

**HYOSUNG**

**HYOSUNG**

***Rapier 450***

***Rapier 450***

**SERVICE MANUAL**

HYOSUNG MOTORS & MACHINERY INC.

**SERVICE MANUAL**

99000HP8910

## FOREWORD

This manual contains an introductory description on HYOSUNG 『**Rapier450**』 and procedures for its inspection/service and overhaul of its main components.

Other information considered as generally known is not included.

Read **GENERAL INFORMATION** section to familiarize yourself with outline of the vehicle and **MAINTENANCE** and other sections to use as a guide for proper inspection and service.

This manual will help you know the vehicle better so that you can assure your customers of your optimum and quick service.

- ❖ This manual has been prepared on the basis of the latest specification at the time of publication. If modification has been made since then, difference may exist between the content of this manual and the actual vehicle.
- ❖ Illustrations in this manual are used to show the basic principles of operation and work procedures. They may not represent the actual vehicle exactly in detail.

### **WARNING**

This manual is intended for those who have enough knowledge and skills for servicing HYOSUNG vehicles. Without such knowledge and skills, you should not attempt servicing by relying on this manual only.

Instead, please contact your nearby authorized HYOSUNG motorcycle dealer.

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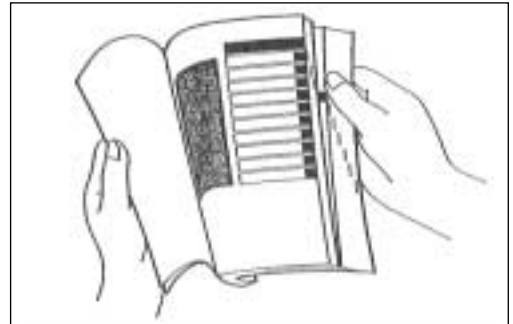
**8**



# HOW TO USE THIS MANUAL

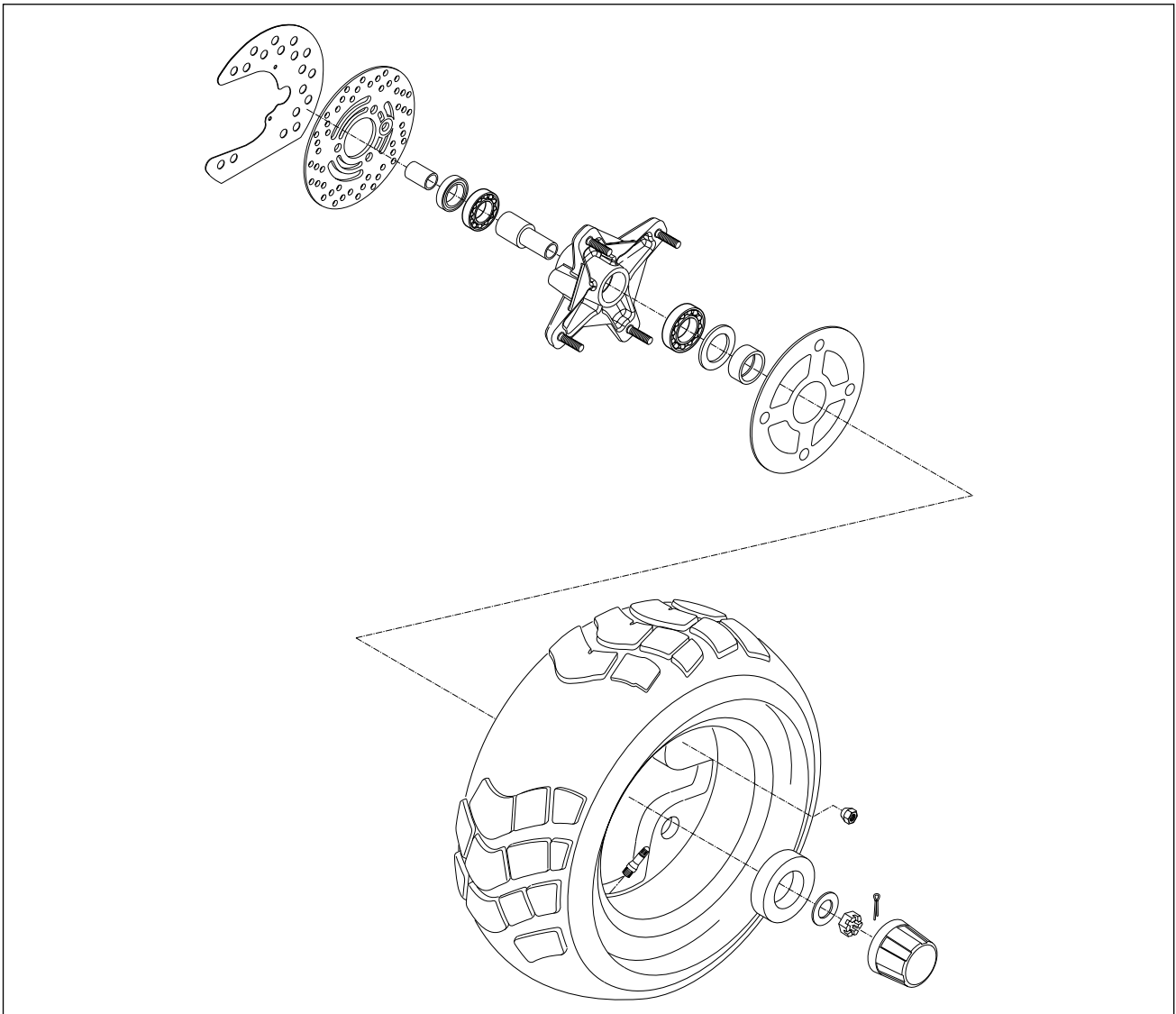
## TO LOCATE WHAT YOU ARE LOOKING FOR :

1. The text of this manual is divided into sections.
2. As the title of these sections is listed on the previous page as GROUP INDEX, select the section where you are looking for.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. On the first page of each section, its contents are listed. Find the item and page you need.


















## COMPONENT PARTS

### Example : Front wheel



## SYMBOL

Listed in the table below are the symbols indicating instructions and other information necessary for servicing and meaning associated with them respectively.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Apply THREAD LOCK "1324".
	Apply oil. Use engine oil unless otherwise specified.		Apply or use brake fluid.
	Apply SUPER GREASE "A".		Measure in voltage range.
	Apply SUPER GREASE "C".		Measure in resistance range.
	Apply SILICONE GREASE.		Measure in current range.
	Apply MOLY PASTE.		Use special tool.
	Apply BOND "1215".		Use engine coolant.
	Use fork oil.		



**NOTE**

*Difference between photographs and actual vehicles depends on the markets.*

# GENERAL INFORMATION

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## WARNING / CAUTION / NOTE

Please read this manual and follow its instructions carefully.

To emphasize special information, the symbol and the words WARNING, CAUTION and NOTE have special meanings. Pay special attention to the messages highlighted by these signal words.

 <b>WARNING</b>
<b>Indicates a potential hazard that could result in death or injury.</b>

 <b>CAUTION</b>
<b>Indicates a potential hazard that could result in vehicle damage.</b>

<b><i>NOTE</i></b>
<b><i>Indicates special information to make maintenance easier or instructions clearer.</i></b>

Please note, however, that the warning and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the vehicle. In addition to the WARNING and CAUTION stated, you must use good judgement and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

## GENERAL PRECAUTIONS

### WARNING

- ❖ Proper service and repair procedures are important for the safety of the service machanic and the safety and reliability of the vehicle.
- ❖ When 2 or more persons work together, pay attention to the safety of each other.
- ❖ When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors.
- ❖ When working with toxic or flammable materials, make sure that the area you work in is well-ventilated and that you follow all off the material manufacturer's instructions.
- ❖ Never use gasoline as a cleaning solvent.
- ❖ To avoid getting burned, do not touch the engine, engine oil, exhaust system or radiator during or for a while after engine operation.
- ❖ After servicing fuel, oil, engine coolant, exhaust or brake systems, check all lines and fittings related to the system for leaks.

### WARNING

- ❖ If parts replacement is necessary, replace the parts with HYOSUNG Genuine Parts or their equivalent.
- ❖ When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.
- ❖ Be sure to use special tools when instructed.
- ❖ Make sure that all parts used in reassembly are clean, and also lubricated when specified.
- ❖ When use of a certain type of lubricant, bond, or sealant is specified, be sure to use the specified type.
- ❖ When removing the battery, disconnect the  $\ominus$  battery lead wire first and then the  $\oplus$  battery lead wire. When reconnecting the battery, connect the  $\oplus$  battery lead wire first and then the  $\ominus$  battery lead wire. Finally, cover the  $\oplus$  battery terminal with the terminal cover.
- ❖ When performing service to electrical parts, if the service procedures do not require use of battery power, diconnect the  $\ominus$  battery lead wire at the battery.
- ❖ Tighten cylinder head and case bolts and nuts, beginning with larger diameter and ending with smaller diameter, from inside to outside diagonally, to the specified tightening torque.
- ❖ Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, cotter pins, circlips, and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any material left over from the mating surfaces.
- ❖ Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.
- ❖ Do not use self-locking nuts a few times over.
- ❖ Use a torque wrench to tighten fasteners to the torque values when specified. Wipe off grease or oil if a thread is smeared with them.
- ❖ After reassembly, check parts for tightness and operation.

### WARNING

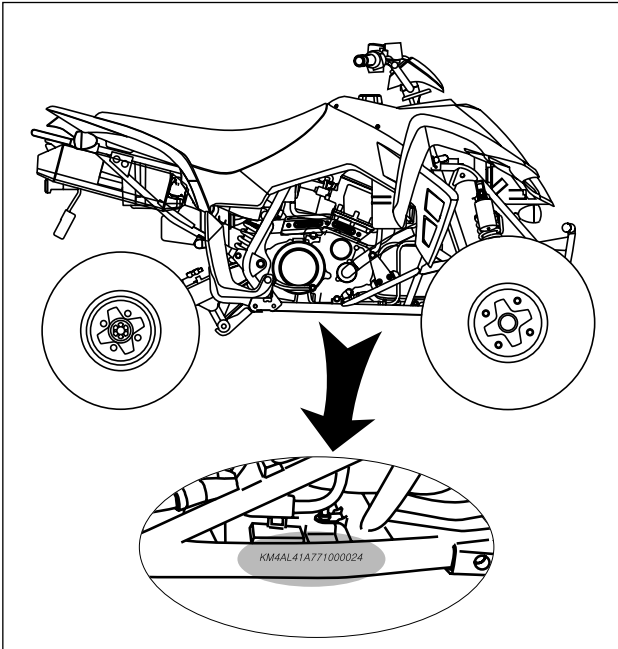
- ❖ To protect environment, do not unlawfully dispose of used motor oil and other fluids: batteries, and tires.
- ❖ To protect Earth's natural resouces, properly dispose of used vehicles and parts.



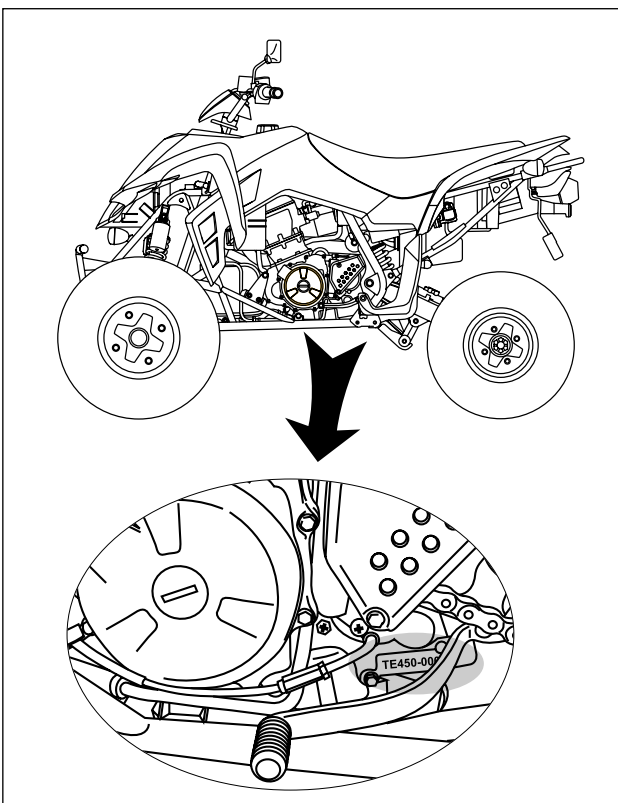
## SERIAL NUMBER LOCATION

The frame serial number or V.I.N. (Vehicle Identification Number) is stamped on the right side of the frame pipe.  
The engine serial number is stamped on the left downside of the crankcase assembly.  
These numbers are required especially for registering the machine and ordering spare parts.

### ◎ FRAME SERIAL NUMBER



### ◎ ENGINE SERIAL NUMBER



# FUEL, OIL AND ENGINE COOLANT RECOMMENDATIONS

## ☉ FUEL

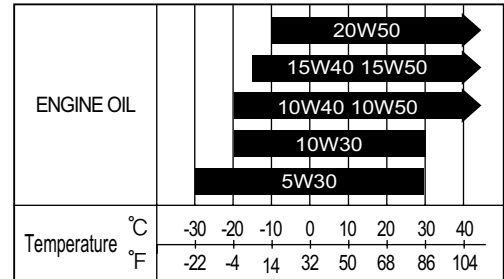
Gasoline used should be graded 91 octane (Research Method) or higher. An unleaded gasoline type is recommended.

## ☉ ENGINE OIL

### ▣ ENGINE OIL SPECIFICATION

Classification system	Grade
API	Over SL
SAE	10W/40

※ *If an SAE 10W/40 motor oil is not available, select an alternative according to the following chart.*



Use a premium quality 4-stroke motor oil to ensure longer service life of your vehicle.

### ⚠ WARNING

- ❖ Don't mix the unrecommended oil. It could damage the engine.
- ❖ When refilling the oil tank, don't allow the dust to get inside.
- ❖ Wipe the spilled oil up immediately.
- ❖ Don't put the patch on the cap. It could disturb the oil to be provided and damage the engine.

## ☉ BRAKE FLUID

- ▣ Specification and classification (Front brake) : DOT4  
(Rear brake) : DOT4

### ⚠ WARNING

Since the brake system of this vehicle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result.  
Do not use any brake fluid taken from old or used or unsealed containers.  
Never re-use brake fluid left over from a previous servicing, which has been stored for a long period.

## 1-5 GENERAL INFORMATION

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### ⦿ ENGINE COOLANT

Use an anti-freeze/engine coolant compatible with an aluminum radiator, mixed with distilled water only.

### ▣ WATER FOR MIXING

Use distilled water only. Water other than distilled water can corrode and clog the aluminum radiator.

### ▣ ANTI-FREEZE/ENGINE COOLANT

The engine coolant perform as a corrosion and rust inhibitor as well as anti-freeze. Therefore, the engine coolant should be used at all times even though the atmospheric temperature in your area does not go down to freezing point.

Hyosung recommends the use of HYOSUNG COOLANT anti-freeze/engine coolant. If this is not available, use an equivalent which is compatible with an aluminum radiator.

### ▣ LIQUID AMOUNT OF WATER/ENGINE COOLANT

For engine coolant mixture information, refer to cooling system section, page 5-1.



## CAUTION

**Mixture of anti-freeze/engine coolant should be limited to 60%. Mixing beyond it would reduce its efficiency. If the anti-freeze/engine coolant mixing ratio is below 50%, rust inhabiting performance is greatly reduced. Be sure to mix it above 50% even though the atmospheric temperature does not go down to the freezing point.**

## BREAK-IN PROCEDURES

During manufacture only the best possible materials are used and all machined parts are finished to a very high standard but it is still necessary to allow the moving parts to "BREAK-IN" before subjecting the engine to maximum stresses.

The future performance and reliability of the engine depends on the care and restraint exercised during its early life.

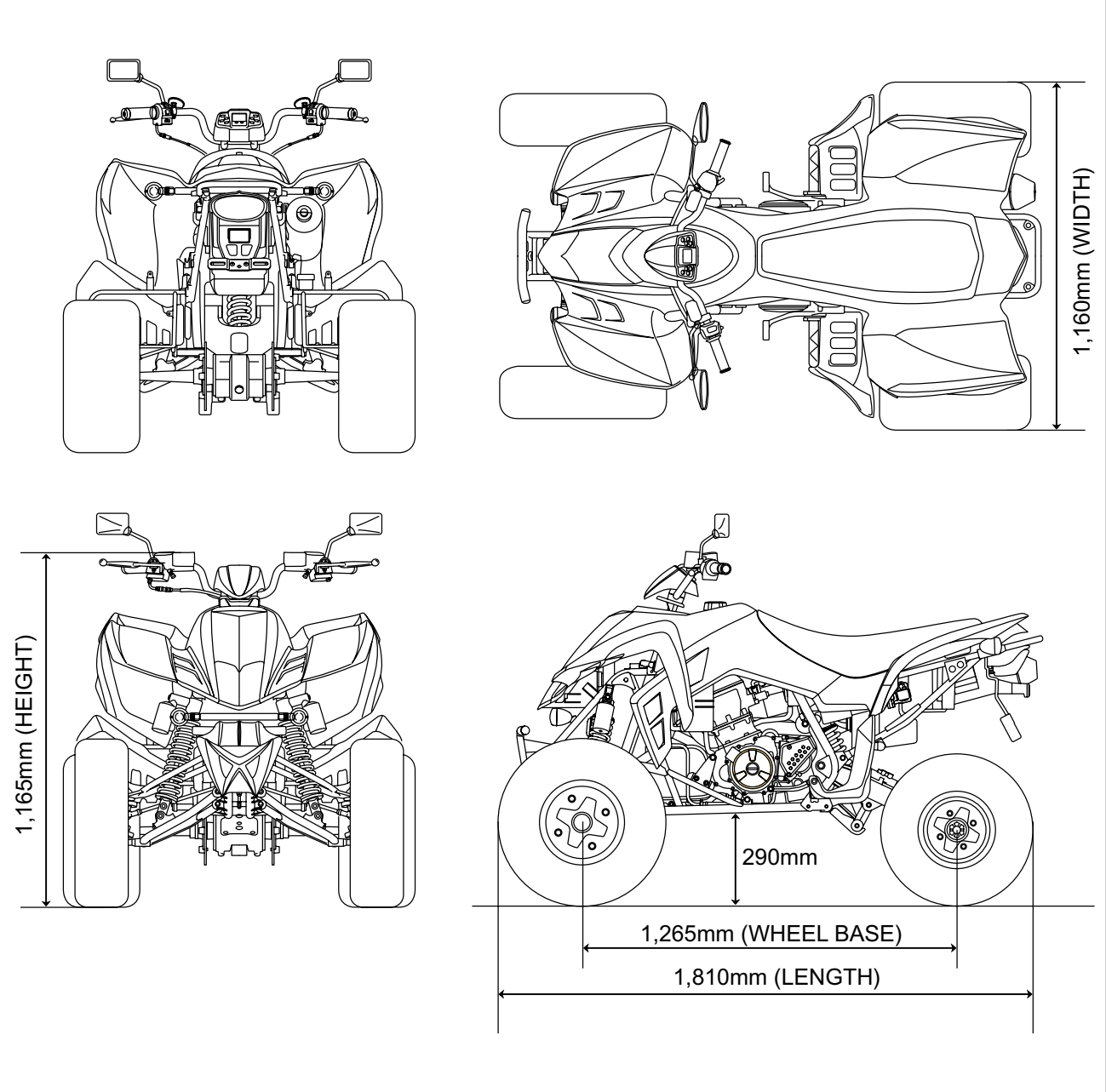
The general rules are as follows :

- Keep to these break-in procedures :

<b>BREAK-IN ENGINE SPEEDS</b>	
Initial 10 hours	Less than 1/2 throttle

- After the engine has been operated for 10 hours the engine to full throttle operation, for short periods of time.
- Do not maintain constant engine speed for an extended period during any portion of the break-in.  
Try to vary the throttle position.

# EXTERIOR ILLUSTRATION



## SPECIFICATIONS

### ⊙ DIMENSIONS AND DRY MASS

ITEM	<b>Rapier450</b>
Overall length	1,810 mm (71.3 in)
Overall width	1,160 mm (45.7 in)
Overall height	1,165 mm (45.9 in)
Wheelbase	1,265 mm (49.8 in)
Ground clearance	290 mm (11.4 in)
Dry mass	220 kg (485 lbs)

### ⊙ ENGINE

ITEM	<b>Rapier450</b>
Type	Four-stroke, DOHC, Liquid-cooled
Number of cylinder	1
Bore	96 mm (3.78 in)
Stroke	62 mm (2.44 in)
Piston displacement	448.8 cm <sup>3</sup> (27.4 in <sup>3</sup> )
Carburetor	BDS42 TYPE
Starter system	Electric starter
Lubrication system	Wet sump

### ⊙ TRANSMISSION

ITEM	<b>Rapier450</b>	
Clutch	Wet multi-plate type	
Transmission	5-forward and 1-reverse	
Gearshift pattern	Forward	1 down 4 up, foot operated
	Reverse	Foot / hand operated
Final reduction	3.143	
Gear ratio	1st	2.538
	2nd	1.684
	3rd	1.261
	4th	1.040
	5th	0.885
	Reverse	2.231
Drive chain	RK 520EXW, 102 Links	

## 1-9 GENERAL INFORMATION

### ⊙ CHASSIS

ITEM	<b>Rapier450</b>
Front suspension	Independent, double wishbone, coil spring and oil damped
Rear suspension	Swingarm type, coil spring and oil damped
Steering angle	37 ° (right & left)
Caster	7.3 °
Trail	34 mm (1.34 in)
Toe-in [when apply to a load 75 kg (165 lbs)]	0 ~ 5 mm (0 ~ 0.2 in)
Camber	0 °
Front brake	Disk brake, twin
Rear brake	Disk brake
Front tire size	21 × 7-10
Rear tire size	20 × 11-9

### ⊙ ELECTRICAL

ITEM	<b>Rapier450</b>
Ignition type	"Igniter" type
Ignition timing	6 ° B.T.D.C.at 1,500 rpm
Spark plug	CR8E
Battery	12V 8Ah (MF)
Fuse	15A
Head lamp	HI : 55W
	LO : 55W
	POSITION : 5W
Brake / Tail lamp	LED type
Turn signal lamp	10W × 4
Speedometer lamp	LCD type
License plate lamp	5W

### ⊙ CAPACITIES

ITEM	<b>Rapier450</b>	
Fuel tank	8 ℓ	
Engine oil	Oil change	2,500 mℓ
	With filter change	2,600 mℓ
	Overhaul	2,700 mℓ
Coolant	1.4 ℓ	

### NOTE

*The specifications are subject to change without notice.*

# PERIODIC MAINTENANCE

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## 2-1 PERIODIC MAINTENANCE

### PERIODIC MAINTENANCE SCHEDULE

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the vehicle operating at peak performance and economy.

#### CAUTION

More frequent servicing should be performed on vehicles that are used under severe conditions.

### PERIODIC MAINTENANCE CHART

#### ■ ENGINE

Item	Interval	Initial 1 month	Every 3 months	Every 6 months	page
Air cleaner element		—	Clean	—	2-3
Exhaust pipe nuts and muffler bolts		Tighten	Tighten	—	2-4
Valve clearance		Inspect	—	Inspect	2-5
Spark plug		—	—	Inspect	2-8
		Replace every 18 months			
Fuel hose		—	Inspect	—	2-9
		Replace every 4 years			
Engine oil and oil filter		Replace	—	Replace	2-10
Engine oil hoses		Inspect	Inspect	—	2-11
Throttle cable		Inspect	Inspect	—	2-9
Idle speed		Inspect	Inspect	—	2-9
Clutch		Inspect	—	Inspect	2-13
Engine coolant		Replace every 2 years			2-12
Radiator hoses		—	—	Inspect	2-13
		Replace every 4 years			
Spark arrester		—	—	Clean	2-13

#### ■ CHASSIS

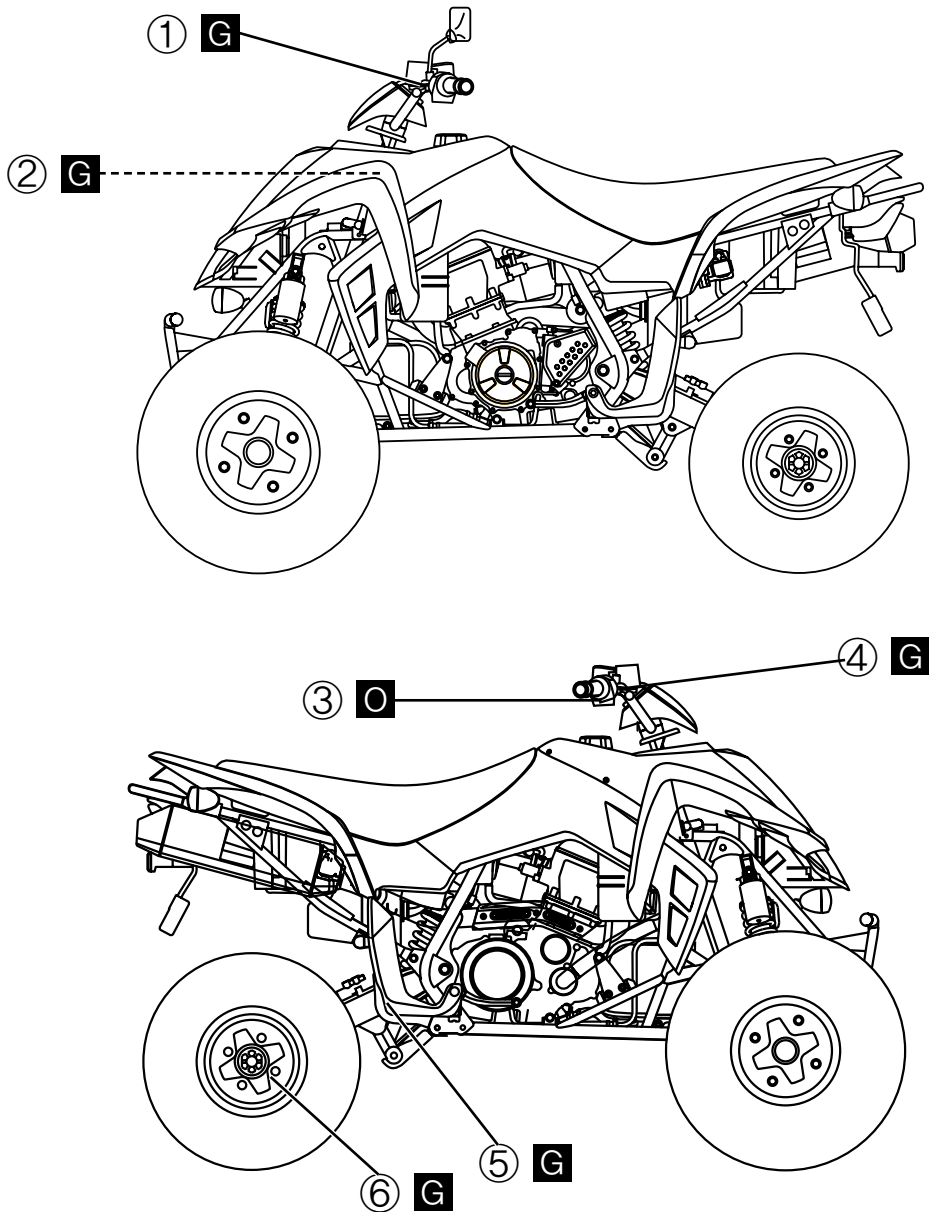
Item	Interval	Initial 1 month	Every 3 months	Every 6 months	page
Drive chain		Inspect every time before riding			2-20
Brakes		Inspect	Inspect	—	2-14
Brake hoses		—	—	Inspect	2-18
		Replace every 4 years			
Brake fluid		—	Inspect	—	2-16
		Replace every 2 years			
Tires		—	Inspect	—	2-18
Steering		Inspect	Inspect	—	2-19
Suspensions		—	—	Inspect	2-23
Front and Rear wheel set nuts		Tighten every time before riding			7-12
Rear axle nut and lock nut		Tighten	Tighten	—	7-72
Chassis bolts and nuts		Tighten	Tighten	—	2-23
General lubrication		Lubricate	Lubricate	—	2-2

#### CAUTION

Using poor quality replacement parts can cause your vehicle to wear more quickly and shorten its useful life. Use only genuine Hyoung replacement parts or their equivalent.

## LUBRICATION POINTS

Proper lubrication is important for smooth operation and long life of each working part of the vehicle. Major lubrication points are indicated below.



- ① Clutch lever holder
- ② Steering shaft holder
- ③ Throttle lever

- ④ Front brake lever holder
- ⑤ Rear brake pedal and rod link
- ⑥ Drive shaft joint spline

⓪ - Motor oil, Ⓜ - Grease

### NOTE

- ❖ Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.
- ❖ Lubricate exposed parts which are subject to rust, with either motor oil or grease whenever the vehicle has been operated under wet or rainy condition.

## MAINTENANCE PROCEDURES

This section describes the servicing procedures for each item mentioned in the Periodic Maintenance chart.

### AIR CLEANER

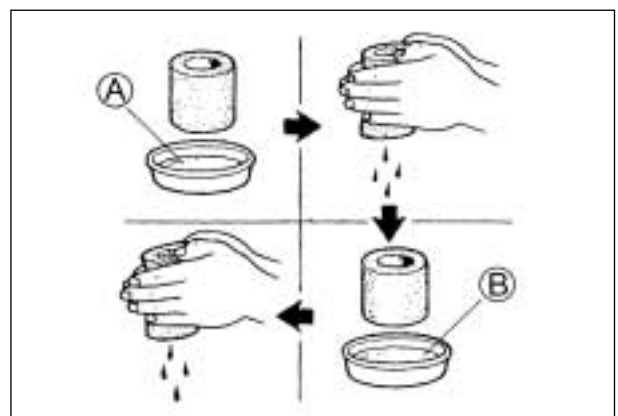
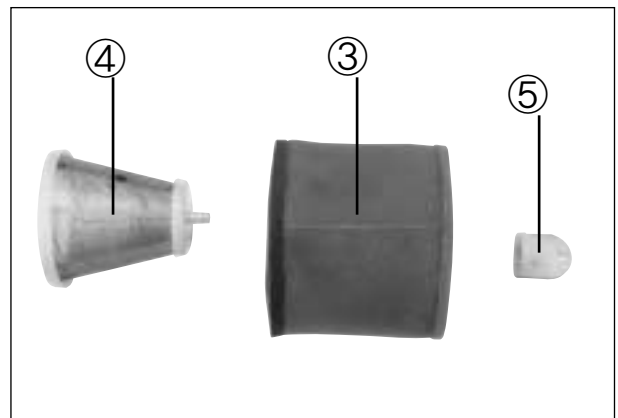
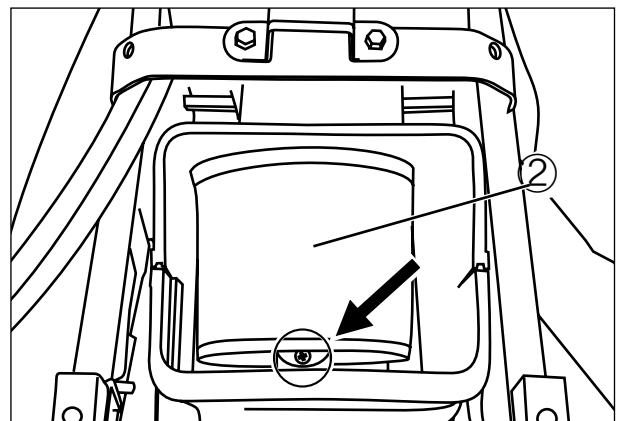
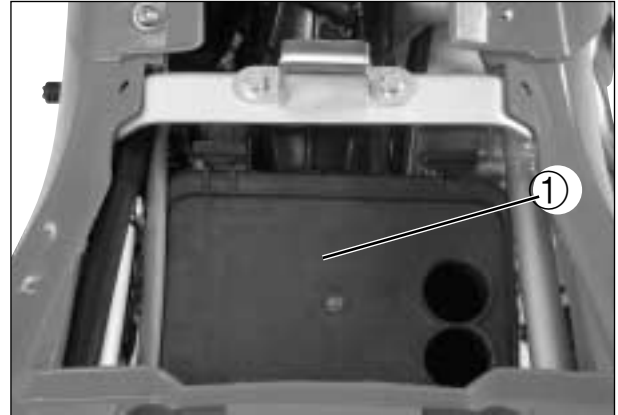
#### Inspect Interval

*Clean Every 3 months.*

If the air cleaner is clogged with dust, intake resistance will be increased, with a resultant decrease in power output and an increase in fuel consumption.

Check and clean the air cleaner element in the following manner :

- Remove the seat. (Refer to page 7-3)
- Remove the air cleaner case cover ① .
  
- Remove the air cleaner element ② .
  
- Separate the polyurethane foam element ③ , element frame ④ and element trap stopper ⑤ .
  
- Fill a wash pan of a proper size with a non-flammable cleaning solvent (A). Immerse the air cleaner element in the cleaning solvent and wash it.
- Press the air cleaner element between the palms of both hands to remove the excess solvent : do not twist or wring the element or it will tear.
- Immerse the element in HYOSUNG genuine oil (B), and then squeeze out the excess oil leaving the element slightly wet.



**⚠ CAUTION**

- ❖ Inspect the air cleaner element for tears. A torn element must be replaced.
- ❖ If driving under dusty conditions, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to operate the engine without the element or with torn element. Make sure that the air cleaner element is in good condition at all times. Life of the engine depends largely on this component!

- Remove the drain cap ① of the air cleaner case to allow any water to drain out.



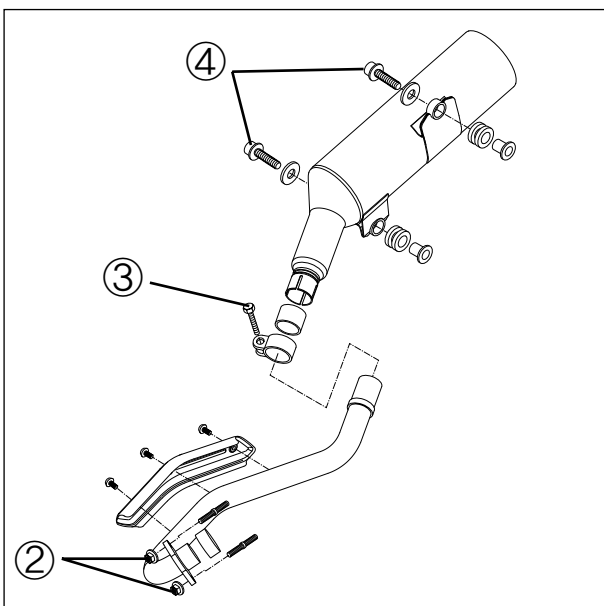
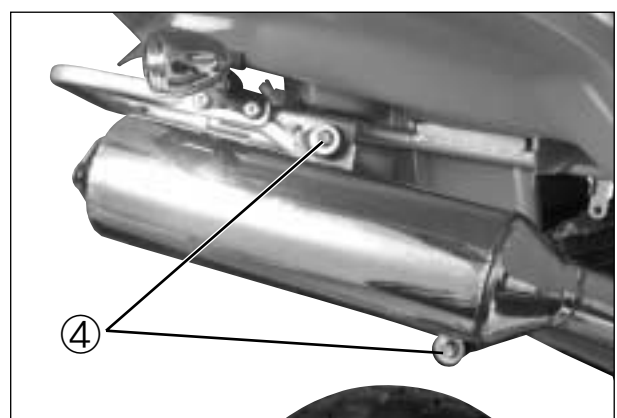
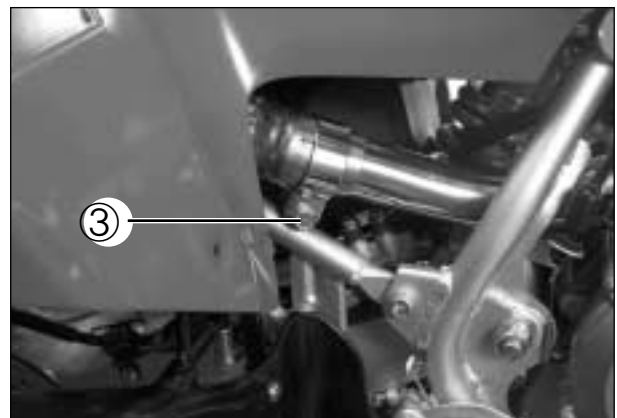
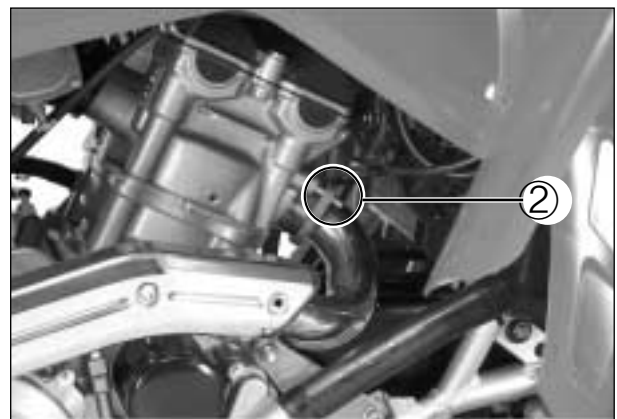
**EXHAUST PIPE NUTS AND MUFFLER BOLTS**

**Inspect Interval**

*Tighten Initially at 1 month and Every 3 months thereafter.*

- Tighten the exhaust pipe nuts ②, muffler connecting bolt ③, and muffler mounting bolts ④ to the specified torque.

- 🔧 **Exhaust pipe nut : 23 N · m (2.3 kgf · m)**
- Muffler connecting bolt**  
: 23 N · m (2.3 kgf · m)
- Muffler mounting bolt**  
: 23 N · m (2.3 kgf · m)



### VALVE CLEARANCE

#### Inspect Interval

*Inspect Initially at 1 month and Every 6 months thereafter.*

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

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

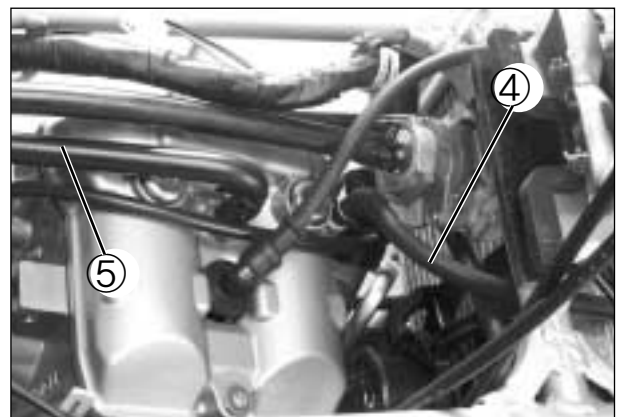
- Remove the seat. (Refer to page 7-3)
- Remove the center front fender ①, center rear fender ② and front fender ③.



- Remove the fuel tank.



- Remove the spark plug.
- Disconnect the oil tank overflow hose ④ and breather hose ⑤.



- Remove the cylinder head cover.  
The valve clearance specification is different for both intake and exhaust valves.  
Valve clearance adjustment must be checked and adjusted :  
1) at the time of periodic inspection,  
2) when the valve mechanism is serviced, and  
3) when the camshafts are removed for servicing.

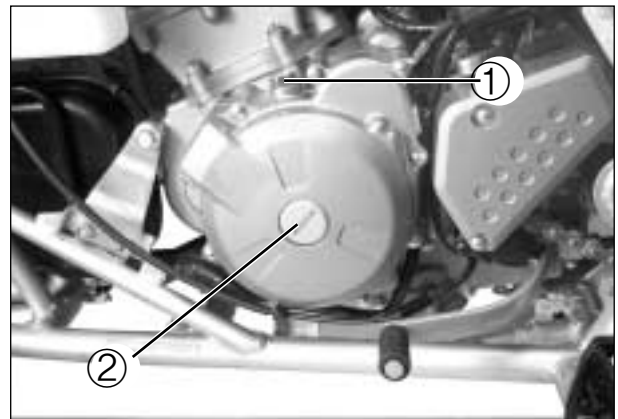


- Remove the valve timing inspection plug ① .
- Remove the magneto cover cap ② using the special tool.

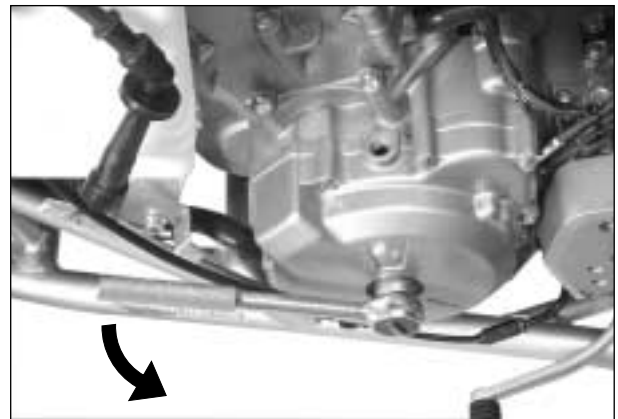
 **Cap plug wrench : 09910-36000**

**NOTE**

- ❖ *The piston must be at top dead center (TDC) on the compression stroke in order to check or adjust the valve clearance.*
- ❖ *The valve clearance should only be checked when the engine is cold.*



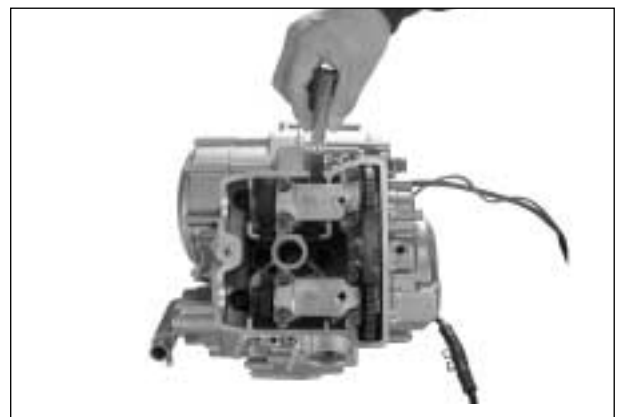
- Rotate the magneto rotor counter-clockwise with a socket wrench to set the piston at TDC on the compression stroke.  
(Rotate the rotor until the “T” line on the magneto rotor is aligned with the triangle mark on the crankcase.)



- To inspect the valve clearance, insert a thickness gauge between the tappet and the camshaft.

Valve clearance	Standard (When cold)
IN.	0.10 ~ 0.20 mm (0.004 ~ 0.008 in)
EX.	0.20 ~ 0.30 mm (0.008 ~ 0.012 in)

 **Thickness gauge : 09900-20806**



## 2-7 PERIODIC MAINTENANCE

- If the clearance is out of specification, first remove the cam chain tension adjuster, camshaft housing, camshaft.

To install the tappet shim at original position, record the shim NO. and clearance to present by "A", "B", "C", "D" mark on the cylinder head.

Select the tappet that agree with tappet clearance (vertical line) and shim NO.(horizontal line) as refer to the tappet shim selection chart.

(Refer to page 8-33 · 34)

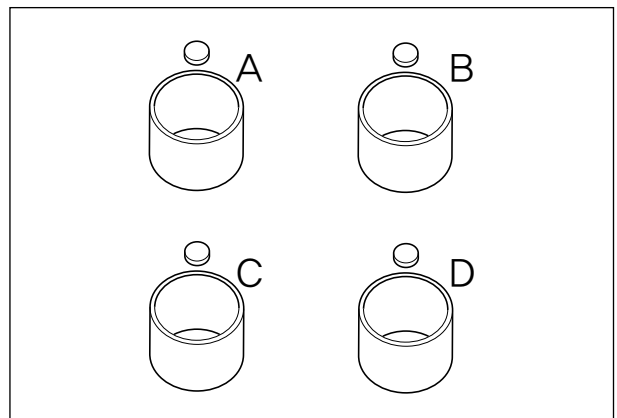
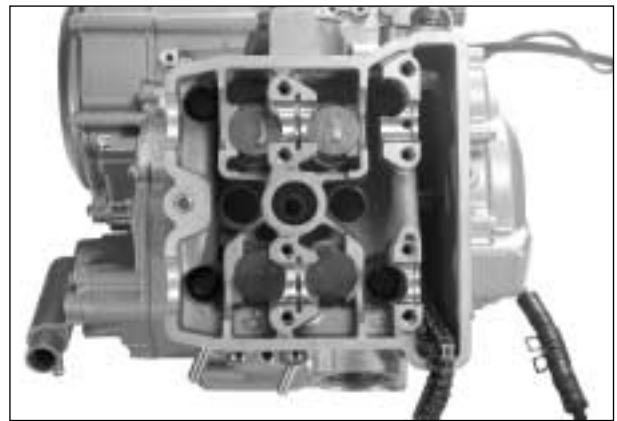
Adjust valve timing, install the camshaft housing and the tension adjuster.

After the crankshaft rotate about 10 times, measure the valve clearance.

If the clearance be not correct, adjust the standard clearance as the same manner above.

- In case of valve adjustment which is not the tappet shim selection chart, please follow instructions of example in the below.

For example, the intake clearance is 0.4 and the shim is 270 (2.70 mm), select 295 (2.95 mm) of the shim which 270 (2.70 mm) of the shim add up the excess clearance 0.25 mm when adjust with the standard 0.15 as the intake standard clearance 0.1~0.2 mm.



### CAUTION

**If you don't rotate the crankshaft about 10 times before measuring the valve clearance, there is no meaning of valve clearance.**

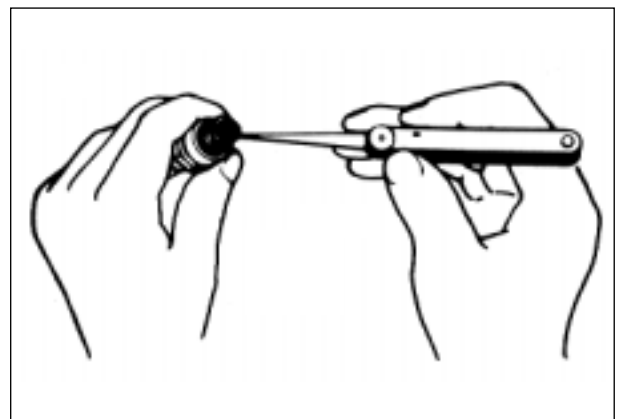
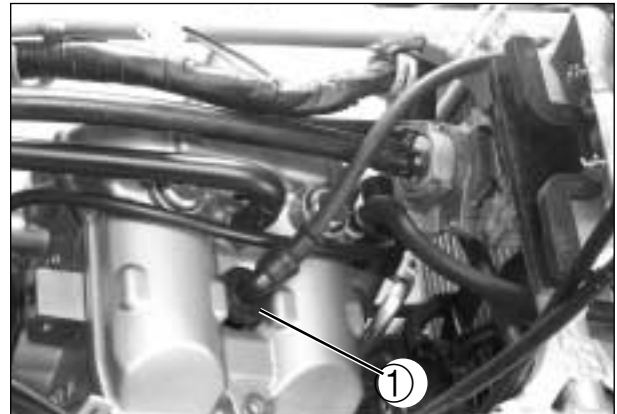
## SPARK PLUG

### Inspect Interval

*Inspect Every 6 months.*  
*Replace Every 18 months.*

- Disconnect the spark plug cap ① and remove the spark plug.

TYPE	SPARK PLUG SPECIFICATION
Hot type	CR7E
Standard type	CR8E
Cold type	CR9E



### ▣ CARBON DEPOSITS

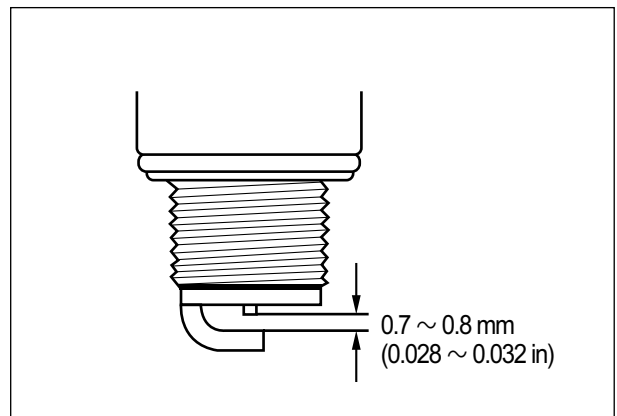
Check to see if there are carbon deposits on the spark plug.  
 If carbon is deposited, remove it using a wire or pin with a pointed end.

### ▣ SPARK PLUG GAP

Measure the spark plug gap using a thickness gauge.  
 If the spark plug gap is out of specification, adjust the gap.

<b>Spark plug gap</b>	0.7~0.8 mm (0.028~0.032 in)
-----------------------	-----------------------------

 **Thickness gauge : 09900-20806**



### ▣ ELECTRODE

Check to see the worn or burnt condition of the electrodes.  
 If it is extremely worn or burnt, replace the spark plug with a new one.  
 And also replace the spark plug if it has a broken insulator, damaged thread, etc.



## 2-9 PERIODIC MAINTENANCE

### CAUTION

To avoid damaging the cylinder head threads ; first, finger tighten the spark plug, and then tighten it to the specified torque using the spark plug wrench.

- Insert the spark plug and finger tighten it to the cylinder head and then tighten it to the specified torque.

 Spark plug : 11 N · m (1.1 kgf · m)

## FUEL HOSE

### Inspect Interval

*Inspect Every 3 months.*

*Replace Every 4 years.*

Inspect the fuel hose for damage and fuel leakage. If any damages are found, replace the fuel hoses with a new one.



## THROTTLE CABLE PLAY

### Inspect Interval

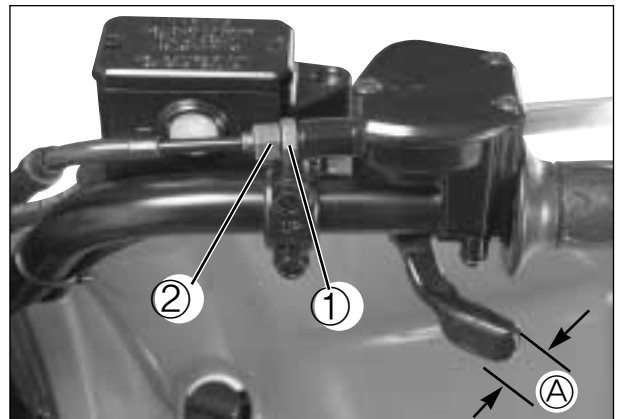
*Inspect Initially at 1 month and Every 3 months thereafter.*

Adjust the throttle cable play  $\text{\textcircled{A}}$  as follows.

- Loosen the lock nut  $\text{\textcircled{1}}$  of the throttle cable.
- Turn the adjuster  $\text{\textcircled{2}}$  in or out to obtain the correct play.

**Throttle cable play  $\text{\textcircled{A}}$**  3 ~ 5 mm (0.12 ~ 0.20 in)

- After adjusting the throttle cable play, tighten the lock nut  $\text{\textcircled{1}}$ .



## ENGINE IDLE SPEED

### Inspect Interval

*Inspect Initially at 1 month and Every 3 months thereafter.*

### NOTE

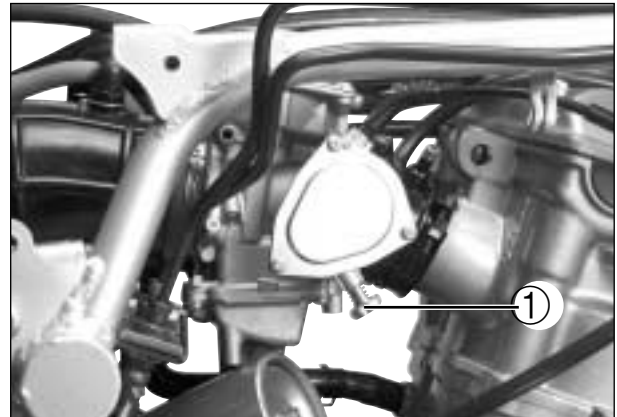
*Make this adjustment when the engine is hot.*



- Connect the engine tachometer to the high-tension cord.
- Start the engine and set the engine idle speed between 1,300 and 1,500 rpm by turning the throttle stop screw ①.

<b>Engine idle speed</b>	1,300 ~ 1,500 rpm
--------------------------	-------------------

 **Engine tachometer : 09900-26006**



## ENGINE OIL AND OIL FILTER

### Inspect Interval

*Replace Initially at 1 month and Every 6 months thereafter.*

The oil should be changed while the engine is warm. Oil filter replacement at the above intervals, should be done together with the engine oil change.

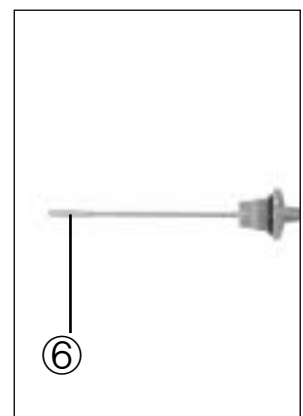
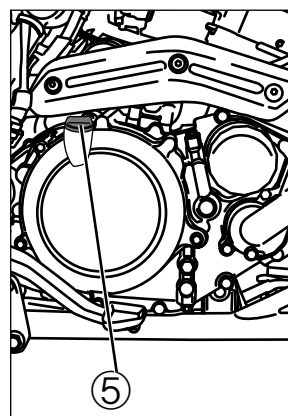
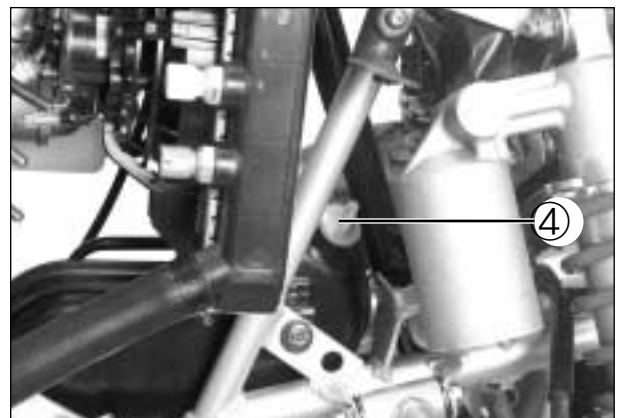
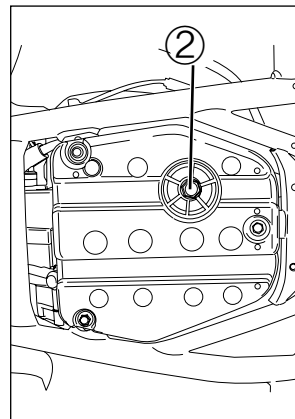
### ENGINE OIL REPLACEMENT

- Place an oil pan under the drain plug ② on the crankcase and drain plug ③ on the oil tank. Then drain out the engine oil by removing the engine oil drain plug ②, ③ and engine oil level gauge ④ and outer cover oil filler cap ⑤.
- Reinstall the drain plug ②, ③ and gasket. Tighten the engine oil drain plug ② and ③ to the specified torque, and then pour the new oil through the oil filler hole of oil tank and filler hole of outer cover. When performing an oil change (without oil filter replacement), the engine will hold about 2,500ml Lof oil. Use an engine oil that meets the API service classifications of over SL and that has a viscosity rating of SAE 10W/40.

#### Engine oil drain plug

② : 21 N · m (2.1 kgf · m)  
 ③ : 12 N · m (1.2 kgf · m)

- Install the oil level gauge ④.
- Install the outer cover oil filler cap ⑤.
- Start the engine and allow it to run for a few minutes at idling speed.
- Turn off the engine and wait about three minutes, and then check the oil level on the dipstick ⑥. (Remove the oil level gauge ④. Wipe the oil from the oil level gauge using a clean rag. Reinsert the oil level gauge until the threads touch filler neck, but do not screw the oil level gauge in.)  
 If the level is below upper limit line, add oil to that level. The vehicle must be in a level position for accurate measurement.

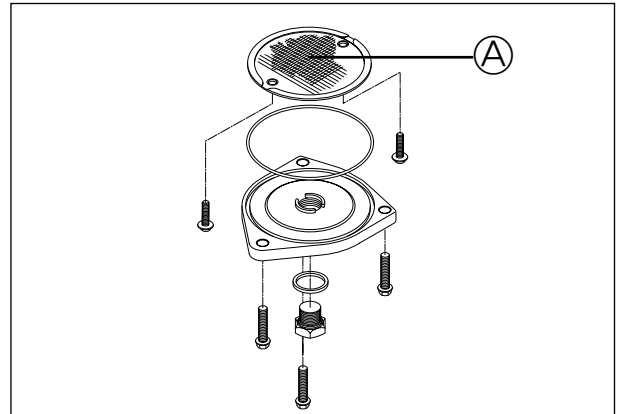


**⚠ CAUTION**

Necessarily, confirm and clean the oil strainer **A** when replace the engine oil (specially, when first replacement).

**⚠ CAUTION**

More frequent servicing may be performed on vehicle that are used under severe conditions.



**■ OIL FILTER REPLACEMENT**

- Drain the engine oil as described in the engine oil replacement procedure.
- Replace the oil filter **①** with a new one.
  
- Add new engine oil and check the oil level as described in the engine oil replacement procedure.



Necessary amount of engine oil	
Oil change	2,500 ml
Oil and filter change	2,600 ml
Engine overhaul	2,700 ml
Engine oil type	SAE 10W/40 API Over SL



**⚠ CAUTION**

When reassembling the oil filter, make sure that the oil filter is installed.  
If the filter is installed improperly, serious engine damage may result.



**ENGINE OIL HOSES**

**Inspect Interval**

*Inspect Initially at 1 month and Every 3 months thereafter.*

Inspect the engine oil hoses for damage and oil leakage. If any damages are found, replace the engine oil hoses with new ones.

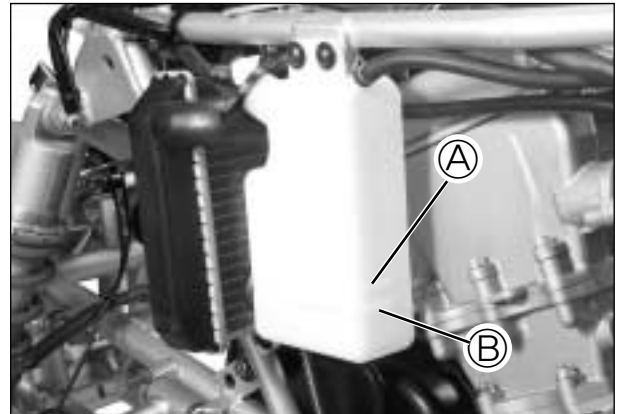
## ENGINE COOLANT

### Inspect Interval

Replace Every 2 years.

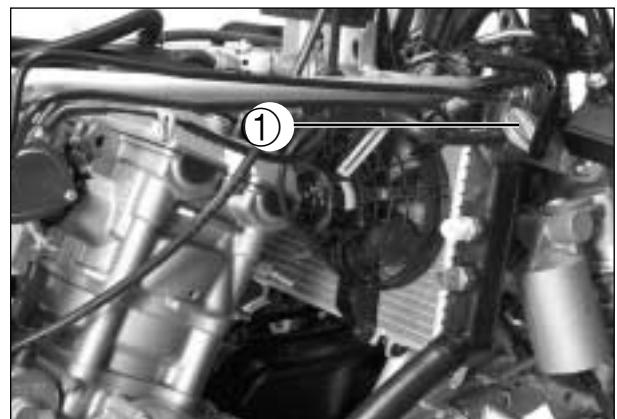
### ENGINE COOLANT CHECK

- Check the engine coolant level by observing the upper (A) and lower (B) lines on the engine coolant reservoir tank.
- If the level is below the lower line, add engine coolant until the level reaches the upper line.



### ENGINE COOLANT REPLACEMENT

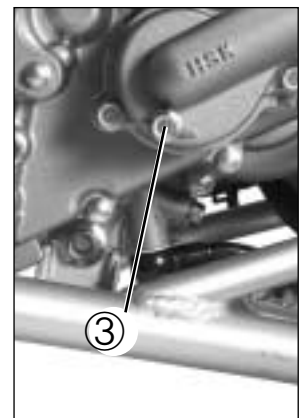
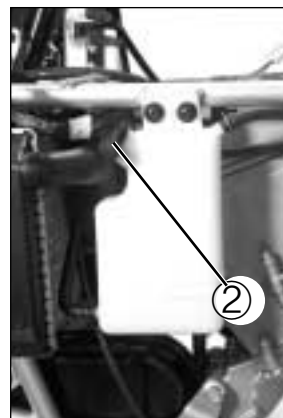
- Remove the radiator cap (1) and engine coolant reservoir tank cap (2).
- Place a pan below the water pump, and then drain the engine coolant by removing the drain bolt (3).



### WARNING

- ❖ Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- ❖ Engine coolant may be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.

- Flush the radiator with fresh water, if necessary.
- Tighten the drain plug securely.
- Pour the specified engine coolant through the radiator cap inlet up to the inlet neck.

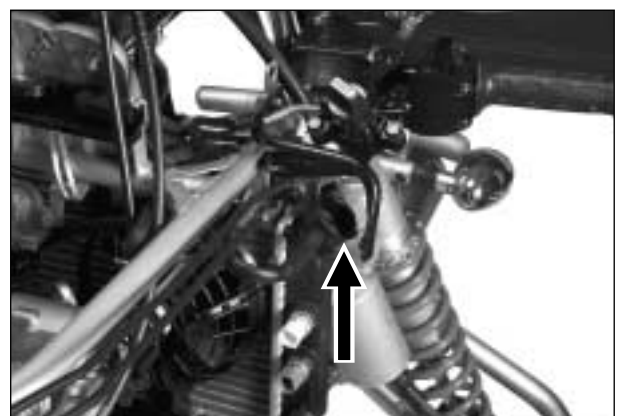


### NOTE

For engine coolant information, refer to page 5-1.

Bleed air from the system as follows :

1. Shift the transmission into neutral.  
Start the engine and let it idle for 2~3 minutes.
2. Snap the throttle 3~4 minutes to bleed air from the system.
3. Stop the engine and add the engine coolant up to the radiator cap inlet neck.
4. Repeat the above procedure until no air bleed from the radiator cap inlet.



## 2-13 PERIODIC MAINTENANCE

5. Install the radiator cap securely.
6. After warming up and cooling down the engine several times, add the engine coolant until the level is between the upper and lower lines on the engine coolant reservoir tank.

### CAUTION

Repeat the above procedure several times and make sure the radiator is filled with the engine coolant to the upper line of the engine coolant reservoir tank.

Engine coolant capacity  
(including reserve)

1.4 ℓ

## RADIATOR HOSES

### Inspect Interval

*Inspect Every 6 months.*

*Replace Every 4 years.*

Inspect the radiator hoses for damage and engine coolant leakage. If any damages are found, replace the radiator hoses with new ones.



## SPARK ARRESTER

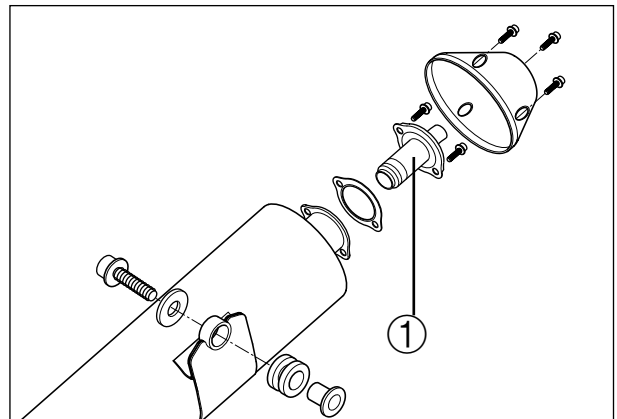
### Inspect Interval

*Clean Every 6 months.*

- Remove the spark arrester ①.
- Clean the spark arrester pipe by brush.
- Reinstall the spark arrester pipe.

### WARNING

Only clean the spark arrester in an open area away from combustible materials. Exhausted hot carbon particles can start a fire.

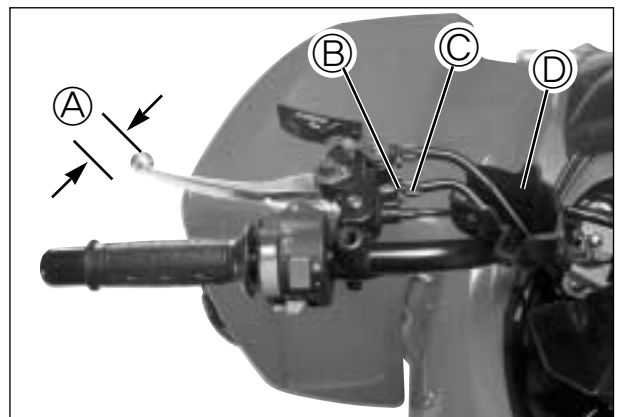


## CLUTCH

### Inspect Interval

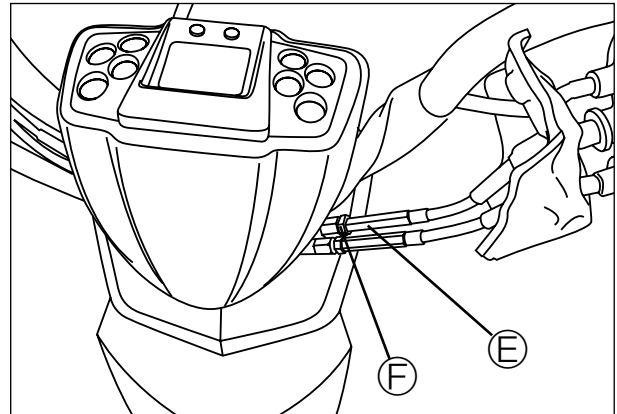
*Inspect Initially at 1 month and Every 6 months thereafter.*

- A basis adjustment be allowed by the clutch lever adjuster ㉞.
- Loosen the clutch lever adjuster lock nut ㉟ and turn the clutch lever adjuster ㊸ in or out to provide the specified play.
- After adjustment, tighten the lock nut ㉟ and cover the rubber boot ㊹.



- If not adjust by the adjuster ③, loosen the clutch cable adjuster lock nut ⑥.
- Turn the clutch cable adjuster ⑤ in or out to provide the specified play.
- After adjustment, tighten the lock nut ⑥.
- The clutch cable should be lubricated with a light weight oil whenever it is adjusted.

**Clutch cable play ④** 10 ~ 15 mm (0.4 ~ 0.6 in)



## BRAKES

### Inspect Interval

*Inspect Initially at 1 month and Every 3 months thereafter.*

### ■ BRAKE PADS

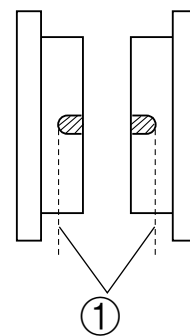
- Remove the front and rear wheels.  
(Refer to page 7-8)

The extent of brake pad wear can be checked by observing the limit line ① on the side of brake pads. When the wear reaches the limit line, replace the pads with new ones. (Refer to page 7-14 and 7-42)

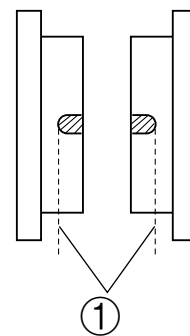
### ⚠ CAUTION

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

### FRONT BRAKE

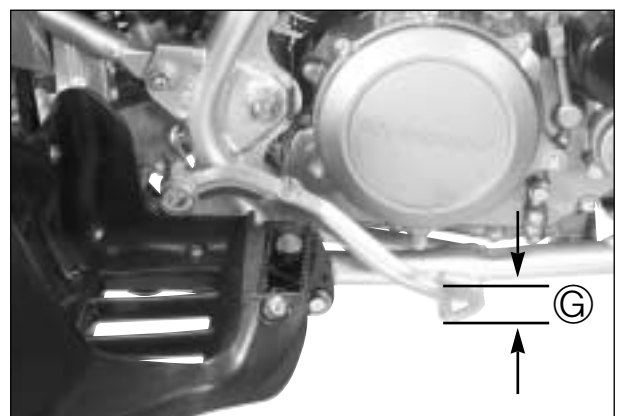


### REAR BRAKE



### ■ REAR BRAKE PEDAL

The procedure for adjusting the rear brake pedal is as follows :



## 2-15 PERIODIC MAINTENANCE

- Remove the rear master cylinder pin.
- Turn the adjuster ⑨ in or out until the pedal play ⑩ to the specification, after loosening the lock nut ①.
- Make sure to tighten the lock nut ① securely.

**Brake pedal play ⑩** 0 ~ 10 mm (0 ~ 0.4 in)

**Ⓜ Rear brake master cylinder rod lock nut : 10~20 N · m (1.0~2.0 kgf · m)**

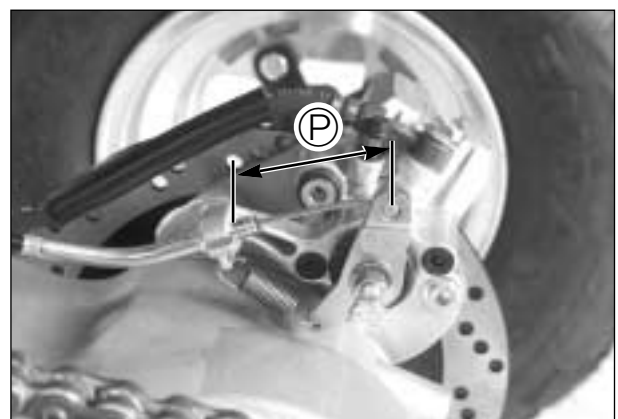
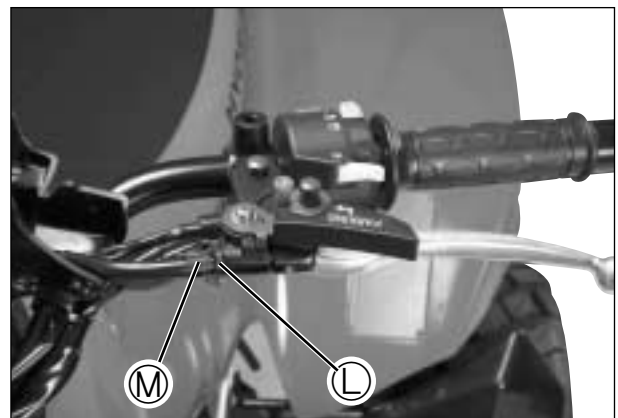
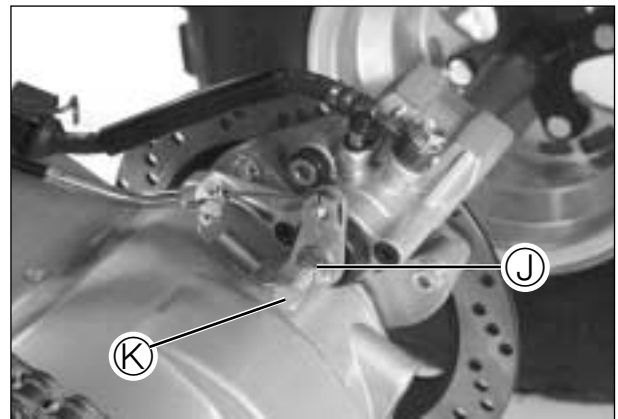
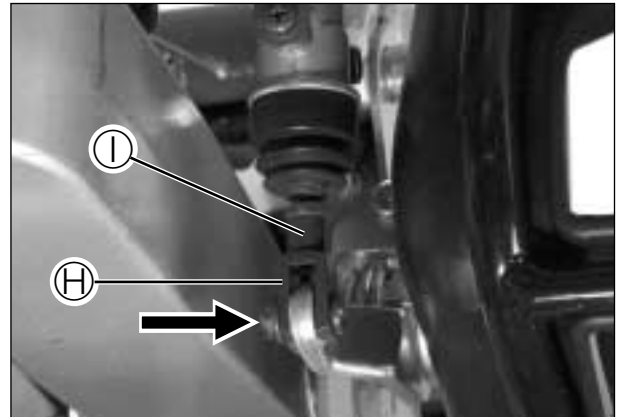
- Adjust the brake switch so the brake light comes on when the brake pedal is depressed 7 ~ 10 mm (0.3 ~ 0.4 in).

### ▣ PARKING BRAKE

Parking brake adjustment may be required if the parking brake does not work properly. Every time the brake pads are replaced, adjust the parking brake.

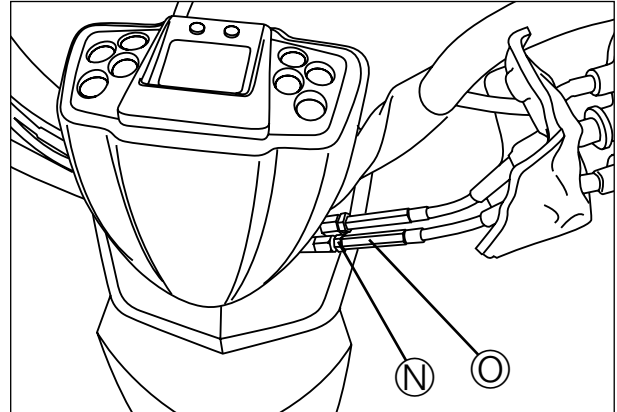
- Park the ATV on level ground.
- Check the front wheels.
- Lift the rear end of the ATV and place a block under swingarm.
- Loosen the parking brake adjuster lock nut ④.
- Loosen the parking brake adjuster ⑤.
- Loosen the parking brake cable adjuster lock nut ⑥, ⑦.

- Turn the adjuster ⑧, ⑨, ⑩, so that the cable length ⑪ is 54 ~ 58 mm (2.1 ~ 2.3 in).



- Tighten the parking brake cable adjuster lock nut (L, N).
- Then turn the parking brake adjuster (K) 1/8 ~ 1/4 back.
- Tighten the parking brake adjuster lock nut (J) while holding the parking brake adjuster (K) in position.

**🔧 Parking brake adjuster lock nut (J)**  
: 18 N · m (1.8 kgf · m)



**⚠ CAUTION**

After adjusting the parking brake, check that there is no dragging when turning the rear wheel with the wheel off the ground.

## BRAKE FLUID

### Inspect Interval

*Inspect Every 3 months.*

*Replace Every 2 years.*

### 📏 BRAKE FLUID LEVEL

- Place the handlebar straight.
- Check the brake fluid level by observing the lower limit line on the front brake master cylinder.
- When the brake fluid level is below the lower limit line, replenish with brake fluid that meets the following specification.

**🛢 Specification and classification : DOT 4**



## ⚠ WARNING

- ❖ The brake system of this vehicle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluids. Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for a long period of time.
- ❖ Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and oil leakage before riding.



**▣ AIR BLEEDING OF THE BRAKE FLUID CIRCUIT**

Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by “sponginess” of the brake lever/pedal and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that, after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner :

- Fill the front or rear brake master cylinder with the specified brake fluid to the top of the inspection window or the upper limit line.  
Replace the master cylinder cap to prevent dirt from entering.
- Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
- Squeeze and release the brake lever or the brake pedal several times in rapid succession and squeeze the lever or push down the pedal fully without releasing it. Loosen the air bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip or the brake pedal reaching bottom of the stroke. Then, close the air bleeder valve, pump and squeeze the brake lever or push down the pedal and open the valve. Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.

**NOTE**

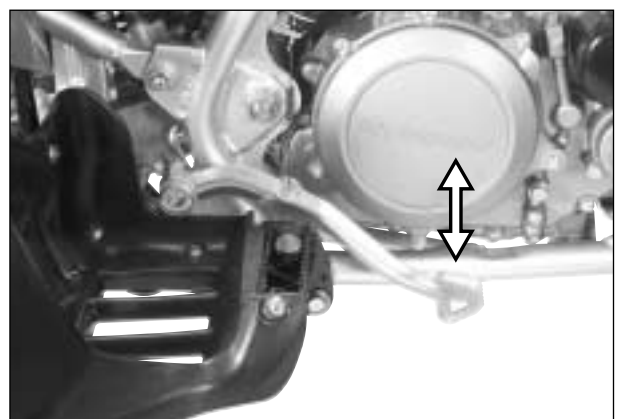
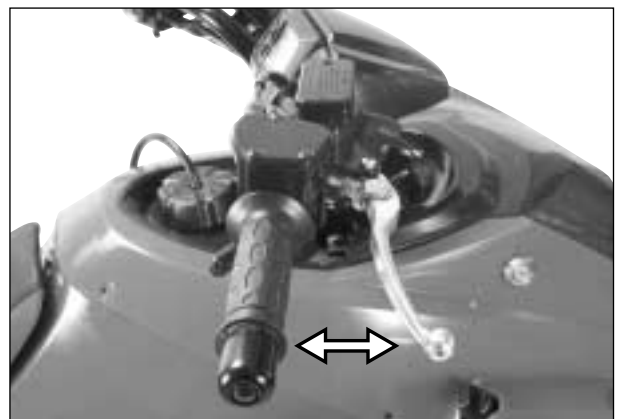
*While bleeding the brake system, replenish the brake fluid in the master cylinder as necessary. Make sure that there is always some fluid visible in the master cylinder.*

- Close the air bleeder valve, and disconnect the hose. Fill the master cylinder with brake fluid to the top of the inspection window or the upper limit line.

**🔧 Brake caliper air bleeder valve**  
: 9 ~ 14 N · m (0.9 ~ 1.4 kgf · m)

**⚠ CAUTION**

**Handle brake fluid with care : the fluid reacts chemically with paint, plastics, rubber materials, etc.**



## BRAKE HOSES

### Inspect Interval

*Inspect Every 6 months.*

*Replace Every 4 years.*

Check the brake hoses for leakage, crack, wear and damage.

If any damages are found, replace the brake hoses with new ones.



## TIRES

### Inspect Interval

*Inspect Every 3 months.*

### ▣ TIRE TREAD CONDITION

Operating the vehicle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace a tire when the remaining depth of the tire tread reaches the following specification.

Front and rear tire tread depth	Service limit
	4 mm (0.16 in)

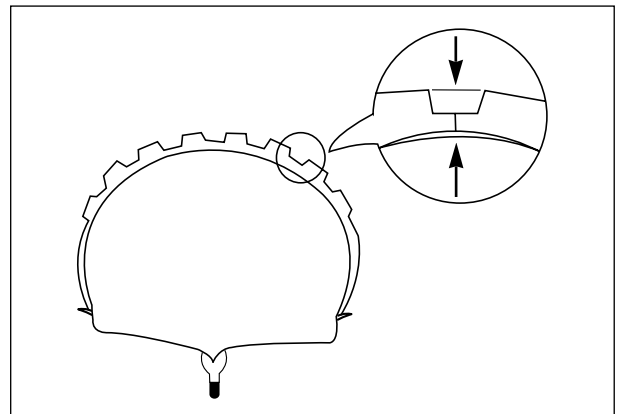
### ▣ TIRE PRESSURE

If the tire pressure is too high or too low, steering will be adversely affected and tire wear will increase. Therefore, maintain the correct tire pressure for good roadability and a longer tire life.

Cold inflation tire pressure is as follows.

COLD INFLATION TIRE PRESSURE		
	ONE PERSON	TWO PERSONS
FRONT	0.3 kgf/cm <sup>2</sup> 30 kPa 4.4 psi	0.35 kgf/cm <sup>2</sup> 35 kPa 4.9 psi
REAR	0.3 kgf/cm <sup>2</sup> 30 kPa 4.4 psi	0.35 kgf/cm <sup>2</sup> 35 kPa 4.9 psi

※ VEHICLE LOAD CAPACITY LIMIT : 150 kg (330.7 lbs)



### ⚠ CAUTION

To minimize the possibility of tire damage from over-inflation, we strongly recommended that a manual type air pump be used rather than a high pressure air compressor as found in service stations. When filling air into the tires, never exceed 250 kPa (2.5 kgf/cm<sup>2</sup>, 36 psi).

### ⚠ CAUTION

The standard tire fitted on this vehicle is a 21×7-10 for the front and a 20×11-9 for the rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires.

## STEERING

### Inspect Interval

*Inspect Initially at 1 month and Every 3 months thereafter.*

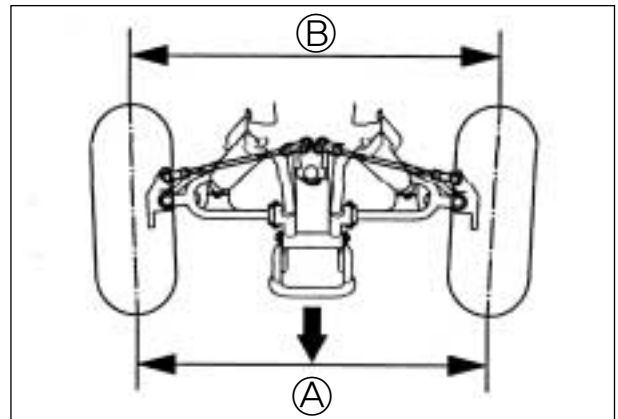
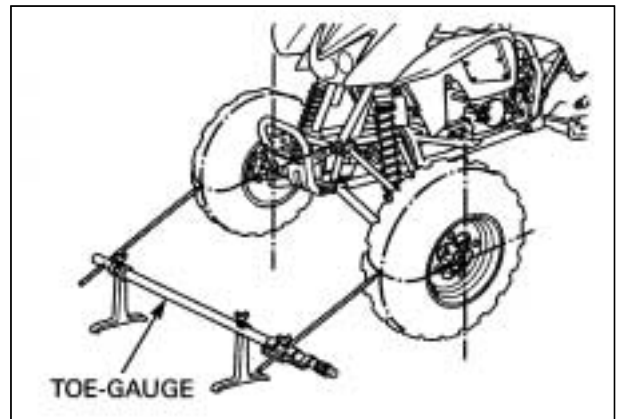
Steering system should be adjusted properly for smooth manipulation of the handlebar and safe running.

### ■ TOE-IN

- Place the vehicle on level ground.
- Make sure the tire pressure for right and left tires is the same and set to the proper specification.
- Set the front wheels in the straight position.
- Place a load of 75 kg (165 lbs) on the seat.
- Measure the distance ① and ② of the front wheels with a toe-in gauge as shown and calculate the difference between ① and ②.

Toe-in	Standard
	0 ~ 5 mm (0 ~ 0.2 in) [When apply to a load 75 kg (165 lbs)]

- If the toe-in is out of specification, bring it into the specified range. (Refer to page 7-40)



# DRIVE CHAIN

## Inspect Interval

*Inspect drive chain each time the vehicle is ridden.*

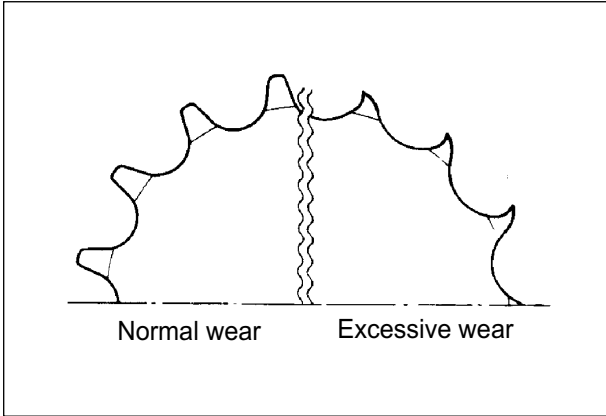
Visually check the drive chain for the possible defects listed below.

(Support the vehicle by a jack and a wooden block, turn the rear wheel slowly by hand with the transmission shifted to Neutral.)

- \* Loose pins
- \* Excessive wear
- \* Damaged rollers
- \* Improper chain adjustment
- \* Dry or rusted links
- \* Missing O-ring seals
- \* Kinked or binding links

If any defects are found, the drive chain must be replaced. Damage to the drive chain means that the sprocket may also be damaged.

If any defects are found, the sprocket must be replaced.

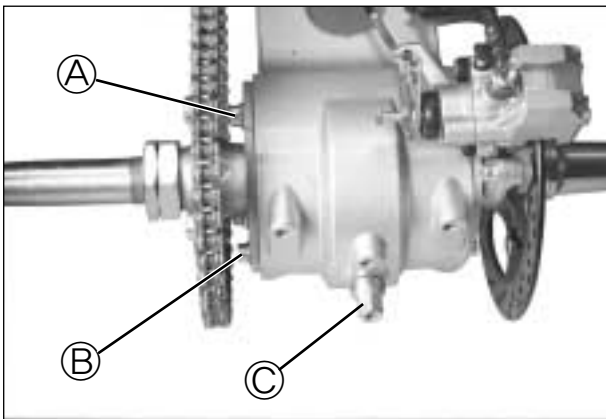
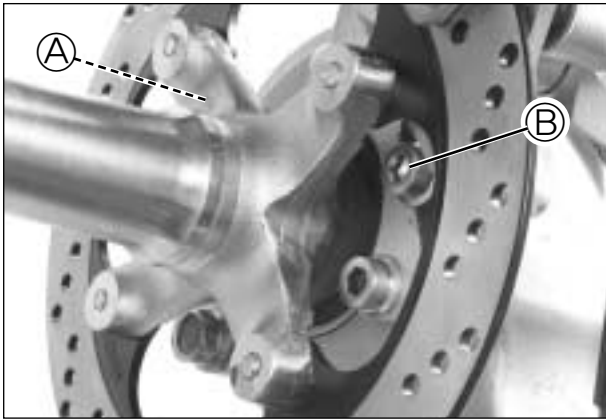
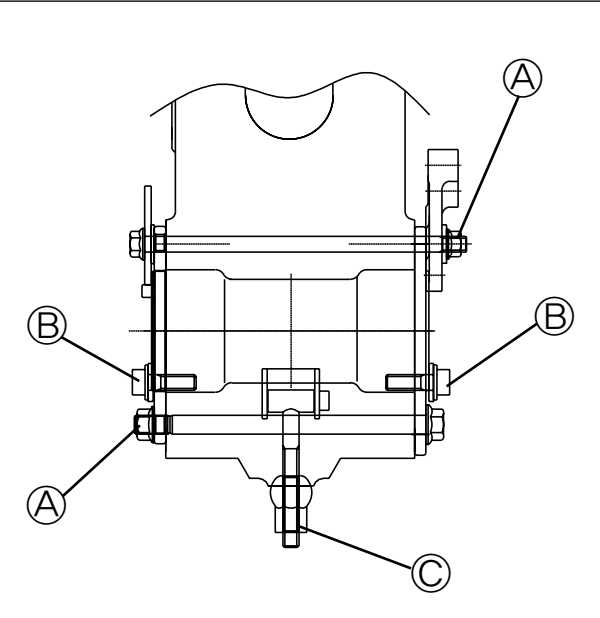


**NOTE**

*When replacing the drive chain, replace the drive chain and sprockets as a set.*

## ■ CHECKING

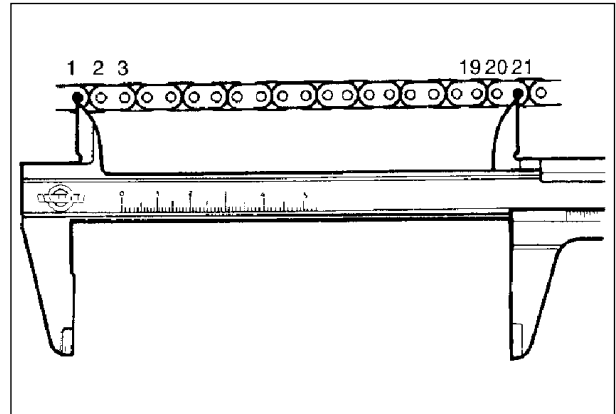
- Place the vehicle on a level ground.
- Loosen the two rear axle housing nuts (A) and two rear axle housing wrench bolts (B).
- Tense the drive chain fully by turning chain adjuster (C).



## 2-21 PERIODIC MAINTENANCE

- Count out 21 pins (20 pitches) on the chain and measure the distance between the two points. If the distance exceeds the service limit, the chain must be replaced.

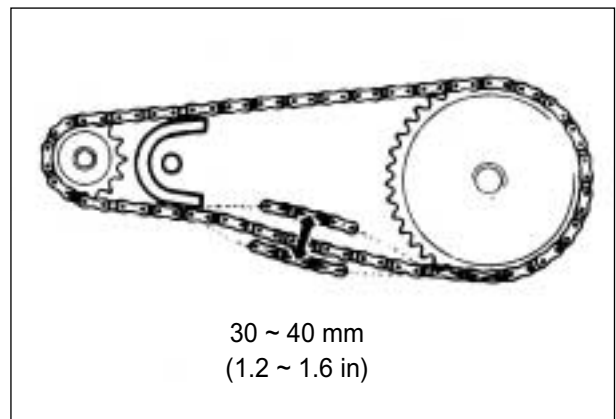
Drive chain 20-pitch length	Service limit
	319.4 mm (12.58 in)



### ▣ ADJUSTING

- Loosen or tighten chain adjuster © until there is 30 ~ 40 mm (1.2 ~ 1.6 in) of slack at the middle of the chain between the engine and rear sprockets as shown.

Drive chain slack	Standard
	30 ~ 40 mm (1.2 ~ 1.6 in)



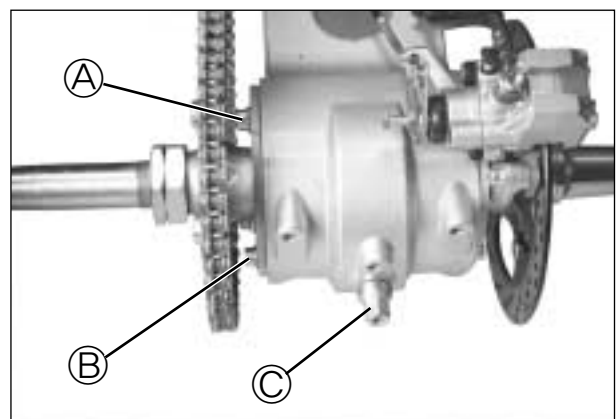
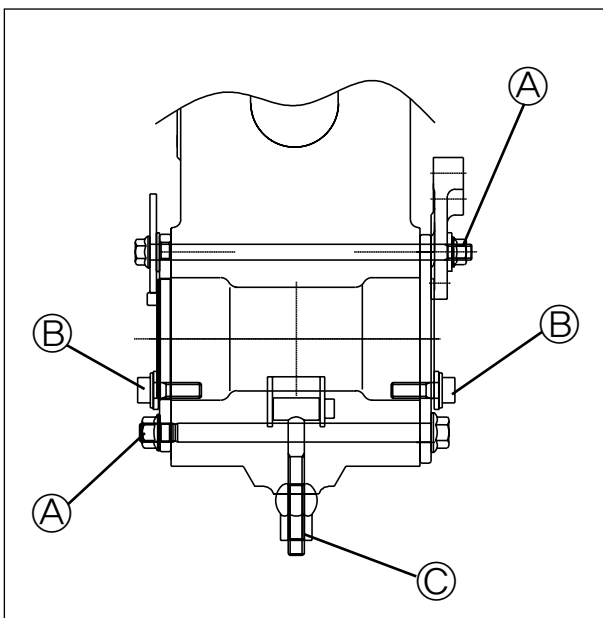
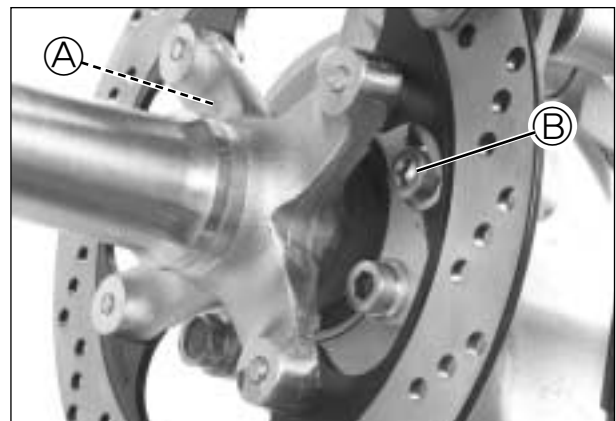
- After adjusting the drive chain, tighten the rear axle housing nuts (A) and wrench bolts (B) in the described order to the specified torque.

#### ▣ Rear axle housing nut (A)

: 70 ~ 100 N · m (7.0 ~ 10.0 kgf · m)

#### Rear axle housing wrench bolt (B)

: 40 ~ 60 N · m (4.0 ~ 6.0 kgf · m)



▣ **CLEANING AND LUBRICATING**

- Clean the drive chain with kerosine.  
If the drive chain tends to rust quickly, the intervals must be shortened.

**⚠ CAUTION**

**Do not use trichloroethylene, gasoline or any similar solvent. These fluids have too great a dissolving power for this chain and they can damage the O-rings.**

**Use only kerosine to clean the drive chain.**

**⚠ CAUTION**

**Some drive chain lubricants contain solvents and additives which could damage the O-rings in your chain.**

**Use Hyosung chain lube or an equivalent that is specifically intended for use with O-ring chains.**

- After washing and drying the chain, oil it with a engine oil or chain lubricating oil.

**⚠ CAUTION**

**The drive chain for this vehicle is made of the special material.**

**The standard drive chain is a RK 520EXW recommends to use this standard drive chain as a replacement.**

**Use of another chain may lead to premature chain failure.**



## SUSPENSIONS

### **Inspect Interval**

*Inspect Every 6 months.*

- Support the vehicle with a jack or wooden blocks.
- Remove the front and rear wheels.  
(Refer to page 7-8)
- Inspect the suspension arm, bearing and bushing for scratches, wear, or damage.  
If any damages are found, replace the suspension arm, bearing or bushing with a new one.  
(Refer to page 7-24~25)
- Inspect the swingarm, rear axle and bearing for scratches, wear or damage.  
If any damages are found, replace them with a new one. (Refer to page 7-63 and 7-69)
- Inspect the front and rear shock absorbers for oil leakage or damage.  
If any damages are found, replace them with a new one. (Refer to page 7-24 and 7-55)

## CHASSIS BOLTS AND NUTS

### **Inspect Interval**

*Tighten Initially at 1 month and Every 3 months thereafter.*

Check that all chassis nuts and bolts are tightened to their specified torque. (Refer to page 8-13)

## COMPRESSION PRESSURE

The compression pressure reading of a cylinder is a good indicator of its internal condition.

The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression pressure reading for each maintenance service.

Compression pressure	
Standard	16 kg/cm <sup>2</sup> (at 500 rpm)
Service limit	14 kg/cm <sup>2</sup> (at 500 rpm)

Low compression pressure can indicate some of the following conditions :

- Excessively worn cylinder wall
- Worn-down piston or piston rings
- Piston rings stuck in grooves
- Poor seating of valves
- Ruptured or otherwise defective cylinder head gasket

### NOTE

*When the compression pressure goes below specification, check the engine for conditions listed above.*

## ▣ COMPRESSION TEST PROCEDURE

### NOTE

- ❖ *Before testing the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values and valves are properly adjusted.*
- ❖ *Have the engine warmed up by idling before testing.*
- ❖ *Make sure that the battery is fully-charged condition.*

Remove the related parts and test the compression pressure in the following manner.

### ⚠ WARNING

**The hot radiator and the hot engine can burn you. Wait until the radiator and the engine are cool enough to touch.**

- Remove the spark plug.
- Fit the compression gauge in the plug holes. Make sure that the connection is tightened.
- Keep the throttle lever in full-open position.
- Press the starter switch and crank the engine for a few seconds.

Record the maximum gauge reading as the compression of cylinder.

 **Compression gauge : 09915-64511**





## OIL PRESSURE

Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

Oil pressure	Standard
	1.0 ~ 3.0 kg /cm <sup>2</sup> (at 60 °C · 3,000 rpm)

If the oil pressure is lower or higher than the specification, the following causes may be considered.

### ▣ LOW OIL PRESSURE

- Clogged oil filter
- Oil leakage from the oil passage
- Damaged O-ring
- Defective oil pump
- Combination of above items


### ▣ HIGH OIL PRESSURE

- Engine oil viscosity is too high
- Clogged oil passage
- Combination of the above items

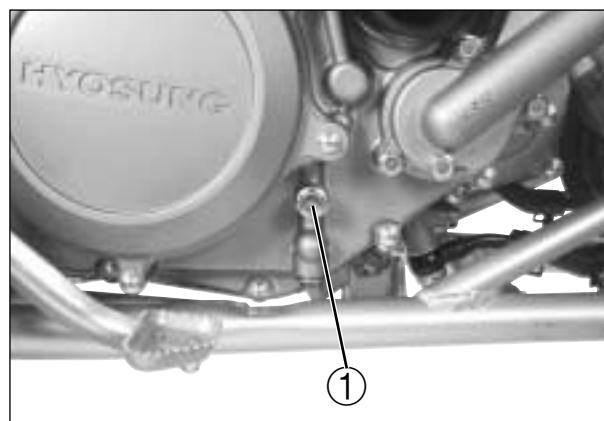
### ▣ OIL PRESSURE TEST PROCEDURE

Check the oil pressure in the following manner.

- Remove the oil check plug ① and install the adapter of oil pressure gauge at the removed position.
- Connect an engine tachometer.
- Warm up the engine as follows :  
Summer : 10 min. at 2,000 rpm.  
Winter : 20 min. at 2,000 rpm.
- After warming up the engine, increase the engine speed to 3,000 rpm. (with the engine tachometer), and read the oil pressure gauge.

 **Engine tachometer : 09900-26006**  
**Oil pressure gauge : 09915-74511**  
**Oil pressure gauge adaptor**  
**: 09915-74532**

 **Engine oil check plug**  
**: 18 N · m (1.8 kgf · m)**



# ENGINE

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### CAUTION

- ❖ Mark an identification of assembly location on each removed part so that each will be restored to the original position during reassembly.
- ❖ Wash clean and dry the removed parts before inspecting and measuring.
- ❖ Oil the rotating or sliding parts before assembly.
- ❖ Make sure to use the correct type of lubricant where specified.
- ❖ Check that each rotating or sliding part moves or operates smoothly after assembly.
- ❖ Make sure to follow the bolt tightening order where specified.
- ❖ If the correct length of the bolt is confused when tightening the crankcase or cover, insert all the bolts and check that the tightening margin is equal in each bolt.

## ENGINE REMOVAL AND REMOUNTING

### ENGINE REMOVAL

Before taking the engine out of the frame, wash the engine using a suitable cleaner.

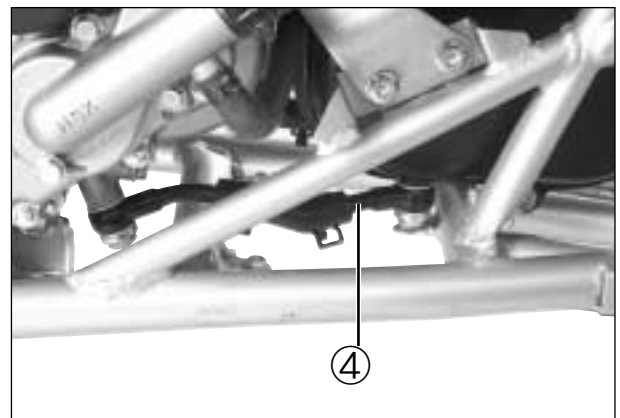
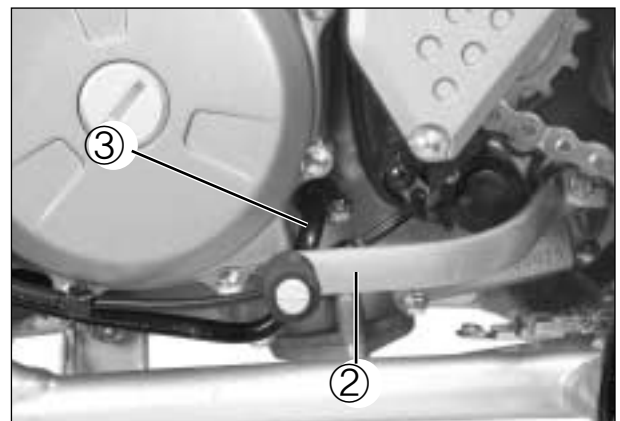
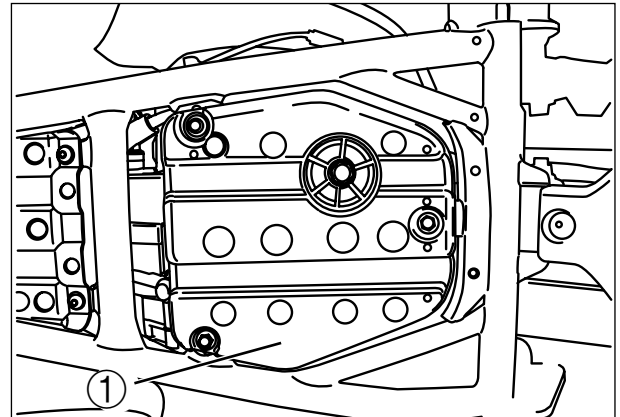
Engine removal is sequentially explained in the following steps.

- Drain engine coolant. (Refer to page 2-12)
- Remove the engine under cover ①.
- Drain engine oil. (Refer to page 2-10)
- Remove the gearshift lever ②.
- Remove the engine oil outlet hose ③ and inlet hose ④.

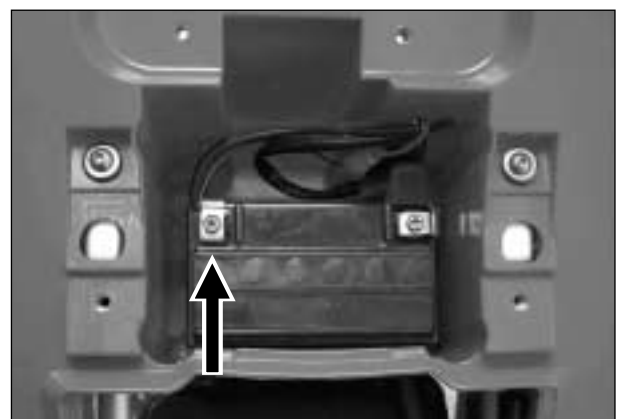


### CAUTION

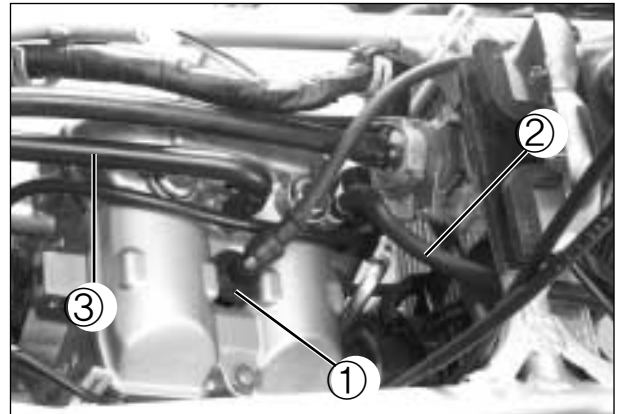
Do not lose the spacer with O-ring behind the outlet oil hose.



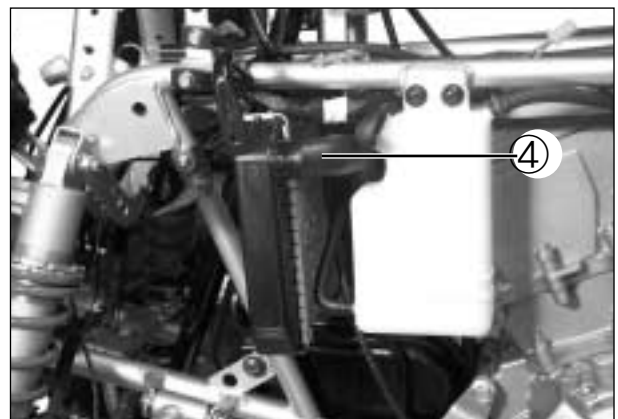
- Remove the seat. (Refer to page 7-3)
- Disconnect the battery ⊖ lead wire.



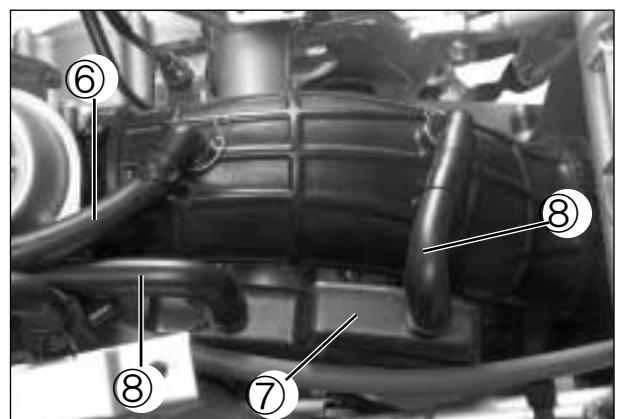
- Remove the fuel tank. (Refer to page 4-1)
- Disconnect the spark plug cap ①, oil tank overflow hose ② and breather hose ③.



- Remove the engine coolant inlet hose ④ and disconnect the outlet hose ⑤.



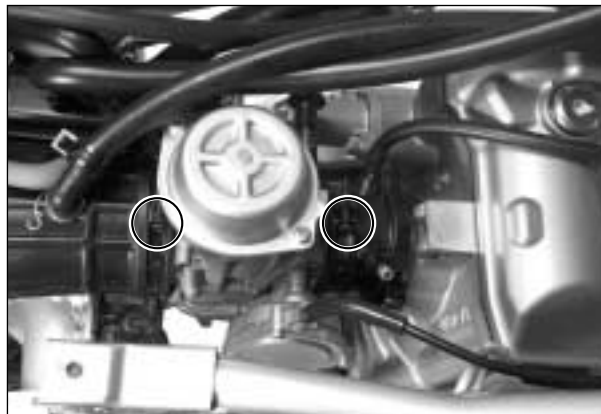
- Disconnect the breather hose ⑥ and remove the oil return tank ⑦ with hose ⑧.



### 3-3 ENGINE

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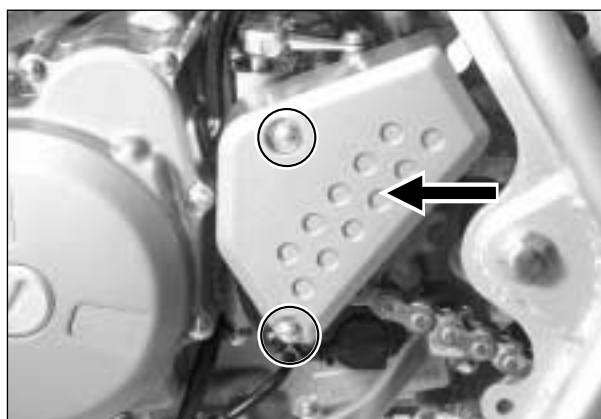
- Remove the carburetor with throttle cable.



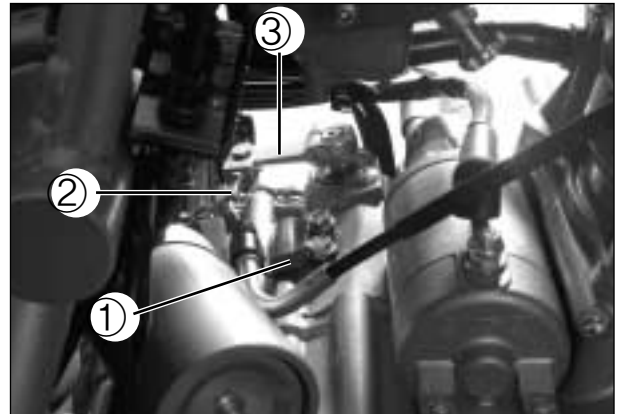
- Disconnect the starter motor lead wire ① and ground lead wire ②.



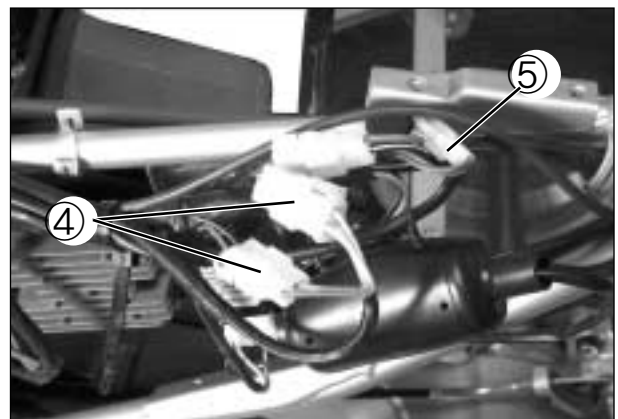
- Remove the engine sprocket cover.



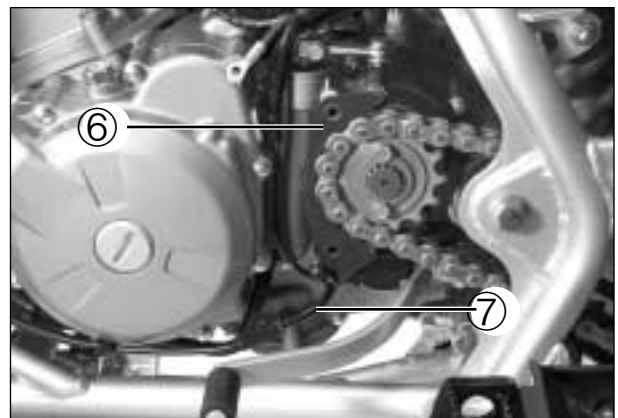
- Remove the clutch cable bracket① .
- Disconnect the clutch cable ② end out of the clutch lever.
- Disconnect the clutch cable ② end out of the clutch release arm.
- Remove the clutch release arm③ .



- Disconnect the magneto lead wire couplers④ and gear position switch lead wire coupler⑤ .



- Remove the reverse gear cable bracket⑥ .
- Disconnect the reverse gear cable⑦ .

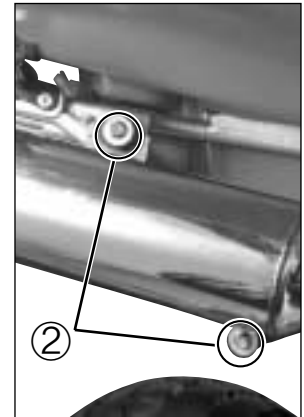
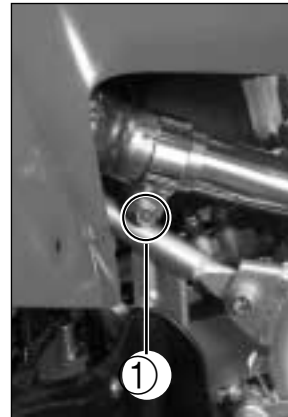


- Remove the engine sprocket with drive chain.

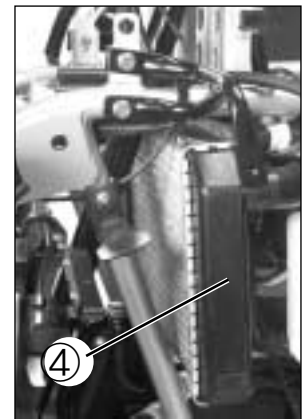
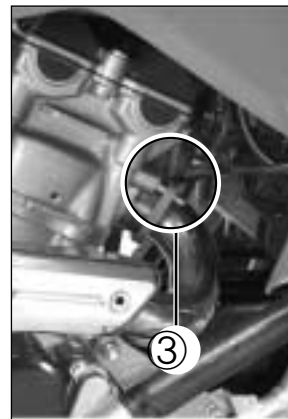
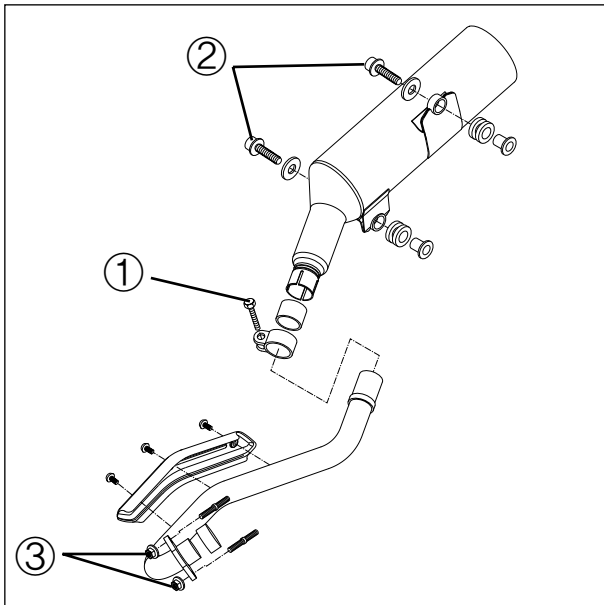


### 3-5 ENGINE

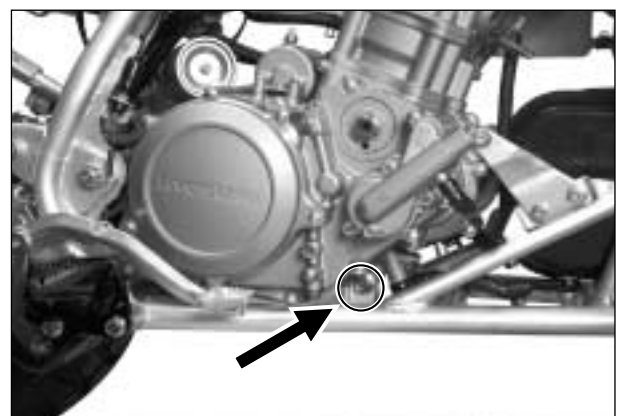
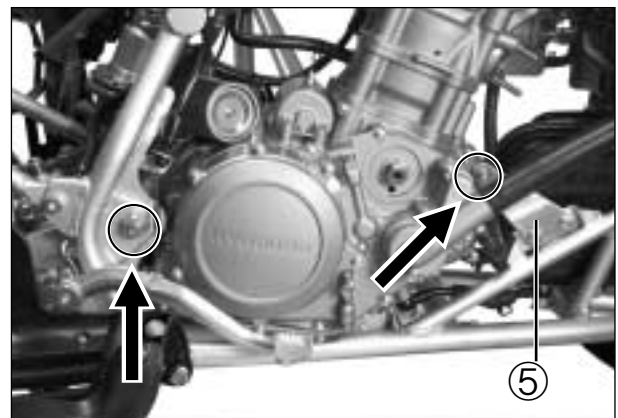
- Loosen the muffler connecting bolt ① .
- Remove the muffler mounting bolts ② .



- Remove the exhaust pipe nuts ③ .
- Remove the muffler.
- Remove the radiator ④ .



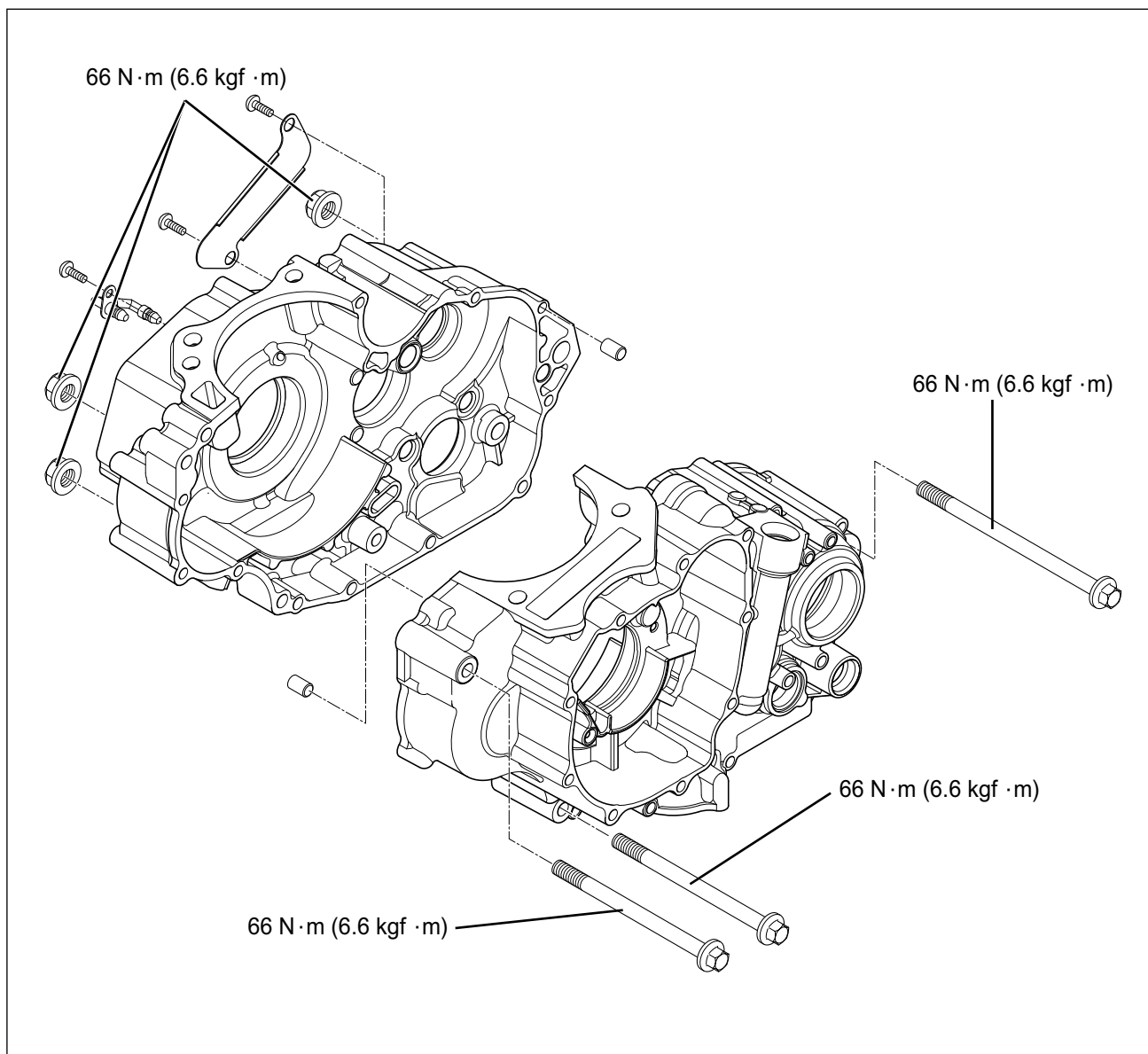
- Remove the engine mounting bolts and nut.
- Remove the engine mounting brackets ⑤ .
- Remove the engine from the left side.



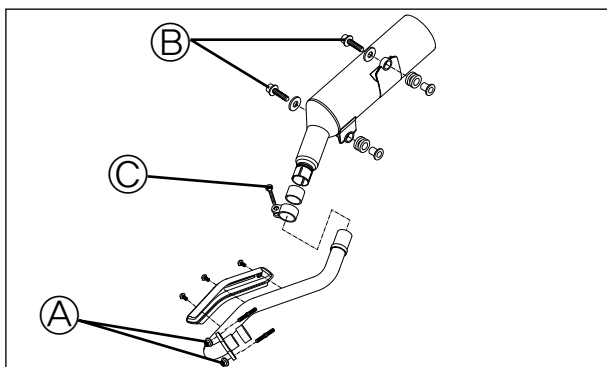
## ENGINE REMOUNTING

Remount the engine in the reverse order of engine removal.

Pay attention to the following points :



- Install the exhaust pipe and muffler.





### 3-7 ENGINE

- Tighten the exhaust pipe nuts (A), muffler mounting bolts (B) and connecting bolt (C) to the specified torque.

 **Exhaust pipe nut**

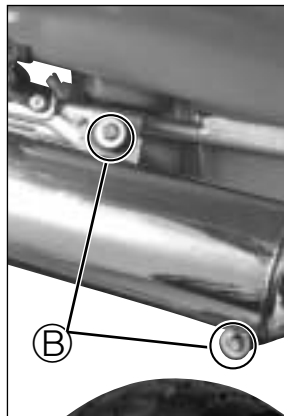
: 23 N · m (2.3 kgf · m)

**Muffler mounting bolt**

: 23 N · m (2.3 kgf · m)

**Muffler connecting bolt**

: 23 N · m (2.3 kgf · m)



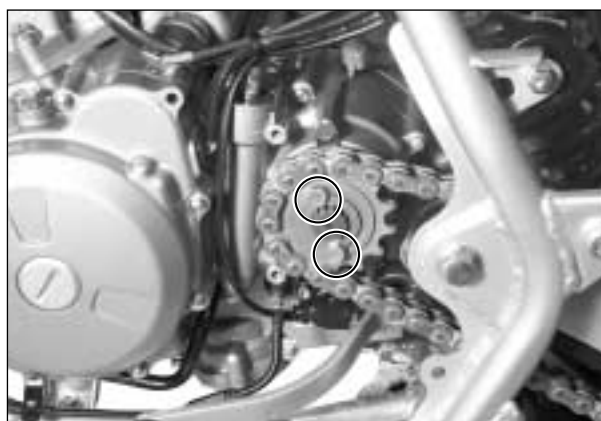
- Install the engine sprocket with drive chain after loosening the chain adjuster.
- Apply THREAD LOCK “1324” to the sprocket bolts.

 **THREAD LOCK “1324”**

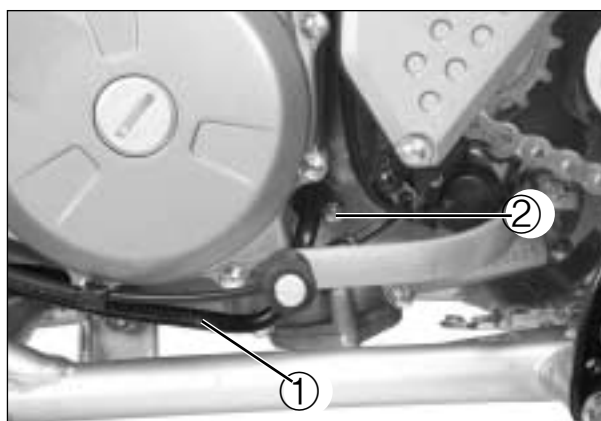
- Tighten the engine sprocket bolts to the specified torque.

 **Engine sprocket bolt**

: 11 ~ 13 N · m (1.1 ~ 1.3 kgf · m)



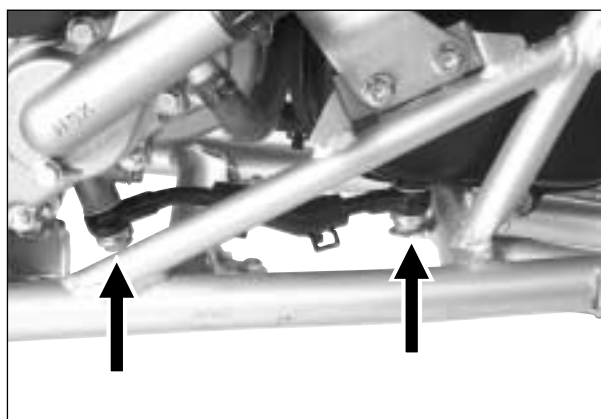
- Install the engine coolant hose.
- Install the O-ring to the engine oil outlet hose (1).
- Tighten the engine oil outlet hose bolt (2) securely.



- Tighten the engine oil inlet hose union bolts to the specified torque.

 **Engine oil inlet hose union bolt**

: 23 N · m (2.3 kgf · m)



- After installing the engine, route the wiring harness, cables and hoses properly.  
(Refer to page 8-26 to 8-31)

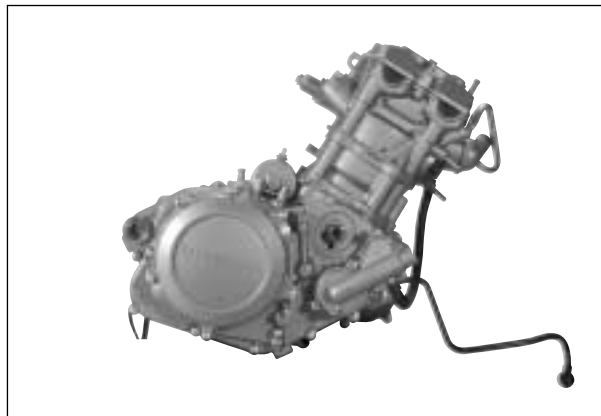
- Adjust the following items.

- \* Engine oil . . . . . Refer to page 2-1

<b>Necessary amount of engine oil</b>	
<b>Oil change</b>	2,500 ml
<b>Oil and filter change</b>	2,600 ml
<b>Engine overhaul</b>	2,700 ml
<b>Engine oil type</b>	SAE 10W/40 API Over SL

- \* Adjust the drive chain slack . . . Refer to page 2-21
- \* Throttle cable play . . . . . Refer to page 2-9
- \* Engine idle speed . . . . . Refer to page 2-9
- \* Clutch cable play . . . . . Refer to page 2-13

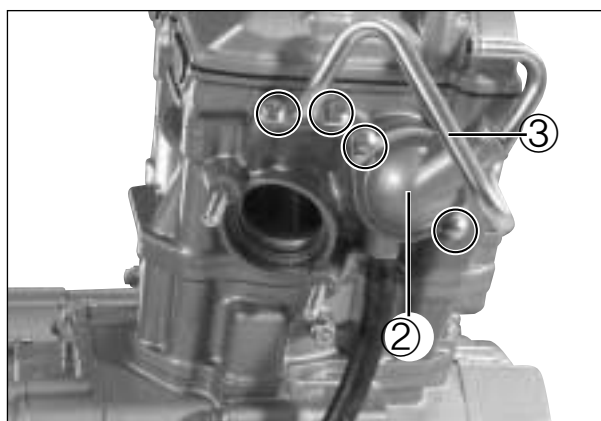
## ENGINE DISASSEMBLY



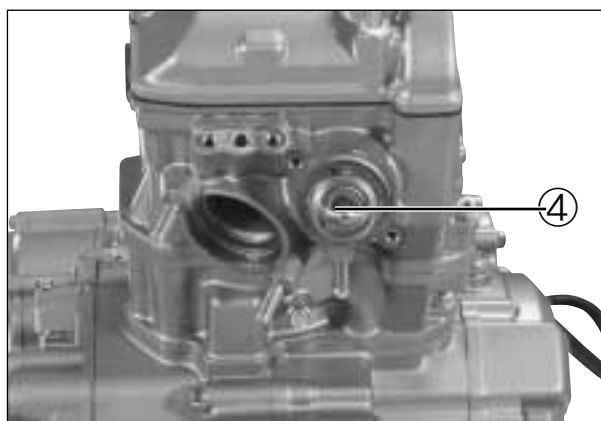
- Remove the starter motor① .
- Remove the spark plug.



- Remove the thermostat cover② and 2nd pipe③ .



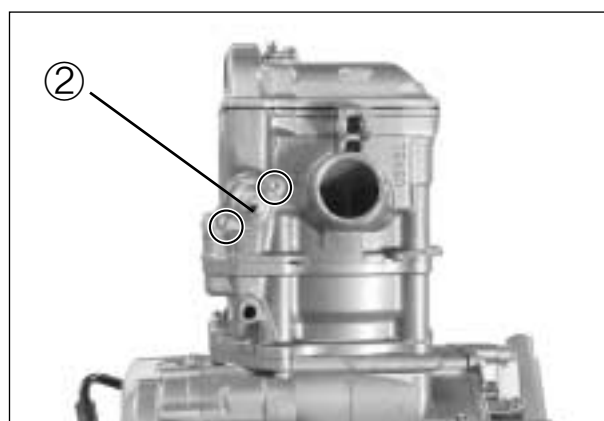
- Remove the thermostat④ .



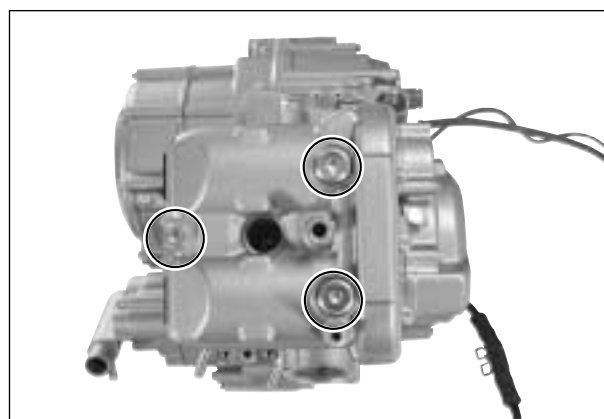
- Remove the cam chain tension adjuster bolt ①.



- Remove the cam chain tension adjuster ②.

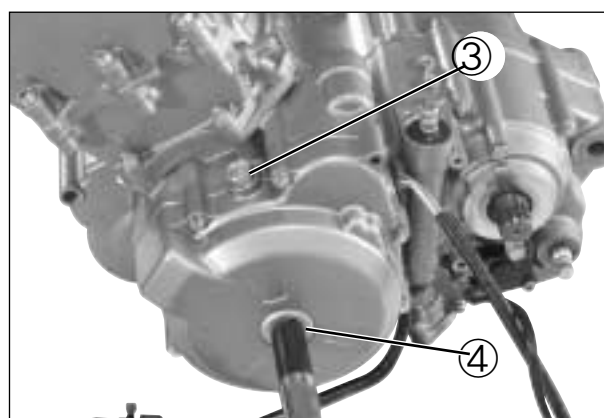


- Remove the cylinder head cover bolts in diagonal stages, and then remove the cylinder head cover.



- Remove the valve timing inspection plug ③.
- Remove the magneto cover cap ④ using the special tool.

 **Cap plug wrench : 09910-36000**

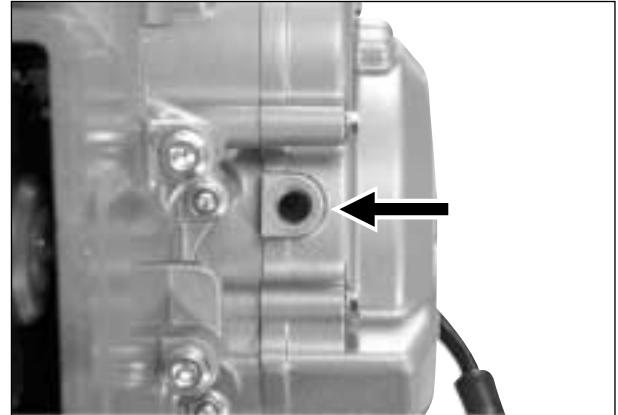


### 3-11 ENGINE

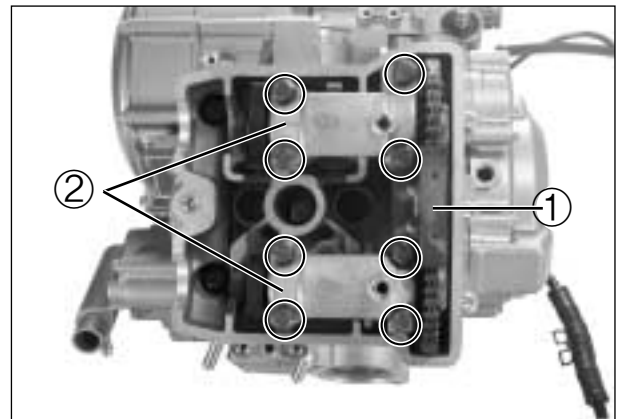
- Turn the magneto rotor until the “T” line on the magneto rotor is aligned with the triangle mark on the crankcase.

#### **NOTE**

*Before removing the camshaft housing, the piston must be at TDC of the compression stroke.*



- Remove the cam chain guide ① and camshaft housing ②.



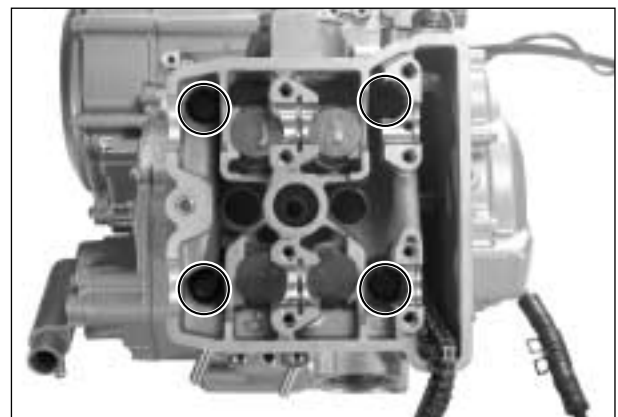
- Remove the dowel pins, intake camshaft ③ and exhaust camshaft ④.

#### **NOTE**

*Do not drop the dowel pins and camshaft drive chain into the crankcase.*



- Remove the four cylinder head bolts in diagonal stages.



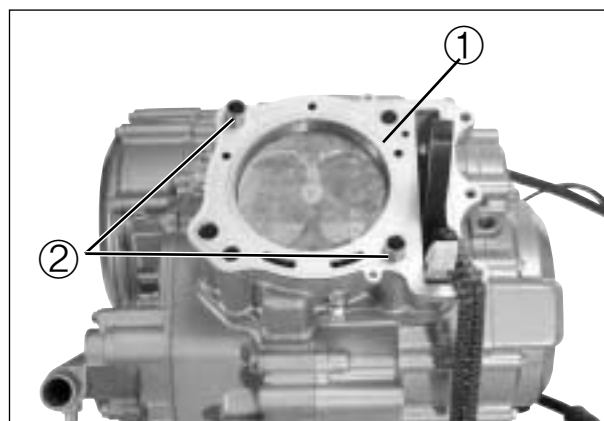
- Remove the cylinder head base bolts, and then remove the cylinder head.

### NOTE

*If the cylinder head does not come off easily, lightly tap it using a plastic hammer.*



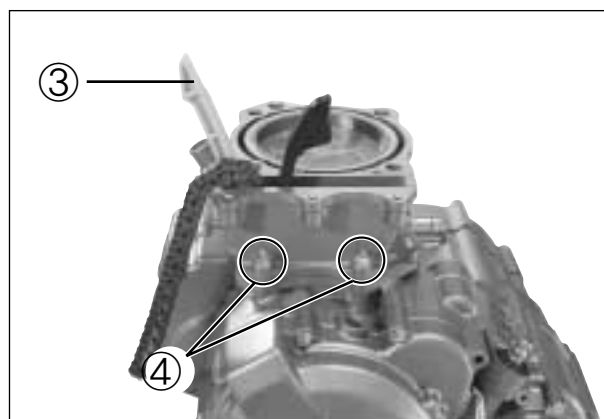
- Remove the cylinder head gasket ① and dowel pins ②.



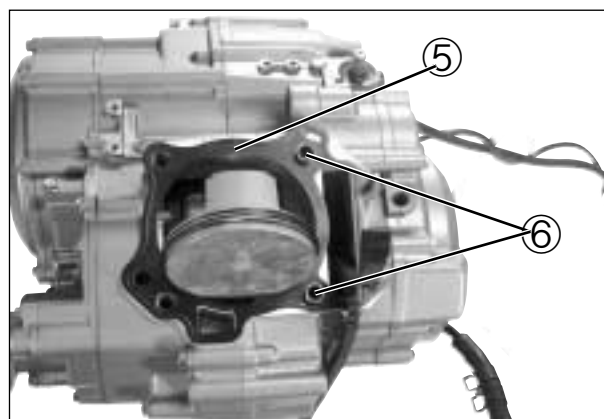
- Remove the cam chain guide ③.
- Remove the cylinder base nuts ④, and then remove the cylinder.

### NOTE

*If the cylinder does not come off easily, lightly tap it using a plastic hammer.*



- Remove the cylinder gasket ⑤ and dowel pins ⑥.



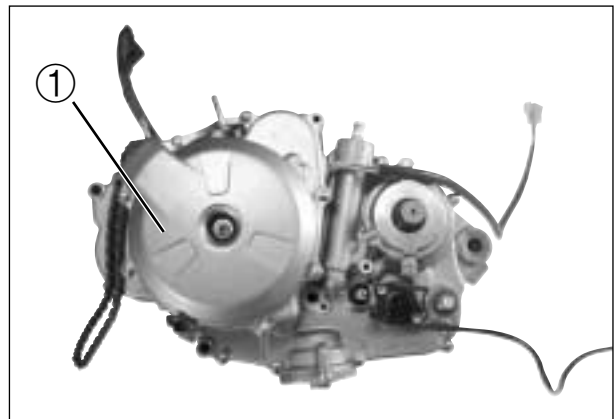
### 3-13 ENGINE

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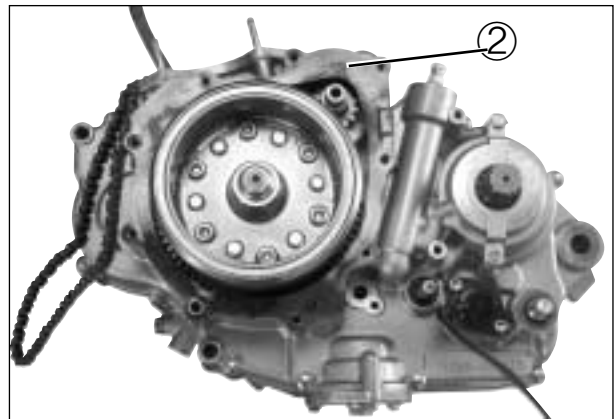
- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase.
- Remove the piston pin circlip.
- Draw out the piston pin and remove the piston.



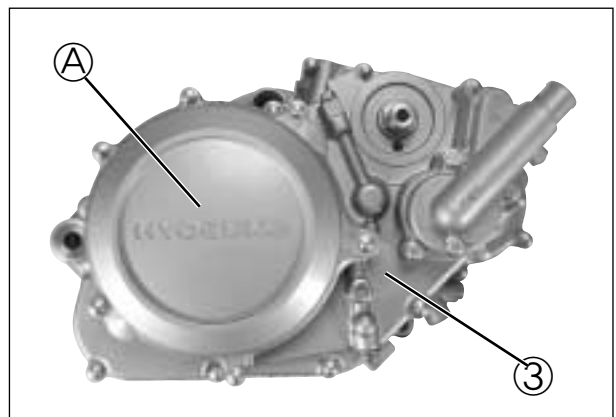
- Remove the magneto cover ①.



- Remove the dowel pins and gasket ②.



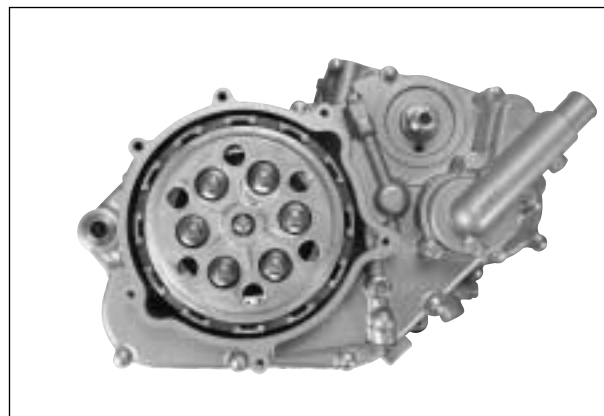
- Remove the clutch cover ③.



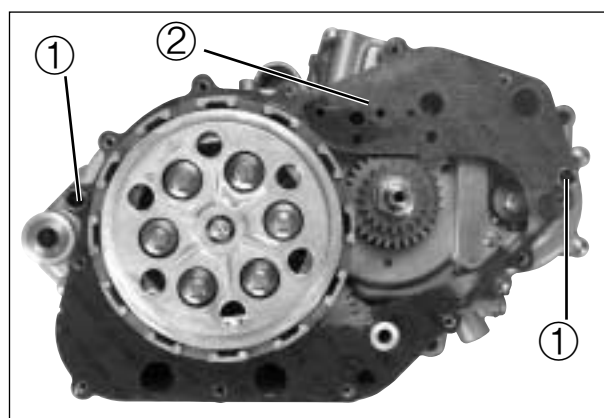
**NOTE**

*When remove or inspect the clutch drive and driven plate, remove only the clutch pressure cover*

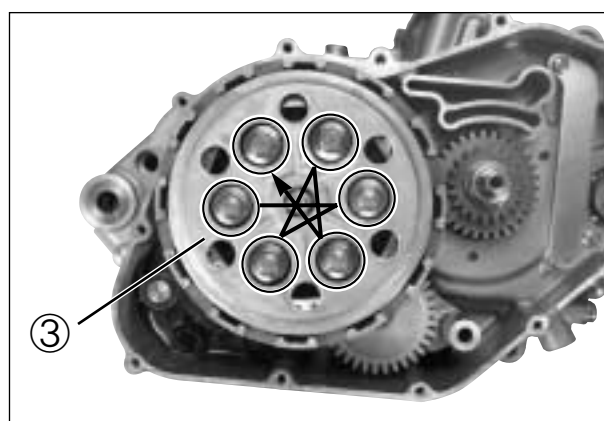
Ⓐ.



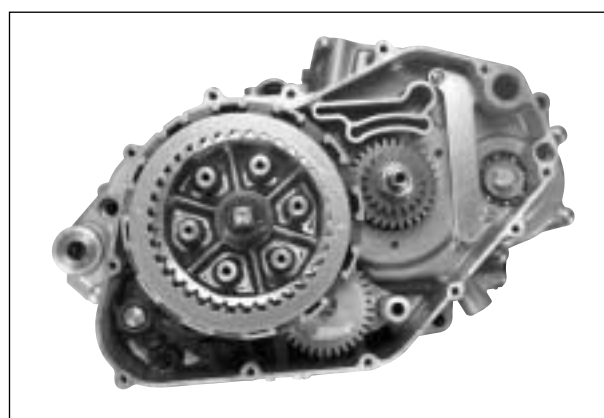
- Remove the dowel pins ① and gasket ②.



- Loosen the clutch spring mounting bolts working in diagonal stages.
- Remove the bolts and springs.
- Remove the clutch pressure disk ③.



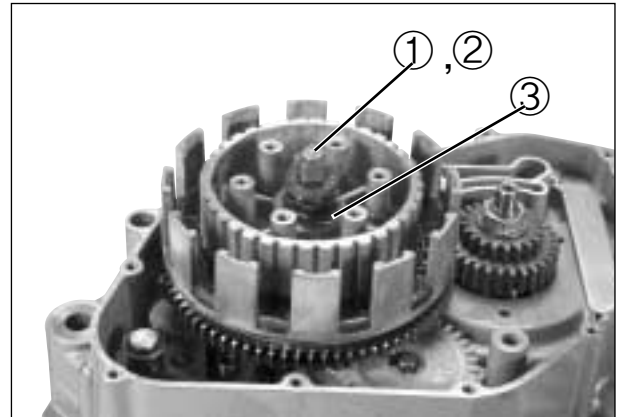
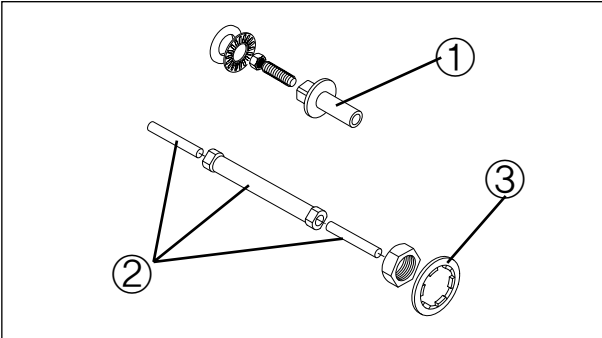
- Remove the clutch drive plates No. 1 and driven plates.
- Remove the spring washer and spring washer seat.
- Remove the clutch drive plate No. 2.





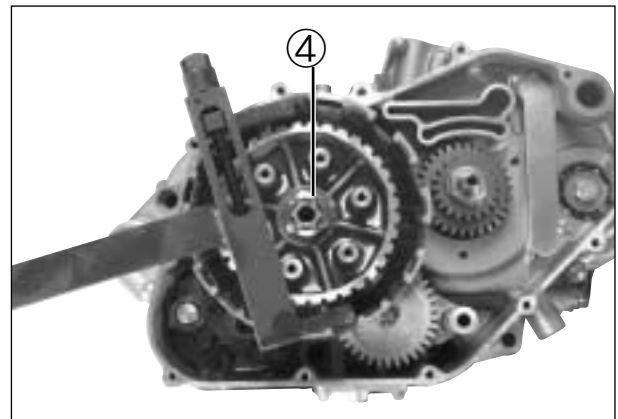
### 3-15 ENGINE

- Remove the clutch push piece① , push rod② .
- Flatten the clutch sleeve hub washer③ .

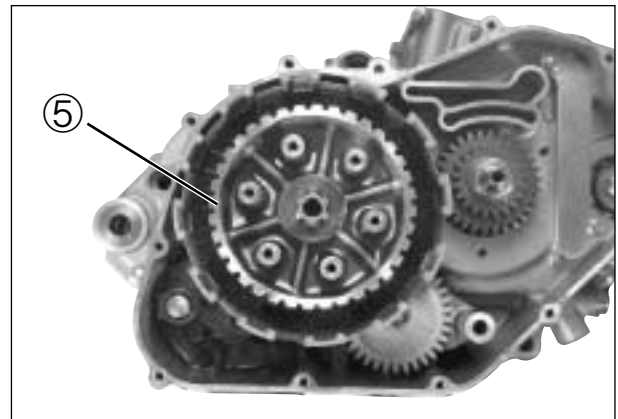


- Hold the clutch sleeve hub using the special tool, and then remove the clutch sleeve hub nut④ .

 **Clutch sleeve hub holder : 09920-53710**



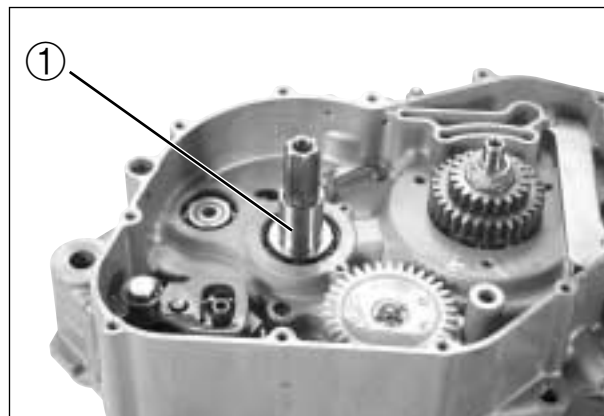
- Remove the clutch sleeve hub⑤ .



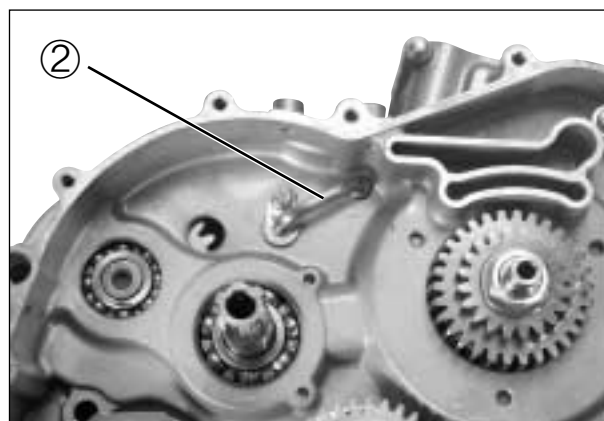
- Remove the primary driven gear assembly⑥ and washer.



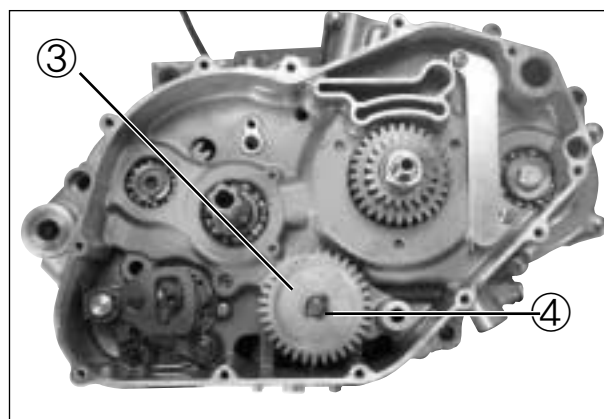
- Remove the collar①.



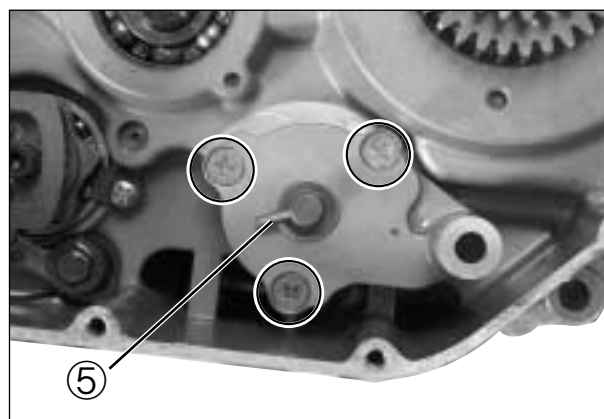
- Remove the oil pipe②.



- Remove the oil pump driven gear③ by removing the circlip④.

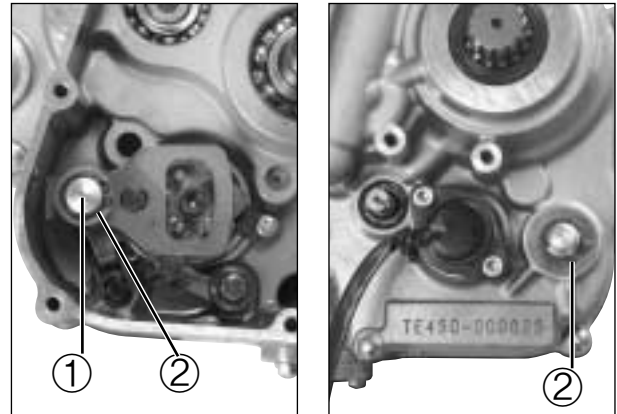


- Remove the oil pin⑤ and oil pump assembly.

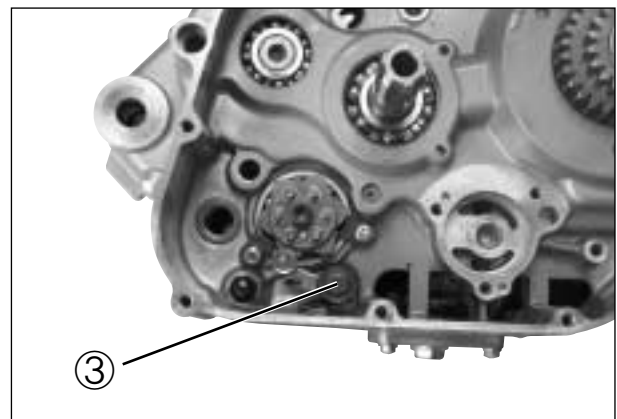


## 3-17 ENGINE

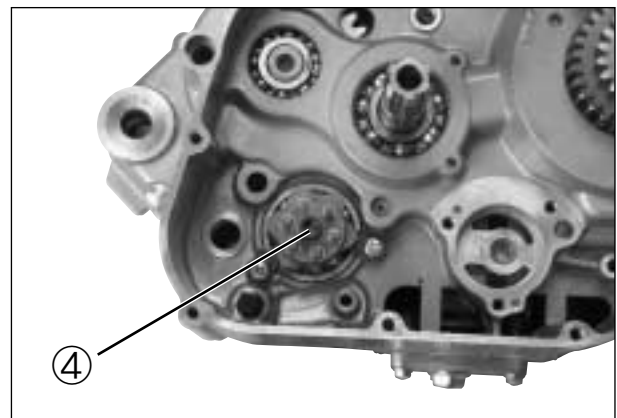
- Remove the gearshift shaft ① by removing the circlip ②.



- Remove the gearshift cam stopper ③.



- Loosen the gearshift cam plate bolt ④.
- Remove the gearshift cam plate.



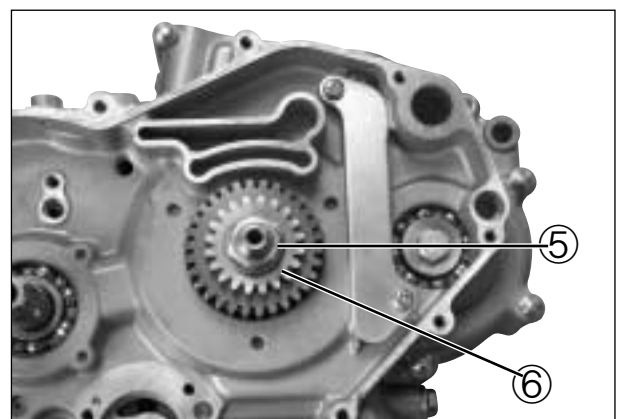
- With the crankshaft held immovable using the special tool, remove the primary drive gear nut ⑤, washer and water pump drive gear ⑥.

 **Conrod holder : 09910-20115**

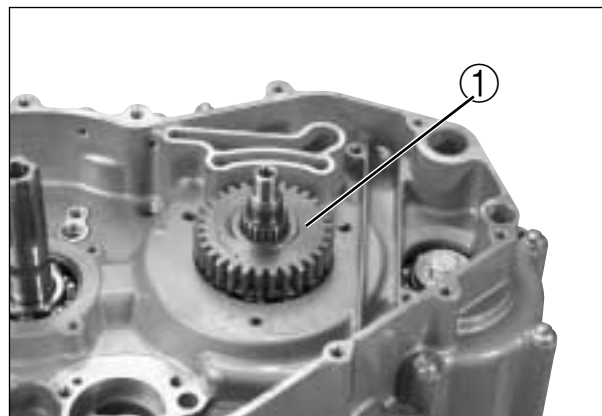
### **CAUTION**

The primary drive gear nut has left-hand threads. If turning it counter-clockwise (↺), it may cause damage.

Pay attention at the primary drive gear nut with a washer, and water pump drive gear with a washer.

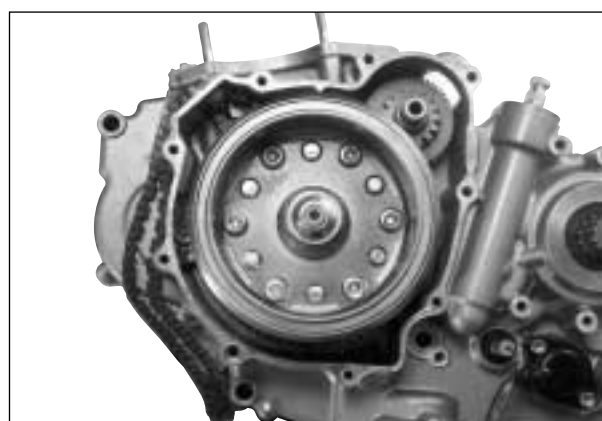


- Remove the primary drive gear①.



- With the magneto rotor held immovable using the special tool, loosen the rotor nut.

 **Conrod holder : 09910-20115**



- Remove the magneto rotor using the special tool.

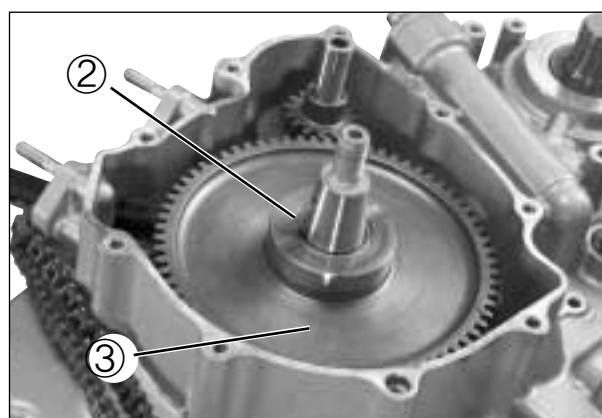
 **Rotor remover : 09930-30164**

 **CAUTION**

Do not hit the magneto rotor with a hammer, otherwise the rotor may be damaged.

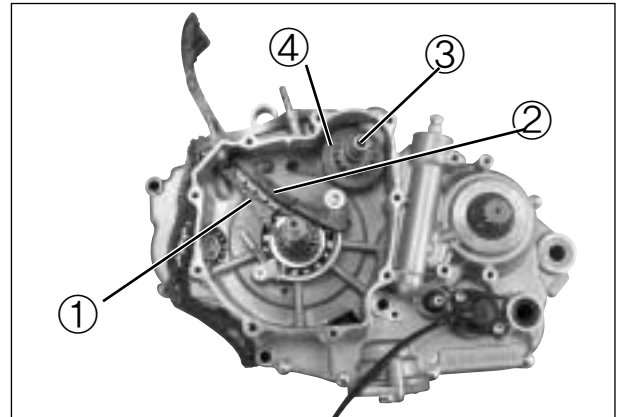


- Remove the magneto rotor key②.
- Remove the starter driven gear③.

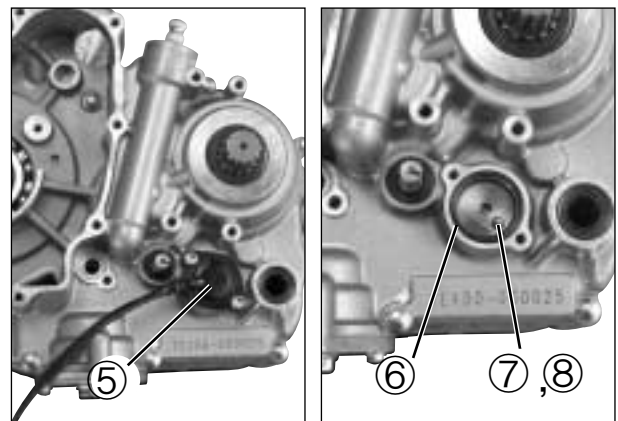
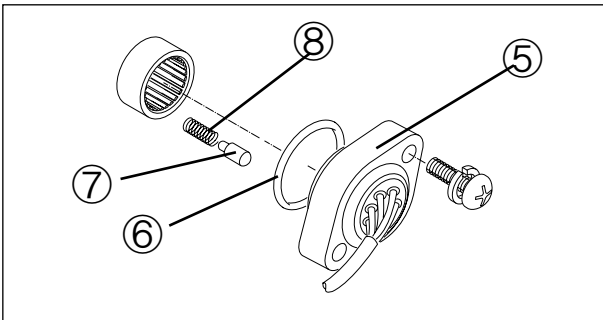


### 3-19 ENGINE

- Remove the cam chain ① and cam chain tensioner ②.
- Remove the starter idle shaft ③ and starter idle gear ④.



- Remove the gear position switch ⑤.
- Remove the O-ring ⑥, switch contact ⑦ and spring ⑧.



- Remove the left crankcase securing bolts.



- Remove the right crankcase securing bolts.



- Separate the crankcase using the special tool.

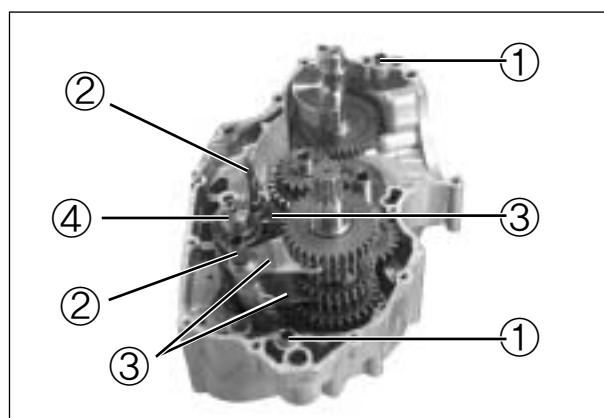
 Crankcase separator : 09920-13120

### NOTE

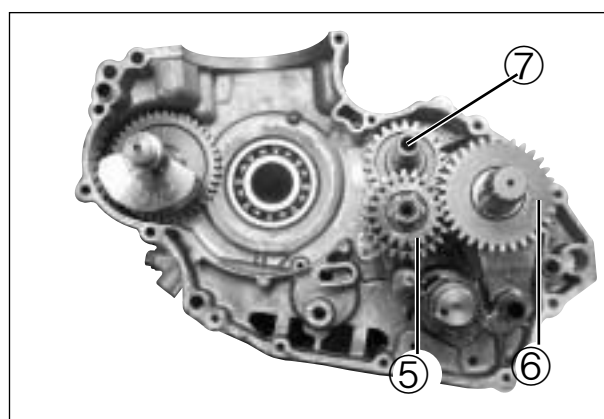
*Fit the crankcase separator, so that the tool arms parallel the side of the crankcase.*



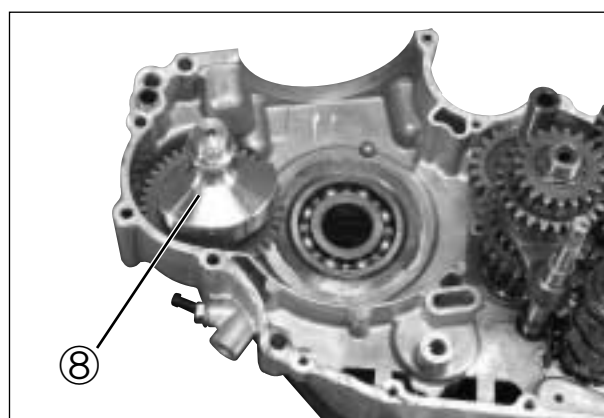
- Remove the dowel pins ①.
- Remove the gearshift fork shafts ②, gearshift forks ③ and gearshift cam ④.



- Remove the countershaft assembly ⑤ and drive-shaft assembly ⑥.
- Remove the reverse idle gear with its shaft ⑦.



- Remove the crank balancer ⑧.



## 3-21 ENGINE

- Remove the crankshaft from the crankcase using the special tool.

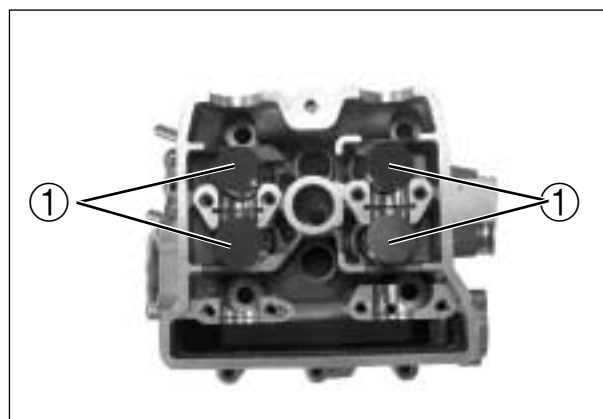
 **Crankcase separator : 09920-13120**



## ENGINE COMPONENT INSPECTION AND SERVICE



### CAUTION

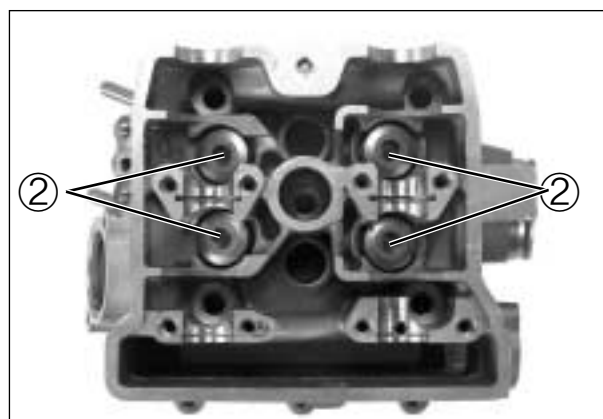
Identify the position of each removed part. Organize the parts in their respective group (for example, exhaust or intake) so that they can be installed in their original positions.




## CYLINDER HEAD

### DISASSEMBLY

- Remove the tappets  and shims  by hand or by using a magnet.

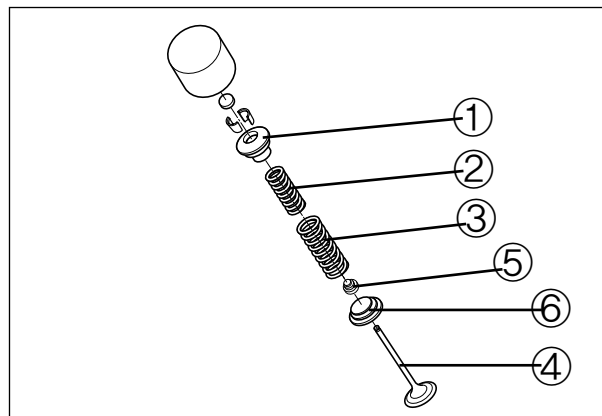


- Compress the valve springs, and then remove the valve cotter pins from the valve stem using the special tools.

 **Valve spring compressor : 09916-14510**  
**Valve spring compressor attachment : 09916-14520**



- Remove the valve spring retainer ①, inner valve spring ② and outer valve spring ③.
- Remove the valve ④ from the other side.
- Remove the oil seal ⑤ with long-nose pliers.
- Remove the valve spring seat ⑥.



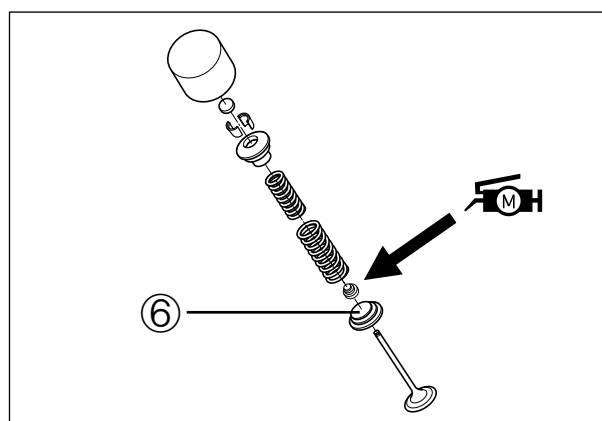
■ REASSEMBLY

- Install each valve spring seat ⑥.
- Apply MOLY PASTE to each oil seal and press-fit them into position.

 MOLY PASTE

 **CAUTION**

Do not reuse the oil seals.

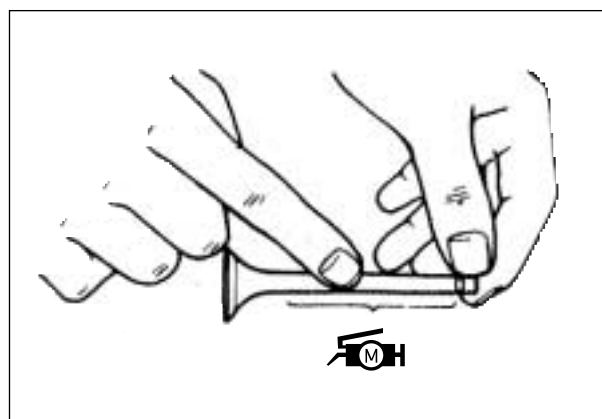


- Apply MOLY PASTE to the valve as shown, and then insert them into the valve guides.

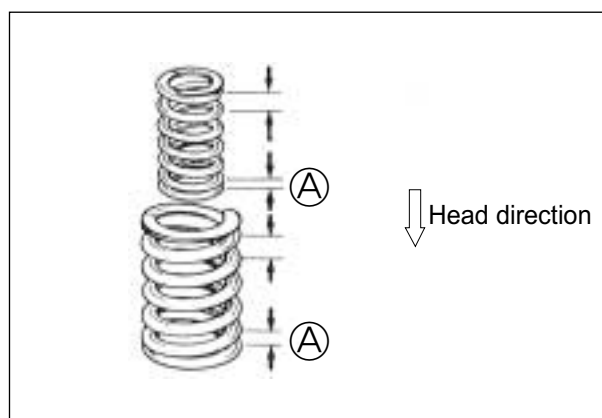
 MOLY PASTE

 **CAUTION**

When inserting each valve into the valve guides, make sure not to damage the lip of the oil seal.




- Install the valve spring with the smaller pitch (A) facing the cylinder head.

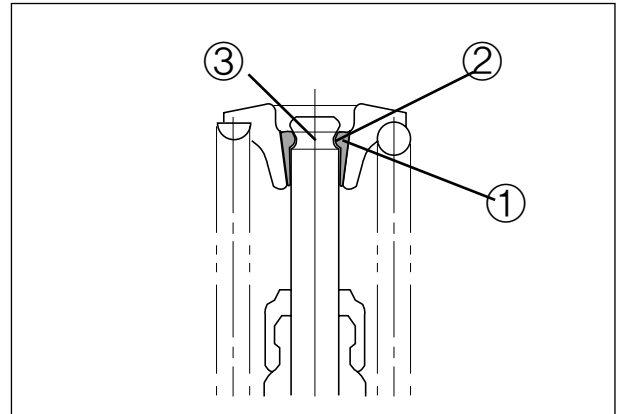




### 3-23 ENGINE

- Install the valve spring retainer by pressing down the spring using the valve spring compressor. Fit the cotter halves to the stem end and release the lifter to allow the cotter ① to wedge between the retainer and the valve stem. Make sure that the rounded lip ② of the cotter fits snugly into the groove ③ in the stem end.

 **Valve spring compressor**  
: 09916-14510  
**Valve spring compressor attachment**  
: 09916-14520



#### **CAUTION**

Be sure to install all of the parts in their original positions.

#### **CYLINDER HEAD DISTORTION**

Decarbonize in combustion chamber.  
Check the gasket surface of the cylinder head for distortion using a straightedge and thickness gauge. Take clearance reading at several places as indicated.  
If any clearance reading exceeds the service limit, replace the cylinder head with a new one.

Cylinder head distortion	Service limit
	0.05 mm (0.002 in)

 **Thickness gauge** : 09900-20806

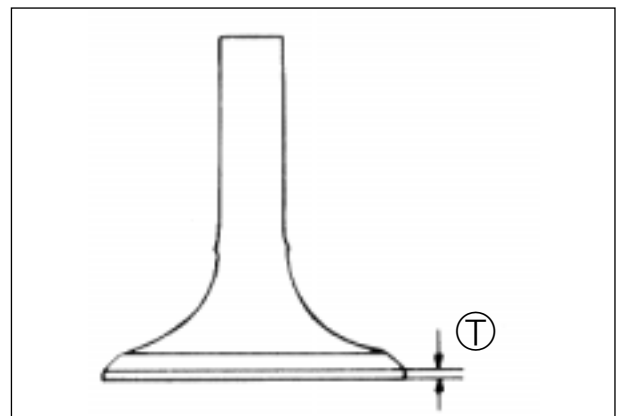


#### **VALVE FACE WEAR**

Visually inspect each valve face for wear or damage. If any abnormal wear is found, replace the respective valve with a new one. The thickness of the valve face decreases as the face wears. Measure the valve head thickness ①. If the valve head thickness is not within the specified value, replace the valve with a new one.

Valve head thickness ①	Service limit
	0.5 mm (0.02 in)

 **Vernier calipers** : 09900-20101

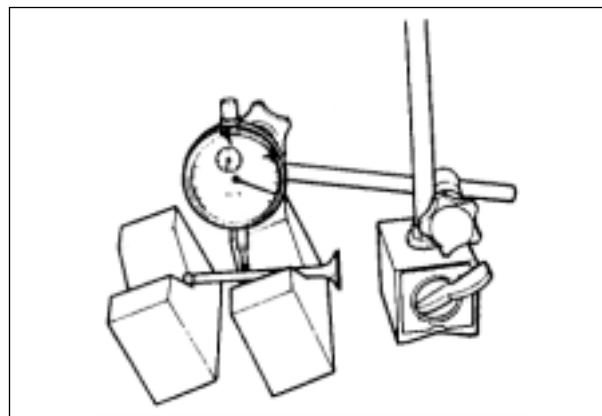


### ▣ VALVE STEM RUNOUT

Check the valve stem for abnormal wear or bend. Support the valve using a V-blocks and measure the valve stem runout using the dial gauge, as shown. If the service limit is exceeded or abnormal condition exists, replace the valve with a new one.

Valve stem runout	Service limit
	0.05 mm (0.002 in)

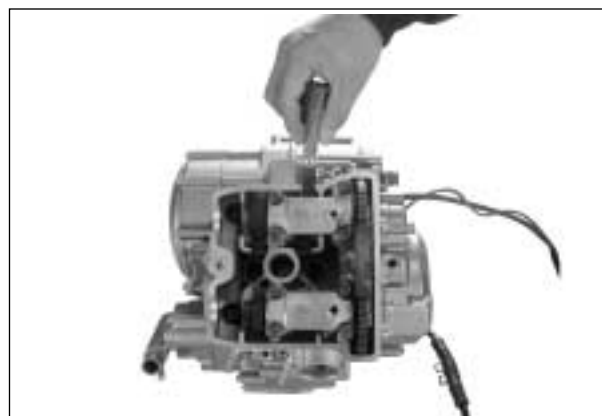
 **Dial gauge : 09900-20606**  
**Magnetic stand : 09900-20701**  
**V-block : 09900-21304**



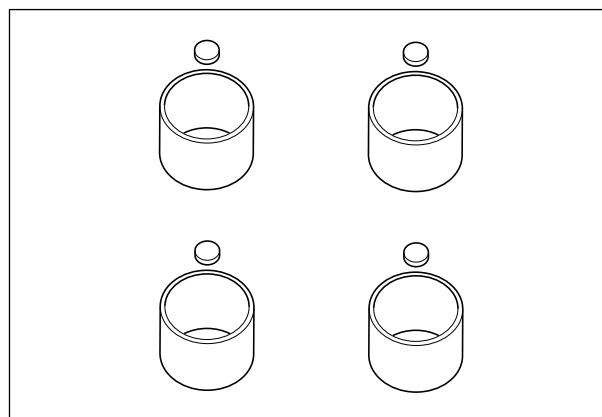
### ▣ TAPPET & SHIM WEAR

When measuring the valve clearance, the clearance should be within the standard range.

Valve clearance	Standard (When cold)
<b>Intake valve</b>	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
<b>Exhaust valve</b>	0.2 ~ 0.3 mm (0.008 ~ 0.012 in)



- Inspect the tappet for wear and scratch.  
If modification or scratch is present, replace the tappet.
- When you checked the valve clearance, if the valve clearance is wide please replace the present shim into thick one, if the valve clearance is narrow please replace the present shim into thin shim. (Refer to page 8-33 · 34)




### ▣ SHIM KIND

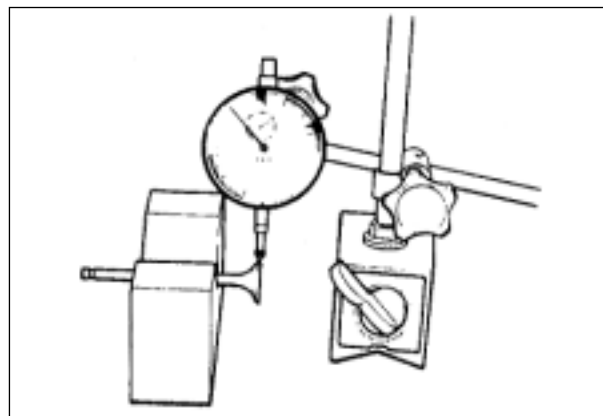
There are 49 kinds of shim which thickness is increased by each 0.025 mm from 2.30 mm to 3.50 mm.

**▣ VALVE HEAD RADIAL RUNOUT**

Support the valve using a v-block and measure the valve head radial runout using the dial gauge, as shown. If the runout exceeds the service limit, replace the valve with a new one.

Valve head radial runout	Service limit
	0.35 mm (0.014 in)

-  Dial gauge : 09900-20606
- Magnetic stand : 09900-20701
- V-block : 09900-21304



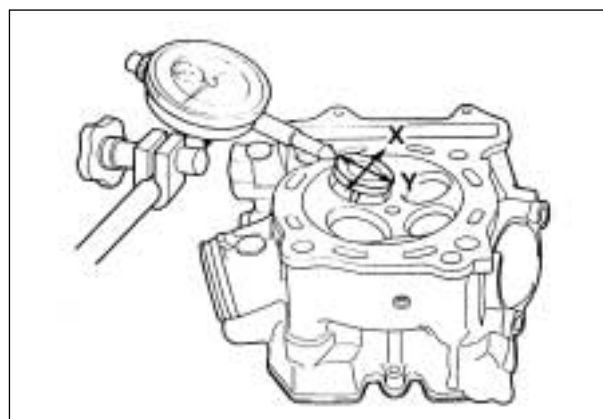
**▣ VALVE STEM DEFLECTION**

Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, "X" and "Y", perpendicular to each other. Position the dial gauge as shown.

If the deflection exceeds the service limit, determine whether the valve or the guide should be replaced with a new one.

Valve stem deflection	Service limit
IN.	0.35 mm (0.014 in)
EX.	0.35 mm (0.014 in)

-  Dial gauge : 09900-20606
- Magnetic stand : 09900-20701




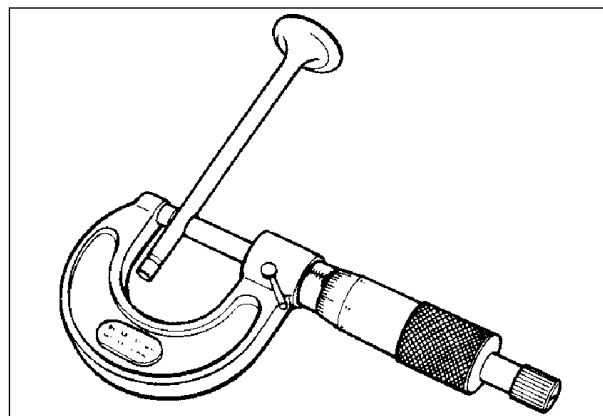
**▣ VALVE STEM DIAMETER**

Measure the valve stem outside diameter using the micrometer.

If the diameter measured exceeds the standard, replace the valve.

Valve stem diameter	Standard
IN.	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in)
EX.	4.955 ~ 4.970 mm (0.1951 ~ 0.1957 in)

-  Micrometer(0~25 mm) : 09900-20201



## ▣ VALVE SPRING

The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.

Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the valve spring is not within specification, replace both the inner and outer springs as a set.

Valve spring free length	Service limit
Inner	36.9 mm (1.45 in)
Outer	39.9 mm (1.57 in)

 Vernier calipers : 09900-20101

Valve spring tension	Standard
Inner	6.5 ~ 7.1 kgf (14.3 ~ 15.7 lbs) at length 32.0 mm (1.26 in)
Outer	12.0 ~ 14.0 kgf (26.5 ~ 30.9 lbs) at length 35.5 mm (1.40 in)

## ▣ CAMSHAFT

The camshaft should be checked for runout and also for wear of cams and journals if the engine has been noted to produce abnormal noise or vibration or a lack of out-put power. Any of these abnormality could be caused by a worn camshaft.

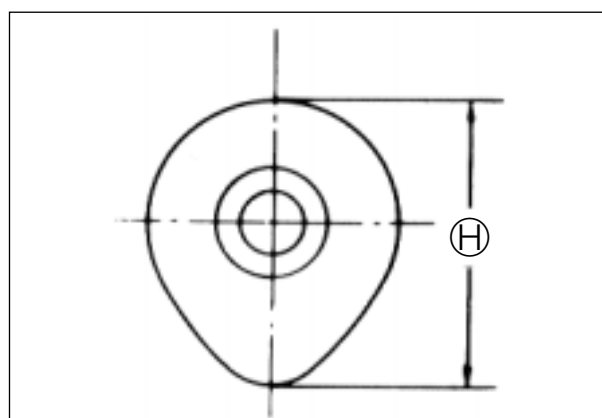
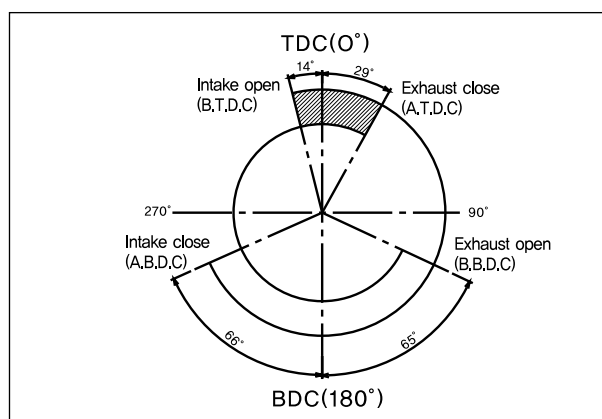
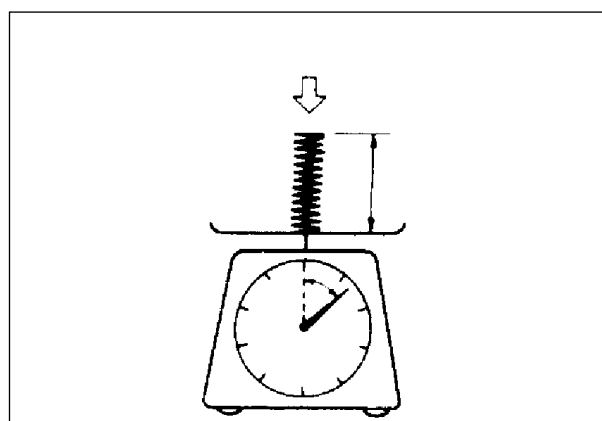
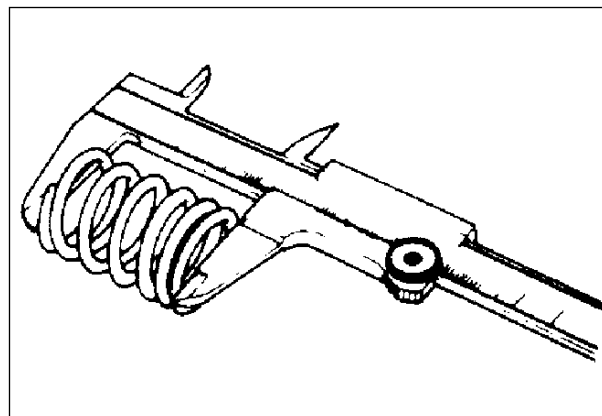
## ▣ CAMSHAFT WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced output power.

The limit of cam wear is specified for both intake and exhaust cams in terms of cam height  $\ominus$ , which is to be measured with a micrometer. Replace camshafts if found it worn down to the limit.

Cam height $\ominus$	Service limit
Intake cam	39.88 mm (1.570 in)
Exhaust cam	39.88 mm (1.570 in)

 Micrometer(25~50 mm) : 09900-20202



**▣ CAMSHAFT JOURNAL WEAR**

Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.

- Use the plastigauge to read the clearance at the widest portion, which is specified as follows :


Camshaft journal oil clearance (IN & EX)	Service limit
	0.15 mm (0.006 in)

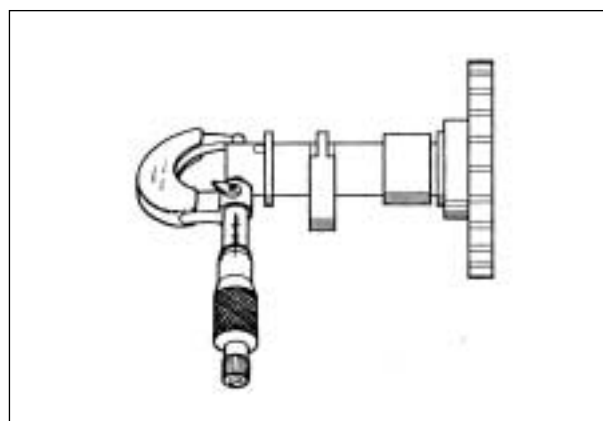
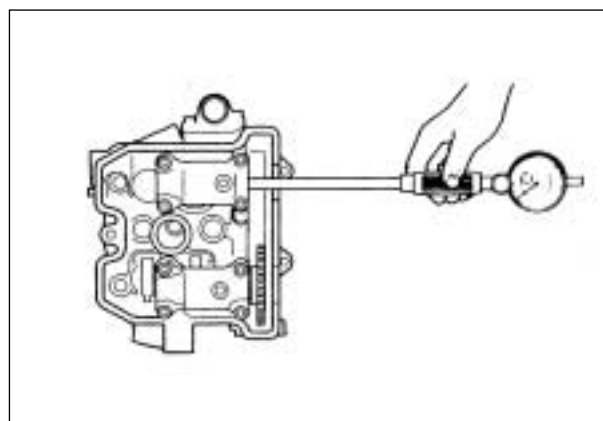
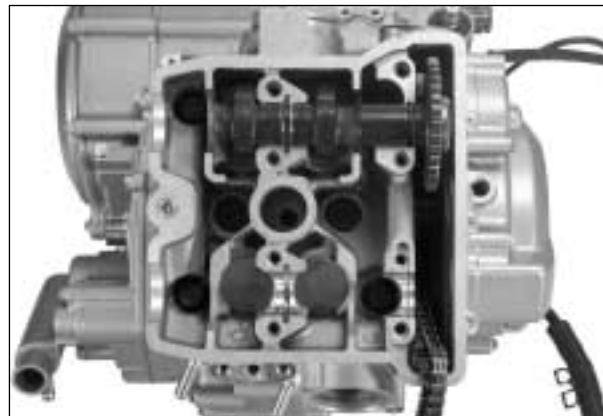
If the camshaft journal oil clearance exceeds the service limit, measure the inside diameter of the camshaft housing and outside diameter of the camshaft journal. Replace the camshaft or the cylinder head and camshaft housing depending upon which one exceeds the specification.

Camshaft housing I.D	Standard
IN.	22.012 ~ 22.025 mm
EX.	(0.8666 ~ 0.8671 in)

 **Small bore gauge : 09900-22401**

Camshaft O.D	Standard
IN.	21.959 ~ 21.980 mm
EX.	(0.8645 ~ 0.8654 in)

 **Micrometer(0 ~ 25 mm) : 09900-20201**

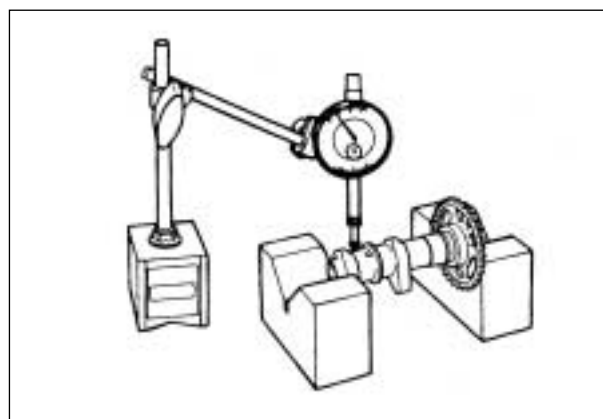


**▣ CAMSHAFT RUNOUT**

Support the valve using a V-blocks and measure the camshaft runout using the dial gauge. If the runout exceeds the service limit, replace the camshaft with a new one.

Camshaft runout	Service limit
	0.10 mm (0.004 in)

 **Dial gauge : 09900-20606**  
**Magnetic stand : 09900-20701**  
**V-block : 09900-21304**



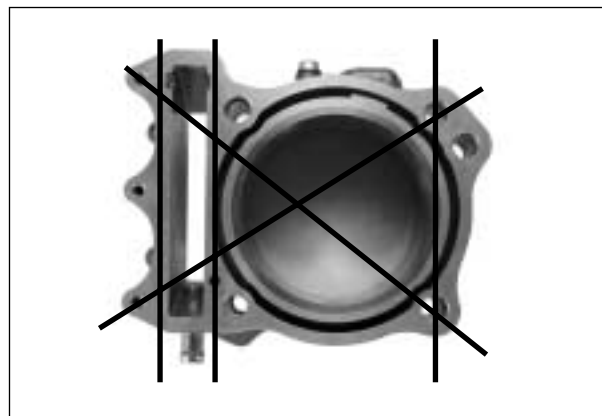
## CYLINDER

### ▣ CYLINDER DISTORTION

Check the gasketed surface of the cylinder for distortion using a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straight-edge exceeds the limit, replace the cylinder.

Cylinder distortion	Service limit
	0.05 mm (0.002 in)

 Thickness gauge : 09900-20806

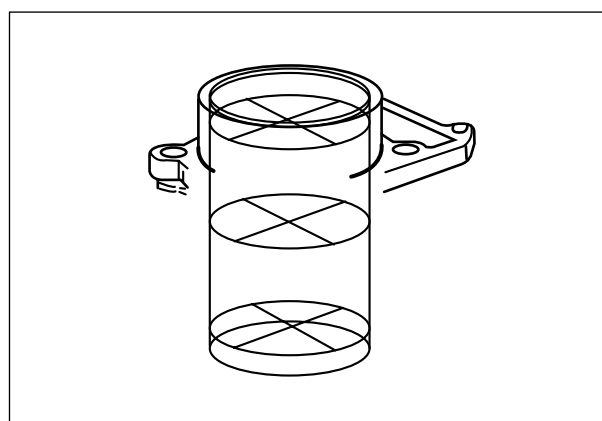


### ▣ CYLINDER BORE

Measure the cylinder bore diameter at six places. If any one of the measurements exceeds the limit, overhaul the cylinder and replace the cylinder.

Cylinder bore	Standard	Service limit
	96.000~96.015 mm (3.7795~3.7801 in)	96.075 mm (3.7825 in)

 Cylinder gauge set : 09900-20508

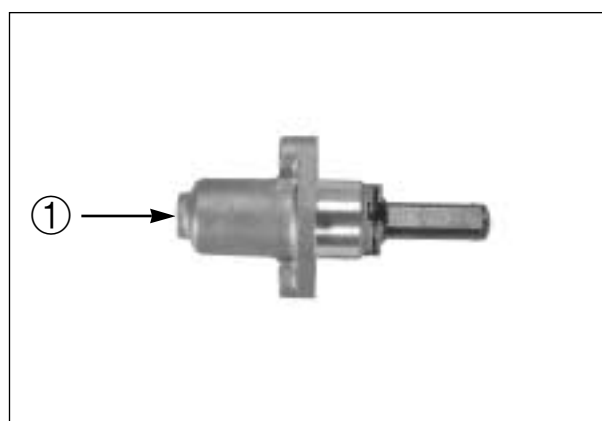


## CAM CHAIN TENSION ADJUSTER AND TENSIONER

### ▣ CAM CHAIN TENSION ADJUSTER

Check that the push rod slides smoothly with the lock shaft handle ① clockwise.

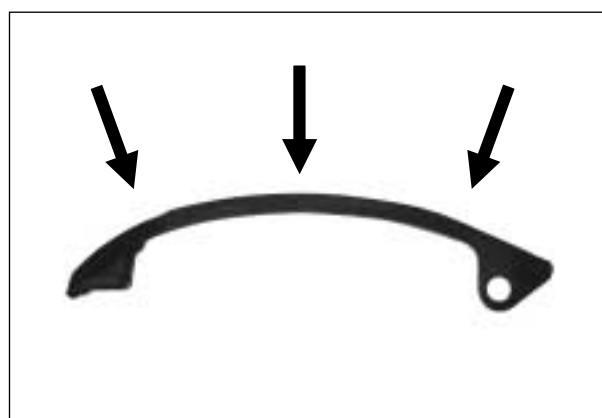
If it does not slide smoothly, replace the cam chain tension adjuster with a new one.



### ▣ CAM CHAIN TENSIONER

Check the contacting surface of the cam chain tensioner.

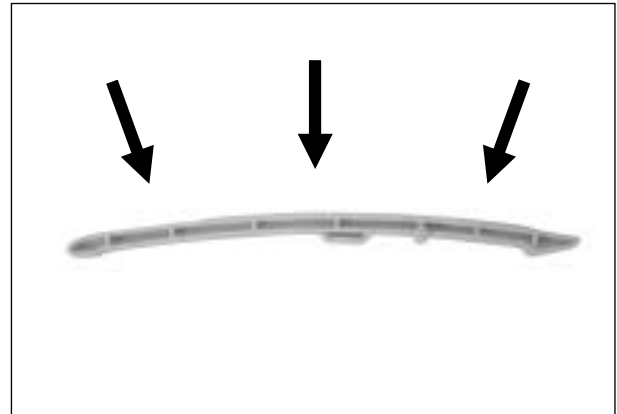
If it is worn or damaged, replace it with a new one.



**▣ CAM CHAIN AND CAM CHAIN GUIDE**

Check the cam chain for wear, damage and kinked or binding links. If any defects are found, replace it with a new one.

Check the cam chain guide for wear and damage. If it is found to be damaged, replace it with a new one.

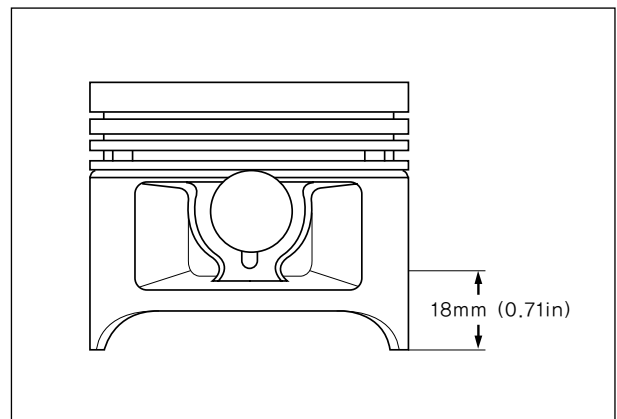


**PISTON AND PISTON RING**

**▣ PISTON DIAMETER INSPECTION**

Measure the outside diameter of piston in the direction perpendicular to the piston pin axis at the height from the skirt as shown in the illustration using a micrometer.

If the measurement is found less than the service limit, replace the piston.

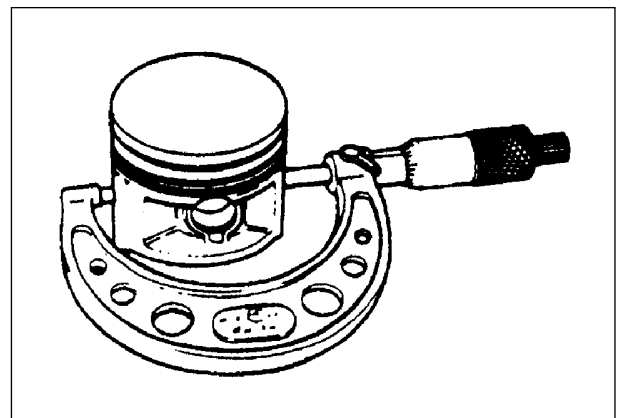


	Service limit
<b>Piston diameter</b>	95.88 mm (3.7748 in)

 **Micrometer(75~100 mm) : 09900-20204**

**▣ PISTON-TO-CYLINDER CLEARANCE**

To determine the piston-to-cylinder clearance, calculate the difference between the cylinder bore and outside diameter of the piston.

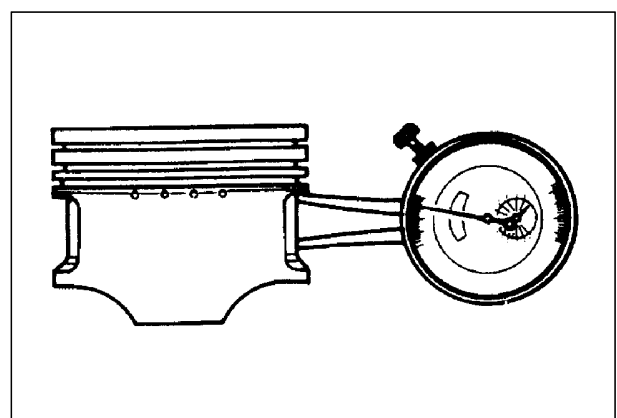


	Standard	Service limit
<b>Piston-to-cylinder clearance</b>	0.050~0.060 mm (0.0020~0.0024 in)	0.120 mm (0.0048 in)

**▣ PISTON PIN HOLE BORE**

Using a dial calipers, measure the piston pin hole bore both the vertical and horizontal directions.

If the measurement exceeds the service limit, replace the piston with a new one.



	Service limit
<b>Piston pin hole bore</b>	19.030 mm (0.7492 in)


 **Dial calipers : 09900-20605**

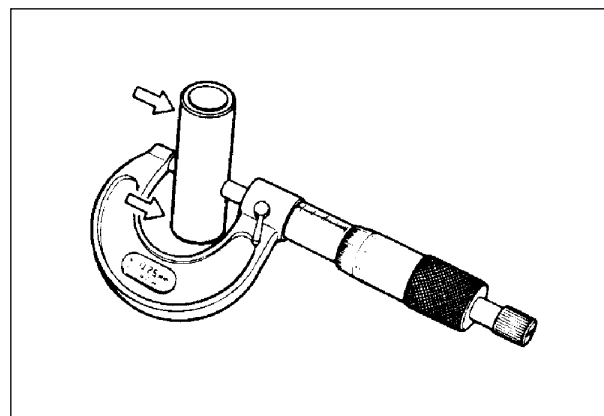
### ▣ PISTON PIN DIAMETER INSPECTION

Using a micrometer, measure the piston pin outside diameter at three position, both the ends and the center.

If any of the measurements is found less than the service limit, replace the pin with a new one.

Piston pin diameter	Service limit
	18.980 mm (0.7472 in)

 Micrometer(0~25 mm) : 09900-20201

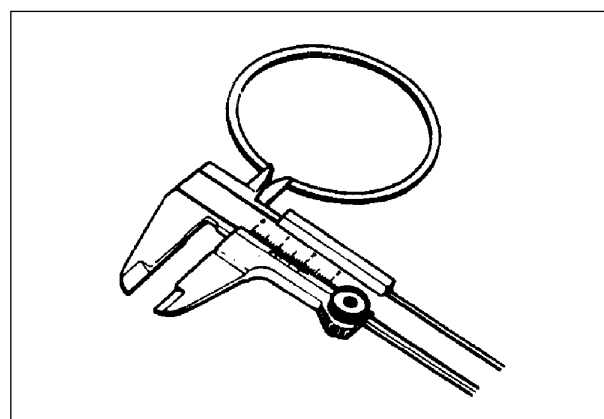


### ▣ PISTON RING FREE END GAP INSPECTION

Before installing piston rings, measure the free end gap of each ring using vernier calipers. If the gap is less than the service limit, replace the ring.

Piston ring free end gap	Standard
1st	Approx 11 mm (0.433 in)
2nd	Approx 10 mm (0.394 in)

 Vernier calipers : 09900-20101



### ▣ PISTON RING END GAP INSPECTION (Assembly condition)

Insert the piston ring squarely into the cylinder using the piston head.

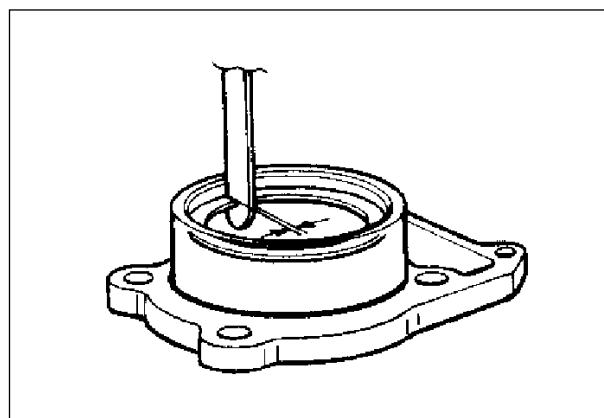
Measure the end gap with a thickness gauge.

If the gap exceeds the service limit, replace the piston ring with a new one.

Piston ring end gap (Assembly condition)	Standard
1st	0.25 ~ 0.40 mm (0.010 ~ 0.016 in)
2nd	0.40 ~ 0.55 mm (0.016 ~ 0.022 in)

Piston ring end gap(Assembly condition)	Service limit
1st	0.5 mm (0.020 in)
2nd	0.7 mm (0.028 in)

 Thickness gauge : 0990-20806





### ▣ PISTON RING-TO-GROOVE CLEARANCE INSPECTION

Remove carbon deposit both from the piston ring and its groove.


Fit the piston ring into the groove. With the ring compressed and lifted up, measure the clearance on the bottom side of the ring using a thickness gauge.

If any clearance reading exceeds the service limit, replace both the piston and piston rings.

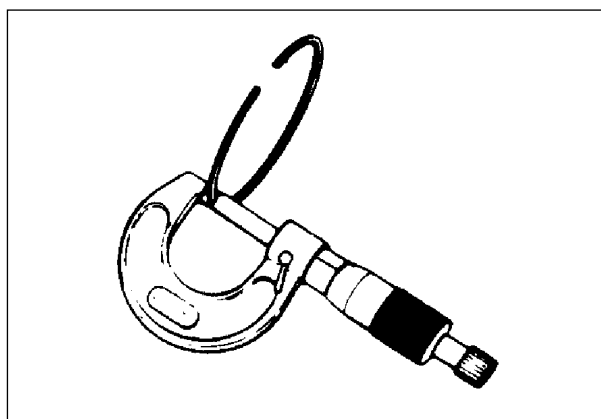
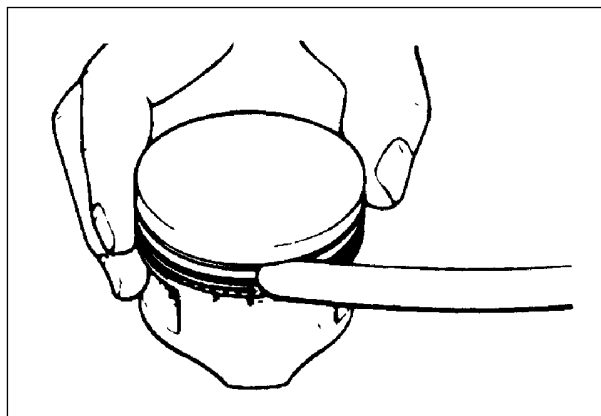
Piston ring-groove clearance	Service limit
1st	0.150 mm (0.006 in)
2nd	0.150 mm (0.006 in)

Piston ring groove width	Standard
1st	1.21~1.23 mm (0.0476~0.0484 in)
2nd	1.01~1.03 mm (0.040~0.041 in)
Oil	2.01~2.03 mm (0.079~0.080 in)

Piston ring thickness	Standard
1st	1.170~1.190 mm (0.0461~0.0469 in)
2nd	0.970~0.990 mm (0.0382~0.0390 in)

 Micrometer(0~25 mm) : 09900-20201

Thickness gauge : 09900-20806



## CONROD

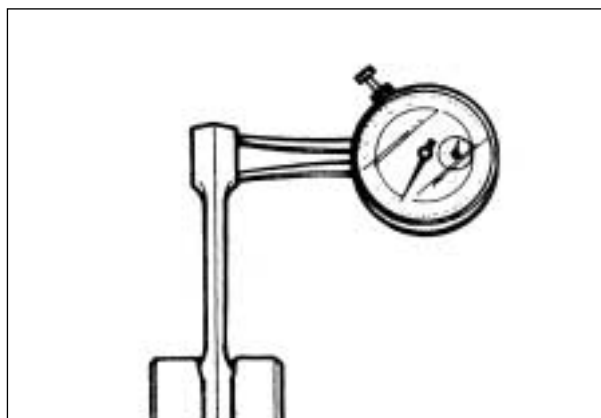
### ▣ CONROD SMALL END INSIDE DIAMETER INSPECTION

Using a dial calipers, measure the conrod small end inside diameter both in vertical and horizontal directions.

If any of the measurements exceeds the service limit, replace the conrod.

Conrod small end I.D.	Standard	Service limit
	19.006~19.014 mm (0.7483~0.7486 in)	19.040 mm (0.7496 in)

 Dial calipers : 09900-20605



### ▣ CONROD DEFLECTION INSPECTION

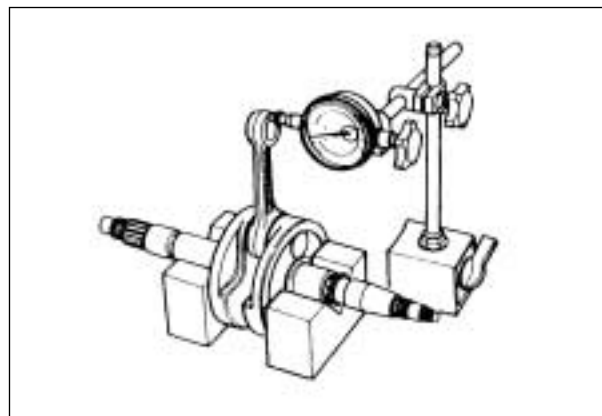
Wear on the big end of the conrod can be estimated by checking the movement of the small end of the rod. Turn the conrod and see if it moves smoothly without play and noise. This method can also be used to check the extent of wear on the parts of the conrod's big end.

Conrod deflection	Service limit
	3.0mm (0.12 in)

 Dial gauge : 09900-20606

Magnetic stand : 09900-20701

V-block : 09900-21304

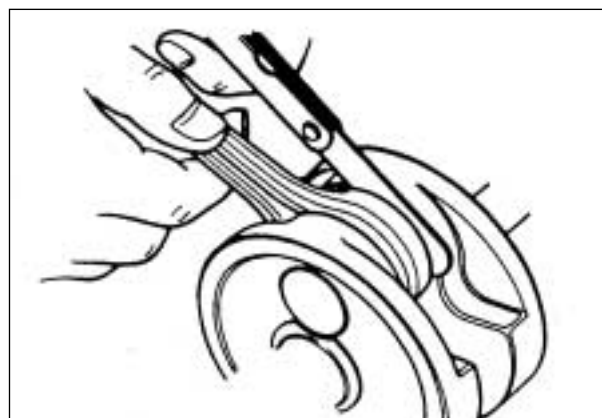


### ▣ CONROD BIG END SIDE CLEARANCE INSPECTION

Push the big end of the conrod to one side and measure the side clearance using a thickness gauge. If the clearance exceeds the service limit, replace the crankshaft assembly with a new one or bring the deflection and the side clearance within the service limit by replacing the worn parts (conrod, big end bearing, crankshaft, crank pin, etc.) with new ones.

Conrod big end side clearance	Standard	Service limit
	0.10~0.65 mm (0.004~0.026 in)	1.0 mm (0.040 in)

 Thickness gauge : 09900-20806



## CRANKSHAFT

### ▣ CRANKSHAFT RUNOUT INSPECTION

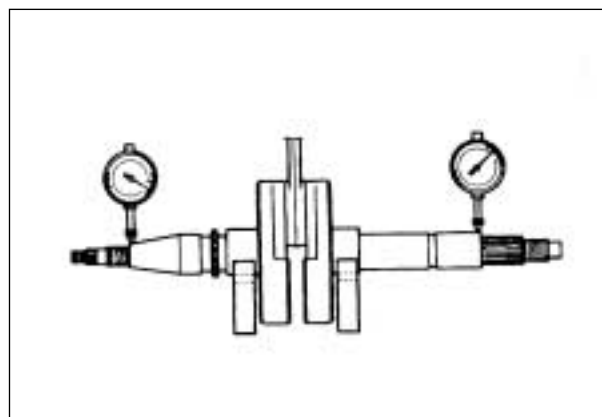
With the right and left crank journals supported using a V-block, turn the crankshaft slowly. At this time, measure the crankshaft end runout using a dial gauge. If the runout exceeds the service limit, replace the crankshaft with a new one.

Crankshaft runout	Service limit
	0.05 mm (0.002 in)

 Dial gauge : 09900-20606

Magnetic stand : 09900-20701

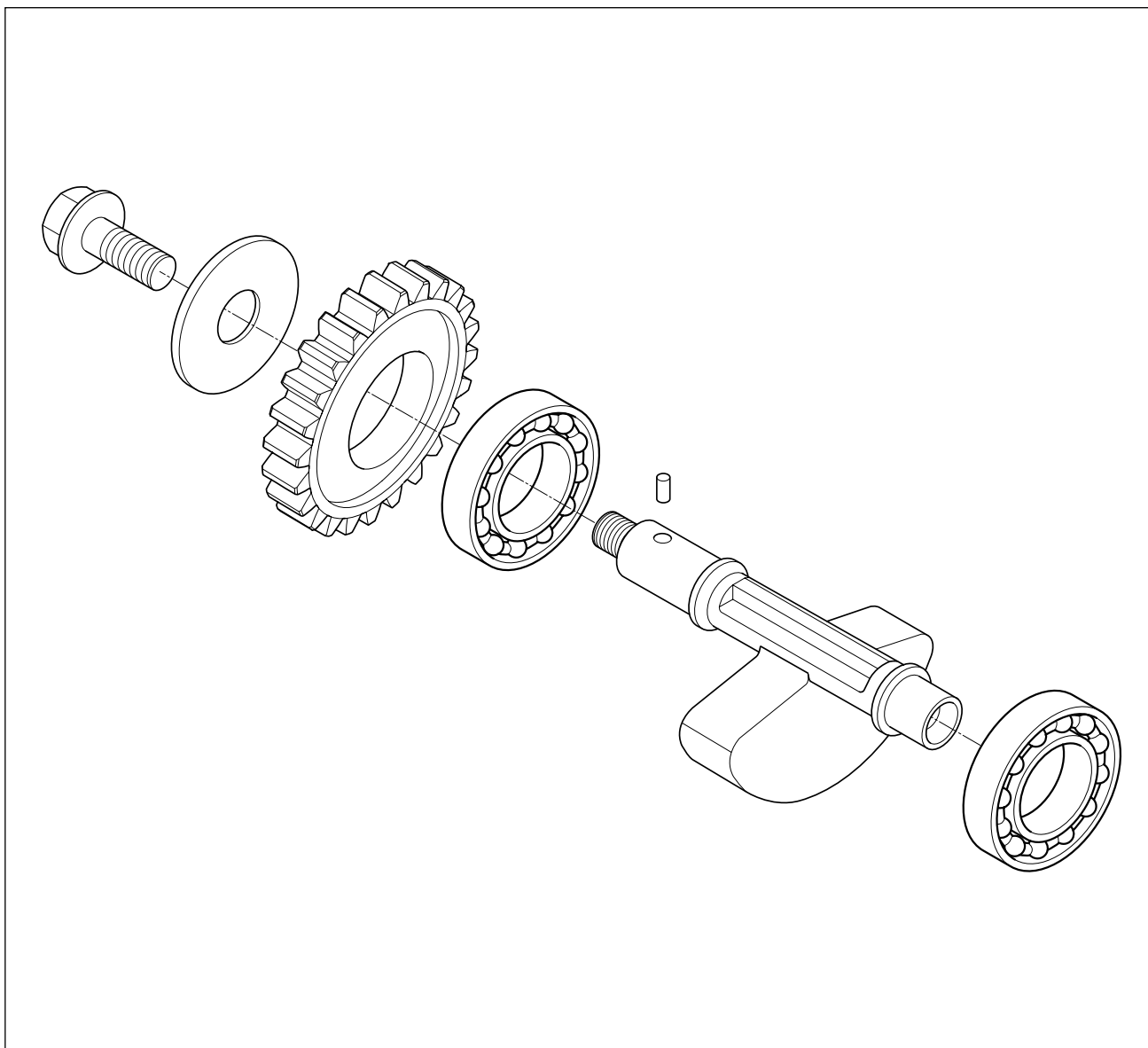
V-block : 09900-21304



## CRANK BALANCER AND BALANCER DRIVE GEAR

### ▣ DISASSEMBLY

- Disassemble the crank balancer and balancer drive gear as shown in the illustration.

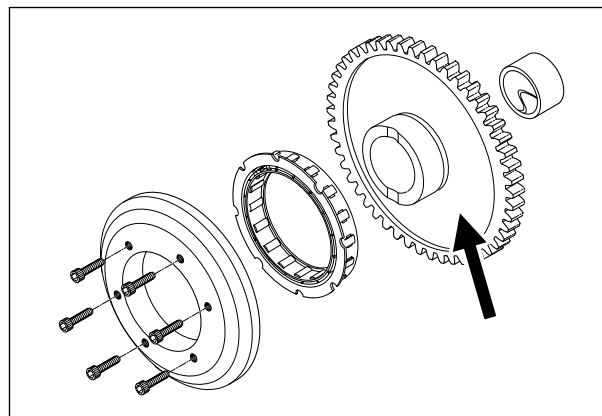


### ▣ REASSEMBLY

Reassemble the crank balancer and balancer drive gear in the reverse order of disassembly.

## ◎ STARTER CLUTCH

Install the starter driven gear onto the starter clutch and turn the starter driven gear by hand (the gear turns in only one direction). The starter driven gear should turn smoothly. If excessive resistance is felt while turning the starter driven gear, inspect the starter clutch. Also, inspect the surface of the starter driven gear which contacts the starter clutch, for wear or damage. If any wear or damage is found, replace the defective parts.



## ▣ DISASSEMBLY

- With the magneto rotor held immovable, remove the starter clutch bolts.



## ▣ REASSEMBLY

- Apply a small quantity of THREAD LOCK "1324" to the starter clutch bolts and tighten them to the specified torque with the magneto rotor held immovable.

 **THREAD LOCK "1324"**

 **Starter clutch bolt**

: 23~28 N · m (2.3~2.8 kgf · m)



## CLUTCH

### CLUTCH DRIVE PLATES

Measure the thickness and claw width of the clutch drive plates using a vernier calipers. If a clutch drive plate is not within the service limit, replace the clutch plates as a set.

Clutch drive plate thickness	Standard	
	NO.1	2.92~3.08 mm (0.115~0.121 in)
	NO.2	3.42~3.58 mm (0.135~0.141 in)

Clutch drive plate thickness	Service limit	
	NO.1	2.62 mm (0.103 in)
	NO.2	3.12 mm (0.123 in)

Clutch drive plate claw width	Standard	
	NO.1	15.9~16.0 mm (0.626~0.630 in)
	NO.2	15.9~16.0 mm (0.626~0.630 in)

Clutch drive plate claw width	Service limit	
	NO.1	15.1 mm (0.595 in)
	NO.2	15.1 mm (0.595 in)

 Vernier calipers : 09900-20101

### CLUTCH DRIVEN PLATES

Measure each clutch driven plate for distortion using the thickness gauge. If a clutch driven plate is not within the service limit, replace the clutch plates as a set.

Clutch driven plate distortion	Service limit
	0.1 mm (0.004 in)

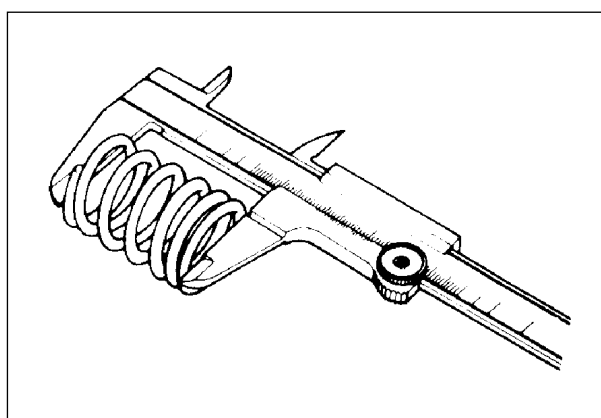
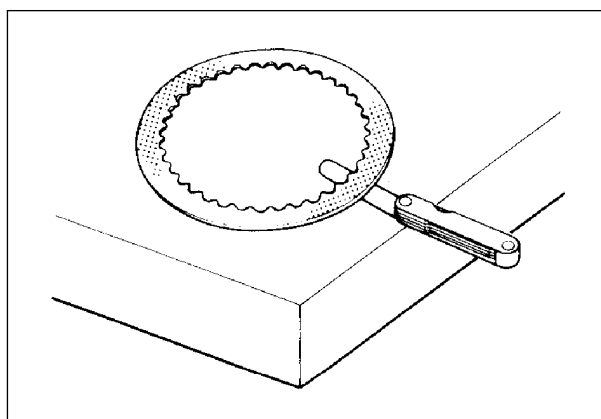
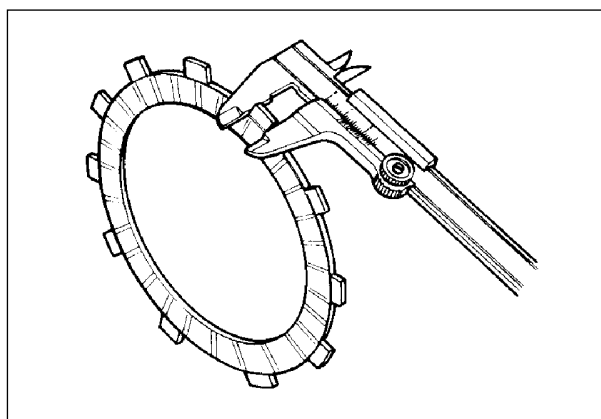
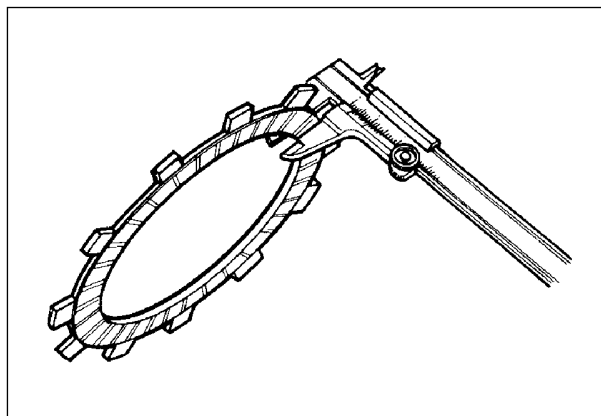
 Thickness gauge : 09900-20806

### CLUTCH SPRING FREE LENGTH

Measure the free length of each clutch spring using a vernier calipers. If any spring is not within the service limit, replace all of the spring with new ones.

Clutch spring free length	Service limit
	51.6 mm (2.032 in)

 Vernier calipers : 09900-20101

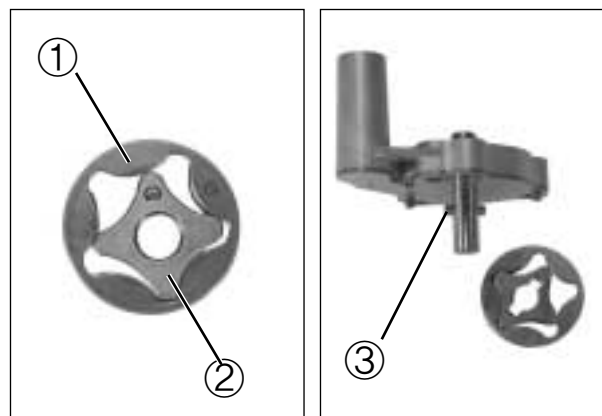


## OIL PUMP

- Remove the outer rotor ①, inner rotor ② and pin ③.

Inspect the outer rotor ① and inner rotor ② for any scratches or other damage.

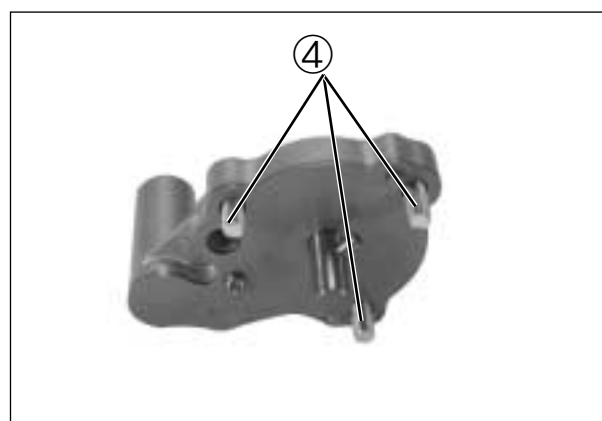
If any damages are found, replace them with new ones.



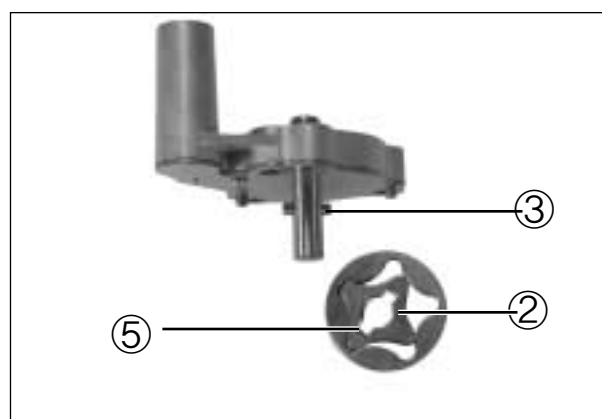
### CAUTION

The oil pump case securing screw ④ is applied with **THREAD LOCK "1324"**. If an attempt is made to overhaul the oil pump assembly, the screw may be damaged. Only the oil pump unit is available as a replacement.

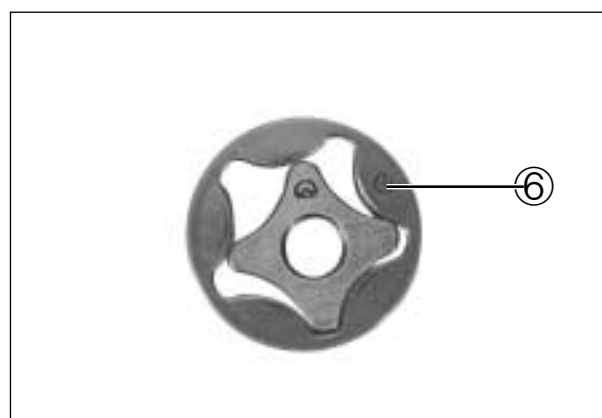
 **THREAD LOCK "1324"**



- Apply engine oil to the sliding surfaces of the oil pump inner rotor, outer rotor and shaft.
- When installing the inner rotor ②, align the pin ③ with the groove ⑤.



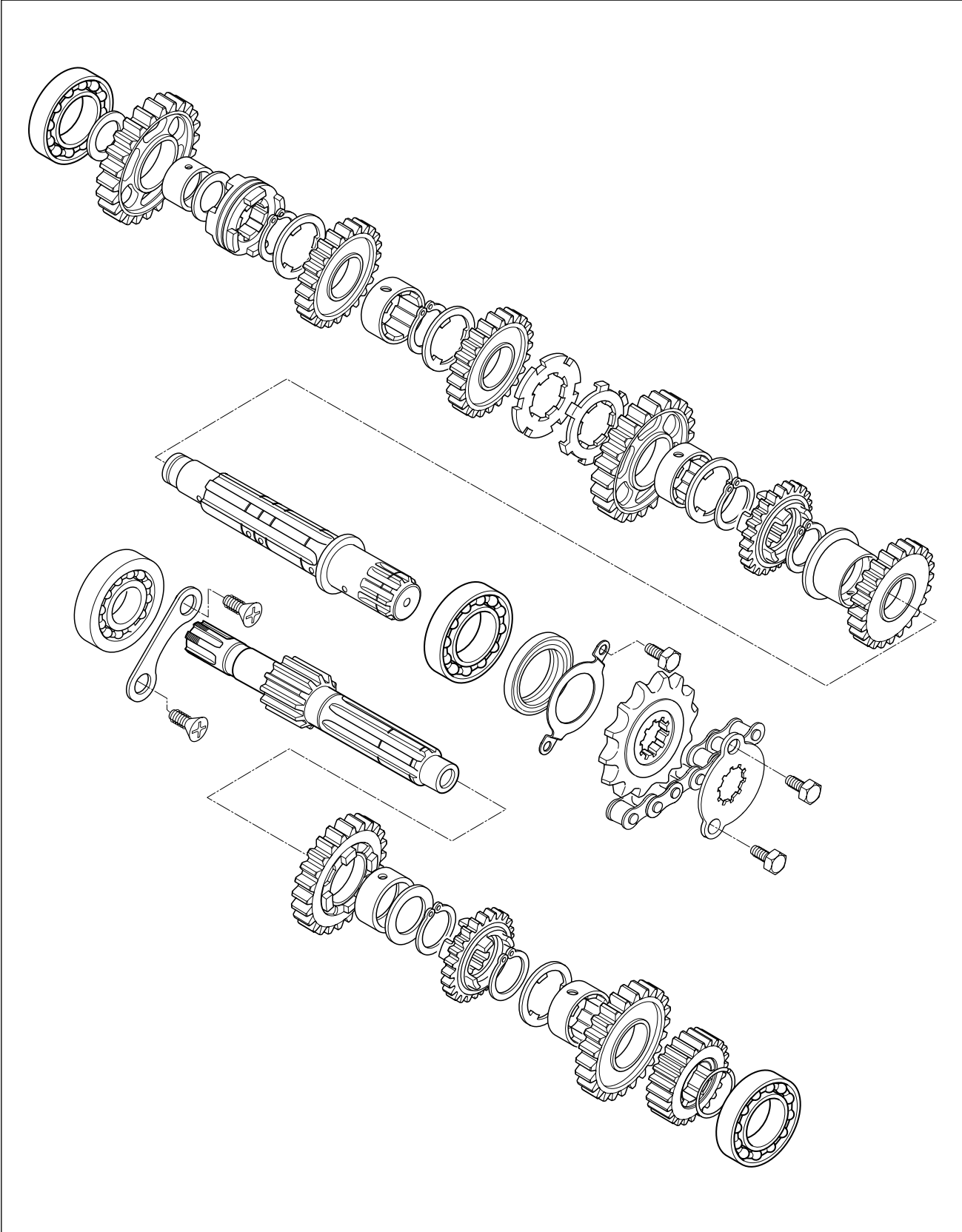
- When installing the outer rotor, face the punched mark ⑥ on the outer rotor to the outside.



# TRANSMISSION

## DISASSEMBLY

Disassemble the transmission gears as shown.



## ▣ INSPECTION

### ◆ GEAR-SHIFTING FORK

Using a thickness gauge, check the clearance between the groove of its gear and shifting fork.

The clearance for each of the three shifting forks plays an important role in the smoothness and positiveness of shifting action.

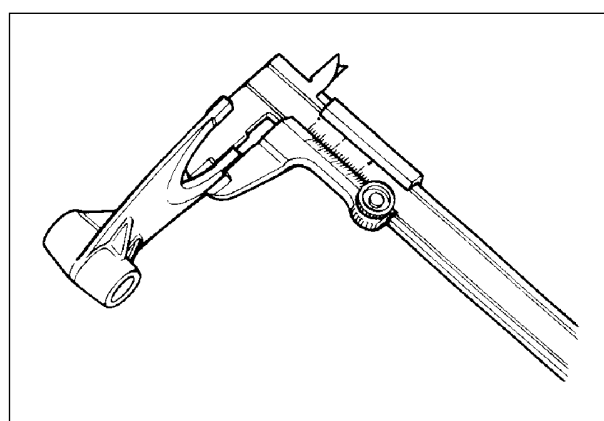
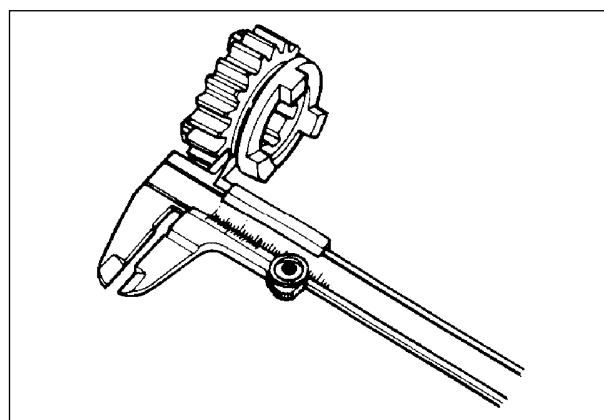
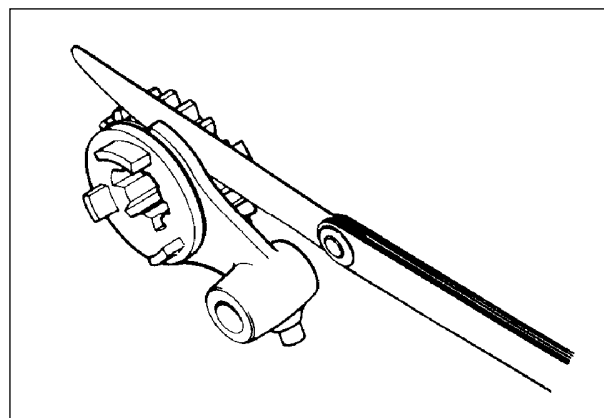
If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

Shift fork to groove clearance	Standard	Service limit
	0.10~0.30 mm (0.004~0.012 in)	0.50 mm (0.020 in)

Shift fork groove width	Standard
NO.1 & NO.2	4.85~5.00 mm (0.191~0.197 in)
NO.3	4.85~5.00 mm (0.191~0.197 in)

Shift fork thickness	Standard
NO.1 & NO.2	5.3~5.4 mm (0.209~0.213 in)
NO.3	5.3~5.4 mm (0.209~0.213 in)

 Vernier calipers : 09900-20101  
Thickness gauge : 09900-20806





### REASSEMBLY

Reassemble the transmission in the reverse order of disassembly. Pay attention to following points :

#### NOTE

*Before installing the gears, coat lightly engine oil to the inner surface of each gear and bushing.*

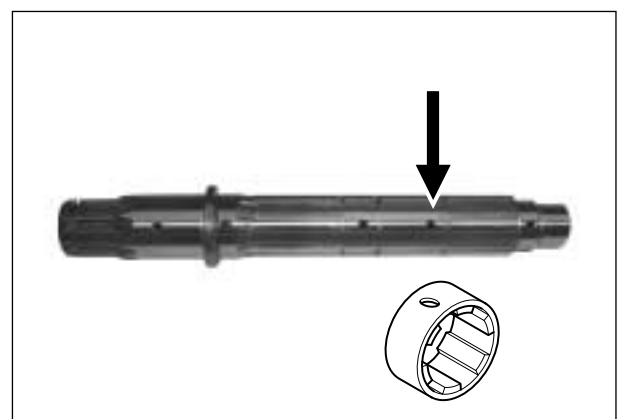
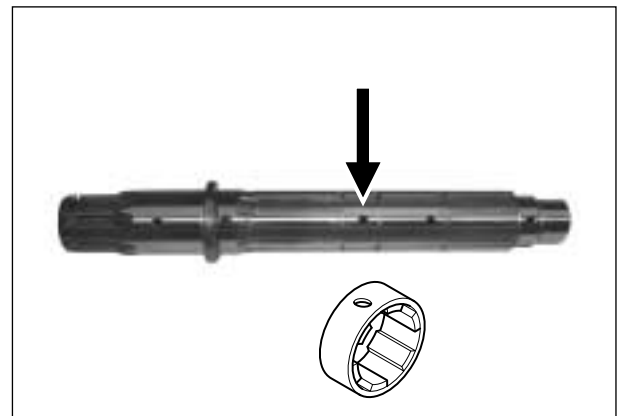
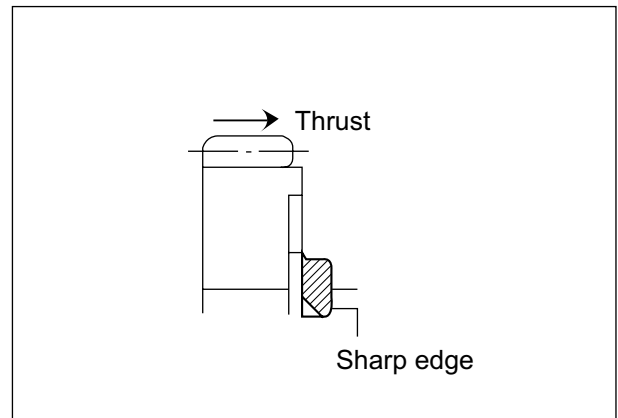
#### CAUTION

- ❖ Never reuse a circlip. After a circlip has been removed from a shaft, it should be discarded and a new circlip must be installed.
- ❖ When installing a new circlip, care must be taken not to expand the end gap larger than required to slip the circlip over the shaft.
- ❖ After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.

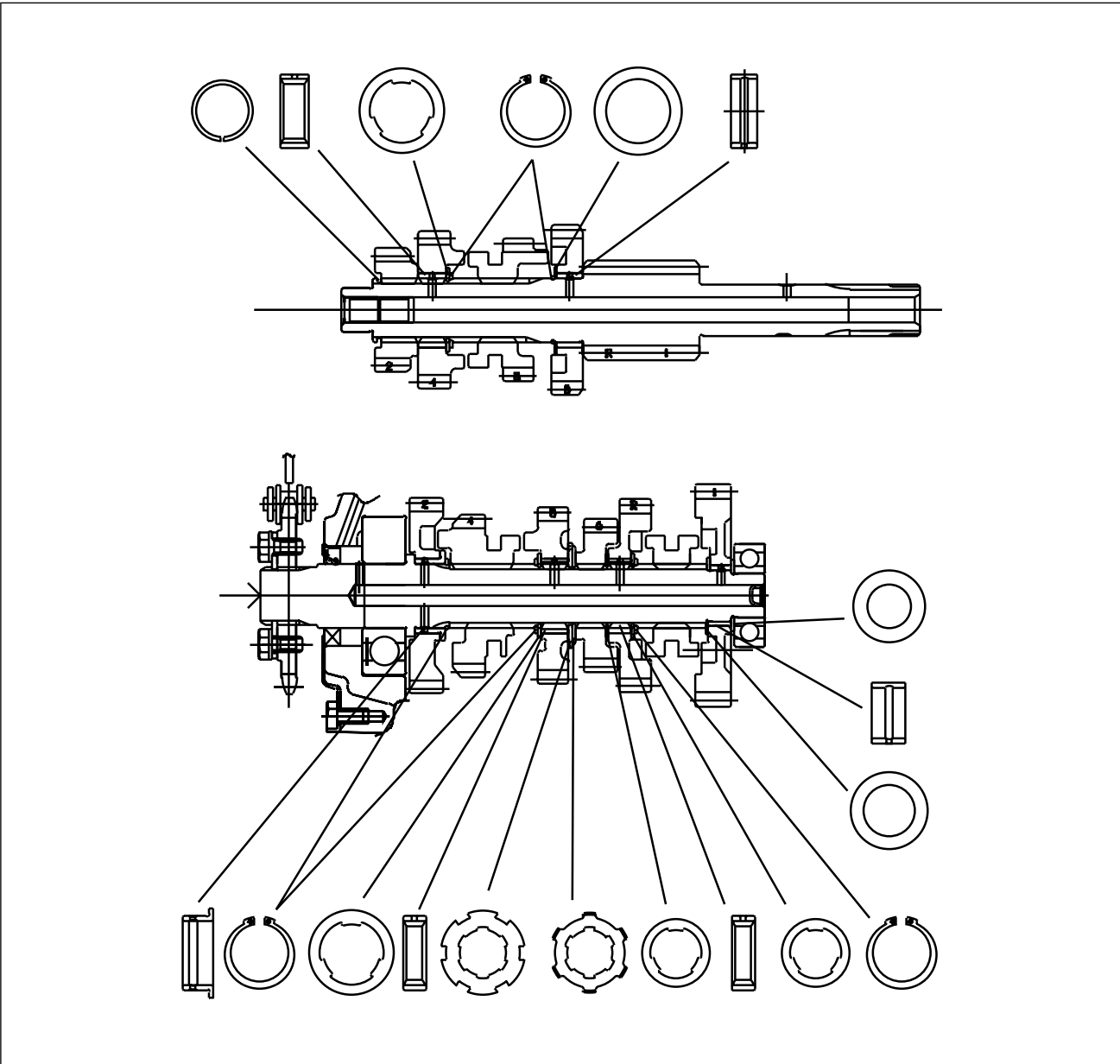
- When installing a new circlip, pay attention to the direction of the circlip. Fit it to the side where the thrust is as shown in figure.

- When installing the third drive gear bushing, align the its oil hole with the driveshaft oil hole.

- When installing the reverse driven gear bushing, align the its oil hole with the driveshaft oil hole.



TRANSMISSION GEARS AND RELATED PARTS



CRANKCASE

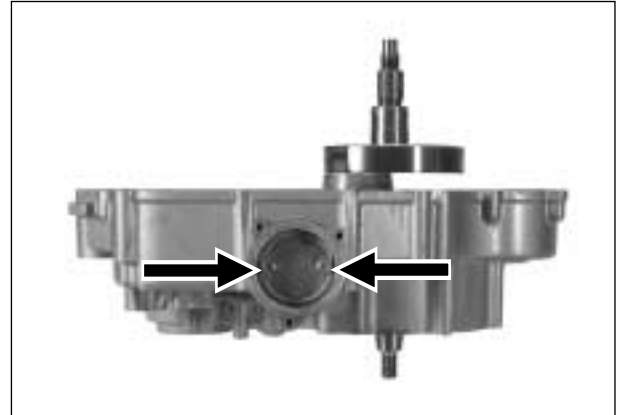
OIL STRAINER CAP

- Remove the oil strainer cap.



## 3-41 ENGINE

- Remove the oil strainer screw.

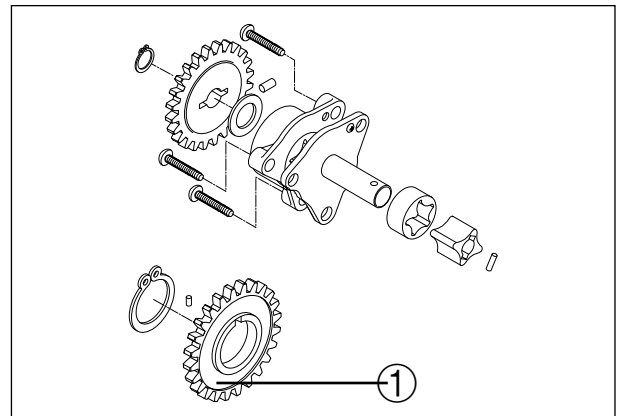


- Clean the oil strainer using compressed air.



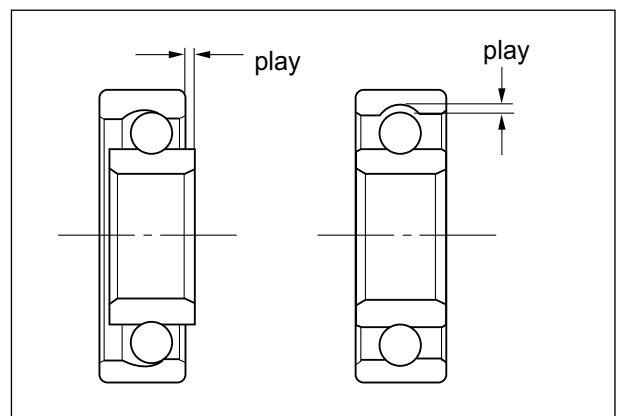
### ▣ OIL PUMP DRIVE GEAR

- Remove the oil pump drive gear ①.



### ▣ BEARING INSPECTION

Wash the bearing with a cleaning solvent and lubricate it with motor oil before inspection. Rotate the inner race and check to see that it turns smoothly. If it does not turn quietly and smoothly, or if there are signs of any abnormalities, the bearing is defective and must be replaced with a new one as follows.



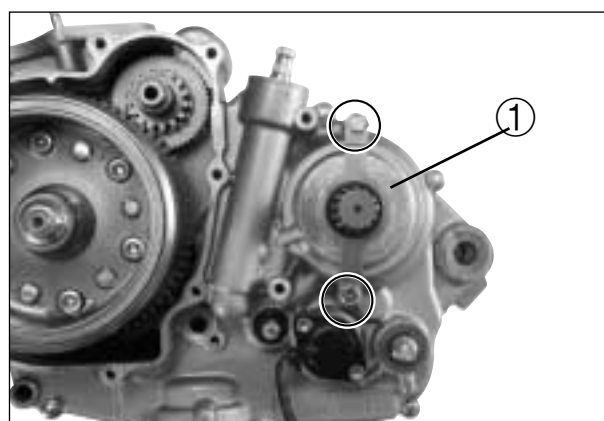
### ▣ OIL SEAL INSPECTION

Damage to the lip of the oil seal may result in leakage of the engine oil. Inspect the oil seal for wear or damage. If any damages are found, replace the oil seal with a new one.



### ▣ OIL SEAL REMOVAL

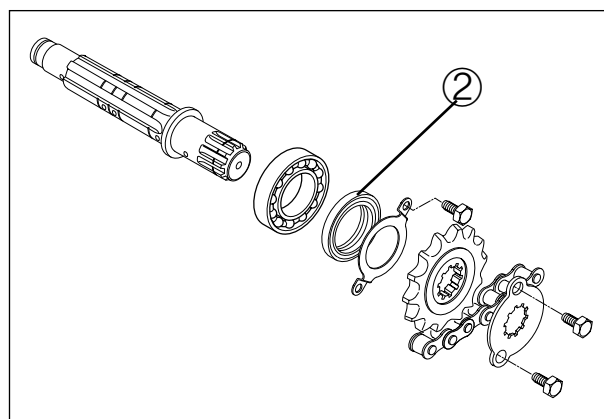
- Remove the oil seal retainer ①.



- Remove the oil seal ②.

### ⚠ CAUTION

Replace the removed oil seals with new ones.



### ▣ OIL SEAL INSTALLATION

- Install the oil seals into the crankcase. Pay attention to the following points :
- Apply SUPER GREASE "A" to the lip of the oil seals.

#### SUPER GREASE "A"

- Install the new oil seals.

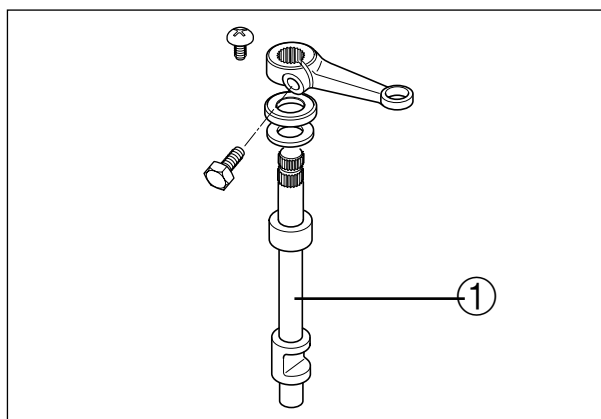
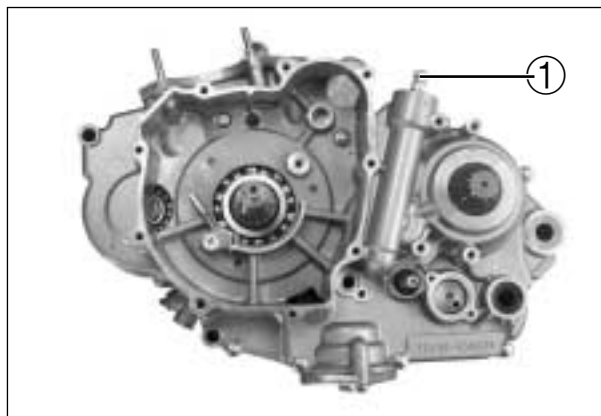


## 3-43 ENGINE

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### ▣ CLUTCH RELEASE CAMSHAFT

- Remove the clutch release camshaft①.



- Install the clutch release camshaft correctly.

## CLUTCH COVER

### ▣ OIL FILTER

☞ Refer to page 2-11

### ▣ WATER PUMP

☞ Refer to page 5-11

## ENGINE REASSEMBLY

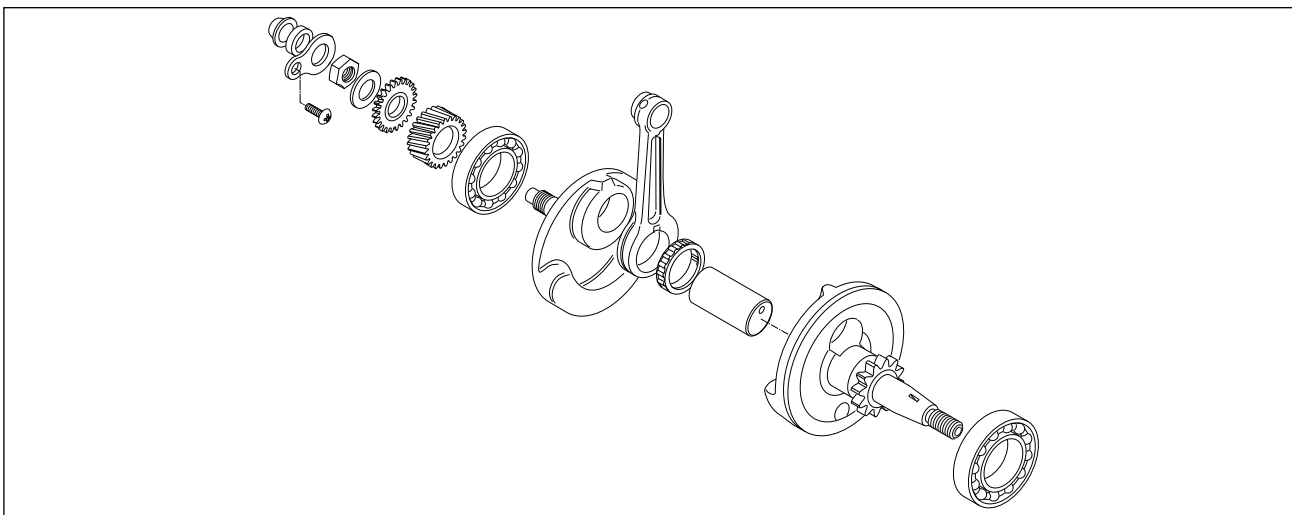
Reassemble the engine in the reverse order of disassembly.

Pay special attention to the following points :

### NOTE

*Apply engine oil to each running and sliding part before reassembling the engine.*

### ⊙ CRANKSHAFT

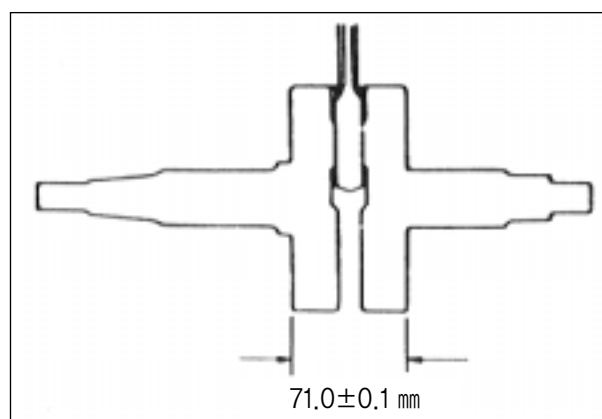


- Determine the width between the webs referring to the figure when rebuilding the crankshaft.

Width between webs	Standard
	$71.0 \pm 0.1$ mm ( $2.795 \pm 0.004$ in)

- When mounting the crankshaft in the crankcase, it is necessary to pull its left end into the crankcase by using the special tools.

 **Crankshaft installer : 09910-32812**



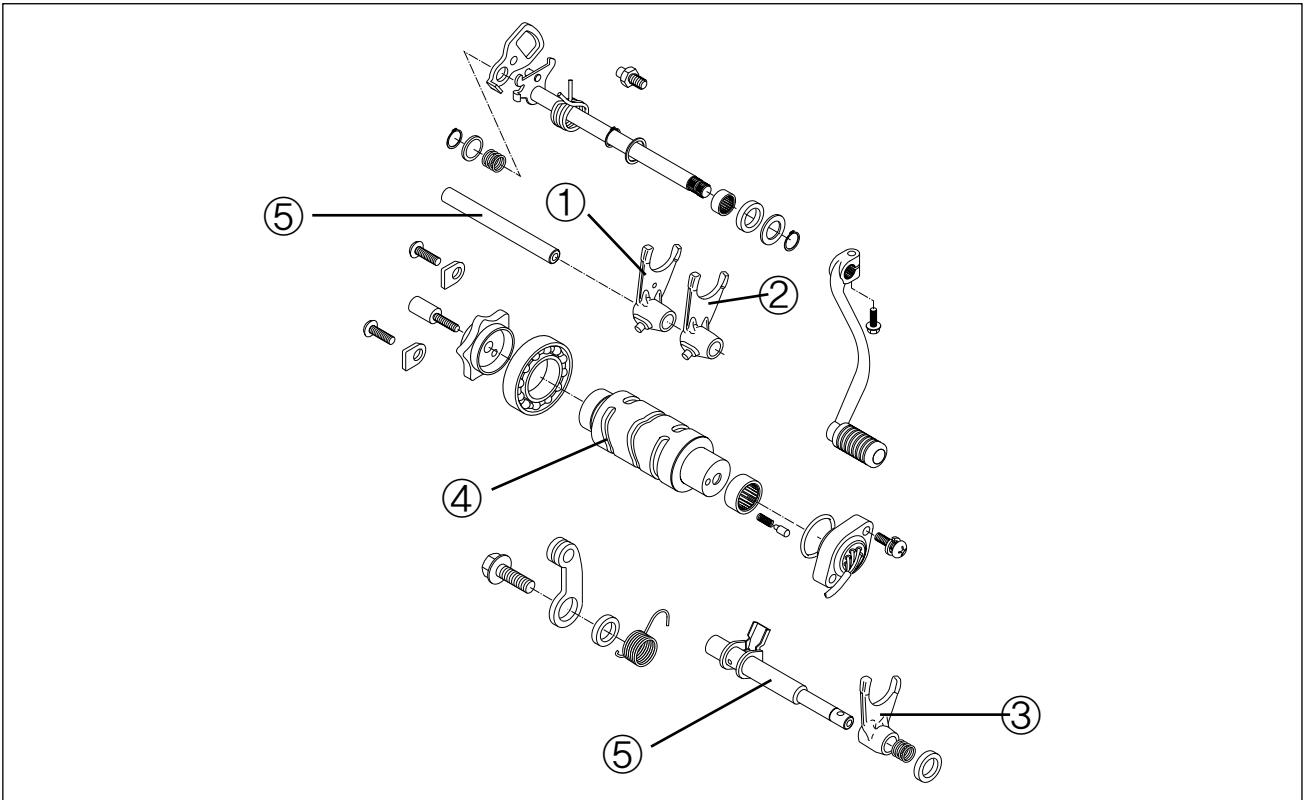
### CAUTION

**Never fit the crankshaft into the crankcase by striking it with a plastic hammer.**

**Always use the special tool, otherwise the accuracy of the crankshaft alignment will be affected.**

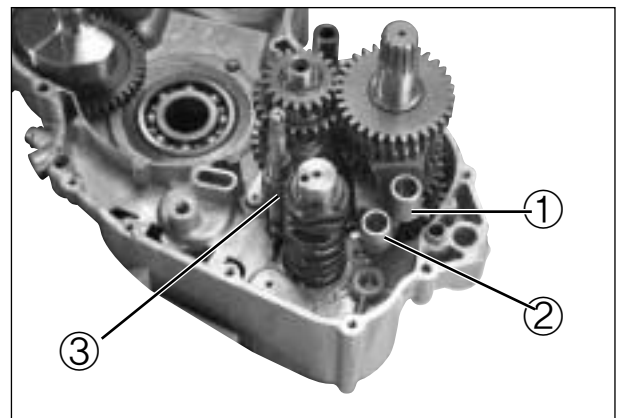


⊙ GEARSHIFT CAM, FORK AND REVERSE LOCK SHAFT



● Install the gearshift forks into the gearshifting grooves in the correct position and direction.

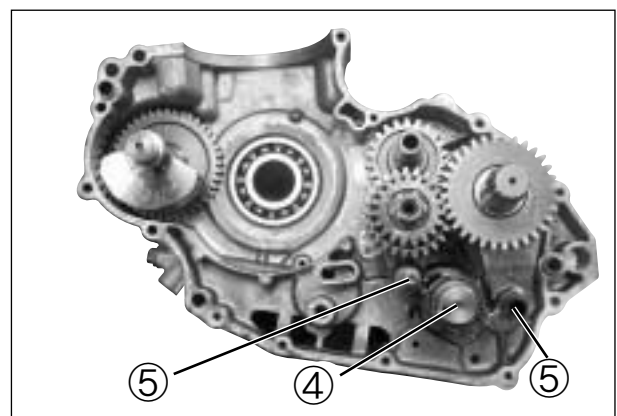
- ① Gearshift fork No. 1
- ② Gearshift fork No. 2
- ③ Gearshift fork No. 3



- Install the gearshift cam ④ .
- Install the gearshift fork shaft ⑤ .

**NOTE**

- ❖ After the gearshift fork shaft and gearshift forks have been fitted, make sure that the gears engage normally.
- ❖ Set the transmission gears to the neutral position.




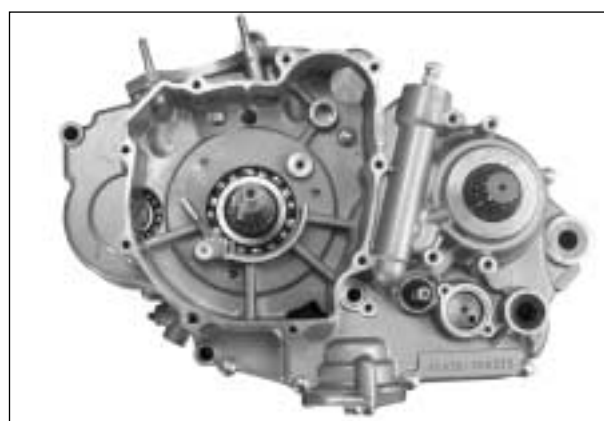
## ⊙ CRANKCASE

- Thoroughly remove the sealant material and oil stains on the mating surface of the right and left crankcases.
- Install the dowel pins ① to the crankcase.
- Apply engine oil to the conrod big end and to the transmission gears.
- Apply BOND "1215" to the mating surface of the crankcase.

 BOND "1215"

- Tighten the crankcase bolts to the specified torque.

 Crankcase bolt : 11 N · m (1.1 kgf · m)




- After the crankcase bolts have been tightened, check if the crankshaft, countershaft, and drive-shaft rotate smoothly. If a large resistance is felt to rotation, try to free the shafts by tapping them with a plastic hammer.

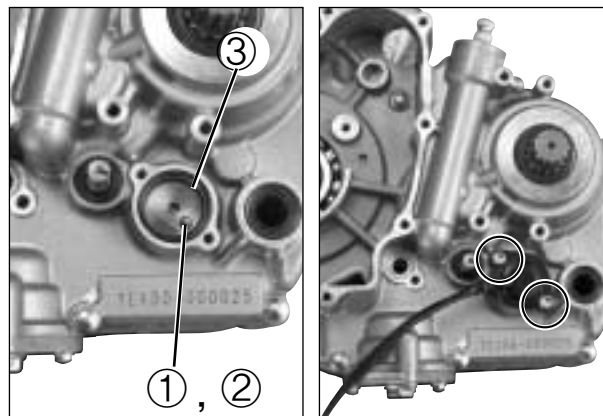




### ⊙ GEAR POSITION SWITCH


- Install the springs ①, contacts ② and new O-ring ③.
- Install the gear position switch and tighten the bolts to the specified torque.

 **Gear position switch bolt**  
: 6.5 N · m (0.65 kgf · m)

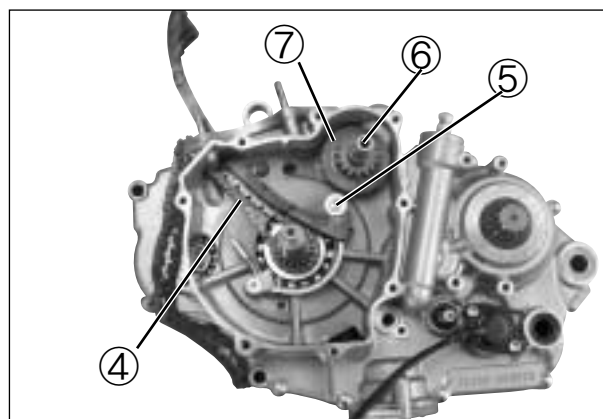


### ⊙ CAM CHAIN

- Install the cam chain ④ onto the sprocket.
- Tighten the cam chain tensioner mounting bolt ⑤ to the specified torque.

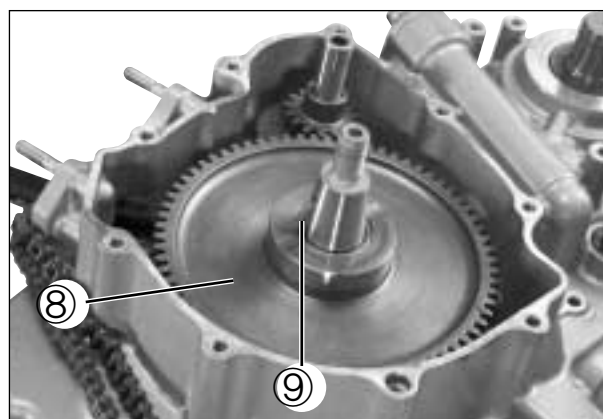
 **Cam chain tensioner mounting bolt**  
: 10 N · m (1.0 kgf · m)

- Install the starter idle shaft ⑥ and starter idle gear ⑦.




### ⊙ STARTER CLUTCH AND MAGNETO ROTOR

- Remove the grease from the tapered portion of the crankshaft and the magneto rotor.
- Install the starter driven gear ⑧ and key ⑨.



- Tighten the magneto rotor nut to the specified torque using the special tool.


 **Magneto rotor nut**  
: 120 N · m (12.0 kgf · m)

 **Conrod holder : 09910-20115**



## ⊙ PRIMARY DRIVE GEAR AND WATER PUMP DRIVE GEAR

- Install the primary drive gear to the crankshaft ① .
- Install the water pump drive gear ② .
- Apply engine oil to the thread and inside surface of the nut.
- With the crankshaft held immovable using the special tool, and then tighten the primary drive gear nut ③ to the specified torque.

 **Primary drive gear nut**  
: 140 N · m (14.0 kgf · m)

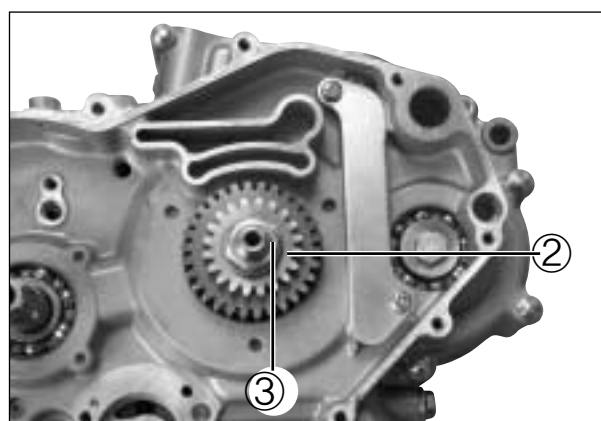
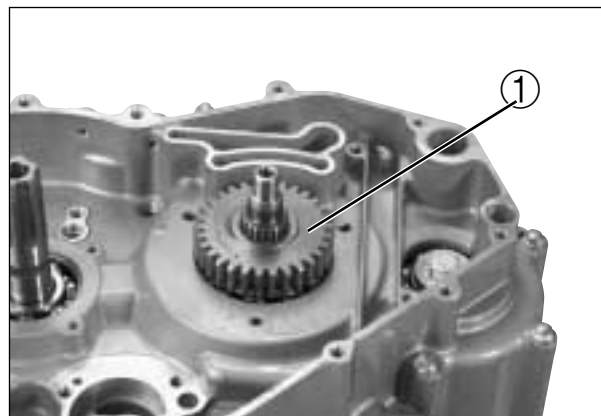
 **Conrod holder** : 09910-20115

### NOTE

*This nut has left-hand thread.*

### CAUTION

Apply engine oil to the primary drive gear nut.

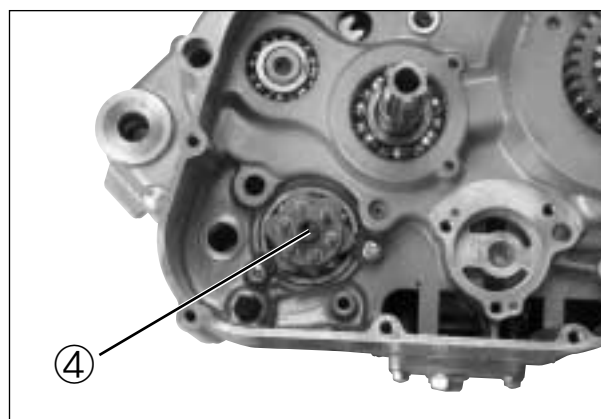


## ⊙ GEARSHIFT CAM STOPPER

- Apply a small quantity THREAD LOCK "1324" to the gearshift cam plate bolt ④ .

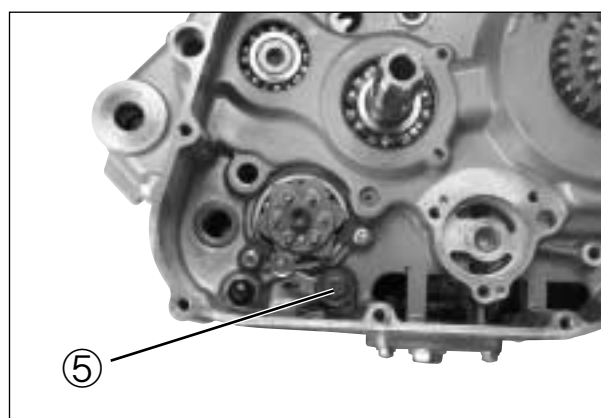
 **THREAD LOCK "1324"**

- Install the gearshift cam plate and gearshift cam plate bolt ④ .



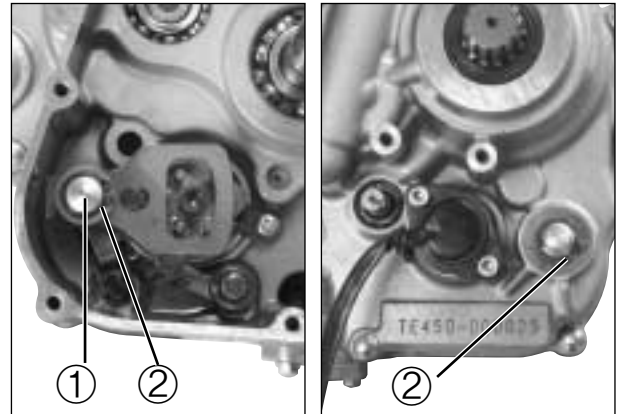
- Install the gearshift cam stopper ⑤ to the specified torque.

 **Gearshift cam stopper**  
: 32 N · m (3.2 kgf · m)



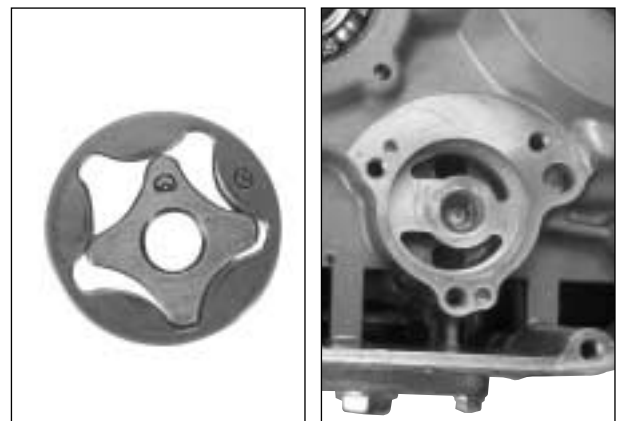
## 3-49 ENGINE

- Install the gearshift shaft ① .
- Install the circlip ② .



### ⊙ OIL PUMP

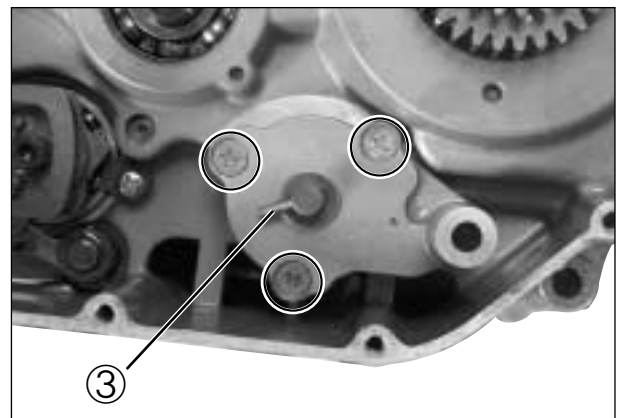
- Before mounting the oil pump, apply engine oil to the sliding surfaces of the oil pump case, outer rotor, inner rotor, and crankcase.



- Apply a small quantity of THREAD LOCK “1324” to the oil pump mounting screws, and then tighten them securely.

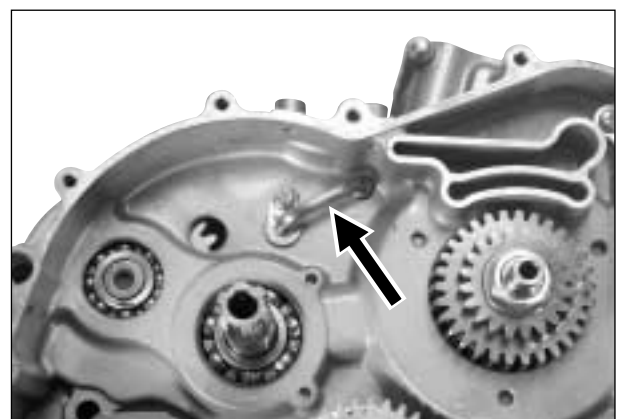
 **THREAD LOCK “1324”**

- When installing the oil pump driven gear, align the pin ③ with the groove.

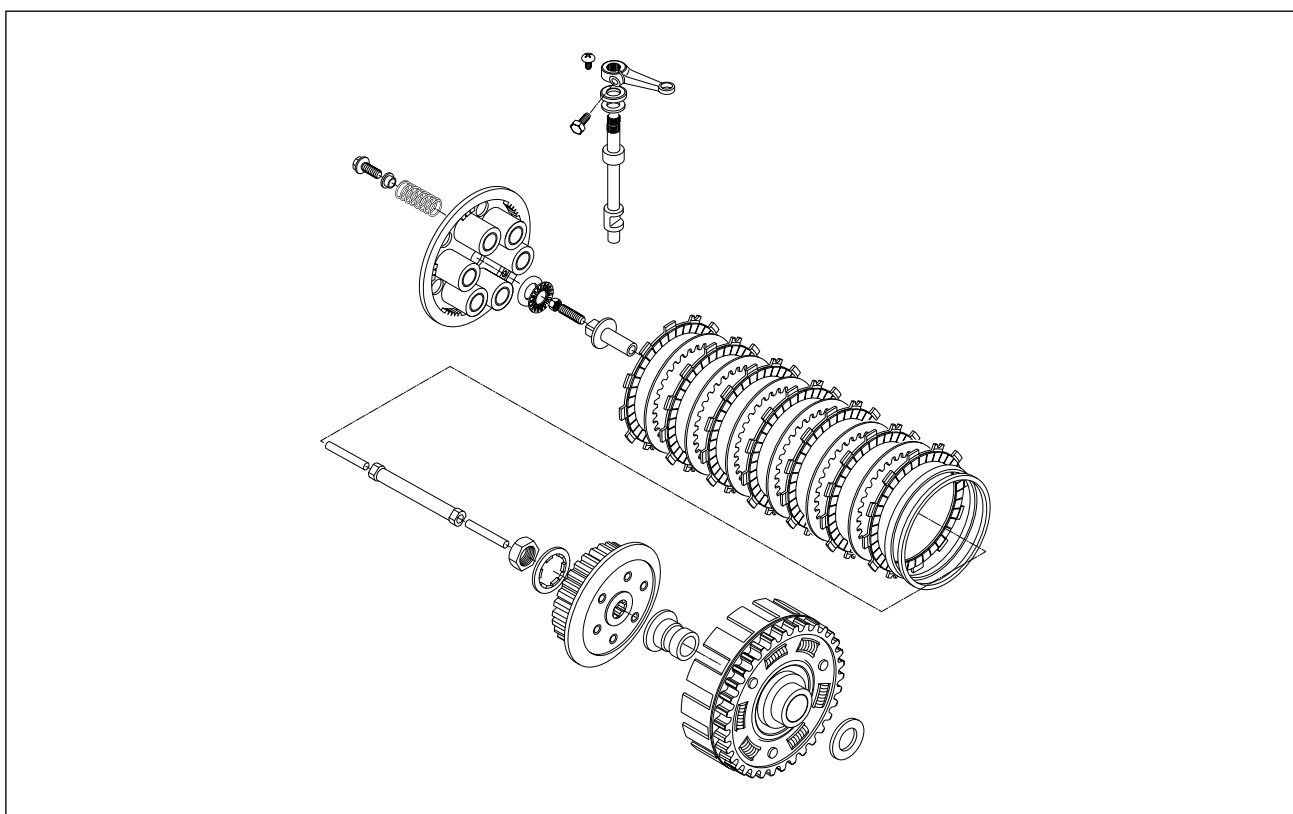


### ⊙ OIL PIPE

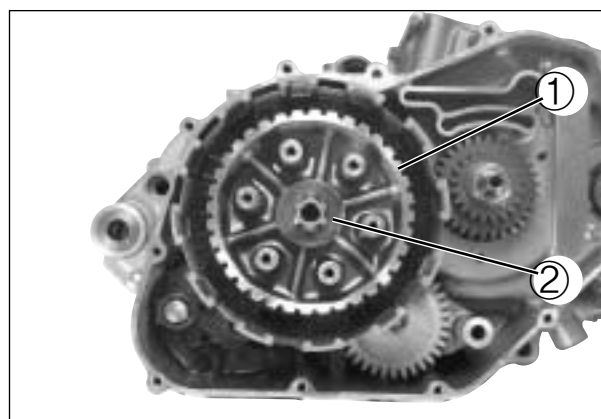
- Apply engine oil to the O-rings.
- Tighten the oil pipe bolt securely.



## ◎ CLUTCH



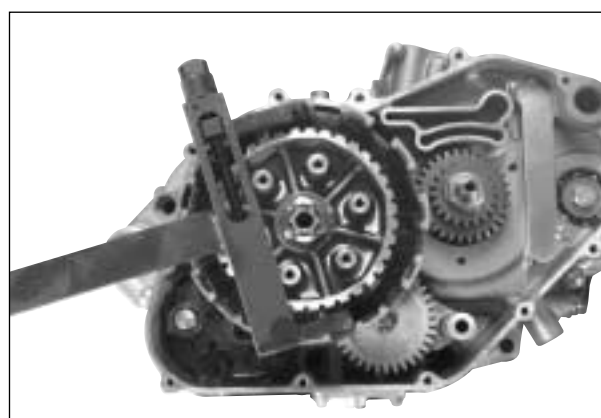
- Install the clutch sleeve hub ①, lock washer ②.



- Hold the clutch sleeve hub using the special tool, and then tighten the clutch sleeve hub nut to the specified torque.

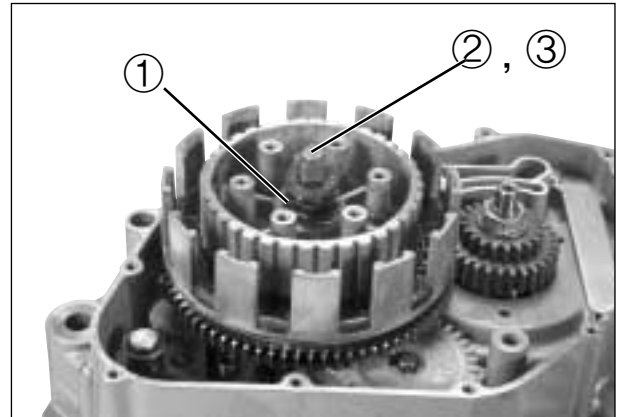
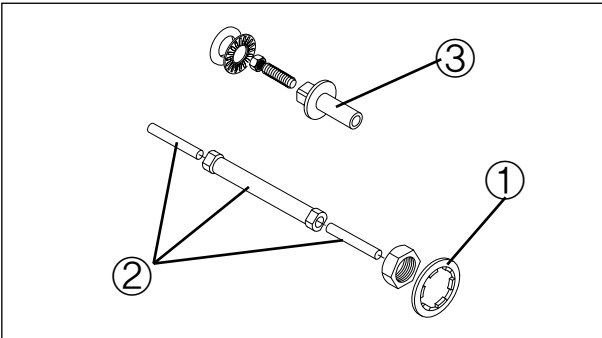
**🔧 Clutch sleeve hub nut**  
: 90 N · m (9.0 kgf · m)

**🧰 Clutch sleeve hub holder : 09920-53710**

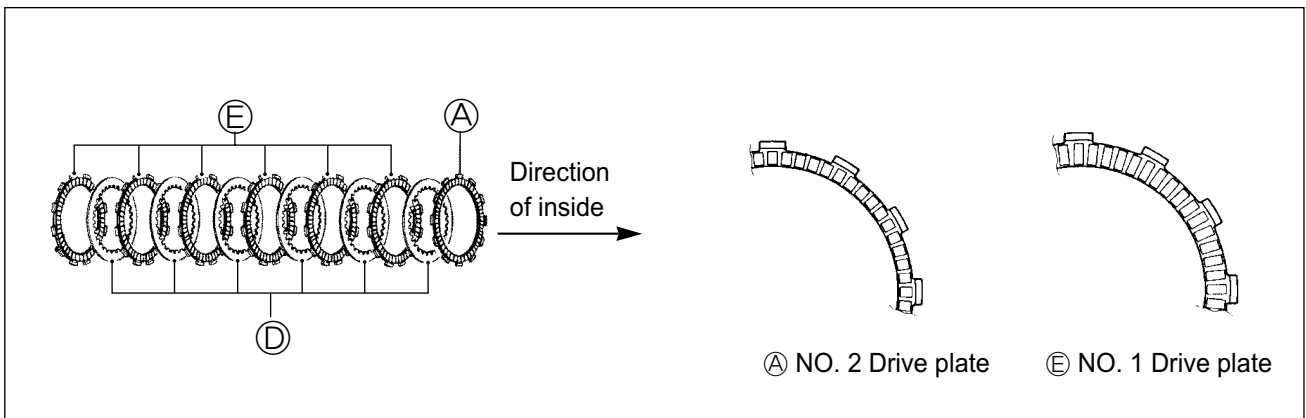
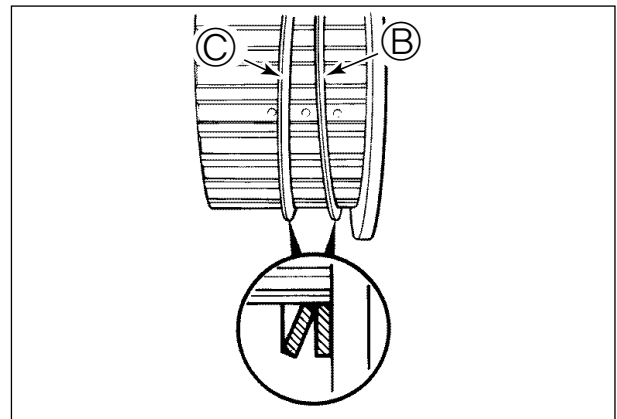


### 3-51 ENGINE

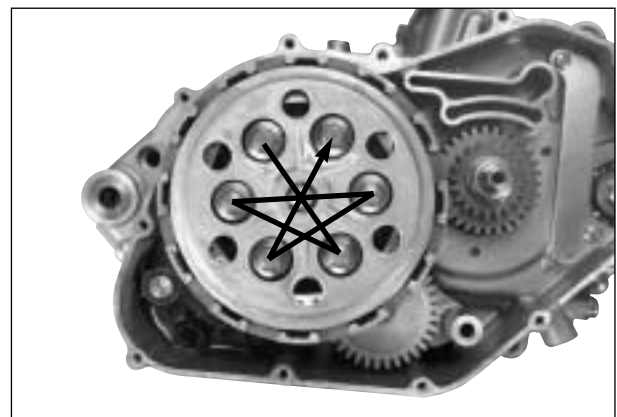
- Bend the tongue of the washer ① securely.
- Install the push rod ②, clutch push piece ③.



- Install the clutch drive plate NO. 2 (A).
- Install the spring washer seat (B) and spring washer (C) onto the clutch sleeve hub correctly.
- Install the clutch driven plates (D) and drive plates NO. 1 (E) one by one into the clutch sleeve hub in the prescribed order.



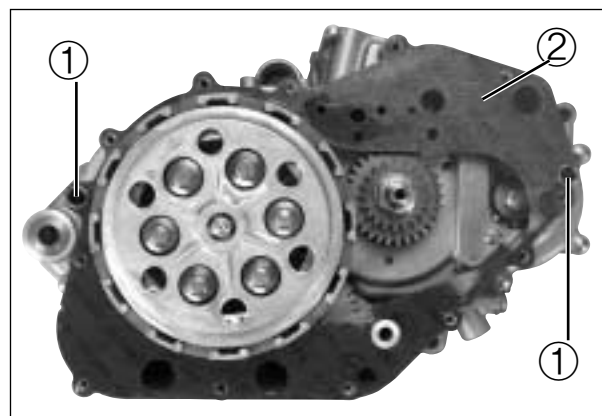
- Tighten the clutch spring set bolts securely in diagonal stages.



- Install the dowel pins① and new gasket② .

**⚠ CAUTION**

Use a new gasket to prevent oil leakage.



- Tighten the clutch cover bolts securely.

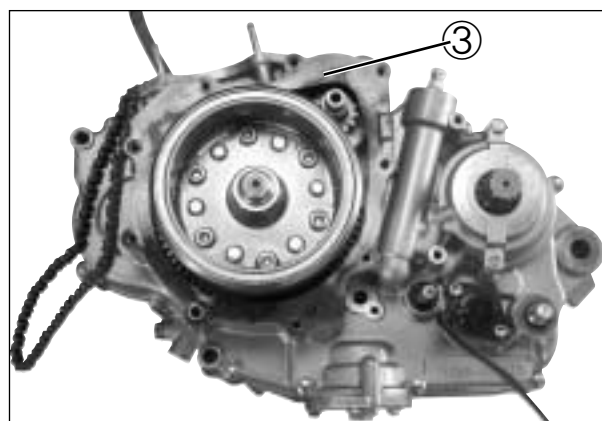


**⊙ MAGNETO ROTOR COVER**

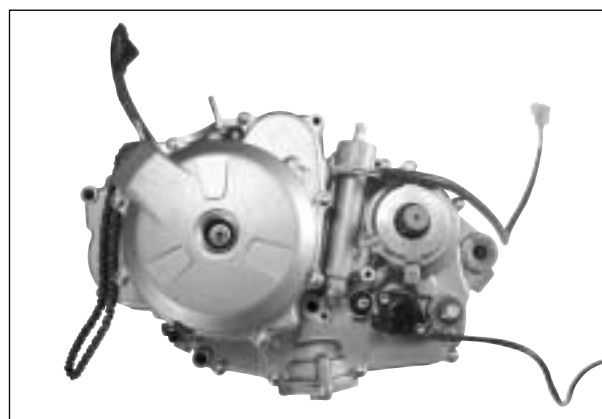
- Install the dowel pins and new gasket③ .

**⚠ CAUTION**

Use a new gasket to prevent oil leakage.



- Tighten the magneto rotor cover bolts securely.

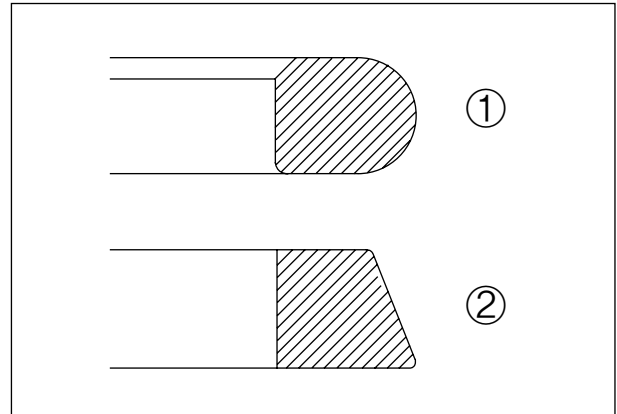


### ⊙ PISTON RING

- Install the oil ring first, the 2nd ring second, and the 1st ring last.

#### NOTE

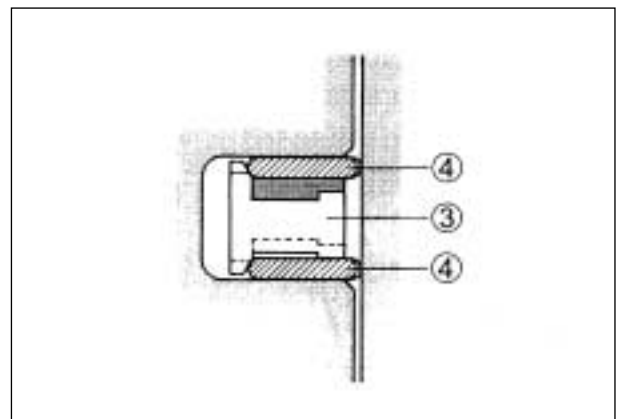
- ❖ The 1st ① and 2nd ② piston rings differ in shape.
- ❖ The 1st and 2nd piston rings should be installed with the mark facing up.



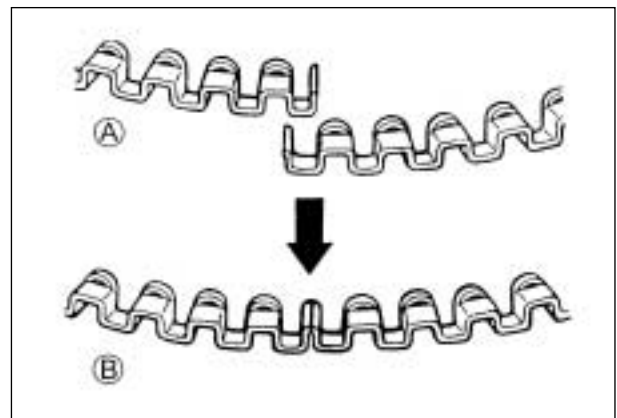
- First, install a spacer ③ into the oil ring groove, and then install the two side rails ④. The spacer and side rails do not have a designated top and bottom. They can be installed in any position.

#### ⚠ CAUTION

When installing the spacer, be careful not to allow its two ends to overlap in the groove.

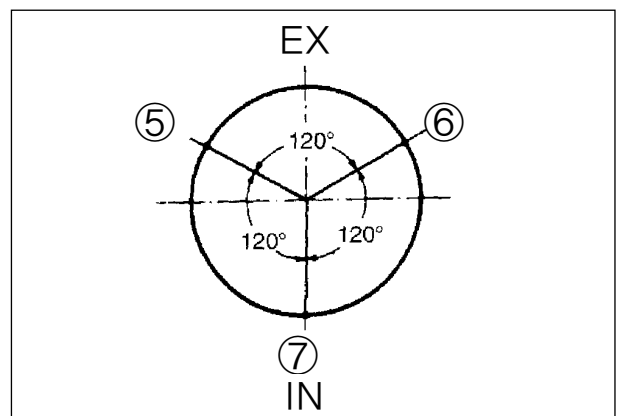


- Ⓐ INCORRECT
- Ⓑ CORRECT



- Position the piston ring gaps as shown. Before inserting the piston into its cylinder, check that the gaps are properly positioned.

- ⑤ 2nd ring and lower side rail
- ⑥ Upper side rail
- ⑦ 1st ring and spacer



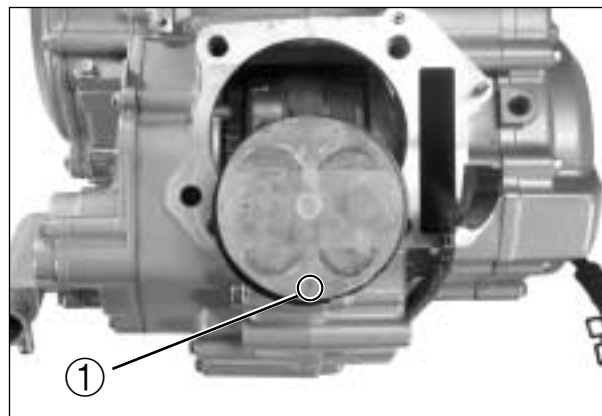
## ⊙ PISTON AND CYLINDER

- Apply MOLY PASTE onto the piston pin and small end of the conrod.

 MOLY PASTE

### NOTE

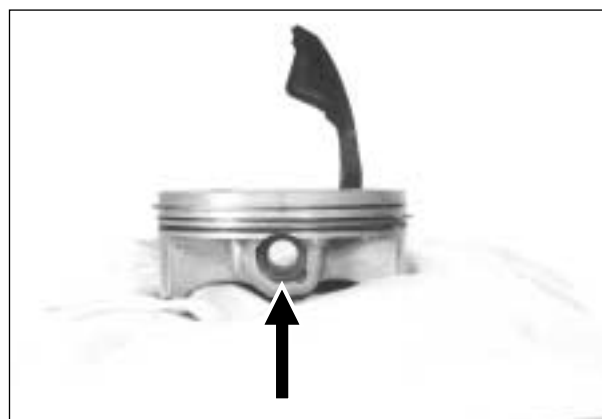
*Install the piston with the punch mark ① on the piston head facing toward the exhaust side.*



- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase, and then fit the piston pin circlip with long-nose pliers.

### ⚠ CAUTION

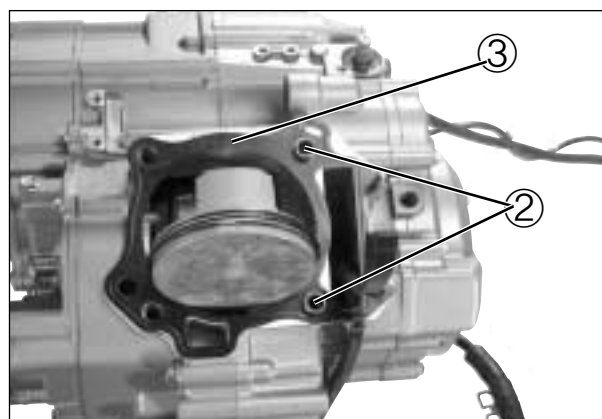
**Use a new piston pin circlip to prevent circlip failure with a bent one.**



- Apply engine oil to the sliding surface of the piston and big end of the conrod.
- Install the dowel pins ② and new gasket ③ onto the crankcase.

### ⚠ CAUTION

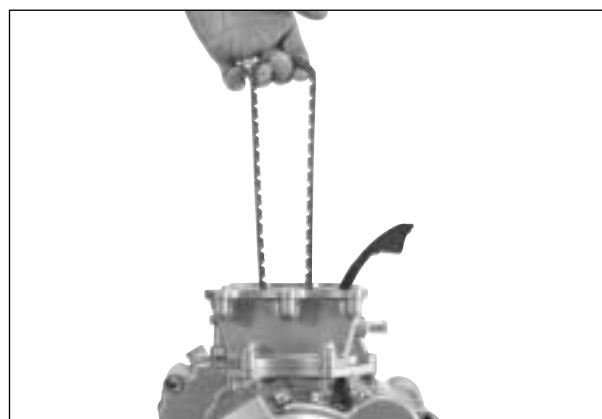
**Use a new gasket to prevent oil leakage.**



- Hold each piston ring with the piston ring sections positioned correctly and put it into the cylinder. Make sure that the piston rings are caught by the cylinder skirt.

### NOTE

*When mounting the cylinder, after attaching the cam chain, keep the cam chain taut. The cam chain must not be caught between the cam chain sprocket and crankcase when the crankshaft is rotated.*





- Install the cam chain guide① .

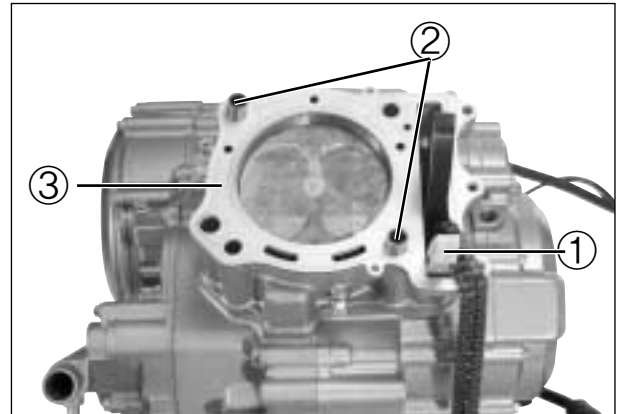
**NOTE**

*Make sure that the guide① is inserted properly or binding of the cam chain and guide may result.*

- Install the dowel pins② and new gasket③ .

**CAUTION**

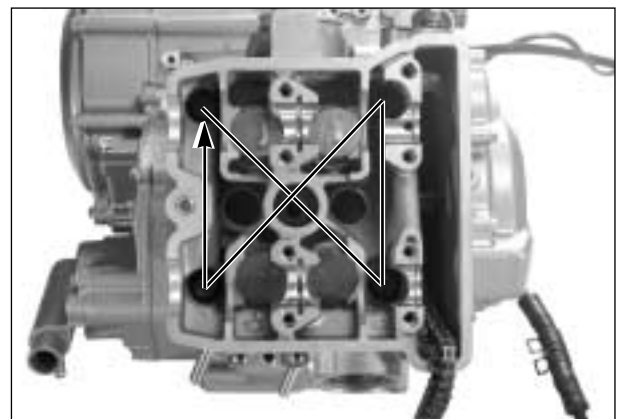
Use a new cylinder head gasket to prevent gas leakage.



**⊙ CYLINDER HEAD**

- With the head snugly seated on the cylinder, secure it by tightening the bolts in diagonal stages. Tighten the cylinder head bolts diagonally to the specified torque.

**🔧** Cylinder head bolt : 47 N · m (4.7 kgf · m)



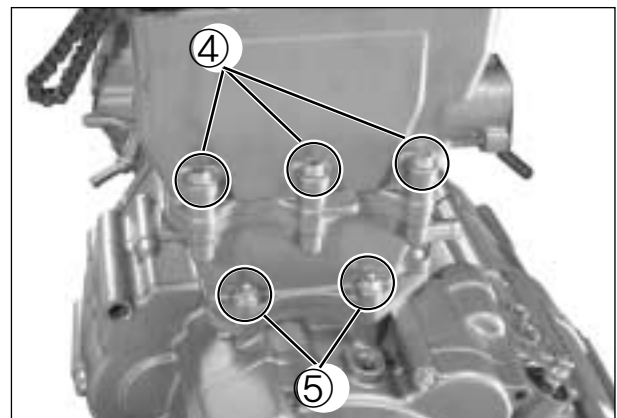
**NOTE**

- ❖ Apply engine oil to the threaded parts of the cylinder head bolts and its washers.
- ❖ Be sure to install the washer with rounded side facing up.

- After tightening the cylinder head bolts to specification, tighten the cylinder head base bolts④ and cylinder base nuts⑤ to the specified torque.

**🔧** Cylinder head base bolt : 10 N · m (1.0 kgf · m)

Cylinder base nut : 10 N · m (1.0 kgf · m)



**⊙ CAMSHAFT ASSEMBLY**

- Turn the magneto rotor until the "T" line on the magneto rotor is aligned with the triangle mark on the crankcase.

**CAUTION**

If the crankshaft is turned without drawing the cam chain upward, the cam chain will catch between crankcase and cam chain sprocket.



**NOTE**

*Just before installing the camshaft into the cylinder head, apply MOLY PASTE to the camshaft journals and cam faces. Also, apply engine oil to the camshaft housing.*

 MOLY PASTE

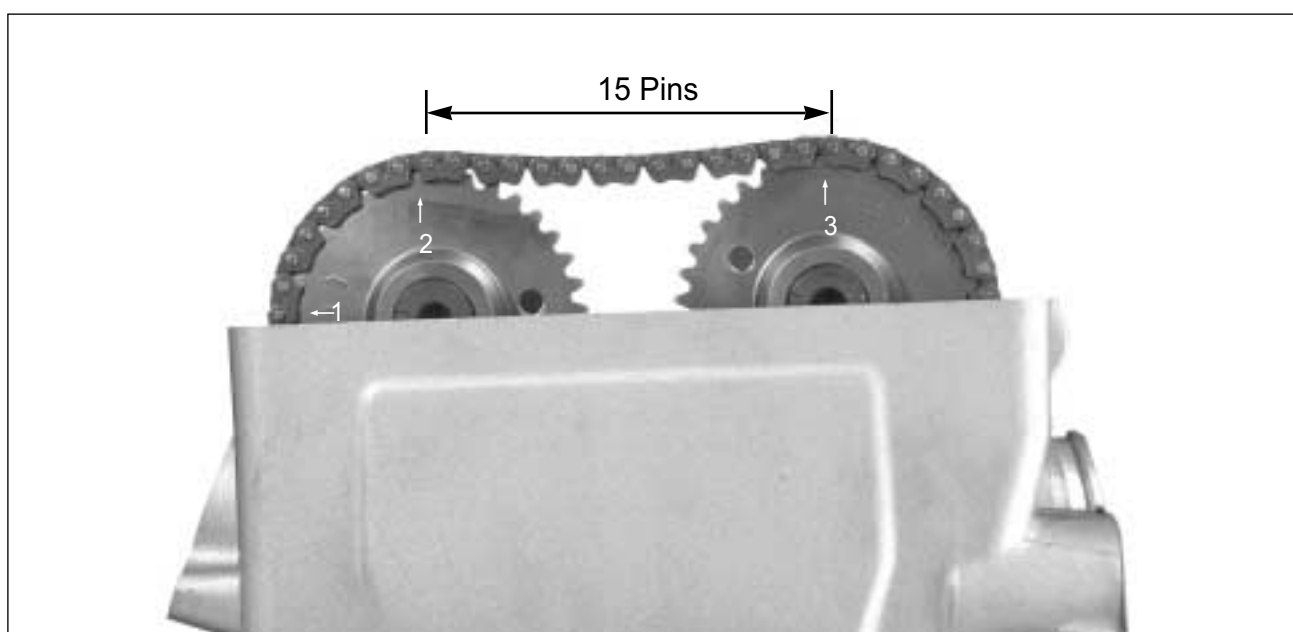
- Place each camshaft into the correct position.

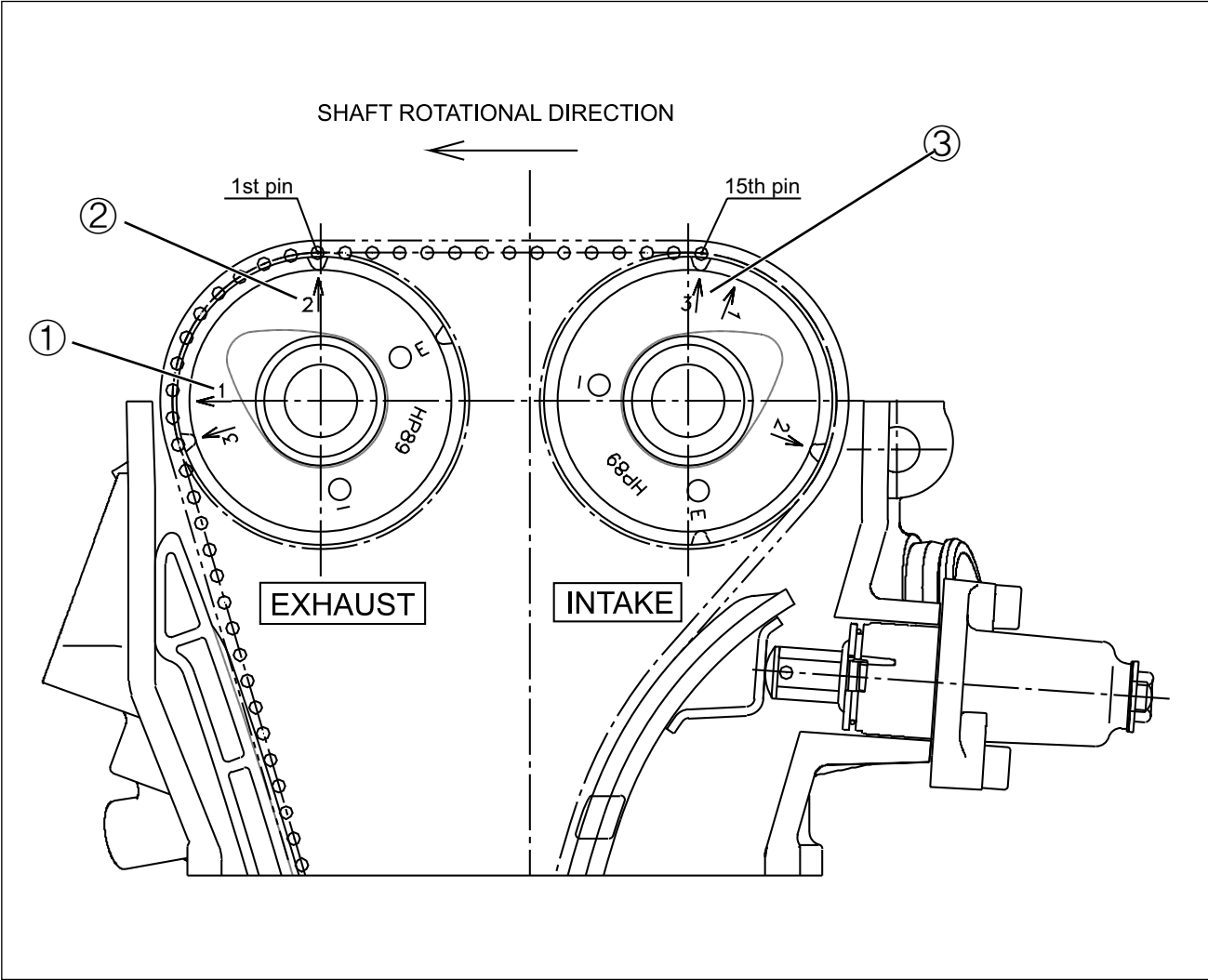


- With the “T” line on the magneto rotor is aligned with the triangle mark on the crankcase, hold the camshaft steady and lightly pull up the cam chain to remove any slack between the cam chain sprocket and exhaust camshaft sprocket.
- The exhaust camshaft sprocket has an arrow marked “1” ①. Turn the exhaust camshaft so that the arrow is aligned with the gasket surface of the cylinder head. Engage the cam chain with the exhaust camshaft sprocket.
- The other arrow marked “2” ② should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked “2” ②, count out 15 roller pins (from the exhaust camshaft side going towards the intake camshaft side). Engage the 15th roller pin on the cam chain with the arrow marked “3” ③ on the intake sprocket. Refer to the following illustrations.

**NOTE**

*The cam chain should now be on all three sprockets. Be careful not to move the crankshaft until the camshaft housing and cam chain tensioner are secured.*

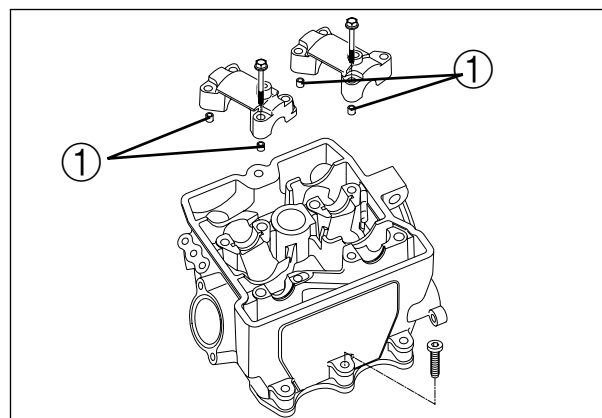





- Install the dowel pins ①.
- Place each camshaft housing and cam chain guide into the correct position.

### NOTE

*Camshaft housing marked "EX" are for the exhaust side and those marked "IN" are for the intake side.*

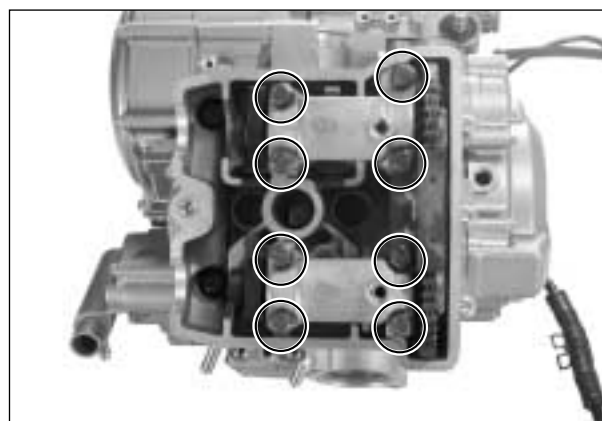


- Tighten the camshaft housing bolts to the specified torque.

 **Camshaft housing bolt**  
: 10 N · m (1.0 kgf · m)

### NOTE

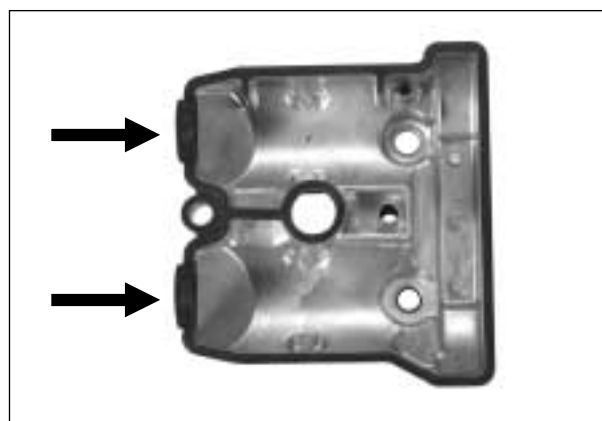
*When tightening the camshaft housing bolts, the piston position must be at TDC on the compression stroke.*



## ⊙ CYLINDER HEAD COVER

- Thoroughly wipe off oil from the fitting surfaces of the cylinder head and cover.
- Apply BOND "1215" to the end caps of the cylinder head cover gasket as shown.

 **BOND "1215"**

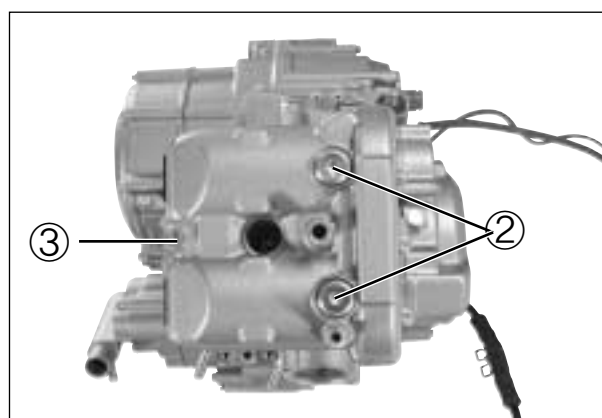


- Apply engine oil to both sides of the washer ②.
- Lightly tighten the cylinder head cover bolts in diagonal stages, and then tighten them to the specified torque.

 **Cylinder head cover bolt**  
: 14 N · m (1.4 kgf · m)

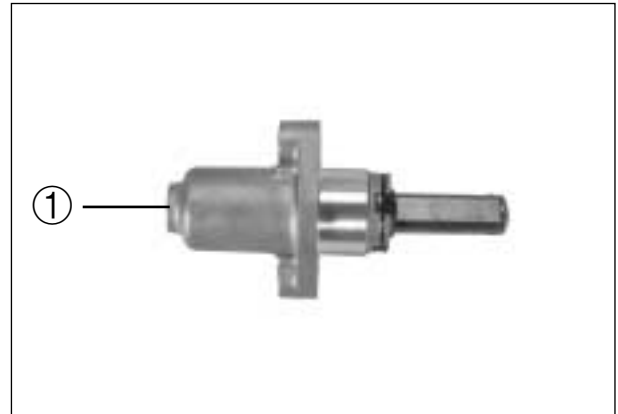
### CAUTION

Use a new washers ②.




### ⊙ CAM CHAIN TENSION ADJUSTER

- Apply engine oil to the push rod.
- Unlock the ratchet mechanism and push the push rod ① all the way.




- Install the new gasket and cam chain tension adjuster to the cylinder.
- Tighten the cam chain tension adjuster mounting bolts to the specified torque.

 **Cam chain tension adjuster mounting bolt**  
: 10 N · m (1.0 kgf · m)

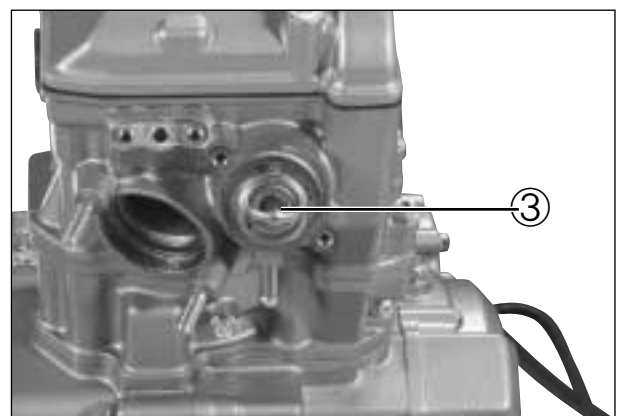


- Tighten the cam chain tension adjuster bolt ② to the specified torque.

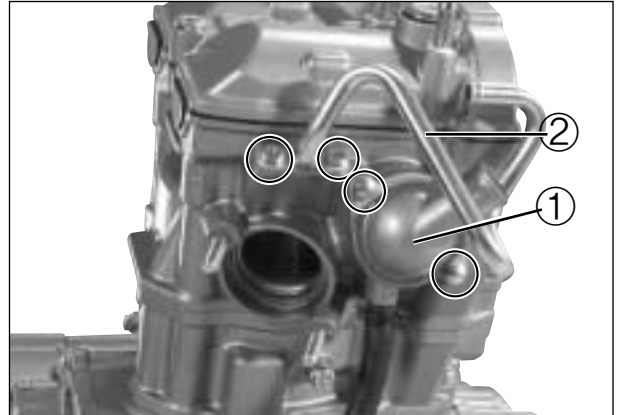
 **Cam chain tension adjuster bolt**  
: 20 N · m (2.0 kgf · m)



- Install the thermostat ③.



- Install the thermostat cover① and 2nd pipe②.



- Install the spark plug.
- Install the starter motor③.



# FUEL SYSTEM

**CONTENTS**

<b>FUEL TANK</b> .....	<b>4- 1</b>
<b>FUEL COCK</b> .....	<b>4- 1</b>
<b>FUEL PUMP</b> .....	<b>4- 2</b>
<b>CARBURETOR</b> .....	<b>4- 3</b>

 **CAUTION**

Gasoline must be handled carefully in an area well ventilated and away from fire or sparks.

## FUEL TANK

### REMOVAL

#### WARNING

Gasoline is highly flammable and explosive. Keep heat, sparks and flames away from gasoline.

- Remove the seat, side covers.  
(Refer to page 7-3~4)
- Remove the fuel tank mounting bolts ①.
  
- Disconnect the fuel hose ②.
- Remove the fuel tank.
- Drain fuel completely.

### REINSTALLATION

Reinstall the fuel tank in the reverse order of removal.

## FUEL COCK

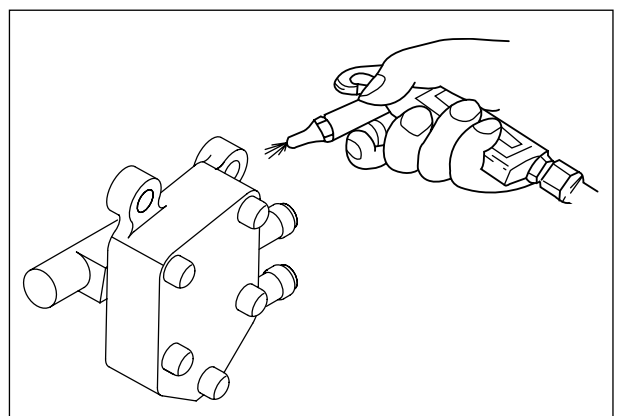
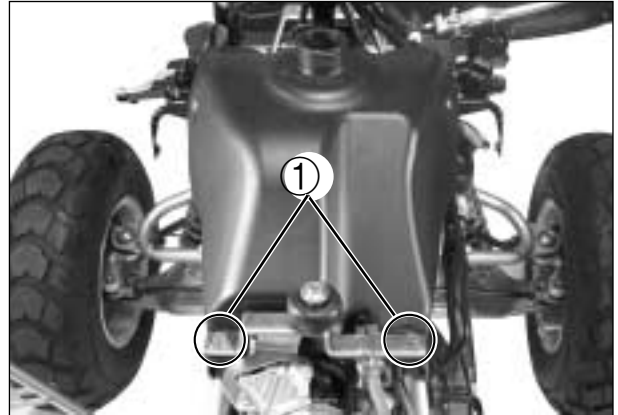
### REMOVAL

- Remove the fuel tank.
- Drain fuel completely.
- Remove the fuel cock.

### INSPECTION

If the fuel filter is dirty with sediment or rust, fuel will not flow smoothly and loss of engine power may result.

Clean the fuel filter with compressed air.  
Also check the fuel cock for cracks.



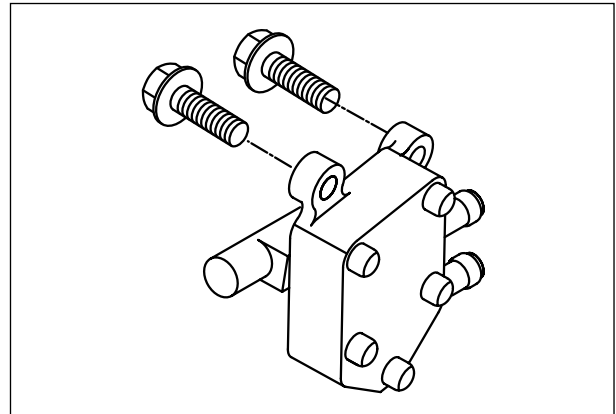


## ⊙ REMOUNTING

Remount the fuel cock in the reverse order of removal.

### ⚠ CAUTION

Tighten the fuel cock bolts evenly.



## FUEL PUMP

### ⊙ REMOVAL

- Remove the seat and fuel tank.
- Disconnect the fuel hoses ③, ④ and vacuum hose ⑤.
- Remove the fuel pump mounting bolts.

### ⊙ INSPECTION

#### ⚠ WARNING

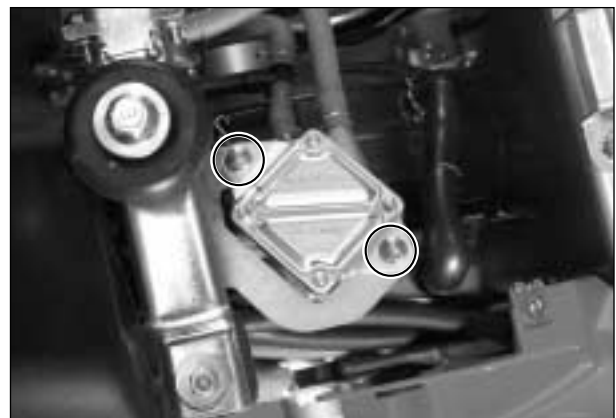
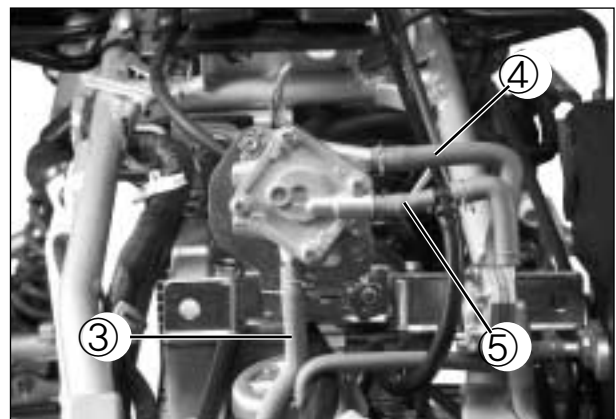
Gasoline is very explosive. Extreme care must be taken.

- Disconnect the fuel hose ③, connect the suitable hose and insert the free end of the hose into a receptacle.

Check the fuel flow when starting the engine for a few seconds by pressing the starter switch.

If the fuel flow is not found, check the fuel cock. (Refer to page 4-1)

If the fuel cock and hoses are not fault, replace the fuel pump.



### ⊙ REASSEMBLY

Carry out the assembly procedure in the reverse order of disassembly.

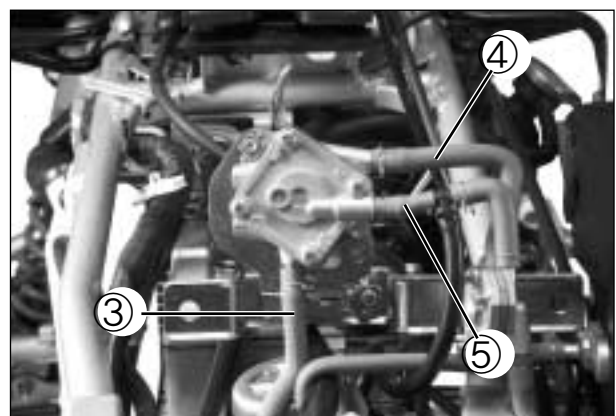
- Tighten the fuel pump mounting bolts.
- Connect the fuel hoses ③, ④ and vacuum hose ⑤ securely.

#### FUEL HOSE ROUTING :

Fuel hose ③ (To carburetor)

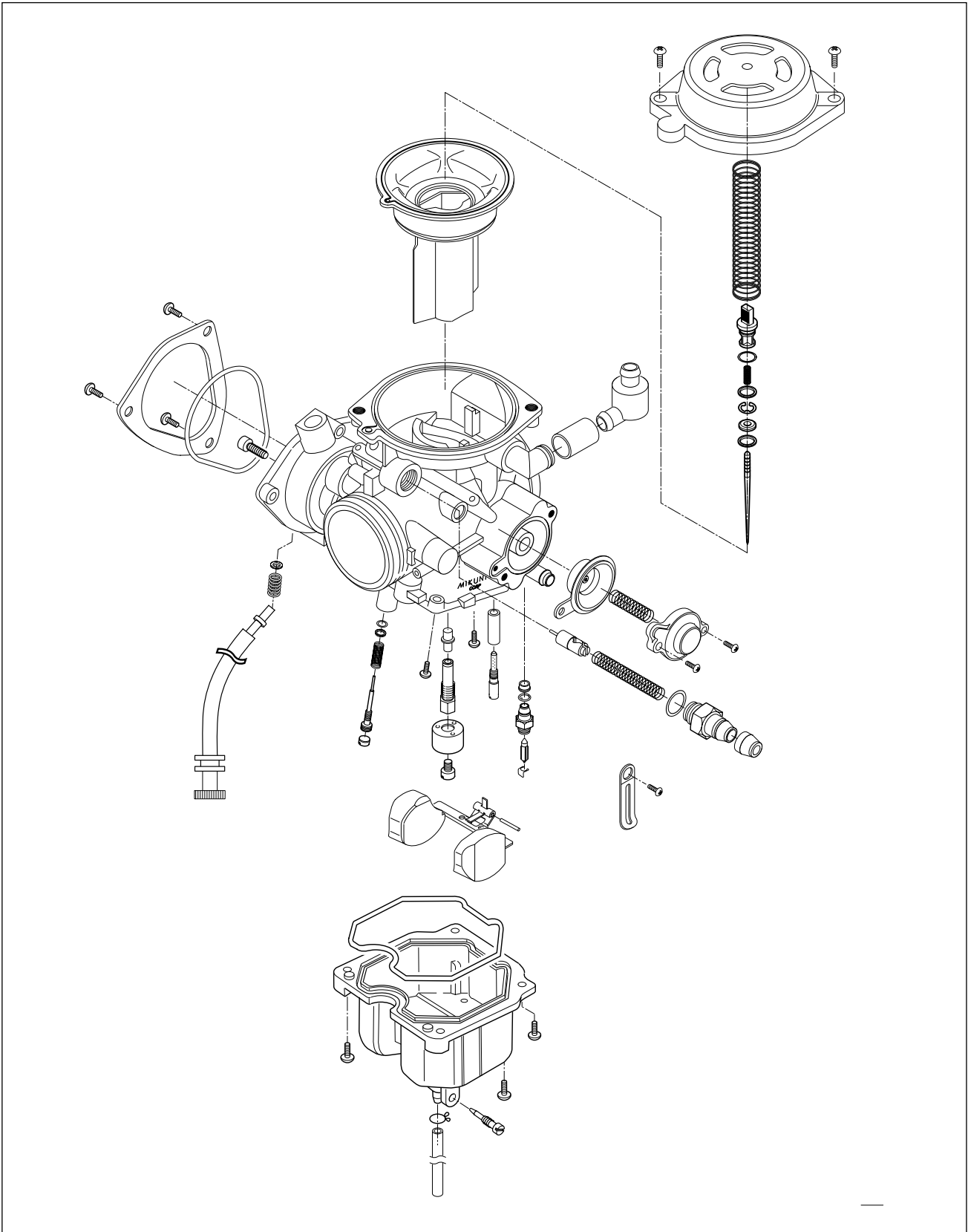
Fuel hose ④ (To fuel cock)

Vacuum hose ⑤ (To intake pipe).



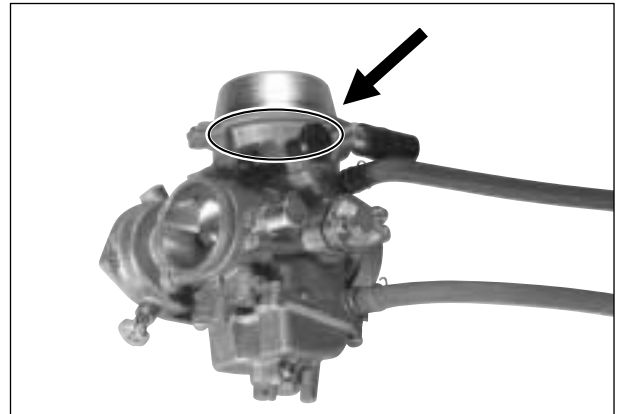
# CARBURETOR

## ⊙ CONSTRUCTION



## ⊙ LOCATION OF CARBURETOR I.D.NO.

The carburetor I.D. is stamped on the location on the carburetor as shown in the right photo.

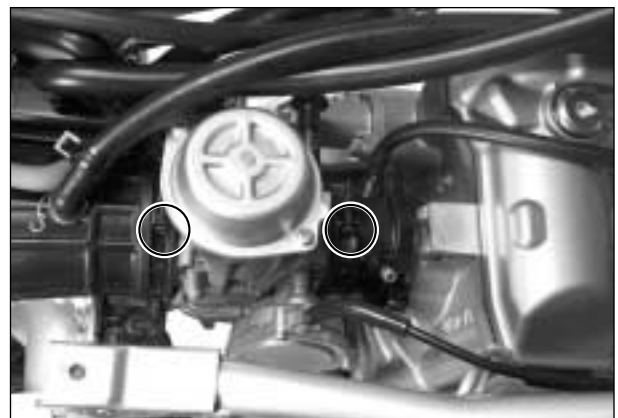


## ⊙ REMOVAL

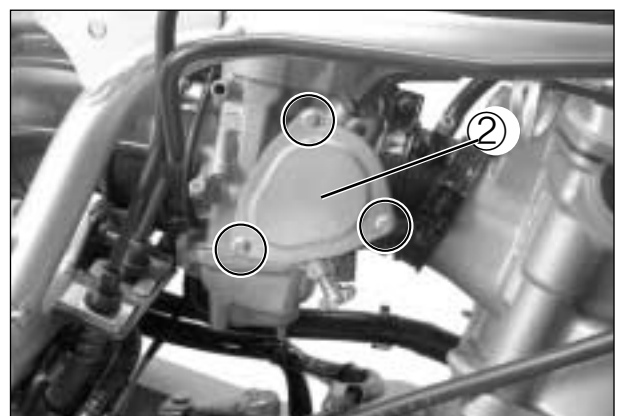
- Remove the left side cover.  
(Refer to page 7-4)
- Disconnect the fuel hose ①.



- Loosen the carburetor clamp screw.



- Remove the carburetor side cap ②.



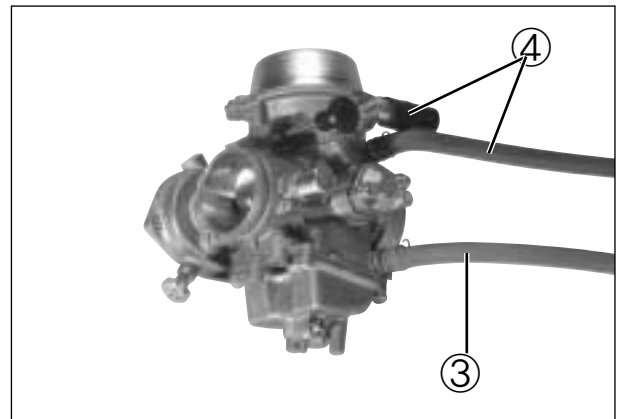
## 4-5 FUEL SYSTEM

- Disconnect the throttle cable ① .
- Remove the O-ring ② .

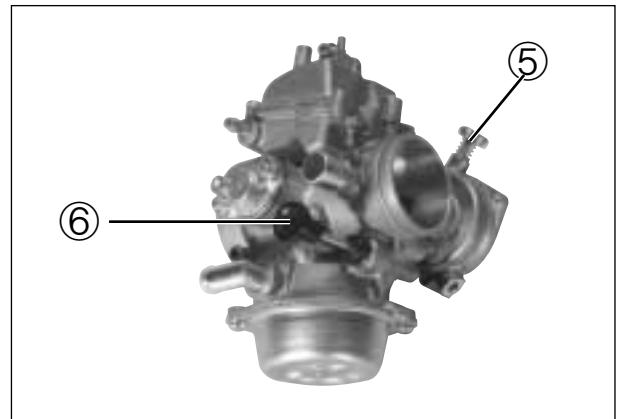


### ⊙ DISASSEMBLY

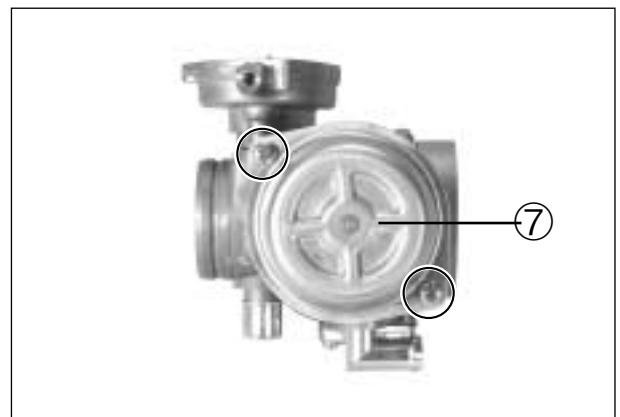
- Remove the fuel hose ③ and air vent hoses ④ .



- Remove the throttle stop screw ⑤ .
- Remove the choke lever ⑥ .



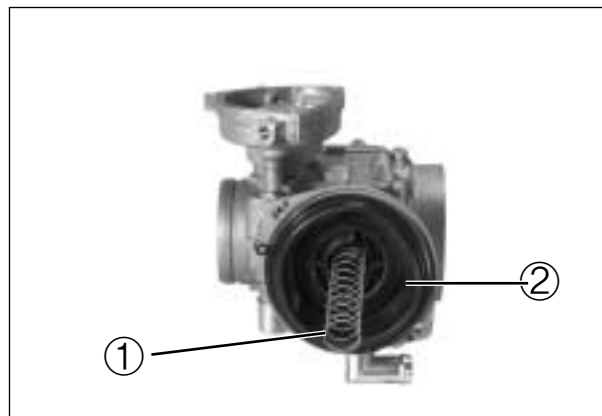
- Remove the carburetor top cap ⑦ .



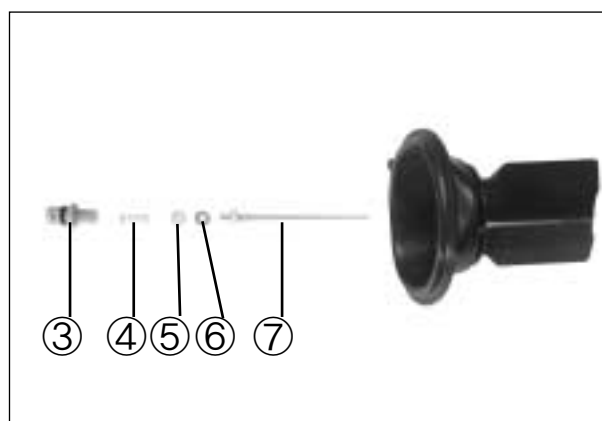
### CAUTION

Do not use compressed air on the carburetor body removing the diaphragm : this may damage the diaphragm.

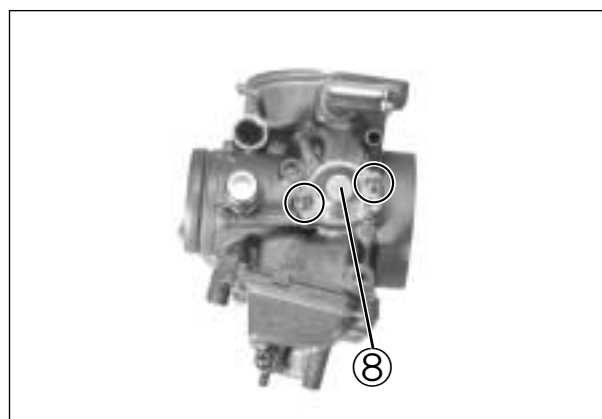
- Remove the spring ①, along with the diaphragm assembly ②.



- Remove the jet needle holder ③, spring ④, E-ring ⑤, ring ⑥ and jet needle ⑦.



- Remove the diaphragm cover ⑧.

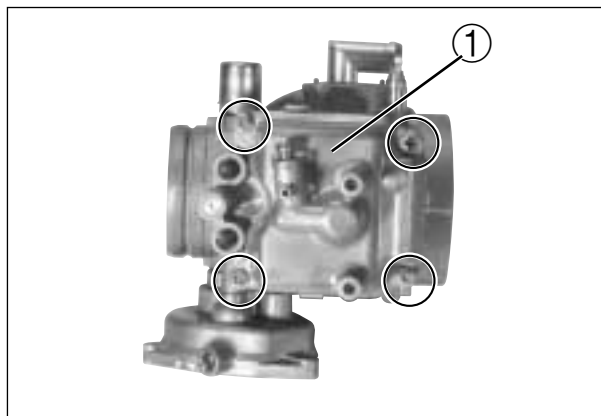


- Remove the diaphragm ⑨.



## 4-7 FUEL SYSTEM

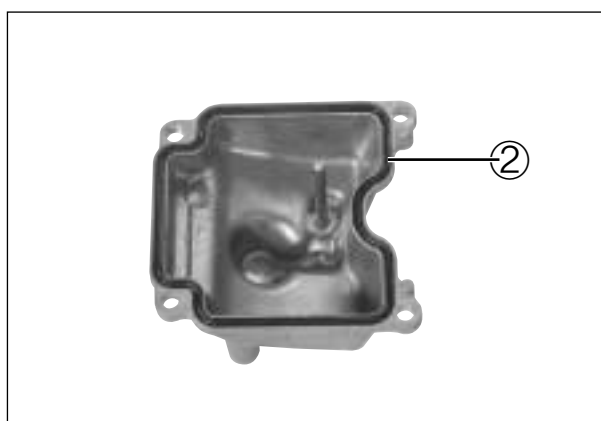
- Remove the float chamber body①.



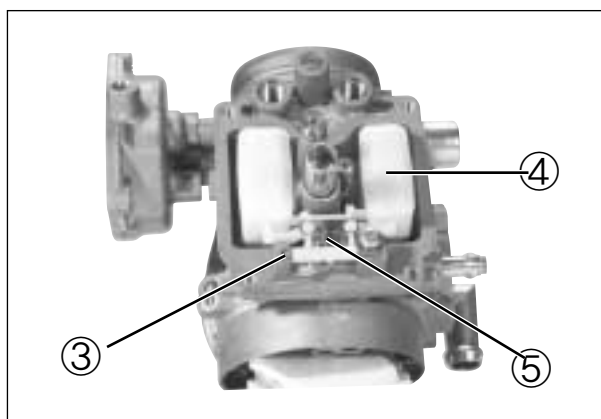
- Remove the O-ring②.

 **CAUTION**

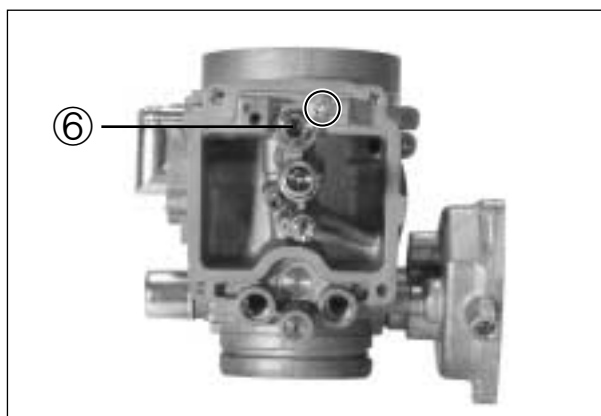
Replace the removed O-ring with a new one to prevent leakage of fuel.



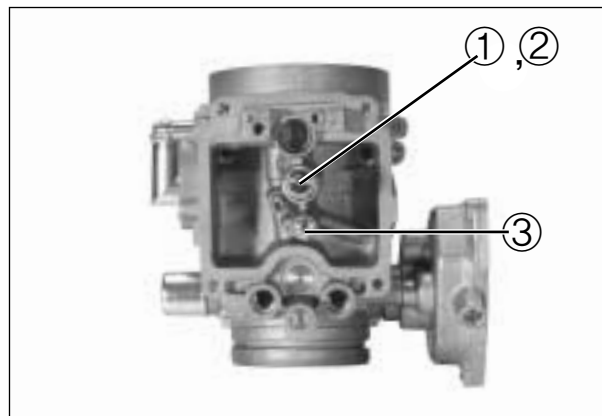
- Remove the float pin③, float④ and needle valve⑤.



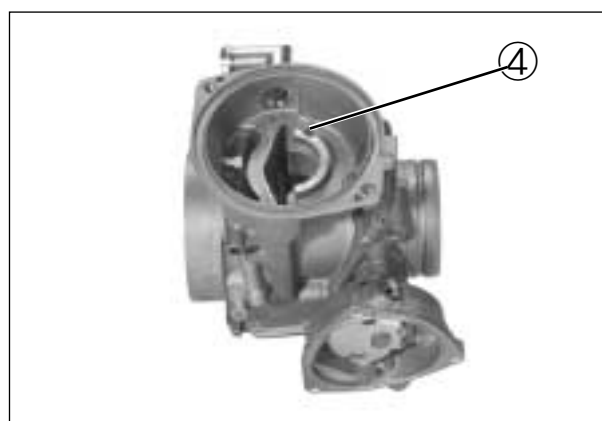
- Remove the valve seat⑥.



- Remove the main jet ①, jet holder ② and pilot jet ③.



- Remove the pilot air jet ④ counting and tightening the number of turn.



### NOTE

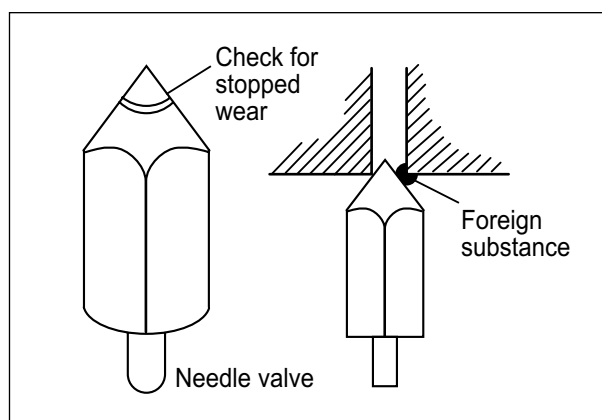
*Before removing the pilot air jet ④, its setting must be determined. Slowly turn the pilot screw clockwise and count the number of turns until it is lightly seated. Make a note of how many turns were made. When reassembling the pilot screw, you will want to set it to its original position.*

### ⊙ INSPECTION

Check the following parts for damage and clogging.

- |                     |                           |
|---------------------|---------------------------|
| * Pilot jet         | * Piston valve            |
| * Main jet          | * Starter jet             |
| * Main air jet      | * Gaskets and O-rings     |
| * Pilot air jet     | * Pilot outlet and bypass |
| * Needle jet holder | * Float                   |
| * Needle valve      | * Jet needle              |
| * Valve seat        | * Diaphragm               |

If any abnormal condition is found, wash the part clean. If damage or clogging is found, replace the part with a new one.

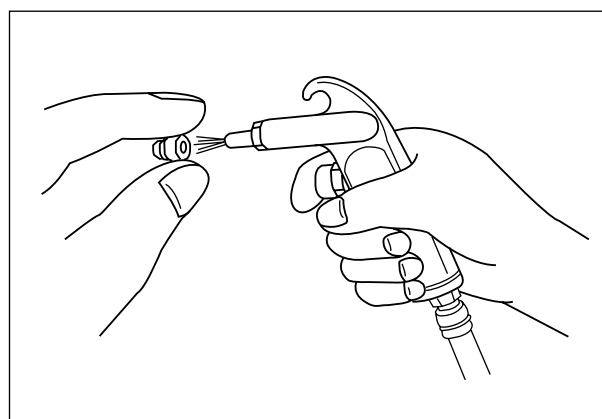


### ⊙ CLEANING

- Clean all jets by using compressed air.
- After cleaning, reassemble the carburetor with new seals and gaskets.

### ⚠ CAUTION

**Do not use wire to clean the passageways, valve seat and jets. Used compressed air only.**



### ⊙ FLOAT HEIGHT ADJUSTMENT

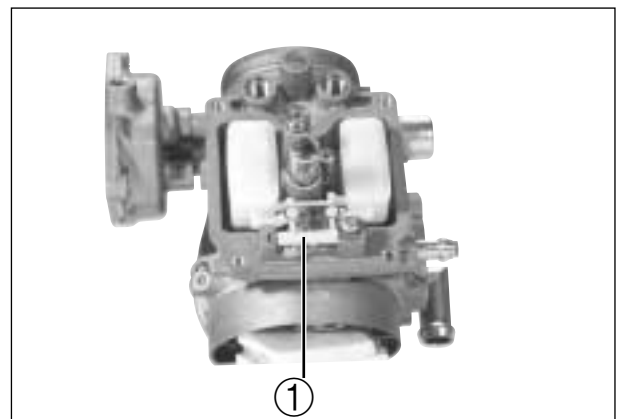
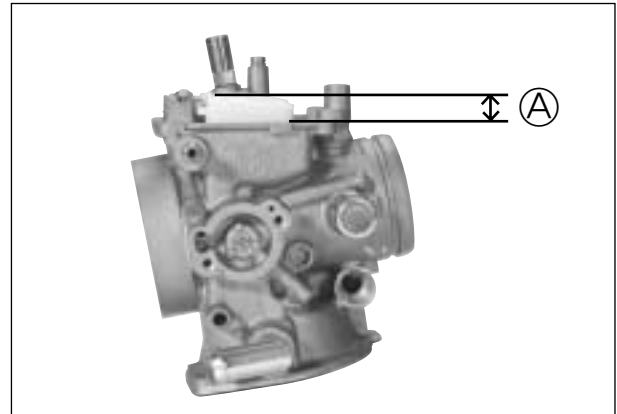
To check the float height, turn the carburetor upside down. Measure the float height (A) while the float arm is just contacting the needle valve using a vernier calipers.

**Float height (A)**

13 mm (0.51 in)

 **Vernier calipers : 09900-20101**

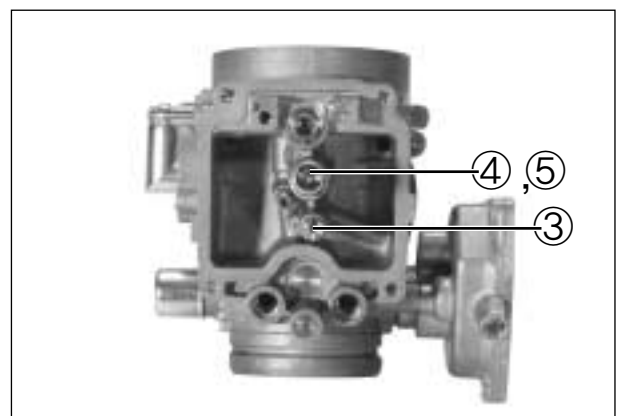
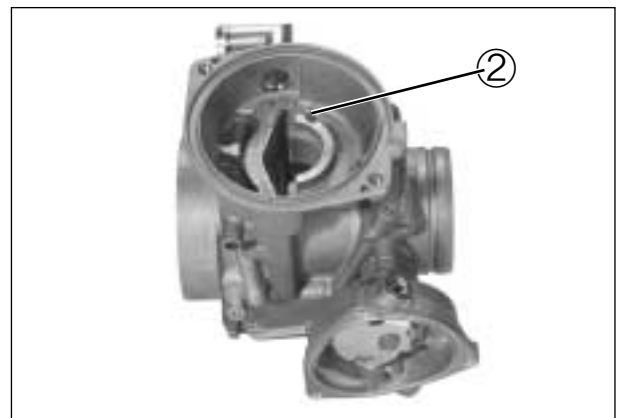
- Bend the float arm ① as necessary to bring the height to the specified level.
- After adjustment, check the float height and the fuel level again.



### ⊙ REASSEMBLY

Carburetor reassembly can be performed in the reverse order of disassembly. When reassembling, carefully observe the following instructions.

- After cleaning, reinstall the pilot air jet ② to the original setting by turning the screw in until it lightly seat, and then backing it out the same number of turns counted during disassembly.
- Install the pilot jet ③, jet holder ④ and main jet ⑤.

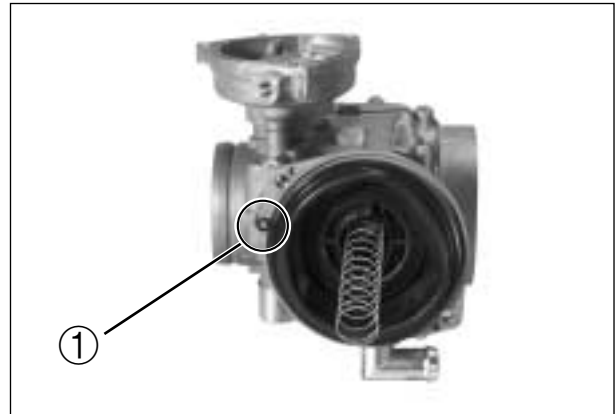




- Align the hole ① of the diaphragm with passage-way on the carburetor body.

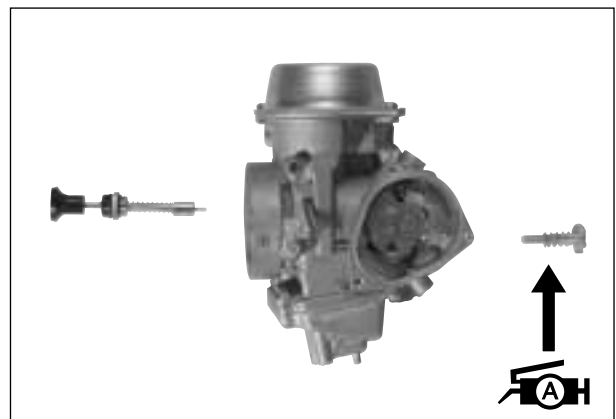
**NOTE**

*When installing the diaphragm, make sure the diaphragm is seated at the concave section of the carburetor.*



- Apply SUPER GREASE “A” to thread part of the throttle stop screw, then install the throttle stop screw to the carburetor.

 SUPER GREASE “A”



⊙ **REMOUNTING**

Remount the carburetor assembly in the reverse order of removal.

Pay attention to the following points :

- Align the lug on the carburetor with intake pipe's cutout.
- Connect the carburetor hoses properly.



- After the carburetor assembly has been remounted onto the engine, perform the following adjustment.

\* Throttle cable adjustment. . . Refer to page 2-9

\* Idle speed adjustment. . . . Refer to page 2-9

# COOLING SYSTEM

## CONTENTS

<b>ENGINE COOLANT</b> .....	<b>5- 1</b>
<b>COOLING CIRCUIT</b> .....	<b>5- 2</b>
<b>RADIATOR</b> .....	<b>5- 2</b>
<b>COOLING FAN</b> .....	<b>5- 5</b>
<b>COOLING FAN THERMO-SWITCH</b> .....	<b>5- 6</b>
<b>WATER TEMPERATURE SWITCH</b> .....	<b>5- 8</b>
<b>THERMOSTAT</b> .....	<b>5- 9</b>
<b>WATER PUMP</b> .....	<b>5-11</b>
<b>OIL TANK AND HOSES</b> .....	<b>5-16</b>

## ENGINE COOLANT

At the time of manufacture, the cooling system is filled with a 50 : 50 mixture of distilled water and ethylene glycol anti-freeze.

This 50 : 50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above  $-31^{\circ}\text{C}$  ( $-24^{\circ}\text{F}$ ).

If the vehicle is to be exposed to temperatures below  $-31^{\circ}\text{C}$  ( $-24^{\circ}\text{F}$ ), this mixing ratio should be increased up to 55% or 60% according to the figure.

Anti-freeze density	Freezing point
50%	$-31^{\circ}\text{C}$ ( $-24^{\circ}\text{F}$ )
55%	$-40^{\circ}\text{C}$ ( $-40^{\circ}\text{F}$ )
60%	$-55^{\circ}\text{C}$ ( $-67^{\circ}\text{F}$ )

<b>⚠ CAUTION</b>	
❖	Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.
❖	Do not put in more than 60% anti-freeze or less than 50%. (Refer to Right figure.)
❖	Do not use a radiator anti-leak additive.

50% Engine coolant including reserve tank capacity	
Anti-freeze	0.7 ℓ
Water	0.7 ℓ

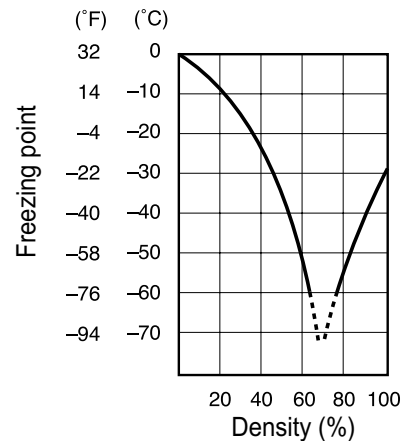


Fig.1 Engine coolant density-freezing point curve.

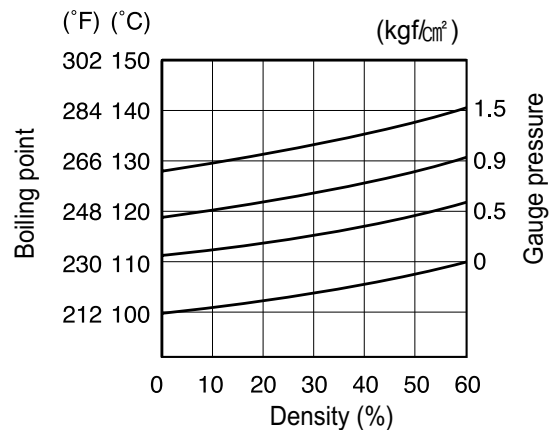
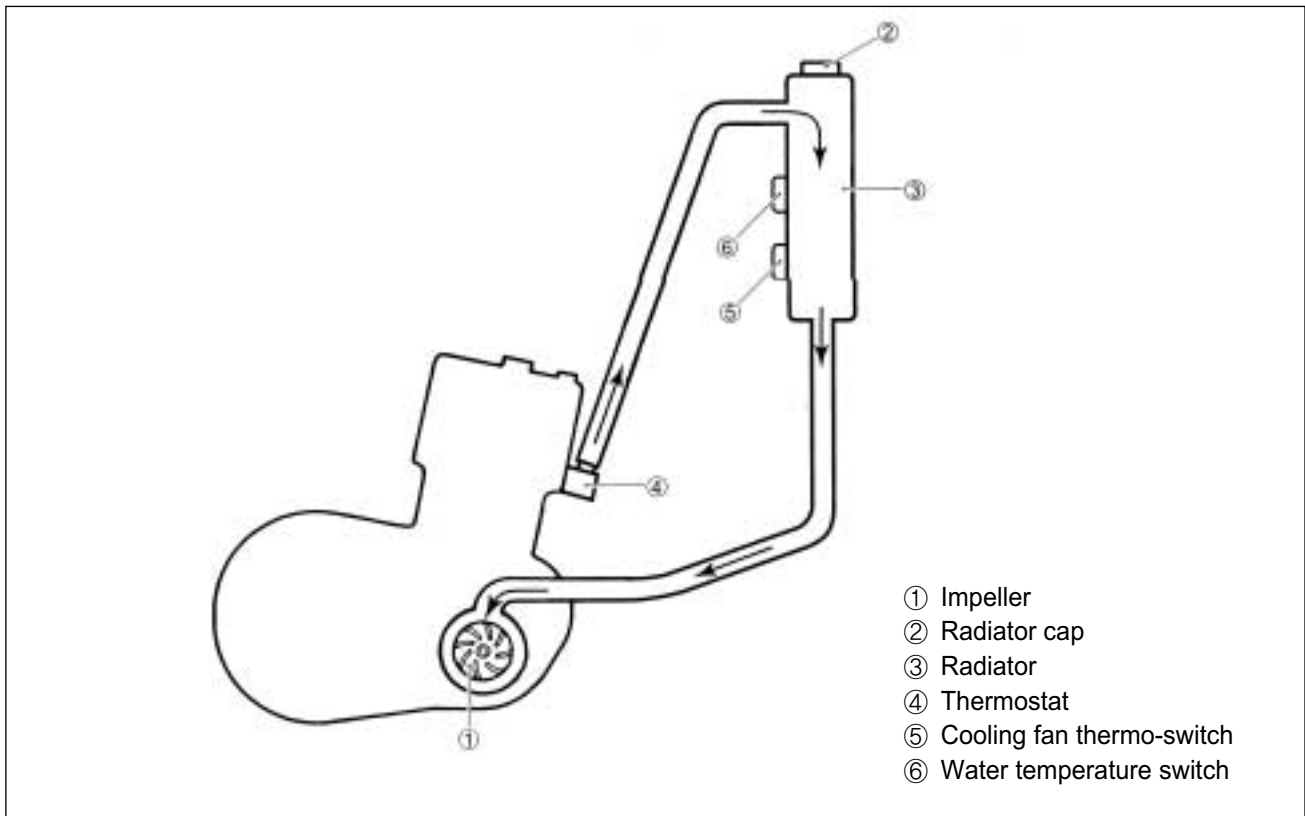


Fig.2 Engine coolant density-boiling point curve.

## ⚠ WARNING

- ❖ You can be injured by scalding fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.
- ❖ The engine must be cool before servicing the cooling system.
- ❖ Coolant is harmful ;
  - \* If it comes in contact with skin or eyes, flush with water.
  - \* If swallowed accidentally, induce vomiting and call physician immediately.
  - \* Keep it away from children.

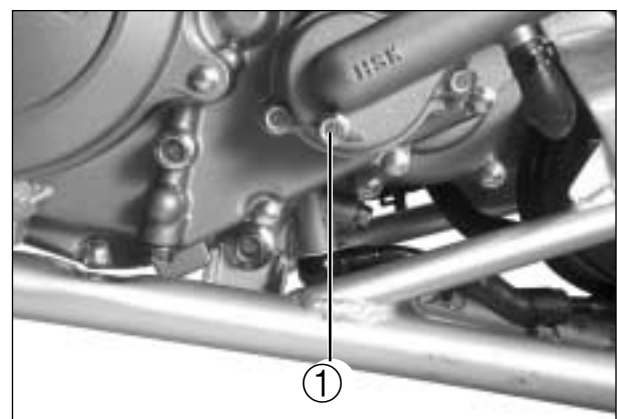
## COOLING CIRCUIT



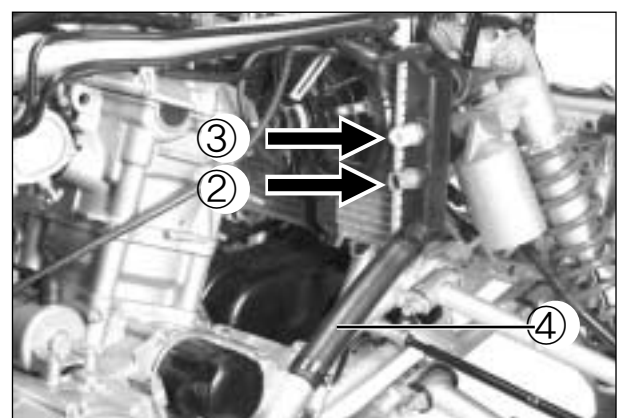
## RADIATOR

### ⊙ REMOVAL

- Remove the front fender. (Refer to page 7-3)
- Drain engine coolant by removing the drain bolt ①.

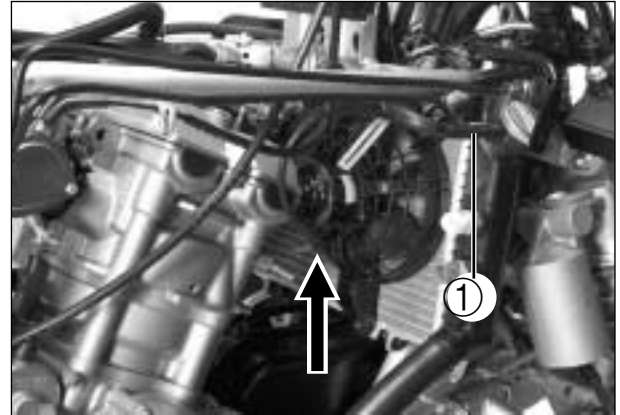


- Disconnect the cooling fan thermo-switch lead wire coupler ② and water temperature switch lead wire coupler ③.
- Disconnect the radiator inlet hose and outlet hose ④.

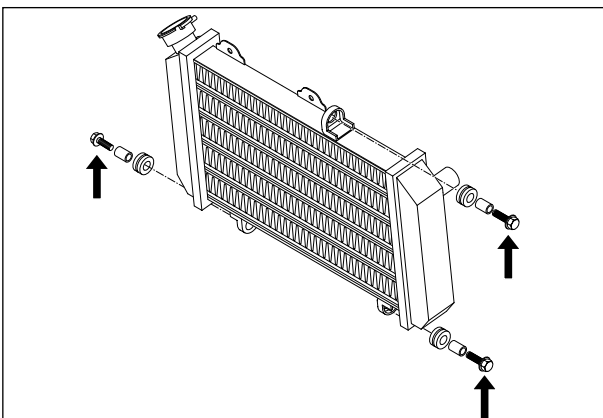
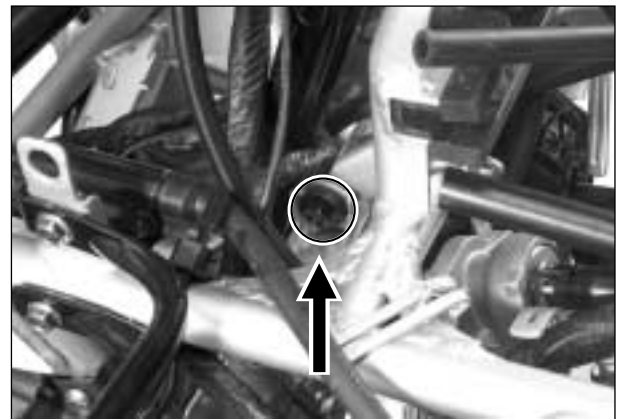


## 5-3 COOLING SYSTEM

- Disconnect reserve tank hose ①.
- Disconnect the cooling fan motor lead wire coupler.

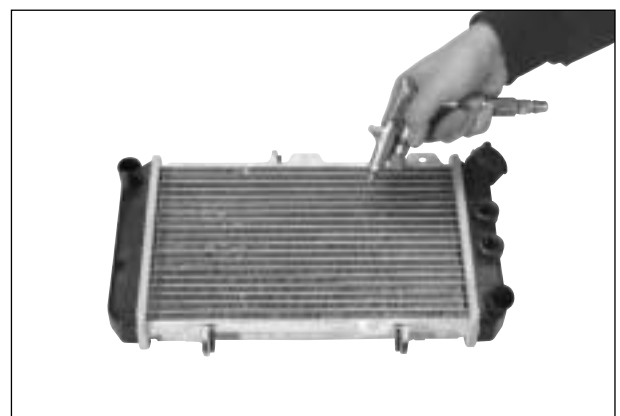


- Remove the radiator by the mounting bolts.

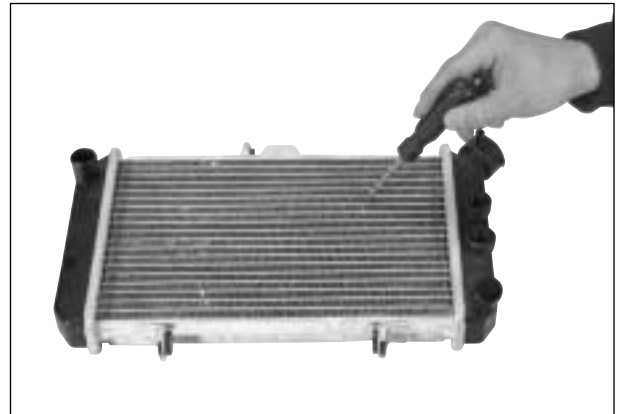


### ⊙ INSPECTION AND CLEANING

Road dirt or trash stuck to the fins must be removed. Use of compressed air is recommended for this cleaning.



Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.



### ⊙ INSPECTION OF WATER HOSE

- Remove the front fender. (Refer to page 7-3)
- Any water hose found in a cracked condition or flattened or water leaked must be replaced.
- Any leakage from the connecting section should be corrected by proper tightening.



### ⊙ REMOUNTING

The radiator reassembly can be performed in the reverse order of disassembly procedures. However, the following points must be observed in the reassembly operation.

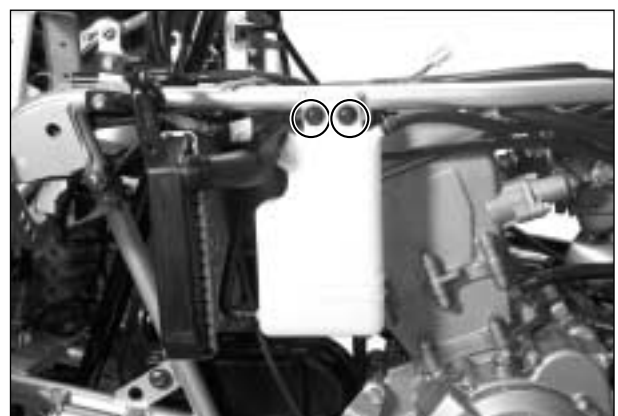
- Install the radiator with the specified torque.
  - 🔧 Radiator mounting bolt
  - : 8~12 N · m (0.8~1.2 kgf · m)

- \* Pour engine coolant . . . . . Refer to page 2-12
- \* Bleed air from the cooling circuit . . . Refer to page 2-12

### ⊙ RADIATOR RESERVOIR TANK

#### ▣ REMOVAL / REMOUNTING

- Remove the reservoir tank mounting bolts and disconnect the siphon hose from the reservoir tank and drain engine coolant.
- Install the reservoir tank in the reverse order of removal.
- Fill the reservoir tank to the upper level line.



## COOLING FAN

### ⊙ INSPECTION

- Remove the front fender. (Refer to page 7-3)
- Disconnect the cooling fan motor lead wire coupler and its thermo-switch lead wire coupler.

Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.

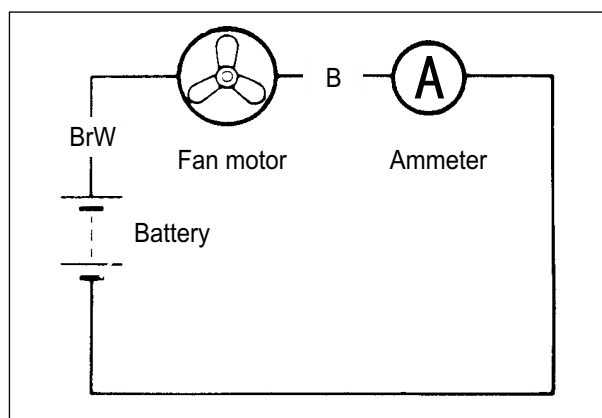


The voltmeter is for making sure that the battery applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 amperes.

If the fan motor does not turn, replace the motor assembly with a new one.

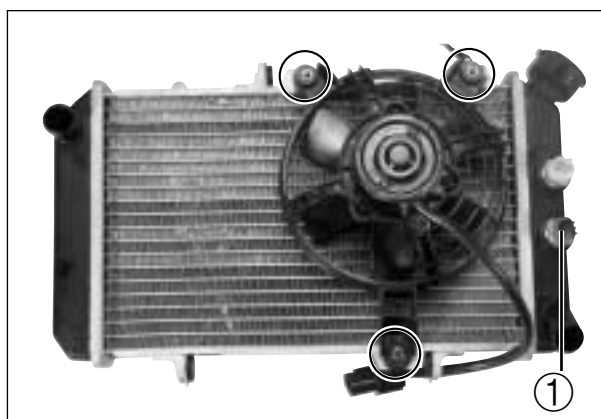
### NOTE

*When making above test, it is not necessary to remove the cooling fan.*



### ⊙ REMOVAL

- Drain engine coolant. (Refer to page 2-12)
- Remove the front fender. (Refer to page 7-3)
- Remove the radiator. (Refer to page 5-2)
- Disconnect the cooling fan thermo-switch ①.
- Remove the cooling fan.



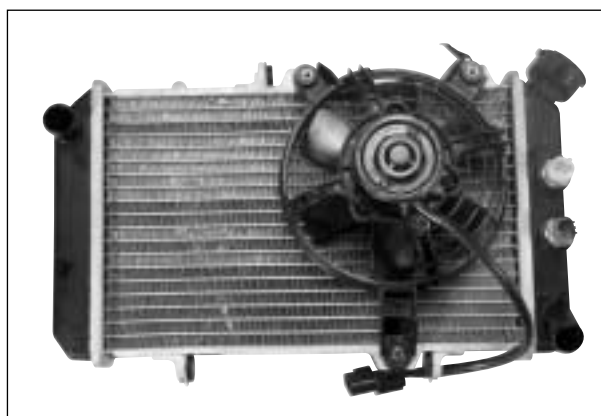
### ⊙ INSTALLATION

- Install the cooling fan to the radiator.

**Ⓜ Cooling fan mounting bolt**  
: 8~12 N · m (0.8~1.2 kgf · m)

**Cooling fan motor mounting bolt**  
: 8 N · m (0.8 kgf · m)

- Install the radiator.
- Route the radiator hoses properly.
- Pour engine coolant. (Refer to page 2-12)
- Bleed air from the cooling circuit.  
(Refer to page 2-12)
- Install the front fender.



## COOLING FAN THERMO-SWITCH

The cooling fan is secured behind the radiator by three bolts and is automatically controlled by the thermo-switch. The thermo-switch remains open when the temperature of the engine coolant is low, but closes when the temperature reaches approximately 88°C (190°F) setting the cooling fan in motion.

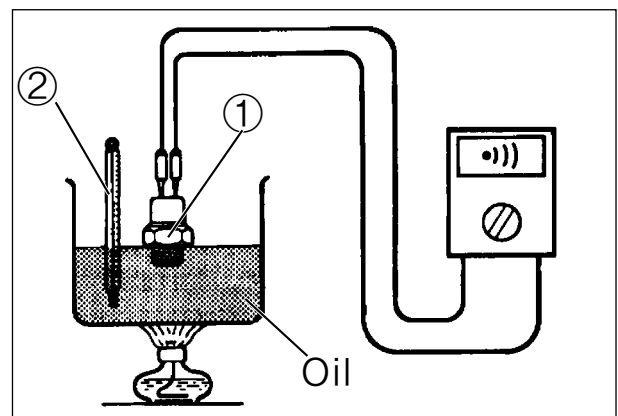
### REMOVAL

- Remove the front fender. (Refer to page 7-3)
- Drain engine coolant. (Refer to page 2-12)
- Disconnect the cooling fan thermo-switch lead wire coupler.
- Remove the cooling fan thermo-switch ①.



### INSPECTION

- Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure.  
Connect the thermo-switch ① to a circuit tester and place it in the OIL contained in a pan, which is placed on a stove.
- Heat the oil to raise its temperature slowly and read the column thermometer ② when the switch closes or opens.



Cooling fan thermo-switch operating temperature	Standard
OFF → ON	Approx. 95°C (203°F)
ON → OFF	Approx. 88°C (190°F)

 Multi circuit tester set : 09900-25008

### CAUTION

- ❖ Take special care when handling the thermo-switch.  
It may cause damage if it gets a sharp impact.
- ❖ Do not contact the cooling fan thermo-switch ① and the column thermometer ② with a pan.



### ⊙ INSTALLATION

Install the cooling fan thermo-switch in the reverse order of removal.

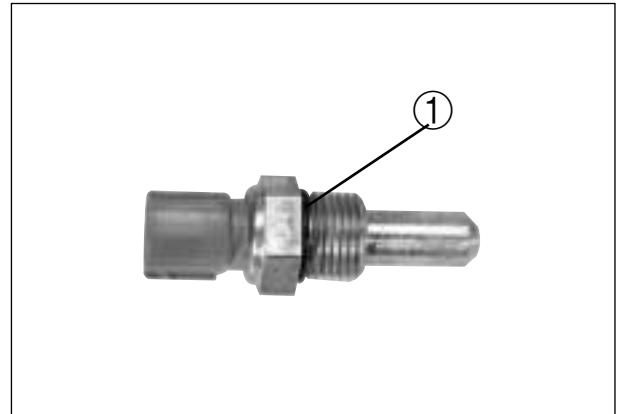
Pay attention to the following points :

- Install a new O-ring ① and apply engine coolant to the O-ring.
- Tighten the cooling fan thermo-switch to the specified torque.

#### Cooling fan thermo-switch

: 13 N · m (1.3 kgf · m)

- Pour engine coolant. (Refer to page 2-12)
- Bleed air from the cooling circuit.  
(Refer to page 2-12)
- Install the front fender.



# WATER TEMPERATURE SWITCH

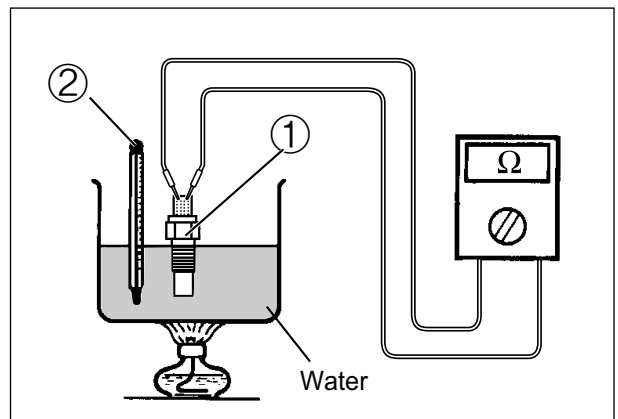
## REMOVAL

- Remove the front fender. (Refer to page 7-3)
- Drain engine coolant. (Refer to page 2-12)
- Disconnect the water temperature switch lead wire coupler.
- Remove the water temperature switch ①.



## INSPECTION

- Check the engine coolant temperature by testing it at the bench as shown in the figure. Connect the water temperature switch ① to a circuit tester and place it in the WATER contained in a pan, which is placed on a stove.
- Heat the water to raise its temperature slowly and read the column thermometer ② and the ohmmeter.



Water temperature switch operating temperature	Standard
OFF → ON	Approx. 120°C (248°F)
ON → OFF	Approx. 113°C (235°F)

 Multi circuit tester set : 09900-25008

If the resistance noted to show infinity or too much different resistance value, replace the water temperature switch with a new one.

## CAUTION


- Take special care when handling the water temperature switch. It may cause damage if it gets a sharp impact.
- Do not contact the water temperature switch ① and the column thermometer ② with a pan.

## INSTALLATION

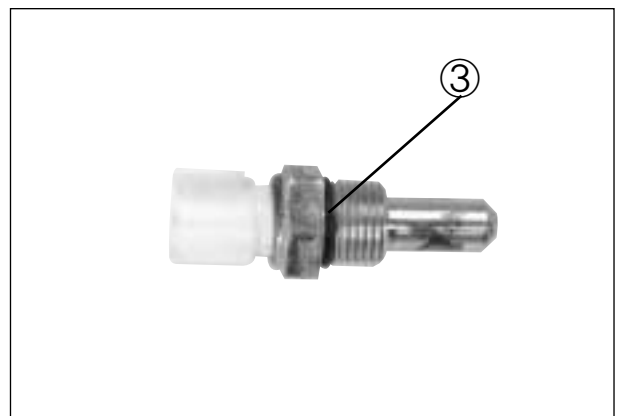
Install the water temperature switch in the reverse order of removal.

Pay attention to the following points :

- Install a new O-ring ③ and apply engine coolant to the O-ring.
- Tighten the water temperature switch to the specified torque.

 **Water temperature switch**  
: 13 N · m (1.3 kgf · m)

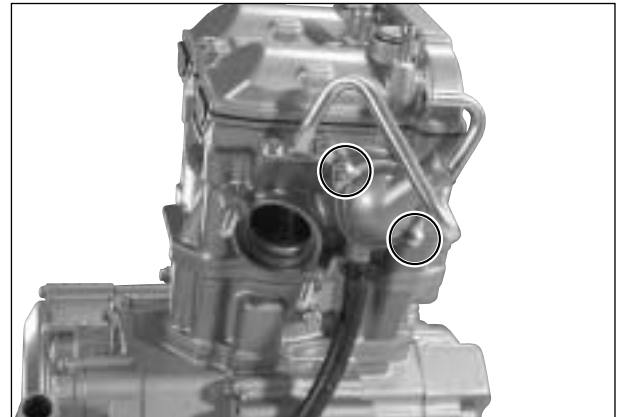
- Pour engine coolant. (Refer to page 2-12)
- Bleed air from the cooling circuit. (Refer to page 2-12)
- Install the front fender.



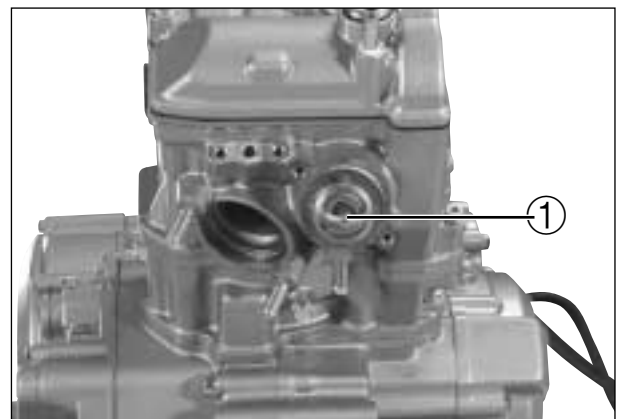
## THERMOSTAT

### ⊙ REMOVAL

- Remove the front fender.  
(Refer to page 7-3)
- Drain engine coolant. (Refer to page 2-12)
- Place a rag under the thermostat case.
- Remove the thermostat case cap.



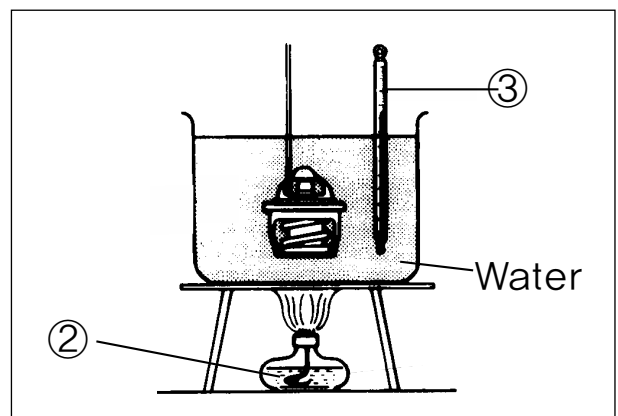
- Remove the thermostat ①.



### ⊙ INSPECTION

Inspect the thermostat pellet for signs of cracking. Test the thermostat at the bench for control action, in the following manner.

- Pass a string between flange, as shown in the photograph.
- Immerse the thermostat in the WATER contained in a beaker, as shown in the illustration. Note that the immersed thermostat is in suspension. Heat the water by placing the beaker on a stove ② and observe the rising temperature on a thermometer ③.
- Read the thermometer just when opening the thermostat. This reading, which is the temperature level at which the thermostat valve begins to open, should be within the standard value.



Thermostat valve operation temperature	Standard
Valve opening	76°C (169°F)
Valve closing	71°C (160°F)

- Keep on heating the water to raise its temperature.
- Just when the water temperature reaches specified value, the thermostat valve should have lifted by at least 8.0 mm (0.32 in).

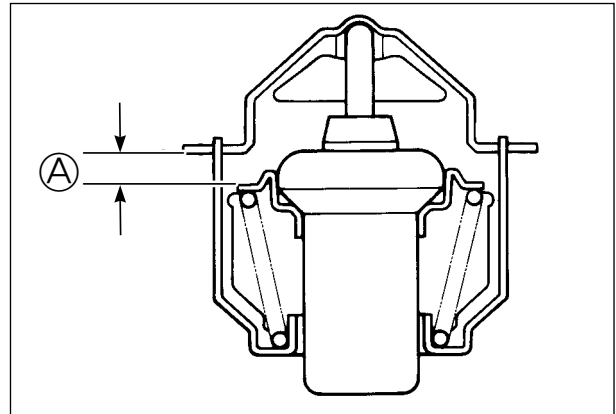
Thermostat valve lift Ⓐ	Standard
	Over 8.0 mm at 90°C (Over 0.32 in at 194°F)

- A thermostat failing to satisfy either of the two requirements, start-to-open temperature and valve lift, must be replaced with a new one.

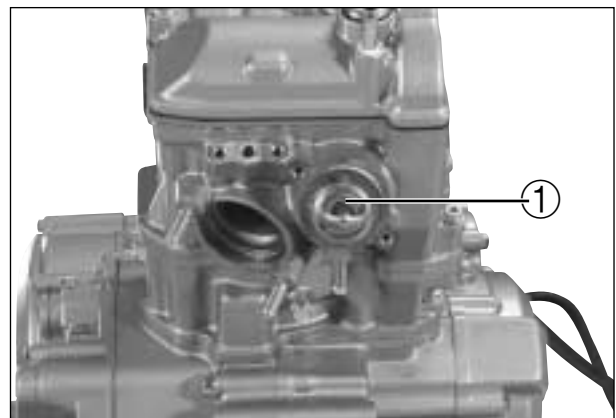
## ⊙ INSTALLATION

Install the thermostat in the reverse order of removal. Pay attention to the following points :

- Apply engine coolant to the rubber seal on the thermostat.



- Install the thermostat ①.



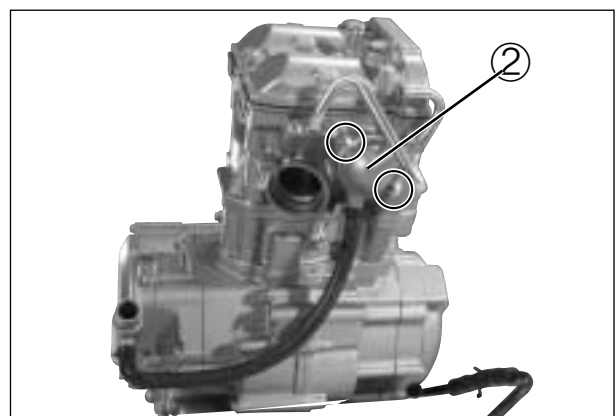
- Install the thermostat case cap ②.
- Tighten the thermostat case bolts to the specified torque.



### Thermostat case bolt

: 10 N · m (1.0 kgf · m)

- Pour engine coolant. (Refer to page 2-12)
- Bleed air from the cooling circuit. (Refer to page 2-12)
- Install the front fender.



## WATER PUMP

### ⊙ REMOVAL AND DISASSEMBLY

- Drain engine coolant. (Refer to page 2-12)
- Drain engine oil. (Refer to page 2-10)

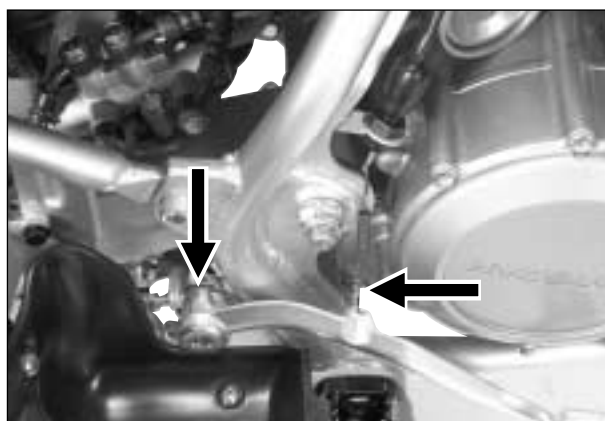
#### WARNING

- ❖ Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- ❖ The engine must be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.

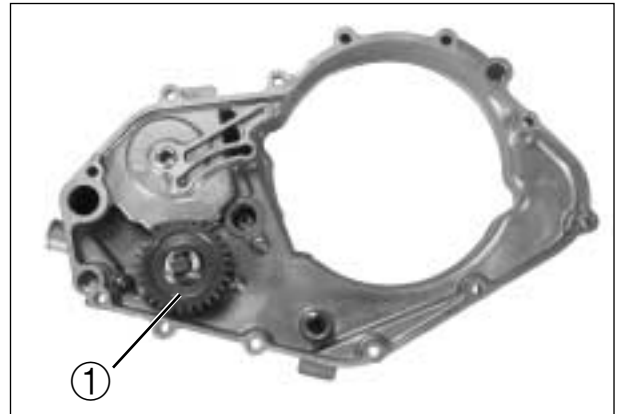
- Disconnect the water hoses.
- Disconnect the rear brake switch spring and rear brake pedal spring as to lower side.
- Remove the rear brake master cylinder mounting bolts.
- Remove the clutch cover with pushing down the rear brake pedal.

#### NOTE

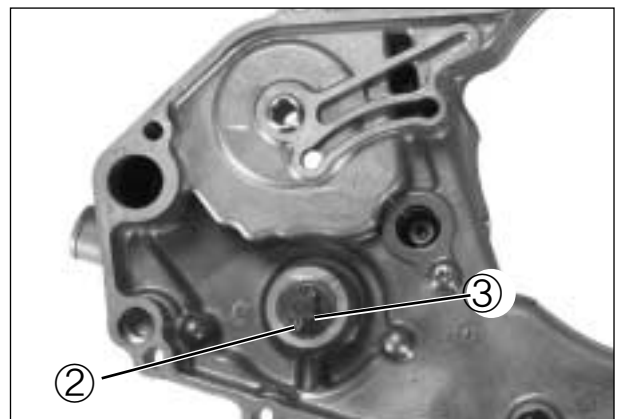
*Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and clutch cover.  
If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the O-ring.*



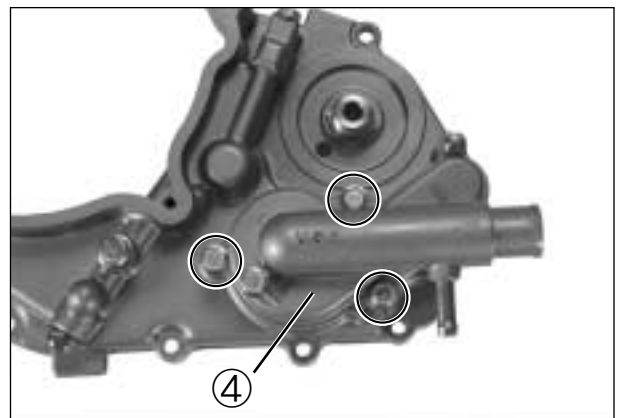
- Remove the circlip and water pump driven gear ①.



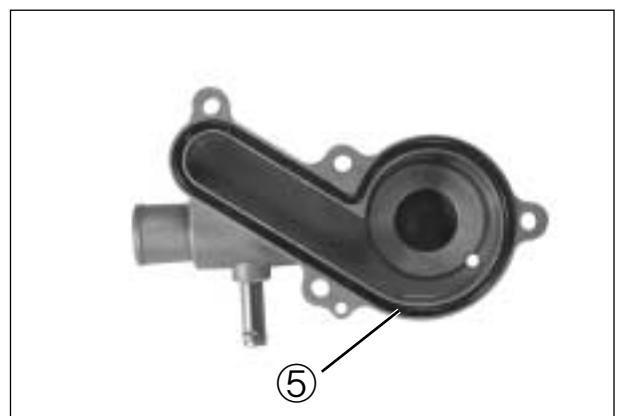
- Remove the pin ② and washer ③.



- Remove the water pump case ④ from the clutch cover.

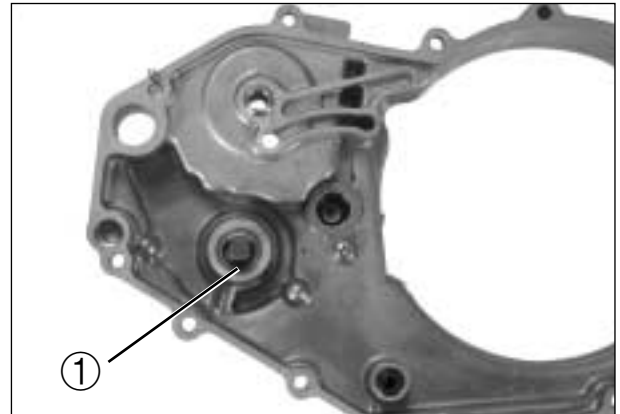


- Remove the O-rings ⑤.

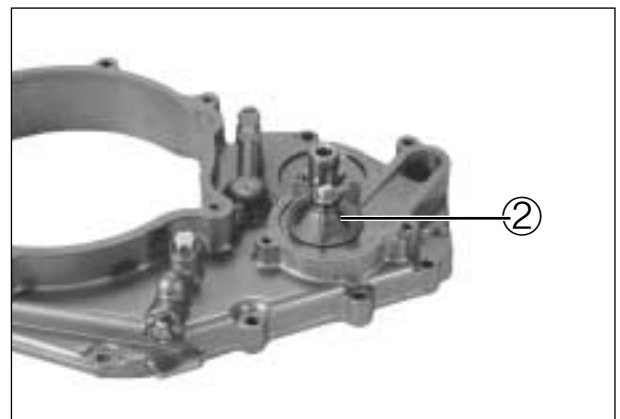


## 5-13 COOLING SYSTEM

- Remove the E-ring ① from the impeller shaft.



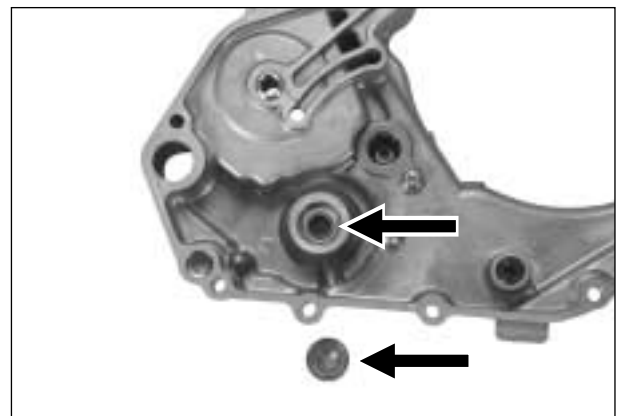
- Remove the impeller ② from the other side.



- Remove the bearing.

### **NOTE**

*If there is no abnormal noise, bearing removal is not necessary.*



## ⊙ INSPECTION

### ▣ BEARING

Inspect the play of the bearing by hand while it is in the water pump case.

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

Replace the bearing if there is anything unusual.



▣ BEARING CASE

Visually inspect the bearing case for damage.  
Replace the water pump body if necessary.



▣ IMPELLER

Visually inspect the impeller and its shaft for damage.

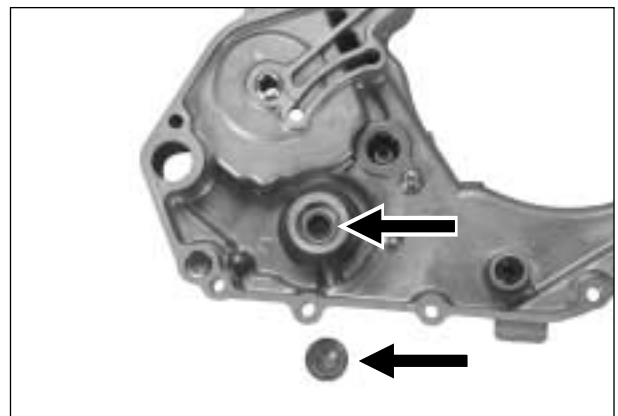


◎ REASSEMBLY AND INSTALLATION

Install the water pump in the reverse order of removal.

Pay attention to the following points :

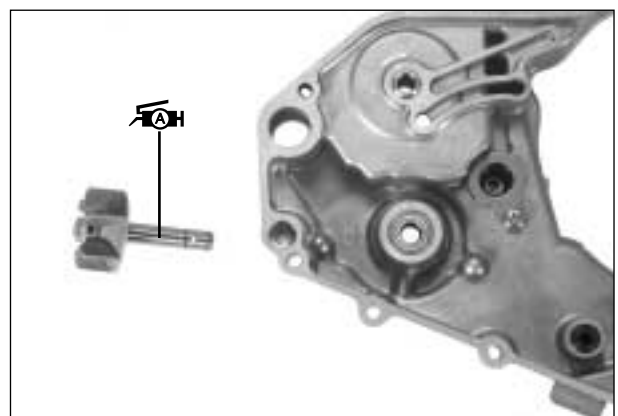
- Install the bearing.



- Apply SUPER GREASE "A" to the impeller shaft.

SUPER GREASE "A"

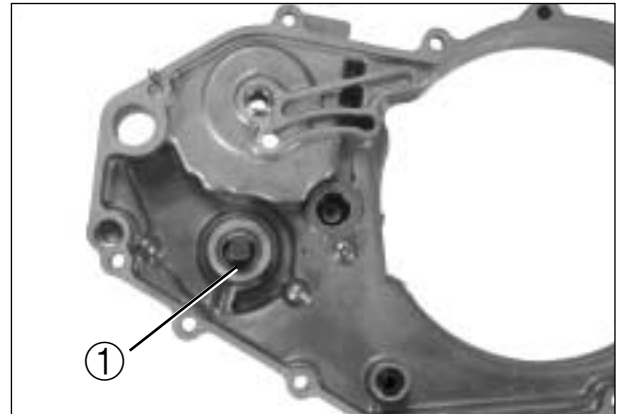
- Install the impeller to the water pump body.





## 5-15 COOLING SYSTEM

- Fix the impeller shaft with the E-ring ① .
- Fill the bearing with engine oil until engine oil comes out from the hole of the bearing housing.




- Apply engine coolant to the O-ring ② .
- Install a new O-ring.

 **CAUTION**

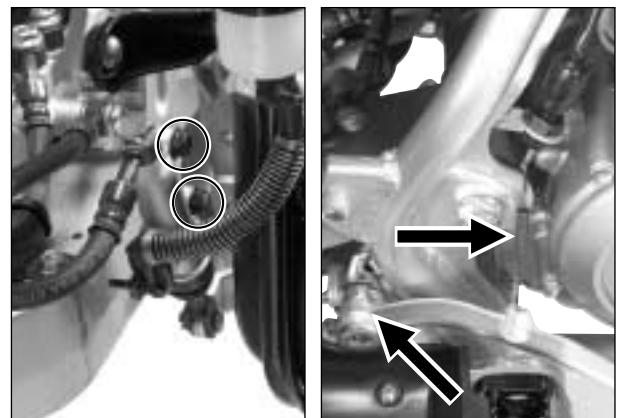
Use a new O-ring to prevent engine coolant leakage.



- Install the rear brake master cylinder mounting bolts.

 **Rear brake master cylinder mounting bolt**  
: 8~12 N · m (0.8~1.2 kgf · m)

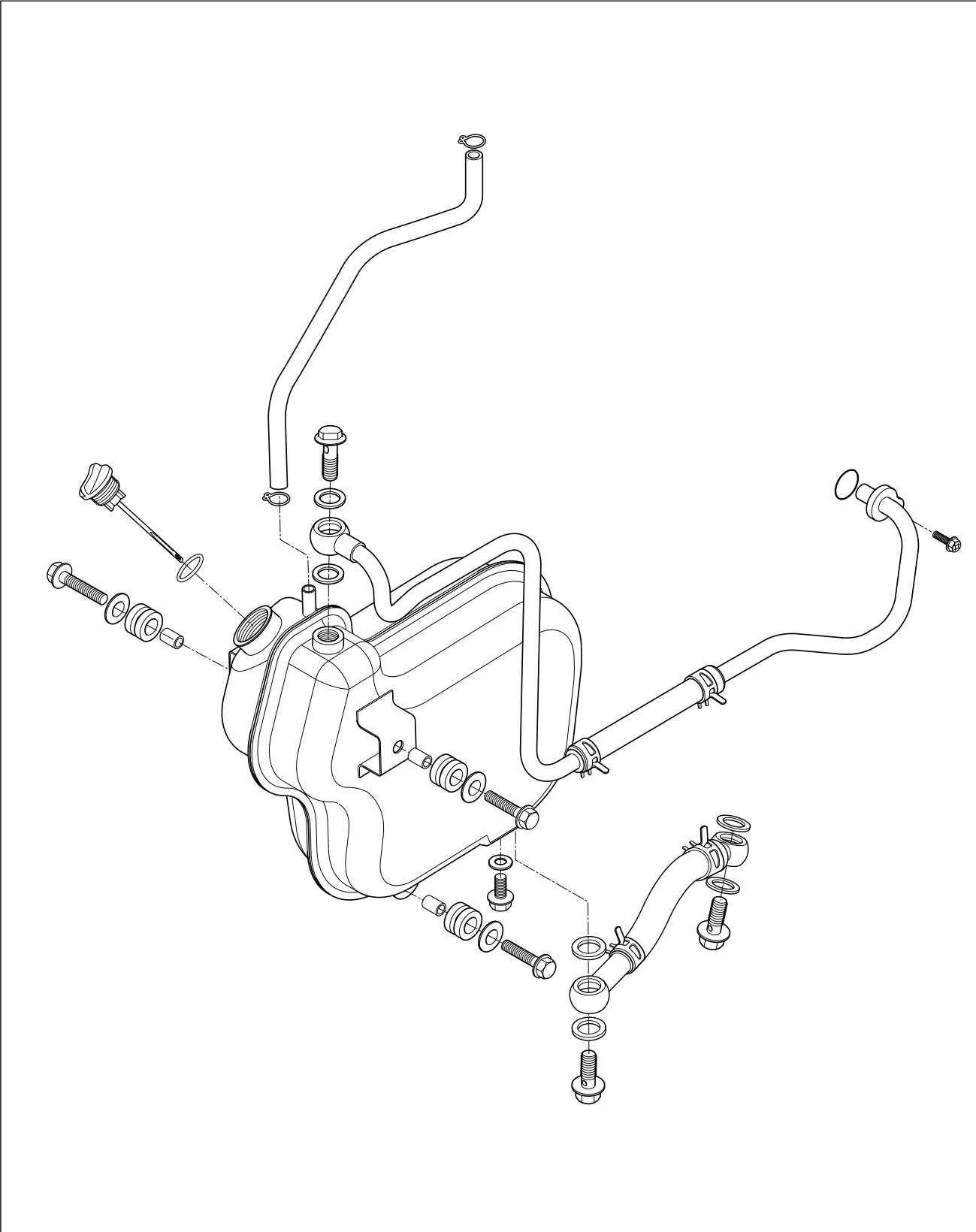
- Connect the rear brake switch spring and rear brake pedal spring as to lower side.



- Connect the water hoses.
- Pour engine coolant. (Refer to page 2-12)
- Pour engine oil. (Refer to page 2-11)

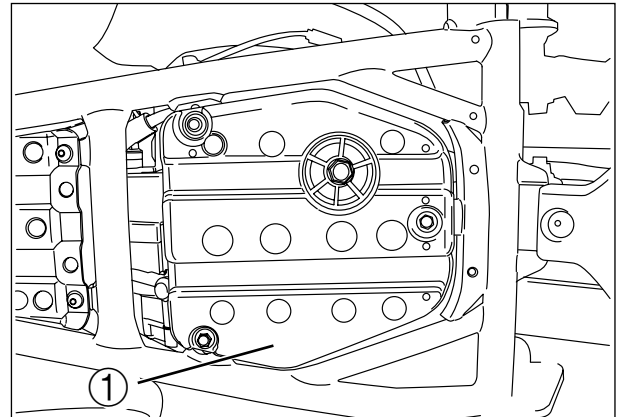
# OIL TANK AND HOSES

## ⦿ CONSTRUCTION

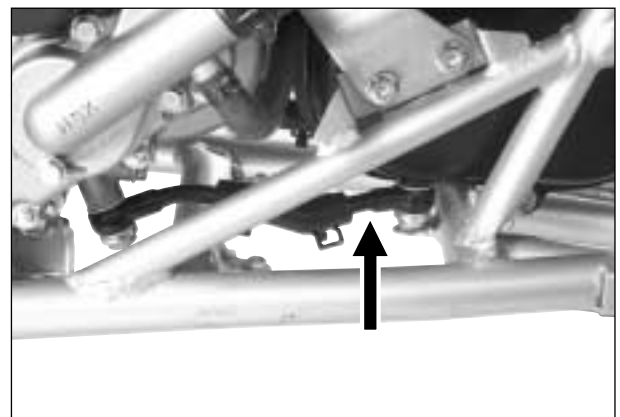
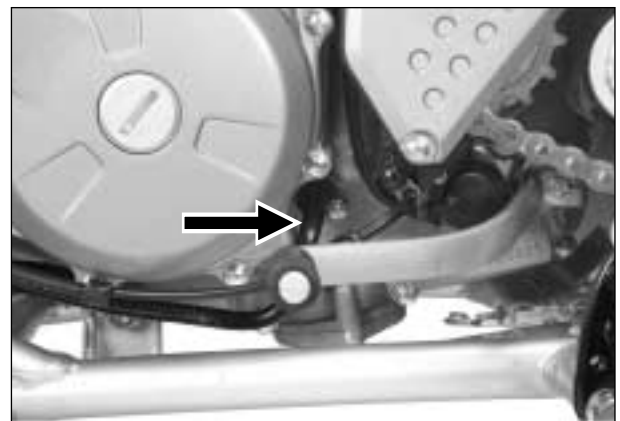
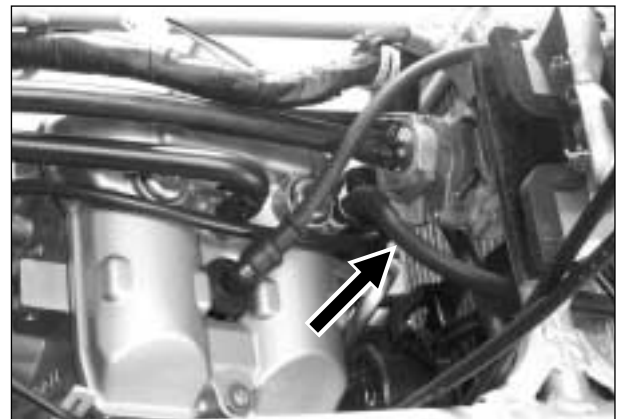


## REMOVAL

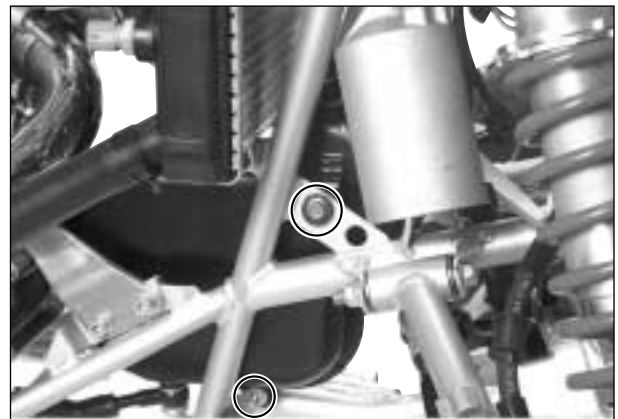
- Remove the front fender. (Refer to page 7-3)
- Drain engine coolant. (Refer to page 2-12)
- Remove the radiator. (Refer to page 5-2)
- Drain engine oil. (Refer to page 2-10)
- Remove the engine under cover①.



- Remove the oil hoses.



- Remove the oil tank.




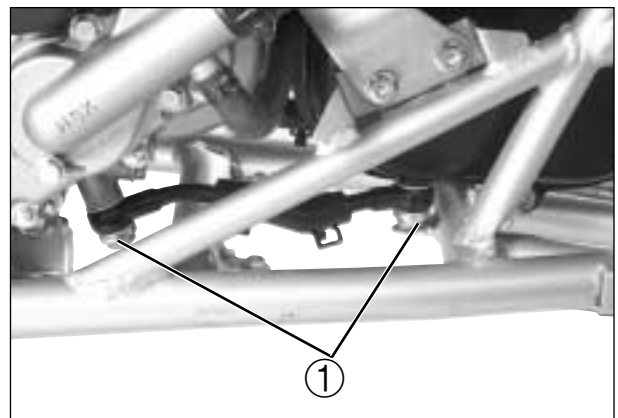
## ◎ REMOUNTING

Remount the oil tank and hoses in the reverse order of removal.

Pay attention to the following points :

- Tighten the engine oil inlet hose union bolts ① to the specified torque.

 **Engine oil inlet hose union bolt**  
: 23 N · m (2.3 kgf · m)



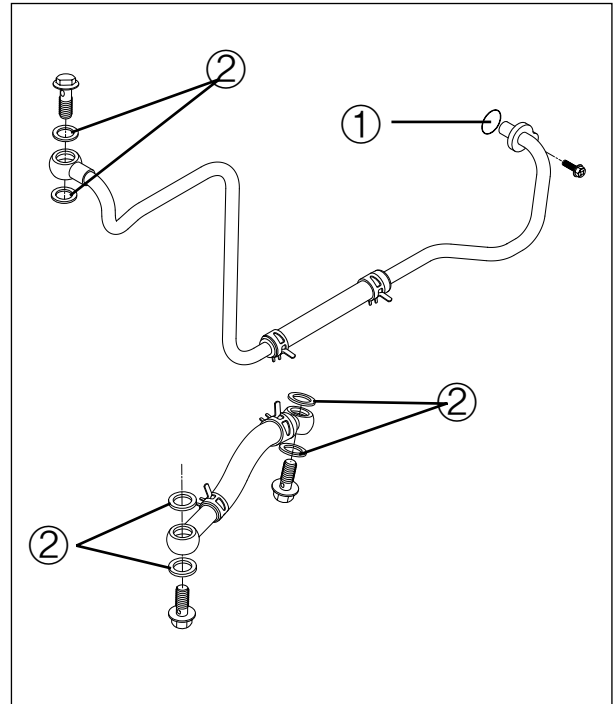
## 5-19 COOLING SYSTEM

- Install the new O-ring ① to the hoses.

 **CAUTION**

Use the new O-rings to prevent engine coolant leakage.

- Install the gaskets ② .
- Apply engine oil to the O-ring and gaskets.
- Pour engine oil. (Refer to page 2-11)
- Install the radiator. (Refer to page 5-4)
- Pour engine coolant. (Refer to page 2-12)
- Install the front fender.

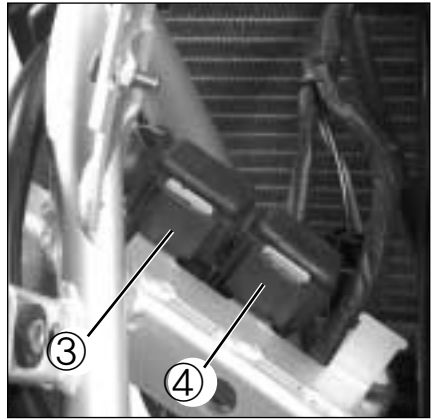
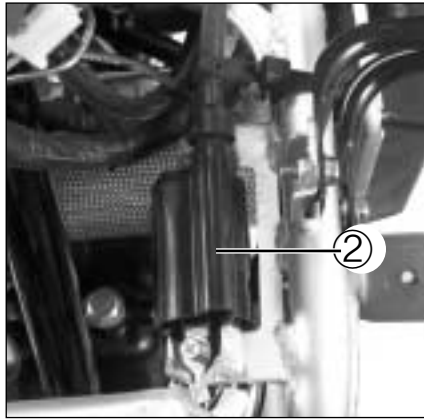
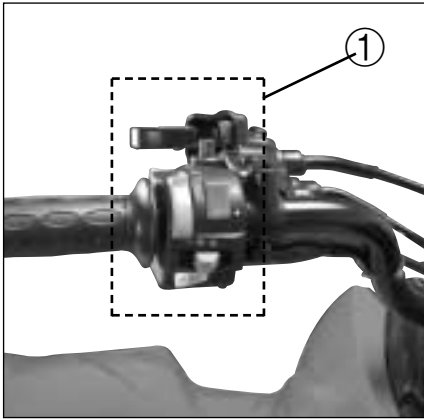


# **ELECTRICAL SYSTEM**

## **CONTENTS**

<b>LOCATION OF ELECTRICAL COMPONENTS</b> .....	<b>6- 1</b>
<b>IGNITION SYSTEM</b> .....	<b>6- 3</b>
<b>CHARGING SYSTEM</b> .....	<b>6- 7</b>
<b>STARTER SYSTEM</b> .....	<b>6- 9</b>
<b>SWITCHES</b> .....	<b>6-12</b>
<b>LAMPS</b> .....	<b>6-14</b>
<b>BATTERY</b> .....	<b>6-16</b>

## LOCATION OF ELECTRICAL COMPONENTS

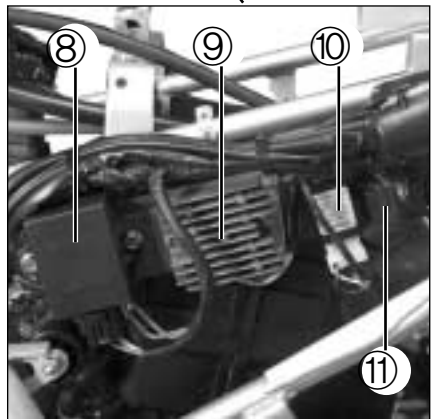
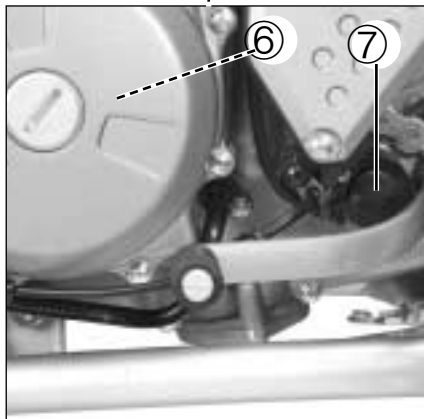
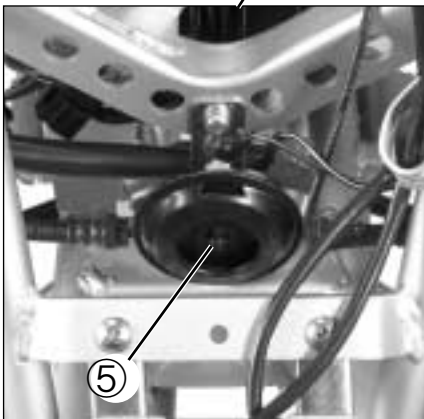
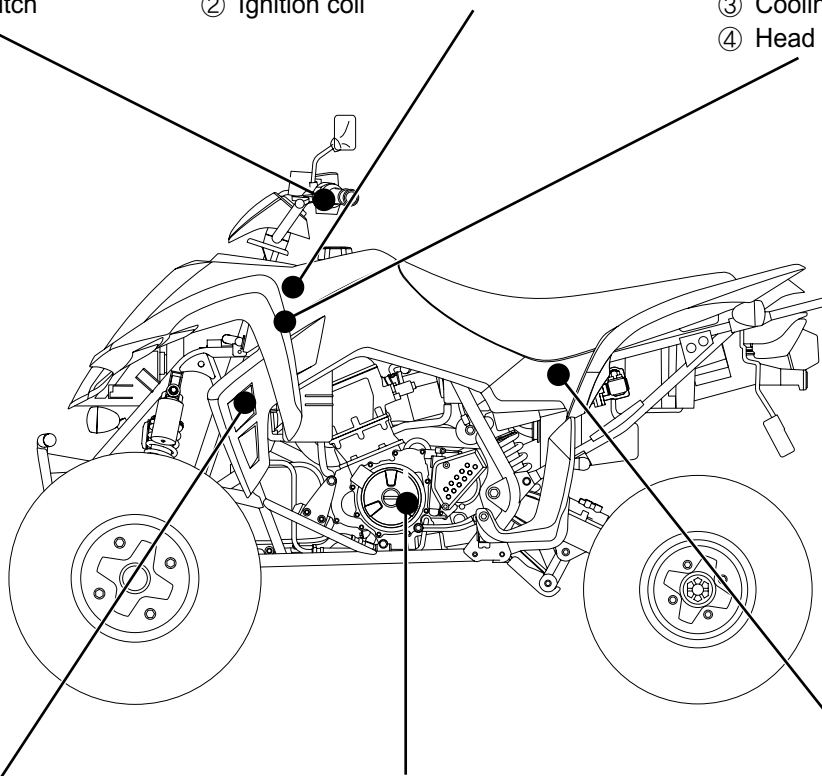


① Left handlebar switch

② Ignition coil

③ Cooling fan motor relay

④ Head lamp relay



⑤ Horn

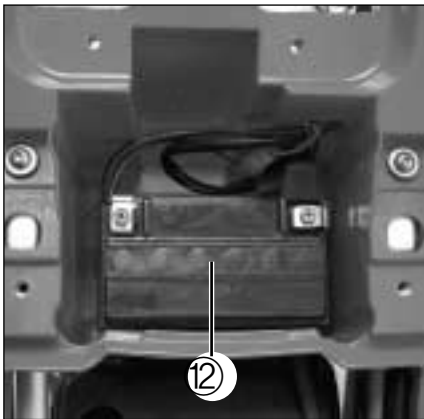
⑥ Magneto

⑦ Gear position switch

⑧ Igniter

⑨ Regulator / Rectifier

⑩ Turn signal relay ⑪ Starter relay



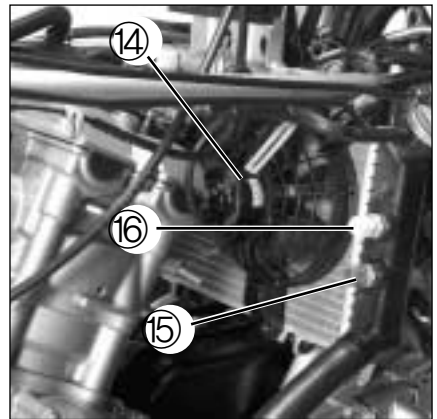
12

12 Battery



13

13 Front brake lamp switch

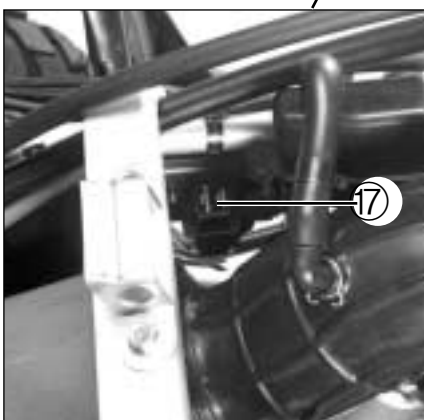
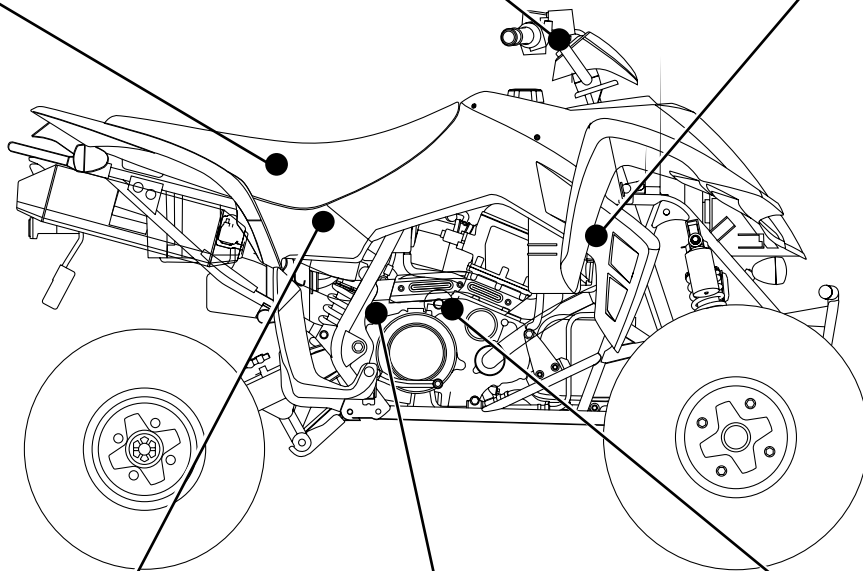


14

16

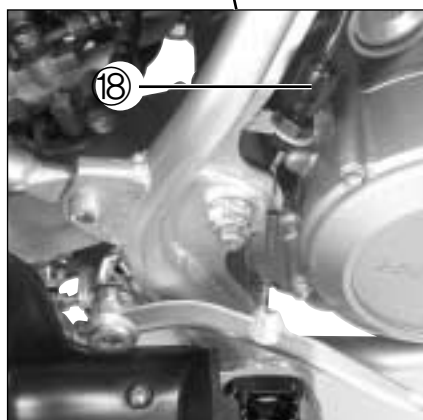
15

14 Cooling fan motor  
15 Cooling fan thermo-switch  
16 Water temperature switch



17

17 Main fuse



18

18 Rear brake lamp switch

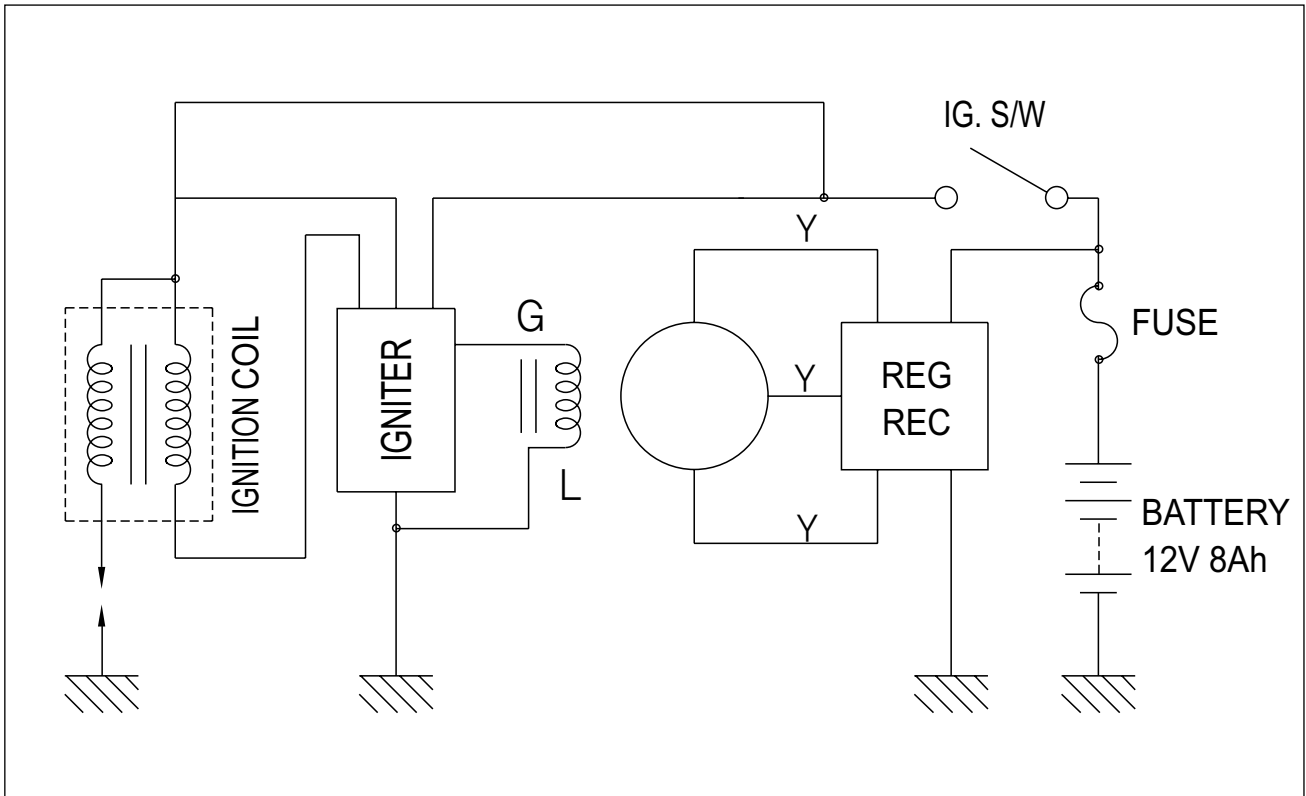


19

19 Starter motor



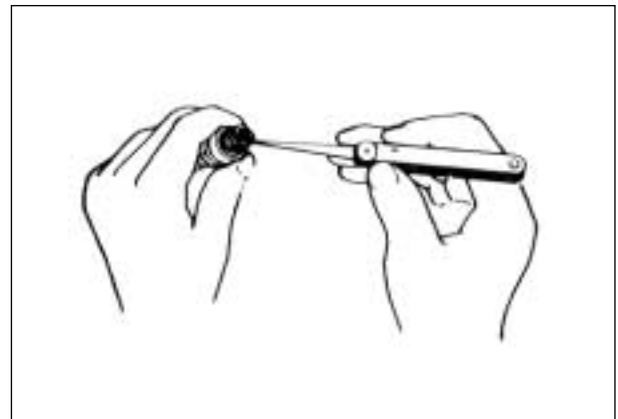
## IGNITION SYSTEM



### ⊙ INSPECTION

#### ▣ SPARK PLUG

Clean the plug with a wire brush and pin. Use the pin to remove carbon, taking care not to damage the porcelain.

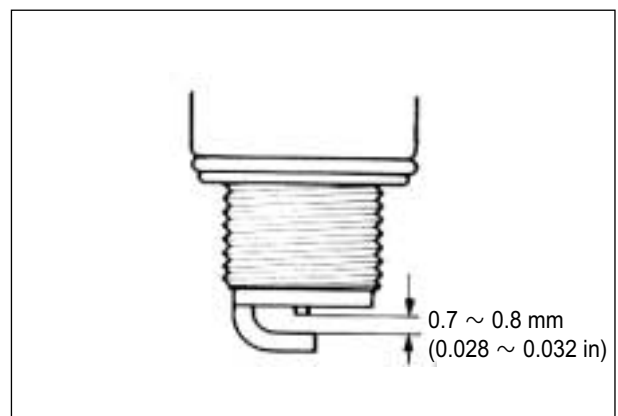


- Check the gap with a thickness gauge.

**Spark plug gap**

0.7 ~ 0.8 mm  
(0.028 ~ 0.032 in)

 **Thickness gauge : 09900-20806**



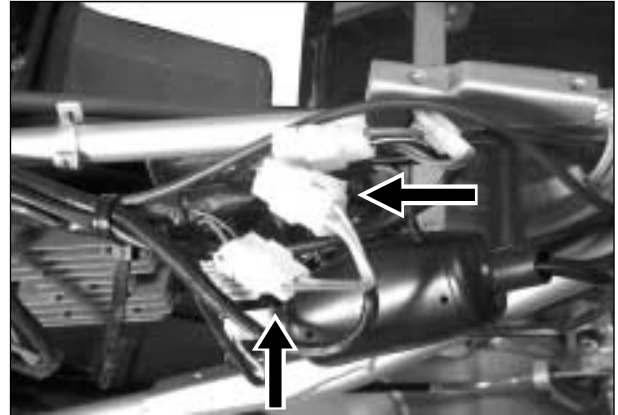
## ▣ MAGNETO

Using the pocket tester, measure the resistance between the lead wires in the following table.

If the resistance is not within the specified value, replace the stator coil, with a new one.

Stator coil resistance	Standard
Pick-up coil	G-L 90 ~ 110 Ω
Charging coil	Y-Y 0.3 ~ 0.8 Ω

 Pocket Tester : 09900-25002



## CAUTION

When mounting the stator on the magneto cover, apply a small quantity of THREAD LOCK “1324” to the threaded parts of screws.

 THREAD LOCK “1324”



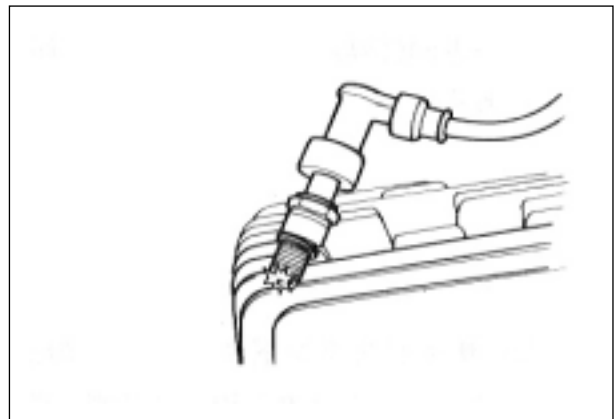
## WIRE COLOR

L : Blue  
 G : Green  
 Y : Yellow  
 Br : Brown  
 BY : Black with Yellow tracer  
 OB : Orange with Black tracer  
 BW : Black with White tracer  
 WL : White with Blue tracer  
 YG : Yellow with Green tracer

## 6-5 ELECTRICAL SYSTEM

### IGNITION COIL

- Remove the front fender, side cover, fuel tank. (Refer to page 7-3 and 4-1)
- Pull out the spark plug.
- Place it on the cylinder head after installing it at the plug cap to obtain ground.
- Push the electric starter switch to rotate the starter motor, to have the test of sparking performance.
- If spark doesn't emit or the spark bring out the orange color, replace the ignition coil.

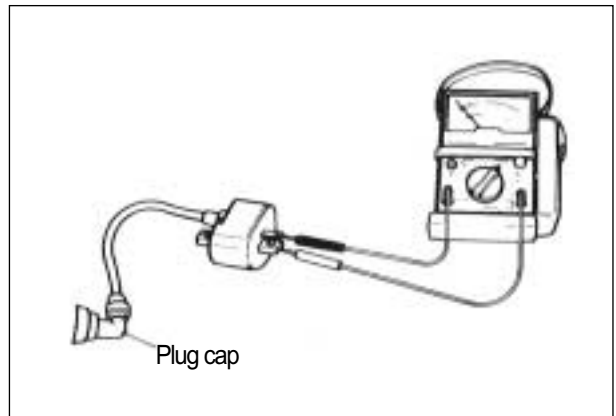


### IGNITION COIL (Checking with Pocket Tester)

- Remove the front fender, side cover, fuel tank. (Refer to page 7-3 and 4-1)
- Disconnect the ignition coil lead wires and spark plug cap, and remove the ignition coil.

Measure the ignition coil resistance in both the primary and secondary windings using a pocket tester or an ohmmeter.

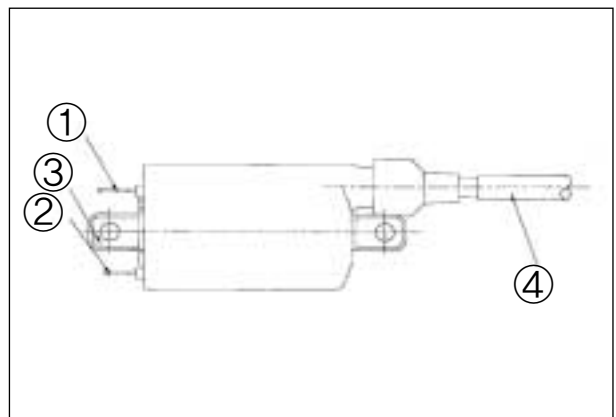
If the resistance in both the primary and secondary windings is close to the specified values, the windings are in sound condition.



Unit : K $\Omega$

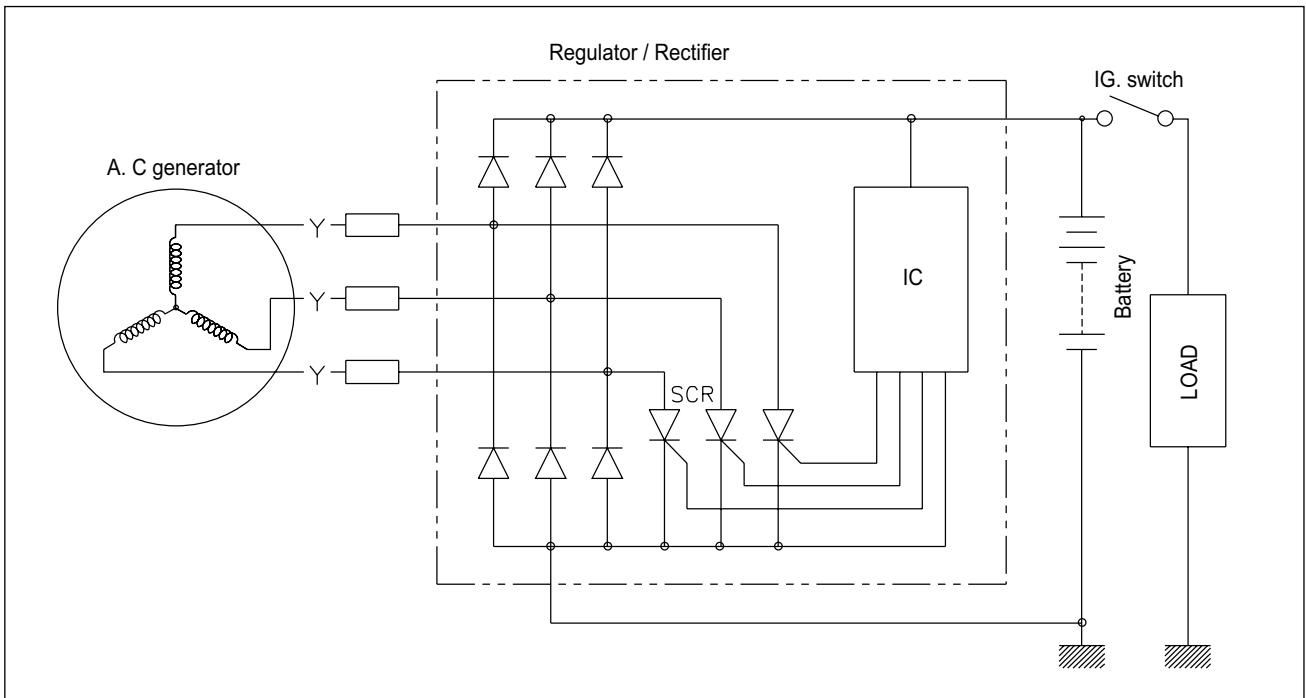
	⊕ TESTER PROBE			
	①	②	③	④
①		3.9~5.3 $\Omega$	$\infty$	12.6~17.0K $\Omega$
②	3.9~5.3 $\Omega$		$\infty$	12.6~17.0K $\Omega$
③	$\infty$	$\infty$		$\infty$
④	12.6~17.0K $\Omega$	12.6~17.0K $\Omega$	$\infty$	

 Pocket tester : 09900-25002





# CHARGING SYSTEM



## ⊙ INSPECTION

### ▣ CHARGING OUTPUT CHECK

Start the engine and keep it running at 5,000 rpm. Using the pocket tester, measure the DC voltage between the battery terminal ⊕ and ⊖. If the voltage is not within the specified value, check the magneto no-load performance and regulator / rectifier.

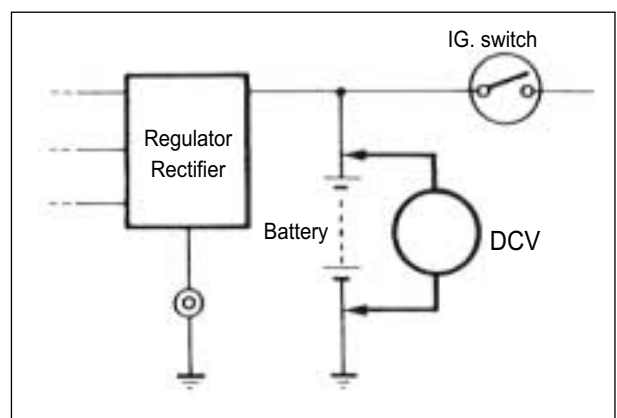


### ⚠ CAUTION

When making this test, be sure that the battery is full-charged condition.

**Standard charge** 13.5~15.0V (at 5,000 rpm)

 **Pocket tester : 09900-25002**



**▣ MAGNETO NO-LOAD PERFORMANCE**

Disconnect the three lead wires from the magneto terminal.

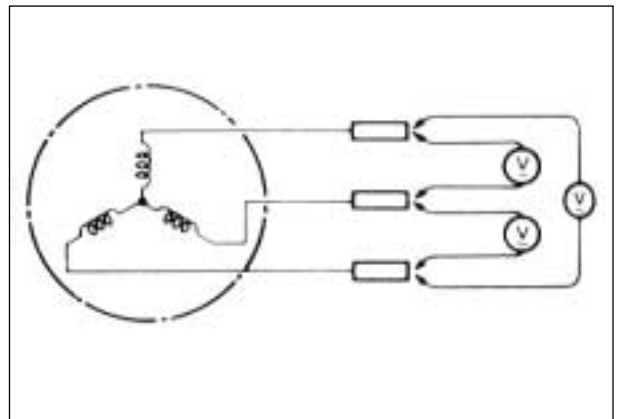
Start the engine and keep it running at 5,000 rpm.

Using the pocket tester, measure the AC voltage between the three lead wires.

If the voltage is under the specified value, replace the magneto with a new one.

**Standard NO-load performance of magneto** Over 70 V (at 5,000 rpm)

 **Pocket tester : 09900-25002**



**▣ REGULATOR / RECTIFIER**

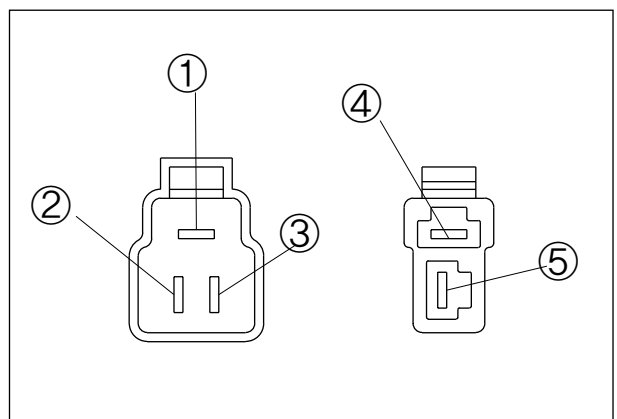
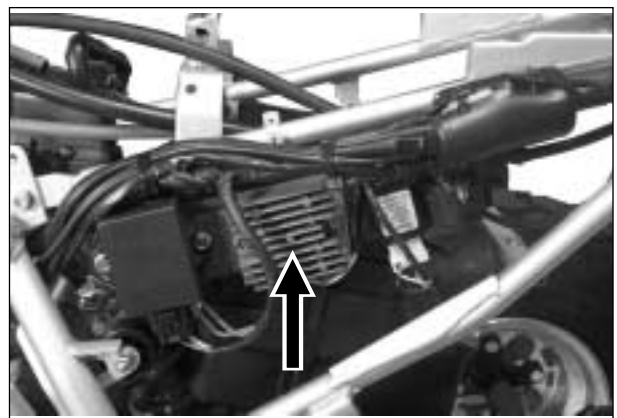
- Remove the rear fender. (Refer to page 7-5)
- Remove the regulator / rectifier.
- Using the pocket tester (× 1 MΩ range), measure the resistance between the terminals in the following table.

If the resistance checked is incorrect, replace the regulator / rectifier.

Unit : MΩ

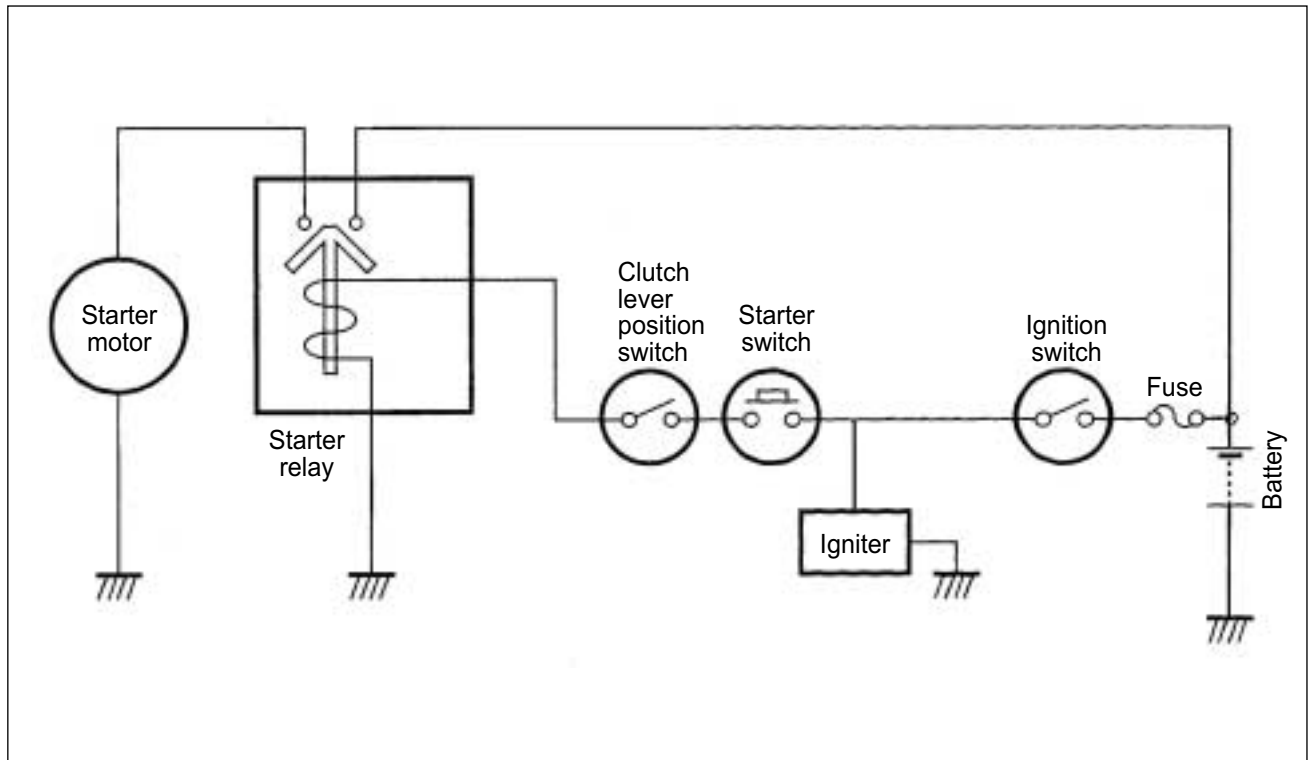
⊕ Tester probe		①	②	③	④	⑤
Tester probe	①		3~4	3~4	1~2	1~2
	②	3~4		3~4	1~2	1~2
	③	3~4	3~4		1~2	1~2
	④	1~2	1~2	1~2		32kΩ
	⑤	1~2	1~2	1~2	32kΩ	

 **Pocket tester : 09900-25002**



## STARTER SYSTEM

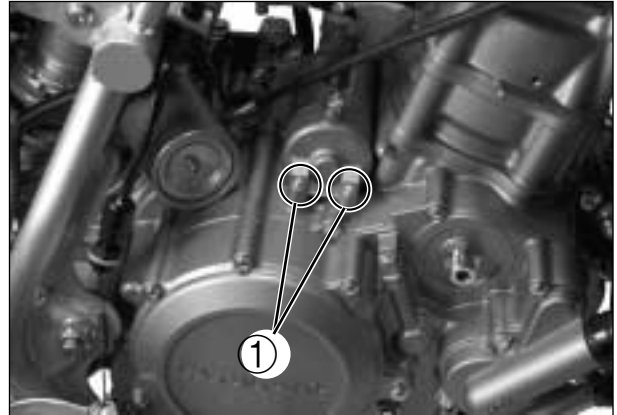
### ◎ STARTER SYSTEM DESCRIPTION



This ATV can only start the engine with pulling the clutch lever.

## ⊙ STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the starter motor lead wire.
- With loosening the bolts ①, remove the starter motor.
- Remove the starter motor.

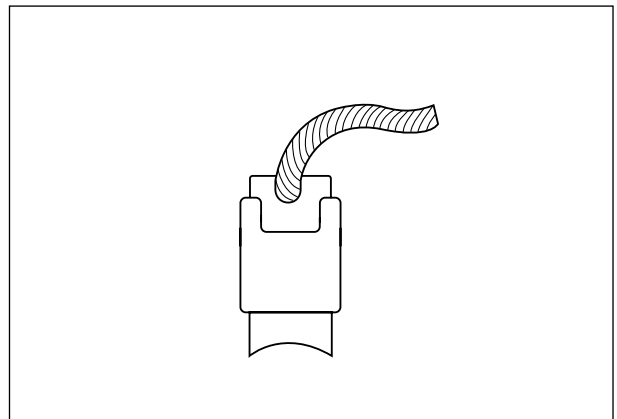


## ⊙ STARTER MOTOR INSPECTION

### ▣ CARBON BRUSH

Inspect the carbon brush for abnormal wear, crack or smoothness in the brush holder.

If any damage are found, replace the brush assembly with a new one.

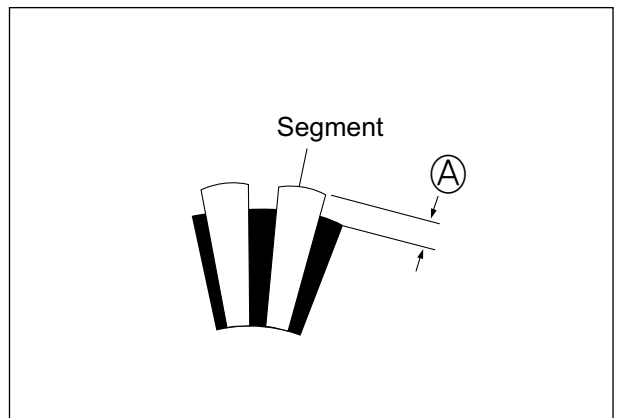


### ▣ COMMUTATOR

Inspect discoloration, abnormal wear or undercut ① of the commutator.

If the commutator is abnormally worn, replace the armature with a new one.

When surface is discolored, polish it with #400 sand paper and clean it with dry cloth.



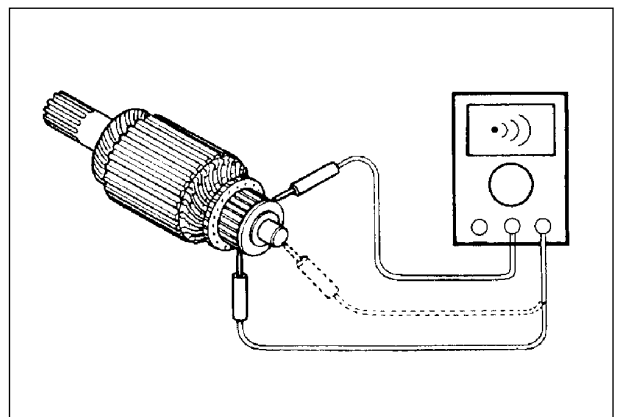
### ▣ ARMATURE COIL INSPECTION

Check continuity between each segment.

Check continuity between each segment and the armature shaft.

If there is no continuity between the segments or there is continuity between the segment and shaft, replace the starter motor with a new one.

 **Pocket tester : 09900-25002**

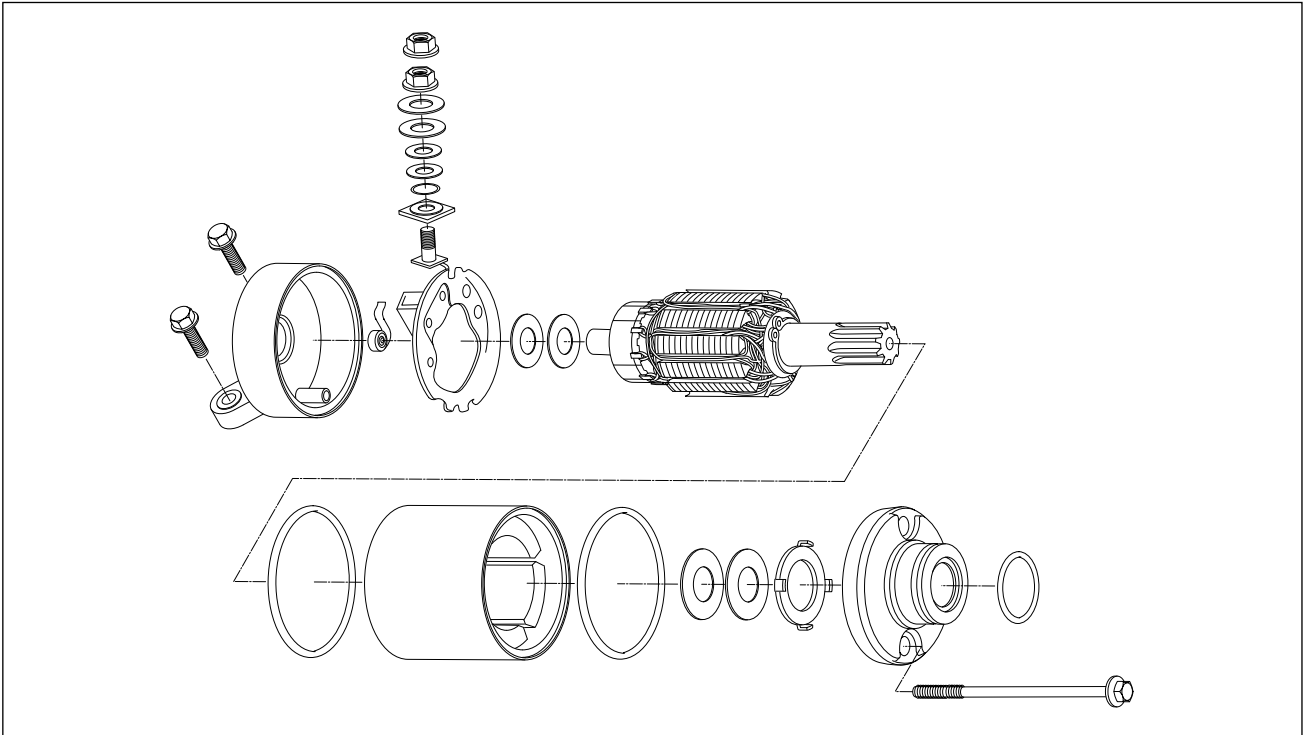




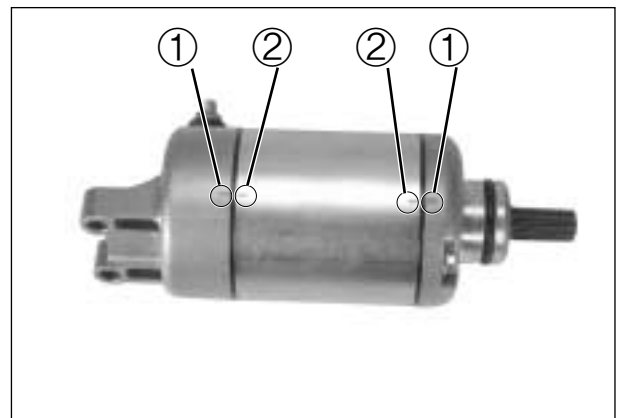
## ◎ STARTER MOTOR REASSEMBLY

Reassemble the starter motor. Pay attention to the following points :

- Reassembly the starter motor as shown in the illustration.

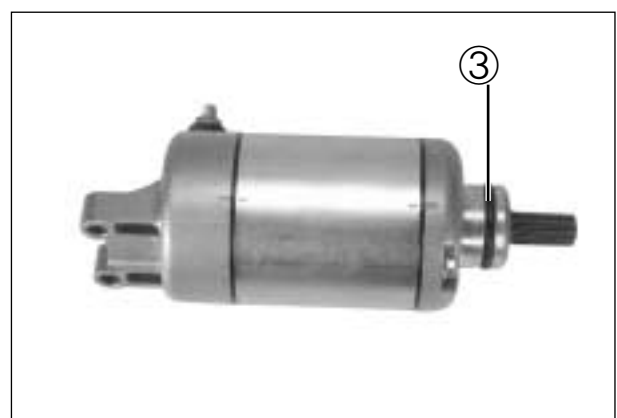


- Align the match mark ① on the housing with the line ② on the housing end.



- Apply SUPER GREASE "A" to the O-ring ③ and remount the starter motor.

 SUPER GREASE "A"






## SWITCHES

Measure each switch for continuity using a tester. If any abnormality is found, replace the respective switch assemblies with new ones.

 **Pocket tester : 09900-25002**

IGNITION SWITCH		
	R	O
ON	○-----○	○-----○
OFF		



HAZARD WARNING SWITCH		
	Sb	Gr
	○-----○	○-----○
●		

LIGHT & DIMMER SWITCH			
	YW	Y	W
	○-----○	○-----○	
	○-----○	○-----○	○-----○
●	○		

STARTER SWITCH		
	O	YR
PUSH	○-----○	○-----○
OFF		

FRONT / REAR BRAKE LAMP SWITCH		
	O	WB
ON	○-----○	○-----○
OFF		

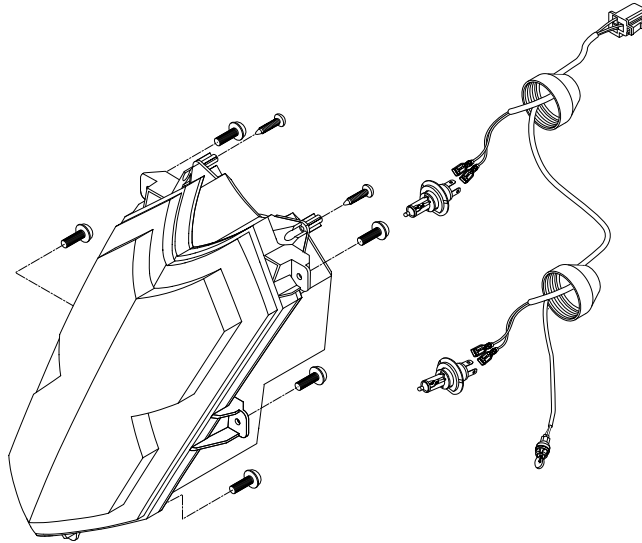
GEAR POSITION SWITCH			
	GR	L	EARTH
R	○-----○	○-----○	○-----○
N		○-----○	○-----○

TURN SIGNAL SWITCH			
	Lg	Sb	B
		○-----○	○-----○
●			
	○-----○	○-----○	

HORN SWITCH		
	G	O
PUSH	○-----○	○-----○
OFF		

## LAMPS

### ⊙ HEAD LAMP

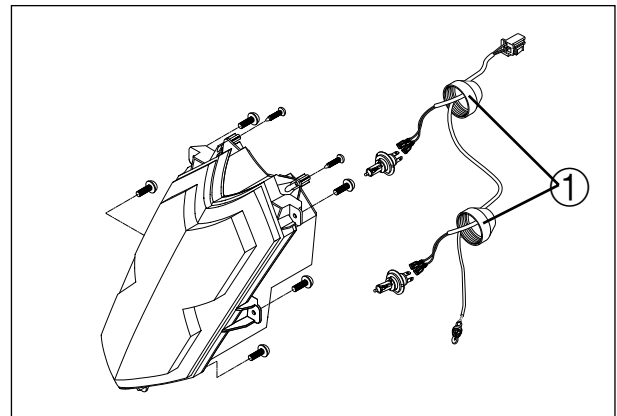


#### ⚠ CAUTION

If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

### ▣ HEAD LAMP BULB REPLACEMENT

- Remove the front fender bolts.  
Move the front fender upward to get enough space to remove the head lamp bulb.
- Remove the dust cover ① and socket spring.
- After removing the bulb at socket, replace the new bulb.
- To install the head lamp, reverse the above sequence.

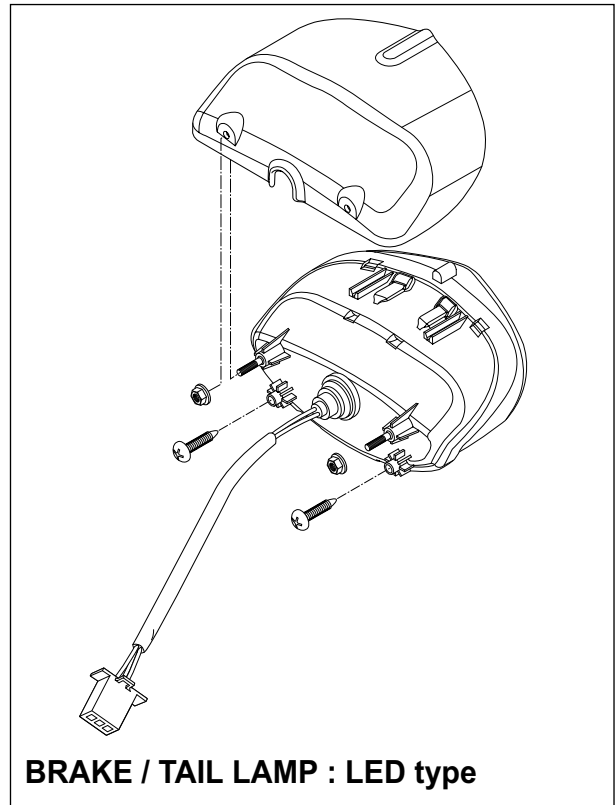


## ◎ BRAKE / TAIL LAMP

### ▣ BRAKE / TAIL LAMP REPLACEMENT

This ATV's brake / tail lamp is LED(Light Emitting Diode) type.

If any abnormal condition are found, replace the brake / tail lamp assembly.



## ◎ TURN SIGNAL LAMP

### ⚠ CAUTION

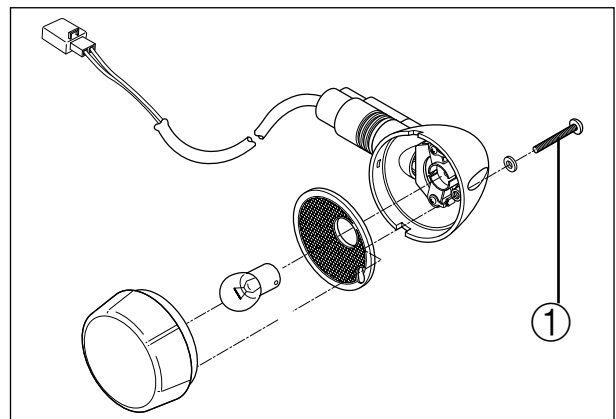
If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

### ▣ TURN SIGNAL LAMP BULB REPLACEMENT

- Remove the lens by removing the screw ① .
- Push the bulb, turn it to the counter-clockwise, and pull it out.
- After stick in the new lamp, assemble the lens.

### ⚠ CAUTION

Overtightening the screws may cause the lens to crack.



### ⦿ COMBINATION METER


Remove the combination meter.  
 Disassemble the combination meter as shown in the illustration.

### ▣ INSPECTION

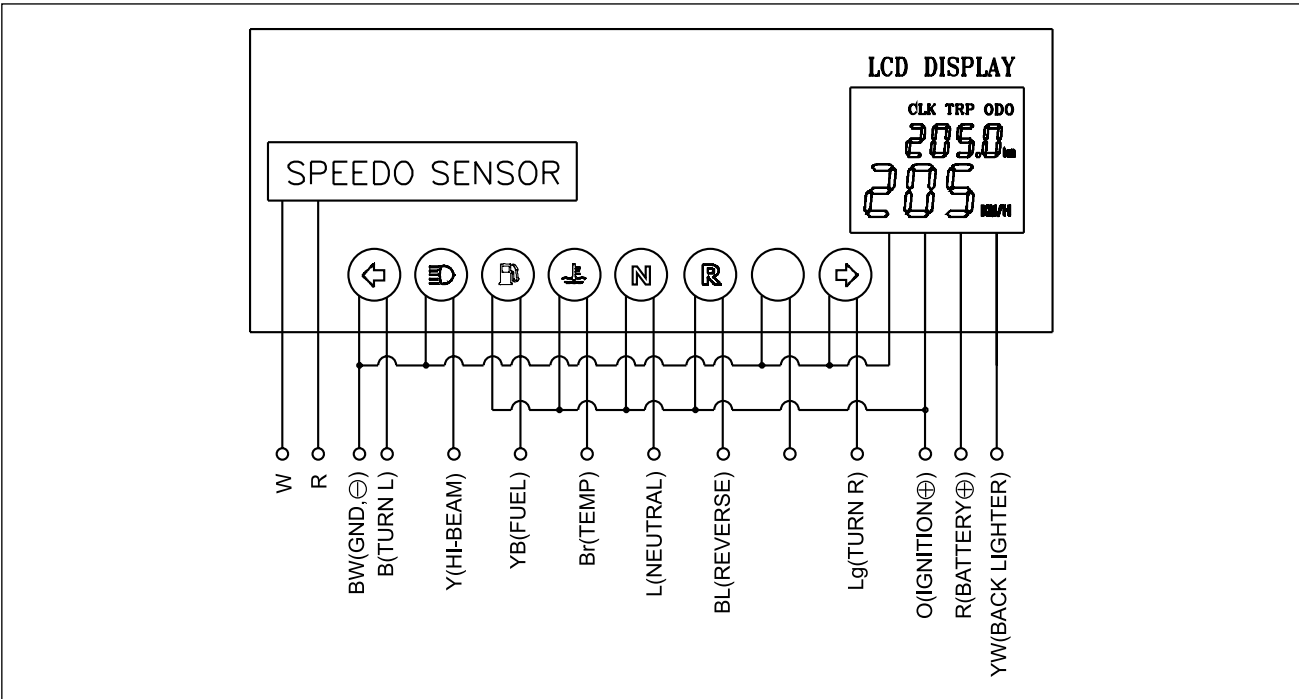
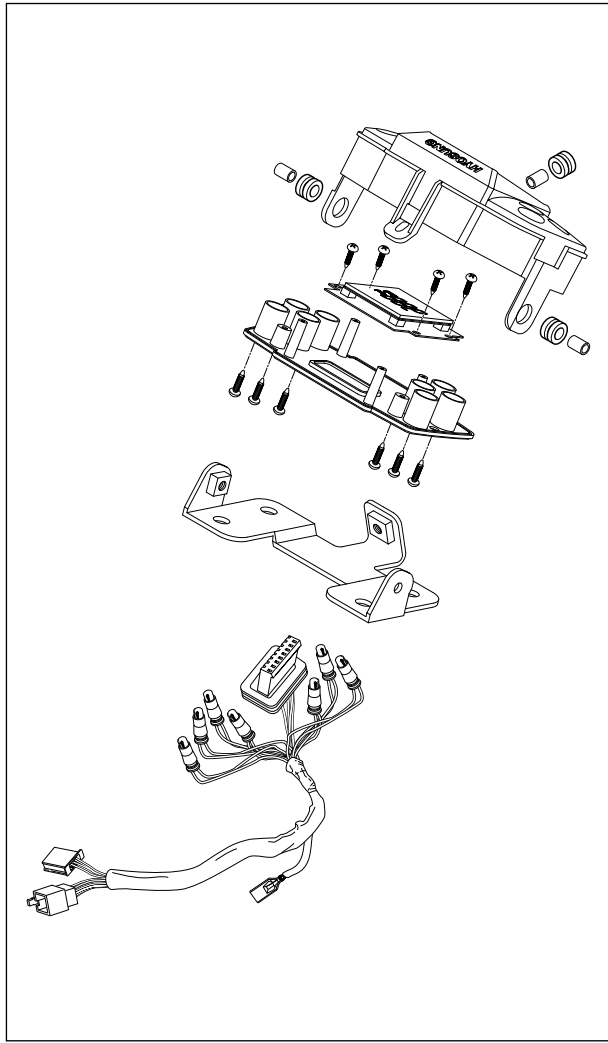
Using the pocket tester, check the continuity between lead wires (Blue color coupler) in the following illustration.

If the continuity measured incorrect, replace the respective part.

 **Pocket tester : 09900-25002**

 **CAUTION**

**When making this test, it is not necessary to remove the combination meter.**



## BATTERY

### ⊙ CAUTION OF BATTERY TREATMENT

The battery needs attention generally as it occurs flammability gas.

If you don't follow the instruction in the below, there may be an explosion and severe accident.

Therefore, pay attention to the following points.

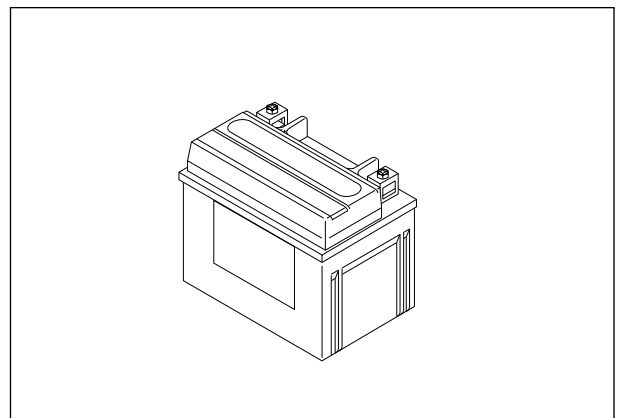
- Positively prohibit battery from contacting to short, spark or firearms.
- The recharge of battery should be done in the wide place where the wind is well ventilated.  
Don't recharge it at the sight of windproof.

### ⊙ CAUTION OF BATTERY ELECTROLYTE TREATMENT

- Pay attention to the battery electrolyte not to stain the chassis or the human body.
- If stains the chassis or the human body, at once wash a vast quantity of water.  
When they were stained, clothes will come into being a hole or painting will take off.  
Consult a doctor.
- When the battery electrolyte was dropped to the surface of land, wash it with a vast quantity of water.  
Neutralize by hydroxide, bicarbonate of soda and so on.

### ⊙ CAUTION OF MAINTENANCE FREE BATTERY TREATMENT

- Do not remove the aluminum tape to seal the battery electrolyte filler hole until use as battery of complete seal type.
- Do not use it except the battery electrolyte.
- Pouring into the battery electrolyte, necessarily use the electrolyte of the specified capacity.
- Do not open the sealing cap after recharging the battery electrolyte.



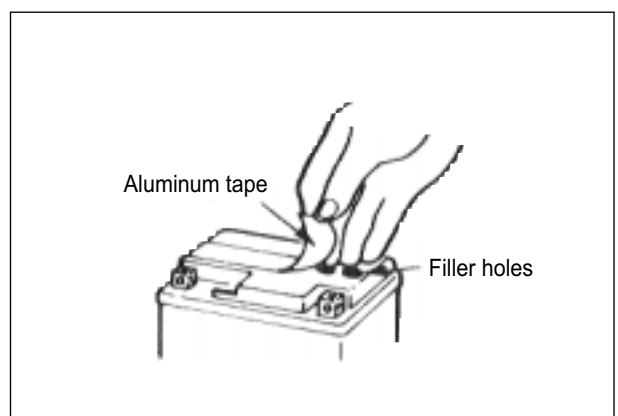
### ▣ FILLING ELECTROLYTE

- ① Put the battery on even land and remove the aluminum tape sealing.
- ② Remove the cap at the electrolyte container.

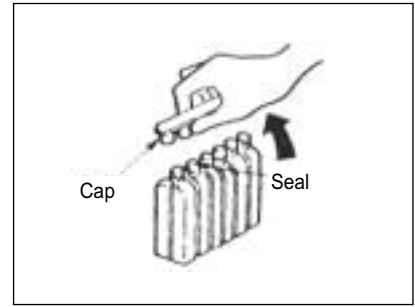
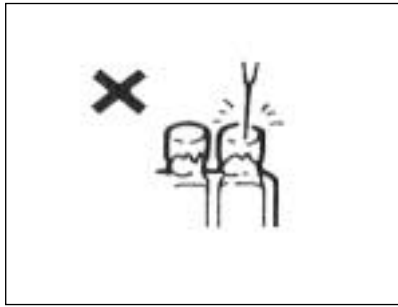
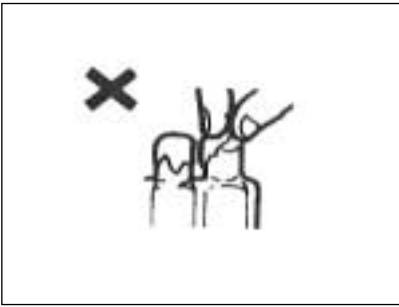


#### CAUTION

Do not remove the seal of the electrolyte container, not prick with sharp thing.



## 6-17 ELECTRICAL SYSTEM



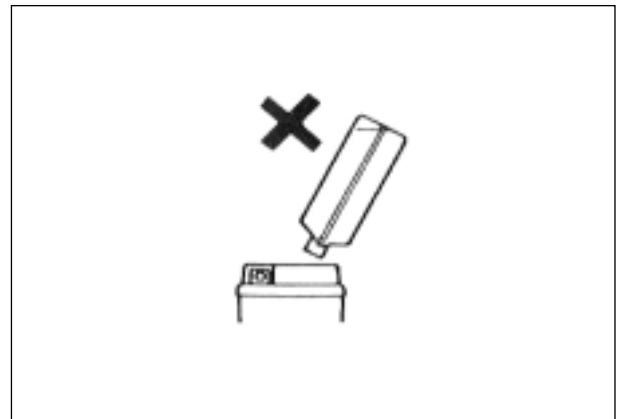
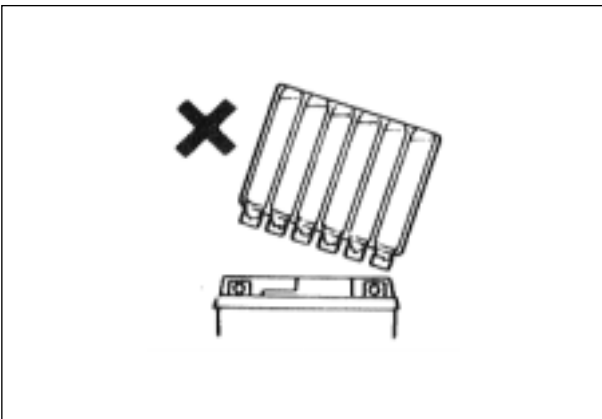
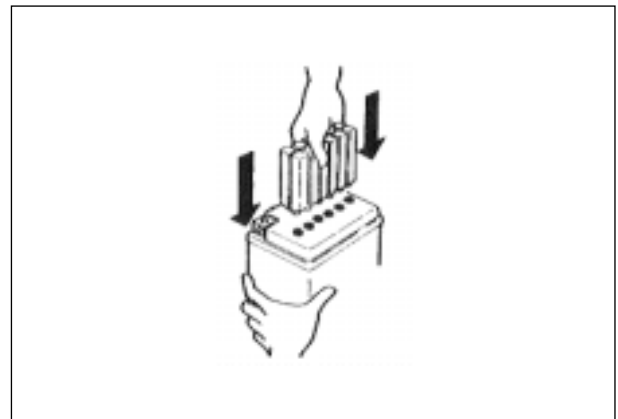
### ③ Pouring of battery electrolyte

When insert the nozzles of the electrolyte container into the battery's electrolyte filler holes, holding the container firmly so that it does not fall.

Take precaution not to allow any fluid to spill.

#### **CAUTION**

The pouring of electrolyte may not be done if the electrolyte container is pushed slopely.

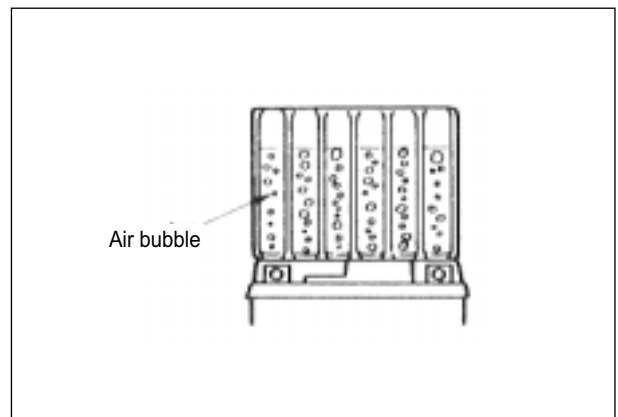


### ④ Confirmation of pour

Make sure that air bubbles are coming up each electrolyte container, and keep this position for more than about 20 minutes.

#### **CAUTION**

If no air bubbles are coming up from a filler port, tap the bottom two or three times.



## ⑤ Separation of electrolyte container

After confirming that you entered the electrolyte into battery completely, remove the electrolyte containers from the battery.

 **CAUTION**

Draw the empty receptacle out slowly because there may be a chance remaining electrolyte vaporize.

## ⑥ Insert the caps

Insert the cap into the filler holes, pressing it firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.

 **SERVICING**

Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, then this can be cleaned away with sandpaper.

 **RECHARGING OPERATION**

- Using the pocket tester, check the battery voltage. If the voltage reading is less than the 12.0 V (DC), recharge the battery with a battery charger.

**How to charge**

<b>Standard</b>	0.8 A × 5~10 hours
<b>Fast</b>	4 A × 30 minutes

 **CAUTION**

When recharging the battery, remove the battery from the vehicle.

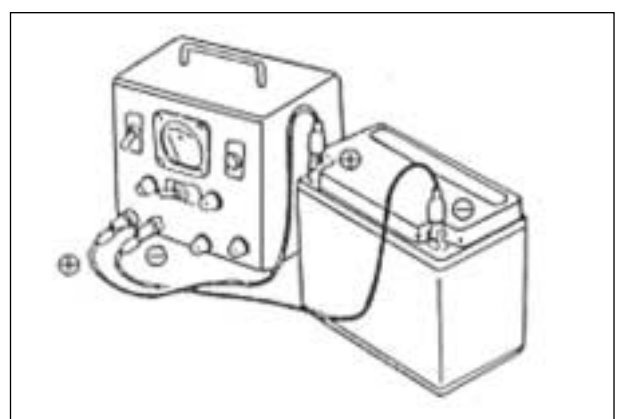
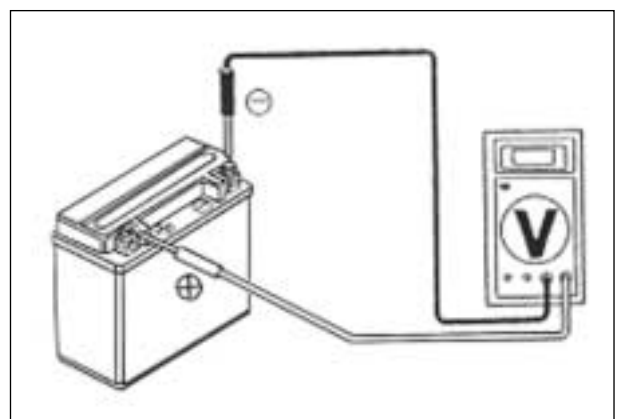
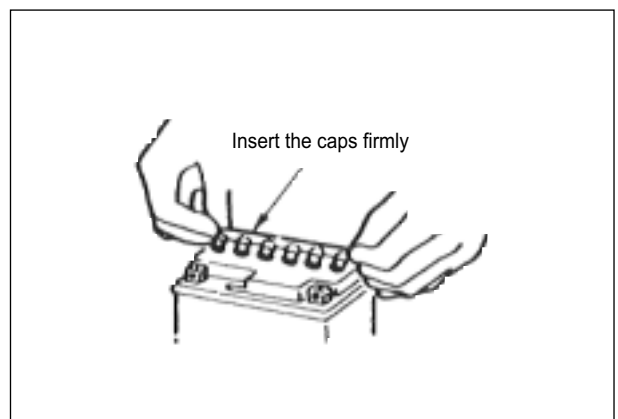
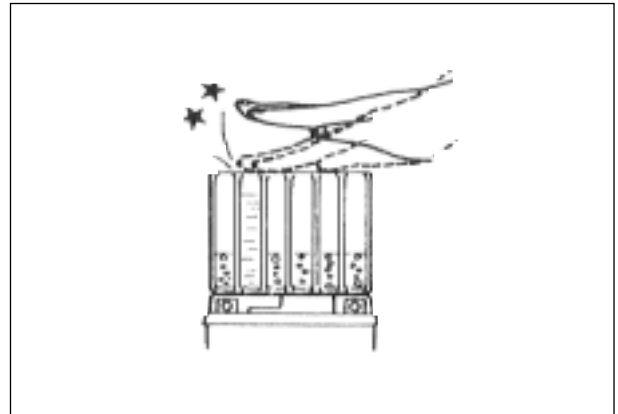
**NOTE**

Do not remove the caps on the battery top while recharging.

 **CAUTION**

Be careful not to permit the charging current to exceed 4A at any time.

- After recharging, wait for more than 30 minutes and check the battery voltage with a pocket tester.
- If the battery voltage is less than the 12.5V, recharge the battery again.
- If battery voltage is still less than 12.5V, after recharging, replace the battery with a new one.
- When the vehicle is not used for a long period, check the battery every 1 month to prevent the battery discharge.





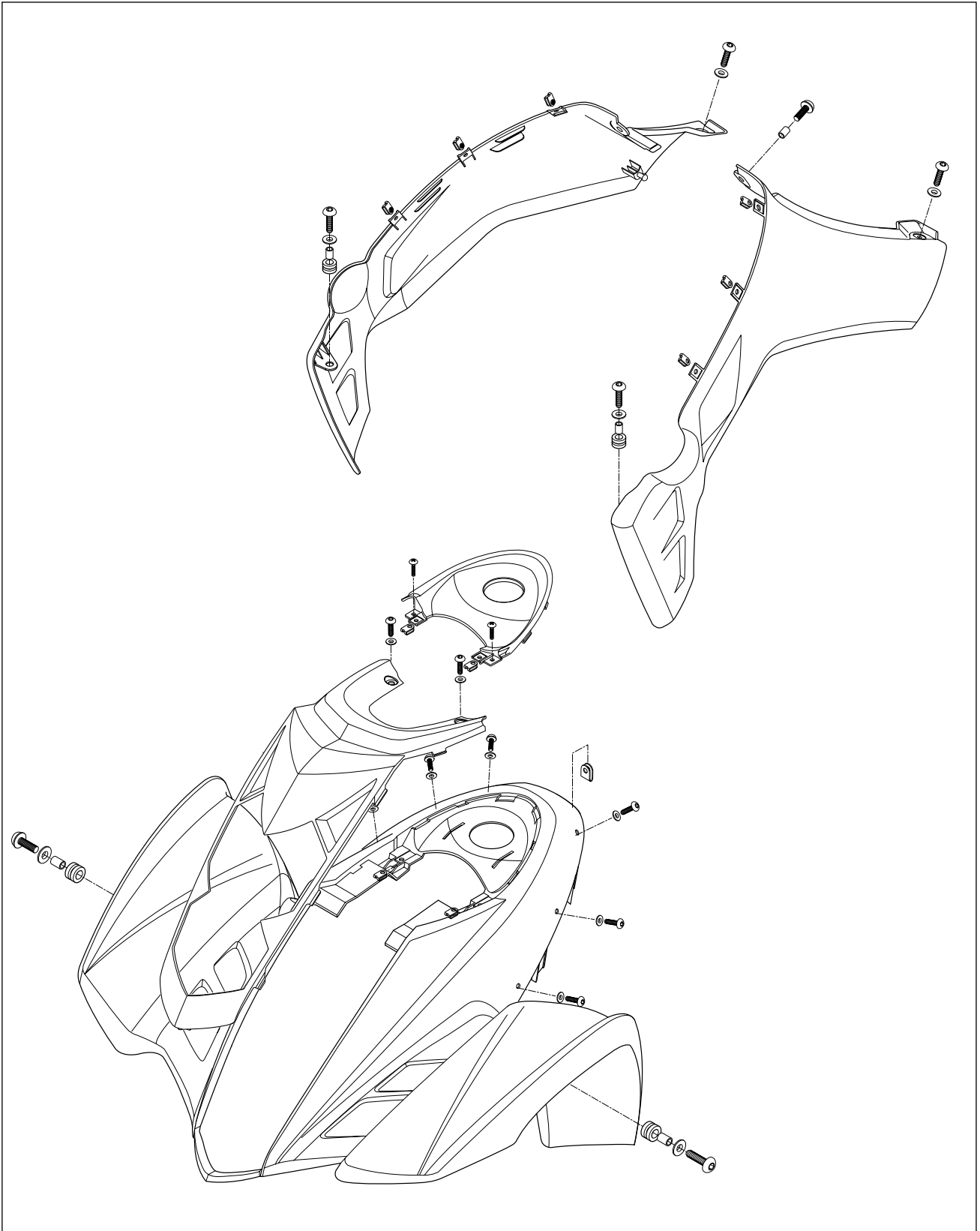
# CHASSIS

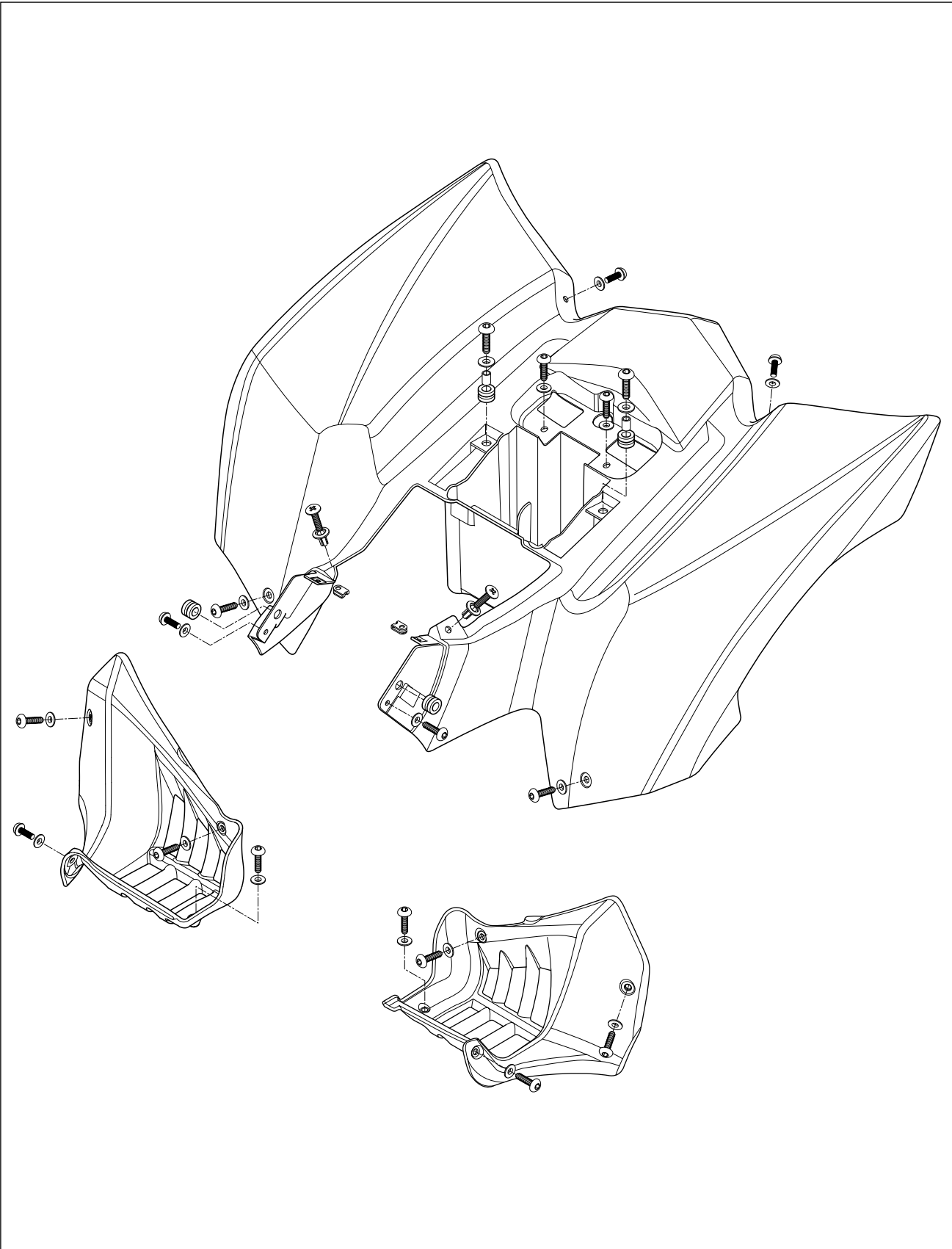
## CONTENTS

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## EXTERIOR PARTS

### ⊙ CONSTRUCTION

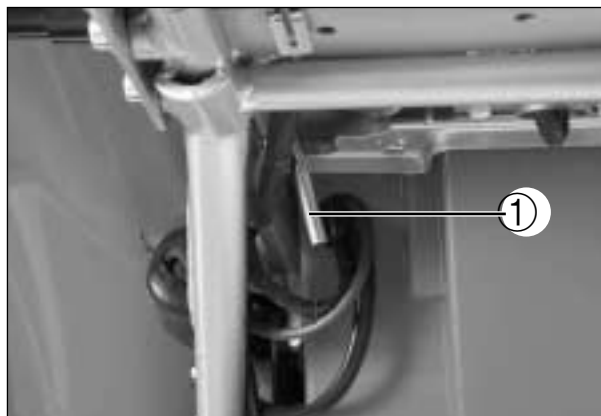




## ◎ REMOVAL

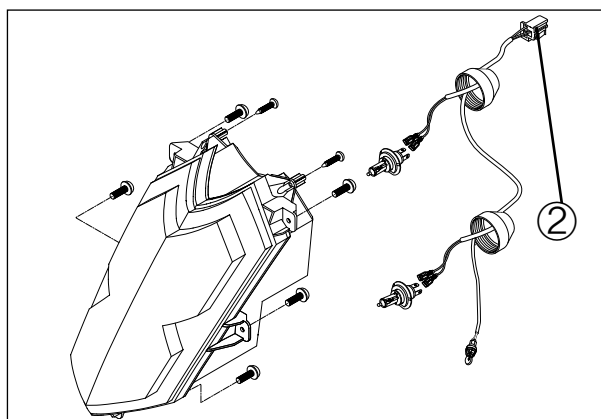
### ▣ SEAT

- Remove the seat by pulling the lock release lever ① which is located behind the rear fender.

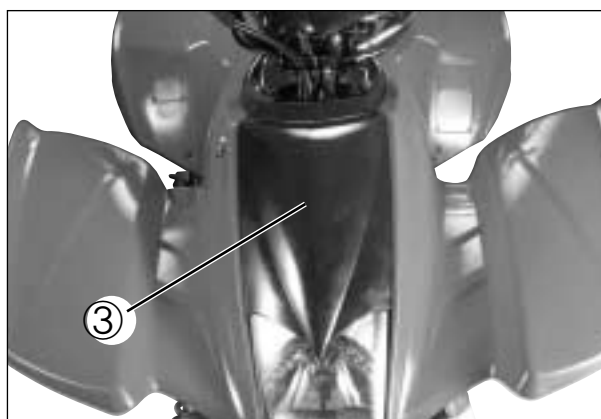


### ▣ FRONT FENDER

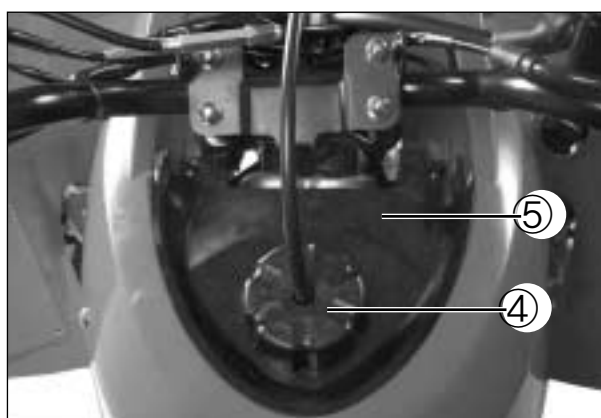
- Disconnect the head lamp coupler ② .



- Remove the seat. (Refer to above)
- Remove the center front fender mounting bolts.
- Remove the center front fender ③ .



- Remove the fuel tank cap ④ .
- Remove the center rear fender mounting bolts.
- Remove the center rear fender ⑤ .



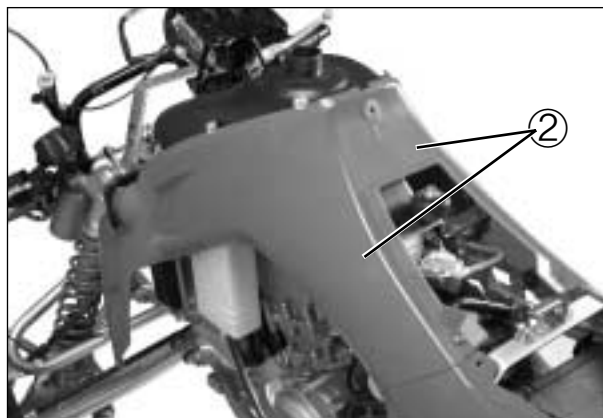
- Remove the four steering head cover bracket bolts.



- Remove the front fender mounting bolts.
- Remove the front fender① .

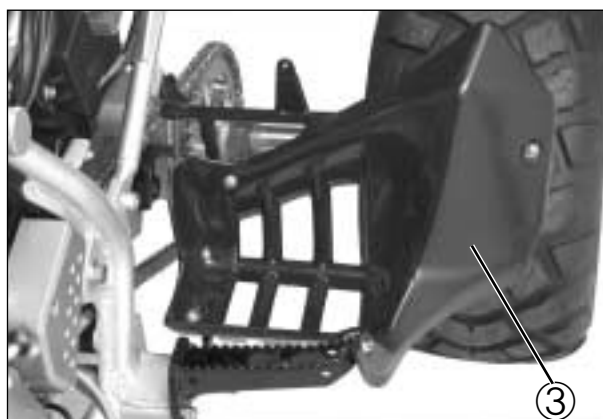
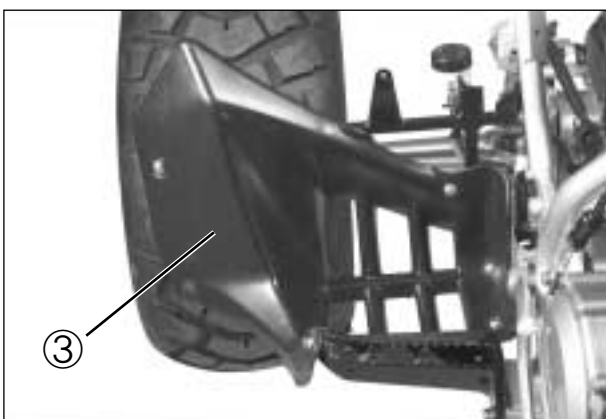


- Remove the side covers② , left and right.



▣ FOOTREST MUDGUARD

- Remove the mudguards③ .



## 7-5 CHASSIS

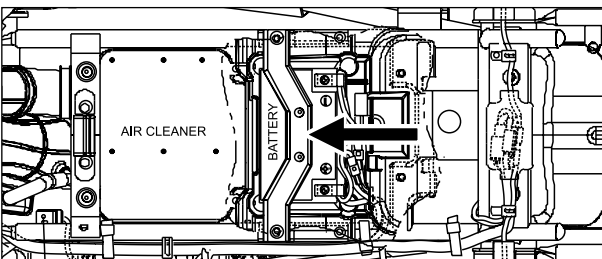
### ■ FOOTREST

- Remove the footrest mudguards.  
(Refer to page 7-4)
- Remove the footrests.

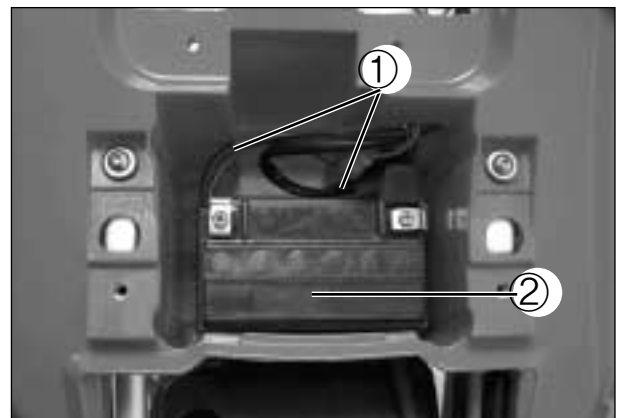


### ■ REAR FENDER

- Remove the seat. (Refer to page 7-3)
- Remove the battery plate.
- Disconnect the battery lead wires ①.
- Remove the battery ②.



- Remove the rear fender mounting bolts.
- Remove the rear fender.



## ◎ REMOUNTING

Remount the exterior parts in the reverse order of removal.

Pay attention to the following points :

### ▣ FOOTREST

- Apply THREAD LOCK “1324” to the bolts ① and tighten bolts to the specified torque.

 **THREAD LOCK “1324”**

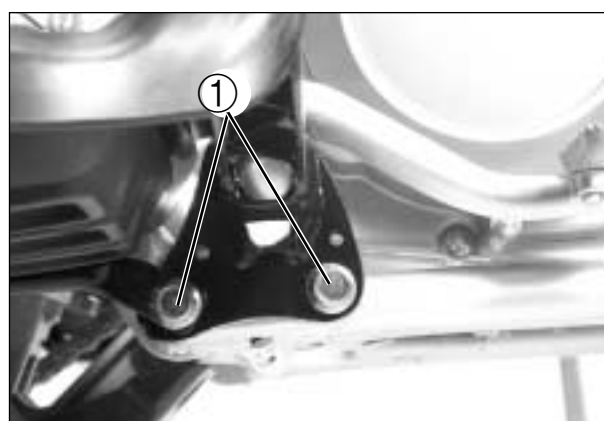
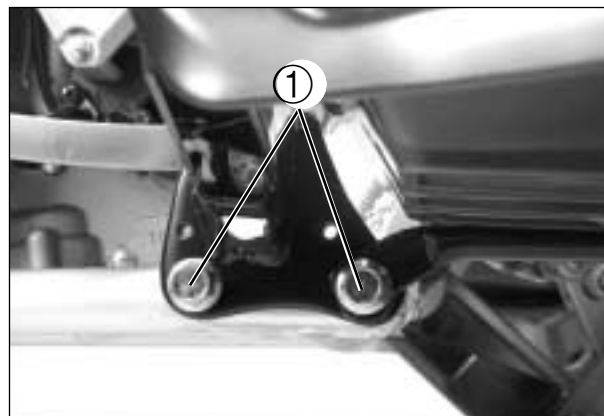
 **Footrest mounting bolt**

: 40~60 N · m (4.0~6.0 kgf · m)

### ▣ MUDGUARD BRACE

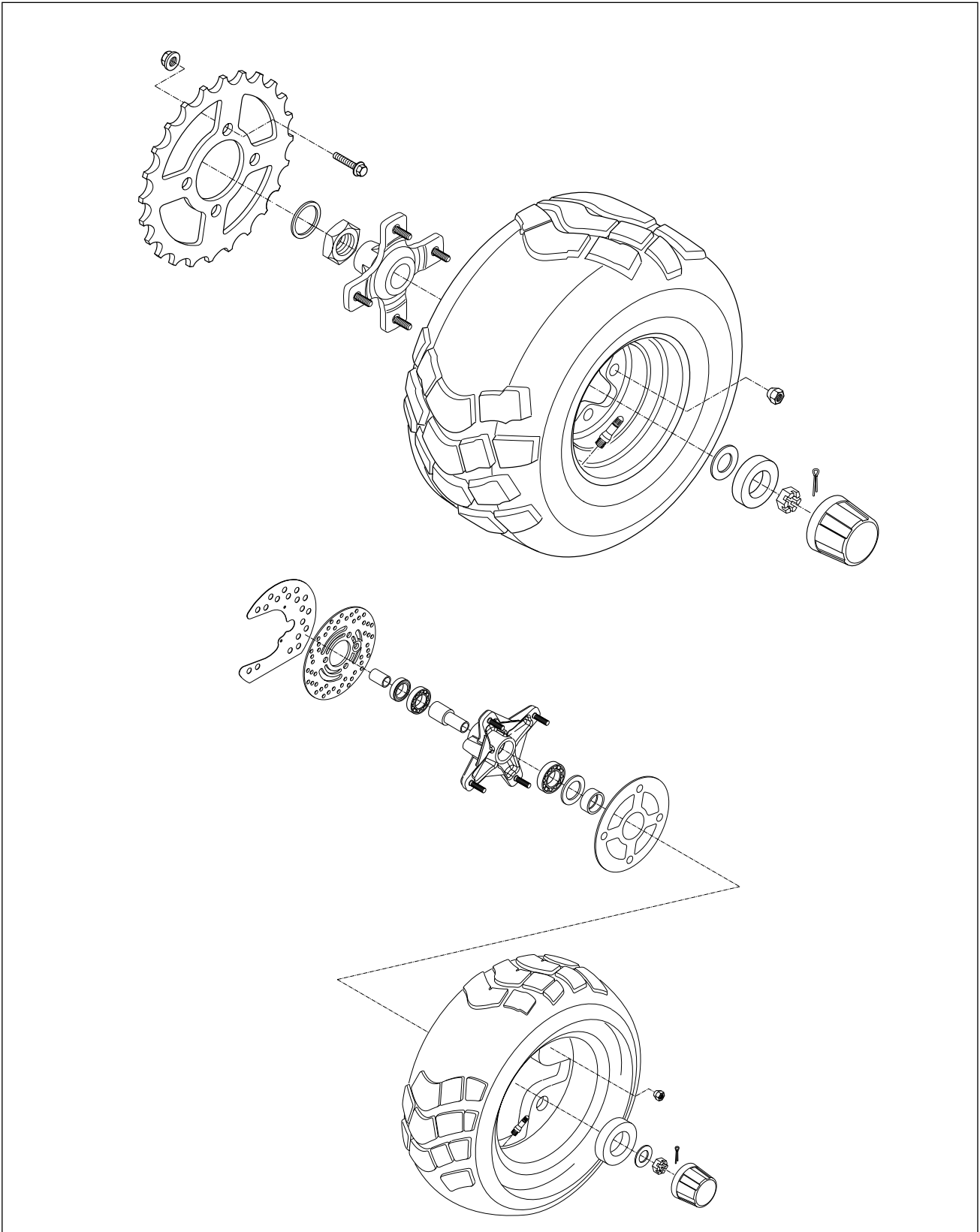
- Apply THREAD LOCK “1324” to the mudguard brace bolts ②.

 **THREAD LOCK “1324”**



## FRONT AND REAR WHEELS

### ⊙ CONSTRUCTION





## ⊙ REMOVAL

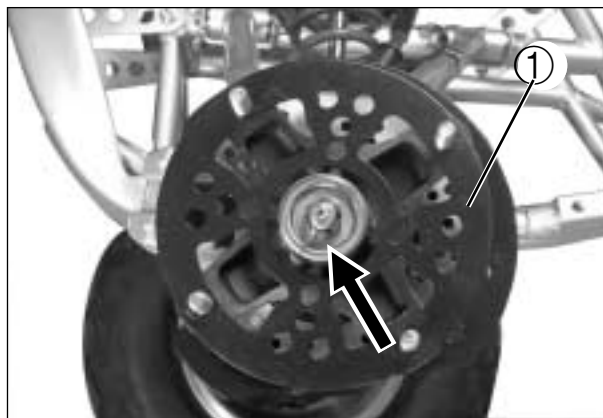
### ▣ FRONT AND REAR WHEELS

- Place the vehicle on level ground.
- Support the vehicle with a jack or wooden block.
- Remove the wheel.



### ▣ FRONT WHEEL HUB

- Remove the front wheel. (Refer to above)
- Remove the front hub plate ①.
- Remove the cotter pin, then loosen the wheel hub nut.
- Remove the wheel hub nut and washer.
- Remove the front brake caliper.  
(Refer to page 7-15)

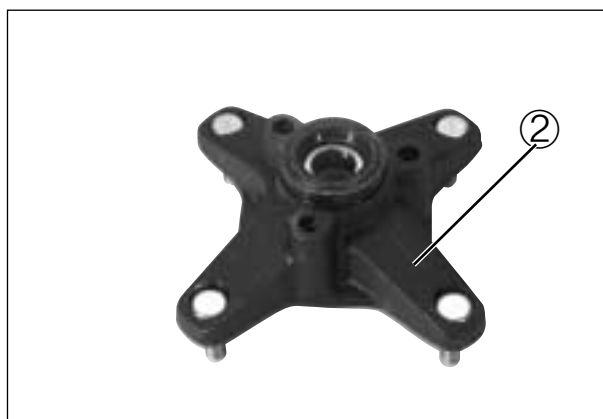


- Remove the front wheel hub ②.

### CAUTION

Do not operate the brake lever while removing the caliper.

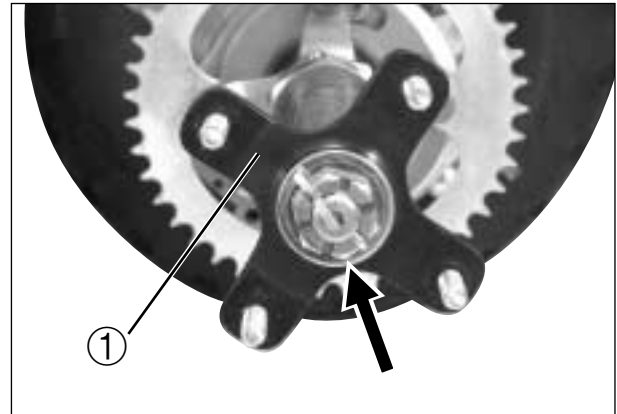
- Remove the disk. (Refer to page 7-18)



## 7-9 CHASSIS

### REAR WHEEL HUB

- Remove the rear wheel.
- Remove the cotter pin and loosen the wheel hub nut by applying the rear brake.
- Remove the wheel hub nut and washer.
- Remove the rear wheel hub ①.

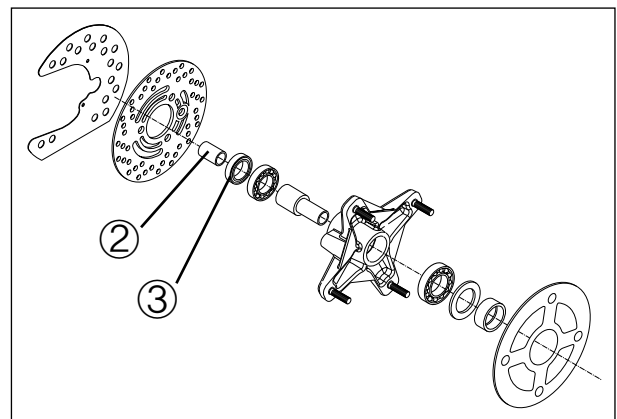


### INSPECTION AND DISASSEMBLY

#### DUST SEAL

Inspect the dust seal lips for wear or damage. If any damages are found, replace the dust seal with a new one.

- Remove the spacer ②.



- Remove the dust seal ③ with the special tool.

 **Oil seal remover : 09913-50121**

#### CAUTION

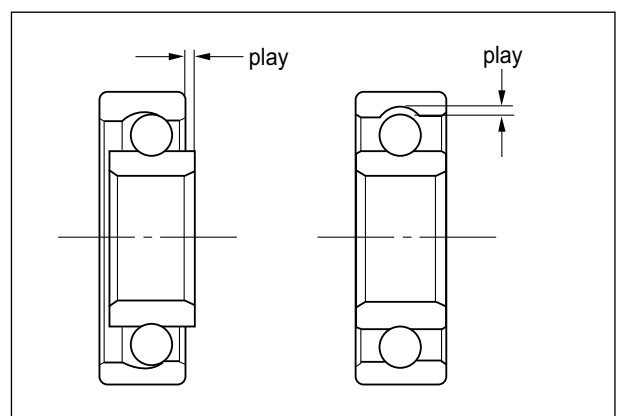
Replace the removed dust seal with a new one.



#### HUB BEARINGS

Inspect the inner race play of the hub bearing by hand while it is in the wheel hub.

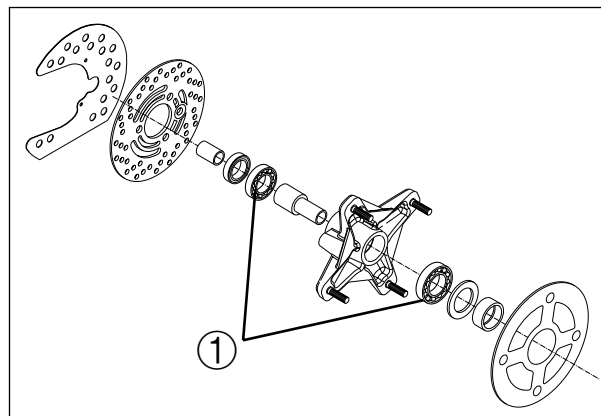
Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. If there is anything unusual, replace the bearing with a new one.



- Remove the hub bearing ① .

**⚠ CAUTION**

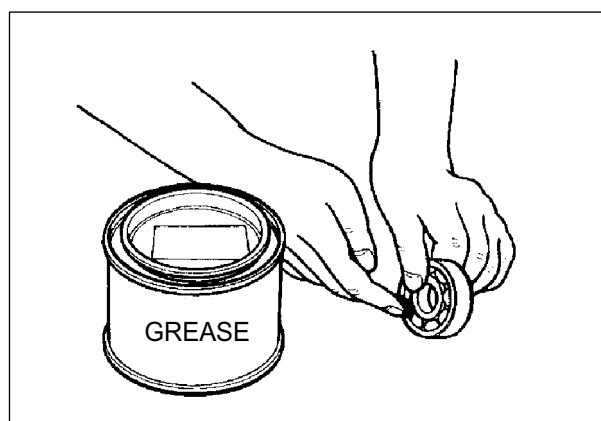
Do not reuse the removed bearings.



**⊙ REASSEMBLY AND REMOUNTING**

**▣ FRONT WHEEL HUB**

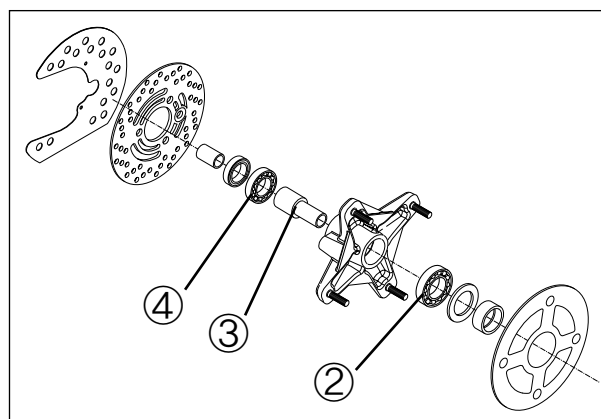
- Apply SUPER GREASE “A” to the hub bearing.



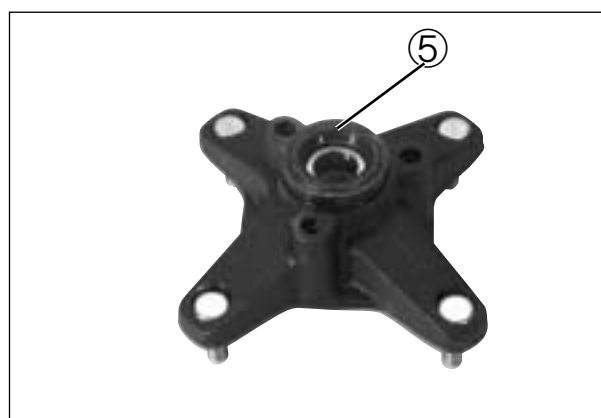
- Install the hub bearings and spacer into the front wheel hub.

**NOTE**

*Install the inner bearing ② first, and then install the spacer ③ and the outer bearing ④.*



- Install the dust seal ⑤ into the front wheel hub with fabric portion facing to outside.
- Apply SUPER GREASE “A” to the dust seal's lip.

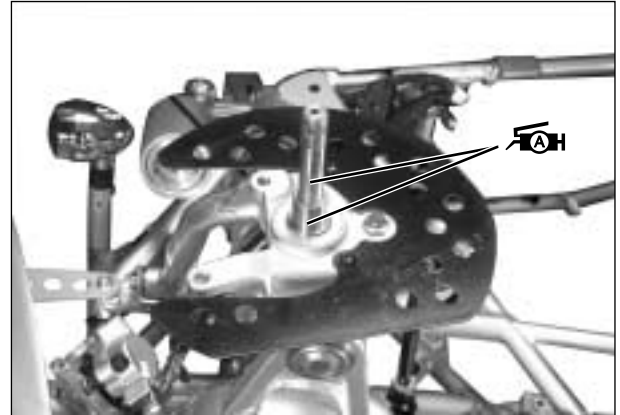


## 7-11 CHASSIS


- Install the front disk to the front wheel hub.  
(Refer to page 7-18)
- Apply SUPER GREASE "A" to the front axle.

 SUPER GREASE "A"

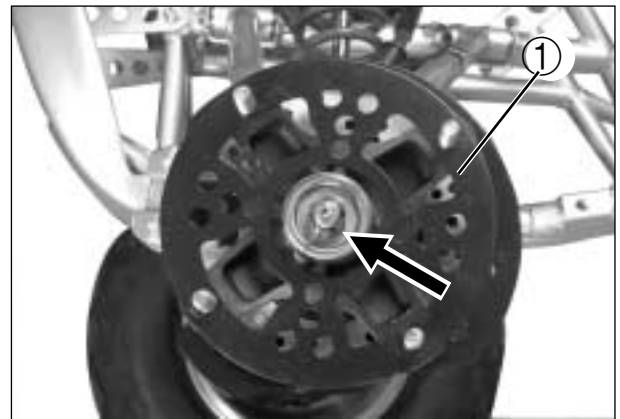
- Install the wheel hub.
- Install the front brake caliper. (Refer to page 7-17)



- Tighten the front wheel hub nut to the specified torque.

 **Front wheel hub nut**  
: 55 N · m (5.5 kgf · m)

- Install the hub plate ①.
- Install the cotter pin into the front axle.
- Install the front wheel.



 **CAUTION**

Replace the removed cotter pin with a new one.

### REAR WHEEL HUB

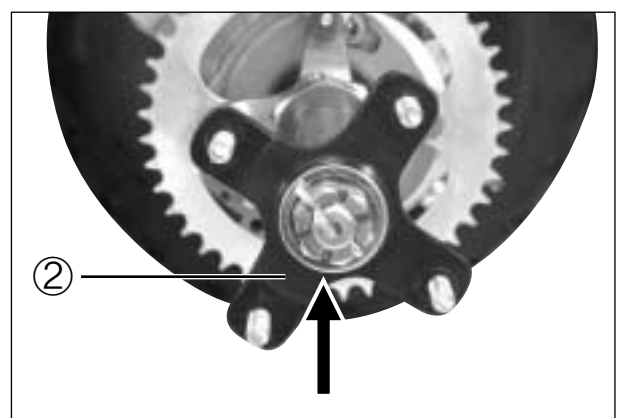
- Apply small amount of SUPER GREASE "A" to the wheel hub's spline.

 SUPER GREASE "A"

- Install the rear wheel hub ②, washer and nut.
- Tighten the rear wheel hub nut to the specified torque.

 **Rear wheel hub nut**  
: 100 N · m (10.0 kgf · m)

- Install the cotter pin into the rear axle.
- Install the rear wheel.



 **CAUTION**

Replace the removed cotter pin with a new one.

## FRONT WHEEL

- Install the front wheel.
- Tighten the wheel set nuts to the specified torque.

### Wheel set nut

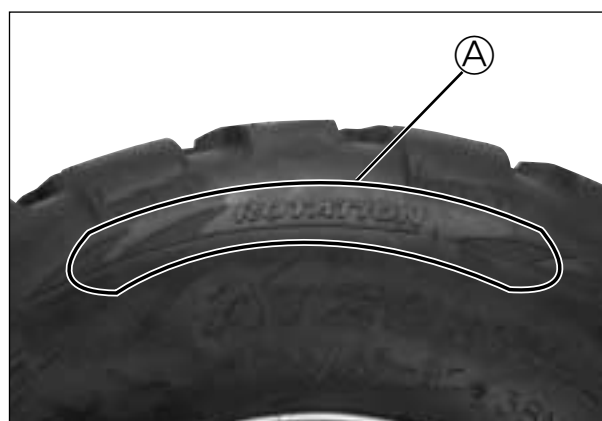
: 39.2~58.8 N · m (3.92~5.88 kgf · m)



### ON-ROAD type

#### NOTE

*When installing the front wheel, make sure that the arrow **A** on the tire points in the direction of rotation.*



## REAR WHEEL

- Install the rear wheel.
- Tighten the wheel set nuts to the specified torque.

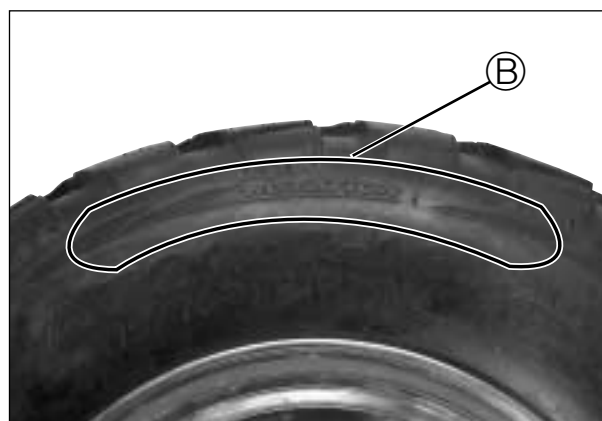
### Wheel set nut

: 39.2 ~ 58.8 N · m (3.92 ~ 5.88 kgf · m)

### ON-ROAD type

#### NOTE

*When installing the rear wheel, make sure that the arrow **B** on the tire points in the direction of rotation.*

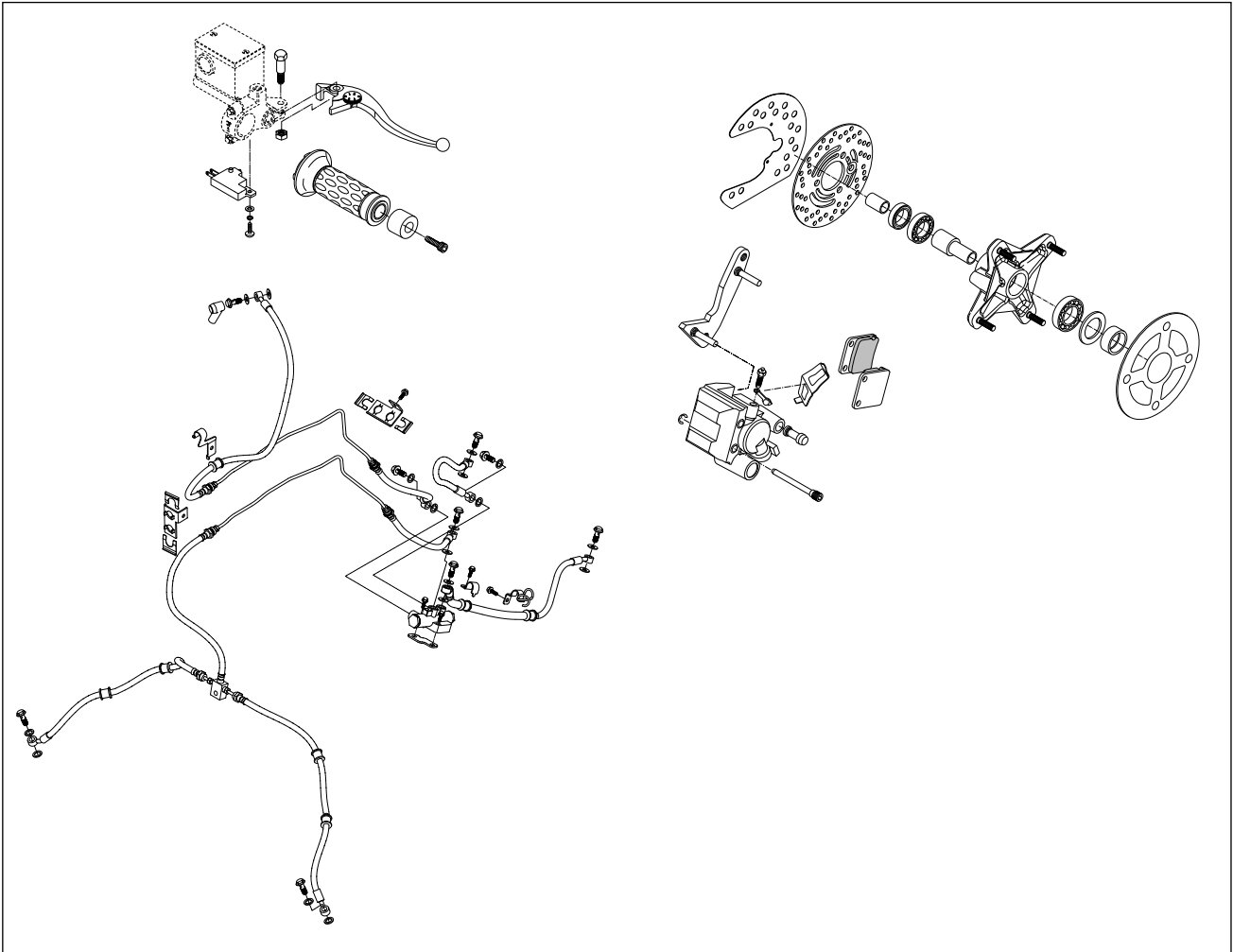


## TIRE

Refer to page 2-18

## FRONT BRAKE

### ⊙ CONSTRUCTION



### ⚠ WARNING

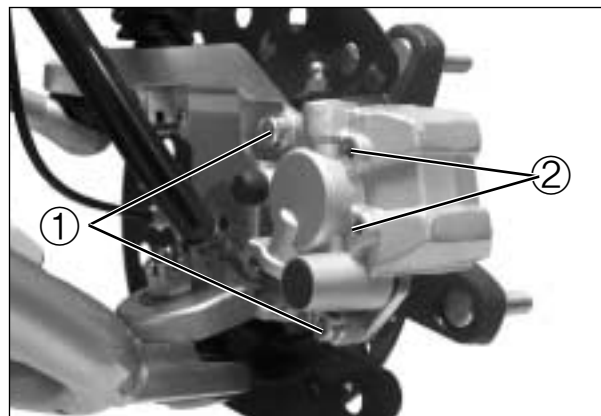
- ❖ This brake system is filled with an ethylene glycol-based DOT4 brake fluid. Do not use or mix different types of fluid, such as silicone-based or petroleum-based brake fluids.
- ❖ Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for a long periods.
- ❖ When storing brake fluid, seal the container completely and keep away from children.
- ❖ When replenishing brake fluid, take care not to get dust into the fluid.
- ❖ When washing brake components, use new brake fluid. Never use cleaning solvent.
- ❖ A contaminated brake disk or brake pad reduces braking performanec. Discard contaminated pads and clean the brake disk with high quality brake cleaner or a neutral detergent.

### ⚠ CAUTION

Handle brake fluid with care : the fluid reacts chemically with paint, plastics, rubber materials etc. and will damage them severely.

## ⊙ BRAKE PAD REPLACEMENT

- Remove the front wheel. (Refer to page 7-8)
- Remove the brake caliper mounting bolts ① and brake pad mounting pins ②.



- Remove the brake pads.

### CAUTION

- ❖ Do not operate the brake lever during or after brake pad removal.
- ❖ Replace the brake pads as a set, otherwise braking performance will be adversely affected.



- Install the new brake pads.

### NOTE

- ❖ Before installing the new pads, inspect the pad mounting pins for wear. If excessive wear is found, replace them with new ones.
- ❖ The E-ring must be installed to the caliper.



- Tighten the brake pad mounting pins ③ and brake caliper mounting bolts ④ to the specified torque.

#### Front brake pad mounting pin

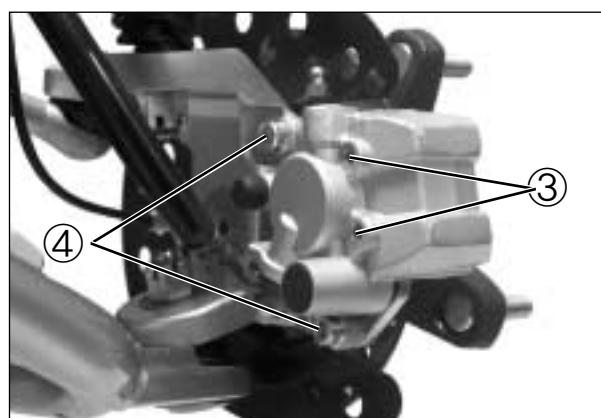
: 18~28 N · m (1.8~2.8 kgf · m)

#### Brake caliper mounting bolt

: 18~28 N · m (1.8~2.8 kgf · m)

### NOTE

After replacing the brake pads, pump the brake lever several times to check for proper brake operation and then check the brake fluid level.




## ⊙ BRAKE FLUID REPLACEMENT

- Place the vehicle on a level surface and keep the handlebar straight.
- Remove the master cylinder reservoir cap and diaphragm.
- Suck up the old brake fluid as much as possible.
- Fill the reservoir with new brake fluid.

 **Specification and classification : DOT 4**

- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper end of the inspection window.

 **Brake air bleeder valve**  
: 9~14 N · m (0.9~1.4 kgf · m)

### CAUTION

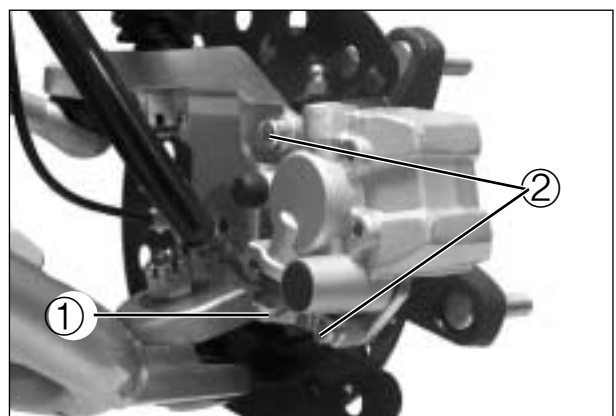
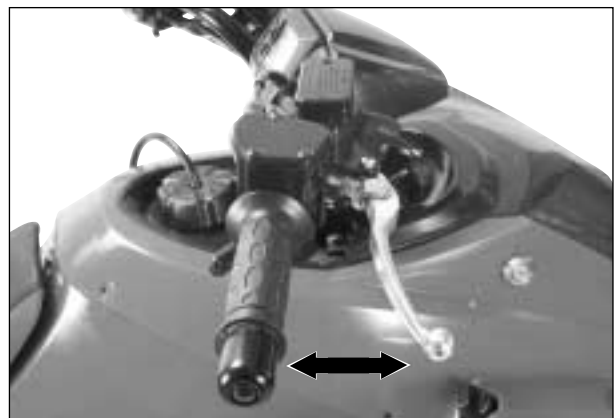
- ❖ Never reuse the brake fluid left over from previous servicing or stored for long periods.
- ❖ Bleed air from the brake system.  
(Refer to page 2-17)

## ⊙ BRAKE CALIPER REMOVAL AND DISASSEMBLY

- Remove the front wheel. (Refer to page 7-8)
- Disconnect the brake hose from the brake caliper by removing the brake hose union bolt ① and allow the brake fluid to drain into a suitable receptacle.
- Remove the brake caliper by removing the brake caliper mounting bolts ②.
- Remove the brake pads. (Refer to page 7-14)

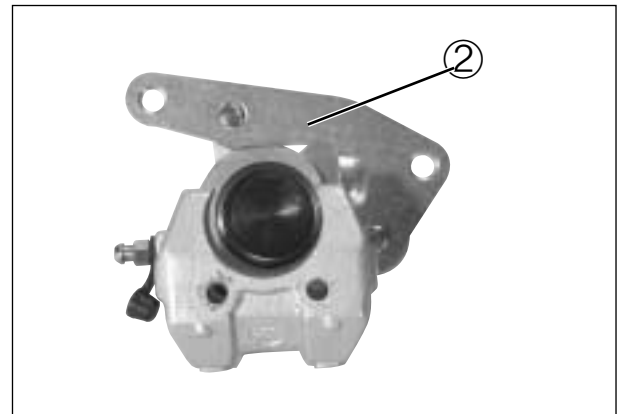
### WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose, brake pipe and hose joints for cracks and leakage of brake fluid.





- Remove the brake pad spring① and brake caliper holder②.



- Using an air gun, push out the brake caliper piston.

**⚠ WARNING**

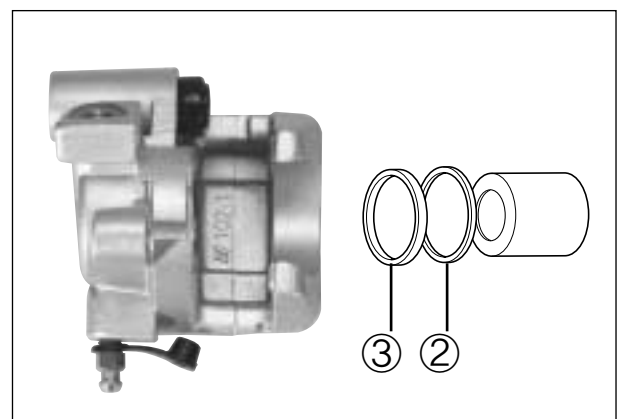
- ❖ Place a rag over the piston to prevent it from popping out and flying and keeping hand off the piston.
- ❖ Be careful of brake fluid which can possibly splash.
- ❖ Do not use high pressure air but increase the pressure gradually.



- Remove the dust seal② and piston seal③.

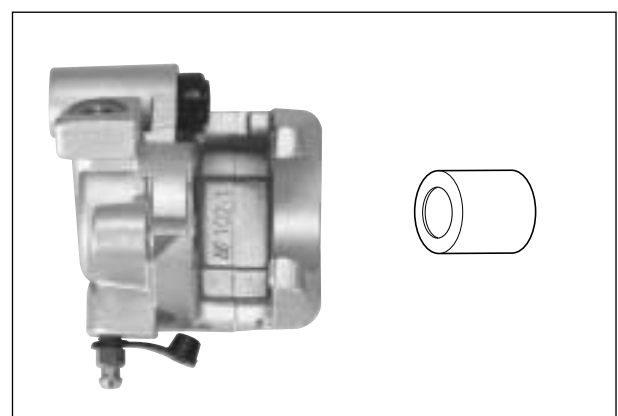
**⚠ CAUTION**

- ❖ Care not to cause scratch on the cylinder bore.
- ❖ Do not reuse the piston seal and dust seal that have been removed.



**⊙ BRAKE CALIPER INSPECTION**

Inspect the brake caliper cylinder wall and piston surface for scratch, corrosion or other damages. If any abnormal condition is noted, replace the caliper.



## ⊙ BRAKE CALIPER REASSEMBLY AND REMOUNTING

Reassemble and remount the brake caliper in the reverse order of removal and disassembly procedures and observe the following points.

### ⚠ CAUTION


- ❖ Wash the brake caliper components with fresh brake fluid before reassembly. Do not wipe off brake fluid with a rag after washing the components.
- ❖ Replace the piston seal and dust seal into new ones with brake fluid applied.

 **Brake fluid specification and classification**  
: DOT 4

- Install the brake pad spring.
- Apply SILICONE GREASE to the brake caliper holder pin.

 **SILICONE GREASE**

- Install the brake pads. (Refer to page 7-14)
- Tighten the brake pad mounting pins ①, brake caliper mounting bolts ② and brake hose union bolts ③ to the specified torque.

 **Front brake pad mounting pin**  
: 18~28 N · m (1.8~2.8 kgf · m)

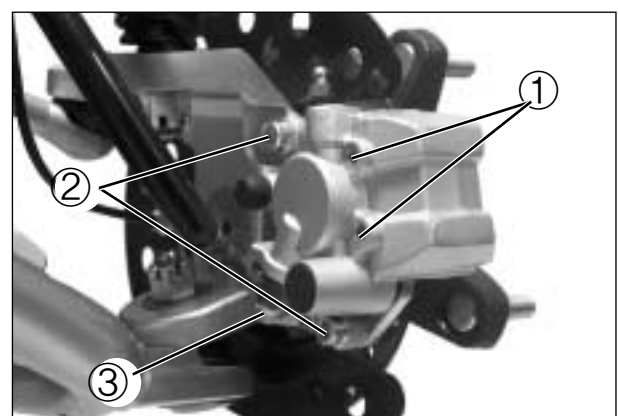
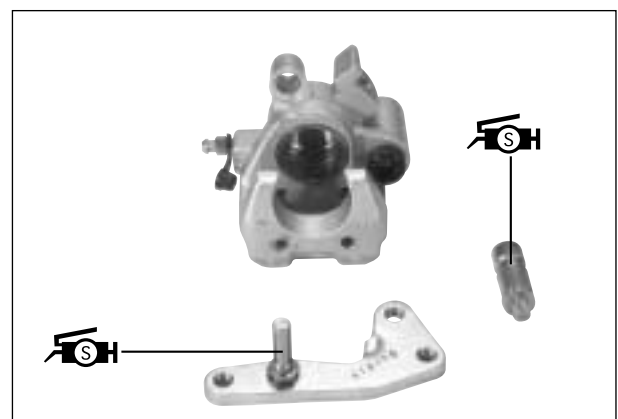
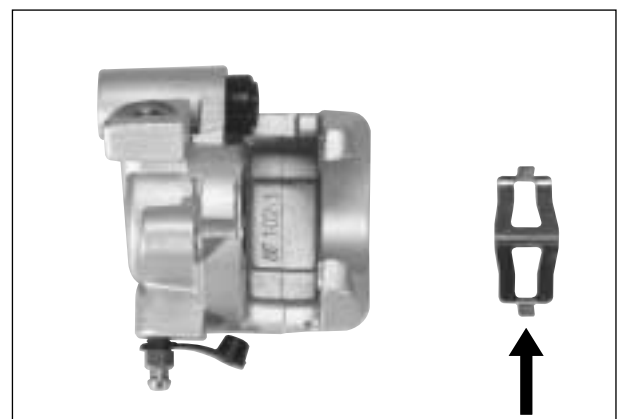
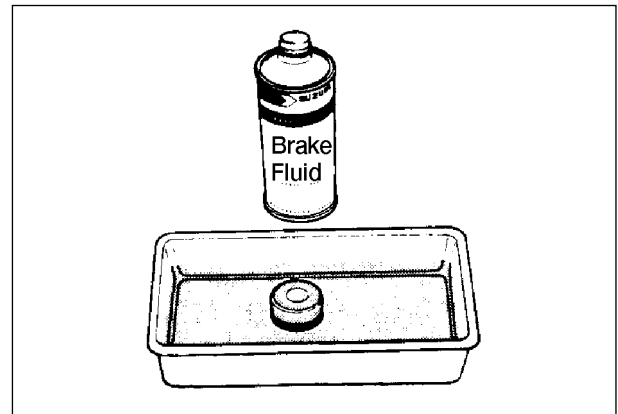
**Front brake caliper mounting bolt**  
: 18~28 N · m (1.8~2.8 kgf · m)

**Front brake hose union bolt**  
: 40~60 N · m (4.0~6.0 kgf · m)

### NOTE

*Before remounting the brake caliper, push the brake caliper pistons all way into the caliper.*

- Fill the system with brake fluid and bleed air. (Refer to page 2-17)
- Inspection after reassembly : Refer to page 2-16




## ⊙ BRAKE DISK REMOVAL AND DISASSEMBLY

- Remove the front wheel. (Refer to page 7-8)
- Remove the front wheel hub. (Refer to page 7-8)
- Remove the brake disk.

## ⊙ BRAKE DISK INSPECTION

- Remove the front wheel. (Refer to page 7-8)
  - Remove the caliper. (Refer to page 7-15)
- Check the brake disk for damage or cracks.  
Measure the thickness using the micrometer.  
Replace the brake disk if the thickness is less than the service limit or if damage is found.

Brake disk thickness	Service limit
	3.0 mm (0.12 in)

 **Micrometer(0~25 mm) : 09900-20201**

Measure the runout using the dial gauge.  
Replace the brake disk if the runout exceeds the service limit.

Brake disk runout	Service limit
	0.3 mm (0.012 in)

 **Dial gauge : 09900-20606**  
**Magnetic stand : 09900-20701**

- If either measurement exceeds the service limit, replace the brake disk. (Refer to above)

## ⊙ BRAKE DISK REASSEMBLY AND REMOUNTING

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


- Install the disk to the wheel hub.

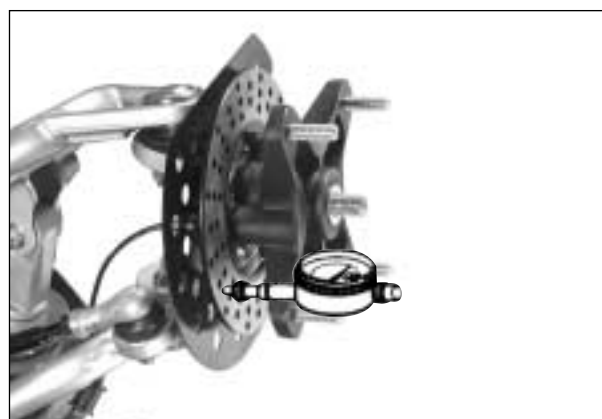
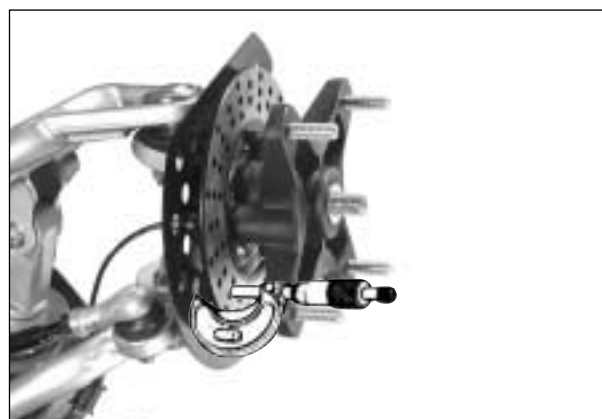
### **NOTE**

*Make sure that the disk is clean and free of any greasy matter.*

- Apply THREAD LOCK "1324" to the brake disk bolts and tighten them to the specified torque.

 **THREAD LOCK "1324"**

 **Brake disk bolt**  
: 18~28 N · m (1.8~2.8 kgf · m)



## ⊙ MASTER CYLINDER DISASSEMBLY

- Drain brake fluid out of the master cylinder.
- Disconnect the brake lamp switch lead wire coupler.
- Remove the union bolt ①.



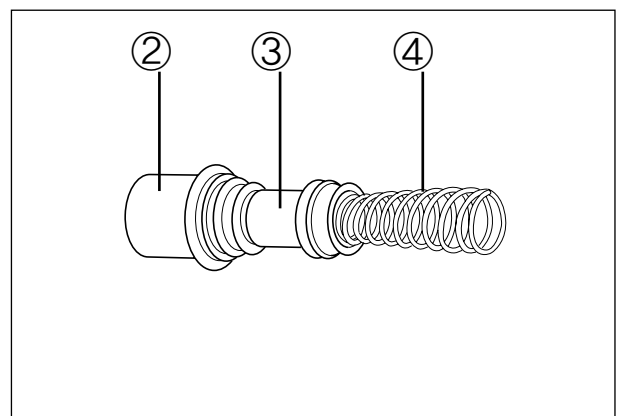
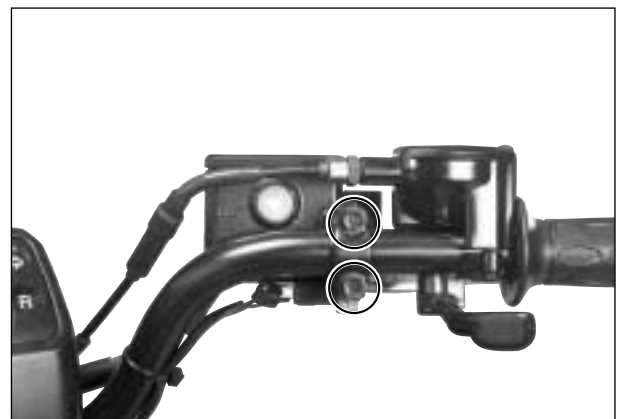
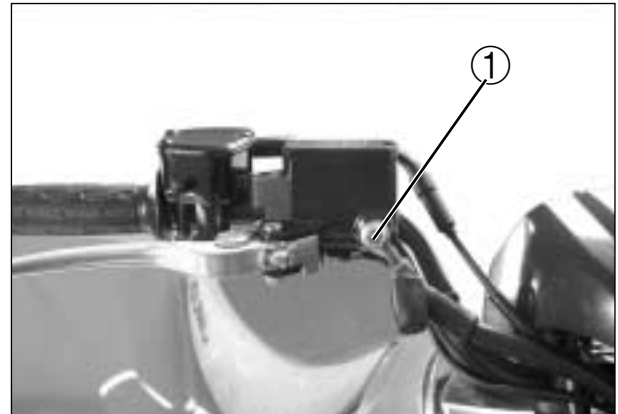
### CAUTION

Place a rag under the union bolt so that brake fluid can not contact the parts.

- Remove the two mounting bolts and take off the master cylinder.

- Remove the two fitting screws and separate the cap and diaphragm.

- Detach the dust seal boot ② and remove the circlip.
- Pull out the piston/cup set ③ and spring ④.



## ⊙ MASTER CYLINDER INSPECTION

Inspect the master cylinder bore for any scratches or other damage.

Inspect the piston surface for any scratches or other damage.


## ⊙ MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly.

Pay attention to the following points :

### ⚠ CAUTION


- ❖ Wash the master cylinder components with new brake fluid before reassembly.
- ❖ When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.

 Brake fluid specification and classification : DOT 4


### NOTE

*When installing the circlip, make sure that the sharp edge of the circlip faces outside.*

- When remounting the master cylinder to the handlebar, first tighten the mounting bolts for upside as shown.

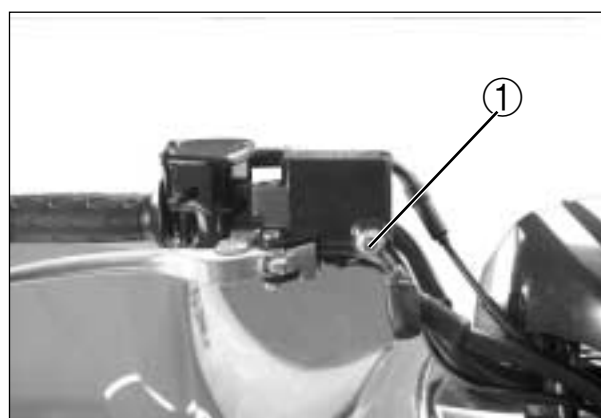
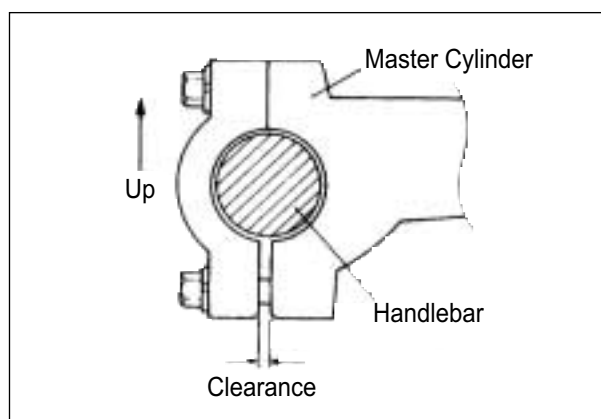
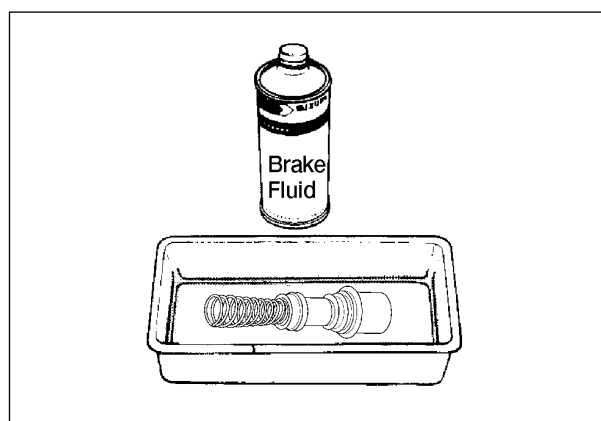
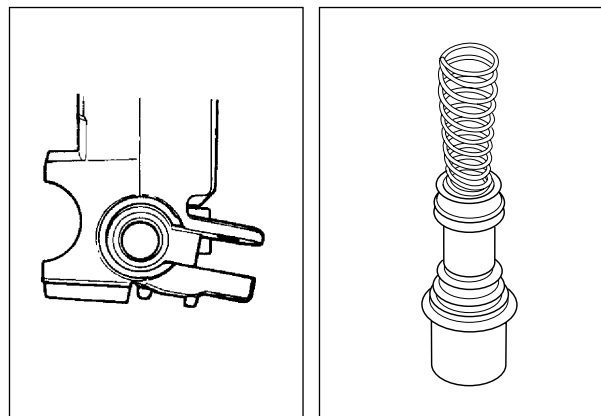
 Front brake master cylinder mounting bolt : 5~8 N · m (0.5~0.8 kgf · m)

- Tighten the brake hose union bolt ① to the specified torque.

 Brake hose union bolt : 40~60 N · m (4.0~6.0 kgf · m)

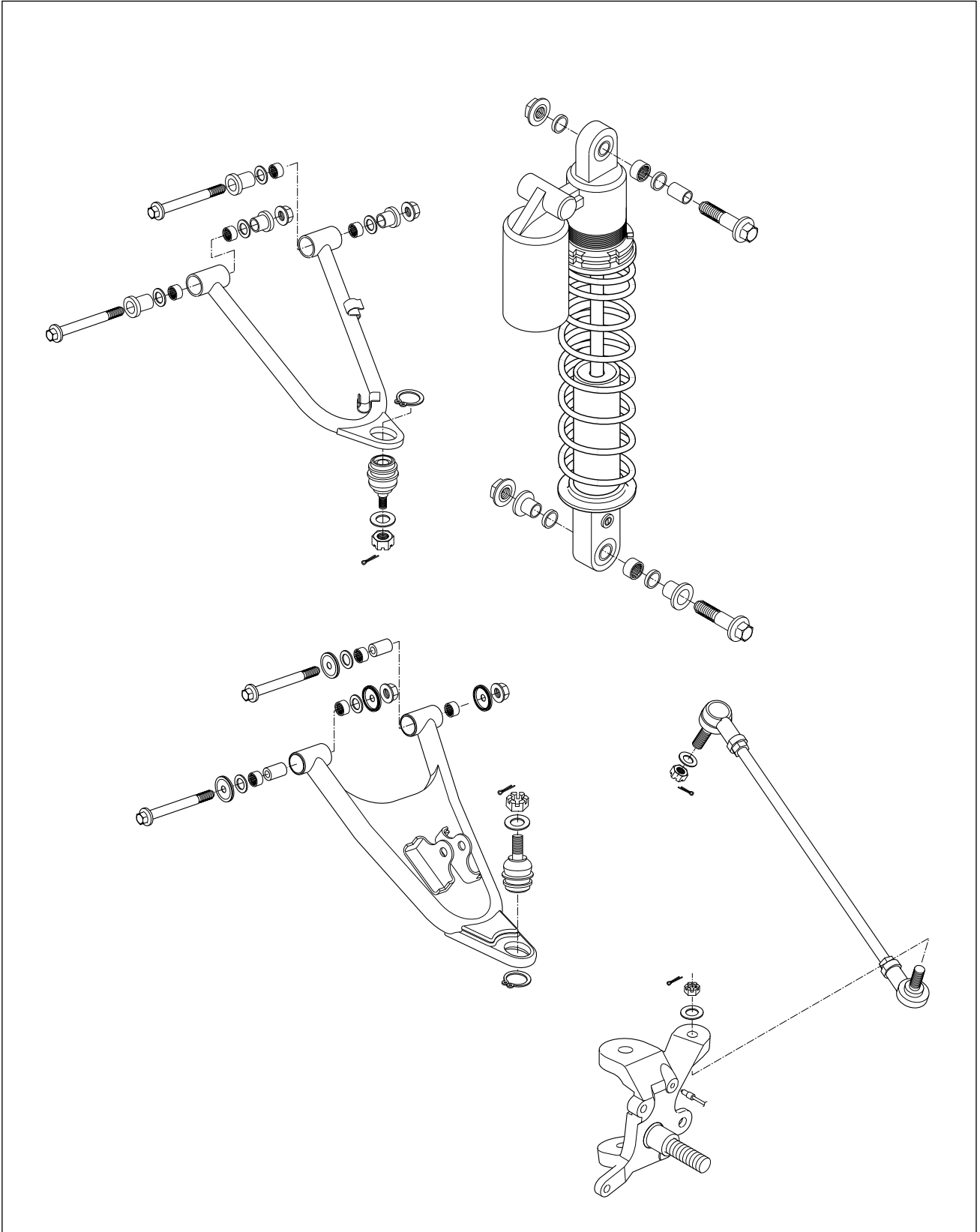
### ⚠ WARNING

Bleed air from the brake fluid circuit after assembling master cylinder. (Refer to page 2-17)



# FRONT SUSPENSION

## ◎ CONSTRUCTION

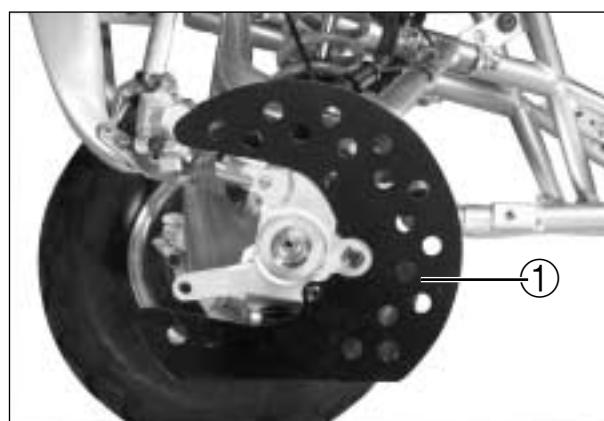


## ⊙ REMOVAL

- Remove the front wheel (Refer to page 7-8)
- Remove the front wheel hub. (Refer to page 7-8)
- Remove the brake caliper. (Refer to page 7-15)



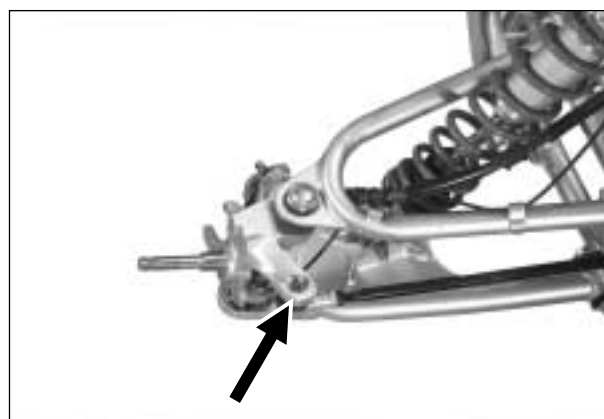
- Remove the front disk cover①.



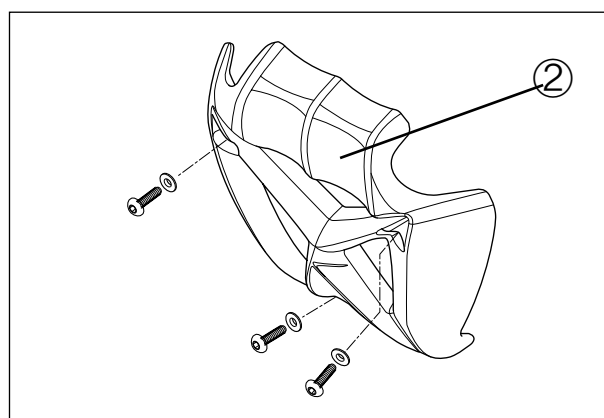
- Remove the cotter pin and tie rod end nut.

 <b>CAUTION</b>
--

Replace the removed cotter pin with a new one.

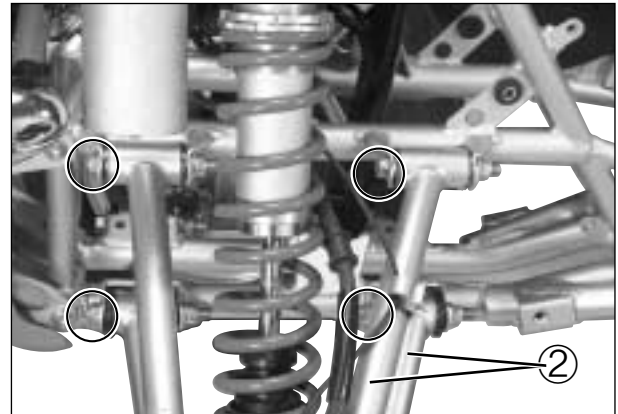
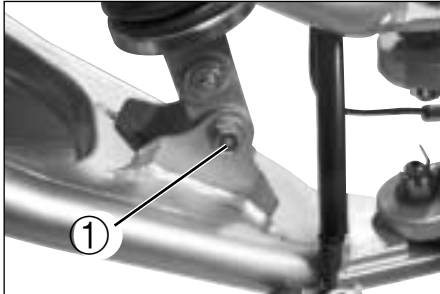


- Remove the front grip②.

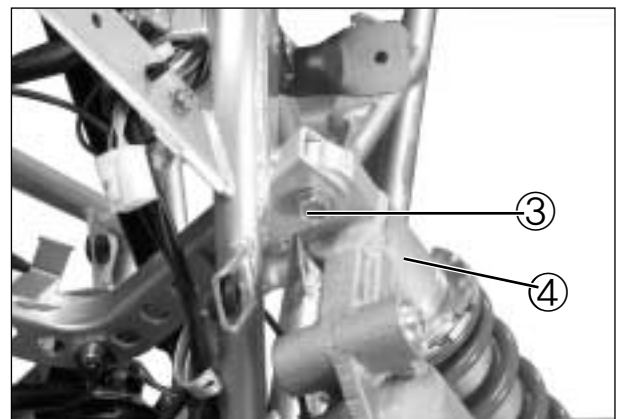


## 7-23 CHASSIS

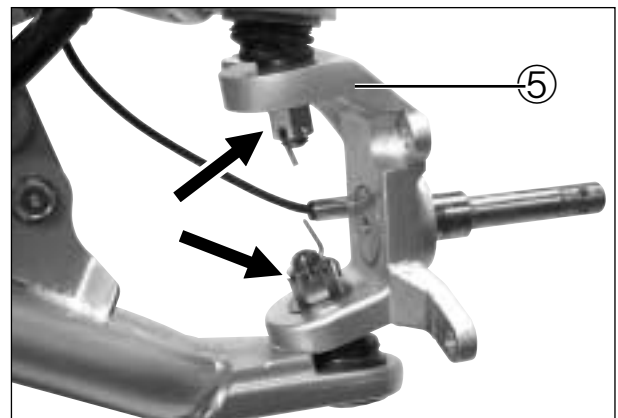
- Remove the shock absorber lower mounting bolt ①.
- Remove the suspension arm assembly ②.



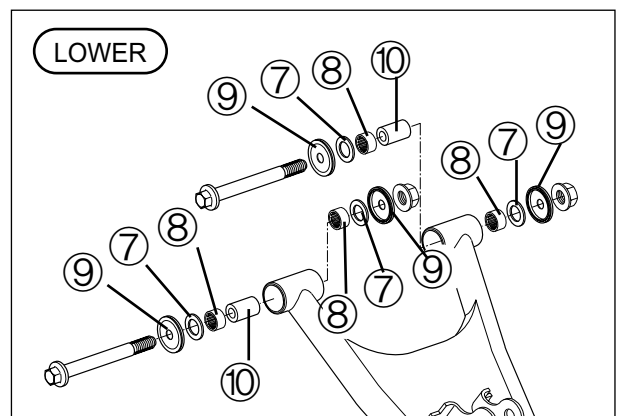
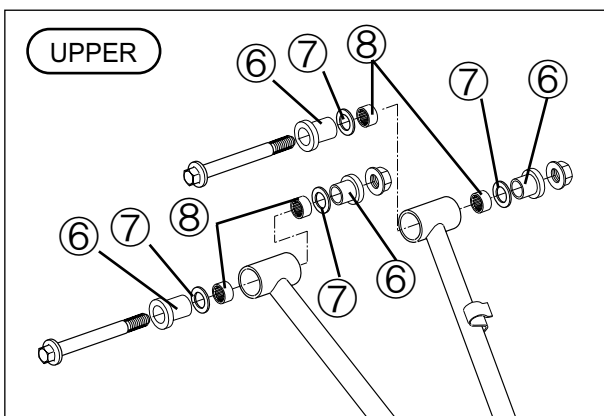
- Remove the shock absorber upper mounting bolt ③.
- Remove the shock absorber ④.



- Remove the cotter pins and nuts.
- Remove the steering knuckle ⑤.



- Remove the spacers ⑥, dust seals ⑦ and bearings ⑧ from the suspension arm.
- Remove the dust caps ⑨, dust seals ⑦, bearings ⑧ and spacers ⑩ from the suspension arm.





## ⊙ INSPECTION AND DISASSEMBLY

### ▣ FRONT SHOCK ABSORBER

Inspect the shock absorber for oil leakage or damage. If any damages are found, replace the front shock absorber with a new one.

Inspect the bearings, spacers and dust seal for wear or damage.

If any damages are found, replace the shock absorber with a new one.

 **CAUTION**

**Do not attempt to disassemble the front shock absorber. It is unserviceable.**

### ▣ KNUCKLE

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

### ▣ KNUCKLE END

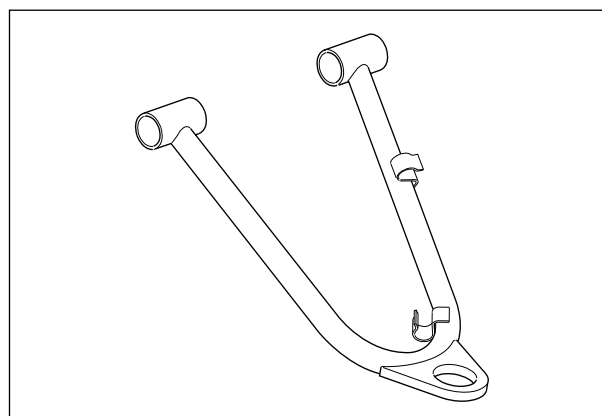
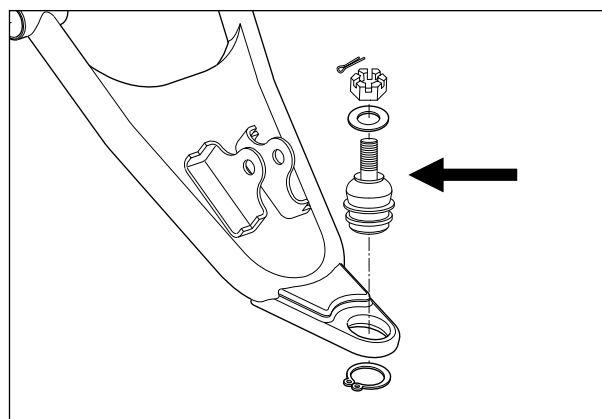
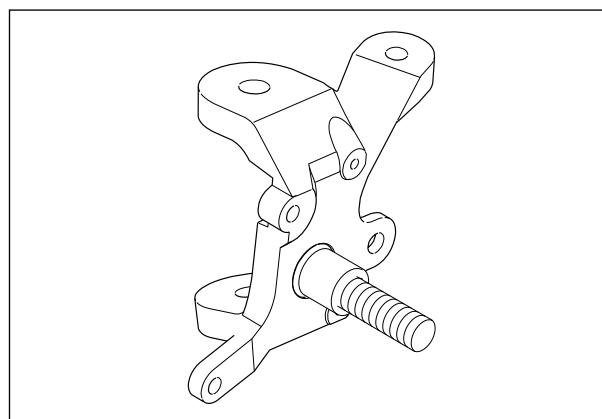
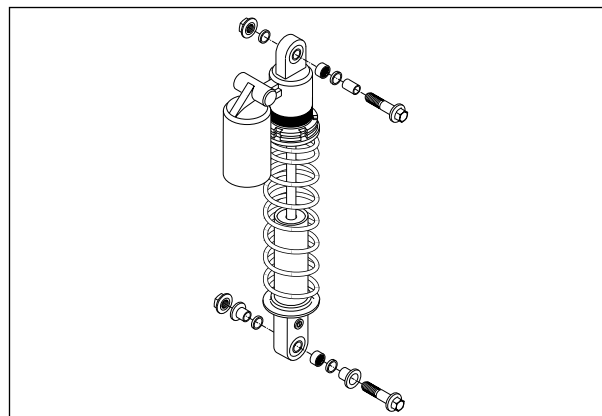
Inspect the knuckle end boot for wear or damage.

If any damages are found, replace the knuckle end with a new one.

Inspect the knuckle end for smooth movement. If there are any abnormalities, replace the knuckle end with a new one.

### ▣ SUSPENSION ARM

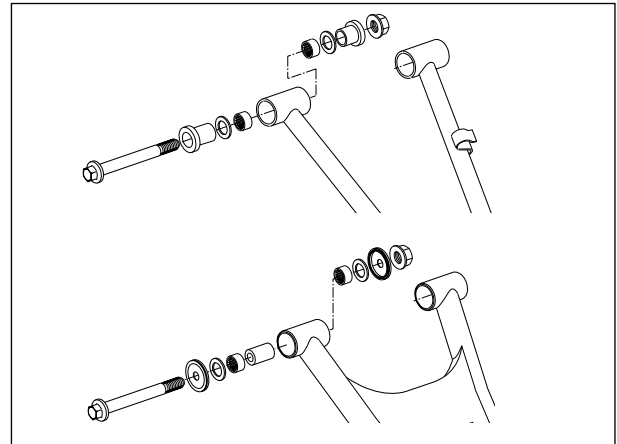
Inspect the suspension arm for wear or damage. If any damages are found, replace the suspension arm with a new one.



### ▣ SUSPENSION ARM PIVOT BEARING

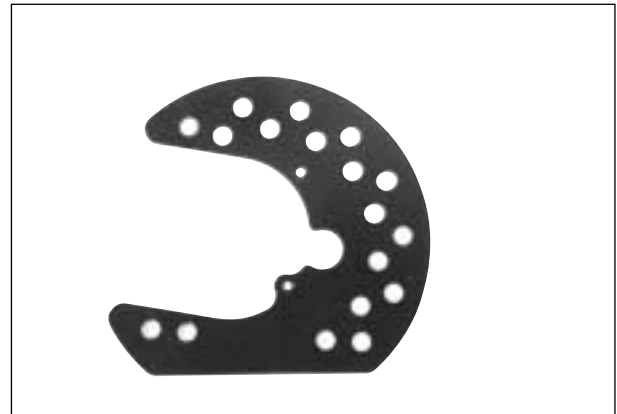
Inspect the dust seal lips and spacers for wear and damage. If any damages are found, replace them with new ones.

Inspect the bearings for play. If excessive play is found, replace them with a new one.



### ▣ BRAKE DISK COVER

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



### ⊙ FRONT SHOCK ABSORBER DISPOSAL

#### ⚠ WARNING

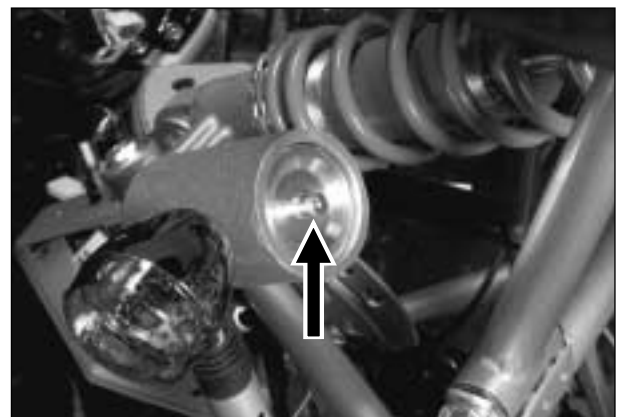
- ❖ The front shock absorber unit contains high-pressure nitrogen gas.
- ❖ Mishandling can cause explosion.
- ❖ Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.
- ❖ Release gas pressure before disposing.

### ▣ GAS PRESSURE RELEASE

- Remove the valve cap.
- Press the valve with a screwdriver to bleed out the nitrogen gas.

#### ⚠ WARNING

- ❖ Releasing high pressure gas from the front shock absorber unit can be hazardous. Never perform any servicing until the nitrogen gas pressure has been released from the front shock absorber unit.
- ❖ When releasing the gas pressure, place a rag over the gas valve and use the tip of a screwdriver to press the valve. Do not use your finger to depress the gas valve, and be sure to direct the valve away from your face and body.
- ❖ Be sure to always wear eye protection when performing this procedure.



## ⊙ REASSEMBLY AND REMOUNTING

Reassemble and remount the front suspension in the reverse order of removal and disassembly.

Pay attention to the following points :

- Apply SUPER GREASE “A” to the dust seals, dust covers and bearing.

### SUPER GREASE “A”


- Install the bearings ①, dust seals ② and spacers ③ into the suspension arm.
- Install the spacers ④, bearings ①, dust seals ② and dust caps ⑤ into the suspension arm.

### NOTE

*Stamped mark on the dust seal ② must face out-side.*

- Degrease the tapered portion of knuckle and also knuckle end with nonflammable cleaning solvent.

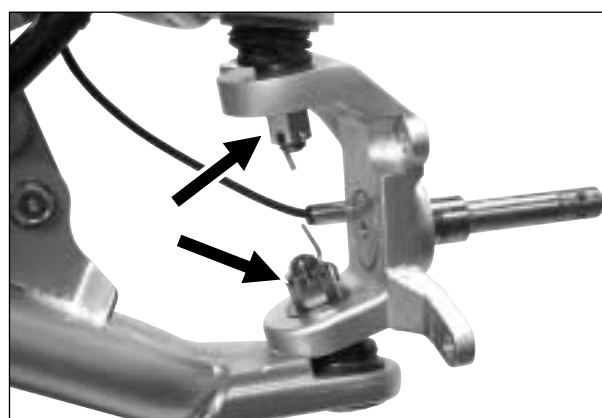
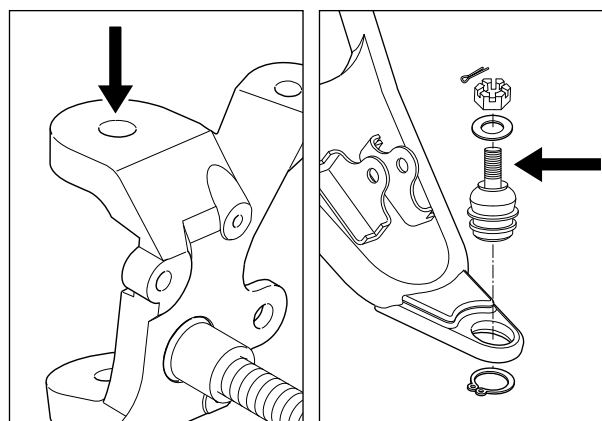
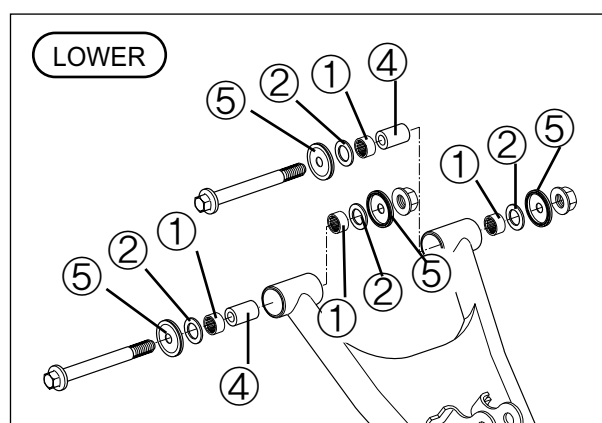
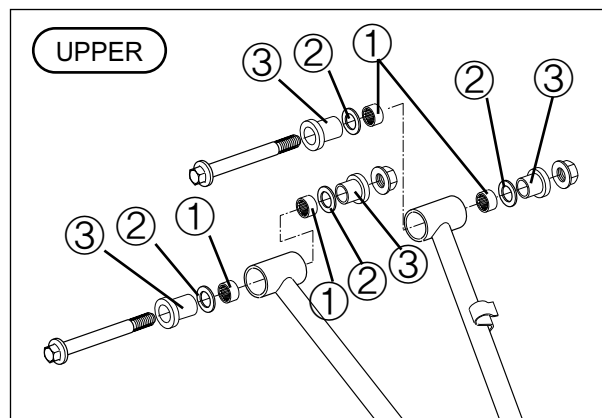
- Install the suspension arms to the steering knuckle and tighten the knuckle end nuts to the specified torque.

 **Knuckle end nut : 43 N · m (4.3 kgf · m)**

- Install the cotter pins.


### CAUTION

Replace the removed cotter pins with new ones.

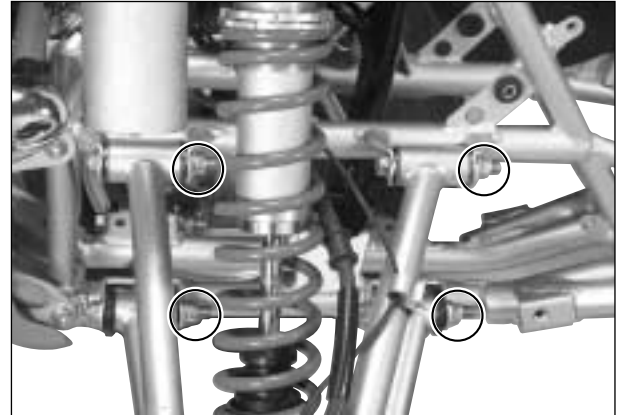


## 7-27 CHASSIS

- Tighten the suspension arm pivot nuts to the specified torque.

 **Suspension arm pivot nut**  
: 40~60 N · m (4.0~6.0 kgf · m)


- Install the front grip and the front shock absorber.

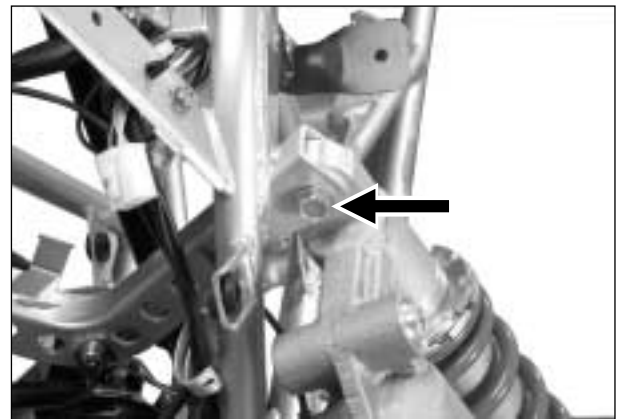
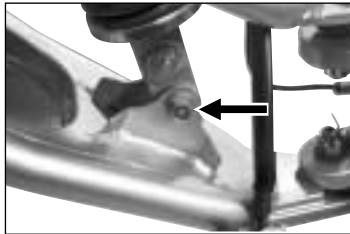


- Apply THREAD LOCK “1324” to the front shock absorber mounting bolts.

 **THREAD LOCK “1324”**

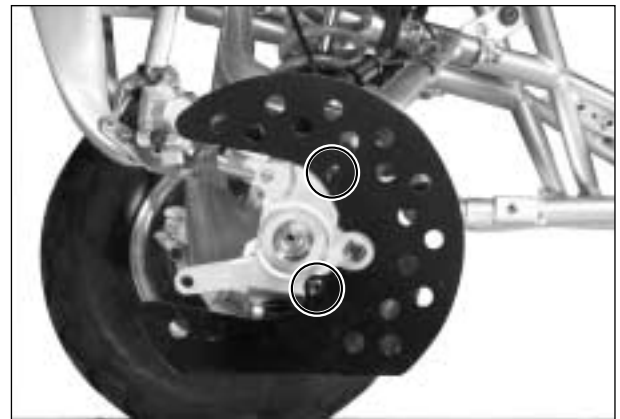
- Tighten the shock absorber mounting nut to the specified torque.

 **Shock absorber mounting nut**  
(Upper and Lower)  
: 40~60 N · m (4.0~6.0 kgf · m)




- Apply THREAD LOCK “1324” to the disk cover mounting bolts, and then tighten the bolts.

 **THREAD LOCK “1324”**



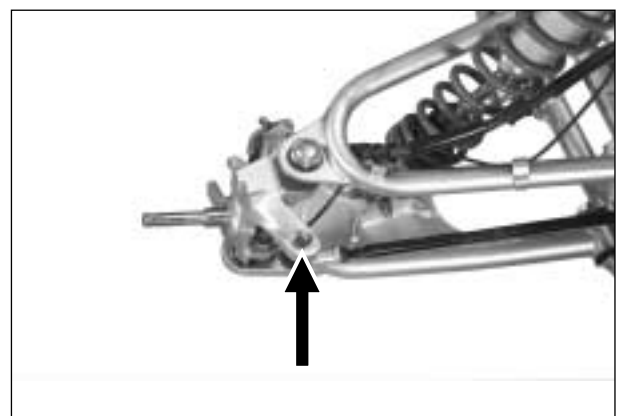
- Tighten the tie rod end nut to the specified torque.

 **Tie rod end nut**  
: 22~35 N · m (2.2~3.5 kgf · m)

- Install the cotter pin.

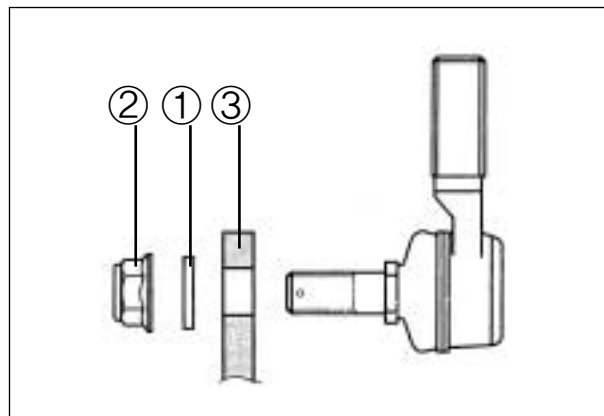
 **CAUTION**

Replace the removed cotter pin with a new one.



**NOTE**

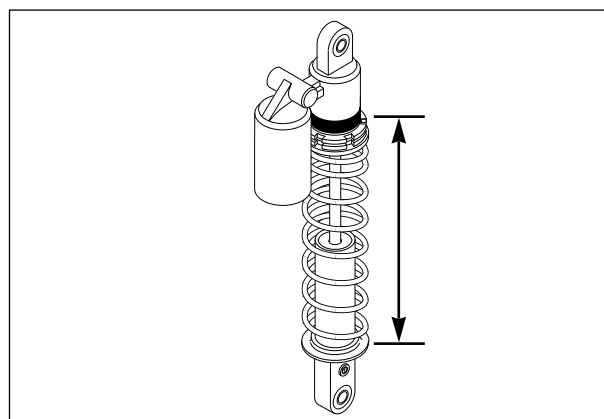
When installing the tie rod end, install the washer ① between the nut ② and steering knuckle ③.

**⊙ FRONT SUSPENSION SETTING****▣ SPRING PRE-LOAD ADJUSTMENT**

The front suspension spring pre-load is adjustable. This adjustment is performed by changing spring set length.

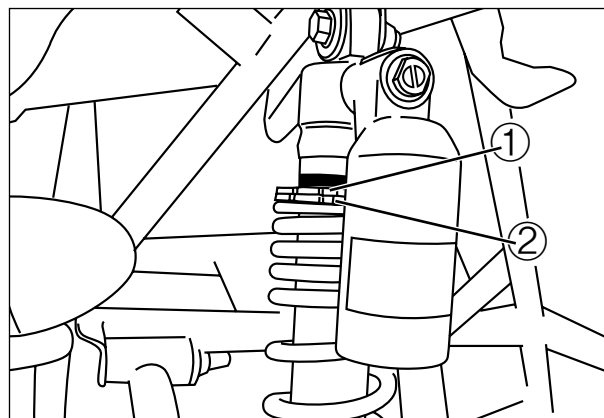
**FRONT SUSPENSION SPRING SET LENGTH**

STANDARD	MAXIMUM (SOFTEST)	MINIMUM (STIFFEST)
270 mm (10.6 in)	280 mm (11.0 in)	258 mm (10.2 in)

**⚠ CAUTION**

Do not set the spring length out of the specified range.

- Remove the front shock absorber. (Refer to page 7-23)
- Loosen the lock nut ①.
- Adjust the spring set length by turning the adjuster ②.
- Tighten the lock nut ①.
  
- Remount the front shock absorber. (Refer to page 7-27)



**▣ DAMPING FORCE ADJUSTMENT**

The compression and tension damping force are adjustable for rider's preference, rider's weight and field condition.

**NOTE**

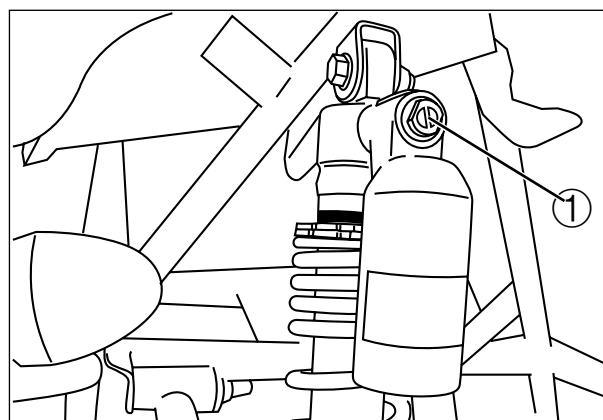
*Do not turn the adjuster screws more than given position, or the adjuster may be damaged.*

**1. Compression damping force**

To adjust the compression damping force turn in the adjuster ① fully for "S" or "H" direction (counter-clockwise or clockwise).

Count the number of turns from the fully turned-in position.

Fully turned-in "H" direction (or clockwise) provides stiffest compression damping force and turning "S" direction (or counter-clockwise) the adjuster will soften compression damping force.



<b>Front shock absorber compression damping force adjuster</b>	<b>Standard</b> 1 1/2 turn from end of "S" direction (counter-clockwise)
--	---

**2. Tension damping force**

To adjust the tension damping force turn in the adjuster ② fully for "S" or "H" direction (counter-clockwise or clockwise).

Count the number of turns from the fully turned-in position.

Fully turned-in "H" direction (or clockwise) provides stiffest tension damping force and turning "S" direction (or counter-clockwise) the adjuster will soften tension damping force.



<b>Front shock absorber tension damping force adjuster</b>	<b>Standard</b> End of "S" direction (counter-clockwise)
--	---

**STANDARD FRONT SHOCK ABSORBER DAMPING FORCE**

	<b>Compression</b>	<b>Tension</b>
<b>Softer</b>	Turn to "S" direction (counter-clockwise)	Turn to "S" direction (counter-clockwise)
<b>Standard</b>	1 1/2 turn from end of "S" direction (counter-clockwise)	End of "S" direction (counter-clockwise)
<b>Stiffer</b>	Turn to "H" direction (clockwise)	Turn to "H" direction (clockwise)

**⚠ WARNING**

Unequal front suspension adjustment can cause poor handling and loss of stability.

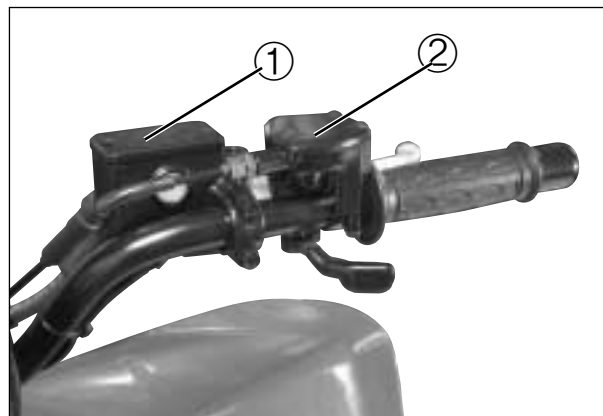
Be sure to adjust the compression and tension damping force on the right and left front shock absorbers to the same setting.



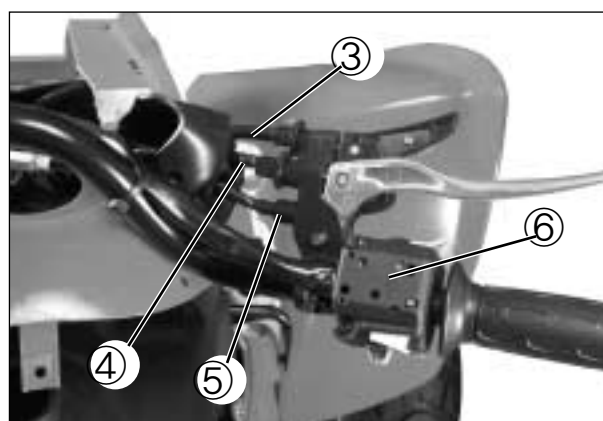
## ◎ REMOVAL

### ▣ HANDLEBAR

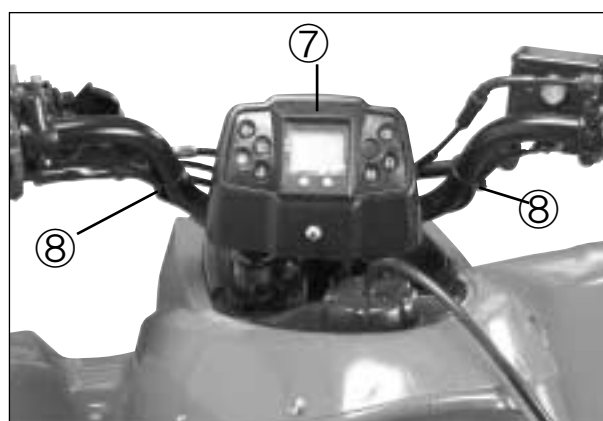
- Remove the front fender. (Refer to page 7-3)
- Remove the master cylinder assembly ① from the handlebar. (Refer to page 7-19)
- Remove the throttle lever case ② .



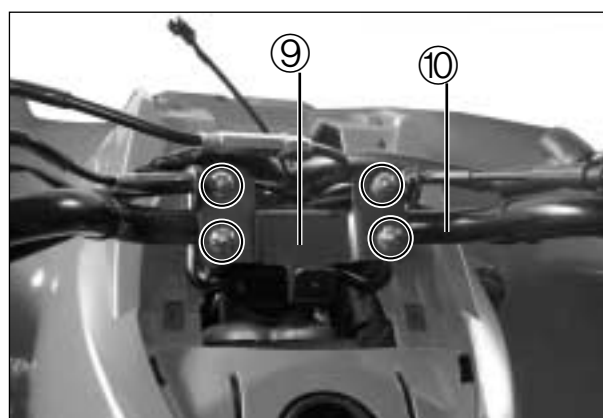
- Disconnect the parking brake cable ③ and the clutch cable ④ .
- Remove the clutch switch ⑤ .
- Remove the handlebar switch box ⑥ .



- Remove the speedometer ⑦ .
- Remove the harness clamps ⑧ .



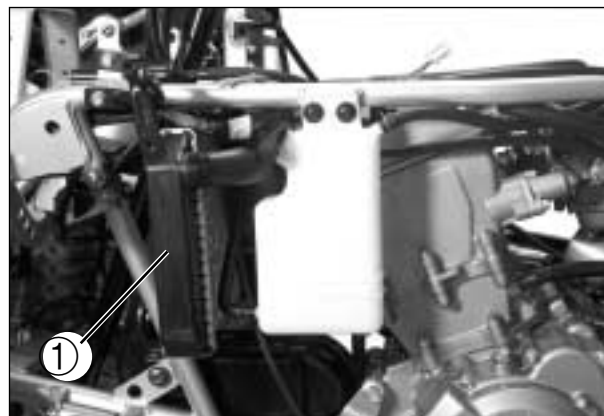
- Remove the steering head cover bracket ⑨ and the handlebar ⑩ .



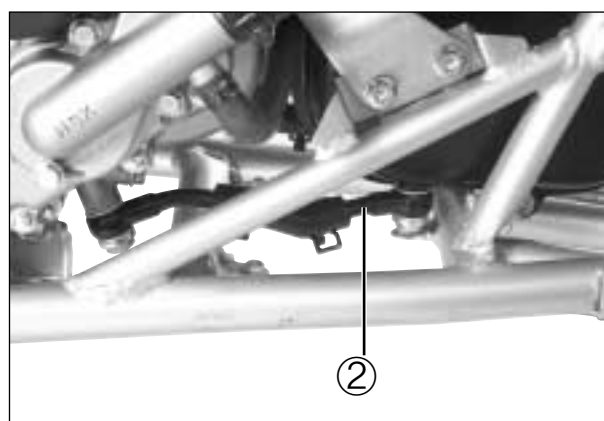


## ▣ STEERING SHAFT AND TIE ROD

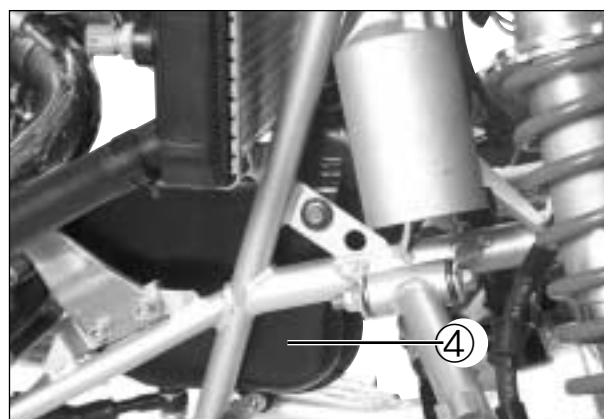
- Drain engine oil and coolant.  
(Refer to page 2-10 and 2-12)
- Remove the radiator assembly①.  
(Refer to page 5-2)



- Disconnect the oil hoses② and overflow hose③.



- Remove the oil tank④. (Refer to page 5-17~18)

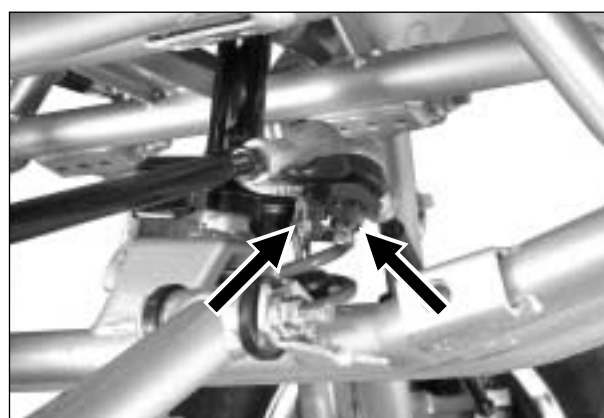


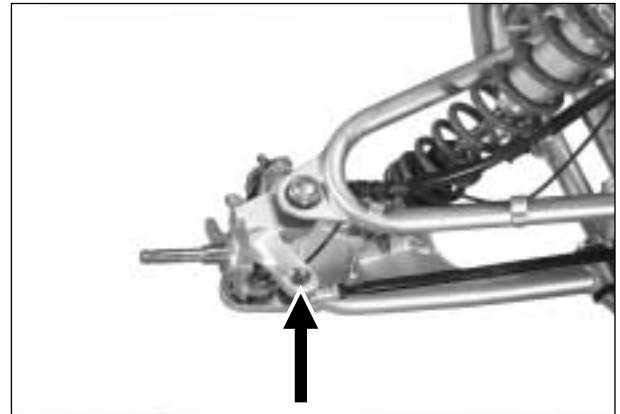
- Remove the cotter pins and tie rod end nuts.

### CAUTION

Replace the removed cotter pins with new ones.

- Remove the tie rods.

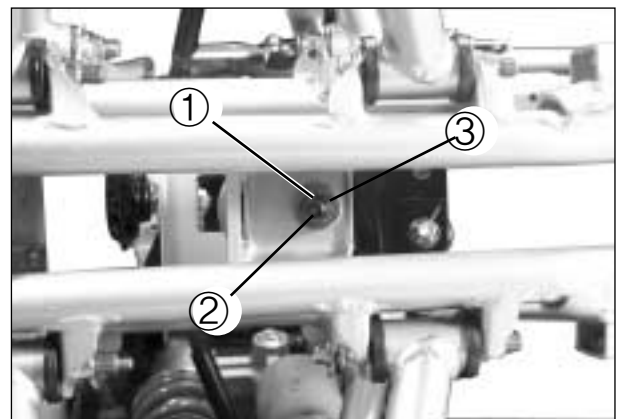




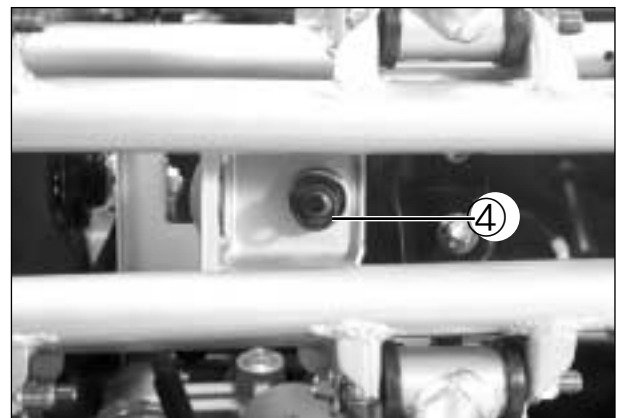
- Remove the cotter pin ① and steering shaft nut ② and washer ③.

**⚠ CAUTION**

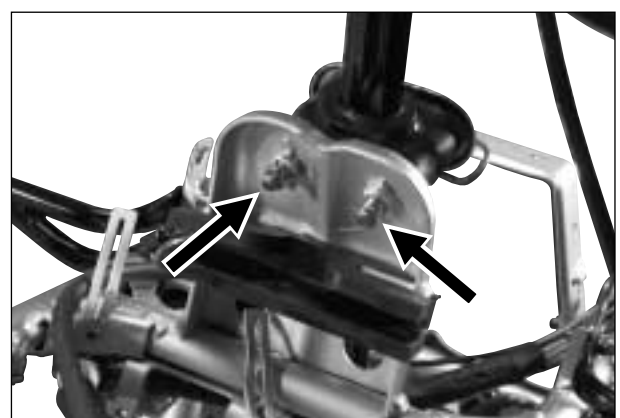
Replace the removed cotter pins with new ones.



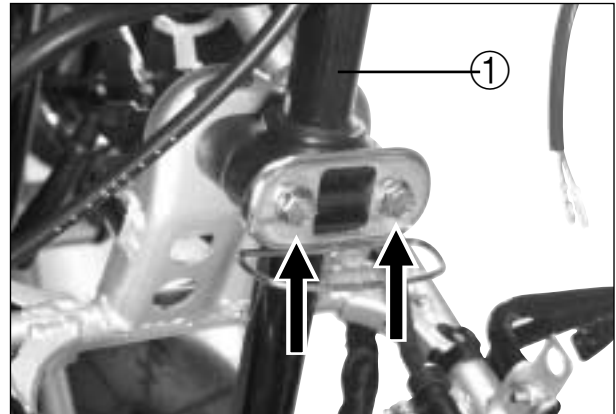
- Remove the O-ring ④.



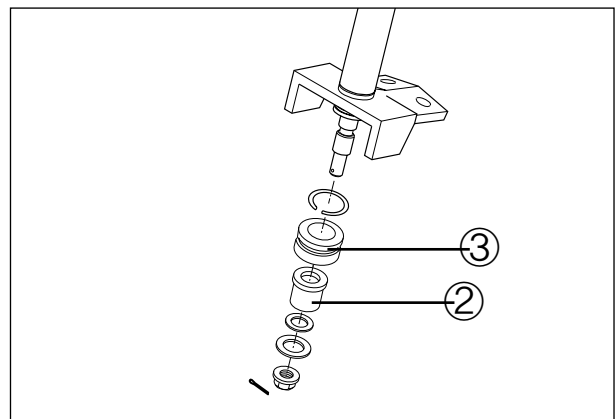
- Remove the steering shaft holder cotter pin.



- Remove the steering shaft holder bolts.
- Remove the cable/hose guide and the steering shaft holder.
- Remove the steering shaft ①.



- Remove the bushing ② and the dust seal ③ from the steering shaft.
- Remove the steering shaft holder half.



## ⊙ INSPECTION

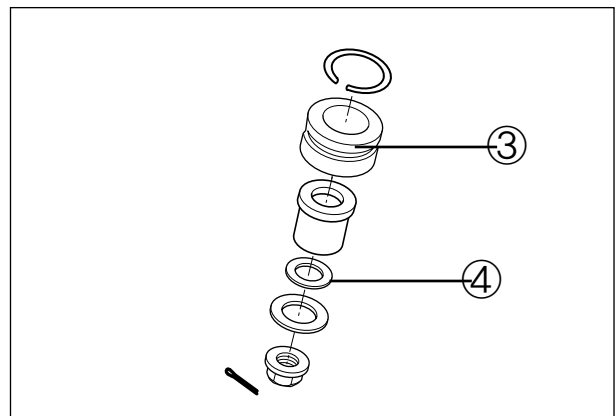
Inspect the removed parts for the following abnormalities.

- \* Handlebar distortion
- \* Handlebar clamp wear

### ▣ DUST SEALS AND O-RING

Inspect the dust seal ③ and O-ring ④ for wear or damage.

If any damages are found, replace the dust seal or O-ring with new ones.



### ▣ TIE ROD

Inspect the tie rod for distortion or damage.

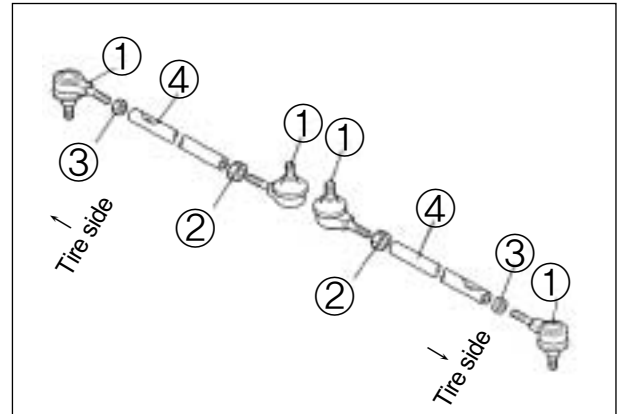
If any damages are found, replace the tie rod with a new one.



- ① Tie rod end
- ② Lock nut
- ③ Lock nut
- ④ Tie rod

**CAUTION**

The lock nuts ③ with a narrow width have left-hand threads.



**TIE ROD END**

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

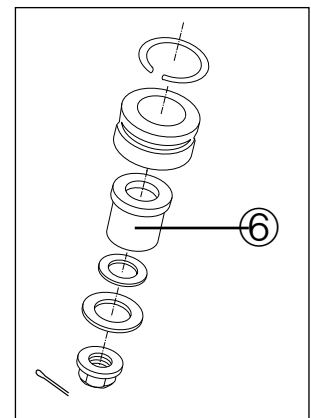
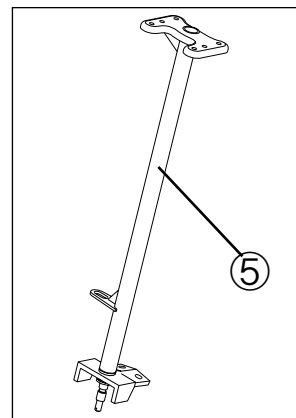


**STEERING SHAFT**

Inspect the steering shaft ⑤ for distortion or bends. If any damages are found, replace the steering shaft with a new one.

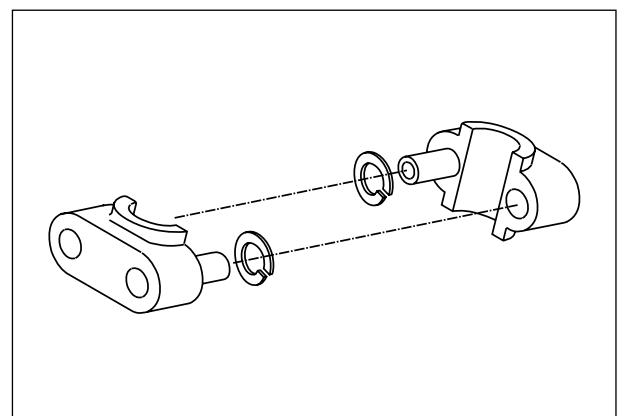
**STEERING SHAFT BUSHING**

Inspect the steering shaft bushing ⑥ for wear and damage. If any damages are found, replace it with a new one.



**STEERING SHAFT HOLDER**

Inspect the steering shaft holders for wear or damage. If any damages are found, replace the steering shaft holders with new ones.



## ⊙ REASSEMBLY AND REMOUNTING

Reassemble and remount the steering shaft in the reverse order of removal and disassembly.

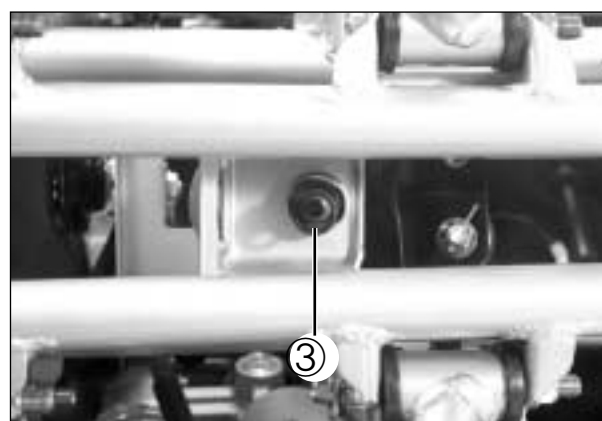
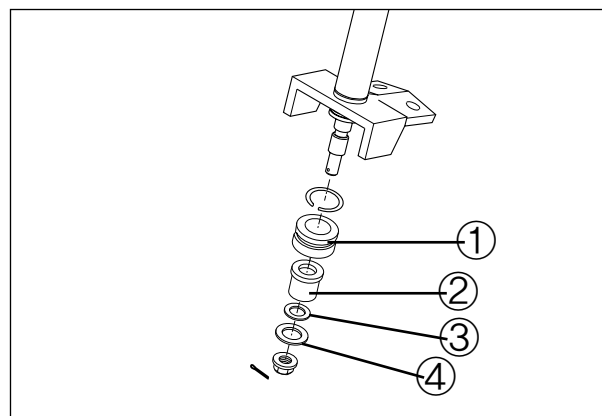
Pay attention to the following points :

### ▣ STEERING SHAFT

- Apply SUPER GREASE "A" to the O-ring, dust seals and steering shaft before remounting the steering shaft.

#### SUPER GREASE "A"

- Install the dust seal ① and bushing ② to the steering shaft.
- Install the new O-ring ③ and washer ④ to the steering shaft.

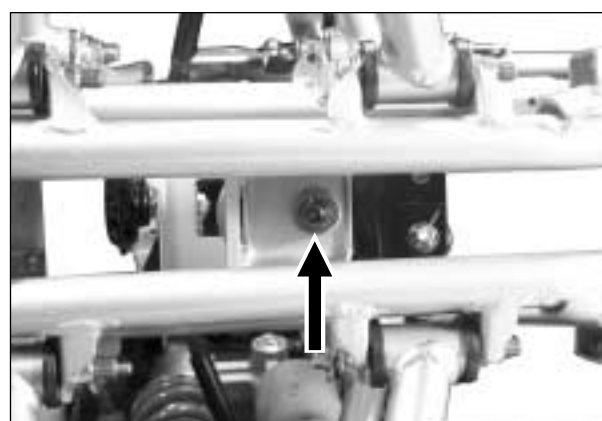


- Tighten the steering shaft nut to the specified torque.

#### Steering shaft nut

: 49 N · m (4.9 kgf · m)

- Install the cotter pin.

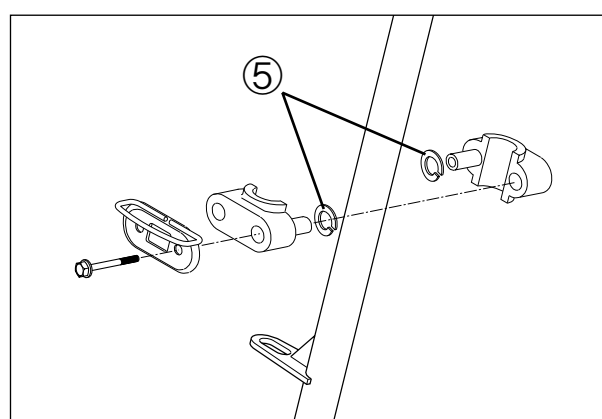


### CAUTION

Replace the removed cotter pin with a new one.

- Apply SUPER GREASE "A" to the dust seals ⑤ and sliding surface of the steering shaft holders before remounting the steering shaft holders.

#### SUPER GREASE "A"



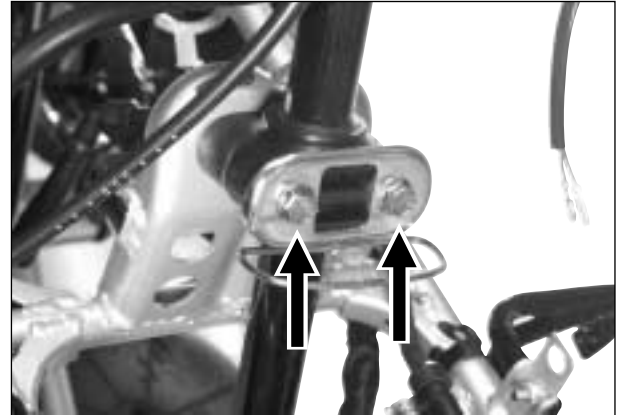
## 7-37 CHASSIS

- Tighten the steering shaft holder bolts to the specified torque.

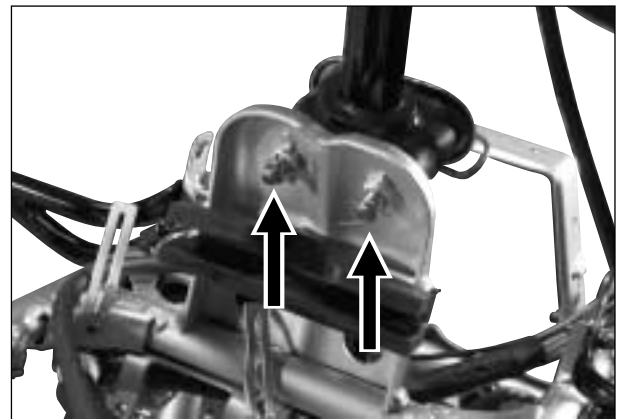
**🔧 Steering shaft holder bolt**  
: 18~28 N · m (1.8~2.8 kgf · m)

### NOTE

*Make sure that the wiring harness, cables and brake hose routing are properly.  
(Refer to page 8-26 to 8-31)*



- Install the steering shaft holder cotter pin.

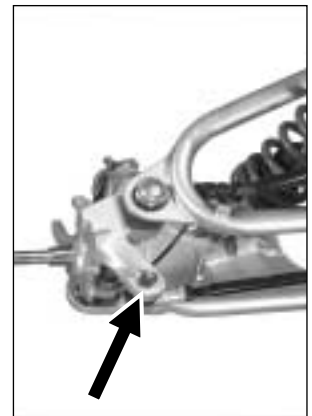


### 🔧 TIE ROD

- Tighten the tie rod end nuts to the specified torque.

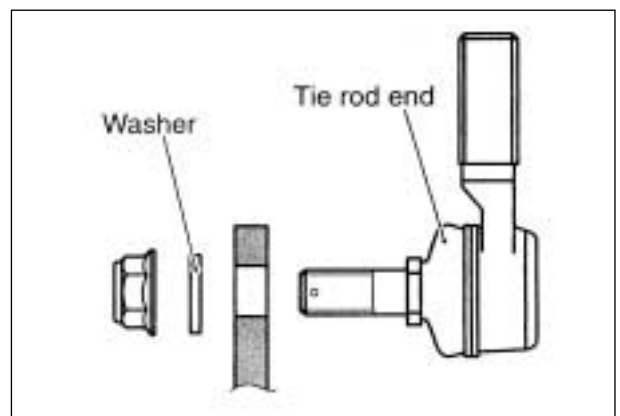
**🔧 Tie rod end nut**  
: 22~35 N · m (2.2~3.5 kgf · m)

- Install the cotter pins.



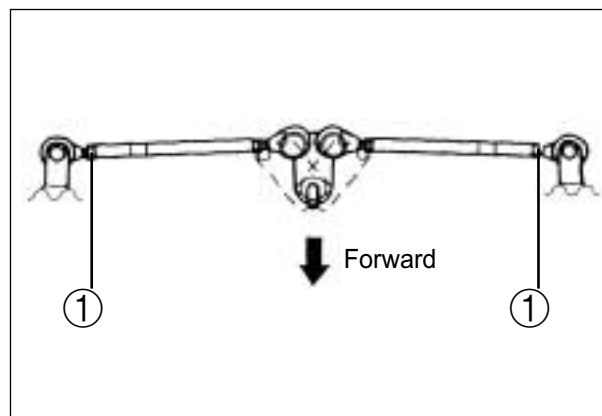
### ⚠ CAUTION

Replace the removed cotter pins with new ones.



**⚠ CAUTION**

The lock nuts ① with a narrow width have left-hand threads.



**■ OIL TANK AND RADIATOR**

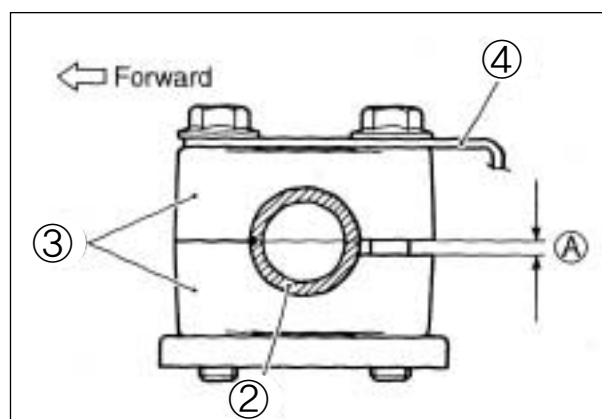
- Install the oil tank. (Refer to page 5-18)
- Reinstall the radiator assembly. (Refer to page 5-4)
- Pour engine oil. (Refer to page 2-11)
- Pour engine coolant and bleed air from the cooling circuit. (Refer to page 2-12)

**■ HANDLEBAR**

- Assemble the handlebar ②, handlebar clamp ③ and steering head cover bracket ④.

**NOTE**

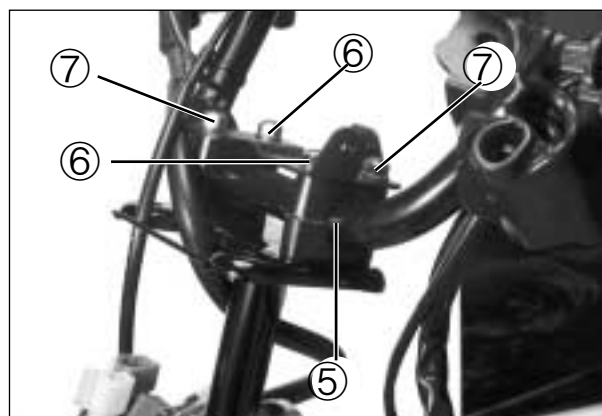
*The higher portion of handlebar clamp must face forward, so that the clearance A of holder is in back of the handlebar.*



- Align the punch mark ⑤ on the handlebar with the mating surface of handlebar clamp.
- First tighten the bolt ⑥ to the specified torque and then tighten the bolt ⑦ to the specified torque.

**🔧 Handlebar clamp bolt :**

**: 18~28 N · m (1.8~2.8 kgf · m)**



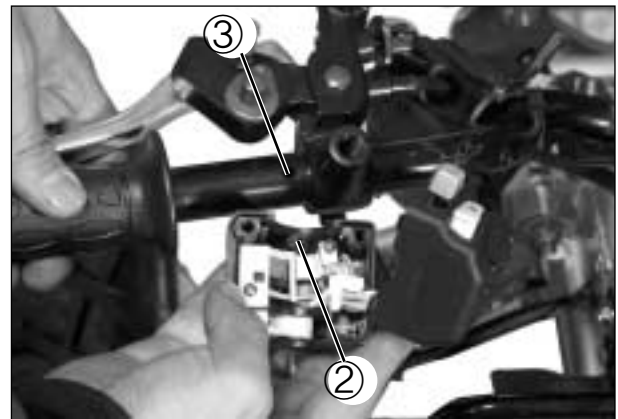
- Install the speedometer①.



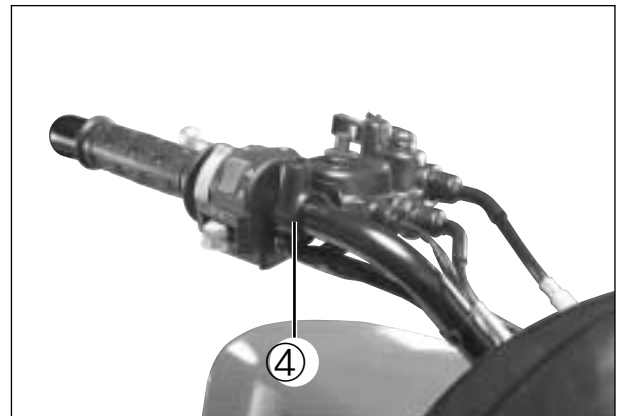
- Install the handle switch box with the lug② on the switch half inserted into the hole③ on the handlebar.

**NOTE**

*When installing the handlebar, make sure that the cable, wiring harness and brake hose routing are proper. (Refer to page 8-26 to 31)*



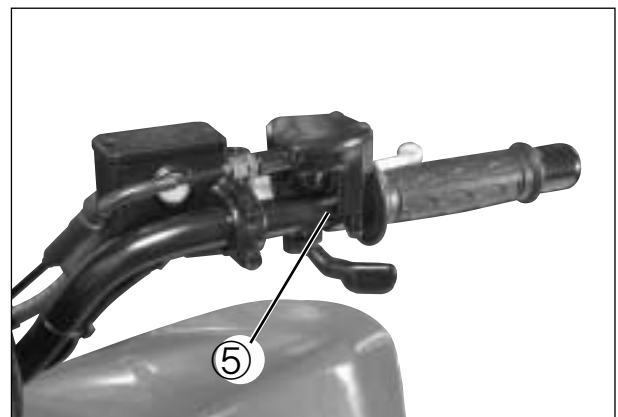
- Install the clutch lever assembly to the handlebar with the mating surface of clutch lever holder aligned with punch mark④ on the handlebar.
- Connect the clutch cable, rear brake cable and clutch switch.
- Adjust each cable play.  
(Refer to page 2-9, 2-13 and 2-15)



- Install the throttle case to the handlebar with the mating surface of throttle case aligned with the punch mark⑤.
- Tighten the throttle case bolts to the specified torque.

**🔧 Throttle case bolt : 5 N · m (0.5 kgf · m)**

- Install the brake master cylinder.  
(Refer to page 7-20)





## ⊙ TOE-IN ADJUSTMENT

Adjust the toe-in as follows :

- Place the vehicle on level ground and set the handlebar straight.  
Make sure all the tires are inflated to the standard pressure. (Refer to page 2-18)
- Place 75 kg (165 lbs) of weight on the seat.
- Loosen the lock nuts (①, ②) on each tie rod.

### ⚠ CAUTION

The lock nuts ① have left-hand threads.


- Measure the distances (A) and (B) between the front wheels. Subtract the measurements of (B) from the measurements of (A) to find the toe-in.  
If the toe-in is not within specification, adjust the tie rod to the right or left until the toe-in is within the specified range.

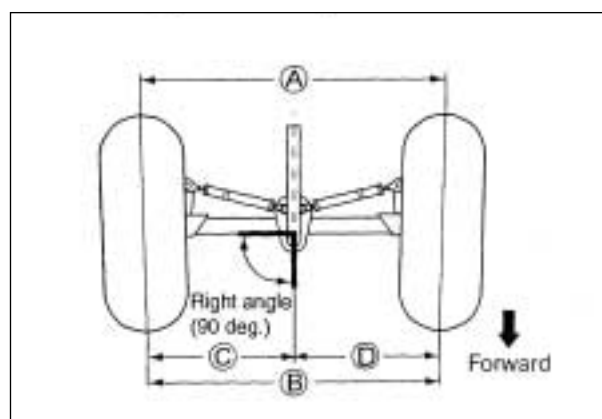
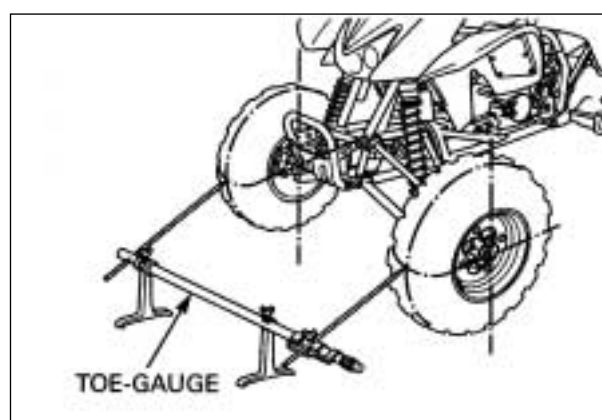
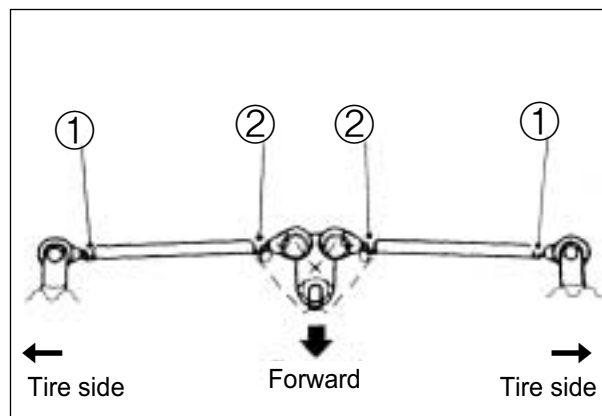
Toe-in	Standard
	0 ~ 5 mm (0 ~ 0.2 in) [When apply to a load 75 kg (165 lbs)]

### NOTE

① - ② = Toe-in

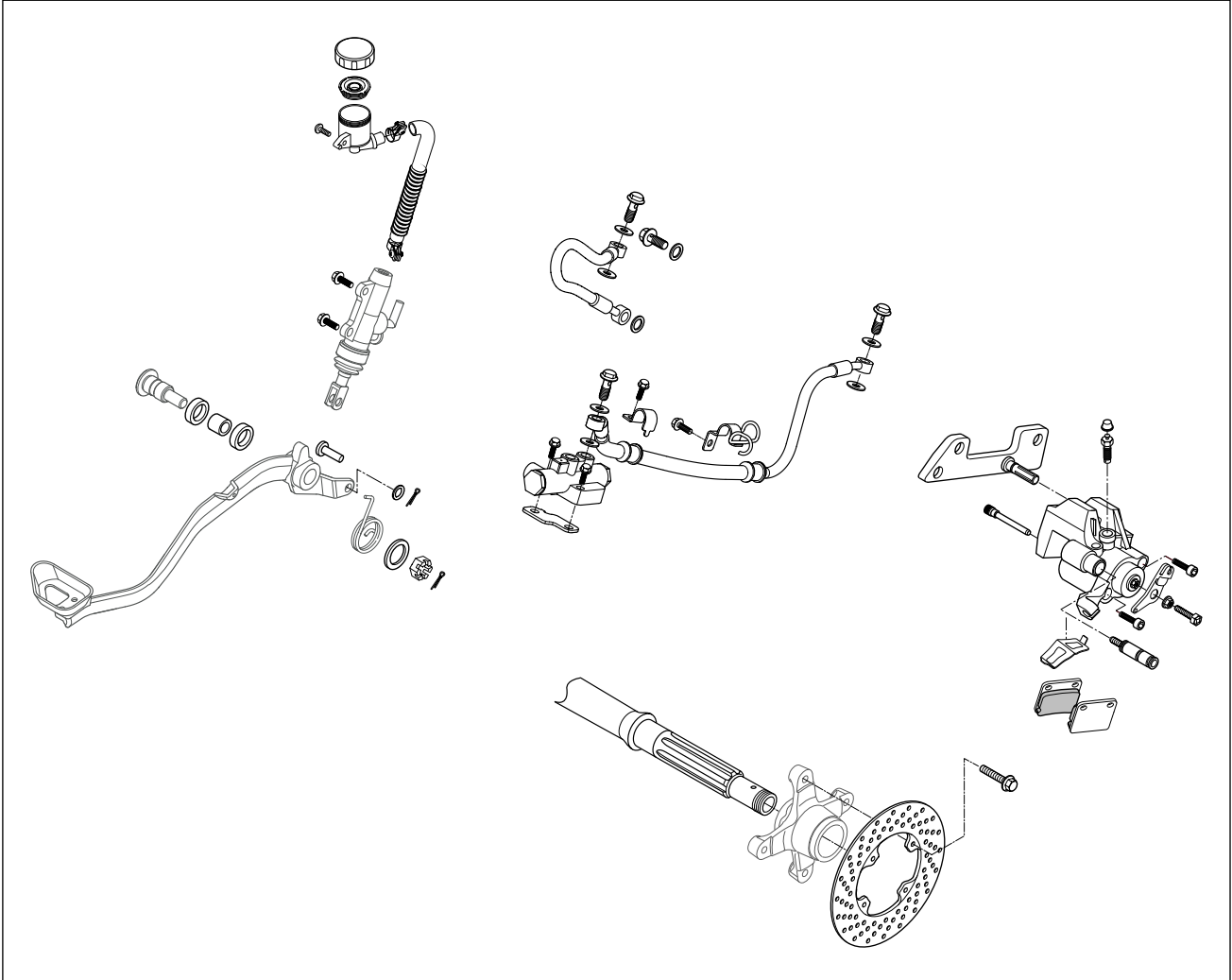
- Temporarily tighten the four lock nuts.
- Check that the distances (C) and (D) are equal, as shown.  
If the distances are not equal, adjust the tie rod to the right or left until the toe-in is within specification.  
Check the toe-in again by measuring distances (A) and (B).
- If the toe-in is not within specification, repeat the adjustment as above until the proper toe-in is obtained and distances (C) and (D) become equal.
- After adjustment has been made, tighten the four lock nuts ① to the specified torque.

 Tie rod lock nut : 29 N · m (2.9 kgf · m)



## REAR BRAKE

### ⊙ CONSTRUCTION



### ⚠ WARNING

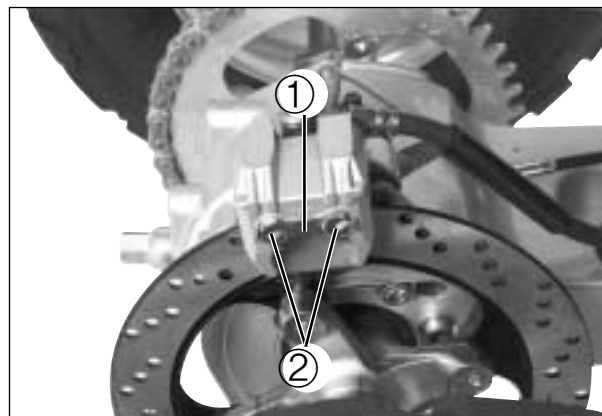
- ❖ This brake system is filled with an ethylene glycol-based DOT 4 brake fluid.  
Do not use or mix different types of fluid such as silicone-based or petroleum-based brake fluids.
- ❖ Do not use any brake fluid taken from old, used or unsealed containers.  
Never reuse brake fluid left over from the last servicing or stored for long periods.
- ❖ When storing the brake fluid, seal the container completely and keep away from children.
- ❖ When replenishing brake fluid, take care not to get dust into fluid.
- ❖ When cleaning brake components, use fresh brake fluid. Never use cleaning solvent.
- ❖ A contaminated brake disk or brake pad reduces braking performance.  
Discard contaminated pads and clean the disk with high quality brake cleaner or neutral detergent.

### ⚠ CAUTION

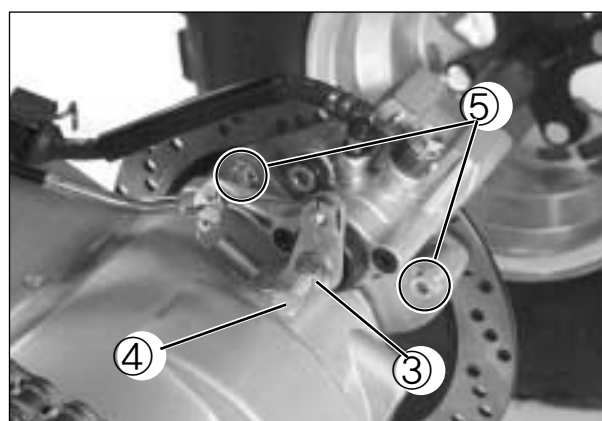
Handle brake fluid with care : the fluid reacts chemically with paint, plastics, rubber materials etc, and will damage them severely.

## ⊙ BRAKE PAD REPLACEMENT

- Flatten the lock washer ①, and then slightly loosen the pad mounting pins ②.



- Loosen the lock nut ③ and turn out the parking brake adjuster ④ several turns.
- Remove the caliper by removing the caliper mounting bolts ⑤.
- Remove the brake pads by removing the pad mounting pins.



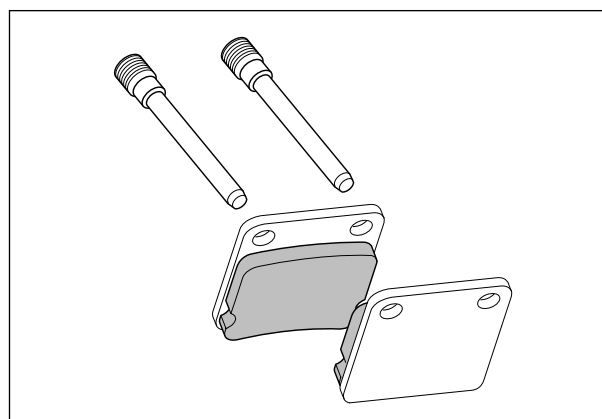
### ⚠ CAUTION

- ❖ Do not operate the brake pedal while dismounting the pads.
- ❖ Replace the brake pads as a set, otherwise braking performance will be adversely affected.

- Install the new brake pad.

### NOTE

- ❖ Before installing the new pads, inspect the pad mounting pins for wear. If excessive wear is found, replace them with new ones.
- ❖ Be sure to loosen the parking brake adjuster before installing the pads.

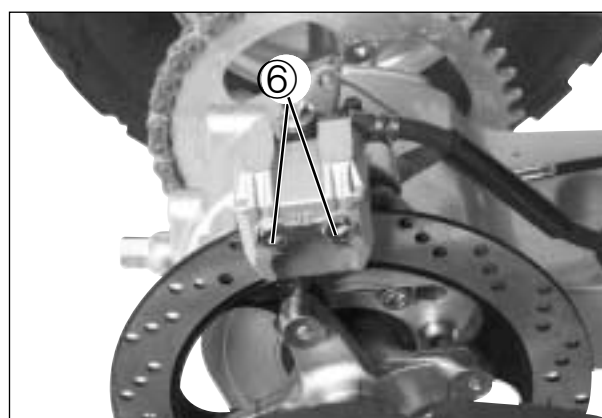


- Tighten the pad mounting pins ⑥ to the specified torque, and then bend the lock washer.

- 🔧 **Rear brake pad mounting pin**  
: 18~28 N · m (1.8~2.8 kgf · m)

### NOTE

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



- Tighten the caliper mounting bolts to the specified torque.

**🔧 Brake caliper mounting bolt**  
: 18~28 N · m (1.8~2.8 kgf · m)

- Adjust the parking brake. (Refer to page 2-15)



### 🔧 BRAKE FLUID REPLACEMENT

- Place the vehicle on a level surface.
- Remove the master cylinder reservoir cap ① and diaphragm.
- Suck up the old brake fluid as much as possible.
- Fill the reservoir with new brake fluid.

**🔧 Specification and classification : DOT 4**



- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake pedal until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose.

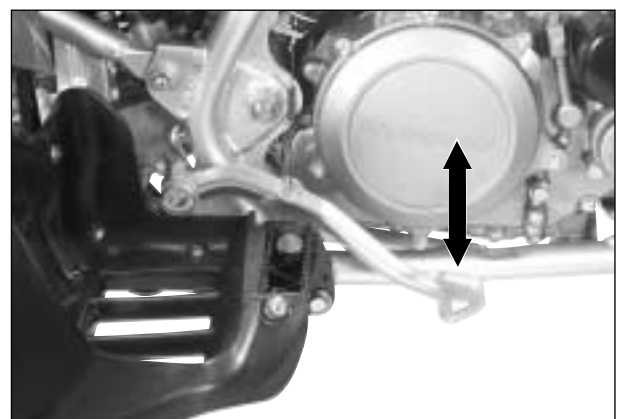
Fill the reservoir with new brake fluid to the upper level.

**🔧 Brake air bleeder valve**  
: 9~14 N · m (0.9~1.4 kgf · m)



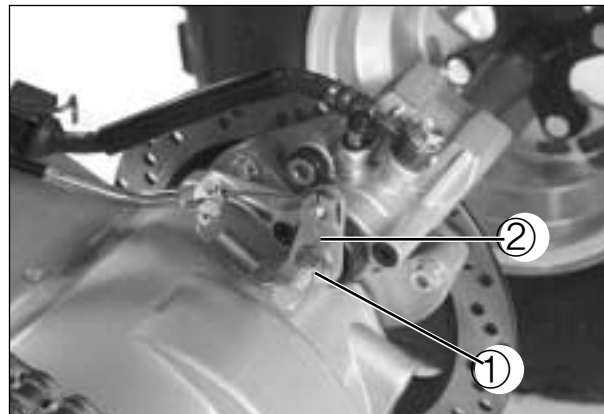
### ⚠️ CAUTION

- ❖ Never reuse the brake fluid left over from previous servicing and stored for long periods.
- ❖ Bleed air from the brake system. (Refer to page 2-17)

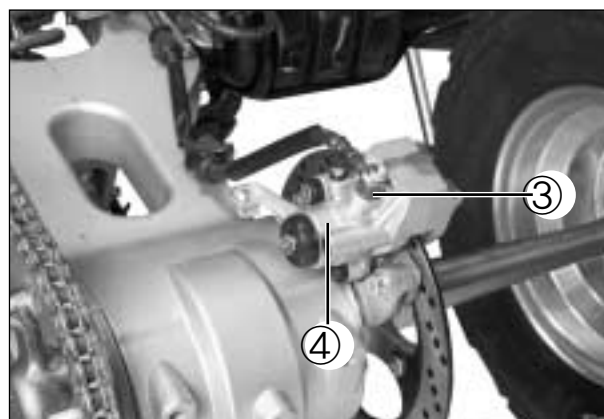


## ⊙ BRAKE CALIPER REMOVAL AND DISASSEMBLY

- Disconnect the parking brake cable by removing the lock nut ① and lever ② .



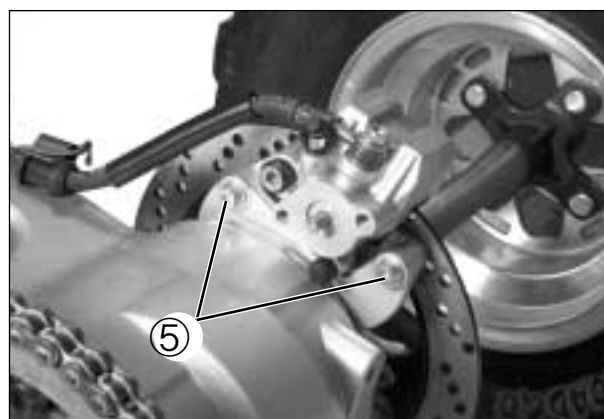
- Disconnect the brake hose ③ and allow the brake fluid to drain into a suitable receptacle.
- Remove the parking brake housing ④ .



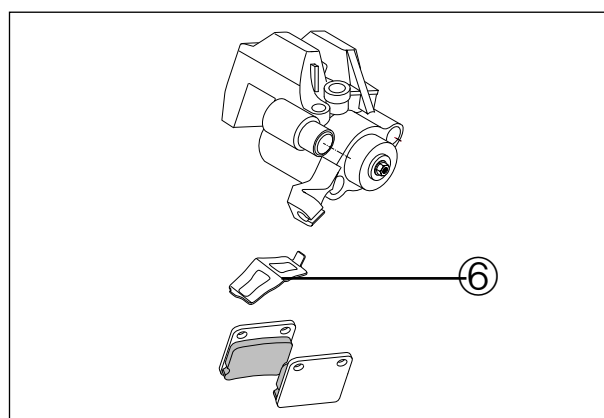
### ⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces.  
Check the brake hose and hose joints for cracks and fluid leakage.

- Remove the brake caliper by removing the caliper mounting bolts ⑤ .

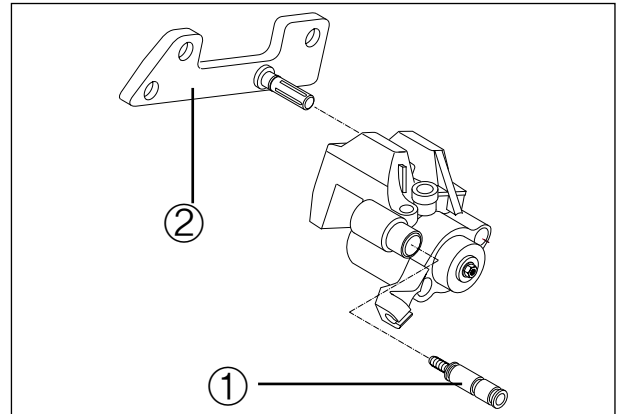


- Remove the pad. (Refer to page 7-42)
- Remove the pad spring ⑥ .

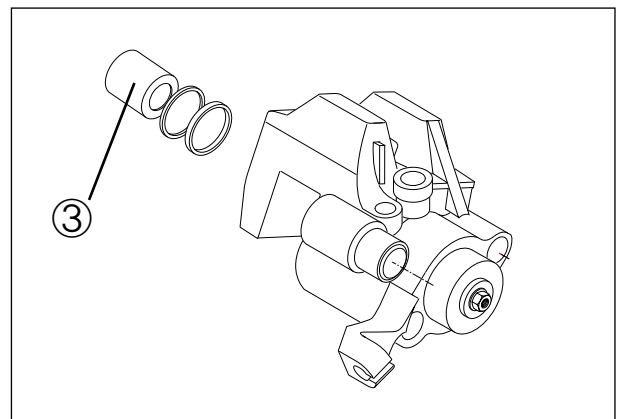


## 7-45 CHASSIS

- Loosen the caliper pin bolt ①, and then remove the caliper holder ②.
- Remove the caliper pin bolt ①.



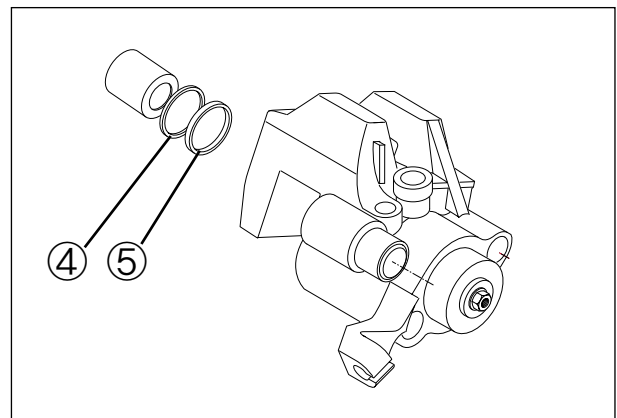
- Place a rag over the brake caliper piston ③ to prevent the piston from popping out.
- Force out the piston by pushing the piston hanger pin.



- Remove the dust seal ④ and piston seal ⑤.

### CAUTION

Do not reuse the dust seal and piston seal to prevent leakage of brake fluid.

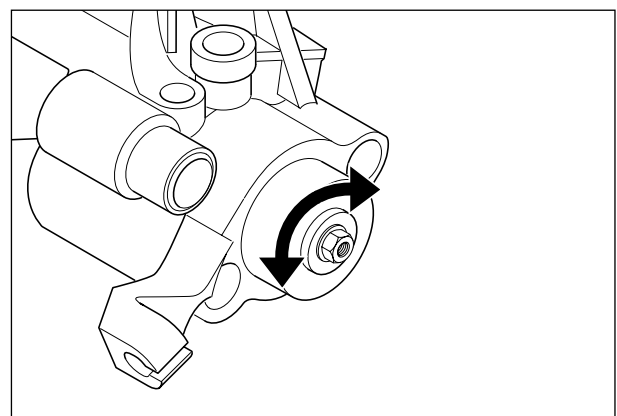


## ⊙ BRAKE CALIPER INSPECTION

☞ Refer to page 7-16

### ▣ PARKING BRAKE

Inspect the parking brake for any damages and smooth rotation by turning the axle. If there is anything unusual, replace the parking brake with a new one.



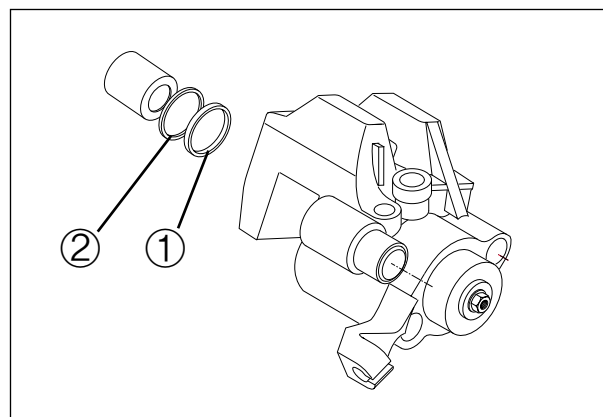
## ◎ BRAKE CALIPER REASSEMBLY AND REMOUNTING

☞ Refer to page 7-17

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

### ▣ PISTON SEALS

- Install the piston seal① and dust seal②.



### ▣ BRAKE CALIPER HOLDER

- Tighten the holder pin③ to the caliper holder④ to the specified torque.

**⤵ Rear brake caliper holder pin**  
: 18 N · m (1.8 kgf · m)

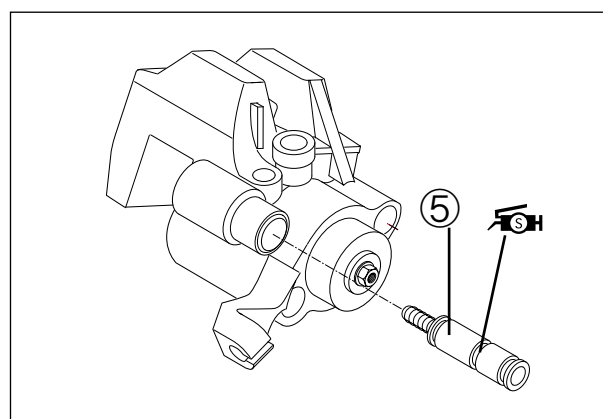
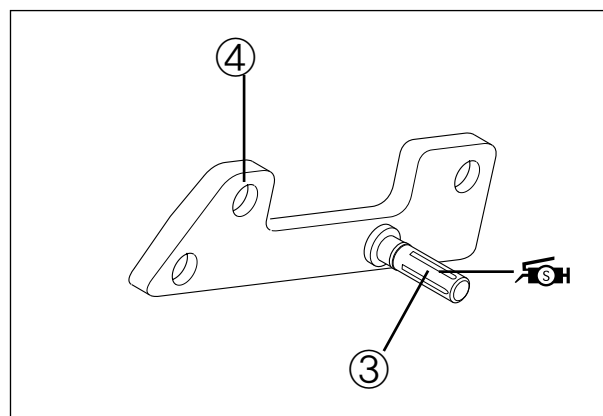
- Apply SILICONE GREASE to the brake caliper holder pin③ and caliper pin bolt⑤.

**🔧 SILICONE GREASE**

- Tighten the brake caliper pin bolt⑤ to the specified torque.

**⤵ Rear brake caliper pin bolt**  
: 23 N · m (2.3 kgf · m)

- Install the pad spring and pads.  
(Refer to page 7-42)



- Tighten the caliper mounting bolts ① and brake hose union bolt ②.

**🔩 Brake caliper mounting bolt**

: 18~28 N · m (1.8~2.8 kgf · m)

**Brake hose union bolt**

: 40~60 N · m (4.0~6.0 kgf · m)

**NOTE**

*Before remounting the brake caliper, push the brake caliper piston all the way into the caliper.*

**⚠ CAUTION**

- ❖ The removed brake hose washers should be replaced with new ones in order to prevent leakage of brake fluid.
- ❖ Bleed air from the system after after reassembling the brake caliper. (Refer to page 2-17)

- Install the parking brake housing ③ and new gasket.
- Apply THREAD LOCK "1324" to the parking brake bolts and tighten them to the specified torque.

**🔩 THREAD LOCK "1324"**

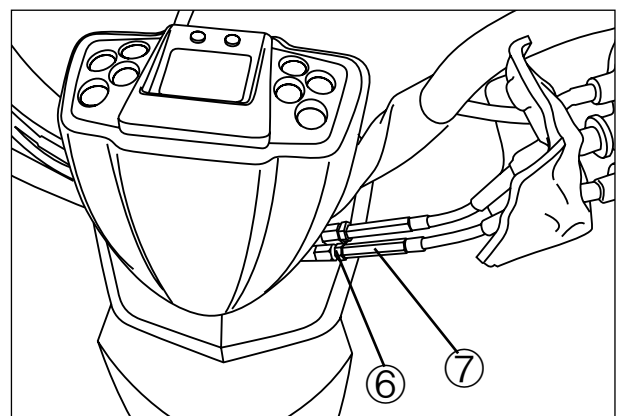
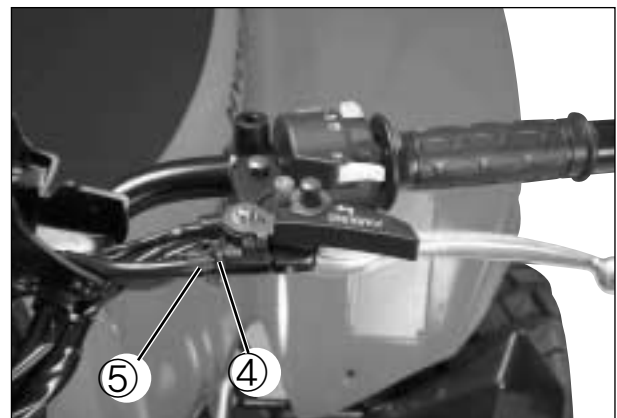
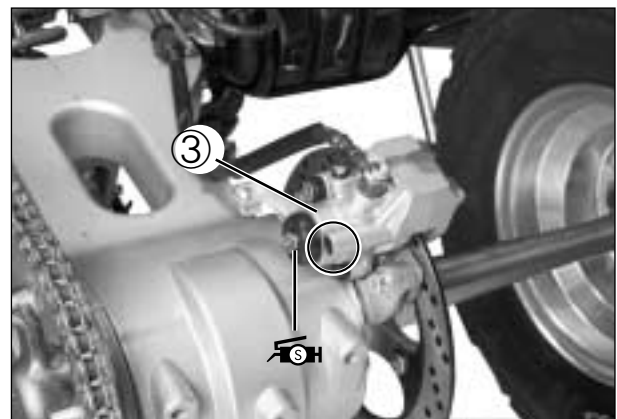
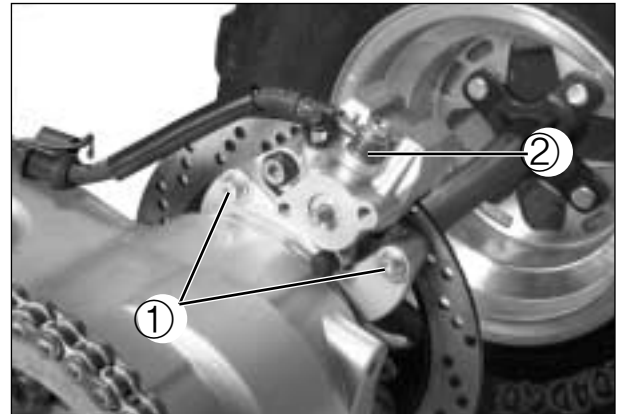
**🔩 Parking brake housing bolt**

: 28 N · m (2.8 kgf · m)

- When replacing the boot with a new one, apply SILICONE GREASE to the groove of parking brake axle.

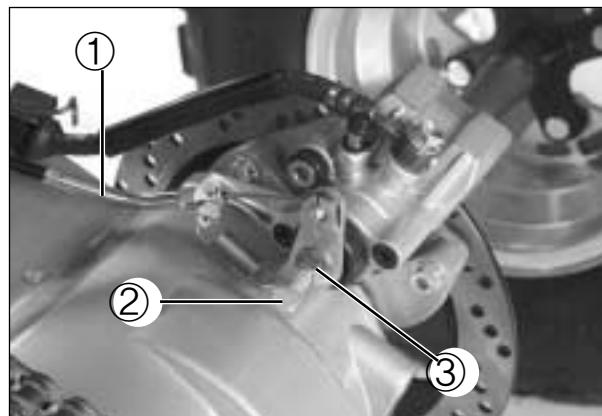
**🔩 SILICONE GREASE**

- Loosen the lock nuts ④, ⑥ and turn the adjusters ⑤, ⑦ in completely, so that the cable play is maximum.





- Connect the parking cable① .
- Install the adjuster② and the lock nut③ .
- Adjust the parking brake. (Refer to page 2-15)

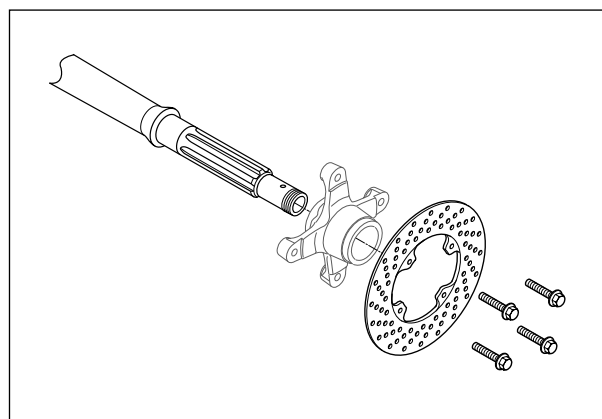


## ⊙ BRAKE DISK REMOVAL AND REMOUNTING

- Remove the rear wheel. (Refer to page 7-8)
- Remove the rear axle. (Refer to page 7-67)
- Remove the brake disk.
- Install the brake disk to the rear axle.

### NOTE

*Make sure that the disk is free of any greasy matter.*



- Apply THREAD LOCK “1324” to the brake disk bolts and tighten them to the specified torque.


 **THREAD LOCK “1324”**

 **Brake disk bolt**

**: 18~28 N · m (1.8~2.8 kgf · m)**

- Install the rear axle. (Refer to page 7-70)
- Install the rear wheel. (Refer to page 7-12)

## ⊙ BRAKE DISK INSPECTION

 Refer to page 7-18

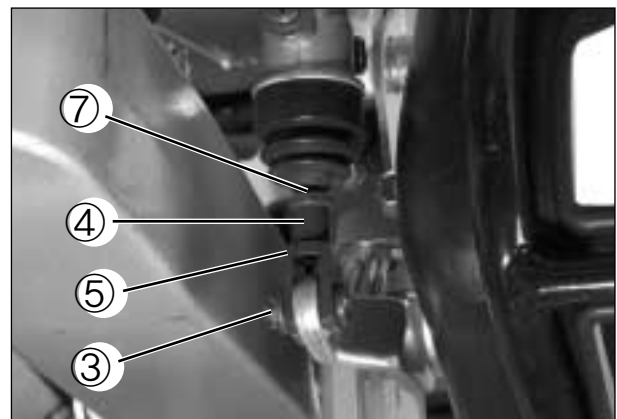
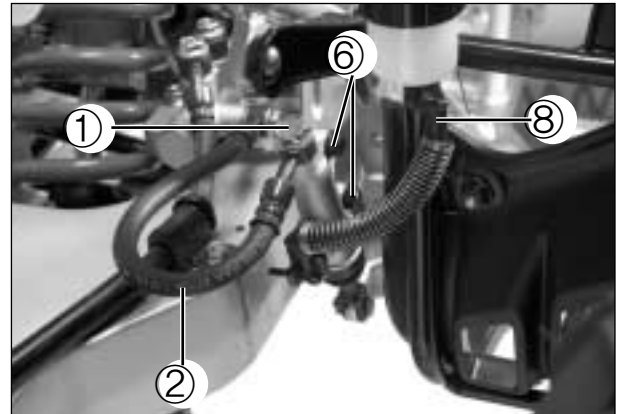
## ⊙ MASTER CYLINDER REMOVAL AND DISASSEMBLY

- Drain the brake fluid. (Refer to page 7-43)
- Place a rag underneath the brake hose union bolt on the master cylinder to catch any split brake fluid.  
Remove the brake hose union bolt ① and disconnect the brake hose ②.

### ⚠ CAUTION

Immediately wipe off any brake fluid contacting any part of the vehicle. The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

- Remove the rear master cylinder pin ③.
- Loosen the master cylinder rod lock nut ④.
- Turn the adjuster ⑤.
- Remove the master cylinder mounting bolt ⑥.
- Remove the master cylinder by turning the master cylinder rod ⑦.
- Disconnect the reservoir tank hose ⑧.



## ⊙ MASTER CYLINDER INSPECTION

☞ Refer to page 7-20

## ⊙ PRESSURE CONTROL VALVE REMOVAL

- Drain the brake fluid.
- Place a rag underneath the brake hose union bolt on the pressure control valve to catch any split brake fluid.  
Remove the brake hose union bolts and disconnect the brake hoses.



## ⊙ PRESSURE CONTROL VALVE REASSEMBLY

Reassemble the pressure control valve in the reverse order of removal.

## ◎ MASTER CYLINDER REASSEMBLY AND REMOUNTING

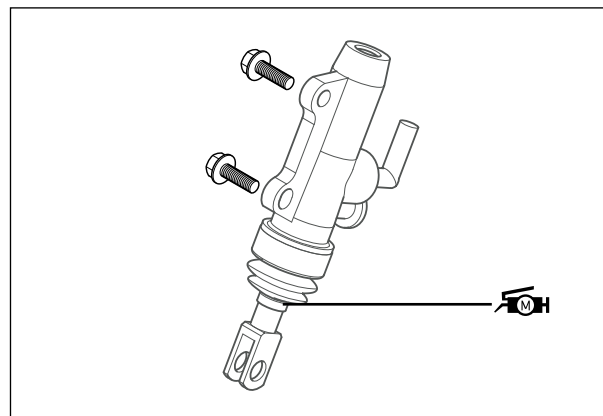
☞ Refer to page 7-20

Reassemble and remount the master cylinder in the reverse order of removal and disassembly.


Pay attention to the following point :

- Apply MOLY PASTE to the master cylinder push rod.

 MOLY PASTE

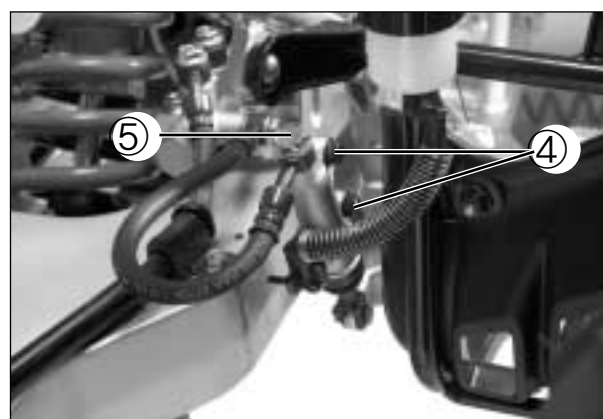
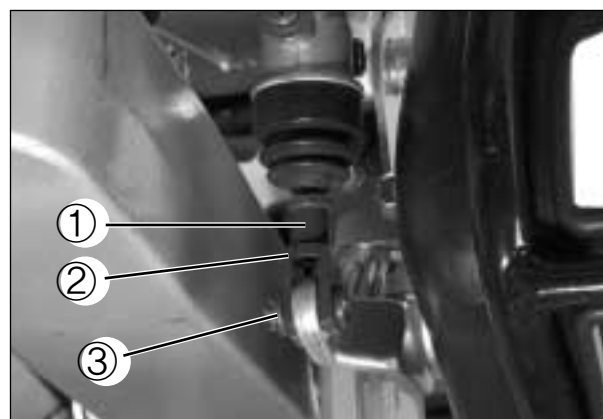


- Install the master cylinder rod lock nut ①, adjuster ② and rear master cylinder pin ③.
- Tighten the master cylinder rod lock nut ①, master cylinder mounting bolts ④ and brake hose union bolt ⑤ to the specified torque.

 **Rear brake master cylinder rod lock nut ①**  
: 10~20 N · m (1.0~2.0 kgf · m)

**Rear brake master cylinder mounting bolt ④** : 8~12 N · m (0.8~1.2 kgf · m)

**Brake hose union bolt ⑤**  
: 40~60 N · m (4.0~6.0 kgf · m)



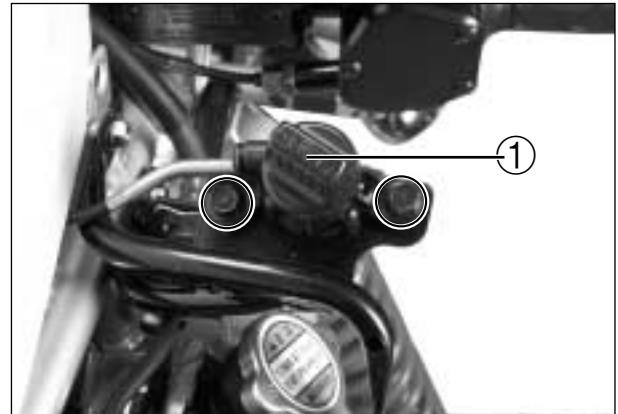
### CAUTION

- ❖ The removed brake hose washers should be replaced with new ones.
- ❖ Bleed air from the system after reassembling the brake master cylinder. (Refer to page 2-17)

## ⊙ REVERSE CABLE

### ▣ REMOVAL

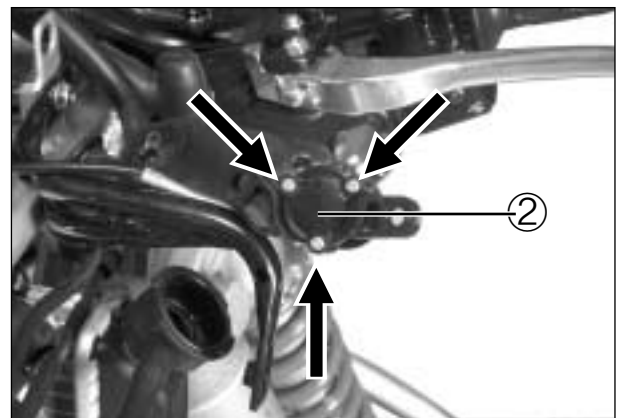
- Remove the reverse lever assembly ① from the bracket.



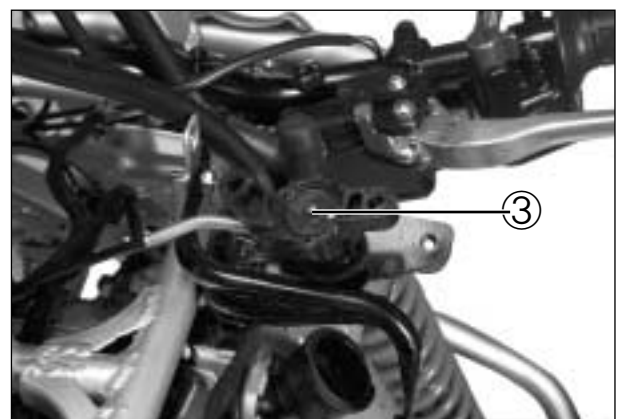
- Remove the reverse cable mounting screw.



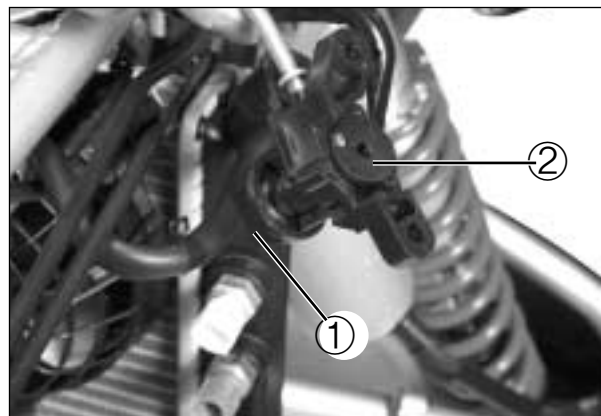
- Remove the cap ②.



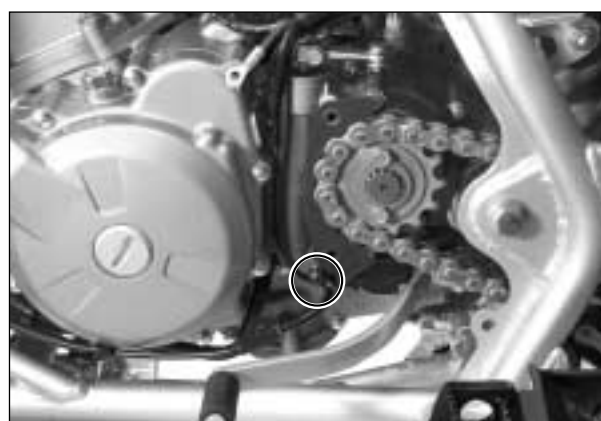
- Remove the screw ③.



- Remove the reverse lever① .
- Disconnect the cable by removing the spool② .



- Remove the engine sprocket cover. (Refer to page 3-3)
- Disconnect the reverse cable by removing the cable mounting screw.

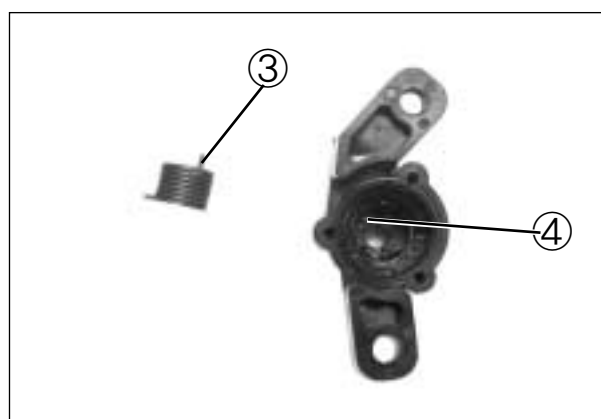


### ▣ REMOUNTING

Remount the reverse cable in the reverse order removal.

Pay attention to the following points :

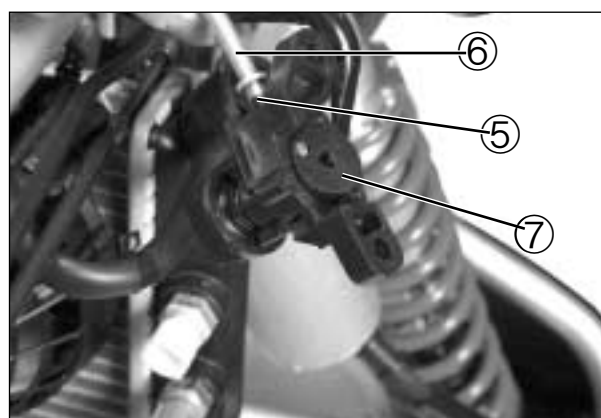
- Install the spring with the spring end③ matched the groove④ on the housing.



- Apply SUPER GREASE "A" to the O-ring⑤ .

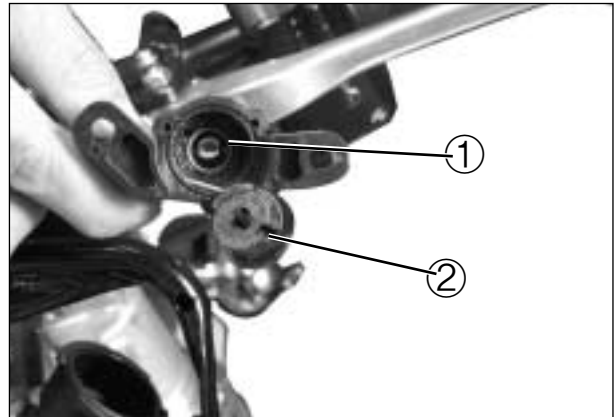
 **SUPER GREASE "A"**

- Install the O-ring⑤ to the reverse cable⑥ .
- Connect the cable to the spool⑦ through the hole of the housing.



**NOTE**

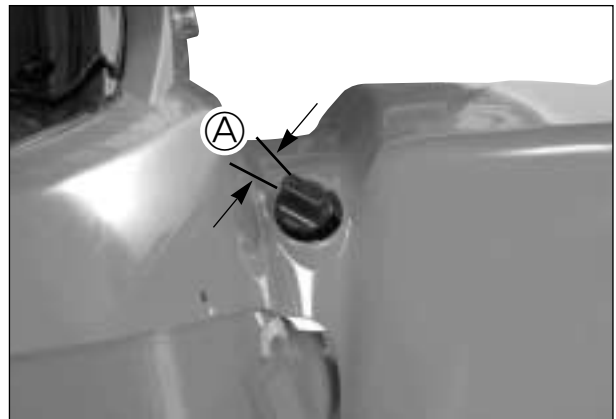
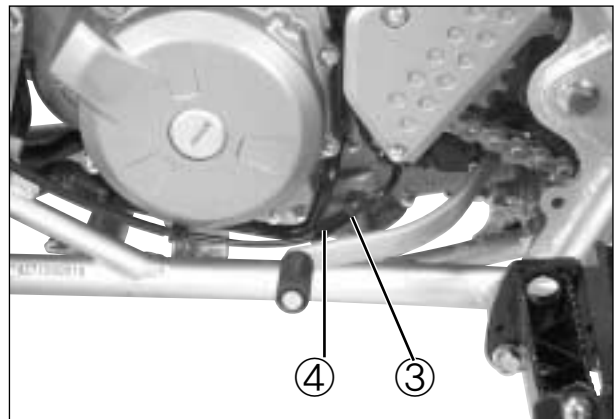
- ❖ *When installing the spool, hook the spring end ① on the concave portion ② of the spool.*
- ❖ *Make sure that the reverse cable is routed correctly.*

**▣ CABLE PLAY ADJUSTMENT**

After installing the reverse cable, adjust the cable play.

The cable adjuster is located at left downside of the crankcase assembly.

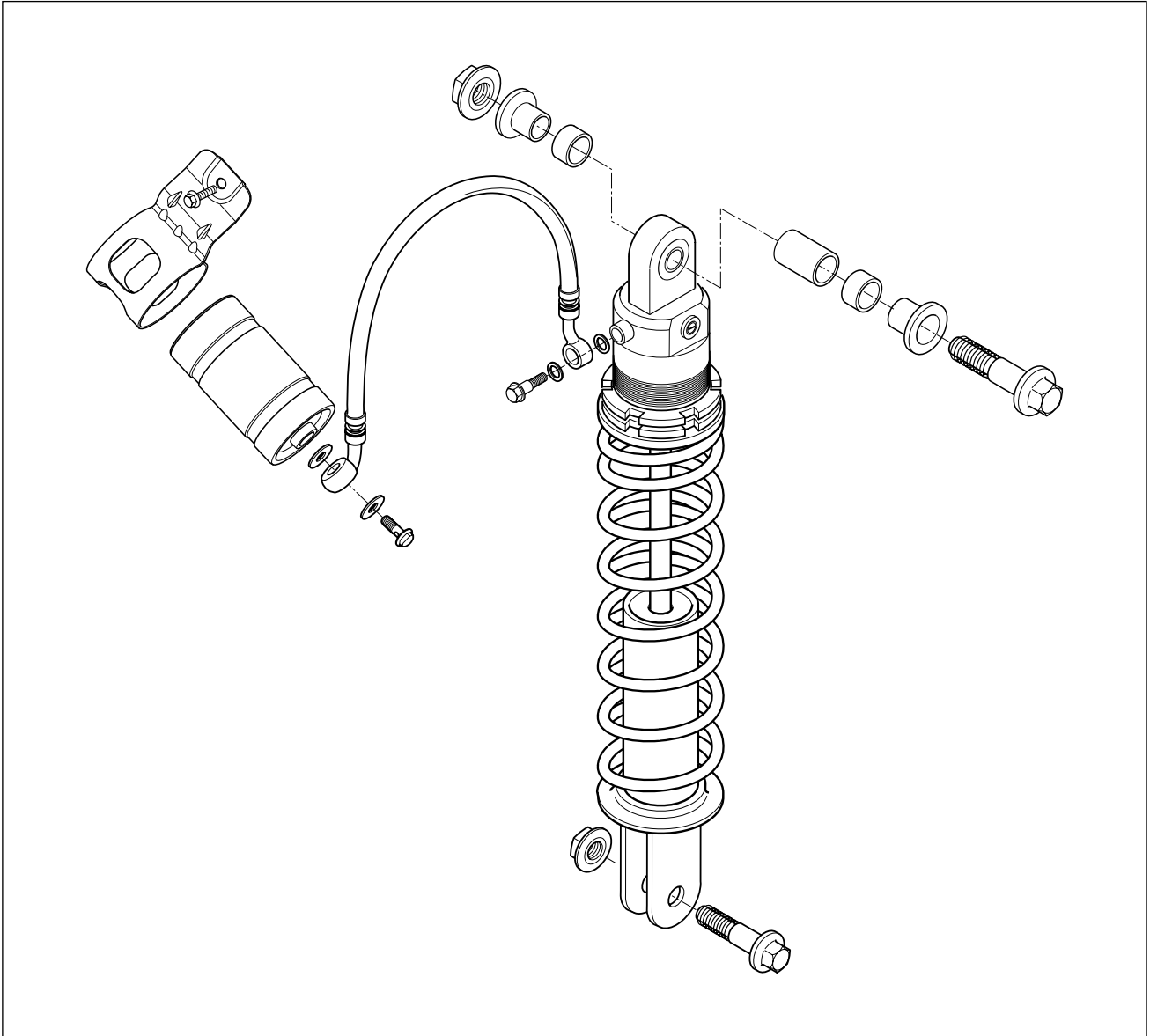
- Loosen the lock nut ③ .
- Turn the adjuster ④ in or out until the cable play ① should be 1 ~ 2 mm (0.04 ~ 0.08 in) at the reverse lever.
- Tighten the lock nut ③ securely.



- After adjustment, be sure to check for reverse function.

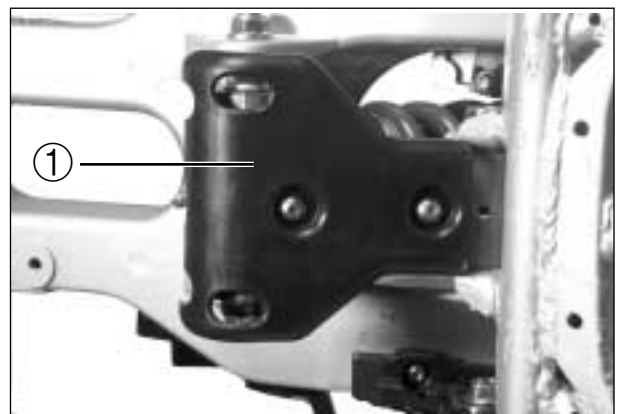
## REAR SHOCK ABSORBER

### ⊙ CONSTRUCTION



### ⊙ REMOVAL

- Raise the rear wheel off the ground and support the vehicle with jack or wooden block.
- Remove the cushion lever cover ①.



## 7-55 CHASSIS

- Remove the cushion rod lower bolt/nut.



- Remove the rear shock absorber mounting bolts/nuts.
- Remove the rear shock absorber by lifting up the swingarm.

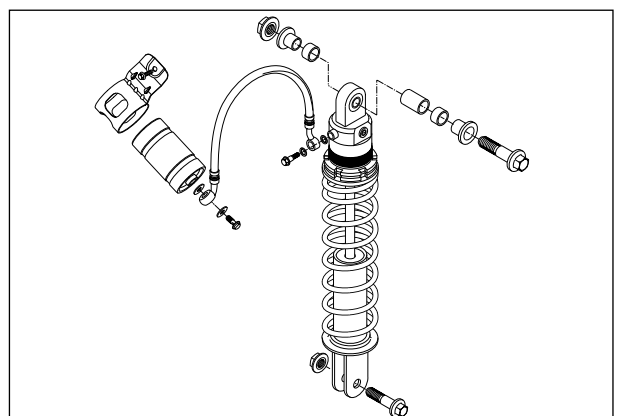


### ⊙ INSPECTION

Inspect the shock absorber body, bearing, seals and spacers for damage and leakage of oil. If any defects are found, replace the shock absorber with a new one.

#### **CAUTION**

**Do not attempt to disassemble the rear shock absorber. It is unserviceable.**





## ◎ REAR SHOCK ABSORBER DISPOSAL

### ⚠ WARNING

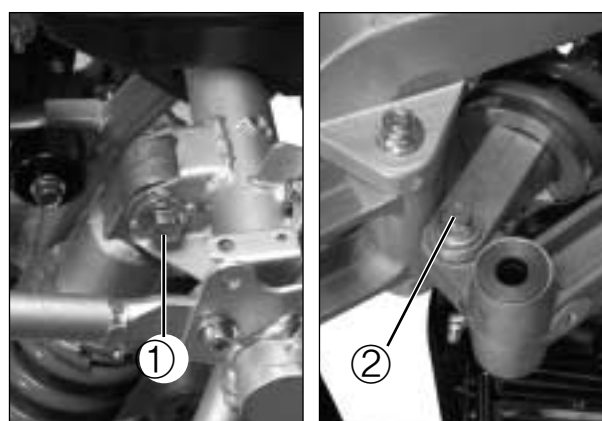
- ❖ The rear shock absorber unit contains high-pressure nitrogen gas.
- ❖ Mishandling can cause explosion.
- ❖ Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.
- ❖ Release gas pressure before disposing.

### ▣ GAS PRESSURE RELEASE

- Remove the valve cap.
- Press the valve with a screwdriver to bleed out the nitrogen gas.

### ⚠ WARNING

- ❖ Releasing high pressure gas from the rear shock absorber unit can be hazardous. Never perform any servicing until the nitrogen gas pressure has been released from the rear shock absorber unit.
- ❖ When releasing the gas pressure, place a rag over the gas valve and use the tip of a screwdriver to press the valve. Do not use your finger to depress the gas valve, and be sure to direct the valve away from your face and body.
- ❖ Be sure to always wear eye protection when performing this procedure.



## ◎ REMOUNTING

Remounting the rear shock absorber in the reverse order of removal. Pay attention to the following points :

- Tighten each bolt/nut to the specified torque.
  - ▣ Rear shock absorber nut (Upper)①  
: 40~60 N · m (4.0~6.0 kgf · m)
  - Rear shock absorber nut (Lower)②  
: 40~60 N · m (4.0~6.0 kgf · m)
  - Rear cushion rod nut③  
: 70~100 N · m (7.0~10.0 kgf · m)



## ⊙ REAR SUSPENSION SETTING

### ▣ SPRING PRE-LOAD ADJUSTMENT

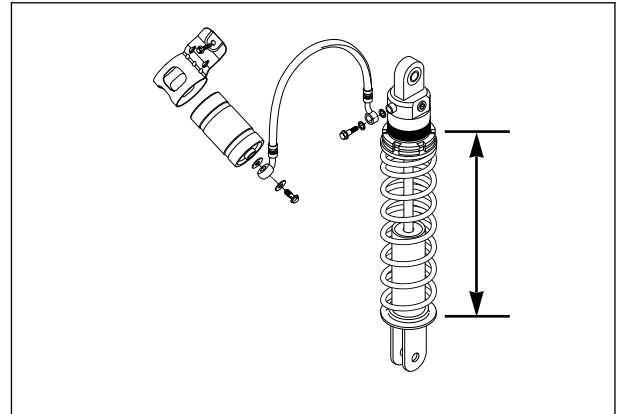
The rear suspension spring pre-load is adjustable. This adjustment is performed by changing spring set length.

REAR SUSPENSION SPRING SET LENGTH		
STANDARD	MAXIMUM (SOFTTEST)	MINIMUM (STIFFEST)
228 mm (8.98 in)	235 mm (9.25 in)	213 mm (8.39 in)

### ⚠ CAUTION

Do not set the spring length out of the specified range.

- Remove the rear shock absorber.  
(Refer to page 7-54)
- Loosen the lock nut ①.
- Adjust the spring set length by turning the adjuster ②.
- Tighten the lock nut ①.
  
- Remount the rear shock absorber.  
(Refer to page 7-56)



## ▣ DAMPING FORCE ADJUSTMENT

The compression and tension damping force are adjustable for rider's preference, rider's weight and field condition.

### NOTE

*Do not turn the adjuster screws more than given position, or the adjuster may be damaged.*

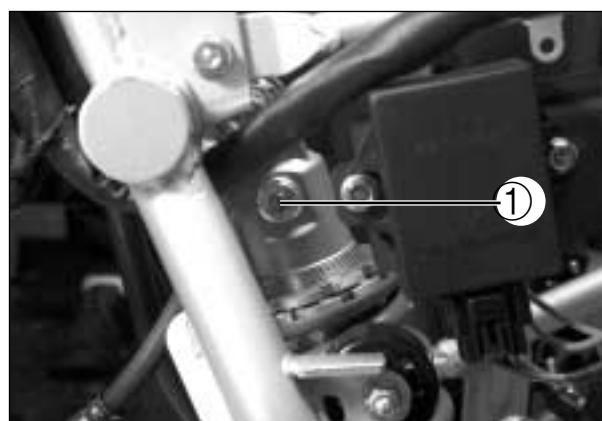
### 1. Compression damping force

To adjust the compression damping force turn in the adjuster ① fully for "S" or "H" direction (counter-clockwise or clockwise).

Count the number of turns from the fully turned-in position.

Fully turned-in "H" direction (or clockwise) provides stiffest compression damping force and turning "S" direction (or counter-clockwise) the adjuster will soften compression damping force.

<b>Rear shock absorber compression damping force adjuster</b>	<b>Standard</b> 1 ½ turn from end of "S" direction (counter-clockwise)
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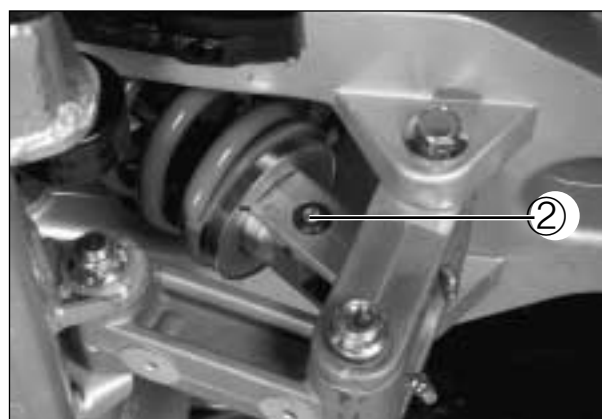
### 2. Tension damping force

To adjust the tension damping force turn in the adjuster ② fully for "S" or "H" direction (counter-clockwise or clockwise).

Count the number of turns from the fully turned-in position.

Fully turned-in "H" direction (or clockwise) provides stiffest tension damping force and turning "S" direction (or counter-clockwise) the adjuster will soften tension damping force.

<b>Rear shock absorber tension damping force adjuster</b>	<b>Standard</b> 1 ½ turn from end of "S" direction (counter-clockwise)
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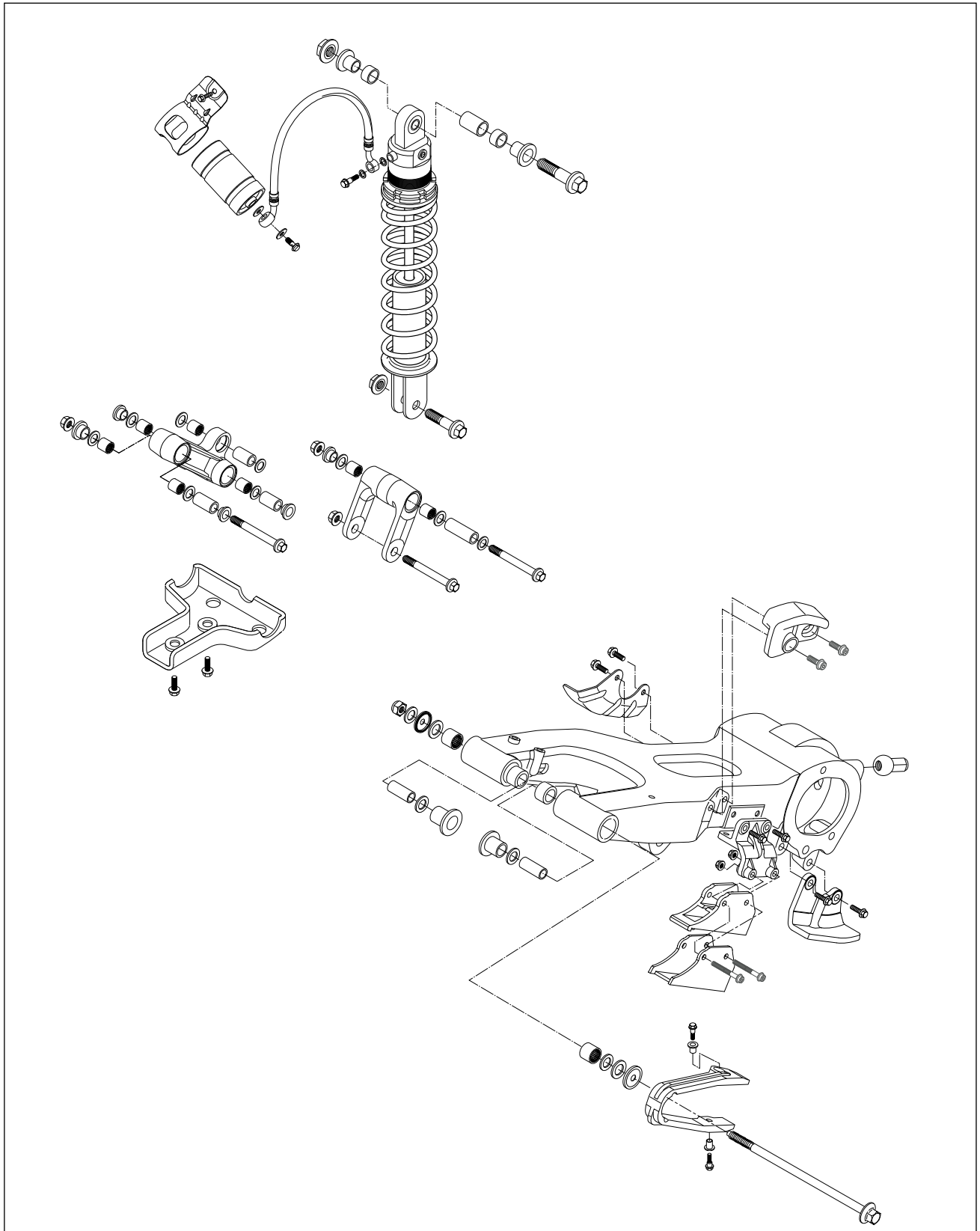


### STANDARD REAR SHOCK ABSORBER DAMPING FORCE

	Compression	Tension
<b>Softer</b>	Turn to "S" direction (counter-clockwise)	Turn to "S" direction (counter-clockwise)
<b>Standard</b>	1 ½ turn from end of "S" direction (counter-clockwise)	1 ½ turn from end of "S" direction (counter-clockwise)
<b>Stiffer</b>	Turn to "H" direction (clockwise)	Turn to "H" direction (clockwise)

## REAR SUSPENSION

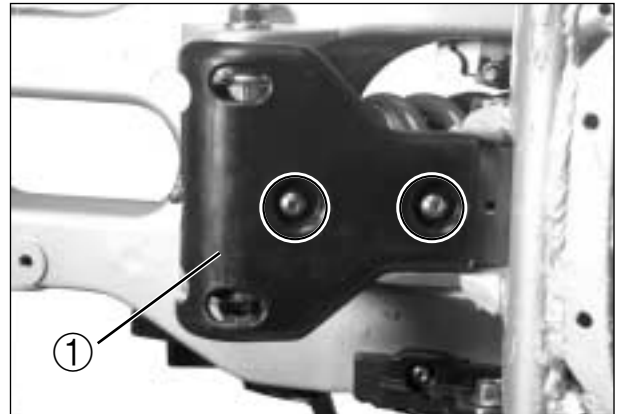
### ⊙ CONSTRUCTION



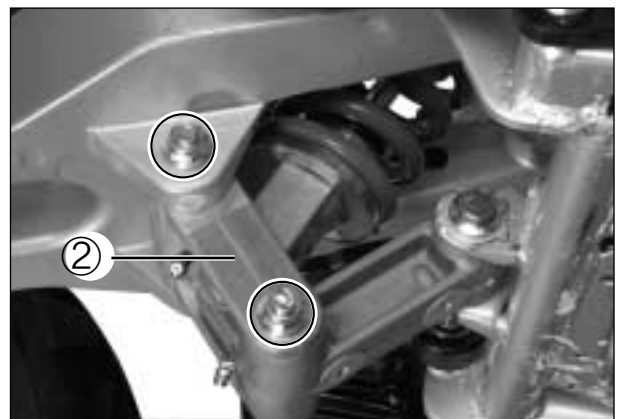
## ⊙ REMOVAL

### ▣ CUSHION LEVER AND CUSHION ROD

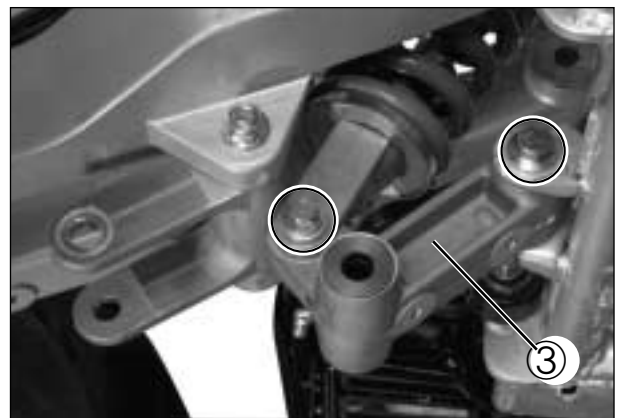
- Place the vehicle on the level ground and support the vehicle with a jack or wooden block.
- Remove the cushion lever cover①.



- Remove the cushion rod②.



- Remove the cushion lever③.



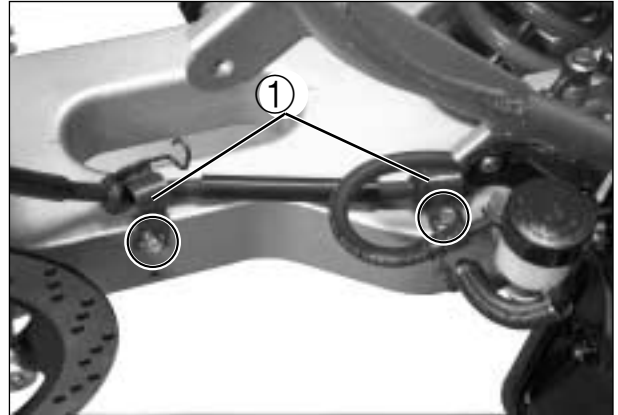
### ▣ REAR SWINGARM

- Remove the cushion rod and cushion lever.  
(Refer to above)
- Remove the rear shock absorber.  
(Refer to page 7-54)
- Remove the rear wheels. (Refer to page 7-8)
- Remove the rear axle and axle housing.  
(Refer to page 7-67)

## 7-61 CHASSIS

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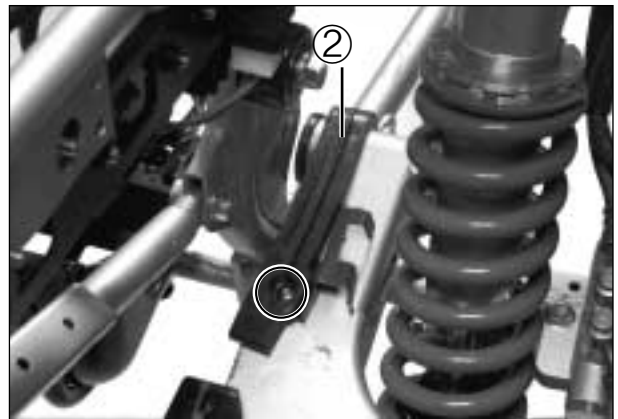
- Remove the brake hose guide①.



- Loosen the swingarm pivot nut and remove the swingarm pivot shaft.
- Remove the swingarm assembly.



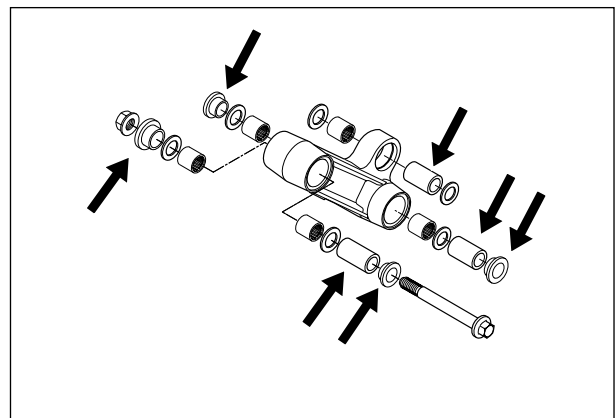
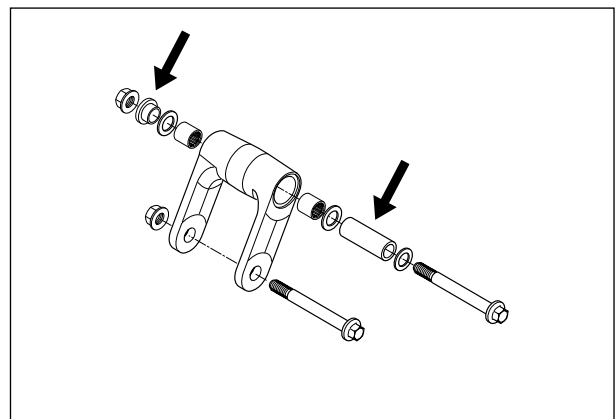
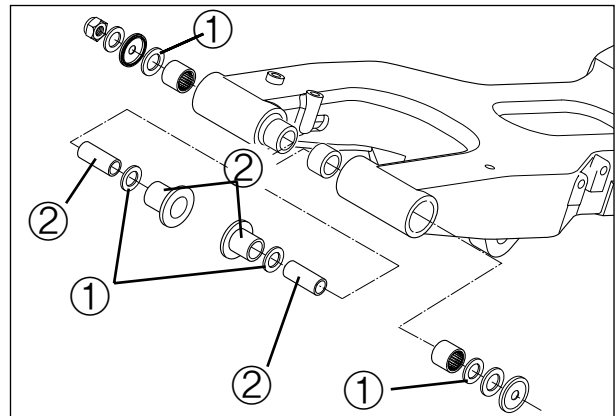
- Remove the chain buffer②.



## ⊙ INSPECTION AND DISASSEMBLY

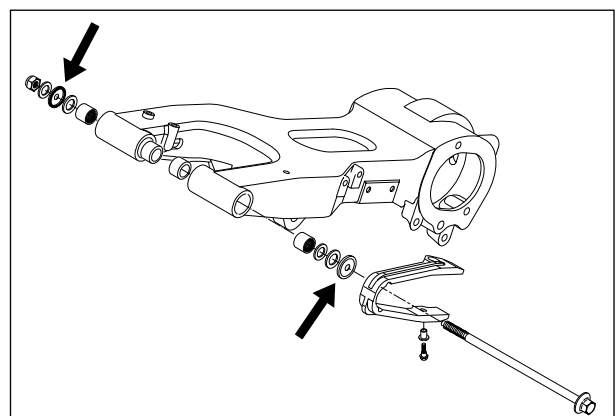
### ▣ SPACER

- Remove the seals ① and spacers ② from the swingarm.
- Remove the spacers from the cushion lever and cushion rod.
- Inspect the spacers for any flaws or other damage.  
If any defects are found, replace the spacers with new ones.



### ▣ DUST SEAL

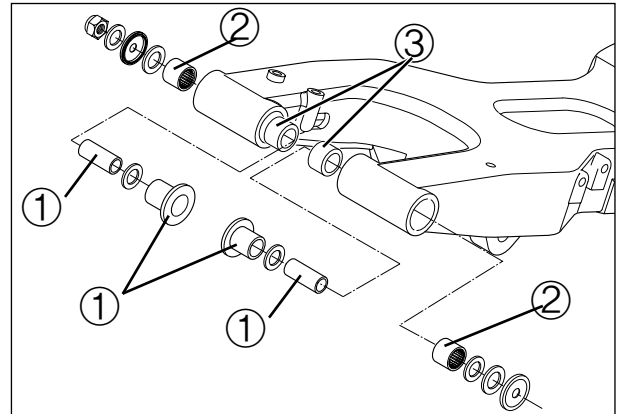
- Inspect the dust seals for wear or damage.  
If any defect are found, replace them with new ones.



**▣ SWINGARM BEARING AND BUSHING**

Insert the spacer ① into the bearing ②, bushing ③ and then check the play when moving the spacer up and down.

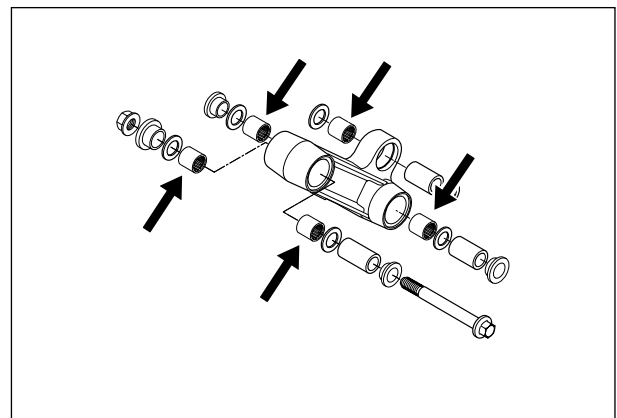
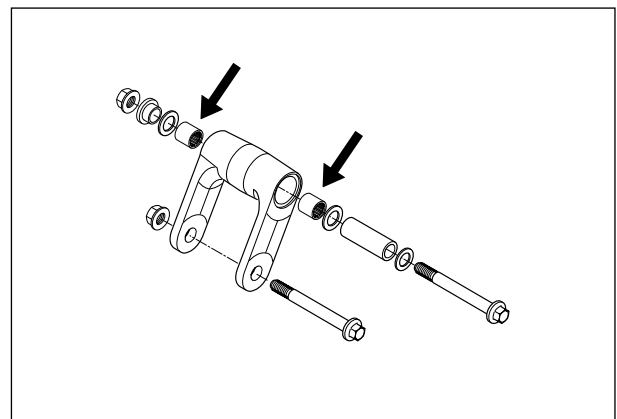
If excessive play is noted, replace the bearing and bushing with a new one.



**▣ CUSHION LEVER BEARING AND CUSHION ROD BEARING**

Insert the spacer into the bearing, and then check the play when moving the spacer up and down.

If excessive play is noted, replace the bearing with a new one.

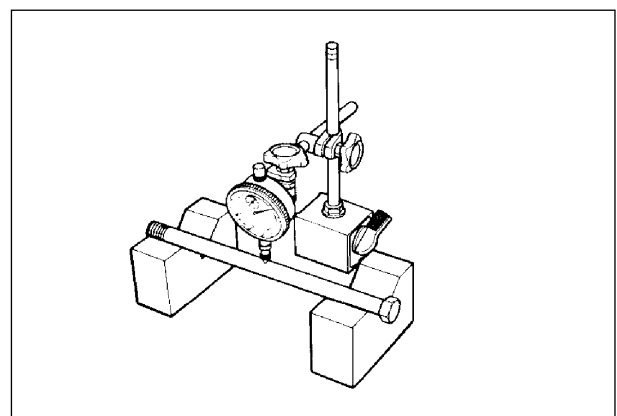


**▣ SWINGARM PIVOT SHAFT**

Using a dial gauge, check the pivot shaft runout. If the runout exceeds service limit, replace the pivot shaft with a new one.

Swingarm pivot shaft runout	Service limit
	0.6 mm (0.024 in)

-  Dial gauge : 09900-20606
- Magnetic stand : 09900-20701
- V-block : 09900-21304

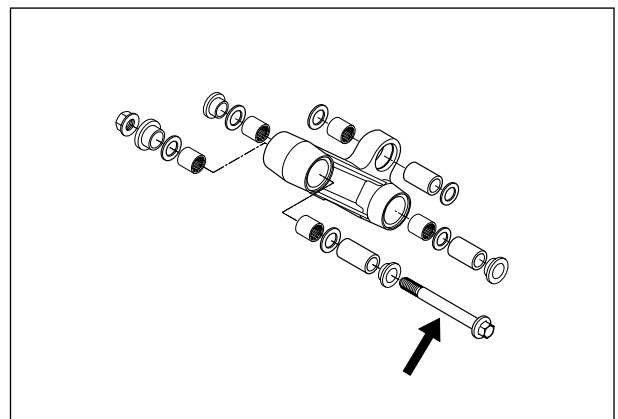
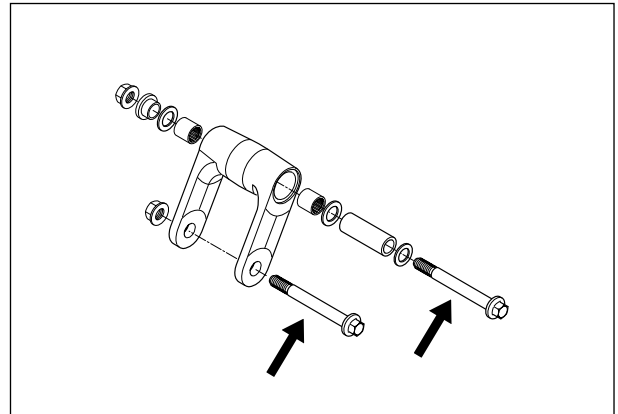




**■ CUSHION LEVER AND ROD BOLT**

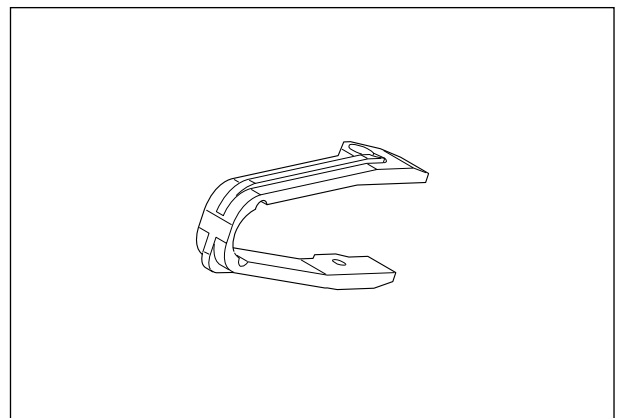
Inspect the cushion lever and rod bolts for damage or bend.

If any defect are noted, replace them with new ones.

**■ CHAIN BUFFER**

Inspect the chain buffer for wear and damage.

If any defects are found, replace the chain buffer with a new one.




## ◎ REMOUNTING

Remount the cushion lever, cushion rod and swingarm in reverse order of removal.


Pay attention to the following points :

- Install the swingarm and pivot shaft.
- Tighten the swingarm pivot nut to the specified torque.

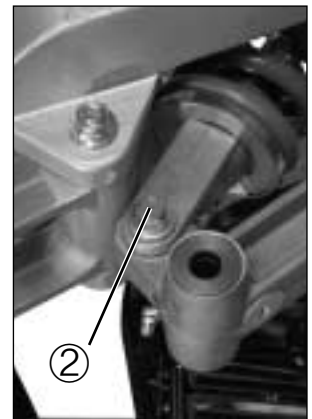
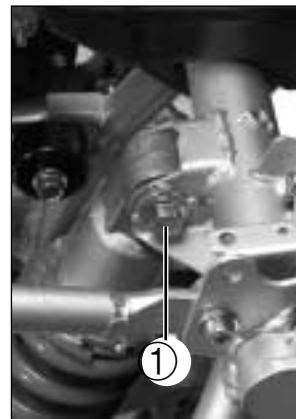
 **Swingarm pivot nut**  
: 50~80 N · m (5.0~8.0 kgf · m)




- Install the rear shock absorber and cushion lever.
- Tighten the rear shock absorber mounting nuts to the specified torque.

 **Rear shock absorber nut (Upper)①**  
: 40~60 N · m (4.0~6.0 kgf · m)

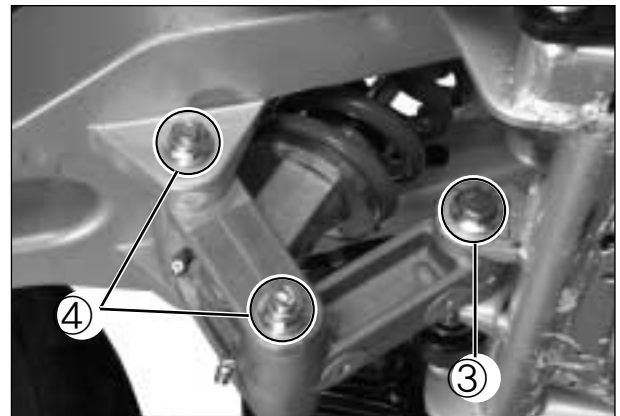
**Rear shock absorber nut (Lower)②**  
: 40~60 N · m (4.0~6.0 kgf · m)



- Tighten the cushion rod nut and cushion lever nut to the specified torque.

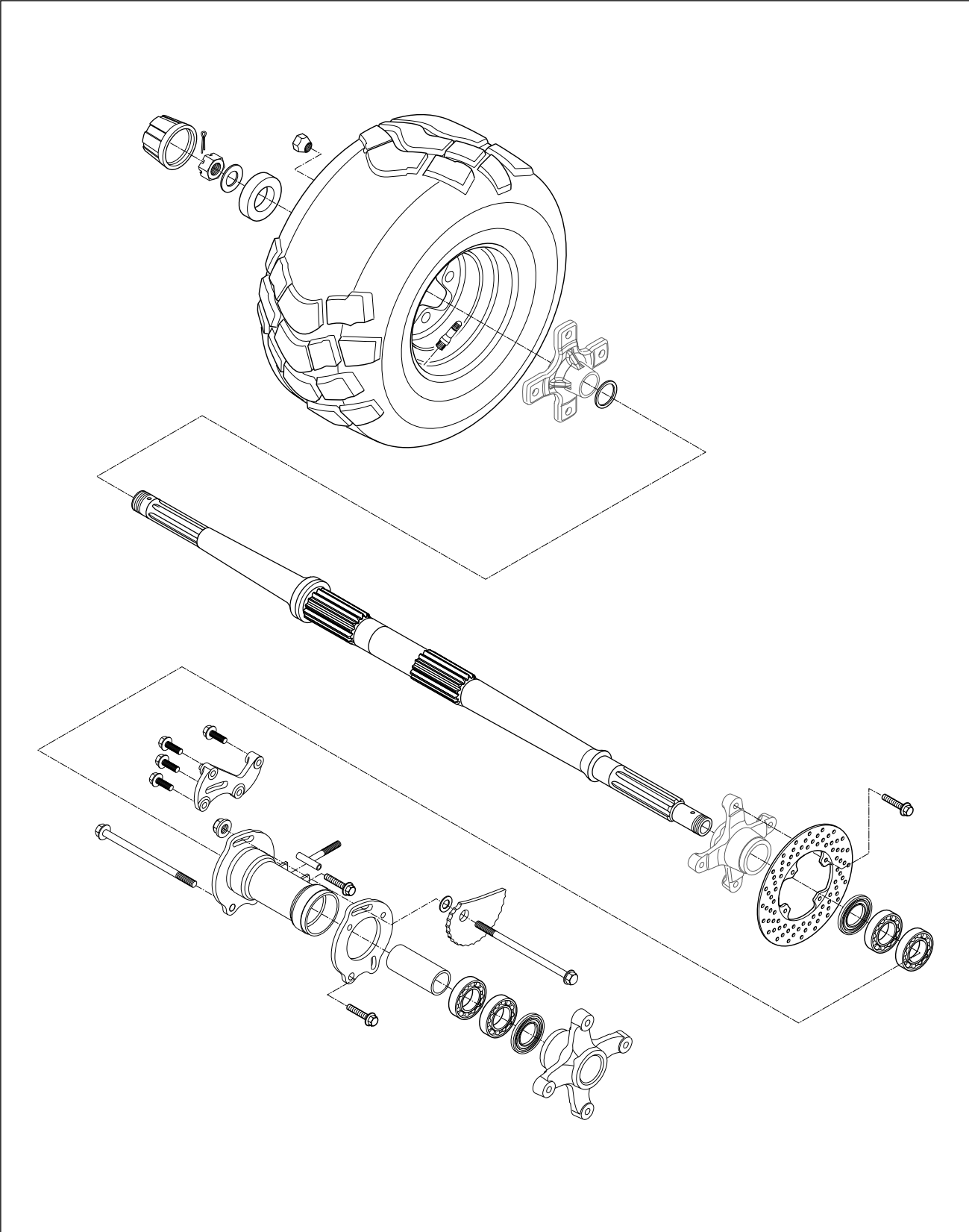
 **Cushion lever nut③**  
: 70~100 N · m (7.0~10.0 kgf · m)

**Cushion rod nut④**  
: 70~100 N · m (7.0~10.0 kgf · m)



# REAR AXLE

## ⊙ CONSTRUCTION

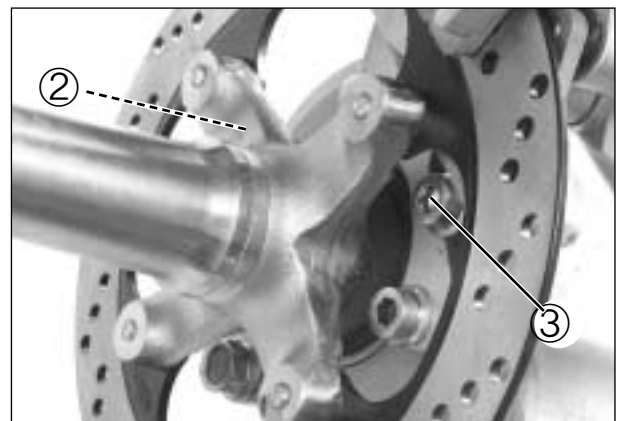
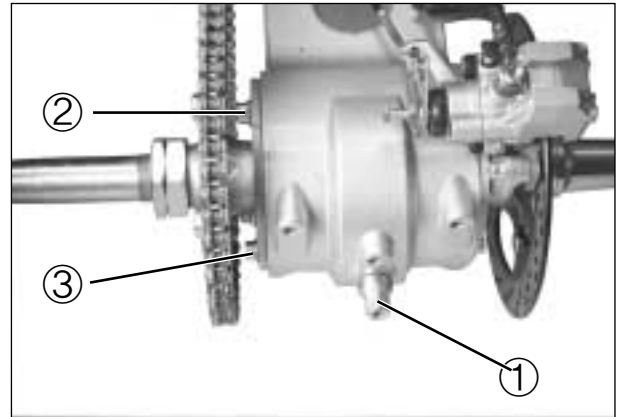


## ⊙ REMOVAL

- Place the vehicle on the level ground and support the vehicle with a jack or wooden block.

### ▣ SPROCKET

- Remove the left rear wheel. (Refer to page 7-8)
- Remove the left rear wheel hub. (Refer to page 7-9)
- Remove the rear caliper.
- Loosen the chain adjuster ①, rear axle housing nuts ② and wrench bolts ③.

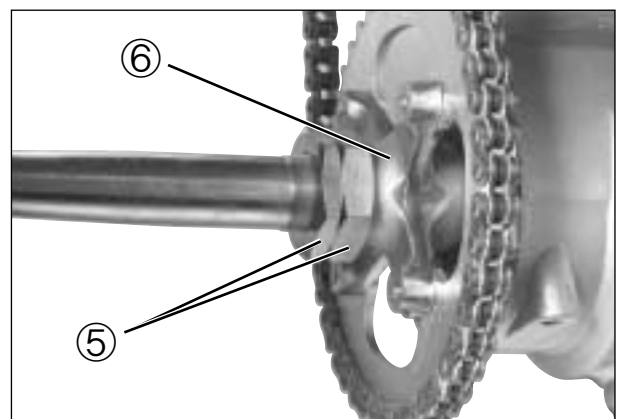


- Loosen the sprocket mounting bolts and remove the sprocket ④.



### ▣ REAR AXLE SHAFT

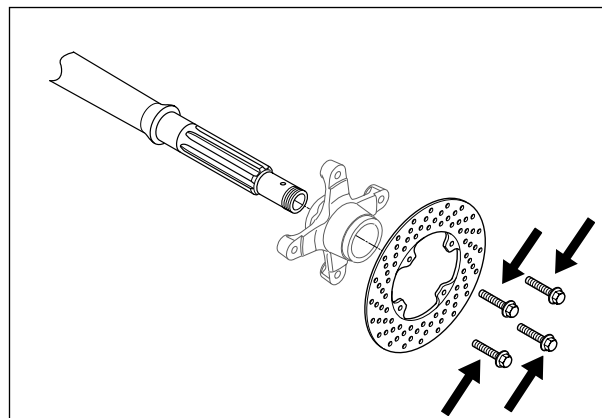
- Remove the rear wheel. (Refer to page 7-8)
- Remove the rear wheel hub. (Refer to page 7-9)
- Loosen the axle nuts ⑤ by applying the rear brake.
- Remove the axle nuts.
- Remove the sprocket flange ⑥.
- Remove the caliper.
- Draw out the rear axle shaft to the right.



- Remove the brake disk.

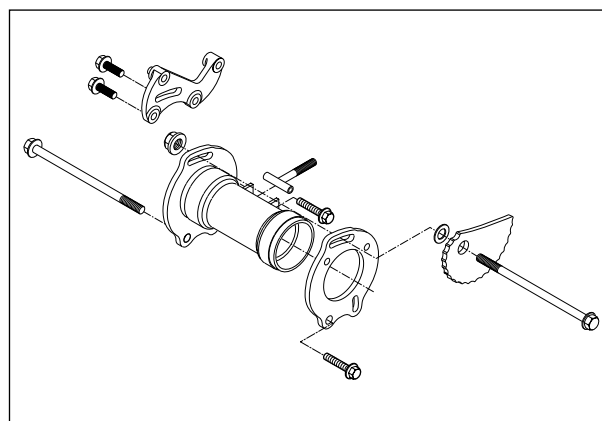
**⚠ CAUTION**

Do not attempt to remove the brake disk flange from the rear axle shaft.  
The rear axle shaft is available only as an assembly.

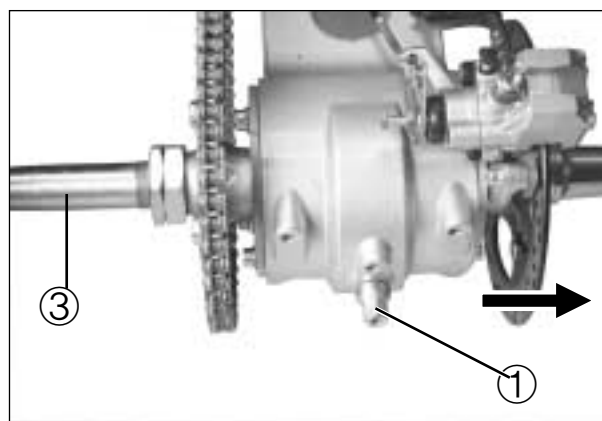
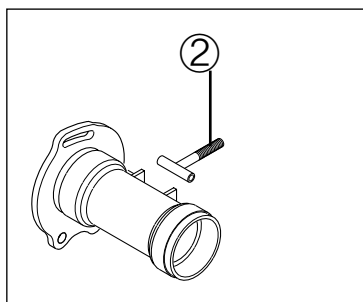


**▣ REAR AXLE HOUSING**

- Remove the axle housing bolts, nuts and wrench bolts.



- Remove the chain adjuster ①.
- Remove the chain adjuster bolt ②.
- Remove the axle shaft ③.

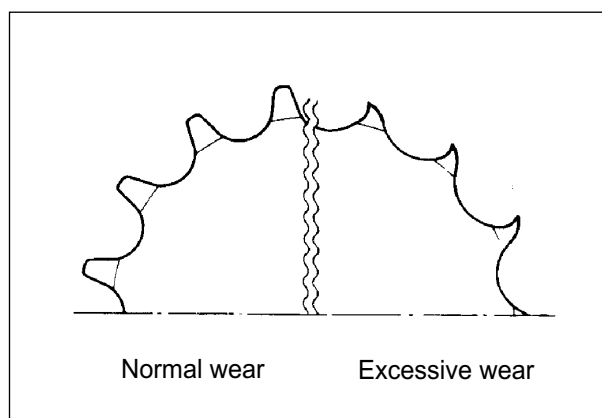


- Remove the axle housing from the swingarm's right side.

**⊙ INSPECTION AND DISASSEMBLY**

**▣ SPROCKET**

Inspect the sprocket teeth for wear.  
If they are worn as shown, replace the engine sprocket, rear sprocket and drive chain as a set.



## REAR AXLE SHAFT

Measure the rear axle shaft runout.

If the runout exceeds the service limit, replace the rear axle shaft with a new one.

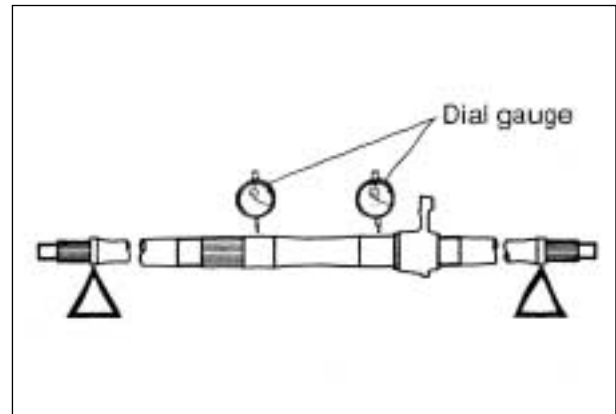
Rear axle shaft runout	Service limit
	6 mm (0.24 in)

 Dial gauge : 09900-20606  
Magnetic stand : 09900-20701  
V-block : 09900-21304

### NOTE

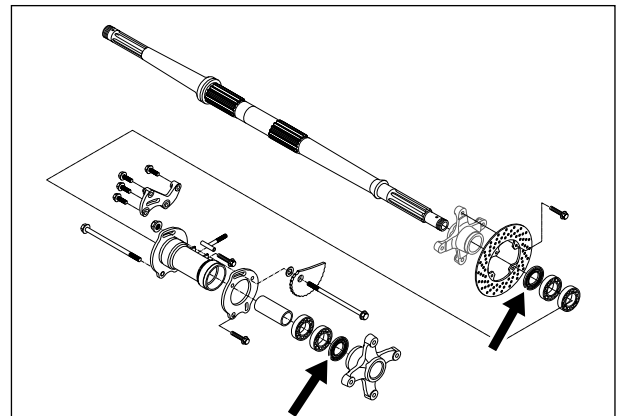
*When measuring the runout, support the rear axle shaft at 34 mm (1.34 in) diameter of the rear axle shaft as shown in illustration.*

*Measure the runout at 40 mm (1.57 in) diameter of the rear axle shaft as shown in illustration.*



## DUST SEAL

Inspect the dust seals for wear or damage. If any defect are founds, replace the dust seal with a new one.

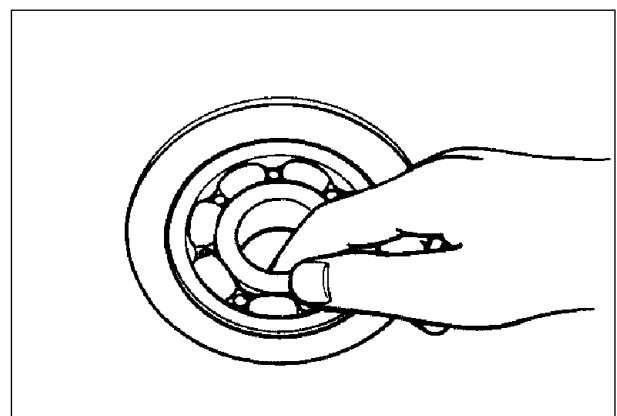


## AXLE BEARINGS

Inspect the play of the wheel bearings by finger while they are in the axle housing.

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

Replace the bearing with a new one, if there is anything unusual.



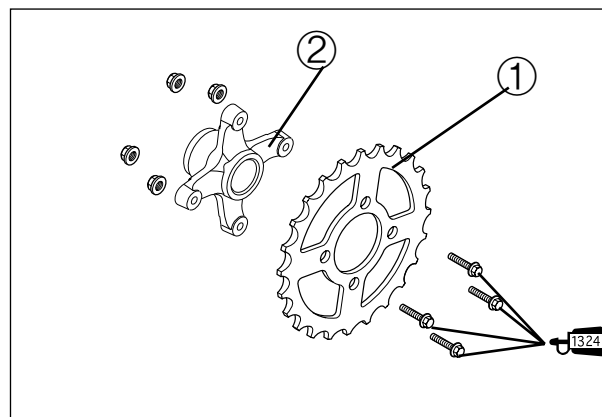
## ▣ REASSEMBLY AND REMOUNTING

Reassemble the rear axle shaft and rear axle housing in the reverse order of removal and disassembly. Pay attention to the following points :


### ▣ REAR SPROCKET

- Install the rear sprocket ① to the sprocket flange ② .
- Apply THREAD LOCK "1324" to the sprocket mounting bolts.

 **THREAD LOCK "1324"**



- Tighten the sprocket mounting bolts to the specified torque.

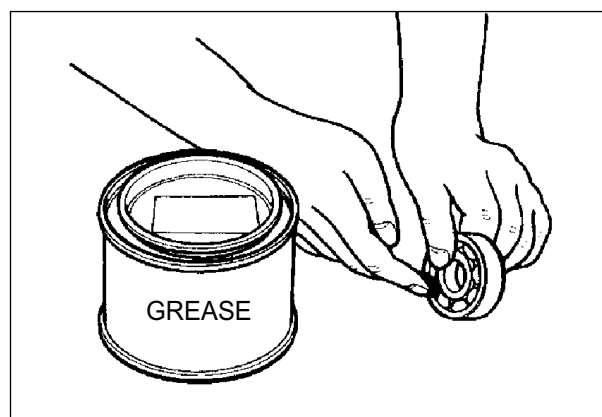
 **Rear sprocket mounting bolt**  
: 18~28 N · m (1.8~2.8 kgf · m)



### ▣ AXLE HOUSING

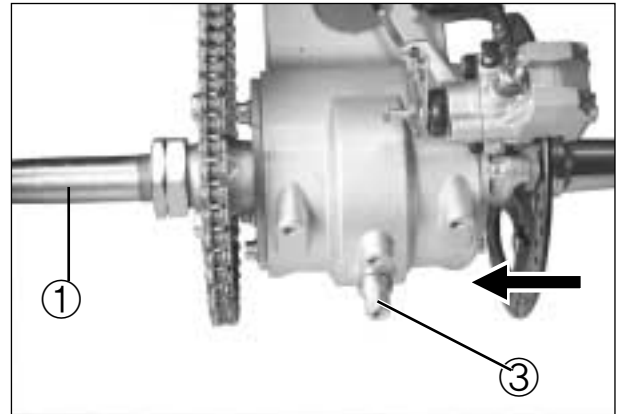
- Apply SUPER GREASE "A" to the bearings and dust seals before installing.

 **SUPER GREASE "A"**

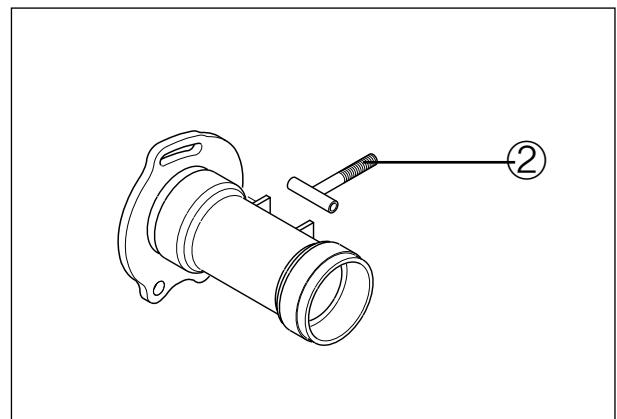


## 7-71 CHASSIS

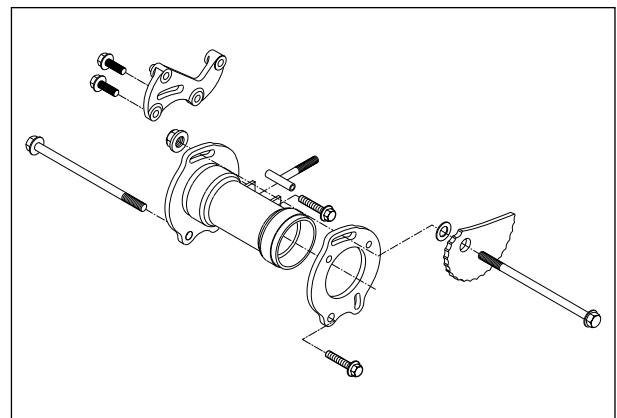
- Install the axle housing from the swingarm's right side.
- Install the rear axle shaft ① .



- Install the chain adjuster bolt ② .



- Install the chain adjuster ③ .
- Tighten the axle housing bolts, nuts and wrench bolts temporarily.



### REAR AXLE SHAFT

When the rear axle shaft is replaced with a new one, install the right axle nut onto the new axle shaft.

- Apply THREAD LOCK "1324" to the axle shaft.

 **THREAD LOCK "1324"**

- Install the brake disk to the rear axle shaft.
- Apply THREAD LOCK "1324" to the disk bolts and tighten them to the specified torque.

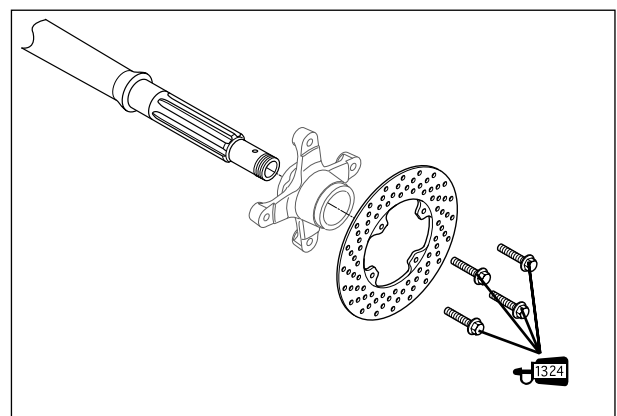
 **THREAD LOCK "1324"**

 **Disk bolt : 18~28 N · m (1.8~2.8 kgf · m)**

### NOTE

*Make sure that the brake disk is clean and free of any grease matter.*

- Install the rear axle shaft into the axle shaft housing.





- Apply SUPER GREASE “A” to the spline of the axle shaft.

 **SUPER GREASE “A”**


- Install the sprocket flange ① to the axle shaft.
- Apply BOND “1215” to the axle shaft.

 **BOND “1215”**

- Apply THREAD LOCK “1324” to the thread portion of the rear axle shaft.

 **THREAD LOCK “1324”**


- Tighten the inner axle shaft inner nut ② to the specified torque.

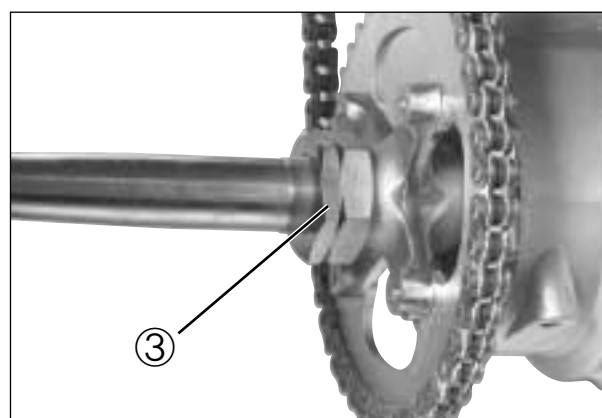
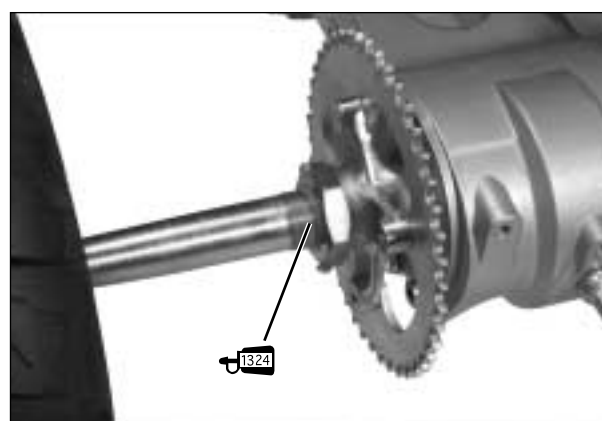
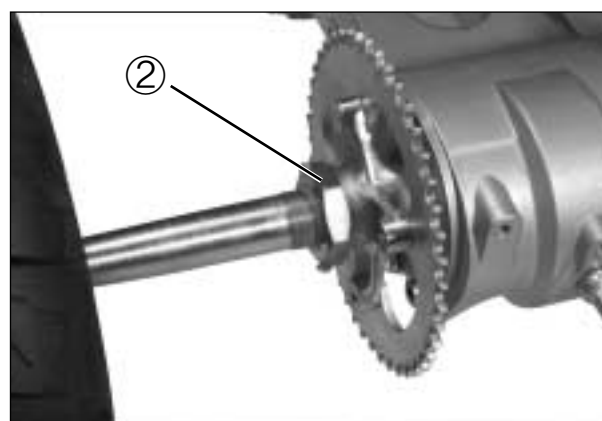
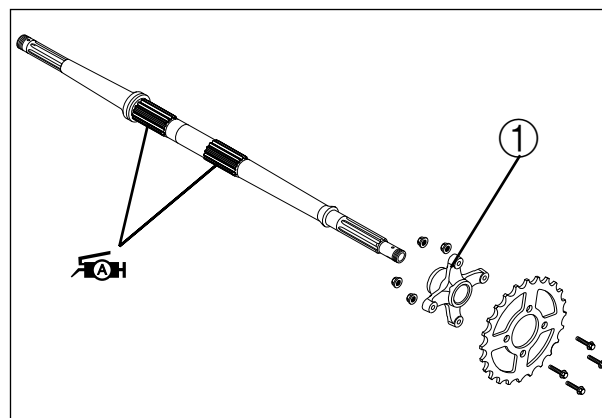
 **Axle shaft nut (inner)**  
: 120~150 N · m (12.0~15.0 kgf · m)

- Apply THREAD LOCK “1324” to the thread portion of the rear axle shaft.

 **THREAD LOCK “1324”**

- Tighten the rear axle outer nut ③ to the specified torque.

 **Axle shaft nut (outer)**  
: 120~150 N · m (12.0~15.0 kgf · m)



## 7-73 CHASSIS

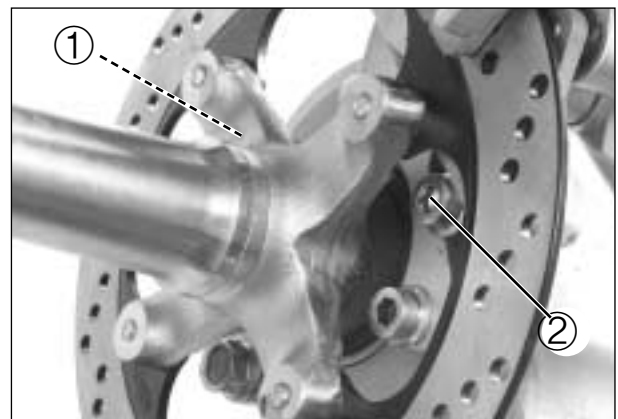
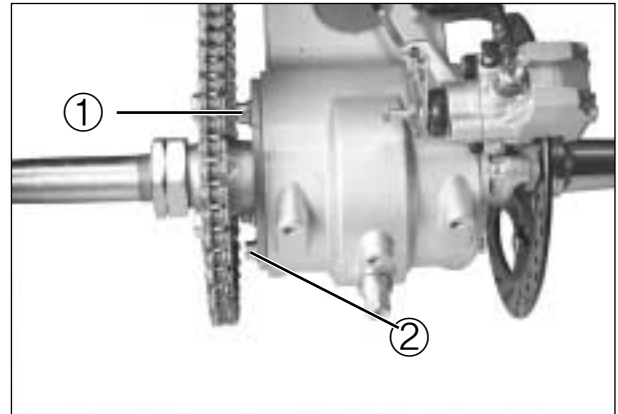
- Install the rear wheel hubs. (Refer to page 7-11)
- Install the rear wheels. (Refer to page 7-12)
- Adjust the chain slack. (Refer to page 2-21)
- Tighten the rear axle housing nuts and wrench bolts to the specified torque in the described order. (Refer to page 2-21)

### Rear axle housing nut①

: 70~100 N · m (7.0~10.0 kgf · m)

### Rear axle housing wrench bolt②

: 40~60 N · m (4.0~6.0 kgf · m)



- Install the rear caliper and tighten the caliper mounting bolts to the specified torque.

### Rear caliper mounting bolt

: 18~28 N · m (1.8~2.8 kgf · m)



# SERVICING INFORMATION

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## TROUBLESHOOTING

### ⊙ ENGINE

Complaint	Symptom and possible causes	Remedy
<b>Engine will not start, or is hard to start.</b>	<p><b>Compression too low</b></p> <ol style="list-style-type: none"> <li>1. Valve clearance out of adjustment.</li> <li>2. Worn valve guides or poor seating of valves.</li> <li>3. Valves mistiming</li> <li>4. Piston rings excessively worn.</li> <li>5. Worn-down cylinder bore.</li> <li>6. Poor seating of spark plug.</li> <li>7. Starter motor cranks but too slowly.</li> </ol> <p><b>Plug not sparking</b></p> <ol style="list-style-type: none"> <li>1. Fouled spark plug.</li> <li>2. Wet spark plug.</li> <li>3. Defective ignition coil.</li> <li>4. Open or short circuit in high tension cord.</li> <li>5. Defective magneto.</li> <li>6. Defective igniter</li> </ol> <p><b>No fuel reaching the carburetor</b></p> <ol style="list-style-type: none"> <li>1. Clogged hole in the fuel tank cap.</li> <li>2. Clogged or defective fuel cock.</li> <li>3. Defective carburetor float valve.</li> <li>4. Clogged fuel pipe.</li> </ol>	<p>Adjust. Repair or replace. Adjust. Replace. Replace or rebore. Retighten. Consult "electrical complaints"</p> <p>Clean or replace. Clean and dry. Replace. Replace. Replace. Replace.</p> <p>Clean. Clean or replace. Replace. Clean or replace.</p>
<b>Engine stalls easily.</b>	<ol style="list-style-type: none"> <li>1. Fouled spark plug.</li> <li>2. Clogged fuel hose.</li> <li>3. Clogged jets in carburetor.</li> <li>4. Valve clearance out of adjustment.</li> <li>5. Defective CDI unit</li> </ol>	<p>Clean. Clean. Clean. Adjust. Replace</p>
<b>Noisy engine.</b>	<p><b>Excessive valve chatter</b></p> <ol style="list-style-type: none"> <li>1. Valve clearance too large.</li> <li>2. Weakened or broken valve springs.</li> <li>3. Worn down camshaft.</li> </ol> <p><b>Noise appears to come from piston</b></p> <ol style="list-style-type: none"> <li>1. Piston or cylinder worn down.</li> <li>2. Weakened or broken valve springs.</li> <li>3. Worn down piston pin or piston pin bore.</li> <li>4. Piston rings or ring groove worn.</li> </ol> <p><b>Noise seems to come from camshaft drive chain</b></p> <ol style="list-style-type: none"> <li>1. Stretched camshaft drive chain.</li> <li>2. Worn camshaft sprockets.</li> <li>3. Cam chain tensioner adjuster not working.</li> </ol> <p><b>Noise seems to come from clutch</b></p> <ol style="list-style-type: none"> <li>1. Worn splines of countershaft or hub.</li> <li>2. Worn teeth of clutch plates.</li> <li>3. Distorted clutch plates, driven and drive.</li> </ol> <p><b>Noise seems to come from crankshaft</b></p> <ol style="list-style-type: none"> <li>1. Worn or broken bearings.</li> <li>2. Big-end bearings worn and broken.</li> <li>3. Thrust clearance too large.</li> </ol>	<p>Adjust. Replace. Replace.</p> <p>Replace. Replace. Replace. Replace.</p> <p>Replace. Replace. Repair or replace.</p> <p>Replace. Replace. Replace.</p> <p>Replace. Replace. Replace.</p>

Complaint	Symptom and possible causes	Remedy
<b>Noisy engine.</b>	<p><b>Noise seems to come from transmission</b></p> <ol style="list-style-type: none"> <li>1. Gears worn or rubbing.</li> <li>2. Badly worn splines.</li> <li>3. Primary gears worn or rubbing.</li> <li>3. Badly worn bearings.</li> </ol> <p><b>Noise seems to come from water pump</b></p> <ol style="list-style-type: none"> <li>1. Too much play on pump shaft bearing.</li> <li>2. Worn or damaged impeller shaft.</li> <li>3. Contact between pump case and impeller.</li> </ol>	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
<b>Slipping clutch.</b>	<ol style="list-style-type: none"> <li>1. Clutch control out of adjustment or too much play.</li> <li>2. Weakened clutch springs.</li> <li>3. Worn or distorted pressure plate.</li> <li>4. Distorted clutch plates, driven and drive.</li> </ol>	<p>Adjust.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
<b>Dragging clutch.</b>	<ol style="list-style-type: none"> <li>1. Clutch control out of adjustment or too much play.</li> <li>2. Weakened clutch springs.</li> <li>3. Distorted clutch plates, driven and drive.</li> </ol>	<p>Adjust.</p> <p>Replace.</p> <p>Replace.</p>
<b>Transmission will not shift.</b>	<ol style="list-style-type: none"> <li>1. Broken gearshift cam.</li> <li>2. Distorted gearshift forks.</li> <li>3. Worn gearshift pawl.</li> </ol>	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
<b>Transmission will not shift back.</b>	<ol style="list-style-type: none"> <li>1. Broken return spring on shift shaft.</li> <li>2. Shift shafts are rubbing or sticky.</li> <li>3. Distorted or worn gearshift forks.</li> </ol>	<p>Replace.</p> <p>Repair.</p> <p>Replace.</p>
<b>Transmission jumps out of gear.</b>	<ol style="list-style-type: none"> <li>1. Worn shifting gears on driveshaft or countershaft.</li> <li>2. Distorted or worn gearshift forks.</li> <li>3. Weakened stopper pawl spring on gearshift cam.</li> <li>4. Worn gearshift pawl.</li> </ol>	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
<b>Engine idles poorly.</b>	<ol style="list-style-type: none"> <li>1. Valve clearance out of adjustment.</li> <li>2. Poor seating of valves.</li> <li>3. Defective valve guides.</li> <li>4. Defective pick-up coil.</li> <li>5. Spark plug gap too wide.</li> <li>6. Defective ignition coil resulting in weak sparking.</li> <li>7. Float-chamber fuel level out of adjustment in carburetor.</li> <li>8. Clogged jets.</li> </ol>	<p>Adjust.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Adjust or replace.</p> <p>Replace.</p> <p>Adjust.</p> <p>Clean.</p>
<b>Engine runs poorly in high speed range.</b>	<ol style="list-style-type: none"> <li>1. Valve springs weakened.</li> <li>2. Valve timing out of adjustment.</li> <li>3. Worn cams.</li> <li>4. Spark plug gap too narrow.</li> <li>5. Defective ignition coil.</li> <li>6. Float-chamber fuel level too low.</li> <li>7. Clogged air cleaner element.</li> <li>8. Clogged fuel hose, resulting in inadequate fuel supply to carburetor.</li> </ol>	<p>Replace.</p> <p>Adjust.</p> <p>Replace.</p> <p>Repair.</p> <p>Replace.</p> <p>Adjust .</p> <p>Clean.</p> <p>Clean or replace.</p>

## 8-3 SERVICING INFORMATION

Complaint	Symptom and possible causes	Remedy
<b>Dirty or heavy exhaust smoke</b>	<ol style="list-style-type: none"> <li>1. Too much engine oil in the engine.</li> <li>2. Worn piston rings or cylinder.</li> <li>3. Worn valve guides.</li> <li>4. Cylinder wall scored or scuffed.</li> <li>5. Worn valves stems.</li> <li>6. Defective stem seals.</li> <li>7. Worn side rails.</li> </ol>	<p>Check with inspection window, drain out excess oil.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
<b>Engine lacks power.</b>	<ol style="list-style-type: none"> <li>1. Loosen of valve clearance.</li> <li>2. Weakened valve springs.</li> <li>3. Valve timing out of adjustment.</li> <li>4. Worn piston ring or cylinder.</li> <li>5. Poor seating of valves.</li> <li>6. Fouled spark plug.</li> <li>7. Worn camshaft.</li> <li>8. Spark plug gap incorrect.</li> <li>9. Clogged jets in carburetor.</li> <li>10. Float-chamber fuel level out of adjustment.</li> <li>11. Clogged air cleaner element.</li> <li>12. Too much enging oil.</li> <li>13. Defective air intake pipe.</li> </ol>	<p>Adjust.</p> <p>Replace.</p> <p>Adjust.</p> <p>Replace.</p> <p>Repair or replace.</p> <p>Clean or replace.</p> <p>Replace.</p> <p>Adjust or replace.</p> <p>Clean.</p> <p>Adjust.</p> <p>Clean.</p> <p>Drain out excess oil.</p> <p>Retighten or replace.</p>
<b>Engine overheats.</b>	<ol style="list-style-type: none"> <li>1. Heavy carbon deposit on piston head.</li> <li>2. Not enough oil in the engine.</li> <li>3. Defective oil pump or clogged oil circuit.</li> <li>4. Fuel level too low in float chamber.</li> <li>5. Air leak from intake pipe.</li> <li>6. Use of incorrect engine oil.</li> <li>7. Defective cooling system.</li> </ol>	<p>Clean.</p> <p>Add oil.</p> <p>Repair or clean.</p> <p>Adjust.</p> <p>Retighten or replace.</p> <p>Change.</p> <p>See "Cooling system" section.</p>

⊙ CARBURETOR

Complaint	Symptom and possible causes	Remedy
<b>Trouble with starting.</b>	<ol style="list-style-type: none"> <li>1. Starter jet is clogged.</li> <li>2. Starter pipe is clogged.</li> <li>3. Air leaking from a joint between starter body and carburetor.</li> <li>4. Starter plunger is not operating properly.</li> </ol>	<p>Clean. Clean. Check starter body and carburetor for tightness, adjust and replace gasket. Check and adjust.</p>
<b>Idling or low-speed trouble.</b>	<ol style="list-style-type: none"> <li>1. Pilot jet, pilot air jet are clogged or loose.</li> <li>2. Pilot outlet or bypass is clogged.</li> <li>3. Starter plunger is not fully closed.</li> </ol>	<p>Check and clean. Check and clean. Check and clean.</p>
<b>Medium or high speed trouble.</b>	<ol style="list-style-type: none"> <li>1. Main jet or main air jet is clogged.</li> <li>2. Needle jet is clogged.</li> <li>3. Throttle valve is not operating properly.</li> <li>4. Filter is clogged.</li> </ol>	<p>Check and clean. Check and clean. Check throttle valve for operation. Check and clean.</p>
<b>Overflow and fuel level fluctuations.</b>	<ol style="list-style-type: none"> <li>1. Needle valve is worn or damaged.</li> <li>2. Spring in needle valve is broken.</li> <li>3. Float is not working properly.</li> <li>4. Foreign matter has adhered to needle valve.</li> <li>5. Fuel level is too high or low.</li> </ol>	<p>Replace. Replace. Check and adjust. Clean. Adjust float height.</p>

⊙ RADIATOR (COOLING SYSTEM)

Complaint	Symptom and possible causes	Remedy
<b>Engine overheats.</b>	<ol style="list-style-type: none"> <li>1. Not enough engine coolant.</li> <li>2. Radiator core clogged with dirt or scale.</li> <li>3. Faulty cooling fan.</li> <li>4. Defective cooling fan thermo-switch.</li> <li>5. Clogged water passage.</li> <li>6. Air trapped in the cooling circuit.</li> <li>7. Defective water pump.</li> <li>8. Use of incorrect engine coolant.</li> <li>9. Defective thermostat.</li> </ol>	<p>Add coolant. Clean. Repair or replace. Replace. Clean. Bleed out air. Replace. Replace. Replace.</p>
<b>Engine overcools.</b>	<ol style="list-style-type: none"> <li>1. Defective cooling fan thermo-switch.</li> <li>2. Extremely cold weather.</li> <li>3. Defective thermostat.</li> </ol>	<p>Replace. Put on the radiator cover. Replace.</p>

## ⊙ ELECTRICAL

Complaint	Symptom and possible causes	Remedy
<b>No sparking or poor sparking.</b>	<ol style="list-style-type: none"> <li>1. Defective ignition coil.</li> <li>2. Defective spark plug.</li> <li>3. Defective igniter</li> </ol>	Replace. Replace. Replace.
<b>Spark plug soon become fouled with carbon.</b>	<ol style="list-style-type: none"> <li>1. Mixture too rich.</li> <li>2. Idling speed set too high.</li> <li>3. Incorrect gasoline.</li> <li>4. Dirty element in air cleaner.</li> <li>5. Spark plug too cold.</li> </ol>	Adjust carburetor. Adjust carburetor. Change. Clean or replace. Replace by hot type plug.
<b>Spark plug become fouled too soon.</b>	<ol style="list-style-type: none"> <li>1. Worn piston rings.</li> <li>2. Pistons or cylinder worn.</li> <li>3. Excessive clearance of valve stems in valve guides.</li> <li>4. Worn stem oil seal.</li> </ol>	Replace. Replace. Replace. Replace.
<b>Spark plug electrodes overheat or burn.</b>	<ol style="list-style-type: none"> <li>1. Spark plug too hot.</li> <li>2. The engine overheats.</li> <li>3. Spark plug loose.</li> <li>4. Mixture too lean.</li> </ol>	Replace by cold type plug. Tune up. Retighten. Adjust carburetor.
<b>Generator charge, but charging rate is below the specification.</b>	<ol style="list-style-type: none"> <li>1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals.</li> <li>2. Grounded or open-circuited stator coils of generator.</li> <li>3. Defective regulator/rectifier.</li> <li>4. Not enough electrolyte in the battery.</li> <li>5. Defective cell plates in the battery.</li> </ol>	Repair or retighten.  Replace. Replace. Add distilled water between the level lines. Replace the battery.
<b>Generator overcharges.</b>	<ol style="list-style-type: none"> <li>1. Internal short-circuit in the battery.</li> <li>2. Resistor element in the regulator/rectifier damaged or defective.</li> <li>3. Regulator/rectifier poorly grounded.</li> </ol>	Replace the battery. Replace. Clean and tighten ground connection.
<b>Unstable charging.</b>	<ol style="list-style-type: none"> <li>1. Lead wire insulation frayed due to vibration resulting in intermittent shorting.</li> <li>2. Generator internally shorted.</li> <li>3. Defective regulator/rectifier.</li> </ol>	Repair or replace  Replace. Replace.
<b>Starter switch is not effective.</b>	<ol style="list-style-type: none"> <li>1. Battery run down.</li> <li>2. Defective switch contacts.</li> <li>3. Brushes not seating properly on commutator in starter motor.</li> <li>4. Defective starter relay.</li> </ol>	Recharge or replace. Replace. Repair or replace. Replace.



⊙ BATTERY

Complaint	Symptom and possible causes	Remedy
<p><b>“Sulfation” acidic white powdery substance or spots on surfaces of cell plates.</b></p>	<ol style="list-style-type: none"> <li>1. Not enough electrolyte.</li> <li>2. Battery case is cracked.</li> <li>3. Battery has been left in a run-down condition for a long time.</li> <li>4. Contaminated electrolyte. (Foreign matter has enters the battery and become mixed with the electrolyte.)</li> </ol>	<p>Add distilled water, if the battery has not been damaged and “sulfation” has not advanced too far, and recharge. Replace the battery. Replace the battery or recharge.</p> <p>If “sulfation” has not advanced far, try to restore the battery by replacing the electrolyte, recharging it fully with the battery detached from the vehicle and then adjusting electrolyte specific gravity.</p>
<p><b>Battery runs down quickly.</b></p>	<ol style="list-style-type: none"> <li>1. The charging method is not correct.</li> <li>2. Cell plates have lost much of their active material as a result of over-charging.</li> <li>3. A short-circuit condition exists within the battery due to excessive accumulation of sediments caused by the high electrolyte specific gravity.</li> <li>4. Electrolyte specific gravity is too low.</li> <li>5. Contaminated electrolyte.</li> <li>6. Battery is too old.</li> </ol>	<p>Check the generator, regulator /rectifier and circuit connections, and make necessary adjustments to obtain specified charging operation. Replace the battery, and correct the charging system. Replace the battery.</p> <p>Recharge the battery fully and adjust electrolyte specific gravity. Replace the electrolyte, recharge the battery and then adjust specific gravity. Replace the battery.</p>
<p><b>Reversed battery polarity.</b></p>	<p>The battery has been connected the wrong way round in the system, so that it is being charged in the reverse direction.</p>	<p>Replace the battery and be sure to connect the battery properly.</p>
<p><b>Battery “sulfation”</b></p>	<ol style="list-style-type: none"> <li>1. Charging rate too low or too high. (When not in use, batteries should be recharged at least once a month to avoid sulfation.)</li> <li>2. Battery electrolyte excessive or insufficient, or its specific gravity too high or too low.</li> <li>3. The battery left unused for too long in cold climate.</li> </ol>	<p>Replace the battery.</p> <p>Keep the electrolyte up to the prescribed level, or adjust the specific gravity by consulting the battery maker’s directions.</p> <p>Replace the battery, if badly sulfated.</p>
<p><b>Battery discharges too rapidly.</b></p>	<ol style="list-style-type: none"> <li>1. Dirty container top and sides.</li> <li>2. Impurities in the electrolyte or electrolyte specific gravity is too high.</li> </ol>	<p>Clean. Change the electrolyte by consulting the battery maker’s directions.</p>










## ⊙ CHASSIS

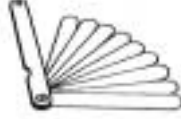

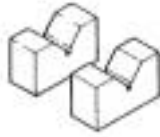






Complaint	Symptom and possible causes	Remedy
<b>Handling is too heavy or stiff</b>	<ol style="list-style-type: none"> <li>1. Improper front wheel alignment.</li> <li>2. Insufficiently lubricated.</li> <li>3. Low air pressure in front tires.</li> <li>4. Tie rod ends tending to seize.</li> <li>5. Linkage connections tending to seize.</li> </ol>	Adjust. Lubricate. Adjust. Replace. Repair or replace.
<b>Steering wobbles.</b>	<ol style="list-style-type: none"> <li>1. Unequally inflated tires.</li> <li>2. Loose front wheel hub nuts.</li> <li>3. Damaged or worn front wheel hub bearings.</li> <li>4. Worn or loose tie rod ends.</li> <li>5. Defective or incorrect front tires.</li> <li>6. Damaged or worn suspension arms and related bearings.</li> <li>7. Distorted front wheels.</li> <li>8. Loose chassis nuts and bolts.</li> </ol>	Regulate. Tighten. Replace. Replace or tighten. Replace. Replace. Replace. Tighten.
<b>Steering pulls to one side.</b>	<ol style="list-style-type: none"> <li>1. Unequally inflated tires.</li> <li>2. Improper front wheel alignment.</li> <li>3. Worn front wheel hub bearings.</li> <li>4. Distorted frame or suspension.</li> <li>5. Defective shock absorber.</li> </ol>	Regulate. Adjust. Replace. Repair or replace. Replace.
<b>Shocks felt in the steering.</b>	<ol style="list-style-type: none"> <li>1. High tire pressure.</li> <li>2. Worn steering linkage connections.</li> <li>3. Loose suspension system bolts.</li> </ol>	Regulate. Replace. Tighten.
<b>Tires rapidly or unevenly wear.</b>	<ol style="list-style-type: none"> <li>1. Worn or loose front wheel hub bearings.</li> <li>2. Improper front wheel alignment.</li> </ol>	Replace. Adjust.
<b>Steering too noisy.</b>	<ol style="list-style-type: none"> <li>1. Loose nuts and bolts.</li> <li>2. Damaged or worn front wheel hub bearings.</li> <li>3. Insufficiently lubricated.</li> </ol>	Tighten. Replace. Lubricate.
<b>Front suspension too soft.</b>	<ol style="list-style-type: none"> <li>1. Weakened spring.</li> <li>2. Shock absorber leaks oil.</li> </ol>	Replace. Replace.
<b>Front suspension too stiff.</b>	<ol style="list-style-type: none"> <li>1. Worn upper or lower suspension arms and related bearings.</li> <li>2. Bent shock absorber rod.</li> </ol>	Tighten. Replace.
<b>Suspension too noisy.</b>	<ol style="list-style-type: none"> <li>1. Loose suspension system bolts.</li> <li>2. Worn suspension arms and related bearings.</li> <li>3. Worn swingarm and suspension bearings.</li> </ol>	Tighten. Replace. Replace.
<b>Rear suspension too soft.</b>	<ol style="list-style-type: none"> <li>1. Weakened spring of shock absorber.</li> <li>2. Leakage oil or gas of shock absorber.</li> <li>3. Improperly set rear spring pre-load adjuster.</li> <li>4. Improperly set damping force adjuster.</li> </ol>	Replace. Replace. Adjust. Adjust.
<b>Rear suspension too stiff.</b>	<ol style="list-style-type: none"> <li>1. Bend shock absorber rod.</li> <li>2. Bent swingarm.</li> <li>3. Worn swingarm and rear suspension bearings.</li> <li>4. Improperly set rear spring pre-load adjuster.</li> <li>5. Improperly set damping force adjuster.</li> <li>6. Improper chain adjustment.</li> </ol>	Replace. Replace. Replace. Adjust. Adjust. Adjust.
<b>Rear wheels wobble.</b>	<ol style="list-style-type: none"> <li>1. Distorted rear wheel rims.</li> <li>2. Damage or worn rear axle housing bearings.</li> <li>3. Defective or incorrect rear tires.</li> <li>4. Loose rear wheel hub nuts.</li> <li>5. Distorted rear axle.</li> <li>6. Loosen rear axle housing mounting bolts.</li> <li>7. Improper rear brake adjustment.</li> <li>8. Damaged or worn rear swingarm and related bearings.</li> <li>9. Rear shock absorber leaks oil.</li> <li>10. Loose rear swingarm nut.</li> </ol>	Replace. Replace. Replace. Tighten. Replace. Tighten. Adjust. Replace. Replace. Tighten.










⊙ BRAKES










Complaint	Symptom and possible causes	Remedy
<p><b>Poor braking (FRONT and REAR)</b></p>	<ol style="list-style-type: none"> <li>1. Not enough brake fluid in the reservoir.</li> <li>2. Air trapped in brake fluid circuit.</li> <li>3. Pads worn down.</li> <li>4. Too much play on brake lever or pedal.</li> <li>5. Oil adhesion on friction surface of pads.</li> <li>6. Worn disk.</li> </ol>	<p>Refill to level mark. Bleed air out. Replace. Adjust. Clean disk and pads. Replace.</p>
<p><b>Insufficient brake power.</b></p>	<ol style="list-style-type: none"> <li>1. Leakage of brake fluid from hydraulic system.</li> <li>2. Worn pads.</li> <li>3. Oil adhesion of engaging surface of pads.</li> <li>4. Worn disk.</li> <li>5. Air in hydraulic system.</li> </ol>	<p>Repair or replace. Replace. Clean disk and pads. Replace. Bleed air.</p>
<p><b>Brake squeaking.</b></p>	<ol style="list-style-type: none"> <li>1. Carbon adhesion on pad surface.</li> <li>2. Tilted pad.</li> <li>3. Damaged wheel bearing.</li> <li>4. Loosen front-wheel axle or rear-wheel axle.</li> <li>5. Worn pads.</li> <li>6. Foreign material in brake fluid.</li> <li>7. Clogged return port of master cylinder.</li> </ol>	<p>Repair surface with sandpaper. Modify pad fitting. Replace. Tighten to specified torque. Replace. Replace brake fluid. Disassemble and clean master cylinder.</p>
<p><b>Excessive brake lever stroke.</b></p>	<ol style="list-style-type: none"> <li>1. Air in hydraulic system.</li> <li>2. Insufficient brake fluid.</li> <li>3. Improper quality of brake fluid.</li> </ol>	<p>Bleed air. Replenish fluid to specified level ; bleed air. Replace with correct fluid.</p>
<p><b>Leakage of brake fluid.</b></p>	<ol style="list-style-type: none"> <li>1. Insufficient tightening of connection joints.</li> <li>2. Cracked hose.</li> <li>3. Worn piston and/or cup.</li> </ol>	<p>Tighten to specified torque. Replace. Replace piston and/or cup.</p>

## SPECIAL TOOLS

Special tools	Part Number · Part Name · Description
	09900-20101 Vernier Calipers Used to conveniently measure various dimensions.
	09900-20201 Micrometer (0~25mm) Used for precise measurement (00~25mm measure ranges).
	09900-20202 Micrometer (25~50mm) Used for precise measurement (25~50mm measure ranges).
	09900-20203 Micrometer (50~75mm) Used for precise measurement (50~75mm measure ranges).
	09900-20204 Micrometer (75~100mm) Used for precise measurement (75~100mm measure ranges).
	09900-20508 Cylinder gauge set Measure inside diameter of cylinder.
	09900-20605 Dial calipers Measure width of conrod big-end.
	09900-20606 Dial gauge Measure oscillation of wheel with using magnetic stand.
	09900-20701 Magnetic stand With using dial gauge.


Special tools	Part Number · Part Name · Description
	09900-20806 Thickness gauge Measure clearance of piston ring.
	09900-21109 Torque wrench Measure torque of tightening.
	09900-21304 V-block With using magnetic stand.
	09900-22401 Small bore gauge Measure inside diameter of conrod small-end.
	09900-25002 Pocket tester Measure voltage, electric current, resistance.
	09900-25008 Multi circuit tester set Inspect thermo-switch or temperature switch.
	09900-26006 Engine tachometer Measure rotational frequency of engine.
	09910-20115 Conrod holder Used to lock the crankshaft.
	09910-32812 Crankshaft installer Used to install the crankshaft in the crankcase.

Special tools	Part Number · Part Name · Description
	09910-36000 Cap plug wrench Used to install or remove the magneto cover cap.
	09913-50121 Oil seal remover Used to remove the oil seal.
	09913-70122 Bearing installer Used to drive bearing in.
	09913-75820 Bearing installer Used to drive bearing in.
	09913-76010 Bearing installer Used to drive bearing in.
	09913-80112 Bearing installer Used to drive bearing in.
	09915-64511 Compression gauge Measure cylinder compression.
	09915-74511 Oil pressure gauge Measure oil pressure of 4-stroke engine.
	09915-74532 Oil pressure gauge adaptor Used with oil pressure gauge.

Special tools	Part Number · Part Name · Description
	09916-14510 Valve spring compressor Used to remove and remounting valve stem.
	09916-14520 Valve spring compressor attachment Used with valve spring compressor.
	09920-13120 Crankcase separator Separate to crankcase.
	09920-53710 Clutch sleeve hub holder Used to install or remove clutch sleeve hub nut.
	09921-20200 Bearing remover (10mm) Used to remove bearing with the rotor remove sliding shaft.
	09921-20210 Bearing remover (12mm) Used to remove bearing with the rotor remove sliding shaft.
	09923-73210 Bearing remover (17mm) Used to remove bearing with the rotor remove sliding shaft.
	09923-74510 Bearing remover (20~35mm) Used to remove bearing with the rotor remove sliding shaft.
	09930-30102 Rotor remove sliding shaft Used to with bearing remover.

## 8-11 SERVICING INFORMATION

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Special tools	Part Number · Part Name · Description
 A cylindrical metal tool with a textured grip and a small protrusion at the top.	09930-30164 Rotor remover
	Used to remove rotor.

## TIGHTENING TORQUE

### ⊙ ENGINE

ITEM		N · m	kgf · m
Water temperature switch		13	1.3
Coolant drain bolt		11 ~ 14	1.1 ~ 1.4
Cooling fan mounting bolt		8 ~ 12	0.8 ~ 1.2
Cooling fan motor mounting bolt		8	0.8
Cooling fan thermo-switch		13	1.3
Radiator mounting bolt		8 ~ 12	0.8 ~ 1.2
Magneto rotor nut		120	12.0
Magneto cover bolt		10	1.0
Muffler connecting bolt		23	2.3
Muffler mounting bolt		23	2.3
Exhaust pipe nut		23	2.3
Thermostat case bolt		10	1.0
Starter clutch bolt		23 ~ 28	2.3 ~ 2.8
Cylinder head bolt		47	4.7
Cylinder head cover bolt		14	1.4
Cylinder head base bolt		10	1.0
Cylinder base nut		10	1.0
Engine sprocket bolt		11 ~ 13	1.1 ~ 1.3
Engine oil check plug		18	1.8
Engine oil drain plug	Crankcase	21	2.1
	Oil tank	12	1.2
Engine oil inlet hose union bolt		23	2.3
Engine mounting nut		66	6.6
Engine mounting bolt		66	6.6
Spark plug		11	1.1
Camshaft housing bolt		10	1.0
Cam chain tensioner mounting bolt		10	1.0
Cam chain tension adjuster mounting bolt		10	1.0
Cam chain tension adjuster bolt		20	2.0
Crankcase bolt		11	1.1
Clutch sleeve hub nut		90	9.0
Primary drive gear nut		140	14.0
Camshaft housing bolt		12	1.2
Horn mounting bolt		8 ~ 12	0.8 ~ 1.2
Gearshift cam stopper		32	3.2
Gear position switch bolt		6.5	0.65

## 8-13 SERVICING INFORMATION

### ◎ CHASSIS

ITEM	N · m	kgf · m
Front & Rear shock absorber mounting nut (Upper)	40 ~ 60	4.0 ~ 6.0
Front & Rear shock absorber mounting bolt (Lower)	40 ~ 60	4.0 ~ 6.0
Rear axle housing nut	70 ~ 100	7.0 ~ 10.0
Rear axle housing wrench bolt	40 ~ 60	4.0 ~ 6.0
Swingarm pivot nut	50 ~ 80	5.0 ~ 8.0
Steering shaft nut	49	4.9
Steering shaft holder bolt	18 ~ 28	1.8 ~ 2.8
Front & Rear brake disk bolt	18 ~ 28	1.8 ~ 2.8
Front brake master cylinder mounting bolt	5 ~ 8	0.5 ~ 0.8
Rear brake master cylinder mounting bolt	8 ~ 12	0.8 ~ 1.2
Front & Rear brake caliper air bleeder valve	9 ~ 14	0.9 ~ 1.4
Front & Rear brake caliper mounting bolt	18 ~ 28	1.8 ~ 2.8
Front & Rear brake hose union bolt	40 ~ 60	4.0 ~ 6.0
Footrest mounting bolt	40 ~ 60	4.0 ~ 6.0
Front wheel hub nut	55	5.5
Rear wheel hub nut	100	10.0
Front & Rear wheel set nut	39.2 ~ 58.8	3.92 ~ 5.88
Front & Rear brake pad mounting pin	18 ~ 28	1.8 ~ 2.8
Knuckle end nut	43	4.3
Suspension arm pivot nut	40 ~ 60	4.0 ~ 6.0
Tie rod end nut	22 ~ 35	2.2 ~ 3.5
Tie rod lock nut	29	2.9
Throttle case bolt	5	0.5
Parking brake housing bolt	28	2.8
Rear brake master cylinder rod lock nut	10 ~ 20	1.0 ~ 2.0
Rear cushion rod nut	70 ~ 100	7.0 ~ 10.0
Rear cushion lever nut	70 ~ 100	7.0 ~ 10.0
Rear sprocket mounting bolt	18 ~ 28	1.8 ~ 2.8
Rear axle shaft nut (inner & outer)	120 ~ 150	12.0 ~ 15.0
Handlebar clamp bolt	18 ~ 28	1.8 ~ 2.8
Parking brake adjuster lock nut	18	1.8
Rear brake caliper holder pin	18	1.8
Rear brake caliper pin bolt	23	2.3



## SERVICE DATA

### ⊙ VALVE + GUIDE

Unit : mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	36.0 (1.42)	—
	EX.	29.0 (1.14)	—
Valve clearance (When cold)	IN.	0.1 ~ 0.2 (0.004 ~ 0.008)	—
	EX.	0.2 ~ 0.3 (0.008 ~ 0.012)	—
Valve guide to valve stem clearance	IN.	0.010 ~ 0.037 (0.0004 ~ 0.0015)	—
	EX.	0.030 ~ 0.057 (0.0012 ~ 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	5.000 ~ 5.012 (0.1969 ~ 0.1973)	—
Valve stem O.D.	IN.	4.975 ~ 4.990 (0.1959 ~ 0.1965)	—
	EX.	4.955 ~ 4.970 (0.1951 ~ 0.1957)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.50 (0.02)
Valve seat width	1.25 ~ 1.65 (0.049 ~ 0.065)		—
Valve seat angle	IN. & EX.	45°	—
Valve head radial runout	IN. & EX.	—	0.35 (0.014)
Valve spring free length	Inner	—	36.9 (1.45)
	Outer	—	39.9 (1.57)
Valve spring tension	Inner.	6.5 ~ 7.1 kgf (14.3 ~ 15.7 lbs) at length 32.0 mm (1.26 in)	—
	Outer	12.0 ~ 14.0 kgf (26.5 ~ 30.9 lbs) at length 35.5 mm (1.40 in)	—

## 8-15 SERVICING INFORMATION

### ⊙ CYLINDER + PISTON + PISTON RING

Unit : mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	16 kg/cm <sup>2</sup> (at 500 rpm)		14 kg/cm <sup>2</sup>
Piston to cylinder clearance	0.050 ~ 0.060 (0.0020 ~ 0.0024)		0.120 (0.0048)
Cylinder bore	96.000 ~ 96.015 (3.7795 ~ 3.7801)		96.075 (3.7825)
Piston diam.	95.945 ~ 95.960 (3.7774 ~ 3.7780) (Measure at 18 mm (0.71 in) from the skirt end)		95.880 (3.7748)
Cylinder or cylinder head distortion	—		0.05 (0.002)
Piston ring free end gap	1st	Approx 11.0 (0.433)	—
	2nd	Approx 10.0 (0.394)	—
Piston ring end gap (Assembly condition)	1st	0.25 ~ 0.40 (0.010 ~ 0.016)	0.5 (0.020)
	2nd	0.40 ~ 0.55 (0.016 ~ 0.022)	0.7 (0.028)
Piston ring to groove clearance	1st	—	0.150 (0.006)
	2nd	—	0.150 (0.006)
Piston ring groove width	1st	1.21 ~ 1.23 (0.0476 ~ 0.0484)	—
	2nd	1.01 ~ 1.03 (0.040 ~ 0.041)	—
	Oil	2.01 ~ 2.03 (0.079 ~ 0.080)	—
Piston ring thickness	1st	1.170 ~ 1.190 (0.0461 ~ 0.0469)	—
	2nd	0.970 ~ 0.990 (0.0382 ~ 0.0390)	—
Piston pin hole bore	19.002 ~ 19.008 (0.7481 ~ 0.7484)		19.030 (0.7492)
Piston pin O.D.	18.992 ~ 18.995 (0.7477 ~ 0.7478)		18.980 (0.7472)

## ⊙ OIL PUMP

ITEM	STANDARD	NOTE
Oil pressure	1.0 ~ 3.0 kgf/cm <sup>2</sup> (at 60 °C, 3,000 rpm)	—
Oil pump reduction ratio	1.3 (45/34)	—

## ⊙ CLUTCH

Unit : mm (in)

ITEM	STANDARD		LIMIT
Clutch cable play	10 ~ 15 (0.4 ~ 0.6)		—
Drive plate thickness	NO. 1	2.92 ~ 3.08 (0.115 ~ 0.121)	2.62 (0.103)
	NO. 2	3.42 ~ 3.58 (0.135 ~ 0.141)	3.12 (0.123)
Drive plate claw width	NO. 1	15.9 ~ 16.0 (0.626 ~ 0.630)	15.1 (0.595)
	NO. 2	15.9 ~ 16.0 (0.626 ~ 0.630)	15.1 (0.595)
Driven plate distortion	—		0.1 (0.004)
Clutch spring free length	54.2 (2.134)		51.6 (2.032)

## 8-17 SERVICING INFORMATION

### ⊙ CAMSHAFT + CYLINDER HEAD

Unit : mm (in)

ITEM		STANDARD	LIMIT
Cam height	IN.	39.98 ~ 40.02 (1.574 ~ 1.576)	39.88 (1.570)
	EX.	39.98 ~ 40.02 (1.574 ~ 1.576)	39.88 (1.570)
Camshaft O.D	IN. & EX.	21.959 ~ 21.980 (0.8645 ~ 0.8654)	
Camshaft housing I.D.	IN. & EX.	22.012 ~ 22.025 (0.8666 ~ 0.8671)	—
Camshaft journal oil clearance	IN. & EX.	—	0.15 (0.006)
Camshaft runout		—	0.10 (0.004)
Cylinder head cover distortion		—	0.05 (0.002)
Cam chain pin (Arrow "3")		15th pin	—

### ⊙ CONROD + CRANKSHAFT

Unit : mm (in)

ITEM		STANDARD	LIMIT
Conrod small end I.D.		19.006 ~ 19.014 (0.7483 ~ 0.7486)	19.040 (0.7496)
Conrod deflection		—	3.0 (0.12)
Conrod big end side clearance		0.10 ~ 0.65 (0.004 ~ 0.026)	1.0 (0.040)
Conrod big end width		24.95 ~ 25.00 (0.982 ~ 0.984)	—
Crank web to web width		71 ± 0.1 (2.795 ± 0.004)	—
Crankshaft runout		—	0.05 (0.002)

## ⊙ TRANSMISSION + DRIVE BELT

Unit : mm (in)

ITEM	STANDARD		LIMIT
Primary reduction ratio	2.500 (75/30)		—
Secondary reduction ratio	3.143 (44/14)		—
Gear ratio	1st	2.538 (33/13)	—
	2nd	1.684 (32/19)	—
	3rd	1.261 (29/23)	—
	4th	1.040 (26/25)	—
	5th	0.885 (23/26)	—
	Reverse	2.231(29/13)	—
Shift fork to groove clearance	0.10 ~ 0.30 (0.004 ~ 0.012)		0.50 (0.020)
Shift fork groove width	NO.1 & NO.2	4.85 ~ 5.00 (0.191 ~ 0.197)	—
	NO.3	4.85 ~ 5.00 (0.191 ~ 0.197)	—
Shift fork thickness	NO.1 & NO.2	5.3 ~ 5.4 (0.209 ~ 0.213)	—
	NO.3	5.3 ~ 5.4 (0.209 ~ 0.213)	—
Drive chain	Type	RK 520EXW	—
	Links	102	—
	20-pitch length	317.5 (12.50)	319.4 (12.58)
Drive chain slack	30 ~ 40 (1.2 ~ 1.6)		—
Reverse cable play	1 ~ 2 (0.04 ~ 0.08)		—

## 8-19 SERVICING INFORMATION

### ⊙ CARBURETOR

Unit : mm (in)

ITEM		SPECIFICATION		
Carburetor type		BDS42 TYPE		
Bore size		∅ 42		
Idle r.p.m.		1,300~1,500 rpm		
Float height		13 (0.51)		
Main jet	(M.J.)	162.5		
Main air jet	(M.A.J.)	50		
Jet needle	(J.N.)	6DFY08-54-3		
Needle jet	(N.J.)	O-6M		
Pilot jet	(P.J.)	45		
Throttle valve	(TH.V.)	105		
By-pass	(B.P.)	#1 0.9	#2 0.8	#3 0.8
Valve seat	(V.S.)	1.5		
Starter jet	(G.S.)	42.5		
Pilot screw	(P.S.)	STD		
Pilot outlet	(P.O.)	∅ 1.1		
PV. Stroke	(P.V.)	29.6		
Throttle cable play		3 ~ 5 (0.12 ~ 0.20)		

## ⊙ THERMOSTAT + COOLING FAN + COOLANT

ITEM	STANDARD		LIMIT
Thermostat valve operating temperature	Valve opening	76°C (169°F)	
	Valve closing	71°C (160°F)	
Thermostat valve lift	Over 8 mm / 90°C (Over 0.32 in/194°F)		
Water temperature switch operating temperature	OFF→ON	Approx. 120°C (248°F)	
	ON→OFF	Approx. 113°C (235°F)	
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 95°C (203°F)	
	ON→OFF	Approx. 88°C (190°F)	
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50 : 50		
Engine coolant capacity	1.4 ℓ		

## 8-21 SERVICING INFORMATION

### ⊙ ELECTRICAL

Unit : mm (in)

ITEM	STANDARD		NOTE
Ignition timing	BTDC 6° / 1,500rpm		
Spark plug	Type	CR8E	
	Gap	0.7 ~ 0.8 (0.028 ~ 0.032)	
	Hot type	CR7E	
	Standard type	CR8E	
	Cold type	CR9E	
Spark performance	Over 8mm (0.32)		
Magneto coil resistance	Pick-up coil	90 ~ 110 Ω	G-L
	Charging coil	0.3 ~ 0.8 Ω	Y-Y
Magneto no-load voltage	Over 70V / 5,000 rpm		
Battery standard charging voltage	13.5 ~ 15.0V / 5,000 rpm		
Battery	Type	YTX9-BS	
	Capacity	12V 8Ah	
	Standard electrolyte S.G.	1.320 at 20°C (68°F)	
Fuse size	15A		



## ⊙ WATTAGE

Unit : W

ITEM	SPECIFICATION	
Head lamp	HI	55W
	LO	55W
	POSITION	5W
License plate lamp	5W	
Brake / Tail lamp	LED type	
Turn signal lamp	10W × 4	
Speedometer lamp	LCD type	
Neutral indicator lamp	3.4W	
Turn signal indicator lamp (Right & left)	3.4W	
High beam indicator lamp	3.4W	
Coolant temperature indicator lamp	3.4W	
Fuel indicator lamp	3.4W	
Reverse indicator lamp	3.4W	

※ LED : Light Emitting Diode

LCD : Liquid Crystal Display



### CAUTION

Do not use except the specified bulb (Wattage).

## ⊙ SUSPENSION

Unit : mm (in)

ITEM	STANDARD	LIMIT
Swingarm pivot shaft runout	—	0.6 (0.024)
Front suspension spring set length	Maximum (Softest)	280 (11.0)
	Standard	270 (10.6)
	Minimum (Stiffest)	258 (10.2)
Rear suspension spring set length	Maximum (Softest)	235 (9.25)
	Standard	228 (8.98)
	Minimum (Stiffest)	213 (8.39)

### STANDARD FRONT SHOCK ABSORBER DAMPING FORCE

	Compression	Tension
<b>Softer</b>	Turn to "S" direction (counter-clockwise)	Turn to "S" direction (counter-clockwise)
<b>Standard</b>	1 ½ turn from end of "S" direction (counter-clockwise)	End of "S" direction (counter-clockwise)
<b>Stiffer</b>	Turn to "H" direction (clockwise)	Turn to "H" direction (clockwise)

### STANDARD REAR SHOCK ABSORBER DAMPING FORCE

	Compression	Tension
<b>Softer</b>	Turn to "S" direction (counter-clockwise)	Turn to "S" direction (counter-clockwise)
<b>Standard</b>	1 ½ turn from end of "S" direction (counter-clockwise)	1 ½ turn from end of "S" direction (counter-clockwise)
<b>Stiffer</b>	Turn to "H" direction (clockwise)	Turn to "H" direction (clockwise)

⊙ BRAKE + WHEEL

Unit : mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	355 (14.0) [when one person riding from the ground]		—
Brake disk thickness	Front	4.0 (0.16)	3.0 (0.12)
	Rear	4.3 (0.17)	3.0 (0.12)
Brake disk runout	Front · Rear	—	0.3 (0.012)
Master cylinder bore	Front	15.870 ~ 15.913 (0.6248 ~ 0.6265)	—
	Rear	12.700 ~ 12.743 (0.5000 ~ 0.5017)	—
Master cylinder piston diam.	Front	15.827 ~ 15.854 (0.6227 ~ 0.6242)	—
	Rear	12.657 ~ 12.684 (0.4983 ~ 0.4994)	—
Brake caliper cylinder bore	Front · Rear	32 (1.26)	—
Brake caliper piston diam.	Front · Rear	32 (1.26)	—
Brake fluid type	Front	DOT4	—
	Rear	DOT4	—
Rear axle shaft nunout	—		6 (0.24)
Tire size	Front	21×7-10	—
	Rear	20×11-9	—
Wheel rim size	Front	10×5.5	—
	Rear	9×8	—
Tire tread depth	Front	—	4 (0.16)
	Rear	—	4 (0.16)
Toe-in [When apply to a load 75 kg (165 lbs)]	0 ~ 5 mm (0 ~ 0.2 in)		—
Caster	7.3°		—
Camber	0°		—

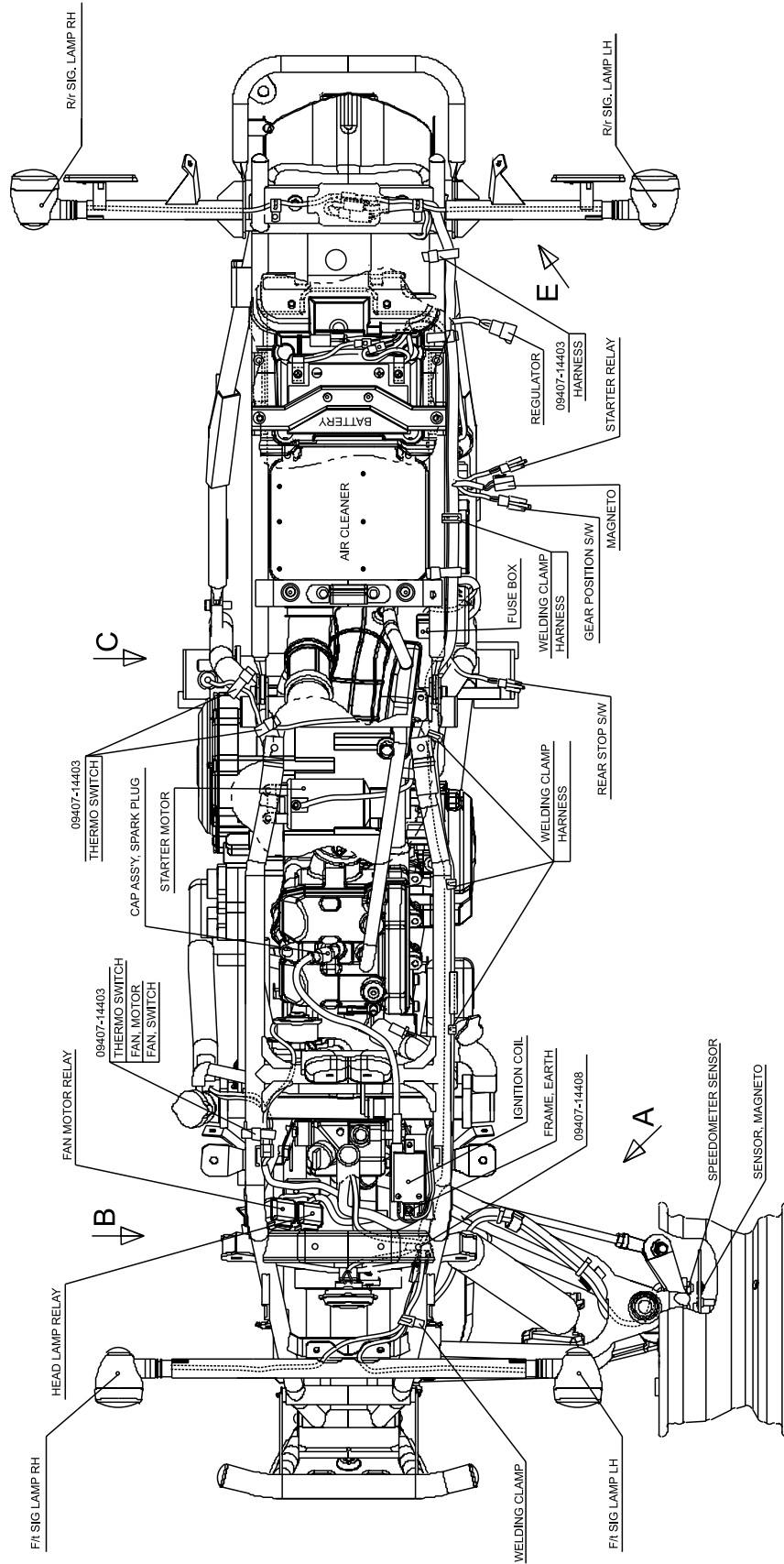
## ⊙ TIRE PRESSURE

COLD INFLATION TIRE PRESSURE		
	ONE PERSON	TWO PERSONS
FRONT	0.3 kgf/cm <sup>2</sup> 30 kPa 4.4 psi	0.35 kgf/cm <sup>2</sup> 35 kPa 4.9 psi
REAR	0.3 kgf/cm <sup>2</sup> 30 kPa 4.4 psi	0.35 kgf/cm <sup>2</sup> 35 kPa 4.9 psi

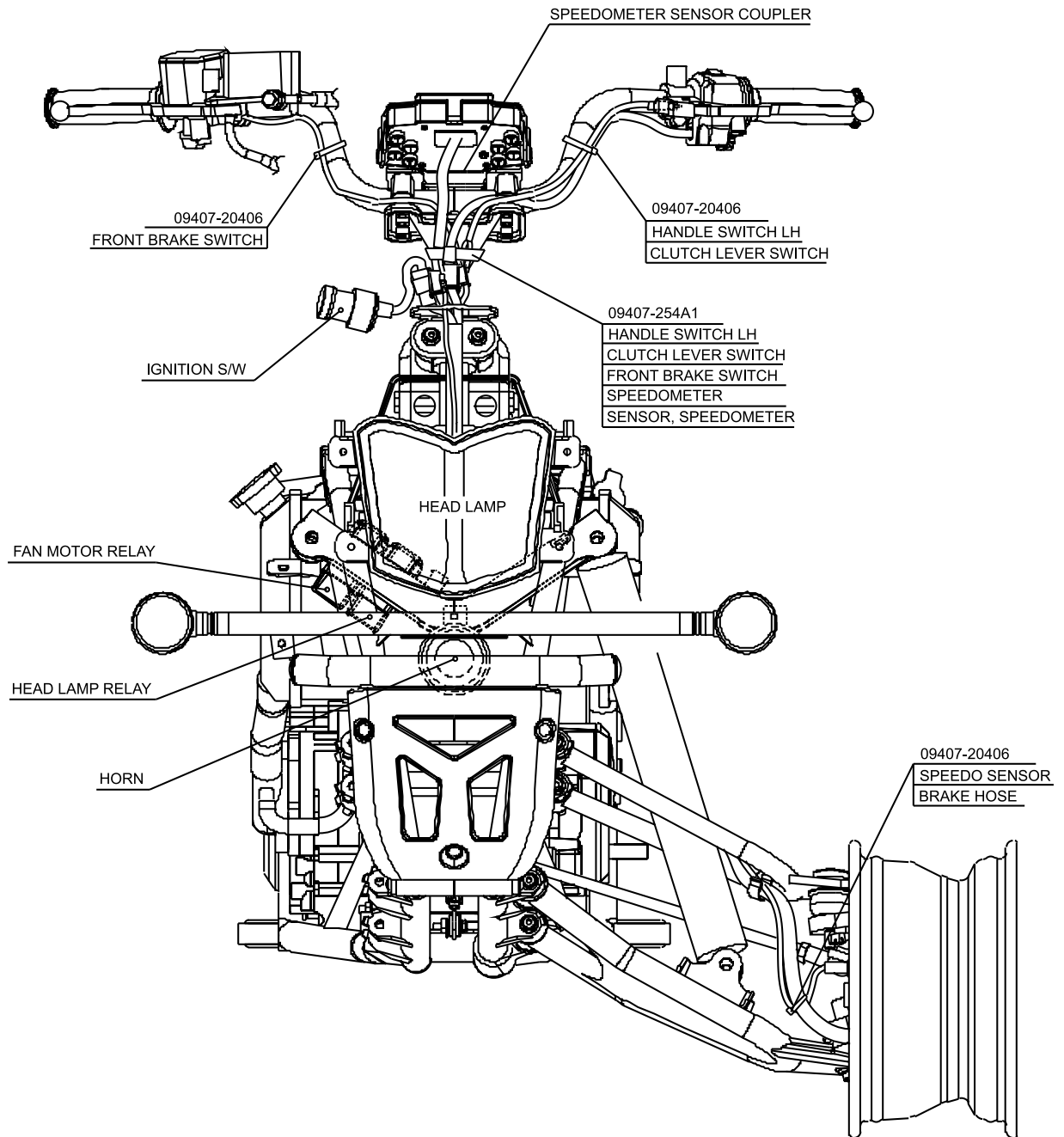
## ⊙ FUEL + OIL

ITEM	STANDARD		NOTE
Fuel type	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		
Fuel tank capacity	8 ℓ		
Engine oil type	API Over SL (SAE 10W/40)		
Necessary amount of engine oil	Change	2,500 mℓ	
	Filter change	2,600 mℓ	
	Overhaul	2,700 mℓ	
Engine oil capacity [Total : 2,700 mℓ]	Oil tank side	1,900 mℓ	
	Filter side	100 mℓ	
	Engine side	550 mℓ	
	Oil hose side	150 mℓ	

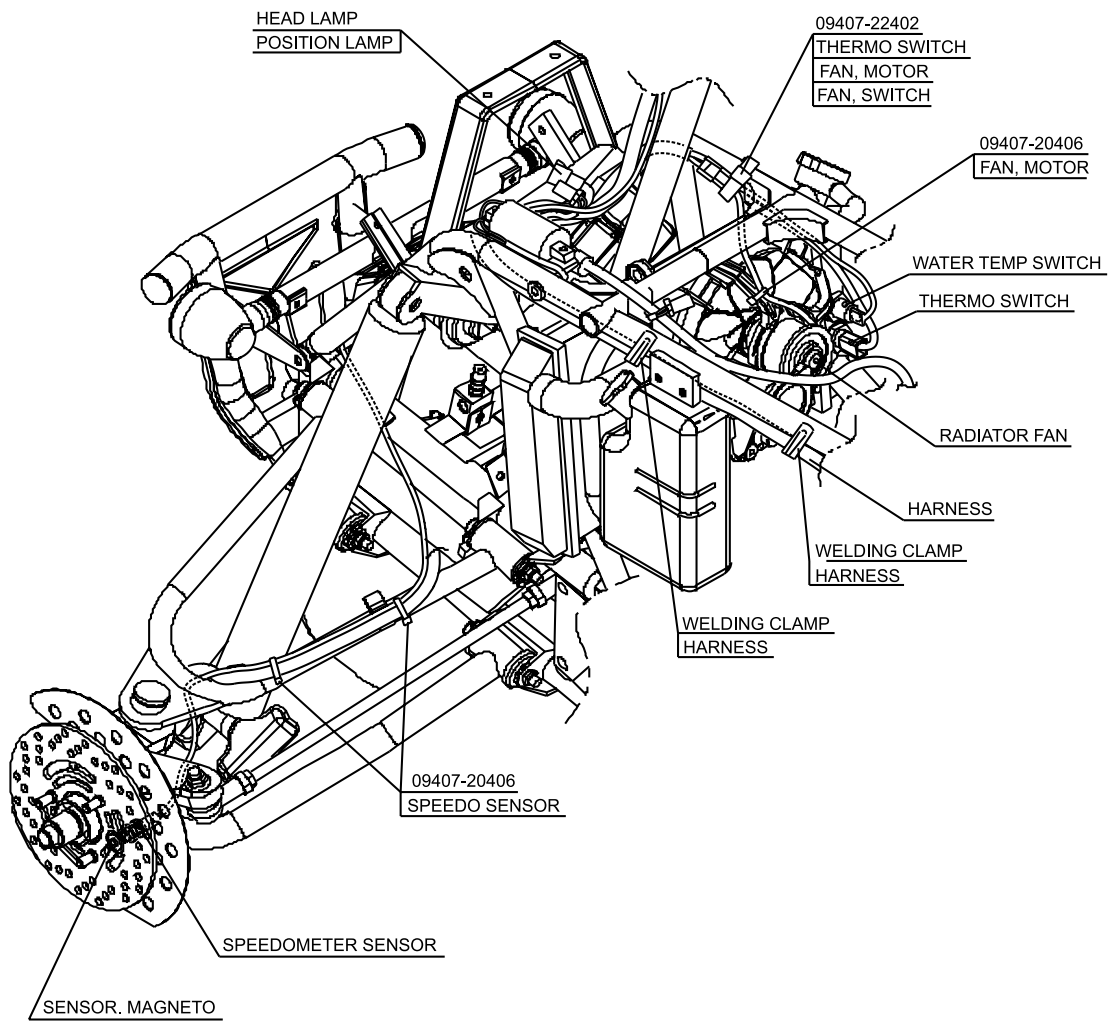
# WIRE AND CABLE ROUTING



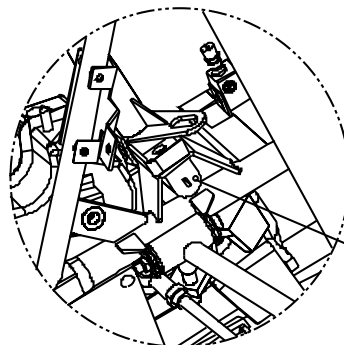




8-29 SERVICING INFORMATION



VIEW A

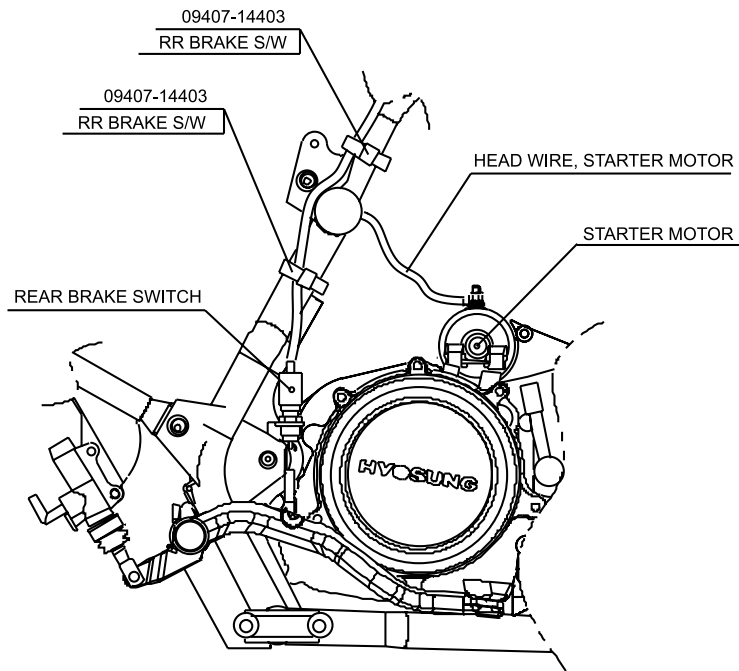


HANDLE LOCK KEY

VIEW B

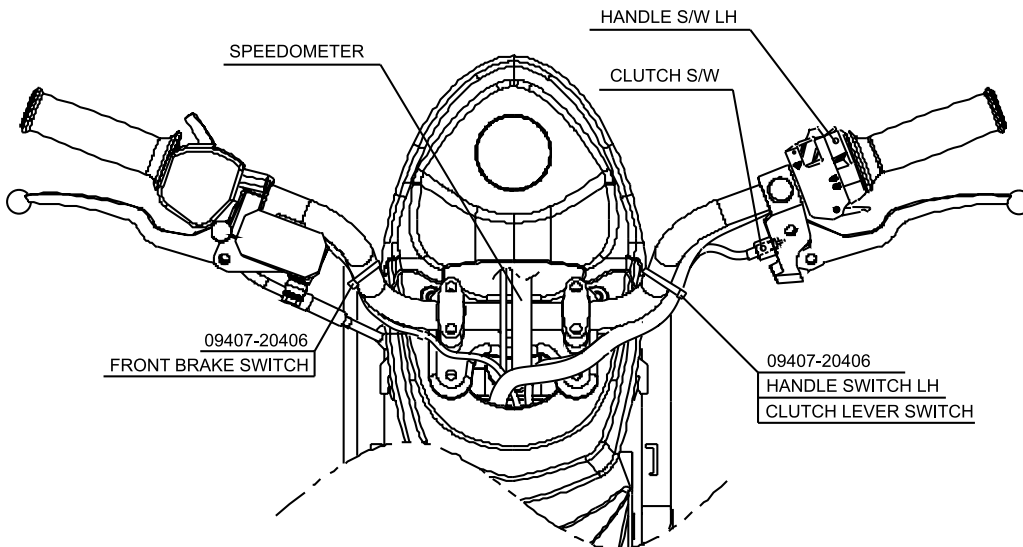
(HANDLE LOCK POSITION ILLUSTRATION)



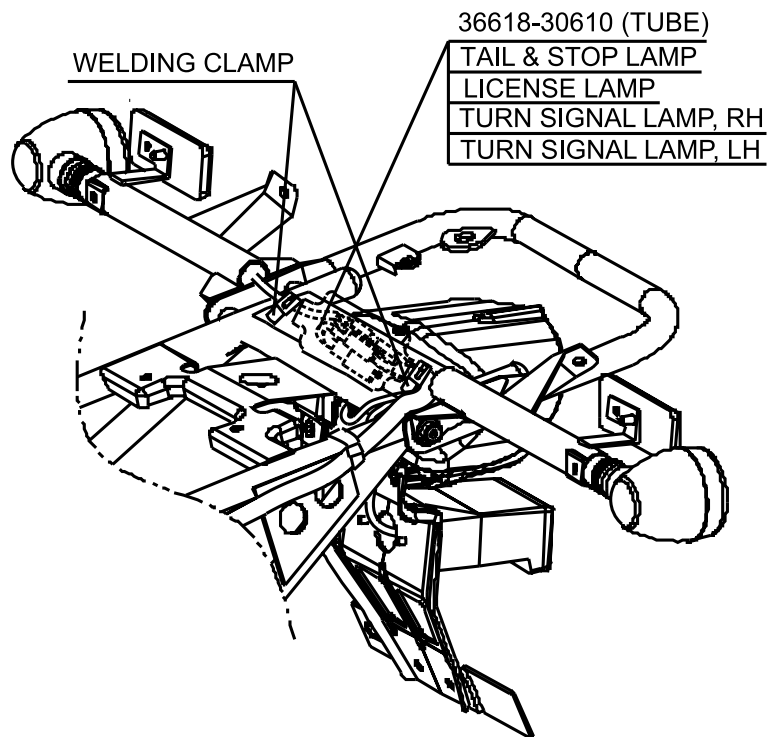


VIEW C

(REAR BRAKE POSITION ILLUSTRATION)

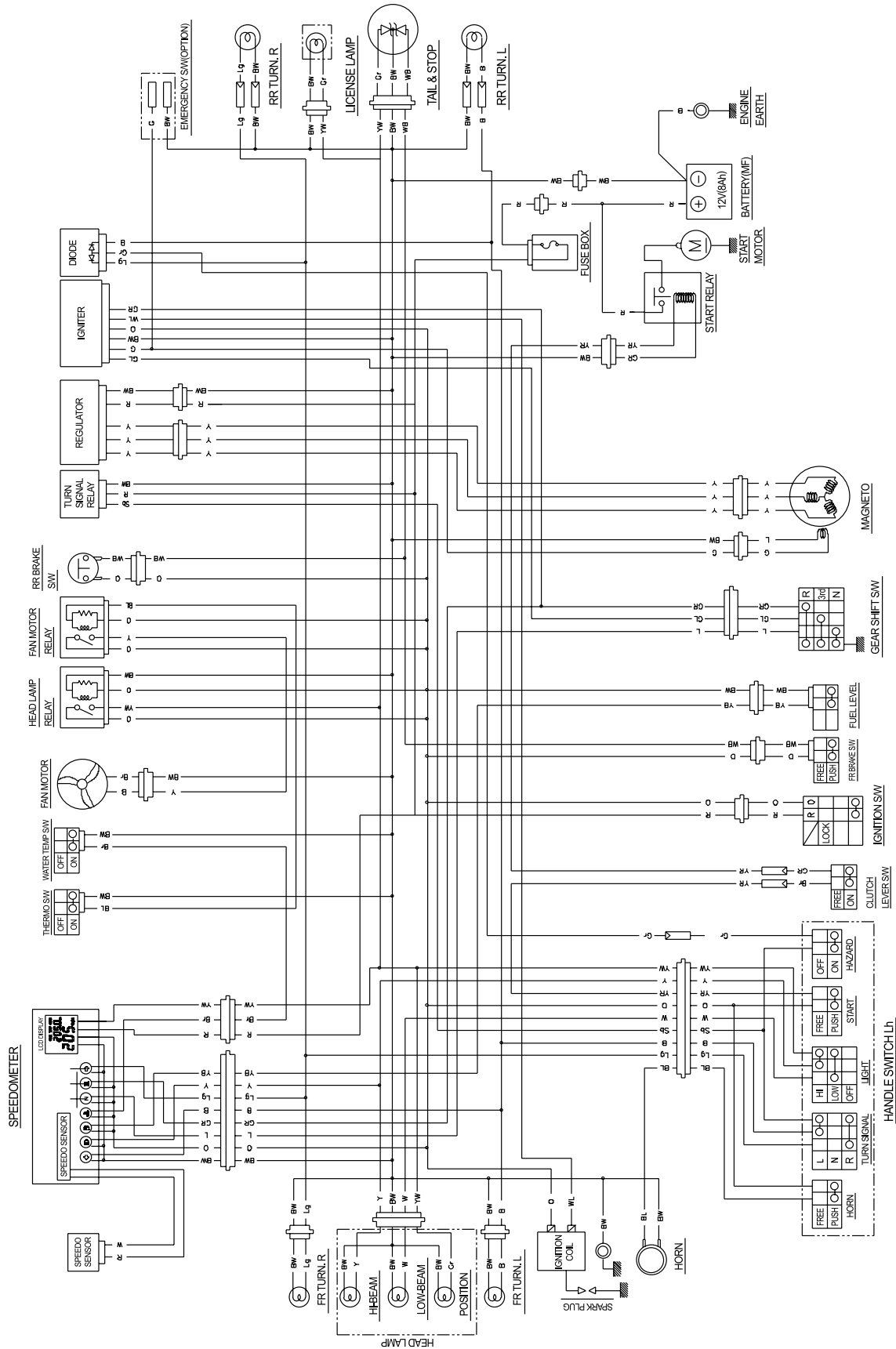


VIEW D



VIEW E

# WIRING DIAGRAM



# TAPPET SHIM SELECTION CHART (IN.)

MEASURING TAPPET CLEARANCE (mm)	SHIM No.	Specified clearance - Adjustment unnecessary																								
		230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350
0.00 ~ 0.04		2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.05 ~ 0.09		2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.10 ~ 0.20		2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50		
0.21 ~ 0.25		2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50			
0.26 ~ 0.30		2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50				
0.31 ~ 0.35		2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50					
0.36 ~ 0.40		2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50						
0.41 ~ 0.45		2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50							
0.46 ~ 0.50		2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50								
0.51 ~ 0.55		2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50									
0.56 ~ 0.60		2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50										
0.61 ~ 0.65		2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50											
0.66 ~ 0.70		2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50												
0.71 ~ 0.75		2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50													
0.76 ~ 0.80		3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50														
0.81 ~ 0.85		3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50															
0.86 ~ 0.90		3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																
0.91 ~ 0.95		3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																	
0.96 ~ 1.00		3.20	3.25	3.30	3.35	3.40	3.45	3.50																		
1.01 ~ 1.05		3.25	3.30	3.35	3.40	3.45	3.50																			
1.06 ~ 1.10		3.30	3.35	3.40	3.45	3.50																				
1.11 ~ 1.15		3.35	3.40	3.45	3.50																					

## HOW TO USE THE CHART

1. Measure the tappet clearance. (When cold)
2. Measure the shim thickness at present.
3. Look for meeting space in that horizontal line for thickness and vertical line for clearance.

### (EXAMPLE)

When the tappet clearance is 0.38mm and the shim thickness at present is 2.70mm, the shim thickness should be used 2.95mm.



## TAPPET SHIM SELECTION CHART (EX.)

SHIM No.	Specified clearance																								
	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350
MEASURING TAPPET CLEARANCE (mm)	SHIM THICKNESS AT PRESENT (mm)																								
	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.10 ~ 0.14	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.15 ~ 0.19	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.20 ~ 0.30	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.31 ~ 0.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50		
0.36 ~ 0.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50			
0.41 ~ 0.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50				
0.46 ~ 0.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50					
0.51 ~ 0.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50						
0.56 ~ 0.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50							
0.61 ~ 0.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50								
0.66 ~ 0.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50									
0.71 ~ 0.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50										
0.76 ~ 0.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50											
0.81 ~ 0.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50												
0.86 ~ 0.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50													
0.91 ~ 0.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50														
0.96 ~ 1.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50															
1.01 ~ 1.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																
1.06 ~ 1.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																	
1.11 ~ 1.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																		
1.16 ~ 1.20	3.25	3.30	3.35	3.40	3.45	3.50																			
1.21 ~ 1.25	3.30	3.35	3.40	3.45	3.50																				

### HOW TO USE THE CHART

1. Measure the tappet clearance. (When cold)
2. Measure the shim thickness at present.
3. Look for meeting space in that horizontal line for thickness and vertical line for clearance.

#### (EXAMPLE)

When the tappet clearance is 0.48mm and the shim thickness at present is 2.70mm, the shim thickness should be used 2.95mm.



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