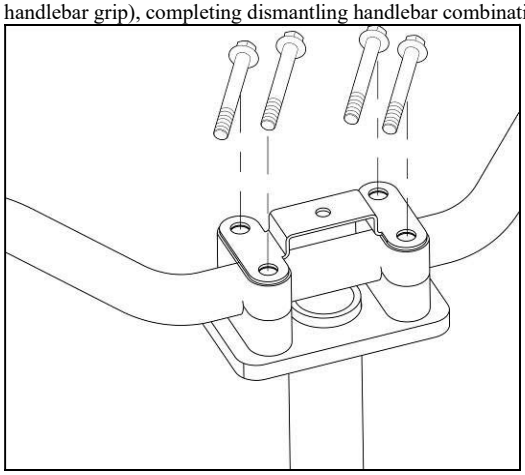
5.Disconnect switch plug-in of winch and remove winch relay ④.



Available overhaul: Replace and test winch relay.
Remove the two bolts numbered 1 to remove the winch switch, and remove the bolts numbered 2 to remove the winch switch bracket.
Available overhaul: Replace and test control switch and combination switch of winch.



6.Remove four M8 bolts, handle bar middle cover location board, handlebar block and handlebar combination (include left and right handlebar grip), completing dismantling handlebar combination.



Installation

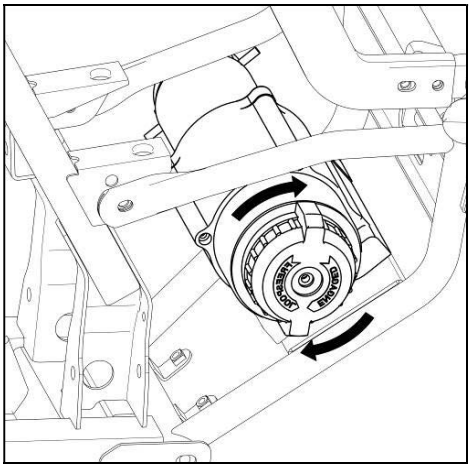
Conduct installation based on reversed sequence of dismantling.

5.6 Winch and Radiator

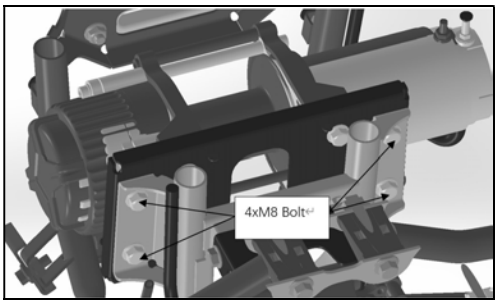
5.6.1. Dismantling

Winch

1.Rotate control handle of winch clockwise, releasing lock-up status of cable. Pull out cable for about 30cm along.



2.Remove the four M8 fixed bolts at the behind of the winch, pull out the relevant connector and cable, and finally remove the winch for maintenance.



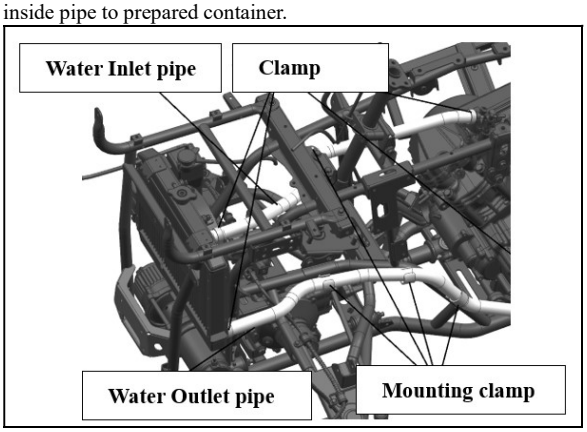
Tightening bolt torque of winch: 22-30N.m.

Available overhaul: Replace winch and cable guide combination.

Radiator

1.Prepare a clean container and place it under the vehicle.

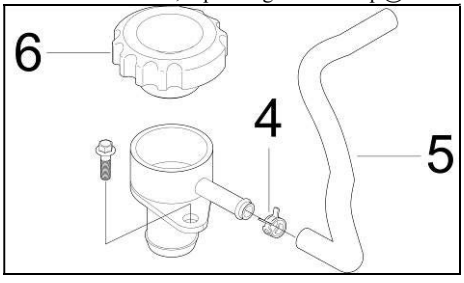
2.Remove water inlet pipe clamp of cylinder head and outlet water pipe clamp of engine, separating inlet water pipe of cylinder head and outlet water pipe of engine from vehicle, and leading coolant inside pipe to prepared container.



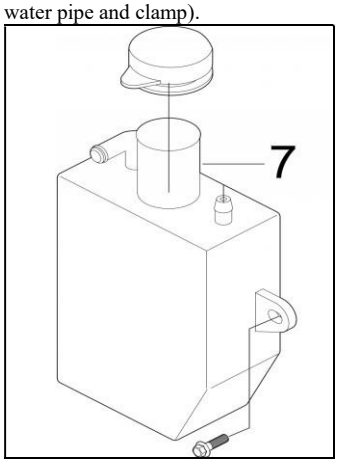
(Refer to relevant contents in section I of the chapter for dismantling vehicle plastic parts)

3.Remove clamp④ of radiator cap, pull out water pipe⑤ of water tank and plug pipe port to prevent leakage.

Remove two screws, separating radiator cap⑥ and radiator.

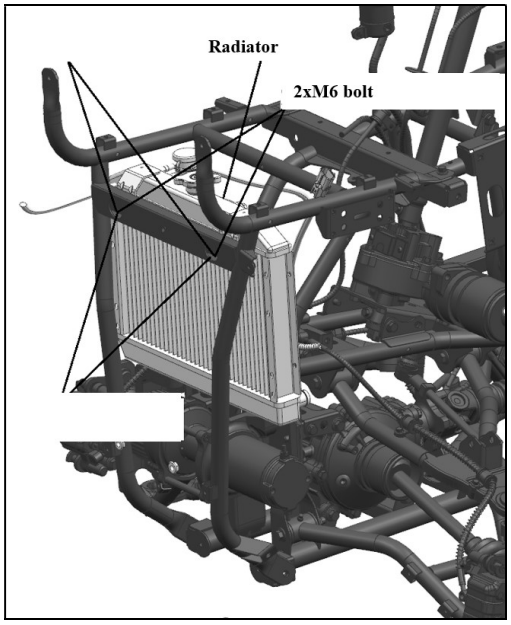


4.Remove two M6 screws and auxiliary water tank⑦ (include water pipe and clamp).



Available overhaul: Replace auxiliary water tank.

5.Remove two M6 screws and radiator ⑧, completing dismantling radiator.



Tightening bolt torque of radiator: 9-12N.m.

Available overhaul: Replace and check water inlet and outlet pipe and radiator cap.

6.Replace and check radiator.

Installation

Conduct reinstallation based on reversed sequence of dismantling.

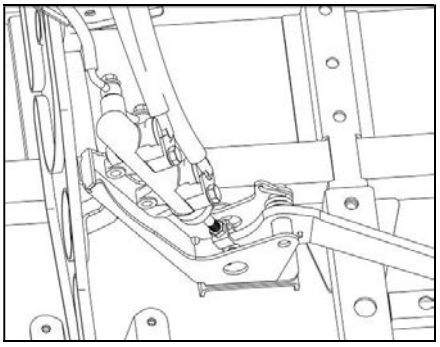
5.7. Engine combination

5.7.1. Dismantling

Foot brake master cylinder combination

1.Remove the two installing bolts of the main brake pump and then remove the foot brake rest.

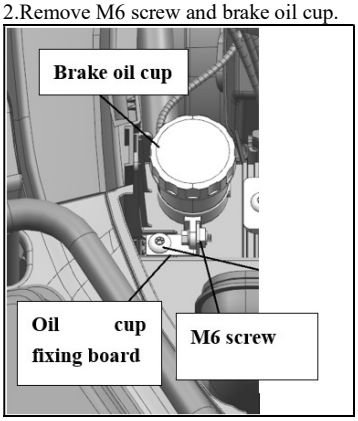
Finally, remove the four fixed bolts of the main pump bracket and take out the injector pump bracket.



(Refer to relevant contents in section I of the chapter for dismantling vehicle plastic parts)

Tightening bolt torque of foot brake master cylinder: 24-28N.m.

2.Remove M6 screw and brake oil cup.



Tightening M6 screw torque of M6 brake oil cup: 9-12N.m.

Available overhaul: Check oil cup level and replace oil cup.

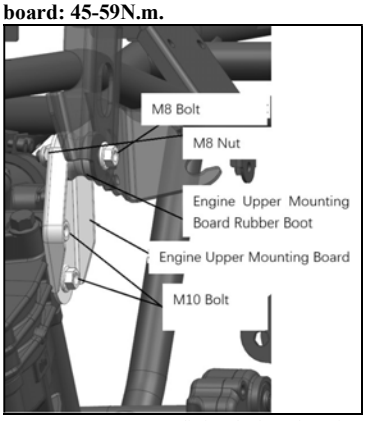
Engine

1.Disconnect crankshaft position sensor, the speed sensor on the engine and the gear display cable, disconnect the oil pressure sensor plug, and disconnect the engine wiring harness from the main harness. Disconnect the engine harness. (Installation should follow position indicated in figure corresponding to gear line tag serial number! Random connection is not allowed to avoid gear indication out of order). Disconnect spark plug, fuel hose, CVT intake &exhaust pipe, throttle valve and exhaust pipe.

2.Remove M8 bolt and two M10 bolts, then remove engine upper mounting board.

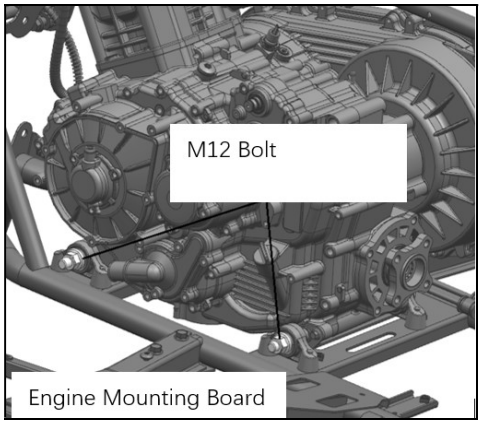
Tightening torque of M8 bolt for engine upper mounting board: 22-30N.m.

Tightening torque of M10 bolt for engine upper mounting board: 45-59N.m.



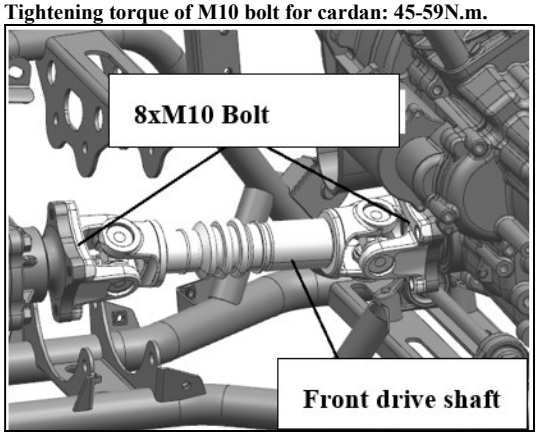
3.Remove two M12 fixing bolts of engine mounting board.

Tightening screw torque of vehicle engine: 78-104N.m.

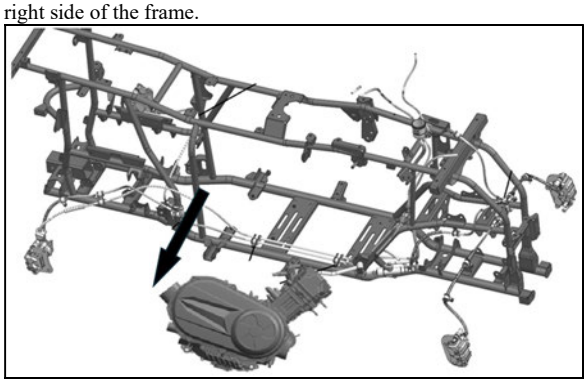


4.The front/rear drive shafts and engine are connected by cardans. After 16 M10 bolts are removed, the front and rear drive shafts can be directly released from the engine.

Tightening torque of M10 bolt for cardan: 45-59N.m.



5.After the engine bolts are removed, check whether there are any plugins forgotten to remove, and finally lift the engine from the right side of the frame.



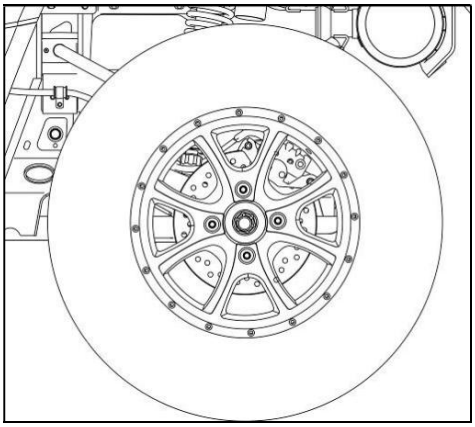
5.8. Rear differential combination

5.8.1. Dismantle the left side

（Left and right disassembly steps are the same, and the process is carried out at the same time）

1. First place intermediate part of vehicle to a dedicated support, leaving front and rear wheels of a vehicle in suspended status.

Remove four nuts, pull along axial direction and remove rear wheel combination.

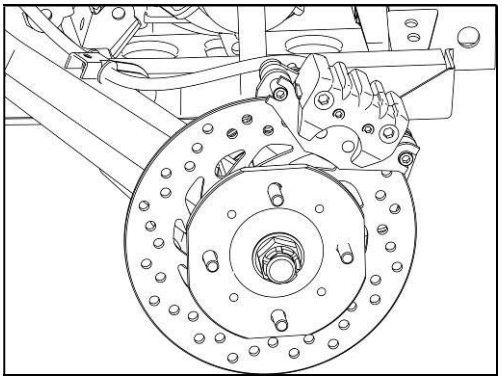


Tightening torque of rear wheel nut: 110-130N.m.

Available overhaul: replace rear wheel combination.

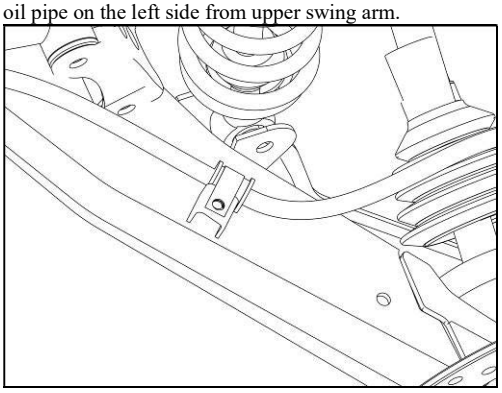
2. Place transmission case gear to “P”, leaving left and right semi-axis in lock-up status.

Remove cotter pin and M20 lock nut of rear semi-axis on the left side.

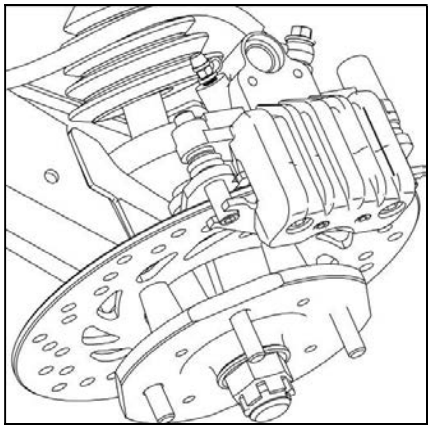


Tightening torque of drive disk M20 lock nut: 280-300 N.m.

3.Remove one screws and brake oil pipe clip, separating rear brake oil pipe on the left side from upper swing arm.



4.Remove the two installing M10 bolts of the left brake caliper and remove the caliper from the brake disc.

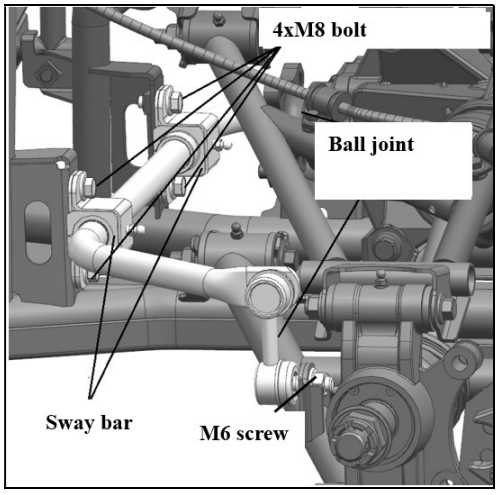


Tightening torque of main body bolts of rear brake pump: 45-59N.m.

Available overhaul: Replace and conduct maintenance of rear brake pump main body and rear drive disk combination.

Note: During dismantling, brake action is prohibited to be conducted, avoiding brake friction plate close or placing spacer between friction plates to avoid friction plate close and to facilitate future installation.

5. Remove the M10 screw for the ball joint. Remove the installing M6 bolts on the sway bar. There are altogether 8 M6 bolts on the left and right sides. After the disassembly, take out the sway bar for maintenance.

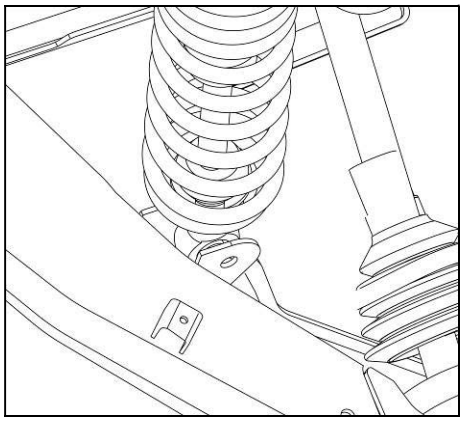


Fastening M6 bolts torque of sway bar: 9-12N.m.

Fastening M10 screw torque of ball joint: 60-65N.m.

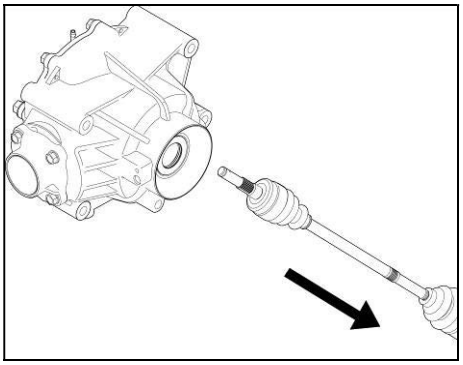
Available overhaul: replace horizontal stabilizer pull rod.

6.Remove the two installing M10 bolts of the rear A-arm and take out the shock absorber.



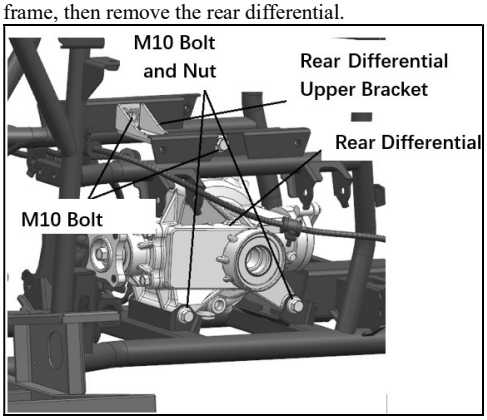
Fastening M10 bolts torque of shock absorber: 45-59N.m.

7.Pull along axial direction and remove rear semi-axis assembly on the left side.



Available overhaul: Replace rear semi-axis assembly on the left side.

8.Remove the bolts and rear differential upper bracket from the frame, then remove the rear differential.

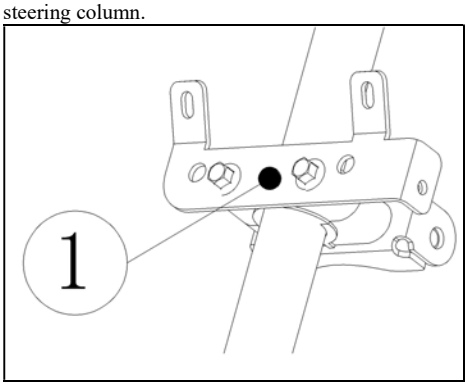


Tightening M10 bolts torque of rear differential: 45-59N.m.

5.9. Steering system

5.9.1. Dismantle steering system (with EPS)

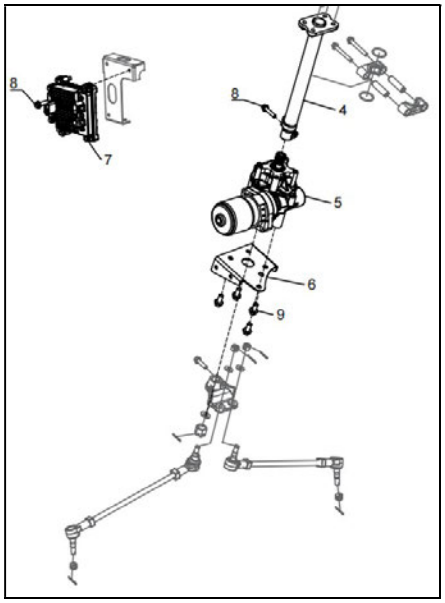
1.Remove two bolts, separating steering column block from steering column.



2.Remove cotter pin and castle nut (two pieces for each), separating left and right steering pull bar from EPS⑤.

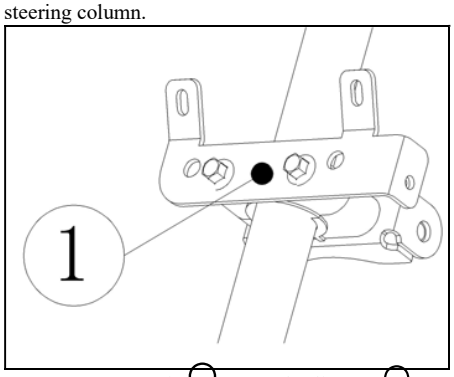
3.Remove four bolts⑨ and lift along axial direction to remove steering column④ and EPS⑤.

4.Remove bolt⑧, sperate the EPS and steering column.



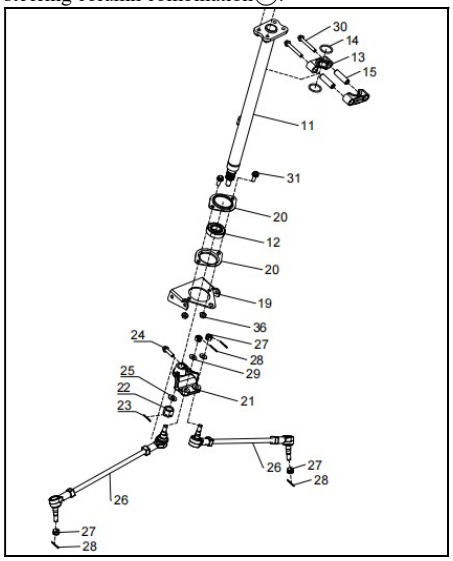
5.9.2. Dismantle steering system (without EPS)

1.Remove two bolts, separating steering column block from steering column.

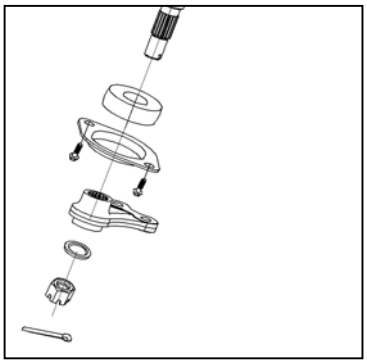


2. Remove cotter pin ○,23 and spline nut ○,22 (two pieces for each), separating left and right steering pull bar ○,26 from steering column⑪.

Remove two screws and lift along axial direction to remove steering column combination⑪.



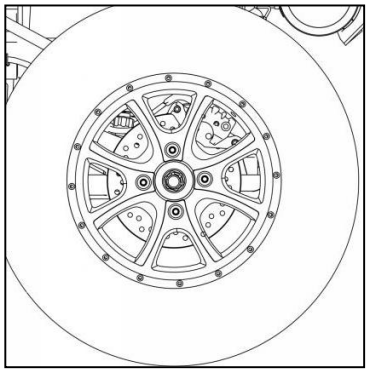
3.Remove the cotter pin, remove the nut, take out the rocker arm, loosen the two bolts and remove the bearing set plate.



5.9.2. Dismantle left side of front differential assembly

1.First place intermediate part of a vehicle to a dedicated support, leaving front and rear wheels of the vehicle in suspended status.

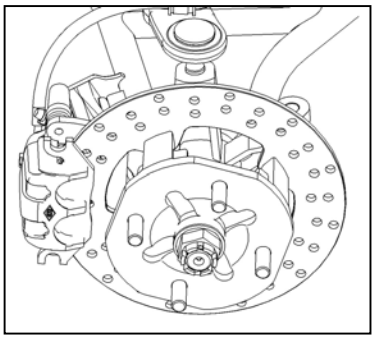
Remove four nuts and pull along axial direction to remove front wheel combination.



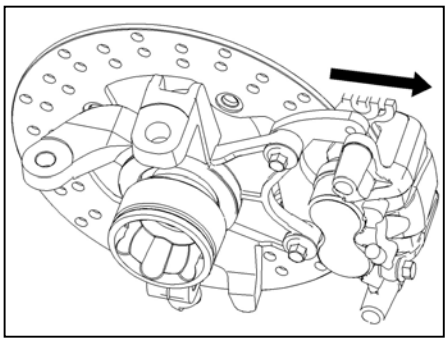
Tightening torque of front wheel nut: 110-130N.m.

Available overhaul: Replace front wheel combination.

2.Remove cotter pin at the left drive disk.



3.Remove two bolts and remove main body combination of front brake pump along arrow direction.

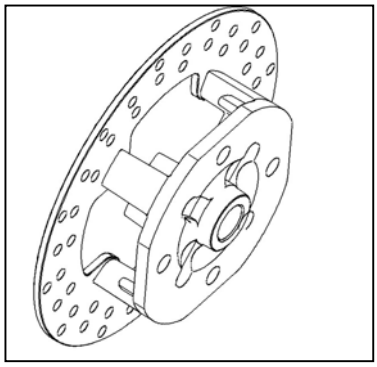


Tightening torque of main body bolt of front brake pump: 45-59N.m.

Available overhaul: replace and conduct maintenance of main body of front brake pump.

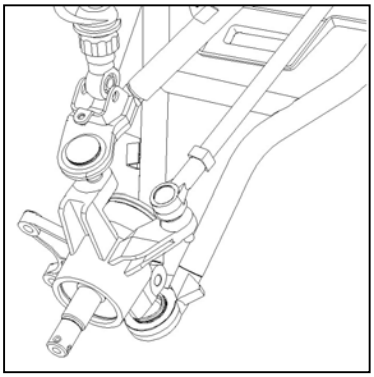
4.Remove the cotter pin, loosen the castle nut and take out the front drive disk combination.

Tightening torque of drive disk lock nut: 280-300 N.m.



Available overhaul: replace and conduct maintenance of drive disk combination

5.Remove the cotter pin of the upper and lower A-arms, loosen the castle nuts of the upper and lower A-arms at first, and then loosen the castle nuts of the direction pull rod, and finally take the steering knuckle out of the vehicle.

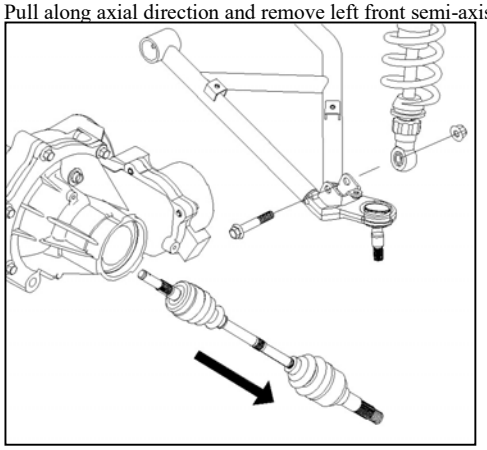


Bolt tightening torque of front lower swing arm: 60-65 N.m.

Available overhaul: replace steering pull bar on the left.

6.Remove tightening bolt and nut below left front shock absorber (one piece for each), separating left front shock absorber and front upper swing arm, and separating front upper swing arm and steering knuckle before removing left steering knuckle assembly along axial direction.

Pull along axial direction and remove left front semi-axis.

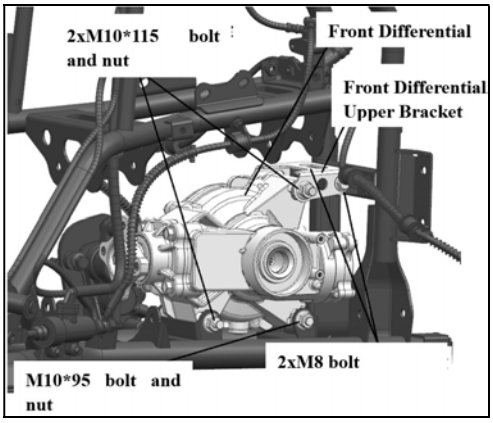


Bolt tightening torque of front shock absorber: 60-65 N.m.

Available overhaul: Replace left front semi-axis.

7.Remove the three bolts of the front differential, remove the hoop of the front drive shaft sleeve after the plug, move a certain distance forward, withdraw the front drive shaft, take out the front differential from the right side of the body for maintenance.

Note: Removal of the front differential does not require removal of any bolts of engine.



Vehicle tightening bolt torque of front differential: 45-59 N.m.

Vehicle tightening bolt torque of front differential upper bracket: 22-30 N.m.

Available overhaul: Replace front retarder assembly.

Installation

Conduct reinstallation based on reversed sequence of dismantling.

5.10 Attentions and Detection

5.10.1 FUEL SYSTEM

The fuel system of a fuel injection system holds much more a pressure than on carbureted vehicle. Prior to disconnecting a hose or to removing a component from the fuel system, follow the recommendation described here.

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on pressurized fuel system. Wear safety glasses. Proceed with care when removing/installing pressure test equipment or disconnecting fuel line connections. Cover the fuel line connection with an absorbent shop rag. Slowly disconnect the fuel hose to minimize spilling. Wipe off any fuel spillage in the engine compartment. Do not allow fuel to spill on hot engine parts and/or electrical connectors. Never use a hose pincher on injection system high pressure hoses. Replace any damage or deteriorated fuel lines.

When the repair is completed, ensure that all hoses are connected and secured.

Always perform the fuel pressure test if any component has been removed. A pressure test must be done before turning the ignition key to ON and setting the engine stop switch to RUN. The fuel pump is activated each time in these conditions.

To locate a leak, pressurize the system. Check for leaking fuel or fuel odor. Spray soapy water on the hose connections and injectors. Air bubbles will show the leaking area.

Inspect the fuel lines, fuel tank, fuel tank cap for damage, clogging and leakage of fuel. If any damages are found, replace the defective parts with the new ones.

FUEL PRESSURE TEST

The pressure test will show the available pressure at the fuel pump outlet. It validates the pressure regulator, the fuel pump and leaks in the system.

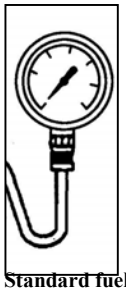
Before proceeding to the pressure test ensure the battery is fully charged. Battery voltage must be over 12 volts.

Ensure there is enough gas in fuel tank.

Disconnect outlet hose.

Install fuel pressure gauge and T-fitting between disconnected hoses.

Turn ignition key ON and set engine stop switch to RUN and observe fuel pressure. Turn ignition key off then back on. Repeat the test.



Standard fuel pressure: 350kpa.

A rapid pressure drop indicates leakage is from the fuel rail, if there is not leaking then replace fuel pump.

A slow pressure drop indicates leakage either from the fuel injector or from the fuel pressure regulator. Check fuel injector and the fuel pressure regulator for leaks. If it is not leaking then replace fuel pump module.

If no leakage, start engine and observe fuel pressure. The fuel pressure should be the same as above.

If pressure is within limits, fuel pump and the fuel pressure regulator are working adequately.

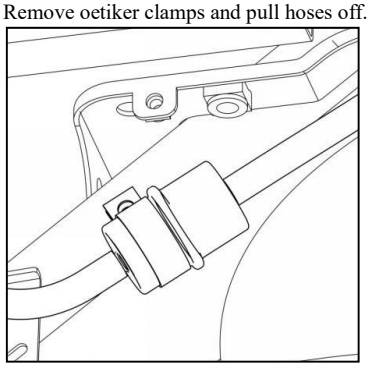
Remove pressure gauge from inlet hose. Reconnect inlet hose.

FUEL FILTER

Replace fuel filter as per amintenance schedule.

Filter Removal

Remove oetiker clamps and pull hoses off. Detach filter from body.



Filter inspection

If fuel filter is suspected to be clogged, it may be checked as follows:

Using low compressed air, check if fuel filter is clogged. Air should flow easily through filter. In doubt, install a new filter.

Filter installation

Use arrow on filter to position it according to fuel flow.

FUEL PUMP

Fuel pump electrical test.

When turning ignition key ON, the fuel pump should run for 5 seconds to build up the fuel pressure in the system.

If the pump does not work, disconnect the connector from the fuel pump.

Install a temporary connector to the fuel pump connector. Apply 12V to this test harness.

CAUTION: Running the fuel pump a few minutes with reverse polarity can damage the pump.

If pump does not run, replace a new pump.

Other wise, check fuse and if good, probe terminals of fuel pump connector on vehicle harness or its connector, repair or replace appropriate part.

Fuel pump removal

Remove fuel pump outlet hose and harness.

Remove fuel pump retaining screws.

Gently push pump up.

CAUTION: While pulling out the fuel pump, pay attention to fuel sensor float arm. Float arm can get stuck and bend which can reduce the fuel sensor capabilities

Fuel pump installation

For installation, reverse the removal process but pay attention to the following.

Install a new gasket.

Pay attention to pump orientation.

Tighten retaining screws as per illustrated sequence.

Install hose properly on OUT nipples and harness.

FUEL TANK

Fuel tank draining

Never perform this operation when the engine and/or the exhaust system is/are hot.

Never sue a hose pincher on injection system high pressure hoses.

Remove fuel tank cap and siphon gas in an approved fuel container.

Fuel tank removal

Remove

Disconnect vent line from body.

Fuel tank inspection

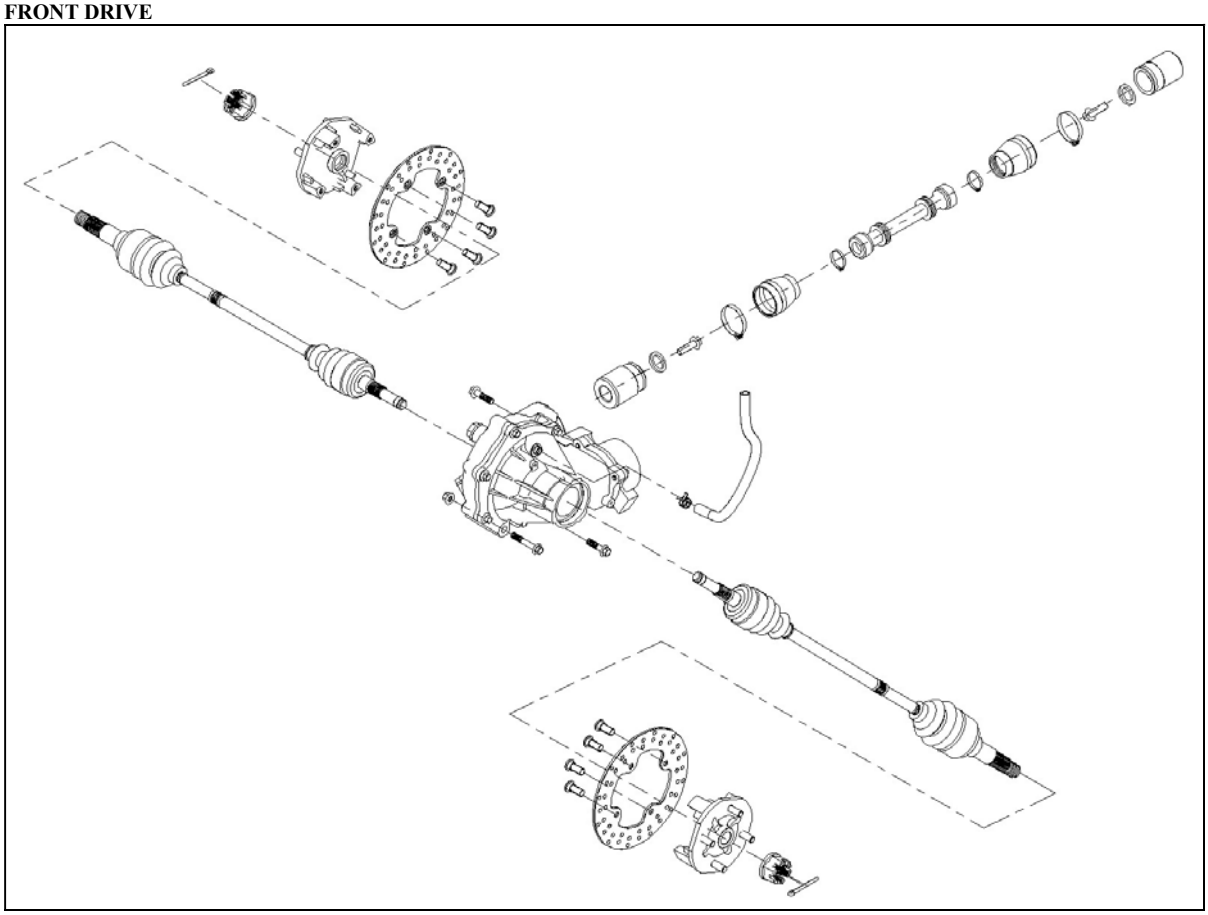
Inspect fuel tank for any damage or cracks which may result in fuel leaks. If so replace tank with a new one. Inspect tank and protector attachment points for damage. Inspect protector for damage.

Fuel tank installation

For installation, reverse the removal process.

5.10.2 DRIVE TRAIN

FRONT DRIVE



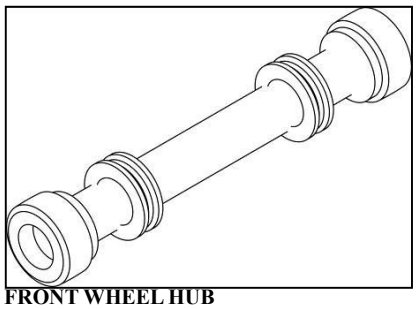
FRONT DRIVE SHAFT

Inspection

Inspect the propeller shaft for wear or damage. If any defects are found, replace the propeller shaft with new one.

Check if U-joint moves freely in all direction.

Check bellows for holes or brittleness.



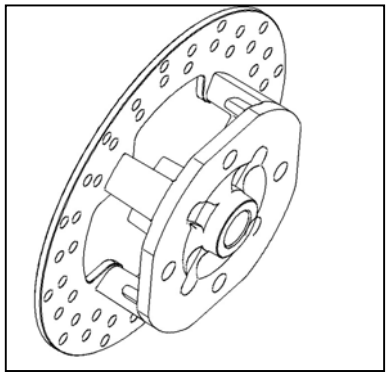
FRONT WHEEL HUB

Inspection

Check wheel hub for cracks or other damages.

Check inner splines and wheel rim bolts for wear or other damages.

If any damage is detected on wheel hub, replace it with a new one.



FRONT C.V. SHAFT

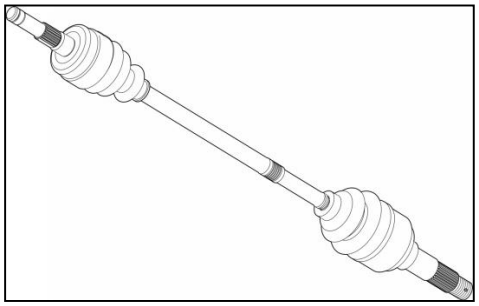
Inspection

Inspect the dust-proof sleeves. If there is any damage or evidence of leaking lubricant, replace them. Remove clamp for dust-proof sleeve, then remove universal joint of differential side. Remove and replace the dust-proof sleeve from the differential side of drive shaft.

Check splines for excessive wear. Replace if necessary. If the splines on plunging joint are worn, a check of differential inner splines should be done.

Check the ring at the end of drive shaft. If wear is apparent, replace the wear ring.

Check if the bearing in kunckle move freely and smoothly. If not, replace them.

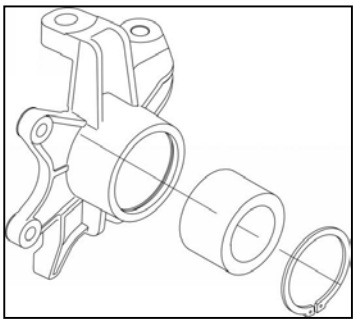


Installation

Apply grease to the splines and insert the end of drive shaft in differential and pull joint a little to make sure that the stop ring is locked in differential side gear groove.

Insert the other end of drive shaft in the knuckle and install the knuckle to the lower suspension arm. Install and torque the ball joint retaining bolts to 45N.m

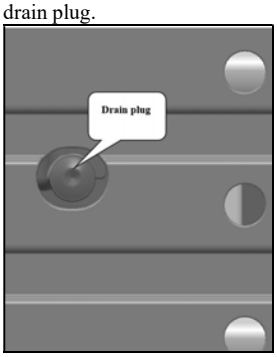
Install all other removed parts.



FRONT DIFFERENTIAL

Remove

Clean the drain plug area. Place an oil pan under the front differential case,and then drain oil completely by removing the drain plug.



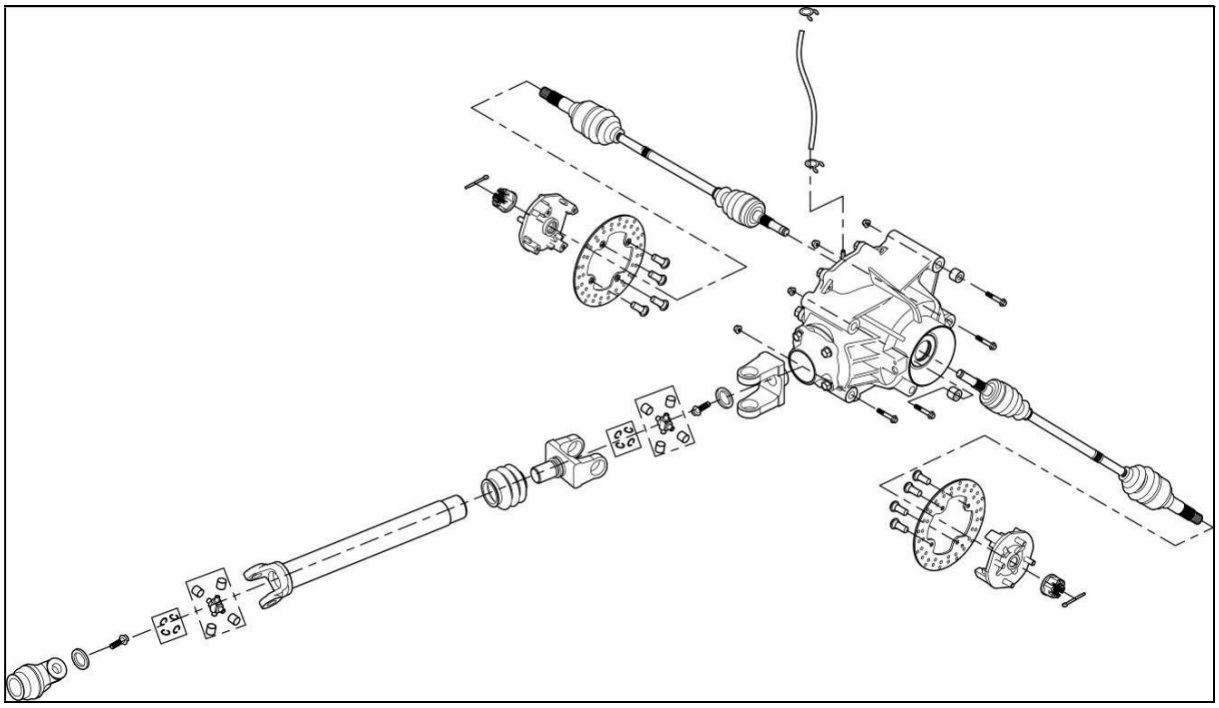
Inspection

Inspect the gear case, case cover, bearing, oil seals and dust seal for wear or damage. If any damage or wear is found, replace the oil seal or dust seal with a new one.

Check back lash and drag torque.

Check the breather rubber case for wear or damage. Also, check that the joint of rubber case fits tightly.

REAR DRIVE



REAR PROPELLER SHAFT

Inspection

Inspect the propeller shaft for wear or damage. If any defects are found, replace the propeller shaft with new one.

Check if U-joint moves freely in all direction.

Check bellows for holes or brittleness.

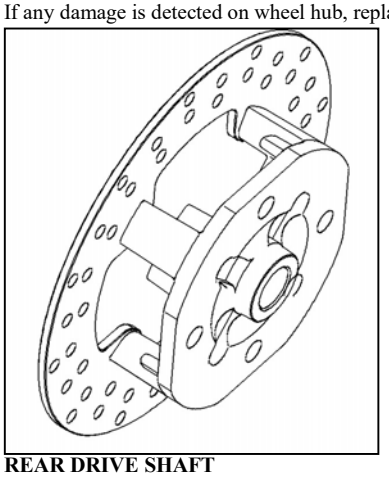
REAR WHEEL HUB

Inspection

Check wheel hub for cracks or other damages.

Check inner splines and wheel rim bolts for wear or other damages.

If any damage is detected on wheel hub, replace it with a new one.



REAR DRIVE SHAFT

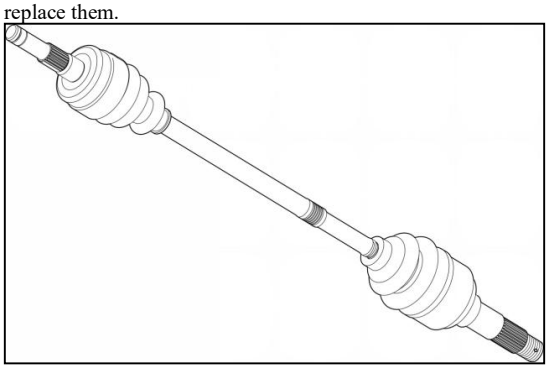
Inspection

Inspect the dust-proof sleeves. If there is any damage or evidence of leaking lubricant, replace them. Remove clamp for dust-proof sleeve, then remove universal joint of differential side. Remove and replace the dust-proof sleeve from the differential side of drive shaft.

Check splines for excessive wear. Replace if necessary. If the splines on plunging joint are worn, a check of differential inner splines should be done.

Check the ring at the end of drive shaft. If wear is apparent, replace the wear ring.

Check if the bearing in kunckle move freely and smoothly. If not, replace them.

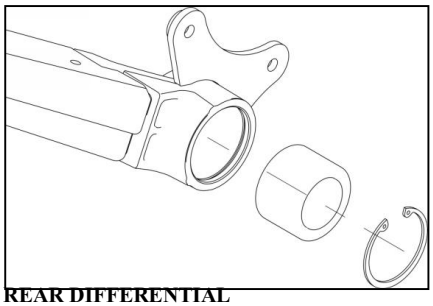


Installation

Apply grease to the splines and insert the end of drive shaft in differential and pull joint a little to make sure that the stop ring is locked in differential side gear groove.

Insert the other end of drive shaft in the knuckle and install the knuckle to the upper suspension arm.

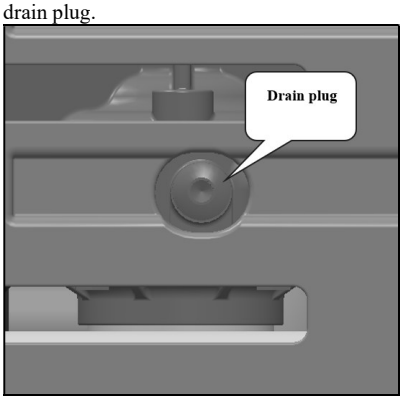
Install all other removed parts.



REAR DIFFERENTIAL

Remove

Clean the drain plug area. Place an oil pan under the rear differential case, and then drain oil completely by removing the drain plug.



Inspection

Inspect the gear case, case cover, bearing, oil seals and dust seal for wear or damage. If any damage or wear is found, replace the oil seal or dust seal with a new one.

Check back lash and drag torque.

Check the breather rubber case for wear or damage. Also, check that the joint of rubber case fits tightly.

TIRES AND WHEELS

When the tires are replaced, never install a bias tire with a redial tire, such a combination could create handling and/or stability problems.

Do not mix tires of different size and/or de-sign on the same axle.

Front and rear tire pairs must be the identical model and manufacturer.

For unidirectional tread pattern, ensure that the tires are installed in the correct direction of rotation.

The radial tires must be installed as a complete set.

In dismantling tires, use special crowbar and rim protection device.

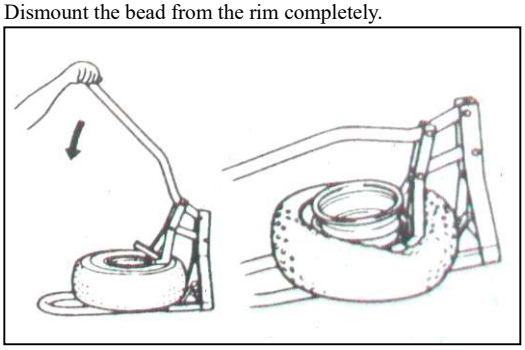
Tire replacement

Use jack to support vehicle and ensure its no dropping.

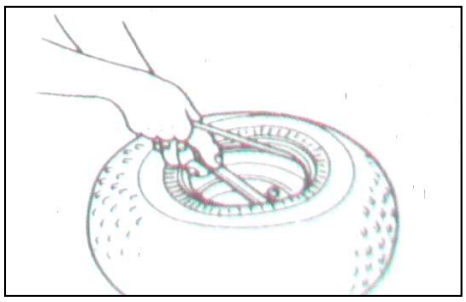
Remove the wheels.

After removing the air valve cap, release the tire pressure by depressing the valve.

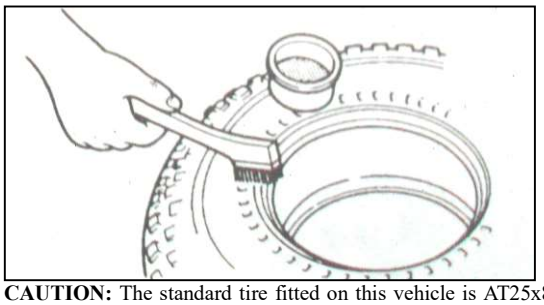
Dismount the bead from the rim completely.



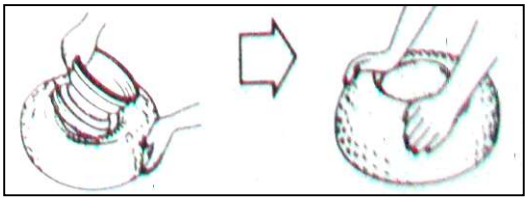
Separate the tire from the rim by using a set of tire levers and rim protectors.



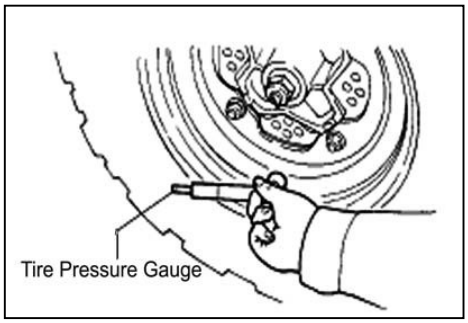
CAUTION: When using the tire lever, do not scratch or hit the sealing portion of the wheel or it may cause air leakage.
Apply tire lubricant to the new tire bead and the flange of the rim. But never apply grease, oil or gasoline to the tire bead because they will deteriorate the tire.



CAUTION: The standard tire fitted on this vehicle is AT25x8-12 for the front and AT25x10-12 for the rear.
The use of tires other than the standard may cause instability. It is highly recommended to use the specified tire.
Inspect the sealing portion of the rim for contamination and distortion before installing the tire on the rim.
Mount the new tire on the rim.



CAUTION: When installing each tire, make sure the arrow on the tire points in the direction of rotation. Also make sure the outer side of the wheel rim is facing outward.
Inflate the tire to seat the tire bead.
Check the rim line cast on the tire side walls. It must be equidistant from the wheel rim all the way around. If the distance between the rim line and the wheel rim varies this indicates that the bead is not properly seated. If this is so, deflate the tire completely, and unseat the tire bead on both sides. Then coat the bead with clean water and reseat the tire.



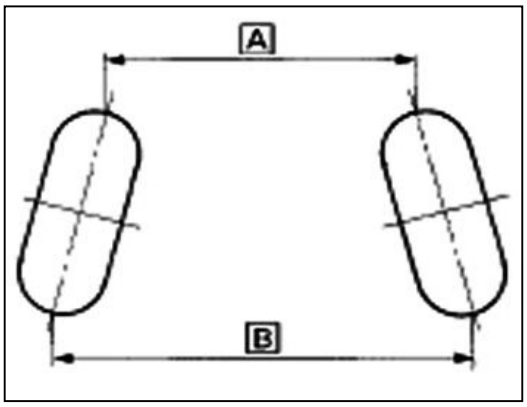
Adjust the tire pressure to specification.

5.10.3 STEERING SYSTEM

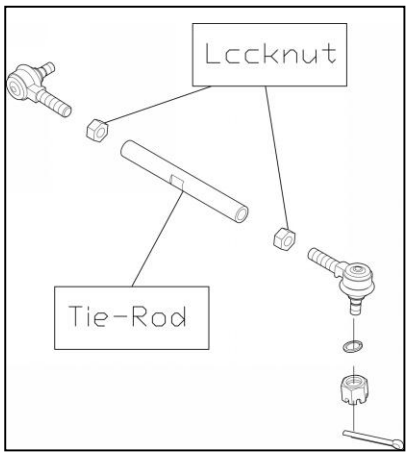
Inspect the tie rod for distortion or damage. If any damage is found, replace the tie rod with a new one.
Inspect the tie ends for smooth movement. If there are any abnormalities, replace the tie rod end with a new one.
Inspect the tie rod end boot for wear or damage.
If any damage is found, replace the tie rod end with a new one.

STEERING ALIGNMENT

Park vehicle on flat ground, make sure the tire pressure for right and left tires is same and set to the proper specification, set the front wheels in the straight position, then place a load of 75kg on the seat.
Measure the distance A and B of the front wheels and calculate the difference.



Toe-in.: B -A= 5mm
A: front of front wheel
B: rear of front wheel
Out of range of toe-in: →Adjust nut of tie rod



CAUTION: After adjusting toe-in, fist rotate steering wheel from center position to the left and right, to ensure that is the same corner, then slowly run vehicle to see whether its direction can be controlled.

5.10.4 SUSPENSION SYSTEM

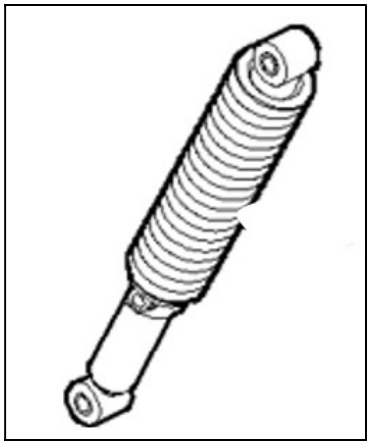
FRONT SUSPENSION

The procedure explained below is the same for the RH and LH sides unless otherwise noted. During assembly or installation, use the torque values and service products as in the torque table.
In order to prevent collapse of vehicle, please do not dismantle left and right suspensions simultaneously.
Before overhauling front suspension system, please ensure stable support of vehicle.

INSPECTION

Shock absorber

Inspect the shock absorber for oil leakage or damage, inspect the bushing for wear or damage. If any damage is found, replace the front shock absorber with a new one.



Extend and compress the piston several times over its entire stroke. Check that it moves smoothly and with uniform resistance with rod up. Any of the following conditions will denote a defective shock:

-A skip or hang up when reversing stroke at mid-travel.

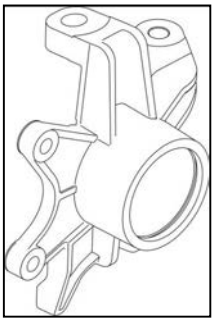
-Seizing or binding conditions except at extreme end of either stroke.

-A gurgling noise after completing one full compression and extension stroke.

Replace shock if any these conditions are found.

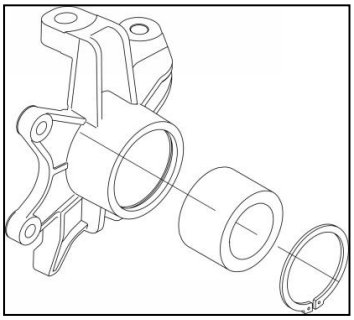
Knuckle

Inspect the knuckle for damage. If any damages are found, replace the knuckle with a new one.



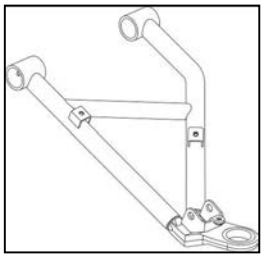
Check bearing and seal for damage or wear, If any damages or wear are found, replace a new one.

Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.



Lower Suspension Arm

Inspect the suspension arm and for damage or distortion. If any damages or distortion are found, replace the suspension arm with a new one.

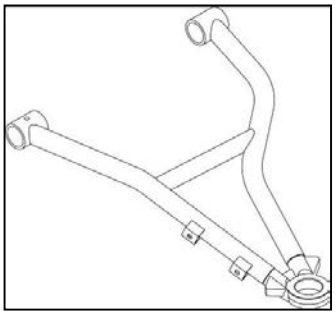


Move suspension arm from side to side. There should be no noticeable loose. Replace bushing if necessary.

Move suspension arm up and down.There should be no noticeable loose. Replace bushing if necessary.

Upper Suspension Arm

Inspect the suspension arm and for damage or distortion. If any damages or distortion are found, replace the suspension arm with a new one.



Move suspension arm from side to side. There should be no noticeable loose. Replace bushing if necessary.

Move suspension arm up and down.There should be no noticeable loose. Replace bushing if necessary.

Check ball joint for damage, pitting, looseness and roughness. If so ,replace it.

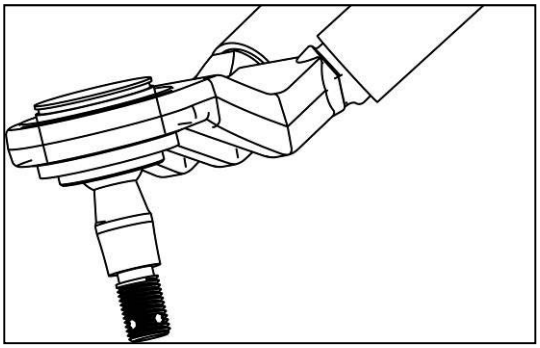
Checl ball joint bellows for cracks. Change if necessary.

REASSEMBLY

Pay attention to the following points.

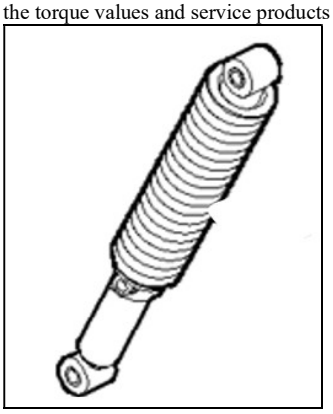
Install the washers and tighten the knuckle nuts to the specified torque.

Replace the removed cotter pins with new cotter pins.



REAR SUSPENSION

The procedure explained below is the same for the RH and LH sides unless otherwise noted. During assembly or installation, use the torque values and service products as in the torque table



INSPECTION

Shock absorber

Inspect the shock absorber for oil leakage or damage, inspect the bushing for wear or damage. If any damage is found, replace the rear shock absorber with a new one.

Extend and compress the piston several times over its entire stroke.

Check that it moves smoothly and with uniform resistance with rod up. Any of the following conditions will denote a defective shock:

-A skip or hang up when reversing stroke at mid-travel.

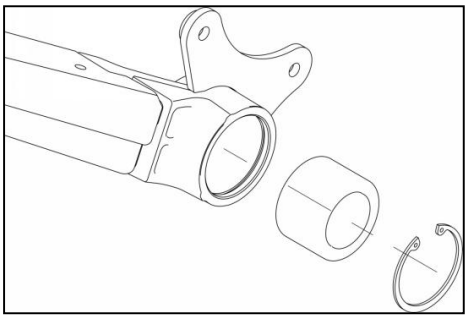
-Seizing or binding conditions except at extreme end of either stroke.

-A gurgling noise after completing one full compression and extension stroke.

Replace shock if any these conditions are found.

Knuckle

Inspect the knuckle for damage. If any damages are found, replace the knuckle with a new one.

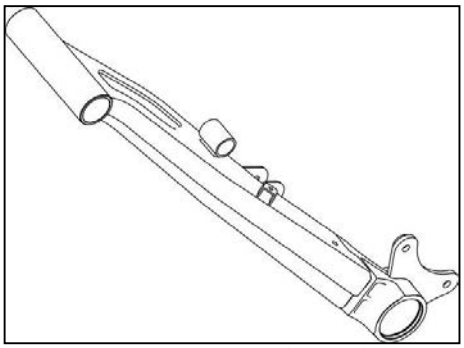


Check bearing and seal for damage or wear, If any damages or wear are found, replace a new one.

Rotate the inner race by hand to inspect for abnormal noise and smooth rotation**.**

Suspension Arm

Inspect the suspension arm and for damage or distortion. If any damages or distortion are found, replace the suspension arm with a new one.



Move suspension arm from side to side. There should be no noticeable loose. Replace bushing if necessary.

Move suspension arm up and down.There should be no noticeable loose. Replace bushing if necessary.

REASSEMBLY

Pay attention to lubricate rear knuckles with lithium-soap based grease.

5.10.5 BRAKES SYSTEM

This brake system is filled with an ethylene glycol-based DOT4 brake fluid. Do not use or mix different types of fluid, such as silicone-based or petroleum-based brake fluids.

Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or which has been stored for a long time.

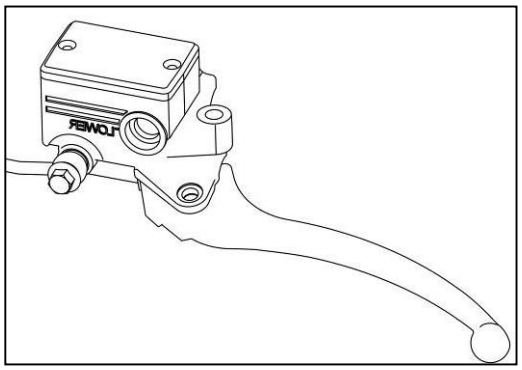
When storing brake fluid, seal the container completely and keep it away from children.

When replenishing brake fluid, take care not to get dust into fluid.

When washing brake components, use new brake fluid. Never use cleaning solvent.

A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the brake disc with high quality brake cleaner or neutral detergent.

Brake fluid may cause damage to surfaces of plastic and rubber parts. Keep it far away from these parts.



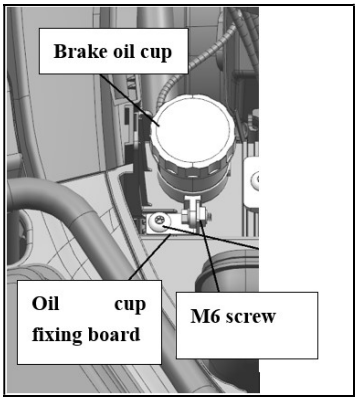
BRAKE FLUID REPLACMENT

Place the vehicle on a level surface.

Remove the master cylinder reservoir cap and diaphragm.

Suck up the old brake fluid as much as possible.

Fill the reservoir with new brake fluid.

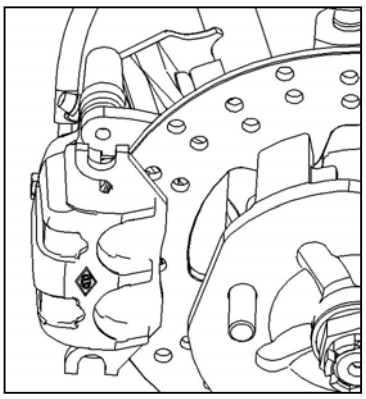


Remove the dust cap of air bleeder valve. Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.

Loosen the air bleeder valve and pump the brake pedal until the old brake fluid is completely out of the brake system.

Close the air bleeder valve and squeeze and release the brake pedal several times in rapid succession and hold the pedal fully squeezed.

Loosen the air bleeder valve for about quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake pedal. Then close the bleeder valve, pump and squeeze the pedal and open the valve. Repeat this process until the fluid flowing into the receptacle contains no air bubbles.

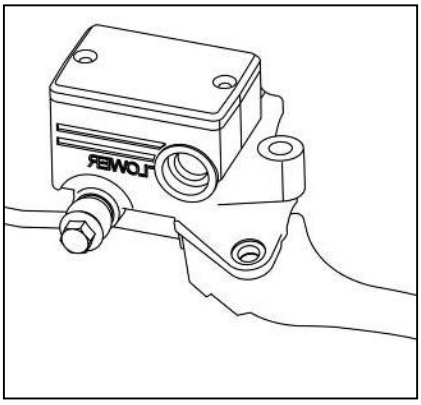


Tighten the air bleeder valve to 6N.m.

Disconnect the clear hose and install the dust cap of air bleeder valve.

Fill the reservoir with new brake fluid to the upper edge of the inspection window.

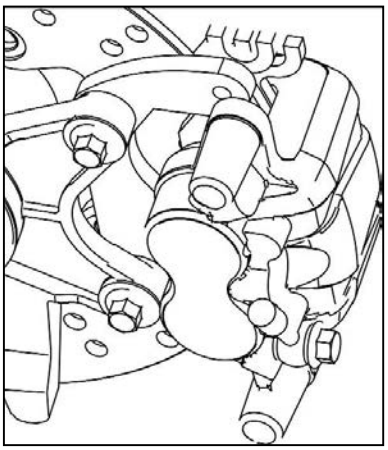
Install the master cylinder reservoir cap and diaphragm.



CAUTION: While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

BRAKE PADS REPLACMENT

Remove the wheel.



Remove the brake caliper mounting bolt and brake pads mounting pins.

Remove the brake pads.

Make sure that pad spring is in position. Install the new brake pads. Install pad pins by pushing in the pads against pad spring to align pad slots in the pads and caliper body. Tighten the brake pad mounting pins to 18N.m.

Tighten the brake pad mounting pins to 80N.m.

CAUTION: Do not operate the brake pedal during or after brake pad removal.

Replace the brake pads as a set, otherwise braking performance will be adversely affected.

After replacing the brake pads, pump the brake pedal a few times to check for proper brake operation and then check the brake fluid level.

BRAKE DISC

Removal and disassembly

Remove the wheel.

Remove the caliper and hub.

Remove the brake disc.

Inspection

Inspect the brake disc for cracks or damage and measure the thickness using the micrometer. If any damage are found or the thickness is less than the service limit, replace the brake disc with a new one.

Minimum thickness of front brake disc: 3.5mm.

Minimum thickness of rear brake disc: 3.0mm

Measure the warpage using the dial gauge. If the warpage exceeds the service limit, replace the brake disc with a new one.

Maxmum warpage of brake disc:0.3mm.

Reassembly and remounting

Reassemble snd remount the brake disc in the reverse order of removal and disassembly. Pay attention to the following points:

-Install the disc to the wheel hub with the punching letters on the disc showed up.

-Make sure that the disc is clean and free of any greasy matter.

-Apply THREAD LOCK to the brake disc bolts and tighten them to 26N.m.

BRAKE CALIPER

Removal

Loosen wheel nuts.

Raise vehicle and support it securely.

Remove appropriate wheel.

Remove the caliper bolts then the caliper. If the caliper is not being remove from the vehicle as during brake pad replacement,simply hang the caliper with a piece of wire to take the weight off the brake hose.

If the caliper is being removed for replacement, drain brake system before removing the banjo fitting and its sealing ring. Remove the caliper from the vehicle.

Catch spilled fluid with a rag. Attach the brake hose in a position to prevent the fluid from flowing out.

Disassembly

Remove brake pads.

Remove slide caliper support and pad spring.

Place rag over piston.

Place caliper body with piston down and apply small squirts of air pressure to the fluid inlet to remove piston.

Remove piston seal.

Clean piston grooves, caliper cylinder and piston with clean brake fluid.

Clean slide pins with brake cleaner and a rag.

Inspection

If boots are deteriorated or hard, replace with new ones.

Check caliper cylinder for scratches, rust or other damages. If so, replace caliper.

Check piston for scratches, rust or other damages. If so, replace caliper.

Assembly

Coat piston seal with clean brake fluid and install it into piston grooves in caliper.

Coat piston with clean brake fluid and install into cylinde with the closing toward caliper body.

Apply dielectric grease into sliding bores and install slide pins.

Install pad spring, caliper bracket and pads.

Installation

For installation,reverse the removal procedure, pay attention to the following details:

-Use new sealing washers when installing fitting retaining brake hose to caliper.

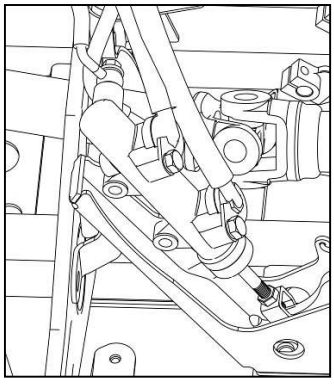
-Install caliper in its orginal position.

-Bleed the brake system

-Check for leaks and make sure the brakes operate normally before driving.

BRAKE LIGHT SWITCH

The brake light switch is located on the brake master cylinder. It can not be adjusted.



Inspection

First ensure brake light is good.

Check switch for dirt or corrosion. Make sure it is operating properly.

Depress brake pedal and check for brake light to turn on. Repeat with the brake pedal.

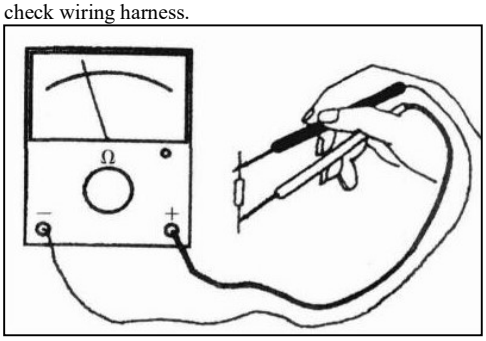
Test

Disconnect switch connectors.

Check switch operation as follows.

SWITCH POSITION	PIN		RESISTANCE
Firmly pushed	1	2	0.2Ωmax
Released			Infinite

If switch is defective, replace with a new one. If switch tests good, check wiring harness.



Remove

Disconnect switch connectors.

Drain brake system.

Unscrew brake light switch from master cylinder.

Catch spilled fluid with a rag.

Installation

For installation,reverse the removal procedure.

Bleed the brake system

Check for leaks and make sure the brakes operate normally before driving.

BRAKE HOSE

Inspection

Brake hose should be inspected frequently for leaks an damages.

Check if the hoses are crushed or damaged. Any deformation can restrict the proper flow of fluid and cause braking problems.

Check hoses for cracking scrapes. This damage can cause hose failure under pressure.

When hoses are removed or disconnected, cleanliness must be observed. Clean all joints and connections before disassembly. New hoses should be cleand with brake fluid before installation to remove any contamination.

Replace any defective parts.

Removal

Before removing any hoses, drain brake system.

Remove all necessary parts to reach the hoses.

Thoroughly clean the arer around the joints that will be disconnected.

Place a pan under the joint that will be disconnected.

Disconnect any retaining clips or brackets holding the hose and remove the defective parts.

Installation

Install the new hose.

Make sure the piece will not rub against any other part.

When there is a banjo fitting securing the hose to the caliper or to the master cylinder, always replace the sealing washers with new ones.

Install any retaining clips or brackets.

Refill and bleed the brake system.

Check for leaks and make sure the brakes operate normally before driving.

6. ELECTRICAL SYSTEM

Overhauling information

Warning

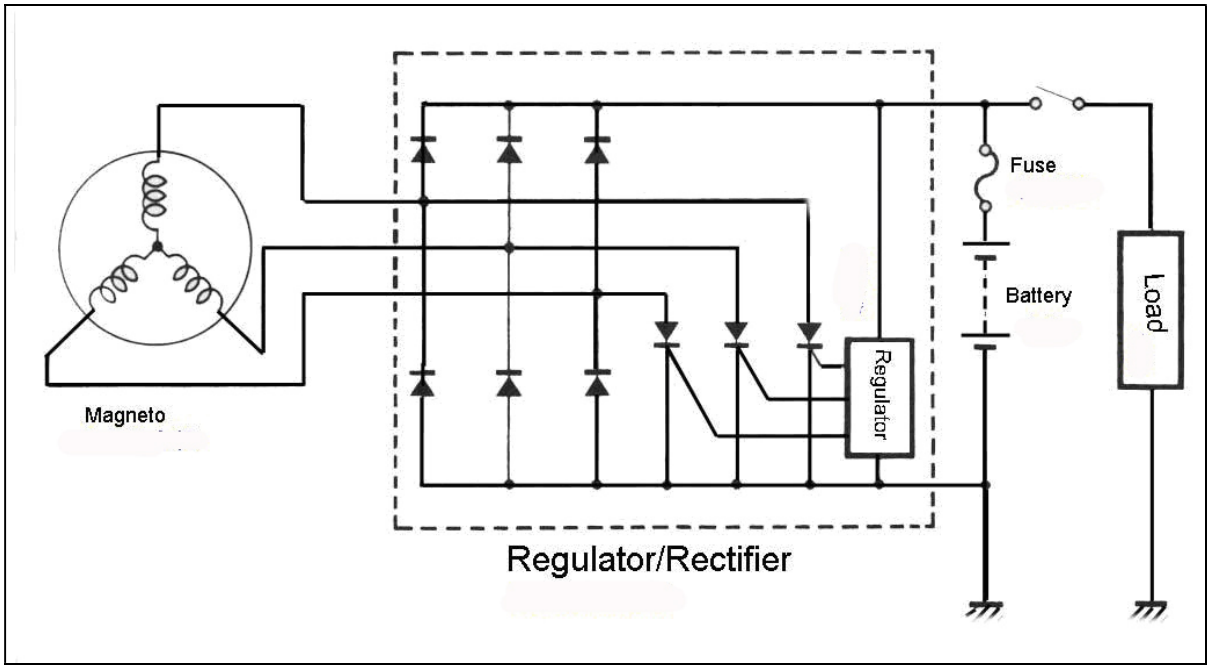
- Bulb will be very hot after turning on headlamp. Please do not touch it immediately after its off. In operation, bulb needs to be cooled.
- In warning inspection of water temperature, fire or high temperature liquid may be needed, keep it far away from inflammables and do not to be burnt.
- The temperature will be very high in turning of headlamp. For replacement, grease dirt will be splashed to glass in case of operation with bare hands or wearing dirty gloves. As a result, hot spots and glass deformation may be caused with damage to bulb as well.
- Pay attention to the following in replacing bulb:

  -- Do not replace bulb when it is on. Turn off ignition switch and replace it after cooling bulb.

  -- In order to avoid splashing grease to glass, wear clean gloves in replacing bulb.

  -- Use cloth with alcohol or banana water to clean glass to prevent any grease sticking to glass.
- Check battery to confirm whether it is normal.
- Regularly check switch and do not dismantle it from vehicle in inspection.
- Cables and wires of each part need to be arranged reasonably. (→Chapter 1) For dismantling and installation of tail lamp and rear steering lamp, please refer to chapter 4.

6.1 Charging system



GENERAL

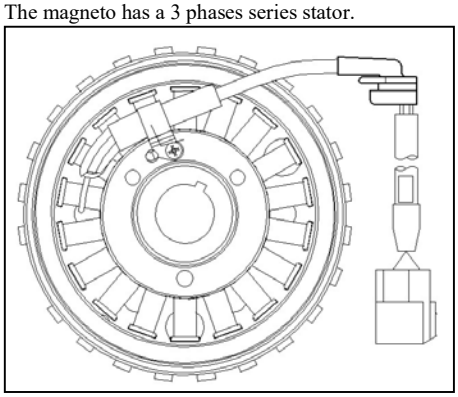
SYSTEM DESCRIPTION

The purpose of the charging system is to keep the battery at a full state of charge and to provide the electrical system with the required electrical power for normal vehicle operation.

Magneto

The magneto is the primary source of electrical energy. It transforms magnetic field into electric current (AC).

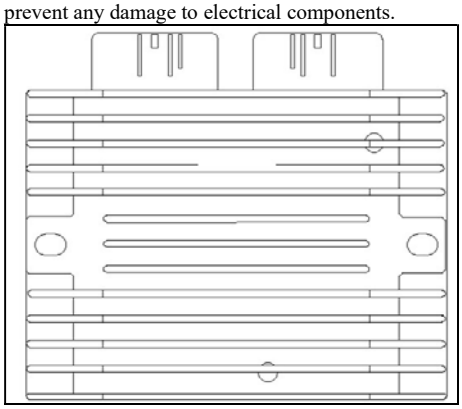
The magneto has a 3 phases series stator.



Voltage Regulator/Rectifier

The rectifier receives AC current from the magneto and transforms it into direct current (DC).

The voltage regulator, included in the same unit, limits voltage to prevent any damage to electrical components.



Battery

The battery supplies DC power to the electric starter for cranking the engine. During engine starting, it also supplies DC power to the entire electrical system.

At low engine RPM operation and high current load conditions, it supplements the magneto output and helps to maintain a steady system voltage.

INSPECTION

Charging System Output

First ensure that battery is in good condition prior to performing the following tests.

Testing the Output Voltage with multimeter.

1. Start engine with the less consumption as possible (no lights, no accessories).
2. Increase engine RPM as specified in the following table and read voltage in the multimeter.

Output Voltage Test	
Engine Speed	Voltage (DC)
4000 RPM	14.5 ± 0.5V

If voltage is above specification, replace voltage regulator/rectifier.

If voltage is below specification, check stator output and wiring harness prior to concluding that voltage regulator/rectifier is defective.

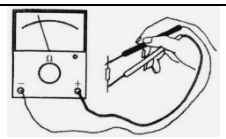
Check Stator

Stator Connector Access

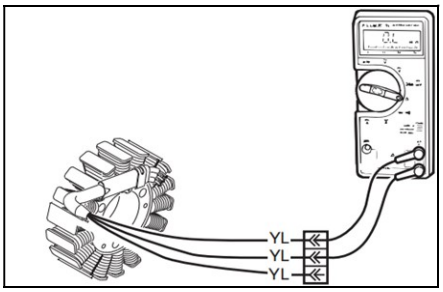
The stator is directly connected to the voltage regulator/rectifier.

Testing the Stator Continuity

1. Disconnect the stator connector from the voltage regulator/rectifier.
2. Check resistance between YELLOW wires.

Required Tool	
UNIT 115 MULTIMETER	

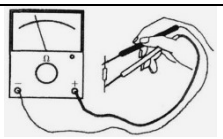
TERMINAL	RESISTANCE @ 20°C (68°F)
1 and 2	0.15 - 0.30 Ω
1 and 3	
2 and 3	



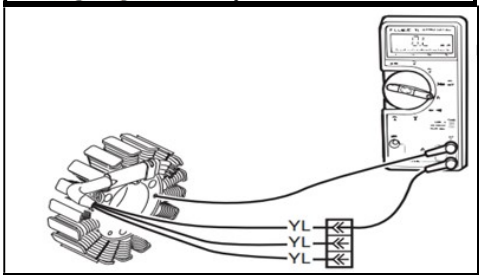
3. If any reading is out of specification, replace stator.
4. Re-plug connectors properly.

Testing the Stator Static Insulation

1. Disconnect the stator connector from the voltage regulator/rectifier.
2. Connect multimeter between any YELLOW wire (on stator connector) and engine ground.

Required Tool	
UNIT 115 MULTIMETER	

TEST PROBES	RESISTANCE @ 20°C (68°F)
Any YELLOW wire and engine ground	Infinite (open circuit)



3. If there is a resistance or continuity, the stator coils and/or the wiring is shorted to ground and needs to be repaired or replaced.
4. Re-plug connectors properly.

Check Battery

1. Connect a battery load tester.
2. Ensure proper test conditions.

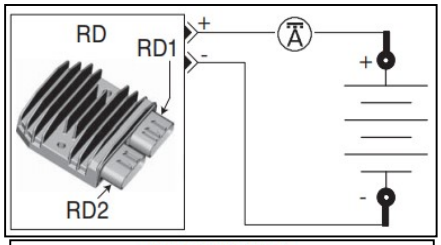
TEST CONDITIONS	
Initial battery voltage‡	Above 12.5 Vdc
Engine	OFF
Load	3 times the amp-hour (AH) rating
Time	15 seconds
‡ Required for accurate testing	

SPECIFICATION	
Battery	Above 9.6 Vdc

If battery voltage drops below specification during test, replace battery and perform a CHARGING SYSTEM LOAD TEST.

Charging System Load Test

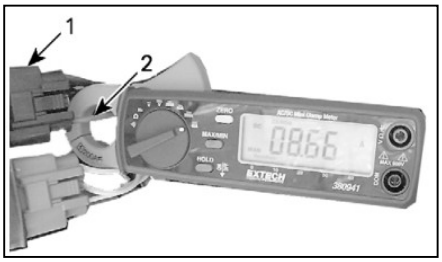
1. Connect a battery load tester.
2. Start vehicle and read voltage on tester.



SPECIFICATION	
Voltage	12.5 - 15 Vdc

If voltage is above specification, replace regulator and continue CHARGING SYSTEM LOAD TEST.

3. Connect an ammeter around RD1-1 wire.



DC CURRENT TEST WITH INDUCTIVE AMMETER
1. Output connector of voltage regulator
2. Ammeter clamped over RED wire

4. Ensure proper test conditions.
5. Read amperage on ammeter.
   45±5Amps

TEST CONDITIONS	
Battery voltage at idle‡	Above 12.6 Vdc
Engine	Increase to 4000 RPM
Load	As required to decrease battery voltage to 12 Vdc
Time	15 seconds
‡ Required for accurate testing	

NOTE: With a fully charged battery and no electrical loads, specification is less than 10A.

If amperage or voltage is not within specification, verify magneto and wires. Replace:

–Voltage regulator if magneto test is within specifications.
–Magneto if magneto test is not within specifications.

VOLTAGE REGULATOR (RD)

Testing the Voltage Regulator Continuity

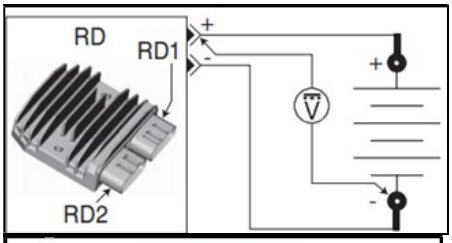
Due to internal circuitry, there is no static test available.

Voltage Regulator Wire Identification

FUNCTION	PIN	COLOR
12Vdc output	RD1-1	RD
12Vdc ground	RD1-3	BK
12Vac input	RD2-1	BK
12Vac input	RD2-2	BK
12Vac input	RD2-3	BK

Testing the Voltage Regulator Power

1. Check voltage at RD1-1.



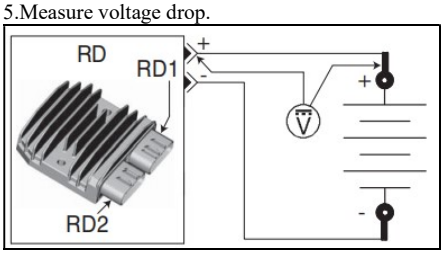
TEST CONDITIONS	
RD1-1	Hot at all times

BACKPROBE	PROBE	SPECIFICATION
RD1-1	BAT2 (-)	Battery voltage

2. Connect a battery load tester.
3. Start vehicle.
4. Ensure proper test conditions.

TEST CONDITIONS	
Battery voltage at idle‡	Above 12.6 Vdc
Engine	Increase to 4000 RPM
Load	As required to decrease battery voltage to 12 Vdc
Time	15 seconds
‡ Required for accurate testing	

5.Measure voltage drop.

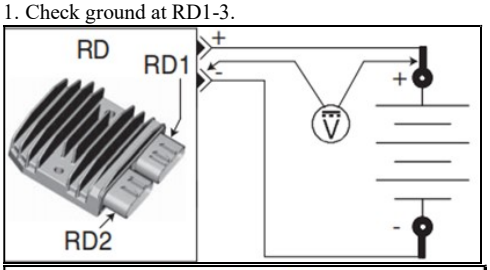


BACKPROBE	PROBE	SPECIFICATION
RD1-1	BAT1 (+)	Under 0.2 Vdc

If voltage drop is above specification, locate and repair damaged connector/wire.

Testing the Voltage Regulator Ground

1. Check ground at RD1-3.



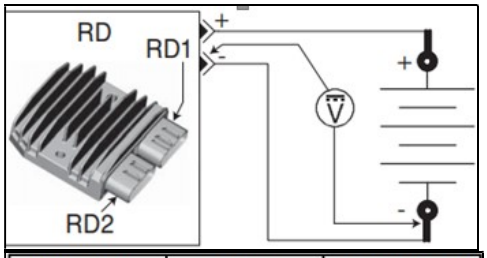
TEST CONDITIONS	
RD1-3	Permanent ground

BACKPROBE	PROBE	SPECIFICATION
RD1-3	BAT1 (+)	Battery voltage

2. Connect a battery load tester.
3. Start vehicle.
4. Ensure proper test conditions.

TEST CONDITIONS	
Battery voltage at idle‡	Above 12.6 Vdc
Engine	Increase to 4000 RPM
Load	As required to decrease battery voltage to 12 Vdc
Time	15 seconds
‡ Required for accurate testing	

5.Measure voltage drop.



BACKPROBE	PROBE	SPECIFICATION
RD1-3	BAT2 (-)	Under 0.4 Vdc

If voltage drop is above specification, locate and repair damaged connector/wire.

BATTERY

Refer to battery manufacturer's instructions for proper filling, activation and routine charging procedures.

Battery Access

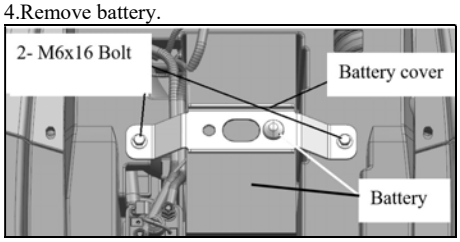
The battery is located underneath the driver's seat.

Removing the Battery

1. Remove seat.
2. Remove battery cover.
3. Disconnect BLACK (-) cable first, then the RED (+) cable.

NOTICE: Always respect this order for removal; disconnect BLACK (-) cable first.

4.Remove battery.



Cleaning the Battery

Clean the battery rack, cables and battery posts using a solution of baking soda and water.

Remove corrosion (if so) from battery cable terminals and battery posts using a firm wire brush.

Rinse with clear water and dry well.

Inspecting the Battery

Visually inspect battery casing for cracks or any other damages. If casing is damaged, replace battery and thoroughly clean battery support with a water and baking soda solution.

Inspect condition of battery posts, battery support, holding strap and strap attachment points and wire terminal lugs.

Battery Storage

It is not necessary to remove the battery during vehicle storage but it is recommended for long term storage.

If the battery is left in the vehicle during storage or used infrequently, disconnect the BLACK (-) negative battery cable to eliminate battery current drain from the electrical equipment.

Recharge the battery once a month with an approved battery charger as per manufacturer's recommendations.

Clean battery, battery support and connections as required.

For other recommendations during storage, refer to battery manufacturer instructions.

▲WARNING
Ensure battery is stored in a safe place, out of reach for children.

Activating a New Battery

Refer to the instructions provided with the battery.

Charging a Battery

▲WARNING
Always wear safety glasses and charge in a ventilated area. Never charge or boost a battery while it is installed on vehicle. Do not open the sealed cap during charging. Do not place battery near open flame.

NOTICE: If battery becomes hot, stop charging and allow it to cool before continuing.

NOTE: If battery pressure increases due to overcharging, the valve opens to release excess pressure, preventing battery damage.

An automatic charger is a fast and convenient way for error-proof charging.

Always follow the battery manufacturer's charging instructions.

When using a constant current charger, charge battery according to the chart below.

Battery Voltage Below 12.8 V and Above 11.5V.

STANDARD CHARGING (RECOMMENDED)	
APPROXIMATE TIME	CHARGE
4 - 9 HOURS	2 A
QUICK CHARGING	
APPROXIMATE TIME	CHARGE
50 MINUTES	10 A

Installing the Battery

NOTICE: Always connect RED (+) cable first then BLACK (-) cable.

STARTING SYSTEM

GENERAL

System Description

The starting system is composed of an electric starter supplied in current by the battery through a solenoid.

The starter solenoid receives a 12volt input from the ignition switch and the ground signal is provided by the Gear controller.

–Transmission in Park or Neutral position and/or brake pedal held.

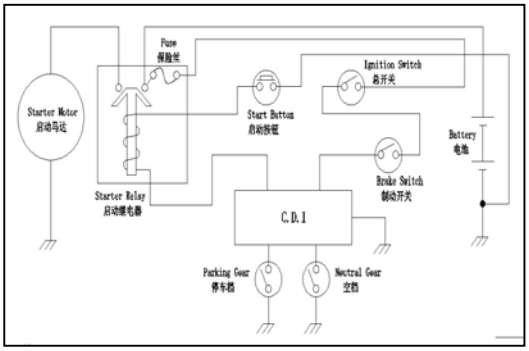
–Ignition switch turns to the start position and hold until the engine starts.

PROCEDURES

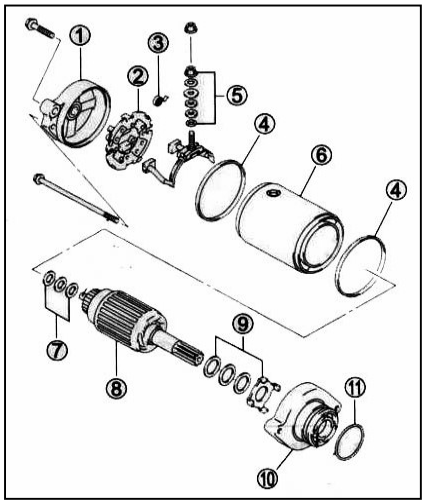
STARTER SOLENOID

Starter Relay Access

The starter solenoid is located beside the fuse box and the battery, under the front seat.

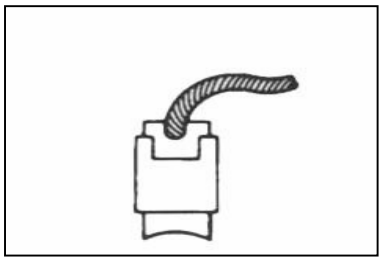


Starter Motor



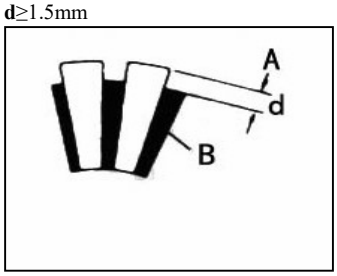
1	Bracket
2	Brush holder
3	Brush spring
4	O-Ring
5	Washer
6	Motor housing
7	Washer
8	Armature coil
9	Washer supporting tools
10	Inner bracket
11	O-Ring

Brush
-Check the brush on the brush holder whether it is worn abnormal, cracked or not smooth.

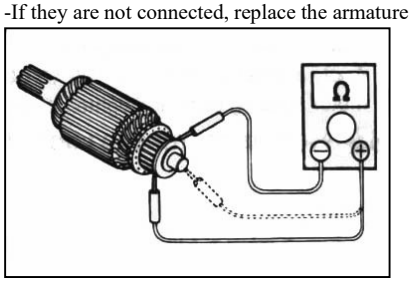


Worn, cracked, or not smooth: → Replace

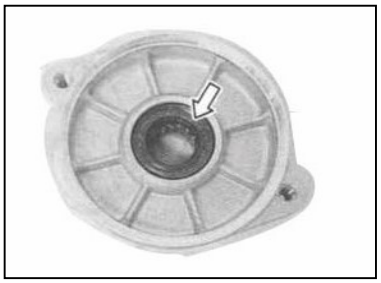
Rectifier
-Check the rectifier whether it is discolored, abnormal wear or concave.
Abnormal wear or damage: → Replace
-If the rectifier is discolored, grind it with sanding paper, then wipe it with a clean fabric.
-If there is concave, scrape off insulator **B**, so that the distance with **A** is **d**.
d≥1.5mm



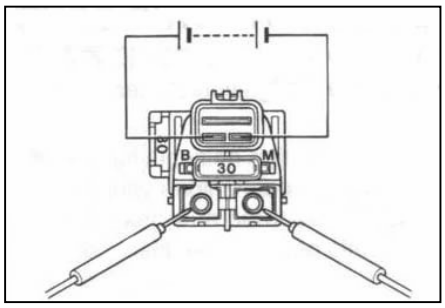
Armature coil
-Test the connection between each wire and the armature coil with the multimeter.
-If they are not connected, replace the armature shaft.



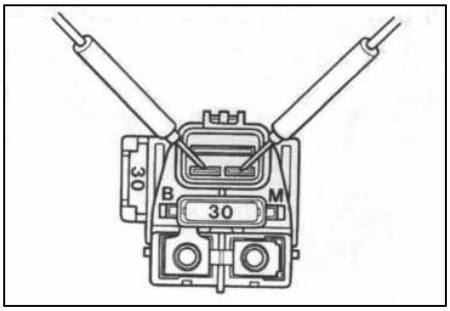
Oil seal
-Check the oil seal lip for damage or leak.
Damage or leakage: →Replace the starter motor.



Starter relay
-Inter-terminal voltage is 12V. Test the direct connection of positive and negative poles with the multimeter.
-If the starter relay clicks and connected, the starter relay is OK.
-When there is no voltage of 12V, they are not connected, the starter relay is OK.

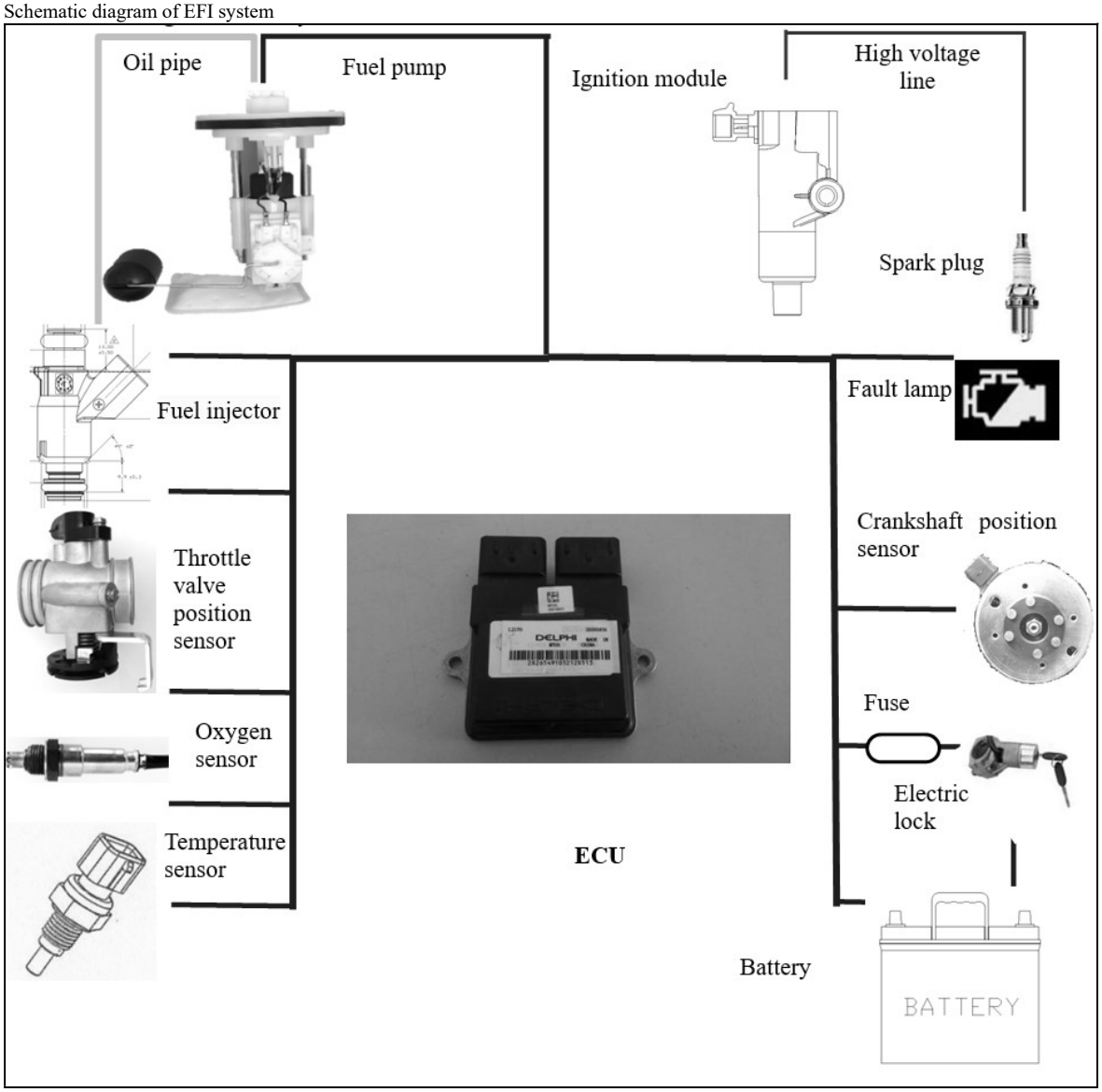


Note: Do not apply battery voltage on the starter relay for more than 2 seconds. This will result in overheating or damaging the relay coil.
-Measure the coil resistance with the multimeter. If the resistance exceeds the specified value, replace the starter relay.
The multimeter is set to 1x10Ω.
Starter relay coil resistance: 3-5Ω.



6.2 EFI system

Schematic diagram of EFI system



The function of EFI system includes two parts: fuel injection management and ignition management, which are realized by the following institutions.

(1). ECU: it is responsible for the receiving of sensor signal, the formulation of control strategy, and the issue of control signal.

(2). Oil supply device: it is composed of oil pump, tubing and injector. The pump pressurizes the fuel to 350 KPa. The injector is installed on the engine inlet to control the injection timing and fuel injection amount.

(3). Ignition device: it is composed of ignition module, high voltage wire and spark plug. The ignition module has a DC capacitor igniter and a high voltage ignition coil, which can raise the voltage of the battery from 12V to more than 15000V, which also can be transported to the spark plug by high-voltage wire to generate spark discharge.

(4). Sensors: including: a. The oxygen sensor, which mounted on an exhaust pipe to detect oxygen concentration in exhaust gases, can realize the closed-loop regulation of the mixture concentration, and when the closed-loop adjustment, the output of 0-0.9V alternating signal can be achieved;

b. cylinder temperature sensor, which is installed on the engine cylinder head to detect the engine body temperature, will affect the starting thickening amount;

c. Crankshaft position sensor, which is integrated on magneto to provide crankshaft angle signal, is the time reference for fuel injection and ignition control;

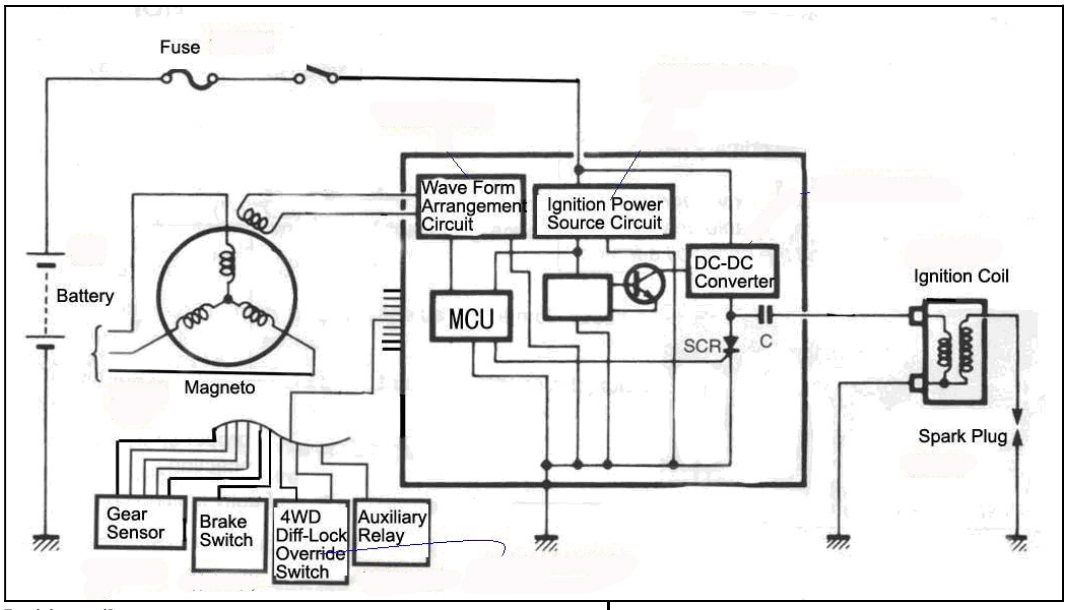
d. The throttle position sensor is mounted on the throttle body to measure the rotation angle of the throttle valve.

(5). Other: including：a. throttle body, which controls air intake through throttle pull wire;

b. Fault alarm lamp, which is installed on the dashboard for fault alarm;

c. Battery, fuse for power supply to EFI system.

6.3 Ignition system



Ignition coil

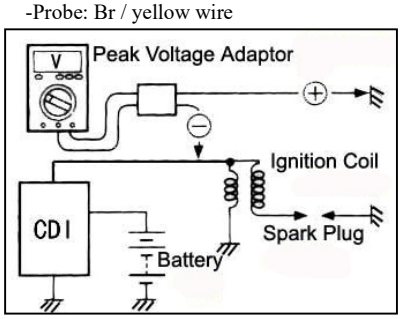
Primary peak voltage of ignition coil

-Remove the spark plug cap as shown in the following figure. Install the new spark plug to the cap. The cylinder is connected to grounding.

-Connect the multimeter and the peak voltage adapter as follows:

+Probe: BK wire or grounding wire

-Probe: Br / yellow wire



NOTE: Make sure the battery voltage ≥12V. The ignition coil wires are connected. When using multimeter and the peak voltage adapter, please refer to the user manual.

-Move the gear to the neutral position, turn on the ignition device.

-Press the start button and crank the engine for a few seconds. Then measure the primary peak voltage of the ignition coil;

-Repeat the steps above for several times. Measure the maximal value of the primary peak voltage.

Set the multimeter at the AC voltage position.

Primary peak voltage of ignition coil: ≥150V

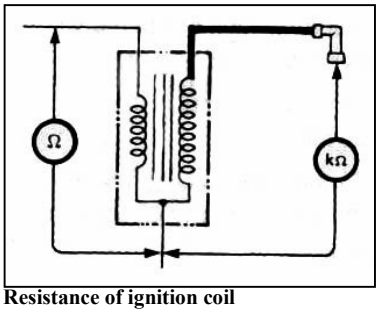
NOTE: Do not touch the test probes or spark plug, in case of electric shock.

-If the voltage is lower than the standard value, check the ignition coil and coupling coil.

Resistance of ignition coil

-Disconnect the ignition coil wires and spark plug cap. Remove the ignition coil;

-Measure the resistance of the primary and secondary windings of the ignition coil with the multimeter. If the resistance of two coils is close to the specified value, the ignition coil is in good condition.



Resistance of ignition coil

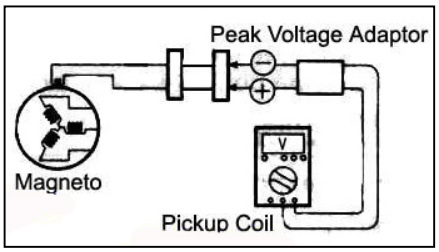
Primary winding: 0.58±0.058Ω (terminal - ground)

Secondary coil: 7.1±0.71Ω (terminal - spark plug cap)

Peak voltage of coupling coil

-Check the peak voltage of the coupling coil with following steps.

-As shown in following figure, connect the multimeter with the peak voltage adapter.



+Probe: Green/white wire

-Probe: BL/Y wire

-Move the gear to the neutral position, turn on the ignition device.

-Press the start button and crank the engine for a few seconds, and then measure the primary peak voltage of the coupling coil;

-Repeat the steps above for several times. Measure the maximal value of the primary peak voltage.

Put the multi meter at AC voltage step.

Peak voltage of coupling coil: ≥4V

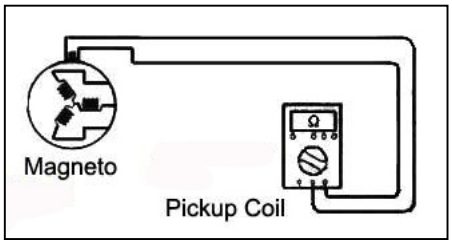
-If the voltage is lower than the standard value, replace coupling coil.

Resistance of coupling coil

The multi meter is put at 1x100Ω step.

Resistance of coupling coil: 135±5Ω

-If the resistance is not within the specified value, replace the coupling coil.



Inspecting an Electrical Connection

When replacing an electric or electronic component, always check electrical connections. Make sure they are tight, make good contact, and are corrosion-free. Dirty, loose or corroded contacts are poor conductors and are often the source of a system or component malfunction.

Pay particular attention to ensure that pins are not bent or pushed out of their connectors.

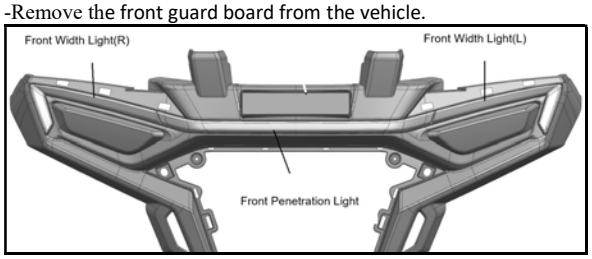
Ensure all wire terminals are properly crimped on wires, and connector housing are properly fastened.

6.4 Light System

Headlight

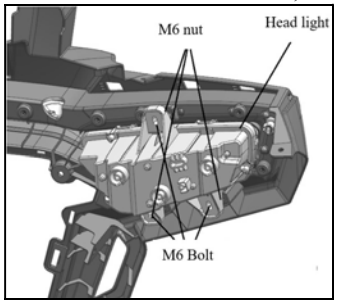
Removal

-Remove the front guard board from the vehicle.

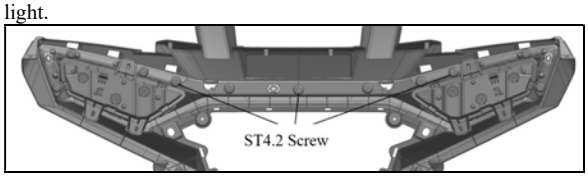


-Disconnect headlight connector

-Loose the three M6 bolts and nut, then remove the headlights.



-Loose the 11 screws (ST4.2), then remove the front penetration light.

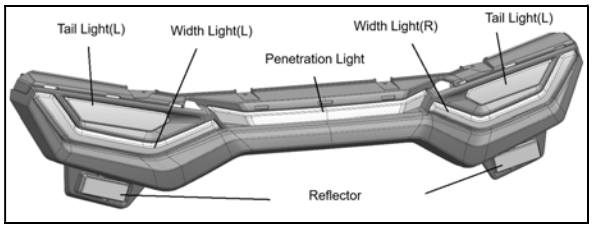


Installation

For installation, reverse the removal procedure.

Tail light

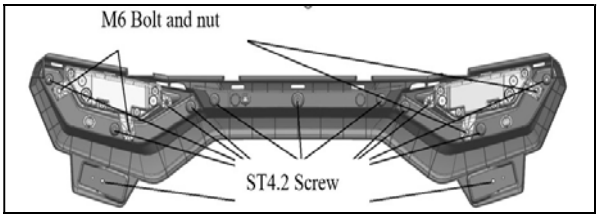
Removal



-Remove the rear cover board from the vehicle.

-Disconnect light connector.

-Loose the three M6 bolts and nut, then remove the taillights.



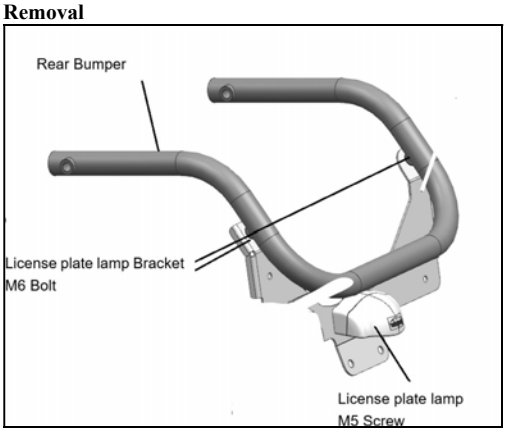
-Loose the 11 screws (ST4.2), then remove the rear penetration light.

Installation

For installation, reverse the removal procedure.

License plate lamp

Removal



-Disconnect license plate light connector.

-Loose the two M5 bolts and nut, then remove the license plate light.

Installation

For installation, reverse the removal procedure.

Tightening torque of M6 bolt: 9-12N.m.

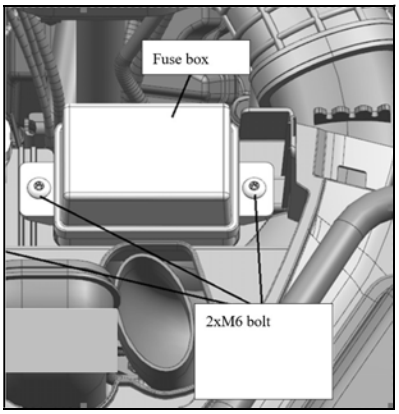
Tightening torque of M5 screw: 5-9N.m.

6.5 FUSE

Removal

Remove the dash board cover, refer to Dismantling.

Remove the two bolts and fuse box.



Tightening torque of M6 bolt for fuse box: 9-12N.m.

Fuse Inspection

Check fuse condition and replace it if necessary.

To remove fuse from holder, pull fuse out. Check if filament is melted.

▲WARNING
Do not use a higher rated fuse.

▲WARNING
If fuse has burnt out, source of malfunction should be determined and corrected before restarting. Contact an authorized ATV dealer for servicing.

7. TROUBLESHOOTING

ELECTRICAL SYSTEM

Symptom: NO SPARK OR POOR SPARK

1. Refer to ignition system.

Symptom: STARTER DOES NOT TURN

1. Refer to starting system.

Symptom: STARTER TURNS BUT DOES NOT CRANK THE ENGINE

1. Refer to starting system.
2. Check gear condition on electric starter.
   Worn and/or damaged starter gear. Replace electric starter and/or starter drive.
3. Check condition of starter pinion gear.
   Worn and/or damaged starter pinion and/or ring gear. Replace starter drive and/or drive pulley fixed sheave.
4. Check splines on starter drive.
   - Poor movement of pinion gear on splines. Clean and/or replace starter drive.

Symptom: STARTER TURNS BUT STARTER DRIVE DOES NOT MESH WITH RING GEAR

1. Refer to starting system.

Symptom: STARTER KEEPS RUNNING

1. Refer to starting system.

COOLING SYSTEM

Symptom: HIGH ENGINE OPERATING TEMPERATURE

1. Check coolant level.
   - Coolant level lower than recommended. Refill (refer to cooling system).
2. Check for air bubbles in cooling system.
   - Air in cooling system. Refill and bleed cooling system (refer to cooling system).
3. Check temperature sensor for electrical/mechanical failure.
   - Temperature sensor defective. Replace.
4. Check thermostat.
   - Thermostat defective (does not open when engine gets hot). Replace (refer to cooling system).
5. Check leak indicator hole (in crankcase MAG side-water pump housing area) if coolant leaks.
   - Coolant leaking from indicator hole means a damaged water pump rotary seal. Replace rotary seal (refer to cooling system).
6. Check condition of hoses and hose clamps fixation.
   - Hoses are brittle and/or hard. Replace.
   - Hose clamps are loose. Retighten clamps.
7. Check condition of impeller located on the water pump shaft.
   - Impeller wirings broken and/or impeller threads are damaged. Replace (refer to cooling system).
8. Check gasket on water pump housing.
   - Gasket on water pump housing leaks. Retighten screws and/or replace gasket.
9. Check cylinder head and/or cylinder base gasket.
   - Worn out gasket(s) is (are) causing coolant leakage. Replace.
10. Check coolant drain screw on water pump housing MAG side.
    - Copper ring on drain screw leaks. Retighten screw and/or replace copper ring.
11. Check intermediate gear(s) behind of PTO cover.
    - Worn out and/or broken gear(s) is/are causing less coolant supply. Replace worn out and/or broken gear(s) (refer to bottom end).
12. Check if water pump shaft is seized.
    - Water pump shaft does not turn. Replace defective part(s).
13. Check cooling fan and connection.
    - Fan motor faulty. Replace.
    - Wire harness is brittle or hard (no connection). Replace.
14. Check radiator fan switch and fuse.
    - Faulty fan switch and/or faulty fuse. Replace defective part(s).
15. Check radiator condition for leakage.
    - Radiator cracked or deformed. Replace radiator.
16. Check mud/dust in radiator fins.
    - Radiator fin obstructed, hard air cooling. Clean radiator fins.

MAGNETO SYSTEM

Symptom: BATTERY NOT CHARGING OR CHARGING VOLTAGE INADQUATE

1. Check battery
   - Battery shows less power. Reload battery.

2. Check magneto for damage and/or electrical failure.
   - Radial position of rotor wrong due to broken woodruff key. Replace woodruff key.
   - Coating on stator winding is damaged. Replace stator.
   - Resistance value is out of specification (refer to technical specifications). Replace magneto.
   - Connector on magneto is damaged and/or has electrical failure. Repair and clean contacts of connector.
3. Check voltage regulator/rectifier.
   - Refer to charging system.
4. Check wiring harness for cracks or other damages.
   - Harness shows electrical failure and/or other damages. Replace/repair wiring harness.

LUBRICATION

Symptom: LOW OR NO OIL PRESSURE/HIGH OIL CONSUMPTION

1. Check oil level and search for leakage on crankcase and/or sealing parts.
   - Crankcase is leaking due to damage. Rebuild engine with new crankcase and gasket parts. Use recommended oil (refer to technical specifications).
   - Crankcase is leaking due to loosen screws. Retighten screws with recommended torque
   - Sealing rings, O-rings and/or gaskets are brittle, hard or damaged. Replace damaged parts.
   - Poston rings worn out (blue colored engine exhaust emission). Replace piston rings (refer to cylinder and head).
   - Piston rings are broken (low compression). Replace piston rings (refer to cylinder and head).
   - Valve stem seal damaged and/or sealing lip is hard and/or brittle. Replace all valve stem seals.
2. Check oil filter for contamination.
   - Oil filter clogged. Replace oil and oil filter at the same time. Use recommended oil (refer to technical specifications).
3. Check oil drain plug on engine bottom.
   - Plug is loose and/or gasket ring is missing. Retighten the plug and/or place gasket ring.
4. Check leak indicator hole if oil leaks (in crankcase MAG side-water pump housing area).
   - Oil leaking from leak indicator hole means a damaged oil seal on water pump shaft. Replace oil seal (refer to cooling system).
5. Check oil pressure switch function.
   - Oil pressure switch damaged. Replace oil pressure switch.
6. Check oil orifice(s) on the oil pump suction side.
   - Oil orifice(s) is (are) clogged. Clean from contamination. Replace oil and oil filter if necessary (refer to maintenance or lubrication system).
7. Check oil pump function.
   - Oil pump rotor is out of wear limit. Replace oil pump (refer to lubrication system).
   - Oil pump seized due to oil leakage and/or air inclusion. Replace oil pump (refer to lubrication system).
   - Gears driving oil pump are broken or otherwise damaged. Replace gears.
   - Incorrect oil being used. Use recommended oil (refer to technical specifications).
8. Check oil pressure regulator valve (spring) function.
   - Valve spring damaged (valve always open). Replace spring.
   - Valve piston is worn or broken. Replace valve piston (refer to lubrication system).
   - Valve piston stays open due to contamination. Clean or repair valve piston.
9. Check plain bearings in crankcase for heavy wear.
   - Plain bearings out of specification (increased clearance). Replace plain bearings (refer to bottom end).
10. Check engine oil strainer in crankcase.
    - Oil strainer is clogged due to contamination. Clean or replace strainer and diagnose causes. Replace possible damaged parts (refer to bottom end).

Symptom: OIL CONTAMINATION (white appearance)

1. Check leak indicator hole (in crankcase MAG side-water pump housing area) if water and oil leaks.
   - Leakage of oil/water mixture from indicator bore means damaged water pump seal ring and rotary seal. Replace sealing ring, rotary seal and change oil, oil filter and/or coolant (refer to lubrication system, cooling system and bottom end).
2. Check cylinder head and/or cylinder base gasket.
   - Gasket damaged or leaking. Retighten cylinder head with recommended torque and/or replace gasket.
3. Check tightening torque of cylinder head screws.
   - Screws not properly tightened. Retighten screws to recommended torque and replace oil.
4. Check oil for particles (may indicate possible engine internal damages).
   - Oil contamination due to metal or plastic particles. Replace possibly damaged part(s) including oil and oil filter. Use recommended oil (refer to technical specifications).

CYLINDER AND HEAD

Symptom: UNUSUAL ENGINE NOISE AND/OR VIBRATION

1. Check noise coming from cylinder head area.
   - Improper valve clearance adjustment. Readjust valve clearance and/or replace defective part(s).
   - Faulty chain tensioner. Replace spring and/or mechanism.
   - Chain guide worn out. Replace chain guide.
   - Stretched chain and/or worn-out sprockets. Replace chain and sprockets.
   - Sprocket screws got loose. Retighten screws with recommended torque.

- Rocker arm(s) is (are) worn out (valve adjustment). Readjust valve clearance and/or replace rocker arm(s).
- Incorrect camshaft timing adjustment. Replace damaged components and readjust camshaft timing (refer to cylinder and head).

Symptom: OIL CONTANMINATION ON CYLINDER AND/OR HEAD

1. Check screws for torque.
   - Loose screws. Retighten screws with recommended torque.
   - Gaskets are brittle, hard, worn out or otherwise damaged. Replace damaged gaskets, O-rings.

CRANKSHAFT

Symptom: UNUSUAL ENGINE NOISE AND/OR VIBRATION

1. Check noise coming from crankshaft area.
   - Crankshaft plain bearings are damaged. Replace crankshaft plain bearings.
   - Connecting rod plain bearings are damaged. Replace connecting rod plain bearings.
   - Magneto rotor got loose. Replace damaged components and retighten rotor retaining screw with recommended torque (refer to MAGNETO SYSTEM).

GEARBOX

Symptom: UNUSUAL GEARBOX NOISE AND/OR VIBRATION

1. Check oil level in gearbox.
   - Oil leakage from gearbox. Replace damaged gasket(s) and/or oil seal(s), torque screws and refill with oil up to specified level (refer to TECHNICAL SPECIFICATIONS and GEARBOX)
2. Check bearings in the gearbox for free movement.
   - Bearing(s) do(es) not move freely. Replace bearing(s)
3. Check for knocking noise.
   - Tooth of gears are damaged and/or worn. Replace respective gears.

Symptom: GEAR INDICATION FAILS.

1. Check contact screws on gear housing center.
   - Check contact screw outside for contamination and wetness. Clean contact screw and screw for wiring harness.
   - Contact(s) is (are) corroded and/or contact screw for wiring harness got loose. Clean contact surface and retighten contact screw(s) with recommended torque.
   - Wiring harness has broken cables. Replace wiring harness.
   - Shifting indicator switch(es) pin(s) is (are) worn and/or damaged. Replace shifting indicator switch(es).

Symptom: GEAR(S) IS (ARE) HARD TO SHIFT

1. Check shift shaft splines and/or shift forks for wear and/or damages.
   - Shift shaft is worn out and/or shows damaged splines. Replace shift shaft.
   - Shift drum track(s) and/or splines is (are) worn out or damaged. Replace shift drum and damaged part(s).
   - Shift fork(s) is (are) worn out and/or engagement pins are damaged. Replace shift fork(s).
   - Shift fork(s) is (are) worn out and/or fork(s) is (are) damaged. Replace shift fork(s).
   - Shift gear(s) is (are) worn out. Replace shift gear(s).
   - Shifting indicator switch(es) pin(s) is (are) worn out (no rounding on top of pin). Replace shifting indicator switch(es).
2. Check engine idle speed.
   - Check throttle cable and throttle adjustment.
   - Check bypass idle valve and connectors.
3. Check CVT one way clutch on drive pulley.
   - CVT one way clutch was not lubricated correctly. Lubricate CVT one way clutch (refer to CONTINUOUSLY VARBRIABLE TRANSMISSION (CVT)).
   - CVT one way clutch is worn out or damaged. Replace defective part(s) (refer to CONTINUOUSLY VARBRIABLE TRANSMISSION (CVT)).
   - Check if friction washer at one way clutch is worn. Replace friction washer (refer to CONTINUOUSLY VARBRIABLE TRANSMISSION (CVT)).
4. Check transmission lever and connecting rod.
   - Ball joint and/or ball joint nut is (are) loose. Retighten or replace the ball joint.
5. Check spring on shift shaft in gearbox.
   - Broken spring. Replace the spring (refer to GEARBOX).
6. Check for any mud intrusions.
   - CVT parts dirty. Clean all CVT parts.

COUPLING UNIT

Symptom: 4 WHEEL DRIVE INDICATION FAILS

1. Check contact screw on gear housing right side for damage and/or wear.
   - Shifting indicator switch pin is worn and/or damaged. Replace shifting indicator switch.
   - Contact is corroded and/or contact screw for wiring harness got loose. Clean contact surface and retighten contact screw with recommended torque.
   - Wiring harness has broken cable. Replace wiring harness.

Symptom: 4 WHEEL DRIVE DOES NOT ENGAGE OR DISENGAGE

1. Check actuator and/or actuator shifting fork for wear and/or damages.
   - Check if selector works properly. If so, check actuator.
   - If selector is out of specifications, check wires, connectors and/or replace selector.

- Actuator shifting fork is worn out and/or damaged. Replace shifting fork of actuator.
- Check function of actuator. Replace if actuator is not turning, refer to GEARBOX.

2. Check shifting sleeve splines and/or shifting fork for wear and/or damages.
   - Check sleeve shows damaged splines. Replace shifting sleeve (refer to GEARBOX).
   - Shifting fork is worn out and/or engagement pin is damaged. Replace shifting fork.

CVT

Symptom: UNUSUAL ACCELERATION BEHAVIOR

1. Check drive belt condition.
   - Belt is too narrow (drive belt engagement is higher in drive pulley). Replace belt if width is less than specified.
2. Check lever condition on drive pulley sliding sheave and/or roller(s) on governor cup.
   - Lever(s) on drive pulley sliding sheave is (are) worn and/or damaged. Replace all levers at the same time (lever kit).
   - Roller(s) is (are) worn and/or damaged. Replace governor cup assembly.
3. Check drive/driven pulley sliding sheave for free axial movement.
   - Sliding sheave is stuck. Replace damaged part(s).
4. Check condition of drive/driven pulley spring.
   - Drive pulley spring tension is too smooth and/or damaged. Replace spring.
   - Driven pulley spring tension is too stiff. Replace spring.
5. Check if cam of driven pulley is worn.
   Replace if out of specifications.
6. Check condition of fixed and sliding sheaves (drive and driven pulley).
   - Check surface of fixed and sliding sheaves (drive and driven pulley) for grooves or other damages.
7. Check valve adjustment.
   - Intake and/or exhaust valves are not adjusted correctly. Adjust valves.
8. Check engine condition.
   - Low engine compression.
9. Check ignition condition.
   - Faulty spark plug. Install new spark plug(s).
10. Check differentials operation.
    - Vehicle on Neutral is hard to move. Repair or replace defective part(s).

Symptom: ENGINE MAXIMUM RPM IS TOO HIGH AND VEHICLE TOP SPEED IS NOT REACHED.

1. Check drive/driven pulley area for contamination and/or water intrusion.
   - CVT area is contaminated with water, dirt or oil. Clean CVT system and replace damaged part(s).
2. Check drive/driven pulley spring tension.
   - Drive pulley spring tension is too stiff. Replace spring.
   - Driven pulley spring tension is too smooth and/or damaged. Replace spring.

Symptom: DRIVE PULLEY NOISE IN IDLE SPEED

1. Check slider shoes (drive pulley).
   - Worn slider shoes (increased clearance between governor cup and drive pulley sliding sheave). Replace all slider shoes at the same time (slider shoes kit).
2. Check driven pulley sliding mechanism (between driven pulley outer and inner sheave).
   - Mechanism is stuck and/or damaged. Replace driven pulley assembly.
3. Check roller(s) and/or levers for wear (located on sliding sheave of drive pulley).
   - Roller(s) on governor cup is (are) worn out and/or damaged. Replace governor cup assembly.
   - Lever(s) on drive pulley sliding sheave is (are) worn out and/or damaged. Replace all levers at the same time (lever kit).
4. Check drive pulley screw for torque.
   - Loose screw. Retighten screw with recommended torque.
5. Check one-way clutch condition on drive pulley sliding sheave.
   - Bearing(s) do(es) not move freely. Replace damaged part(s) and lubricate inside of one-way clutch.
   - Spring sleeve(s) inside one-way clutch is (are) worn out. Replace both sleeves and springs and lubricate inside of one-way clutch.
   - Spring(s) inside one-way clutch is (are) worn out. Replace both pins and springs and lubricate inside of one-way clutch.

Symptom: DRIVE PULLEY NOISE WHEN ACCELERATING/DECELERATING

1. Check if belt runs in dry condition.
   - Drive pulley area is wet/contaminated due to water/dirt intrusion. Clean driven pulley area and/or drain water out of CVT cover.
2. Check drive/driven pulley screw for torque.
   - Loose screw on drive pulley. Retighten screw with recommended torque.
3. Check cam and driven pulley fixed sheave for wear.
   - Cam and/or drive pulley fixed sheave out of wear limit and/or damaged. Replace damaged part(s).
4. Check torque gear fixed in driven pulley sliding sheave for wear.
   - Torque gear out of wear limit and/or damaged. Replace torque gear).
5. Check for foreign particles in CVT area (stones, dirt, etc.).
   - Small particles damaged belt and/or pulley surface(s). clean system and replace damaged parts.

Symptom: VIBRATIONS ORIGINATING FROM DRIVE PULLEY

1. Check tightening torque of drive pulley screw.
   - Moving sliding sheave. Retighten screw.
2. Check fixed sheave bushings.
   - Excessive gap between bushings and fixed sheave shaft, thus restraining sliding sheave movements. Replace fixed sheave assembly.
3. Check if slider shoes are present and/or placed in correct position.
   - Slider shoe(s) is (are) missing and/or damaged. Replace all slider shoes at the same time (slider shoes kit).

Symptom: VIBRATIONS ORIGINATING FROM DRIVEN PULLEY

1. Check fixed and sliding sheave bushings on driven pulley.
   - Excessive gap between bushings and CVT shaft, thus restraining sliding sheave movements. Replace fixed and/or sliding sheave of driven pulley, polish CVT shaft area with fine emery cloth and wipe clean with a cloth.

Symptom: PULLEYS DO NOT DOWN/UP SHIFT PROPERLY.

1. Check drive pulley bushings (cleanliness, wear, etc.)
   - Check items 1 and 2 of UNUSUAL ACCELERATION BEHAVIOR.
   - Bushings stick to fixed sheave pulley shaft. Clean or replace.
   - Spring seat sticks to sliding sheave pulley bushing. Clean system and/or replace sliding sheave pulley.
   - One-way clutch does not operate properly. Clean system and/or replace damaged part(s).
2. Check driven pulley spring tension.
   - Driven pulley spring tension is too weak or broken. Replace.
   - Driven pulley cam is worn or damaged. Replace.

Symptom: BELT GLAZED EXCESSIVELY OR HAVING BAKED APPEARANCE

1. Check if CVT air intake and/or outlet is clogged.
   - CVT area heats up due to contamination. Clean air intake and/or outlet from contamination.
   - Fans located on drive pulley is worn or damaged. Replace.
2. Check if pulley sheaves are clean.
   - Oil on pulley surfaces. Clean pulley sheaves and replace belt.
   - Water intrusion in CVT area. Find root cause and repair. Drain water and replace belt.

Symptom: BELT WORN EXCESSIVELY IN TOP WIDTH.

1. Check drive belt width.
   - Considerable wear. Replace belt if narrower than specified (refer to CONTINUOUSLY VARIABLE TRANSMISSION (CVT) OR TECHNICAL SPECIFICATIONS)。
2. Check driver belt identification number.
   - Wrong type of belt. Replace belt with an appropriate drive belt.
3. Check for localized belt wear caused by belt slippage.
   - Localized wear. Replace belt.

Symptom: BELT DISINTEGRATION.

1. Check drive belt lifetime is exceeded.
   - Clean CVT system and rebuild with a new drive belt.
2. Check drive belt identification number.
   - Excessive belt speed. Using unspecified type of belt. Replace belt with proper type of belt.
3. Check if pulley sheaves are clean.
   - Oil on pulley surfaces. Clean pulley surfaces with fine emery cloth and wipe clean using pulley flange cleaner and a cloth.
   - Drive/driven pulley sheaves are damaged through stones inside CVT area. Clean pulley surfaces with fine emery cloth, wipe clean with a cloth or replace drive/driven pulley sheaves and belt.

Symptom: BACK BETWEEN COGS

1. Check drive belt condition.
   - Considerable use, belt wearing out. Replace.
   - Brittle belt condition through aging. Replace belt.

ENGINE GENERAL

Symptom: ENGINE CRANKS BUT FAIL TO START

1. Check if spark plug connectors fit on spark plugs (refer to IGNITION SYSTEM).
2. Check spark plugs.
   - Define spark plugs (no spark) or wrong spark plug gap. Readjust gap and clean spark plugs or replace.
3. Check for fuel on spark plugs.
   - Flooded engine (spark plugs wet when removed). Activate engine drowned mode and crank engine with rags over the spark plug holes.
4. Check battery voltage.
   - Battery is discharged and starter works not properly. Charge battery.
5. Check fuel level in fuel tank and fuel pressure. Ensure fuel pump was not disabled.
   Low or no fuel pressure. Replace defective part(s).
6. Check fuel injectors.
   - Plugged or faulty injector(s). Replace defective part(s).
7. Check idle bypass valve.
   - Stuck or defective.
8. Check encoder wheel.
   - Bent tooth. Refer to MAGNETO SYSTEM.

9. Check engine compression.
   - Insufficient engine compression. Replace defective part(s).
10. Check fault AODES in DIAGNOSTIC TOOL system.
    - Check if actuator(s) is/are defective. Replace defective part(s) (refer to COMPONENT INSPECTION AND ADJUSTMENT).

Symptom: ENGINE DOES NOT START

1. Electrical problem.
   - Determine if the electrical system works correctly (fuse(s), battery, wiring harness, etc.). Refer to IGNITION SYSTEM.
2. Problem with fuel system (carburetor, fuel pump, hoses, etc.).
   - Clean, inspect, repair or replace defective parts.
3. Check engine compression.
   - Insufficient engine compression. Replace defective parts.
   - Valve seat worn and/or damaged. Repair by performing valve guide procedure (refer to CYLINDER AND HEAD). Readjust valve clearance.
4. Internal engine problem.
   - Overhaul engine to find defective parts. Refer to the appropriate section in ENGINE.

Symptom: ENGINE HARD TO START

1. Check idle bypass valve.
   - Stuck or defective. Refer to ENGINE MANAGEMENT.
2. Check closed throttle and idle actuator with DIAGNOSTIC TOOL
   - Wrong TPS zero setting/idle bypass valve reset. Refer to ENGINE MANAGEMENT.
3. Check engine compression.
   - Wrong adjustment (likely too tight). Refer to ENGINE MANAGEMENT.
4. Check engine compression.
   - Insufficient engine compression. Replace defective part(s) refer to LEAK TEST.
5. Verify spark plug condition.
   - Defective, improperly set, worn out, fouled. Identify source of problem and correct. Replace.
6. Check fuel level in fuel tank and fuel pressure.
   - Low or no fuel pressure. Replace defective part(s) refer to FUEL TANK AND FUEL PUMP.
7. Check CAPS (camshaft position sensor).
   - Defective sensor/wiring. Refer to ENGINE MANAGEMENT.

Symptom: ENGINE SUDDENLY TURNS OFF

1. Perform engine leak test.
   - Damaged head gasket and/or seal and/or leaking inlet/exhaust valve(s). replace and/or repair defective parts.
2. Check spark plugs condition and/or gap.
   - Fouled spark plugs or wrong spark plug gap. Readjust gap and clean spark plugs or replace.
3. Piston seizure.
   - Spark plugs heat range is too hot. Install spark plugs with appropriate heat range (refer to TECHNICAL SPECIFICATIONS).
   - Compression ratio is too high. Install genuine parts.
   - Poor oil quality. Use recommended oil.
   - Leaks at air intake manifold (engine gets too lean). Retighten screws or replace air intake manifold gasket.
   - Snow/water intrusion through intake system into combustion chamber. Clean intake system and replace defective part(s).
4. Melted and/or perforated piston dome; melted section at ring end gap.
   - Spark plugs heat range is too hot. Install recommended spark plugs (refer to TECHNICAL SPECIFICATIONS).
   - Coolant less than recommended level (engine gets too hot). Repair cooling circuit and/or refill with recommended liquid.
   - Poor quality and/or wrong fuel. Clean from contamination and use appropriate fuel (refer to TECHNICAL SPECIFICATIONS).
5. Piston color is dark due to seizure on intake and exhaust side.
   - Cooling system leaks and lowers coolant level. Tighten clamps or replace defective parts. Add antifreeze in cooling system until appropriate level reached. Replace damaged parts.
6. Cracked or broken piston.
   - Cracked or broken piston due to excessive piston/cylinder clearance or engine overheating. Replace piston. Check piston/cylinder clearance (refer to CYLINDER AND HEAD).
7. Check piston rings and cylinder surface for grooves.
   - Poor oil quality. Use recommended oil.
   - Contamination through engine intake. Replace defective part(s) and use new air filter.
8. Check crankshaft, rocker arms movement.
   - Oil pump failure due to lack of oil. Repair and replace defective parts and use new recommended oil.
   - Oil contamination due to clogged oil filter/oil strainer. Replace oil and oil filter at the same time, replace defective part(s).
9. Check valve springs exhaust/intake.
   - Broken valve spring damages the cylinder head, valve(s), rocker arm(s), piston, piston rings and connecting rod. Replace defective part(s).
10. Check if fuel supply is sufficient.

- Low fuel level.
- Clogged fuel filter or fuel injector filter.
- Fuel line is contaminated and/or bent. Clean and/or replace defective part(s).

Symptom: ENGINE BACKFIRES

1. Check spark plugs.
   - Carbon accumulation caused by defective spark plugs. Replace spark plugs.
2. Check leakage on intake manifold.
   - Air leak on intake system. Retighten screws and/or replace intake manifold gasket.
3. Check exhaust air leaking.
   - Exhaust gasket is leaking. Retighten screws and/or replace exhaust gasket.
4. Check intake valve(s) for leaking.
   - Intake valve(s) is (are) leaking. Repair or replace valve(s).
5. Check if fuel supply is sufficient.
   - Fuel line is contaminated and/or bent (engine gets lean). Clean and/or replace defective part(s).
6. Check engine ground.
   - Poor engine ground. Clean.

Symptom: ENGINE DOES NOT OFFER MAXIMUM POWER AND/OR DOES NOT REACH MAXIMUM OPERATING RPM

1. Check spark plugs condition and/or gap.
   - Fouled spark plugs or wrong spark plug gap. Readjust gap and clean spark plugs or replace.
2. Check spark plugs type.
   - Improper spark plugs heat range. Install recommended spark plugs (refer to TECHNICAL SPECIFICATIONS).
3. Perform engine leak test.
   - Damaged head gasket and/or seal and/or leaking intake/exhaust valve(s). replace and/or repair defective parts.
4. Check for water in fuel (wrong fuel).
   - There is water in fuel or wrong fuel. Drain fuel system, search for leakage and refill it with appropriate fuel.
5. Check engine compression.
   - Worn piston(s) and/or piston ring(s). Replace defective part(s).
6. Check fuel pressure.
   - Low fuel pressure. Perform fuel pressure test (refer to FUEL SYSTEM).
7. Check air intake system.
   - Air filter is clogged due to contamination. Replace air filter.
8. Check if EMS (engine management system) is in limp home mode. Check fault AODES in DIAGNOSTIC TOOL system.
   - Check if electrical actuator(s) is/are defective. Replace defective part(s).
9. Check drive belt.
   - Worn. Replace belt if its width is less than specified.

Symptom: HIGH ENGINE OPERATING TEMPERATURE

1. Check if cooling system shows any failure (see COOLING SYSTEM).
   - System is leaking. Repair and/or replace damaged part(s).
2. Check function of lubrication system (see LUBRICATION SYSTEM).
   - Lubrication is not working properly. Repair and/or replace damaged part(s).
3. Check condition and heat range of spark plugs.
   - Melted spark plug tip or inadequate heat range. Replace.
4. Check air leakage on engine intake.
   - Leakage causes overheating. Replace/repair damaged part(s).
5. Check air inlet and outlet of the CVT cover.
   - Air circulation is clogged (overheating). Clean air circulation from contamination.
   - Drive belt worn and/or damaged. Replace belt with an appropriate drive belt (refer to TECHNICAL SPECIFICATIONS).

8 SPECIFICATIONS

Item		Parameter	
Dimensions		Long	Short
Overall length（mm）		2215	2055
Overall width（mm）		1172	1172
Overall height（mm）		1260	1260
Wheelbase（mm）		1460	1300
Ground clearance（mm）		265	265
Engine			
Type	Single cylinder, Four-stroke, liquid-cooled, SOHC		
Number of valves	4(mechanical adjustment)		
Cylinder diameter	91 mm		
Piston stroke	76.2 mm		
Compression ratio	10.7:1		
Displacement	495cm^3		
Maximum power	28kW/6800rpm		
Maximum torque	46N.m/5800rpm		
Idle speed	1600±50rpm		
Lubrication	Type	Wet tank lubrication, oil filters can be changed	
	Oil pressure	0.25-0.35MPa at 1600rpm	
	Type of oil	SAE5W-40 SJ	
	Oil quantity	2800mL	
	Replacement of capacity	2450mL	
Fuel	Type	Unleaded gasoline only 92# or higher	
	Fuel pressure	350 KPa	
	Fuel tank capacity	20L	
Valve clearance	Intake	0.08 to 0.1mm	
	Exhaust	0.08 to 0.1mm	
Spark plug	Type/manufacturer	DCPR8E/NGK	
	Gap	0.8 to 1.0mm	
Transmission type		CVT (Continuously Variable Transmission)	
Continuously variable ratio		0.646 to 2.87	
Drive belt width	Service limit	30.00mm	
Gearbox type		Dual range(H/L) with park, neutral and reverse	
Gear ratio	H	3.5	
	L	6.562	
	R	5.369	
Capacity of cooling liquid	Type	Ethyl glycol/water mix (-35℃)	
	Maximum load	3200ml	
	Capacity of water tank	300ml	
Cooling liquid temperature thermostat	Valve opening	65℃	
	Fan opening	88℃	
Tire			
Type		Tubeless	
Pressure		45KPa	
Size Front		AT25x8-12(Rim12x6)	
Size Rear		AT25x10-12(Rim12x7)	
Brake			
System		Front and rear unified	
Type Front		Dual disc brake	
Type Rear		Dual disc brake	
Operation		Foot/hand operation	
Suspension and shock absorber			
Front suspension		A-Arm Independent	
Rear suspension		A-Arm Independent	
Front shock absorber		oil damper	
Front shock absorber travel		107mm	
Rear shock absorber		oil damper	
Rear shock absorber travel		107mm	
Drive train			
Front differential		Shaft driven/single auto-lock differential	
Front differential ratio		3.67:1	
Rear axle		Shaft driven/single differential	
Rear axle ratio		3.67:1	

Front differential oil capacity			240mL (GL-4-90)
Rear differential oil capacity			240mL (GL-4-90)
Electrical			
Ignition system			EFI
Battery		Type	Maintenance Free
		Voltage	12V
		capacity	20AH
Fuses	F1	Ignition Switch	15 A
	F2	Combination Switch	15 A
	F3	2WD/4WD Switch	10 A
	F4	Winch	5A
	F5	Fan	30A
	F6	Backup power	20A
	F7	EFI	20A
	F8	Light power supply	15A
Relays	RY 1	Light Relay	-
	RY 2	Combination Switch Relay	-
	RY 3	EFI Relay	-
	RY 4	2WD/4WD Switch Relay 1	-
	RY 5	2WD/4WD Switch Relay 2	-
	RY 6	Fan Relay	-
	RY 7	Fuel Pump Relay	-
	RY 8	Handlebar Heating Relay	-
	RY 9	Overtaking light Relay	-
	RY 10	Right trailer steering Relay	-
	RY 11	Left trailer steering Relay	-
	RY 12	Rear fog light Relay	-

Wire diagram