PREFACE

This Service Manual describes the technical features and servicing procedures for the KYMCO ***SUPER 8 50***

Section 1 contains the precautions for all operations stated in this manual. Read them carefully before starting any operation.

Section 2 is the removal/installation procedures for the frame covers which are subject to higher removal/installation frequency during maintenance and servicing operations.

Section 3 describes the inspection/ adjustment procedures, safety rules and service information for each part, starting from periodic maintenance.

Sections 6 through 17 give instructions for disassembly, assembly and inspection of engine, chassis frame and electrical equipment.

Most sections start with an assembly or system illustration and troubleshooting for the section. The subsequent pages give detailed procedures for the section.

Our company reserves the right to make any alteration in the design. The information and contents included in this manual may be different from the motorcycle in case specifications are changed.

KWANG YANG MOTOR CO., LTD.
OVERSEAS SALES DEPARTMENT
OVERSEAS SERVICE SECTION

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ENGINE SERIAL NUMBER

Location of Engine Serial Number

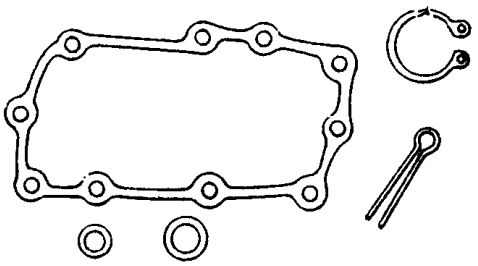
SPECIFICATIONS

Motorcycle Name & Type			SUPER 8 50
Name & Model No.			KP10G(BLA2)
Overall length (mm)			2040
Overall width (mm)			735
Overall height (mm)			1100
Wheel base (mm)			1365
Engine type			Air cooled 4-stroke
Displacement			50cc
Fuel Used			92# nonleaded gasoline
Net weight (kg)		Front wheel	47
		Rear wheel	73
		Total	120
Max weight(kg)		Front wheel	87
		Rear wheel	183
		Total	270
Tires		Front wheel	120/70 -14
		Rear wheel	120/80 -14
Ground clearance (mm)			130
Perform-ance	Braking distance (m)		2.0 (Initial speed 30km/h)
	Min. turning radius (mm)		L:2060/R:2050
Engine	Starting system		Starting motor
	Type		Gasoline, 4-stroke
	Cylinder arrangement		Single cylinder
	Combustion chamber type		Semi-sphere
	Valve arrangement		O.H.C.
	Bore x stroke (mm)		ϕ 39*41.4
	Compression ratio		11.2:1
	Compression pressure (kg/cm²-rpm)		12±2
	Max. output		2.3kw/7000rpm
	Max. torque		3.3Nm/6000rpm
	Port timing	Intake Open	-10°
		Intake Close	17°
		Exhaust Open	30°
		Exhaust Close	-8°
	Valve clearance (cold) (mm)	Intake	0.10
		Exhaust	0.10
	Idle speed (rpm)		2000rpm
	Lubrication System	Lubrication type	OIL PUMP
		Oil pump type	Cycloid type
		Oil filter type	Full-flow filtration
		Oil capacity	0.85 liter
	Cooling Type		Forced air cooling

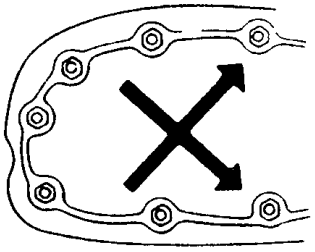
Fuel System	Air cleaner type & No			Paper element
	Fuel capacity			6.0 liter
	Carburetor	Type		-----
		Piston dia. (mm)		------
		Venturi dia.(mm)		--
		Throttle type		
Electrical Equipment	Ignition System	Type		ECU
		Ignition timing		BTDC 13°~ 28°
		Contact breaker		Non-contact point type
		Spark plug		NGK CR6HSA
		Spark plug gap		0.6～0.7mm
	Battery	Capacity		12V8AH
Power Drive System	Clutch	Type		Dry centrifugal type
	Transmission Gear	Type		CVT
		Operation		Stepless automatic transmission
	Reduction Gear	Type		Two-stage reduction
		Reduction ratio	1st	0.8-3.1
			2nd	11.05
Moving Device	Front Axle	Caster angle		27°
		Trail length		—
	Tire pressure (kg/cm²)		Front	1.75
			Rear	2.25
	Turning angle		Left	45°
			Right	45°
Brake system type			Front	DISK
			Rear	Drum
Damping Device	Suspension type		Front	FR:TELESCOPE
			Rear	RR:UNIT SWING
	Shock absorber distance		Front	80
			Rear	82
Frame type				Pipe Under Bone

SERVICE PRECAUTIONS

■ Make sure to install new gaskets, O-rings, circlips, cotter pins, etc. when reassembling.



■ When tightening bolts or nuts, begin with larger-diameter to smaller ones at several times, and tighten to the specified torque diagonally.



■ Use genuine parts and lubricants

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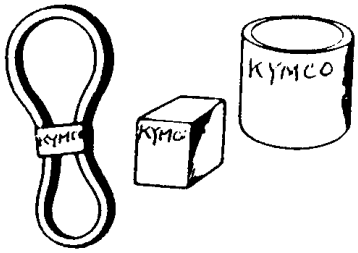
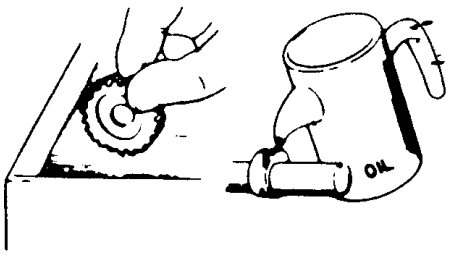
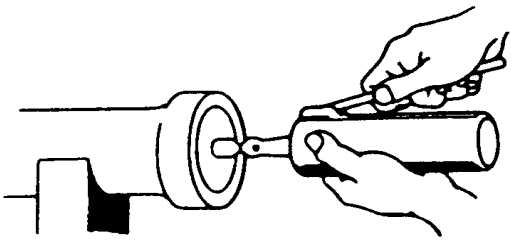


■ When servicing the motorcycle, be sure to use special tools for removal and installation.

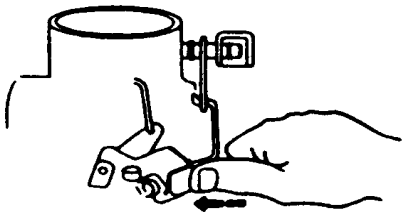
■ After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.



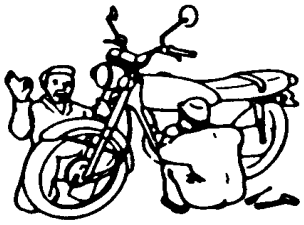
■ Apply or add designated greases and lubricants to the specified lubrication points.



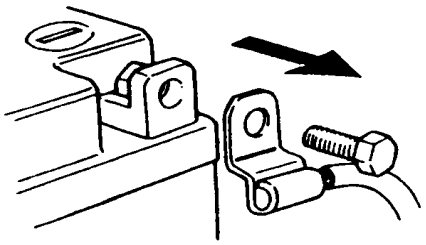
■ After reassembly, check all parts for proper tightening and operation.



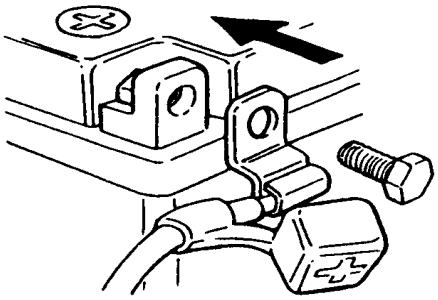
■ When two persons work together, pay attention to the mutual working safety.



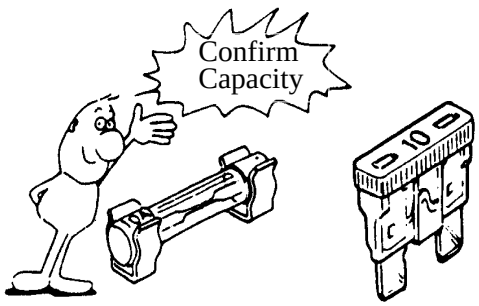
■ Disconnect the battery negative (-) terminal before operation.
■ When using a spanner or other tools, make sure not to damage the motorcycle surface.



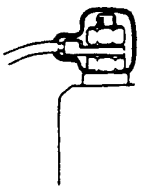
■ After operation, check all connecting points, fasteners, and lines for proper connection and installation.
■ When connecting the battery, the positive (+) terminal must be connected first.
■ After connection, apply grease to the battery terminals.
■ Terminal caps shall be installed securely.



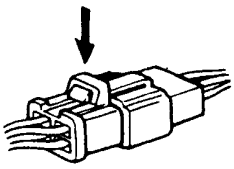
■ If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.



■ After operation, terminal caps shall be installed securely.

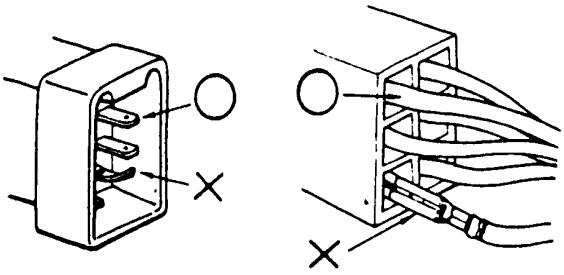


■ When taking out the connector, the lock on the connector shall be released before operation.

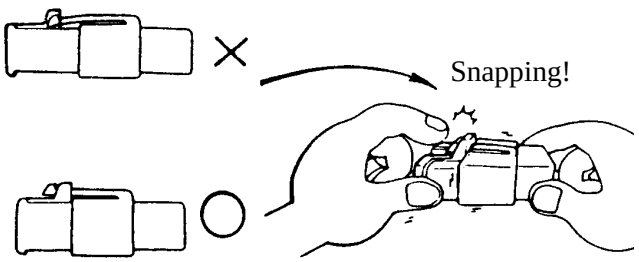


■ Hold the connector body when connecting or disconnecting it.
■ Do not pull the connector wire.

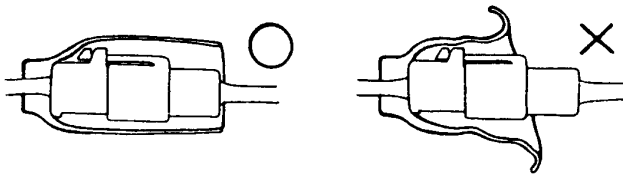
■ Check if any connector terminal is bending, protruding or loose.



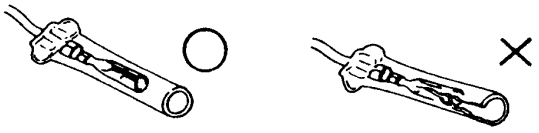
- The connector shall be inserted completely.
- If the double connector has a lock, lock it at the correct position.
- Check if there is any loose wire.



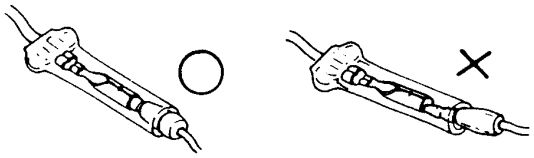
- Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



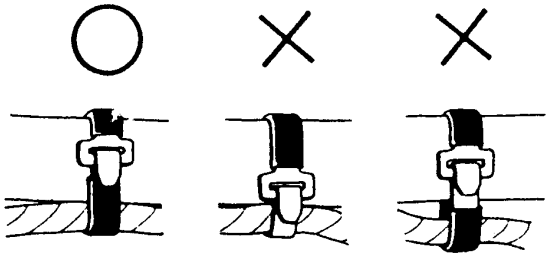
- Check the double connector cover for proper coverage and installation.



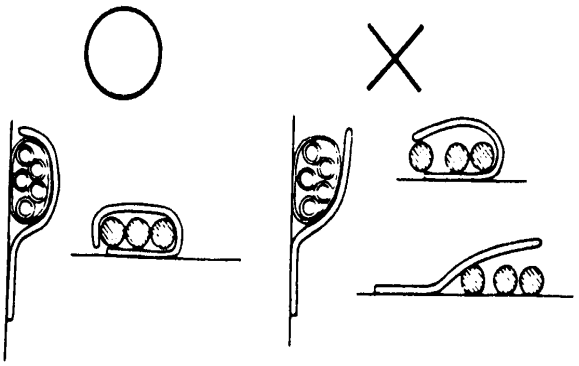
- Insert the terminal completely.
- Check the terminal cover for proper coverage.
- Do not make the terminal cover opening face up.



- Secure wire harnesses to the frame with their respective wire bands at the designated locations.
  Tighten the bands so that only the insulated surfaces contact the wire harnesses.



■ After clamping, check each wire to make sure it is secure.



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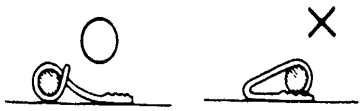
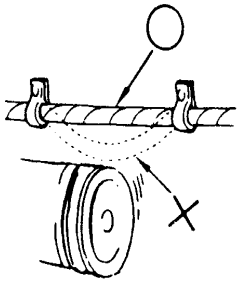
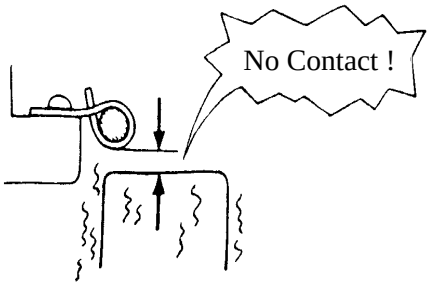
■ Do not squeeze wires against the weld or its clamp



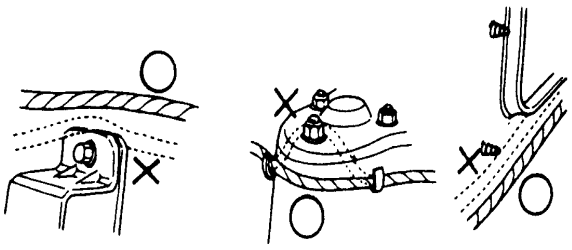
■ After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



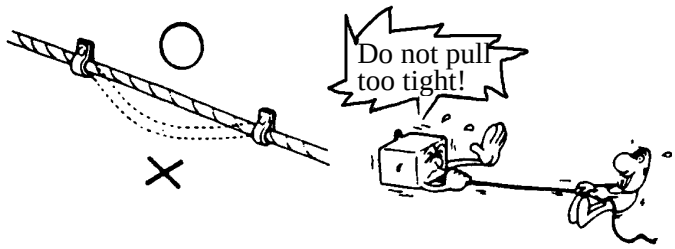
■ When fixing the wire harnesses, do not make it contact the parts which will generate high heat.



■ Route wire harnesses to avoid sharp edges or corners. Avoid the projected ends of bolts and screws.
■ Route wire harnesses passing through the side of bolts and screws. Avoid the projected ends of bolts and screws.



■ Route harnesses so they are neither pulled tight nor have excessive slack.



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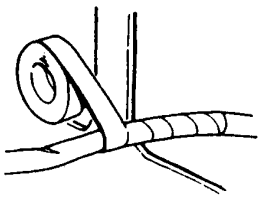
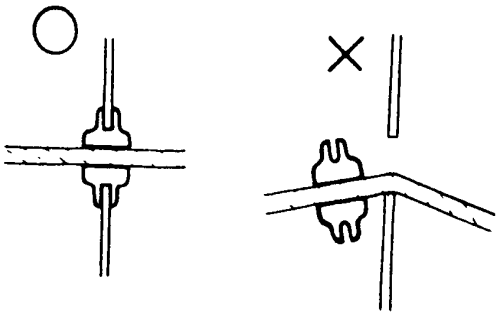
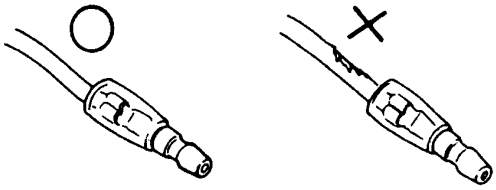
■ Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner



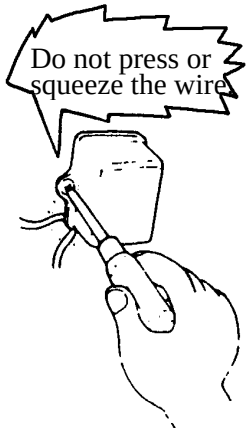
■ When rubber protecting cover is used to protect the wire harnesses, it shall be installed securely.



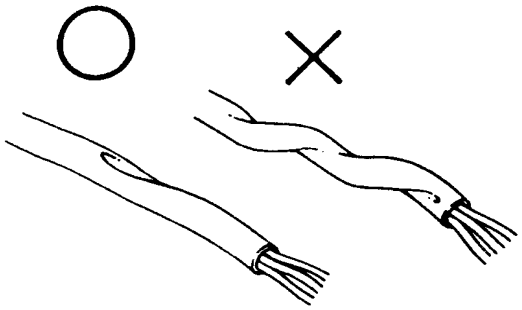
■ Do not break the sheath of wire.
■ If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.



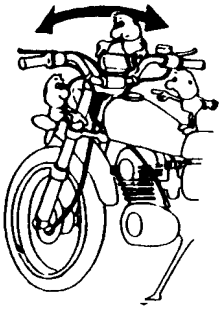
■ When installing other parts, do not press or squeeze the wires.



■ After routing, check that the wire harnesses are not twisted or kinked.

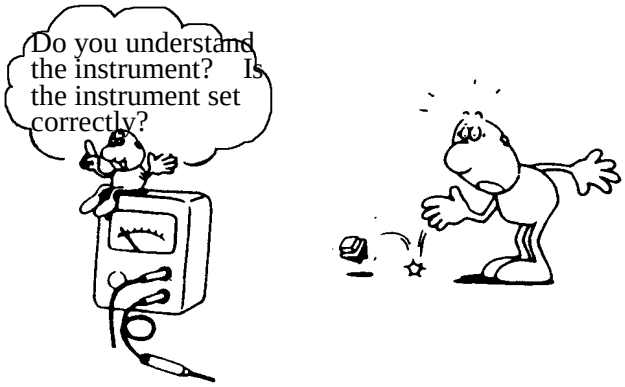


■ Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



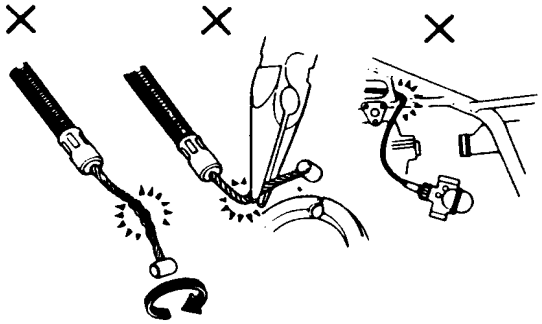
■ When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.

■ Be careful not to drop any parts.



■ When rust is found on a terminal, remove the rust with sand paper or equivalent before connecting.

■ Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.



■ Symbols:

The following symbols represent the servicing methods and cautions included in this service manual.

Engine Oil : Apply engine oil to the specified points. (Use designated engine oil for lubrication.)

Grease : Apply grease for lubrication.

Gear Oil : Transmission Gear Oil (90#)

Special : Use special tool.

* : Caution

: Warning

(⇨12-3) : Refer to page 12-3.

TORQUE VALUES

STANDARD TORQUE VALUES

Item	Torque (kg-m)	Item	Torque (kg-m)
5mm bolt, nut	0.45-0.6	5mm screw	0.35-0.5
6mm bolt, nut	0.6-1.2	6mm screw, SH bolt	0.7-1.1
8mm bolt, nut	1.8-2.5	6mm flange bolt, nut	1.0-1.4
10mm bolt, nut	3.0-4.0	8mm flange bolt, nut	2.4-3.0
12mm bolt, nut	5.0-6.0	10mm flange bolt, nut	3.5-4.5

Torque specifications listed below are for important fasteners.

ENGINE

Item	Q'ty	Thread dia.(mm)	Torque (kg-m)	Remarks
Cylinder head bolt A	2	6	0.7-1.1	Double end bolt
Cylinder head bolt B	4	6	0.7-1.1	
Oil filter screen cap	1	30	1.0-2.0	
Exhaust muffler lock bolt	2	6	0.7-1.1	Double end bolt
Cylinder head flange nut	4	7	1.2-1.6	Apply oil to
Valve adjusting lock nut	2	3	0.07-0.09	threads
Cam chain tensioner slipper bolt	1	8	0.4-0.7	
Oil bolt	1	8	1.1-1.5	
Clutch outer nut	1	10	3.5-4.5	
Clutch drive plate nut	1	28	5.0-6.0	
Starter motor mounting bolt	2	6	0.8-1.2	
Oil pump bolt	3	4	0.1-0.3	
Drive face nut	1	10	5.5-6.5	
Spark plug	1	10	1.0-1.4	
A.C. generator stator bolt	2	6	0.8-1.2	
Cam chain tensioner bolt	1	6	0.8-1.2	

FRAME

Item	Q'ty	Thread dia.(mm)	Torque (kg-m)	Remarks
Steering stem lock nut	1	25.4	8.0-12.0	U-nut
Front axle nut	1	10	5.0-7.0	U-nut
Rear axle nut	1	14	11.0-13.0	U-nut
Rear shock absorber upper bolt	1	10	4.0-5.0	
Rear shock absorber lower bolt	1	8	2.0-3.0	
Speedometer cable set screw	1	5	0.45-0.6	
Rear shock absorber lock nut	1	8	3.0-3.6	Apply locking agent

SPECIAL TOOLS

Tool Name	Tool No.	Remarks	Ref. Page
Bearing puller 10.12.15.18 mm	E037	10.12.15.18mm bearing	10-3 10-4 12-6
Bushing remover L	E032	11102 bush engine hanger rubber	
Bushing remover S	EO19	11203 bush rear cushion under rubber	
Crankshaft bearing puller	E030	91005 radial bearing	
Crankshaft protector	E029	13000 crankshaft comp 12mm.14mm	
Clutch spring compressor	E027	2301a driven pully assy	9-9 9-12
Cushion assemble & disassemble tool	F004	52400 cushion assy	13-4
Flywheel holder	E017	31110 flywheel comp.2310a pully assy driven	9-5 9-9 9-13 14-7 14-9
Flywheel puller	E002	Left hand thread 27mm	14-7
Long socket wrench 32mm 8angle	F002	50306 steering stem	12-21 12-22
Oil seal & bearing installer	E014	Oil seal & bearing install	
Tool boox	E033	Special tools storage	
Tappet adjuster	E036	90012 screw tappet	3-5
Valve spring compressor	E038	Valve spring	7-7 7-8

LUBRICATION POINTS

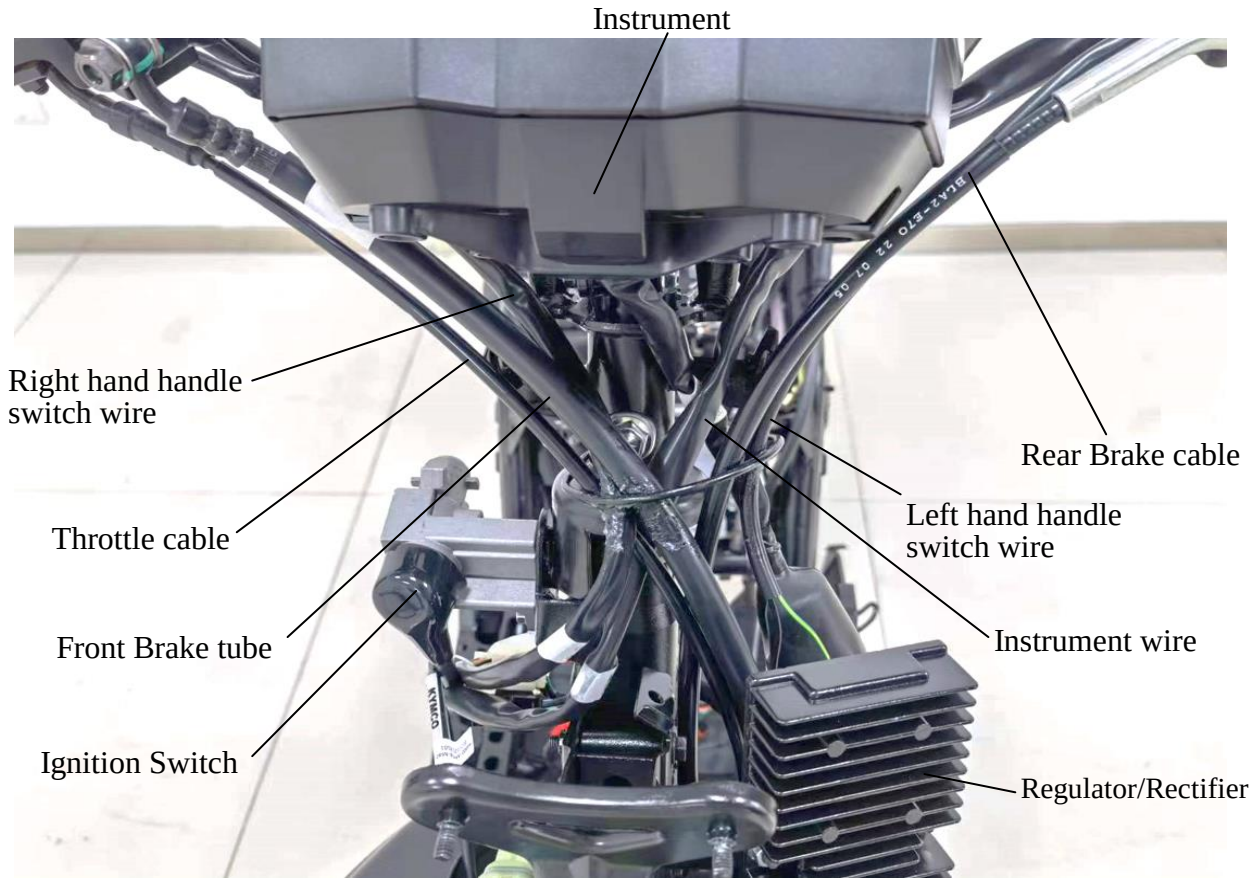
ENGINE

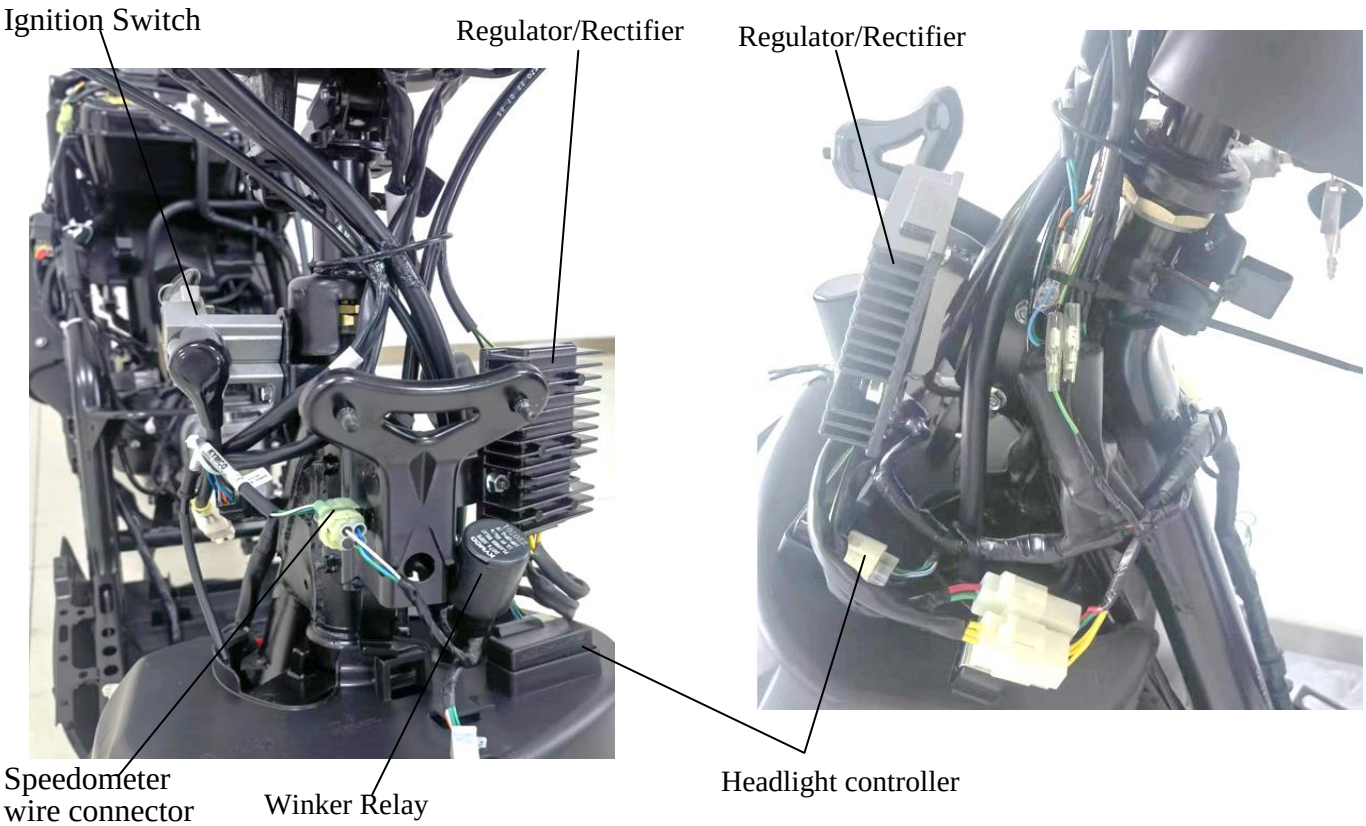
Lubrication Points	Lubricant
Valve guide/valve stem movable part Cam lobes Valve rocker arm friction surface Cam chain Cylinder lock bolt and nut Piston surroundings and piston ring grooves Piston pin surroundings Cylinder inside wall Connecting rod/piston pin hole Connecting rod big end Crankshaft R/L side oil seal Starter reduction gear engaging part Countershaft gear engaging part Final gear engaging part Bearing movable part O-ring face Oil seal lip	•Genuine KYMCO Engine Oil (SAE15W-40) •API–SG Engine Oil
Starter idle gear Friction spring movable part/shaft movable part Shaft movable grooved part Kick starter spindle movable part	High-temperature resistant grease
A.C. generator connector Transmission case breather tube	Adhesive

FRAME

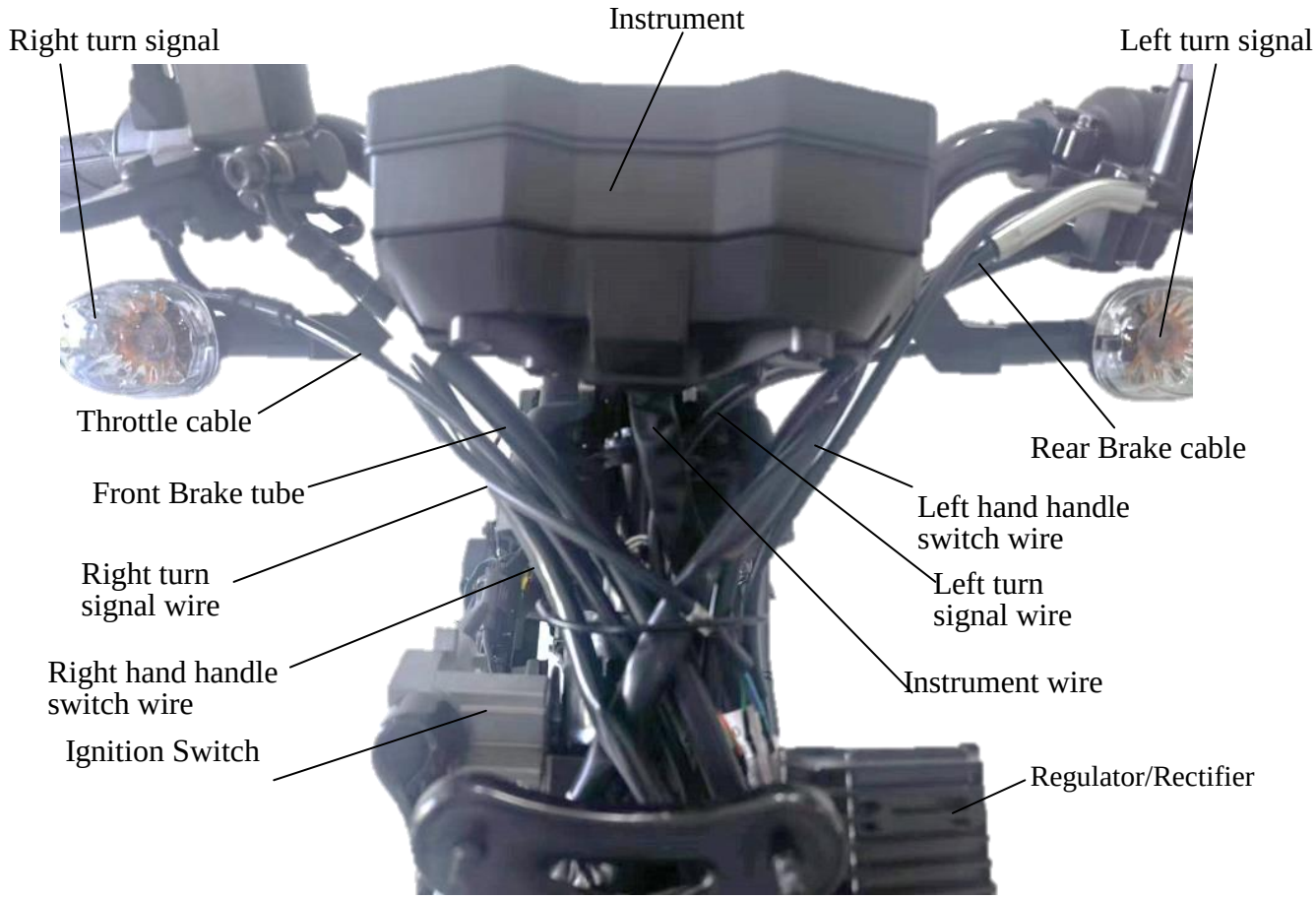
The following is the lubrication points for the frame.
Use general purpose grease for parts not listed.
Apply clean engine oil or grease to cables and movable parts not specified.
This will avoid abnormal noise and rise the durability of the motorcycle.

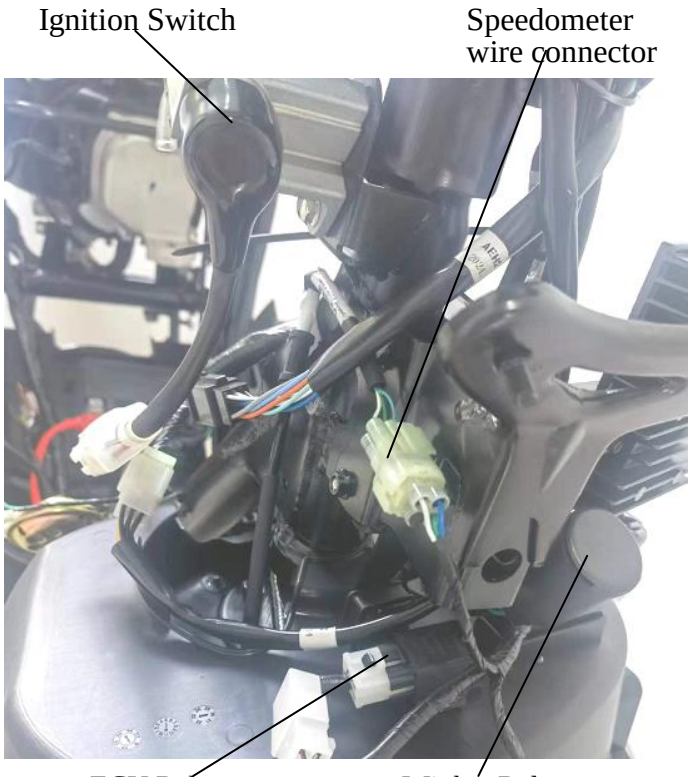
CABLE & HARNESS ROUTING

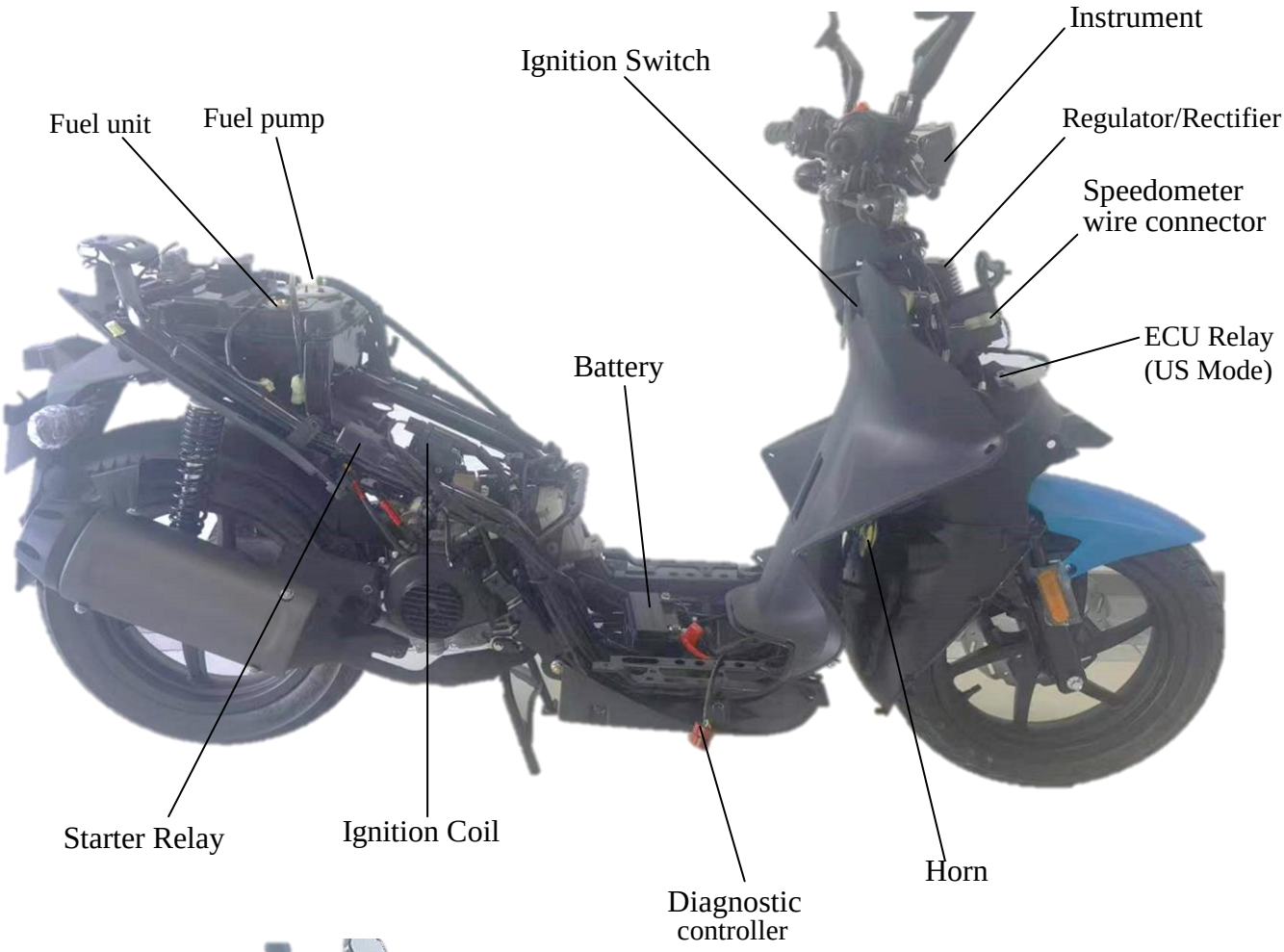


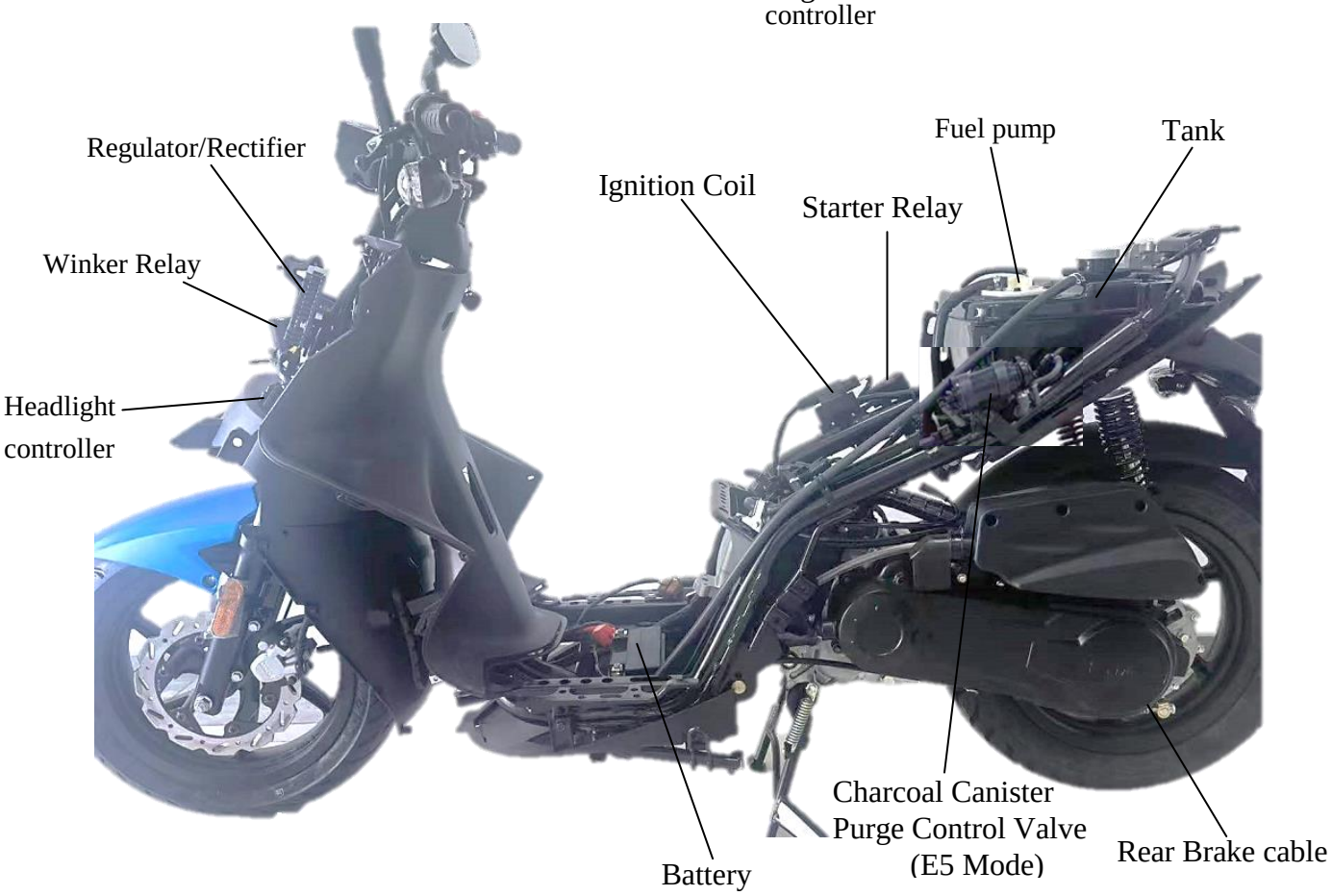


SUPER 8 50 (US Mode)

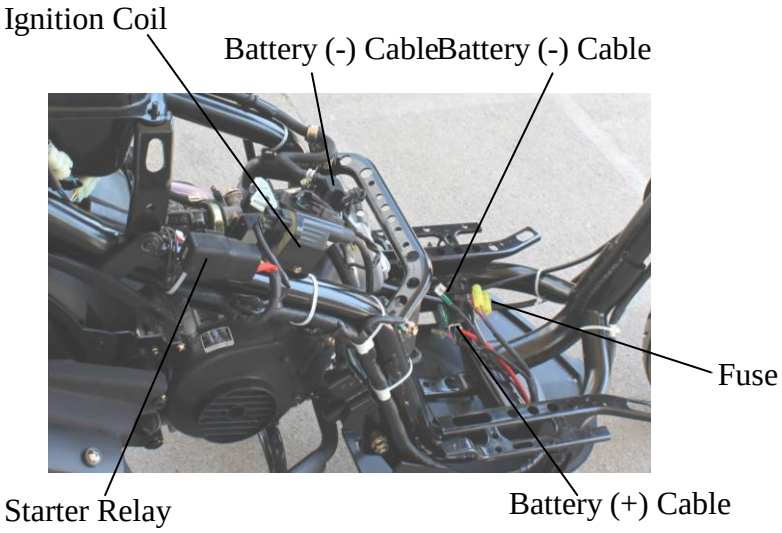


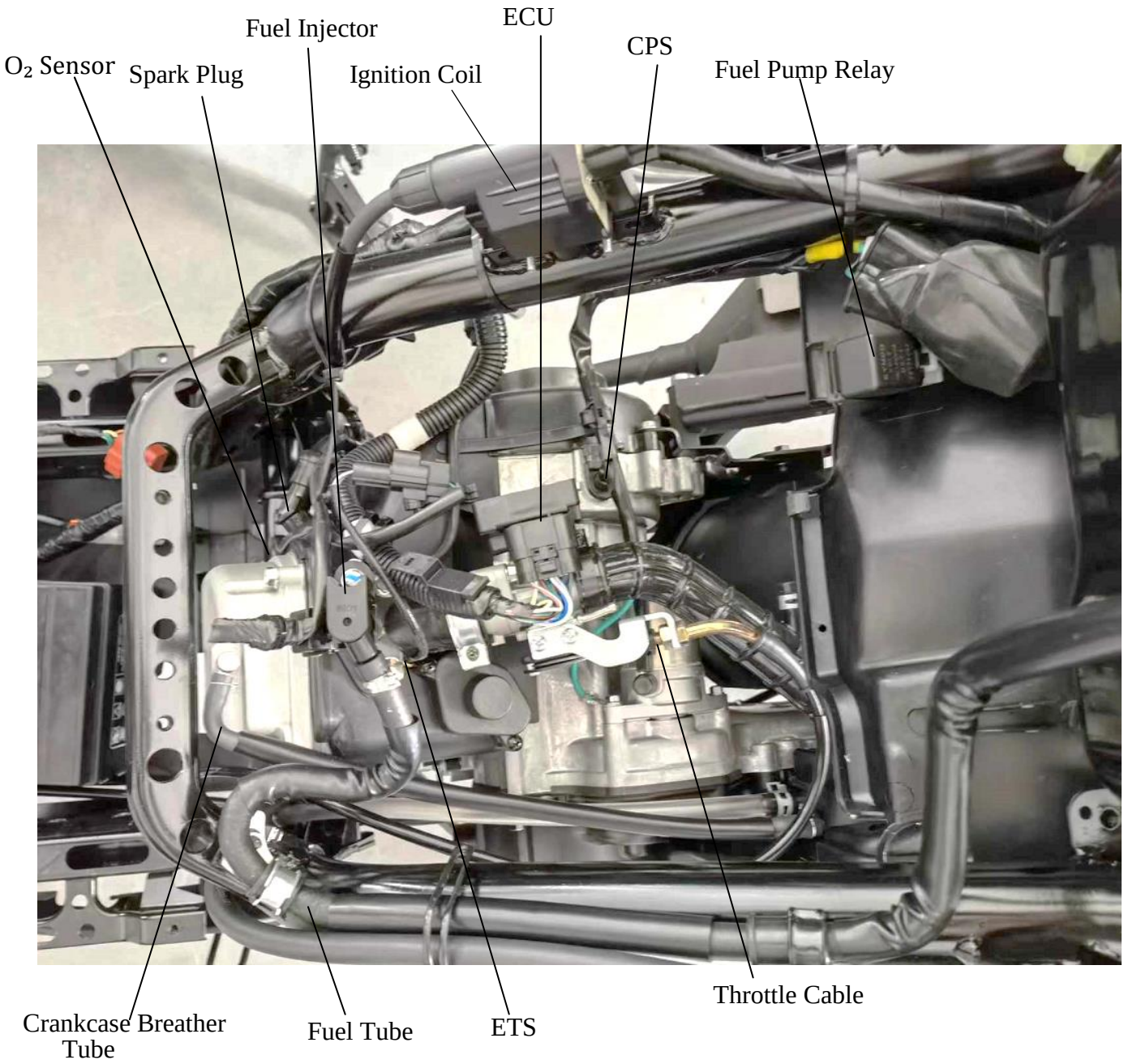



Instrument
Ignition Switch
Fuel unit
Fuel pump
Regulator/Rectifier
Speedometer wire connector
ECU Relay (US Mode)
Battery
Starter Relay
Ignition Coil
Diagnostic controller
Horn

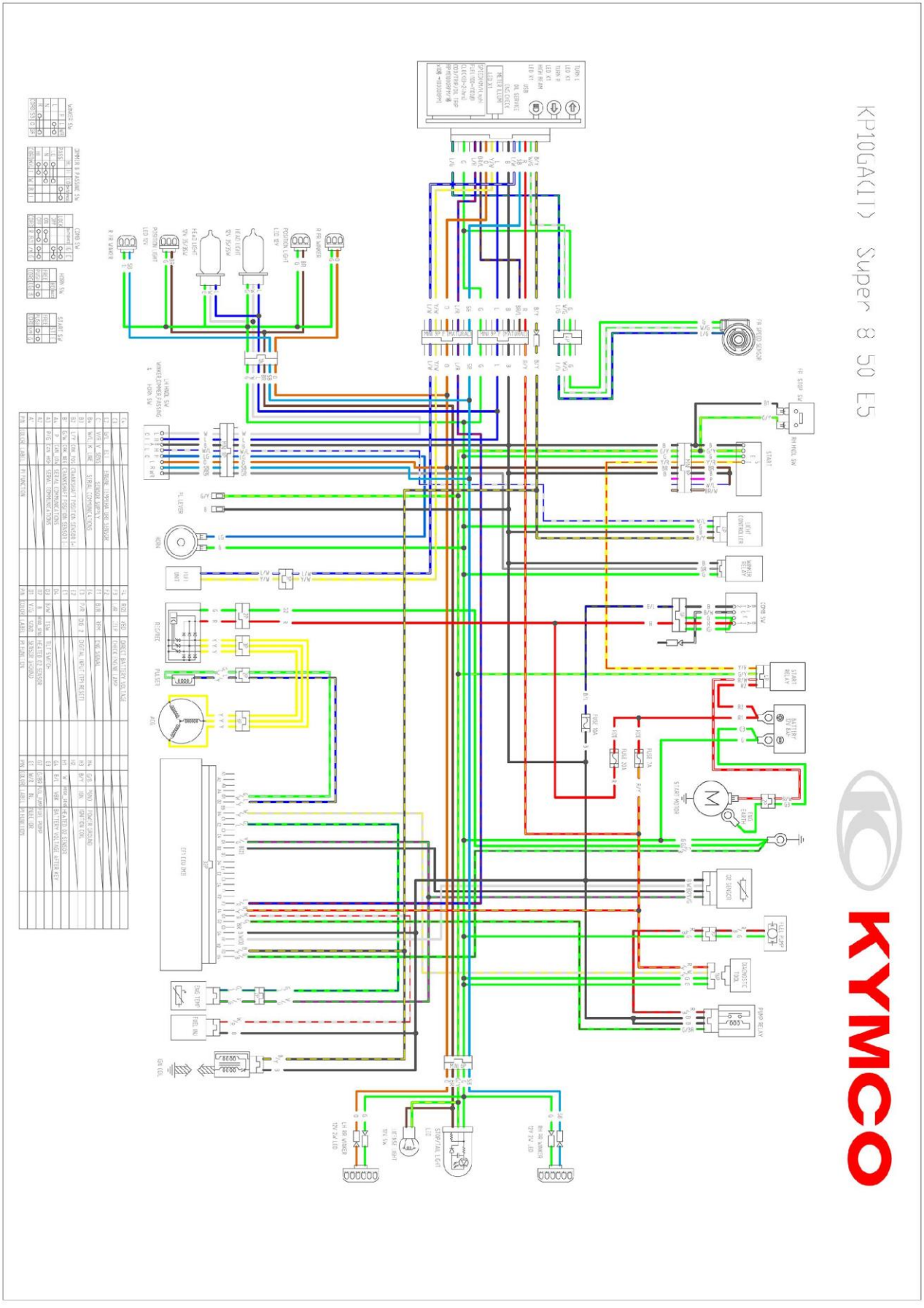

Regulator/Rectifier
Fuel pump
Tank
Ignition Coil
Starter Relay
Winker Relay
Headlight controller
Charcoal Canister Purge Control Valve (E5 Mode)
Rear Brake cable
Battery


Fuel Pump
Fuel uint
Fuel Tube
Fuel Pump Realy
Starter Relay
Ignition Coil
Starter Motor


Ignition Coil
Battery (-) Cable
Battery (-) Cable
Fuse
Starter Relay
Battery (+) Cable


O_2 Sensor
Spark Plug
Fuel Injector
Ignition Coil
ECU
CPS
Fuel Pump Relay
Crankcase Breather Tube
Fuel Tube
ETS
Throttle Cable

WIRING DIAGRAM



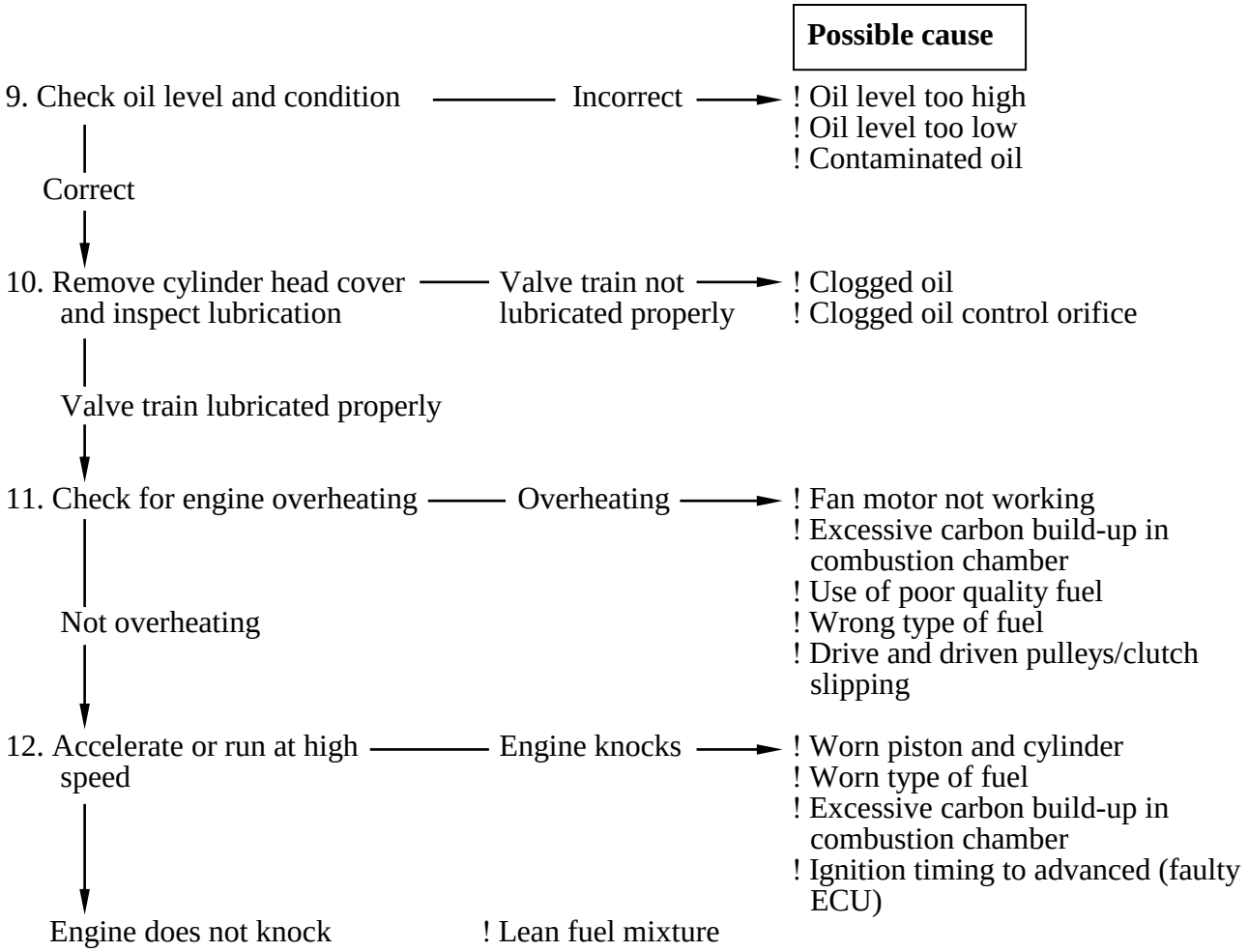
TROUBLESHOOTING

ENGINE WILL NOT START OR IS HARD TO START

		Possible cause
1. Check for operation of the fuel pump	Abnormal →	! Faulty fuel pump
Normal ↓		
2. Inspect the fuel flow	Abnormal →	! Faulty pressure regulator
Normal ↓		
3. Inspect the fuel injector	Abnormal →	! Faulty injector
Normal ↓		
4. Perform spark test	Weak or no spark →	! Faulty spark plug ! Fouled spark plug ! Faulty ECU ! Broken or shorted spark plug wire ! Faulty ignition switch ! Faulty ignition pulse generator ! Loose or disconnected spark plug wire
Good spark ↓		
5. Test cylinder compression	Low compression →	! Valve stuck open ! Worn cylinder and piston ring ! Damaged cylinder head gasket ! Seized valve ! Improper valve timing
Compression normal ↓		
6. Starting following normal procedure	Engine start but stops →	! Intake pipe leaking ! Improper ignition timing (Faulty ignition coil or ignition pulse generator) ! Fuel contaminated
Engine does not start ↓		
7. Remove and inspect spark plug	Wet plug →	! Throttle valve open ! Clogged air cleaner

ENGINE LACKS POWER

		Possible cause
1. Raise wheel off the ground and spin by hand	Wheels do not spin freely	! Brake dragging ! Worn or damaged wheel bearing
Wheel spins freely		
2. Check tire pressure	Pressure low	! Faulty tire valve ! Punctured tire
Pressure normal		
3. Accelerate lightly	Engine speed does not increase	! Air cleaner dirty ! Restricted fuel flow ! Clogged muffler ! Pinched fuel tank breather
Engine speed increase		
4. Check ignition timing	Incorrect	! Faulty ECU ! Faulty ignition pulse generator
Correct		
5. Test cylinder compression	Incorrect	! Valve stuck open ! Worn cylinder and piston rings ! Leaking head gasket ! Improper valve timing
Normal		
6. Inspect fuel flow	Abnormal	! Faulty pressure regulator
Normal		
7. Inspect the fuel injector	Abnormal	! Faulty injector
Normal		
8. Remove spark plug	Fouled or discolored	! Faulty spark plug
Not fouled or discolored		


Possible cause
9. Check oil level and condition
Incorrect
! Oil level too high
! Oil level too low
! Contaminated oil
Correct
10. Remove cylinder head cover and inspect lubrication
Valve train not lubricated properly
! Clogged oil
! Clogged oil control orifice
Valve train lubricated properly
11. Check for engine overheating
Overheating
! Fan motor not working
! Excessive carbon build-up in combustion chamber
! Use of poor quality fuel
! Wrong type of fuel
! Drive and driven pulleys/clutch slipping
Not overheating
12. Accelerate or run at high speed
Engine knocks
! Worn piston and cylinder
! Worn type of fuel
! Excessive carbon build-up in combustion chamber
! Ignition timing to advanced (faulty ECU)
Engine does not knock
! Lean fuel mixture

POOR PERFORMANCE AT LOW AND IDLE SPEED

		Possible cause
1. Check ignition timing	Incorrect	! Improper ignition timing
Correct		
2. Inspect the fuel flow	Abnormal	! Faulty pressure regulator
Normal		
3. Inspect the fuel injector	Abnormal	! Faulty injector
Normal		
4. Check for leaks in the intake pipe	Leaking	! Loose insulator clamp ! Damage insulator
No leak		
5. Perform spark test	Weak or intermittent spark	! Faulty the spark plug ! Faulty carbon or wet fouled spark plug ! Faulty ECU ! Faulty ignition coil ! Faulty ignition pulse generator ! Faulty ignition switch ! Loose or disconnected spark plug wires
Good spark		

POOR PERFORMANCE AT HIGH SPEED

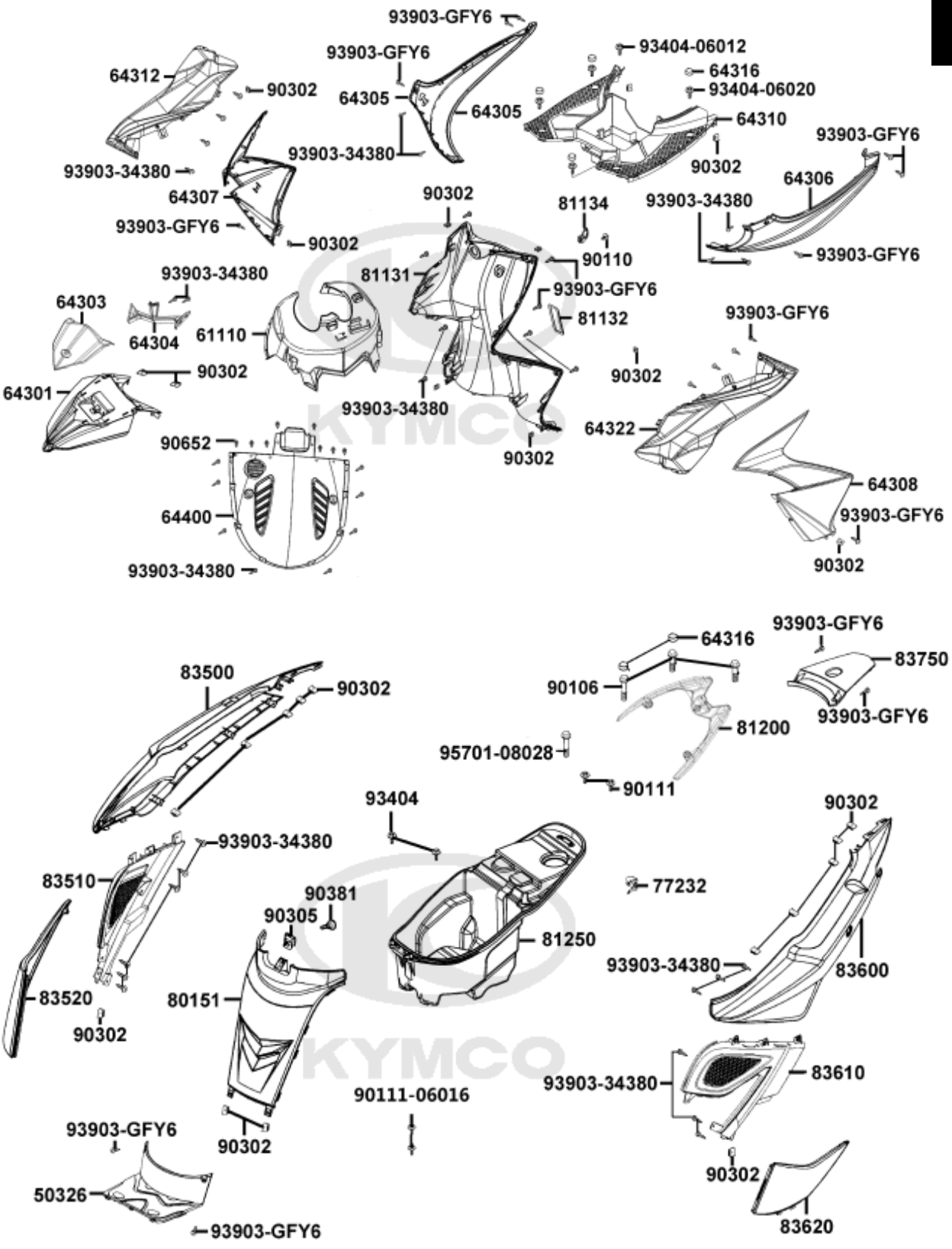
		Possible cause
1. Check ignition timing	Incorrect	! Faulty ECU
Correct ↓		
2. Inspect the fuel flow	Abnormal	! Faulty pressure regulator
Normal ↓		
3. Inspect the fuel injector	Abnormal	! Faulty injector
Normal ↓		
4. Check valve timing	Incorrect	! Camshaft not installed properly
Correct ↓		
5. Check valve spring	Weak	! Faulty valve spring
Not weak		

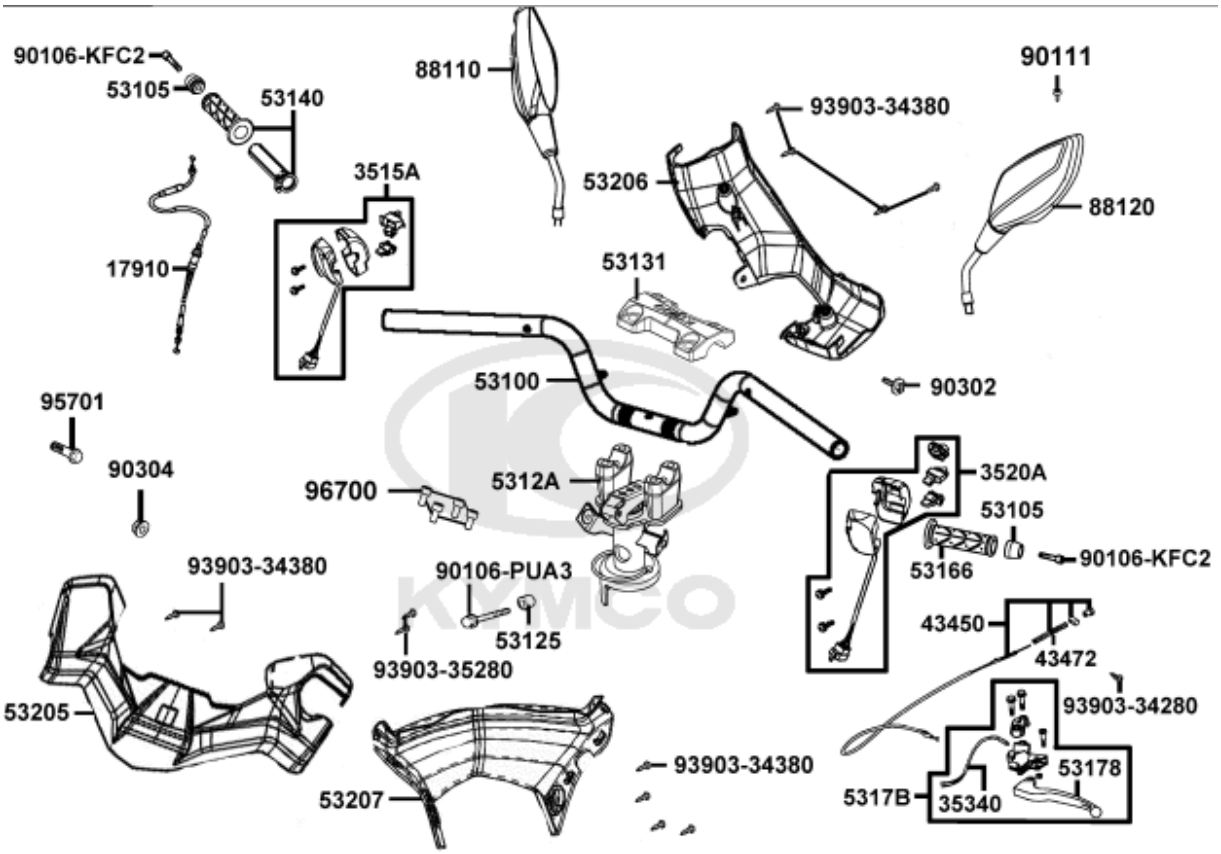
POOR HANDLING

	Possible cause
1. If steering is heavy	! Steering stem adjusting nut too tight ! Damaged steering head bearings
2. If either wheel is wobbling	! Excessive wheel bearing play ! Bent rim ! Improper installed wheel hub ! Swing arm pivot bearing excessively worn ! Bent frame
3. If the motorcycle pulled to one side	! Faulty the shock absorber ! Front and rear wheel not aligned ! Bent fork ! Bent swing arm ! Bent axle

SCHEMATIC DRAWING

2

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90304
96700
5312A
3520A
53105
53166
90106-KFC2
93903-34380
90106-PUA3
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5317B
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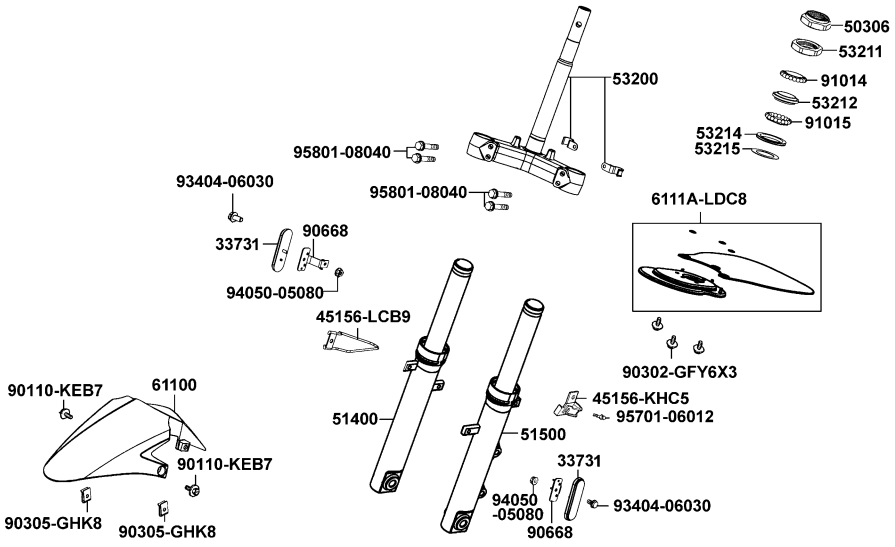
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90668
94050-05080
45156-LCB9
90302-GFY6X3
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61100
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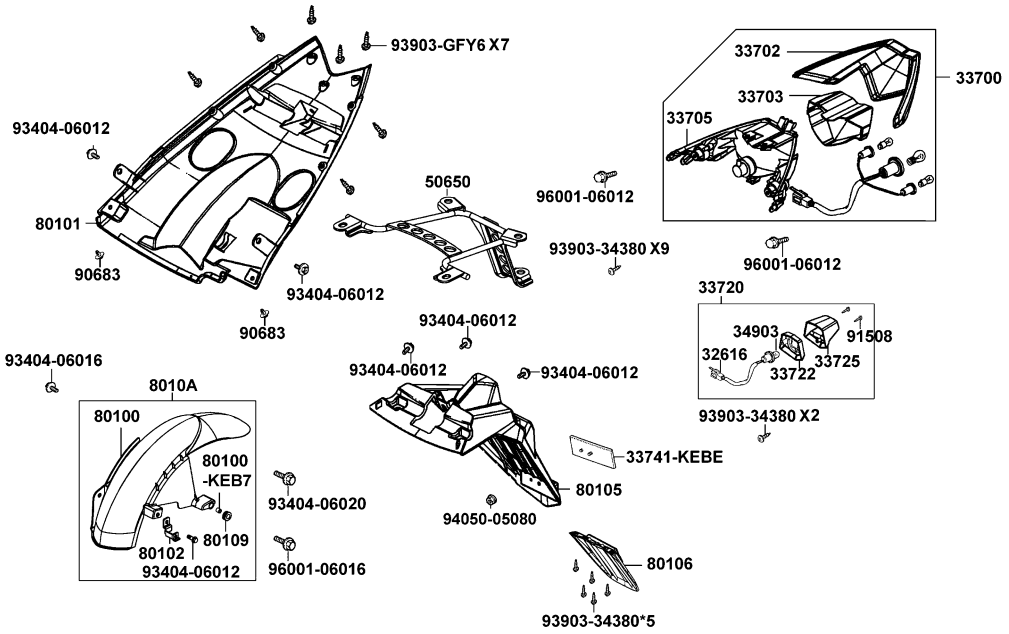
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93903-34380 X9
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96001-06012
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34903
91508
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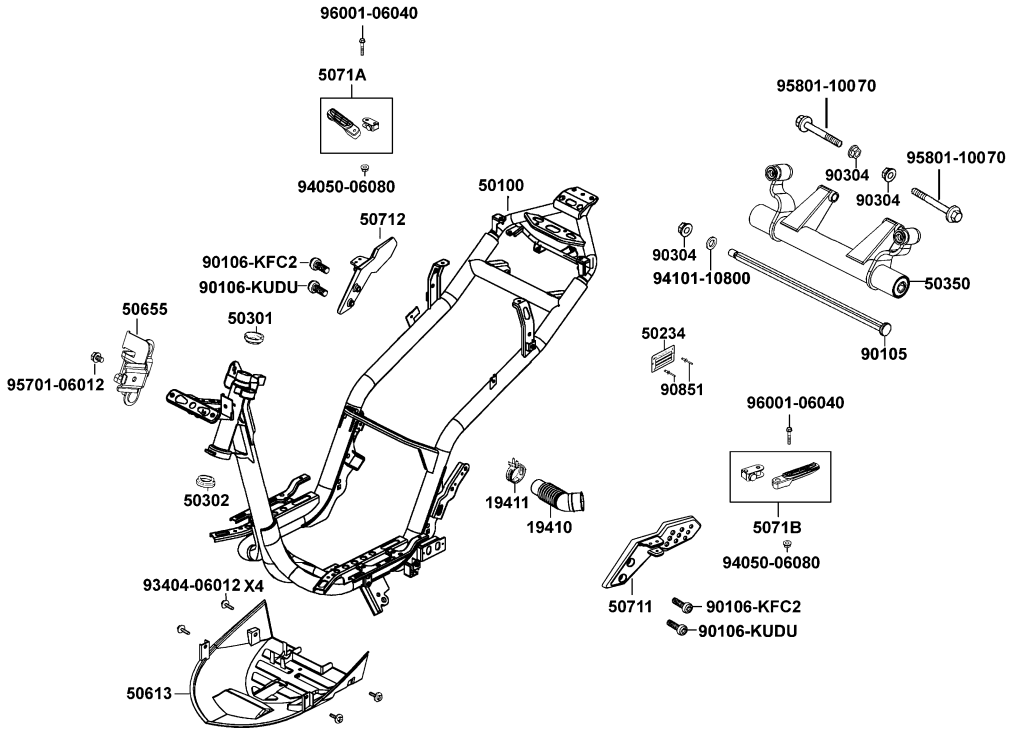
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93404-06012 X4
50613
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50350
90105
50234
90851
96001-06040
5071B
94050-06080
50711
90106-KFC2
90106-KUDU

SERVICE INFORMATION 2-1
FRAME COVERS 2-2
EXHAUST MUFFLER REMOVAL 2-5

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- When removing frame covers, use special care not to pull them by force because the cover joint claws may be damaged.

Items Related for Removal

- Handlebar front cover ——— Handlebar rear cover
  Headlight wire connector
- Handlebar rear cover ——— Speedometer cable and instrument light
  wire connectors, etc.
- Frame body cover ——— Met-in box, rear grip, rear turn signal
  lights, floor board
- Floor board ——— Frame body cover
  Battery and wire connectors
- Leg Shield ——— Front cover, floor board

TORQUE VALUES

Exhaust muffler joint lock nut	1.0~1.4kgf-m
Exhaust muffler lock bolt	3.0~3.6kgf-m

HANDLEBAR COVER

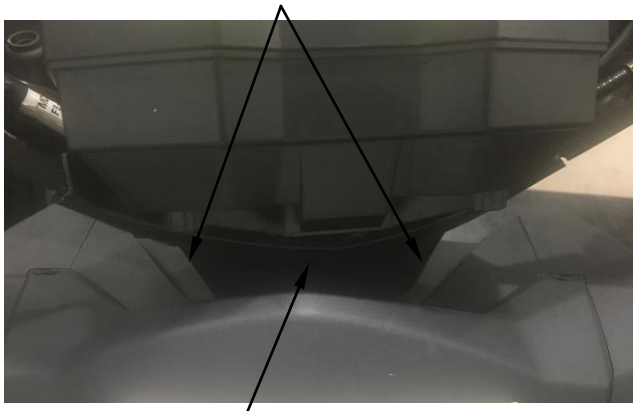
UPPER/LOWER HANDLEBAR COVER REMOVAL

Remove the two screws and then remove upper handlebar cover.

Screws

bolts

Remove the two bolts and then remove front handlebar cover.



front handlebar cover.

Screws

Remove the two screws and then remove lower handlebar cover.

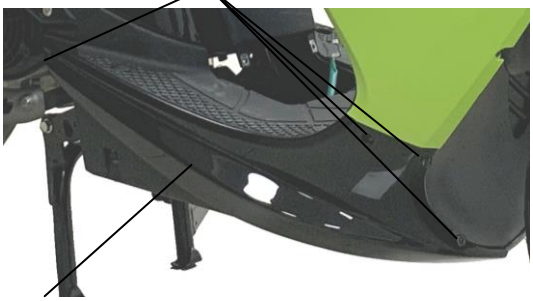
FRAME COVERS

LEFT AND RIGHT SIDE

Remove the four screws attaching the left side or right side skirt

Remove the left side or right side skirt

* During removal, do not pull the joint claws forcedly to avoid damage.



FRONT CENTER COVER

Remove the two plastic fasteners on the front cover.

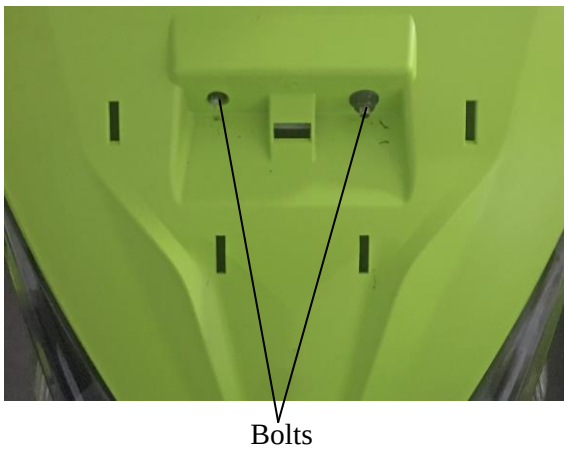
Remove the front center cover.

FRONT COVER REMOVAL

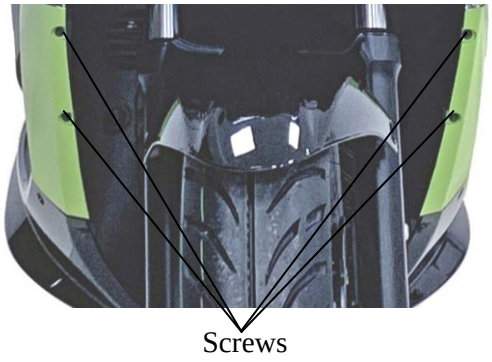
Remove the left side or right side skirt(2-2)

Remove the front center cover(2-2).

Remove the two bolts on the front cover.



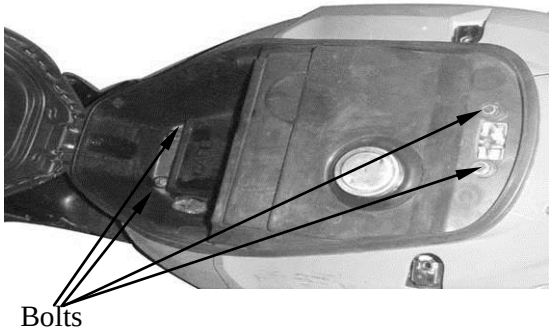
Remove the four screws on the front cover.



Remove the ten screws on the back of the front cover.
Remove the front cover.
The installation sequence is the reverse of removal.

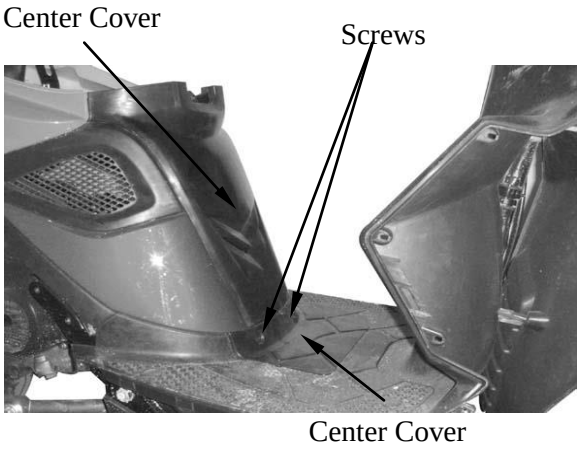
MET-IN BOX REMOVAL

Open the seat and remove the four bolt attaching the met-in box.
Remove the met-in box .

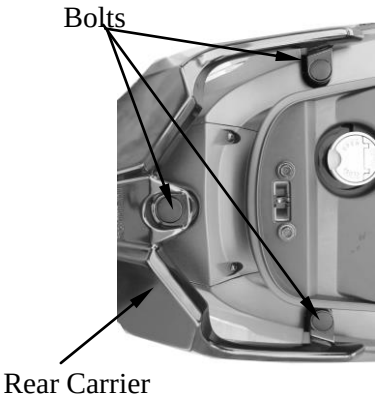


FRAME BODY COVER REMOVAL

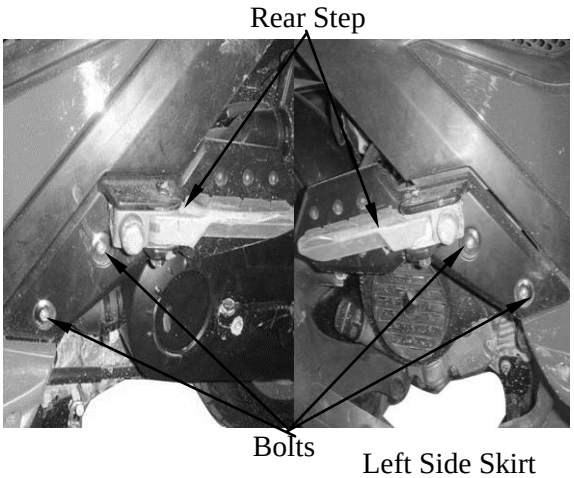
Remove the two screws on the battery cover.
Remove the center cover



Remove the three bolts attaching the rear carrier.
Remove the rear carrier.



Remove the two bolt attaching the lefe and right rear step.
Remove the rear step



Remove the two screws attaching the left side and right side skirt
Remove the left side and right side skirt

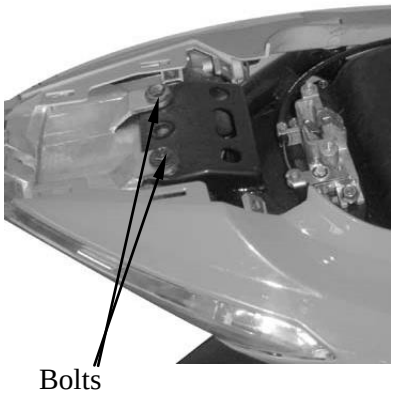
* During removal, do not pull the joint claws forcedly to avoid damage.
When installing, be sure to connect the seat lock wire.

Remove the two screws on the center rear cover.

Remove the center rear cover.

.

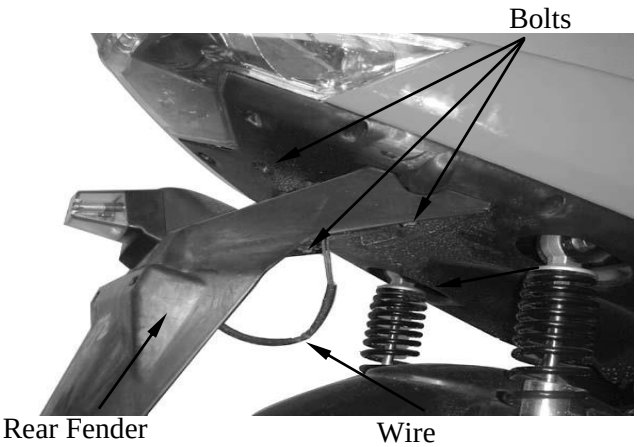
Remove the two bolts attaching the frame body cover.



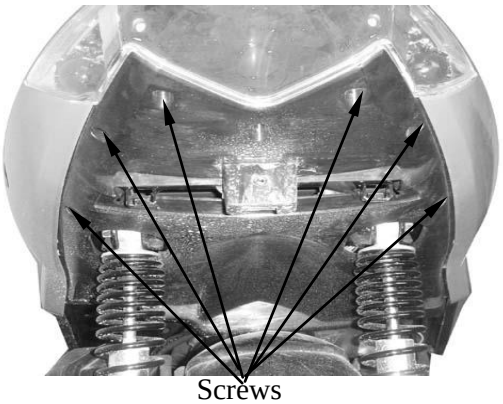
Remove the two bolts attaching the rear fender.

Disconnect the taillight wire connector

Remove the erar fender.

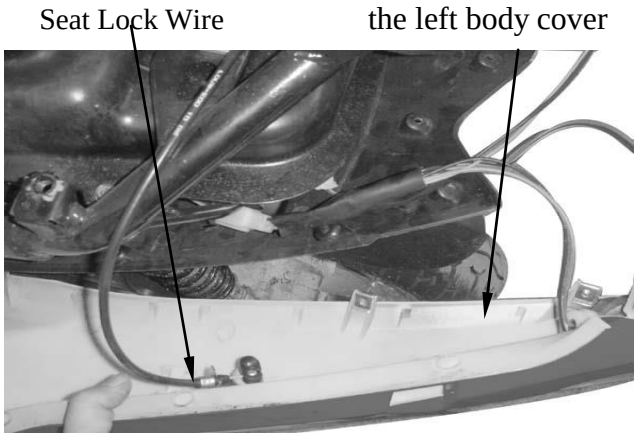


Remove the six screws attaching the fender rear inner.



Discornnect the seat lock wire.
Discornnect the tail lamp wire connectors
Remove the left and right body cover

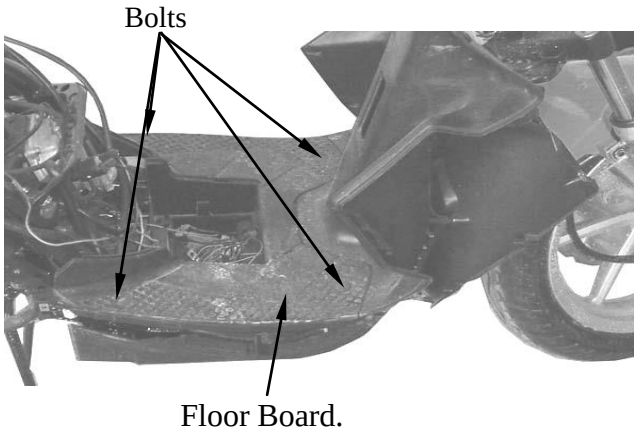
The installation sequence is the reverse of remove



* During removal, do not pull the joint claws forcedly to avoid damage.
When installing, be sure to connect the seat lock wire.

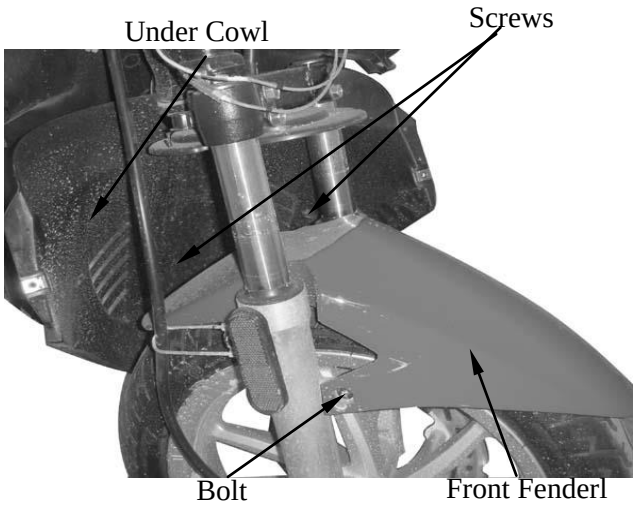
FLOOR BOARD REMOVAL

Remove the rear carrier. (⇨2-3)
Remove the met-in box. (⇨2-3)
Remove the frame body cover. (⇨2-4)
Remove the four bolts attaching the floor board.
Remove the floor board.



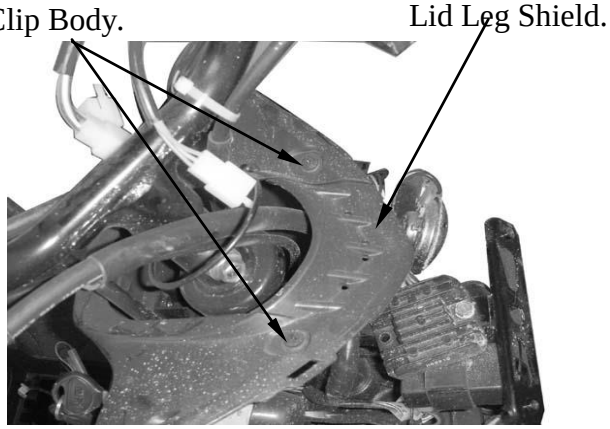
F RONT FENDER AND UNDER COWL REMOVAL

Remove the two on the under cowl.
Remove the under cowl.
Remove the L/R side bolts attaching the front fender and front fender.

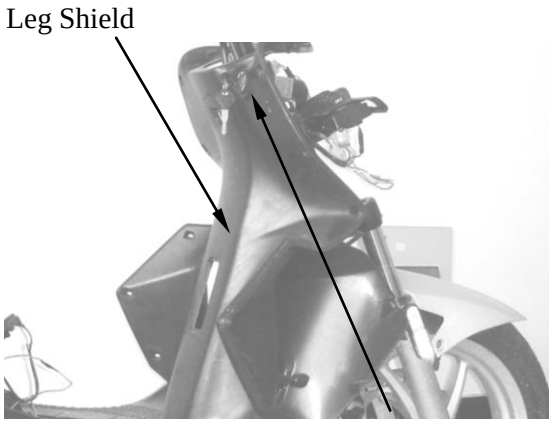


LEG SHIELD REMOVAL

Remove the two clip body on the lid leg shield
Remove the lid leg shield.
The installation sequence is the reverse of remove



Remove the decorative ring.
Remove the leg shieid.
The installation sequence is the reverse of remove



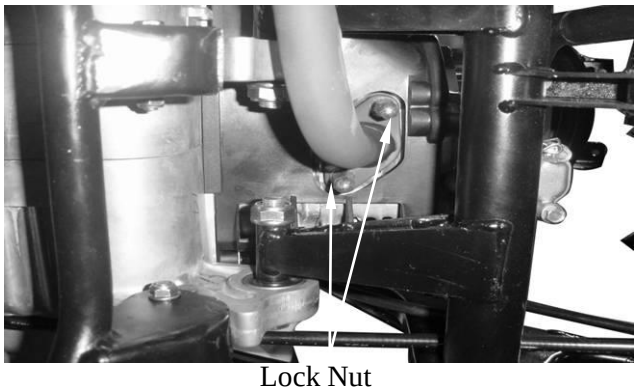
EXHAUST MUFFLER REMOVAL

Disconnect the O_2 Sensor connector.
Remove the two exhaust muffler joint lock nuts.
Remove the two exhaust muffler lock bolts.
Remove the exhaust muffler.
Remove the exhaust muffler joint packing collar.

When installing, first install the exhaust muffler packing collar and then install the exhaust muffler.
First install and tighten the exhaust muffler joint lock nuts. Then, install and tighten the exhaust muffler lock bolts.
Connect the O_2 Sensor connector.

Torques:

Exhaust muffler lock bolt: 3.0~3.6kgf-m
Exhaust muffler joint lock nut: 1.0~1.4kgf-m



* Be sure to install a new exhaust muffler packing collar.

SERVICE INFORMATION.....3-0
MAINTENANCE SCHEDULE 3-2
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THROTTLE OPERATION 3-3
AIR CLEANER 3-4
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VALVE CLEARANCE.....3-5
CARBURETOR IDLE SPEED 3-5
IGNITION TIMING 3-6
CYLINDER COMPRESSION.....3-6
FINAL REDUCTION GEAR OIL.....3- 7
DRIVE BELT.....3- 7
HEADLIGHT AIM 3- 8
NUTS/BOLTS/FASTENERS 3- 9
WHEELS/TIRES.....3- 9
STEERING HANDLEBAR 3- 9

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Before running the engine, make sure that the working area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas which may cause death to people.
- Gasoline is extremely flammable and is explosive under some conditions. The working area must be well-ventilated and do not smoke or allow flames or sparks near the working area or fuel storage area.

SPECIFICATIONS

ENGINE

Throttle grip free play	: 2～6mm
Spark plug gap	: 0.6～0.7mm
Spark plug	: NGK CR7HSA
Valve clearance	: IN: 0.10mm
	: EX: 0.10mm
Idle speed	: 2000rpm
Engine oil capacity:	
At disassembly	: 0.85 liter
At change	: 0.7 liter
Gear oil capacity	:
At disassembly	: 0.21 liter
At change	: 0.18 liter

3

Cylinder compression : 12kg/cm^2
Ignition timing: 13°～ 28°
CHASSIS
Front brake free play: 10～20mm
Rear brake free play : 10～20mm

TIRE PRESSURE

	1 Rider	2 Riders
Front	1.5kg/cm^2	2.0kg/cm^2
Rear	1.75kg/cm^2	2.25kg/cm^2

TIRE SIZE:
Front : 120/70-14
Rear : 120/80-14

TORQUE VALUES
Front axle nut 5.0～7.0kgf-m
Rear axle nut 11～13kgf-m

MAINTENANCE SCHEDULE

Perform the periodic maintenance at each scheduled maintenance period.
I: Inspect, and Clean, Adjust, Lubricate or Replace if necessary.
A: Adjust C: Clean R: Replace T : Tighten

Item \ Frequency	Whichever comes first ⇨ ⇩	Regular Service Mileage (km)											
		1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
Engine oil		R New Motorcycle 300km	R		R		R		R		R		R
Engine oil filter screen					C				C				
Fuel filter screen											R		
Gear oil	Note 3	R New motorcycle 300km				R					R		
Valve clearance			A		A				A				A
Air Cleaner	Note 2,3	Replace at every2000km											
Spark plug		Clean at every 3000km and replace if necessary											
Brake system		I	I	I	I	I	I	I	I	I	I	I	I
Drive belt									I				
Suspension					I				I				I
Nut, bolt, fastener									I				
Tire					I				I				I
Steering head bearing		I					I						I

- In the interest of safety, we recommend these items should be serviced only by an authorized KYMCO motorcycle dealer.

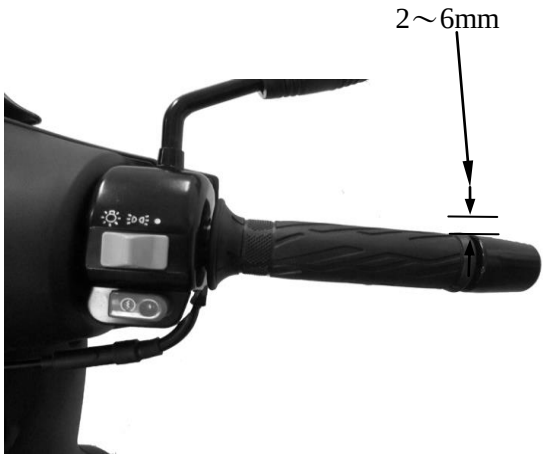
Note: 1. For higher odometer readings, repeat at the frequency interval established here.
2. Service more frequently when riding in dusty or rainy areas.
3. Service more frequently when riding in rain or at full throttle.

3. INSPECTION/ADJUSTMENT

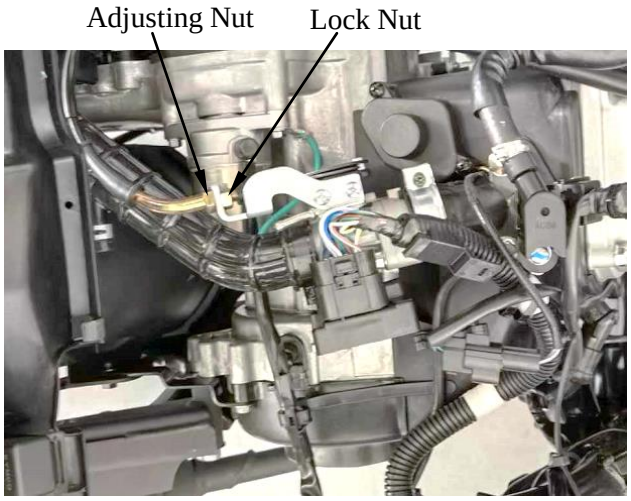
THROTTLE OPERATION

Check the throttle grip for smooth movement.
Measure the throttle grip free play.

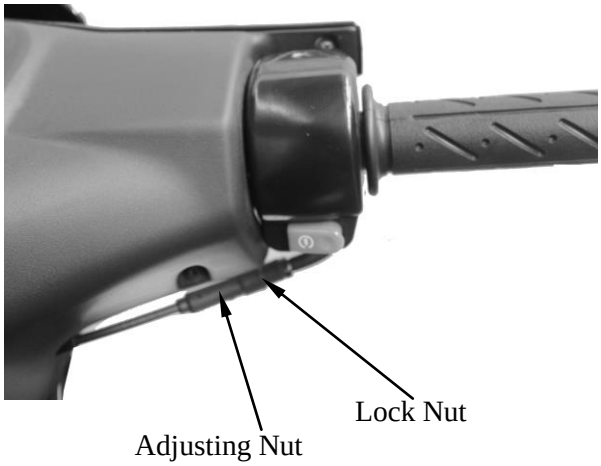
Free Play: 2～6mm



Major adjustment of the throttle grip free play is made at the carburetor side.
Adjust by loosening the lock nut and turning the adjusting nut.



Minor adjustment is made with the adjusting nut at the throttle grip side.
Slide the rubber cover out and adjust by loosening the lock nut and turning the adjusting nut.



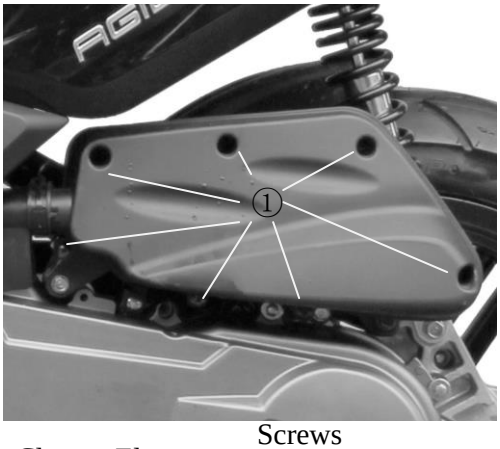
AIR CLEANER

AIR CLEANER REPLACEMENT

Remove the air cleaner case cover by removing the 7 screws.

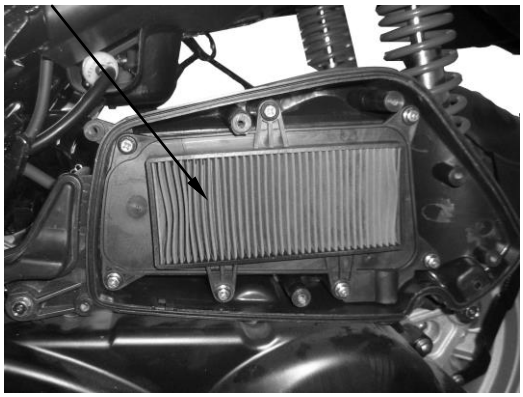
Remove the air cleaner element by removing the four screws.
Check the element and replace it if it is excessively dirty or damaged.

Air Cleaner Case Cover



Screws

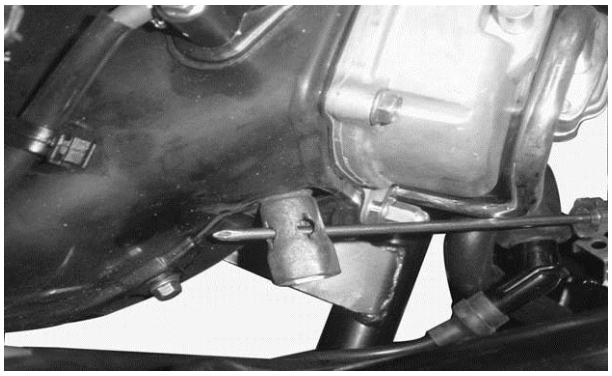
Air Cleaner Element



CHANGE INTERVAL

More frequent replacement is required when riding in unusually dusty or rainy areas.

* • The air cleaner element has a viscous type paper element. Do not clean it with any fluid.
  • Be sure to install the air cleaner element and cover securely.



SPARK PLUG

Remove the spark plug.
Check the spark plug for wear and fouling deposits.
Clean any fouling deposits with a spark plug cleaner or a wire brush.

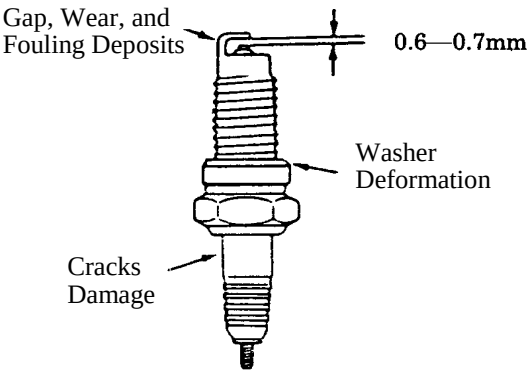
Specified Spark Plug:

NGK CR7HSA

Measure the spark plug gap.

Spark Plug Gap: 0.6～0.7mm

* When installing, first screw in the spark plug by hand and then tighten it with a spark plug wrench.

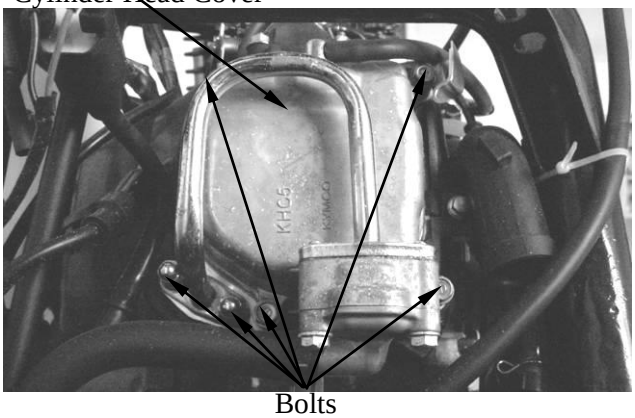


VALVE CLEARANCE

* Inspect and adjust valve clearance while the engine is cold (below 35℃).

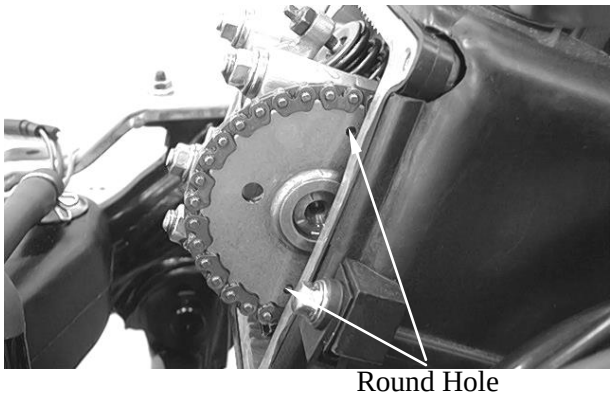
Remove the frame cover. (⇨2-3)
Remove the six bolts on the cylinder head cover.
Remove the cylinder head cover. (⇨7-3)
Remove the cylinder head cover..

Cylinder Head Cover



Bolts

Turn the flywheel counterclockwise so that the "T" mark on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.



Round Hole

Inspect and adjust the valve clearance.

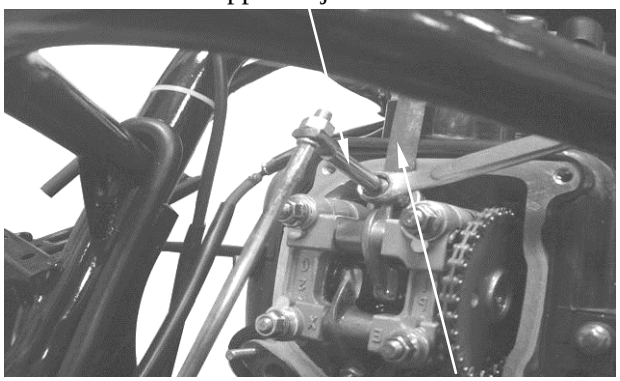
Valve Clearance: IN : 0.1mm
EX: 0.1mm

Loosen the lock nut and adjust by turning the adjusting nut

Special

Tappet Adjuster

Tappet Adjuster



Feeler Gauge

* • Check the valve clearance again after the lock nut is tightened.

IGNITION TIMING

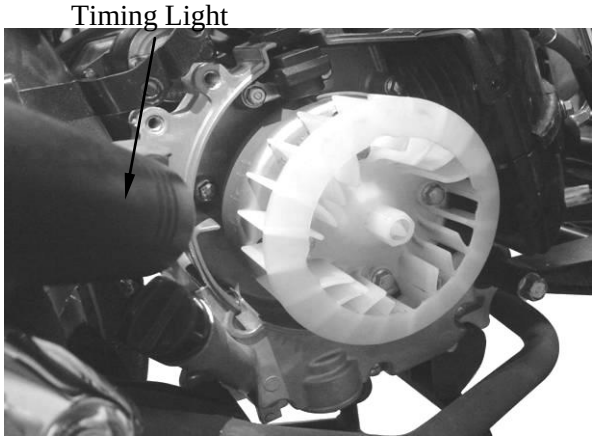
* The CDI unit is not adjustable. If the ignition timing is incorrect, check the ignition system. (⇨15-5)

Remove the right of the fan cover.

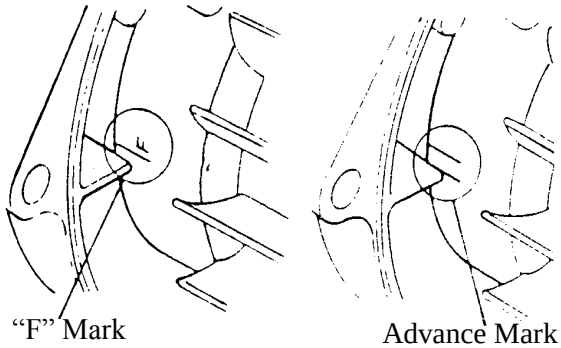
Timing Hole Cap

Check the ignition timing with a timing light. When the engine is running at idle speed, the ignition timing is correct if the "F" mark on the flywheel aligns with the index mark on the crankcase.

Timing Light



Also use a timing light to check the advance. Raise the engine speed to 4,000rpm and the index mark on the crankcase cover should be aligned with the advance mark on the flywheel.

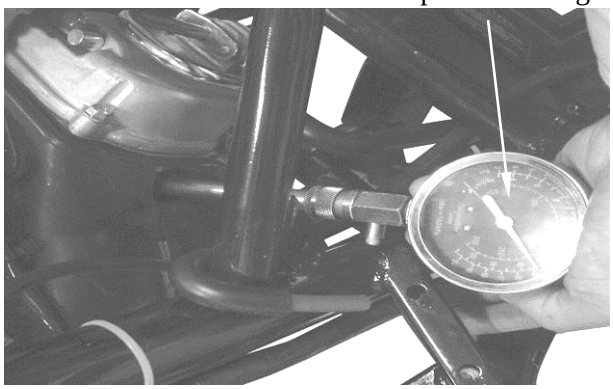


"F" Mark Advance Mark

CYLINDER COMPRESSION

Warm up the engine before compression test.
Remove the met-in box and center cover. (⇨2-3)
Remove the spark plug.
Insert a compression gauge.
Open the throttle valve fully and push the starter button to test the compression.

Compression Gauge



Compression: 13kg/cm^{2}rpm

If the compression is low, check for the following:

- Leaky valves
- Valve clearance to small
- Leaking cylinder head gasket
- Worn piston rings
- Worn piston/cylinder

If the compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and the piston head.

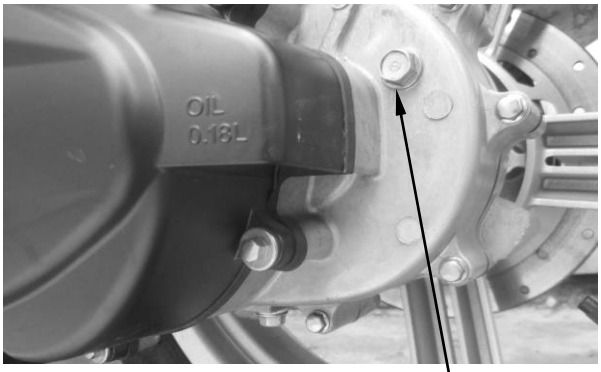
FINAL REDUCTION GEAR OIL

OIL LEVEL CHECK

* Place the motorcycle on its main stand on level ground for oil level check.

Stop the engine and remove the oil check bolt.
The oil level shall be at the oil check bolt hole.
If the oil level is low, add the recommended oil to the proper level.

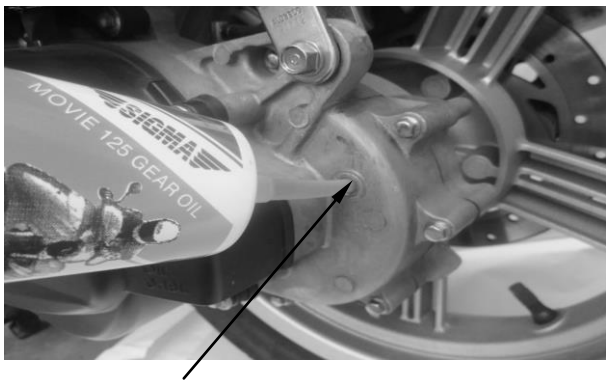
Recommended Oil: SAE90#



Oil Check Bolt/Sealing Washer

Install the oil check bolt.

* Make sure that the sealing washer is in good condition.



Oil Check Bolt Hole

OIL CHANGE

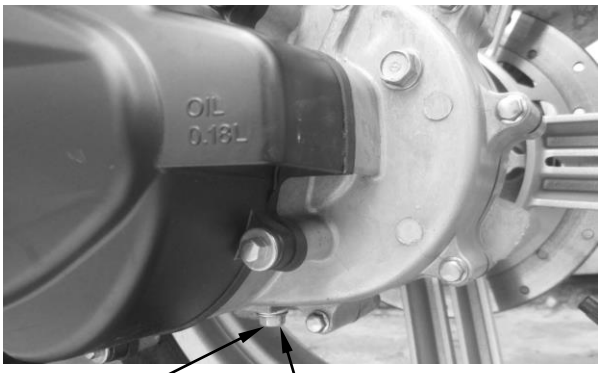
Remove the oil check bolt.
Remove the oil drain bolt and drain the oil thoroughly.
Install the oil drain bolt.
Torque: 0.8~1.2kgf-m

* Make sure that the sealing washer is in good condition.

Fill with the recommended oil.

Oil Capacity: At disassembly : 0.21liter
At change : 0.18 liter

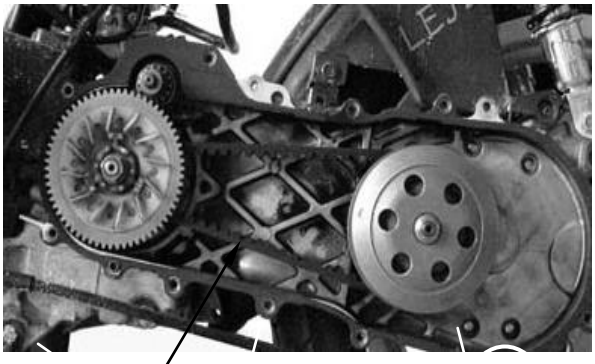
Reinstall the oil check bolt and check for oil leaks.
Torque:0.8~1.2kgf-m



Oil Drain Bolt/ Sealing Washer

DRIVE BELT

Remove the left crankcase cover. (⇨9-2)
Inspect the drive belt for cracks or excessive wear.
Replace the drive belt with a new one if necessary and in accordance with the Maintenance Schedule.

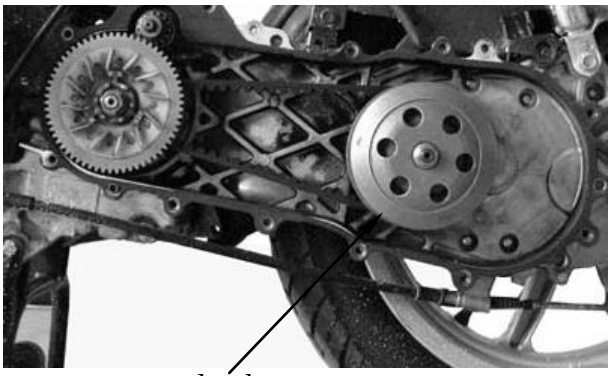

Drive Belt

HEADLIGHT AIM

Turn the ignition switch ON and start the engine.
Turn on the headlight switch.
Adjust the headlight aim by turning the headlight aim adjusting screw.

CLUTCH SHOE WEAR

Start the engine and check the clutch operation by increasing the engine speed gradually.
If the motorcycle tends to creep, or the engine stalls, check the clutch shoes for wear and replace if necessary. (⇨9-11)



SUSPENSION

FRONT

Fully apply the front brake lever and check the action of the front shock absorbers by compressing them several times.
Check the entire shock absorber assembly for oil leaks, looseness or damage.

REAR

Check the action of the rear shock absorber by compressing it several times.
Check the entire shock absorber assembly for oil leaks, looseness or damage.
Jack the rear wheel off the ground and move the rear wheel sideways with force to see if the engine hanger bushings are worn.

NUTS/BOLTS/FASTENERS

Check all important chassis nuts and bolts for looseness.
Tighten them to their specified torque values if any looseness is found. (⇨1-11)

WHEELS/TIRES

Check the tires for cuts, imbedded nails or other damages.

Check the tire pressure.

* Tire pressure should be checked when tires are cold.

TIRE PRESSURE

	1 Rider	2 Riders
Front	1.5kg/cm^2	1.75kg/cm^2
Rear	2.00kg/cm^2	2.25kg/cm^2

TIRE SIZE

Front : 120/70-14
Rear : 120/80-14

Front Axle

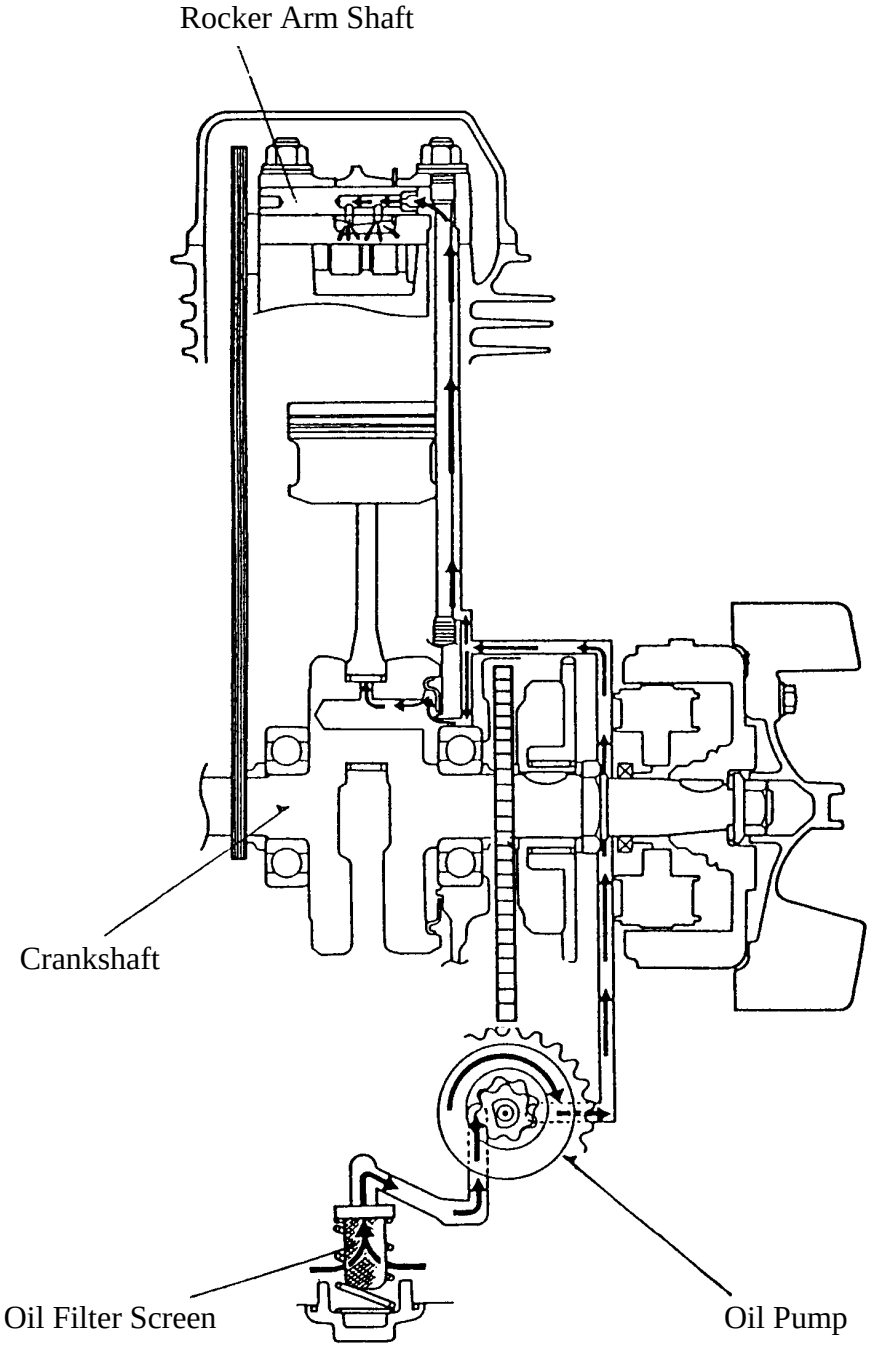
Check the front axle nut for looseness.
Check the rear axle nut for looseness.
If the axle nuts are loose, tighten them to the specified torques.

Torques: **Front** : 5.0～7.0kgf-m
Rear : 11～13kgf-m

STEERING HANDLEBAR

Check that the control cables do not interfere with handlebar rotation.
Raise the front wheel off the ground and check that the steering handlebar rotates freely.
If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing.

LUBRICATION SYSTEM



4. LUBRICATION SYSTEM

SERVICE INFORMATION 4-1
TROUBLESHOOTING 4-1
ENGINE OIL/OIL FILTER 4-2
OIL PUMP 4-3

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The maintenance of lubrication system can be performed with the engine installed in the frame.
- Use care when removing and installing the oil pump not to allow dust and foreign matters to enter the engine and oil line.
- Do not attempt to disassemble the oil pump. The oil pump must be replaced as a set when it reaches its service limit.
- After the oil pump is installed, check each part for oil leaks.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Oil pump	Inner rotor-to-outer rotor clearance	—	0.12
	Outer rotor-to-pump body clearance	—	0.12
	Rotor end-to-pump body clearance	0.05～0.10	0.2

TROUBLESHOOTING

Oil level too low

- Natural oil consumption
- Oil leaks
- Worn or poorly installed piston rings
- Worn valve guide or seal

Poor lubrication pressure

- Oil level too low
- Clogged oil filter or oil passages
- Not use the specified oil

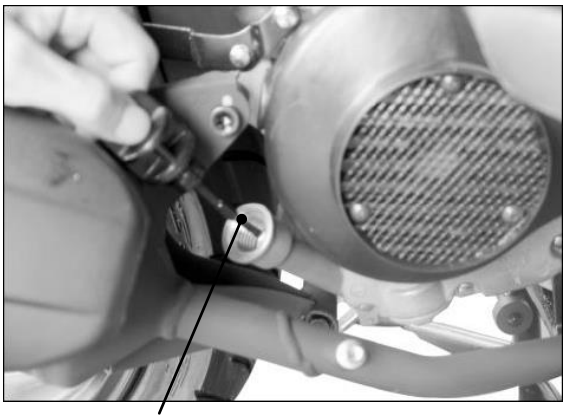
4. LUBRICATION SYSTEM

ENGINE OIL/OIL FILTER

OIL LEVEL

* • Place the motorcycle upright on level ground for engine oil level check.
  • Run the engine for 2～3 minutes and check the oil level after the engine is stopped for 2～3 minutes.

Remove the oil dipstick and check the oil level with the oil dipstick.
If the level is near the lower level, fill to the upper level with the specified engine oil.


Oil Dipstick

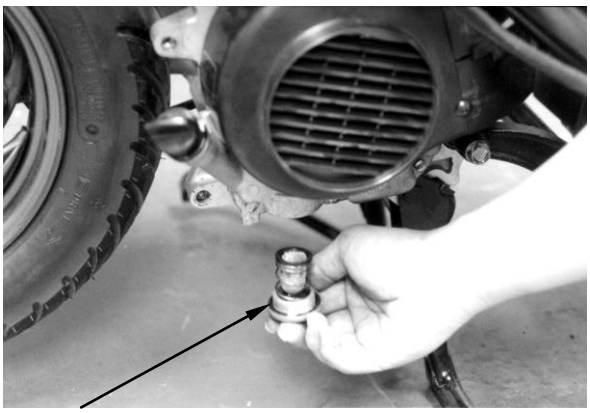
OIL CHANGE

* The engine oil will drain more easily while the engine is warm.

Remove the drain bolt to drain the engine oil thoroughly.
Remove the oil filter screen cap and clean the oil filter screen with compressed air.


Oil Filter Screen Cap

Check the filter screen O-ring for damage and replace if necessary.
Install the oil filter screen, spring and filter screen cap.
Torque: 1.0~2.0kgf-m


O-ring

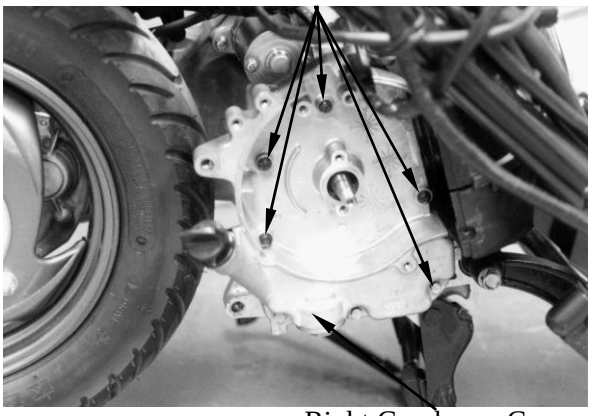
Fill the crankcase with the specified engine oil to the proper level.
Oil Capacity: At disassembly : 0.85 liter
At change : 0.70 liter

Check for oil leaks and then start the engine and let it idle for few minutes.
Recheck the oil level.

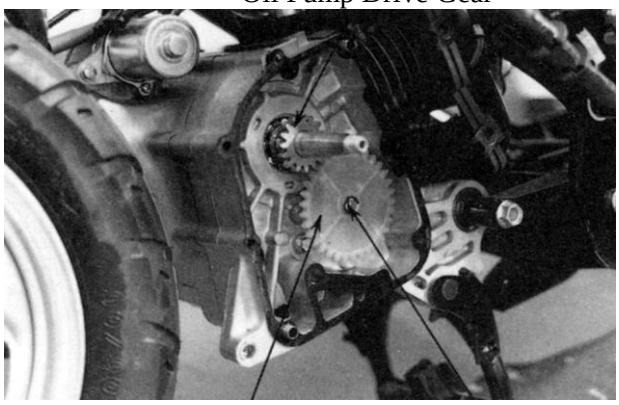
OIL PUMP

REMOVAL

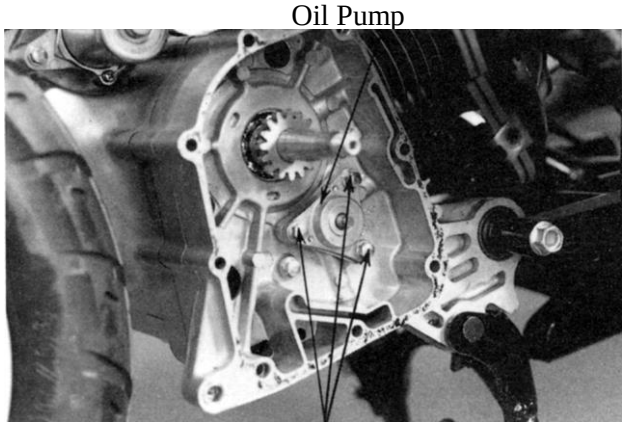
Remove the A.C. generator flywheel. (⇨14-7)
Remove the A.C. generator stator and pulsar coil. (⇨14-6)
Remove the eight right crankcase cover bolts and the right crankcase cover.



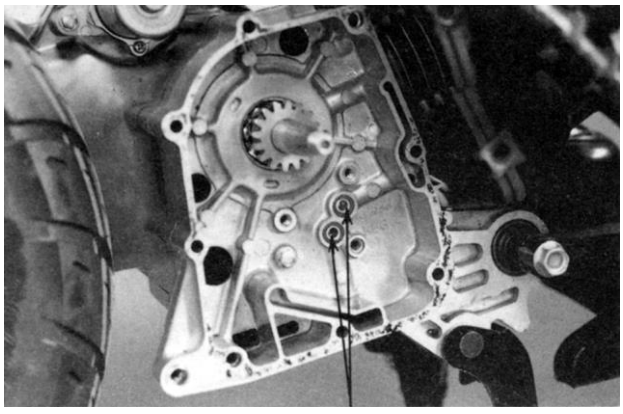
Remove the gasket and dowel pins.
Remove the oil pump drive gear circlip.
Remove the oil pump gear.



Remove the oil pump mounting bolts.
Remove the oil pump.



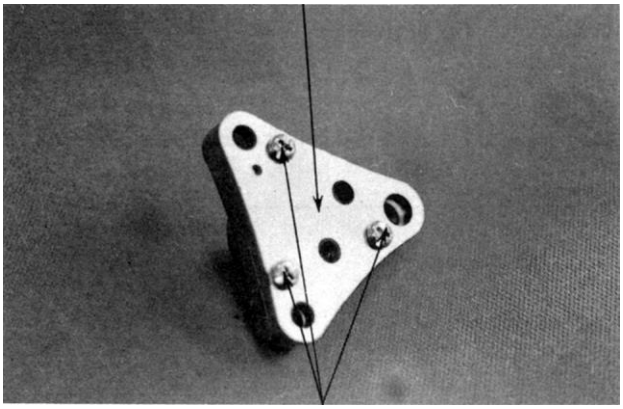
Remove the two O-rings.
Inspect the two O-rings for damage or deterioration.



DISASSEMBLY

Remove the three oil pump boby screws.
Disassembly the oil pump.

Oil Pump Boby

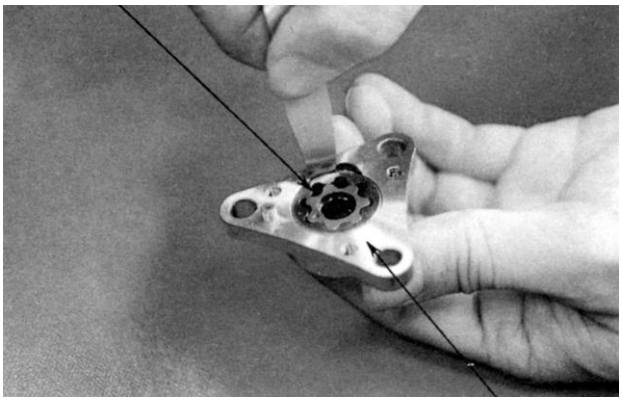


Screws

INSPECTION

Measure the pump boby-to-outer rotor clearance.
Service Limit: 0.12mm

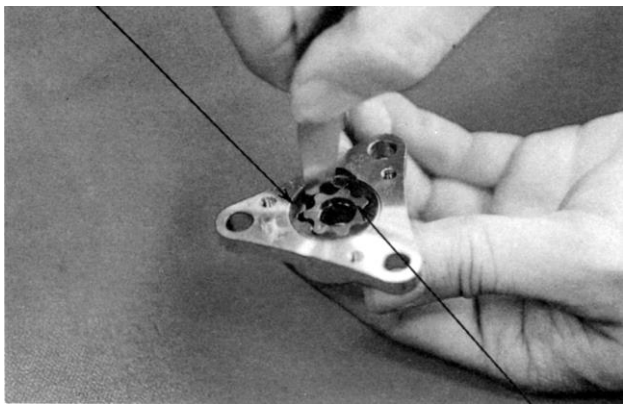
Outer Rotor



Oil Pump Boby

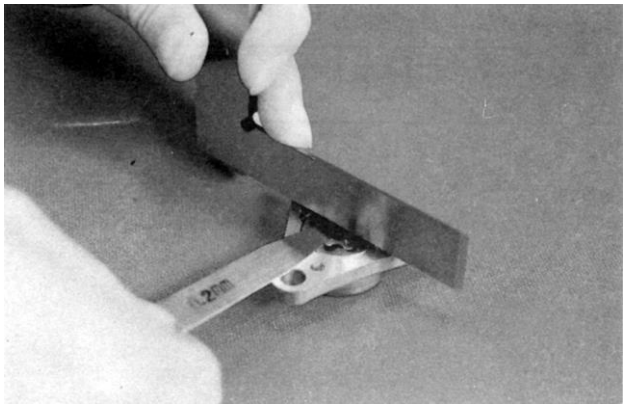
Measure the inner rotor-to-outer rotor clearance.
Service Limit: 0.12mm

Outer Rotor



Inner Rotor

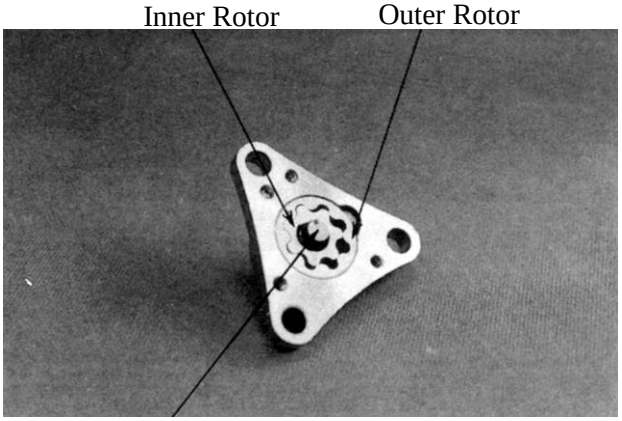
Measure the rotor end-to- pump boby clearance.
Service Limit: 0.2mm



ASSEMBLY

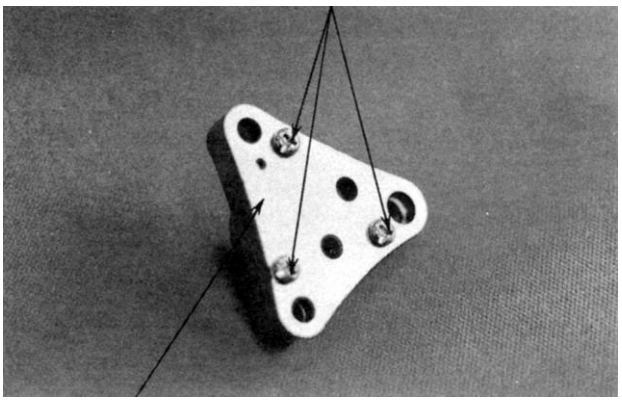
Install the outer rotor, inner rotor and pump shaft into the pump boby.

* Install the pump shaft by aligning the flat on the shaft with the flat in the inner rotor.



Pump Shaft

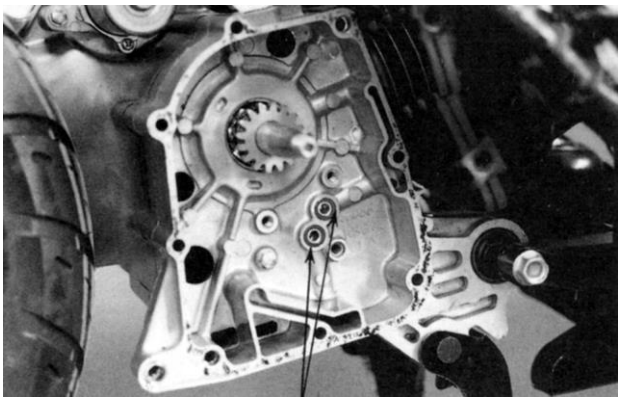
Install the pump cover and tighten the screws to secure the pump cover.



Pump Cover

INSTALLATION

First install the two O-rings onto the oil pump base.

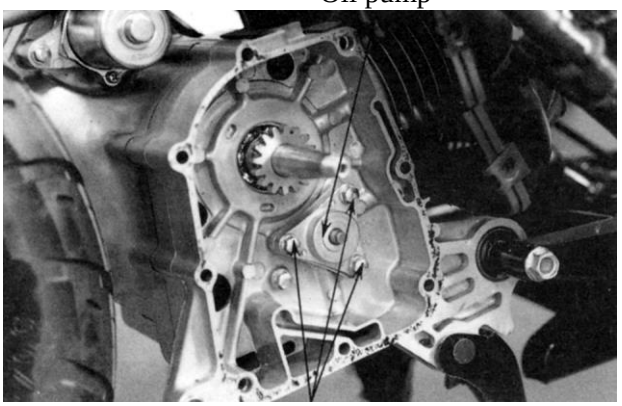


O-rings

Install the oil pump into the crankcase.

* Fill the oil pump with engine oil before installation.

After the oil pump is installed, tighten the three mounting bolts.

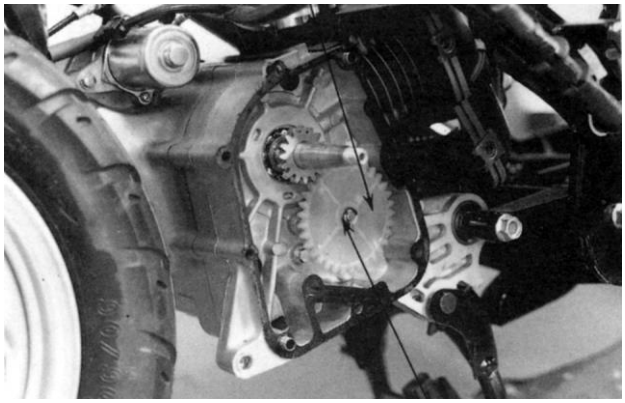


Bolts

Install the pump driven gear and secure it with the circlip.

Torque: 0.8～1.2kg-m

Pump Driven Gear



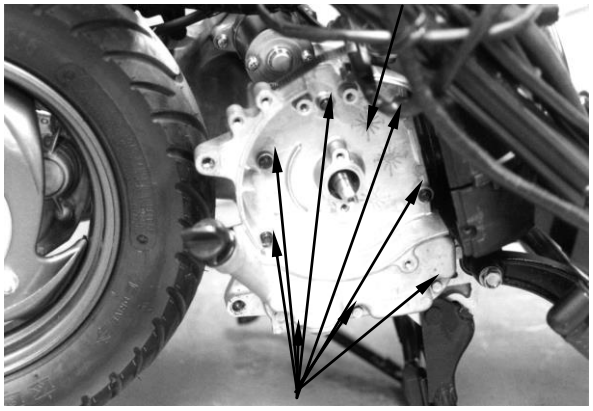
Circlip

Install the right crankcase cover and tighten the eight bolts.

Torque: 0.8~1.2kgf-m

* Diagonally tighten the bolts in 2～3 times.

Right Crankcase Cover



Bolts

FUEL INJECTION SYSTEM

5

SYSTEM DIAGRAM ..... 5 - 1
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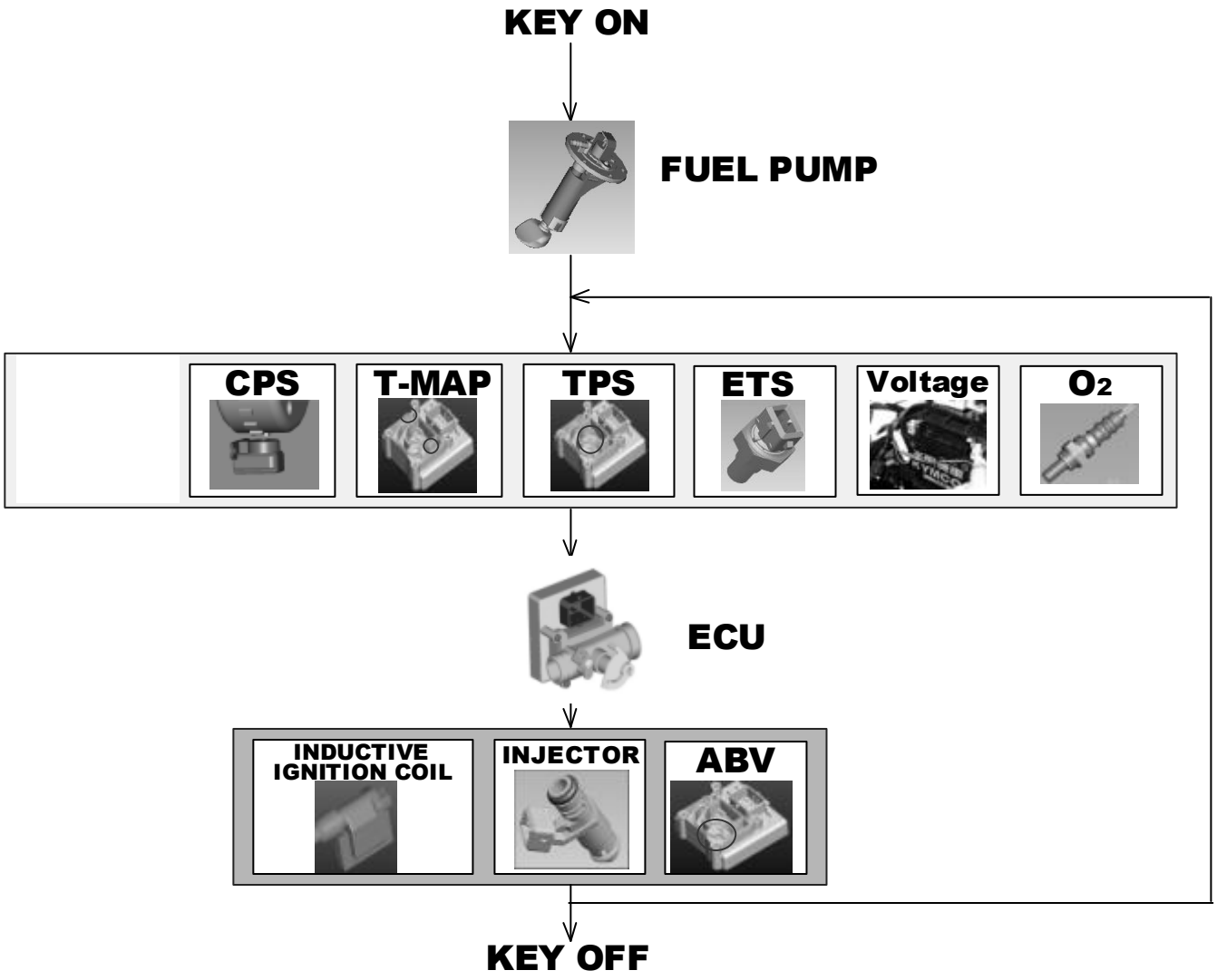
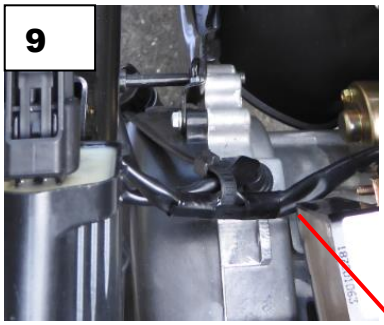
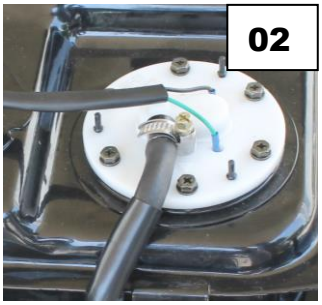
SYSTEM DIAGRAM

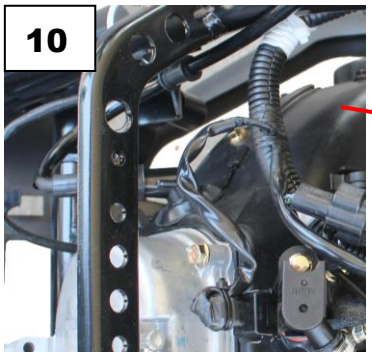


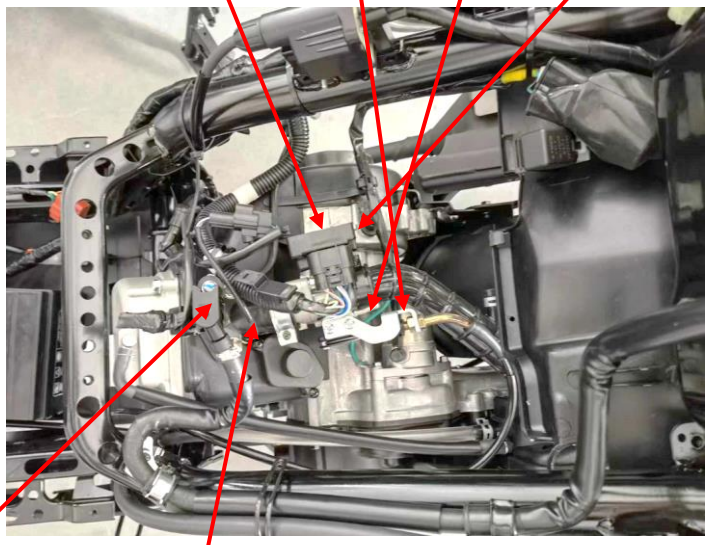
Parts Location

01:Inductive ignition coil
02:Fuel pump
03:ECU
04:Fuel injector
05:ETS sensor
06:T-MAP sensor
07:ABV
08:TPS
09:CPS
10:O2/O2 HT sensor









SERVICE INFORMATION

GENERAL INSTRUCTIONS

* Gasoline is very dangerous. When working with gasoline, keep sparks and flames away from the working area.
Gasoline is extremely flammable and is explosive under certain conditions. Be sure to work in a well-ventilated area.

- Disconnect the cables of the battery when the engine is running, which could lead to ECU damage.
- Connect the harness positive (+) cable to the battery negative (-) terminal or connect the harness negative (-) to the battery positive (+) terminal, which could lead to ECU damage.
- Always keep fuel over 750 cc in fuel tank.

SPECIFICATIONS

Item			Standard
Charging voltage of battery			13.5 ~ 14.5V
Voltage from the ECU to sensor			5±0.1V
Fuel injector resistance (20℃/68℉)			10.6 ~ 15.9Ω
Temperature sensor resistance			10--12 KΩ (25℃)
Throttle position sensor voltage			Idle (0°) = 0.23±0.05V Throttle fully (90°/3.27V over)
Fuel pump resistance (20℃/68℉)			about 2Ω
O2 sensor	O2 sensor heater resistance		6.7 ~ 9.5Ω
	Voltage	Air/Fuel<14.7 (Rich)	>0.7V
		Air/Fuel>14.7 (Lean)	<0.18V
Crank position sensor (Pulser) resistance			95 ~ 144Ω
Inductive ignition coil resistance (20℃/68℉)			0.55 ~ 0.75Ω
Roll sensor voltage (diagnostics)			Normal: 0.3 ~ 1.4V Fall down (>65°): 3.5 ~ 4.7V
Idle speed			2000±100 rpm

TROUBLESHOOTING

Engine won't start

- Battery voltage too low
- Fuel level too low
- Pinched or clogged fuel hose
- Faulty fuel pump operating system
- Clogged fuel filter (fuel pump)
- Clogged fuel injector
- Faulty spark plug or wrong type
- Cut by ECU due to angle detect sensor or incorrect function

Backfiring or misfiring during acceleration

- Ignition system malfunction

Poor performance (drive ability) and poor fuel economy

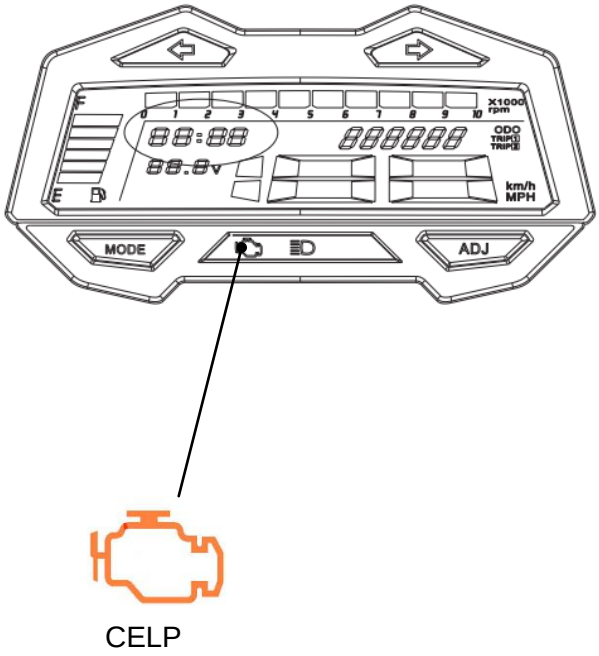
- Pinched or clogged fuel hose
- Faulty fuel injector

Engine stall, hard to start, rough idling

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted

CHECK ENGINE LAMP (CELP)

1. When turning on the switch, the CLEP indicator will illuminate always. it goes off after start the engine.
2. If there is any malfunction, the CLEP indicator will still illuminate,
3. please take your scooter to a KYMCO dealer for service as soon as possible.



CELP

Failure Code Chart

No	Diagnose code	Failure Code	Pcode	NOTE
1	D1	B0099	B0099 Roll sensor Voltage High	
2	F0	C0064	C0064 Roll sensor malfunction	
3	A1	P0030	P0030 O2 sensor heater malfunction	
4	A2	P0031	P0031 O2 sensor heater Voltage Low	
5	A3	P0032	P0032 Lambda sensor heater Voltage High	
6	A4	P0105	P0105 MAP sensor malfunction	
7	A5	P0107	P0107 MAP sensor Voltage Low	
8	A6	P0108	P0108 MAP sensor Voltage High	
9	A7	P0110	P0110 Intake air temperature sensor malfunction or Voltage High	
10	A8	P0111	P0111 Intake air temperature circuit malfunction	
11	A9	P0112	P0112 Intake air temperature sensor Voltage Low	
12	D6	P0113	P0113 Intake air temperature sensor Voltage High	
13	AA	P0114	P0114 Intake air temperature intermittent failure	
14	AB	P0115	P0115 Engine Temperature Sensor malfunction or Voltage High	
15	AC	P0117	P0117 Engine Temperature Sensor Voltage Low	
16	AD	P0118	P0118 Engine Temperature Sensor Voltage High	
17	AE	P0119	P0119 Engine Temperature intermittent failure	
18	AF	P0120	P0120 Throttle Position Sensor malfunction or Voltage Low	
19	B0	P0121	P0121 Throttle position sensor adaptation is out of range	
20	B1	P0122	P0122 Throttle Position Sensor Voltage Low	
21	B2	P0123	P0123 Throttle Position Sensor Voltage High	
22	B3	P0124	P0124 Difference between the two last TPS acquisitions is out of range	
23	B4	P0130	P0130 O2 sensor signal malfunction	
24	B5	P0131	P0131 O2 sensor signal Voltage Low	
25	B6	P0132	P0132 O2 sensor signal Voltage High	
26	D7	P0171	P0171 System over lean or over rich (Too Lean)	
27	D8	P0172	P0172 System over lean or over rich (Too Rich)	
28	B7	P0200	P0200 Injection malfunction	
29	DA	P0201	P0201 Injection valve malfunction	
30	B8	P0217	P0217 Engine over temperature condition	
31	B9	P0219	P0219 CVT overspeed detected	
32	BA	P0230	P0230 Fuel pump malfunction	
33	BB	P0231	P0231 Fuel pump Voltage Low	
34	BC	P0232	P0232 Fuel pump Voltage High	
35	BD	P0260	P0260 Injection valve malfunction	
36	BE	P0261	P0261 Injection valve Voltage Low	

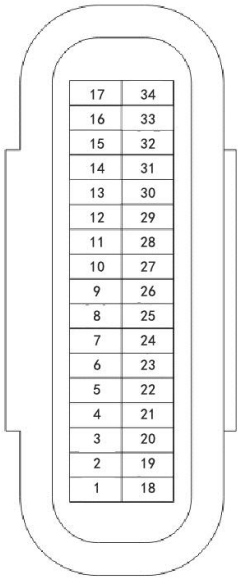
37	BF	P0262	P0262 Injection valve Voltage High	
38	BE	P0264	P0264 Injection valve Voltage Low	
39	BF	P0265	P0265 Injection valve Voltage High	
40	C0	P0335	P0335 Crankshaft sensor malfunction	
41	C1	P0350	P0350 Ignition malfunction or Voltage Low	
42	C2	P0351	P0351 Ignition Voltage High	
43	DB	P0412	P0412 Secondary air injection system malfunction	
44	C3	P0480	P0480 Fan Relay/Circuit malfunction	
45	F1	P0484	P0484 Fan Relay/Circuit Voltage High	
46	F2	P0485	P0485 Fan Relay/Circuit Voltage Low	
47	DE	P0500	P0500 Vehicle Speed Sensor malfunction	
48	D9	P0501	P0501 Vehicle Speed Sensor malfunction	
49	C4	P0505	P0505 ISAV idle speed actuator valve malfunction	
50	C5	P0508	P0508 ISAV idle speed actuator valve Voltage Low	
51	C6	P0509	P0509 ISAV idle speed actuator valve Voltage High	
52	DF	P0511	P0511 ISC stepper mortor malfunction	
53	F3	P0560	P0560 Battery voltage VBK malfunction	
54	F4	P0561	P0561 Battery voltage VBK malfunction	
55	C7	P0562	P0562 Battery voltage VBK too Low	
56	C8	P0563	P0563 Battery voltage VBK too High	
57	DC	P0603	P0603 ECU memory error	
58	F7	P0615	P0615 Starter Relay malfunction	
59	F8	P0616	P0616 Starter Relay Voltage Low	
60	F9	P0617	P0617 Starter Relay Voltage High	
61	C9	P0650	P0650 MIL Voltage High	
62	CA	P0700	P0700 Engine overspeed detected	
63	CB	P1110	P1110 Roll sensor Voltage High	
64	CC	P1111	P1111 Roll sensor malfunction or Voltage Low	
65	DD	P1205	P1205 MAP sensor malfunction	
66	CD	P1410	P1410 AISV system break down	
67	E0	P1505	P1505 ISC system malfunction	
68	E1	P1521	P1521 VACS Valve circuit malfunction	
69	CE	P1630	P1630 Roll sensor curcuit malfunction	
70	CF	P2187	P2187 Lambda control too High	
71	D0	P2188	P2188 Lambda control too Low	
72	D4	P2300	P2300 Ignition malfunction or Voltage Low	
73	D5	P2301	P2301 Ignition malfunction or Voltage High	
74	D4	P2303	P2303 Ignition malfunction or Voltage Low	
75	D5	P2304	P2304 Ignition malfunction or Voltage High	
76	D3	P263A	P263A MIL Voltage Low	

77	D2	P263B	P263B MIL Voltage High	
78		C006A	C006A Accelerometer identifier diagnosis Failure of self test	
79		P0106	P0106 Stuck MAP signal	
80		P0116	P0116 TCO out of range	
81		P0133	P0133 Oxygen sensor switching time monitoring Implausible oxygen sensor switching time	
82		P0134	P0134 Lambda sensor diagnosis Open signal	
83		P0135	P0135 Lambda sensor heater plausibility diagnosis Lambda sensor heater implausible operation	
84		P016B	P016B Lambda controller Excessive positive deviation of lambda controller	
85		P016C	P016C Lambda controller Excessive negative deviation of lambda controller	
86		P0300	P0300 Multiple misfire A diagnosis	
87		P0313	P0313 Misfire fuel tank low	
88		P0314	P0314 Misfire A diagnosis	
89		P0336	P0336 Crankshaft wrong tooth number diagnosis Additional CRK tooth detected	
90		P0339	P0339 Crankshaft sensor Additional edges inside filtering period	
91		P0410	P0410 Secondary Air Valve Plausibality diagnosis Secondary Air Valve Unplausible	
92		P0413	P0413 Secondary air valve diagnosis Open signal	
93		P0414	P0414 Secondary air valve diagnosis Signal shorted to ground	
94		P0444	P0444 Canister purge solenoid diagnosis Open signal	
95		P0458	P0458 Canister purge solenoid diagnosis Signal shorted to ground	
96		P0459	P0459 Canister purge solenoid diagnosis Signal shorted to battery	
97		P0503	P0503 Intermittent vehicle speed signal from CAN diagnosis	
98		P0519	P0519 Stepper plausibility diagnosis Implausible stepper control	
99		P0661	P0661 Variable intake pipe diagnosis Signal shorted to battery	
100		P0662	P0662 Variable intake pipe diagnosis Signal shorted to ground	
101		P0663	P0663 Variable intake pipe diagnosis Signal open	
102		P0894	P0894 CVT overspeed Transmission component slipping	
103		P2A00	P2A00 Oxygen sensor out of range	
104		U0241	U0241 Head lamp diagnosis Signal shorted to ground	
105		U1601	U1601 CAN Bus off diagnosis Bus off	
106		U1605	U1605 CAN control unit diagnosis for checked received messages Fail	
107		P0643	P0643 Reference voltage diagnosis 1 Signal shorted to battery	
108		P0608	P0608 Reference voltage diagnosis 1 Signal shorted to ground or open	

ECU

There are 34 pins attaching the ECU.

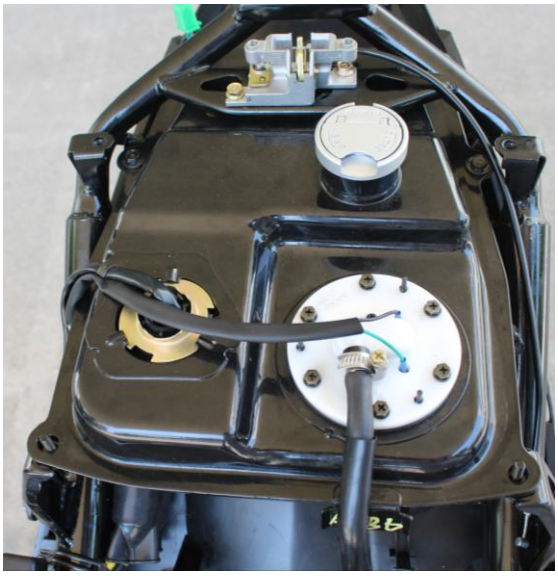
ECU PIN FUNCTION



09	W/R	INJECTION		18	G/BR	PUMP RELAY	
08	W/Y	K-LINE		17			
07	B	VBK		16		VEH SPEED	
06		TILT		15	G/L	ECT	
05	W3	HEGO HEAT		14	R/Y	VBD	
04	G/W	CPS(-)		13	L/Y	CPS(+)	
03				12	B2	HEGO SENS	
02		RPM/TEMP OUT		11	L/R	MIL	
01	V/G	PGND		10	B/Y	IGNITION COIL	
PIN	COLOR	PI FUNCTION		PIN	COLOR	PI FUNCTION	

MAP content (edition issue no.)

ECU



FUEL PUMP

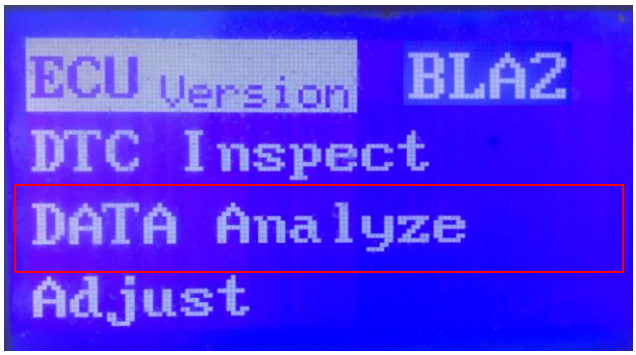
Connect the meter (+) probe to the red/black wire and the meter (-) probe to the green wire to measure the voltage from the ECU input to fuel pump unit.

Standard : 8~16 V (Battery volt)

To measure the resistance of the fuel pump to see if it is short circuit or not.

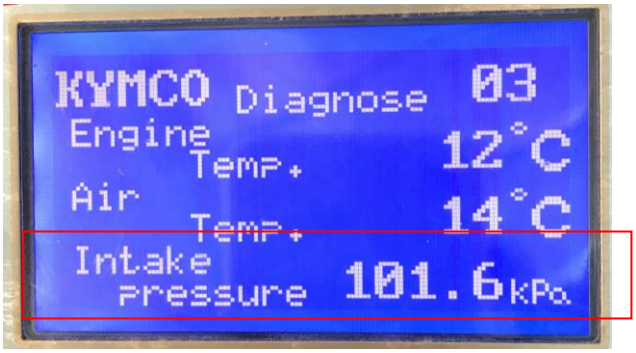
T-MAP(Manifold Air Temperature Pressure) Sensor

Connect the PDA or Fi diagnostic tool.
Enter the Data Analyze
Check if the manifold pressure data is malfunction.
Turn the ignition switch to the "ON" position.
If data is incorrect, and the T-map sensor is problem.



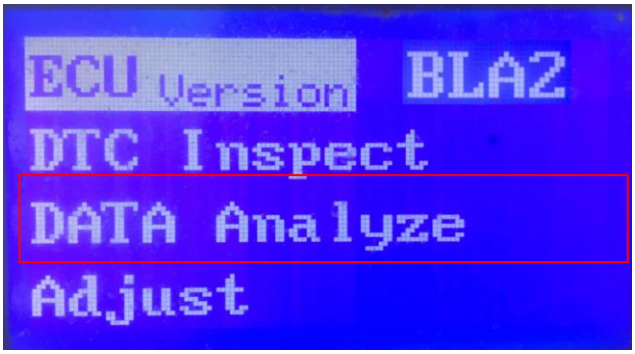
Standard : 101.3 ±3 kpa on sea altitude

The ambient pressure drop is about **12Kpa** according to the altitude raises.



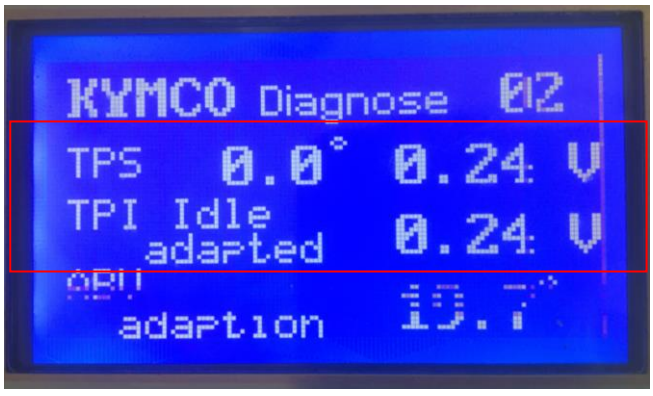
TPS (Throttle Position Sensor)

Enter the Data Analyze
Check if the TPS position data is malfunction.
Turn the ignition switch to the "ON" position.
If data is incorrect even the Idle and throttle fully, the TPS is problem.



Standard :

Idle ~0 °	0.23V ±0.05
Throttle fully ~90 °	> 3.27V



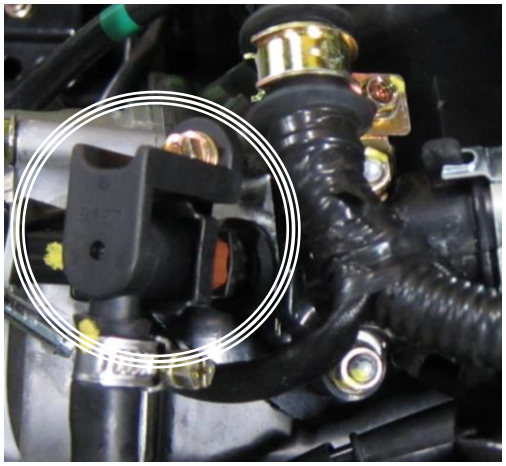
ETS (Engine Temperature Sensor)

Connect the meter (+) probe to the V/G wire and the meter (-) probe to the G/L wire to measure the voltage

Standard : 5±0.25 V

Measure the resistance of the WTS

Standard (25℃): 10--12kΩ



INJECTOR

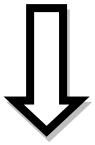
Measure the resistance of the Injector
Standard (20°C/68°F): 10.6~15.9Ω

O2 SENSOR

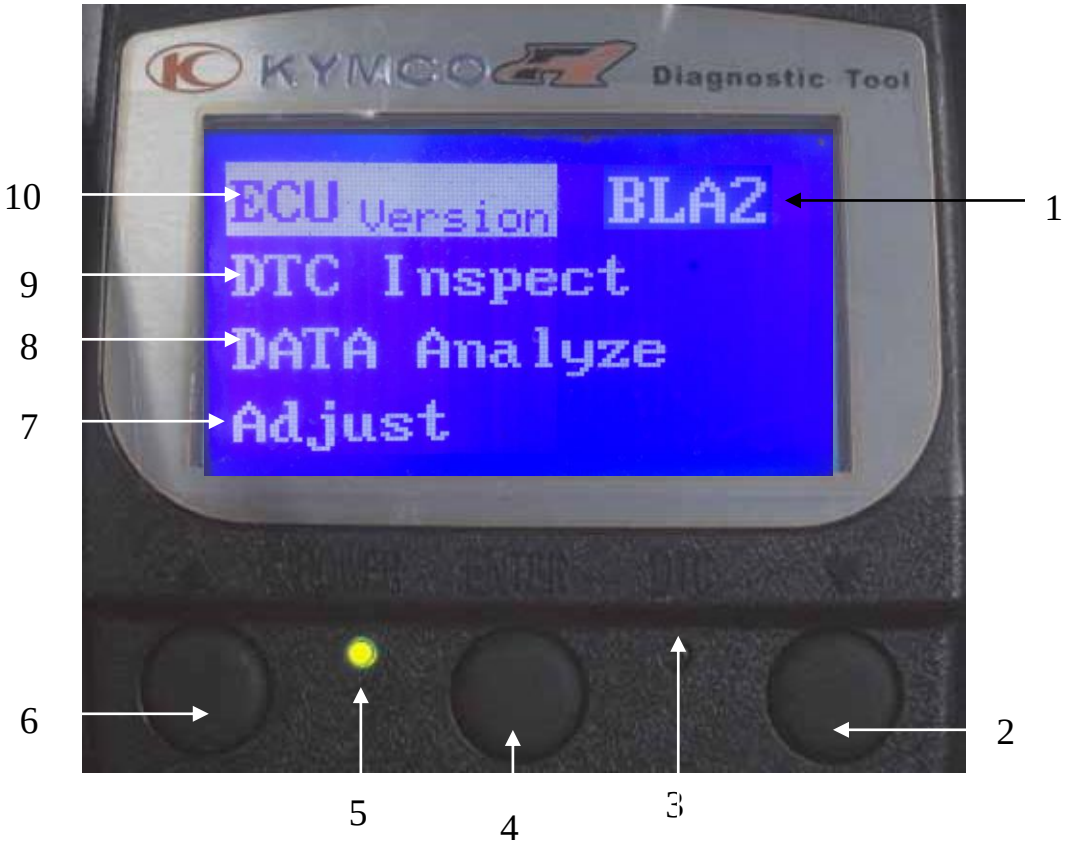
Measure the resistance of the O2 sensor heater. (2 white wire pin)

Standard (20℃/68℉): 6.7 ~9.5Ω

Connect the PDA or KYMCO Fi diagnostic tool.
Enter the Data Analyze
Check Page 05
Turn the ignition switch to the "ON" position.
Starting engine till the O2 heater activation is ON.
If data is incorrect, the O2 sensor is problem.



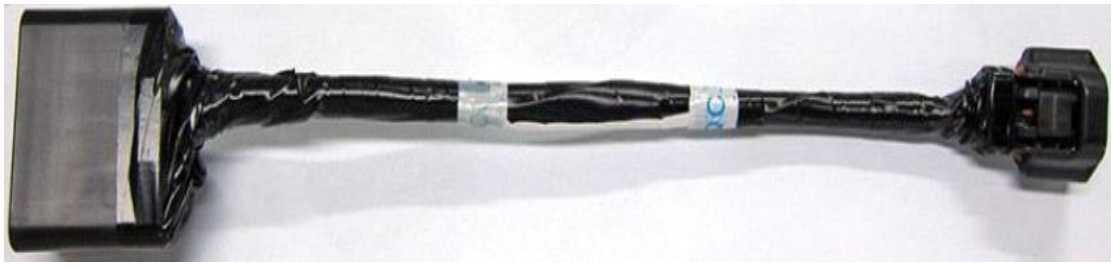
Fi Diagnostic Tool
Operation Instructions
Part No. 3620A-LEB2-E00



1 Model No.
2 Down Button
3 DTC indicator (Failure codes)
4 Enter or Exit
5 Power indicator
6 UP Button
7 Adjust (TPI and ABV reset function)
8 DATA Analyze
9 DTC Inspect
10 ECU Version

Note: For EURO 5 models

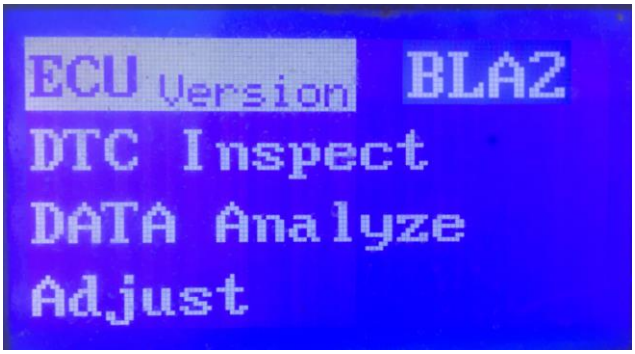
Use the Sub cord, OBD diagnostics, connecter (part number:36205-LFA7- E00) to connect between vehicle and diagnostic tool.



DTC INSPECTION

Connect Fi diagnostic tool with the connector of harness wire located beside the Battery.

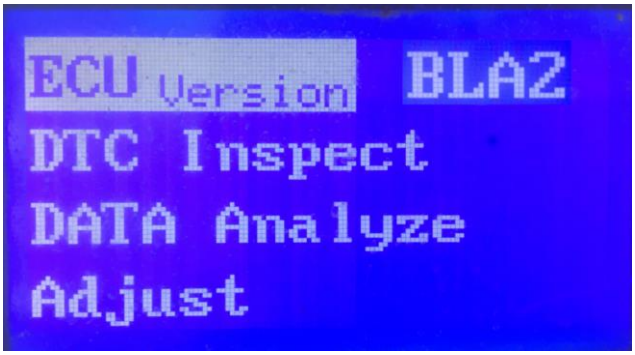
Press the " Enter " button



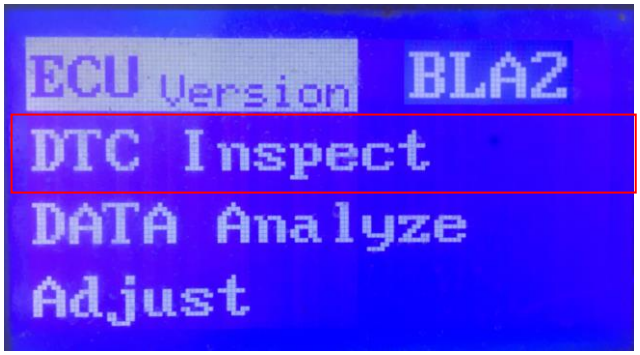
Check the software version

Press the " Enter " button and then turn to the first page.

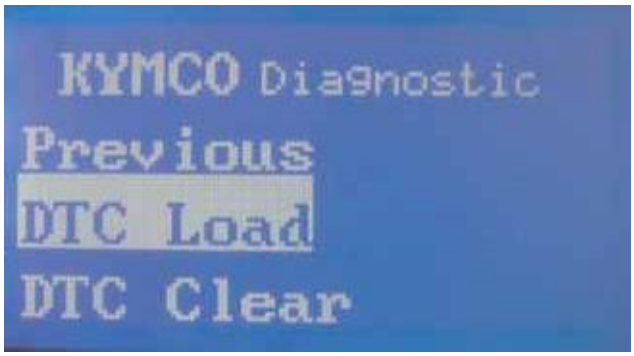
Press the " Down " button to enter the DTC Inspect.



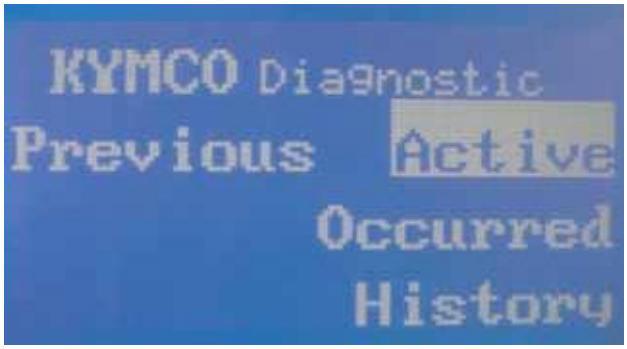
Press the " Enter " button to check the DTC number



Press the " Enter " button



Press the " Enter " button

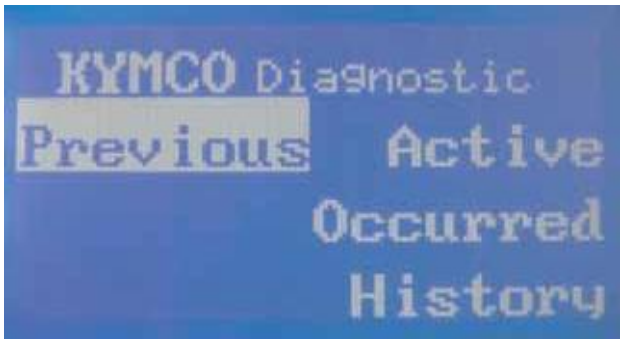


Display the DTC number of the DTC-List. Refer to DTC summary list.

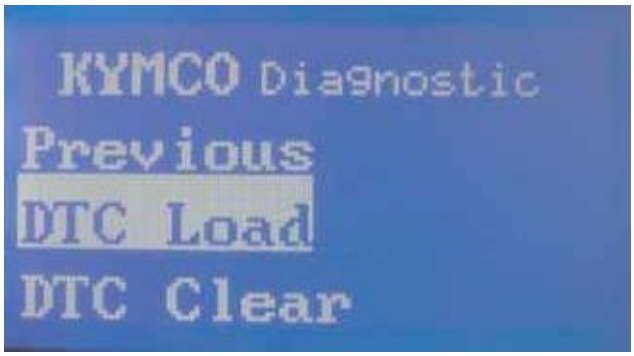
Press the " Enter " button and then turn to the previous page

Press the " UP " button

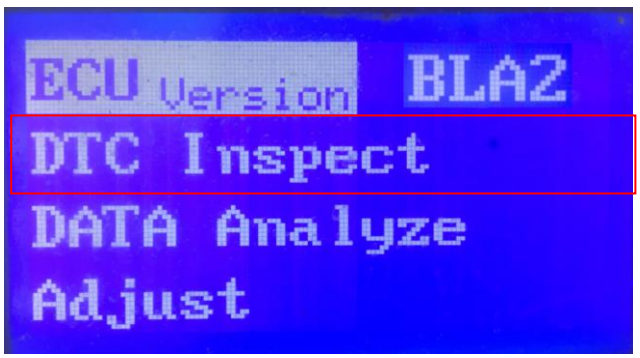
Press the " Enter " button and then turn to thee previous page.



Press the " UP " button



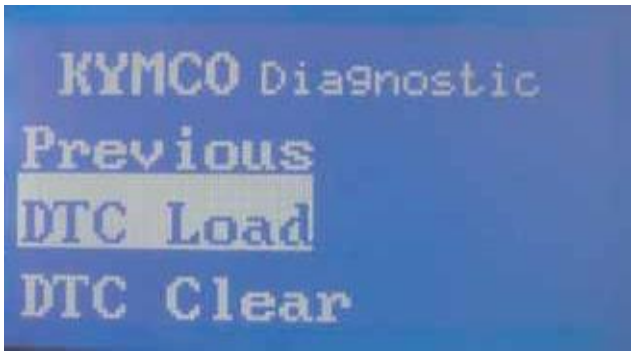
Press the " Enter " button and then turn to the first page.



DTC CLEAR PROCEDURE

Choose " Load DTC "

Press the " Down " button



Press the " Enter " button

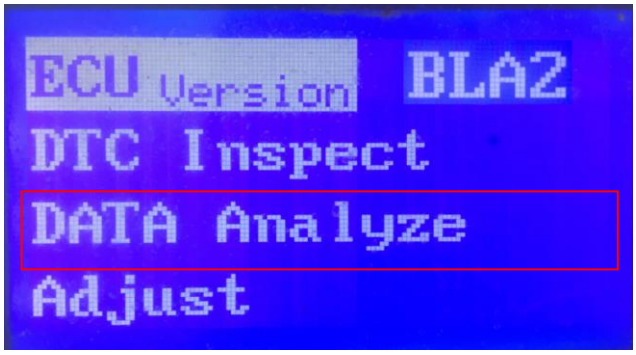
The DTC indicator is lighting at that time.

Clearing DTC until the DTC indicator is off.

DATA ANALYSIS

Choose " Data Analyze "

Press the " Enter " button to enter page 01.



The figure includes the engine speed, idle speed and the battery voltage.

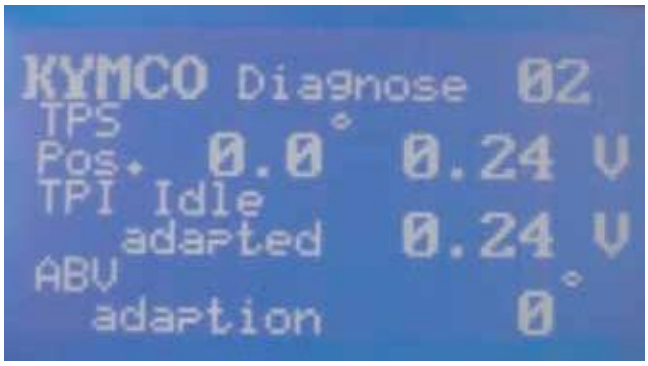
Refer to standard specification.

Press the " Down " button to enter page 02.

The figure includes TPS position, TPI idle adapted voltage and TPI WOT adapted (Throttle grip fully opened).

Refer to standard specification.

Press the " Down " button to enter page 03.

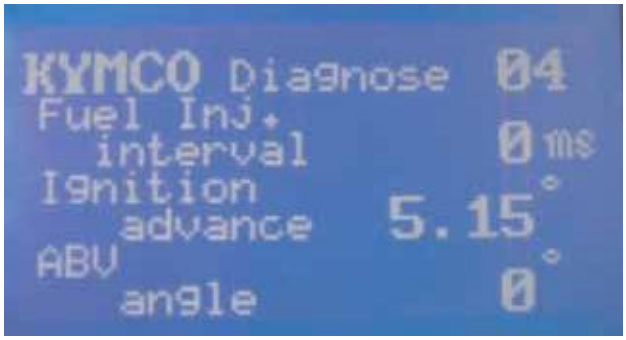


The figure includes engine working temperature, atmosphere pressure and Manifold pressure.

Refer to standard specifications on page 18-9.

Press the " Down " button to enter page 04.

The figure includes fuel injector interval, ignition advance angle and ABV angle. Refer to standard specification. Press the "Down" button to enter page 05.



The figure includes O2 sensor voltage,O2 heater working condition and O2 correction.

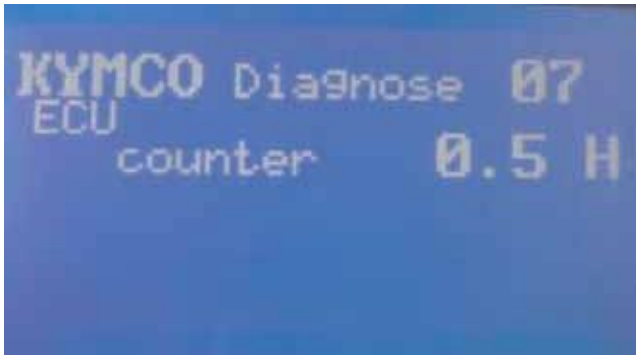
Refer to standard specification.

Press the " Down " button to enter page 06.

Press the " Down " button to enter page 07.

The figure includes ECU counter hours.

Press the " UP " button to the first page.



5. FUEL INJECTION SYSTEM

Reason of repair: □Maintenance □Breakdown				
Item		Data	Reference	Memo
ECU Version	ECU No			
	Hardware Ver			
	Software Ver		QK0A50	
	Calibration Ver		E5BLA2EUAA	
	Model Name		BLA2	
DTC	Active			
	Occurred			
	History			
(Cool Engine) Engine Stop	Air Temp.(°C)		environ.temp ± 2 °C	
	Engine Temp.(Cooling)		environ.temp ± 2 °C	
	Atom. Pressure (Kpa.)		101.3 ± 3 kPa	The ambient pressure drop about 12kpa at the altitude every 1000m raised
	Throttle Position (%)		Below2.5° / over90°	
	Throttle Position (V)	0.23V ± 0.05 / >3.27		IDLE/Throttle fully
	TPI Idle Mean (V)		0.23±0.05	IDLE/Throttle fully
	Battery Volt (V)		>12 V	
	Idle Speed Set point (RPM)		---	
	ISCAdapMean (°)		---	
	Accumulated Eng. Run Time (Hr)		---	
(Hot Engine) Before Repair	EngineSpeed IDLE(rpm)		2000 ± 100 rpm	
	MAPSample (kPa)		52 ~ 68 kpa	
	Injection duration (ms)		1.4 ~ 2. 5ms /1. 7~3ms(cold)	
	Ign. Advance (°)		3 ~ 20 BTDC	
	Air Temp.(°C)		environ.temp ±2 °C	
	Engine Temp. (°C)		>110 °C/>70°C(winter)	
	O^2 sensor voltage (V)		0 ~ 1 V	
	O^2 sensor heater (Yes/no)		YES	
	O^2 sensor correct		±20%	
	ABVAngDurMech (°)		＜140 °	>140 ° The scooter with exchang engine oil and clean throttly body >180 ° The scooter must clean throttly body
(Hot Engine) After Repair	EngineSpeed IDLE(rpm)		2000 ± 100 rpm	80~90°C
	MAPSample (kPa)		52 ~ 68 kpa	80~90°C
	Injection duration (ms)		1.4 ~ 2. 5ms /1. 7~3ms(cold)	80~90°C
	Ign. Advance (°)		3 ~ 20 BTDC	80~90°C
	Air Temp.(°C)		environ.temp ±2 °C	
	Engine Temp. (°C)		>110 °C/>70°C(winter)	
	O^2 sensor voltage (V)		0 ~ 1 V	
	O^2 sensor heater (Yes/no)		YES	
	O^2 sensor correct		±20%	
	ABVAngDurMech (°)		＜140 °	>140 ° The scooter with exchang engine oil and clean throttly body >180 ° The scooter must clean throttly body
Repair description			Repair Process	

FUEL INJECTION SYSTEM (E5+)

SYSTEM DIAGRAM ..... 5 - 1
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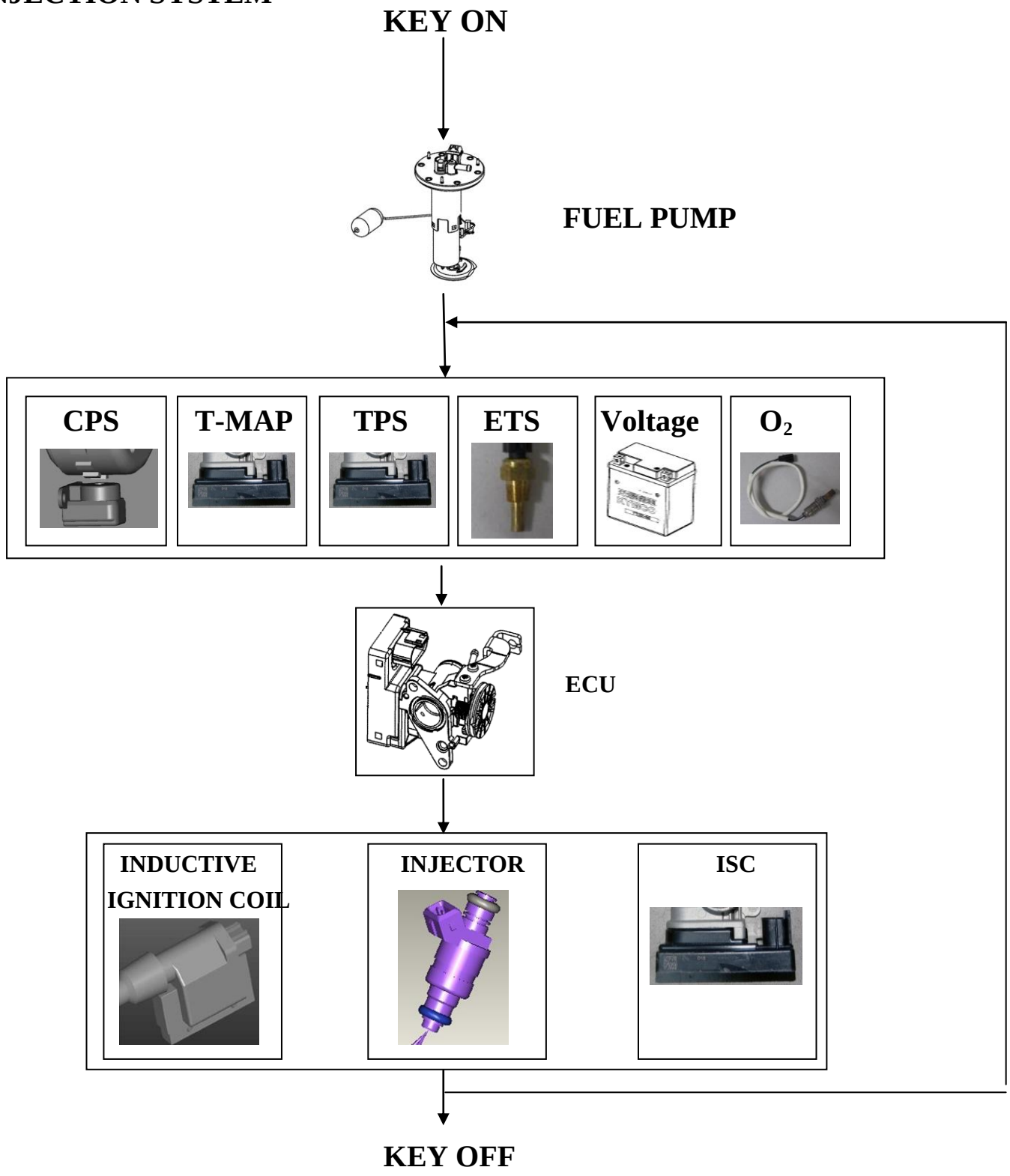
CHECK ENGINE LAMP (CELP) ..... 5 - 5
FAILURE CODES CHART ..... 5 - 6
FI DIAGNOSTIC TOOL ..... 5 - 9
DIAGNOSTIC REPORT 5-11

5. FUEL INJECTION SYSTEM

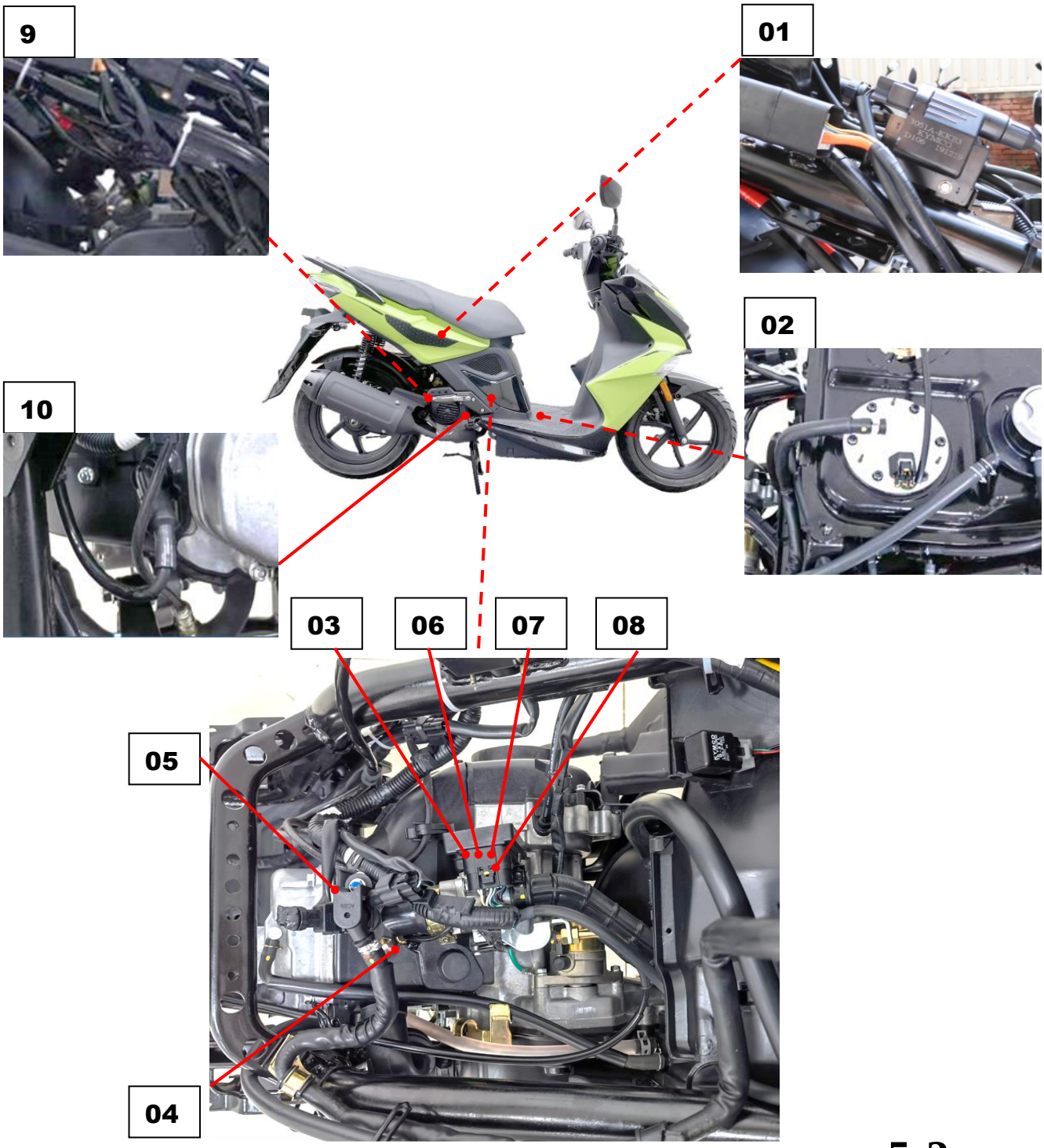
INJECTION SYSTEM



5. FUEL INJECTION SYSTEM

Parts Location

01:Inductive Ignition coil
02:Fuel pump
03:ECU
04: ETS sensor
05: Fuel Injector
06:T-MAP sensor
07:ISC
08:TPS
09:CPS
10:O_2 sensor



SERVICE INFORMATION

GENERAL INSTRUCTIONS

* Gasoline is very dangerous. When working with gasoline, keep sparks and flames away from the working area.
Gasoline is extremely flammable and is explosive under certain conditions. Be sure to work in a well-ventilated area.

- Disconnect the cables of the battery when the engine is running, which could lead to ECU damage.
- Connect the harness positive (+) cable to the battery negative (-) terminal or connect the harness negative (-) to the battery positive (+) terminal, which could lead to ECU damage.
- Always keep fuel over 750 cc in fuel tank.

SPECIFICATIONS

Item			Standard
Charging voltage of battery			13.5 ~ 14.5V
Voltage from the ECU to sensor			5±0.1V
Fuel injector resistance (20℃/68℉)			12±0.6Ω
Engine temperature sensor resistance			11.529±10% kΩ(25℃)
Throttle position sensor voltage			Idle (0°/ 0.51±0.1V) Throttle fully (90°/3.85V over)
Fuel pump pressure			2.5bar
Fuel unit resistance (20℃/68℉)			F: about 100Ω E: about 1100Ω
O2 sensor	O2 sensor heater resistance		15Ω
	Voltage	Air/Fuel<14.7 (Rich)	>0.7V
		Air/Fuel>14.7 (Lean)	<0.18V
Crank position sensor (Pulser) resistance			107 ~ 119Ω
Inductive ignition coil resistance (20℃/68℉)			0.60 ~ 0.66Ω
Idle speed			2000 ±100 rpm

TROUBLESHOOTING

Engine won't start

- Battery voltage too low
- Fuel level too low
- Pinched or clogged fuel hose
- Faulty fuel pump operating system
- Clogged fuel filter (fuel pump)
- Clogged fuel injector
- Faulty spark plug or wrong type
- Cut by ECU due to angle detect sensor or incorrect function

Backfiring or misfiring during acceleration

- Ignition system malfunction

Poor performance (drive ability) and poor fuel economy

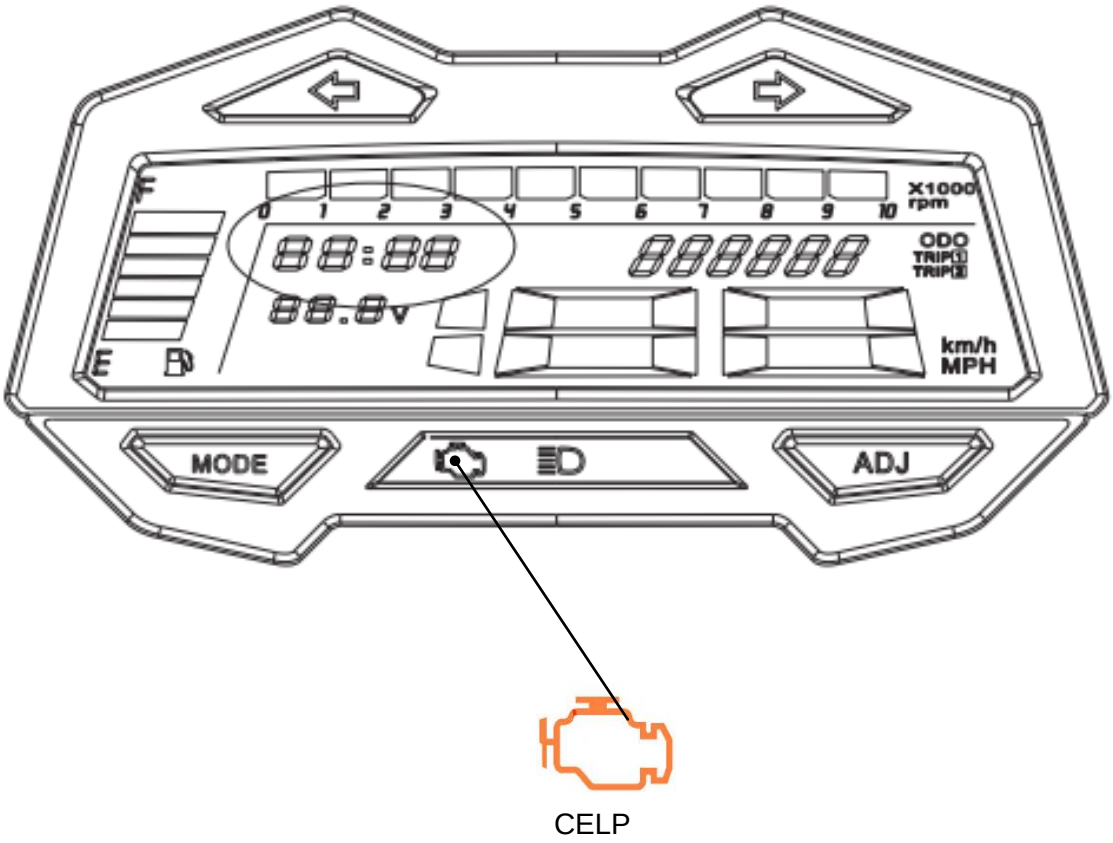
- Pinched or clogged fuel hose
- Faulty fuel injector

Engine stall, hard to start, rough idling

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted

CHECK ENGINE LAMP (CELP)

Open the Ignition switch, the CLEP indicator will illuminate always.
After starting it will crush out.
If there is any malfunction,
the CLEP indicator will still illuminate,
please take your scooter to a KYMCO dealer for service as soon as possible.



CELP

Failure Code Chart

No	Diagnose code	Failure Code	Pcode	
1	D1	B0099	B0099 Roll sensor Voltage High	
2	F0	C0064	C0064 Roll sensor malfunction	
3	A1	P0030	P0030 O2 sensor heater malfunction	
4	A2	P0031	P0031 O2 sensor heater Voltage Low	
5	A3	P0032	P0032 Lambda sensor heater Voltage High	
6	A4	P0105	P0105 MAP sensor malfunction	
7	A5	P0107	P0107 MAP sensor Voltage Low	
8	A6	P0108	P0108 MAP sensor Voltage High	
9	A7	P0110	P0110 Intake air temperature sensor malfunction or Voltage High	
10	A8	P0111	P0111 Intake air temperature circuit malfunction	
11	A9	P0112	P0112 Intake air temperature sensor Voltage Low	
12	D6	P0113	P0113 Intake air temperature sensor Voltage High	
13	AA	P0114	P0114 Intake air temperature intermittent failure	
14	AB	P0115	P0115 Engine Temperature Sensor malfunction or Voltage High	
15	AC	P0117	P0117 Engine Temperature Sensor Voltage Low	
16	AD	P0118	P0118 Engine Temperature Sensor Voltage High	
17	AE	P0119	P0119 Engine Temperature intermittent failure	
18	AF	P0120	P0120 Throttle Position Sensor malfunction or Voltage Low	
19	B0	P0121	P0121 Throttle position sensor adaptation is out of range	
20	B1	P0122	P0122 Throttle Position Sensor Voltage Low	
21	B2	P0123	P0123 Throttle Position Sensor Voltage High	
22	B3	P0124	P0124 Difference between the two last TPS acquisitions is out of range	
23	B4	P0130	P0130 O2 sensor signal malfunction	
24	B5	P0131	P0131 O2 sensor signal Voltage Low	
25	B6	P0132	P0132 O2 sensor signal Voltage High	
26	D7	P0171	P0171 System over lean or over rich (Too Lean)	
27	D8	P0172	P0172 System over lean or over rich (Too Rich)	
28	B7	P0200	P0200 Injection malfunction	
29	DA	P0201	P0201 Injection valve malfunction	
30	B8	P0217	P0217 Engine over temperature condition	
31	B9	P0219	P0219 CVT overspeed detected	
32	BA	P0230	P0230 Fuel pump malfunction	
33	BB	P0231	P0231 Fuel pump Voltage Low	
34	BC	P0232	P0232 Fuel pump Voltage High	
35	BD	P0260	P0260 Injection valve malfunction	
36	BE	P0261	P0261 Injection valve Voltage Low	
37	BF	P0262	P0262 Injection valve Voltage High	

38	BE	P0264	P0264 Injection valve Voltage Low	
39	BF	P0265	P0265 Injection valve Voltage High	
40	C0	P0335	P0335 Crankshaft sensor malfunction	
41	C1	P0350	P0350 Ignition malfunction or Voltage Low	
42	C2	P0351	P0351 Ignition Voltage High	
43	DB	P0412	P0412 Secondary air injection system malfunction	
44	C3	P0480	P0480 Fan Relay/Circuit malfunction	
45	F1	P0484	P0484 Fan Relay/Circuit Voltage High	
46	F2	P0485	P0485 Fan Relay/Circuit Voltage Low	
47	DE	P0500	P0500 Vehicle Speed Sensor malfunction	
48	D9	P0501	P0501 Vehicle Speed Sensor malfunction	
49	C4	P0505	P0505 ISAV idle speed actuator valve malfunction	
50	C5	P0508	P0508 ISAV idle speed actuator valve Voltage Low	
51	C6	P0509	P0509 ISAV idle speed actuator valve Voltage High	
52	DF	P0511	P0511 ISC stepper mortor malfunction	
53	F3	P0560	P0560 Battery voltage VBK malfunction	
54	F4	P0561	P0561 Battery voltage VBK malfunction	
55	C7	P0562	P0562 Battery voltage VBK too Low	
56	C8	P0563	P0563 Battery voltage VBK too High	
57	DC	P0603	P0603 ECU memory error	
58	F7	P0615	P0615 Starter Relay malfunction	
59	F8	P0616	P0616 Starter Relay Voltage Low	
60	F9	P0617	P0617 Starter Relay Voltage High	
61	C9	P0650	P0650 MIL Voltage High	
62	CA	P0700	P0700 Engine overspeed detected	
63	CB	P1110	P1110 Roll sensor Voltage High	
64	CC	P1111	P1111 Roll sensor malfunction or Voltage Low	
65	DD	P1205	P1205 MAP sensor malfunction	
66	CD	P1410	P1410 AISV system break down	
67	E0	P1505	P1505 ISC system malfunction	
68	E1	P1521	P1521 VACS Valve circuit malfunction	
69	CE	P1630	P1630 Roll sensor curcuit malfunction	
70	CF	P2187	P2187 Lambda control too High	
71	D0	P2188	P2188 Lambda control too Low	
72	D4	P2300	P2300 Ignition malfunction or Voltage Low	
73	D5	P2301	P2301 Ignition malfunction or Voltage High	
74	D4	P2303	P2303 Ignition malfunction or Voltage Low	
75	D5	P2304	P2304 Ignition malfunction or Voltage High	
76	D3	P263A	P263A MIL Voltage Low	
77	D2	P263B	P263B MIL Voltage High	
78		C006A	C006A Accelerometer identifier diagnosis Failure of self test	

79		P0106	P0106 Stuck MAP signal	
80		P0116	P0116 TCO out of range	
81		P0133	P0133 Oxygen sensor switching time monitoring Implausible oxygen sensor switching time	
82		P0134	P0134 Lambda sensor diagnosis Open signal	
83		P0135	P0135 Lambda sensor heater plausibility diagnosis Lambda sensor heater implausible operation	
84		P016B	P016B Lambda controller Excessive positive deviation of lambda controller	
85		P016C	P016C Lambda controller Excessive negative deviation of lambda controller	
86		P0300	P0300 Multiple misfire A diagnosis	
87		P0313	P0313 Misfire fuel tank low	
88		P0314	P0314 Misfire A diagnosis	
89		P0336	P0336 Crankshaft wrong tooth number diagnosis Additional CRK tooth detected	
90		P0339	P0339 Crankshaft sensor Additional edges inside filtering period	
91		P0410	P0410 Secondary Air Valve Plausibality diagnosis Secondary Air Valve Unplausible	
92		P0413	P0413 Secondary air valve diagnosis Open signal	
93		P0414	P0414 Secondary air valve diagnosis Signal shorted to ground	
94		P0444	P0444 Canister purge solenoid diagnosis Open signal	
95		P0458	P0458 Canister purge solenoid diagnosis Signal shorted to ground	
96		P0459	P0459 Canister purge solenoid diagnosis Signal shorted to battery	
97		P0503	P0503 Intermittent vehicle speed signal from CAN diagnosis	
98		P0519	P0519 Stepper plausibility diagnosis Implausible stepper control	
99		P0661	P0661 Variable intake pipe diagnosis Signal shorted to battery	
100		P0662	P0662 Variable intake pipe diagnosis Signal shorted to ground	
101		P0663	P0663 Variable intake pipe diagnosis Signal open	
102		P0894	P0894 CVT overspeed Transmission component slipping	
103		P2A00	P2A00 Oxygen sensor out of range	
104		U0241	U0241 Head lamp diagnosis Signal shorted to ground	
105		U1601	U1601 CAN Bus off diagnosis Bus off	
106		U1605	U1605 CAN control unit diagnosis for checked received messages Fail	
107		P0643	P0643 Reference voltage diagnosis 1 Signal shorted to battery	
108		P0608	P0608 Reference voltage diagnosis 1 Signal shorted to ground or open	

Fi Diagnostic Tool
Operation Instructions
Part No. 3620A LEB2 E00

Diagnostic version

1 Model No.
2 Down Button
3 DTC indicator (Failure codes)
4 Enter or Exit
5 Power indicator
6 UP Button
7 DATA Analyze
8 DTC Inspect
9 ECU Version

Note:

Use the sub-cord, OBD diagnostics, connecter (part number:36205-LGC6- E00) to connect between vehicle and diagnostic tool.

DTC INSPECTION

Connect Fi diagnostic tool with the connector of harness wire located beside the Battery.

* •Fi diagnostic tool is electrically After Connect Fi diagnostic tool with the connector of harness,
  •The data can only be read after the main switch is turned on

Press the " Enter " button

VERSION INSPECTION
Check the software version
Press the " Enter " button and then turn to the first page.

DTC INSPECTION
Press the " Down " button to enter the DTC Inspect.

DATA ANALYSIS INSPECTION
Press the " Down " button to enter the DTC Inspect.

5. FUEL INJECTION SYSTEM

SUPER 8 50 E5 +Diagnostic report

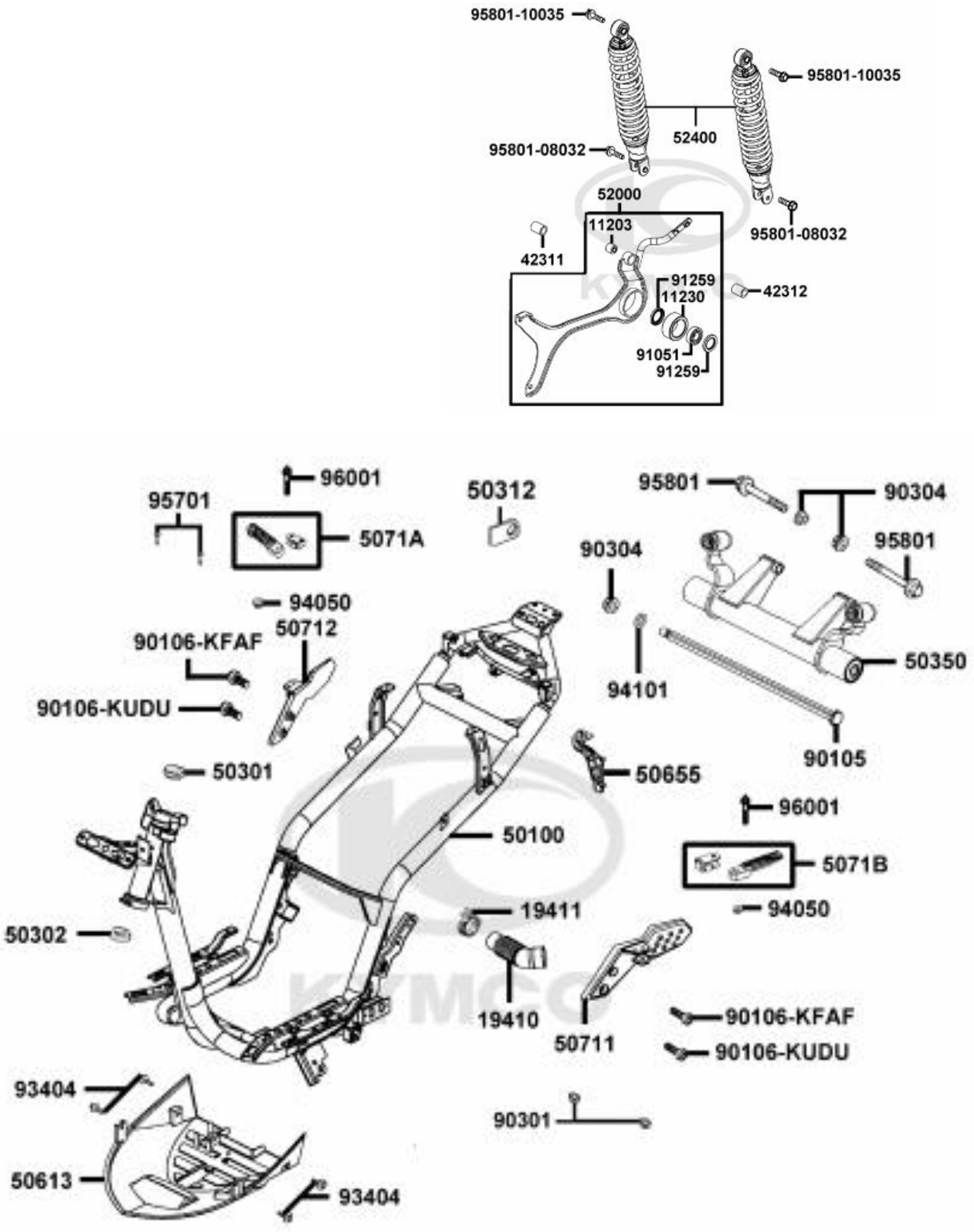
SF :	**Customer :**		**Eng. No:**
Production Date :	**Service Date :**		**Mileage :**
Reason of repair: □Maintenance □Breakdown			

	Item	Data	Reference	Memo
ECU Version	ECU No			BLA2
	Hardware Ver			
	Software Ver			
	Calibration Ver		E5BLA2EUAA	
DTC	Active			
	Occurred			
	History			
(Cool Engine) Engine Stop	Air Temp.(℃)		Environ temp ±2 ℃	
	Engine Temp.(Cooling)		Environ temp ±2 ℃	
	Atom. Pressure (kpa.)		101.3 ±3 kpa	The ambient pressure drop about 12kpa at the altitude every 1000m raised
	Throttle Position (%)		0 °/ >90 °	IDLE/Throttle fully
	Throttle Position (V)		0.51 ±0.1V / >3.85V	IDLE/Throttle fully
	TPI Idle Mean (V)		0.51 ±0.1V	
	Battery Volt (V)		>12 V	
(Hot Engine) Before Repair	Engine Speed IDLE(rpm)		2000 ±100 rpm	
	Battery Volt (V)		>13 V	
	MAPSample (kPa)		50~ 65 kpa	
	Injection duration (ms)		1.6~2.8ms	
	Ign. Advance (°)		2~16BTDC	
	Air Temp.(℃)		environ.temp ±2 ℃	
	Engine Temp. (℃)		>110℃	
	O^2 sensor voltage (V)		0 ~ 1 V	
	O^2 sensor heater (Yes/no)		YES	
	O^2 sensor correct		-14%~15%	
	ISC AngDurMech (°)		15%<ISC＜45%	>45% The scooter with exchang engine oil and clean throttly body
				>50% °The scooter must clean throttly body
(Hot Engine) After Repair	Engine Speed IDLE(rpm)		2000 ±100 rpm	
	Battery Volt (V)		>13 V	
	MAPSample (kPa)		50~ 65 kpa	
	Injection duration (ms)		1.6~2.8ms	
	Ign. Advance (°)		2~16BTDC	
	Air Temp.(℃)		environ.temp ±2 ℃	
	Engine Temp. (℃)		>110℃	
	O^2 sensor voltage (V)		0 ~ 1 V	
	O^2 sensor heater (Yes/no)		YES	
	O^2 sensor correct		-14%~15%	
	ISC AngDurMech (°)		15%<ISC＜45%	>45% The scooter with exchang engine oil and clean throttly body
				>50% °The scooter must clean throttly body

6

ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION 6-2
ENGINE REMOVAL 6-3
ENGINE INSTALLATION 6-6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50312
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90106-KFAF
90106-KUDU
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19411
94050
50302
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90106-KFAF
90106-KUDU
93404
90301
50613
93404

SERVICE INFORMATION

GENERALINSTRUCTIONS

- A jack or other adjustable support is required to support and maneuver the engine. Be careful not to damage the motorcycle body, cables and wires during engine removal.
- Use towels to protect the motorcycle body during engine removal.
- Drain the coolant before removing the engine.
- After the engine is installed,fill the cooling system with coolant and be sure to bleed air. Start the engine to check for coolant leaks.
- Before removing the engine, the rear brake caliper must be removed first. Be careful not to bend or twist the brake fluid tube.

SPECIFICATIONS

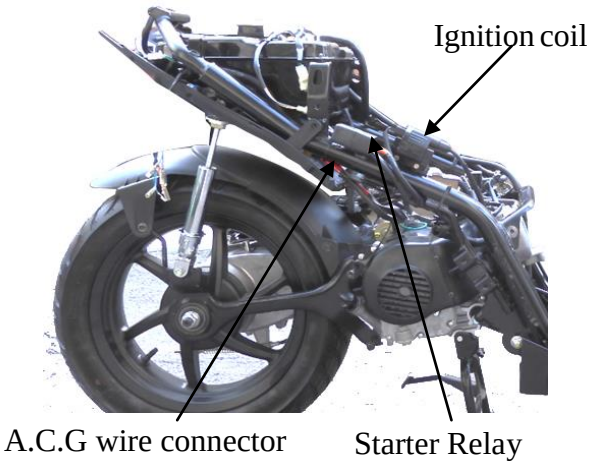
Engine oil capacity: 0.9 Liter

TORQUE VALUES

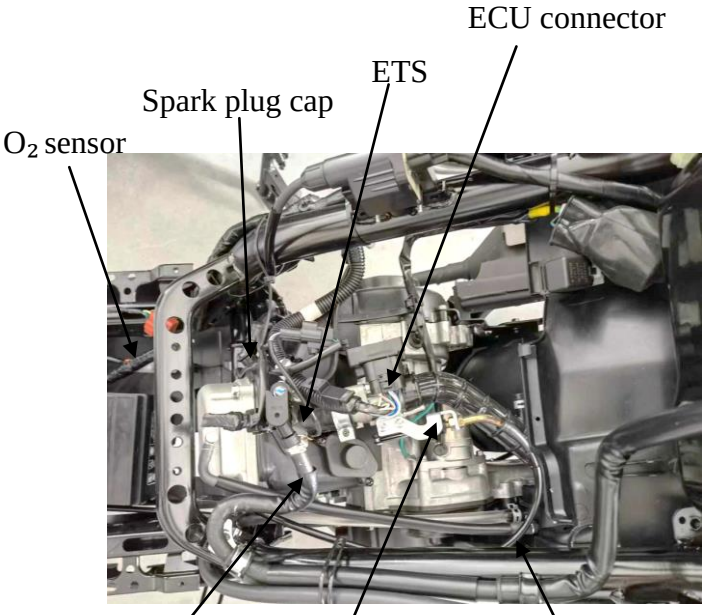
Rear shock absorber upper mount bolt	40 N-m
Rear shock absorber lower mount bolt	40 N-m
Rear axle nut	120 N-n
Engine hanger bolt (frame side)	50 N-m
Engine hanger bolt (ENG. side)	50 N-m
Rear caliper holder bolt	27 N-m
Exhaust muffler pipe nut	20 N-m
Exhaust muffler bracket bolt (attached to RR Fork)	35 N-m
Rear fork bolt (attached to ENG case)	32 N-m

ENGINE REMOVAL

Remove the frame body cover(2-4/5).
Disconnect the battery negative cable.
Disconnect the engine negative cable.
Disconnect the A.C. Generator wire connector.
Disconnect the starter motor cable from the starter relay.

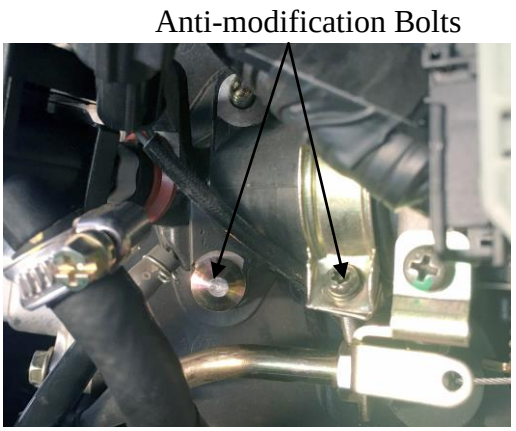


Remove the spark plug cap.
Remove the ignition coil'swire.
Remove the O2 sensor wire.



Disconnect the ECU connector
Disconnect the engine temperature sensor connector.
Remove the injector's wire.
Remove the throttle cable.
Remove the vacuum tube.
Remove the Crankcase Breather Tube.
Remove the fuel tube attaching to injector.

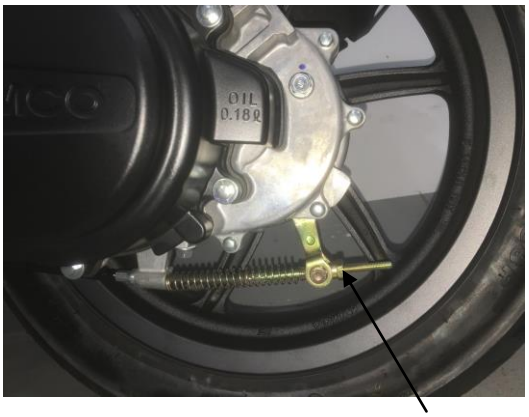
There are two Anti-modification Bolts attaching to the throttle body.If you to remove the throttle body or ECU,you need special tools as below.



Remove the air cleaner

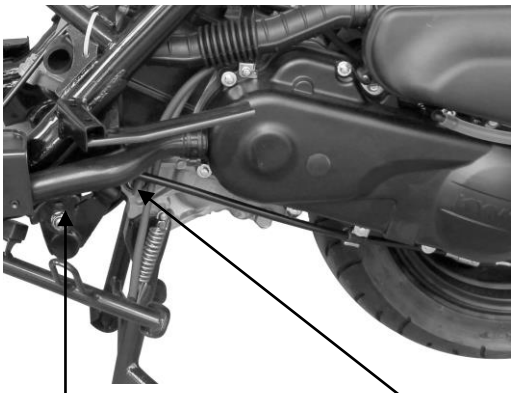
Remove the exhaust muffler(2-6)

Remove the rear brake caliper.
Remove one bolt attaching to rear brake hose clamps.



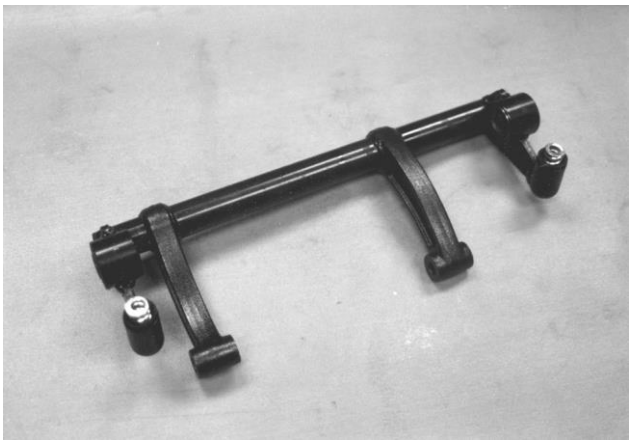
Remove the right and left rear shock absorbers mounting bolts.

Remove the engine mounting bolt and pull out the engine with the engine hanger bracket backward.



ENGINE HANGER BRACKET REMOVAL

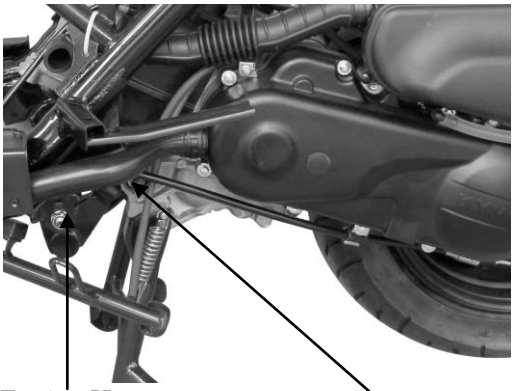
Remove the engine hanger bracket bolt and nut.
Remove the engine.
Inspect the engine hanger bushings and stopper rubbers for wear or damage.



ENGINE HANGER BRACKET

INSTALLATION

Install the engine hanger bracket to the engine.
Install and tighten the engine hanger bracket bolts.

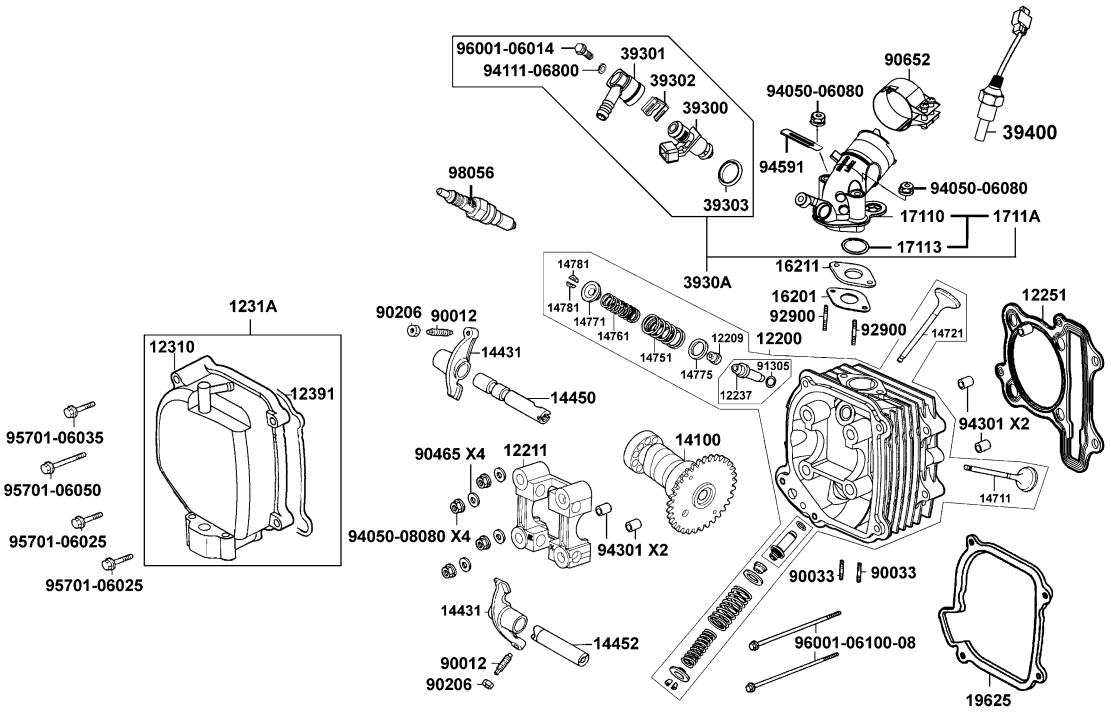


ENGINE INSTALLATION

Install the engine and tighten the engine mounting bolts.
Torque: 5.0kg-m
Tighten the rear shock absorbers mounting bolts.
Torque: Up side 4.0kg-m
Down side 2.5kg-m
Install the removed parts in the reverse order of removal.

✳ **Tire pressure should be checked when tires are cold.**

After installation, inspect and adjust the following:
Throttle grip free play (⇨3-3)


96001-06014
39301
94111-06800
39302
39300
39303
90652
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39400
94591
98056
94050-06080
17110
1711A
17113
3930A
16211
16201
92900
92900
14721
12251
14781
14781
14771
14761
14751
12209
12200
14775
91305
12237
1231A
12310
12391
90206
90012
14431
14450
95701-06035
95701-06050
95701-06025
95701-06025
90465 X4
12211
14100
94050-08080 X4
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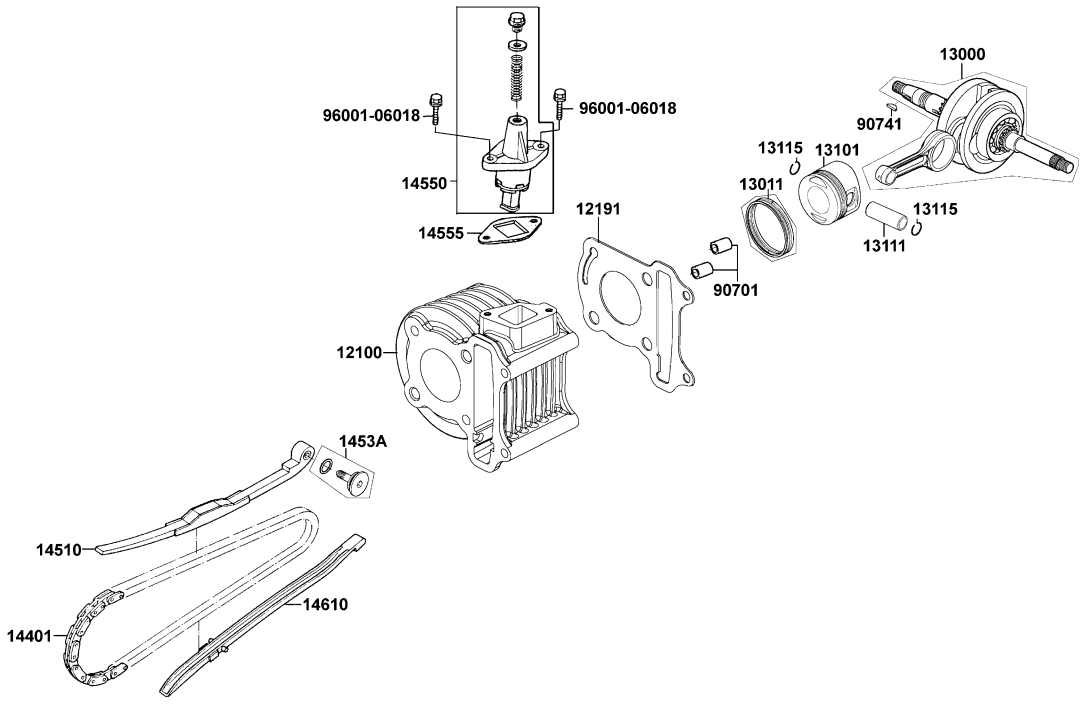
19625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7

7. CYLINDER HEAD/VALVES

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SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder head can be serviced with the engine installed in the frame.
- When assembling, apply molybdenum disulfide grease or engine oil to the valve guide movable parts, valve arm and camshaft sliding surfaces for initial lubrication.
- The camshaft is lubricated by engine oil through the cylinder head engine oil passages. Clean and unclog the oil passages before assembling the cylinder head.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- After removal, mark and arrange the removed parts in order. When assembling, install them in the reverse order of removal.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Valve clearance (cold)	IN	0.10	—
	EX	0.10	—
Cylinder head compression pressure		14kg/cm²	
Cylinder head warpage		—	0.05
Camshaft cam height	IN	25.706	25.306
	EX	25.564	25.164
Valve rocker arm I.D.	IN	10.000～10.015	10.10
	EX	10.000～10.015	10.10
Valve rocker arm shaft O.D.	IN	9.972～9.987	9.91
	EX	9.972～9.987	9.91
Valve seat width	IN	1.0	1.8
	EX	1.0	1.8
Valve stem O.D.	IN	4.975～4.990	4.90
	EX	4.955～4.970	4.90
Valve guide I.D.	IN	5.000～5.012	5.03
	EX	5.000～5.012	5.03
Valve stem-to-guide clearance	IN	0.010～0.037	0.08
	EX	0.030～0.057	0.10

7. CYLINDER HEAD/VALVES

TORQUE VALUES

Cylinder head nut	1.8~2.2kgf-m	Apply engine oil to threads
Valve clearance adjusting nut	0.7~1.1kgf-m	Apply engine oil to threads

SPECIAL TOOLS

Valve spring compressor

TROUBLESHOOTING

- The poor cylinder head operation can be diagnosed by a compression test or by tracing engine top-end noises.

Poor performance at idle speed
- Compression too low

Compression too low
- Incorrect valve clearance adjustment
- Burned or bend valves
- Incorrect valve timing
- Broken valve spring
- Poor valve and seat contact
- Leaking cylinder head gasket
- Warped or cracked cylinder head
- Poorly installed spark plug

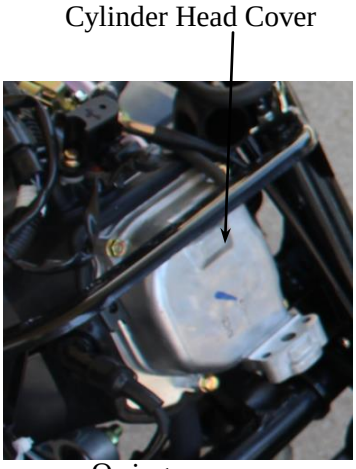
Compression too high
- Excessive carbon build-up in combustion chamber

White smoke from exhaust muffler
- Worn valve stem or valve guide
- Damaged valve stem seal

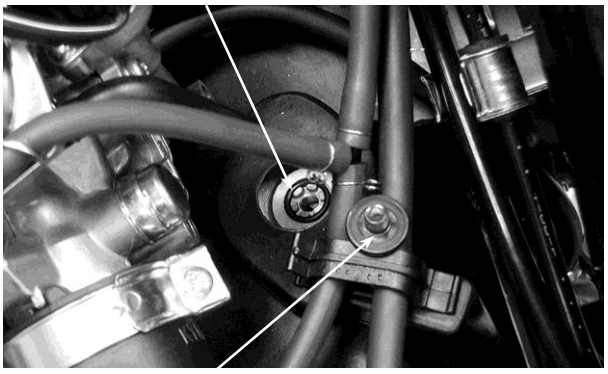
Abnormal noise
- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain guide
- Worn camshaft and rocker arm

CAMSHAFT REMOVAL

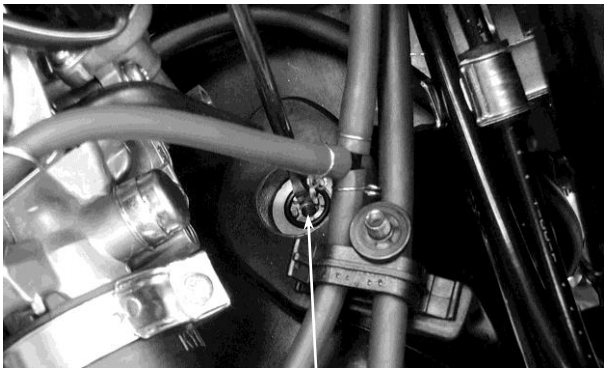
Remove the center cover.
Remove the four cylinder head cover bolts to remove the cylinder head cover.
Remove the two nuts attaching the secondary air inlet tube.



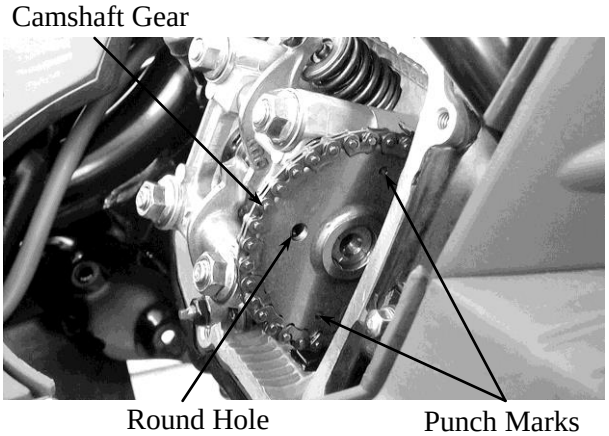
Remove the cam chain tensioner cap screw and the O-ring.



Turn the cam chain tensioner screw clockwise to tighten it.

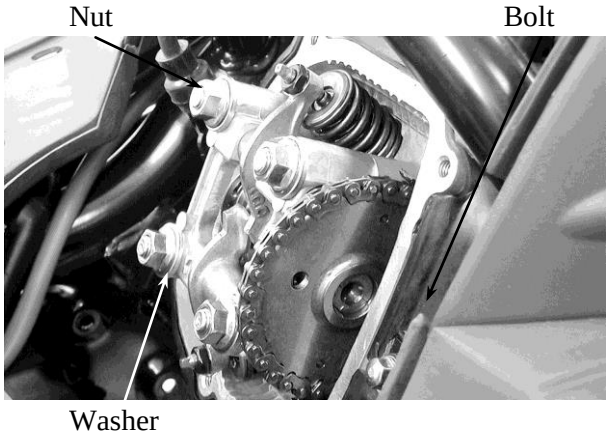


Turn the flywheel counterclockwise so that the “T” mark on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.

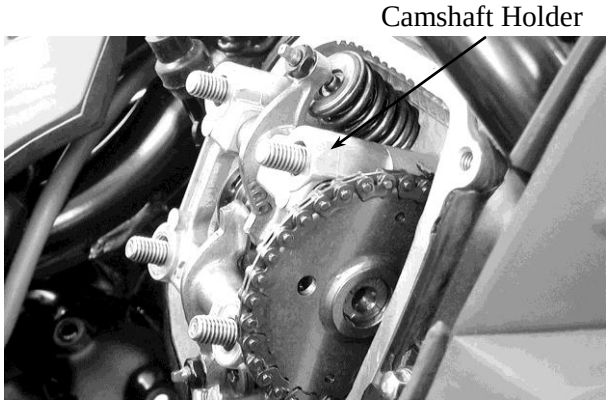


Remove the two cylinder head bolts.
Remove the four cylinder head nuts and washers.

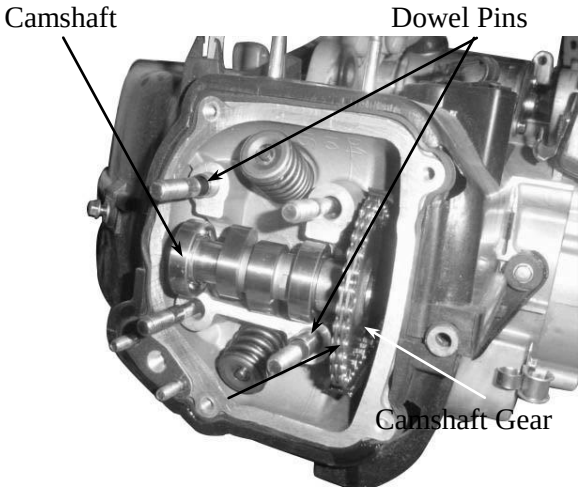
* Diagonally loosen the cylinder head nuts in 2 or 3 times.



Remove the camshaft holder and dowel pins.



Remove the camshaft gear from the cam chain and remove the camshaft.



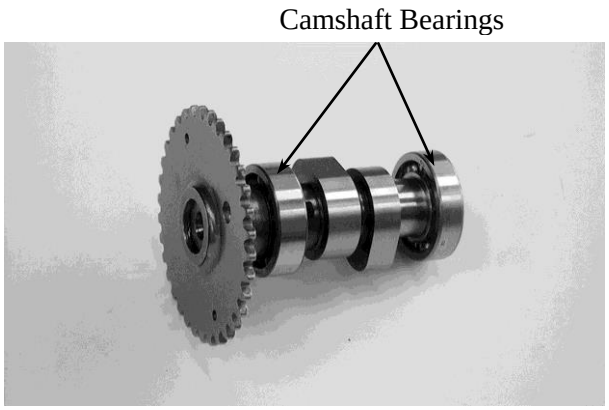
CAMSHAFT INSPECTION

Check each cam lobe for wear or damage.
Measure the cam lobe height.

Service Limits:

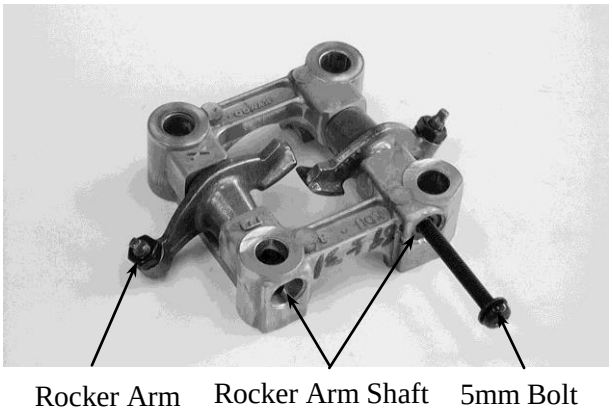
IN : 26.038mm replace if below
EX: 25.407mm replace if below

Check each camshaft bearing for play or damage. Replace the camshaft assembly with a new one if the bearings are noisy or have excessive play.



CAMSHAFT HOLDER DISASSEMBLY

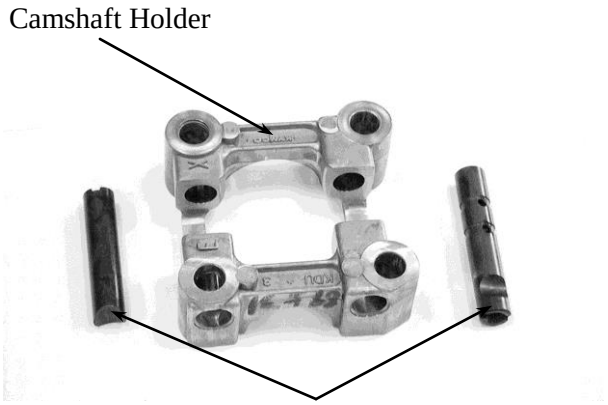
Take out the valve rocker arm shafts using a 5mm bolt.
Remove the valve rocker arms.



CAMSHAFT HOLDER INSPECTION

Inspect the camshaft holder, valve rocker arms and rocker arm shafts for wear or damage.

* If the valve rocker arm contact surface is worn, check each cam lobe for wear or damage.



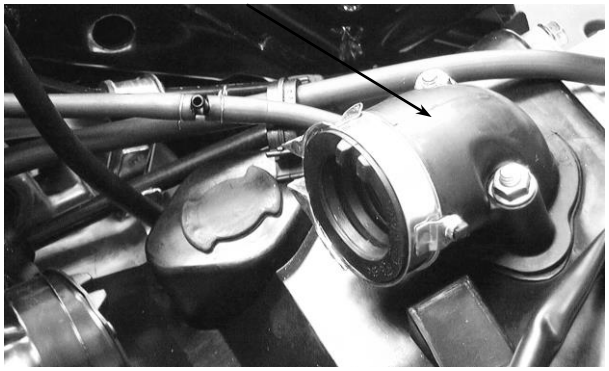
Measure the I.D. of each valve rocker arm.
Service Limits:
IN: 10.10mm replace if over
EX: 10.10mm replace if over
Measure each rocker arm shaft O.D.

Service Limits:
IN: 9.91mm replace if over
EX: 9.91mm replace if over

CYLINDER HEAD REMOVE

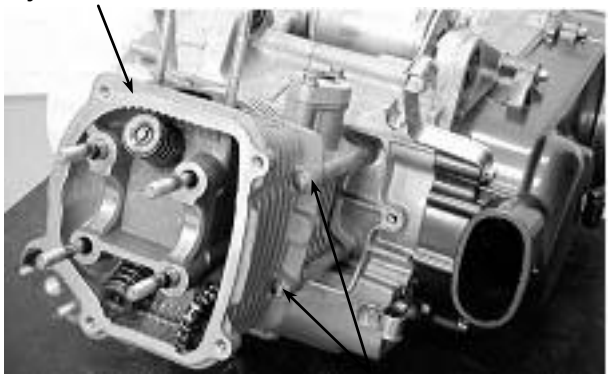
Remove the camshaft.
Remove the carburetor.
Remove the exhaust muffler.
Remove the carburetor intake manifold.
Remove the cooling fan cover.
Remove the engine cover bolts and screws.
Separate the engine cover joint claws.

Intake Manifold



Remove the cylinder head.

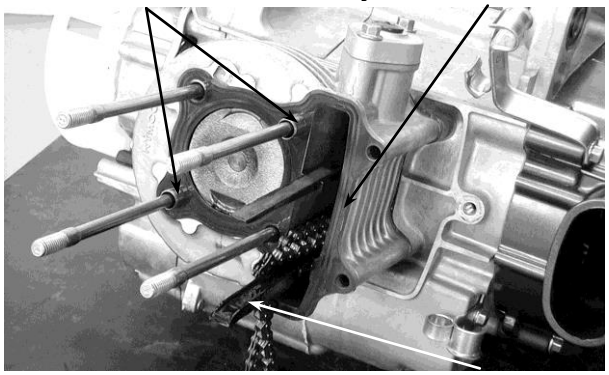
Cylinder Head



Bolts

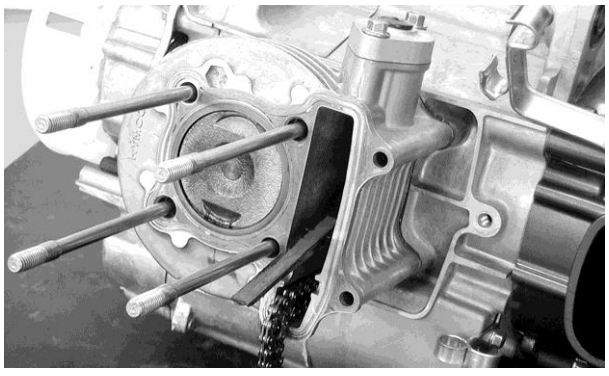
Remove the dowel pins and cylinder head gasket.
Remove the cam chain guide.

Dowel Pins Cylinder Head Gasket



Cam Chain Guide

Remove all gasket material from the cylinder mating surface.



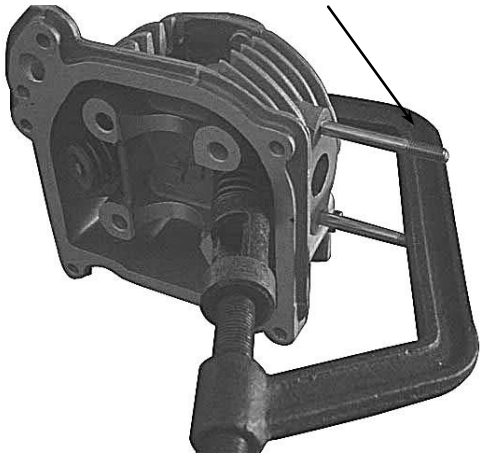
* • Avoid damaging the cylinder mating surface.
  • Be careful not to drop any gasket material into the engine.

CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, springs, spring seats and valve stem seals using a valve spring compressor.

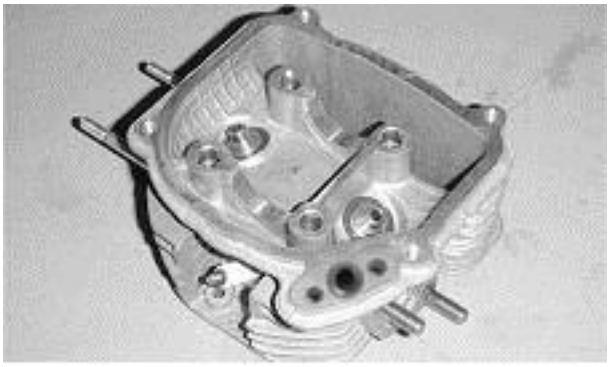
* • Be sure to compress the valve springs with a valve spring compressor.
  • Mark all disassembled parts to ensure correct reassembly.

Special
Valve Spring Compressor



Remove carbon deposits from the combustion chamber.
Clean off any gasket material from the cylinder head mating surface.

* Be careful not to damage the cylinder head mating surface.

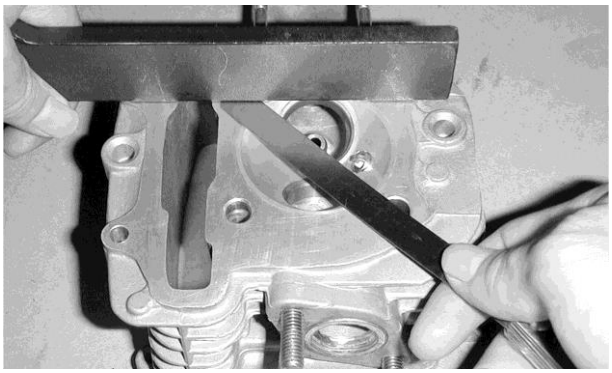


INSPECTION

CYLINDER HEAD

Check the spark plug hole and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and feeler gauge.

Service Limit: 0.05mm repair or replace if over

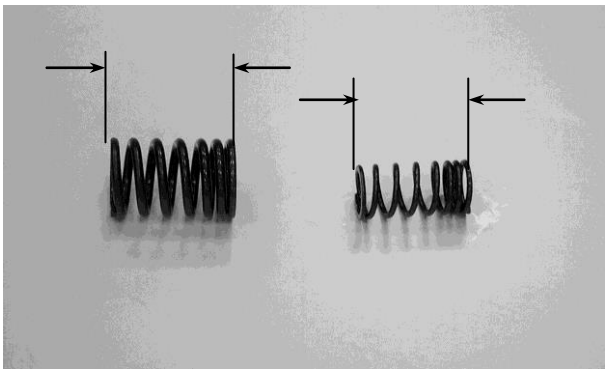


VALVE SPRING FREE LENGTH

Measure the free length of the inner and outer valve springs.

Service Limits:

Inner : 30.1mm replace if below
Outer : 33.3mm replace if below



VALVE /VALVE GUIDE

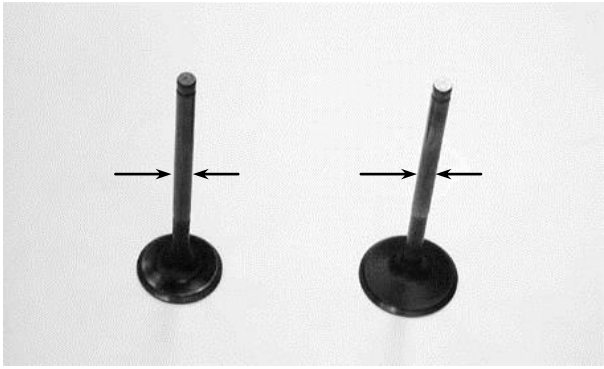
Inspect each valve for bending, burning, scratches or abnormal stem wear.
Check valve movement in the guide.

Measure each valve stem O.D.

Service Limits:

IN : 4.90mm replace if below

EX: 4.90mm replace if below



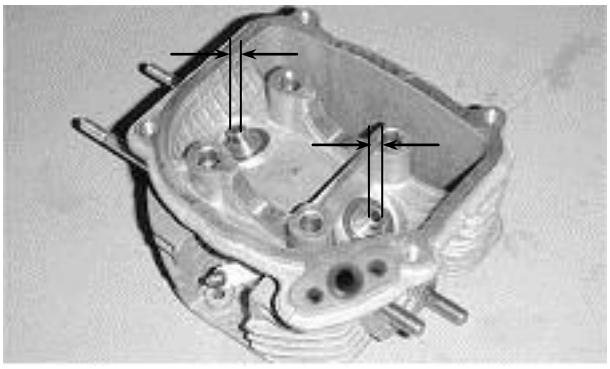
Measure each valve guide I.D.

Service Limits: IN : 5.03mm replace if over
EX: 5.03mm replace if over

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

Service Limits: IN : 0.08mm replace if over
EX: 0.10mm replace if over

* If the stem-to-guide clearance exceeds the service limits, replace the cylinder head as necessary.

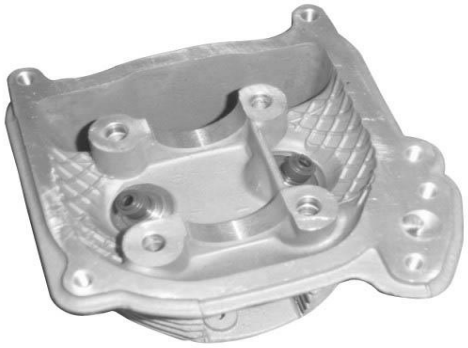


CYLINDER HEAD ASSEMBLY

Install the valve spring seats and valve stem seals.

* Be sure to install new valve stem seals.

Lubricate each valve stem with engine oil and insert the valves into the valve guides.
Install the valve springs and retainers.



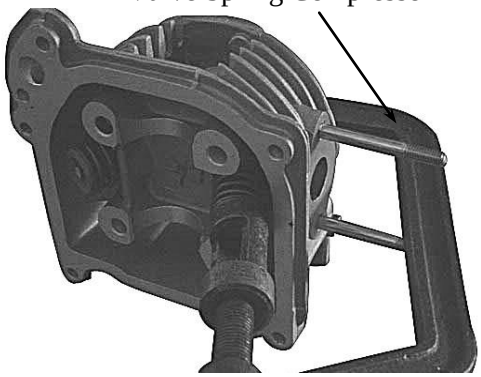
Compress the valve springs using the valve spring compressor, then install the valve cotters.

* • When assembling, a valve spring compressor must be used.
  • Install the cotters with the pointed ends facing down from the upper side of the cylinder head.

Special

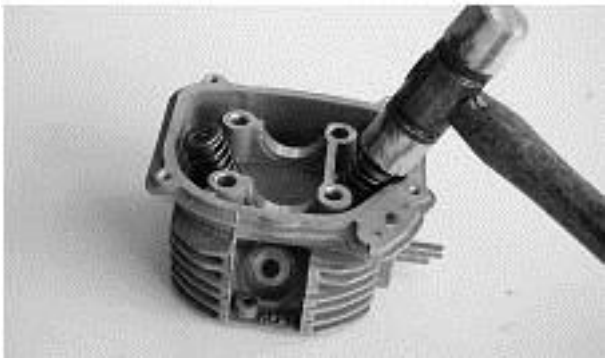
Valve Spring Compressor

Valve Spring Compressor



Tap the valve stems gently with a plastic hammer for 2～3 times to firmly seat the cotters.

* Be careful not to damage the valves.



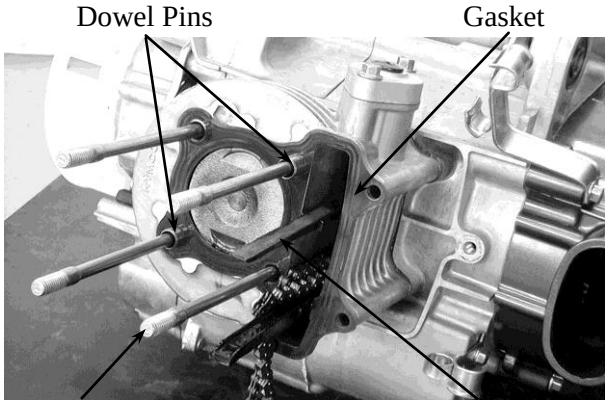
CYLINDER HEAD INSTALLATION

Tighten the four stud bolts.

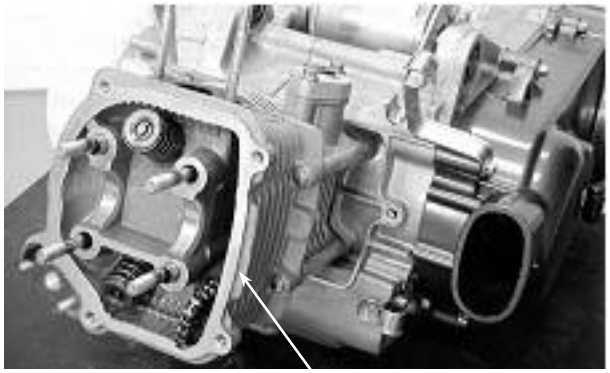
Install the dowel pins and a new cylinder head gasket.

Install the cam chain guide.

Torque: Stud Bolts :0.7～1.1kg-m



Install the cylinder head.



Cylinder Head

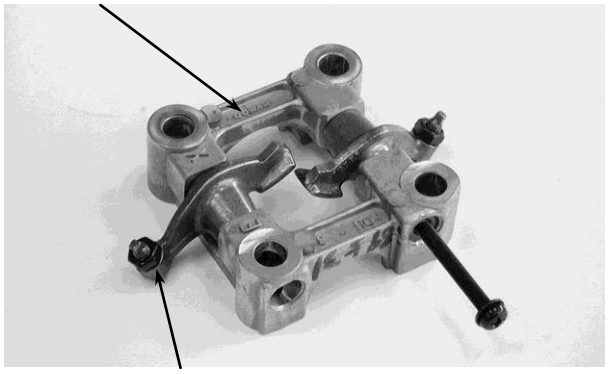
CAMSHAFT HOLDER ASSEMBLY

Install the exhaust valve rocker arm to the "EX" mark side of the camshaft holder.

Install the intake valve rocker arm and the rocker arm shafts.

* • Align the cutout on the front end of the intake valve rocker arm shaft with the bolt of the camshaft holder.
  • Align the cross cutout on the exhaust valve rocker arm shaft with the bolt of the camshaft holder.

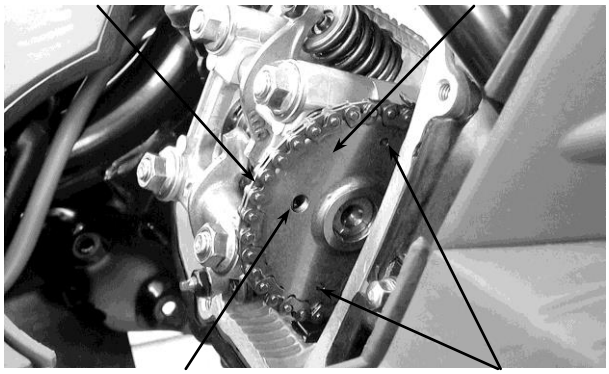
Camshaft Holder



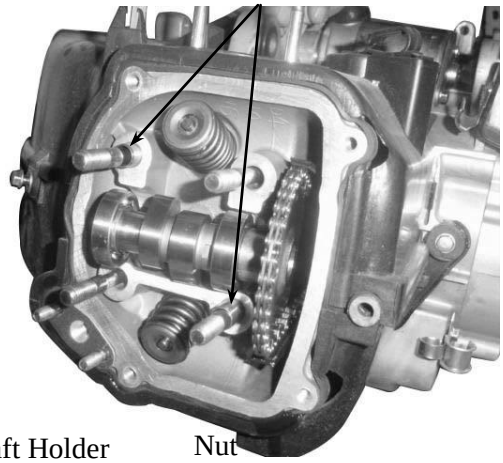
Valve Rocker Arm

CAMSHAFT INSTALLATION

Turn the flywheel so that the "T" mark on the flywheel aligns with the index mark on the crankcase.
Keep the round hole on the camshaft gear facing up and align the punch marks on the camshaft gear with the cylinder head surface (Position the intake and exhaust cam lobes down.) and install the camshaft onto the cylinder head.
Install the cam chain over the camshaft gear.



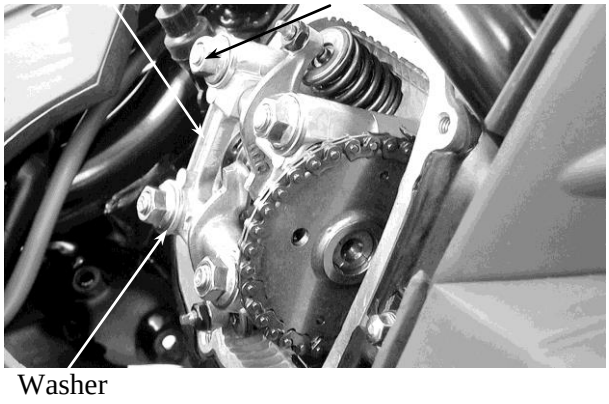
Install the dowel pins.



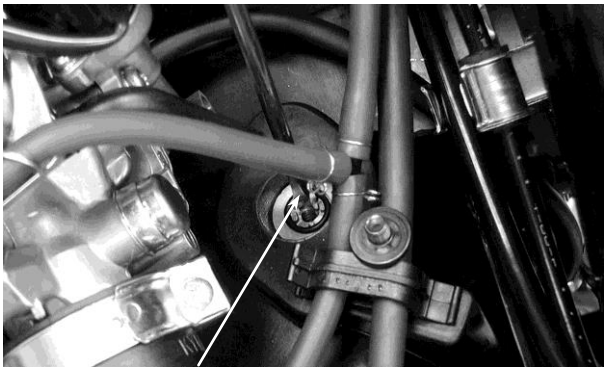
Install the camshaft holder, washers and nuts on the cylinder head.
Tighten the four cylinder head nuts and two bolts.

Torque: Cylinder head nut: 2.0kg-m

∗
- Apply engine oil to the threads of the cylinder head nuts.
- Diagonally tighten the cylinder head nuts in 2～3 times.



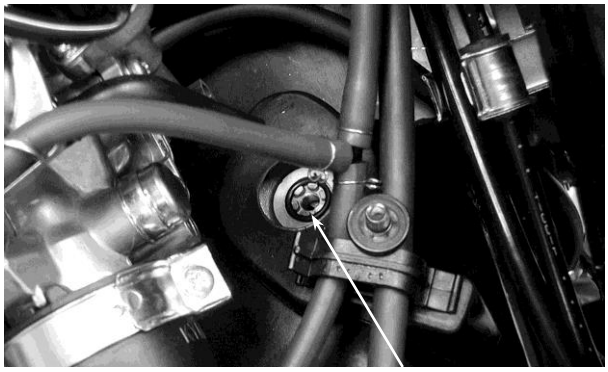
Adjust the valve clearance.
Turn the cam chain tensioner screw counter-clockwise to release it.



7. CYLINDER HEAD/VALVES

Apply engine oil to a new O-ring and install it.
Tighten the cam chain tensioner cap screw.

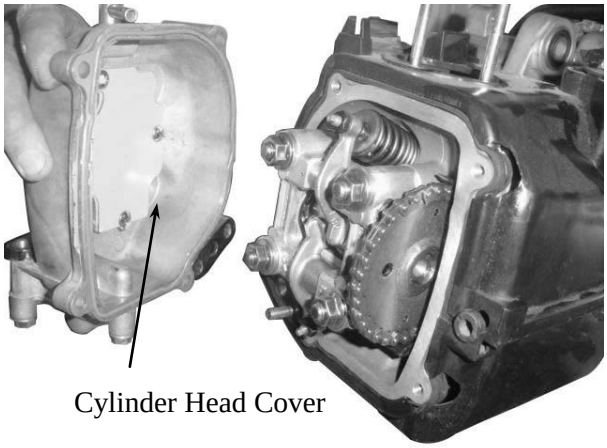
* Be sure to install the O-ring into the groove properly.



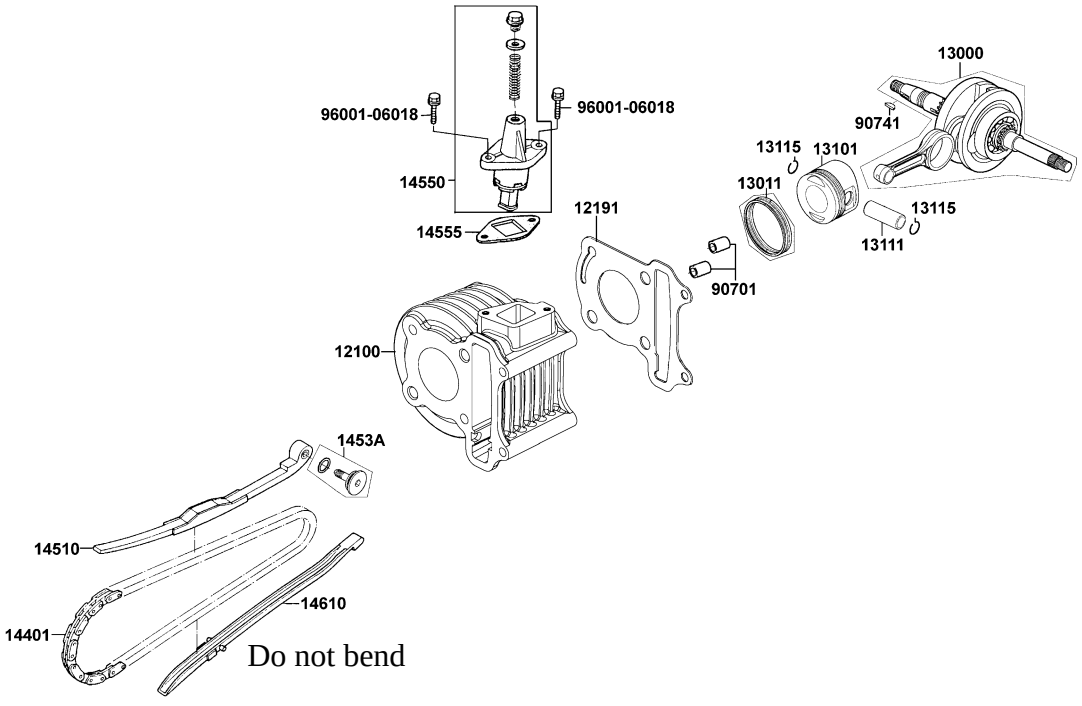
O-ring

Install a new cylinder head cover O-ring and install the cylinder head cover.
Install and tighten the cylinder head cover bolts.

* Be sure to install the O-ring into the groove properly.



Cylinder Head Cover


96001-06018
96001-06018
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14610
14401
Do not bend
13000
90741
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13101
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13111
90701

8. CYLINDER/PISTON

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PISTON REMOVAL.....8-2
PISTON INSTALLATION.....8-6
CYLINDER INSTALLATION.....8-6

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The cylinder and piston can be serviced with the engine installed in the frame.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.

SPECIFICATIONS

Item			Standard (mm)	Service Limit (mm)
Cylinder	I.D.		39.00-39.01	39.1
	Warpage		—	0.05
	Cylindricity		—	0.05
	True roundness		—	0.05
Piston, piston ring	Ring-to-groove clearance	Top	0.015-0.050	0.09
		Second	0.015-0.050	0.09
	Ring end gap	Top	0.06-0.16	0.45
		Second	0.13-0.28	0.45
		Oil side rail	0.20-0.70	—
	Piston O.D.		38.855-38.875	38.8
	Piston O.D. measuring position		8mm from bottom of skirt	—
	Piston-to-cylinder clearance		0.010-0.040	0.1
	Piston pin hole I.D.		13.002-13.008	13.04
Piston pin O.D			12.994-13.000	12.96
Piston-to-piston pin clearance			0.002-0.014	—
Connecting rod small end I.D. bore			13.016-13.034	13.06

TROUBLESHOOTING

- When hard starting or poor performance at low speed occurs, check the crankcase breather for white smoke. If white smoke is found, it means that the piston rings are worn, stuck or broken.

Compression too low or uneven compression

- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston

Compression too high

- Excessive carbon build-up in combustion chamber or on piston head

Excessive smoke from exhaust muffler

- Worn or damaged piston rings
- Worn or damaged cylinder and piston

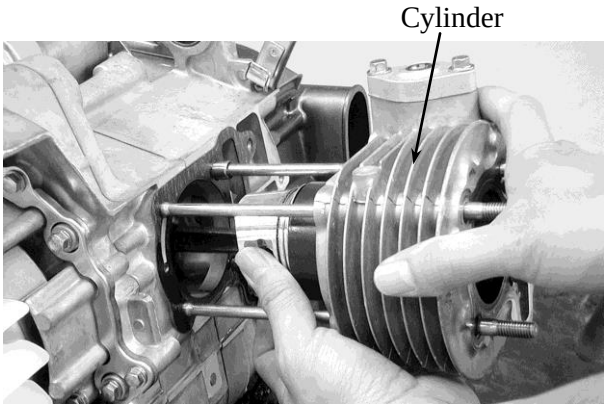
Abnormal noisy piston

- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin

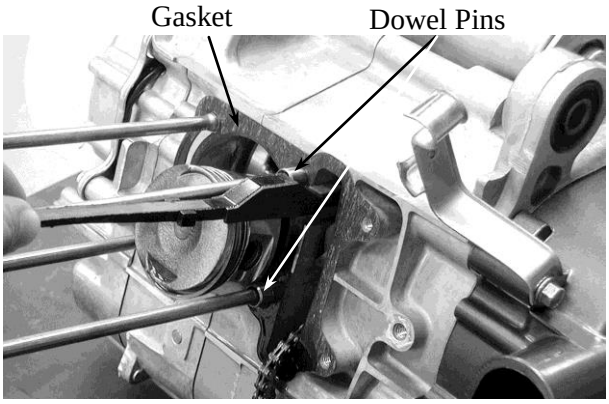
8. CYLINDER/PISTON

CYLINDER REMOVAL

Remove the cylinder head.
Remove the cam chain guide.
Remove the cylinder base bolts.
Remove the cylinder.



Remove the cylinder gasket and dowel pins.
Clean any gasket material from the cylinder surface.

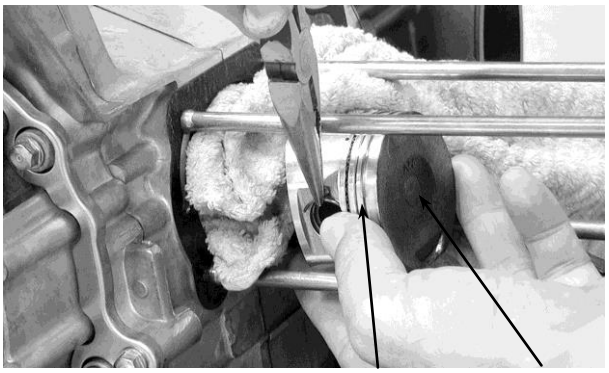


PISTON REMOVAL

Remove the piston pin clip.

* Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.

Press the piston pin out of the piston and remove the piston.



8. CYLINDER/PISTON

Inspect the piston, piston pin and piston rings. Remove the piston rings.

* Take care not to damage or break the piston rings during removal.

Clean carbon deposits from the piston ring grooves.

Install the piston rings onto the piston and measure the piston ring-to-groove clearance.

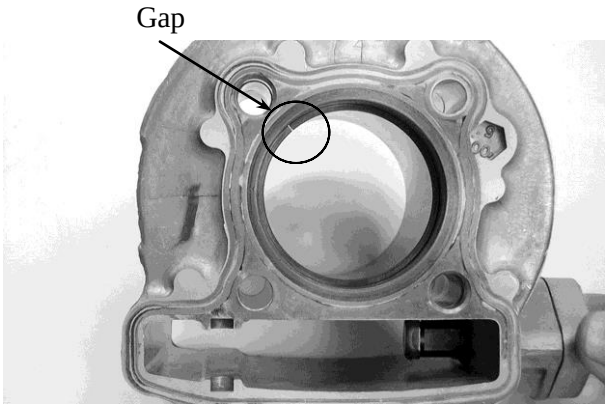
Service Limits:

Top: 0.09mm replace if over

2nd: 0.09mm replace if over

Remove the piston rings and insert each piston ring into the cylinder bottom.

* Use the piston head to push each piston ring into the cylinder.

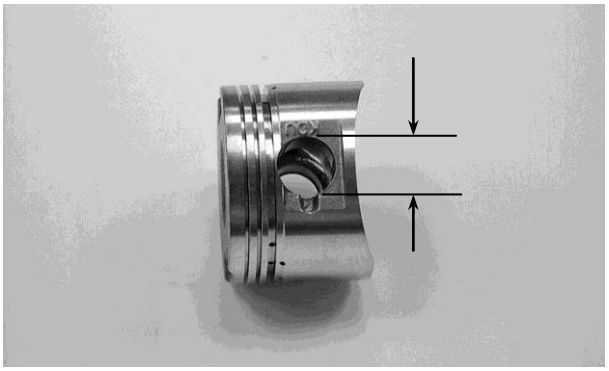


Measure the piston ring end gap.

Service Limit: 0.45mm replace if over

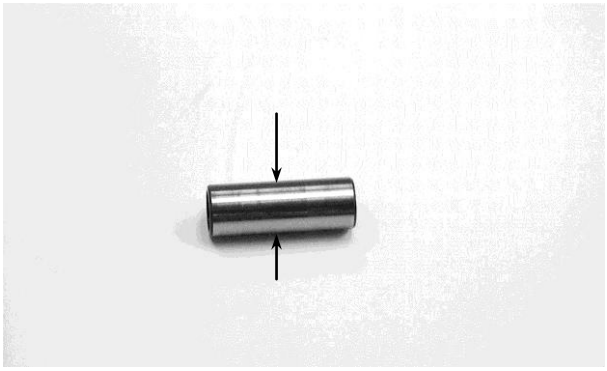
Measure the piston pin hole I.D.

Service Limit: 13.04mm replace if over



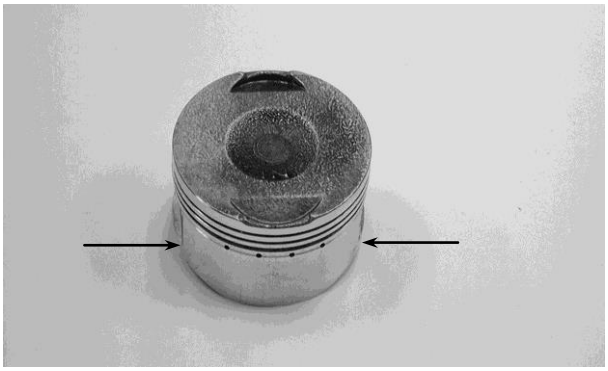
Measure the piston pin O.D.

Service Limit: 12.96mm replace if below



Measure the piston O.D.

* Take measurement at 9mm from the bottom and 90° to the piston pin hole.



Service Limit: 38.9mm replace if below

Measure the piston-to-piston pin clearance.

Service Limit: 0.02mm replace if over

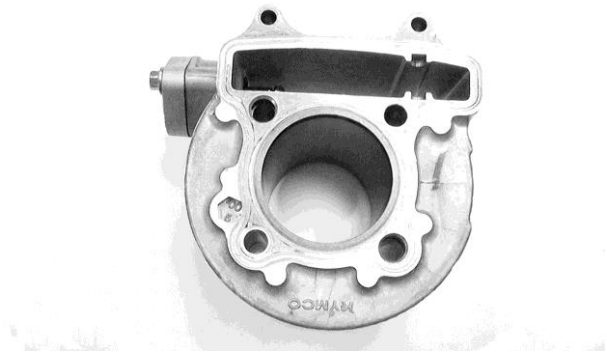
CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage. Measure the cylinder I.D. at three levels of top, middle and bottom at 90° to the piston pin (in both X and Y directions).

Service Limit: 39.10mm repair or replace if over

Measure the cylinder-to-piston clearance.

Service Limit: 0.1mm repair or replace if over

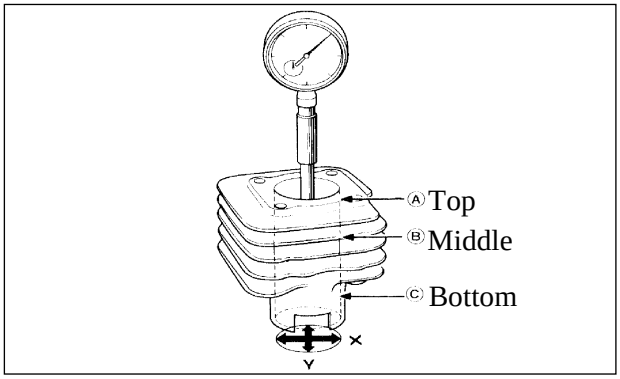


The true roundness is the difference between the values measured in X and Y directions. The cylindricity (difference between the values measured at the three levels) is subject to the maximum value calculated.

Service Limits:

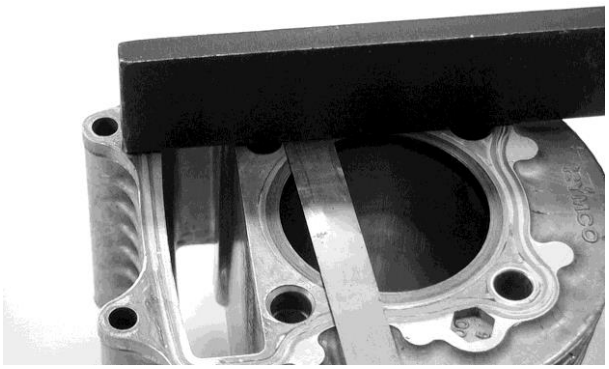
True Roundness: 0.05mm repair or replace if over

Cylindricity: 0.05mm repair or replace if over

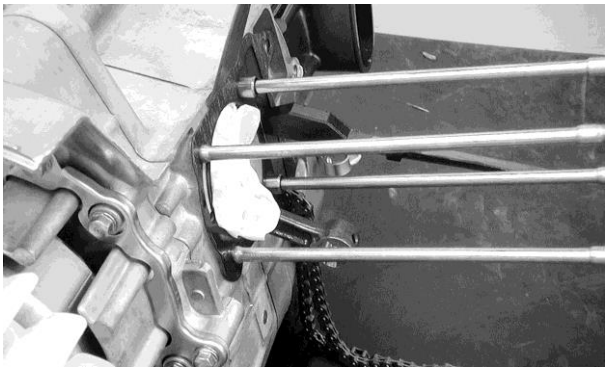


8. CYLINDER/PISTON

Inspect the top of the cylinder for warpage.
Service Limit:
0.05mm repair or replace if over

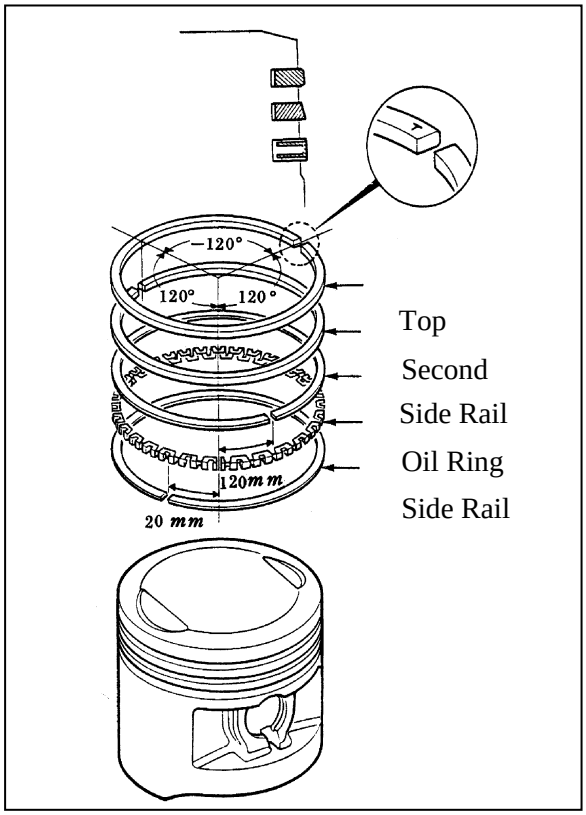


Measure the connecting rod small end I.D.
Service Limit: 13.06mm replace if over



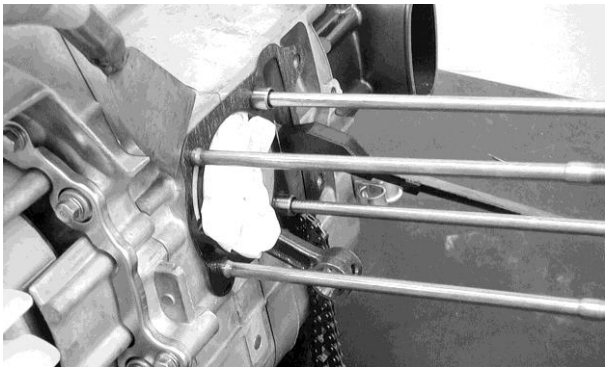
PISTON RING INSTALLATION
Install the piston rings onto the piston.
Apply engine oil to each piston ring.

*
- Be careful not to damage or break the piston and piston rings.
- All rings should be installed with the markings facing up.
- After installing the rings, they should rotate freely without sticking.



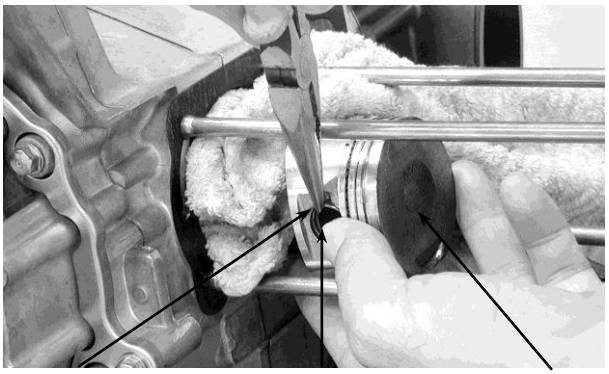
PISTON INSTALLATION

Remove any gasket material from the crankcase surface.



* Be careful not to drop foreign matters into the crankcase.

Install the piston, piston pin and a new piston pin clip.

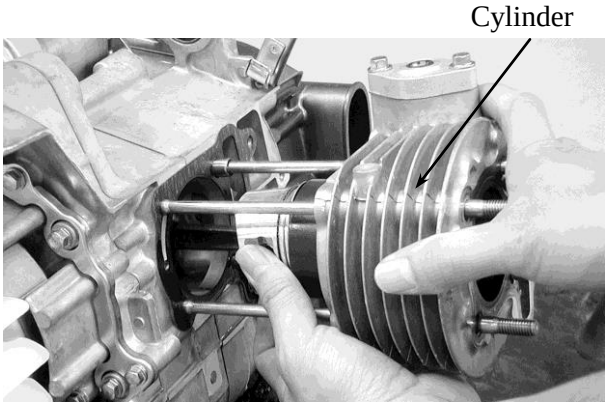


* • Position the piston "IN" mark on the intake valve side.
  • Place a clean shop towel in the crankcase to keep the piston pin clip from falling into the crankcase.

CYLINDER INSTALLATION

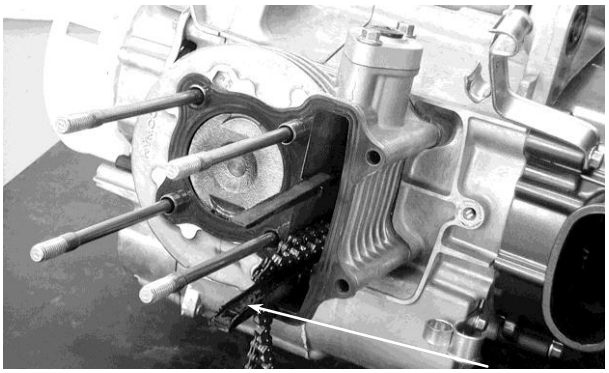
Install the dowel pins and a new cylinder gasket on the crankcase.

Coat the cylinder bore, piston and piston rings with clean engine oil.
Carefully lower the cylinder over the piston by compressing the piston rings.



* • Be careful not to damage or break the piston rings.
  • Stagger the ring end gaps at 120° to the piston pin.

Loosely install the cylinder base bolts.

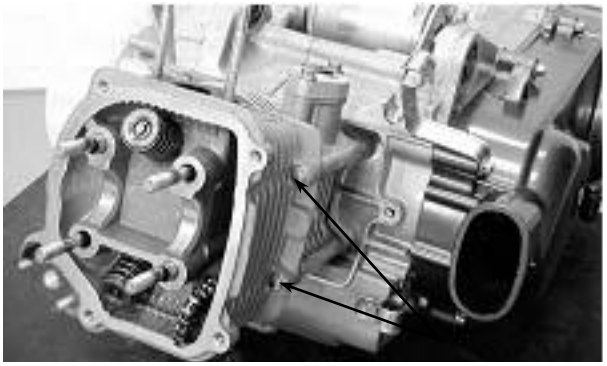


Cam Chain Guide

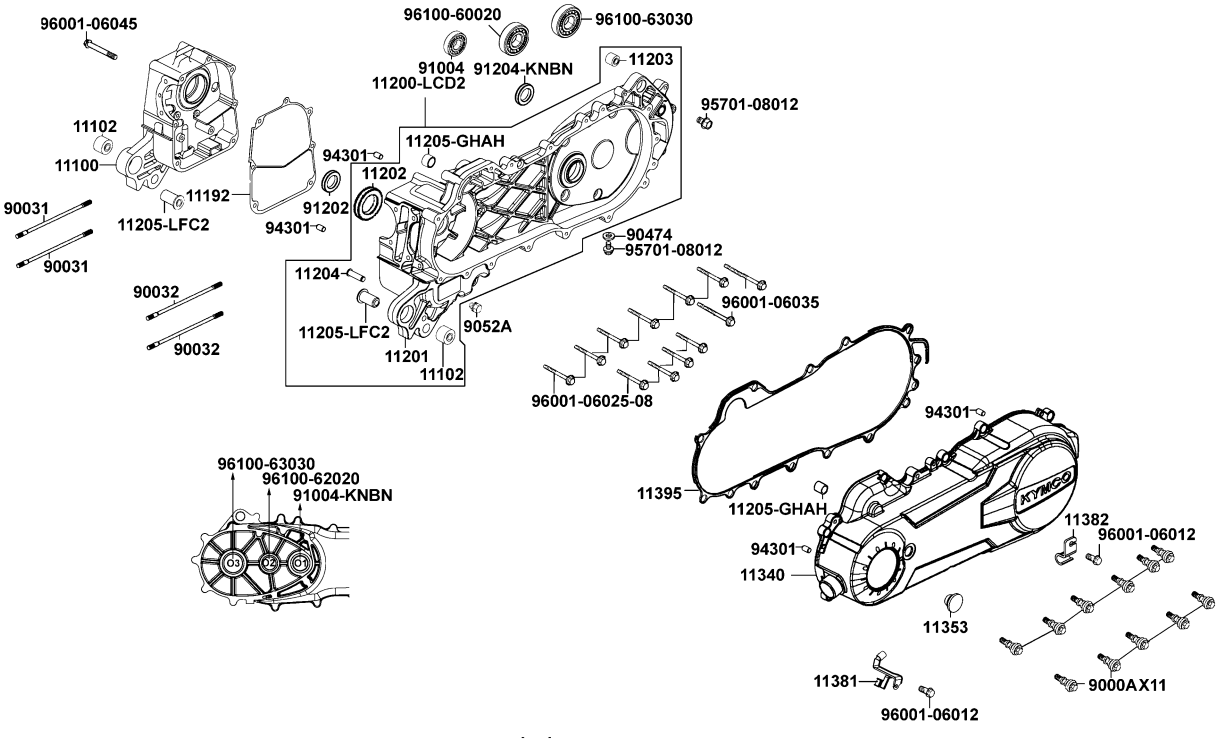
Install the cam chain guide.

* Insert the tab on the cam chain guide into the cylinder groove.

Install the cylinder head.
Tighten the cylinder base bolts.



Cylinder Base Bolt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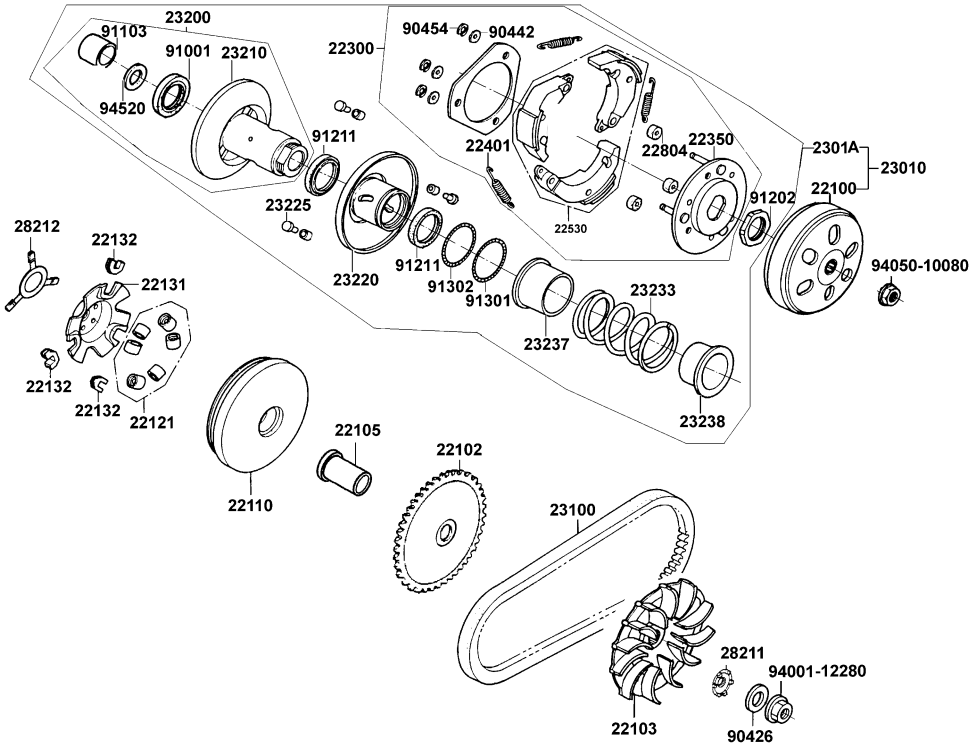
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22103
90426

SERVICE INFORMATION 9-1
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CLUTCH/DRIVEN PULLEY 9-9

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The drive pulley, clutch and driven pulley can be serviced with the engine installed.
- Avoid getting grease and oil on the drive belt and pulley faces. Remove any oil or grease from them to minimize the slipping of drive belt and drive pulley.

SPECIFICATIONS

Item	Standard (mm)	Service Limit (mm)
Movable drive face bushing I.D.	23.989~24.025	24.06
Drive face collar O.D.	23.960~23.974	23.94
Drive belt width	17.5	16.5
Clutch lining thickness	—	1.5
Clutch outer I.D.	107.0-107.2	107.5
Driven face spring free length	—	97
Driven face O.D.	33.965-33.485	33.94
Movable driven face I.D.	34.0-34.025	34.06
Weight roller O.D.	15.920~16.080	15.4

TORQUE VALUES

Drive face nut	5.5~6.5kgf-m
Clutch outer nut	3.5~4.5kgf-m
Clutch drive plate nut	5.0-6.0kg-m

SPECIAL TOOLS

Universal holder

Clutch spring compressor

TROUBLESHOOTING

Engine starts but motorcycle won‘t move

- Worn drive belt
- Broken ramp plate
- Worn or damaged clutch lining
- Broken driven face spring

Engine stalls or motorcycle creeps

- Broken clutch weight spring

Lack of power

- Worn drive belt
- Weak driven face spring
- Worn weight roller
- Fouled drive face

LEFT CRANKCASE COVER

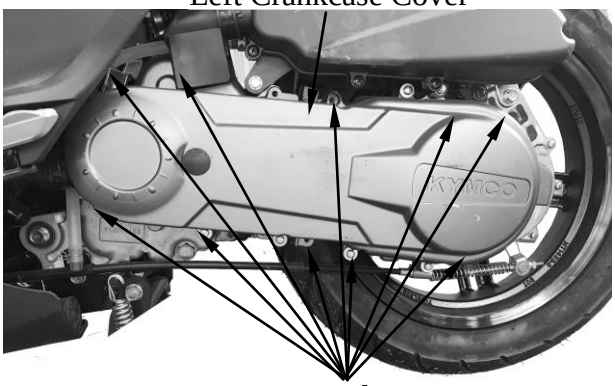
REMOVAL

Loosen the drive belt air tube band screw.

Air Tube Band

Remove the left crankcase cover bolts.
Remove the seal rubber and dowel pins.

Left Crankcase Cover

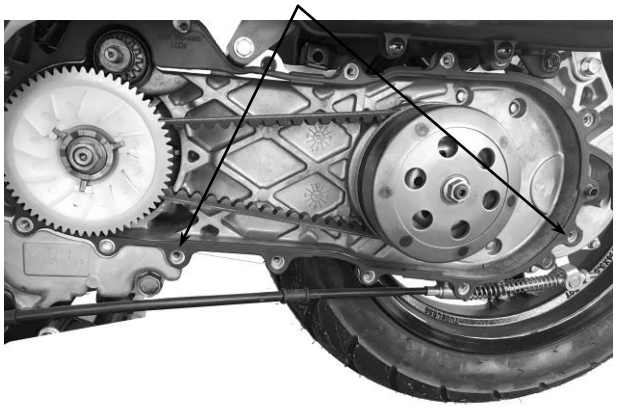


Bolts

INSTALLATION

Install the dowel pins and gasket.

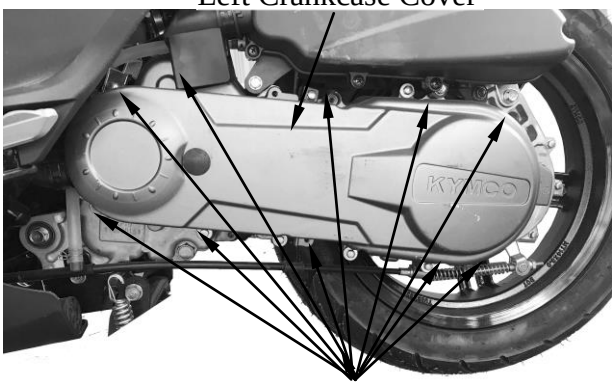
Dowel Pins



Install the left crankcase cover and tighten the left crankcase cover bolts.
Install the cable clamp to the specified location and tighten the bolt.

Install the drive belt air tube and tighten the tube band screw.

Left Crankcase Cover



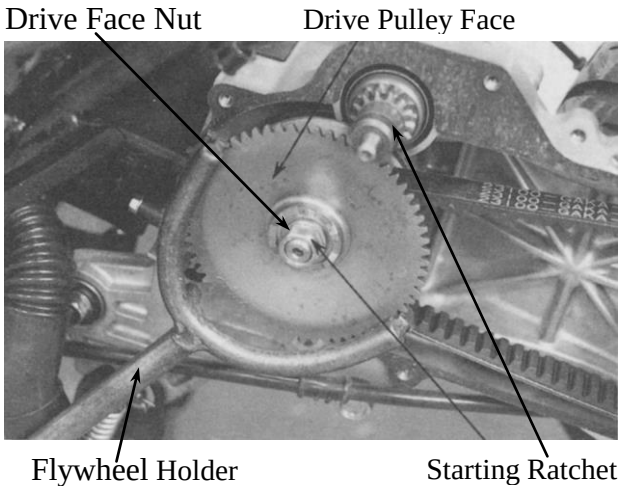
Bolts

DRIVE PULLEY

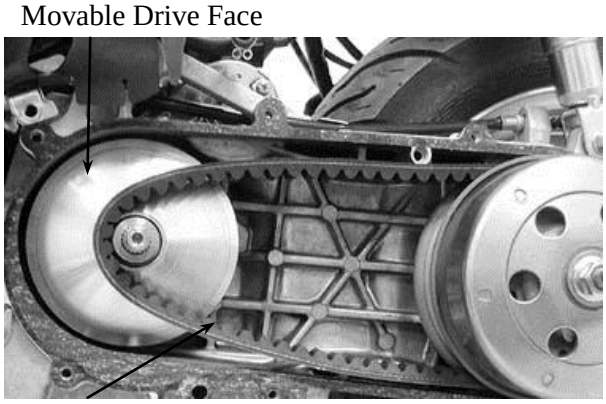
REMOVAL

Remove the left crankcase cover.
Hold the drive pulley using an universal holder and remove the drive face nut and starting ratchet.
Remove the drive pulley face.

Special
Flywheel Holder



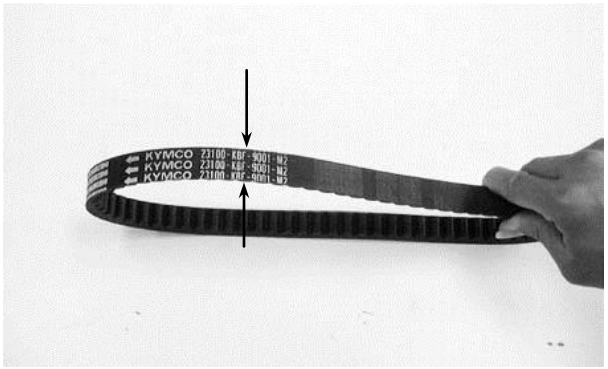
Hold the clutch outer with the universal holder and remove the clutch outer nut.
Remove the clutch/driven pulley and drive belt.



INSPECTION

Check the drive belt for cracks, separation or abnormal or excessive wear.
Measure the drive belt width.
Service Limit: 17.0mm replace if below

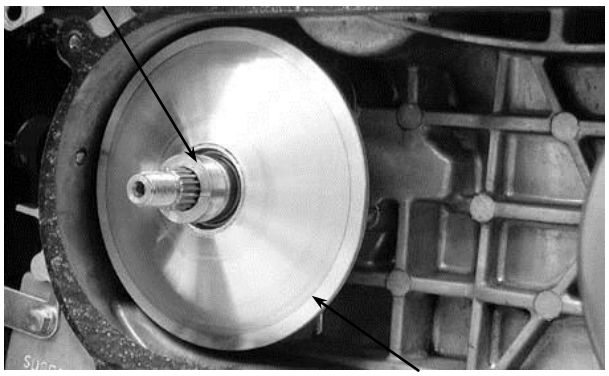
* Use specified genuine parts for replace-ment.



Remove the movable drive face assembly.
Remove the drive pulley collar.

DISASSEMBLY
Remove the ramp plate.

Drive Pulley Collar

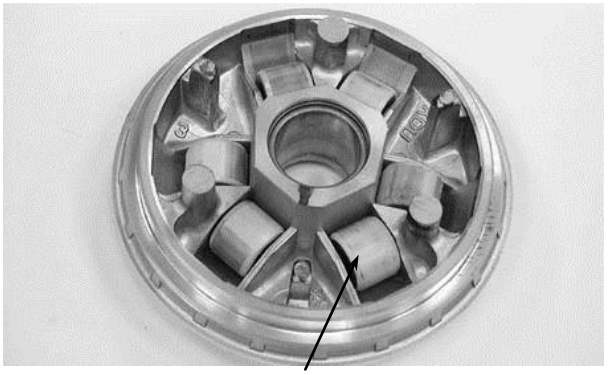


Movable Drive Face Assembly

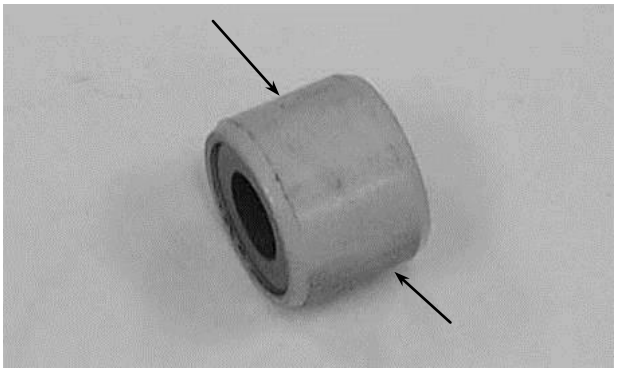
Ramp Plate

Remove the weight rollers.

INSPECTION
Check each weight roller for wear or damage.
Measure each weight roller O.D.
Service Limit: 15.4mm replace if below

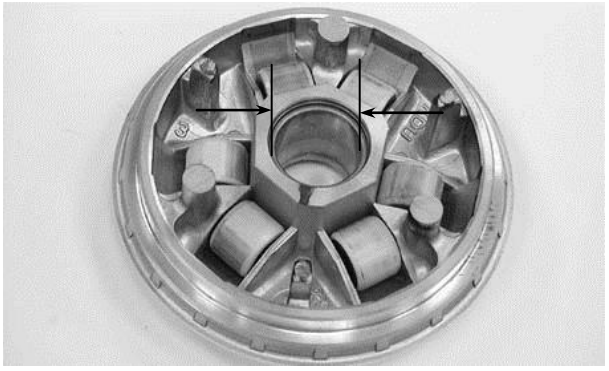


Weight Roller



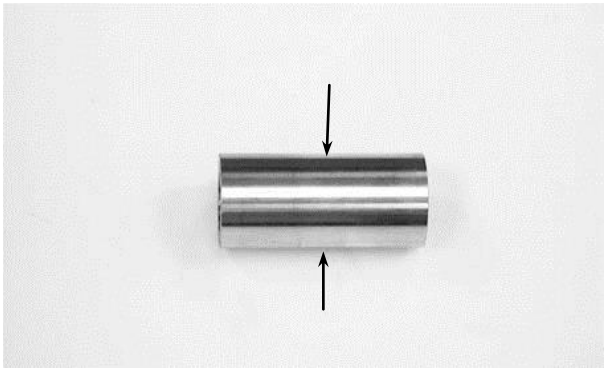
Measure the movable drive face bushing I.D.

Service Limit: 24.06mm replace if over



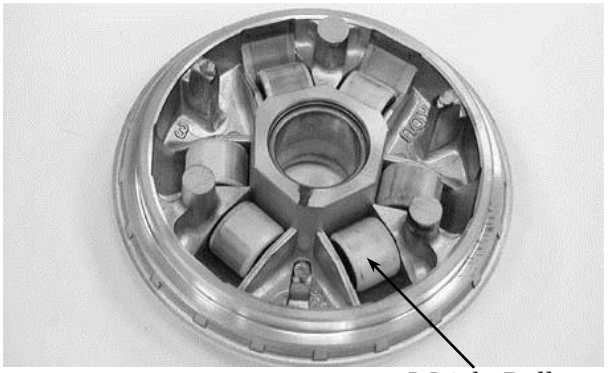
Check the drive pulley collar for wear or damage.
Measure the O.D. of the drive pulley collar sliding surface.

Service Limit: 19.97mm replace if below



ASSEMBLY

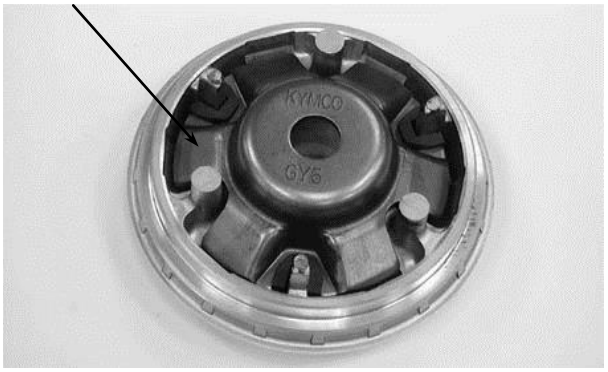
Install the weight rollers into the movable drive face.



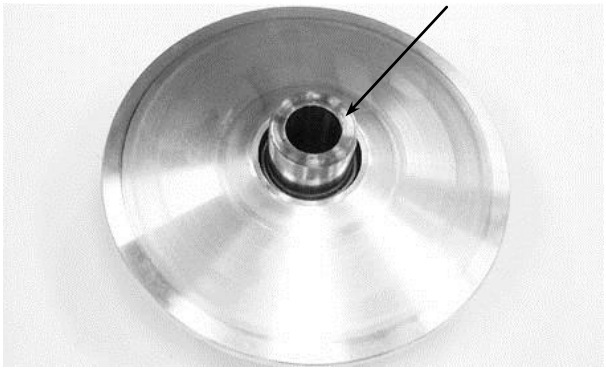
Weight Roller

Install the ramp plate.

Ramp Plate

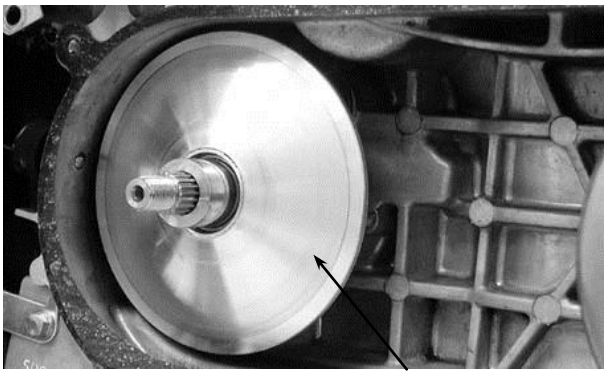


Insert the drive pulley collar into the movable drive face.

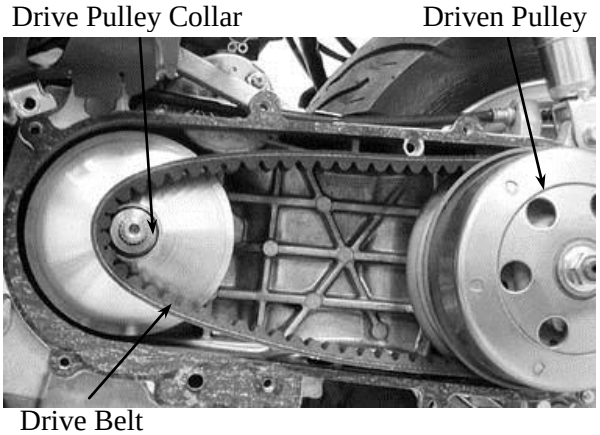


INSTALLATION

Install the movable drive face onto the crankshaft.

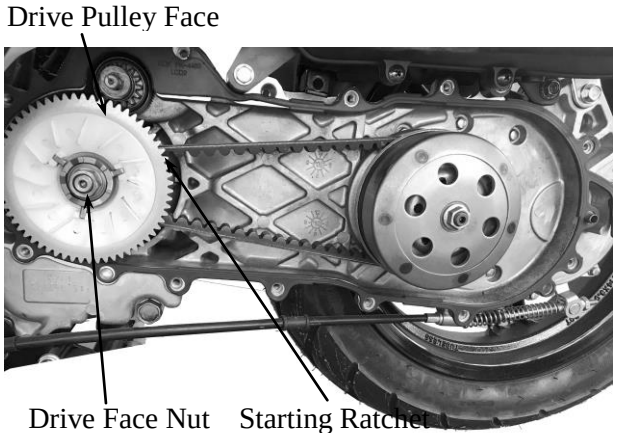


Lay the drive belt on the driven pulley.
Set the drive belt on the drive pulley collar.



Install the drive pulley face, starting ratchet and drive face nut.

* • When installing the drive pulley face, compress it to let the drive belt move downward to the lowest position so that the drive pulley can be tightened.
  • Install the starting ratchet by aligning the starting ratchet teeth with the crankshaft teeth.



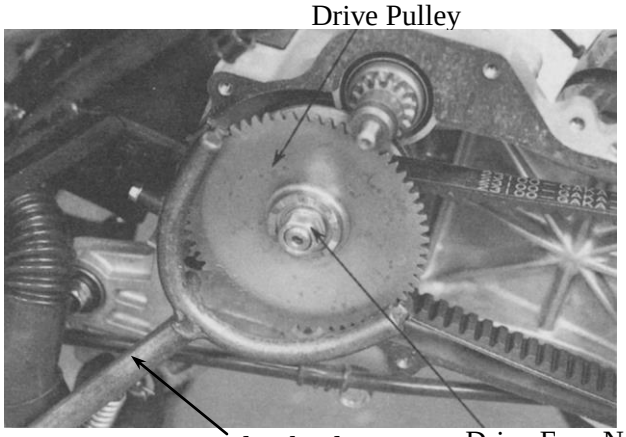
Hold the drive pulley with the universal holder and tighten the drive face nut.

Torque: 5.5kg-m

Special

Flywheel Holder

* Do not get oil or grease on the drive belt or pulley faces.

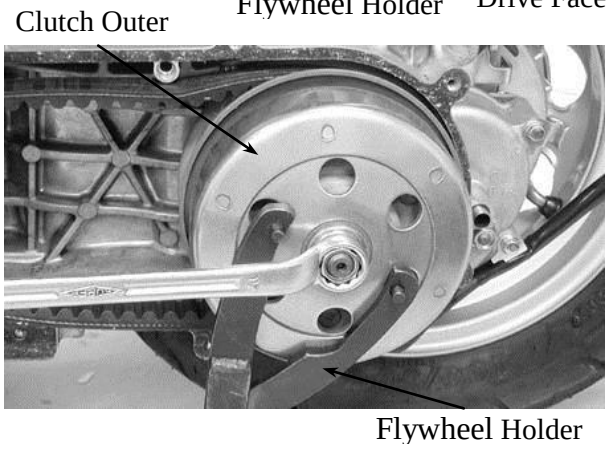


CLUTCH/DRIVEN PULLEY

Remove the left crankcase cover.
Remove the drive pulley and drive belt.
Hold the clutch outer with the universal holder and remove the clutch outer nut.

Special

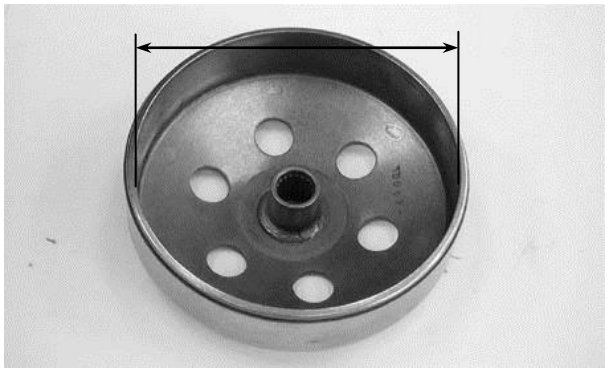
Flywheel Holder



INSPECTION

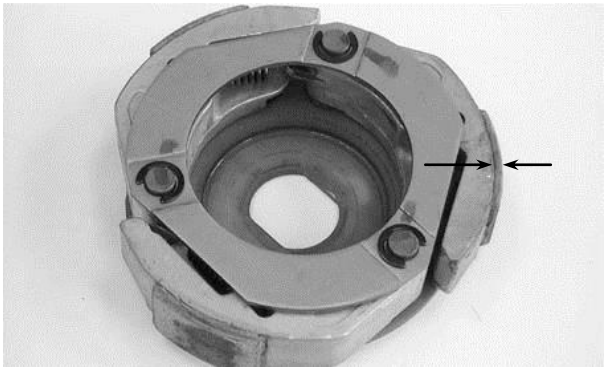
Inspect the clutch outer for wear or damage.
Measure the clutch outer I.D.

Service Limit: 125.5mm replace if over



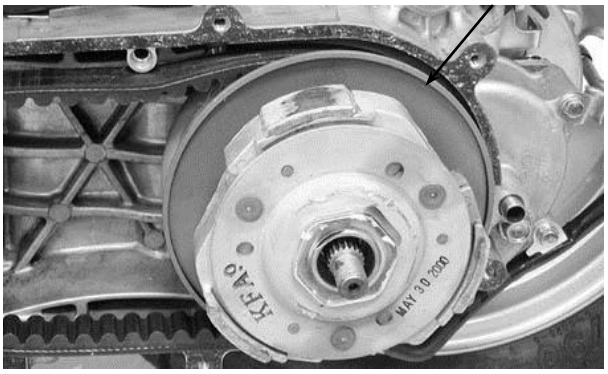
Check the clutch shoes for wear or damage.

Measure the clutch lining thickness.
Service Limit: 1.5mm replace if below



CLUTCH/DRIVEN PULLEY DISASSEMBLY

Clutch/Driven Pulley



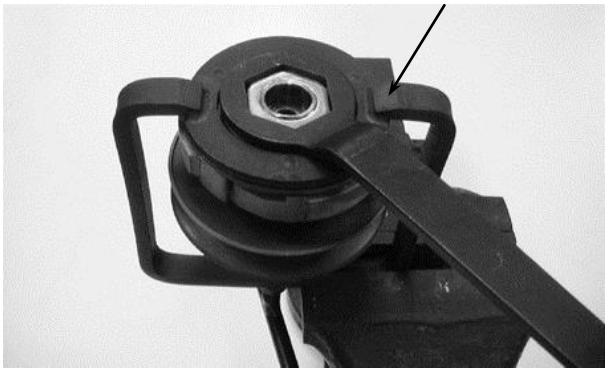
Hold the clutch/driven pulley assembly with the clutch spring compressor.

* Be sure to use a clutch spring compressor to avoid spring damage.

Special

Clutch Spring Compressor

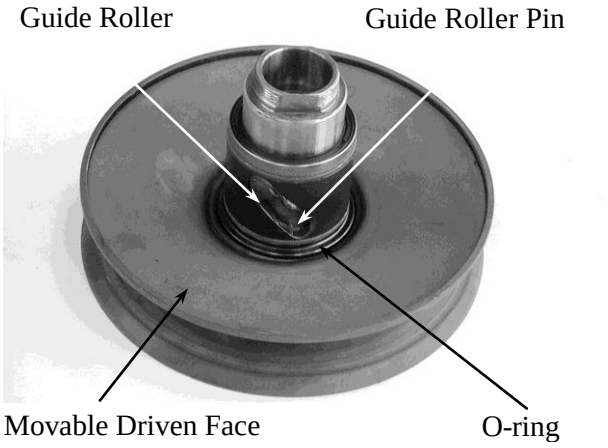
Clutch Spring Compressor



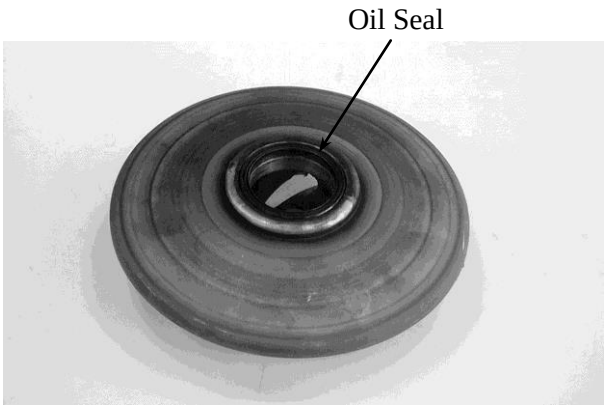
Set the clutch spring compressor in a vise and remove the clutch drive plate nut.

Loosen the clutch spring compressor and disassemble the clutch/driven pulley assembly.
Remove the seal collar.

Pull out the guide roller pins and guide rollers. Remove the movable driven face from the driven face.

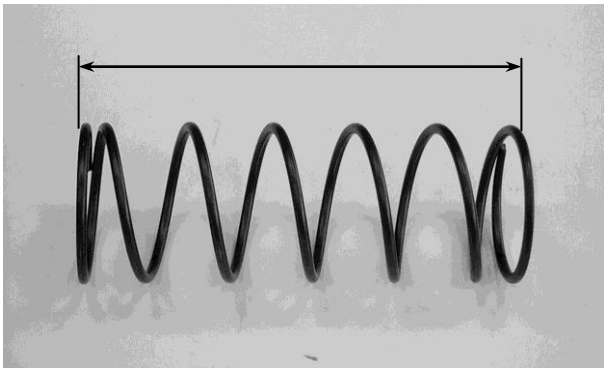


Remove the oil seal from the movable driven face.

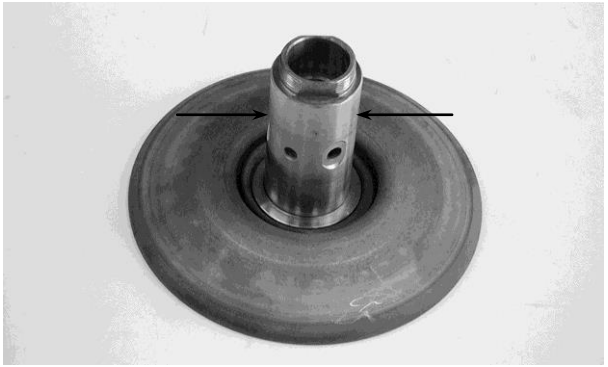


INSPECTION

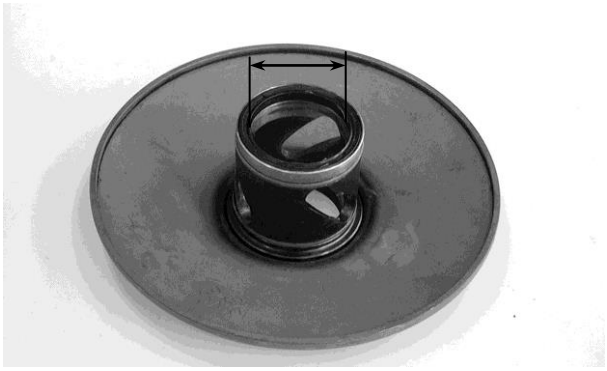
Measure the driven face spring free length.
Service Limit: 97mm replace if below



Check the driven face for wear or damage.
Measure the driven face O.D.
Service Limit: 33.94mm replace if below



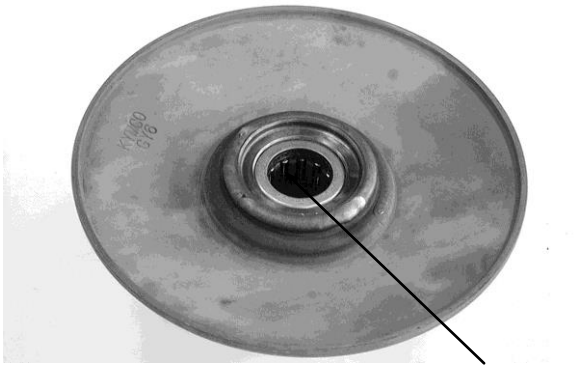
Check the movable driven face for wear or damage.
Measure the movable driven face I.D.
Service Limit: 34.06mm replace if over



DRIVEN PULLEY FACE BEARING REPLACEMENT

Drive the inner needle bearing out of the driven pulley face.

* Discard the removed bearing and replace with a new one.

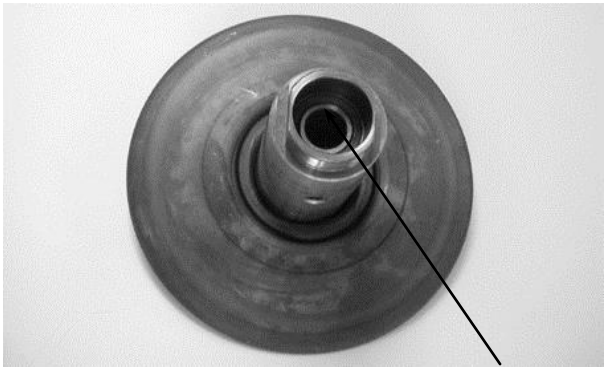


Inner Bearing

Remove the drive the outer bearing out of the driven face.

* Discard the removed bearing and replace with a new one.

Apply grease to the outer bearing.
Drive a new outer bearing into the driven face with the sealed end facing up.

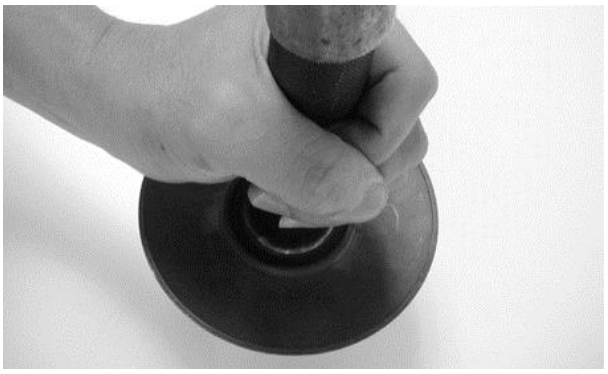


Outer Bearing

Apply grease to the driven face bore areas.

* Pack all bearing cavities with 5.0～5.6g grease.
  Specified grease: Heat resistance 230°C

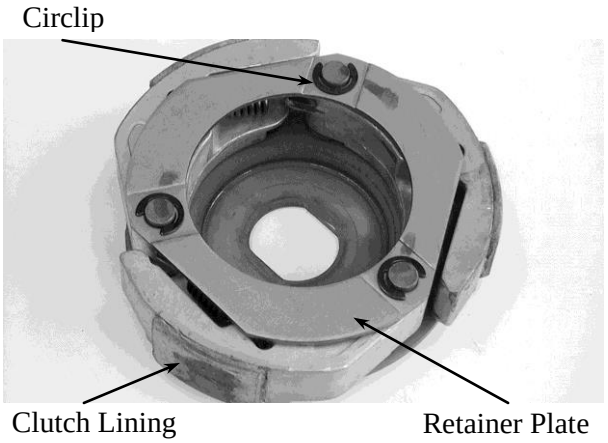
Press a new needle bearing into the driven face.



CLUTCH DISASSEMBLY

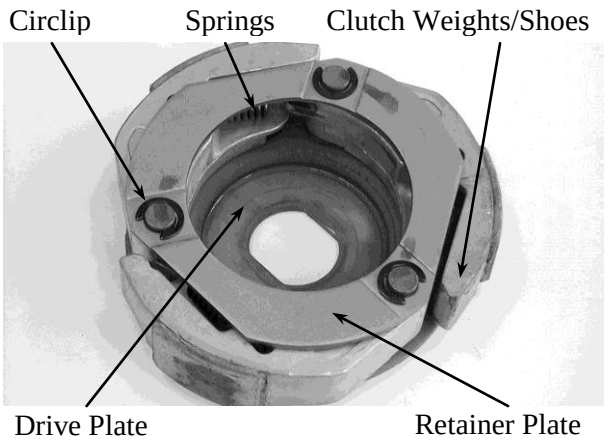
Remove the circlips and retainer plate to disassemble the clutch.

* Keep grease off the clutch linings.



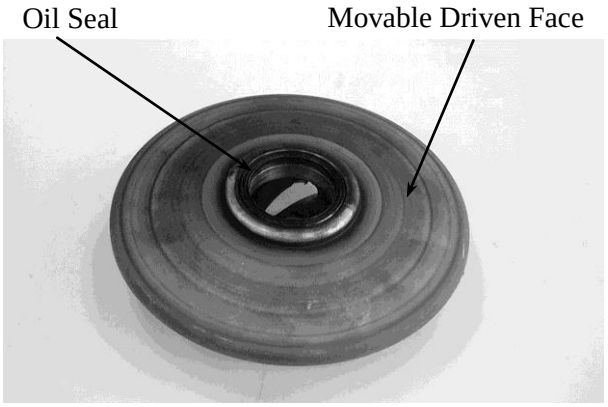
CLUTCH ASSEMBLY

Install the damper rubbers on the drive plate pins.
Install the clutch weights/shoes and clutch springs onto the drive plate.
Install the retainer plate and secure with the circlips.



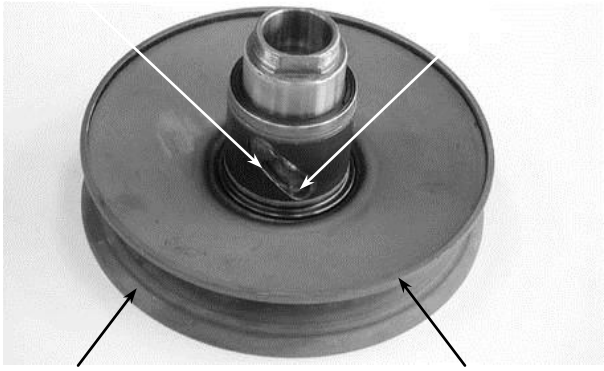
CLUTCH/DRIVEN PULLEY ASSEMBLY

Clean the driven pulley faces and remove any grease from them.
Install the oil seal onto the moveable driven face.
Apply grease to the O-rings and install them onto the moveable driven face.



Install the movable driven face onto the driven face.
Apply grease to the guide rollers and guide roller pins and then install them into the holes of the driven face.
Install the seal collar.
Remove any excessive grease.

* Be sure to clean the driven face off any grease.



Set the driven pulley assembly, driven face spring and clutch assembly onto the clutch spring compressor.

* Align the flat surface of the driven face with the flat on the clutch drive plate.

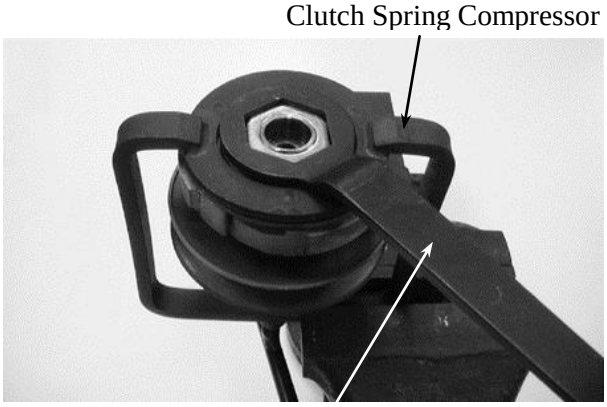
Compress the clutch spring compressor and install the drive plate nut.
Set the clutch spring compressor in a vise and tighten the drive plate nut to the specified torque.

Torque: 5.5kg-m

* Be sure to use a clutch spring compressor to avoid spring damage.

Special

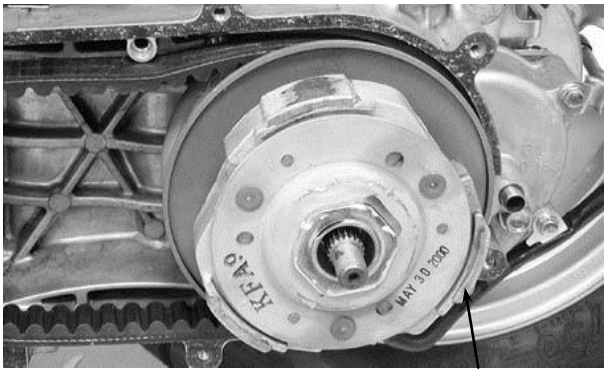
Clutch Spring Compressor



INSTALLATION

Install the clutch/driven pulley onto the drive shaft.

* Keep grease off the drive shaft.



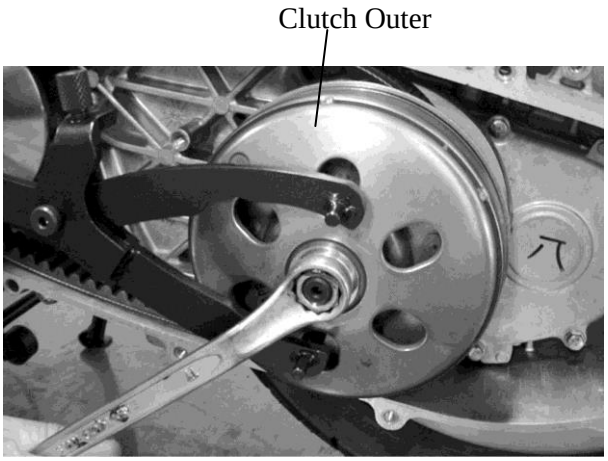
Clutch/Driven Pulley

Install the clutch outer.
Hold the clutch outer with the universal holder.
Install and tighten the clutch outer nut.

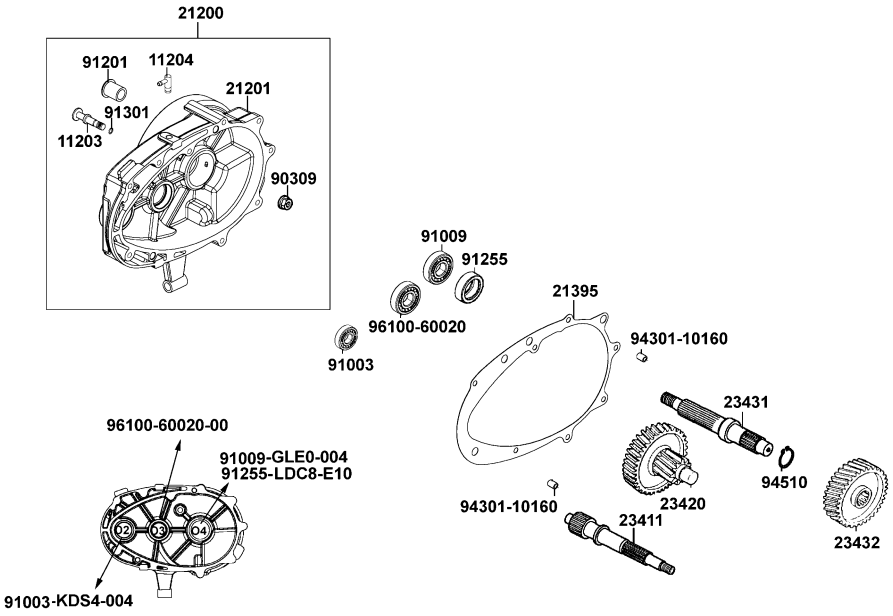
Torque: 5.5kg-m

Special
Flywheel Holder

Install the drive belt.
Install the left crankcase cover.



10. FINAL REDUCTION



10. FINAL REDUCTION

SERVICE INFORMATION 10-1	FINAL REDUCTION INSPECTION 10-2
TROUBLESHOOTING 10-1	BEARING REPLACEMENT 10-3
FINAL REDUCTION DISASSEMBLY 10-2	FINAL REDUCTION ASSEMBLY 10-4

SERVICE INFORMATION

SPECIFICATIONS

Specified Oil: GEAR OIL SAE 90#

Oil Capacity:	At disassembly	: 0.21 liter
	At change	: 0.18 liter

SPECIAL TOOLS

Bearing puller, 10,12,15,18mm

10

TROUBLESHOOTING

Engine starts but motorcycle won‘t move

- Damaged transmission
- Seized or burnt transmission
- Faulty drive belt
- Faulty clutch

Abnormal noise

- Worn, seized or chipped gears
- Worn bearing

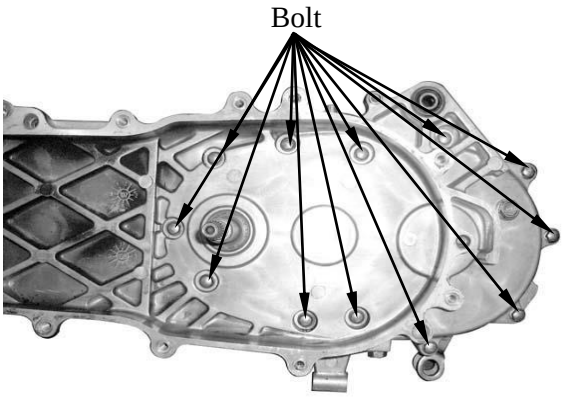
Oil leaks

- Oil level too high
- Worn or damaged oil seal

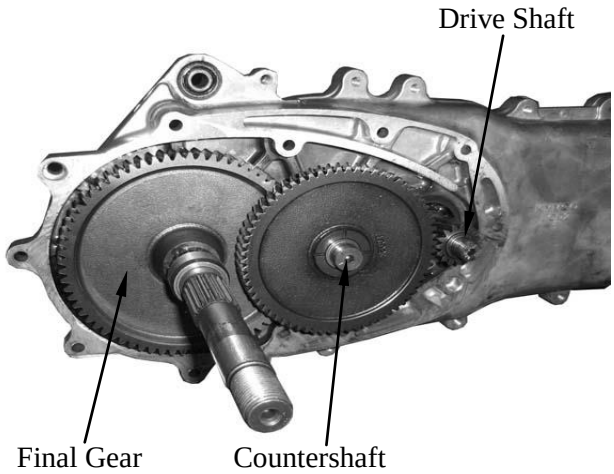
10. FINAL REDUCTION

FINAL REDUCTION DISASSEMBLY

Remove the rear brake cable. (⇨13-3)
Remove the rear wheel. (⇨13-2)
Remove the left crankcase cover. (⇨9-2)
Remove the clutch/driven pulley. (⇨9-10)
Drain the transmission gear oil into a clean container.
Remove the transmission case cover attaching bolts.
Remove the transmission case cover.
Remove the gasket and dowel pins.

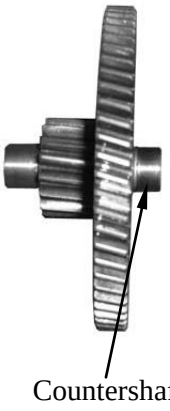


Remove the final gear and countershaft.

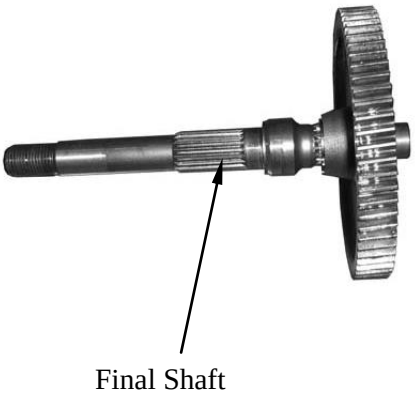


FINAL REDUCTION INSPECTION

Inspect the countershaft and gear for wear or damage.

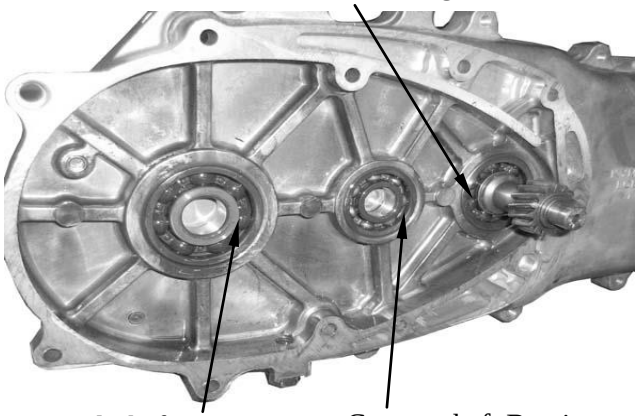


Inspect the final gear and final shaft for wear, damage or seizure.



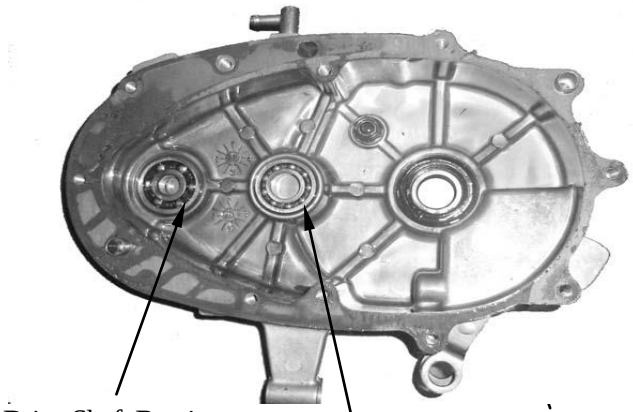
10. FINAL REDUCTION

Check the left crankcase bearings for excessive play and inspect the oil seal for wear or damage.



Inspect the drive shaft and gear for wear or damage.
Check the transmission case cover bearings for excessive play and inspect the final shaft bearing oil seal for wear or damage.

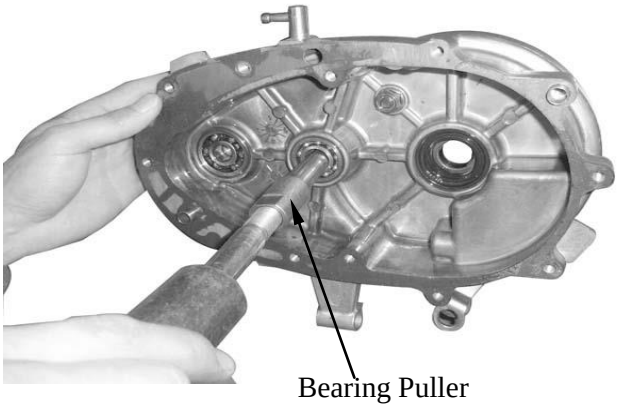
* Do not remove the transmission case cover except for necessary part replace-ment. When replacing the drive shaft, also replace the bearing and



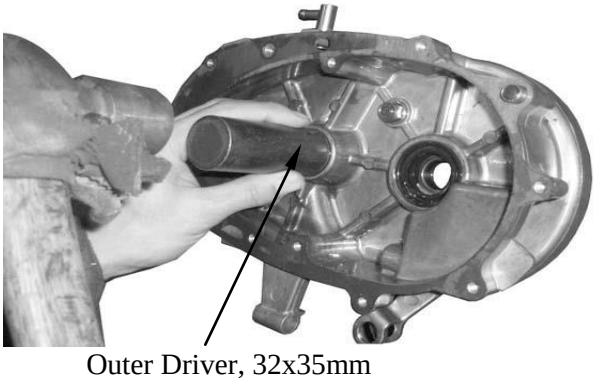
BEARING REPLACEMENT (TRANSMISSION CASE COVER)

Remove the transmission case cover bearings using a bearing puller.
Remove the final shaft oil seal.

Special
Bearing Puller



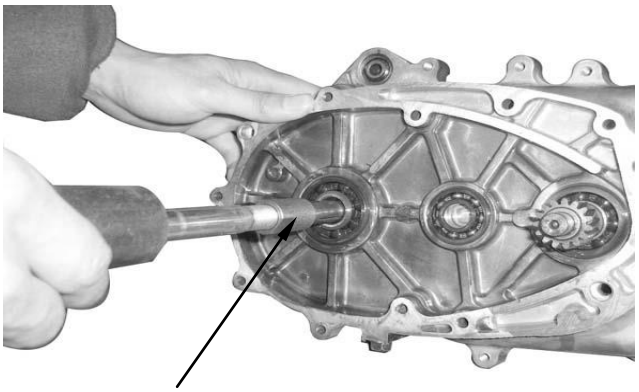
Drive new bearings into the transmission case cover.



BEARING REPLACEMENT (LEFT CRANKCASE)

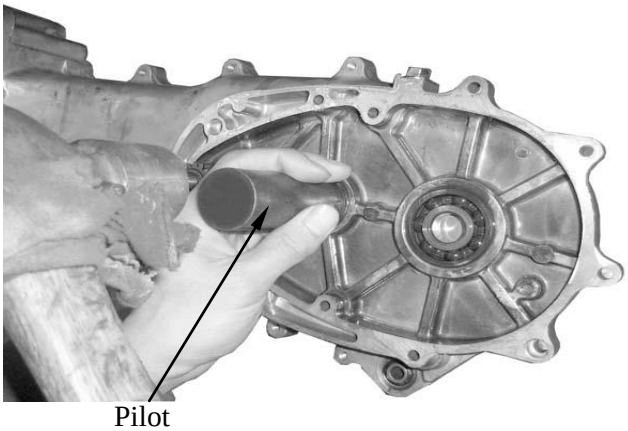
Remove the drive shaft.
Remove the drive shaft oil seal.
Remove the left crankcase bearings using a bearing puller.

Special
Bearing Puller



Bearing Puller, 12mm

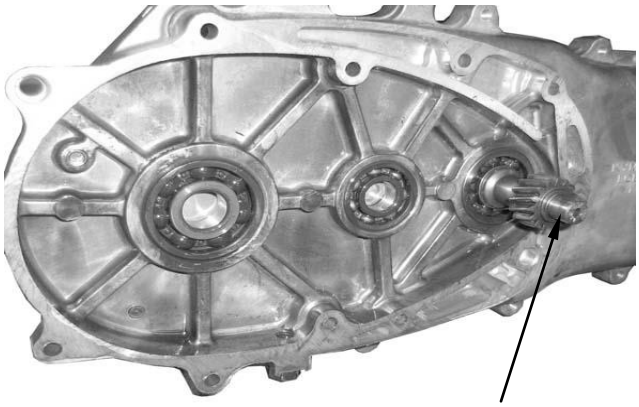
Drive new bearings into the left crankcase.
Install a new drive shaft oil seal.



Pilot

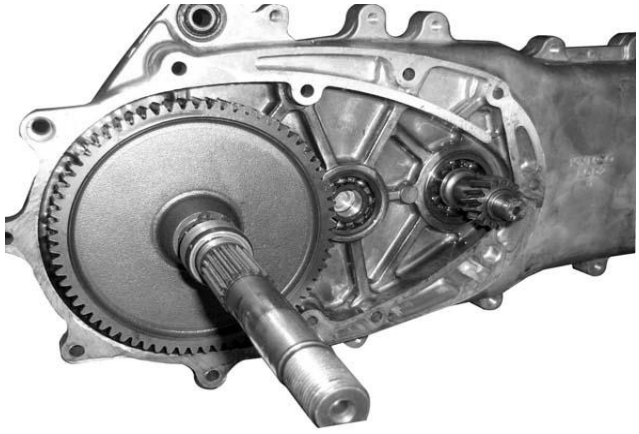
FINAL REDUCTION ASSEMBLY

Install the drive shaft into the left crankcase.



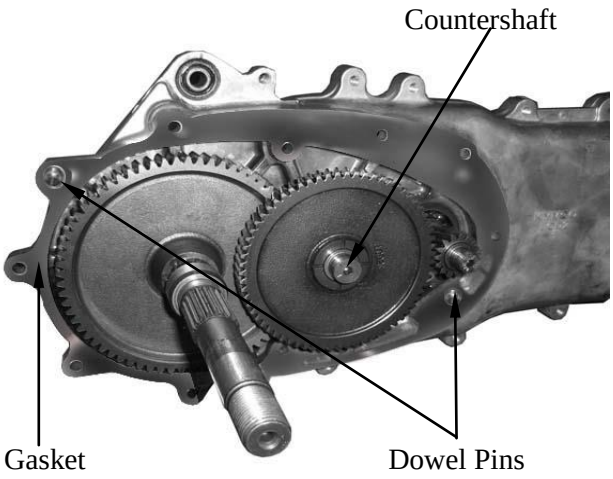
Drive Shaft

Install the final gear and final shaft into the left crankcase.

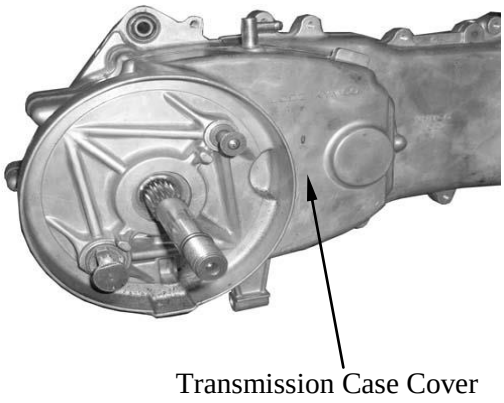


10. FINAL REDUCTION

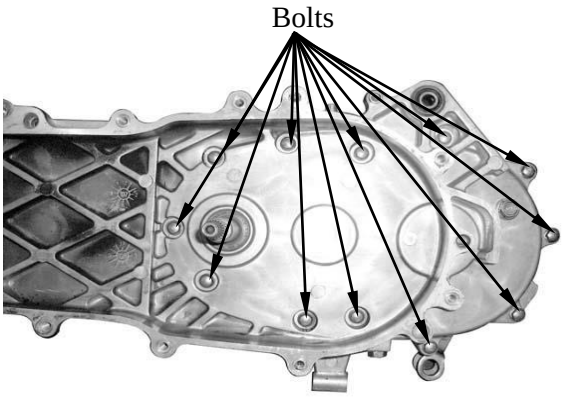
Install the countershaft and gear into the left crankcase.
Install the dowel pins and a new gasket.



Install the transmission case cover.



Install and tighten the transmission case cover bolts.
Install the clutch/driven pulley. (⇨9-13)



After installation, fill the transmission case with the specified oil. (⇨3-7)

*
- Place the motorcycle on its main stand on level ground.
- Check the oil sealing washer for wear or damage.

Specified Gear Oil: SAE90#

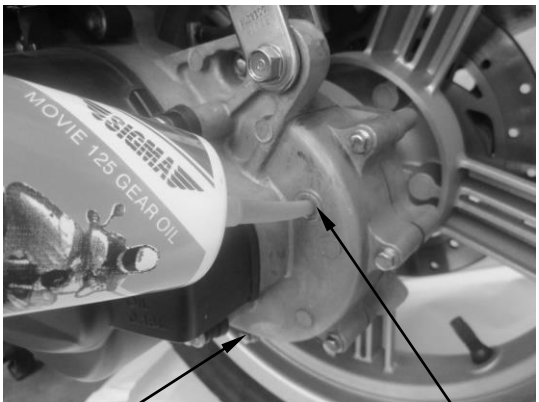
Oil Capacity:

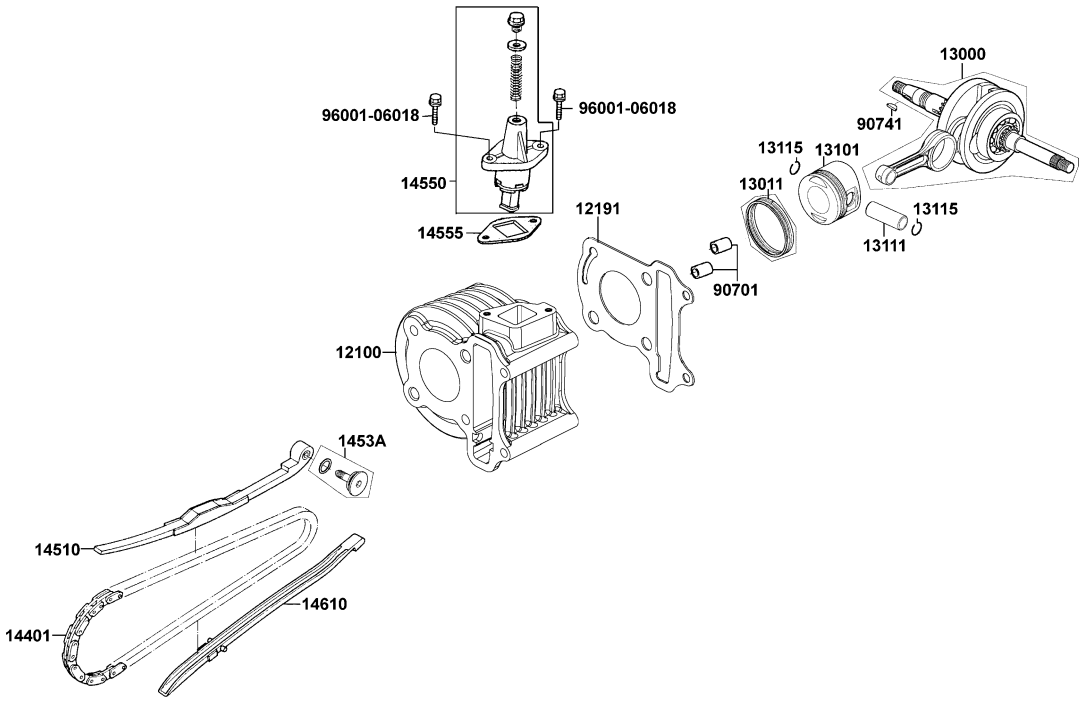
At disassembly : 0.2 liter
At change : 0.18 liter

Install and tighten the oil check bolt.

Torque: 0.8～1.2kgf-m

Start the engine and check for oil leaks. Check the oil level from the oil check bolt hole and add the specified oil to the proper level if the oil level is low.




96001-06018
96001-06018
14550
14555
13000
90741
13115
13101
13011
13115
13111
12191
90701
12100
1453A
14510
14610
14401

11. CRANKCASE/CRANKSHAFT

SERVICE INFORMATION 11-1
TROUBLESHOOTING 11-1
CRANKCASE SEPARATION 11-2
CRANKSHAFT 11-3
CRANKCASE ASSEMBLY 11-4

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- This section covers crankcase separation to service the crankshaft. The engine must be removed for this operation.
- The following parts must be removed before separating the crankcase.
  - –Cylinder head (⇨Section 7)
  - –Cylinder/piston (⇨Section 8)
  - –Drive and driven pulleys (⇨Section 9)
  - –A.C. generator (⇨Section 14)
  - –Carburetor/air cleaner (⇨Section 5)
  - –Rear wheel/rear shock absorber (⇨Section 13)
  - –Starter motor (⇨Section 16)
  - –Oil pump (⇨Section 4)

SPECIFICATIONS

	Item	Standard (mm)	Service Limit (mm)
Crankshaft	Connecting rod big end side clearance	0.10～0.35	0.55
	Connecting rod big end radial clearance	0-0.008	0.05
	Runout	—	0.10

TORQUE VALUES

Crankcase bolt	0.8~1.2kgf-m
Cam chain tensioner slipper bolt	0.8~1.2kgf-m

TROUBLESHOOTING

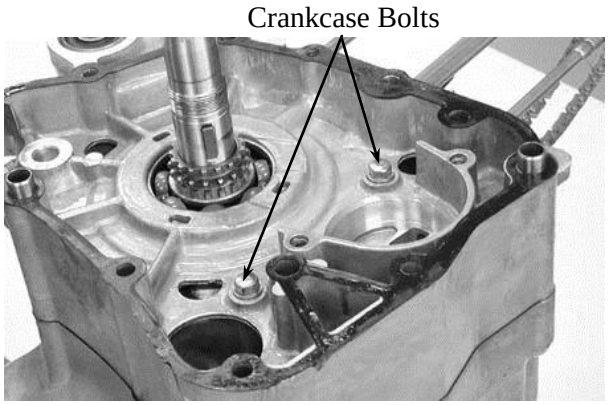
Excessive engine noise

- Excessive bearing play
- Excessive crankpin bearing play

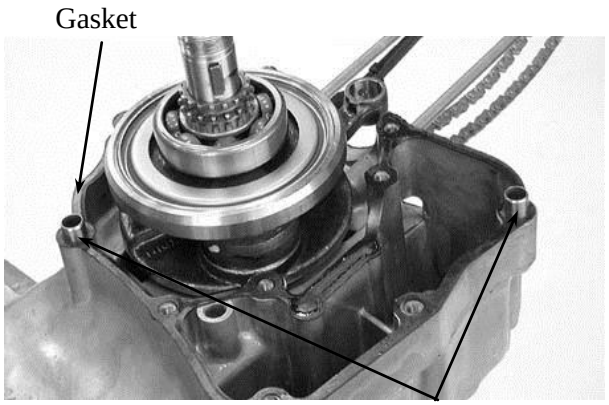
CRANKCASE SEPARATION

Remove the two crankcase attaching bolts. Separate the left and right crankcase halves.

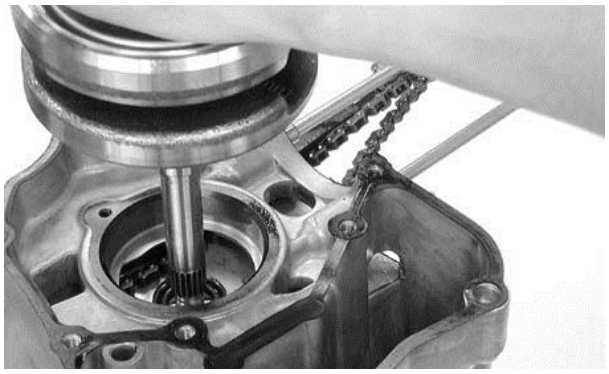
* Do not damage the crankcase gasket surface.



Remove the gasket and dowel pins.

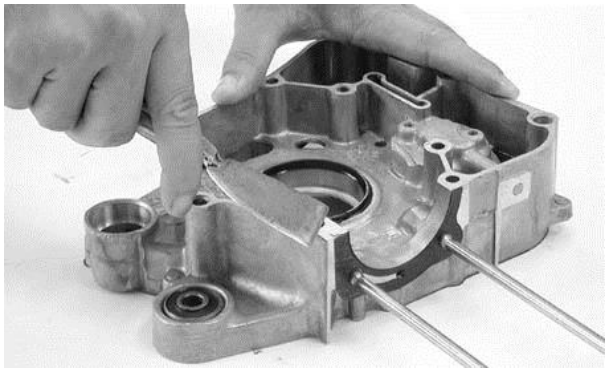


Remove the crankshaft and cam chain from the left crankcase.

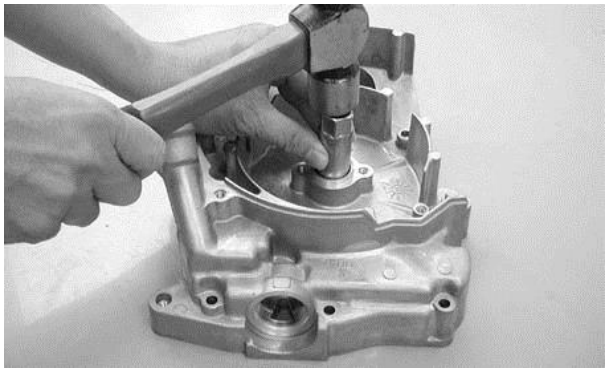


Clean off all gasket material from the crankcase mating surfaces.

* Avoid damaging the crankcase mating surfaces.



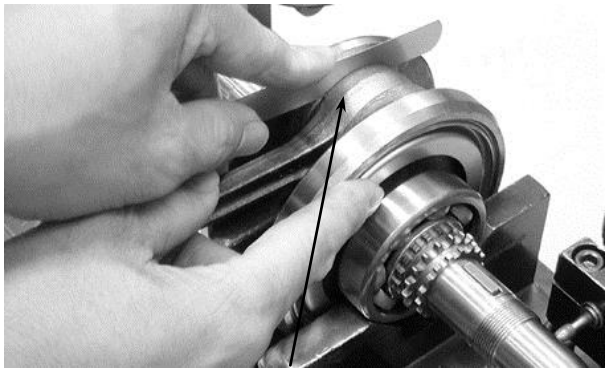
Remove the oil seal from the right crankcase.
Check the oil seal lip for wear or deterioration.
The installation sequence is the reverse of removal.



CRANKSHAFT INSPECTION

Measure the connecting rod big end side clearance.

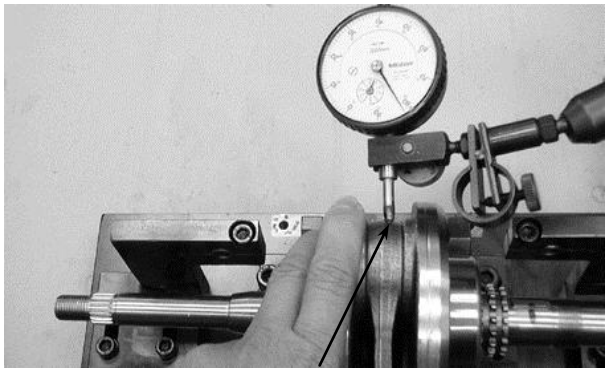
Service Limit: 0.55mm replace if over



Connecting Rod Big End

Measure the connecting rod big end radial clearance at two points at right angels to the shaft.

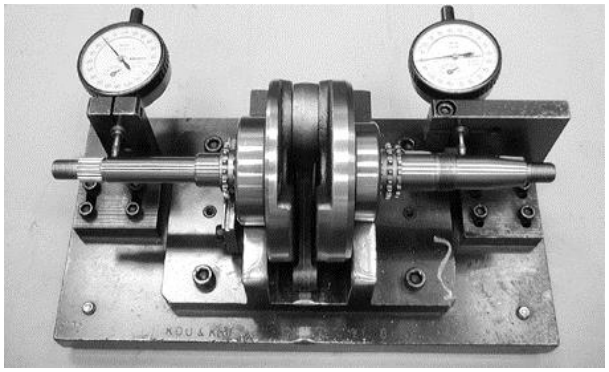
Service Limit: 0.05mm replace if over



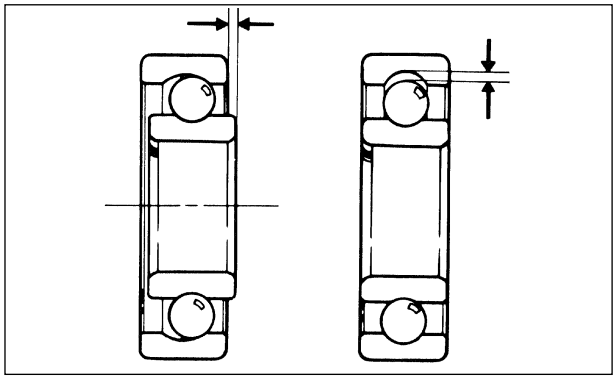
Measuring Location

Measure the crankshaft runout.

Service Limit: 0.10mm replace if over

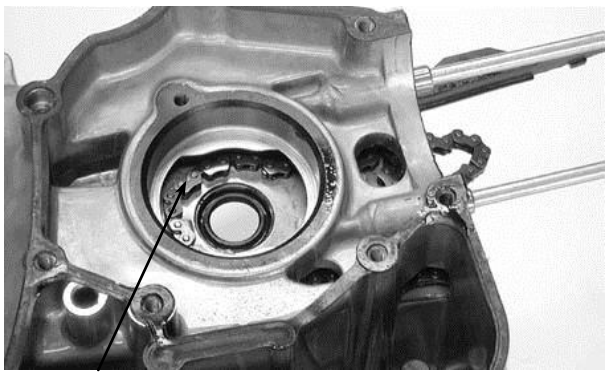


Turn the crankshaft bearings and check for excessive play.
If they do not turn smoothly, quietly or if they fit loosely in the crankshaft, replace the crankshaft as a set.



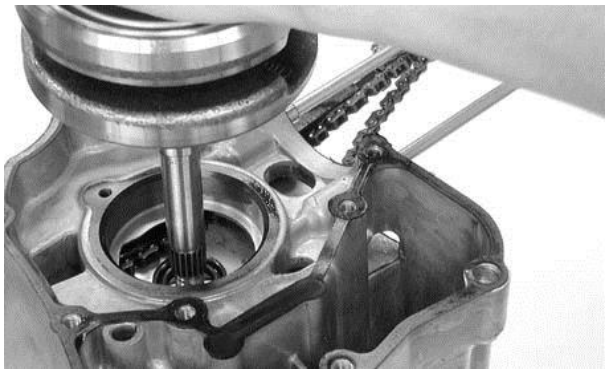
CRANKCASE ASSEMBLY

Install the cam chain into the left crankcase.



Cam Chain

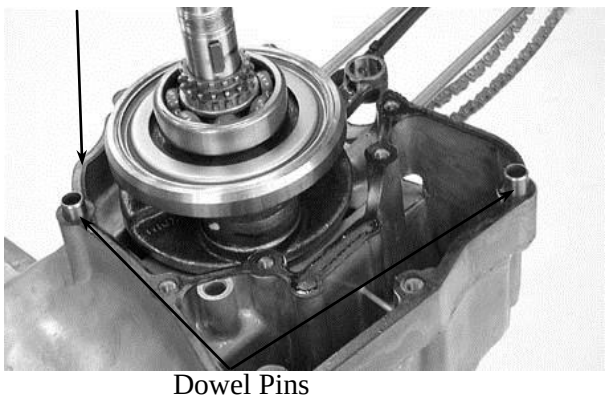
Install the crankshaft into the left crankcase.



Install the dowel pins and a new gasket onto the left crankcase.

* Place the right crankcase over the crankshaft and onto the left crankcase.

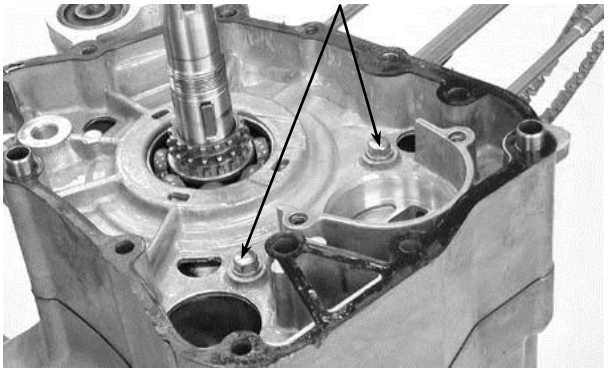
Gasket

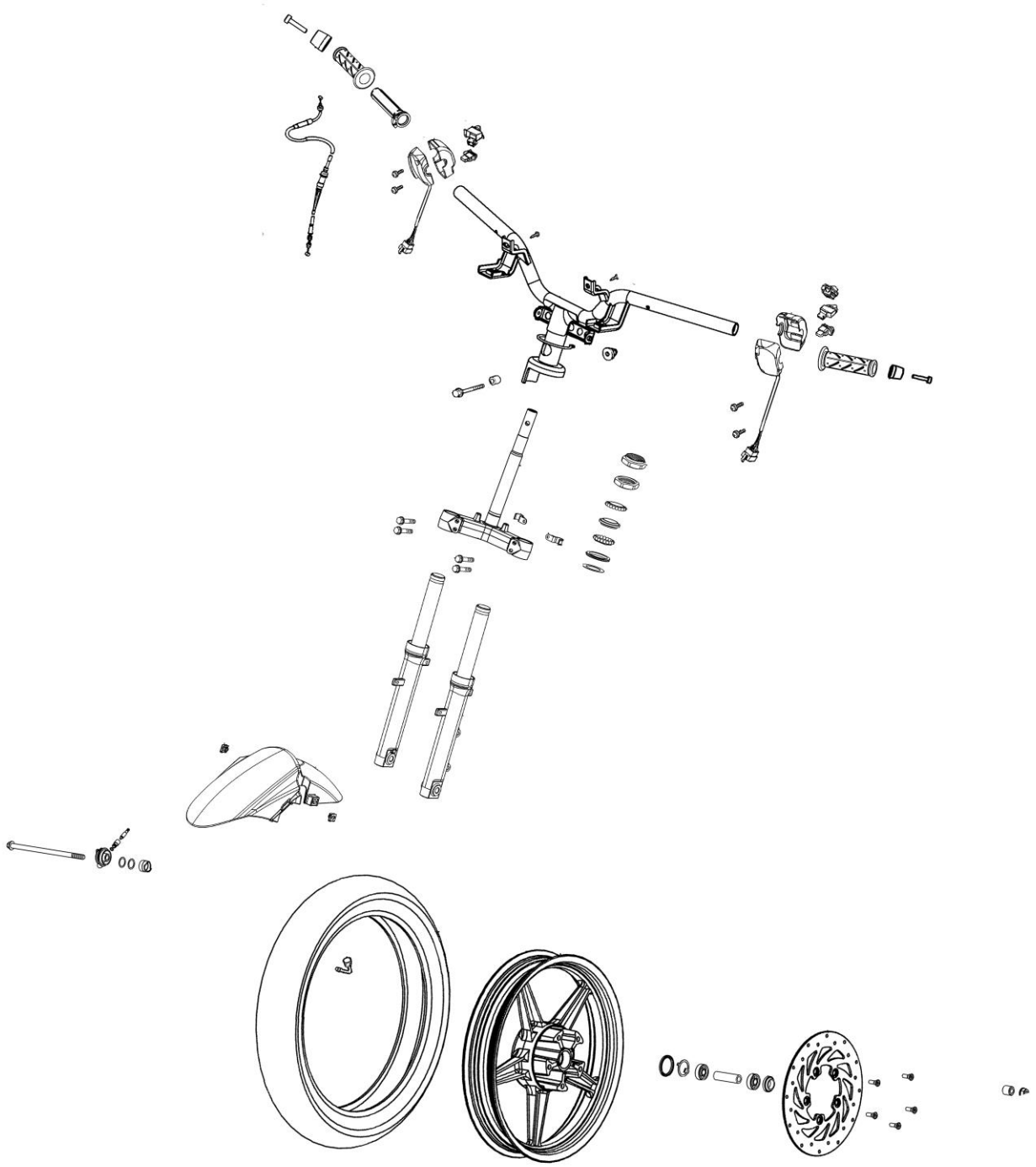


Dowel Pins

Tighten the two crankcase attaching bolts.
Torque: 0.8~1.2kg-m

Crankcase Bolts





SERVICE INFORMATION 12-1
TROUBLESHOOTING 12-2
STEERING HANDLEBAR 12-3
FRONT WHEEL 12-4
FRONT SHOCK ABSORBER 12-18
FRONT FORK 12-21

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Remove the motorcycle frame covers before removing the front wheel. Jack the motorcycle front wheel off the ground and be careful to prevent the motorcycle from falling down.
- During servicing, keep oil or grease off the brake drum and brake linings.

SPECIFICATIONS

Item		Standard (mm)	Service Limit (mm)
Axle shaft runout		—	0.2
Front wheel rim runout	Radial	—	2.0
	Axial	—	2.0
Front shock absorber spring free length		230	226.5

TORQUE VALUES

Handlebar bolt	4.5~5.5kgf-m
Steering stem lock nut	6.0~8.0kgf-m
Steering top cone race	0.5~1.3kgf-m
Front shock absorber bolt	3.0kgf-m
Front axle nut	5.0~7.0kgf-m
Brake arm bolt	0.8~1.2kgf-m

SPECIAL TOOLS

Long socket wrench,32mm 8angle

TROUBLESHOOTING

Hard steering (heavy)
- Excessively tightened steering stem top cone race
- Broken steering balls
- Insufficient tire pressure

Steers to one side or does not track straight
- Uneven front shock absorbers
- Bent front fork
- Bent front axle or uneven tire

Front wheel wobbling
- Bent rim
- Excessive wheel bearing play
- Bent spoke plate
- Faulty tire
- Improperly tightened axle nut

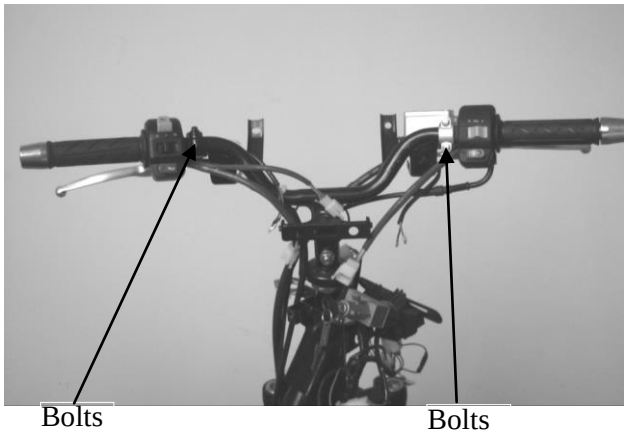
Soft front shock absorber
- Weak shock springs
- Insufficient damper oil

Front shock absorber noise
- Slider bending
- Loose fork fasteners
- Lack of lubrication

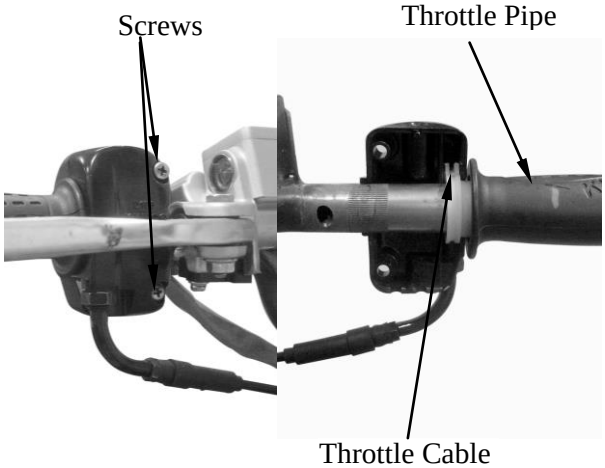
STEERING HANDLEBAR

REMOVAL

Remove the handlebar front and rear covers. (⇨2-2)
Remove the two bolts attaching each of the front and rear brake levers.
Remove the front and rear brake levers.



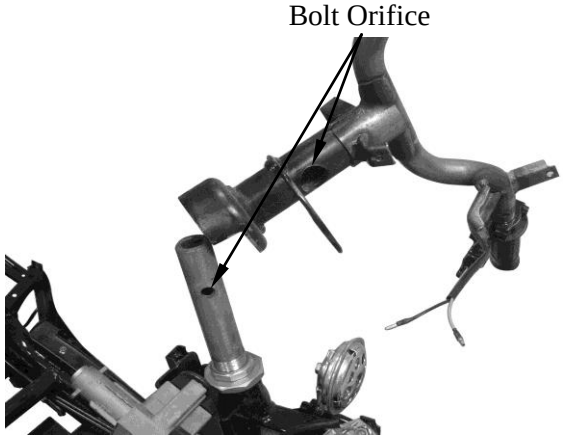
Remove the two throttle holder screws and throttle holder.
Disconnect the throttle cable from the throttle pipe and then remove the throttle pipe from the handlebar.



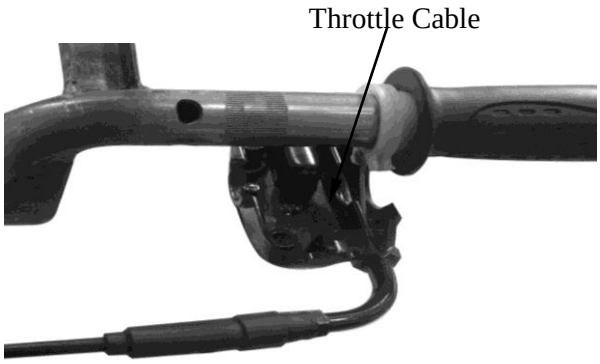
Remove the handlebar lock nut and bolt to remove the handlebar.

INSTALLATION

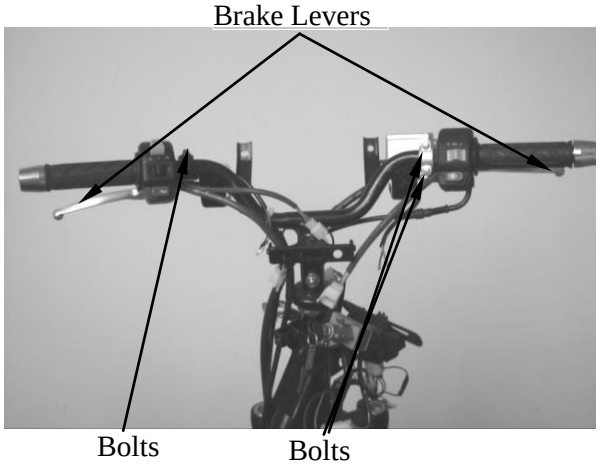
Install the handlebar onto the steering stem by aligning the tab on the handlebar with the bolt orifice on the steering stem.
Install and tighten the handlebar bolt and lock nut.
Torque: 4.5～5.5kgf-m



Apply grease to the tip of the throttle pipe.
Install the throttle pipe and connect the throttle cable.



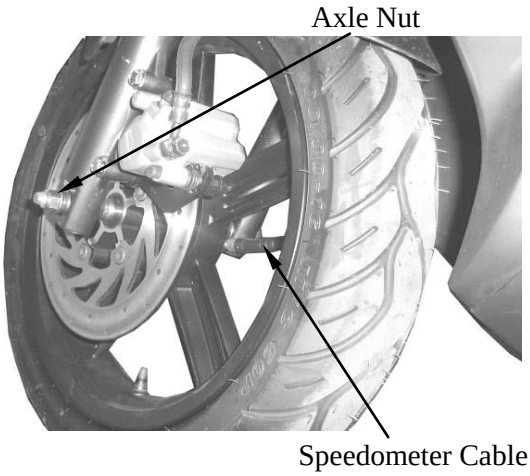
Install the front and rear brake levers in the reverse order of removal.



FRONT WHEEL

REMOVAL

Jack the motorcycle front wheel off the ground.
Remove the speedometer cable set screw and disconnect the speedometer cable.
Remove the front axle nut and pull out the axle.
Remove the front wheel.
Remove the and speedometer gear box and side collar.

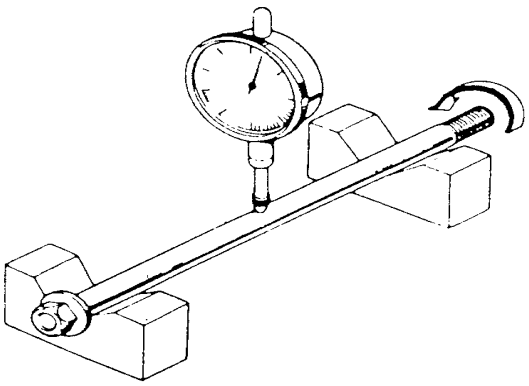


INSPECTION

AXLE RUNOUT

Set the axle in V blocks and measure the runout using a dial gauge.
The actual runout is $^1/_2$ of the total indicator reading.

Service Limit: 0.2mm replace if over



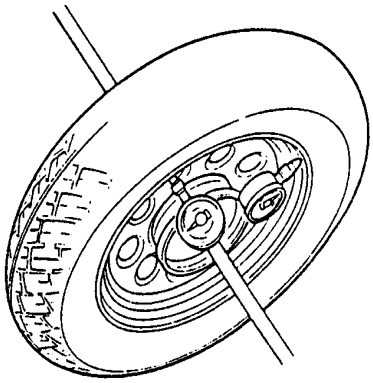
WHEEL RIM

Check the wheel rim runout.

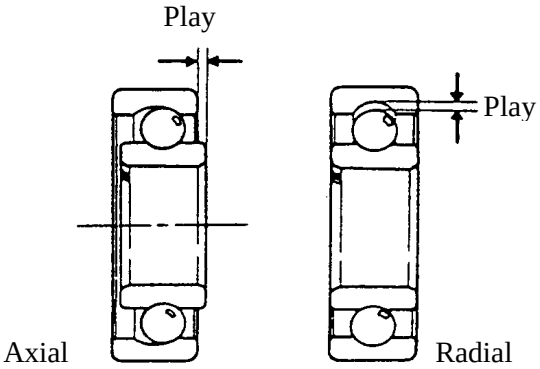
Service Limits:

Radial: 2.0mm replace if over

Axial: 2.0mm replace if over



Turn the wheel bearings and replace the bearings if they are noisy or have excessive play.



DISASSEMBLY

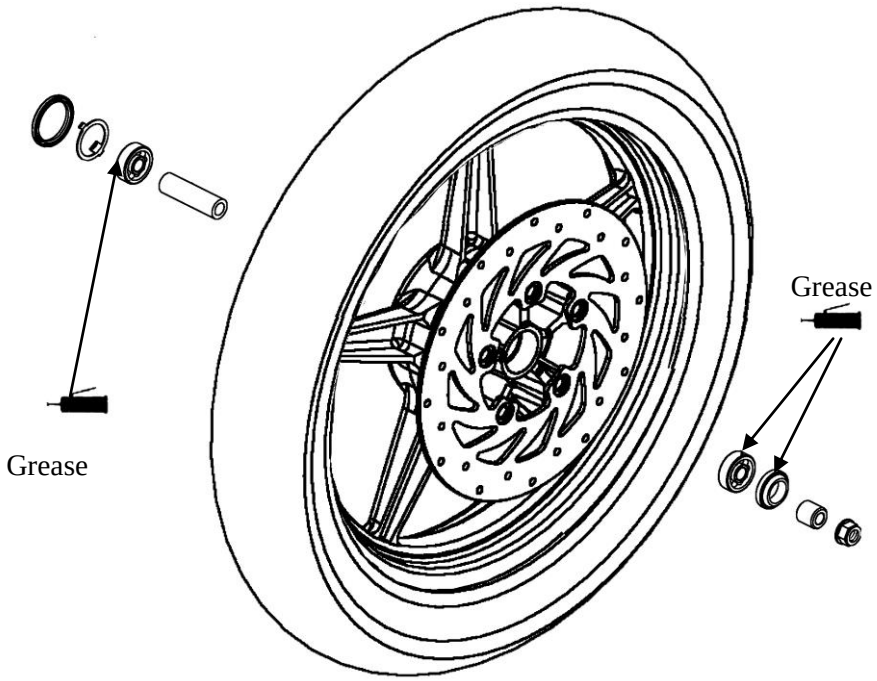
Remove the dust seal.

Remove the front wheel bearings and distance collar.

Special

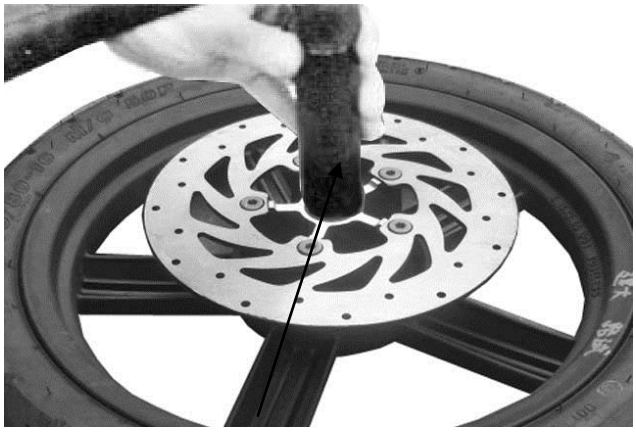
Bearing Puller

ASSEMBLY

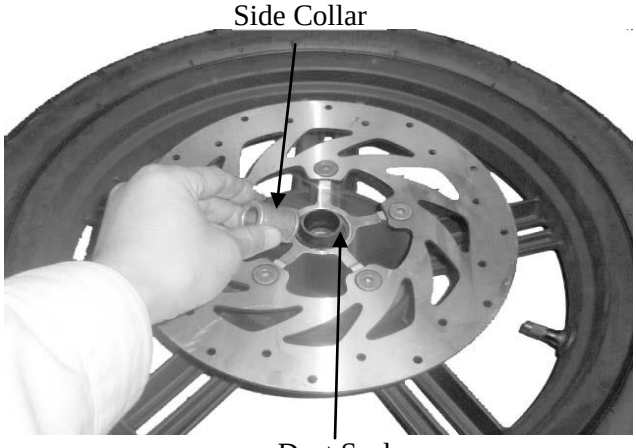


Pack all bearing cavities with grease.
Drive in the left bearing.
Install the distance collar.
Drive in the right bearing.

* Drive in the bearing squarely with the sealed end facing out.



Apply grease to a new dust seal lip and install the dust seal.
Install the side collar.



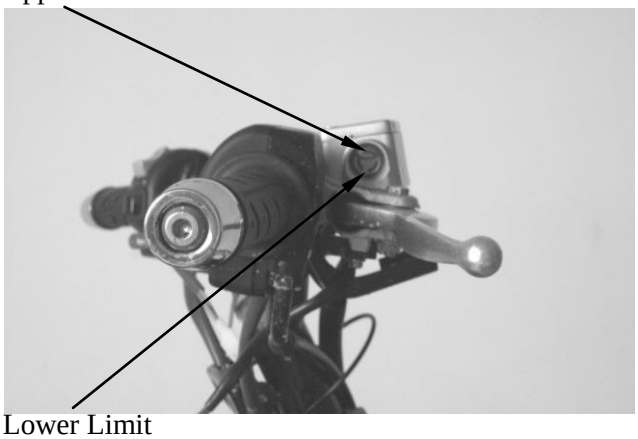
HYDRAULIC BRAKE (FRONT BRAKE)

Brake Fluid Replacement/Air Bleeding

Check the brake fluid level on level ground.

*
- When operating the brake lever, the brake reservoir cap must be tightened securely to avoid spill of brake fluid.
- When servicing the brake system, use shop towels to cover plastic parts and coated surfaces to avoid damage caused by spill of brake fluid.

Upper Limit



Lower Limit

Brake Fluid Bleeding

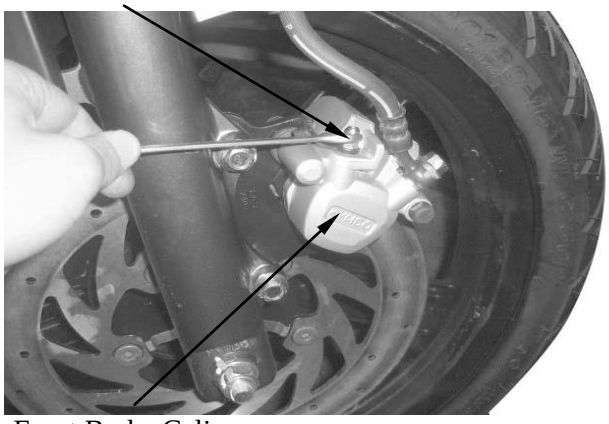
In order to avoid spill of brake fluid, connect a transparent hose to the bleed valve.

Warning

Brake fluid spilled on brake pads or brake disk will reduce the braking effect. Clean the brake pads and brake disk with a high quality brake degreaser.

Fully apply the brake lever and then loosen the brake caliper bleed valve to drain the brake fluid until there is no air bubbles in the brake fluid. Then, tighten the bleed valve. Repeat these steps until the brake system is free of air.

Bleed Valve



Front Brake Caliper

Brake Fluid Refilling

Add DOT-4 brake fluid to the brake reservoir.

*
- When bleeding, be careful not to allow air in the brake reservoir flowing into the brake system.
- When using a brake bleeder, follow the manufacturer‘s instructions.
- Never use dirty or unspecified brake fluid or mix different brake fluids be-cause it will damage the brake

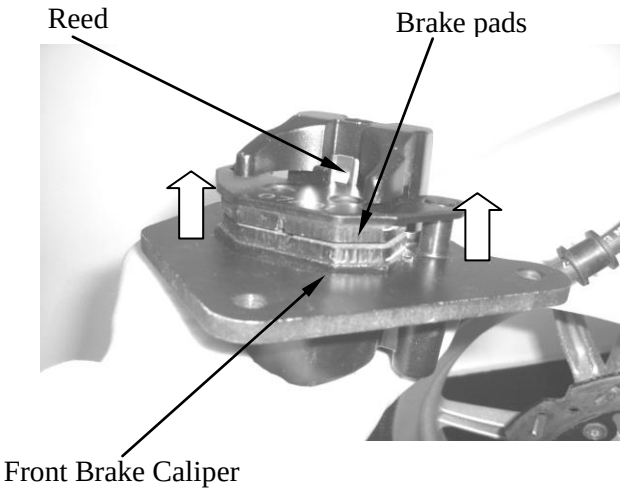
Make sure to bleed air from the brake system.

Brake Pad/Disk Replacement

* The brake pads must be replaced as a set to ensure the balance of the brake disk.

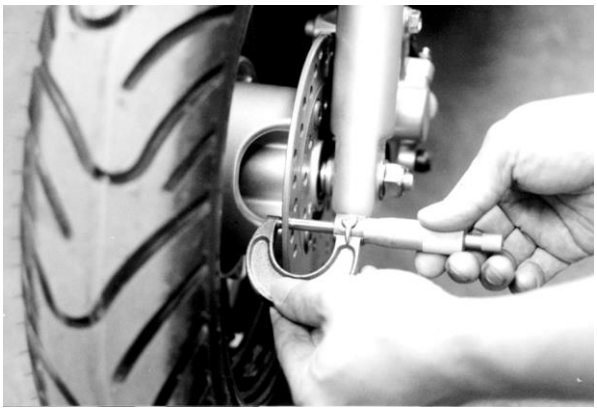
Remove the two bolts attaching the brake caliper.
Remove the brake caliper.
Downpress reed and remove the brake pads.
Install the brake pads in the reverse order of removal.

* • Keep grease or oil off the brake pads to avoid brake failure.



Brake Disk

Measure the brake disk thickness.
Service Limit: 3.0mm
Measure the brake disk runout.
Service Limit: 0.3mm



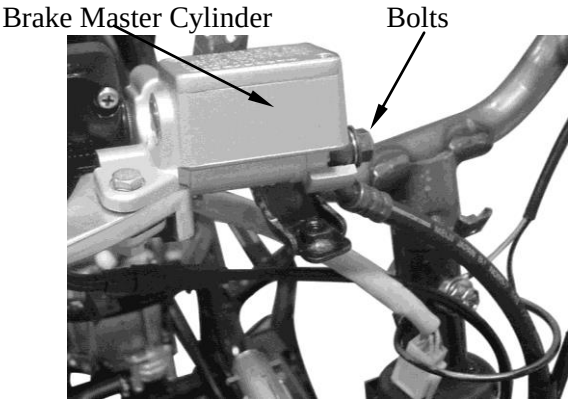
BRAKE MASTER CYLINDER

Removal

First drain the brake fluid from the hydraulic brake system.

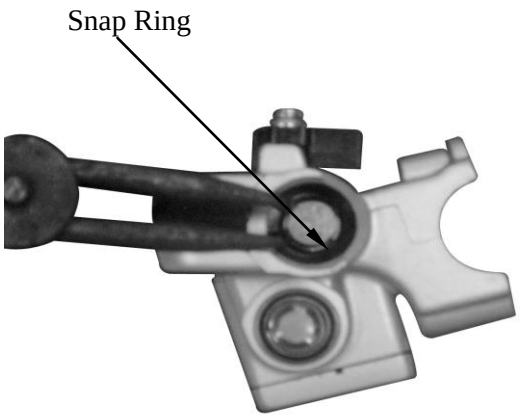
*

- When servicing the brake system, use shop towels to cover rubber and plastic parts and coated surfaces to avoid being contaminated by brake fluid.
- When removing the brake fluid pipe bolt, be sure to plug the pipe to avoid brake fluid leakage.

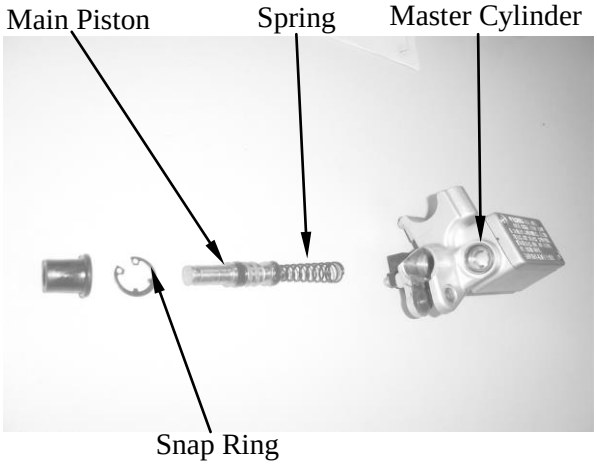


Disassembly

Remove the piston rubber cover and snap ring from the brake master cylinder.



Remove the washer, main piston and spring from the brake master cylinder.
Clean the inside of the master cylinder and brake reservoir with brake fluid.

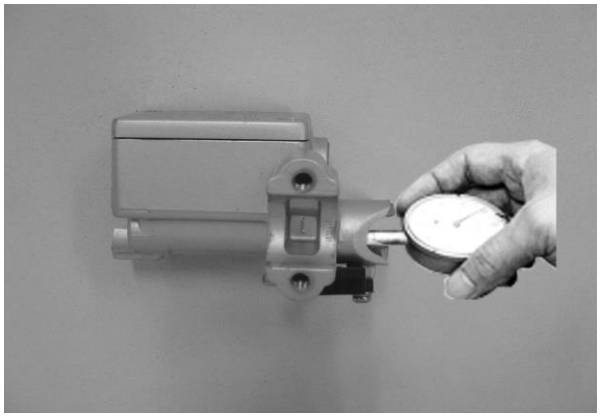


Inspection

Measure the brake master cylinder I.D.

Service Limit: 12.75mm

Inspect the master cylinder for scratch or crack.



Measure the brake master cylinder piston O.D.

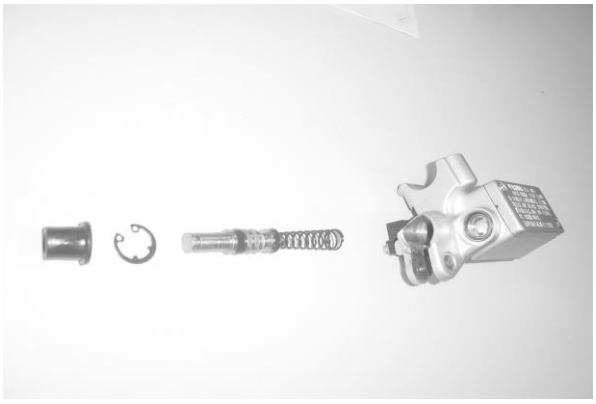
Service Limit: 12.6mm

Before assembly, inspect the lst and 2nd rubber cups for wear.

Assembly

Before assembly, apply brake fluid to all removed parts.

Install the spring together with the 1st rubber cup.



*

- During assembly, the main piston and spring must be installed as a unit without exchange.
- When assembling the piston, soak the cups in brake fluid for a while.
- Install the cups with the cup lips facing the correct direction.

Install the main piston, spring and snap ring.

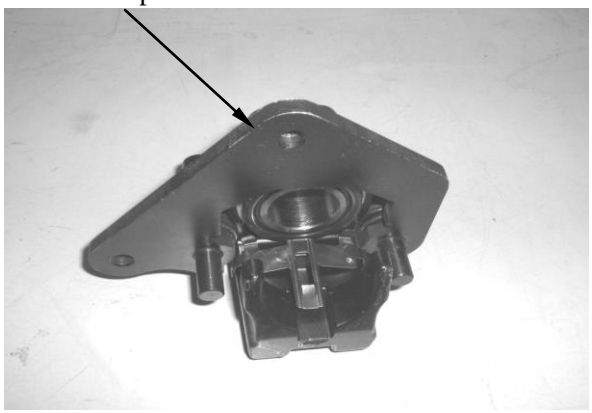
Install the rubber cover.

Install the brake lever.

Disassembly

Remove the brake caliper seat from the brake caliper.

Brake Caliper Seat

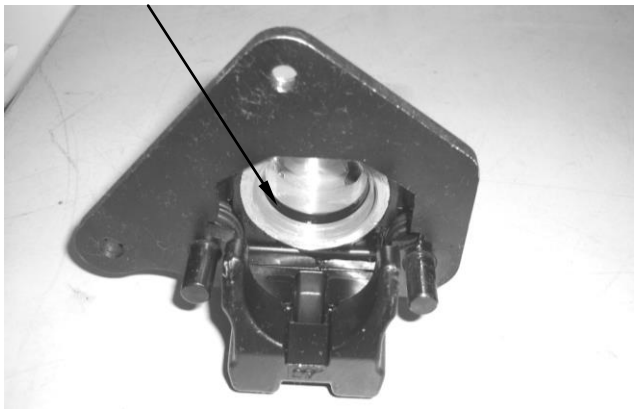


Remove the piston from the brake caliper.
If necessary, use compressed air to squeeze out the piston through the brake fluid inlet opening and place a shop towel under the caliper to avoid contamination caused by the removed piston.
Check the piston cylinder for scratch or wear and replace if necessary.

Compressed Air

Push the piston oil seal outward to remove it.
Clean the oil seal groove with brake fluid.

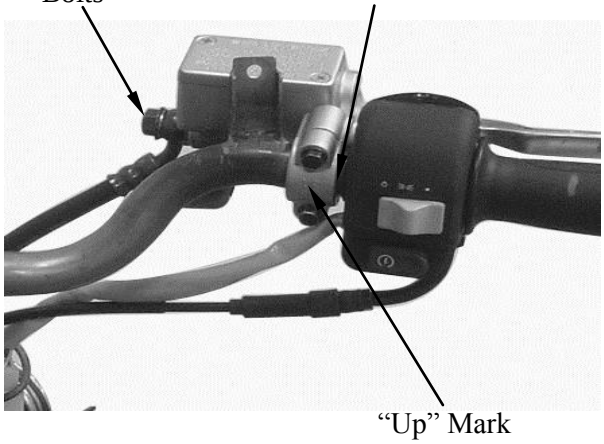
Piston Oil Seal



* Be careful not to damage the piston surface.

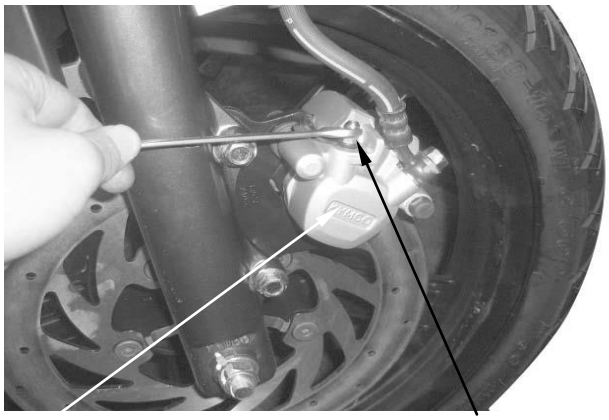
Place the brake master cylinder on the handlebar and install the holder with "up" mark facing up. Be sure to align the punch mark with the holder joint.
First tighten the upper bolt and then tighten the lower bolt.

Torque: 3.0～4.0kgf-m



Install the brake fluid pipe with the attaching bolt and two sealing washers.

Install the handlebar covers. (⇨12-3)
Fill the brake reservoir with recommended brake fluid to the upper limit and bleed air according to the method stated in 12-10.

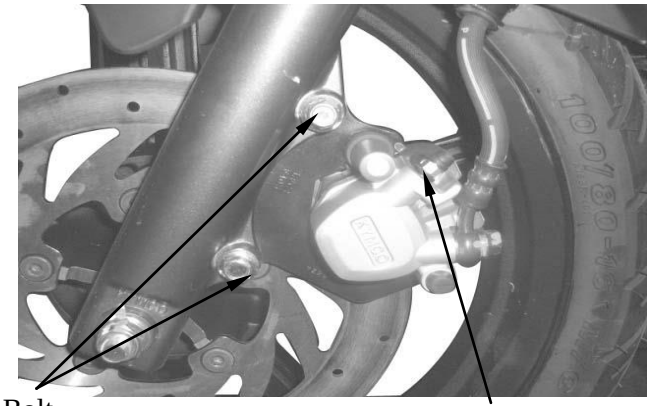


BRAKE CALIPER (FRONT)

Removal

Remove the brake caliper.
Place a clean container under the brake caliper and disconnect the brake fluid pipe from the caliper.

* Do not spill brake fluid on any coated surfaces.



Check the piston for scratch or wear.
Measure the piston O.D. with a micrometer.
Service Limit: 34mm

Check the caliper cylinder for scratch or wear and measure the cylinder bore.
Service Limit: 34.5mm

Assembly
Clean all removed parts.
Apply silicon grease to the piston and oil seal.
Lubricate the brake caliper cylinder inside wall with brake fluid.
Install the brake caliper piston with grooved side facing out.

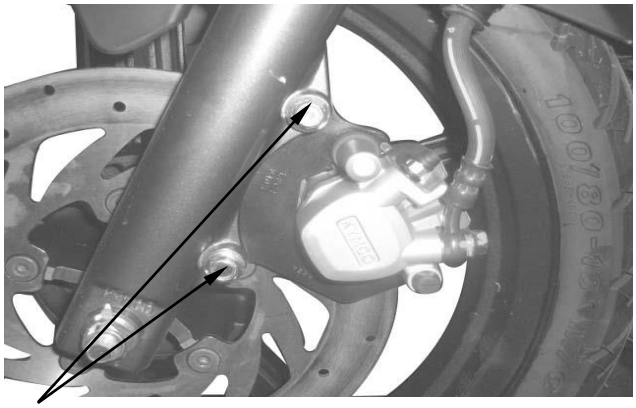
* Install the piston with its outer end 3～5mm protruding beyond the brake caliper.

Wipe off excessive brake fluid with a clean shop towel. Apply silicon grease to the brake caliper seat pin and caliper inside.
Install the brake caliper seat.

Installation

Install the brake caliper and tighten the two bolts.

Torque: 2.9～3.5kg-m

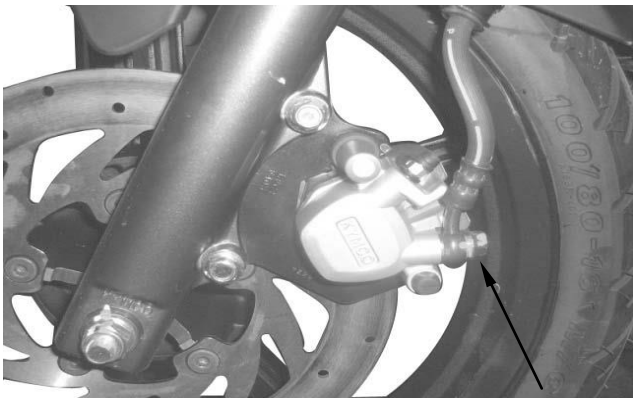


Bolts

Connect the brake fluid pipe to the brake caliper and tighten the fluid pipe bolt.

Torque: 2.5～3.5kg-m

Fill the brake reservoir with recommended brake fluid and bleed air from the brake syst em. (⇨12-10)

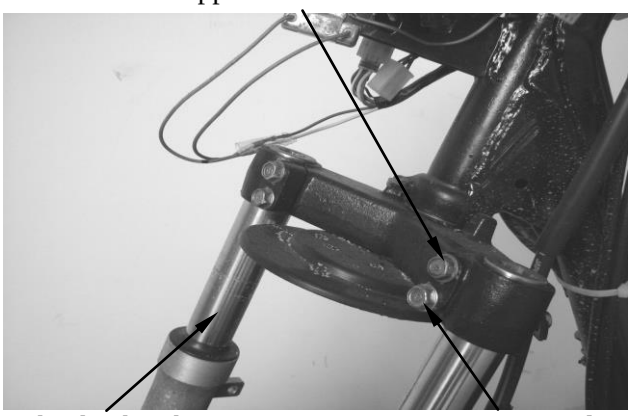


Bolt

FRONT SHOCK ABSORBER

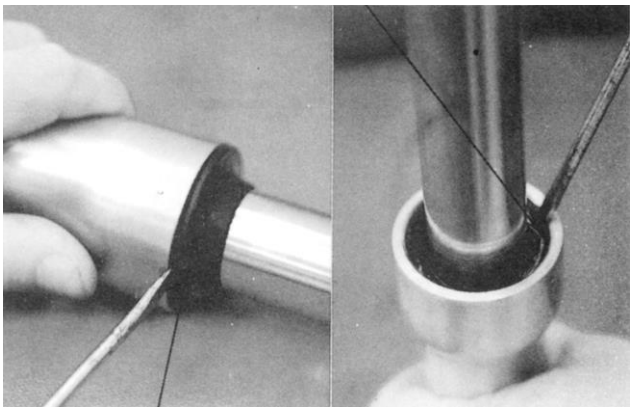
REMOVAL

Remove the front wheel. (⇨12-4)
Remove the front lower cover. (⇨2-2)
Remove the front inner fender.
Remove the front shock absorber upper mount bolts.
Loosen the lower mount bolts to remove the front shock absorbers.

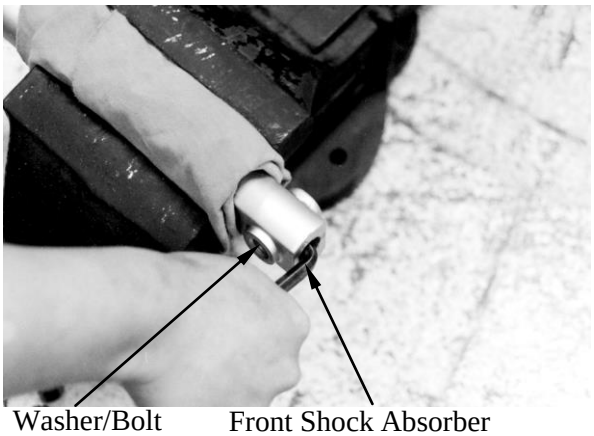


DISASSEMBLY

Remove the dust boot.
Remove the circlip.

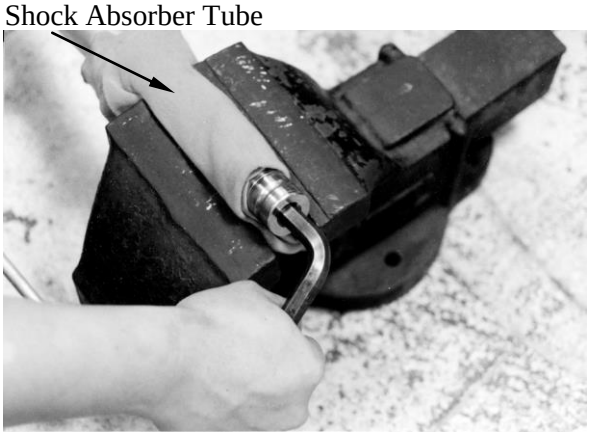


Set the front shock absorber in a vise.
Remove the damper rod, hex bolt and copper washer.
Pull out the front shock absorber tube.



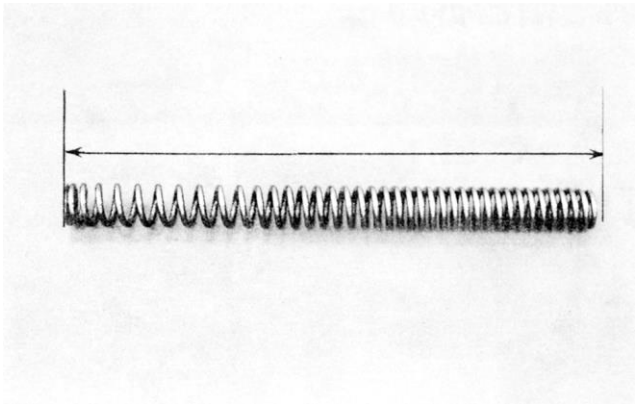
Set the front shock absorber tube in a vise.
Remove the top nut, shock spring, damper, and damper spring from the front shock absorber tube.

* • When holding the shock absorber tube, place a shop towel to protect it and do apply too much force .

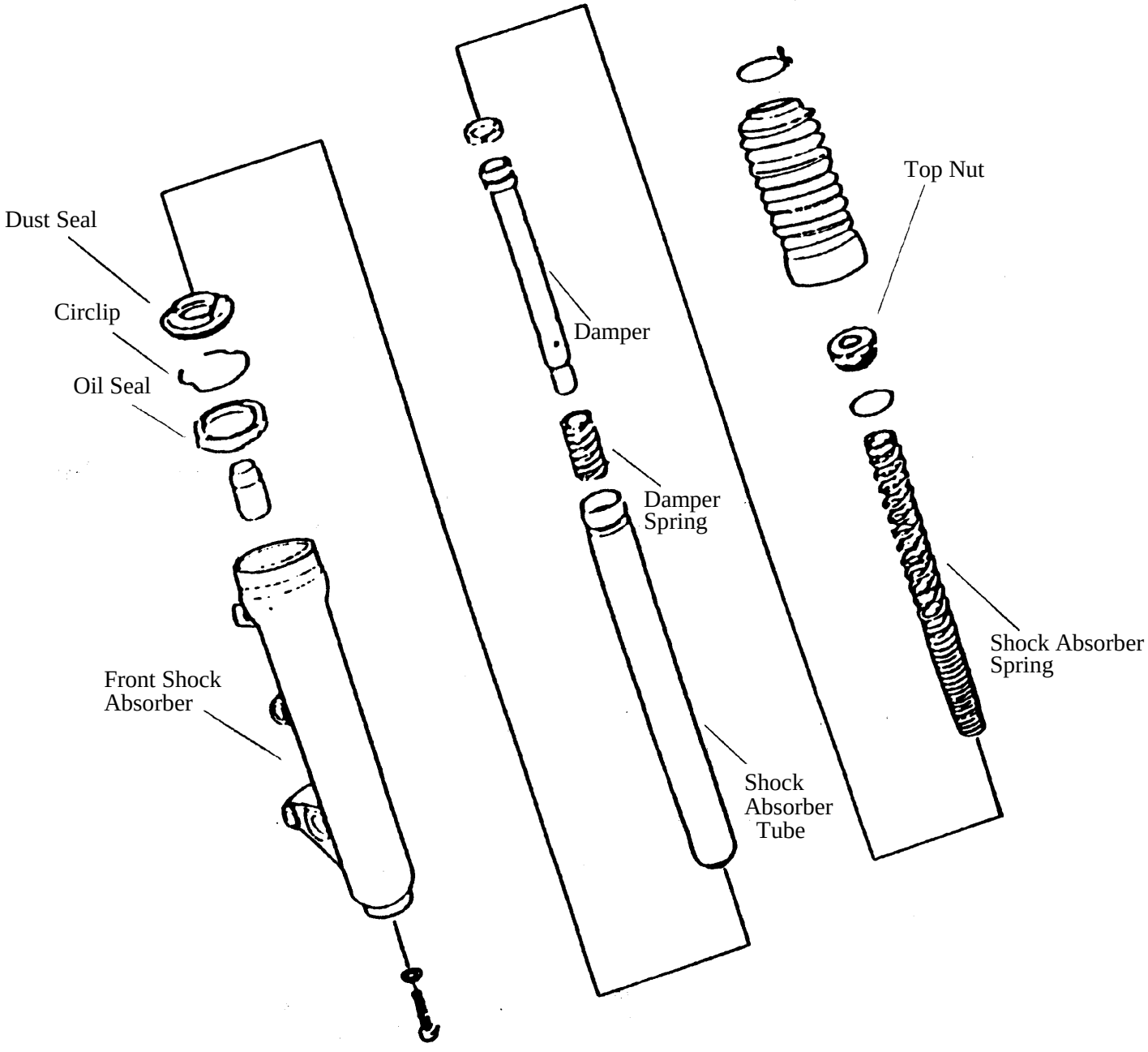


Measure the front shock absorber spring free length.

Service Limits: Right : 226.5mm
Left : 226.5mm



ASSEMBLY



Install the damper spring onto the damper rod and then install them into the front shock

absorber tube.
Install the shock absorber spring onto the front shock absorber tube and tighten the top nut.

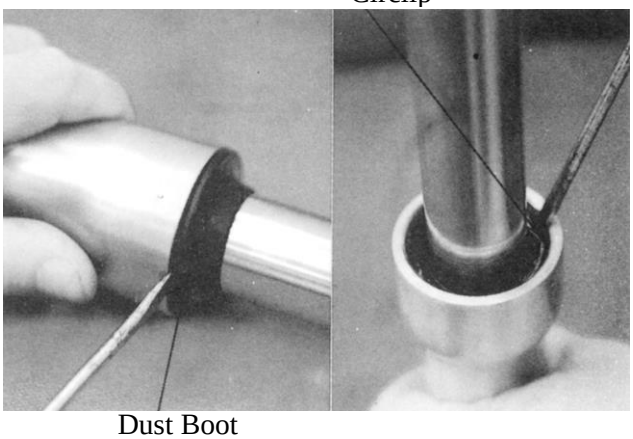
* Install the front shock absorber spring with the closely wound coils facing down.


Shock Absorber Tube

Set the front shock absorber in a vise.
Insert the shock absorber tube into the shock absorber and tighten the hex bolt.
(Apply locking agent to the washer and install it together with the hex bolt.)
Torque: 3.0kgf-m

Add engine oil into the front shock absorber.
Specified Oil: SS#8
Oil Capacity: 97±1cc

Circlip


Dust Boot

Install the circlip.
Install the dust boot.

Upper Mount Bolts


Front Shock Absorber
Lower Mount Bolts

INSTALLATION

Install the front shock absorbers onto the steering stem.
Install and tighten the front shock absorber upper mount bolts.
Tighten the lower mount bolts.

* Align the upper mount bolt hole with the groove on the front fork.

Install the front wheel. (⇨12-7)

FRONT FORK

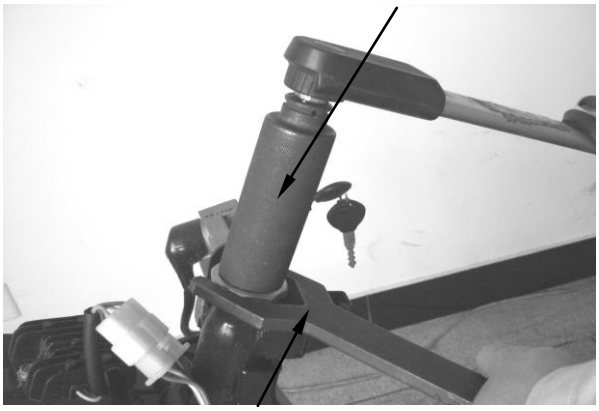
REMOVAL

Remove the steering handlebar. (⇨12-3)
Remove the front wheel. (⇨12-4)
Disconnect the speedometer cable.
Remove the steering stem lock nut using long socket wrench.

Special

Long Socket Wrench,32mm 8Angle

Long Socket Wrench



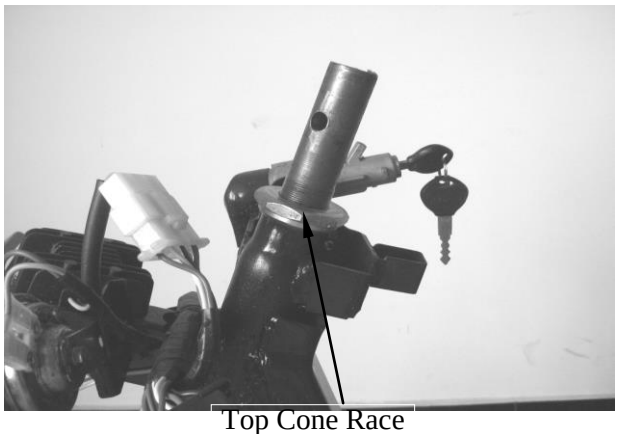
Lock Nut Wrench

Remove the top cone race and remove the steering stem.

* • Be careful not to lose the steel balls (26 on top race and 29 on bottom race).

Inspect the ball races and cone races for wear or damage and replace if necessary.

.



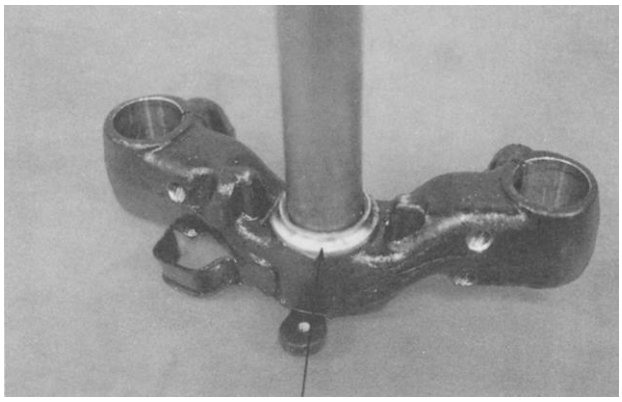
Top Cone Race

BOTTOM CONE RACE REPLACEMENT

Remove the bottom cone race using a chisel.

* Be careful not to damage the steering stem and front fork.

Drive a new bottom cone race into place with a proper driver.

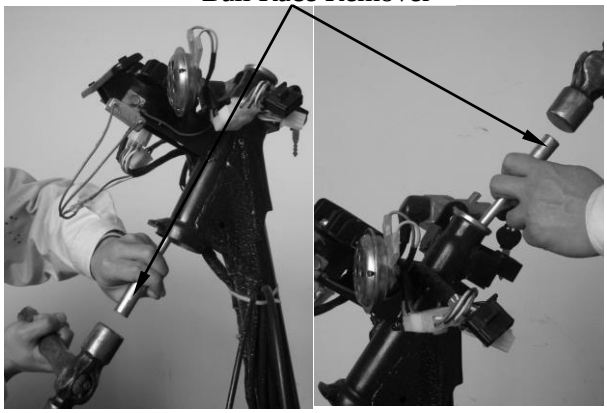


Bottom Cone Race

BALL RACE REPLACEMENT

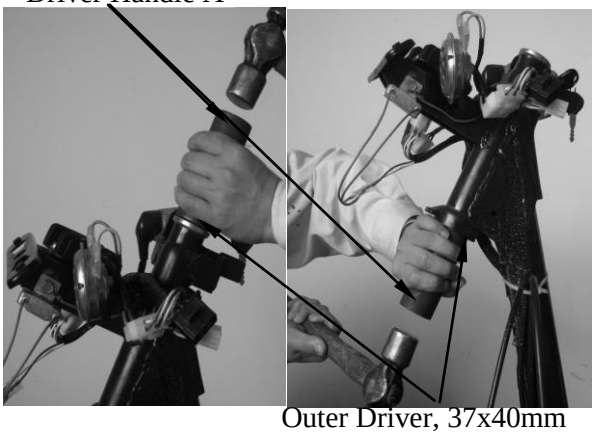
Drive out the top and bottom ball races.

Ball Race Remover



Drive new top and bottom ball races into the steering head using the outer driver.

Driver Handle A

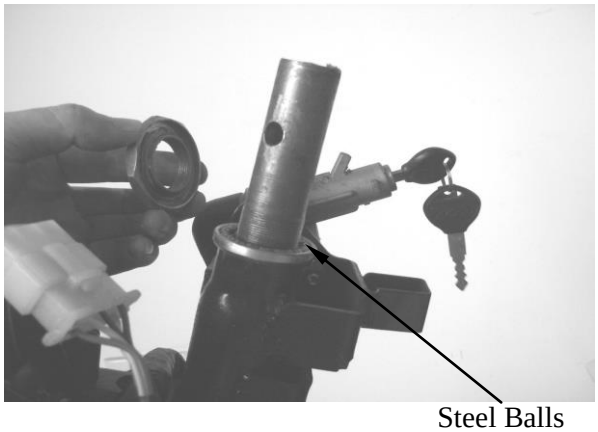


Outer Driver, 37x40mm

* Be sure to completely drive in the ball races.

INSTALLATION

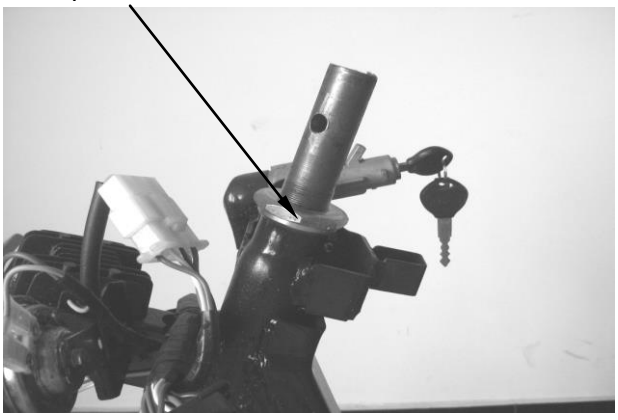
Apply grease to the top and bottom ball races and install 26 steel balls on the top ball race and 29 steel balls on the bottom ball race.
Apply grease to the ball races and install the front fork.



Steel Balls

Apply grease to the top cone race and install it.
Tighten the top cone race and then turn the steering stem right and left several times to make steel balls contact each other closely.

Top Cone Race



* Check that the steering stem rotates freely without vertical play.

Install the steering stem lock nut and tighten it while holding the top cone race.

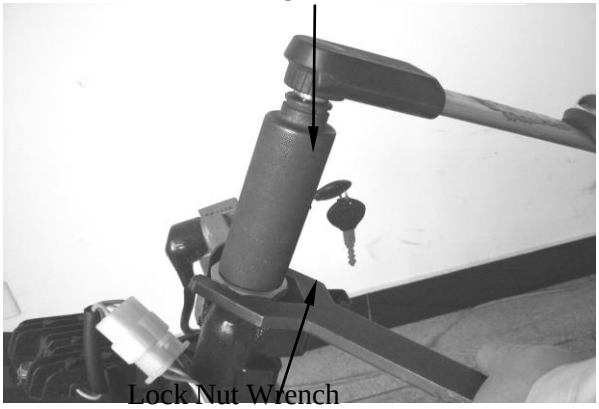
Torque: 6.0～8.0kgf-m

Install the front wheel. (⇨12-7)
Install the steering handlebar. (⇨12-3)
Install the speedometer cable. (⇨12-7)

Special

Long Socket Wrench,32mm×8Angle

Long Socket Wrench



Lock Nut Wrench

13. REAR WHEEL/REAR BRAKE/REAR SHOCK ABSORBER

REAR WHEEL/REAR BRAKE/REAR SHOCK ABSORBER

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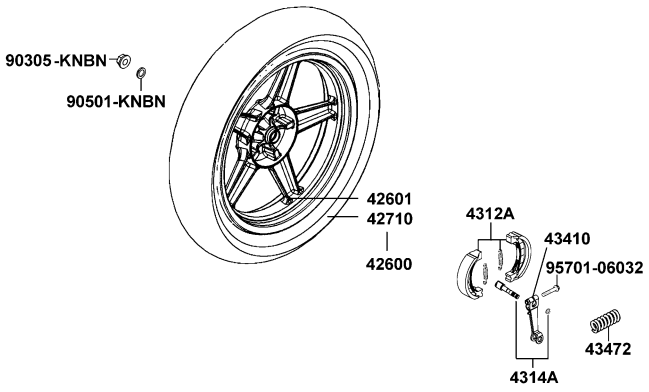
TROUBLESHOOTING 13-2
REAR BRAKE 13-3
REAR WHEEL ----------13-7
REAR SHOCK ABSORBER 13-8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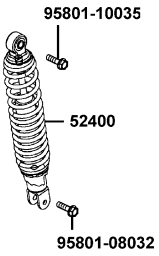
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52400
95801-08032

13. REAR WHEEL/REAR BRAKE/REAR SHOCK ABSORBER

SERVICE INFORMATION

GENERAL INSTRUCTIONS

*When performing the service stated in this section,the engine and exhaust muffler must be cold to avoid scalding.

*During servicing,keep oil or grease off the brake pads and brake disk.

REAR SHOCK ABSORBER REMOVAL

Remove the met-in box.
Remove the frame body cover
Remove the suspension upper mount bolt
Remove the suspension lower mount bolt
Remove the rear shock absorber

INSTALLATION

Install the upper and lower mount bolts.
Install the frame body cover.
Torque:
Upper Mount Bolt: 35～45Nm
Lower Mount Bolt: 24～30Nm

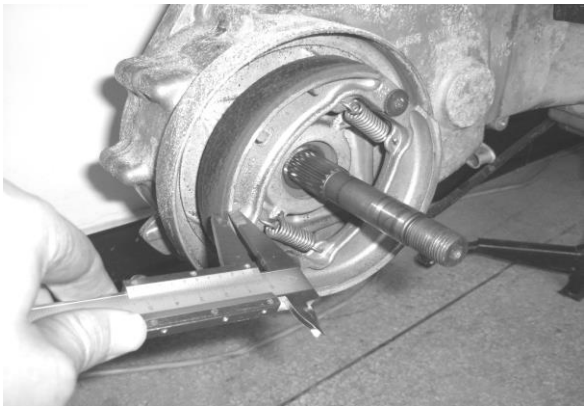
REAR WHEEL REMOVAL

Disconnect the connector of O_2 sensor.
Remove the muffler mount bolts
Remove the muffler.
Remove the rear fork
Remove the rear axle mount bolt
Remove the rear wheel.

INSTALLATION

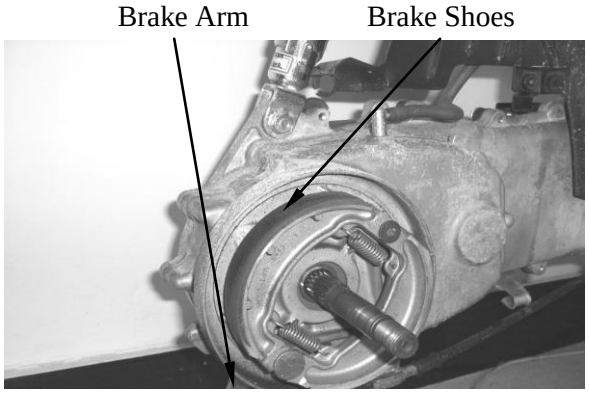
Install the rear wheel in reverse order of removal.
Torque:
Rear axle Mount Bolt: 110～130Nm
Muffler Mount Bolts: 35 Nm
Muffler Joint Bolts: 12Nm

REAR BRAKE REMOVAL
BRAKE LINING INSPECTION
Measure the brake lining thickness.
Service Limit: 2.0mm replace if below

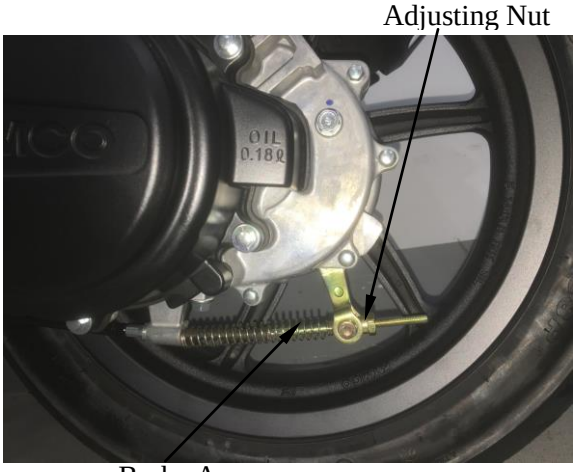


* Keep oil or grease off the brake linings.

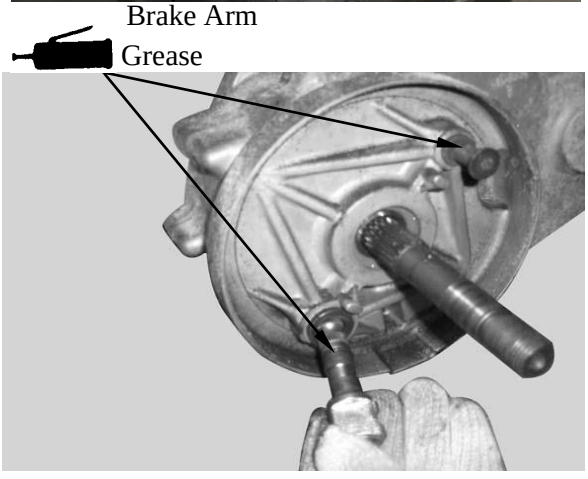
REAR BRAKE DISASSEMBLY
Remove the rear brake adjusting nut and disconnect the rear brake cable.
Remove the rear brake shoes.



Remove the brake arm bolt to remove the brake arm.
Remove the brake cam.



REAR BRAKE ASSEMBLY
Apply grease to the anchor pin.
Apply grease to the brake cam and install it.
Install the brake shoes.

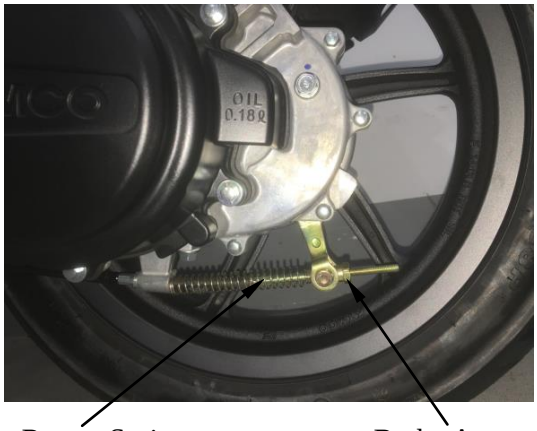


Apply a small amount of engine oil to the felt seal and install it to the brake cam.
Install the brake arm.

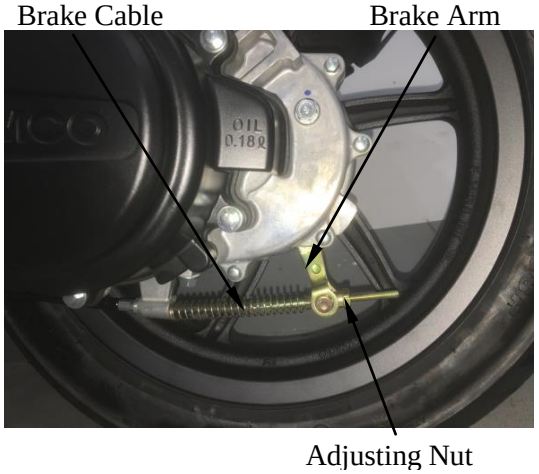
* Align the wide groove on the wear indicator plate with the wide tooth of the brake cam.

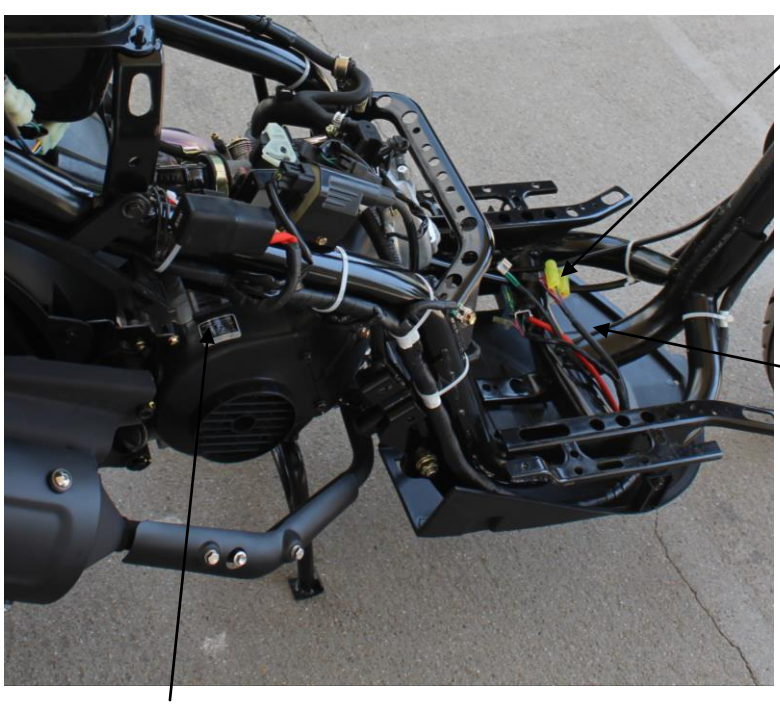
Install and tighten the brake arm bolt.

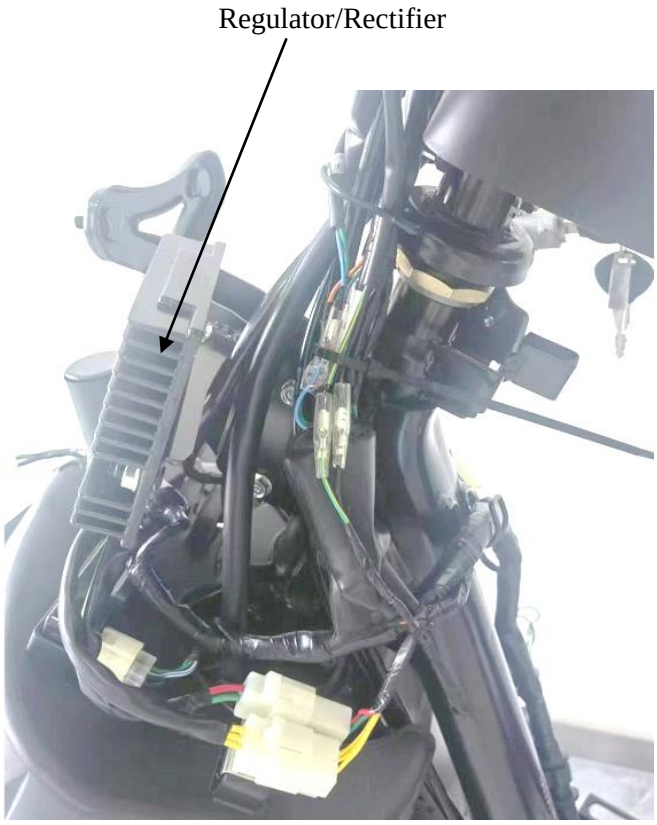
* Align the scribed line on the brake arm with the punch mark on the brake cam.



Install the brake arm return spring.
Install the brake arm pin.
Connect the brake cable and install the adjusting nut.
Install the rear wheel. (⇨13-2)
Adjust the rear brake lever free play. (⇨3-8)




Fuse
Battery
A.C. Generator


Regulator/Rectifier

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A.C. GENERATOR CHARGING COIL....14-6
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A.C. GENERATOR REMOVAL 14-6
A.C. GENERATOR INATALLATION....14-8

SERVICE INFORMATION

GENERAL INSTRUCTIONS

The battery electrolyte (sulfuric acid) is poisonous and may seriously damage the skin and eyes. Avoid contact with skin, eyes, or clothing. In case of contact, flush with water and get prompt medical attention

- The battery can be charged and discharged repeatedly. If a discharged battery is not used for a long time, its service life will be shortened. Generally, the capacity of a battery will decrease after it is used for 2～3 years. A capacity-decreased battery will resume its voltage after it is recharged but its voltage decreases suddenly and then increases when a load is added.
- When a battery is overcharged, some symptoms can be found. If there is a short circuit inside the battery, no voltage is produced on the battery terminals. If the rectifier won't operate, the voltage will become too high and shorten the battery service life.
- If a battery is not used for a long time, it will discharge by itself and should be recharged every 3 months.
- A new battery filled with electrolyte will generate voltage within a certain time and it should be recharged when the capacity is insufficient. Recharging a new battery will prolong its service life.
- Inspect the charging system according to the sequence specified in the Troubleshooting.
- Do not disconnect and soon reconnect the power of any electrical equipment because the electronic parts in the regulator/rectifier will be damaged. Turn off the ignition switch before operation.
- It is not necessary to check the MF battery electrolyte or fill with distilled water.
- Check the load of the whole charging system.
- Do not quick charge the battery. Quick charging should only be done in an emergency.
- Remove the battery from the motorcycle for charging.
- When replacing the battery, do not use a traditional battery.
- When charging, check the voltage with an voltmeter.

SPECIFICATIONS

Item			Standard
Battery	Capacity/Model		12V–8AH
	Voltage (20℃)	Fully charged	13.1V
		Undercharged	12.3V
	Charging current		STD: 0.4A Quick: 4.0A
	Charging time		STD: 5～10hr Quick: 30min
Regulator/Rectifier	Limit voltage		14±0.5V/5000rpm

TORQUE VALUES

Pulser coil bolt	0.45~0.6kgf-m
Stator bolt	0.8~1.2kgf-m
Flywheel nut	3.5~4.5kgf-m
Cooling fan bolt	0.8~1.2kgf-m

SPECIAL TOOLS

Universal holder
Flywheel puller

TESTING INSTRUMENTS

Kowa electric tester
Sanwa electric tester

TROUBLESHOOTING

No power

- Dead battery
- Disconnected battery cable
- Fuse burned out
- Faulty ignition switch

Low power

- Weak battery
- Loose battery connection
- Charging system failure
- Faulty regulator/rectifier

Intermittent power

- Loose battery cable connection
- Loose charging system connection
- Loose connection or short circuit in lighting system

Charging system failure

- Loose, broken or shorted wire or connector
- Faulty regulator/rectifier
- Faulty A.C. generator

BATTERY

REMOVAL

Remove the battery cover screws on the floor board.
Open the battery cover and remove the battery by removing the bolt and band.
First disconnect the battery negative (-) cable and then the positive (+) cable.

> When disconnecting the battery positive (+) cable, do not touch the frame with tool; otherwise it will cause short circuit and sparks to fire the fuel.

The installation sequence is the reverse of removal.

> First connect the positive (+) cable and the negative (-) cable to avoid short circuit.

BATTERY VOLTAGE (OPEN CIRCUIT VOLTAGE) INSPECTION

Remove the floor board.
Open the battery cover and disconnect the battery cables.
Measure the voltage between the battery terminals.
Fully charged : 13.1V
Undercharged: 12.3V max.

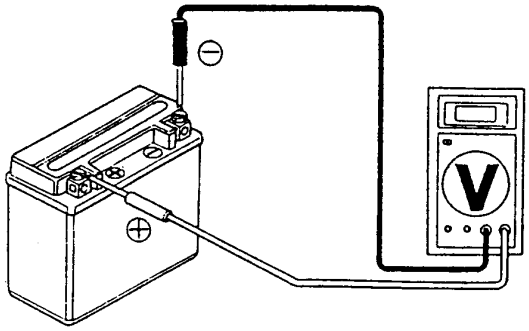
> * Battery charging inspection must be performed with a voltmeter.

CHARGING

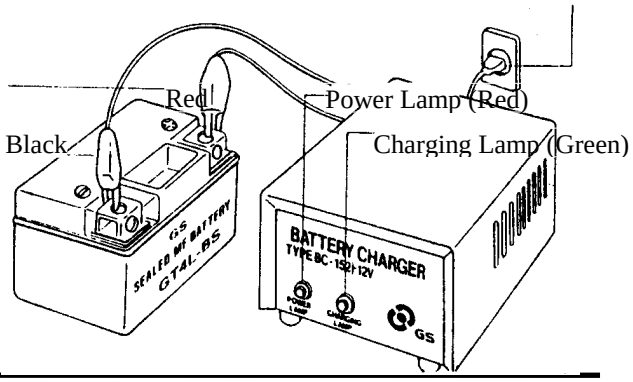
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (-) cable to the battery negative (-) terminal.

> - Keep flames and sparks away from a charging battery.
> - Turn power ON/OFF at the charger, not at the battery terminals to prevent sparks near the battery to avoid explosion.
> - Charge the battery according to the current specified on the battery.

> * - Quick charging should only be done in an emergency.
> - Measure the voltage 30 minutes after the battery is charged.



Charging current: Standard : 0.4A
Quick : 4A
Charging time : Standard : 5～10 hours
Quick : 30 minutes
After charging: Open circuit voltage: 12.8V min.
Note: The battery temperature should not exceed 45℃ during charging.



CHARGING SYSTEM

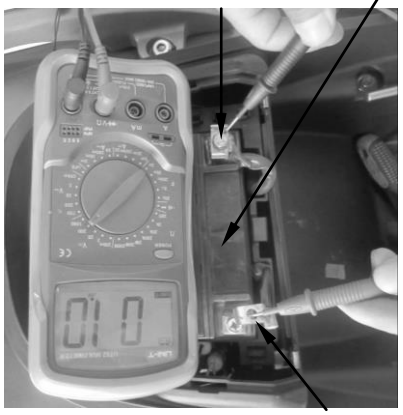
SHORT CIRCUIT TEST

Disconnect the ground wire from the battery and connect an ammeter across the battery negative (-) terminal and the ground wire. Turn the ignition switch OFF and check for short circuit.

* Connect the electric tester positive (+) terminal to ground wire and the tester negative (-) terminal to the battery negative (-) terminal.

If any abnormality is found, check the ignition switch and wire harness for short circuit .

(-) Terminal Battery



(+) Terminal

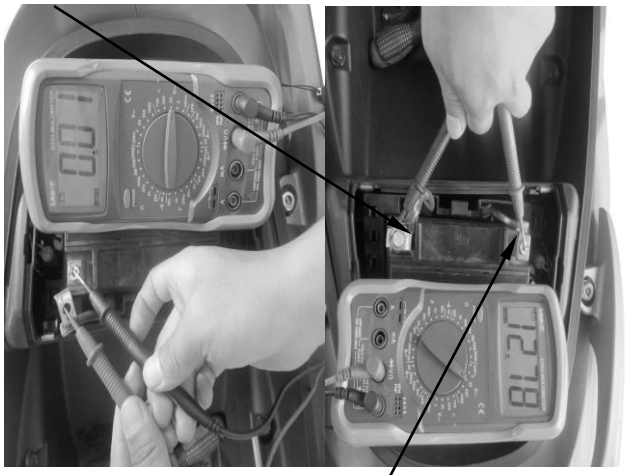
CURRENT TEST

This inspection must be performed with an electric tester when the battery is fully charged.
Warm up the engine for inspection.
Connect the electric tester across the battery terminals. Disconnect the fuse and connect an ammeter between the fuse terminals.
Attach a tachometer to the engine.
Start the engine and gradually increase the engine speed to measure the limit voltage and current.

Limit Voltage/Current: 13.5～14.5V/0.5A max. (5000rpm max.)

If the limit voltage is not within the specified range, check the regulator/rectifier. (⇨14-5)

(-) Terminal



(+) Terminal

REGULATOR/RECTIFIER

INSPECTION

Remove the met-in box.

Remove the regulator/rectifier wire coupler.

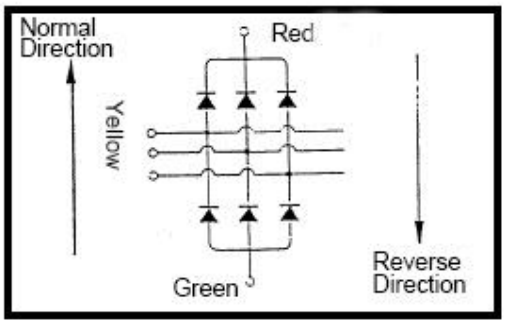
Check the continuity between the wire terminals.

Normal Direction:Continuity

	(+)Probe	(-)Probe
Ⅰ	Yellow	Green
Ⅱ	Red	Yellow

Reverse Direction：No Continuity

	(+)Probe	(-)Probe
Ⅰ	Green	Yellow
Ⅱ	Yellow	Red

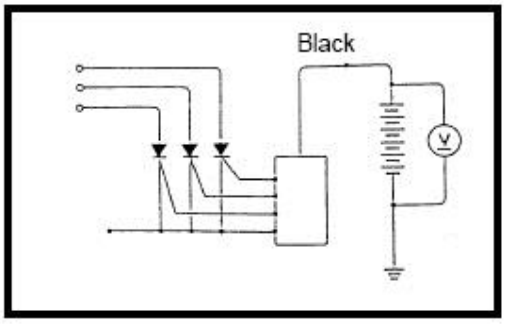


VOLTAGE REGULATION TEST

Connect a coltmeter across the battery terminals.

Start the engine and gradually increase the engine speed to 5000 rpm.

The battery terminal voltage should be within 13.5v~14.5V.



A.C. GENERATOR CHARGING COIL

* The inspection of A.C. generator charging coil can be made with the engine installed.

A.C GENERATOR INSPECTION

This test can be made without removing the staor from the engine.Disconnect the yellow wire from the auto-bystarter.

Remove the met-in box.

Disconnect the A.C. generator connector.

Check the continuity between the yellow wires and ground.

There should be continuity between the yellow wires and on continuity between each yellow wire and ground.

Resistance:

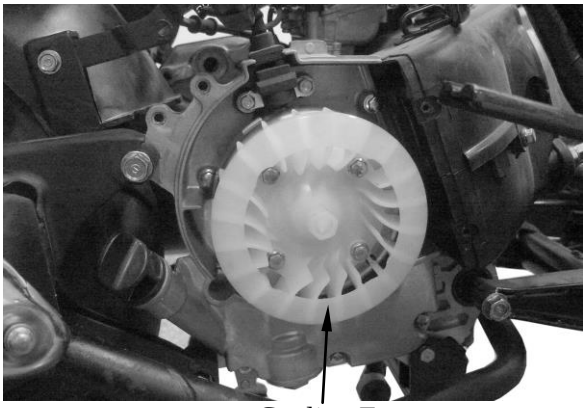
Yellow~Yellow	1~2.5Ω

A.C. GENERATOR

REMOVAL

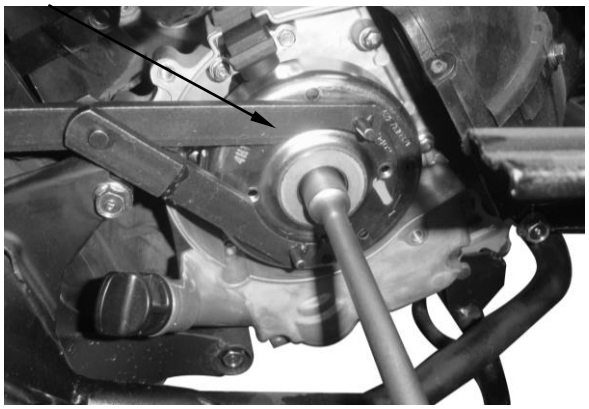
Remove the right side cover. (⇨2-4)
Remove the four bolts attaching the cooling fan cover to remove the fan cover.

Remove the cooling fan by removing the four cooling fan attaching bolts.



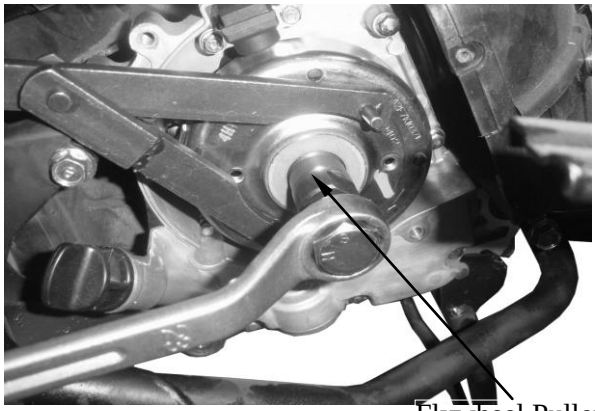
Hold the flywheel with an universal holder.
Remove the flywheel nut.

Special
Universal Holder

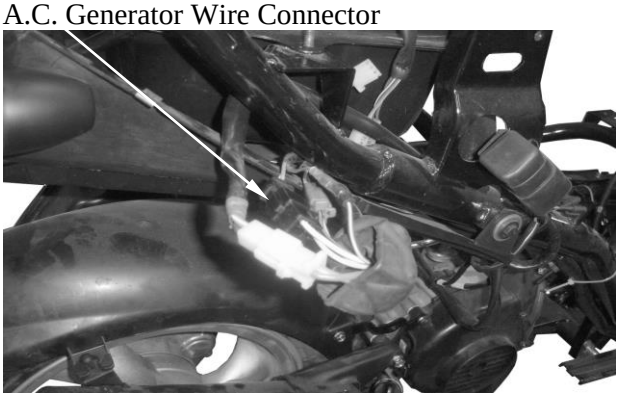


Remove the A.C. generator flywheel using the flywheel puller.
Remove the woodruff key.

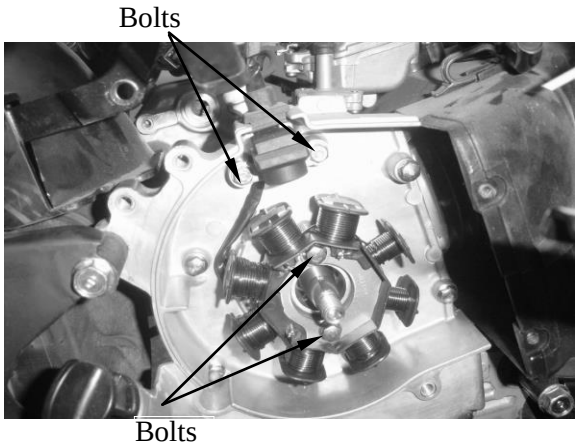
Special
Flywheel Puller



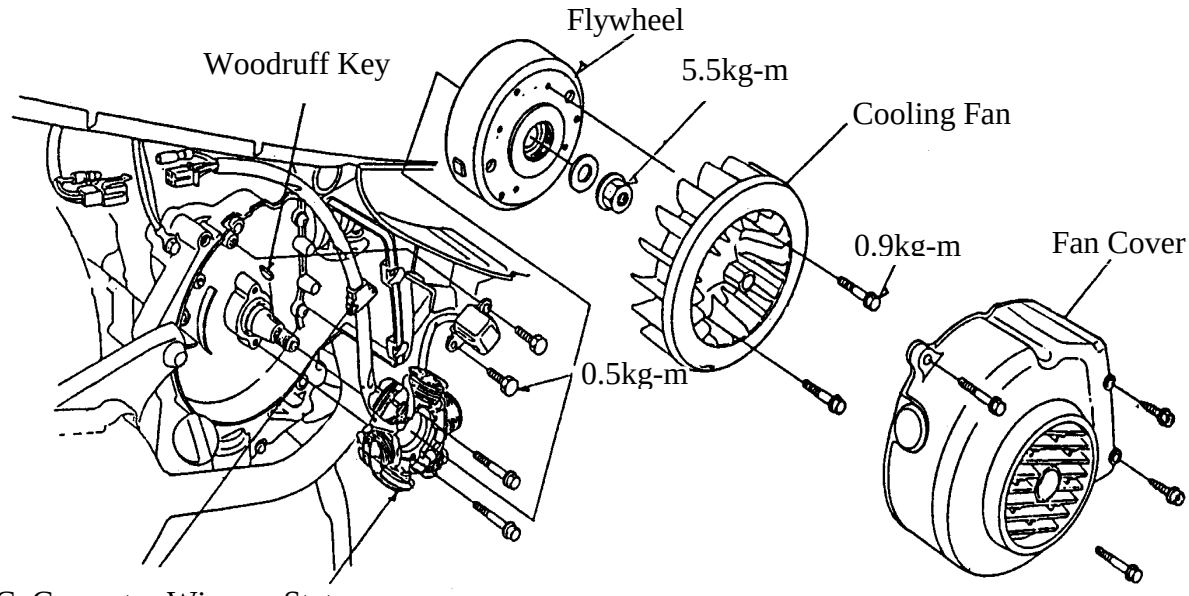
Remove the A.C. generator wire connector.



Remove the A.C. generator wire set plate.
Remove the pulser coil bolts.
Remove the A.C. generator wire rubber sleeve and pulser coil from the right crankcase.
Remove the two bolts and A.C. generator stator.



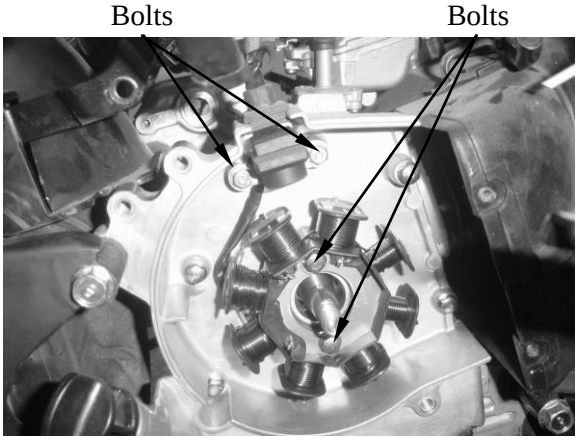
A.C. GNERATOR INSTALLATION



Install the A.C. generator stator and pulser coil onto the right crankcase.
Tighten the stator and pulser coil bolts.

Torques: Pulser Coil : 0.45~0.6kgf-m
Stator : 0.8~1.2kgf-m

Install the A.C. generator wire rubber sleeve and A.C. generator wire set plate.

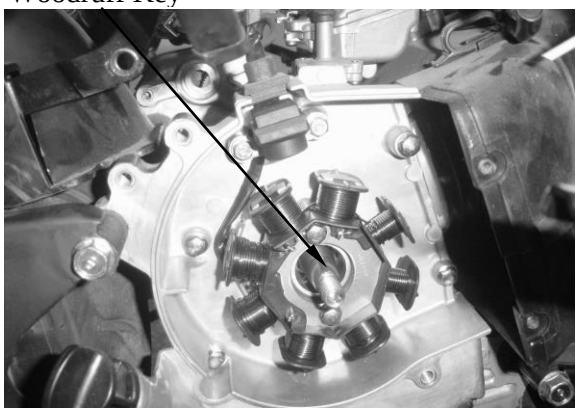


Connect the A.C. generator wire connector.

A.C. Generator Wire Connector

Clean the taper hole in the flywheel off any burrs and dirt.
Install the woodruff key in the crankshaft keyway.

Woodruff Key

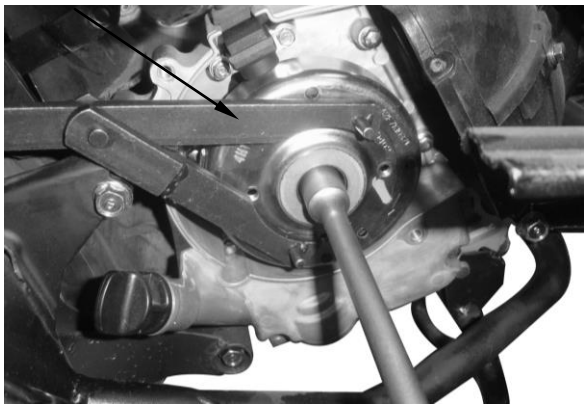


Install the flywheel onto the crankshaft with the flywheel hole aligned with the crankshaft woodruff key.

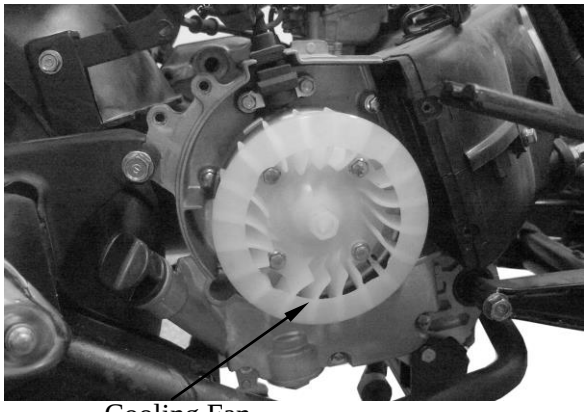
* The inside of the flywheel is magnetic. Make sure that there is no bolt or nut before installation.

Hold the flywheel with the universal holder and tighten the flywheel nut.
Torque: 3.5~4.5kgf-m

Universal Holder

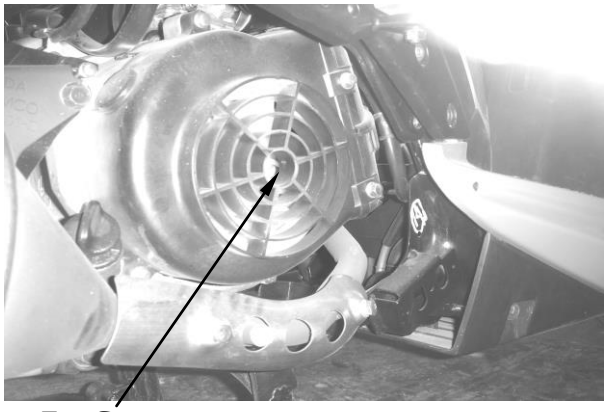


Special
Universal Holder
Install the cooling fan.
Torque: 0.8~1.2kgf-m

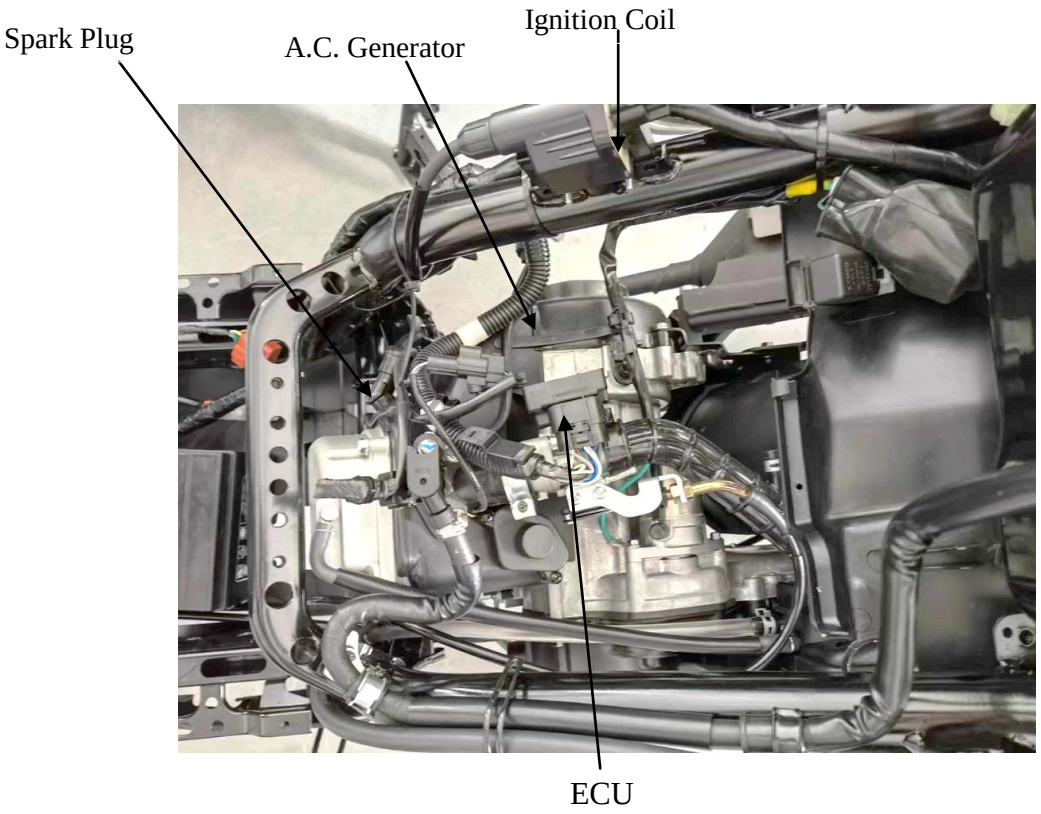


Cooling Fan

Install the fan cover.
Install the right side cover. (⇨2-4)

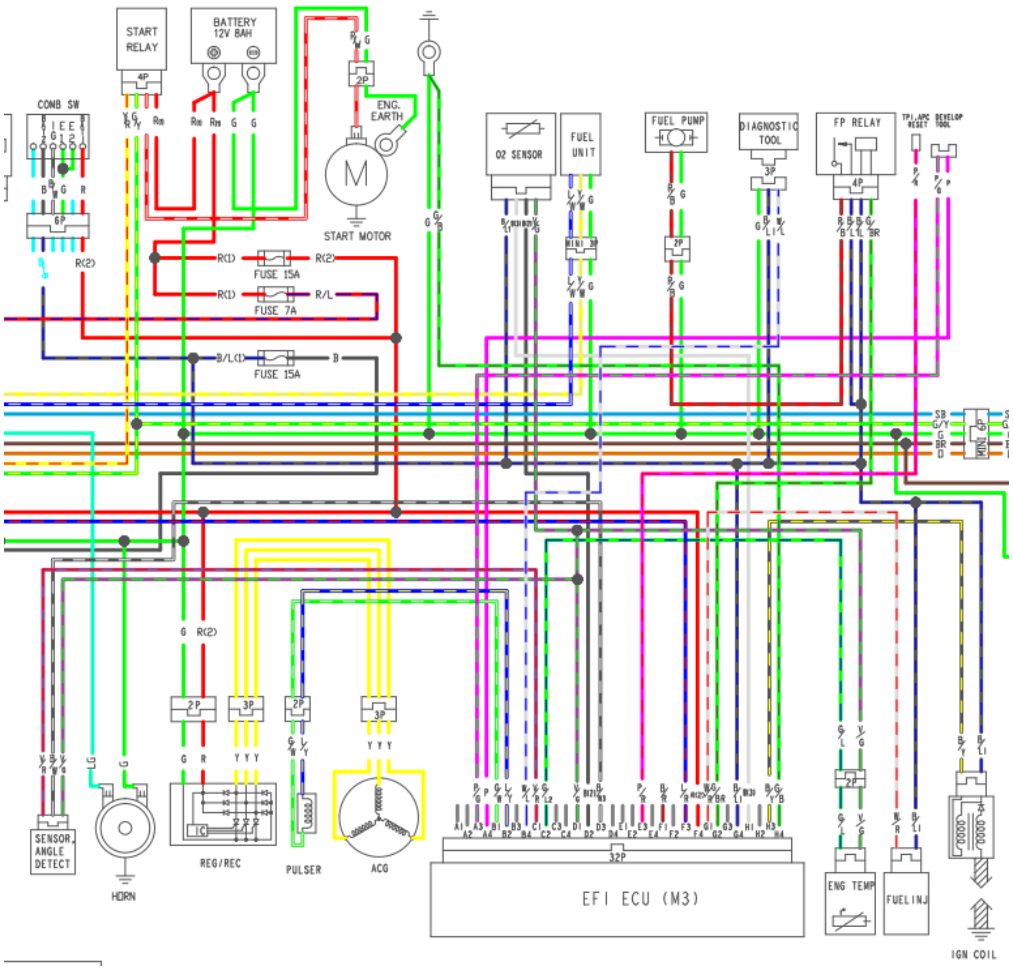


Fan Cover


Spark Plug
A.C. Generator
Ignition Coil
ECU


Main Switch

SERVICE INFORMATION



GENERAL INSTRUCTIONS

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is “ON” and current is present.
- When servicing the ignition system, always follow the steps in the troubleshooting on page 17-2.
- The ignition timing cannot be adjusted since the ignition control module is already adjusted in factory.
- The ignition control module or ECU maybe damaged if dropped or the connector is disconnected when the key is “ ON ”, the excessive voltage may damage the ignition control module or ECU. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding.
- Make sure the battery is adequately charged. Using the starter motor with weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use a spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.

SPECIFICATIONS

Item		Standard
Spark plug	Standard type	NGK CR7HSA
Spark plug gap		0.6 ~ 0.7 mm
Inductive Ignition Coil	Primary coil	0.55~0.75Ω
Throttle Position Sensor Input Volt		5V ±0.1
Fuel Pump		About 2.0Ω
Fuel Injector		10.6Ω~15.9Ω
Engine Temperature Sensor		2.5kΩ~2.7kΩ(25℃)
Oxygen Sensor (engine warming condition)		6.7 ~ 9.5Ω
Crank Position Sensor		96~144Ω
Angle Detect Sensor		0.4V~1.44V(normal) 3.7V~4.4V (fall down)

TROUBLESHOOTING

No peak voltage

- Short circuit in engine stop switch or ignition switch wire.
- Faulty engine stop switch or ignition switch.
- Loose or poorly connected ignition control module connectors.
- Open circuit or poor connection in ground wire of the ignition control module.
- Faulty crank position sensor.
- Faulty ignition control module.

Peak voltage is normal, but no spark jumps at the plug

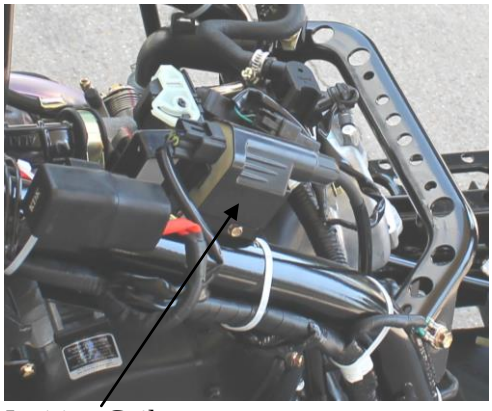
- Faulty spark plug or leaking ignition coil secondary current.
- Faulty ignition coil.

15. IGNITION SYSTEM

IGNITION COIL

REMOVAL

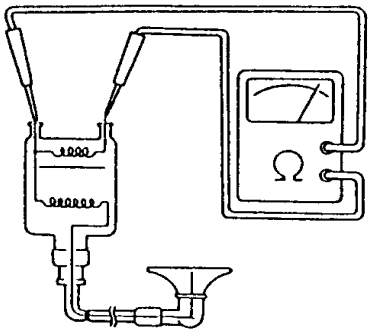
Remove the met-in box. (⇨2-3)
Remove the spark plug cap.
Disconnect the ignition coil wires and remove the ignition coil bolt and ignition coil.



Ignition Coil

INSPECTION

CONTINUITY TEST



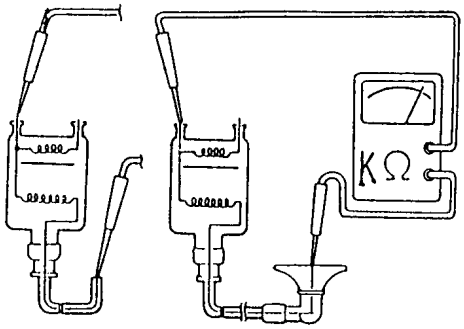
Measure the resistance between the ignition coil primary coil terminals.

Resistance: 0.1～1.0Ω

Measure the secondary coil resistances with and without the spark plug cap.

Resistances:

(with plug cap) : 7～12KΩ
(without plug cap) : 3～5KΩ



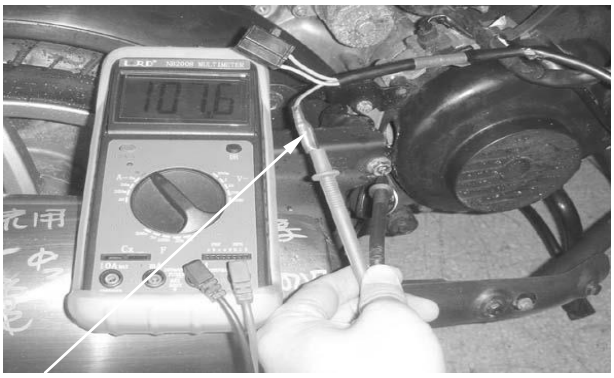
* Correctly operate the tester following the manufacturer's instructions.

PULSER COIL

INSPECTION

* This test is performed with the stator installed in the engine.

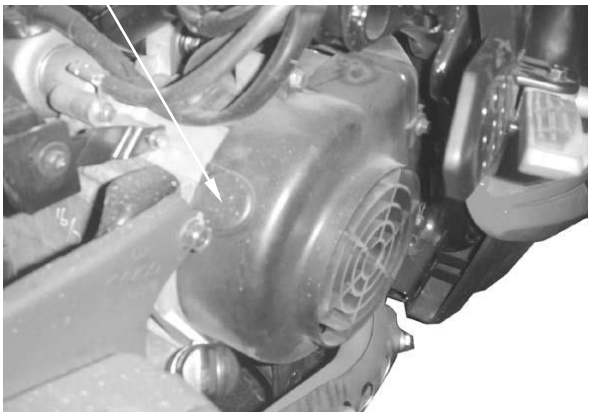
Remove the frame body cover. (⇨2-3)
Disconnect the A.C. generator connector.


Pulser Coil Coupler

Measure the pulser coil resistance between the blue/yellow and green wire terminals.
Resistance: 80～160Ω
Refer to page 14-6 for the A.C. generator removal.

IGNITION TIMING INSPECTION

Timing Hole Cap



Remove the timing hole cap.


"F" Mark

Warm up the engine and check the ignition timing with a timing light.
When the engine is running at the ignition timing is correct if the "F" mark aligns with the index mark within ±2°.
Ignition Timing: BTDC28°/4000rpm

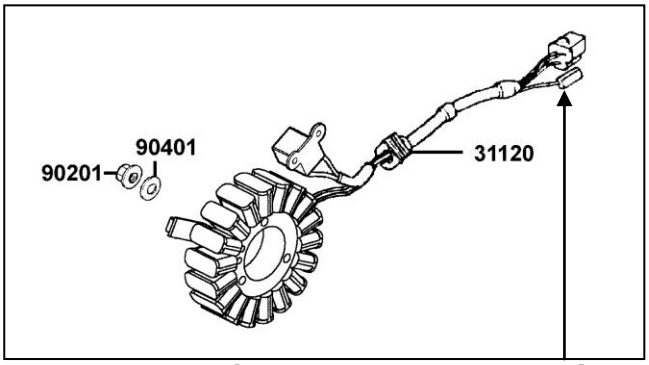
A .C. GENERATOR INSPECTION

CRANK POSITION SENSOR INSPECTION

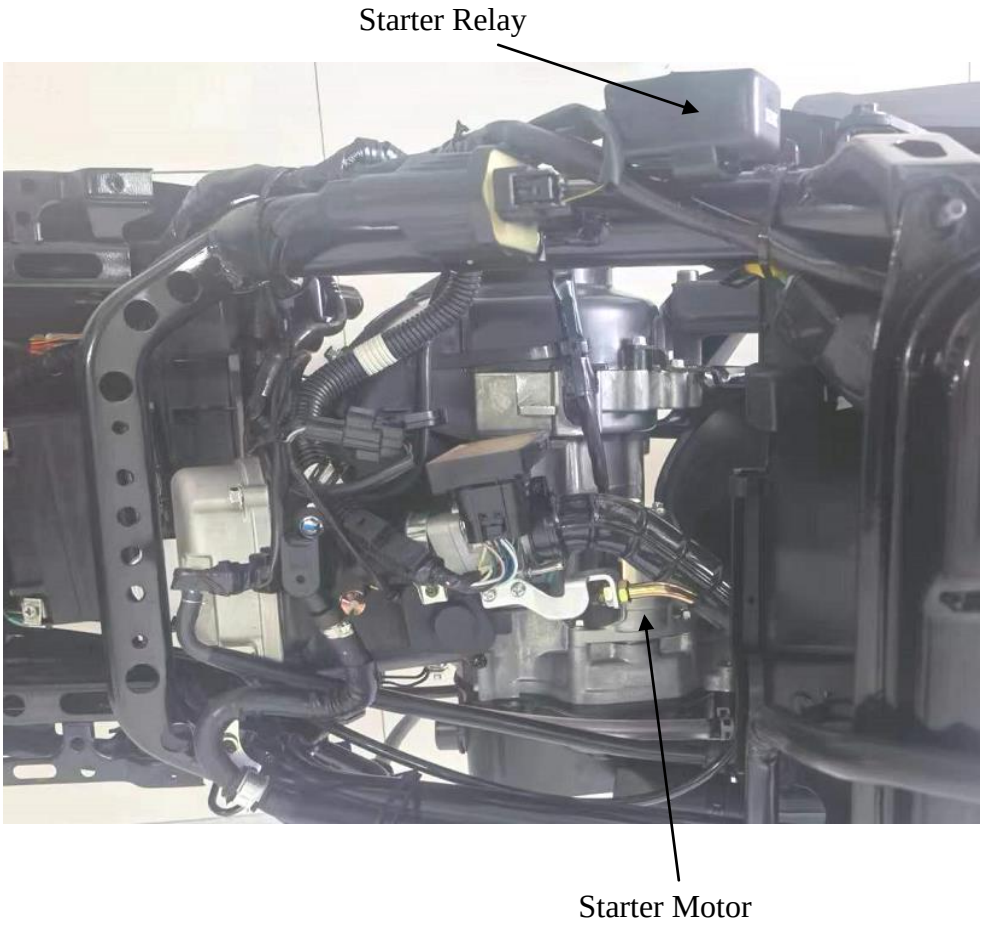
* This test is performed with the stator installed in the engine.

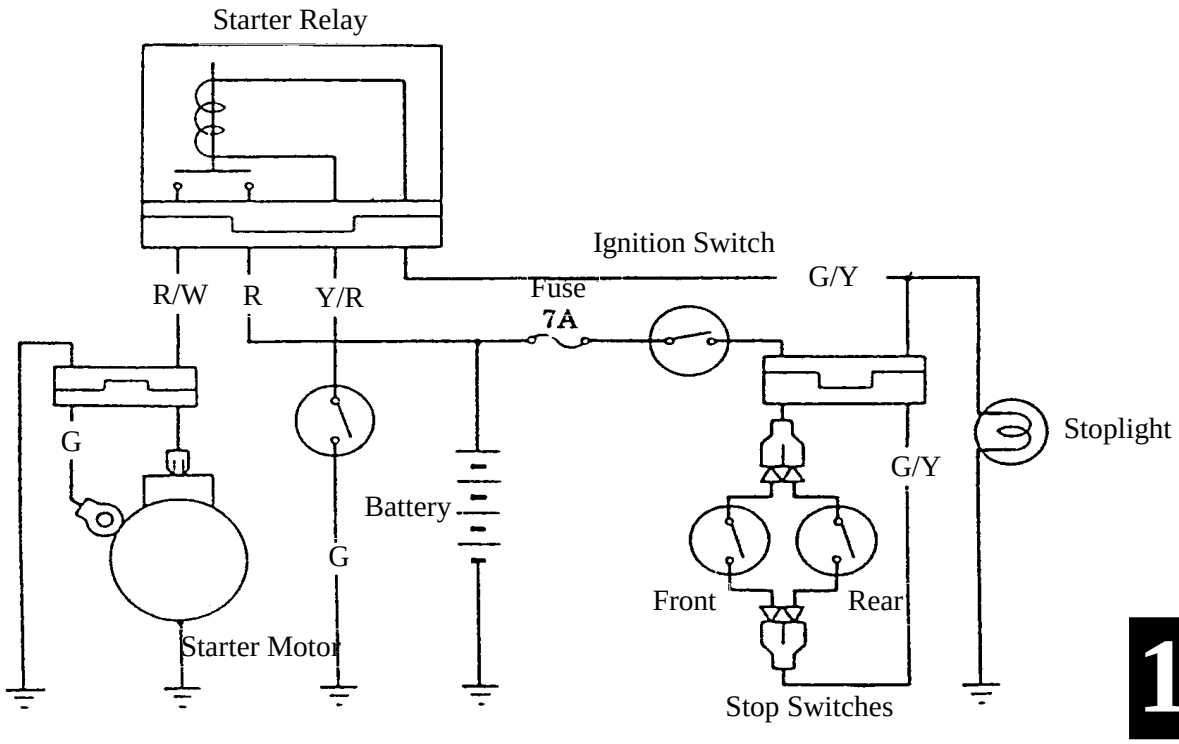
Remove the seat and met-in box.
Disconnect the Crank Position Sensor Wire Coupler.
Measure the resistance between the blue/white and green/white wire terminals.

Blue/Yellow～Green/White	96~144Ω



Crank Position Sensor Wire Coupler


Starter Relay
Starter Motor


Starter Relay
Ignition Switch
G/Y
R/W
R
Y/R
Fuse
7A
G
Battery
G
Starter Motor
G/Y
Stoplight
Front
Rear
Stop Switches

16. STARTING SYSTEM

SERVICE INFORMATION 16-1
TROUBLESHOOTING.....16-1
STARTER MOTOR 16-2
STARTER RELAY.....16-4

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The removal of starter motor can be accomplished with the engine installed.

SPECIFICATIONS

Item	Standard (mm)	Service Limit (mm)
Starter motor brush length	12.5	8.5

TROUBLESHOOTING

Starter motor won‘t turn

- Fuse burned out
- Weak battery
- Faulty ignition switch
- Faulty starter clutch
- Faulty front or rear stop switch
- Faulty starter relay
- Poorly connected, broken or shorted wire
- Faulty starter motor

Lack of power

- Weak battery
- Loose wire or connection
- Foreign matter stuck in starter motor or gear

Starter motor rotates but engine does not start

- Faulty starter clutch
- Starter motor rotates reversely
- Weak battery

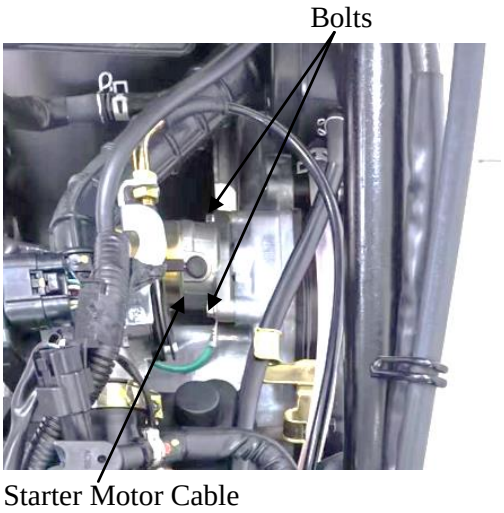
STARTER MOTOR

REMOVAL

* Before removing the starter motor, turn the ignition switch OFF and remove the battery ground. Then, turn on the ignition switch and push the starter button to see if the starter motor operates properly.

Rfmove the mrt-in box.

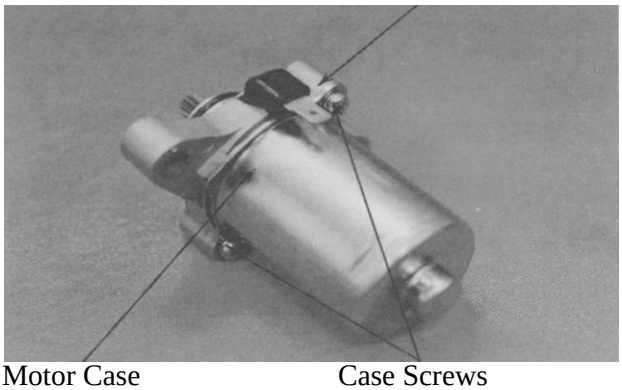
Remove the starter motor cable.
Remove the two starter motor mounting bolts and the motor.



Remove the waterproof rubber jacket and disconnect the starter motor cable connector.

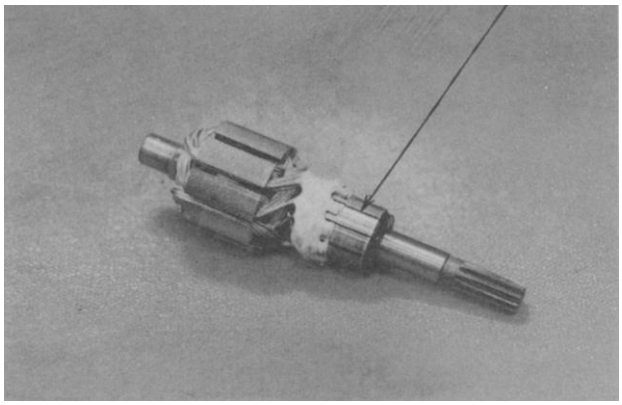
DISASSEMBLY

Remove the two starter motor case screws, front cover, motor case and other parts.

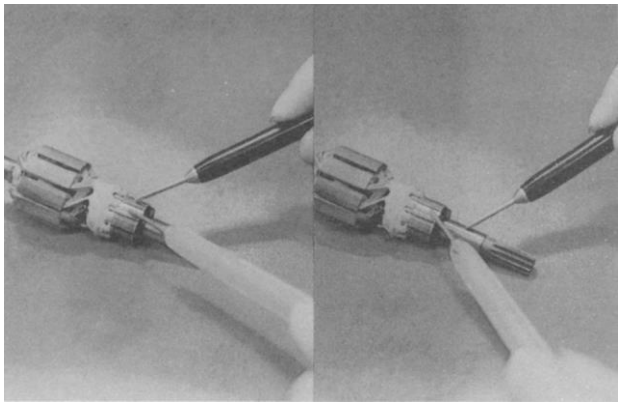


INSPECTION

Inspect the removed parts for wear, damage or discoloration and replace if necessary.
Clean the commutator if there is metal powder between the segments.

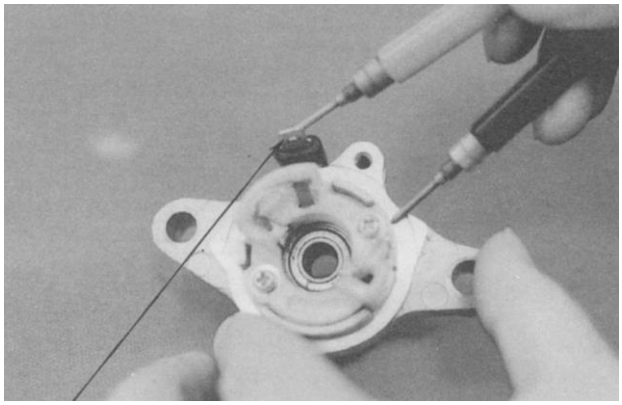


Check for continuity between pairs of the commutator segments and there should be continuity.
Also, make a continuity check between individual commutator segments and the armature shaft. There should be no continuity.



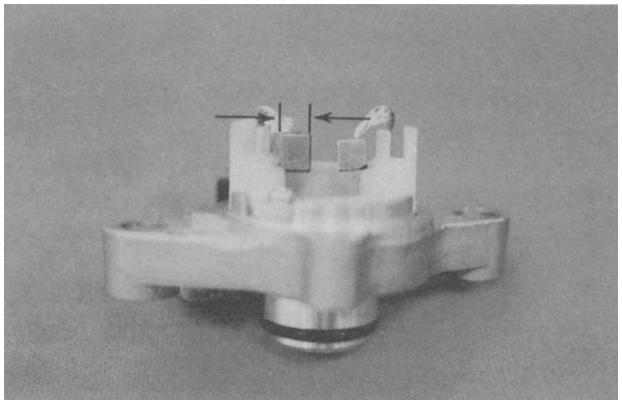
STARTER MOTOR CASE CONTINUITY CHECK

Check to confirm that there is no continuity between the starter motor wire terminal and the motor front cover.
Also check for the continuity between the wire terminal and each brush and there should be continuity.
Replace if necessary.

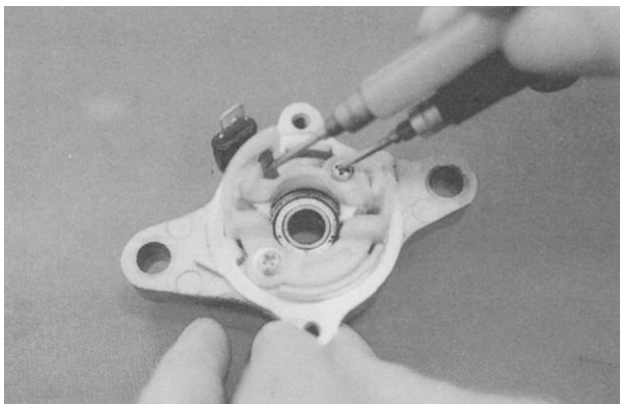


Wire Terminal

Measure the length of the brushes.
Service Limit: 8.5mm replace if below

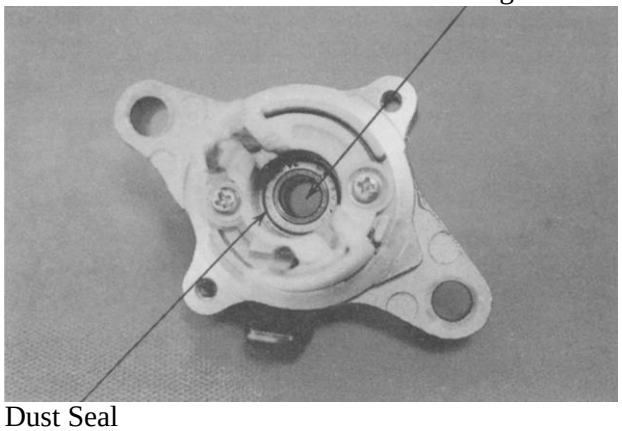


Check for continuity between the brushes. If there is continuity, replace with new ones.



Check if the needle bearing in the front cover turns freely and has no excessive play.
Replace if necessary.
Check the dust seal for wear or damage.

Bearing



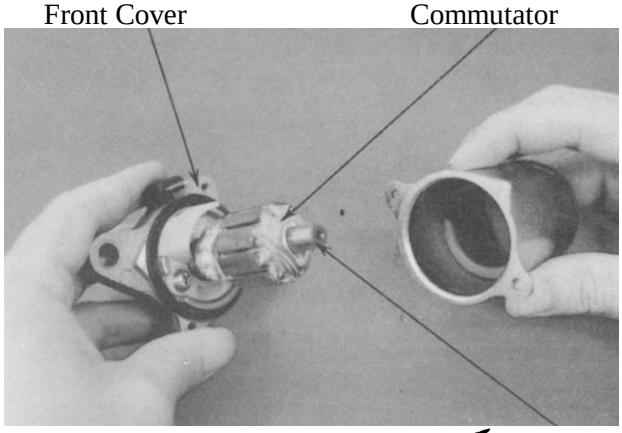
Dust Seal

ASSEMBLY

Apply grease to the dust seal in the front cover.
Install the brushes onto the brush holders.
Apply a thin coat of grease to the two ends of the armature shaft.
Insert the commutator into the front cover.

* • Be careful not to damage the brush and armature shaft mating surfaces.
• When installing the commutator, the armature shaft should not damage the dust seal lip.

Front Cover Commutator

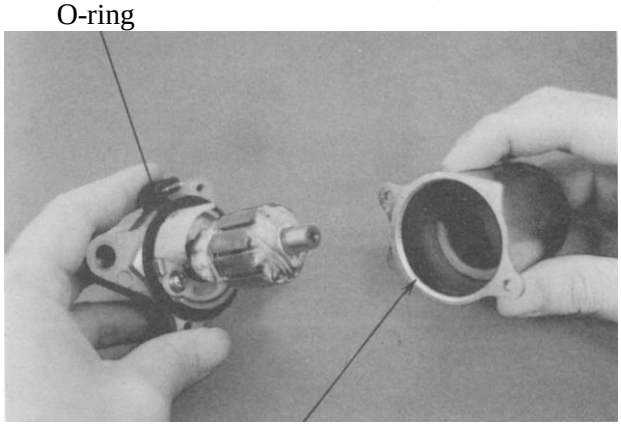


Grease

Install a new O-ring to the front cover.
Install the starter motor case, aligning the tab on the motor case with the tab on the front cover.
Tighten the starter motor case screws.

* When assembling the front cover and motor case, slightly press down the armature shaft to assemble them.

O-ring



Motor Case

STARTER RELAY

INSPECTION

Remove the met-in box.
Remove the battery cover.
Remove the frame body cover. (⇨2-2)
Turn the ignition switch ON and the starter relay is normal if you hear a click when the starter button is depressed.
If there is no click sound:

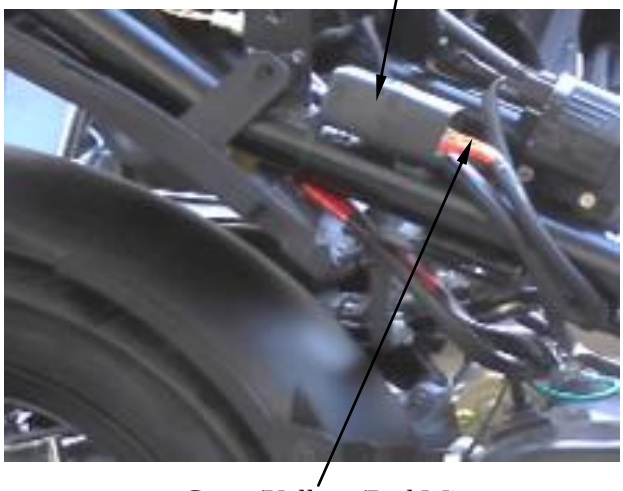
- Inspect the starter relay voltage
- Inspect the starter relay ground circuit
- Inspect the starter relay operation

STARTER RELAY VOLTAGE INSPECTION

Place the motorcycle on its main stand.
Measure the voltage between the starter relay connector green/yellow wire (-) and engine ground.
Turn the ignition switch ON and the battery voltage should be normal when the brake lever is fully applied.
If the battery has no voltage, inspect the stop switch continuity and cable.

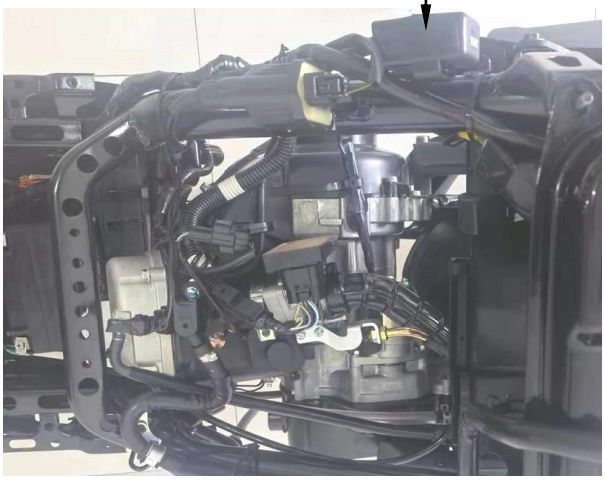
* Turn to the DCV position for the voltage meter, then inspect the starter relay.

Starter Relay



Green/Yellow /Red Wire

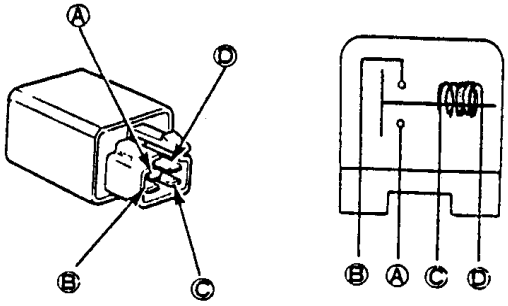
Starter Relay



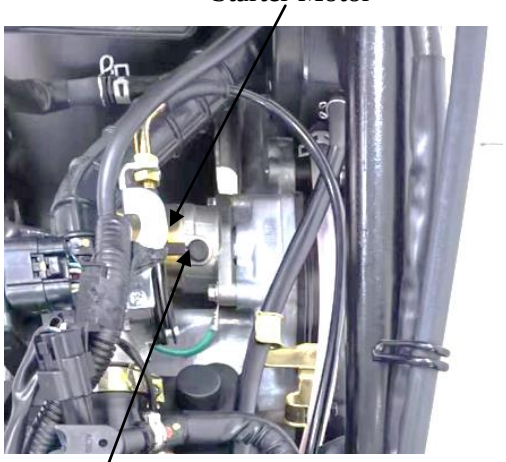
STARTER RELAY TEST

Remove the battery cover.
Disconnect the 4P connector from the starter relay and remove the starter relay.

Connect the starter relay (D) terminal to the 12V battery positive (+) terminal and the relay (C) terminal to the battery negative (-) terminal. Check for continuity between the starter relay (A) and (B) terminals. The relay is normal if there is continuity.



Starter Motor



Connector

STARTER MOTOR INSTALLATION

Apply engine oil to the starter motor O-ring and install the starter motor.
Tighten the two mounting bolts.
Connect the starter motor cable connector.

SERVICE INFORMATION 17-0
TROUBLESHOOTING 17-0
FUEL UNIT 17-1
HANDLEBAR SWITCHES..... 17-2
IGNITION SWITCH 17-3
STOP SWITCHES/HORN..... 17-4
INSTRUMENTS 17-4
HEADLIGHT/LIGHTS..... 17-5

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- An electric tester is needed to measure or test the electric equipment.
- Be sure to use fuses and bulbs of the same specifications to avoid damage of electrical equipment.
- After installation of each switch, a continuity check must be performed. A continuity check can usually be made without removing the part from the motorcycle.

TROUBLESHOOTING

Lights do not come on when ignition switch is "ON"

- Burned bulb
- Faulty switch
- Broken wire
- Fuse burned out
- Weak battery
- Poorly connected or shorted wire
- Faulty winker

Light dims

- Faulty ignition coil
- Wire or switch resistance too high
- Faulty regulator/rectifier

Headlight does not change when dimmer switch is turn to Hi or Lo

- Faulty or burned bulb
- Faulty dimmer switch

Fuel gauge pointer does not register correctly

- Disconnected wire or connector
- Broken wire
- Faulty float
- Faulty fuel unit
- Faulty instrument

Fuel gauge pointer fluctuates or swings

- Loose wire connection
- Faulty fuel unit
- Faulty instrument

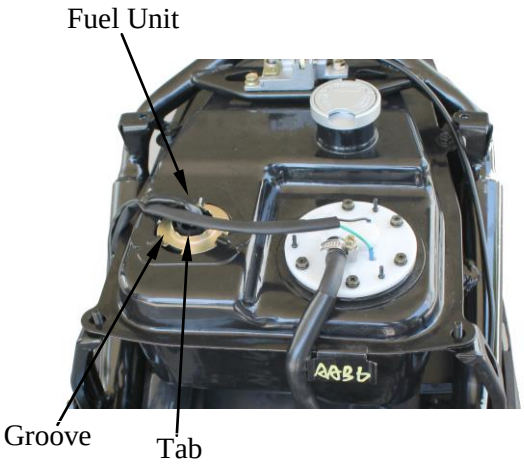
FUEL UNIT

* **No Smoking!**

REMOVAL

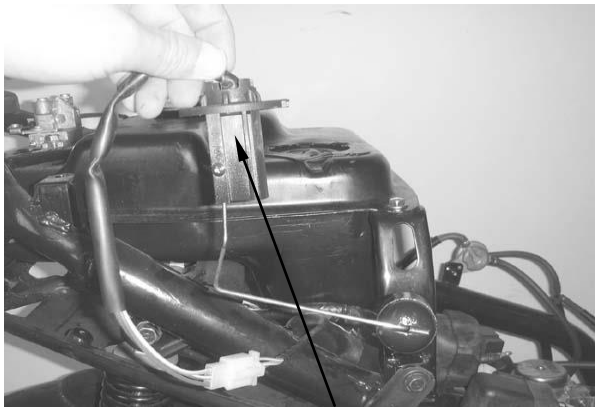
Remove the met-in box. (⇨2-3)
Remove the frame right side cover. (⇨2-4)
Disconnect the fuel unit wire connector.
Turn the fuel unit retainer counterclockwise to remove it.

* Do not damage the fuel unit wire.



Remove the fuel unit.

* Be careful not to bend or damage the fuel unit float arm.



INSTALLATION

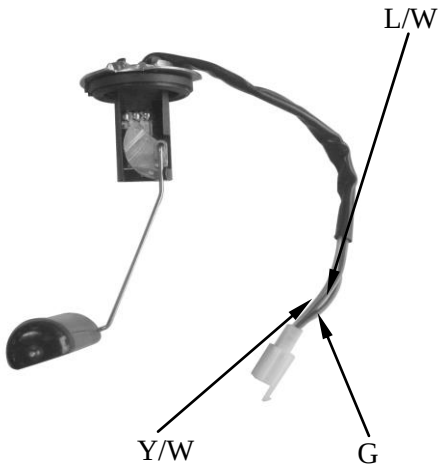
The installation sequence is the reverse of removal.

* • Align the groove on the fuel unit with the tab on the fuel tank.
  • Align the arrow on the retainer with the arrow on the fuel tank.
  • Turn the retainer clockwise to secure it.

INSPECTION

Remove the fuel unit.
Measure the resistance between the fuel unit wire terminals with the float at upper and lower positions.

Wire Terminals	Upper	Lower
G～Y/W	30Ω	686Ω
G～L/W	566Ω	153Ω
Y/W～L/W	599Ω	599Ω



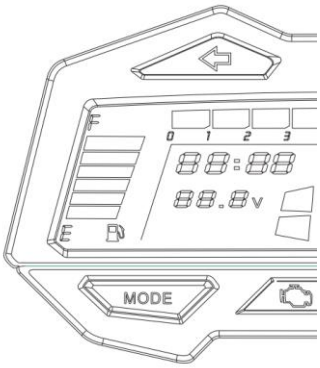
FUEL GAUGE INSPECTION

Connect the fuel unit wire connector and turn the ignition switch “ON”.

* Before performing the following test, operate the turn signals to determine that the battery circuit is normal.

Check the fuel gauge needle for correct indication by moving the fuel unit float up and down.

Float Position	Needle Position
Upper	“F” (Full)
Lower	“E” (Empty)



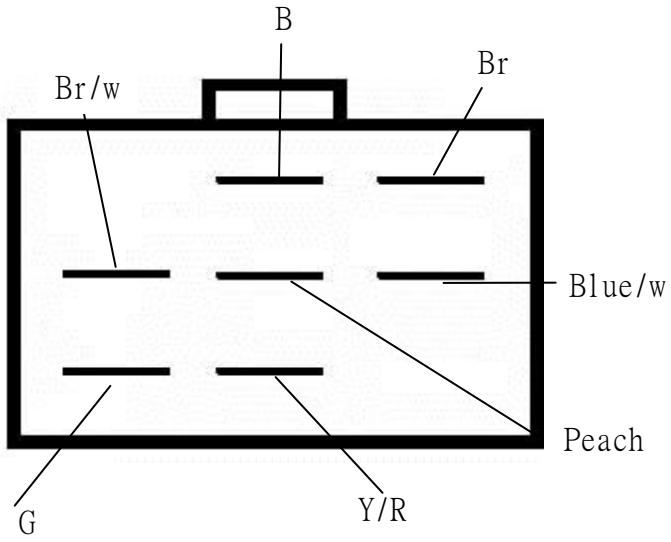
HANDLEBAR SWITCHES

INSPECTION

Remove the handlebar front cover. (⇨2-2)
Disconnect the handlebar switch couplers and check for continuity between wire terminals. If there is any abnormality found, check each switch.

HEADLIGHT SWITCH(SUPER 8 50 E4)

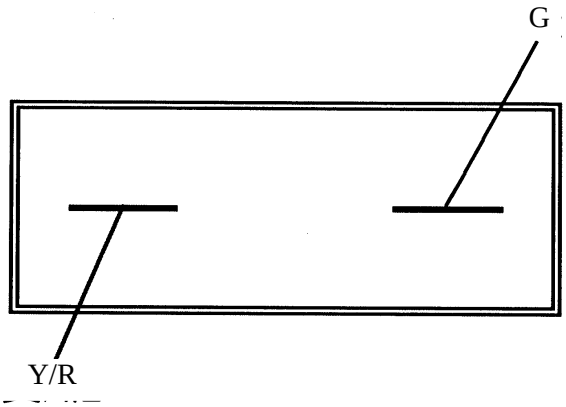
Color	Black	Brown	Blue/ White	Brown/ White
•	○			
≡D⊂≡	○	○		○
☼	○	○	○	



✱ Use the X1Ω range for test when using an electric tester.

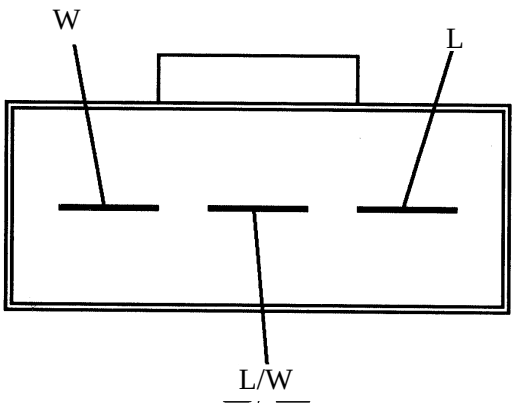
STARTER SWITCH

Color	Yellow/Red	Green
FREE		
PUSH	○	○



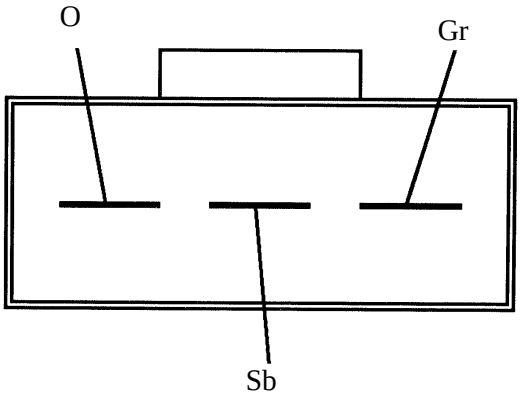
DIMMER SWITCH

Color	White	Black	Blue
≡D	○	○	
≢D		○	○



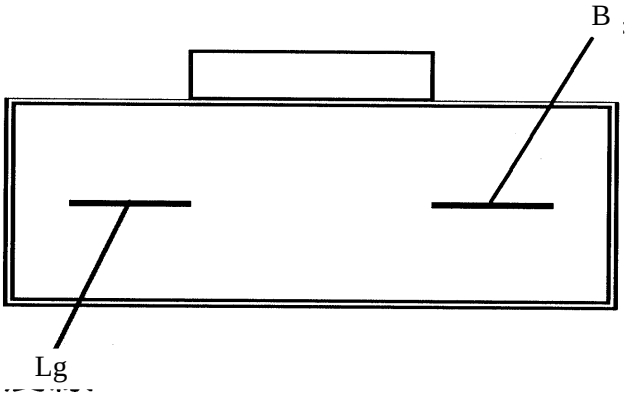
TURN SIGNAL SWITCH

Color	Gray	Light Blue	Orange
R	○	○	
N			
L	○		○



HORN SWITCH

Color	Light Green	Black
FREE		
PUSH	○———	———○



SWITCH REPLACEMENT

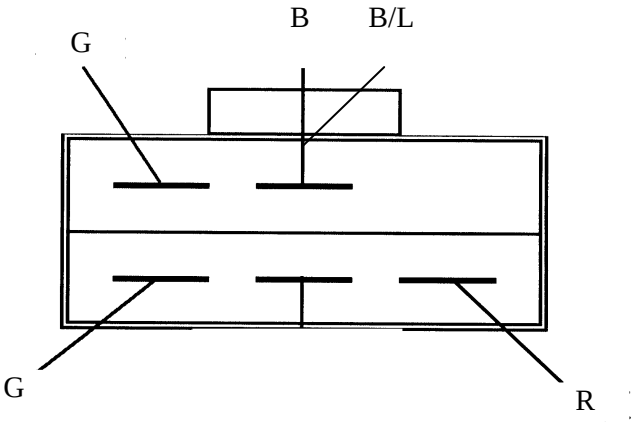
Remove the front covers. (⇨2-2)
Remove the handlebar front cover. (⇨2-2)
The installation sequence is the reverse of removal.

IGNITION SWITCH

INSPECTION

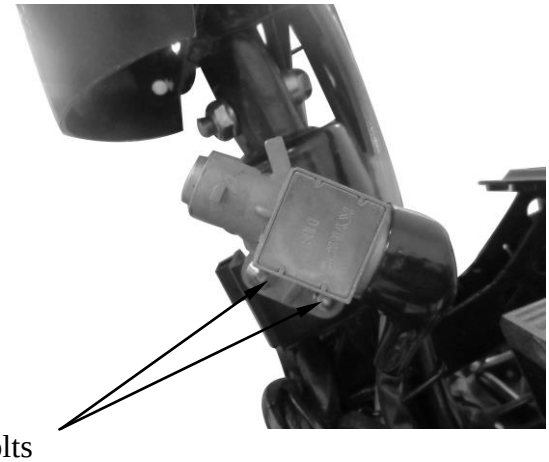
Remove the front covers. (⇨2-2)
Disconnect the ignition switch wire coupler.
Check for continuity between the wire terminals.

Color	Black	Red	Black/ Blue	Green
OFF			○———	———○
ON	○———	———○		
LOCK			○———	———○



IGNITION SWITCH REPLACEMENT

Remove the front covers. (⇨2-2)
Disconnect the ignition switch wire coupler.
Remove the two mounting bolts to remove the ignition switch decorative ring and holder.
Remove the two screws to remove the ignition switch from the ignition switch holder for replacement.
The installation sequence is the reverse of removal.



STOP SWITCH

INSPECTION

Remove the handlebar upper cover. (⇨2-2)
Disconnect the front stop switch wire coupler.
Check for continuity between the wire terminals when the front brake lever is applied. The switch is normal if there is continuity.
Disconnect the rear stop switch wire coupler.
Check for continuity between the wire terminals when the rear brake lever is applied.
The switch is normal if there is continuity.

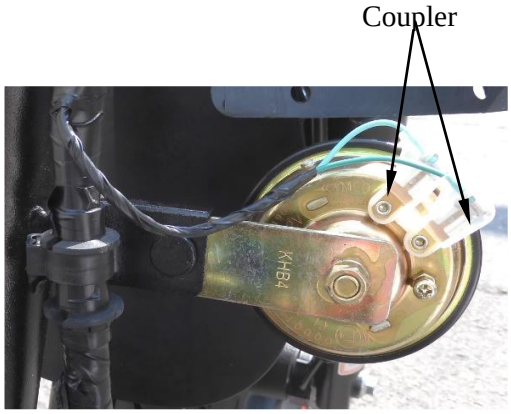
HORN

INSPECTION

Remove the front covers. (⇨2-2)
Disconnect the horn wire coupler.
The horn is normal if it sounds when a 12V battery is connected across the horn wire terminals.

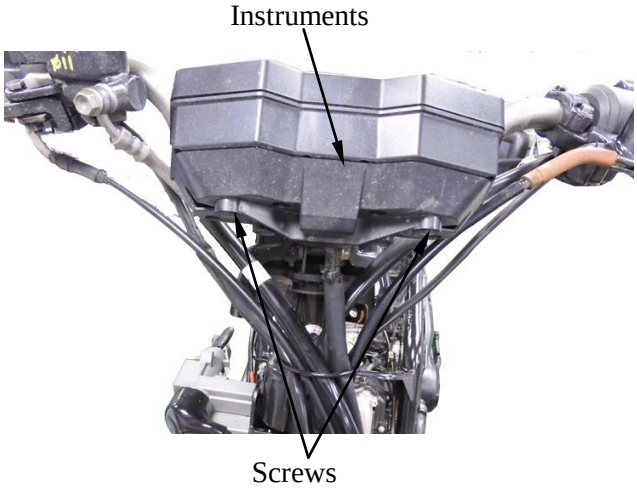
REPLACEMENT

Disconnect the horn wire coupler.
Remover the two bolts attaching the horn.
Remove the horn.
The installation sequence is the reverse of removal.



INSTRUMENTS

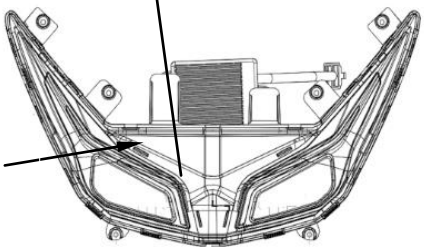
Remove the handlebar front cover. (⇨2-2)
Remove the handlebar rear cover. (⇨2-2)
Disconnect the handlebar switch couplers.
Remove the three screws to remove the instruments.
Install a new horn in the reverse order of removal.



HEADLIGHT

REMOVAL

Remove the front cover(⇨2-3).
Remove the headlight set.



✻
- Align the tab on the headlight with the groove on the handlebar cover.
- After installation, adjust the headlight beam.

REPLACEMENT

Headlight set need to be replaced as a set.
The installation sequence is the reverse of removal.

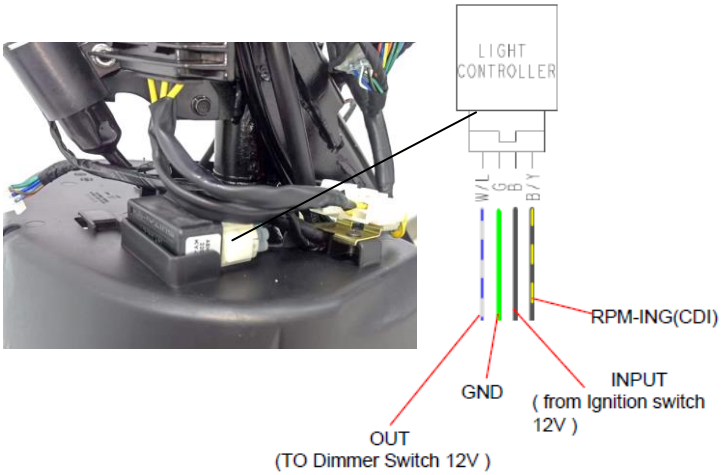
HEADLIGHT CONTROLLER

The Headlight is come on when the engine starts.

INSPECTION

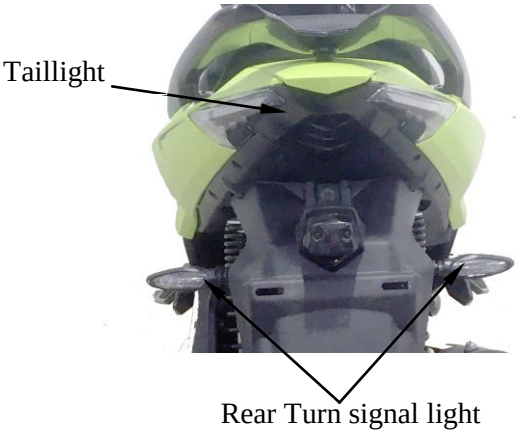
Turn the ignition switch to “ON” Connect the multimeter (+) probe to the Black terminal and the multi-meter (-) probe to the Green terminal. The voltage is the battery voltage.

Starts the engine. Connect the multimeter (+) probe to the white/Blue terminal and the multi-meter (-) probe to the Green terminal. The voltage is the battery voltage.



TAILLIGHT/STOPLIGHT/REAR TURN SIGNAL LIGHT/LICENSE LIGHT

Remove the body cover(⇨2-9).
Remove the taillight set.



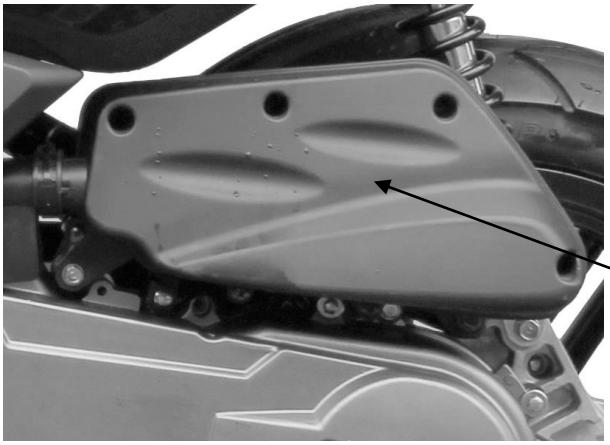
18

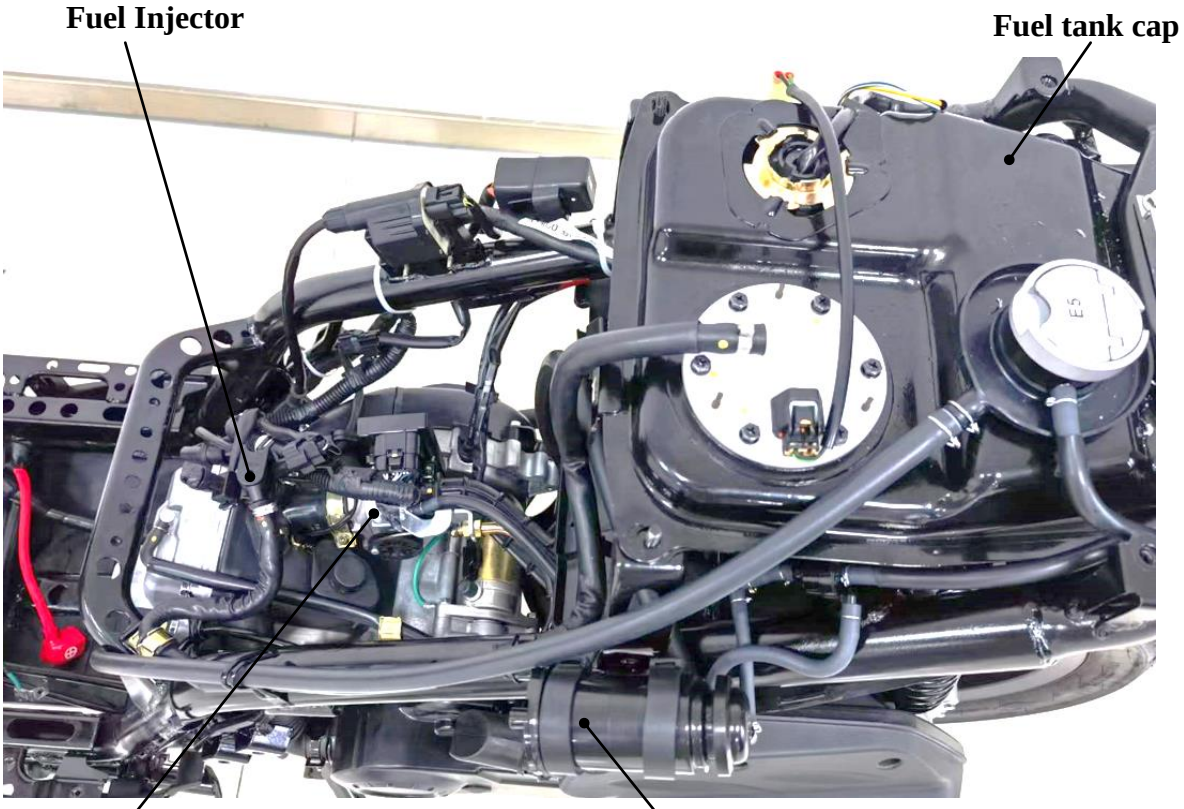
EVAPORATIVE EMISSION CONTROL SYSTEM

(Apply to models with evaporative emission control system)

SCHEMATIC DRAWING ---------- 20-1
EVAPORATIVE EMISSION CONTROL SYSTEM FUNCTION---------- 20-2
TROUBLESHOOTING---------- 20-2
SERVICE INFORMATION ---------- 20-3
PERGE CONTROL VALVE ---------- 20-4
CHARCOAL CANISTER---------- 20-6

SCHEMATIC DRAWING





EVAPORATIVE EMISSION CONTROL SYSTEM FUNCTION

FOREWORD:

The Evaporative Emission Control System is abbreviated to E.E.C. System. This device collects the fuel vapor from the fuel tank and then the fuel vapor is drawn into the engine for re-burning to avoid air pollution caused by the fuel vapor diffused into the air.

FUNCTION

Item	Purpose	Function
Purge Control Valve	Control vaporized HC from fuel tank not to diffuse into the air.	The charcoal canister absorbs vaporized HC from the fuel tank. When the engine is running and the purge control valve is open, the fuel vapor in the charcoal canister is drawn into the engine for re-burning.
Charcoal Canister	Absorb and store the vaporized HC from the fuel tank and carburetor.	The vaporized HC is absorbed in the charcoal canister and the specified volume of HC in the emission should not exceed 2g.
P.C.V. System	Completely recover the HC from blow-by gas in the crankcase for re-burning.	Through the P.C.V. system, the blow-by gas from the crankcase is separated into fuel vapor and fuel and then drawn into the cylinder for re-burning.

TROUBLESHOOTING

Engine loses power or runs erratic at idle speed

1. Clogged P.C.V. system
2. Clogged air cleaner
3. Faulty purge control valve
4. Loose or broken E.E.C. system tubes

Engine idles or accelerates roughly

1. Faulty fuel cut-off valve
2. Faulty purge control valve
3. Clogged or faulty charcoal canister

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Do not smoke or allow flames or sparks near the working area.
- Note the locations of tubes for proper installation.
- Replace any damaged tube with a new one.
- Make sure to tighten the connector of each tube securely.

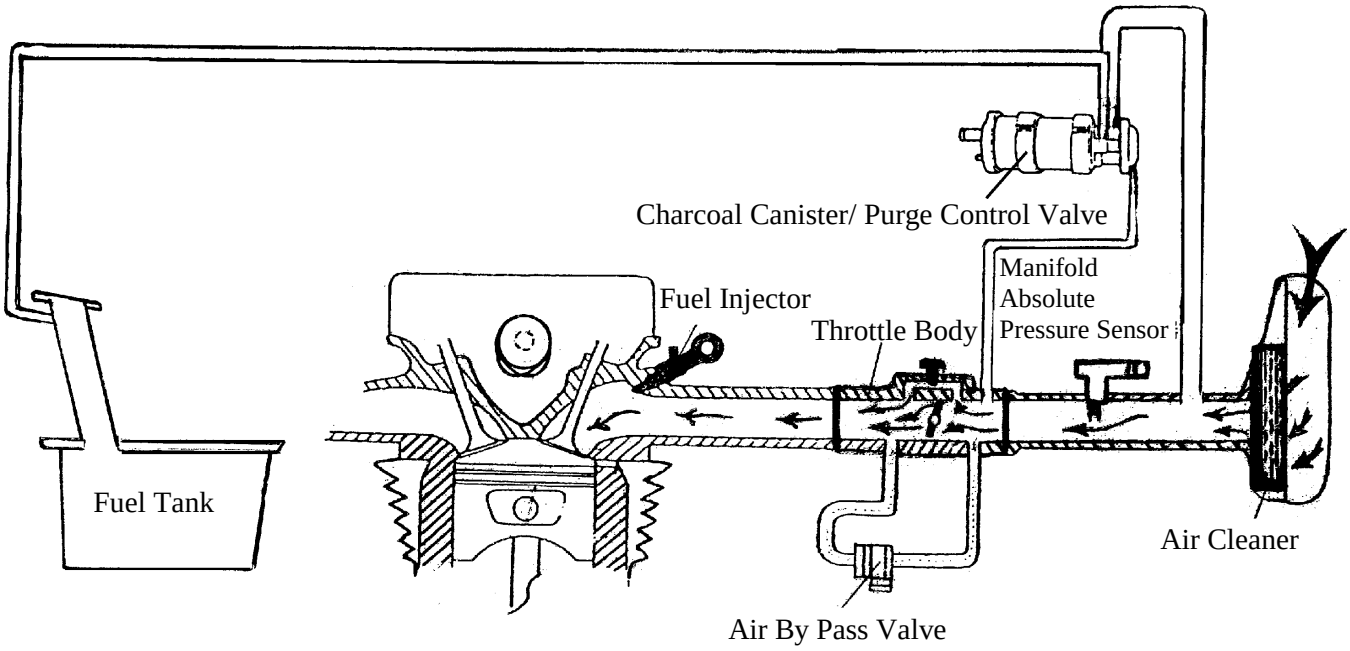
TOOLS

- Vacuum pump－A937X－014－XXXX
- Pressure pump－

SPECIFICATIONS

Purge control valve vacuum pressure	45mm/Hg
Charcoal canister capacity	90cc

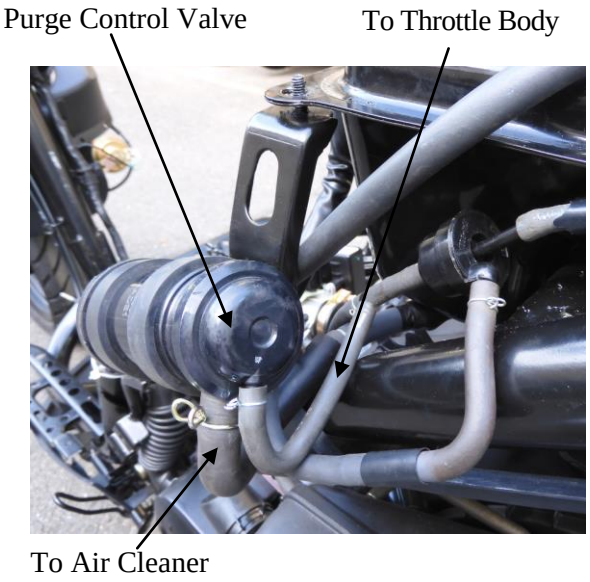
A. LEAKAGE TEST PIPING DIAGRAM



PURGE CONTROL VALVE

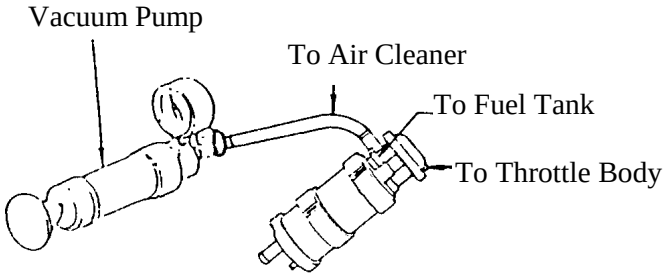
REMOVAL

1. Remove the body cover.
2. Disconnect the purge control valve vacuum tube that goes to the throttle body and the tubes that go to the air cleaner and charcoal canister. Remove the charcoal canister/purge control valve.

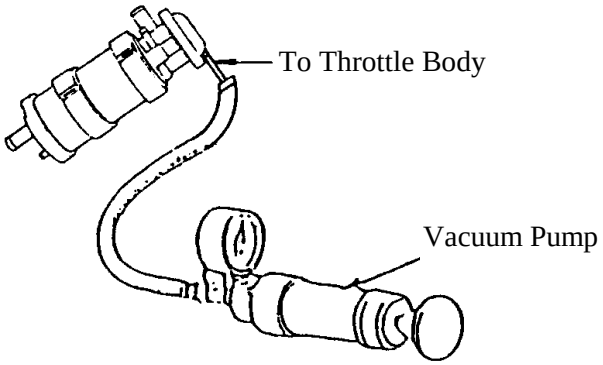


INSPECTION

Connect a vacuum pump to the purge control valve tube that goes to the air cleaner and apply vacuum pressure of 250mm/Hg. The specified vacuum must be maintained for one minute. Replace the purge control valve with a new one if vacuum is not maintained.

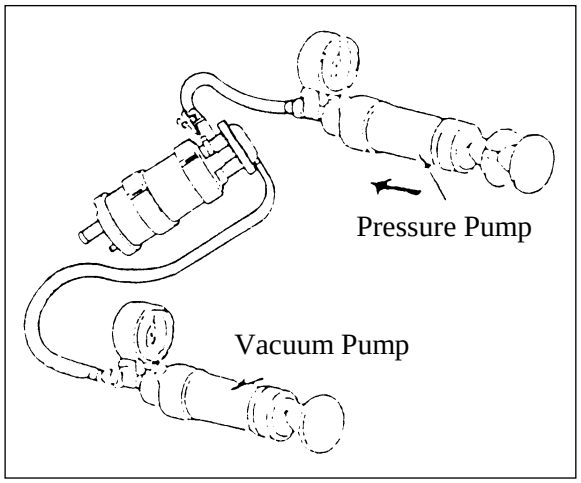


Connect a vacuum pump to the purge control valve tube that goes to the carburetor vacuum tube and apply vacuum pressure of 45mm/Hg. The specified vacuum must be maintained for one minute. Replace the purge control valve with a new one if vacuum is not maintained.



PURGE CONTROL VALVE FLOW INSPECTION

1. Connect a vacuum pump to the purge control valve vacuum tube and apply vacuum pressure of 45mm/Hg.
2. Connect a pressure pump to the tube that goes to the charcoal canister and apply pressure. The flow must be over 9.4 liters per minute and replace the purge control valve with a new one if the specified flow is not reached.



* To prevent damage to the purge control valve, do not use high air pressure sources. Use a hand operated pressure pump only.

INSTALLATION

1. Install the purge control valve in the reverse order of removal.
2. Route and reconnect the purge control valve tubes properly and securely.

* Be careful not to bend, twist or kink the tubes during installation.

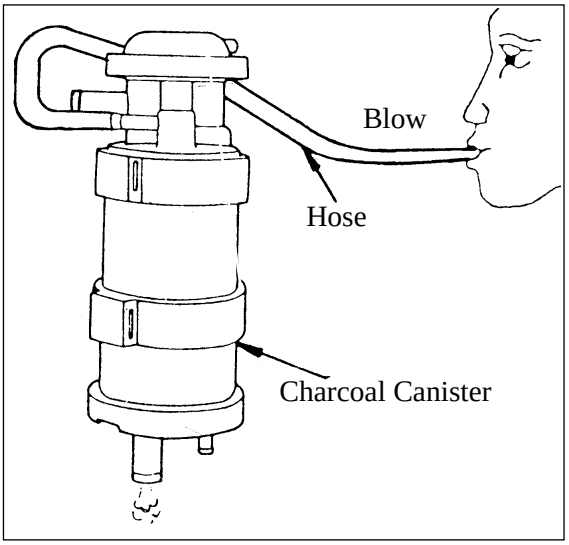
CHARCOAL CANISTER

REMOVAL

1. Remove the front cover.
2. Disconnect the charcoal canister tubes that go to the fuel tank and purge control valve.
3. Remove the charcoal canister.

INSPECTION

1. Plug the tube that goes to the fuel tank and plug the blow-by tube. Then connect a hose to the canister. Blow the hose with mouth. The charcoal canister is normal if air can be blown into it. If clogged, replace it with a new one.
2. Check the charcoal for cracks and replace if necessary.



INSTALLATION

Install the charcoal canister in the reverse order of removal.

*
- The charcoal canister must be installed to its original position to avoid affecting its performance.
- Do not bend, twist or kink the tubes during installation.