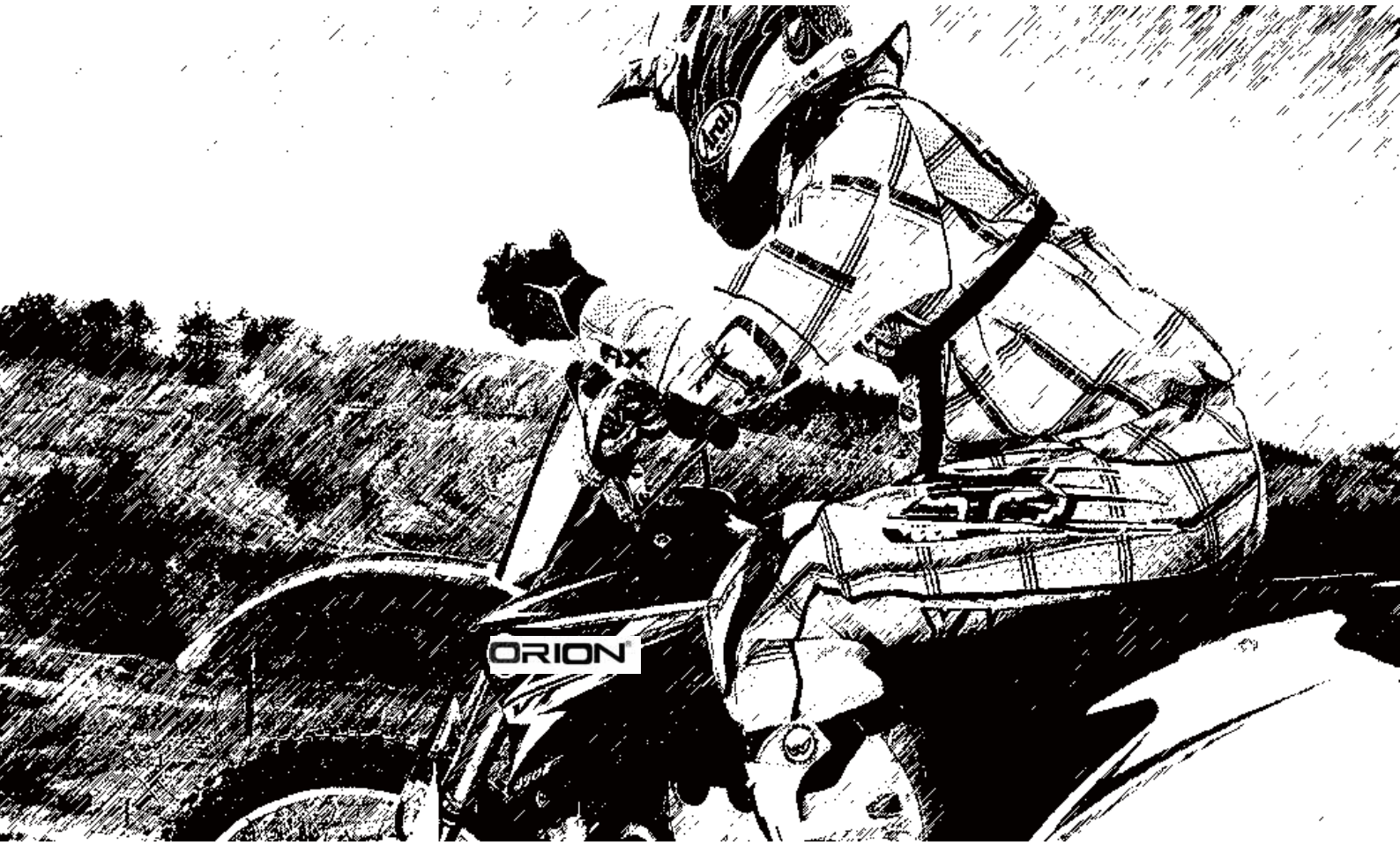
ORION®



SERVICE MANUAL

AGB-21G

ORION®

INTRODUCTION

Congratulations on your purchase of an Apollo AGB-21G.

NOTE:

As improvements are made on this model, some data in this manual may become outdated. If you have any questions, please consult your dealer.

⚠ WARNING

PLEASE READ THIS MANUAL CAREFULLY AND COMPLETELY BEFORE OPERATING THIS MACHINE. DO NOT ATTEMPT TO OPERATE THIS MACHINE UNTIL YOU HAVE ATTAINED A SATISFACTORY KNOWLEDGE OF ITS CONTROLS AND OPERATING FEATURES AND UNTIL YOU HAVE BEEN TRAINED IN SAFE AND PROPER RIDING TECHNIQUES. REGULAR INSPECTIONS AND CAREFUL MAINTENANCE, ALONG WITH GOOD RIDING SKILLS, WILL ENSURE THAT YOU SAFETY ENJOY THE CAPABILITIES AND THE RELIABILITY OF THIS MACHINE.

IMPORTANT NOTICE

THIS MACHINE IS DESIGNED STRICTLY FOR COMPETITION USE, ONLY ON A CLOSED COURSE. It is illegal for this machine to be operated on any public street, road, or highway. Off-road use on public lands may also be illegal. Please check local regulations before riding.

⚠SAFETY INFORMATION

1. **THIS MACHINE IS TO BE OPERATED BY AN EXPERIENCED RIDER ONLY. Do not attempt to operate this machine at maximum power until you are totally familiar with its characteristics.**
2. **THIS MACHINE IS DESIGNED TO BE RIDDEN BY THE OPERATOR ONLY. Do not carry passengers on this machine.**
3. **ALWAYS WEAR PROTECTIVE APPAREL. When operating this machine, always wear an approved helmet with goggles or a face shield. Also wear heavy boots, gloves, and protective clothing. Always wear proper fitting clothing that will not be caught in any of the moving parts or controls of the machine.**
4. **ALWAYS MAINTAIN YOUR MACHINE IN PROPER WORKING ORDER. For safety and reliability, the machine must be properly maintained. Always perform the pre-operation checks indicated in this manual. Correcting a mechanical problem before you ride may prevent an accident.**
5. **GASOLINE IS HIGHLY FLAMMABLE. Always turn off the engine while refueling. Take care to not spill any gasoline on the engine or exhaust system. Never refuel in the vicinity of an open flame, or while smoking.**

6. **GASOLINE CAN CAUSE INJURY.**
   If you should swallow some gasoline, inhale excess gasoline vapors, or allow any gasoline to get into your eyes, contact a doctor immediately. If any gasoline spills onto your skin or clothing, immediately wash skin areas with soap and water, and change your clothes.
7. **ONLY OPERATE THE MACHINE IN AN AREA WITH ADEQUATE VENTILATION.**
   Never start the engine or let it run for any length of time in an enclosed area. Exhaust fumes are poisonous. These fumes contain carbon monoxide, which by itself is odorless and colorless. Carbon monoxide is a dangerous gas which can cause unconsciousness or can be lethal.
8. **PARK THE MACHINE CAREFULLY; TURN OFF THE ENGINE.**
   Always turn off the engine if you are going to leave the machine. Do not park the machine on a slope or soft ground as it may fall over.
9. **THE ENGINE, EXHAUST PIPE, MUFFLER, AND OIL TANK WILL BE VERY HOT AFTER THE ENGINE HAS BEEN RUN.**
   Be careful not to touch them or to allow any clothing item to contact them during inspection or repair.
10. **PROPERLY SECURE THE MACHINE BEFORE TRANSPORTING IT.**
    When transporting the machine in another vehicle, always be sure it is properly secured and in an upright position and that the fuel cock is in the " OFF " position. Otherwise, fuel may leak out of the carburetor or fuel tank.

TO THE NEW OWNER

This manual will provide you with a good basic understanding of features, operation, and basic maintenance and inspection items of this machine. Please read this manual carefully and completely before operating your new machine. If you have any questions regarding the operation or maintenance of your machine, please consult your dealer.

NOTE:
This manual should be considered a permanent part of this machine and should remain with it even if the machine is subsequently sold.

NOTICE

Some data in this manual may become outdated due to improvements made to this model in the future. If there is any question you have regarding this manual or your machine, please consult your dealer.

F.I.M. MACHINE WEIGHTS:

Weights of machines without fuel
The minimum weights for motocross machines are:
for the class 125cc ..... minimum 64 kg

In modifying your machine (e.g., for weight reduction), take note of the above limits of weight.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

⚠
The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING
Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION:
A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

NOTE:
A NOTE provides key information to make procedures easier or clearer.

MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been complied to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.
In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
  Pitting/damage → Replace.

INDEX

GENERAL INFORMATION	1
SPECIFICATIONS	2
REGULAR INSPECTION AND ADJUSTMENTS	3
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ELECTRICAL	6

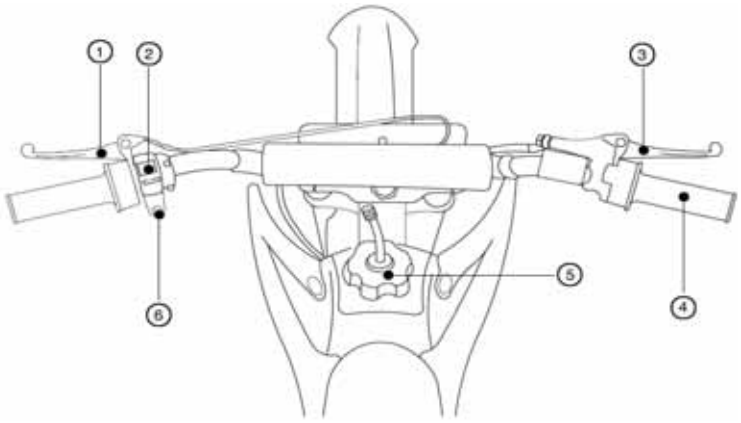
GENERAL INFORMATION

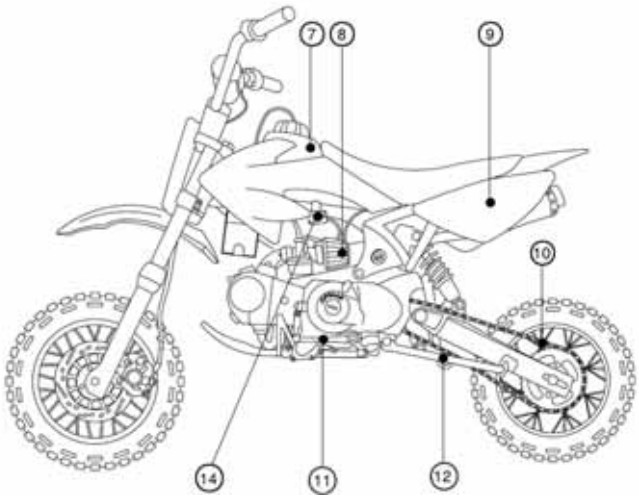
DESCRIPTION

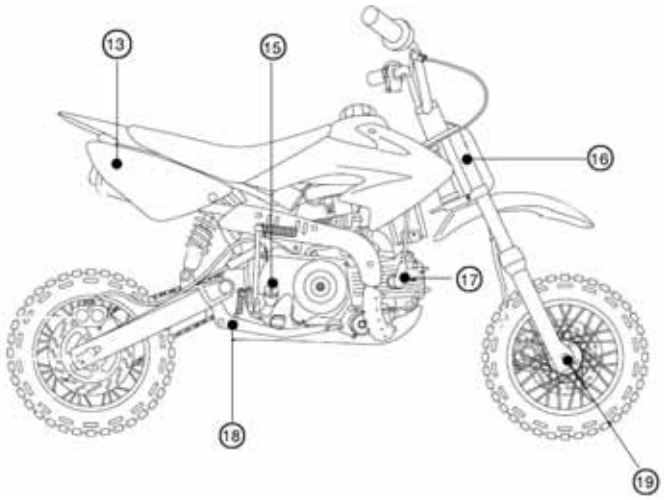
1 Clutch lever
2 Engine stop switch
3 Front brake lever
4 Throttle grip
5 Fuel tank cap
6 Engine start switch
7 Fuel tank
8 Air filter
9 Left side cover
10 Drive chain
11 Shift pedal
12 Side stand
13 Right side cover
14 Fuel cock
15 Kick starter cank
16 Front fork
17 Spark plug
18 Rear brake pedal
19 Front axle

NOTE:

- The machine you have purchased may differ slightly from those shown in the following.
- Designs and specifications are subject to change without notice.



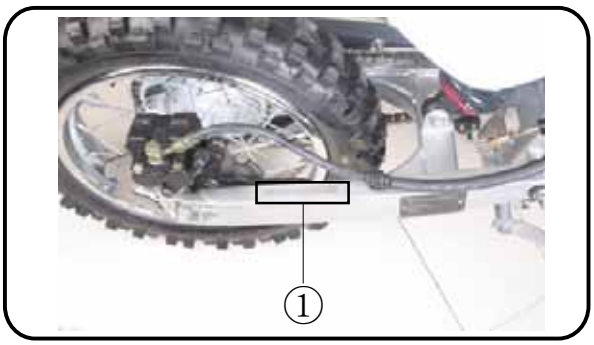




MACHINE IDENTIFICATION

There are two significant reasons for knowing the serial number of your machine:

1. When ordering parts, you can give the number to your dealer for positive identification of the model you own.
2. If your machine is stolen, the authorities will need the number to search for and identify your machine.



VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped on the right of the steering head pipe.

ENGINE SERIAL NUMBER

The engine serial number ② is stamped into the elevated part of the right-side of the engine.

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
   When washing the machine with high pressured water, cover the parts follows.
   - Silencer exhaust port
   - Side cover air intake port

2. Use proper tools and cleaning equipment. Refer to “SPECIAL TOOLS” section.

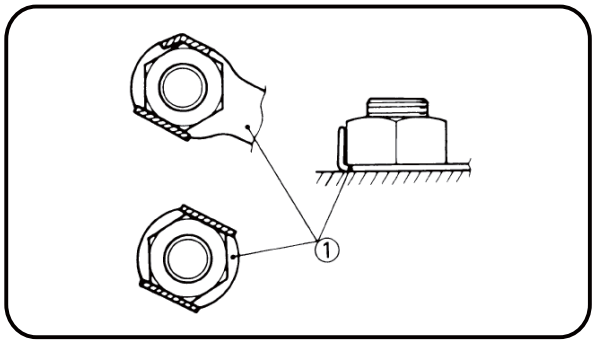
3. When disassembling the machine, keep mated parts together. They include gears, cylinders, pistons, and other mated parts that have been “mated” through normal wear. Mated parts must be reused as an assembly or replaced.

4. During the machine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled.

5. Keep away from fire.

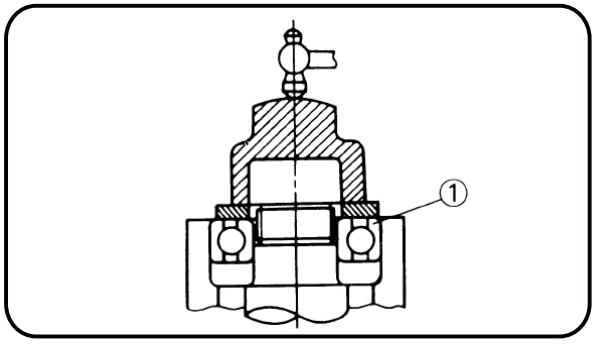
GASKETS, OIL SEALS AND O-RINGS

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



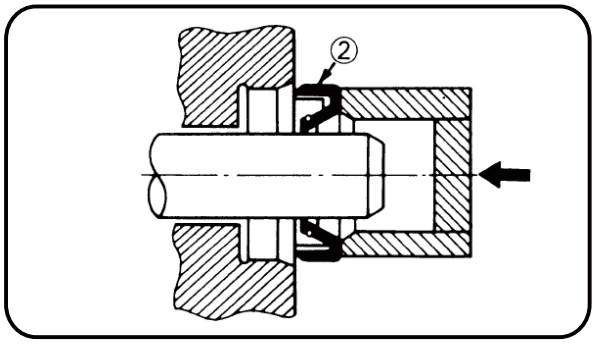
LOCK WASHERS/PLATES AND COTTER PINS

1. All lock washers/plates ① and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



BEARINGS AND OIL SEALS

1. Install the bearing(s) ① and oil seal(s) ② with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of lightweight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

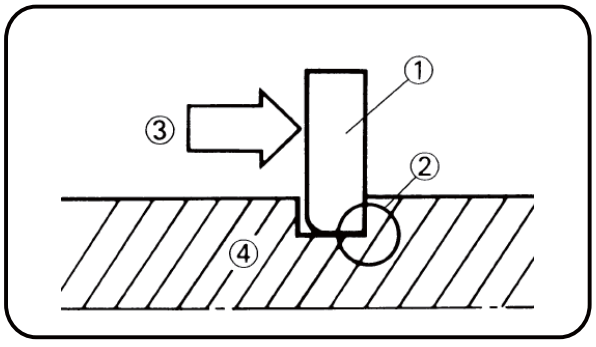


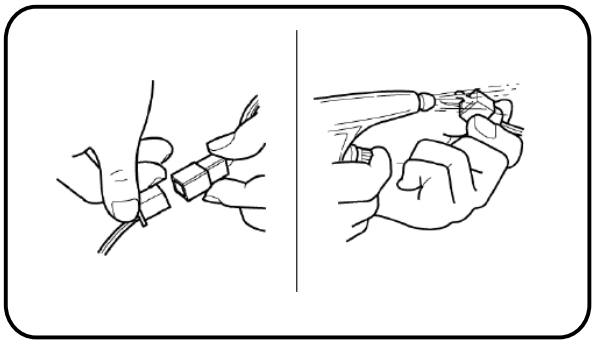
CAUTION:

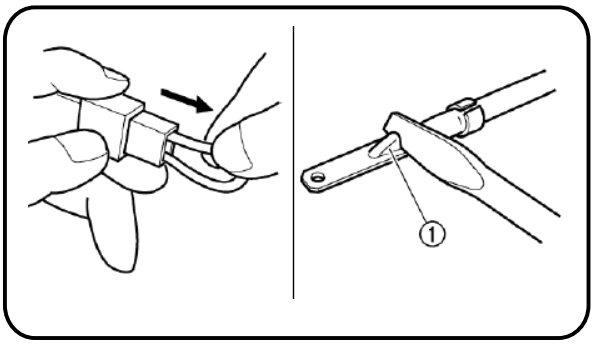
Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.

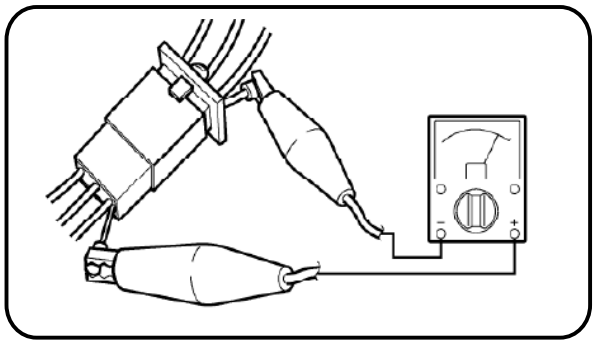
CIRCLIPS

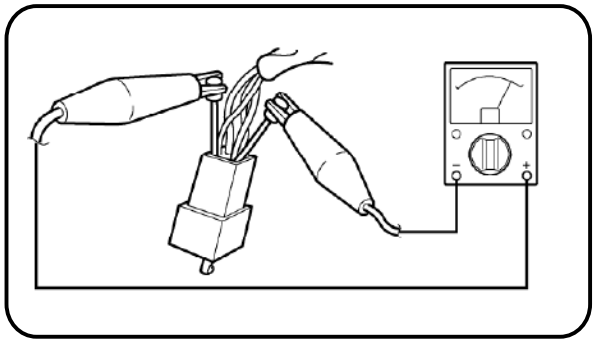
1. All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite to the thrust ③ it receives. See the sectional view.
   ④ Shaft











CHECKING OF CONNECTION

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

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

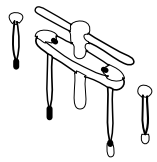
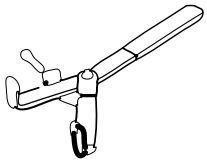
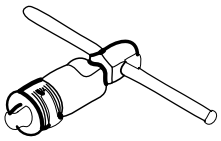
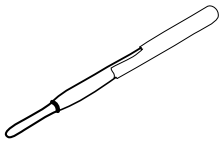
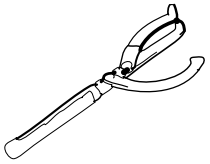
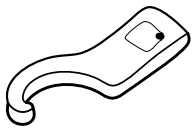
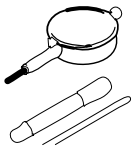
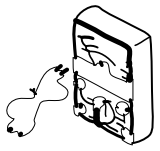
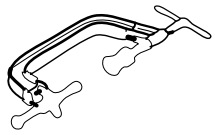
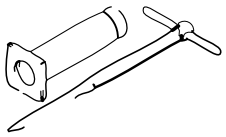
NOTE:
The two connectors “click” together.

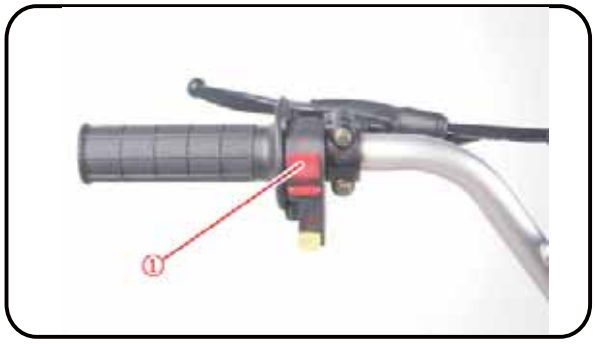
7. Check for continuity with a tester.

NOTE:
- If there in no continuity, clean the terminals.
- Be sure to perform the steps 1 to 7 listed above when checking the wireharness.
- For a field remedy, use a contact revitalizer available on the market.
- Use the tester on the connector as shown.

SPECIAL TOOLS

The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques. The shape and part number used for the special tool differ by country, so two types are provided. Refer to the list provided to avoid errors when placing an order.

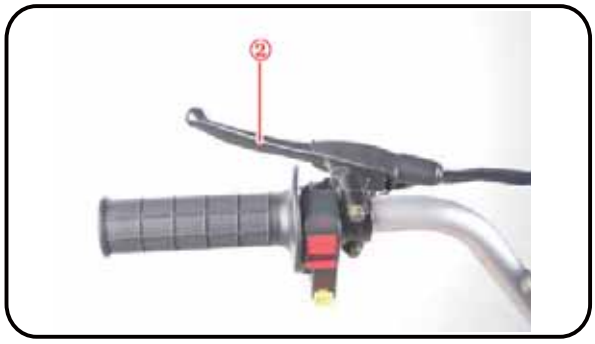
Tool name/How to us	Illustration	Tool name/How to us	Illustration
Crankcase separating tool These tool is used to remove the crankshaft from either case.		Clutch holding tool This tool is used to hold the clutch when removing or installing the clutch boss securing nut.	
Flywheel puller This tool is used to remove the flywheel magneto.		Valve guide remover This tool is needed to remove and install the valve guide.	
Rotor holding tool This tool is used when loosening or tightening the fly-wheel magneto securing nut		Steering nut wrench This tool is used when tighten the steering ring nut to specification.	
Dial gauge and stand Stand These tools are used to check each part for runout or bent.		Pocket tester Use this tool to inspect the coil resistance, output voltage and amperage.	
Crankshaft installing tool/pot/bolt Spacer (crankshaft installer) Adapter (M12) These tools are used to install the crankshaft.		Valve spring compressor This tool is needed to remove and install the valve assemblies.	
Piston pin puller set This tool is used to remove the piston pin.			



CONTROL FUNCTIONS

ENGINE STOP SWITCH

The engine stop switch ① is located on the left handlebar. Continue pushing the engine stop switch till the engine comes to a stop.



CLUTCH LEVER

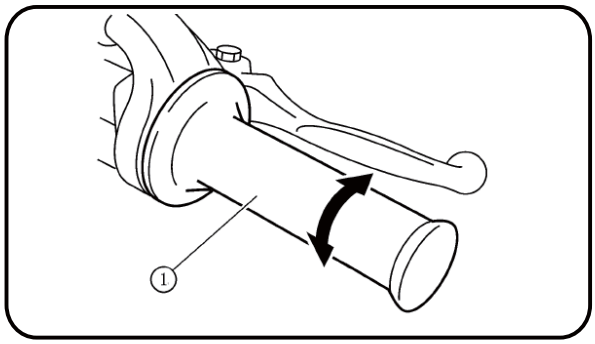
The clutch lever ② is located on the left handlebar; it disengages or engages the clutch. Pull the clutch lever to the handlebar to disengage the clutch, and release the lever to engage the clutch. The lever should be pulled rapidly and released slowly for smooth starts.

SHIFT PEDAL

The gear ratios of the constant-mesh 4 speed transmission are ideally spaced. The gears can be shifted by using the shift pedal ① on the left side of the engine.

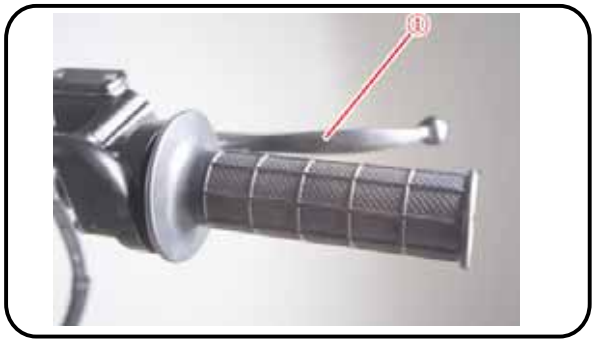
KICKSTARTER CRANK

Rotate the kickstarter crank ① away from the engine. Push the starter down lightly with your foot until the gears engage, then kick smoothly and forcefully to start the engine. This model has a primary kickstarter crank so the engine can be started in any gear if the clutch is disengaged. In normal practices, however, shift to neutral before starting.



THROTTLE GRIP

The throttle grip ① is located on the right handlebar; it accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.

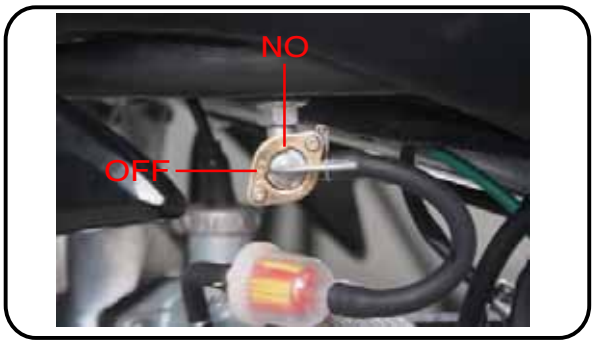


FRONT BRAKE LEVER

The front brake lever ① is located on the right handlebar. Pull it toward the handlebar to activate the front brake.

REAR BRAKE PEDAL

The rear brake pedal ① is located on the right side of the machine. Press down on the brake pedal to activate the rear brake.



FUEL COCK

The fuel cock supplies fuel from the tank to carburetor while filtering the fuel. The fuel cock has the two positions:

OFF: With the lever in this position, fuel will not flow. Always return the lever to this position when the engine is not running.

ON: With the lever in this position, fuel flows to the carburetor. Normal riding is done with the lever in this position

SPARK PLUG WRENCH

This spark plug wrench ① is used to remove and install the spark plug.

NIPPLE WRENCH

This nipple wrench ① is used to tighten the spoke.

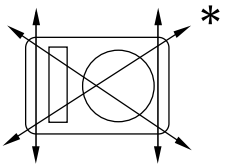
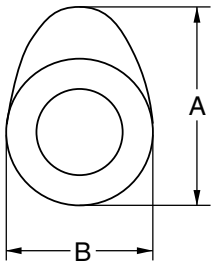
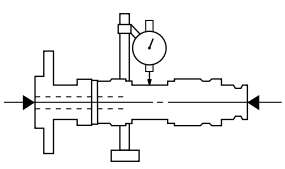
SPECIFICATIONS

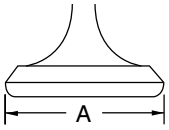
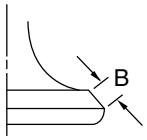
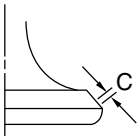
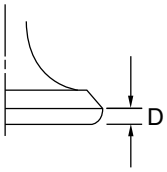
Model name:	21G
Model code number:	AGB-21G
Dimensions:	
Overall length	1,550 mm
Overall width	600 mm
Overall height	830 mm
Seat height	690 mm
Wheelbase	1,105 mm
Minimum ground clearance	260 mm
Basic weight: With oil and full fuel tank	66kg
Engine:	
Engine type	Air cooled 4-stroke
Cylinder arrangement	Single cylinder, forward inclined
Displacement	123.67 cm^3
Bore × stroke	54.0 × 54 mm
Compression ratio	9 : 1
Starting system	Kickstarter and Electrical Starting
Lubrication system:	Dry sump
Oil type or grade:	At 5 ˚C (40 ˚F) or higher SF15W/40 type SG motor oil (Non-Friction modified) At 15 ˚C (60 ˚F) or lower

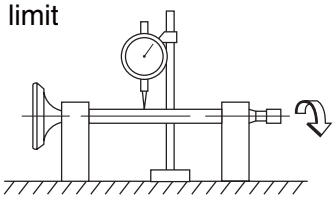
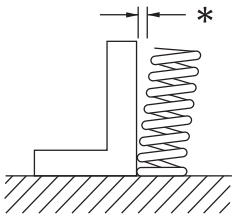
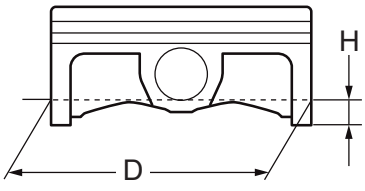
Oil capacity:	
Engine oil	
Periodic oil change	0.8 L
With oil filter replacement	0.85 L
Total amount	0.9 L
Air filter:	Wet type element
Fuel:	
Type	Premium unleaded gasoline only with a research octane number of 90 or higher. Premium gasoline
Tank capacity	3.5 L
Carburetor:	
Type	PZ26-5K
Manufacturer	JINGKE
Spark plug:	
Type/manufacturer	A7RTC/NGK
Gap	0.6 ~ 0.7 mm
Clutch type:	Wet, multiple-disc
Transmission:	
Primary reduction system	Gear
Primary reduction ratio	67/18 (3.772)
Secondary reduction system	Chain drive
Secondary reduction ratio	43/15 (2.867)
Transmission type	Constant mesh, 4-speed
Operation	Left foot operation
Gear ratio: 1st	36/11 (2.818)
2nd	31/16 (1.938)
3rd	27/20 (1.350)
4th	24/23 (1.043)
Chassis:	
Frame type	Semi double cradle
Caster angle	27.3˚
Tire:	
Type	With tube
Size (front)	60/100-14 30M
Size (rear)	80/100-12 41M
Tire pressure (front and rear)	130 kPa (1.3 kgf/cm^2)

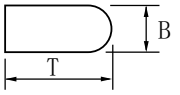
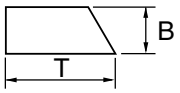
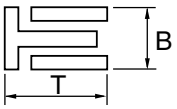
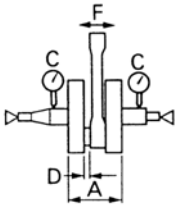
Brake:	
Front brake type	Single disc brake
Operation	Right hand operation
Rear brake type	Single disc brake
Operation	Right foot operation
Suspension:	
Front suspension	Telescopic fork
Rear suspension	Swingarm (link type monocross suspension)
Shock absorber:	
Front shock absorber	Coil spring/oil damper
Rear shock absorber	Coil spring/oil damper
Wheel travel:	
Front wheel travel	200 mm
Rear wheel travel	200 mm
Electrical:	
Ignition system	CDI magneto

ENGINE

Item	Standard	Limit
Cylinder head:		
Warp limit	----	0.03 mm
		
Cylinder:		
Bore size	54.00 ~ 54.015 mm	----
Out of round limit	----	0.05 mm
Camshaft:		
Drive method	Chain drive (Left)	----
Camshaft cap inside diameter	32.009 ~ 32.034 mm	----
Camshaft outside diameter	31.963 ~ 31.979 mm	----
Shaft-to-cap clearance	0.030 ~ 0.071 mm	
Cam dimensions		
		
Intake “A”	26.555 ~ 26.675 mm	26.30 mm
“B”	20.99 ~ 21.01 mm	20.95 mm
Exhaust “A”	26.316 ~ 26.436 mm	26.00 mm
“B”	20.99 ~ 21.01 mm	20.95 mm
Camshaft runout limit	----	0.03 mm
		

Item		Standard	Limit
Timing chain:			
Timing chain type / No. of links		90T/90	----
Timing chain adjustment method		Automatic	----
Valve, valve seat, valve guide:			
Valve clearance (cold)	IN	0.02 ~ 0.04 mm	----
	EX	0.02 ~ 0.04 mm	----
Valve dimensions:			
 Head Diameter	 Face Width	 Seat Width	 Margin Thickness
"A" head diameter	IN	26.9 ~ 27.1 mm	----
	EX	22.9 ~ 23.1 mm	----
"B" face width	IN	1.1~1.5 mm	----
	EX	1.1~1.5 mm	----
"C" seat width	IN	0.9 ~ 1.1 mm	1.6 mm
	EX	0.8 ~ 1.0 mm	1.6 mm
"D" margin thickness	IN	0.65~0.95 mm	----
	EX	0.65~0.95 mm	----
Stem outside diameter	IN	4.97~4.985 mm	4.94 mm
	EX	4.955 ~ 4.97 mm	4.925 mm
Guide inside diameter	IN	5.000 ~ 5.012 mm	5.050 mm
	EX	5.500 ~ 5.512 mm	5.550 mm
Stem-to-guide clearance	IN	0.015 ~ 0.042 mm	0.08 mm
	EX	0.030 ~ 0.057 mm	0.10 mm

Item		Standard	Limit
Stem runout limit		----	0.03 mm
			
Valve seat width	IN	0.8 ~ 1.2 mm	1.6 mm
	EX	0.8 ~ 1.2 mm	1.6 mm
Valve spring:			
Free length	IN	33.78 mm	32.5 mm
	EX	35.55 mm	34.0 mm
Set length (valve closed)	IN	22.45 mm	----
	EX	25.45 mm	----
Compressed force (installed)	IN	52 ~ 64 N at 22.45 mm	----
	EX	105 ~ 129 N at 25.45 mm	----
Tilt limit *	IN	----	1.3˚/ 0.8 mm
	EX	----	1.35˚/0.8mm
			
Direction of winding (top view)	IN	Clockwise	----
	EX	Clockwise	----
Piston:			
Piston to cylinder clearance		0.025 ~ 0.05 mm	0.1 mm
Piston size “D”		53.965 ~ 53.975 mm	----
			
Measuring point “H”		10 mm	----
Piston off-set		0.4 mm /IN-side	----

Item	Standard	Limit
Piston pin bore inside diameter	14.002 ~ 14.013 mm	14.04 mm
Piston pin outside diameter	13.994 ~ 14.000 mm	13.98 mm
Piston rings:		
Top ring: 		
Type	Barrel	----
Dimensions (B × T)	0.98 × 2.00mm	----
End gap (installed)	0.10 ~ 0.25 mm	0.60 mm
Side clearance (installed)	0.040 ~ 0.080 mm	0.12 mm
2nd ring: 		
Type	Taper	----
Dimensions (B × T)	0.98 × 2.20 mm	----
End gap (installed)	0.15 ~ 0.30 mm	0.60 mm
Side clearance	0.040 ~ 0.080 mm	0.12 mm
Oil ring: 		
Dimensions (B × T)	1.92 × 2.45 mm	----
End gap (installed)	0.20 ~ 0.50 mm	----
Crankshaft:		
Crank width “A” 	40.15~ 40.20 mm	----
Runout limit “C”	0.03 mm	0.05 mm
Big end side clearance “D”	0.15 ~ 0.35mm	0.60 mm
Small end free play “F”	0.4 ~ 1.0 mm	2.0 mm

Item		Standard	Limit
Clutch:			
Friction plate thickness		2.85~2.95 mm	2.7 mm
Quantity		3	----
Clutch plate thickness		1.4 ~ 1.6 mm	----
Quantity		3	----
Warp limit		----	0.1 mm
Clutch spring free length		20.5 mm	19.5 mm
Quantity		4	----

Clutch release method		Inner push, cam push	----
Shifter:			
Shifter type		Cam drum and guide bar	----
Guide bar bending limit		----	0.05 mm
Kickstarter:			
Type		Kick and ratchet type	----
Carburetor:			
Type/manufacturer		PZ26-5K / JINGKE	
I. D. mark		JK	----
Main jet	(M.J)	85#	----
Main air jet	(M.A.J)	ø1.0	----
Jet needle	(J.N)	26-5	----
Idle jet	(I.J)	38#	----
Float needle valve size	(F.N.A)	ø2.0	----
Float weight	(F.W)	8 g	----
Float height	(F.H)	2.0 ~ 3.0 mm	----
Air throttle	(A.T)	B6L	----

REGULAR INSPECTION AND ADJUSTMENTS

MAINTENANCE INTERVALS

The following schedule is intended as a general guide to maintenance and lubrication. Bear in mind that such factors as weather, terrain, geographical location, and individual usage will alter the required maintenance and lubrication intervals. If you are a doubt as to what intervals to follow in maintaining and lubricating your machine, consult your dealer.

Item	After break-in	Every race	Every third (or 500 km)	Every fifth (or 1,000 km)	As required	Remarks
ENGINE OIL Replace Inspect	● 	 ●	 	● 	 ●	
OIL FILTER ELEMENT, OIL STRAINER Clean	 	 	 	● 	 	
VALVES Check the valve clearances Inspect Replace	● 	 	● 	 ● 	 ●	The engine must be cold. Check the valve seats and valve stems for wear.
VALVE SPRINGS Inspect Replace	 	 	 	● 	 ●	Check the free length and the tilt.
VALVE LIFTERS Inspect Replace	 	 	 	● 	 ●	Check for scratches and wear.
CAMSHAFTS Inspect Replace	 	 	 	● 	 ●	Inspect the camshaft surface. Inspect the decompression system.
TIMING CHAIN SPROCKETS, TIMING CHAIN Inspect Replace	 	 	 	 ● 	 ●	Check for wear on the teeth and for damage.
PISTON Inspect Clean Replace	 	 	 	● 	● ● ●	Inspect crack Inspect carbon deposits and eliminate them.
PISTON RING Inspect Replace	 	 	 	● ●	 ●	Check ring end gap
PISTON PIN Inspect Replace	 	 	 	● 	 ●	
CYLINDER HEAD Inspect and clean	 	 	 	 ●	 	Inspect carbon deposits and eliminate them. Change gasket
CYLINDER Inspect and clean Replace	 	 	 	● 	 ●	Inspect score marks Inspect wear
CLUTCH Inspect and adjust Replace	● 	● 	 	 	 ●	Inspect housing, friction plate, clutch plate and spring
TRANSMISSION Inspect Replace bearing	 	 	 	 	● ●	

Item	After break-in	Every race	Every third (or 500 km)	Every fifth (or 1,000 km)	As required	Remarks
SHIFT FORK, SHIFT CAM, GUIDE BAR Inspect					●	Inspect wear
ROTOR NUT Retighten	●			●		
EXHAUST PIPE, SILENCER, PROTECTOR Inspect and retighten Clean Replace	●	●		● ●	●	* Whichever comes first
CRANK Inspect and clean				●	●	
CARBURETOR Inspect, adjust and clean	●	●				When using a high-pressure washer, make sure that water does not enter the accelerator pump.
SPARK PLUG Inspect and clean Replace	●		●		●	
DRIVE CHAIN Lubricate, slack, alignment Replace	●	●			●	Use chain lube Chain slack: 30 ~ 40 mm
OUTSIDE NUTS AND BOLTS Retighten	●	●				Refer to “STARTING AND BREAK-IN” section in the CHAPTER 1.
AIR FILTER Clean and lubricate Replace	●	●			●	Use foam air-filter oil or equivalent oil
OIL FILTER Replace	●			●		
OIL STRAINER (frame) Clean				●		
FRAME Clean and inspect	●	●				
FUEL TANK, COCK Clean and inspect	●		●			
BRAKES Adjust lever position and pedal height Lubricate pivot point Check brake disc surface Check fluid level and leakage Retighten brake disc bolts, caliper bolts, master cylinder bolts and union bolts Replace pads Replace brake fluid	● ● ● ● ●	● ● ● ● ●			● ●	Every one year

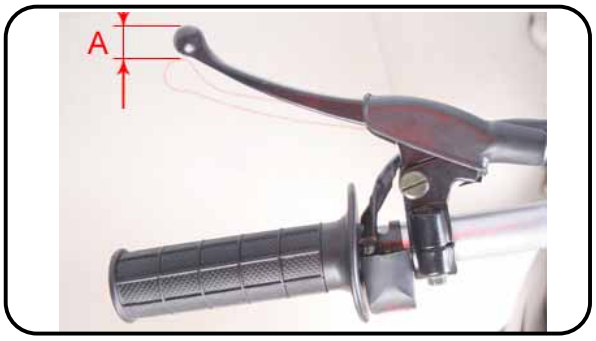
Item	After break-in	Every race	Every third (or 500 km)	Every fifth (or 1,000 km)	As required	Remarks
FRONT FORKS						
Inspect and adjust	●	●				
Replace oil	●			●		
Replace oil seal					●	
FRONT FORK OIL SEAL AND DUST SEAL						
Clean and lube	●	●				Lithium base grease
REAR SHOCK ABSORBER						
Inspect and adjust	●	●			(After rain ride)	
Lube			●		●	Molybdenum disulfide grease
Retighten	●	●				
DRIVE CHAIN GUIDE AND ROLLERS						
Inspect	●	●				
SWINGARM						Molybdenum disulfide grease
Inspect, lube and retighten	●	●				
RELAY ARM, CONNECTING ROD						Molybdenum disulfide grease
Inspect, lube and retighten	●	●				
STEERING HEAD						
Inspect free play and retighten	●	●				
Clean and lube				●		Lithium base grease
Replace bearing					●	
TIRE, WHEELS						
Inspect air pressure, wheel run-out, tire wear and spoke looseness	●	●				
Retighten sprocket bolt	●	●				
Inspect bearings			●			
Replace bearings					●	
Lubricate			●			Lithium base grease
THROTTLE, CONTROL CABLE						
Check routing and connection	●	●				SAE 10W-30 motor oil
Lubricate	●	●				Inspect dirt and wear on the throttle cable on the carburetor side.
Inspect and clean (throttle cable)	●	●				

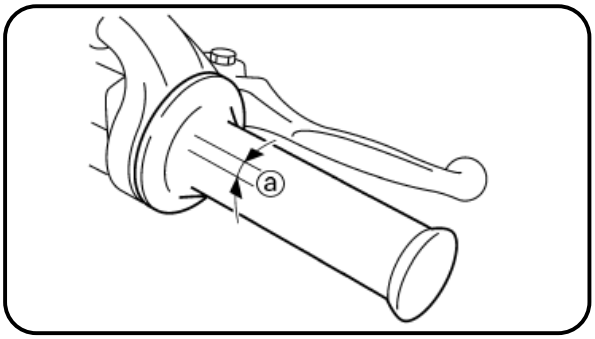
PRE-OPERATION INSPECTION AND MAINTENANCE

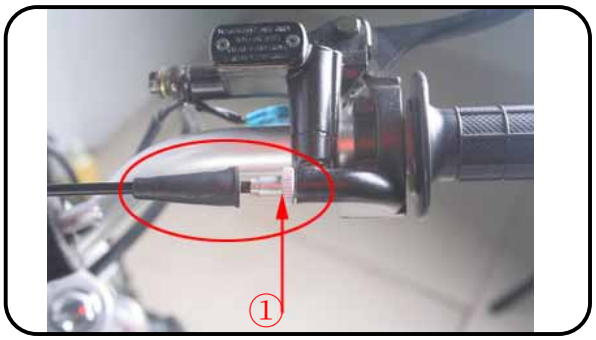
Before riding for break-in operation, practice or a race, make sure the machine is in good operating condition.
Before using this machine, check the following points.

GENERAL INSPECTION AND MAINTENANCE

Item	Routine	
Fuel	Check that a fresh gasoline is filled in the fuel tank. Check the fuel line for leakage.	
Engine oil	Check that the oil level is correct. Check the crankcase and frame oil line for leakage.	
Gear shifter and clutch	Check that gears can be shifted correctly in order and that the clutch operates smoothly.	
Throttle grip/Housing	Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and housing, if necessary.	
Brakes	Check the play of front brake and effect of front and rear brake.	
Drive chain	Check drive chain slack and alignment. Check that the drive chain is lubricated properly.	
Wheels	Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play.	
Steering	Check that the handlebar can be turned smoothly and have no excessive play.	
Front forks and rear shock absorber	Check that they operate smoothly and there is no oil leakage.	
Cables (wires)	Check that the clutch and throttle cables move smoothly. Check that they are not caught when the handlebars are turned or when the front forks travel up and down.	
Exhaust pipe	Check that the exhaust pipe is tightly mounted and has no cracks.	
Rear wheel sprocket	Check that the rear wheel sprocket tightening bolt is not loose.	
Lubrication	Check for smooth operation. Lubricate if necessary.	
Bolts and nuts	Check the chassis and engine for loose bolts and nuts.	
Lead connectors	Check that the CDI magneto, CDI unit, and ignition coil are connected tightly.	







CLUTCH ADJUSTMENT

1. Check:
   - Clutch lever free play A
     Out of specification → Adjust.

Clutch lever free play A :
5 ~ 10 mm

2. Adjust:
   - Clutch lever free play

Clutch lever free play adjustment steps:
- Loosen the locknuts ①.
- Adjust the free play by changing their tightening position.
- Tighten the locknuts.

NOTE:
- Make minute adjustment on the lever side using the adjuster ②.
- After adjustment, check proper operation of clutch lever.

THROTTLE CABLE ADJUSTMENT

1. Check:
   - Throttle grip free play ⓐ
     Out of specification → Adjust.

Throttle grip free play ⓐ:
3 ~ 5 mm

2. Adjust:
   - Throttle grip free play

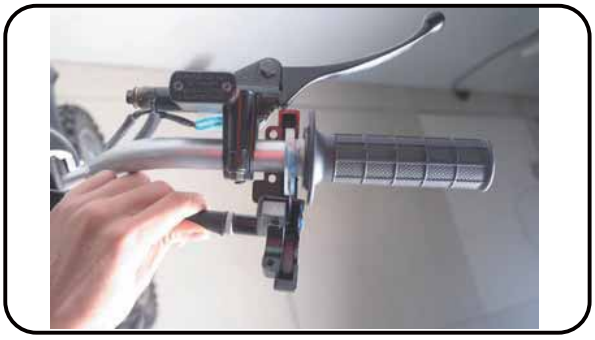
Throttle grip free play adjustment steps:
- Slide the adjuster cover.
- Turn the adjuster ① until the specified free play is obtained.
- Tighten the locknut.

NOTE:
Before adjusting the throttle cable free play, the engine idle speed should be adjusted.

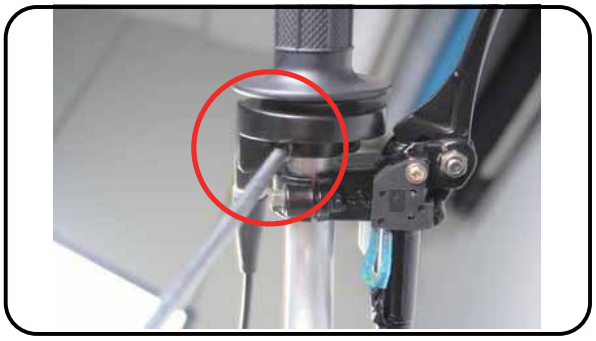
⚠ WARNING
After adjusting, turn the handlebar to right and left and make sure that the engine idling does not run faster.

THROTTLE LUBRICATION

1. Remove:
   - Screw (throttle grip cap)



2. Apply:
   - Lithium soap base grease
     On the throttle cable end



3. Install:
   - Screw (throttle grip cap)

	4 Nm (0.4 m · kg)

AIR FILTER REPLACE

NOTE:
Proper air filter maintenance is the biggest key to preventing premature engine wear and damage.

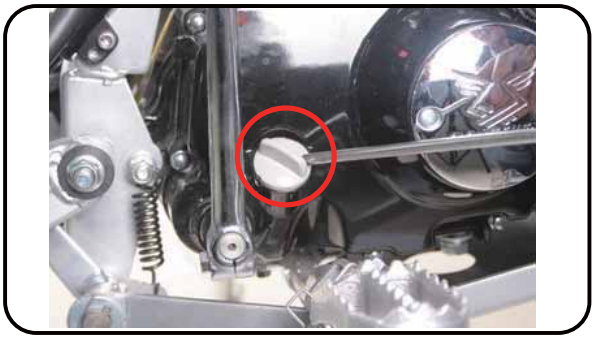
CAUTION:
Never run the engine without the air filter element in place; this would allow dirt and dust to enter the engine and cause rapid wear and possible engine damage.

1. Remove:
   - Screw

2. Install:

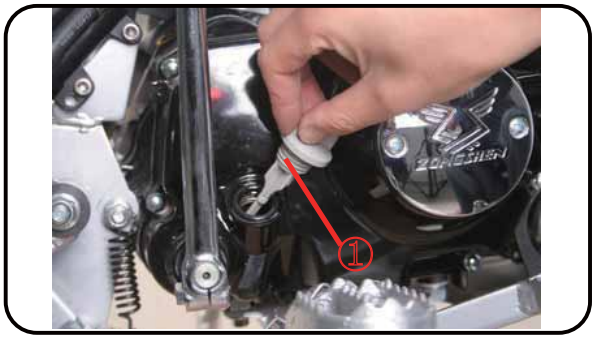
- Fitting Screw

	5 Nm (0.5 m · kg)

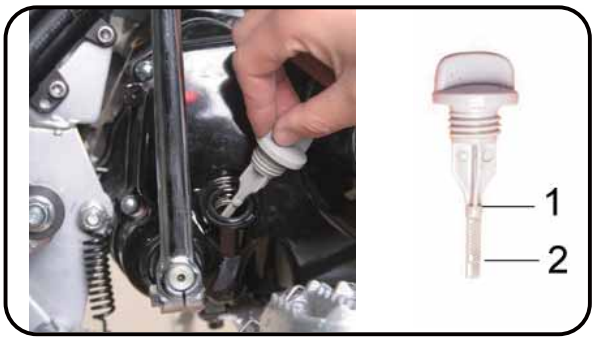


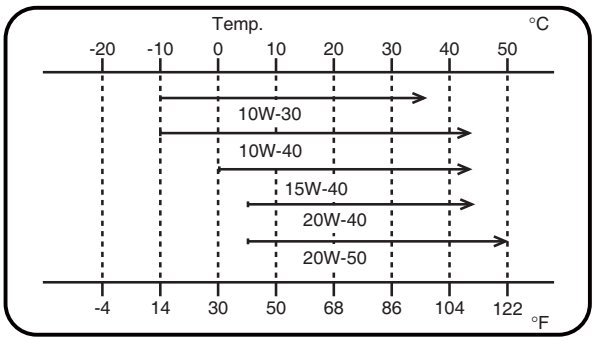
ENGINE OIL LEVEL INSPECTION

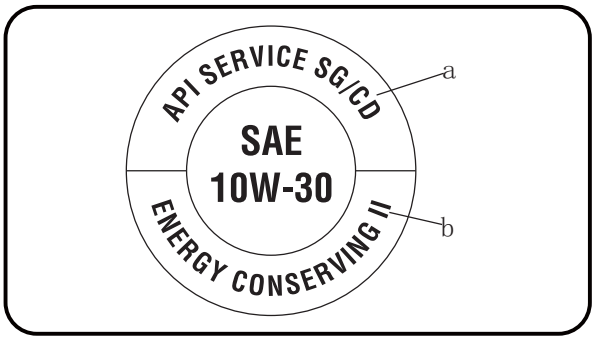
1. Start the engine, warm it up for several minutes, and then turn off the engine and wait for five minutes.
2. Place the machine on a level place and hold it up on upright position by placing the suitable stand under the engine.



3. Remove:
   - Oil tank cap ①







4. Inspect:
   - Oil level

   Oil level should be between maximum 1 and minimum 2 marks.
   Oil level is low → Add oil to proper level.

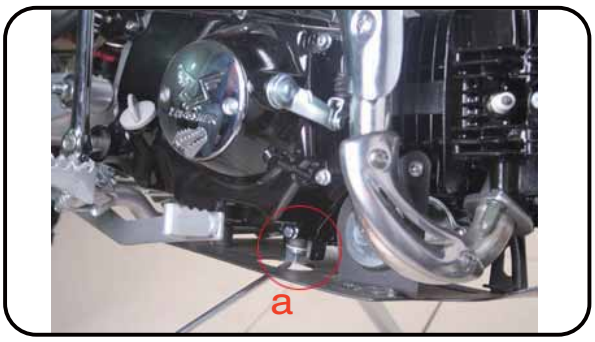
NOTE:
When inspecting the oil level, do not screw the oil tank cap into the oil tank. Insert the gauge lightly.

Recommended oil:
Refer to the following chart for selection of oils which are suited to the atmospheric temperatures.
Recommended engine oil classification:
API STANDARD:
API "SG" or higher grade (Designed primarily for motorcycles)

CAUTION:
- **Do not add any chemical additives or use oils with a grade of CD a or higher.**
- **Do not use oils labeled "ENERGY CONSERVING II" b or higher. Engine oil also lubricates the clutch and additives could cause clutch slippage.**
- **Do not allow foreign materials to enter the crankcase.**

5. Install:
   - Oil tank cap
6. Start the engine and let it warm up for several minutes.
7. Turn off the engine and inspect the oil level once again.

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



ENGINE OIL REPLACEMENT

1. Start the engine and warm it up for several minutes, and then turn off the engine and wait for five minute.
2. Place the machine on a level place and hold it on upright position by placing the suitable stand under the engine.
3. Place a suitable container under the engine.

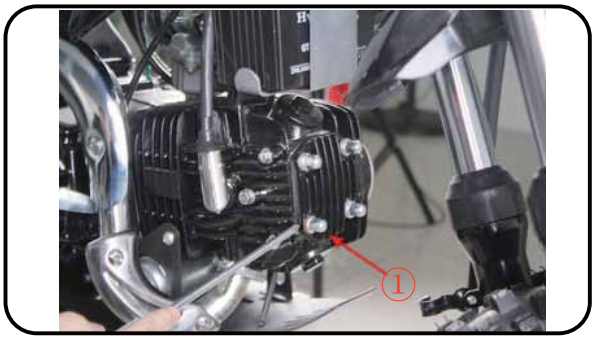
4. Remove:
   - Oil cap

5. Fill:
   - Engine oil

Oil quantity:
Total amount:
0.9 L
Periodic oil change:
0.8 L
With oil filter replacement:
0.85 L

6. Check:
   - Oil leakage

7. Check:
   - Engine oil level

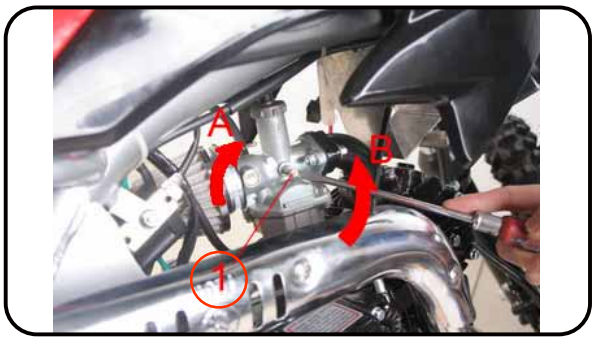


OIL PRESSURE INSPECTION

1. Check:
   - Oil pressure

Checking steps:
- Slightly loosen the oil pressure check bolt ①.
- Start the engine and keep it idling until oil starts to seep from the oil pressure check bolt. If no oil comes out after one minute, turn the engine off so it will not seize.
- Check oil passages and oil pump for damage or leakage.
- Start the engine after solving the problem(s) and recheck the oil pressure.
- Tighten the oil pressure check bolt.

Oil pressure check bolt:
10 Nm (1.0 m • kg)



PILOT SCREW ADJUSTMENT

1. Adjust:
   - Pilot screw ①

Adjustment steps:

NOTE:
To optimize the fuel flow at a smaller throttle opening, each machine's pilot screw has been individually set at the factory. Before adjusting the pilot screw, turn it in fully and count the number of turns. Record this number as the factory-set number of turns out.

- Turn in the pilot screw until it is lightly seated.
- Turn out the pilot screw by the factory-set number of turns.

Pilot screw:
1-5/8 turns out (example)

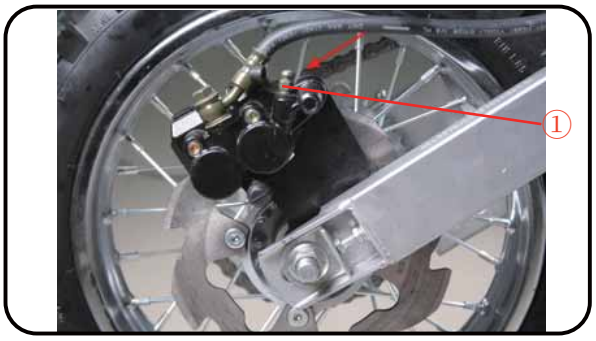
ENGINE IDLING SPEED ADJUSTMENT

1. Start the engine and thoroughly warm it up.
2. Attach:
   - Inductive tachometer
     To spark plug lead.
3. Adjust:
   - Engine idling speed

Adjustment steps:
- Adjust the pilot screw.
  Refer to "PILOT SCREW ADJUSTMENT" section.
- Turn the throttle stop screw ① until the engine runs at the lowest possible speed.

To increase idle speed → Turn the throttle stop screw ① in A.
To decrease idle speed → Turn the throttle stop screw ① out B .

Engine idling speed:
1,400 ~ 1,600 r/min



CHASSIS

BRAKE SYSTEM AIR BLEEDING

⚠ WARNING

Bleed the brake system if:

- **The system has been disassembled.**
- **A brake hose has been loosened or removed.**
- **The brake fluid is very low.**
- **The brake operation is faulty.**

A dangerous loss of braking performance may occur if the brake system is not properly bleed.

1. Remove:
   - Reservoir cap
   - Diaphragm

2. Bleed:
   - Brake fluid

A Front
B Rear

Air bleeding steps:

a. Add proper brake fluid to the reservoir.
b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
c. Connect the clear plastic tube ② tightly to the caliper bleed screw ①.
d. Place the other end of the tube into a container.
e. Slowly apply the brake lever or pedal several times.
f. Pull the lever in or push down on the pedal. Hold the lever or pedal in position.
g. Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
h. Tighten the bleed screw when the lever or pedal limit has been reached; then release the lever or pedal.

Bleed screw:
6 Nm (0.6 m • kg)

i. Repeat steps (e) to (h) until of the air bubbles have been removed from the system.

NOTE:
If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

j. Add brake fluid to the level line on the reservoir.

⚠ WARNING
Check the operation of the brake after bleeding the brake system.

3. Install:
   - Diaphragm
   - Reservoir cap

FRONT BRAKE

1. Check:
   - Brake lever position A

Brake lever position A :

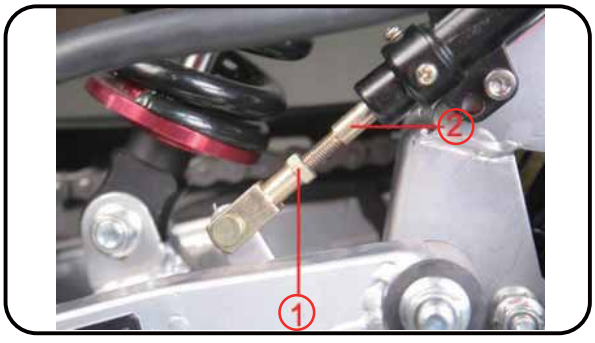
Standard position	Extent of adjustment
100 mm	Unavailable

REAR BRAKE ADJUSTMENT

1. Check:
   - Brake pedal height A
     Out of specification → Adjust.

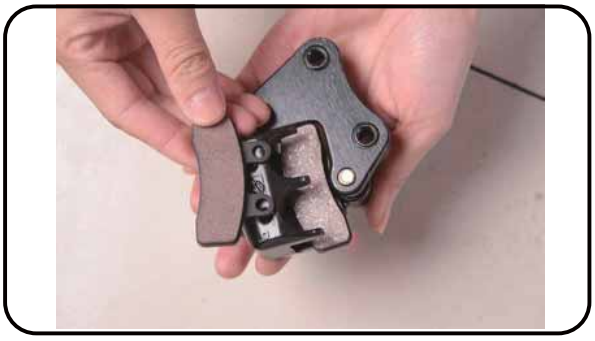
Brake pedal height A :
10 mm

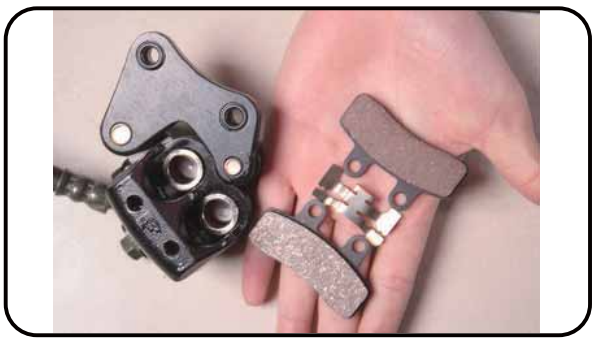
2. Adjust:
   - Brake pedal height



Pedal height adjustment steps:
- Loosen the locknut ①.
- Turn the adjusting nut ② until the pedal height a is within specified height.
- Tighten the locknut.

⚠ WARNING
- **Adjust the pedal height between the maximum and the minimum**
- **After the pedal height adjustment, make sure that the rear brake does not drag.**





FRONT BRAKE PAD INSPECTION AND REPLACEMENT

1. Inspect:
   - Brake pad thickness A
     Out of specification → Replace as a set.

Brake pad thickness:
4.0 mm
<Limit>: 1.0 mm

2. Replace:
   - Brake pad

Brake pad replacement steps:

- Remove Bolt 1 and 2
- Loosen the Caliper
- Remove Bolt 3 and 4
- Replace the Brake pad

CAUTION:
Do not reuse the drained brake fluid.

Tighten the bleed screw.

Bleed screw 3 and 4 :
18 Nm (1.8 m • kg)

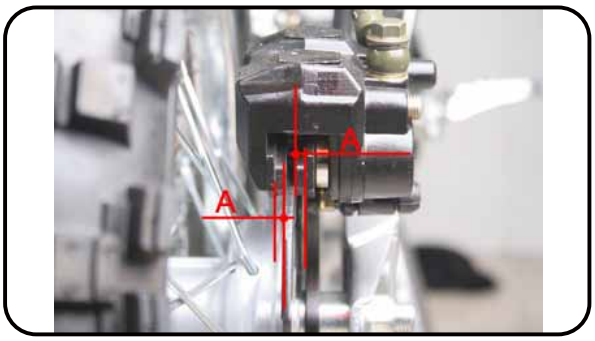
- Install the Caliper Bolt 1 and 2

Bolt (brake caliper):
25 Nm (2.5 m • kg)

3. Inspect:
   - Brake fluid level
     Refer to “BRAKE FLUID LEVEL INSPECTION” section.

4. Check:
   - Brake lever operation
     A softy or spongy feeling → Bleed brake system.
     Refer to “BRAKE SYSTEM AIR BLEEDING” section.

REAR BRAKE PAD INSPECTION AND REPLACEMENT



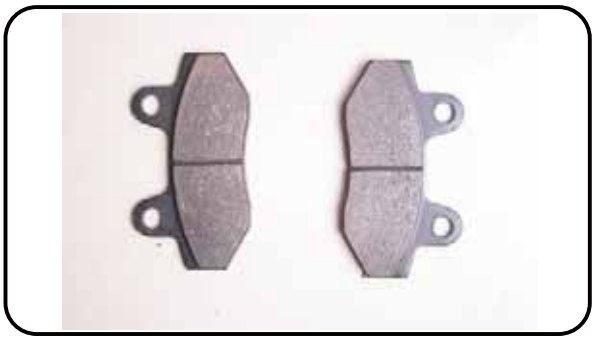
REAR BRAKE PAD INSPECTION AND REPLACEMENT

1. Inspect:
   - Brake pad thickness A
     Out of specification → Replace as a set.

Brake pad thickness:
4 mm
<Limit>: 1.0 mm

2. Replace:
   - Brake pad

Brake pad replacement steps:
- Remove the Screw 1 and 2.
- Remove the Nut 3.
- Loosen the Caliper .
- Reeplace the Brake pad.



A

B

CAUTION:

Do not reuse the drained brake fluid.

- Tighten the bleed screw 1 and 2.

Bleed screw 1 and 2:
18 Nm (1.8m • kg)

Nut 3 (brake caliper):
20 Nm (2.0m • kg)

3. Inspect:
   - Brake fluid level
     Refer to "BRAKE FLUID LEVEL INSPECTION" section.
4. Check:
   - Brake pedal operation
     A softy or spongy feeling → Bleed brake system.
     Refer to "BRAKE SYSTEM AIR BLEEDING" section.

BRAKE FLUID LEVEL INSPECTION

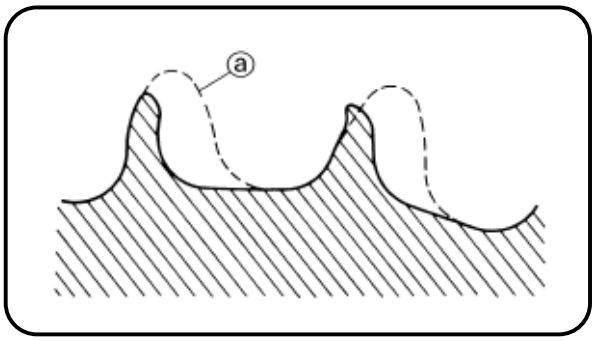
1. Place the brake master cylinder so that its top is in a horizontal position.
2. Inspect:
   - Brake fluid level
     Fluid at lower level → Fill up.

a Lower level
A Front
B Rear

Recommended brake fluid:
DOT #3 or DOT #4

⚠ WARNING

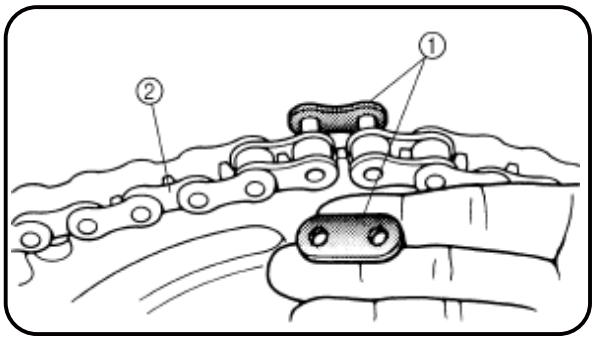
- **Use only designated quality brake fluid to avoid poor brake performance.**
- **Refill with same type and brand of brake fluid; mixing fluids could result in poor brake performance.**
- **Be sure that water or other contaminants do not enter master cylinder when refilling.**
- **Clean up spilled fluid immediately to avoid erosion of painted surfaces or plastic parts.**



SPROCKETS INSPECTION

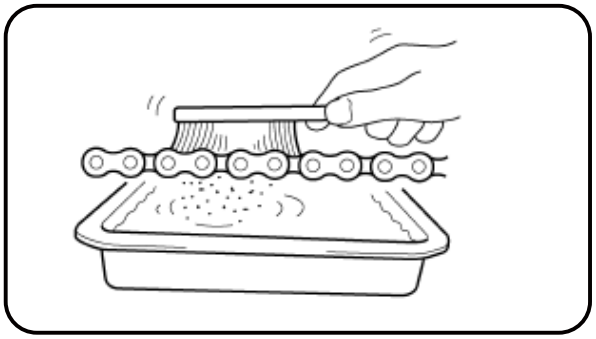
1. Inspect:
   - Sprocket teeth (a)
     Excessive wear → Replace.

NOTE:
Replace the drive sprocket, rear wheel sprocket and drive chain as a set.

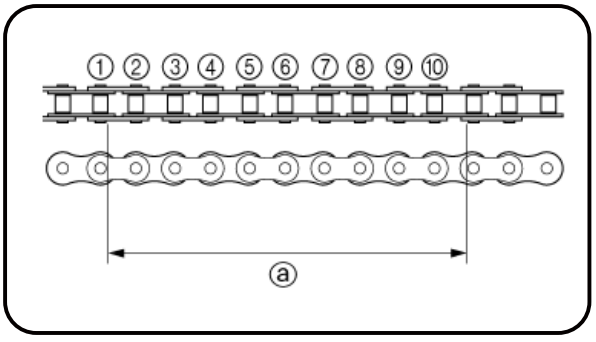


DRIVE CHAIN INSPECTION

1. Remove:
   - Master link clip
   - Joint (1)
   - Drive chain (2)

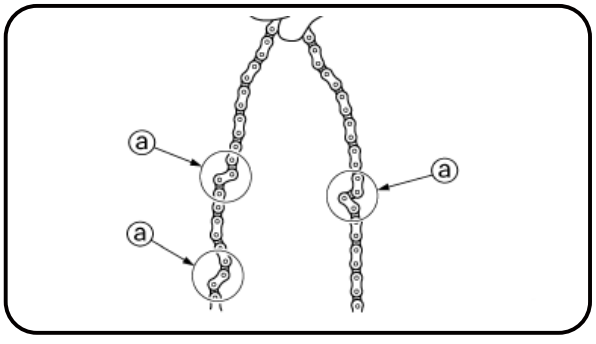


2. Clean:
   - Drive chain
     Place it in kerosene, and brush off as much dirt as possible. Then remove the drive chain from the kerosene and dry the drive chain.

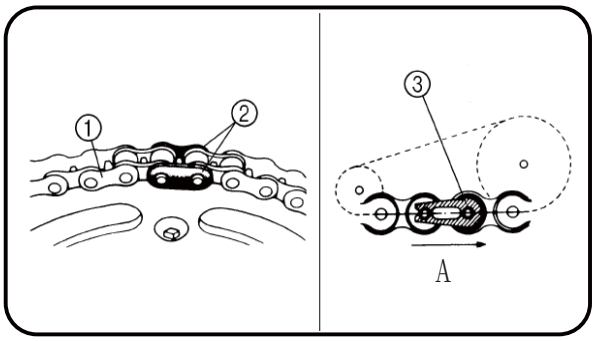


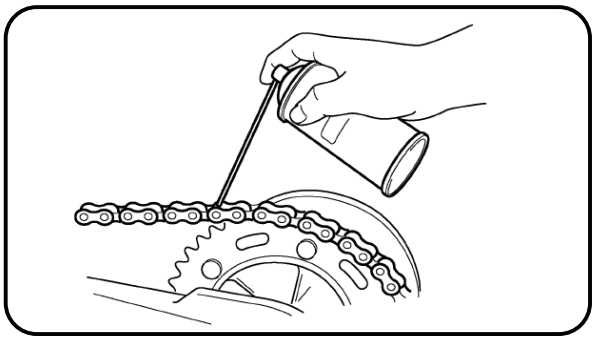
3. Measure:
   - Drive chain length (10 links) (a)
     Out of specification → Replace.

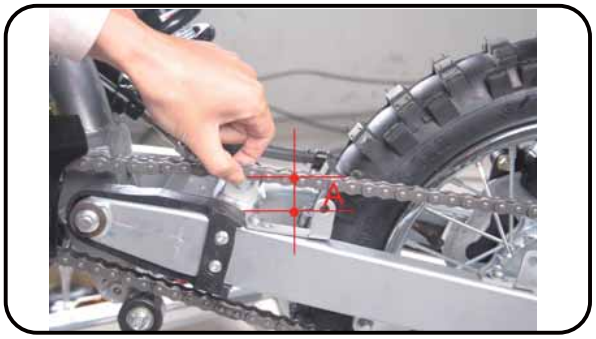
Drive chain length (10 links):
<Limit>: 144.4 mm



4. Check:
   - Drive chain stiffness (a)
     Clean and oil the drive chain and hold as illustrated.
     Stiff → Replace drive chain.







5. Install:
   - Drive chain ①
   - Joint ②
   - Master link clip ③

CAUTION:

Be sure to install the master link clip to the direction as shown.

A Turning direction

6. Lubricate:
   - Drive chain

Drive chain lubricant:
SAE 10W-30 motor oil or suitable chain lubricants

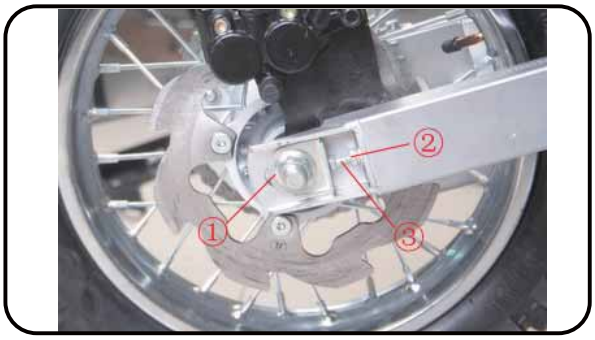
DRIVE CHAIN SLACK ADJUSTMENT

1. Elevate the rear wheel by placing the suitable stand under the engine.
2. Check:
   - Drive chain slack A
     Above the seal guard installation bolt.
     Out of specification → Adjust.

Drive chain slack:
30 ~ 50 mm

NOTE:

Before checking or adjusting, rotate the rear wheel through several revolutions and check the slack several times to find the tightest point. Check and/or adjust the drive chain slack with the rear wheel in this "tight chain" position.



3. Adjust:
   • Drive chain slack

Drive chain slack adjustment steps:
- Loosen the axle nut ① and locknuts ②.
- Adjust the drive chain slack by turning the adjusters ③.

To tighten → Turn the adjuster ③ counterclockwise.
To loosen → Turn the adjuster ③ clockwise and push wheel forward.

- Turn each adjuster exactly the same amount to maintain correct axle alignment.

NOTE:
Turn the adjuster so that the drive chain is in line with the sprocket, as viewed from the rear.

CAUTION:
Too small drive chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

- Tighten the axle nut while pushing down the drive chain.

Axle nut:
65 Nm (6.5 m • kg)

- Tighten the locknuts.

Locknut:
12 Nm (1.2 m • kg)

FRONT FORK INSPECTION

1. Inspect:
   • Front fork smooth action
   Operate the front brake and stroke the front fork.
   Unsmooth action/oil leakage → Repair or replace.

ELECTRICAL SYSTEM
CHECKING THE BATTERY

⚠ WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

First aid in case of bodily contact:
External

- **SKIN – Wash with water.**
- **EYES – Flush with water for 15 minutes and get immediate medical attention.**

Internal

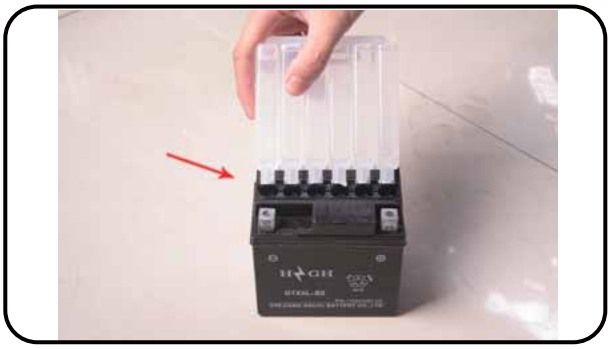
- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

1. Disconnect:
   - battery leads
     (from the battery terminals)

CAUTION:

First, disconnect the negative lead ①, then the positive lead ②.

2. Remove:
   - Screw (Battery bracket) :



NOTE:

Replace the battery whenever:

- battery voltage does not rise to specification or bubbles fail to rise during charging,
- sulphation of one or more battery cells occurs (as indicated by the battery plates turning white or material accumulating in the bottom of the battery cell),
- specific gravity readings after a long, slow charge indicate that one battery cell's charge is lower than the rest,
- warpage or buckling of the battery plates or insulators is evident.

CAUTION:

Add only distilled water. Tap water contains minerals which are harmful to the battery.

3. Charge:
   - battery

Battery charging amperage and time
0.4 amps/10 hrs

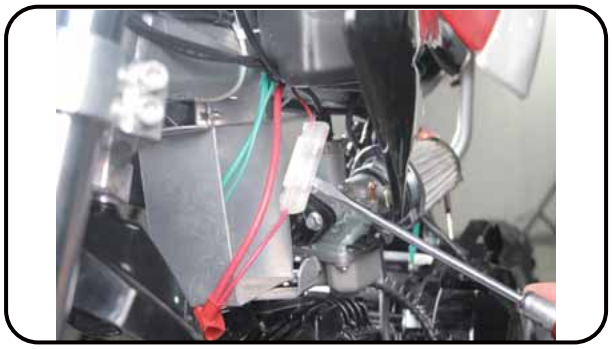
⚠ WARNING

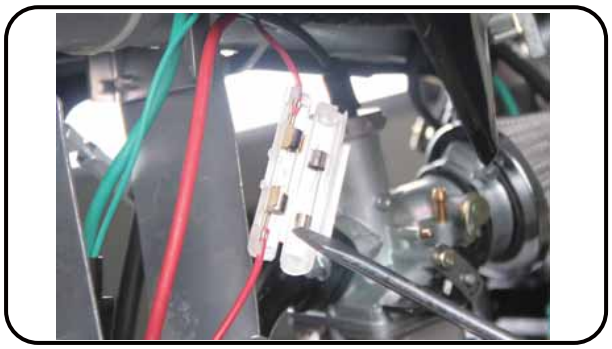
Do not quick charge a battery.

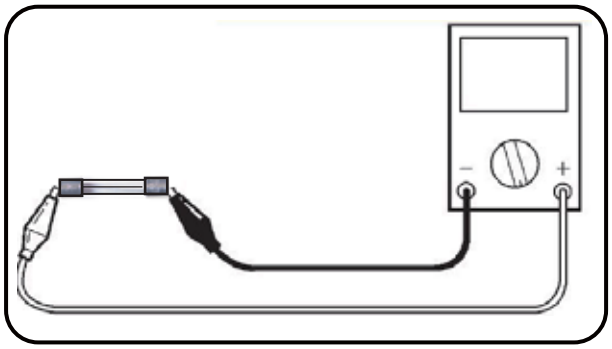
CAUTION:

- **To ensure maximum performance, always charge a new battery before using it.**
- **Do not use a high-rate battery charger. They force a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.**
- **If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.**
- **When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative lead from the battery terminal.)**
- **To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.**

- **Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.**
- **Make sure that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.**
- **If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!**







CHECKING THE FUSE

The following procedure applies to all of the fuses.

CAUTION:

To avoid a short circuit, always turn the main switch to "OFF" when checking or replacing a fuse.

Check:
- fuse

a. Connect the pocket tester to the fuse and check it for continuity.

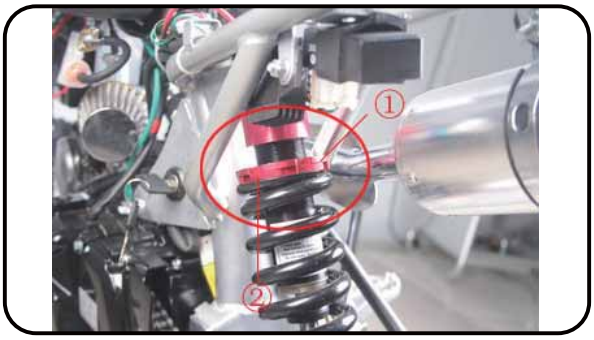
NOTE:

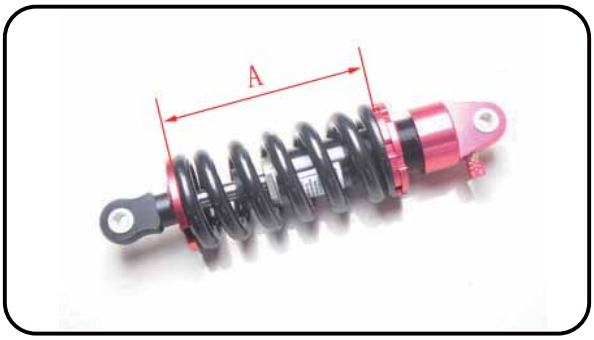
Set the pocket tester selector to "Ω × 1".

b. If the pocket tester indicates "∞", replace the fuse.

REAR SHOCK ABSORBER INSPECTION

1. Inspect:
   - Swingarm smooth action
     Abnormal noise/unsmooth action → Grease the pivoting points or repair the pivoting points.
     Damage/oil leakage → Replace.





REAR SHOCK ABSORBER SPRING PRELOAD ADJUSTMENT

1. Elevate the rear wheel by placing the suitable stand under the engine.
2. Remove:
   - Rear frame
3. Loosen:
   - Locknut ①
4. Adjust:
   - Spring preload
     By turning the adjuster ②.

Stiffer → Increase the spring preload. (Turn the adjuster ② in.)
Softer → Decrease the spring preload. (Turn the adjuster ② out.)

Spring length (installed) A :

Standard length	Extent of adjustment
140 mm	135 ~ 140 mm

* For EUROPE

NOTE:

- Be sure to remove all dirt and mud from around the locknut and adjuster before adjustment.
- The length of the spring (installed) changes 1.5 mm (0.06 in) per turn of the adjuster.

CAUTION:

Never attempt to turn the adjuster beyond the maximum or minimum setting.

5. Tighten:
   - Locknut
6. Install:
   - Rear frame (upper)
     40 Nm (4 m • **kg**)
   - Rear frame (lower)
     40 Nm (4 m • **kg**)

TIRE PRESSURE CHECK

1. Measure:
   - Tire pressure
     Out of specification → Adjust.

Standard tire pressure:
130 kPa (1.3 kgf/cm^2)

NOTE:

- Check the tire while it is cold.
- Loose bead stoppers allow the tire to slip off its position on the rim when the tire pressure is low.
- A tilted tire valve stem indicates that the tire slips off its position on the rim.
- If the tire valve stem is found tilted, the tire is considered to be slipping off its position. Correct the tire position.

SPOKES INSPECTION AND TIGHTENING

1. Inspect:
   - Spokes ①
     Bend/damage → Replace.
     Loose spoke → Retighten.
2. Tighten:
   - Spokes **3 Nm (0.3 m · kg)**

NOTE:

Be sure to retighten these spokes before and after break-in. After a practice or a race check spokes for looseness.

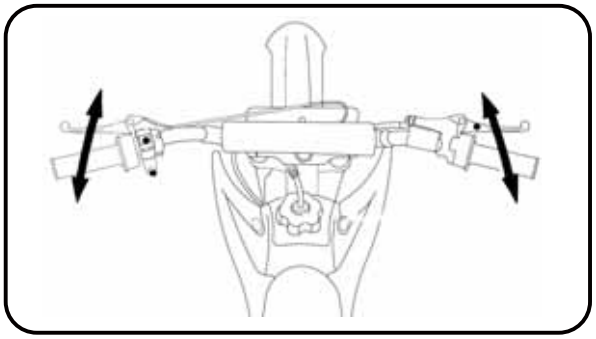
WHEEL INSPECTION

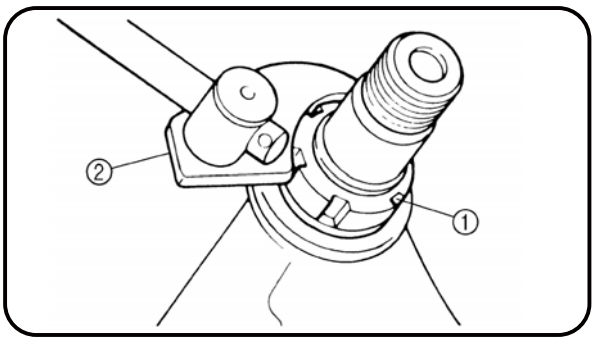
1. Inspect:
   - Wheel runout
     Elevate the wheel and turn it.
     Abnormal runout → Replace.

2. Inspect:
   - Bearing free play
     Exist play → Replace.

STEERING HEAD INSPECTION AND ADJUSTMENT

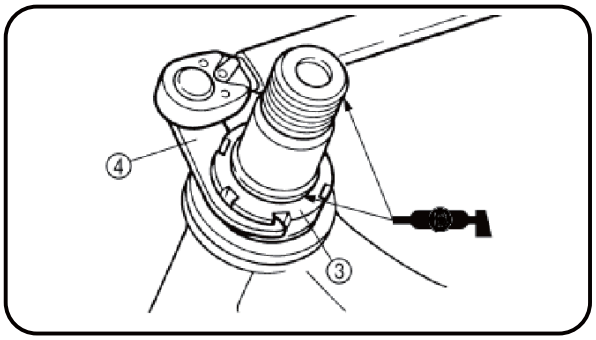
1. Elevate the front wheel by placing a suitable stand under the engine.
2. Check:
   - Steering stem
     Grasp the bottom of the forks and gently rock the fork assembly back and forth.
     Free play → Adjust steering head.
3. Check:
   - Steering smooth action
     Turn the handlebar lock to lock.
     Unsmooth action → Adjust steering ring nut.





4. Adjust:
   - Steering ring nut

Steering ring nut adjustment steps:
- Remove the number plate.
- Remove the handlebar and handlebar upper bracket.
- Loosen the steering ring nut ① using the steering nut wrench②.



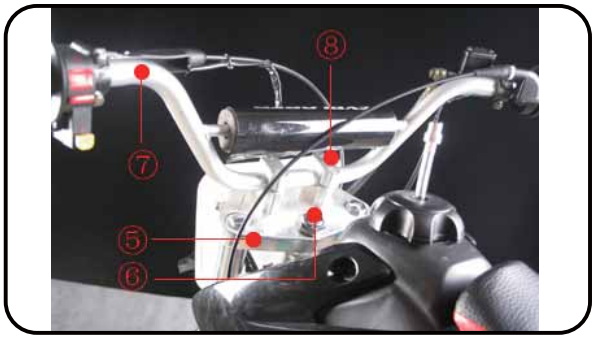
• Tighten the steering ring nut ③ using steering nut wrench④.

NOTE:
- Apply the lithium soap base grease on the thread of the steering stem.
- Set the torque wrench to the steering nut wrench so that they form a right angle.

Steering ring nut (initial tightening):
30 Nm (3 m • kg)

- Loosen the steering ring nut one turn.
- Retighten the steering ring nut using the steering nut wrench.

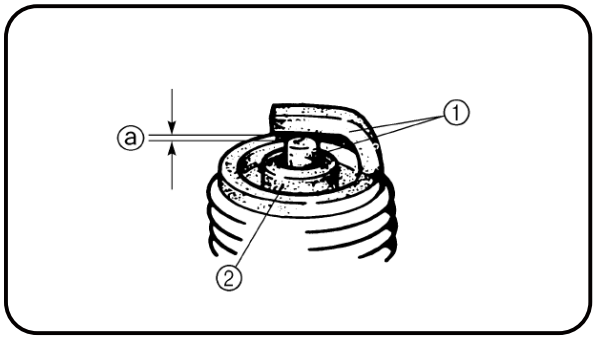
⚠ WARNING
Avoid over-tightening.



- Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings.
- Install the upper bracket ⑤, washer, steering stem nut ⑥, handlebar ⑦, handlebar upper holder ⑧.

CAUTION:
First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.

Steering stem nut:
70 Nm (7 m • kg)
Handlebar upper holder:
25 Nm (2.5 m • kg)



ELECTRICAL

SPARK PLUG INSPECTION

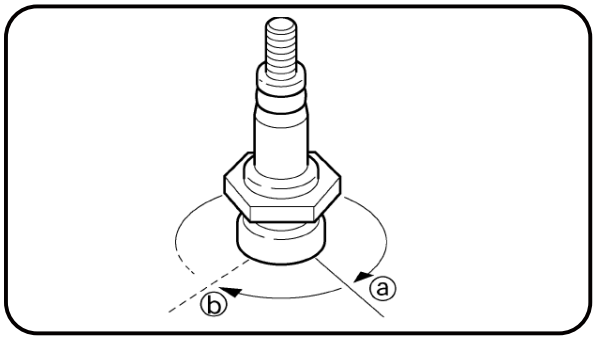
1. Remove:
   - Spark plug
2. Inspect:
   - Electrode ①
     Wear/damage → Replace.
   - Insulator color ②
     Normal condition is ⓐ medium to light tan color.
     Distinctly different color → Check the engine condition.

NOTE:
When the engine runs for many hours at low speeds, the spark plug insulator will become sooty, even if the engine and carburetor are in good operating condition.

3. Measure:
   - Plug gap ⓐ
     Use a wire gauge or thickness gauge.
     Out of specification → Regap.

Spark plug gap:
0.6 ~ 0.7 mm

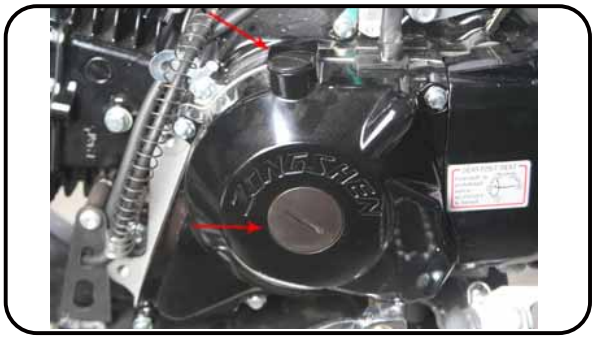
4. Clean the plug with a spark plug cleaner if necessary.



5. Tighten:
   - Spark plug

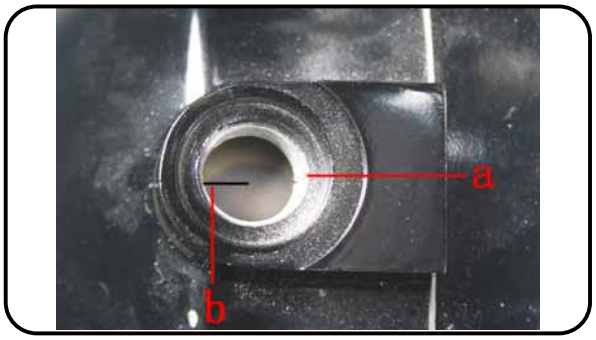
15 Nm (1.5 m • kg)

NOTE:
- Before installing a spark plug, clean the gasket surface and plug surface.
- Finger-tighten ⓐ the spark plug before torquing to specification ⓑ.



IGNITION TIMING CHECK

1. Remove:
   - Timing mark accessing screw



2. Check:
   - Ignition timing

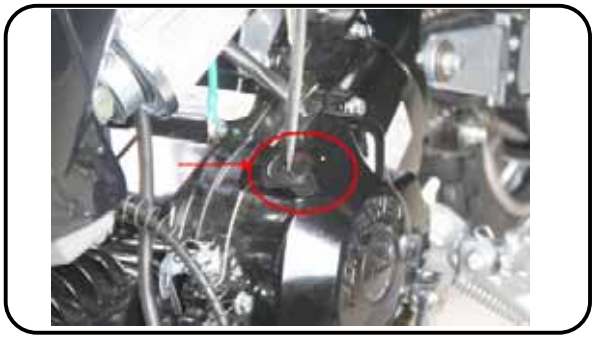
Checking steps:

- Start the engine and let it warm up. Let the engine run at the specified speed.

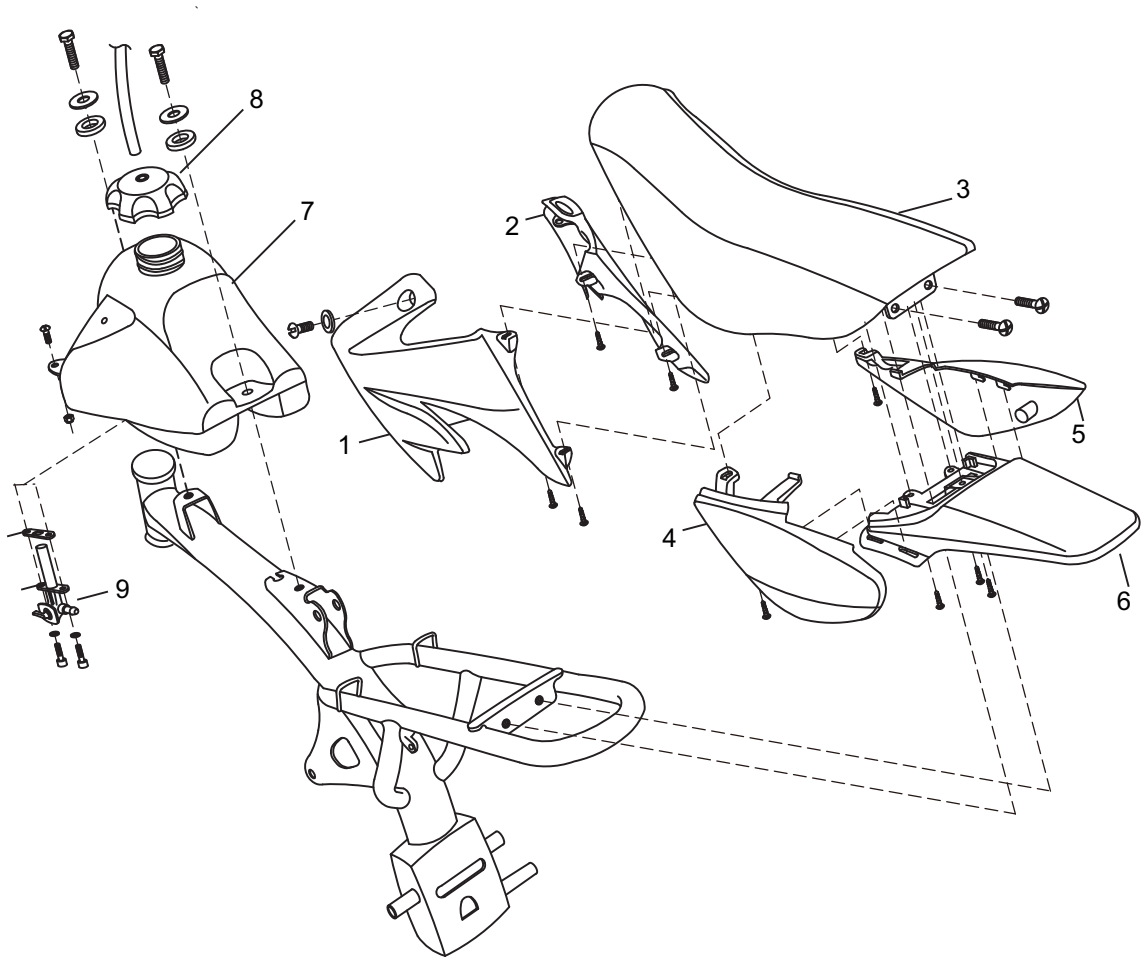
Engine speed:
1,400 ~ 1,600 r/min

- Visually check the stationary pointer a is within the firing range b on the rotor. Incorrect firing range → Check rotor and pickup assembly.

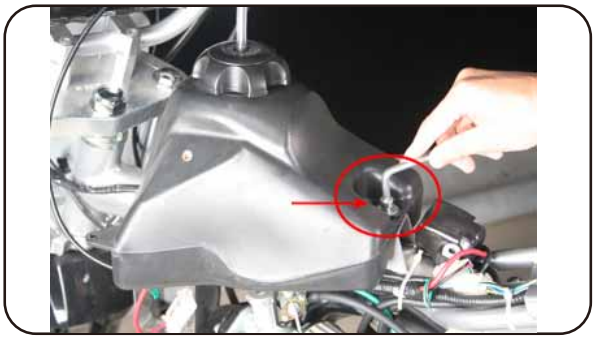
3. Install:
   - Timing mark accessing screw



SEAT, FUEL TANK AND SIDE COVERS



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	LEFT TANK COVER	1	
2	RIGHT TANK COVER	1	
3	SEAT	1	
4	LEFT FENDER PLATE	1	
5	RIGHT FENDER PLATE	1	
6	TAIL FENDER	1	
7	FUEL TANK	1	
8	FUEL CAP	1	
9	PET-COCK	1	
			For installation, reverse the removal procedure.

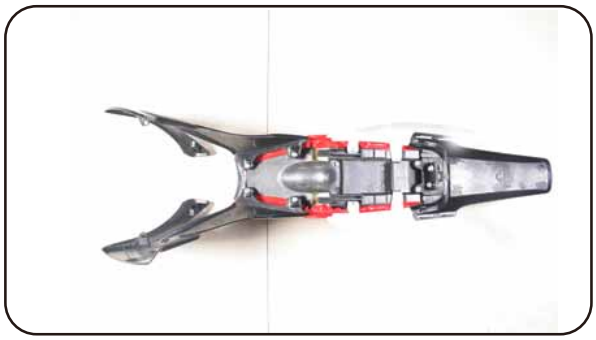


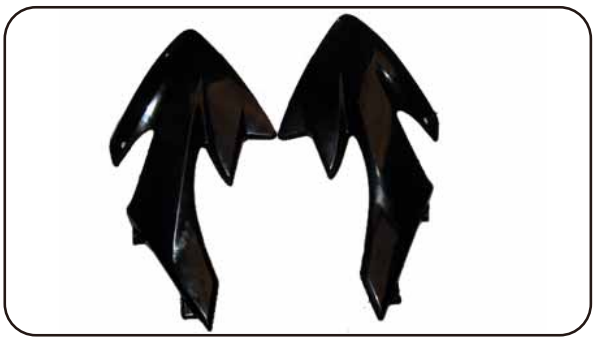
REMOVAL POINTS

Fuel Tank , Side covers and Seat

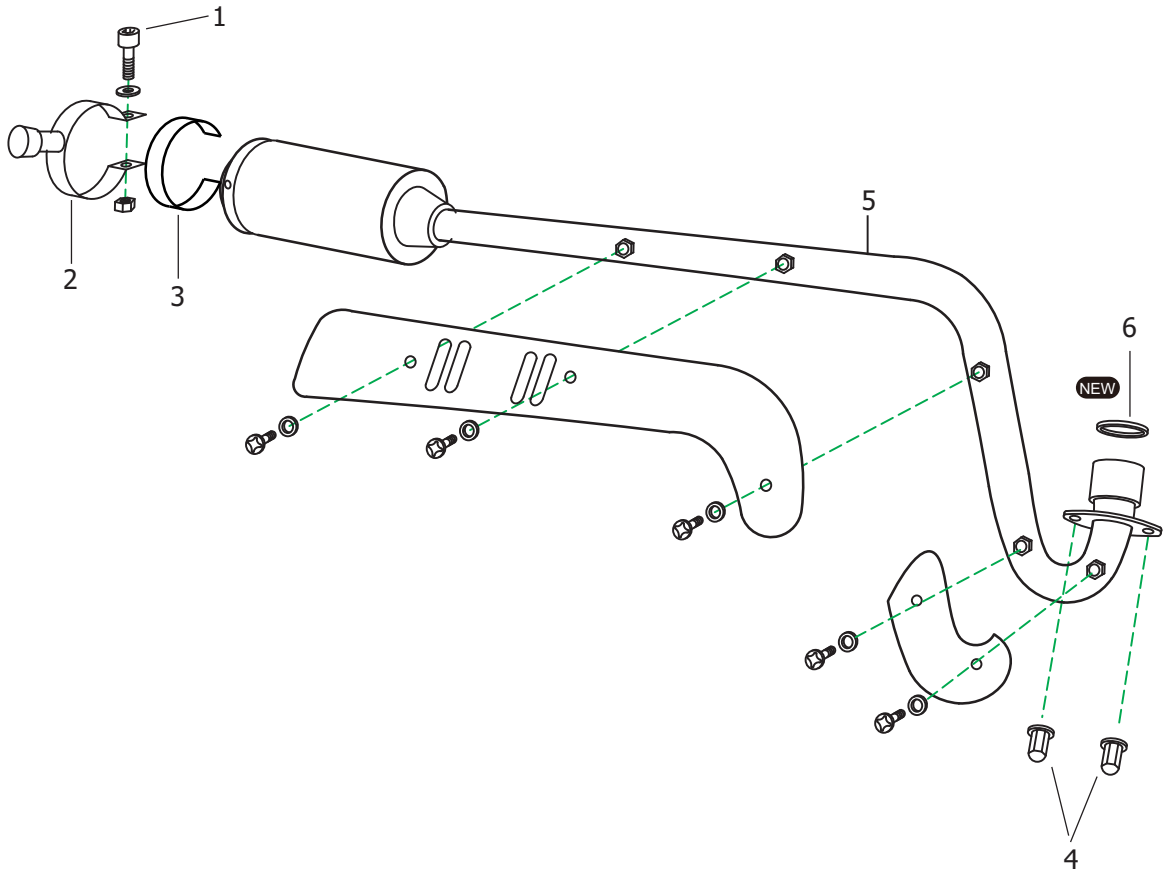
Remove:

- Bolt for Tank Cover
- Seat Bolt
- Bolt for Fuel Tank
- Fuel Tank
- Screw for Tank Cover and Seat
- Left Tank Cover
- Right Tank Cover
- Screw for Fender plate
- Left Fender plate
- Right Fender plate
- Screw for Fender plate
- Seat





EXHAUST PIPE AND SILENCER



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	BOLT	1	
2	HOOP	1	
3	RUBBER MAT	1	
4	NUT M6×14	2	
5	EXHAUST MUFFLER	1	
6	EXHAUST PIPE SEAL	1	
			For installation, reverse the removal procedure.

INSPECTION

Silencer and exhaust pipe

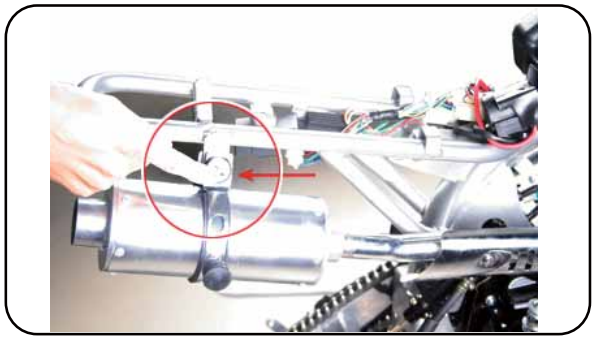
1. Inspect:
   - Gasket ①
     Damage → Replace.

ASSEMBLY AND INSTALLATION

Silencer and exhaust pipe

1. Install:
   - Gasket ①
   - Exhaust muffler
   - Nut ② (exhaust pipe)

15 Nm (1.5 m • kg)

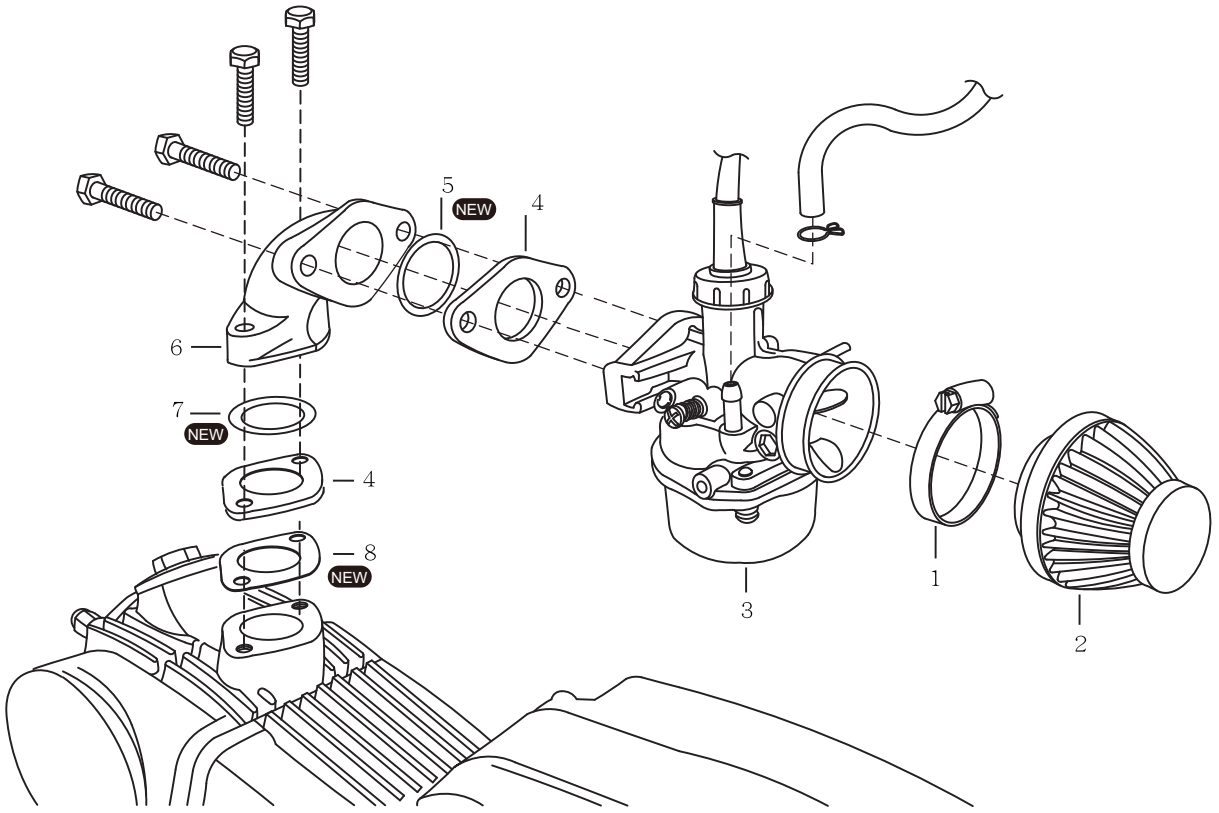


2. Install:
   - Washer
   - Bolt (silencer)

25 Nm (2.5 m • kg)

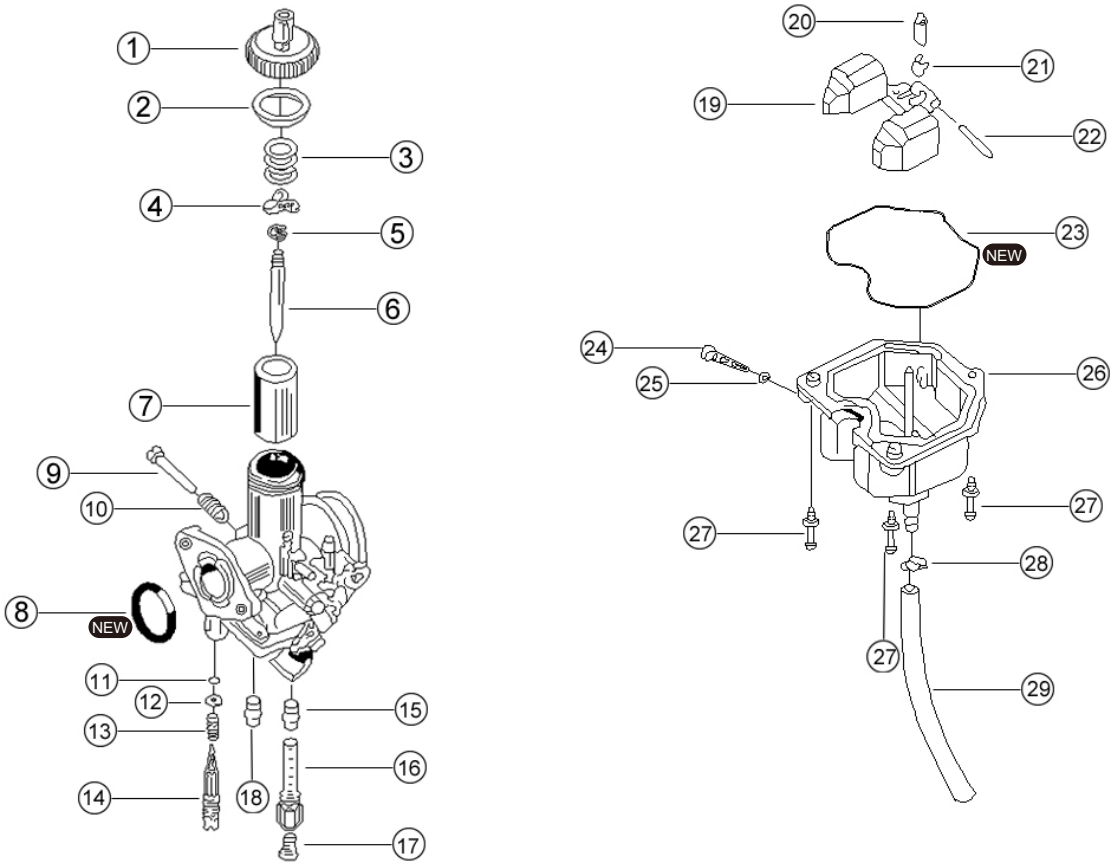
NOTE:
First, temporarily tighten the Nut ① (exhaust pipe), then tighten the bolt ②

CRBURETOR & AIR-FITER



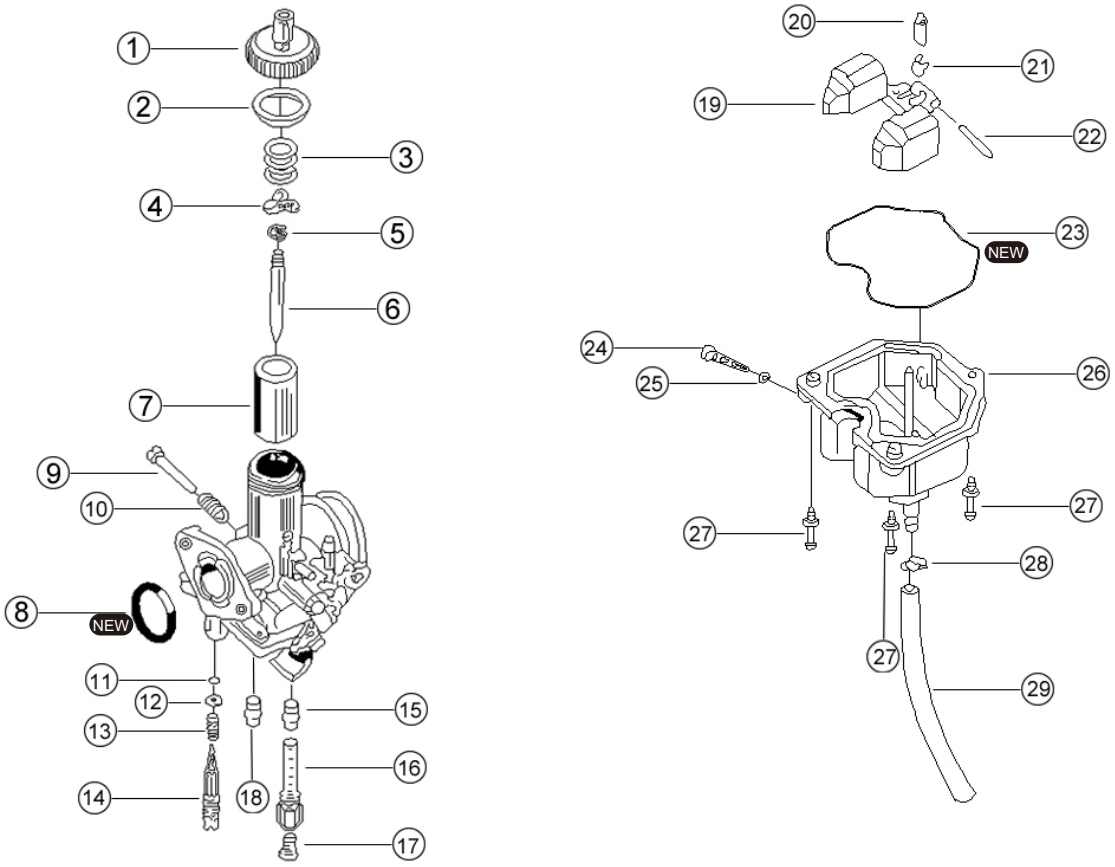
Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	SCREW FOR AIR-FITER CLAMP	1	
2	AIR-FITER	1	
3	CRBURETOR	1	
4	GASKET,HEAT INSULATING, CRBURETOR	2	
5	O-RING	1	
6	INLET PIPE	1	
7	O-RING	1	
8	GASKET	1	
			For installation, reverse the removal procedure.

CARBURETOR DISASSEMBLY

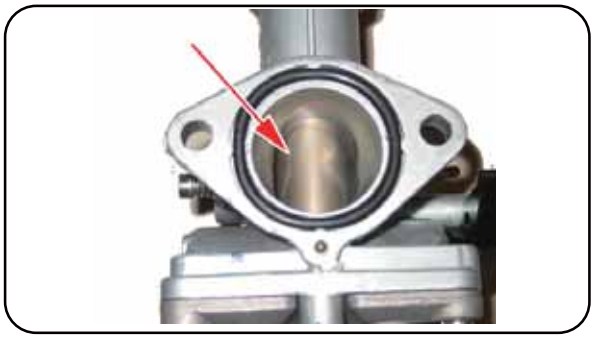


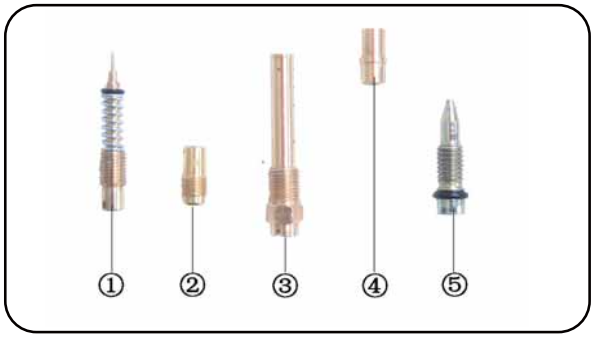
Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	UPPER COVER	1	
2	GASKET,UPPER COVER	1	
3	RETURN SPRING,AIR THROTTLE	1	
4	V-CLIP	1	
5	E-CIRCLIP	1	
6	NEEDLE,JET	1	
7	AIR THROTTLE	1	
8	O-RING	1	
9	ADJUSTING SCREW,AIR THROTTLE	1	
10	SPRING,ADJUSTING SCREW	1	
11	O-RING	1	
12	WASHER	1	
13	ADJUSTING SCREW SPRING	1	
14	IDLE FOAM JET	1	
15	MAIN JET,OIL	1	
16	MAIN JET,FOAM	1	
17	MAIN MEASURING HOLE	1	
18	IDLE JET	1	For installation, reverse the removal procedure.

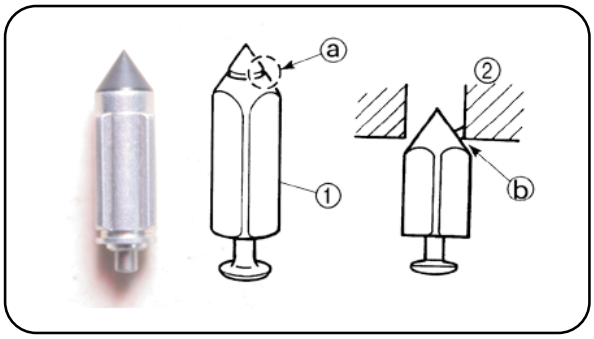
CARBURETOR DISASSEMBLY

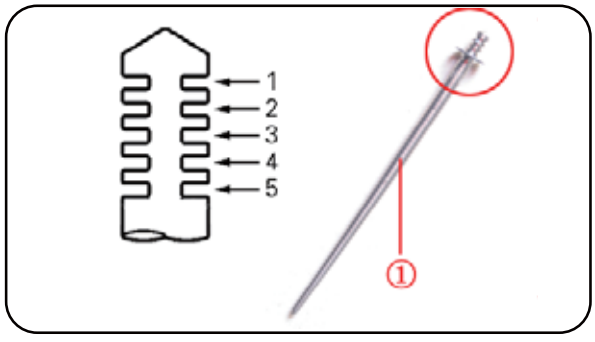


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
19	FLOAT COMP	1	
20	NEEDLE VALVE,CARBURETOR FLOAT	1	
21	HOOK,NEEDLE VALVE	1	
22	FLOAT PIN	1	
23	GASKET,FLOAT CHAMBER	1	
24	DRAIN SCREW	1	
25	O-RING	3	
27	SCREW UNIT,FLOAT CHAMPER	1	
28	PIPE CLIP	1	
29	HOSE	1	
			For installation, reverse the removal procedure.









INSPECTION

Carburetor

1. Inspect:
   - Carburetor body
     Contamination → Clean.

NOTE:
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.

2. Inspect:
   - Adjust Screw,Mixture ①
   - Idle Jet ②
   - Main Measuring Hole and Main Nozzi ③
   - Main Jet ④
   - Drain Screw ⑤

   Damage → Replace.
   Contamination → Clean.

NOTE:
- Use a petroleum based solvent for cleaning. Blow out all passages and jets with compressed air.
- Never use a wire.

Needle valve

1. Inspect:
   - Needle valve ①
   - Valve seat ②

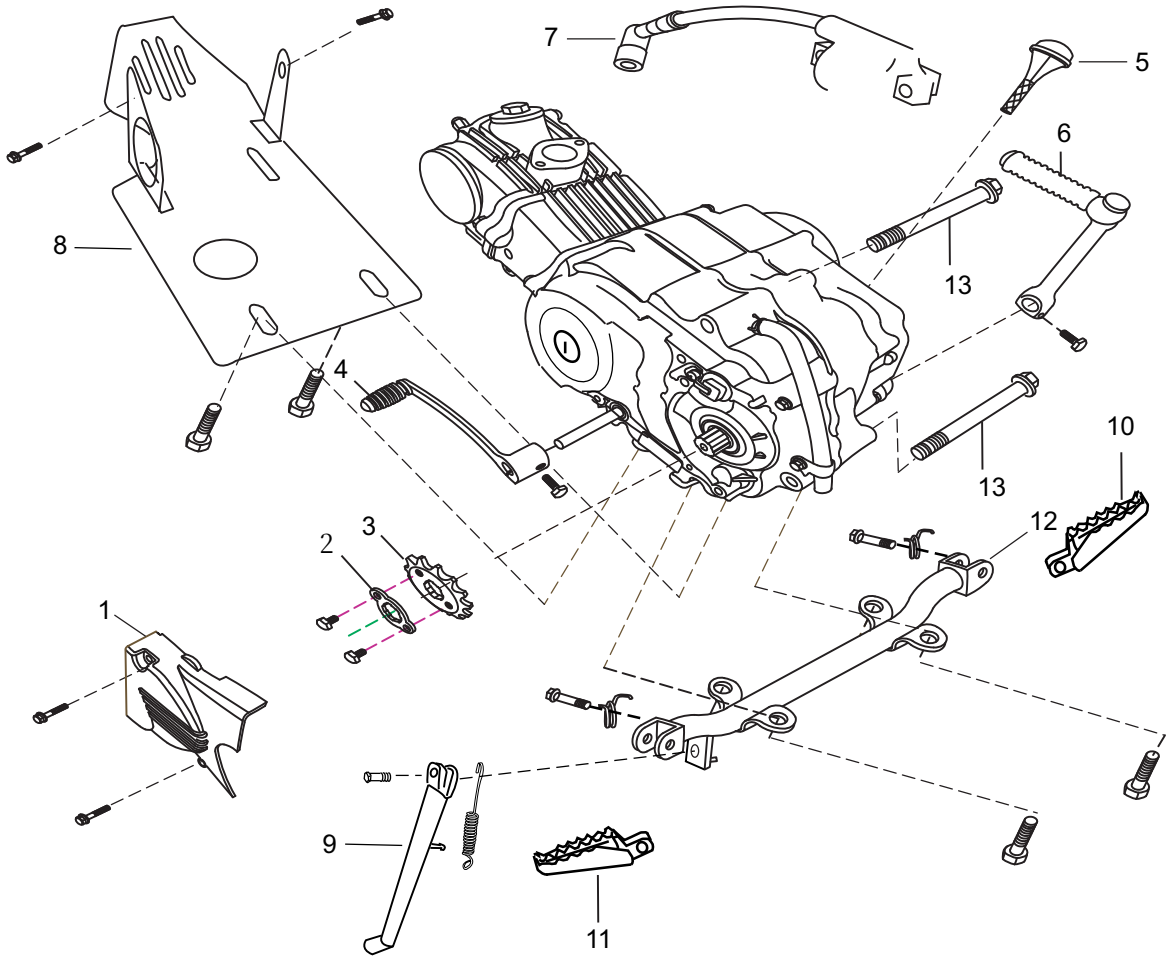
   Grooved wear ⓐ → Replace.
   Dust ⓑ → Clean.

Jet needle

1. Inspect:
   - Jet needle ①
     Bends/wear → Replace.
   - Clip groove
     Free play exists/wear → Replace.
   - Clip position

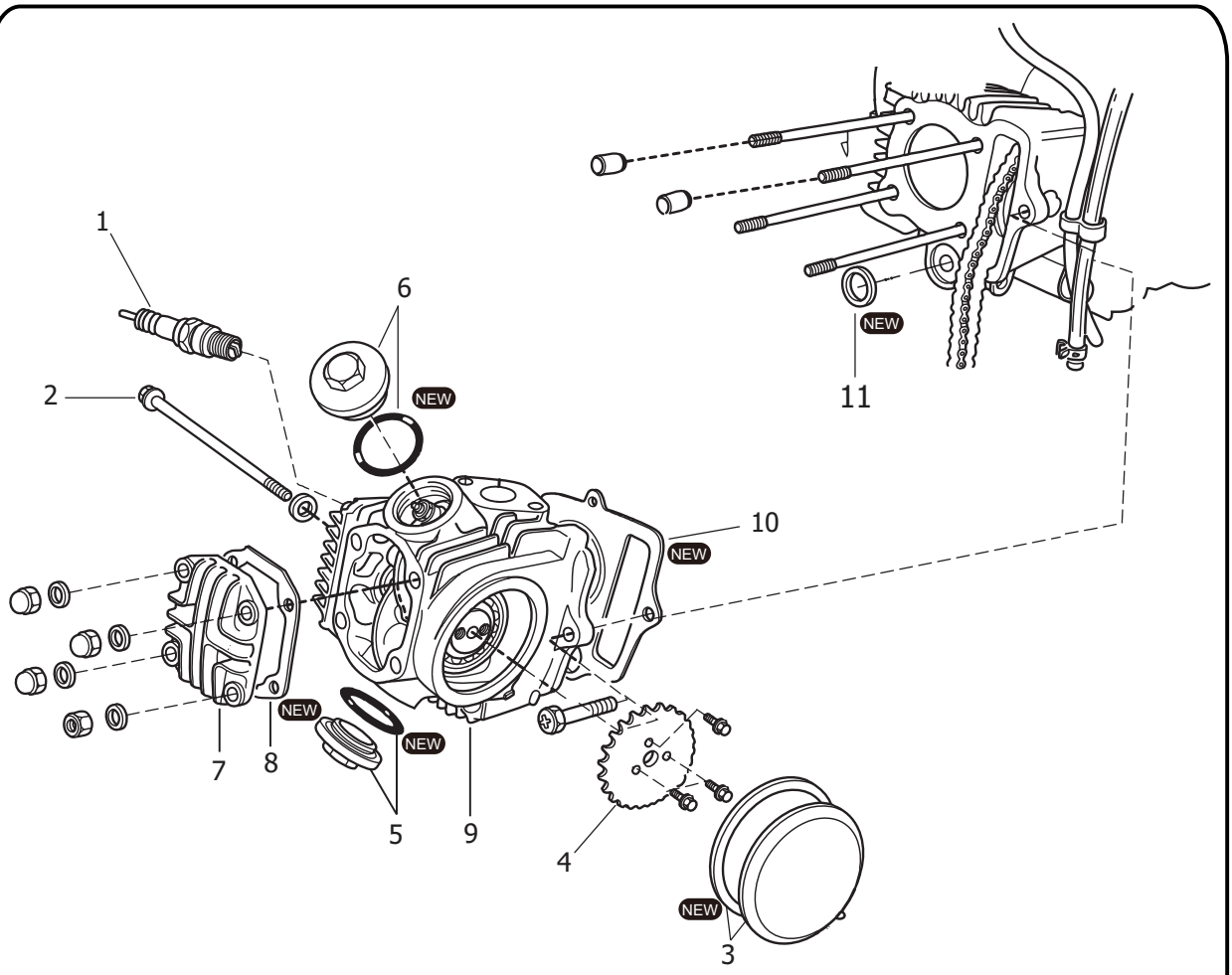
Standard clip position:
No.4 Groove

SPROCKET REPLACEMENT



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	COVER,L.RR.CRANKCASE	1	
2	INITIATIVE CHAIN DRIVER RIVET PLANK	1	
3	DRIVING GEAR	1	
4	SHIFT PEDAL	1	
5	GUAGE OIL LEVER	1	
6	KICK STARTER	1	
7	SPARK PLUG CAP	1	
8	ENGINE SKID PLATE	1	
9	SIDE STAND	1	
10	RIGHT FOOT PAGS	1	
11	LEFT FOOT PEGS	1	
12	BRACKET FOR PEDAL	1	
13	AXLE	2	
			For installation, reverse the removal procedure.

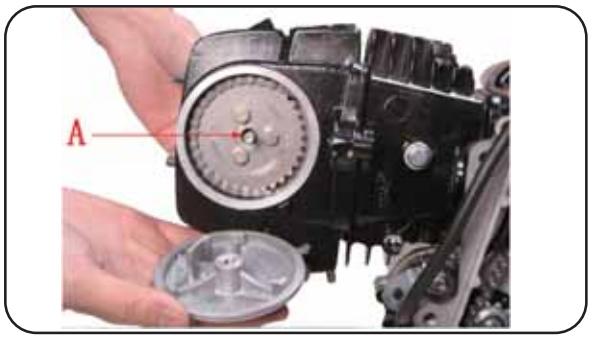
CYLINDER HEAD

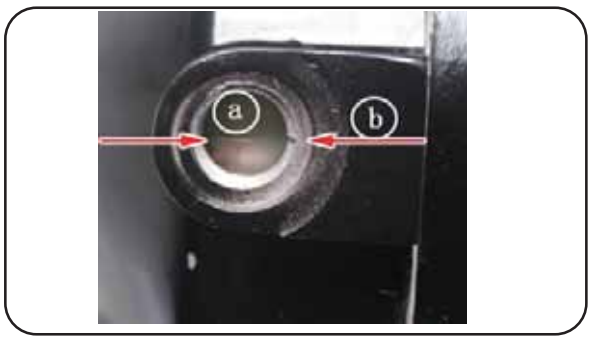


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	Spark plug	1	
2	Bolt M6 x 110	1	
3	Cylinder cover L / Gasket	1	
4	Timing driven sprocket	1	
5	Valve cover / O-ring	1	
6	Valve cover / O-ring	1	
7	Cylinder cover	1	
8	Gasket,cylinder cover	1	
9	Cylinder head	1	
10	Gasket,cylinder head	1	
11	Rectangle ring	1	
			For installation, reverse the removal procedure.

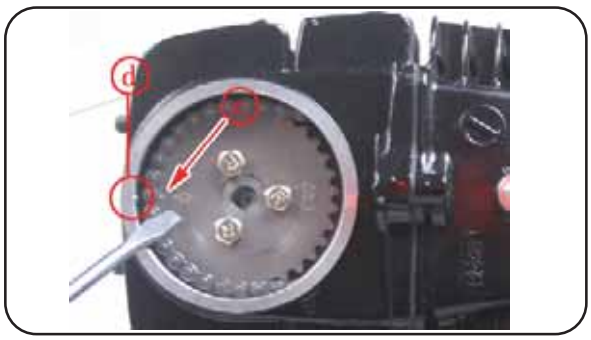
REMOVING THE CYLINDER HEAD

1. Remove:
   - Long Bolt A
   - Nut B





2. Align:
   - "I" mark ⓐ on the generator rotor (with the stationary pointer ⓑ on the crankcase cover)



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a. Turn the primary pulley counterclockwise.
b. When the piston is at TDC on the compression stroke, align the "I" mark ⓒ on the camshaft sprocket with the mark ⓓ on the cylinder head.

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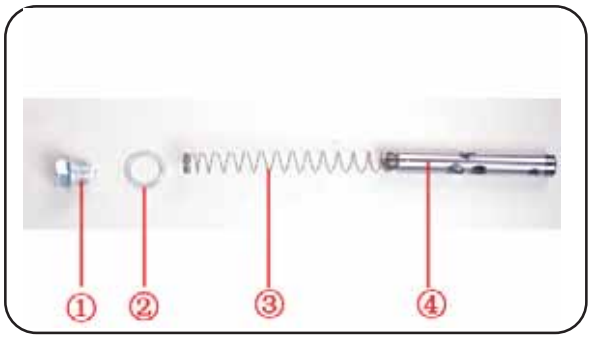
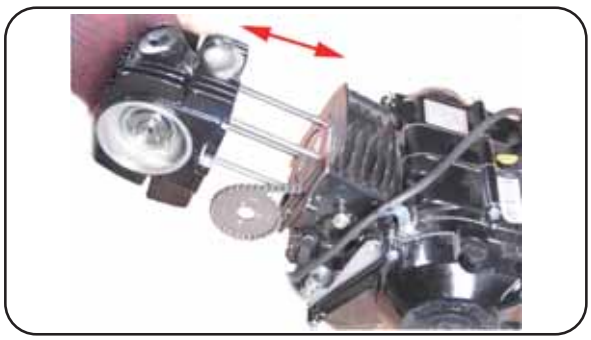
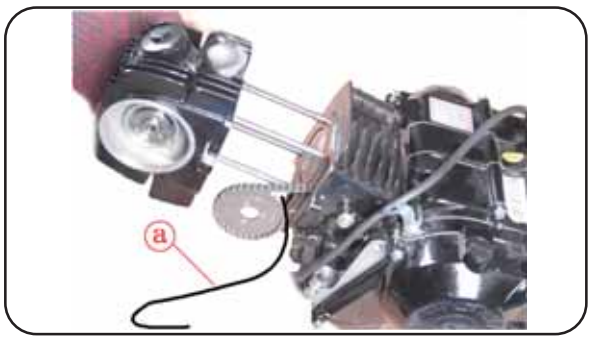
3. Loosen:
   - Bolt①
4. Remove:
   - Bolt②

5 Remove Chain Tensioner



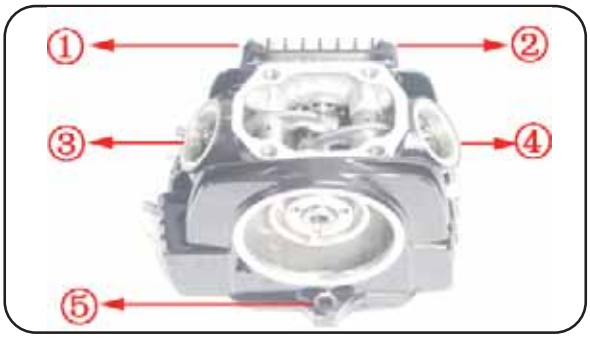
- Bolt ①
- Washer ②
- Spring Chain Tensioner Push Road ③
- Chain Tensioner Push Road Assembly④





NOTE:

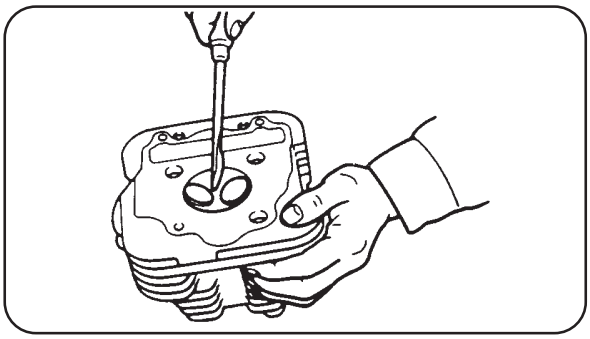
- To prevent the timing chain from falling into the crankcase, fasten it with a wire ⓐ.
- While holding the generator rotor bolt with a wrench, remove the bolt.



6. Remove:
   • cylinder head

NOTE:

• Loosen the nuts ① ② ③ ④ ⑤ in the proper sequence.
• Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



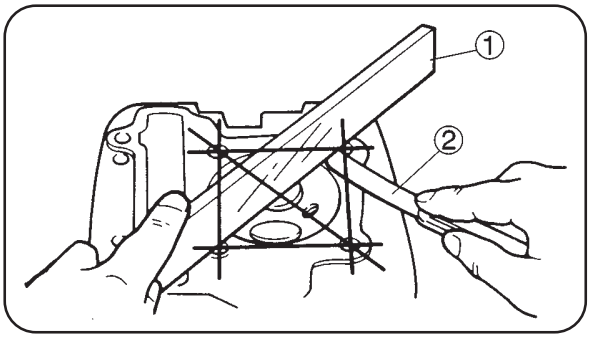
CHECKING THE CYLINDER HEAD

1. Eliminate:
   • combustion chamber carbon deposits (with a rounded scraper)

NOTE:

Do not use a sharp instrument to avoid damaging or scratching:
• spark plug threads
• valve seats

2. Check:
   • cylinder head
     Damage/scratches → Replace.



3. Measure:
   • cylinder head warpage
     Out of specification → Resurface the cylinder head.

Cylinder head warpage
Less than 0.03 mm

a. Place a straightedge ① and a thickness gauge ② across the cylinder head.
b. Measure the warpage.
c. If the limited is exceeded, resurface the cylinder head as follows.
d. Place a 400 ~ 600 grit wet abrasive paper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

NOTE:

To ensure an even surface, rotate the cylinder head several times.

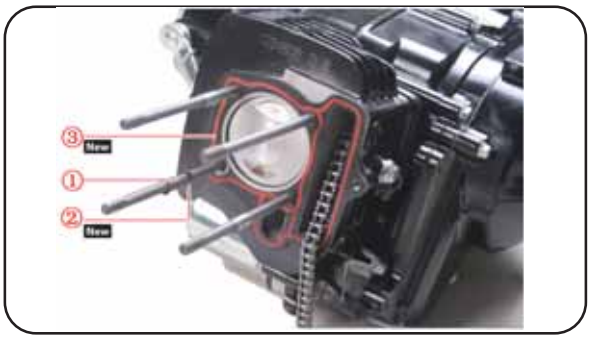
CHECKING THE TIMING CHAIN TENSIONER

1. Check:
   - timing chain tensioner ①
     Cracks/damage → Replace.

CHECKING THE TAPPET COVERS AND CAMSHAFT SPROCKET COVER

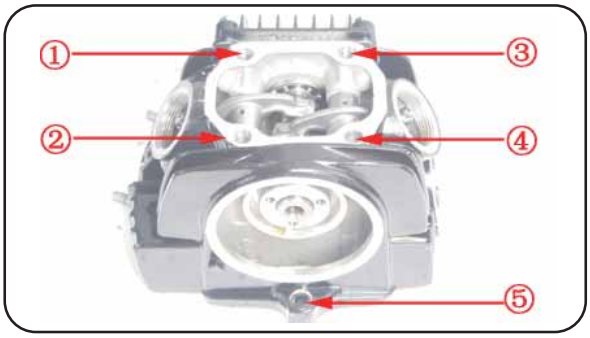
The following procedure applies to both of the tappet covers and O-rings.

1. Check:
   - tappet cover • camshaft sprocket cover
   - O-ring
     Damage/wear → Replace the defective part(-s).



INSTALLING THE CYLINDER HEAD

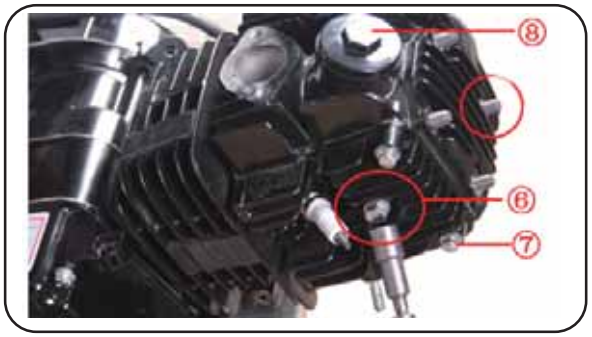
1. Install:
   - dowel pins ①
   - O-ring (New) ②
   - gasket (New) ③



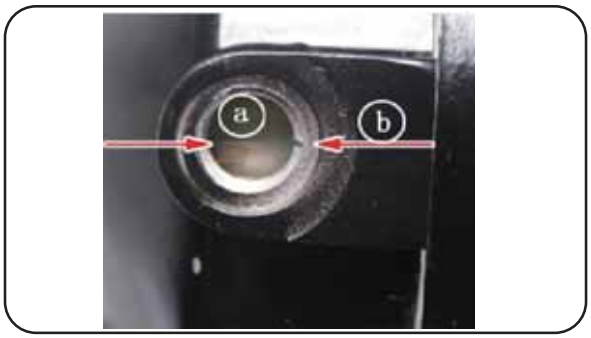
2. Install:
   - cylinder head

NOTE:

- Apply engine oil onto the threads of the cylinder head nuts.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.



Cylinder head nut and bolt
M7 (① ~ ④) 15Nm
M6 (⑤) 10Nm
M6 (⑥) 10Nm
M6 (⑦) 10Nm
M30 (⑧) 20Nm



INSTALLING THE CAMSHAFT SPROCKET

1. Align:
   - "I" mark on the generator rotor (with the mark on the generator rotor cover)

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a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the "I" mark ⓐ on the generator rotor with the mark ⓑ on the generator rotor cover.

NOTE:

Be sure to keep the timing chain as tight as possible.

2. Install:
   - timing chain (onto the camshaft sprocket)
   - camshaft sprocket (onto the camshaft)

NOTE:

The notch ⓐ on the camshaft should face towards the intake side of the engine.
Align the camshaft marks ⓐ with the edge of the cylinder head as shown.

CAUTION:

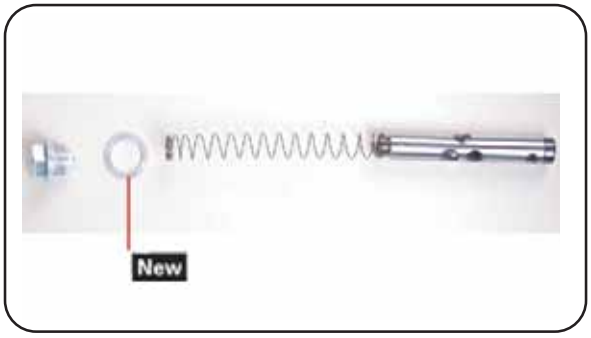
Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

3. Install:
   - Timing chain tensioner bolt ① and washer (New)

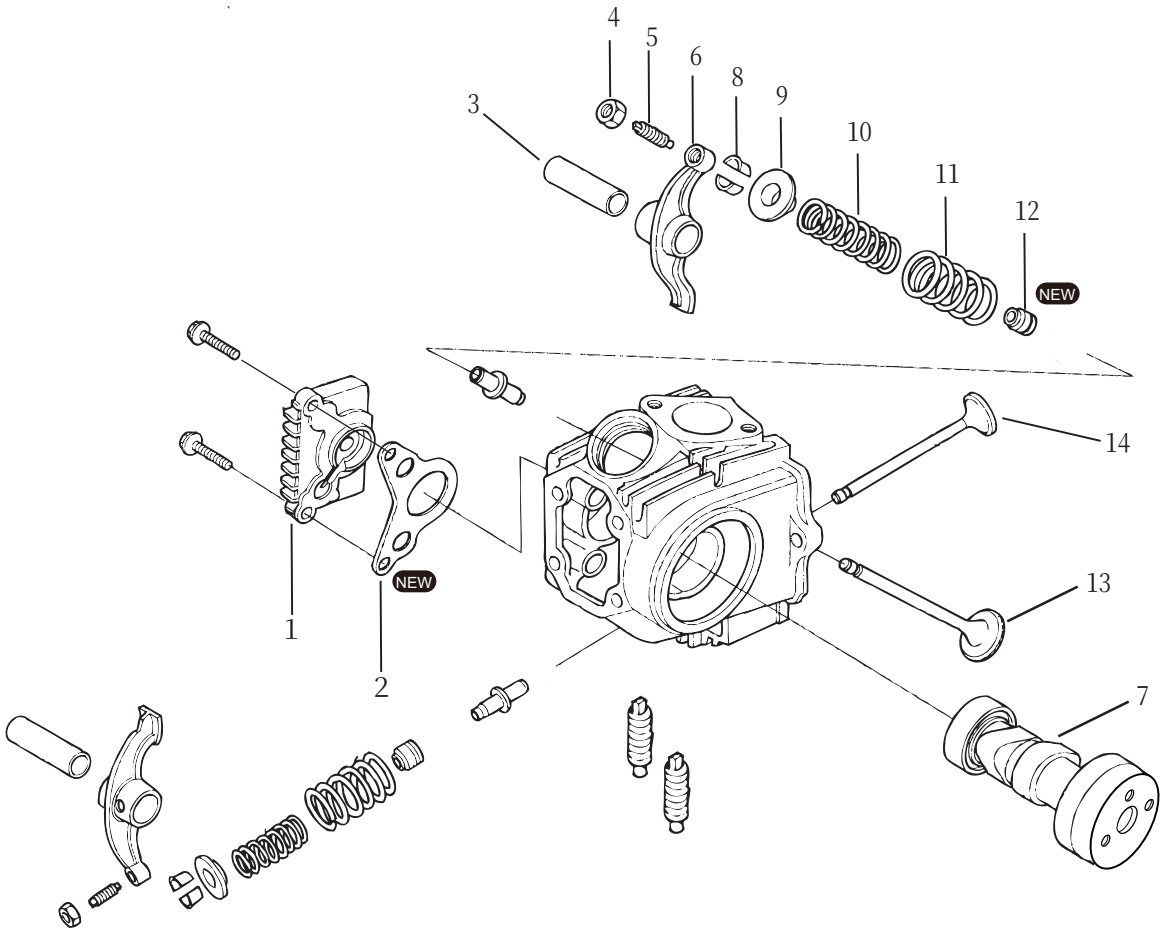
12 Nm (1.2 m•kg)

   - Camshaft sprocket bolts ②

6 Nm (0.6 m•kg)



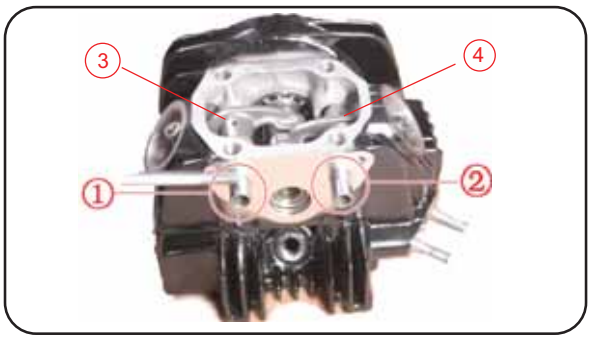
CAMSHAFT /VALVES AND VALVE SPRINGS



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	RIGHT COVER,CYLINDER HEAD	1	
2	GASKET	1	
3	SHAFT,VALVE RROCKER ARM	2	
4	ADJUSTING NUT	2	
5	ADJUSTING SCREW	2	
6	VALVE RROCKER ARM	2	
7	CAM SHAFT	1	
8	VALVE COTTER	4	
9	PETAINER,VALVE SPRING	2	
10	VALVE INNER SPRING	2	
11	VALVE OUTER SPRING	2	
12	VALVE STEM SEAL	2	
13	INTAKE VALVE	1	
14	EXHAUST VALVE	1	
			For installation, reverse the removal procedure.

REMOVING THE ROCKER ARMS AND CAMSHAFT

1. Loosen:
   - locknuts ①
   - adjusting screws ②

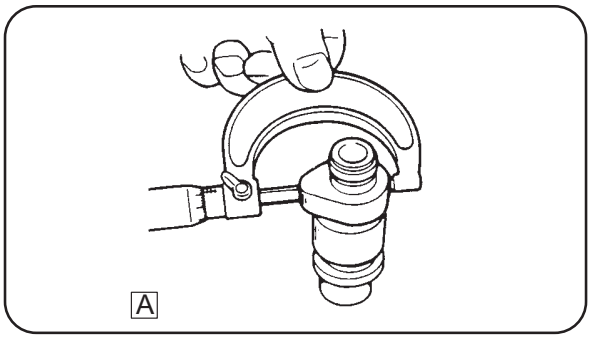


2. Remove:
   - intake rocker arm shaft ①
   - exhaust rocker arm shaft ②
   - intake rocker arm ③
   - exhaust rocker arm ④

3. Remove:
   - camshaft ①

CHECKING THE CAMSHAFTS

1. Check:
   - camshaft bushings
     Damage/wear → Replace.
   - camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.

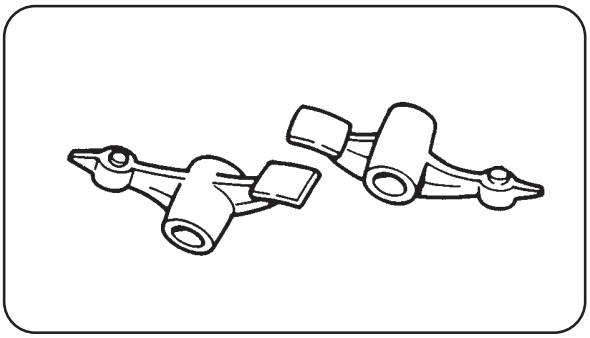


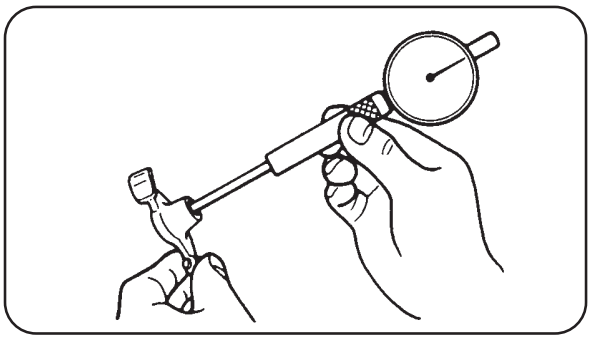
2 Measure:
- camshaft lobe dimensions A
  Out of specification → Replace the camshaft.

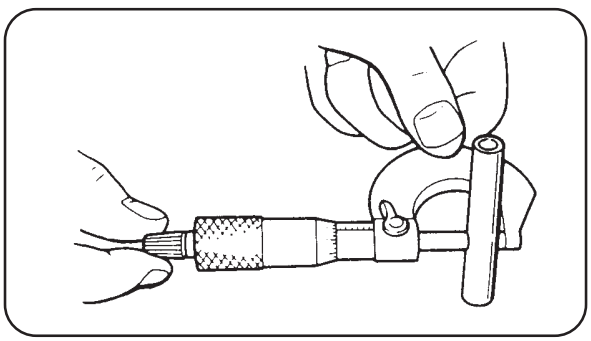
Camshaft lobe dimension limit
Intake
26.30 mm

Exhaust
26.00 mm

3. Check:
- camshaft oil passage
  Obstruction → Blow out with compressed air.







CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:
- rocker arm
  Damage/wear → Replace.
2. Check:
- rocker arm shaft
  Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Check:
- camshaft lobe
  Excessive wear → Replace the camshaft.
4. Measure:
- rocker arm inside diameter
  Out of specification → Replace.

Rocker arm inside diameter
10.000 ~ 10.015 mm
Limit 10.1 mm

5. Measure:
- rocker arm shaft outside diameter
  Out of specification → Replace.

Rocker arm shaft outside diameter
9.98 ~ 9.995 mm
Limit 9.910 mm

6. Calculate:
   • rocker-arm-to-rocker-arm-shaft clearance

NOTE:

Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

Out of specification → Replace the defective part(-s).

Rocker-arm-to-rocker-arm-shaft clearance
0.005 ~ 0.035 mm

INSTALLING THE CAMSHAFT AND ROCKER ARMS

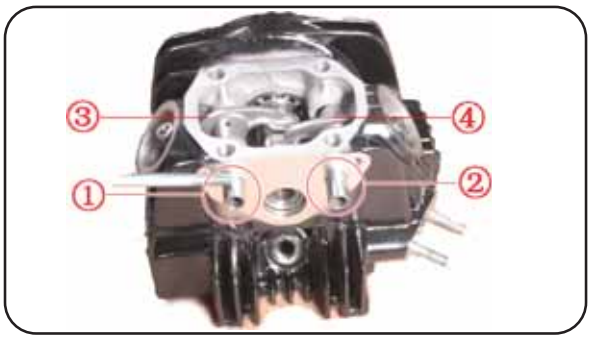
1. Lubricate:
   • rocker arm shaft

Recommended lubricant
Molybdenum disulfide oil

2. Install:
   • exhaust rocker arm ④
   • exhaust rocker arm shaft ②

NOTE:

Make sure that the exhaust rocker arm shaft is completely pushed into the cylinder head.



3. Install:
   • intake rocker arm ③
   • intake rocker arm shaft ①

NOTE:

Insert the camshaft into the hole in the cylinder head and the intake rocker arm shaft as shown .

4. Lubricate:
   • Camshaft

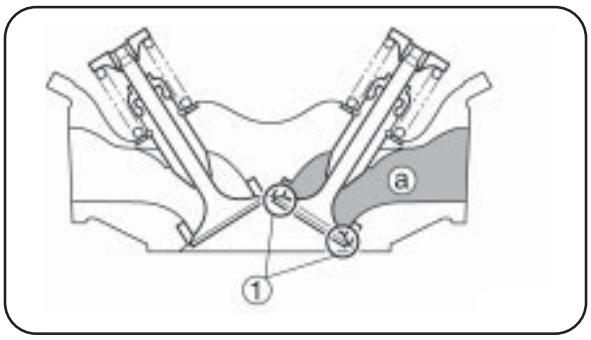
Recommended lubricant
Camshaft
Molybdenum disulfide oil
Camshaft bearing
Engine oil

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

NOTE:

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



1. Check:
   - valve sealing
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
     Refer to "CHECKING THE VALVE SEATS".

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a. Pour a clean solvent ⓐ into the intake and exhaust ports.
b. Check that the valves properly seal.
   There should be no leakage at the valve seat ①.

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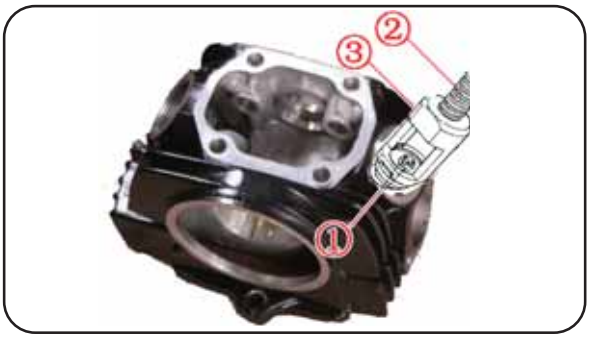
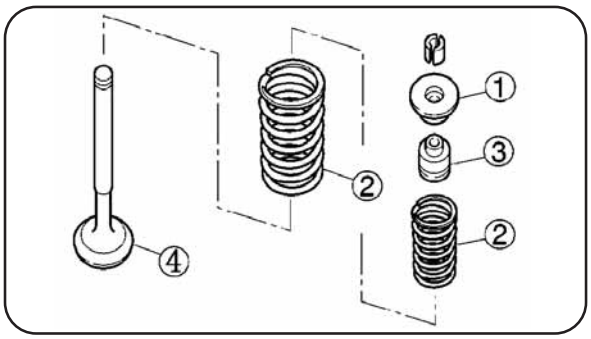


2. Remove:
   - valve cotters ①

NOTE:

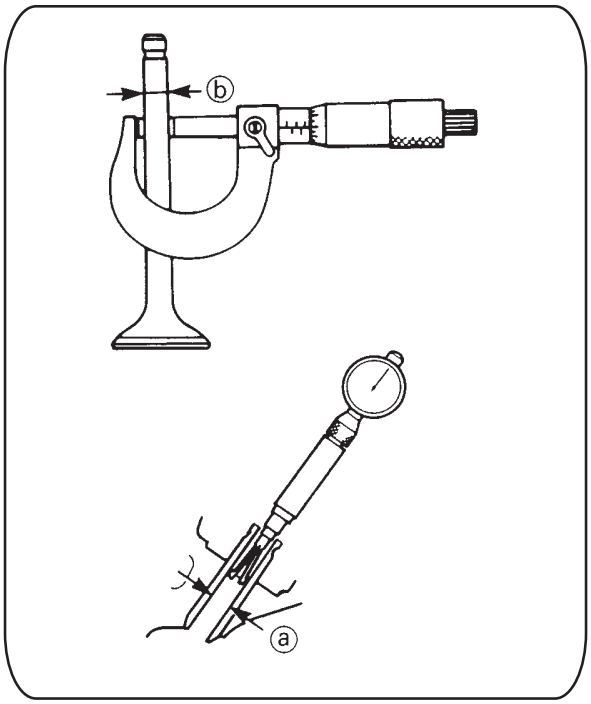
Remove the valve cotters by compressing the valve springs with the valve spring compressor ② and attachment ③.

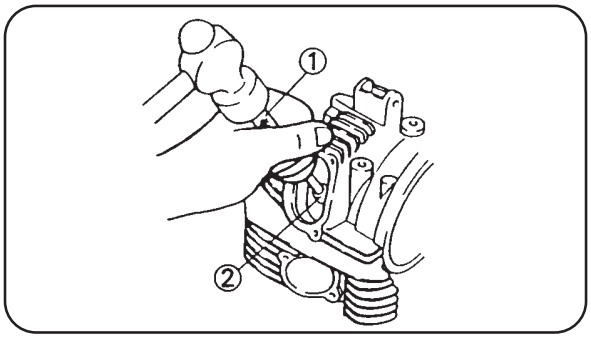


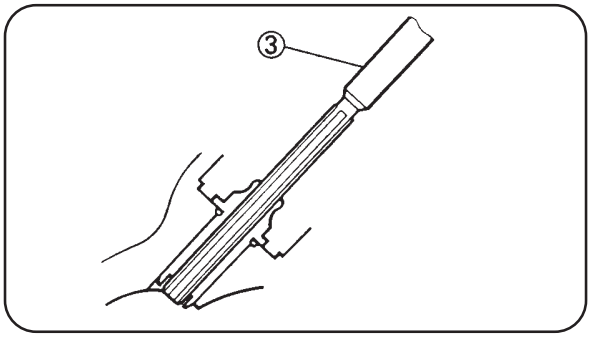
3. Remove:
   - upper spring seat ①
   - valve springs ②
   - oil seal ③
   - valve ④

NOTE:

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







CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:
   - valve-stem-to-valve-guide clearance

Valve-stem-to-valve-guide clearance = Valve guide inside diameter ⓐ – Valve stem diameter ⓑ

Out of specification → Replace the valve guide.

Valve-stem-to-valve-guide clearance
Intake
0.015 ~ 0.042 mm
Limit: 0.08 mm
Exhaust
0.030 ~ 0.057 mm
Limit: 0.10 mm

2. Replace:
   - valve guide

NOTE:

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100°C in an oven.

a. Remove the valve guide with a valve guide remover ①.

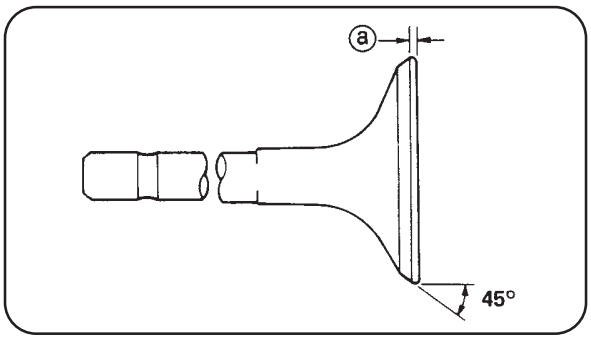
b. Install the new valve guide with a valve guide installer ② and valve guide remover ①.

c. After installing the valve guide, bore the valve guide with a valve guide reamer ③ to obtain the proper valve-stem-to-valve-guide clearance.

NOTE:

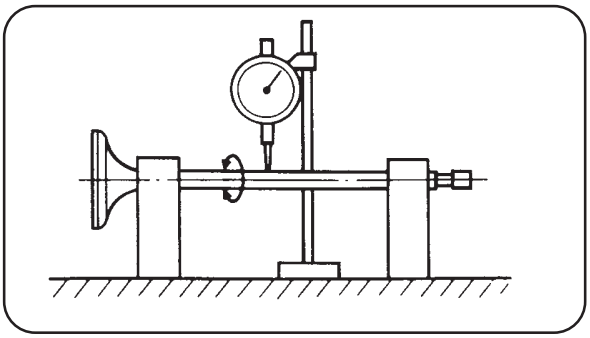
After replacing the valve guide, reface the valve seat.

3. Eliminate:
   • carbon deposits
   (from the valve face and valve seat)
4. Check:
   • valve face
   Pitting/wear → Grind the valve face.
   • valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.



5. Measure:
   • valve margin thickness ⓐ
   Out of specification → Replace the valve.

Valve margin thickness
0.65 ~ 0.95 mm



6. Measure:
   • valve stem runout
   Out of specification → Replace the valve.

NOTE:

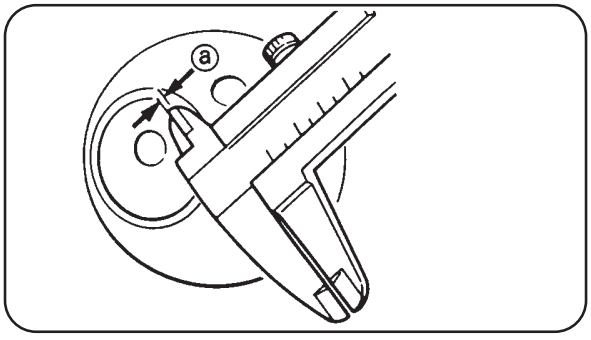
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.

Valve stem runout
Limit: 0.03 mm

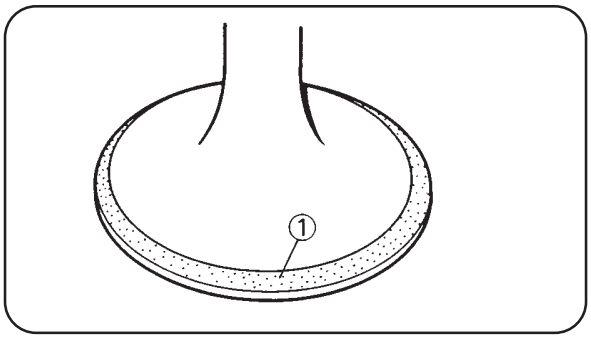
CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:
   • carbon deposits
   (from the valve face and valve seat)
2. Check:
   • valve seat
   Pitting/wear → Replace the cylinder head.
3. Measure:
   • valve seat width ⓐ
   Out of specification → Replace the cylinder head.



Valve seat width
Intake: 0.8 ~ 1.2mm
Limit: 1.6 mm
Exhaust: 0.8 ~ 1.2mm
Limit: 1.6 mm

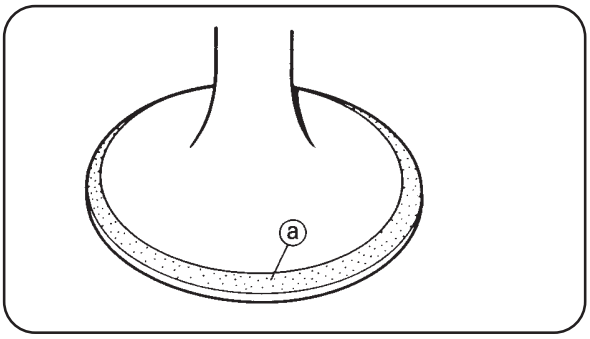


a. Apply Mechanic's blueing dye (Dykem) ① onto the valve face.
b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear pattern.
d. Measure the valve seat width. Where the valve seat and valve face contacted one another, the blueing will have been removed.

4. Lap:
   • valve face
   • valve seat

NOTE:

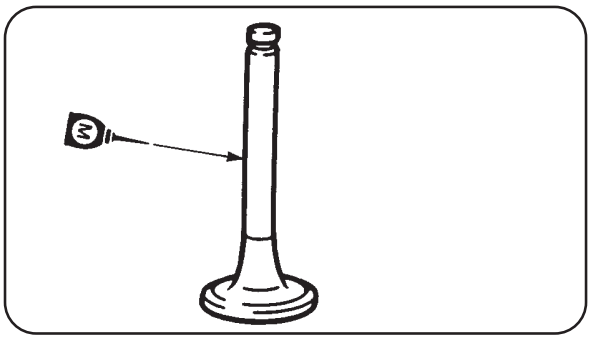
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.



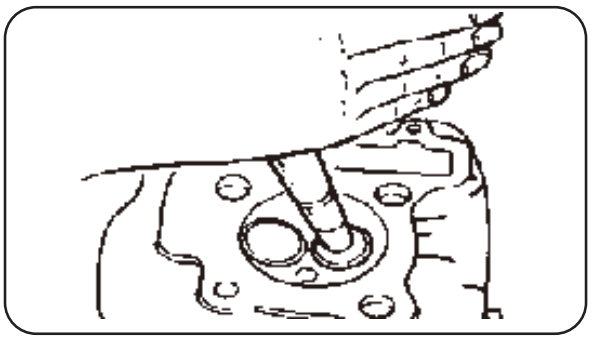
a. Apply a coarse lapping compound ⓐ to the valve face.

CAUTION:

Do not let the lapping compound enter the gap between the valve stem and the valve guide.



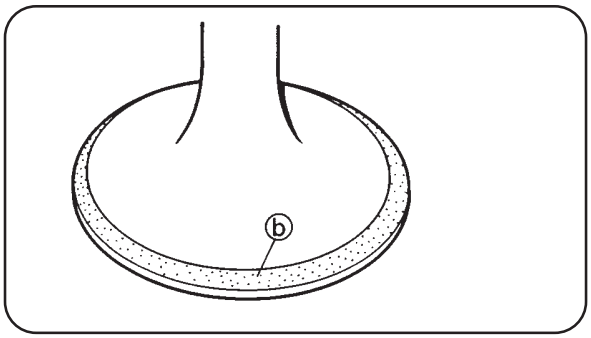
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.

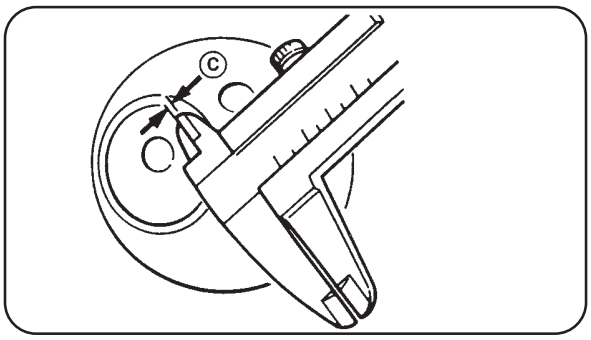


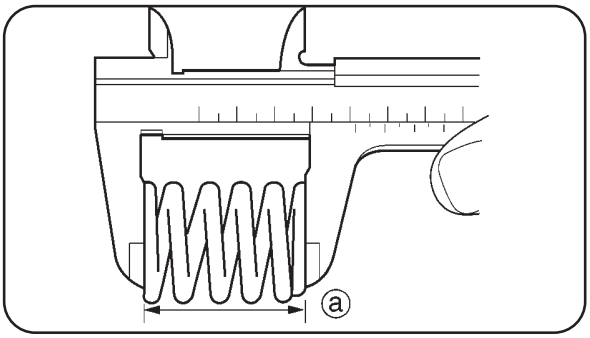
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

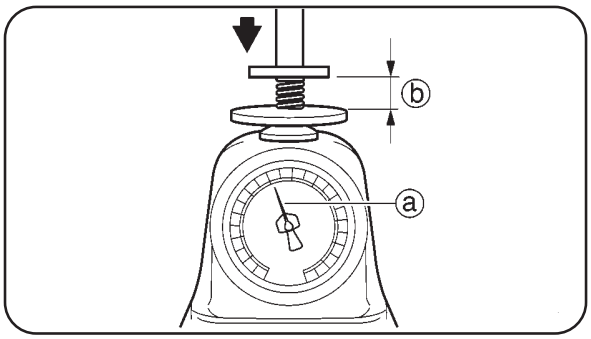
NOTE:

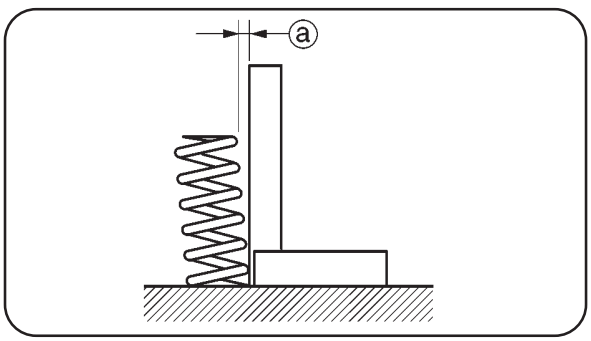
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hand.











e. Apply a fine lapping compound to the valve face and repeat the above steps.
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
g. Apply Mechanic's blueing dye (Dykem) ⓑ onto the valve face.
h. Install the valve into the cylinder head.
i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
j. Measure the valve seat width ⓒ again. If the valve seat width is out of specification, reface and lap the valve seat.

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CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
   • valve spring free length ⓐ
   Out of specification → Replace the valve spring.

Valve spring free length (intake and exhaust)
Inner spring
33.78 mm Limit: 32.5 mm
Outer spring
35.55 mm Limit: 34.0 mm

2. Measure:
   • compressed spring force ⓐ
   Out of specification → Replace the valve spring.

ⓑ Installed length

Compressed spring force
Intake and exhaust inner spring
52 ~ 64 Nm at 22.45 mm
Intake and exhaust outer spring
105 ~129 Nm at 25.45 mm

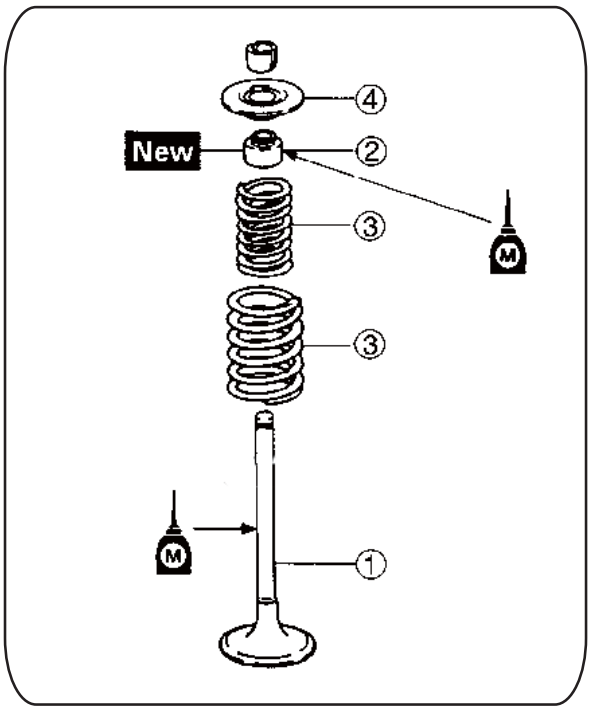
3. Measure:
   • valve spring tilt ⓐ
   Out of specification → Replace the valve spring.

Spring tilt limit
Intake and exhaust inner spring
1.3°/0.8 mm
Intake and exhaust outer spring
1.35°/0.8 mm

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

1. Deburr:
   - valve stem end
     (with an oil stone)



2. Lubricate:
   - valve stem
   - oil seal
     (with the recommended lubricant)

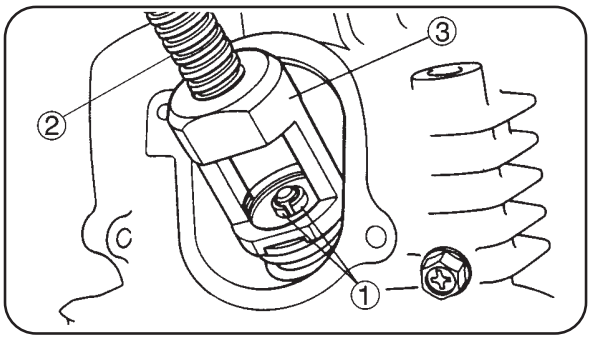
	Recommended lubricant **Molybdenum disulfide oil**

3. Install:
   - valve ①
   - oil seal ②
   - valve springs ③
   - upper spring seat ④

   (into the cylinder head)

NOTE:

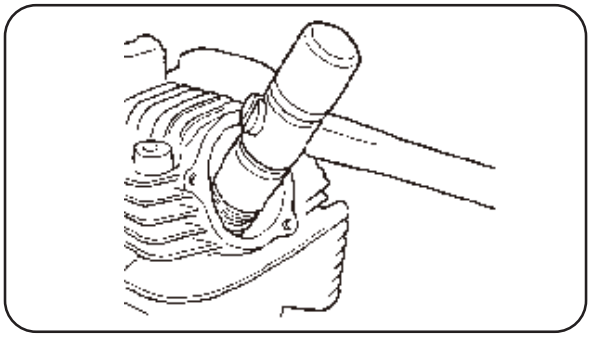
Install the valve springs with the larger pitch a facing up.



4. Install:
   - valve cotters ①

NOTE:

Install the valve cotters by compressing the valve springs with the valve spring compressor ② and attachment ③.

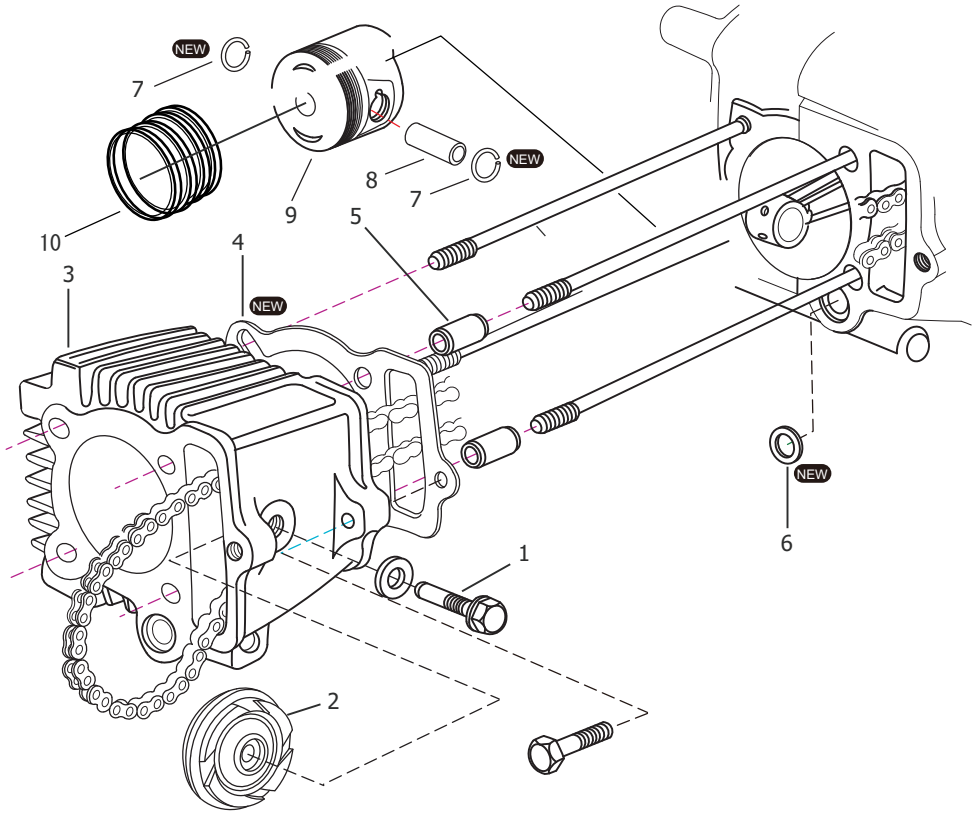


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

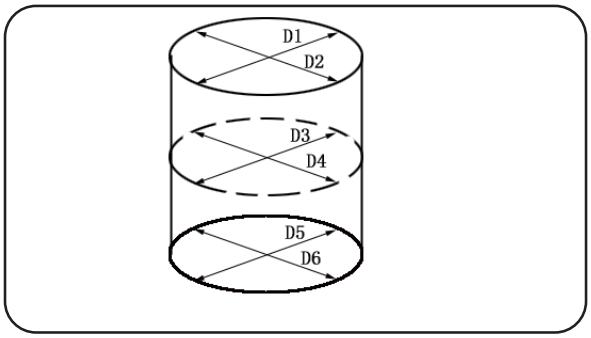
CAUTION:

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

CYLINDER AND PISTON



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	PIN SHAFT,GUIDEROLLER	1	
2	CAM CHAIN GUIDE ROLLER	1	
3	CYLINDER BLOCK	1	
4	GASKET,CYLINDER BLOCK	1	
5	DOWEL PIN	1	
6	RECTANGLE RING	1	
7	CIRCLIP,PISTON PIN	2	
8	PISTON PIN	1	
9	PISTON	1	
10	PISTON RING	1	
			For installation, reverse the removal procedure.



REMOVING THE PISTON AND PISTON RINGS

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

NOTE:

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

2. Remove:
   - top ring
   - 2nd ring
   - oil ring

NOTE:

When removing the piston ring, open the end gap of the ring by fingers, and push up the other side of the ring.

CHECKING THE CYLINDER AND PISTON

1. Check:
   - piston wall
   - cylinder wall

   Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - piston-to-cylinder clearance

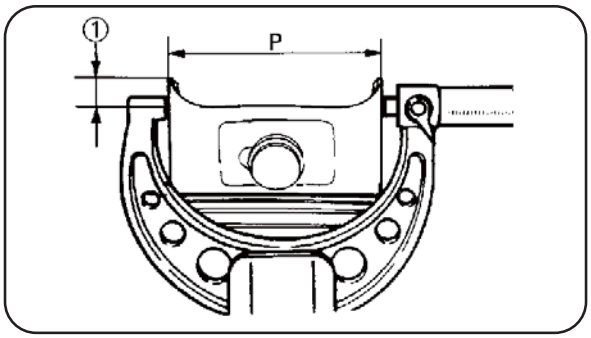
a. Measure cylinder bore "C" with the cylinder bore gauge.

NOTE:

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Cylinder bore "C"	**54.00 ~ 54.015 mm**
Taper limit "T"	**0.05 mm**
Out of round "R"	**0.005 mm**

"C" = Maximum D
"T" = (Maximum D_1 or D_2) – (Maximum D_5 or D_6)
"R" = (Maximum D_1, D_3 or D_5) – (Minimum D_2, D_4 or D_6)



b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter "P" with the micrometer.

① 7.0 mm from the bottom edge of the piston.

	Piston size "P"
Standard	53.965 ~ 53.975 mm

d. If out of specification, replace the piston and piston rings as a set.
e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore "C" –
Piston skirt diameter "P"

Piston-to-cylinder clearance
0.025 ~ 0.05 mm

f. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

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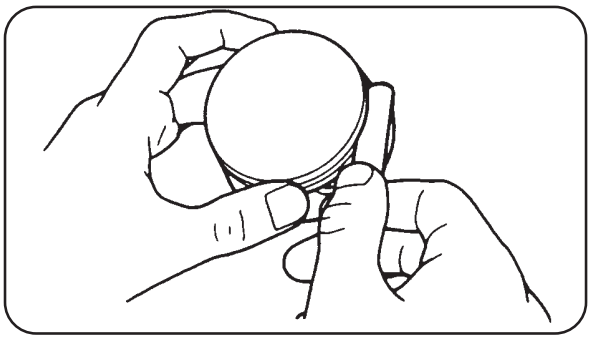


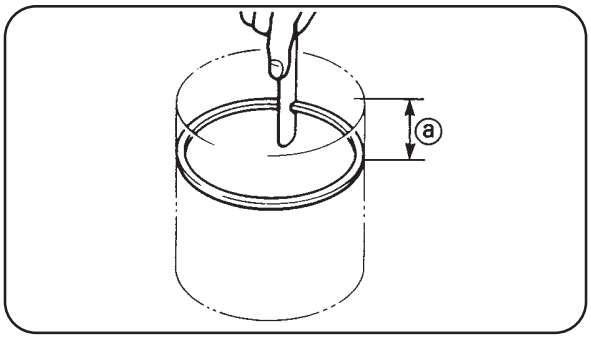
CHECKING THE PISTON RINGS

1. Measure:
   • piston ring side clearance
   Out of specification → Replace the piston and piston rings as a set.

NOTE:

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

Piston ring side clearance
Top ring
0.04 ~ 0.08 mm
<Limit>: 0.12mm
2nd ring
0.04 ~ 0.08 mm
<Limit>: 0.12mm



2. Install:
   • piston ring
   (into the cylinder)

NOTE:

Level the piston ring in the cylinder with the piston crown as shown.

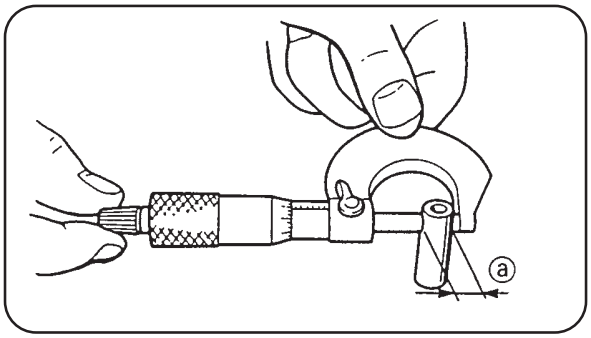
ⓐ 5.0 mm

3. Measure:
   • piston ring end gap
   Out of specification → Replace the piston ring.

NOTE:

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

Piston ring end gap
Top ring
0.10 ~ 0.25 mm
<Limit>: 0.60 mm
2nd ring
0.15 ~ 0.30 mm
<Limit>: 0.60 mm
Oil ring
0.2 ~ 0.5 mm

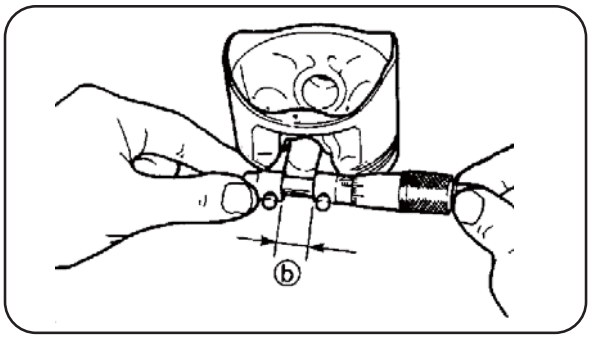


CHECKING THE PISTON PIN

1. Check:
   • piston pin
   Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   • piston pin outside diameter ⓐ
   Out of specification → Replace the piston pin.

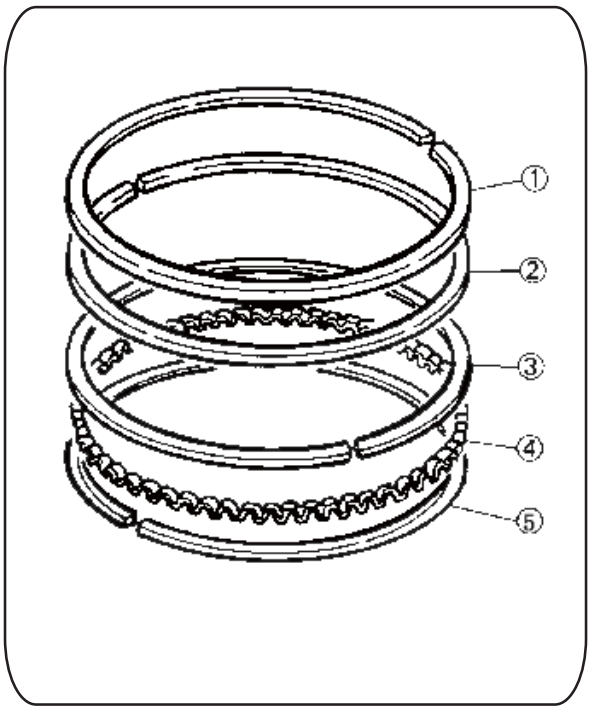
Piston pin outside diameter
13.994 ~ 14.000 mm

3. Calculate:
   • piston-pin-to-piston clearance
   Out of specification → Replace the piston pin and piston as a set.



Piston-pin-to-piston clearance =
Piston pin bore size ⓑ –
Piston pin outside diameter ⓐ

Piston-pin-to-piston clearance
0.002 ~ 0.019 mm

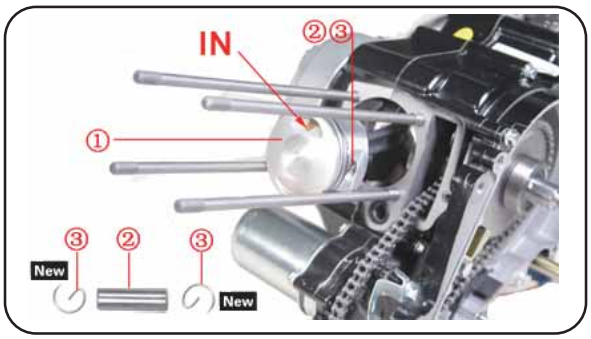


INSTALLING THE PISTON AND CYLINDER

1. Install:
   - top ring ①
   - 2nd ring ②
   - upper oil ring rail ③
   - oil ring expander ④
   - lower oil ring rail ⑤

NOTE:

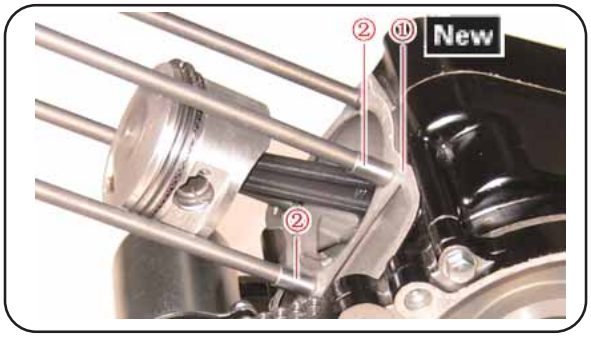
Be sure to install the piston rings so that the manufacturer's marks or numbers face up.



2. Install:
   - piston ①
   - piston pin ②
   - piston pin clip ③ New

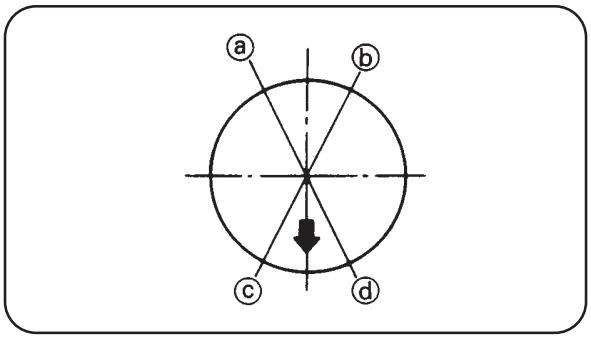
NOTE:

- Apply engine oil onto the poston pin.
- Make sure that the mark "IN" on the piston points towards the intake side of the cylinder.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.



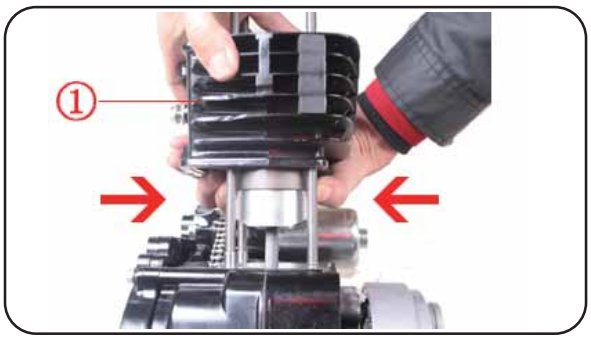
3. Install:
   - gasket ① New
   - dowel pins ②
4. Lubricate:
   - piston
   - piston rings
   - cylinder
   (with the recommended lubricant)

Recommended lubricant
Engine oil



5. Offset:
   • piston ring end gaps

ⓐ Top ring
ⓑ Lower oil ring rail
ⓒ Upper oil ring rail
ⓓ 2nd ring

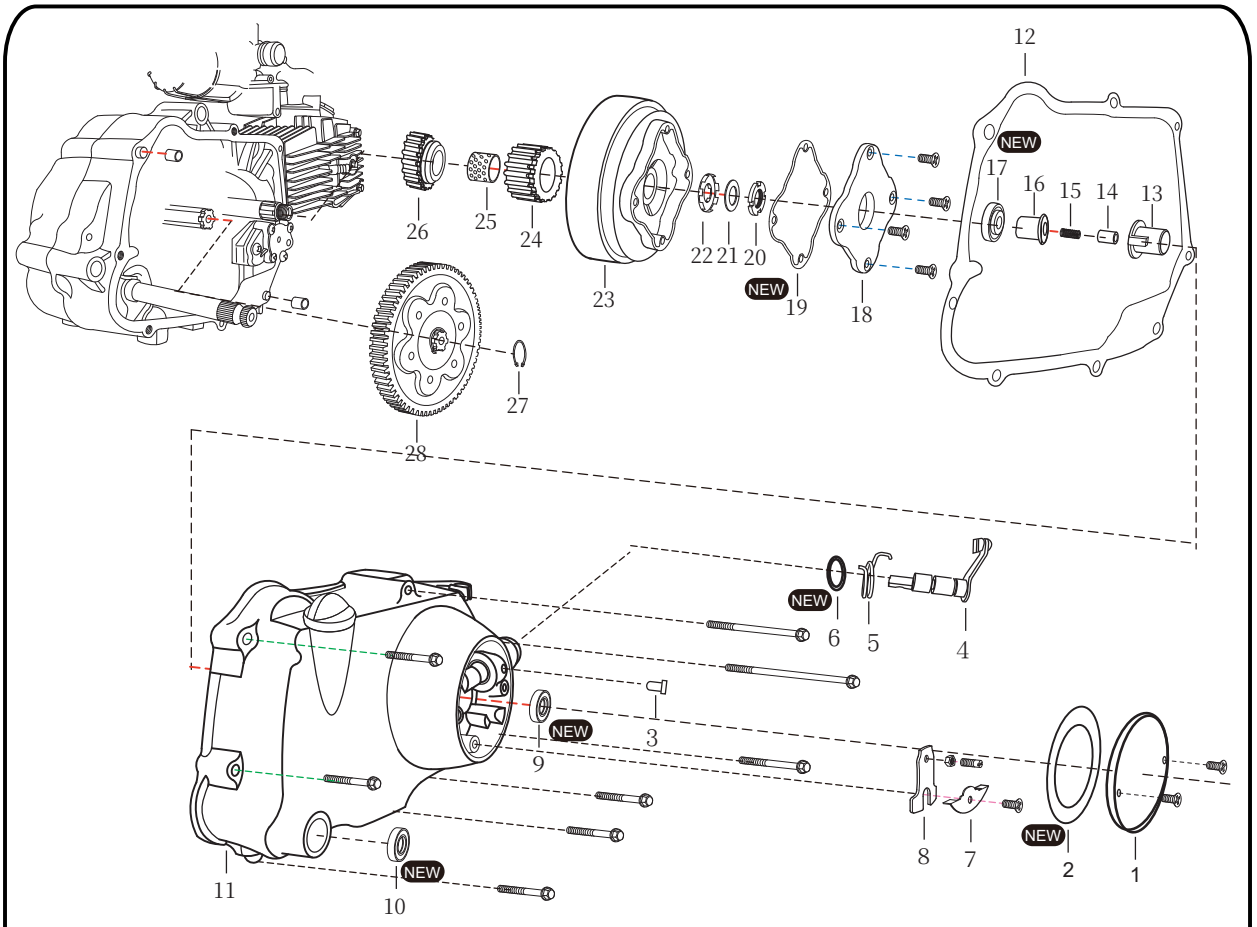


6. Install:
   • cylinder ①

NOTE:

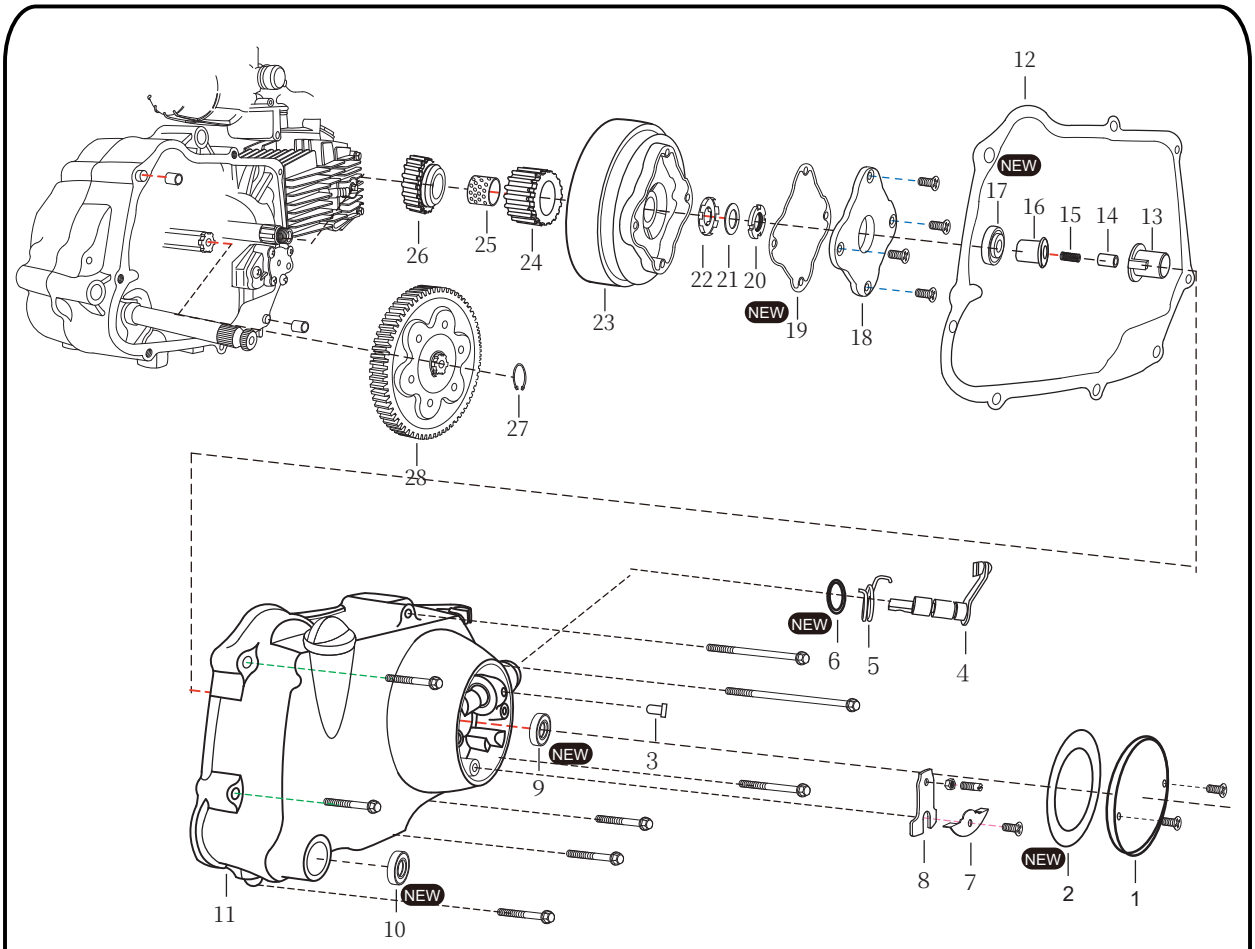
- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

CLUTCH



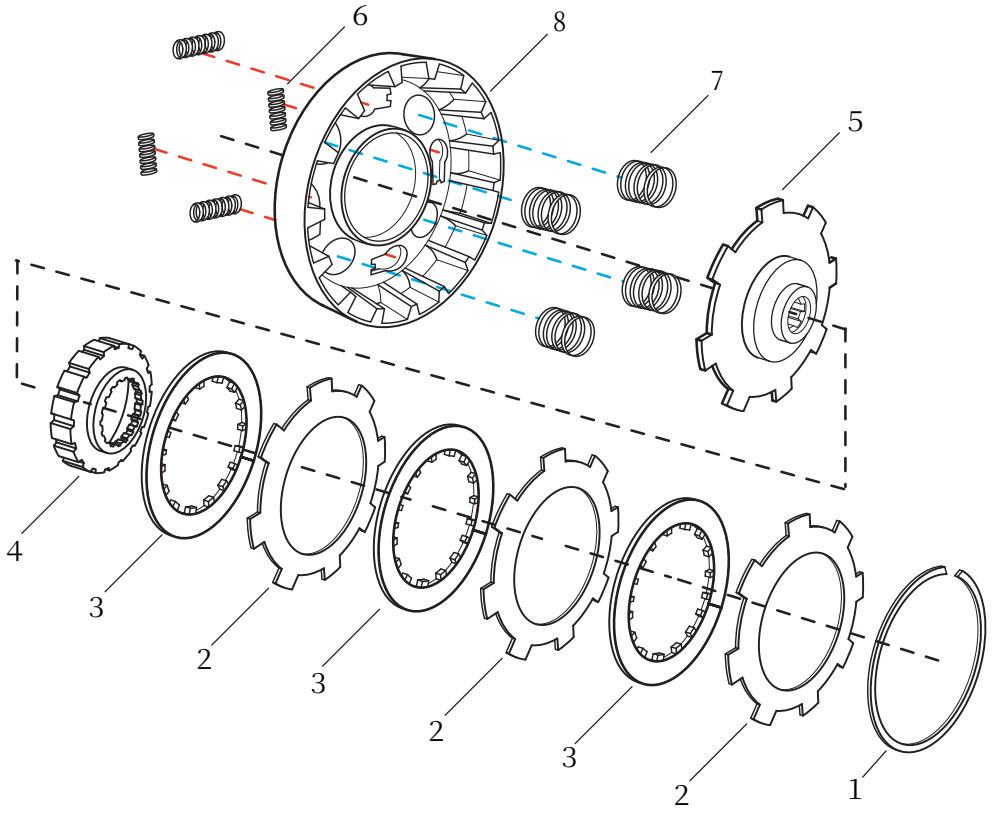
Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	DECORATE COVER,R CRANK CASE COVER	1	
2	GASKET,DECORATE COVER	1	
3	CLUTCHLEVER PIN	1	
4	CLUTCHLEVER ASSY	1	
5	CLUTCH CAM SHAFT SPRING	1	
6	O-RING	1	
7	CLUTCH SHIFTING PLATE	1	
8	CLUTCH PRESSURE PLATE	1	
9	OIL SEAL	1	
10	OIL SEAL	1	
11	R ,CRANK CASE COVER	1	
12	GASKET,R ,CRANK CASE COVER	1	
13	CLUTCH PUSH ROD	1	
14	OIL TUBE	1	
15	OIL THIMBLE SPRING	1	
16	OIL THIMBLE	1	
17	BEARING	1	
18	CLUTCH END COVER	1	For installation, reverse the removal procedure.

CLUTCH

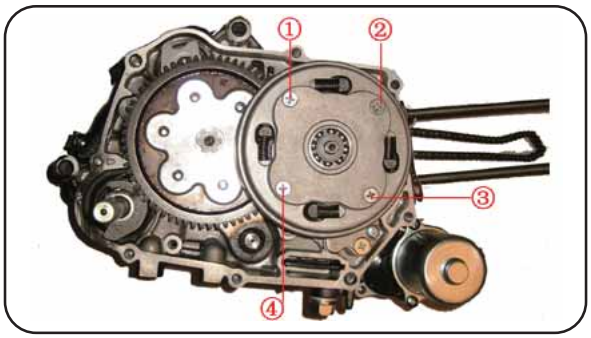


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
19	GASKET,END COVER	1	
20	NUT	1	
21	WASHER	1	
22	THURST WASHER	1	
23	CLUTCH ASSY	1	
24	DRIVER GEAR	1	
25	SLEEVE	1	
26	BUSH	1	
27	CIRCLIP	1	
28	DRIVEN GEAR CAM	1	
			For installation, reverse the removal procedure.

CLUTCH

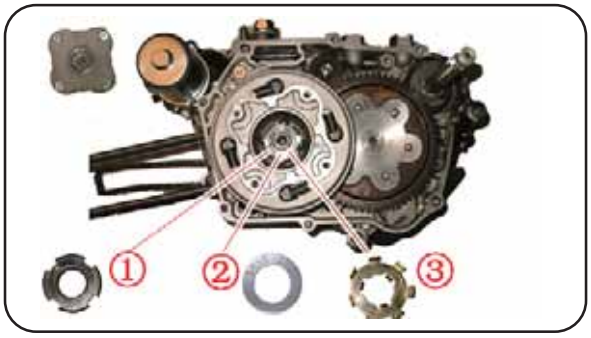


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	CIRCLIP	1	
2	PLATE	3	
3	CLUTCH DRIVE FRICTION PLATE	3	
4	CLUTCH CENTER SLEEVE	1	
5	DRIVE PLATE	1	
6	CLUTCH CUSHION SPRING	1	
7	CLUTCH SPRING	1	
8	CLUTCH OUTER CASE	1	
		1	
			For installation, reverse the removal procedure.



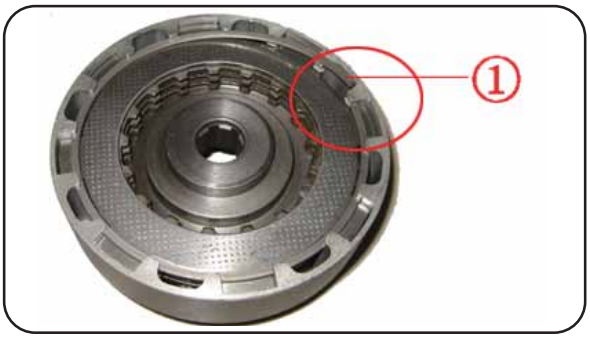
REMOVING THE CLUTCH

1. Remove:
   Screw ① - ④.



2. Straighten the lock washer tab ③
3. Remove:
   - clutch boss nut ①
   - washer ②

NOTE:
While holding the clutch boss with the universal clutch holder , loosen the clutch boss nut.



4. Remove:
   - snap spring ①

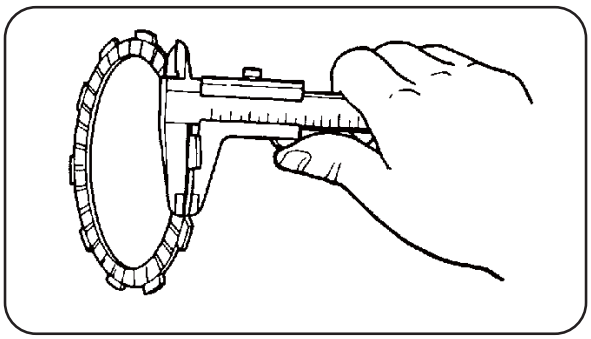
CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

1. Check:
   - friction plate
     Damage/wear → Replace the friction plates as a set.

2. Measure:
   - friction plate thickness
     Out of specification → Replace the friction plates as a set.

NOTE:
Measure the friction plate at four places.

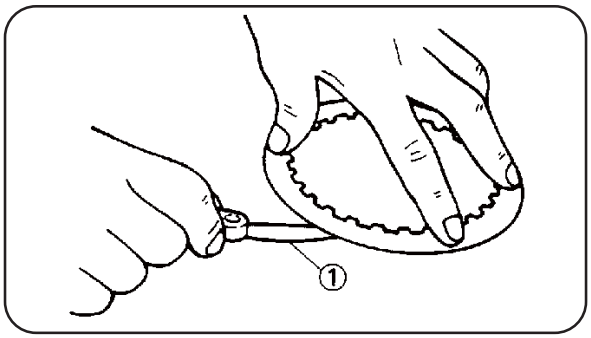


Friction plate thickness
2.85 ~ 2.95 mm
<Limit>: 2.7 mm

CHECKING THE CLUTCH PLATES

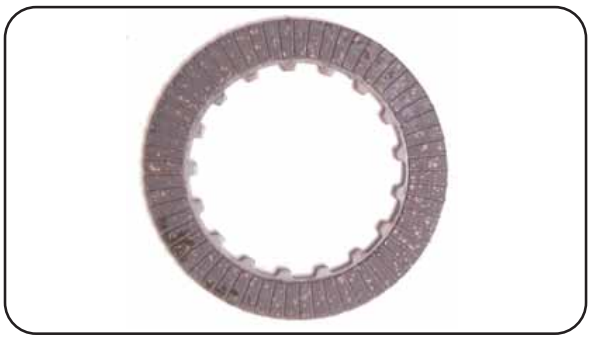
The following procedure applies to all of the clutch plates.

1. Check:
   - clutch plate
     Damage → Replace the clutch plates as a set.



2. Measure:
   • clutch plate warpage
   (with a surface plate and thickness gauge ①)
   Out of specification → Replace the clutch plates as a set.

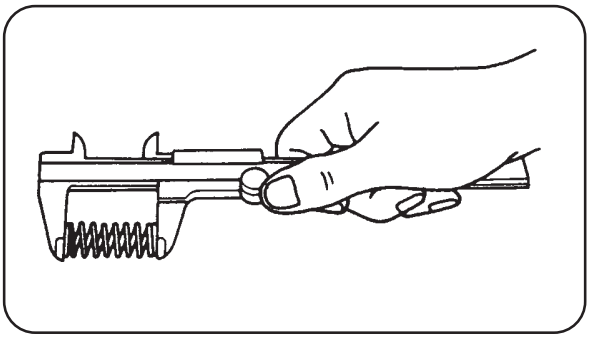
Clutch plate warpage limit
Less than 0.1 mm



CHECKING THE CLUTCH SPRINGS

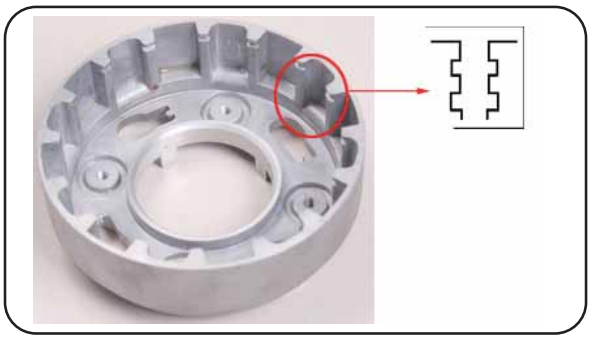
The following procedure applies to all of the clutch springs.

1. Check:
   • clutch spring
   Damage → Replace the clutch springs as a set.



2. Measure:
   • clutch spring free length
   Out of specification → Replace the clutch springs as a set.

Clutch spring free length
20.5 mm
<Limit>: 19.5 mm

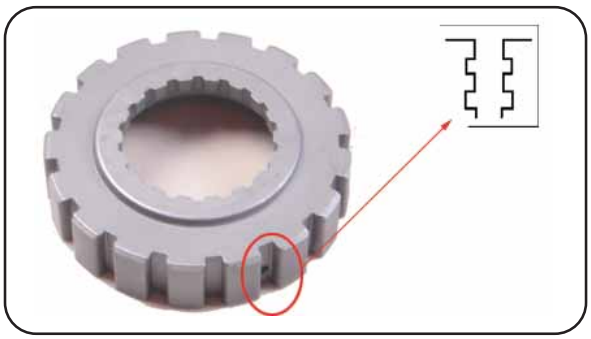


CHECKING THE CLUTCH OUTER CASE

1. Check:
   • clutch outer case dogs
   Damage/pitting/wear → Deburr the clutch outer case dogs or replace it.

NOTE:

Pitting on the clutch housing dogs will cause erratic clutch operation.



CHECKING THE CLUTCH CENTER SLEEVE

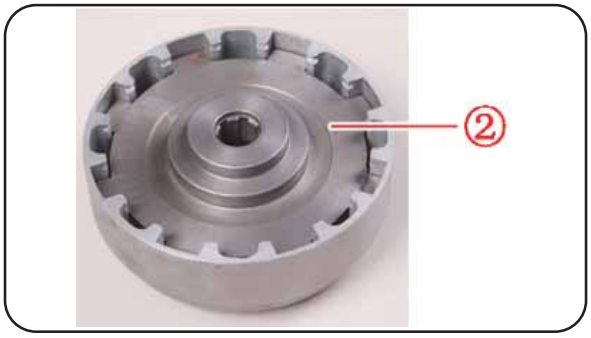
1. Check:
   • clutch center sleeve splines
   Damage/pitting/wear → Replace the clutch center sleeve.

NOTE:

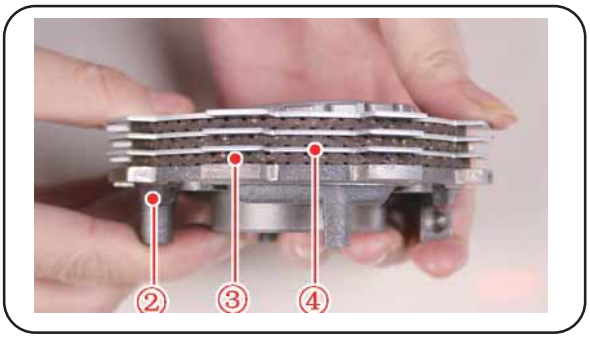
Pitting on the clutch sleeve splines will cause erratic clutch operation.

INSTALLING THE CLUTCH ASSY

1. Install:
   - put the clutch spring ① into the clutch outer case.



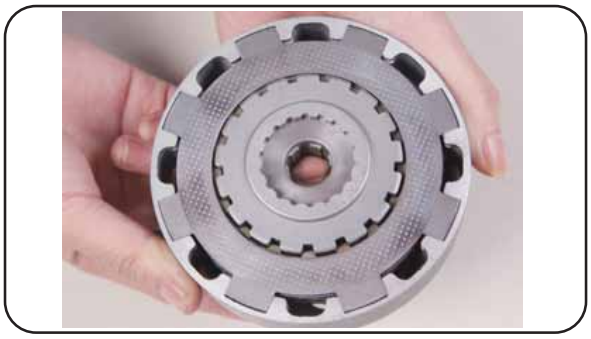
- put the drive plate ② into the clutch outer case.



2. Lubricate:
   - friction plates ③
   - upper plates ④

   (with the recommended lubricant)

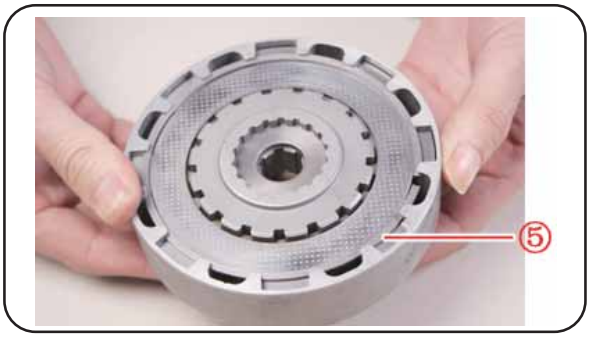
	Recommended lubricant **Engine oil**



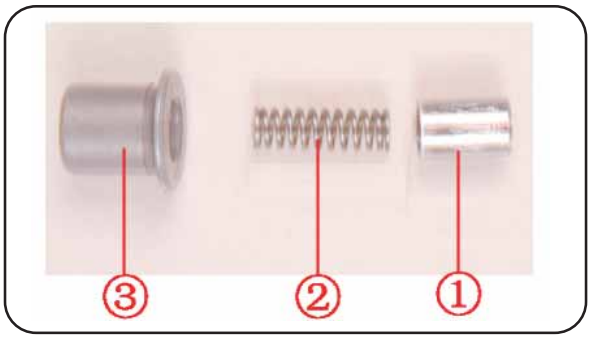
3. Install:
   - friction plates ③
   - upper plates ④

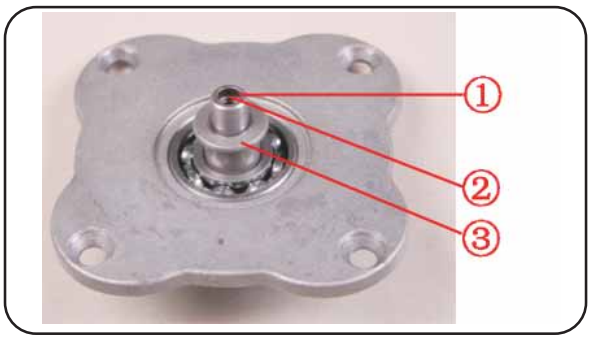
NOTE:

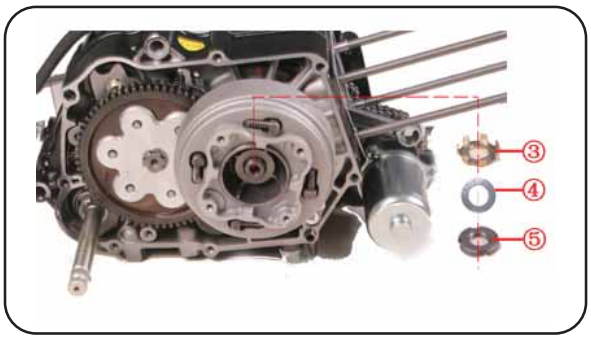
First, install a friction plate and then alternate between a upper plate and a friction plate.



4. Install:
   - pressure plate and install clutch circlip ⑤







CHECKING THE CLUTCH PUSH RODS

1. Check:
   - oil tube ①
   - oil thimble spring ②
   - oil thimble ③

   Cracks/damage/wear → Replace the defective part(-s).

2. Measure:
   - oil thimble spring ② free length

   Out of specification → Replace the oil thimble spring.

	Oil thimble spring free length 17.5 mm

INSTALLING THE CLUTCH

1. Install:
   - clutch assy ①

NOTE:

Make sure that the teeth on the lock washer are correctly aligned with the grooves on the clutch boss.

- thrust washer④,make sure the “OUT SIDE” mark on the washer is upturned.

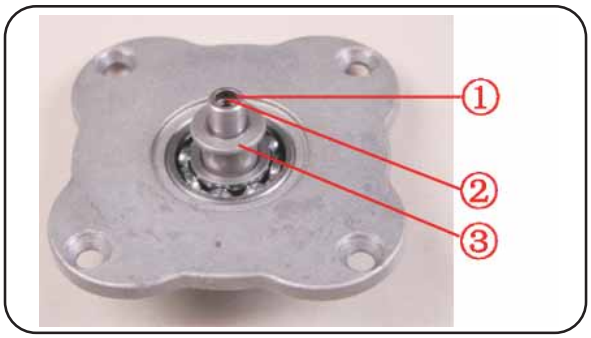
2. Tighten:
   - clutch boss nut ⑤

	60 Nm (6.0 m•kg)

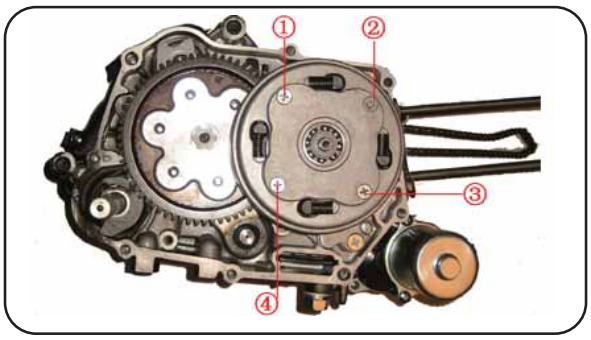
NOTE:

While holding the clutch boss with the universal clutch holder , tighten the clutch boss nut.

3. Bend the lock washer tab ③ along a flat side of the nut.



4. Install:
   - oil tube ①
   - oil thimble spring ②
   - oil thimble ③



- screw ① – ④

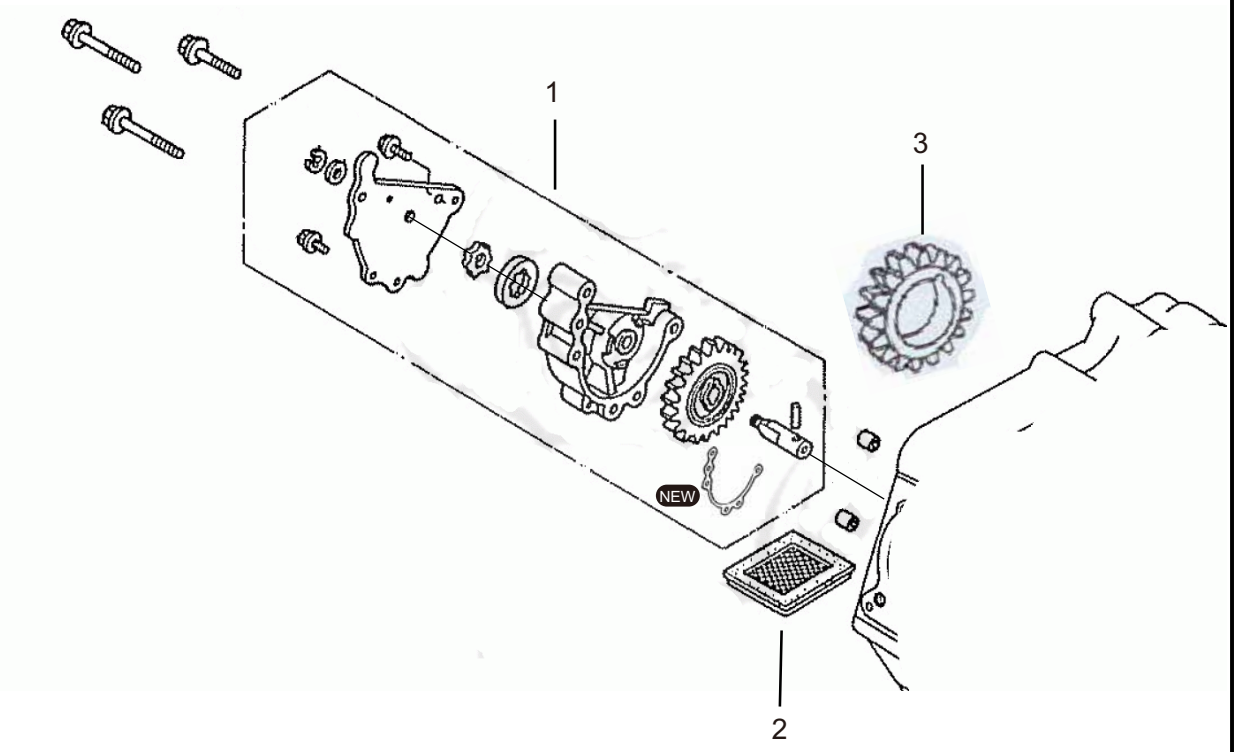
	6 Nm (0.6 m • kg)

5. Check
   - clutch assy

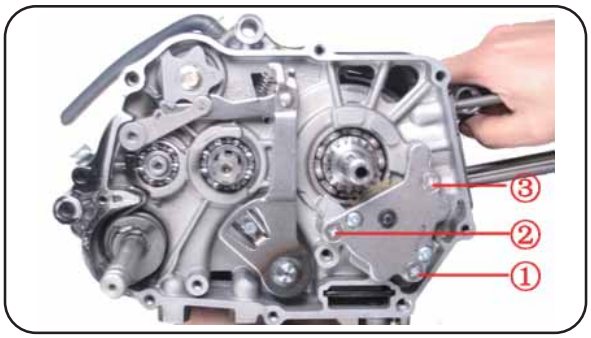
NOTE:

Make sure that the teeth on the lock washer are correctly aligned with the grooves on the clutch boss.

OIL PUMP

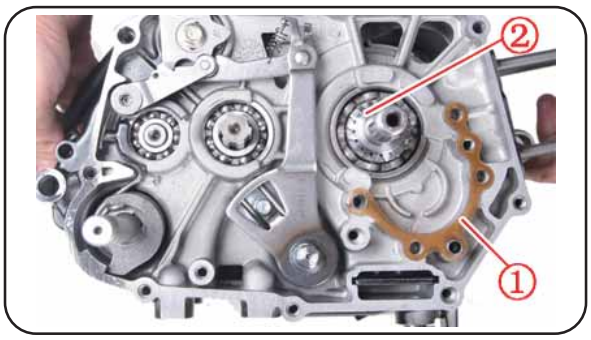


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	OIL PUMP	1	
2	OIL FILTER SCREEN	1	
3	GEAR	1	
			For installation, reverse the removal procedure.



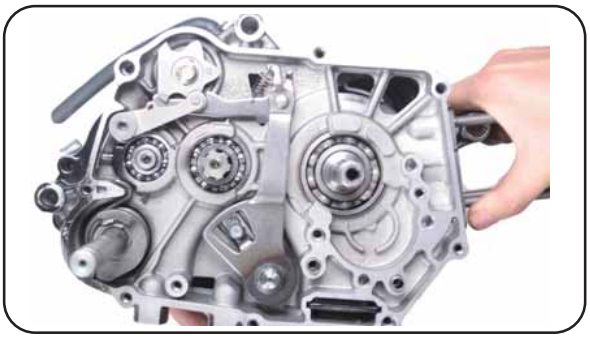
REMOVING THE OIL PUMP

1. Remove:
   • Screw ① - ③.



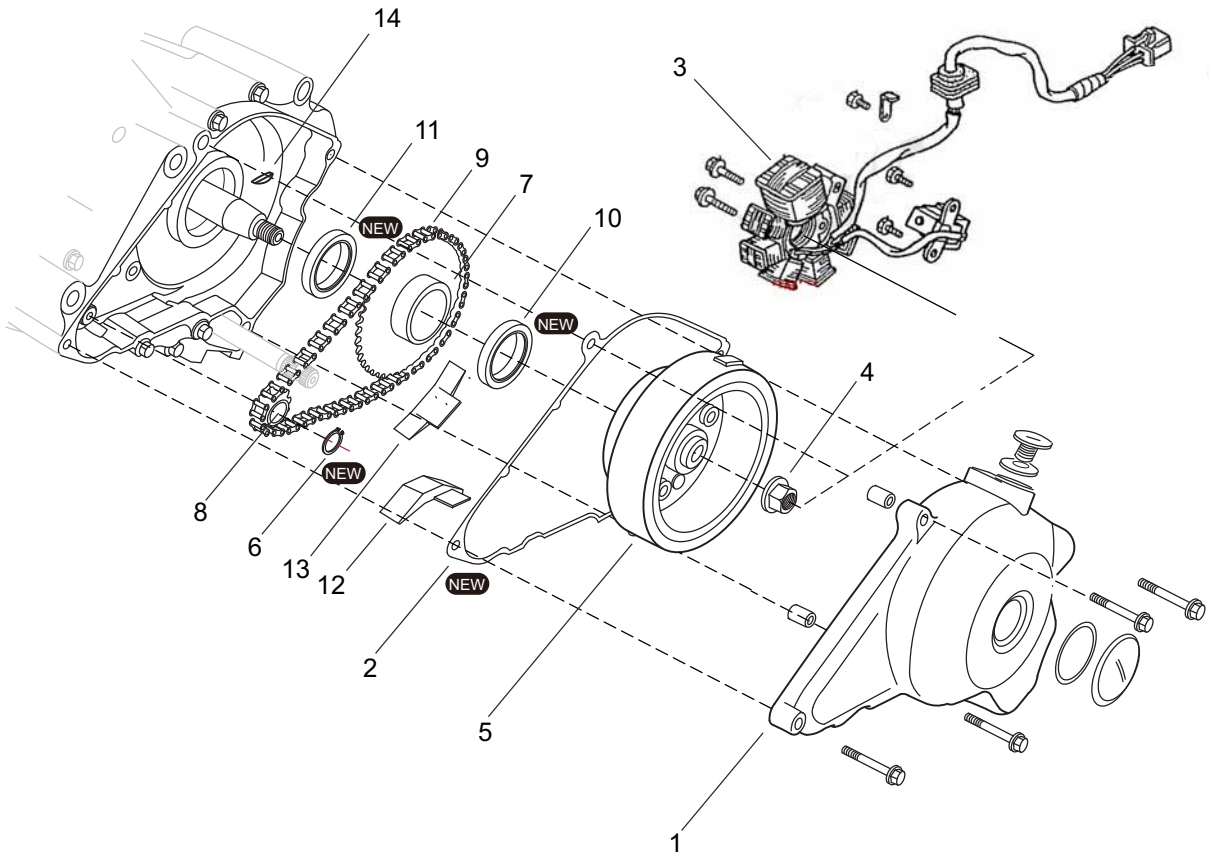
2. Remove:
   • gasket of oil pump ①
   • gear of oil pump ②

NOTE:
Remove the gasket of oil pump and check the state.Replace if worn or if reuse if questionable.

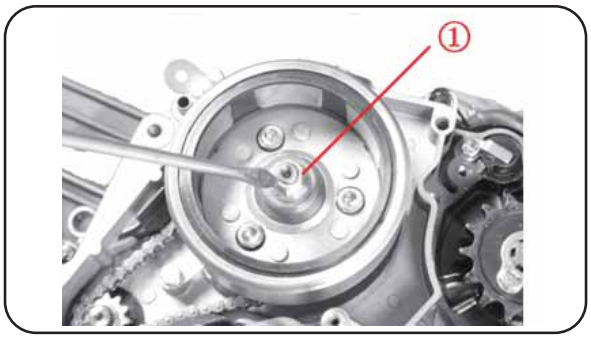


3. Check:
   • Remove the oil pump and inspect oil way for smoothness.clean oil way as necessary.
   • Check whether the gear is worn.

MAGNETO AND STARTER GEAR

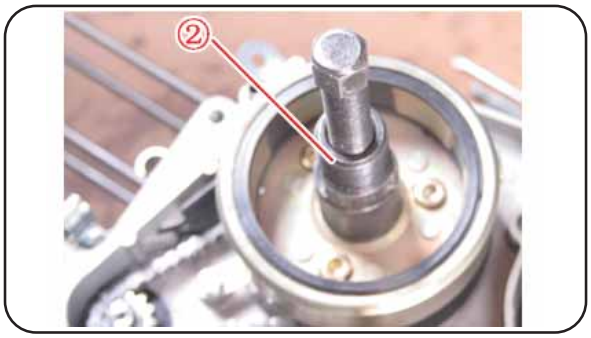


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	FRONT COVER, LEFT CRANKCASE	1	
2	GASKET, LEFT CRANKCASE	1	
3	STATOR , MAGNETO	1	
4	NUT	1	
5	COTOR , MAGNETO	1	
6	CIRCLIP 10	1	
7	DRIVEN SPROCKET, STARTING MOTOR	1	
8	DRIVE SPROCKET, STARTING MOTOR	1	
9	STARTING MOTOR DRIVE CHAIN	1	
10	OIL SEAL 19×30×5	1	
11	OIL SEAL	1	
12	CHAIN PROTECT PLATE	1	
13	CHAIN GUIDE PLATE	1	
14	WOODRUFF KEY	1	
			For installation, reverse the removal procedure.



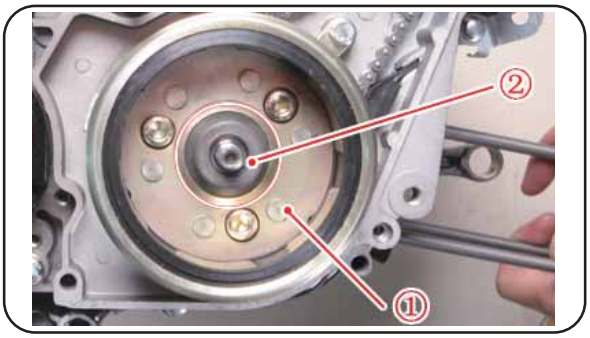
REMOVING THE GENERATOR ROTOR

1. Remove:
   - bolt ① (magneto)

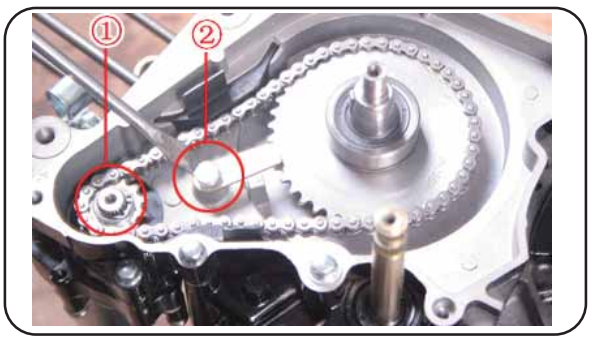


NOTE:

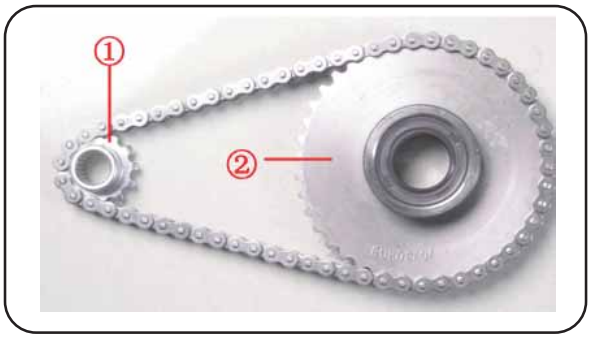
- Loosen the bolt (generator rotor) ① while holding the rotor with a sheave holder ②.
- Do not allow the sheave holder to touch the projection on the rotor.



2. Remove:
   - generator rotor ①
   - woodruff key ②



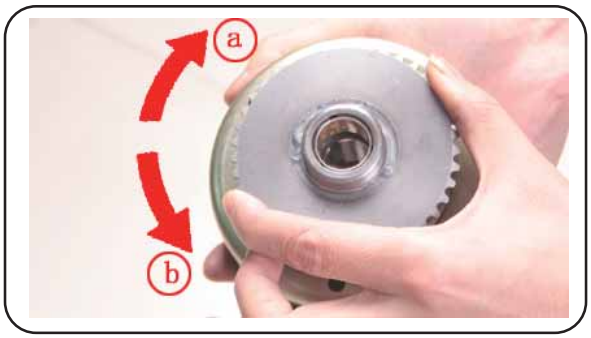
3. Remove:
   - circlip ①
   - bolt ②



CHECKING THE STARTER CLUTCH

1. Check:
   - starter clutch drive gear ①
   - starter clutch gear ②

   Burrs/chips/roughness/wear → Replace the defective part(-s).



2. Check:
   • starter clutch operation

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Hold the starter clutch.

b. When turning the starter clutch gear clockwise ⓐ, the starter clutch and the starter clutch gear should engage.
   If the starter clutch gear and starter clutch do not engage, the starter clutch is faulty and must be replaced.

c. When turning the starter clutch gear counterclockwise ⓑ, it should turn freely.
   If the starter clutch gear does not turn freely, the starter clutch is faulty and must be replaced.

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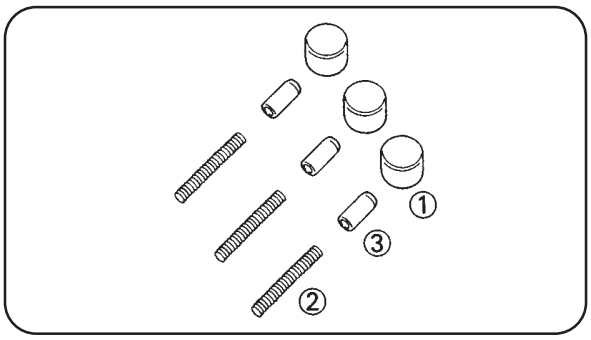
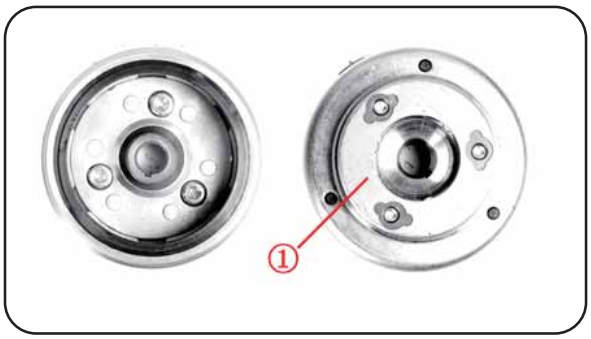


3. Inspect:
   • dowel pins ①
   • compression springs ②
   • spring caps ③
   Wear/Damage → Replace.

4. Inspect:
   • starter wheel gear (contacting surface)
   Pitting/Wear/Damage → Replace.

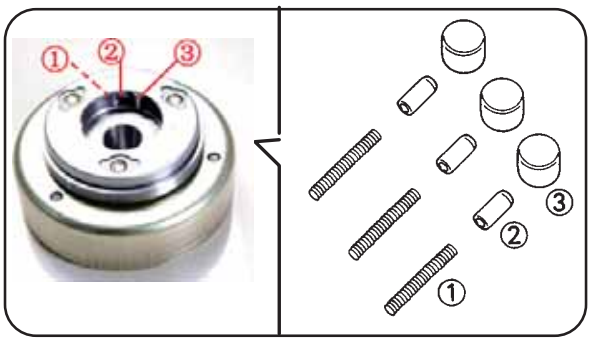


INSTALLING THE STARTER CLUTCH

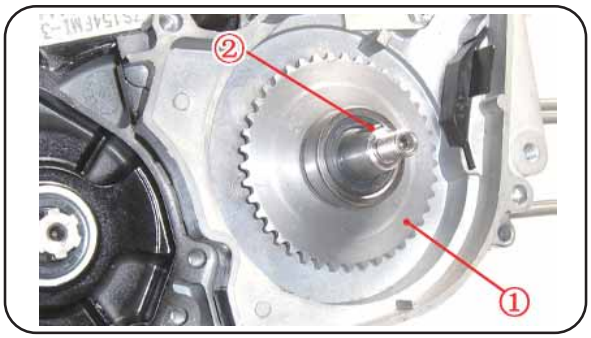
1. Install:
   • starter clutch assembly ①

   30 Nm (3.0 m•kg)

2. Unloosen the starter clutch assembly by using the center punch.

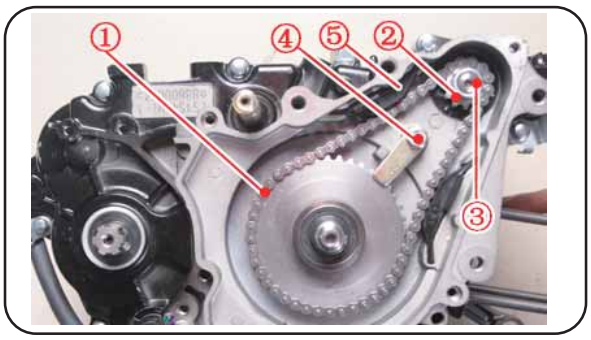


3. Install:
   • compression springs ①
   • spring caps ②
   • dowel pins ③

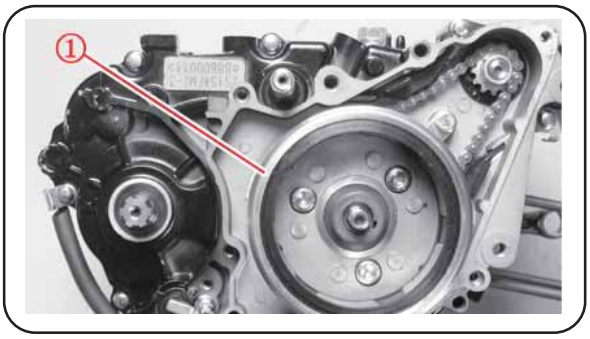


INSTALLING THE GENERATOR ROTOR

1. Install:
   - starter wheel gear ①
   - woodruff key ②



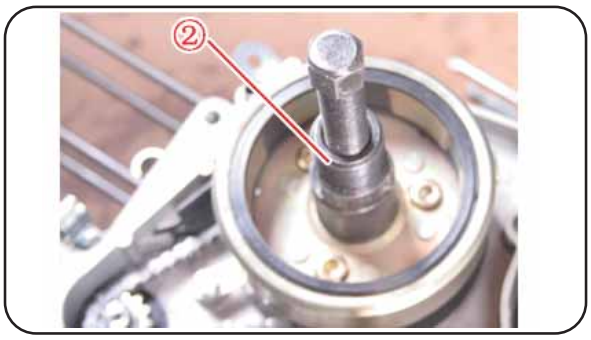
2. Install:
   - starting motor drive chain ①
   - drive gear ②
   - cirlip ③
   - bolt ④
   - chain protect plate ⑤



3. Install:
   - generator rotor ①

NOTE:

- Clean the tapered portion of the crankshaft and the rotor hub.
- When installing the rotor, make sure the woodruff key is properly seated in the key way of the crankshaft and turning the starter wheel gear clockwise.



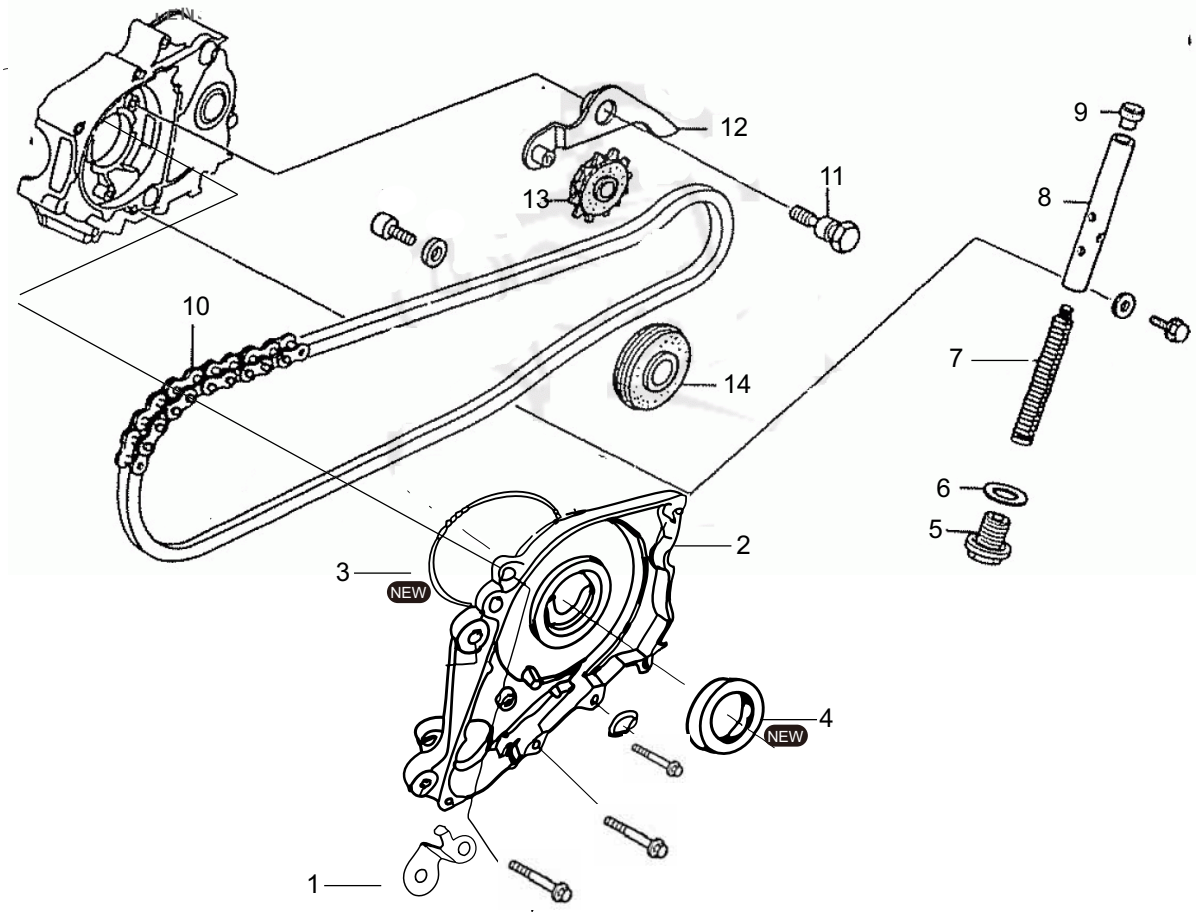
4. Tighten:
   - generator rotor ②

50 Nm (5.0 m•kg)

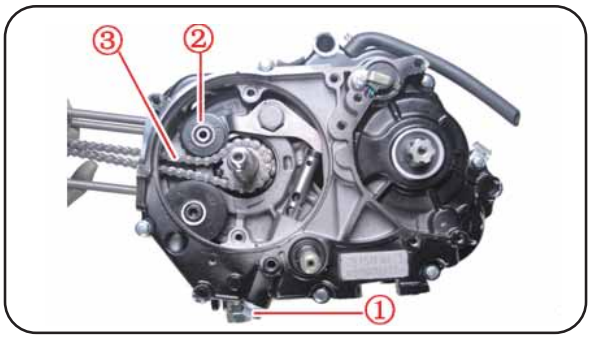
NOTE:

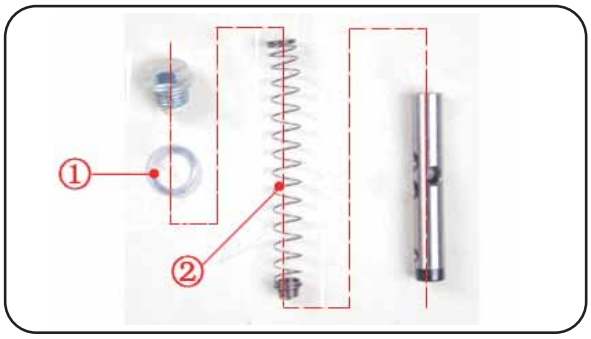
Tighten the bolt while holding the generator rotor with the sheave holder .

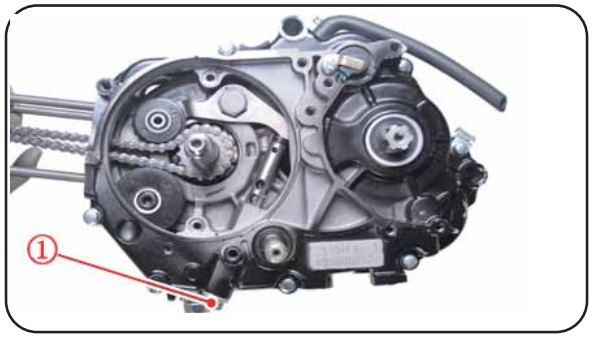
CAM CHAIN-TENSIOR



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	CLIP, VOLTAGE WIRE	1	
2	LOWER PAN, OIL INSULATING	1	
3	O-RING	1	
4	OIL SEAL	1	
5	BOLT M14×1.5	1	
6	WASHER	1	
7	SPRING, CHAIN TENSIONER PUSH ROD	1	
8	CHAIN TENSIONER PUSH ROD	1	
9	TIGHTENING ROD HEAD	1	
10	TIMING CHAIN	1	
11	TIGHTENING ARM SHAFT	1	
12	TIGHTENING ARM	1	
13	TIGHTENING IDLER WHEEL SET	1	
14	OIL PUMP DRIVE SPROCKET	1	
			For installation, reverse the removal procedure.







CAM CHAIN TENSIOR

1. Remove:
   - bolt of cam chain tension ①
   - roller of cam chain tension ②
   - cam chain ③

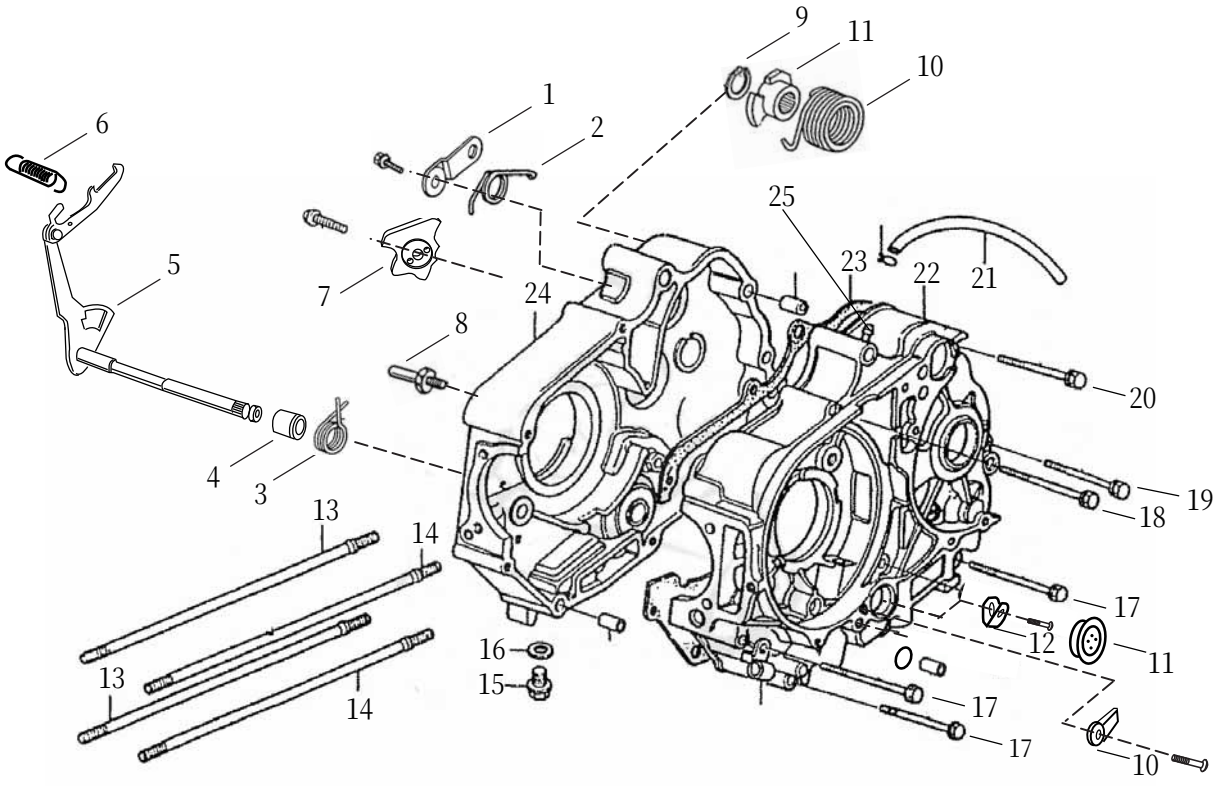
2. Check:
   - aluminium washer ①
     Pitting/Wear/Damage → Replace.
   - spring of chain tension push rod ②.
     Pitting/Wear/Damage → Replace.

INSTALLING THE CAM CHAIN TENSIOR

1. Install:
   - bolt of cam chain tension ①

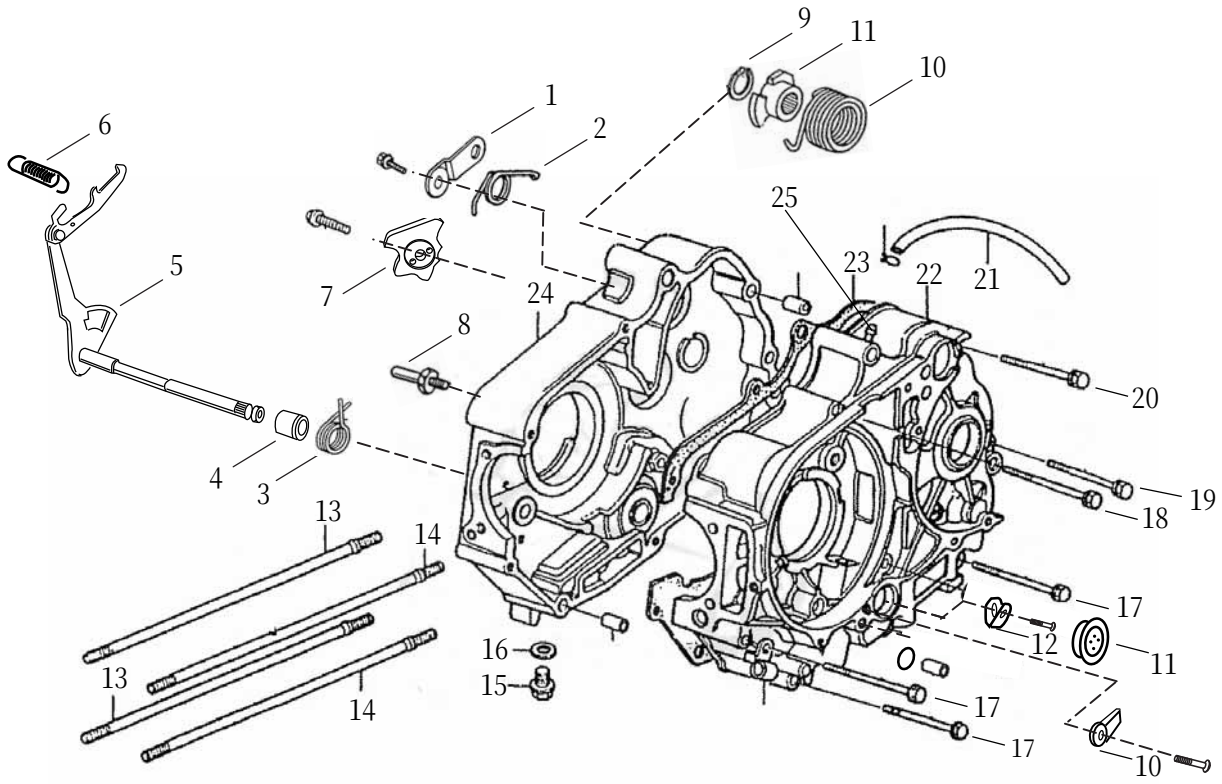
20 Nm (2.0 m • kg)

CRANKSHAFT AND GEARSHIFT ARM

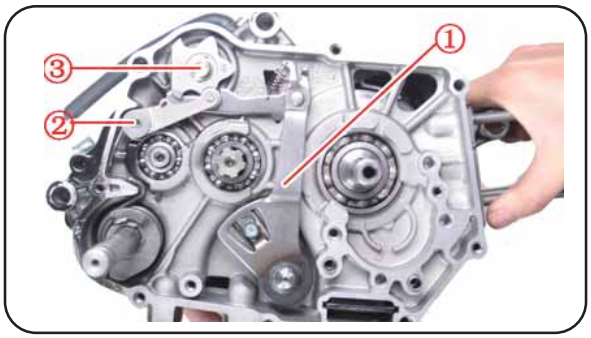


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	BOLT, LOCATING PLATE LOCATING PLATE GROUP	1	
2	RETURN SPRING, LOCATING PLATE	1	
3	RETURN SPRING, GEARSHIFT LEVER	1	
4	BUSH	1	
5	GEARSHIFT LEVER BODY ASSY	1	
6	TENSION SPRING, GEARSHIFT LEVER	1	
7	STOP PLATE	1	
8	BOLT M8×11	1	
9	CIRCLIP 16	1	
10	SPRING	1	
11	SPRING SHAFE SPRING BASE	1	
			For installation, reverse the removal procedure.

CRANKSHAFT AND GEARSHIFT ARM



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
12	CONTACT, GEAR INDICATION	1	
13	CYLINDER STUD BOLT B M7 X 204	2	
14	CYLINDER STUD BOLT A M7 X 212	2	
15	OIL DRAIN PLUG M12×1.5	1	
16	WASHER 12.5×1.5×20	1	
17	BOLT M6×65	3	
18	BOLT M6×60	1	
19	BOLT M6×45	1	
20	BOLT M6×60	1	
21	BREATHER TUBE C100-2#	1	
22	LEFT CRANKCASE	1	
23	GASKET, CRANKCASE	1	
24	RIGHT CRANKCASE	1	
25	TIE-IN, BREATHER TUBE	1	
			For installation, reverse the removal procedure.

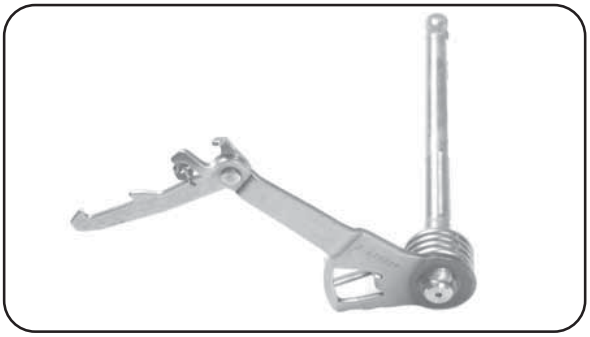


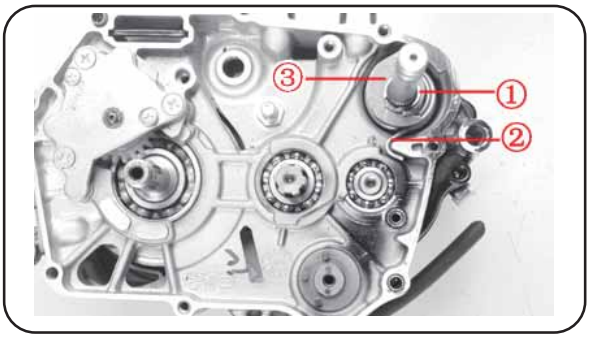
DISASSEMBLING THE CRANKCASE

1. Gearshift arm ①:

   Remove:

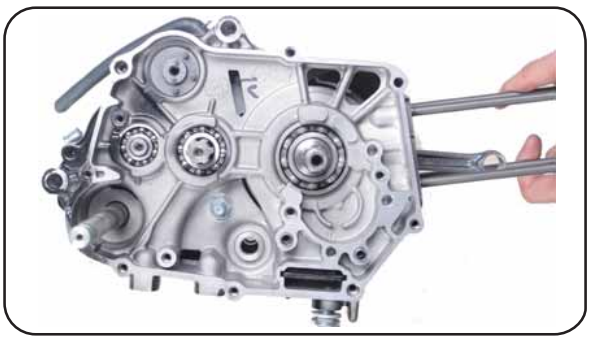
   • bolt of locating plate ②
   • bolt of locating plate ③

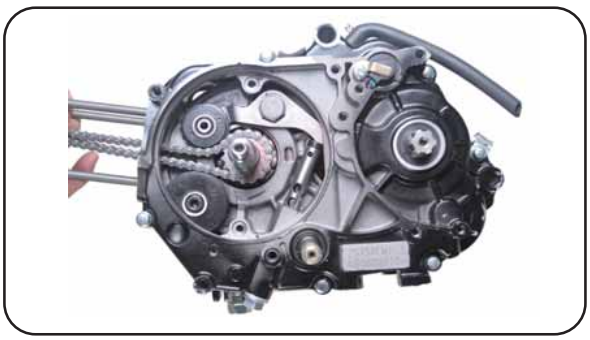


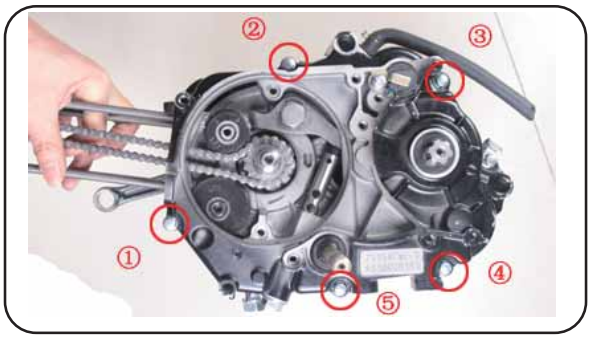


2. Remove:

   • cirlip ①
   • spring ②
   • spring seat ③







DISASSEMBLING THE CRANKCASE

1. Remove:
   • crankcase bolts ① ~ ⑤

NOTE:

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

2. Remove:
   • right crankcase

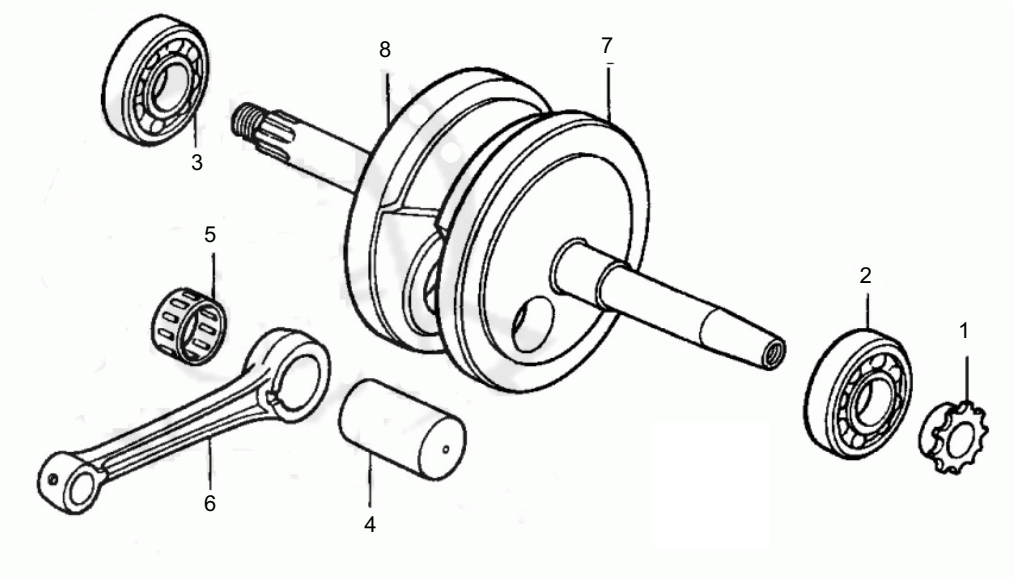
NOTE:

Set the left crankcase half under then put in the flat head screw driver to the separating slit .

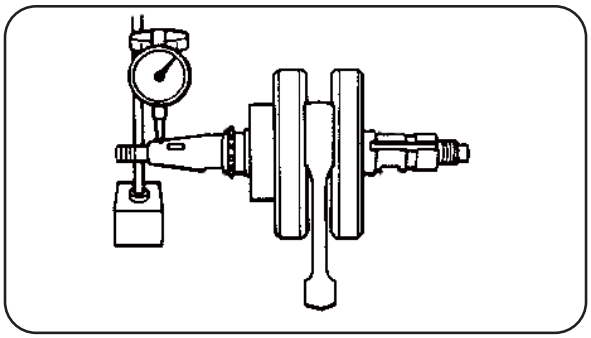
CAUTION:

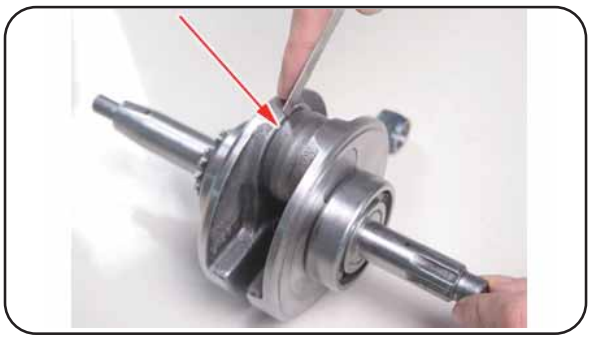
- **First check that the shift drum segment's teeth and the drive axle circlip are properly positioned, then remove the right crankcase.**
- **Do not damage the crankcase mating surfaces.**

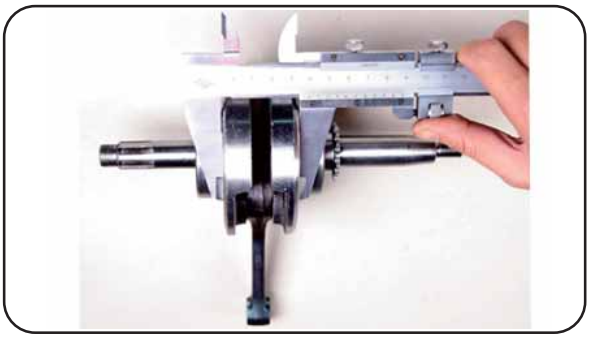
CRANKSHAFT

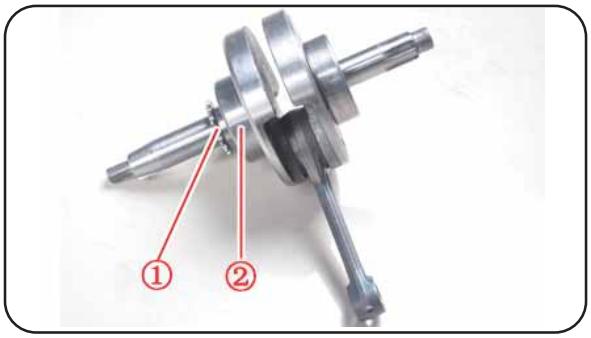


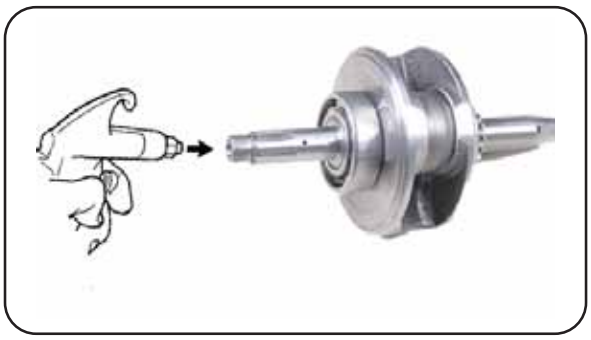
Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	TIMING DRIVE SPROCKET	1	
2	BEARING (6205)	1	
3	BEARING (6205)	1	
4	PIN	1	
5	ROLLER BEARING	1	
6	JOINT RED	1	
7	LEFT CRANKSHAFT	1	
8	RIGHT CRANKSHAFT	1	
			For installation, reverse the removal procedure.











CHECKING THE CRANKSHAFT AND CONNECTING ROD

1. Measure:
   - crankshaft runout
     Out of specification → Replace the crankshaft, bearing or both.

NOTE:

Turn the crankshaft slowly.

Crankshaft runout
Less than 0.03 mm

2. Measure:
   - big end axial clearance
     Out of specification → Replace the big end bearing, crankshaft pin, or connecting rod.

Big end axial clearance
0.15 ~ 0.35 mm
Limit 0.6 mm

3. Measure:
   - crankshaft width
     Out of specification → Replace the crankshaft.

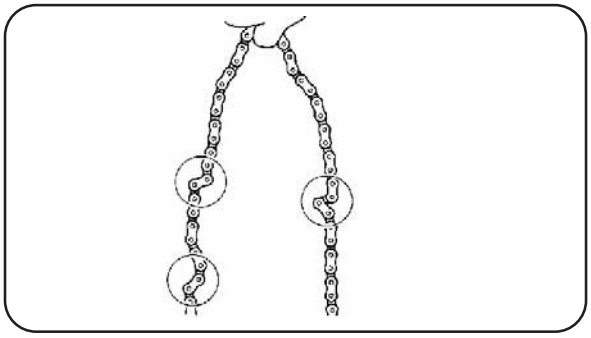
Crankshaft width
40.15 ~ 40.20 mm

4. Check:
   - crankshaft sprocket ①
     Damage/wear → Replace the crankshaft.
   - bearing ②
     Cracks/damage/wear → Replace the crankshaft.

5. Check:
   - crankshaft journal
     Scratches/wear → Replace the crankshaft.
   - crankshaft journal oil passage
     Obstruction → Blow out with compressed air.

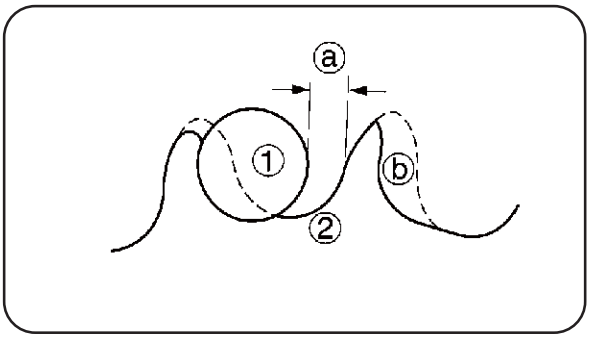
CHECKING THE BEARINGS AND OIL SEALS

1. Check:
   - bearings
     Clean and lubricate the bearings, then rotate the inner race with your finger.
     Rough movement → Replace.
2. Check:
   - oil seals
     Damage/wear → Replace.

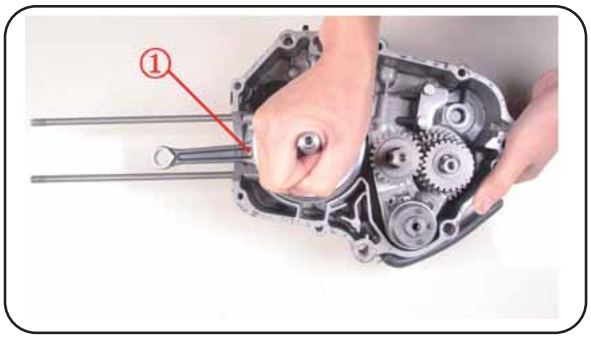


CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKET, AND TIMING CHAIN GUIDES

1. Check:
   - timing chain
     Damage/stiffness → Replace the timing chain and camshaft sprocket as a set.



2. Check:
   - camshaft sprocket
     More than 1/4 tooth ⓐ wear → Replace the camshaft sprocket and the timing chain as a set.
     ⓐ 1/4 tooth
     ⓑ Correct
     ① Timing chain roller
     ② Camshaft sprocket
3. Check:
   - timing chain guide (exhaust side)
   - timing chain guide (intake side)
   - timing chain guide (top side)
     Damage/wear → Replace the defective part(-s).



INSTALLING THE CRANKSHAFT

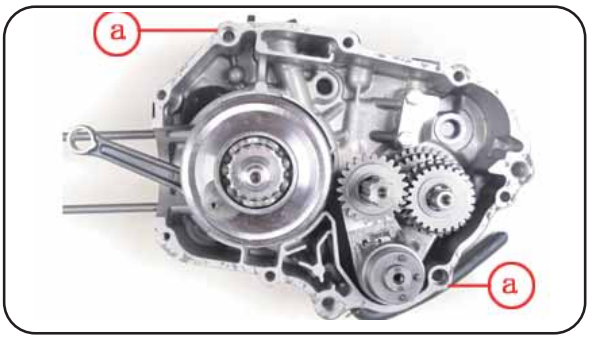
1. Install:
   • crankshaft ①

CAUTION:

To avoid scratching the crankshaft and to ease the installation procedure, apply grease onto the oil seal lips and apply engine oil onto each bearing.

ASSEMBLING THE CRANKCASE

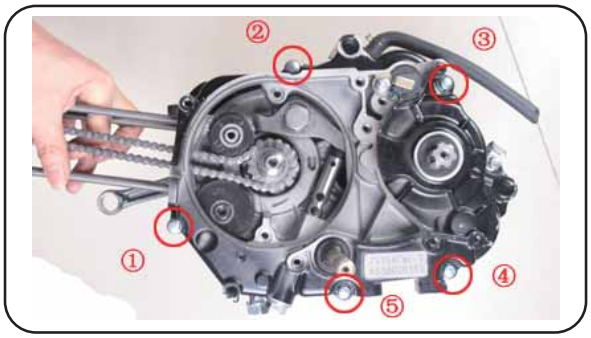
1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
2. Apply:
   • sealant
   (onto the crankcase mating surfaces)



NOTE:

Do not allow any sealant to come into contact with the oil gallery ⓐ.

3. Install:
   • dowel pins
   • right crankcase



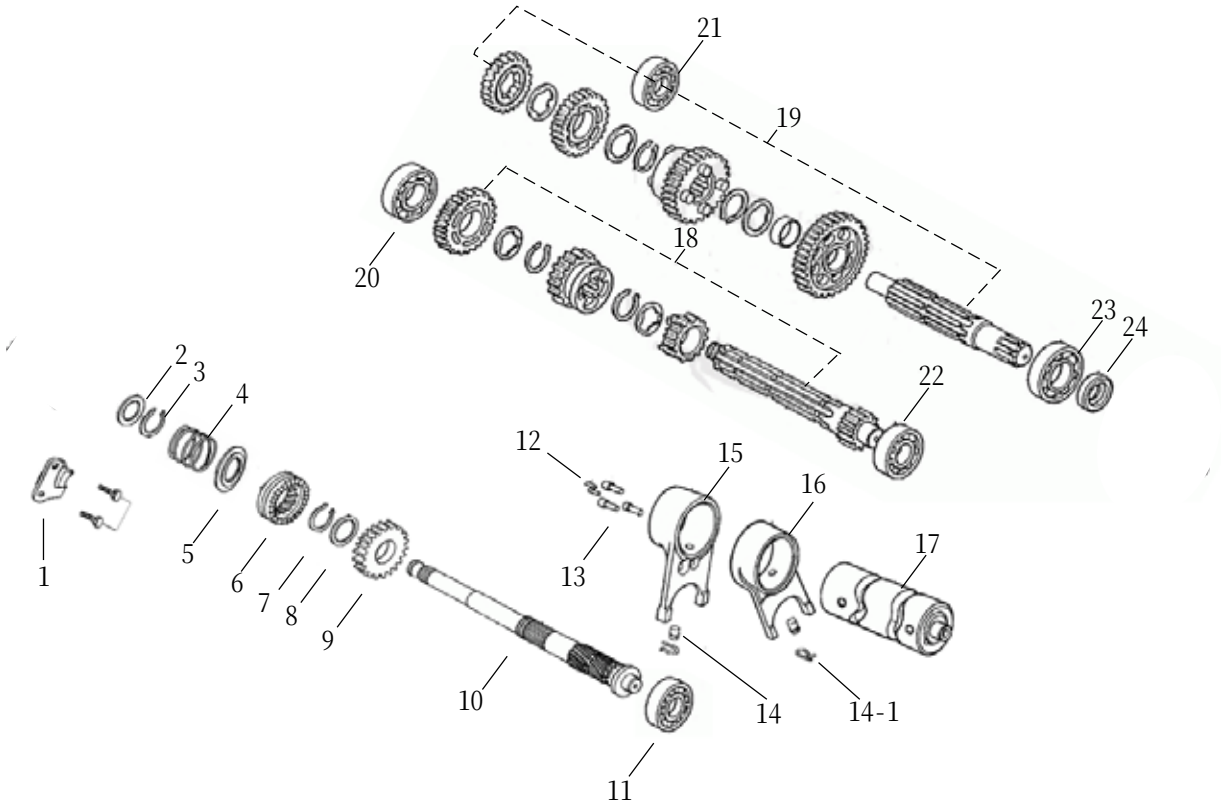
4. Tighten:
   • crankcase right half

10 Nm (1.0 m•kg)

NOTE:

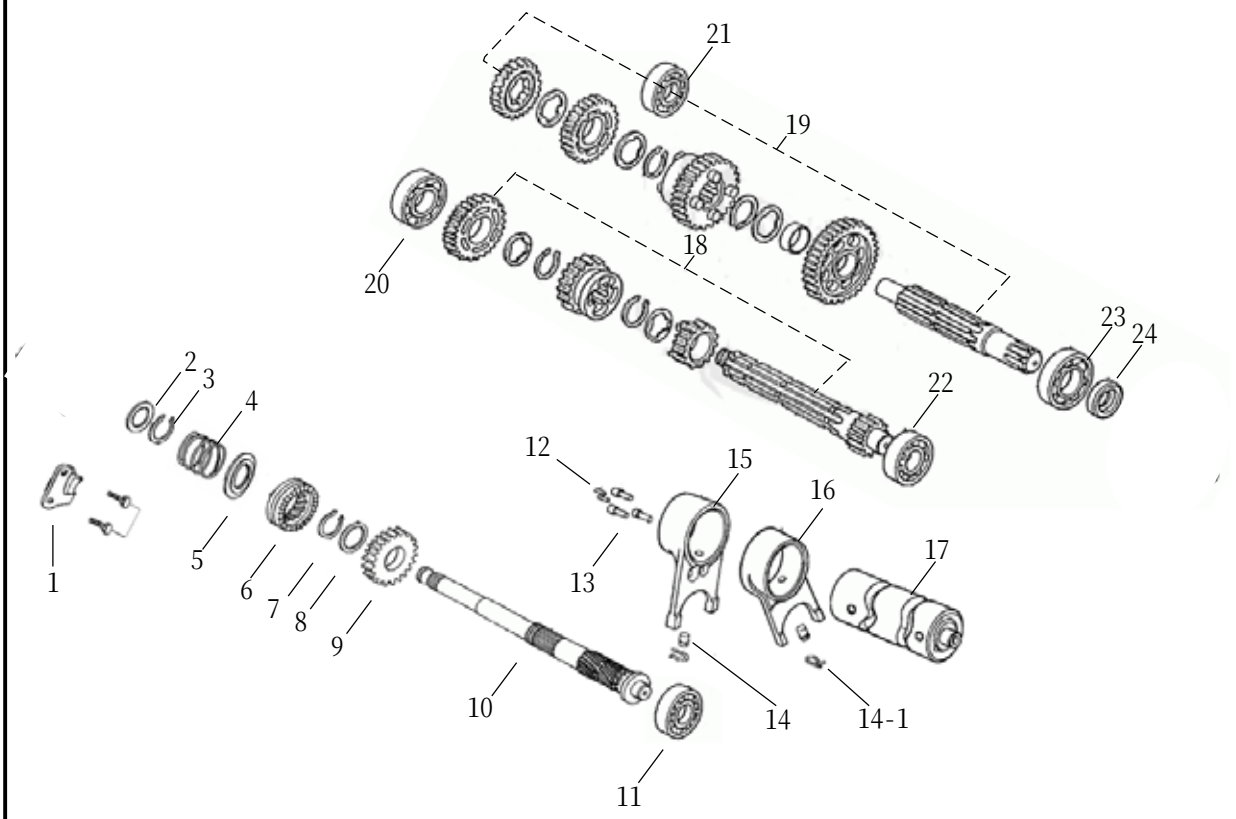
Tighten the screws in decreasing numerical order (see numbers on the illustration).

TRANSMISSION DEVICE,SHIFT DRUM ,GEAR FORKS

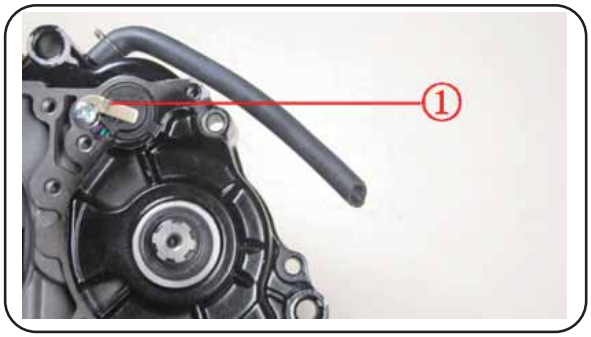


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	RATCHET SPRING PLATE	1	
2	WASHER 17	1	
3	CIRCLIP	1	
4	SPRING	1	
5	RATCHET SPRING BASE	1	
6	STARING RATCHET WHEEL	1	
7	CIRCLIP	1	
8	WASHER	1	
9	STARING GEAR	1	
10	SPRING SHAFE	1	
11	BEARING	1	
12	PIN	2	
13	PIN	3	
14	PIN	2	
14-1	PRING CLIP	2	
15	GEAR FORK	1	
16	GEAR FORK	1	
17	DRUM	1	For installation, reverse the removal procedure.

TRANSMISSION DEVICE,SHIFT DRUM ,GEAR FORKS

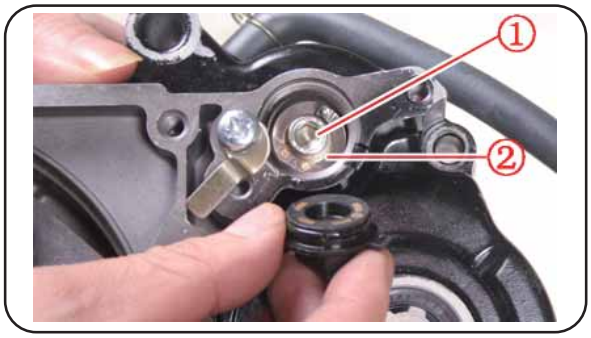


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
18	MAINSHAFT	1	
19	COUNTERSHAFT	1	
20	BEARING 6203	1	
21	BEARING 6201	1	
22	BEARING 6001	1	
23	BEARING 6203	1	
24	OIL SEAL 17X29X5	1	
			For installation, reverse the removal procedure.

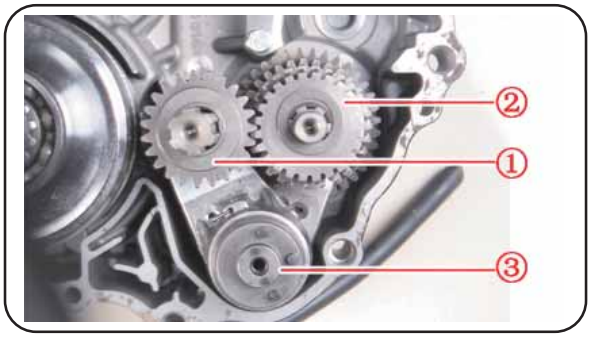


REMOVING THE TRANSMISSION

1. Loosen:
   - screw ①



2. Remove:
   - screw ①
   - contact ,gear indication ②

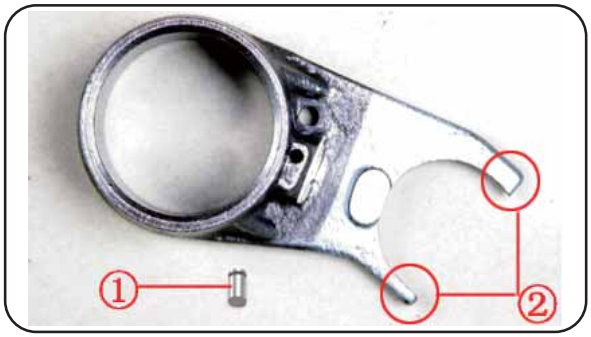


3. Remove:
   - drive axle assembly ①
   - main axle assembly ②
   - gearshift drum assy ③

   Remove them at same the time.

4.Gearshift drum assy dissembly.

Remove:
- clip. gearshift drum ①
- pin. gearshift drum ②



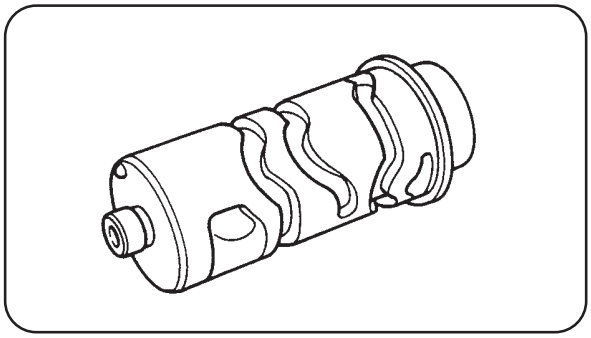
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks and related components.

Check:

- shift fork cam follower ①
- shift fork pawl ②

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

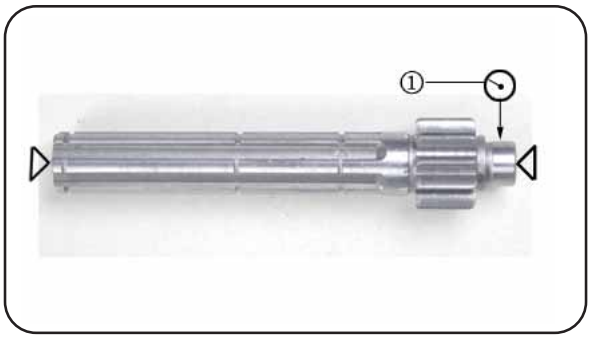


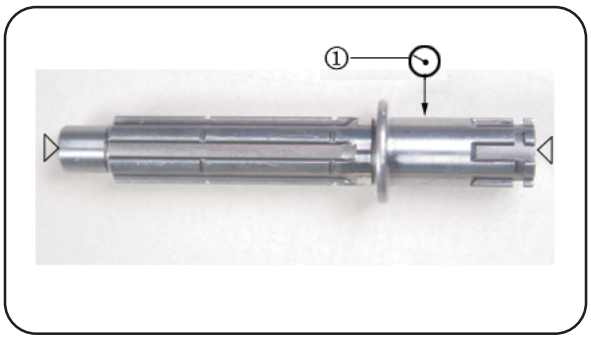
CHECKING THE SHIFT DRUM

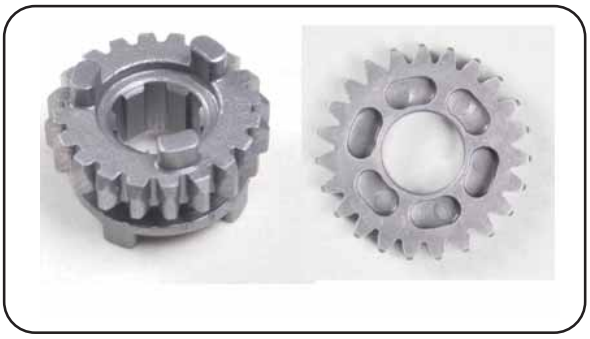
1. Check:
   - shift drum grooves

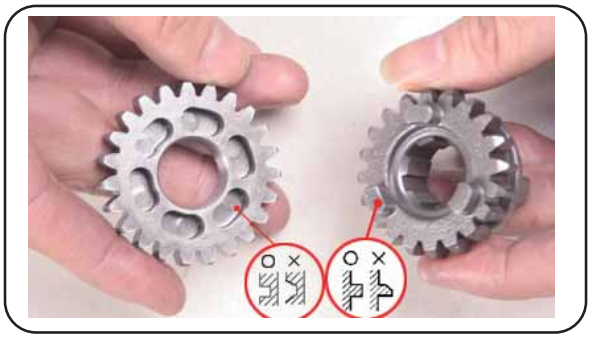
   Damage/scratches/wear → Replace the shift drum.
   - shift drum segment

   Damage/wear → Replace.









CHECKING THE TRANSMISSION

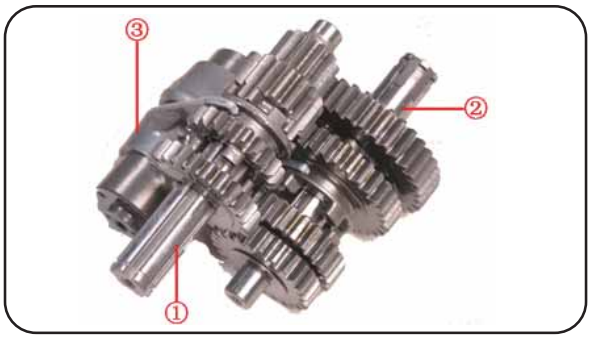
1. Measure:
   - main axle runout
     (with a centering device and dial gauge ①)
     Out of specification → Replace the main axle.

Main axle runout limit
0.02 mm

2. Measure:
   - drive axle runout
     (with a centering device and dial gauge ①)
     Out of specification → Replace the drive axle.

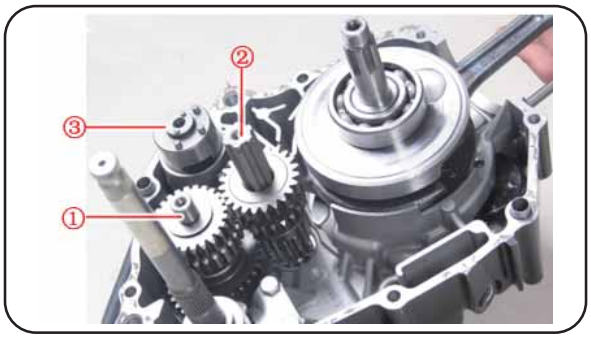
Drive axle runout limit
0.02 mm

3. Check:
   - transmission gears
     Blue discoloration/pitting/wear → Replace the defective gear(-s).
   - transmission gear dogs
     Cracks/damage/rounded edges → Replace the defective gear(-s).
4. Check:
   - transmission gear engagement
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - transmission gear movement
     Rough movement → Replace the defective part(-s).
6. Check:
   - circlips
     Damage/bends/looseness → Replace.



INSTALLING THE TRANSMISSION, SHIFT FORKS AND SHIFT DRUM

1. Install:
   - main axle ①
   - drive axle ②
   - gearshift drum assy ③



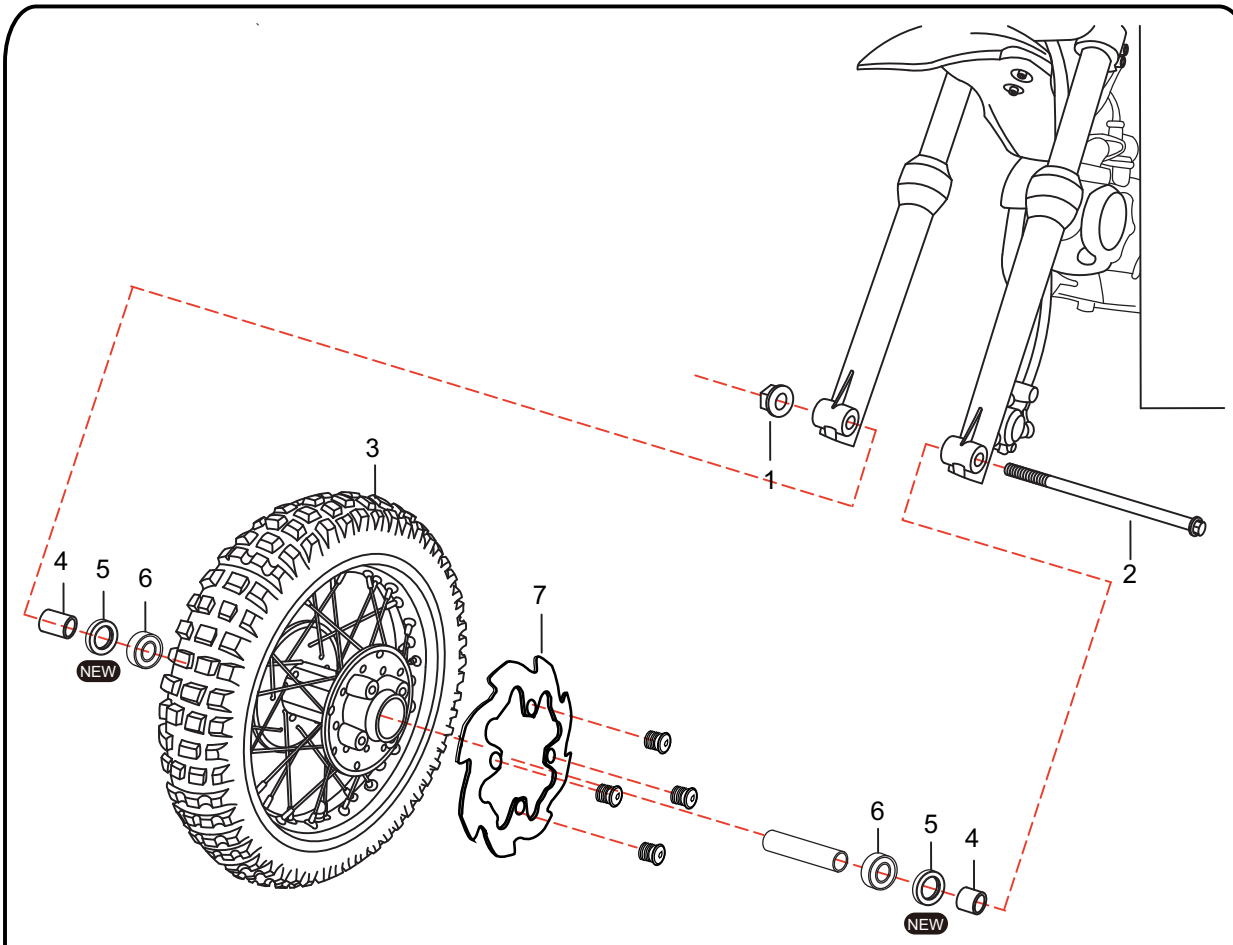
Put them into the crankcase at same the time.

2. Check:
   - shift cam operation
     Unsmoothy operation → Repair.

NOTE:

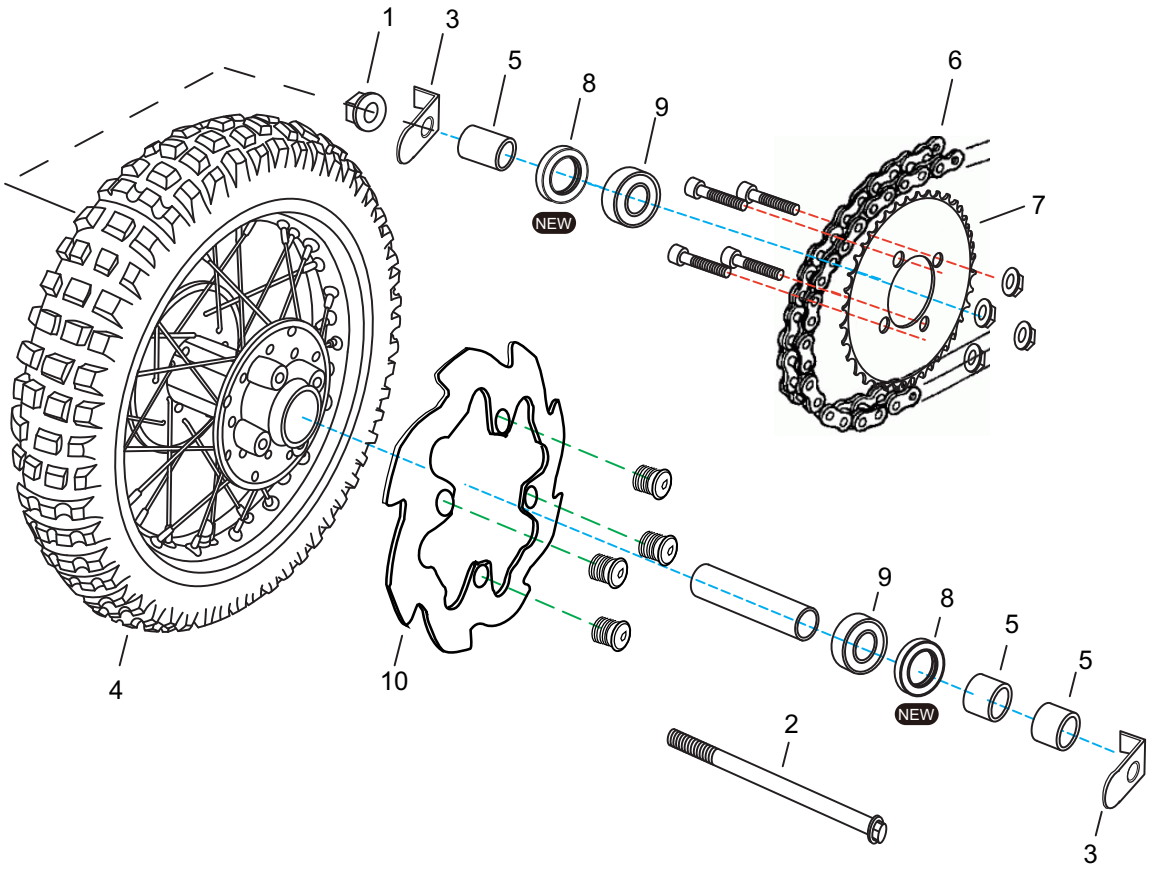
Check the transmission and shift forks for smooth operation by turning the shift cam with your hand.

FRONT WHEEL



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	NUT(FRONT WHEEL AXLE)	1	
2	FRONT RIM AXLE	1	
3	FRONT TIRE	1	
4	COLLAR, FR.WHEEL	2	
5	OIL SEAL	2	
6	BEARING	2	
7	FRONT-BRAKE DISK	1	
			For installation, reverse the removal procedure.

REAR WHEEL



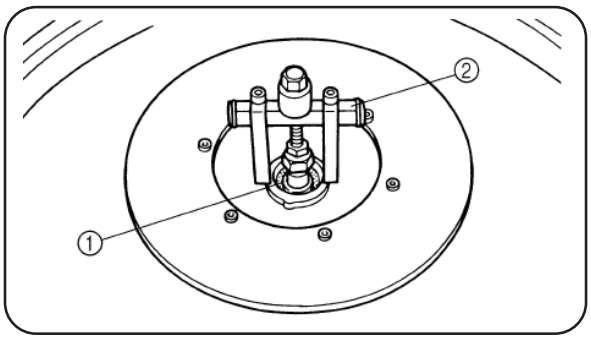
Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	NUT(FRONT WHEEL AXLE)	1	
2	FRONT RIM AXLE	1	
3	CHAIN PULLER	2	
4	REAR WHEEL	1	
5	COLLAR, RE.WHEEL	3	
6	DRIVEN SPROKET	1	
7	OIL SEAL	2	
8	BEARING	2	
9	FRONT-BRAKE DISK	1	
			For installation, reverse the removal procedure.

REMOVAL POINTS

Rear wheel

1. Remove:
   - Wheel ①

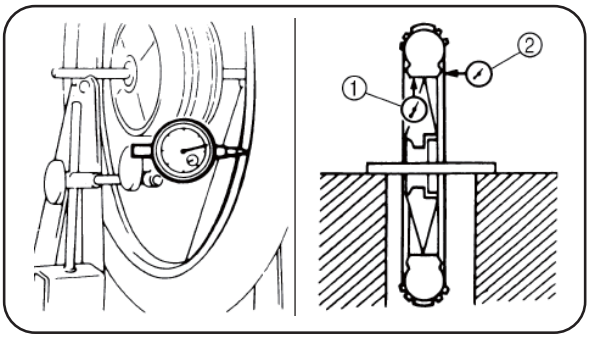
NOTE:
Push the wheel forward and remove the drive chain ②.



Wheel bearing (if necessary)

1. Remove:
   - Bearing ①

NOTE:
Remove the bearing using a general bearing puller ②.



INSPECTION

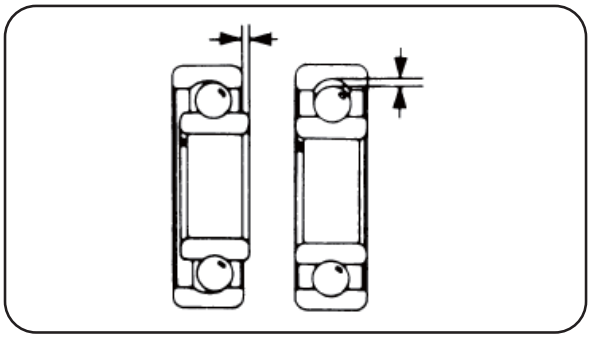
Wheel

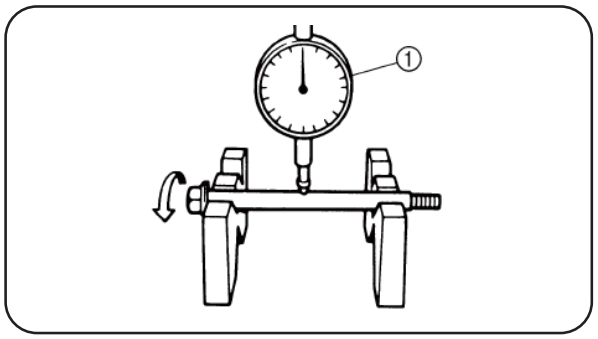
1. Measure:
   - Wheel runout
     Out of limit → Repair/replace.

Wheel runout limit:
Radial ①: 2.0 mm
Lateral ②: 2.0 mm

2. Inspect:
   - Bearing
     Rotate inner race with a finger.
     Rough spot/seizure → Replace.

NOTE:
Replace the bearings, oil seal and wheel collar as a set.





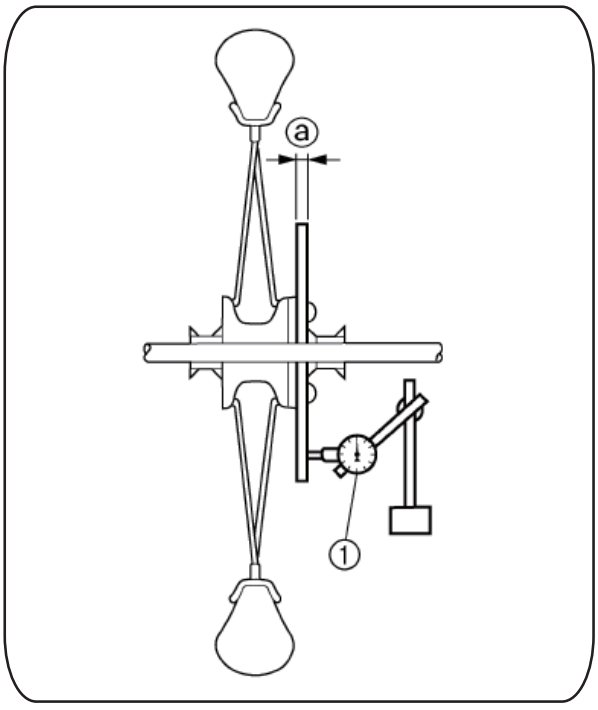
Wheel axle

1. Measure:
   - Wheel axle bends
     Out of specification → Replace.
     Use the dial gauge ①.

Wheel axle bending limit:
0.5 mm

NOTE:
The bending value is shown by one half of the dial gauge reading.

⚠ WARNING
Do not attempt to straighten a bent axle.



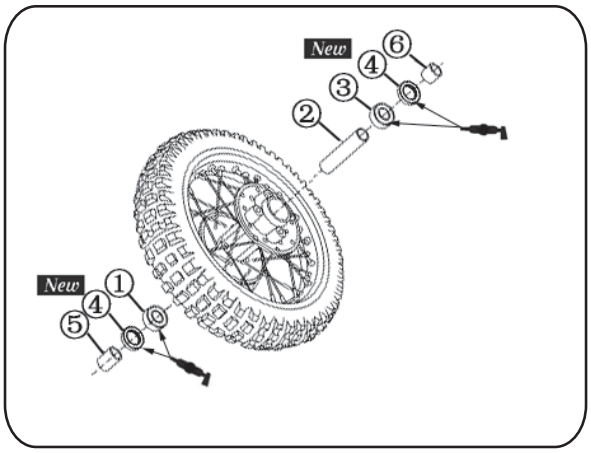
Brake disc

1. Measure:
   - Brake disc deflection (only rear brake disc)
     Use the dial gauge ①.
     Out of specification → Inspect wheel runout.
     If wheel runout is in good condition, replace the brake disc.

Brake disc deflection limit:
Rear:
<Limit>: 0.15 mm

2. Measure:
   - Brake disc thickness ⓐ
     Out of limit → Replace.

Brake disc thickness:
Front:
3.0 mm
<Limit>: 2.5 mm
Rear:
3.0 mm
<Limit>: 2.5 mm



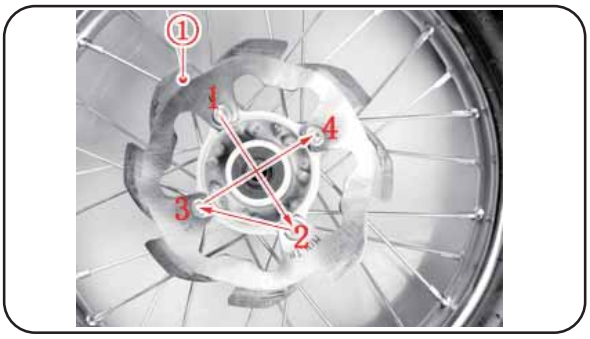
ASSEMBLY AND INSTALLATION

Front wheel

1. Install:
   - Bearing (left) ①
   - Middel spacer ②
   - Bearing (right) ③
   - Oil seal ④ ***New***
   - Collar (left) ⑤
   - Collar (right) ⑥

NOTE:

- Apply the lithium soap base grease on the bearing and oil seal lip when installing.
- Use a socket that matches the outside diameter of the race of the bearing.
- Left side of bearing shall be installed first.
- Install the oil seal with its manufacture's marks or numbers facing outward.

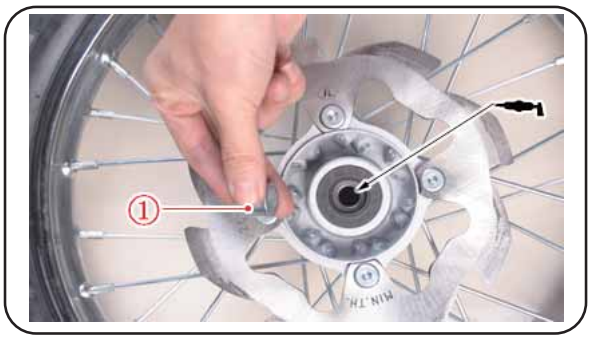


CAUTION:

Do not strike the inner race of the bearing. Contact should be made only with the outer race.

2. Install:
   - Brake disc ①
   - Bolt (brake disc) ②

12 Nm (1.2 m • kg)



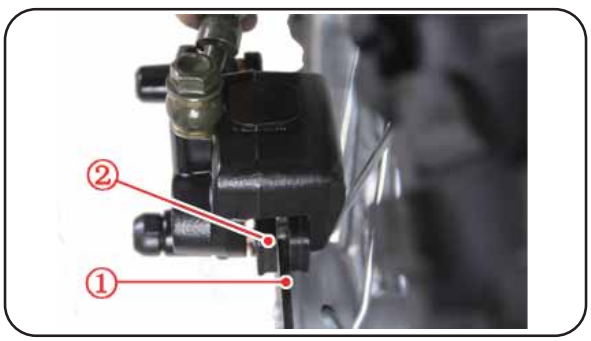
NOTE:

Tighten the bolts in stage, using a crisscross pattern.

3. Install:
   - Collar ①

NOTE:

Apply the lithium soap base grease on the oil seal lip.



4. Install:
   - Wheel

NOTE:

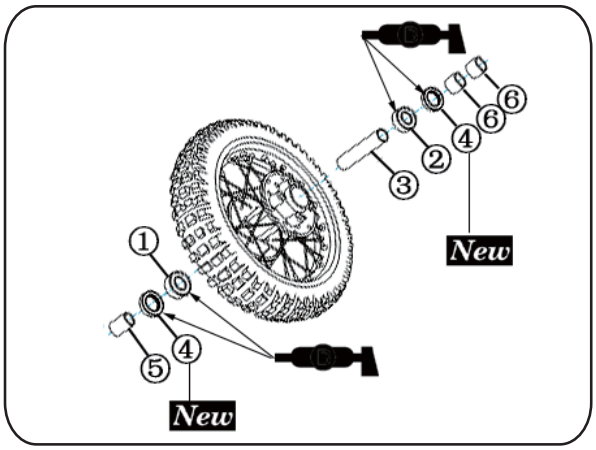
Install the brake disc ① between the brake pads ② correctly.

5. Install:
   - Wheel axle ①

NOTE:
Apply the lithium soap base grease on the wheel axle.

6. Install:
   - Nut (wheel axle) ②

	50Nm (5 m · kg)



Rear wheel

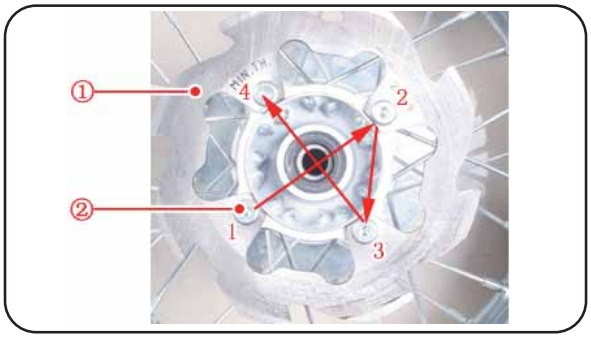
1. Install:
   - Bearing (left) ①
   - Bearing (right) ②
   - Middle spacer ③
   - Oil seal ④ ***New***
   - Left Collar ⑤
   - Right Collar ⑥

NOTE:

- Apply the lithium soap base grease on the bearing and oil seal lip when installing.
- Install the bearing with seal facing outward.
- Use a socket that matches the outside diameter of the race of the bearing.
- Right side of bearing shall be installed first.
- Install the oil seal with its manufacture's marks or numbers facing outward.

CAUTION:

Do not strike the inner race of the bearing. Contact should be made only with the outer race.

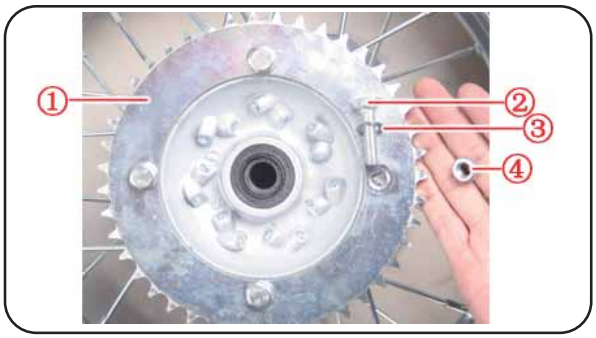


2. Install:
   - Brake disc ①
   - Bolt (brake disc) ②

	14 Nm (1.4 m · kg)

NOTE:

Tighten the bolts in stage, using a crisscross pattern.



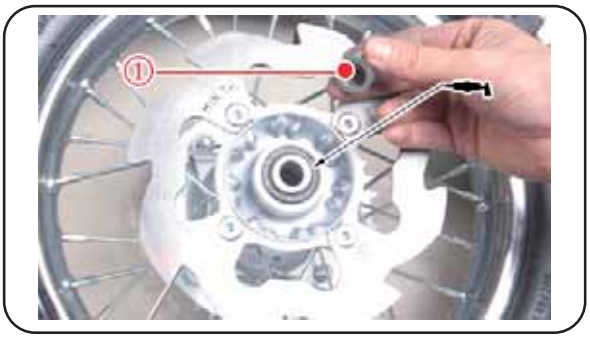
3. Install:
   - Rear wheel sprocket ①
   - Bolt (rear wheel sprocket) ②

     25 Nm (2.5m · kg)
   - Washer (rear wheel sprocket) ③
   - Nut (rear wheel sprocket) ④

NOTE:
Tighten the nuts in stage, using a crisscross pattern.

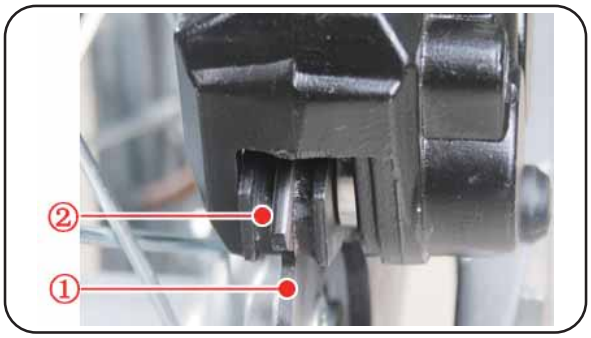
4. Install:
   - Left Collar ①

NOTE:
Apply the lithium soap base grease on the oil seal lip.



5. Install:
   - Right Collar ①

NOTE:
Apply the lithium soap base grease on the oil seal lip.

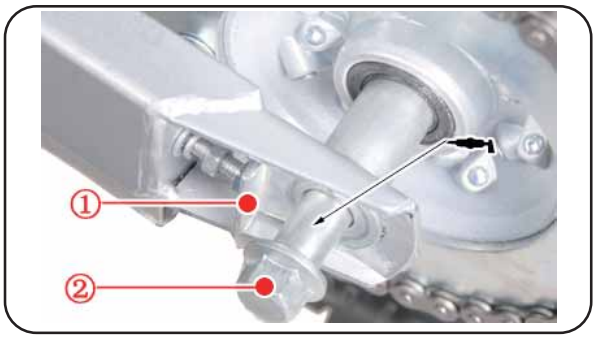


6. Install:
   - Wheel

NOTE:
Install the brake disc ① between the brake pads ② correctly.

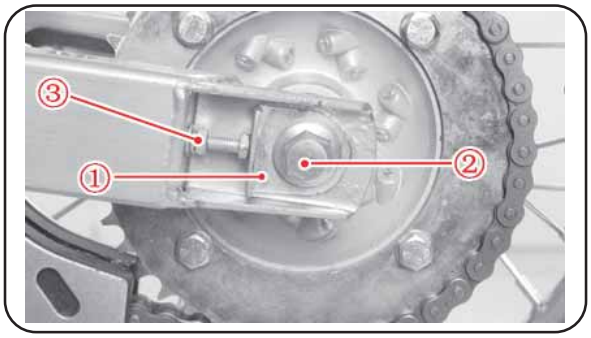
7. Install:
   - Drive chain ②

NOTE:
Push the wheel ① forward and install the drive chain.



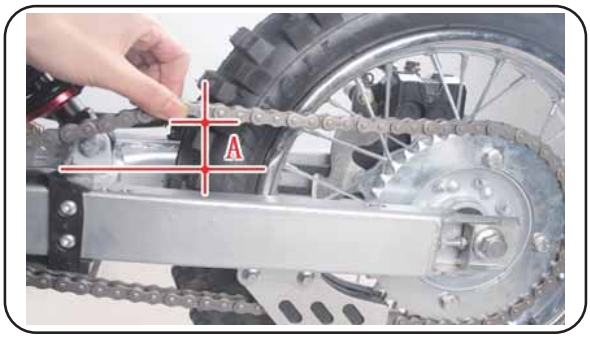
7. Install:
   - Left drive chain puller ①
   - Wheel axle ②

NOTE:
- Install the left drive chain puller, and insert the wheel axle from left side.
- Apply the lithium soap base grease on the wheel axle.



8. Install:
   - Left drive chain puller ①
   - Bolt (wheel axle) ②
   - Adujust bolt (wheel axle) ③

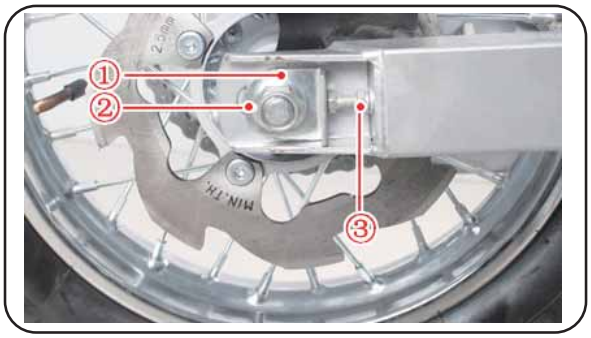
NOTE:
Temporarily tighten the nut (wheel axle) at this point.



9. Adjust:
   - Drive chain slack A

Drive chain slack:
30 ~ 40 mm

Refer to "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.



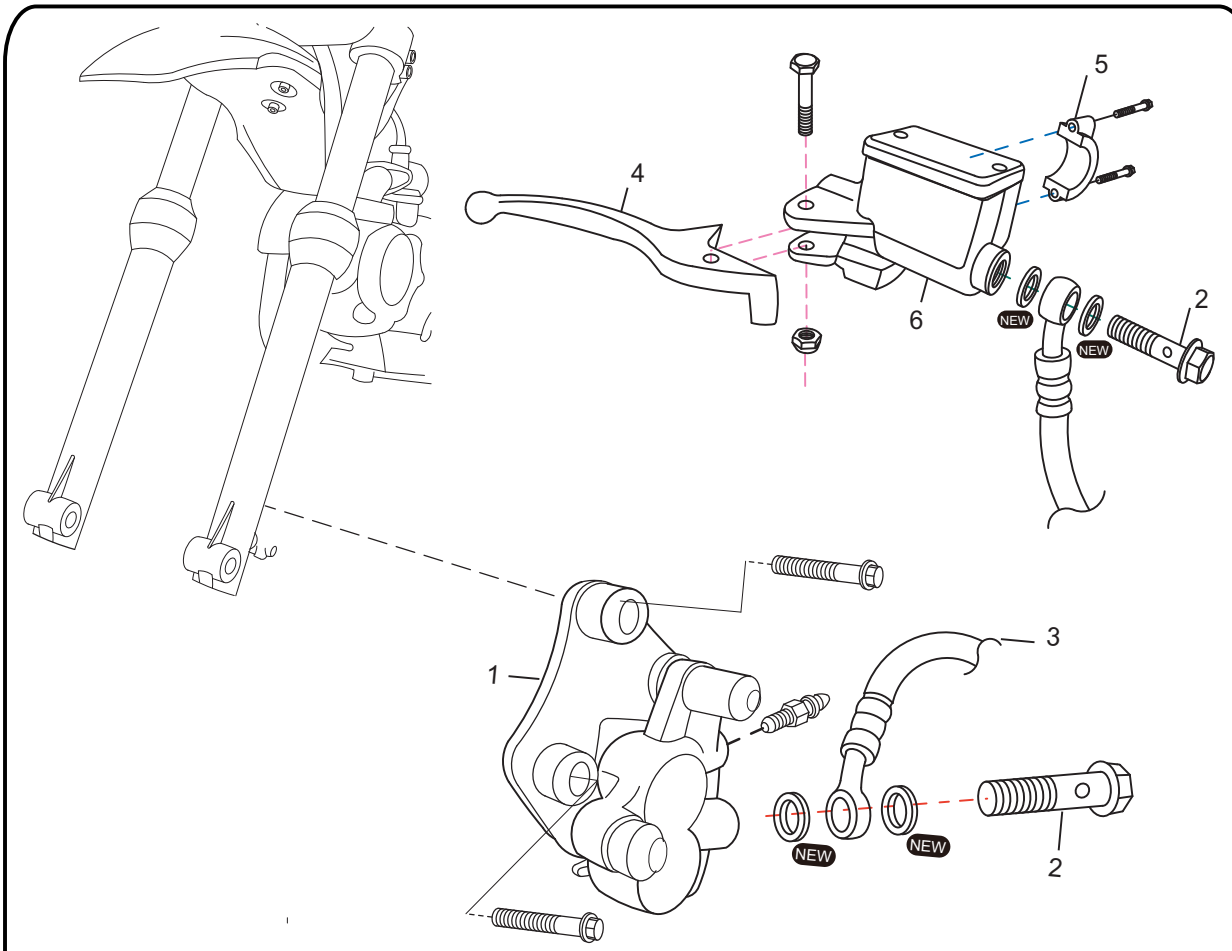
10. Tighten:
    - Reft drive chain puller
    - Nut (wheel axle) ②

65 Nm (6.5 m·kg)

    - Locknut ③

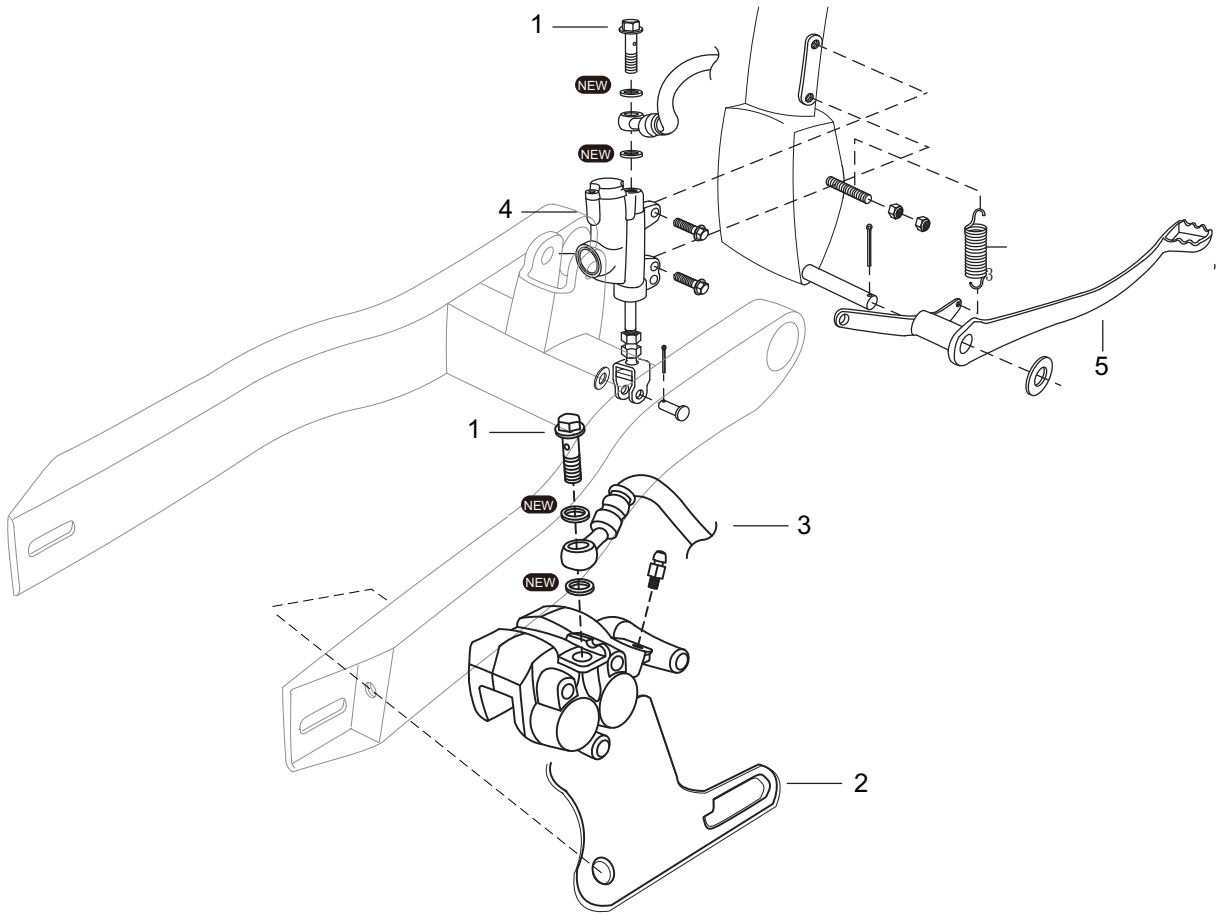
12 Nm (1.2 m · kg)

FRONT BRAKE

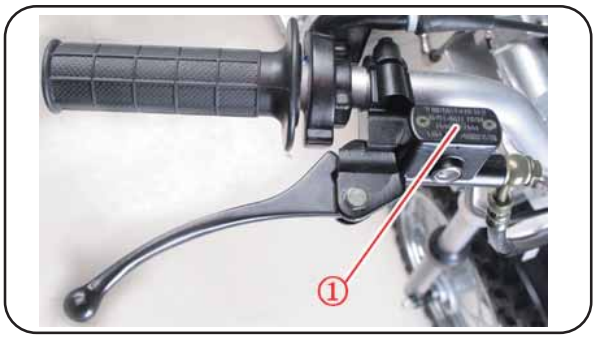


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	FR,CALIPER ASSY.	1	
2	UNION BOLT	2	
3	FR,BRAKE HOSE	1	
4	BRAKE LEVER	1	
5	BRAKE MASTER CYLINDER BRACKET	1	
6	BRAKE MASTER CYLINDER	2	
			For installation, reverse the removal procedure.

REAR BRAKE



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	UNION BOLT.	2	
2	REAR,CALIPER ASSY.	1	
3	REAR,BRAKE HOSE	1	
4	REAR MASTER CYLINDER ASSY	1	
5	REAR.BRAKE PEDAL	1	
			For installation, reverse the removal procedure.



REMOVAL POINTS

Brake fluid

1. Remove:

   [Front]

   • Brake master cylinder cap ①

NOTE:

Do not remove the diaphragm.

[Rear]

• Brake master cylinder cap ①

NOTE:

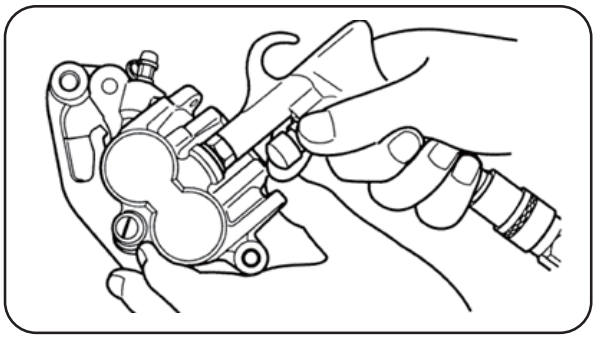
Do not remove the diaphragm.

2. Connect the transparent hose ② to the bleed screw ① and place a suitable container under its end.

3. Loosen the bleed screw and drain the brake fluid while pulling the lever in or pushing down on the pedal.

CAUTION:

- **Do not reuse the drained brake fluid.**
- **Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.**



Brake caliper piston

1. Remove:
   - Brake caliper piston
     Use compressed air and proceed carefully.

⚠ WARNING

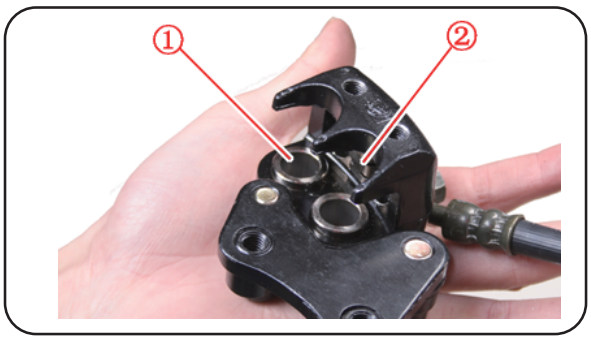
- **Cover piston with rag and use extreme caution when expelling piston from cylinder.**
- **Never attempt to pry out piston.**

Caliper piston removal steps:

- Insert a piece of rag into the brake caliper to lock one brake caliper.
- Carefully force the piston out of the brake caliper cylinder with compressed air.

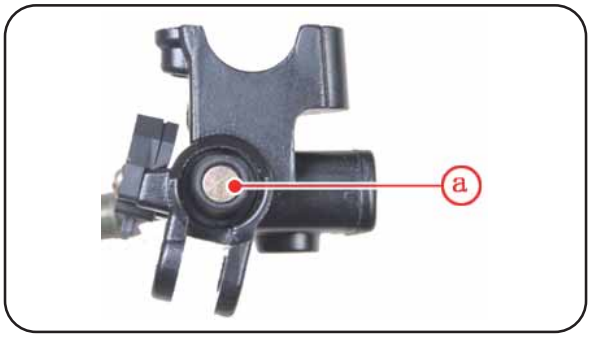
Brake caliper piston and spring plate

1. Remove:
   - Piston ① (Brake caliper)
   - Pad support ② (Brake caliper)
     Wear/damage/ → Replace



CAUTION:

Never attempt to take out the piston .



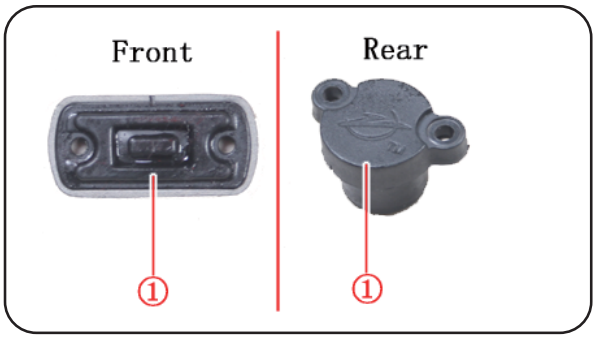
INSPECTION

Brake master cylinder

1. Inspect:
   - Brake master cylinder inner surface ⓐ
     Wear/scratches → Replace master cylinder assembly.
     Stains → Clean.

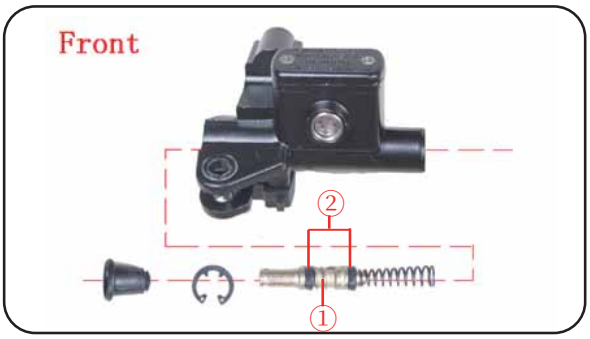
⚠ WARNING

Use only new brake fluid.



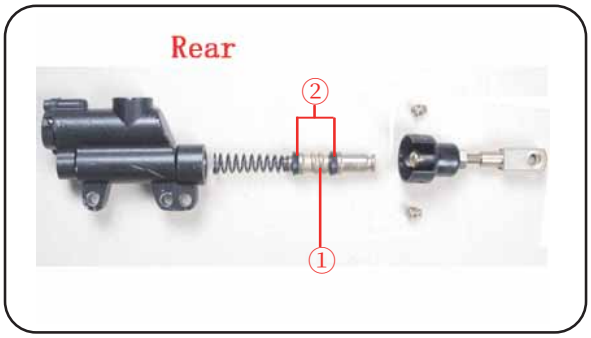
2. Inspect:
   - Diaphragm ①

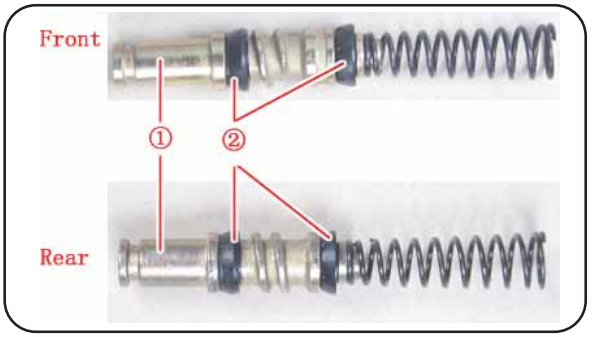
   Crack/damage → Replace.

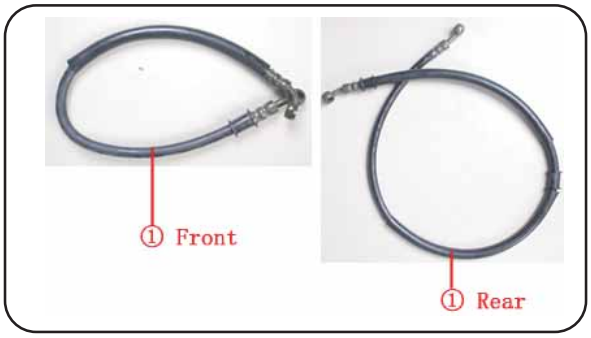


3. Inspect:
   - Brake master cylinder piston ①
   - Brake master cylinder cup ②

   Wear/damage/score marks → Replace brake master cylinder kit.







Brake hose

1. Inspect:
   - Brake hose ①

   Crack/damage → Replace.

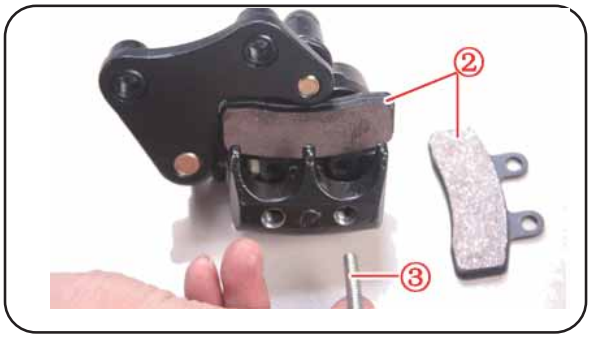
ASSEMBLY AND INSTALLATION

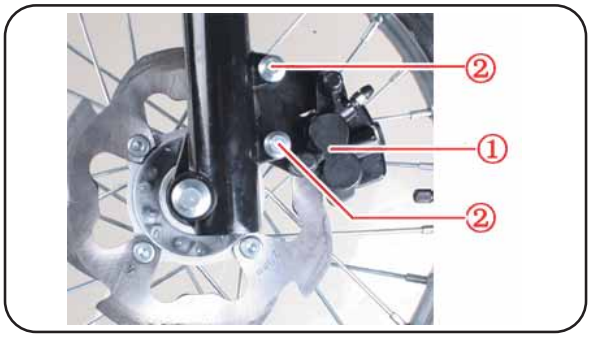
⚠ WARNING

- **All internal parts should be cleaned in new brake fluid only.**
- **Internal parts should be lubricated with brake fluid when installed.**

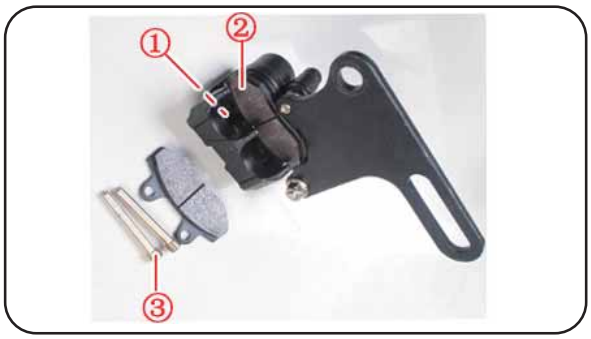
Front braker caliper

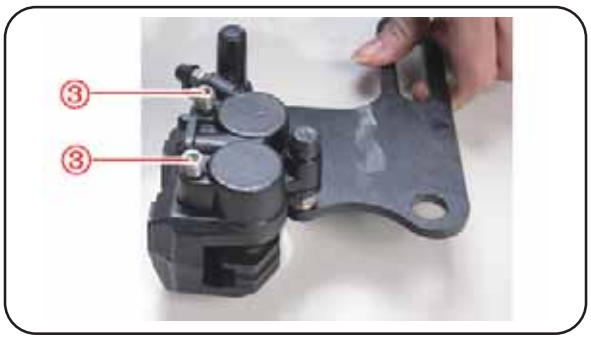
1. Install:
   - Pad support ①
   - Brake pad ②
   - Pad pin ③





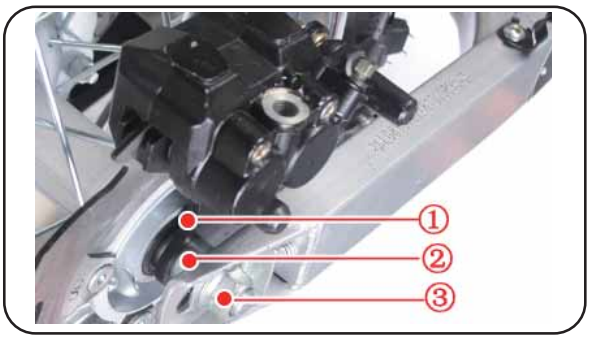
2. Install:
   - Brake caliper ①
   - Bolt (front brake caliper) ②



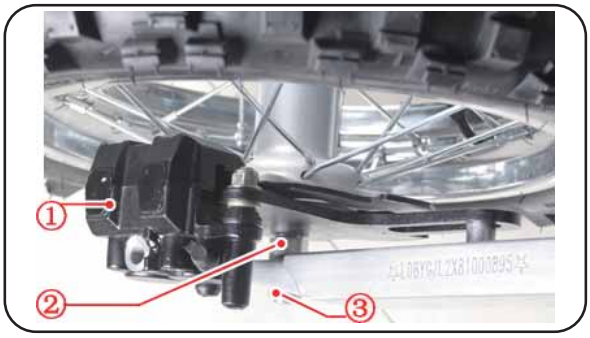


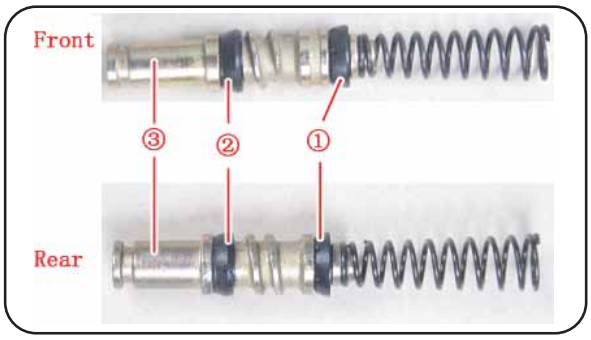
Rear braker caliper

1. Install:
   - Pad support ①
   - Brake pad ②
   - Pad pin ③



2. Install:
   - Brake caliper ①
   - Right spacer (rear wheel) ②
   - Nut (rear wheel) ③





Brake master cylinder kit

1. Clean:
   - Brake master cylinder
   - Brake master cylinder kit

   Clean them with brake fluid.
2. Install:
   - Brake master cylinder cup (primary) ①
   - Brake master cylinder cup (secondary) ②

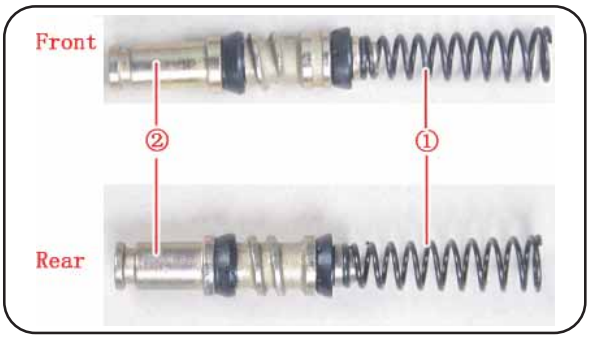
     To brake master cylinder piston ③

NOTE:

Apply the brake fluid on the brake master cylinder cup.

⚠ WARNING

After installing, cylinder cup should be installed as shown direction. Wrong installation cause improper brake performance.

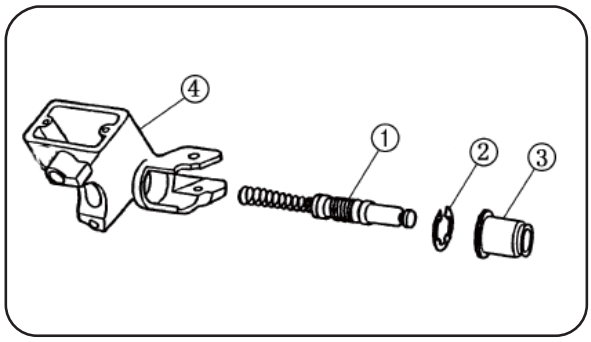


3. Install:
   - Spring ①

     To brake master cylinder piston ②.

NOTE:

Install the spring at the smaller dia. side.

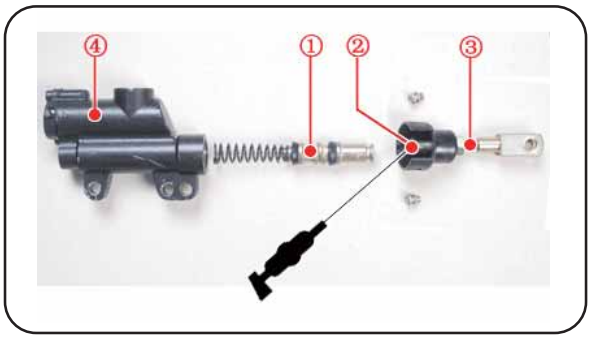


4. Install:

   [Front]
   - Brake master cylinder kit ①
   - Circlip ②
   - Brake master cylinder boot ③

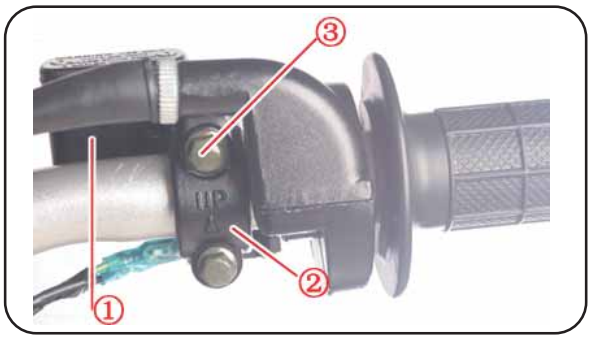
     To brake master cylinder ④.

   [Rear]
   - Brake master cylinder kit ①
   - Push rod ②
   - Brake master cylinder boot ③
   - To brake master cylinder ④



NOTE:

- Apply the brake fluid on the brake master cylinder kit.
- Apply the lithium soap base grease on the tip of the push rod.
- When installing the circlip, use a long nose circlip pliers.



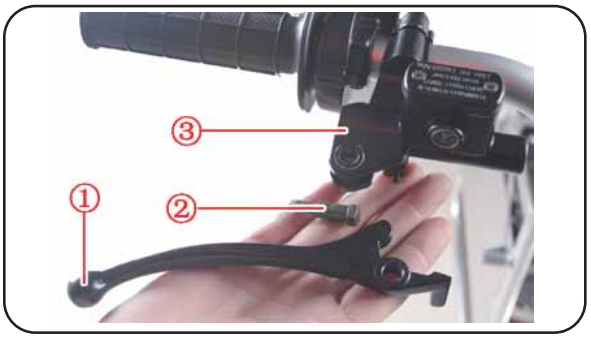
Front brake master cylinder

1. Install:
   - Brake master cylinder ①
   - Brake master cylinder bracket ②
   - Bolt (brake master cylinder bracket) ③

   9 Nm (0.9 m • kg)

NOTE:

- Install the bracket so that the arrow mark a face upward.
- First tighten the bolts on the upper side of the brake master cylinder bracket, and then tighten the bolts on the lower side.

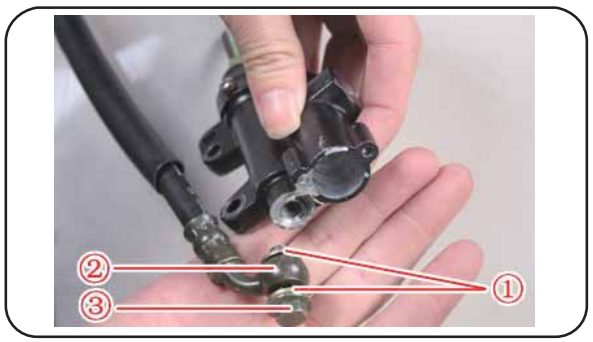


2. Install:
   - Brake lever ①
   - Bolt (brake lever) ②

     6 Nm (0.6 m • kg)
   - Front brake master cylinder③

NOTE:

Apply the lithium soap base grease on the brake lever sliding surface, bolt and contacting surface of the brake master cylinder piston.



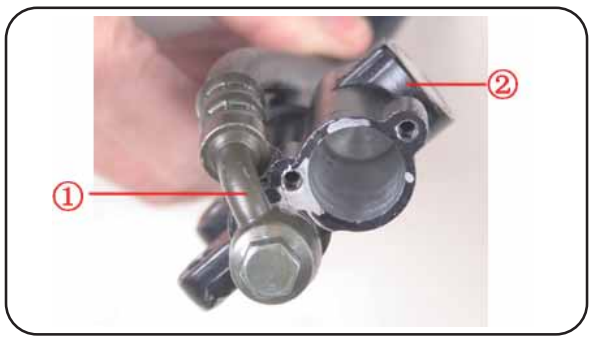
Rear brake master cylinder

1. Install:
   - Copper washer ① ***New***
   - Brake hose ②
   - Union bolt ③

     25 Nm (2.5 m• kg)

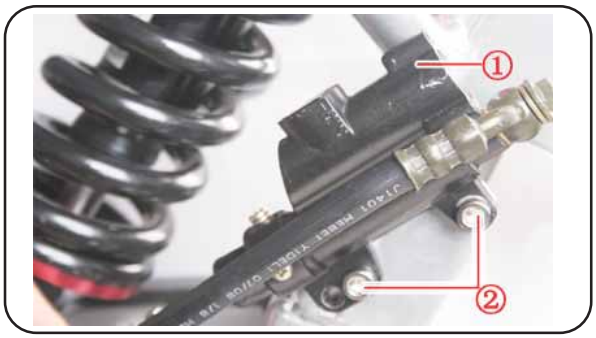
⚠ WARNING

Always use new copper washers.



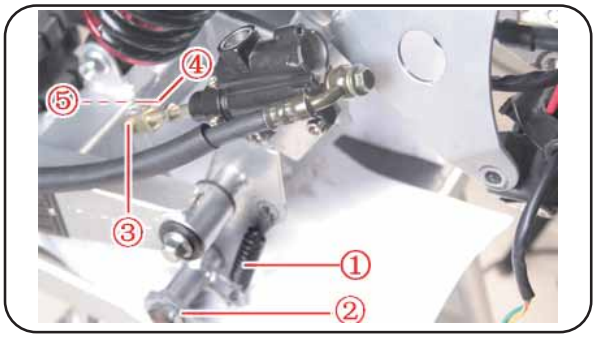
CAUTION:

Install the brake hose so that its pipe portion ① directs as shown and lightly touches the projection ② on the brake master cylinder.



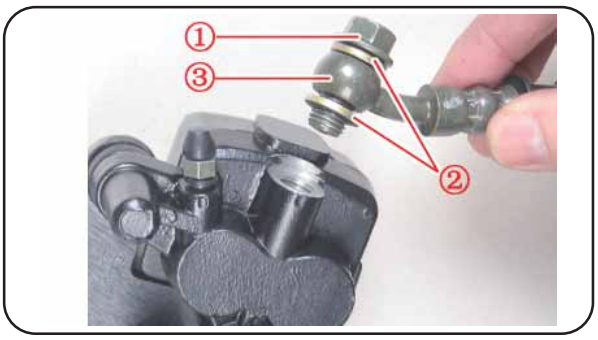
2. Install:
   - Brake master cylinder ①
   - Bolt (brake master cylinder) ②

	9 Nm (0.9 m · kg)



3. Install:
   - Spring ①
   - Brake pedal ②
   - Pin ③
   - Washer ④
   - Cotter pin ⑤ *New*

NOTE:
After installing, check the brake pedal height. Refer to "REAR BRAKE ADJUSTMENT" section in the CHAPTTER 3 .



Front brake hose

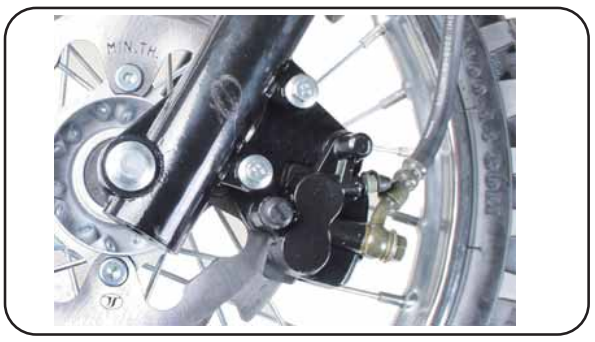
1. Install:
   - Union bolt ①

	25 Nm (2.5 m · kg)

   - Copper washer ②
   - Brake hose ③

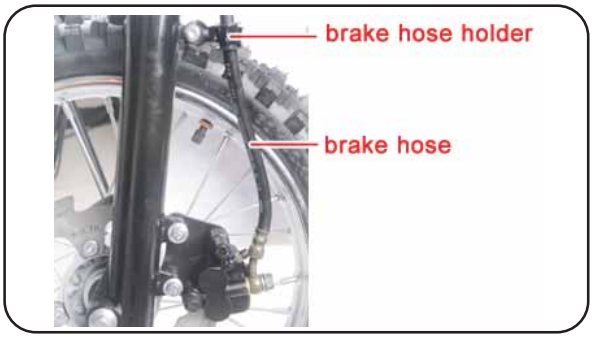
⚠ WARNING

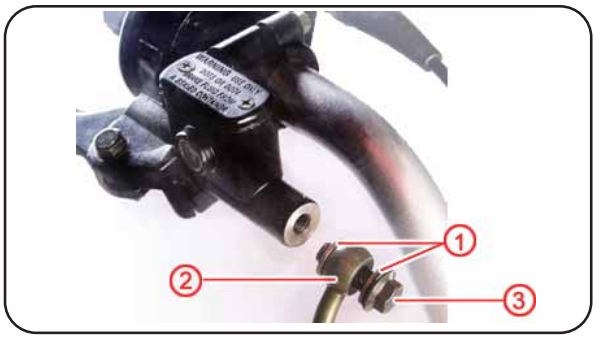
Always use new copper washers.



CAUTION:

After installing,brake hose should be installed as shown direction.wrong installation case brake hose broken.





2. Install:
   - Copper washer ① *New*
   - Brake hose ②
   - Union bolt ③

	25 Nm (2.5 m · kg)

⚠ WARNING

Always use new copper washers.

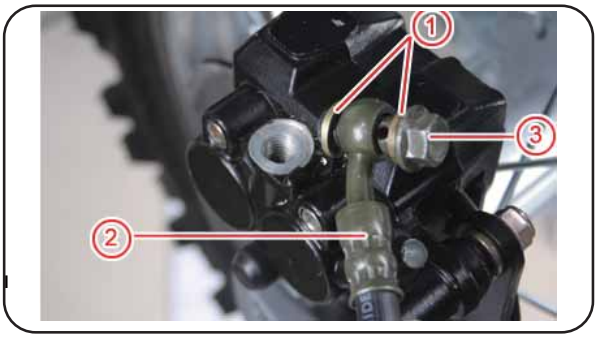
Rear brake hose

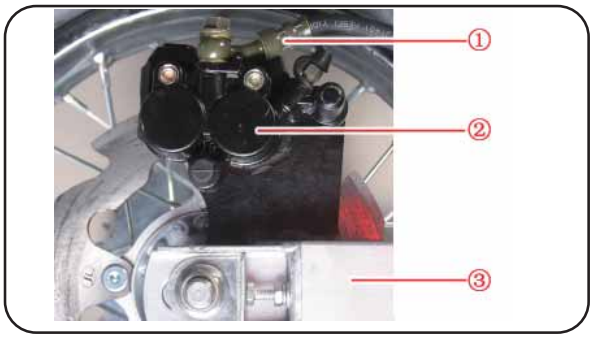
1. Install:
   - Copper washer ① *New*
   - Brake hose ②
   - Union bolt ③

	25 Nm (2.5 m · kg)

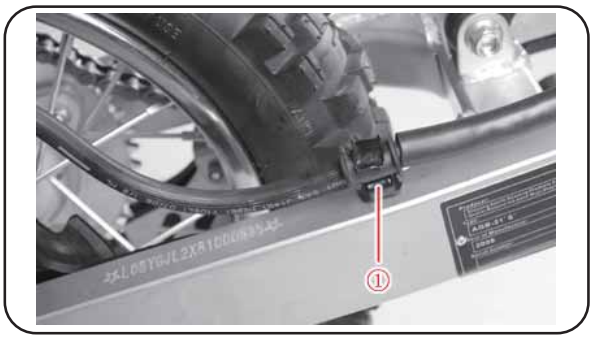
⚠ WARNING

Always use new copper washers.





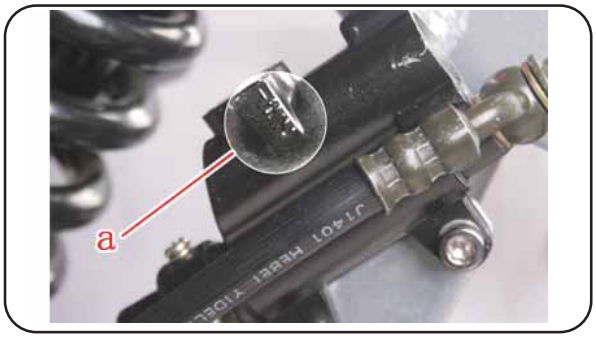
- Brake hose ①
- Brake caliper ②
- Swing arm ③



2. Install:
   - Brake holder ①

CAUTION:

After installing,brake hose should be installed as shown direction.wrong installation case brake hose broken.



Brake fluid

1. Fill:
   - Brake fluid
     Until the fluid level reaches “LOWER” level line .

Recommended brake fluid:
DOT #3 or DOT #4

⚠ WARNING

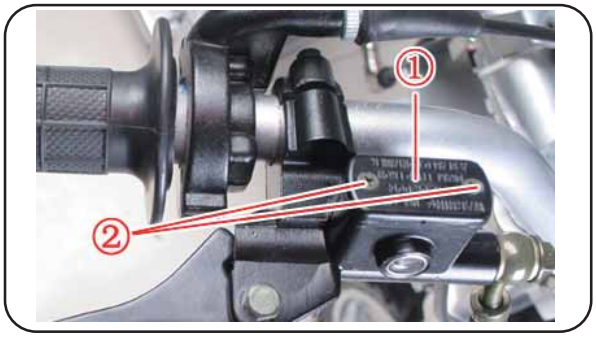
- **Use only the designated quality brake fluid:**
  otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- **Refill with the same type of brake fluid;**
  mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- **Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.**

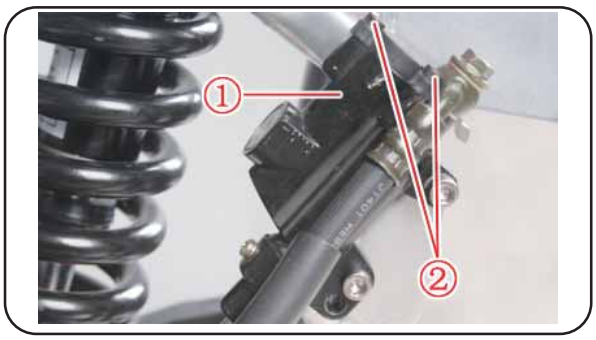
CAUTION:

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

2. Air bleed:
   - Brake system
     Refer to “BRAKE SYSTEM AIR BLEEDING” section in the CHAPTER 3.

3. Inspect:
   - Brake fluid level
     Fluid at lower level → Fill up.
     Refer to “BRAKE FLUID LEVEL INSPECTION” section in the CHAPTER 3.





4. Install:
   [Front]
   - Diaphragm
   - Brake master cylinder cap ①
   - Screw (brake master cylinder cap) ②

   2 Nm (0.2 m · kg)

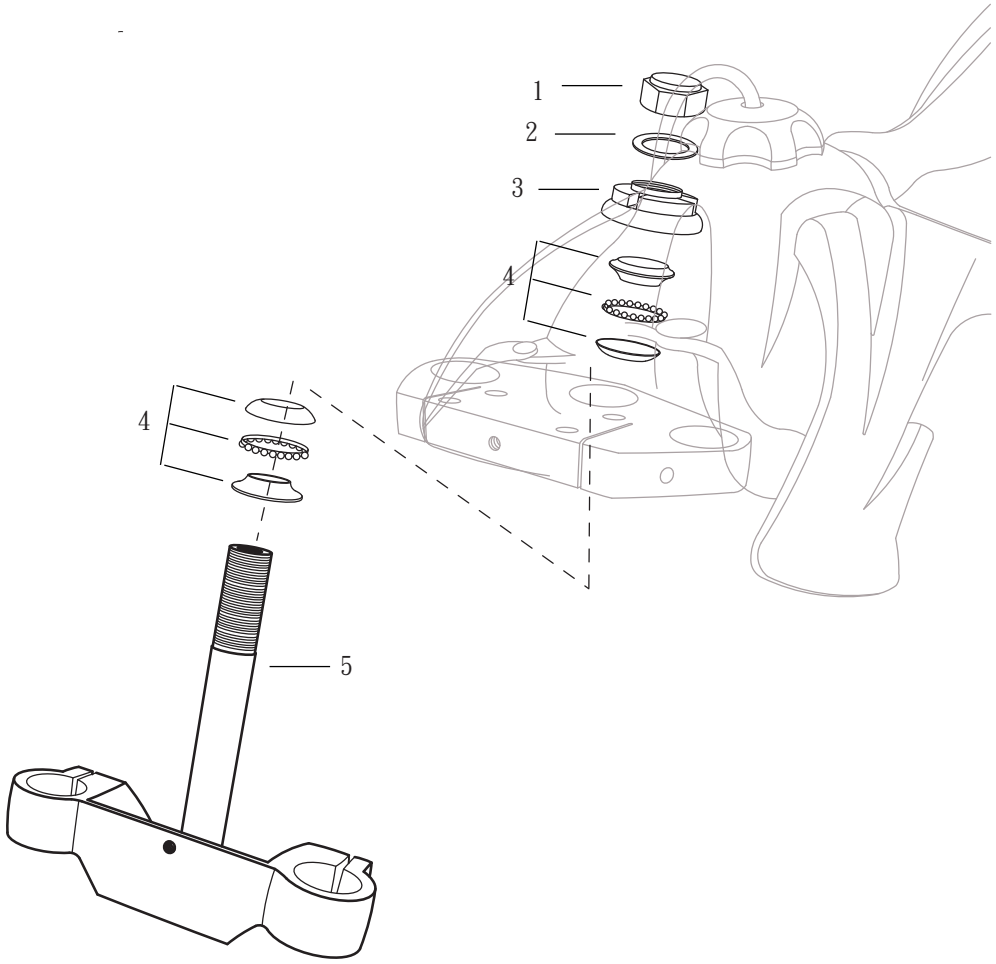
   [Rear]
   - Diaphragm
   - Brake master cylinder cap ①
   - Bolt (brake master cylinder cap) ②

   2 Nm (0.2 m · kg)

CAUTION:

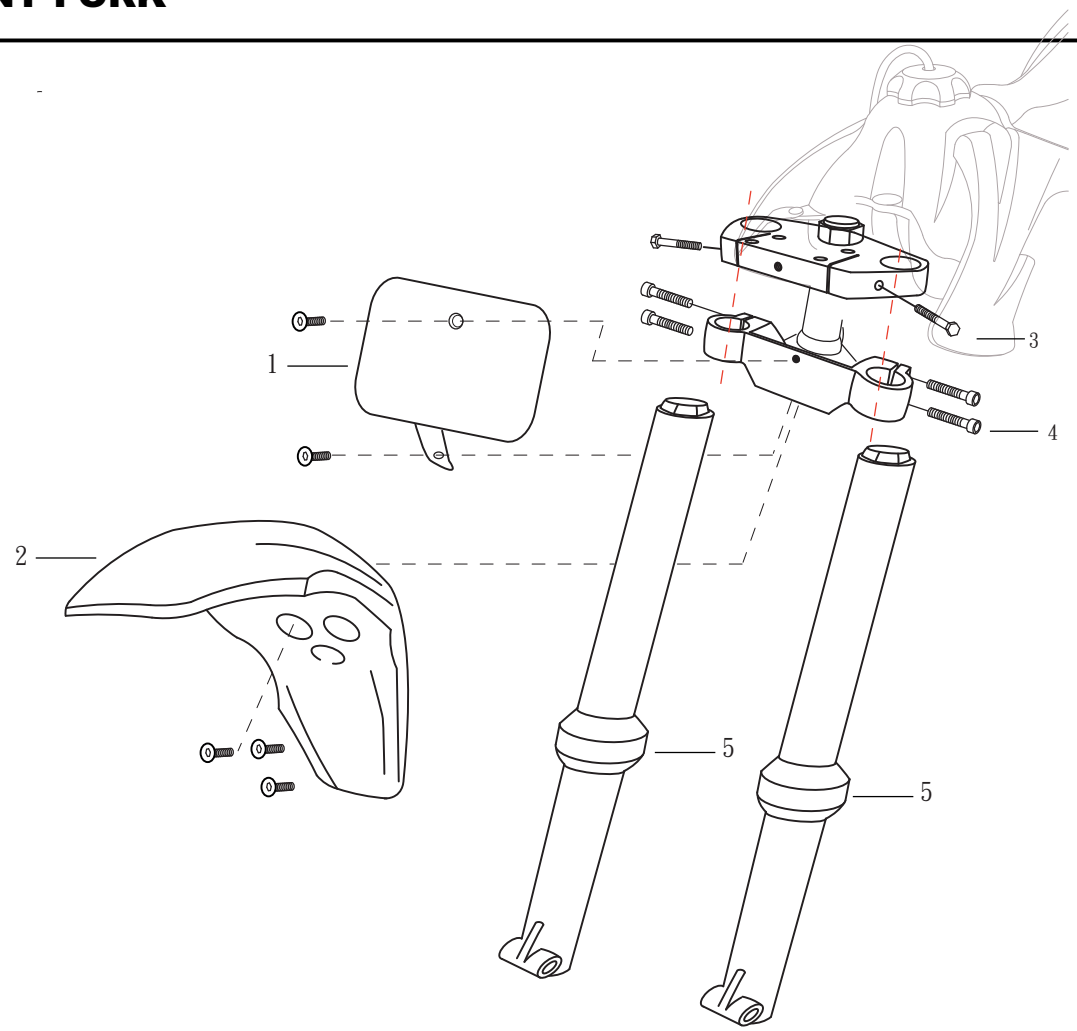
After installation, while pulling the brake lever in or pushing down on the brake pedal, check whether there is any brake fluid leaking where the union bolts are installed respectively at the brake master cylinder and brake caliper.

STREERING

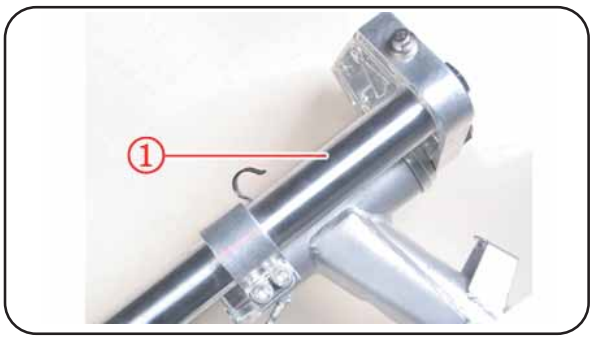


Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	NUT STEERING UPPER M22	1	
2	WASHER（STEEL).	1	
3	STEERING STEM LOCK NUT	1	
4	BEARING ASSY	1	
5	TRIPLE CLAMP(STEERING STEM) ASSY	1	
			For installation, reverse the removal procedure.

FRONT FORK



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	FRONT NUMBER PLATE	1	
2	FRONT FENDER	1	
3	SCREW	2	
4	SCREW .	4	
5	FRONT.FORK ASSY	1	
			For installation, reverse the removal procedure.

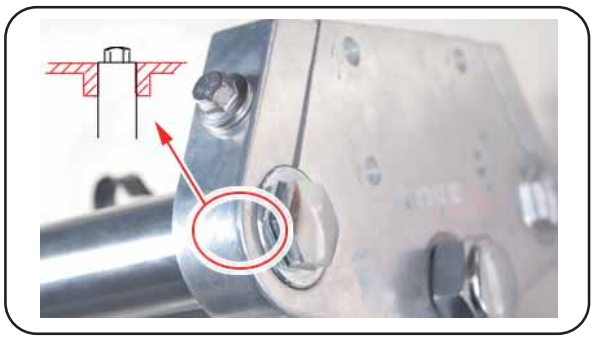


Installation

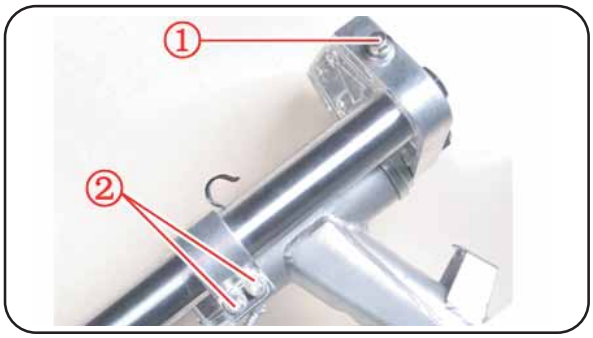
1. Install:
   - Front fork ①

NOTE:

- Temporarily tighten the pinch bolts (lower bracket).
- Do not tighten the pinch bolts (upper bracket) yet.



2. Tighten:
   - Front fork .



4. Tighten:
   - Pinch bolt (upper bracket) ①

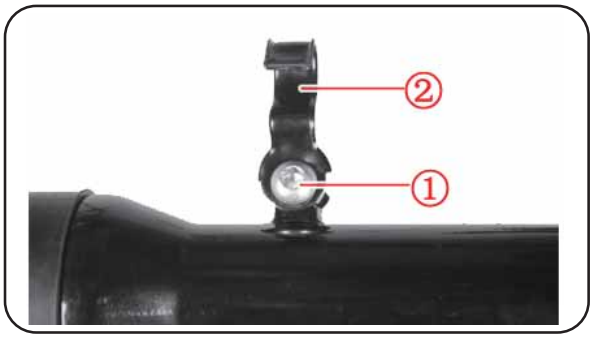
	15 Nm (1.5 m · kg)

   - Pinch bolt (lower bracket) ②

	15 Nm (1.5 m · kg)

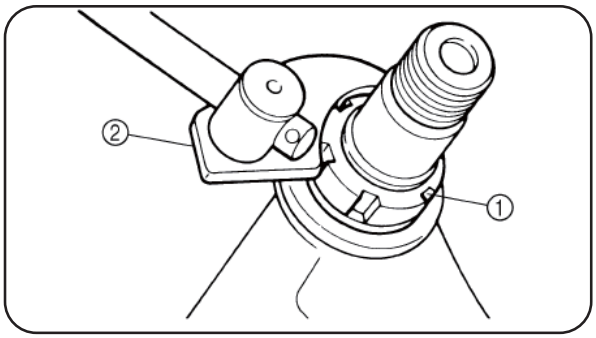
CAUTION:

Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.



5. Install:
   - Brake hose holder ②
   - Bolt (brake hose holder) ①

	9 Nm (0.9 m · kg)



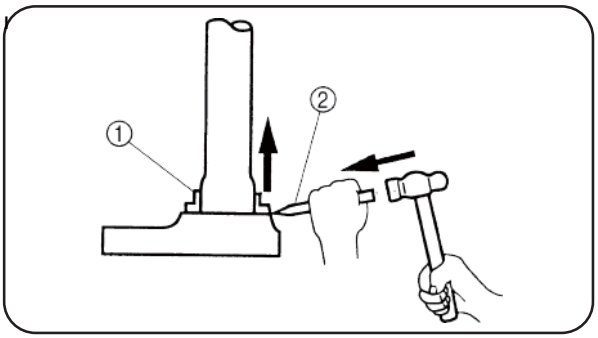
REMOVAL POINTS

Steering ring nut

1. Remove:
   - Steering ring nut ①
     Use the steering nut wrench②

⚠ WARNING

Support the steering stem so that it may not fall down.

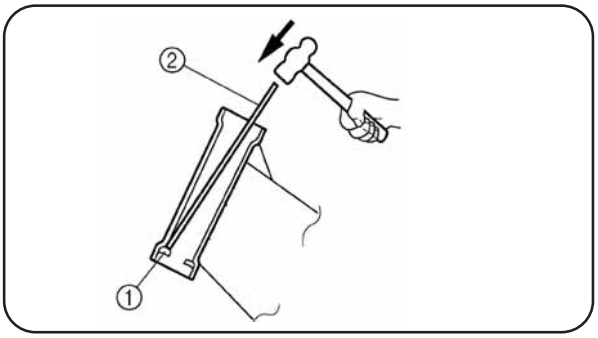


Lower bearing

1. Remove:
   - Lower bearing ①
     Use the floor chisel ②.

CAUTION:

Take care not to damage the steering shaft thread.



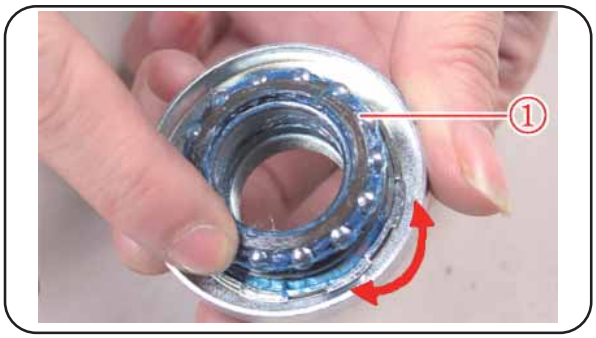
Ball race

1. Remove:
   - Ball race ①
     Remove the ball race using long rod ②
     and the hammer.

INSPECTION

Steering stem

1. Inspect:
   - Steering stem ①
     Bend/damage → Replace.

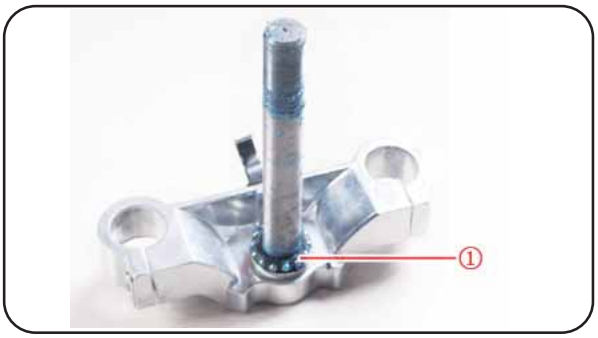


Bearing and ball race

1. Wash the bearings and ball races with a solvent.
2. Inspect:
   - Bearing ①
   - Ball race

   Pitting/damage → Replace bearings and ball races as a set.

   Install the bearing in the ball races. Spin the bearings by hand. If the bearings hang up or are not smooth in their operation in the ball races, replace bearings and ball races as a set.



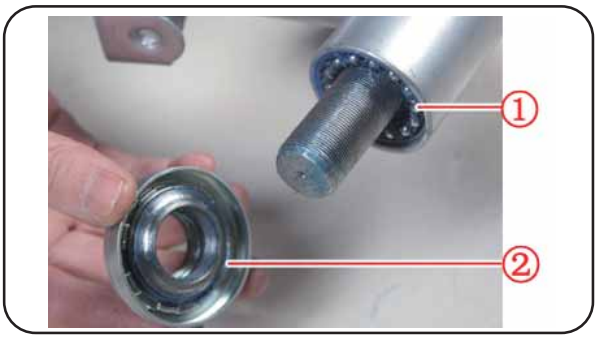
ASSEMBLY AND INSTALLATION

Lower bracket

1. Install:
   - Lower bearing ①

NOTE:

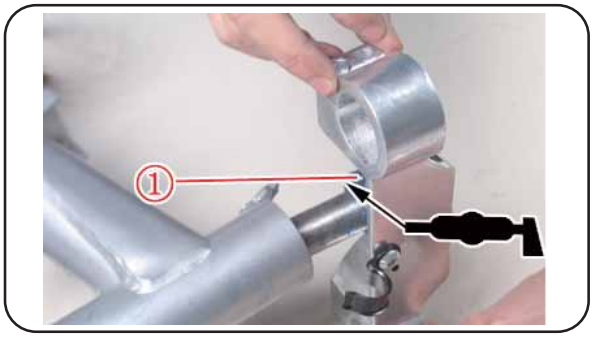
Apply the lithium soap base grease on the dust seal lip and bearing inner circumference.



2. Install:
   - Ball race
   - Upper bearing ①
   - Ball race cover ②

NOTE:

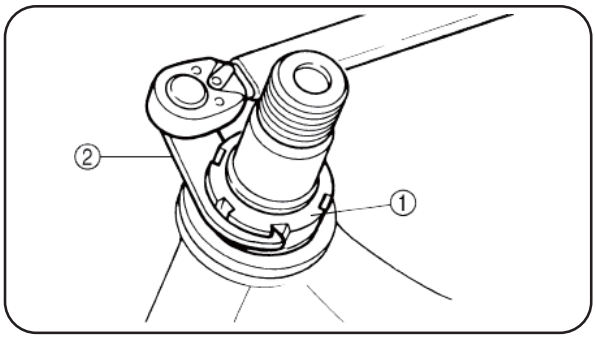
Apply the lithium soap base grease on the bearing and ball race cover lip.



3. Install:
   - Lower bracket ①

NOTE:

Apply the lithium soap base grease on the bearing, the portion a and thread of the steering stem.

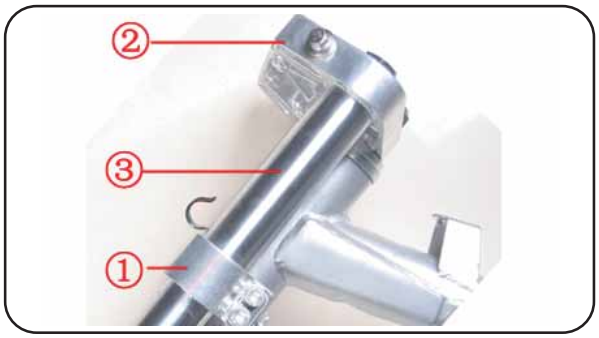


4. Install:
   - Steering ring nut ①

     30 Nm (3 m · kg)

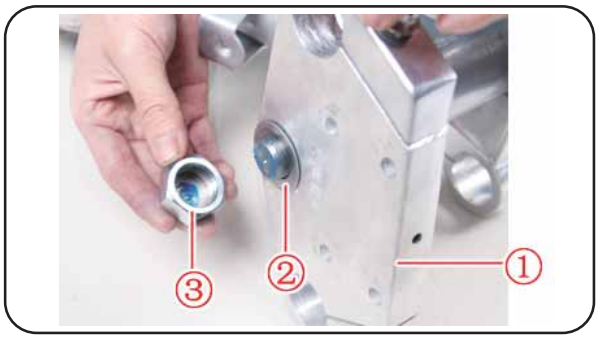
     Tighten the steering ring nut using the steering nut wrench 2 .
     Refer to “STEERING HEAD INSPECTION AND ADJUSTMENT” section in the CHAPTER 3.

5. Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings.



6. Install:
   - Lower ①
   - Upper bracket ②
   - Front fork ③

NOTE:
- Temporarily tighten the pinch bolts (lower bracket).
- Do not tighten the pinch bolts (upper bracket) yet.



7. Install:
   - Upper bracket ②
   - Washer
   - Steering stem nut ③

     70 Nm (7.0 m · kg)

8. After tightening the nut, check the steering for smooth movement. If not, adjust the steering by loosening the steering ring nut little by little.

9. Tighten:
   - Pinch bolt (upper bracket) ①

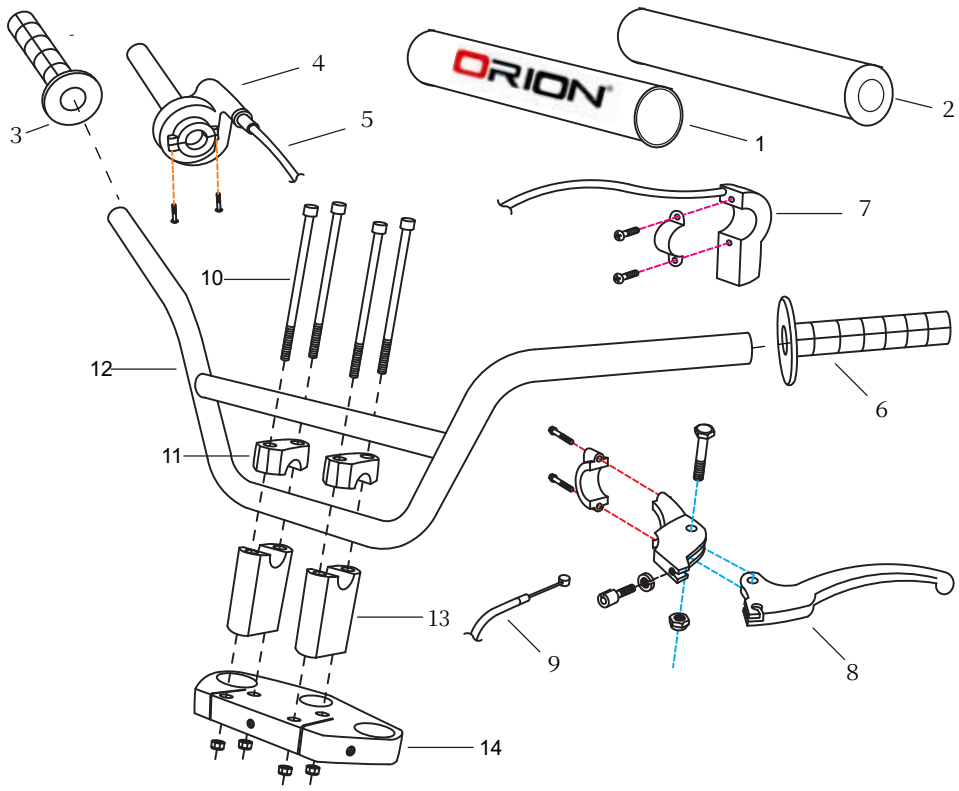
     15 Nm (1.5 m · kg)
   - Pinch bolt (lower bracket)

     15 Nm (1.5 m · kg)

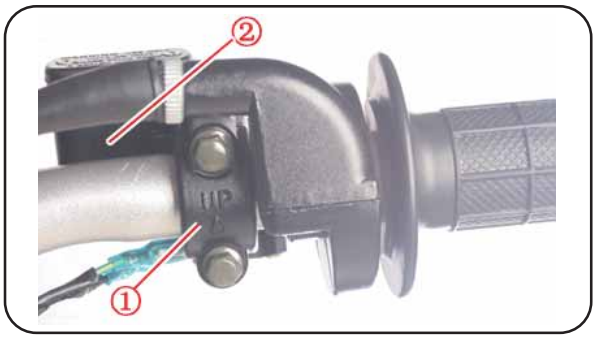
CAUTION:

Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.

HANDLEBAR



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	CROSS BAR COVER	1	
2	CROSS BAR FOAM.	1	
3	GRIP .R	1	
4	THROTTLE HOUSEING	1	
5	THROTTLE CABLE	1	
6	GRIP .L	1	
7	START SWITCH ASSY	1	
8	CLUTCH LEVER ASSY.	1	
9	CLUTCH CABLE ASSY	1	
10	SCREW WITH NUTM8X80	4	
11	RISER SET FOR HANDLEBAR	2	
12	HANDLEBAR	1	
13	RISER SET FOR HANDLEBAR	2	
14	UPPER TRIPLECLAMP	1	
			For installation, reverse the removal procedure.



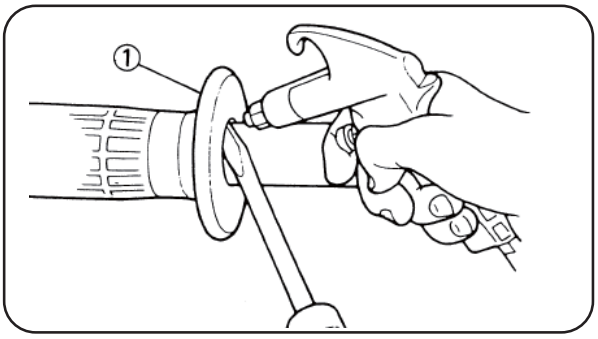
REMOVAL POINTS

Brake master cylinder

1. Remove:
   - Brake master cylinder bracket ①
   - Brake master cylinder ②

CAUTION:

- **Do not let the brake master cylinder hang on the brake hose.**
- **Keep the brake master cylinder cap side horizontal to prevent air from coming in.**

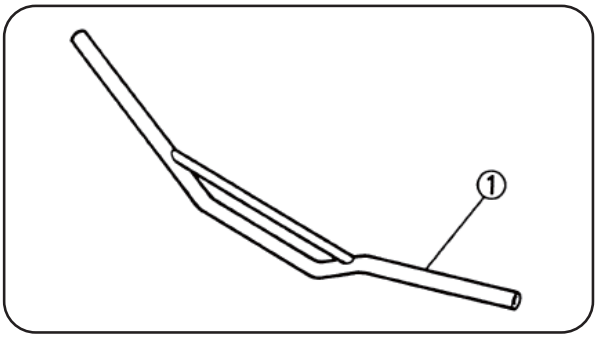


Grip

1. Remove:
   - Grip ①

NOTE:

Blow in air between the handlebar or tube guide and the grip. Then remove the grip which has become loose.



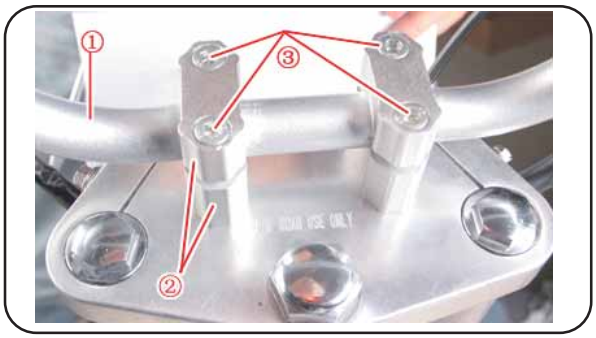
INSPECTION

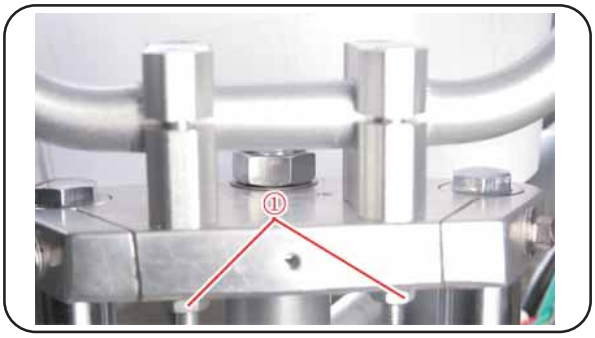
Handlebar

1. Inspect:
   - Handlebar ①
     Bends/cracks/damage → Replace.

⚠ WARNING

Do not attempt to straighten a bent handlebar as this may dangerously weaken the handlebar.





ASSEMBLY AND INSTALLATION

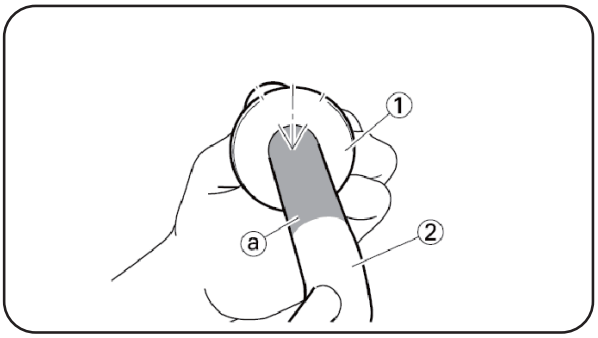
Handlebar

1. Install:
   - Handlebar ①
   - Handlebar upper holder ②
   - Bolt (handlebar upper holder) ③

	25 Nm (2.5 m · kg)

NOTE:

- The handlebar upper holder should be installed with the punched mark a forward.
- First tighten the bolts on the front side of the handlebar upper holder, and then tighten the bolts on the rear side.

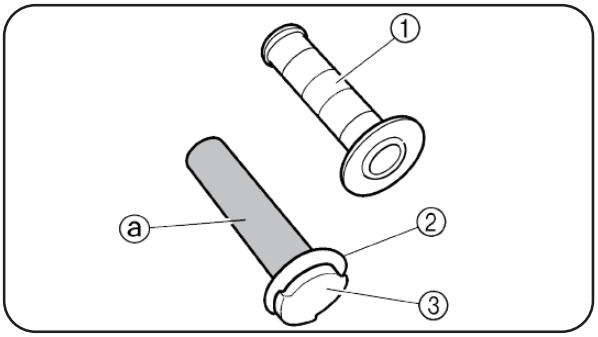


2. Install:
   - Left grip ①

   Apply the adhesive to the handlebar ②.

NOTE:

- Before applying the adhesive, wipe off grease or oil on the handlebar surface ⓐ with a lacquer thinner.

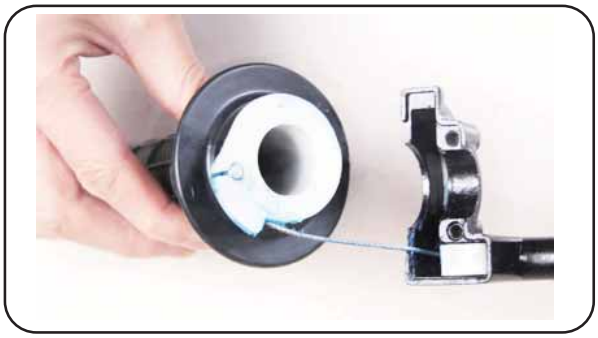


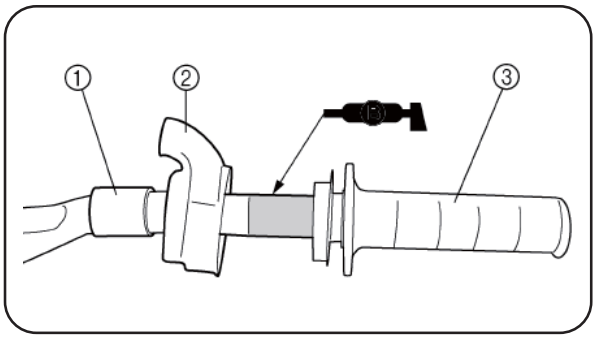
3. Install:
   - Right grip ①
   - Collar ②

   Apply the adhesive on the tube guide ③.

NOTE:

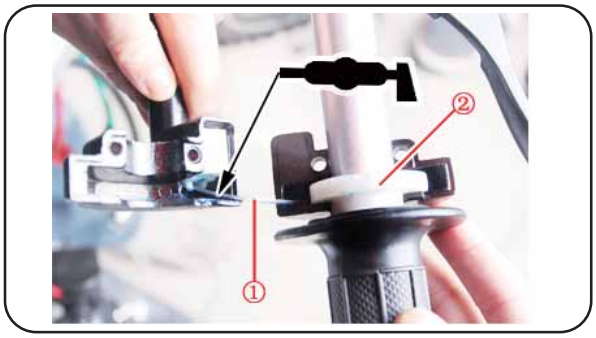
- Before applying the adhesive, wipe off grease or oil on the tube guide surface ⓐ with a lacquer thinner.





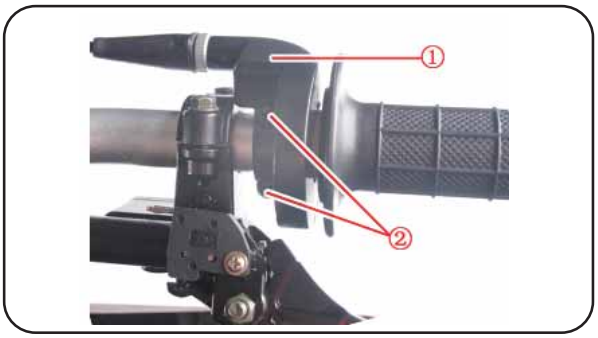
4. Install:
   - Collar ①
   - Grip cap cover ②
   - Throttle grip ③

NOTE:
Apply the lithium soap base grease on the throttle grip sliding surface.



5. Install:
   - Throttle cables ①
     To tube guide ②.

NOTE:
Apply the lithium soap base grease on the throttle cable end and tube guide cable winding portion.

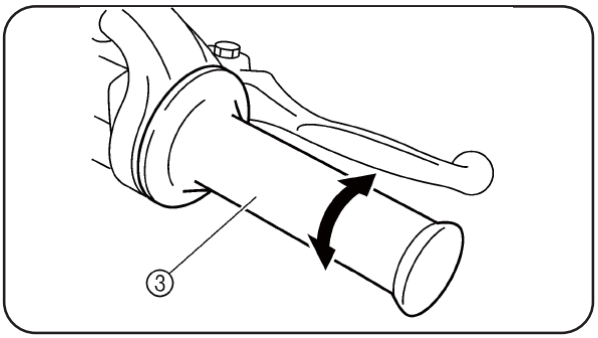


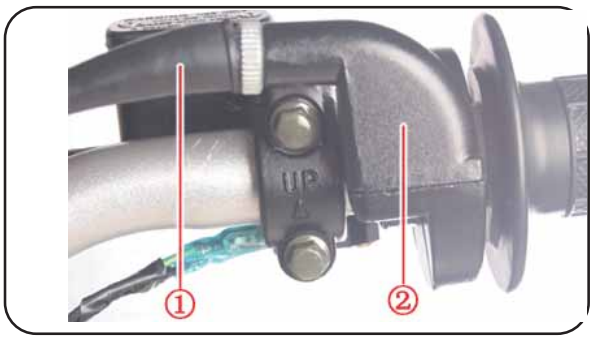
6. Install:
   - Throttle cable cap ①
   - Screw (throttle cable cap) ②

	4 Nm (0.4 m · kg, 2.9 ft · lb)

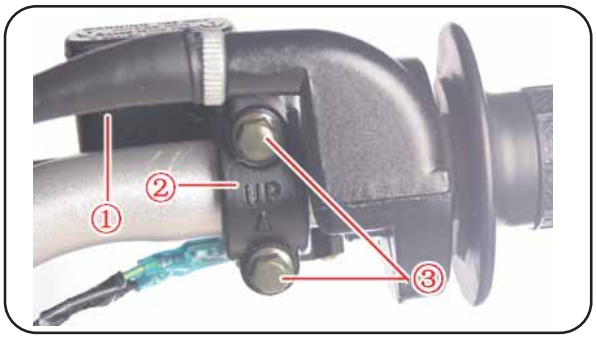
⚠ WARNING

After tightening the screws, check that the throttle grip ③ moves smoothly. If it does not, retighten the bolts for adjustment.





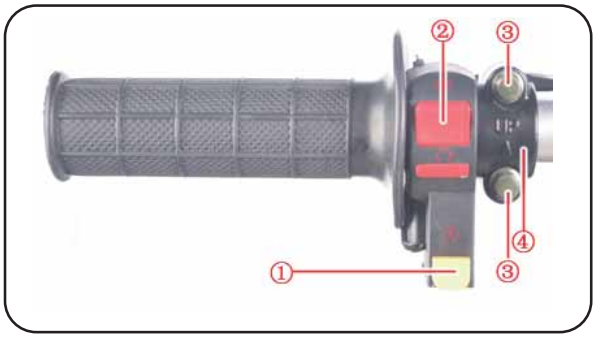
7. Install:
   - Grip cap cover ①
   - Cover (throttle cable cap) ②



8. Install:
   - Brake master cylinder ①
   - Brake master cylinder bracket ②
   - Bolt (brake master cylinder bracket) ③

9 Nm (0.9 m • kg)

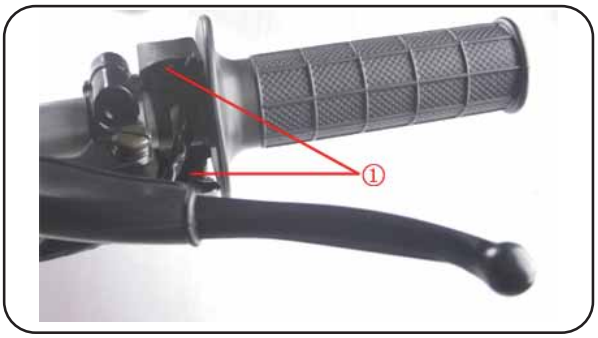
NOTE:
- Install the bracket so that the arrow mark a faces upward.
- First tighten the bolt on the upper side of the brake master cylinder bracket, and then tighten the bolt on the lower side.



9. Install:
   - Engine start button ①
   - Engine stop switch ②
   - Bolt (clutch lever holder) ③

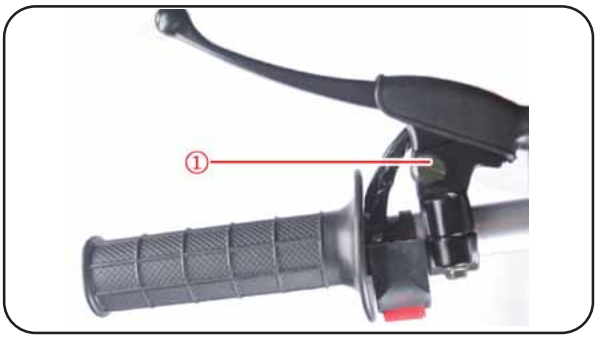
9 Nm (0.9 m • kg)

   - Clutch lever holder ④



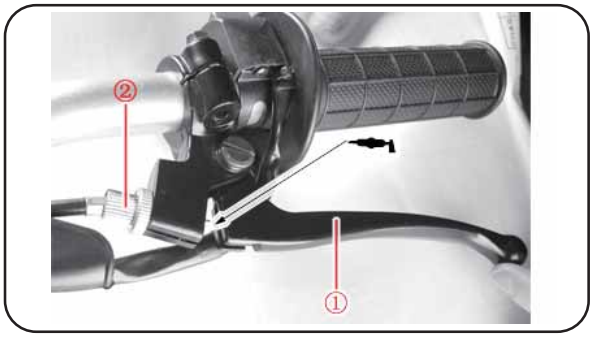
   - Screw (Engine start button) ①

4 Nm(0.4 m • kg)



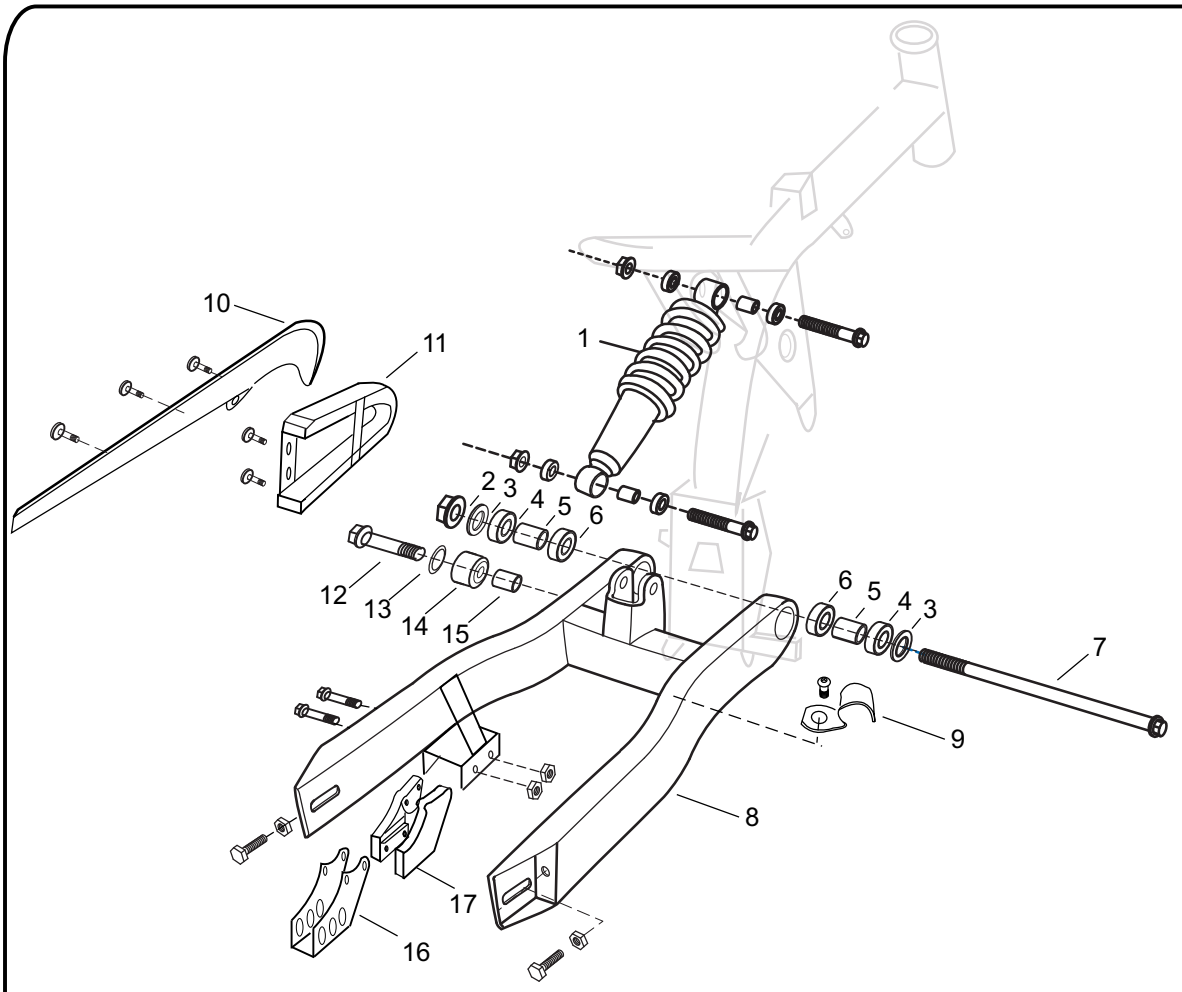
10. Install:
    - Bolt (clutch lever) ①

NOTE:
Apply the lithium soap base grease on the clutch cable end .



11. Adjust:
    - Clutch lever free play
      Refer to "CLUTCH ADJUSTMENT" section in the CHAPTER 3.
    - Hot starter lever free play

SWINGARM AND REAR SHOCK ABSORBER



Order	Job / Part name	Q'ty	Remarks
			Remove the parts in the order listed.
1	REAR SHOCK	1	
2	NUT	1	
3	WSHER	2	
4	NEEDLE BEARING	2	
5	BUSHING	2	
6	NEEDLE BEARING	1	
7	MIDDLE AXLE BOLT	1	
8	REAR SWING ARM ASSY	1	
9	CLIP	1	
10	CHAIN GUARD	1	
11	REAR FORK DUST COVER	1	
12	BOLT	1	
13	WSHER	1	
14	CHAIN ROLLER	1	
15	COLLAR	1	
16	CHAIN GUIDE-BRACKET	1	
17	LT.CHAIN-GUIDE BRACKET（set)	1	
			For installation, reverse the removal procedure.

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

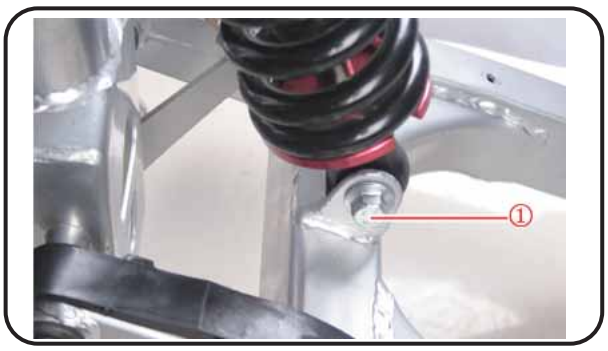
1. Stand the motorcycle on a level surface.

⚠ WARNING

Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

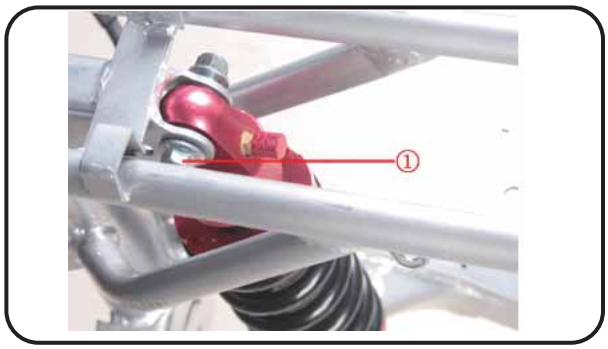
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   - rear shock absorber assembly lower bolt ①

NOTE:

While removing the rear shock absorber assembly lower pin, hold the swingarm so that it does not drop down.



3. Remove:
   - rear shock absorber assembly upper bolt ①
   - rear shock absorber assembly

NOTE:

Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm and relay arm.

REMOVING THE DRIVE CHAIN

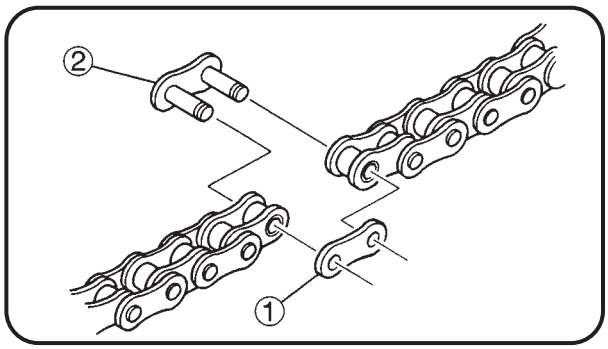
1. Stand the motorcycle on a level surface.

⚠ WARNING

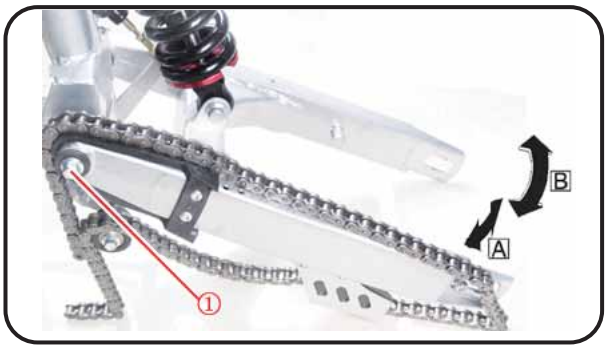
Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Remove:
   - chain cover
3. Remove:
   - master link clip
     (with interlocking slip-joint pliers)
4. Remove:
   - master link plate ①
   - master link ②
5. Remove:
   - drive chain



REMOVING THE SWINGARM

1. Stand the motorcycle on a level surface.

⚠ WARNING

Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Check:
   - swingarm side play A
   - swingarm vertical movement B

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a. Check the tightening torque of the pivot shaft nut ①.

	Pivot shaft nut **50 Nm (5.0 m•kg)**

b. Check the swingarm side play A by moving the swingarm from side to side.
c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.

	Swingarm side play (at the end of the swingarm) **1.0 mm**

d. Check the swingarm vertical movement B by moving the swingarm up and down.
If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.

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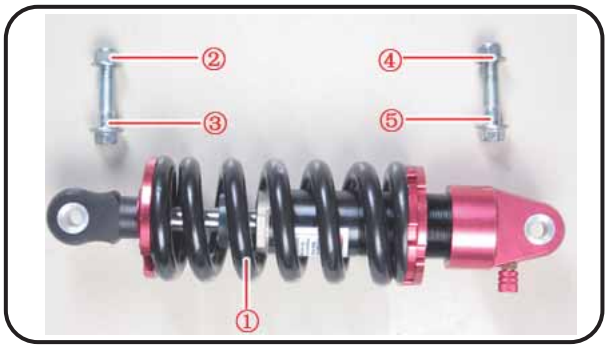
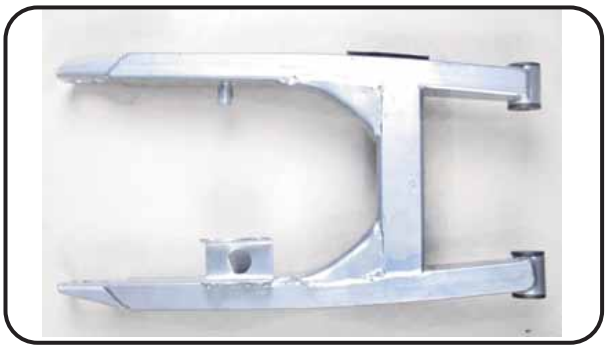
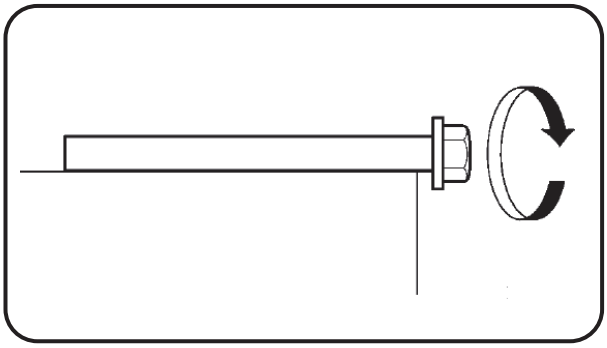






CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
   - rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   - rear shock absorber
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
   - spring
     Damage/wear → Replace the rear shock absorber assembly.
   - bolts
     Bends/damage/wear → Replace.

CHECKING THE SWINGARM

1. Check:
   - swingarm
     Bends/cracks/damage → Replace.

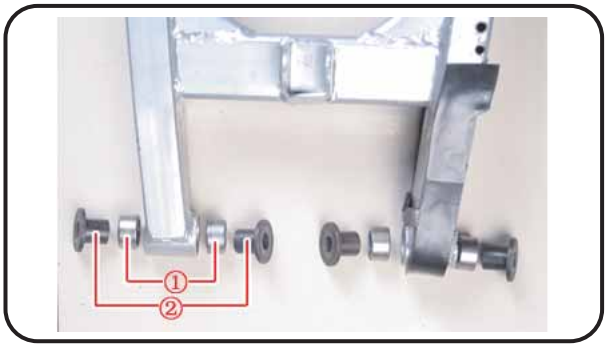
2. Check:
   - pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

⚠ WARNING

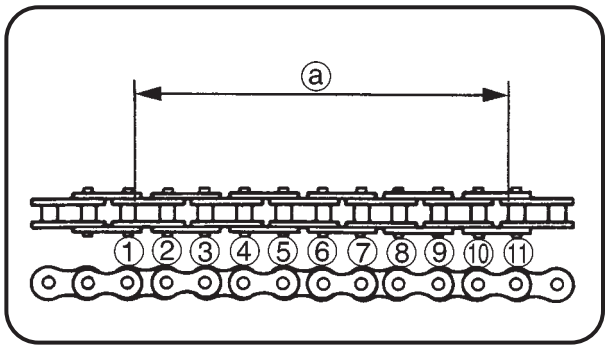
Do not attempt to straighten a bent pivot shaft.

3. Wash:
   - pivot shaft
   - spacer ①
   - bearings ②

Recommended cleaning solvent
Kerosine



4. Check:
   • spacer ①
     Damage/wear → Replace.
   • bearings ②
     Damage/pitting → Replace.



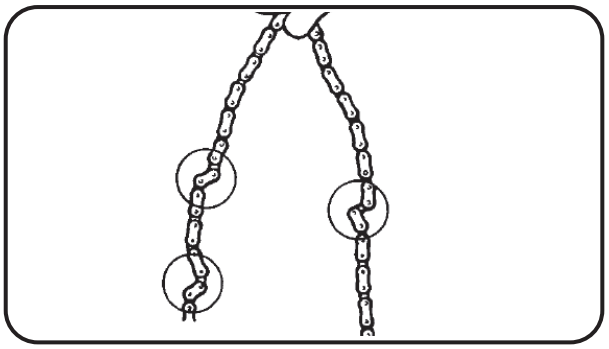
CHECKING THE DRIVE CHAIN

1. Measure:
   • 10-link section ⓐ of the drive chain
     Out of specification → Replace the drive chain.

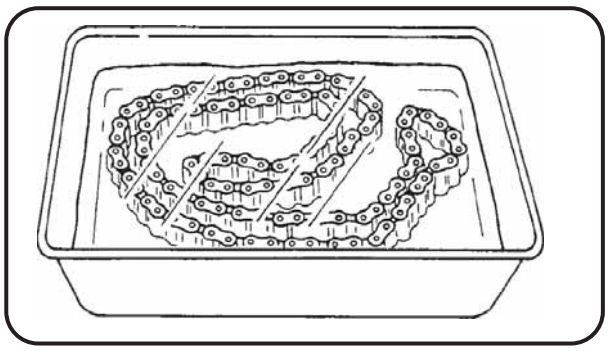
10-link drive chain section limit (maximum)
144.4 mm

NOTE:

- While measuring the 10-link section, push down on the drive chain to increase its tension.
- Measure the length between drive chain roller ① and ⑪ as shown.
- Perform this measurement at two or three different places.



2. Check:
   • drive chain
     Stiffness → Clean and lubricate or replace.



3. Clean:
   • drive chain

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a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosine and remove any remaining dirt.
c. Remove the drive chain from the kerosine and completely dry it.

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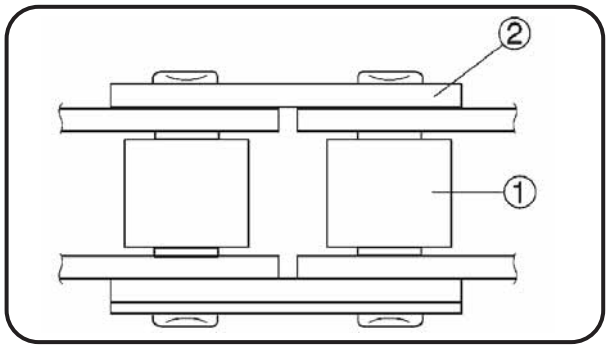
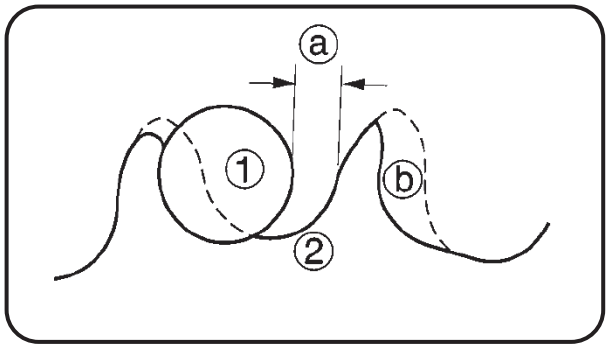


4. Check:
   • drive chain rollers ①
   Damage/wear → Replace the drive chain.
   • drive chain side plates ②
   Damage/wear → Replace the drive chain.
   Cracks → Replace the drive chain and make sure that the battery breather hose is properly routed away from the drive chain and below the swingarm.
5. Lubricate:
   • drive chain

Recommended lubricant
Engine oil or chain lubricant suitable for non-O-ring chains



6. Check:
   • drive sprocket
   • rear wheel sprocket
   More than 1/4 tooth ⓐ wear → drive chain sprockets as a set.
   Bent teeth → Replace the drive chain sprockets as a set.

ⓑ Correct
① Drive chain roller
② Drive chain sprocket

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
   • rear shock absorber assembly

40 Nm(4.0 m • kg)

NOTE:

When installing the rear shock absorber assembly, lift up the swingarm.

INSTALLING THE SWINGARM

1. Lubricate:
   - bearings
   - spacers
   - pivot shaft

Recommended lubricant
Molybdenum disulfide grease

2. Install:
   - Swingarm

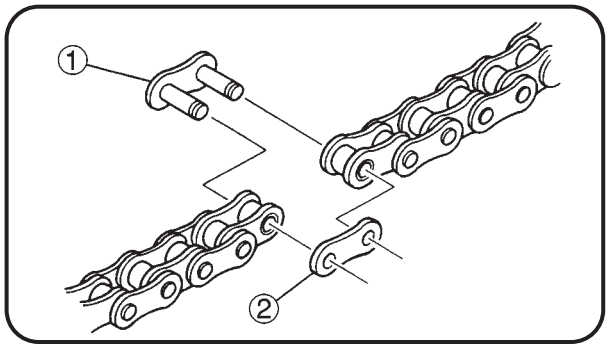
50 Nm (5.0 m•kg)

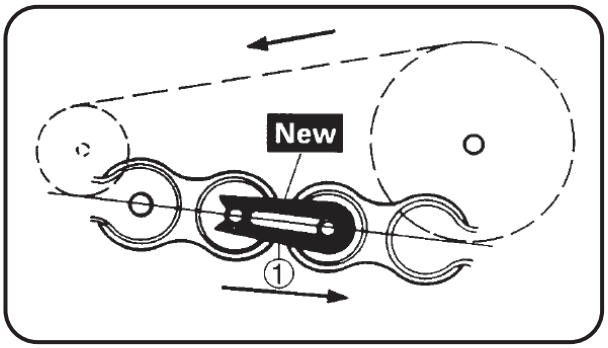
3. Install
   - rear shock absorber assembly
   - rear wheel

   Refer to “INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY” and ”REAR WHEEL”.
4. Adjust:
   - drive chain slack

   Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.

Drive chain slack
30 ~ 50 mm





INSTALLING THE DRIVE CHAIN

1. Lubricate:
   - drive chain
   - master link (New)

Recommended lubricant
Engine oil or chain lubricant suitable for non-O-ring chains

2. Install:
   - master link ①
   - master link plate ②
3. Install:
   - master link clip ①

CAUTION:

- **The closed end of the master link clip must face in the direction of drive chain rotation.**
- **Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chain’s life.**

4. Adjust:
   - drive chain slack

   Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.

Drive chain slack
30 ~ 50 mm

CAUTION:

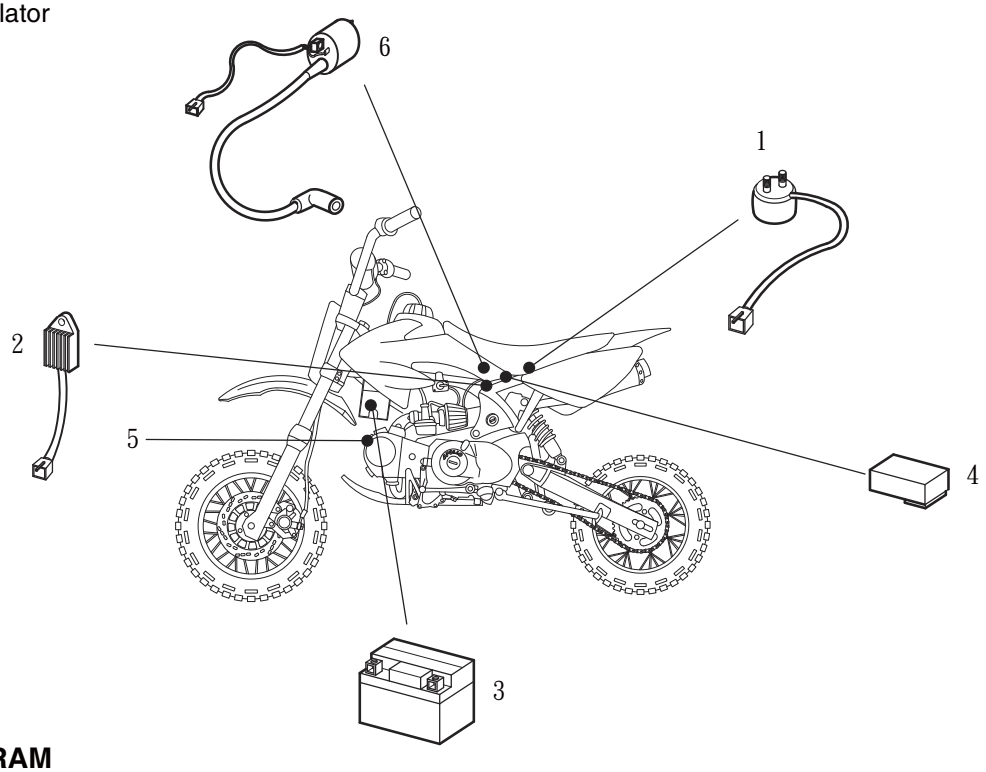
A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

ELECTRICAL

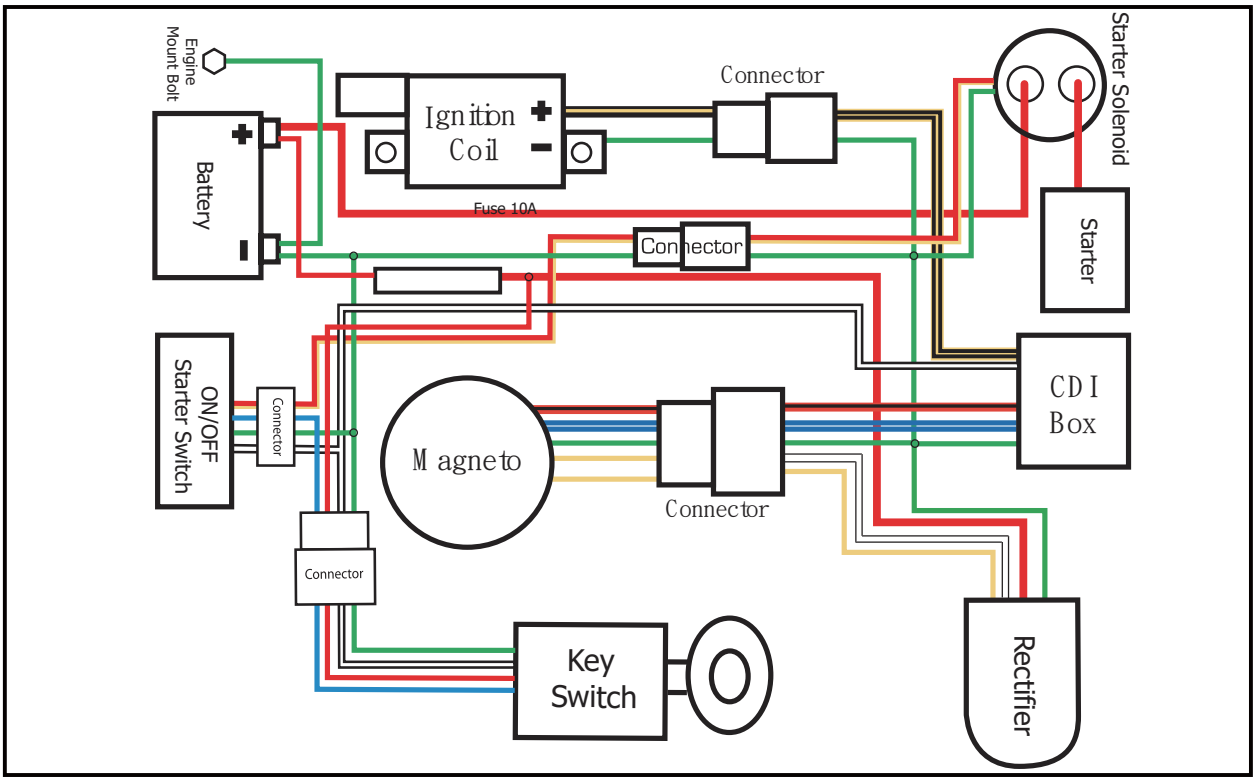
ELECTRICAL COMPONENTS AND WIRING DIAGRAM

ELECTRICAL COMPONENTS

1 Starter Solenoid
2 Rectifier/Regulator
3 Battery
4 CDI magneto
5 Spark plug
6 Ignition coil
7 CDI unit



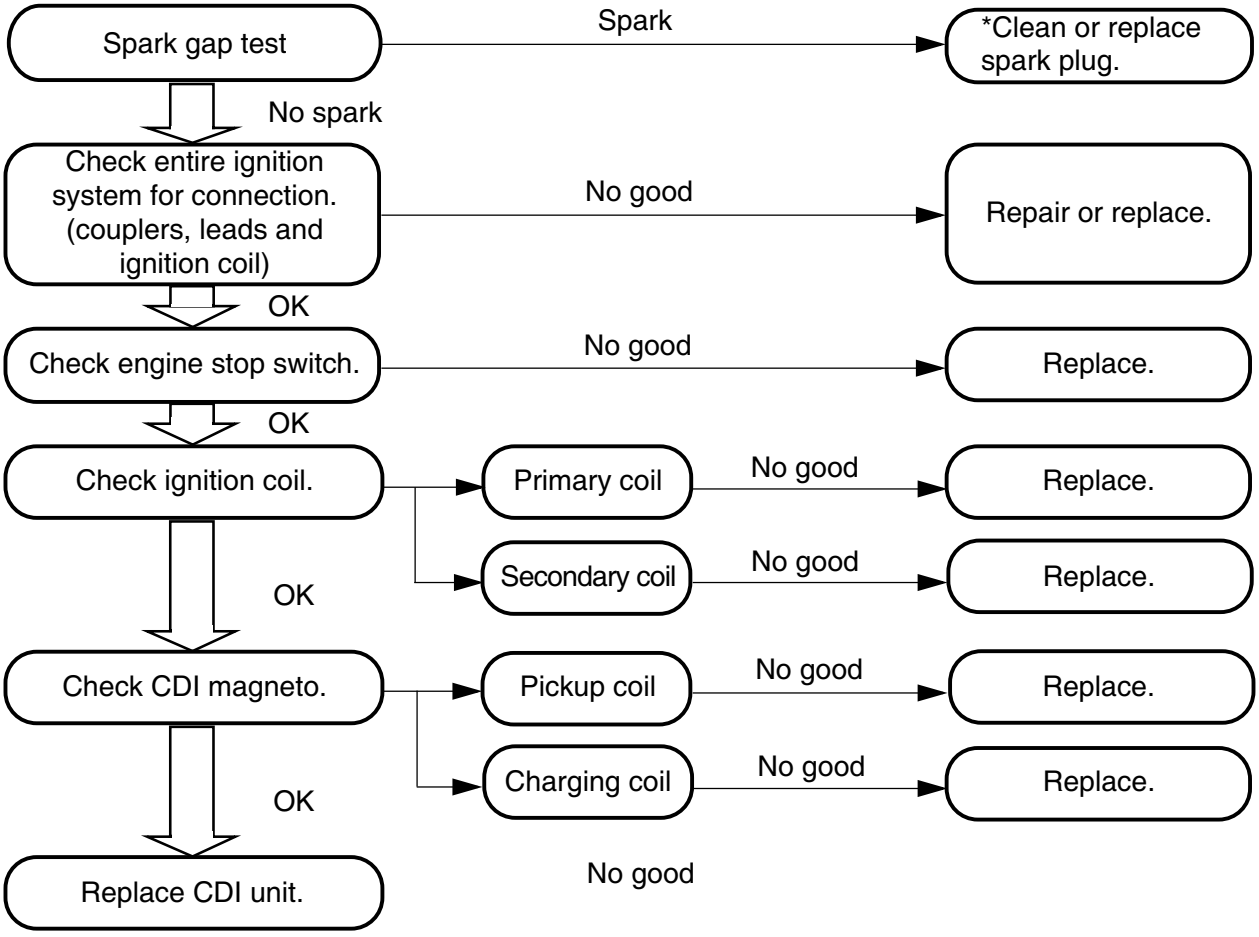
WIRING DIAGRAM



IGNITION SYSTEM

INSPECTION STEPS

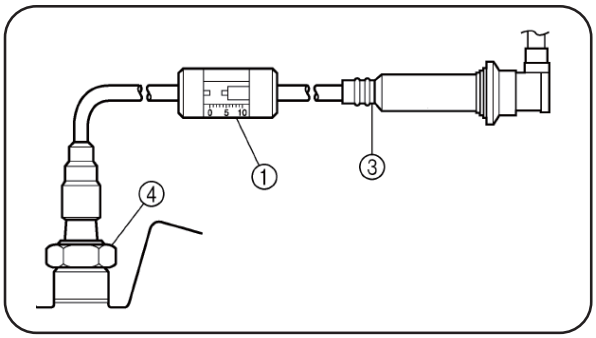
Use the following steps for checking the possibility of the malfunctioning engine being attributable to ignition system failure and for checking the spark plug which will not spark.



***marked: Only when the ignition checker is used.**

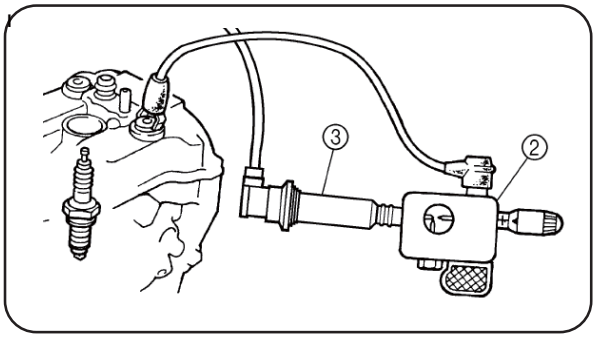
NOTE:

- Remove the following parts before inspection.
  1) Seat
  2) Fuel tank
- Use the following special tools in this inspection.



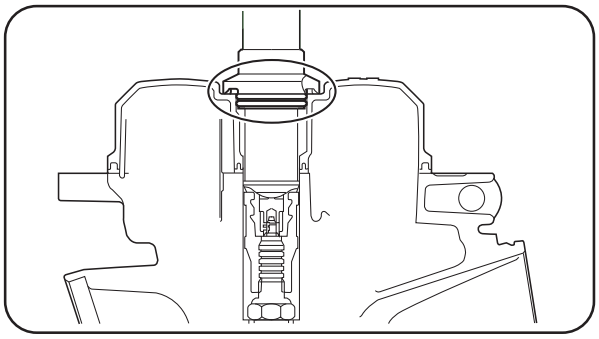
SPARK GAP TEST

1. Disconnect the spark plug cap from spark plug.
2. Remove the ignition coil cap.
3. Connect the dynamic spark tester① (ignition checker②) as shown.
   - Ignition coil③
   - Spark plug④



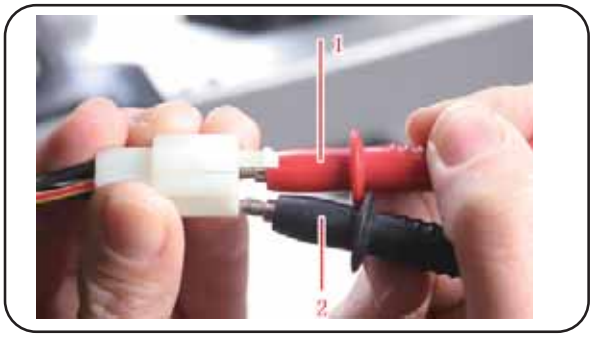
4. Kick the kickstarter crank.
5. Check the ignition spark gap.
6. Start engine, and increase spark gap until misfire occurs.

Minimum spark gap:
6.0 mm



COUPLERS, LEADS AND IGNITION COIL CONNECTION INSPECTION

1. Check:
   - Couplers and leads connection
     Rust/dust/looseness/short-circuit → Repair or replace.
   - Ignition coil and spark plug as they are fitted
     Push in the ignition coil until it closely contacts the spark plug hole in the cylinder head cover.



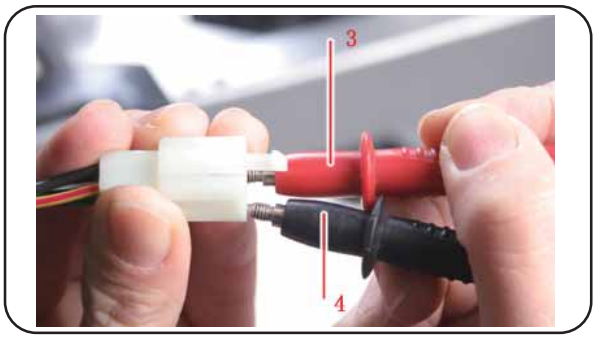
ENGINE START／STOP SWITCH INSPECTION

1. Inspect:
   - Engine stop switch conduct

Tester (+) lead → Black/White lead 1
Tester (–) lead → Green lead 2

	B/W 1	G 2	Tester selector position
PUSH IN	○—○		Ω×1
FREE			

No continuous while being pushed → Replace.
Continuous while being freed → Replace.



2. Inspect:
   - Engine start switch conduct

Tester (+) lead → Red/Yellow lead 3
Tester (–) lead → Black lead 4

	B 4	R/Y 3	Tester selector position
PUSH IN	○—○		Ω×1
FREE			

No continuous while being pushed → Replace.
Continuous while being freed → Replace.