PREFACE

This Service Manual describes the technical features and servicing procedures for the KYMCO **Skytown 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.

QUALITY TECHNOLOGY DEPARTMENT

EDUCATION SECTION

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1. GENERAL INFORMATION

1

ENGINE SERIAL NUMBER

Location of Frame Serial Number

Location of Engine Serial Number

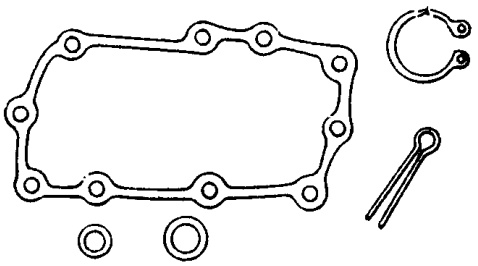
SPECIFICATIONS

Name & Model			Skytown 50
Overall length (mm)			1995 or 1910
Overall width (mm)			750
Overall height (mm)			1090 or 1317
Wheel base (mm)			1300
Engine type			Air cooled 4-stroke
Fuel Used			92# nonleaded gasoline
Displacement (cc)			50cc
Net weight (kg)	Front wheel		51
	Rear wheel		61
	Total		112
Max weight Capacity (kg)	Front wheel		85
	Rear wheel		181
	Total		266
Tires	Front wheel		110/70-13
	Rear wheel		120/70-12
Ground clearance (mm)			135
Min. turning radius (mm)R/L			2000
Starting system			Starting motor
Fuel type			Gasoline, 4-stroke motor oil
Cylinder arrangement			Single cylinder, flat
Combustion chamber type			Semi-sphere
Valve arrangement			O.H.C.
Bore x stroke (mm)			φ39 X41.4
Compression ratio			11.0±0.2
Compression pressure (kg/cm² rpm)			12kg/cm² ±2
Max. output			2.4kw/7500rpm
Max. torque (NM/rpm)			3.2 N.M/6500rpm
Port timing	Intake	Open	4°
		Close	12°
	Exhaust	Open	20°
		Close	-8°
Valve clearance		Intake	0.08mm
		Exhaust	0.08mm
Idle speed (rpm)			2000±100
Lubrication type			centrifugal type

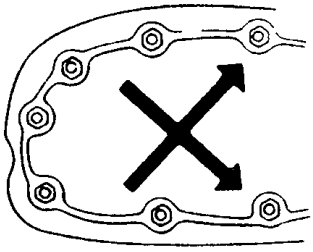
Lubrication oil capacity (liter)			0.85L
Exchanging capacity			0.7L
Air cleaner type & No.			Wet, single
Gear Oil capacity			0.12L
Exchanging capacity			0.11L
Fuel capacity (liter)			7.0L
Carburetor	Type		—
	Piston dia. (mm)		—
	Venturi dia. (mm)		—
Ignition system type			ECU
Ignition timing F mark			—
Spark plug			NGK CR6HSA
Spark plug gap (mm)			0.6～0.7
Battery capacity			12V7AH
Power to transmission gear			Power−transmission gear−clutch
Reduction ratio of power to transmission			—
Clutch type			Dry multi-disc clutch
Transmission gear operation type			Automatic centrifugal type
Transmission ratio	1 speed		—
Reduction gear	Type		Two-stage reduction
	1st reduction ratio		0.86～2.47
	2nd reduction ratio		18.72
Transmission gear type			Non-stage transmission
Tire pressure (kg/cm²)	Front wheel		1.75/1.75 kg/cm²
	Rear wheel		2.0/2.25 kg/cm²
Turning angle			Right43° & left 43°
Brake system type	Front wheel		Disk
	Rear wheel		Disk
Suspension type	Front wheel		Telescope
	Rear wheel		Unit swing
Shock absorber type	Front wheel		Telescope
	Rear wheel		Unit swing
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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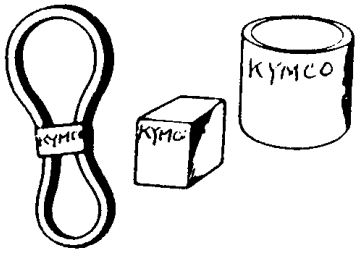
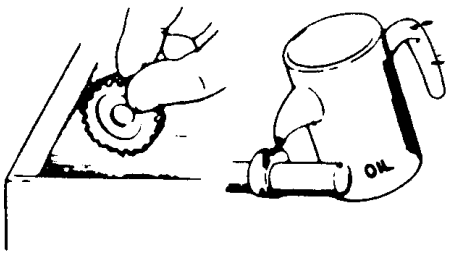
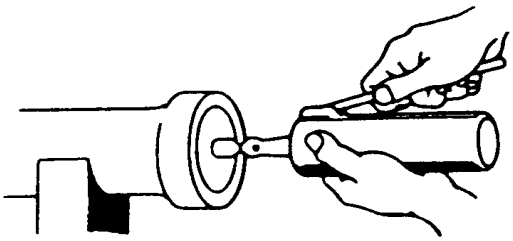


■ When servicing the motorcycle, be sure to use special tools for removal and installation.

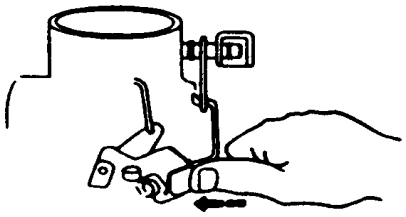
■ After disassembly, clean removed parts. Lubricate sliding surfaces with engine oil before reassembly.



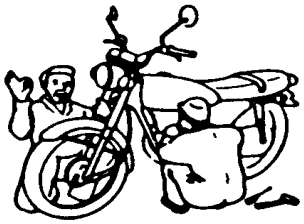
■ Apply or add designated greases and lubricants to the specified lubrication points.



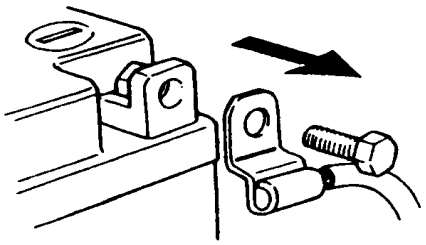
■ After reassembly, check all parts for proper tightening and operation.



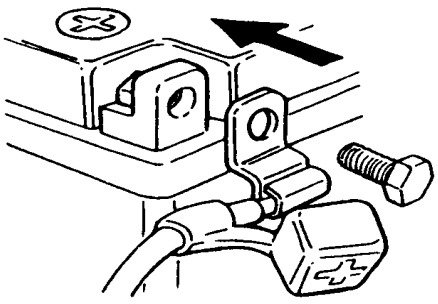
■ When two persons work together, pay attention to the mutual working safety.



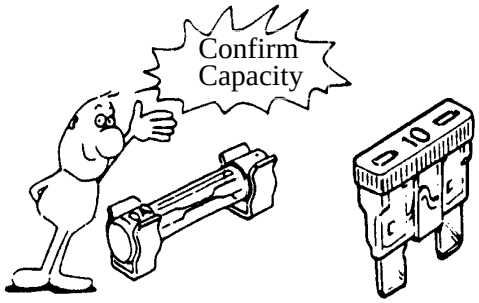
■ Disconnect the battery negative (-) terminal before operation.
■ When using a spanner or other tools, make sure not to damage the motorcycle surface.



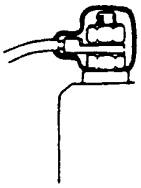
■ After operation, check all connecting points, fasteners, and lines for proper connection and installation.
■ When connecting the battery, the positive (+) terminal must be connected first.
■ After connection, apply grease to the battery terminals.
■ Terminal caps shall be installed securely.



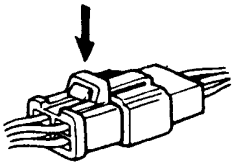
■ If the fuse is burned out, find the cause and repair it. Replace it with a new one according to the specified capacity.



■ After operation, terminal caps shall be installed securely.

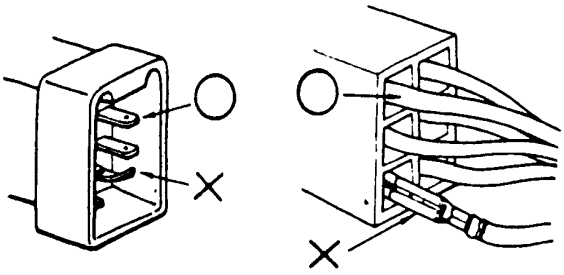


■ When taking out the connector, the lock on the connector shall be released before operation.

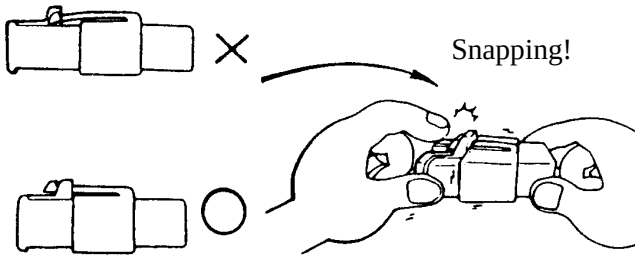


■ Hold the connector body when connecting or disconnecting it.
■ Do not pull the connector wire.

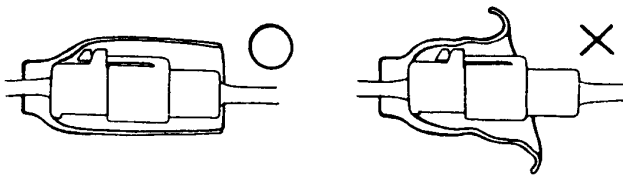
■ Check if any connector terminal is bending, protruding or loose.



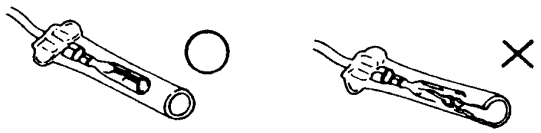
- The connector shall be inserted completely.
- If the double connector has a lock, lock it at the correct position.
- Check if there is any loose wire.



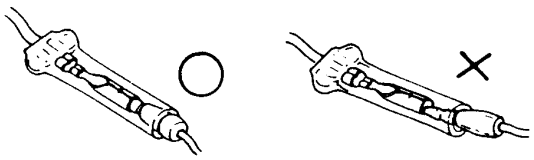
- Before connecting a terminal, check for damaged terminal cover or loose negative terminal.



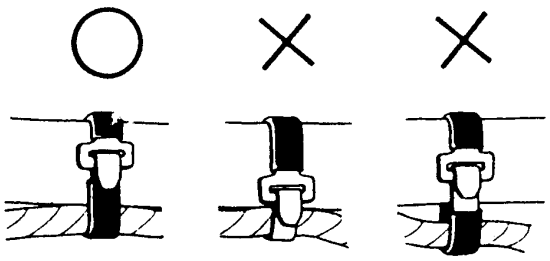
- Check the double connector cover for proper coverage and installation.



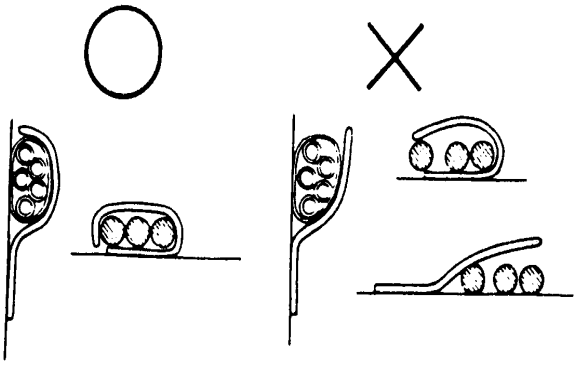
- Insert the terminal completely.
- Check the terminal cover for proper coverage.
- Do not make the terminal cover opening face up.



- 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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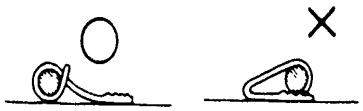
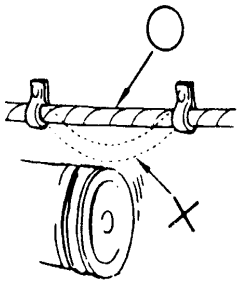
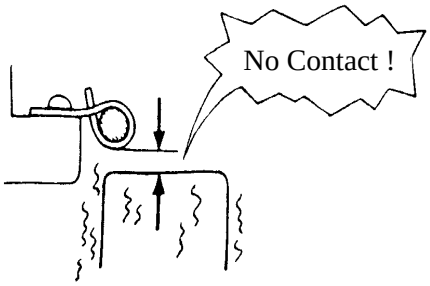
■ Do not squeeze wires against the weld or its clamp



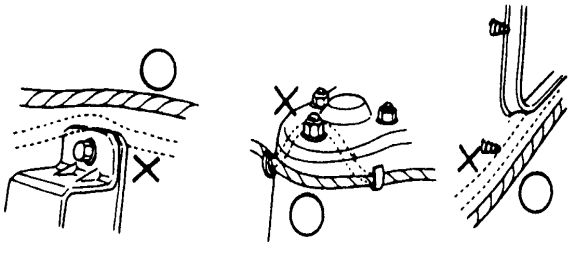
■ After clamping, check each harness to make sure that it is not interfering with any moving or sliding parts.



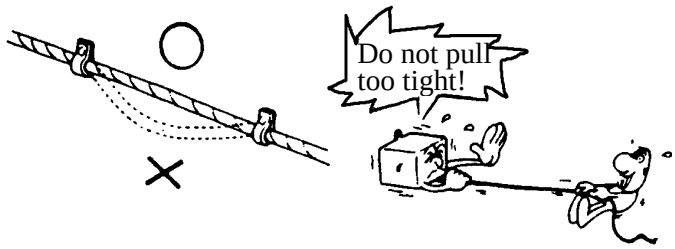
■ When fixing the wire harnesses, do not make it contact the parts, which will generate high heat.



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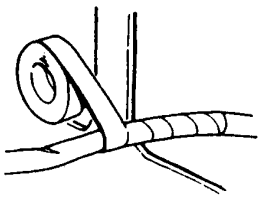
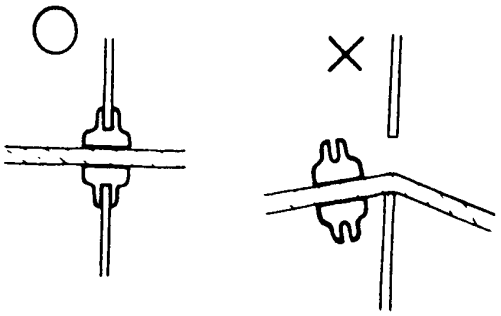
■ Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner.

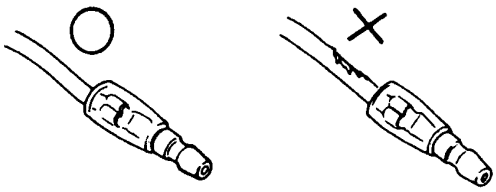


■ When rubber protecting cover is used to protect the wire harnesses, it shall be installed securely.

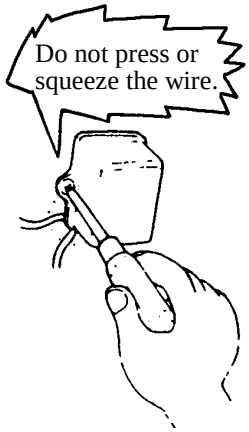


■ Do not break the sheath of wire.

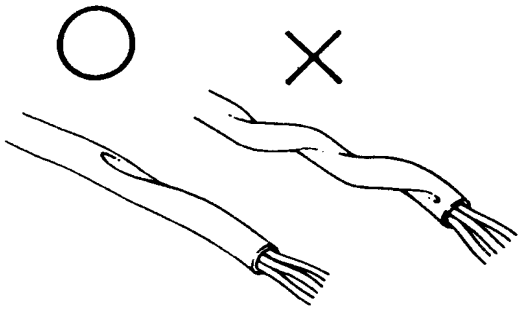
■ If a wire or harness is with a broken sheath, repair by wrapping it with protective tape or replace it.



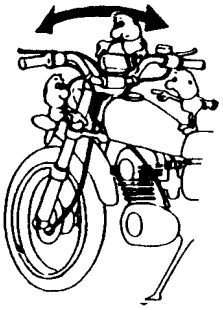
■ When installing other parts, do not press or squeeze the wires.



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

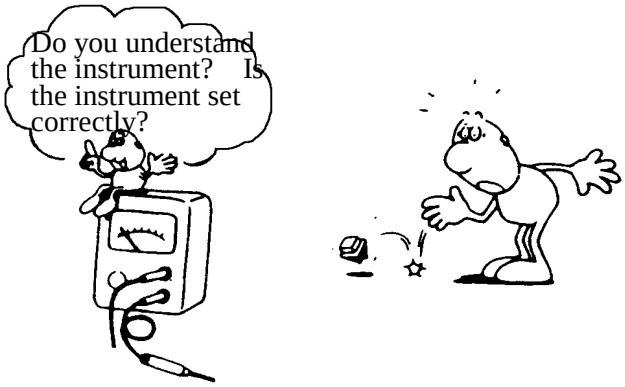


■ Wire harnesses routed along with handlebar should not be pulled tight, have excessive slack or interfere with adjacent or surrounding parts in all steering positions.



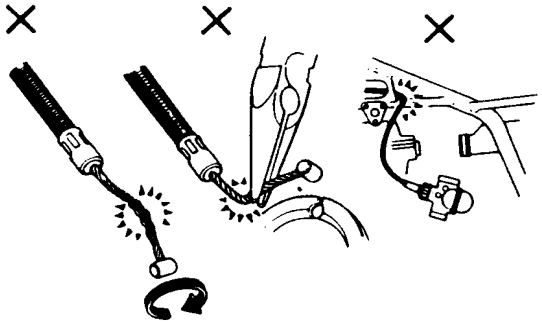
■ When a testing device is used, make sure to understand the operating methods thoroughly and operate according to the operating instructions.

■ 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#)

: Use special tool.

* : Caution

: Warning

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.

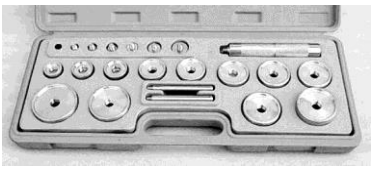
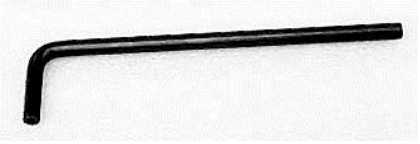
ENGINE

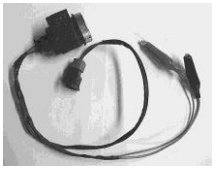
Item	Q'ty	Thread dia.(mm)	Torque (kg-m)	Remarks
Cylinder head bolt A	2	6	0.7-1.1	Double end bolt
Cylinder head bolt B	4	6	0.7-1.1	
Oil filter screen cap	1	30	1.0-2.0	
Exhaust muffler lock bolt	2	6	0.7-1.1	Double end bolt
Cylinder head flange nut	4	7	1.2-1.6	Apply oil to
Valve adjusting lock nut	2	3	0.07-0.09	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	BC1	6.0-8.0	U-nut
Steering handle post nut	1	10	4.0-5.0	U-nut
Front axle nut	1	12	5.0-7.0	U-nut
Rear axle nut	1	16	11.0-13.0	U-nut
Rear shock absorber upper bolt	1	10	3.5-4.5	
Rear shock absorber lower bolt	1	8	2.4-3.0	
Muffler Bracket/ Rear Fork	1	8	3.0-3.6	
Rear Fork/Engine Case	1	8	2.4-3.0	Flange bolt
Engine Hanger---Frame side	2	10	4.5–5.5	
Engine Hanger---Engine side	2	10	4.5–5.5	U-nut

SPECIAL TOOLS

Description	Tool No.	Photo
Flywheel puller	A120E00002	
Oil seal and bearing installer	A120E00014	
Universal holder	A120E00017	
Flywheel holder	A120E00021	
Clutch spring compressor	A120E00034	
Valve adjuster	A120E00036	
Bearing puller	A120E00037	
Cylinder Compression Gauage	A120E00039	

Description	Tool No.	Photo
Valve spring compressor	A120E00040	
Fuel Pressure Gauage	A120E00048	
INJECTOR CLEANER for Synerjet	A120E00075	
Wires Injector Connector	A120E00090	
Lock nut wrench	A120F00002	
Lower/Upper Race Remover & Installer	A120F00008	
Steering Stem Top Thread Wrench (shoter type)	A120F00024	
Steering Stem Top Thread Wrench	A120F00029	
Band Remover/Installer	A120F00030	

Description	Tool No.	Photo
Pliers Fuel Pipe	A120F00031	
Electric Repair Kit	A120F00032	

LUBRICATION POINTS

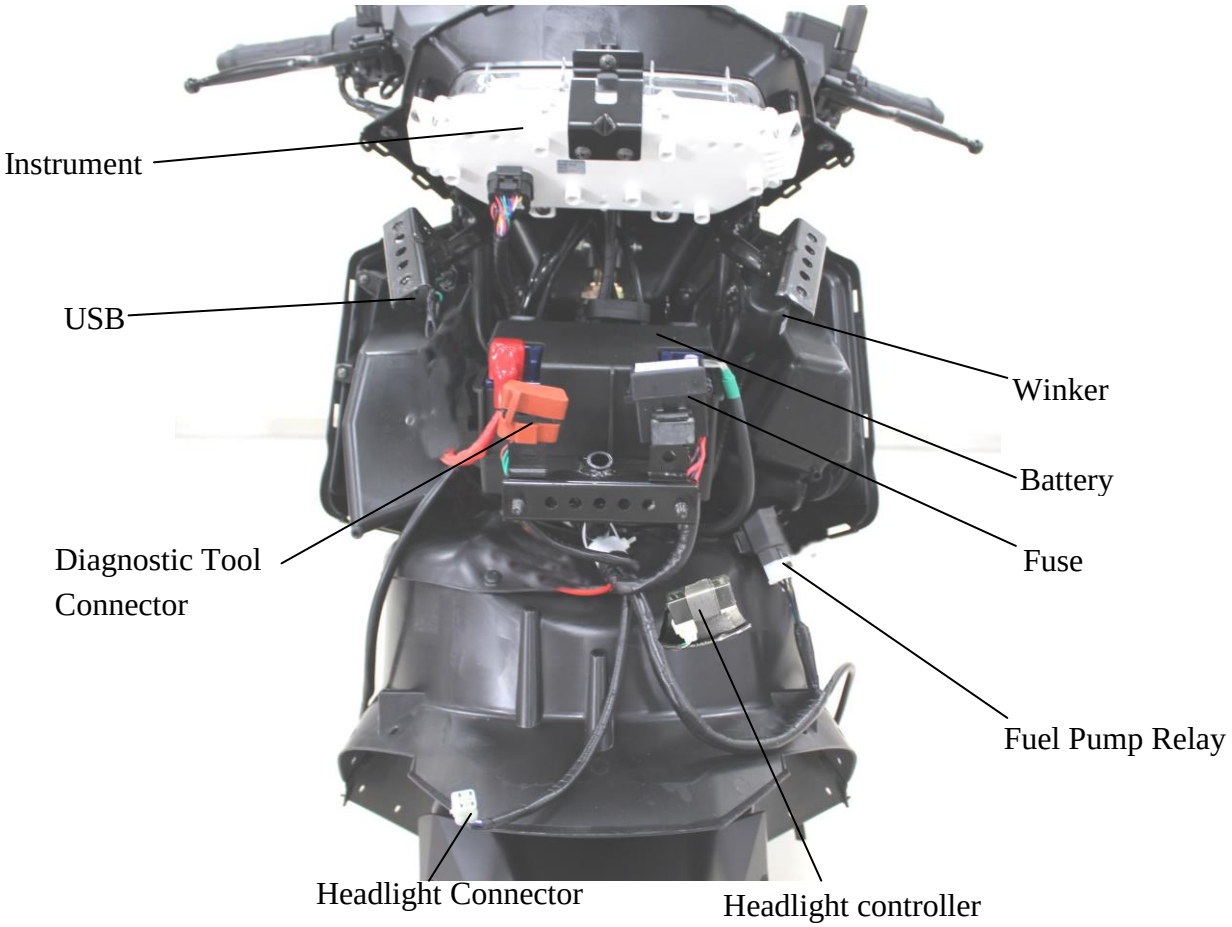
ENGINE

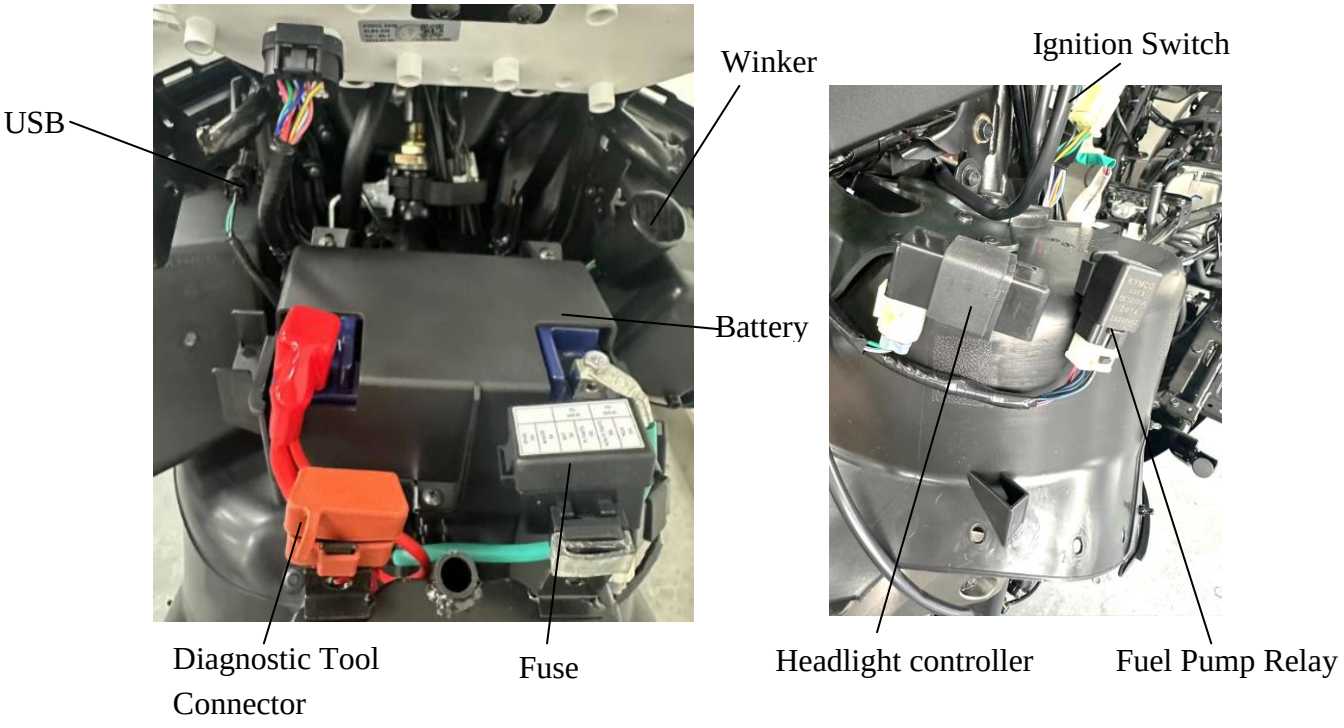
Lubrication Points	Lubricant
Valve guide/valve stem movable part Cam lobes Valve rocker arm friction surface Cam chain Cylinder lock bolt and nut Piston surroundings and piston ring grooves Piston pin surroundings Cylinder inside wall Connecting rod/piston pin hole Connecting rod big end Crankshaft R/L 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–SL 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

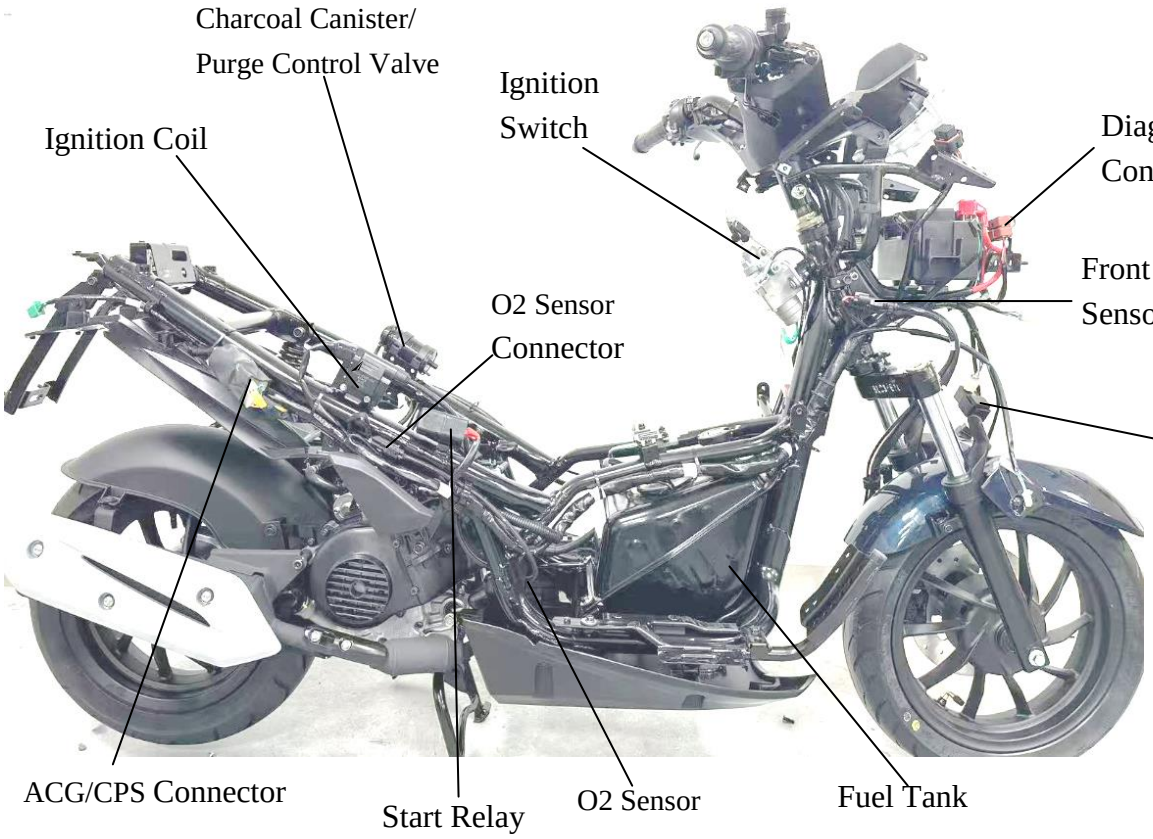
The following is the lubrication points for the frame.
Use a general purpose grease for parts not listed.
Apply clean engine oil or grease to cables and movable parts not specified.
This will avoid abnormal noise and rise the durability of the motorcycle.

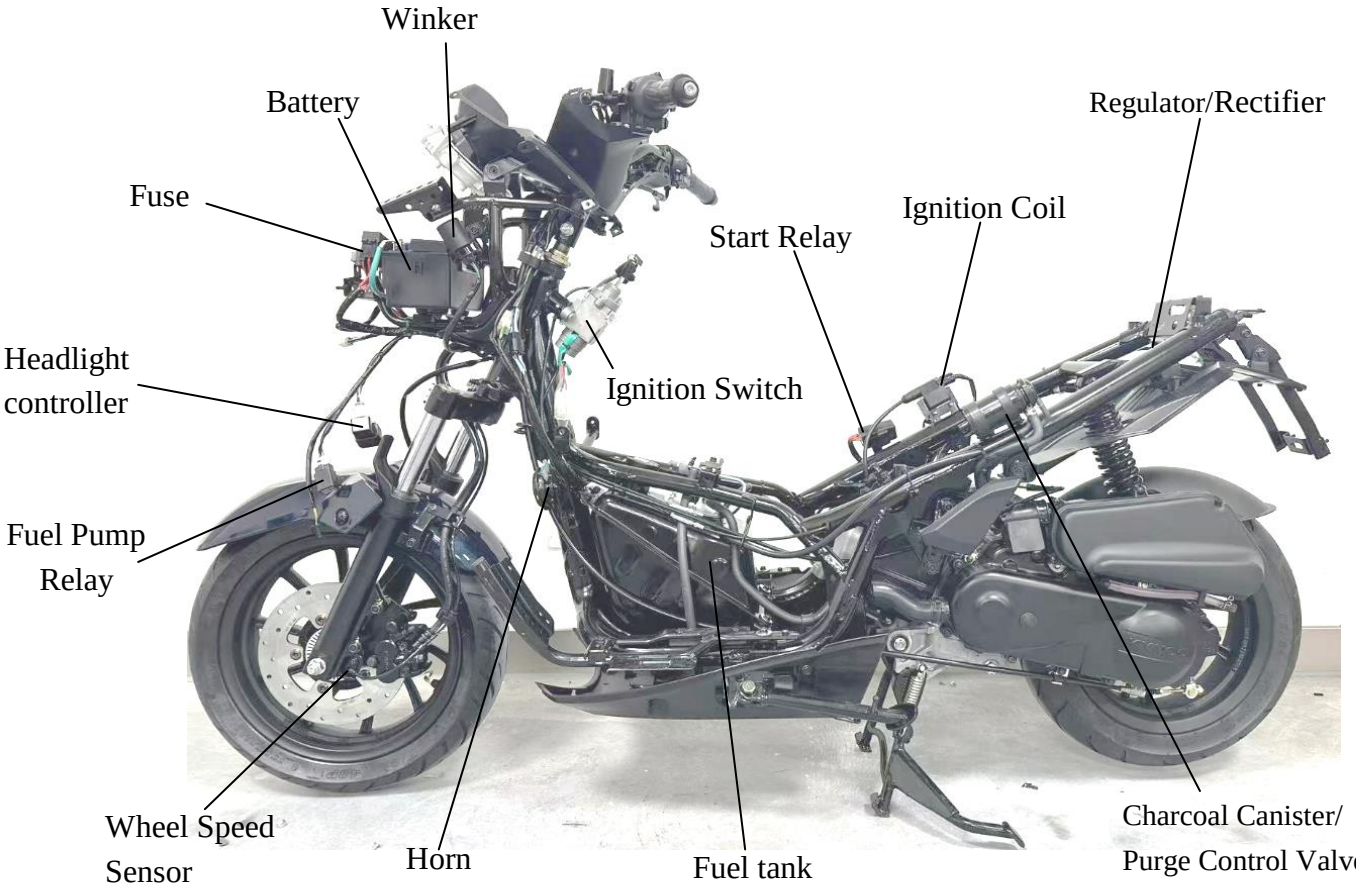
CABLE & HARNESS ROUTING

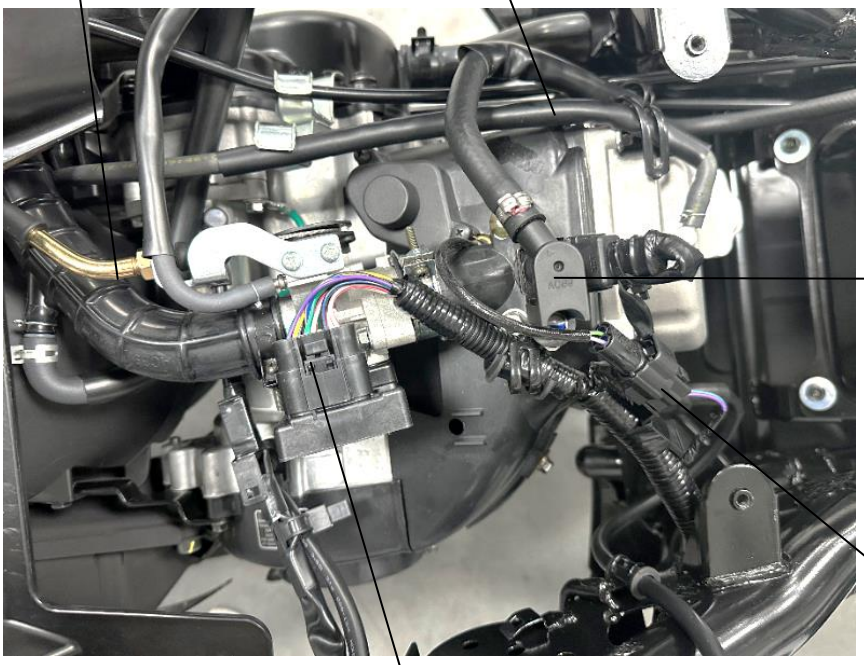


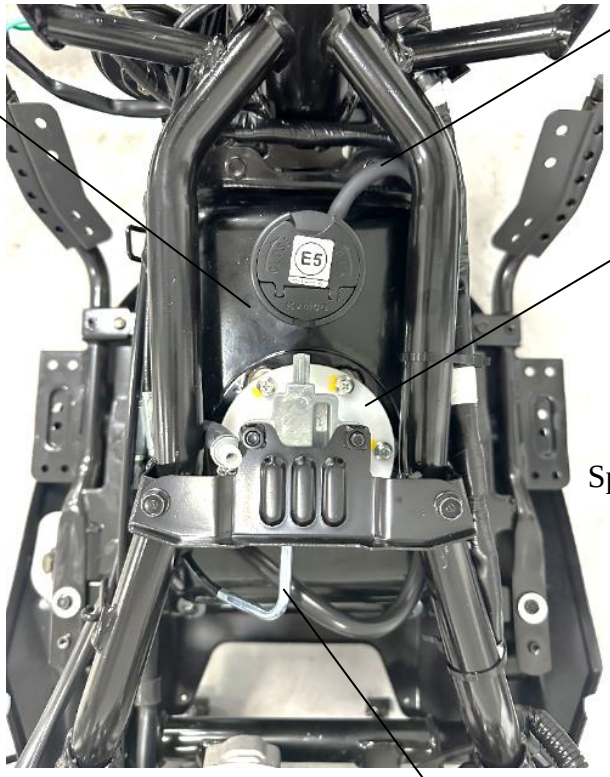


1. GENERAL INFORMATION






Throttle cable
Crankcase Breather Tube
Fuel Injector
ETS Connector
ECU
Throttle


Fuel Tank
Gasoline gas collection pipe
Fuel Pump
Fuel Unit
Fuel tank cover cable


ETS Connector
Spark plug
Fuel Injector

Troubleshooting

Vehicle can not be started

Preliminary 6 Step Inspection

1. Is the battery fully charged (12 V or higher). See the Battery topic for more information.

2. Key-On and listen for any action with Fuel Pump / Fuel Pump Relay (It will turn off automatically in 5-10 seconds)

3. Key-On to check for any failure lamp light up on dashboard. See the Self-Diagnosis topic for more information.

4. Is the Idle screw of Throttle Valve being changed or loose?

5. Has the vehicle under regular service? Is the gas station a good one?

6. Is the spark plug the correct model of specified by the vehicle builder?

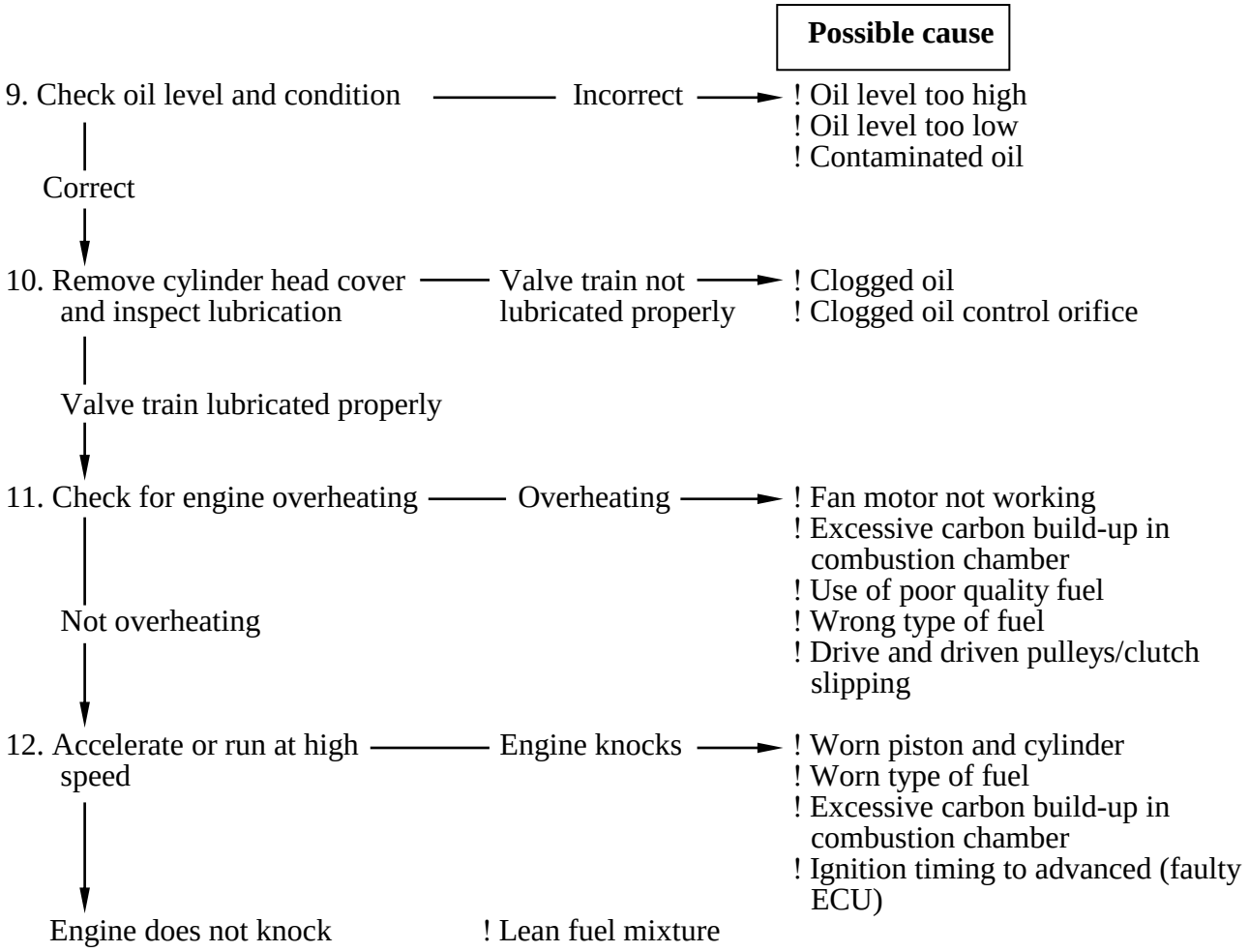
General Troubleshooting

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
Good spark		! Broken or shorted spark plug wire ! Faulty ignition switch ! Faulty ignition pulse generator ! Loose or disconnected spark plug wire
5. Test cylinder compression	Low compression	! Valve stuck open ! Worn cylinder and piston ring ! Damaged cylinder head gasket
Compression normal		! Seized valve ! Improper valve timing
6. Starting following normal procedure	Engine start but stops	! Intake pipe leaking ! Improper ignition timing (Faulty ignition coil or ignition pulse generator)
Engine does not start		! Fuel contaminated
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

2

EXHAUST MUFFLER/FRAME COVERS

2. EXHAUST MUFFLER/FRAME COVERS

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- When removing frame covers, use care not to pull them by force because the cover joint claws may be damaged.
- Make sure to route cables and harnesses according to the Cable & Harness Routing.

TORQUE VALUES

Exhaust muffler pipe nuts	1.8~2.2 kgf-m
Exhaust muffler brake /RR Frok	3.2~3.8 kgf-m
RR fork/Engine case	3.0~4.0 kgf-m

TROUBLESHOOTING

Noisy exhaust muffler

- Damaged exhaust muffler
- Exhaust muffler joint air leaks

Lack of power

- Caved exhaust muffler
- Clogged exhaust muffler
- Exhaust muffler air leaks

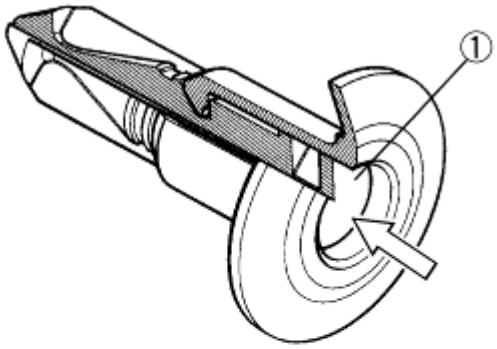
2. EXHAUST MUFFLER/FRAME COVERS

FASTENER REMOVAL AND REINSTALLATION

REMOVAL

Depress the head of fastener center piece ←.

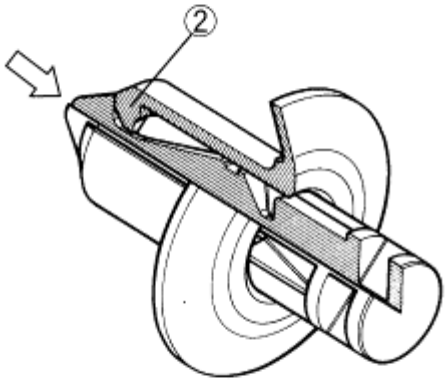
Pull out the fastener.



INSTALLATION

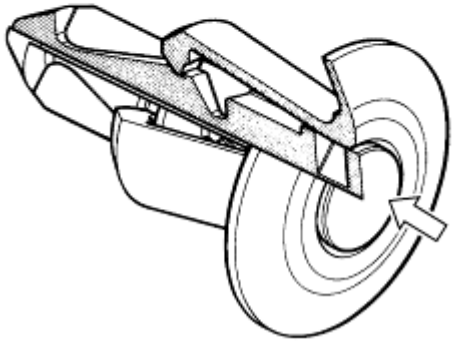
Let the center piece stick out toward the head so that the pawls ↑ close.

Insert the fastener into the installation hole.



* To prevent the pawl ↑ from damage, insert the fastener all the way into the installation hole

Push in the head of center piece until it becomes flush with the fastener outside face.



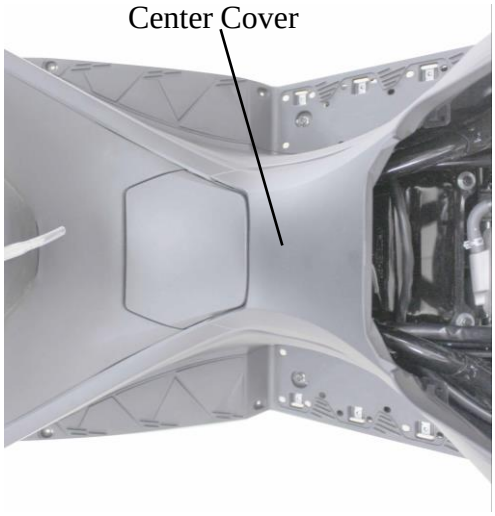
2. EXHAUST MUFFLER/FRAME COVERS

FRAME COVERS REMOVAL/ INSTALLATION

MET-IN BOX REMOVAL

Unlock the seat with the ignition key.
Open the seat.
Remove the 4 bolts attaching the met-in box.
Remove the met-in box .

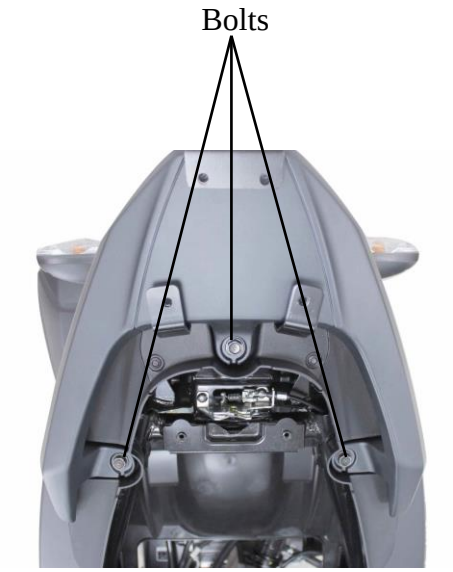
Remove the Center Cover.



Installation is in the reverse order of removal.

REAR CARRIER REMOVAL

Remove the three bolts and then remove the rear carrier.

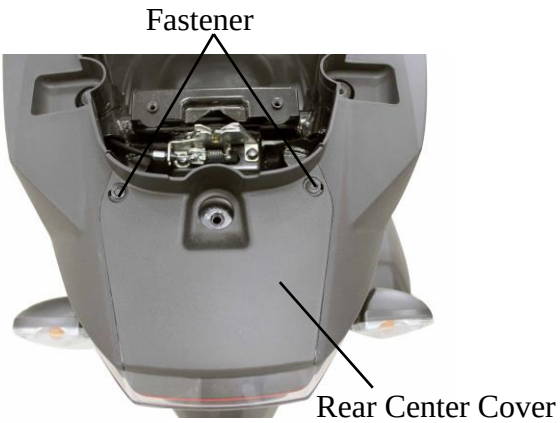


Installation is in the reverse order of removal.

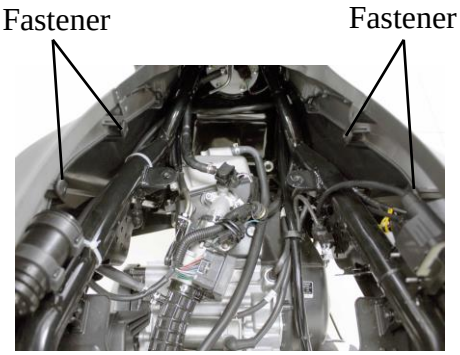
2. EXHAUST MUFFLER/FRAME COVERS

BODY COVER

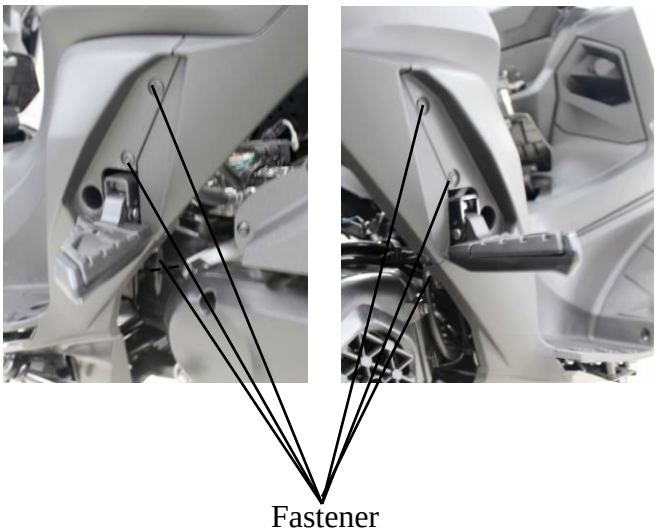
Remove two fasteners and then remove the rear center cover



Remove four fasteners and two nuts.



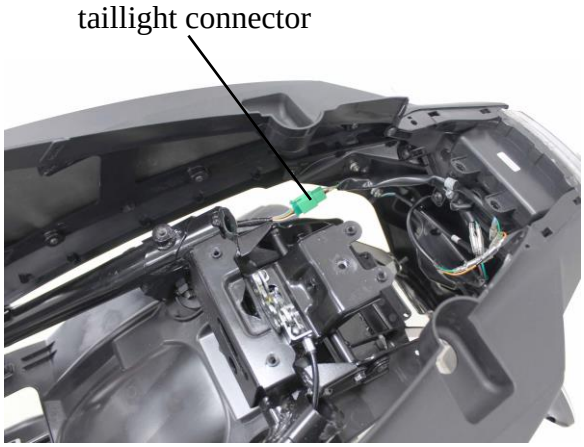
Remove the six fasteners attaching to the right and left the body .



2. EXHAUST MUFFLER/FRAME COVERS

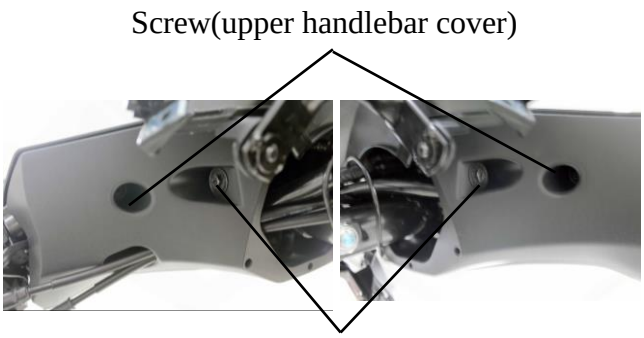
Disconnect the taillight connector, then remove the body cover.

Installation is in the reverse order of removal.

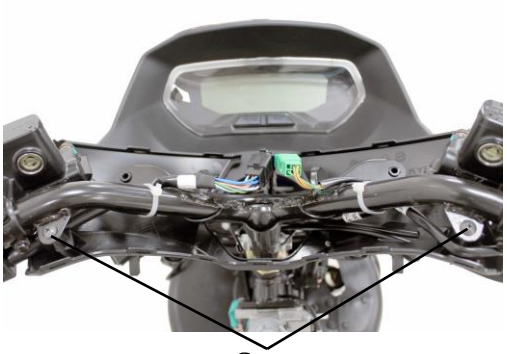


UPPER/LOWER HANDLEBAR COVER

Remove the two screws .
Remove upper handlebar cover.

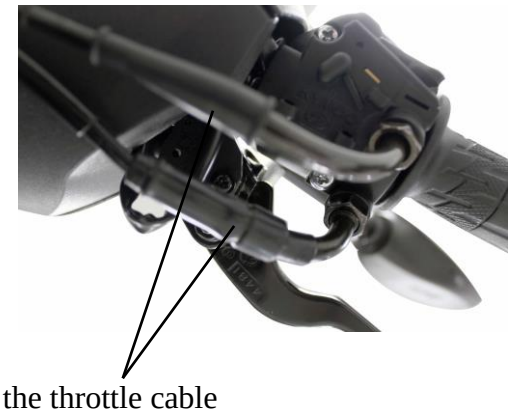


Remove the two bolts and the two screws.



Disconnect the throttle cable refer to the **"THROTTLE BODY /TPS"** section, then pull the throttle cable out from the lower cover.
Remove the lower cover.

Installation is in the reverse order of removal.



2. EXHAUST MUFFLER/FRAME COVERS

WINDSHIELD
Remove the four bolts.
Remove the windshield.

FRONT CENTER COVER

Remove the windshield
Remove the four bolts and the windshield bracket.
Remove the two screws.
Remove the front center cover.

Installation is in the reverse order of removal

RIGHT/LEFT FOOT SKIRT
Remove the screws attaching to the right or left skirt.

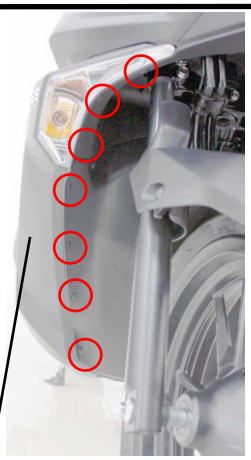
.

2. EXHAUST MUFFLER/FRAME COVERS

Remove the fasteners attaching under cover and the right or left skirt.
Disconnect the right/left turn signal light connectors.
Remove the right or left skirt.

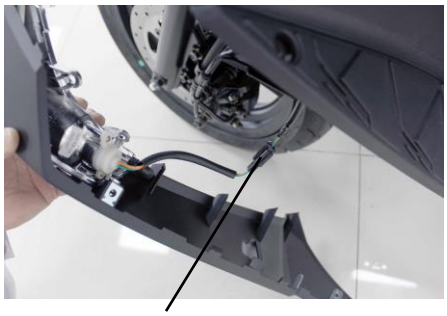
* During removal, do not pull the joint claws forcedly to avoid damage.

Installation is in the reverse order of removal.



Right Foot skirt

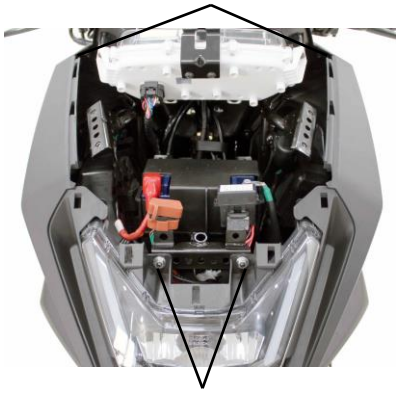
Left Foot skirt



Turn signal light connector

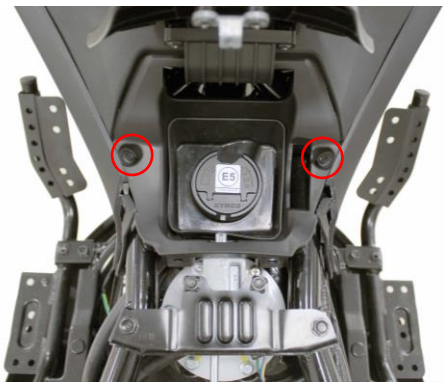
FRONT COVER
Remove the body cover
Remove the windshield.
Remove the front center cover.
Remove the right and left skirt.
Remove the right and left floorboard.
Remove the two Fasteners and the two nuts.

Fastener



Nut

Remove the four fasteners from the inner cover.



2. EXHAUST MUFFLER/FRAME COVERS

Disconnect the headlight light connector.

headlight light connector

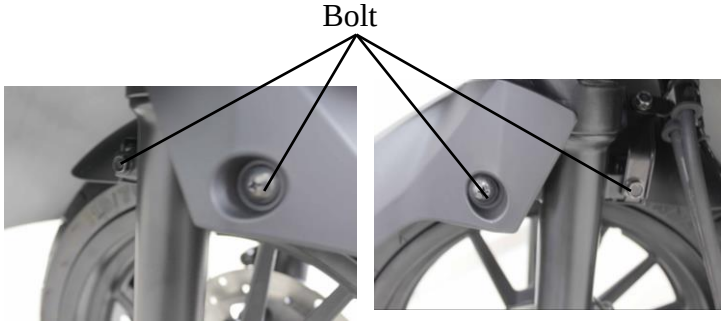
Remove the front cover

Installation is in the reverse order of removal.

FRONT FENDER

Remove the four bolts attaching to the front fender.

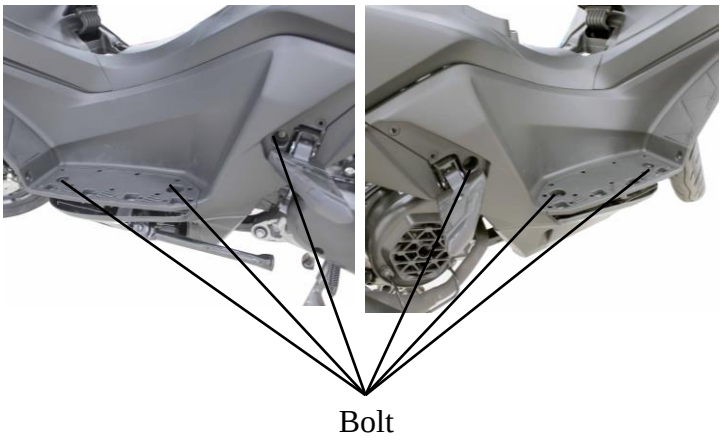
Installation is in the reverse order of removal.



FLOORBOARD

Remove the body cover.
Remove the right and left skirt.
Remove the right and left Passenger foot pegs.
Remove the six bolts .
Remove the right and left floorboard.

Installation is in the reverse order of removal.

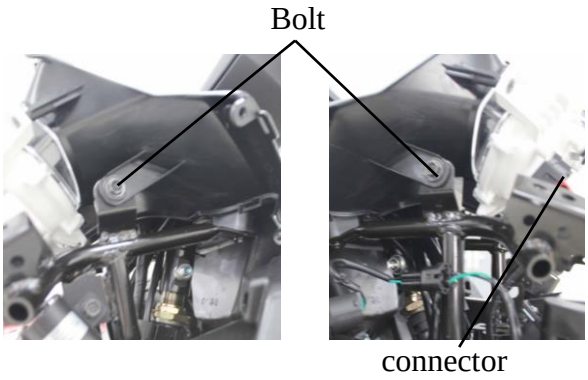


2. EXHAUST MUFFLER/FRAME COVERS

METER PANEL

Remove the front cover.
Remove the inner cover.
Remove the four bolts.

Disconnect the meter connector.
Remove meter panel.

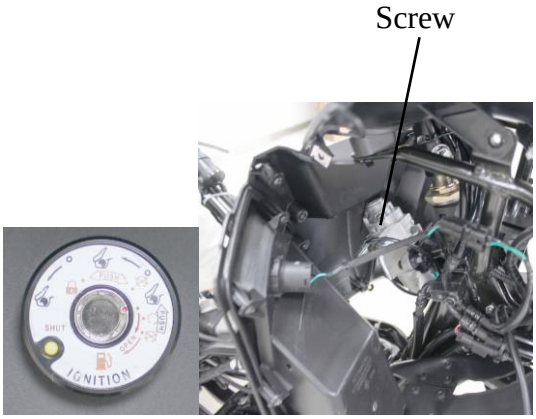


Installation is in the reverse order of removal.

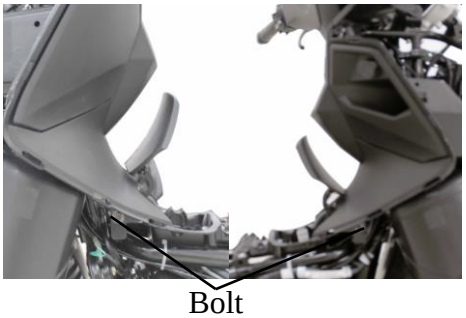
INNER COVER

Remove the front cover.
Remove the one screws
Remove the ignition key garnish.

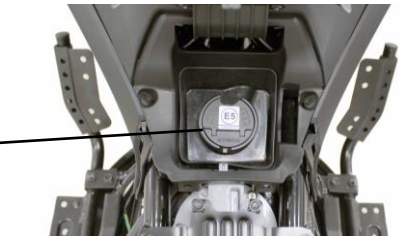
* During removal, do not pull the joint claws forcedly to avoid damage.



Remove the two bolts attaching to the inner cover.



Remove the fuel filler cap .
.



2. EXHAUST MUFFLER/FRAME COVERS

Disconnect the connector of USB.

Remove the inner cover.
Installation is in the reverse order of removal.

FRONT INNER FENDER

Remove the six fasteners, connect
front inner fender and the top inner fender

Remove front inner fender

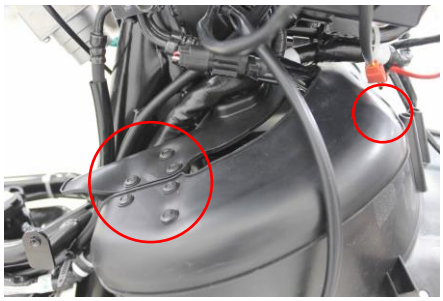
front inner fender

Headlight
controller

Relay

TOP INNER FENDER

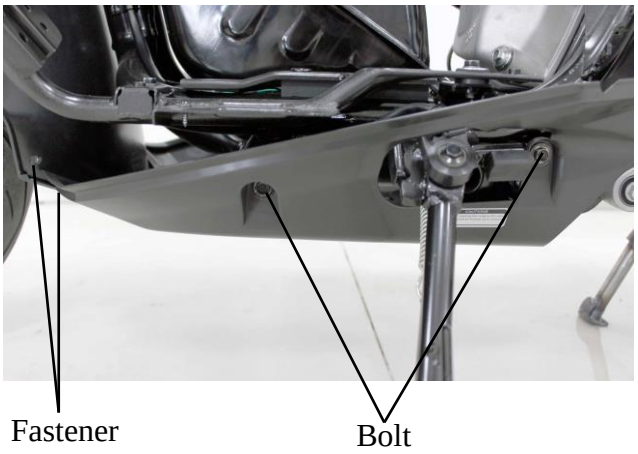
Disconnect the connector of relay and
Headlight controller
Remove the eleven fasteners.
Remove the top inner fender



2. EXHAUST MUFFLER/FRAME COVERS

UNDER COVER

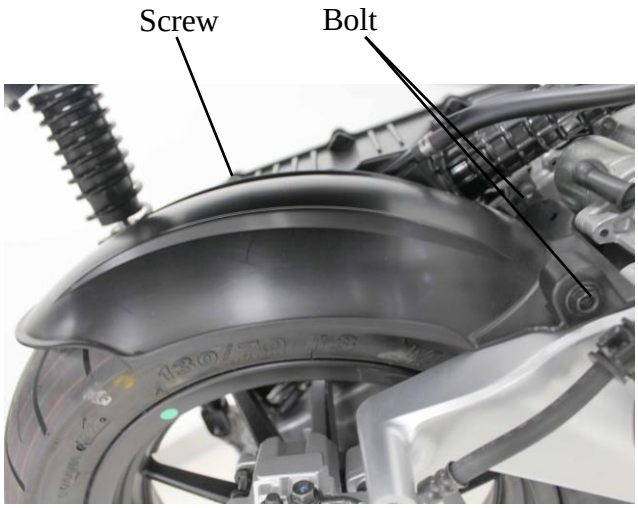
Remove four bolts and two fasteners attaching to under cover.
Remove the under cover.



REAR FENDER

Remove the one screw.
Remove the two bolts.

Remove the rear fender rear.



FENDER,REAR INNER

Remove the four bolts.
Remove the rear shock absorber upper mount bolt.
Remove the fender rear inner.

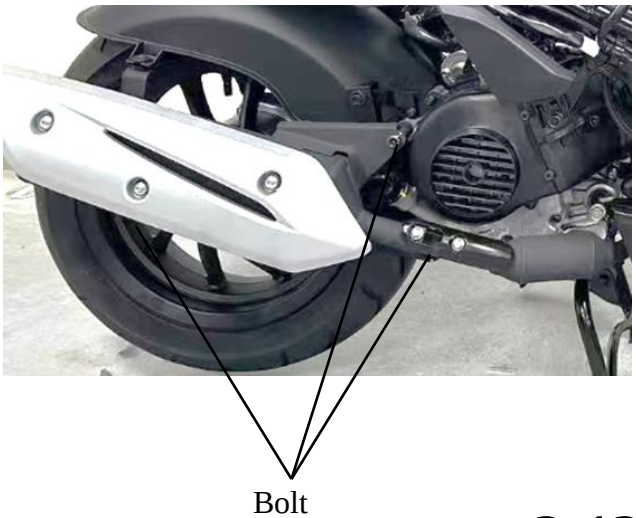
EXHAUST MUFFLER

REMOVAL

Disconnect the connectors with O2 heater/O2 sensor.

Remove the two exhaust pipe joint nuts

Remove three muffler mount bolts and muffler and gasket.



2. EXHAUST MUFFLER/FRAME COVERS

INSTALLATION

Replace the gasket with a new one.
Install the exhaust muffler and three mounting bolts.

Install and tighten the two exhaust pipe joint nuts to the specified torque

Torque: 20 N•m (2 kgf•m,)

Tighten the three mounting bolts

Torque: 35 N•m (3.5 kgf•m,)

3. INSPECTION/ADJUSTMENT

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- CR6HSA
Valve clearance	: IN: 0.10mm
	: EX: 0.10mm
Idle speed	: 2000 ±100rpm
Engine oil capacity:	
At disassembly	: 0.85 liter
At change	: 0.7 liter
Gear oil capacity	:
At disassembly	: 0.12 liter
At change	: 0.11 liter

3. INSPECTION/ADJUSTMENT

Cylinder compression ：12±2 kg/cm^2

Rear brake free play ：10～20mm

TIRE PRESSURE

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

TIRE SIZE:
Front ：110/70-13
Rear ：120/70-12

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

MAINTENANCE SCHEDULE

Perform the pre-ride inspection at each scheduled maintenance period. This interval should be judged by odometer reading or months, whichever comes first.

Maintenance schedule legend

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY

C: CLEAN R: REPLACE A: ADJUST L: LUBRICATE T: TIGHTEN D:DIAGNOSE

The maintenance schedule specifies the maintenance required to keep your like Ⅱ 50i scooter in peak operating condition. Maintenance work should be performed in accordance with KYMCO standards and specifications by properly trained and equipped technicians. Your KYMCO dealer meets all of these requirements.

* Should be serviced by your KYMCO dealer, unless you have the proper tools, service data and are technically qualified

* In the interest of safety, we recommend these items be serviced only by your KYMCO dealer.

KYMCO recommends that your KYMCO dealer road test your scooter after each periodic maintenance service is completed.

Maintenance schedule notes :

1. At higher odometer readings, repeat at the frequency interval listed here.
2. Service more frequently if the scooter is ridden in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Clean every 1200 miles (2000 km) after replacement, and replace every 3000 miles (5000 km).
5. Replace every 1 year, or every 2400 miles (4000 km), whichever comes first. Replacement requires mechanical skill.
6. Replace every 6000 miles (10000 km). Replacement requires mechanical skill.
7. Replace every 2 years. Replacement requires mechanical skill.

3. INSPECTION/ADJUSTMENT

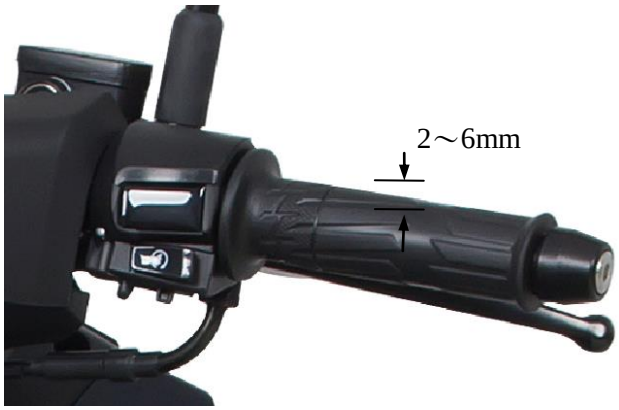
ITEM / FREQUENCY	WHICHEVER COMES FIRST		ODOMETER READING [NOTE(1)]							
		×1000km	0.3	1	3	5	7	9	11	REFER TO PAGE
		×1000mi	0.2	0.6	1.8	3	4.2	5.4	6.6	
	NOTE	MONTH		3	6	12	18	24	30	
AIR CLEANER	NOTE2			I	R	I	R	I	R	
SPARK PLUGS	NOTE4					R				
THROTTLE OPERATION						I		I		
VALVE CLEARANCE			A		A		A		A	
FUEL LINE						I		I		
CRANKCASE BREATHER	NOTE3			C	C	C	C	C	C	
ENGINE OIL			R	R	R	R	R	R	R	
FI SYSTEM				D	D	D	D	C	D	
ENGINE OIL STRAINER SCREEN			C		C		C		C	
ENGINE DILE SPEED					I		I		I	
COOLING SYSTEM						I		I		
SECONDARY AIR SUPPLY SYSTEM						I		I		

ITEM / FREQUENCY	WHICHEVER COMES FIRST		ODOMETER READING [NOTE(1)]							
		×1000km	0.3	1	3	5	7	9	11	REFER TO PAGE
		×1000mi	0.2	0.6	1.8	3	4.2	5.4	6.6	
	NOTE	MONTH		3	6	12	18	24	30	
TRANSMISSION OIL	NOTE5		R		R		R		R	
DRIVE BELT							I			
CLUTCH SHOE WEAR							I			
BRAKE FLUID	NOTE7				I	I	I	R	I	
BRAKE PAD WEAR				I	I	I	I	I	I	
BRAKE SYSTEM				I	I	I	I	I	I	
BRAKE LIGHT SWITCH						I		I		
SIDE STAND						I		I		
SUSPENSION						I		I		
HEADLIGHT AIM						I		I		
NUTS,BOLTS,FASTENERS			I			I		I		
WHEELS/TIRES				I	I	I	I	I	I	
STEERING BEARINGS			I			I		I		

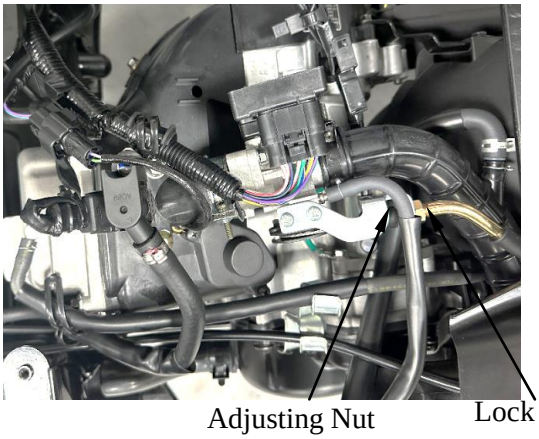
THROTTLE OPERATION

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

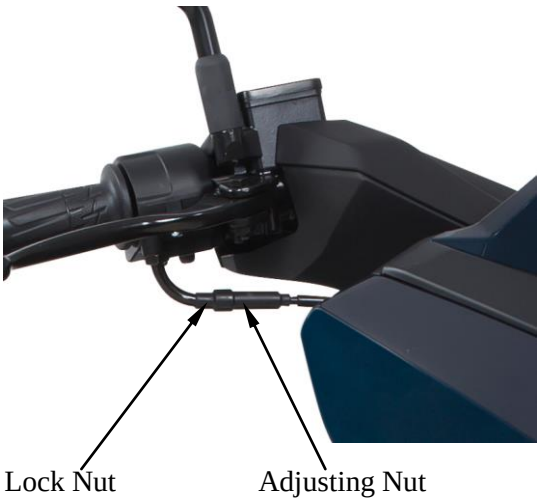
Free Play: 2～6mm



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

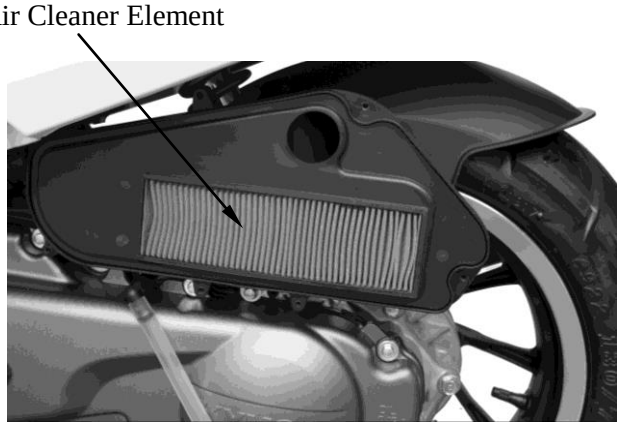
AIR CLEANER REPLACEMENT

Remove the air cleaner case cover screws and the cover by removing the five screws.

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

CHANGE INTERVAL

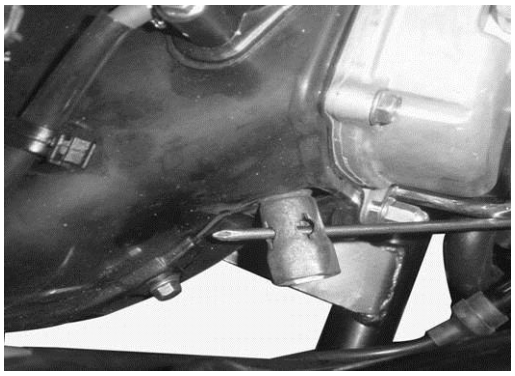
More frequent replacement is required when riding in unusually dusty or rainy areas.



* • 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.

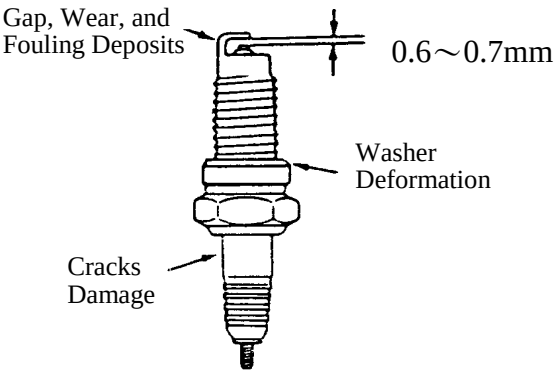
SPARK PLUG

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- CR6HSA

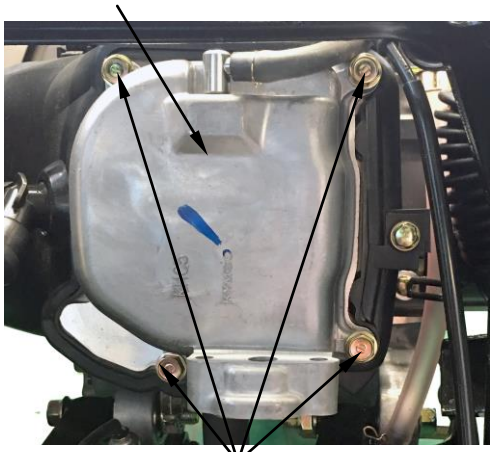
Measure the spark plug gap.
Spark Plug Gap: 0.6～0.7mm



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

VALVE CLEARANCE

Cylinder Head Cover

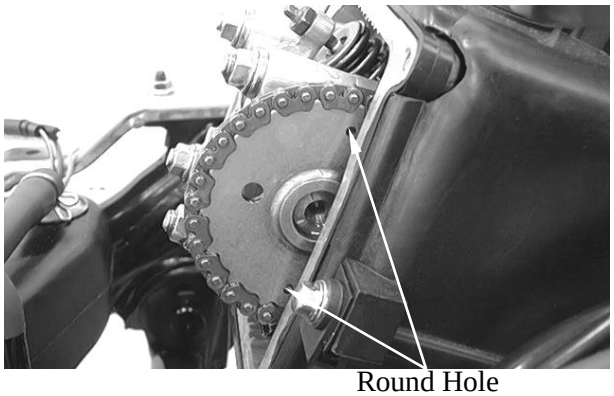


Bolts

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

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

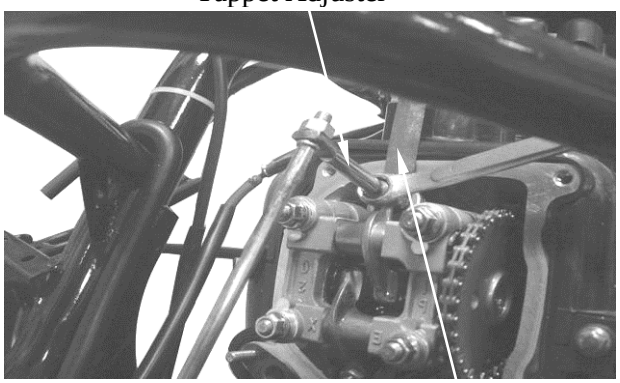
Turn the flywheel counterclockwise so that the "T" mark on the flywheel aligns with the index mark on the crankcase to bring the round hole on the camshaft gear facing up to the top dead center on the compression stroke.



Round Hole

Inspect and adjust the valve clearance.
Valve Clearance: IN : 0.1mm
EX: 0.1mm

Tappet Adjuster



Feeler Gauge

Loosen the lock nut and adjust by turning the adjusting nut

Special

Tappet Adjuster

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

3. INSPECTION/ADJUSTMENT

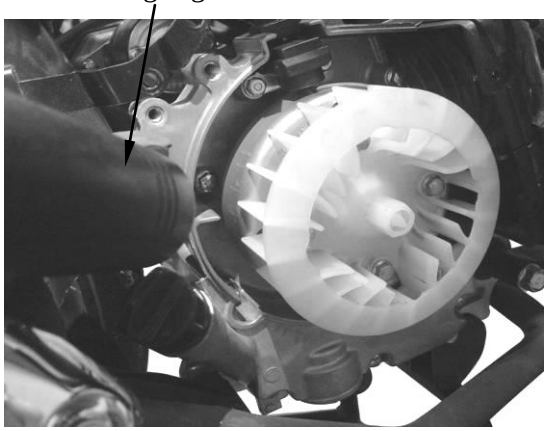
IGNITION TIMING

Remove the right of the fan cover.

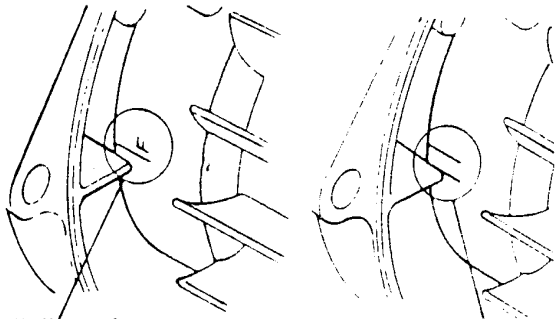
Timing Hole Cap

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.

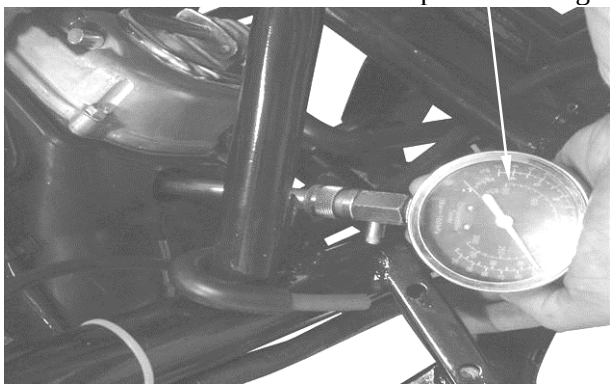
Compression: 15±2kg/cm² rpm

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.

Compression Gauge



FINAL REDUCTION GEAR OIL

OIL LEVEL CHECK

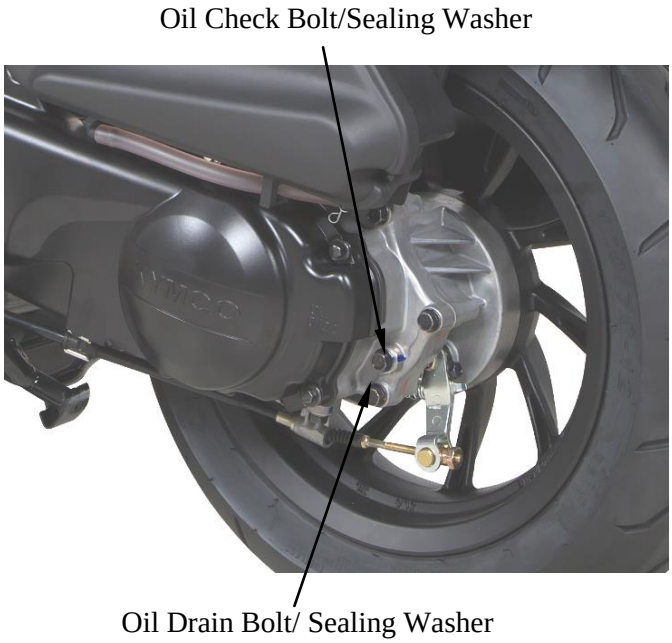
* Place the motorcycle on its main stand on level ground for oil level check.

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#

Install the oil check bolt.

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



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.

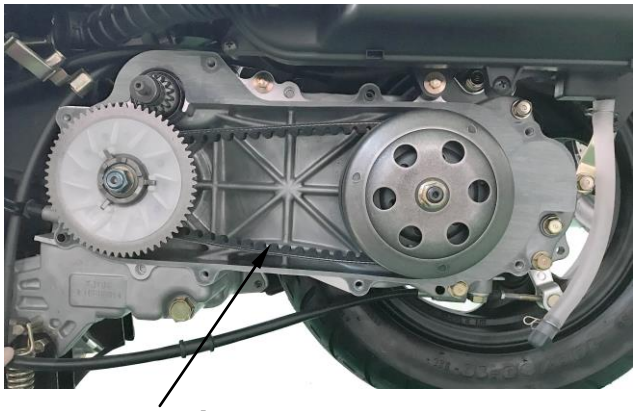
Fill with the recommended oil.

Oil Capacity: At disassembly : 0.12 liter
At change : 0.11 liter

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

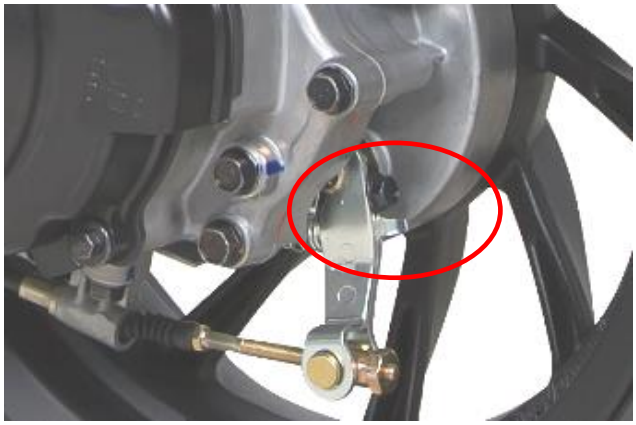
DRIVE BELT

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.



BRAKE SHOE

Replace the brake shoes if the arrow on the wear indicator plate aligns with the punch mark on the brake panel when the brake is fully applied.
Refer to page 12-7 and 13-3 for brake shoe replacement.



REAR BRAKE

Measure the rear brake lever free play.
Free Play: 10～20mm

BRAKE ADJUSTING NUT

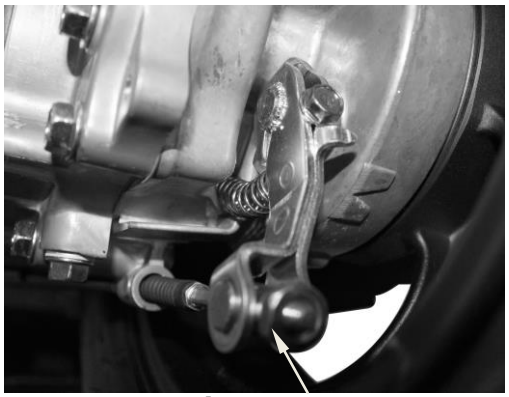
If the free play do not fall within the limit, adjust by turning the adjusting nut.

Adjusting Nut

BRAKE FLUID

Turn the steering handlebar upright and check if the rear brake fluid level should be between the upper and lower level lines.
Specified Brake Fluid: DOT-4。

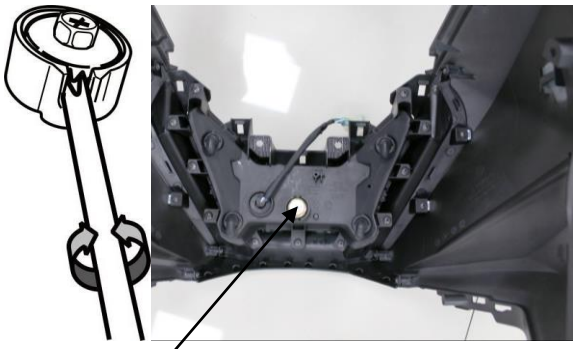
If the free play do not fall within the limit, adjust by turning the adjusting nut.



Adjusting Nut

HEADLIGHT AIM

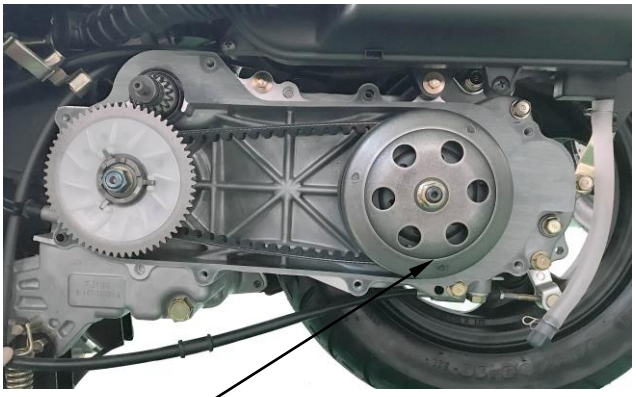
Turn the ignition switch ON and start the engine.
Turn on the headlight switch.
Adjust the headlight aim by turning the headlight aim adjusting screw.



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)



clutch

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	1.75kg/cm^2	1.75kg/cm^2
Rear	2.00kg/cm^2	2.25kg/cm^2

TIRE SIZE

Front: 110/70-12
Rear : 130/70-12

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.

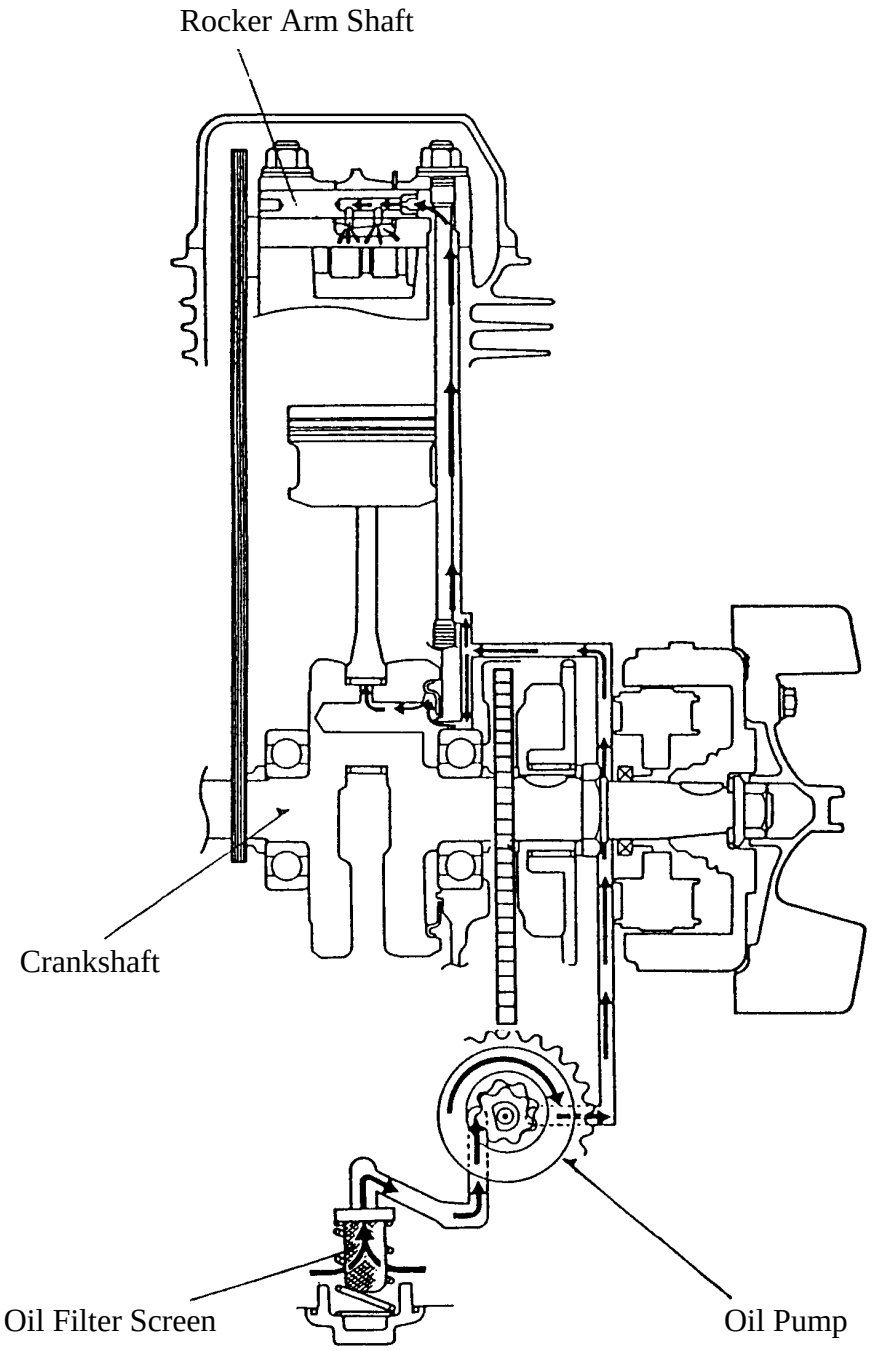
Torques: **Front** : 5.0～7.0kgf-m
Rear : 11～13kgf-m

Front Axle Nut

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

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

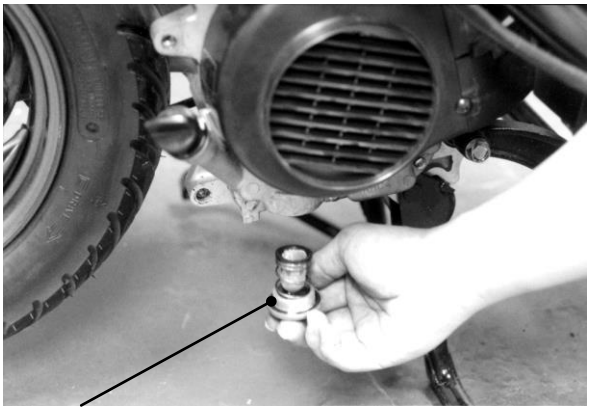
OIL CHANGE

* 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

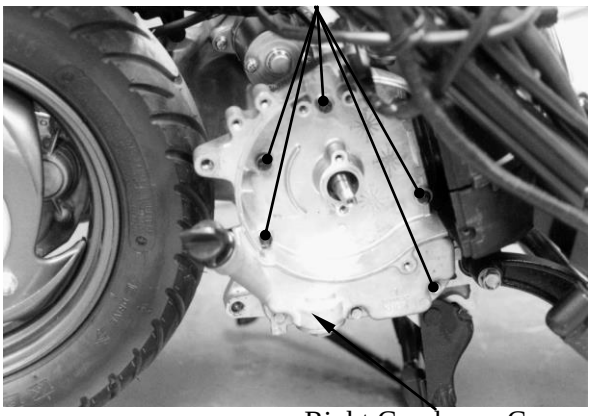
Fill the crankcase with the specified engine oil to the proper level.
Oil Capacity: At disassembly : 0.85 liter
At change : 0.70 liter

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

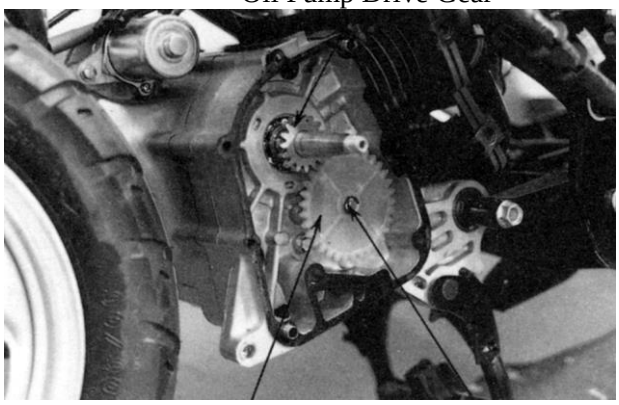
OIL PUMP

REMOVAL

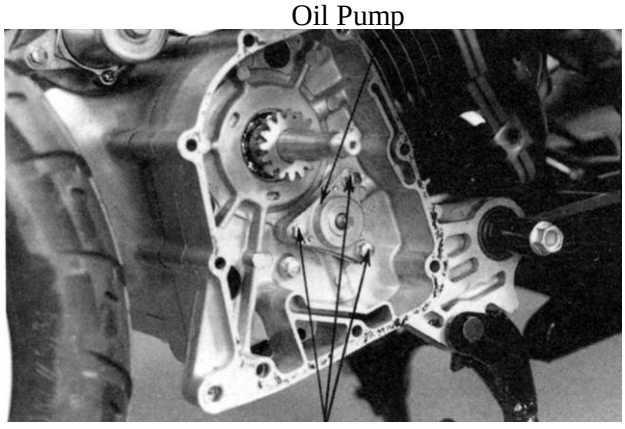
Remove the A.C. generator flywheel. (⇨14-7)
Remove the A.C. generator stator and pulsar coil. (⇨14-6)
Remove the eight right crankcase cover bolts and the right crankcase cover.



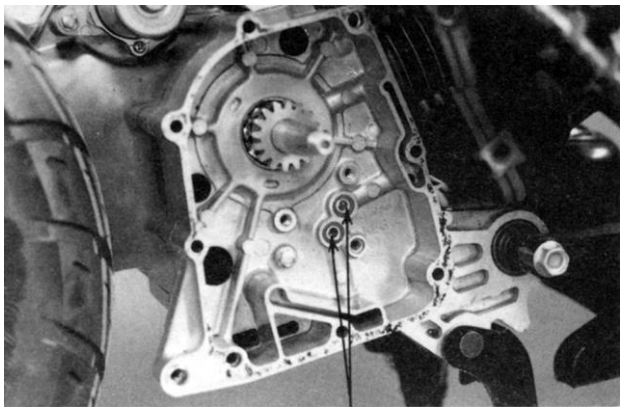
Remove the gasket and dowel pins.
Remove the oil pump drive gear circlip.
Remove the oil pump gear.



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



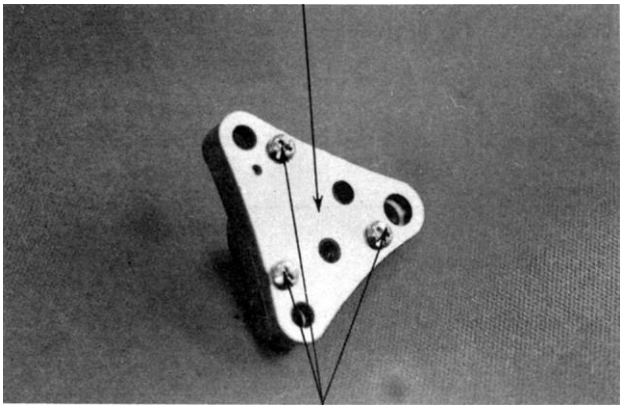
Remove the two O-rings.
Inspect the two O-rings for damage or deterioration.



DISASSEMBLY

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

Oil Pump Boby

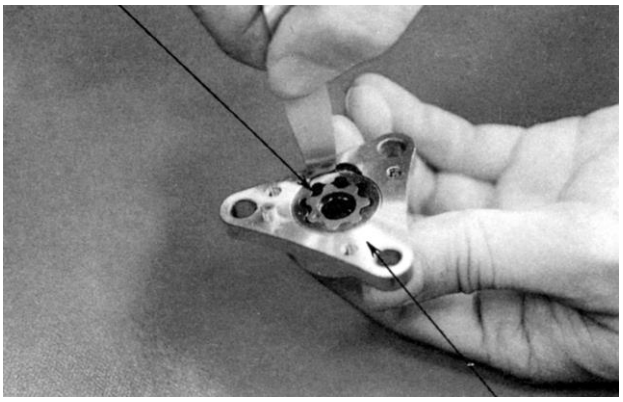


Screws

INSPECTION

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

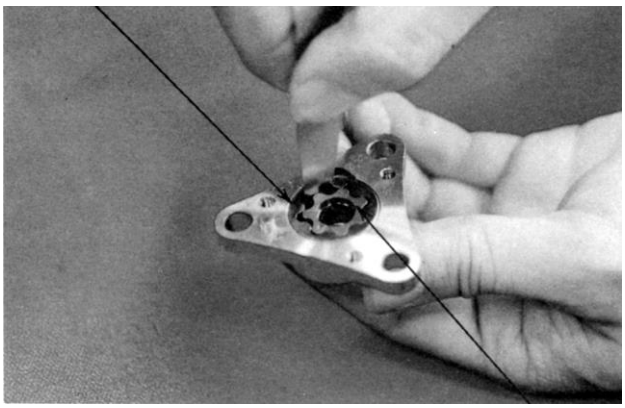
Outer Rotor



Oil Pump Boby

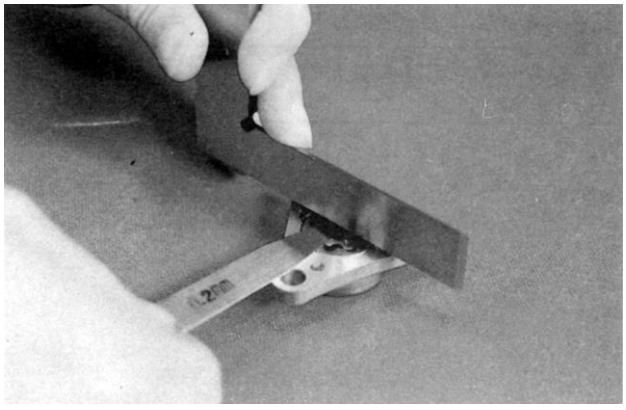
Measure the inner rotor-to-outer rotor clearance.
Service Limit: 0.12mm

Outer Rotor



Inner Rotor

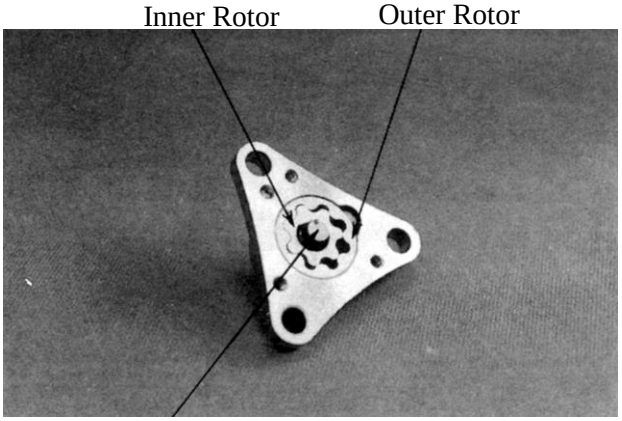
Measure the rotor end-to- pump boby clearance.
Service Limit: 0.2mm



ASSEMBLY

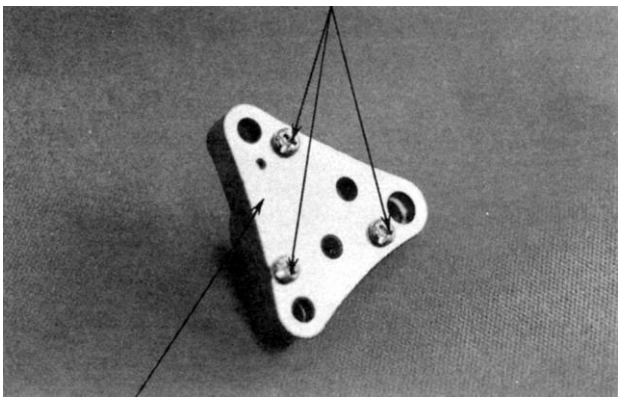
Install the outer rotor, inner rotor and pump shaft into the pump boby.

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



Pump Shaft

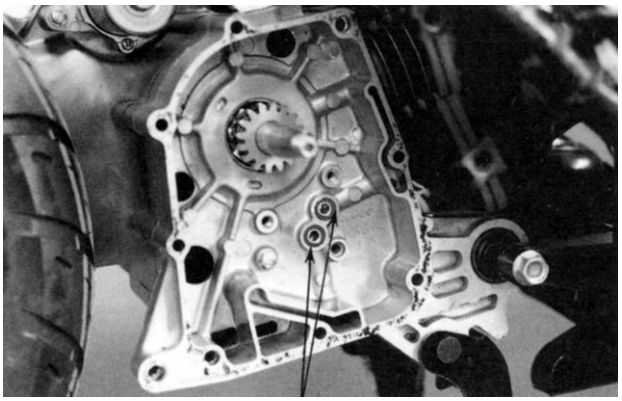
Install the pump cover and tighten the screws to secure the pump cover.



Pump Cover

INSTALLATION

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

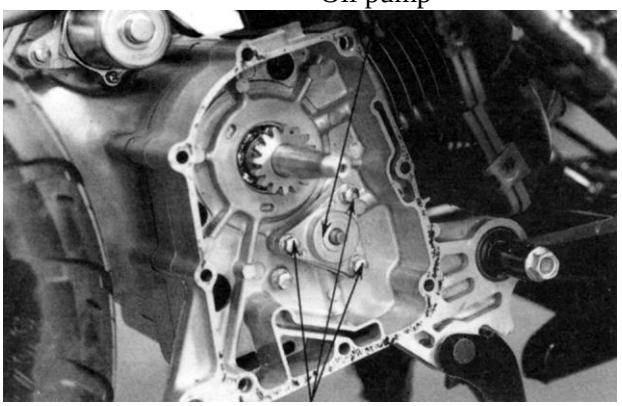


O-rings

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.

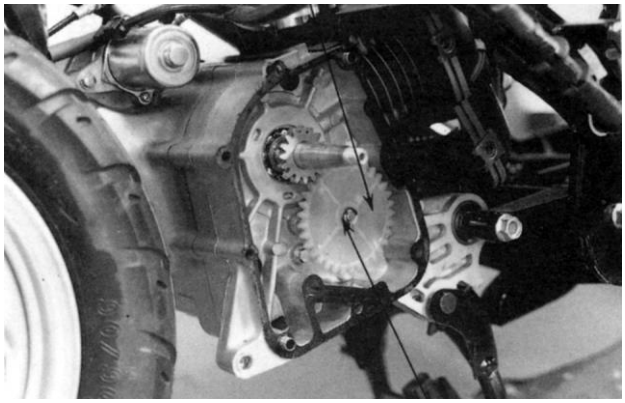


Bolts

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

Torque: 0.8～1.2kg-m

Pump Driven Gear



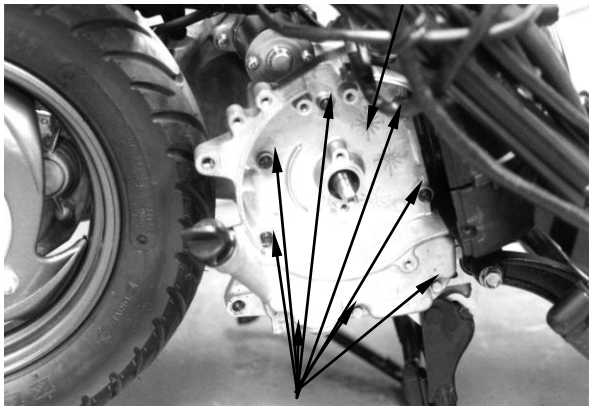
Circlip

Right Crankcase Cover

Install the right crankcase cover and tighten the eight bolts.

Torque: 0.8~1.2kgf-m

* Diagonally tighten the bolts in 2～3 times.

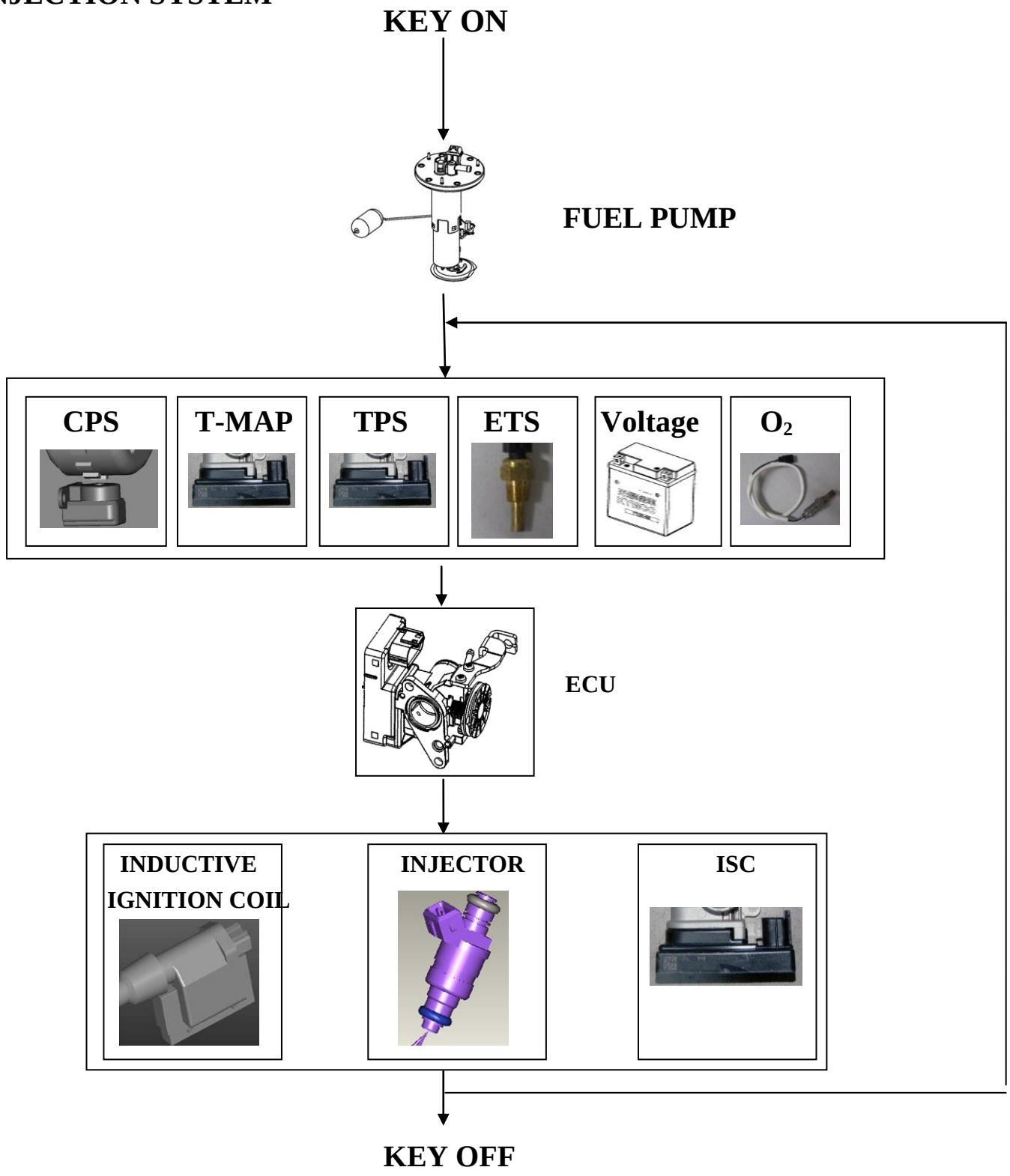


Bolts

FUEL INJECTION SYSTEM

5. FUEL INJECTION SYSTEM

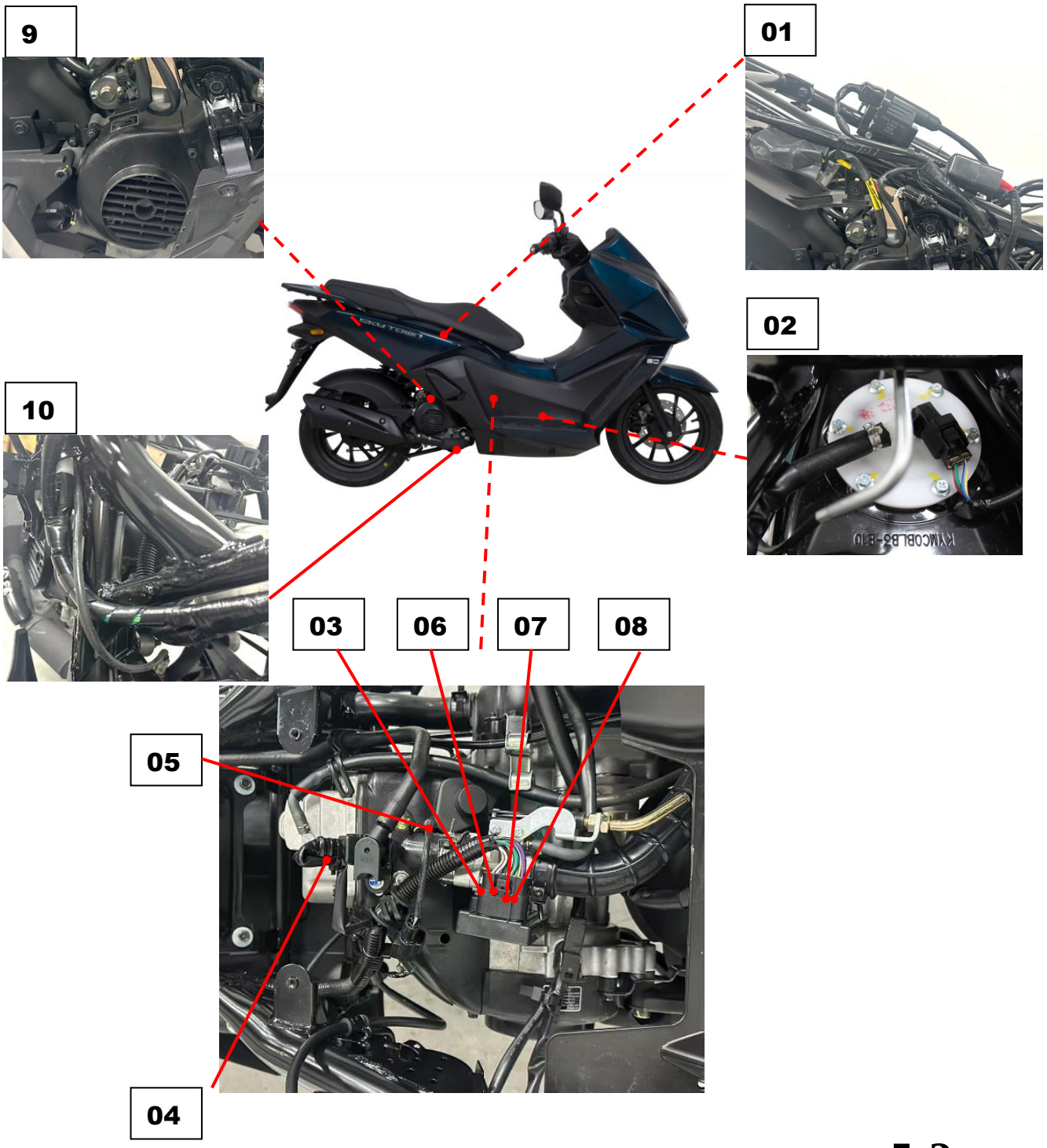
INJECTION SYSTEM



5. FUEL INJECTION SYSTEM

Parts Location

01:Inductive Ignition coil
02:Fuel pump
03:ECU
04:Fuel Injector
05:ETS sensor
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			96 ~ 144Ω
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.

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	

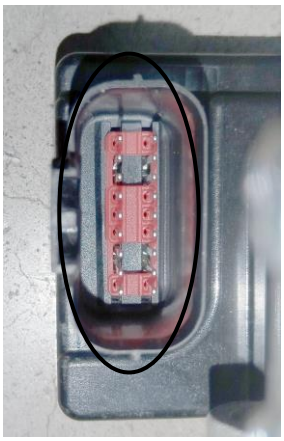
37	BF	P0262	P0262 Injection valve Voltage High	
38	BE	P0264	P0264 Injection valve Voltage Low	
39	BF	P0265	P0265 Injection valve Voltage High	
40	C0	P0335	P0335 Crankshaft sensor malfunction	
41	C1	P0350	P0350 Ignition malfunction or Voltage Low	
42	C2	P0351	P0351 Ignition Voltage High	
43	DB	P0412	P0412 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	

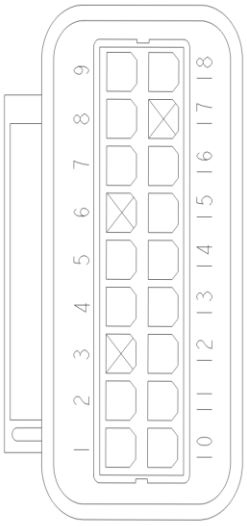
5. FUEL INJECTION SYSTEM

ECU

There are 18 pins attaching the ECU.



ECU PIN FUNCTION



PIN	FUNCTION	PIN	FUNCTION
01	POWER GND	13	CRANKSHAFT POSITION SENSOR(+)
02	RPM	14	DIRECT BATTERY VOLTAGE
03		15	ENGINE TEMPERATURE SENSOR
04	CRANKSHAFT POSITION SENSOR(-)	16	SPEED
05	HETED 02 SENSOR	17	
06		18	FUEL PUMP
07	BATTERY VOLTAGE AFTER KEY		
08	K-LINE		
09	INJECTOR		
10	IGNITION COIL		
11	CHECK ENGINE LAMP		
12	O2 SENSOR		

MAP content (edition issue no.)

Prohibited to adjust and remove the throttle body idle screw

5. FUEL INJECTION SYSTEM

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)

Fuel Pump Standard Pressure:2.5Kg/cm ²(bar)

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

Fuel Pump Inspection :

1. Fuel Pump pressure:

>>>About : 2.5bar

2.If there is no continuity replace it

INJECTOR

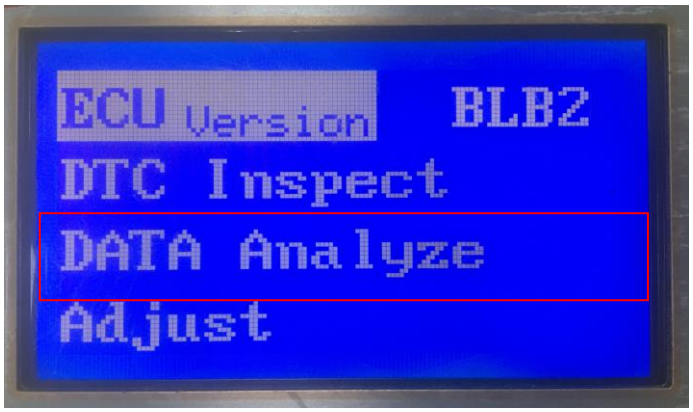
Measure the resistance of the Injector

Standard (20 ℃/68 ℉): 12±0.6Ω

5. FUEL INJECTION SYSTEM

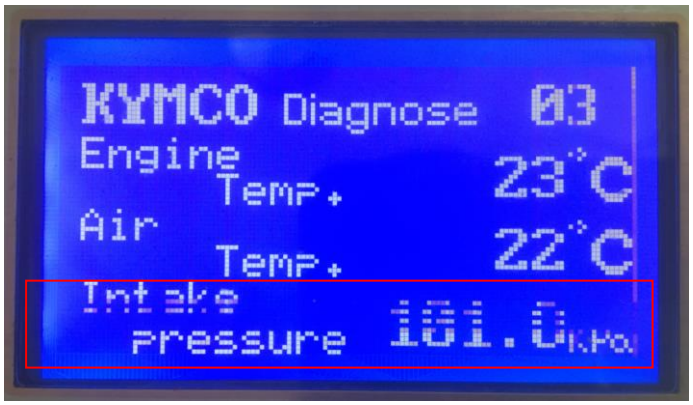
T-MAP(Manifold Air Temperature Pressure) Sensor

Connect the 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.



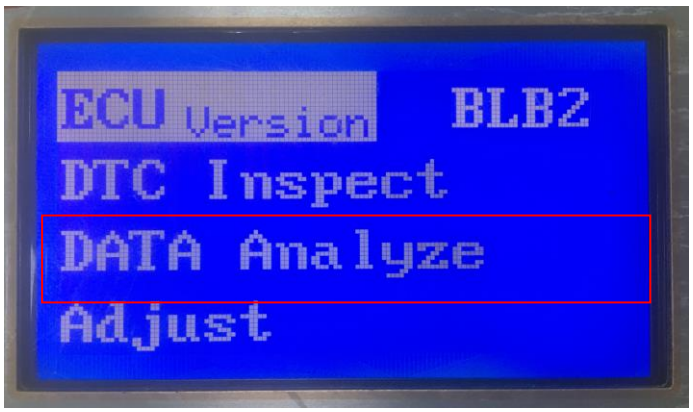
Standard : 101.3 ±3 kpa on sea altitude

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



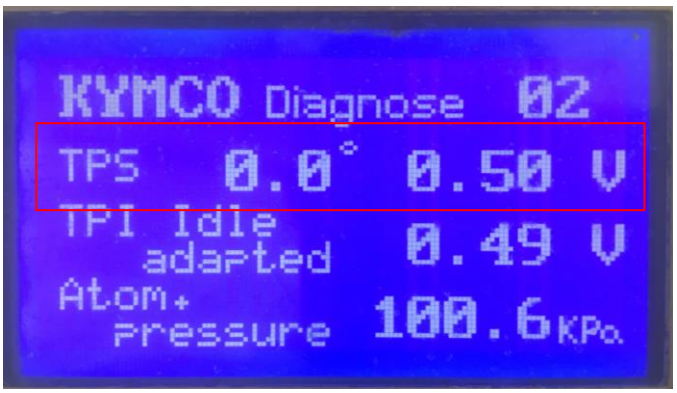
TPS (Throttle Position Sensor)

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 °	0.51V ±0.1
Throttle fully ~90 °	> 3.85V



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 ETS

Standard 11.529±10% kΩ(25℃)

CPS

Measure the resistance of the CPS

Measure the resistance between the blue/white and green/white wire terminals.

Standard : 96~144Ω

CPS Connector

CPS

5. FUEL INJECTION SYSTEM

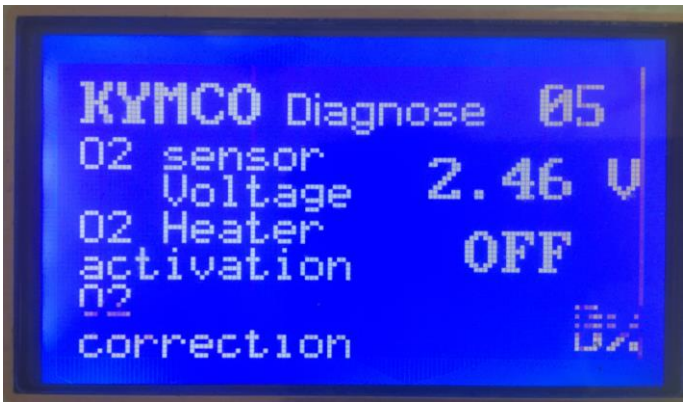
O2 SENSOR

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

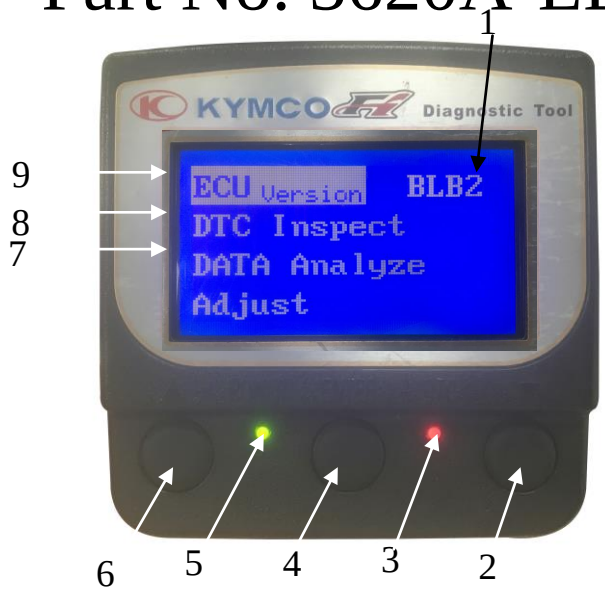
Standard (20℃/68℉): 15Ω

Connect the 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 2.

If data is incorrect, the O2 sensor is problem.



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

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.

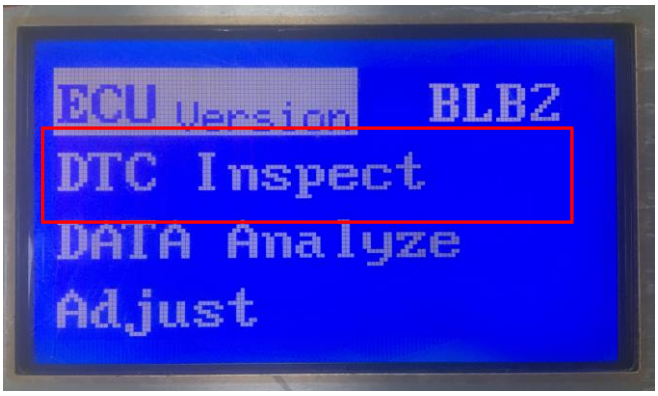
Press the " UP " button

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

DTC CLEAR PROCEDURE

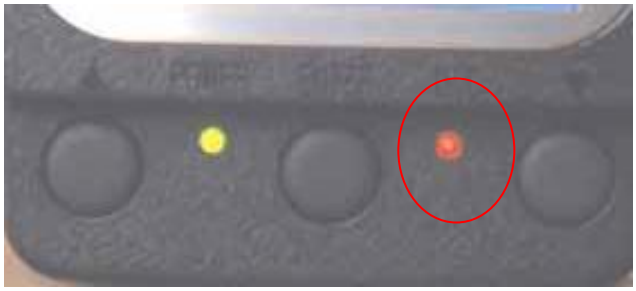
Choose " DTC Inspect "

Press the "Enter" button



Choose " DTC Clear "
Press the " Enter " button

The DTC indicator is lighting at that time.

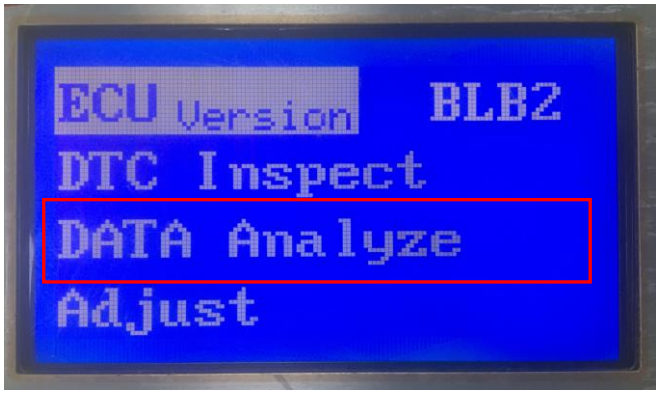


Clearing DTC until the DTC indicator is off.

DATA ANALYSIS

Choose " Data Analyze "

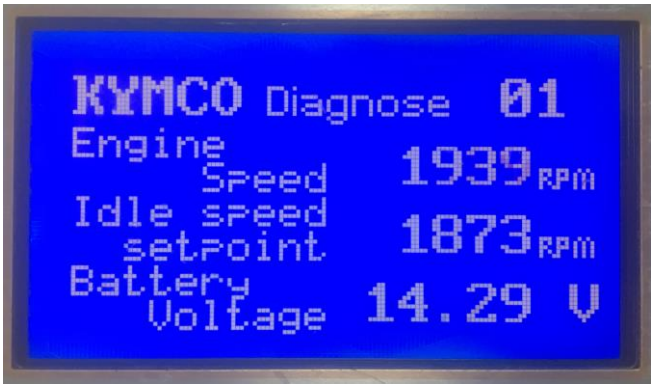
Press the " Enter " button to enter page 01.



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

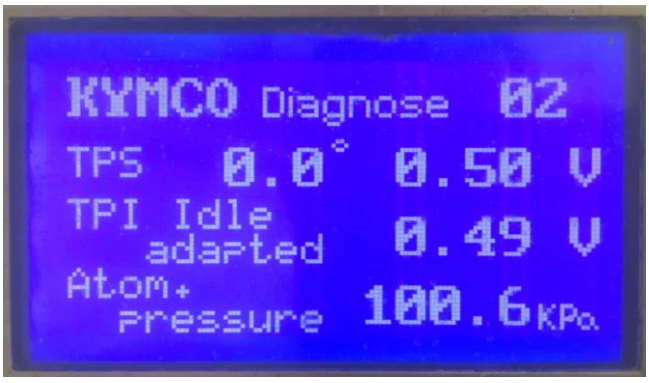
Refer to standard specification.

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).
atmosphere pressure
Refer to standard specification.

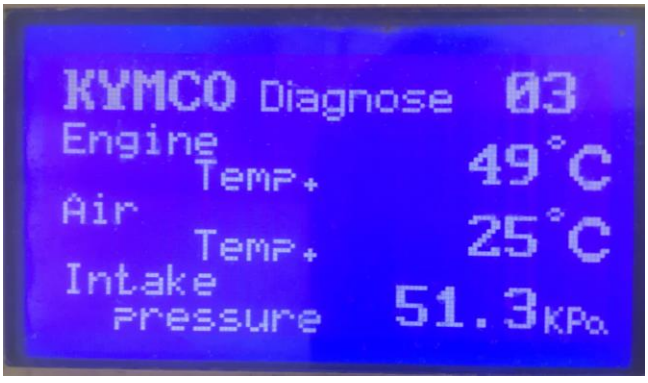
Press the " Down " button to enter page 03.



The figure includes engine working temperature, Air temperature and Intake pressure.

Refer to standard specifications

Press the " Down " button to enter page 04.



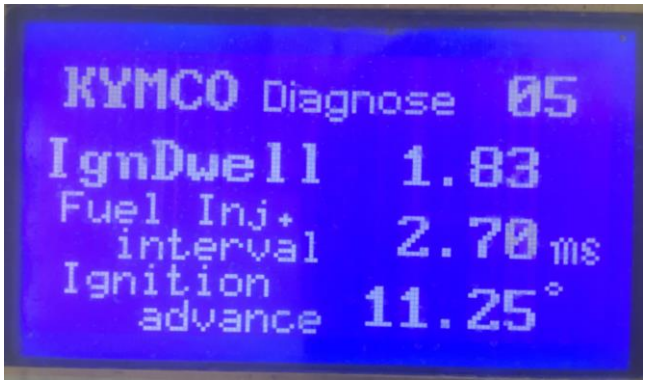
5. FUEL INJECTION SYSTEM

The figure includes ISC and ISC learn step. Refer to standard specification.
Press the "Down" button to enter page 05.

The figure includes Ignition Dwell duration, fuel Injection duration and Ignition advance.

Refer to standard specification.

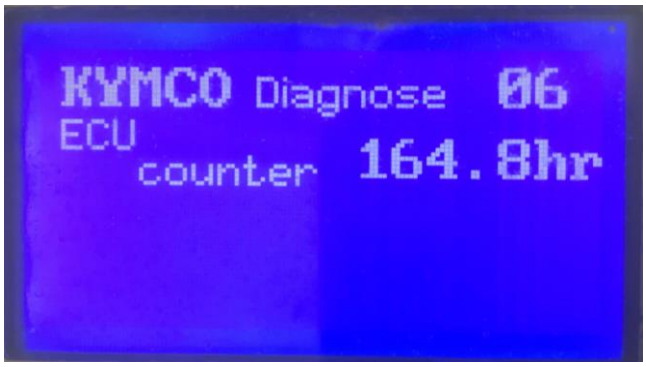
Press the " Down " button to enter page 06.



The figure includes ECU counter hours.

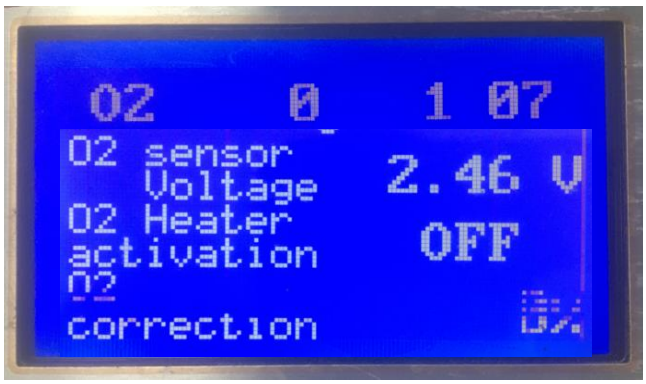
Refer to standard specification.

Press the " Down " button to enter page 07.



The figure includes O2 sensor heater and O2 sensor correction.

Press the " UP " button to the first page.



5. FUEL INJECTION SYSTEM

Skytown 50 Diagnostic report

SF :	Customer :	Eng. No:
Production Date :	Service Date :	Mileage :

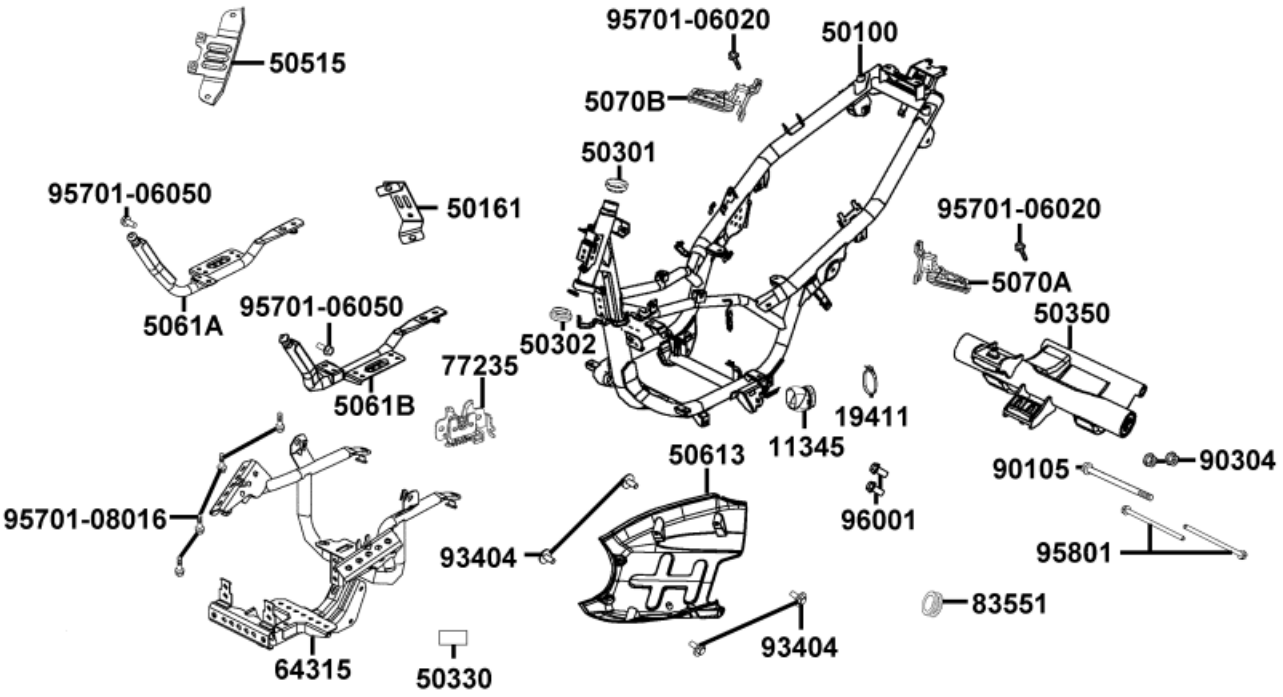
Reason of repair: □Maintenance □Breakdown

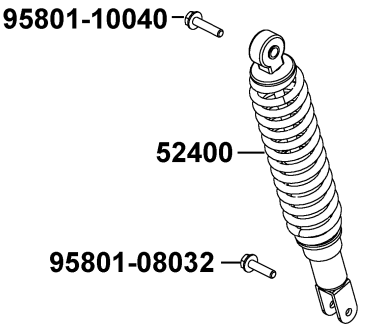
	Item	Data	Reference	Memo
ECU Version	ECU No			BLB2
	Hardware Ver			
	Software Ver		STLC1310	
	Calibration Ver		E5BLB2EUAA	
DTC	Active			
	Occurred			
	History			
(Cool Engine) Engine Stop	Air Temp.(℃)		Environ temp ±2 ℃	
	Engine Temp.(Cooling)		Environ temp ±2 ℃	
	Atom. Pressure (kpa.)		101.3 ±3 kpa	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	
	ISC Mean		-10%~20%	
	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 ℃	
	Ign.Dwell duration (ms)		1.6~2.8ms	
	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
	ISC Mean		-10%~20%	
(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 ℃	
	Ign.Dwell duration (ms)		1.6~2.8ms	
	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
	ISC Mean		-10%~20%	

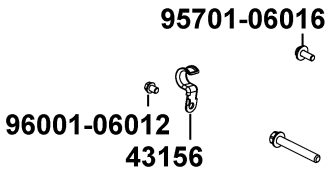
6

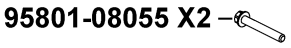
ENGINE REMOVAL/INSTALLATION

6. ENGINE REMOVAL/INSTALLATION









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

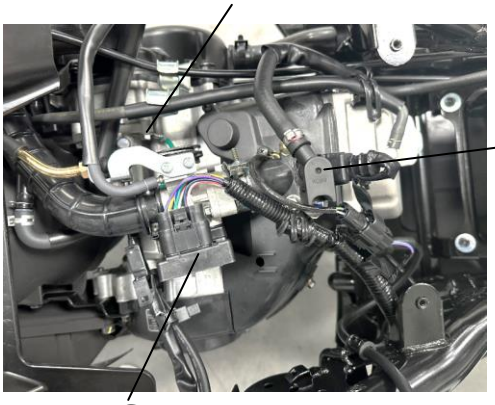
TORQUE VALUES

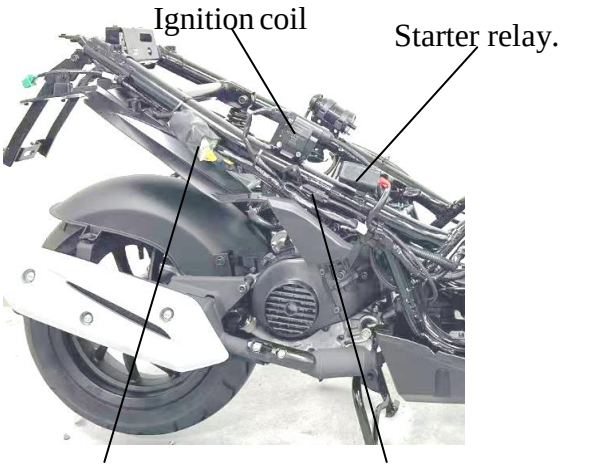
Rear shock absorber upper mount bolt	40 N-m
Rear shock absorber lower mount bolt	40 N-m
Rear axle nut	120 N-n
Engine hanger bolt (frame side)	50 N-m
Engine hanger bolt (ENG. side)	50 N-m
Rear caliper holder bolt	27 N-m
Exhaust muffler pipe nut	20 N-m
Exhaust muffler bracket bolt (attached to RR Fork)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

6. ENGINE REMOVAL/INSTALLATION

ENGINE REMOVAL

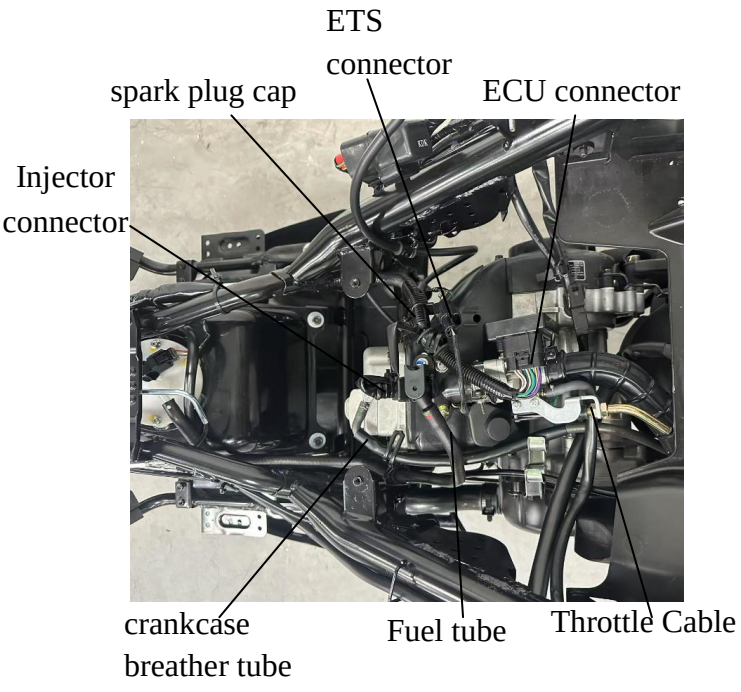
Remove the frame body cover(2-6).
Remove the rear fender (2-11).
Disconnect the engine negative cable.
Disconnect the starter motor cable from the starter relay.
.



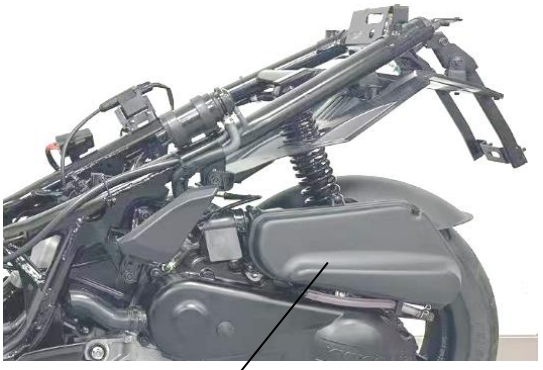


Remove the spark plug cap.
Remove the ignition coil's wire.
Remove the O2 sensor wire.

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 fuel tube attaching to injector.



Remove the air cleaner
Remove the exhaust muffler(2-6)



Air cleaner

Remove the rear brake cable

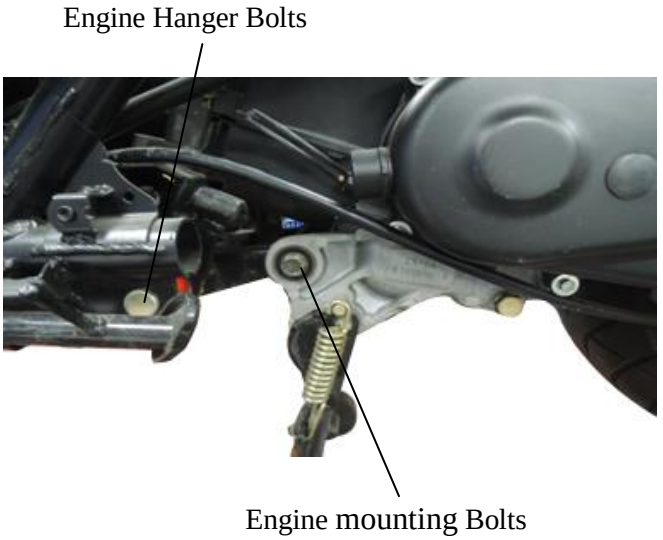
Rear brake cable

Remove the rear shock absorbers mounting bolts.

Rear Shock Absorber Bolts

6. ENGINE REMOVAL/INSTALLATION

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

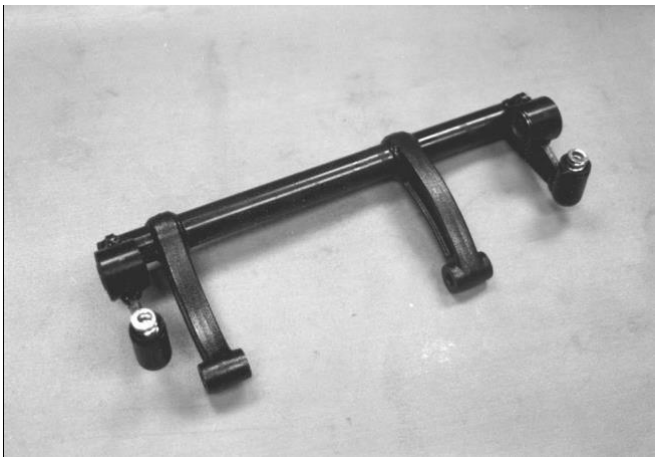


ENGINE HANGER BRACKET REMOVAL

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 Hanger

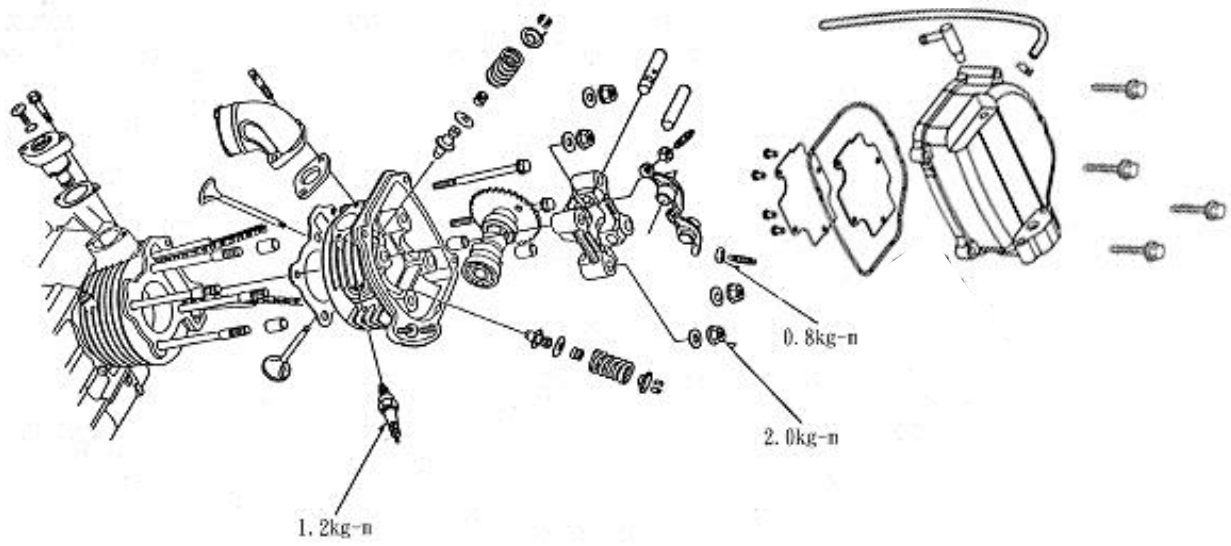
ENGINE INSTALLATION

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)

7. CYLINDER HEAD/VALVES



7. CYLINDER HEAD/VALVES

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	0.1	—
	EX	0.1	—
Cylinder head compression		15kg/cm^2	—
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	4.9
	EX	4.955-4.970	4.9
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	0.1
Valve spring free length		35.25	29.1

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

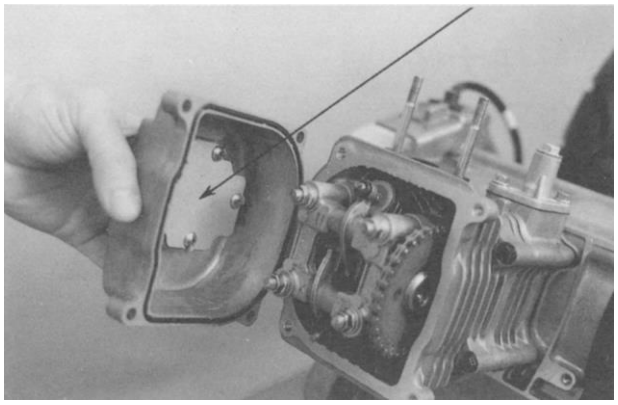
White smoke from exhaust muffler
- Worn valve stem or valve guide
- Damaged valve stem seal

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

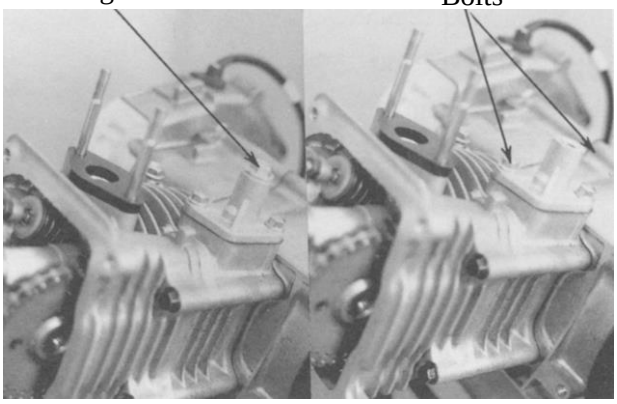
Remove the center cover. (⇨2-3)
Remove the frame center.
Remove the four cylinder head cover bolts to remove the cylinder head cover.

Cylinder Head Cover



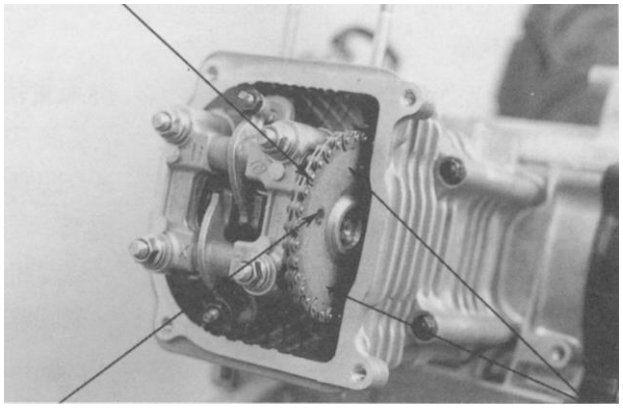
Remove the cam chain tensioner sealing bolt and spring.
Remove the two bolts attaching the cam chain tensioner and the tensioner.

Sealing Bolt
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.

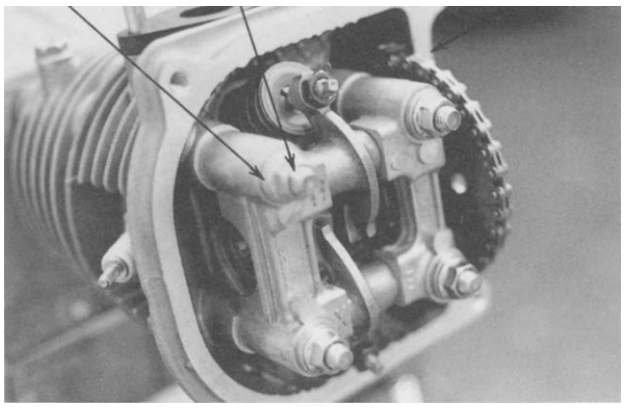
Camshaft Gear



Round Hole
Punch Marks

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

Washer
Nut

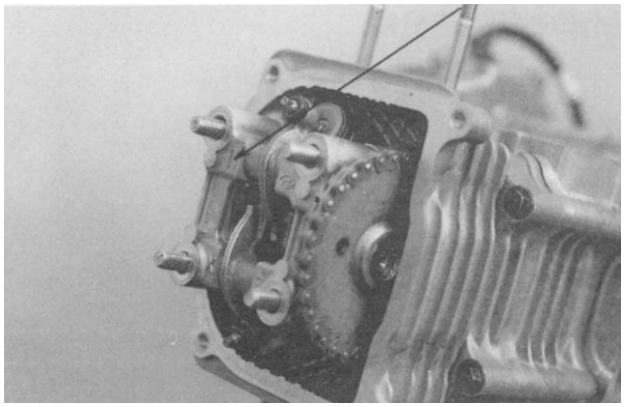


* Diagonally loosen the cylinder head nuts in 2 or 3 times.

7. CYLINDER HEAD/VALVES

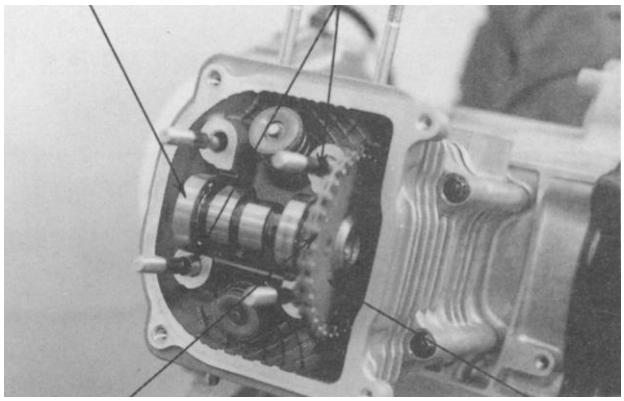
Remove the camshaft holder and dowel pins.

Camshaft Holder



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

Camshaft Dowel Pins



Cam Chain Camshaft Gear

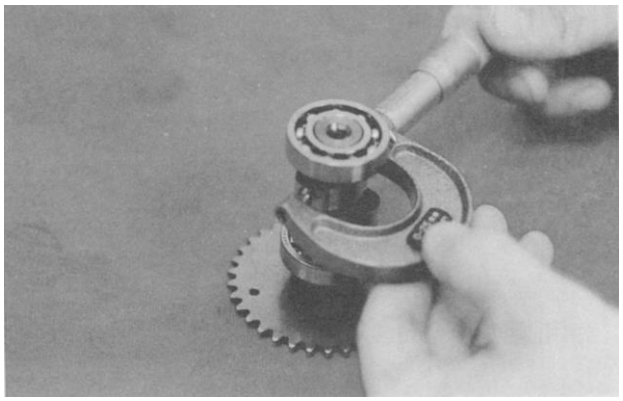
CAMSHAFT INSPECTION

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

Service Limits:

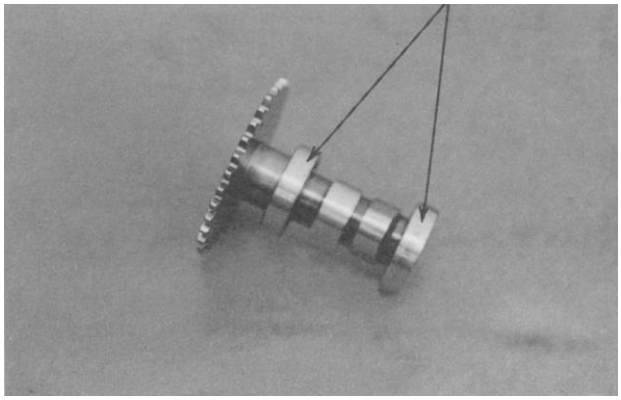
IN : 25.306mm replace if below

EX: 25.164mm 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 Bearings

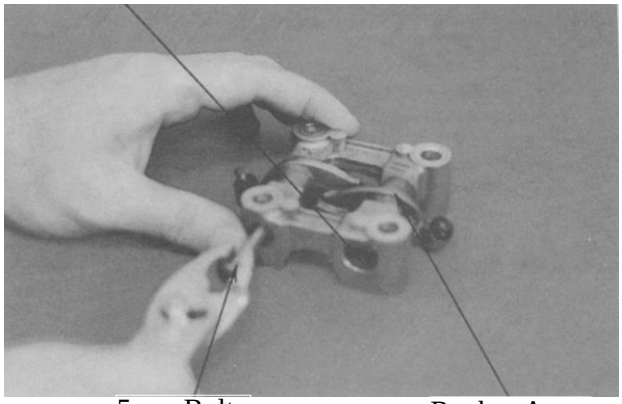


7. CYLINDER HEAD/VALVES

CAMSHAFT HOLDER DISASSEMBLY

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

Rocker Arm Shaft



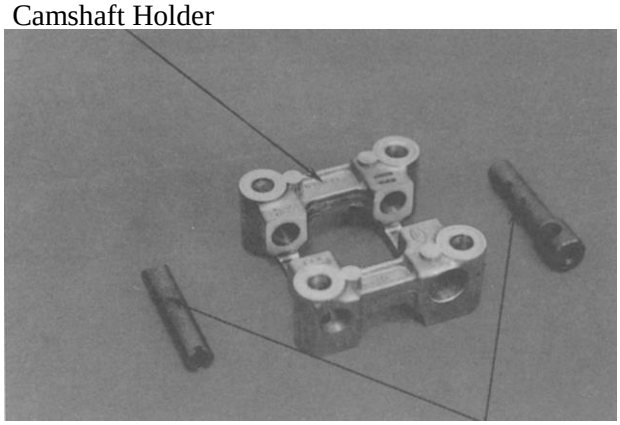
5mm Bolt Rocker Arm

CAMSHAFT HOLDER INSPECTION

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

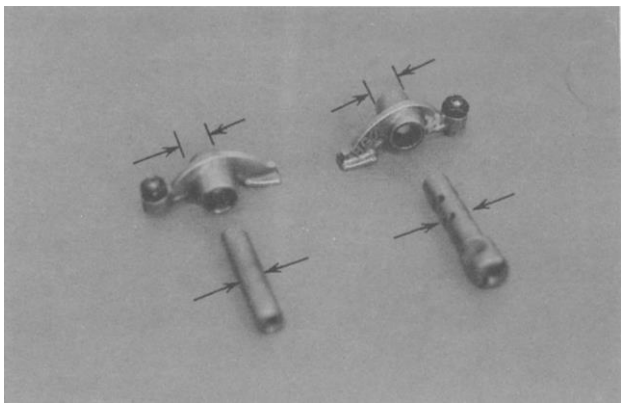
* If the valve rocker arm contact surface is worn, check each cam lobe for wear or damage.

Camshaft Holder



Rocker Arm Shafts

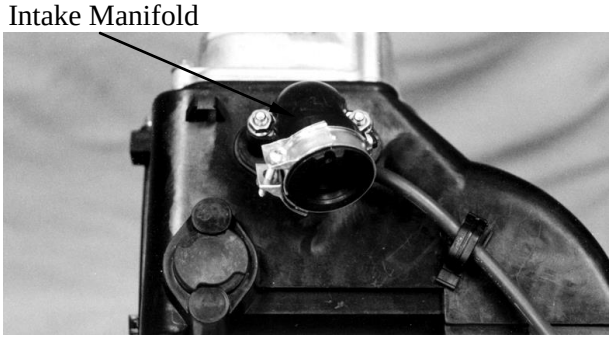
Measure the I.D. of each valve rocker arm.
Service Limits: IN:10.10mm replace if over
EX:10.10mm replace if over
Measure each rocker arm shaft O.D.
Service Limits: IN: 9.91mm replace if over
EX: 9.91mm replace if over



CYLINDER HEAD REMOVAL

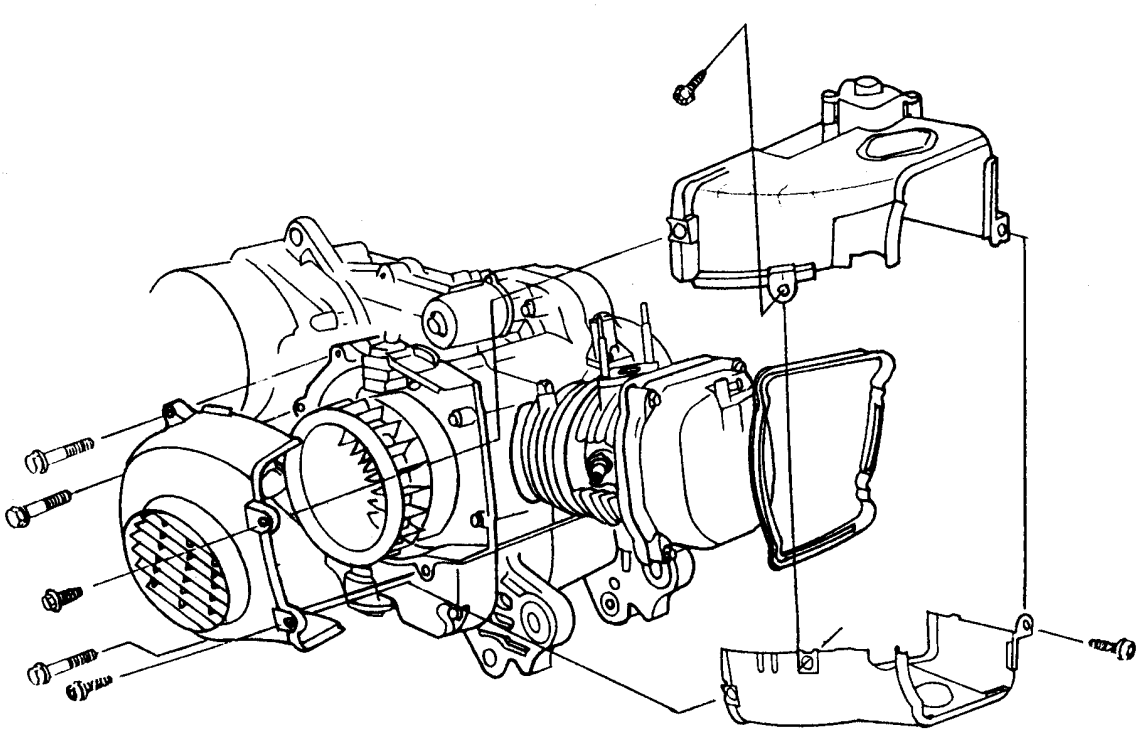
Remove the camshaft. (⇨7-3)
Remove the carburetor. (⇨5-5)
Remove the exhaust muffler. (⇨2-5)
Remove the carburetor intake manifold.

Intake Manifold



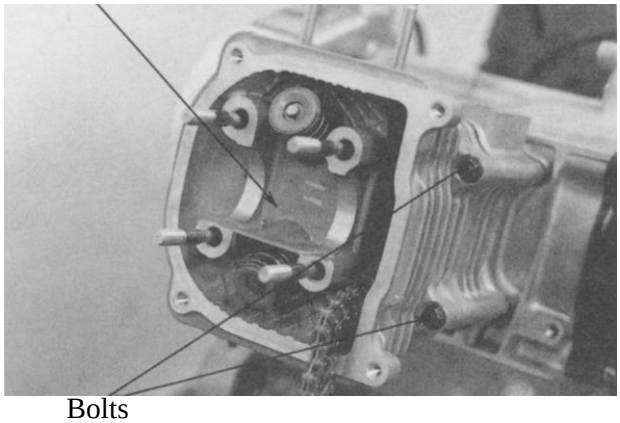
7. CYLINDER HEAD/VALVES

Remove the cooling fan cover. (⇨14-6)
Remove the engine cover bolts and screws.
Separate the engine cover joint claws.



Remove the cylinder head.

Cylinder Head

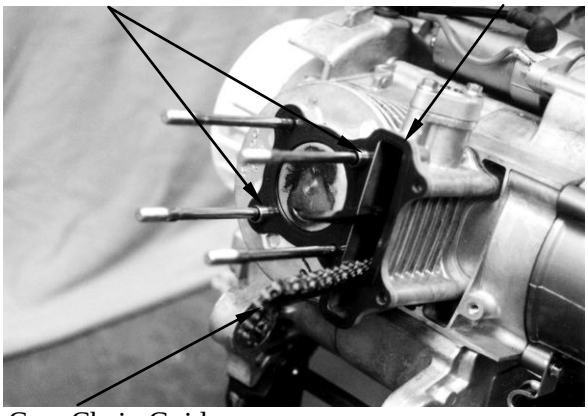


Bolts

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

Dowel Pins

Cylinder Head Gasket



Cam Chain Guide

7. CYLINDER HEAD/VALVES

CYLINDER HEAD DISASSEMBLY

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

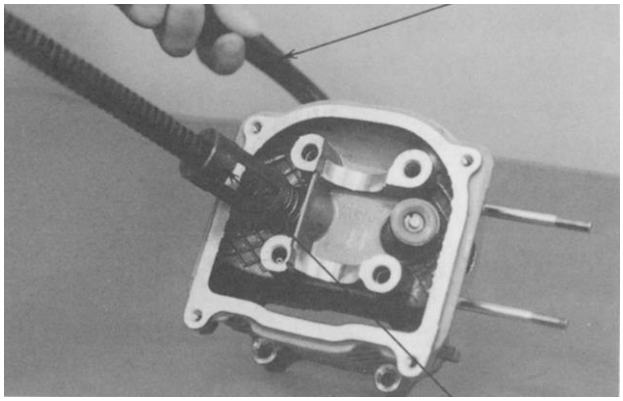
* • Be sure to compress the valve springs with a valve spring compressor.
  • Mark all disassembled parts to ensure correct reassembly.

Special

Valve Spring Compressor

Valve Spring Compressor Attachment

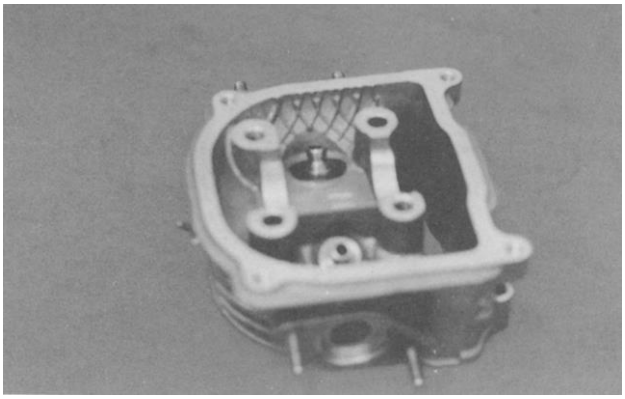
Valve Spring Compressor



Valve Spring Compressor Attachment

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

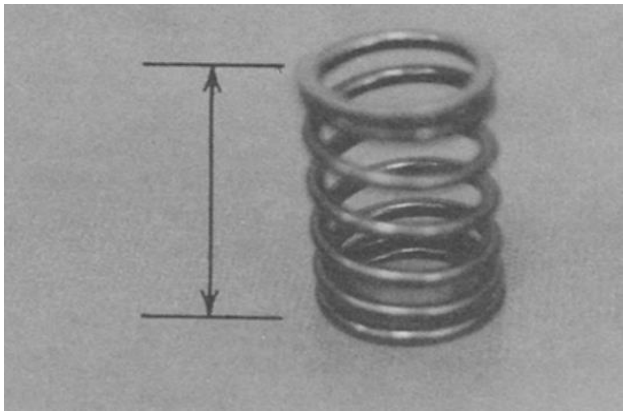
Check the spark plug hole and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and feeler gauge.

Service Limit: 0.05mm repair or replace if over

VALVE SPRING FREE LENGTH

Measure the free length of the springs.

Service Limits: 29.1mm replace if below

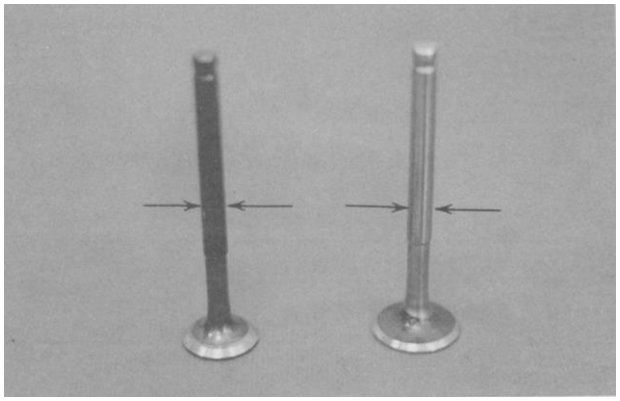


VALVE/ VALVE GUIDE

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 : 4.9mm replace if below
EX: 4.9mm replace if below



CYLINDER HEAD ASSEMBLY

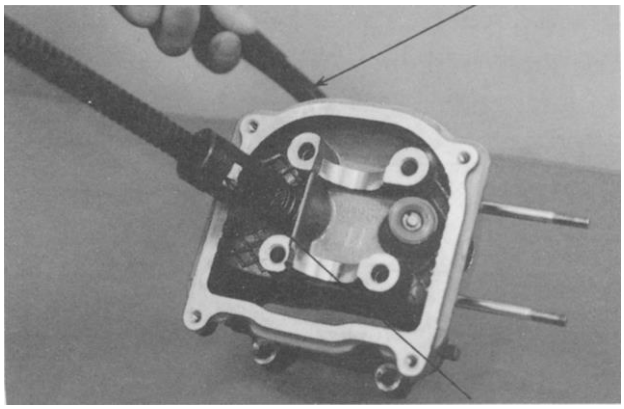
* • When assembling, a valve spring compressor must be used.
  • Install the cotters with the pointed ends facing down from the upper side of the cylinder head.

Special

Valve Spring Compressor

Valve Spring Compressor Attachment

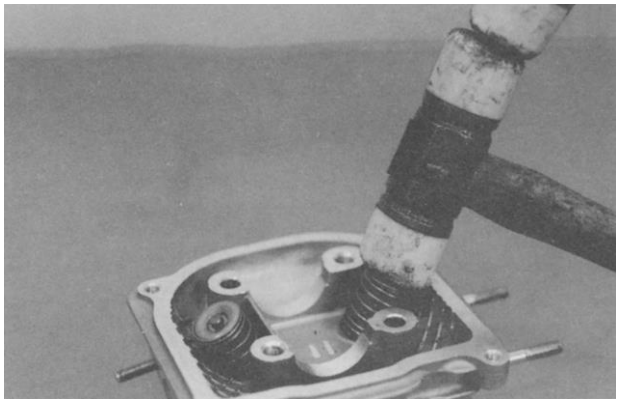
Valve Spring Compressor



Valve Spring Compressor Attachment

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

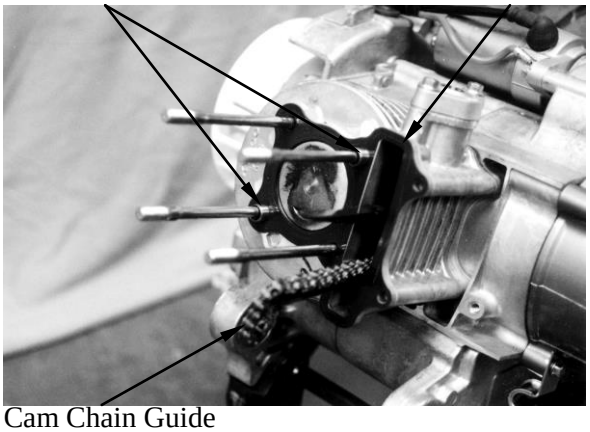
* Be careful not to damage the valves.



CYLINDER HEAD INSTALLATION

Install the dowel pins and a new cylinder head gasket.
Install the cam chain guide.

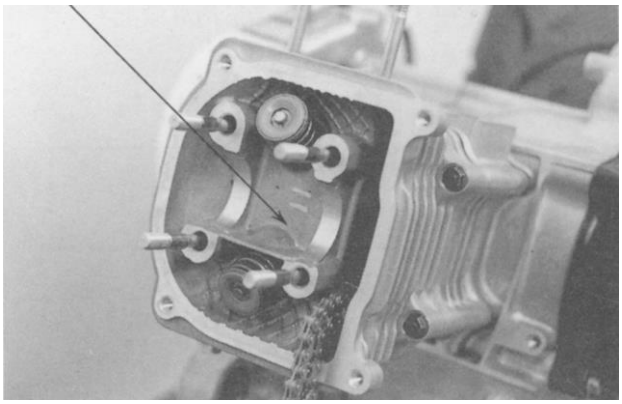
Dowel Pins Gasket



Cam Chain Guide

Install the cylinder head.

Cylinder Head

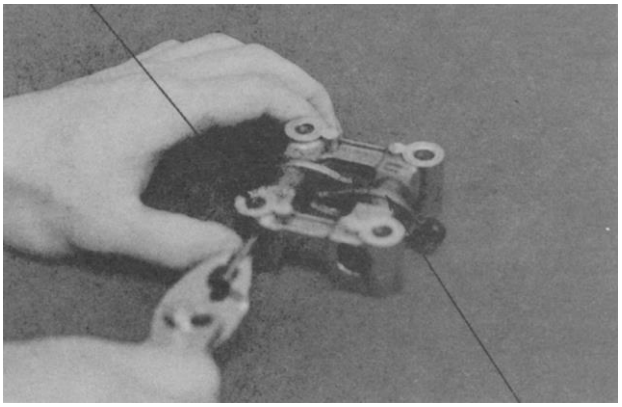


CAMSHAFT HOLDER ASSEMBLY

First assemble the camshaft holder.
Install the intake and exhaust valve rocker arms and rocker arm shafts.

* • When installing the rocker arm shaft, align the shaft front end with the bolt hole of the camshaft holder.

Camshaft Holder



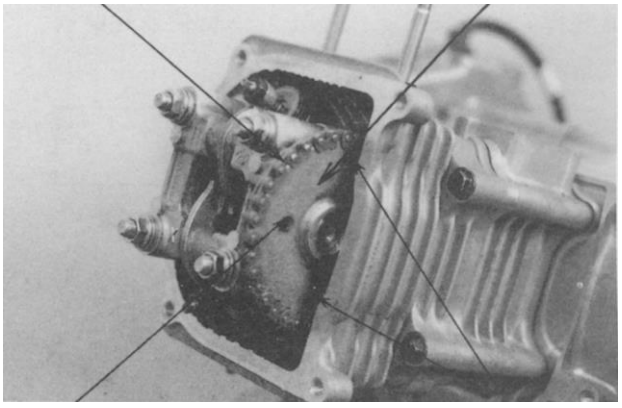
Valve Rocker Arm

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.

Cam Chain

Camshaft Gear

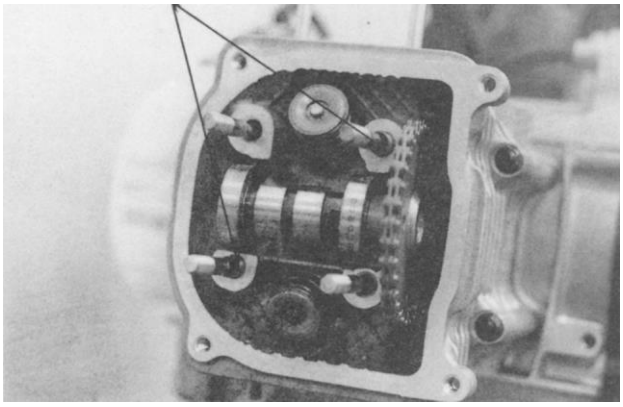


Round Hole

Punch Marks

Dowel Pins

Install the dowel pins.

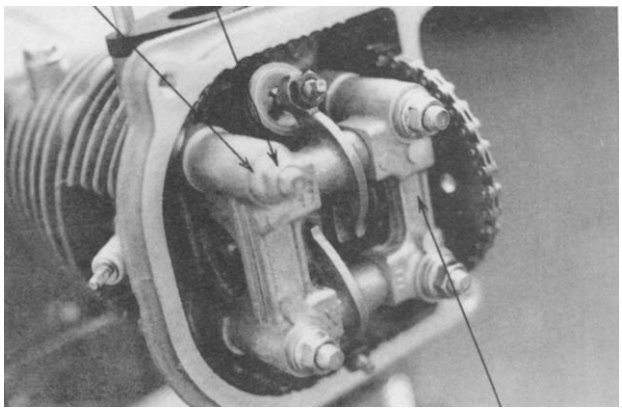


Install the camshaft holder, washers and nuts on the cylinder head.
Tighten the four cylinder head nuts and two bolts.

Torque: Cylinder head nut: 1.8~2.2kgf-m

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

Washer Nut



Camshaft Holder

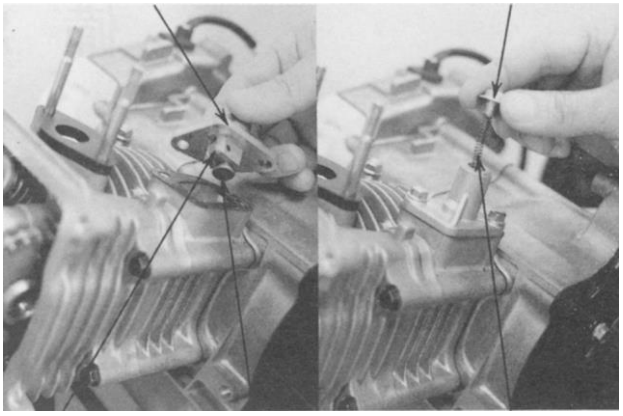
CAM CHAIN TENSIONER INSTALLATION

First install a new cam chain tensioner gasket.
Install the tensioner using the two bolts.
Install the tensioner spring.
Install the O-ring and sealing bolt.

* When installing the tensioner, release the lock pawl and push the push rod all the way in.

Torque:: 0.45~0.6kgf-m

Cam Chain Tensioner Sealing Bolt

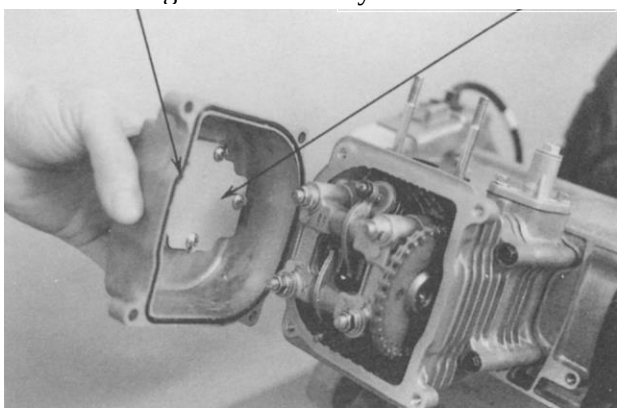


Lock Pawl Push Rod Spring

Adjust the valve clearance. (⇨3-5)
Install a new cylinder head cover O-ring and install the cylinder head cover.

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

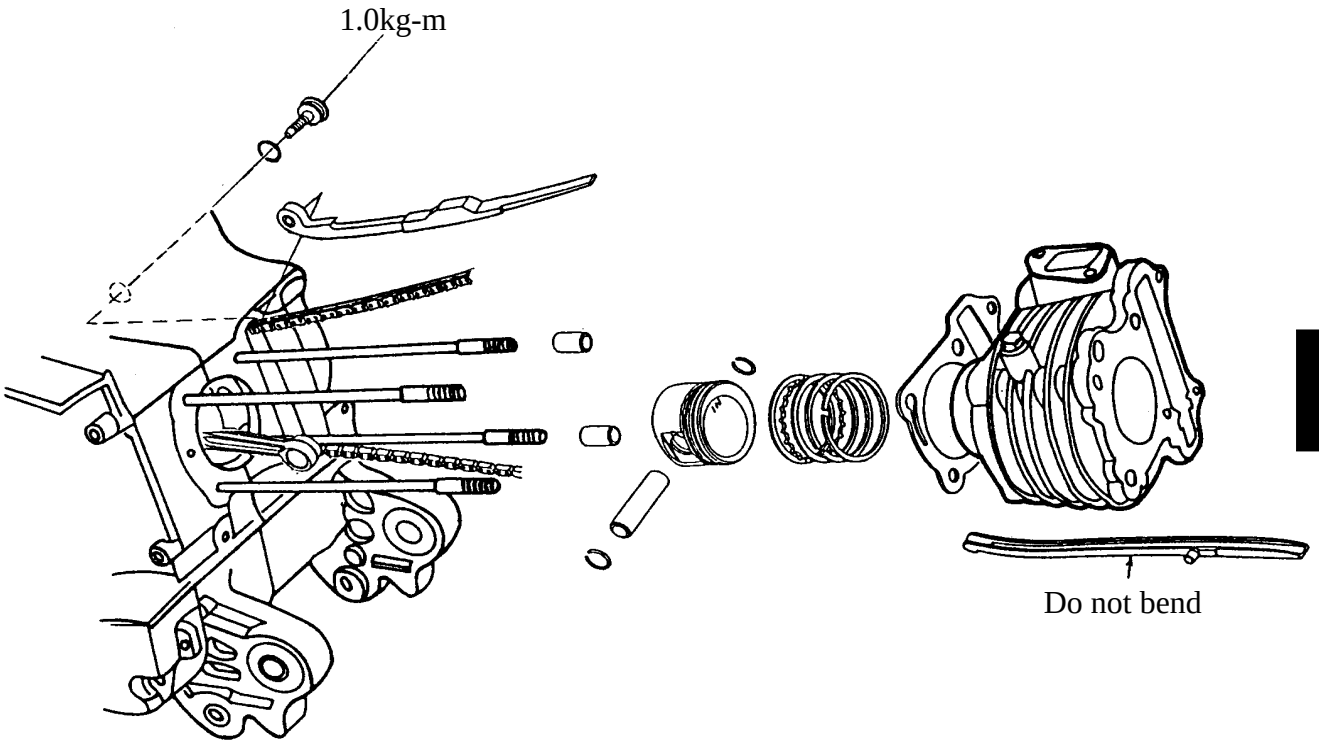
O-ring Cylinder Head Cover



Install and tighten the cylinder head cover bolts.

Torque:: 0.8~1.2kgf-m

8. CYLINDER/PISTON



8. CYLINDER/PISTON

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	39.10
	Warpage		—	0.05
	Cylindricity		—	0.05
	True roundness		—	0.05
Piston, piston ring	Ring-to-groov clearance	Top	0.015-0.050	0.09
		Second	0.015-0.050	0.09
	Ring end gap	Top	0.08-0.20	0.45
		Second	0.05-0.20	0.45
		Oil side rail	0.20-0.70	—
	Piston O.D.		38.855-38.875	38.8
	Piston O.D. measuring		9mm from bottom of skirt	—
	Piston-to-cylinder clearance		0.010-0.040	0.1
	Piston pin hole I.D.		13.002-13.008	13.004
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

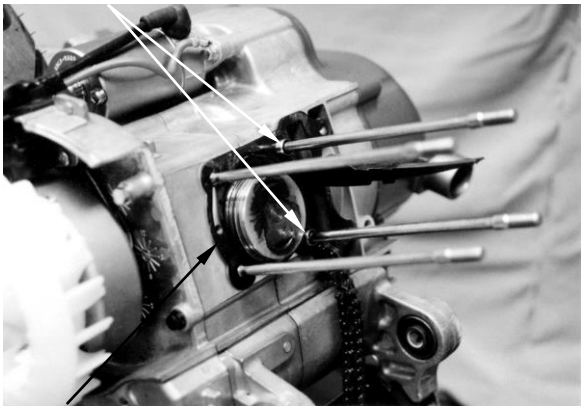
- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin

8. CYLINDER/PISTON

CYLINDER REMOVAL

Remove the cylinder head. (⇨7-6)
Remove the cam chain guide.
Remove the cylinder.

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

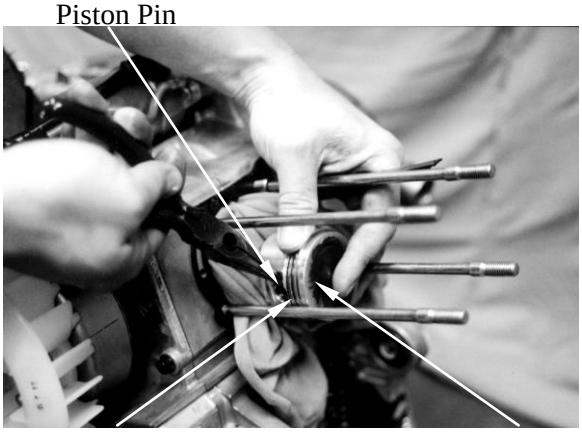


PISTON REMOVAL

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.

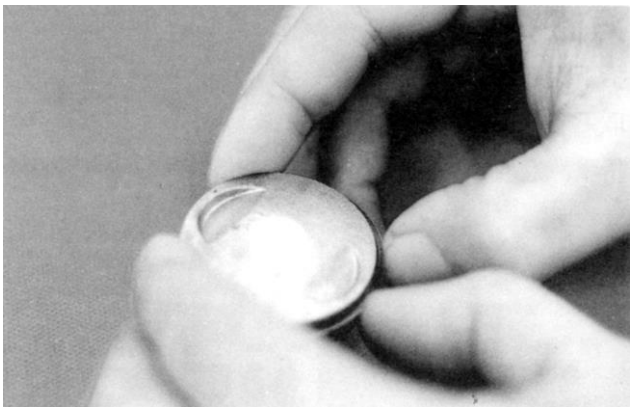


8. CYLINDER/PISTON

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.

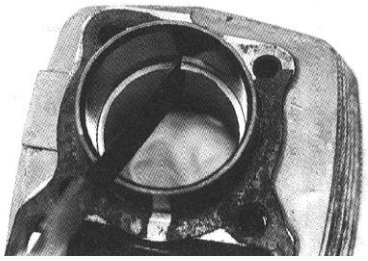
Service Limits: **Top**: 0.09mm replace if over
2nd: 0.09mm replace if over

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.

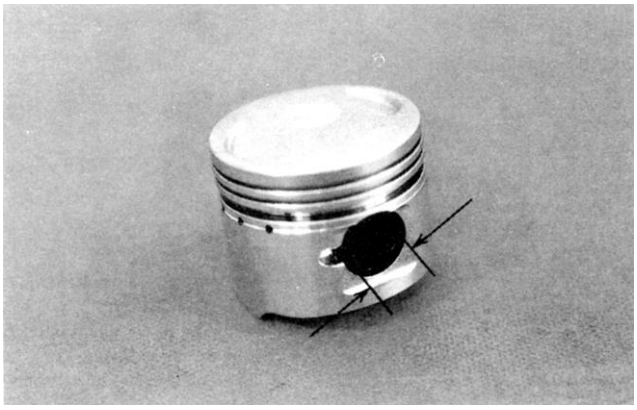
Measure the piston ring end gap.

Service Limit: 0.45mm replace if over

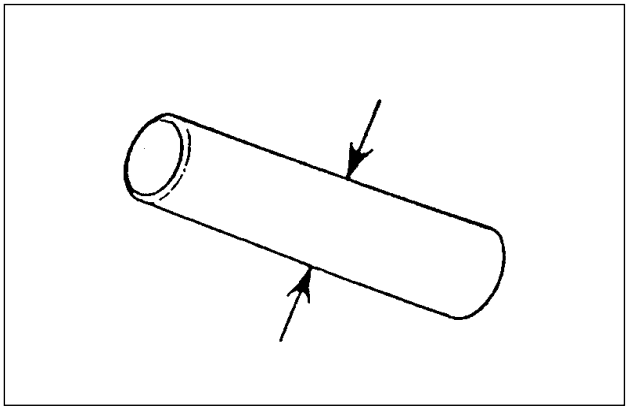


Measure the piston pin hole I.D.

Service Limit: 13.004mm replace if below



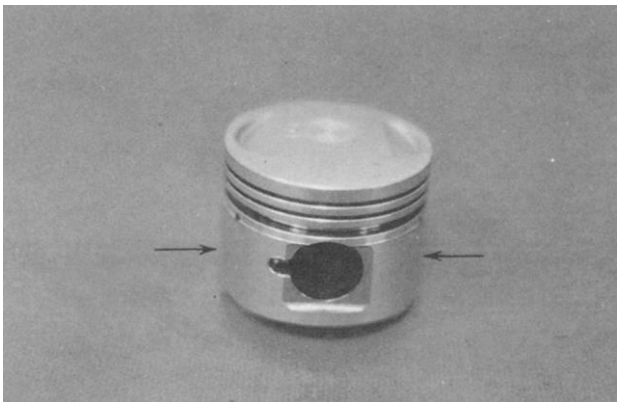
Measure the piston pin O.D.
Service Limit:12.96mm replace if below



Measure the piston O.D.

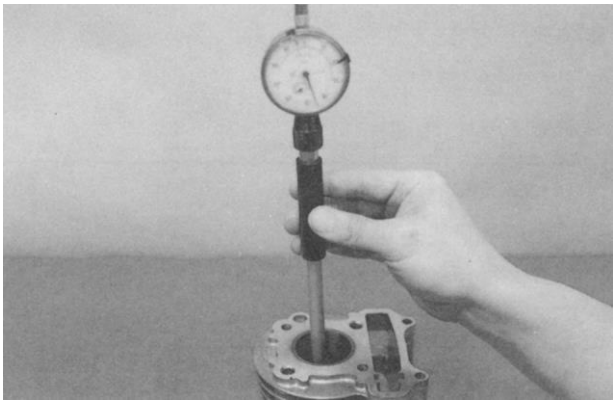
* Take measurement at 9mm from the bottom and 90° to the piston pin hole.

Service Limit: 38.8mm replace if below
Measure the piston-to-piston pin clearance.
Service Limit: 0.02mm replace if over

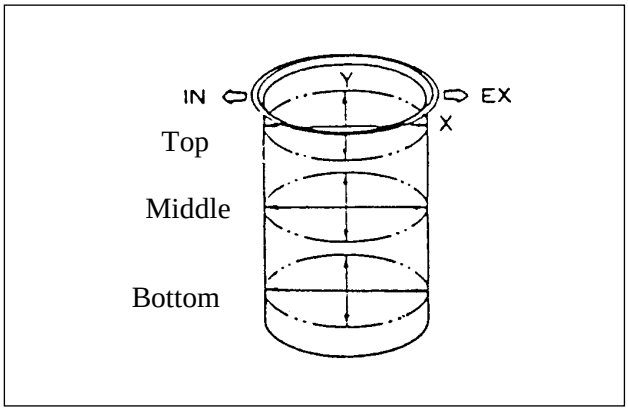


CYLINDER INSPECTION

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

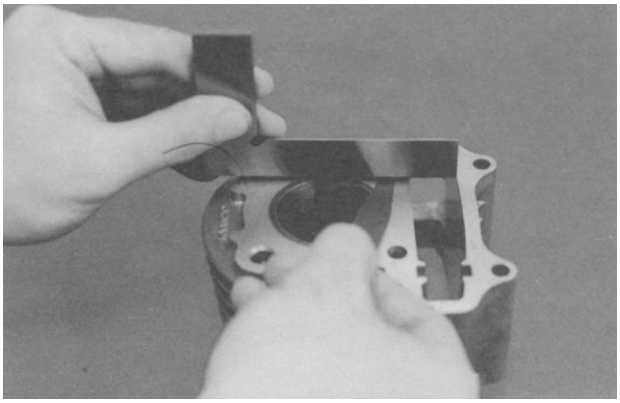


The true roundness is the difference between the values measured in X and Y directions.
The cylindricity (difference between the values measured at the three levels) is subject to the maximum value calculated.
Service Limits:
True Roundness: 0.05mm repair or replace if over
Cylindricity: 0.05mm repair or replace if over

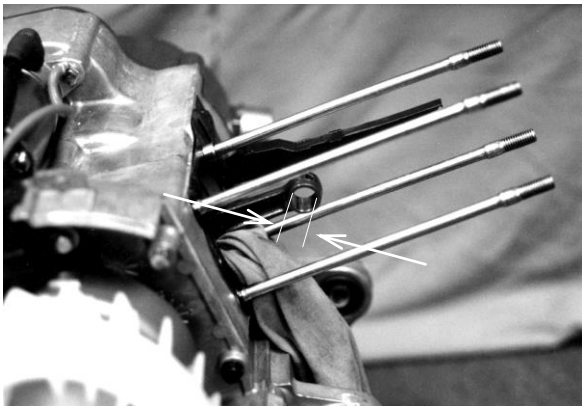


8. CYLINDER/PISTON

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



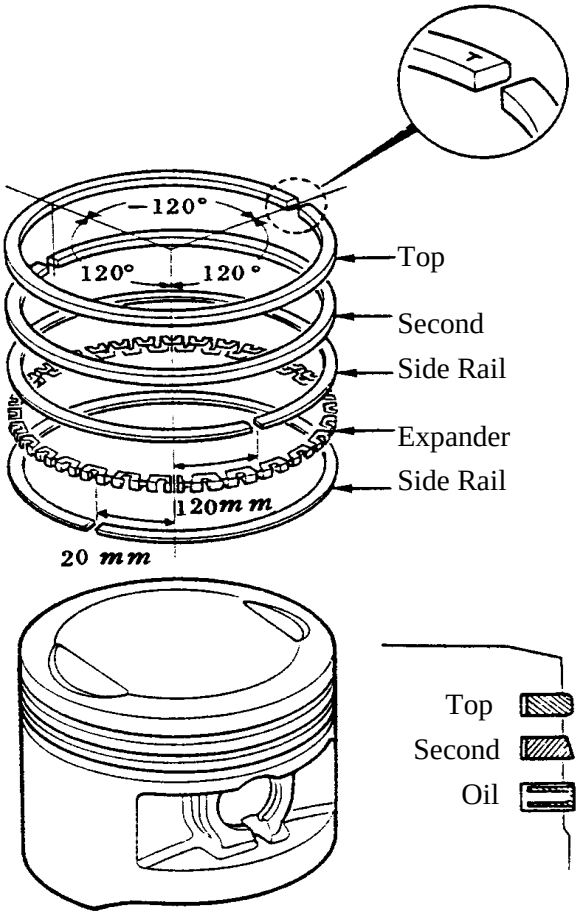
Measure the connecting rod small end I.D.
Service Limit: 13.06mm replace if over



PISTON RING INSTALLATION

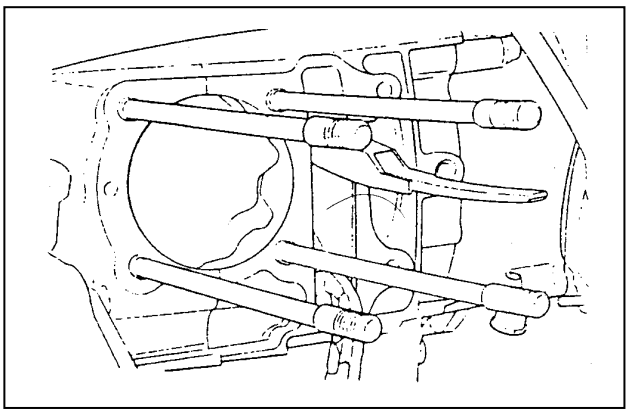
Install the piston rings onto the piston.
Apply engine oil to each piston ring.

*
- 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.



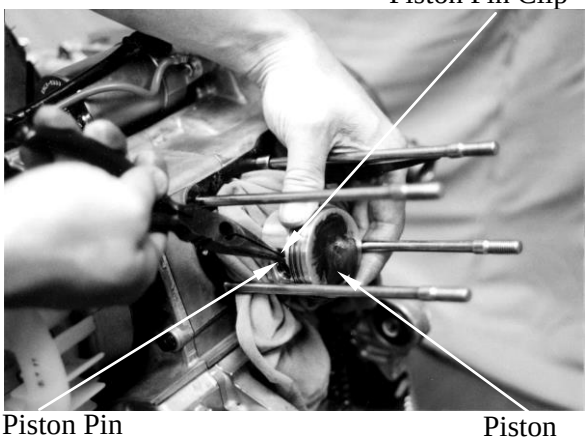
PISTON INSTALLATION

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.
  • Do not align the ring end gaps with the intake/exhaust valve and piston pin.

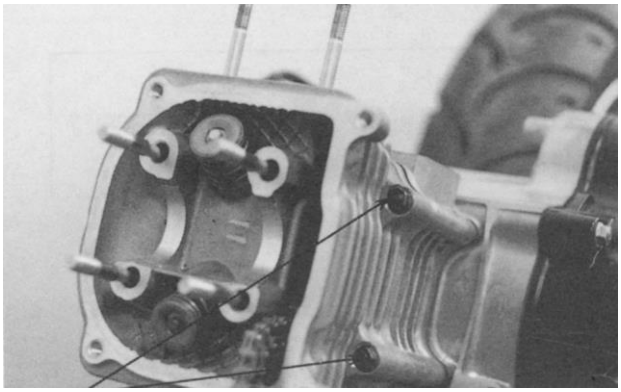
Install the cam chain guide.

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

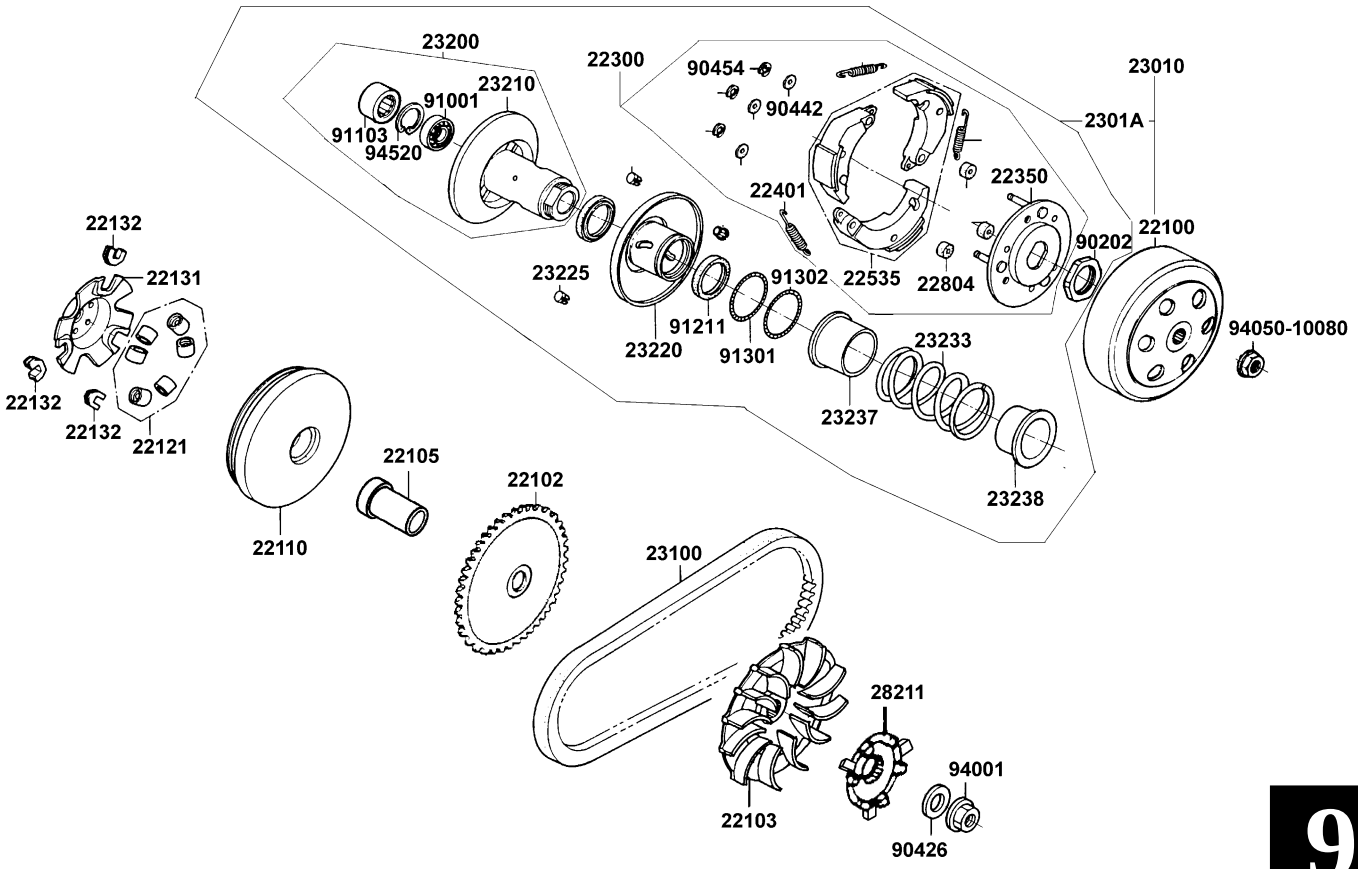
Install the cylinder head. (⇨7-8)
Loosely install the cylinder base bolts.

Cam Chain Guide

Tighten the cylinder base bolts.



Cylinder Base Bolts


23200
22300
90454
23010
23210
91001
90442
2301A
91103
94520
22401
22350
22132
22100
90202
22131
23225
91302
22535
22804
91211
94050-10080
23220
91301
23233
22132
23237
22132
22121
22105
22102
23238
22110
23100
28211
94001
22103
90426

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	—	154.6
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

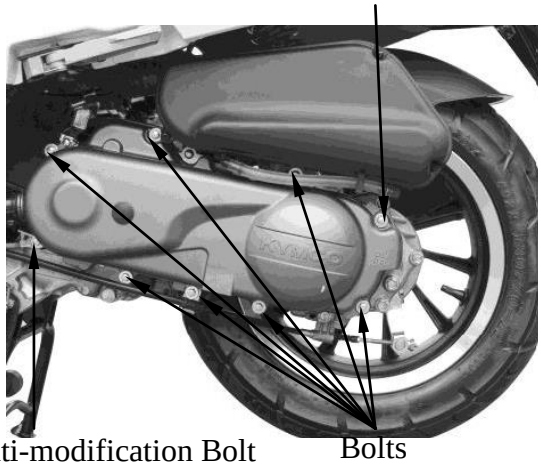
- Worn drive belt
- Weak driven face spring
- Worn weight roller
- Fouled drive face

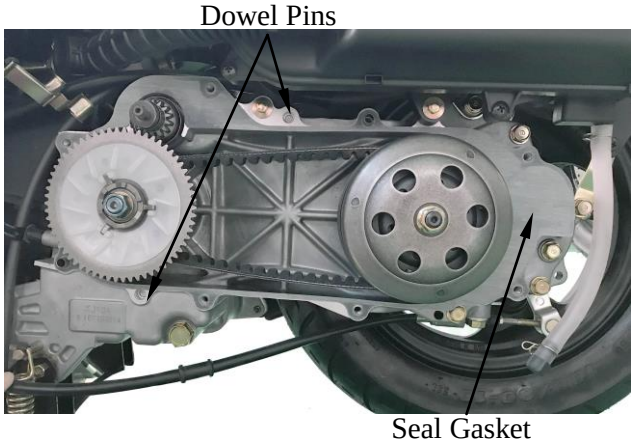
LEFT CRANKCASE COVER

REMOVAL

Loosen the drive belt air tube band screw.
Remove the seven left crankcase cover bolts and two Anti-modification Bolts .
Remove the seal gasket and dowel pins.
Inspect the seal gasket for damage or deterioration.

* Use specified genuine parts for replace-ment.

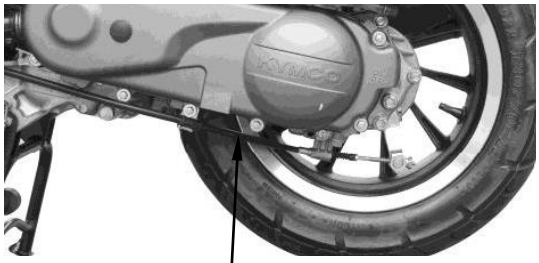




LEFT CRANKCASE COVER INSTALLATION

First install the dowel pins.
Install the seal rubber.

Install the left crankcase cover and the six left crankcase cover bolts and two Anti-modification Bolts .
Connect the drive belt air tube and tighten the tube band screw.
Install the rear brake cable clamp.



DRIVE BELT

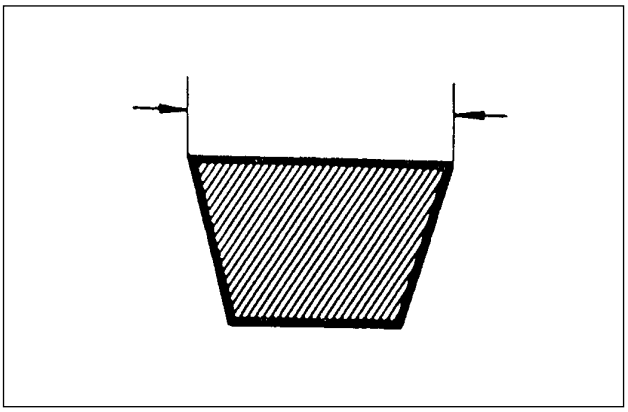
REMOVAL

Remove the left crankcase cover.

INSPECTION

Check the drive belt for cracks, separation or abnormal or excessive wear.
Measure the drive belt width.

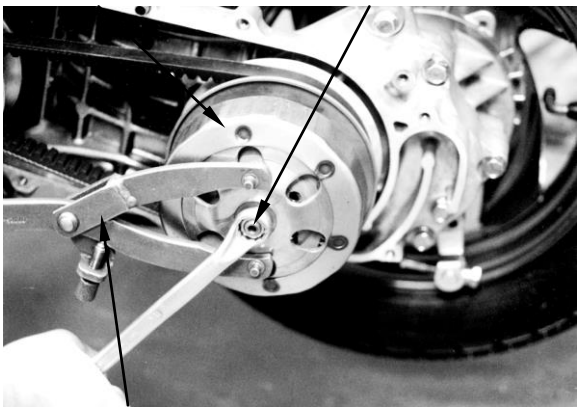
Service Limit: 16.5mm



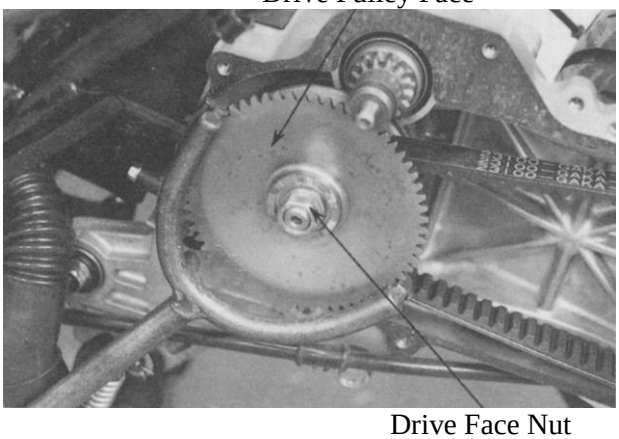
REPLACEMENT

Remove the eight left crankcase cover bolts and left crankcase cover. (⇨9-2)
Hold the clutch outer with an universal holder and remove the clutch outer nut.

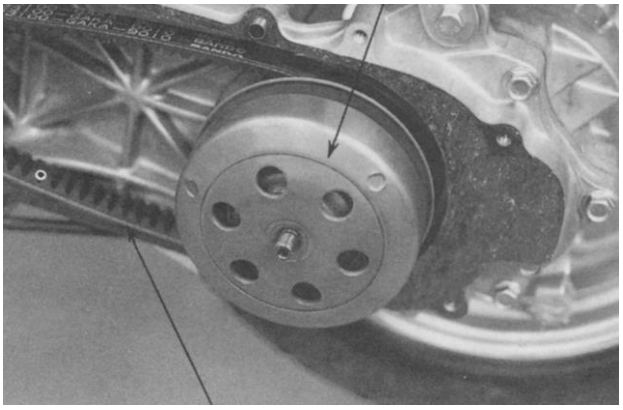
Special
Universal Holder



Hold the drive pulley using a holder and remove the drive face nut, starting ratchet and washer.
Remove the drive pulley face.

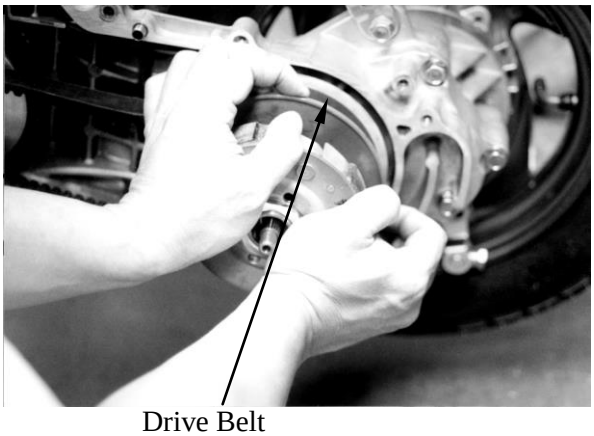


Remove the drive belt from the clutch/driven pulley.



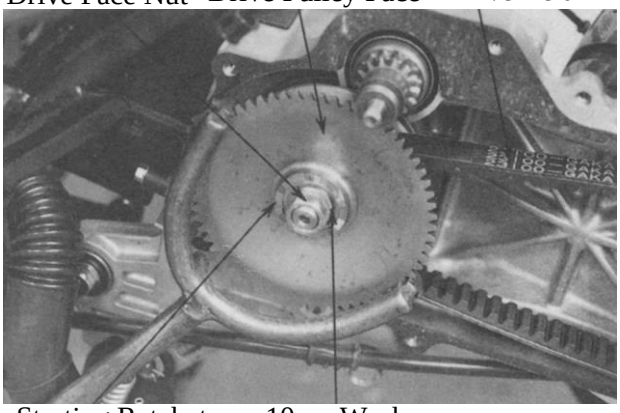
INSTALLATION

Turn the driven pulley clockwise to widen the drive belt groove and lay a new drive belt on the driven pulley.



Set the drive belt on the drive pulley face collar.
Install the drive pulley face, starting ratchet washer. Install and tighten the drive face nut.

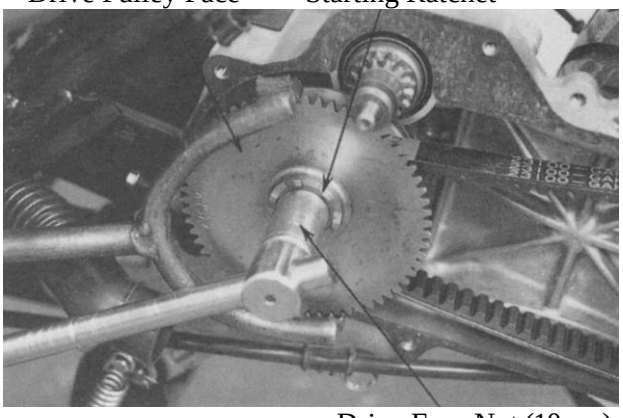
* When installing, align the tooth space of the drive pulley face and starting ratchet with the crankshaft tooth and then tighten the nut.



DRIVE PULLEY

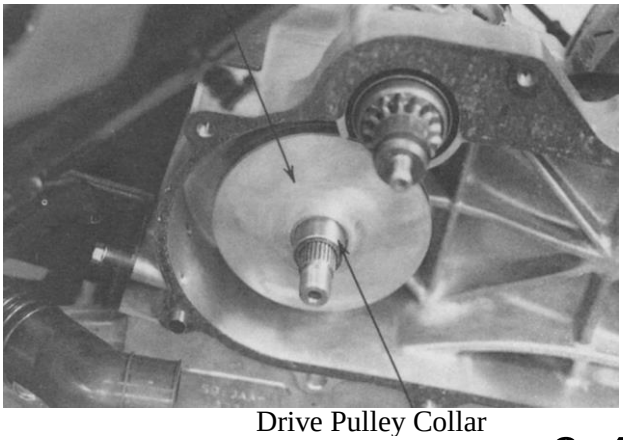
REMOVAL

Hold the drive pulley using a holder and remove the drive face nut, starting ratchet and washer.
Remove the drive pulley face.

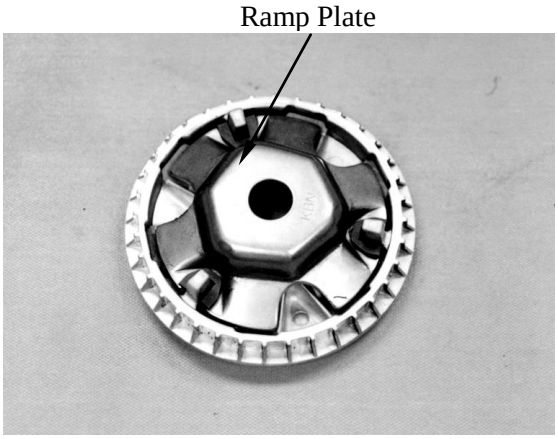


DISASSEMBLY

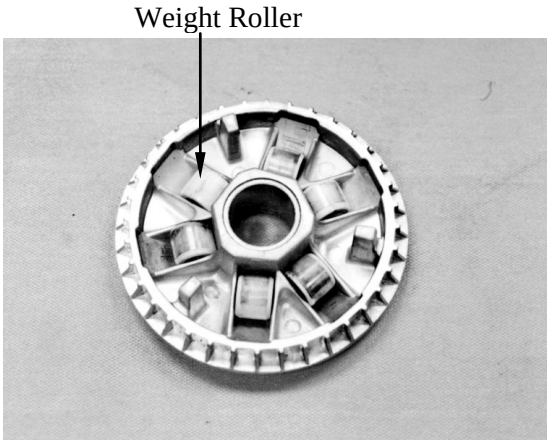
Remove the movable drive face assembly and drive pulley collar from the crankshaft.



Remove the ramp plate.



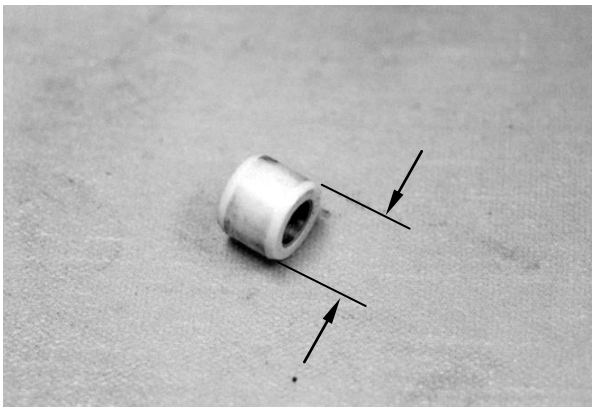
Remove the weight rollers.



INSPECTION

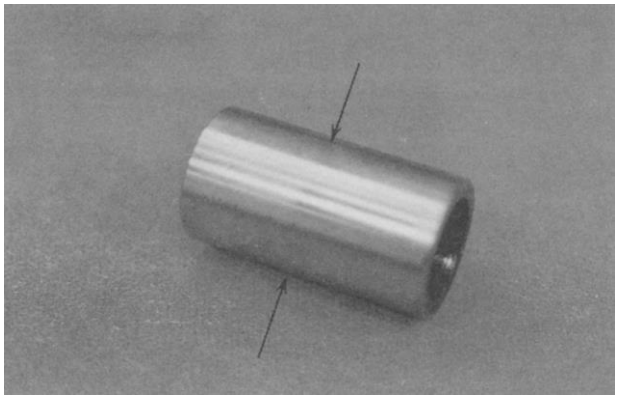
Check each weight roller for wear or damage.
Measure each weight roller O.D.

Service Limit: 12.4mm replace if below



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

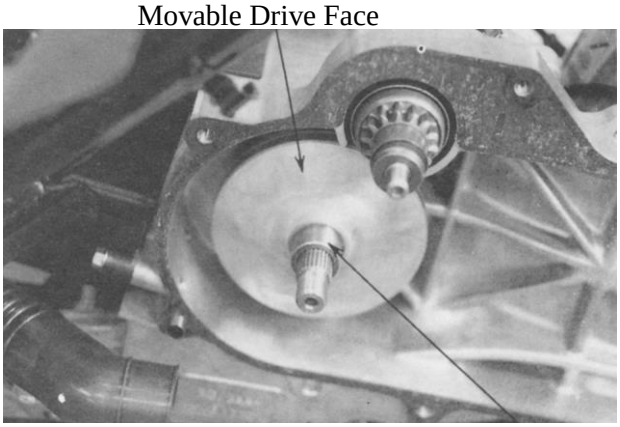
Service Limit: 19.97mm replace if below



INSTALLATION

Install the drive pulley collar and movable drive face onto the crankshaft.

Movable Drive Face

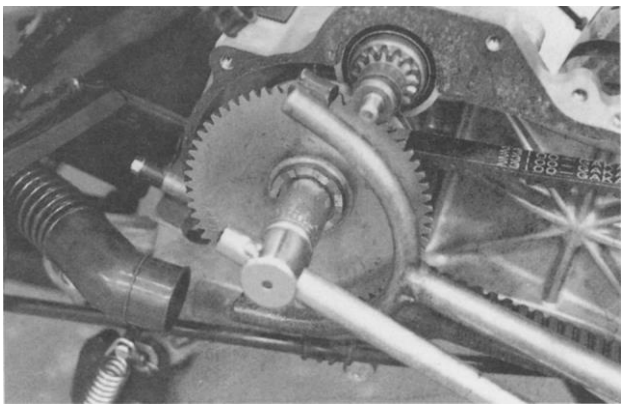


Drive Pulley Collar

Set the drive belt on the drive pulley collar. Install the drive pulley face and tighten the drive face nut. (⇨9-6)

Torque: 5.5~6.5kgf-m

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



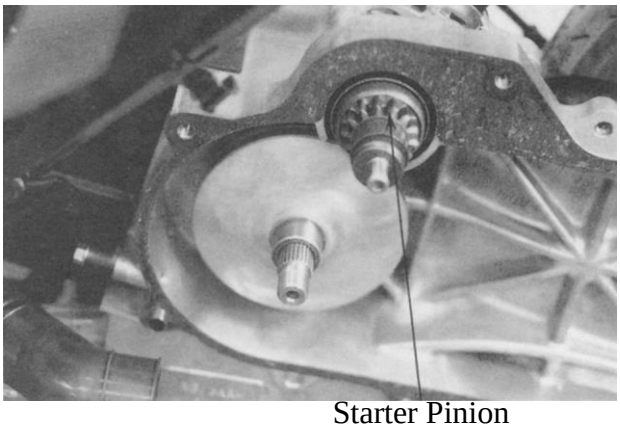
STARTER PINION

REMOVAL

Remove the left crankcase cover.
Remove the drive pulley.
Remove the starter pinion holder.
Remove the starter pinion.

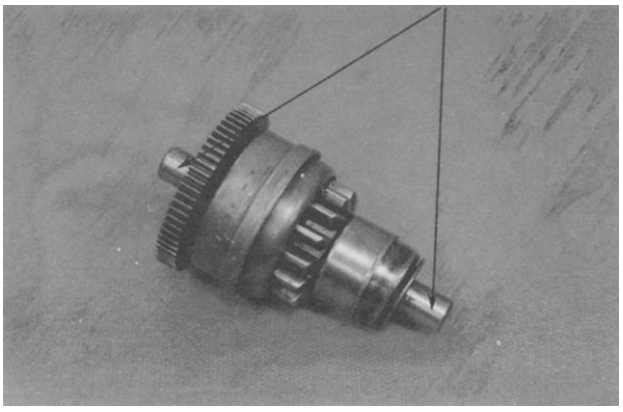
INSPECTION

Inspect the starter pinion shaft forcing part for wear or damage.
Inspect the starter pinion for smooth operation.
Inspect the starter pinion and shaft for wear or damage.



Starter Pinion

Starter Pinion Shaft



INSTALLATION

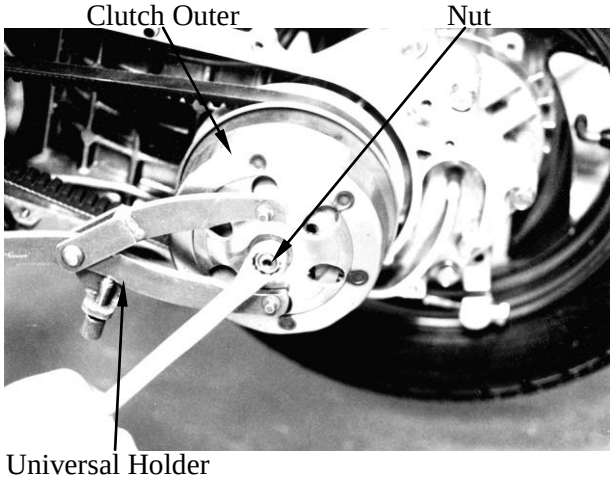
Apply a small amount of grease to the starter pinion shaft and install it in the reverse order of removal.

CLUTCH/DRIVEN PULLEY

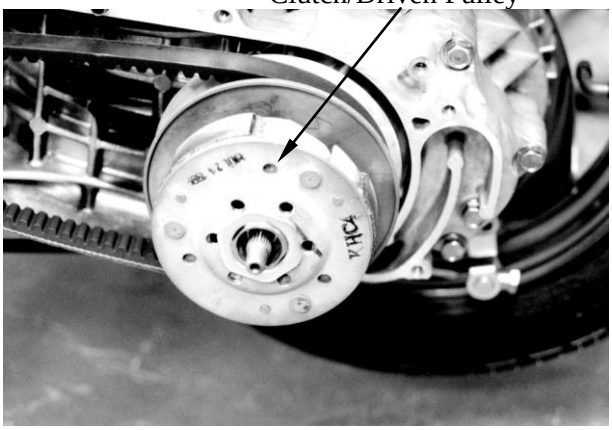
REMOVAL

Remove the drive pulley. (⇨9-6)
Hold the clutch outer with the universal holder and remove the clutch outer nut.
Remove the clutch outer.

Special
Universal Holder



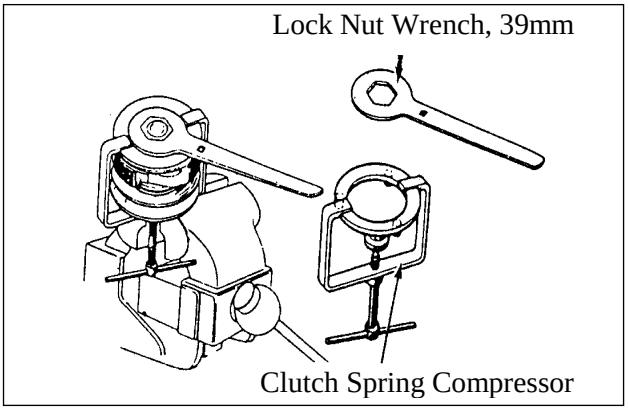
Remove the clutch/driven pulley assembly
Remove the drive belt from the clutch/driven pulley assembly.



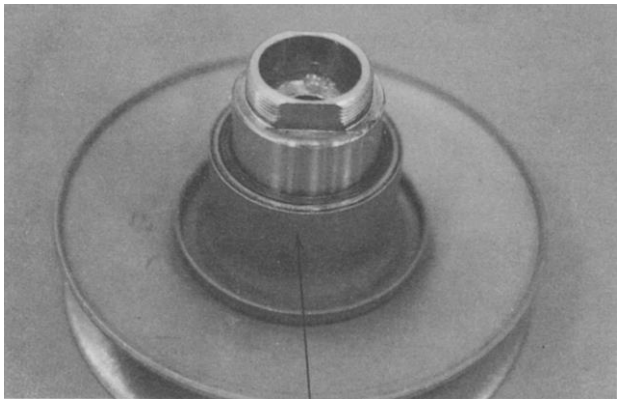
DISASSEMBLY

Hold the clutch/driven pulley assembly with the clutch spring compressor.
Set the clutch spring compressor in a vise and remove the 39mm clutch drive plate nut.
Loosen the clutch spring compressor and disassemble the driven pulley assembly.

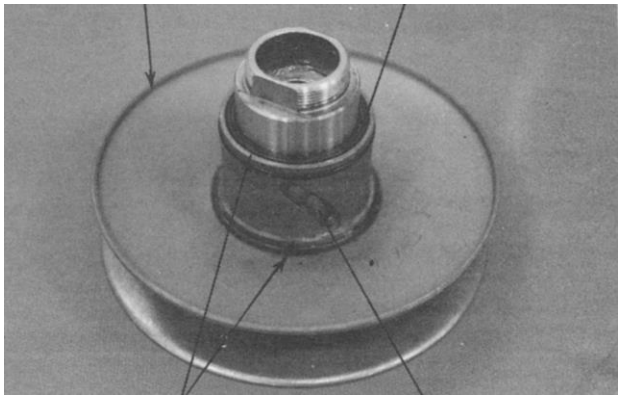
Special
Clutch Spring Compressor



Remove the seal collar.

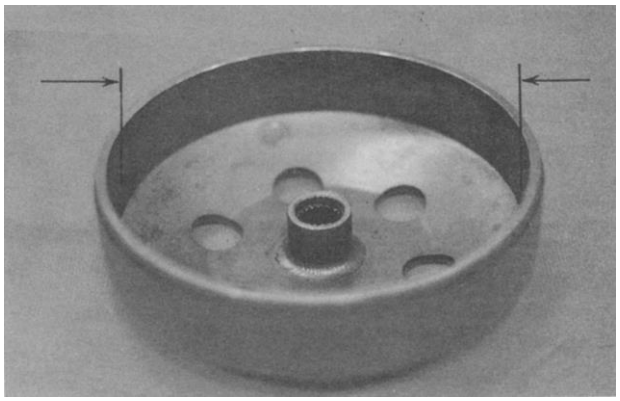


Pull out the guide roller pins and guide rollers.
Remove the movable driven face from the driven face.
Remove the O-rings and oil seal from the movable driven face.

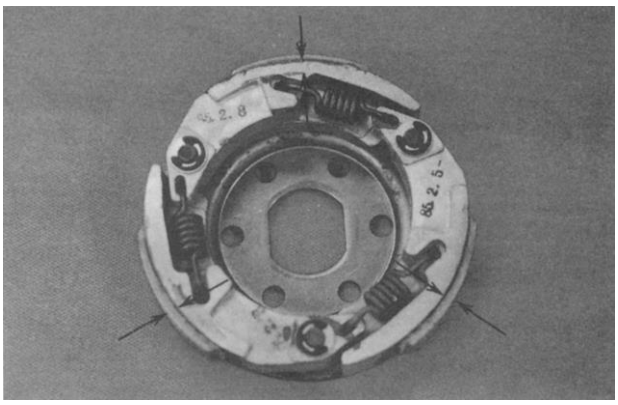


INSPECTION

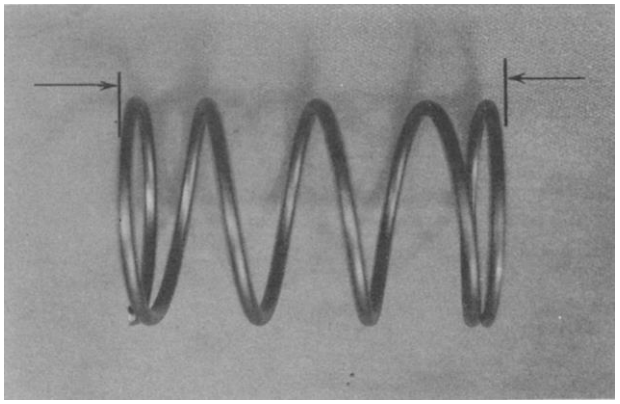
Inspect the clutch outer for wear or damage.
Measure the clutch outer I.D.
Service Limit: 107.5mm replace if over



Check the clutch shoes for wear or damage.
Measure the clutch lining thickness.
Service Limit: 2.0mm replace if below



Measure the driven face spring free length.
Service Limit: 92.8mm replace if below

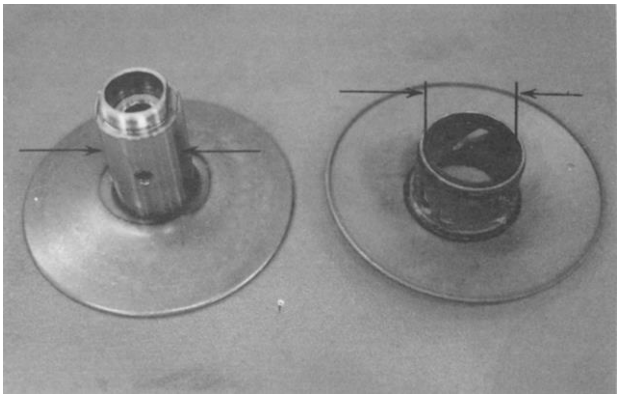


Check the driven face for wear or damage.
Measure the driven face O.D.

Service Limit: 33.94mm replace if below

Check the movable driven face for wear or damage.
Measure the movable driven face I.D.

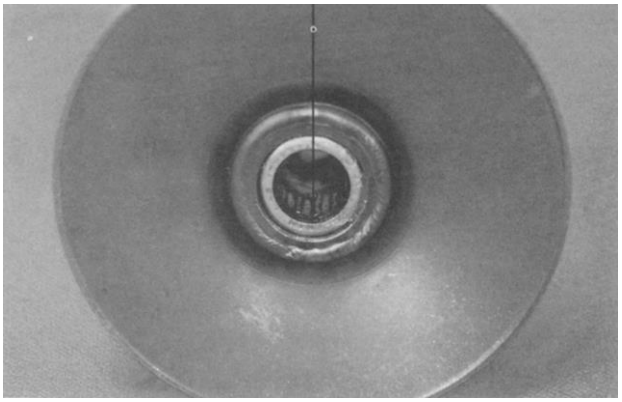
Service Limit: 34.06mm replace if over



Inner Bearing

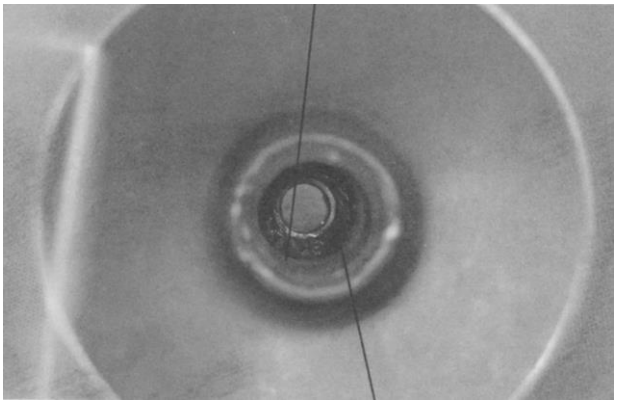
DRIVEN PULLEY FACE BEARING REPLACEMENT

Drive the inner needle bearing out of the driven pulley face.
Discard the removed bearing and replace with a new one.



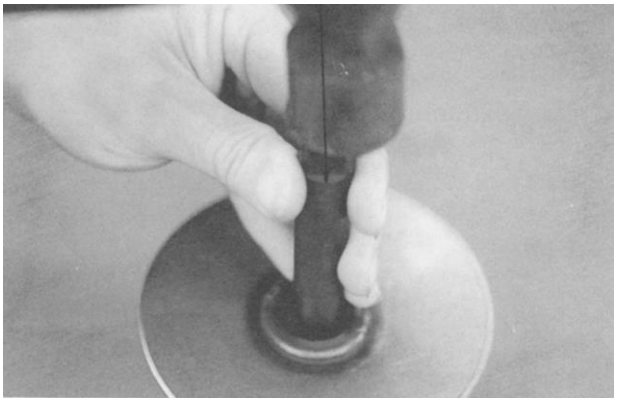
Snap Ring

Remove the snap ring and drive the outer bearing out of the driven face.



Outer Bearing
Bearing Remover

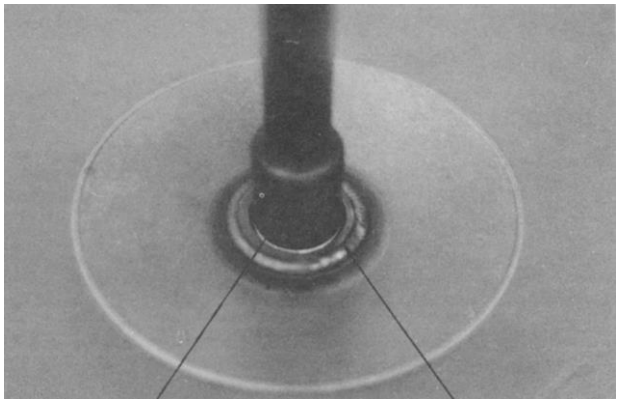
Apply grease to the outer bearing.
Drive a new outer bearing into the driven face with the sealed end facing up.
Seat the snap ring in its groove.



* 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.

Driver Handle

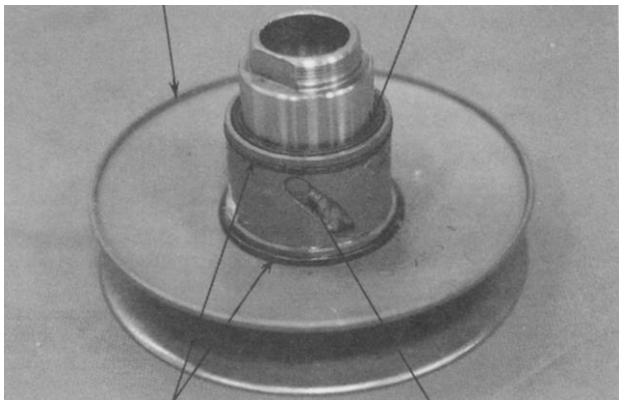


Outer Driver, 24x26mm Pilot, 17mm

Movable Driven Face Oil Seal

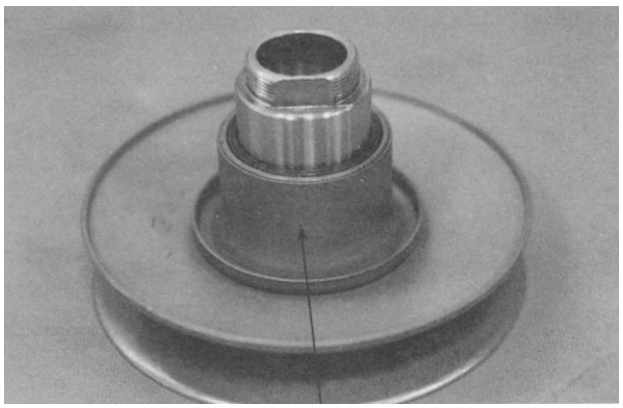
ASSEMBLY

Install the movable driven face onto the driven face.
Install the O-rings, guide rollers and guide roller pins.
Install the a new oil seal.



O-rings Guide Roller Pin

Install the seal collar.



Seal Collar

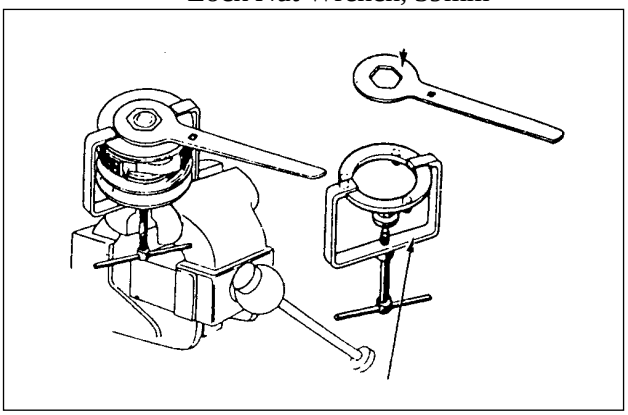
Lock Nut Wrench, 39mm

Set the driven pulley assembly, driven face spring and clutch assembly onto the clutch spring compressor.
Compress the clutch spring compressor and install the 39mm drive plate nut.
Set the clutch spring compressor in a vise and tighten the drive plate nut to the specified torque.

Torque: 5.0～6.0kgf-m

Special

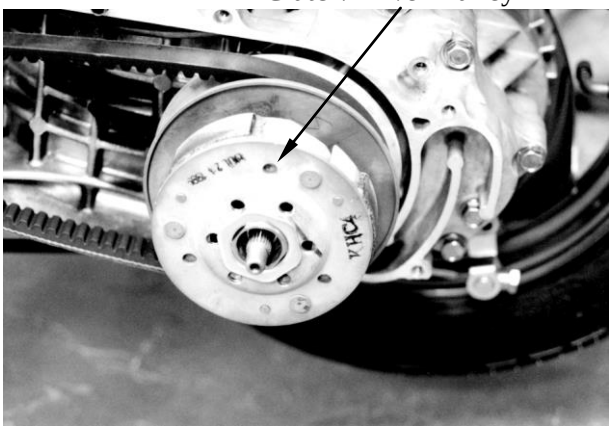
Clutch Spring Compressor



Clutch Spring Compressor

INSTALLATION

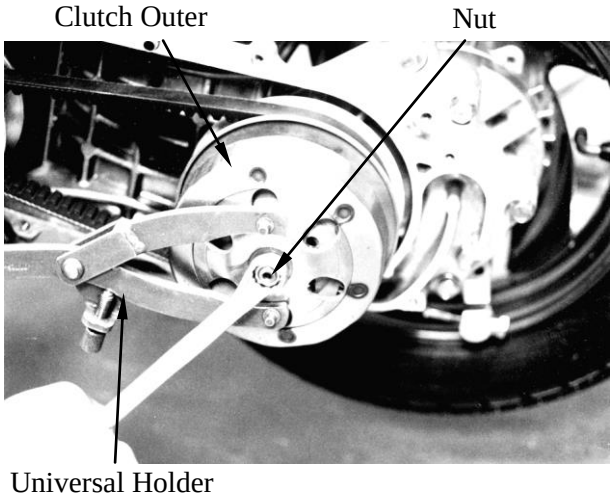
Lay the drive belt on the driven pulley and install the clutch/driven pulley onto the drive shaft.



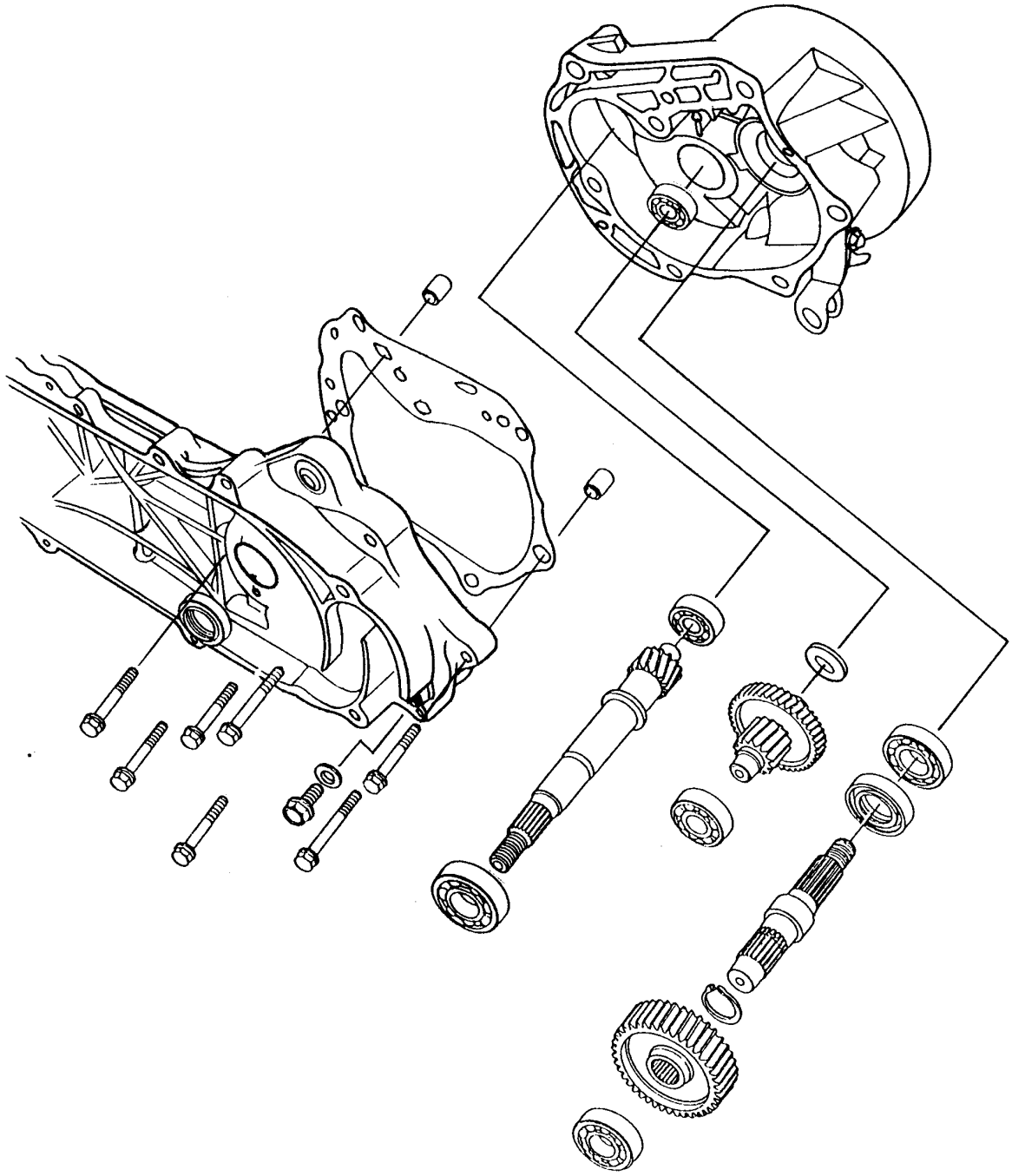
Install the clutch outer.
Hold the clutch outer with the universal holder.
Install and tighten the 10mm clutch outer nut.

Torque: 3.5~4.5kgf-m

Install the left crankcase cover. (⇨9-4)



10. FINAL REDUCTION



10. FINAL REDUCTION

SERVICE INFORMATION

SPECIFICATIONS

Specified Oil: GEAR OIL SAE 90#
Oil Capacity: At disassembly : 0.12 liter
At change : 0.11 liter

SPECIAL TOOLS

Bearing puller, 10,12,15,18mm

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

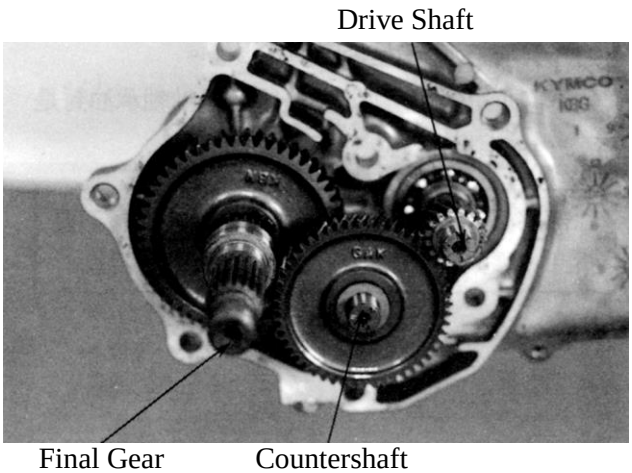
Oil leaks

- Oil level too high
- Worn or damaged oil seal

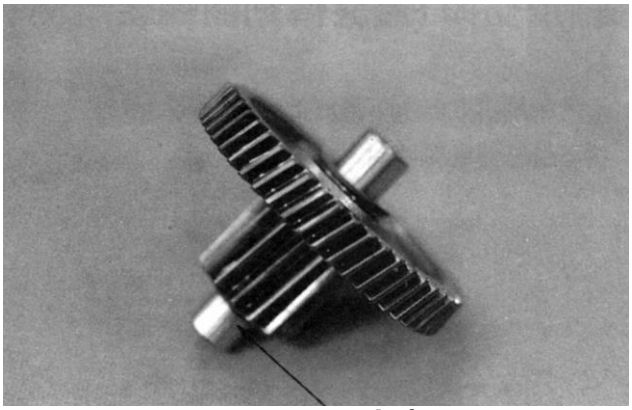
10. FINAL REDUCTION

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.

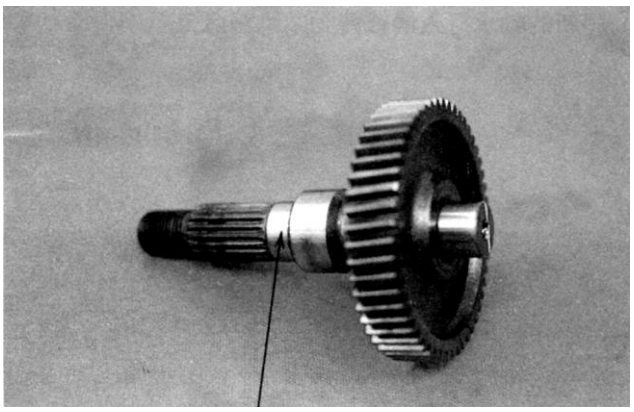


Remove the final gear and countershaft.



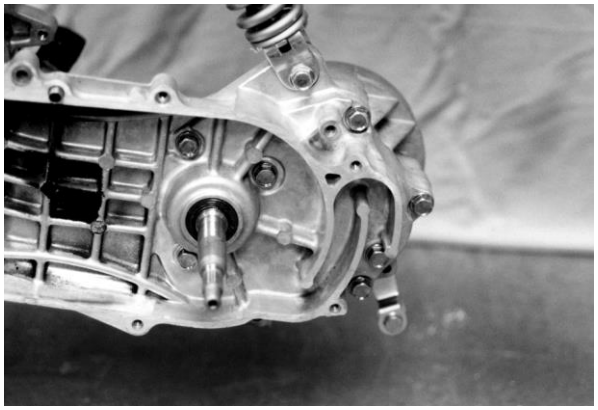
FINAL REDUCTION INSPECTION

Inspect the countershaft and gear for wear or damage.



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

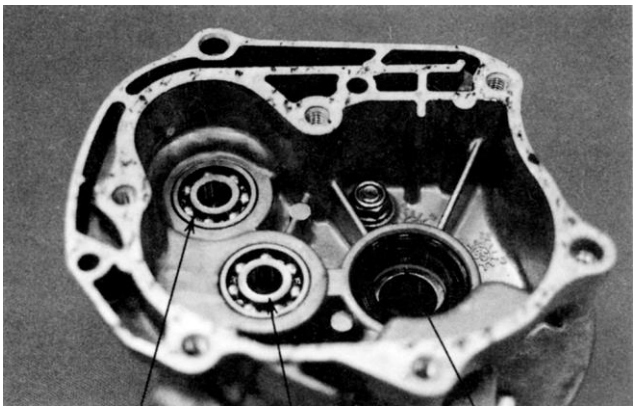
Check the left crankcase bearings for excessive play and inspect the oil seal for wear or damage.



10. FINAL REDUCTION

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

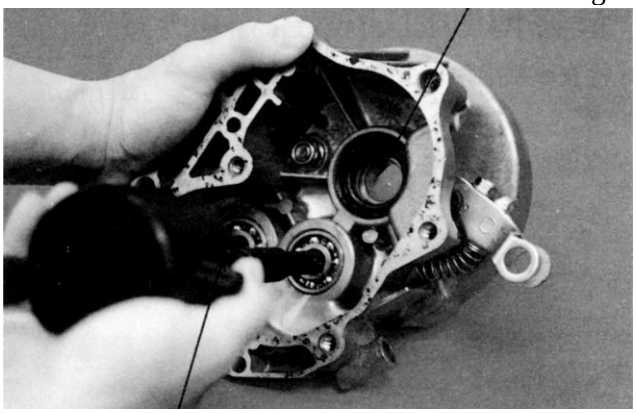


Countershaft Bearing Drive Shaft Bearing Oil Seal
Final Shaft Bearing

BEARING REPLACEMENT (TRANSMISSION CASE COVER)

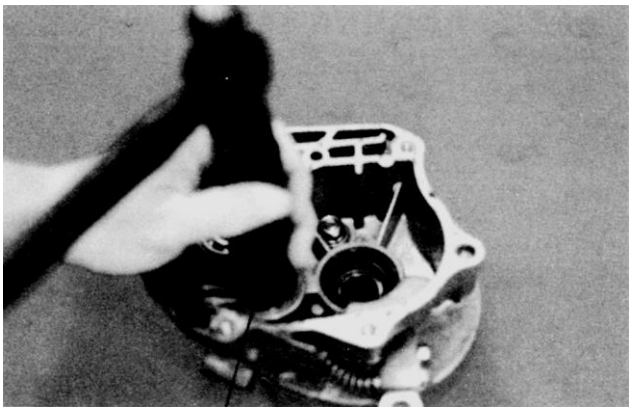
Remove the transmission case cover bearings using a bearing puller.
Remove the final shaft oil seal.

Special
Bearing Puller



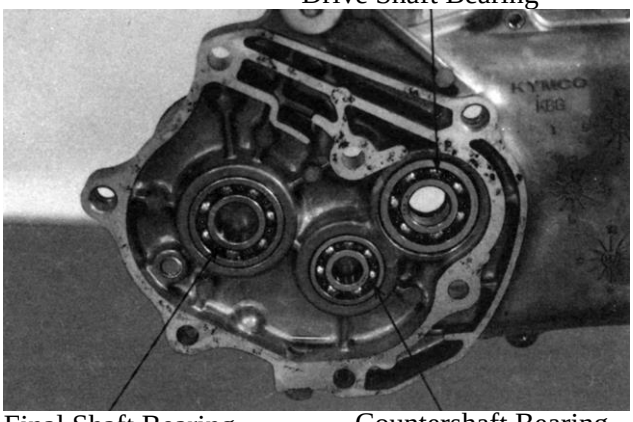
Bearing Puller

Drive new bearings into the transmission case cover.



Outer Driver, 32x35mm

Drive Shaft Bearing



Final Shaft Bearing Countershaft Bearing

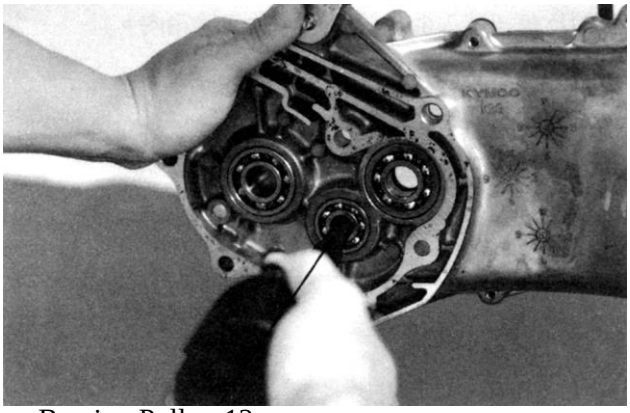
10. FINAL REDUCTION

BEARING REPLACEMENT (LEFT CRANKCASE)

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

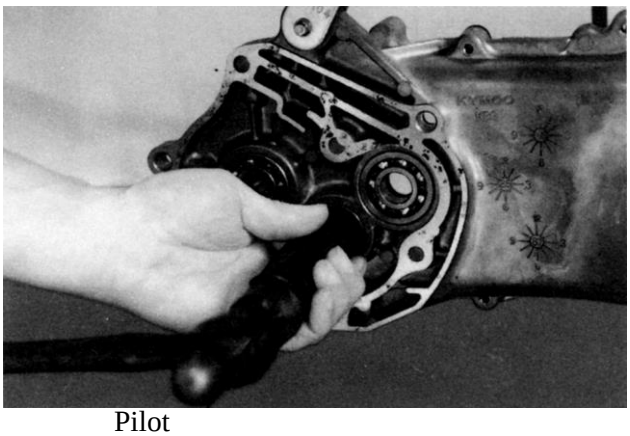
Special

Bearing Puller



Bearing Puller, 12mm

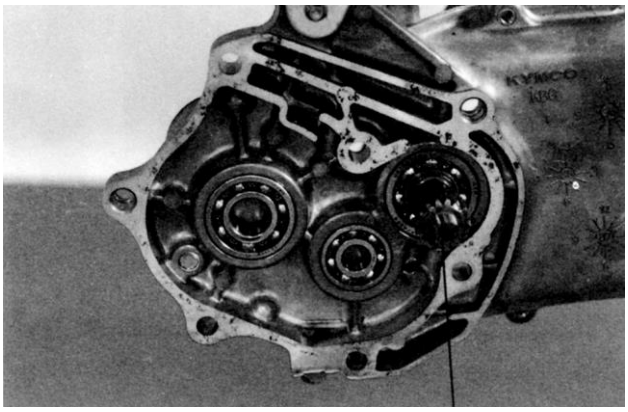
Drive new bearings into the left crankcase.
Install a new drive shaft oil seal.



Pilot

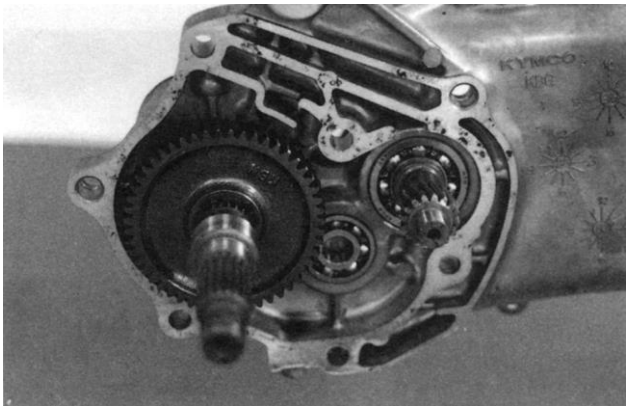
FINAL REDUCTION ASSEMBLY

Install the drive shaft into the left crankcase.



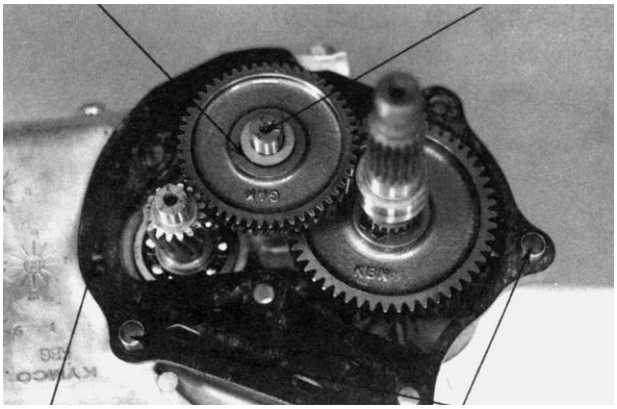
Drive Shaft

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



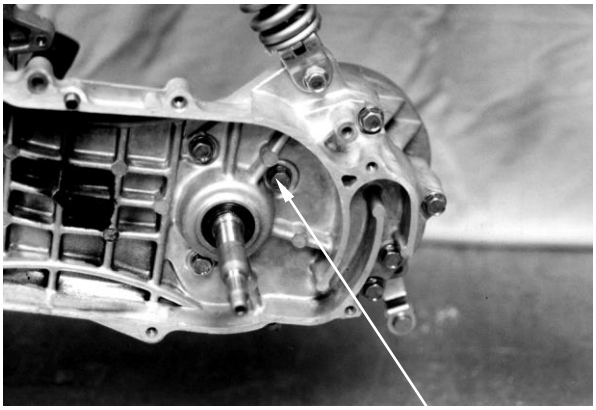
10. FINAL REDUCTION

Install the countershaft and gear into the left crankcase.
Install the resin washer onto the countershaft.
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#

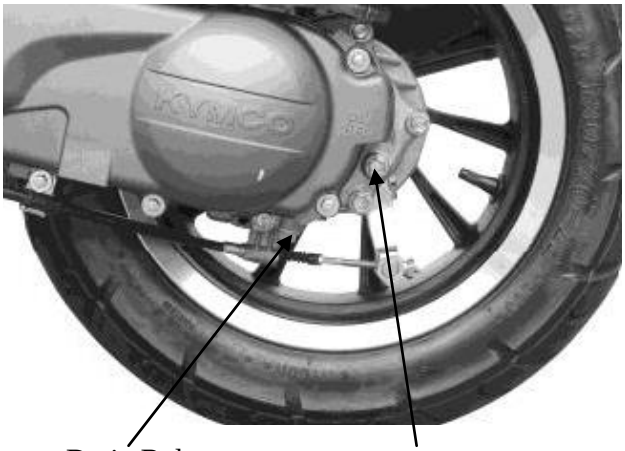
Oil Capacity:

At disassembly : 0.11 liter
At change : 0.10 liter

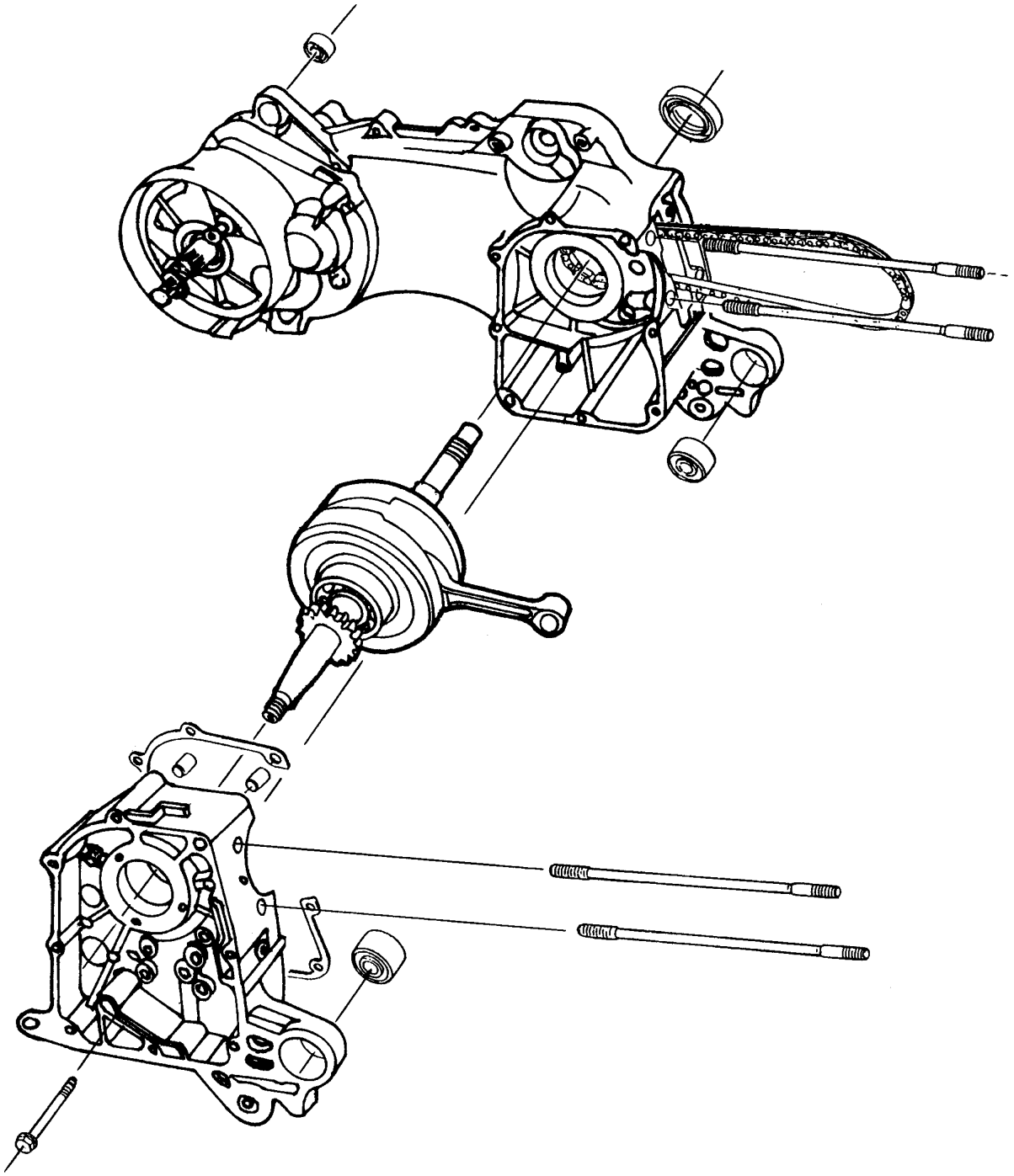
Install and tighten the oil check bolt.

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.



11. CRANKCASE/CRANKSHAFT



11. CRANKCASE/CRANKSHAFT

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

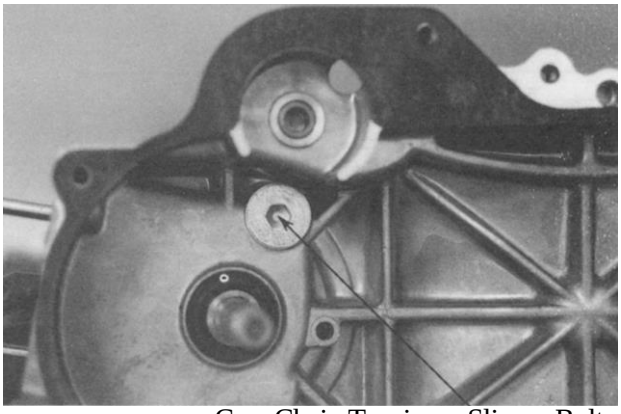
TROUBLESHOOTING

Excessive engine noise

- Excessive bearing play
- Excessive crankpin bearing play

CRANKCASE SEPARATION

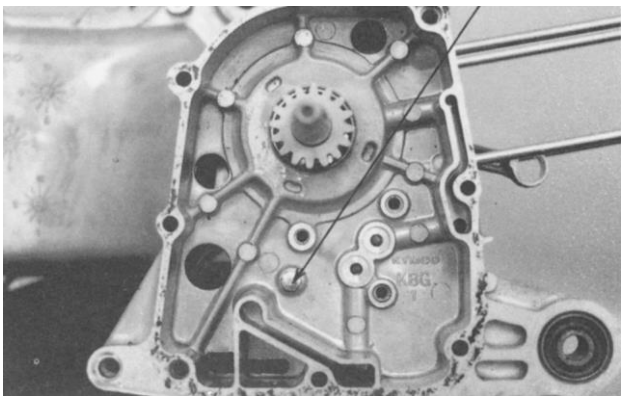
Remove the cam chain tensioner slipper bolt and cam chain tensioner slipper.



Cam Chain Tensioner Slipper Bolt

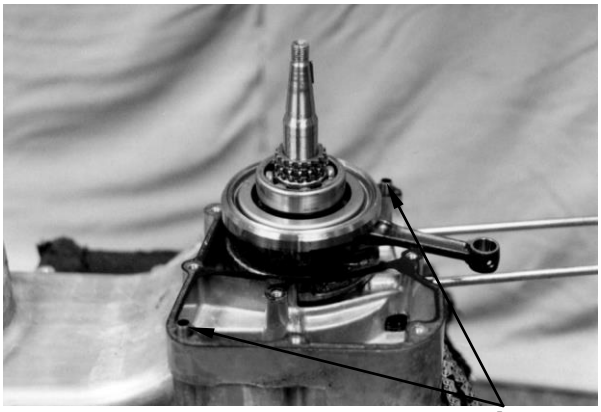
Crankcase Bolt

Remove the crankcase attaching bolt.
Separate the left and right crankcase halves.



* • Do not damage the crankcase gasket surface.
  • Never use a driver to pry the crankcase mating surfaces apart.

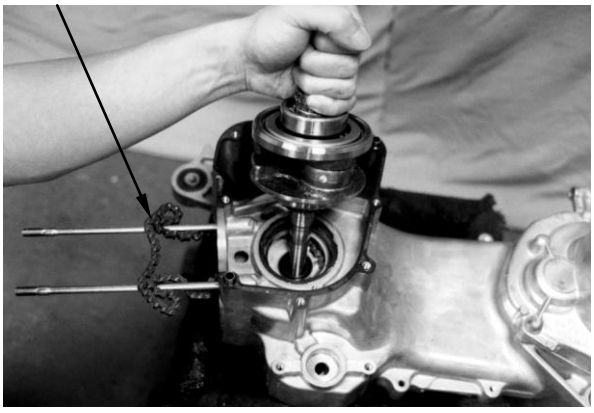
Remove the gasket and dowel pins.



Dowel Pins

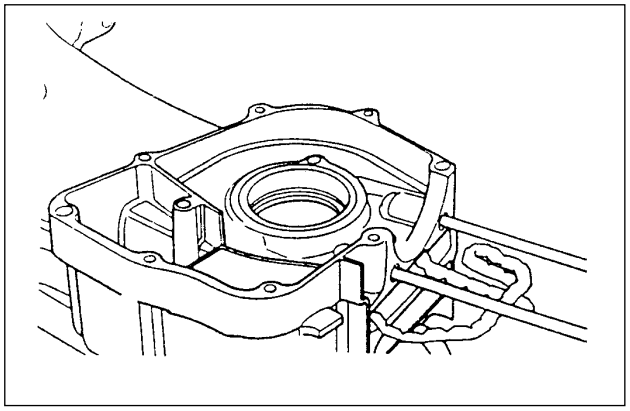
Cam Chain

Remove the crankshaft from the left crankcase.
Remove the cam chain.



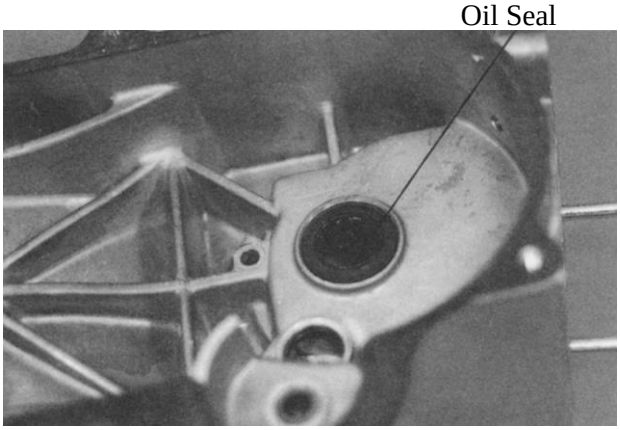
11. CRANKCASE/CRANKSHAFT

Clean off all gasket material from the crankcase mating surfaces.

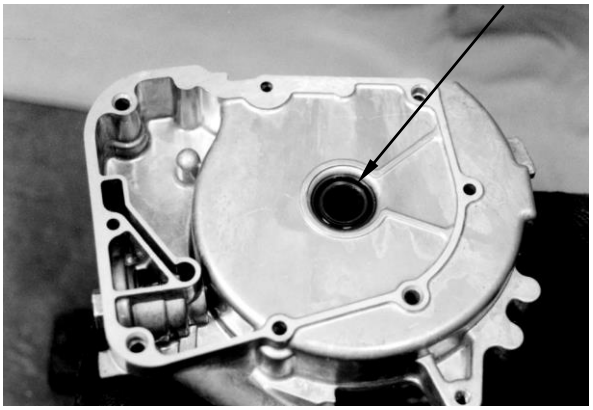


* Avoid damaging the crankcase mating surfaces.

Remove the oil seal from the left crankcase.



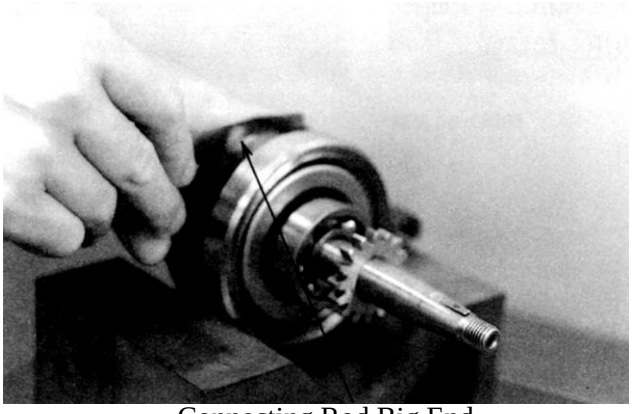
Remove the oil seal from the right crankcase.



CRANKSHAFT

Measure the connecting rod big end side clearance.

Service Limit: 0.55mm replace if over



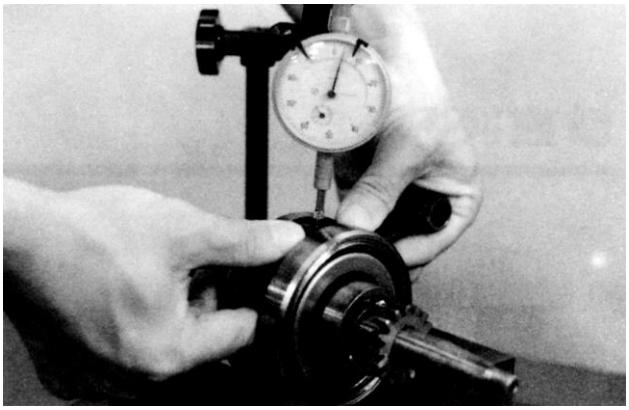
Connecting Rod Big End

11. CRANKCASE/CRANKSHAFT

Measuring Location

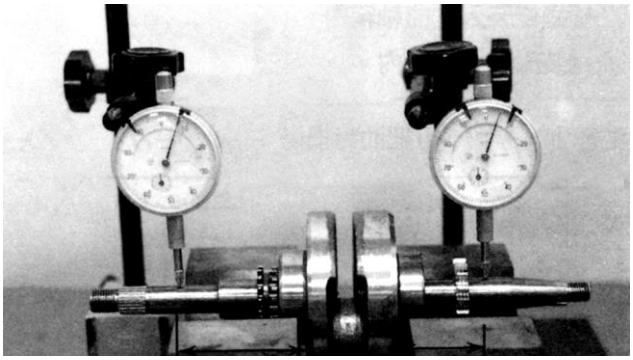
Measure the connecting rod big end radial clearance at two points at right angels to the shaft.

Service Limit: 0.05mm replace if over



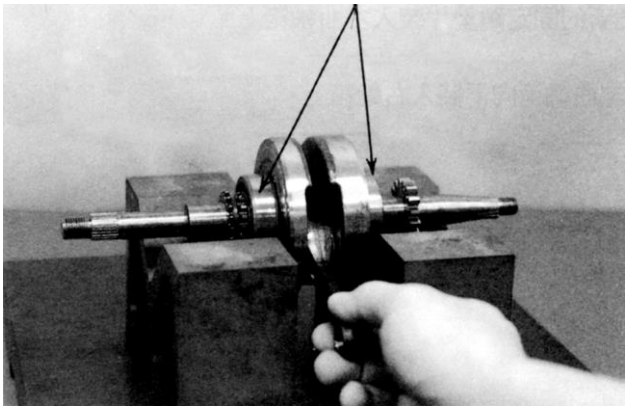
Measure the crankshaft runout.

Service Limit: 0.10mm replace if over



Crankshaft Bearings

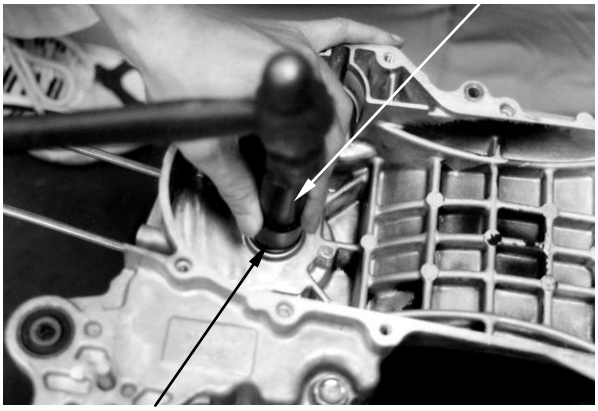
Turn the crankshaft bearings and check for excessive play.
If they do not turn smoothly, quietly or if they fit loosely in the crankshaft, replace the crankshaft as a set.



CRANKCASE ASSEMBLY

Install new oil seals into the right and left crankcase .

Driver Handle A

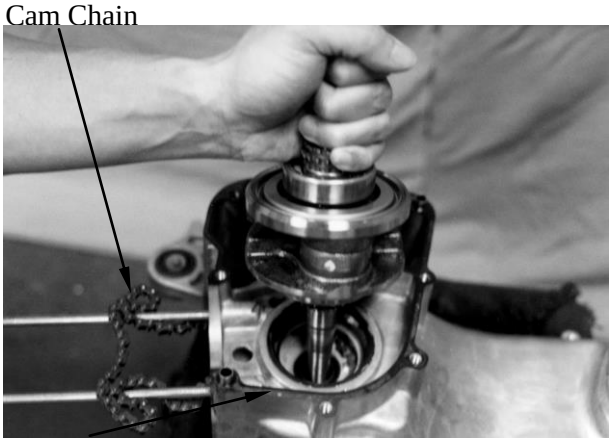


Outer Driver

11. CRANKCASE/CRANKSHAFT

Install the cam chain into the left crankcase.
Install the crankshaft into the left crankcase.

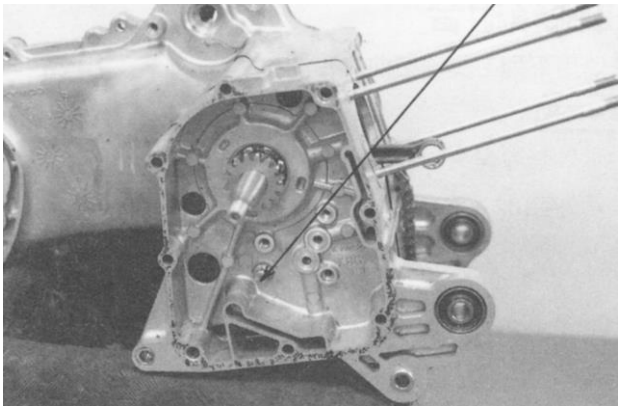
* When installing the cam chain, be careful not to damage the oil seal.



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

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

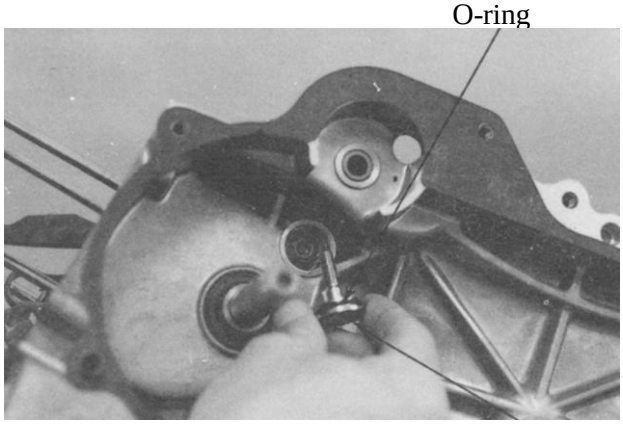
Tighten the crankcase attaching bolt.
Torque: 0.8~1.2kgf-m



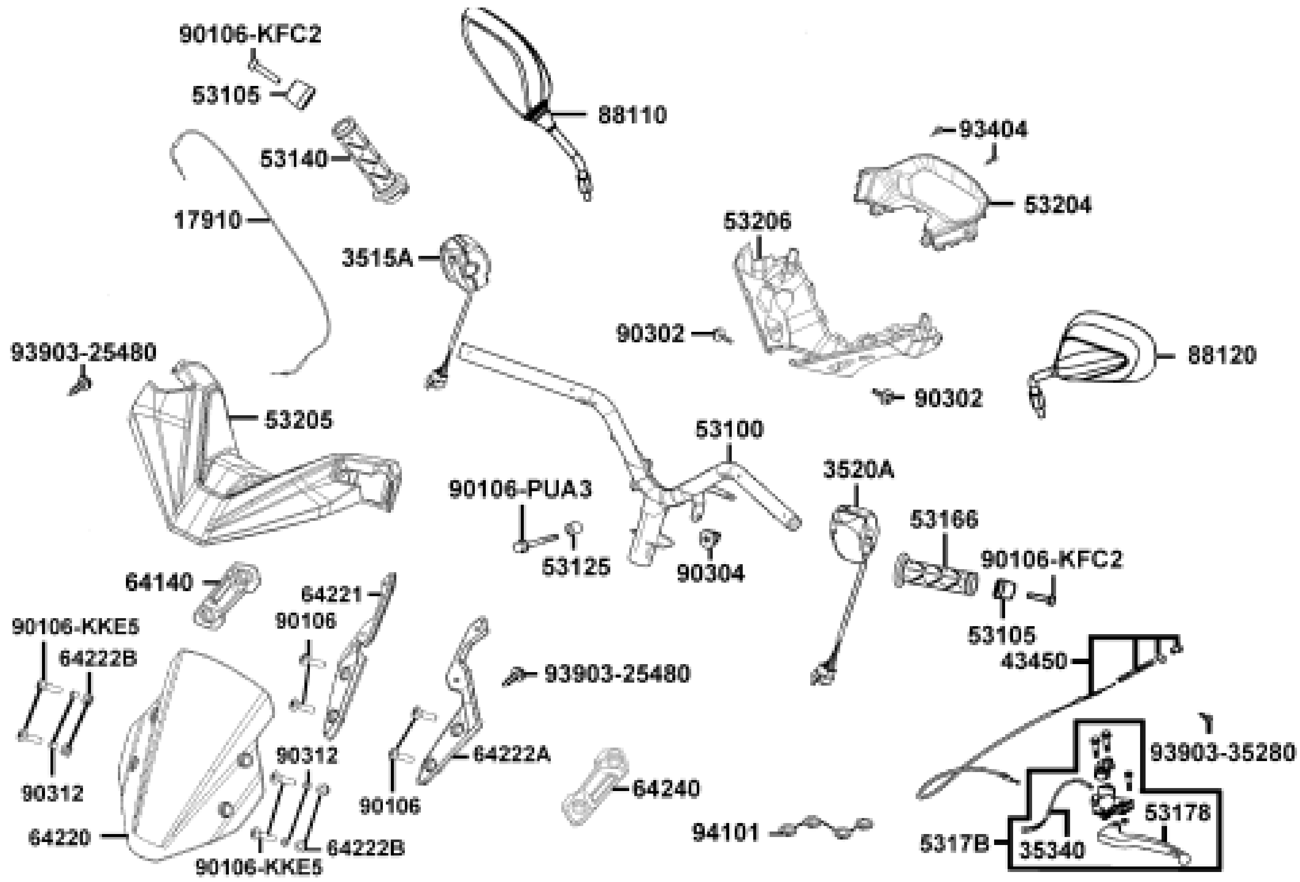
Install the cam chain tensioner slipper.
Install a new O-ring onto the cam chain tensioner slipper bolt.
Apply engine oil to the O-ring and tighten the bolt.

Torque: 0.8~1.2kgf-m

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



FRONT WHEEL/FRONT BRAKE/FRONT SUSPENSION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90106-PUA3
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90106-KFC2
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90106-KKE5
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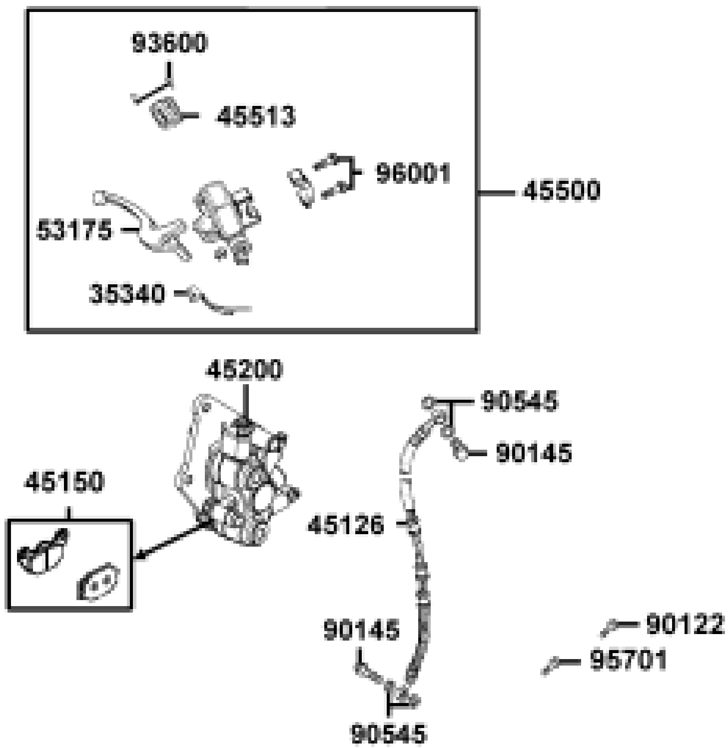
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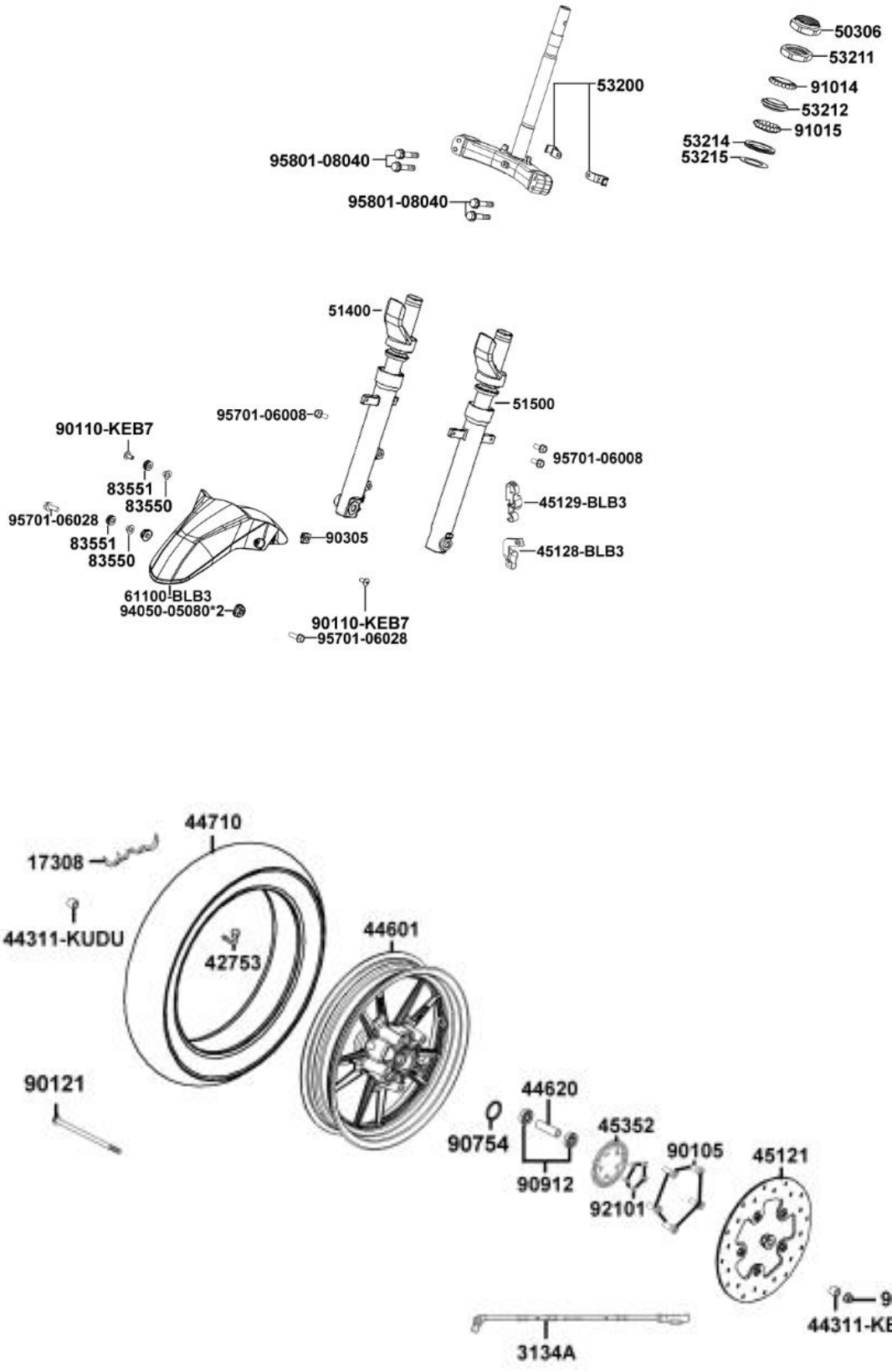
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45129-BLB3
45128-BLB3
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44311-KEBE
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SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Remove 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.
- Contaminated brake disk or brake pads reduce stopping power. Clean the contaminated brake disk with high-performance brake degreaser and replace the brake pads.
- Do not use brake fluid for cleaning.
- Bleed air from the brake system if the brake system is removed or the brake is soft.
- Do not allow any foreign matters to enter the brake system when filling it with brake fluid.
- Brake fluid will damage painted surfaces and plastic parts. When servicing the brake system, use shop towels to cover and protect rubber, plastic parts and coated surfaces. Wipe off any spilled brake fluid with a clean shop towel.
- Inspect the brake system before riding.

SPECIFICATIONS

Item		Standard (mm)
Axle shaft run out		—
Front wheel rim run out	Radial	—
	Axial	—
Front brake lining thickness		5.5
Brake disk runout		—
Brake master cylinder I.D.		12.700～12.743
Brake master cylinder piston O.D.		12.657～12.684
Brake caliper piston O.D.		25.33~25.36
Brake caliper cylinder I.D.		25.4~25.45

TORQUE VALUES

Steering stem bolt	4.0～5.0kg-m	Brake caliper bleed valve	0.6kg-m
Steering stem lock nut	7.0～8.0kg-m	Brake fluid tube bolt	3.0～4.0kg-m
Steering top cone race	0.5～1.3kg-m	Brake pad pin bolt	1.5～2.0kg-m
Front shock absorber bolt	2.0～2.5kg-m	Brake caliper bolt	2.9～3.5kg-m
Front axle nut	5.0～7.0kg-m	Brake master cylinder bolt	1.0～1.4kg-m

SPECIAL TOOLS

Lock nut wrench
Outer driver, 28x30mm
Ball race remover
Pliers (close)
Bearing remover head, 10mm
Driver handle A
Pilot, 10mm
Outer driver, 37x40mm
Bearing remover

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

Poor brake performance

- Incorrectly adjusted brake
- Worn brake linings
- Contaminated brake lining surface
- Worn brake shoes at cam contacting area
- Worn brake drum
- Poorly connected brake arm

Poor brake performance (Disk Brake)

- Air in brake system
- Deteriorated brake fluid
- Contaminated brake pads and brake disk
- Worn brake pads
- Worn brake master cylinder piston oil seal
- Clogged brake fluid line
- Deformed brake disk
- Unevenly worn brake caliper

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

FRONT WHEEL

REMOVAL

Remove the front wheel off the ground.
Remove the front axle nut and pull out the axle.
Remove the front wheel.

Axle Nut

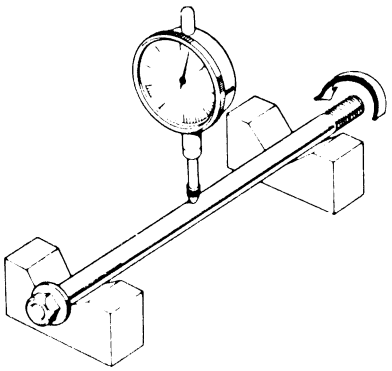
Axle Shaft

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



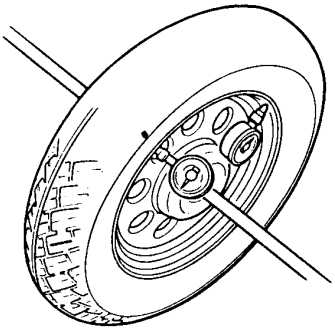
WHEEL RIM

Check the wheel rim run-out.

Service Limits:

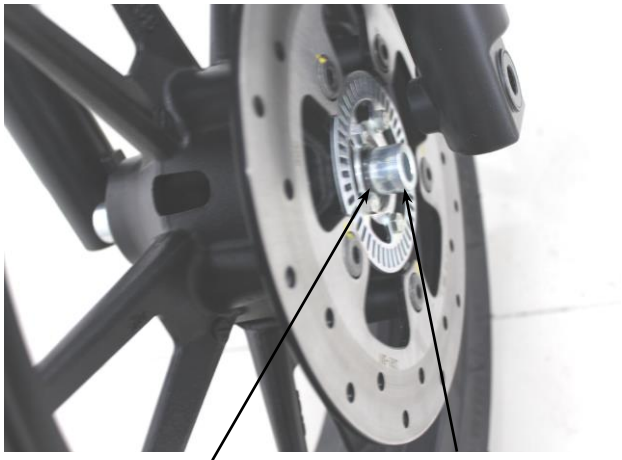
Radial: 2.0mm replace if over

Axial: 2.0mm replace if over



FRONT WHEEL BEARING

Remove the side collar (1) and dust seal (2).



Turn the inner race of each bearing with your finger to see if they turn smoothly and quietly. Also check if the outer race fits tightly in the hub. Replace the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

Remove the front wheel bearing (3) by using the special tool.

Special tool:

Bearing puller A120E00037

Remove the distance collar from wheel.

Remove the front wheel bearing (4) by using the special tool.

Special tool:

Bearing puller A120E00037

ASSEMBLY

Install the front wheel bearing(3) (4) by using the special tool.

Special tool:

Bearing puller A120E00014

Install the distance collar.

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

INSTALLATION

Apply a thin coat of grease to the axle shaft.
Install the front wheel.
Insert the axle shaft.

Install and tighten the axle nut.
Torque: 5.0~7.0kg-m

Rotate the front tire to check the speedometer if be performed.

HYDRAULIC 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 splash of brake fluid.
- When servicing the brake system, use shop towels to cover plastic parts and coated surfaces to avoid damage caused by splash of brake fluid.

Lower Limit

Brake Bleed Valve

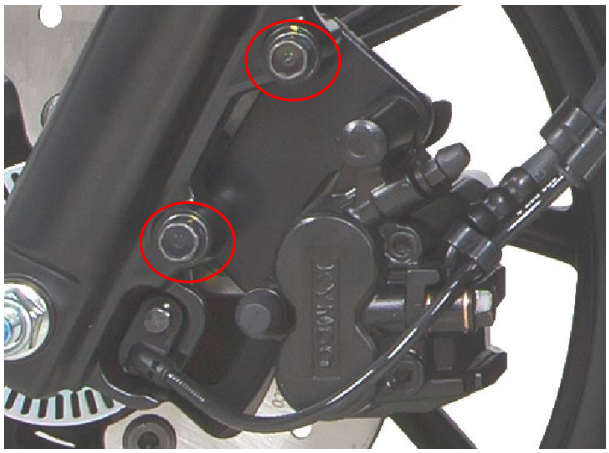
BRAKE FLUID BLEEDING

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

Warning

Spilled brake fluid on brake pads or brake disk reduces stopping power. Clean the brake pads and brake disk with a high-performance 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.



BRAKE FLUID REFILLING

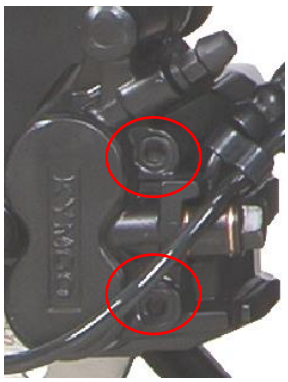
Add DOT-4 brake fluid to the brake reservoir.

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

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.



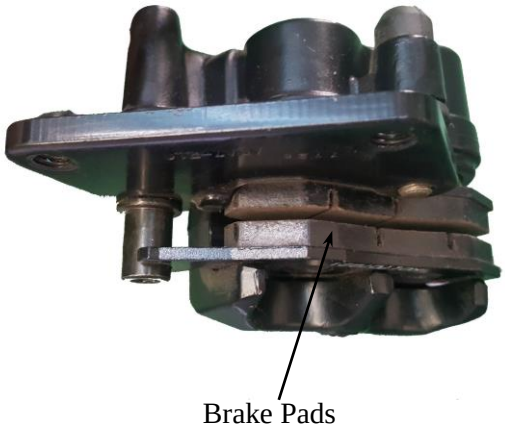
Remove the two bolts attaching the brake caliper.
Remove the brake caliper.
Compress the brake caliper seat, and press down the fixed-reed to take out the brake pads.

Install the brake pads in the reverse order of removal.

Tighten the brake pad pin bolt.

Torque: 1.5～2.0kg-m

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



Brake Pads

BRAKE DISK

Measure the brake disk thickness.

Service Limit: 3.5mm

Measure the brake disk runout.

Service Limit: 0.3mm

BRAKE MASTER CYLINDER

REMOVAL

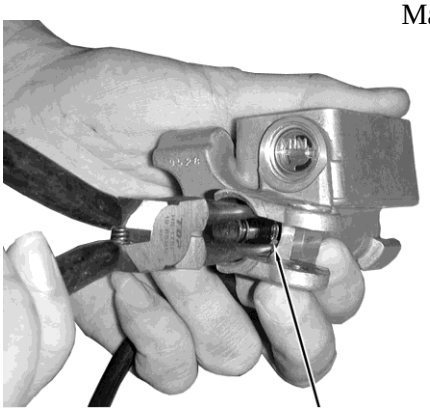
First drain the brake fluid from the hydraulic brake system.

* • 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 tube bolt, be sure to plug the tube end to avoid brake fluid leakage.

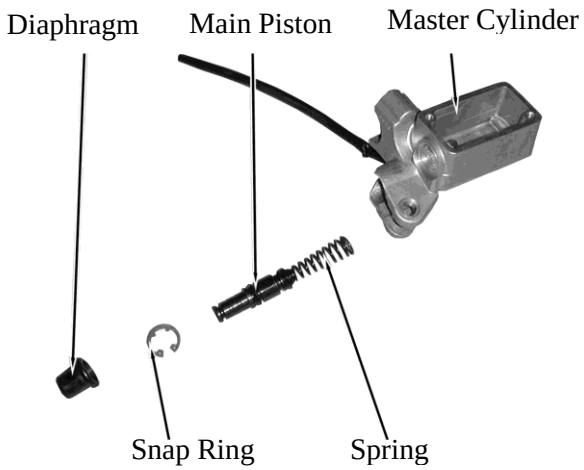
Master Cylinder

DISASSEMBLY

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



Snap Ring



Remove the 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.

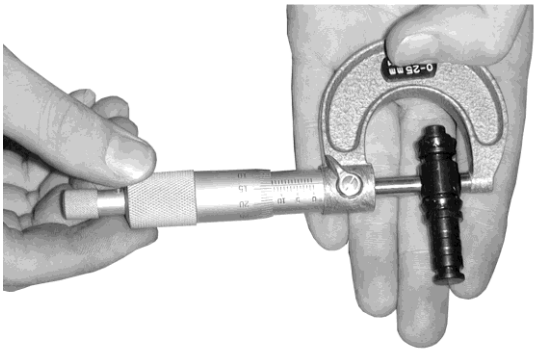
Inspect the master cylinder for scratches or cracks.

Service Limit: 12.75mm

Measure the brake master cylinder piston O.D.

Service Limit: 12.64mm

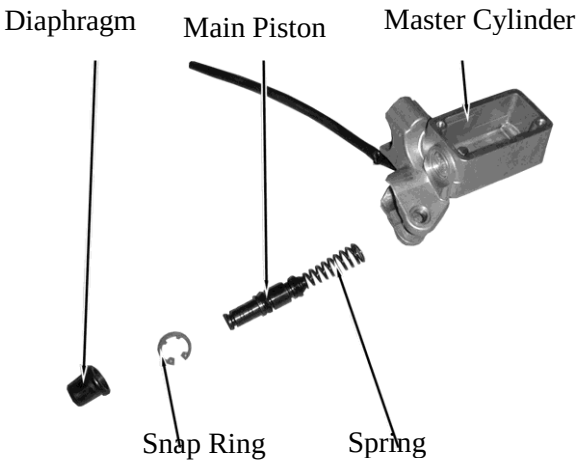
Before assembly, inspect the lst and 2nd rubber cups for wear or damage.



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.

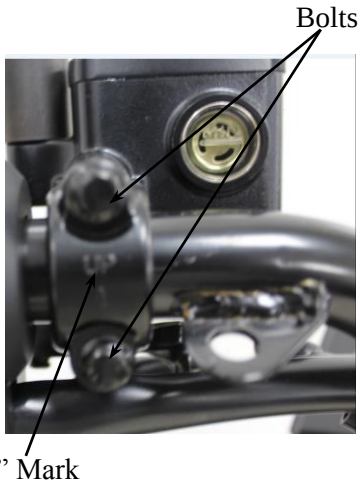
Install the diaphragm.

Install the brake lever.

Place the brake master cylinder on the handlebar and install the holder with the "up" mark facing up. Also align the punch mark with the holder joint seam.

First tighten the upper bolt and then tighten the lower bolt.

Torque: 1.0～1.4kg-m

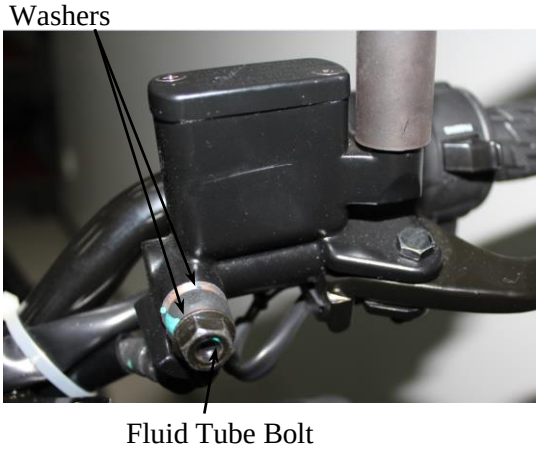


Install the brake fluid tube with the attaching bolt and two sealing washers.

Install the handlebar covers.

Connect the front and rear stop switch wire connectors.

Fill the brake reservoir with recommended brake fluid to the upper limit and bleed air according to the method stated in page 12-8.

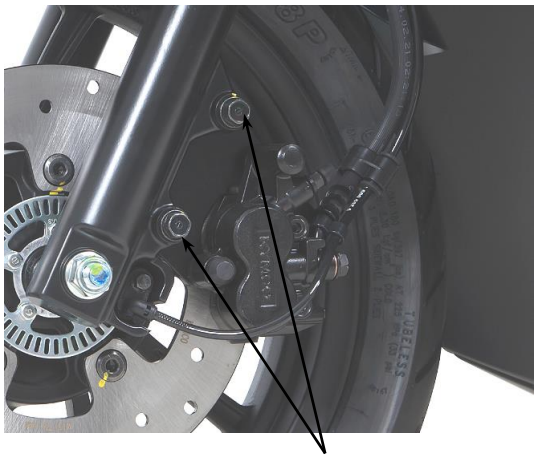


BRAKE CALIPER

REMOVAL

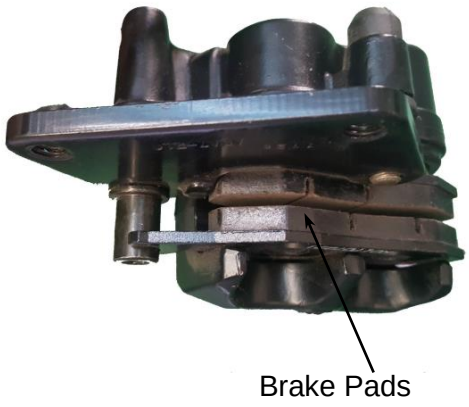
Remove the brake caliper and brake pad springs. Place a clean container under the brake caliper and disconnect the brake fluid pipe from the caliper.

* Do not spill brake fluid on any coated surfaces.

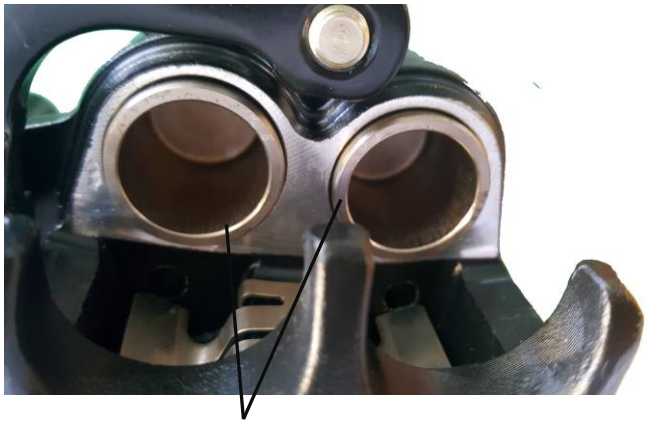


DISASSEMBLY

Remove the brake caliper seat from the brake caliper.



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



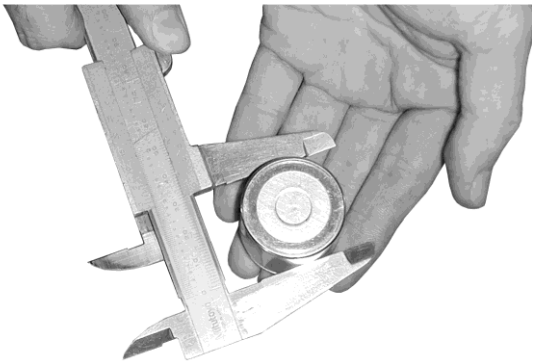
Rear Brake piston

* Be careful not to damage the piston surface.

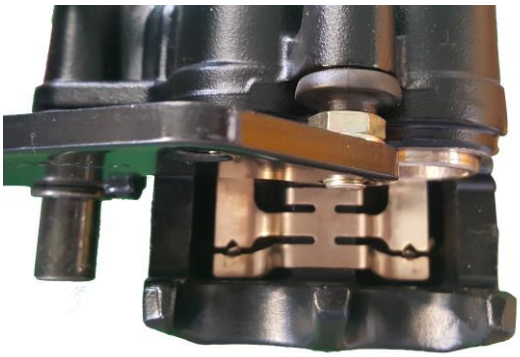
Check each piston for scratches or wear.
Measure each piston O.D. with a micrometer gauge.

Service Limit:

25.35mm



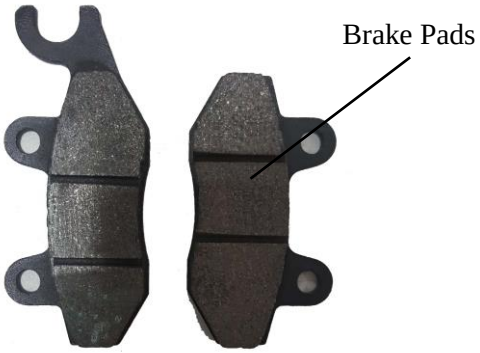
Check each caliper cylinder for scratches or wear and measure the cylinder bore.



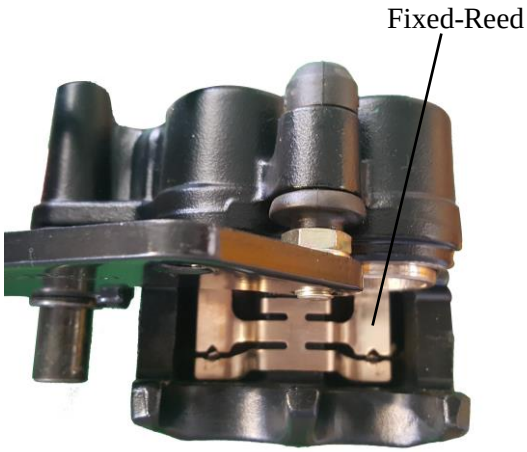
ASSEMBLY

Clean all removed parts.
Apply silicon grease to the pistons and oil seals.
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 protruding 3～5mm beyond the brake caliper cylinder.



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

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

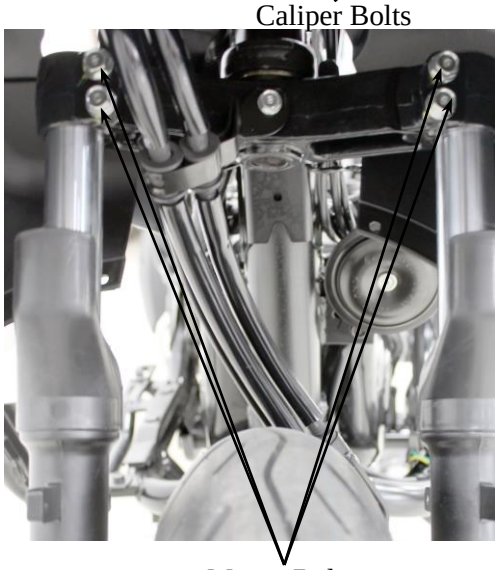
Torque: 3.0～4.0kg-m

Fill the brake reservoir with recommended brake fluid and bleed air from the brake system.

FRONT SHOCK ABSORBER

REMOVAL

Remove the front cover.
Remove the front wheel.
Remove the front shock absorber upper mount bolts.
Loosen the lower mount bolts to remove the front shock absorbers.



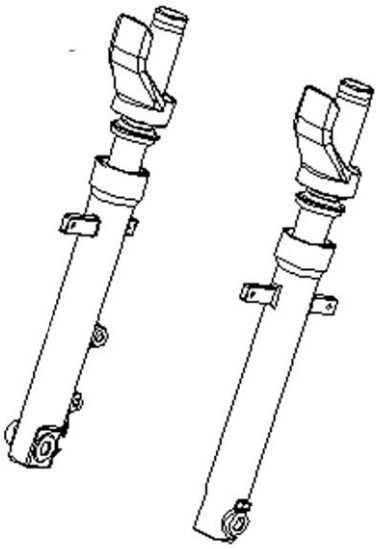
INSPECTION

Inspect the following items and replace if necessary.

- Front shock absorber tube bending or damage.
- Weak front shock absorber spring.
- Damper and damper rod bending.
- Oil seal damage or wear.

Specified Oil: SS#8

Oil Capacity: 80±1 cc

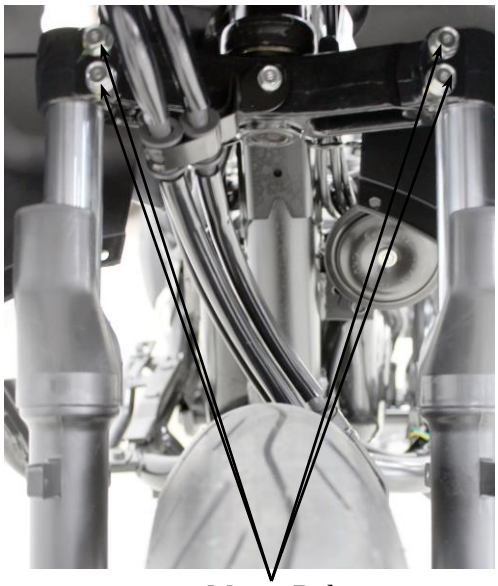


INSTALLATION

Install the front shock absorbers onto the steering stem.

Install and tighten the front shock absorber upper mount bolts.

Tighten the lower mount bolts.



Mount Bolt

*

Align the upper mount bolt hole with the groove on the front fork.
Front shock absorbers are installed at the same altitude.

Install the front wheel.

STEERING HANDLEBAR

REMOVAL

Remove the throttle seat screws.

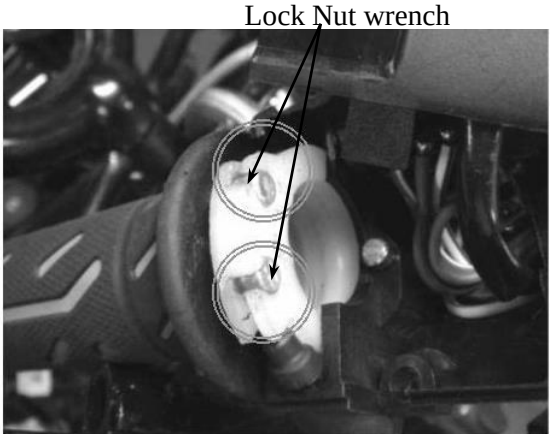
Throttle Pipe

Remove the throttle seat from the handlebar and disconnect the throttle cable from the throttle pipe.
Remove the throttle pipe from the handlebar.

Remove two screws and then remove the left handlebar switch.

Remove the upper handlebar cover and the lower cover.(⇨2-5)

Lock Nut wrench



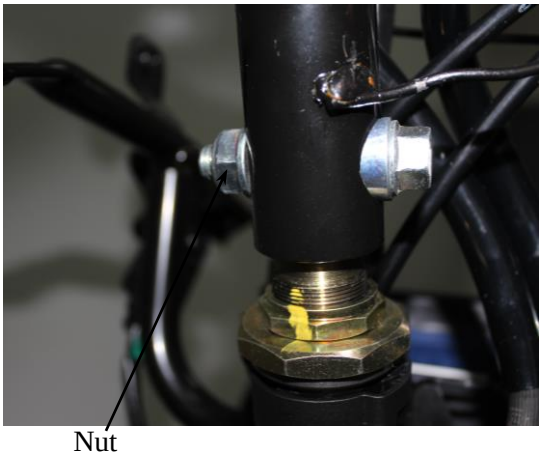
Disconnect the brake light switch wire.
Remove the front and rear brake master cylinder holder bolts to remove the brake master cylinder.

Brake Master Cylinder

Blots

brake light switch wire

Remove the steering stem lock bolt, collar, nut and the handlebar.



Nut

STEERING STEM

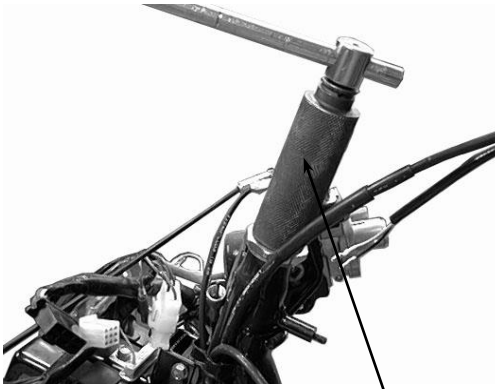
REMOVAL

Remove the steering stem lock nut.

Specia

Steering Stem Lock Nut Wrench

Lock Nut wrench



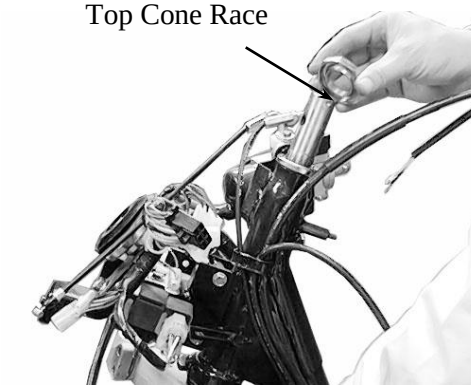
Steering Stem Lock Nut Wrench

Remove the top cone race.

*
- Be careful not to lose the steel balls (20 on top race and 15 on bottom race).
- Clean the openings of frame covers with clean shop towels.

Remove the front fork.

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.

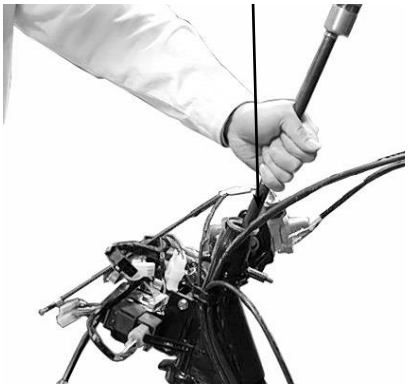
Drive a new bottom cone race into place with a proper driver.

Bottom Cone Race

BALL RACE REPLACEMENT

Drive out the top and bottom ball races.

Ball Race Remover

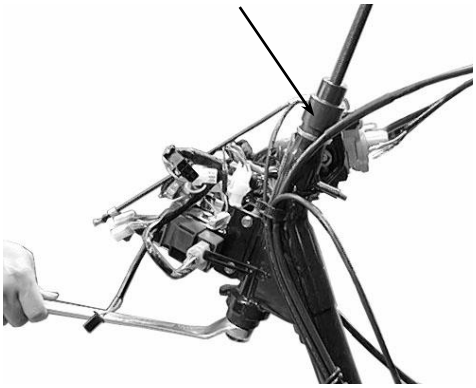


Drive new top and bottom ball races into the steering head using the outer driver.

Special

Outer Driver

Outer Driver



INSTALLATION

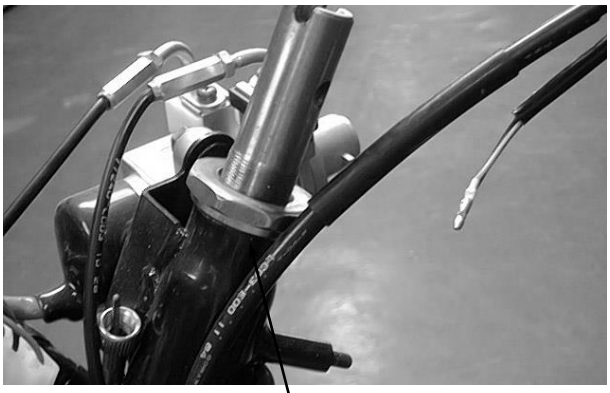
Install the top and bottom steel balls.

Apply grease to the top and bottom ball races and install 20 steel balls on the top ball race and 15 steel balls on the bottom ball race.

Top Steel Ball

Apply grease to the ball races and install the front fork.
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.

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



Top Cone Race

Top Cone Race Lock Nut Wrench

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

Torque: 7.0～8.0kg-m

Install the front wheel.

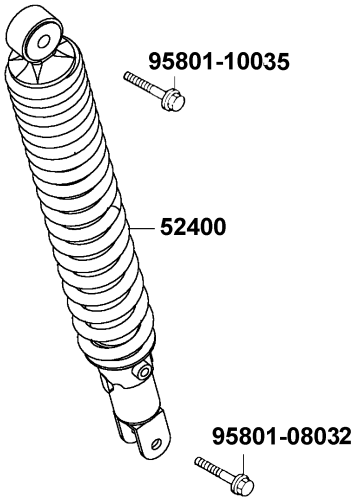
Steering Stem Lock Nut Wrench

HANDLEBAR INSTALLATION

Install the handlebar onto the steering stem tube and then install and tighten the bolt.
Torque: 4.5kg-m

Install the front wheel.
Install the brake levers.
Install the handlebar covers.

Nut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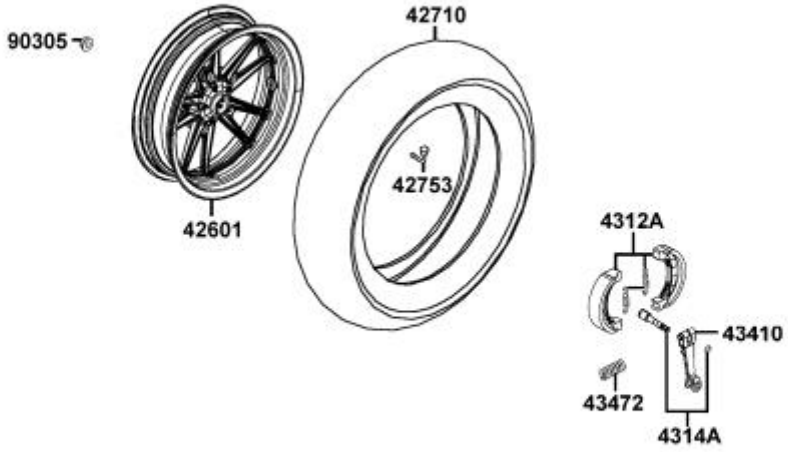
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SERVICE INFORMATION

GENERAL INSTRUCTIONS

- During servicing, keep oil or grease off the brake drum and brake linings.

SPECIFICATIONS

Item			Standard (mm)	Service Limit (mm)
Rear wheel	Rim runout	Radial	—	2.0
		Axial	—	2.0
	Rear brake drum I.D		110	111
Rear brake lining thickness			4.0	2.0
Rear shock absorber spring free length			227	220

TORQUE VALUES

Rear axle nut	11~13kgf-m
Rear shock absorber upper mount bolt	3.5~4.5kgf-m
Rear shock absorber lower mount bolt	2.4~3.0kgf-m
Exhaust muffler joint lock nut	1.0~1.4kgf-m
Exhaust muffler lock bolt	3.0~3.6kgf-m

Special Tool
Cushion Assemble & Disassemble Tool

TROUBLESHOOTING

Rear wheel wobbling
- Bent rim
- Faulty tire
- Axle not tightened properly

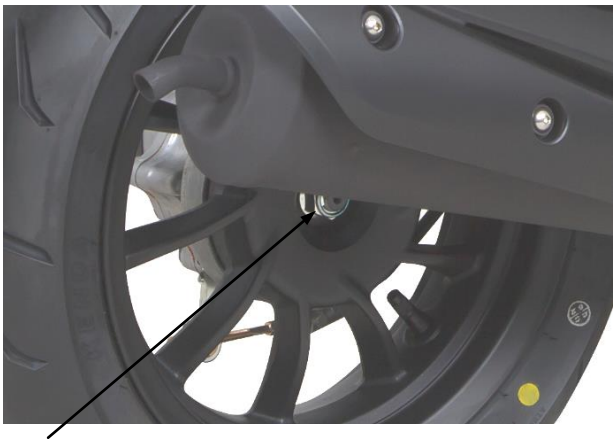
Soft rear shock absorber
- Weak shock absorber spring
- Faulty damper

Poor brake performance
- Brake not adjusted properly
- Worn brake linings
- Worn brake shoes at cam contacting area
- Worn brake cam
- Worn brake drum

REAR WHEEL

REMOVAL

Remove the exhaust muffler. (⇨2-5)
Remove the rear axle nut.
Remove the rear wheel.
.



Rear Axle Nut

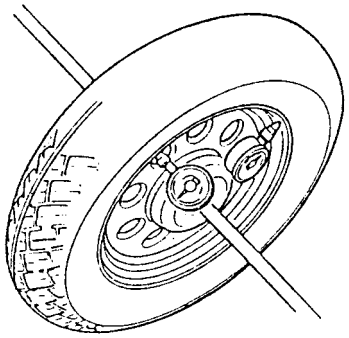
INSPECTION

Measure the rear wheel rim runout.

Service Limits:

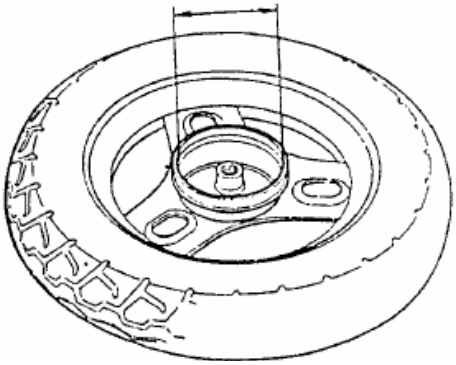
Radial: 2.0mm replace if over

Axial: 2.0mm replace if over



Inspect the rear brake drum.
Measure the rear brake drum I.D.

Service Limits: 130mm replace if over



INSTALLATION

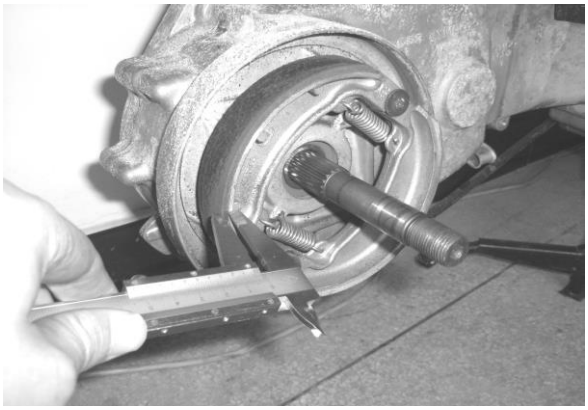
Install the rear wheel in the reverse order of removal.
Tighten the rear axle nut.
Torque: 11.0-13.0kg-m
Install the exhaust muffler.
Torque:
Exhaust muffler joint lock nut: 1.0~1.4kgf-m
Exhaust muffler lock bolt: 3.0~3.6kgf-m

* First install and tighten the exhaust muffler joint lock nuts and then the exhaust muffler lock bolts.

REAR BRAKE

BRAKE LINING INSPECTION

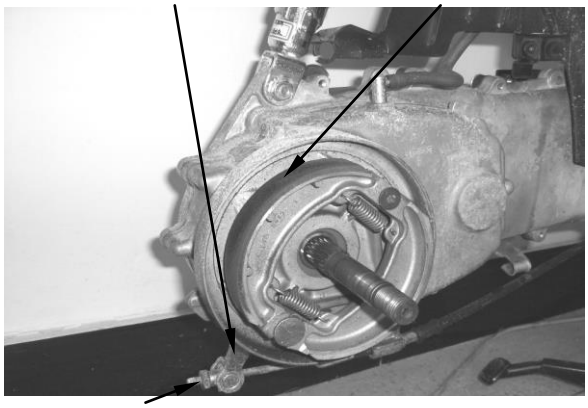
Measure the brake lining thickness.
Service Limit: 2.0mm replace if below



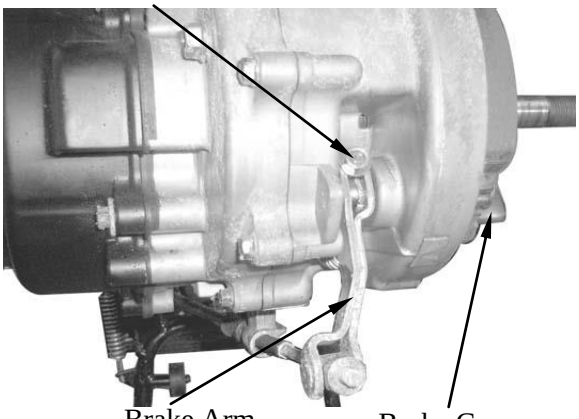
* Keep oil or grease off the brake linings.

REAR BRAKE DISASSEMBLY

Remove the rear brake adjusting nut and disconnect the rear brake cable.
Remove the rear brake shoes.

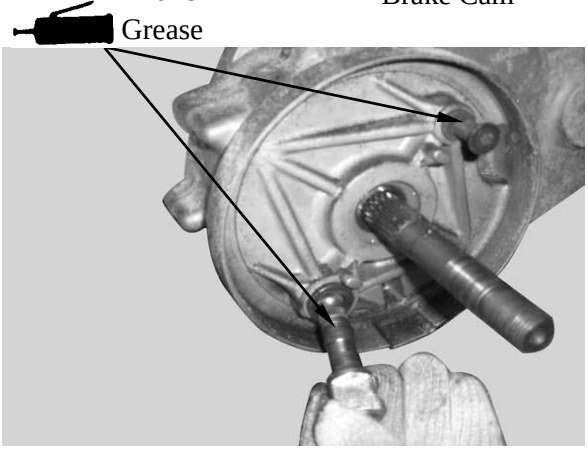


Remove the brake arm bolt to remove the brake arm.
Remove the brake cam.



REAR BRAKE ASSEMBLY

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

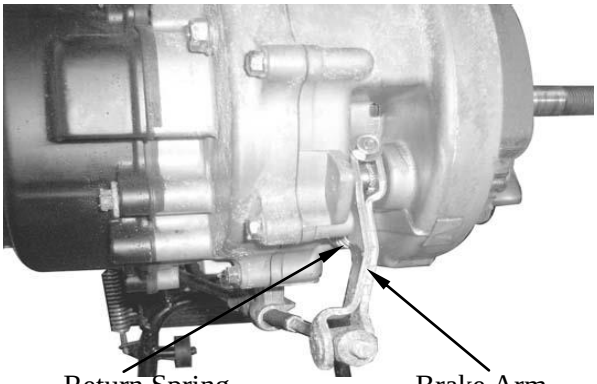


Apply a small amount of engine oil to the felt seal and install it to the brake cam.
Install the brake arm.

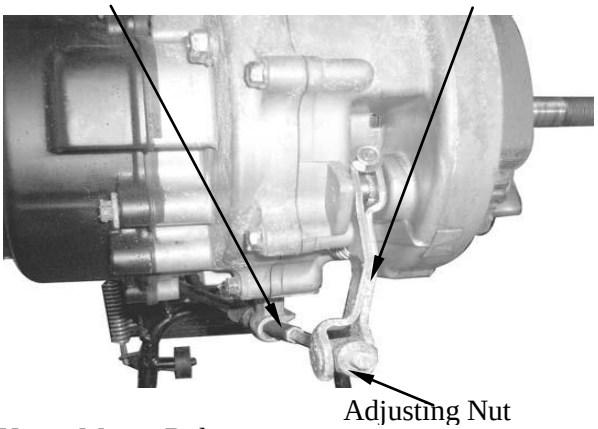
* Align the wide groove on the wear indicator plate with the wide tooth of the brake cam.

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)



LEFT REAR SHOCK ABSORBER

REMOVAL

Remove the frame body cover. (⇨2-3)
Remove the air cleaner case. (⇨5-19)

Remove the rear shock absorber upper and lower mount bolts.
Remove the rear shock absorber.

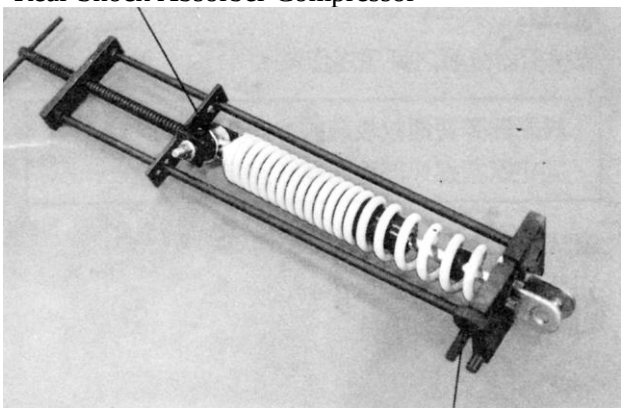
DISASSEMBLY

Install the rear shock absorber compressor as the figure shown.

* Install the rear shock absorber lower joint into the rear shock absorber compressor.

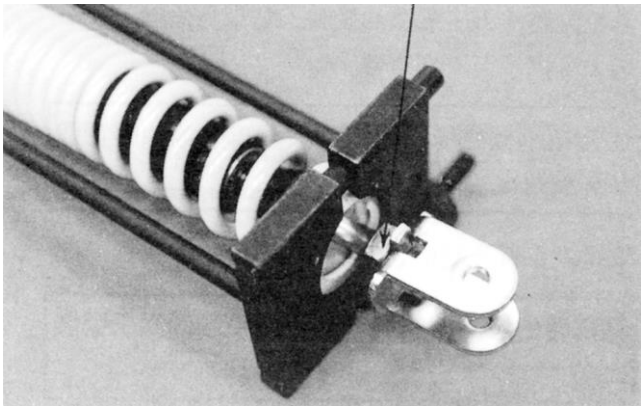
Compress the rear shock absorber spring.

Special
Cushion Assemble & Disassemble Tool



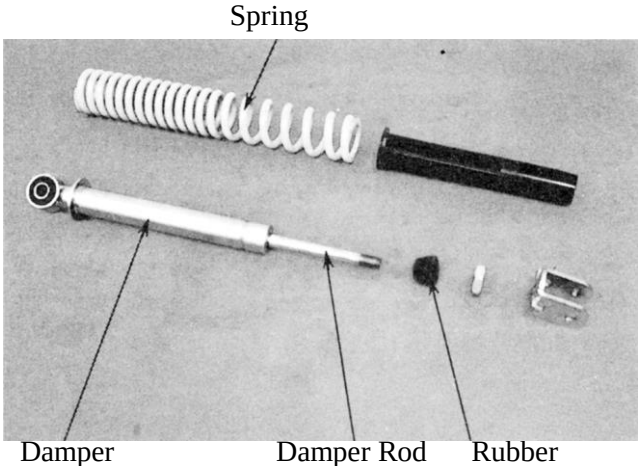
INSPECTION

Inspect the damper rod for bending or damage.
Inspect the damper for oil leaks.
Inspect the damper rubber for deterioration or damage.



Measure the rear shock absorber spring free length.

Service Limit: 210mm replace if over

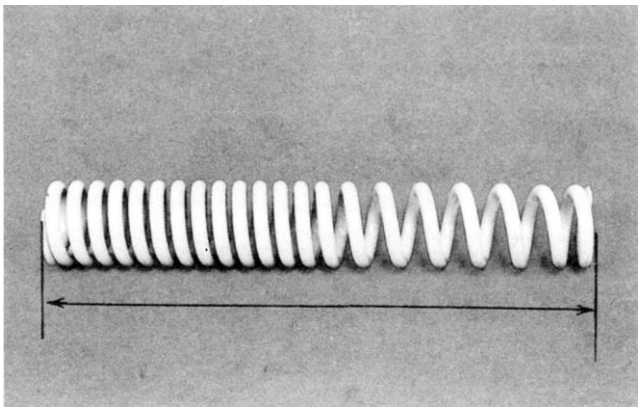


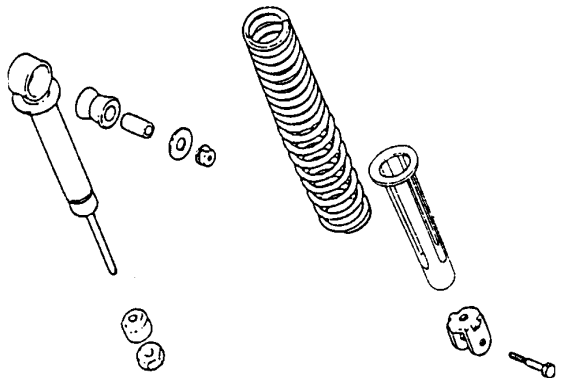
ASSEMBLY

Assemble the rear shock absorbers in the reverse order of disassembly.

*

- Install the shock absorber spring with loosely wound coils facing down.
- Apply locking agent to the lock nut threads and tighten the lock nut.





INSTALLATION

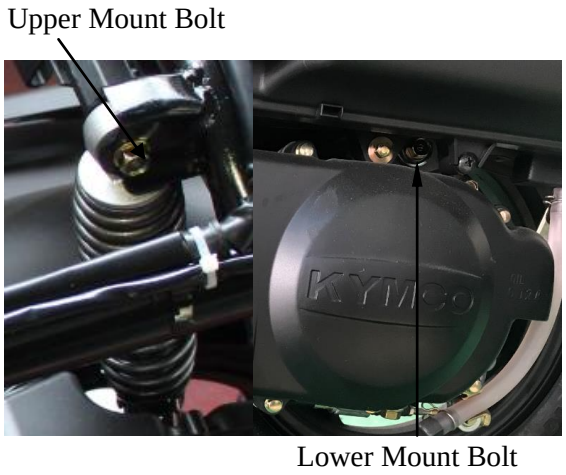
Install the rear shock absorber.
Install the rear shock absorber upper mount bolt and then the lower mount bolt.
Tighten the bolts.

Torque:

Upper Mount Bolt: 3.5~4.5kgf-m

Lower Mount Bolt: 2.4~3.0kgf-m

Install the air cleaner case. (⇨5-15)
Install the frame body cover. (⇨2-3)



14

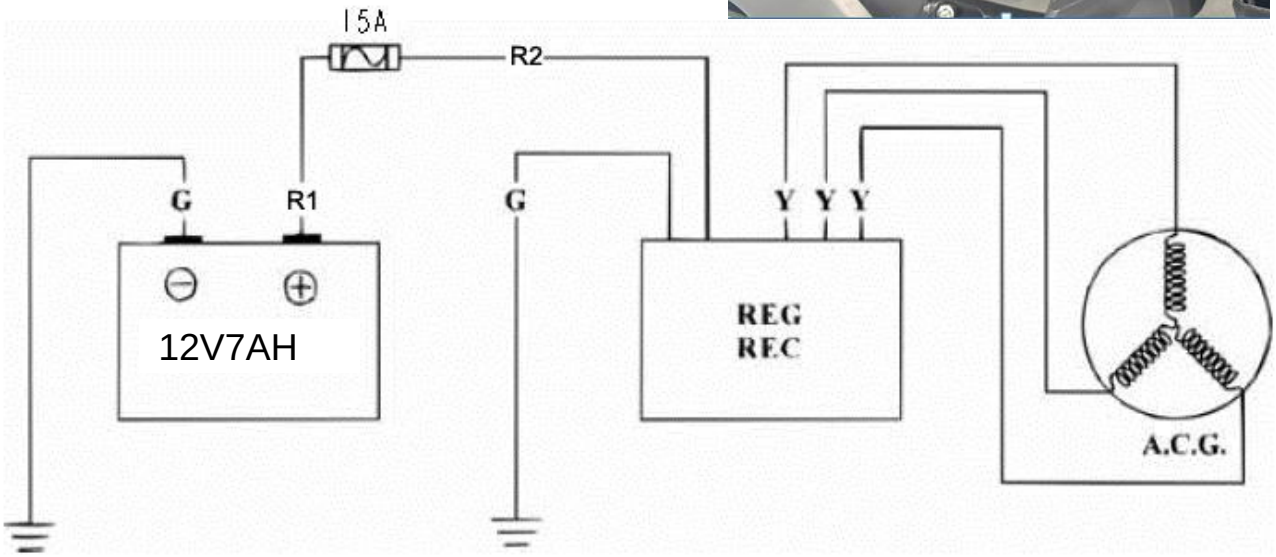
BATTERY/CHARGING SYSTEM

14. BATTERY/CHARGING SYSTEM

CHARGING SYSTEM LAYOUT

Regulator/Rectifier

A. C. G



14. BATTERY/CHARGING SYSTEM

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 electric tester.

SPECIFICATIONS

Item			Standard
Battery	Capacity		12V7AH
	Voltage (20℃)	Fully charged	12.8V
		Insufficient charged	< 12V
	Charging current		0.6A* 5~10H

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 ignition system

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

14. BATTERY/CHARGING SYSTEM

BATTERY REMOVAL

Remove the windshield and the front cover. ⇨2- 6)
Remove the battery cover.
Disconnect the battery cables .

* First disconnect the battery negative (-) cable and then the positive (+) cable.

Remove the battery.
The installation sequence is the reverse of removal.

BATTERY CHARGING (OPEN CIRCUIT VOLTAGE) INSPECTION

Remove the battery cover and disconnect the battery cables.
Measure the voltage between the battery terminals.
Fully charged : 13.0V～13.2V
Undercharged : 12.3V max.

* Battery charging inspection must be performed with an electric tester.

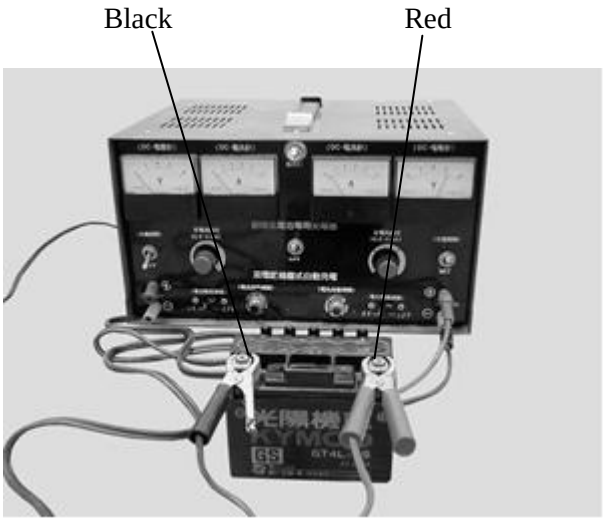
CHARGING METHOD

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

* • 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.
  • Charge the battery according to the current specified on the battery surface.

Charging current :Standard: 0.6A
Quick: 3A
Charging time: Standard: 5~10 hours
Quick: 1.0 hours
After charging: Open circuit voltage: 12.8V min.

* • Quick charging should only be done in an emergency.
  • During quick charging, the battery temperature should not exceed 45℃.
  • Measure the voltage 30 minutes after the battery is charged.



PERFORMANCE TEST

Warm up the engine.

Remove the floor mat and front tool box cover.

* Use a fully charged battery to check the charging system output.

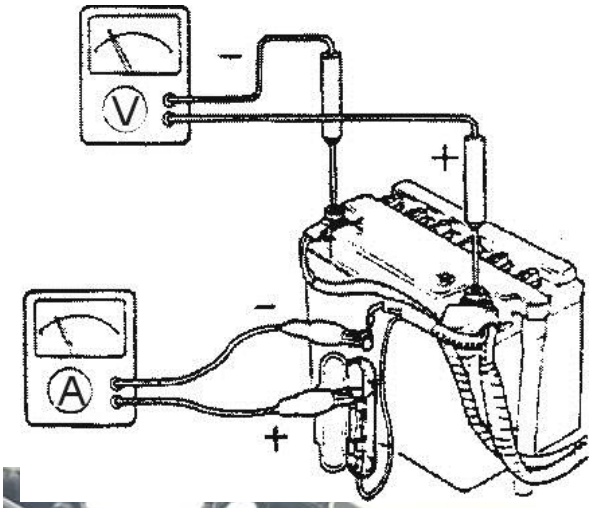
Stop the engine and open the fuse box.

Disconnect the wire lead from the fuse terminal.

Connect an ammeter between the wire lead and fuse terminal as shown.

Connect the battery positive (+) terminal to the voltmeter positive (+) probe and battery negative (-) terminal to the voltmeter negative (-) probe.

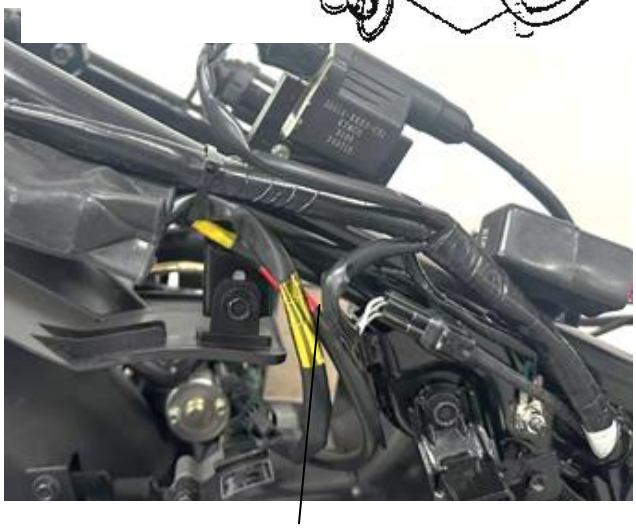
Start the engine, gradually increase engine speed to test the output:



Position / RPM	Day	Night
2500	1.3A min.	1.0A min.
6000	2.0A min.	2.0A min.

Charging Limit Voltage: 14±0.5V/5500rpm

If the limit voltage is not within the specified range, check the regulator/ rectifier.



A.C. Generator Connector

A.C GENERATOR INSPECTION

This test can be made without removing the Staor from the engine. Disconnect the yellow wire from the auto-by starter.

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.

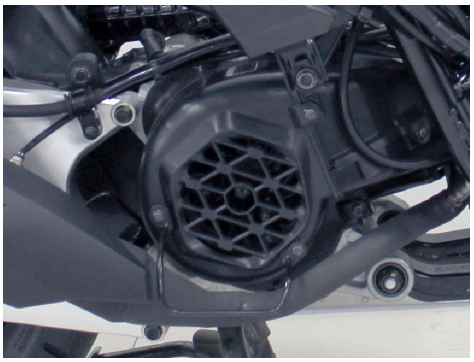
Resistance:

Yellow ~ Yellow	1~2.5Ω

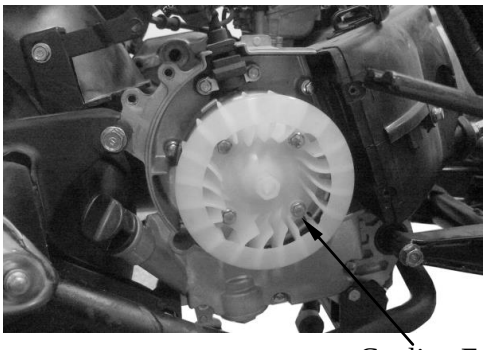
A.C. GENERATOR

REMOVAL

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

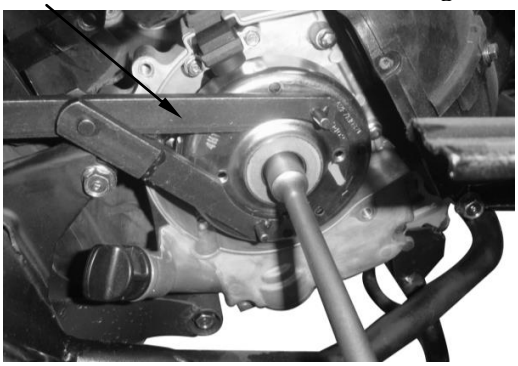


Remove the cooling fan by removing the four cooling fan attaching bolts.



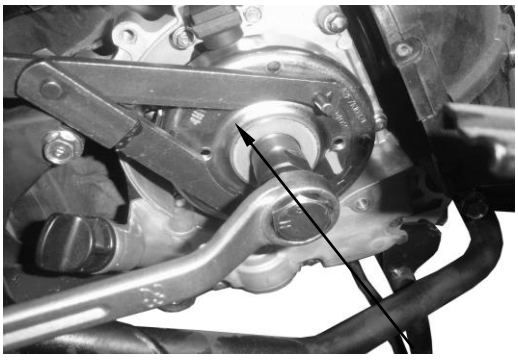
Hold the flywheel with an universal holder.
Remove the flywheel nut.

Special
Universal Holder



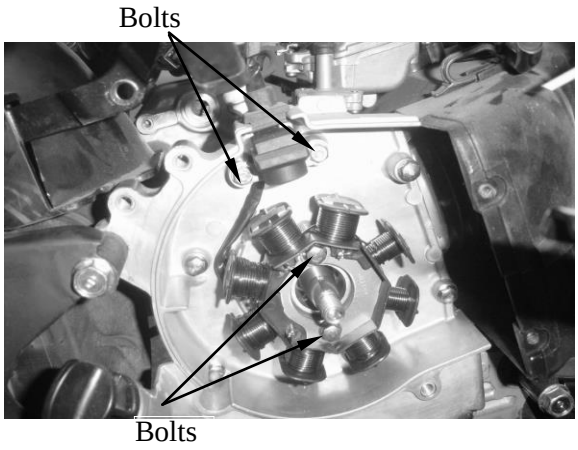
Remove the A.C. generator flywheel using the flywheel puller.
Remove the woodruff key.

Special
Flywheel Puller

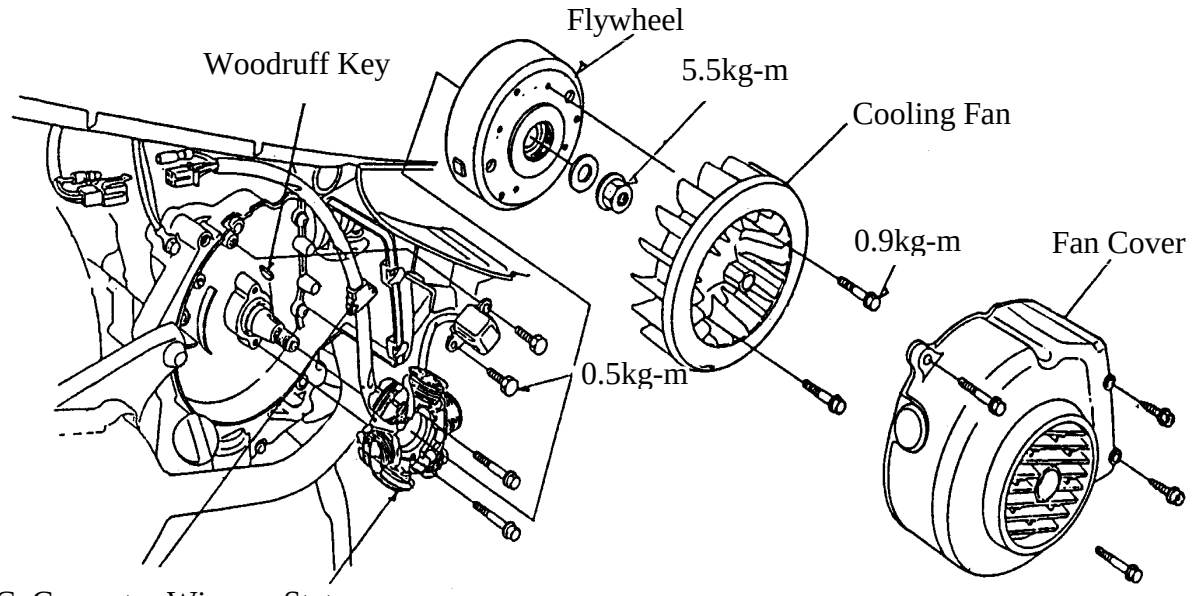


Remove the A.C. generator wire connector.

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.



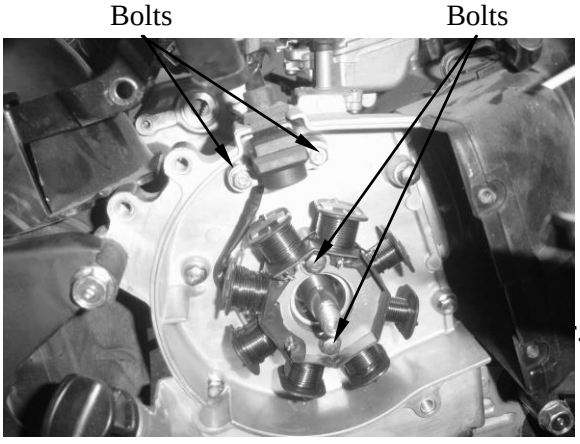
A.C. GNERATOR INSTALLATION



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.



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

A.C. Generator Wire Connector

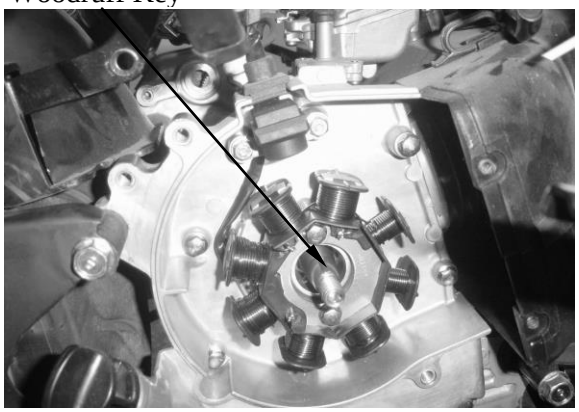
Install the flywheel onto the crankshaft with the flywheel hole aligned with the crankshaft woodruff key.

* 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

Woodruff Key



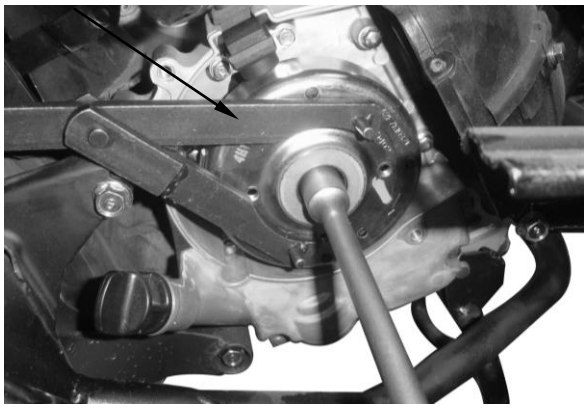
Special

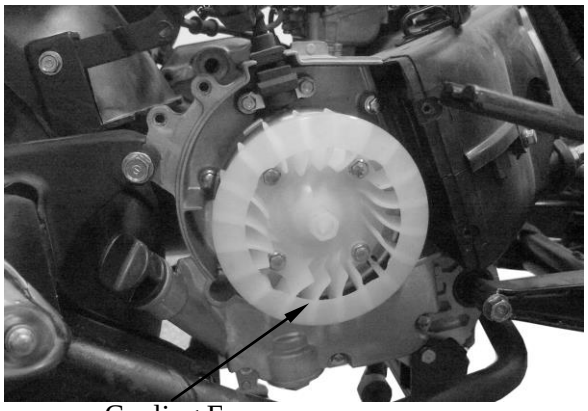
Universal Holder

Install the cooling fan.

Torque: 0.8~1.2kgf-m

Universal Holder





Cooling Fan

14. BATTERY/CHARGING SYSTEM

Install the fan cover.
Install the body cover. (⇨2-4)

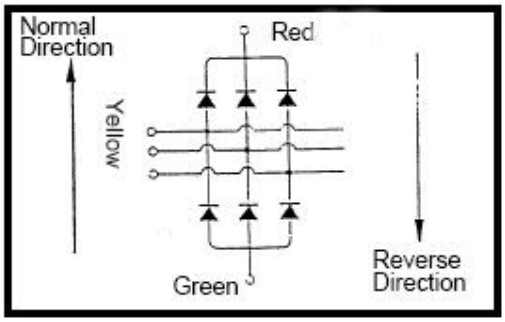
REGULATOR/RECTIFIER INSPECTION

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

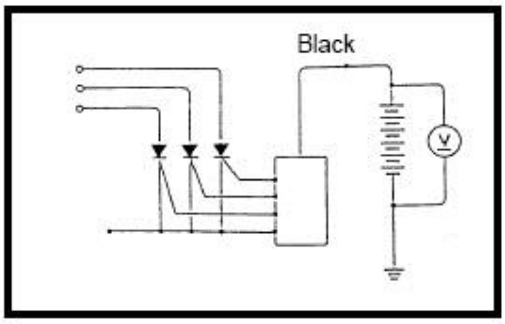
Reverse Direction： No Continuity

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



VOLTAGE REGULATION TEST

Connect a colt meter across the battery terminals.
Start the engine and gradually increase the engine speed to 5500 rpm.
The battery terminal voltage should be within 13.5v~14.5V.



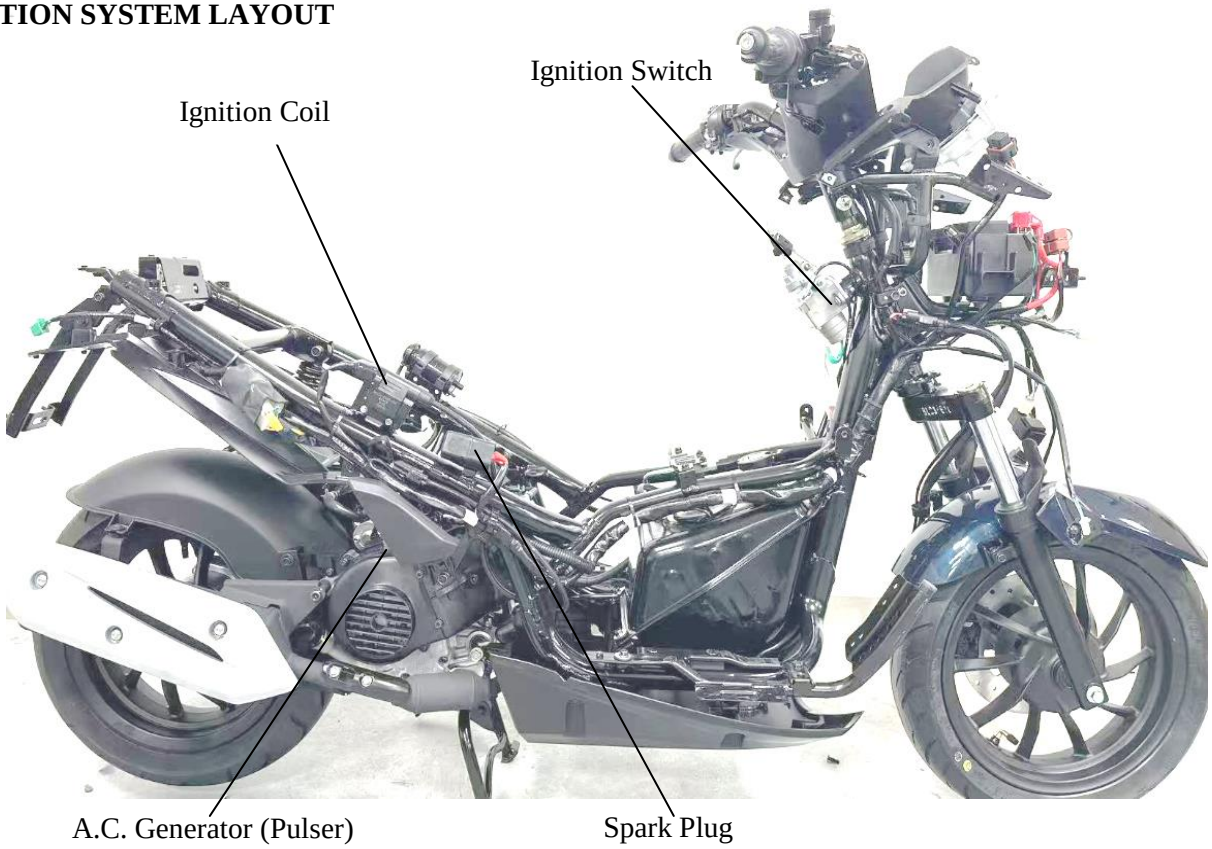
15. IGNITION SYSTEM

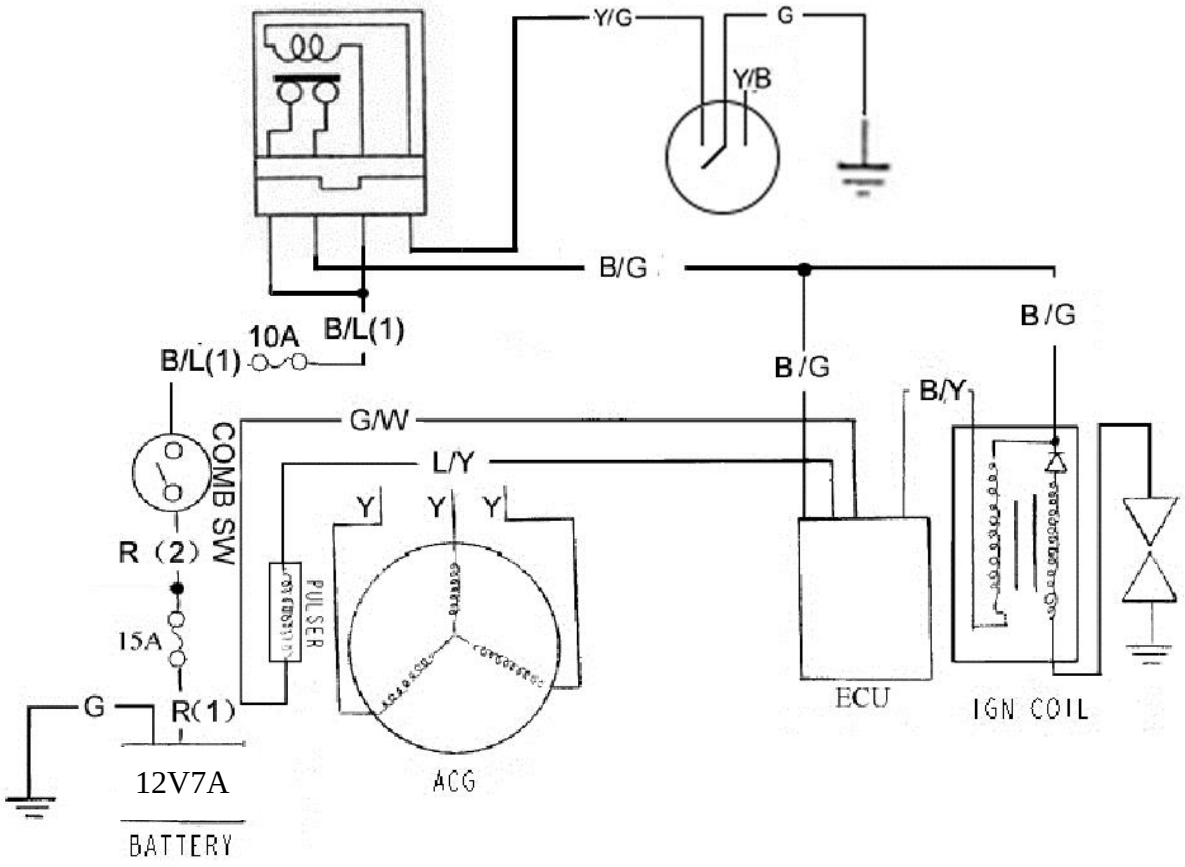
15

IGNITION SYSTEM

15. IGNITION SYSTEM

IGNITION SYSTEM LAYOUT





15. IGNITION SYSTEM

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 CR6HSA
Spark plug gap		0.6 ~ 0.7 mm
Inductive Ignition Coil	Primary coil	0.60~0.66Ω
Throttle Position Sensor Input Volt		5V ±0.1
Fuel Injector		12 ±0.6Ω
Engine Temperature Sensor		11.529 ±10%kΩ(25℃)
Oxygen Sensor (engine warming condition)		15Ω
Crank Position Sensor		96~144Ω

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

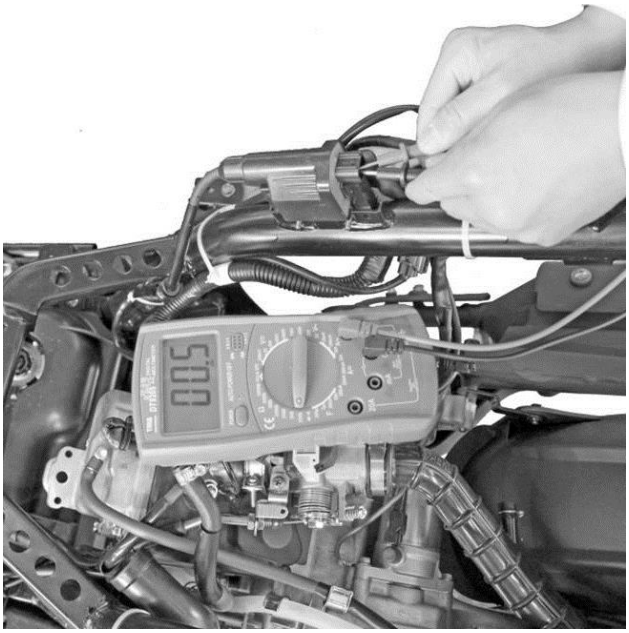
IGNITION COIL INSPECTION

Remove the seat and met-in box.

Remove the ignition coil.

IGNITION COIL CONTINUITY TEST

Inspect the continuity of the ignition coil, primary coil



Measure the ignition coil resistances 0.60~0.66Ω/20℃

15. IGNITION SYSTEM

Crank Position Sensor Coupler.

CRANK POSITION SENSOR INSPECTION

This test is performed with the stator installed in the engine

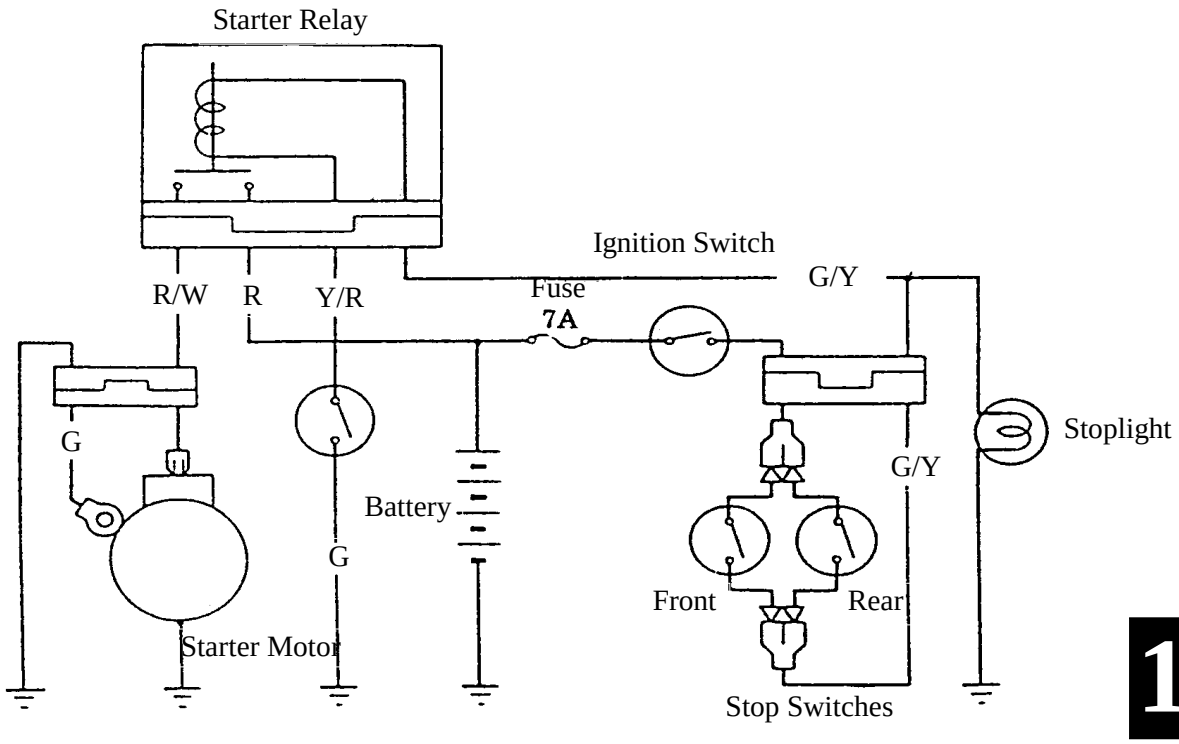
Remove the seat and met-in box.

Disconnect the Crank Position Sensor Wire Coupler.

Measure the resistance between the blue/white and green/white wire terminals.

Blue/Yellow~ Green/White	96Ω-144Ω


Starter Motor
Starter Relay


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

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

16. STARTING SYSTEM

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.

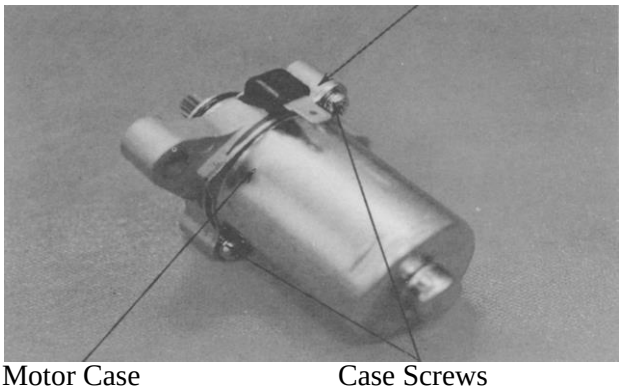
Remove the met-in box.

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.

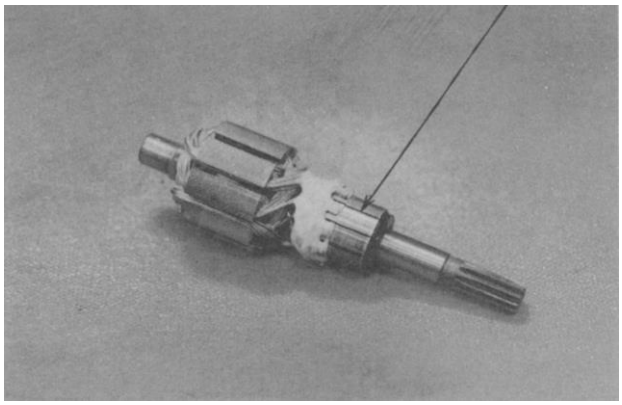
DISASSEMBLY

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

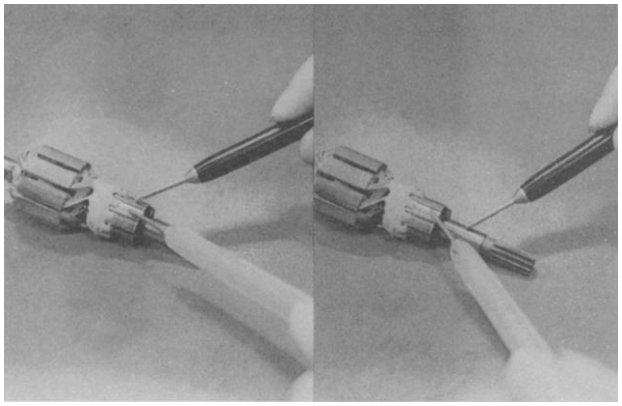


INSPECTION

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

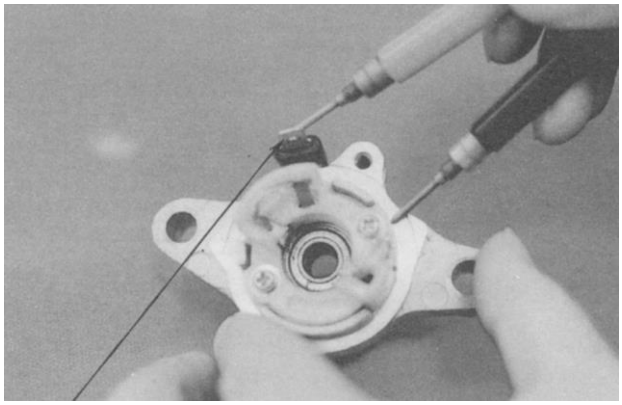


Check for continuity between pairs of the commutator segments and there should be continuity.
Also, make a continuity check between individual commutator segments and the armature shaft. There should be no continuity.



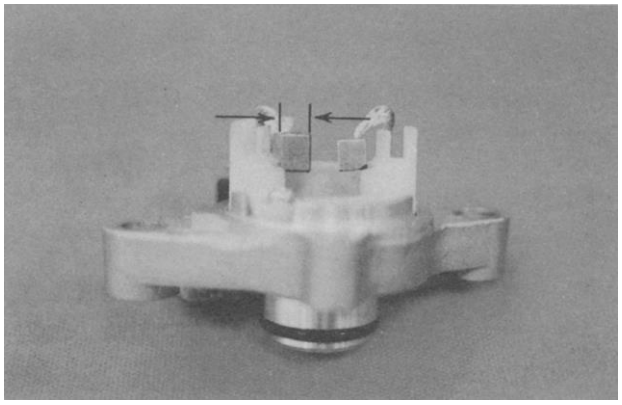
STARTER MOTOR CASE CONTINUITY CHECK

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.

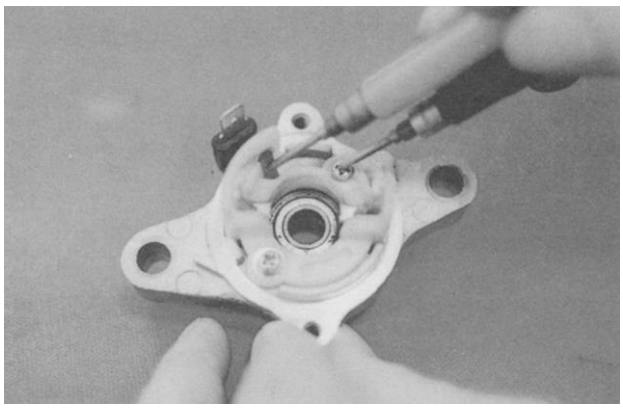


Wire Terminal

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

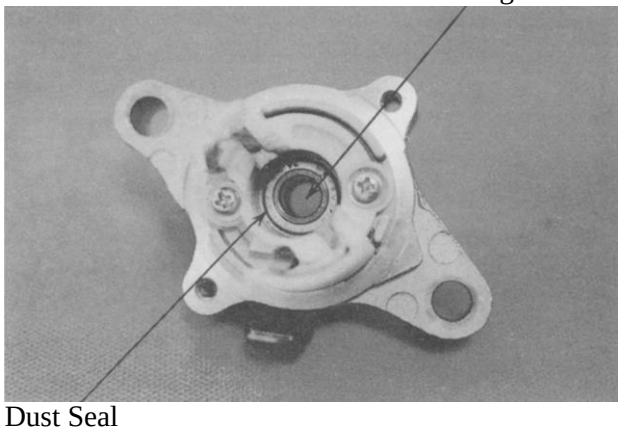


Check for continuity between the brushes. If there is continuity, replace with new ones.



Bearing

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.

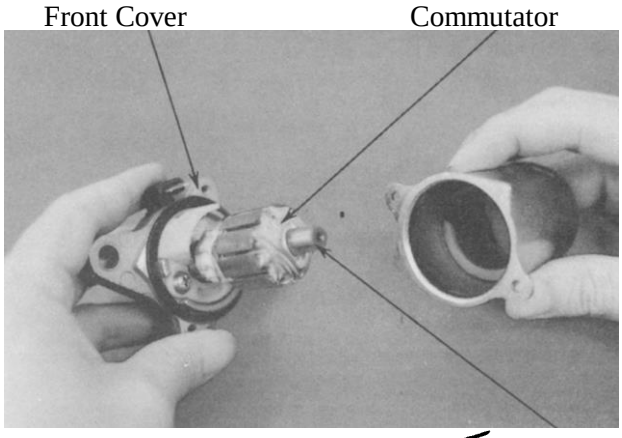


Dust Seal

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.

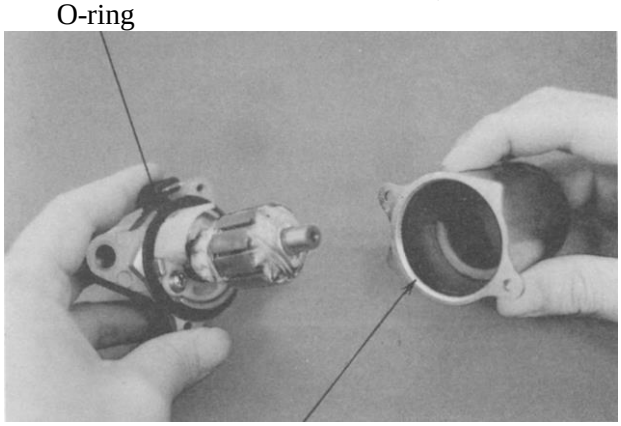
* • Be careful not to damage the brush and armature shaft mating surfaces.
  • When installing the commutator, the armature shaft should not damage the dust seal lip.



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.

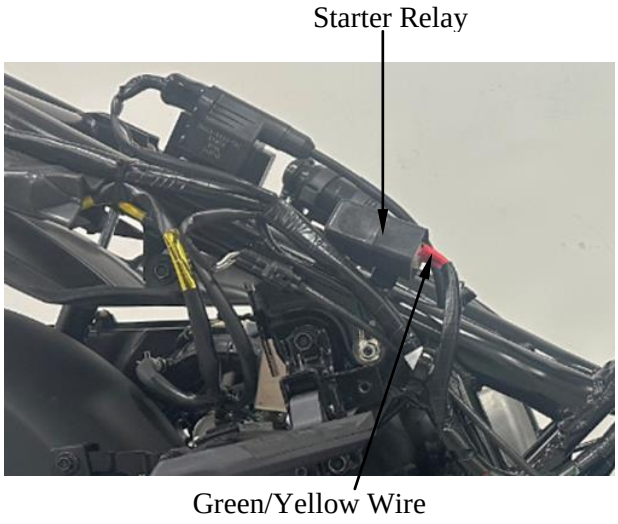


STARTER RELAY

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



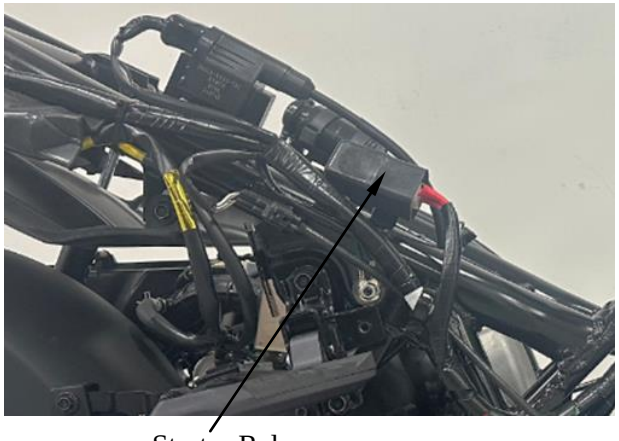
STARTER RELAY VOLTAGE INSPECTION

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.

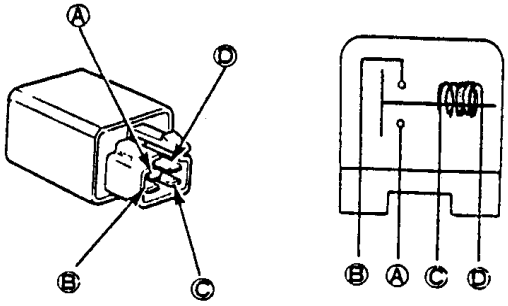
* Turn to the DCV position for the voltage meter, then inspect the starter relay.

STARTER RELAY TEST

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

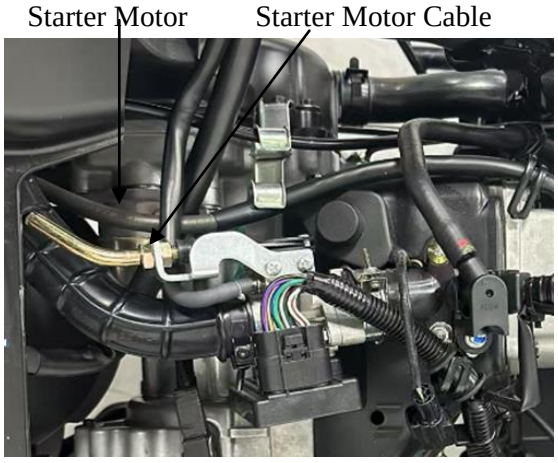


Connect the starter relay (D) terminal to the 12V battery positive (+) terminal and the relay (C) terminal to the battery negative (-) terminal. Check for continuity between the starter relay (A) and (B) terminals. The relay is normal if there is continuity.



STARTER MOTOR 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.



INSTRUMENT/SWITCHES/LIGHTS

17. INSTRUMENT/SWITCHES/LIGHTS

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Wires should be connected to other wires of the same color. Couplers must be connected to other couplers of the same color.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- After installation of each switch, a continuity check must be performed.

TROUBLESHOOTING

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

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

Motor oil indicator light does not come on (when motor oil is insufficient)

- Fuse burned out
- Dead battery
- Faulty ignition switch
- Faulty instrument
- Faulty oil meter

Motor oil indicator light winks

- Loose wire connection
- Broken wire
- Faulty oil meter

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 seat.

Open the fuel tank cover.

Remove the center cover.

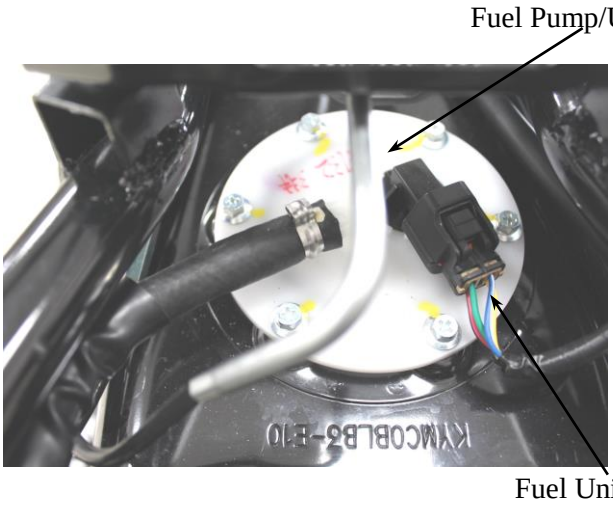
Remove the bracket of the fuel tank cover lock .

Disconnect the fuel Pump/unit wire connectors.

* Do not damage the fuel unit wire.

Remove the fuel pump/Unit.

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



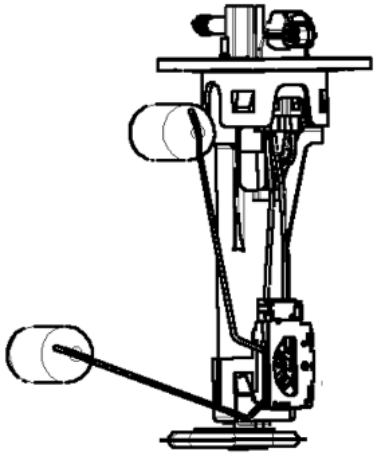
INSPECTION

Remove the fuel unit.

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

RESISTANCES Unit: Ω

Wire Terminals	Upper	Lower
L/W～Y/W	100±3%Ω	1100±3%Ω



FUEL GAUGE INSPECTION

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

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

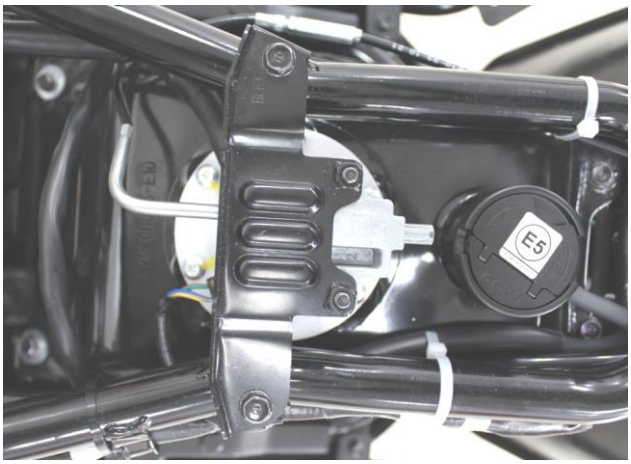
Check the fuel gauge needle for correct indication by moving the fuel unit float up and down.

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

INSTALLATION

The installation sequence is the reverse of removal.

* • Install the fuel unit at the connect position.

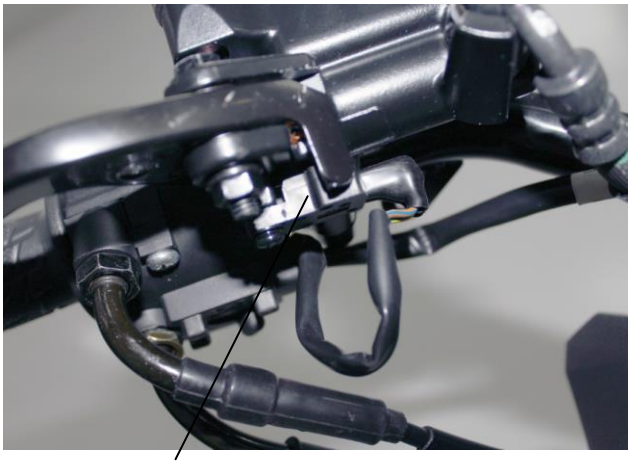


BRAKE LIGHT SWITCH

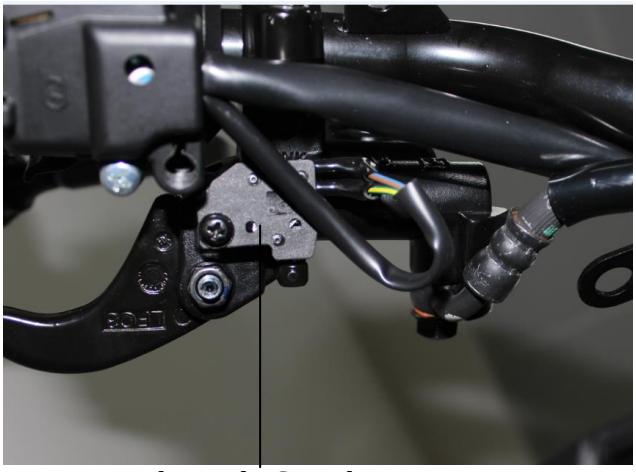
Remove the upper handlebar cover.

Disconnect front or rear brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the front or rear brake lever squeezed, and there should be no continuity with the front or rear brake lever is released.



Front Brake Light Switch



Rear Brake Light Switch

IGNITION SWITCH

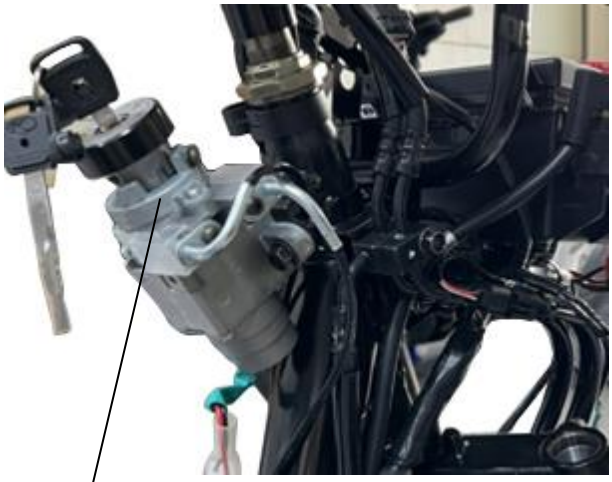
INSPECTION

Remove the front cover.

Disconnect the ignition switch connector and check the ignition switch for continuity at the switch side connector terminals.

Continuity should exist between the color code wires as follows:

	IG	E1.E2	BAT1	BAT2
ON			○—○	○—○
OFF	○—○	○—○		
LOCK	○—○	○—○		
CORD COLOR	B/W	G	R	B



Ignition switch

RIGHT HANDLEBAR SWITCH INSPECTION

Remove the up and down handlebar cover.

Disconnect the left handlebar switch connector and check for continuity at switch side connector terminals.

Continuity should exist between the color code wires as follows:

START SW		
	ST	E
FREE		
PUSH	○—○	○—○
CORD COLOR	Y/R	G

Starter Switch

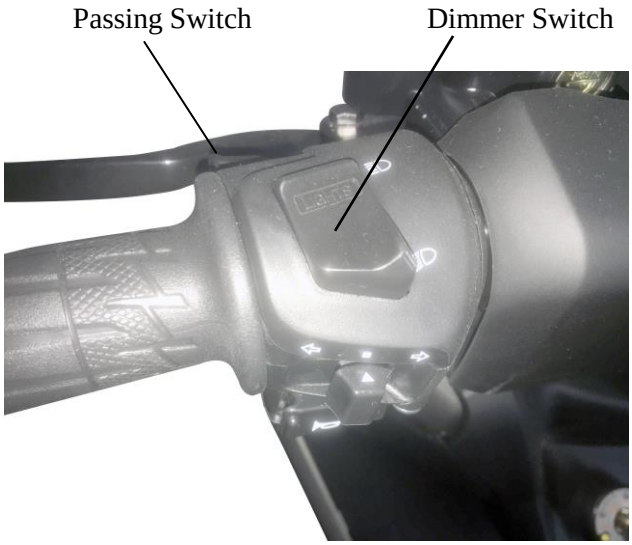
LEFT HANDLEBAR SWITCH

INSPECTION

Remove the up and down handlebar cover.

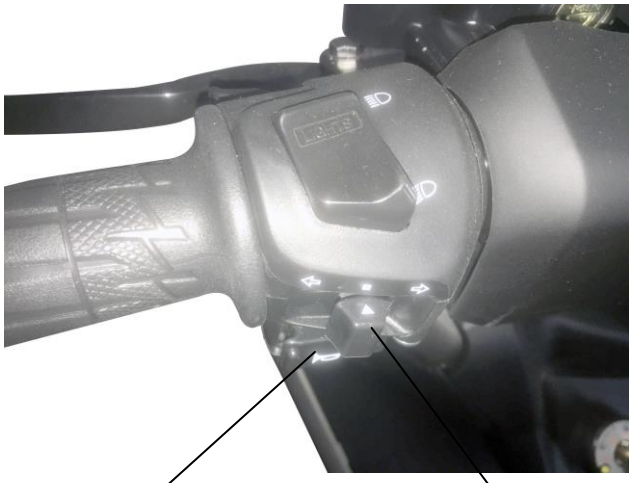
Disconnect the right handlebar switch connector and check for continuity at switch side connector terminals.

Continuity should exist between the color code wires as follows:



DIMMER & PASSING SW				
	HL	LO	HI	PASS
LO	○	○		
(N)	○	○	○	
HI	○		○	
PUSH	○	○	○	○
CORD COLOR	L/W	W	L	B

WINKER SW			
	WR	R	L
L ⇦	○		○
N ■			
R ⇨	○	○	
CORD COLOR	GR	SB	O



HORN SW		
	HO	BAT
FREE		
PUSH	○	○
CORD COLOR	LG	B

17. INSTRUMENT/SWITCHES/LIGHTS

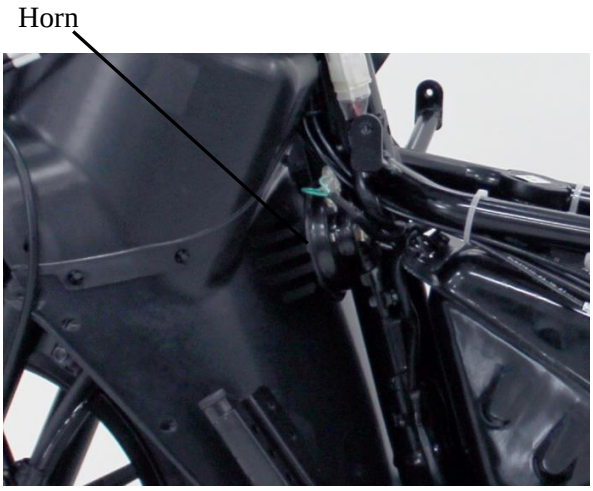
HORN INSPECTION

Remove the front cover .(⇨2-6)
Remove the floorboard. (⇨2-8)
Remove the inner cover. (⇨2-10)

Disconnect the horn wire couplers.

The horn is normal if it sounds when a 12V battery is connected across the horn wire terminals.

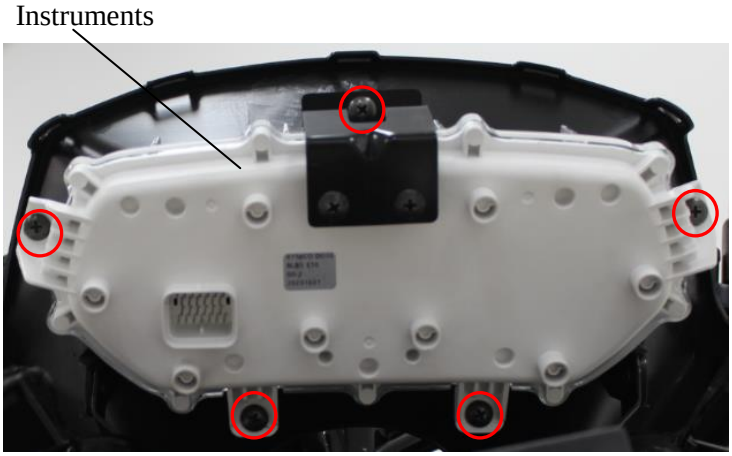
Install a new horn in the reverse order of removal.



INSTRUMENTS

Remove the front cover .(⇨2-6)
Remove the inner cover .(⇨2-8)
Remove meter panel. (⇨2-9)

Remove the five screws.
Remove the Instruments.
Install a new horn in the reverse order of removal.

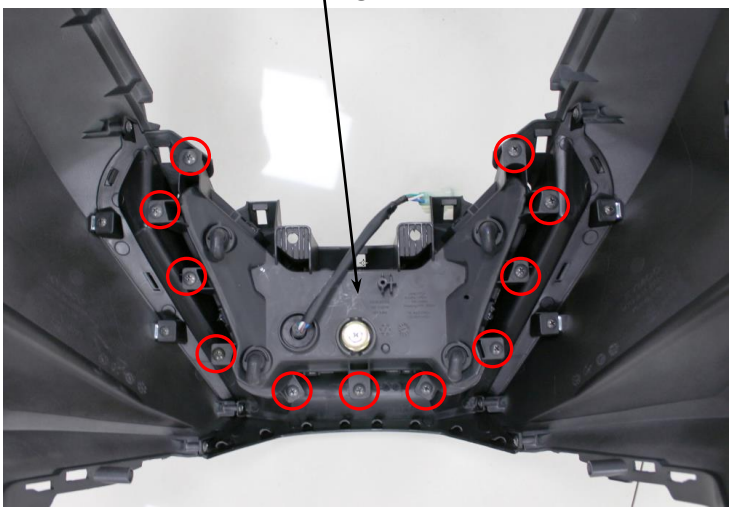


HEADLIGHT/ FRONT TURN SIGNAL LIGHTS
REMOVAL/REPLACEMENT

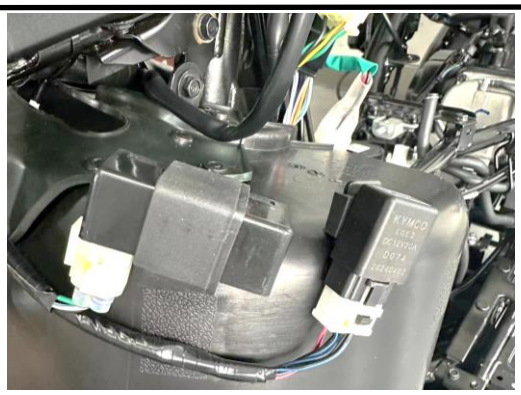
Remove the front center cover (⇨2-3) .
Remove the left and right foot skirt (⇨2-3).
Remove the front cover(⇨2-3).
Remove the 11 screws attaching the front cover.
Remove and replacement the headlight.

* •Headlight set need to be replaced as a set.

The installation sequence is the reverse of removal.



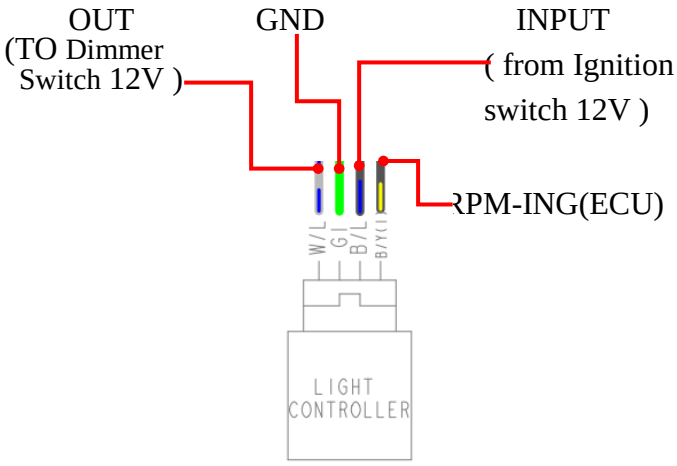
17. INSTRUMENT/SWITCHES/LIGHTS



HEADLIGHT CONTROLLER

The Headlight is come on when the engine starts.
INSPECTION
Turn the ignition switch to “ON”
Connect the multimeter (+) probe to the Brown/Blue 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..

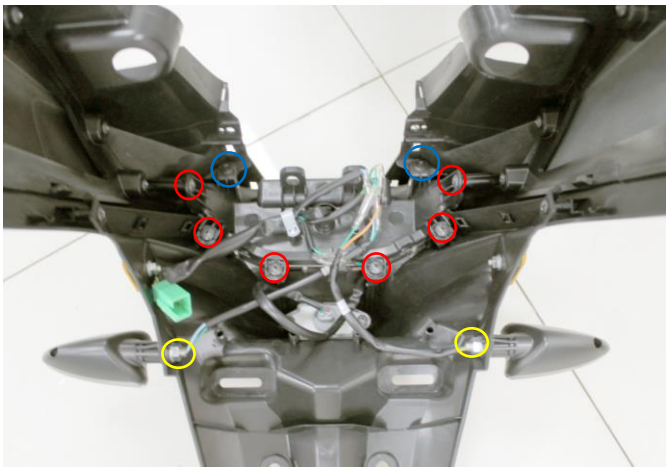


TAILLIGHT/BRAKE LIGHT

Remove the seat and met-in box (⇨2-4) .
Remove the center cover(⇨2-5).
Remove the rear carrier(⇨2-5).
Remove the rear center cover(⇨2-5).
Remove the rear fender(⇨2-5).
Remove the frame body cover(⇨2-6).
Remove the screws(red) and fasteners(blue) attaching the taillight/brake lights.
The installation sequence is the reverse of removal.

REAR TURN SIGNAL LIGHTS

Remove the nuts(yellow) attaching the rear turn signal lights.
Disconnect the rear turn signal lights connector.
Remove the rear turn signal lights.
The installation sequence is the reverse of removal.



SIDE STAND SWITCH

INSPECTION

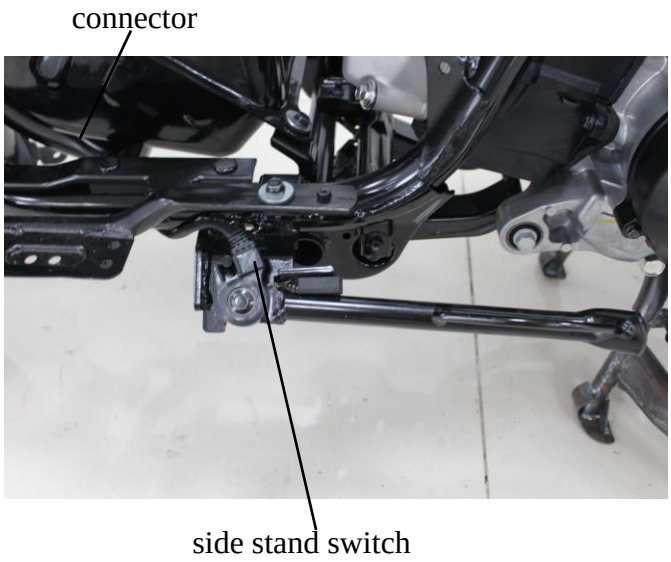
Remove the luggage box.

Side stand switch is located on side stand.

Disconnect the side stand switch connector.

There should be continuity between the Yellow/Green and Green with the side stand is up.

There should be continuity between the Yellow/Black and Green with the side stand is down.

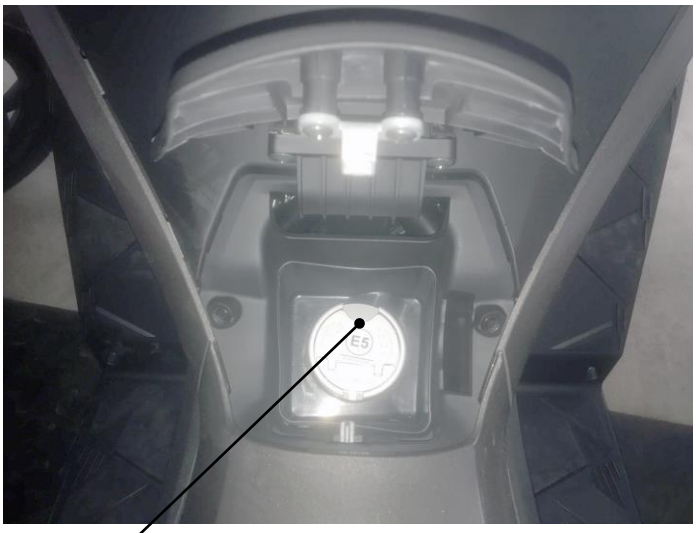


18

EVAPORATIVE EMISSION CONTROL SYSTEM

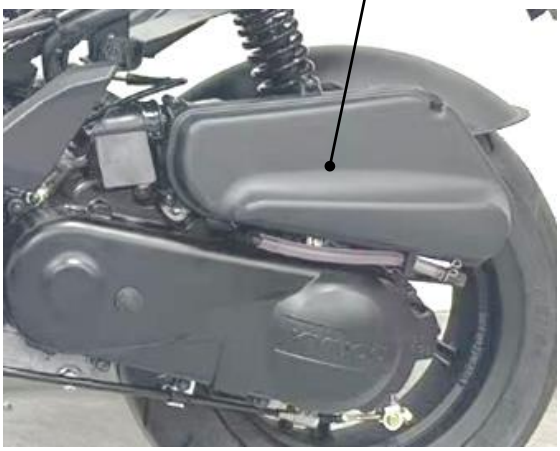
18. EVAPORATIVE EMISSION CONTROL SYSTEM

SCHEMATIC DRAWING



Fuel tank cap

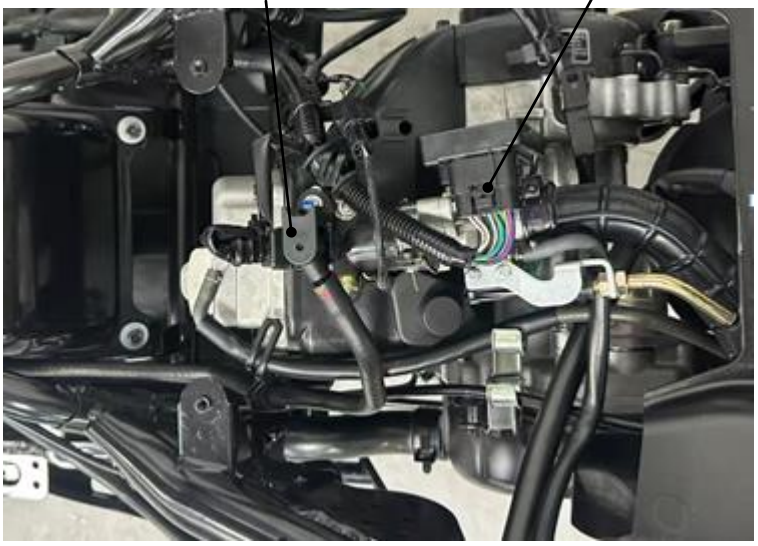
Air Cleaner



Air Cleaner filter

Fuel Injector

Throttle Body



Charcoal Canister/ Purge Control Valve

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.

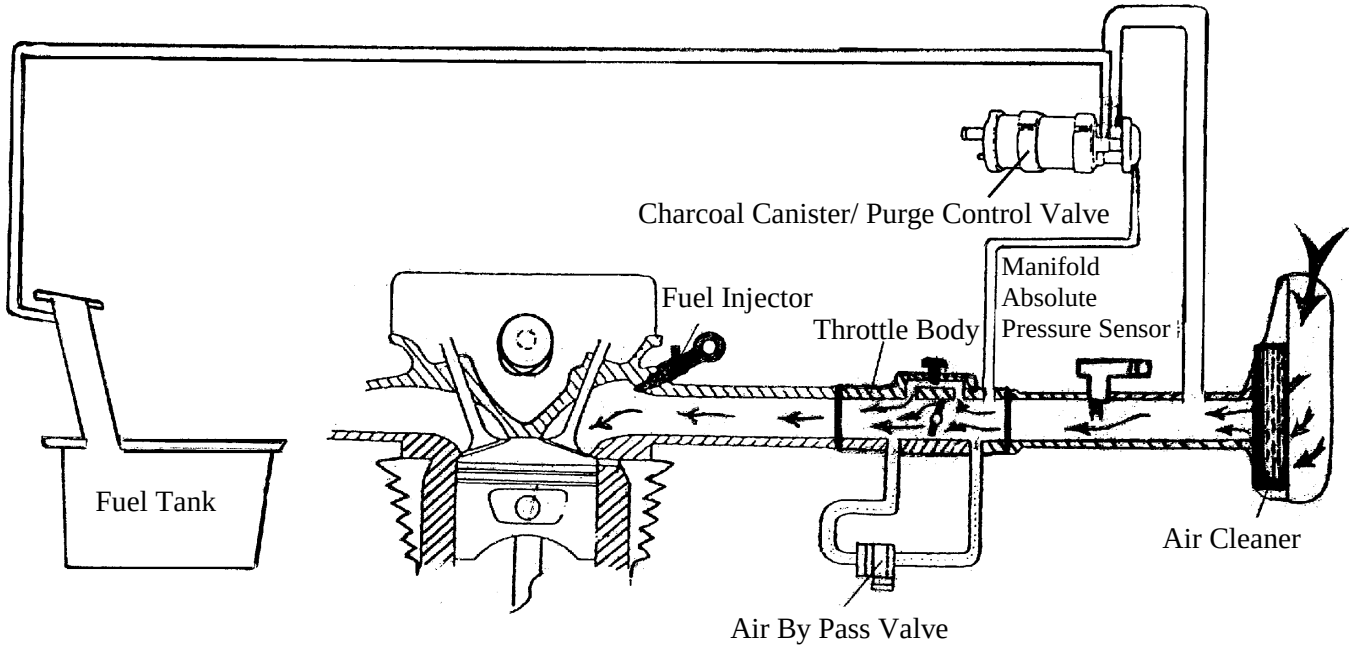
TOOLS

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

SPECIFICATIONS

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

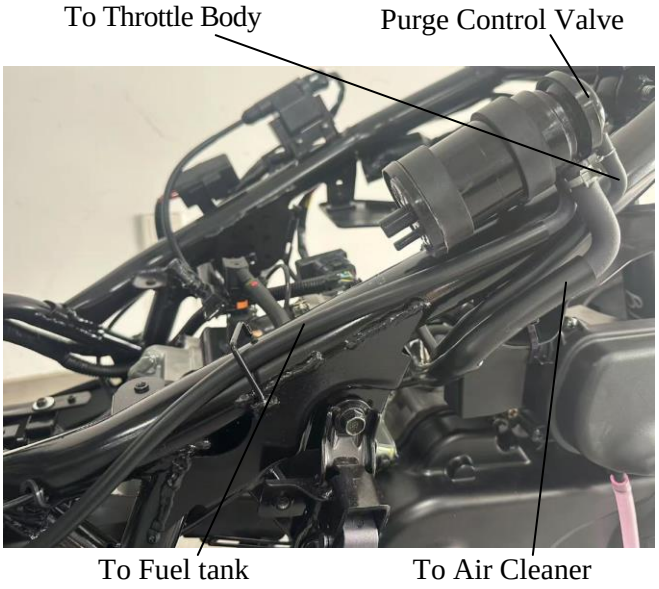
A. LEAKAGE TEST PIPING DIAGRAM



PURGE CONTROL VALVE

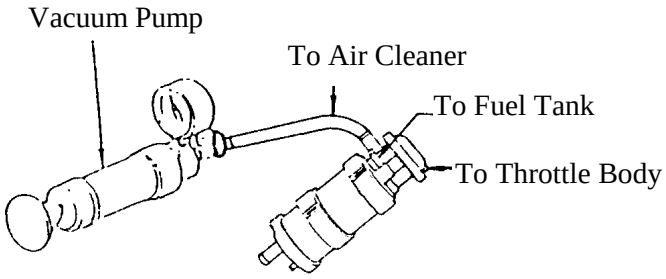
REMOVAL

1. Remove the front 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.

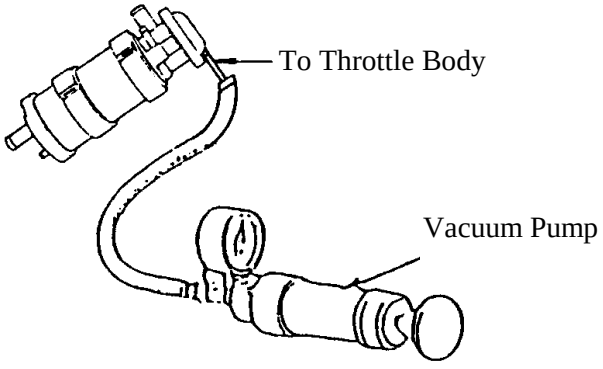


INSPECTION

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.

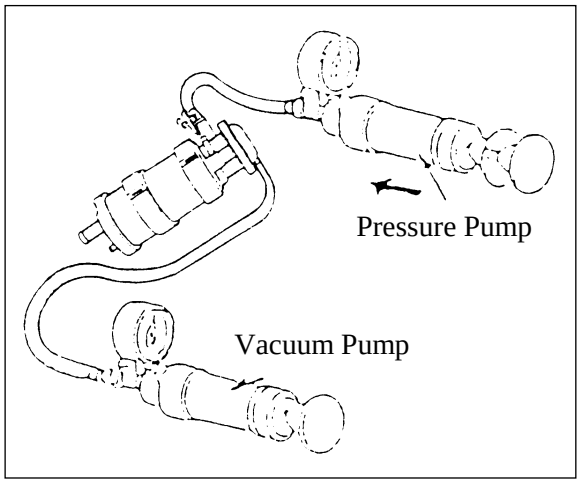


Connect a vacuum pump to the purge control valve tube that goes to the carburetor vacuum tube and apply vacuum pressure of 45mm/Hg. The specified vacuum must be maintained for one minute. Replace the purge control valve with a new one if vacuum is not maintained.



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

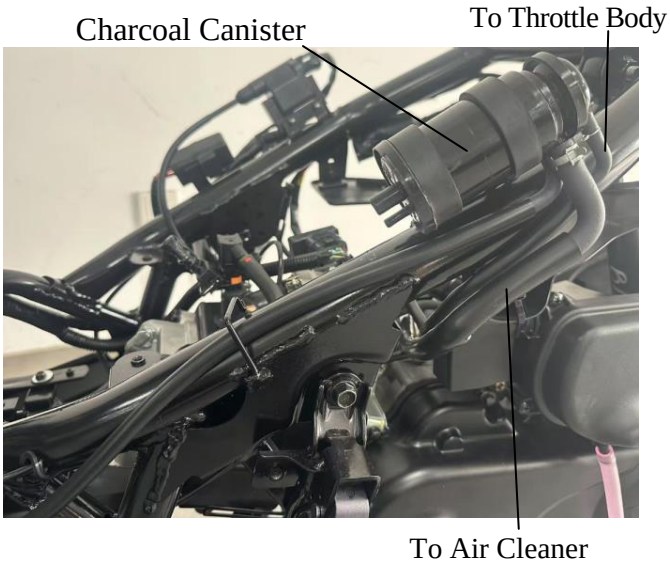
1. Install the purge control valve in the reverse order of removal.
2. Route and reconnect the purge control valve tubes properly and securely.

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

CHARCOAL CANISTER

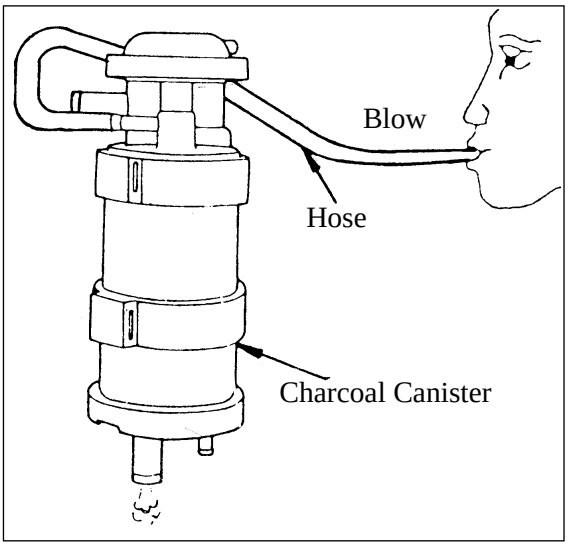
REMOVAL

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.