2022 ATV

SERVICE MANUAL 22.0

M210 ATV

※*General Information*
※*Maintenance*
※*Engine*
※*Chassis*
※*Brakes*
※*Electrical*

ATV SERVICE MANUAL22.0

LH200ATV-E 维修手册英文 版本 22.0

Foreword

This manual is designed primarily for use by the ATV factory certified service technicians in a properly equipped shop. Persons using this manual should have a sound knowledge of mechanical theory, tool use, and shop procedures in order to perform the work safely and correctly. The technician should read the text and be familiar with service procedures before starting the work. Certain procedures require the use of special tools. Use only the proper tools, as specified. Cleanliness of parts and tools as well as the work area is of primary importance.

This manual is divided into sections. Each section covers a specific ATV component or system and, in addition to the standard service procedures. Keep this manual available for reference in the shop area. When using this manual as a guide, the technician should use discretion as to how much disassembly is needed to correct any given condition.

All references to left and right side of the vehicle are from the operator's perspective when seated in a normal riding position.

At the time of publication all information contained in this manual was technically correct. Some photographs used in this manual are used for clarity purposes only and are not designed to depict actual conditions. We constantly refine and improve its products, all materials and specifications are subject to change without notice.

This ATV's publications and decals display the words **Warning, Caution, Note,** and At This Point to emphasize important information:

WARNING

Indicates a potential hazard which will result in severe injury or death to the operator, bystander or person inspecting or servicing the ATV.

CAUTION

Indicates a potential hazard which may result in personal injury or death or damage to the machine.

NOTE

The word "**NOTE**" in this manual will alert you to key information or instructions.

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CHAPTER1 ……..…General Information

CHAPTER2 ……..……Maintenance

CHAPTER3……..……..……...……Engine

CHAPTER4……..……..……..……...……Chassis

CHAPTER5……...……Brakes

CHAPTER6……..……...…Electrical

WARNING

Never run an engine in an enclosed area. Carbon monoxide exhaust gas is poisonous and can cause severe injury or death. Always start engines outdoors.

Gasoline is extremely flammable and explosive under certain conditions. Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with skin, eyes or clothing. Always keep alert and wear protection..

Exhaust system components are very hot during and after use of ATV. Never service when the engine is warm or hot. Escaping steam from cooling system or hot oil from the machine can cause severe burns. The engine must be cool before service.

Crate of the ATV and parts in the ATV maybe have sharp edge, always pay attention and wear protection.

CHAPTER 1 GENERAL INFORMATION

WARNING
The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

1.1 IMPORTANT INFORMATION

1.2 V.I.N AND ENGINE SERIAL NUMBER

1.3 VEHICLE DIMENSIONS

1.1 IMPORTANT INFORMATION

PREPARATION FOR REMOVAL PROCEDURES

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment.
3. When disassembling the machine, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been ”mated ”through normal wear. Mated part must always be reused or replaced as an assembly.
4. During machine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

REPLACEMENT PARTS

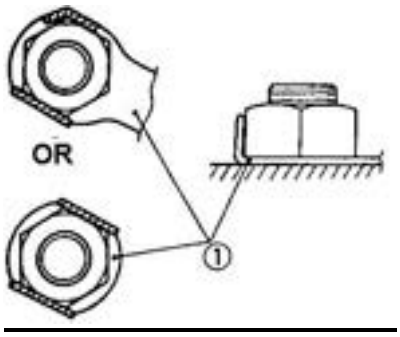
Use only genuine parts for all replacements. Use recommended oil and grease for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

GASKETS,OIL SEALS AND O-RINGS

1. Replace all gaskets seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.

LOCK WASHERS/PLATES AND COTTER PINS

Replace all lock washers/plates and cotter pins after removal. Bend lock tabs along the bolt or nut flats after the bolt or nut has been tightened to specification.



BEARINGS AND OIL SEALS

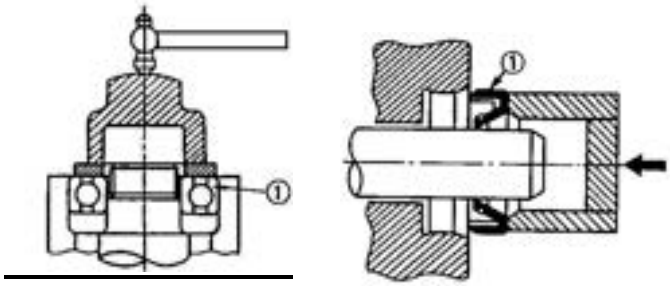
Install bearings and oil seals so that the manufacturer’s marks or numbers are visible. When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips. Oil bearings liberally when installing, if appropriate.

① oil seal

CAUTION:

Do not use compressed air to spin the bearings dry. This will damage the bearing surfaces.

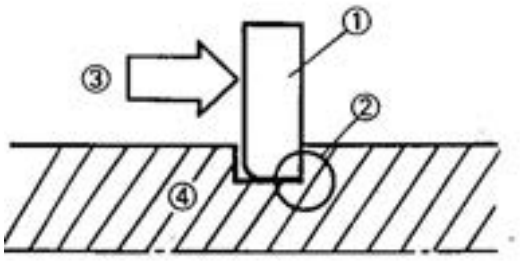
① Bearing



CIRCLIPS

1. Check all circlips carefully before reassembly. Always replace piston pin clips after one use.

Replace distorted circlips. When installing a circlip①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ it receives. See sectional view. ④ Shaft



CHECKING OF CONNECTIONS

Dealing with stains, rust, moisture, etc. on the connector.

1. Disconnect:
   - ●Connector
2. Dry each terminal with an air blower.
3. Connect and disconnect the connector two or three.
4. Pull the lead to check that it will not come off.
5. If the terminal comes off, bend up the pin ① and reinset the terminal into the connector.
6. Connect:
   - ● Connector

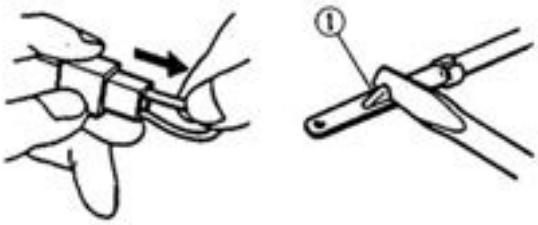
NOTE:

The two connectors ” click ” together.

7. Check for continuity with a tester.

NOTE:

- ● If there is no continuity, clean the terminals.
- ● Be sure to perform the steps 1 to 7 listed above when checking the wire harness.
- ● Use the tester on the connector as shown.



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CONVERSION TABLE

How to use the CONVERSION TABLE

Use this table to convert METRIC unit data to IMPERIAL unit data.
Ex.

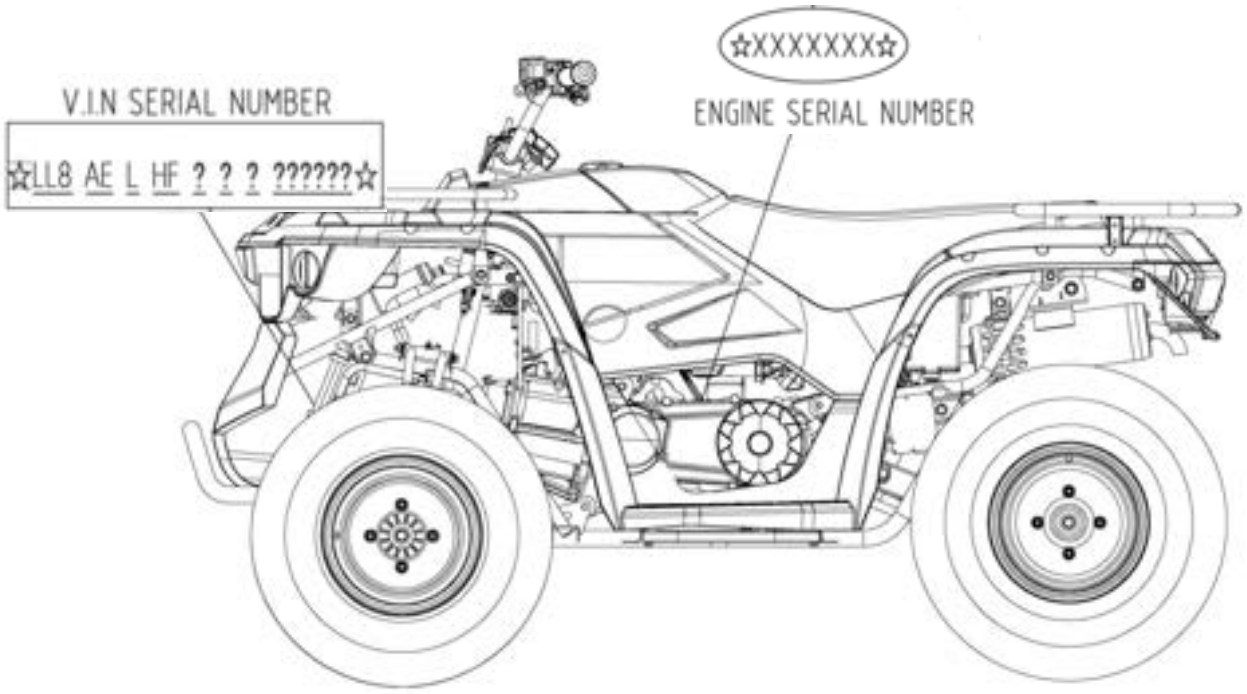
METRIC		MULTIPLER		IMP
**mm	x	0. 3937	=	**in
**cm	x	0.03937	=	**in

CONVERSION TABLE

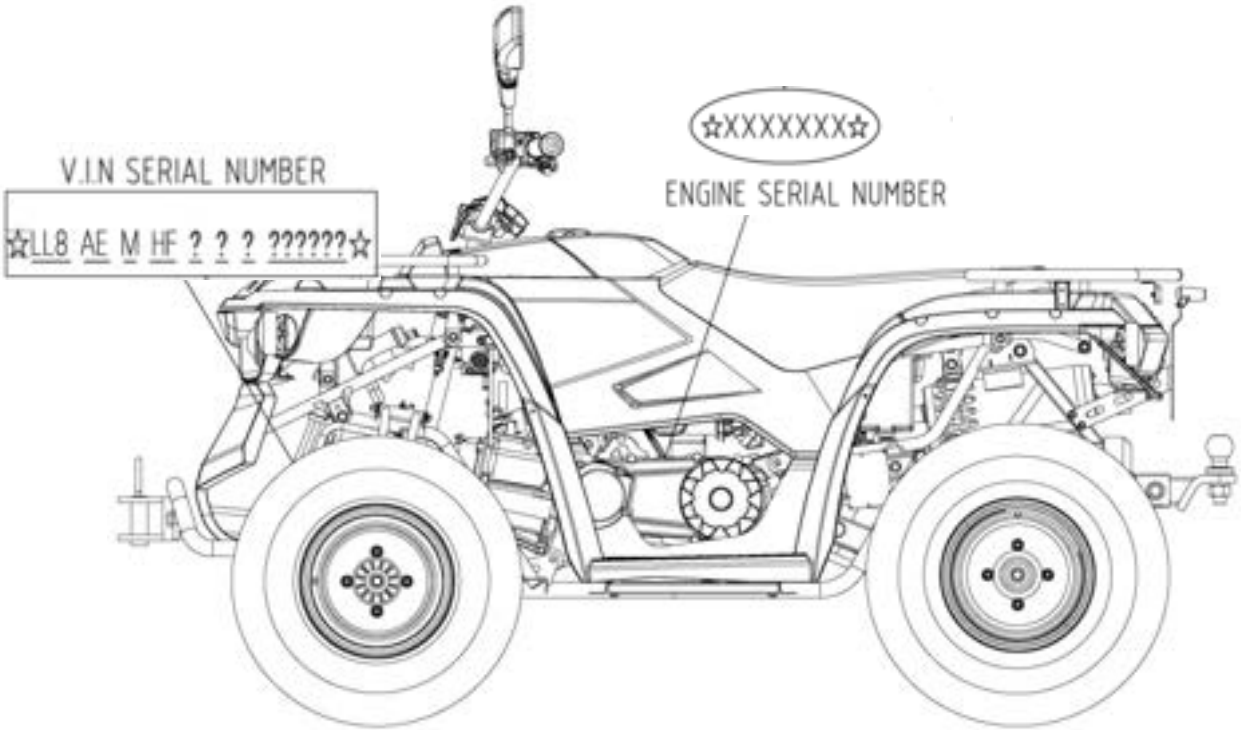
METRIC TO IMP			
	Known	Multiplier	Result
Torque	m • kg m • kg cm • kg cm • kg	7.233 86.794 0.0723 0.8679	ft • lb In • lb ft • lb In • lb
Weight	kg g	2.205 0.03527	lb oz
Distance	km/h km m m cm mm	0.6214 0.6214 3.281 1.094 0.3927 0.03927	mph mi ft yd in in
Volume/ Capacity	cc(cm^3) cc(cm^3) lit(liter) lit(liter)	0.03527 0.06102 0.8799 0.2199	oz(IMP liq.) cu • in qt (IMP liq.) gal(IMP liq.)
Miscellaneous	kg/mm kg/cm^2 Centigrade	55.997 14.2234 9/5(℃)+32	lb/in psi(lb/in^2) Fahrenheit(° F)

1.2 V.I.N AND ENGINE SERIAL NUMBER

T3a

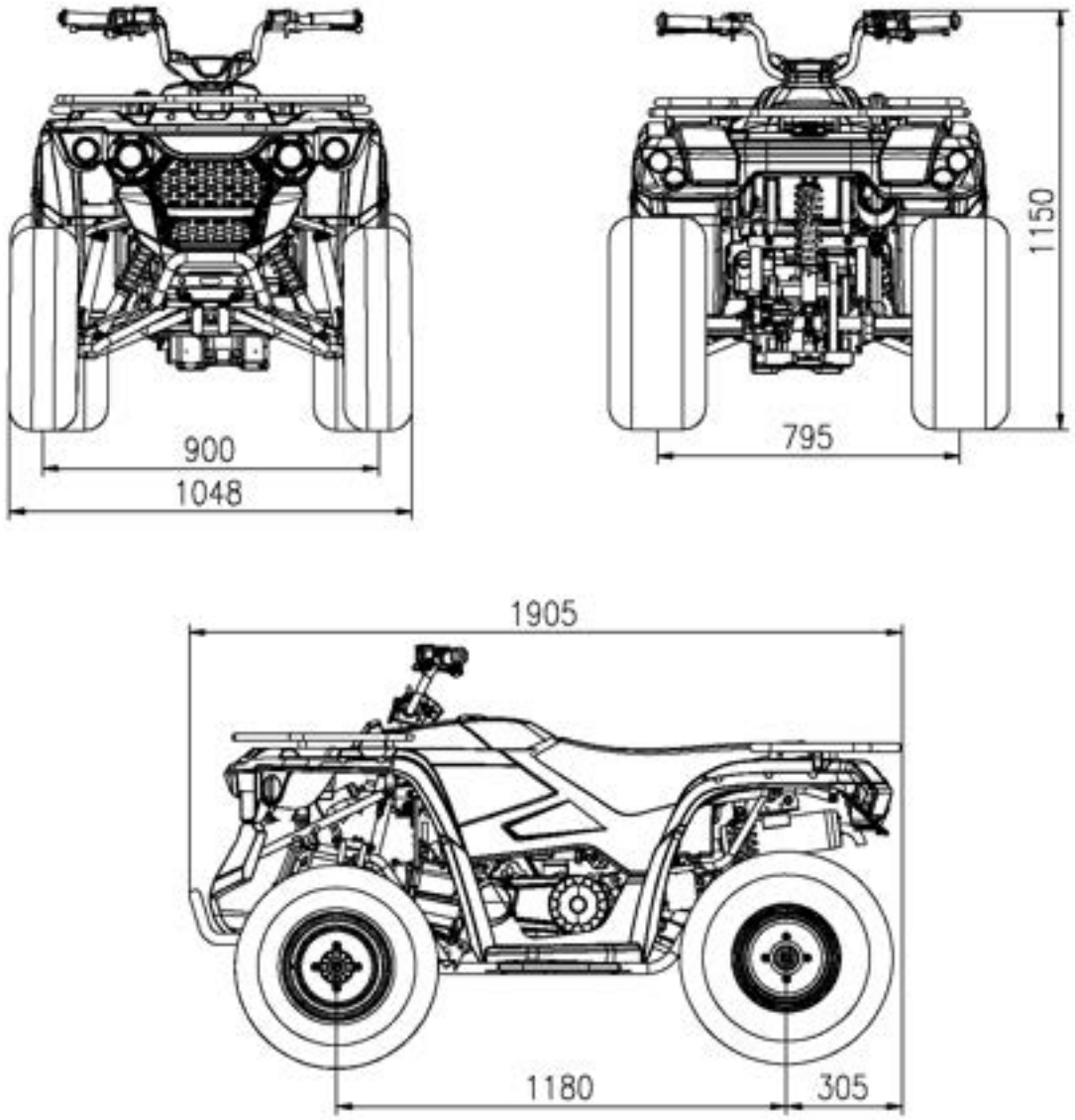


CE/T3b

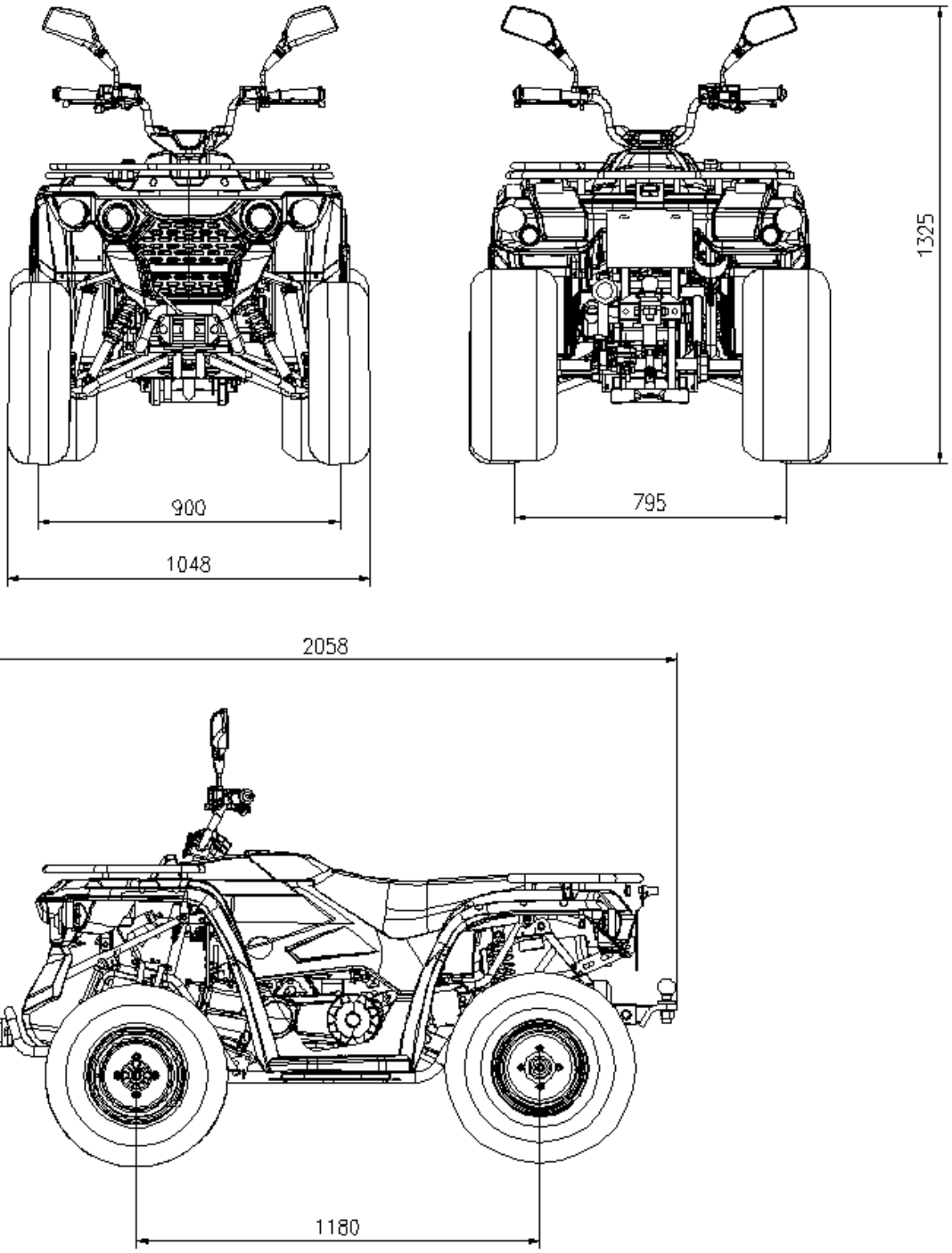


1.3 VEHICLE DIMENSIONS

CE



T3



NOTES

CHAPTER 2 MAINTENANCE

WARNING
The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

2.1 PERIODIC MAINTENANCE

2.2 FUEL SYSTEM

2.3 TOE ALIGNMENT

2.4 BRAKING SYSTEM INSPECTION

2.5 SUSPENSION SPRING RPELOAD ADJUSTMENT

2.6 WHEELS

2.7 TIRE PRESSURE

2.8 FRAME, NUTS, BOLTS, FASTENERS

2.1 PERIODIC MAINTENANCE

GENARAL
CAUTION
Mark on the following chart
DL ： Due to the nature of the adjustments marked with a DL on the following chart, it is recommended that service be performed by an authorized dealer.
▲： Service/Inspect more frequently when operating in adverse conditions.

PERIODIC MAINTENANCE SCHEDULE
Careful periodic maintenance will help keep your vehicle in the safest, most reliable condition. Inspection, adjustment and lubrication intervals of important components are explained in the following chart on the following pages.
Maintenance intervals are based upon average riding conditions and an average vehicle speed of approximately 16km/h (10 miles per hour). Vehicles subjected to severe use, such as operation in wet or dusty areas, should be inspected and serviced more frequently.
Inspect, clean, lubricate, adjust or replace parts as necessary.
NOTE: Inspection may reveal the need for replacement parts. Always use genuine parts available from your dealer.
Service and adjustments are critical. If you are not familiar with safe service and adjustment procedures, have a qualified dealer perform these operations.
A = Adjust I = Inspect
C = Clean L = Lubricate
D = Drain R = Replace
T =Tighten to Correct Torque

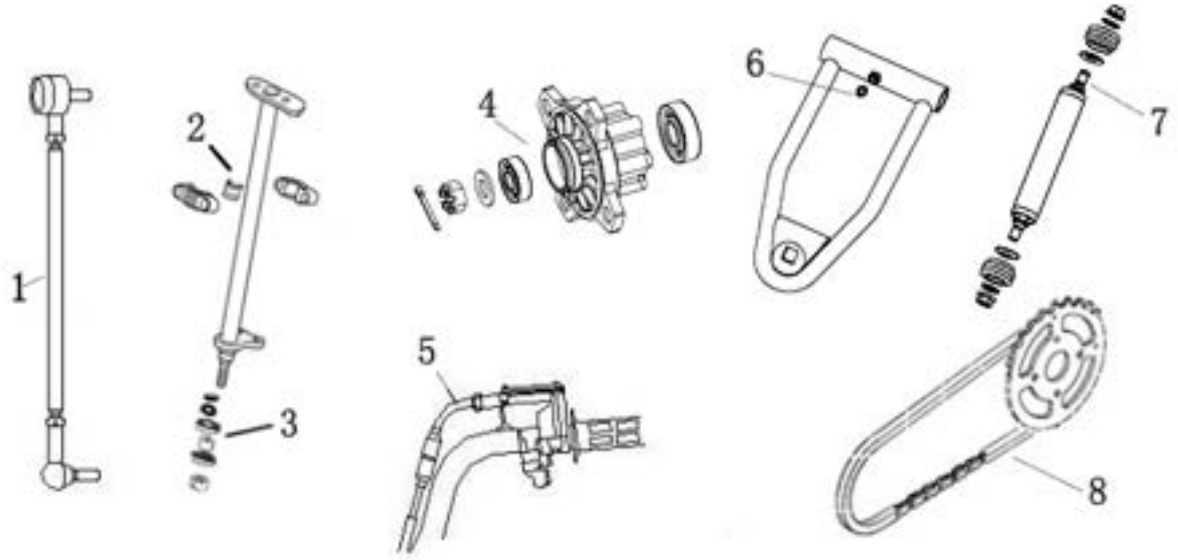
	Item	Hours	When	Remarks
	Service (Main) Brake System	/	Pre-ride	I
	Auxiliary (Secondary) Brake	/	Pre-ride	I
	Parking Brake	/	Pre-ride	I
	Tires	/	Pre-ride	I
	Wheels	/	Pre-ride	I
	Frame nuts, bolts fasteners	/	Pre-ride	I
	Headlamp Inspection	/	Daily	C
	Tail lamp inspection	/	Daily	C
▲	Air Filter-Main Element	2	Weekly	I C Replace if necessary
▲	Transmission Oil Level	10	Monthly	I change annually
	Battery Terminals	10	Monthly	I C

DL	Brake pad wear	2	Weekly	I
	Engine Cylinder Head and Cylinder Base Fasteners	25	3 months	I (re-torque required at first service only)
▲	General Lubrication all fittings, pivots, cables, etc.	25	3 months	L
	Engine Oil-Level	/	Daily	I
	Engine Oil Change	30 hrs	3 months	R Break-in Service at 1 month. Change oil more often in cold weather use.
▲	Engine breather hose	100 hrs	6 months	I
	Throttle Cable	/	Pre-ride	I
DL	Throttle Cable	50 hrs	6 months	A L (Grease M) R if necessary
	Shift linkage	50 hrs	6 months	I A R if necessary
DL	Transmission belt	50 hrs	6 months	I R if necessary
▲	Steering	50 hrs	6 months	I L T if necessary
▲	Rear Axle (and Bearings)	50 hrs	6 months	I L
▲	Front Suspension	50 hrs	6 months	I L T if necessary
▲	Rear Suspension	50 hrs	6 months	I T if necessary
	Spark Plug	100 hrs	12 months	I R if necessary
DL	Ignition Timing	100 hrs	12 months	I Adjust as needed
DL	Fuel System	100 hrs	12 months	Check for leaks at tank, cap, lines, fuel pump, filter, and throttle body. Replace lines every 2 years.
	Spark arrestor	10 hrs	monthly	C R if necessary
DL	Clutches (drive and Driven)	25 hrs	3 months	I R R if necessary
	Engine mounts	25 hrs	3 months	I T
DL	Valve clearance	100 hrs	12 months	I A
DL	Brake fluid Level	/	Pre-ride	I

	Brake fluid	200 hrs	24 months	Change every two years
/DL	Toe adjustment	/	As Required	Periodic inspection, adjust when parts are replaced
	Headlight Aim	/	As Required	Adjust if necessary
▲ DL	Ball joint (knuckle assembly)	10 hrs	monthly	I, (for damage, wear, and play) R. Replace if necessary

LUBRICANT AND FLUID

	Item	Lube Rec	Method	Frequency
▲	1.Tie rods	Grease	Locate fittings and grease	Semi-annually
▲	2.Steering Post Bushings	Grease	Locate fitting on pivot shaft and grease with grease gun	Every 3 months or 50 hours
▲	3. Steering Post Bearing	Grease	Locate fittings and grease	Every 3 months or 50 hours
▲	4.Front Wheel bearings	Grease (high temperature resist)	Inspect and replace bearings if necessary	Semi-annually
▲	5.Throttle Cable	Grease M	Grease, inspect and replace it if necessary	Monthly or 20 hours
▲	6. Front A-arm pivot Shaft	Grease	Locate fitting on pivot shaft and grease with grease gun	Every 3 months or 50 hours (Except Maintenance-Free A-arm pivot)
	7. Ball joint (knuckle assembly)	Grease	Locate fittings and grease	Every 3 months or 50 hours
▲	8.CHAIN	Lubricate	I C L Adjust or/ and replace if necessary	Weekly
	9.Engine Oil	SAE 15W/40 SE	Add to proper level on dipstick	Check level daily
	10. Brake Fluid	DOT 3 Only	Maintain level Between fill lines. See “7.CONTROL”	As require; change every two years or 200 hours
	11.Transmission Oil	SEA 80W/90GL5	Add to proper level on dipstick	Change annually or at 100 hours



LUBRICATION RECOMMENDATIONS
NOTE:

1. ⚠ More often under severe use, such as wet or dusty conditions.
2. ⚠ Grease: Light weight lithium-soap grease.
3. ⚠ Grease M：Molybdenum disulfide (MoS_2) grease (water resistant).
4. ⚠ When suspension action becomes stiff or after washing.
5. ⚠ Hours are based on 10 mph(16Km/h) average.

2.2 FUEL SYSTEM

WARNING

Gasoline is extremely flammable and explosive under certain conditions.

Always stop the engine and refuel outdoors or in a well ventilated area.

Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

Do not overfill the tank. Do not fill the tank neck.

⚠ If you get gasoline in your eyes or if you swallow gasoline, see your doctor immediately.

If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

⚠ Never start the engine or let it run in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

⚠ Never drain the float bowl when the engine is hot. Severe burns may result.

FUEL LINES

Check fuel lines for signs of wear, deterioration, damage or leakage. Replace if necessary.

Be sure fuel lines are routed properly and fixed solidly.

CAUTION: Make sure lines are not kinked or pinched.

Replace all fuel lines every two years.

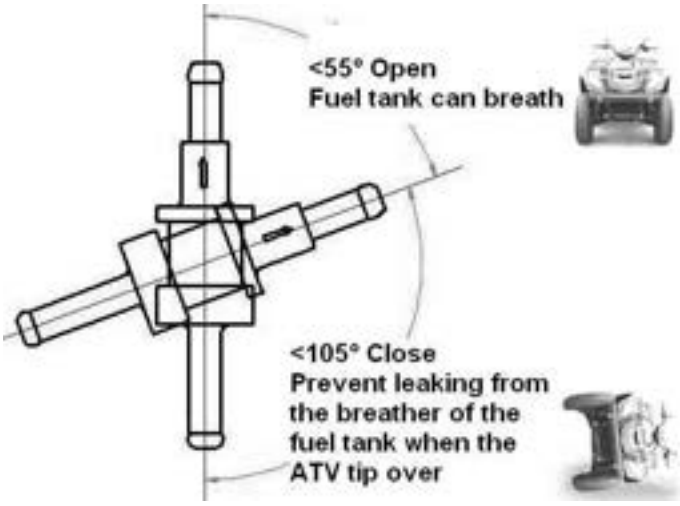
After replacing the fuel line, start engine and inspect for leaks.

NOTE

After installing the fuel pump and connecting the fuel line, refill the fuel tank and check that there is no fuel leaking.

WARNING

Always pay attention to the fittings of the fuel tank during fuel lines service. Don't pull the line from the tank directly for removal. Inspect fittings and tank body for looseness, nicks, and scratches. Replace gas tank if necessary.



VENT LINES AND ROLL OVER VALVE

1. Check fuel tank, dump valve, throttle body, and transmission vent lines for signs of wear, deterioration, damage or leakage. Replace every two years.

2. Be sure vent lines and drain lines are routed properly toward the ground and secured with cable ties. **CAUTION**: Make sure lines are not kinked or pinched

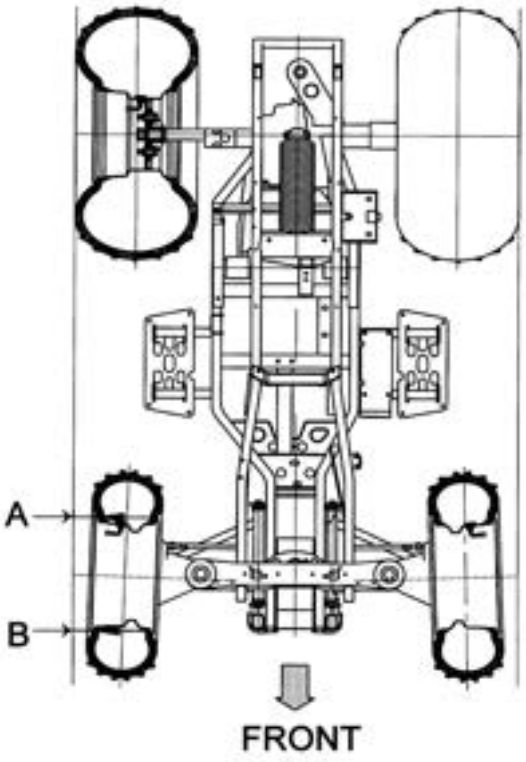
***NOTE. On some models, there is a Roll-Over Valve on the end of the gas tank vent line. Make sure the ↑ mark on the R-O Valve is upwards.**

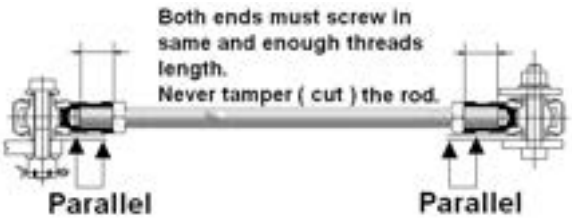
2.3 TOE ALIGNMENT

METHOD: STRAIGHTEDGE OR STRING
Be sure to keep handlebars centered

NOTE: String should just touch side surface of rear tire on each side of the ATV.
Measure from string to rim at front and rear of rim.
Rear rim measurement (A) should be 1/16" to 1/8" (1.5 to 3 mm) more than front rim measurement (B).
NOTE: The steering post arm (frog) can be used as an indicator of whether the handlebars are straight. The frog should always point straight back from the steering post when handlebars are straight.

WARNING: Always pay attention to tie rods assembly, Both ends must screw in same and enough threads length.





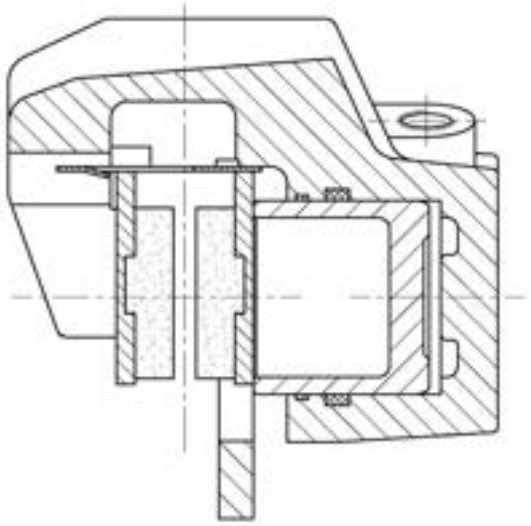
2.4 BRAKING SYSTEM INSPECTION

DISC BRACK

The following checks are recommended to keep the braking system in good operating condition. Service life of braking system components depends on operating conditions. Inspect brakes in accordance with the maintenance schedule and before each ride.

- Keep fluid level in the master cylinder reservoir to the indicated level on reservoir.
- Use DOT 3 brake fluid.

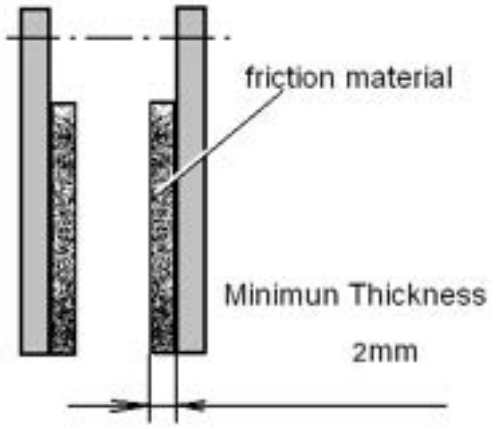
NOTE: Use new brake fluid or brake fluid from a sealed container to avoid contamination to system.



Checking

Although the brake has been adjusted at the factory, the brake should be checked for proper operation. The mechanical brake must be maintained to be fully functional.

- Check brake system for fluid leaks.
- Check brake for excessive travel or spongy feel.
- Check friction pads for wear, damage and looseness.
- Check surface condition of the disc.



BRAKE PAD INSPECTION

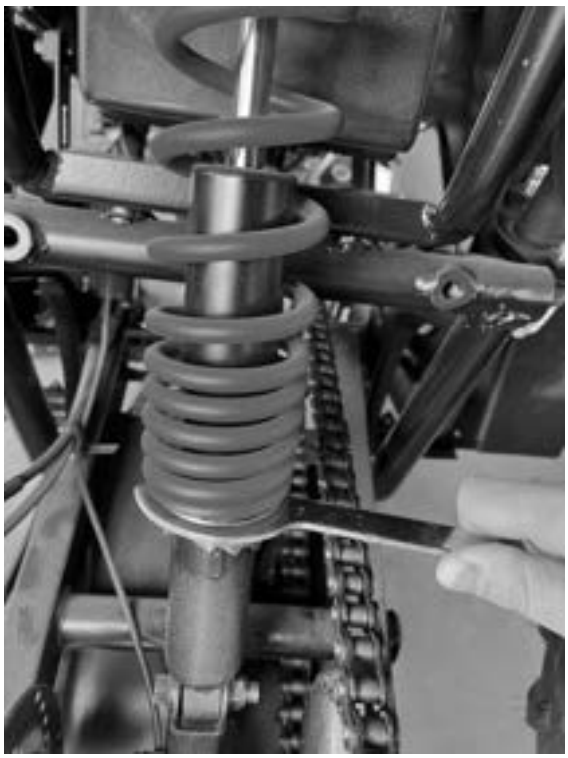
- Pads should be changed when friction material is worn to 2mm.

HOSE/FITTING INSPECTION

Check braking system hoses and fittings for cracks, deterioration, abrasion, and leaks. Tighten any loose fittings and replace any worn or damaged parts.

2.5 SUSPENSION SPRING RPELOAD ADJUSTMENT

Operator weight and vehicle loading affect suspension spring preload requirements. Adjust as necessary.



FRONT SUSPENSION

Compress and release front suspension. Damping should be smooth throughout the range of travel.

Check all front suspension components for wear or damage.

Inspect from strut cartridges for leakage. Shock spring preload can not be adjusted, replace if necessary.

REAR SUSPENSION

Compress and release rear suspension. Damping should be smooth throughout the range of travel. Check all rear suspension components for wear or damage.

Inspect shock for leakage

Shock spring preload can be adjusted using the shock spanner wrench.

2.6 WHEELS

Inspect all wheels for runout of damage.
Check wheel nuts and ensure they are tight.
Do not over tighten the wheel nuts.

WHEEL, HUB TORQUE TABLE

	Specification	
	Youth/Mini ATV	
Front Wheel Nuts	45-50N.m	33-37 Ft.Lbs
Rear Wheel Nuts	45-50 N.m	33-37 Ft.Lbs
Front Spindle Nut	80-85 N.m	59-63 Ft.Lbs
Rear Hub Retaining Nut	110-115 N.m	81-85 Ft.Lbs

WHEEL REMOVAL

1. Stop the engine, place the transmission in gear
   And lock the parking brake.
2. Loosen the wheel nuts slightly.
3. Elevate the side of the vehicle by placing a suitable stand under the footrest frame.
4. Remove the wheel nuts and remove the wheel.

WHEEL INSTALLATION

1. With the transmission in gear and the parking Brake locked, place the wheel in the correct Position on the wheel hub. Be sure the valve stem is toward the outside and rotation arrows on the tire point toward rotation.
2. Attach the wheel nuts and finger tighten them.
3. Lower the vehicle to the ground.
4. Securely tighten the wheel nuts to the proper Torque listed in the table above.

CAUTION:
If wheels are improperly installed it could affect Vehicle handling and tire wear.

2.7 TIRE PRESSURE

TIRE INSPECTION

CAUTION :

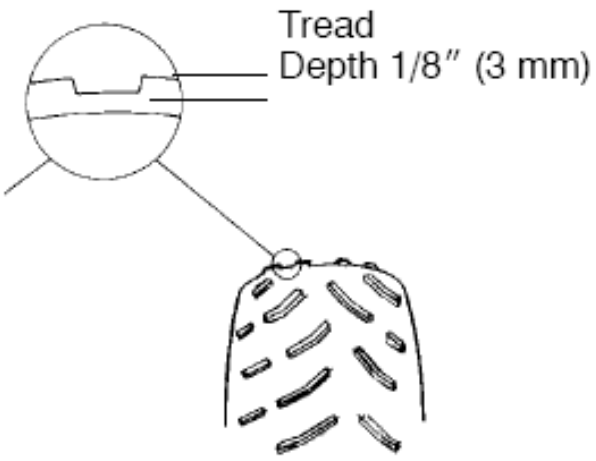
- Maintain proper tire pressure. Refer to the warning tire pressure decal applied to the vehicle.
- Improper tire inflation may affect ATV maneuverability.
- When replacing a tire always use original equipment size and type and replace in pairs.
- The use of non- standard size or type tires may affect ATV handling and cause machine damage.

Tire Pressure Inspection

	Front	Rear
M210	5PSI （35KPa）	5PSI （35KPa）

TIRE TREAD DEPTH

Always replace tires when tread depth is worn to 1/8" (3mm) or less.



WARNING Operating an ATV with worn tires will increase the possibility of the vehicle skidding easily with possible loss of control.

Worn tires can cause an accident.
Always replace tires when the tread depth measures 1/8" (3mm) or less

2.8 FRAME , NUTS, BOLTS, FASTENERS

Periodically inspect the tightness of all fasteners in accordance with the maintenance schedule. Check that all cotter pins are in place. Refer to specific fastener torques listed in each chapter.

Item	Torque（Ft-Lb）	Torque (Nm)	Remarks
Handlebar Clamp bolt M8X35	18	25	
Nut M10X1.25 Attaching Tie Rod to Steering column	26-30	35-41	
Nut M10X1.25 Attaching Tie Rod to Knuckle	26-30	35-41	
Tie Rod Jam Nut M12	13	17	
Bolt M10 Attaching Lower A-arm and Frame	44	60	
Nut M10X1.25 Attaching Front Shockabsorber to A-Arm	33	44	
Nut M10X1.25 Attaching Front Shockabsorber to Frame	33	44	
Nut M10X1.25 Attaching Rear Shockabsorber to Frame	25	34	
Nut M10X1.25 Attaching Rear Shockabsorber to Swingarm Assy	25	34	
Nut M10X1.25 Tie Rod Assy Attaching to Knuckle	26-30	35-41	
Bolt M12X30 Attaching Swingarm Assy to Axle Tube And Hitch Assemblyle	63-66	85-90	
Steering Column Nut M14X1.5	59-63	80-85	
Brake Disc Install Braket Bolt	14-18	19-25	LT
Nut M14X1.5 Of Swingarm Pivot	81-85	110-115	
Nut M10X1.25 Attaching Front Wheel to Front Wheel Hub	33-37	45-50	
Nut M10X1.25 Attaching Rear Wheel to Rear Wheel Hub	33-37	45-50	
BOLT M10 Attaching Engine Assembly to Frame	26-30	35-41	

LT*—Apply Loctite™ 242

NOTES

CHAPTER 3 ENGINE

3.1 MAINTENANCE SPECIFICATIONS

3.1.1 SPECIFICATIONS

3.1.2 TIGHTENING TORQUES

3.2 PARTS INSPECTION AND SERVICE

3.2.1 ENGINE OIL LEVEL INSPECTION

3.2.2 ENGINE OIL CHANGE

3.2.3 ENGINE MOUNT INSPECTION

3.2.4 SPARK PLUG INSPECTION

3.2.5 VALVE CLEARANCE ADJUSTMENT

3.2.6 COMPRESSION PRESSURE

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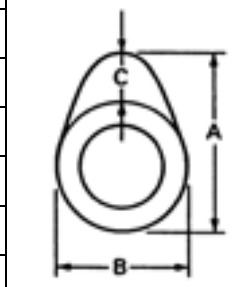
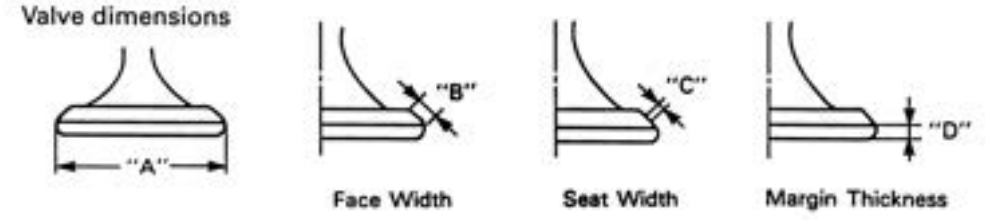
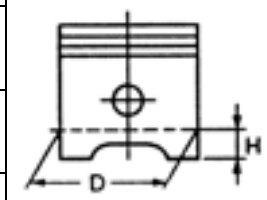
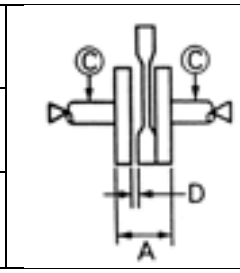
3.1 MAINTENANCE SPECIFICATIONS

3.1.1 SPECIFICATIONS

Item			Standard	Limit
Cylinder head	Surface warpage limit		…..	0.05mm
Cylinder	Surface warpage limit (mating with cylinder head)		…..	0.05mm
	Bore size		62.515-62.520 mm	62.56mm
	Out of round limit		…..	0.05mm
Camshaft	Cam dimensions			
	Intake "A"		29.52-29.58mmmm	29.47mm
	"B"		25.00-25.03mm	24.95mm
	"C"		4.52-4.58mm	4.47mm
	Exhaust "A"		29.32-29.38mm	29.27mm
	"B"		25.00-25.03mm	24.95mm
	"C"		4.32-4.38mm	4.37mm
	Camshaft runout limit		…..	0.05mm
Cam chain	Type/No. of links		CL05-5-94L	…
Rocker arm , Rocker-armshaft	Rocker arm inside diameter		10.000-10.015mm	10.1mm
	Rocker shaft outside diameter		9.972-9.987mm	9.92mm
	Rocker arm - to- rocker arm shaft clearance		0.013-0.043mm	…
Valve, Valve seat, Valve guide	Valve clearance (cold)	IN	0.04-0.06mm	…
		EX	0.05-0.07mm	…
	Valve dimensions			
				
	"A" head diameter	IN	26.9-27.1mm	…
		EX	22.9-23.1mm	…
	"B" face width	IN	1.0-1.7mm	…
		EX	1.0-1.7mm	…
	"C " seat width	IN	0.6-0.8mm	…
		EX	0.6-0.8mm	…
	"D" margin thickness	IN	0.55-0.85mm	…
		EX	0.85-1.15mm	…

Item			Standard	Limit
Valve, Valve seat, Valve guide	Stem outside diameter	IN	4.970-4.980mm	4.9mm
		EX	4.955-4.970mm	4.9mm
	Guide inside diameter	IN	5.000-5.012mm	5.03mm
		EX	5.000-5.012mm	5.03mm
	Stem-to-guide clearance	IN	0.02-0.032mm	0.08mm
		EX	0.03-0.057mm	0.10mm
	Stem runout limit		…..	0.10mm
	Valve seat width	IN	0.6-0.8mm	1.5mm
		EX	0.6-0.8mm	1.5mm
Valve spring	Free length	IN/EX	37mm	36.5mm
	Set length (valve closed)	IN/EX	34.8mm	…
	Com pressed pressure	IN/EX	215-237N/97-107N	
	Tilt limit	IN/EX	…..	2.5°
Piston	Piston to cylinder clearance		0.024-0.036mm	0.1mm
	Piston size "D"		62.475-62.485mm	…
	Measuring point "H"		10mm	…
	Piston pin bore inside diameter		15.002-15.008mm	15.04mm
	Piston pin outside diameter		14.994-15.000mm	14.96mm
Piston rings	Top ring	End gap (installed)	0.10-0.25mm	0.45mm
		Side clearance (installed)	0.02-0.06mm	0.11mm
	2nd ring	End gap (installed)	0.20-0.40mm	0.6mm
		Side clearance (installed)	0.02-0.06mm	0.12mm
	Oil ring	End gap (installed)	0.20-0.70mm	…
Crankshaft	Crank width "A"		45.05-45.15mm	…
	Runout limit "C "		0.04mm	…
	Big end side clearance "D"		0.10-0.35mm	…

Item		Standard	Limit
Automatic centrifugal clutch	Clutch shoe thickness	3.5mm	2.0mm
	Clutch hosing inside diameter	113.5-113.8mm	113.8mm
	Clutch shoe spring free length	156mm	39mm
	Weight outside diameter	20mm	19mm
	Clutch- in revolution	2600-2800r/min	…
V-belt	Width	20mm	19mm
Oil pump	Tip clearance	0.15mm	0.23mm
	Side clearance	0.15-0.22mm	0.26mm
	Housing and rotor clearance	0.05-0.12mm	0.14mm

3.1.2 TIGHTENING TORQUES

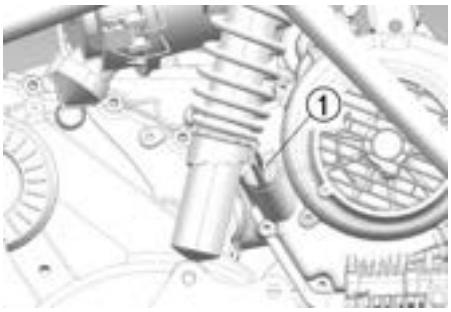
Part to be tightened	Part name	Thread size	Q'ty	Tightening Torque N.m	Tightening Torque m.kg	Remarks
Cylinder head cover	Bolt	M6	4	10	1.0	
Cylinder head & cylinder	Nut	M8	4	25	2.5	
Cylinder head & cylinder	Bolt	M6	2	10	1.0	
Spark plug	...	M10	1	12	1.2	
Camshaft platen	Bolt	M6	1	10	1.0	
Timing sprocket	Bolt	M6	2	15	1.5	
Valve adjuster locknut	Nut	M5	2	10	1.0	
Tensioner	Bolt	M6	2	10	1.0	
Tensioner cap	Screw	M5	1	5	0.5	
Balance shaft	Nut	M14	1	65	6.5	
Crankcase bolts	Bolt	M6	2	10	1.0	
Engine oil drain plug	Bolt	M12	1	25	2.5	
Oil cooling pipe	Bolt	M12	4	39	3.9	
Cover, Oil Filter Screen	...	M30	1	14	1.4	
Gear box cover	Bolt	M6	10	10	1.0	
Crankcase cover(left)	Bolt	M6	8	10	1.0	
Crankcase cover(right)	Bolt	M6	9	10	1.0	
Crankshaft position sensor	Bolt	M6	2	10	1.0	
Flywheel nut	Nut	M12	1	60	6.0	
Fan bolt	Bolt	M6	4	10	1.0	
Stator fasteners	Bolt	M6	3	10	1.0	
Crankshaft slotted nut	Nut	M22	1	95	9.5	
Start motor	Bolt	M6	2	10	1.0	
Driving pulley assy	Nut	M12	1	60	6.0	
Driven pulley assy	Nut	M12	1	60	6.0	
Drain plug(transmission)	Bolt	M12	1	25	2.5	
Oil pump	Bolt	M6	2	10	1.0	
Oil pump sprocket	Nut	M6	1	10	1.0	
Oil pump cover	Bolt	M6	2	10	1.0	
Oil cooler	Bolt	M6	2	10	1.0	

Part to be tightened	Part name	Thread size	Q'ty	Tightening Torque N.m	m.kg	Remarks
Temperature sensor	...	M10	1	12	1.2	
Oxygen sensor	...	M12	1	18	1.8	
Spark arrestor fasteners	Bolt	M6	3	10	1.0	
Exhaust pipe	Nut	M8	2	13	1.3	
Exhaust mounting fastener	Bolt	M10	1	45	4.5	
Locating Bolt	Bolt	M14	1	25	2.5	

3.2 PARTS INSPECTION AND SERVICE

3.2.1 ENGINE OIL LEVEL INSPECTION

1. Position vehicle on a level surface and apply the parking brake.
2. Start the engine and allow the engine to run for 30 seconds to properly circulate the oil.
3. Shut the vehicle off and allow engine to cool down.
4. Remove the dipstick ① and wipe it dry with a clean cloth.
5. Check the oil level (Do not thread dipstick in).



●Engine oil level

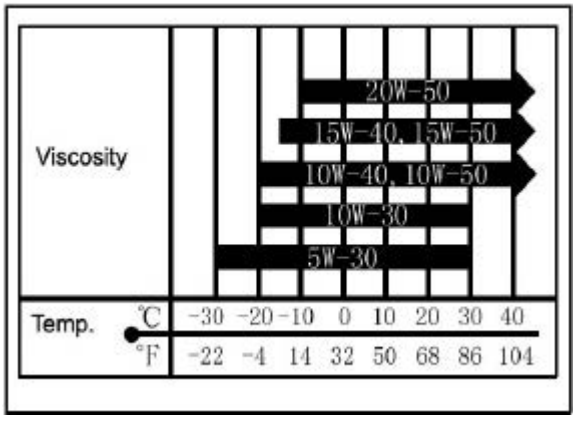
Oil level should be between maximum and minimum ② marks.

Oil level is below the minimum mark Add oil up to the proper lever.

RECOMMENDED ENGINE OIL

Refer to the chart for selection of the oils suited to the atmospheric temperature.

	API STANDARD: **API SE or higher grade**



CAUTION:

●Do not put in any chemical additives or use oils with a grade of CD or higher.

●Be sure not to use oils labeled "ENERGY CONSERVING I" or higher. Engine oil also lubricates the clutch and additives could cause clutch slippage.

●Be sure no foreign material enters the crankcase.

6. Add the recommended oil as necessary to bring the oil level within the SAFE range on the dipstick. Do NOT overfill.

CAUTION:

Over-filling engine crankcase will result in oil entering the air box. Maintain the recommended oil level.

7. When finished, reinstall the dipstick.
8. Start the engine and allow the engine to run for 30 seconds to properly circulate the oil.
9. Turn off the engine.

NOTE:

Wait a few minutes until the oil settles before inspecting the oil level.

3.2.2 ENGINE OIL CHANGE

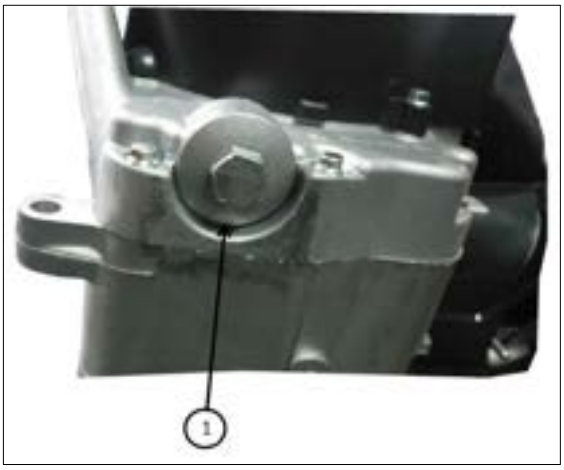
Always change engine oil and filter at the intervals outlined in the Periodic Maintenance Chart. Always change the oil filter whenever changing engine oil.

The crankcase drain plug is located on the bottom of the crankcase. Access the drain plug from the bottom of the vehicle.

1.Position vehicle on a level surface and apply the parking brake.
2.Start the engine and allow the engine to run for 30 seconds to properly circulate the oil.
3.Shut the vehicle off and allow engine to cool down.
4.Place a drain pan beneath the engine crankcase.
5.Remove the drain plug ① and pre-filter screen and allow the oil to drain completely.

NOTE:

Wipe up any residual oil that may have collected on the chain guard or other vehicle components after oil has drained completely.



6.Wash the oil pre-filter screen with solvent to remove any debris. Allow the screen to air dry.
7.The external oil filter is located on right-hand side of rear the swingarm. The screw on oil filter should be replaced when oil is changed. With the oil drained from the crankcase, unscrew the oil filter and replace with a new one. Ensure that the oil filter gasket is properly seated, lubricated with oil and in good condition. Do not over tighten the oil filter.

8.Inspect the sealing washer on the drain plug. Replace the washer if it is damaged.

NOTE:
The sealing surfaces on the drain plug and crankcase should be clean and free of burrs, nicks or scratches.

9. Reassemble the pre-filter screen and spring to the drain plug.
10.Reinstall the drain plug, and torque to specification.

TORQUE
Engine Oil Drain Plug: 14 N.m

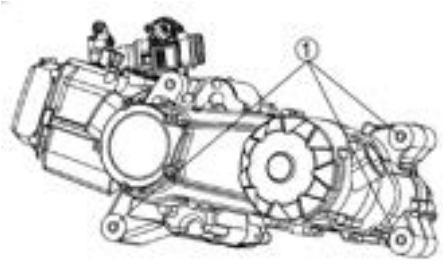
11.Fill the engine to the recommended specification.

	Engine Oil quantity: 0.8 L

12.Start engine and allow it to idle for 30 seconds.
13.Stop the engine and inspect for oil leaks. Wait at least 15 seconds before removing the oil dipstick.
14.Remove the dipstick ② and wipe it dry with a clean cloth.
15.Check the engine oil level.
Refer to **"3.2.1 ENGINE OIL LEVEL INSPECTION"** section.
16. Dispose of used oil properly.

3.2.3 ENGINE MOUNT INSPECTION

Periodically inspect engine upper mounts ① for cracks or damage.



3.2.4 SPARK PLUG INSPECTION

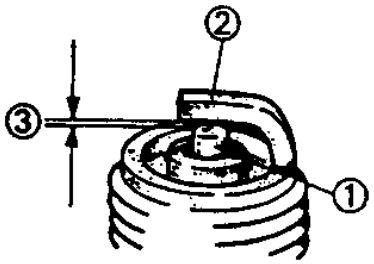
1.Remove :
- Spark plug cap
- Spark plug

CAUTION:
Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinder.

2. Check:
●Spark plug type
Incorrect → Replace.

	Standard spark plug: **CR7HSA (NGK)**

3.Inspect:
●Electrode ①
Wear/ damage → Replace.
●Insulator ②
Abnormal color → Replace.
Normal color is a medium - to- light tan color.

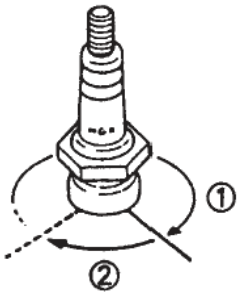


4.Clean:
●Spark plug
(with spark plug cleaner or w ire brush)
5.Measure:
●Spark plug gap ③
(with a wire gauge)
Out of specification → Adjust gap.

	Spark plug gap : 0.6-0.8 mm

6. Install:
●Spark plug

TORQUE
Spark plug: 12N.m



NOTE:
Before installing a spark plug, clean the Gasket surface and plug surface.

3.2.5 VALVE CLEARANCE ADJUSTMENT
NOTE:
Valve clearance adjustment should be made with the engine cool, at room temperature.
When the valve clearance is to be measured or adjusted, the piston must be at Top Dead Center

(T.D.C.) on the compression.
1. Remove:
● Valve cover
2. Remove:
●Spark plug
3. Remove:
●Cooling fan cover
4. Verify cam lobes are pointed down.
5.Measure:
●Valve clearance
Out of specification → Adjust.

Valve clearance (cold):
Intake valve 0.04-0.06mm
Exhaust valve 0.05-0.07mm

6. Adjust:
●Valve clearance
Adjustment steps:
●Insert the correct thickness feeler gauge between end of exhaust valve stem and adjuster screw.
●Loosen locknut and turn adjuster screw until there is slight drag on feeler gauge.
●When clearance is correct, hold adjuster screw and tighten locknut securely.
●Re-check the valve clearance
●Repeat adjustment procedure if necessary until clearance is correct with locknut secured.

7. Install:
●Cooling fan cover
●Valve cover
●Spark plug

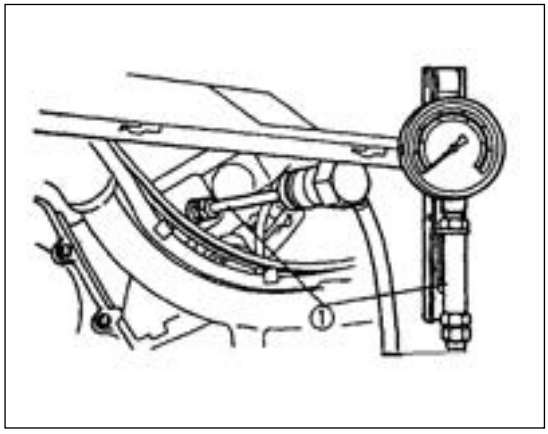
TORQUE
Spark plug: 12N.m

3.2.6 COMPRESSION PRESSURE MEASUREMENT

NOTE :
Insufficient compression pressure will result in performance loss.
1. Check:
●Valve clearance

Out of specification → Adjust.
Refer to "**3.2.5VALVE CLEARANCE ADJUSTMENT**" section.
2.Start the engine and let it warm up for several minutes.
3.Turn off the engine.
4. Remove:
●Spark plug
NOTE :
Before removing the spark plug, use com pressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

5. Attach:
●Compression gauge①
6. Measure:
●Compression pressure
If it exceeds the maximum pressure allowed→ Inspect the cylinder head, valve surfaces and piston crown for carbon deposits.



If it is below the minimum pressure →
Squirt a few drops of oil into the affected cylinder and measure again. Follow the table below.

Compression pressure (With oil applied into cylinder)	
Reading	Diagnosis
Higher than without oil	Worn or damaged pistons
Same as without oil	Possible defective ring (s), valves, cylinder head gasket or Piston →Repair.

	Compression pressure(at sea level): Standard: 1,100 kPa (11Kg/cm^2, 11 bar) Minimum : 900kPa (9 kg /cm ^{2}, 9 bar)

Measurement steps :
●Crank the engine with the throttle wide open until reading on the compression gauge stabilizes.

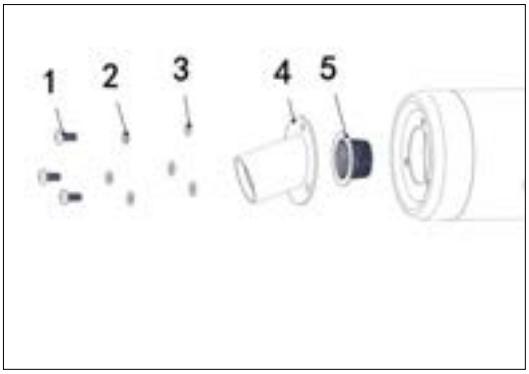
WARNING :
Before cranking the engine, ground all spark plug leads to prevent sparking.
8. Install:
●Spark plug

TORQUE
Spark plug: 12N.m

3.2.7 SPARK ARRESTOR SERVICE

WARNING :
●Do not clean spark arrestor immediately after the engine has been run, as the exhaust system becomes very hot. Serious burns could result from contact with the exhaust components. Allow components to cool sufficiently before proceeding.
●Wear eye protection and gloves.
●Never run the engine in an enclosed area. Exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness or death in a very short time.

NOTE :
To remove accumulated carbon, clean the spark arrestor at the interval recommended in the Periodic Maintenance Chart.



1. Remove:
●Bolt
●Spark arrestor

2. Use a non-synthetic brush to clean the arrestor screen ⑤. A synthetic brush may melt if components are warm.

3. Inspect:
●Wear and damage → Replace.
4. Install:
●Spark arrestor
●Bolt

TORQUE
Spark Arrestor Fasteners:

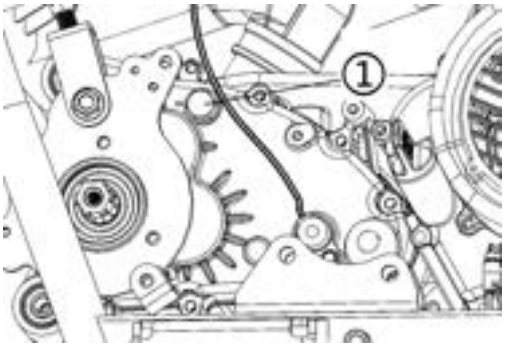
10N.m

3.2.8 TRANSMISSION OIL LEVEL CHECK

NOTE :

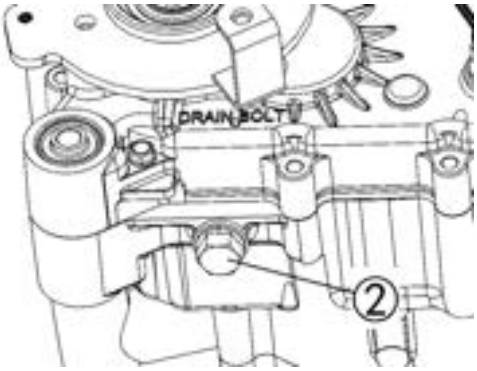
To check and ensure proper transmission lubricant level, the transmission needs to be drained and filled to the proper specification.

The fill plug ① is located on the side of the transmission gearcase. Access the fill plug on the right-hand side of the gearcase.



3.2.9 TRANSMISSION OIL CHANGE

The drain plug is located on the bottom of the transmission gearcase. Access the drain plug from the bottom of the vehicle.



1.Remove:
- Fill plug ①

2.Place a drain pan under the transmission drain plug.
3.Remove:
- Drain plug ②

4. Allow lubricant to drain completely.
5.Clean the drain plug magnetic surface.
6. Install:
- Drain plug

TORQUE
Transmission Fill / Drain Plug: 25N.m

7. Add the recommended amount of lubricant through the fill plug hole. Do NOT overfill or fill to the bottom of the fill plug hole.

	Transmission Oil quantity: 0.3 L

8. Install:
- Fill plug

TORQUE
Transmission Fill / Drain Plug: 25N.m

9.Check for leaks. Dispose of used lubricant

properly.

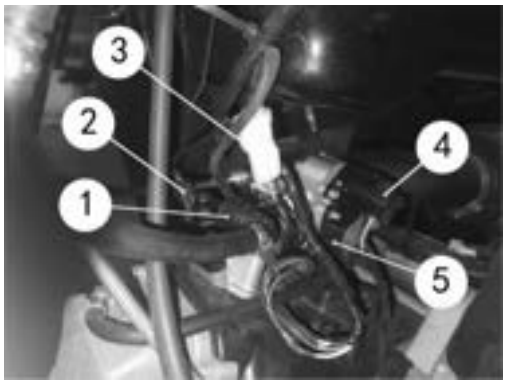
3.3 ENGINE REMOVAL AND INSTALLATION

3.3.1 ENGINE REMOVAL

1.Remove side panels and pedals.

2.Remove axle.

3.Remove air box and muffler from the engine.



4.Remove the fuel supply line①.

5.Disconnect the following electrical components:

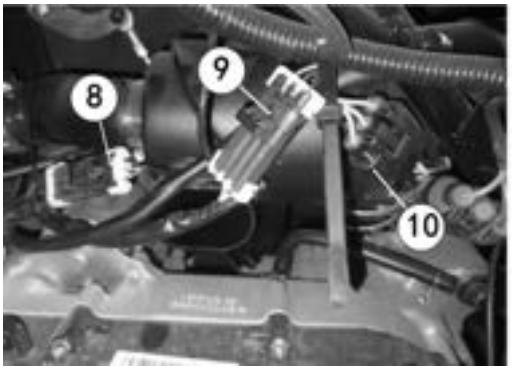
- Injector②
- Engine Temperature Sensor③
- Stepper motor (throttle body) ④
- Sensor (throttle body) ⑤

6.Loosen nut ⑥ and remove accelerator cable.

7.Disconnect the following electrical components:

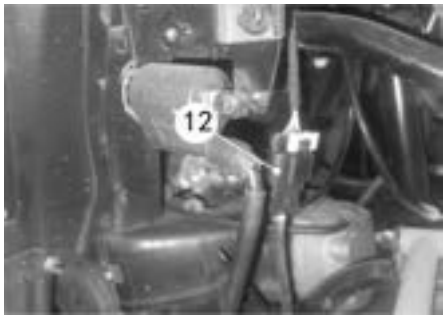
- Spark Plug Lead⑦

- Gear Indicator Switch⑧
- CPS⑨
- Charging coil⑩

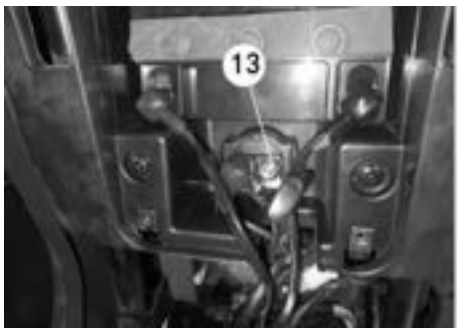


●Engine Ground ⑪

● Oxygen Sensor ⑫



8.Remove starter cable ⑬.



9.Remove the Shifting rocker arm ⑭ from the transmission.

10.Remove engine mounting bolt ⑮ ⑯ ⑰.

11.Remove small sprocket and protective cover.
12.Remove engine out vehicle.

3.3.2 ENGINE INSTALLATION

1.Install the engine into the frame.

2.Install the engine mounting bolt ① ② ③.

Torque to specification

TORQUE
Engine Mounting Bolt: 50N.m

3.Install the Shifting rocker arm ④ to the transmission.

TORQUE
Shifting rocker arm Bolt: 10N.m

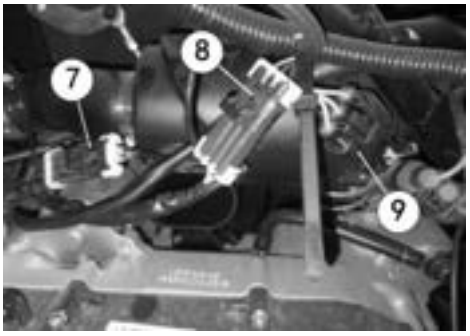
4.Install starter cable ⑤.

TORQUE
Starter cable nut: 10N.m

5. Connect the following electrical components:

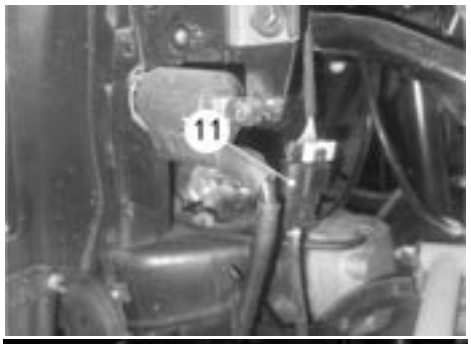
- Spark Plug Lead ⑥

- Gear Indicator Switch ⑦
- CPS ⑧
- Charging coil ⑨



- Engine Ground ⑩

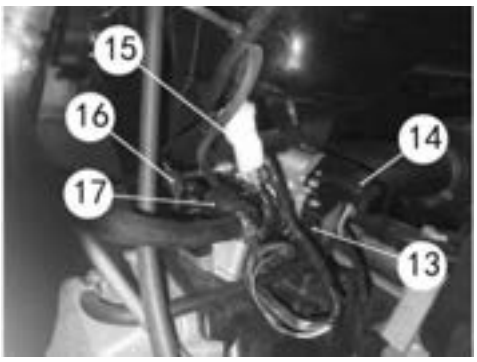
- Oxygen Sensor ⑪



6.Install accelerator cable into the carburetor, adjust accelerator cable and tighten nut ⑫.

7. Connect the following electrical components:

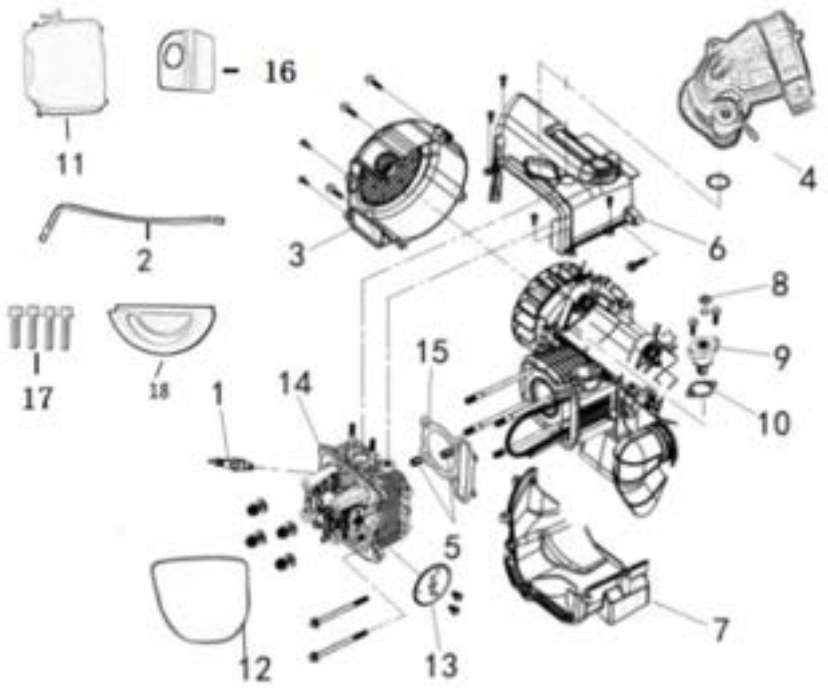
- Sensor (throttle body) ⑬
- Stepper motor (throttle body) ⑭
- Engine Temperature Sensor ⑮
- Injector ⑯



8.Connect the fuel supply line ⑰ to the fuel rail.

9.Install air box and muffler into the engine
10.Install axle.
11.Properly adjust the chain.
12.Install side panels and pedals.

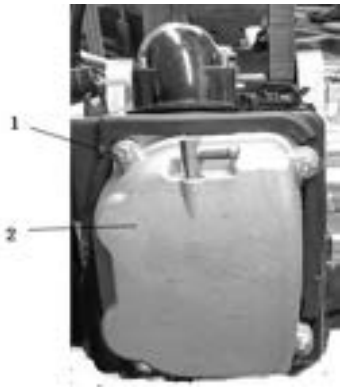
3.4 CYLINDER HEAD



Order	Job/Parts to remove	Q'ty	Remarks
	Exhaust pipe		Disconnect.
	Engine oil		Disconnect.
1	Spark plug	1	
2	Cylinder head breather hose	1	
3	Cooling fan cover	1	
4	Intake pipe	1	
5	Dowel pin	2	
6	Shroud comp b	1	
7	Shroud comp a	1	
8	Timing chain tensioner cap bolt	1	
9	Timing chain tensioner	1	
10	Gasket	1	
11	Cylinder head cover	1	
12	Valve cover seal	1	
13	Timing sprocket	1	
14	Cylinder head	1	
15	Cylinder head gasket	1	
16	Intake Valve rocker shaft baffle	1	
17	Cover Bolt	4	
18	Block of cylinder head	1	

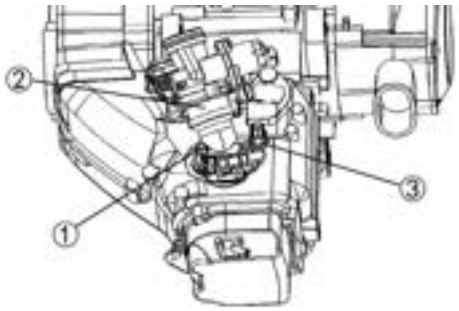
3.4.1 CYLINDER HEAD COVER REMOVAL

1. Loosen:
● Bolts ①
2. Remove:
● Cylinder head cover ②



3.4.2 CYLINDER HEAD REMOVAL

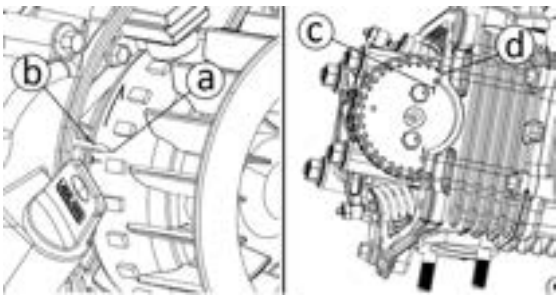
1. Loosen:
●Nuts ①
2. Remove:
●Throttle body adapter ②
3. Remove:
●Engine temperature sensor ③



4. Remove:
●Cooling fan cover
●Upper shroud
●Lower shroud

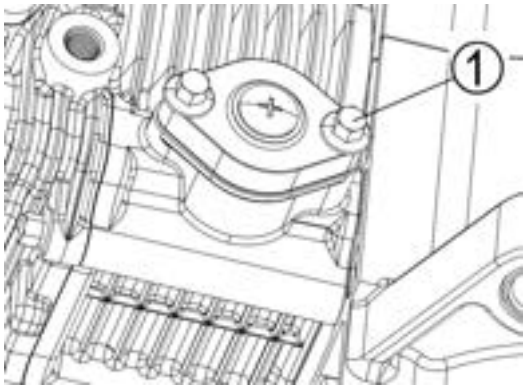
5. Align:
"T" mark ⓐ on the rotor
(with stationary pointer ⓑ on the crankcase)

NOTE:
If any special mark found, contact the UTV manufacture via the agent for the parts and special instruction.



NOTE:
Turn the cooling fan clockwise and align the "I" mark ⓒ with the cylinder head match mark ⓓ when the piston is at TDC on the compression

6. Loosen:
● Bolts ①
7. Remove:
●Timing chain tensioner assembly
●Timing chain tensioner gasket

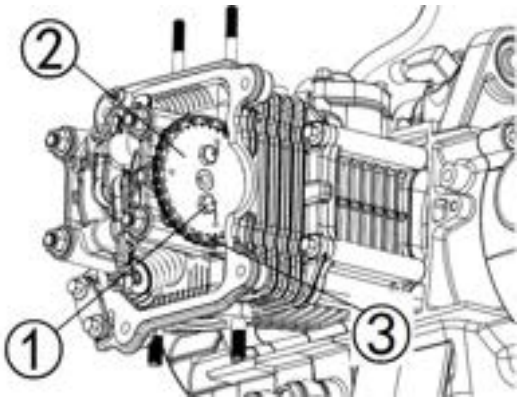


NOTE:
The plunger is under spring tension. Maintain inward pressure on the tensioner body while removing.

8.Inspect:
●Tensioner and plunger ②
Wear/ damage → Replace.

NOTE:
Using a small flat blade screwdriver, turn the tensioner clockwise to retract the plunger. The plunger should move smoothly in and out of the tensioner body.

9. Loosen:
● Bolts ①
10. Remove:
● Cam sprocket ②
● Timing chain ③



NOTE:
Fasten a safety w ire to the timing chain to prevent it from falling into the crankcase.
11. Inspect:
● Cam sprocket
Wear/ damage → Replace.

12. Remove:
● Cylinder head

NOTE:
●Loosen the nuts in their proper loosening sequence.
●Start by loosening each nut 1/2 turn until all are loose.

3.4.3 CYLINDER HEAD INSPECTION

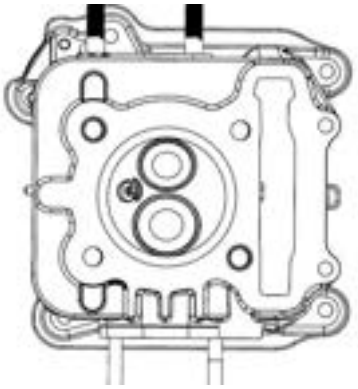
1. Eliminate:

●Carbon deposits
(from combustion chambers)
Use a rounded scraper.

NOTE:

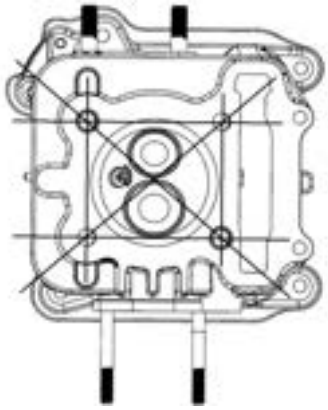
Do not use a sharp instrument to avoid damaging or scratching:

●Spark plug threads
●Valve seats



2. Inspect:

●Cylinder head
Scratches/damage → Replace.



3. Measure:

●Cylinder head warpage
Out of secification → Resurface.

	Cylinder head warpage : Less than 0.05 mm

Warpage measurement and resurfacement steps:

●Place a straight edge and a feeler gauge across the cylinder head.
●Measure the warpage.
If the warpage is out of specification, resurface the cylinder head.
● Place a 400 ~ 600 grit wet abrasive paper on the surface plate, and resurface the head using a figure eight sanding patten.

NOTE:

Rotate the cylinder head several times for an even resurfacement.

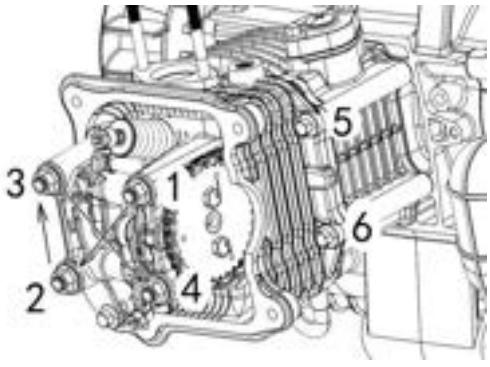
3.4.4 CYLINDER HEAD INSTALLATION

1. Install:

●Gasket (cylinder head) NEW
●Dowel pins
●Cylinder head

NOTE:

●Apply engine oil onto the nut threads.
●Tighten the nuts in a crisscross pattern.



2. Tighten:

●Nuts (cylinder head)

TORQUE
Cylinder head Nuts: 25N.m

●Bolts (cylinder)

TORQUE
Cylinder Bolts: 10N.m

3. Install:

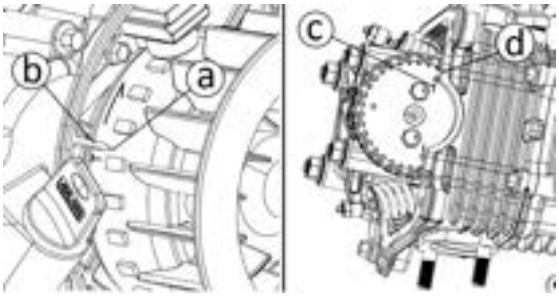
●Cam sprocket

●Timing chain

Installing steps :

●Turn the cooling fan clockwise until the TDC mark ⓐ matches the stationary pointer ⓑ.

●Align the "T" mark ⓒ on the cam sprocket with the stationary pointer ⓓ on the cylinder head.



NOTE:

If any special mark found, contact the UTV manufacture via the agent for the parts and special instruction.

●Fit the timing chain onto the cam sprocket and install the cam sprocket on the camshaft.

NOTE:

●When installing the cam sprocket, keep the timing chain as tense as possible on the exhaust side.

●Align the match mark ⓒ on the cam sprocket with the stationary pointer ⓓ on the cylinder head.

●Align the hole in the cam shaft with the hole in the cam sprocket.

CAUTION:

Do not turn the crankshaft during installation of the cam shaft. Dam age or improper valve timing will result.

●While holding the camshaft, temporarily tighten the bolts.

●Remove the safety wire from the timing chain.

4. Tighten:

●Bolts (cam sprocket)

TORQUE
Cam sprocket Bolts: 15N.m

5. Install:

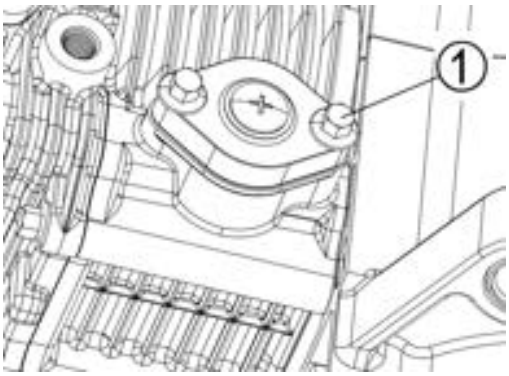
●Timing chain tensioner

Installing steps:

●Using a small flat blade screwdriver, turn the tensioner clockwise to retract the plunger ② all the way into the tensioner body.

●Keeping the plunger retracted, install the tensioner assembly with a new gasket and tighten the bolts ① to specification.

TORQUE
Tensioner Bolts: 10N.m



●Release the tensioner and install the tensioner cap.

TORQUE
Tensioner Cap: 5N.m

●Slowly rotate engine two to three revolutions and recheck cam timing once chain is tight.

6. Check:

●Valve timing

Out of alignment → Adjust.

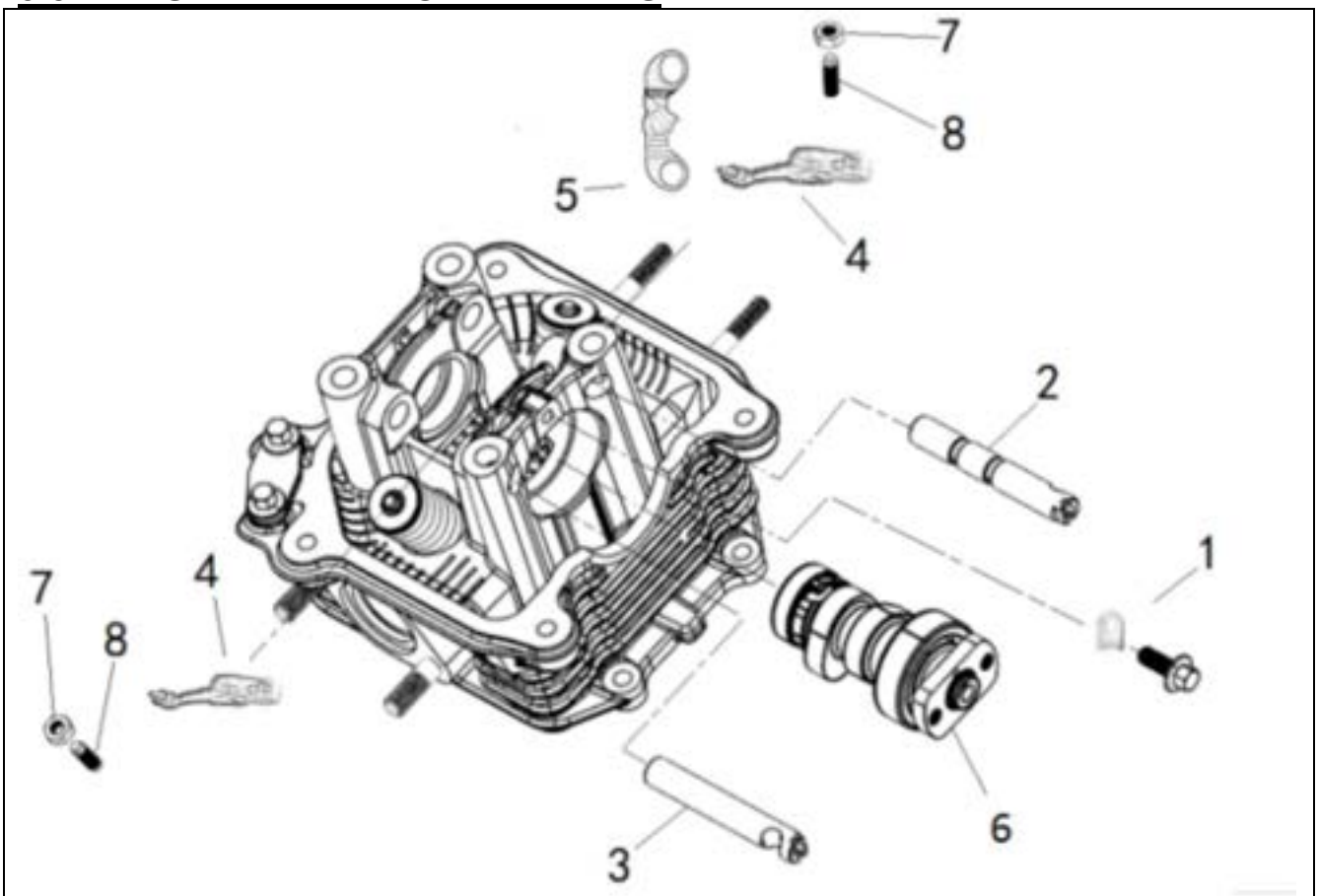
7. Check:

●Valve clearance

Out of specification → Adjust.

Refer to the **"3.2.5VALVE CLEARANCE ADJUSTMENT"** section.

3.5 CAMSHAFT AND ROCKER ARMS



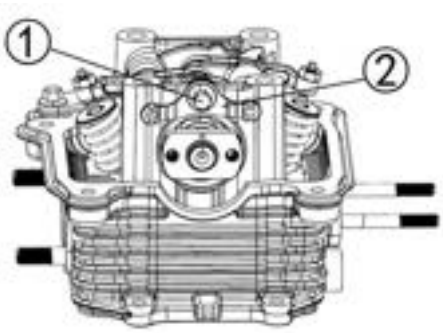
Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "**CYLINDER HEAD**"
1	Camshaft bearing pressure platen	1	
2	Intake rocker shaft	1	
3	Exhaust rocker shaft	1	
4	Rocker arm assembly	1	
5	Pressure reducing valve stop plate	1	
6	Camshaft	1	
7	Locknut	2	
8	Valve adjusting screw	2	

3.5.1 CAMSHAFT AND ROCKER ARMS REMOVAL

1.Loosen:
- Bolt ①

2. Remove:
- Camshaft bearing platen ②
- Rocker arm shaft (intake)
- Rocker arm shaft (exhaust)

3. Remove:
- Rocker arm (intake)
- Rocker arm (exhaust)
- Camshaft



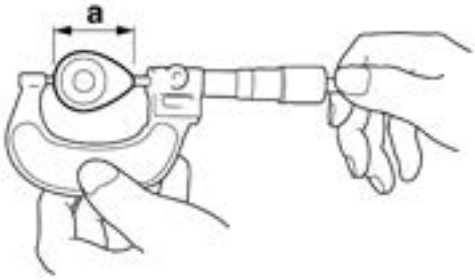
3.5.2 CAMSHAFT INSPECTION

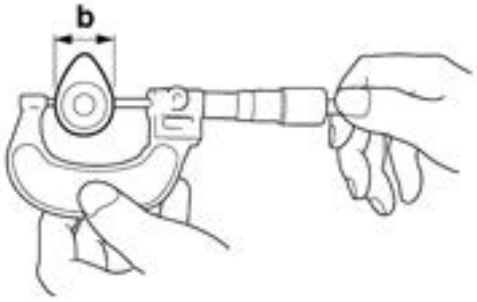
1. Inspect:
- Camshaft lobes

Pitting/Scratches/Blue discoloration →Replace.

2. Measure:
- Camshaft lobes length “a” and “b”

Out of specification → Replace.





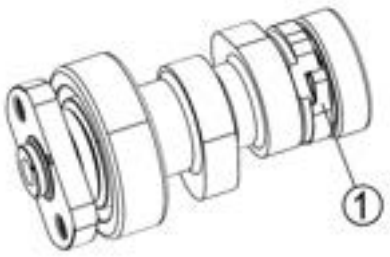
Camshaft lobes length:
Intake:
A 29.52-29.58mmmm
<Lim it: 29.47 mm>
B 25.00-25.03mm
<Lim it: 24.95 mm>
Exhaust:
A 29.32-29.38mm
<Lim it: 29.27 mm>
B 25.00-25.03mm
<Lim it: 24.95 mm>

3. Inspect:
- Compression release mechanism 1

Excessive wear → Replace.

NOTE:

This is a one-way rotating shoulder that lifts the exhaust valve slightly during start-up. If the one-way mechanism is not functioning, replace the cam. Verify the stop bracket and spring is functioning correctly.



3.5.3 ROCKER ARMS AND ROCKER ARM SHAFTS INSPECTION

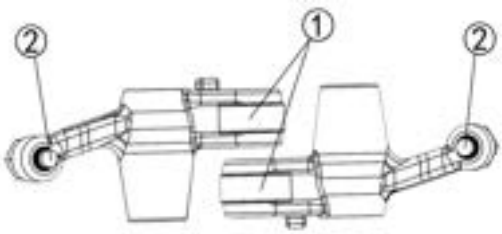
1. Inspect:

●Camshaft lobe contact surface ①

Excessive wear → Replace.

●Adjuster surface ②

Wear/Pitting/Scratches/Blue discoloration → Replace.



2. Inspect:

●Rocker arm shaft hole.

Excessive wear → Replace.

3. Inspect:

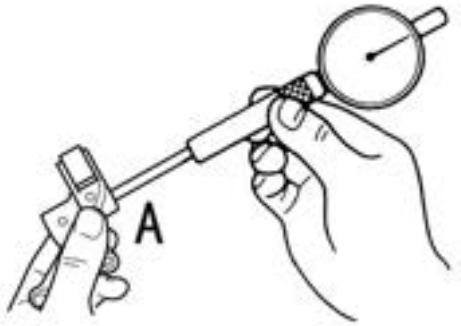
●The surface condition of the rocker arm shafts.

Pitting/scratches/blue discoloration → Replace or check lubrication.

4. Measure:

●Measure the inside diameter A of the rocker arm holes.

Out of specification → Replace.

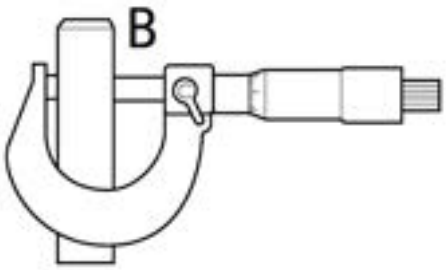


	Inside diameter (rocker arm): 10.000-10.015mm
	< Lim it: 10.100 mm >

5. Measure:

● Measure the outside diameter B of the rocker arm shafts.

Out of specification → Replace.



	Outside diameter(rocker arm shaft): 9.972-9.987 mm
	<Lim it: 9.920 mm>

6. Calculate:

●Rocker-arm-to-rocker-arm-shaft clearance

Out of specification → Replace.

	Rocker-arm-to-rocker-arm-shaft clearance: 0.013-0.043 mm

3.5.4 CAMSHAFT AND ROCKER ARM INSTALLATION

1. Lubricate:

●Cam shaft

	Camshaft: **Molybdenum disulfide oil**
Camshaft bearing: **Engine oil**	

2. Install:

●Cam shaft

3. Apply:

●Molybdenum disulfide oil onto the rocker arm and rocker arm shaft.

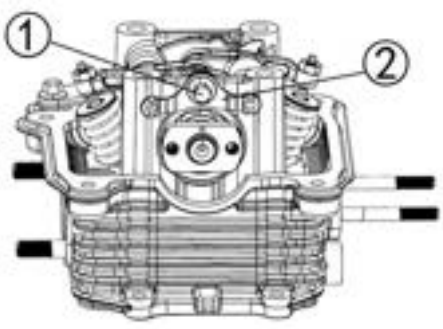
	Molybdenum disulfide oil

4. Install:

- Exhaust rocker arm
- Exhaust rocker arm shaft
- Exhaust rocker arm return spring
- Intake rocker arm
- Intake rocker arm shaft
- Intake rocker arm plate
- Intake rocker arm return spring

5. Install:

●Camshaft bearing platen ②



6. Tighten:

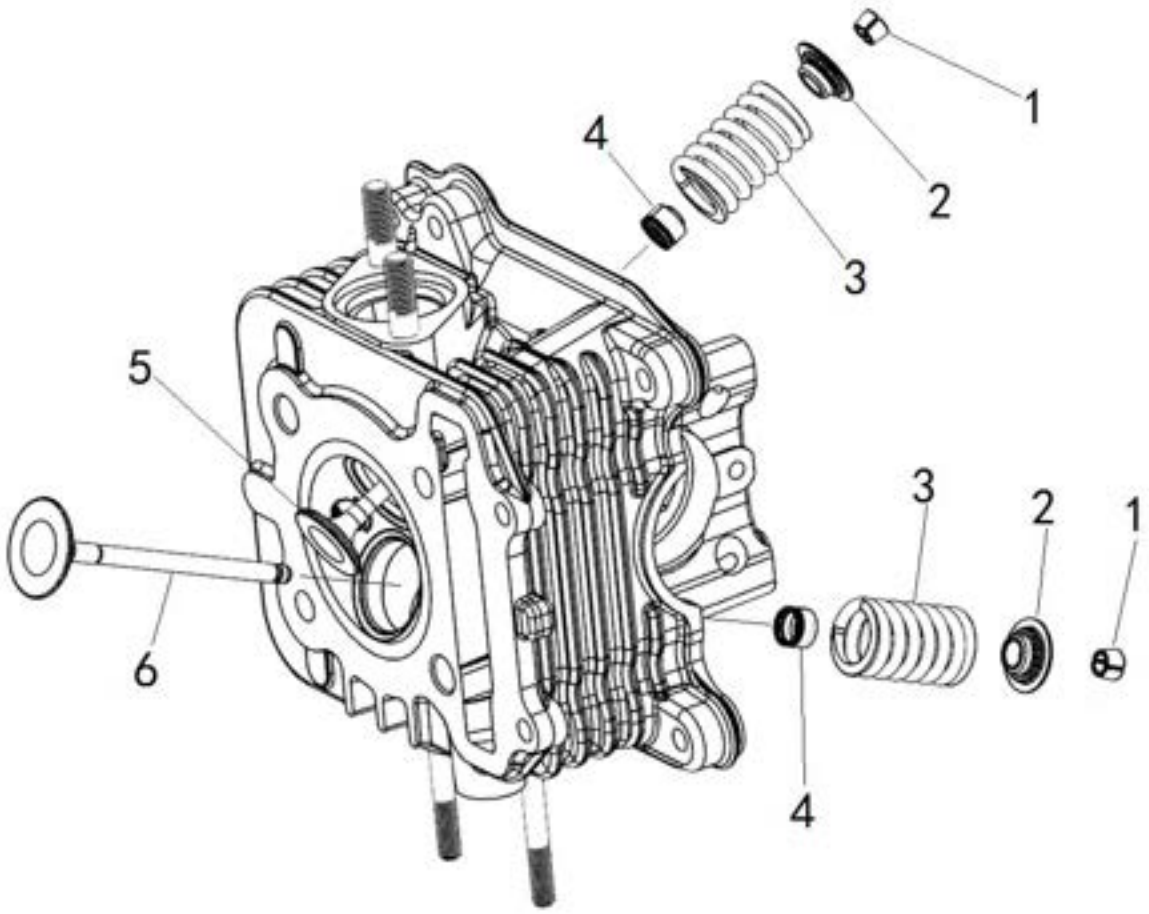
- Bolt ①

TORQUE
Camshaft bearing platen Bolt: 10N.m

CAUTION:

Do not confuse the installation direction of rocker arm shaft. Be sure to install the threaded part facing outward.

3.6 VALVES AND VALVE SPRINGS



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "**CYLINDER HEAD**"
	Camshaft		Refer to "**CAMSHAFT AND ROCKER ARMS**"
1	Valve cotter	4	
2	Valve spring retainer	2	
3	Valve spring	2	
4	Valve stem seal	2	
5	Exhaust valve	1	
6	Intake valve	1	

3.6.1 VALVES AND VALVE SPRINGS REMOVAL

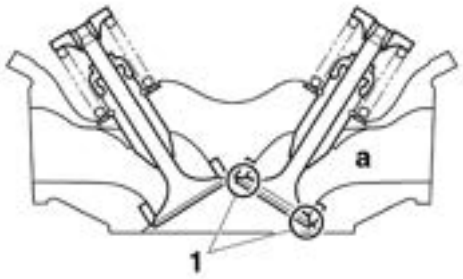
NOTE:

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Inspect:

● Valve sealing

Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.



Inspection steps:

a. Pour a clean solvent “a” into the intake and exhaust ports.

b. Check that the valves properly seal.

NOTE:

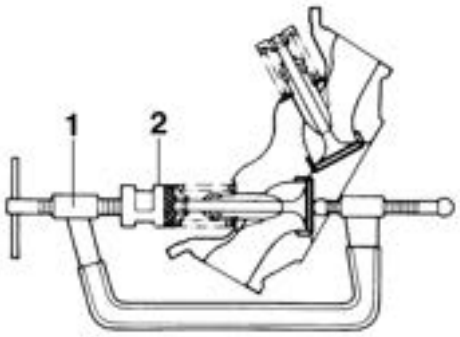
There should be no leakage at the valve seat “1”.

2. Remove:

● Valve cotters

NOTE:

Remove the valve cotters by compressing the valve spring with the valve spring compressor “1” and the valve spring compressor attachment “2”.



CAUTION:

Do not compress so much as to avoid damage to the valve spring.

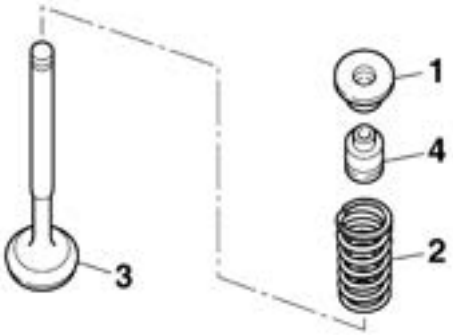
3. Remove:

● Valve spring retainer “1”

● Valve spring “2”

● Valve “3”

● Valve stem seal “4”



NOTE:

Identify the position of each part very carefully so that it can be reinstalled in its original place.

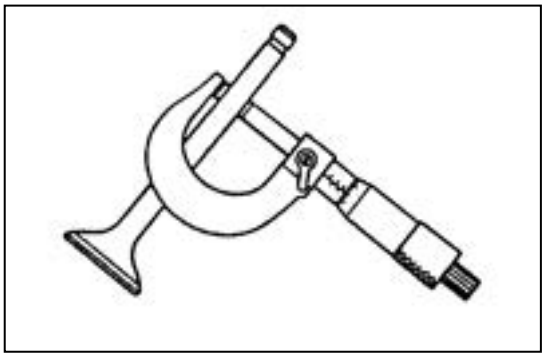
3.6.2 VALVE AND VALVE SPRINGS INSPECTION

1. Measure:

●Valve stem diameter

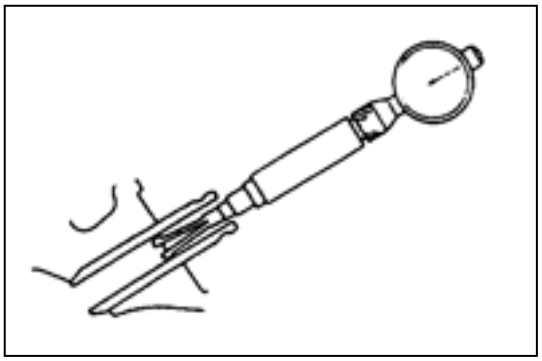
Out of specification → Replace.

Valve stem diameter:
Intake:
4.970-4.980mm
<Limit: 4.90mm>
Exhaust:
4.955-4.970mm
<Limit: 4.90mm>



2. Measure:
●Valve guide inside diameter
Out of specification → Replace.

Valve guide inside diameter:
Intake:
5.000-5.012mm
<Limit: 5.03mm>
Exhaust:
5.000-5.012mm
<Limit: 5.03mm>

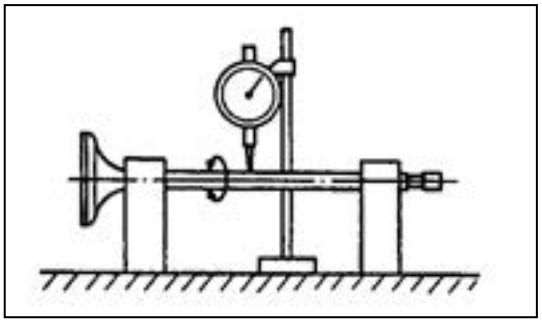


3. Measure:
●Valve-stem-to-valve-guide clearance
Out of specification → Replace.

Stem-to-guide clearance limit:
Intake:
0.08 mm
Exhaust:
0.10 mm

4.Measure:
●Runout (valve stem)
Out of specification → Replace.

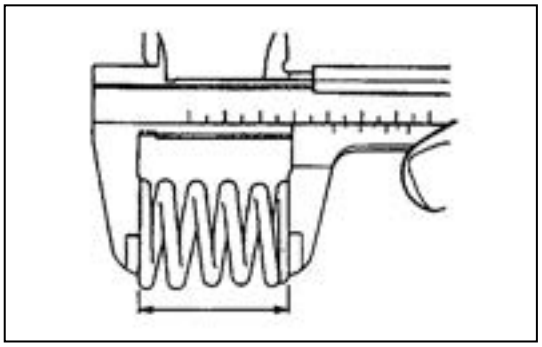
Runout limit:
0.10 mm



NOTE:
●When installing a new valve, always replace the valve guide.
●If the valve is removed or replaced, always replace the valve stem seal.

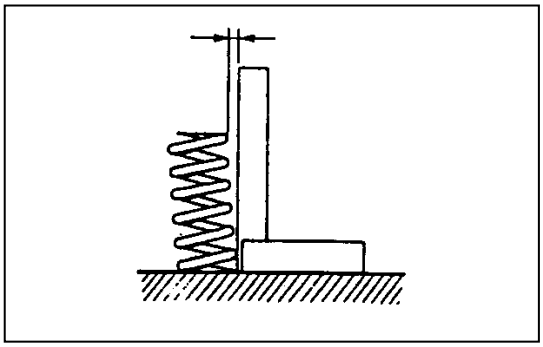
5. Inspect:
●Valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
6. Measure:
●Free length (valve spring)
Out of specification → Replace.

Valve spring free length:
Intake:
37 mm
<Limit: 35 mm>
Exhaust:
34.8 mm
<Limit: 32.8 mm>



7. Measure:
●Spring tilt
Out of specification → Replace.

Spring tilt (intake)
2.5° / 1.60mm
Spring tilt (exhaust)
2.5° / 1.60mm



8. Inspect:
●Spring contact face
Wear/Pitting/Scratches → Replace.

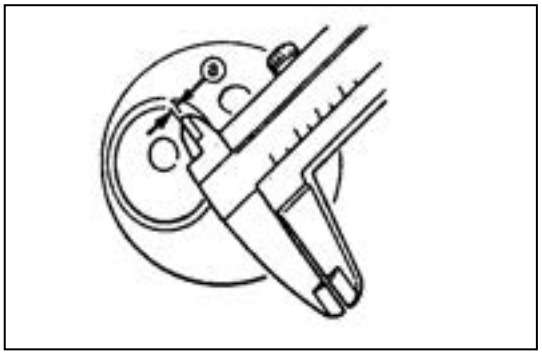
3.6.3 VALVE SEATS INSPECTION

1. Eliminate:
●Carbon deposits
(from the valve face and valve seat)

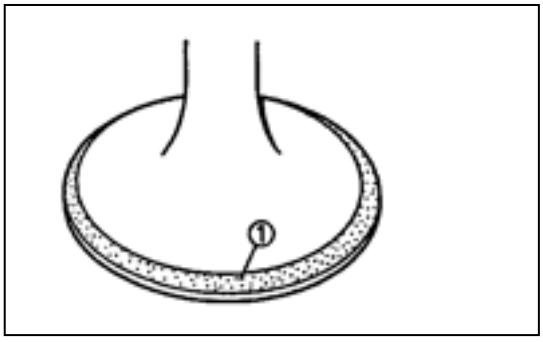
2. Inspect:
●Valve face
Pitting/wear → Grind the valve face.

3. Measure:
●Valve seat width ⓐ
Out of specification → Reface the valve seat.

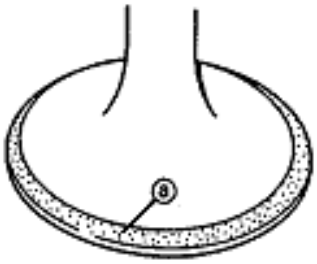
Valve seat width:
Intake:
0.6-0.8mm
<Limit:1.5mm>
Exhaust:
0.6-0.8mm
<Limit:1.5mm>



Measurement step:
●Apply Mechanic's blueing dye (Dykem) ① to the valve face.
●Install the valve into the cylinder head.
Press the valve through the valve guide and onto the valve seat to make a clear pattern.
●Measure the valve seat width. Where the valve seat and valve face made contact, blueing will have been removed.
●If the valve seat is too wide, too narrow, or the seat is not centered, the valve seat must be replaced.

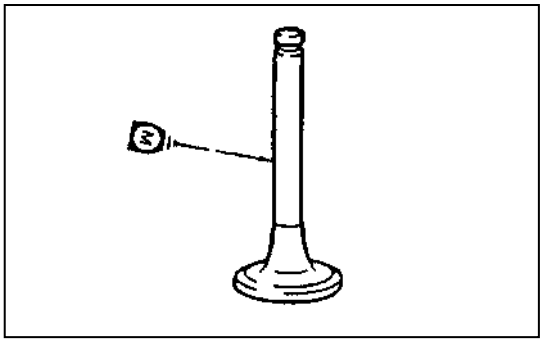


4. Lap:
●Valve face
●Valve seat
NOTE:
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.



Lapping steps:
●Apply a coarse lapping com pound ⓐ to the valve face.
CAUTION:
Do not let compound enter the gap between the valve stem and the guide.

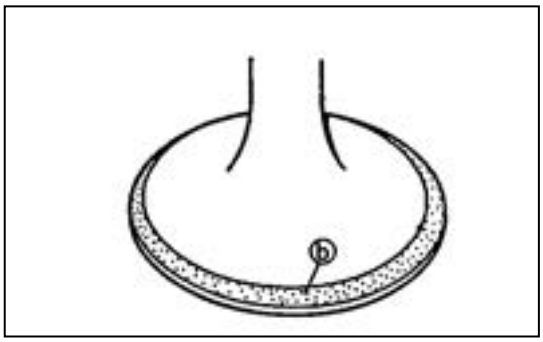
●Apply molybdenum disulfide oil to the valve stem.
●Install the valve into the cylinder head.
●Turn the valve until the valve face and valve seat are evenly polished, then clean off al com pound.
NOTE:
For best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.



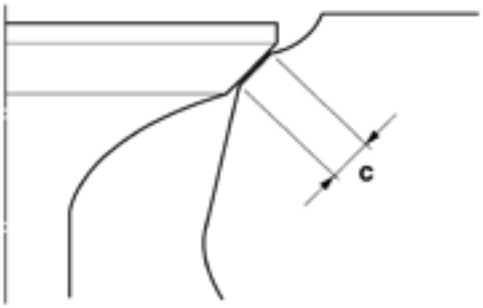
●Apply a fine lapping compound to the valve face and repeat the above steps.

NOTE:

Make sure to clean off all compound from the valve face and valve seat after every lapping operation.

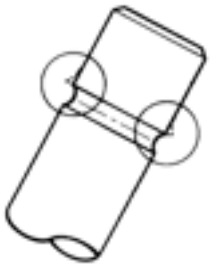


●Apply Mechanic's blueing dye (Dykem) ⓑ to the valve face.
●Install the valve into the cylinder head.
●Press the valve through the valve guide and onto the valve seat to make a clear pattern.
●Measure the valve seat with "c" again.

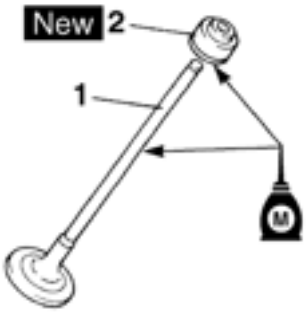


3.6.4 VALVES AND VALVE SPRINGS INSTALLATION

1. Deburr:
●Valve stem end
Use an oilstone to smooth the stem end.

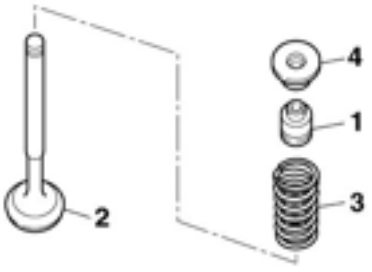


2.Lubricate:
●Valve stem "1"
●Valve seal "2" New
(with the recommended lubricant)



	Recommended lubricant **Molybdenum disulfide oil**

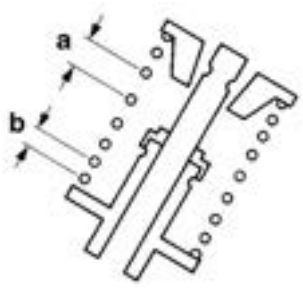
3. Install:
● Valve stem seal "1" New
● Valve "2"
● Valve spring "3"
● Valve spring retainer "4"
(into the cylinder head)



NOTE:

●Make sure each valve is installed in its original place.

●Install the valve springs with the larger pitch “a” facing up.



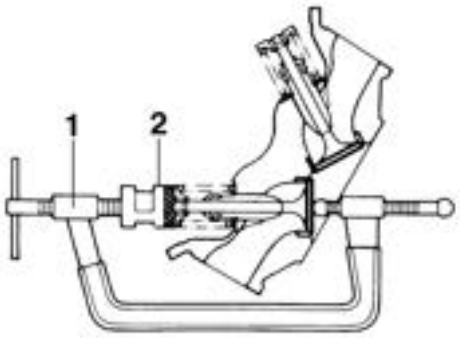
b. Smaller pitch

4. Install:

●Valve cotters

NOTE:

Install the valve cotters by compressing the valve spring with the valve spring compressor “1” and the valve spring compressor attachment “2”.

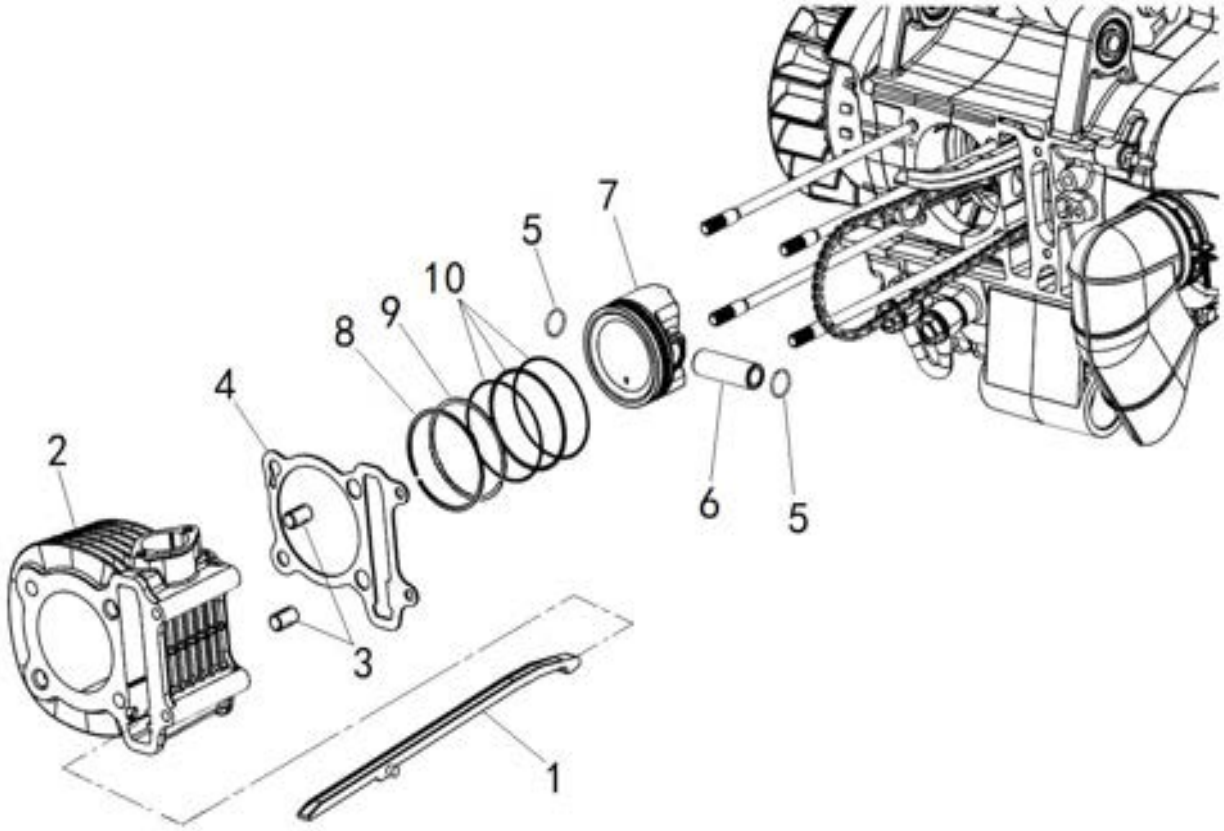


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

CAUTION:

Hitting the valve tip with excessive force could damage the valve.

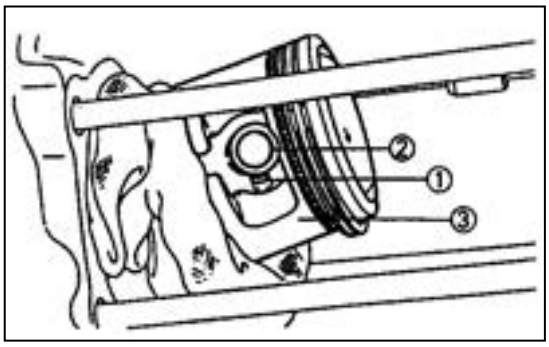
3.7 CYLINDER AND PISTON



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "**CYLINDER HEAD**"
1	Timing chain guide (exhaust side)	1	
2	Cylinder	1	
3	Dowel pin	2	
4	Cylinder gasket	1	
5	Piston pin clip	2	
6	Piston pin	1	
7	Piston	1	
8	Top ring	1	
9	2nd ring	1	
10	Oil ring	1	

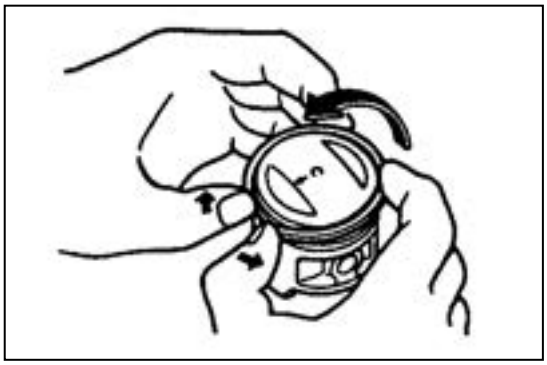
3.7.1 PISTON AND PISTON RINGS REMOVAL

1. Remove:
- Piston pin circlip ①
- Piston pin ②
- Piston ③



NOTE:
Before removing the piston pin circlip, cover the crankcase opening with a clean tow el or rag to prevent the circlip from falling into the crankcase cavity.

2. Remove:
- Top ring
- 2nd ring
- Oil ring



NOTE:
When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

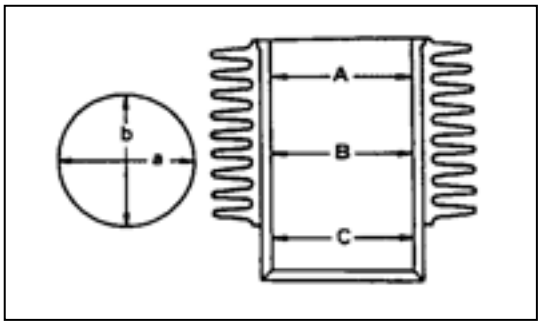
3.7.2 CYLINDER INSPECTION

1. Check:
- Piston wall
- Cylinder wall

Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.

2. Measure:
- Cylinder bore

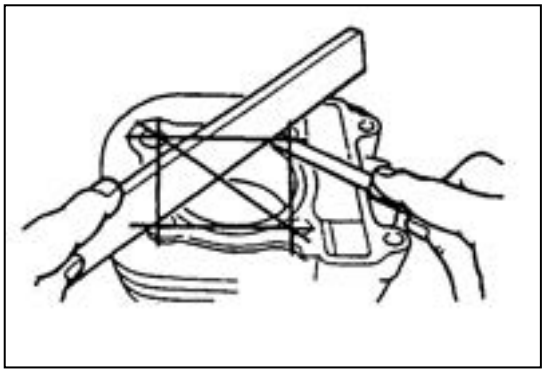
Out of specification → Rebore or replace.



NOTE:
- Measure cylinder bore with the cylinder bore gauge.
- Measure cylinder bore by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Cylinder bore:
62.515-62.520
< Limit:62.600mm>
< Difference limit between A,B and C :0.03mm >

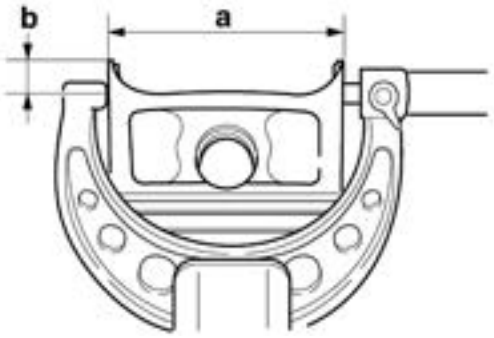
3. Measure:
●Warpage
Out of specification → Replace.



Cylinder warpage limit:
0.05mm

3.7.3 PISTON AND PISTON PIN INSPECTION

1. Measure:
●Piston skirt diameter "a"
Out of specification → Replace .
"b" 7.0mm from the piston bottom edge.



Piston skirt diameter:
62.475-62.485mm

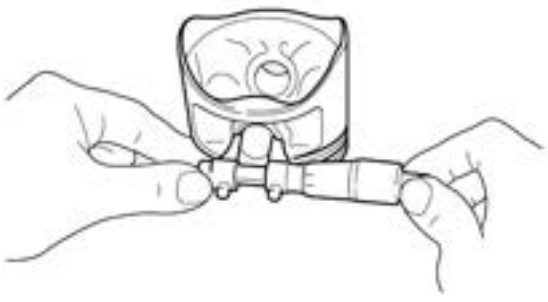
2. Calculate:
●Piston-to-cylinder clearance

Piston-to-cylinder clearance=
Cylinder bore-Piston skirt diameter

Refer to "CYLINDER" section for cylinder bore measurement.
Out of specification → Replace the piston and piston rings as a set.

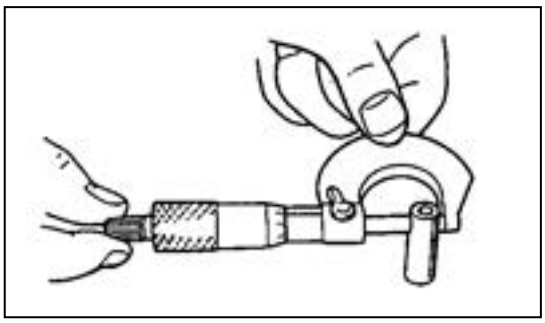
Piston-to-cylinder clearance:
0.025-0.045mm
<Limit: 0.10mm>

3. Measure:
●Piston pin bore diameter
Out of specification → Replace.



Piston pin bore diameter:
15.002-15.008mm
<Limit:15.04mm>

4. Measure:
●Piston pin outside diameter
Out of specification → Replace.



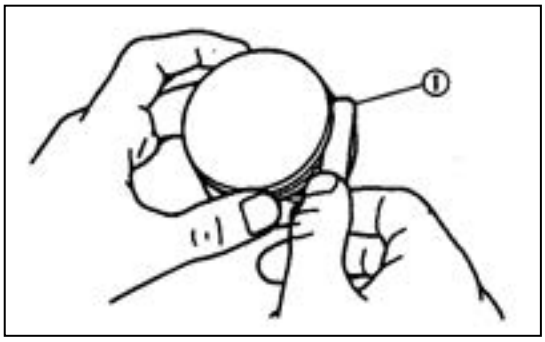
Piston pin bore diameter:
14.994-15.000mm
<Limit:14.960mm>

5. Inspect:
●Piston pin
Blue discoloration/groove → Clean or replace.

3.7.4 PISTON RINGS INSPECTION

1. Measure:
●Side clearance ①
Out of specification → Replace the piston and the piston rings as a set.

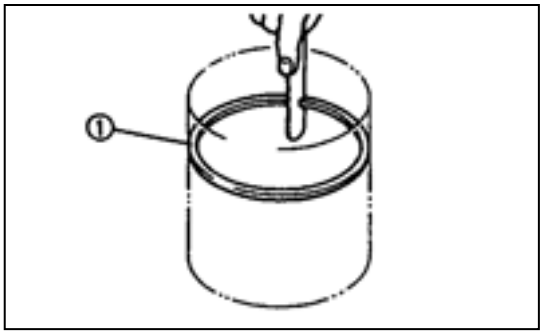
NOTE:
Eliminate the carbon deposits from the piston ring grooves and rings before measuring the side clearance.



Side clearance (piston ring):
Top ring:
0.02-0.06mm
<Limit: 0.11mm>
2nd ring:
0.02-0.06mm
<Limit: 0.12mm>

2. Install:
●Piston ring
(into the cylinder)

NOTE :
Level the piston ring into the cylinder with the piston crown.
① 50mm



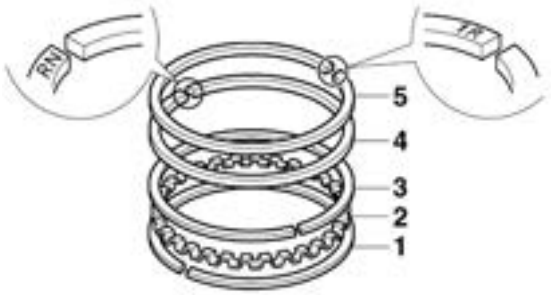
3. Measure:
●Piston ring end gap
●Out of specification → Replace.

NOTE :
The oil ring expander spacer end gap cannot be measured. If the oil ring rail gap is excessive, replace all three piston rings.

Piston ring end gap:
Top ring:
0.10-0.25mm
<Limit:0.45mm>
2nd ring:
0.20-0.40mm
<Limit:0.60mm>
Oil ring:
0.20-0.70mm

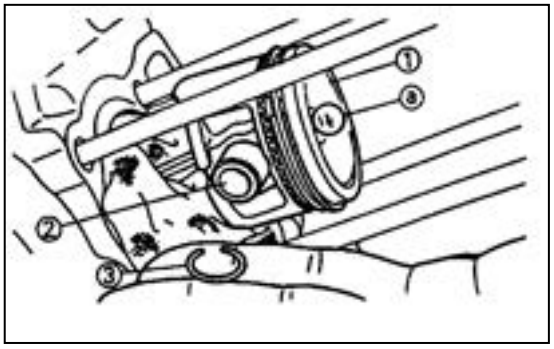
3.7.5 PISTON RINGS, PISTON AND CYLINDER INSTALLATION

1. Install:
- Lower oil ring rail “1”
- Oil ring expander “2”
- Upper oil ring rail “3”
- 2nd ring “4”
- Top ring “5”



NOTE:
- Be sure to install the piston rings so that the manufacturer’s marks or numbers face up.
- Lubricate the pistons and piston rings liberally with engine oil.

2.Install:
- Piston ①
- Piston pin ②
- Piston pin clip ③ NEW

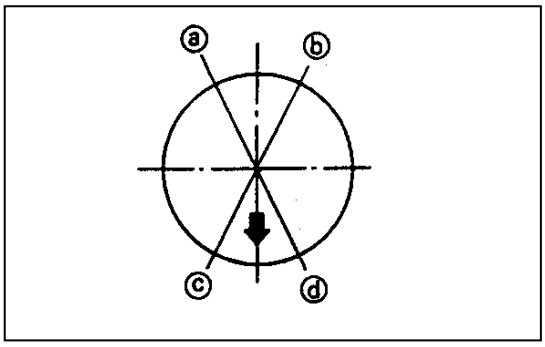


NOTE:
- Apply engine oil to the piston pins.
- The " △ " mark ⓐ on the piston must face the exhaust side of the cylinder.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.

3. Install:
- Gasket (cylinder) NEW
- Dowel pins

4. Position:
- Piston rings

NOTE:
Offset the piston ring end gaps as shown.



ⓐ Top ring end
ⓑ Oil ring end (lower)
ⓒ Oil ring end (upper)
ⓓ 2nd ring end

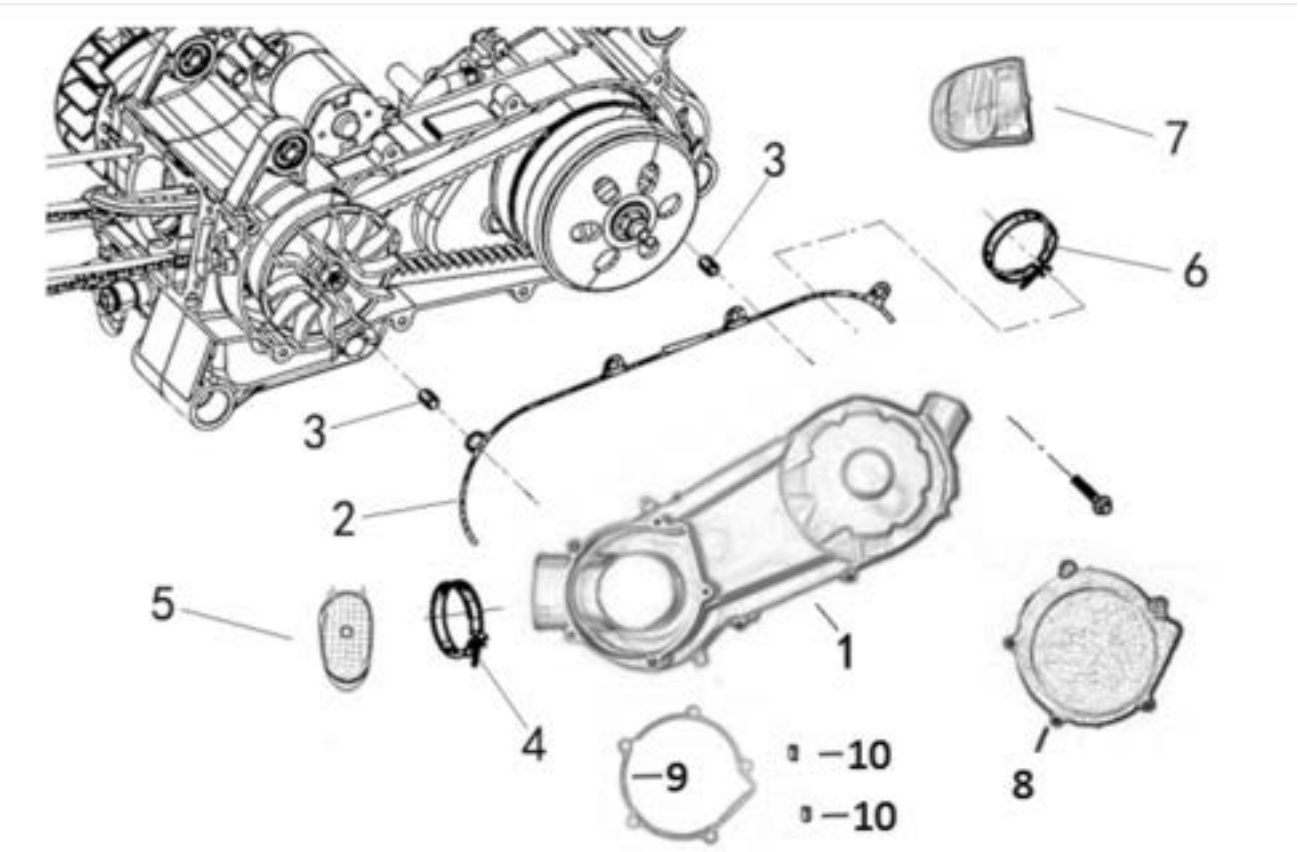
5. Lubricate:
●Piston outer surface
●Piston ring
●Cylinder inner surface
(with the recommended lubricant)

	Recommended lubricant Engine oil

6. Install:
●Cylinder
NOTE:
●Install the cylinder with one hand while com pressing the piston rings with the other hand.
●Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

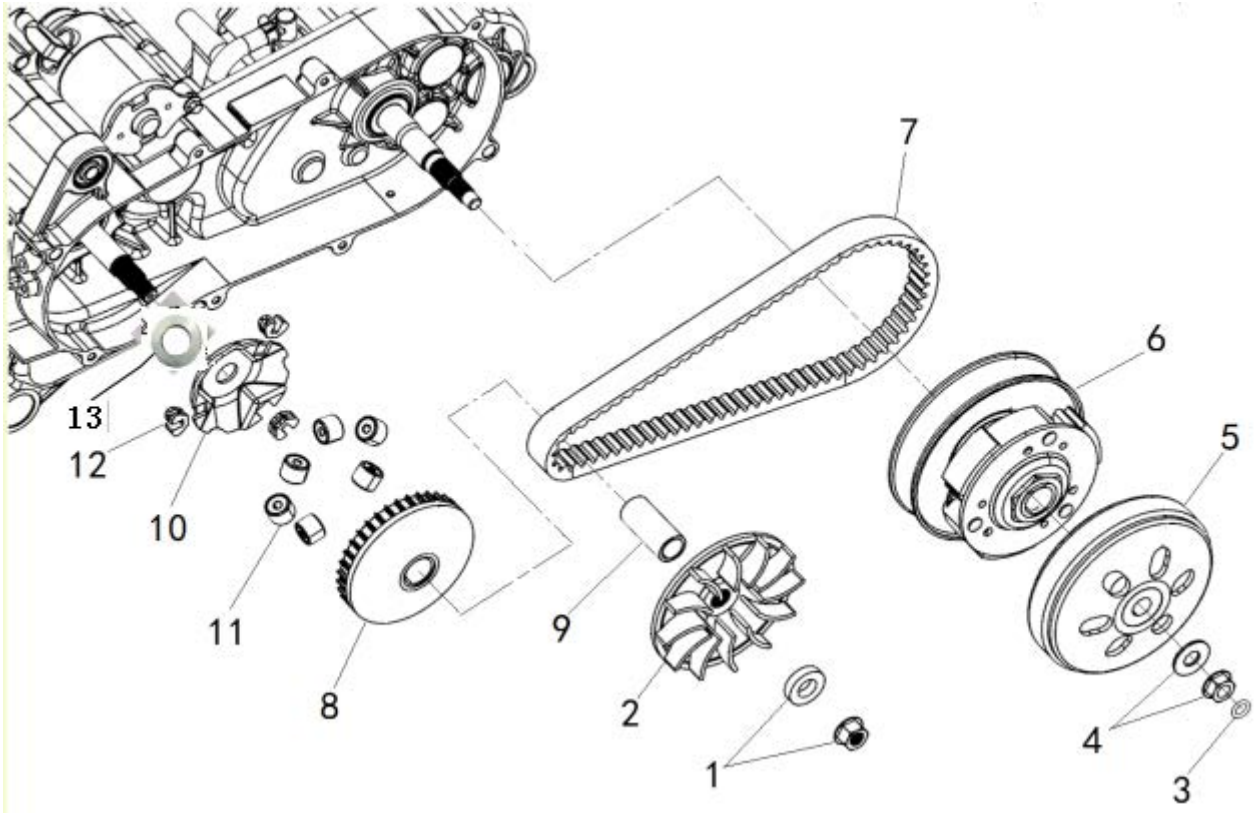
3.8 V-BELT, CLUTCH AND SECONDARY/PRIMARY SHEAVE

CRANKCASE COVER (LEFT)



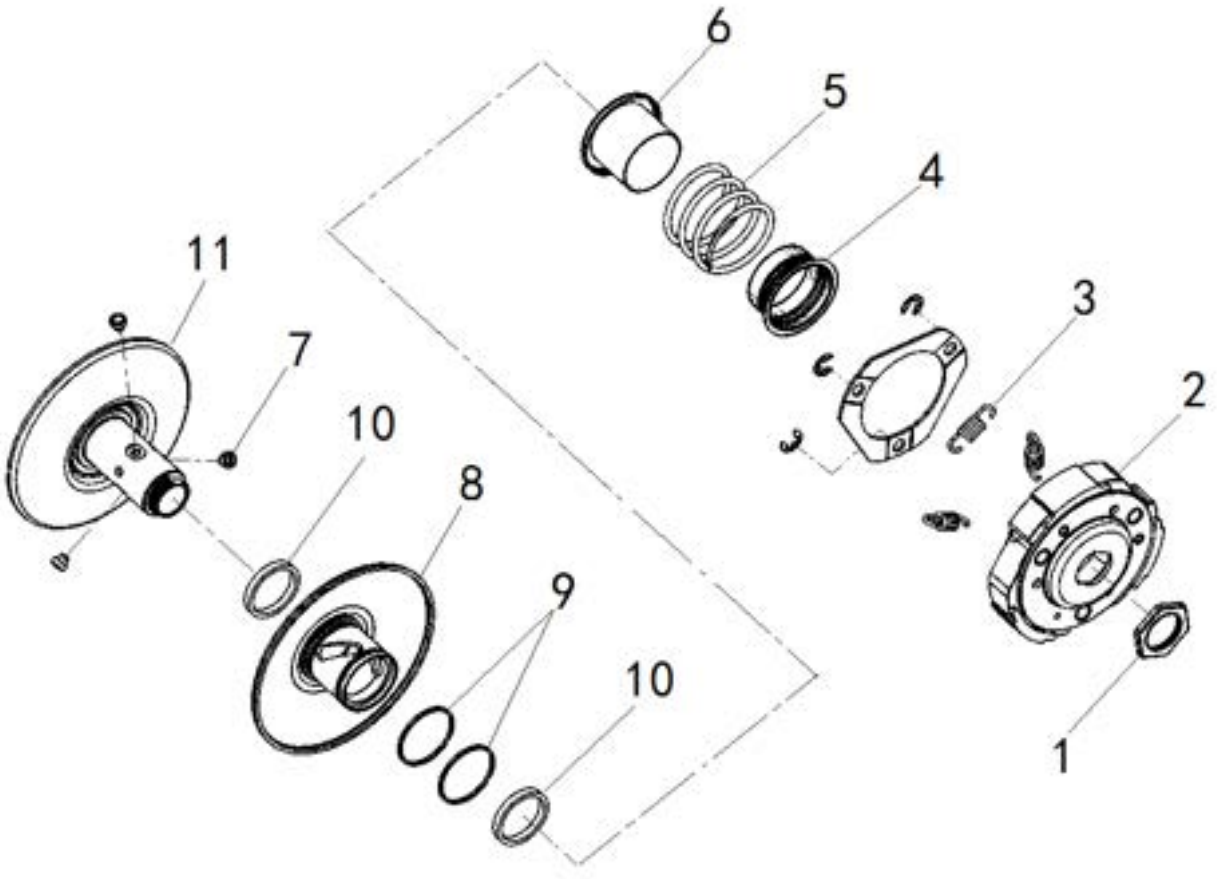
Order	Job/Parts to remove	Q'ty	Remarks
1	Crankcase cover (left)	1	
2	Crankcase cover (left) gasket	1	
3	Dowel pin	2	
4	Hose clamp A	1	
5	Joint A	1	
6	Hose clamp B	1	
7	Joint B	1	
8	Left Little Guy	1	
9	Left Little Guygasket	1	
10	Dowel pin	2	

PRIMARY SHEAVE



Order	Job/Parts to remove	Q'ty	Remarks
1	Nut/Plain washer	1/1	
2	Primary fixed sheave	1	
3	O-ring	1	
4	Nut/Plain washer	1/1	
5	Clutch housing	1	
6	Clutch assembly	1	
7	V-belt	1	
8	Primary sliding sheave	1	
9	Collar	1	
10	Cam	1	
11	Weight	6	
12	Slider	3	
13	Starting driven gasket	1	

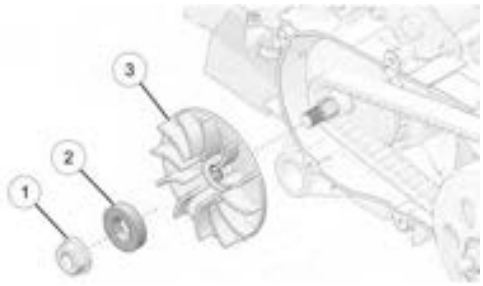
SECONDARY SHEAVE



Order	Job/Parts to remove	Q'ty	Remarks
1	Nut	1	
2	Clutch carrier	1	
3	Clutch shoe spring	3	
4	Spring seat A	1	
5	Compression spring	1	
6	Spring seat B	1	
7	Guide pin	3	
8	Secondary sliding sheave	1	
9	O-ring	2	
10	Oil seal	2	
11	Secondary fixed sheave	1	

3.8.1 PRIMARY SHEAVE REMOVAL

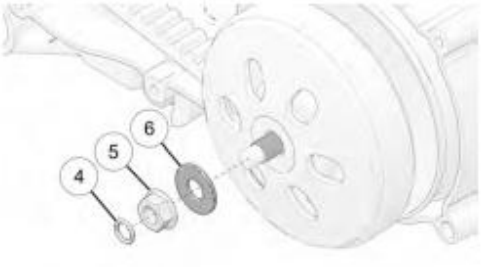
1. Loosen:
●Nut ①(primary sheave)



2. Remove:
●Plate washer ②
●Primary fixed sheave③

3.8.2 SECONDARY SHEAVE AND V-BELT REMOVAL

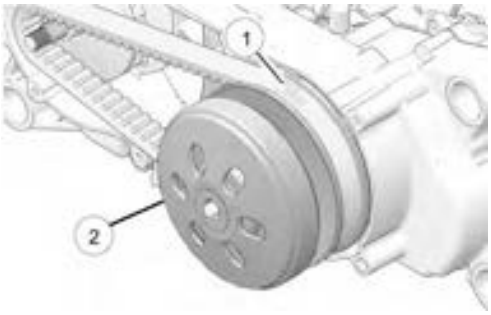
1. Remove:
●Seal ④



2. Loosen:
●Nut ⑤

3. Remove:
Washer ⑥

4. Remove:
● V-belt ①
● Clutch assembly ②

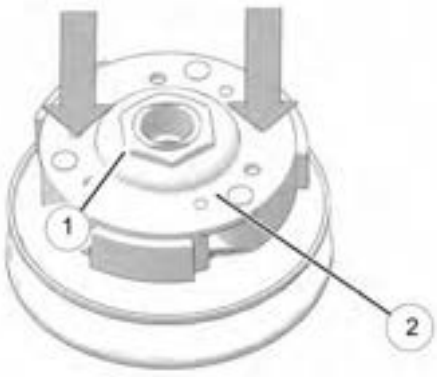


NOTE:
Remove the V-belt from the primary sheave side with clutch assembly.

3.8.3 SECONDARY SHEAVE DISASSEMBLY

1. Remove:
● Nut ① (secondary sheave)

NOTE:
Secure driven clutch assembly in a soft jaw vise or clamp.
Loosen retaining nut (counterclockwise) about 1 turn.
Hold downward pressure on friction shoe plate ②, then remove nut.
Release pressure on plate and remove friction shoe assembly and driven spring.



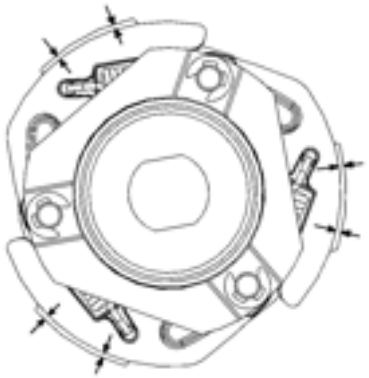
3.8.4 CLUTCH INSPECTION

1.Measure:

●Clutch shoe thickness

Scratches → Glaze using coarse sandpaper.

Wear /Damage → Replace.



	Clutch shoe thickness: **3.5mm** **<Limit:2.0mm>**

NOTE:

●After using the sandpaper, clean off the polished particles.

●Inspect the other clutch shoes.

●Replace all three as a set.

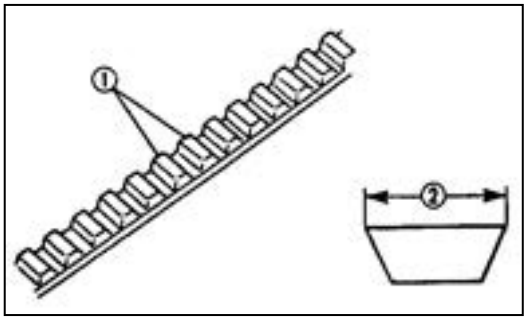
3.8.5 V-BELT INSPECTION

1.Inspect:

●V-belt ①

Cracks/Wear /Scaling /Chipping → Replace.

Oil/Grease → Check primary sheave and secondary sheave.



2. Measure:

●V-belt width ②

Out of specification → Replace.

	V-belt width: **20mm** **<Limit:19.0mm>**

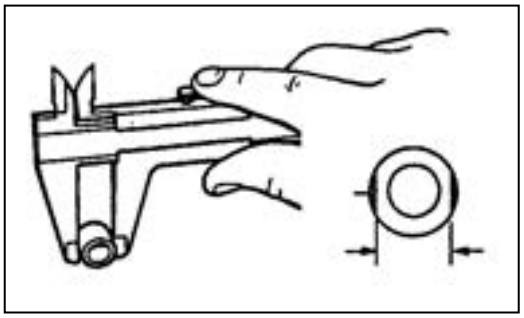
3.8.6 WEIGHT INSPECTION

1. Inspect:

● Weight minimum outside diameter

Cracks/Wear /Scaling /Chipping → Replace.

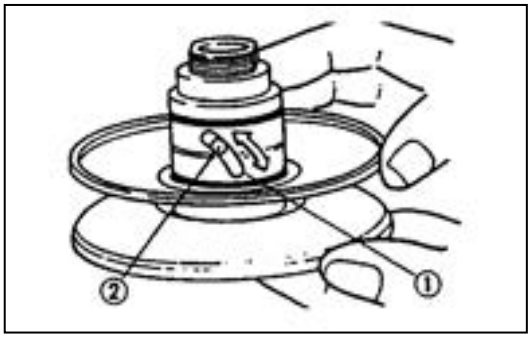
Out of specification → Replace.



	Weight out side diameter: **20.0 mm** **<Limit:19mm>**

3.8.7 SECOMDARY SHEAVE INSPECTION

1. Inspect:
- Secondary fixed sheave smooth operation
- Secondary sliding sheave smooth operation



2. Inspect:
- Torque cam groove ①

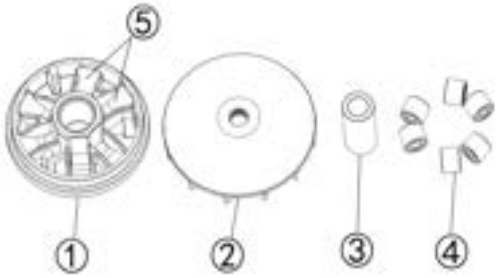
Wear /Damage → Replace.

3. Inspect:
- Guide pin ②

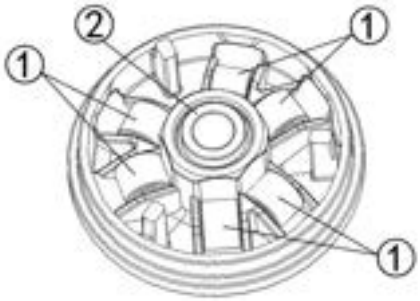
Wear /Damage → Replace.

3.8.8 PRIMARY SHEAVE ASSEMEBLY

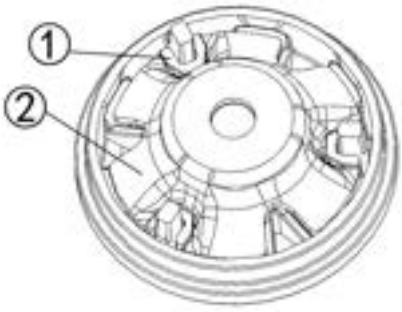
1. Clean:
- Primary sliding sheave face ①
- Primary fixed sheave face ②
- Collar ③
- Weight ④
- Primary sliding sheave cam face ⑤



2. Install:
- Weight ①
- Collar ②

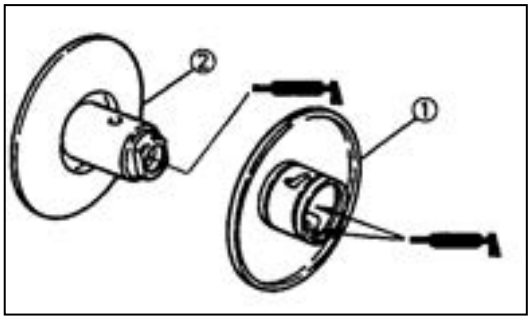


3. Install:
- Slider ①
- Cam ②



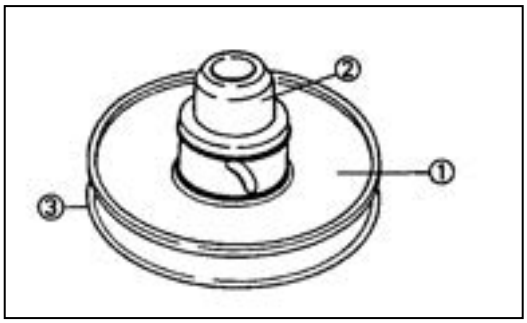
3.8.9 SECOMDARY SHEAVE INSTALLATION

1. Apply:
●Lightweight lithium-soap base grease
(to the secondary sliding sheave ① inner surface, grease nipple groove, and oil seals)
● Lightweight lithium-soap base grease
(to the bearings, oil seals and inner surface of the secondary fixed sheave ②)

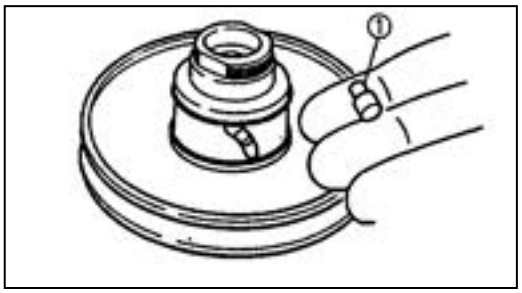


2. Install:
●Secondary sliding sheave ①

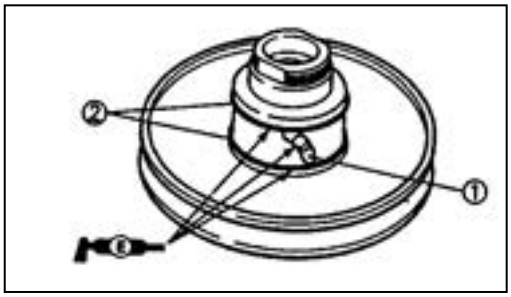
NOTE:
Install the secondary sliding sheave ①using the oil seal guide ② to the secondary fixed sheave③.



3. Install:
●Guide pin①



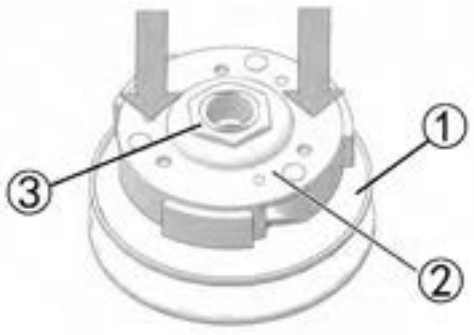
4. Apply:
● Lightweight lithium-soap base grease
(to the guide pin sliding groove ①, and oil seal ②NEW)



5. Install:
●Secondary sheave complete ①
●Compression spring
●Clutch carrier ②

6. Tighten:
●Nut ③

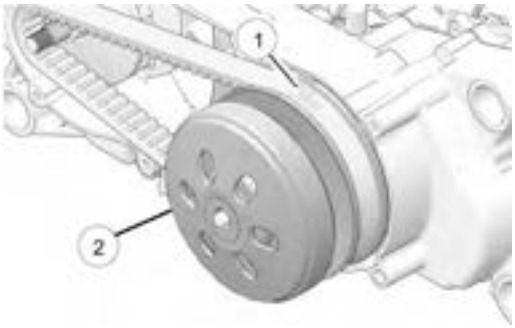
NOTE:
Have an assistant available for final assembly. Install spring. Place centrifugal hub over the spring and compress assembly together with both hands, aligning flats of hub with flats on threaded shaft.



With assembly compressed and threads exposed, have assistant thread a new nut onto shaft.

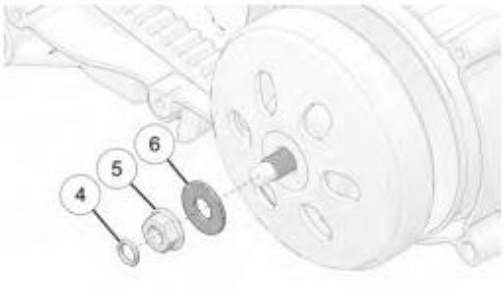
7. Install:
- V-belt ①
- Clutch assembly ②

NOTE:
Install the V-bet with clutch assembly to the primary sheave side.



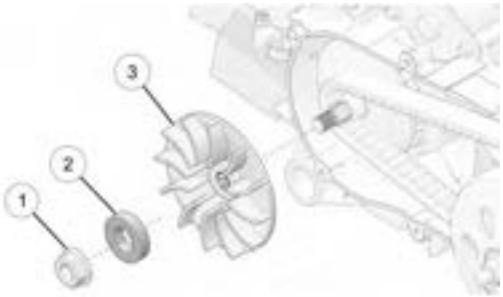
CAUTION:
Never smear grease to the V-belt, secondary sheave and clutch.

8. Install:
- Seal ④
- Nut ⑤
- Washer ⑥



TORQUE
Driven pulley assy nut: 60N.m

9. Install:
- Nut ①(primary sheave)
- Plate washer ②
- Primary fixed sheave③

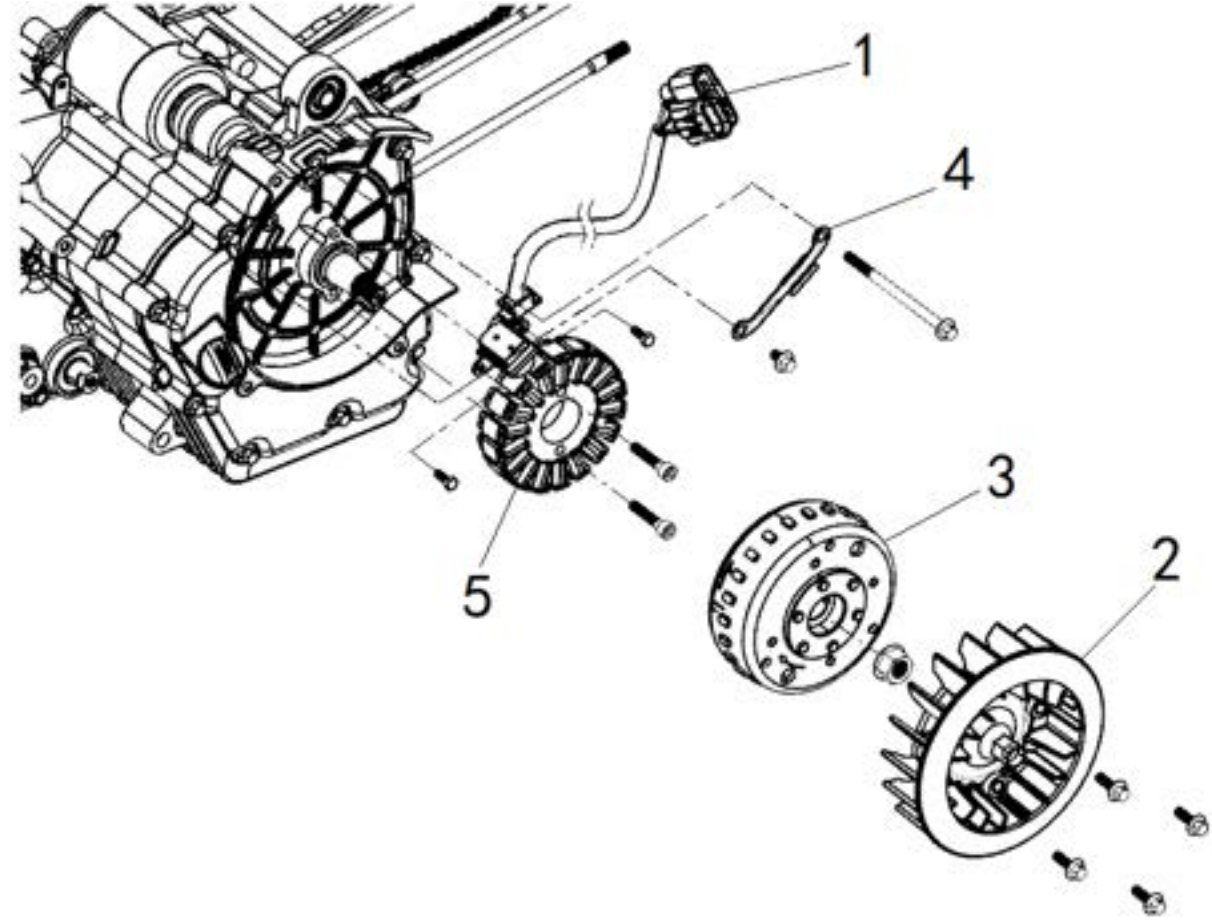


TORQUE
Driving pulley assy nut: 60N.m

NOTE:
Move the V-belt to minimum diameter of the primary sheave, maximum diameter of the secondary sheave and make the V-belt tense.

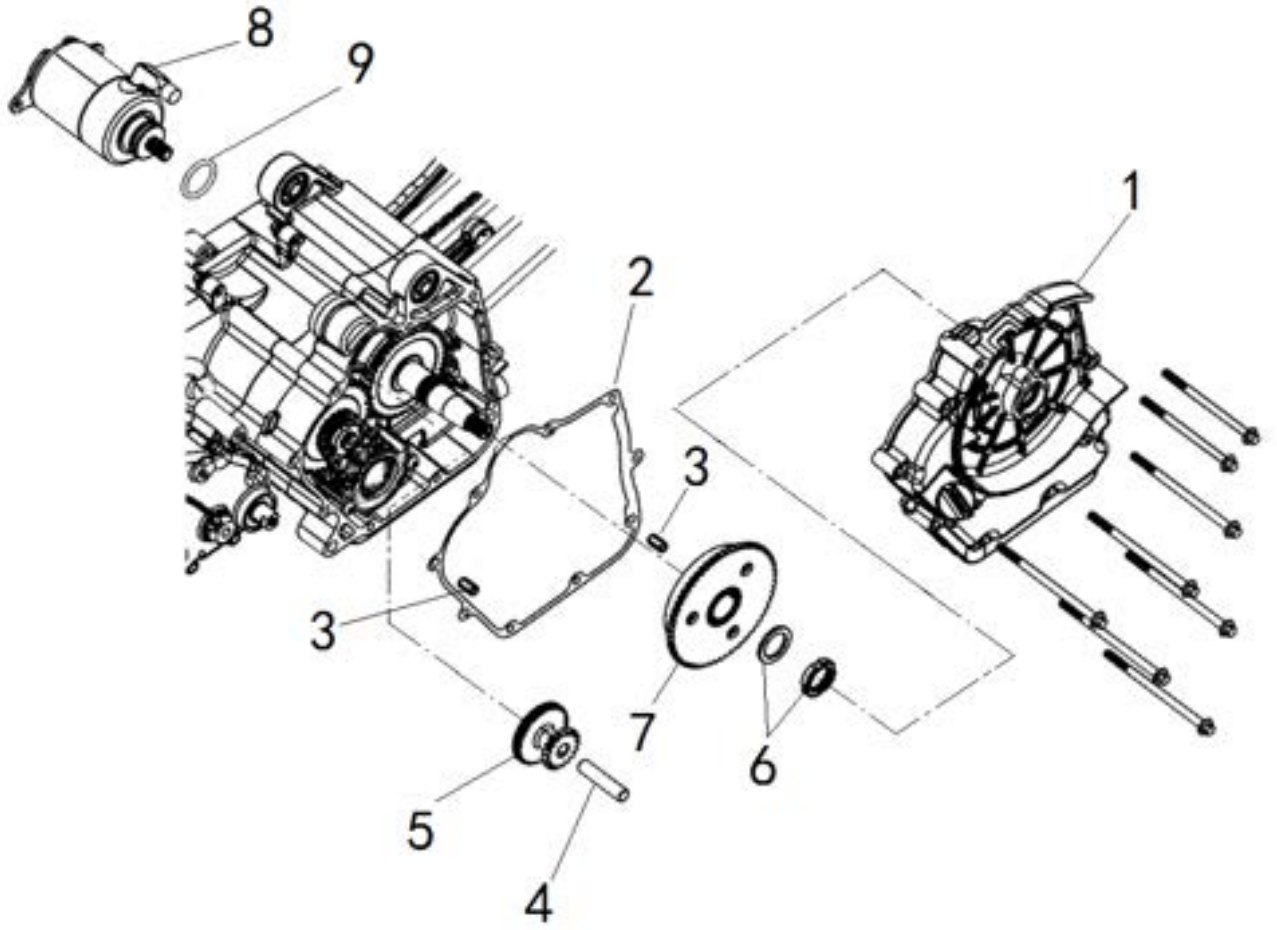
3.9 A.C. MAGNETO AND STARTER CLUTCH

A.C. MAGNETO



Order	Job/Parts to remove	Q'ty	Remarks
	Cooling fan cover		Refer to "**CYLINDER HEAD**"
1	Couplers (A.C. magneto lead)	1	Disconnect the couplers.
2	Cooling fan	1	
3	Magneto flywheel	1	
4	Clamper (A.C. magneto cord)	1	
5	Magneto coil	1	

STARTER CLUTCH AND STARTER MOTOR



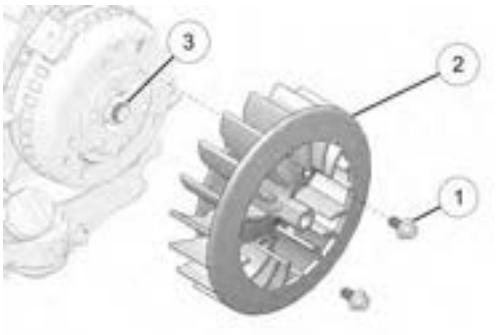
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Disconnect.
1	Crankcase cover (right)	1	
2	Crankcase cover (right) gasket	1	
3	Dowel pin	2	
4	Shaft (idle gear)	1	
5	Idler gear	1	
6	Nut/Plain washer	1	
7	Starter one way clutch assembly	1	
8	Starter motor	1	
9	O-ring	1	

3.9.1 A.C. MAGNETO REMOVAL

CAUTION:

Avoid damage to the flywheel or crankshaft end. Do not strike components or special tools with hammers or heavy objects.

1. Loosen:
- Bolts ①

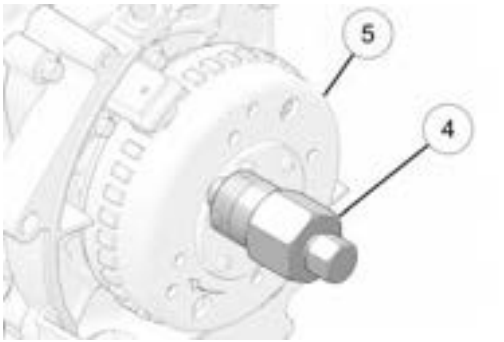


2. Remove:
- Cooling fan ②

3. Loosen:
- Nut ③

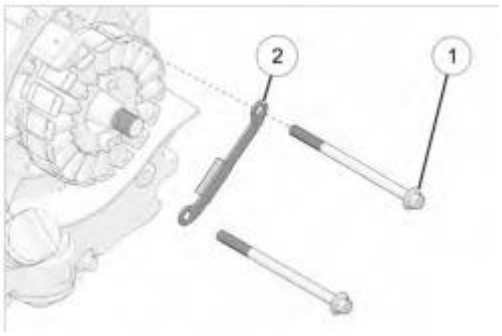
4. Remove:
- Rotor ⑤

NOTE:
- Remove the rotor using the flywheel puller④.



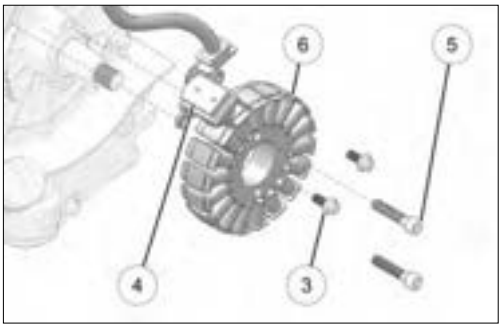
5. Loosen:
- Bolt ①

6. Remove:
- Cord clamp ②



7. Loosen:
- Bolts③
- Bolts⑤

8. Remove:
- Crankshaft position sensor ④ and stator coil ⑥

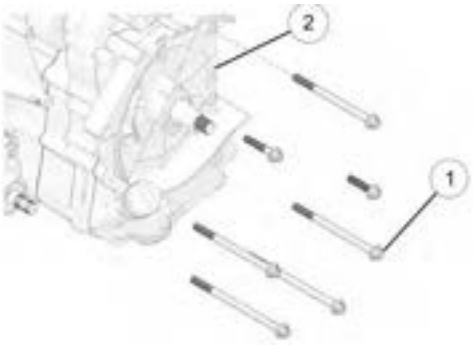


9. Check:
- Stator coil
- Crankshaft position sensor

Damage → Replace the crankshaft position sensor/stator assembly.

3.9.2 CRANKCASE COVER REMOVAL

1. Loosen:
●Bolts ①



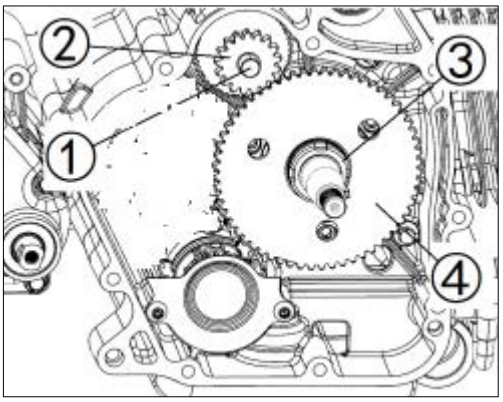
2. Remove:
●Crankcase cover ②

NOTE:

Pay attention to location and length of each fastener for assembly purposes.

3.9.3 STARTER DRIVE ONE-WAY CLUTCH REMOVAL AND INSPECTION

1. Remove:
● Shaft ①
● Start drive gear ②



2. Inspect:
● Start drive gear
Burrs /chips /roughness /wear → Replace.

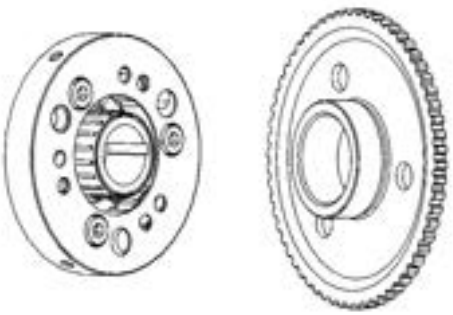
3. Loosen:
● Slotted nut ③
● Washer

NOTE:

●Remove the slotted nut ③ using the Slotted Nut Socket .
●Slotted nut ③ is left-hand thread.

4. Remove:
● Starter wheel gear ④

5. Inspect:
● Starter wheel gear
Burrs /chips /roughness /wear → Replace.
● Starter clutch gear contact surfaces
Damage /pitting /wear → Replace.
● Starter clutch operation
Unsmooth operation → Replace.



NOTE:

Assembly should turn in one direction only.

3.9.4 STARTER DRIVE ONE-WAY CLUTCH INSTALLATION

1. Install:

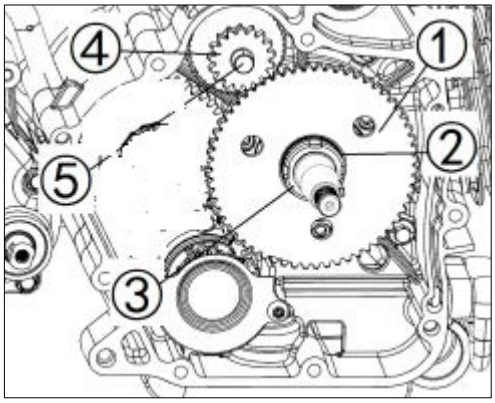
●Starter wheel gear ①

● Washer ②

2.Tighten:

● Slotted nut ③

TORQUE
Slotted nut: 95N.m



NOTE:

● Install the slotted nut ③ using the Slotted Nut Socket .

●Slotted nut ③ is left-hand thread.

3. Install:

● Start drive gear ④

● Shaft ⑤

3.9.5 CRANKCASE COVER INSTALLATION

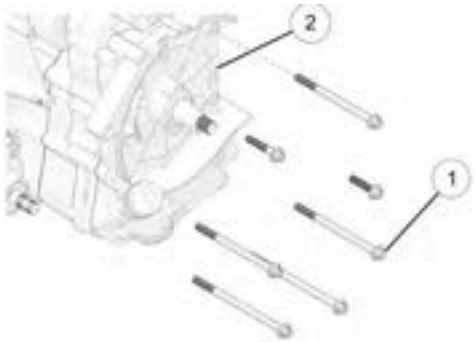
1. Clean all the gasket mating surface and crankcase mating surface thoroughly.

2. Install:

●Dowel pins

● Gasket (crankcase cover) NEW

● Crankcase cover ②



3.Tighten:

●Bolts (crankcase cover) ①

TORQUE
Bolts(crankcase cover): 10N.m

3.9.6 A.C. MAGNETO INSTALLATION

1. Install:

● Crankshaft position sensor ② and stator coil ①

2.Tighten:

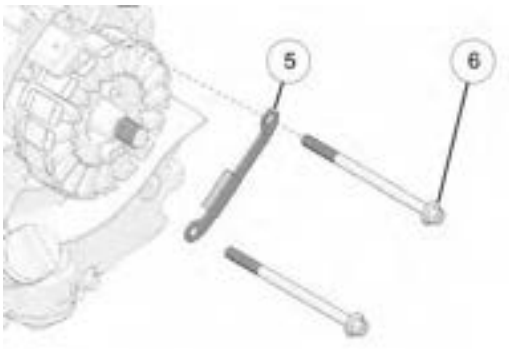
●Bolts (crankshaft position sensor) ③

TORQUE
Bolts(crankshaft position sensor): 10N.m

●Bolts (stator coil) ④

TORQUE
Bolts(stator coil): 10N.m

3. Install:
● Cord clamp ⑤

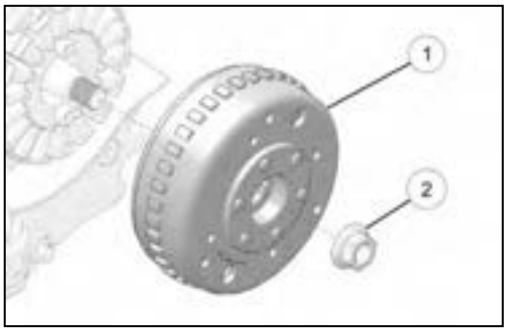


4.Tighten:
●Bolts (cord clamp) ⑥

TORQUE
Bolts(cord clamp): 10N.m

NOTE:
● Route the wires appropriately to avoid contact with any moving parts.
● Apply a small amount of Crankcase Sealant to the stator wire grommet and install into the housing cavity.

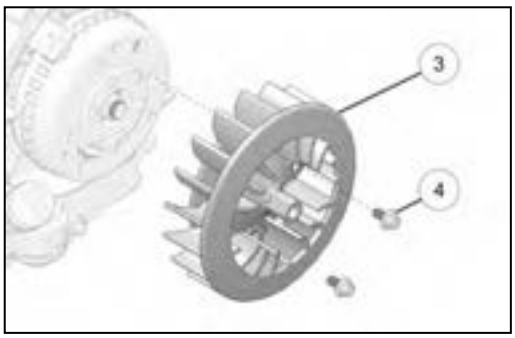
5. Install:
●Rotor ①



6. Tighten:
● Nut ②

TORQUE
Nut (rotor): 60N.m

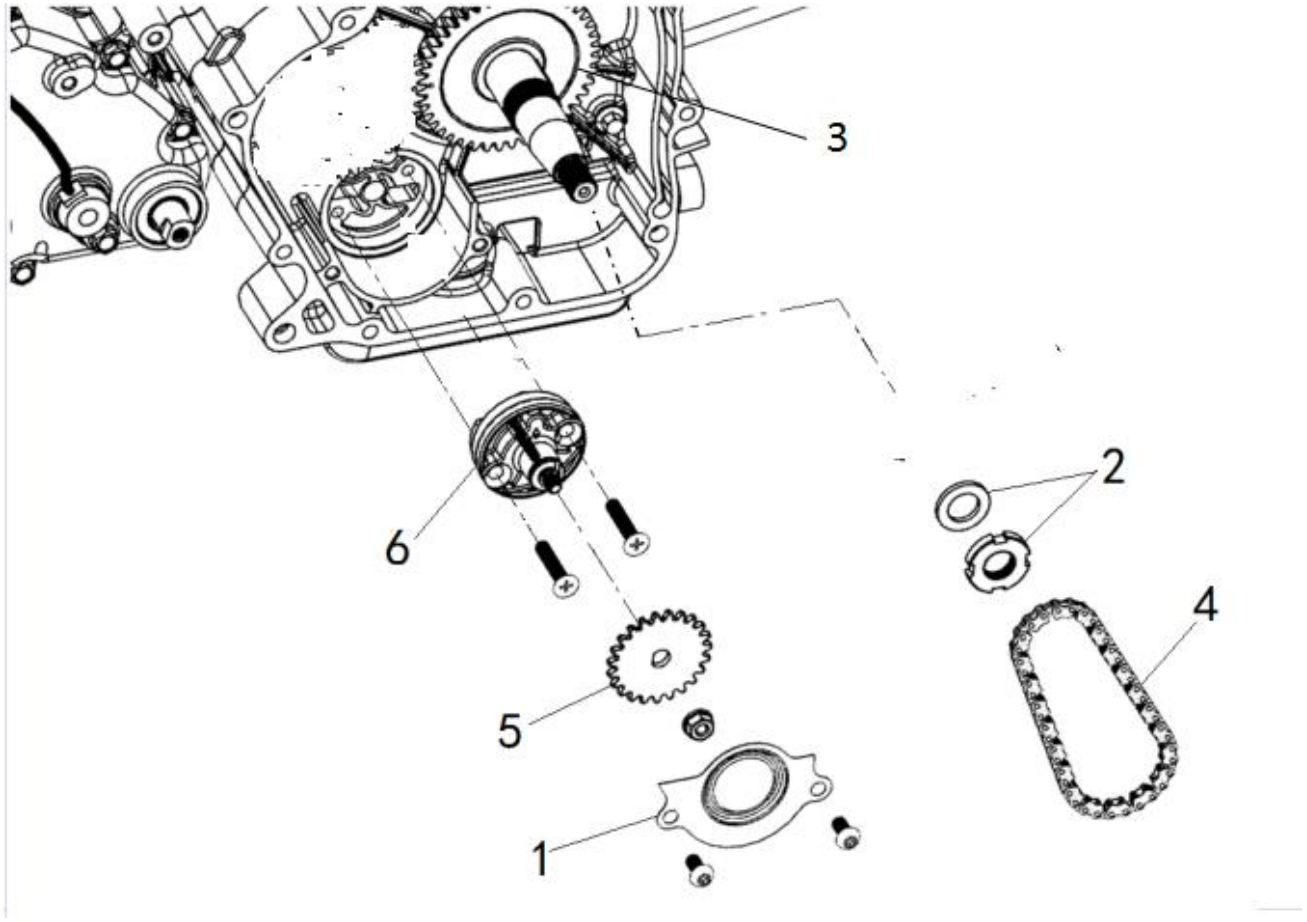
7. Install:
●Cooling fan ③



8. Tighten:
●Bolts (cooling fan) ④

TORQUE
Bolts (cooling fan): 10N.m

3.10 OIL PUMP

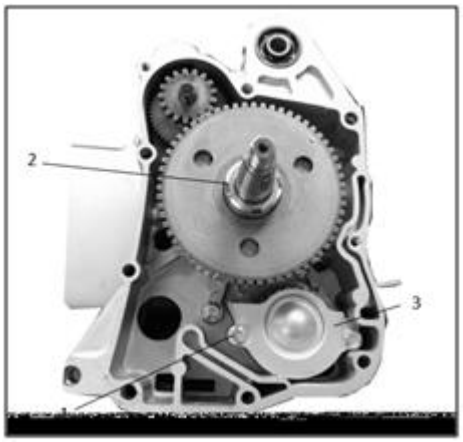


Order	Job/Parts to remove	Q'ty	Remarks
	A.C. magneto		Refer to "**A.C. MAGNETO AND STARTER CLUTCH**"
1	Cover	1	
2	Nut/Plain washer	1	
3	Overrunning Clutch	1	
4	Chain	1	
5	Oil pump driven sprocket	1	
6	Oil pump	1	

3.10.1 OIL PUMP REMOVAL AND INSPECTION

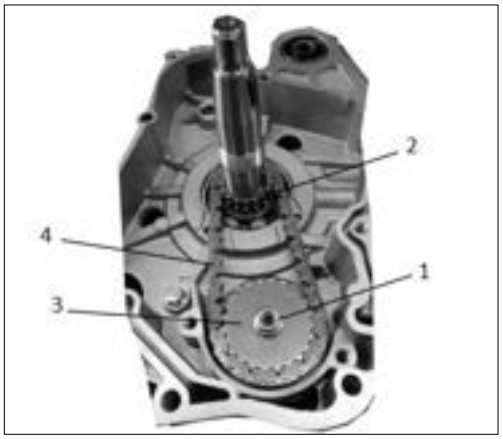
1. Loosen:
- Bolts ①
- Nut ②

2. Remove:
- Oil pump cover ③



3. Loosen:
- Nut ①

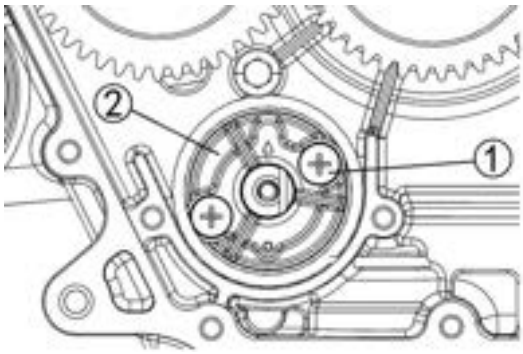
4. Remove:
- Oil pump drive sprocket ②
- Oil pump driven sprocket ③
- Oil Pump chain ④



5. Inspect:

- Oil pump drive sprocket
- Oil pump driven sprocket

Wear/ Damage → Replace.



6. Loosen:
- Bolts ①

7. Remove:
- Oil pump ②

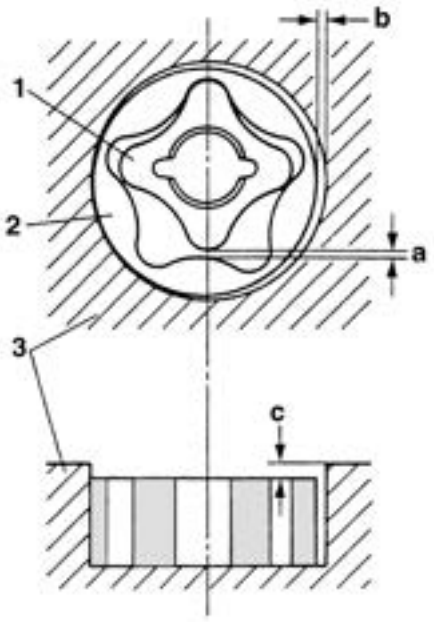
8. Inspect:
- Oil pump housing

Cracks/damage/wear → Replace.

9. Measure:
- Inner-rotor-to-outer-rotor-tip clearance “a”
- Outer-rotor-to-oil-pump-housing clearance “b”
- Oil-pump-housing-to-inner-rotor-and-outerrotor clearance “c”

Out of specification → Replace the oil pump.

	Tip clearance “a” : **0.15-0.20 mm** **<Limit: 0.23mm>** **Side clearance “b” :** **0.15-0.22 mm** **<Limit:0.26mm>** **Housing and rotor clearance “c” :** **0.05-0.12 mm** **<Limit: 0.14mm>**

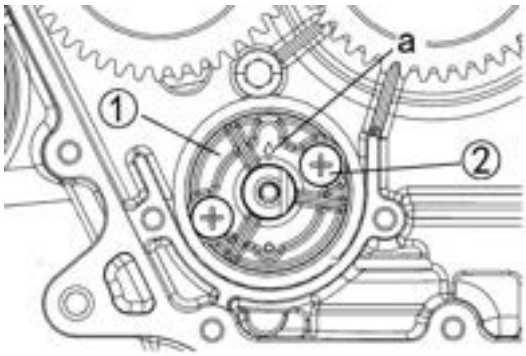


1. Inner rotor
2. Outer rotor
3. Oil pump housing

3.10.2 OIL PUMP INSTALLATION

1. Install:
● Oil pump ①

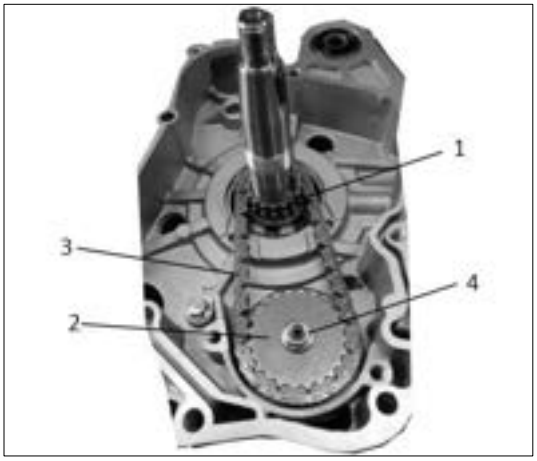
NOTE:
Install a new pump with the oil galley "a" pointed up as shown.



2. Tighten:
●Bolts ②

TORQUE
Oil pump bolts: 10N.m

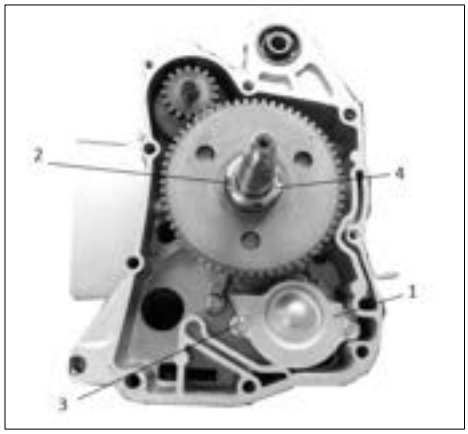
3. Install:
● Oil pump drive sprocket ①
● Oil pump driven sprocket ②
● Oil Pump chain ③



4. Tighten:
● Nut ④

TORQUE
Oil pump driven sprocket nut: 10N.m

5. Install:
- Oil pump cover ①
- Washer ②



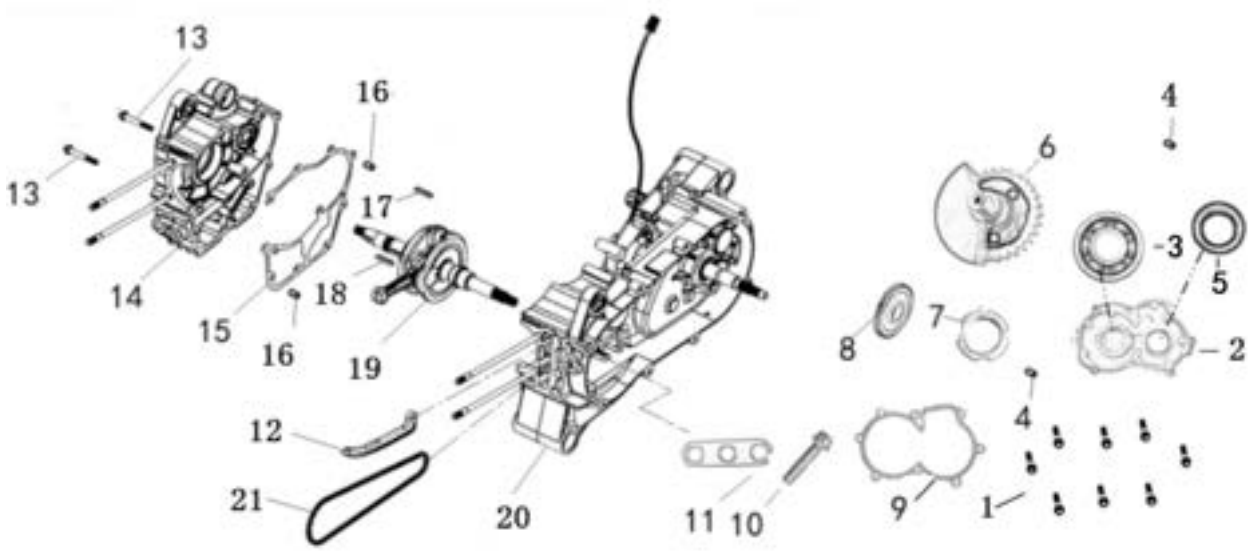
6. Tighten:
- Bolts ③

TORQUE
Oil pump cover bolts: 10N.m

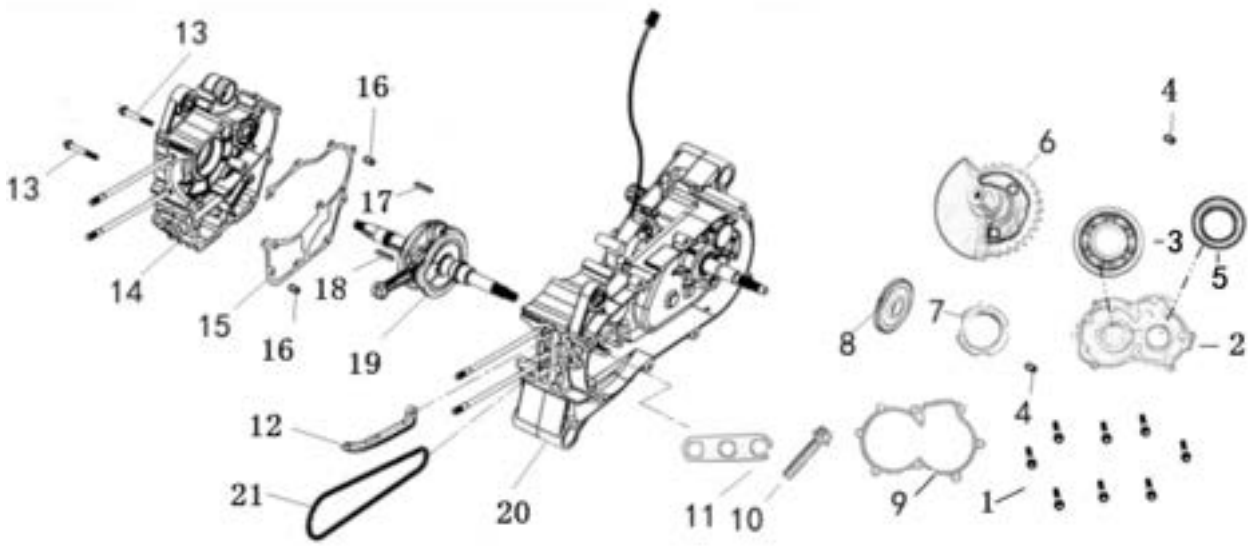
- Nut ④

TORQUE
Oil pump drive sprocket nut: 65N.m

3.11 CRANKCASE AND CRANKSHAFT



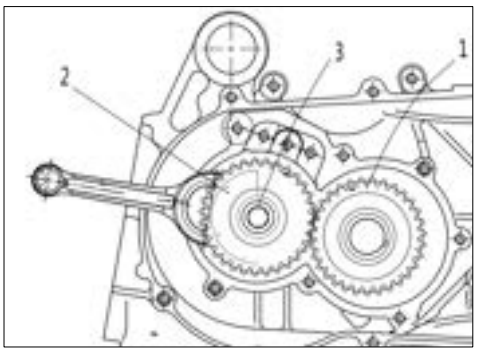
Order	Job/Parts to remove	Q'ty	Remarks
	Engine removal		Refer to "**ENGINE REMOVAL**".
	Cylinder head		Refer to "**CYLINDER HEAD**"
	Cylinder, and piston		Refer to "**CYLINDER AND PISTION**"
	V-belt, clutch, secondary/ primary sheave		Refer to "**V-BELT, CLUTCH AND SECONDARY/ PRIMARY SHEAV**E"
	A.C. magneto and starter clutch		Refer to "**A.C. MAGNETO AND STARTER CLUTCH**"
	Oil pump		Refer to "**OIL PUMP**"
1	Bolt	8	
2	Small cap for balancing shaft	1	
3	Balance left bearing	1	
4	Dowel pin	2	
5	Oil seal	1	
6	Balance shaft Assembly	1	
7	Nut	1	
8	Balance drive gear	1	
9	Balance Shaft Small Cover gasket	1	



Order	Job/Parts to remove	Q'ty	Remarks
10	Bolt		
11	Pressure Plate	1	
12	Timing chain guide (intake)	1	
13	Bolt	2	
14	Crankcase (right)	1	
15	Crankcase (right) gasket	1	
16	Dowel pin	2	
17	Flat key	1	
18	Flat key	1	
19	Crankshaft assembly	1	
20	Crankcase (left)	1	
21	Timing chain	1	

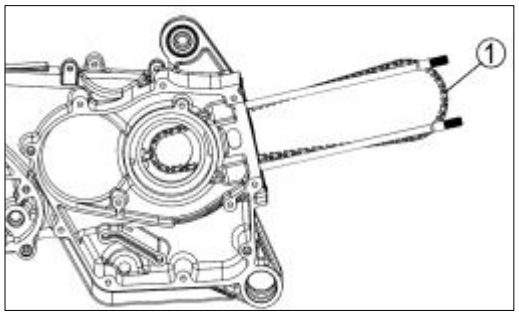
3.11.1 CRANKSHAFT&BALANCER REMOVAL

1. Remove:
- ●NUT ③
- ●Balancer drive gear②
- ●Balancer shaft ①



2.Loosen:
- ● Bolts ④

3. Remove:
- ● Crankcase RH
- ● Crankshaft assembly
- ● Balancer
- ● Timing chain ①



NOTE:

●Before removing the crankshaft assembly, remove the timing chain from the crankshaft sprocket.

●If the timing chain hooks to the crankshaft sprocket, the crankshaft cannot be removed.

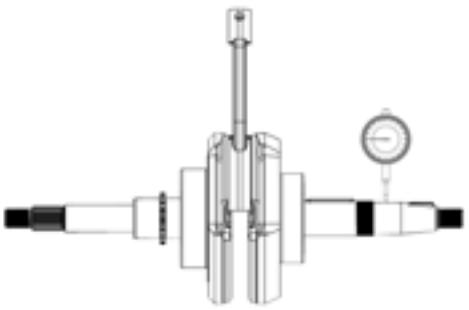
3.11.2 CRANKSHAFT INSPECTION

1. Measure:
- ●Crankshaft runout

Out of specification → Replace crankshaft and/ or bearing.

NOTE:

Measure the crankshaft runout with the crankshaft assembly running slowly.



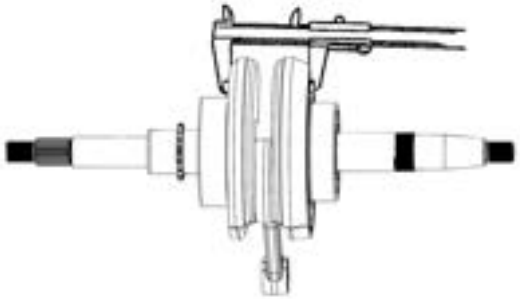
	Runout limit: 0.04 mm

2. Measure:
●Big end side clearance
Out of specification → Replace big end bearing, crank pin and/or connecting rod.

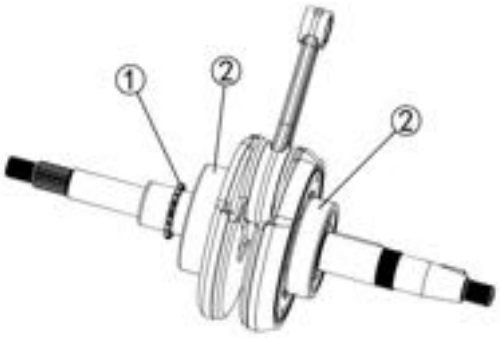
	Big end side clearance: 0.10-0.35mm

3. Measure:
●Crank width
Out of specification → Replace crankshaft.

	Crank width: 45.05-45.15mm

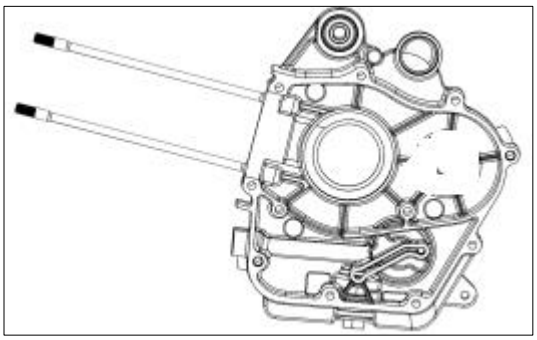


4. Inspect:
●Crankshaft sprocket ①
Wear/ Damage → Replace crankshaft.
●Bearing ②
Wear/ Crack /Damage → Replace crankshaft.

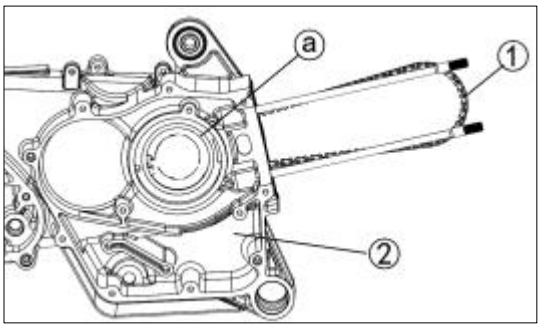


3.11.3 CRANKCASE INSTALLATION

1. Clean all the gasket mating surface and crankcase mating surface thoroughly.



2. Install:
●Dowel pins
●Timing chain①
NOTE:
Install the timing chain not to be seen through the crankshaft hole ⓐ on the crankcase (left)②.



3. Install:
● Crankshaft assembly
● Balancer
●Gasket (crankcase) NEW
● Crankcase RH

4. Tighten:

●Bolts (Crankcase RH)

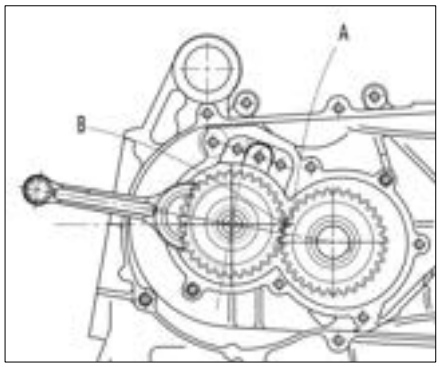
TORQUE
Crankcase RH Bolts: 10N.m

5. Install:

●Balancer drive gear

●nut

●Balancer shaft

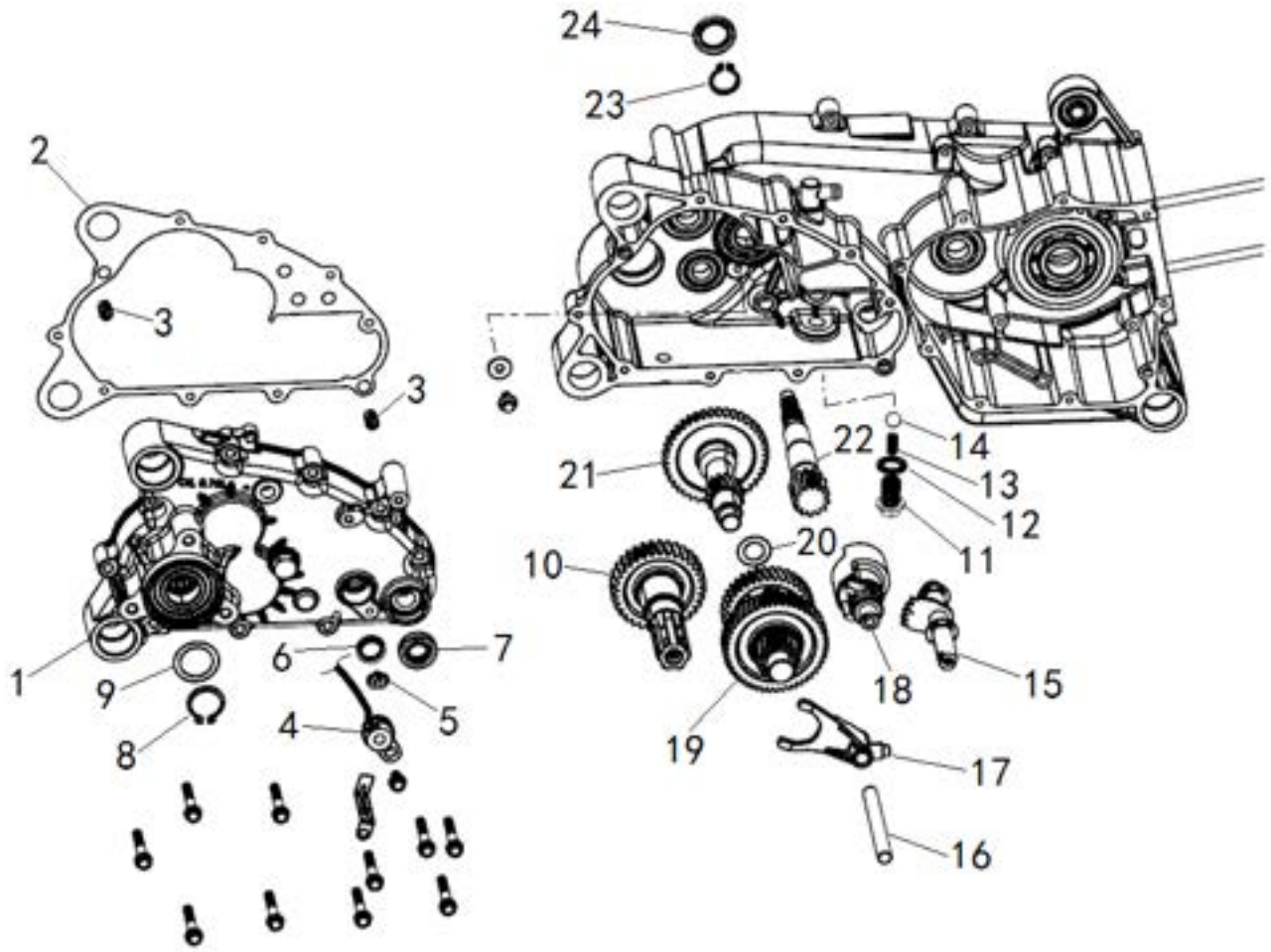


NOTE:

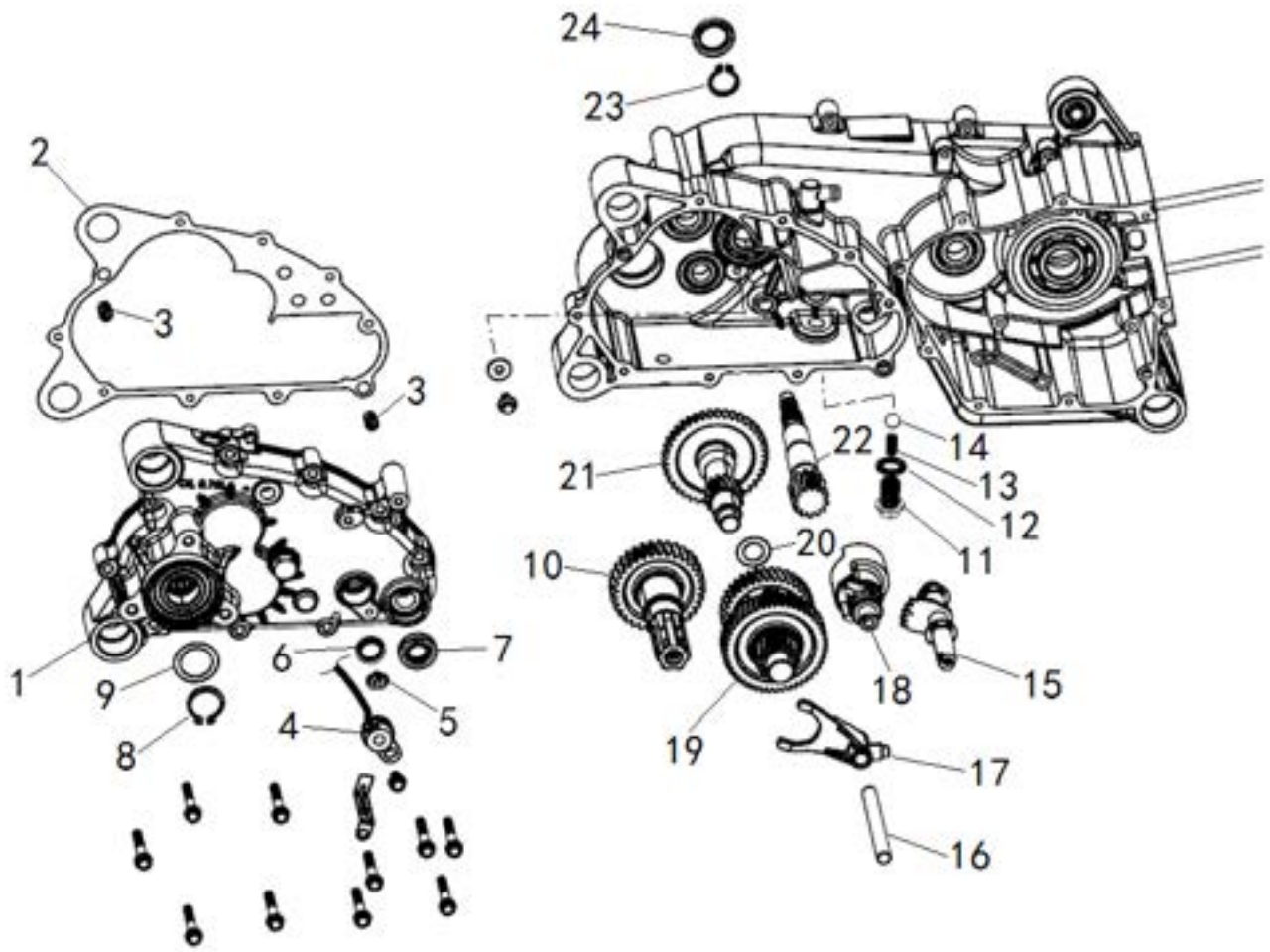
Align the punch mark “a” on the balancer drive gear with the punch mark “b” on the balancer driven gear.

TORQUE
Nut: 65N.m

3.12 TRANSMISSION

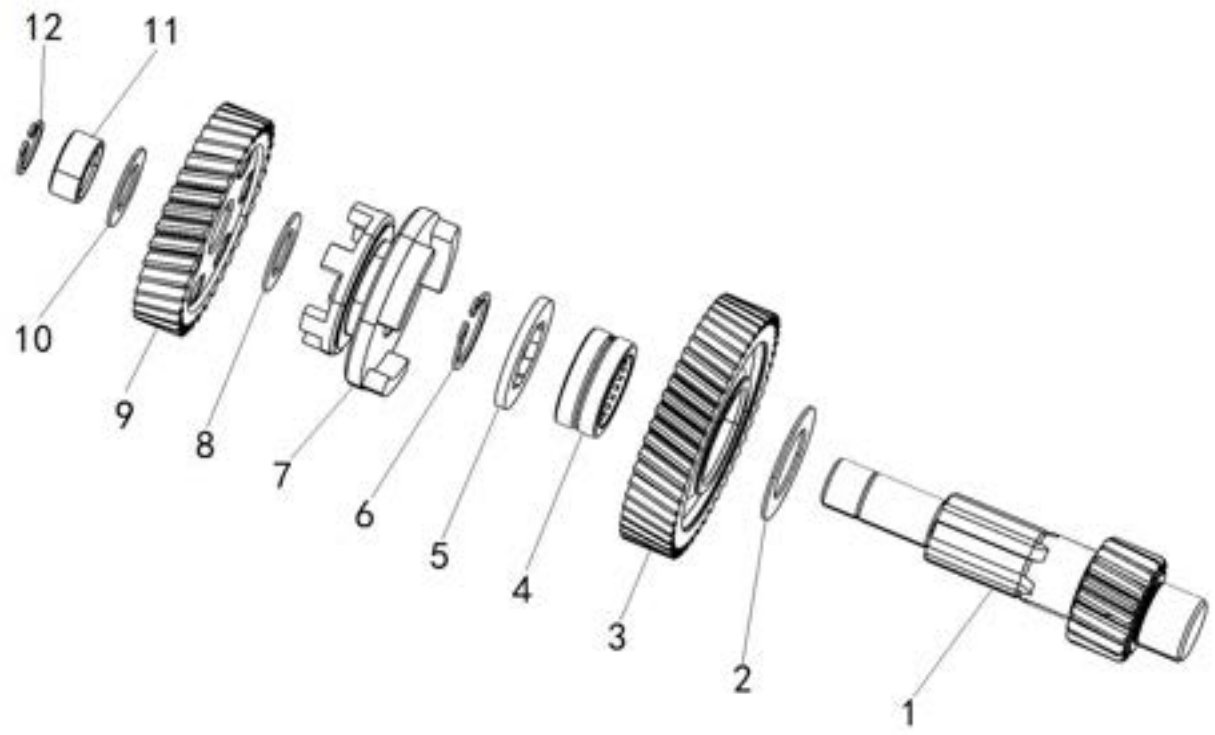


Order	Job/Parts to remove	Q'ty	Remarks
	Engine removal		Refer to "**ENGINE REMOVAL**".
1	Transmission cover	1	
2	Transmission cover gasket	1	
3	Dowel pin	2	
4	Shift indicator cable	1	
5	Shift indicator contact	1	
6	Oil seal	1	
7	Oil seal	1	
8	Circlip	1	
9	Washer	1	
10	Output shaft assembly	1	
11	Bolt	1	
12	Washer	1	
13	Positioning spring	1	
14	Steel ball	1	
15	Transmission shaft assembly	1	



Order	Job/Parts to remove	Q'ty	Remarks
16	Shift fork shaft	1	
17	Shift fork	1	
18	Gearshift drum	1	
19	Gearshift shaft assembly	1	
20	Washer	1	
21	Reverse gear shaft assembly	1	
22	Drive shaft	1	
23	Circlip	1	
24	Oil seal	1	

GEARSHIFT SHAFT ASSEMBLY



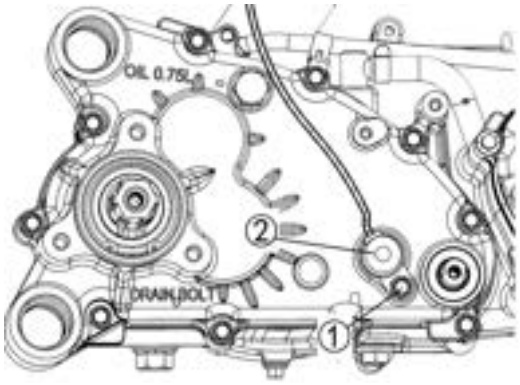
Order	Job/Parts to remove	Q'ty	Remarks
	Transmission removal		
1	Main shaft	1	
2	Washer	1	
3	Gear	1	
4	Bearing	1	
5	Splined washer	1	
6	Circlip	1	
7	Sliding dog gear	1	
8	Washer	1	
9	Gear	1	
10	Washer	1	
11	Shaft collar	1	
12	Circlip	1	

3.12.1 TRANSMISSION DISASSEMBLY AND INSPECTION

1. Remove:
- Drain plug ①
- Washer

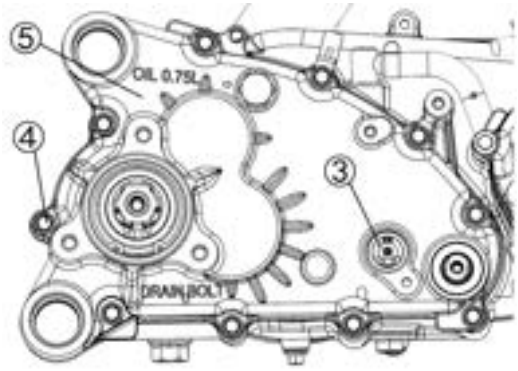
2. Drain
- Transmission oil

3. Loosen:
- Bolt ①



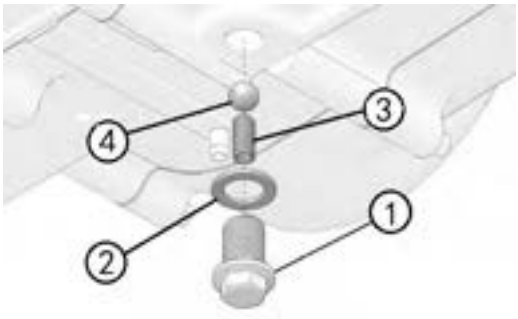
4. Remove:
- Shift indicator cable ②
- Shift indicator contact ③

5. Loosen:
- Bolts ④

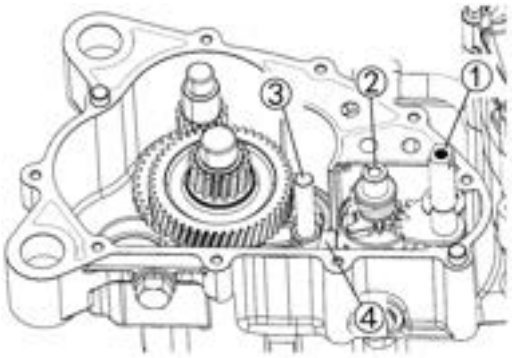


6. Remove:
- Transmission cover assembly ⑤

7. Remove:
- Detent bolt ①
- Washer ②
- Spring ③
- Ball ④

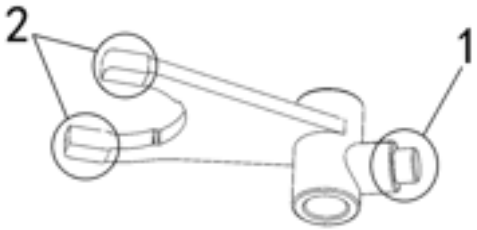


8. Remove:
- Shift lever shaft ①
- Shift drum ②
- Shift fork guide bar ③
- Shift fork ④



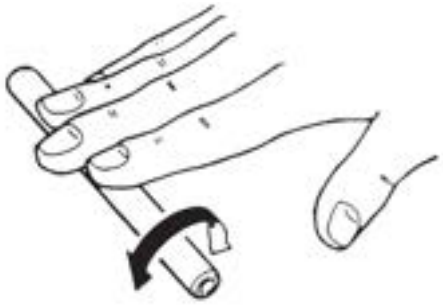
9. Inspect:
- Shift fork cam follower "1"
- Shift fork pawl "2"

Bends/damage/scoring/wear → Replace the shift fork.



10. Inspect:
- Shift fork guide bar

Roll the shift fork guide bar on a flat surface.
Bends → Replace.



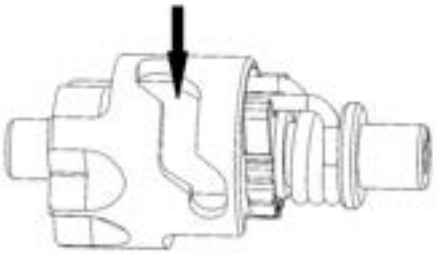
WARNING :
Do not attempt to straighten a bent shift fork guide bar.

11. Inspect:
- Shift fork movement

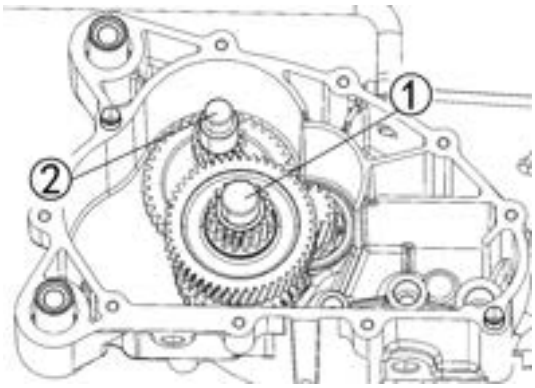
(along the shift fork guide bar)
Rough movement → Replace the shift forks and shift fork guide bar as a set.

12. Inspect:
- Shift drum grooves

Damage /scratches /wear → Replace the shift drum.

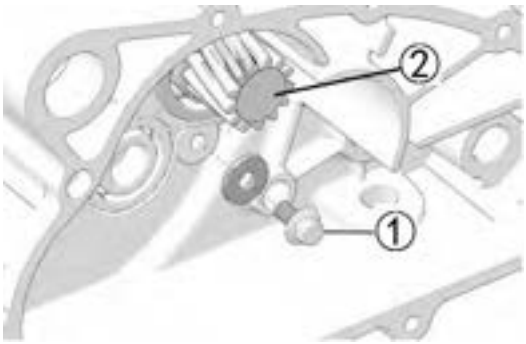


13. Remove:
- Gearshift shaft assembly ①
- Washer
- Reverse gear shaft ②

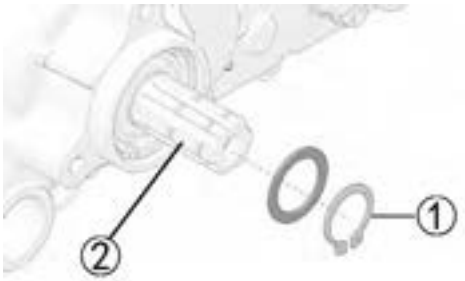


14. Loosen:
- Bolt ①

15. Remove:
- Drive shaft ②



16. Remove:
- Circlip ①
- Output shaft ②



17. Inspect:
- Transmission gears

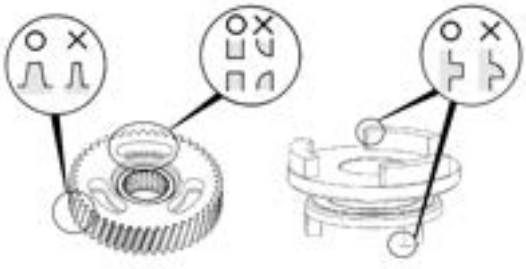
Blue discoloration /pitting /wear → Replace the defective gear(s).
- Transmission gear engagement

(each pinion gear to its respective wheel gear)
Incorrect → Reassemble the transmission axle assemblies.
- Transmission gear movement

Rough movement → Replace the defective part(s).
- Transmission gear dogs

Cracks /damage /rounded edges → Replace the defective gear(s).
- Circlips

Bends/damage/looseness → Replace.



18. Inspect:
- Bearings

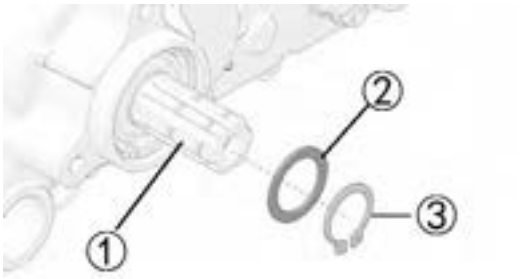
Wear/ Crack /Damage → Replace.

NOTE:

All bearings should rotate freely without binding. Bearing inner race should have no detectable radial (up and down) movement of inner race.

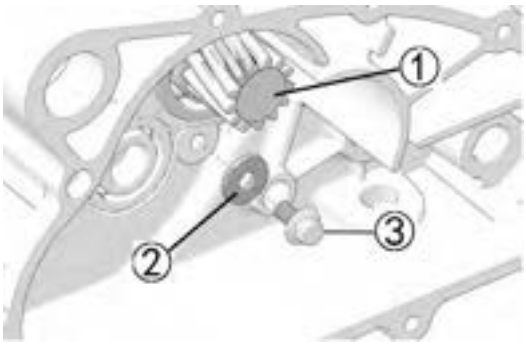
3.12.2 TRANSMISSION INSTALLATION

1. Clean all the gasket mating surface and transmission mating surface thoroughly.



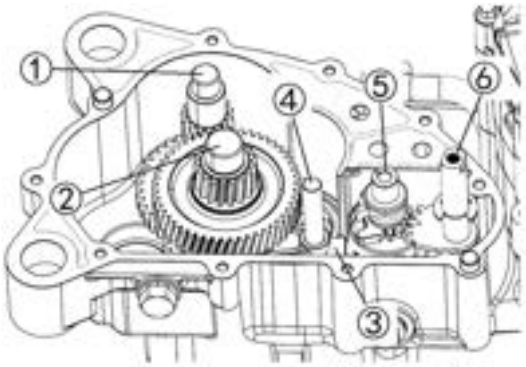
2. Install:
- Output shaft ①
- Washer ②
- Circlip ③

3. Install:
- Drive shaft ①
- Washer ②

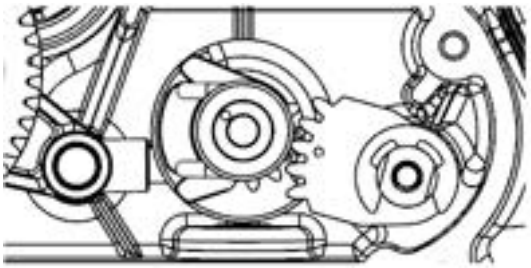


4.Tighten:
- Bolt ③

TORQUE
Drive shaft bolt: 10N.m



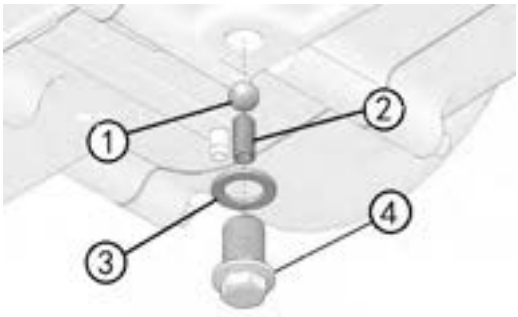
5. Install:
- Reverse gear shaft ①
- Washer (gearshift shaft)
- Gearshift shaft assembly ②
- Shift fork ③
- Shift fork guide bar ④
- Shift drum ⑤
- Shift lever shaft ⑥



NOTE:

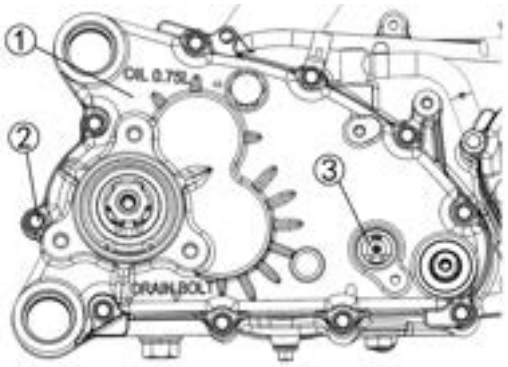
Use the alignment marks on the shift shaft and drum to achieve proper alignment.

6. Install:
- Ball ①
- Spring ②
- Washer ③
- Detent bolt ④



TORQUE
Detent bolt: 19N.m

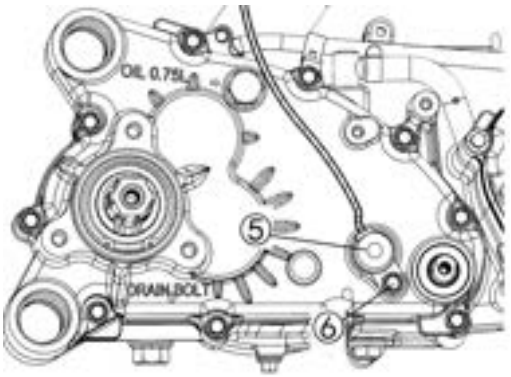
7. Install:
- Dowel pins
- Gasket (transmission cover) NEW
- Transmission cover assembly ①



8. Tighten:
- Bolts ②

TORQUE
transmission cover bolts: 10N.m

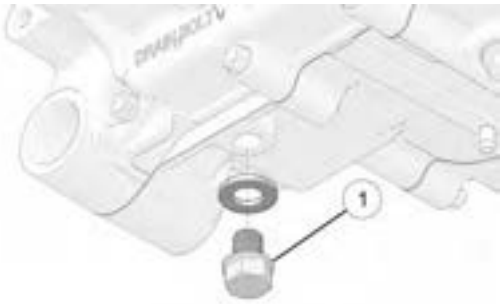
9. Install:
- Shift indicator contact ③
- Shift indicator cable ④



10. Tighten:
- Bolt ⑤

TORQUE
Shift indicator cable bolt: 10N.m

11. Install:
- Washer
- Drain plug ①



TORQUE
Drain plug: 25N.m

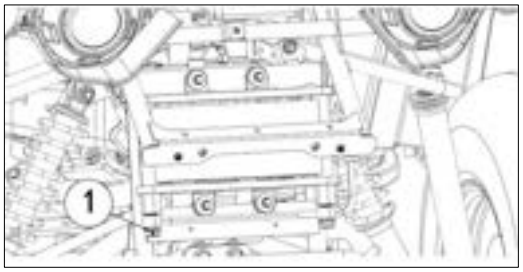
12. Add:
- Transmission oil

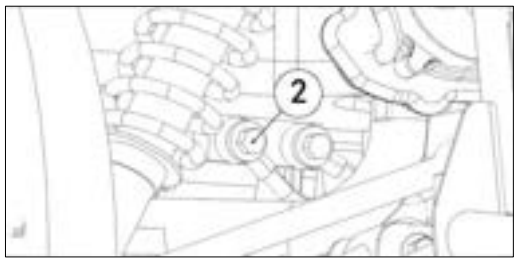
Refer to "**3.2.9TRANSMISSION OIL CHANGE**" section.

3.13 OIL COOLER

3.13.1 OIL COOLER REMOVAL

1.Position vehicle on a level surface and apply the parking brake.
2.Place a drain pan beneath the oil line connections.
3.Remove the banjo bolt ① and two crush washers securing the oil supply or return hose to the oil cooler.
4.Remove the banjo bolt ② and two crush washers securing the oil supply or return hose to the engine.





CAUTION:

Wipe up any residual oil that may have collected on any vehicle components.

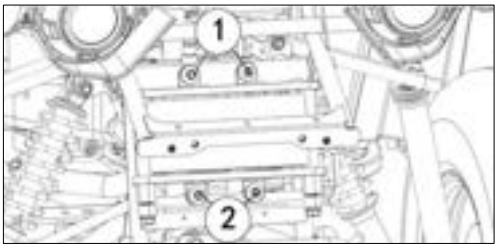
5.Remove the oil supply or return hose from the vehicle.

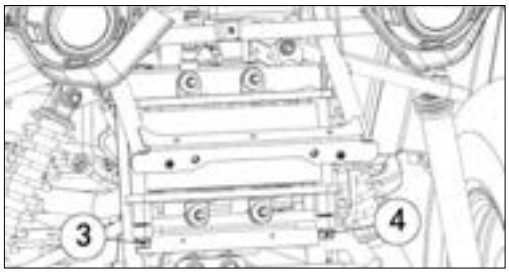
NOTE:

Note the orientation of the oil line fittings and oil line routing during removal.

3.13.2 OIL COOLER INSTALLATION

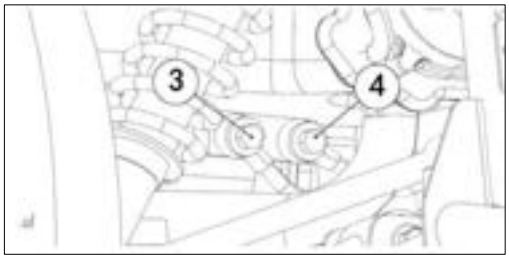
1.Install the bolts ① and ② retaining the oil cooler to the vehicle.
2.Carefully install new oil supply or return hose into vehicle.





CAUTION:

The oil return line fittings ③ will attach to the left engine port when viewed head on and the rear port on the engine cooler.
The oil supply line fittings ④will attach to the right engine port when viewed head on and the front port on the engine cooler.



3.Install two new crush washers and banjo bolt to secure the oil supply or return hose to the oil cooler.
Torque banjo bolt to specification.

TORQUE
Oil Hose Banjo Bolt: 39N.m

4.Install two new crush washers and banjo bolt to secure the oil supply or return hose to the engine.
Torque banjo bolt to specification.

TORQUE
Oil Hose Banjo Bolt: 39N.m

5.Start engine and allow it to idle for 30 seconds.
6.Stop the engine and inspect for oil leaks. Wait at least 15 seconds before removing the oil dipstick.
7.Remove the dipstick and wipe it dry with a clean cloth.
8.Reinstall the dipstick to fully seat it.
CAUTION:
Make certain the dipstick is inserted all the way down to ensure an accurate reading.

9.Remove the dipstick and check the oil level.
10.Add the recommended oil as necessary to bring the oil level within.
CAUTION:
Over-filling engine crankcase will result in oil entering the air box. Maintain the recommended oil level.

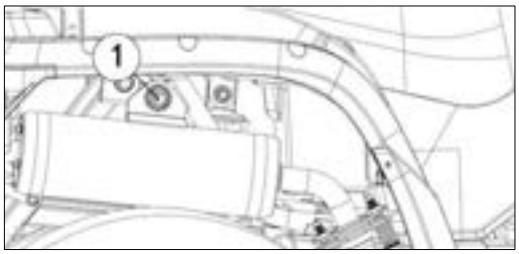
NOTE:
Rising oil level between checks in cool weather driving, can indicate moisture collecting in the oil reservoir. If the oil level is over the full mark, change the oil.

11.When finished, reinstall the dipstick.

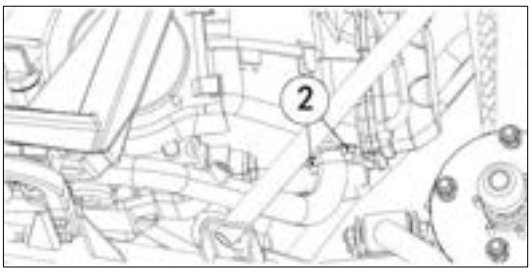
3.14 EXHAUST

3.14.1 EXHAUST REMOVAL

1.Remove the bolt ①.



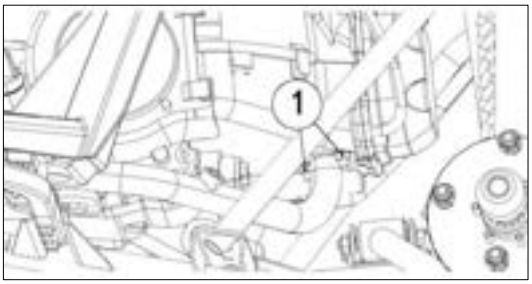
2.Remove the nuts ② retaining the exhaust to the engine.



3.14.2 EXHAUST INSTALLATION

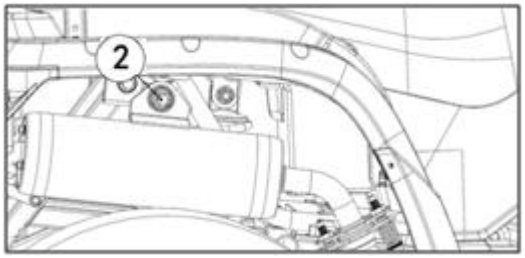
1.Install nuts ① retaining the exhaust to the engine. Torque to specification.

TORQUE
Exhaust Nuts: 13N.m



2.Install the bolts ②.
Torque fastener to specification.

TORQUE
Exhaust Mounting Fastener: 40-50N.m



3.15 AIR BOX / INTAKE SYSTEM

CAUTION:

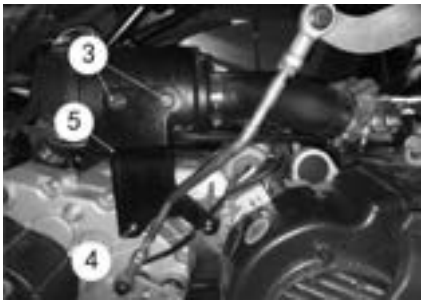
Make sure the air box cover is properly seated upon installation or severe engine damage could occur.

3.15.1 AIR BOX REMOVAL

1.Remove the side plate ①.

2.Loosen the gear clamp ②.

3.Remove fasteners ③ ④ ,then remove the plate ⑤



4.Carefully remove the air box from the vehicle.

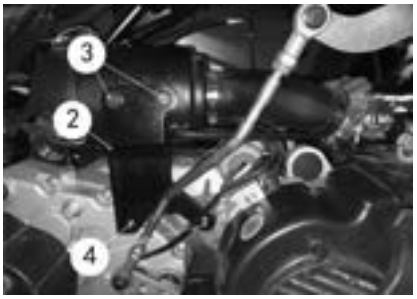
3.15.2 AIR BOX INSTALLATION

1.Install the air box assembly back onto the vehicle , Install the gear clamp ① and tighten to specification.

TORQUE
Gear Clamp: 8N.m

2.Install the plate ② and the fasteners ③ ④ that secure the air box to the engine. Torque fasteners to specification.

TORQUE
Air Box Fasteners: 15N.m



3.Install the side plate ⑤.

3.16 FUEL INJECTION SYSTEM

3.16.1 ECU

3.16.1.1 Description & Working Principle

The ECU continuously monitors the operating conditions of the engine through the system sensors. It also provides the necessary computation, adaptability, and output control in order to minimize the tailpipe emissions and fuel consumption, while optimizing vehicle drivability for all operating conditions. The ECU also provides diagnosis when system malfunctions occur.

3.16.1.2 Appearance

The SE08 ECU has a polyester header. The ECU is shown below.

3.16.1.3 Handling –Don'ts & Do's

ACTION	REASON
DO NOT: Place the ECU close to the exhaust pipe or Engine when removed.	High temperature might reduce the life of the ECU and also can damage the ECU.
DO NOT: Place the ECU close to or pour water, oil or any other liquids.	ECU is susceptible to water and liquids.
DO NOT: Allow mud or other debris to accumulate on the surface of the ECU.	Having mud or debris accumulated on the ECU casing reduces its heat dissipation efficiency.
DO NOT: Apply any voltage relative to any point to the ECU.	Drastically affects the performance of the ECU and may lead to ECU damage.
DO NOT: Clean ECU with any solvent or any corrosive liquid.	Can damage the housing of the ECU.
DO: Take extreme care that water droplets or excess moisture should not fall on ECU connectors.	ECU connectors can get short and may lead to ECU damage.
DO: Clean the ECU with a moist cloth and keep it dry.	Prevents ECU damage.

3.16.1.4 Installation requirements

The ECU shall be mounted using M6 machined screws with a torque of 8 Nm ±10%. The mounting surface should also be flat to avoid subjecting the base plate to unnecessary force and warping the PCB.

3.16.1.5 Power Requirements

●**Operating Range:** All planned functions are executed in this range. Battery and/or Ignition voltage: 9.0 to 16V DC. However, when the battery voltage is lower than 12.6 volts, the engine's start speed may be low. Then, you should charger the battery with the charge.

●**Reverse Voltage:** The controller may suffer permanent damage: Battery and/or Ignition voltage < -13V DC

3.16.1.6 Operating Temperature

The controller shall operate in the ambient temperature from -20 ℃ to +85 ℃.

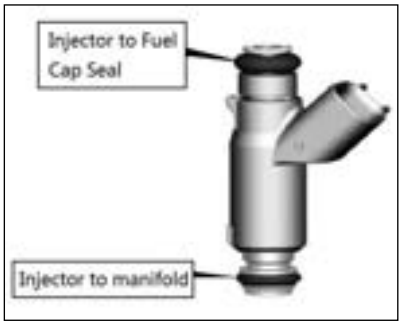
3.16.1.7 Maintenance service and Repair

ECU is a non-serviceable part. Once there are problems, it's important to first determine if the problem is caused by software/calibration. If it is caused by software/calibration, please reflash the ECU by professional tools. In the event of ECU hardware failure or malfunction (during warranty period only) the ECU should be sent back to the vehicle manufacturer giving complete details of the ECU Part No, Serial number, Vehicle Model & Make, manufacturing Date, Total kms run on the vehicle, Location of use, Vehicle No, Date of return.

3.16.2 INJECTOR

3.16.2.1 Appearance

The figure below shows the standard MEV14-182 Fuel Injector appearance.



3.16.2.2 Temperature Requirements :

Typical injector temperature environments are defined below. The injector will not experience any loss of the ability to comply with the flow tolerance requirements after exposure to the following temperature environments. Also, they will not experience unacceptable external leakage, any type of physical degradation, or loss of service life during or after being exposed to these ambient conditions.

●Normal Operating Temperature Range: - 30℃ to 125℃

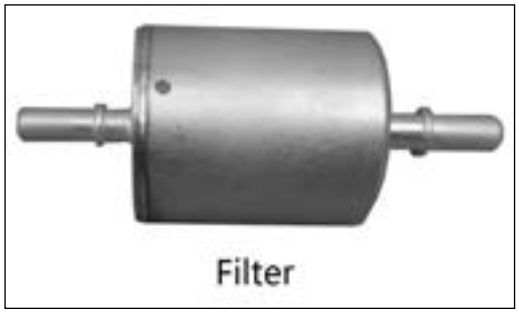
●Extreme Operating Temperature Range (some performance degradation): - 40℃ to 150℃

3.16.2.3 Fuel Contamination

The injector fuel inlet filter protects the fuel injector from initial build fuel contamination as well as from fuel system assembly contamination. Filtration is extremely important because particle contaminants can cause an injector to stick open, flow shift or tip leak.

The injector inlet filter is not a serviceable component and is designed only to trap potential built-in contamination between the chassis fuel filter and injector.

Please replace the fuel filter regularly according to the usage. The filter is located above the tank.



3.16.2.4 Injector Installation

Follow these guidelines to prevent damage to the injector and its electrical interface during the replacement or re-installation process.

●Lubrication: Apply a light coating of lubricant to the lower injector seal ring. ISO 10 light mineral oil or equivalent is recommended.

● The preferred technique is to apply the lubricant to the sockets the injectors are being installed into, rather than directly to the seal ring itself. This will help minimize the possibility of injector contamination.

●Avoid applying lubricant over the director plate holes – this may restrict injector flow. Do not dip the injector tip in lubricant.

●The injectors come from the factory with the seal rings attached. The re-use of seal rings is not preferred when replacing an injector. If an injector is to be re-used, and no new seal rings are available, take care to inspect each seal ring for signs of damage. Even minor defects in the seal ring can lead to leakage. Take extra care in installing seal ring over flange of injector inlet.

●Carefully installing the harness connector will prevent terminal damage. Listen for a positive audible click from the connector retention device — this ensures that it is fully engaged.

● Avoid unnecessarily disconnecting / reconnecting the harness connector.

●Wires routed in a manner that can allow them to become pinched between components can result in a short circuit and a stuck open injector.

●For injectors that require orientation for spray pattern, do not rotate the injector in the fuel rail assembly to install the injector electrical connector. This may dislodge the retaining clip, and result in improper spray orientation.

The table is a list of lubricant oils that were tested and approved for O-ring lubrication. These lubricants have shown to have no effect on injector performance (plugging, sticking).

Lubrication Recommendation		
Lubricant Name	**Supplier**	**Viscosity (cSt) @ 40 °C**
Spindura 10	Equilon	10
Spindura 22	Equilon	21
DTE-24	Mobil	32
DTE-25	Mobil	46
DTE-26	Mobil	68
Norpar 15	Exxon / Mobil	<1
Drawsol 60	DA Stewart	1-2
NocoLube AW 46	NOCO Energy	46
NocoLube AW 32	NOCO Energy	32
Advantage Spindle Oil	Advantage Lubrication Specialties	10

3.16.2.5 Replacement Techniques

The following procedure outlines standard the Injector removal and replacement.

Warning: The injector and all associated hardware may be extremely hot.

● Shut off ignition.

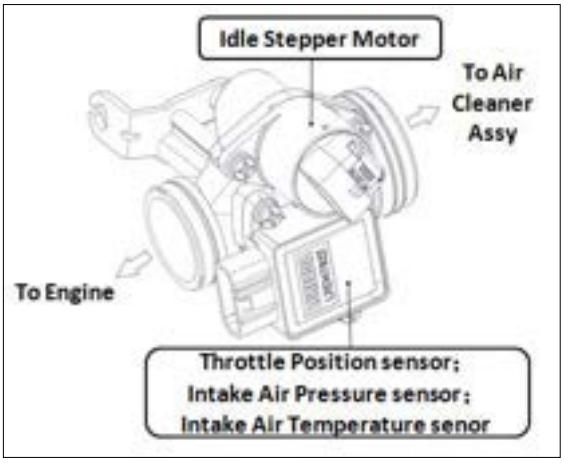
● Disconnect negative battery cable to avoid possible fuel discharge if an accidental attempt is made to start the engine.
● Disconnect the electrical connector from the injector wiring harness.
● Relieve fuel pressure.
● Remove the retaining clip from the fuel injector.
● Carefully clean debris from the interface surfaces. Do not damage seal mating surfaces.
● Remove the injector from the manifold.
● Apply a light coating of a lubricant to both the upper and lower injector seal ring of the replacement injector.
Check that the injector is installed in the original orientation to maintain proper spray targeting, and that the retaining clip is properly seated on the injector and the fuel line.
● Install the new injector into the manifold.
● Install the retaining clip after connecting the fuel line.
● Tighten the injector mounting to the desired torque as mentioned in the manufacturer manual.
● Tighten the fuel line.
● Re-install the injector electrical connector.
● Turn the key on and off to check if the fuel is leaking.
● Start engine and verify proper operation.

3.16.2.6 Interchange ability

The injector should be replaced in service only with an equivalent injector of the same part number. On occasion, a new part number may supersede part numbers. Consult the appropriate vehicle service manual and part number guide for the latest replacement injector part number information.

3.16.3 THROTTLE BODY ASSEMBLY

3.16.3.1 Description and Working Principle



The Throttle Body Assembly is an interactive system comprised of the following subsystems: the main casting body, bearing system, shaft and valve system, return spring system, cable interface system, throttle position sensing system, Intake Air Pressure and Temperature sensing system and the bypass air control system. The subsystems interact and support each other to provide all the functional requirements, which are mentioned below:

- Control intake air flow.
- Control idle air flow.
- Sense throttle position - Provide position feed--back to Engine Controller.
- Provide reactionary force to the throttle.

3.16.3.2 Throttle Body Removal

- Disconnect negative terminal of the battery.
- Disconnect electric lead wire of throttle position sensor coupler, stepper motor coupler and MAP/MAT sensor coupler (if this sensor is mounted on the throttle body).
- Disconnect accelerator cable from throttle body.
- Remove air cleaner outlet hose and throttle body outlet hose.

3.16.3.3 Cleaning Procedure

It may be removed and cleaned using carburetor cleaner (3M make recommended). Once the throttle body cover is removed, spray the throttle-body cleaner inside the shipping air passage, and use the brushes to gently dislodge the dirt, gum and varnish that are present. Do not let the bye pass holes be blocked by dirt or foreign particles.

3.16.3.4 Throttle Body Installation

Reverse the procedure for installation noting the following:

- Adjust accelerator cable play.
- Check to ensure that all removed parts are

back in place.

● Reinstall any necessary part which have not been reinstalled.

3.16.4 ENGINE TEMPERATURE SENSOR

3.16.4.1 Description and Working Principle

This sensor is used in air cooled engines. It provides a resistance that varies as a function of temperature within prescribed tolerance limits. The sensor has a negative temperature coefficient of resistance.

3.16.4.2 Installation Requirements

Dynamic Torque Requirement: The sensor shall be hand into the application and then driven by a driver with a maximum no load speed of 400 rpm or installed to the desired torque by a hand torque wrench (M14). The recommended installation torque is:

● Minimum: 10 N·m

● Maximum: 13 N·m

● Static Torque Requirement: The torque required to remove the sensor from the mating hole shall be within 200% of the installation torque mentioned above.

3.16.5 OXYGEN SENSOR

3.16.5.1 Description and Working Principle

This sensor is a device for monitoring the residual oxygen in the exhaust of an internal combustion engine. It is the feedback element for engine closed loop control.

3.16.5.2 Technical Parameters

● A/F ratio rich threshold: ＞720 mVDC

● A/F ratio lean threshold: ＜120 mVDC

(These parameters as above are measured basing on 450°C (engine dyno), typically on 70% duty at 10Hz and under 13.5V)

●Heater part resistance:18±3Ω (This parameter is measured basing on 21°C)

● Operating temperature range: 260-850 °C

3.16.5.3 Fuel Quality Requirements

Pb≤0.005g/L
P≤0.0002g/L
S≤0.04% (weight proportion)x
MMT≤0.0085g/L
Si≤4ppm

3.16.6 IGNITION COIL

3.16.6.1 Description and Working Principle

This coil provides energy to the spark plug in the combustion chamber. The coil itself doesn't have a driver. The high voltage tower of the coil is connected to the spark plug using a high voltage cable assembly.

3.16.6.2 Installation requirements

- The vehicle frame provides the mounting surface and mounting holes.
- Never route the coil wire with the same bundle as the Crank sensor wires. There is around 200 V peak potential between wire and engine ground. This voltage potential could cause a noise on sensor cables.

3.16.6.3 Do's and Don'ts

ACTION	REASON
DO NOT: Install the low voltage connectors with the power applied.	This might cause an unwanted secondary firing, possibly leading to personal injury.
DO NOT: Use a screw driver to asset in removing secondary boots from the secondary tower. Use tools designed for secondary removal.	It is possible to damage a secondary lead in such a manner that creates an electrical path to outside the system permitting improper system operation misfire, or even possible personal injury if arcing occurs.
DO NOT: Use parts that have been dropped or display physical damage.	Damaged components can lead to premature failure.
DO NOT: Scratch or apply any non approved material to the surface of the high voltage tower which mates with the high voltage secondary leads.	This can jeopardize the seal integrity of the mating surfaces which in turn can create a secondary high voltage leak path.
DO NOT: Strike any part of the ignition system with a tool or other object.	This can lead to physical damage which can cause a system malfunction or failure.
DO NOT: Permit paint or other sprayed materials to be sprayed onto the electrical connectors.	Insulating type sprays can create a high resistance or open connection. And, a conductive type spray can create an electrical short condition.

ACTION	REASON
DO NOT: Support the ignition system by the wiring harness or plug wire.	These leads are not designed to support the weight of the ignition system. It can create a poor electrical connection Or become disconnected allowing the system to fall and be subjected to physical damage.
DO NOT: Pierce or probe the secondary leads.	This creates an electrical path to outside the system permitting improper system operation, misfire, or even possible personal injury if arcing occurs.
DO NOT: Operate without the spark plug attached.	If a technician or mechanic comes in contact with the high voltage generated during operation, personal injury may occur. Or, if the engine is operated under this condition, unburned fuel may fill the converter area creating a potential hazard.
DO NOT: Share ignition component wiring with other components, Dedicated wiring is required.	This prevents electrical cross talking between components which can lead to component malfunction.
DO NOT: Apply voltage to the ignition system other than vehicle system voltage for testing purposes.	This can cause reduced performance or an electrical malfunction of the ignition system.
DO NOT: Use high impact tools to apply the spark plug boot to the ignition secondary towers. Installation of the high voltage secondary leads by hand is preferred.	Damage to the coil tower, secondary boot, or mating connection surfaces might occur.
DO: Install the secondary leads before connecting the primary leads.	In the event the low voltage connection has been made and the power applied, unwanted secondary output might occur possibly resulting in injury, damage the ignition component, and test equipment.
DO: Take care when working around the ignition system.	The high voltage produced by the coil secondary circuit can cause personal injury and/or damage test equipment.
DO: Proper handling and shipping methods need to be in place to reduce the risk of damage due to impact, moisture, or contamination.	Damaged components can lead to premature failure.
DO: Avoid unnecessary disconnecting and connecting of the electrical components.	The electrical connections are not designed for repeated connection and disconnection.
DO: Insure the low voltage connectors are entirely seated and the locking mechanism is engaged.	This prevents intermittent electrical connections leading to an improper ignition system operation.
DO: Use approved connector breakouts when testing the ignition system.	Connector and/or component damage may occur.

ACTION	REASON
DO: Insure the appropriate seals are included in the connector system.	Liquid intrusion into the terminal connection area might occur causing an electrical intermittent or short condition. In the event of severe terminal corrosion, an open condition might occur.
DO: Operate with gasoline based internal combustion engines.	Other fuels or combustion designs may require additional design considerations.
DO: The power feed line should be fused.	This could protect the system in the event of an electrical short.
DO: The module heat sink and back plate must not be used as a connection point when jump starting the engine.	The high level of voltage and current which the module could be subjected to, could cause module performance degradation or failure.
DO: Connection of the module back plate to vehicle ground is desirable whenever possible.	This greatly reduces potential ground loops and acts as a heat transfer source from the module.
DO: The ignition system ground wire should be kept as short as possible. And, when permissible, should be grounded at the same engine block position as the engine controller.	This would greatly reduce the possible of unwanted electrical ground loops.
DO: The electrical wiring to the ignition system should be routed so that the conductors are protected from excessive heat, damage, and wear.	Helps prevent electrical intermittent, open or shorted operating conditions.
DO: Ignition secondary leads should not be routed with the ignition primary harness or any other electrical harness.	Voltage spikes can be transmitted from the secondary cables into other leads which are in close. This could create a component performance degradation or failure condition.
DO: Spark plug wires(secondary leads) & primary wiring: - must not contact sharp surface. - must not be under tension between fixed points. - must be clear of moving parts (belts, fan, etc…). - must be protected from or kept at least 125 mm away from radiant heat source exceeding 400 F. - must be protected from environmental damage (dirt, splash, oils, fluids, etc….). - must be retained, secured or insulated to prevent pinching, misrouting, rattles, and squeaks.	Spark plug wires carry very high voltage (30,000 volt). If the secondary lead loses its dielectric characteristics thru being nicked, cut , chaffed, then an arc thru to a nearby ground could take place. This kind of condition could lead to misfire, no start, or premature failure of ignition system.
DO: Not all fasteners are designed for repeat use. Beware of fastener specifications. All harnesses should be supported within 6" of a mating connection.	Adequate retention force might not be achieved if the fastener is not designed to be reused. Mating connections are not designed to support the weight of the harness assembly.

ACTION	REASON
DO: For removing spark plugs follow the following steps: 1- Grasp the spark plug boot and gently rotate 90° ; and then pull the spark plug boot and cable away from the spark plug. 2- Before removing spark plug, brush or air blast dirt away from the well areas. 3- Use correct size deep socket wrench to loosen each spark plug one or two turns.	To remove spark plugs from Aluminum heads, allow the engine to cool. The heat of the engine, in combination with a spark plug that is still hot, may cause the spark plug threads to strip the cylinder head upon removal. Use goggles to protect eyes from dirt when applying compressed air to spark plug wells.
DO: Cleaning a spark plug could be done as follow: 1- Wipe all spark plug surfaces clean….remove oil, water, dirt and moist residues. 2- If the firing end of spark plug has oily or wet deposit, brush the spark plug in an approved, non-flammable and non-toxic solvent. Then dry the spark plug thoroughly with compressed air. 3- Use a propane torch to dry wet-fuel fouled plugs. Allow the torch flame to enter up the center electrode insulator. Allow plug to cool down. 4- If the spark plug threads have carbon & scale deposits, clean with wire brush, taking care not to injure the electrode or the insulator tip.	Cleaning a spark plug will reduce the voltage required for an electrical arc(spark) across the electrodes. Cleaning & re-gapping will not restore a used spark plug to a new condition. It may be more economical and efficient to replace used spark plugs with new plugs instead of cleaning. Sooted plugs should be replaced. Do not cool by using water or any liquid. Clean threads permit easier installation and proper seating which will maximize transfer heat away from the plug.
DO: Regap spark plugs to the exact measurement specified by the engine manufacturer to keep the best fuel economy and proper engine performance: 1- Use round wire-type gauge for an accurate measure of gap on all used spark plugs. 2- When gapping a spark plug only the side electrode is moved. The center electrode must not be moved.	Too wide a gap could cause the plug to misfire (higher required ignition voltage). Too narrow of a gap could affect idle stability. A flat gauge can't accurately measure the spark plug on used plugs.
DO: When replacing spark plugs with new ones, always use equivalent plugs with same heat range, thread, size, etc….	Higher heat range plug (hotter plug) could lead to pre-ignition & possible piston damage. Lower heat range (colder plug) could lead to cold fouling & emission problem.

ACTION	REASON
DO: For installing spark plugs follow the following steps: 1- Make sure the cylinder head threads and spark plug threads are clean. Make sure the spark plug thread is free of dings and burrs. If necessary, use a thread chaser and seat cleaning tool. 2- Make sure the spark plug gasket seat is clean, and then thread the gasket to fit flush against the gasket seat. Tapered seat plugs do not require gaskets. 3- Screw the spark plugs finger-tight into the cylinder head. Then, use a torque wrench to tighten spark plugs following manufacturer's recommendation. Torque is different for various plug type & cylinder head material.	If the thread is damage, it prevents a good heat transform from the shell to the cylinder head. Do not use any type of anti-seize compound on spark plug threads. Doing this will decrease the amount of friction between the threads. The result of the lowered friction is that when the spark plug is torqued to the proper specification, the spark plug is turned too far into the cylinder head. This increases the likelihood of pulling or stripping the threads in the cylinder head. Over tightening of a spark plug can cause stretching of the spark plug shell and could allow blow by to pass thru the gasket seal between the shell and insulator. Over-tightening also results in extremely difficult removal.

3.16.7 FUEL PUMP

3.16.7.1 Description and Working Principle

Fuel Pump supplies fuel to engine at system pressure. Fuel Pump is mounted to fuel tank at top and supplies fuel to engine through hoses. Fuel Pump consists of Fuel Pump to generate the fuel flow and pressure regulator to regulate the fuel pressure.

When power is supplied to fuel pump, motor in pump assembly rotates the impeller. Impeller in turn draws the fuel from strainer and pumps the flow to generate the system pressure.

Pressure Regulator is a diaphragm type mechanical device. Fuel flow from filter enters in the inlet of pressure regulator. Pressure regulator regulates the fuel pressure at a set pressure by releasing the excessive fuel flow to fuel tank.

3.16.7.2 Operating Conditions

● Fuel Pump needs to be mounted on Fuel Tank Top according to the installation instructions.

● Fuel Pump is intended to use with gasoline. However if the fuel contains ethanol, please

contact vehicle manufacture to check whether the fuel pump module itself can survive or not.

● Make sure there is at least 3 liters of gasoline in the fuel tank before priming for first time (don't run the pump dry).

3.16.7.3 Service Procedure

Precautions:

Before attempting any service on fuel system, following cautions should be always followed for personal safety and to avoid system damages.

● Disconnect negative cable at battery.

● DO NOT smoke, and place 'No SMOKING" sign near work area.

● Make sure to have fire extinguisher handy.

● Make sure to perform work in well ventilated area and away from any open fire/flames.

● Wear Safety glasses.

● To relieve fuel vapor pressure in fuel tank, remove fuel filler cap fuel filler neck and then reinstall it.

● As fuel lines are at high pressures when the engine is stopped, loosening or disconnecting fuel line will cause dangerous spout of fuel. Before loosening/ disconnecting fuel lines, please follow the ***'Fuel Pressure Relief Procedure'*** described in this section.

● Small amount of fuel may drip after the fuel lines are disconnected. In order to reduce the risk of personal injury, cover the pipe / hose ends with suitable blind with no rust or contamination.

● After servicing, make sure that the fuel hoses and clamps are connected according to the hose fitment instructions given in vehicle instruction manual.

● After servicing, please follow the ***'Fuel Leakage Check Procedure'*** described in this section.

● After servicing make sure to fill at least 3 liters gasoline before pump is primed (ignition key should be turned on only after ensuring there is minimum 3 liters of fuel in the fuel tank)

Fuel Module Diagnosis:

Step	Action	Yes	No
1	Switch on Ignition key. Fuel Pump primes for 3 seconds when the ignition key is ON. Check for fuel pump running noise for 3 seconds after ignition key is ON.	If fuel pump running noise can be heard, go to step 4.	If fuel pump running noise cannot be heard, go to step 2.
2	Disconnect Fuel Pump coupler. Check voltage at harness coupler. Is the voltage within 10-14V?	Go to step 3	Check the electrical circuit from Ignition to Fuel Pump.
3	Connect 12V DC power supply (battery) to Fuel Pump. Make sure that enough fuel available in fuel tank to avoid fuel pump running dry. Is the fuel pump running?	1. Check electrical circuit from Fuel Pump to ECU. 2. Check ECU.	1. Check Fuel Pump Harness integrity. 2. Check Fuel Pump.
4	Check fuel system pressure at Injector inlet (with a T-joint) while engine is running in idle condition. Is the pressure about 300 kPa?	Fuel Pump Operation Normal	Go to Step 5
5	Is the Pressure below 300kPa too much?	1. Check for leakages from hoses, hose joints; 2. Check Fuel Pump; 3. Check Pressure Regulator;	1. Clogged Filter; 2. Kink/ Blockage in Fuel Hoses; 3. Check Regulator.

3.16.7.4 Fuel Pump Removal

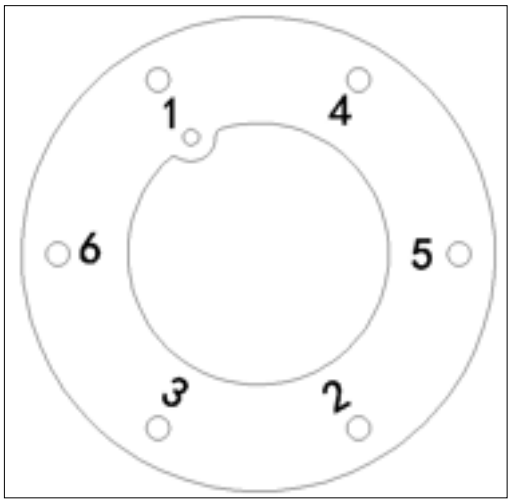
- Relieve fuel pressure in fuel lines referring to the ***'Fuel Pressure Relief Procedure'*** provided in this section.
- Disconnect negative cable at battery.
- Disconnect Fuel Pump wire coupler.
- Drain the fuel in fuel tank thru fuel filler with help of hand pump (siphon). Collect the fuel in approved container for contamination and safety.
- Disconnect the fuel hoses from Fuel Pump by using standard tools.
- Remove the fuel tank from vehicle.
- Place the fuel tank with bottom up condition. Care to be taken not to cause any scratches/ damages on fuel tank.
- Open the Fuel Pump mounting bolts.

● Take out Fuel Pump assembly from fuel tank with care.

3.16.7.5 Fuel Pump Installation

● Replace the Fuel Pump gasket in Fuel Pump assembly with a new one. Old / Used gaskets can cause leakages.

● Place the bolts on Fuel Pump cover and tighten the bolts gradually in 1-6 sequence to apply equal compression on gasket. It is shown as right.



Bolt Tightening Torque: 8 Nm. Fuel Pump is installed with the M5×12 bolts. Use designated bolts only. Follow the tightening torque and tightening sequence instruction. Over torque and miss-sequence can cause unequal compression of gasket and leakage.

● Install the Fuel Tank to vehicle.

● Connect for fuel hoses with suitable hose clamps.

● Connect Fuel Pump coupler.

● Follow ***'Fuel Leakage Check Procedure'*** to check any leakage before the engine is started.

3.16.7.6 Fuel Pressure Relief Procedure

Caution: This work must not be done when engine is hot.

After making sure that engine is cold, relieve fuel pressure as follows.

● Place vehicle gear in 'Neutral'.

● Disconnect Fuel Pump electrical coupler from vehicle harness.

● Start engine and run till it stops due to lack of fuel. Repeat ignition key ON and OFF for 2 ~ 3 times of about 3 seconds each time to relieve fuel pressure in lines. Fuel Connections are now safe for servicing.

● Upon the completion of servicing, Connect Fuel Pump Connector to Vehicle Harness.

3.16.7.7 Fuel Leakage Check Procedure:

After performing any service on fuel system, check to make sure that there are no fuel leakages as below.

● Fill about 3 ~ 5 liters of fuel in tank.
● Turn Ignition key to ON position for 3 seconds (to operate fuel pump) and then turn to OFF position. Repeat this for 3 ~ 4 times to apply fuel pressure in fuel lines.
● In this state, check to see that there are no fuel leakage from any part of fuel system (Fuel Tank, Hoses, Hose Joints, etc)

3.16.8 MOTOR SCANNER (For Motion SE08)

3.16.8.1 Precautions

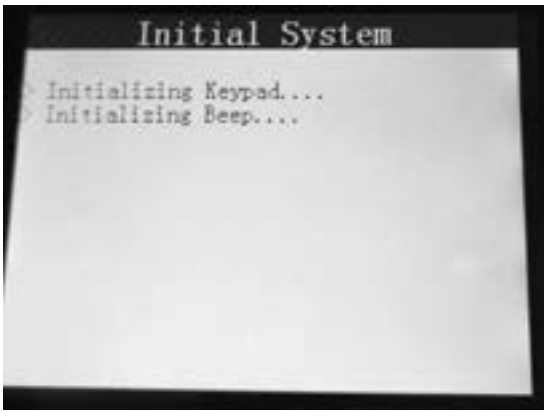
● Motor-Scanner is a precision instrument and should be protected from vibration and impact.
● If the unit does not run correctly or the screen is unstable when first turned on, disconnect it from the vehicle and try again.
● Never test electrical signals that exceed the limit of specifications.
● Test cannot be performed by the person who is driving the car.
● This unit should be used and stored in the following conditions:
Ambient temperature: 0~50℃
Relative humidity: < 90%
Note: This instruction is only applicable to Motion Motor Scanner. For other Motor Scanner, please refer to the Instructions for it.

1	[⏮]	Key	To return to the previous interface
2	[▲]	Key	To move the cursor to upper item in the menu
3	[▼]	Key	To move the cursor to down item in the menu
4	[◀]	Key	To move the cursor to left item in the menu
5	[▶]	Key	To move the cursor to right item in the menu
6	[↵]	Key	To confirm and execute this operation

3.16.8.2 Preparations Connection

● Find the 6PIN diagnostic socket on the vehicle.
● Connect one end of the diagnostic main cable to the diagnostic socket on the vehicle. Turn on the key.

Normal Power – on Display
When power is on normally, the unit will display:



Seconds later, the unit will display:

3.16.8.3 Functions

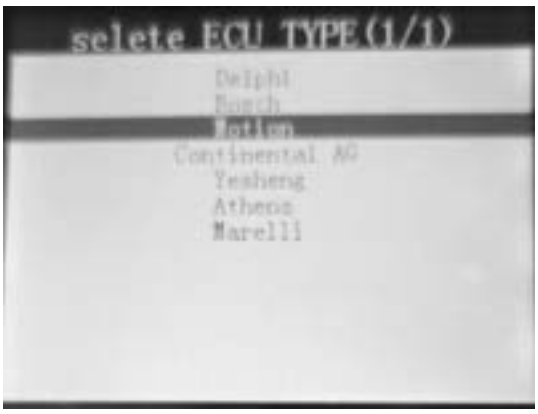
Motion Motor-Scanner can be used to diagnose Motion Engine Management System with functions: Read DTC, Clear DTC, Data Stream, Status Stream, and Record Data.

Operations

When the unit is powered up, the screen will display the interface as right.

Here, we take diagnostic function for demonstration.

Select ECU and press [↵] key, it will display an interface for EFI system selection, as shown right.



Select ‘Motion’ and press [↵] key, it will display information about the ECU version list, as shown right

Select ‘SE08 K’ and press [↵] key, it will display information about function list, as shown right

Available functions are as follows:

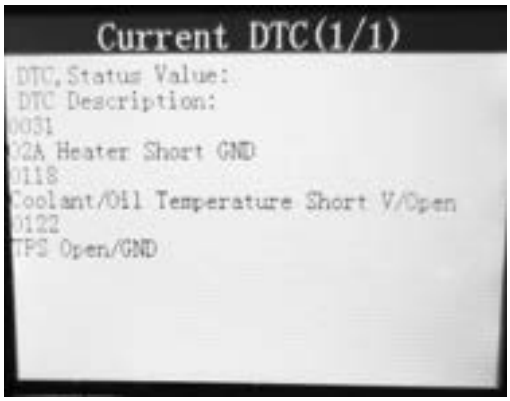
- Read DTC
- Clear DTC
- Data Stream
- Record Data

Press ▲ or ▼ or ◀ or ▶ key to select function you needed, as shown right

1. Read DTC

Select ‘Read DTC  ’, and press [↵] , it will display function list as right.

Select ‘Read Current DTC’ and press [↵] ,If there are some malfunctions with the vehicle's EFI system, the screen will display fault information as right.



2. Clear DTC

Select ‘Read DTC  ’, and press [↵] , it will display function list as right.

Press ▼ key to select ‘Clear DTC ’ , the screen will display "SUCCESS", as shown right. This means the fault code has been removed successfully.

3. Data Stream

Select ‘Read Date  ’, and press [↵]

it will display function list as right.

Select ‘Display Date’ , and press [↵] , it will display Engine information as right .

4. Data Record

Select ‘Read Date  ’, and press [↵] , it will display function list as right.

Press ▼ to select ‘Record Data ’ , it will display as right. (The recorded data can be used to analyze engine conditions)

3.16.8.4 SE08 ECU Malf Code

Malf code	Description
0107	MAP Sensor Circuit Low Voltage or Open
0108	MAP Sensor Circuit High Voltage
0112	IAT Circuit Low Voltage
0113	IAT Circuit High Voltage or Open
0117	Coolant/Oil Temperature Sensor Circuit Low Voltage
0118	Coolant/Oil Temperature Sensor Circuit High Voltage or Open
0122	TPS Circuit Low Voltage or Open
0123	TPS Circuit Short to High Voltage
0131	O2S 1 Circuit Low Voltage
0132	O2S 1 Circuit High Voltage or Open
0031	O2S Heater Circuit High Voltage or open
0032	O2S Heater Circuit Low Voltage
0650	Engine fault indicator is faulty
0335	CKP Sensor No Signal
0336	CKP Sensor Noisy Signal
2300	Cylinder 1 Ignition Coil "A" Short to Low Voltage/Open
0116	Coolant/Oil Temperature Out of range
0116	Coolant/Oil Temperature Sensor Signal Malfunction
0505	Idle Speed Control Error
0562	System Voltage Low
0563	System Voltage High
1693	Tachometer Circuit Low Voltage
1694	Tachometer Circuit High Voltage
0459	CCP Short to High Voltage
0458	CCP Short to Low/Open
00D1	Cylinder 1 Sensor Heater Circuit Low Current（Heater failure)
0232	Fuel Pump Relay Short to High Voltage
0231	Fuel Pump Relay Short to Low Voltage/Open
014D	Cylinder 1 Sensor Reaction Time From Thin to Thick Slow

Malf code	Description
014C	Cylinder 1 Sensor Reaction Time From Thick to Thin Slow
0601	ECM Read-Only Memory Check Error
0262	Cylinder 1 Fuel Injector Short to High Voltage
0261	Cylinder 1 Fuel Injector Short to Low Voltage/Open
3106	Steady State Intake Pressure Low
0105	MAP Signal Stuck
0114	IAT Signal Erratic change
0111	IAT Signal Stuck
2195	Cylinder 1 Sensor PE Thin
0300	Misfire incident detected
0301	Cylinder 1 Misfire
0500	VSS No Signal
0850	Park Neutral Switch Error
2257	Secondary Air Supply Valve Open/Short to Low Voltage
2258	Secondary Air Supply Valve Short to High Voltage

NOTES

CHAPTER 4 CHASSIS

WARNING

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

4.1 FRONT WHEEL / HUB / BRAKE

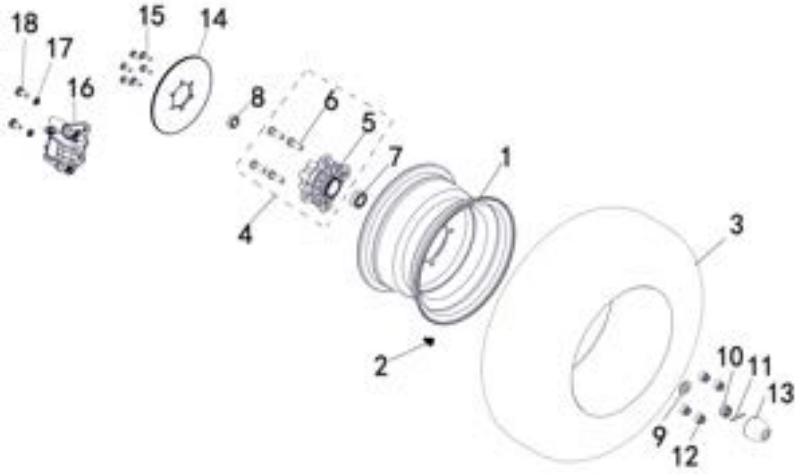
4.2 A-RM REPLACEMENT

4.3 FINAL DRIVE

4.4 SWING ARM

4.1 FRONT WHEEL/ HUB

1	WHEEL SUB-ASSY
2	VALVE，RIM
3	TIRE FRONT
4	HUB FOR WHEEL ASSY
5	HUB ASSY SHRT
6	BOLT
7	BEARING 6202RZ
8	BEARING 6204RZ
9	WASHER 14
10	NUT M14
11	COTTER PIN 4X28
12	NUT M10，WHEEL
13	CAP，WHEEL SUB-ASSY
14	FRONT BRAKE DISC
15	BOLT M6X16
16	BRAKE CALIPER，LEFT，FRONT
17	SPRING WASHER 8
18	BOLT M8X16



FRONT WHEEL REMOVAL

1. Place the vehicle on level ground with engine off and fuel off, set the parking brake,
2. Loosen the 4 nuts (6), but not removal.
3. Elevate front end and safely support machine under frame area, Removal the nuts.
4. Remove the front wheel.
   Inspect all wheels for runout and damage.

FRONT HUB REMOVAL

1. Remove the wheel as described above.
2. Remove the PROTECTIVE RUBBER (1)and cotter pin.
3. Loosen and remove the SLOTTED NUT (3) and washer.
4. Remove the brake caliper.
5. Removal the front hub.

FRONT HUB/ BRAKE DISC / BRAKE PANEL/ BRAKE CALIPER/ BRAKE SHOE INSPECTION

Rotate each bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion. Replace bearing if moisture, dirt, corrosion, or roughness is evident. Inspect the whole hub for damage replace if necessary.
Inspect the brake disc/ brake caliper/ brake shoe, replace if necessary.
See the CHAPTER 2 MAINTENANCE for the service limit of the brake shoe.
NOTE: Replace the brake shoes as a set either is worn to the limit.

HUB BEARING REPLACEMENT

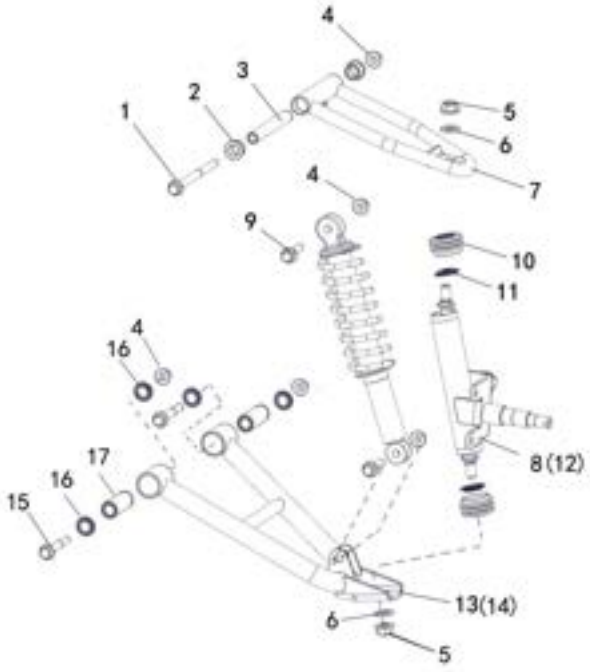
1. Remove the bearing 6202RZ.
2. Remove the brake disc.
3. Remove the bearing 6204RZ.

1. Apply grease to the bearings.
2. Drive the bearing 6204RZ in first, seal side facing out,
3. Install the disc brake.
4. Drive the bearing 6202RZ in, seal side out.

Reverse the wheel and hub removal procedure for installation.

4.2. A-RM REPLACEMENT

1	BOLT
2	BUSHING
3	SHAFT PIVOT，LONG
4	NUT M10X1.25
5	NUT M12X1.25
6	WASHER 12
7	ARM UPPER FRT
8	CARRIER BEARING，FRONT，LH
9	BOLT M10X1.25X42
10	SEAL-BALL HEAD，DUST，SPINDLE
11	SPACER-BALL HEAD，SPINDLE
12	CARRIER BEARING，FRONT，RH
13	ARM LWR FRT LH
14	ARM LWR FRT RH
15	BOLT M10X1.25X70
16	DUST COVER
17	BUSHING，LONG



REMOVAL

1. Remove wheel/ hub as described above.
2. Remove NUT (5), WASHER (6), and removal the A-ARM PIVOT SHAFT (8/12).
3. Remove BOLTS (9) and removal FRONT SHOCK ABSORBER.
4. Remove bolts (1/15) and removal A-ARM.

INSPECTION

Clean and Inspect whether the BUSHING（2）, SEAL-BALL HEAD,DUST,SPINDLE（10） and BUSHING,LONG（17） is damaged. Replace if necessary.

INSTALLATION

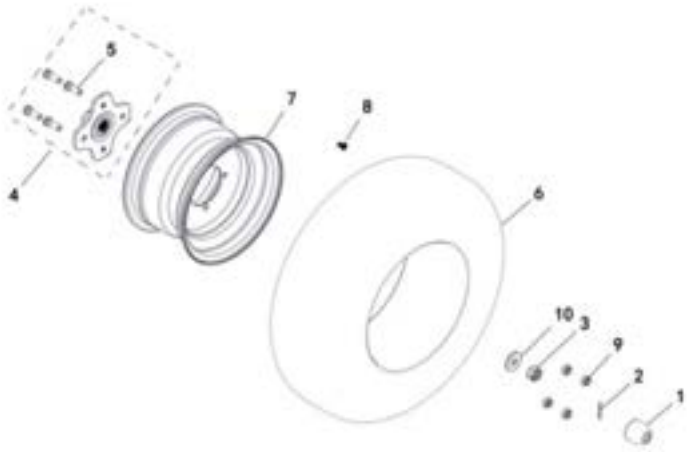
NOTE: Always use new A-ARM PIVOT SHAFT
SEALED RING for re-installation.
Apply grease on A-ARM PIVOT SHAFT

Reverse the hub removal procedure for installation.

4.3 FINAL DRIVE

REAR WHEEL

1	PROTECTIVE RUBBER
2	COTTER PIN 4X28
3	SLOTTED NUT M14X1.5
4	HUB REAR
5	THE REAR WHEEL BOLT INSTALLATION
6	TIRE REAR
7	WHEEL REAR
8	VALVE.RIM
9	WHEEL HUB CONE NUT
10	WASHER



Removal

1. Place the vehicle on level ground with engine off,
2. Loosen the 4 NUTS (9), but not removal.
3. Elevate rear end and safely support machine under frame area, Removal the NUTS.
4. Removal the wheel.

Inspection

Inspect all wheels for run out and damage.

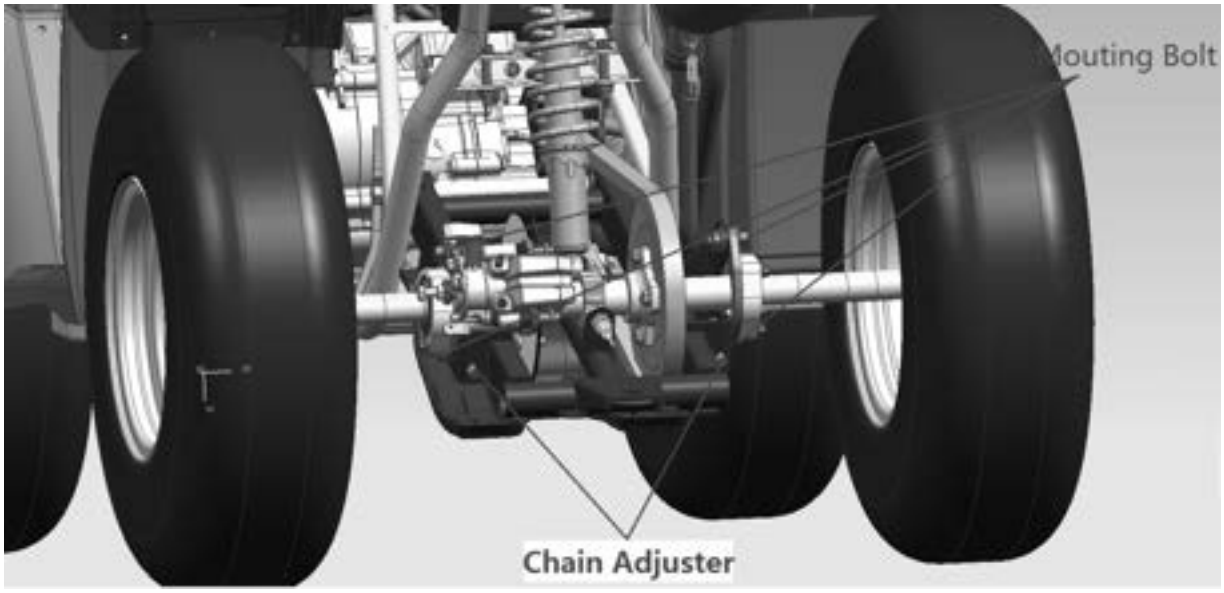
Installation

Reverse the wheel removal procedure for installation.

DRIVE CHAIN

Chain Removal

1. Place the vehicle on level ground with engine off,
2. Rotate rear wheel to place master link in accessible position between two sprockets.
3. Remove the rear wheels as described above.
4. Loosen, but not removal the four mounting bolts. Loosen the chain adjuster.
5. Slide the retaining clip of the master link and remove clip and side plate.
6. Slide master link out and remove the chain.



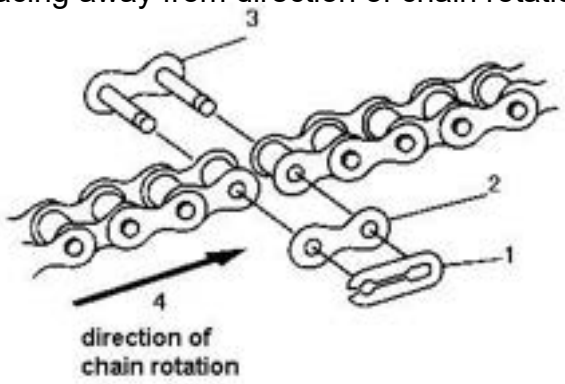
Chain Inspection, Installation and Adjustment

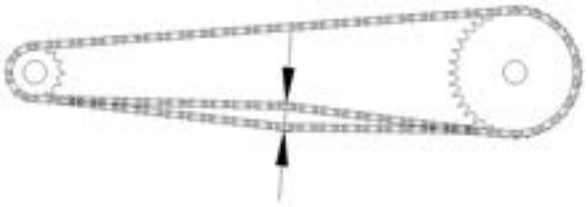
1. Clean and Inspect chain and chain sprocket for wear.

NOTE: To clean the chain, remove the chain from the ATV, dip it in solvent, and clean out as much dirt as possible. Take the chain out of the solvent and dry it. Immediately lubricate the chain to prevent rust.

2. If sprockets are worn, replace sprockets and chain as a set.
3. Replace guards if damaged.
4. Slide the pin portion of the master link(3) in to each end of chain to be connected.
5. Slide the side plate(2) portion of the master link on to the pins.
6. Slide the retaining clip(1) on to the pins until clip snaps securely in to place.

CAUTION: The master link should be installed with the open end of the retaining clip (1) facing away from direction of chain rotation (4).





7. Turn the chain adjuster to obtain 1/4'' (6mm) to 3/8'' (10mm) chain flex. To tighten the chain, turn the chain adjuster clockwise. To loosen the chain, turn the chain adjuster count clockwise and push the rear axle forward.

8. Securely tighten the mounting bolts.

Torque Specifications: 63-66Ft.Lbs (85-90N.m)

9. Recheck the chain tension: At the center point between the two sprockets, push and pull the chain and note total flex. If flex is more than 1/2'' (12mm), readjust chain.

10. Apply proper type spray-on chain lubricant thoroughly inside and outside plates and rollers of chain. Move ATV as needed to access entire chain.

FINAL DRIVE

Removal

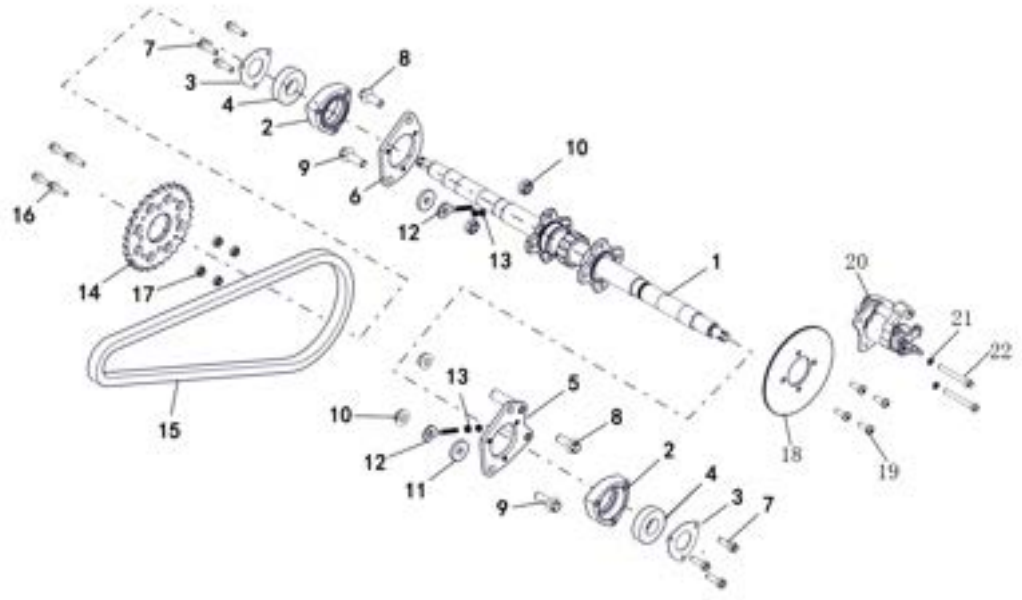
1. Remove the rear brake pump.
2. Remove wheels, chain as described above.
3. Remove the 4 M12 mounting bolts and 4 M6 adjusting nuts.
4. Remove the final drive assembly from the swing arm,

Installation

Reverse the removal procedure for installation. Adjust chain tension as described above. Securely tighten the mounting bolts.

Torque Specifications: 63-66Ft.Lbs (85-90N.m)

Final Drive Disassembly



1	REAR AXLE	13	NUT
2	HOUSING-AXLE BEARING	14	DRIVEN SPROCKET
3	PLATE-RETAINER，BEARING	15	CHAIN
4	BEARING 6206-2RS	16	BOLT M8X28
5	BRACKET，HOUSING-AXLE BEARING，L	17	NUT M8
6	BRACKET，HOUSING-AXLE BEARING，R	18	REAR BRAKE DISC
7	BOLT M8X30	19	SCREW M8X25
8	BOLT M12X1.25X30	20	BRAKE CALIPER，REAR
9	BOLT M12X1.25X34	21	SPRING WASHER 8
10	NUT M12X1.25	22	BOLT，PARKING CALIPER
11	WASHER		
12	CHAIN ADJUSTER		

1. Remove BOLTS (7).
2. Removal the HOUSING-AXLE BEARING (2).

Inspection

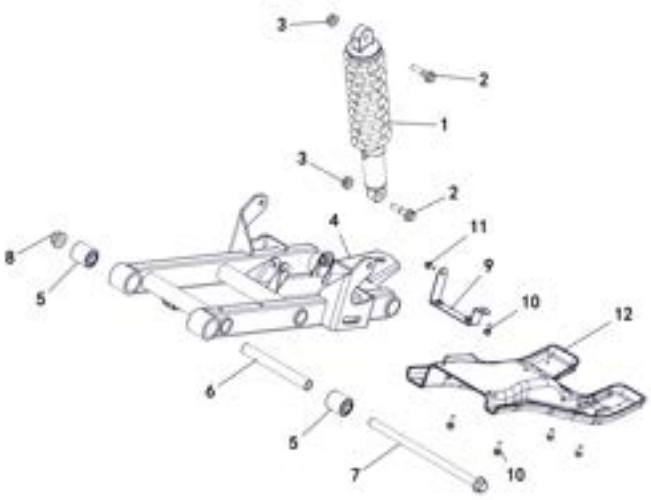
Rotate each bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion. Replace bearing if moisture, dirt, corrosion, or roughness is evident. Inspect the whole things for damage replace if necessary.

Installation

Reverse the removal procedure for installation.

4.4 SWING ARM

1	SHOCK ABSORBER REAR
2	BOLT M10X1.25X42
3	NUT M10X1.25
4	SWINGARM ASSY
5	SHAKER CUSHION SLEEVE
6	SWING ARM PIVOT BUSHING
7	SWING ARM PIVOT
8	NUT M14X1.5
9	MOUNTING BRACKET，CHASSIS GUARD PLATE
10	BOLT M6X16
11	BOLT M6X12
12	CRADLE PLATE



Removal

1. Removal SHOCK ABSORBER REAR.
2. Removal NUT (8), BOLT (7).

Inspection

Inspect the SWING ARM PIVOT BUSHING (5) and the BOLT (7)for nicks, scratches, or damage. Replace if necessary.

Installation

Reverse the removal procedure for installation.

Note. Install **new** seal. Coat the lip, bush, and pivot with grease.

Torque Specifications: NUT(8) M14X1. 5: 81-85Ft.Lbs (110~115N.m)
Bolt for rear shock absorber: 26-30Ft.Lbs (35~41N.m)

NOTES

CHAPTER 5 BRAKES

WARNING
The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

NOTE
Also See Chapter 2 for Maintenance Information.

5.1 SPECIFICATIONS

5.2 TORQUE

5.3 BRAKE SYSTEM SERVICE NOTES

5.4 BURNISHING PROCEDURE

5.5 FLUID REPLACEMENT/BLEEDING PROCEDURE

5.6 HAND BRAKE MASTER CYLINDER REMOVAL/ INSPECTION /INSTALLATION

5.7 FRONT PAD REMOVAL / INSPECTION / INSTALLATION

5.8 FRONT DISC INSPECTION / REMOVAL / REPLACEMENT

5.9 REAR CALIPER REMOVAL/ INSPECTION / INSTALLATION

5.10 REAR BRAKE PAD REMOVAL/ INSPECTION / INSTALLATION

5.11 REAR CALIPER REMOVAL/ INSPECTION/ INSTALLATION

5.12 REAR BRAKE DISC INSPECTION / REMOVAL / REPLACEMENT

5.1 SPECIFICATIONS

Brake Caliper			
Item		**Standard**	**Service Limit**
Brake Pad Friction material Thickness	hydraulic	0.157"/ 4mm	0.08"/ 2mm
Brake Disc Thickness		0.137"/3.5m m	0.125"/3.2mm
Brake Disc Thickness Variance Between Measurements		-	0.002 "/ 0.051m m
Brake Disc Runout		-	0.005 "/ 0.12 7m m

5.2 TORQUE

Item	Torque (ft. lbs. except where noted*)	Torque (Nm)
Front Caliper Mounting Bolts	18	25
Rear Caliper Mounting Bolts	18	25
Front Brake Disc	18	25
Rear Brake Disc	18	25

5.3 BRAKE SYSTEM SERVICE NOTES

- It is strongly recommended always change the caliper and (or) the master cylinder as an assembly. The parts inside maybe not interchangeable due to different brake manufactures and (or) different brake type.
- Do not over – fill the master cylinder fluid reservoir.
- Check and adjust master cylinder reservoir fluid level after pad service.
- Make sure atmospheric vent on reservoir is unobstructed.
- Test for brake drag after any brake system service and investigate cause if brake drag is evident.
- Inspect caliper piston seals for foreign material that could prevent caliper pistons from returning freely.
- Perform a brake burnishing procedure after install new pads to maximize service life.

5.4 BURNISHING PROCEDURE

Brake pads must be burnished to achieve full braking effectiveness. Braking distance will be extended until brake pads are properly burnished. To properly burnish the brake pads, use the following procedure.

1. Choose an area large enough to safely accelerate the ATV to 24km/h (15 mph) and to brake to a stop.
2. Using Fgear, accelerate to 50 km/h (30 mph); then compress brake handle to decelerate to 0-8km/h (5 mph).
3. Repeat procedure on each brake system 20 times until brake pads are burnished.
(4. Adjust the mechanical parking brake (if necessary).)
5. Verify that the brake light illuminates when the hand lever is compressed or the brake pedal is depressed.

WARNING
Failure to properly burnish the brake pads could lead to premature brake pad wear or brake loss. Brake loss can result in severe injury.

5.5 FLUID REPLACEMENT/BLEEDING PROCEDURE

NOTE : When bleeding the brakes or replacing the fluid always start with the caliper farthest from the master cylinder.

CAUTION
Always wear safety glasses.

CAUTION
Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV.

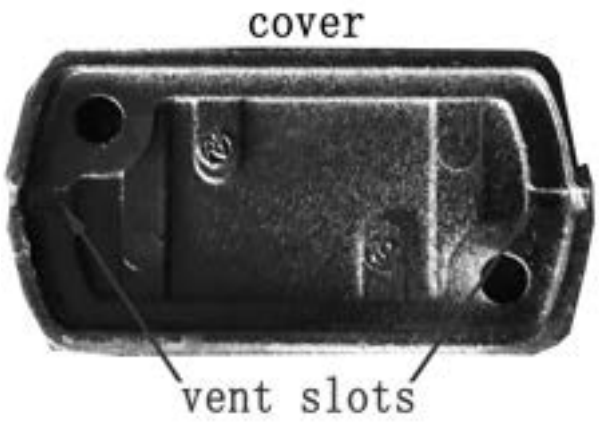
BRAKE BLEEDING-FLUID CHANGE

This procedure should be used to change fluid or bleed brakes during regular maintenance.

1. Clean reservoir cover thoroughly.
2. Remove screws, cover and diaphragm from reservoir.
3. Cover and remove any debris or blockage.
4. If changing fluid, remove old fluid from reservoir with a brake fluid pump or similar tool.

NOTE: Do not remove brake lever when reservoir fluid level is low.

5. Add brake fluid up to the indicated MAX level on the reservoir.
6. Begin bleeding procedure with the caliper that is farthest from the master cylinder. Install a box end wrench on the caliper bleeder screw. Attach a clean, clear hose



to the fitting and place the other end in a clean container. Be sure the hose fits tightly on the fitting.

NOTE: Fluid may be forced from supply port when brake lever is pumped. Place diaphragm in reservoir to prevent spills. Do not install cover.

DOT 3 Brake Fluid

Reservoir Cover Torque
5 in. lbs. (.6 Nm)

7. Slowly pump brake lever (D) until pressure builds and holds.
8. While maintaining lever pressure, open bleeder screw. Close bleeder screw and release brake lever.

NOTE: Do not release lever before bleeder screw is tight or air may be drawn into caliper.

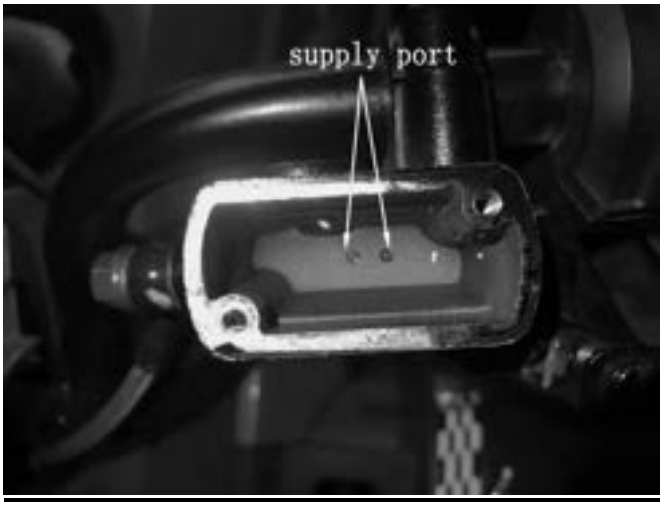
9. Repeat procedure until clean fluid appears in bleeder hose and all air has been purged. Add fluid as necessary to maintain level in reservoir.

CAUTION:
Maintain at least 1/2 " (13mm of brake fluid in the reservoir to prevent air from entering the master cylinder.

10. Tighten bleeder screw securely and remove bleeder hose.
11. Repeat procedure steps 5- 9 for the remaining caliper (s).
12. Add brake fluid to MAX level on reservoir.

NOTE: The liquid level is always between the maximum and minimum.

13. Install diaphragm, cover and screws. Tighten screws to specification.
14. Field test machine at low speed before putting into service. Check for proper braking action and lever reserve. With lever firmly applied, lever reserve should be no less than 1/2 " (13mm) from handlebar.
15. Check brake system for fluid leaks and inspect all hoses and lines for wear or abrasion. Replace hose if w ear or abrasion is found.



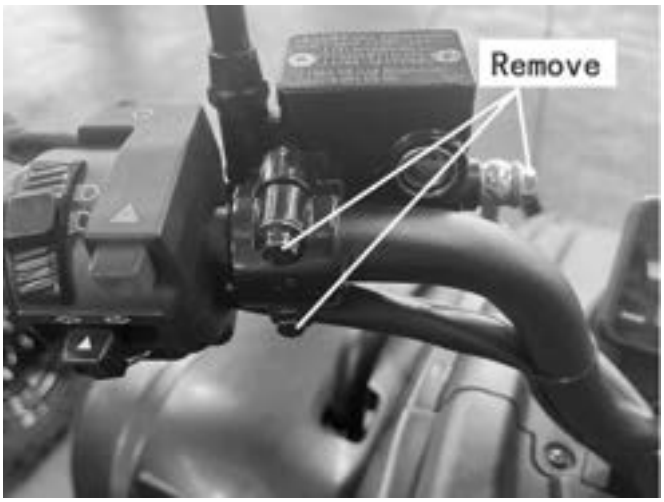
5.6 HAND BRAKE MASTER CYLINDER REMOVAL/ INSPECTION /INSTALLATION

CAUTION: The master cylinder is a non-serviceable Component; it must be replaced as an assembly.

NOTE: If any special service needed, contact the ATV manufacture via the agent for the parts and special instruction.

REMOVAL

1. Clean master cylinder and reservoir assembly. Make sure you have a clean work area to disassemble brake components.
2. Place a shop towel under brake hose connection at master cylinder. Loosen bolt, remove bolt and sealing washers.



CAUTION

Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

3. Remove master cylinder from handlebars.

INSPECTION

Inspect parking brake for wear. If the parking cable is worn, replace cable and test the parking performance, if any locking problem exists, Replace the master cylinder as an assembly.

INSTALLATION

1. Install master cylinder on handlebars. Torque mounting bolts to 55 in. lbs. (6 N m).

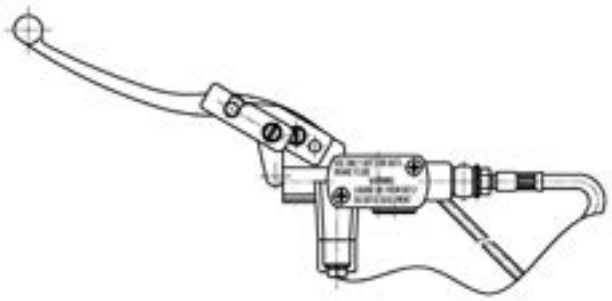
NOTE: To speed up the brake bleeding procedure the master cylinder can be purged of air before brake hose is attached. Fill with DOT3 brake fluid and pump lever slowly two to three times with finger over the outlet end to purge master cylinder of air.

2. Place new sealing washers on each side of hand brake hose and torque bolt to specification.

Master Cylinder Mounting
Bolt Torque 55 in. lbs . (6 N m)

Brake Line Banjo Bolt Torque
15 ft. lbs. (21 Nm)

3. Fill reservoir with **DOT 3** fluid.
4. Follow bleeding procedure, Check all connections for leaks and repair if necessary.



5.7 FRONT PAD REMOVAL / INSPECTION / INSTALLATION

NOTE: The brake pads should be replaced as a set.

REMOVAL

1. Elevate and support front of ATV safely.

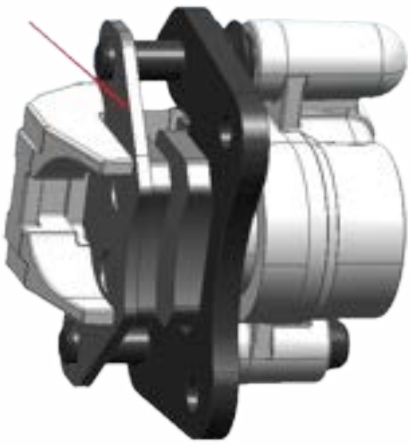
CAUT ION: Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

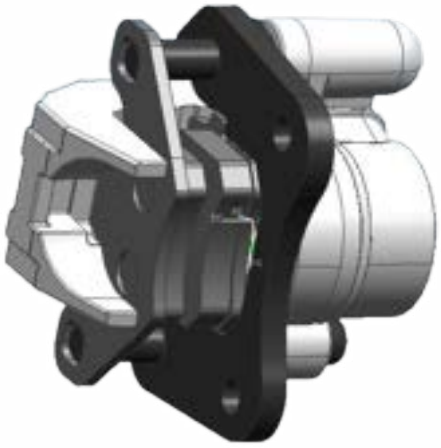
2. Remove the front wheel.
3. Remove caliper from mounting bracket.
4. Push caliper piston into caliper bore slowly using a C-clamp or locking pliers with pads installed.

NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

5. Push mounting bracket inward and slip outer brake pad past edge. Remove inner pad.
6. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.

Remove





INSPECTION

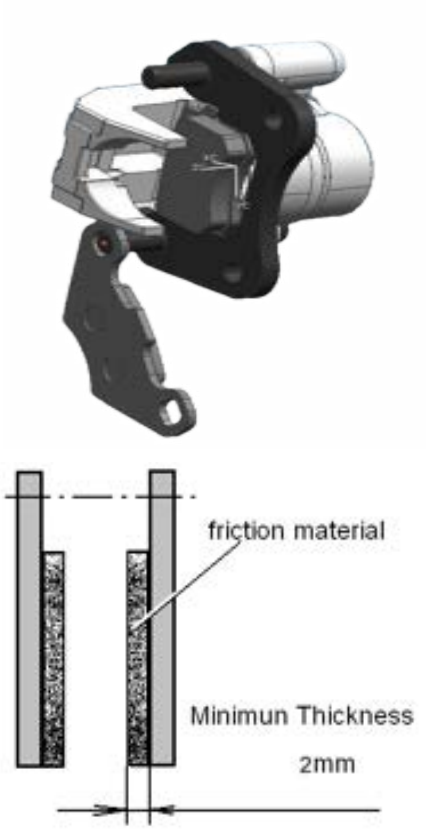
Measure the thickness of the pad friction material. Replace pads if worn beyond the service limit.

Service Limit 2 mm

INSTALLATION

1. Lubricate mounting bracket pins with a light film of All Season Grease, and install rubber dust boots.

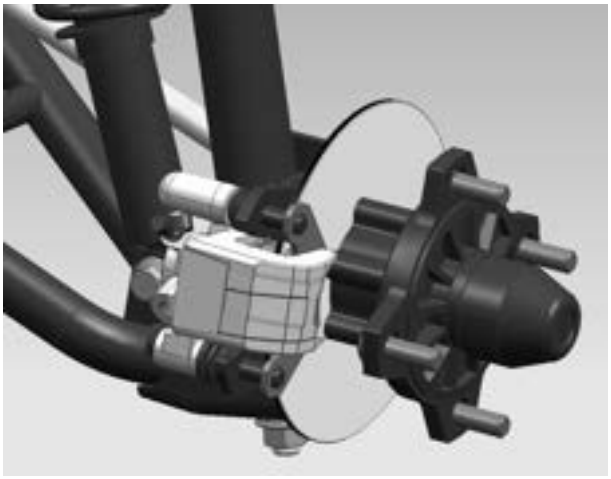
2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other. Be sure pads and disc are free of dirt or grease.
Front Caliper Mounting Bolts Torque 18 ft. lbs. (25 Nm)
3. Install caliper on carrier bearing, and torque mounting bolts.
4. Slowly pump the brake lever until pressure has been built up. Maintain at least 1/2 ". (13 mm) of brake fluid in the reservoir to prevent air from entering the brake system.
Hand Master Cylinder(s) Fluid Level: Between MIN and MAX lines
5. Install wheels and torque wheel nuts, test and burnish.
See **BURNISHING PROCEDURE**



5.8 FRONT DISC INSPECTION / REMOVAL / REPLACEMENT

INSPECTION

1. Visually inspect the brake disc for nicks, scratches, or damage.
2. Measure the disc thickness at 8 different points around the pad contact surface using a 0-1" micrometer and a dial indicator. Replace disc if worn beyond service limit.



Brake Disc Thickness
New0.137"(3.5mm)
Service Lim it 0.125"/3 .2 mm
Brake Disc Thickness Variance
Service Limit 0.002 " (0.051mm)
difference between measurements
Brake Disc Runout
Service Limit 0.005" (0.127 mm)

REMOVAL/ REPLACEMENT

1. Removal caliper and hub.
2. Remove bolts and disc.
3. Clean mating surface of disc and hub.

4. Install new disc on hub.
5. and tighten to specified.

CAUTION: Always use new brake disc mounting bolts.

Front Brake Disc Mounting Bolt Torque :
18 ft. lbs. (25 Nm)

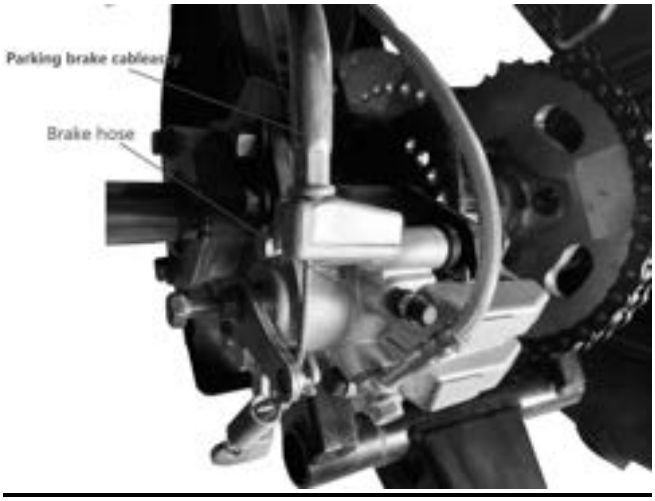
5.9 REAR CALIPER REMOVAL/ INSPECTION / INSTALLATION

CAUTION: The caliper is a non-serviceable Component; it must be replaced as an assembly.

NOTE: If any special service needed, contact the ATV manufacture via the agent for the parts and special instruction.

REMOVAL

1. Remove wheel, remove caliper from the bracket.
2. Remove the parking cable .Loosen and remove brake hose(s) to caliper. Place a container under caliper to catch fluid draining.



INSPECTION

Inspect caliper body for nicks, scratches or worn. Replace caliper as an assembly if any problem exists.

INSTALLATION

1. Install caliper to the bracket, Install new bolts.

Caliper Mounting Bolt Torque18 ft. lbs. (25 Nm)

2. Install brake hose and tighten securely.
3. Install the parking cable
4. Bleeding and Install wheels, If new brake pads are installed, burnishing procedure should be performed. See **BURNISHING PROCEDURE,** And field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when lever is released. If the brake drags, recheck assembly and installation.

5.10 REAR BRAKE PAD REMOVAL/ INSPECTION / INSTALLATION

NOTE: The brake pads should be replaced as a set.

REMOVAL and INSPECTION

1. Lift caliper off of disc.

NOTE. When removing caliper, be careful not to damage brake hose . Support caliper so as not to kink or bend brake hose.

2. Push caliper pistons into caliper bore slowly with pads installed.

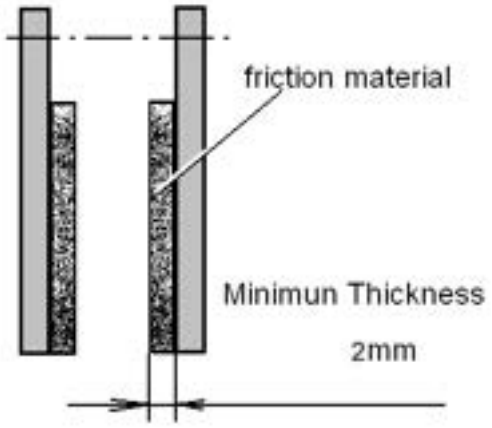
NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

3. Remove brake pad retaining pin, and pad spacer.

4. Clean.

5. Measure the thickness of the pad friction material. Replace pads if worn beyond the service limit.

Rear Brake Pad Service Limit 2 mm



INSTALLATION

1. Install new pads in caliper body. Be sure to put spacer between pads.

2. Install caliper and torque mounting bolts.

Brake Caliper Torque: 18 ft. lbs. (25 Nm)

3. Install wheels, burnishing procedure should be performed. See **BURNISHING PROCEDURE,** And field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when lever is released. If the brake drags, recheck assembly and installation.

5.11 REAR CALIPER REMOVAL/ INSPECTION/ INSTALLATION

CAUTION: The caliper is a non-serviceable Component; it must be replaced as an assembly.
NOTE: If any special service needed, contact the ATV manufacture via the agent for the parts and special instruction.

1. Clean caliper area.
2. Using a flare nut wrench, remove hose(s). Place a container to catch brake fluid draining from brake hose.
3. Remove caliper.
4. Remove brake pad as described above.
5. Inspect surface of caliper for nicks, scratches or damage and replace if necessary.
6. Install caliper and torque mounting bolts.

Caliper Mounting Bolt/ Caliper body Bolt Torque:
18 ft. lbs. (25 Nm)

7. Install brake hose and tighten to specified torque.

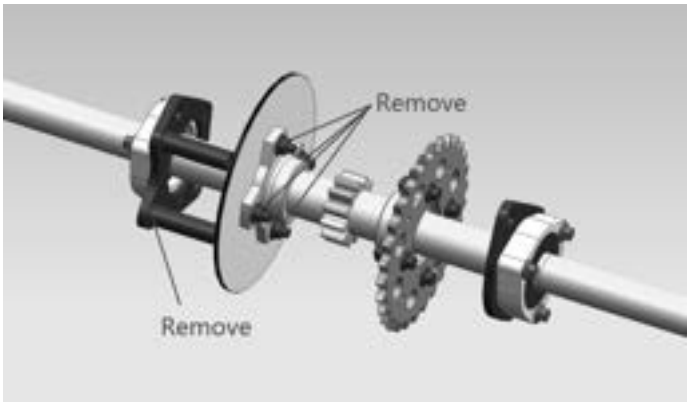
Banjo Bolt Torque: 15 ft. lbs. (21 Nm)

8. Bleed.
10. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when lever is released. If the brake drags, recheck assembly and installation.

5.12 REAR BRAKE DISC INSPECTION / REMOVAL / REPLACEMENT

INSPECTION

1. Visually inspect the brake disc for nicks, scratches, or damage.
2. Measure the disc thickness at 8 different points around the pad contact surface using a 0-1" micrometer and a dial indicator. Replace disc if worn beyond service limit.



Brake Disc Thickness
New0.137"(3.5mm)

Service Lim it 0.125"(3.2 mm)

Brake Disc Thickness Variance
Service Limit 0.002 " (0.051mm)
difference between measurements

Brake Disc Runout
Service Lim it 0.005" (0.127 mm)

REMOVAL/ REPLACEMENT

1. Removal wheel and caliper.
2. Remove rear axle assembly.
3. Remove bearing housing.
4. Remove bolts and disc from the flange.
5. Clean mating surface of disc and hub.
6. Install new disc on flange.
7. Tighten to specified.

CAUTION: Always use new brake disc mounting bolts.

Rear Brake Disc Mounting Bolt Torque :
14-18 ft. lbs. (19-25 Nm)

NOTES

CHAPTER 6 ELECTRICAL

6.1 PARTS INSPECTION AND SERVICE

6.2 BATTERY

6.3 IGNITION SYSTEM

6.4 CHARGING SYSTEM

6.5 ELECTRICS STARTING SYSTEM

6.6 LIGHTING SYSTEM

6.7 GEAR SHIFT SENSOR TEST

6.8 SPEEDOMETER SYSTEM

6.9 MAIN SWITCH AND HANDLE SWITCH

6.10 FUEL GAUGE/ FUEL LEVEL SENSOR

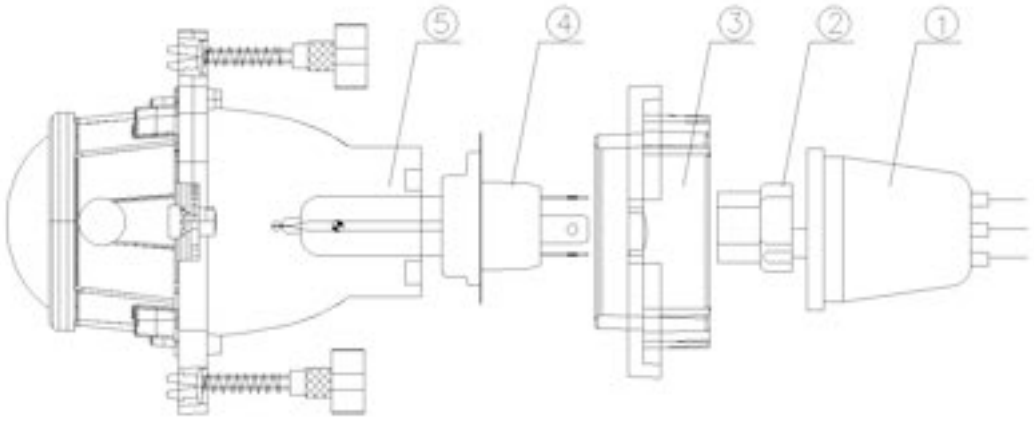
6.11 WIRING DIAGRAM

6.1 PARTS INSPECTION AND SERVICE

HEADLIGHT LAMP REPLACEMENT

FOR Halogen lens lamp

1. Pull the cable plug off the conducting strip in the socket, remove the clip ① before dismounting the bulb ④.
2. Fit a new bulb into the socket ③, sitting properly in the three slots, install the clip as shown in the fig. and connect the cable plug to the conducting strip.
3. Use bulb 12V 35W/35W .



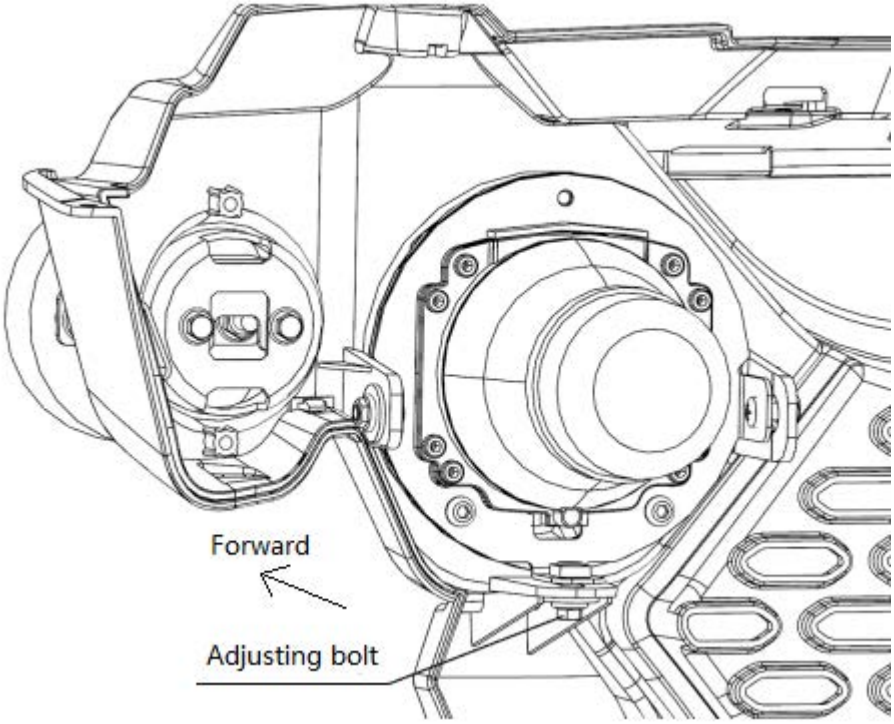
FOR LED Headlamp

1. Unplug the connector of the light;
2. Remove the self tapping screw 、adjusting bolt and washers;
3. Remove the headlight from the cover ;
4. Install a new well led headlight to the cover ;
5. Install the washer 、self tapping screw and adjusting bolt;
6. Connect the connector to wire harness.

For LED Headlamp

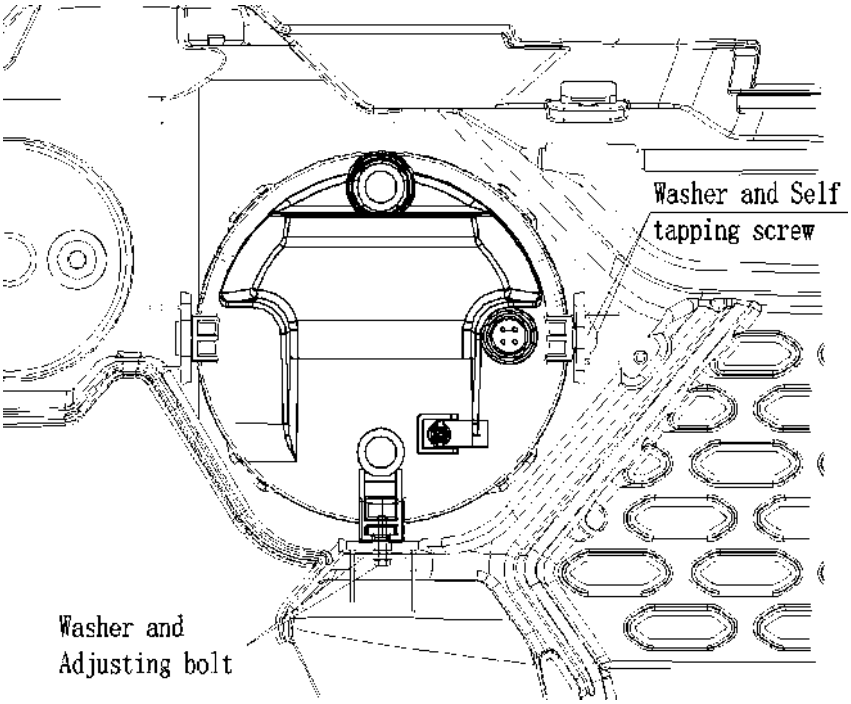
1. Unplug the connector of the light;
2. Remove the self tapping screw 、adjusting bolt and washers;
3. Remove the headlight from the cover ;
4. Install a new well led headlight to the cover ;
5. Install the washers 、self tapping screw and adjusting bolt;
6. Connect the connector to wire harness.

HEADLIGHT ADJUSTMENT(For Halogen Lens Low Beam Headlamp)



To lower headlight brightness cut-off line, turn adjusting bolt backward. And to raise brightness cut-off line, turn the bolt forward.

HEADLIGHT ADJUSTMENT(For LED Headlamp)



To lower headlight brightness cut-off line, turn adjusting bolt backward. And to raise brightness cut-off line, turn the bolt forward.

6.2 BATTERY

Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with skin, eyes or clothing Antidote:
External: Flush with water.

Internal: Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.

Eyes: Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in an enclosed space. Always shield eyes when working near batteries.
KEEP OUT OF REACH OF CHILDREN

WARNING: The gases given off by a battery are explosive. Any spark or open flame near a battery can cause an explosion which will spray battery acid on anyone close to it. If battery acid gets on anyone, wash the affected area with large quantities of cool water and seek immediate medical attention.

Battery Maintenance
If the vehicle will not be used for more than one month, remove the battery, fully charge it, and then place it in a cool, dry place. If the battery will be stored for more than two months, check it at least once a month and fully charge it if necessary.

CAUTION
To charge this battery, a specified battery charger is required. Using a conventional battery charger will damage the battery.
Ensure to the cables are properly routed when installing the battery.

BATTERY TESTING
Whenever a service complaint is related to either the starting or charging systems, the battery should be checked first.
Following are three tests which can easily be made on a battery to determine its condition: OCV Test, Specific Gravity Test and Load Test.

MF (Maintenance Free) battery does not require the Specific Gravity Test and Refill

Open Circuit Voltage Test
Battery voltage should be checked with a digital multitester. Readings of 12.6 or less require further battery testing and charging.

NOTE: Lead acid batteries should be kept at or near a full charge as possible.

Load Test

CAUTION: Remove spark plug high tension leads and connect securely to engine ground before proceeding.

NOTE: This test can only be performed on machines with electric starters. This test cannot be performed with an engine or starting system that is not working properly.
A battery may indicate a full charge condition in the OCV test and the specific gravity test, but still may not have the storage capacity necessary to properly function in the electrical system. For this reason, a battery capacity or load test should be conducted whenever poor battery performance is encountered. To perform this test, hook a multitester to the battery in the same manner as was done in the OCV test. The reading should be 12.6 volts or greater. Engage the electric starter and view the registered battery voltage while cranking the engine. Continue the test for 15 seconds. During this cranking period, the observed voltage should not drop below 9.5 volts. If the beginning voltage is 12.6 or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

6.3 IGNITION SYSTEM

IGNITION SYSTEM TROUBLESHOOTING
No Spark, Weak or Intermittent Spark

- Spark plug gap incorrect
- Fouled spark plug
- Faulty spark plug cap or poor connection to high tension lead
- Related wiring loose, disconnected, shorted, or corroded
- Engine stop switch or ignition switch faulty
- Terminal board or connections wet, corroded
- Poor ignition coil ground (e.g. coil mount loose or corroded)
- Faulty stator (measure resistance of all ignition related windings)
- Incorrect wiring (inspect color coding in connectors etc.)
- Faulty ignition coil winding (measure resistance of primary and secondary)
- Worn magneto (RH) end crankshaft bearings
- Sheared flywheel key
- Flywheel loose or damaged
- Trigger coil air gap too wide (where applicable) should be 0.030-0 .050" (0. 75-1.25 mm)
- Excessive crankshaft run out on magneto (RH) end should not exceed 0.005" (0.13mm)

DIAGRAM REFER TO "6.11 WIRING DIAGRAM"

IF THE IGNITION SYSTEM FAILS TO OPERATE

Procedure
Check:

1. Fuse	6. Ignition coil
2. Battery	7.Pickup coil resistance
3. Spark plug	8.Main switch
4. Ignition spark gap	9.Wiring connection
5. Spark plug cap resistance	(entire ignition system)

1.Fuse NO CONTINUITY

Check the ECU fuses in the fuse box.If it is OK

⇩ CONTINUITY

2. Battery

● Check the battery condition.

Refer to "BATTERY INSPECTION"

⇩ CORRECT

3.Spark plug

● Check the spark plug condition.
● Check the spark plug type.
● Check the spark plug gap

Spark plug gap: 0.6 ~ 0.8mm

⇩

4.Ignition spark gap

● Disconnect the spark plug cap from the spark plug

●Connect the ignition tester 1 as shown.
Spark plug
●Turn the main switch to "ON".
●Check the ignition spark gap .
●Check the spark by pushing the starter switch, and increase the spark gap until a misfire occurs.

Minimum spark gap: 0.6mm (0.024 in)

⇩ OUT OF SPECIFICATION OR NO SPARK

5.Spark plug cap resistance

●Remover the spark plug cap

●Connect the pocket tester (ΩX1 k) to the spark plug cap.

Replace the fuse.

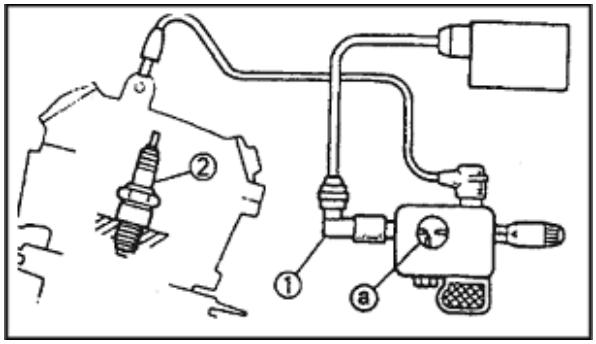
INCORRECT

● Clean battery terminals.
● Recharge or replace the battery.

Standard spark plug:CR7HSA / NGK

OUT OF SPECIFICATION

Repair or replace the spark plug

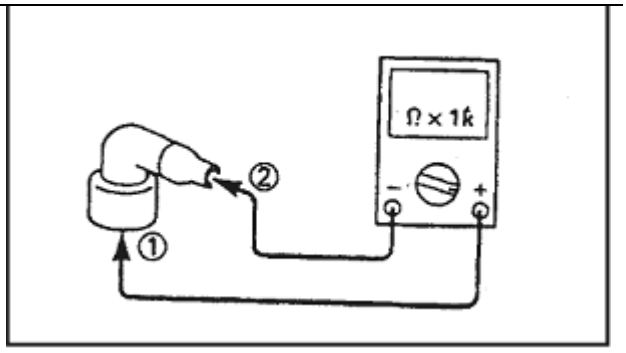


MEETS SPECIFICATION

The ignition system is not faulty.

Tester (+) lead →
Spark plug side①
Tester (—) lead→
High tension cord side ②

NOTE:
● When removing the spark plug cap. do not pull the spark plug cap from high tension cord.
●Remove→ Turning counter clockwise
●Connect→ Turning clockwise.
●Check the high tension cord when connecting the spark plug cap.
● When connecting the spark plug cap, cut the high tension cord about 5mm.



OUT OF SPECIFICATION

Spark plug cap resistance:
5.0±1 KΩ(23±5℃)

Replace the spark plug cap

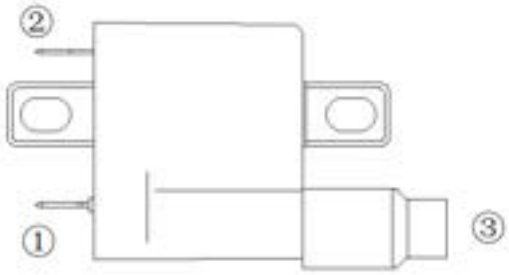
CORRECT

6. Ignition coil resistance

Disconnect the ignition coil connector from the wire harness.
●Connect the pocket tester(Ω×1) to the ignition coil.
● Check if the primary coil has the specified resistance.

Primary coil resistance:
0.59Ω±20% (23±5℃)

Tester (+) lead
Spark plug lead ①
Tester (—) lead
Spark plug lead ②



●Remover the spark plug cap.
●Connect the pocket tester (Ω×1k) to the ignition coil.
●Check the secondary has the specified resistance

Secondary coil resistance:
8KΩ±20% (23±5℃)

Tester (+) lead
Spark plug lead ①
Tester (—) lead
Spark plug lead ③

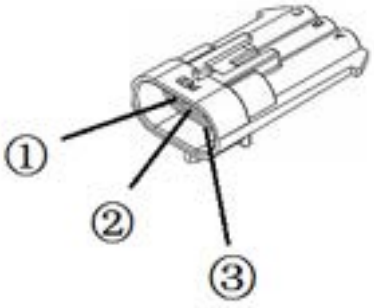
OUT OF SPECIFICATION

BOTH MEET SPECIFICATION

Replace the ignition coil.

7. Pickup coil resistance

● Disconnect the pickup coil coupler from the wire harness.
●Connect the pocket tester (Ω 100) to the pickup coil coupler.
Tester (+) lead →
Bl/W Terminal ①
Tester (-) lead→
G/W Terminal ②
Terminal ③connect shield wire,Ground



OUT OF SPECIFICATION

Replace the pickup coil.

● Check the pickup coil has the specified resistance.

 Primary coil resistance:
130**±10**Ω (20℃)

⇩ MEETS SPECIFICATION

8.Main switch
CHECK SWITCHES

NO CONTINUITY

Replace the main switch

⇩ CONTINIUTY

9.Wiring connection

●Check the connection of the entire ignition system
Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTIONS

Correct

⇩ CORRECT

Replace the ignition unit.

6.4 CHARGING SYSTEM

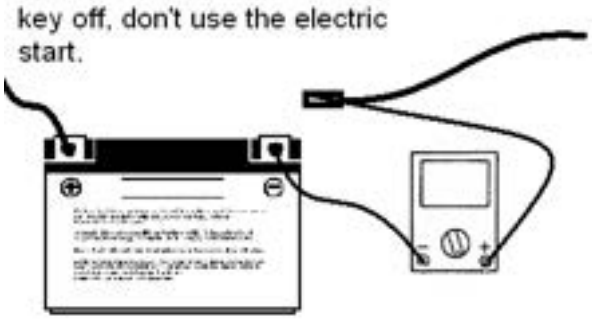
DIAGRAM REFER TO "6.11 WIRING DIAGRAM"

REFER TO CIRCUIT DIAGRAM

CURRENT DRAW - KEY OFF

CAUTION: Do not connect or disconnect the battery cable or ammeter with the engine running. Damage will occur to light bulbs.
Connect an ammeter in series with the negative battery cable. Check for current draw with the key off, if the draw is excessive, loads should be disconnected from the system one by one until the draw is eliminated. Check component wiring as well as the component for partial shorts to ground to eliminate the draw.

Current draw key off:
Maximum of 0.01DCA(10mA)



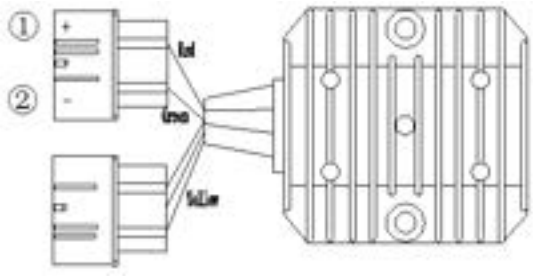
CHARGING SYSTEM
Procedure
Check:
1. Battery
2. Voltage regulator/rectifier
3.Magneto coil resistance
4.Wiring system (entire charging system)

1. Battery
Check the battery condition.
Refer to "BATTERY INSPECTION"

INCORRECT

Clean battery terminals
Recharge or replace the battery

2.Charging voltage
Connect the engine tachometer to the spark plug lead.
●Connect the pocket tester (DC20V) to the battery
Test (+) lead→
Battery (+) terminal ①
Tester (-) lead→
Battery (-) terminal ②
Measure the battery terminal voltage.



start the engine and accelerate to about 5,000rpm
●check the terminal voltage
Measured voltage-terminal Voltage:
0.2-2.5V up
NOTE: Use a fully changed battery.

MEETS SPECITICATION
The charging circuit is not faulty
Replace the battery

OUT OF SPECICATION

3. Magneto coil resistance
Remove the A.C. magneto coupler from wire harness
Connect the pocket tester (ΩX1) to the magneto coil
Tester (+) lead –yellow terminal
Tester (-) lead –yellow terminal
Measure the magneto coil resistance
Magneto coil resistance 0.5-0.8Ω （20℃）

OUT OF SPECITICATION

Replace the magneto coil

MEETS SPECIFICATION

4.Wiring connection
check the entire charging system for connections
Refer to “CIRCUIT DIAGRAM”

POOR CONNECTION

Replace the wire harness

Correct

6.5 ELECTRICS STARTING SYSTEM

DIAGRAM REFER TO "6.11 WIRING DIAGRAM"

TROUBLESHOOTING

1. Turn the main switch to “ ” position.
2. Shift into neutral, apply the handbrake lever and press the engine start button.
3. **IF THE STARTER MOTOR FAILS TO OPERATE**

Procedure

Check:

1. Fuse
2. Battery
3. Starter motor
4. Starter relay & Starter auxiliary relay
5. Main switch
6. Left/right handbrake switch
7. Starter switch
8. Wiring connection (entire starting system)

1. Fuse

CHECKING FUSE

NO CONTINUITY

Replace the fuse

2. Battery

Check the battery condition.

Refer to "BATTERY INSPECTION" section

INCORRECT

Clean battery terminals

Recharge or replace the battery

3.Starter motor

Connect the battery positive terminal and starter motor cable using a jumper lead.

Check the starter motor operation

DOES NOT MOVE

Repair or replace the starter motor

WARNING

A wire used as a jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may burn.

This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity

4. Starter relay & Starter auxiliary relay

●Disconnect the starter auxiliary relay unit coupler from the wire harness.

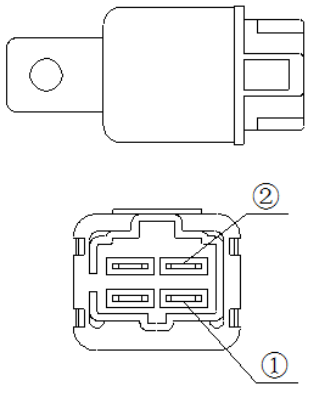
●Connect the pocket tester (Ωx100) to the relay unit coupler terminals.

Battery (+) lead→ terminal ①

Battery (-) lead→ terminal ②

Measure the starter auxiliary relay resistance

Starter auxiliary relay resistance 85Ω ± 10%（20℃）



CONTINUITY

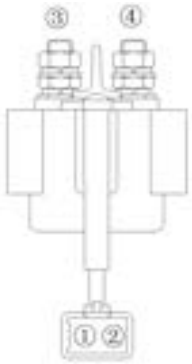
Replace the starter auxiliary relay

●Disconnect the relay unit coupler from the wire harness.

●Connect the pocket tester (Ωx1) and battery (12V) to the relay unit coupler terminals.

Battery (+) lead→ terminal ①

Battery (-) lead→ terminal ②



●Check the starter relay for continuity.

Test (+) lead → terminal ③

Test (-) lead → terminal ④

CONTINUITY

Replace the starter replay

5.Main switch

CHECK SWITCHES

NO CONTINUITY

Replace the main switch

6. Left/Right handbrake switch

CHECKING SWITCHES

NO CONTINUITY

Replace the brake switch

7. Starter switch

CHECKING SWITCHES

NO CONTINUITY

Replace the handlebar switch

8. Wiring connection

Check the connections of the entire starting system.

Refer to “CIRCUIT DIAGRAM”

POOR CONNECTION

Reconnecting

Correct

6.6 LIGHTING SYSTEM

DIAGRAM REFER TO "6.11 WIRING DIAGRAM"

TROUBLESHOOTING

Procedure

Check:

1. Fuse
2. Battery
3. Main switch
4. Lights switch
5. Dimmer switch
6. Wiring connection (entire lighting system)

1.Fuse

CHECK FUSE

NO CONTINUITY → Replace the fuse

2. Battery

Check the battery condition.

Refer to “BATTERY INSPECTION”

INCORRECT → Clean battery terminals
Recharge or replace the battery

3. Main switch

CHECK SWITCHES

NO CONTINUITY → Replace the main switch

4. Lights switch

Turning the main switch on the " "position, the Light switch is on.

CHECK SWITCHES

NO CONTINUITY → Replace the main switch

4.1Dimmer switch

Dimmer switch is on Left handle switch

CHECK SWITCHES

NO CONTINUITY → Replace the left handlebar switch

4.2 Wiring connection

Check the connections of the entire lighting system

POOR CONNECTIONS →

correct

1. Check the condition of each of the lighting system's circuits

Refer to "LIGHTING SYSTEM CHECK"

LIGHT SYSTEM CHECK

1. If the headlight and the high beam indicator fail to come on

1.Blub and bulb socket
CHECK it

NO CONTINUITY

Replace the bulb or Replace the headlight

2. Voltage

Turn the main switch to " " position.

Turn the dimmer switch to low beam or high beam.

Connect the pocket tester (DC20V) to the headlight and high beam indicator light couplers.

A When the dimmer switch is on low beam.
Tester (+) lead →White lead
Tester negative (-) lead →Green lead

B When the dimmer switch is on high beam
Tester (+) lead →Blue lead
Tester negative (-) lead →Green lead

Check for voltage (12V) on the lead at bulb socket connectors

OUT OF SPECIFICATION

The wiring circuit from the main switch to bulb socket connector is faulty. Repair it.

This circuit is not faulty. Replace the light.

2.The taillight fails to come on
The taillight or turn signal light is LED.

1. Connector

Check Connector. If the connector is loose or dropped

YES

Replace the connector or Plug in tightly

NO

2. Voltage

Connect the pocket tester (DC20V) to the taillight couplers.

Tester (+) lead→
Green/Yellow terminal
Tester (-) lead→
Green terminal

Turn the main switch to on.
Step on brake.
Check the voltage (12V) on the taillight couplers

OUT OF SPECIFICATION

The wiring circuit from main switch to light connector of faulty. Repair it.

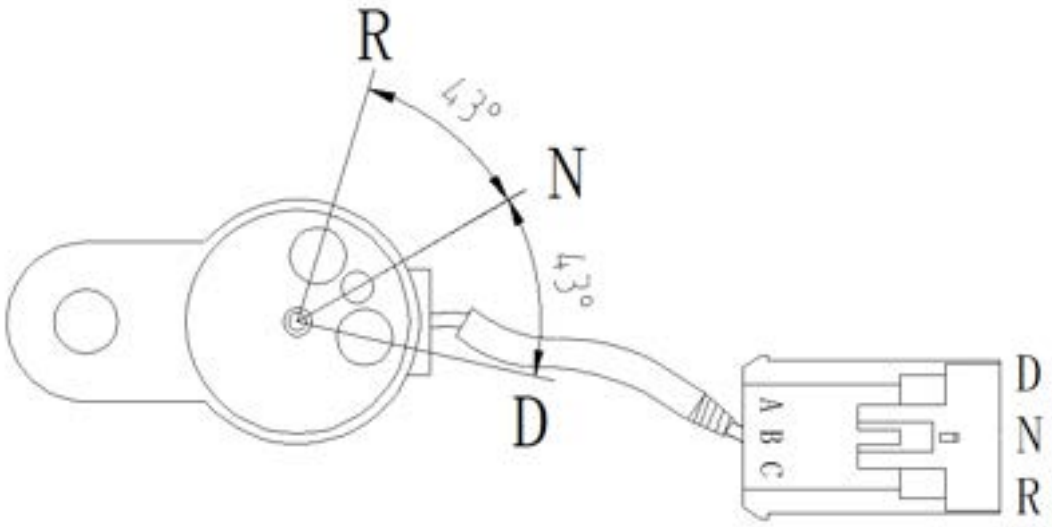
This circuit is not faulty. Replace the light.

6.7 GEAR SHIFT SENSOR TEST

DIAGRAM REFER TO "6.11 WIRING DIAGRAM"

Sensor table

	Gr/R	G/W	Pu	G
Drive	●			●
Neutral		●		●
Reverse			●	●



6.8 SPEEDMETER SYSTEM

OPERATION OF SPPED SENSOR

Speed Sensor is on the rear cradle

Operation Instructions of Electric Dial Meter and Speed Sensor/ Operation Instructions of LCD Meter and Speed Sensor

A. Hall Sensor is a new type sensor used to measure speed, angle, revolution and length, etc by means of voltage pulse signals converted from sensing gear ratio of black metal gear or gear rack.

B. Main Technical Parameter for sensor：

Item	Code	Vol value	Unit
Operating voltage	Vcc	5-20	V
Operating current	Icc	≤15	mA
Low voltage output	Vol	≤ 0.4	V
Hight voltage output	Voh	≥ (Vcc-1)	V
Operating distance	D	1mm ≤ D ≤ 1.5mm	mm

C. The following is the graphic illustration for sensor installation, Wire ① (red/gray) is positive and wire ② (green) negative, Wire ③ (green/yellow) works as the one tooth of the splines to output signals.

Note: Always screw in the sensor by hand when installation or adjustment.

1, Align one tooth of the splines to the centre of the sensor by turning the rear axle.

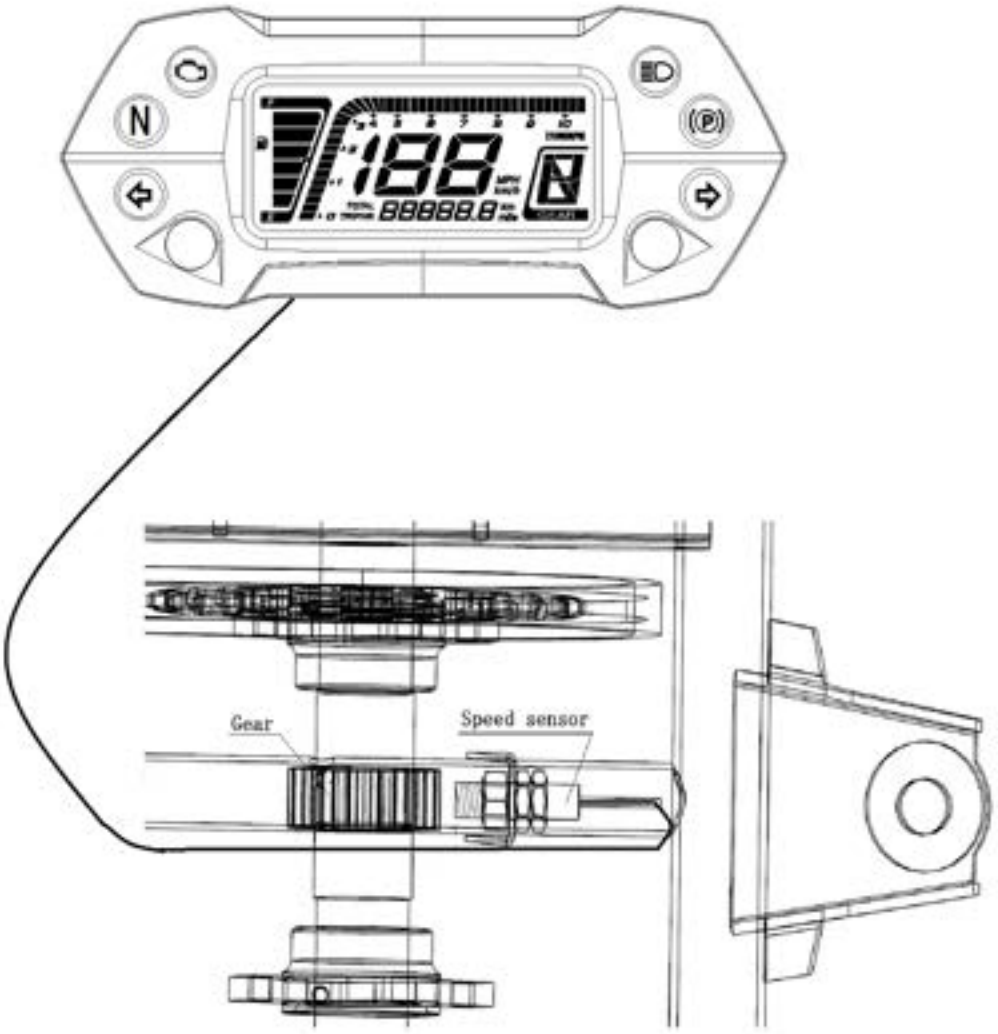
2. Screw the senor in (CW) by hand slightly until resistance is felt.

3. Turn back the sensor (CCW) by 1 turn.

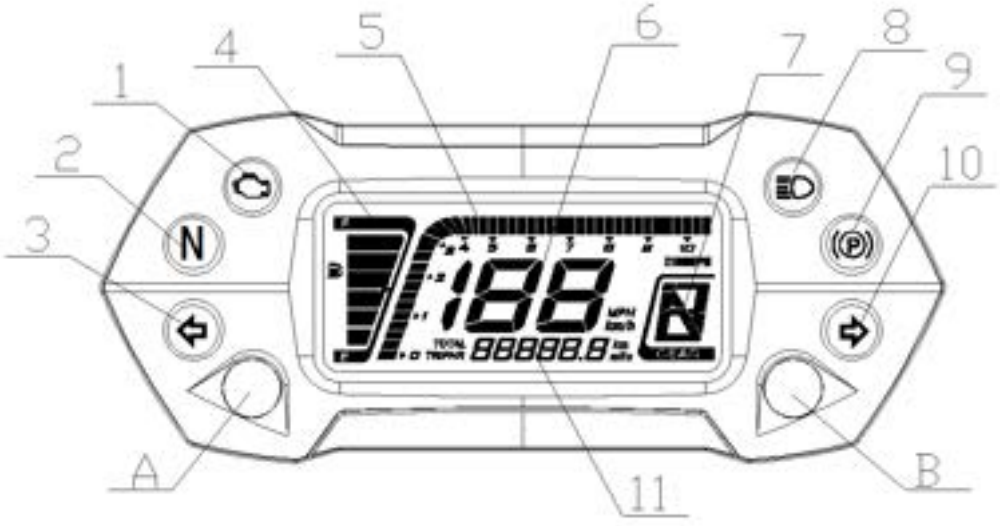
4. Tighten the jam nut.

Speed Sensor on the Rear Cradle Output Shaft.

The following is the graphic illustration for sensor installation.



LCD Meter



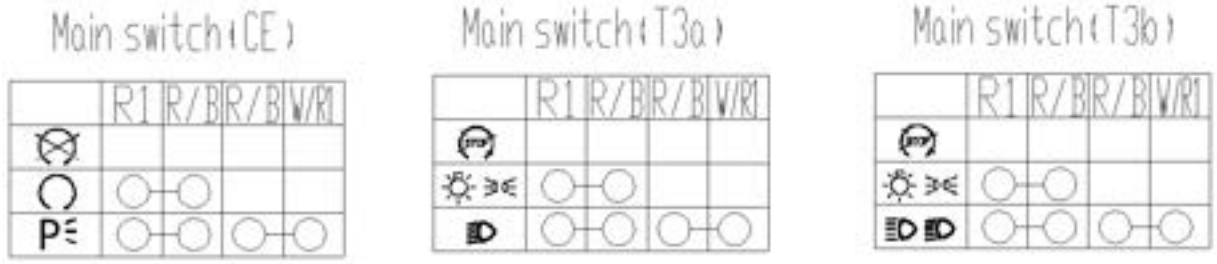
1. MIL Indicator	8. High Beam Indicator Light （Option）
2. Neutral Indicator	9. Parking Brake Indicate Lamp
3. Turn Left Indicator Light	10. Turn Right Indicator Light
4. Fuel Gauge Indicator	11.The odometer and Engine Working Hour Counter
5. Engine RPM Meter	A.ODO/TRIP/HOUR Selector
6. Speedometer	B.km/h、mph and km、miles Selector
7. Gear Position Indicator	

Button A: Pushing the left button switch, then display between ODO and TRIP and HOUR.

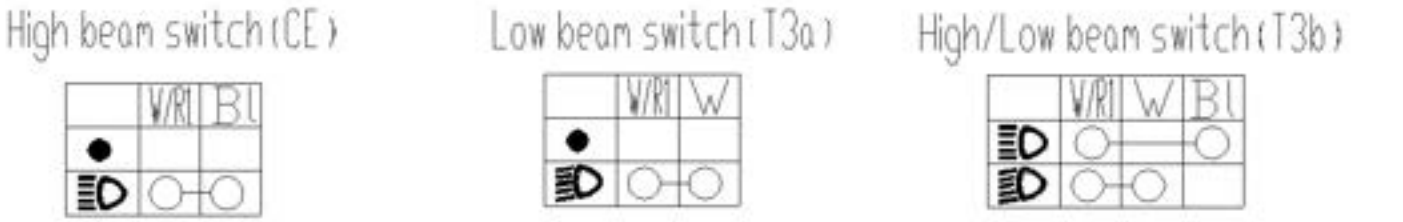
Button B: Holding in the right button and turning the key to “on” switch then display between “mph” and “km/h”.

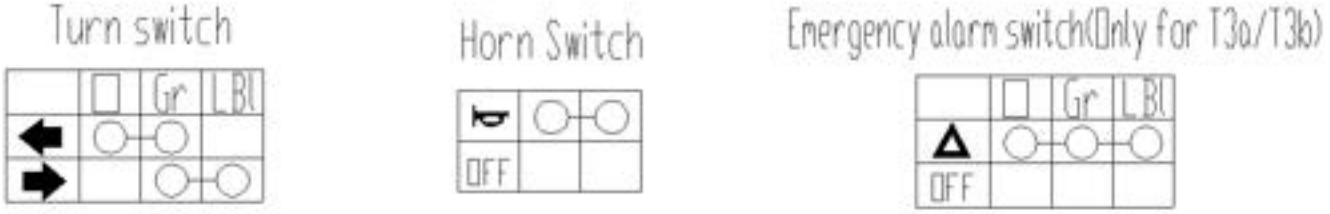
6.9 MAIN SWITCH AND HANDLE SWITCH

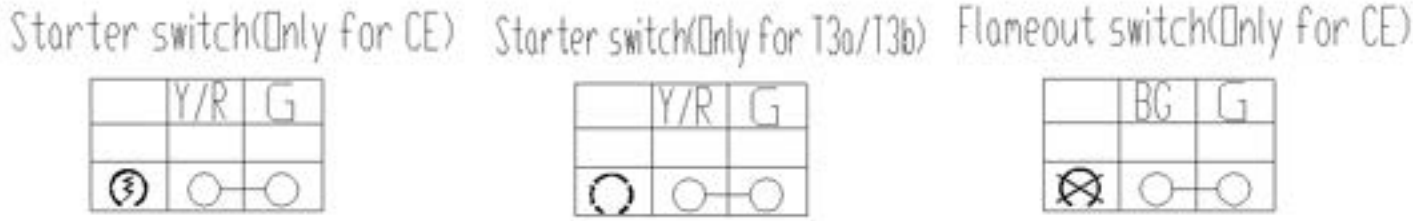
Main switch



Left handle switch







6.10 FUEL GAUGE/ FUEL LEVEL SENSOR

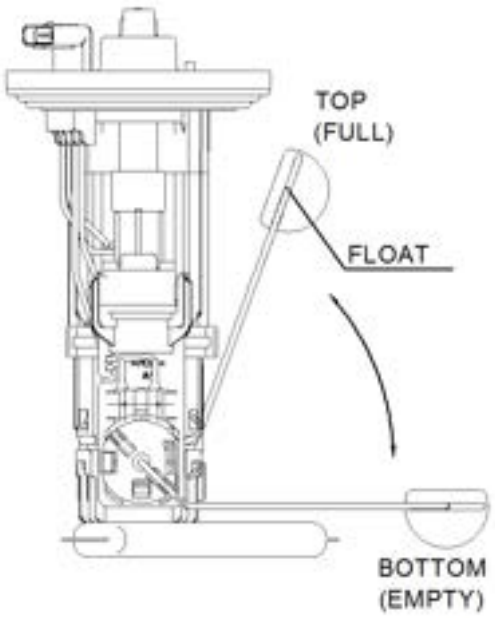
EFI

Remove fuel tank cap and the cover, and then remove fuel pump attached to fuel tank

Hold fuel pump in an upright position after removing it. It is normal if indicator shows “E”, otherwise, circuitry connection, fuel sensor or instrument should be inspected

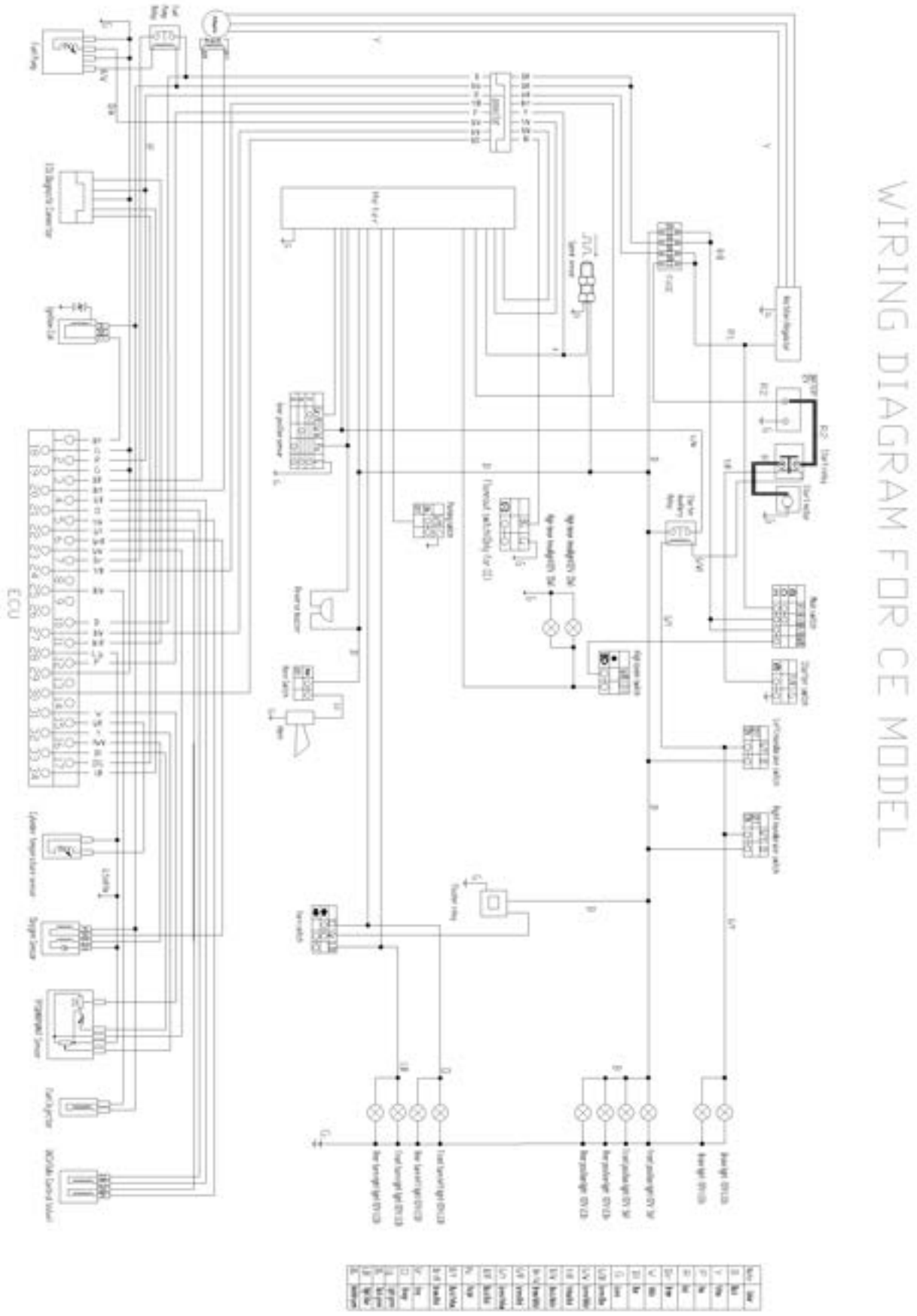
Turn fuel sensor upside down. It is normal if indicator shows “F”, otherwise, circuitry connection, fuel sensor or instrument should be inspected

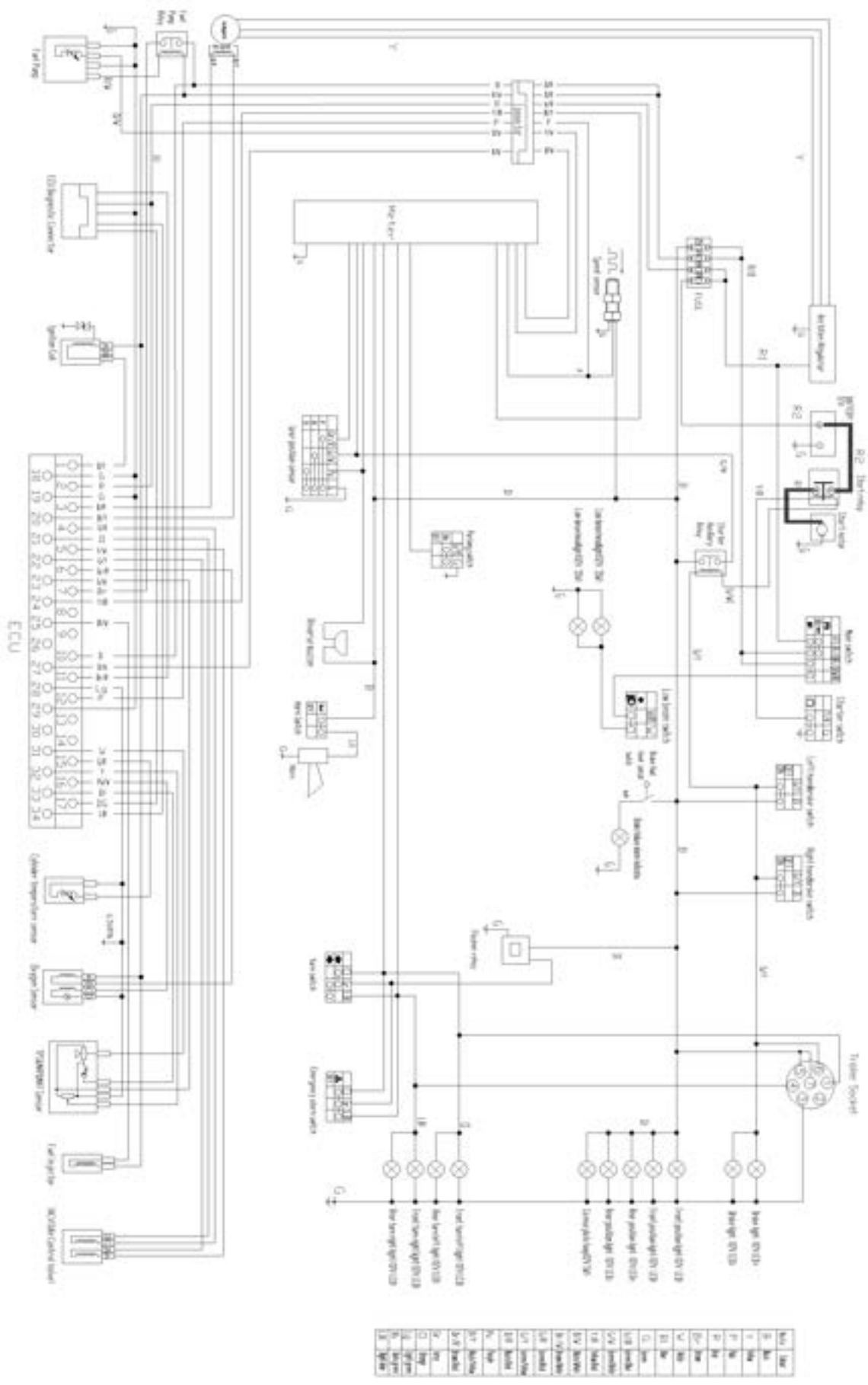
Fuel sensor resistance range

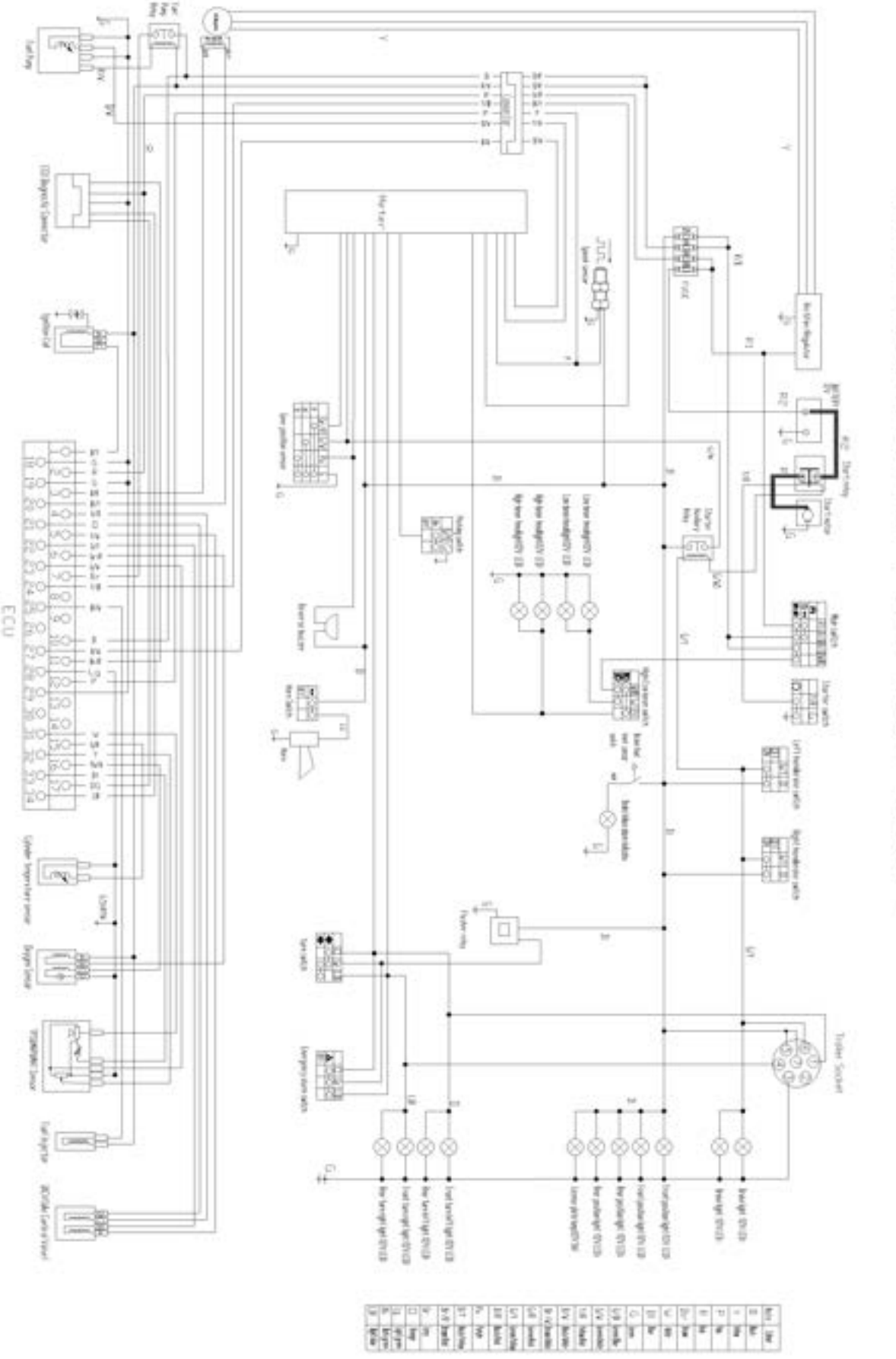


FLOAT POSITION	RESISTANCE(20℃/ 68° F)
TOP(FULL)	5-9Ω
BOTTOM(EMPTY)	94-100Ω

6.11 WIRING DIAGRAM




WIRING DIAGRAM FOR T3a MODEL
ECU


WIRING DIAGRAM FOR T3b MODEL
ECU