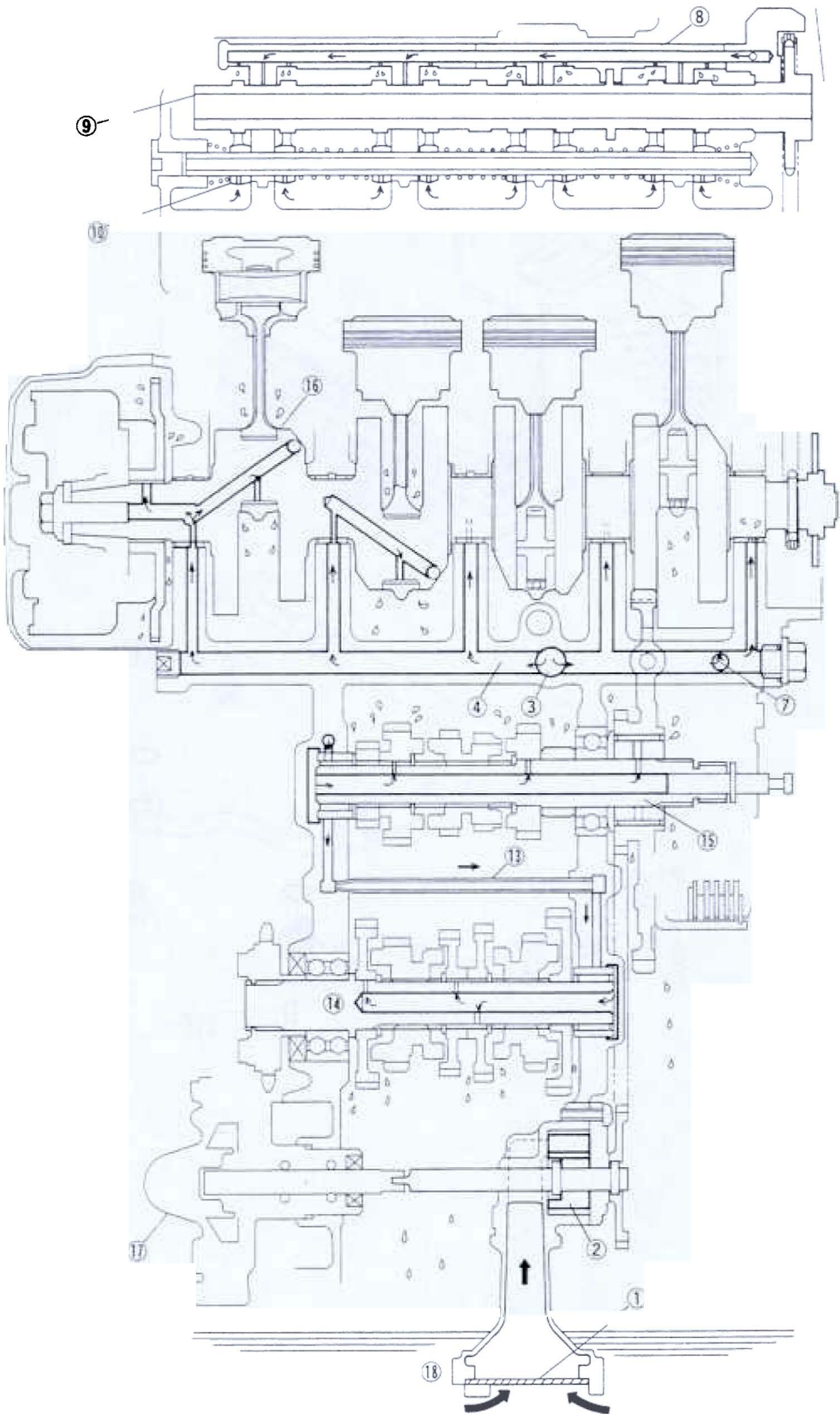


6-4 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart





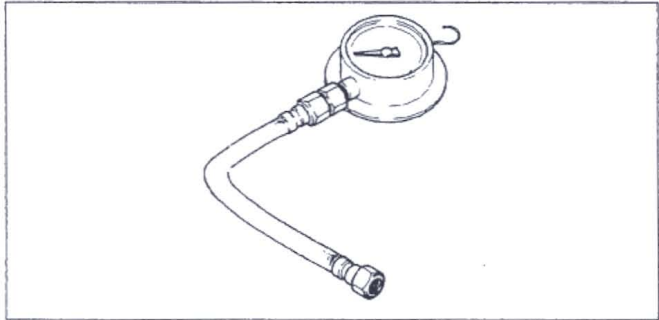
6-6 ENGINE LUBRICATION SYSTEM

Specifications

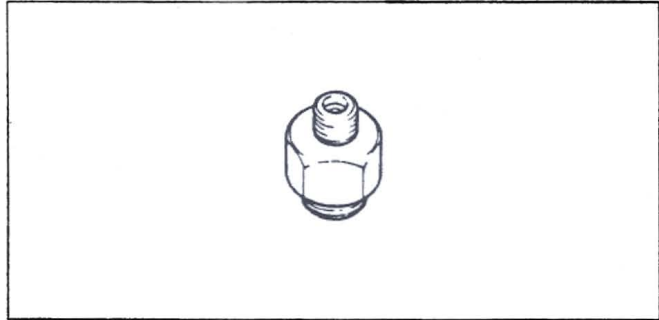
Item	Standard
<b>Engine Oil:</b> Grade Viscosity Capacity	SE or SF class SAE 10W-40 2.8 L (when filter is not removed) 3.0 L (when filter is removed)
<b>Oil Pressure Measurement:</b> Oil Pressure @4,000 r/min (rpm), oil temp. 90°C (194°F)	216 ~ 275 kPa (2.2 ~ 2.8 kg/cm², 31 ~ 40 psi)

Special Tools

Oil Pressure Gauge, 10 kg/cm²: 57001-164

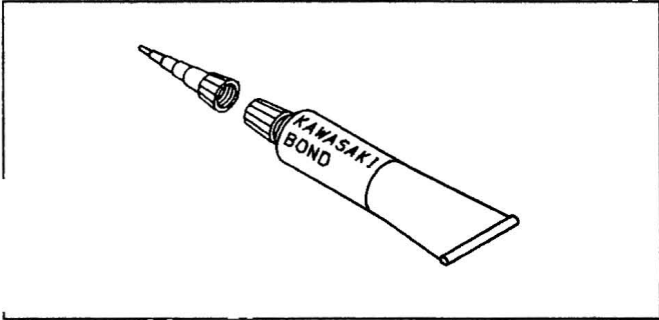


Oil Pressure Gauge Adapter, M18 x 1.5: 57001-1278



Sealant

Kawasaki Bond (Silicone Sealant): 56019-120



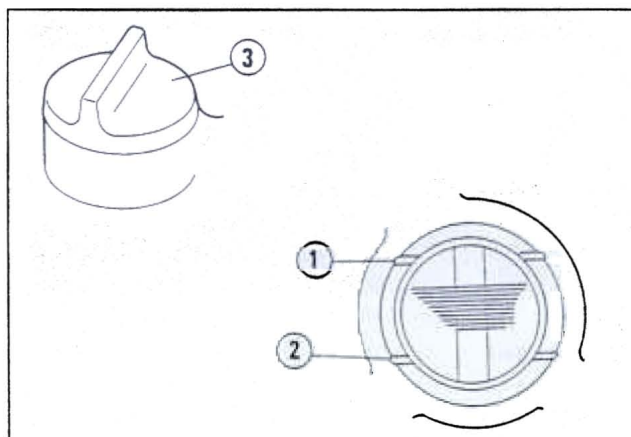
## Engine Oil and Oil Filter

### ⚠ WARNING

Motorcycle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.

### Oil Level Inspection

- Support the motorcycle perpendicular to the ground.
- Check that the engine oil level is between the upper and lower levels in the gauge.



1. Upper Level  
2. Lower Level  
3. Oil Filler Opening Plug

### NOTE

- Situate the motorcycle so that it is perpendicular to the ground.
- If the motorcycle has just been used, wait several minutes for all the oil to drain down.
- If the oil has just been changed, start the engine and run it for several minutes at idle speed. This fills the oil filter with oil. Stop the engine, then wait several minutes until the oil settles.

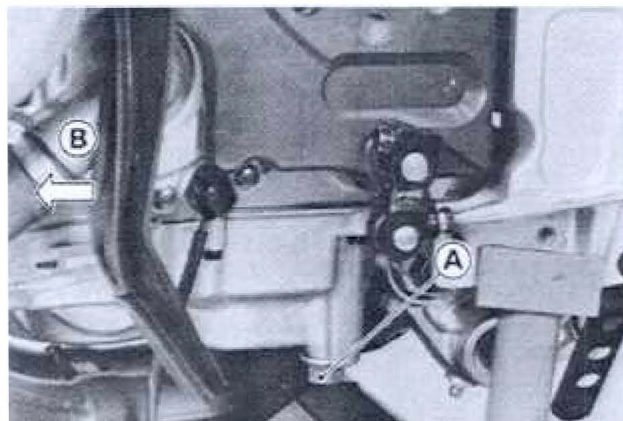
### CAUTION

Racing the engine before the oil reaches every part can cause engine seizure.

If the engine oil gets extremely low or if the oil pump or oil passages clog up or otherwise do not function properly, the oil pressure warning light will light. If this light stays on when the engine is running above idle speed, stop the engine immediately and find the cause.

### Engine Oil Change

- Support the motorcycle perpendicular to the ground after warming up the engine.
- Remove the engine drain plug to drain the oil.



A. Drain Plug

B. Front

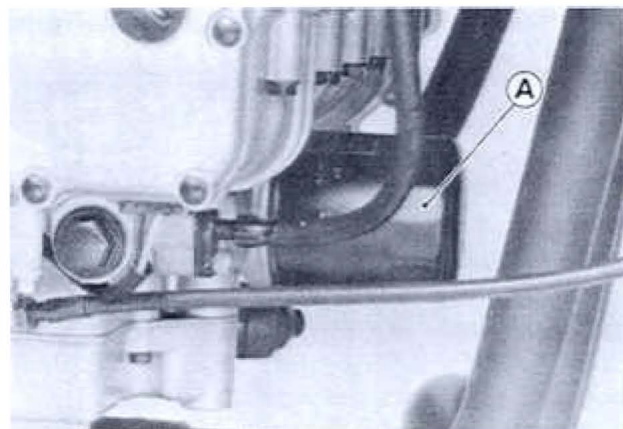
- The oil in the filter can be drained by removing the filter (see Oil Filter Change).
- ★ Replace the drain plug gasket with a new one if it is damaged.
- Tighten the drain plug to the specified torque (see Exploded View).
- Pour in the specified type and amount of oil.

### Engine Oil

- Grade: SE or SF class  
Viscosity: SAE 10W-40  
Amount: 3.0 L (filter is removed)  
2.8 L (filter is not removed)

### Oil Filter Change

- Remove the lower fairing.
- Drain the engine oil (see this chapter).
- Remove the oil filter with the oil filter wrench.



A. Oil Filter

- Replace the filter with a new one.
- When installing the oil filter, be careful of the following.
  - Apply oil to the gasket before installation.

## 6-8 ENGINE LUBRICATION SYSTEM

- Tighten the filter with the oil filter wrench to the specified torque (see Exploded View) or tighten it with hands about  $\frac{3}{4}$  turns after gasket contacts the mounting surface of engine.
- Pour in the specified type and amount of oil.

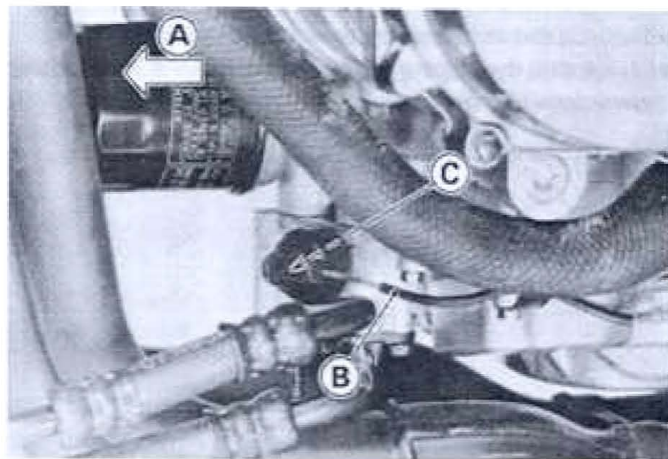
---

### Oil Pan

---

#### *Removal*

- Set the motorcycle on its side stand.
- Remove the following.
  - Lower Fairings (see Frame chapter)
  - Muffler (see Engine Top End)
  - Engine Oil (Drain, see this chapter)
  - Oil Pressure Switch Lead
  - Oil Pressure Switch (as necessary)
  - Oil Pipes



A. Front  
B. Switch Lead  
C. Oil Pressure Switch

- Remove the oil pan bolts and take off the oil pan.

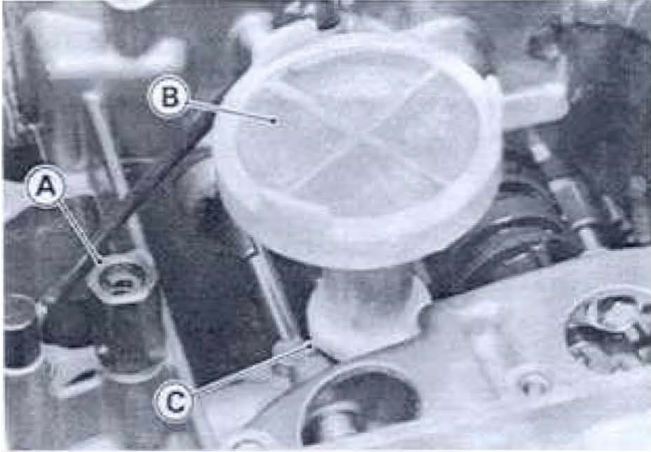
#### *Installation*

- Installation is the reverse of removal. Note the following.
- Apply silicone sealant to the threads of the oil pressure switch and tighten it to the specified torque (see Exploded View).
- Replace the gasket with a new one.
- Replace the O-rings with new ones if they are damaged.
- Tighten the oil pan bolts to the specified torque (see Exploded View).

## Relief Valve, Oil Pump Filter

### Removal

- Remove the oil pan.
- Unscrew the oil pressure relief valve from the engine.
- Pull out the oil pump filter and the oil pipe.



A. Relief Valve  
B. Oil Pump Filter  
C. Unround Portion

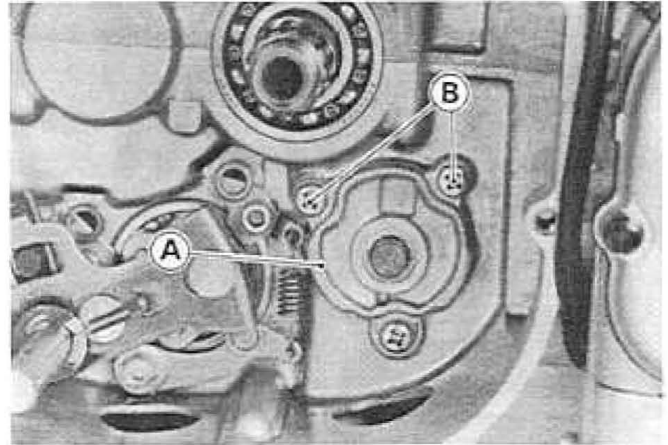
### Installation

- Installation is the reverse of removal. Note the following.
- Apply a non-permanent locking agent to the thread of the relief valve and tighten it to the specified torque (see Exploded View).
- Replace the oil pipe O-ring if it is damaged.
- When installing the oil pump filter, note the position of its unround portion.

## Oil Pump

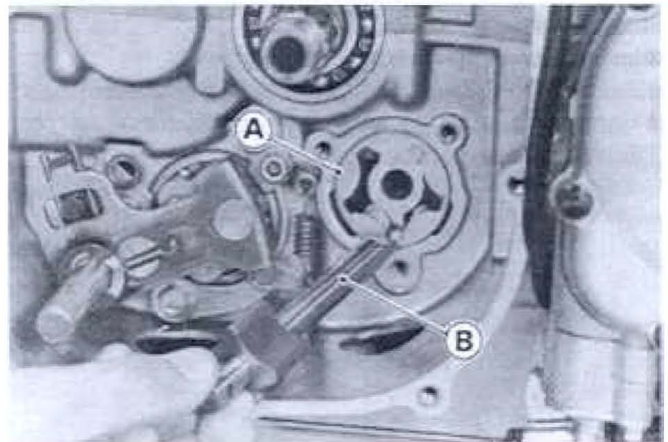
### Removal

- Remove the following.
  - Clutch (see Clutch chapter)
  - Circlip
  - Oil Pump Gear
  - Oil Pump Cover



A. Pump Cover  
B. Pump Cover Screw

- Remove the oil pump shaft and pump rotor.



A. Pump Rotor  
B. Pump Shaft

### Installation

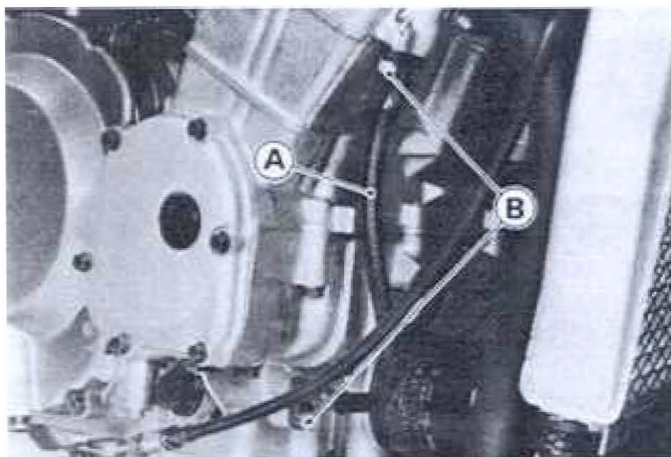
- Installation is the reverse of removal. Note the following.
- When installing the oil pump, note the position of the water pump shaft slot and turn the oil pump shaft so that the projection fits into the slot.
- Tighten the oil pump cover screw to the specified torque (see the Exploded view).
- Replace the pump gear circlip with a new one.

## 6-10 ENGINE LUBRICATION SYSTEM

### Oil Hose

#### Removal

- Drain the engine oil.
- Remove the lower fairing (see Frame chapter).
- Remove the Allen bolts from the cylinder head and the crankcase.
- Take out the oil hose.



A. Oil Hose

B. Allen Bolt

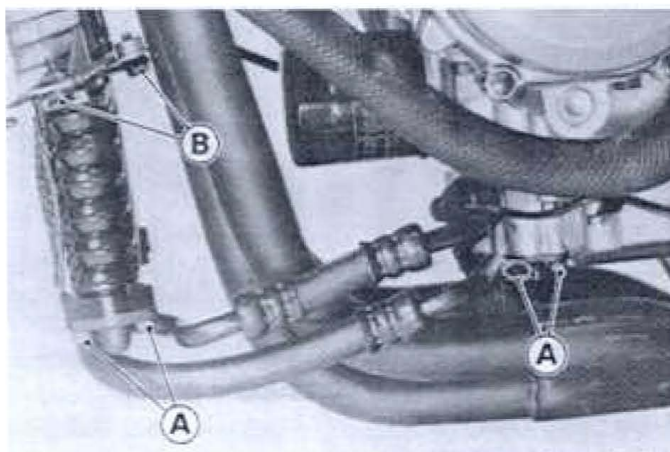
#### Installation

- Installation is the reverse of removal.
- Replace the O-rings with new ones if they are damaged.
- Tighten the Allen bolts to the specified torque (see Exploded View).

### Oil Cooler

#### Removal

- Remove the following.
  - Engine Oil (Drain, see this chapter)
  - Lower Fairings (see Frame chapter)
  - Muffler (see Engine Top chapter)
  - Oil Cooler Pipe Fitting Bolts
  - Oil Cooler Mounting Bolts



A. Fitting Bolts

B. Mounting Bolts

- Remove the oil cooler.

#### Installation

- Installation is the reverse of removal. Note the following.
- Replace the O-rings with new ones.
- Tighten the oil cooler pipe fitting bolts to the specified torque (see Exploded View).

---

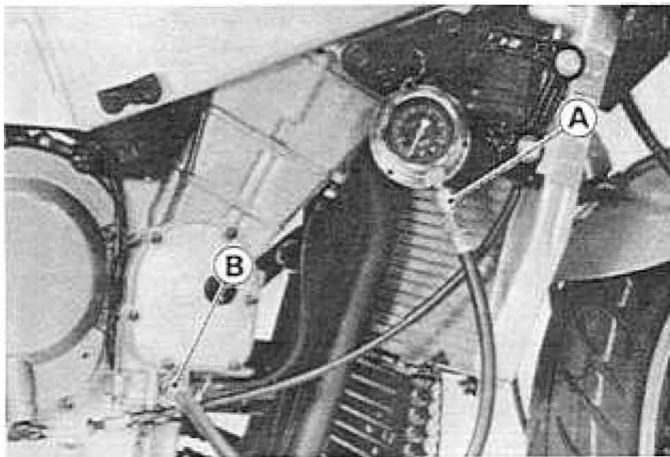
## Oil Pressure Measurement

---

### *Oil Pressure Measurement*

#### NOTE

- *Measure the oil pressure after the engine is warmed up.*
- Remove the following.
  - Right Lower Fairing (see Frame chapter)
  - Oil Passage Plug
- Attach the oil pressure gauge and adapter (special tools) to the plug hole.



A. Oil Pressure Gauge: 57001-164  
B. Adapter: 57001-1278

### Oil Pressure

Standard     216 ~ 275 kPa  
                  (2.2 ~ 2.8 kg/cm<sup>2</sup>, 31 ~ 40 psi)  
                  @4000 r/min (rpm), 90°C (194°F)  
                  of oil temp.

- ★ If the oil pressure is much lower than the standard, check the oil pump, relief valve, and/or crankshaft bearing insert wear immediately.

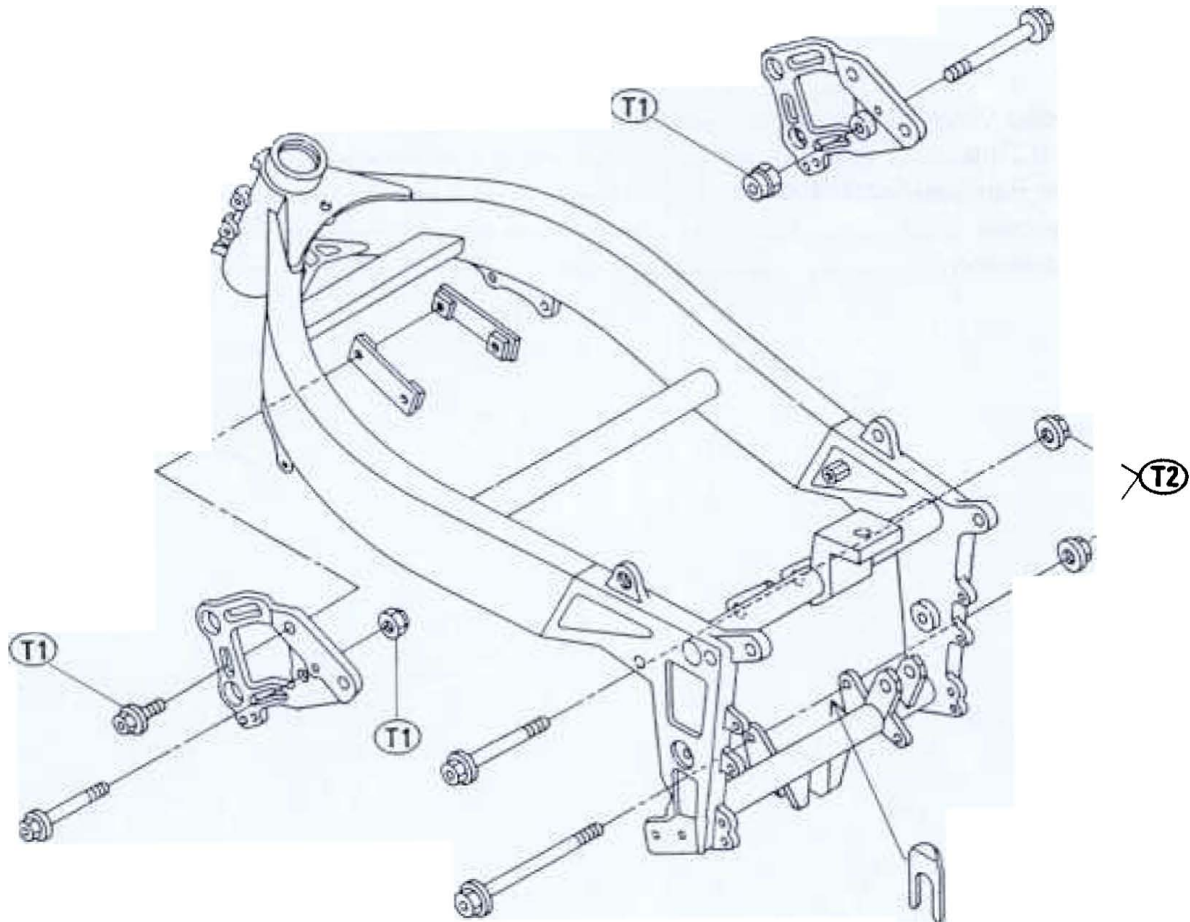
# Engine Removal / Installation

## Table of Contents

Exploded View .....	7-2
Special Tool.....	7-3
Engine Removal/Installation.....	7-3
Removal .....	7-3
Installation .....	7-4

## 7-2 ENGINE REMOVAL / INSTALLATION

### Exploded View



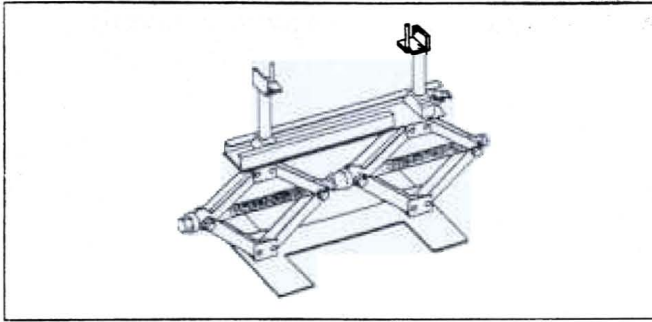
**T1: 30 N-m (3.1 kg-m, 22 ft-lb)**

**T2: 36 N-m (3.7 kg-m, 27 ft-lb)**

**Install a shim (thickness 0.5 mm) between the lower part of the crankcase and the frame bracket.**

## Special Tool

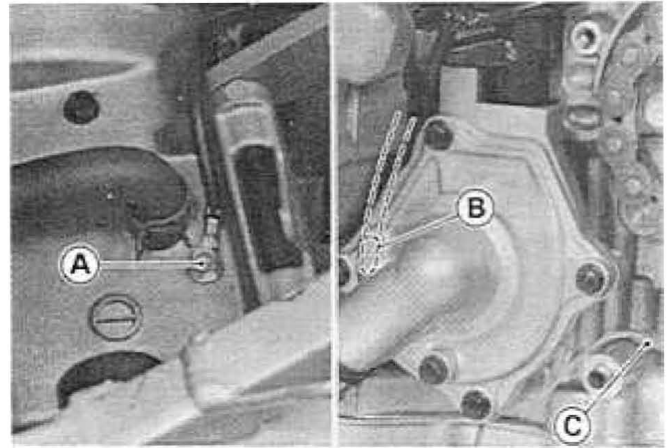
Jack: 57001-1238



## Engine Removal/Installation

### Removal

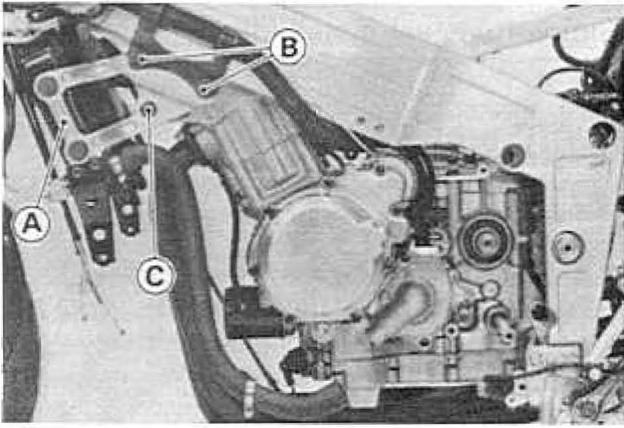
- Remove the following.
  - Fairings (see Frame chapter)
  - Engine Oil (Drain, see Engine Lubrication System chapter)
  - Coolant (Drain, see Cooling System chapter)
  - Fuel Tank (see Fuel System chapter)
  - Air Cleaner Housing (see Fuel System chapter)
  - Carburetors (see Fuel System chapter)
  - Baffle Plate
  - Oil Cooler and Oil Pipes (see Engine Lubrication System chapter)
  - Radiator (see Cooling System chapter)
  - Muffler (see Engine Top End chapter)
  - Engine Sprocket (see Final Drive chapter)
- Disconnect wiring from the engine and free them from the clamps.
  - Clutch Cable
  - Spark Plug Caps
  - Pickup Coil Lead Connector
  - Battery Ground Lead Terminal
  - Starter Motor Lead Terminal
  - Water Temperature Sensor Lead Connector
  - Oil Pressure Switch Connector
  - Side Stand Switch Connector
  - Alternator Leads Connector
  - Neutral Switch Connector



- A. Battery Ground Lead Terminal
- B. Side Stand Switch Connector
- C. Neutral Switch Connector

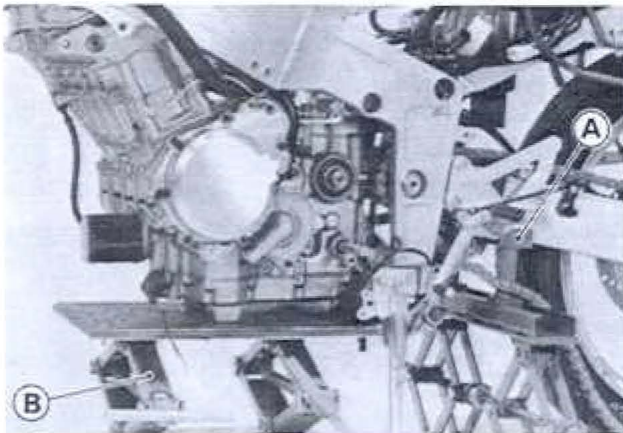
- If the crankshaft is to be removed after engine removal, you may remove the following parts at this time.
  - Cylinder
  - Alternator
- In case of the transmission, you may remove the clutch.
- Remove the engine mounting nuts and the bracket nuts but do not remove the bolt as yet.

## 7-4 ENGINE REMOVAL / INSTALLATION



- A. Bracket
- B. Bracket Bolts and Nuts
- C. Engine Mounting Bolts and Nuts

- Place the jack (special tool) under the swing arm to steady the motorcycle.
- Place the suitable stand or the jack under the engine.
- Remove the engine mounting bolts. Support the engine before sliding out the engine mounting bolts.



- A. Jack: 57001-1238
- B. Suitable Stand

### *Installation*

- Installation is the reverse of removal. Note the following.
- Install a shim (thickness 0.5 mm) between the lower part of the crankcase and the frame bracket (see Exploded View).
- Supporting the engine, first insert the upper bolts, and then the lower bolts.
- Tighten the following fasteners to the specified torque (see Exploded View).
  - Engine Mounting Bolts
  - Engine Bracket Bolts
- Run the wires, cables, and hoses as shown in the Wiring, Cables, and Hose Routing section of the General Information chapter.
- Adjust the following.
  - Throttle Cables (see Fuel System chapter)
  - Choke Cable (see Fuel System chapter)
  - Clutch Cable (see Clutch chapter)

Drive Chain (see Final Drive chapter)

- Fill the engine with engine oil (see Engine Lubrication System chapter).
- Fill the engine with coolant and bleed the air from the cooling system (see Cooling System chapter).
- Adjust the carburetor synchronization and idling.

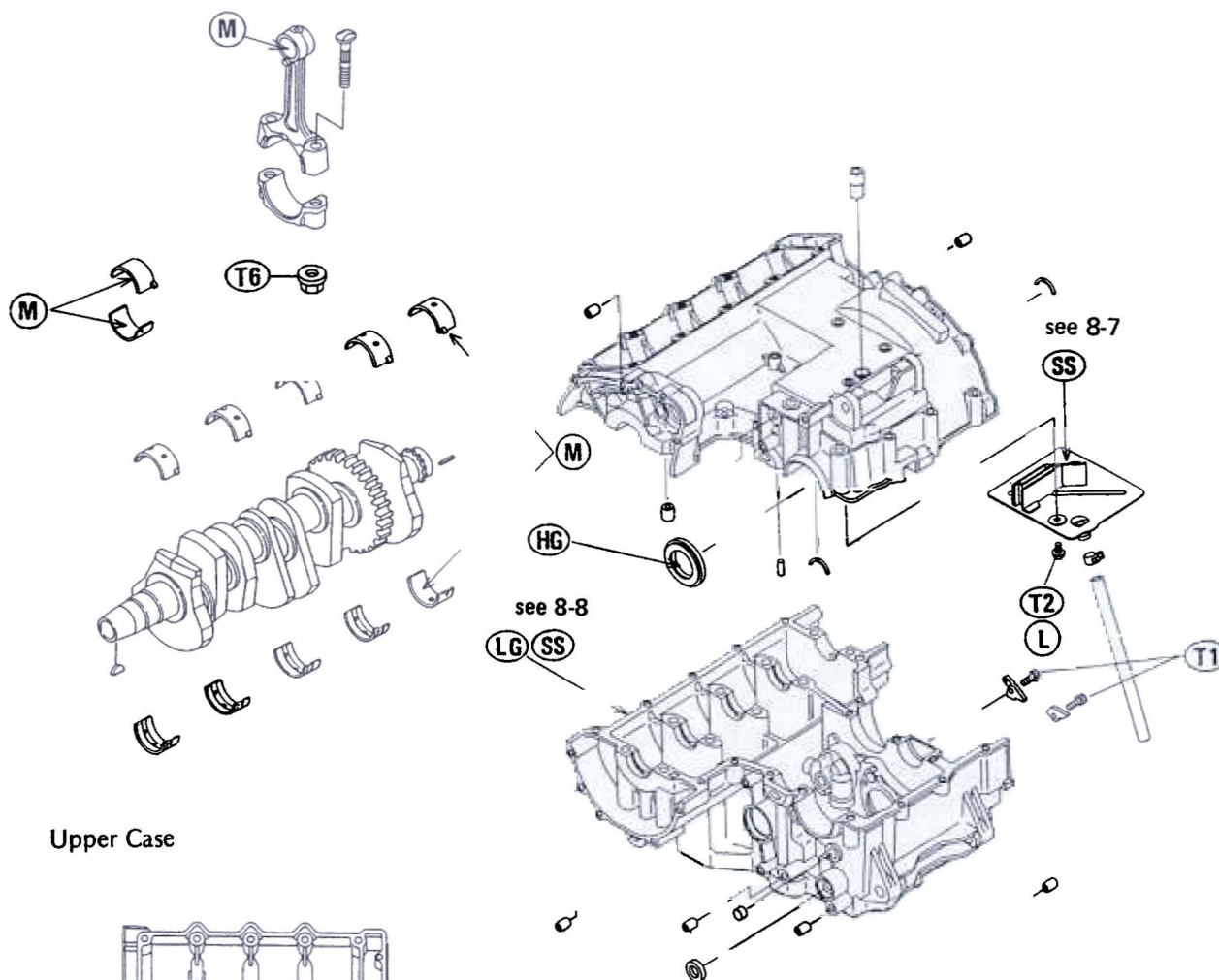
# Crankshaft / Transmission

## Table of Contents

Exploded View .....	...8-2
Specifications .....	...8-4
Special Tools .....	...8-6
Sealant .....	...8-6
Crankcase .....	...8-7
Crankcase Splitting .....	...8-7
Crankcase Assembly .....	...8-7
Crankshaft/Connecting Rods .....	...8-9
Crankshaft Removal .....	...8-9
Crankshaft Installation .....	...8-9
Connecting Rod Removal .....	...8-10
Connecting Rod Installation .....	...8-10
Connecting Rod Big End Bearing Insert/Crankpin Wear .....	...8-10
Crankshaft Main Bearing/Journal Wear .....	...8-12
Crankshaft Side Clearance .....	...8-13
Transmission .....	...8-14
Shift Pedal Removal .....	...8-14
Shift Pedal Installation .....	...8-14
External Shift Mechanism Removal .....	...8-14
External Shift Mechanism Installation .....	...8-14
Transmission Shaft Removal .....	...8-14
Transmission Shaft Installation .....	...8-15
Transmission Disassembly .....	...8-15
Transmission Assembly .....	...8-15
Shift Drum and Fork Removal .....	...8-17
Shift Drum and Fork Installation .....	...8-17
Shift Drum Disassembly .....	...8-17
Shift Drum Assembly .....	...8-17

## 8-2 CRANKSHAFT / TRANSMISSION

### Exploded View



**T1:** 8.8 N-m (0.9 kg-m, 78 in-lb)

**T2:** 9.8 N-m (1.0 kg-m, 7.0 ft-lb)

**T3:** 12 N-m (1.2 kg-m, 8.5 ft-lb)

**T4:** 15 N-m (1.5 kg-m, 11.0 ft-lb)

**T5:** 20 N-m (2.0 kg-m, 14.5 ft-lb)

**T6:** 25 N-m (2.6 kg-m, 19 ft-lb)

**T7:** 27 N-m (2.8 kg-m, 20 ft-lb)

**G :** Apply grease.

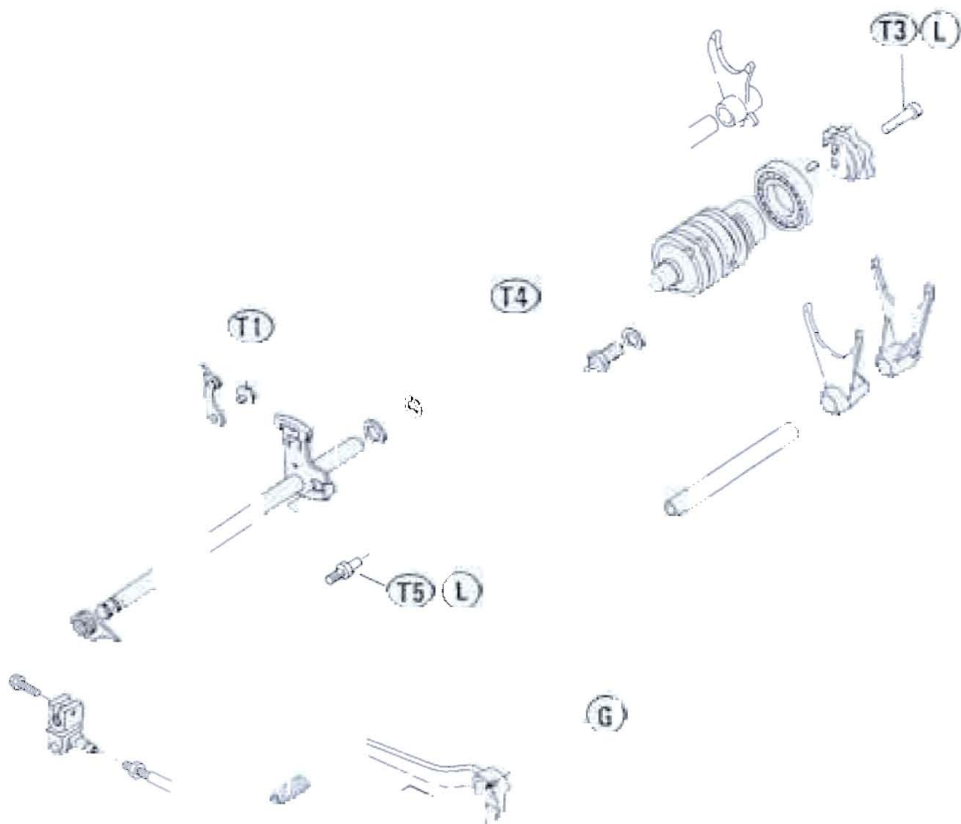
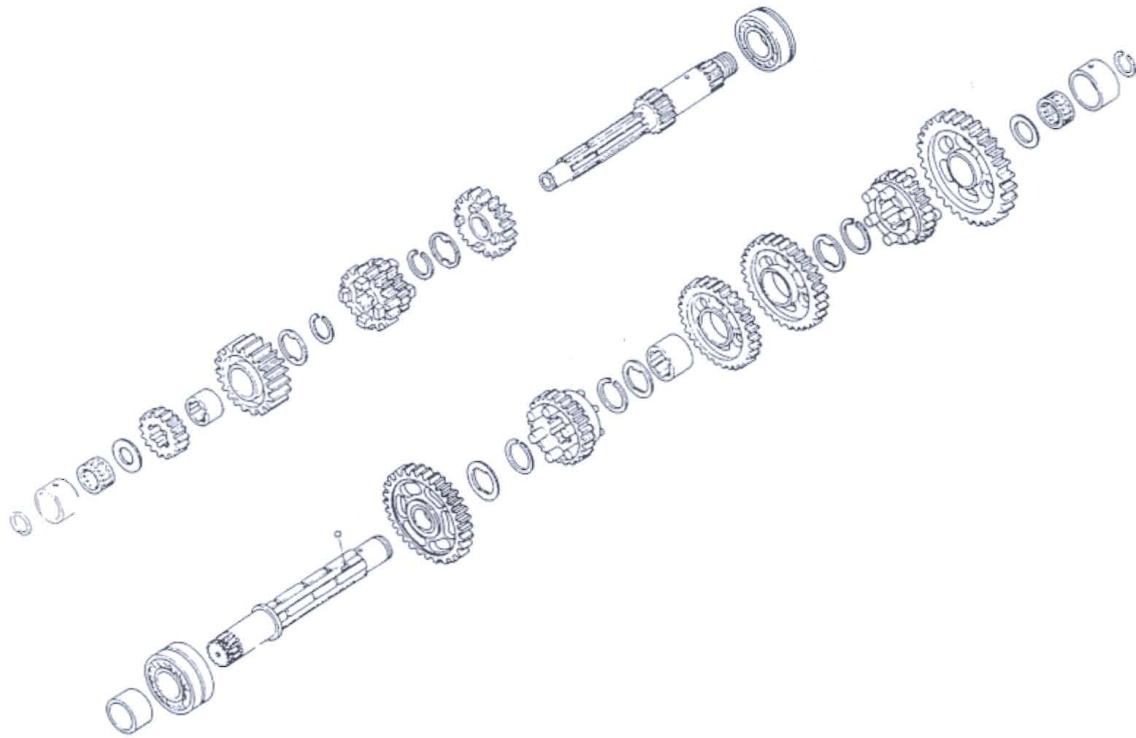
**H :** Apply high temperature grease.

**LG:** Apply liquid gasket – black (Kawasaki Bond: 92104-1003) to the mating surface of the right and left crankcase halves.

**L :** Apply a non-permanent locking agent to the threads.

**SS:** Apply silicone sealant (Kawasaki Bond: 56019-120) to the gaskets and the threads.

**M:** Apply a thin coat of a molybdenum disulfide grease.



## 8-4 CRANKSHAFT / TRANSMISSION

### Specifications

Item	Standard	Service Limit																					
<b>Crankshaft, Connecting Rods:</b>																							
Connecting rod big end side clearance	0.13 ~ 0.38 mm	0.60 mm																					
Connecting rod big end bearing insert/crankpin clearance	0.031 ~ 0.059 mm	0.10mm																					
Crankpin diameter:	29.984 ~ 30.000 mm	29.97 mm																					
Marking	None	- - -																					
	○	- - -																					
Connecting rod big end bore diameter:	33.000 ~ 33.016 mm	- - -																					
Marking	None	- - -																					
	○	- - -																					
Connecting rod big end bearing insert thickness:																							
	Blue	- - -																					
	Black	- - -																					
	Brown	- - -																					
Connecting rod big end bearing insert selection:																							
<table><tr><th rowspan="2">Con-Rod Big End Bore Diameter Marking</th><th rowspan="2">Crankpin Diameter Marking</th><th colspan="2">Bearing Insert</th></tr><tr><th>Size Color</th><th>Part Number</th></tr><tr><td>○</td><td>None</td><td>Blue</td><td>92028-1492</td></tr><tr><td>None</td><td>None</td><td rowspan="2">Black</td><td rowspan="2">92028-1493</td></tr><tr><td>○</td><td>○</td></tr><tr><td>None</td><td>○</td><td>Brown</td><td>92028-1494</td></tr></table>				Con-Rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert		Size Color	Part Number	○	None	Blue	92028-1492	None	None	Black	92028-1493	○	○	None	○	Brown	92028-1494
Con-Rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert																					
		Size Color	Part Number																				
○	None	Blue	92028-1492																				
None	None	Black	92028-1493																				
○	○																						
None	○	Brown	92028-1494																				
Crankshaft side clearance	0.05 ~ 0.20 mm	0.40 mm																					
Crankshaft runout	0.02 mm or less	0.05 mm TIR																					
Crankshaft main bearing insert, journal clearance	0.014 ~ 0.038 mm	0.08 mm																					
Crankshaft main journal diameter:	29.984 ~ 30.000 mm	29.96 mm																					
Marking	None	- - -																					
	1	- - -																					
Crankcase main bearing bore diameter:	33.000 ~ 33.016 mm	- - -																					
Marking	○	- - -																					
	None	- - -																					
Crankshaft main bearing insert thickness:																							
	Brown	- - -																					
	Black	- - -																					
	Blue	- - -																					

## CRANKSHAFT / TRANSMISSION 8-5

Item	Standard		Service Limit	
Crankshaft main bearing insert selection:				
Crankcase Main Bearing Bore Diameter Mark	Crankshaft Main Journal Diameter Mark	Bearing Insert*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92028-1418	5
			92028-1421	1, 2, 3, 4
○	None	Black	92028-1417	5
None	1		92028-1420	1, 2, 3, 4
None	None	Blue	92028-1416	5
			92028-1419	1, 2, 3, 4

\*The bearing inserts for No. 5 has no oil groove.

<b>Transmission:</b>		
Shift fork ear thickness	4.9 ~ 5.0 mm	4.8 mm
Gear shift fork groove width	5.05 ~ 5.15 mm	5.3 mm
Shift fork guide pin diameter	5.9 ~ 6.0 mm	5.8 mm
Shift drum groove width	6.05 ~ 6.20 mm	6.3 mm

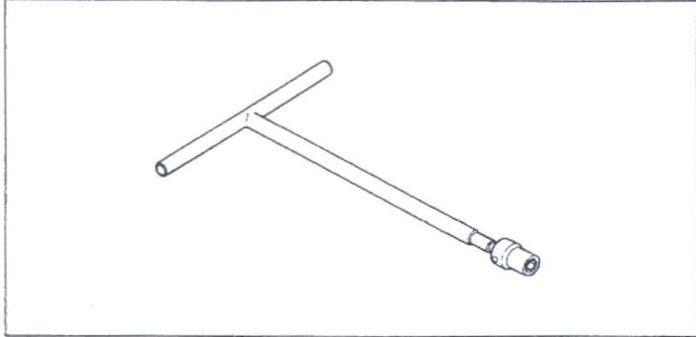
## 8-6 CRANKSHAFT / TRANSMISSION

---

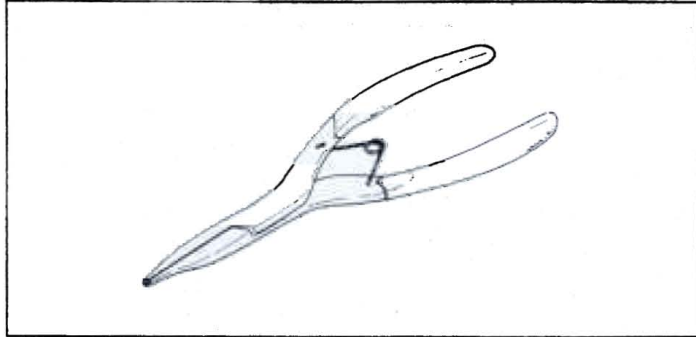
### Special Tools

---

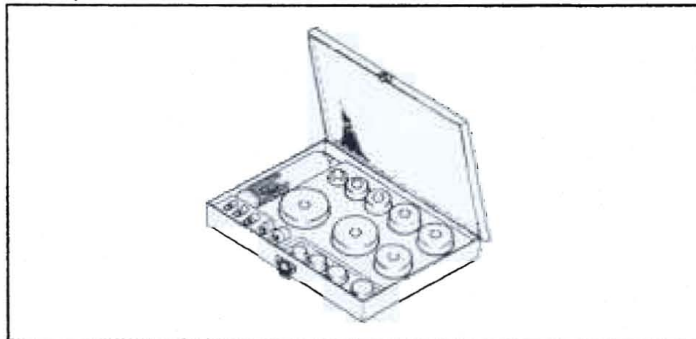
Socket Wrench, Hex 8: 57001-1268



Outside Circlip Pliers: 57001-144



Bearing Driver Set: 57001-1129

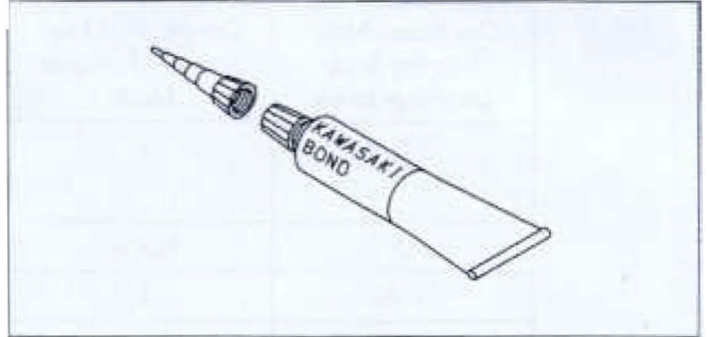


---

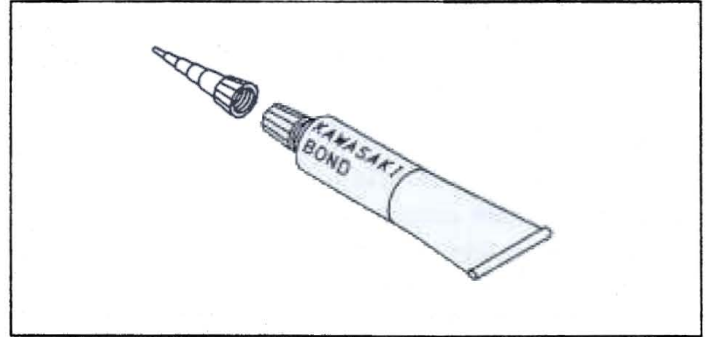
### Sealant

---

Kawasaki Bond (Silicone Sealant): 56019-120



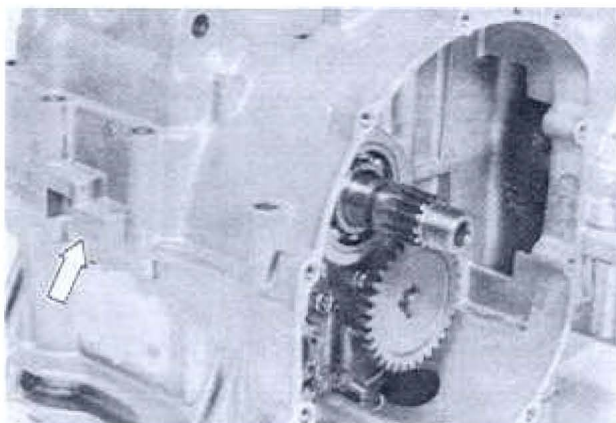
Kawasaki Bond (Liquid Gasket - Silver): 92104-002



## Crankcase

### Crankcase Splitting

- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove the following.
  - Cylinder Head (if the crankshaft is to be removed, see Engine Top End chapter)
  - Cylinder, Piston (if the crankshaft is to be removed, see Engine Top End chapter)
  - Starter Motor (see Electrical System chapter)
  - Crankcase Bolt (upper and lower)
- If necessary, remove the following.
  - Clutch (see Clutch chapter)
  - External Shift Mechanism (see this chapter)
  - Timing Rotor (see this chapter)
  - Oil Pump (see Engine Lubrication System chapter)
  - Alternator Rotor (see Electrical System chapter)
  - Water Pump (see Cooling System chapter)
  - Oil Filter Mounting Bolt
  - Oil Pan
  - Oil Pump Filter
  - Oil Pipe
- Gently tap the crankcase half with a plastic mallet, and separate the crankcase halves.



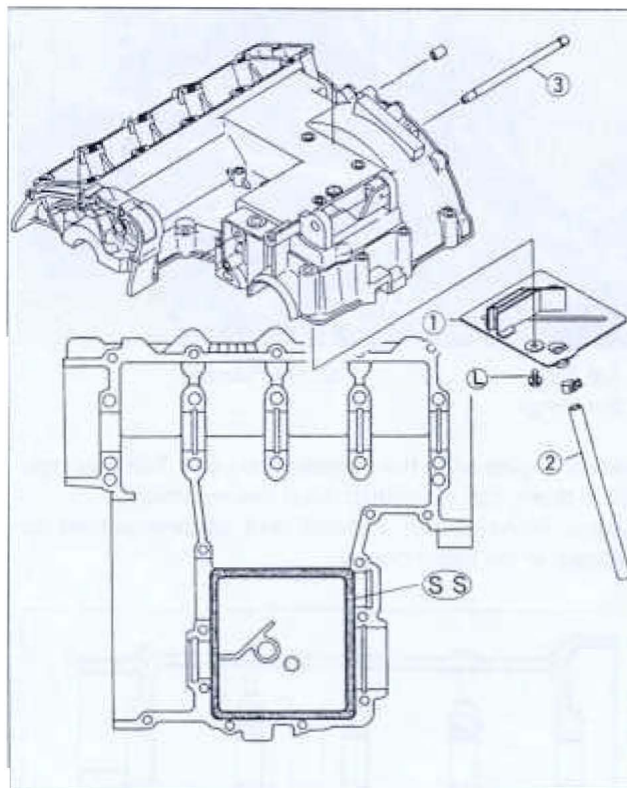
### Crankcase Assembly

#### CAUTION

The upper and lower crankcase halves are machined at the factory in the assembled state, so the crankcase halves must be replaced as a set.

- With a high-flash point solvent, clean off the mating surfaces of the crankcase halves and wipe dry.
- Using compressed air, blow out the oil passages in the crankcase halves.
- Install the oil pipe.
- Apply silicone sealant to the breather plate mating surface on the upper crankcase and then install the breather plate.

- Apply a non-permanent locking agent to the plate mounting bolt (see Exploded View).



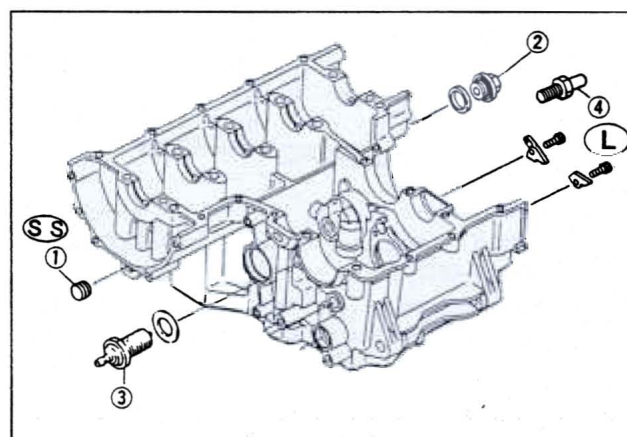
SS: Apply silicone sealant

L: Apply a non-permanent locking agent

1. Breather Plate

2. Oil Return Hose

3. Oil Pipe



SS: Apply silicone sealant

L: Apply a non-permanent locking agent

1. Left Oil Plug

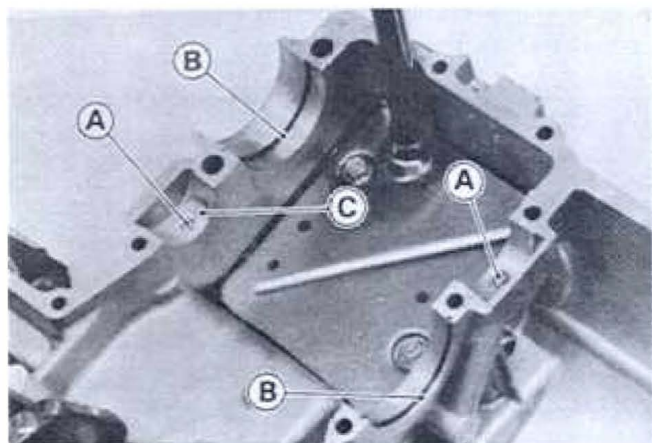
2. Right Oil Plug

3. Neutral Switch

4. Return Spring Bolt

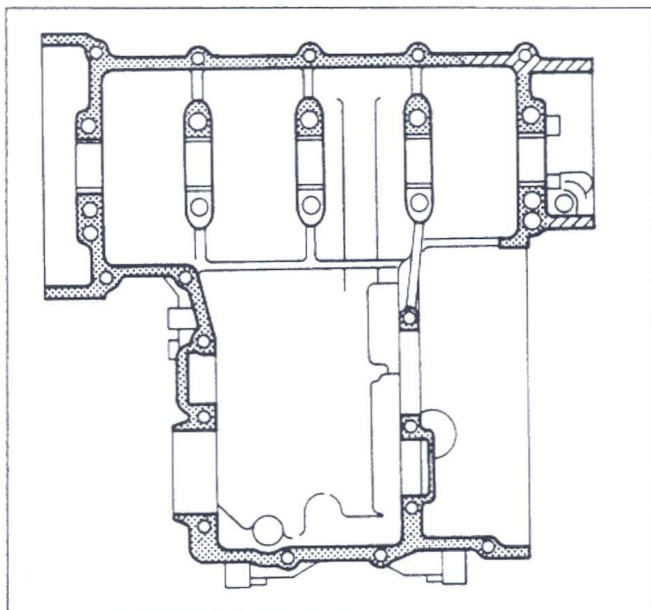
- Install the set pins and rings.



## 8-8 CRANKSHAFT / TRANSMISSION



A. Set Pin  
B. Set Rings  
C. Oil Passage

- Apply engine oil to the transmission gears, ball bearings, shift drum, and crankshaft main bearing inserts.
- Apply liquid gasket – black and silicone sealant as shown in the figure below.

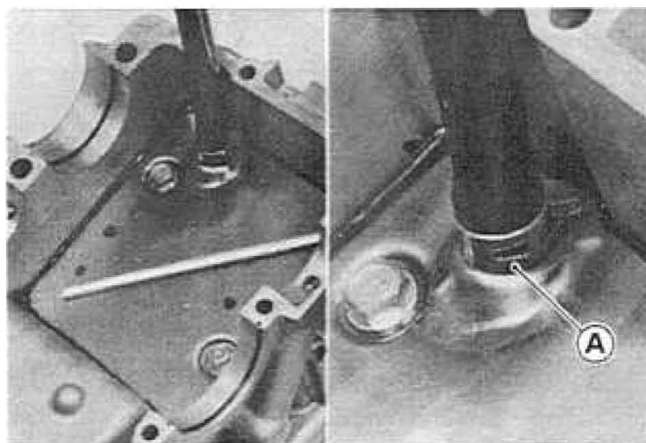


-  : Liquid Gasket – Silver (Kawasaki Bond: 92014-002)
-  : Silicone Sealant (Kawasaki Bond: 56019-120)  
Apply silicone sealant upon liquid gasket.

### CAUTION

If liquid gasket and silicone sealant adheres to any areas not indicated, the engine oil passages may be obstructed, causing engine seizure.

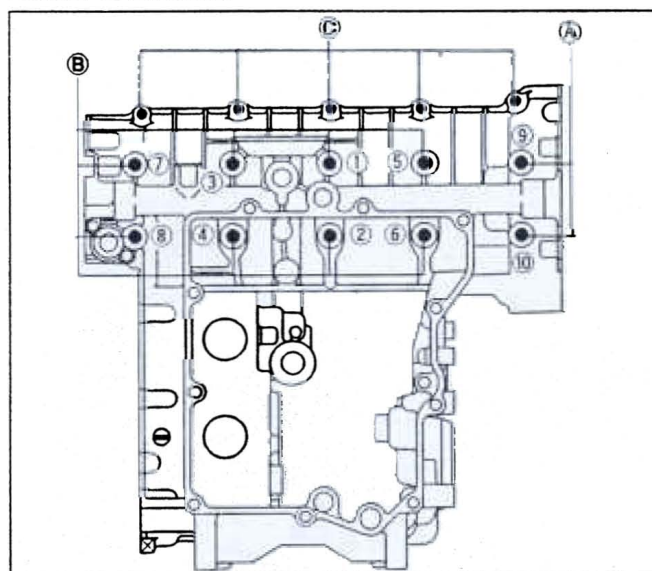
- Install the crankshaft, shift drum and transmission.
- Set the grip of clamp backward at the crankcase.



A. Oil Return Hose Clamp

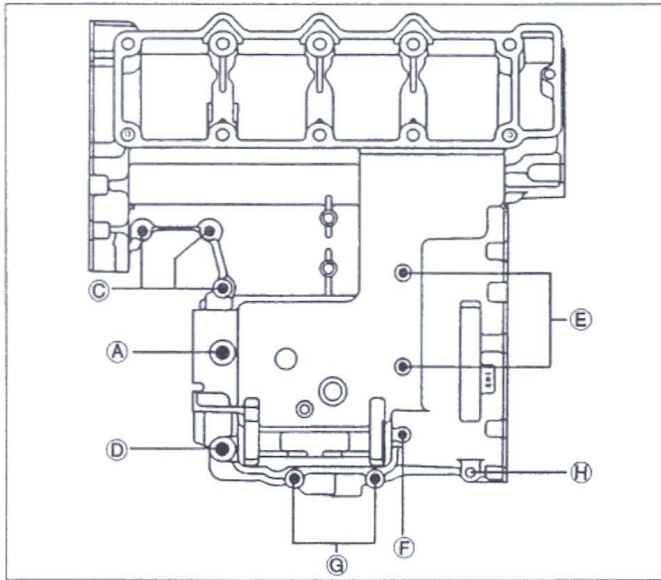
- Tighten the crankcase mounting bolts following the tightening sequence to the specified torque (see Exploded View).
- Following the tightening sequence, tighten the 8 mm bolts first to about one half of the specified torque, and finally to the specified torque.
- Tighten the 6 mm bolts to the specified torque.

### Lower Crankcase



A.  $\phi 8 \times L95$  mm  
B.  $\phi 8 \times L90$  mm  
C.  $\phi 6 \times L40$  mm

## Upper Crankcase



D.  $\Phi 8 \times L72$  mm

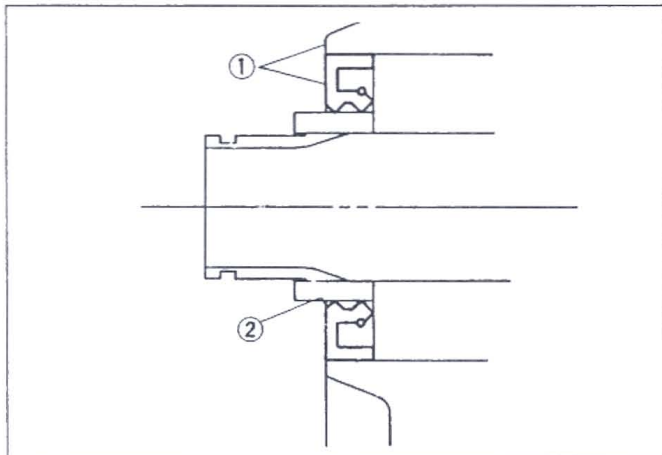
G.  $\Phi 6 \times L65$  mm

E.  $\Phi 6 \times L95$  mm

H.  $\Phi \times L50$  mm

F.  $\Phi 6 \times L85$  mm

- Apply high temperature grease to the output shaft oil seal lips and press the oil seal in the crankcase until the seal is even with the end of the hole.
- Install the collar.



1. Oil seal is even with end of hole.

2. Collar

- Check the following.
  - Shift drum is in the neutral position.
  - The #1 and 4 pistons are at TDC.
  - Drive shaft and output shaft turn freely.
  - Neutral finder operates properly (while spinning the output shaft, gears can be shifted from 1st to 2nd).

## Crankshaft/Connecting Rods

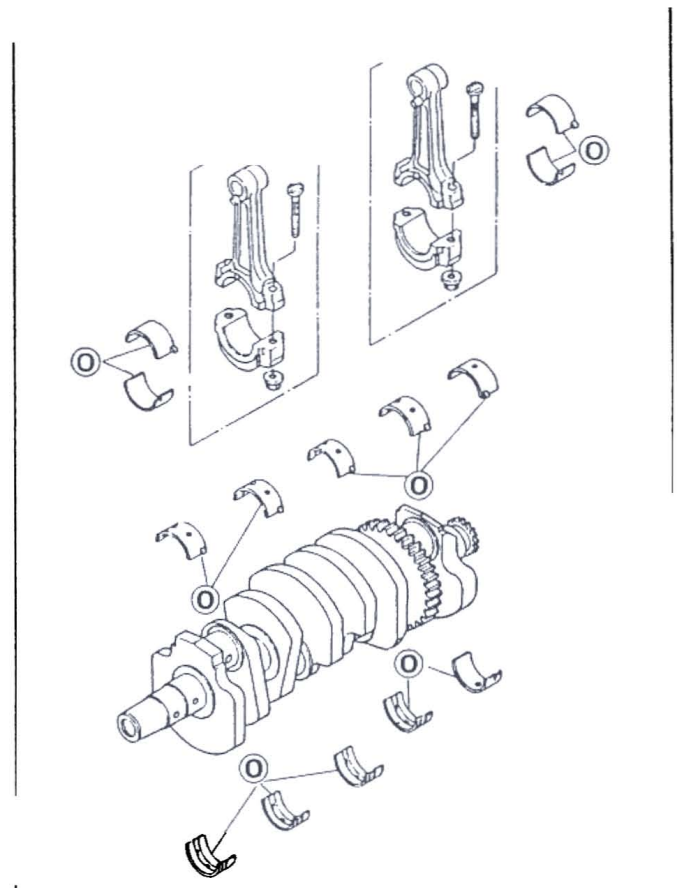
### Crankshaft Removal

- Remove the engine.
- Remove the cylinder head, cylinder and pistons.
- Split the crankcase (see Crankcase Splitting).
- Take the crankshaft out of the upper crankcase.

### Crankshaft Installation

#### CAUTION

If the crankshaft, bearing inserts, or crankcase halves are replaced with new ones, select the bearing inserts and check clearance with a plastigage before assembling engine to be sure the correct bearing inserts are installed.



O. Apply engine oil.

- Apply engine oil to the crankshaft main bearing inserts.

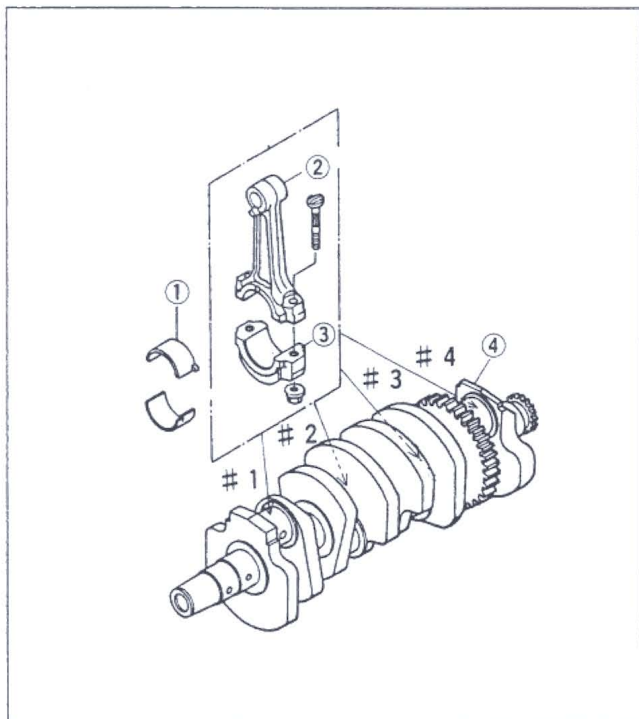
## 8-10 CRANKSHAFT / TRANSMISSION

### Connecting Rod Removal

- Remove the crankshaft.
- Remove the connecting rods from the crankshaft.

#### NOTE

- Mark and record the locations of the connecting rods and their big end caps so that they can be reassembled in their original positions.

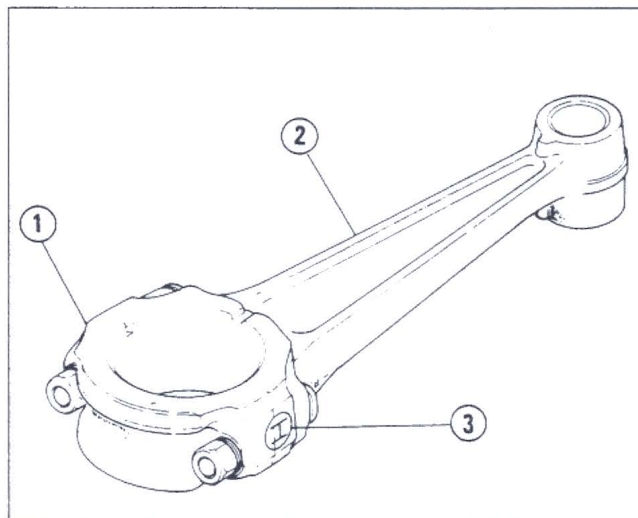


- 1. Main Bearing Inserts
- 2. Connecting Rod
- 3. Big End Cap
- 4. Crankshaft

### Connecting Rod Installation

#### CAUTION

To minimize vibration, a pair of connecting rods (left two rods or right two) should have the same weight mark.



- 1. Big End Cap
- 2. Connecting Rod
- 3. Weight Mark, Alphabet

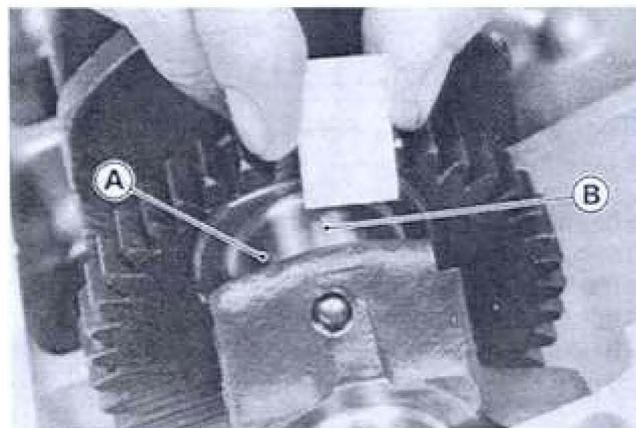
#### CAUTION

If the connecting rods, big end bearing inserts, or crankshaft are replaced with new ones, select the bearing insert and check clearance with a plastigage before assembling engine to be sure the correct bearing inserts are installed.

- Apply engine oil to the big end bearing inserts.
- Tighten the big end cap nuts to the specified torque (see Exploded View).

### Connecting Rod Big End Bearing Insert/Crankpin Wear

- Measure the bearing insert/crankpin clearance with a plastigage.



- A. Crankpin
- B. Plastigage

#### NOTE

- Tighten the big end cap nuts to the specified torque (see Exploded View).
- Do not move the connecting rod and crankshaft during clearance measurement.

### Connecting Rod Big End Bearing Insert/Crankpin Clearance

Standard: 0.031 ~ 0.059 mm  
Service Limit: 0.10 mm

- ★ If clearance is within the standard, no bearing replacement is required.
- ★ If clearance is between 0.059 mm and the service limit (0.10 mm), replace the bearing inserts with inserts painted blue. Check insert/crankpin clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
- ★ If clearance exceeds the service limit, measure the diameter of the crankpins.

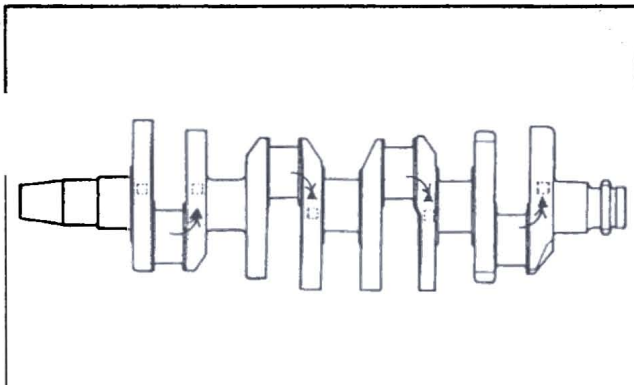
### Crankpin Diameter

Standard: 29.984 ~ 30.000 mm  
Service Limit: 29.97 mm

- ★ If any crankpin has worn past the service limit, replace the crankshaft with a new one.
- ★ If the measured crankpin diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

### Crankpin Diameter Marks

None: 29.984 ~ 29.994 mm  
○: 29.995 ~ 30.000 mm



### ▲ Crankpin Diameter Marks, "O" mark or no mark

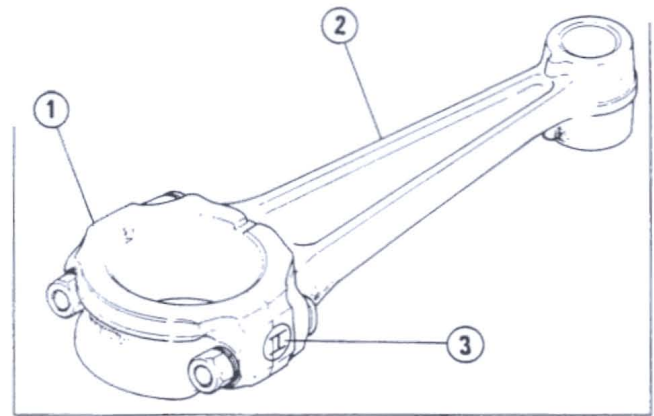
- Measure the connecting rod big end inside diameter, and mark each connecting rod big end in accordance with the inside diameter.

### NOTE

- Tighten the nuts to the specified torque (see Exploded View).
- The mark already on the big end should almost coincide with the measurement.

### Connecting Rod Big End Inside Diameter Marks

None: 33.000 ~ 33.008 mm  
○: 33.009 ~ 33.016 mm

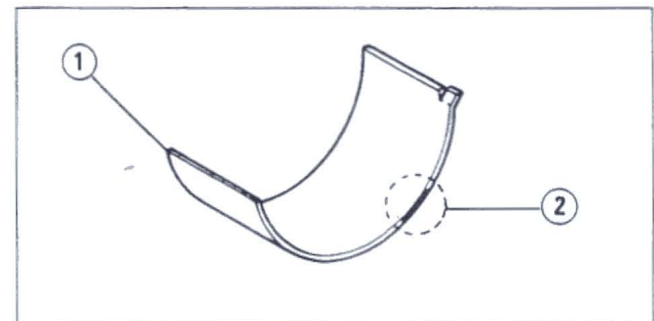


1. Big End Cap
2. Connecting Rod
3. Diameter Mark, "O" mark or no mark

- Select the proper bearing insert in accordance with the combination of the connecting rod and crankshaft coding.

### Big End Bearing Insert Selection

Con-Rod Big End Bore Diameter Marking	Crankpin Diameter Mark	Bearing Insert	
		Size Color	Part Number
○	None	Blue	92028-1492
None	None	Black	92028-1493
○	○		
None	○	Brown	92028-1494



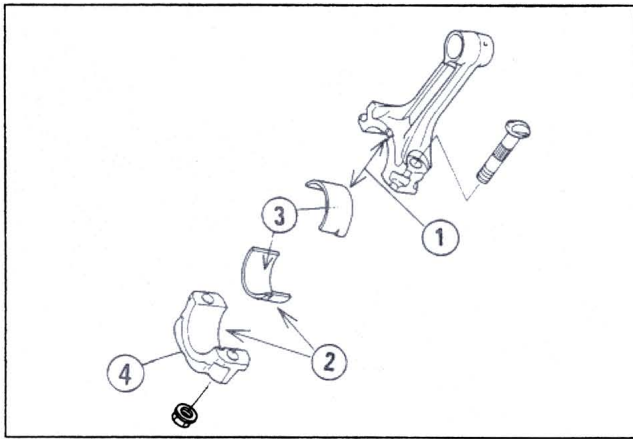
1. Bearing Insert
2. Color Size Mark

- Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.
- Apply molybdenum disulfide grease to the upper inner surface of the connecting rod big end (between the connecting rod big end and the bearing insert).

### CAUTION

Do not apply molybdenum disulfide grease to the inner surface of the big end cap (between the big end cap and the bearing insert).

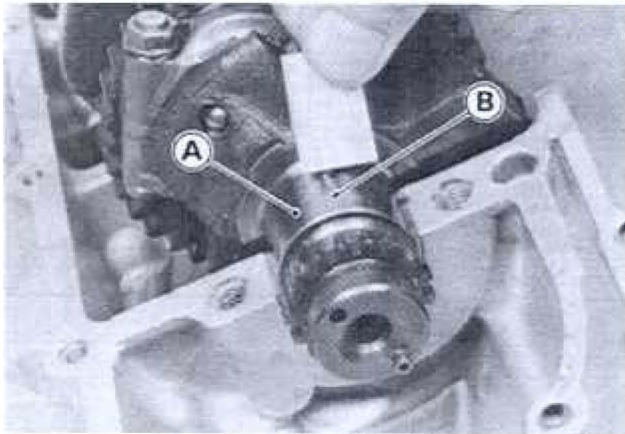
## 8-12 CRANKSHAFT / TRANSMISSION



1. Apply molybdenum disulfide grease. 3. Oil.
2. Do not apply grease. 4. Big End Cap

### Crankshaft Main Bearing/Journal Wear

- Measure the bearing insert/crankshaft main journal clearance with a plastigage.



A. Crankshaft Main Journal B. Plastigage

#### NOTE

- Tighten the crankcase bolts to the specified torque (see Exploded View).
- Do not turn the crankshaft during clearance measurement.
- Journal clearance less than 0.025 mm can not be measured by plastigage, however, using genuine parts maintains the minimum standard clearance.

### Crankshaft Main Bearing Insert/Journal Clearance

Standard: 0.014 ~ 0.038 mm  
Service Limit: 0.08 mm

- ★ If clearance is within the standard, no bearing replacement is required.
- ★ If clearance is between 0.038 mm and the service limit (0.08 mm), replace the bearing inserts with inserts painted blue. Check insert/journal clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

- ★ If clearance exceeds the service limit, measure the diameter of the crankshaft main journal.

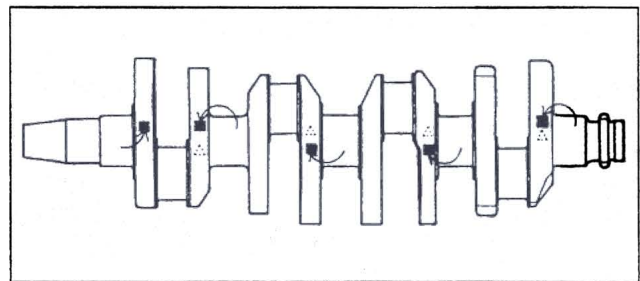
### Crankshaft Main Journal Diameter

Standard: 29.984 ~ 30.000 mm  
Service Limit: 29.96 mm

- ★ If any journal has worn past the service limit, replace the crankshaft with a new one.
- ★ If the measured journal diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

### Crankshaft Main Journal Diameter Marks

None: 29.984 ~ 29.992 mm  
1: 29.993 ~ 30.000 mm



- Crankshaft Main Journal Diameter Marks, "1" mark or no mark

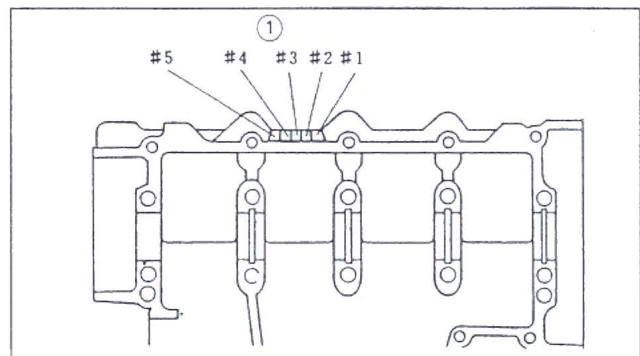
- Measure the main bearing bore diameter, and mark the upper crankcase half in accordance with the bore diameter.

#### NOTE

- Tighten the crankcase bolts to the specified torque (see Exploded View).
- The mark already on the upper crankcase half should almost coincide with the measurement.

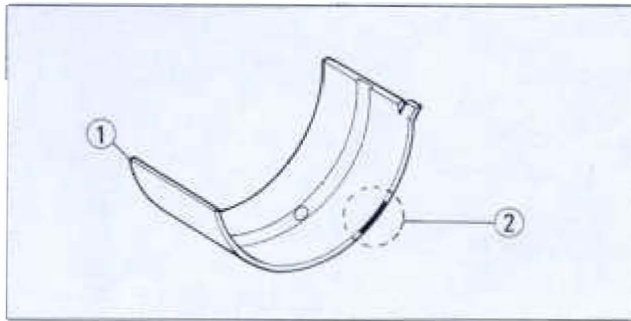
### Crankcase Main Bearing Bore Diameter Marks

○: 33.000 ~ 33.008 mm  
None: 33.009 ~ 33.016 mm



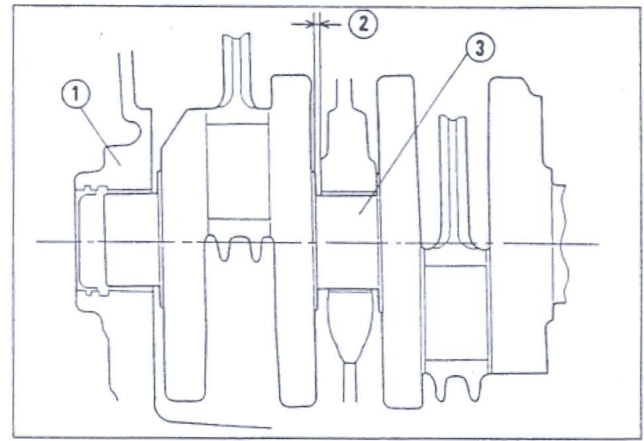
1. Crankcase Main Bearing Bore Diameter Marks, "O" mark or no mark

- Select the proper bearing insert in accordance with the combination of the crankcase and crankshaft coding.



1. Bearing Insert 2. Size Color Mark

- Install the new inserts in the crankcase halves and check insert/journal clearance with plastigage.



1. Crankcase 2. Measure here. 3. No. 2 Journal

### Crankshaft Side Clearance

- Insert a thickness gauge between the crankcase and the crankweb at the No. 2 journal to determine clearance.
- ★ If the clearance exceeds the service limit, replace the crankcase halves as a set.

### Crankshaft Side Clearance

Standard: 0.05 ~ 0.20 mm  
Service Limit: 0.40 mm

### Main Bearing Insert Selection

Crankcase Main Bearing Bore Diameter Mark	Crankshaft Main Journal Diameter Mark	Crankshaft Bearing Insert*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92028-1418	5
			92028-1421	1, 2, 3, 4
○	None	Black	92028-1417	5
None	1		92028-1420	1, 2, 3, 4
None	None	Blue	92028-1416	5
			92028-1419	1, 2, 3, 4

\*The bearing inserts for No. 5 has no oil groove.

## 8-14 CRANKSHAFT / TRANSMISSION

### Transmission

#### Shift Pedal Removal

- Remove the left lower fairing (see Frame chapter).
- Mark the position of the shift lever on the shift shaft so that it can be installed later in the same position.
- Remove the shift lever and shift pedal.

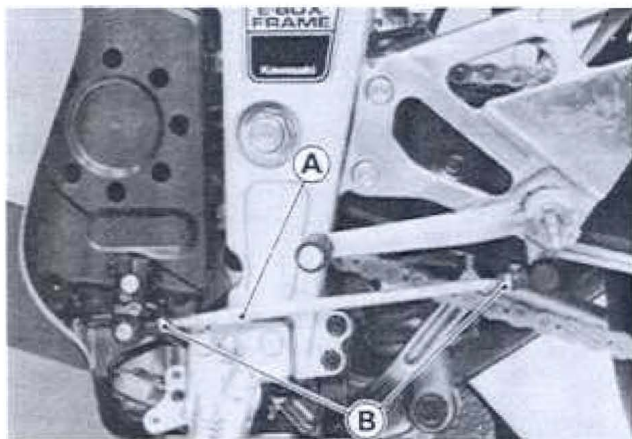
#### Shift Pedal Installation

- Apply grease to the shift pedal pivot.
- Tighten the shift pedal mounting bolt to the specified torque.
- ★ If necessary, adjust the pedal position from the standard position to suit you as follows.
- Loosen the front and rear rod locknuts.

#### NOTE

- The locknut next to the knurled portion of the rod has left-hand threads.

- Turn the rod to adjust the pedal position.
- Tighten the locknuts securely.

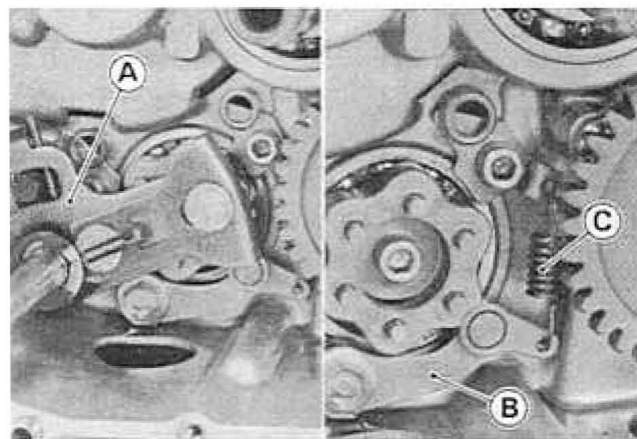


A. Rod

B. Locknut

#### External Shift Mechanism Removal

- Remove the following.
  - Engine Oil (see Engine Lubrication System chapter)
  - Clutch
  - Shift Pedal
- Pull out the shift mechanism arm with the shift shaft.
- Remove the shift drum set lever spring and then remove set lever.



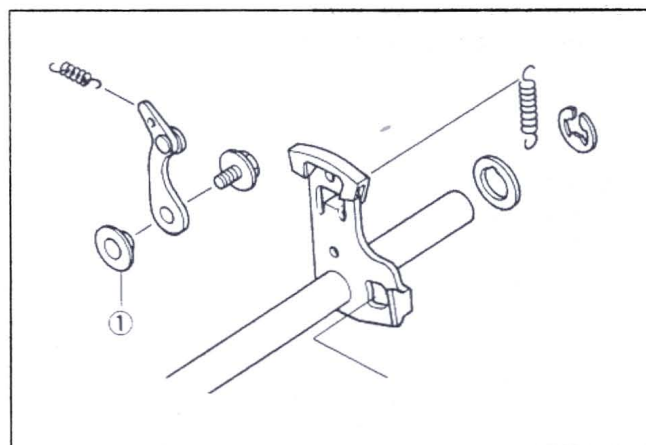
A. Shift Mechanism Arm

B. Shift Drum Set Lever

C. Set Lever Spring

#### External Shift Mechanism Installation

- Be careful of the direction of the shift drum set lever bolt collar.



1. Collar

- Tighten the shift drum set lever bolt to the specified torque (see Exploded View).
- Install the shift drum set lever spring.

#### Transmission Shaft Removal

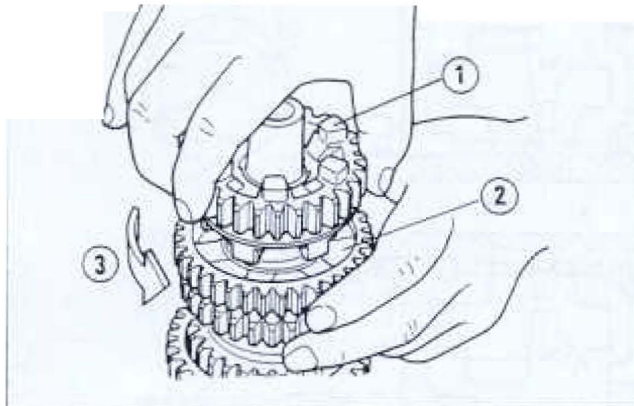
- Remove the clutch (see Clutch chapter).
- Remove the engine (see Engine Removal/Installation chapter).
- Split the crankcase (see this chapter).
- Remove the drive shaft and output shaft.

## Transmission Shaft Installation

- Be careful of the following.
- Apply engine oil to the sliding portion of the gears and bearings.
- Check to see that the set pins and set rings are in place.
- Install the drive shaft and output shaft into the upper crankcase half.

## Transmission Disassembly

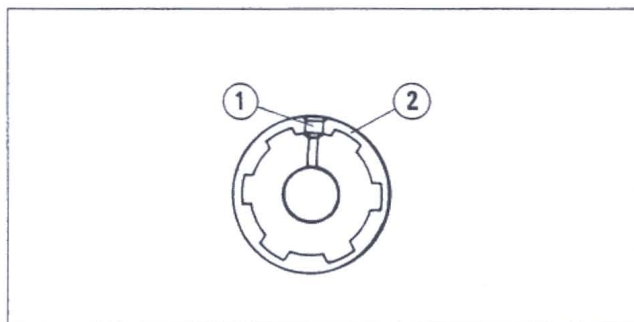
- Remove the transmission shafts.
- Using the circlip pliers (special tool: 57001-144) to remove the circlips, disassemble the transmission shafts.
- The 5th gear on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism. Remove the 5th gear as follows.
- Set the output shaft in a vertical position holding the 3rd gear.
- Spin the 5th gear quickly and pull it off upward.



1. 5th Gear  
2. 3rd Gear  
3. Spin quickly

## Transmission Assembly

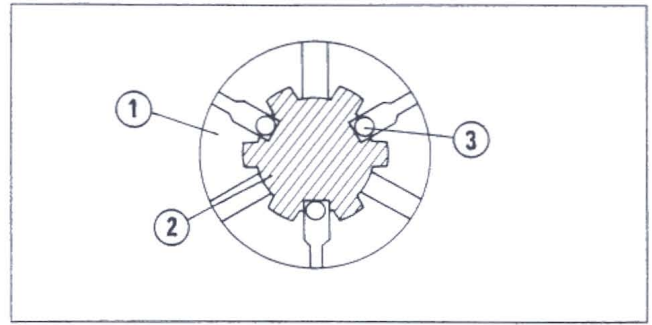
- Install the gear bushings on the shafts with their oil holes aligned with the shaft oil holes.



1. Oil Hole  
2. Bushing

- Fit the steel balls into the 5th gear holes as shown.

## View AA

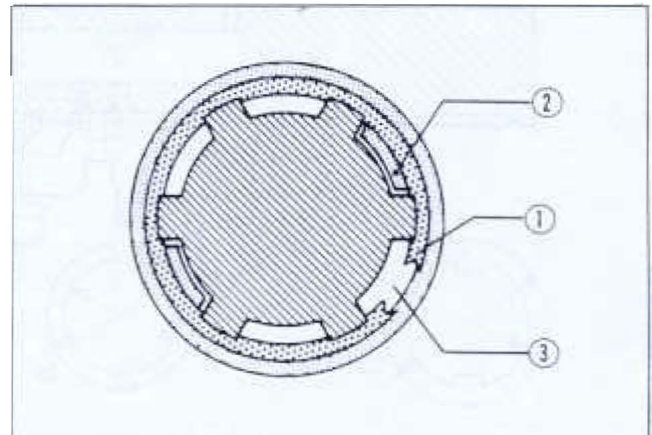


1. Gear  
2. Shaft  
3. Steel Balls

## CAUTION

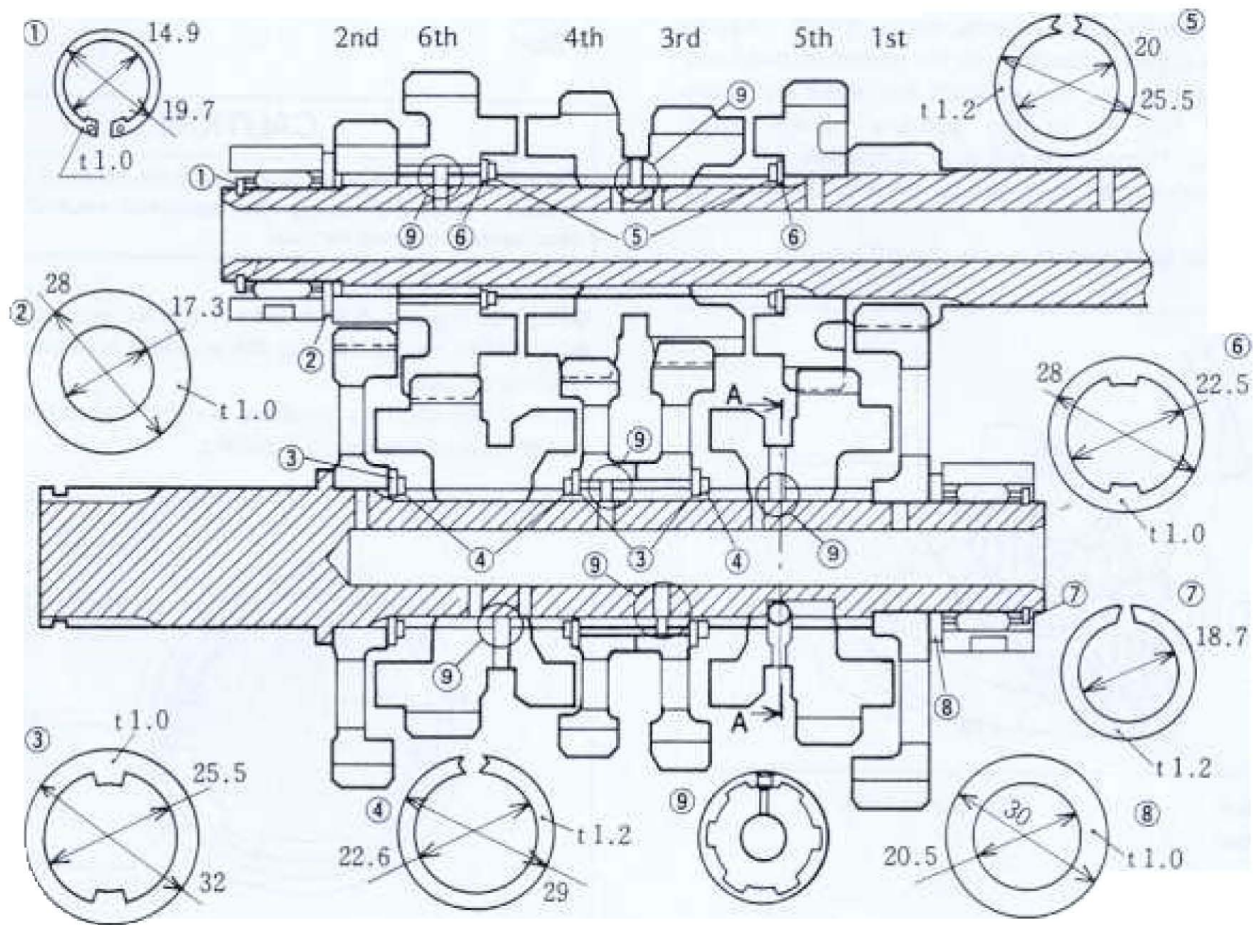
Do not apply grease to the steel balls to hold them in place. This will cause the positive neutral finder mechanism to malfunction.

- Replace any circlip that were removed with new ones.
- Install the circlips so that the opening is aligned with a spline groove.
- Install the toothed washers so that the teeth are not aligned with the circlip opening.



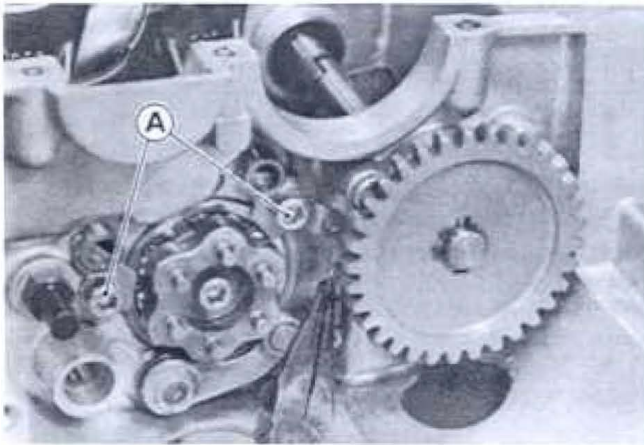
1. Circlip  
2. Toothed Washer  
3. Groov

## 8-16 CRANKSHAFT / TRANSMISSION



## Shift Drum and Fork Removal

- Remove the following.
  - Lower Crankcase Half (see Crankcase Splitting)
  - External Shift Mechanism (see this chapter)
  - Shift Drum Bearing Retainer Bolt

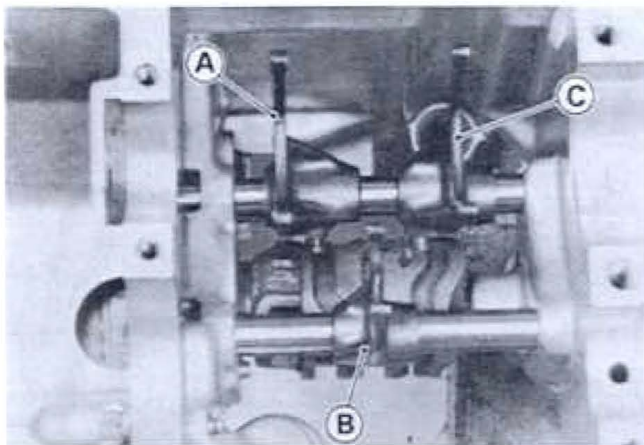


A. Shift Drum Bearing Retainer Bolt

- Pull out the shift rods and take off the shift forks.
- Pull out the shift drum.

## Shift Drum and Fork Installation

- There are three types of the shift forks. The smaller shift fork is for the drive shaft gear.
- Other two are for output shaft gears.
- Install the shift forks as shown, noting the rib position.



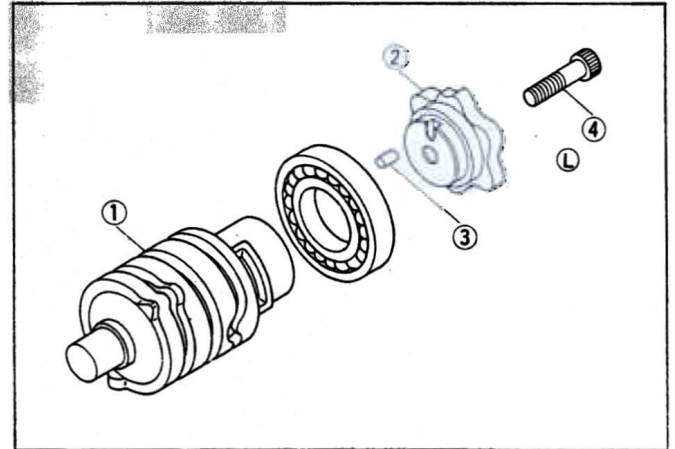
- A. Shift Fork (clutch side)
- B. Shift Fork (for drive shaft gear)
- C. Shift Fork (engine sprocket side)

## Shift Drum Disassembly

- Remove the shift drum (see this chapter).
- While holding the shift drum with a vise, remove the shift drum cam bolt.

## Shift Drum Assembly

- Align the hole of the shift drum cam with the dowel pin.



- 1. Shift Drum
- 2. Shift Drum Cam
- 3. Dowel Pin
- 4. Cam Mounting Bolt

- Tighten the following to the specified torque (see Exploded View).
  - Shift Drum Bearing Retainer Bolt
  - Shift Drum Cam Mounting Bolt
  - (Apply a non-permanent locking agent)

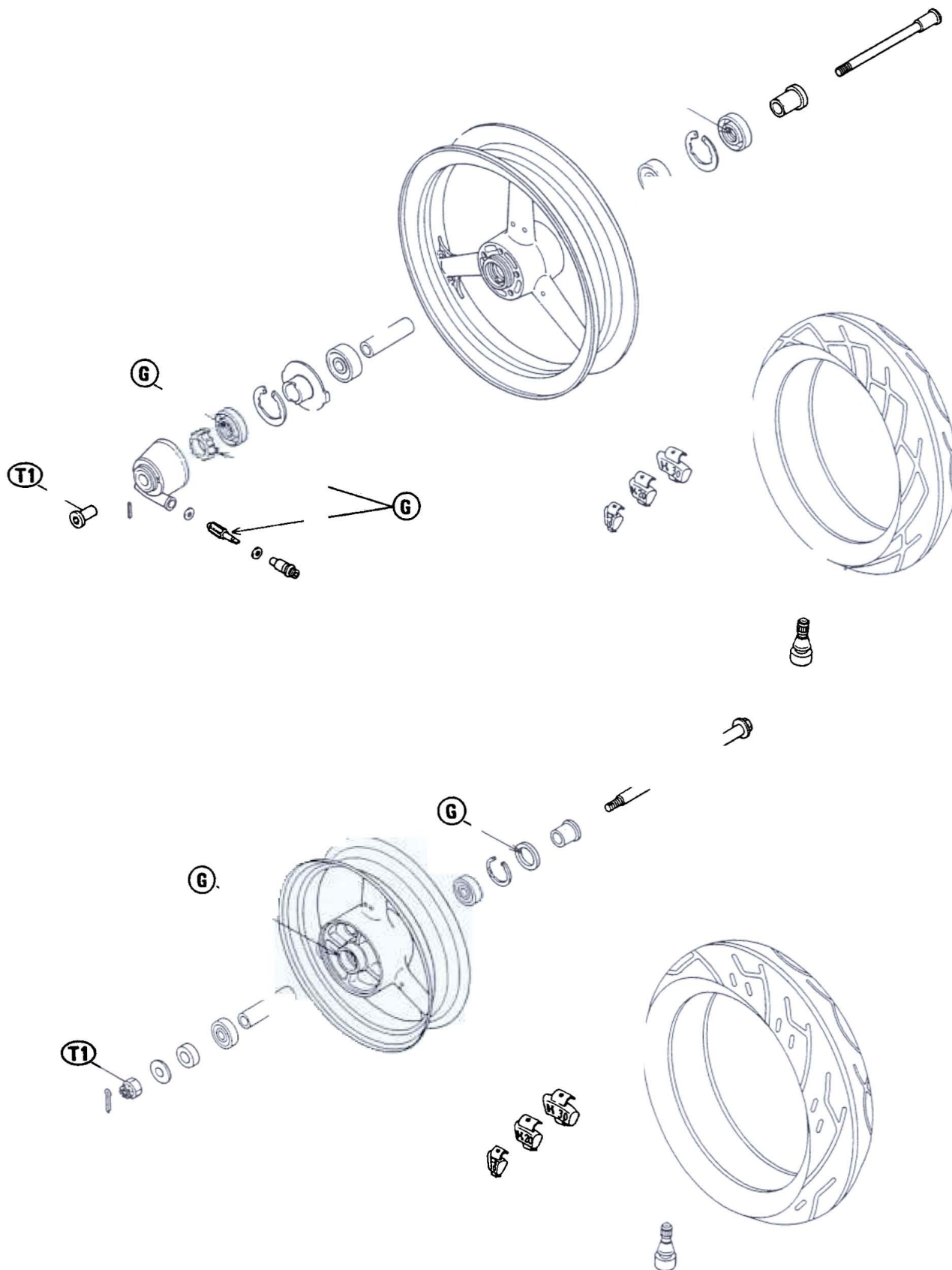
# Wheels / Tires

## Table of Contents

Exploded View .....	.....9-2
Specifications .....	.....9-3
Special Tools .....	.....9-4
Wheels (Rims) .....	.....9-5
Front Wheel Removal .....	.....9-5
Front Wheel Installation.....	.....9-5
Rear Wheel Removal .....	.....9-6
Rear Wheel Installation.....	.....9-6
Wheel Inspection .....	.....9-6
Balance Weight Installation.....	.....9-7
Balance Weight Removal ...	.....9-8
Tires .....	.....9-8
Tire Air Pressure Inspection .....	.....9-8
Tire Inspection .....	.....9-8
Removal .....	.....9-8
Installation.....	.....9-9
Hub Bearings .....	.....9-11
Removal .....	.....9-11
Installation.....	.....9-11
Lubrication .....	.....9-11
Speedometer Gear Housing....	.....9-11
Disassembly and Assembly .....	.....9-11
Lubrication .....	.....9-11

## 9-2 WHEELS / TIRES

### Exploded View



**T1: 11 N-m (11.0 kg-m, 80 ft-lb)**

**G : Apply grease.**

---

**Specifications**

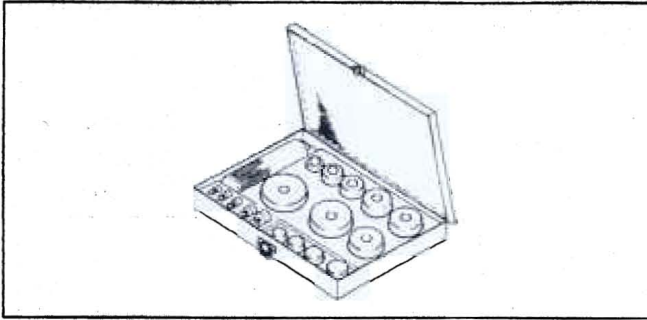

---

Item	Standard	Service Limit
<b>Wheels:</b>		
Rim runout (with tire installed):		
Axial	---	0.5 mm
Radial	---	0.8 mm
Axle runout/100 mm	Under 0.05 mm	0.2 mm
<b>Tires:</b>		
Air pressure (when cold):		
Front	225 kPa (2.25 kg/cm <sup>2</sup> , 32 psi)	---
Rear	250 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)	---
Tread Depth:		
Front	4.0 mm	1 mm
Rear	6.0 mm	2 mm
		(Up to 130 km/h)
		3 mm
		(Over 130 km/h)
Standard tire: Front: Size, Type	120/60 VR17 TUBELESS	---
Make	DUNLOP K510F	---
	BRIDGESTONE CYROX-17	---
Rear: Size, Type	160/60 VR17 TUBELESS	---
Make	DUNLOP K510	---
	BRIDGESTONE CYROX-16	---

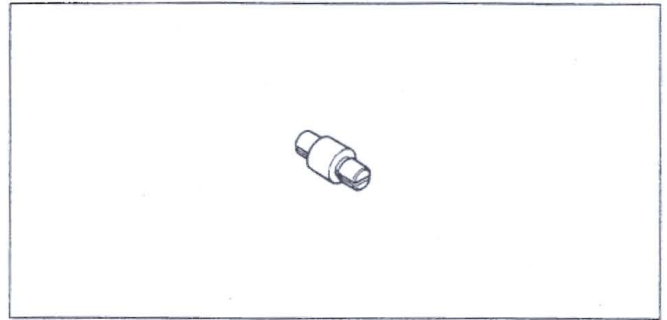
## 9-4 WHEELS / TIRES

### Special Tools

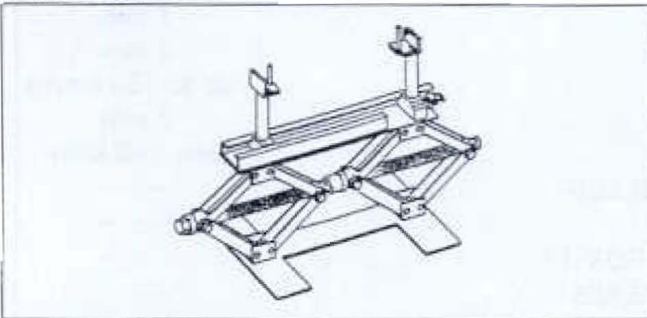
Bearing Driver Set: 57001-1129



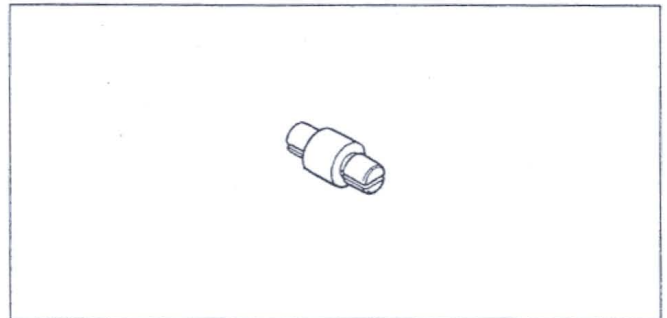
Bearing Remover Head,  $\phi 15 \times \phi 17$ : 57001-1267



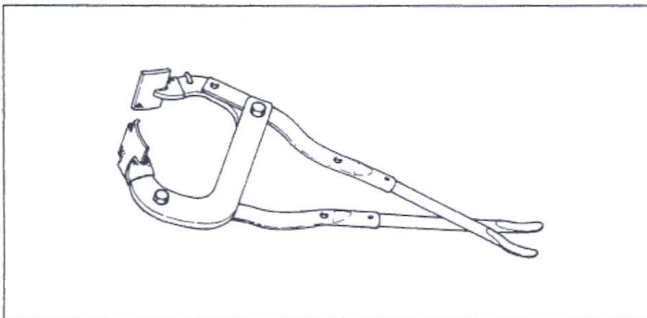
Jack: 57001-1238



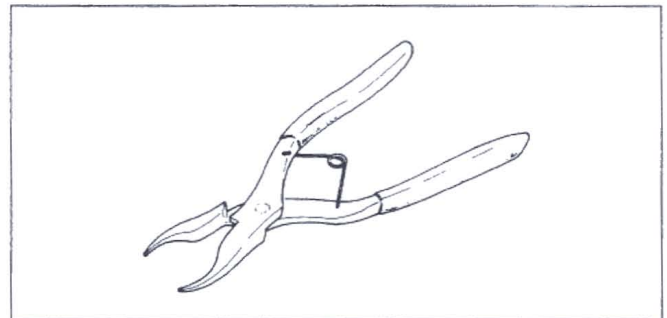
Bearing Remover Head,  $\phi 20 \times \phi 22$ : 57001-1293



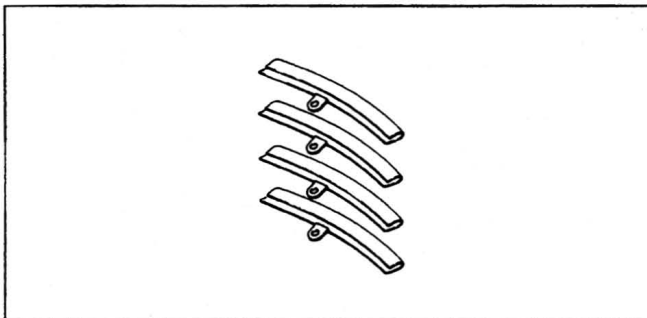
Bead Breaker Assembly: 57001-1072



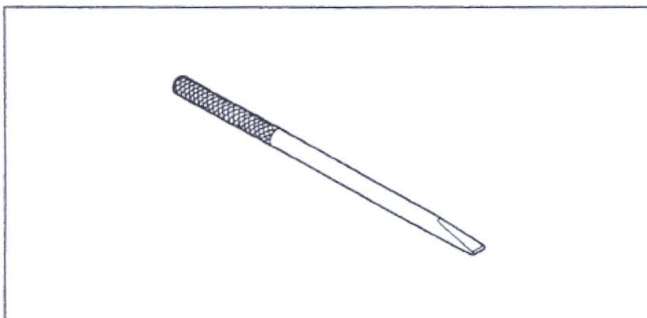
Inside Circlip Pliers: 57001-143



Rim Protector: 57001-1063



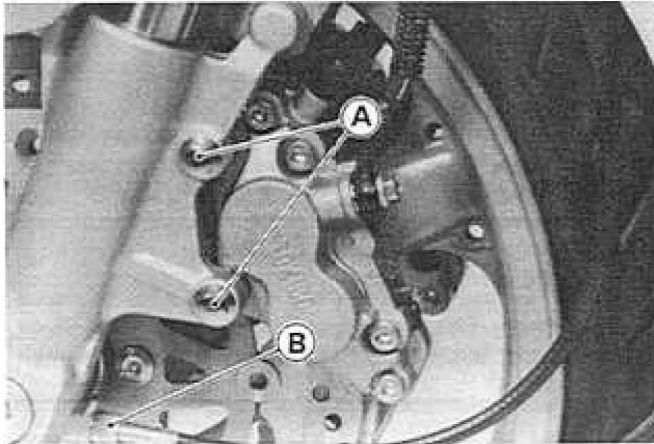
Bearing Remover Shaft: 57001-1265



## Wheels (Rims)

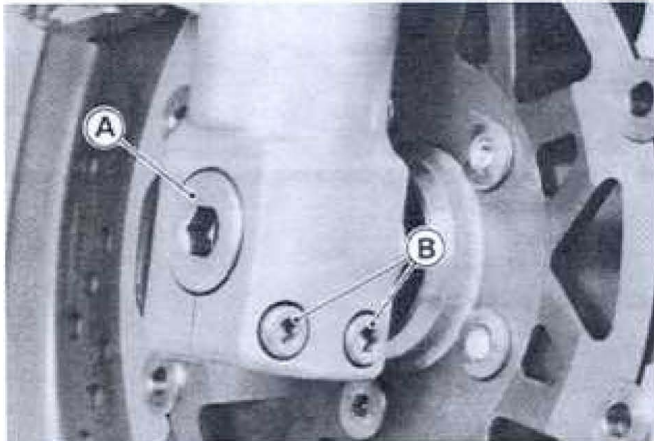
### Front Wheel Removal

- Remove the following.
  - Lower Fairings (see Frame chapter)
  - Speedometer Cable Lower End
  - Right and Left Brake Calipers



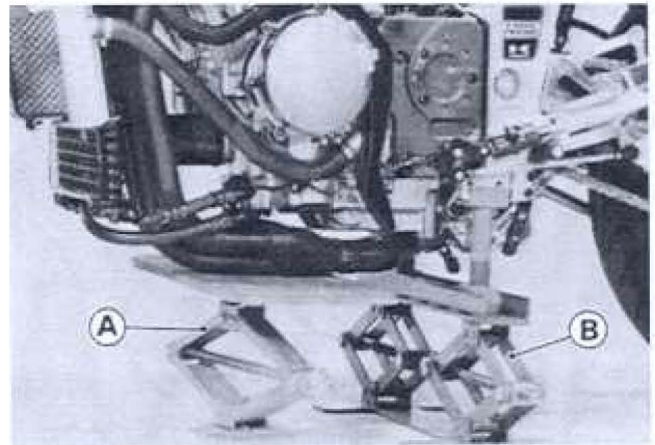
A. Caliper Mounting Bolts  
B. Speedometer Cable Lower End

Right Side Axle Clamp Bolts (Loosen)  
Axle (Loosen)



A. Axle  
B. Axle Clamp Bolts

- Using the jack (special tool) and a stand, raise the front wheel off the ground.



A. Jack or Stand  
B. Jack: 57001-1238

- Pull out the axle to the right and drop the front wheel out of the forks.

### CAUTION

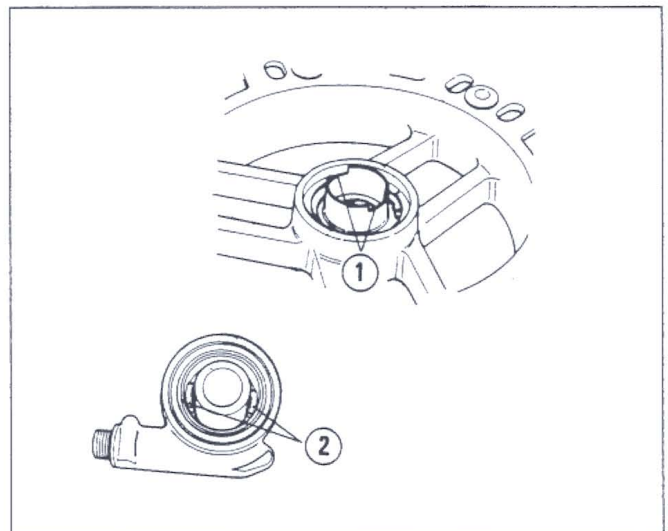
Do not lay the wheel down on one of the discs. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

### Front Wheel Installation

- Installation is the reverse of removal. Note the following.

### NOTE

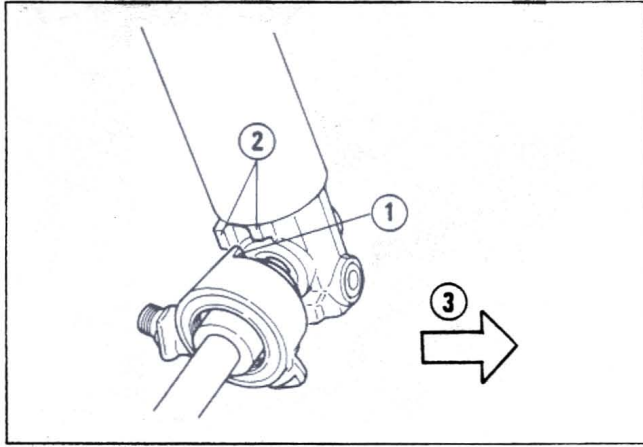
- Put the speedometer gear drive onto the wheel hub notches, then install the housings that it fits in the drive notches.
- Fit the speedometer gear housing stop in the fork leg stop.



1. Notches

2. Projections

## 9-6 WHEELS / TIRES



1. Housing Stop  
2. Fork Leg Stop  
3. Front

○Fit the collar in the right side of the hub.

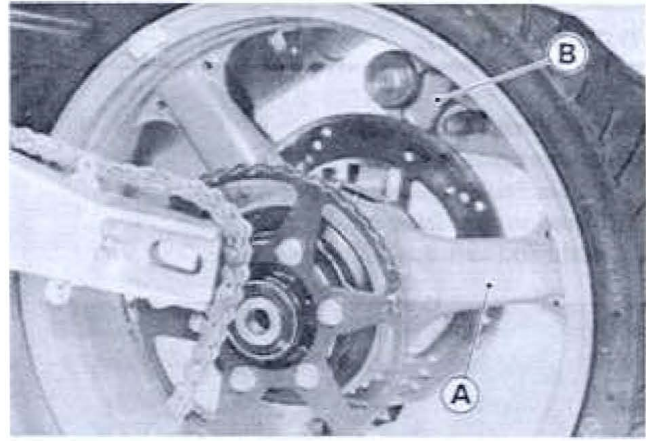
- Apply grease to the speedometer gear and hub grease seal.
- Tighten the following fasteners to the specified torque (see Exploded View).
  - Axle Nut
  - Axle Clamp Bolts
  - Caliper Mounting Bolts
- Check the front brake.

### ⚠ WARNING

Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brakes will not function on the first application of the lever if this is not done.

### Rear Wheel Removal

- Remove the following.
  - Chain Case
  - Rear Caliper
  - Cotter Pin and Axle Nut
- Remove the drive chain from the rear sprocket toward the left (see Final Drive chapter).
- Pull out the axle.
- Move the rear wheel back and remove the caliper bracket installed.



A. Rear Wheel

B. Rear Caliper Bracket

### CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

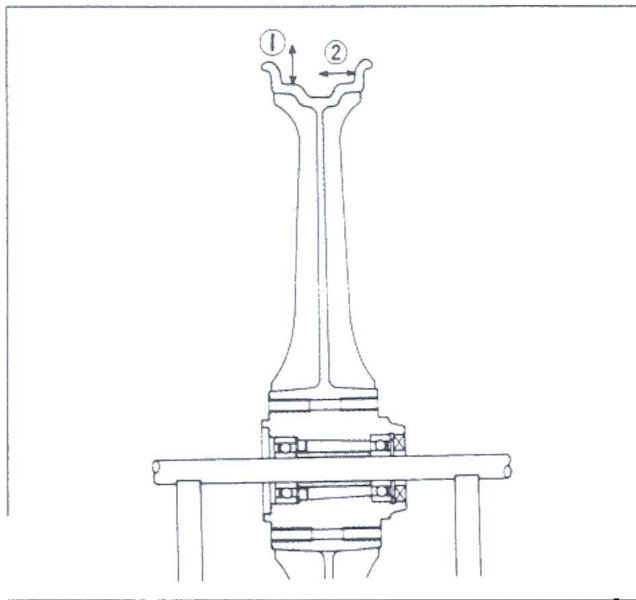
### Rear Wheel Installation

- Installation is the reverse of removal. Note the following.
- Apply grease to the following.
  - Coupling Grease Seal
  - Wheel Hub Grease Seal
  - Caliper Holder Pivot
- Adjust the drive chain after installation (see Final Drive chapter).
- Tighten the following fasteners to the specified torque (see Exploded View).
  - Axle Nut
  - Caliper Mounting Bolts
- Check the rear brake.

### Wheel Inspection

- Remove the tire from the wheel (see Tire Removal).
- Measure the rim runout by using the dial gauge.

## Rim Runout



### 1. Radial Runout

### 2. Axial Runout

- ★ If rim runout exceeds the service limit, check the wheel bearings (see this chapter).
- ★ If the problem is not due to the bearings, the wheel must be replaced.

### Axial Runout

Service Limit: 0.5 mm

### Radial Runout

Service Limit: 0.8 mm

## ⚠ WARNING

Never attempt to repair a damaged wheel. If there is any damage besides wheel bearings, the wheel must be replaced to insure safe operational condition.

### Balance Weight Installation

- Check if the weight portion has any play on the rim flange.
- ★ If it does, discard it.
- Lubricate the balance weight blade, tire bead, and rim flange with a soap and water solution or rubber lubricant. This helps the balance weight slip onto the rim flange.

## CAUTION

Do not lubricate the tire bead with engine oil or petroleum distillates because they will deteriorate the tire.

- Install the balance weight on the rim.
- Slip the weight on the rim flange by pushing or lightly hammering the weight in the direction shown in the figure.

- Check that the blade and weight seat fully on the rim flange, and that the clip is hooked over the rim ridge and reaches rim flat portion.

## ⚠ WARNING

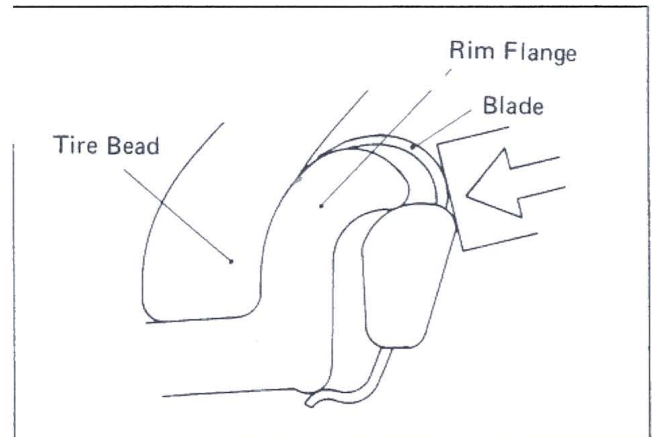
If the balance weight has any play on the rim flange, the blade and/or clip have been stretched. Replace the loose balance weight.  
Do not reuse used balance weight.

### Balance Weight

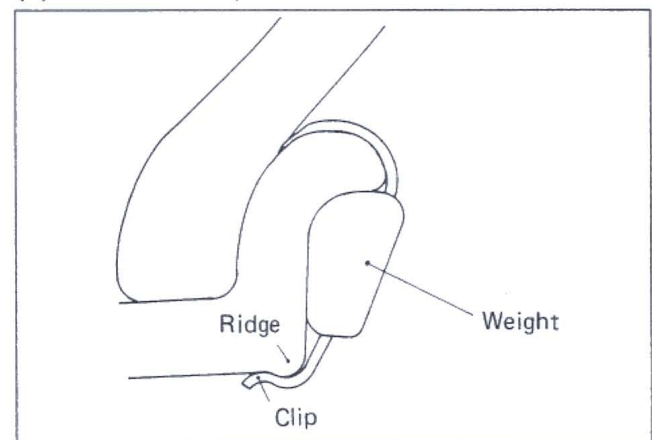
Part Number	Weight(grams)
41075-1014	10
41075-1015	20
41075-1016	30

### Installing Balance Weight

- (a) Press or lightly hammer the weight in.



- (b) Installation completed.



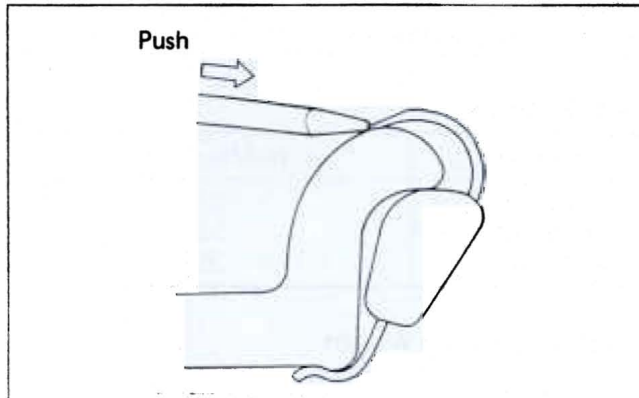
## 9-8 WHEELS / TIRES

### Balance Weight Removal

(a) When the tire is not on the rim.

- Push the blade portion toward the outside with a regular tip screw driver, and slip the weight off the rim flange.
- Discard the used balance weight.

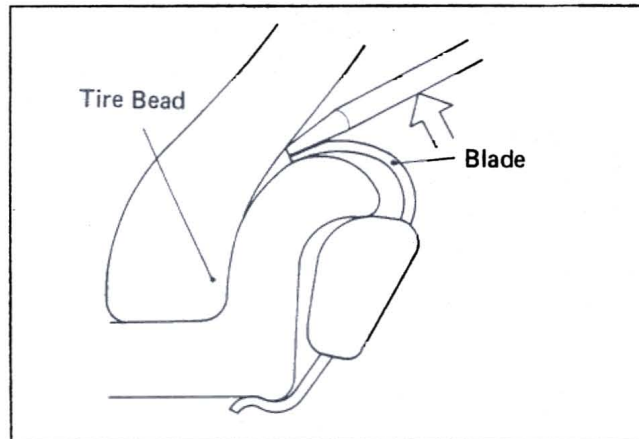
### Removing Balance Weight (without tire on rim)



(b) When the tire is on the rim.

- Pry the balance weight off the rim flange using a regular tip screw driver as shown in the figure.
- Insert a tip of the screw driver between the tire bead and weight blade until the end of the tip reaches the end of the weight blade.
- Push the driver grip toward the tire so that the balance weight slips off the rim flange.
- Discard the used balance weight.

### Removing Balance Weight (with tire on rim)



## Tires

### Tire Air Pressure Inspection

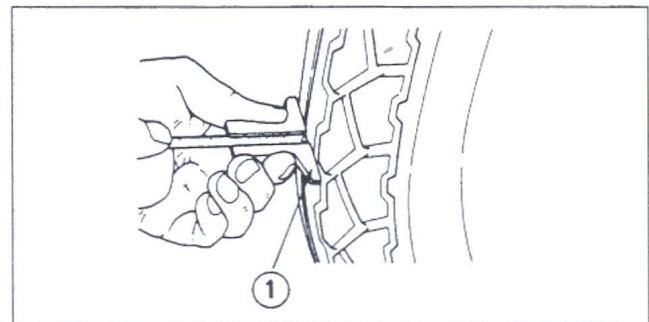
#### NOTE

○ Measure the tire pressure when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).

Front	Up to 181 kg (401 lb)	225 kPa (2.25 kg/cm <sup>2</sup> , 32 psi)
Rear	Up to 181 kg (401 lb)	250 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)

### Tire Inspection

- Visually inspect the tire for cracks and cuts, replacing the tire in case of bad damage.
- Measure the tread depth at the center of the tread with a depth gauge.



#### 1. Depth Gauge

★ If any measurement is less than the service limit, replace the tire.

### Tire Tread Depth

#### Front

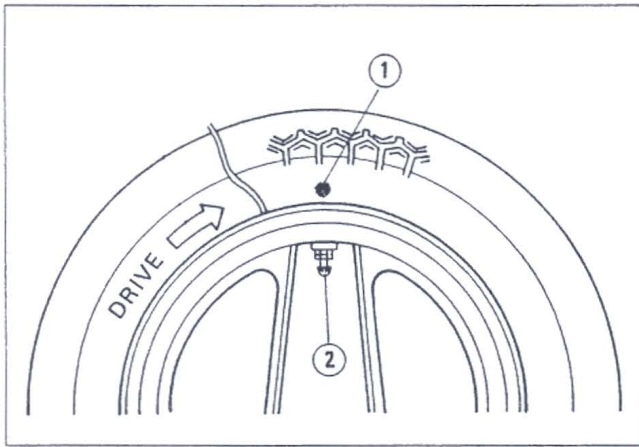
Standard 4.0 mm  
Service Limit 1 mm

#### Rear

Standard 6.0 mm  
Service Limit 2 mm (Up to 130 km/h)  
3 mm (Over 130 km/h)

### Removal

- Remove the following.
  - Wheel (see this chapter)
  - Disc(s)
  - Valve Core (let out the air)
- To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.



1. Chalk Mark or Yellow Mark      2. Valve Stem

- Lubricate the tire beads and rim flanges on both sides with a soap and water solution or rubber lubricant. This helps the tire beads slip off the rim flanges.

### CAUTION

Never lubricate with engine oil or petroleum distillates because they will deteriorate the tire.

- Remove the tire from the rim using a suitable commercially available tire changer.

### NOTE

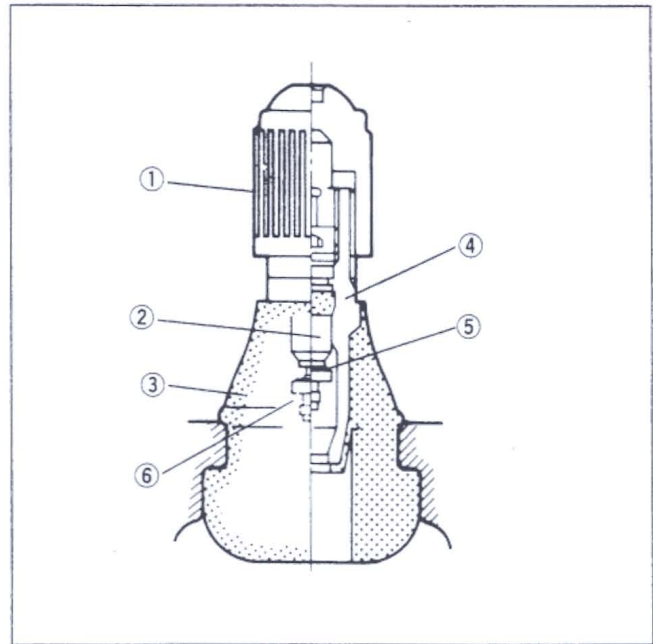
- The tires cannot be removed with hand tools because they fit the rims too tightly.

### Installation

- Inspect the rim and tire, and replace them if necessary.
- Clean the sealing surfaces of the rim and tire, and smooth the sealing surfaces of the rim with a fine emery cloth if necessary.
- Remove the air valve and discard it.

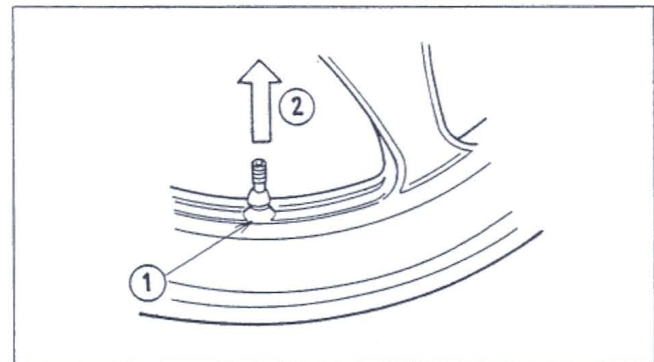
### CAUTION

Replace the air valve whenever the tire is replaced. Do not reuse the air valve.



1. Plastic Cap      4. Valve Stem  
2. Valve Core      5. Valve Seat  
3. Stem Seal      6. Valve Opened

- Install a new valve in the rim.
- Remove the valve cap, lubricate the stem with a soap and water solution, and pull the stem through the rim from the inside out until it snaps into place.



1. Apply soap and water solution.  
2. Pull the stem out.

### CAUTION

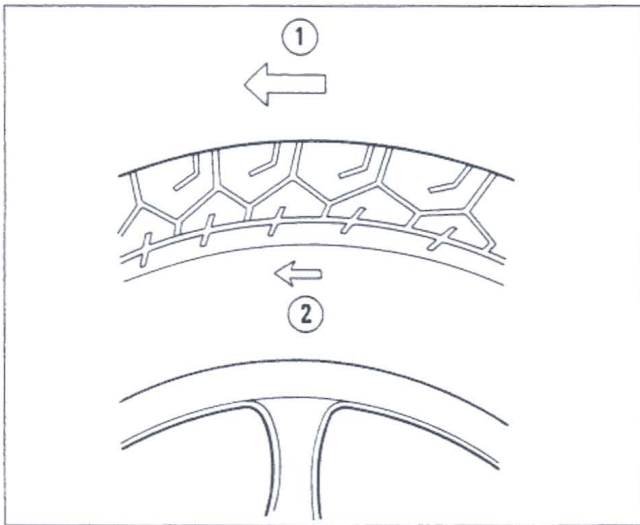
Do not use engine oil or petroleum distillates to lubricate the stem because they will deteriorate the rubber.

- Apply a soap and water solution, or rubber lubricant to the rim flange and tire beads.
- Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.

### NOTE

- The direction of the tire rotation is shown by an arrow on the tire sidewall.

## 9-10 WHEELS / TIRES



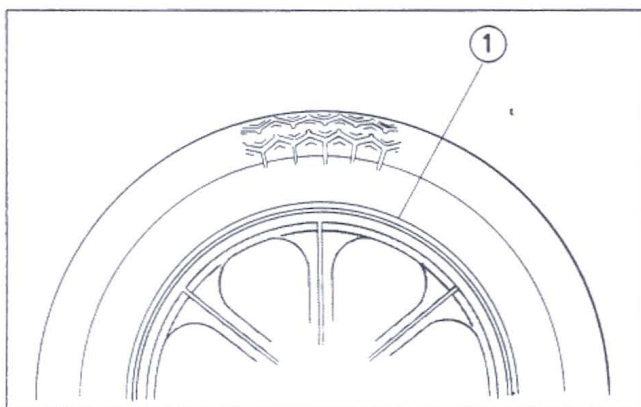
1. Rotation Direction
2. Rotation Mark (Arrow)

- Position the tire on the rim so that the valve is at the tire balance mark (the chalk mark made during removal, or the yellow paint mark on a new tire).
- Install the tire on the rim using a suitable commercially available tire changer.
- Lubricate the tire beads and rim flanges with a soap and water solution or rubber lubricant to help seat the tire beads in the sealing surfaces of the rim while inflating the tire.
- Center the rim in the tire beads, and inflate the tire with compressed air until the tire beads seat in the sealing surfaces.

### ⚠ WARNING

Be sure to install the valve core whenever inflating the tire, and do not inflate the tire to more than 400 kPa (4.0 kg/cm<sup>2</sup>, 57 psi). Overinflation can explode the tire with possibility of injury and loss of life.

- Check to see that the rim lines on both sides of the tire sidewalls are parallel with the rim flanges.



Rim Line

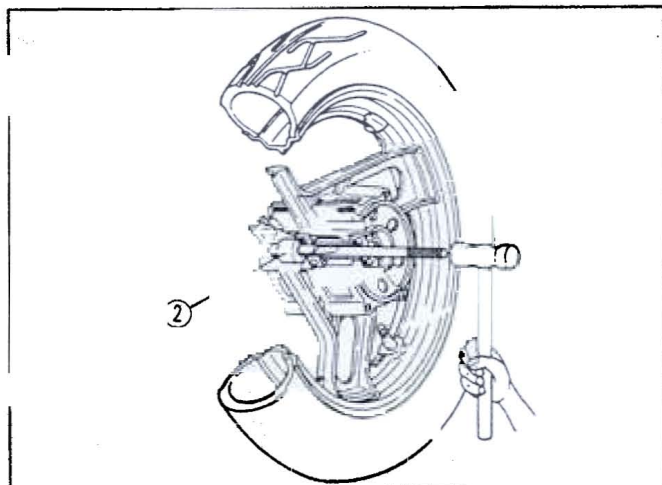
- If the rim flanges and tire sidewall rim lines are not parallel, remove the valve core. Lubricate the rim flanges and tire beads. Install the valve core and inflate the tire again.

- After the tire beads seat in the rim flanges, check for air leaks. Inflate the tire slightly above standard inflation. Use a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.
- Adjust the air pressure to the specified pressure (see Tire Inspection).
- Install the brake disc(s) so that the disc rotation mark aligns with the tire rotation (see Brake System chapter).
- Adjust the wheel balance.

## Hub Bearings

### Removal

- Remove the following.
  - Wheel (see this chapter)
  - Oil Seals and Circlips
- Use the bearing remover (special tool) to remove the hub bearings



1. Bearing Remover Shaft: 57001-1265
2. Bearing Remover Head

### CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

### Installation

- Install the bearings by using the bearing driver set (special tools: 57001-1129).

### NOTE

- *Install the bearings so that the marked or sealed side faces out.*

### Lubrication

### NOTE

- *Since the front and rear hub bearings are packed with grease and sealed, they are not required to be removed for lubrication. Clean and grease the rear hub bearings.*

## Speedometer Gear Housing

### Disassembly and Assembly

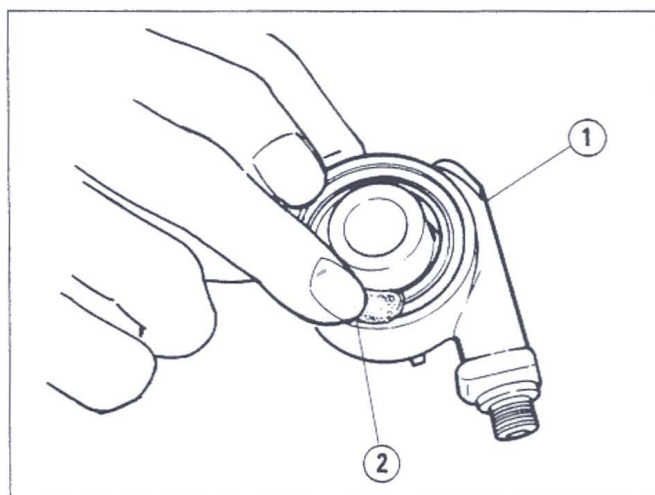
### NOTE

- *It is recommended that the assembly be replaced rather than attempting to repair the components.*

- Install the speedometer gear housing so that it fits in the speedometer gear drive notches (see Front Wheel Installation).

### Lubrication

- Clean and grease the speedometer gear housing.



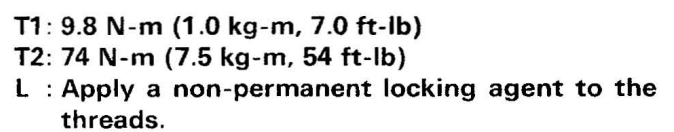
1. Speedometer Gear Housing
2. Grease.

# Final Drive

## Table of Contents

Exploded View .....	.10-2
Specifications .....	.10-3
Special Tools .....	.10-3
Drive Chain.....	.10-4
Drive Chain Slack Adjustment .....	.10-4
Wheel Alignment Adjustment .....	.10-4
Drive Chain Wear Inspection.....	.10-4
Lubrication .....	.10-5
Drive Chain Removal.....	.10-5
Drive Chain Installation .....	.10-6
Sprocket, Coupling .....	.10-6
Engine Sprocket Removal .....	.10-6
Engine Sprocket Installation.....	.10-6
Rear Sprocket Removal .....	.10-7
Rear Sprocket Installation.....	.10-7
Rear Sprocket Wear .....	.10-7
Coupling Installation .....	.10-7

### Exploded View

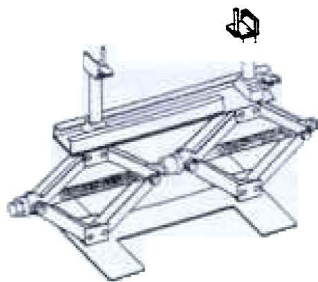


## Specifications

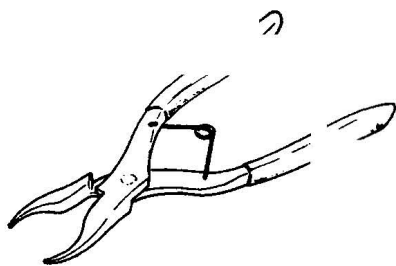
Item	Standard	Service Limit
<b>Drive Chain:</b>		
Make and type	ENUMA EK520-SX 0	---
Chain slack	Endless 108 links 20 ~ 35 mm (35mm is best)	Less than 20 mm, or more than 40 mm
20-link length	317.5 ~ 318.2 mm	323 mm

## Special Tools

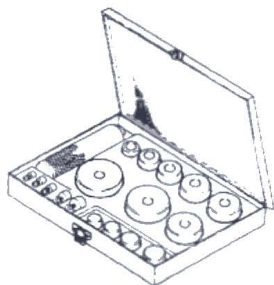
Jack: 57001-1238



Inside Circlip Pliers: 57001-143



Bearing Driver Set: 57001-1129



## 10-4 FINAL DRIVE

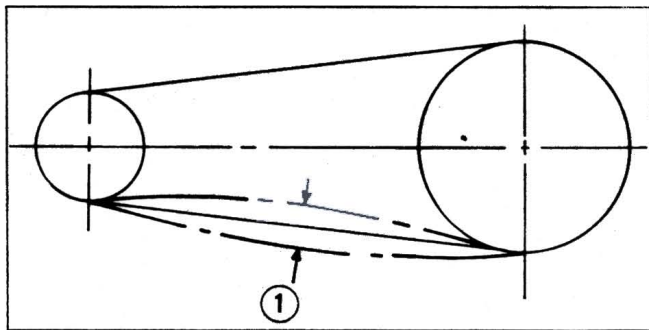
### Drive Chain

#### Drive Chain Slack Adjustment

- Set the motorcycle up on its side stand and check that the chain slack is within the standard value.

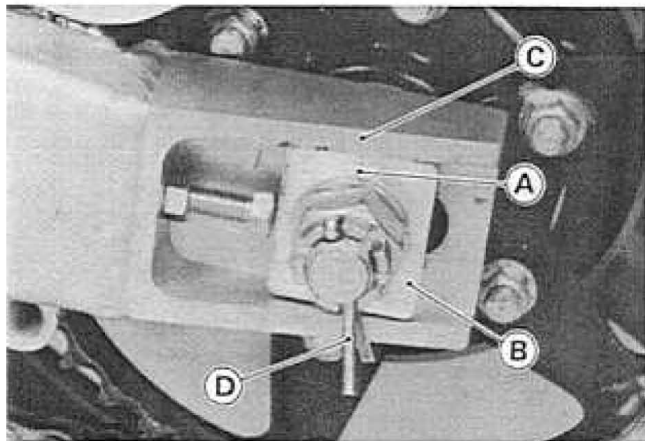
#### Drive Chain Slack

Standard: 20 ~ 35 mm (35mm is best)  
Service Limit: 20 ~ 40 mm



1. Chain Slack

- Check to see that the notches on the alignment indicators on both sides are in the same position.

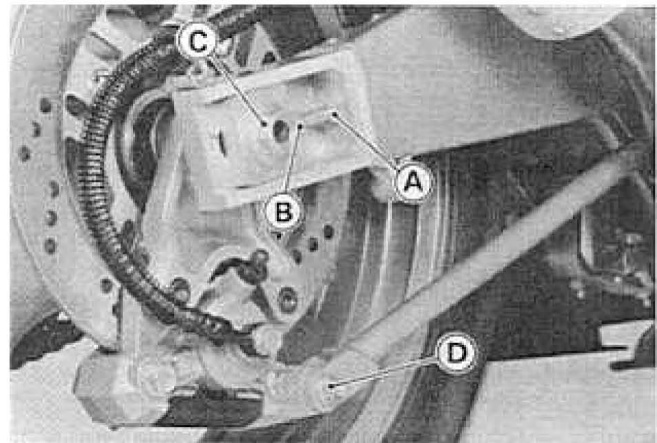


A. Notch  
B. Alignment Indicator  
C. Swing Arm Marks  
D. Cotter Pin

- Adjust the chain slack as follows.
  - Loosen the following nuts.
    - Axle Nut
    - Both Chain Adjuster Locknuts

#### NOTE

- Do not loosen the torque link nut.



A. Locknut  
B. Adjuster  
C. Axle  
D. Torque Link Nut

- Turn the chain adjusters forward or rearward until the drive chain has the correct amount of chain slack.
- The right and left notches on the alignment indicators should point to the same marks or positions on the swing arm (see above).

#### ⚠ WARNING

Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition.

- Tighten the adjuster locknuts securely.
- Tighten the axle nut to the specified torque (see Exploded View).
- Insert a new cotter pin through the axle and nut, and spread its ends.

#### Wheel Alignment Adjustment

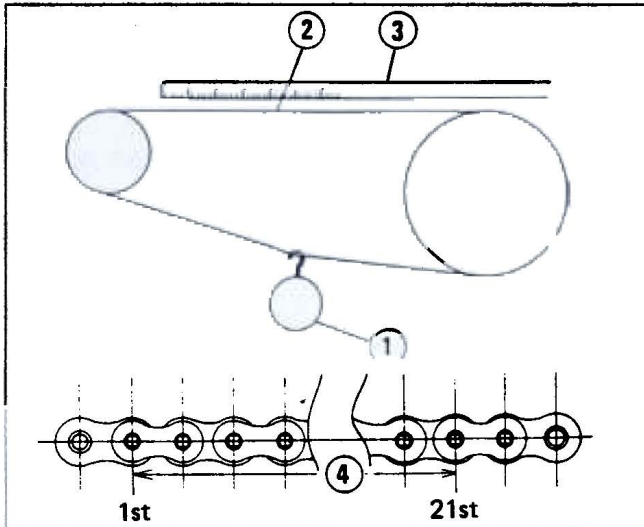
- Check to see if wheel alignment is properly adjusted. The right and left notches on the alignment indicators should point to the same marks or positions on the swing arm.
- ★ If they are not, adjust the chain slack and align the wheel alignment (see Drive Chain Slack Adjustment).

#### ⚠ WARNING

Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition.

#### Drive Chain Wear Inspection

- Stretch the chain taut hanging a 98 N (10 kg, 20 lb) weight on the chain.
- Measure the length of 20 links on the straight part of the chain from pin center of the 1st pin to pin center of the 21st pin. Since the chain may wear unevenly, take measurement at several places.



1. Weight
2. Straight Part
3. Ruler
4. Measure this length.

#### Drive Chain 20-Link Length

**Standard:** 317.5 ~ 318.2 mm  
**Service Limit:** 323 mm

★ If any measurement exceeds the service limit, replace the chain. Also, replace the engine and rear sprockets when the drive chain is replaced.

#### ⚠ WARNING

For safety, use only the standard chain. It is an endless type and should not be cut for installation.

#### Lubrication

#### CAUTION

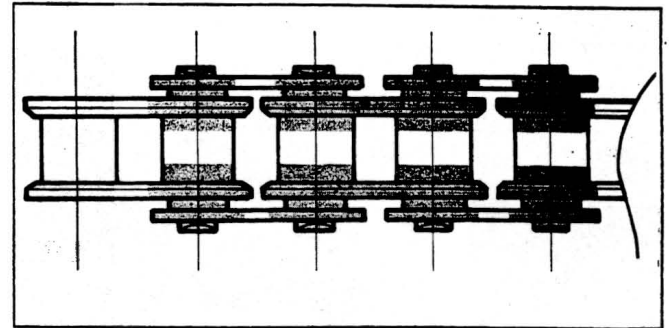
The O-rings between the side plates seal in the lubricant between the pin and the bushing. To avoid damaging the O-rings and resultant loss of lubricant, observe the following rules.

Use only kerosene or diesel oil for cleaning an O-ring drive chain. Any other cleaning solution such as gasoline or trichloroethylene will cause deterioration and swelling of the O-rings.

Immediately blow the chain dry with compressed air after cleaning.

Complete cleaning and drying the chain within 10 minutes.

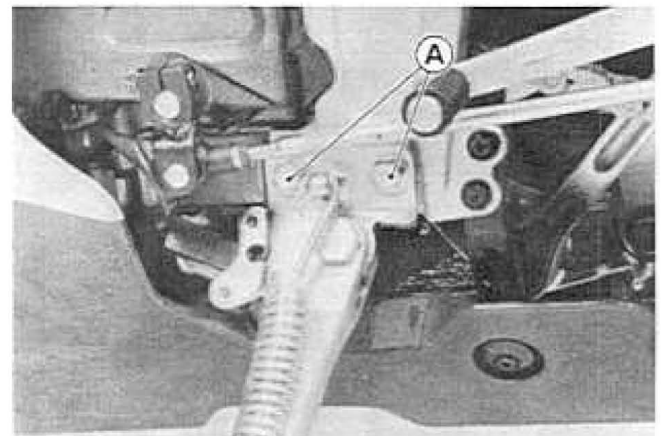
- If a special lubricant is not available, a heavy oil such as SEA 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.



■ Oil Applied Areas

#### Drive Chain Removal

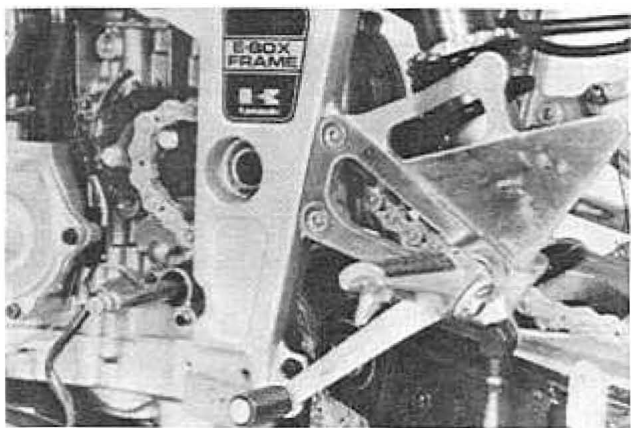
- Remove the following.
  - Lower Fairings (see Frame chapter)
  - Chain Cover
  - Engine Sprocket Cover (see this chapter)
  - Rear Shock Absorber Mounting Nut (lower)
  - Tie-Rod Nuts (upper)
  - Swing Arm Shaft Nut
  - Rear Caliper (see Brakes chapter)
- Loosen the drive chain.
- Remove the side stand.



A. Side Stand Bracket Bolts

- Place the jack under the frame to steady the motorcycle.
- Disengage the chain from the rear sprocket and the engine sprocket.
- Remove the swing arm shaft and pull it backward.
- Remove the chain.

## 10-6 FINAL DRIVE



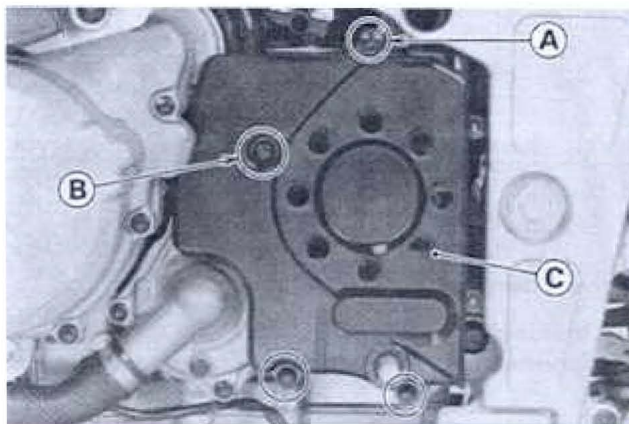
### *Drive Chain Installation*

- Installation is the reverse of removal. Note the following.
- Tighten the following fasteners to the specified torque.
  - Rear Shock Absorber Mounting Nuts
  - Tie-Rod Nuts
  - Swing Arm Shaft Nut
  - Rear Wheel Axle Nut
- Apply a non-permanent locking agent to the side stand bracket bolts and tighten the specified torque (see Frame chapter).
- Adjust the drive chain (see this chapter).

## Sprocket, Coupling

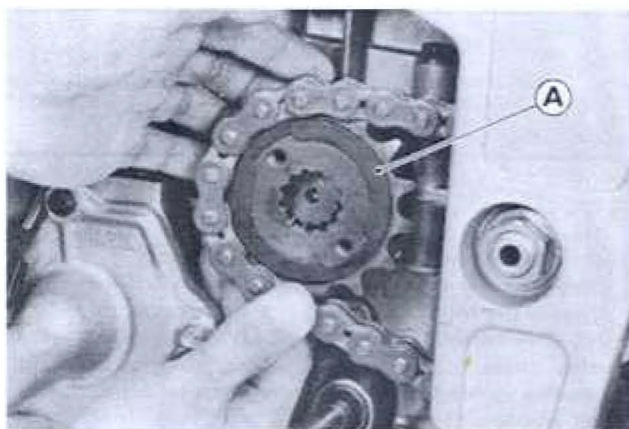
### *Engine Sprocket Removal*

- Loosen the drive chain (see Drive Chain Slack Adjustment).
- Remove the following.
  - Left Lower Fairing (see Frame chapter)
  - Shift Pedal
  - Engine Sprocket Cover



- A. Bolts
- C. Engine Sprocket Cover
- B. Bolt (locking agent)

- Remove the engine sprocket plate.
- Pull the engine sprocket off the output shaft along with the chain.



- A. Engine Sprocket

- Remove the engine sprocket.

### *Engine Sprocket Installation*

- Installation is the reverse of removal. Note the following.
- Engage the sprocket with the drive chain so that hollow side faces inward.
- Tighten the sprocket plate bolt to the specified torque (see Exploded View).
- Apply a non-permanent locking agent to the engine sprocket cover bolt (one bolt only, see Exploded View).

### Rear Sprocket Removal

- Remove the rear wheel (see Wheels/Tires chapter)

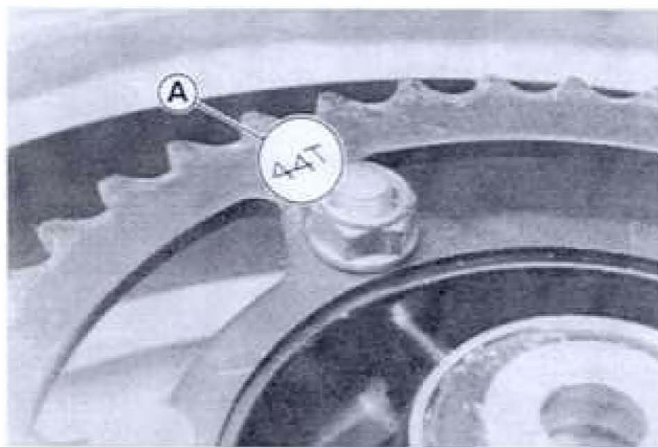
#### CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

- Pull out the rear wheel coupling from the rear wheel.
- Remove the rear sprocket nuts.
- Remove the rear sprocket.

### Rear Sprocket Installation

- Installation is the reverse of removal. Note the following.
- Install the sprocket facing the tooth number marking outward.



A. Tooth Number Marking

- Tighten the rear sprocket nuts to the specified torque (see Exploded View).
- If the stud bolt is to be replaced, apply a non-permanent locking agent to the lower half of the stud bolt.
- Install the rear wheel (see Wheels/Tires chapter).

### Rear Sprocket Wear

- Visually inspect the rear sprocket teeth.
- ★ If the teeth are worn as illustrated, replace the sprocket, and inspect the drive chain and engine sprocket (see Drive Chain Wear Inspection).

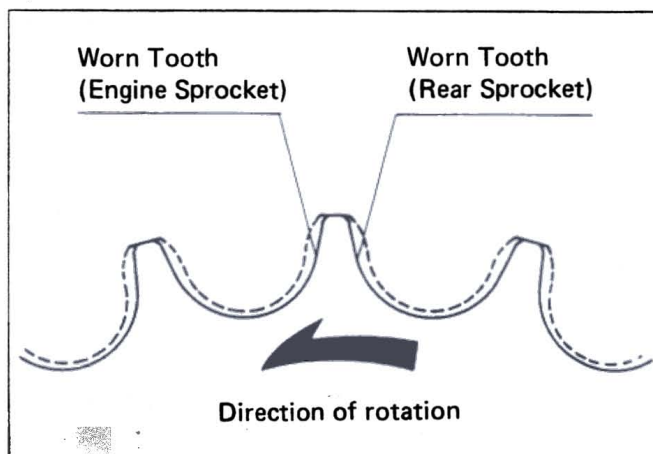
#### CAUTION

If a sprocket requires replacement, the drive chain is probably worn also. Upon replacing the rear sprocket, inspect the chain and engine sprocket.

### NOTE

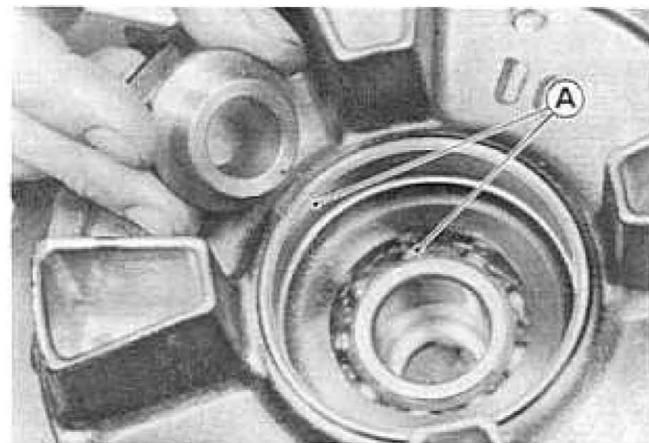
○ Sprocket wear is exaggerated for illustration.

### Sprocket Teeth



### Coupling Installation

- Grease the following.
  - Ball Bearing
  - Coupling Grease Seal
  - Coupling Internal Surface



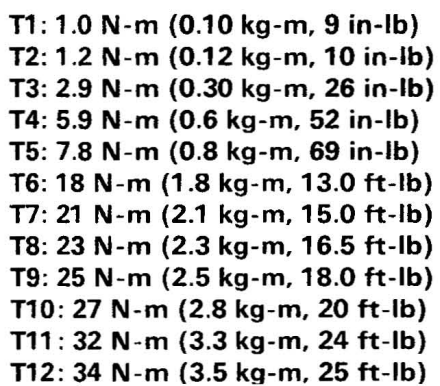
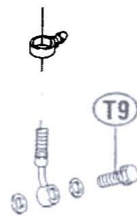
A. Grease here.

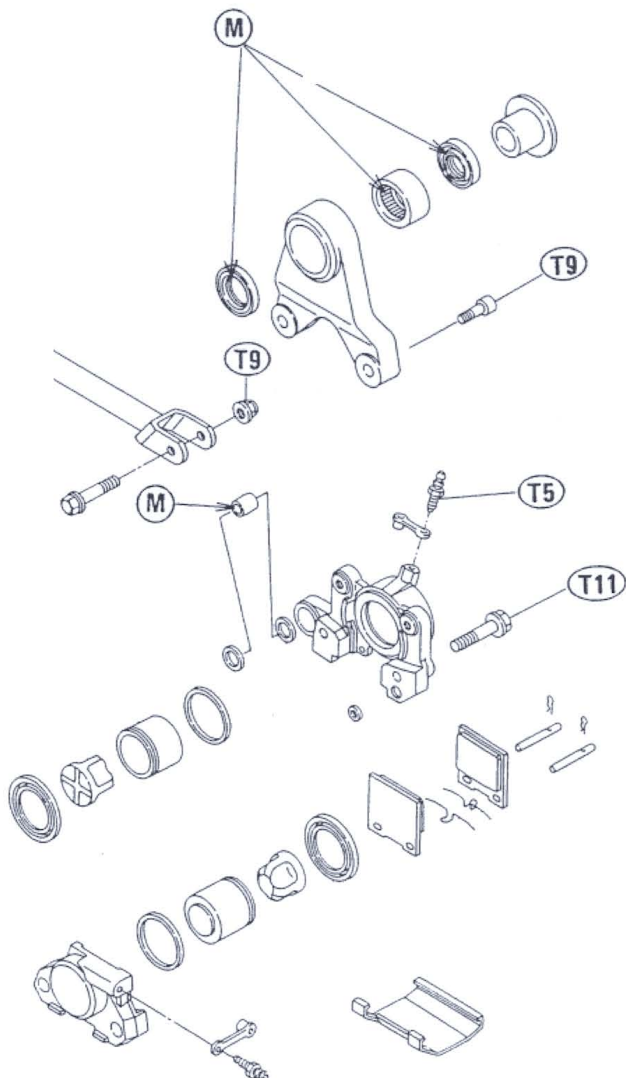
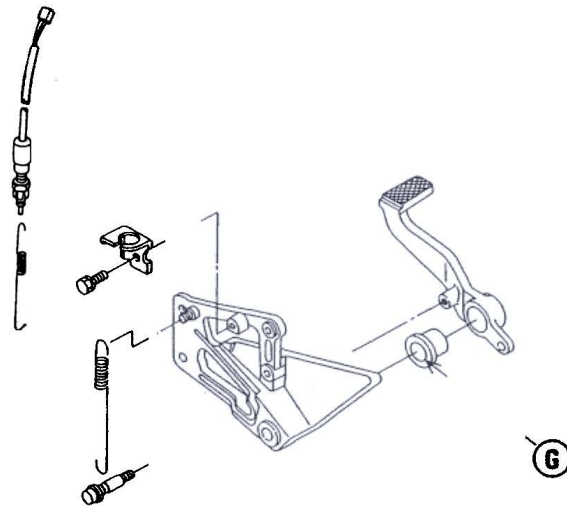
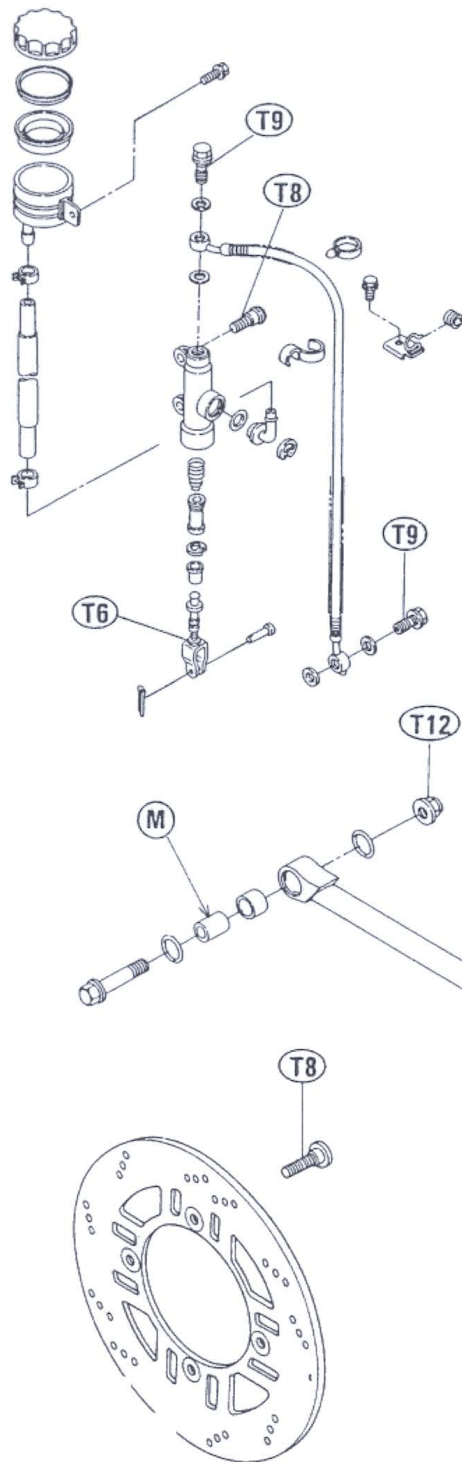
# Brakes

## Table of Contents

Exploded View .....	..11-2
Specifications .....	..11-4
Special Tools .....	..11-4
Brake Fluid .....	..11-5
Fluid Level Inspection .....	..11-5
Brake Fluid Change .....	..11-5
Brake Fluid Requirement: .....	..11-5
Changing Brake Fluid: .....	..11-5
Bleeding the Brake Line .....	..11-6
Brake Pedal .....	..11-7
Brake Pedal Position Adjustment .....	..11-7
Rear Brake Light Switch Adjustment .....	..11-8
Calipers .....	..11-8
Front Caliper Removal .....	..11-8
Rear Caliper Removal .....	..11-8
Caliper Installation .....	..11-9
Front Caliper Disassembly .....	..11-9
Rear Caliper Disassembly .....	..11-10
Assembly Notes .....	..11-10
Brake Pads .....	..11-11
Front Brake Pad Removal .....	..11-11
Rear Brake Pad Removal .....	..11-11
Installation Notes .....	..11-12
Lining Wear .....	..11-12
Master Cylinders .....	..11-13
Front Master Cylinder Installation .....	..11-13
Rear Master Cylinder Removal Notes .....	..11-13
Rear Master Cylinder Installation Notes .....	..11-13
Inspection and Adjustment after Installation .....	..11-13
Disassembly .....	..11-13
Assembly .....	..11-14
Inspection (Visually) .....	..11-14
Brake Discs .....	..11-14
Installation .....	..11-14
Wear .....	..11-14
Warp .....	..11-14

### Exploded View





**G : Apply grease.**  
**M : Apply molybdenum disulfide grease.**

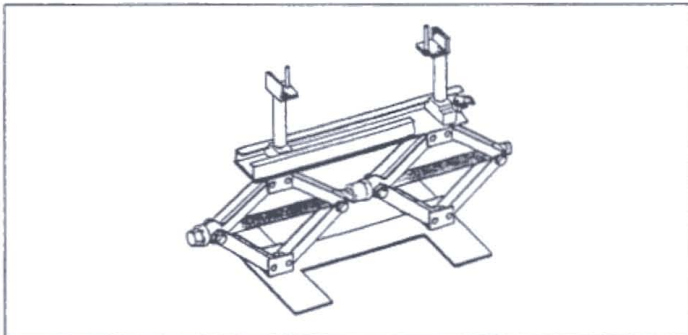
## 11-4 BRAKES

### Specifications

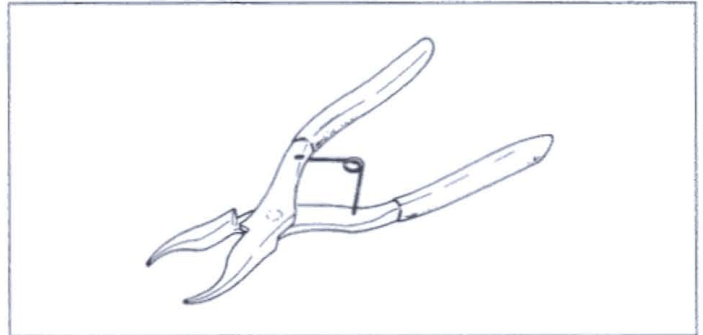
Item	Standard	Service Limit
<b>Brake Fluid:</b>		
Grade	D.O.T.3	---
Brand (recommended)	Atlas Extra Heavy Duty Shell Super Heavy Duty Texaco Super Heavy Duty Wagner Lockheed Heavy Duty Castrol Girling-Universal Castrol GT (LMA) Castrol Disc Brake Fluid	---
<b>Brake Lever Free Play:</b>	Non-adjustable	---
<b>Brake Pedal:</b>		
Brake pedal free play	Non-adjustable	---
Brake pedal position	43 mm below from center of brake pedal shaft	---
<b>Brake Light Switch:</b>		
Front	Non-adjustable	---
Rear	ON after about 10 mm pedal travel	---
<b>Brake Pad Lining Thickness:</b>		
Front	4 mm	1 mm
Rear	4 mm	1 mm
<b>Brake Discs:</b>		
Disc thickness:		
Front	4.3 ~ 4.6 mm	4 mm
Rear	5.8 ~ 6.1 mm	5 mm
Disc runout	0.2 mm or under	0.3 mm

### Special Tools

Jack: 57001-1238



Inside Circlip Pliers: 57001-143



## Brake Fluid

### Fluid Level Inspection

In accordance with the Periodic Maintenance Chart, inspect the brake fluid level in the front and rear brake fluid reservoir.

- Check the brake fluid level in the reservoir.

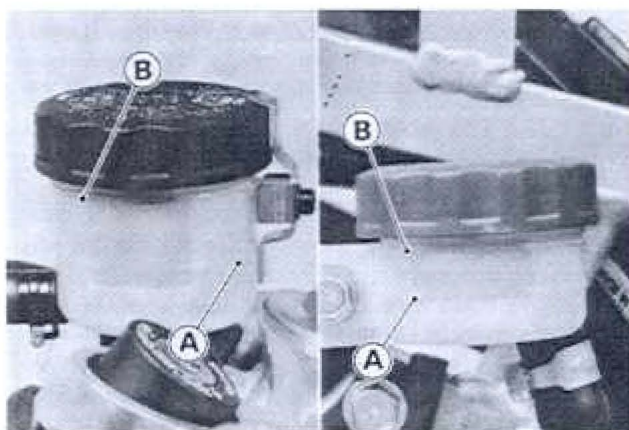
### NOTE

○ Hold the reservoir horizontal when checking brake fluid level.

★ The fluid level must be kept above the lower level lines. If the fluid level is lower than the lower level line, fill the reservoir to the upper level line of the reservoir.

### ⚠ WARNING

Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that already is in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter. Mixing different types and brands of brake fluid lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.



A. Lower Level Line

B. Upper Level Line

### Brake Fluid Change

In accordance with the Periodic Maintenance Chart, change the brake fluid. The brake fluid should also be changed if it becomes contaminated with dirt or water.

### Brake Fluid Requirement:

Recommended fluids are given in the table below. If none of the recommended brake fluids are available, use extra heavy-duty brake fluid only from a container marked D.O.T.3.

### Recommended Disc Brake Fluid

Type	D.O.T.3
Brand	Atlas Extra Heavy Duty
	Shell Super Heavy Duty
	Texaco Super Heavy Duty
	Wagner Lockheed Heavy Duty
	Castrol Girling-Universal
	Castrol GT (LMA)
	Castrol Disc Brake Fluid

### Changing Brake Fluid:

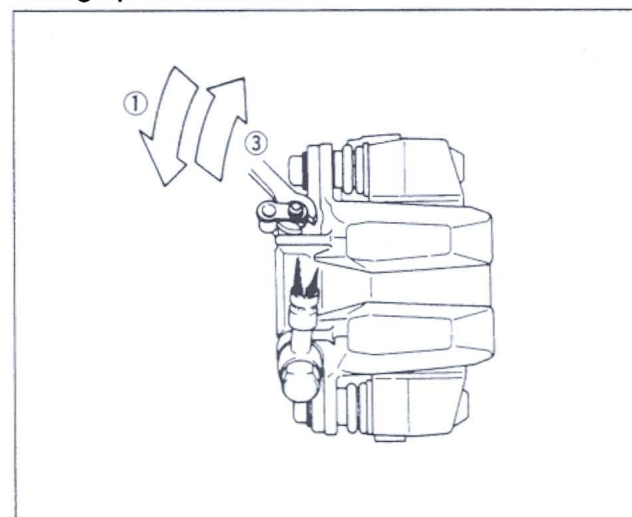
- Remove the rubber cap on the bleed valve.
- Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
- Open the bleed valve (counterclockwise to open), and pump the brake lever or pedal until all the fluid is drained from the line.
- Close the bleed valve.
- Remove the reservoir cap.
- Fill the reservoir with fresh brake fluid.
- Install the reservoir cap.
- Open the bleed valve, apply the brake by the brake lever or pedal, close the valve with the brake held applied, and then quickly release the lever or pedal. Repeat this operation until the brake line is filled and fluid starts coming out of the plastic hose.

### NOTE

○ Replenish the fluid in the reservoir as often as necessary to keep it from running completely out.

- Bleed the air from the lines (continue with Bleeding the Brake).

### Filling up the Brake Line

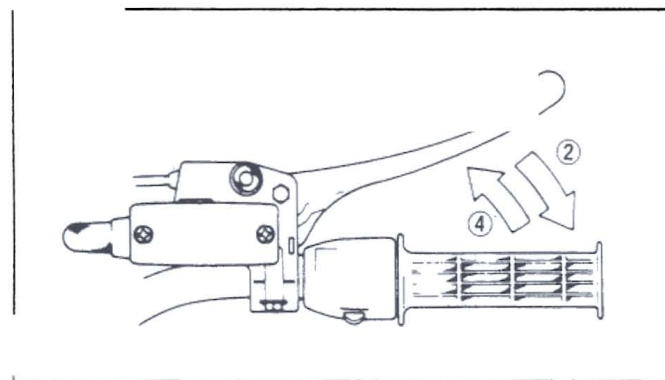


## 11-6 BRAKES

### *Bleeding the Brake Line*

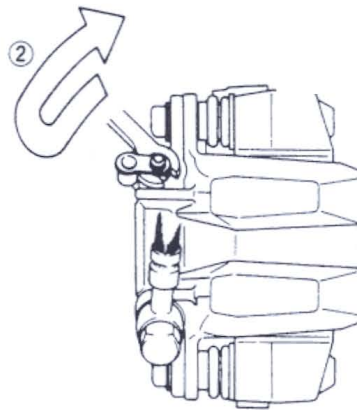
The brake fluid has a very low compression coefficient so that almost all the movement of the brake lever or pedal is transmitted directly to the caliper for braking action. Air, however, is easily compressed. When air enters the brake lines, brake lever or pedal movement will be partially used in compressing the air. This will make the lever or pedal feel spongy, and there will be a loss in braking power.

- Bleed the air from the brake whenever brake lever or pedal action feels soft or spongy, after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.
- Check that there is plenty of fluid in the reservoir.
- The fluid level must be checked several times during the bleeding operation and replenished as necessary (see Brake Fluid Change).
- ★ If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.
- With the reservoir cap off, slowly pump the brake lever or pedal several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir. This bleeds the air from the master cylinder end of the line.
- ★ If brake lever or pedal action still feels soft or spongy, bleed the remaining air as follows.
- Connect a clear plastic hose to the bleed valve at the caliper, running the other end of the hose into a container.
- Pump the brake lever or pedal a few times until it comes hard.
- Holding the brake applied, quickly open (turn counter-clockwise) and close the bleed valve.
- Repeat this operation until no more air can be seen coming out into the plastic hose.
- Check the fluid level in the reservoir every so often, replenishing it as necessary.



1. Open the bleed valve.
2. Apply the brake and hold it.
3. Close the bleed valve.
4. Then quickly release the brake.

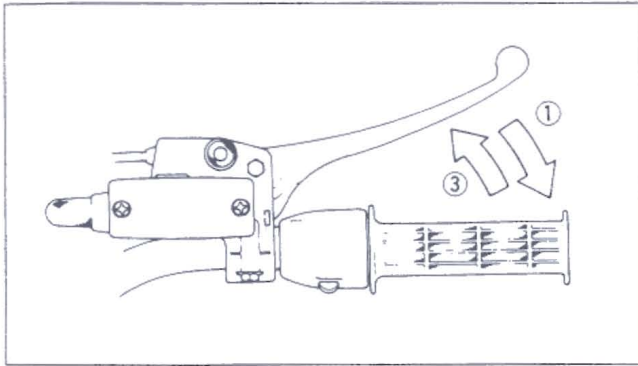
### Bleeding the Brake Line



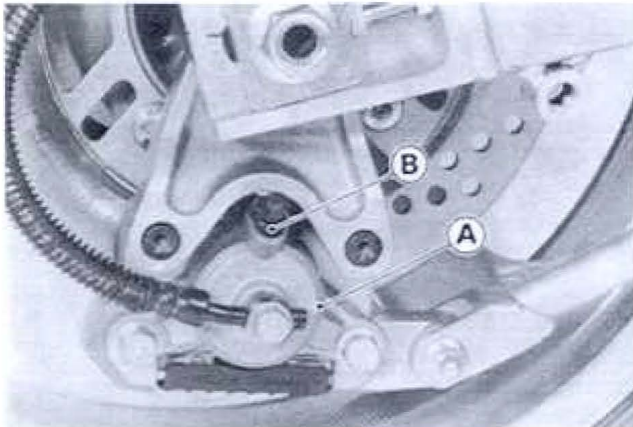
### ⚠ WARNING

When working with the disc brake, observe the precautions listed below.

1. Never reuse old brake fluid.
2. Do not use fluid from a container that has been left unsealed or that has been open for a long time.
3. Do not mix two types and brands of fluid for use in the brake. This lowers the brake fluid boiling point and could cause the brake to be ineffective. It may also cause the rubber brake parts to deteriorate.
4. Don't leave the reservoir cap off for any length of time to avoid moisture contamination of the fluid.
5. Don't change the fluid in the rain or when a strong wind is blowing.
6. Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely and will eventually deteriorate the rubber used in the disc brake.
7. When handling the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily.
8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately.
9. If any of the brake line fittings or the bleed valve is opened at any time, the **AIR MUST BE BLED FROM THE BRAKE.**



1. Hold the brake applied.
2. Quickly open and close the valve.
3. Release the brake.



A. Caliper                      B. Bleed Valve

- When air bleeding is finished, install the rubber caps on the bleed valve, and check that the brake fluid is filled to the upper level line marked in the reservoir (handlebar turned so that the reservoir is level).

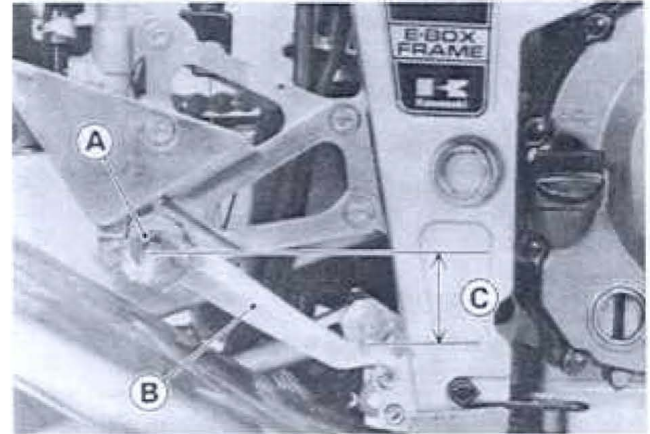
## Brake Pedal

### Brake Pedal Position Adjustment

- Check that the brake pedal is in the correct position.

#### Pedal Position

**Standard:**                      About 43 mm below from center of brake pedal shaft

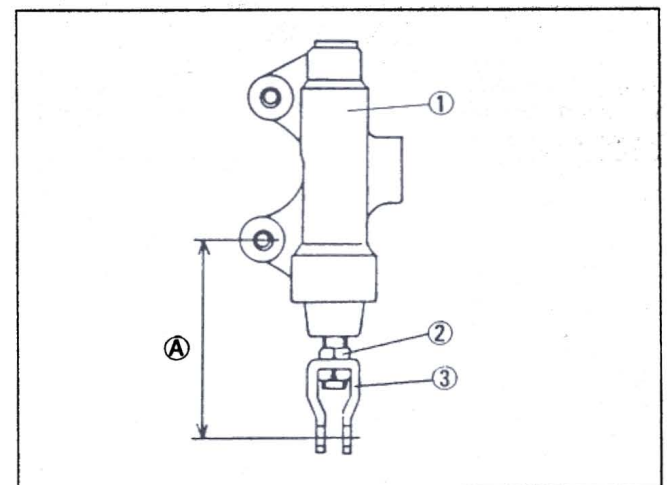


A. Footpeg                      C. Pedal Position  
B. Brake Pedal

#### NOTE

- Usually it is not necessary to adjust the pedal position, but always adjust it when the master cylinder is disassembled.
- If the pedal position cannot be adjusted by turning the clevis, the brake pedal may be deformed or incorrectly installed.

- When the brake pedal is in its rest position, measure the length (A) indicated in the figure.
- ★ If the length (A) is not within the specified length, adjust a nut.

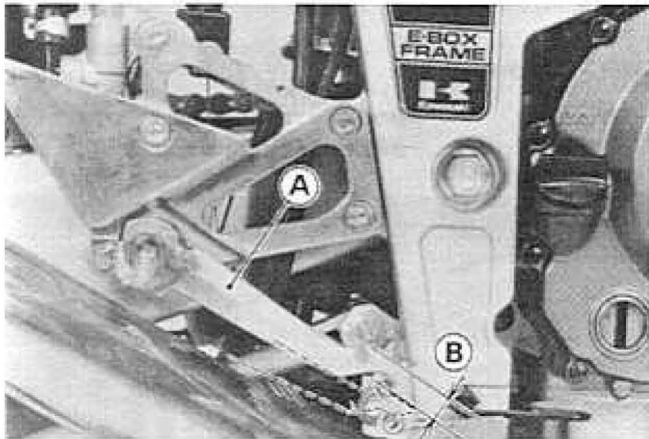


1. Master Cylinder                      3. Clevis  
2. Locknut

## 11-8 BRAKES

### Rear Brake Light Switch Adjustment

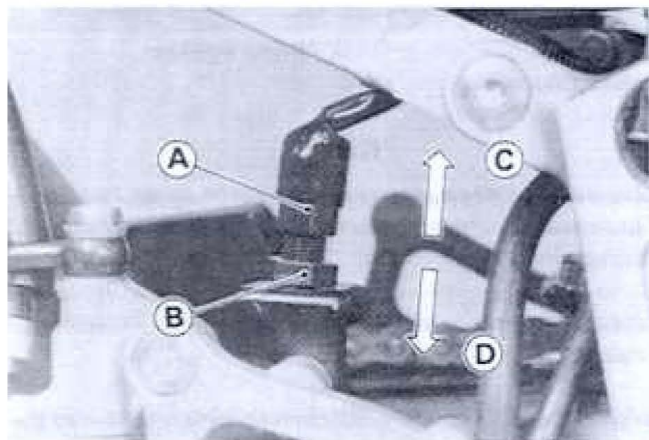
- Check the operation of the rear brake light switch by depressing the brake pedal. The brake light should go on after about **10 mm** of pedal travel.



A. Brake Pedal

B. 10 mm

- ★ If it does not, adjust the brake light switch.
- Turn the adjusting nut to adjust the switch.



A. Switch Body  
B. Adjusting Nut

C. Light sooner.  
D. Light later.

#### CAUTION

To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.

## Calipers

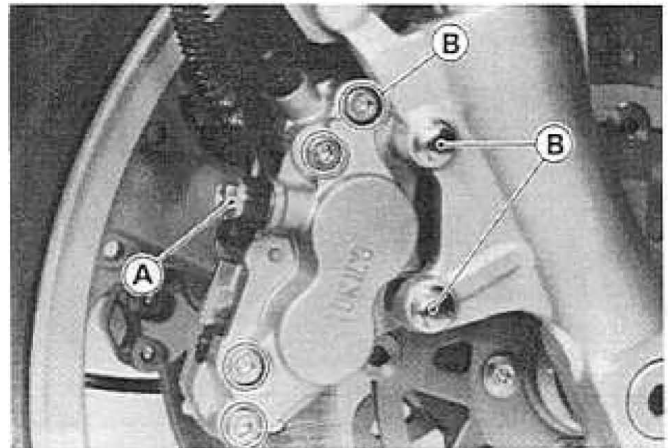
### Front Caliper Removal

- Remove the following.
  - Banjo Bolt (at the caliper)
  - Caliper Mounting Bolts

#### CAUTION

Do not loosen the caliper bolts. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper bolts will cause brake fluid leakage.

- Remove the caliper.



A. Banjo Bolt

C. Caliper Mounting Bolts

B. Caliper Assembly Bolts

#### CAUTION

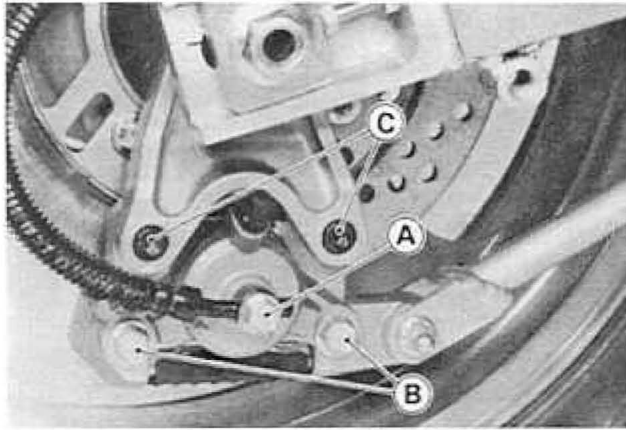
Immediately wipe up any brake fluid that spills.

### Rear Caliper Removal

- Remove the rear caliper in the same way as the front caliper.

#### CAUTION

Do not loosen the caliper bolts. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper bolts will cause brake fluid leakage.



A. Banjo Bolt  
B. Caliper Assembly Bolts  
C. Caliper Mounting Bolts

### Caliper Installation

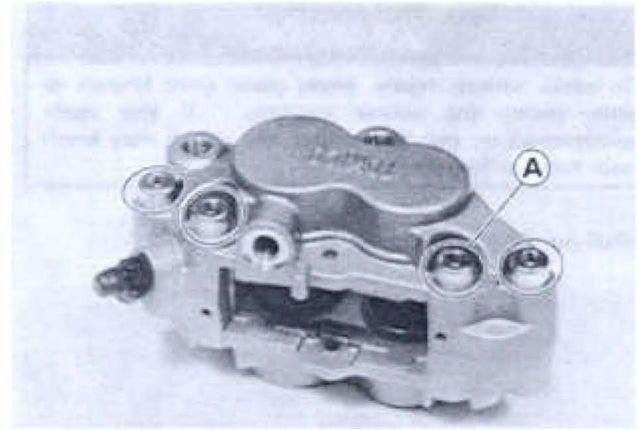
- Tighten the caliper mounting bolts to the specified torque (see Exploded View).
- Connect the brake hose to the caliper putting a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolt to the specified torque (see Exploded View).
- Check the fluid level in the master cylinder (reservoir), and bleed the brake line (see Bleeding the Brake).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

### ⚠ WARNING

Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brakes will not function on the first application of the lever or pedal if this is not done.

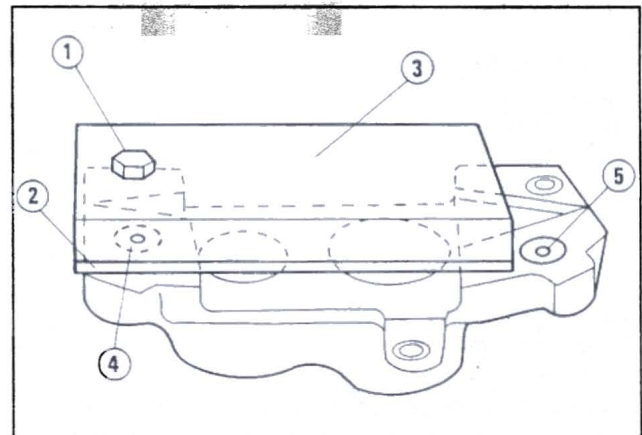
### Front Caliper Disassembly

- Remove the following.
  - Front Brake Pads (see this chapter)
  - Front Caliper (see this chapter)
- Remove the caliper assembly bolts and split the front caliper.



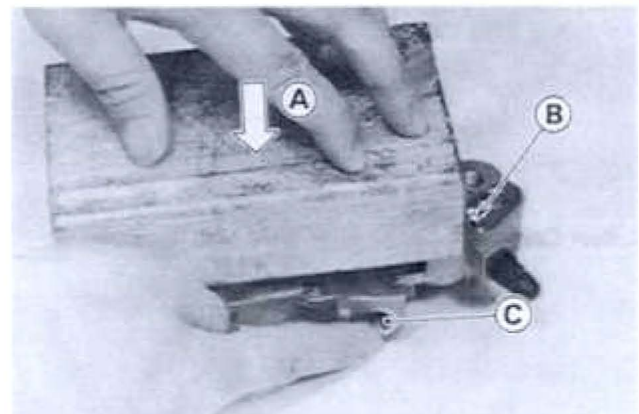
A. Caliper Assembly Bolts

- Remove the piston insulator and the O-rings.
- Using compressed air, remove the pistons. One way to remove the pistons is as follows.
- Install a wooden board more than 10 mm thick and a rubber gasket on the caliper half as shown. Leave one of the oil passages open.



1. Bolt and Nut  
2. Rubber Gasket  
3. Wooden Board  
4. Oil Passage sealed by Rubber Gasket  
5. Oil Passage

- Lightly apply compressed air to the oil passage until the pistons hit the rubber gasket. Block the hose joint opening during this operation.



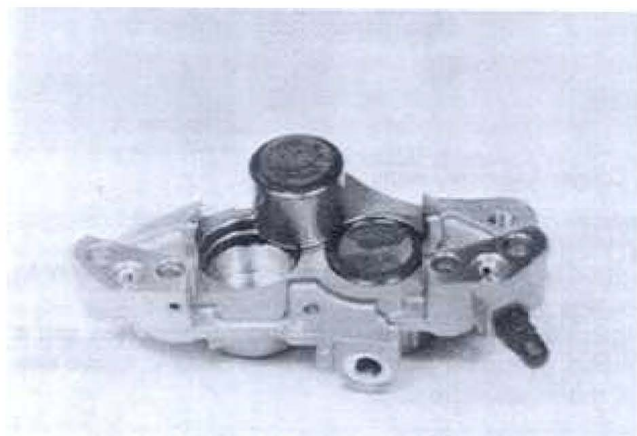
A. Push down  
B. Apply compressed air.  
C. Hose Joint Opening

## 11-10 BRAKES

### ⚠ WARNING

To avoid serious injury, never place your fingers or palm inside the caliper opening. If you apply compressed air into the caliper, the piston may crush your hand or fingers.

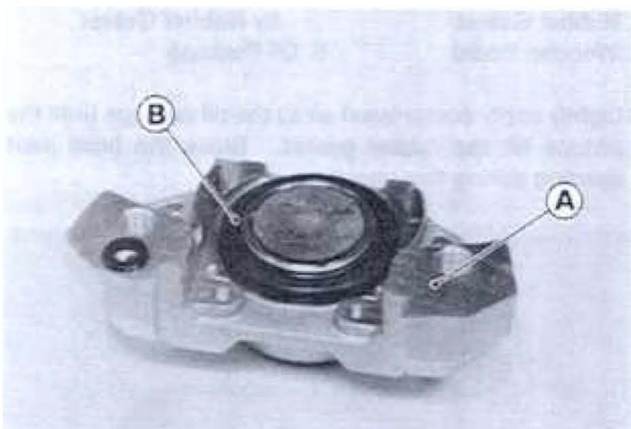
○ Pull out the pistons by hand.



- Remove the following.
  - Dust Seals
  - Fluid Seals
- Repeat the previous step to remove the pistons from the other side of the caliper body.

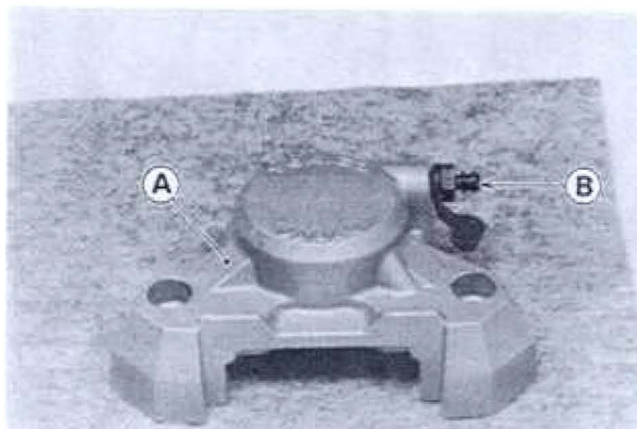
### Rear Caliper Disassembly

- Disassemble the rear caliper in the same manner as the front caliper (see Front Caliper Disassembly). Note the additional information below.
- Remove the piston dust seal before piston removal.



A. Rear Caliper

B. Dust Seal



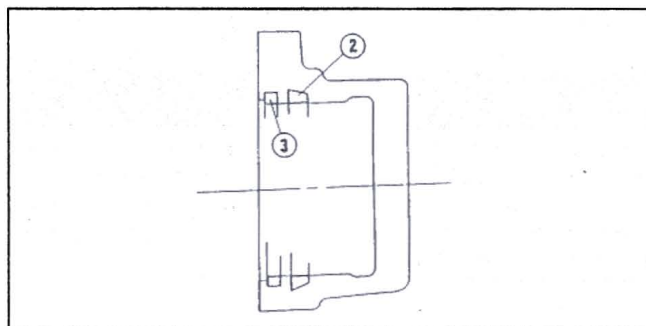
A. Rear Caliper

B. Apply compressed air.

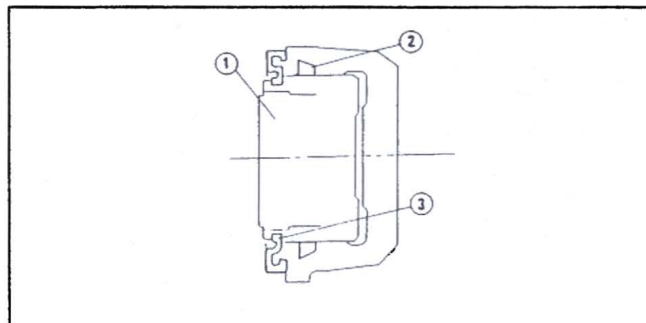
### Assembly Notes

- Apply brake fluid to the cylinders, pistons, and fluid seals, and push the pistons into the cylinders by hand. Take care that neither the cylinder nor the piston skirt get scratched.
- For the rear caliper, install the dust seal around the piston and push them into the cylinder. Check that the dust seal is properly fitted into the grooves in the piston and caliper body.

### Front Caliper



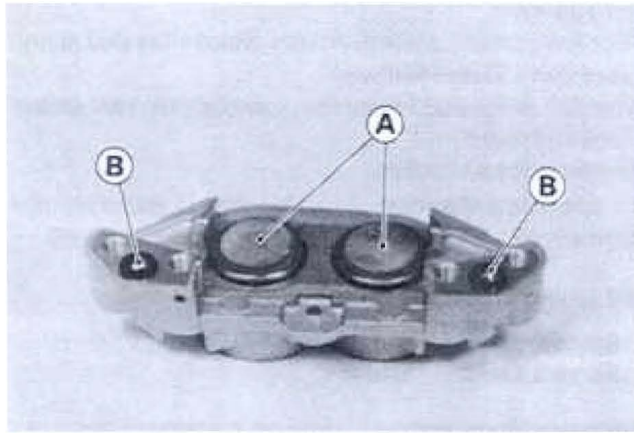
### Rear Caliper



1. Piston  
2. Fluid Seal

3. Dust Seal

- Be sure to install the following.



A. Piston Insulators

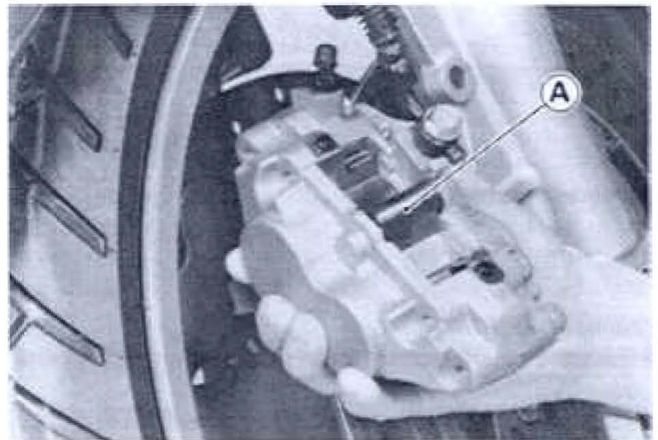
B. O-Rings

- Tighten the caliper assembly bolts to the specified torque (see Exploded View).

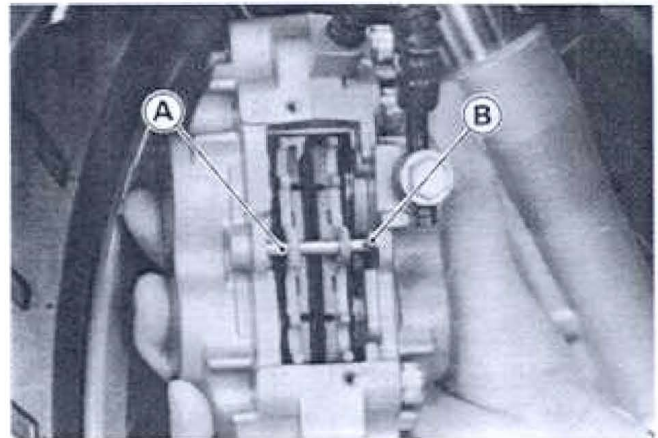
## Brake Pads

### Front Brake Pad Removal

- Remove the following.
  - Pad Spring
  - Clip
  - Pad Pin



A. Pad Spring



A. Pad Pin

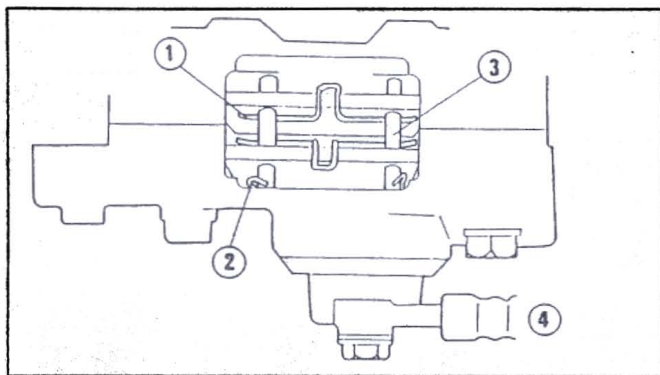
B. Clip

- Remove the brake pads.

### Rear Brake Pad Removal

- Remove the following.
  - Rear Caliper (see this chapter)
  - Plastic Pad Cover
  - Clips
  - Pad Pins
  - Springs

## 11-12 BRAKES

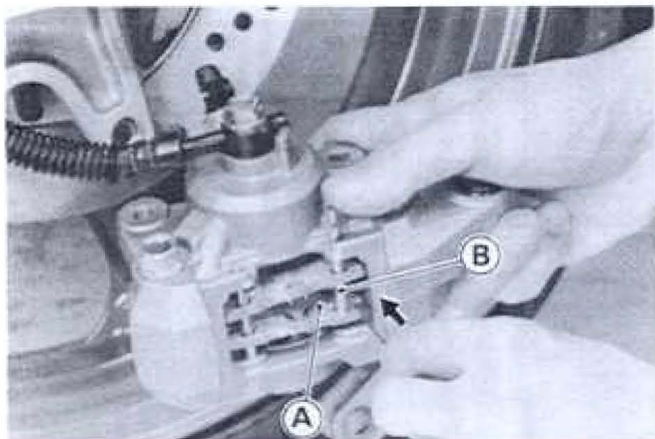


1. Springs  
2. Clips  
3. Pad Pins  
4. Outside

- Remove the brake pads .

### Installation Notes

- Push the caliper pistons in by hand as far as they will go.
- Install the pad pin(s) and clip(s) as shown. The clip(s) must be "outside" of the pads.



- A. Spring  
B. Pad Pin

- For the rear caliper, install the springs, pad pins, and clips on the original position shown (see Rear Brake Pad Removal).

### ⚠ WARNING

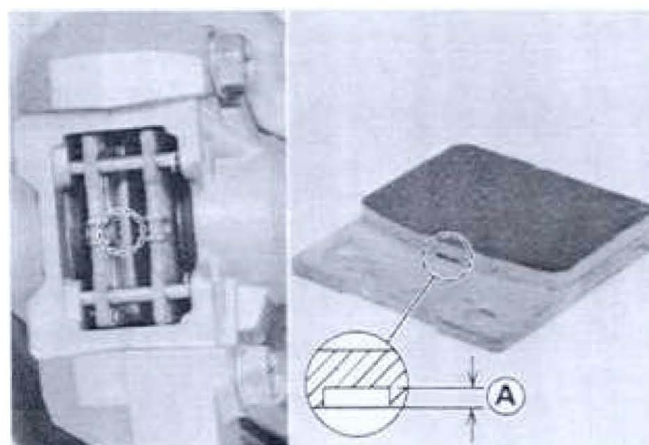
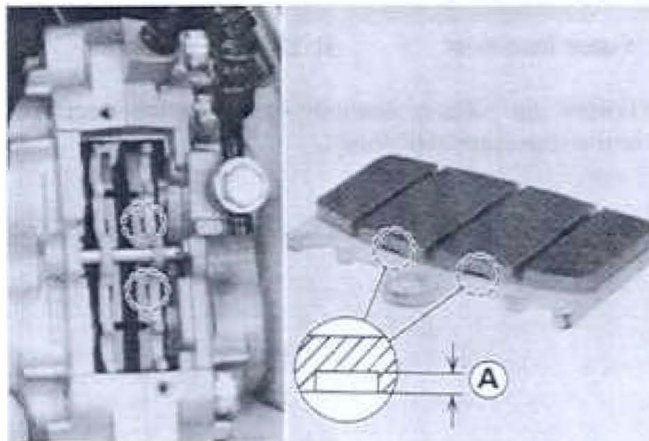
Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brake will not function on the first application of the lever or pedal if this is not done.

### Lining Wear

- For front caliper pad inspection, remove the pad spring (see Front Caliper Removal).
- For rear caliper pad inspection, remove the rear caliper (see this chapter).
- Remove the pad cover.
- ★ If the lining thickness of either pad is less than the service limit, replace both pads in the caliper as a set.

### Pad Lining Thickness (front and rear)

Standard: 4 mm  
Service Limit: 1 mm

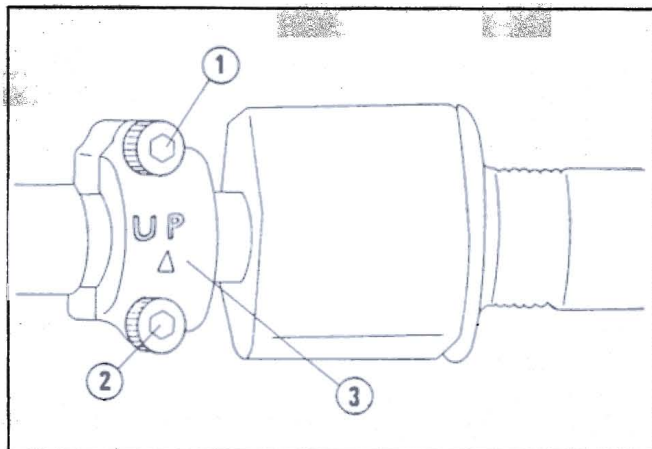


A. Service Limit

## Master Cylinders

### Front Master Cylinder Installation

- The master cylinder clamp must be installed with the arrow mark upward.
- Tighten the upper clamp bolt first, and then the lower clamp bolts to the specified torque (see Exploded View). There will be a gap at the lower part of the clamp after tightening.

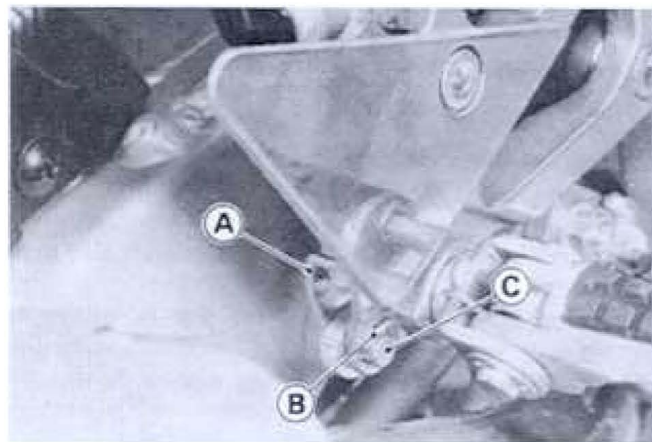


1. Tighten upper clamp bolts first.
2. Lower Clamp Bolt
3. Arrow Mark

- Use a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolts to the specified torque (see Exploded View).

### Rear Master Cylinder Removal Notes

- Remove the cotter pin and then pull the joint pin out of the push rod clevis and brake pedal.



- A. Clevis  
B. Cotter Pin  
C. Joint Pin

- Remove the master cylinder by taking off the mounting bolts.

### Rear Master Cylinder Installation Notes

- Use a new flat washer on each side of the brake hose fitting.
- Tighten the banjo bolts to the specified torque (see Exploded View).
- Tighten the rear master cylinder mounting bolts (2) to the specified torque (see Exploded View).

### Inspection and Adjustment after Installation

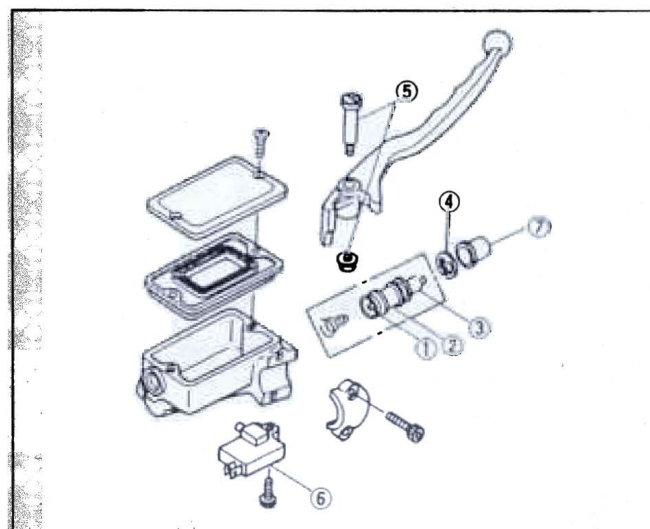
- Check and adjust the following items after installation.
  - Brake Pedal Position
  - Rear Brake Light Switch Position
  - Brake Line Air Bleed
  - Brake Drag
  - Braking Power
  - Brake Fluid Leakage

### Disassembly

- Remove the following parts.
  - Dust Cover
  - Retainer
  - Piston with Secondary Cup
  - Primary Cup
  - Spring

## CAUTION

Do not remove the secondary cup from the piston since removal will damage them.



1. Primary Cup
2. Piston
3. Secondary Cup
4. Retainer
5. Brake Lever Pivot Bolt, Nut
6. Front Brake Light Switch
7. Boot

## 11-14 BRAKES

### Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.
- Apply brake fluid to the removed parts and to the inner wall of the cylinder.

### CAUTION

Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning brake parts. Do not use any other fluid for cleaning these parts. Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the disc brake.

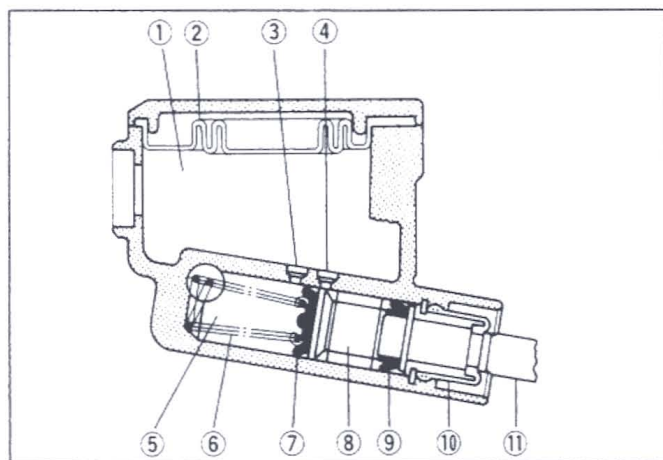
- Take care not to scratch the piston or the inner wall of the cylinder.

### Inspection (Visually)

- Check that there are no scratches, wear, rust, or pitting on the following parts.

Inside of the Master Cylinder  
Outside of the Piston  
Primary Cups  
Secondary Cups  
Dust Covers  
Return Springs  
Relief and Supply Port Plugged

- ★ If they are damaged, replace them.

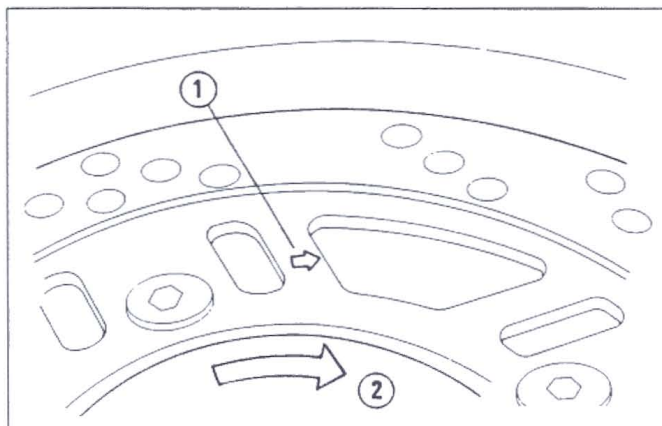


- |                  |                  |
|------------------|------------------|
| 1. Reservoir     | 7. Primary Cup   |
| 2. Diaphragm     | 8. Piston        |
| 3. Relief Port   | 9. Secondary Cup |
| 4. Supply Port   | 10. Dust Cover   |
| 5. Cylinder      | 11. Brake Lever  |
| 6. Return Spring |                  |

## Brake Discs

### Installation

- Install the brake disc on the wheel so that the rotation mark aligns with the tire rotation.



1. Rotation Mark

2. Rotation Direction

- Tighten the disc mounting bolts to the specified torque (see Exploded View).

### Wear

- ★ Replace the disc if the sliding surfaces have worn past the service limit.

### Front Disc Thickness

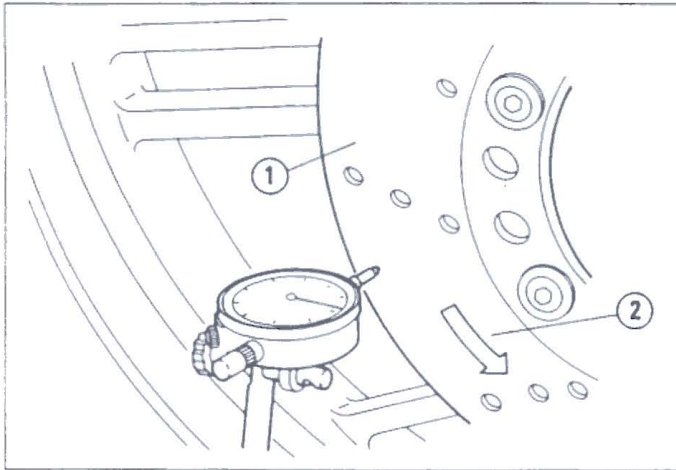
Standard: 4.3 ~ 4.6 mm  
Service Limit: 4.0 mm

### Rear Disc Thickness

Standard: 5.8 ~ 6.1 mm  
Service Limit: 5.0 mm

### Warp

- Jack up the motorcycle so that the wheel is off the ground (see Wheels/Tires chapter and Final Drive chapter).
- For front disc inspection, turn the handlebar fully to one side.
- Set up a dial gauge against the disc as shown and measure disc runout.
- ★ If runout exceeds the service limit, replace the disc.



1. Brake Disc

2. Turn the wheel by hand.

### Disc Runout

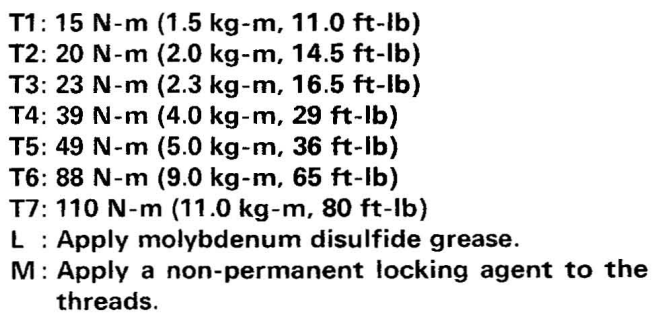
<b>Standard:</b>	<b>Under 0.2 mm</b>
<b>Service Limit:</b>	<b>0.3 mm</b>

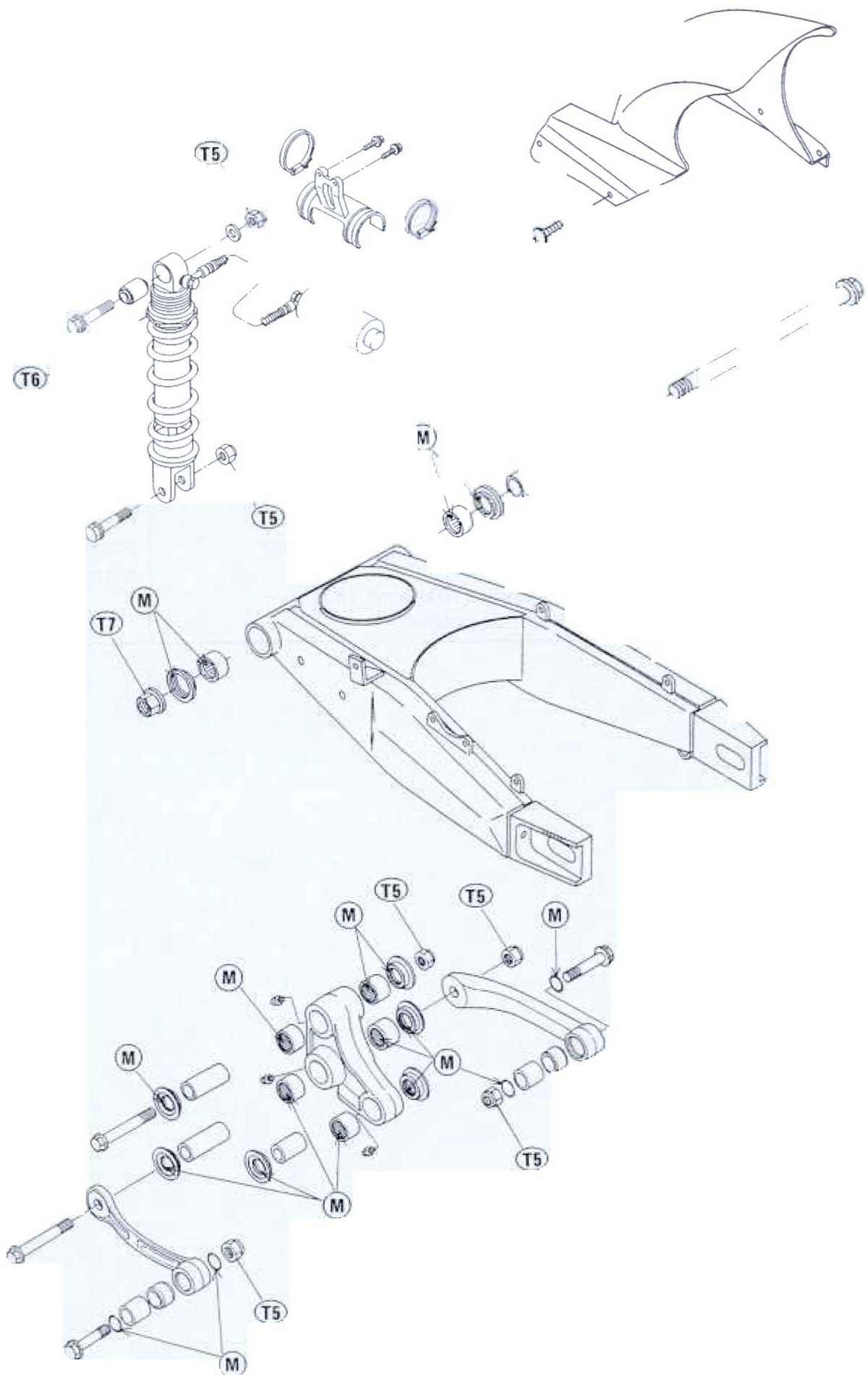
# Suspension

## Table of Contents

Exploded View .....	...12-2
Specifications .....	...12-4
Special Tools .....	...12-5
Front Fork .....	...12-6
Rebound Damping Force Adjustment ...	...12-6
Spring Preload Adjustment .....	...12-6
Fork Oil Change .....	...12-6
Removal .....	...12-8
Installation .....	...12-8
Disassembly .....	...12-8
Assembly .....	...12-10
Rear Shock Absorber .....	...12-11
Rebound Damping Force Adjustment ...	...12-11
Spring Preload Adjustment .....	...12-11
Removal .....	...12-11
Installation .....	...12-12
Disassembly .....	...12-12
Scrapping .....	...12-12
Swing Arm .....	...12-13
Removal .....	...12-13
Installation .....	...12-13
Swing Arm Sleeve Inspection .....	...12-13
Tie-Rod, Rocker Arm .....	...12-14
Tie-Rod Removal .....	...12-14
Tie-Rod Installation .....	...12-14
Rocker Arm Removal .....	...12-14
Rocker Arm Installation .....	...12-14
Needle Bearing Inspection .....	...12-14
Tie-Rod, Rocker Arm Sleeve Inspection	...12-14

### Exploded View





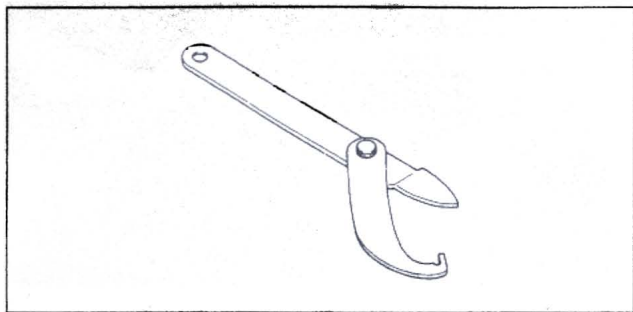
## 12-4 SUSPENSION

### Specifications

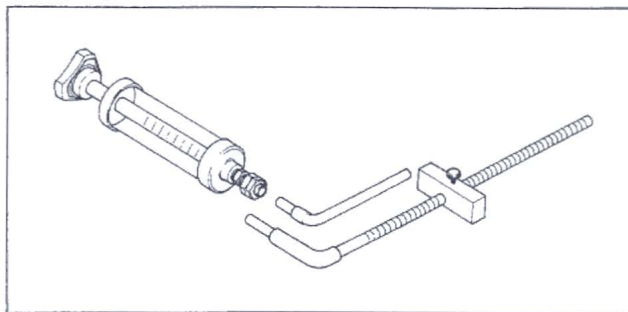
Item	Standard	Service Limit
<b>Front Fork:</b>		
Rebound damping setting	6th click from fully counterclockwise position	---
Spring preload setting	1/4 turn out position from fully counterclockwise position	---
Fork oil:		
Viscosity	SAE 5W	
Amount (perside):		
when changing oil	355 mL	
After disassembly and completely dry	421 ±4 mL	
Oil level (fully compressed, without spring)	94 ±2 mm below from top of inner tube	
Fork spring free length	311.6 mm	305 mm
<b>Rear Shock Absorber:</b>		
Rebound damping setting	No. 1 of 4 position	---
Spring preload setting	Spring free length minus 12 mm	Spring free length minus 12 mm to 24 mm
Gas pressure	980 kPa (10 kg/cm <sup>2</sup> , 142 psi) Non-adjustable	---

## Special Tools

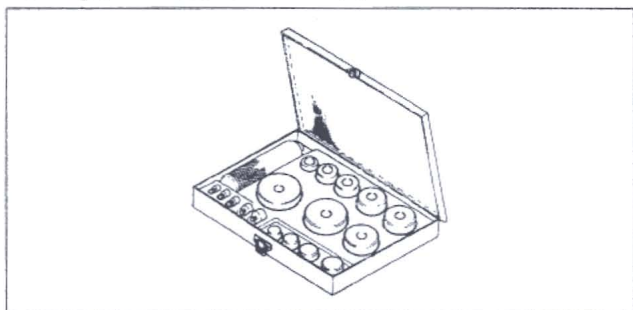
Steering Stem Nut Wrench: 57001-1100



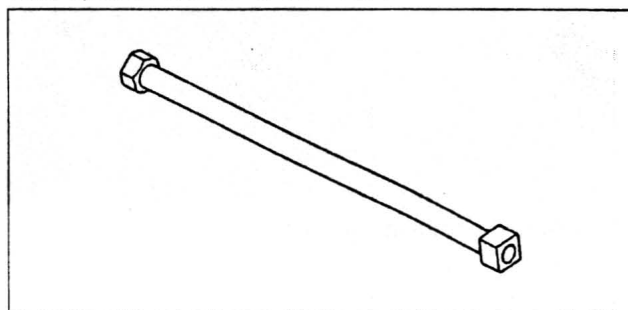
Oil Syringe: 57001-1290



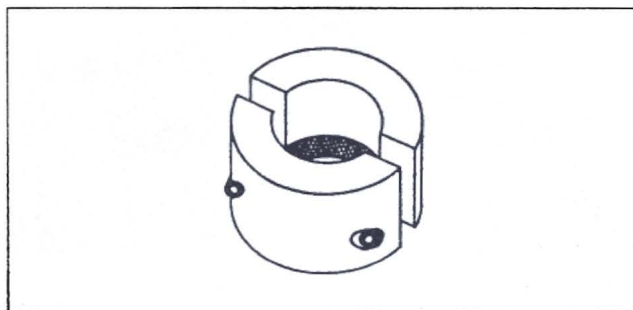
Bearing Driver Set: 57001-1129



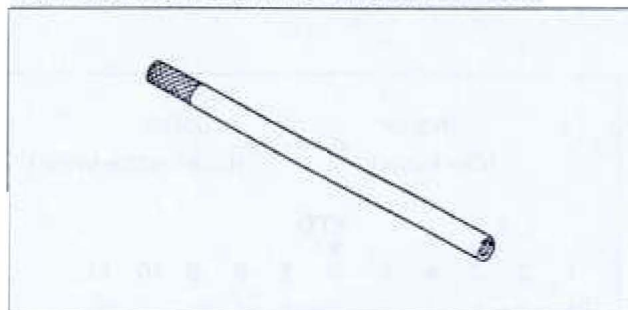
Fork Cylinder Holder: 57001-1297



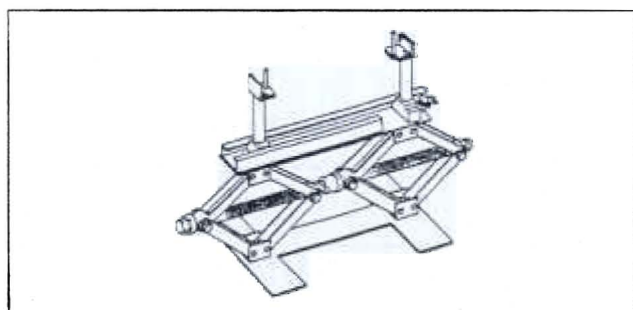
Fork Outer Tube Weight: 57001-1218



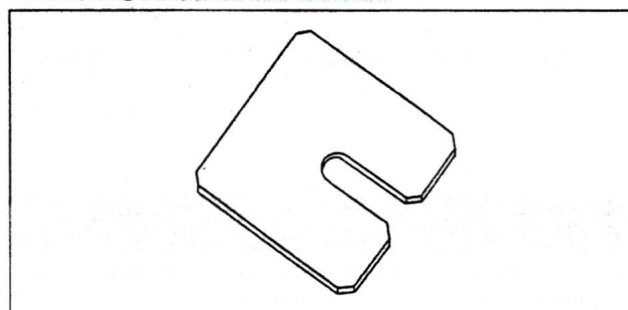
Fork Piston Rod Puller, M10 x 1.0: 57001-1298



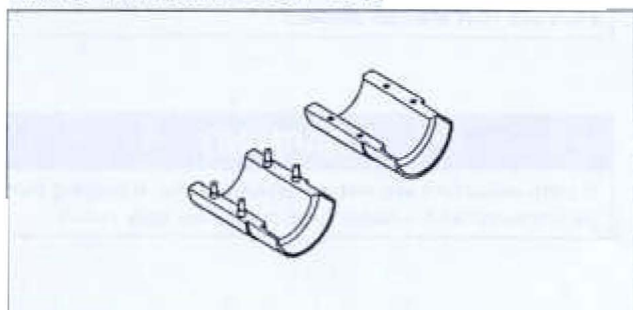
Jack: 57001-1238



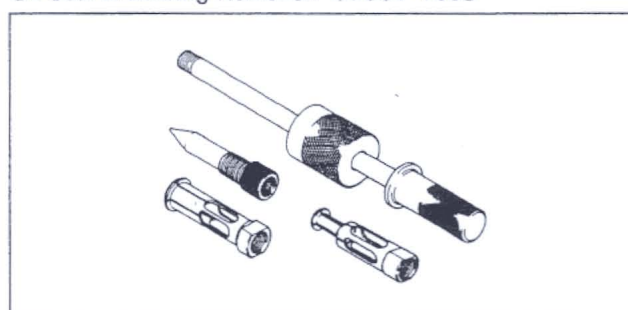
Fork Spring Stopper: 57001-1316



Fork Oil Seal Driver: 57001-1288



Oil Seal & Bearing Remover: 57001-1058

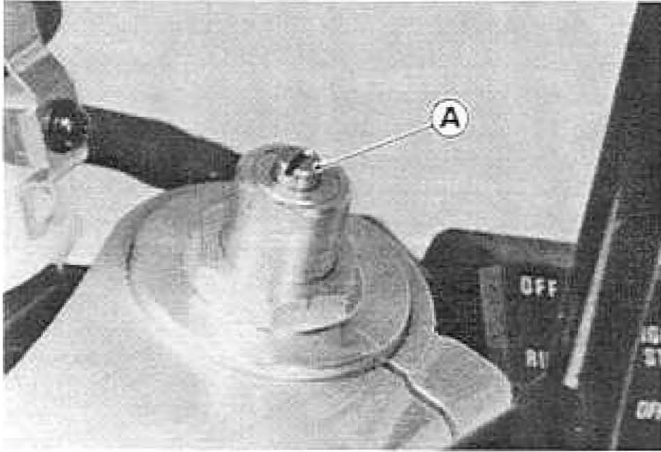


## 12-6 SUSPENSION

### Front Fork

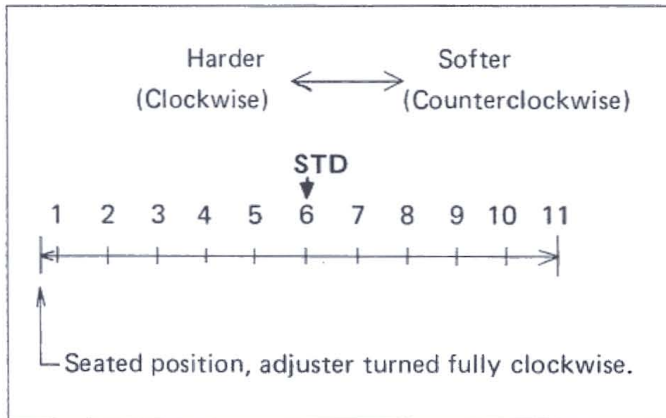
#### Rebound Damping Force Adjustment

- To adjust the rebound damping, turn the rebound damping adjuster until you feel a click.



A. Rebound Damping Adjuster

- The standard adjuster setting is the **6th click** from the fully clockwise position.



#### ⚠ WARNING

If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

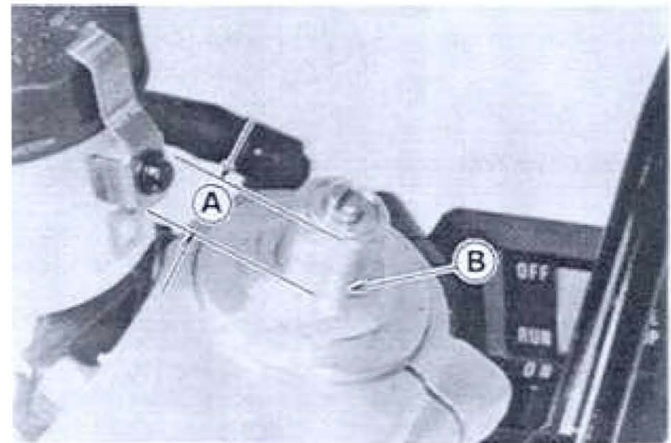
#### Spring Preload Adjustment

- Turn the adjuster in to increase spring preload and out to decrease spring preload.



A. Preload Adjuster

- The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is **14 mm** as shown.



A. 14 mm

B. 5 Marks

#### Adjuster Protrusion

- Standard: 14 mm (5 Marks)  
Usable Range: 5 ~ 20 mm (1 ~ 8 Marks)

#### CAUTION

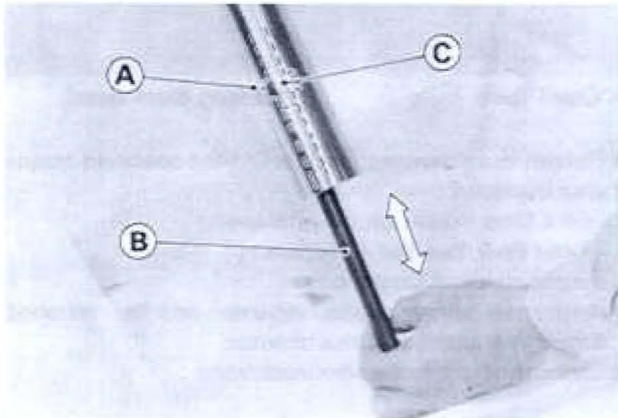
When setting the standard position, do not turn adjuster beyond the fully counterclockwise position. Fork top bolt may be loosen.

#### ⚠ WARNING

If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.

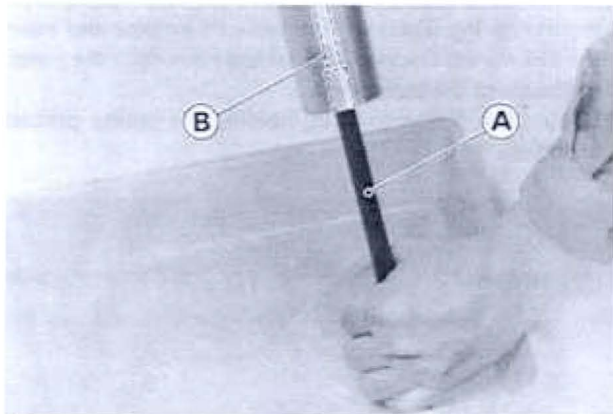
### Fork Oil Change

- Remove the following.
  - Front Fork (see Front Fork Removal)
  - Top Bolt
  - Top Spring
  - Main Spring
- Pour out the fork oil with the fork upside down.
- Using the piston rod puller (special tool), move the piston rod up and down several times in order to expel all the oil from inside the fork cylinder.



A. Inner Tube  
B. Rod Puller: 57001-1298  
C. Piston Rod

- Fill the specified type of oil in the fork cylinder.
- Using the fork position rod puller (special tool), bleed the air in the fork oil by pumping the push rod.



A. Fork Piston Rod Puller: 57001-1298  
B. Piston Rod

- Pull up the piston rod with the fork piston rod puller (special tool).

### NOTE

- Pull up the piston rod slowly so as not to spill the fork oil out of the fork tube.
- Measure the fork oil level. Fork oil level may be measured using the oil syringe (special tool).

### NOTE

- Measure the fork oil level, compressing the outer tube and piston rod down with the push rod installed.
- Set the oil syringe stopper so that its lower side shows the oil level distance specified.

### NOTE

- The gauge tube is graduated in 1 cm division.
- The syringe body is graduated in 10 mL division, excluding the gauge tube of about 5 mL capacity.

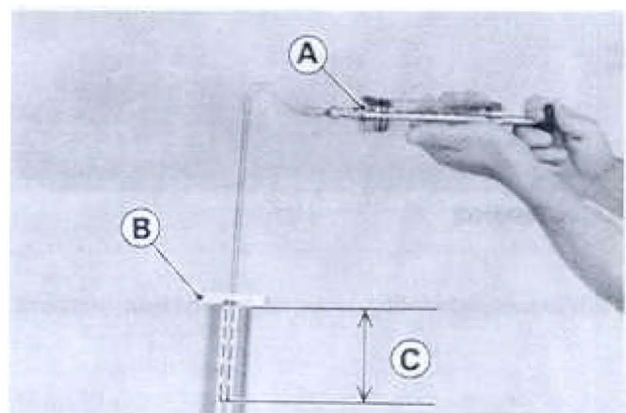
Oil Level (fully compressed, without spring)

94 ±2 mm (from the top of the inner tube)

- With the fork fully compressed, insert the gauge the into the inner tube and position the stopper across the inner tube top end.

### NOTE

- Position the stopper so that the gauge tube is the center of inner tube diameter, or the specified oil level can not get correctly.
- Pull the handle slowly to pump out the excess oil until the oil comes out no longer.
- ★ If no oil is pumped out, there is insufficient oil in the inner tube. Pour in enough oil, then pump out the excess oil as shown above.



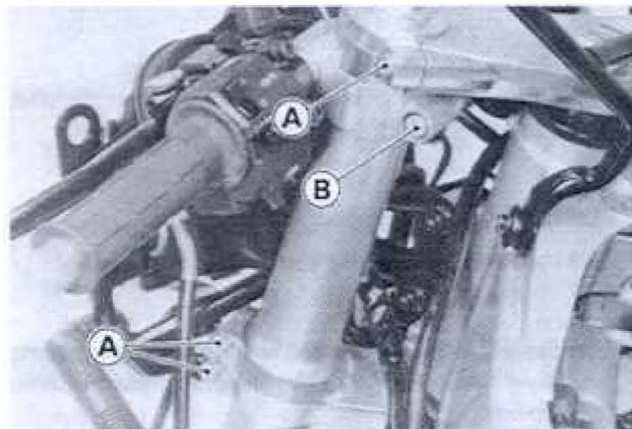
A. Oil Syringe: 57001-1290  
B. Stopper  
C. Oil Level Distance

- ★ If the oil is above or below the specified level, remove or add oil and recheck the oil level.
- Tighten the fork top plug to the specified torque (see Exploded View).
- Change the oil of the other fork leg in the same manner.
- Adjust the rebound damping force and the spring preload (see this chapter).

## 12-8 SUSPENSION

### Removal

- Remove the following.
  - Lower Fairing
  - Front Wheel
  - Front Fender Mounting Bolts and Screws
  - Fork Clamp Bolts (upper and lower, loosen)
  - Handle Holder Clamp Bolts (loosen)



A. Fork Clamp Bolts

B. Handle Holder Clamp Bolt

- If the fork leg is to be disassembled, loosen the fork top bolt.

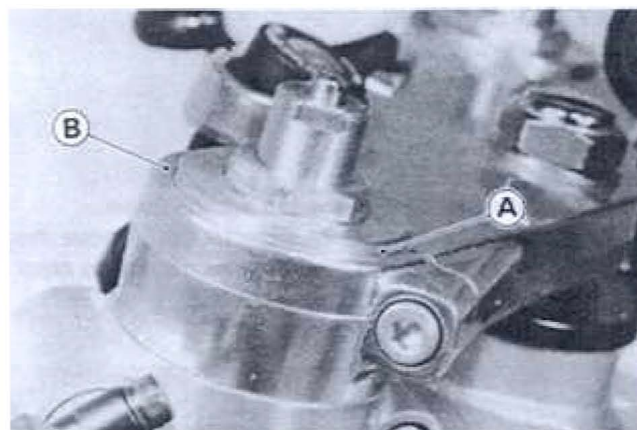


A. Fork Top Bolt

- With a twisting motion, work the fork leg down and out.

### Installation

- If the fork leg was disassembled, adjust the fork oil level.
- Align the bottom of chamfer on the outer tube upper end, with the upper surface of the steering stem head.



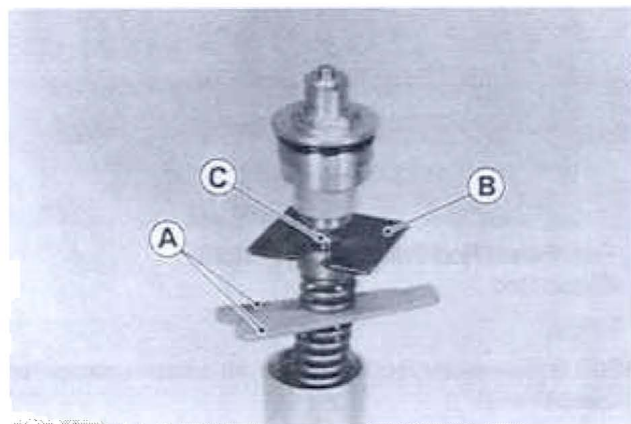
A. Outer Tube

B. Steering Stem Head

- Tighten the following fasteners to the specified torque (see Exploded View).
  - Fork Clamp Bolts (upper and lower)
  - Front Fork Top Bolt (if necessary)
  - Handle Holder Clamp Bolt
- Adjust the spring preload adjuster and the rebound damping adjuster (see this chapter).
- Check the front brake after installation.

### Disassembly

- Remove the front fork (see this chapter).
- Drain the fork oil.
- Turn the spring preload adjuster fully counterclockwise until the adjuster stops.
- Remove the fork top bolt from the outer tube.
- To loose the piston rod nut inside the top spring press the top spring down with suitable thin plates and insert the fork spring stopper (special tool) between the piston rod nut and the top spring.
- Loosen the piston rod nut, holding the spring preload adjuster.



A. Suitable Thin Plates      C. Piston Rod Nut  
B. Fork Spring Stopper: 57001-1316

- Remove the following.
  - Fork Top Bolt
  - Collar
  - Top Spring with Fork Spring Guide
  - Main Spring