Kawasaki

KR-1

Motorcycle Service Manual

Quick Reference Guide

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This quick reference guide will assist you in locating a desired topic or procedure.

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- Refer to the sectional table of contents for the exact pages to locate the specific topic required.

1

General Information

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Before Servicing

Before starting to service a motorcycle, careful reading of the applicable section is recommended to eliminate unnecessary work. Photographs, diagrams, notes, cautions, warnings, and detailed descriptions have been included wherever necessary. Nevertheless, even a detailed account has limitations, a certain amount of basic knowledge is also required for successful work.

Especially note the following:

(1) Dirt

Before removal and disassembly, clean the motorcycle. Any dirt entering the engine or other parts will work as an abrasive and shorten the life of the motorcycle. For the same reason, before installing a new part, clean off any dust or metal filings.

(2) Battery Ground

Remove the ground (–) lead from the battery before performing any disassembly operations on the motorcycle. This prevents:

(a) the possibility of accidentally turning the engine over while partially disassembled.

(b) sparks at electrical connections which will occur when they are disconnected.

(c) damage to electrical parts.

(3) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, they should all be started in their holes and tightened to a snug fit. Then tighten them evenly in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter of turn and then remove them.

Where there is a tightening sequence indication in this Service Manual, the bolts, nuts, or screws must be tightened in the order and method indicated.

(4) Torque

The torque values given in this Service Manual should always be adhered to. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(5) Force

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Whenever tapping is necessary, tap lightly using a wooden or plastic faced mallet. Use an impact driver for screws (particularly for the removal of screws held by a locking agent) in order to avoid damaging the screw heads.

(6) Edges

Watch for sharp edges, especially during major engine disassembly and assembly. Protect your hands with gloves or a piece of thick cloth when lifting the engine or turning it over.

(7) High Flash point Solvent

A high flash point solvent is recommended to reduce fire danger. A commercial solvent commonly available in North America is Stoddard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(8) Gasket, O-ring

Do not reuse a gasket or O-ring once it has been in service. The mating surfaces around the gasket should be free of foreign matter and perfectly smooth to avoid oil or compression leaks.

(9) Liquid Gasket, Nonpermanent Locking Agent

Follow manufacturer's directions for cleaning and preparing surfaces where these compounds will be used. Apply sparingly. Excessive amounts may block engine oil passages and cause serious damage. An example of a non-permanent locking agent commonly available in North America is Loctite Lock'n Seal (Blue).

(10) Press

A part installed using a press or driver, such as a wheel bearing, should first be coated with oil on its outer or inner circumference so that it will go into place smoothly.

(11) Ball Bearing

When installing a ball bearing, the bearing race which is affected by friction should be pushed by a suitable driver. This prevents severe stress on the balls and races, and prevents races and balls from being dented. Press a ball bearing until it stops at the stop in the hole or on the shaft.

(12) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals.

When pressing in a seal which has manufacturer's marks, press it in with the marks facing out. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of seal, until the face of the seal is even with the end of the hole.

(13) Seal Guide

A seal guide is required for certain oil or grease seals during installation to avoid damage to the seal lips. Before a shaft passes through a seal, apply a little oil, preferably high temperature grease on the lips to reduce rubber to metal friction.

(14) Circlip, Retaining Ring

Replace any circlips and retaining rings that were removed with new ones, as removal weakens and deforms them. When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more.

(15) Cotter Pin

Replace any cotter pins that were removed with new ones, as removal deforms and breaks them.

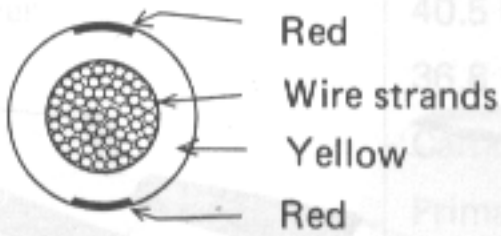
(16) Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the rubbing surfaces have an adequate lubricative film. During assembly, oil or grease (whichever is more suitable) should be applied to any rubbing surface which has lost its lubricative film. Old grease and dirty oil should be cleaned off. Deteriorated grease has lost its lubricative quality and may contain abrasive foreign particles.

Don't use just any oil or grease. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended. This manual makes reference to molybdenum disulfide grease (MoS_2) in the assembly of certain engine and chassis parts. Always check manufacturer recommendations before using such special lubricants.

(17) Electrical Wires

All the electrical wires are either single-color or two-color and, with only a few exceptions, must be connected to wires of the same color. On any of the two-color wires there is a greater amount of one color and a lesser amount of a second color, so a two-color wire is identified by first the primary color and then the secondary color. For example, a yellow wire with thin red stripes is referred to as a "yellow/red" wire; it would be a "red/yellow" wire if the colors were reversed to make red the main color.

Wire (cross-section)	Name of Wire Color
	Yellow/red

(18) Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed. These replacement parts will be damaged or lose their original function once removed.

(19) Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to the condition of them, replace them with new ones.

Abrasion	Crack	Hardening	Warp
Bent	Dent	Scratch	Wear
Color change	Deterioration	Seizure	

(20) Service Data

Numbers of service data in this text have following meanings:

"Standards": Show dimensions or performances which brand-new parts or systems have.

"Service limits": Indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

Model Identification

KR250-B1

KR250-B2

General Specifications

Items		KR250-B1	KR250-B2
Dimensions:			
Overall length		Ⓐ 2 005 mm, Ⓢ 1 945 mm	2 015mm, Ⓖ Ⓘ 2 035 mm
Overall width		690 mm	←
Overall height		1 115 mm	←
Wheelbase		1 365 mm	←
Road clearance		125 mm	←
Seat height		750 mm	←
Dry weight		123 kg	←
Curb weight:	Front	70 kg	←
	Rear	76 kg	←
Fuel tank capacity		16.0 L	←
Performance:			
Braking distance		12.5 m from 50 km/h	
Minimum turning radius		3.2 m	
Engine:			
Type		2-stroke, Crankcase Reed Valve, 2-cylinder	
Cooling system		Liquid-cooled	
Bore and stroke		56.0 x 50.6 mm	
Displacement		249 mL	
Compression ratio		7.4	
Maximum horsepower		40.5 kW (55 PS) @10 500 r/min (rpm)	
Maximum torque		36.8 N-m (3.75 kg-m, 27.1 ft-lb) @10 500 r/min (rpm)	
Carburetion system		Carburetors, Keihin PWK28 x 2	
Starting system		Primary kick	
Ignition system		CDI	
Timing advance		Electronically advanced	
Ignition timing		From 13.5° BTDC @1 200 r/min (rpm) to 25° BTDC @5 600 r/min (rpm)	
Spark plug		NGK BR9ES, ND W27ESR	
Valve timing:			
Inlet	Open	—	
	Close	—	
	Duration	—	

Items			KR250-B1	KR250-B2
Exhaust	Open		93° BBDC	←
	Close		93° ABDC	←
	Duration		186°	←
Scavenging	Open		63° BBDC	←
	Close		63° ABDC	←
	Duration		126°	←
Lubrication system			Superlube (oil injection)	←
Engine oil:				
Type			2-stroke oil	←
Capacity			1.2 L	←
Drive Train:				
Primary reduction sytem:				
Type			Gear	←
Reduction ratio			2.541 (61/24)	←
Clutch type			Wet multi disc	←
Transmission:	Type		6-speed, constant mesh, return shift	←
	Gear ratios:	1st	2.533 (38/15)	←
		2nd	1.727 (38/22)	←
		3rd	1.315 (25/19)	←
		4th	1.086 (25/23)	←
		5th	0.962 (26/27)	←
		6th	0.862 (25/29)	←
Final drive system:				
Type			Chain drive	←
Reduction ratio			2.666 (40/15), Ⓢ 2.928 (41/14)	←
Overall drive ratio			5.842 @Top gear, Ⓢ 6.416 @Top gear	←
Transmission oil				
Grade			SE class	←
Viscosity			SAE 10W30 or 10W40	←
Capacity			0.85 L	←
Frame:				
Type			Tubular, diamond	←
Caster (rake angle)			24°	←
Trail			93 mm	←
Front tire:	Type		Tubeless	←
	Size		100/70 R17 48H	100/70 R17 49H

Items		KR250-B1	KR250-B2
Rear tire:	Type	Tubeless	←
	Size	130/60 R18 60H	←
Front suspension:			
	Type	Telescopic fork	←
	Wheel travel	130 mm	←
Rear suspension:	Type	Swing arm (uni-trak)	←
	Wheel travel	105 mm	←
Brake type:	Front	Dual disc	←
	Rear	Single disc	←
Electrical Equipment:			
Battery		12 V 4 Ah	←
Headlight:	Type	Semi-sealed beam	←
	Bulb	12 V 60/55 W (quartz-halogen)	←
Tail/brake light		12 V 5/21 W, Ⓢ 12 V 8/27 W	←
Magneto:	Type	Three-phase AC	←
	Rated output	14 A @8 000 r/min (rpm), 14 V	←
Voltage regulator:			
	Type	Short-circuit	←

Specifications subject to change without notice and may not apply to every country.

Ⓐ : Australian Model
Ⓖ : Greek Model
Ⓘ : Italian Model
Ⓢ : South African Model

Periodic Maintenance Chart

The scheduled maintenance must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

OPERATION \ FREQUENCY	Whichever comes first → Every	*ODOMETER READING 800 km	4 000 km	8 000 km	12 000 km	16 000 km	20 000 km	24 000 km
Idle speed – check †		•	•	•	•	•	•	•
Throttle grip play – check †		•		•		•		•
Oil pump and carburetor synchronization –check †		•	•	•	•	•	•	•
Spark plug – clean and gap †		•	•	•	•	•	•	•
Air cleaner element – clean			•		•		•	
Air cleaner element–replace	5 cleanings					•		
Fuel system–clean				•		•		•
Cylinder head bolts – check †		•		•		•		•
Battery electrolyte level – check †	month	•	•	•	•	•	•	•
Brake fluid level – check †	month	•	•	•	•	•	•	•
Brake fluid – change	2 years						•	
Brake light switch – check †		•	•	•	•	•	•	•
Brake pad wear – check †			•	•	•	•	•	•
Clutch – adjust		•	•	•	•	•	•	•
Steering play – check †		•	•	•	•	•	•	•
Drive chain wear – check †			•	•	•	•	•	•
Nuts, bolts, fasteners – check †		•		•		•		•
Tire wear – check †			•	•	•	•	•	•
Transmission oil – change	year	•		•		•		•
General lubrication – perform			•	•	•	•	•	•
Front fork oil – change								•
Swing arm pivot – lubricate				•		•		•
Coolant – change	2 years							•
Radiator hoses, connections – check †	year	•		•		•		•
Steering stem bearing – lubricate	2 years						•	
Caliper piston seal and dust seal – replace	2 years							
Master cylinder cup and dust seal – replace	2 years							
Brake hose – replace	4 years							
Fuel hose – replace	4 years							
Drive chain – lubricate	Every 300 km							
Drive chain slack – check †	Every 800 km							

* : For higher odometer readings, repeat at the frequency interval established here.
† : Replace, add, adjust, or torque if necessary.

Torque and Locking Agent

Tighten all bolts and nuts to the proper torque using an accurate torque wrench. In insufficiently tightened, a bolt or nut may become damaged or fall off, possibly resulting in damage to the motorcycle and injury to the rider. A bolt or nut which is overtightening may become damaged, strip an internal thread, or break and then fall out. The following table lists the tightening torque for the major bolts and nuts, and the parts requiring use of a non-permanent locking agent, liquid gasket, or silicone sealant. When checking the tightening torque of the bolts and nuts, first loosen the bolt or nut by half a turn and then tighten to specified torque.

Letters used in the "Remarks" column mean:
L : Apply a non-permanent locking agent to the threads.
LG : Apply liquid gasket – silver (Kawasaki bond: 92104-002) to the threads.
S : Tighten the fasteners following the specified sequence.
SS : Apply a silicone sealant (Kawasaki bond: 56019-120) to the threads.

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Cooling System:				
Coolant Temperature Sensor	15	1.5	11.0	SS
Drain Plug	17	1.7	12.0	
Impeller Shaft Nut	9.8	1.0	87 in-lb	
Engine Top End:				
Cylinder Head Bolts	25	2.5	18.0	S
Cylinder Nuts	22	2.2	16.0	S
Exhaust Valve Operating Unit Screw	2.9	0.3	26 in-lb	
Exhaust Valve Operating Unit Connecting-rod Screws	–	–	–	L
Cylinder Studs	9.8	1.0	87 in-lb	
Engine Right Side:				
Clutch Spring Bolts	9.8	1.0	87 in-lb	
Kick Stopper Mounting Screws	–	–	–	L
Engine Lubrication System:				
Transmission Oil Drain Plug	20	2.0	14.5	
Oil Pump Outlet Hose Banjo Bolts	4.9	0.5	43 in-lb	
Engine Removal/Installation:				
Engine Mounting Bolts	49	5.0	36	
Crankshaft/Transmission:				
Crankcase Bolts (8 mm Dia.)	25	2.5	18.0	
Crankcase Bolts (6 mm Dia.)	9.8	1.0	87 in-lb	
Shift Drum Pin Plate Bolt	22	2.2	16.0	L
Shift Drum Positioning Lever Mounting Bolt	9.8	1.0	87 in-lb	
Gear Positioning Lever Stud	22	2.2	16.0	L
Balance Cover Mounting Bolts (8 mm Dia.)	25	2.5	18.0	
Balance Cover Mounting Bolts (6 mm Dia.)	9.8	1.0	87 in-lb	

Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Wheels/Tires:				
Front Axle Nut	88	9.0	65	
Front Axle Clamp Bolts	20	2.0	14.5	
Rear Axle Nut	88	9.0	65	
Tire Air Valve Nuts	1.5	0.15	13 in-lb	
Final Drive:				
Engine Sprocket Holding Plate Bolts	9.8	1.0	87 in-lb	
Rear Sprocket Nuts	59	6.0	43	
Rear Coupling Studs	—	—	—	L
Brakes:				
Caliper Mounting Bolts	25	2.5	18.0	
Brake Hose Banjo Bolts	25	2.5	18.0	
Disc Mounting Allen Bolts	23	2.3	16.5	
Brake Lever Pivot Nut	5.9	0.60	52 in-lb	
Front Master Cylinder Clamp Bolts	8.8	0.90	78 in-lb	
Torque Link Nut (Front)	34	3.5	25	
Torque Link Nut (Rear)	14	1.4	10.0	
Rear Master Cylinder Mounting Bolts	25	2.5	18.0	
Bleed Valves	7.8	0.8	69 in-lb	
Brake Pedal Mounting Bolt	25	2.5	18.0	
Suspension:				
Front Fork:				
Fork Clamp Bolts (Upper)	20	2.0	14.5	
Fork Clamp Bolts (Lower)	29	3.0	22	
Bottom Allen Bolts	61	6.2	45	L
Drain Screws	—	—	—	LG
Axle Clamp Bolts	20	2.0	14.5	
Rear Shock Absorber:				
Shock Absorber Bolts	49	5.0	36	
Rocker Arm Bolt	49	5.0	36	
Swing Arm Pivot Nut	93	9.5	69	
Rocker Arm Nut	49	5.0	36	
Steering:				
Steering Stem Head Nut	39	4.0	29	
Handlebar Holder Allen Bolts	12	1.2	104 in-lb	L
Handlebar Clamp Bolts	23	2.3	16.5	
Frame:				
Side Stand Bracket Mounting Bolts	25	2.5	18.0	L

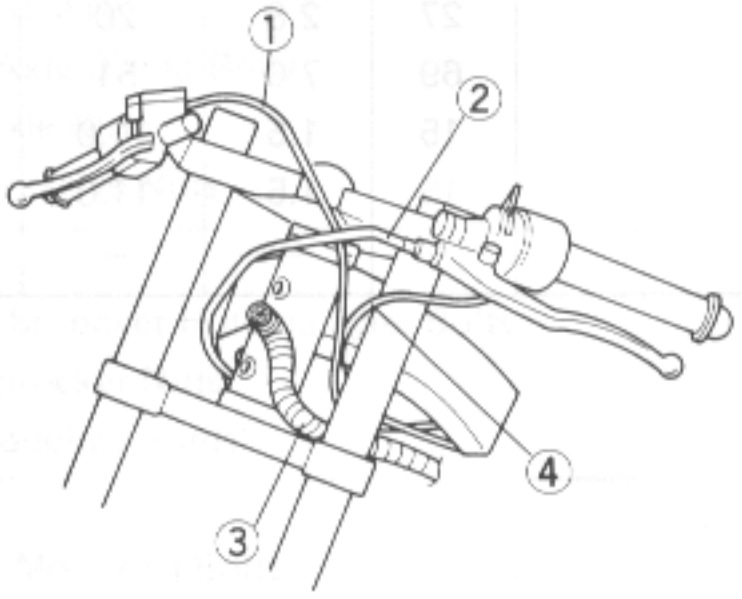
Fastener	Torque			Remarks
	N-m	kg-m	ft-lb	
Electrical System:				
Spark Plugs	27	2.8	20	
Magneto Rotor Bolt	69	7.0	51	
Coolant Temperature Sensor	15	1.5	11.0	SS
Neutral Switch	15	1.5	11.0	
Side Stand Switch Mounting Screws	—	—	—	L

The table below, relating tightening torque to thread diameter, lists the basic torque for the bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. All of the values are for use with dry solvent-cleaned threads.

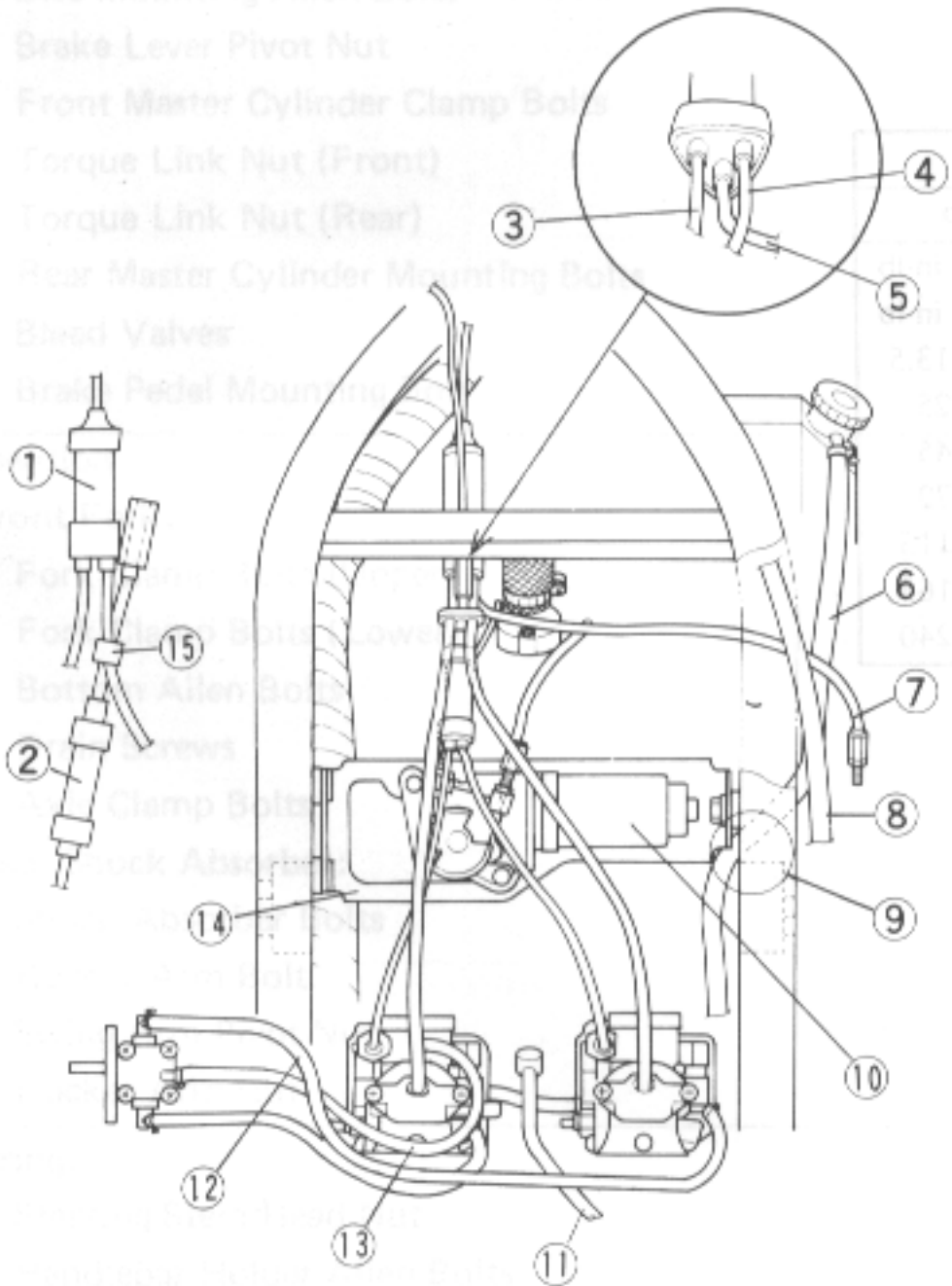
General Fasteners

Threads dia. (mm)	Torque		
	N-m	kg-m	ft-lb
5	3.4 – 4.9	0.35 – 0.50	30 – 43 in-lb
6	5.9 – 7.8	0.60 – 0.80	52 – 69 in-lb
8	14 – 19	1.4 – 1.9	10.0 – 13.5
10	25 – 34	2.6 – 3.5	19.0 – 25
12	44 – 61	4.5 – 6.2	33 – 45
14	73 – 98	7.4 – 10.0	54 – 72
16	115 – 155	11.5 – 16.0	83 – 115
18	165 – 225	17.0 – 23	125 – 165
20	225 – 325	23 – 33	165 – 240

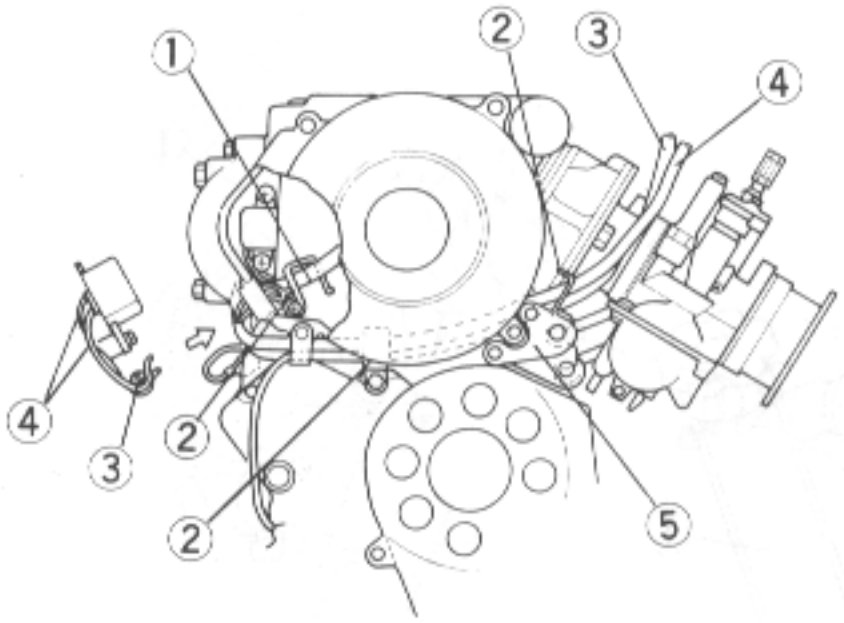
Suggested Wiring, Cable or Hose Routing



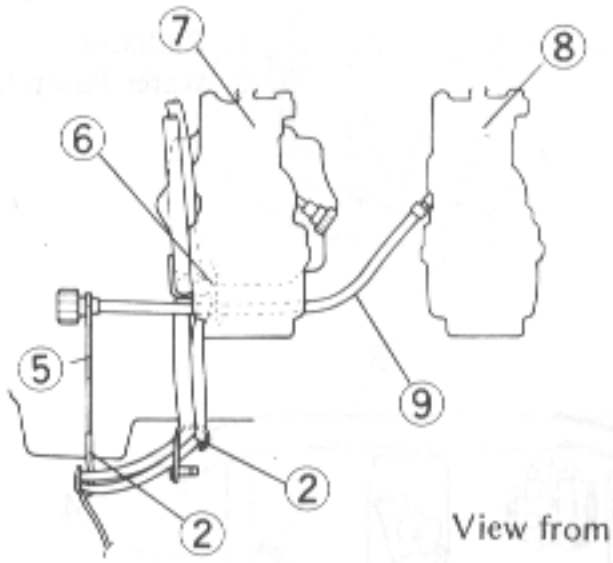
1. Throttle Cable
2. Clutch Cable
3. Main Harness
4. Choke Cable



1. Throttle Cable
2. Choke Cable
3. To Left Carburetor
4. To Right Carburetor
5. To Oil Pump
6. Radiator Reservoir Tank Tube (route ⑥ under ⑧)
7. Oil Pump Cable (route ⑦ over ⑥)
8. Clutch Cable (route ⑧ over ⑥)
9. Route ⑥ between ⑭ and engine.
10. Exhaust Valve Operating Motor
11. Crankcase Breather Tube
12. Fuel Tank Hose
13. Vent Hose (route ⑬ under ⑫)
14. Bracket
15. Clamp



1. Take care not to touch the magnet lead to the magneto flywheel.
2. Clamp
3. Magneto Lead
4. Pickup Coil Lead
5. Bracket
6. Tighten the clamp and carburetor holder together.
7. Left Carburetor
8. Right Carburetor



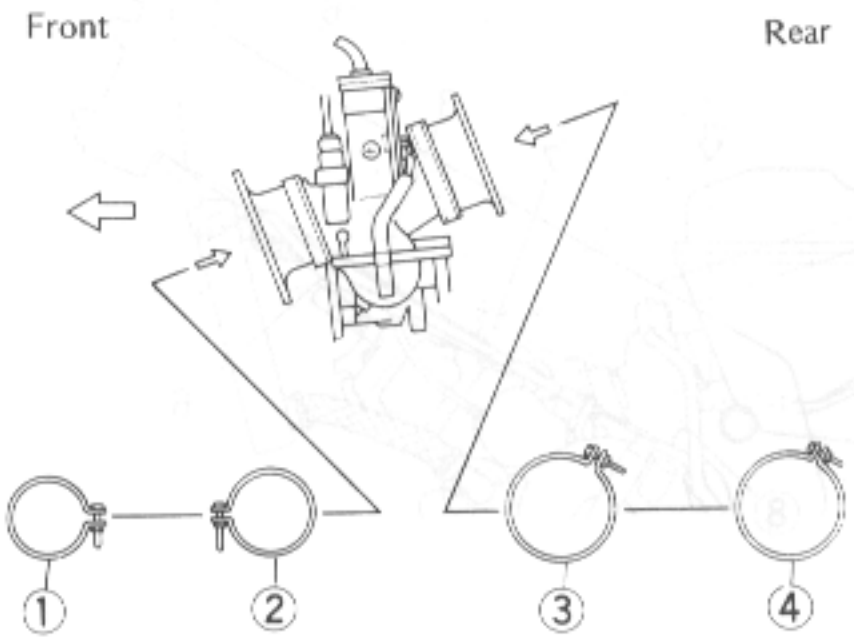
View from Rear

NOTE

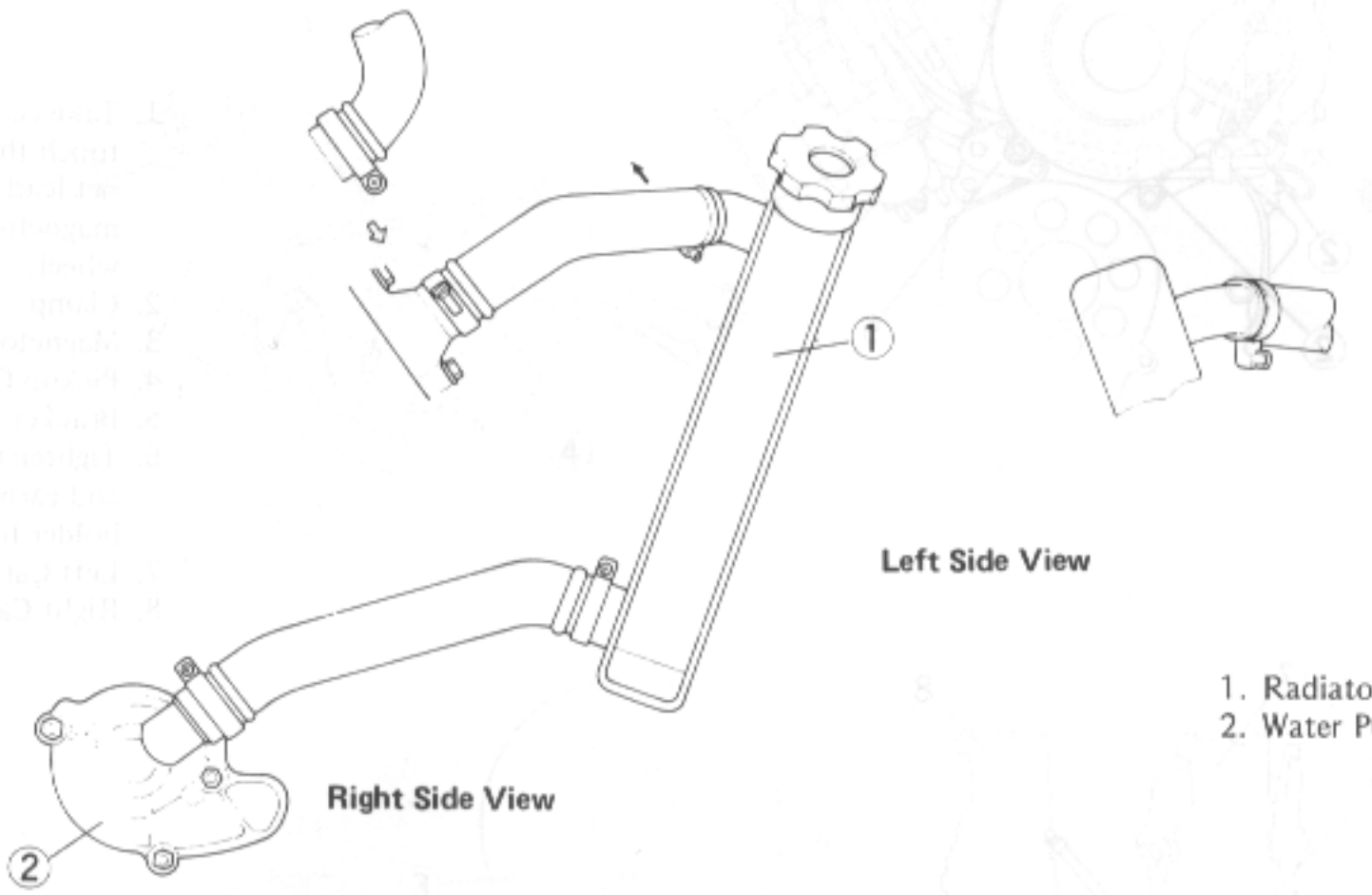
○*Install the left carburetor after right carburetor installation.*

CAUTION

○**Do not pull the magneto lead after installation. If the clamp deforms by pulling the magneto lead, the lead will be touch to the magneto flywheel.**



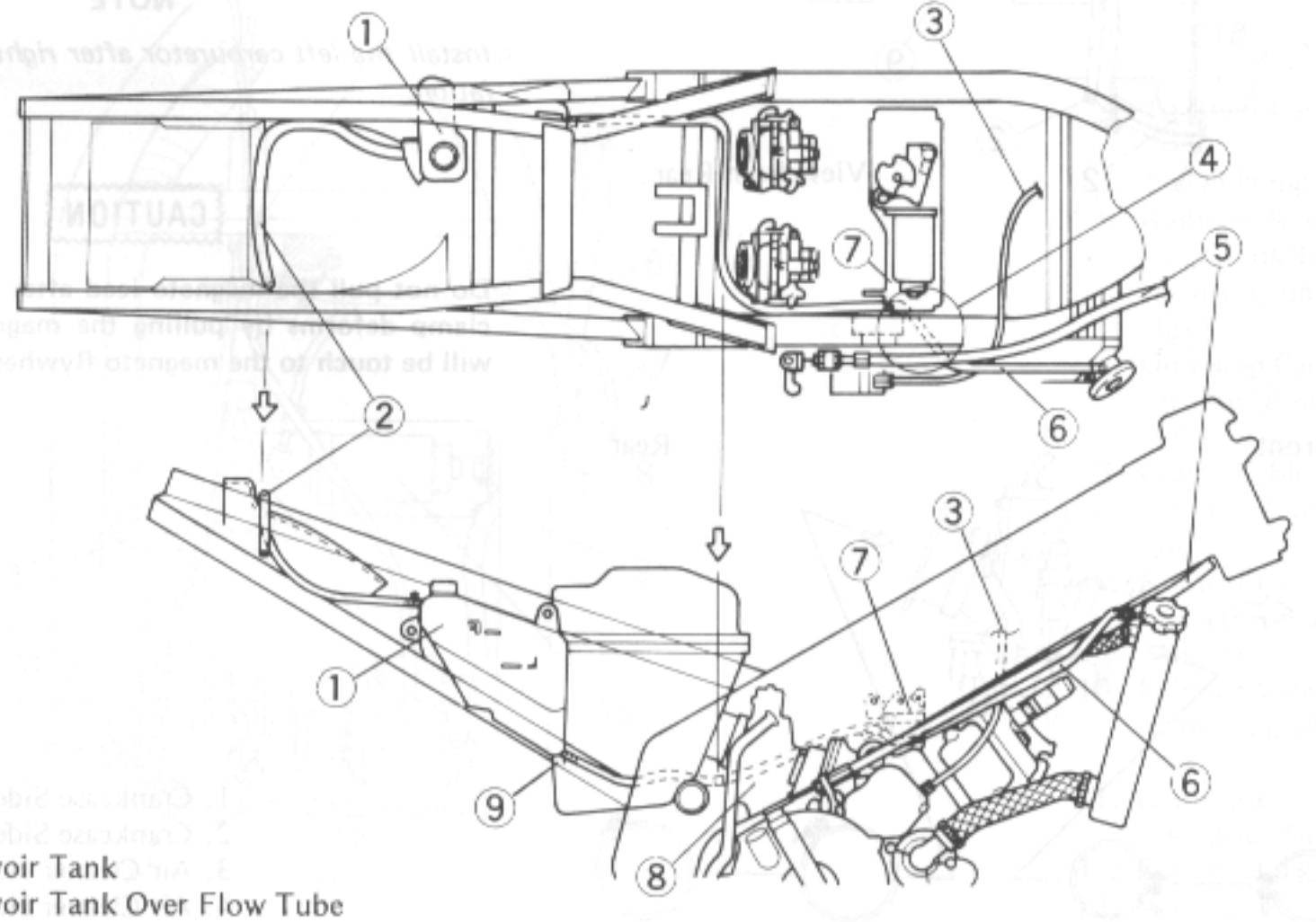
1. Crankcase Side (Right)
2. Crankcase Side (Left)
3. Air Cleaner Housing Side (Left)
4. Air Cleaner Housing Side (Right)



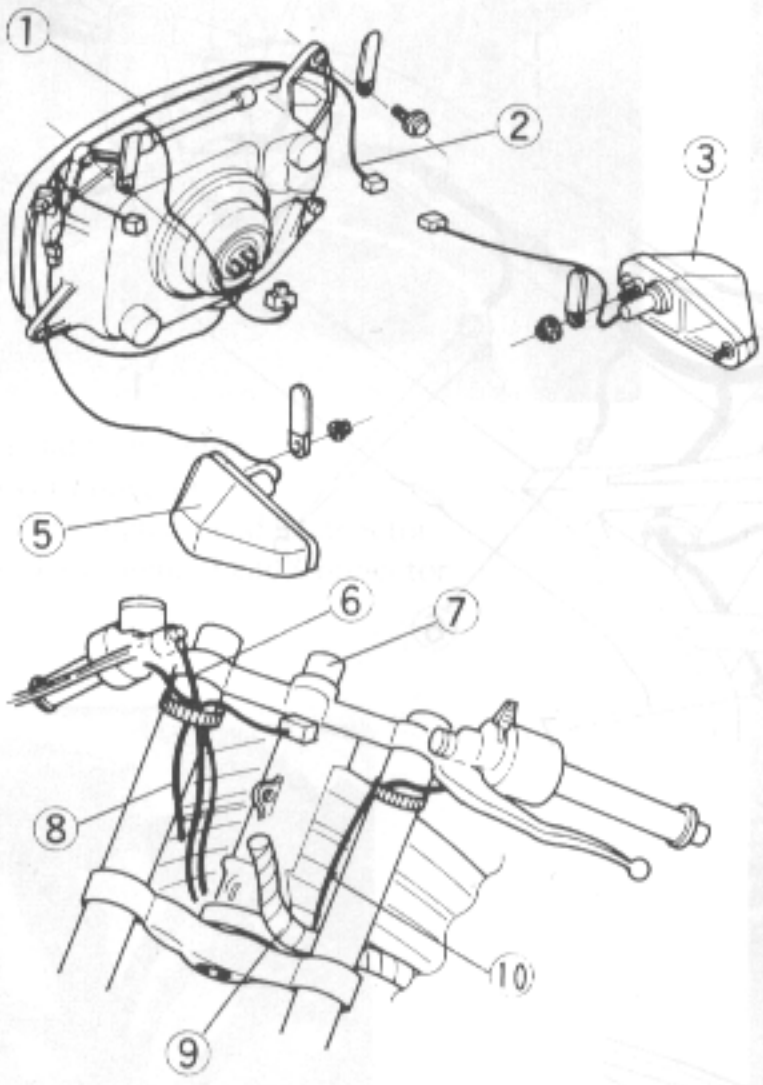
Left Side View

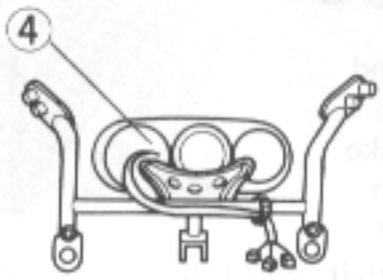
Right Side View

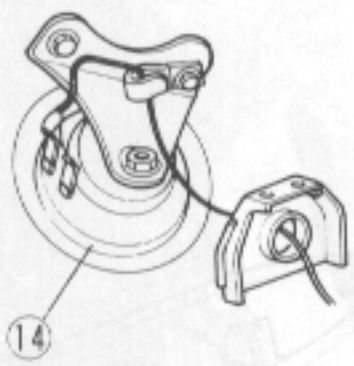
1. Radiator
2. Water Pump Cover

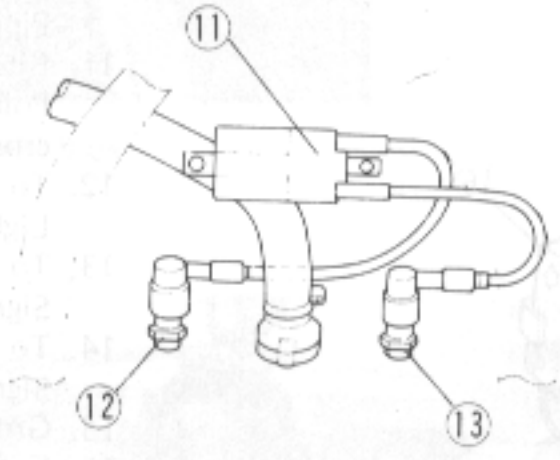


1. Coolant Reservoir Tank
2. Coolant Reservoir Tank Over Flow Tube
3. Oil Pump Cable
4. Route ⑥ between ⑦ and engine.
5. Clutch Cable
6. Radiator Reservoir Tank Tube
7. Exhaust Valve Operating Motor Bracket
8. Carburetor
9. Clamp



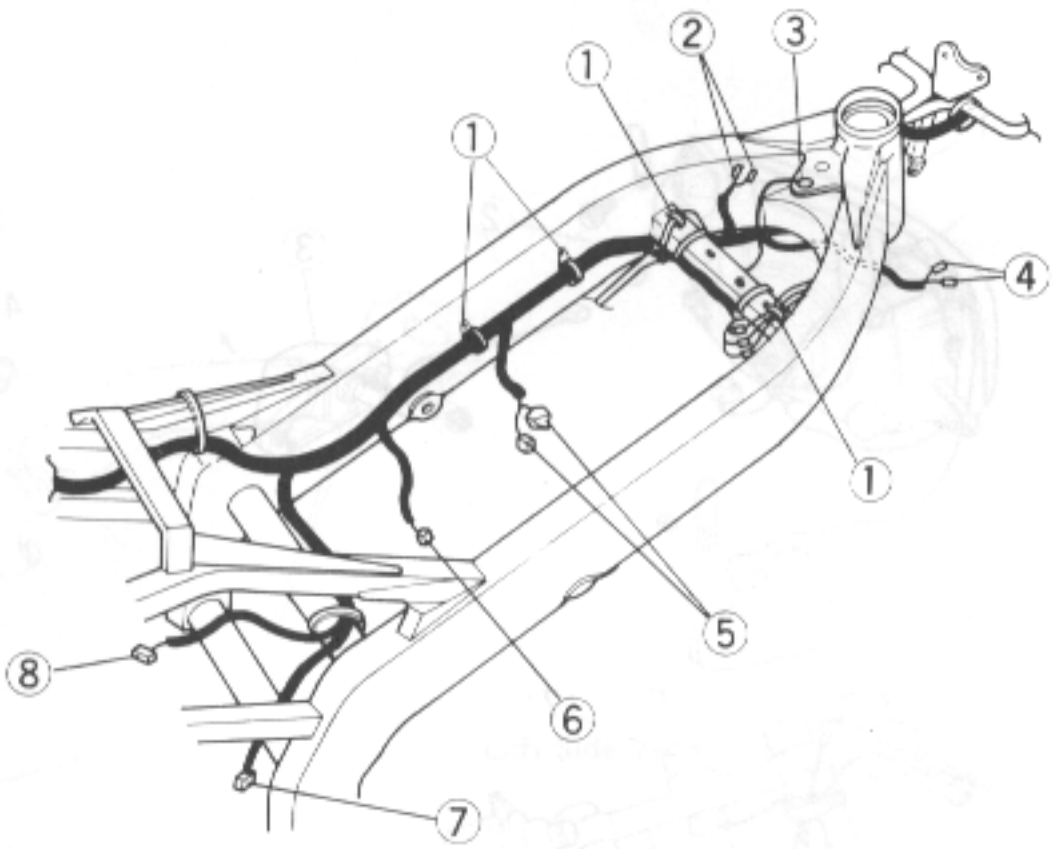


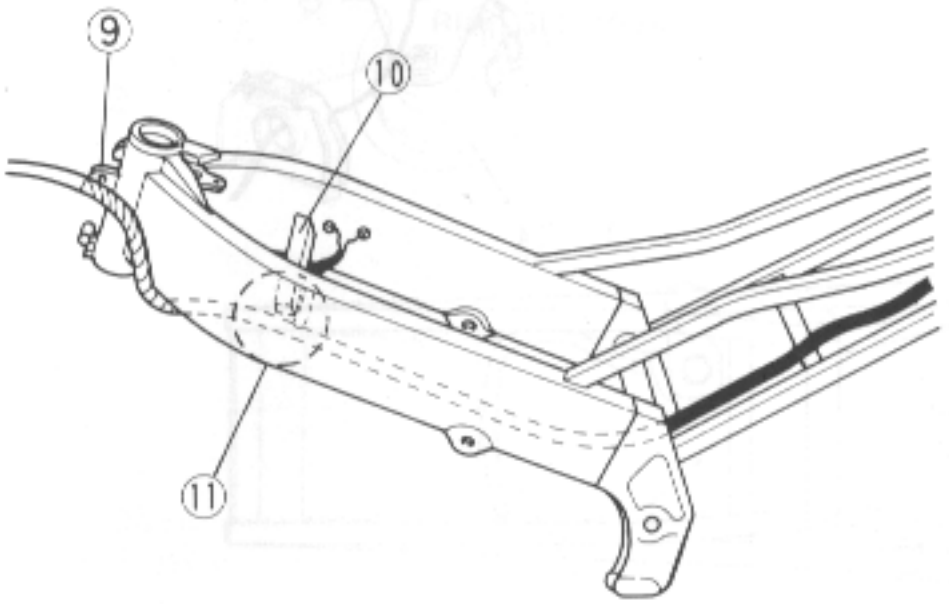


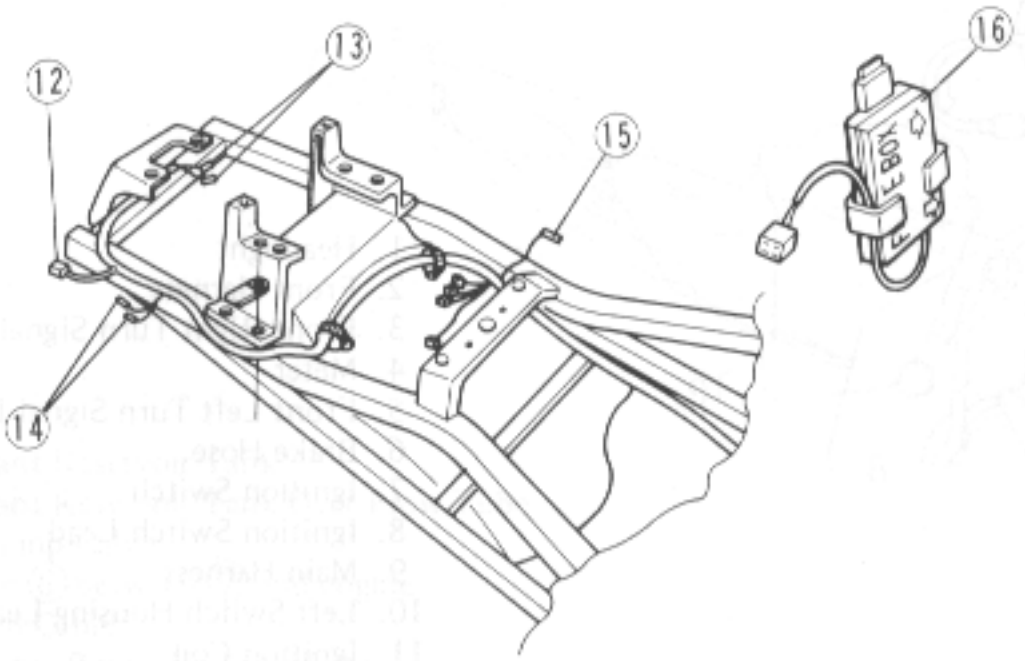


1. Headlight
2. Front Harness
3. Front Right Turn Signal Light
4. Meter
5. Front Left Turn Signal Light
6. Brake Hose
7. Ignition Switch
8. Ignition Switch Lead
9. Main Harness
10. Left Switch Housing Lead
11. Ignition Coil
12. Left Spark Plug
13. Right Spark Plug
14. Horn

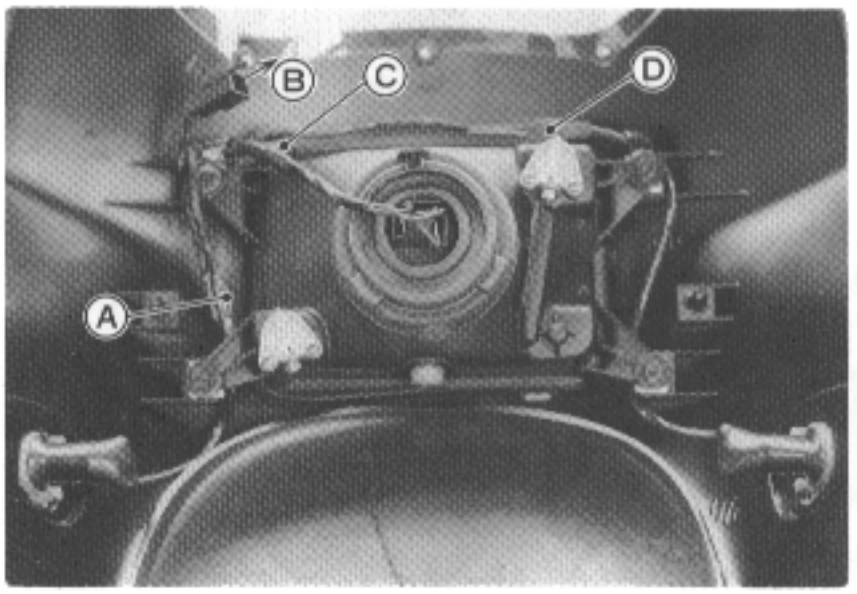
1. Clamp
2. To Ignition Coil
3. Ground Lead
4. To Horn
5. To Exhaust Valve Operating Motor
6. To Side Stand Switch
7. To Rear Brake Light Switch
8. To Oil Level Warning Switch



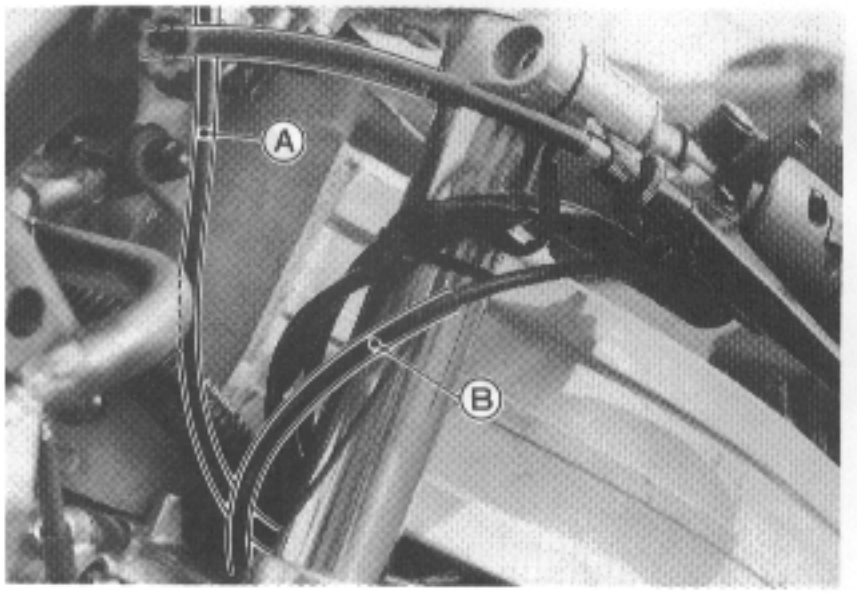




9. Align the end of main harness guard to the upper fairing stay mounting portion.
10. Front Cross Pipe
11. Fit the Branch Point under the cross pipe.
12. To Tail/Brake Light
13. To Left Turn Signal Light
14. To Right Turn Signal Light
15. Ground Lead
16. Fuse Box

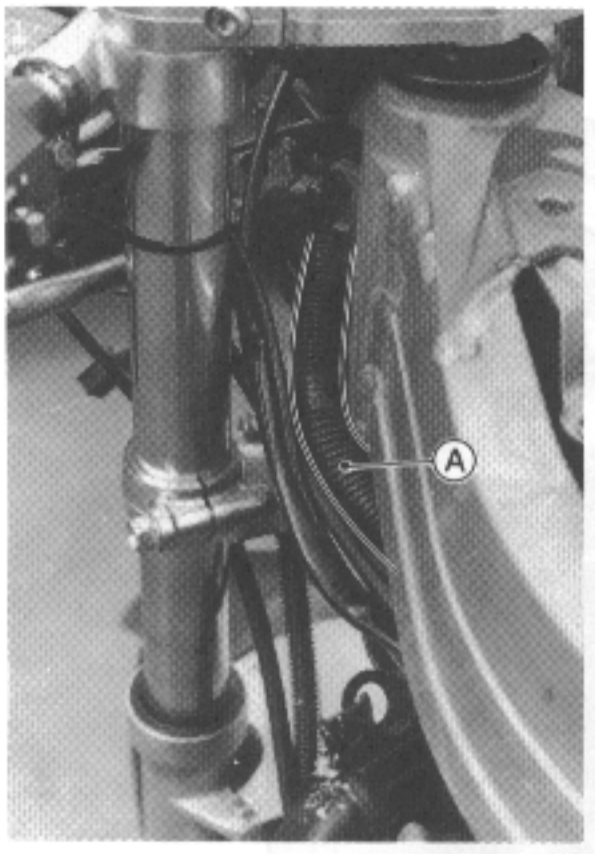


A. City Light Lead Connector
B. Main Harness Connector
C. Front Left Turn Signal Lead Connector
D. Front Right Turn Signal Lead Connector

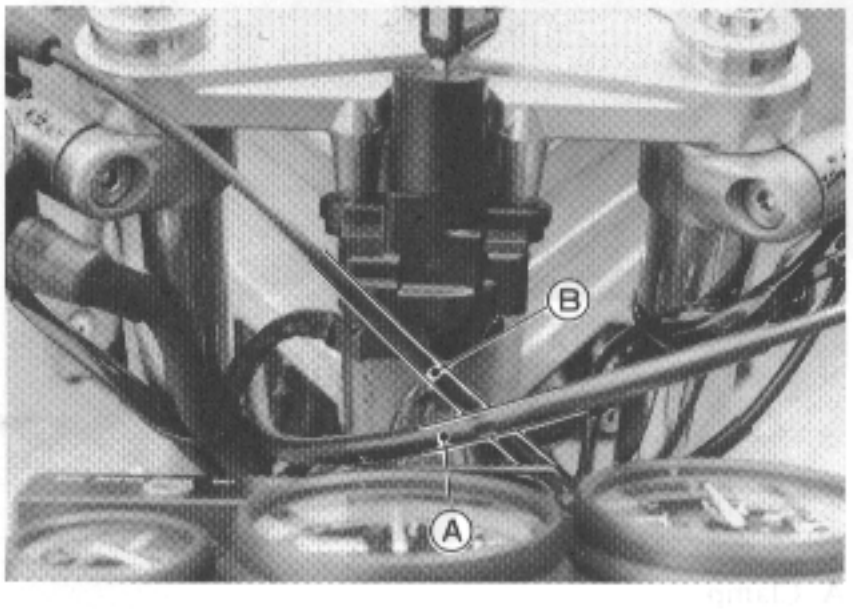


A. Throttle Cable B. Choke Cable

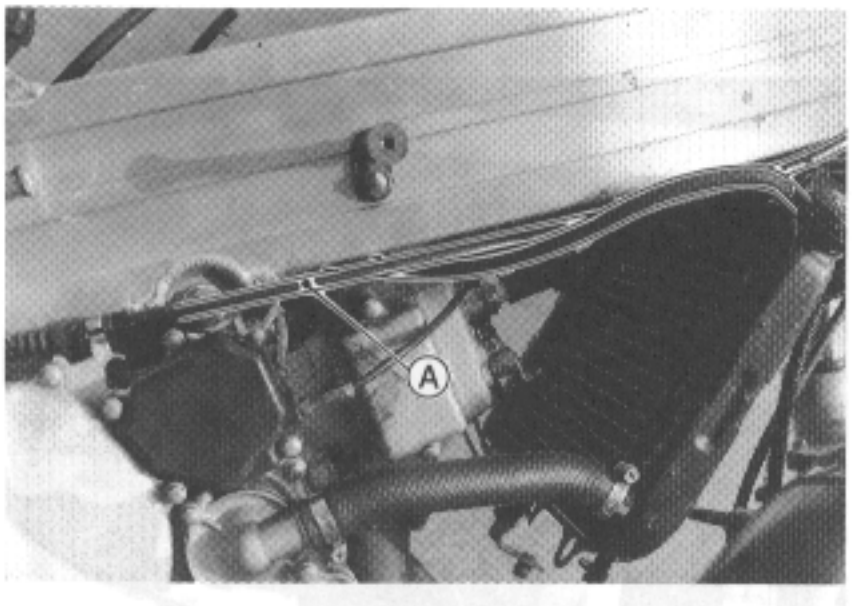
Front Fork Right Side



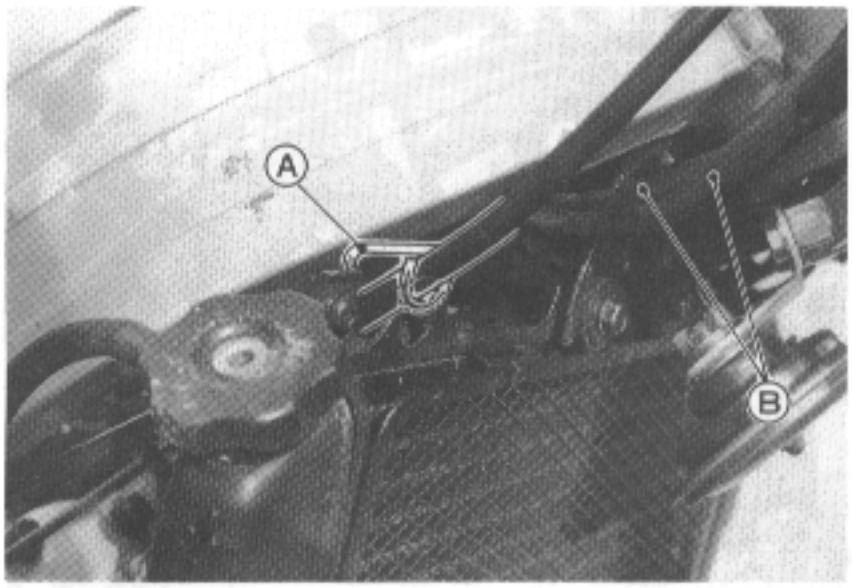
Route the main harness inside of the other leads and cables.



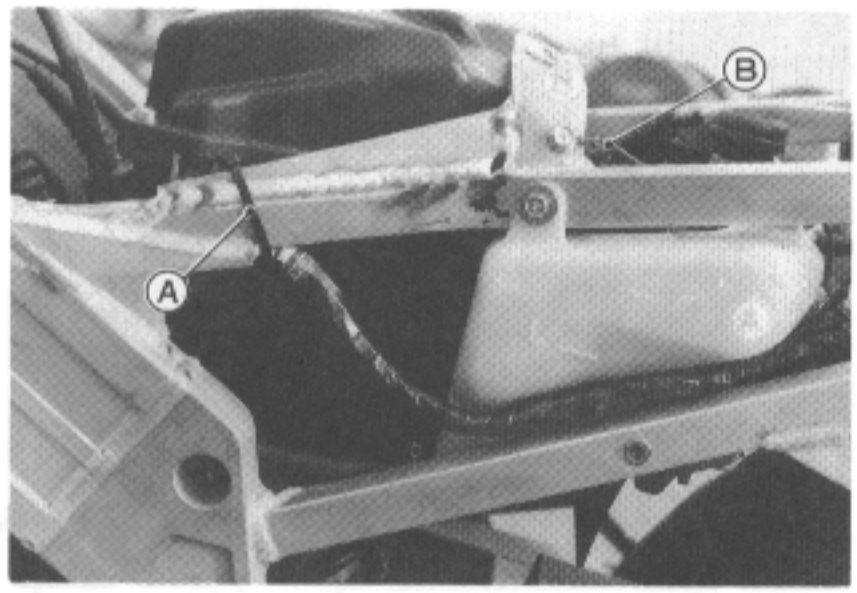
A. Clutch Cable B. Throttle Cable



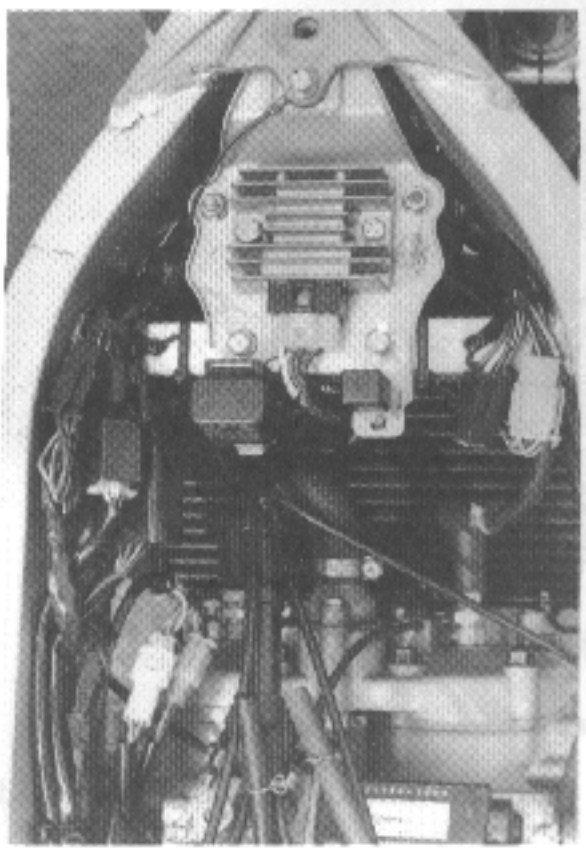
A. Clutch Cable

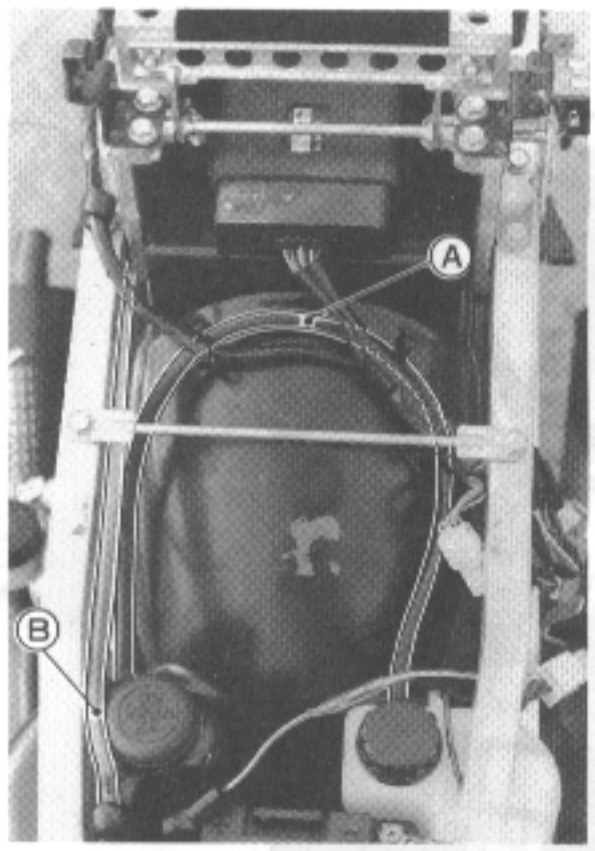


A. Clutch Cable Clamp
B. Right Switch Housing Lead, Ignition Switch Lead

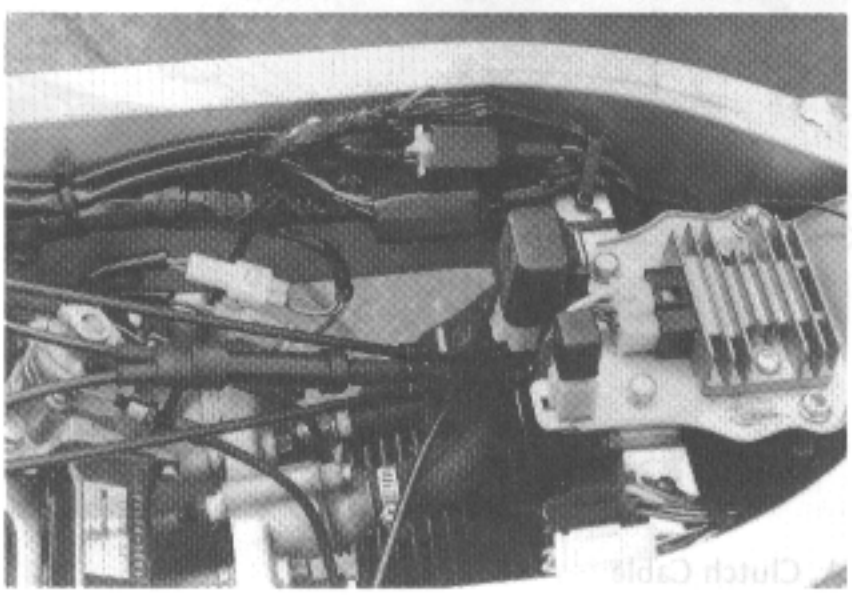


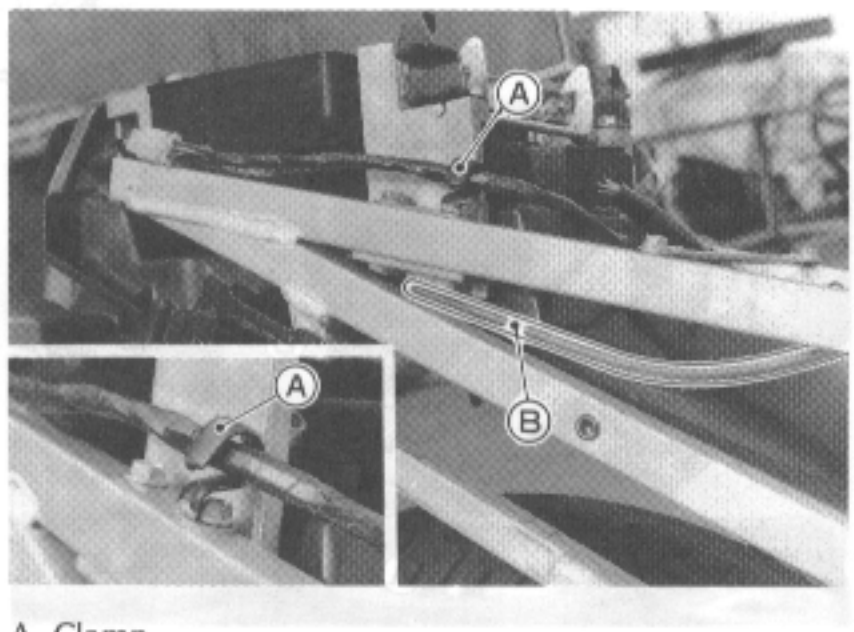
A. Strap B. Ground Lead



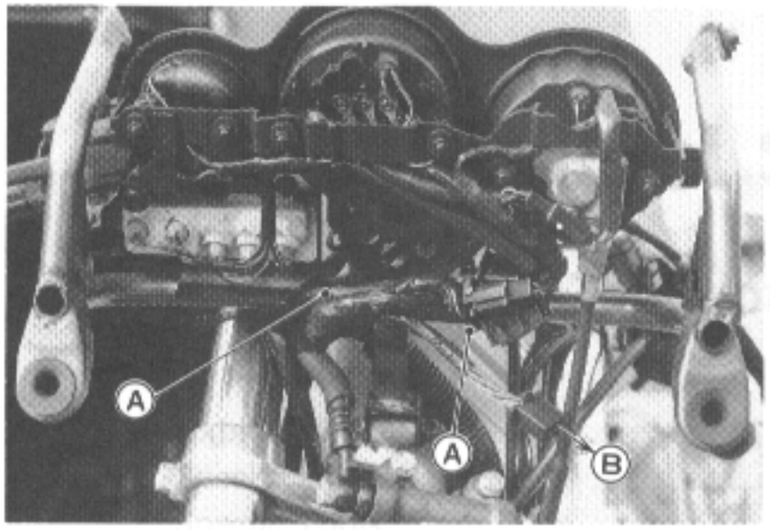


A. Coolant Reservoir Tank Over Flow Tube
B. Oil Tank Vent Hose

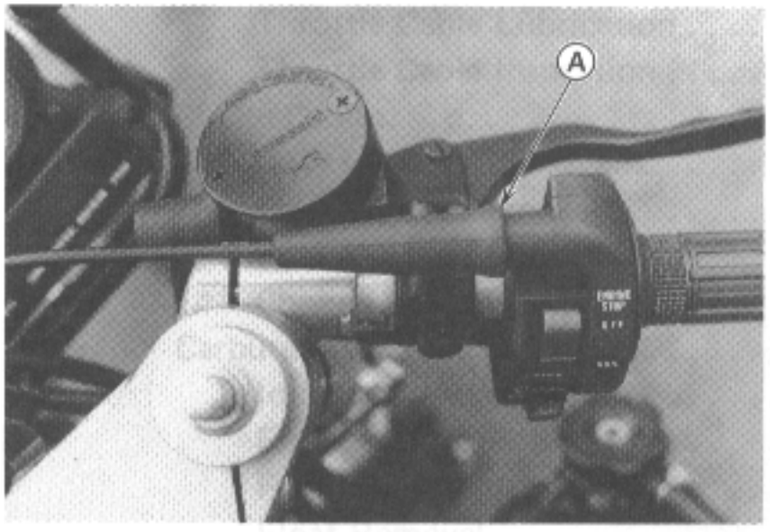




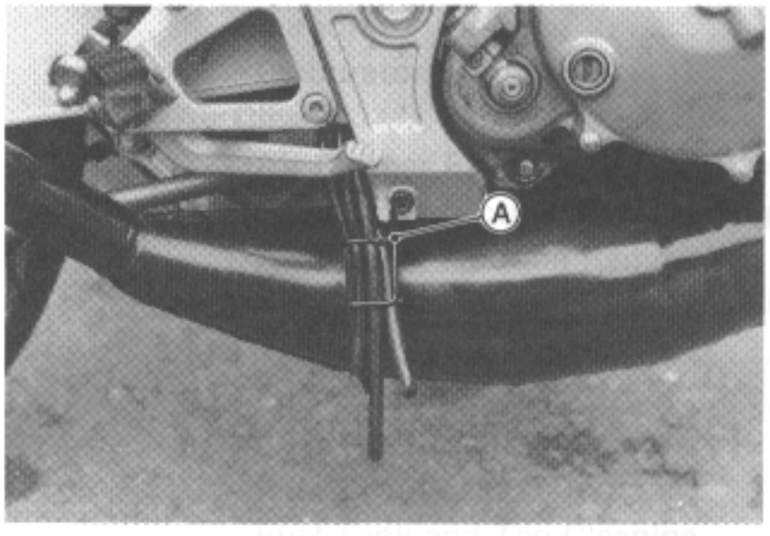
A. Clamp
B. Oil Tank Vent Hose Rear End



A. Strap
B. To Front Harness



A. Install Boot



A. Clamp for Vent Hose

Fuel System

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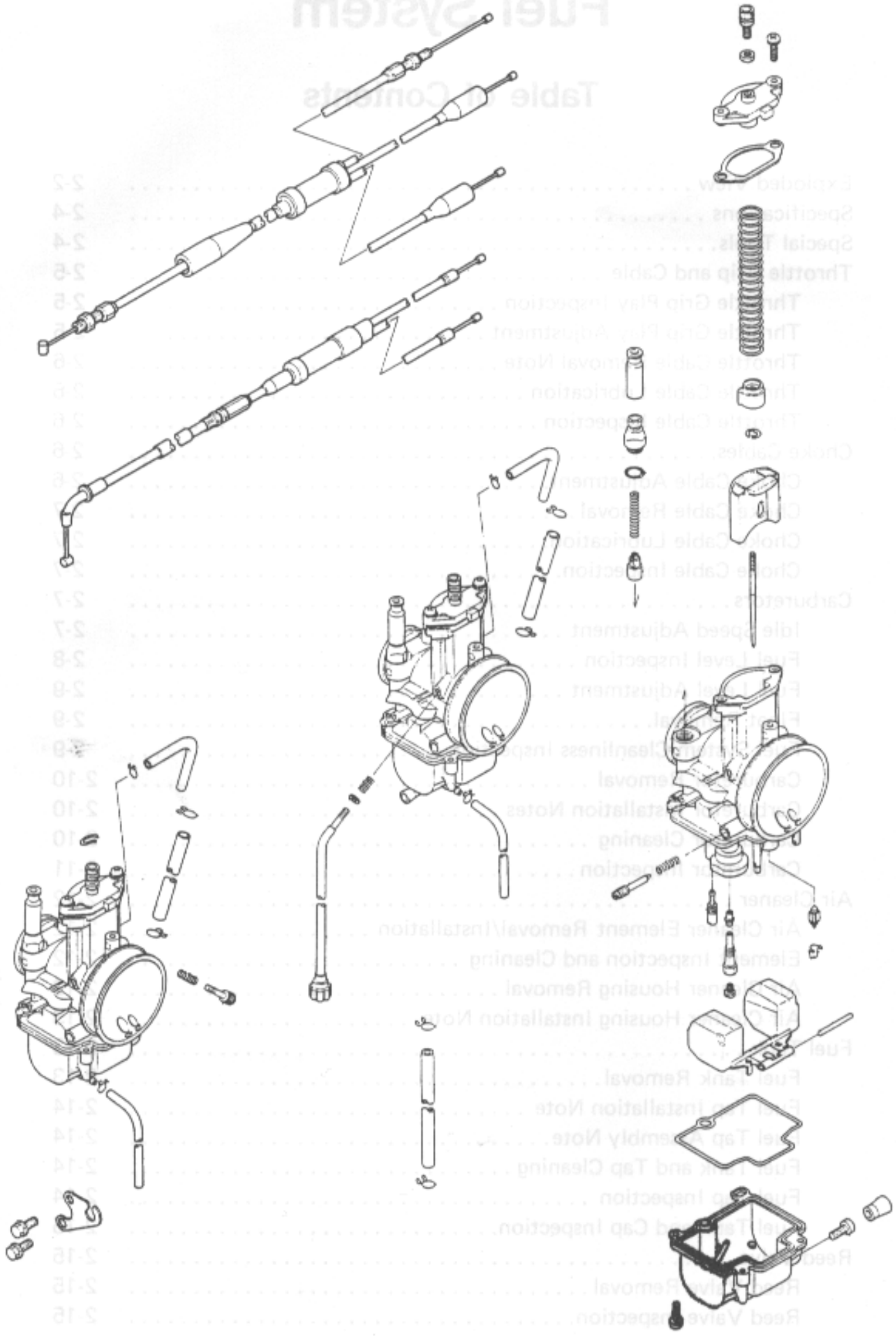
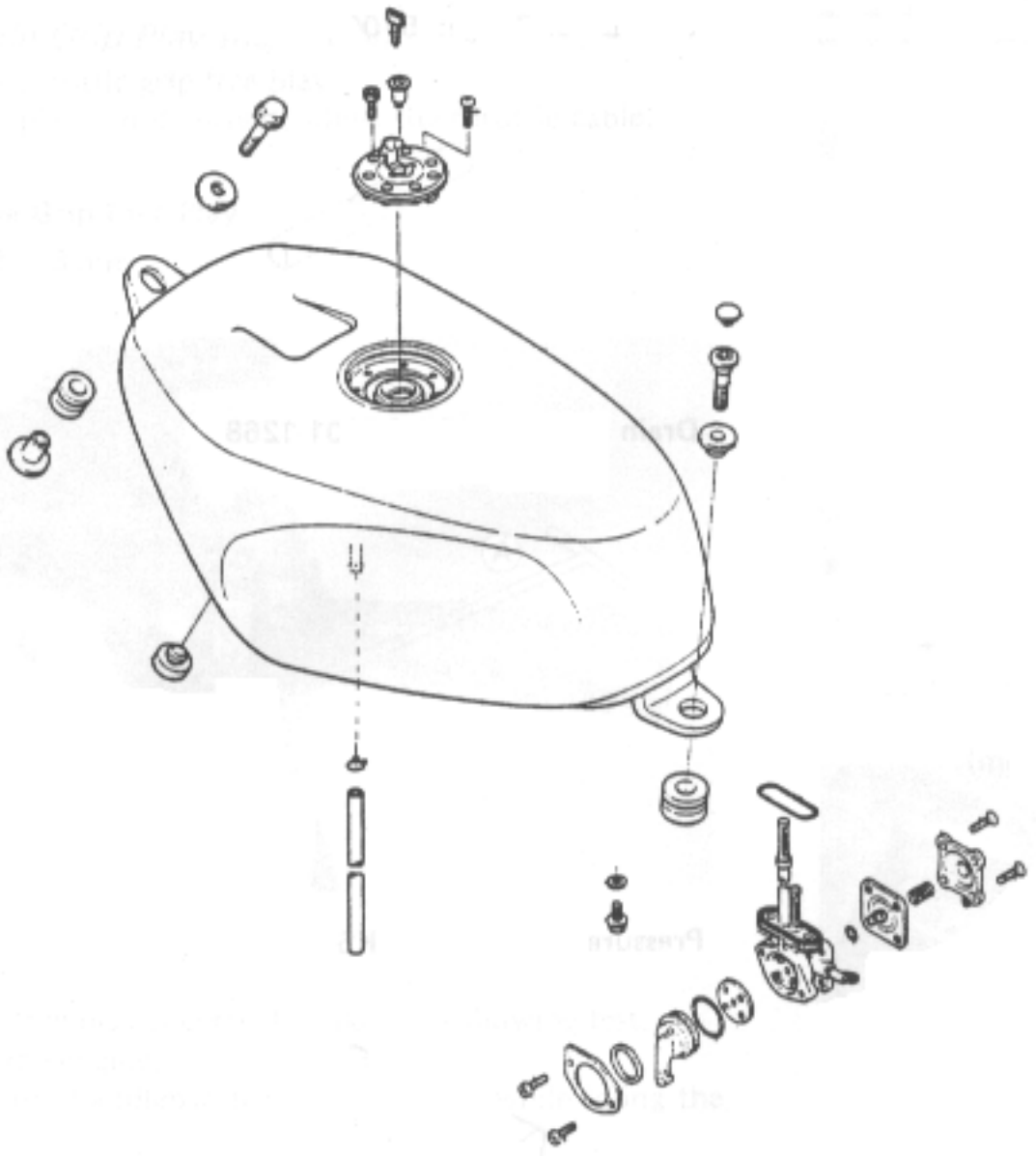
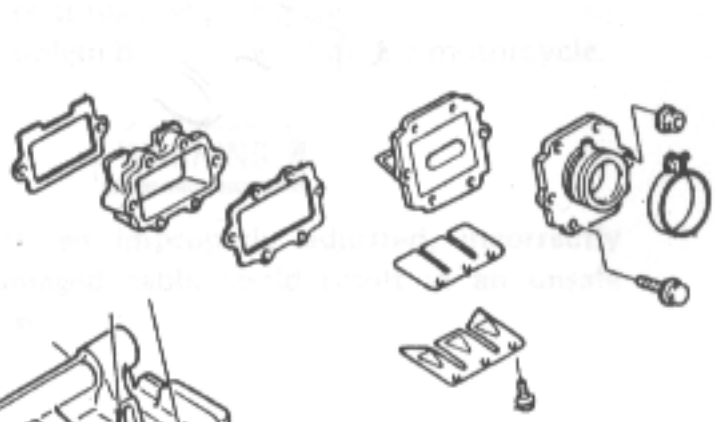
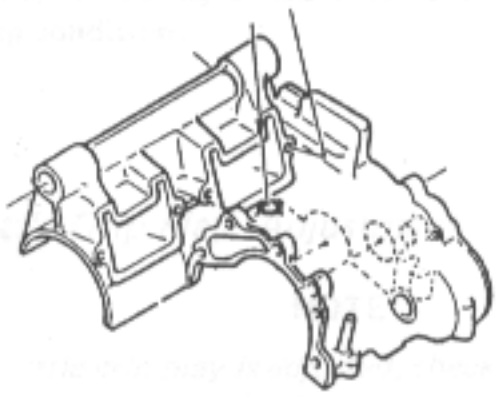
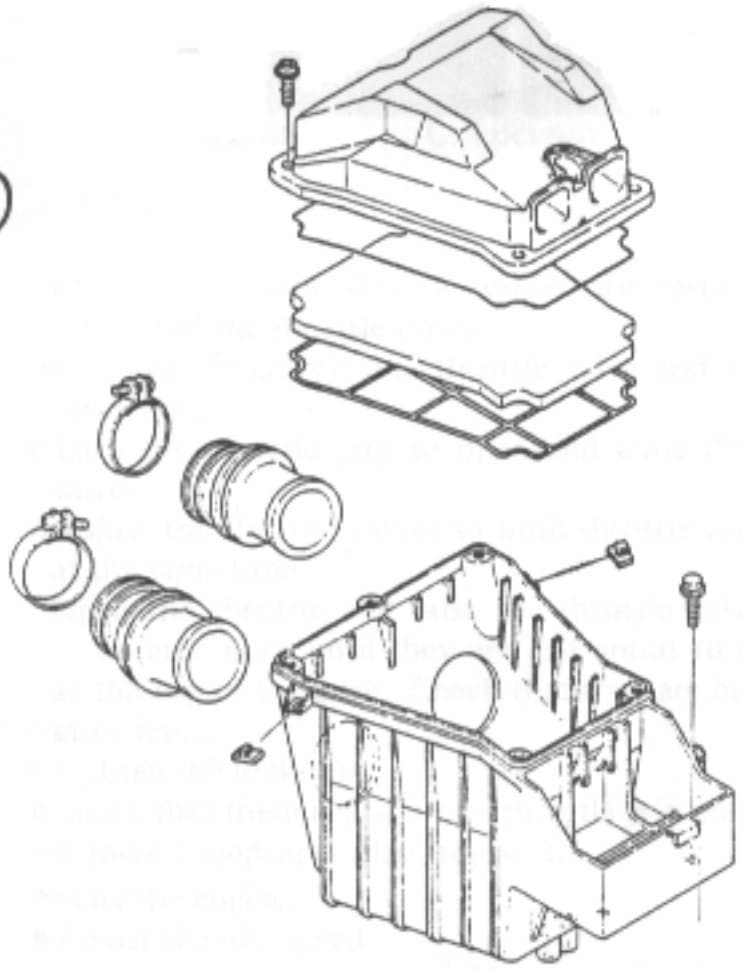
Exploded View











Specifications

Throttle Grip Free Play

Standard: 2 – 3 mm

Carburetor Specifications

Make/Type	Keihin/PWK28
Main Jet	135
Main Air Jet	60
Jet Needle	N68A
Jet Needle Clip Position	4
Pilot Jet	38
Pilot Air Screw	1½ turns out
Cutaway	3.5
Service Fuel Level	1 ±1 mm
Float Height	19 ±2 mm

Idle Speed

Standard: 900 – 1100 r/min (rpm)

Air Cleaner Element Oil

Grade: SE class
Viscosity SAE30

Reed Valve

Reed Warp

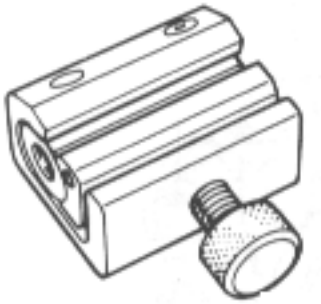
Service Limit: 0.2 mm

Special Tools

Fuel Level Gauge: 57001-1017

Drain Plug Wrench: 57001-1268

Pressure Cable Luber: K59019-021

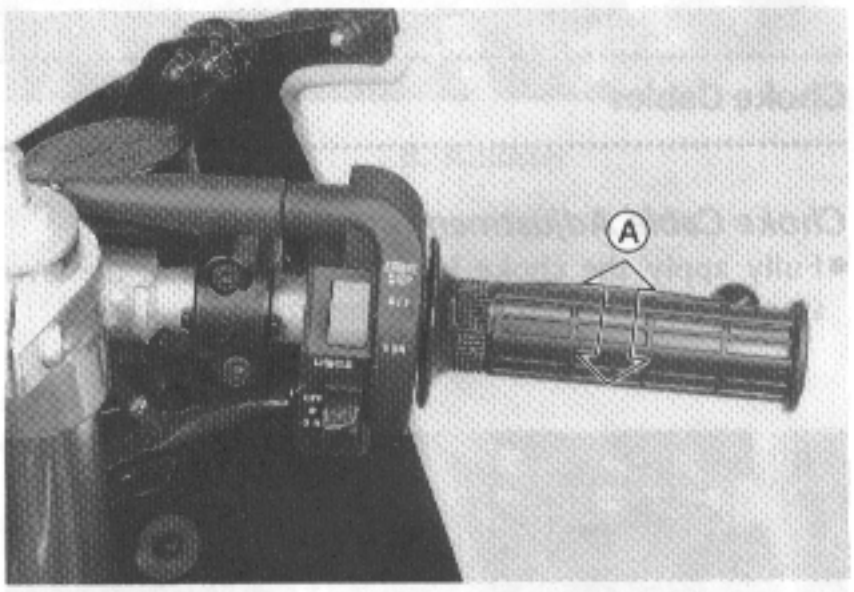


Throttle Grip and Cables

Throttle Grip Play Inspection

●Check throttle grip free play.
★If free play is not correct, adjust the throttle cable.

Throttle Grip Free Play
2 – 3 mm



A. Free Play

★If the free play is correct, make the following test.
●Start the engine.
●Turn the handlebar from side to side while idling the engine.
★If idle speed varies, the throttle control cable may be poorly routed or it may be damaged.
●Correct any problem before operating the motorcycle.

WARNING

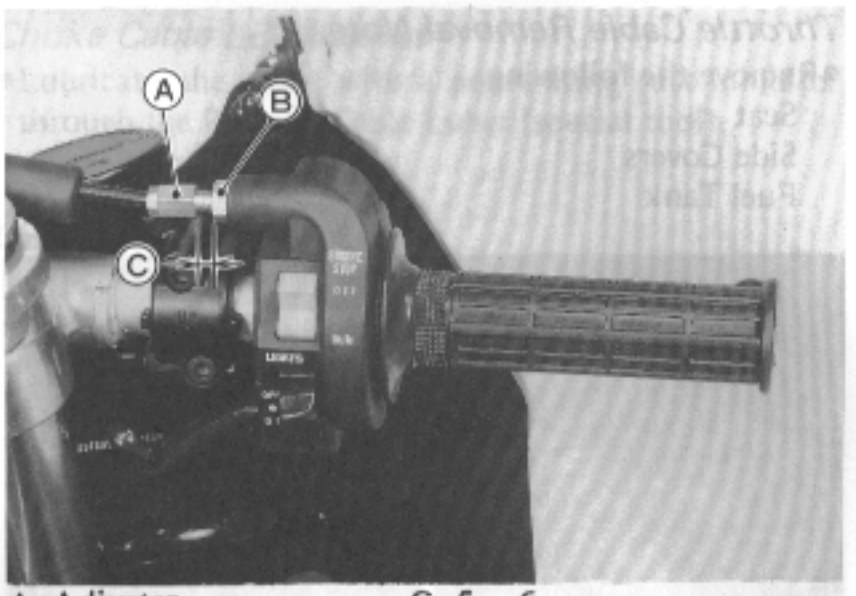
○**Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.**

Throttle Grip Play Adjustment

NOTE

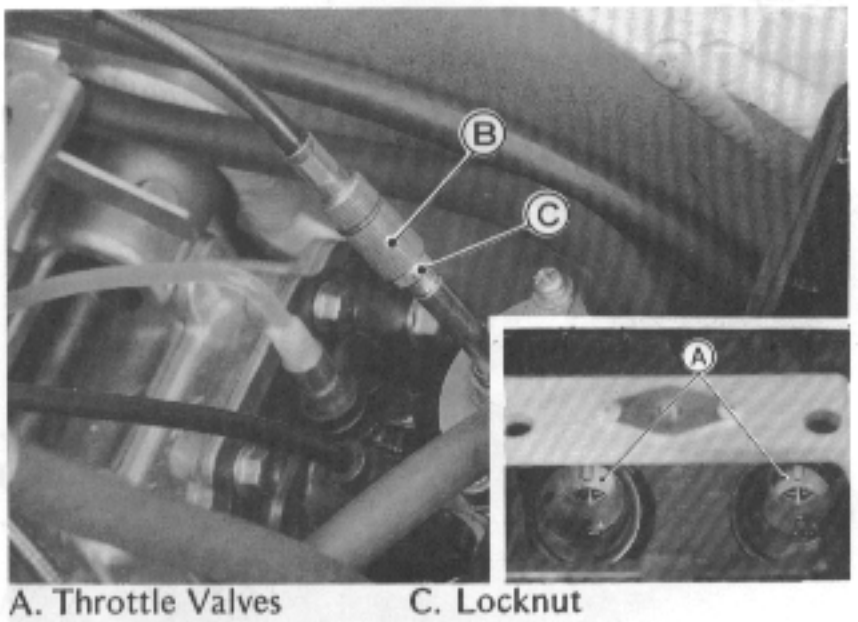
○*If throttle grip play is adjusted, check the oil pump and carburetor synchronization.*

●Remove the following.
Seat
Side Covers
Fuel Tank
Air Cleaner Housing Cover
Air Cleaner Element
Air Cleaner Element Frame
●Loosen the locknut at the throttle grip.
●Turn in the adjuster so that 5 – 6 mm of threads are visible. And tighten the locknut.



A. Adjuster
B. Locknut
C. 5 – 6 mm

●Adjust the throttle cables so that both throttle valves operate together and at the same level.
○Back out the idle adjust screws and loosen the locknuts and adjusters on the top of the carburetors.

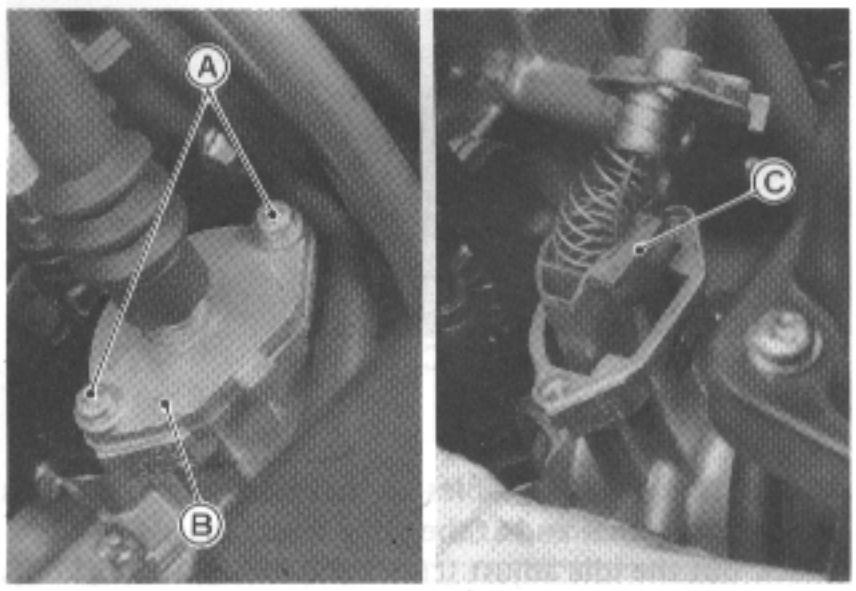


A. Throttle Valves
B. Adjuster
C. Locknut

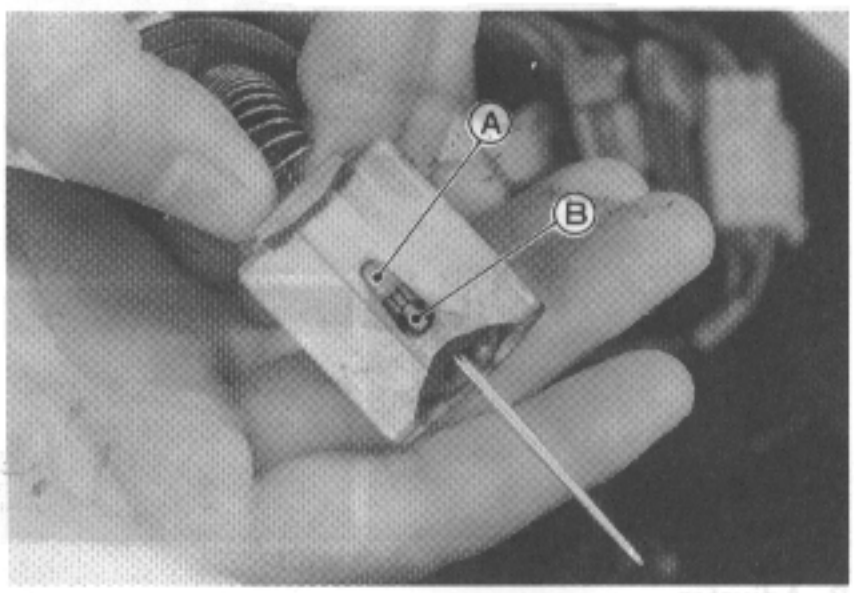
○Check that both throttle valves are resting at the bottom of the throttle bores.
○Put your finger on one throttle valve and watch the other one.
○Turn the throttle grip to open and close the throttle valves.
○Adjust the throttle cables so both throttle valves move at the same time.
○Open the throttle and raise the throttle valves in the carburetor bore until they are just about to disappear at the top of the bore. Check that they are both at the same level.
○Tighten the locknuts.
●Check that there is 2 – 3 mm throttle grip play.
★If there is improper play, adjust it.
●Start the engine.
●Adjust the idle speed.
●Turn the handlebar from side to side while idling the engine.
★If idle speed varies, the cable may be poorly routed or it may be damaged.
●Correct any problem before operating the motorcycle.

Throttle Cable Removal Note

- Remove the following.
  Seat
  Side Covers
  Fuel Tank



A. Screws
B. Cap
C. Throttle Valve

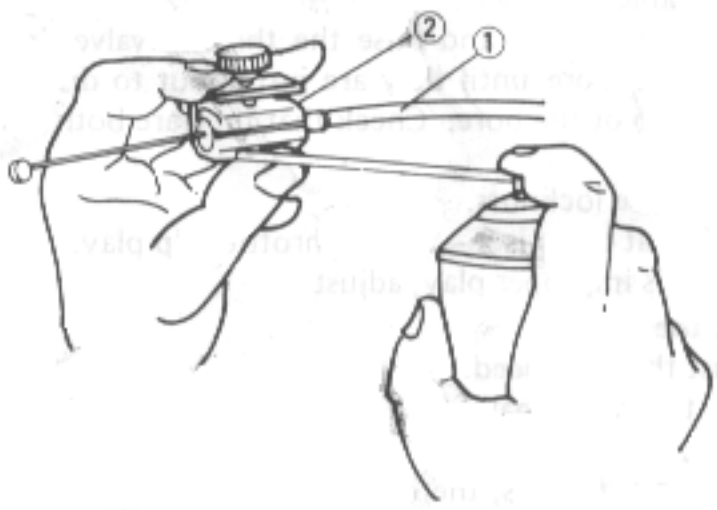


A. Retainer
B. Throttle Cable Lower End

Throttle Cable Lubrication

- Lubricate the cable with a penetrating rust inhibitor through the Pressure Cable Luber (special tool).

Cable Lubrication



1. Cable
2. Pressure Cable Luber: K56019-021

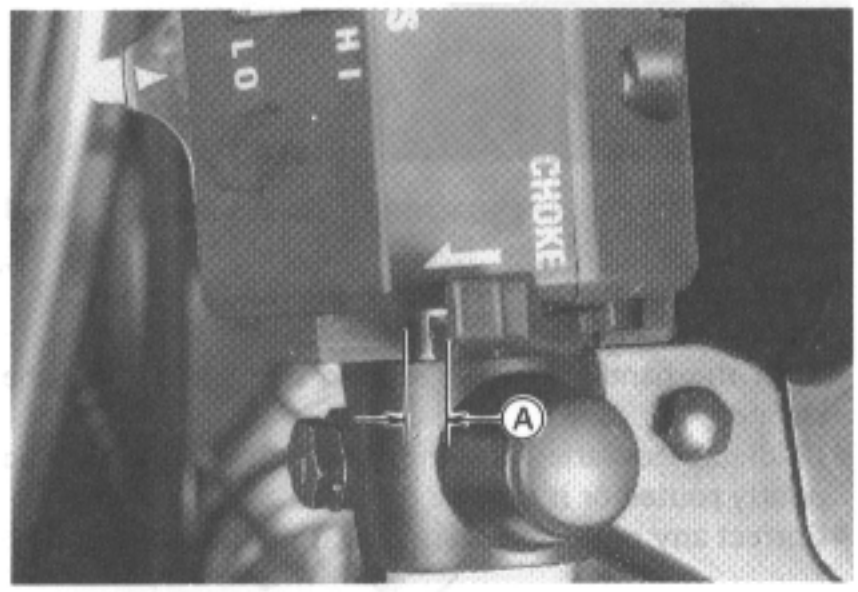
Throttle Cable Inspection

- With the throttle cable disconnected at both ends, the cable should move freely within the cable housing.

Choke Cables

Choke Cable Adjustment

- Fully apply the choke lever and check that the lever stops 2 mm before it touches the stopper.



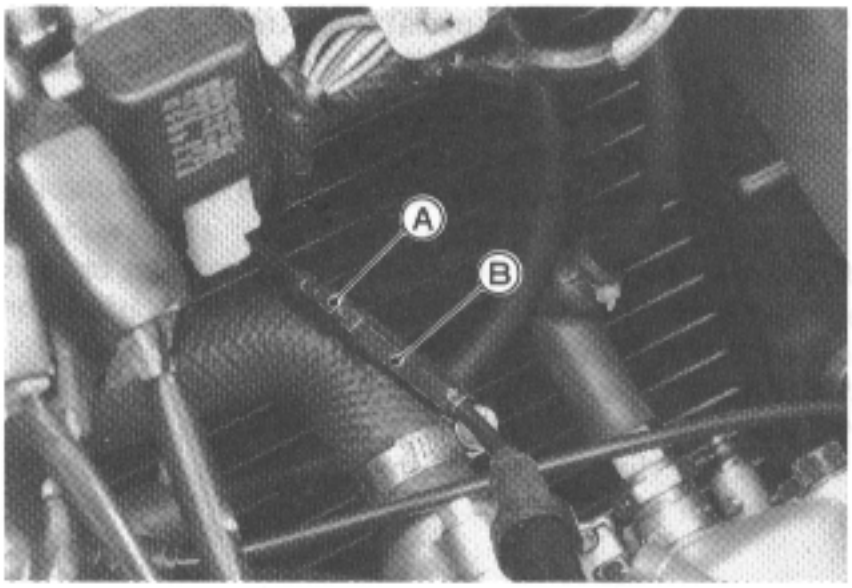
A. 2 mm

- Turn the handlebar from side to side.
- ★If the choke lever position shifts, the cables may be poorly routed or it may be damaged.
- Correct any problem before operating the motorcycle.

WARNING

○Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.

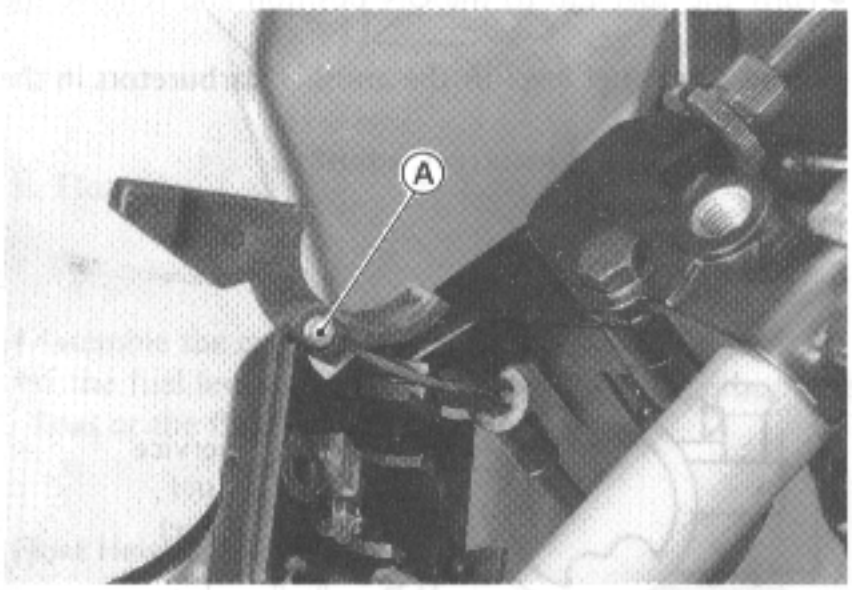
- Adjust the choke cable as follows.
○Remove the fuel tank.
○Loosen the locknut.
○Turn the adjuster as required.
○Tighten the locknut.
○Install the fuel tank.



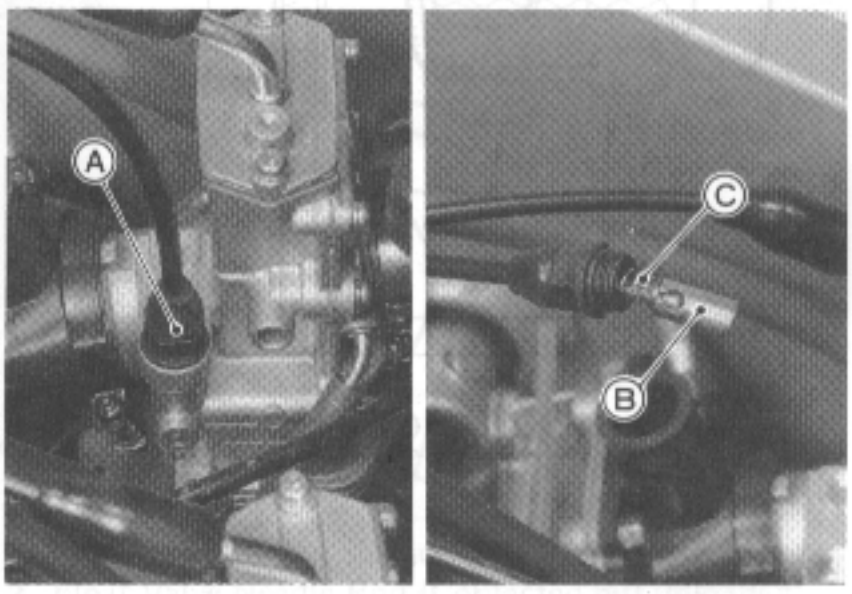
A. Locknut B. Adjuster

Choke Cable Removal

- Remove the following.
  Seat
  Side Covers
  Fuel Tank



A. Choke Cable Upper End

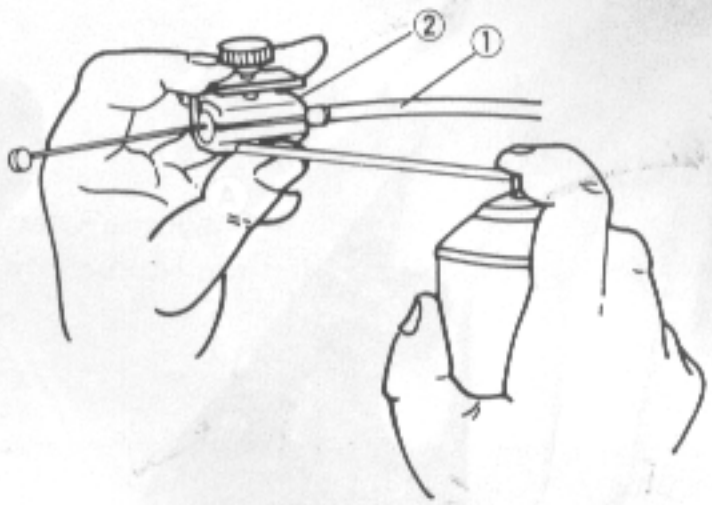


A. Choke Cable Lower End C. Spring
B. Plunger

Choke Cable Lubrication

- Lubricate the cable with a penetrating rust inhibitor through the Pressure Cable Luber (special tool).

Cable Lubrication



1. Cable
2. Pressure Cable Luber: K56019-021

Choke Cable Inspection

- With the choke cable disconnected at the both ends, the cable should move freely within the cable housing.

Carburetors

Idle Speed Adjustment

- Adjust the throttle cable.
- Start the engine and warm it up thoroughly.
- Turn the handlebar from side to side while idling the engine.
- ★If idle speed varies, the throttle cables may be poorly routed or they may be damaged.
- Correct any problem before operating the motorcycle.

WARNING

- ○**Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.**

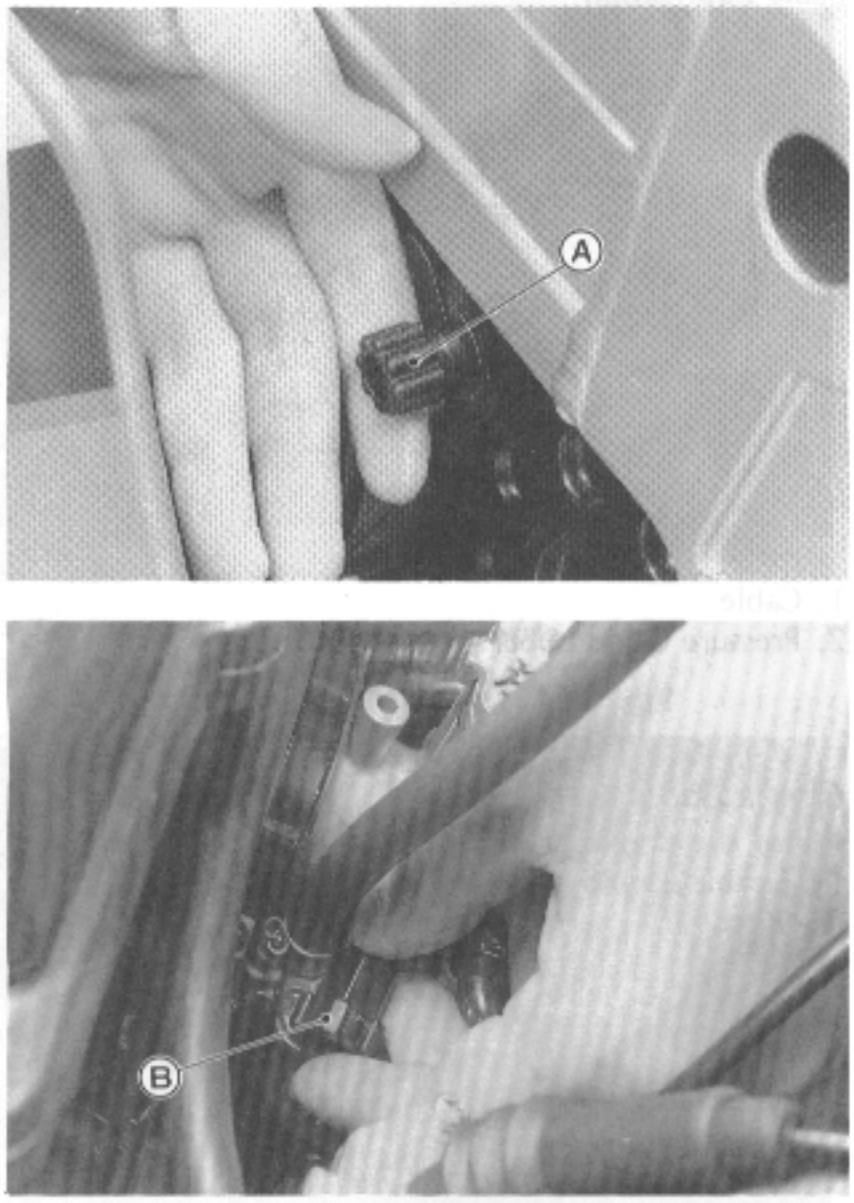
- Check idle speed.

Idle Speed

Standard: 900 – 1 100 r/min (rpm)

- ★If the idle speed exceeds the standard range, adjust the idle speed.
- Stop the engine.

- Screw in the idle adjusting screws until they stop.
- Start the engine and check idle speed.
- Screw in or out adjusting screw to adjust the idle speed.



A. Idle Adjusting Screw on RH Carburetor
B. Idle Adjusting Screw on LH Carburetor

- Hold your hands in back of the mufflers to check that both exhaust pressures are equal.
Refer to page 2-16 for more detailed information.

Fuel Level Inspection

WARNING

○**Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.**

- Remove the carburetors, and hold them in true vertical position on a stand.
- Put the fuel tank on a bench, and connect the fuel tap to the carburetors using a suitable hose.
- Prepare a rubber hose (6 mm in diameter and about 300 mm long).
- Connect fuel gauge (special tool) to the carburetor float bowl with the rubber hose.
- Hold the gauge vertically against the side of the carburetor body so that the "zero" line is several millimeters higher than the bottom edge of the carburetor body.
- Turn the fuel tap to the PRI or RES position to feed fuel to the carburetor, then turn out the carburetor drain plug a few turns.
- Wait until the fuel level in the gauge settles.
- Keeping the gauge vertical, slowly lower the gauge until the "zero" line is even with the bottom edge of the carburetor body.

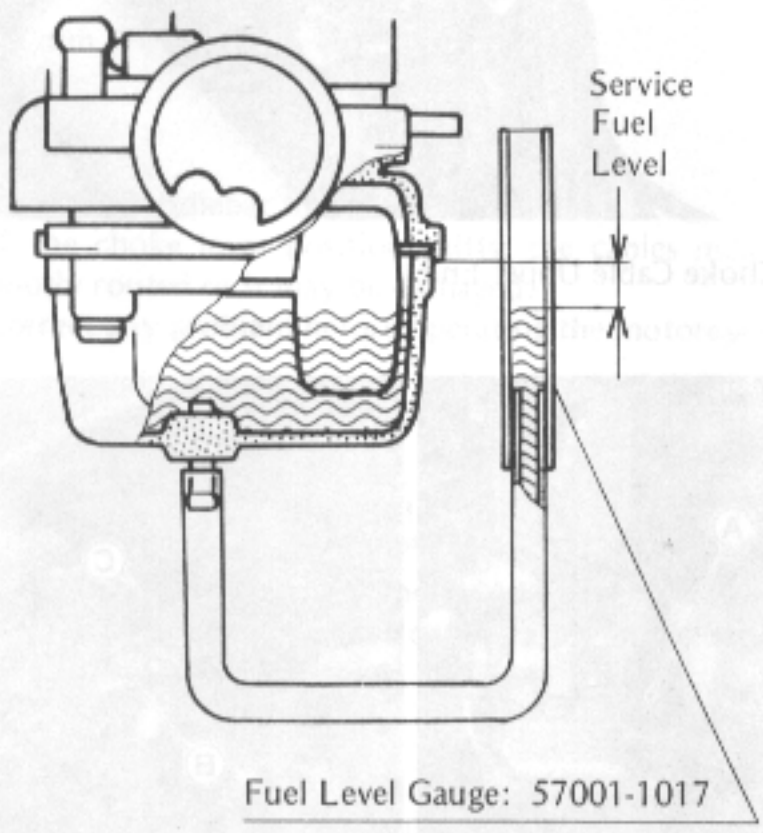
NOTE

○*Do not lower the "zero" line below the bottom edge of the carburetor body. If the gauge is lowered and then raised again, the fuel level measure shows somewhat higher than the actual fuel level. If the gauge is lowered too far, dump the fuel out of it into suitable container and start the procedure over again.*

- Read the fuel level in the gauge and compare it to the specification.
- Screw in the carburetor drain plug.
- Turn the fuel tap to the ON position and remove the fuel level gauge.
- Inspect the fuel level in the another carburetors in the same manner.

★If the fuel level is incorrect, adjust it.

Service Fuel Level



Fuel Level

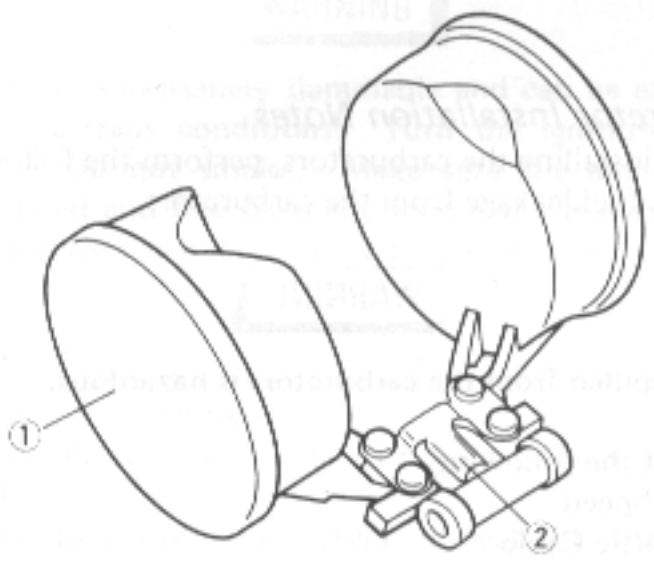
1 ±1 mm below the bottom edge of carburetor body

Fuel Level Adjustment

- Read the WARNING in the Fuel Level Inspection.
- Drain fuel from the carburetors into a suitable container.
- Remove the float bowl by taking out the screws with lockwashers.
- Bend the tang on the float arm very slightly to change the float height. Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.

Float Height

19 ±2 mm

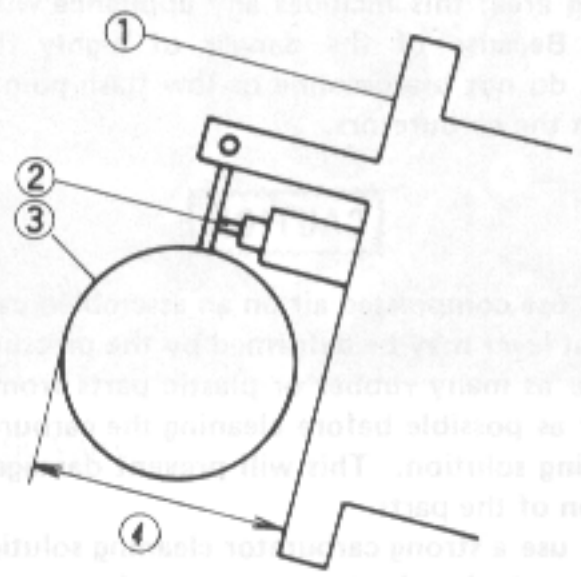


1. Float
2. Tang

- Assemble the carburetor, and recheck the fuel level.

★If the fuel level cannot be adjusted by this method, the float or the float valve is damaged.

Float Height Measurement



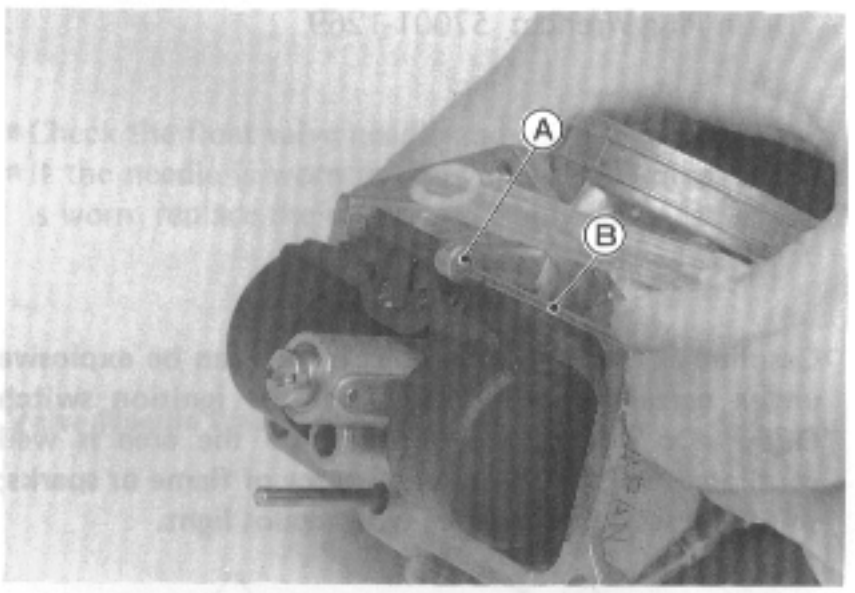
1. Float Bowl Mating Surface
2. Float Valve Needle Rod (Contacted but unloaded)
3. Float
4. Float Height

NOTE

○*Float height is the distance from the float bowl mating surface of the carburetor body (with the gasket removed) to the top of the float. Measure the height with the carburetor upside down.*

Float Removal

- Drive out the pivot pin and remove the float.



A. Pivot Pin
B. Drive out the pin.

Fuel System Cleanliness Inspection

WARNING

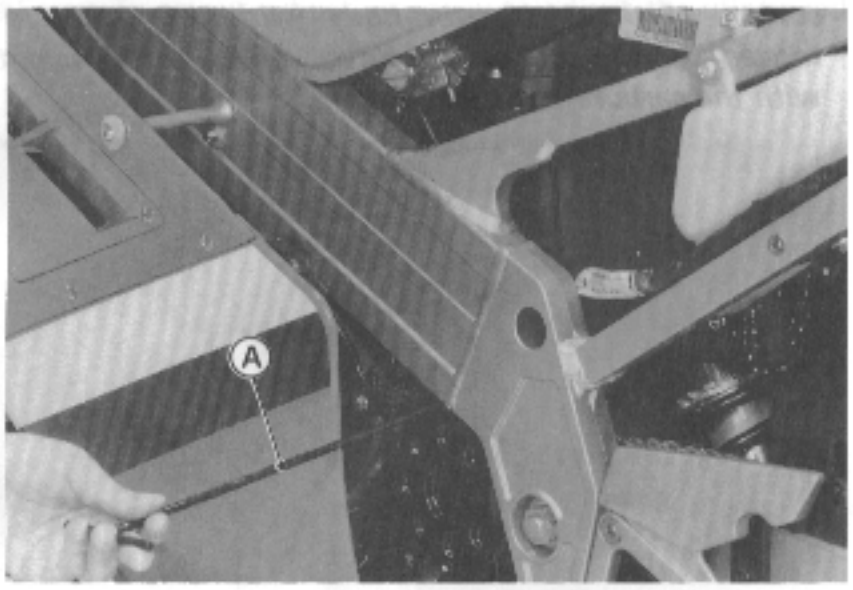
○**Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.**

○**Make sure the engine is cold before working. Wipe any fuel off the engine before starting it.**

- Remove the following.
  - Seat
  - Side Covers
  - Fuel Tank
- Using the drain plug wrench (special tool), turn out each drain plug a few turns and drain the carburetors, and check to see if water or dirt comes out.

★If any water or dirt comes out, clean the carburetors and the fuel tank.

●Tighten the drain plug securely.



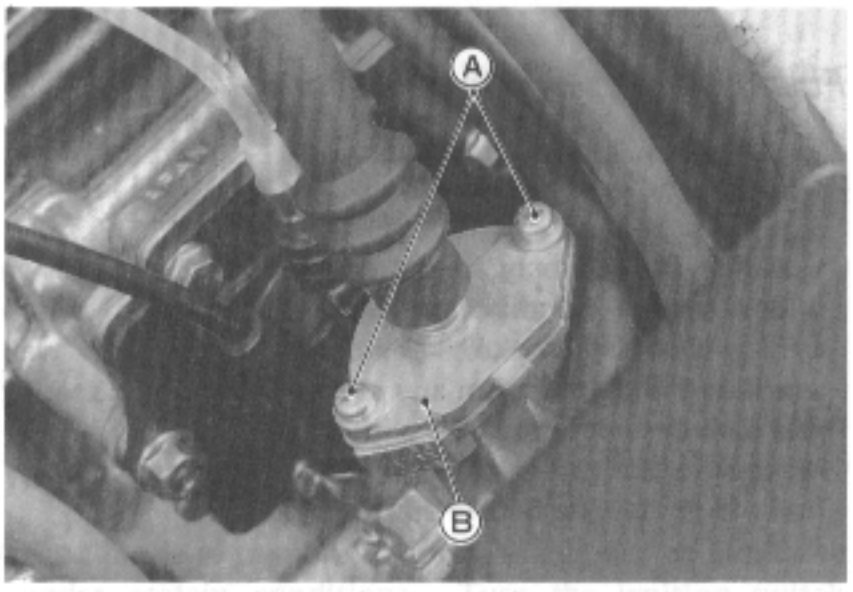
A. Drain Plug Wrench: 57001-1269

Carburetor Removal

WARNING

○Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

●Remove the following.
Side Covers
Seat
Fuel Tank



A. Mounting Screws B. Cap

Choke Cable Lower End
●Loosen the clamps and remove the ducts.
●Remove the carburetors.
●After removing the carburetors, stuff pieces of lint-free, clean cloths into the carburetor holders and the intake ducts to keep the dirt out of the engine and air cleaner.

WARNING

○If dirt or dust is allowed to pass through into the carburetors, the throttle may become stuck, possibly causing an accident.

CAUTION

○If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.
○If the throttle valves are not removed from the cables, wrap them in a clean cloth to avoid damage.

Carburetor Installation Notes

●After installing the carburetors, perform the following.
○Check fuel leakage from the carburetors.

WARNING

○Fuel spilled from the carburetors is hazardous.

○Adjust the following.
Idle Speed
Throttle Cable
Choke Cable
Oil Pump Cable

Carburetor Cleaning

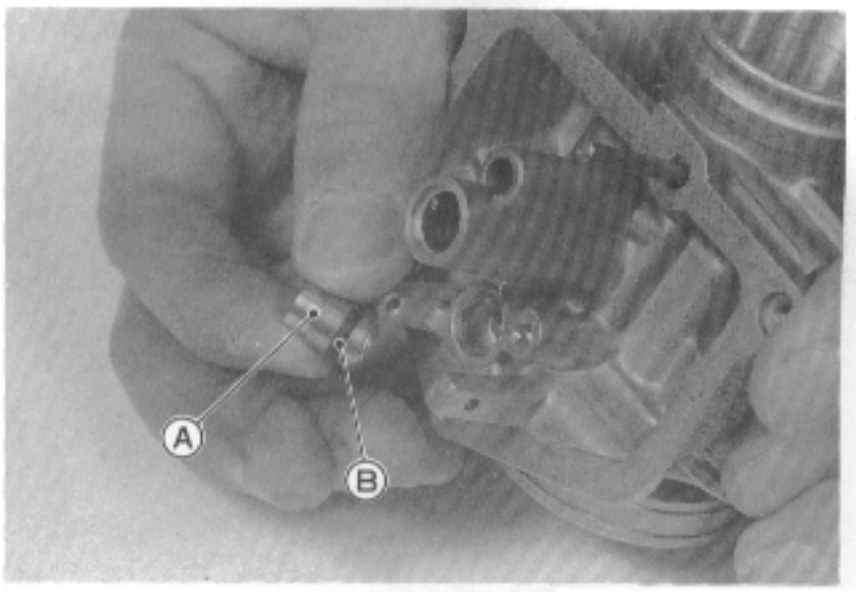
WARNING

○Clean the carburetors in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area; this includes any appliance with a pilot light. Because of the danger of highly flammable liquids, do not use gasoline or low flash point solvents to clean the carburetors.

CAUTION

○Do not use compressed air on an assembled carburetor, the float lever may be deformed by the pressure.
○Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor with a cleaning solution. This will prevent damage or deterioration of the parts.
○Do not use a strong carburetor cleaning solution which could attack the plastic parts; instead, use a mild high flash point cleaning solution safe for plastic parts.
○Do not use wire or any other hard instrument to clean carburetor parts, especially jets, as they may be damaged.

- Disassemble the carburetor.
- Immerse all the metal parts in a carburetor cleaning solution.
- Rinse the parts in water.
- When the parts are clean, dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Assemble the carburetor.



A. Valve Seat B. O-Ring

Carburetor Inspection

WARNING

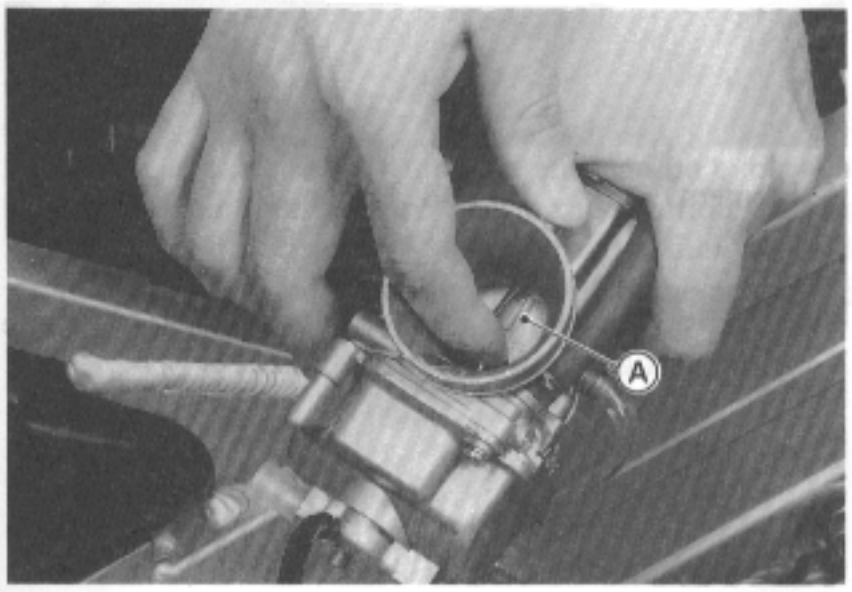
○Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove the carburetor.
- Before disassembling the carburetor, check the fuel level.

★If the fuel level is incorrect, inspect the rest of the carburetor before correcting it.

- Pull the carburetor cable to check that the throttle valve moves smoothly and return back with the spring tension.

★If the throttle valve does not move smoothly. Replace the carburetor.

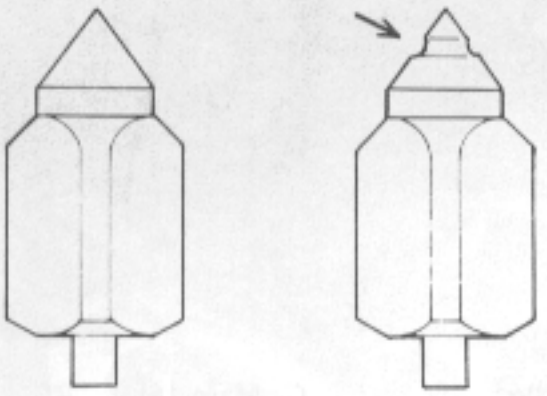


A. Throttle Valve

- Disassemble the carburetors.
- Clean the carburetor and check the parts as follows.
- Remove the float valve needle.
- Pull out the float valve seat.
- Check the float valve needle and valve seat for wear.

★If the needle is worn as shown in the figure or the seat is worn, replace the valve needle and valve seat as a set.

Valve Needle Wear



Good Bad

- Push the rod in the valve needle, then replace it.

★If the rod does not spring out, replace the valve needle and valve seat as a set.

- Check the O-ring on the float valve seat for damage.

★If the O-ring is damaged, replace the O-ring and the float valve as a set.

- Check the pilot jet for any damage.

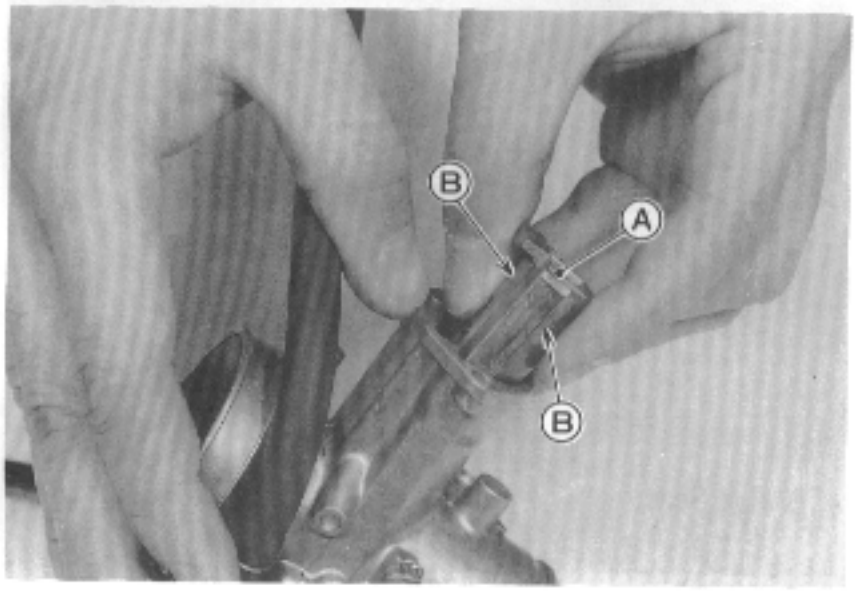
★If the pilot jet is damaged, replace it with new one.

- Remove the throttle valve and jet needle.
- Inspect the outside of the throttle valve for scratches and abnormal wear.

★If the valve is badly scratched or worn, replace it.

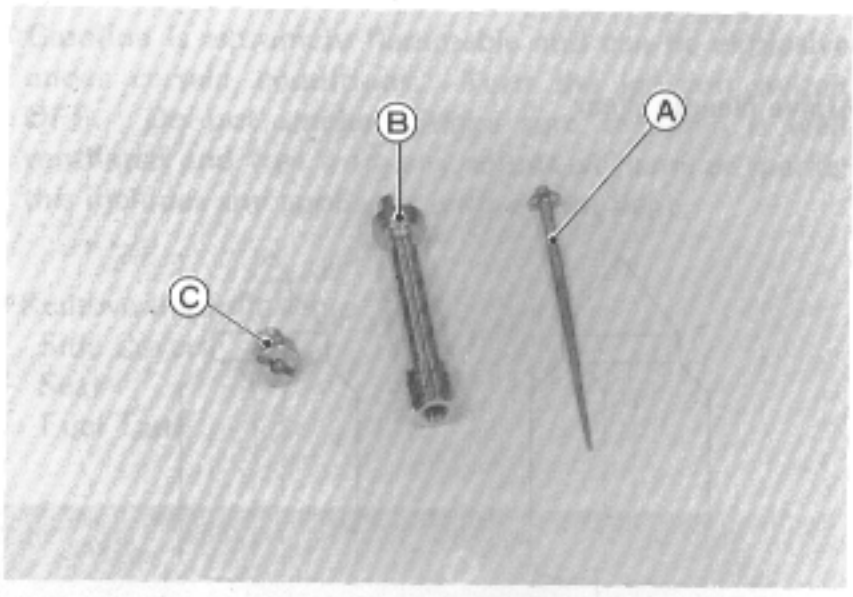
- Inspect the inside of the carburetor body for these same faults.

●If it is badly scratched or worn, replace the entire carburetor.



A. Throttle Valve B. Sliding Surface

●Remove the main jet, and then press out the needle jet using a suitable bar.
●Check the jet needle and needle jet for wear.
★A worn needle jet or jet needle should be replaced.



A. Jet Needle C. Main Jet
B. Needle Jet

●Disassemble the carburetor, and clean the fuel and air passages with a high flash point solvent and compressed air.
●Push a clean, lint-free towel into the air cleaner hosing to keep dirt or other foreign material from entering.

WARNING

○If dirt or dust is allowed to pass through into the carburetors, the throttle valves may become stuck, possibly causing an accident.

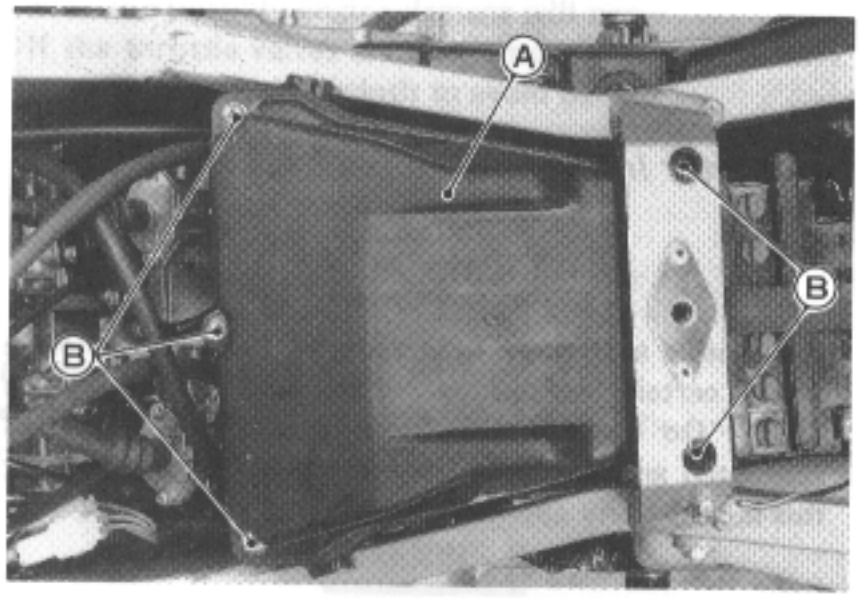
CAUTION

○If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.

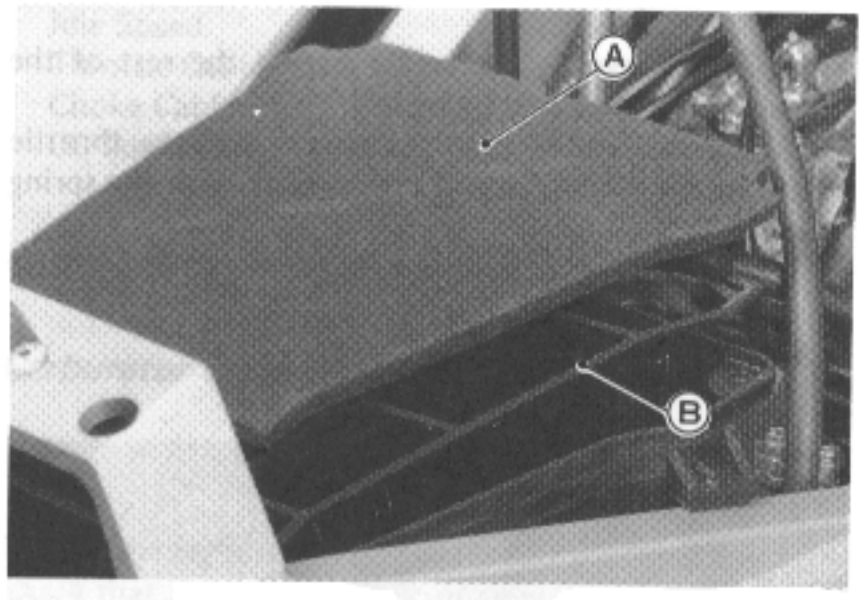
Air Cleaner

Air Cleaner Element Removal/Installation

●Remove the following.
Seat
Side Covers
Fuel Tank



A. Cover B. Mounting Screws



A. Element B. Frame

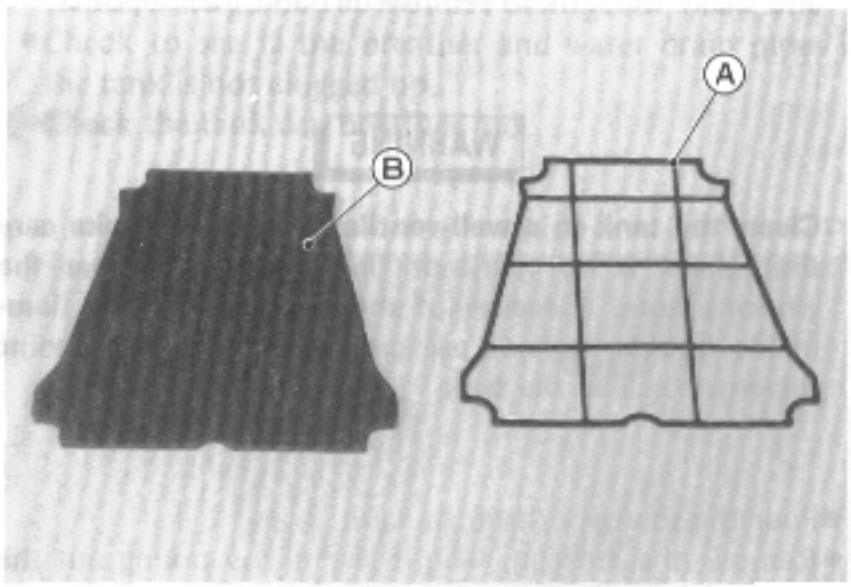
●When installing the air cleaner housing cover, take care not to overtighten the mounting bolts.

Element Inspection and Cleaning

NOTE

○*In dusty areas, the element should be cleaned more frequently than the recommended interval.*
○*After riding through rain or on muddy roads, the element should be cleaned immediately.*

- The damaged part must be replaced or it will allow dirt into the carburetors.



A. Frame B. Filter

WARNING

○Clean the element in a well-ventilated area, and take care that there is no spark or flame near the working area. Because of the danger of highly flammable liquids, do not use gasoline or low flash point solvents to clean the element.

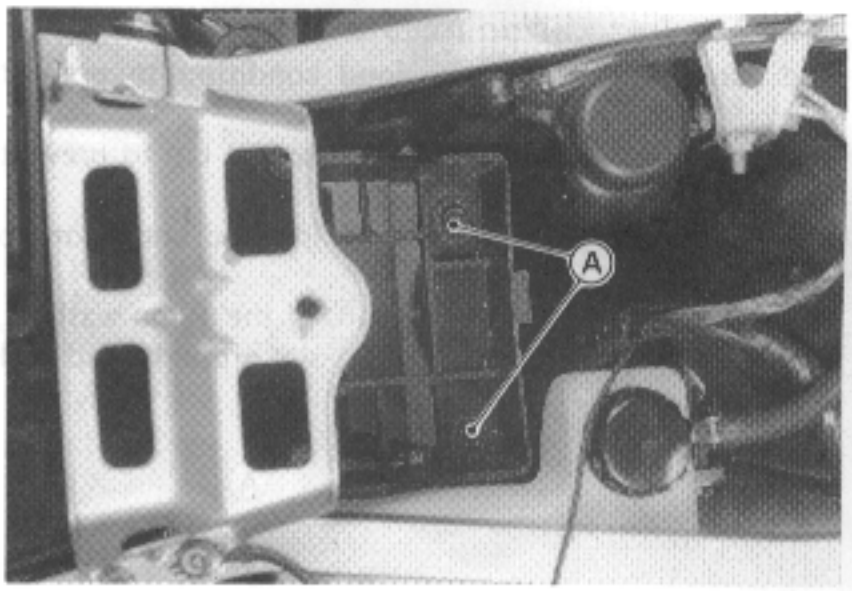
- Clean the element in a bath of a high flash point solvent, and then dry it with compressed air or by shaking it.
- After cleaning, saturate the sponge filter with SE class SAE30 oil, squeeze out the excess, then wrap it in a clean rag and squeeze it dry as possible. Be careful not to tear the sponge filter.

WARNING

○Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

Air Cleaner Housing Removal

- Remove the following
  - Seat
  - Side Covers
  - Fuel Tank
  - Air Cleaner Housing Cover
  - Air Cleaner Element
  - Air Cleaner Element Frame
  - Carburetor
  - Battery

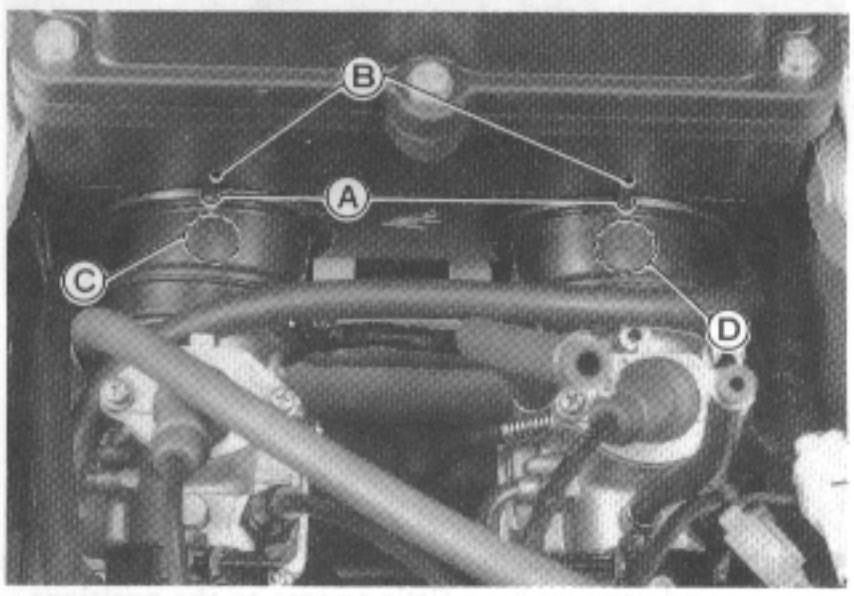


A. Mounting Bolts

- Take the air cleaner housing toward to front.

Air Cleaner Housing Installation Note

- Install the air cleaner housing ducts as shown.



A. Notches C. R Mark
B. Projections D. L Mark

Fuel Tank

Fuel Tank Removal

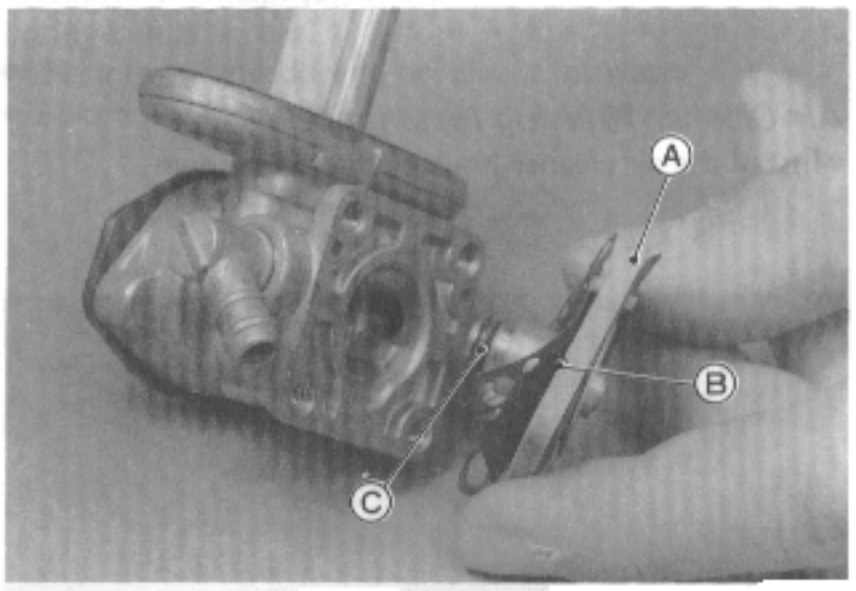
- Remove the following.
  - Seat
  - Side Covers
- Turn the fuel tap to the ON position and pull the hose off the tank and tap.
- Unscrew the mounting bolt and remove the fuel tank.

Fuel Tap Installation Note

- Be sure the O-ring is in good condition to prevent leaks.
- Be sure to clamp the fuel hose to the tap to prevent leaks.
- Be sure the nylon washers are in good condition to prevent leaks.
  - Do not use steel washers in place of the nylon washers, because they will not seal the bolts properly and fuel will leak.

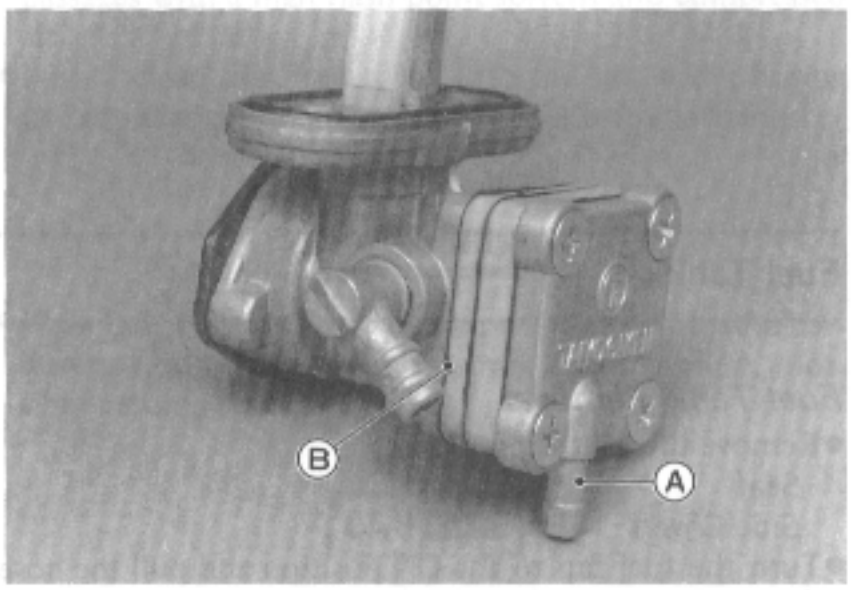
Fuel Tap Assembly Note

- Install the diaphragm plate so that the groove in the plate faces toward the O-ring side.



A. Diaphragm Plate C. O-ring
B. Groove

- Orient the diaphragm plate and cover so that the groove and vacuum hose fitting come to the positions.



A. Vacuum hose fitting. B. Groove

Fuel Tank and Tap Cleaning

- Remove the fuel tank and drain it.
- Pour some high flash point solvent into the fuel tank and shake the tank to remove dirt and fuel deposits.

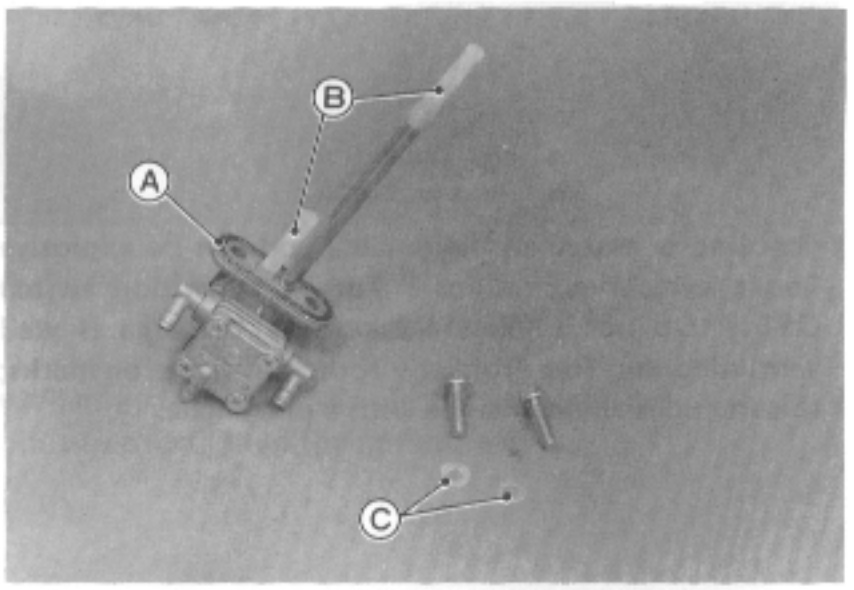
WARNING

- **Clean the tank in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area. Because of the danger or highly flammable liquids, do not use gasoline or low flash point solvents to clean the tank.**

- Pour the solvent out of the tank.
- Remove the fuel tap from the tank by taking out the bolts with nylon washers.
- Clean the fuel tap filter screens in a high flash point solvent.
- Pour high flash point solvent through the tap in all lever positions.
- Dry the tank and tap with compressed air.
- Install the tap in the tank.
- Install the fuel tank.

Fuel Tap Inspection

- Remove the fuel tap.
- Check the fuel tap filter screens for any breaks or deterioration.



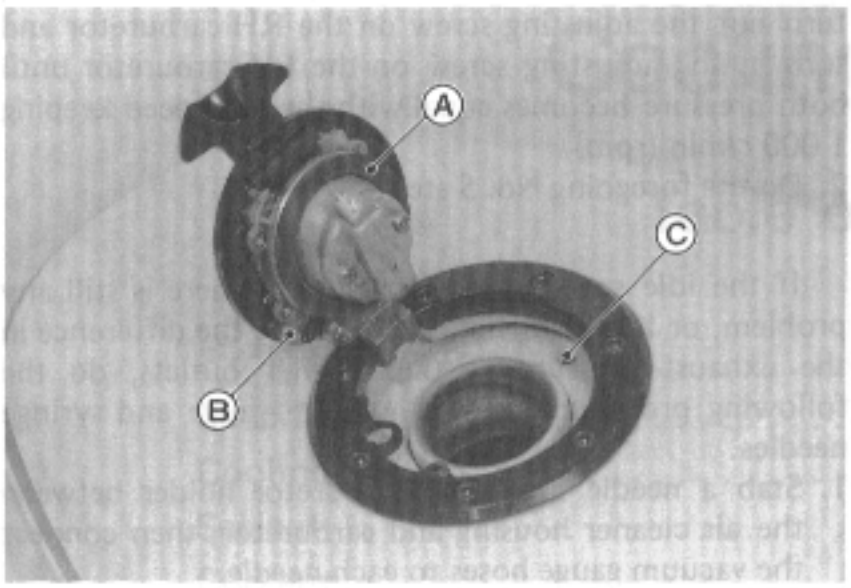
A. O-ring C. Gasket
B. Filter Screens

★If the fuel tap screens have any breaks or are deteriorated, it may allow dirt to reach the carburetor, causing poor running. Replace the fuel tap.

★If the fuel tap leaks, or allows fuel to flow when it is ON or RES without engine running, replace the damaged gasket or O-ring.

Fuel Tank and Cap Inspection

- Visually inspect the gaskets on the tank and cap for any damage.
- ★Replace the gaskets if they are damaged.
- Check to see if the breather and water drain pipes in the tank is not clogged up.
- Check the tank cap breather too.



A. Gasket
B. Breather Pipe
C. Breather

★If they are clogged, remove the tank and drain it, and then blow the breather free with compressed air.

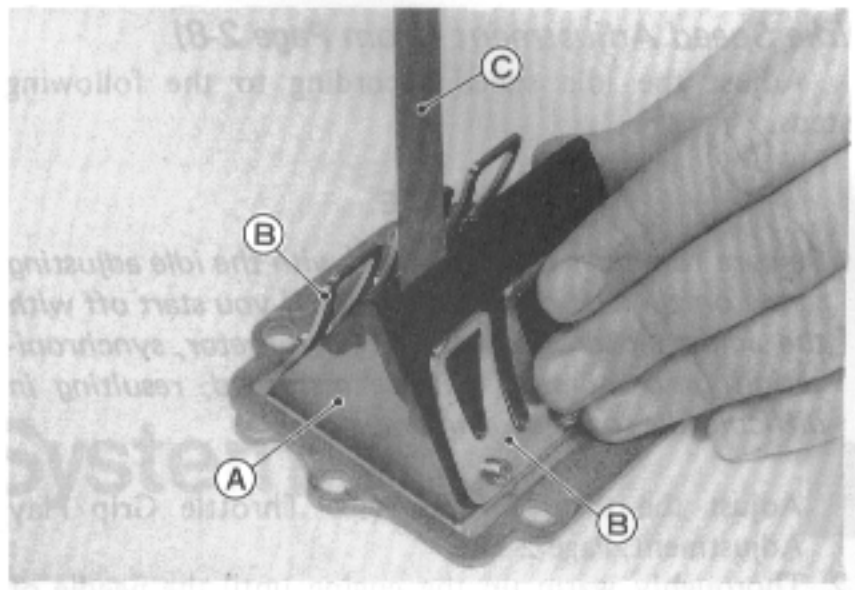
Reed Valve

Reed Valve Removal

- Remove the carburetor from the carburetor holder.
- Remove the carburetor holder mounting bolts, and move the holder rearward.
- Take the reed valve out of the crankcase.

Reed Valve Inspection

- Inspect the reeds for cracks, folds or other visible damage.
- ★If there is any doubt as to the condition of a reed, replace the reed valve assembly.
- ★If a reed becomes wavy, replace the valve assembly even if its warp is less than the service limit.
- Measure the clearance between the reed and holder, and check the read warp as shown.



A. Reed
B. Reed Valve Holder
C. Thickness Gauge

★If any one of the clearance measurements exceeds the service limit, replace the valve assembly.

Reed Warp

Service Limit:	**0.2 mm**

Idle Speed Adjustment (from Page 2-8)

Adjust the idle speed according to the following steps.

NOTE

○*Be sure to adjust the idle speed with the idle adjusting screw on the RH carburetor first. If you start off with the adjusting screw on the LH carburetor, synchronization of carburetors will be disturbed, resulting in difficult idle speed adjustment.*

1. Adjust the throttle cable (see Throttle Grip Play Adjustment, Page 2-5).
2. Thoroughly warm up the engine until the needle of the coolant temperature gauge indicates as shown.

CAUTION

○**Do not run the engine over 6 000 r/min (rpm).**

3. Adjust the idle speed to 1 000 r/min (rpm) by turning in or out the idle adjusting screw on the RH carburetor.
4. With the engine idling, turn the handlebar to both sides. If handlebar movement changes the idle speed, the throttle cable may be improperly adjusted or incorrectly routed, or it may be damaged. Be sure to correct any of these conditions before riding.

WARNING

○**Operation with an improperly adjusted, incorrectly routed, or damaged cable could result in an unsafe riding condition.**

5. Turn the throttle grip back and forth to vary the engine revolution. Check that the idle speed comes back to 1 000 r/min (rpm) smoothly when releasing the throttle grip.

If the idle speed is not stable or there is any problem, proceed to the next steps.

1. With the engine idling, hold your hands behind each muffler outlet to feel the exhaust pressure. If the LH exhaust pressure is higher than the RH one, turn out the idle adjusting screw on the LH carburetor and turn in the idle adjusting screw on the RH carburetor until both pressure becomes equal with the idle speed keeping 1 000 r/min (rpm).

NOTE

○*Turn the idle adjusting screw ¼ turn maximum at a time.*

○*If more than ½ turn is needed to adjust the idle speed, check the throttle cables for correct routing, carburetors for foreign material, starter plunger for sticking open, etc.*

If the RH exhaust pressure is higher than the LH one, turn out the adjusting screw on the RH carburetor and turn in the adjusting screw on the LH carburetor until both pressure becomes equal with the idle speed keeping 1 000 r/min (rpm).

2. Do the foregoing No. 5 step.

If the idle speed is still unstable or there is still any problem, or if it is difficult to perceive the difference in the exhaust pressure at the muffler outlets, do the following procedure using a vacuum gauge and syringe needles.

1. Stab a needle into each carburetor holder between the air cleaner housing and carburetor, then connect the vacuum gauge hoses to each needle.
2. Screw in or out both adjusting screws until intake vacuum difference between the two cylinders becomes less than 5.4 kPa (4 mmHg) with the idle speed keeping 1 000 r/min (rpm).

Cooling System

3

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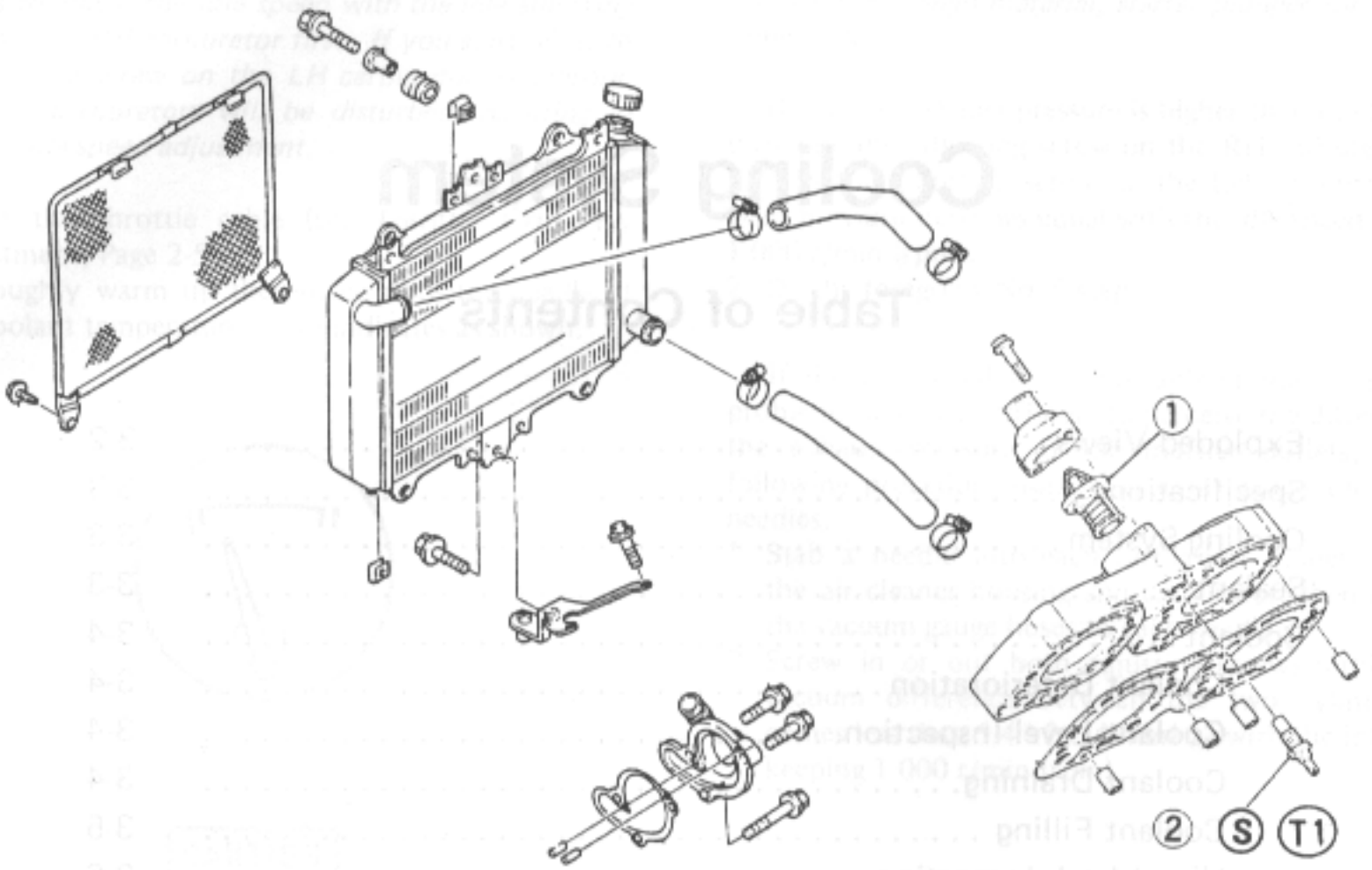
Exploded View



1. Thermostat
2. Coolant Temperature Sensor
3. Drain Plug

O : Apply oil.

S : Apply silicone sealant (Kawasaki Bond: 56019-120).

T1: 15 N-m (1.5 kg-m, 11.0 ft-lb)

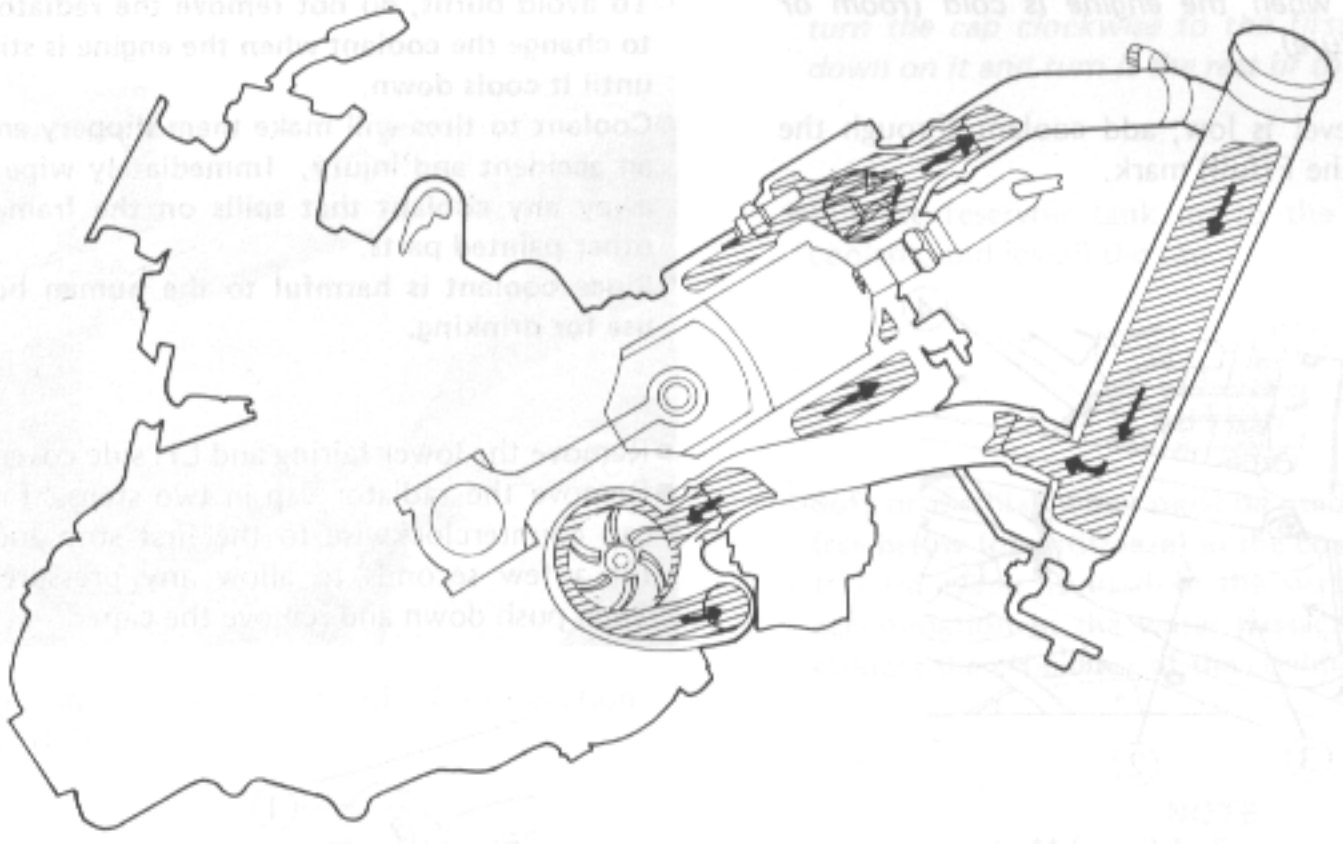
T2: 17 N-m (1.7 kg-m, 12.0 ft-lb)

T3: 9.8 N-m (1.0 kg-m, 87 in-lb)

Specifications

Item	Standard
Coolant Provided when Shipping:	
Type	Permanent type of antifreeze for aluminum engine and radiator
Color	Green
Mixed ratio	Soft water 50%, coolant 50%
Freezing point	–35°C (–31°F)
Total amount	1.5 L (Up to reservoir tank full level)
Radiator Cap:	
Relief pressure	93 – 123 kPa (0.95 – 1.25 kg/cm², 14 – 18 psi)
Thermostat:	
Valve opening temperature	63.5 – 66.5°C (147 – 153°F)
Valve full open lift	not less than 6 mm @80°C (176°F)

Cooling System



Sealant

Kawasaki Bond (Silicone Sealant): 56019-120

Coolant

Coolant Deterioration

- Visually inspect the coolant in the reservoir tank.

○If whitish cotton-like wafts are observed, aluminum parts in the cooling system are corroded. If the coolant is brown, iron or steel parts are rusting. In either case, flush the cooling system.

○If the coolant gives off an abnormal smell when changing, check for a cooling system leak. It may be caused by exhaust gas leaking into the cooling system.

NOTE

○*Be sure to inspect the coolant at the reservoir tank. If the coolant is checked by removing the radiator cap, the air must be bled from the cooling system.*

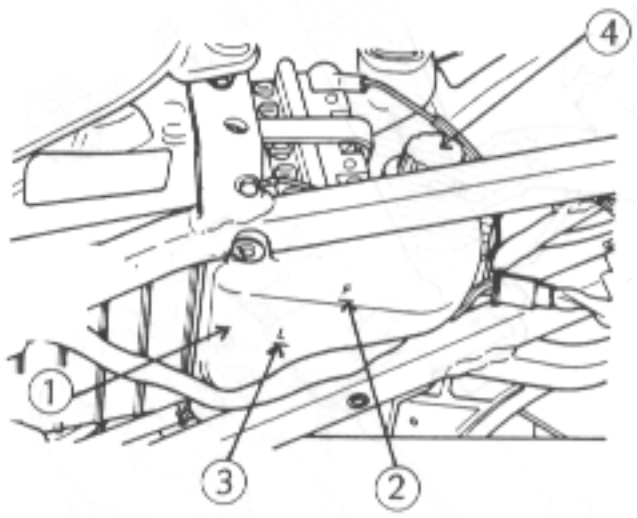
Coolant Level Inspection

- Situate the motorcycle so that it is level gauge on the reservoir tank. The coolant level should be between the F(full) and the L(low) marks.

NOTE

○*Check the level when the engine is cold (room or ambient temperature).*

★If the coolant level is low, add coolant through the filler opening to the F(full) mark.



1. Reservoir Tank
2. F(Full) Mark
3. L(Low) Mark
4. Cap

CAUTION

○**For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties. The diluted coolant can attack the aluminum engine parts. In an emergency, soft water can be added. But the diluted coolant must be returned to the correct mixture ratio within a few days.**

○**If coolant must be added often, or the reservoir tank has run completely dry; there is probably leakage in the cooling system. Check the system for leaks (see Visual Leak Inspection, and Pressure Testing).**

Coolant Draining

The coolant should be changed periodically to ensure long engine life.

CAUTION

○**Use coolant containing corrosion inhibitors made specifically for aluminum engines and radiators in accordance with the instructions of the manufactures (see Coolant Filling section).**

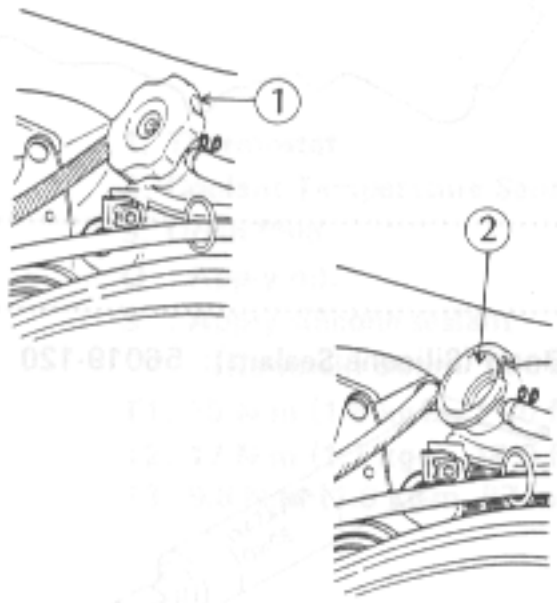
WARNING

○**To avoid burns, do not remove the radiator cap or try to change the coolant when the engine is still hot. Wait until it cools down.**

○**Coolant to tires will make them slippery and can cause an accident and injury. Immediately wipe up or wash away any coolant that spills on the frame, engine or other painted parts.**

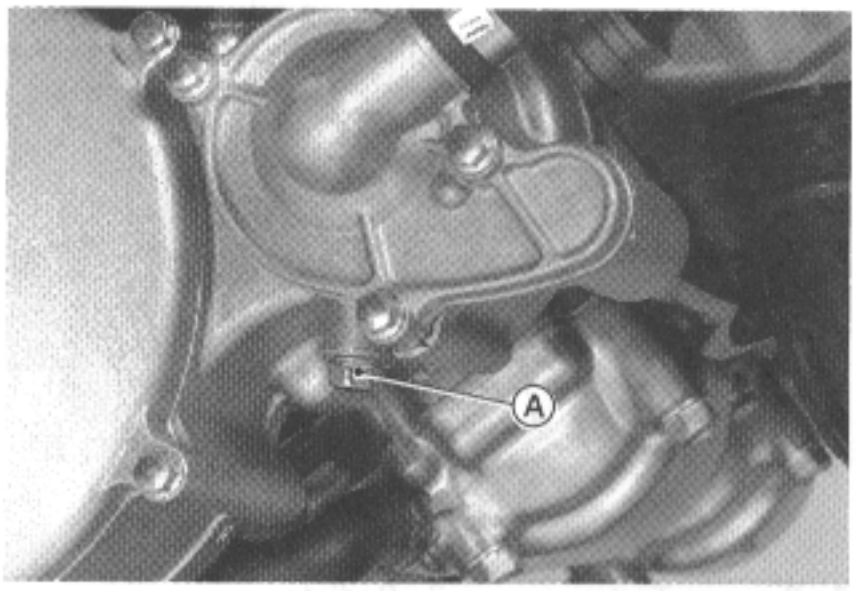
○**Since coolant is harmful to the human body, do not use for drinking.**

- Remove the lower fairing and LH side cover.
- Remove the radiator cap in two steps. First turn the cap counterclockwise to the first stop and wait there for a few seconds to allow any pressure to escape. Then push down and remove the cap.



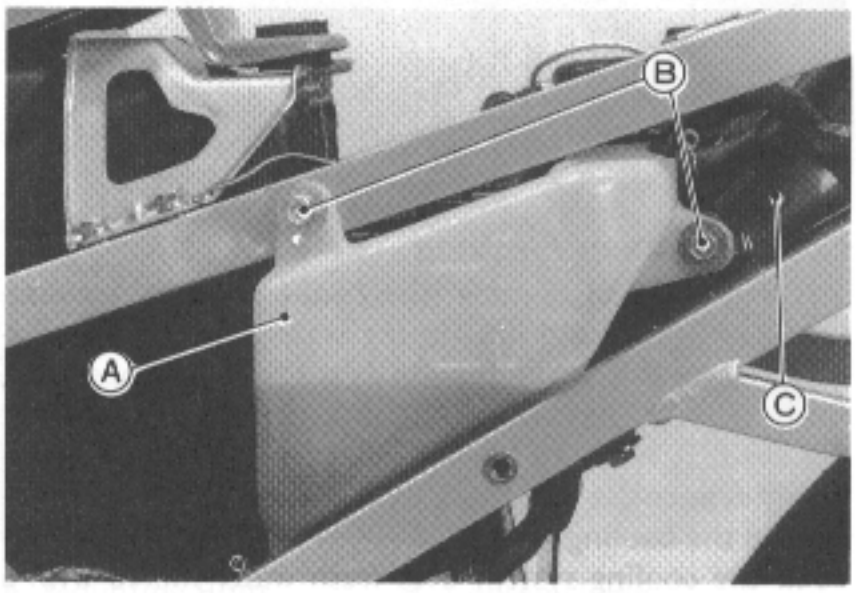
1. Radiator Cap
2. Filler Neck

●Drain the coolant from the radiator and engine by removing the drain plug at the bottom of the water pump body.



A. Drain Plug

●Remove the rear fender front section (see Frame chapter).
●Remove the reservoir tank and pour the coolant into a suitable container.



A. Reservoir Tank
B. Mounting Bolt
C. Rear Fender Front Section

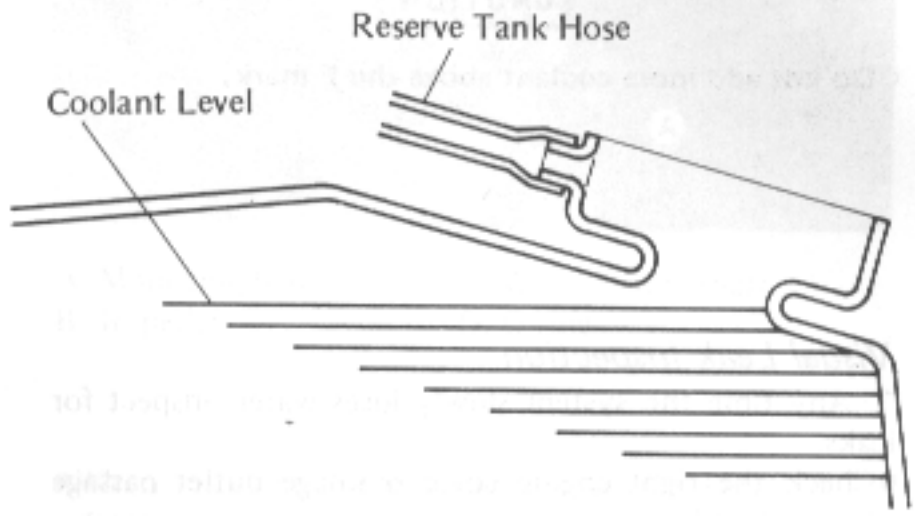
●Inspect the old coolant for color and smell.

Coolant Filling

●Install the drain plugs. Always replace the gaskets with new ones, if they are damaged.
●Tighten the drain plugs to the specification (see General Information chapter).

●Fill the radiator up to the bottom of the radiator filler neck with coolant, and install the cap turning it clockwise about 1/4 turn.

Radiator Filler Neck



NOTE

○*Pour in the coolant slowly so that it can expel the air from the engine and radiator.*
○*The radiator cap must be installed in two steps. First turn the cap clockwise to the first stop. Then push down on it and turn it the rest of the way.*

●Fill the reservoir tank up to the F(full) mark with coolant, and install the cap.

CAUTION

○**Soft or distilled water must be used with the antifreeze (see below for antifreeze) in the cooling system.**
○**If hard water is used in the system, it causes scales accumulation in the water passages, and considerably reduces the efficiency of the cooling system.**

NOTE

○*Choose a suitable mixture ratio by referring to the coolant manufacturer's directions.*

The coolant provided when shipping

Type: Permanent type antifreeze for aluminum engine and radiator
Color: Green
Mixed ratio: Soft water 50%, Coolant 50%
Freezing point: –35°C (–31°F)
Total amount: 1.5 L (up to F(full) mark)

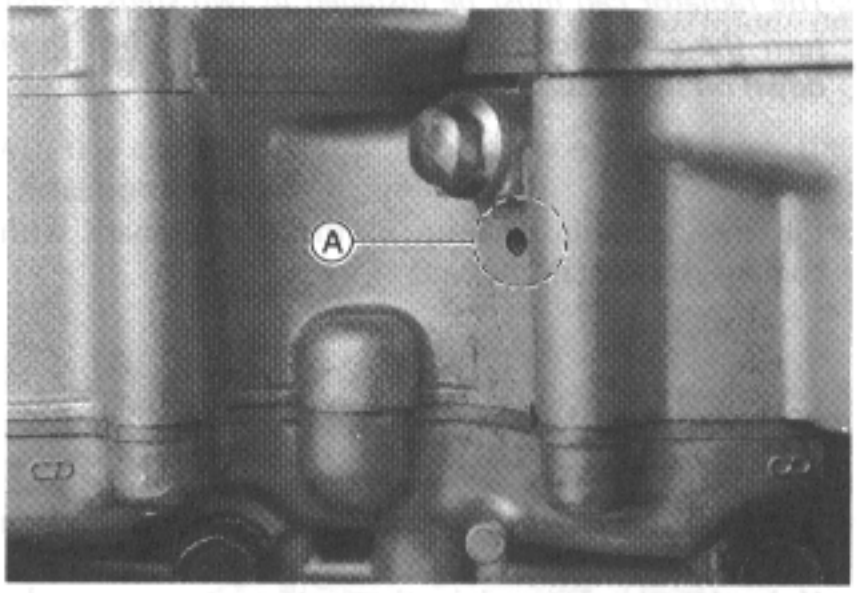
●Start the engine, warm it up thoroughly until the radiator fan turns on and then stop the engine.
●Check the coolant level in the reservoir tank after the engine cools down.
★If the coolant level is lower than the L mark, add coolant up to the F mark.

CAUTION

○**Do not add more coolant above the F mark.**

Visual Leak Inspection

Any time the system slowly loses water, inspect for leaks.
●Check the right engine cover drainage outlet passage for coolant leaks.
★If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Disassemble the water pump and remove the mechanical seal.
★If there are no apparent leaks, pressure test the system.



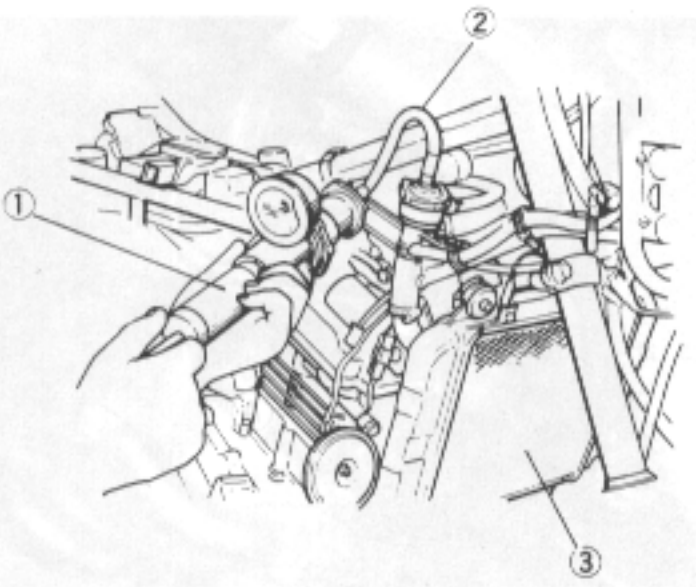
A. Drainage Outlet Passage

Cooling System Pressure Testing

CAUTION

○**During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure is 108 kPa (1.1 kg/cm², 16 psi).**

●Remove the radiator cap, and install a cooling system pressure tester on the radiator filler neck.
●Wet the cap sealing surfaces with water or coolant to prevent pressure leaks.
●Build up pressure in the system carefully until the pressure reaches 108 kPa (1.1 kg/cm², 16 psi).
●Watch the gauge for at least 6 seconds. If the pressure holds steady, the system is all right.



1. Pressure Tester
2. Adapter
3. Radiator

●Remove the pressure tester, replenish the coolant, and install the radiator cap.
★If the pressure drops and no external source is found, check for internal leaks. Droplets in the engine oil indicate internal leakage. Check the cylinder head gasket and the water pump mechanical seal.

Cooling System Flushing

Over a period of time, the cooling system accumulates rust, scale, and lime in the water jacket and radiator. When this accumulation is suspected or observed, flush the cooling system. If this accumulation is not removed, it will clog up the water passage and considerably reduce the efficiency of the cooling system.
●Drain the cooling system.
●Fill the cooling system with fresh water mixed with a flushing compound.

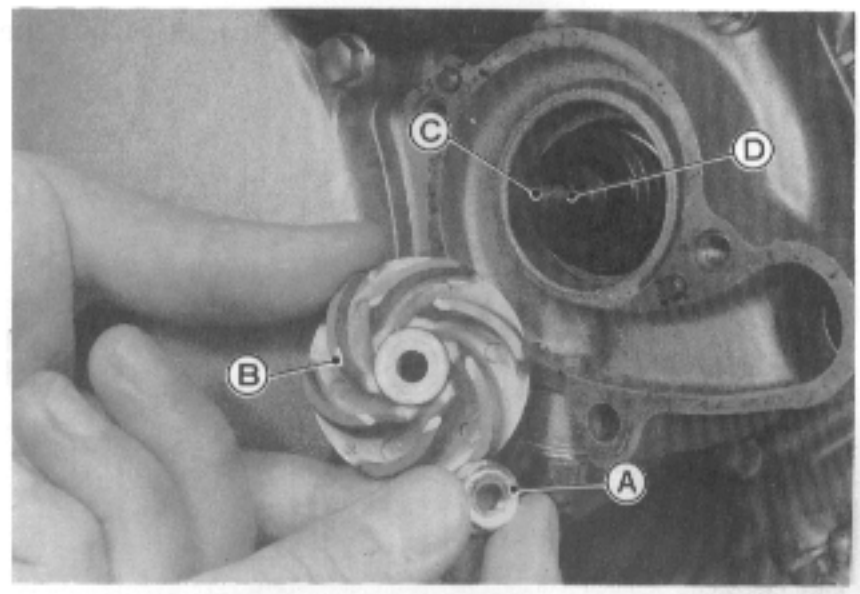
CAUTION

○**Do not use a flushing compound which is harmful to the aluminum engine and radiator. Carefully follow the instructions supplied by the manufacturer of the cleaning product.**

●Warm up the engine, and run it at normal operating temperature for about ten minutes.
●Stop the engine, and drain the cooling system.
●Fill the system with fresh water.
●Warm up the engine and drain the system.
●Repeat the previous two steps once more.
●Fill the system with a permanent type coolant, and bleed the air from the system.

Disassembly and Assembly Precautions

- Prior to disassembly of cooling system parts (radiator, thermostat, pump, sensor, etc.), wait until coolant cools down and drain coolant.
- After assembling and filling the system with coolant, bleed the air form the system.



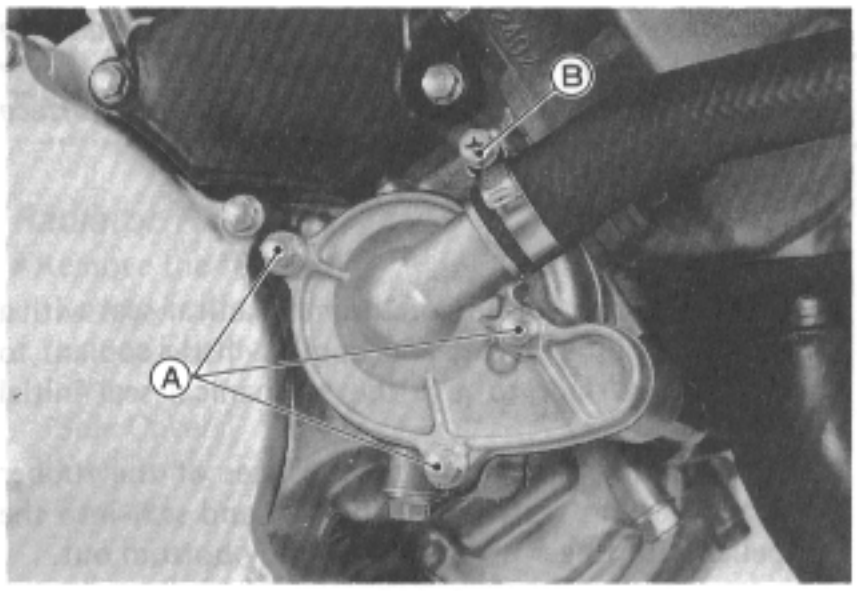
A. Mounting Nut
B. Impeller
C. Water Pump Shaft
D. O-ring

- When installing the impeller, replace the O-ring if it is damaged.

Water Pump, Mechanical Seal

Pump Cover Removal

- Drain the coolant.
- Remove the following.



A. Mounting Bolts
B. Loosen clamp.

Water Pump Disassembly

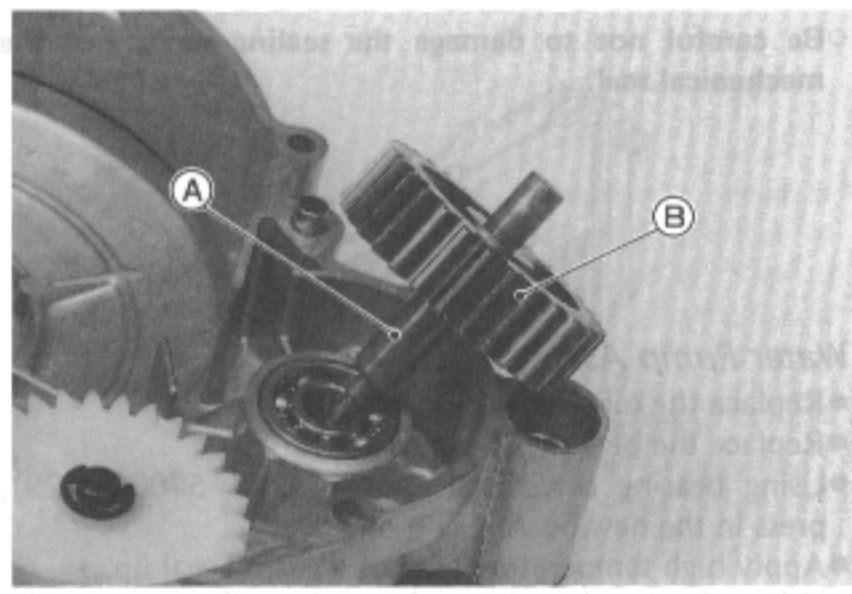
- Remove the water pump cover.
- Remove the right engine cover (see Engine Right Side chapter).
- Remove the water pump impeller.

Pump Impeller Removal/Installation Notes

CAUTION

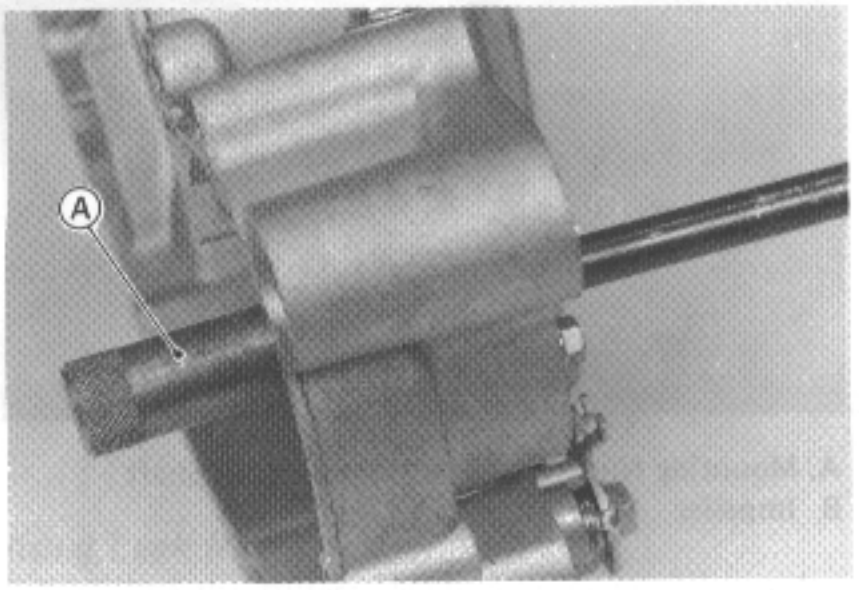
○The impeller has an O-ring. Turn the impeller clockwise during installation, and counterclockwise during removal. This is to prevent impeller O-ring damage by the shaft threads.

- Unscrew the mounting nut end remove the impeller.



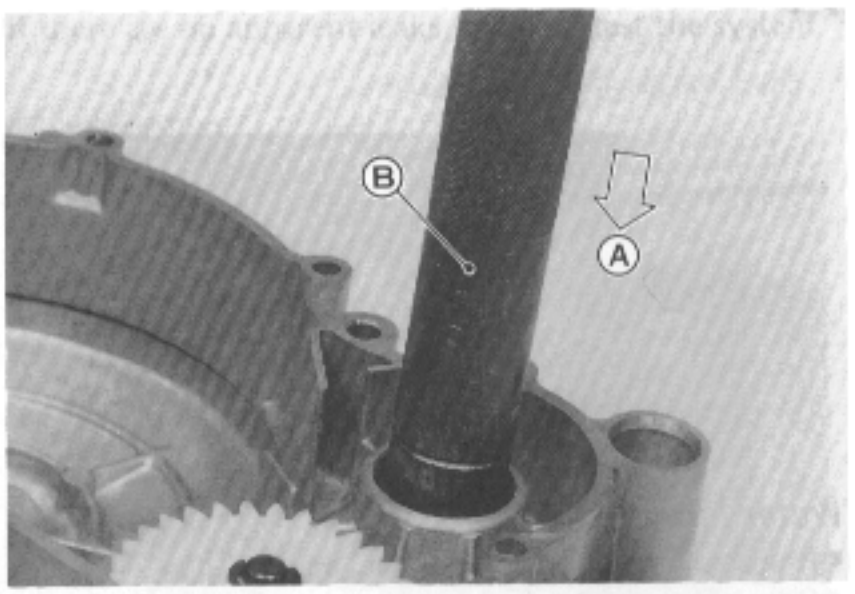
A. Water Pump Shaft
B. Water Pump Driven Gear

●Using bearing remover set (special tool), drive out the bearing.



A. Bearing Remover Set: 57001-1264

●Using bearing driver set (special tool), press out the mechanical seal and oil seal.



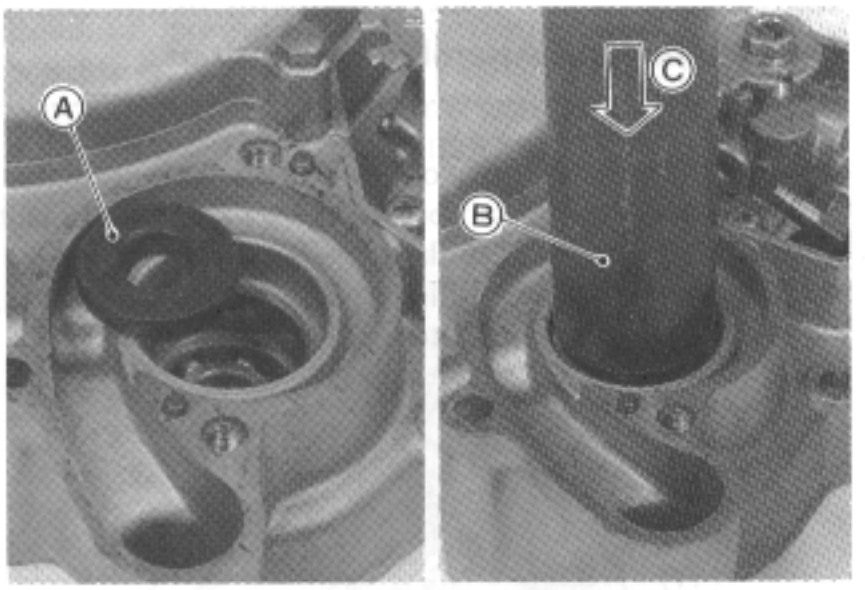
A. Press
B. Bearing Driver Set: 57001-1129

CAUTION

○Be careful not to damage the sealing surface of the mechanical seal.

Water Pump Assembly Notes

●Replace the oil seal if it is damaged.
●Replace the bearing with a new one.
●Using bearing driver set (special tool: 57001-1129), press in the new bearing and oil seal.
●Apply high temperature grease to the oil seal lip.
●Using the bearing driver (special tool), press in the mechanical seal.



A. Oil Seal
B. Bearing Driver: 57001-382
C. Press

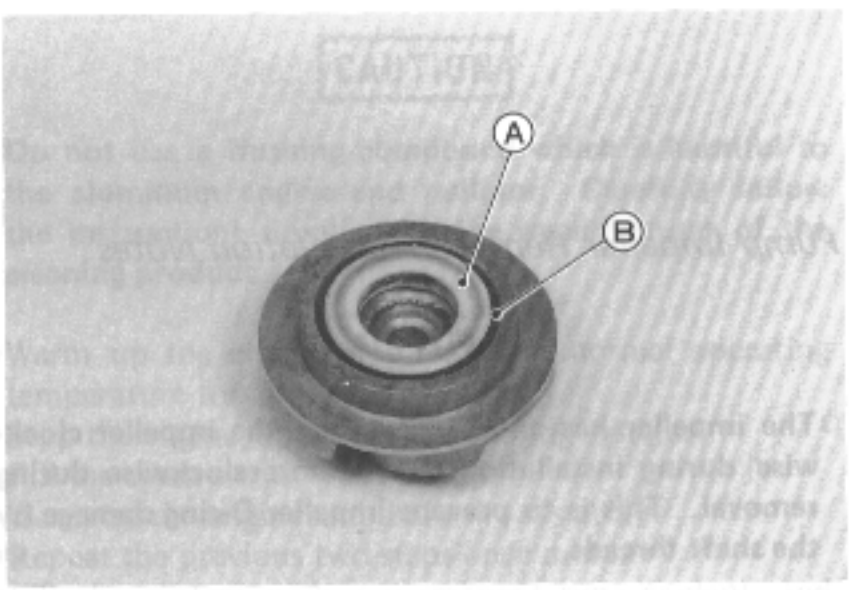
CAUTION

○Do not block the coolant draining outlet passage with the mechanical seal by pressing it too deep into the right engine cover.

NOTE

○Since the replacement mechanical seal has an adhesive coated body, do not apply a liquid gasket – silver (Kawasaki Bond: 92104-002) to the exterior surface of the body.

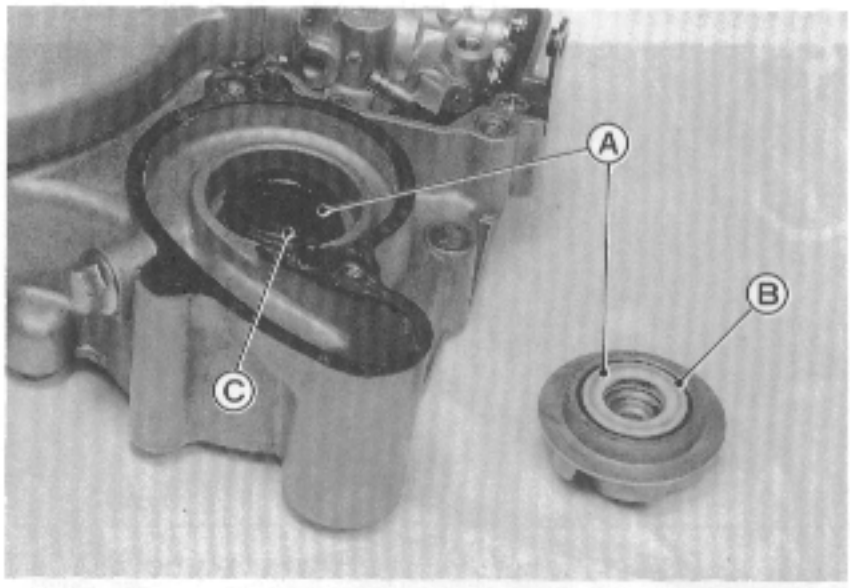
●Clean the sliding surface of the mechanical seal with a high flash-point solvent, and apply a little coolant to the sliding surface to give the mechanical seal initial lubrication.
●After applying coolant to the surfaces of the rubber seal and sealing seat, install the seal and seat into the impeller with finger pressure until they bottom out.



A. Sealing Seat B. Rubber Seal

Mechanical Seal Inspection

- Visually inspect the mechanical seal.
- ★If any one of the parts is damaged, replace the mechanical seal as a unit.
- ○The sealing seat and rubber seal may be removed easily by hand.

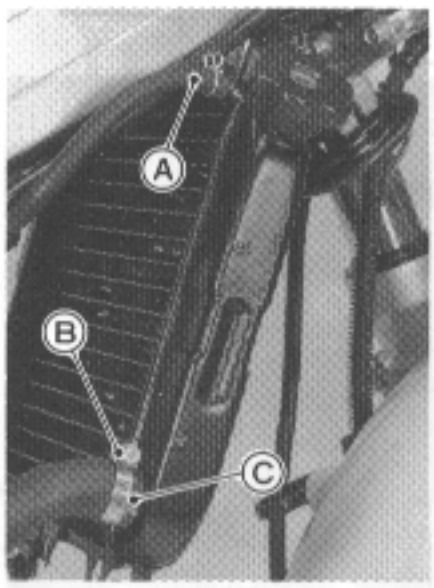


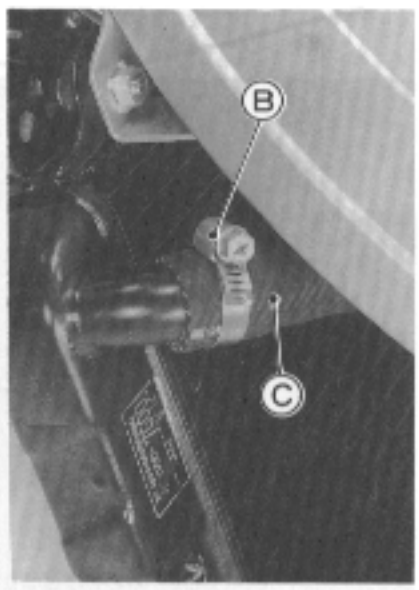
A. Impeller Sealing Seat Surface
B. Rubber Seal
C. Mechanical Seal Diaphragm

Radiator

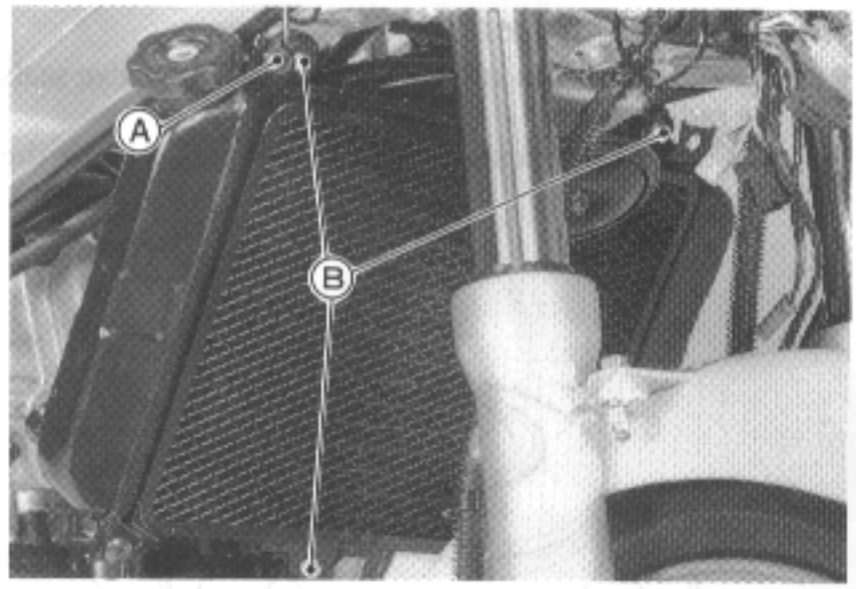
Radiator Removal

- Remove the following.
  - Lower Fairing
  - Upper Fairing
  - Seat
  - Side Covers
  - Fuel Tank
  - Coolant





A. Reservoir Tank Hose End
B. Clamp (Loosen)
C. Radiator Hose End



A. Clutch Cable Clamp Mounting Bolt
B. Radiator Mounting Bolt

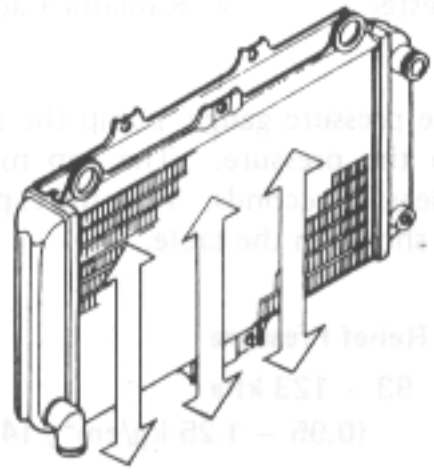
Radiator Inspection

- Check the radiator core.
- ★If there are obstructions to air flow, remove them.
- ★If the corrugated fins are deformed, carefully straighten them.
- ★If the air passages of the radiator core are blocked more than 20% by unremovable obstructions or irreparably deformed fins, replace the radiator with a new one.

CAUTION

○When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage.

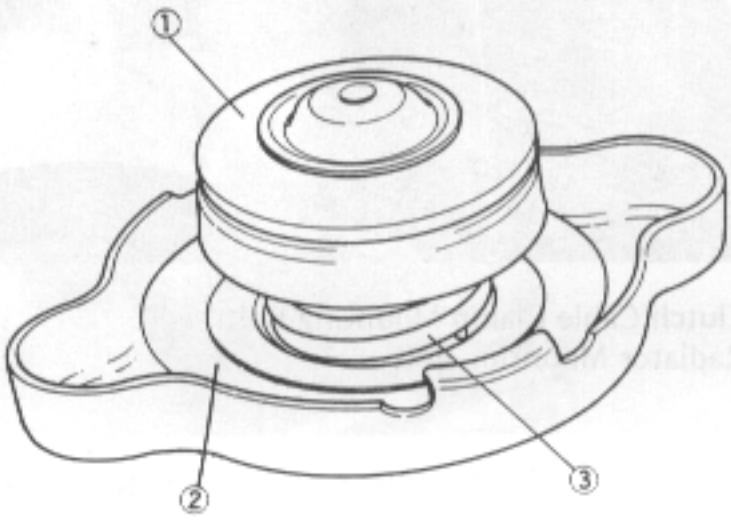
1) Keep the steam gun away more than 0.5 m from the radiator core.
2) Hold the steam gun perpendicular to the core surface.
3) Run the steam gun horizontally following the core fin direction.. Running it vertically may damage the fin.



Radiator Cap Inspection

●Check the condition of the top and bottom valve seals of the radiator cap.

★If any one of them shows visible damage, replace the cap.

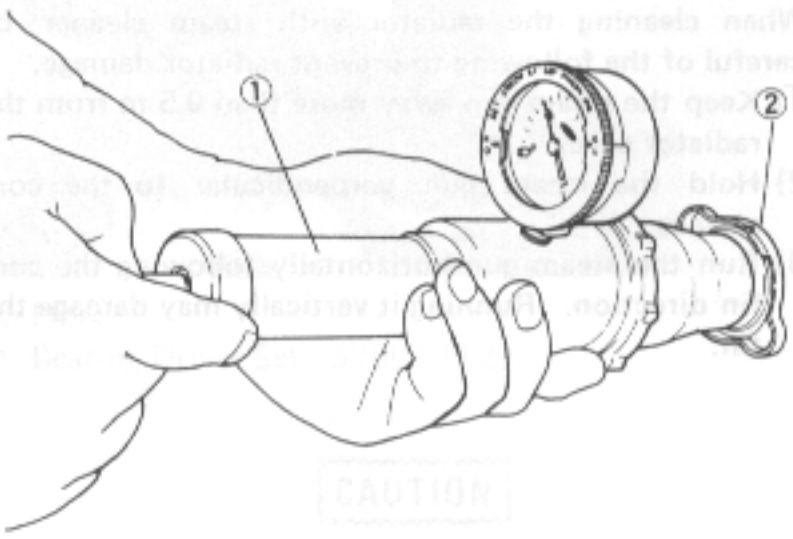


1. Bottom Valve Seal
2. Top Valve Seal
3. Valve Spring

●Install the cap on a cooling system pressure tester.

NOTE

○*Wet the cap sealing surfaces with water or coolant to prevent pressure leaks.*



1. Pressure Tester
2. Radiator Cap

●Watching the pressure gauge, pump the pressure tester to build up the pressure. The cap must retain the pressure at least 6 seconds. Also the cap must open at the pressure shown in the table.

Radiator Cap Relief Pressure

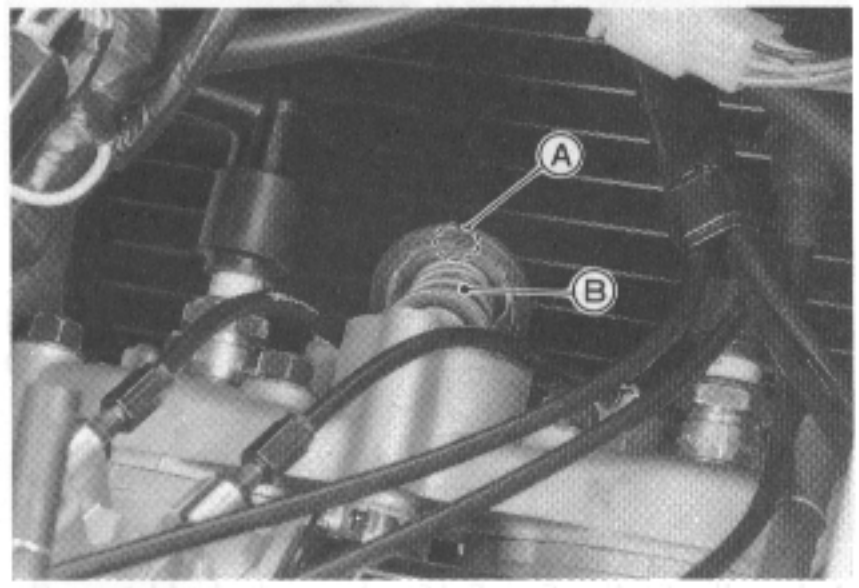
Standard: 93 – 123 kPa
(0.95 – 1.25 kg/cm², 14 – 18 psi)

★If the cap cannot hold the specified pressure, or if it holds too much pressure, replace it with a new one.

Thermostat

Thermostat Installation Note

●Install the thermostat so that the air bleeder hole is on top with the engine installed in the frame.



A. Thermostat
B. Air Bleeder Hole

Thermostat Inspection

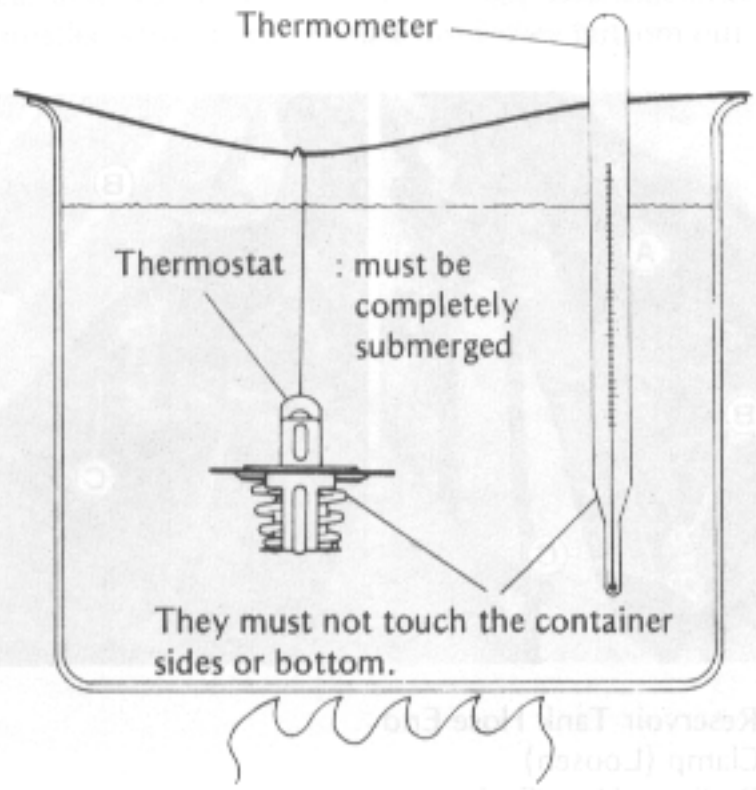
●Remove the thermostat, and inspect the thermostat valve at room temperature.

★If the valve is open, replace the valve with a new one.

●To check valve opening temperature, suspend the thermostat and an accurate thermostat in a container of water.

○Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.

Valve Opening Temperature Measurement



●Watch the valve. As soon as the valve starts to open, note the temperature.
★If it is out of the service limit range, replace the thermostat.

Thermostat Valve Opening Temperature

63.5 – 66.5°C (147 – 153°F)

Water Temperature Sensor

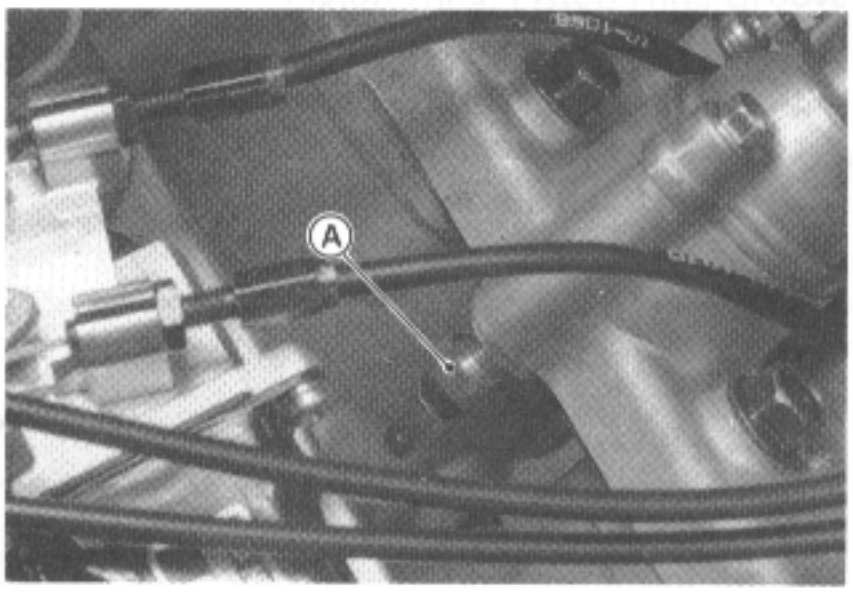
Removal Caution

CAUTION

○**The water temperature sensor should never be allowed to fall on a hard surface. Such a shock to these parts can damage them.**

Installation Notes

●Apply silicone sealant (Kawasaki Bond: 56019-120) to the threads of sensor.
●Tighten the sensor to the specified torque (see General Information chapter).



A. Water Temperature Sensor

Engine Top End

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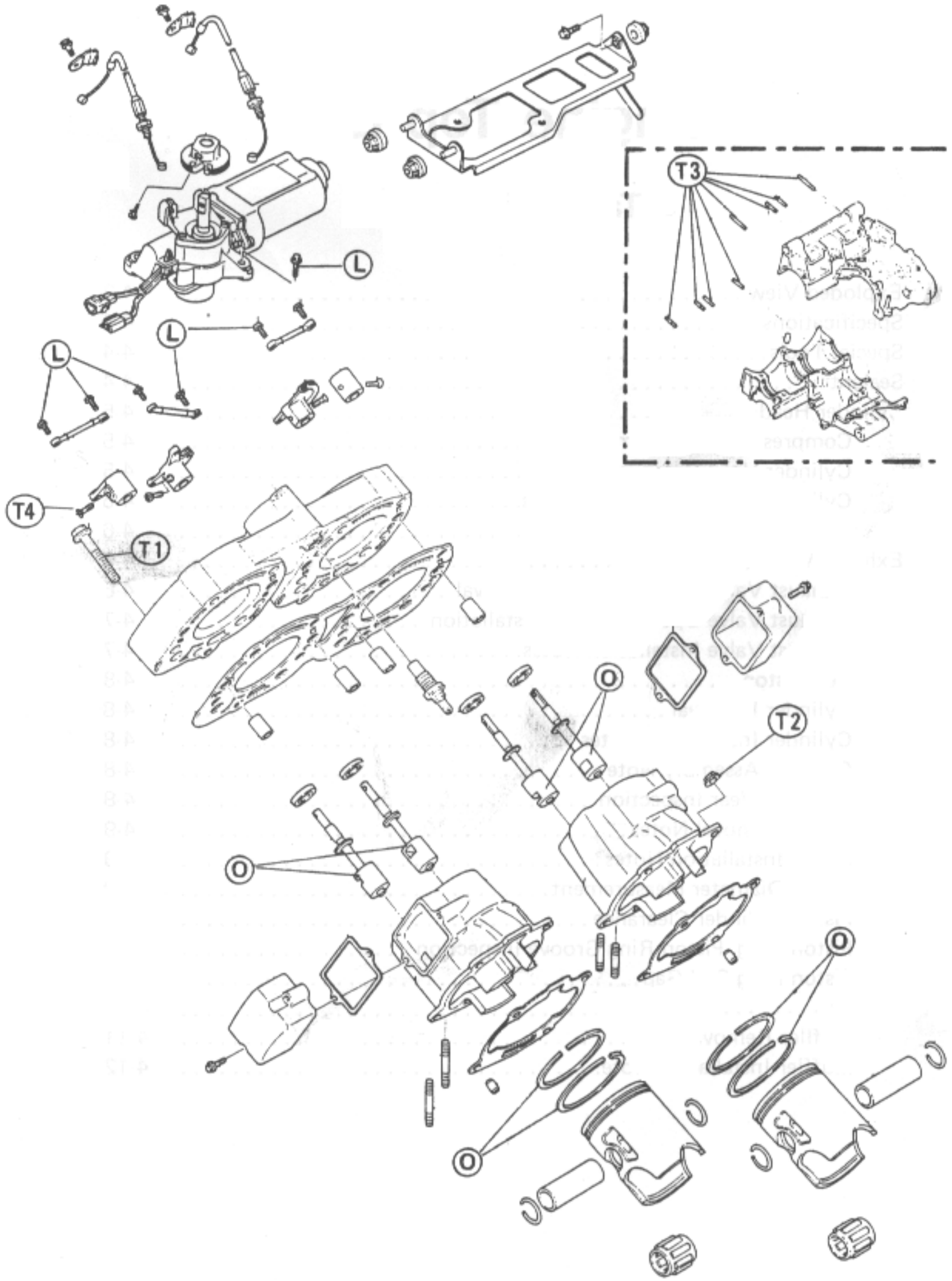
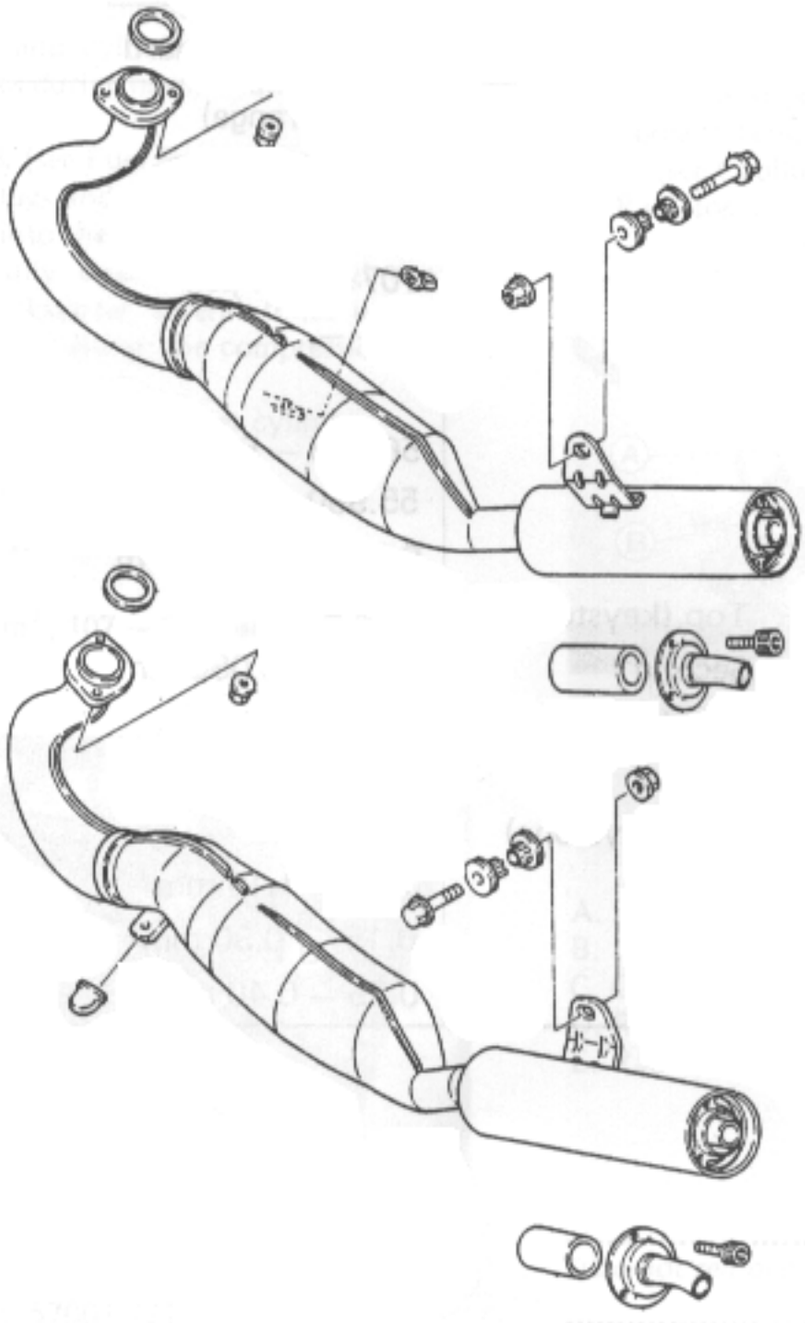
Exploded View





L : Apply non-permanent locking agent.
O : Apply 2-stroke engine oil.
T1: 25 N-m (2.5 kg-m, 19.0 ft-lb)
T2: 22 N-m (2.2 kg-m, 16.0 ft-lb)
T3: 9.8 N-m (1.0 kg-m, 87 in-lb)
T4: 2.9 N-m (0.3 kg-m, 26 in-lb)

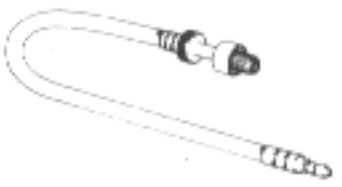
Specifications

Item		Standard	Service Limit
Cylinder Compression:		(usable range) 735 – 1,130 kPa (7.5 – 11.5 kg/cm², 107 – 164 psi)	– – –
Cylinder head warp		– – –	0.05 mm
Cylinder Block, Piston:			
Cylinder inside diameter		56.015 – 56.030 mm	56.09 mm
Piston diameter		55.960 – 55.975 mm	55.81 mm
Piston/cylinder clearance		0.040 – 0.070 mm	– – –
Piston ring/groove clearance	Top (keystone)	– – –	– – –
	Second	0.040 – 0.080 mm	0.18 mm
Piston ring groove width	Top (keystone)	– – –	– – –
	Second	1.230 – 1.250 mm	1.330 mm
Piston ring thickness	Top (keystone)	– – –	– – –
	Second	1.17 – 1.19 mm	1.10 mm
Piston ring end gap	Top	0.15 – 0.30 mm	0.60 mm
	Second	0.25 – 0.40 mm	0.7 mm

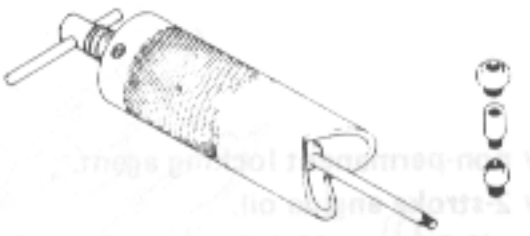
Special Tools

Compression Gauge: 57001-221

Adapter: 57001-1159



Piston Pin Puller Assembly: 57001-910



Sealant

Kawasaki Bond (Silicone Sealant): 56019-120

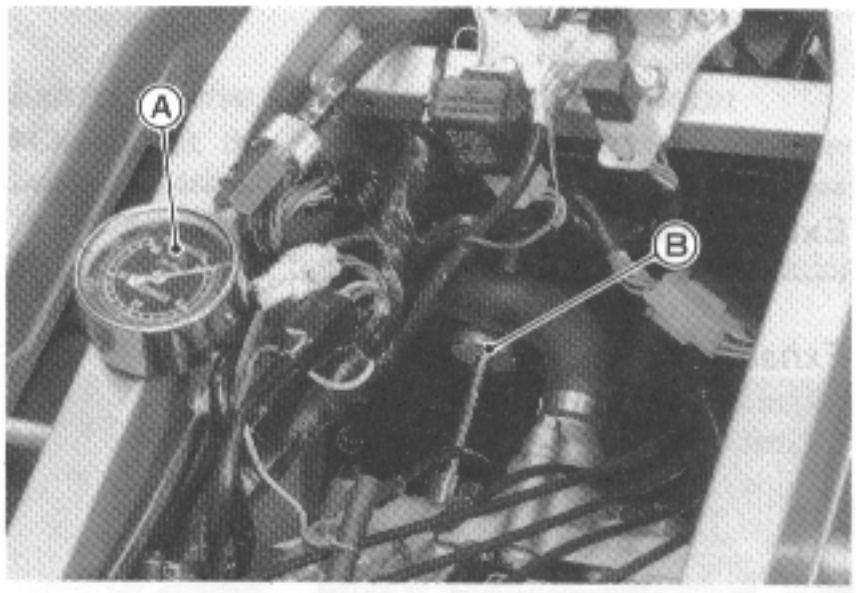
Cylinder Head

Compression Measurement

- Throughly warm up the engine so that engine oil between the piston and cylinder wall will help seal compression at it does during normal running.
- Stop the engine.
- Remove the fuel tank (see Fuel System chapter).
- Remove the spark plugs and attach compression gauge (special tool) firmly into the spark plug hole.
- With the throttle fully open, turn the engine over sharply with the kickstarter several times until the compression gauge stops rising; the compression is the highest reading obtainable.
- Repeat the measurement for the other cylinder.

Cylinder Compression (Usable Range)

735 – 1,139 kPa
(7.5 – 11.5 kg/cm^2, 107 – 164 psi)



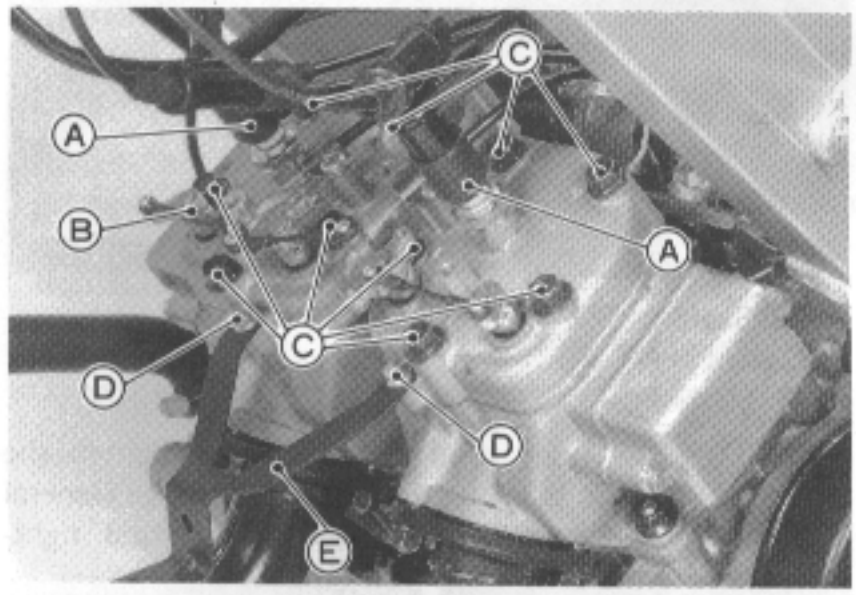
A. Compression Gauge: 57001-221
B. Adapter: 57001-1159

★If the cylinder compression is higher than the usable range, check the following:
- ○Carbon build-up on the piston crown and cylinder head—clean off any carbon on the piston crowns and cylinder head.
- ○Cylinder head gasket, cylinder base gaskets—use only the proper gaskets. The use of a gasket of incorrect thickness will change the compression.

★If cylinder compression is lower than the usable range, check the following:
- ○Gas leakage around the cylinder head—replace the damaged gasket and check the cylinder head for warp.
- ○Gas leakage from the crank chamber—check the crankshaft oil seals, valve cover oil seals and O-rings and reed valves.
- ○Check the joint between the crankcase halves.
- ○Piston/cylinder clearance, piston seizure.
- ○Piston rings, piston ring grooves wear.

Cylinder Head Removal

- Remove the following.
  - Seat
  - Side Cover
  - Fuel Tank
  - Fairings
  - Coolant
  - Thermostat (see Cooling System chapter)
  - Coolant Temperature Sensor (see Cooling System chapter)
  - Radiator



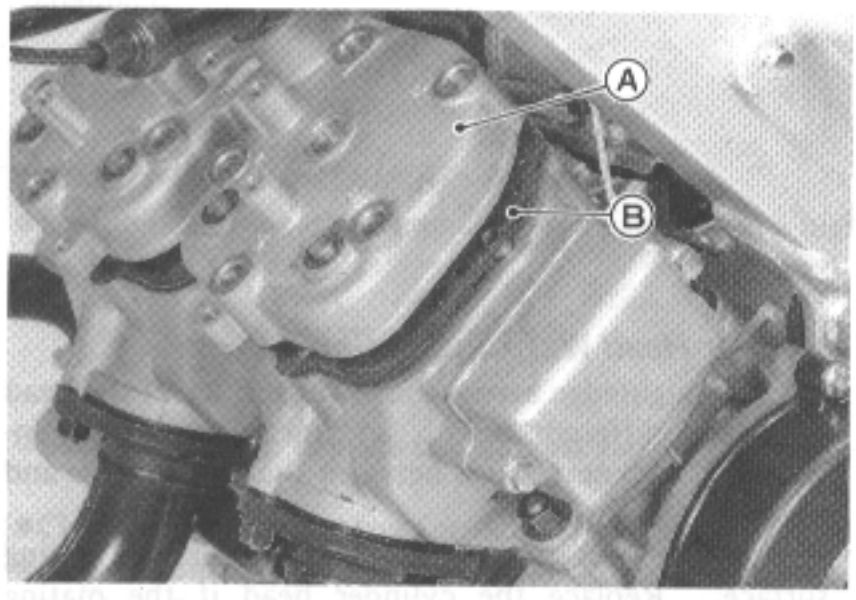
A. Spark Plug
B. Exhaust Valve Operating Unit
C. Cylinder Head Mounting Bolts
D. Radiator for Bracket Mounting Bolts
E. Radiator for Bracket

NOTE

○*Do not remove the exhaust valve operating motor.*

CAUTION

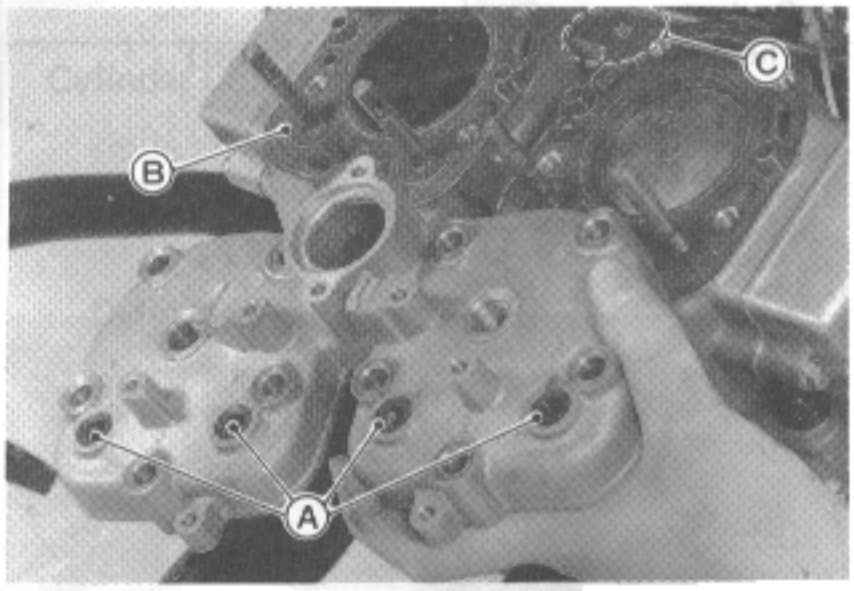
○**Take care not to damage the exhaust valves.**



A. Cylinder Head B. Gasket

Cylinder Head Installation Notes

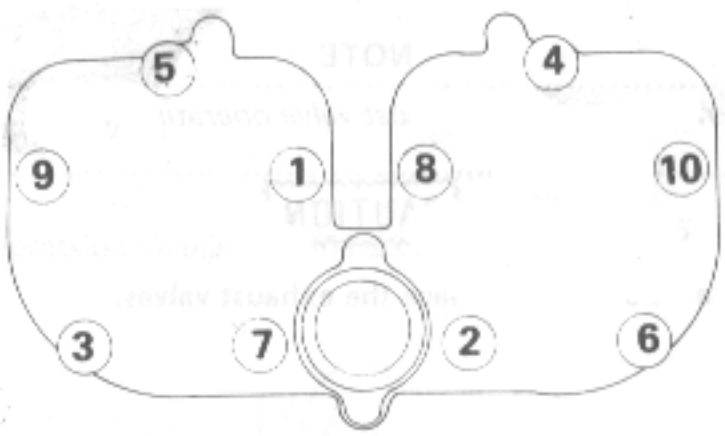
- Check the oil seals for damage. Replace them if necessary.
- Replace the gasket with a new one and install it as shown.



A. Oil Seals
B. Gasket
C. UP Mark

- Install the cylinder head as shown and tighten the cylinder head bolts to the specified torque (see General Information chapter), following the specified tightening sequence.

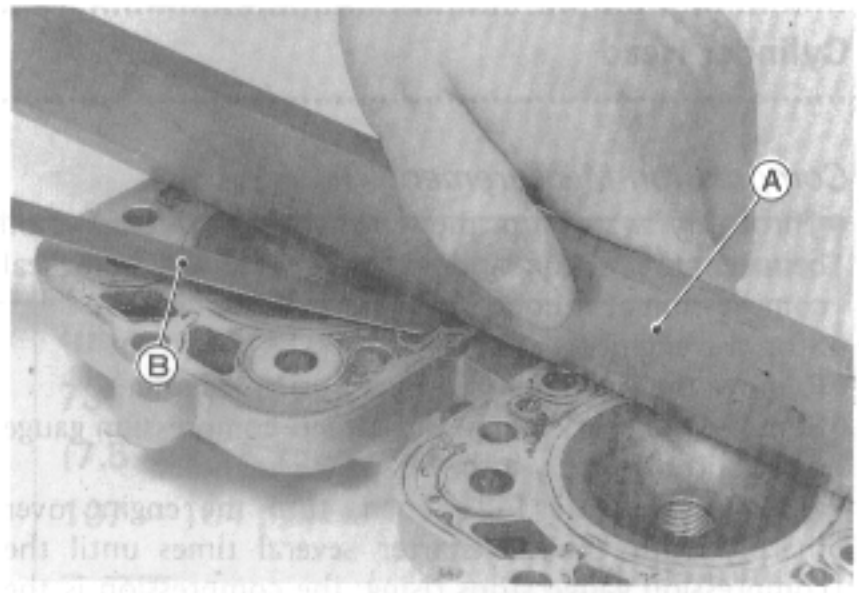
○Tighten the first to about one half of the specified torque, and then tighten them to the specified torque. Finally, retighten them to the specified torque again to check that they are tightened securely. Be sure to follow the specified tightening sequence.



Cylinder Head Warp Inspection

- Lay a straightedge across the lower surface of the head at several different points, and measure warp by inserting a thickness gauge between the straightedge and the head.

★If warp exceeds the service limit, repair the mating surface. Replace the cylinder head if the mating surface is badly damaged.



A. Straightedge
B. Thickness Gauge

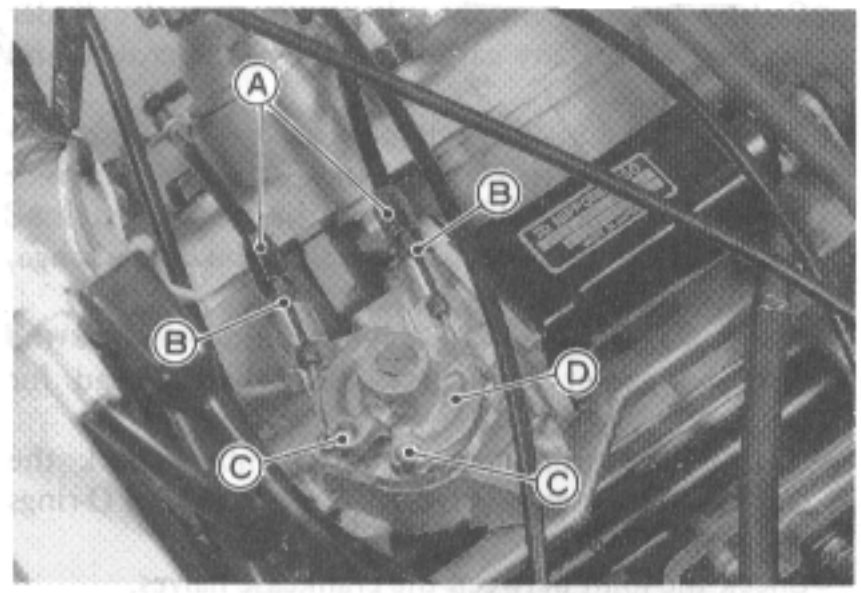
Cylinder Head Warp

Service Limit:	**0.05 mm**

Exhaust Valve (KIPS)

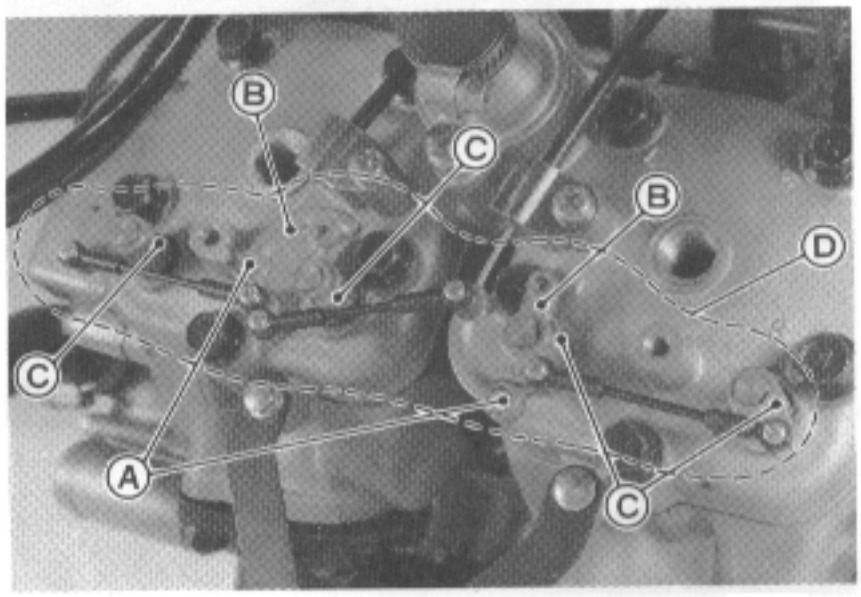
Exhaust Valve Operating Unit Removal

- Remove the following.
  - Seat
  - Side Covers
  - Fuel Tank
  - Fairings
  - Radiator (see Cooling System chapter)
  - Spark Plug
- Loosen the locknuts and screw in both adjusters. Then slip out the tips from the pulley and screw out the adjusters from the bracket.



A. Locknuts
B. Adjusters
C. Cable Upper Ends
D. Pulley

●Slip out the tips from the pullies. Then unscrew the mounting screws and remove the operating unit off the exhaust valves.

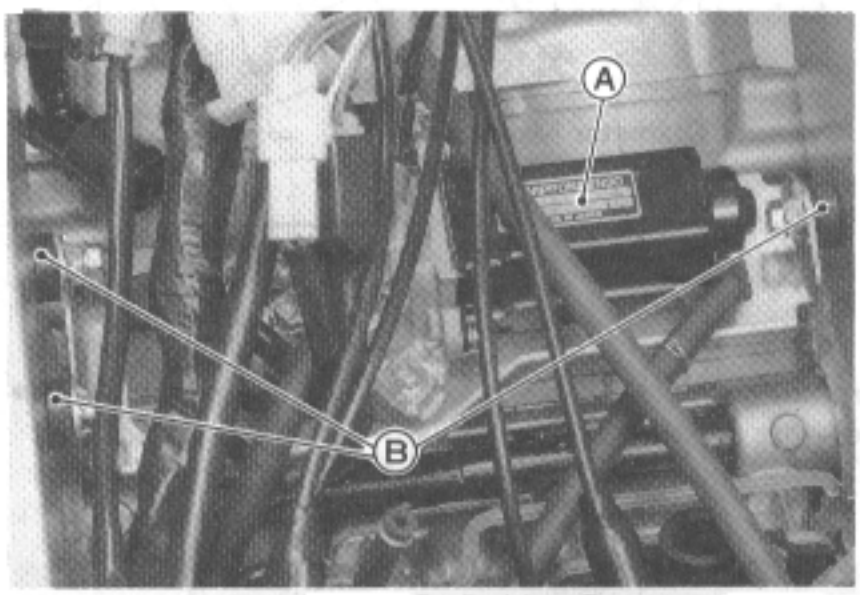


A. Cable Lower Ends
B. Pulley
C. Mounting Screws
D. Operating Unit

●Remove the operating motor.

Exhaust Valve Operating Unit Installation

●Check that the exhaust valve operating motor stops correct position (see CDI Unit/Exhaust Valve Operation Inspection in the Electrical System chapter).
★Visually inspect the rubber dampers on the operating motor mounts, and replace them if necessary.



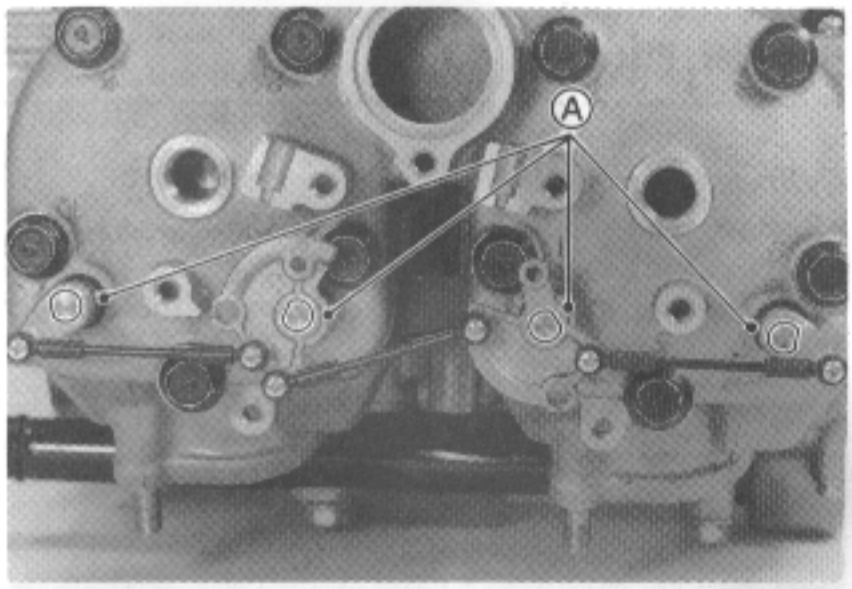
A. Operating Motor
B. Rubber Dampers

●Tighten the exhaust valve operating unit screws to the specified torque (see General Information chapter).

CAUTION

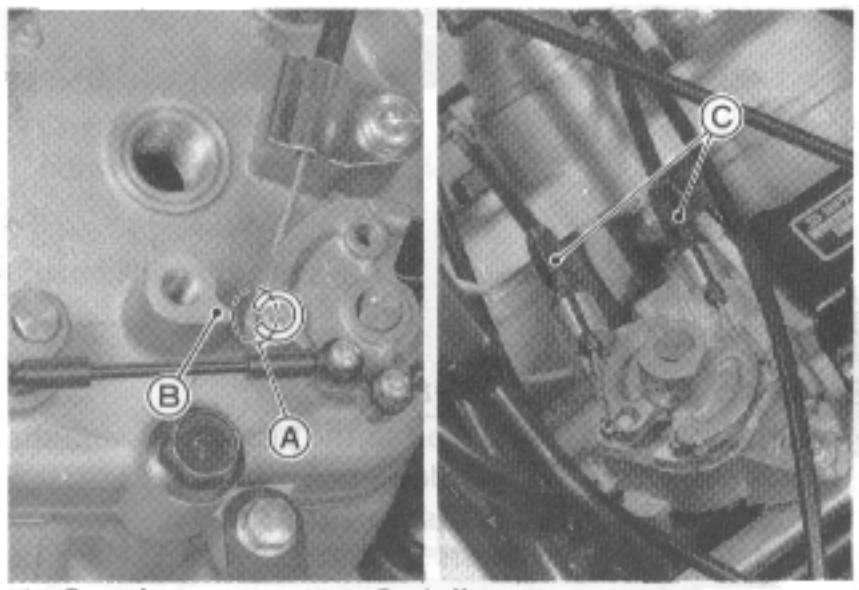
○Take care not to over tighten the exhaust valve operating unit screws to prevent the exhaust valve damage.

●Install the operating unit as shown.



A. Exhaust Valve Operating Unit Screws

●Install the cable lower ends. Fully screw in the adjusters and install the cable upper ends. Then align the opening on the pulley with the cylinder head projection as shown.



A. Opening
B. Projection
C. Adjusters

●With the pulley held, turn out the both adjusters evenly until the cables have no free play.
●Screw in both adjuster 2 times to make proper cable free play.
●Check the exhaust valve operation (see Electrical chapter).

Exhaust Valve Installation Notes

●Scrape out any carbon and clean the valves with a high flash point solvent.

CAUTION

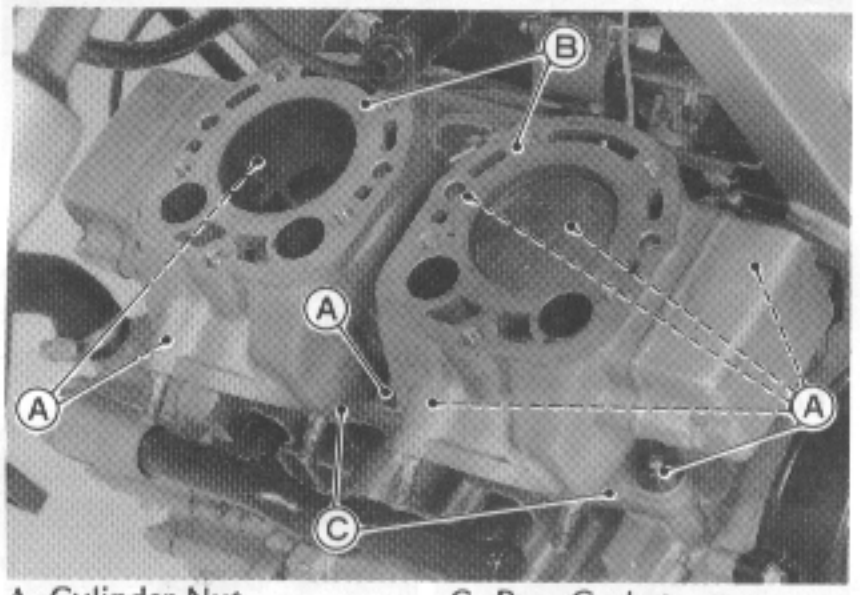
○Take care not to damage the exhaust valves.

●Check the exhaust valves for signs of damage.
★Replace the exhaust valves with new ones if necessary.
●Apply a 2-stroke engine oil at the lower ends of the exhaust valves.

Cylinder, Piston

Cylinder Removal

- Remove the cylinder head and muffler.
- Remove the exhaust valves.
- Unscrew the mounting bolts and remove the cylinder and gasket.

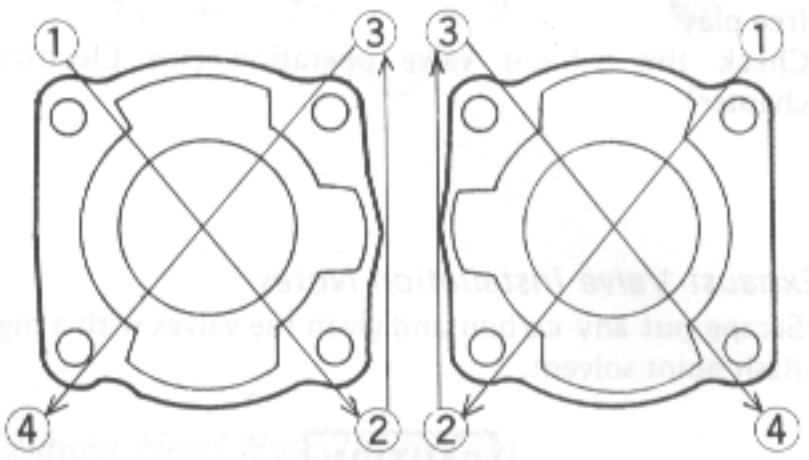


A. Cylinder Nut
B. Cylinder
C. Base Gasket

Cylinder Installation Notes

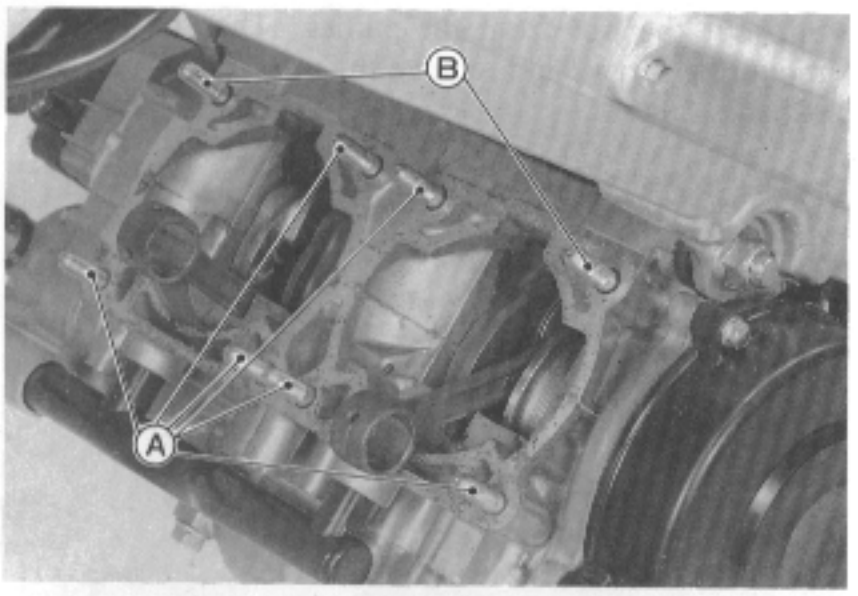
- Apply a little two-stroke oil to the piston rings and the inside surface of the cylinder.
- Install the new cylinder base gasket.
- Tighten the cylinder nuts to the specified torque (see General Information chapter), following the specified tightening sequence.

○Tighten them first to about one half of the specified torque. After cylinder head bolt tightening, tighten the nuts to the specified torque. Be sure to follow the specified tightening sequence.



Cylinder Assembly Note

- Screw the cylinder studs in the correct locations and specified torque (see General Information chapter).



A. 25 mm Length B. 30 mm Length

Cylinder Wear Inspection

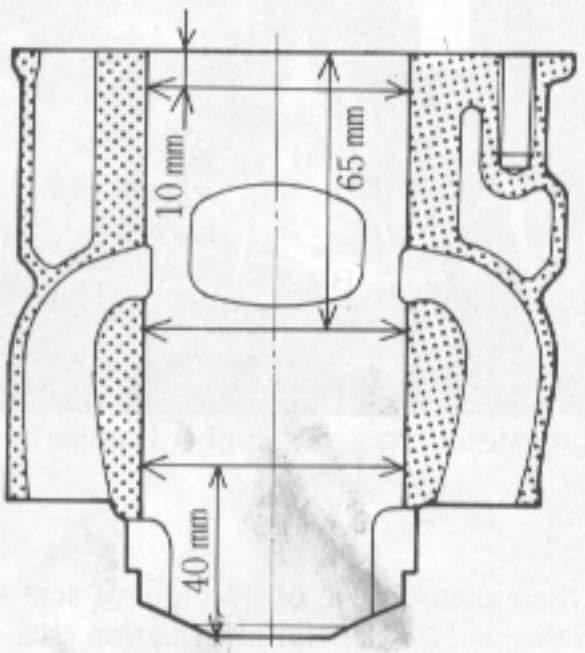
- Inspect the inside of the cylinder for scratches and abnormal wear.

★If the cylinder is damaged or badly worn, replace it with a new one.

- Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement at each of the 3 locations (total of 6 measurements) shown in the figure.

★If the cylinder inside diameter measurement exceeds the service limit, the cylinder must be replaced with a new one since the ELECTROFUSION cylinder cannot be bored or honed.

Cylinder Diameter Measurement

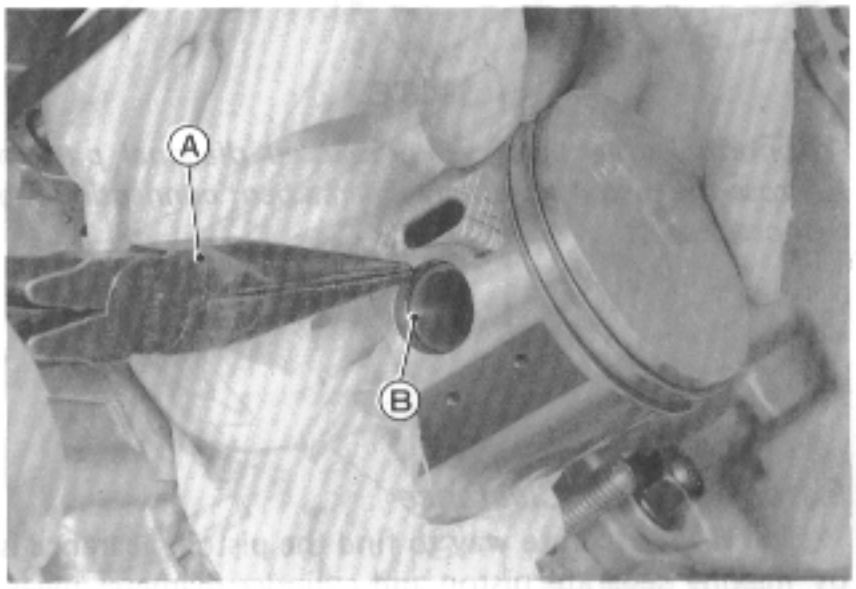


Cylinder Inside Diameter

Standard:	**56.015 – 56.030 mm and less than 0.01 mm difference between any two measurements**
Service Limit:	**56.09 mm or more than 0.05 mm difference between any two measurement**

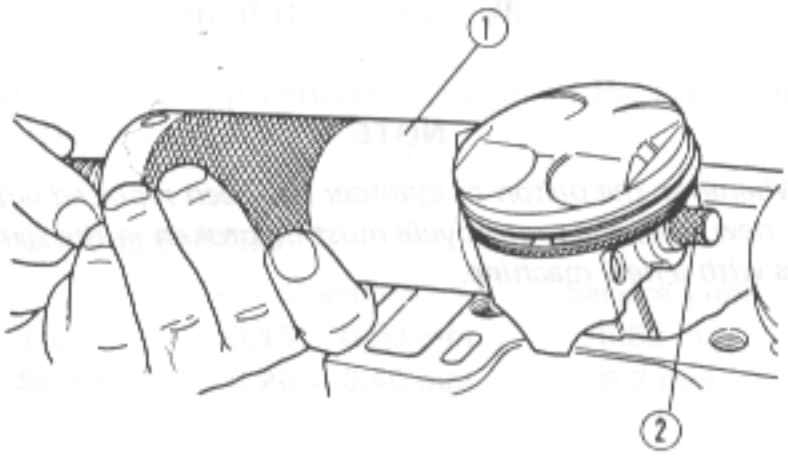
Piston Removal Notes

- Remove the piston pin snap ring.



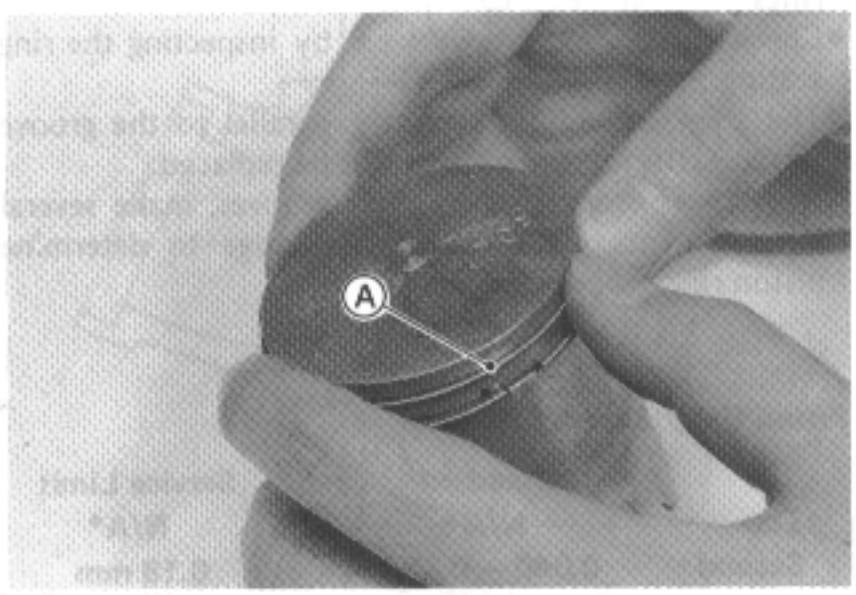
A. Pliers B. Snap Ring

- Remove the piston by pushing its pin out the side that the snap ring was removed. Use piston pin puller assembly (special tool), if the pin is tight.



1. Piston Pin Puller Assembly: 57001-910
2. Adapter

- Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring to remove it.

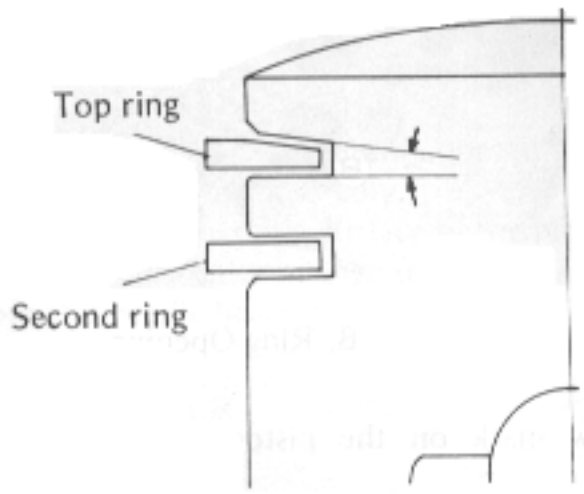


A. Piston Ring

Piston Installation Notes

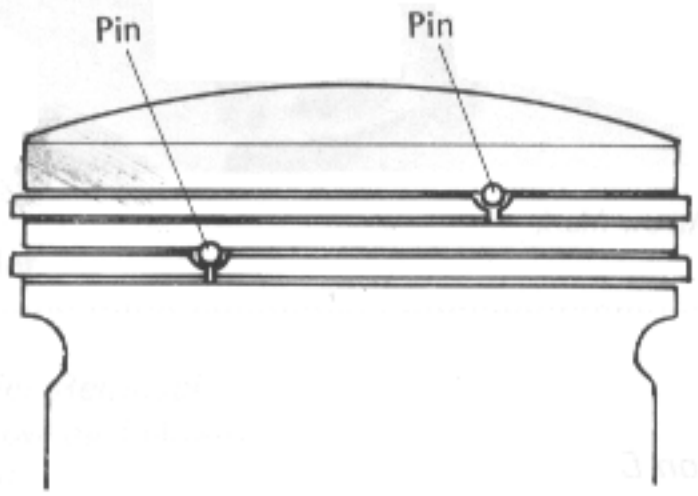
- Install the piston rings so that the correct side faces upwards as shown

Piston Ring



- When installing the piston rings by hand, first fit one end of the piston ring against the pin in the ring groove, spread the ring opening with the other hand and then slip the ring into the groove.
- Check to see that the pin in each piston ring groove is between the ends of the piston ring.

Piston Ring Position



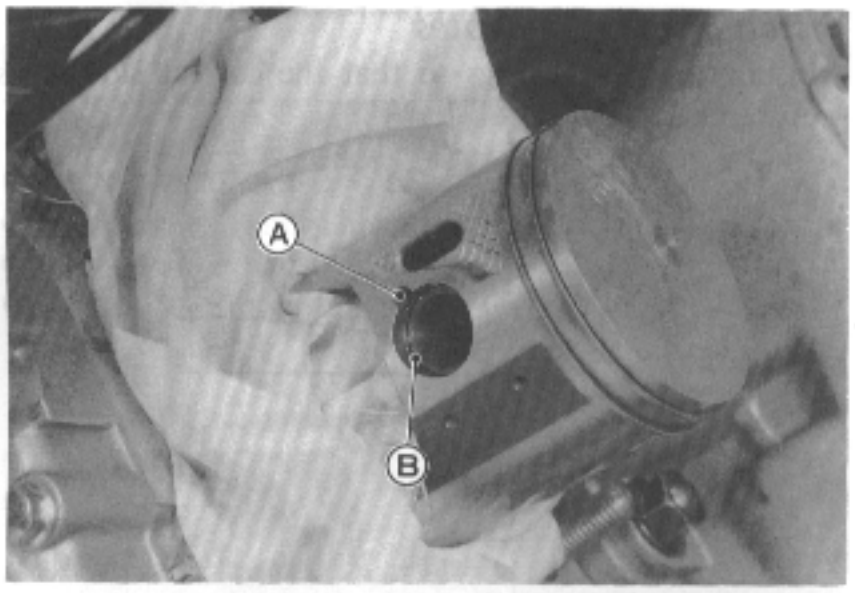
CAUTION

○Incorrect installation of the pistons could cause piston ring breakage and result in severe engine damage.
○When installing a piston pin snap ring, compress it only enough to install it and no more.

CAUTION

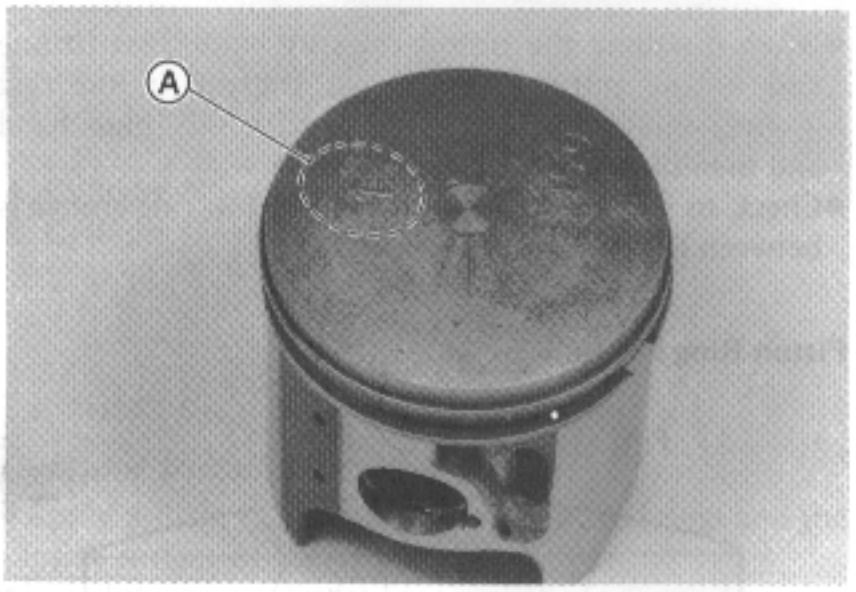
○Do not reuse snap rings, since removal weakens and deforms them. They could fall out and score the cylinder wall.

- Fit a new piston pin snap ring into the side of the piston so that the ring opening does no coincide with the slits of the piston pin hole.



A. Slit B. Ring Opening

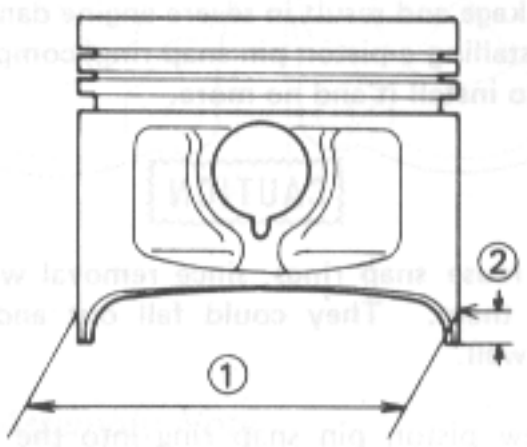
- The arrow mark on the piston must point toward front.



A. Arrow Mark

Piston Diameter Measurement

- Measure the outside diameter of the piston **10 mm** up from the bottom of the piston at a right angle to the direction of the piston pin.



1. Piston Diameter 2. 10 mm

Piston Diameter

Standard:	**55.960 – 55.975 mm**
Service Limit:	**55.81 mm**

NOTE

○*Abnormal wear such as a marked diagonal pattern across the piston skirt may mean a bent connecting rod or crankshaft.*

Piston/Cylinder Clearance

The most accurate way to find the piston clearance is by making separate piston and cylinder diameter measurements and then computing the difference between the two values. Measure the piston diameter as just described, and measure the cylinder diameter at the very bottom of the cylinder.

Piston/Cylinder Clearance

0.040 – 0.070 mm

NOTE

○*Whenever the piston or cylinder has been replaced with a new one, the motorcycle must be broken in the same as with a new machine.*

Piston Ring, Piston Ring Groove Inspection

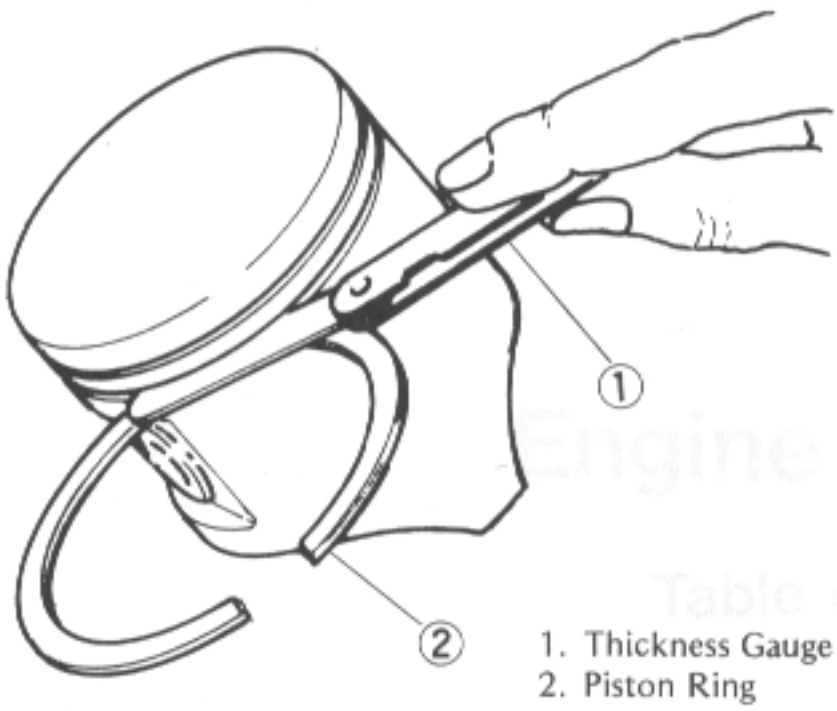
- Visually inspect the piston rings and the piston ring grooves.
- ★If the rings are worn unevenly or damaged, they must be replaced.
- ★If the piston ring grooves are worn unevenly or damaged, the piston must be replaced and fitted with new rings.
- Check for uneven groove wear by inspecting the ring seating.
- ★The rings should fit perfectly parallel to the groove surfaces. If not, the piston must be replaced.
- With the piston rings in their grooves, make several measurements with a thickness gauge to determine piston ring/groove clearance.

Piston Ring/Groove Clearance

	Standard	Service Limit
Top	**N/A***	**N/A***
Second	**0.040 – 0.080 mm**	**0.18 mm**

***Tapered Ring**

Groove Clearance Measurement



1. Thickness Gauge
2. Piston Ring

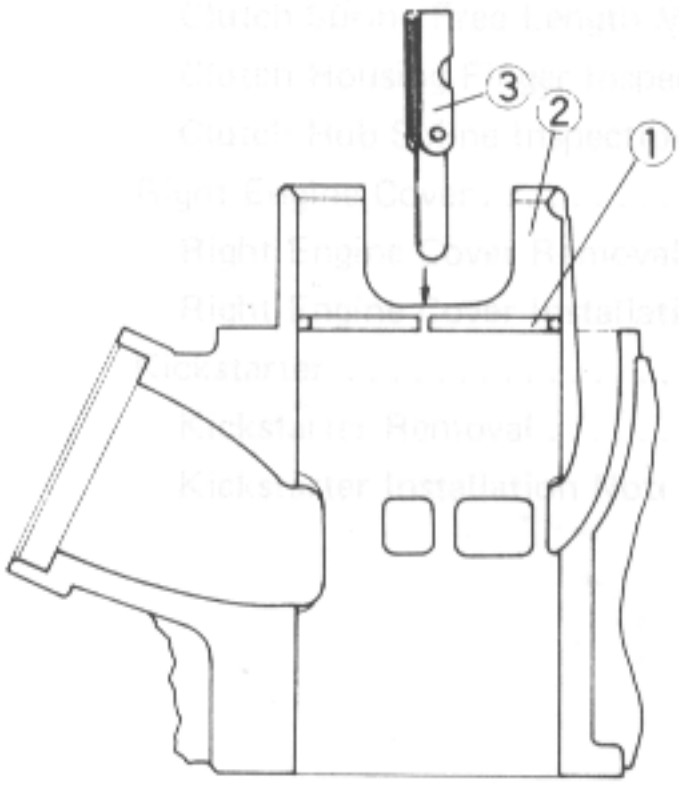
Piston Ring End Gap

- Place the piston ring inside the cylinder, using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low.
- Measure the gap between the ends of the ring with a thickness gauge.

Piston Ring End Gap

	Standard	Service Limit
Top	0.15 – 0.30 mm	0.60 mm
Second	0.25 – 0.40 mm	0.7 mm

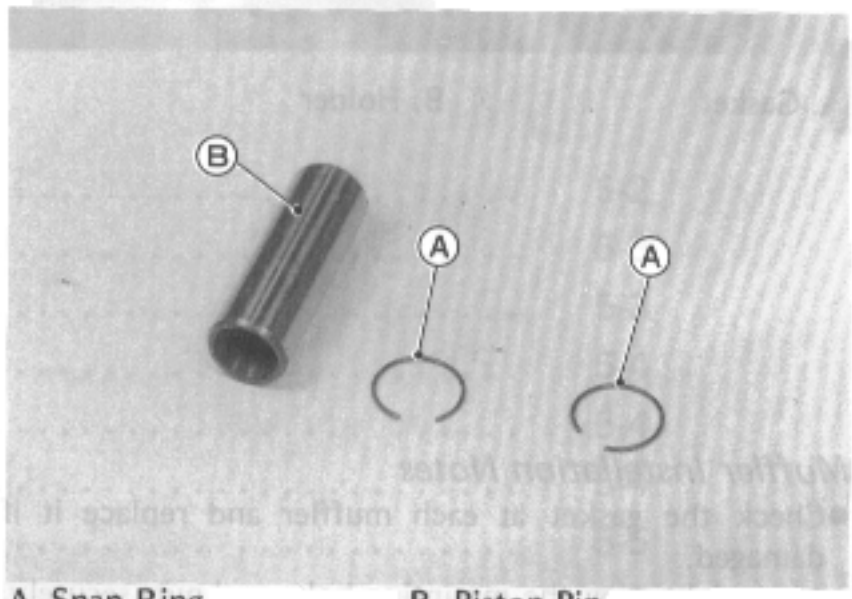
End Gap Measurement



1. Piston Ring
2. Cylinder Block
3. Thickness Gauge

Piston, Piston Pin, Connecting Rod Wear Inspection

- Visually inspect the snap rings are fitted in place.
- ★If the ring shows weakness or deformation, replace the ring. Also if the pin hole groove shows excessive wear, replace the piston.
- Visually inspect the piston pin hole and connecting rod small end hole.
- ★If the piston pin hole shows uneven wear, replace the piston.
- ★If the rod small end hole shows uneven wear, replace the rod, or crankshaft assembly.
- Visually inspect the outer surface of the piston pin.
- ★If the pin shows color change or stepped wear, replace the pin and needle bearing

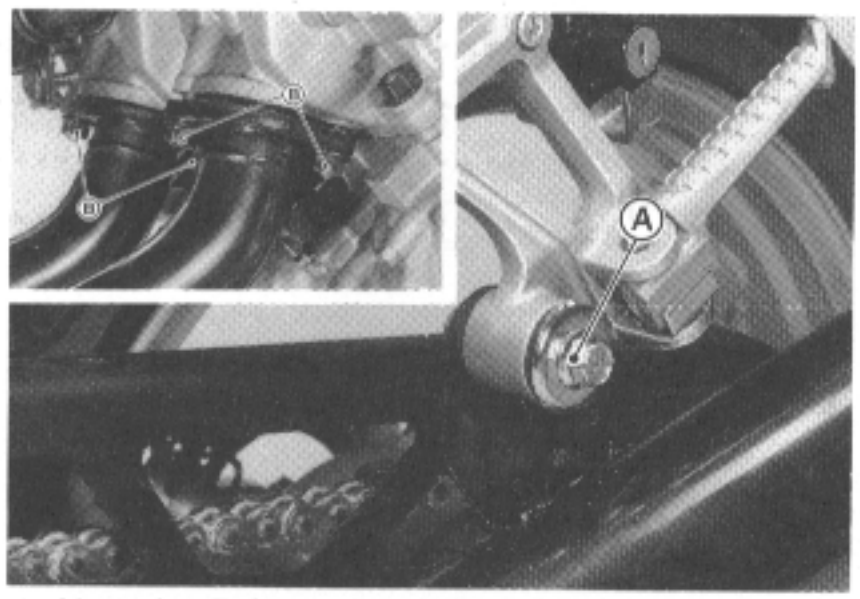


A. Snap Ring B. Piston Pin

Muffler

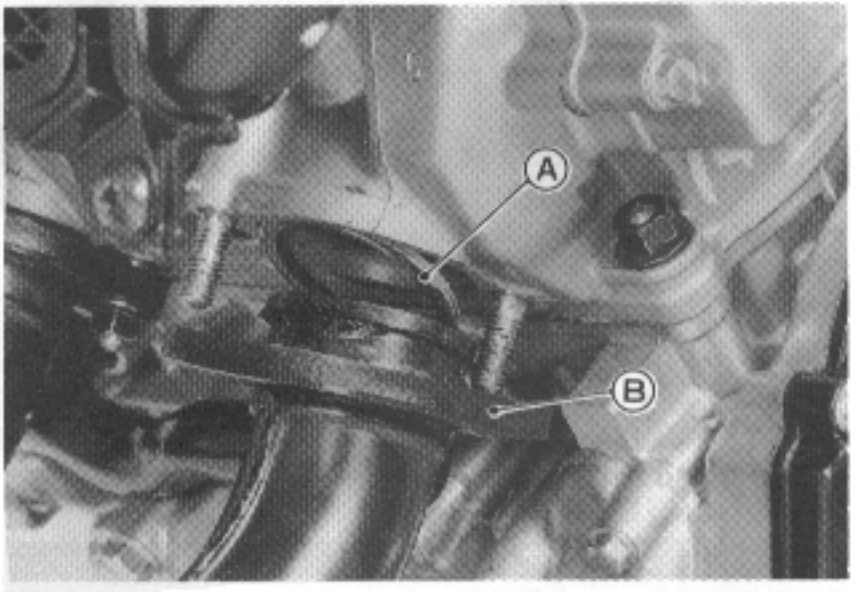
Muffler Removal

- Remove the following.
  - Seat
  - Side Covers
  - Fuel Tank
  - Fairings



A. Mounting Bolt B. Mounting Nut

- Remove the muffler and gasket.



A. Gasket B. Holder

Muffler Installation Notes

- Check the gasket at each muffler and replace it if damaged.
- After tightening the mounting bolts and nuts securely, thoroughly warm up the engine, wait until the engine cools down and tighten all mounting bolts and nuts.

Engine Right Side

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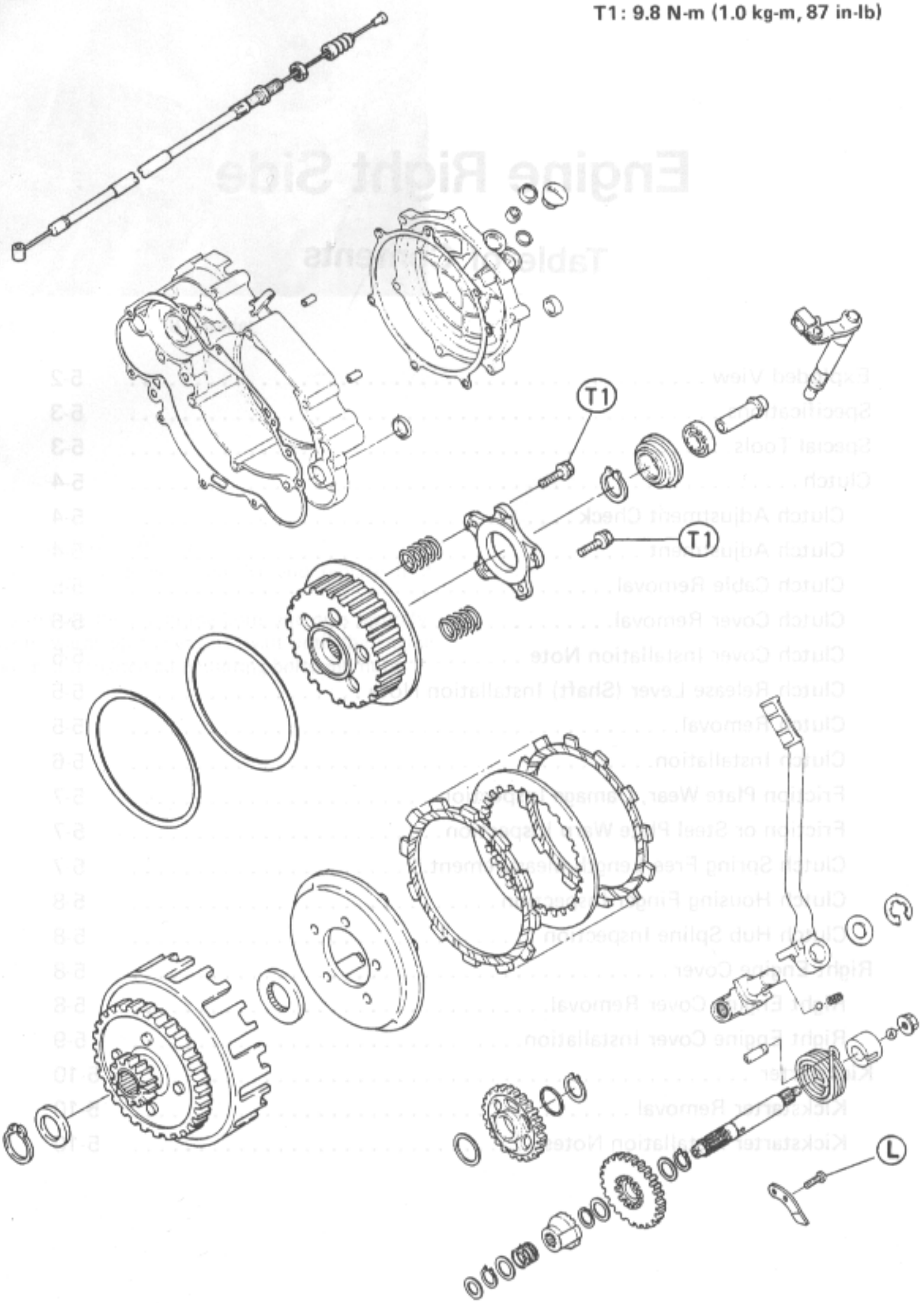
Exploded View



Specifications

Item	Standard	Service Limit
Clutch:		
Clutch lever free play	2 – 3 mm	– – –
Clutch spring free length	35.34 mm	34.2 mm
Friction plate thickness	2.9 – 3.1 mm	2.7 mm
Friction and steel plate warp	not more than 0.2 mm	0.3 mm

Special Tools

Circlip Pliers: 57001-144

Clutch

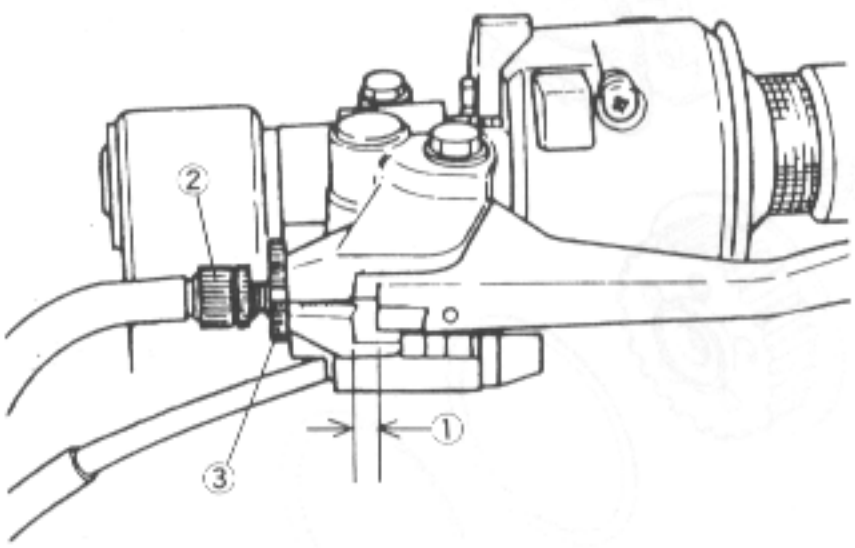
WARNING

○**To avoid serious burn, never touch the engine or exhaust pipe during clutch adjustment.**

Clutch Adjustment Check

- Pull the clutch lever just enough to take up the free play.
- Measure the gap between the lever and the lever bracket.

Clutch Lever Free Play



1. Clutch Lever Free Play 2 – 3 mm
2. Adjuster
3. Locknut

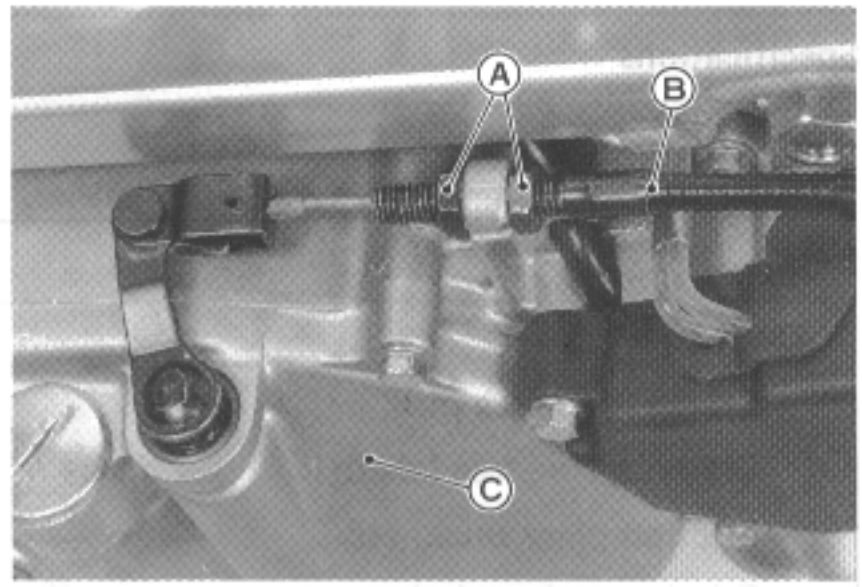
★If the gap is too wide, the clutch may not release fully. If the gap is too narrow, the clutch may not engage fully. In either case, adjust the clutch.

Clutch Adjustment

- Loosen the knurled locknut at the clutch lever.
- Turn the adjuster so that the clutch lever will have 2 – 3 mm of play.
- Tighten the locknut.

★If it cannot be done, use the adjusting nuts at the lower end of the cable.

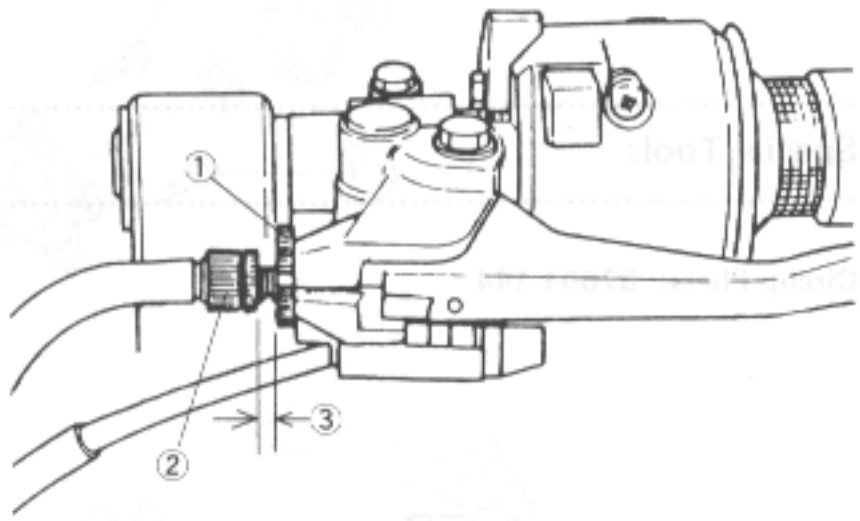
- Loosen the lower cable adjusting nuts at the clutch cover as far as they will go.



A. Adjusting Nut
B. Clutch Cable
C. Clutch Cover

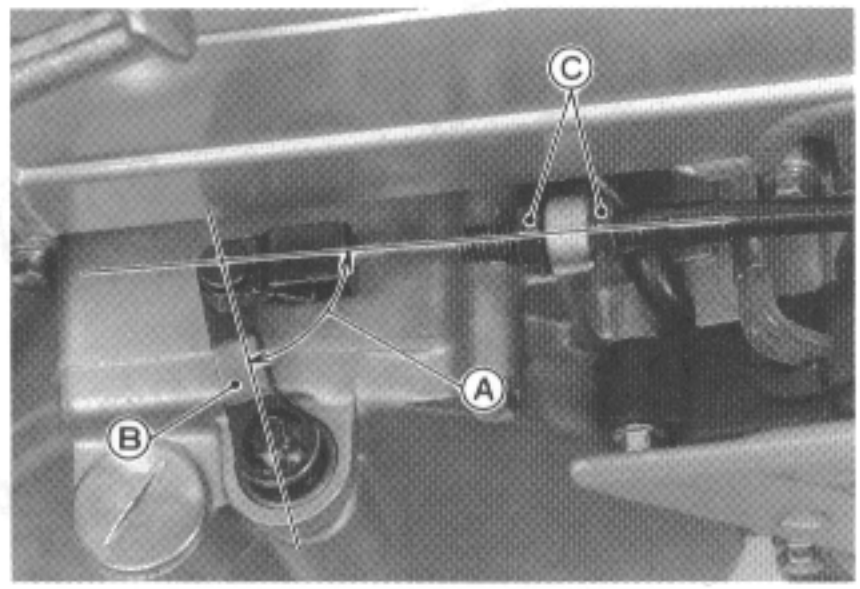
- Loosen the knurled locknut at the clutch lever.
- Turn in the adjuster so that 5 – 6 mm of threads are visible.

Clutch Adjuster Clearance



1. Locknut
2. Adjuster
3. 5 – 6 mm

- Pull the clutch outer cable tight and tighten the lower cable adjusting nuts against the bracket.
- At this time, check that the clutch release lever to clutch cable angle is 80 – 90°.



A. 80 – 90°
B. Release Lever
C. Adjusting Nuts

●Turn the adjuster at the clutch lever until the free play is correct
★If the clutch cannot be adjusted by this method, inspect the clutch parts.
●Tighten the knurled locknut at the clutch lever.

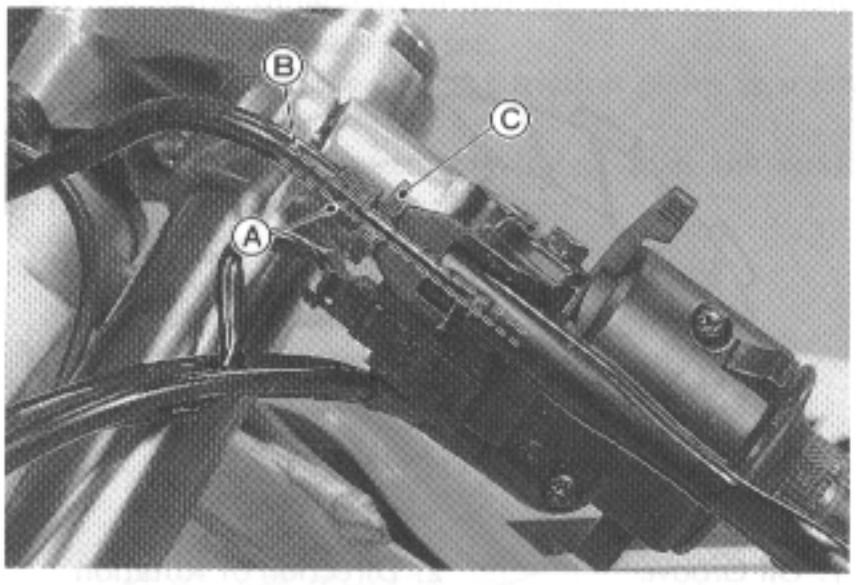
NOTE

○*Be sure that the outer cable end at the clutch lever is fully seated in the adjuster at the clutch lever, or it could slip into place later, creating enough cable play to prevent clutch disengagement.*

●After the adjustment is made, start the engine and check that the clutch does not slip and that it releases properly.

Clutch Cable Removal

●Slide the dust cover at the clutch lower end out of place.
●Loosen the nuts, and slide the lower end of the clutch cable to give the cable plenty of play.
●Loosen the knurled locknut at the clutch lever, and screw in the adjuster.
●Line up the slots in the clutch lever, knurled locknut, and adjuster, and then free the cable from the lever.

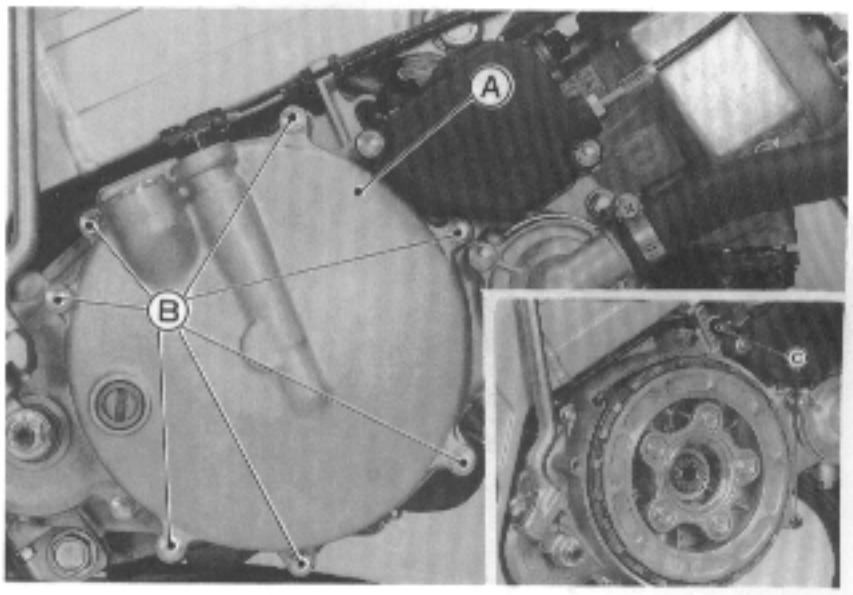


A. Adjuster
B. Slot
C. Knurled Locknut

●Free the clutch inner cable tip from the clutch release lever.

Clutch Cover Removal

●Remove the clutch cable.
●Drain the transmission oil (see Engine Lubrication System chapter).
●Unscrew the clutch cover bolts and take off the cover. Do not loose the knock pins.



A. Clutch Cover
B. Mounting Bolts
C. Knock Pins

CAUTION

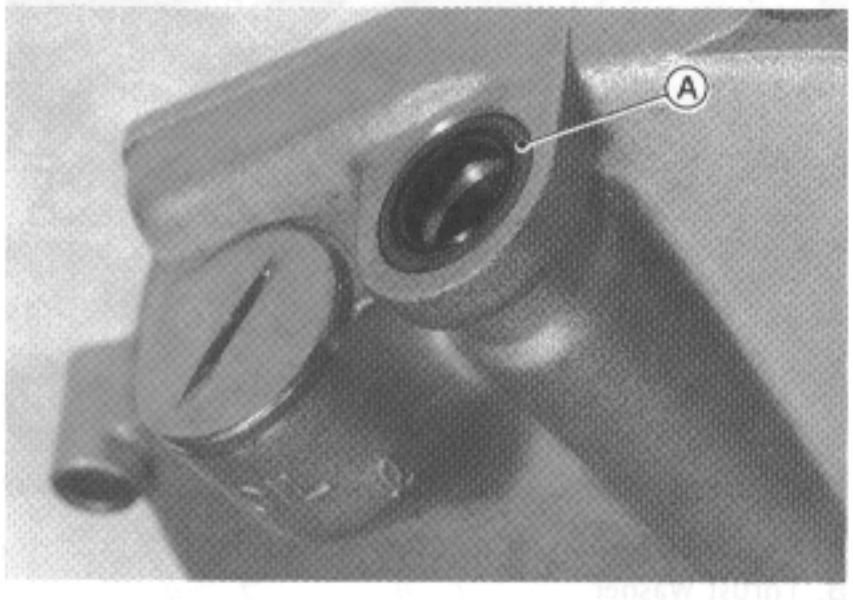
○**Do not remove the clutch release shaft unless it is absolutely necessary. If removed, you must replace the oil seal with a new one.**

Clutch Cover Installation Note

●Replace the clutch cover gasket with a new one.
●Check the clutch adjustment.

Clutch Release Lever (Shaft) Installation Note

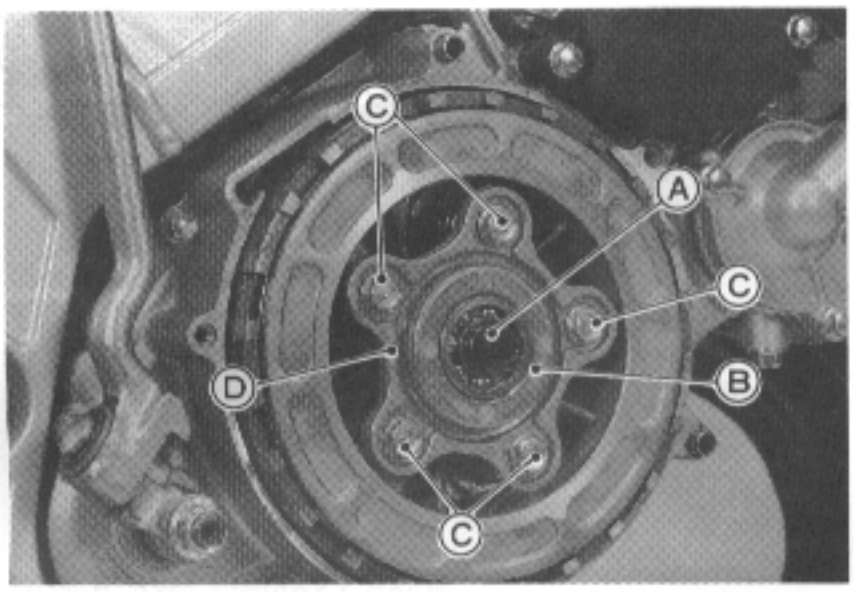
●Inspect the oil seal and replace it if necessary.



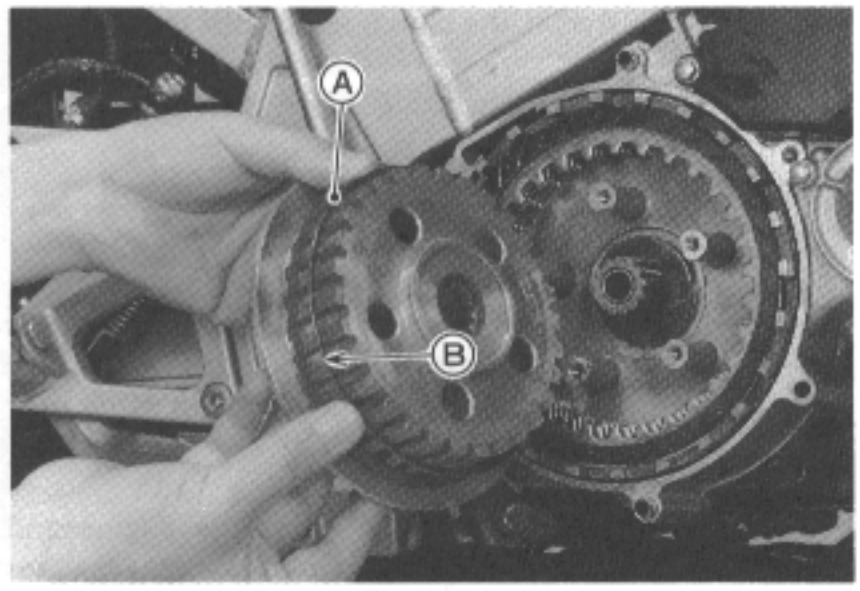
A. Oil Seal

Clutch Removal

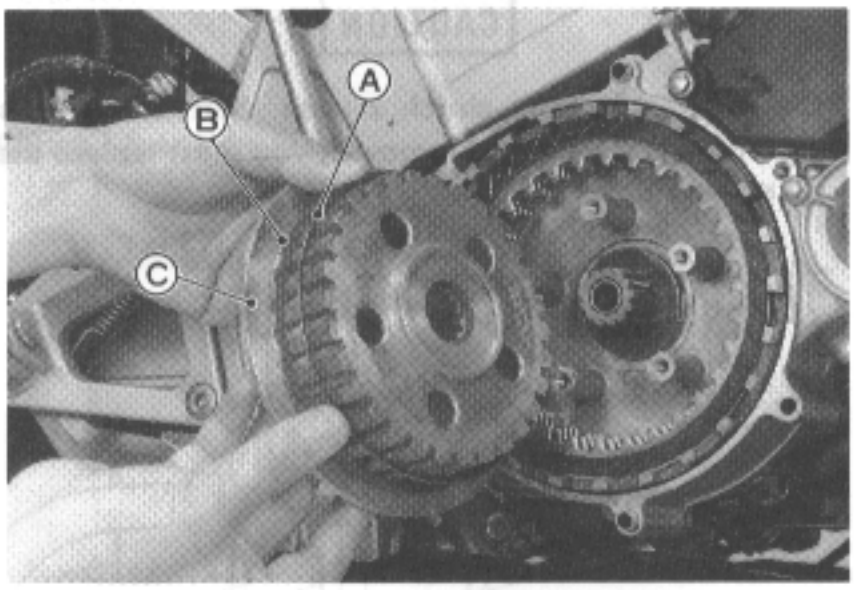
●Remove the clutch cover.
●Remove the following.



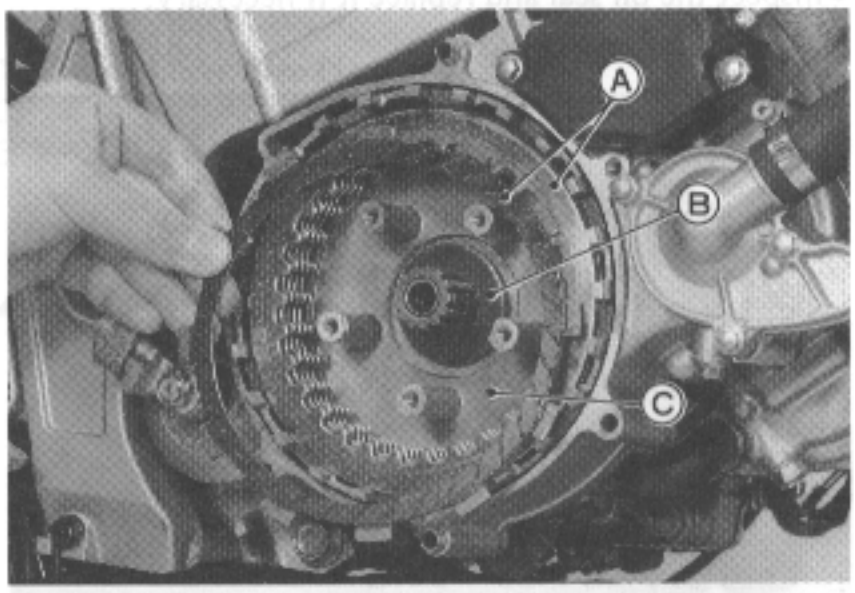
A. Push Rod
B. Bearing Holder
C. Spring Bolts
D. Holder



A. Spring Side
B. Concave Side



A. Springs
B. Spring Seat
C. Clutch Hub

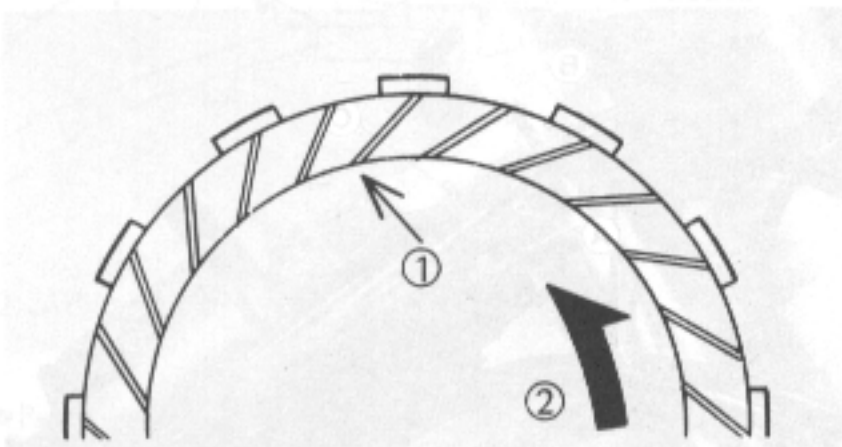


A. Clutch Plates
B. Thrust Washer
C. Clutch Housing

Clutch Installation Notes

- Install the spring plate as shown.
- Install the friction plates and steel plates, starting with a friction plate and alternating them.
- The grooves on the friction plate surfaces are cut tangentially and radially, install the friction plates so that the grooves run toward the center in the direction of clutch housing rotation (counterclockwise viewed form the engine right side).

Friction Plate Installation



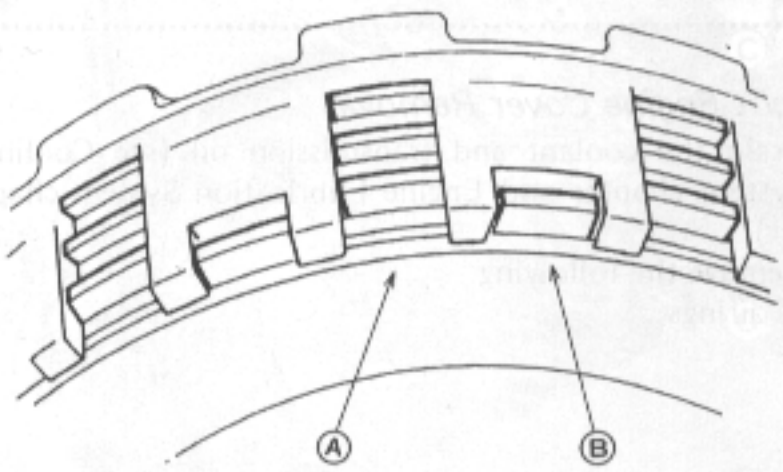
1. Oil Groove
2. Direction of Rotation

CAUTION

- **If new dry steel plates and friction plates are installed, apply engine oil to the surfaces of each plate to avoid clutch plate seizure.**

NOTE

- *First, Install the seven friction plates fitting the tangs of plates in the grooves (A) in the clutch housing. And then, install the last one fitting the tangs in the grooves (B) in the housing.*

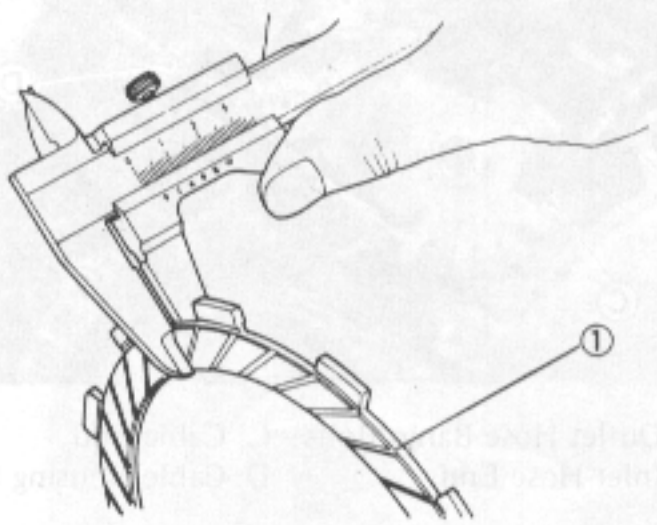


- Then, tighten the clutch spring bolts to the specified torque.
- Discard the used clutch hub circlip, and install a new one.

Friction Plate Wear, Damage Inspection

- Visually inspect the friction plates to see if they show any signs of seizure, overheating, or uneven wear.
- ★If any plates show signs of damage, replace the friction plates and steel plates as a set.
- Measure the thickness of the friction plates at several points.
- ★If any of the measurements is less than the service limit, replace the friction plate.

Friction Plate Thickness Measurement



1. Friction Plate

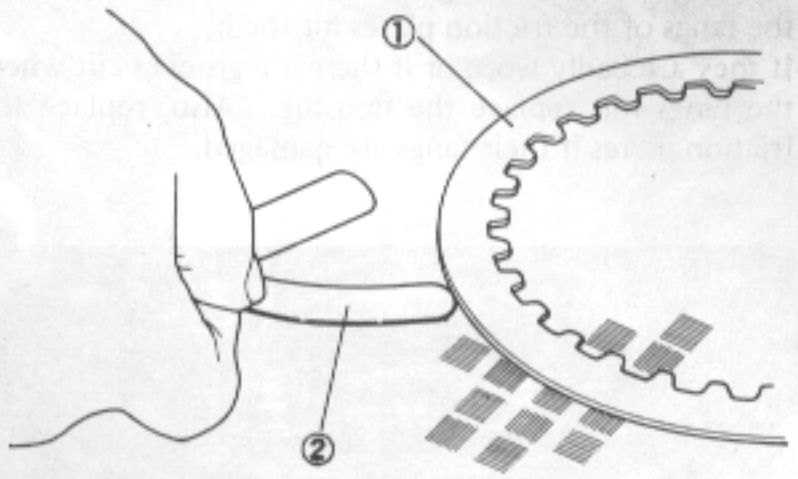
Friction Plate Thickness

Standard:	**2.9 – 3.1 mm**
Service Limit:	**2.7 mm**

Friction or Steel Plate Warp Inspection

- Place each friction plate or steel plate on a surface plate, and measure the gap between the surface plate and each friction plate or steel plate. The gap is the amount of friction or steel plate warp.
- ★If any plate is warped over the service limit, replace it with a new one.

Friction or Steel Plate Warp Inspection



1. Friction or Steel Plate 2. Thickness Gauge

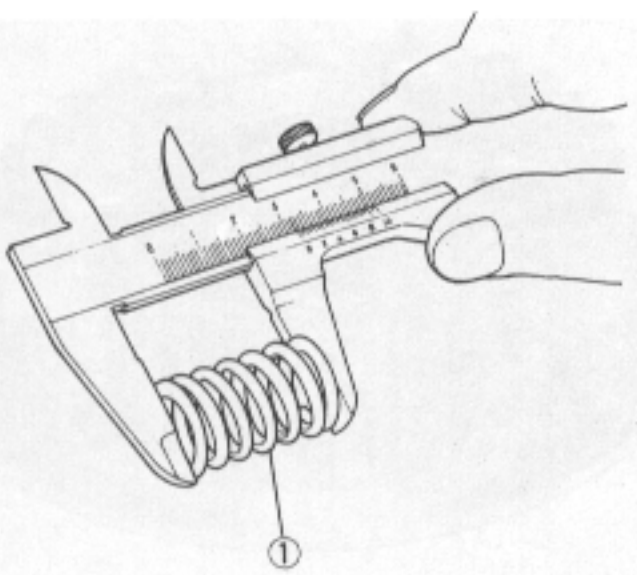
Friction and Steel Plate Warp

Standard:	**less than 0.2 mm**
Service Limit:	**0.3 mm**

Clutch Spring Free Length Measurement

- Since the spring becomes shorter as it weakens, check its free length to determine its condition.
- ★If any of the springs is shorter than the service limit, it must be replaced.

Clutch Spring Free Length Measurement



1. Clutch Spring

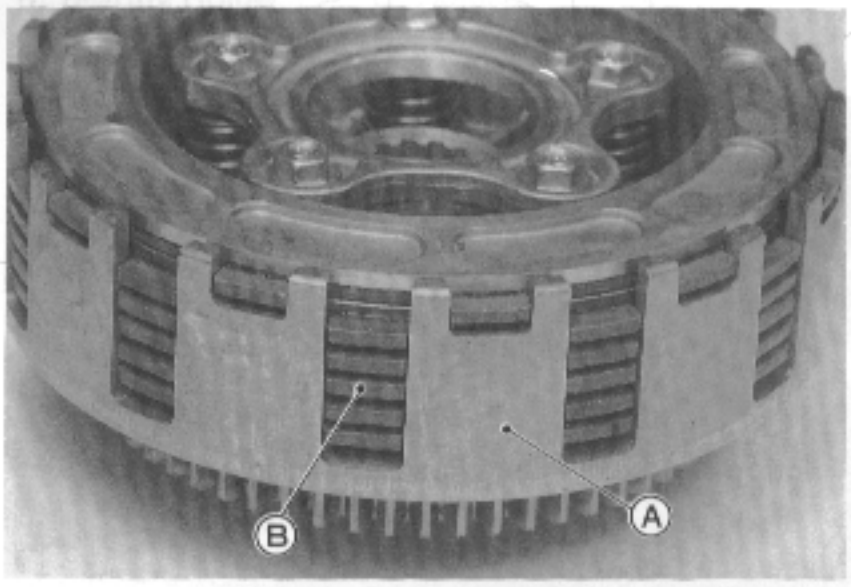
Clutch Spring Free Length

Standard:	**35.34 mm**
Service Limit:	**34.2 mm**

Clutch Housing Finger Inspection

- Visually inspect the fingers of the clutch housing where the tangs of the friction plates hit them.

★If they are badly worn or if there are grooves cut where the tangs hit, replace the housing. Also, replace the friction plates if their tangs are damaged.

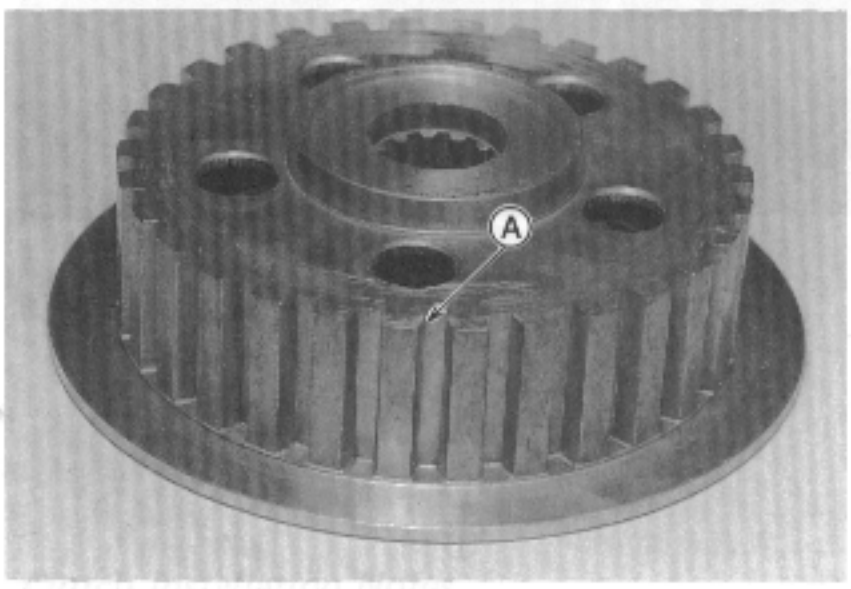


A. Clutch Housing Finger B. Friction Plate Tang

Clutch Hub Spline Inspection

- Visually inspect where the teeth on the steel plates wear against the splines of the clutch hub.

★If there are notches worn into the splines, replace the clutch hub. Also, replace the steel plates if their teeth are damaged.

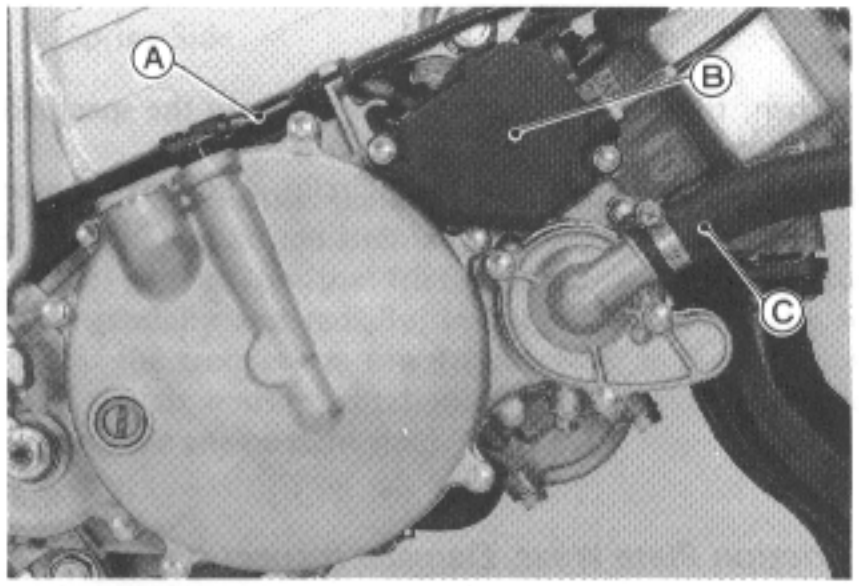


A. Clutch Hub Spline

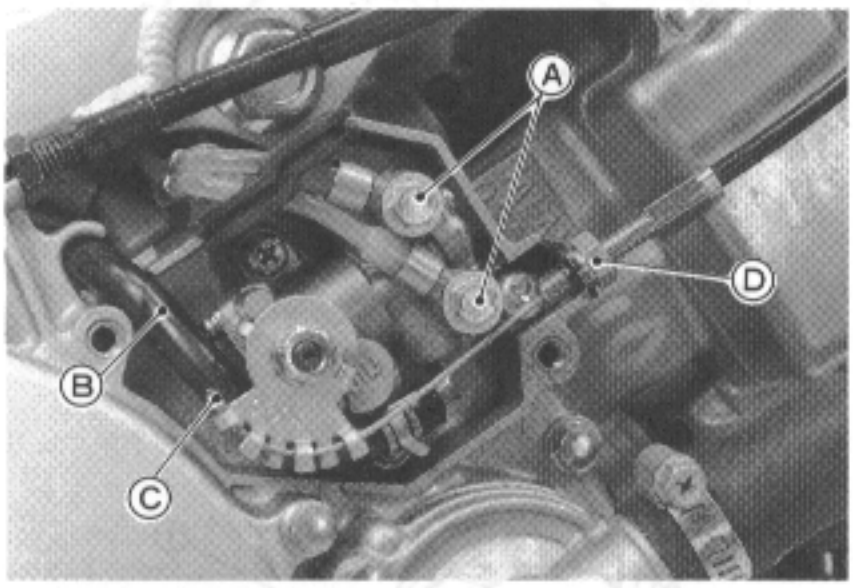
Right Engine Cover

Right Engine Cover Removal

- Drain the coolant and transmission oil (see Cooling System chapter and Engine Lubrication System chapter).
- Remove the following.
  Fairings



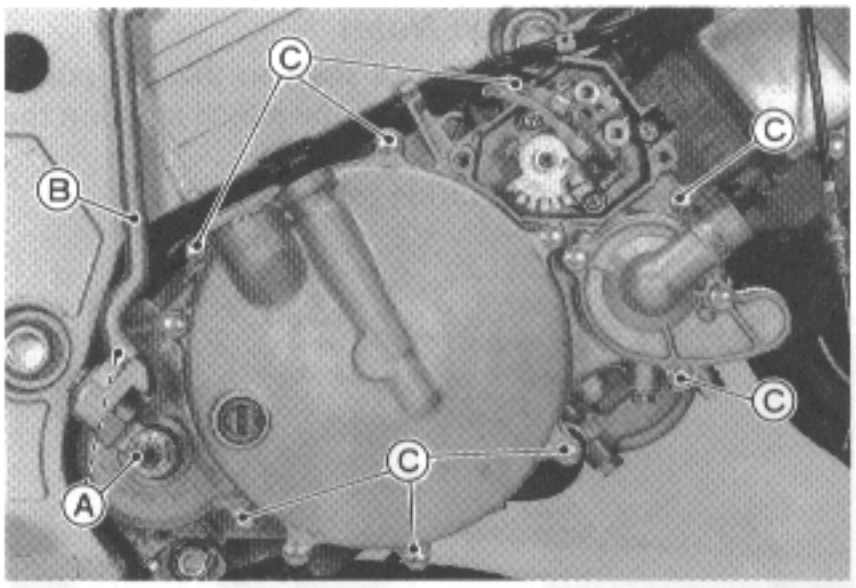
A. Clutch Cable
B. Oil Pump Cover
C. Radiator Hose Lower End



A. Oil Outlet Hose Banjo Bolts C. Cable End
B. Oil Inlet Hose End D. Cable Housing End

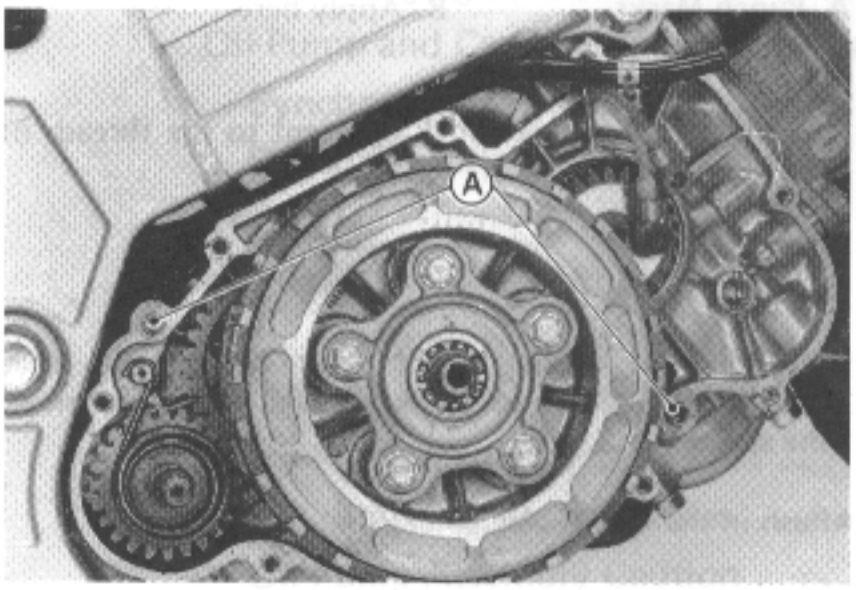
NOTE

○*When disconnecting the oil inlet hose end, screw a suitable bolt into the hose to keep the oil from flowing out.*



A. Kick Pedal Mounting Nut
B. Kick Pedal
C. Right Engine Cover Mounting Bolts

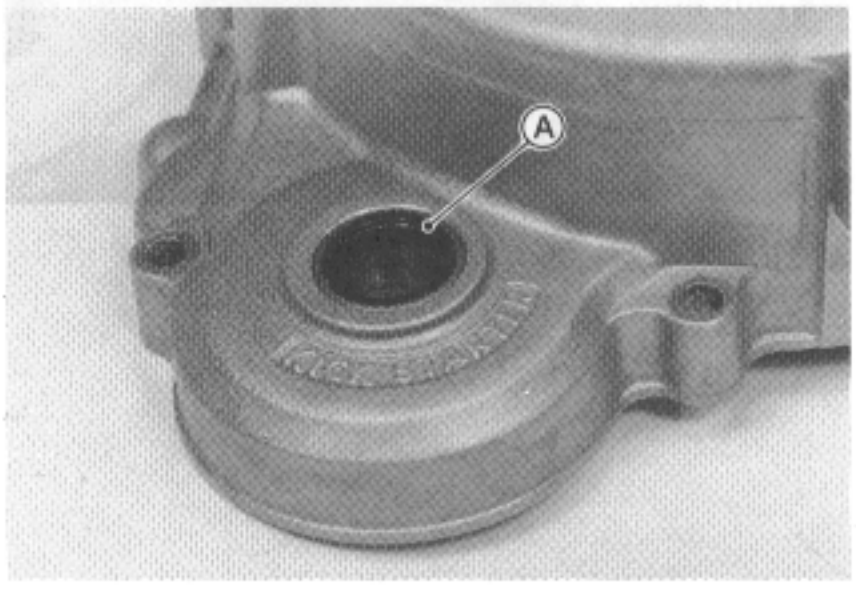
- Remove the right engine cover and gasket. Do not loose the knock pins.



A. Knock Pins

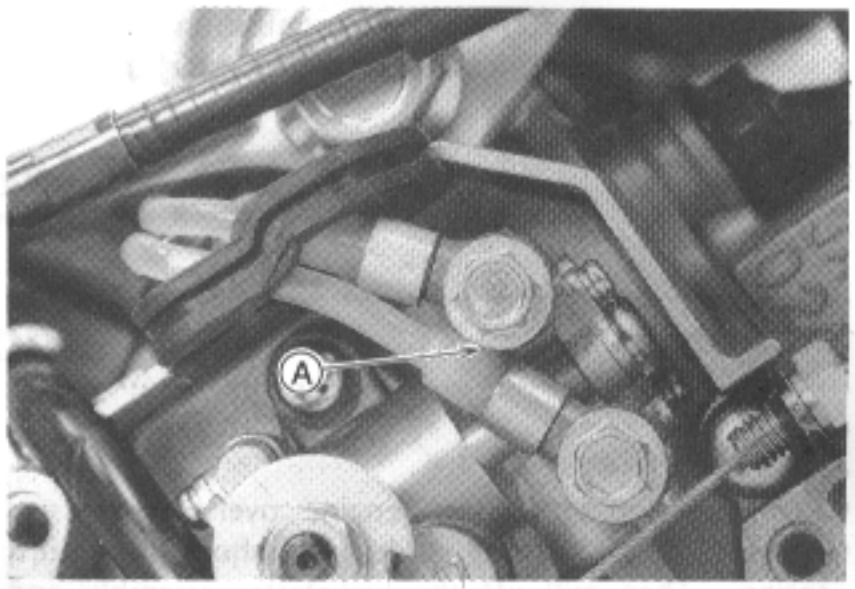
Right Engine Cover Installation

- Replace the gasket if necessary.
- Replace the oil seal if it is damaged.



A. Oil Seal

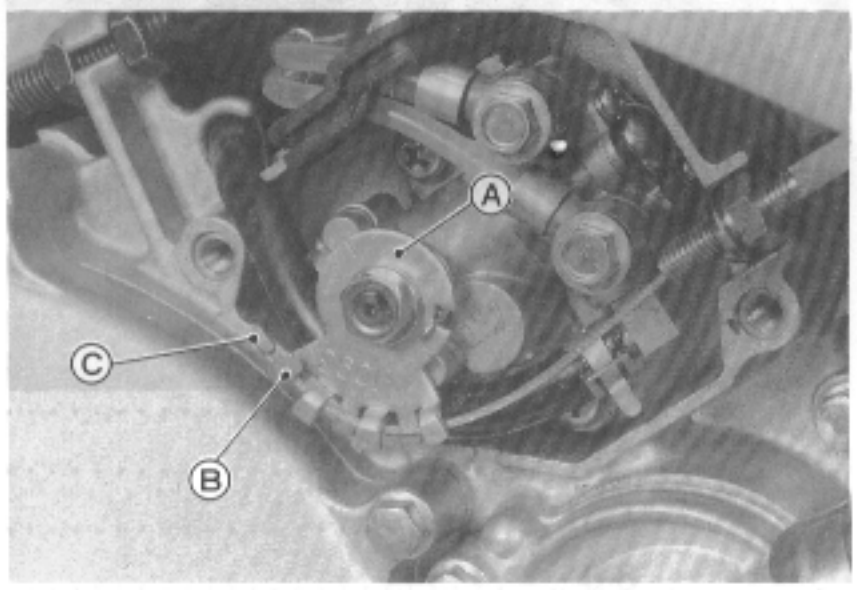
- Replace the flat washers on each side of the outlet hoses.
- Install the oil outlet hoses as shown.



A. Contact

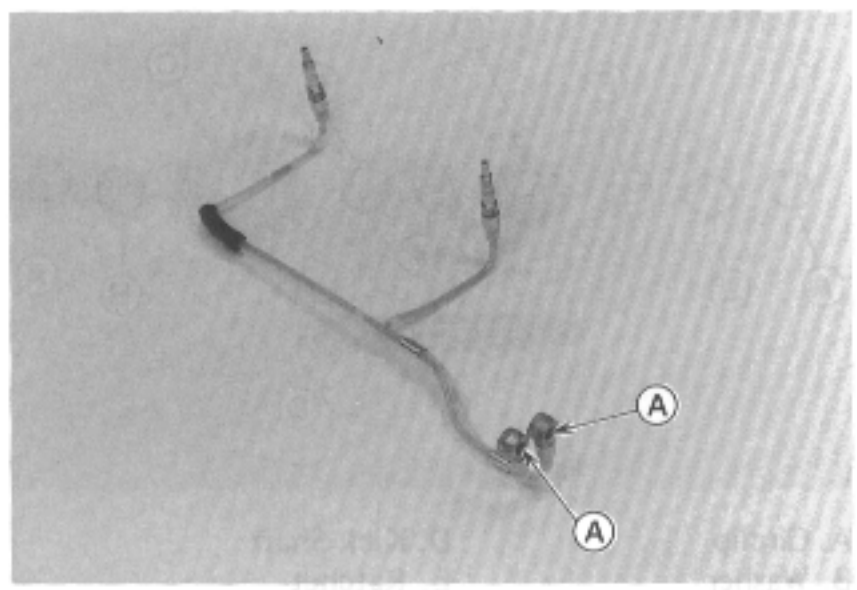
CAUTION

○Make sure the tab on the oil pump lever is bent to hold the cable nipple securely. If loose, the cable may slip out, resulting in piston seizure.



A. Pump Lever
B. Tab
C. Cable Nipple

- Fill the outlet hoses with 2-stroke oil. This shortens air bleeding time.



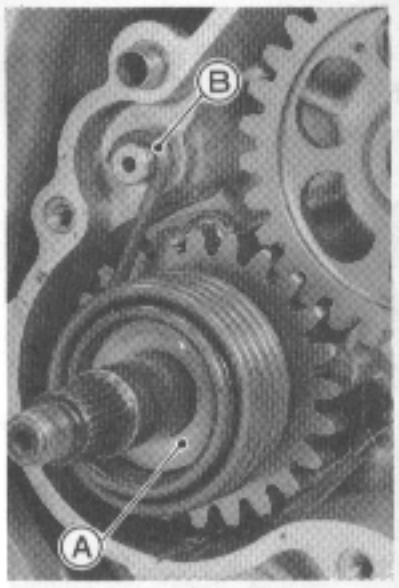
A. Apply a 2-stroke oil.

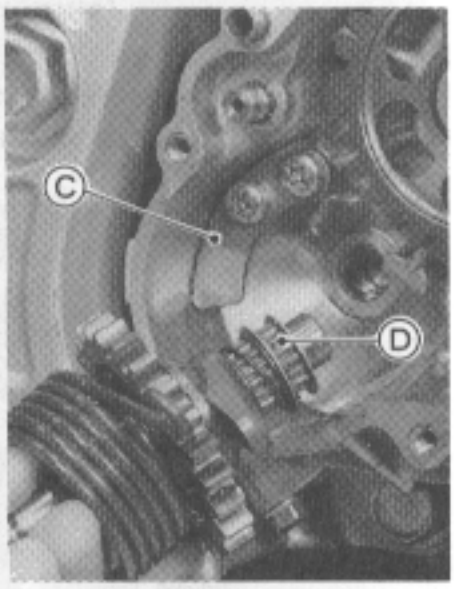
- Bleed the oil pump (see Engine Lubrication System chapter).
- After installation adjust the following.
  Clutch Cable
  Oil Pump and Carburetor Synchronization
  (see Engine Lubrication System chapter)

Kickstarter

Kickstarter Removal

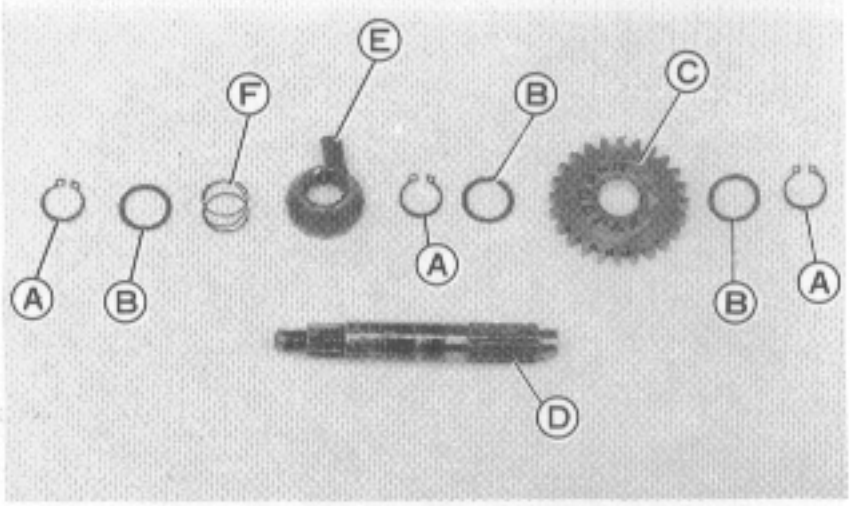
- Remove the clutch and right engine cover.
- Pull off the kick spring guide and unhook the return spring. Then pull off the kickstarter assembly and washer.





A. Kick Spring Guide
B. Return Spring
C. Kick Guide
D. Washer

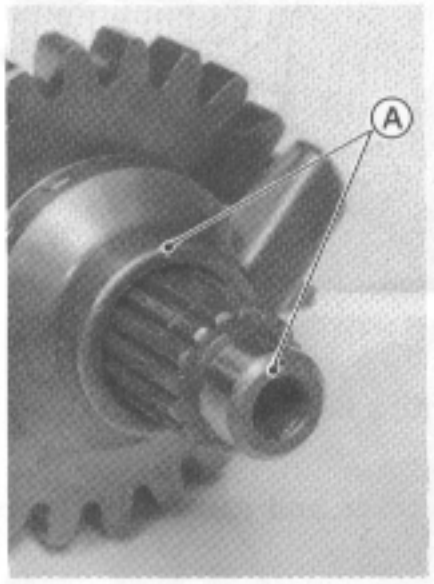
- Remove the circlips and disassemble the kickstarter assembly.

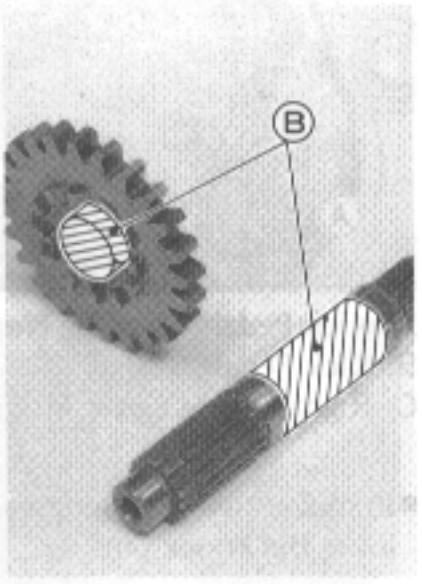


A. Circlip
B. Washer
C. Kick Gear
D. Kick Shaft
E. Ratchet
F. Spring

Kickstarter Installation Notes

- Install the ratchet on the kick shaft so that the punch mark on the ratchet aligns with the punch mark on the kick shaft.
- Apply molybdenum disulfide grease as shown.





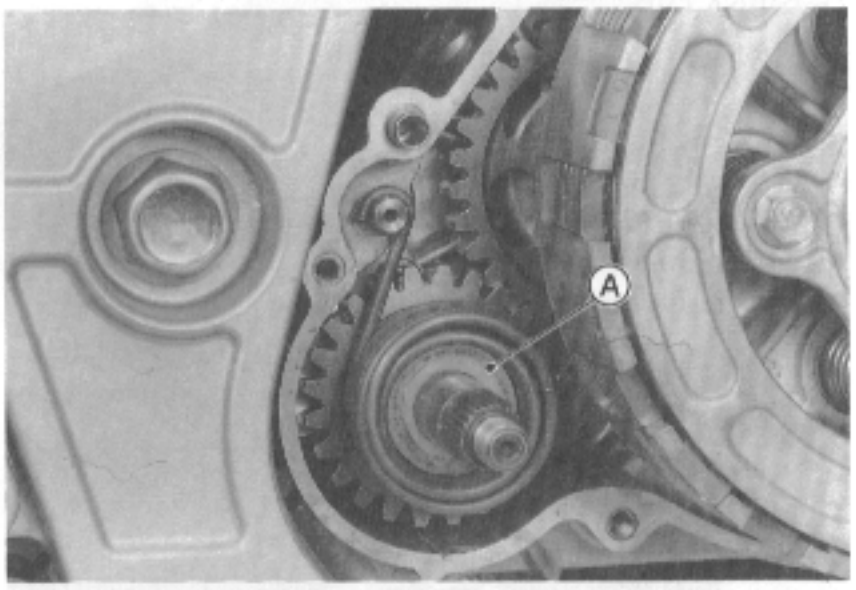
A. Punch Marks B. Apply here.

- Apply non-permanent locking agent to the threads of the kick guide mounting screws.

CAUTION

○Misalignment of the ratchet gear changes the kick spring preload. Light preload could weaken or break the spring.

- Push in the kick spring guide completely.



A. Kick Spring Guide

Engine Lubrication System

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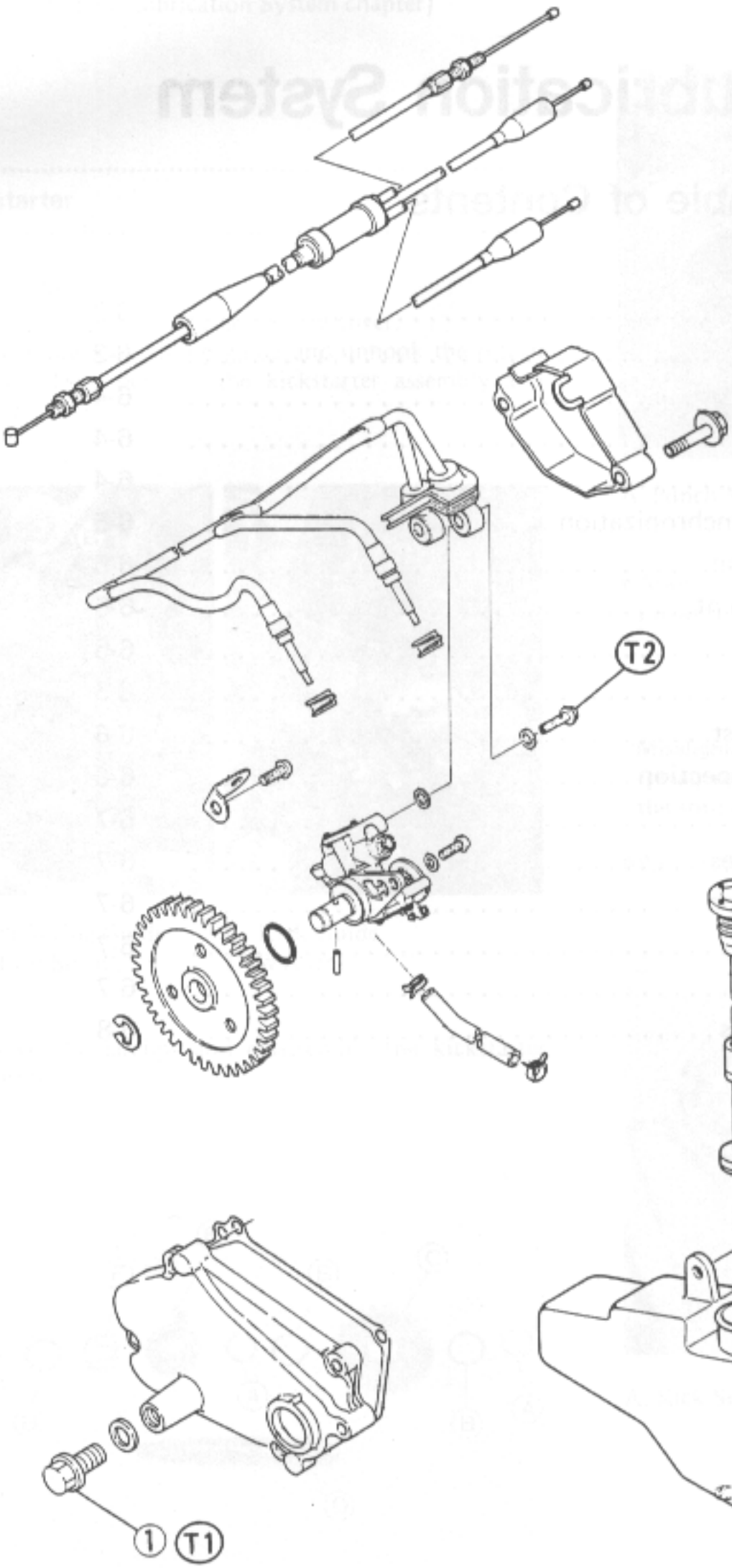
Exploded View



1. Drain Plug
T1 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T2 : 4.9 N-m (0.5 kg-m, 43 in-lb)

Specifications

Item		Standard	Service Limit
Engine Lubrication System:			
Transmission oil:	Grade	SE class	
	Viscosity	SAE 10W30 or 10W40	
	Amount	0.85 L	
Engine oil pump:	Oil pump output @2,000 r/min (rpm), 3 min.	3.0 – 3.7 mL (per one outlet)	– – –

Transmission Oil

In order for the transmission and clutch to function properly, always maintain the transmission oil at the proper level and change the oil periodically.

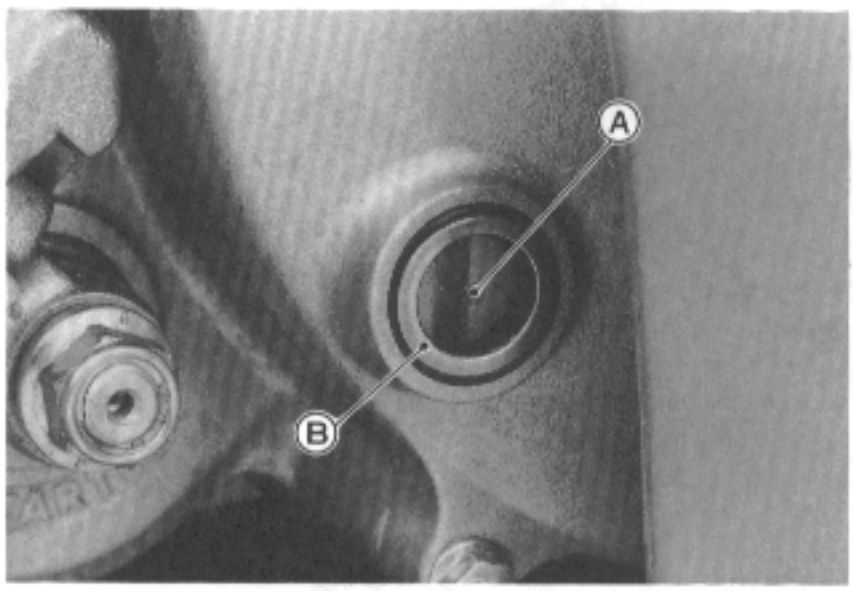
WARNING

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

Oil Level Inspection

- If the motorcycle has just been used, wait several minutes for all the oil to drain down.
- If the oil has been poured in since the motorcycle was last used, kick the engine over 3 or 4 times with the ignition switch left in the OFF position. This ensures that the oil "settle."
- Situate the motorcycle so that it is perpendicular to the ground.
- Check the oil level through the oil level gauge.

★The oil level should come up above the mark.



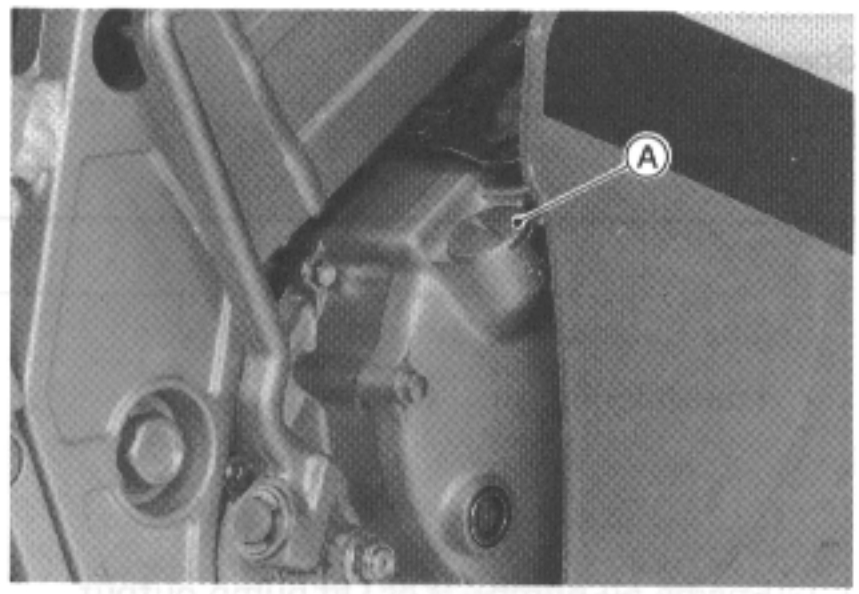
A. Mark B. Oil Level Gauge

★If the oil level is too high, remove the excess oil, using a syringe or some other suitable device.

★If the oil level is too low, add oil through the oil filler opening. Use the same type and brand of oil that is already in the engine.

NOTE

○*If the oil must be refilled but the type and brand of the oil that already is in the engine are unidentified, change the oil in the engine completely.*

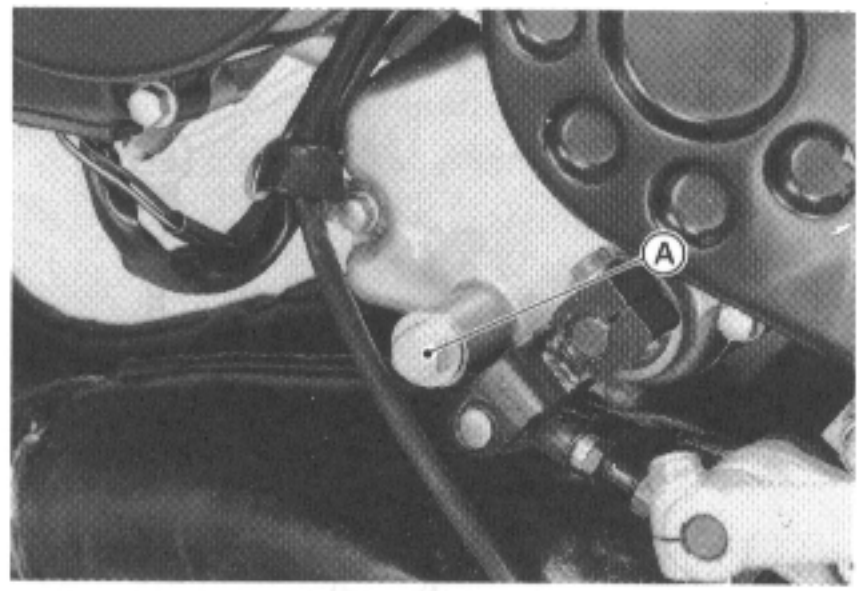


A. Oil Filler Opening Plug

- Install the oil filler opening plug.

Oil Changing

- Warm up the engine thoroughly so that the oil will pick up any sediment and drain easily. Then stop the engine.
- Place an oil pan beneath the engine.
- Remove the transmission drain plug.



A. Transmission Oil Drain Plug

- With the motorcycle perpendicular to the ground, let the oil completely drain.
- After the oil has completely drained, install the drain plug with its gasket.

NOTE

○*Replace the damaged gasket with a new one.*

- Fill the engine up to the proper level with a transmission oil specified in the table.
- Check the oil level.

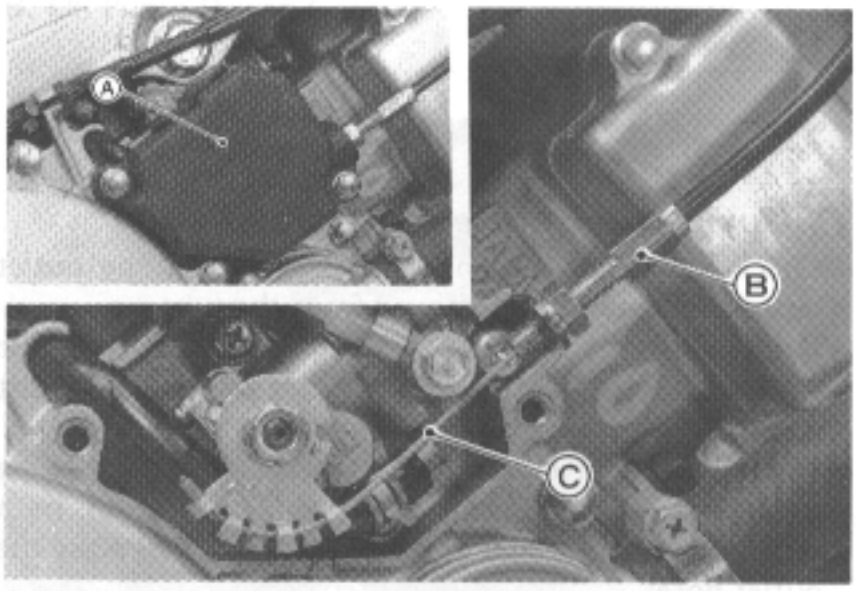
Transmission Oil

Grade:	**SE class**
Viscosity:	**SAE 10W30 or 10W40**
Capacity:	**0.85 L**

Oil Pump and Carburetor Synchronization

Synchronization Inspection

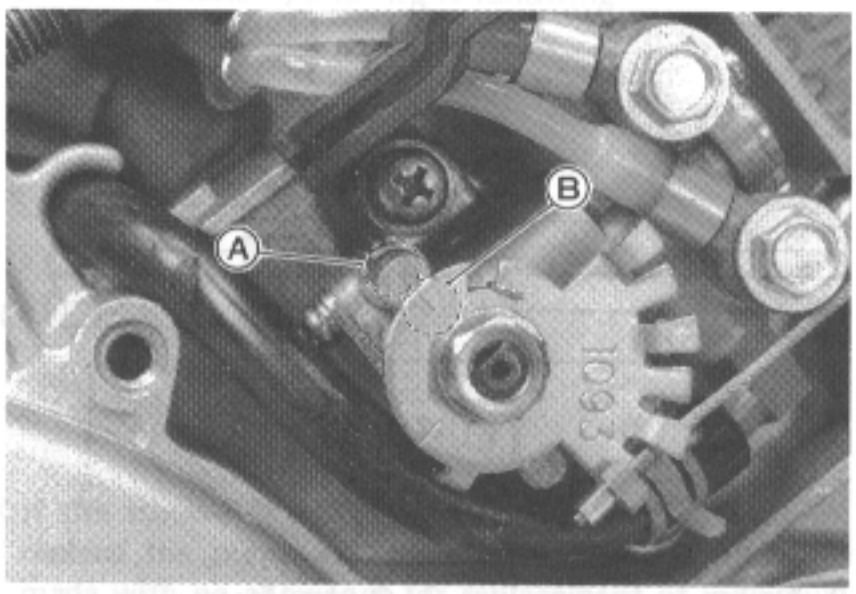
- Check the throttle grip play (see Fuel System chapter).
- Remove the fairings.
- Remove the oil pump cover.
- Check to see that the outer cable end of the oil pump is fully seated in the cable adjuster.



A. Oil Pump Cover
B. Outer Housing
C. Inner Cable

- Make sure the tab on the oil pump lever is bent to hold the oil pump inner cable securely.
- Turn the throttle grip fully, and check to see if the synchronization mark on the pump lever aligns with the mark on the lever stopper.

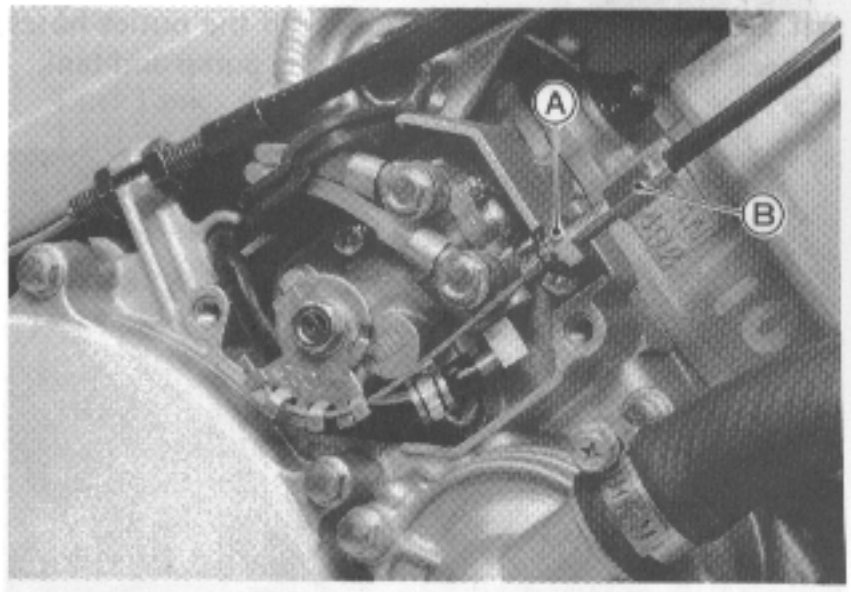
★If they do not line up, adjust the oil pump cable.



A. Mark on Stopper
B. Mark on Pump Lever

Synchronization Adjustment

- Loosen the oil pump cable adjuster locknut, and turn the adjuster to synchronize the pump with the carburetor.



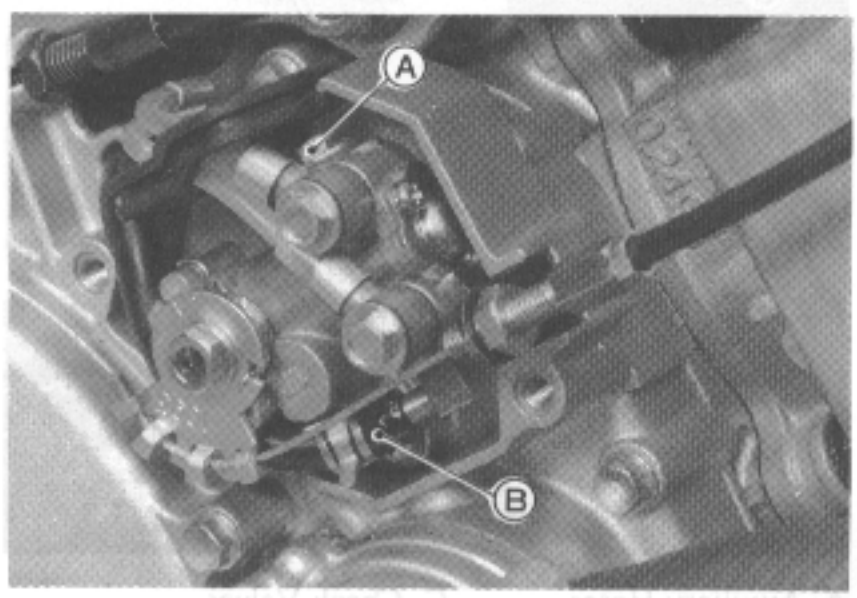
A. Locknut
B. Cable Adjuster

- Tighten the locknut, and check the pump synchronization. Re-adjust if necessary.
- Install the oil pump cover.

Engine Oil Pump

Bleeding the Oil Pump

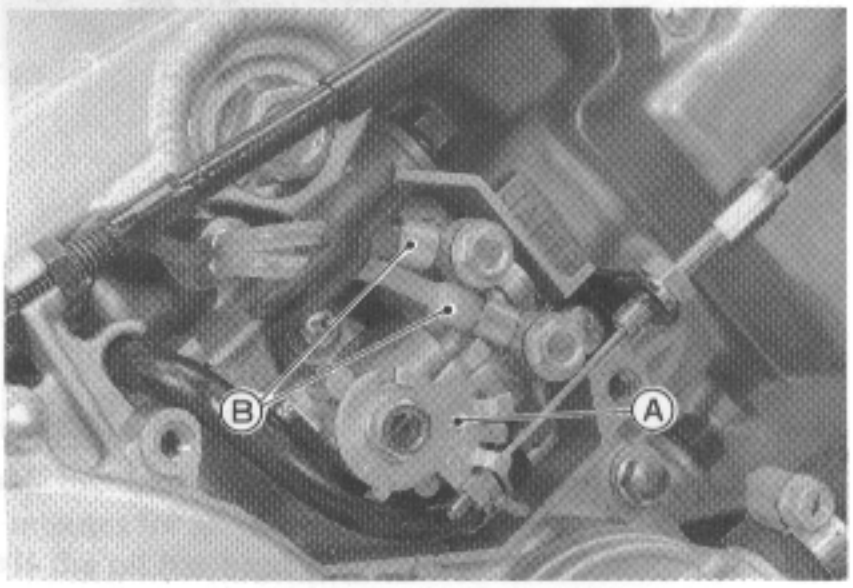
- First check that there is plenty of engine oil in the oil tank.
- Remove the oil pump cover.
- Bleed the air from the oil pump inlet hose and oil pump body by backing out the bleeder bolt on the oil pump body a couple of turns. Leave it until the oil flows out of the bleeder bolt, and tighten the bolt securely.



A. Bleeder Bolt
B. Inlet Hose

- Bleed the air from the outlet hoses with the engine idling (below **2,000 rpm**), and with the oil pump lever opened fully to maximize the pump output by pulling the oil pump cable outer tube.
- Keep the engine idling until the air is completely pumped out.

★If air bubbles continue to appear in the outlet hoses, check the oil hose connections at the pump and tank.



A. Oil Pump Lever. opened fully. B. Outlet Hose

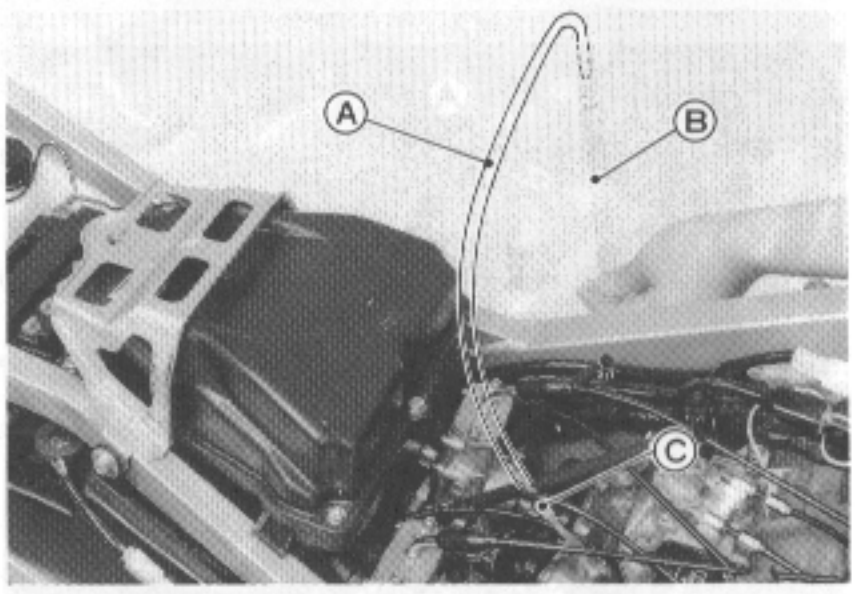
Oil Pump Performance Test

CAUTION

○**Use a 30:1 mixture of gasoline to oil in the fuel tank or the optional fuel tank in place of the gasoline normally used.**

○**Make sure the work area is well ventilated.**

- Remove the oil pump cover.
- Remove the oil pump outlet hoses from the carburetor holders. Fit the holes with suitable bolts instead of the outlet hoses.
- Using the auxiliary hoses, lead the pump output into containers.



A. Auxiliary Hoses
B. Containers
C. Check Valves

- Start the engine, and keep it at **2,000 rpm**.
- Opening the oil pump lever fully, collect the oil that is, being pumped for **3 minutes**. If the each quantity of oil collected corresponds with the table, the oil pump is operating properly.

Oil Pump Output

Standard:	**3.0 – 3.7 mL per one outlet hose**

†3 minutes measurement at 2,000 rpm of engine speed, oil pump lever fully opened.

★If the oil pump output is subnormal, inspect the oil pump, the inlet and outlet tubes for oil leaks.

★If any oil leaks is not found, replace the oil pump.

Oil Pump Check Valve Inspection

○Check valves are assembled at the end of the outlet hoses and can not be removed from the tube.

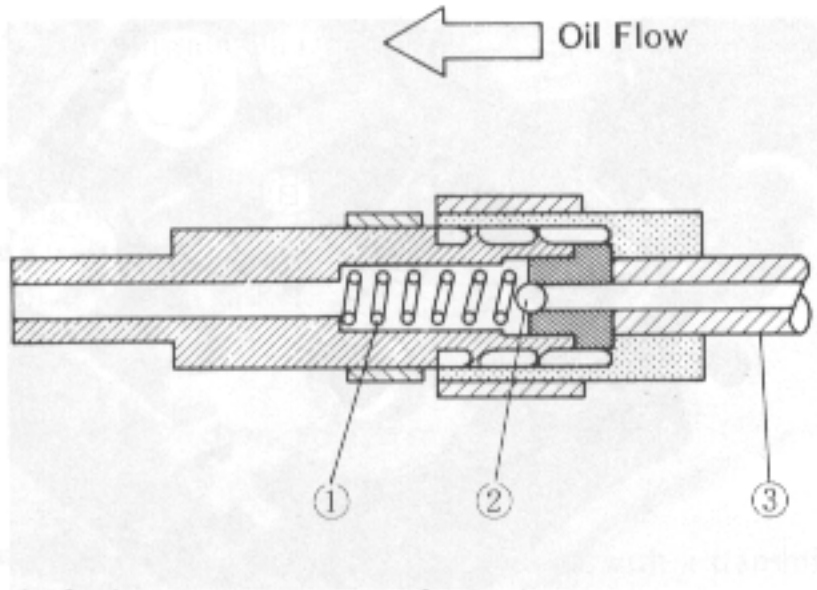
★If oil will not pass through the check valve, clean the valve out by using a high flash point solvent in a squirt gun or syringe.

★If the check valve does not work properly after being cleaned out, whether allowing oil to pass in both directions or not allowing oil to pass at all, replace the outlet hoses.

CAUTION

○**Do not use compressed air on the valve since doing so would damage the valve spring.**

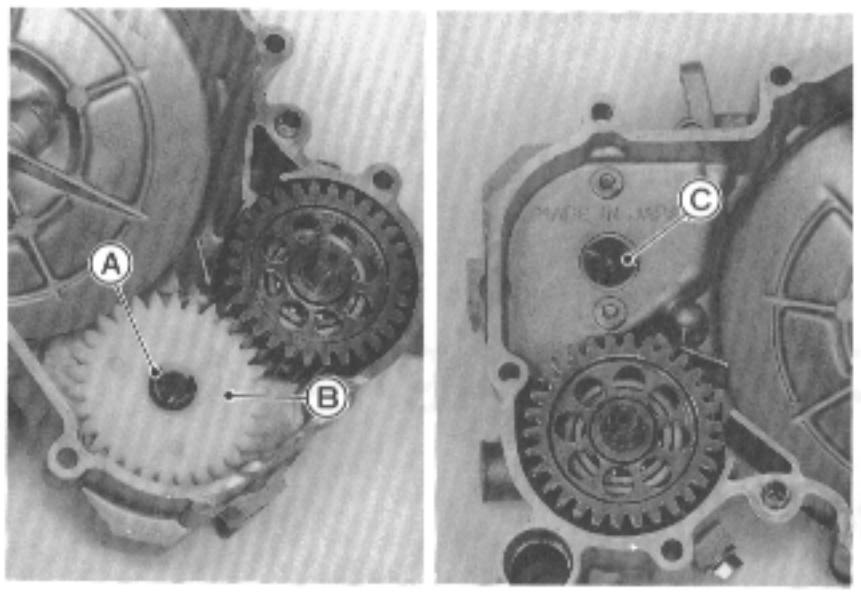
Check Valve



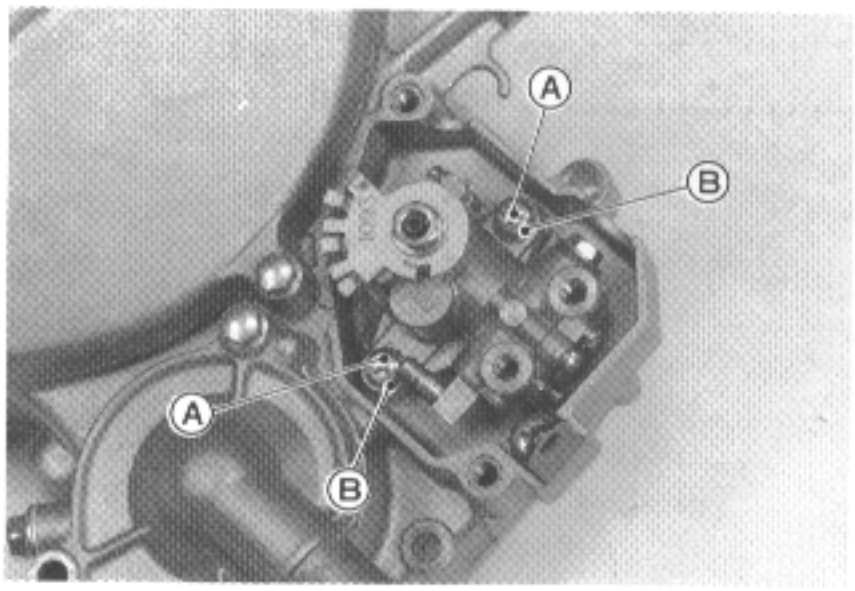
1. Spring
2. Steel Ball
3. Outlet Hose

Oil Pump Removal

● Remove the engine right cover (see Engine Right Side chapter) and remove the following.



A. E-ring
B. Oil Pump Driven Gear
C. Pin



A. Mounting Screws
B. Washers

Oil Pump Installation Notes

● After installation perform the following.
Oil Pump Bleeding
Oil Pump and Carburetor Synchronization

Oil Pump Assembly Caution

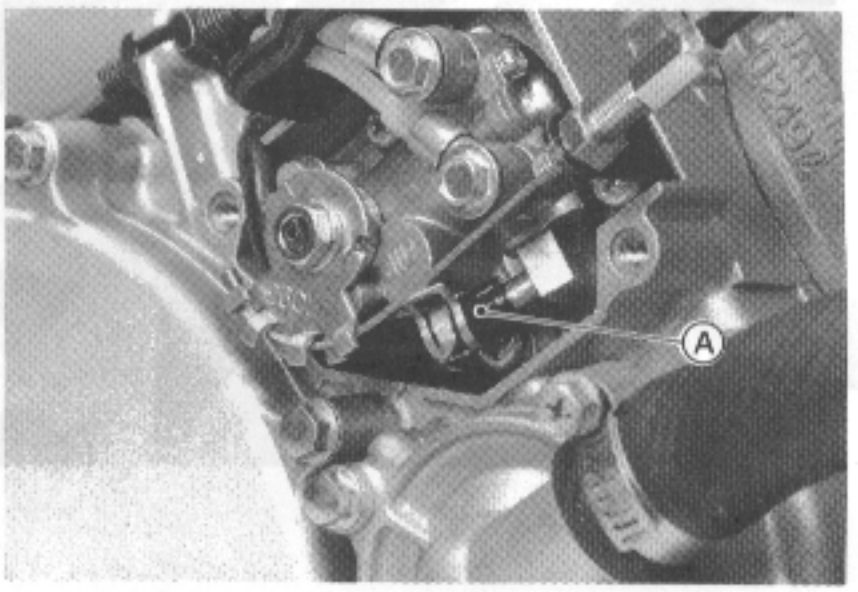
CAUTION

○ **If the trouble is with internal parts of the oil pump, replace the pump as a unit. The pump is precision made with no allowance for replacement of individual parts.**

Engine Oil Tank

Engine Oil Tank Removal

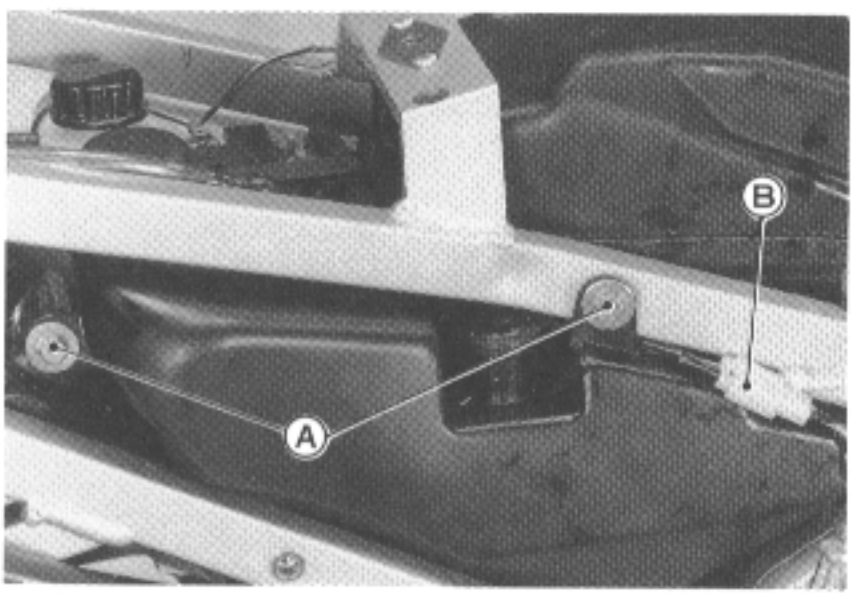
● Remove the following.
Seat
Side Covers
Fuel Tank
Fairings
Carburetor (see Fuel System chapter)
Air Cleaner Housing (see Fuel System chapter)
Oil Pump Cover



A. Oil Pump Inlet Hose End

NOTE

○ *When disconnecting the inlet hose, screw a suitable bolt into the oil pump inlet hose to keep the oil from flowing out. Then keep the end of the hose upward.*



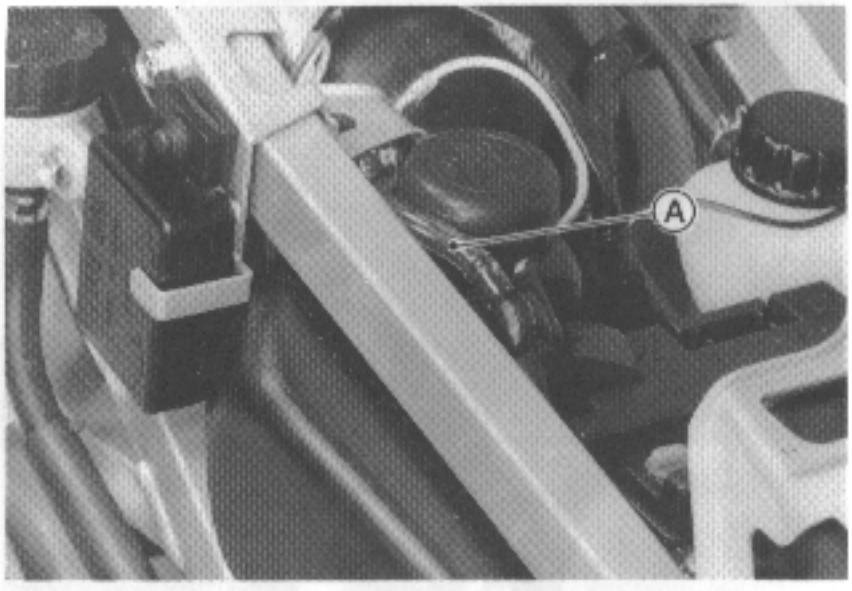
A. Mounting Bolts
B. Oil Level Warning Light Lead Connector

● Remove the engine oil tank.

Oil Tank Installation Notes

CAUTION

○**Always keep the oil tank breather tube free of obstruction, and make sure it does not get pinched, crimped, bent sharply, or melted by the exhaust pipe. If the breather is obstructed, engine oil flow to the oil pump will be hindered and serious engine damage will occur.**



A. Breather Tube

★If any air has gotten trapped in the oil pump inlet hose, bleed the oil pump (see Oil Pump Bleeding).

CAUTION

○**To avoid serious engine damage, air in the oil pump line must be removed by bleeding.**

Engine Removal/Installation

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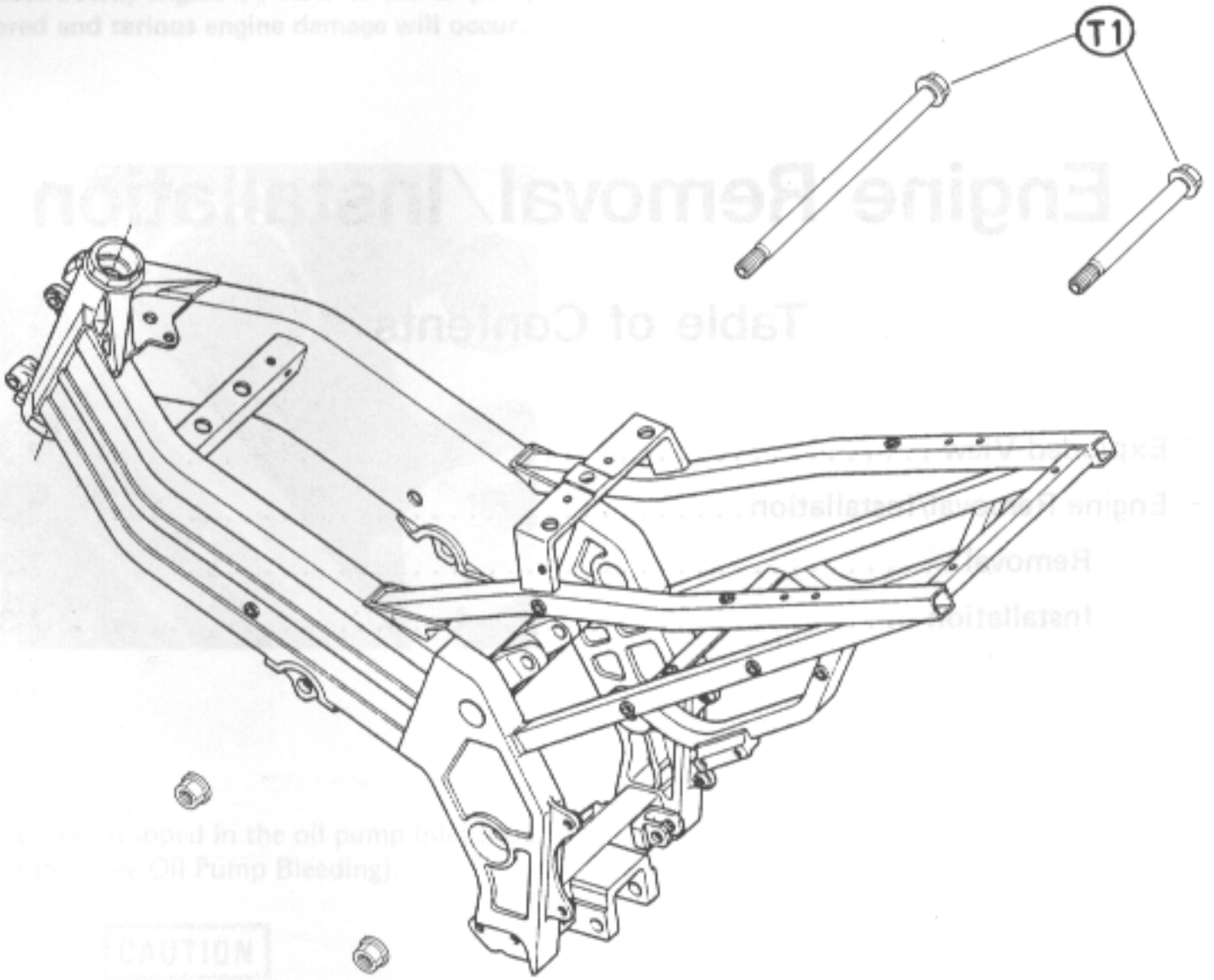
Exploded View



T1: 49 N-m (5.0 kg-m, 36 ft-lb)

Engine Removal/Installation

Removal

- Remove the following.
  - Seat
  - Fairings
  - Side Covers
  - Fuel Tank
  - Clutch Cable (see Engine Right Side chapter)
  - Shift Pedal (see Crankshaft/Transmission chapter)
  - Engine Sprocket (see Final Drive chapter)
  - Radiator (see Cooling System chapter)
  - Muffler (see Engine Top End chapter)
  - Carburetor (see Fuel System chapter)
  - Spark Plugs
  - Exhaust Valve Operating Unit (see Engine Top End chapter)
  - Oil Pump Cable (see Engine Lubrication System chapter)
- Disconnect all cables and wires off the engine (see Parts Location in the Electrical System chapter).
- Using a jack, slightly lift up the engine. Then remove the engine mounting bolts.
- Remove the engine.

Installation

- Tighten the engine mounting bolts to the specified torque (see General Information chapter).
- Route all wires and cables correctly (see General Information chapter).
- Apply non-permanent locking agent to the threads of the side stand bracket mounting bolts.
- ★Visually inspect the clip on the rear axle nut, and replace it if necessary.
- Tighten the following parts to the specified torque (see General Information chapter).
  - Engine Sprocket Mounting Bolts
  - Rear Axle Nut
  - Side Stand Bracket Mounting Bolts
- Check and adjust following items after installation.
  - Drive Chain Slack (see Final Drive chapter)
  - Exhaust Valve Operation (see Electrical System chapter)
  - Oil Pump and Throttle Cable Synchronization (see Engine Lubrication chapter)
  - Coolant Level (see Cooling System chapter)

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.**

Crankshaft/Transmission

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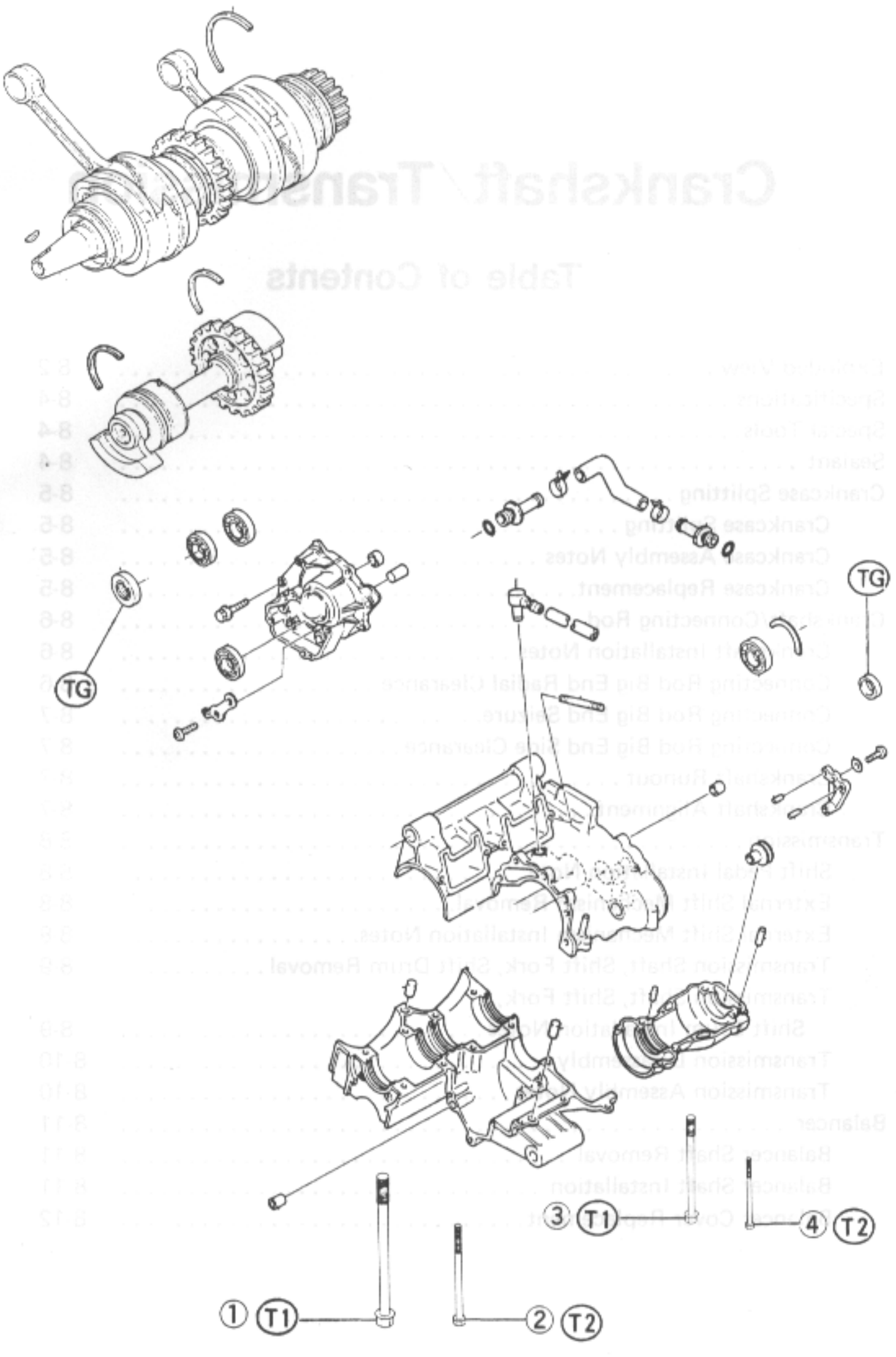
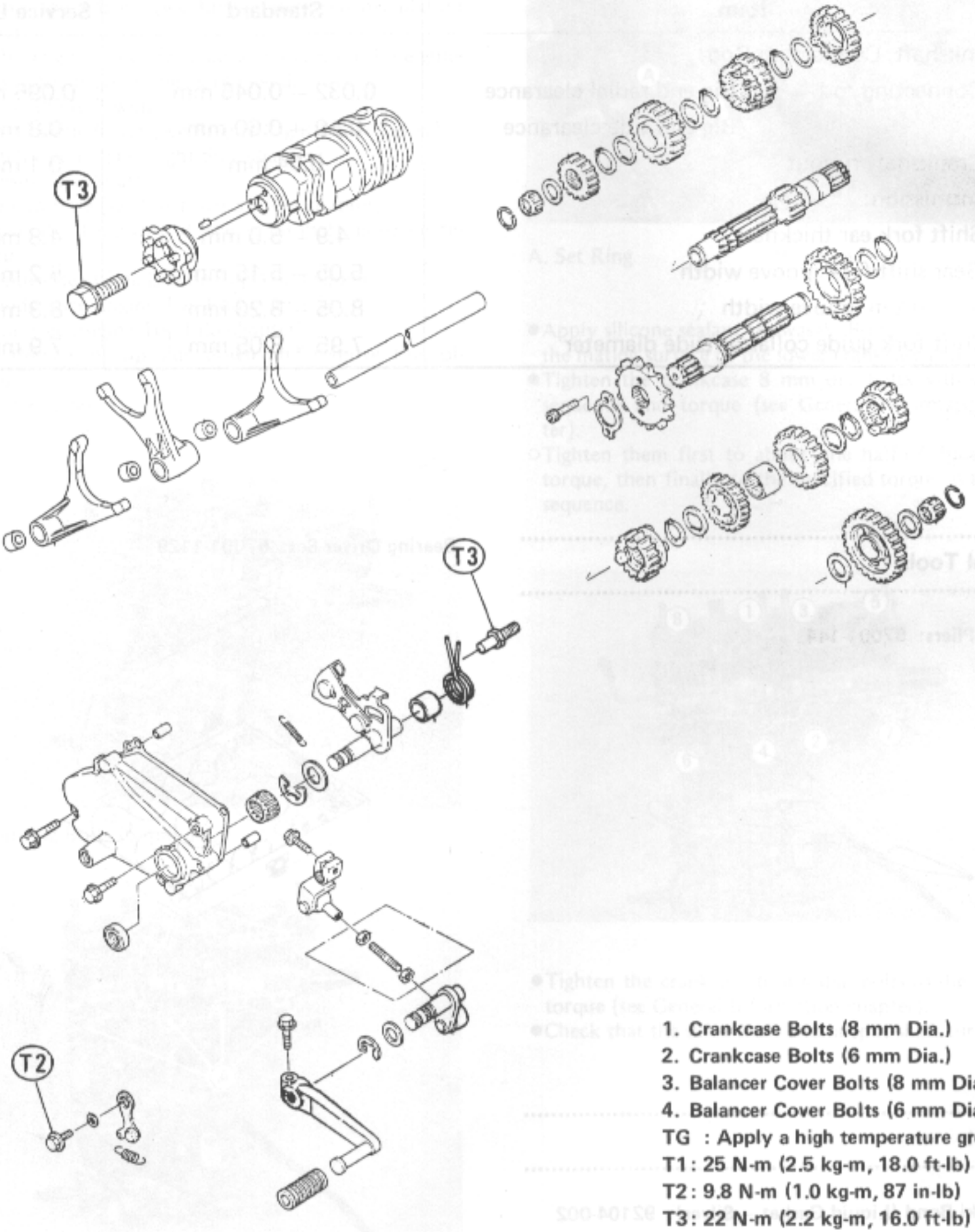
Exploded View





1. Crankcase Bolts (8 mm Dia.)
2. Crankcase Bolts (6 mm Dia.)
3. Balancer Cover Bolts (8 mm Dia.)
4. Balancer Cover Bolts (6 mm Dia.)

TG : Apply a high temperature grease.
T1 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T2 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T3 : 22 N-m (2.2 kg-m, 16.0 ft-lb)

Specifications

Item		Standard	Service Limit
Crankshaft, Connecting Rod:			
Connecting rod	Big end radial clearance	0.032 – 0.045 mm	0.095 mm
	Big end side clearance	0.50 – 0.60 mm	0.8 mm
Crankshaft runout		0.04 mm	0.1 mm
Transmission:			
Shift fork ear thickness		4.9 – 5.0 mm	4.8 mm
Gear shift fork groove width		5.05 – 5.15 mm	5.2 mm
Shift drum groove width		8.05 – 8.20 mm	8.3 mm
Shift fork guide collar outside diameter		7.95 – 8.05 mm	7.9 mm

Special Tools

Circlip Pliers: 57001-144

Bearing Driver Set: 57001-1129

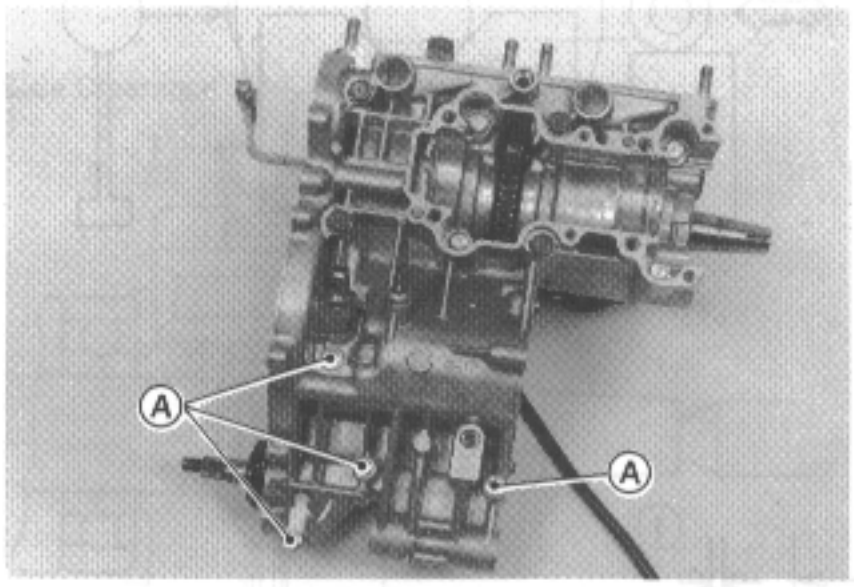
Sealant

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

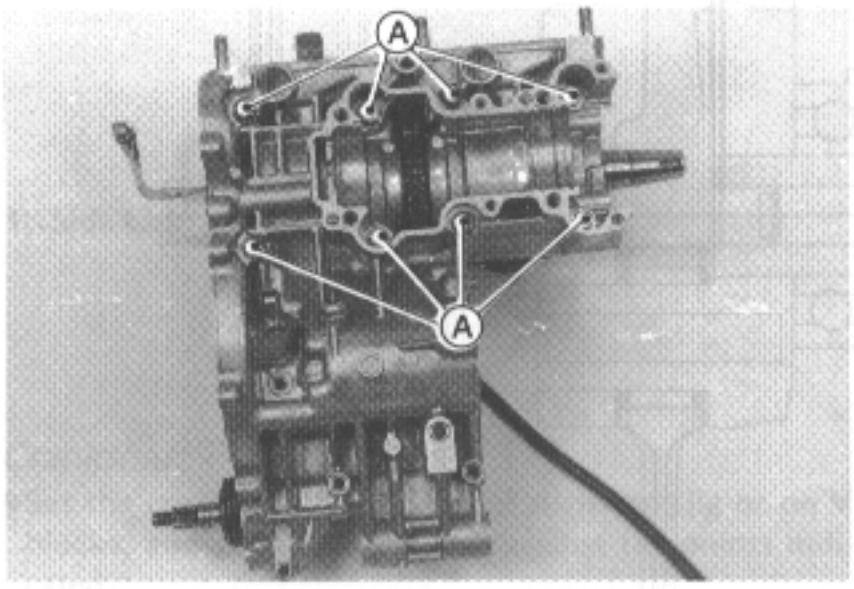
Crankcase Splitting

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.
  Right Engine Cover (see Engine Right Side chapter)
  Clutch (see Engine Right Side chapter)
  Transmission Shaft
  Magneto Base (see Electrical System chapter)
- ★Remove the following if the crankshaft is to be removed.
  Cylinder Head (see Engine Top End chapter)
  Cylinder (see Engine Top End chapter)
  Piston (see Engine Top End chapter)
- Turn the engine up side down and remove the following.
  Balancer Shaft



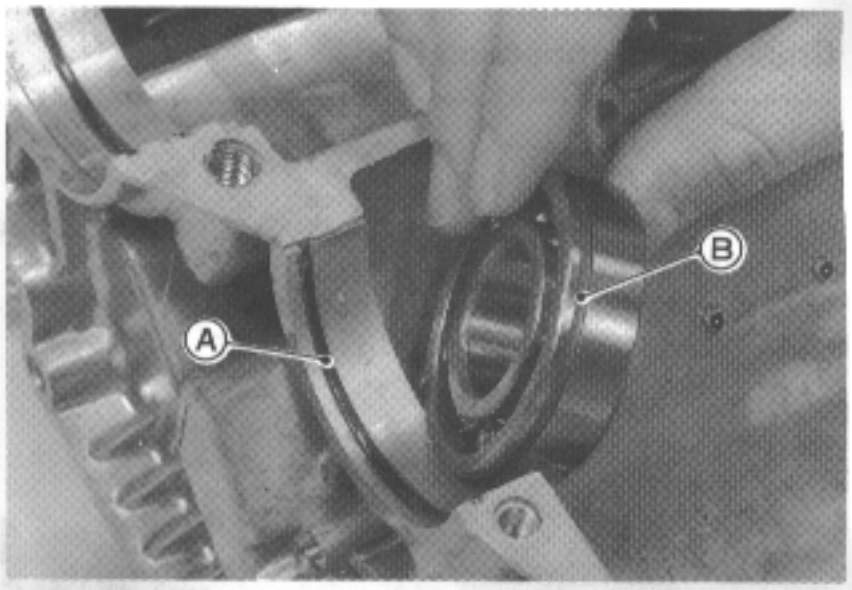
Mounting Bolts (6 mm dia.)



A. Mounting Bolts (8 mm dia.)

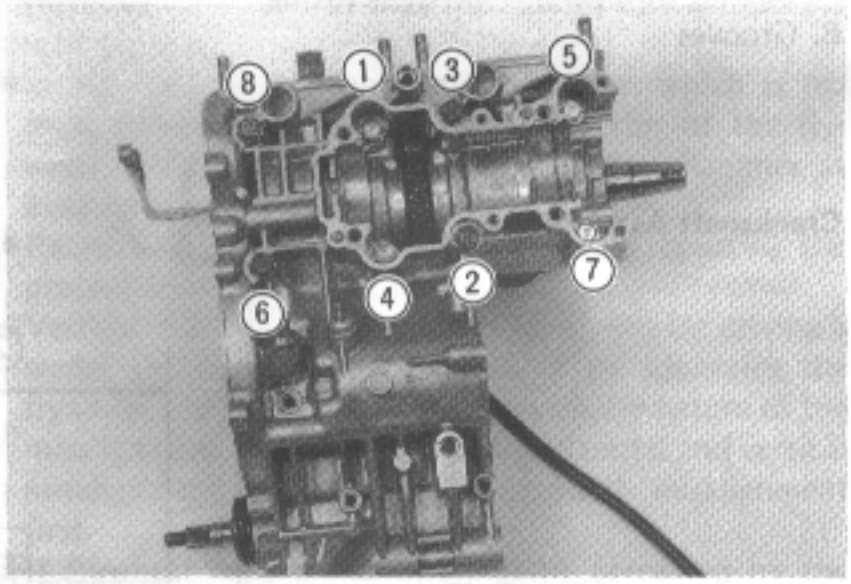
Crankcase Assembly Notes

- Install the set rings, and fit the grooves on the bearing to the set rings.



A. Set Ring B. Groove

- Apply silicone sealant (Kawasaki Bond: 56019-120) to the mating surface of the lower crankcase half.
- Tighten the crankcase 8 mm dia. bolts with specified sequence and torque (see General Information chapter).
- ○Tighten them first to about one half of the specified torque, then finally to the specified torque in the same sequence.



- Tighten the crankcase 6 mm dia. bolts to the specified torque (see General Information chapter).
- Check that the drive shaft and output shaft turn freely.

Crankcase Replacement

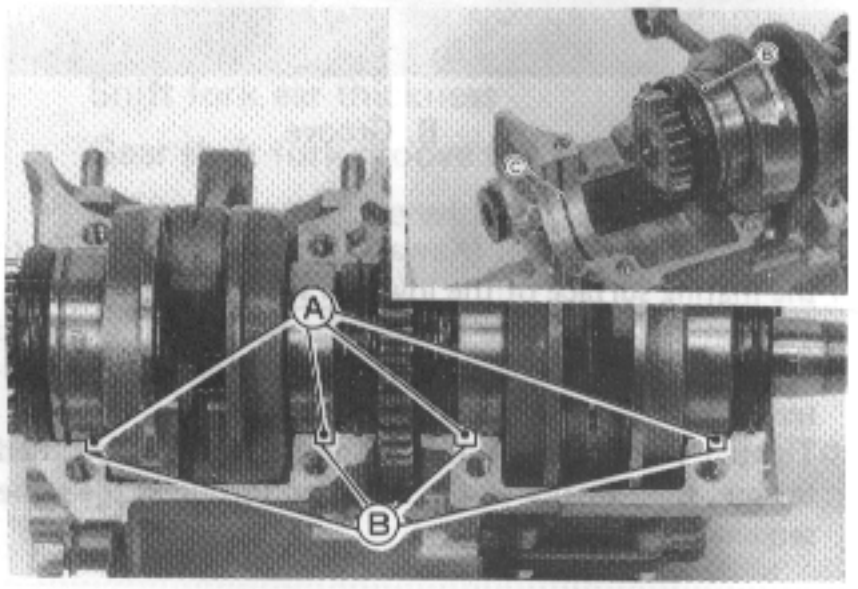
CAUTION

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

Crankshaft/Connecting Rod

Crankshaft Installation Notes

- Install the set rings, and fit the grooves on the bearing to the set rings.
- Fit the bearing stoppers to the grooves on the crankcase.



A. Bearing Stoppers
B. Grooves
C. Set Ring

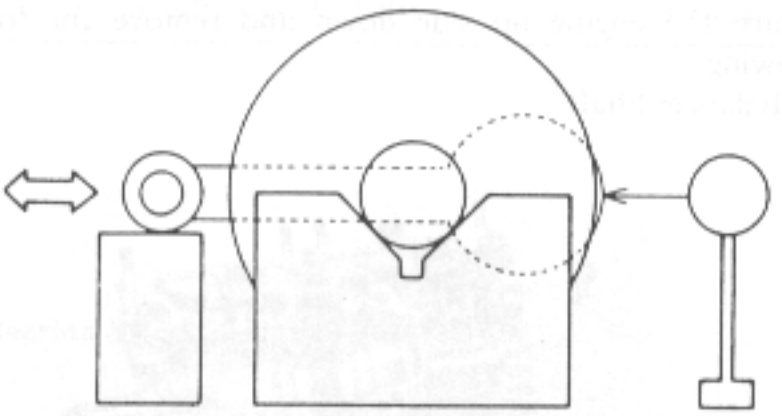
Connecting Rod Big End Radial Clearance

- Set the crankshaft in flywheel alignment jig or on V blocks, and place a dial gauge against the big end of the connecting rod.
- Push the connecting rod first towards the gauge and then in the opposite direction. The difference between the two gauge readings is the radial clearance.

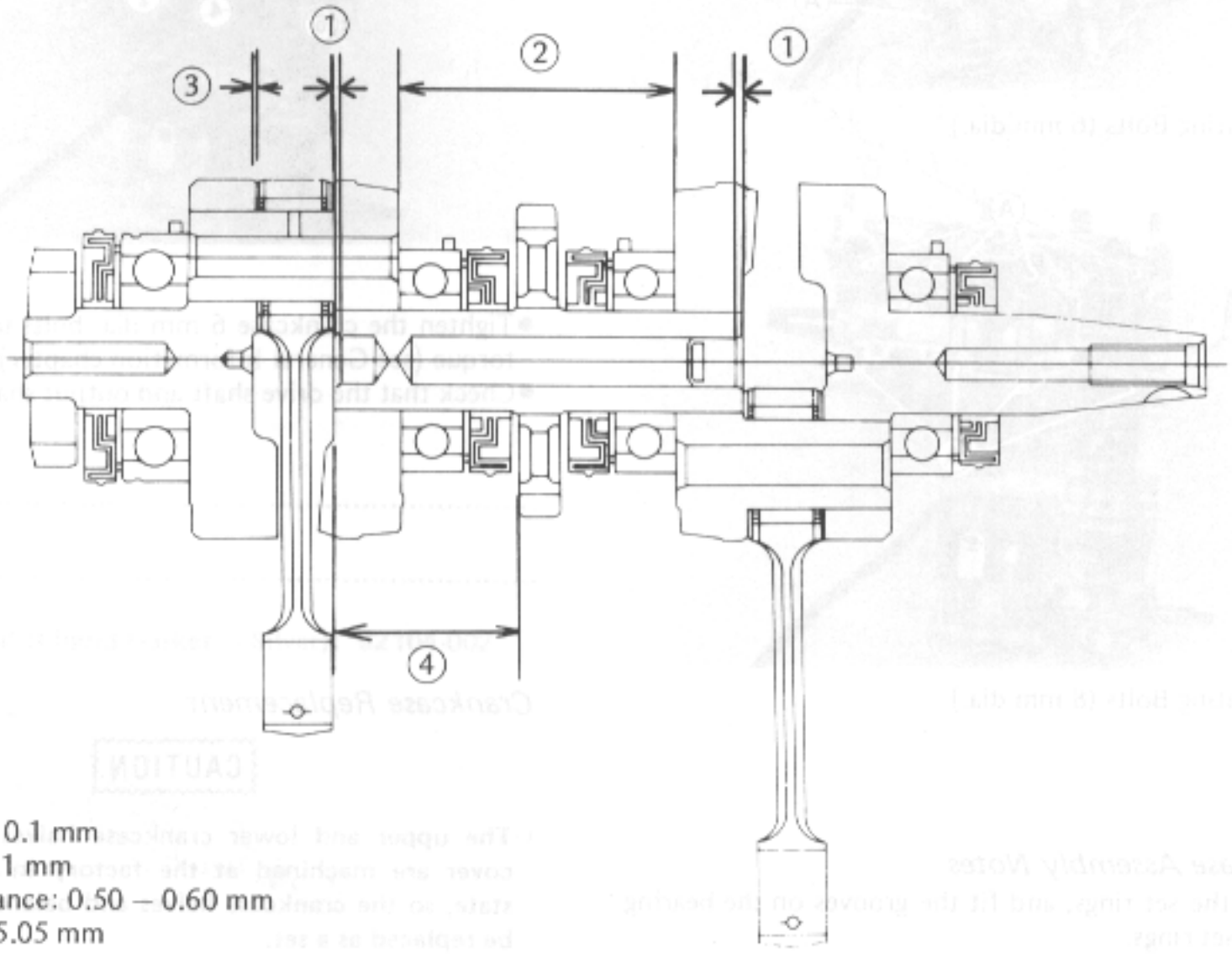
★If the radial clearance exceeds the service limit, the crankshaft should be either replaced or disassembled and the crankpin, needle bearing, and connecting rod big end examined for wear.

Connecting Rod Big End Radial Clearance

Standard:	**0.032 – 0.045 mm**
Service Limit:	**0.095 mm**



Crankshaft Assembly



1. more than 0.1 mm
2. 66.9 – 67.1 mm
3. Side Clearance: 0.50 – 0.60 mm
4. 44.85 – 45.05 mm

Connecting Rod Big End Seizure

★If case of serious seizure with damaged flywheels, the crankshaft must be replaced.

★In case of less serious damage, disassemble the crankshaft and replace the crankpin, needle bearing, side washers, and connecting rod.

Connecting Rod Big End Side Clearance

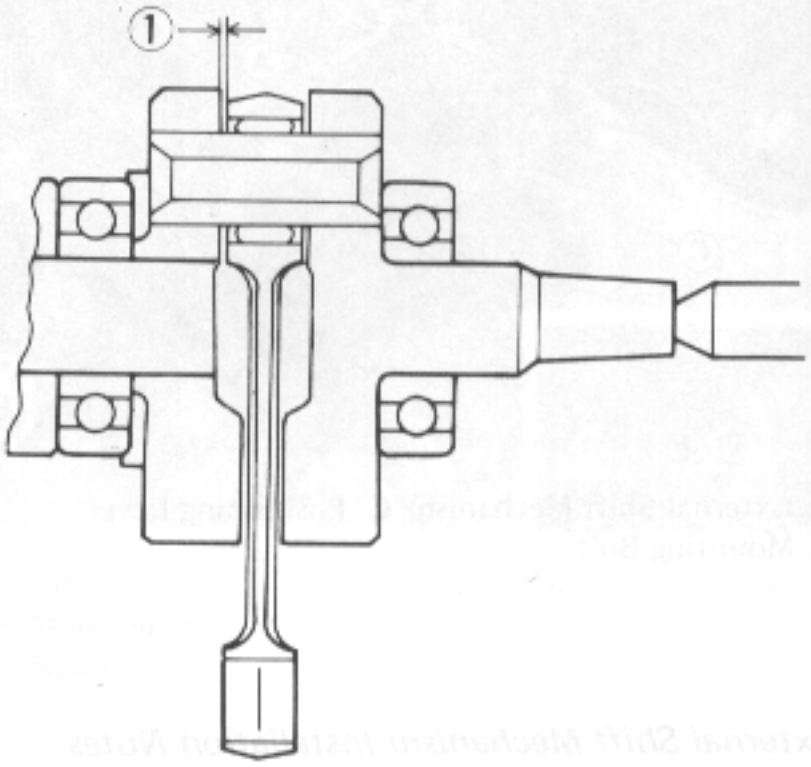
●Measure the side clearance of the connecting rod with a thickness gauge.

★If the clearance exceeds the service limit, replace the crankshaft.

Connecting Rod Big End Side Clearance

Standard:	**0.50 – 0.60 mm**
Service Limit:	**0.8 mm**

Side Clearance



1. Side Clearance

Crankshaft Runout

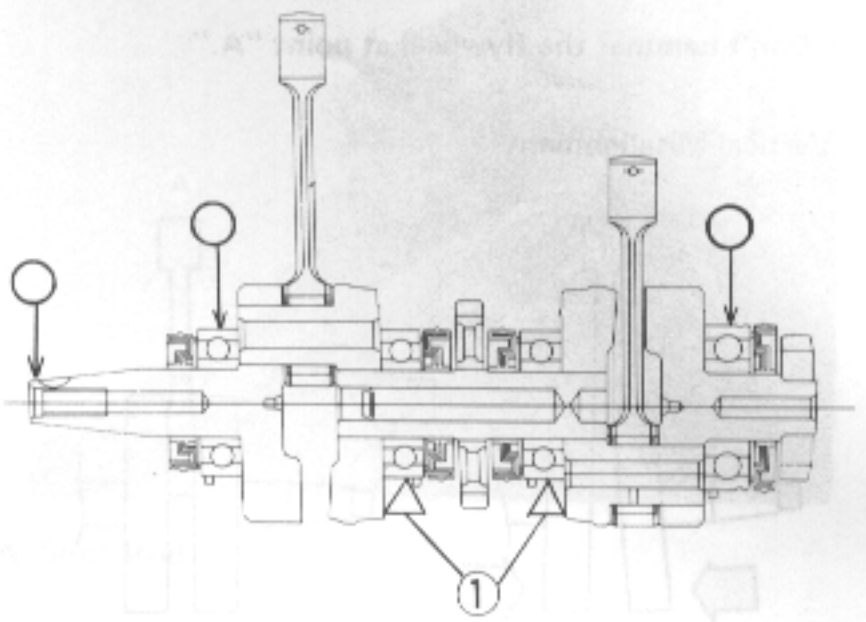
●Set the crankshaft in a flywheel alignment jig or on V blocks, and place a dial gauge against the points indicated.

●Turn the crankshaft slowly. The maximum difference in gauge readings is the crankshaft runout.

Crankshaft Runout

Standard:	**0.04 mm**
Service Limit:	**0.1 mm**

Crankshaft Runout



Crankshaft Alignment

★If the runout at either point exceeds the service limit, align the flywheels so that the runout falls within the service limit.

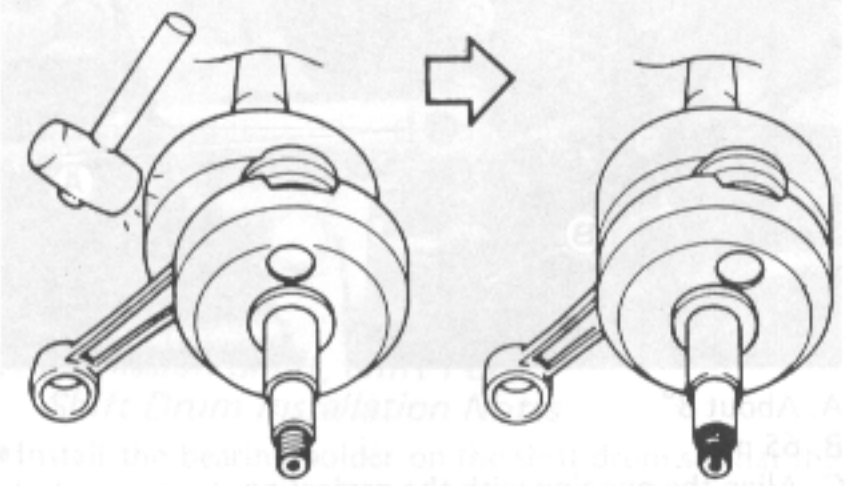
●In the case of horizontal misalignment, which is the most common, strike the projecting rim of the flywheel with a plastic, soft lead, or brass hammer as indicated in the figure.

●Recheck the runout with a dial gauge, repeating the process until the runout falls within the service limit.

○Vertical misalignment is corrected either by driving a wedge in between the flywheels or by squeezing the flywheel rims in a vise, depending on the nature of the misalignment. In both cases of horizontal and vertical misalignment, correct the horizontal misalignment first.

★If flywheel misalignment cannot be corrected by the above method, replace the crankpin or the crankshaft itself.

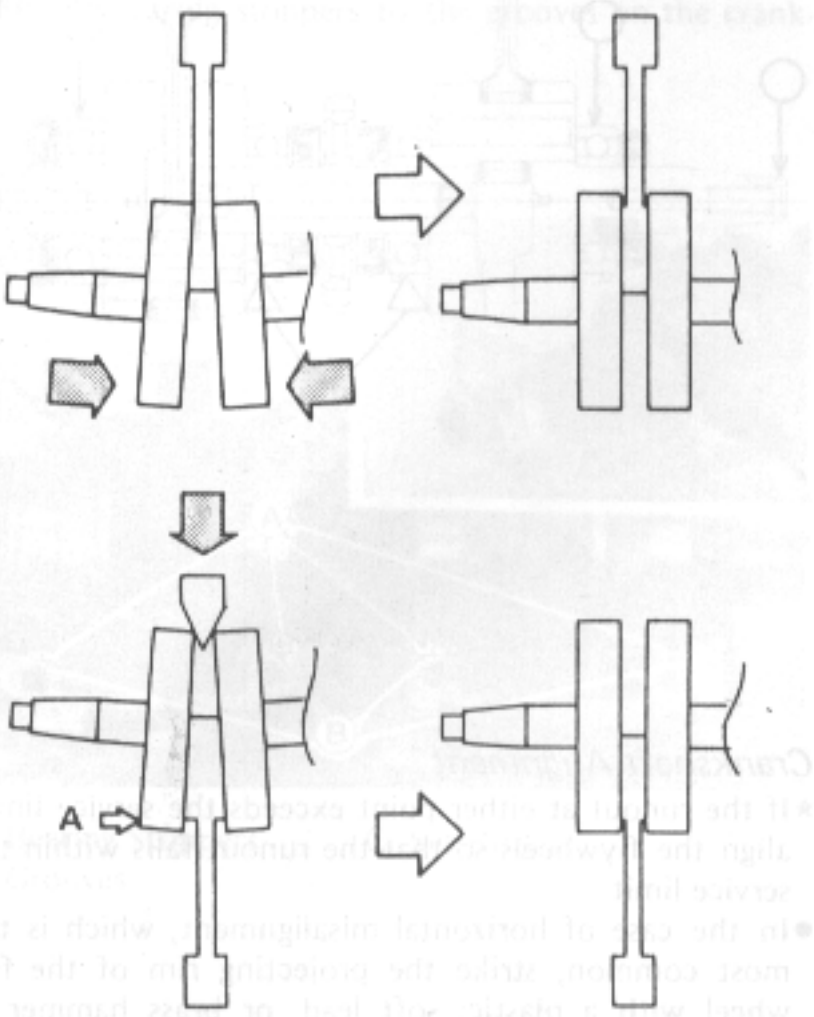
Horizontal Misalignment



CAUTION

○**Don't hammer the flywheel at point "A."**

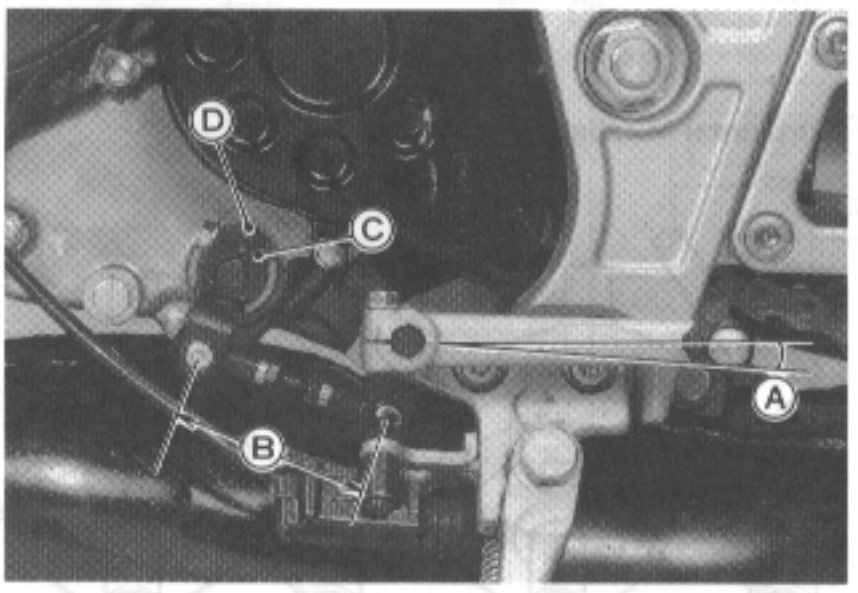
Vertical Misalignment



Transmission

Shift Pedal Installation Note

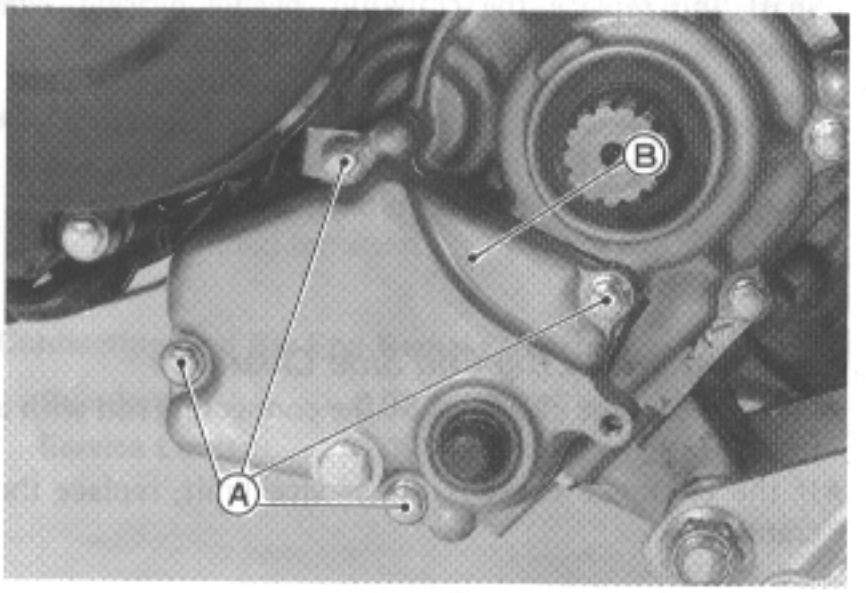
●Install the shift pedal as shown.



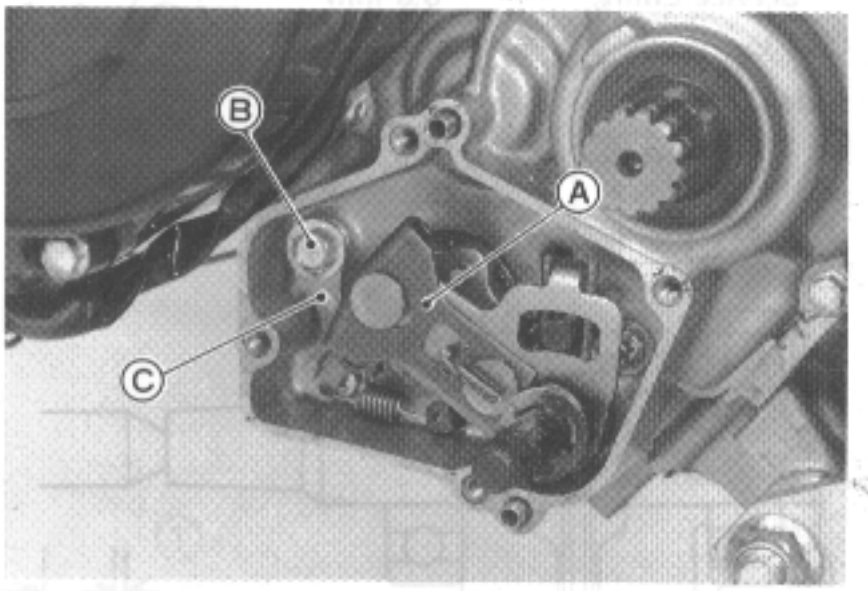
A. About 8°
B. 65 mm
C. Align the opening with the projection.
D. Projection

External Shift Mechanism Removal

●Remove the following.
Engine Sprocket (see Final Drive chapter)



A. Mounting Bolts
B. External Shift Mechanism Cover



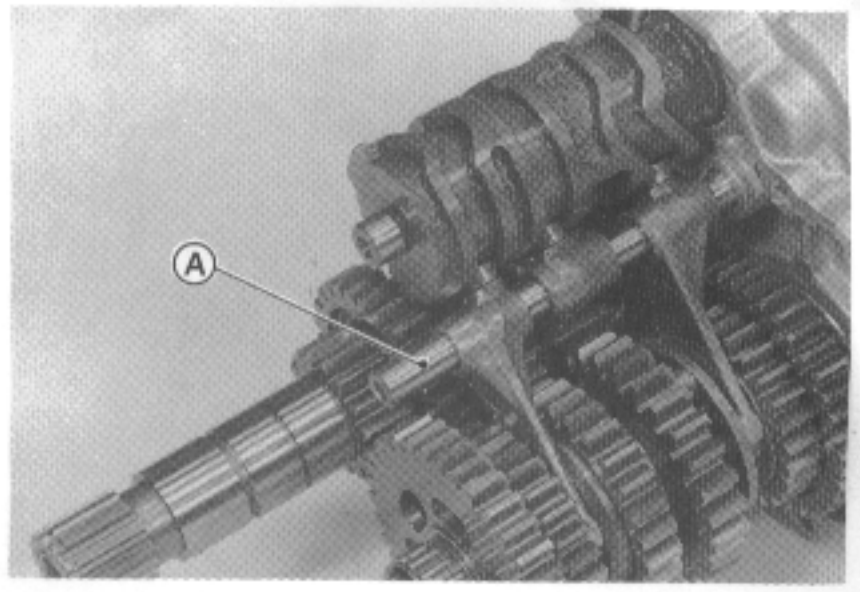
A. External Shift Mechanism C. Positioning Lever
B. Mounting Bolt

External Shift Mechanism Installation Notes

●Tighten the shift drum positioning lever mounting bolt to the specified torque (see General Information chapter).
●Apply a high temperature grease to the lip of the oil seal on the external shift mechanism cover.
●Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
●Visually inspect the rear axle nut clip, and replace it if necessary.
●Tighten the following to the specified torque (see General Information chapter).
Engine Sprocket Mounting Bolts
Rear Axle Nut
Side Stand Bracket Mounting Bolts
●Check and adjust the following items (see Final Drive chapter).
Drive Chain Slack
Wheel Alignment

WARNING

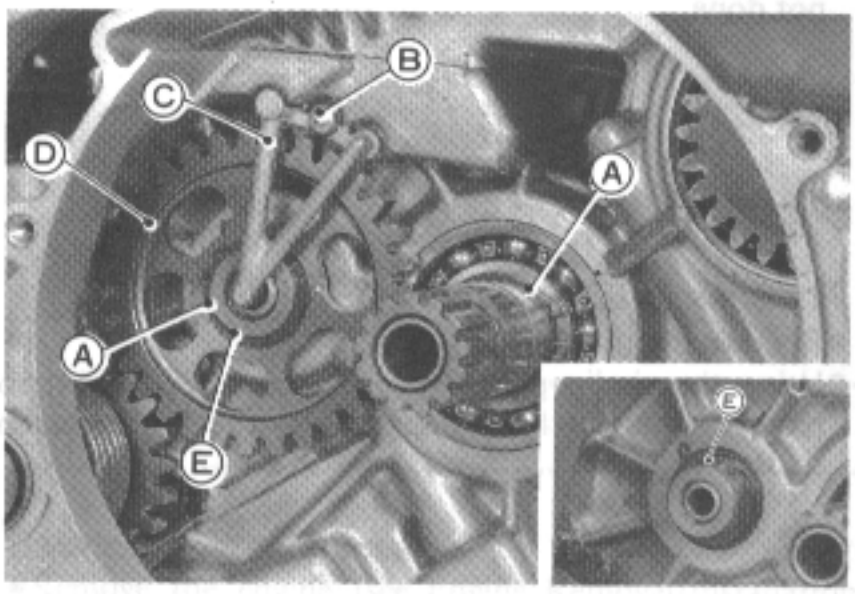
○Do not attempt to drive the motorcycle until a full brake pedal is obtained by pumping the brake pedal until the pads are against the disc. The brake will not function on the first application of the pedal if this is not done.



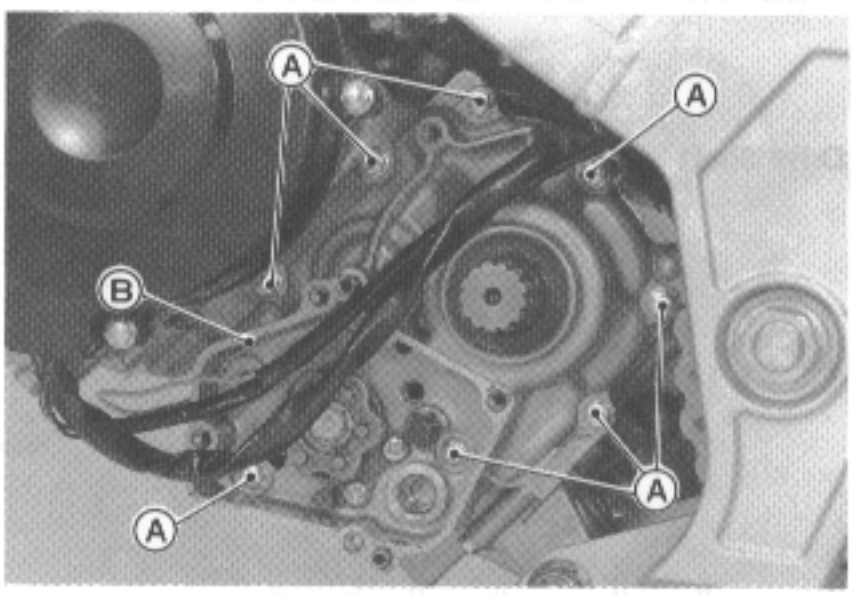
A. Shift Rod

Transmission Shaft, Shift Fork, Shift Drum Removal

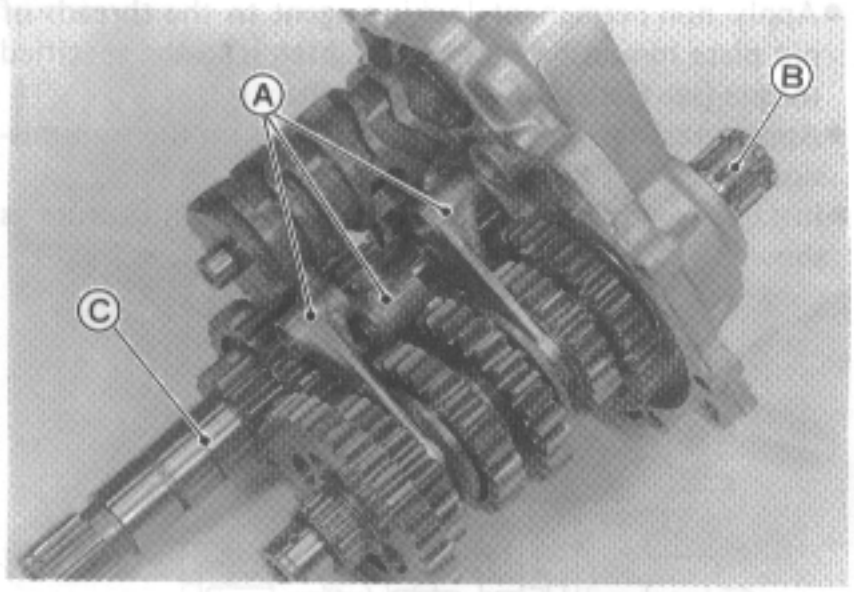
● Remove the following.
External Shift Mechanism
Clutch (see Engine Right Side chapter)



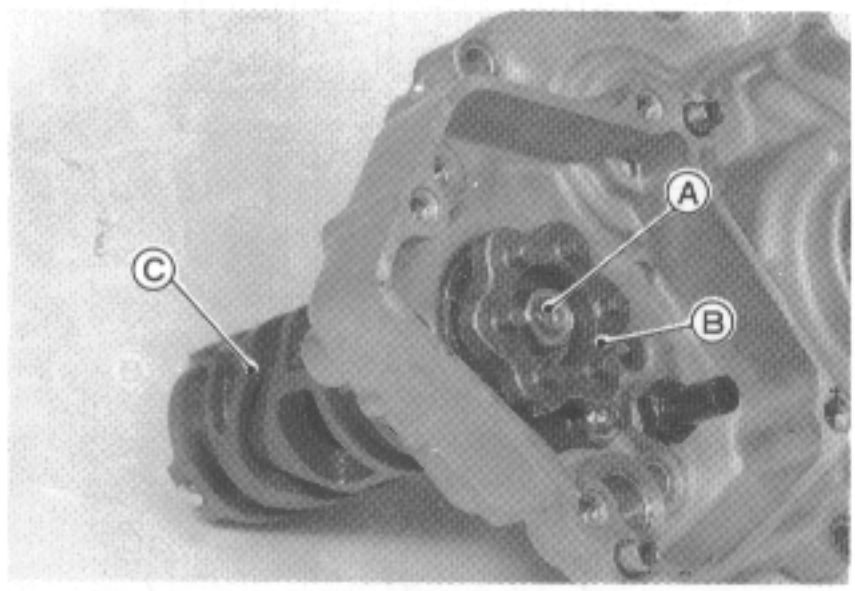
A. Circlip
B. Mounting Screw
C. Retainer
D. Idle Gear
E. Washers



A. Mounting Bolts and Screw
B. Transmission Case



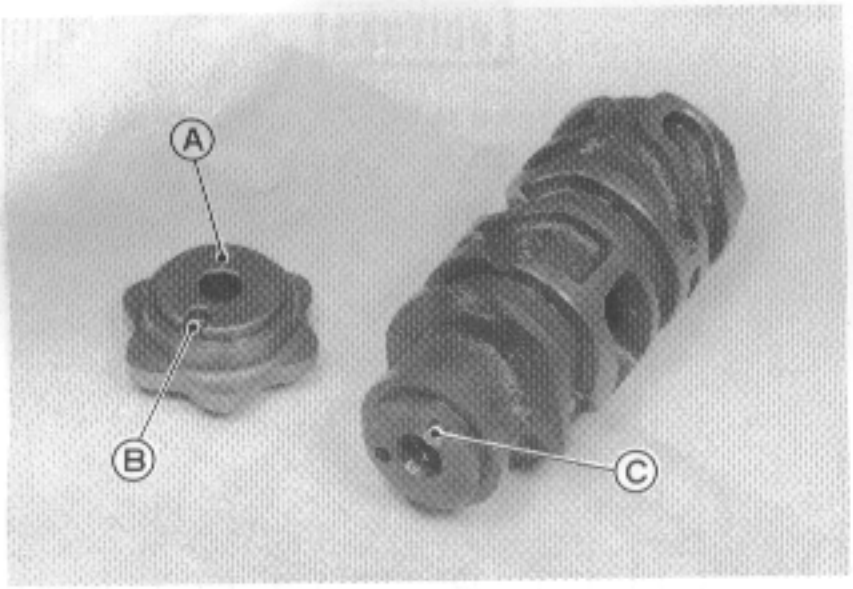
A. Shift Forks
B. Output Shaft
C. Drive Shaft



A. Mounting Bolt
B. Pin Plate
C. Shift Drum

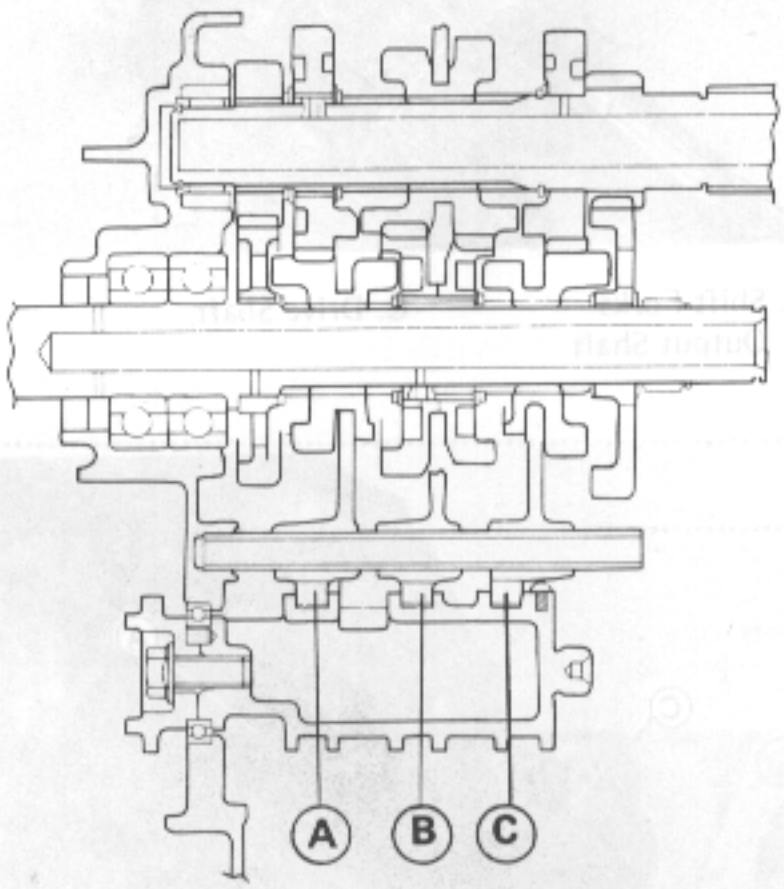
Transmission Shaft, Shift Fork, Shift Drum Installation Notes

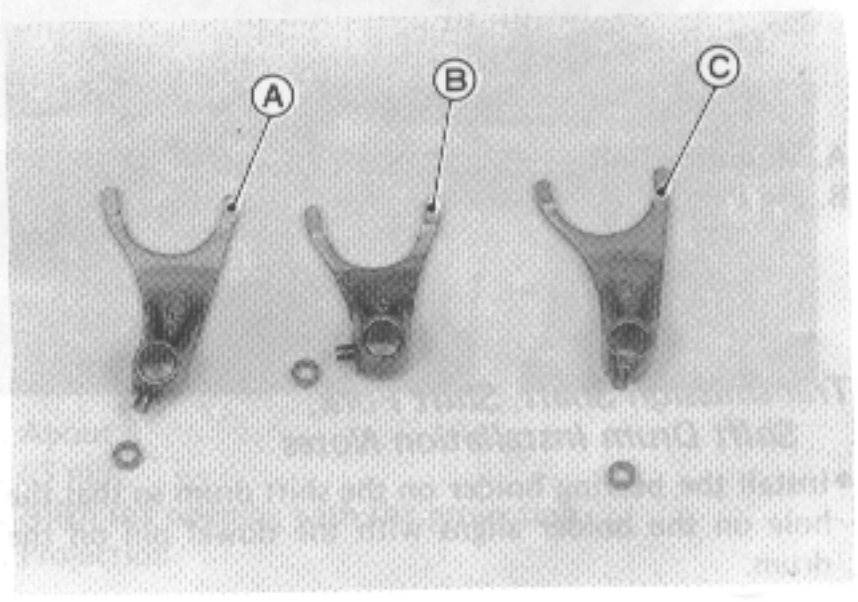
● Install the bearing holder on the shift drum so that the hole on the holder aligns with the dowel pin on the drum.



A. Bearing Holder
B. Hole
C. Dowel Pin

- Apply non-permanent locking agent to the threads of pin plate mounting bolt, and tighten it to the specified torque (see General Information chapter).
- Apply grease to the lips of the oil seals on the transmission case.
- Install the transmission shaft, shift forks, shift drum as shown.





- Apply silicone sealant (Kawasaki Bond: 56019-120) to the mating surface of the lower crankcase half.
- Tighten the shift drum positioning bolt to the specified torque (see General Information chapter).
- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
- Visually inspect the rear axle nut clip, and replace it if necessary.
- Tighten the following to the specified torque (see General Information chapter).
  Engine Sprocket Mounting Bolts
  Rear Axle Nut
  Side Stand Bracket Mounting Bolts
- Check and adjust the following items (see Final Drive chapter).
  Drive Chain Slack
  Wheel Alignment

WARNING

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

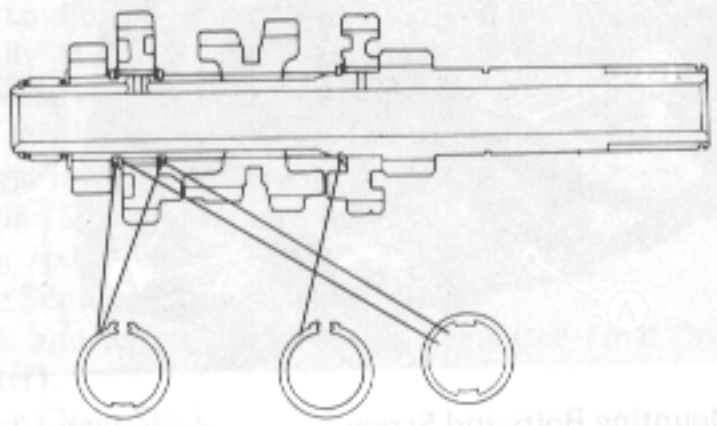
Transmission Disassembly

- Remove the transmission shaft.
- Using the circlip pliers (special tool: 57001-144) to remove the circlips, disassemble the transmission shafts.

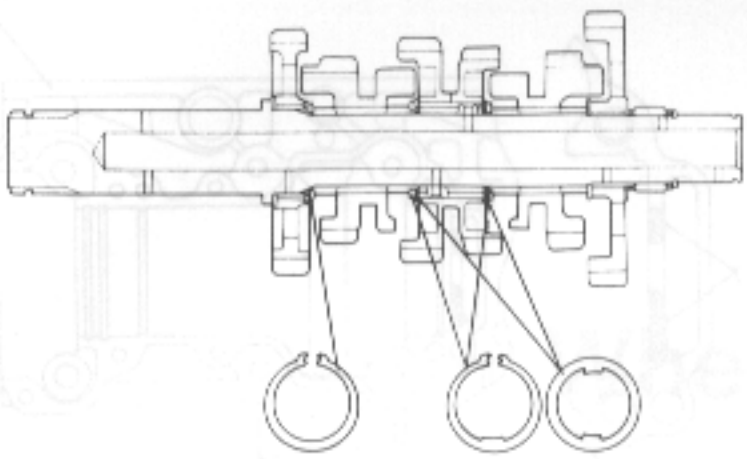
Transmission Assembly Notes

- Replace any circlip that were removed.
- Assemble the transmission shaft as shown.

Drive Shaft



Output Shaft

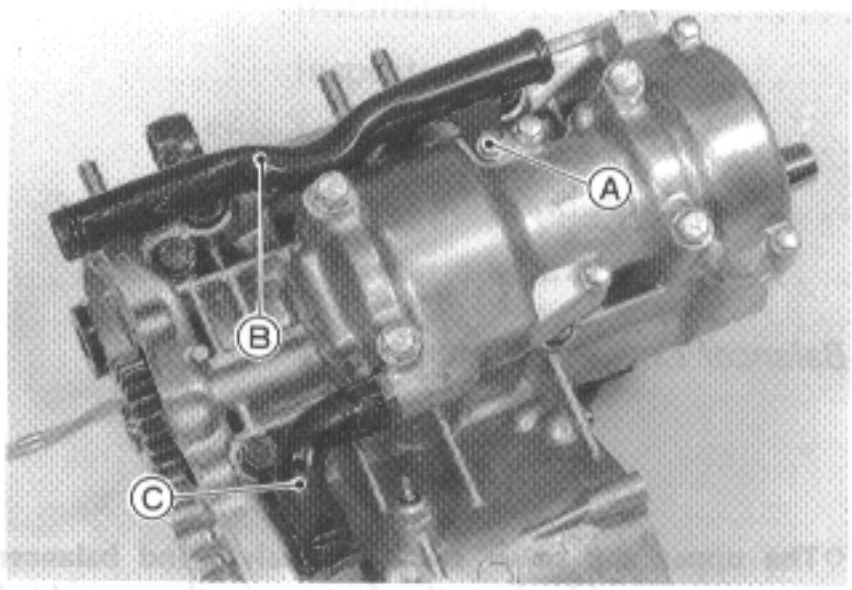


Balancer

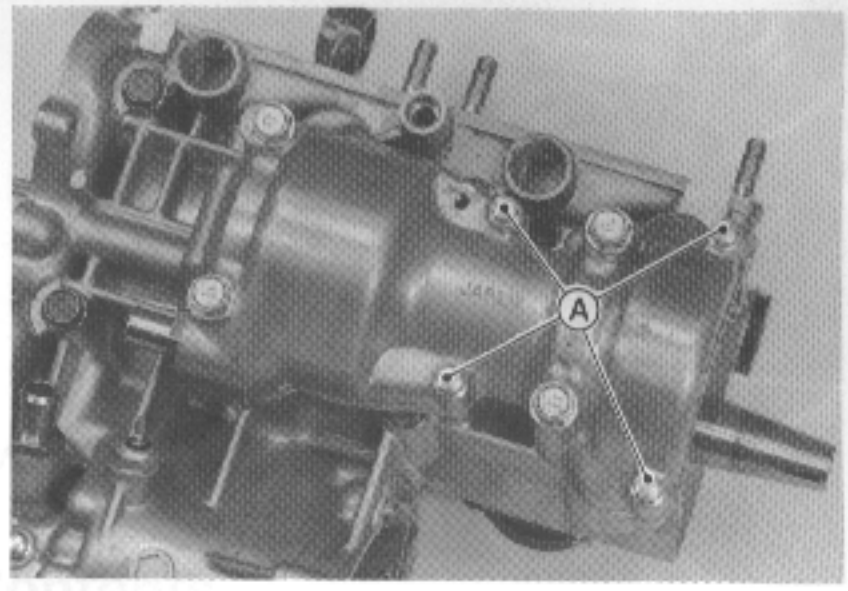
Balancer Shaft Removal

- Remove the engine (see Engine Removal/Installation chapter).
- Remove the following.

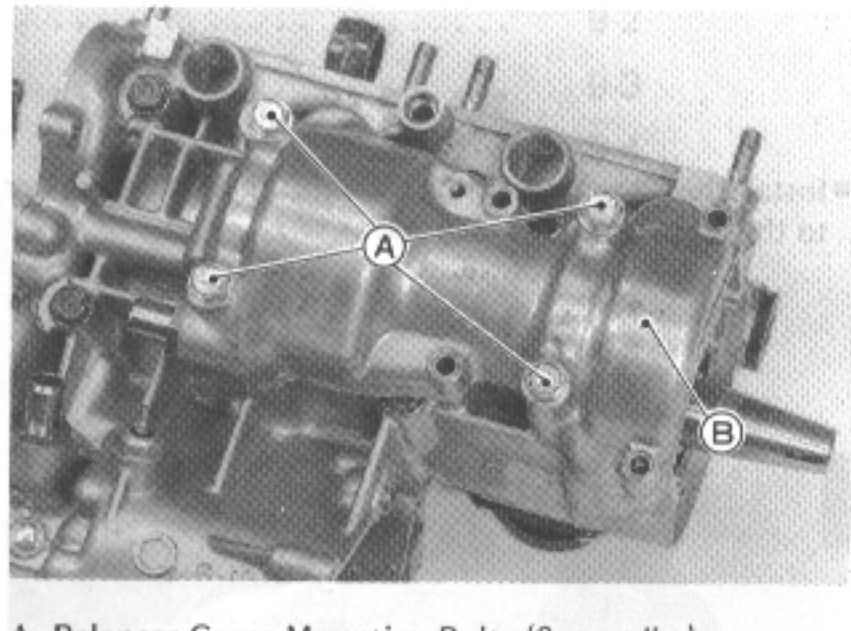
Right Engine Cover (see Engine Right Side chapter)



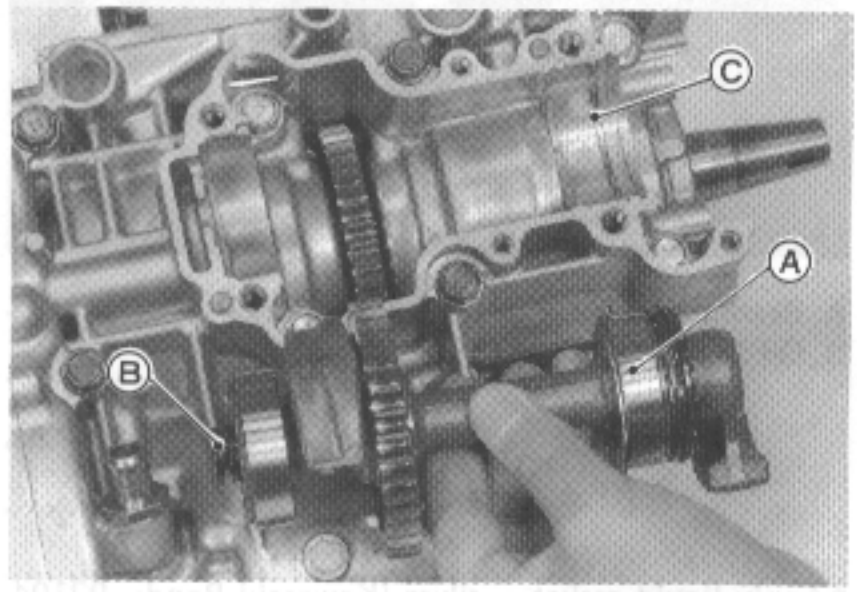
A. Mounting Bolt
B. Water Pipe
C. Transmission Oil Hose



A. Balancer Cover Mounting Bolts (6 mm dia.)



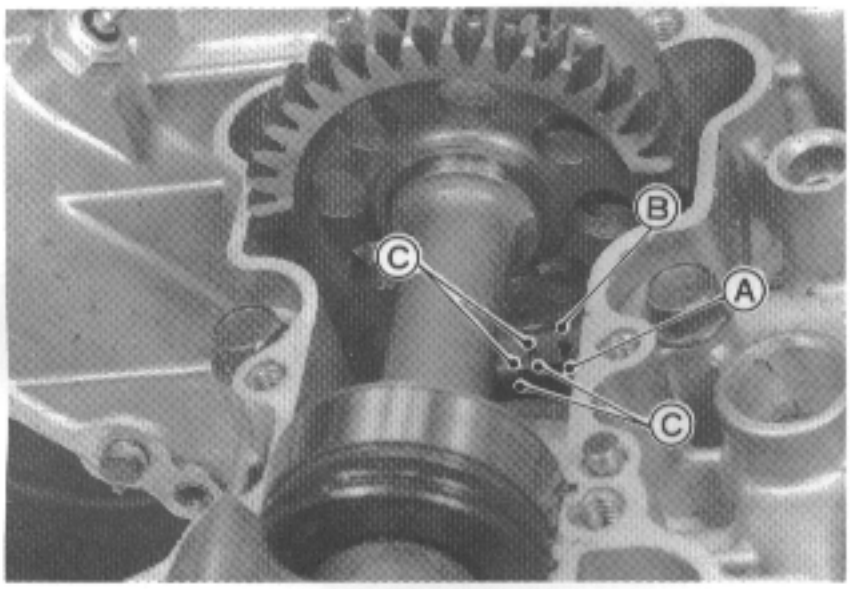
A. Balancer Cover Mounting Bolts (8 mm dia.)
B. Balancer Cover



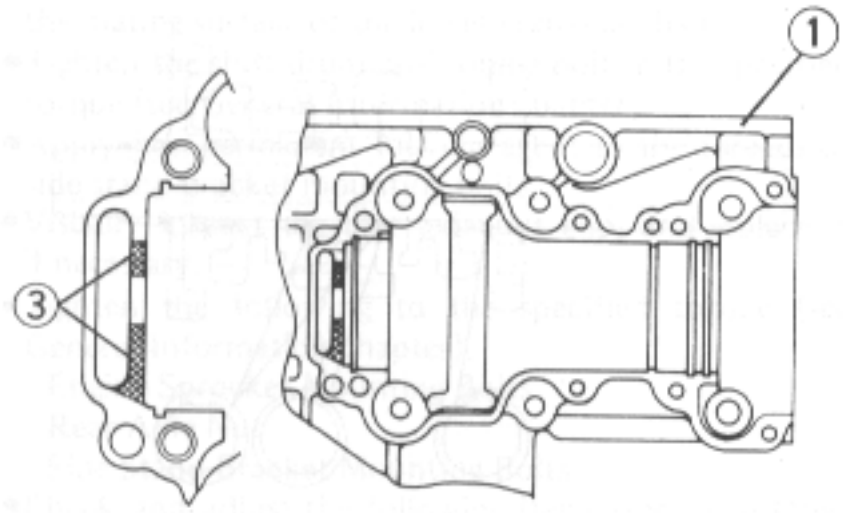
A. Balancer Shaft
B. Plug
C. Set Ring

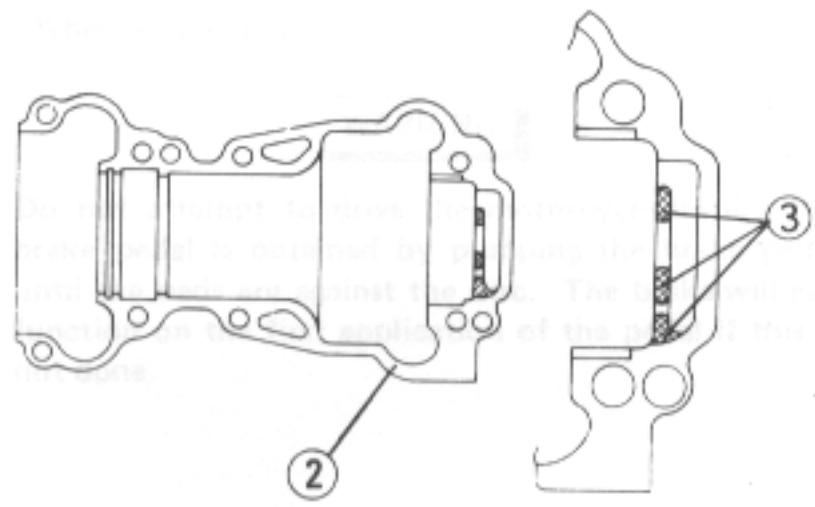
Balancer Shaft Installation

- Align the punch marks on the balancer gear and crankshaft gear.

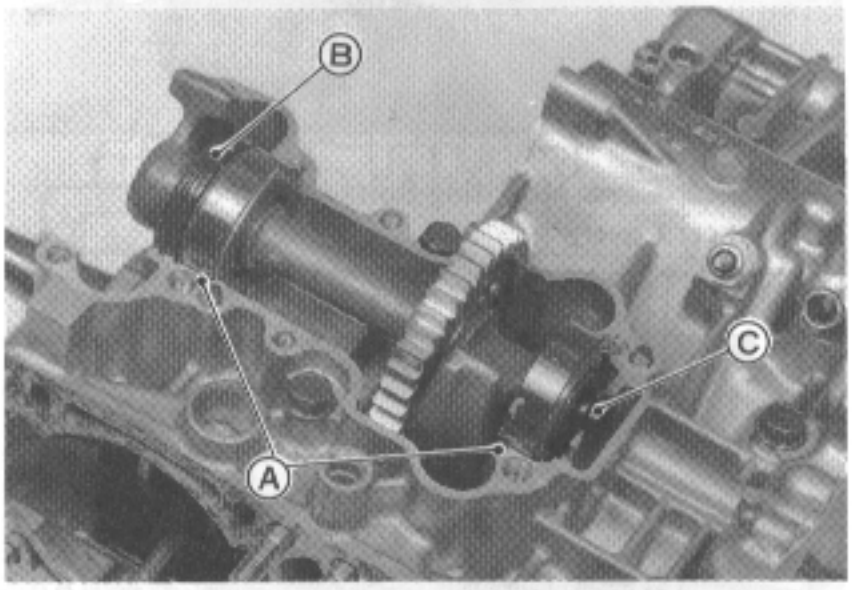


A. Crankshaft Gear
B. Balancer Gear
C. Punch Mark





- Install the oil seal and plug, then fit the bearing stopper to the groove on the crankcase.



A. Bearing Stopper
B. Oil Seal
C. Plug

- Apply liquid gasket – silver (Kawasaki Bond: 92104-002) to the mating surface of the balancer cover.

CAUTION

○Do not apply liquid gasket – silver (Kawasaki Bond: 92104-002) to the areas indicated below.

1. Crankcase
2. Balancer Cover
3. Do not apply here.

- Tighten the balancer cover mounting bolts to the specified torque (see General Information chapter).

Balancer Cover Replacement

CAUTION

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

Wheels/Tires

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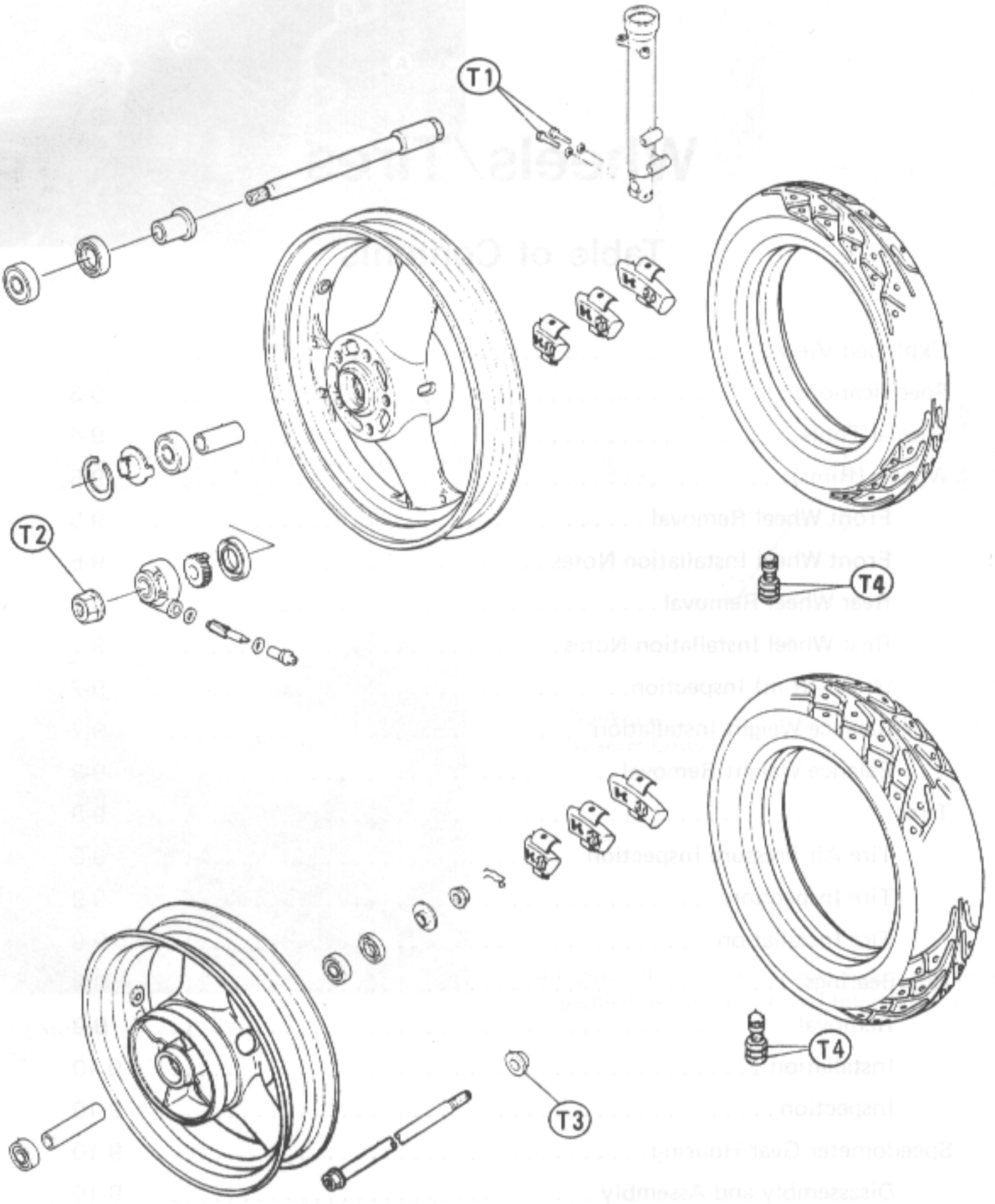
Exploded View



T1 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T2 : 88 N-m (9.0 kg-m, 65 ft-lb)
T3 : 88 N-m (9.0 kg-m, 65 ft-lb)
T4 : 1.5 N-m (0.15 kg-m, 13 in-lb)

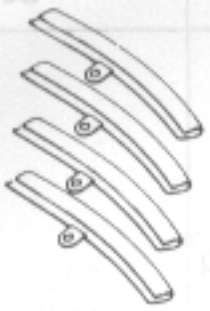
Specifications

Item		Standard	Service Limit
Wheels:			
Front tire	Make & type	Bridgestone CYROX-05 Tubeless,	
		Dunlop K510F Tubeless	
	Tire size	*100/70 R17 48H **100/70 R17 49H	
	Air pressure	Up to 97.5 kg (215 lb) load	
		200 kPa (2.00 kg/cm², 28 psi)	
		97.5 – 184 kg (215 – 406 lb) load	
		225 kPa (2.25 kg/cm², 32 psi)	
	Tread depth	(Bridgestone) 3.4 mm	1 mm
		(Dunlop) 3.9 mm	1 mm
Rear tire	Make & type	Bridgestone CYROX-12 Tubeless,	
		Dunlop K510 Tubeless	
	Tire size	130/60 R18 60H	
	Air pressure	Up to 97.5 kg (215 lb) load	
		225 kPa (2.25 kg/cm², 32 psi)	
		97.5 – 184 kg (215 – 406 lb) load	
		250 kPa (2.50 kg/cm², 36 psi)	
	Tread depth	(Bridgestone) 5.8 mm	2 mm: Up to 110 km/h (70 mph)
			3 mm: Over 110 km/h (70 mph)
		(Dunlop) 6.4 mm	2 mm: Up to 110 km/h (70 mph)
			3 mm: Over 110 km/h (70 mph)
Rim runout	Axial	— — —	0.5 mm
	Radial	— — —	0.8 mm
Axle runout/100 mm		0.1 mm	0.2 mm
			0.7 mm (Replace limit)

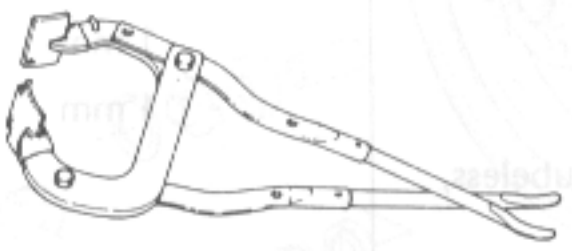
* : 88 Model
** : 89 Model

Special Tools

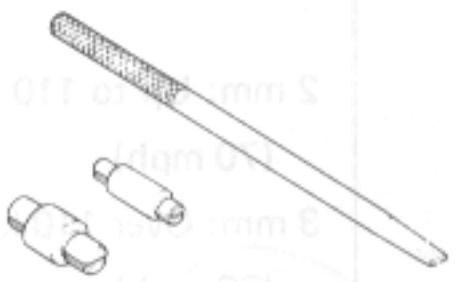
Rim Protector: 57001-1063



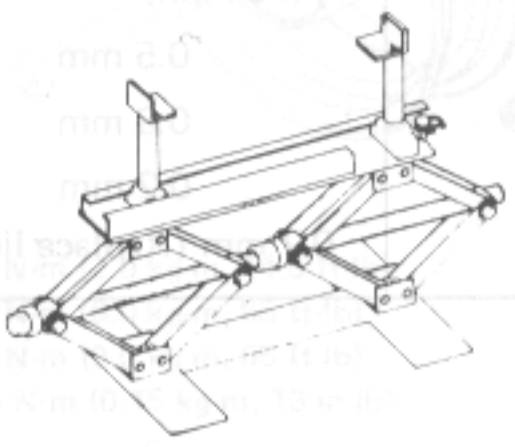
Beed Breaker: 57001-1072



Bearing Remover Set: 57001-1264



Jack Stand: 57001-1238



Circlip Pliers: 57001-143

Tire Iron: 57001-1073

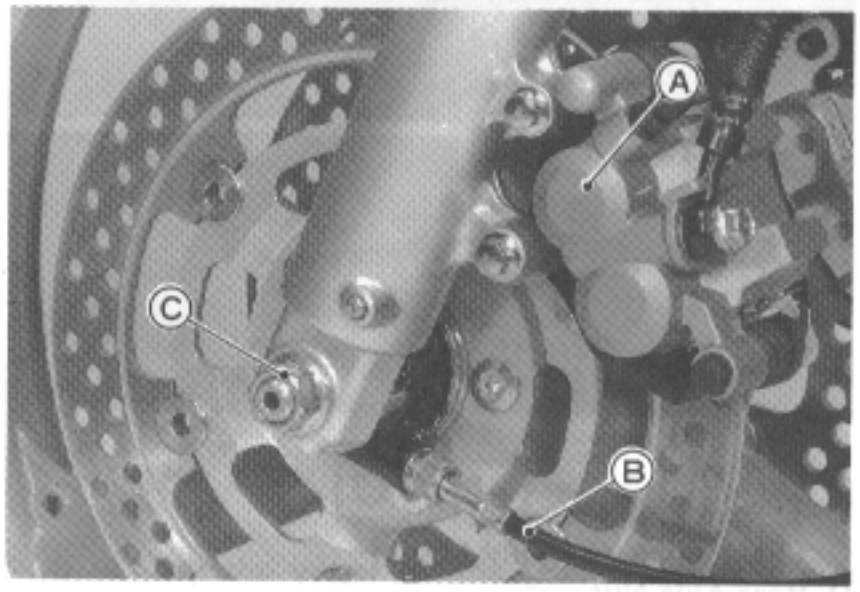
NOTE

- *The tire irons (P/N 57001-1073) are included in the bead breaker (P/N 57001-1072).*

Wheels (Rims)

Front Wheel Removal

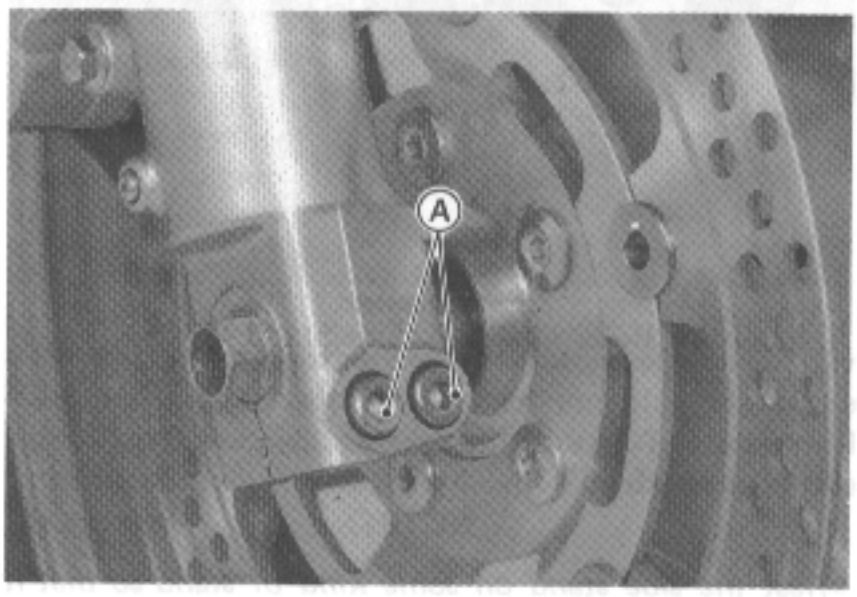
- Remove the following.
  Lower Fairing
  Muffler (see Engine Top End chapter)
  RH or LH Brake Caliper Mounting Bolts



A. Caliper
B. Speedometer Cable Lower End
C. Axle Nut

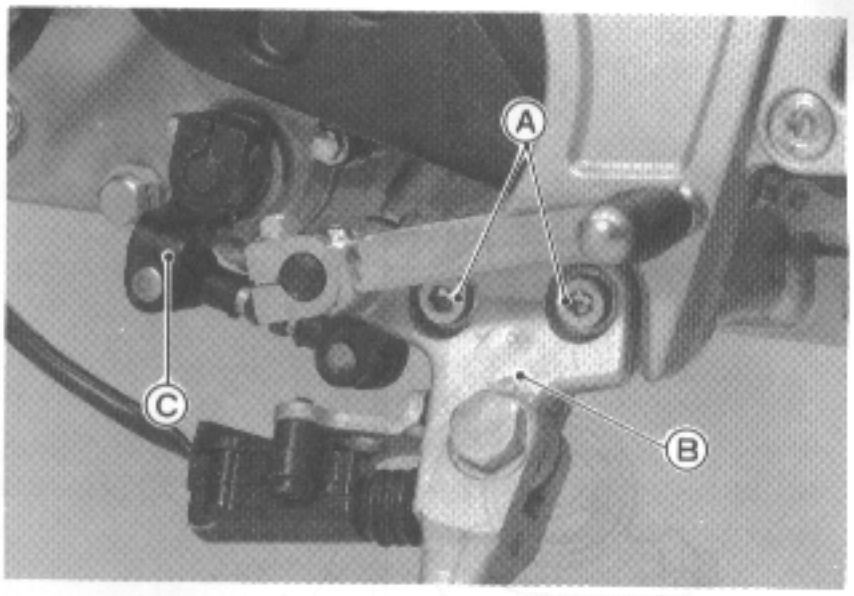
NOTE

○*Rest the caliper and the side stand on some kind of stand so that they do not dangle.*



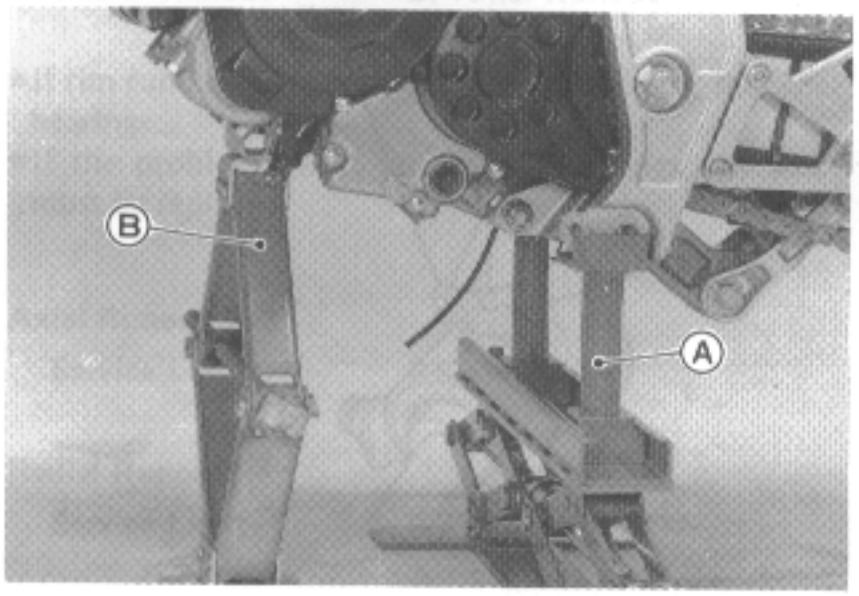
A. Axle Clamp Bolts (Loosen)

Shift Pedal (see Crankshaft/Transmission chapter)



A. Side Stand Bracket Mounting Bolts
B. Side Stand
C. Shift Pedal

- Using the jack stand (special tool), support the vehicle and lift the front of the vehicle by a suitable jack.



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

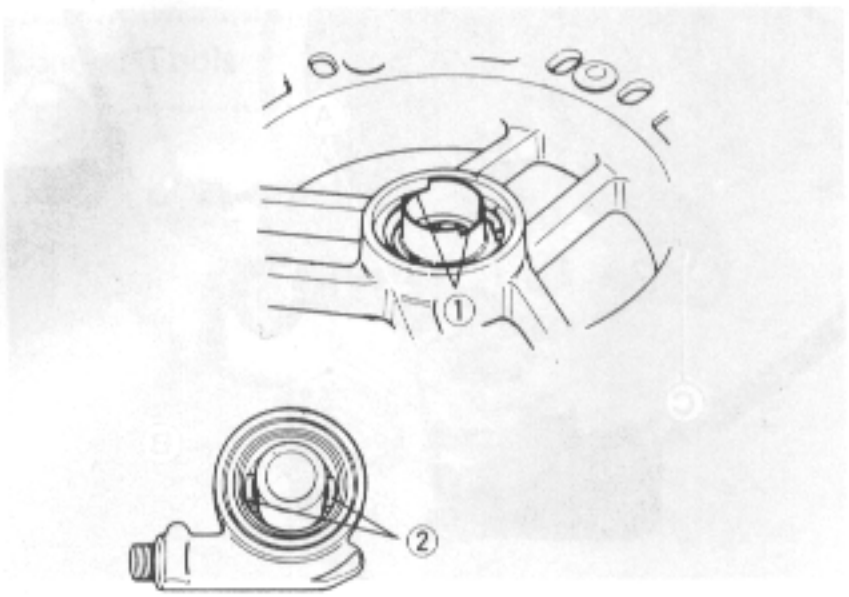
- Pull the axle shaft out and remove the front wheel.

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 discs do not touch the ground.**

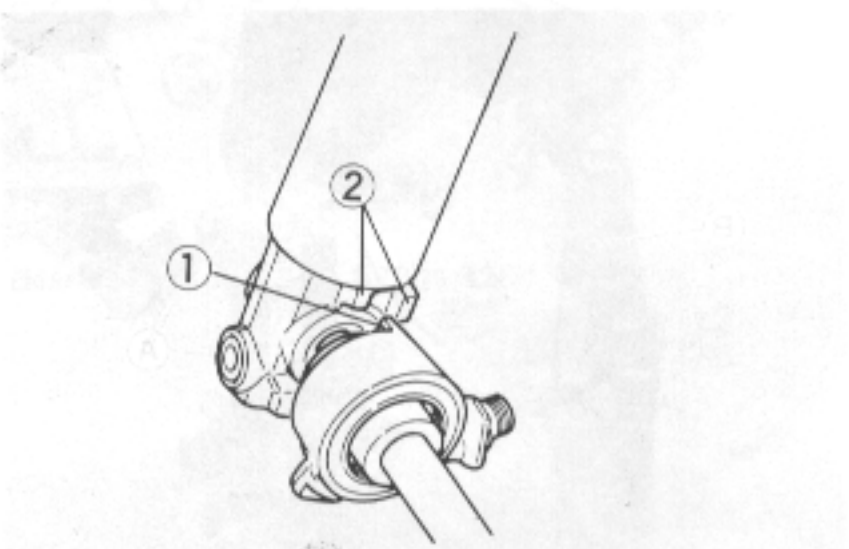
Front Wheel Installation Notes

- Put the speedometer gear drive onto the wheel hub notches, then install the housing so that it fits the drive notches.



1. Notches 2. Projections

●Fit the speedometer gear housing stop to the fork leg stop, and check that the collar is on the right hand side of the hub.



1. Housing Stop 2. Fork Leg Stop

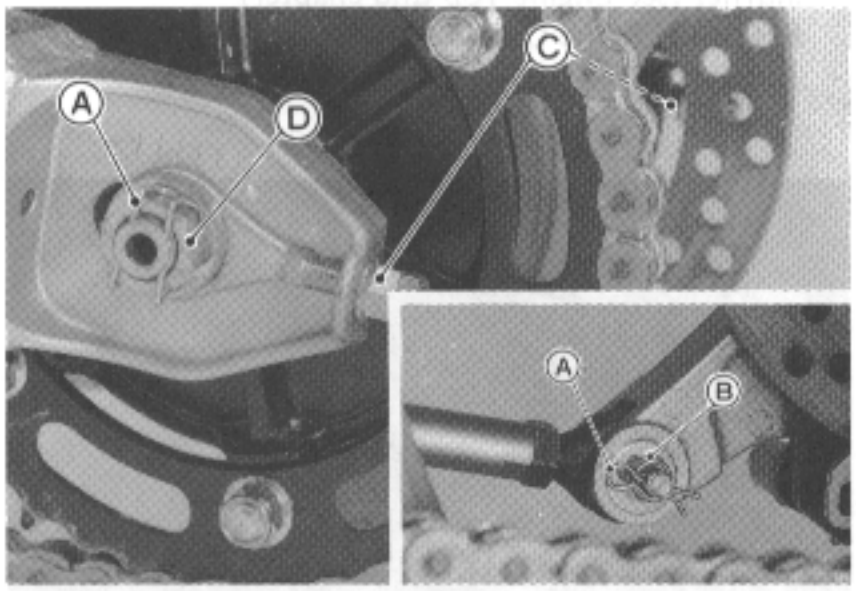
●Apply non-permanent locking agent to the threads of side stand bracket mounting bolts (see General Information chapter).
●Tighten the following parts to the specified torque (see General Information chapter).
Axle Nut
Axle Clamp Bolts
Brake Caliper Mounting Bolts
Side Stand Bracket Mounting Bolts
●Check the front brake.

WARNING

○**Do not attempt to drive the motorcycle until fully depressing the brake lever then pump 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.**

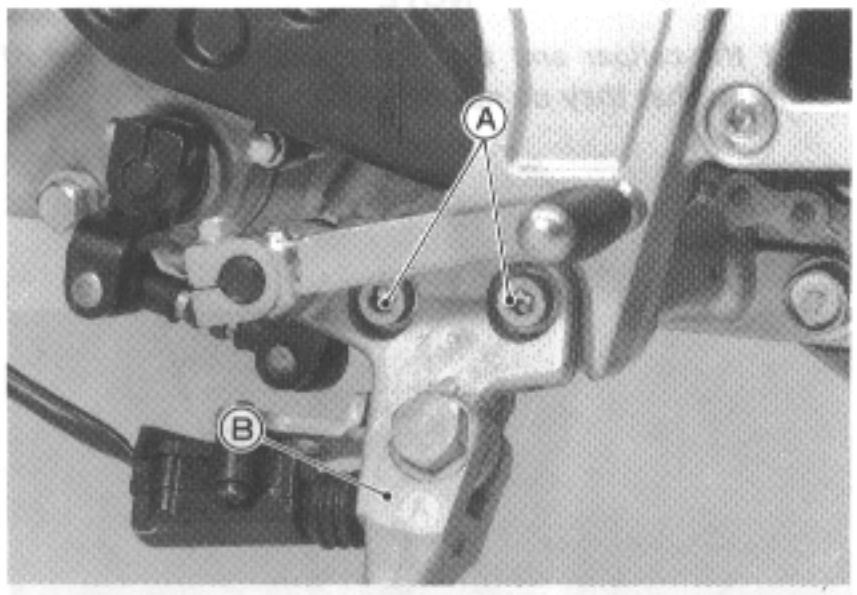
Rear Wheel Removal

●Remove the following.
Lower Fairing
Muffler (see Engine Top End chapter)



A. Clip
B. Torque Link Rear End Nut
C. Chain Adjuster (Fully Loose)
D. Rear Axle Nut

Shift Pedal (see Crankshaft/Transmission chapter)

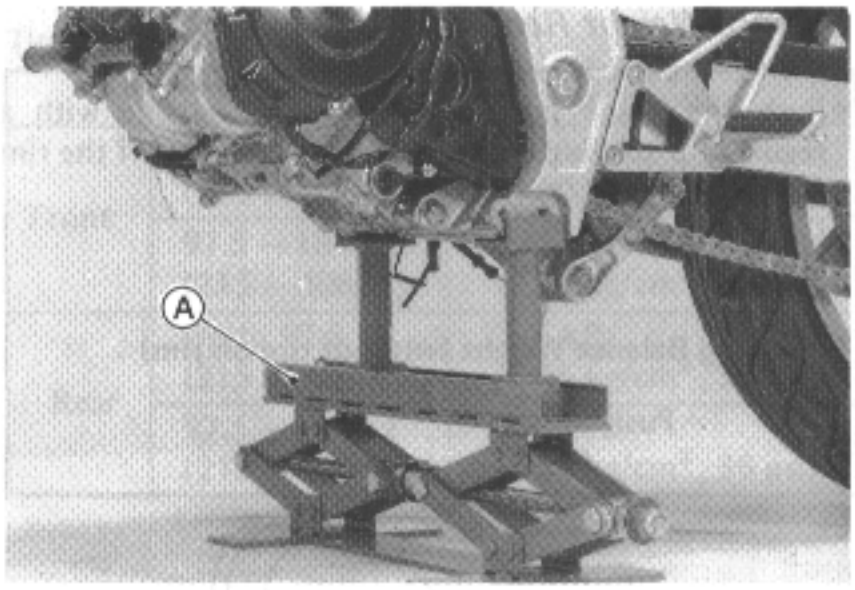


A. Mounting Bolts B. Side Stand

NOTE

○*Rest the side stand on some kind of stand so that it doesn't dangle.*

●Using the jack stand (special tool), lift the rear of vehicle.



A. Jack Stand: 57001-1238

- Fully loosen the drive chain and pull off the rear axle.
- Pull the drive chain toward the left and remove the rear wheel.
- Remove the coupling.

CAUTION

○**Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc.**

Rear Wheel Installation Notes

- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.

★Visually inspect the clips on the torque link nut and rear axle nut, and replace them if necessary.

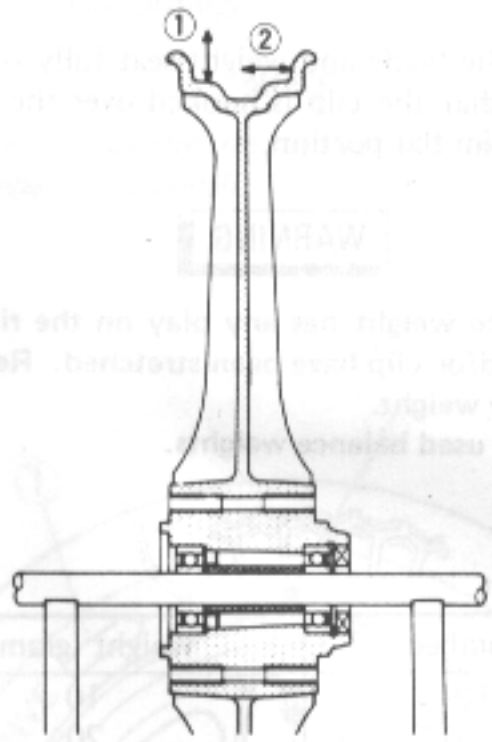
- Tighten the following parts to the specified torque (see General Information chapter).
  - Side Stand Bracket Mounting Bolts
  - Torque Link Rear End Nut
  - Rear Axle Nut
- Check the following items (see Final Drive chapter).
  - Driven Chain Slack
  - Wheel Alignment
  - Brake Function

WARNING

○**Do not attempt to drive the motorcycle until fully depressing the brake pedal then pumping the brake pedal until the pads are against the disc. The brake will not function on the first application of the pedal if this is not done.**

Wheel (Rim) Inspection

- Remove the tire from the wheel.
- Measure the rim runout by using a dial gauge.



1. Radial Runout 2. Axial Runout

★If rim runout exceeds the service limit, check the wheel bearings.

★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 blade-and-clip plate.

★If it does, discard it.

- Lubricate the balance weight blade, tire bead, and rim flange with a soap and water solution or rubber lubrication. This helps the balance weight slip onto the rim flange.

CAUTION

○**Do not lubricate the tire bead with engine oil or gasoline because they will deteriorate the tire.**

- Install the balance weight on the rim.
  - Slip the weight to 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

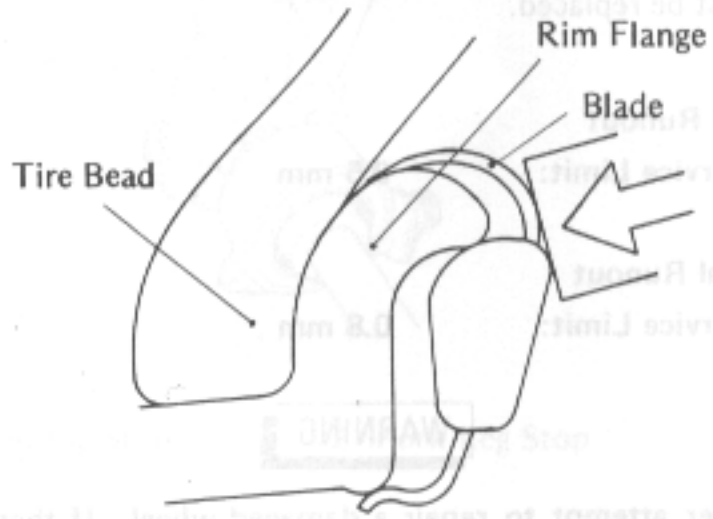
- **If the balance weight has any play on the rim flange, the blade and/or clip have been stretched. Replace the loose balance weight.**
- **Do not reuse used balance weights.**

Balance Weight

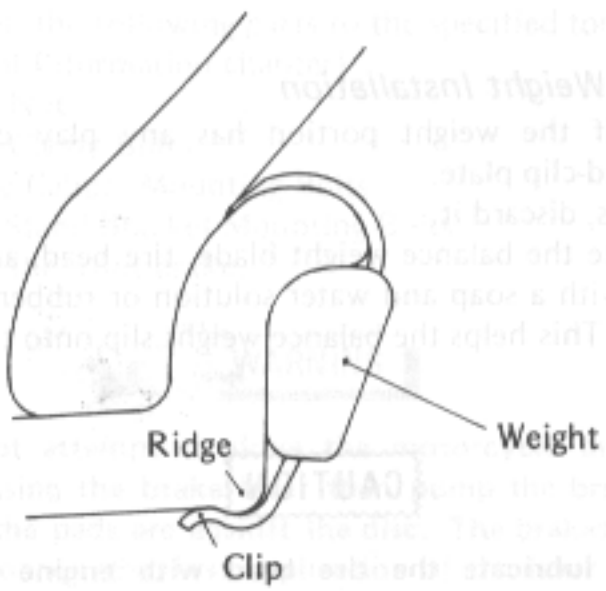
Part Number	Weight (grams)
41075-1014	10
41075-1015	20
41075-1016	30

Installing Balancer Weight

(a)Press or lightly hammer the weight in.



(b)Installation completed.

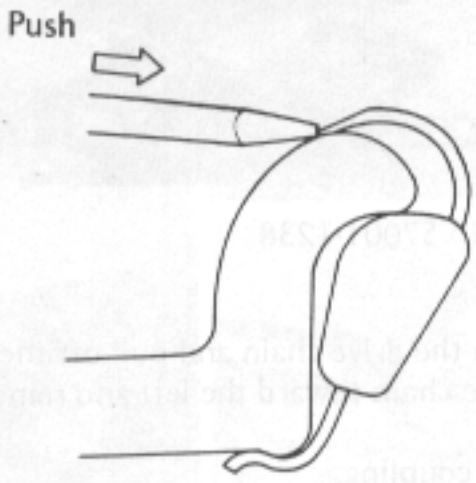


Balance Weight Removal

(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.

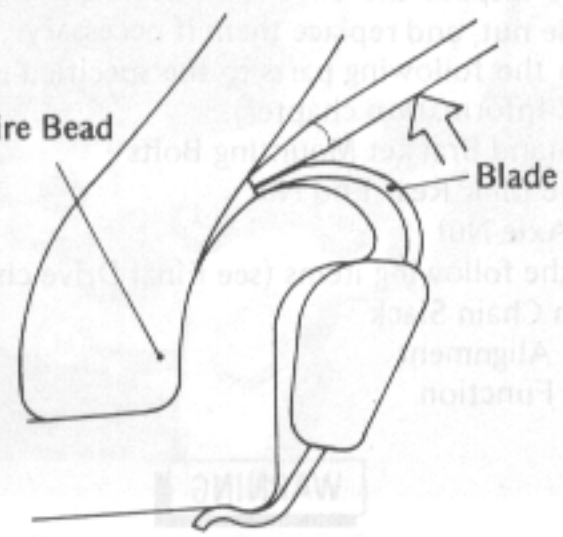
Removing Balance Weight (without tire on rim)



(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

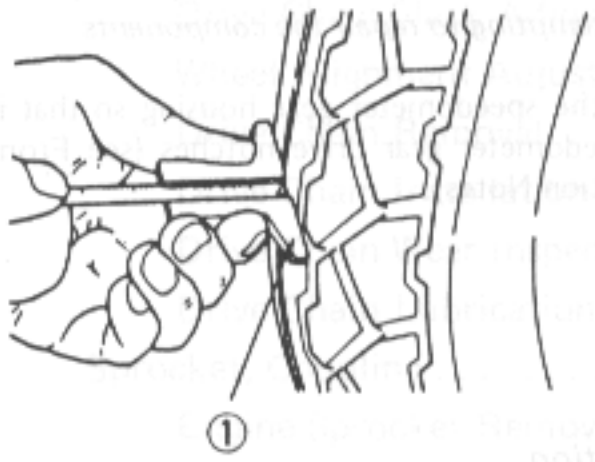
- *Measure tire pressure when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).*

Tire Air Pressure (when cold)

	Load	Air Pressure
Front	Up to 97.5 kg (215 lb)	200 kPa (2.00 kg/cm², 28 psi)
	97.5 – 184 kg (215 – 406 lb)	225 kPa (2.25 kg/cm², 32 psi)
Rear	Up to 97.5 kg (215 lb)	225 kPa (2.25 kg/cm², 32 psi)
	97.5 – 184 kg (215 – 406 lb)	250 kPa (2.50 kg/cm², 36 psi)

Tire Inspection

- Visually inspect the tire for cracks and cuts. Reduce the tire if badly damaged.
- 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:

(Bridgestone) 3.4 mm

(Dunlop) 3.9 mm

Service Limit: 1 mm

Rear

Standard:

(Bridgestone) 5.8 mm

(Dunlop) 6.4 mm

Service Limit: 2 mm Up to 110 km/h (70 mph)

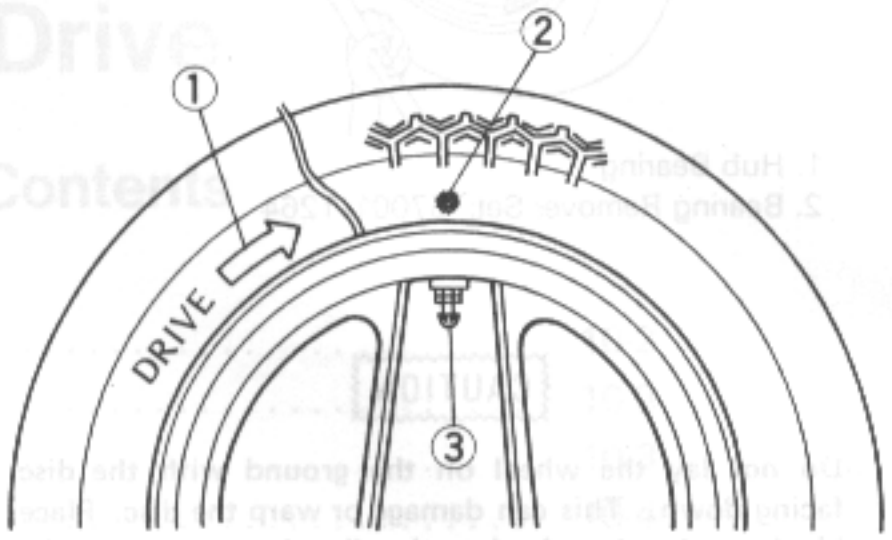
3 mm Over 110 km/h (70 mph)

Tire Installation

- Check the tire rotation mark on the rear tire and install it on the rim accordingly.

NOTE

○*The direction of the tire rotation is shown by an arrow on the rear tire sidewall.*



1. Rotation Mark (Arrow)
2. Balance Mark (Yellow Paint)
3. Air Valve

- Position the tire on the rim so that the air valve is at the tire balance mark (the yellow paint mark on a new tire).

WARNING

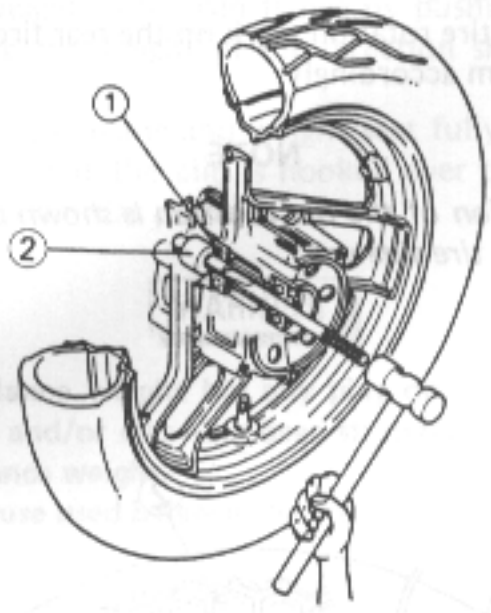
○**To ensure safe handling and stability, use only the recommended standard tires for replacement, inflated to the standard pressure.**

Hub Bearings

Removal

- Using the bearing remover set (special tool), remove the hub bearings.

○Remove the bearing retainer.



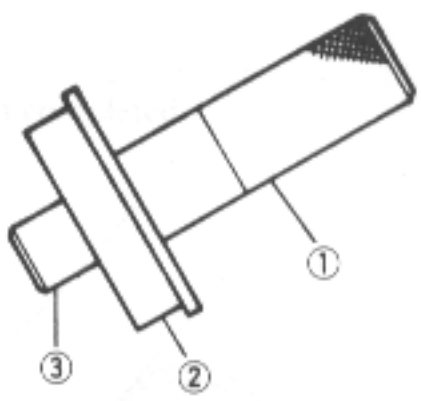
1. Hub Bearing
2. Bearing Remover Set: 57001-1264

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 the disc does not touch the ground.**

Installation

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



1. Bearing Driver Holder
2. Driver (Large)
3. Driver (Small)

NOTE

○*Install the bearings so that the marked or shielded sides face out.*

Inspection

●Turn each bearing back and forth while checking for roughness or binding.
★If roughness or binding is found, replace the bearing.
★If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.
●Examine the bearing seal for tears or leakage.
★If the seal is torn is leaking, replace the bearing.

Speedometer Gear Housing

Disassembly and Assembly

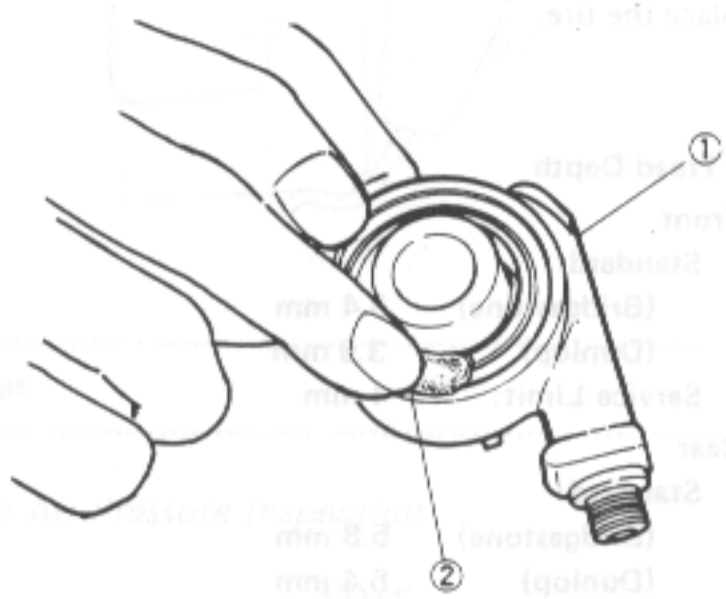
NOTE

○*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 Notes).

Lubrication

●Clean and grease the speedometer gear housing.



1. Speedometer Gear Housing
2. Grease.

Final Drive

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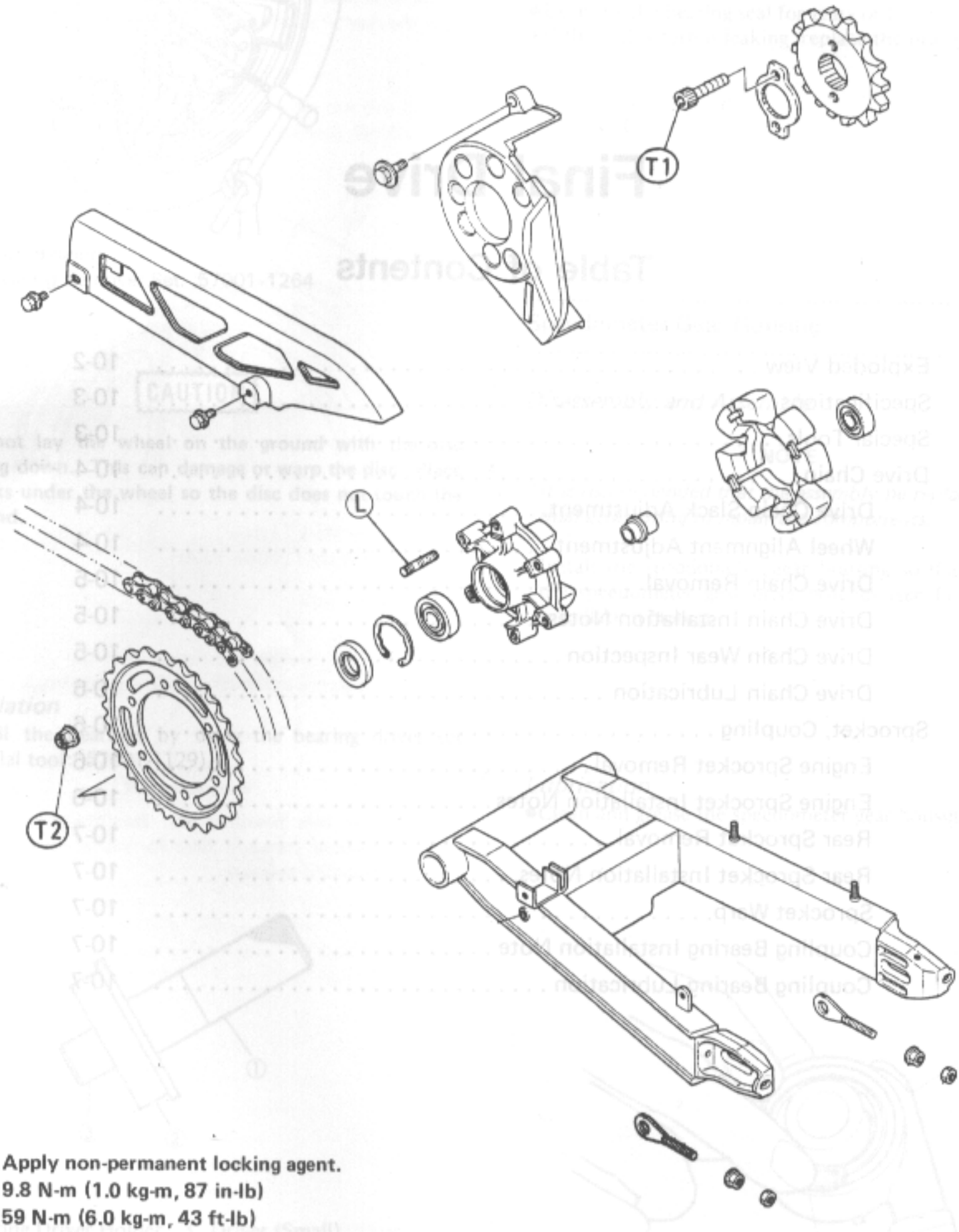
Exploded View



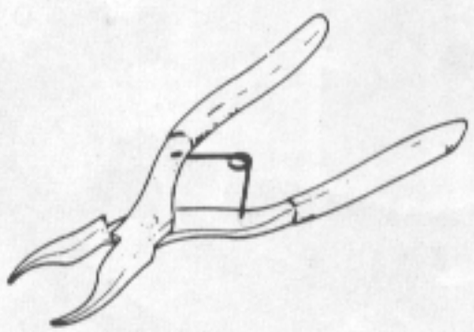
L : Apply non-permanent locking agent.
T1 : 9.8 N-m (1.0 kg-m, 87 in-lb)
T2 : 59 N-m (6.0 kg-m, 43 ft-lb)

Specifications

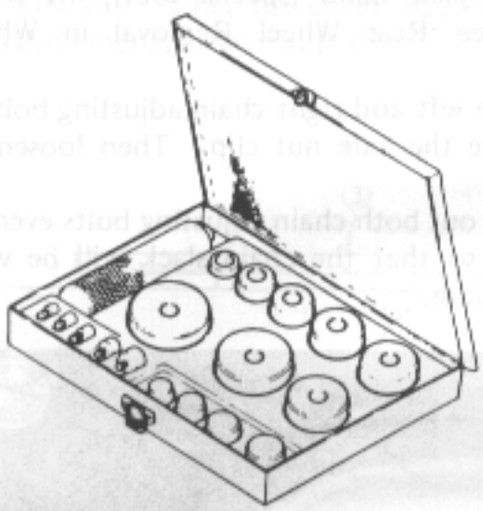
Item	Standard	Service Limit
Drive Chain:		
Make and type	Daido, D.I.D. 520V-2, Endless, 106 Link	
Chain slack:	30 – 40 mm	30 – 45 mm
20-link length	317.5 – 318.4 mm	323 mm

Special Tools

Circlip Pliers: 57001-143



Bearing Driver Set: 57001-1129



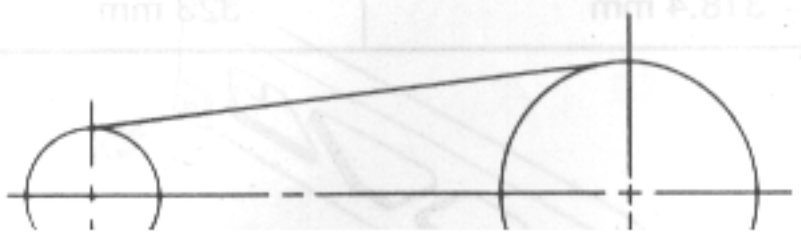
Drive Chain

Drive Chain Slack Adjustment

- Set the vehicle up on its side stand.
- Check the chain slack within the standard value. Be sure that the wheel alignment is properly adjusted.

NOTE

○*The notch on the left side adjuster should align with the same swing arm mark that the right side adjuster notch aligns with.*



10-4 FINAL DRIVE

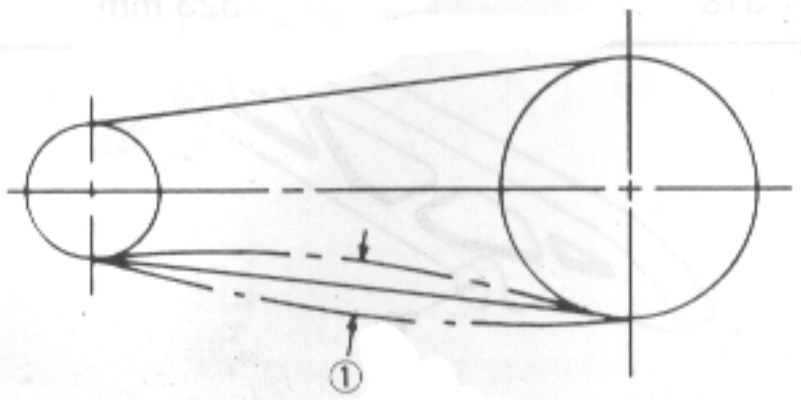
Drive Chain

Drive Chain Slack Adjustment

- Set the vehicle up on its side stand.
- Check the chain slack within the standard value. Be sure that the wheel alignment is properly adjusted.

NOTE

○*The notch on the left side adjuster should align with the same swing arm mark that the right side adjuster notch aligns with.*



1. Chain Slack

Drive Chain Slack

Standard:	**30 – 40 mm**
Too Tighten:	**Less than 30 mm**
Too Loose:	**More than 45 mm**

- If the chain slack is not within the standard value, perform the following.
- Using the jack stand (special tool), lift the rear of vehicle (see Rear Wheel Removal in Wheels/Tires chapter).
- Loosen the left and right chain adjusting bolt locknuts and remove the axle nut clip. Then loosen the axle nut.
- Tighten the axle nut to the specified torque (see General Information chapter).
- Replace the axle nut clip if necessary.
- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts and tighten them to the specified torque (see General Information chapter).

NOTE

○*The notch on the left side adjuster should align with the same swing arm mark that the right side adjuster notch aligns with.*

WARNING

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

- Tighten the axle nut to the specified torque (see General Information chapter).
- Replace the axle nut clip if necessary.
- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts and tighten them to the specified torque (see General Information chapter).

NOTE

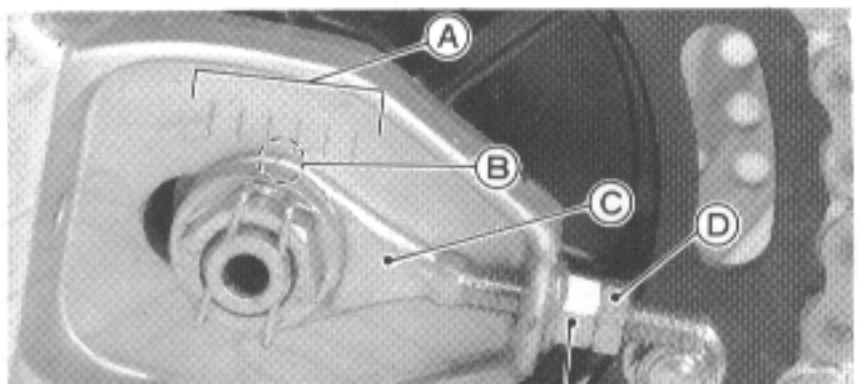
○*The notch on the left side adjuster should align with the same swing arm mark that the right side adjuster notch aligns with.*

WARNING

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

Wheel Alignment Adjustment

- Set the vehicle up on its side stand.
- Check to see if the left and right notches on the chain adjuster point to the same marks or positions on the swing arm.



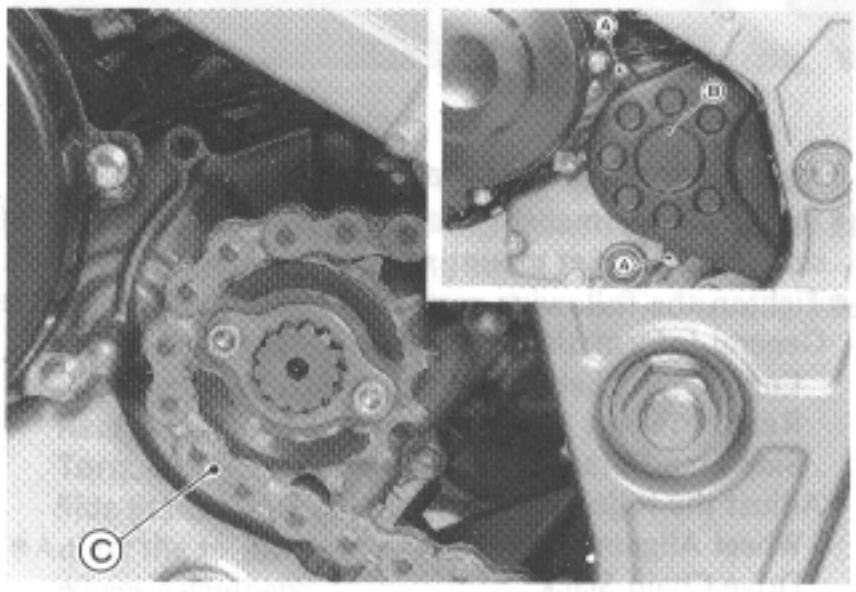
- Turn in or out both chain adjusting nuts so that the notches on the adjusters point to the same marks or positions on the swing arm on both sides.
- Check the drive chain slack.
- Tighten the axle nut to the specified torque (see General Information chapter).
- Replace the axle nut clip if necessary.
- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts and tighten them to the specified torque (see General Information chapter).

WARNING

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

Drive Chain Removal

- Remove the following.
  - Lower Fairing
  - Mufflers (see Engine Top End chapter)
  - Side Stand
  - Rear Wheel (see Wheels/Tires chapter)
  - Chain Case
  - Swing Arm (see Suspension chapter)



A. Mounting Bolts
B. Engine Sprocket Cover
C. Chain

CAUTION

○Take care not to damage the brake hose. Damage to the brake line greatly reduces the brake line strength and brake fluid leakage, resulting in the loss of brake control.

Drive Chain Installation Notes

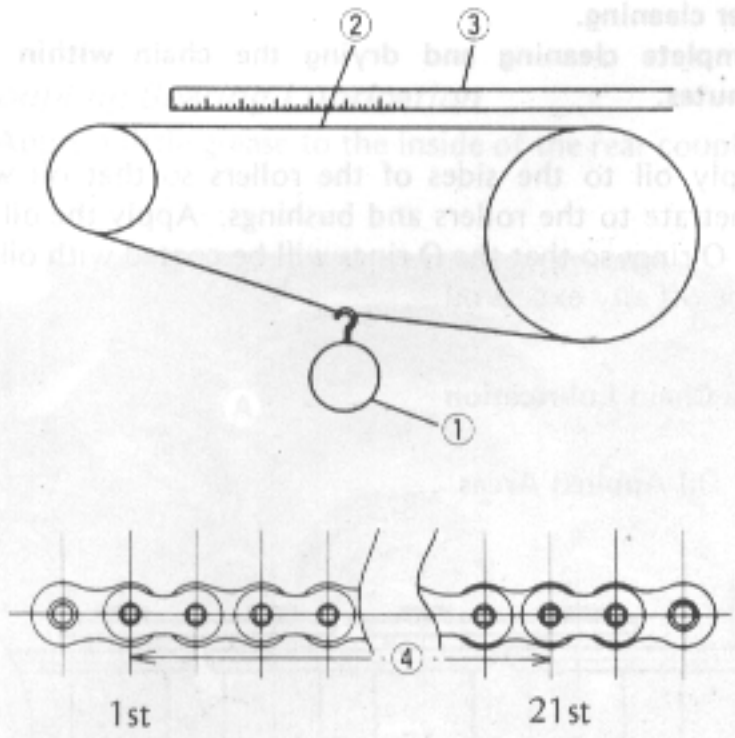
- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
- Tighten the following parts to the specified torque (see General Information chapter).
  - Swing Arm Pivot Shaft Bolt
  - Rear Shock Absorber Lower End Bolts
  - Tie-Rod Lower End Bolts
  - Rear Axle Nut
  - Torque Link Nuts
  - Side Stand Bracket Mounting Bolts
- Adjust the following.
  - Wheel Alignment
  - Drive Chain Slack
- Replace the clips on the axle nut and torque link nut if necessary.
- Check the brake function.

WARNING

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

Drive Chain Wear Inspection

- Stretch the chain taut hanging a 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 measurements at several places.



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

Drive Chain 20-link Length

Standard:	**317.5 – 318.4 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.**

Drive Chain Lubrication

The chain should be lubricated with a lubricant which will both prevent the exterior from rusting and also absorb shock and reduce friction in the interior of the chain. An effective, good quality lubricant specially formulated for chains is best for regular chain lubrication.

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

- If the chain appears especially dirty, it should be cleaned before lubricant.

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 or trichloroethylene will cause deterioration and swelling of the O-rings.**

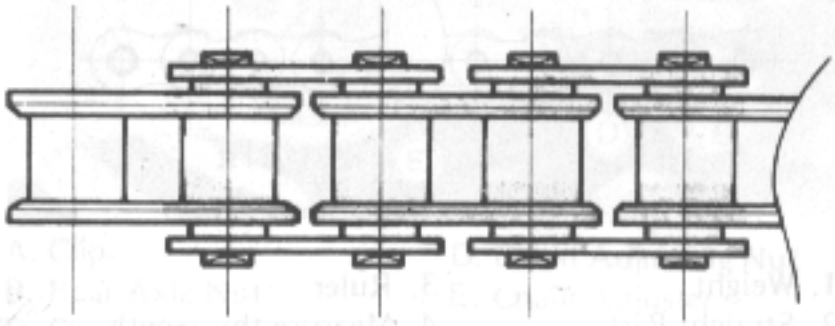
○**Immediately blow the chain dry with compressed air after cleaning.**

○**Complete cleaning and drying the chain within 10 minutes.**

- Apply oil to the sides of the rollers so that oil will penetrate to the rollers and bushings. Apply the oil to the O-rings so that the O-rings will be coated with oil.
- Wipe off any excess oil.

Drive Chain Lubrication

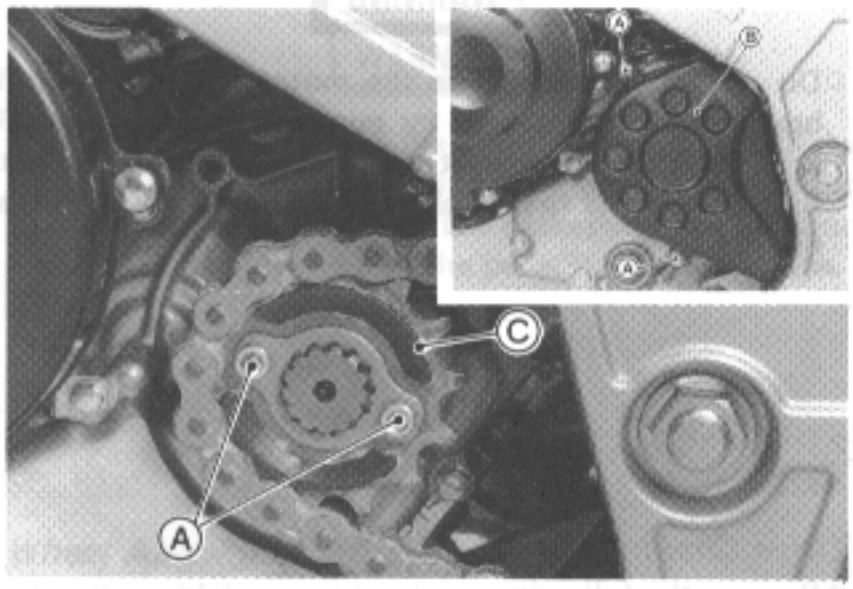
Oil Applied Areas



Sprocket, Coupling

Engine Sprocket Removal

- Using the jack stand (special tool), lift the rear of vehicle (see Rear Wheel Removal in Wheels/Tires chapter).
- Fully loosen the drive chain.
- Remove the following.



A. Mounting Bolts
B. Engine Sprocket Cover
C. Engine Sprocket

- Take the drive chain off the engine sprocket and remove the sprocket.

Engine Sprocket Installation Notes

- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
- Tighten the following parts to the specified torque (see General Information chapter).
  - Engine Sprocket Mounting Bolts
  - Rear Axle Nut
  - Side Stand Bracket Mounting Bolts
- Adjust the following.
  - Wheel Alignment
  - Drive Chain Slack
- Replace the axle nut clip if necessary.
- Check the brake function.

WARNING

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

Rear Sprocket Removal

● Remove the rear wheel (see Wheels/Tires chapter).

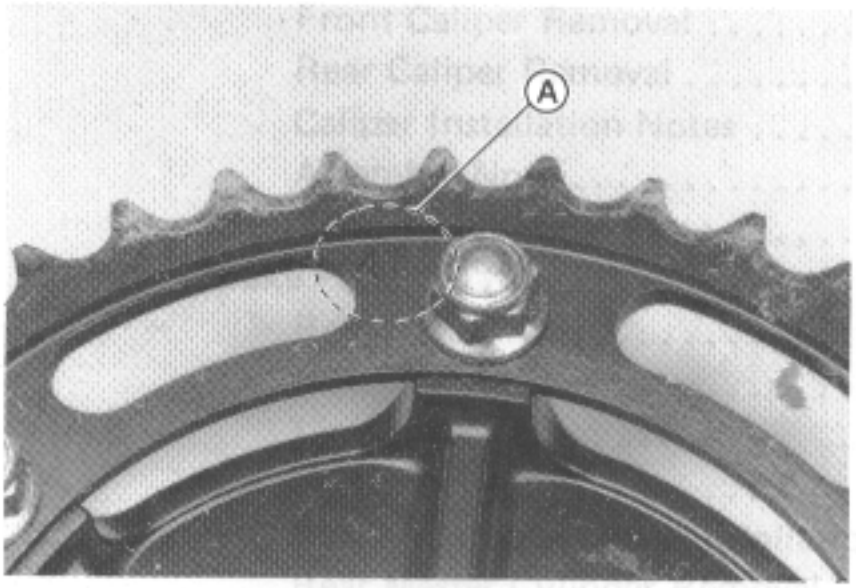
CAUTION

○ **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 the disc does not touch the ground.**

● Remove the rear sprocket nuts.
● Remove the rear sprocket and remove the coupling from the rear wheel.

Rear Sprocket Installation Notes

● Install the sprocket facing the tooth number marking outward.



A. Tooth Number Marking

● Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
● Tighten the following parts to the specified torque (see General Information chapter).
  Rear Sprocket Nuts
  Rear Axle Nut
  Torque Link Nuts
  Side Stand Bracket Mounting Bolts
● Adjust the following.
  Wheel Alignment
  Drive Chain Slack
● Replace the axle nut clip if necessary.
● Check the brake function.

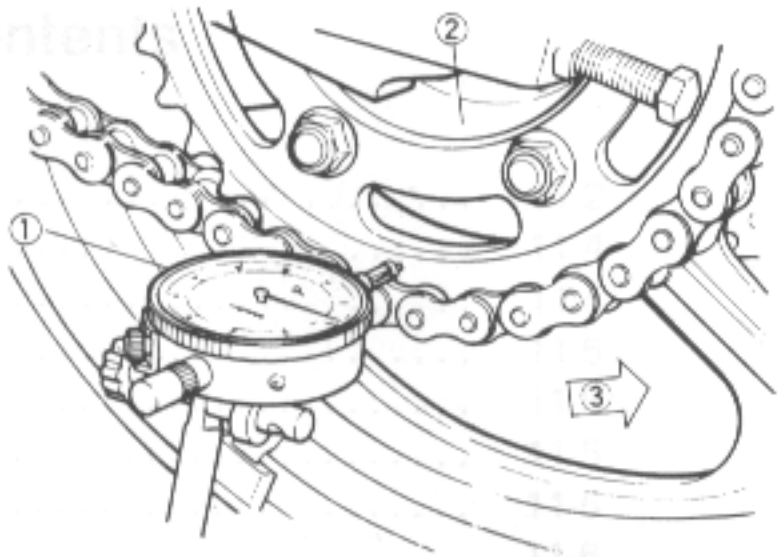
WARNING

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

Sprocket Warp

Elevate the rear wheel so that it will turn freely, and set a dial gauge against the rear sprocket near the teeth as shown. Rotate the rear wheel. The difference between the highest and lowest dial gauge readings is the amount of runout (warp).

If the runout exceeds the service limit, replace the rear sprocket.



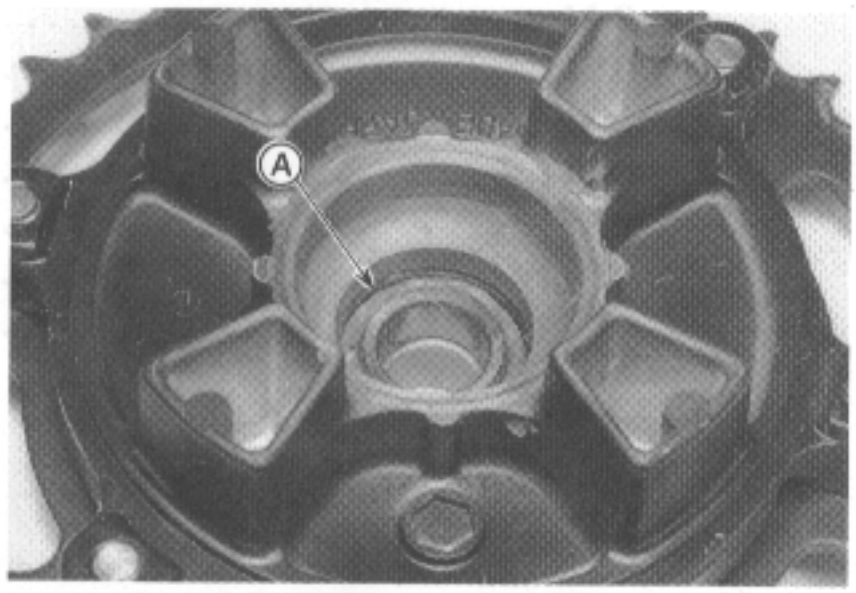
1. Dial Gauge
2. Rear Sprocket
3. Turn.

Coupling Bearing Installation Note

● Install the coupling bearing with sealed side facing to outward.

Coupling Bearing Lubrication

● Apply a little grease to the inside of the rear coupling.



A. Grease.

Brakes

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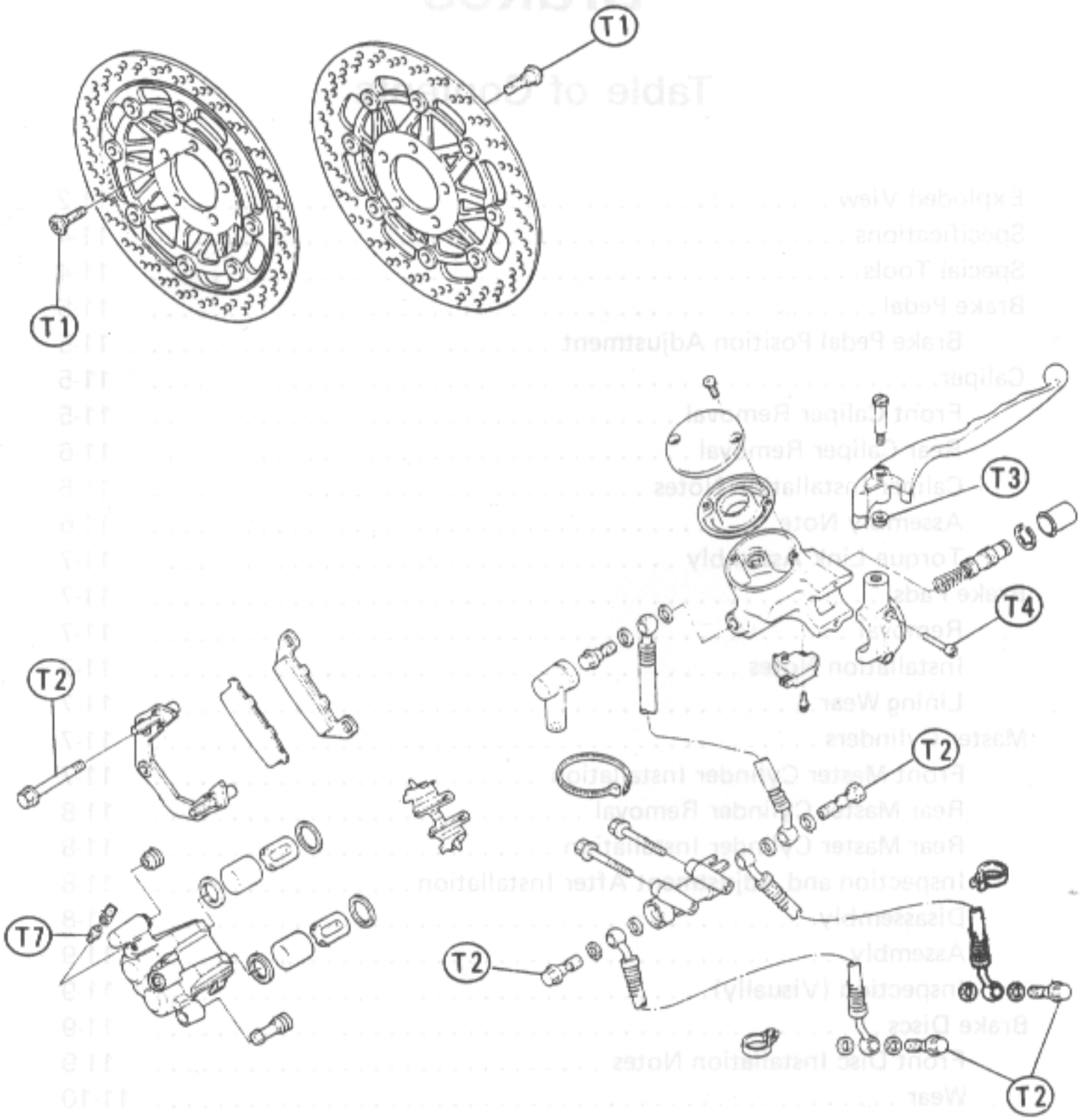
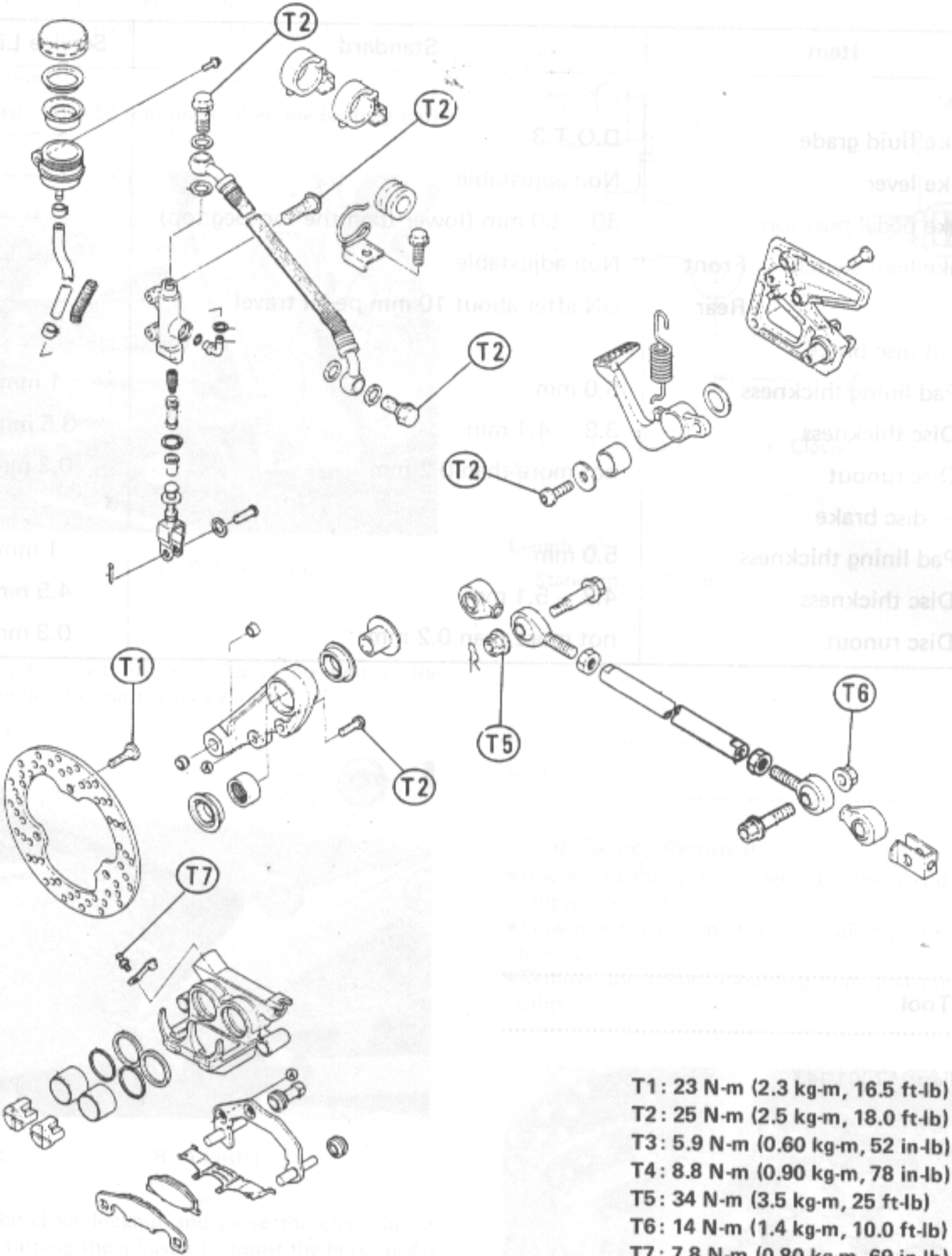
Exploded View





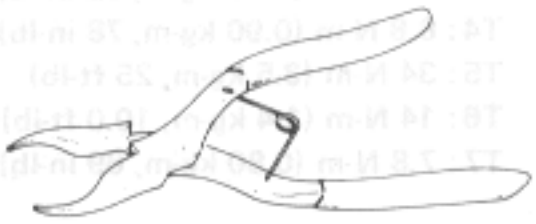
T1 : 23 N-m (2.3 kg-m, 16.5 ft-lb)
T2 : 25 N-m (2.5 kg-m, 18.0 ft-lb)
T3 : 5.9 N-m (0.60 kg-m, 52 in-lb)
T4 : 8.8 N-m (0.90 kg-m, 78 in-lb)
T5 : 34 N-m (3.5 kg-m, 25 ft-lb)
T6 : 14 N-m (1.4 kg-m, 10.0 ft-lb)
T7 : 7.8 N-m (0.80 kg-m, 69 in-lb)

Specifications

Item		Standard	Service Limit
Brakes:			
Brake fluid grade		D.O.T.3	– – –
Brake lever		Non adjustable	– – –
Brake pedal position		30 – 50 mm (lower than the footpeg top)	– – –
Brake light switch:	Front	Non adjustable	– – –
	Rear	ON after about 10 mm pedal travel	– – –
Front disc brake			
Pad lining thickness		5.0 mm	1 mm
Disc thickness		3.8 – 4.1 mm	3.5 mm
Disc runout		not more than 0.2 mm	0.3 mm
Rear disc brake			
Pad lining thickness		5.0 mm	1 mm
Disc thickness		4.8 – 5.1 mm	4.5 mm
Disc runout		not more than 0.2 mm	0.3 mm

Special Tool

Circlip Pliers: 57001-143



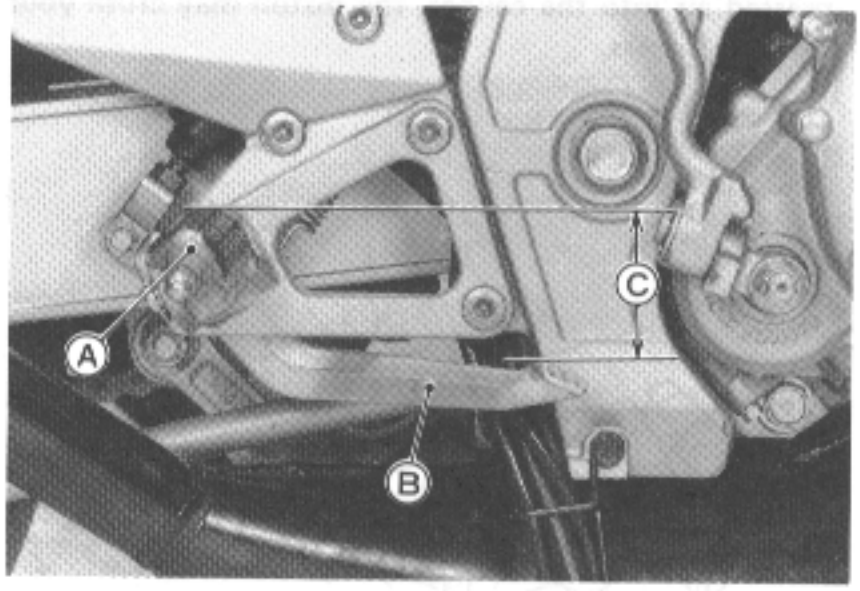
Brake Pedal

Brake Pedal Position Adjustment

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

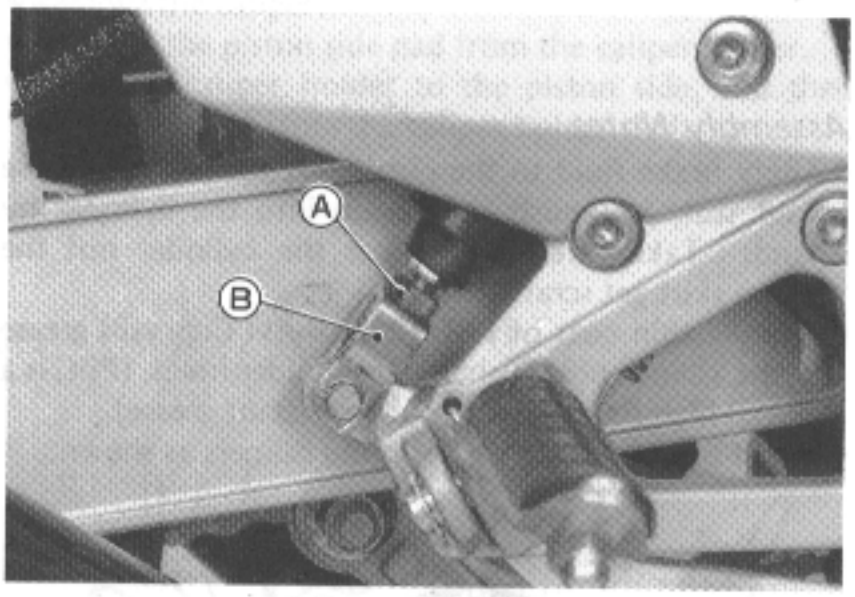
Pedal Position

Standard: 30 – 50 mm (lower than the footpeg top)



A. Footpeg
B. Brake Pedal
C. Pedal Position

★If it is not, adjust the brake pedal position at the adjuster under the rear master cylinder.



A. Locknut
B. Adjuster

●Loosen the clevis locknut and move the clevis up or down by turning the adjuster to adjust the brake pedal position.

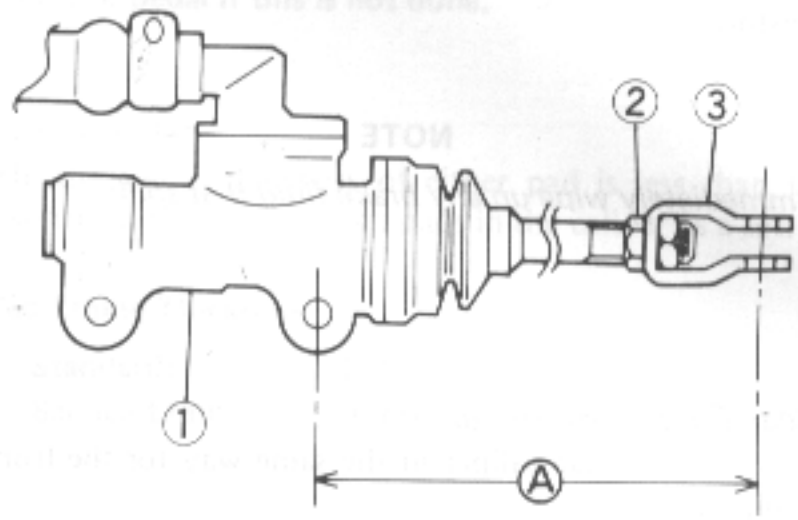
NOTE

○*Usually it's not necessary to adjust the pedal position, but always adjust it when the master cylinder is disassembled.*

○*If the push rod length 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 Ⓐ indicated in the figure.

★If the length Ⓐ is not within the specified length, adjust a nut.



1. Master Cylinder
2. Locknut
3. Clevis

Length Ⓐ

Standard: 67 mm

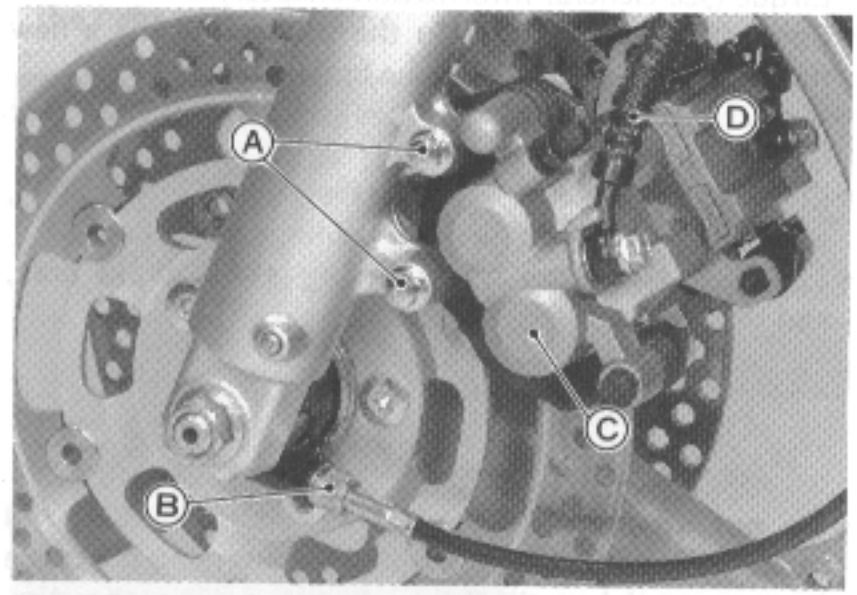
Caliper

Front Caliper Removal

●Disconnect the speedometer cable lower end (left side caliper removal).

●Loosen the banjo bolt at the caliper, and tighten it loosely.

●Remove the caliper mounting bolts and take off the caliper.



A. Caliper Mounting Bolts
B. Cable Lower End
C. Caliper
D. Brake Hose

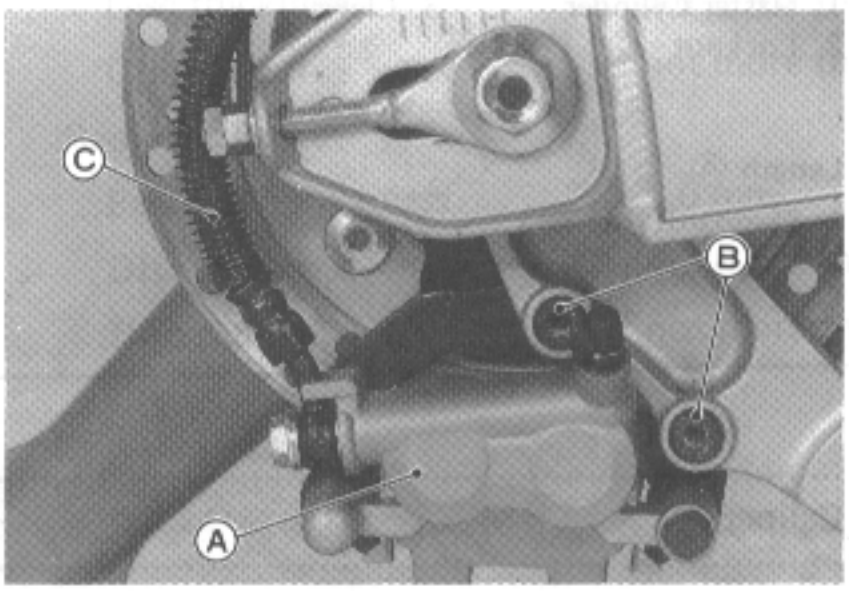
●Disconnect the brake hose from the caliper.
★If the caliper is to be disassembled after removal and if compressed air is not available, remove the piston using the following steps before disconnecting the brake hose from the caliper.
○Remove the pads.
○Pump the brake lever or pedal to remove the caliper piston.

NOTE

○*Immediately wipe up any brake fluid that spills.*

Rear Caliper Removal

●Remove the rear caliper in the same way for the front caliper.



A. Caliper
B. Mounting Bolts
C. Brake Hose

Caliper Installation Notes

●Tighten the caliper mounting bolts to the specified torque (see General Information chapter).
●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 General Information chapter).
●Check the fluid level in the master cylinder (reservoir), and bleed the brake line (see Bleeding the Brake).
●Check the brake for weak braking power, brake drag, and fluid leakage.

WARNING

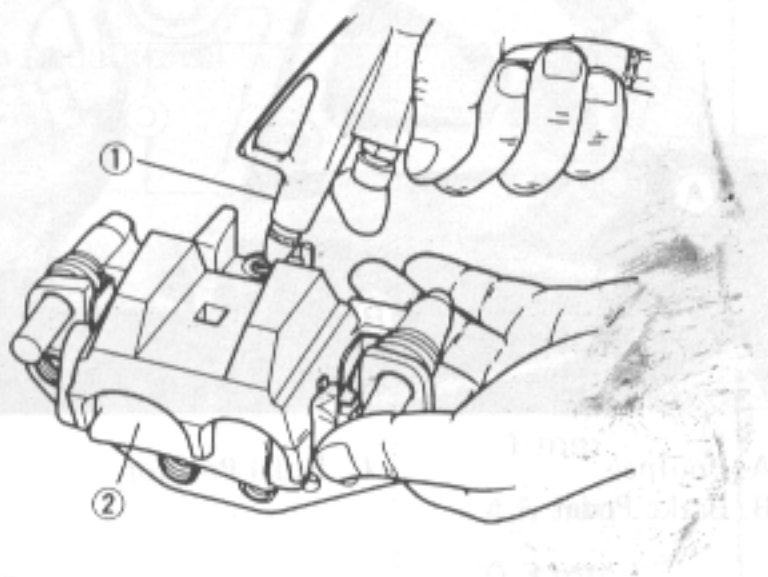
○**Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brakes will not function on the first application of the lever or pedal if this is not done.**

Disassembly Notes

●Using compressed air, remove the piston.
○Cover the caliper opening with a clean, heavy cloth.
○Remove the piston by lightly applying compressed air to where the brake line fits into the caliper.

WARNING

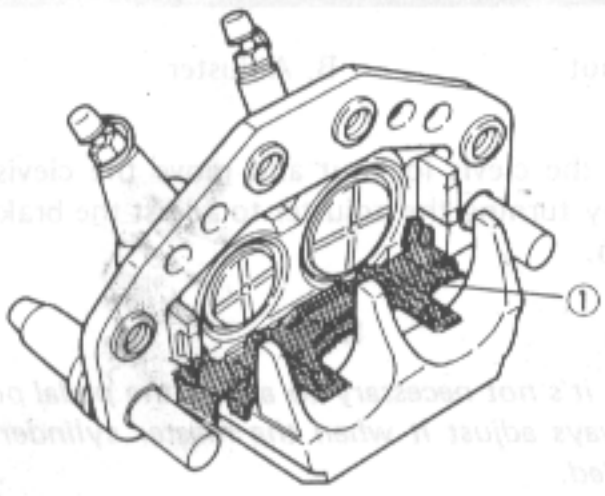
○**To avoid serious injury, never place your fingers or palm inside the caliper opening. If you apply compressed air into the caliper, the piston may crush your hand or fingers.**



1. Apply compressed air. 2. Cloth

Assembly Notes

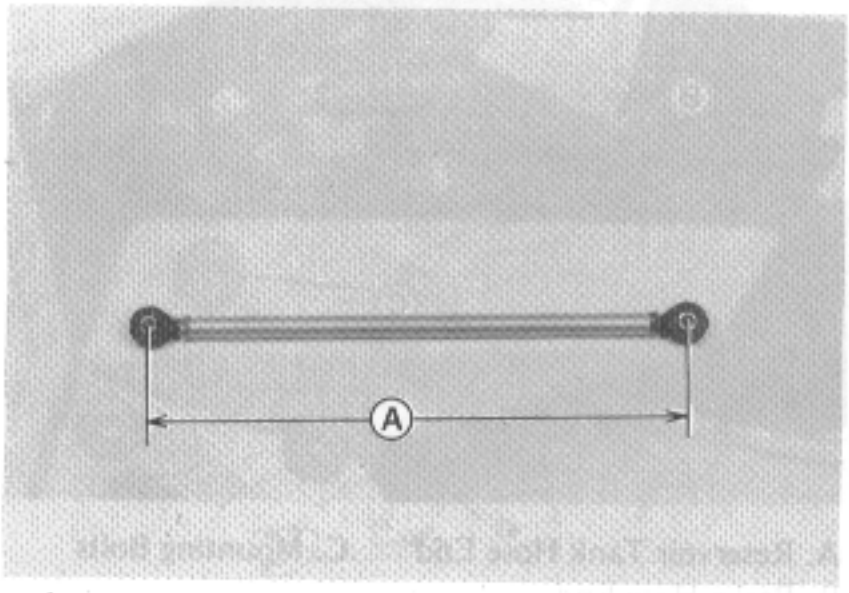
●Apply brake fluid to the outside of the piston and the fluid seal, and push the piston into the cylinder by hand. Take care that neither the cylinder not the piston skirt get scratched.
●Apply a thin coat of PBC (Poly Butyl Cuprysil) grease to the caliper holder shafts and holder holes. (PBC is a special high temperature, water-resistant grease).
●Install the anti-rattle spring in the calipers as shown.



1. Anti-rattle Spring

Torque Link Assembly Note

●Assemble the torque link as shown, if it was disassembled.

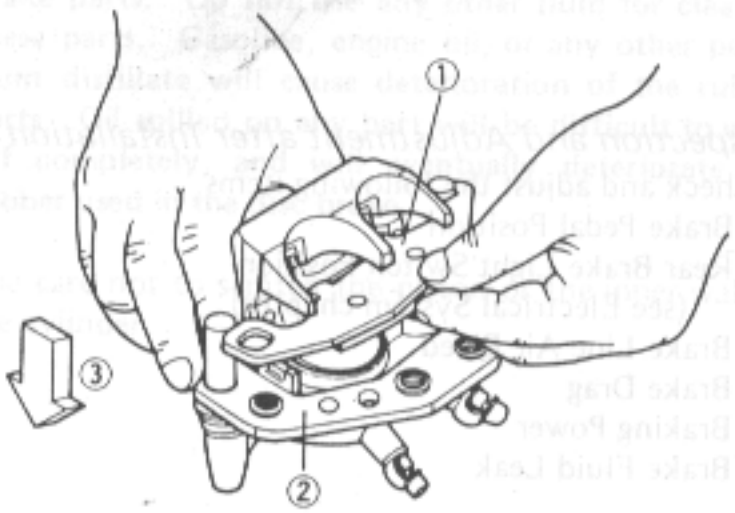


A. 393 – 395 mm

Brake Pads

Removal

●Remove the caliper.
●Take off the piston side pad from the caliper holder.
●Push the caliper holder to the piston side, and then remove the pad from the caliper holder shaft.



1. Pad
2. Caliper Holder
3. Push the caliper holder.

Installation Notes

●Push the caliper pistons in by hand as far as they will go.

WARNING

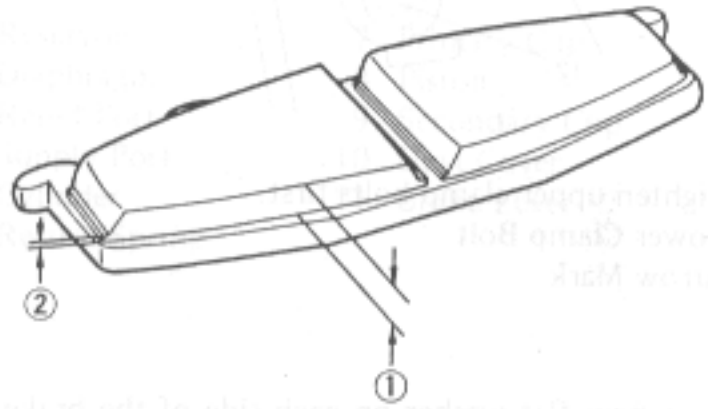
○**Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brake will not function on the first application of the lever or pedal if this is not done.**

Lining Wear

★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

Standard:	**5.0 mm**
Service Limit:	**1 mm**

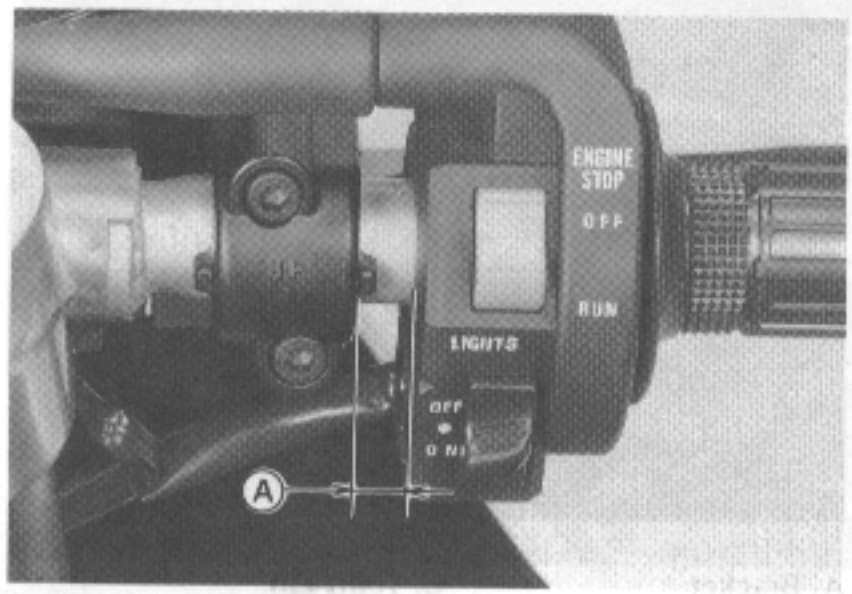


1. Lining Thickness
2. Service Limit

Master Cylinders

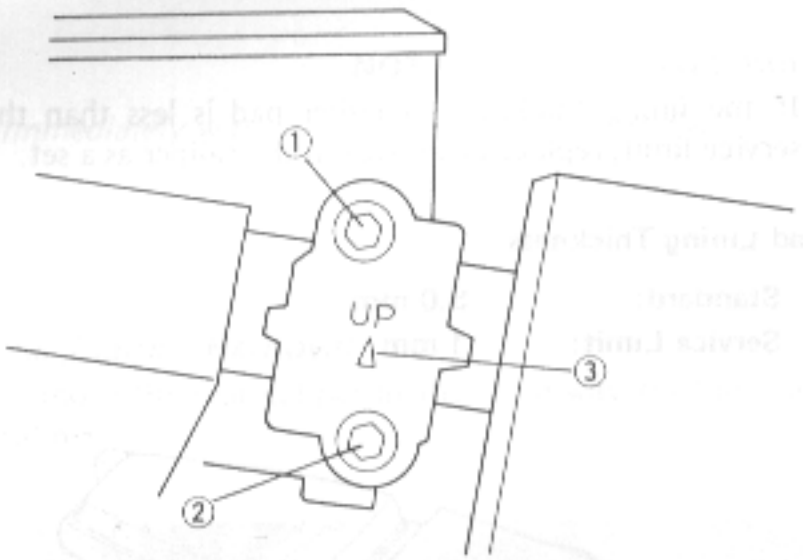
Front Master Cylinder Installation

●When installing the front master cylinder, note the following.
○Install the master cylinder clamp at 10 mm far from the right switch housing.



A. 10 mm

○The master cylinder clamp must be installed with the arrow mark upward.
○Torque the upper clamp bolt first, and then the lower clamp bolt to the specification (see General Information chapter). There will be a gap at the lower part of the clamp after tightening.

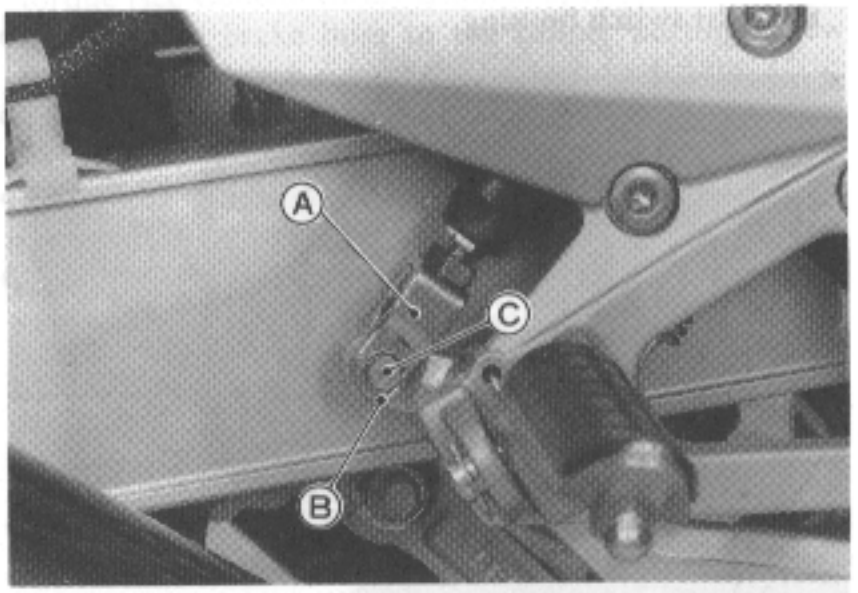


1. Tighten upper clamp bolts first.
2. Lower Clamp Bolt
3. Arrow Mark

○Use a new flat washer on each side of the brake hose fitting.
○Tighten the banjo bolts to the specified torque (see General Information chapter).

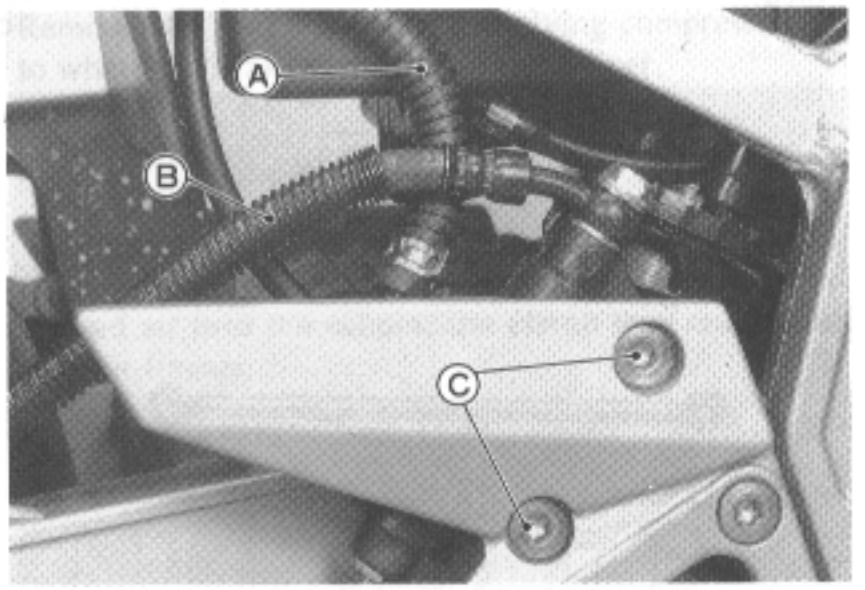
Rear Master Cylinder Removal

●Remove the cotter pin from the rear master cylinder bracket, and remove the joint pin.



A. Bracket
B. Cotter Pin
C. Joint Pin

●Remove the following.



A. Reservoir Tank Hose End
B. Brake Hose End
C. Mounting Bolts

NOTE

○*Immediately wipe up any brake fluid that spills.*

Rear Master Cylinder Installation

●Note the following.
○Use a new flat washer on each side of the brake hose fitting. Be sure that the metal pipe is properly fitted into the U-shaped notch in the master cylinder.
○Tighten the banjo bolts to the specified torque (see General Information chapter).
○Tighten the rear master cylinder mounting bolts to the specified torque (see General Information chapter).

Inspection and Adjustment after Installation

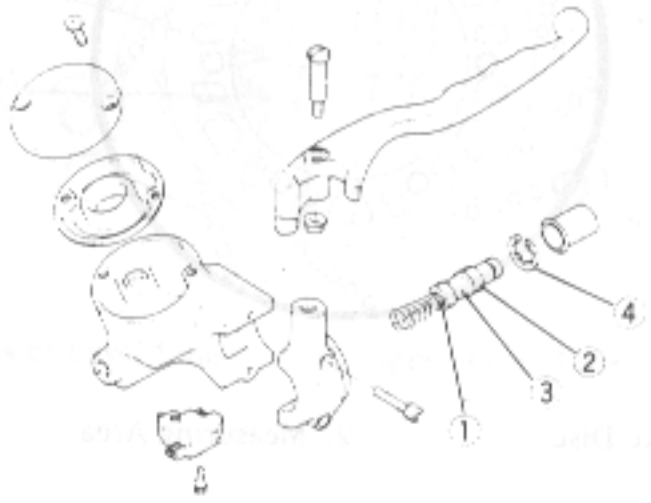
●Check and adjust the following items.
Brake Pedal Position
Rear Brake Light Switch Position
(see Electrical System chapter)
Brake Line Air Bleed
Brake Drag
Braking Power
Brake Fluid Leak

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. Secondary Cup
3. Piston
4. Retainer

Assembly

●Note the following.

○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 discs; 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.

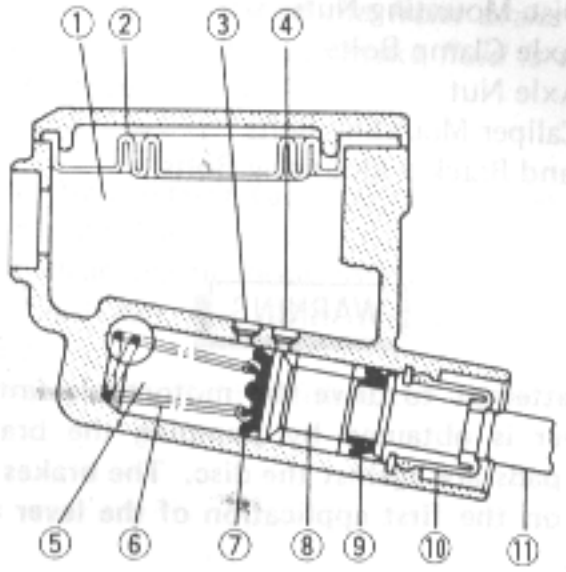
○The care not to scratch the piston or the inner wall of the cylinder.

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 Spring
Relief and Supply Port Plugged

★If they are damaged, replace them.

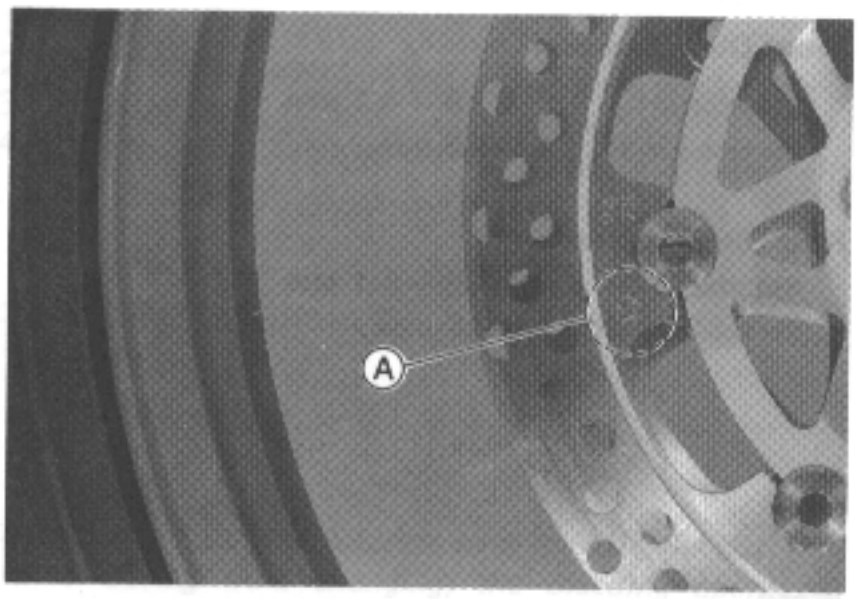


1. Reservoir
2. Diaphragm
3. Relief Port
4. Supply Port
5. Cylinder
6. Return Spring
7. Primary Cup
8. Piston
9. Secondary Cup
10. Dust Cover
11. Brake Lever

Brake Disc

Front Disc Installation Notes

●Check the disc rotation mark on the disc, and install it on the wheel accordingly.



A. Mark

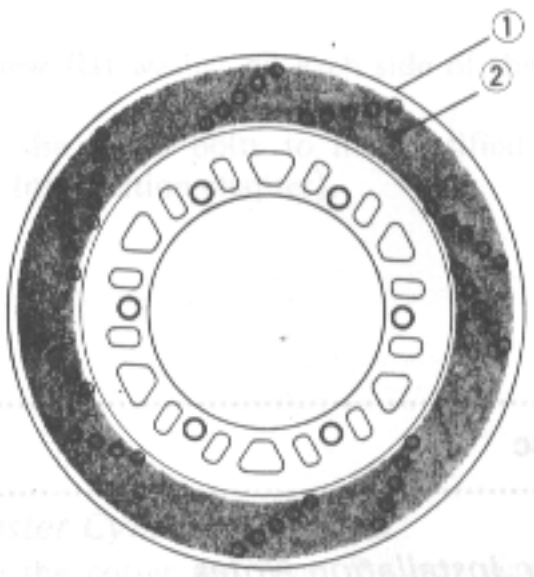
- Apply non-permanent locking agent to the threads of side stand bracket mounting bolts.
- Tighten the following parts to the specified torque (see General Information chapter).
  - Brake Disc Mounting Nuts
  - Front Axle Clamp Bolts
  - Front Axle Nut
  - Brake Caliper Mounting Bolts
  - Side Stand Bracket Mounting Bolts

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.

Wear

★Replace the disc if it has worn past the service limit.



1. Brake Disc 2. Measuring Area

Front Disc Thickness

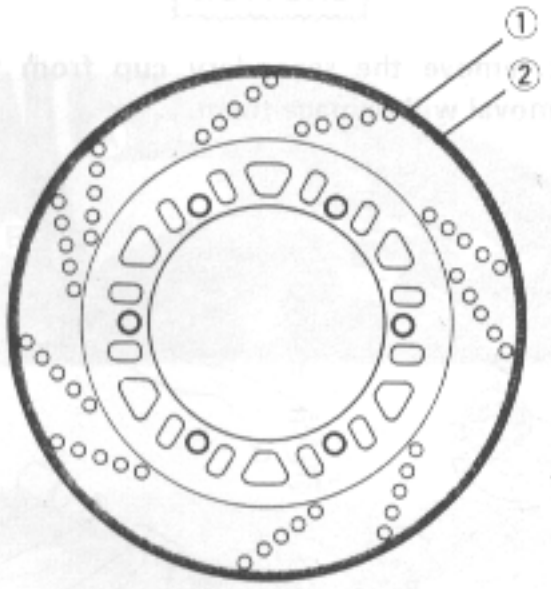
Standard:	**3.8 – 4.1 mm**
Service Limit:	**3.5 mm**

Rear Disc Thickness

Standard:	**4.8 – 5.1 mm**
Service Limit:	**4.5 mm**

Warp

★If runout exceeds the service limit, replace the disc.



1. Brake Disc 2. Measuring Area

Disc Runout

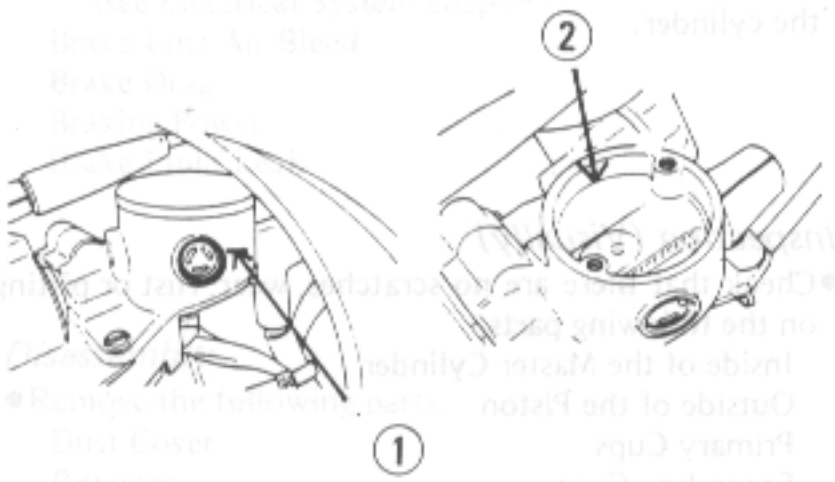
Standard:	**Under 0.2 mm**
Service Limit:	**0.3 mm**

Brake Fluid

Fluid Level Inspection

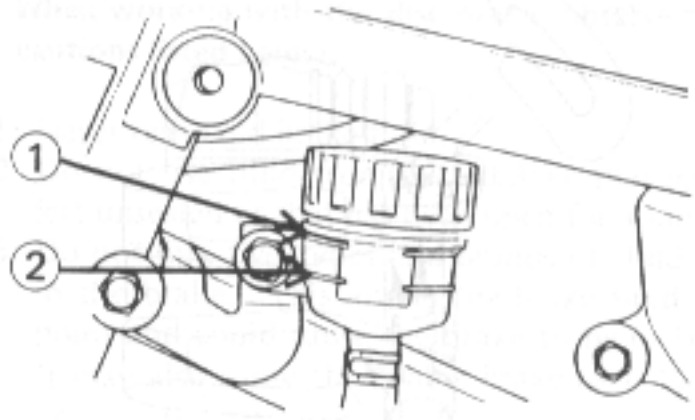
- Check the brake fluid level in the reservoir.

Front Brake Fluid Reservoir



1. Lower Level Line 2. Upper Level Line

Rear Brake Fluid Reservoir



1. Lower Level Line 2. Upper Level Line

NOTE

○*Hold the reservoir horizontal when checking brake fluid level.*

★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.**

Recommended Brake Fluid

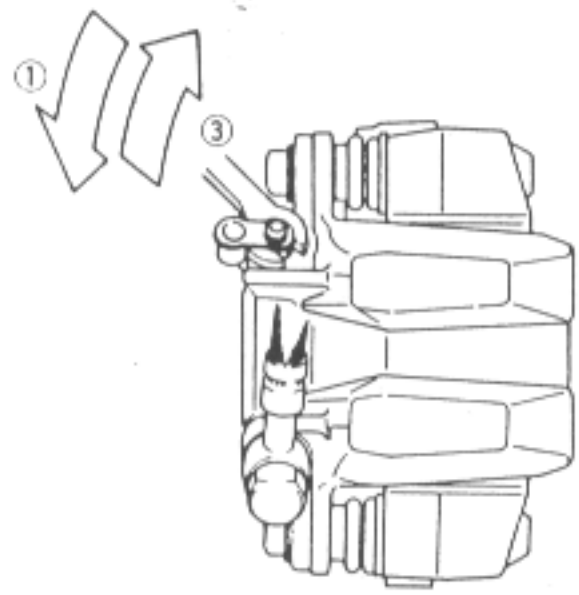
Type	**D.O.T.3**
Brand	**Atlas Extra Heavy Duty**
	Shell Super Heavy Duty
	Texaco Super Heavy Duty
	Wagner Lockheed Heavy Duty
	Castrol Girling-Universal
	Castrol GT (LMA)
	Castrol Disc Brake Fluid

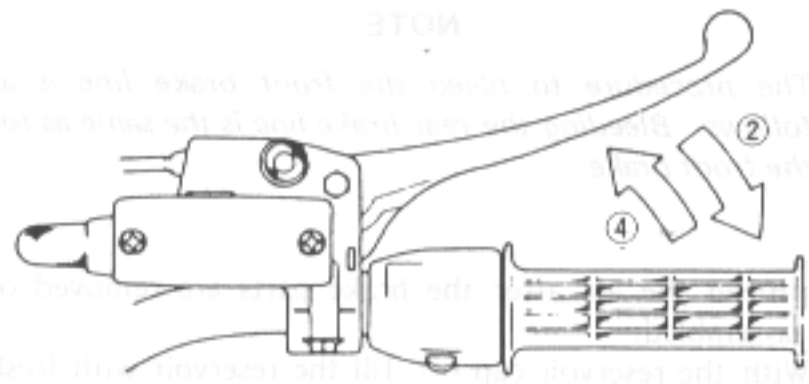
Brake Fluid Change

NOTE

○*The procedure to change the front brake fluid is as follows. Changing the rear brake fluid is the same as for the front brake.*

- Remove the reservoir cap, and remove the rubber cap on the bleed valve.
- After a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
- Change the brake fluid as follows:





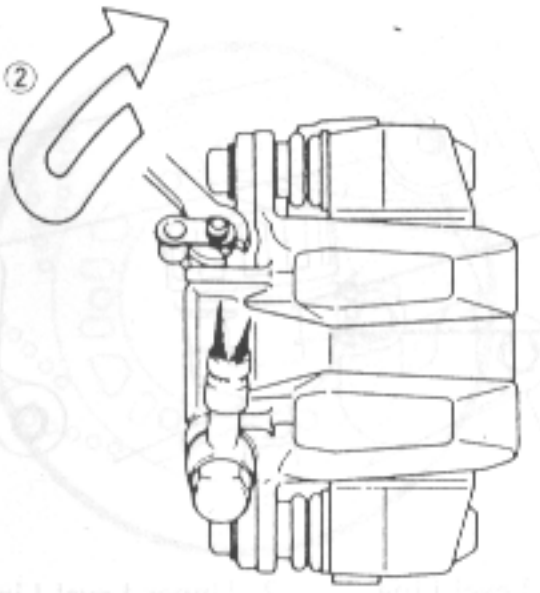
1. Open the bleed valve.
2. Apply the brake and hold it.
3. Close the bleed valve.
4. Release the brake lever.

○Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

○*If the fluid in the reservoir runs completely out any time during fluid changing, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○Repeat this operation until fresh brake fluid comes out from the plastic hose or the color of the fluid changes.

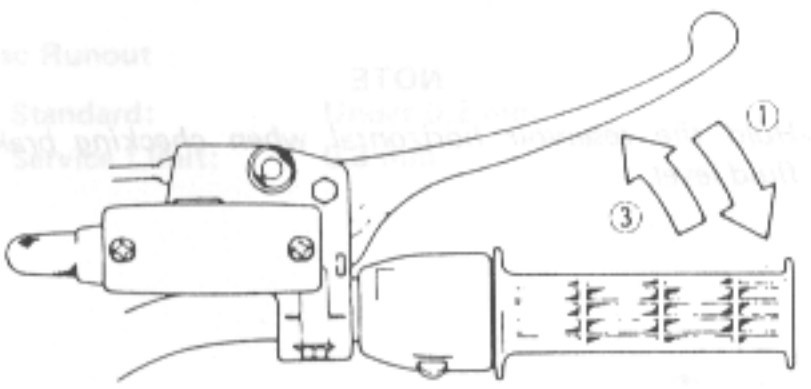


WARNING

○Do not mix two brands of fluid. 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 is already in the reservoir are unidentified.

NOTE

○Front Brake: Repeat the above steps one more time for the other caliper.



Bleeding the Brake Line

NOTE

○The procedure to bleed the front brake line is as follows. Bleeding the rear brake line is the same as for the front brake.

Bleed the air after the brake parts are removed or disassembled.

- With the reservoir cap off, fill the reservoir with fresh brake oil.
- 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 and the brake line.

NOTE

○Tap the brake hose lightly going from the caliper to the reservoir side and let the air off from the reservoir when the brake lever has a sponge feeling.

- After a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
- Bleed the brake line and the caliper as follows:

1. Pump the brake lever a few times until it becomes firm.
2. Quickly open and close the valve.
3. Release the brake lever.

○Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

○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.

○Front Brake: Repeat the above steps one more time for the other caliper.

○Repeat this operation until no more air can be seen coming out into the plastic hose.

NOTE

○If the brake lever action still feels soft or spongy, tap the brake hose lightly from bottom to top end or air will rise up to the top part of the hose, slowly pump the brake lever as the same manner as above.

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, motor 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.**

Suspension

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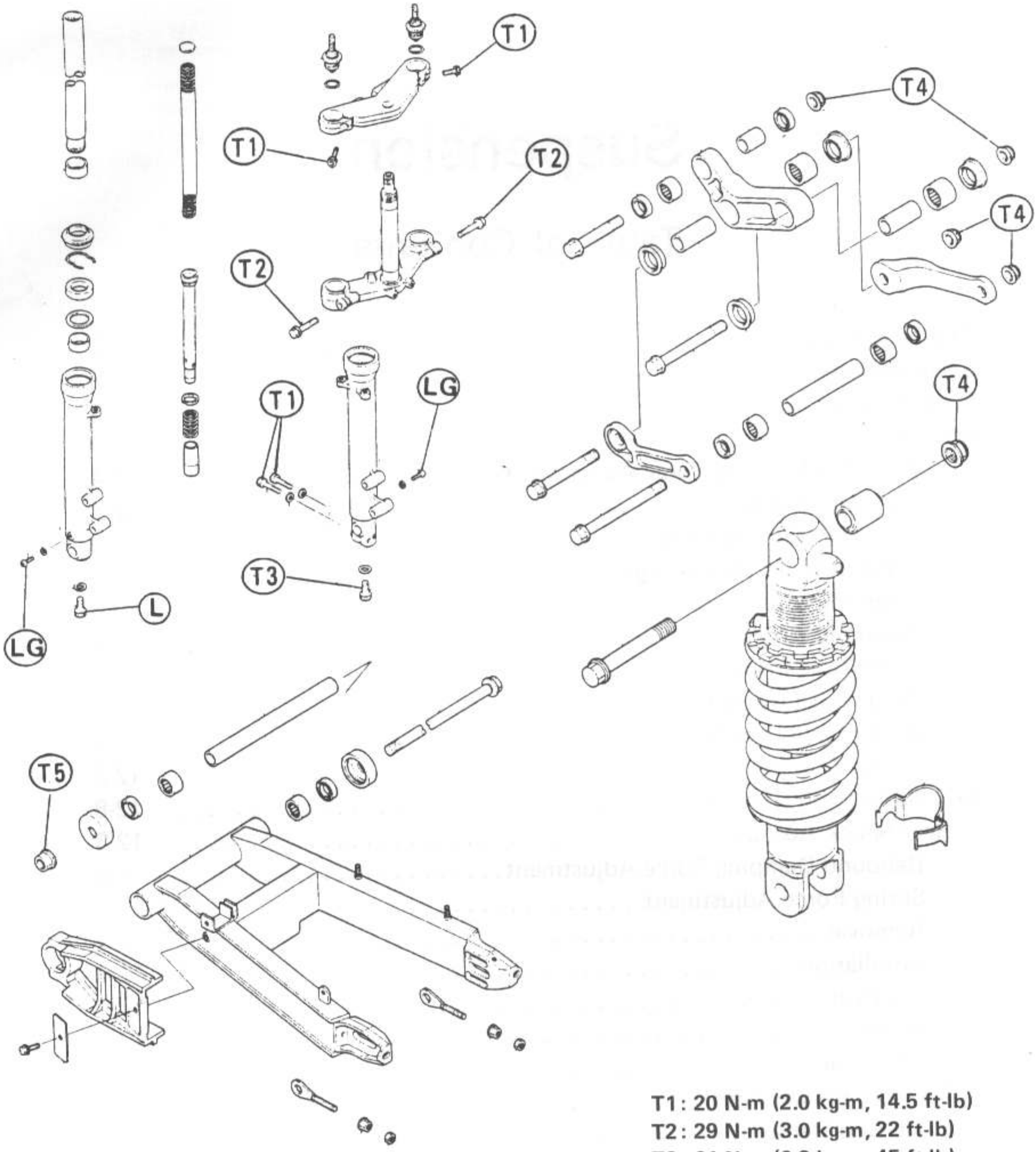
Exploded View



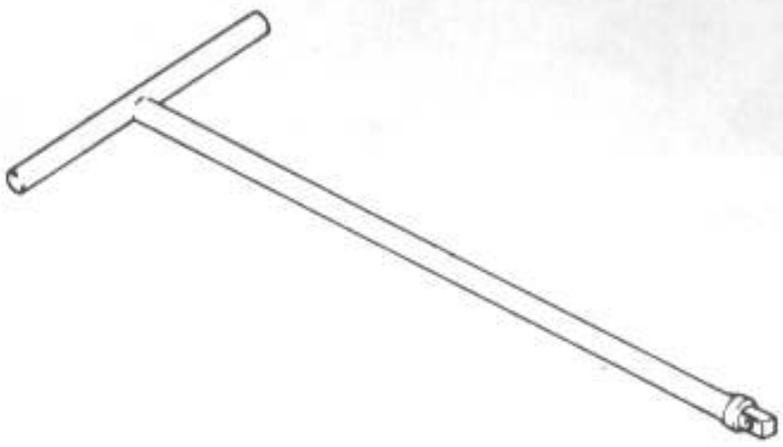
T1 : 20 N-m (2.0 kg-m, 14.5 ft-lb)
T2 : 29 N-m (3.0 kg-m, 22 ft-lb)
T3 : 61 N-m (6.2 kg-m, 45 ft-lb)
T4 : 49 N-m (5.0 kg-m, 36 ft-lb)
T5 : 93 N-m (9.5 kg-m, 69 ft-lb)

Specifications

Item	Standard	Service Limit
Front Fork:		
Oil type	SAE10W20	— — —
Oil capacity	421 ±4 mL (when assembling) approx. 355 mL (when oil changing)	— — —
Oil level (full compressed, without main spring)	125 ±2 mm	— — —
Fork spring free length	450.7 mm	442 mm
Fork spring force	6th mark from the top	— — —
Rear Shock Absorber:		
Rebound damping force adjuster setting position	No. 2	— — —
Spring force	Spring free length minus 10 mm	Spring free length minus 0 to 25 mm

Special Tools

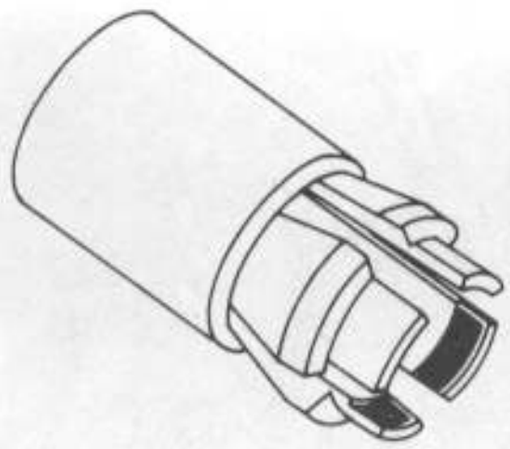
Front Fork Cylinder Handle: 57001-183



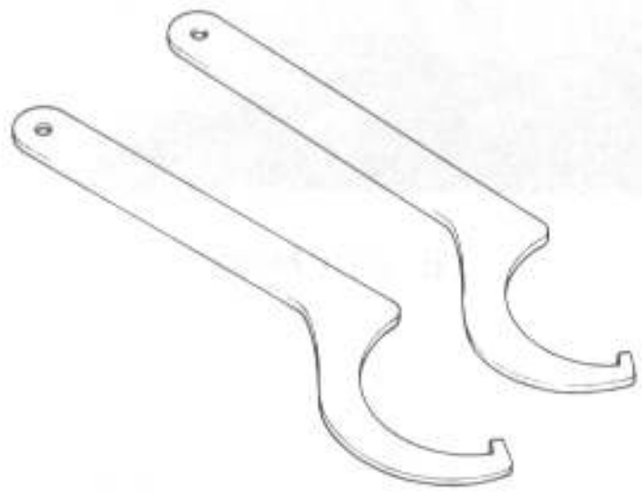
Adapter: 57001-1057

Fork Outer Tube Weight: 57001-1218

Fork Oil Seal Driver: 57001-1219



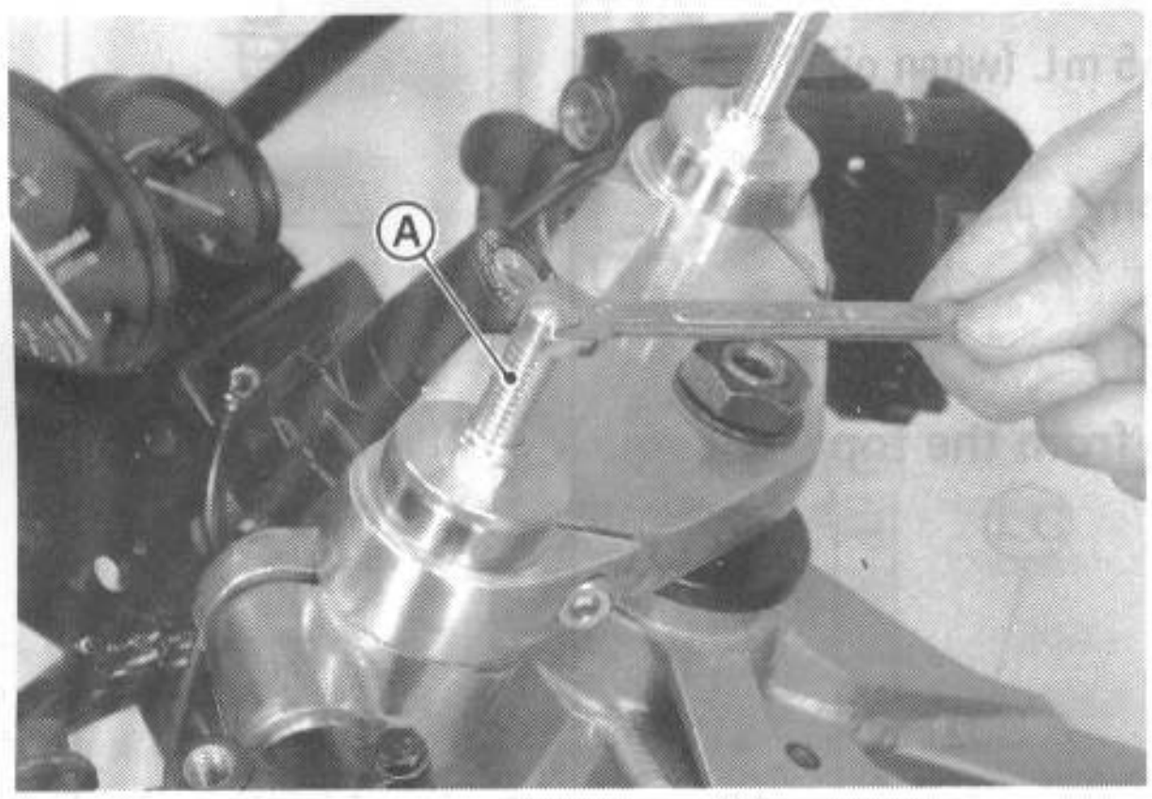
Hook Wrench: 57001-1101



Front Fork

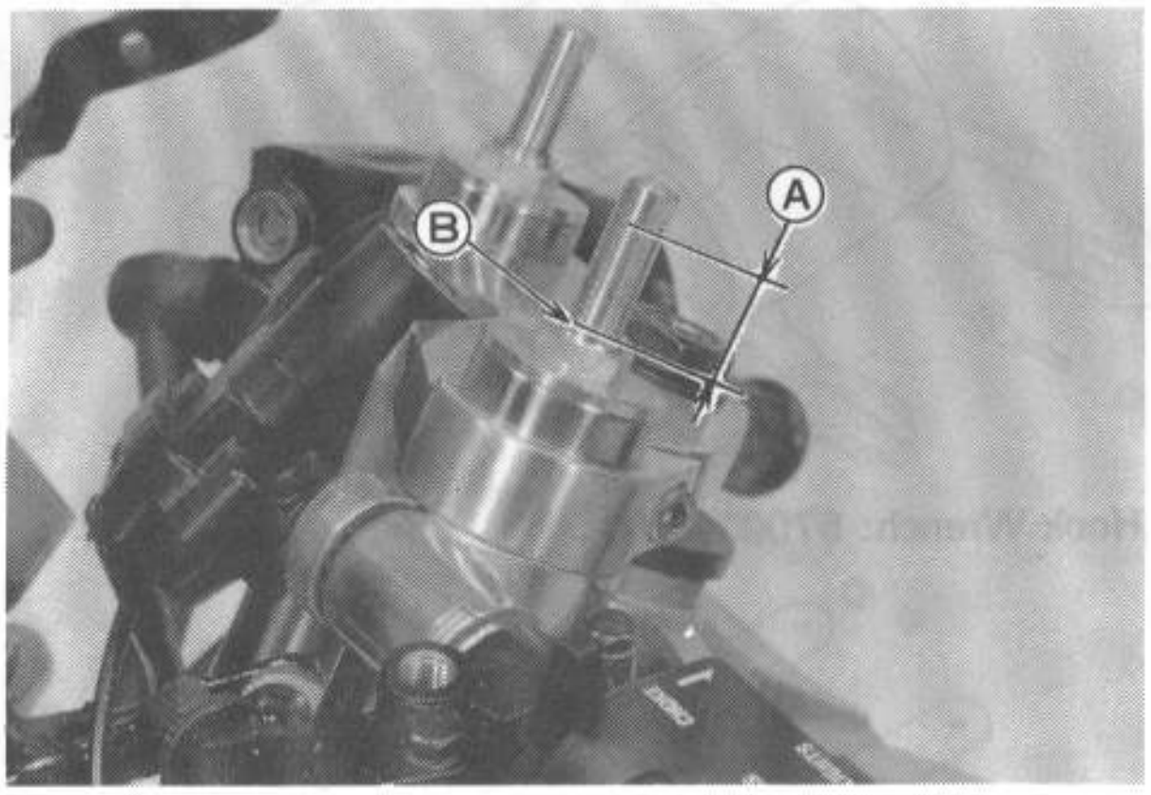
Front Fork Spring Force Adjustment

●Turn the adjuster in to increase spring force and out to decrease spring force.



A. Adjuster

○The standard setting position of the adjuster for the average-build rider with no passenger and no accessories is the 6th mark from the top.



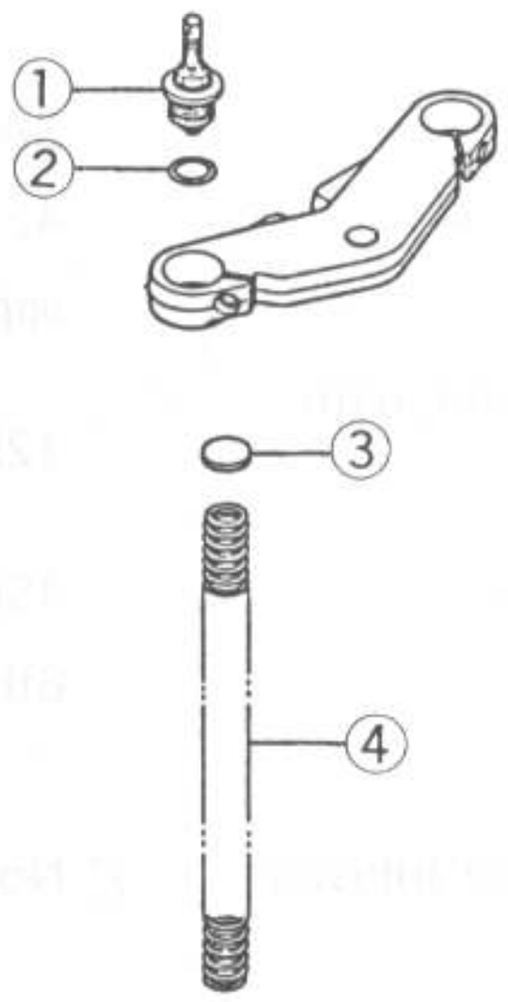
A. Marks B. 6th Mark

WARNING

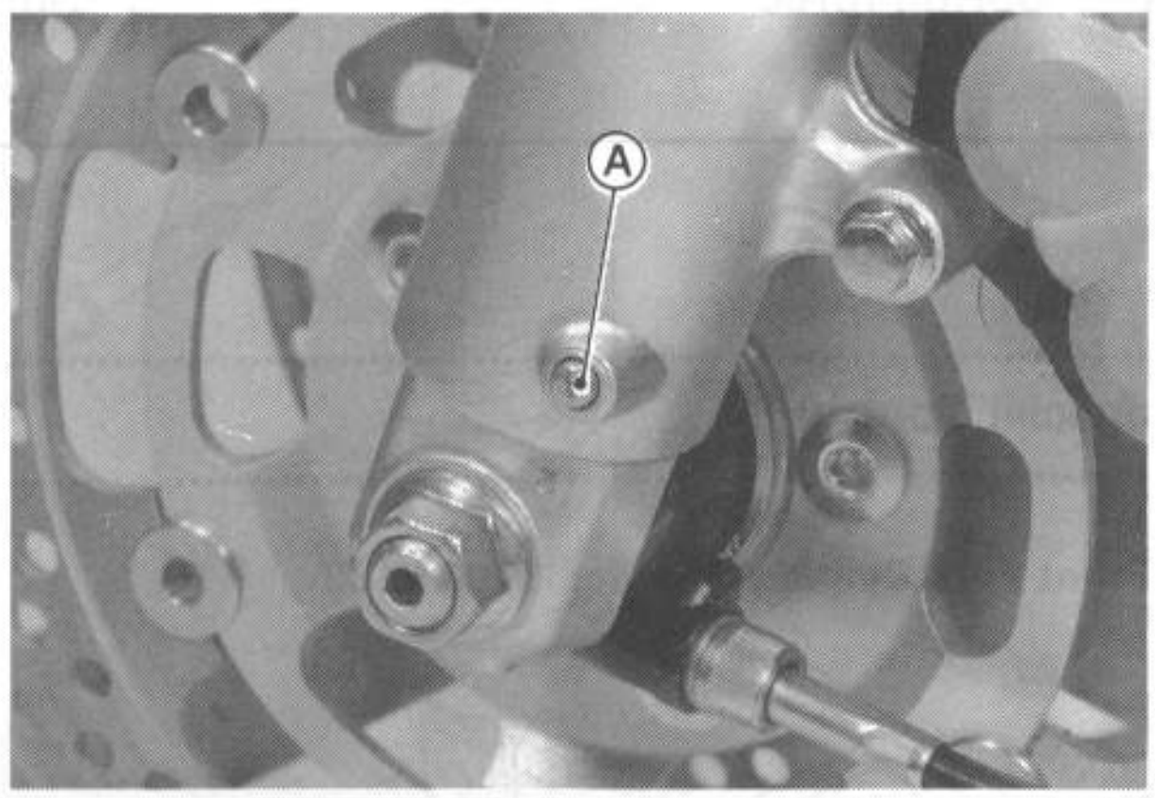
○**If both adjusters are not adjusted equally, handling may be impaired and a hazardous condition may result.**

Fork Oil Change

●Set the motorcycle on its side stand.
●Remove the following.



1. Fork Top Plug
2. O-ring
3. Spring Seat
4. Spring



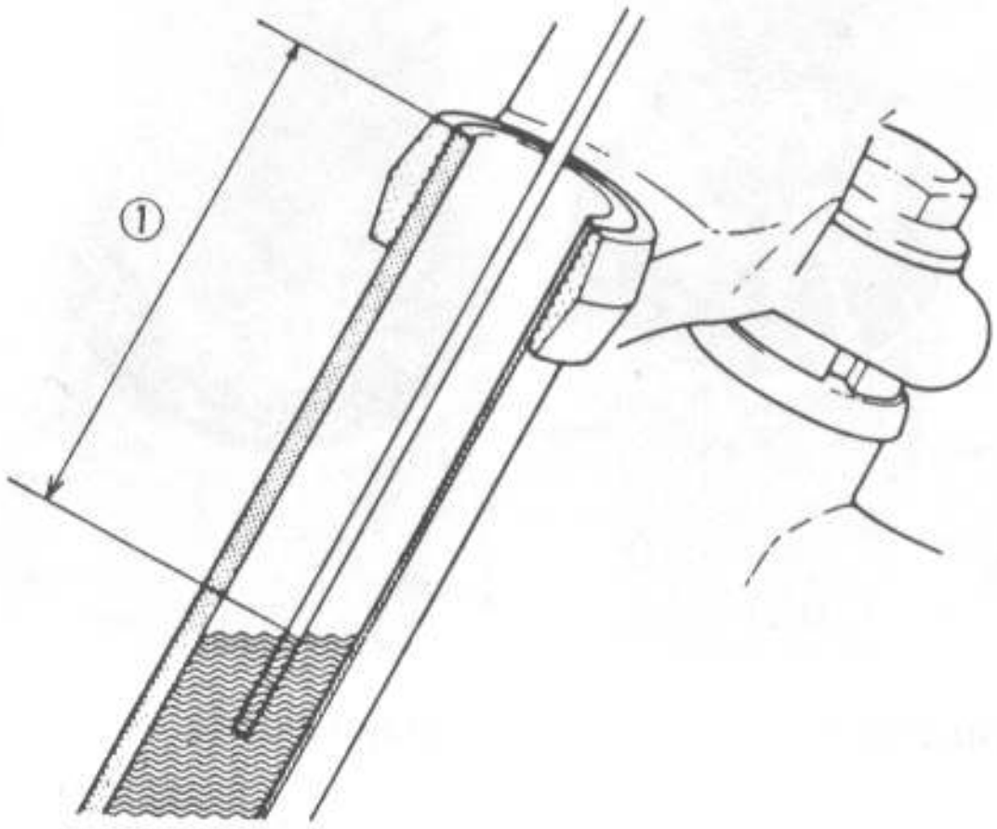
A. Drain Screw

●Pump the fork legs to force out the oil.
●Apply liquid gasket–silver (Kawasaki Bond: 92104-002) to the threads of the drain screw and gasket.
●Pour in the specified type and amount of oil.

Front Fork Oil

Viscosity	**SAE 10W20**
Amount per side	
When changing oil:	**About 355 mL**
After disassembly and completely dry:	**421 ±4 mL**

●With the fork fully compressed insert a tape measure or rod in the inner tube, and measure the distance from the top of the inner tube to the oil.



1. Oil Level

Fork Oil Level
(Fully Compressed, without main spring)
125 ±2 mm

★If the oil is above or below the specified level, remove or add oil and recheck the oil level.
●When installing the parts removed, tighten the fork top plug to the specified torque (see General Information chapter).
●Change the oil of the other fork leg in the same manner.

Removal (each fork leg)
●Remove the front wheel (see Wheels/Tires chapter).
★If the front fork legs are to be disassembled, loosen the fork top plugs beforehand.
●Remove the following.
Caliper (from the fork leg to be removed.)
Fairings
Front Fender

A. Handlebar Holder Clamp Bolt B. Fork Clamp Bolts

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

Installation (each fork leg)
●Install the fork leg as shown.

A. 10 mm

●Apply a non-permanent locking agent to the threads of side stand bracket mounting bolt.
○Tighten the following to the specified torques (see General Information chapter).
Fork Clamp Bolts
Handlebar Holder Clamp Bolt
Caliper Mounting Bolts
Front Axle Nut
Side Stand Bracket Mounting Bolts
Front Axle Clamp Bolts

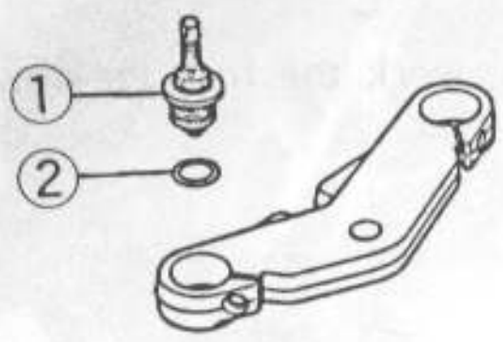
WARNING

○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 brake will not function on the first application of the lever if this is not done.

Disassembly

●Remove the front fork.

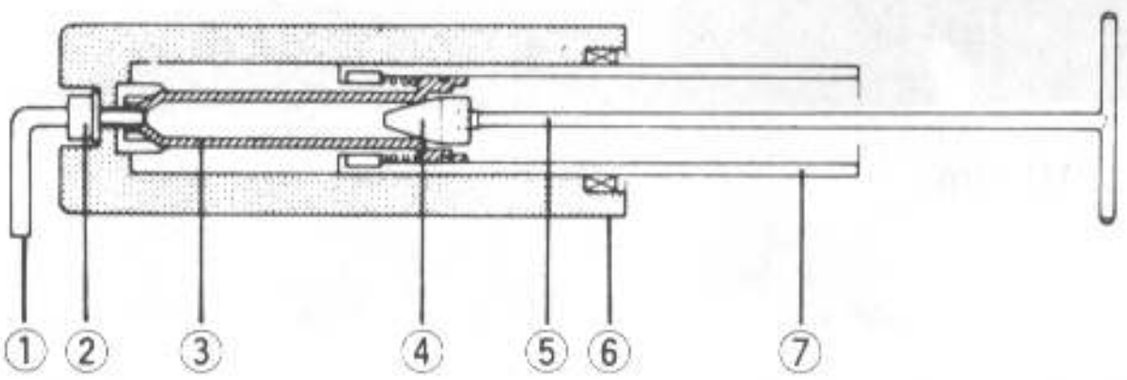
●Remove the following.



1. Fork Top Plug
2. O-ring
3. Spring Seat
4. Spring

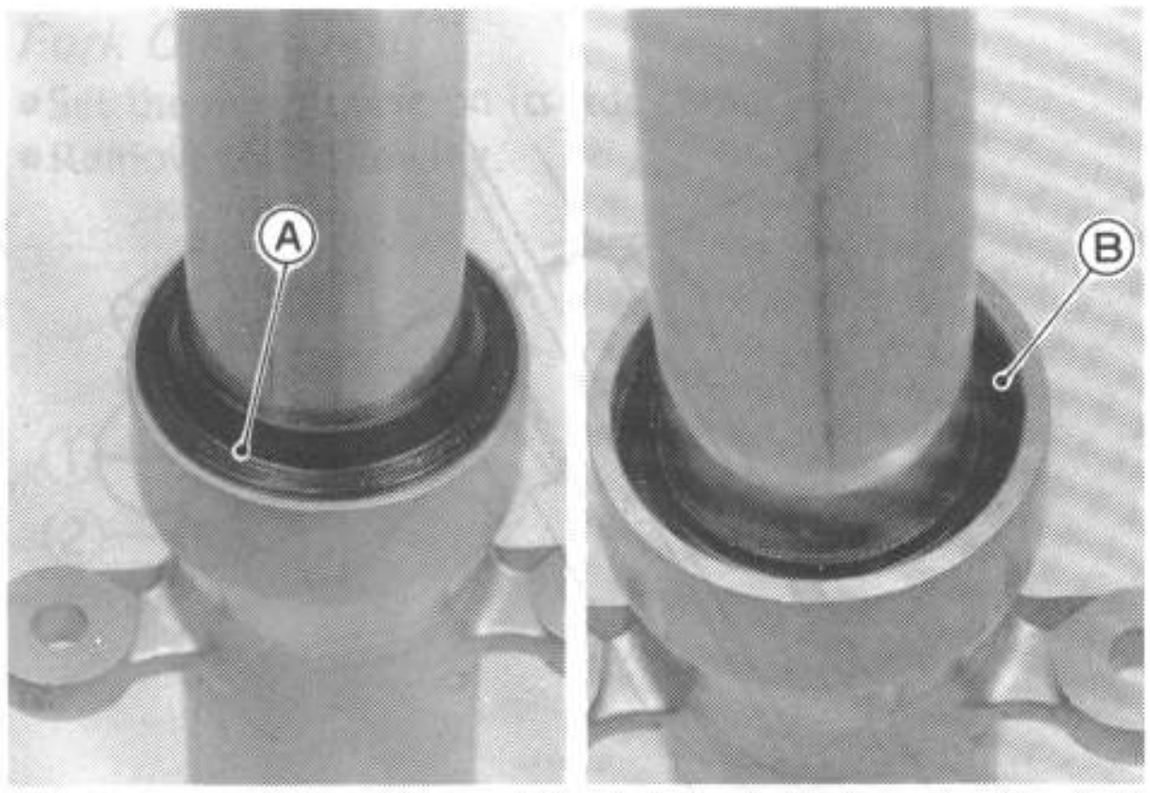
●Pour out the fork oil.

●Stop the cylinder from turning by using the front fork cylinder holder handle and adapter (special tools). Unscrew the Allen bolt and take the bolt, and gasket out of the bottom of the outer tube.



1. Wrench
2. Bolt
3. Cylinder
4. Adapter: 57001-1057
5. Handle: 57001-183
6. Outer Tube
7. Inner Tube

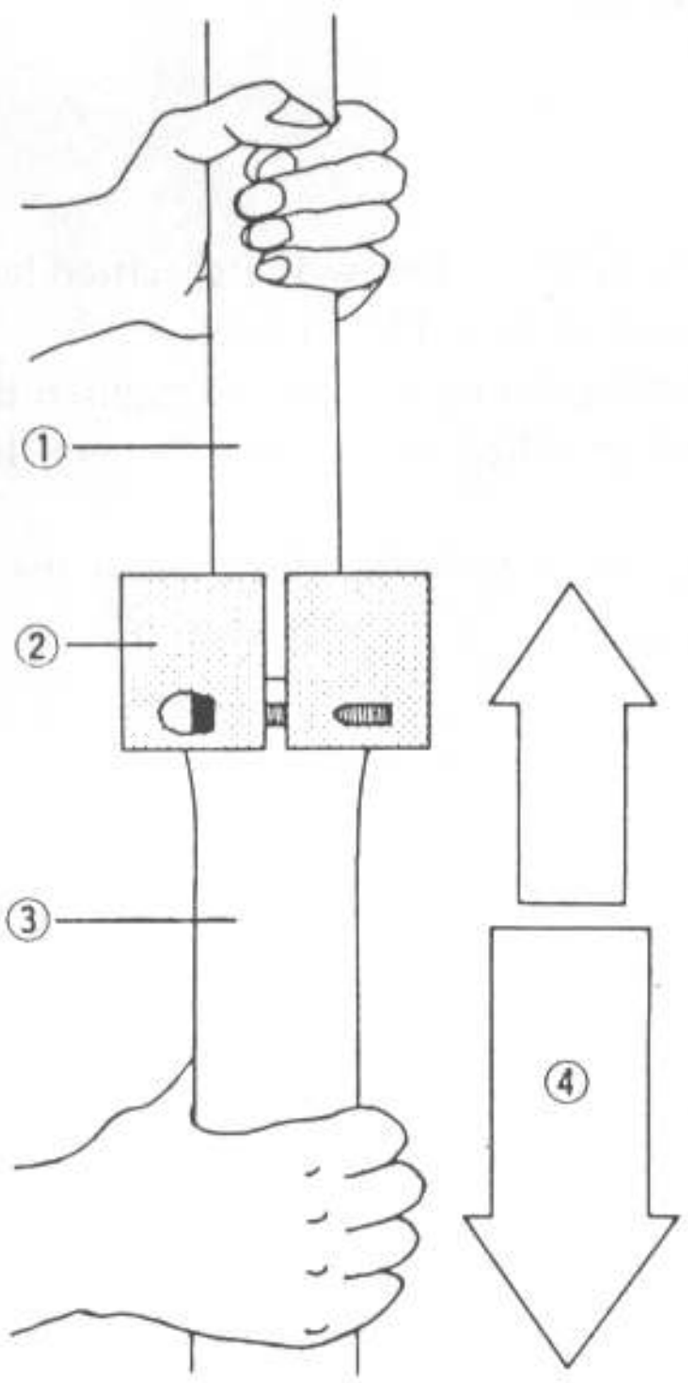
●Remove the following.



A. Dust Seal B. Retainer

○Mount the weight (special tool) on the top of the outer tube, by fitting the step of the weight (special tool) to the top corner of the outer tube.

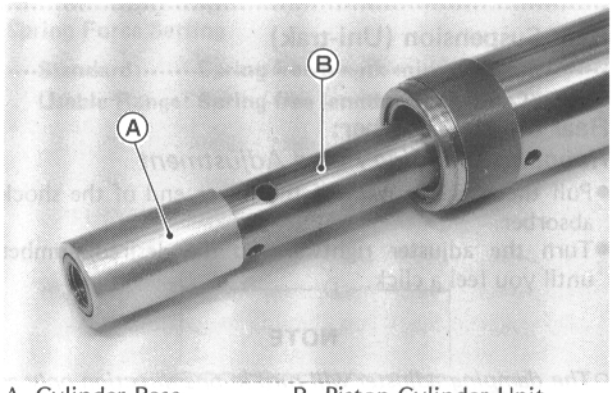
○Holding the inner tube by hand in a vertical position, stroke the outer tube several times and pull it down.



1. Inner Tube
2. Fork Outer Tube Weight: 57001-1218
3. Outer Tube
4. Stroke

●Take the oil seal, washer, and guide bush off the inner tube.

●Take the cylinder base off the pistons cylinder unit.

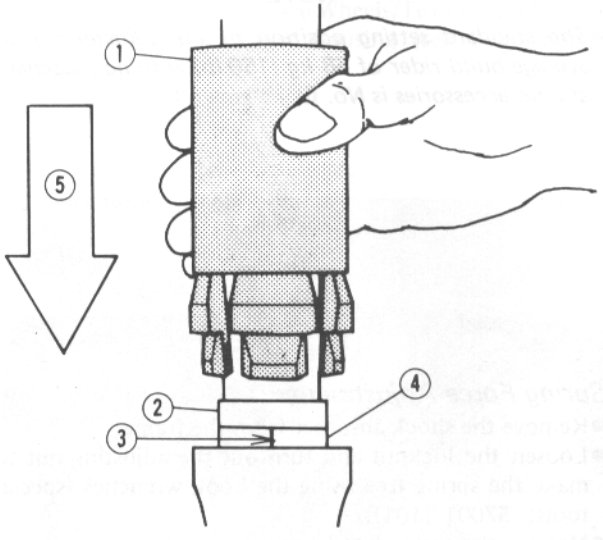


A. Cylinder Base B. Piston Cylinder Unit

- Take the piston cylinder unit and spring out of the inner tube.

Assembly Notes

- Check the top plug O-rings for damage.
- ★Replace them with new ones if damaged.
- Replace the oil seal removed with a new one.
- Replace the guide bushes with new ones.
- Apply non-permanent locking agent to the Allen bolt.
- Apply liquid gasket–silver (Kawasaki bond: 92104-002) to both sides of the gasket.
- Tighten the Allen bolt to the specified torque (see General Information chapter), using the front fork cylinder holder handle and adapter (special tools) to stop the cylinder from turning.
- Install the guide bush (with a used guide bush on it) by tapping the used guide bush with the fork oil seal driver (special tool) until it stops. The slit of the bush must be faced toward the left or right.



1. Driver: 57001-1219
2. Used Guide Bush
3. Slit (toward the left or right)
4. New Guide Bush
5. Tap

- Use the fork oil seal driver (special tool: 57001-1219) to install the oil seal in the front fork leg.
- Pour in the specified type and amount of oil.
- Install the fork spring with the closed spring end upward.
- Apply non-permanent locking agent to the threads of the side stand bracket mounting bolt.
- Tighten the following to the specified torques (see General Information chapter).

  Fork Top Plug
  Fork Clamp Bolts
  Handlebar Holder Clamp Bolt
  Caliper Mounting Bolts
  Front Axle Nut
  Front Axle Clamp Bolts
  Side Stand Bracket Mounting Bolts

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 brake will not function on the first application of the lever if this is not done.**

Inner Tube Inspection

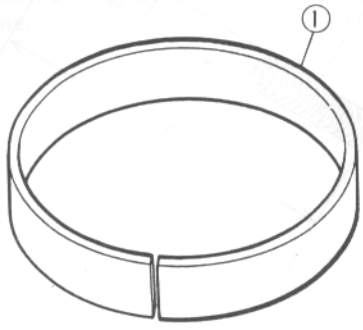
- ★If the inner tube is damaged, replace it.
- Nicks or rust damage can sometimes be repaired by using a wet-stone to remove sharp edges or raised areas which cause seal damage.
- ★If the damage is not repairable, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced.

CAUTION

○**If the inner tube is badly bent or creased, replace it. Excessive bending, followed by subsequent straightening, can weaken the inner tube.**

Guide Bush Inspection

- ★Replace the guide bushes if they are damaged or worn.

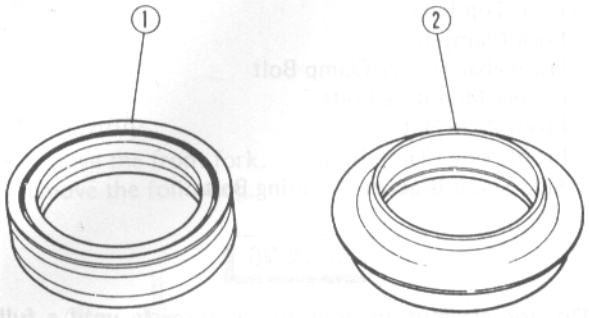


1. Guide Bush

Oil Seal and Dust Seal Inspection

★If dust seal is any damage or wear, replace it.

●Replace the oil seal with a new one whenever it has been removed.



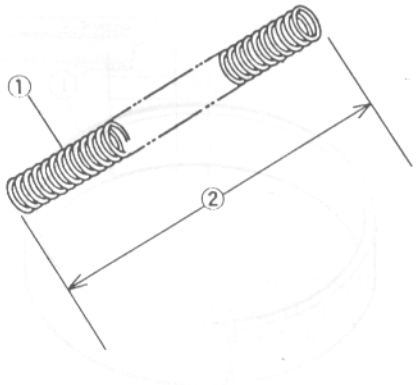
1. Oil Seal
2. Dust Seal

Spring Tension

★If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.

Fork Spring Free Length

Standard:	**450.7 mm**
Service Limit:	**442 mm**



1. Fork Spring
2. Free Length

Rear Suspension (Uni-trak)

Rear Shock Absorber:

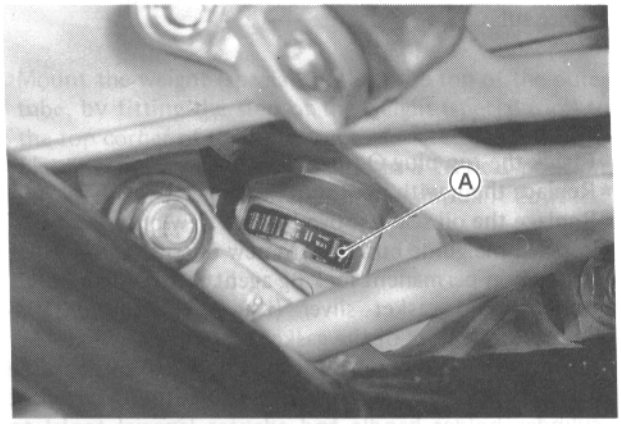
Rebound Damping Force Adjustment

●Pull the plastic cover off the lower end of the shock absorber.

●Turn the adjuster rightward to the desired number until you feel a click.

NOTE

○*The damping adjuster will turn in one direction only as indicated on it.*



A. Adjuster

Position	I	II	III	IIII
Damping Force	→			Larger

NOTE

○*The standard setting position of the adjuster for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is No.* II.

Spring Force Adjustment

●Remove the shock absorber from the frame.

●Loosen the locknut and turn out the adjusting nut to make the spring free using the hook wrenches (special tools: 57001-1101).

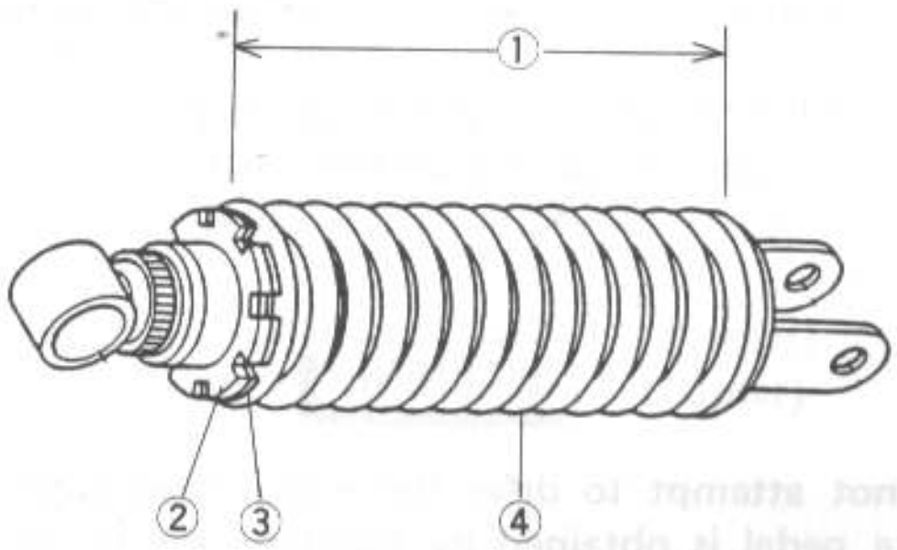
●Measure the spring free length.

●Turn in the adjusting nut to the desired position and tighten the locknut.

○The adjusting nut turned in by 10 mm from the free spring end represents the recommended spring force.

Spring Force Setting

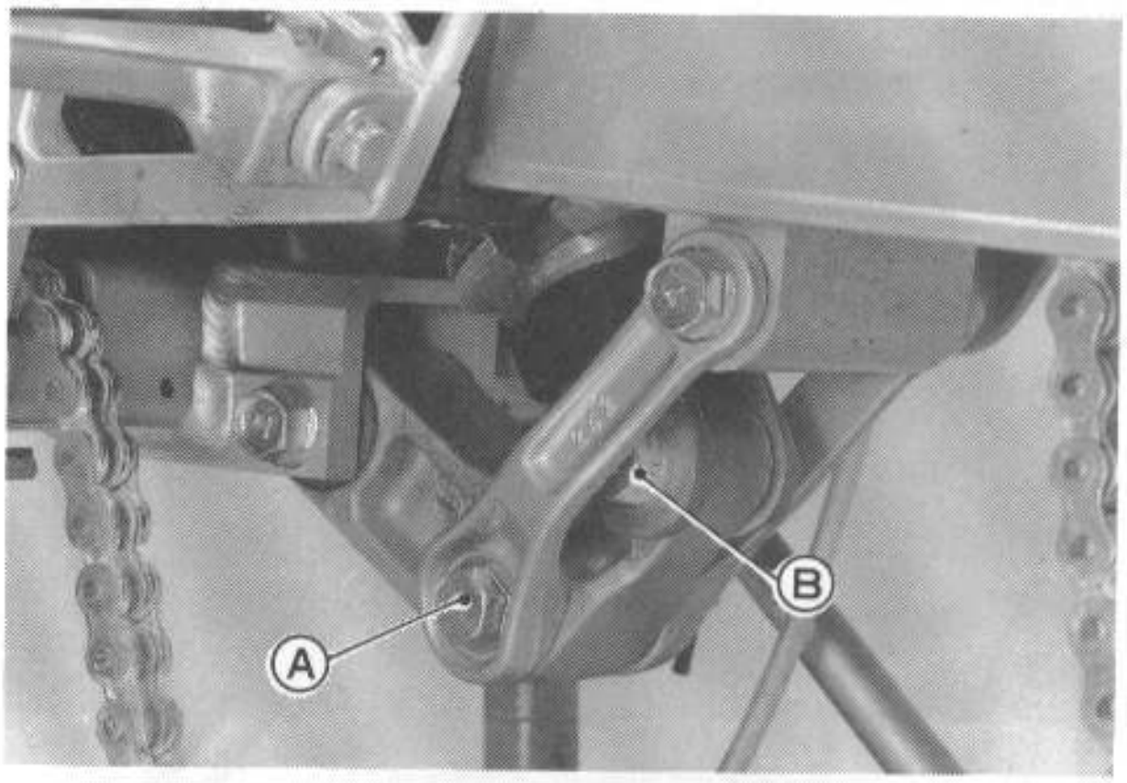
Standard: Spring free length minus 10 mm
Usable Range: Spring free length minus 0 to 25 mm



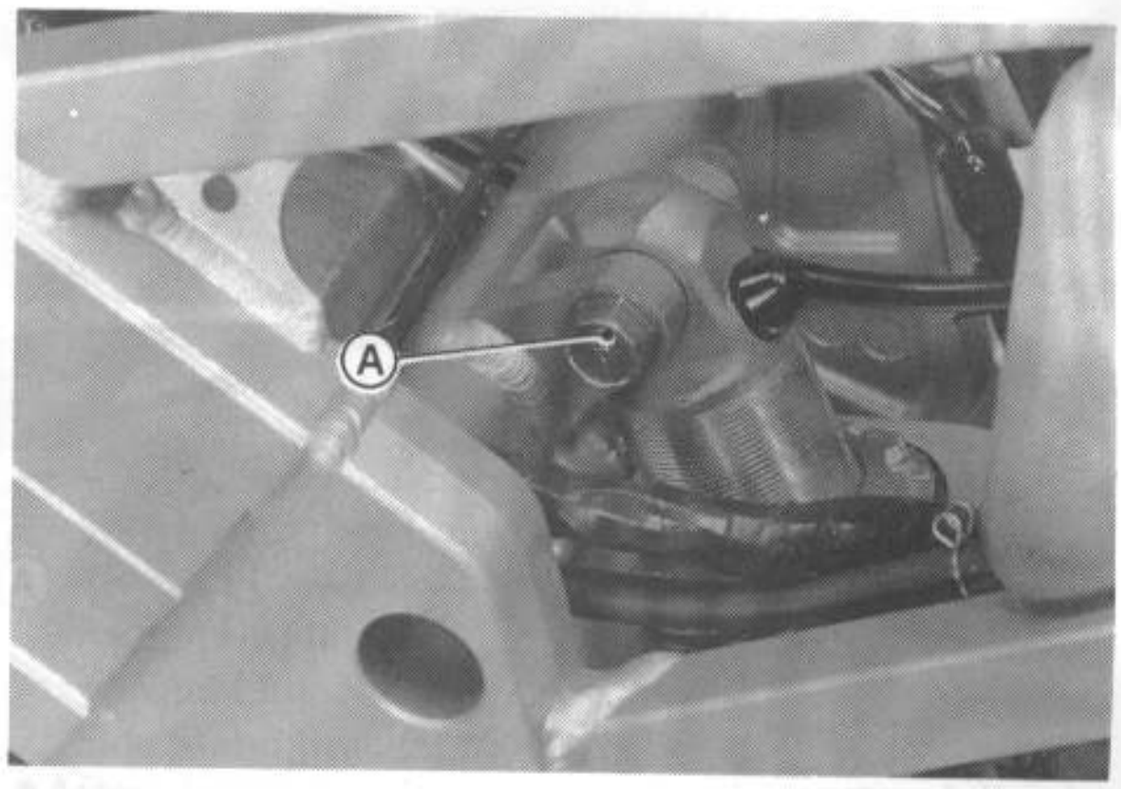
1. Spring Length
2. Locknut
3. Adjusting Nut
4. Spring

Removal

- Remove the rear wheel (see Wheels/Tires chapter).
- Remove the air cleaner housing (see Fuel System chapter).
- Remove the following parts.



A. Tie-Rod Lower Bolt
B. Shock Absorber Lower Mounting Bolt



A. Shock Absorber Upper Mounting Bolt

Installation

- Apply non-permanent locking agent to the threads of the side stand bracket mounting bolts.
- Visually inspect the clips for the torque link nut and rear axle nut. Replace them with the new ones, if necessary.
- Tighten the following bolts and nuts to the specified torque (see General Information chapter).
  - Shock Absorber Upper Mounting Bolt
  - Shock Absorber Lower Mounting Bolt
  - Tie-Rod Lower Bolt
  - Rear Axle Nut
  - Torque Link Nuts
  - Side Stand Bracket Mounting Bolts
- After installation, check and adjust the following.
  - Drive Chain Slack (see Final Drive chapter)
  - Wheel Alignment (see Final Drive chapter)
  - Throttle and Choke Cables Operation (see Fuel System chapter)

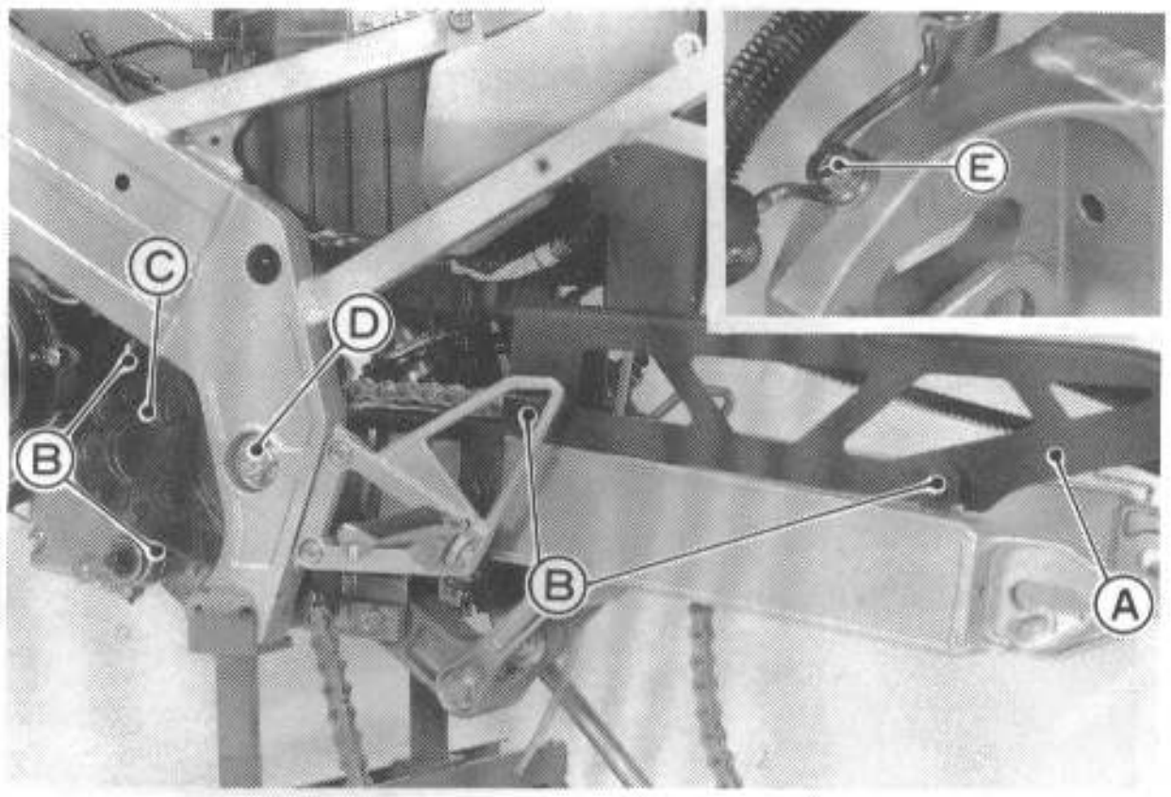
WARNING

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

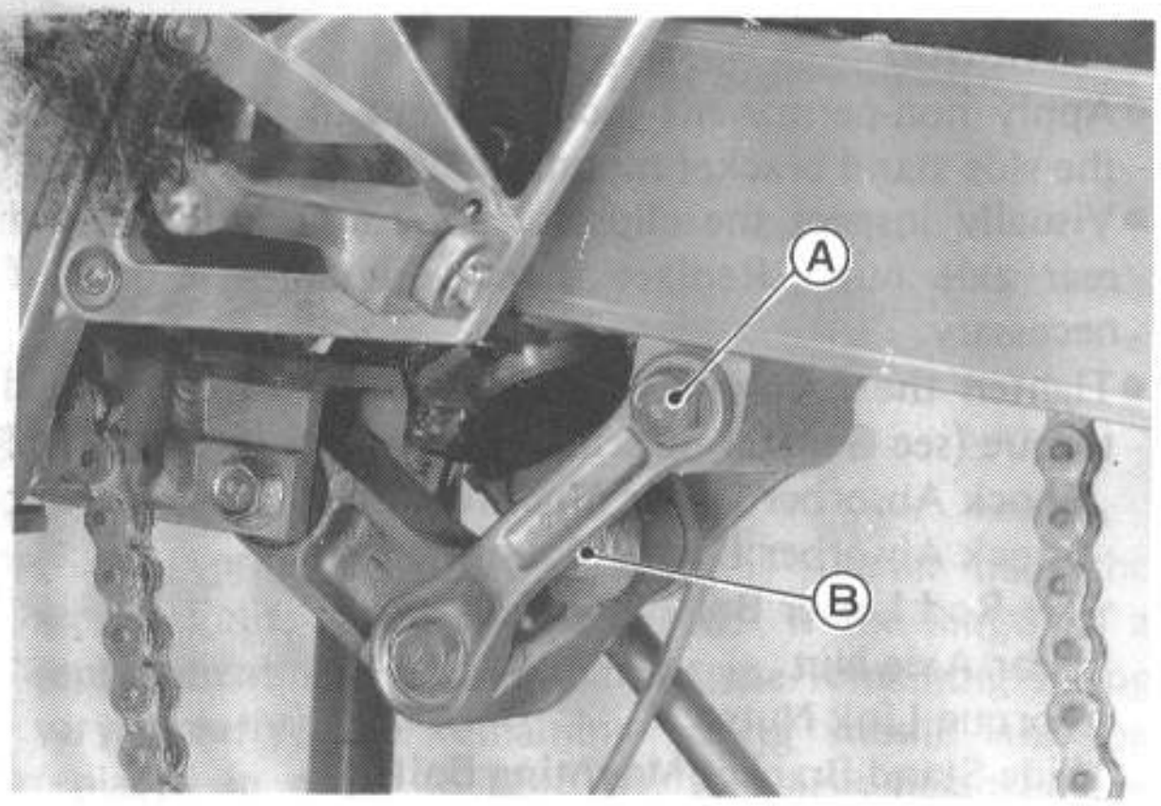
Swing Arm:

Removal

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



A. Chain Case
B. Mounting Bolt
C. Engine Sprocket Cover
D. Swing Arm Pivot Shaft Nut
E. Brake Hose Clamp Mounting Bolt



A. Tie-Rod Upper Bolt
B. Shock Absorber Lower Mounting Bolt

- Pull out the swing arm pivot shaft, then remove the swing arm.

CAUTION

○**Take care not to damage the brake hose.**

Installation

- Apply non-permanent locking agent to the threads of the side stand bracket mounting bolts.
- Visually inspect the clips for the torque link nut and rear axle nut. Replace them with new ones, if necessary.
- Tighten the following bolts and nuts to the specified torque (see General Information chapter).
  - Swing Arm Pivot Shaft Nut
  - Shock Absorber Lower Mounting Bolt
  - Tie-Rod Upper Bolt
  - Rear Axle Nut
  - Torque Link Nut
  - Side Stand Bracket Mounting Bolts
- After installation, check and adjust the following items.
  - Drive Chain Slack (see Final Drive chapter)
  - Wheel Alignment (see Final Drive chapter)

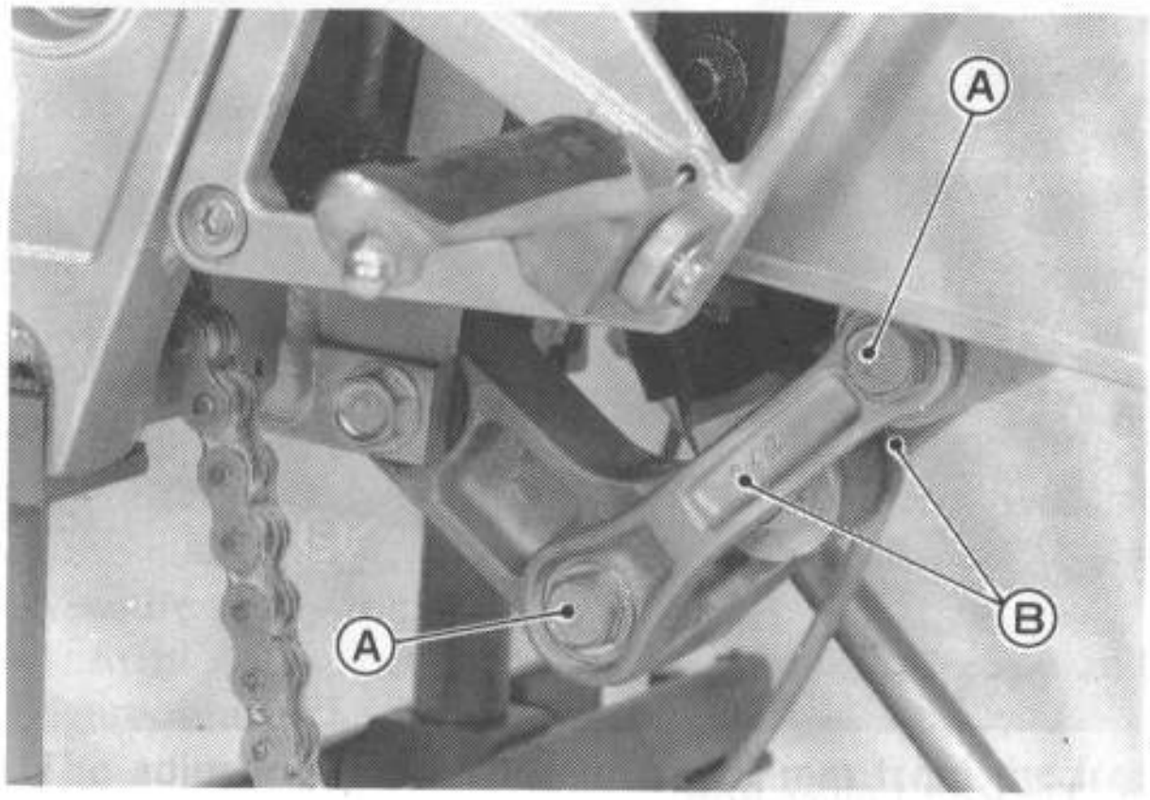
WARNING

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

Tie-Rod, Rocker Arm:

Tie-Rod Removal

- Remove the rear wheel (see Wheels/Tires chapter).
- Remove the upper and lower mounting bolts and take the tie-rods off.



A. Mounting Bolts B. Tie-Rods

Tie-Rod Installation

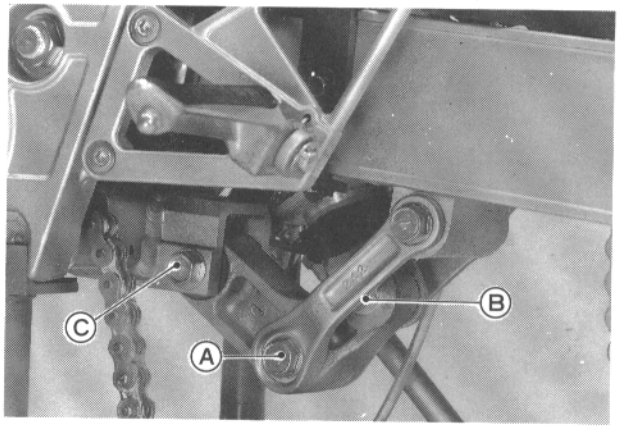
- Apply non-permanent locking agent to the threads of the side stand bracket mounting bolts.
- Visually inspect the clips for the torque link nut and rear axle nut. Replace them with new ones, if necessary.
- Tighten the following bolts and nuts to the specified torque (see General Information chapter).
  - Tie-Rod Mounting Bolts
  - Rear Axle Nut
  - Torque Link Nut
  - Side Stand Bracket Mounting Bolts
- After installation, check and adjust the following items.
  - Drive Chain Slack (see Final Drive chapter)
  - Wheel Alignment (see Final Drive chapter)

WARNING

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

Rocker Arm Removal

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



A. Tie-Rod Lower Bolt
B. Shock Absorber Lower Bolt
C. Rocker Arm Shaft

Rocker Arm Installation

- Apply non-permanent locking agent to the threads of the side stand bracket mounting bolts.
- Visually inspect the clips for the torque link nut and rear axle nut. Replace them with new ones, if necessary.
- Tighten the following bolts and nuts to the specified torque (see General Information chapter).
  - Rocker Arm Shaft Nut
  - Shock Absorber Lower Bolt
  - Tie-Rod Lower Bolt
  - Rear Axle Nut
  - Torque Link Nut
  - Side Stand Bracket Mounting Bolts
- After installation, check and adjust the following items.
  - Drive Chain Slack (see Final Drive chapter)
  - Wheel Alignment (see Final Drive chapter)

WARNING

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

Needle Bearing Inspection

★If there is any doubt as to the condition of either needle bearing, replace the bearing and sleeve as a set.

Tie-Rod, Rocker Arm Sleeve Inspection

★If there is visible damage, replace the sleeve and needle bearing as a set.

Tie-Rod, Rocker Arm Needle Bearing Lubrication

There is a grease nipple on the tie-rod and rocker arm for lubrication.

- Force the Molybdenum Disulfide Grease into the nipple until it comes out at both sides of the tie-rod or rocker arm, and wipe off any excess.

Steering

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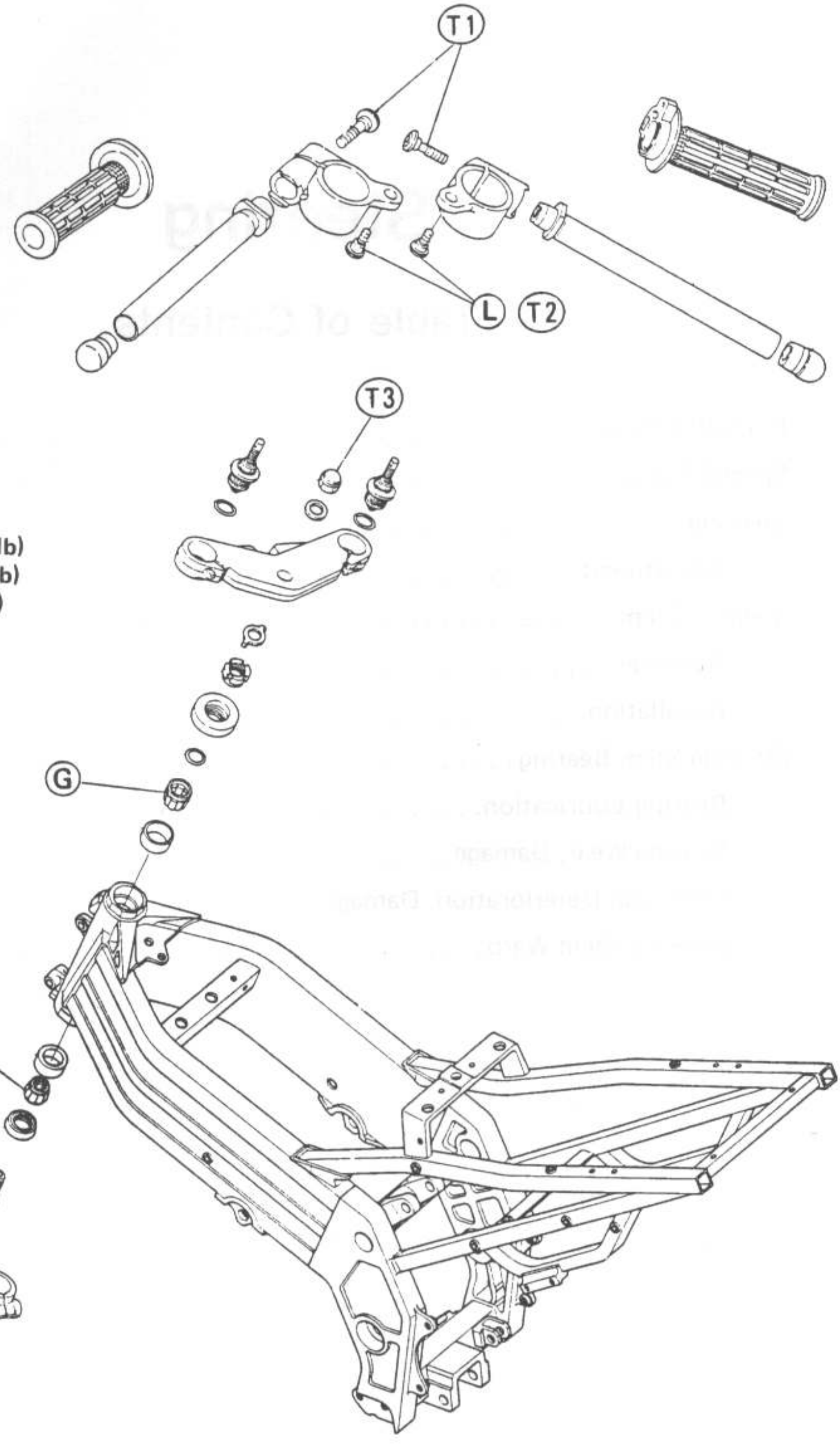
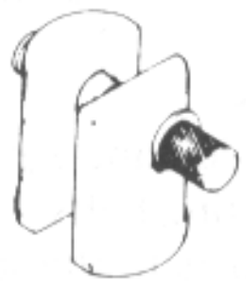
Exploded View



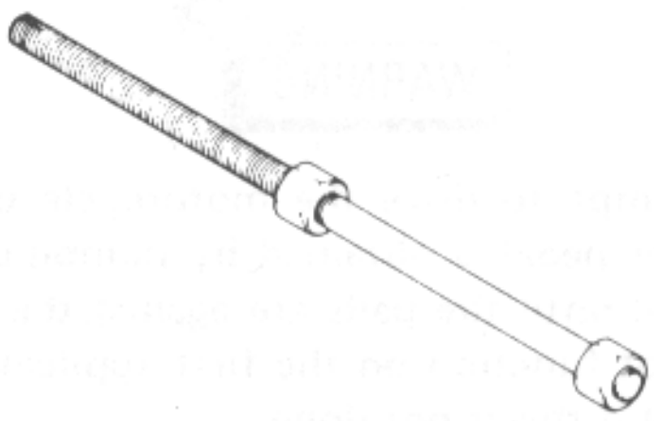
G : Apply grease.
T1: 23 N-m (2.3 kg-m, 16.5 ft-lb)
T2: 12 N-m (1.2 kg-m, 104 in-lb)
T3: 39 N-m (4.0 kg-m, 29 ft-lb)

Special Tools

Stem Bearing Remover: 57001-1107

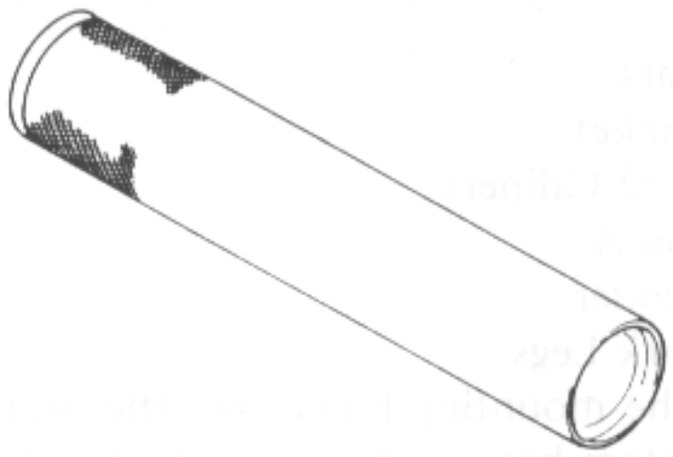


Stem Bearing Press Shaft: 57001-1075



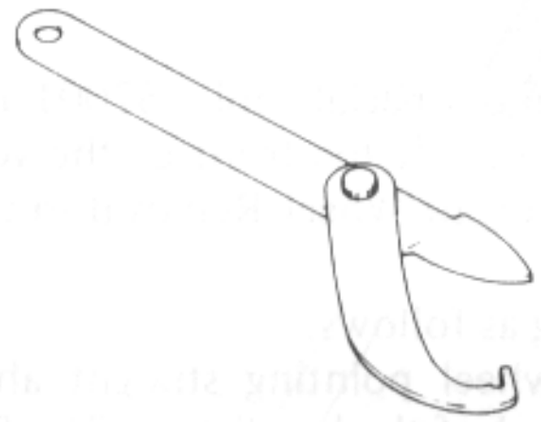
Outer Race Driver: 57001-1106

Stem Bearing Driver: 57001-137



Adapter: 57001-1092

Stem Nut Wrench: 57001-1100



Steering

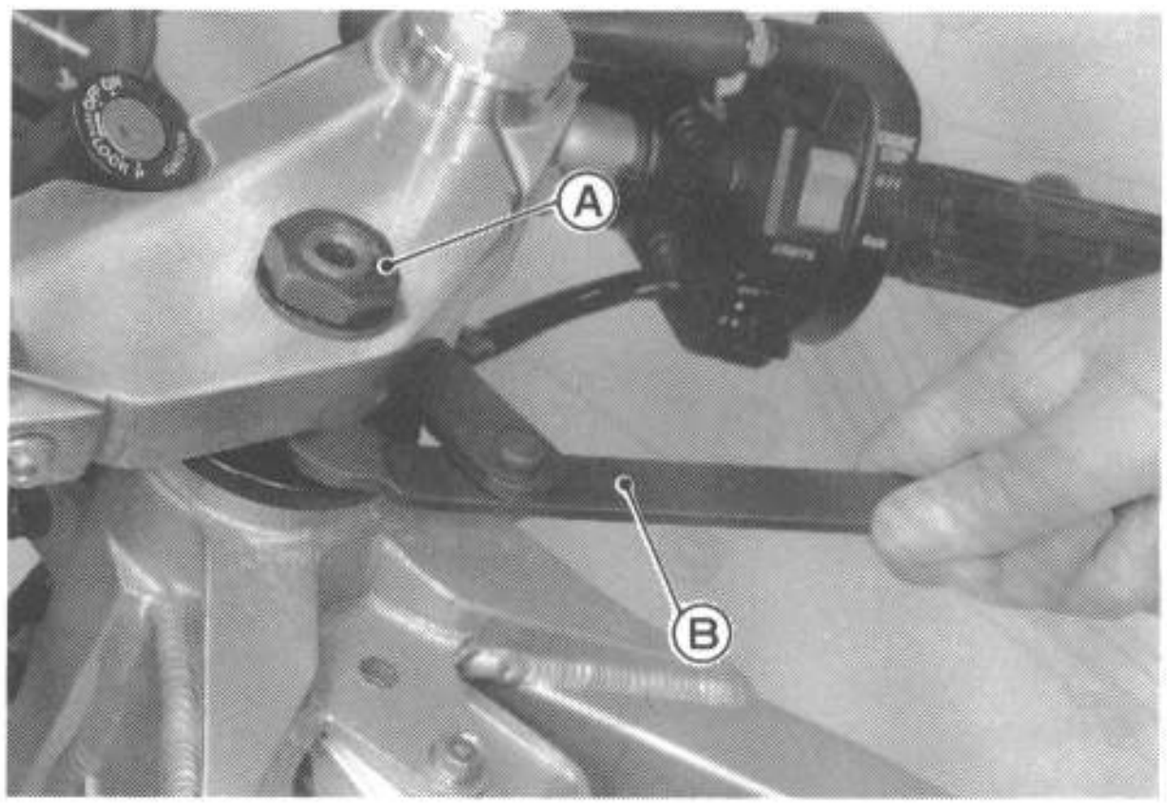
Adjustment

- Using the jack stand (special tool: 57001-1238), support the vehicle and lift the front of the vehicle by a suitable jack (see Front Wheel Removal in the Wheels/Tires chapter).
- Check the steering as follows.
  - ○With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.
  - ○Feel for steering looseness by pushing and pulling the forks.
  - ★If the wheel binds or catches before the stop, the steering is too tight.
  - ★If you feel looseness, the steering is too loose.

NOTE

- ○*The cables and wiring will have some effect on the motion of the fork which must be taken into account. Be sure the wires and cables are properly routed.*
- ○*The bearings must be in good condition and properly lubricated in order for any test to be valid.*

- ★Adjust the steering if necessary.
- Remove the following parts.
  - Fuel Tank
  - Fork Lower Clamp Bolts (both sides)
  - Stem Head Nut (Loosen)
- Adjust the steering with the stem nut wrench (special tool).



A. Stem Head Nut
B. Stem Nut Wrench: 57001-1100

- ★If the steering is too tight, loosen the stem locknut a fraction of a turn.
- ★If the steering is loose, tighten the locknut a fraction of a turn.

NOTE

- ○*Turn the locknut 1/8 turn at a time maximum.*

- Tighten the steering stem head nut to the specified torque (see General Information chapter).
- Tighten the front fork lower clamp bolts to the specified torque (see General Information chapter in Suspension chapter).
- Check the steering again.
- ★If the steering is still too tight or too loose, repeat the adjustment.
- Install the removed parts.
- Apply a non-permanent locking agent to the threads of side stand bracket mounting bolts.
- Tighten the following parts to the specified torque (see General Information chapter).
  - Axle Nut
  - Axle Clamp Bolts
  - Brake Caliper Mounting Bolts
  - Side Stand Bracket Mounting Bolts

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.**

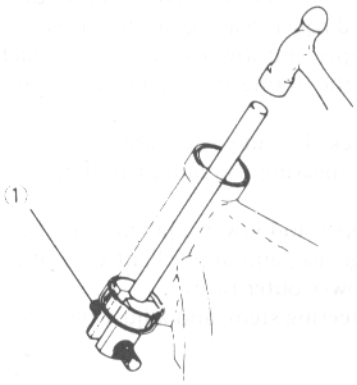
Steering Stem

Removal

- Remove the following parts.
  - Fuel Tank
  - Fairing
  - Handlebars
  - Horn Bracket
  - Both Front Calipers
  - Front Wheel
  - Front Fender
  - Front Fork Legs
- Remove the mounting bolts, free the brake hose joint from the stem base, and remove the front brake assembly as a set.
- Remove the stem head nut.
- Remove the steering stem head.
- Push up on the stem base, and remove the steering stem locknut using the stem nut wrench (special tool), then remove the steering stem and stem base (single unit).
- Remove the upper tapered roller bearing inner race and O-ring.
- To remove the outer races pressed into the head pipe, install the stem bearing remover (special tool) as shown below, and hammer the stem bearing remover to drive it out.

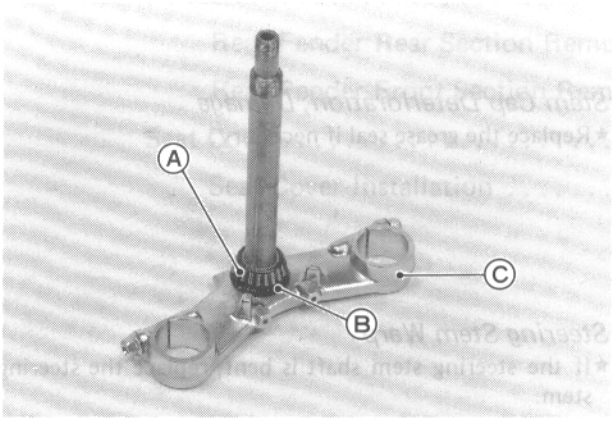
NOTE

○*If either steering stem bearing is damaged, it is recommended that both the upper and lower bearings (including outer races) should be replaced with new ones.*

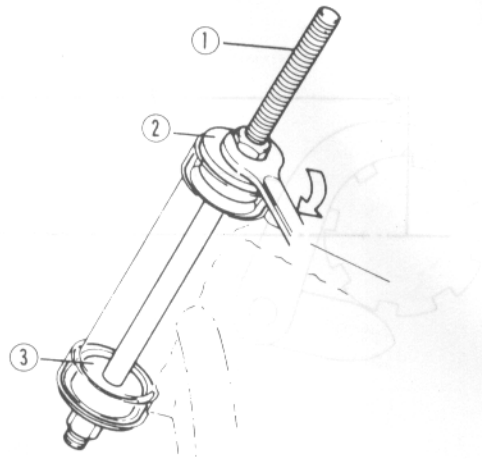


1. Stem Bearing Remover: 57001-1107

●Remove the lower inner race (with its grease seal) which is pressed onto the steering stem.

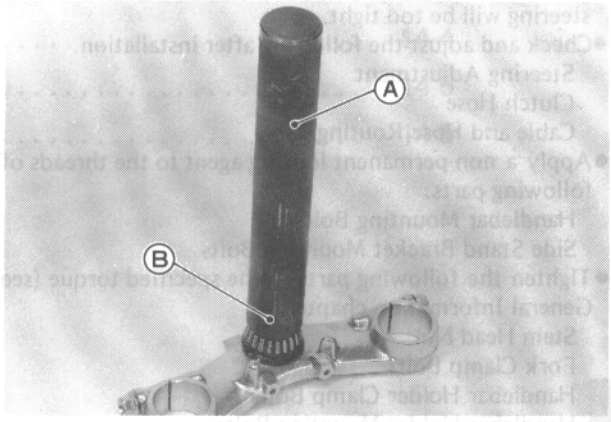


A. Inner Race
B. Grease Seal
C. Stem Base



1. Driver Press Shaft: 57001-1075
2. Driver: 57001-1106
3. Driver: 57001-1106

●Apply grease to the lower tapered roller bearing, and drive it onto the steering stem using the stem bearing driver and adapter (special tools: 57001-137 and 57001-1092).



A. Stem Bearing Driver: 57001-137
B. Adapter: 57001-1092

Installation

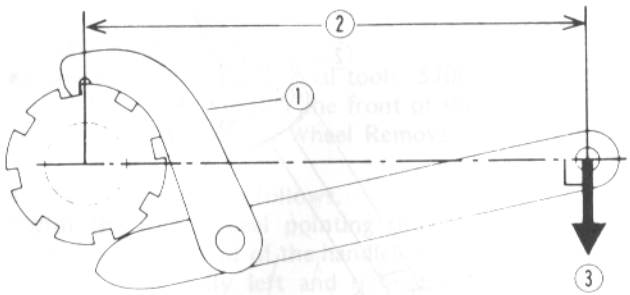
●Installation is reverse of removal. Note the following.

○Apply grease to the outer races, and then drive them into the head pipe using the drivers and the driver press shaft (special tools).

★Check the O-ring on the upper tapered roller bearing for damage. Replace it if necessary.

●The following four steps should be performed after steering bearing installation. This procedure settles the bearings in place.

○Using the stem nut wrench, tighten the stem locknut to 39 N-m (4.0 kg-m, 29 ft-lb) of torque. (To tighten the steering stem locknut to the specified torque, hook the wrench on the stem locknut, and pull the wrench at the hole by 22.2 kg force in the direction shown.)



1. Stem Nut Wrench: 57001-1100
2. 180 mm
3. 22.2 kg

○Check that there is no play and the steering stem turns smoothly without the rattle.
☆If not, the steering stem bearing may be damaged.
○Again back out the stem locknut a fraction of a turn until it turns lightly.
○Turn the stem locknut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.
●Check and adjust the following after installation.
Steering Adjustment
Clutch Hose
Cable and Hose Routing
●Apply a non-permanent locking agent to the threads of following parts.
Handlebar Mounting Bolts
Side Stand Bracket Mounting Bolts
●Tighten the following parts to the specified torque (see General Information chapter).
Stem Head Nut
Fork Clamp Bolts
Handlebar Holder Clamp Bolts
Handlebar Holder Mounting Bolts
Front Axle Nut
Front Axle Clamp Bolts
Brake Caliper Mounting Bolts
Side Stand Bracket Mounting Bolts

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.

Steering Stem Bearing

Bearing Lubrication

●Perform the following.
○Remove the steering stem.
○Using a high flash-point solvent, wash the upper and lower tapered roller bearings in the cages.
○Wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean of grease and dirt.
○Visually check the outer races and the rollers.
☆Replace the bearing assemblies if they show wear or damage.
○Pack the upper and lower tapered roller bearings in the cages with grease, and apply light coat of grease to the upper and lower outer races.
○Install the steering stem, and adjust the steering.

Bearing Wear, Damage

★Replace the bearing assemblies if they show damage.

Stem Cap Deterioration, Damage

★Replace the grease seal if necessary.

Steering Stem Warp

★If the steering stem shaft is bent, replace the steering stem.

Frame

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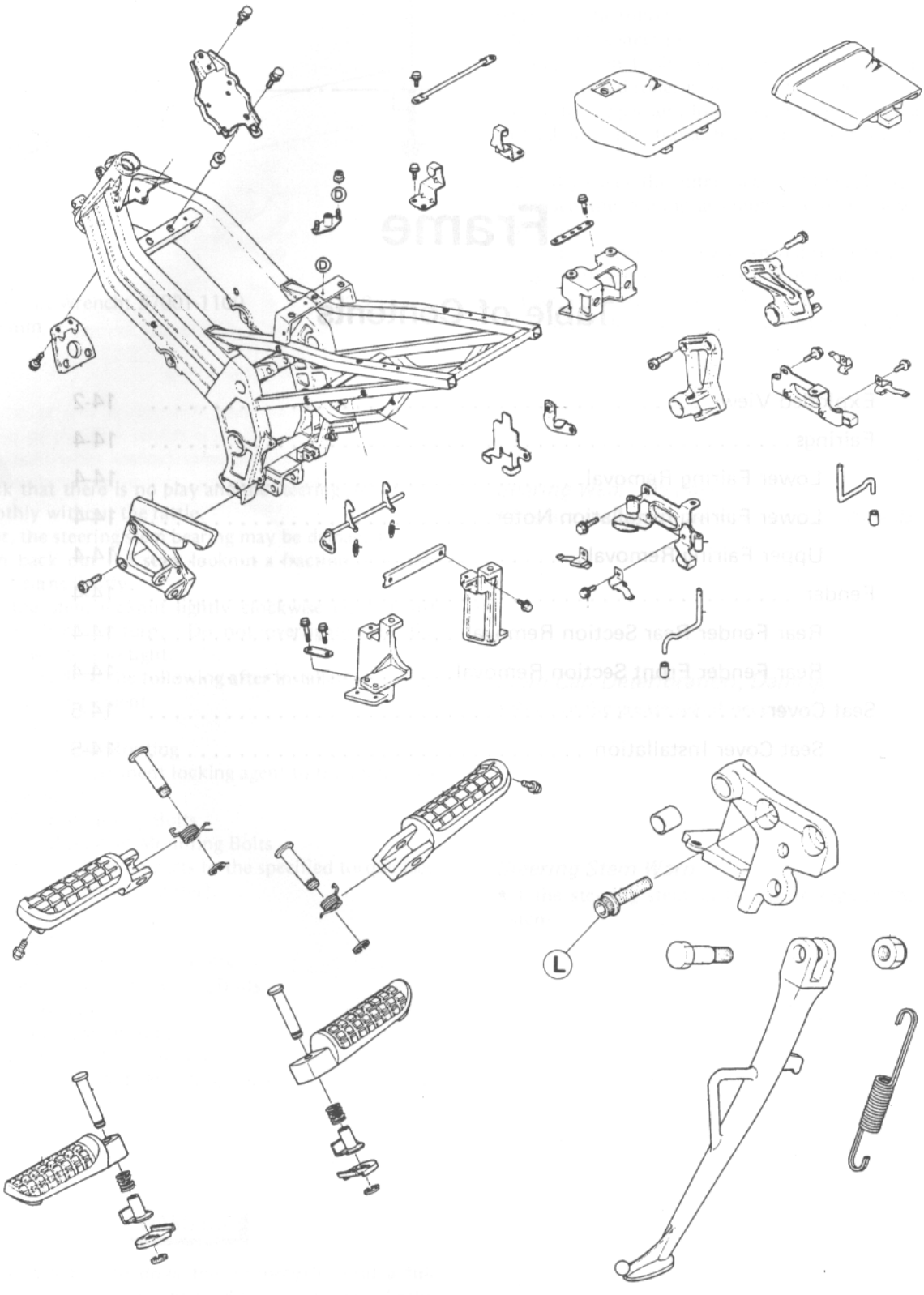
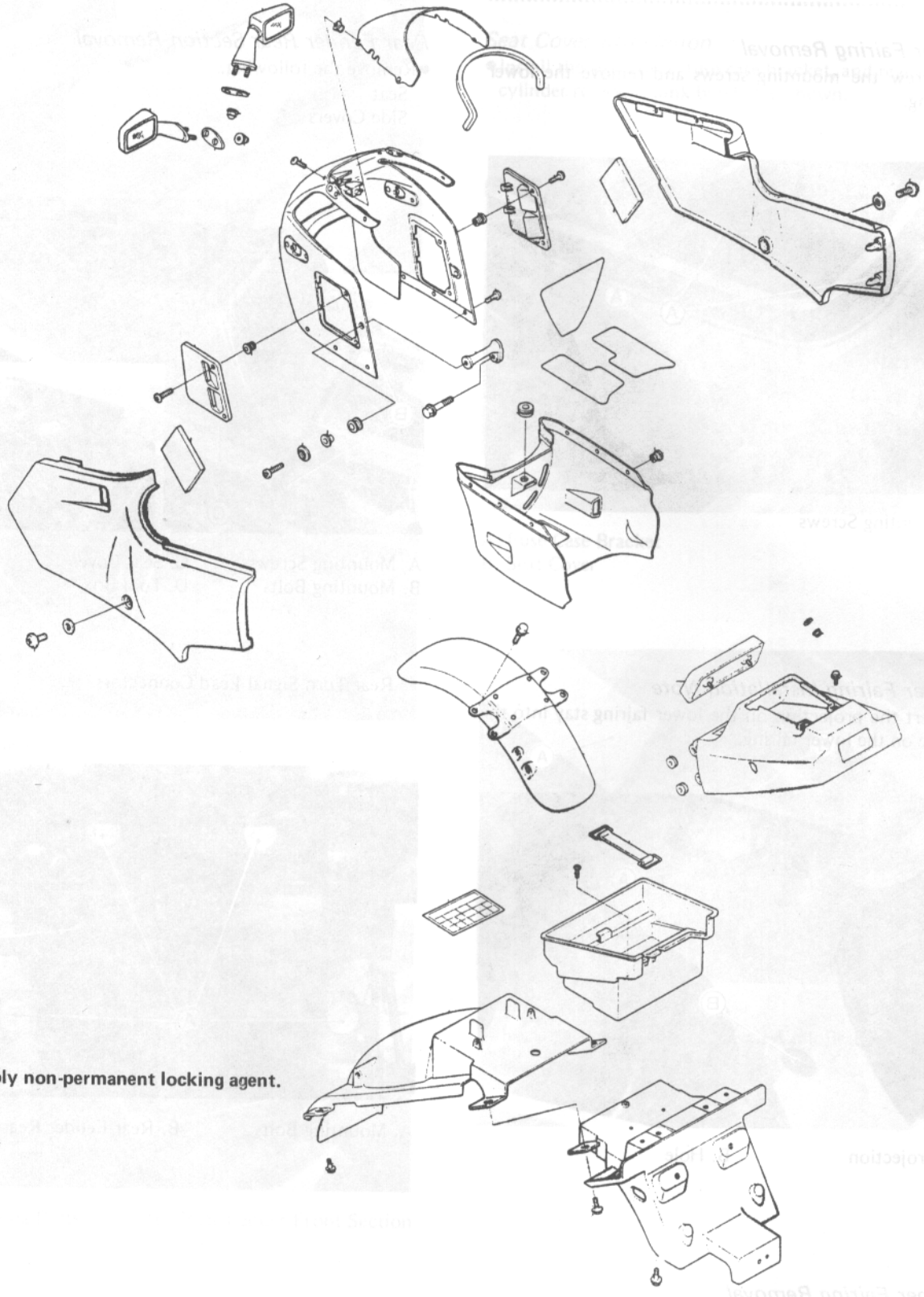
Exploded View



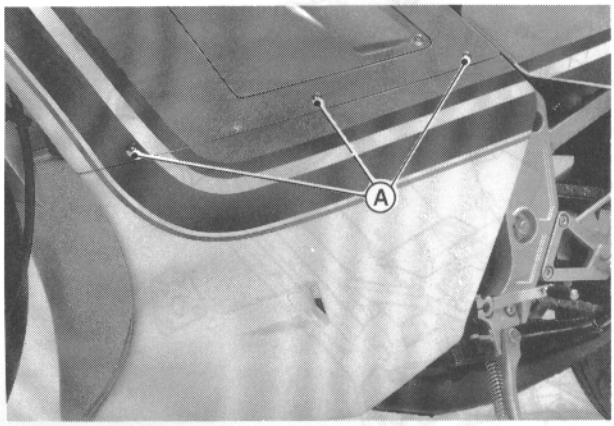


L : Apply non-permanent locking agent.

Fairings

Lower Fairing Removal

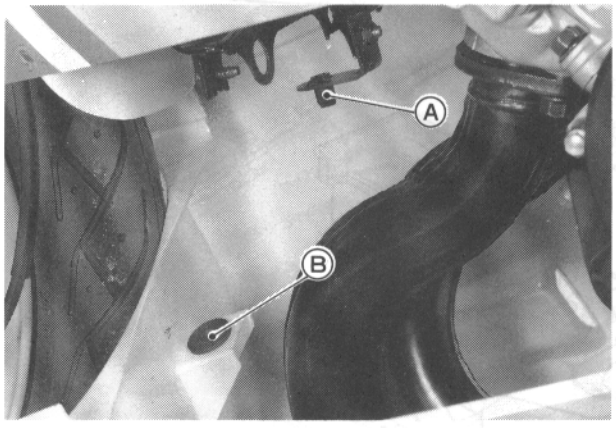
● Unscrew the mounting screws and remove the lower fairing.



A. Mounting Screws

Lower Fairing Installation Note

● Insert the projection on the lower fairing stay into the hole on the lower fairing.



A. Projection B. Hole

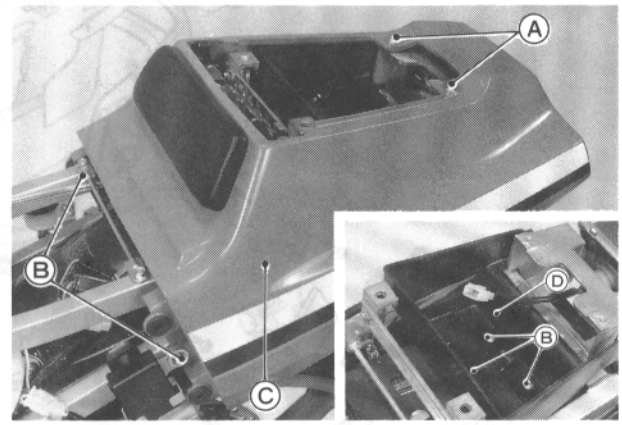
Upper Fairing Removal

● Remove the following.
  Lower Fairing
  Rear View Mirrors
● Unscrew the mounting bolts and screws, and remove the upper fairing.

Fender

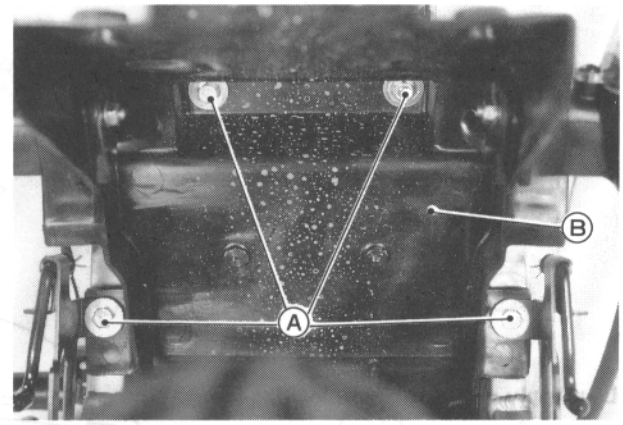
Rear Fender Rear Section Removal

● Remove the following.
  Seat
  Side Covers



A. Mounting Screws C. Seat Cover
B. Mounting Bolts D. Tool Box

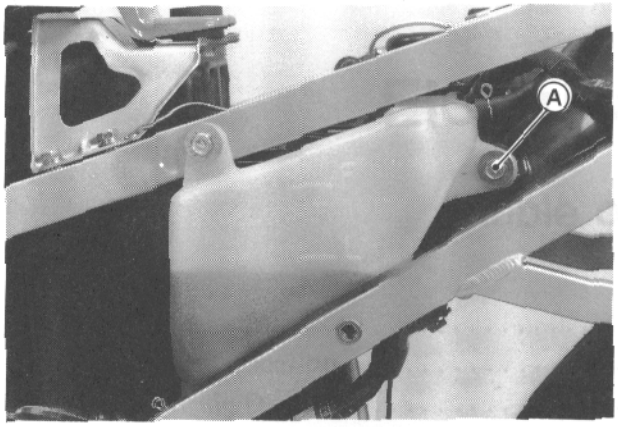
Rear Turn Signal Lead Connectors



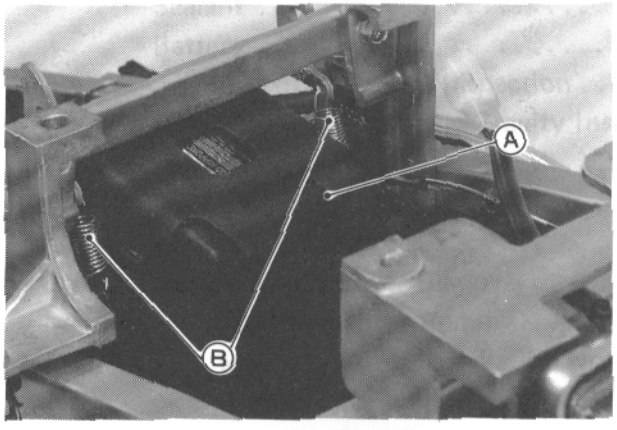
A. Mounting Bolts B. Rear Fender Rear Section

Rear Fender Front Section Removal

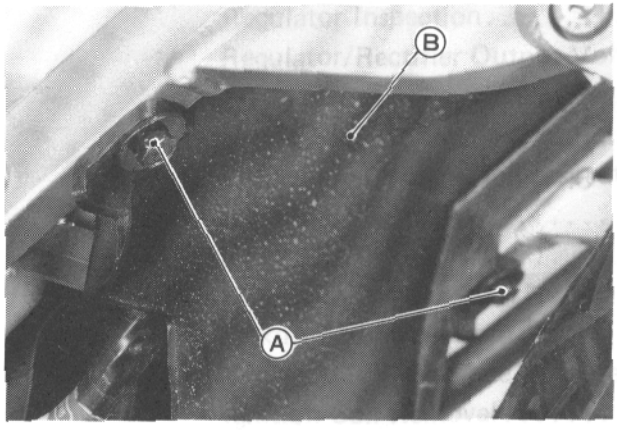
● Remove the rear fender rear section.
● Remove the following.



A. Coolant Reservoir Tank Mounting Bolt (Rear)



A. CDI Unit
B. Seat Lock Return Spring

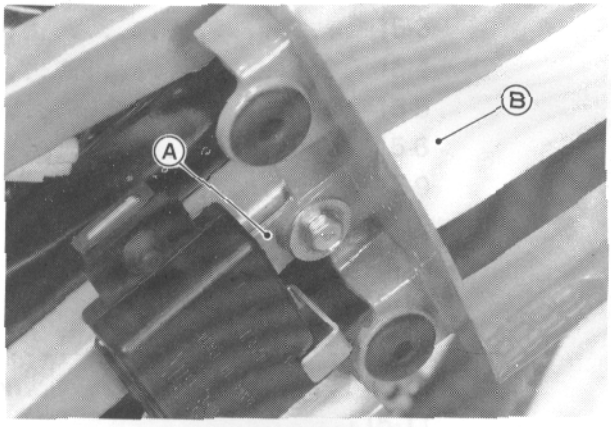


A. Mounting Bolts B. Rear Fender Front Section

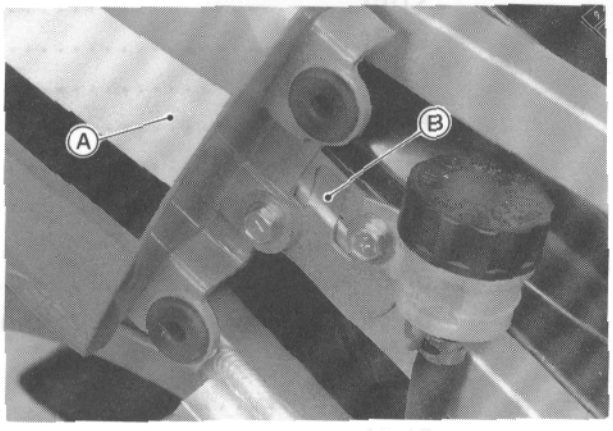
Seat Cover

Seat Cover Installation

- Install the seat cover, fuse case bracket, and rear master cylinder reservoir tank bracket as shown.



A. Fuse Case Bracket
B. Seat Cover



A. Seat Cover
B. Rear Master Cylinder Reservoir Tank Bracket

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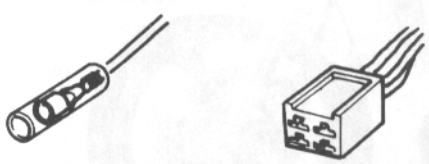
Precautions

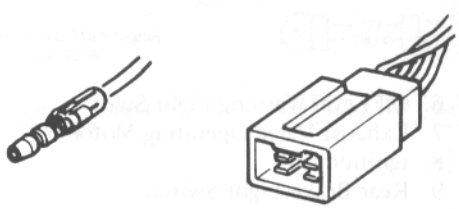
There are numbers of important precautions that are musts when servicing electrical system. Learn and observe all the rules below.

- Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the large amount of current, never keep the starter switch pushed when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Do not use a meter illumination bulb rated for other than voltage or wattage specified in the wiring diagram, as the meter or gauge panel could be warped by excessive heat radiated from the bulb.
- Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was brought on by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.
- Electrical Connectors

Female Connectors



Male Connectors

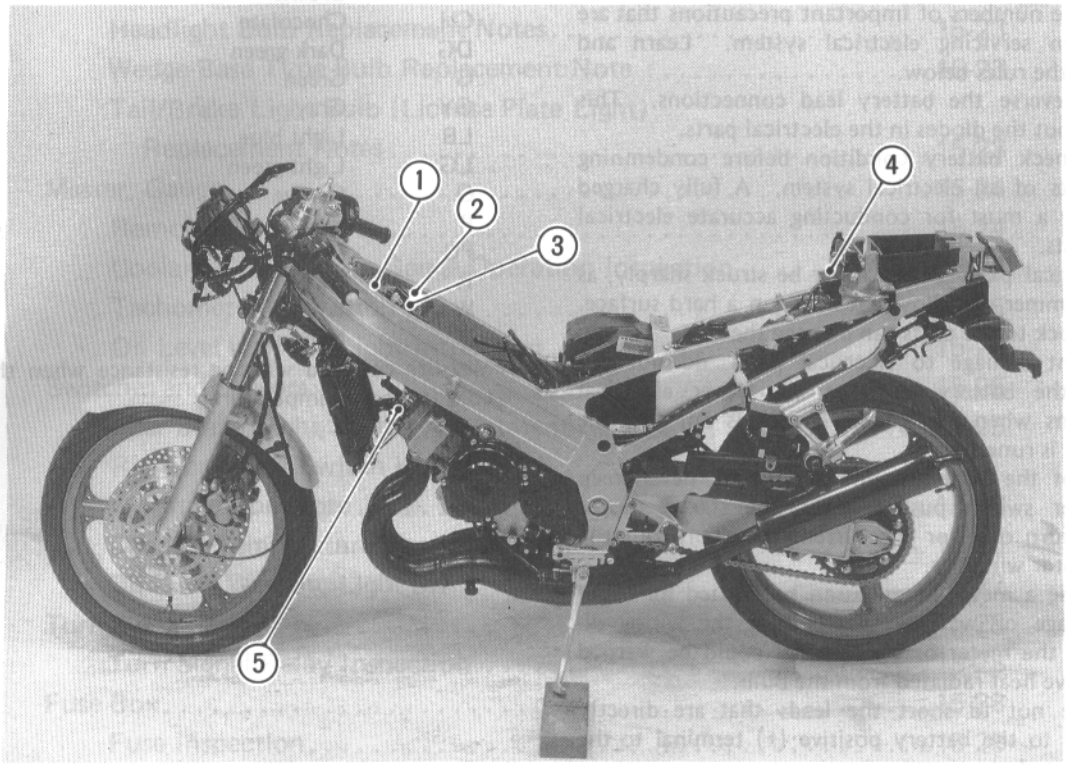


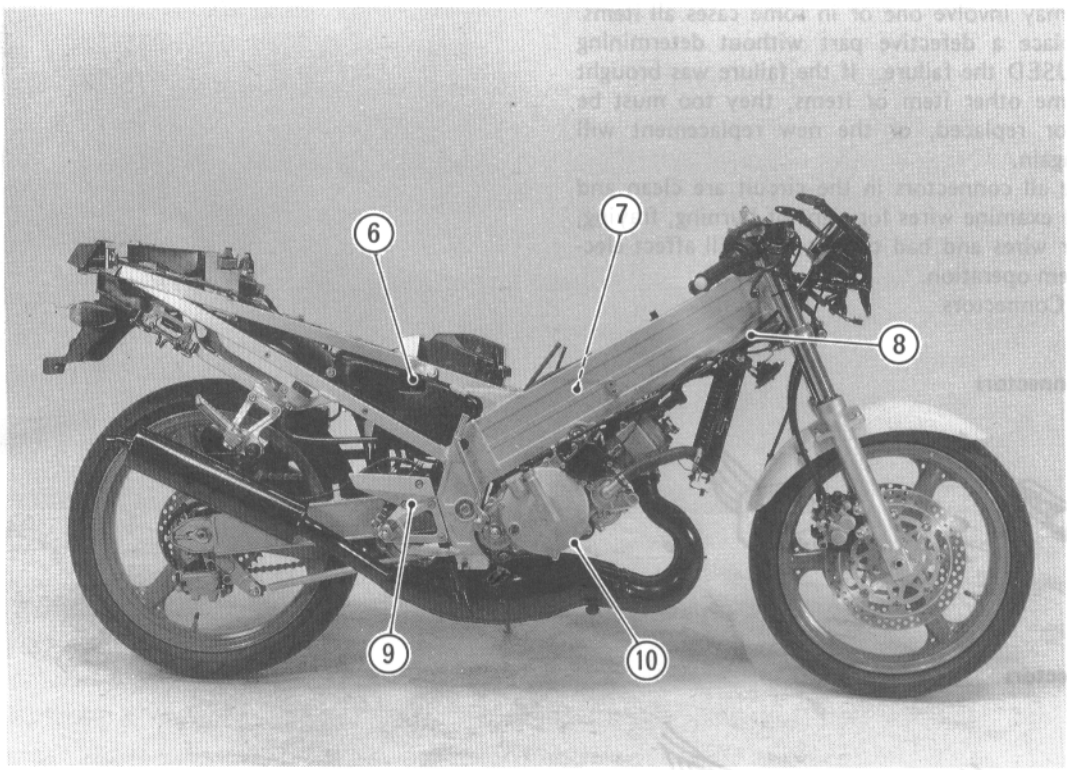
- Color Codes:

BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark green
G	Green
GY	Gray
LB	Light blue
LG	Light green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

- Measure coil and winding resistance when the part is cold (at room temperature).

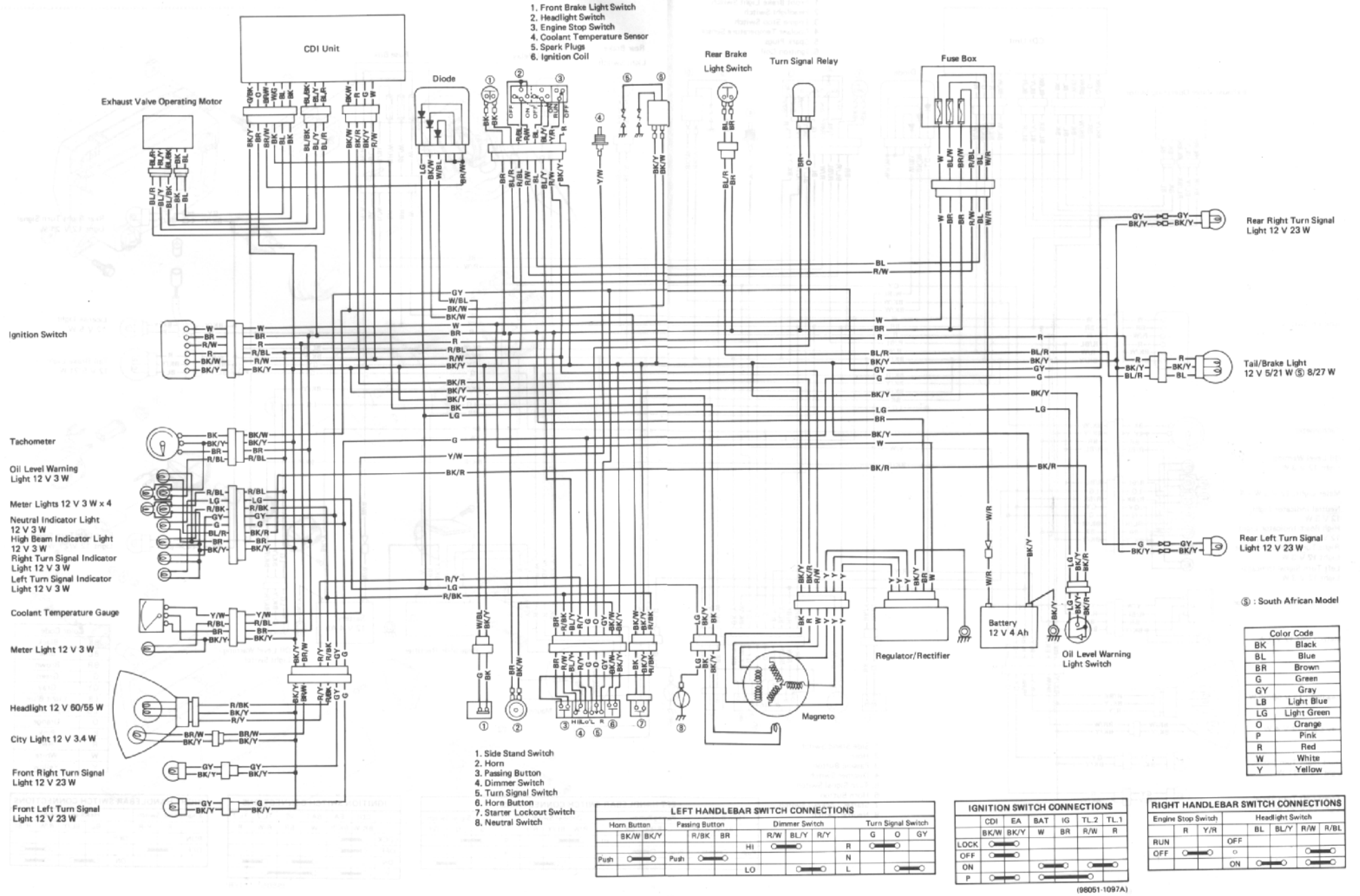
Parts Location





1. Regulator/Rectifier
2. Diode
3. Turn Signal Relay
4. CDI Unit
5. Exhaust Valve Operating Unit
6. Oil Level Warning Light Switch
7. Exhaust Valve Operating Motor
8. Ignition Coil
9. Rear Brake Light Switch
10. Neutral Switch

KR250-B1, B2 Wiring Diagram (Australian and South African models)



Ⓢ : South African Model

Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
R	Red
W	White
Y	Yellow

LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Passing Button			Dimmer Switch				Turn Signal Switch		
	BK/W	BK/Y		R/BK	BR		R/W	BL/Y	R/Y		G	O	GY
						HI	○	●		R	●	○	
Push	●	○	Push	●	○					N			
						LO		●		L			●

IGNITION SWITCH CONNECTIONS

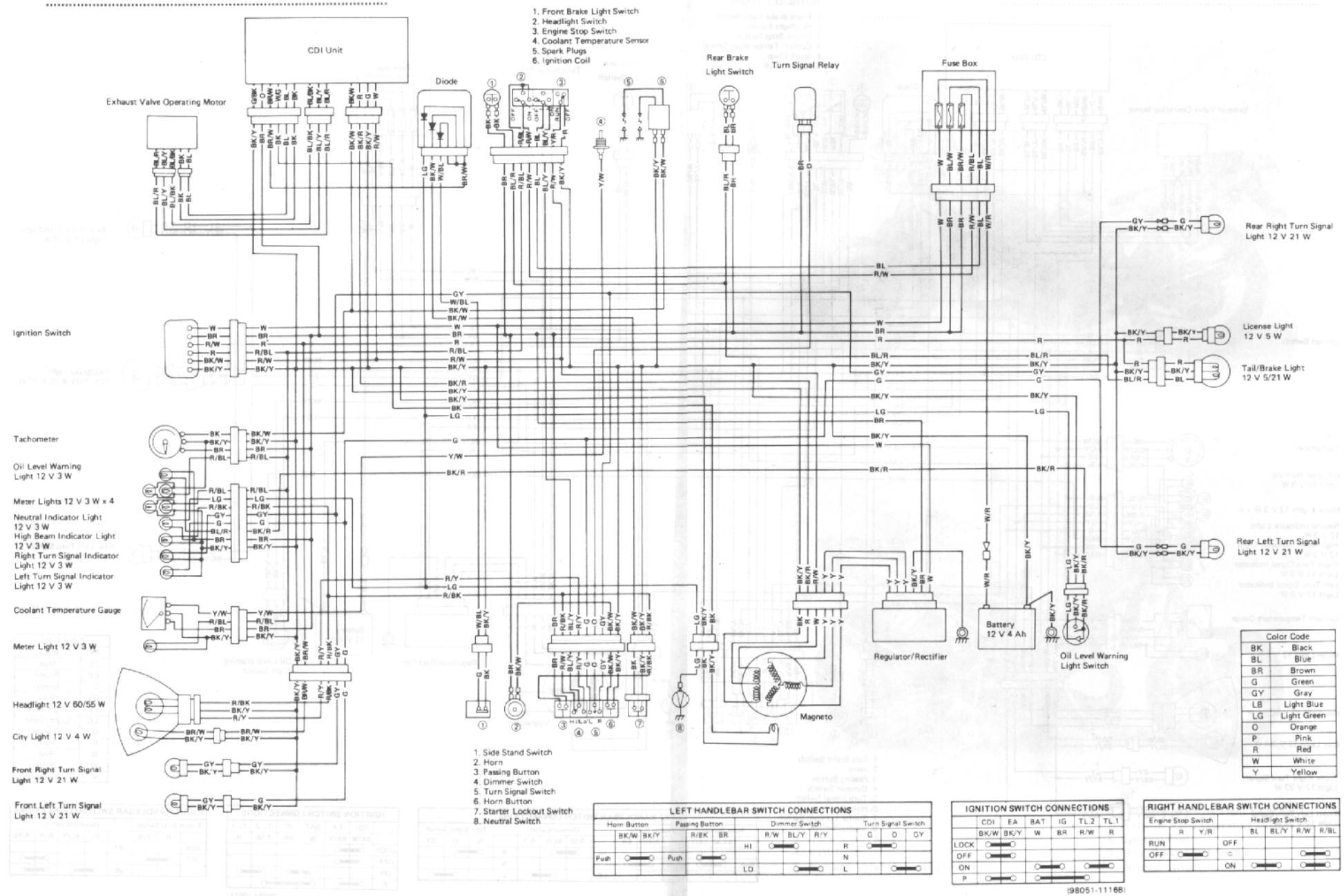
	CDI	EA	BAT	IG	TL.2	TL.1
	BK/W	BK/Y	W	BR	R/W	R
LOCK	●					
OFF	●					
ON			●		●	
P	●		●		●	

(98051-1097A)

RIGHT HANDLEBAR SWITCH CONNECTIONS

Engine Stop Switch			Headlight Switch				
	R	Y/R		BL	BL/Y	R/W	R/BL
RUN			OFF				
OFF	●		○				●
			ON	●			●

KR250-B2 Wiring Diagram
(Other than Australian and South African models)



Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
R	Red
W	White
Y	Yellow

LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button		Passing Button		Dimmer Switch			Turn Signal Switch		
	BK/W	BK/Y		R/BK	BR		R/W	BL/Y	R/Y		G	O	GY
Push	●	●	Push	●	●	HI	●			R	●		
										N			
						LO		●		L			●

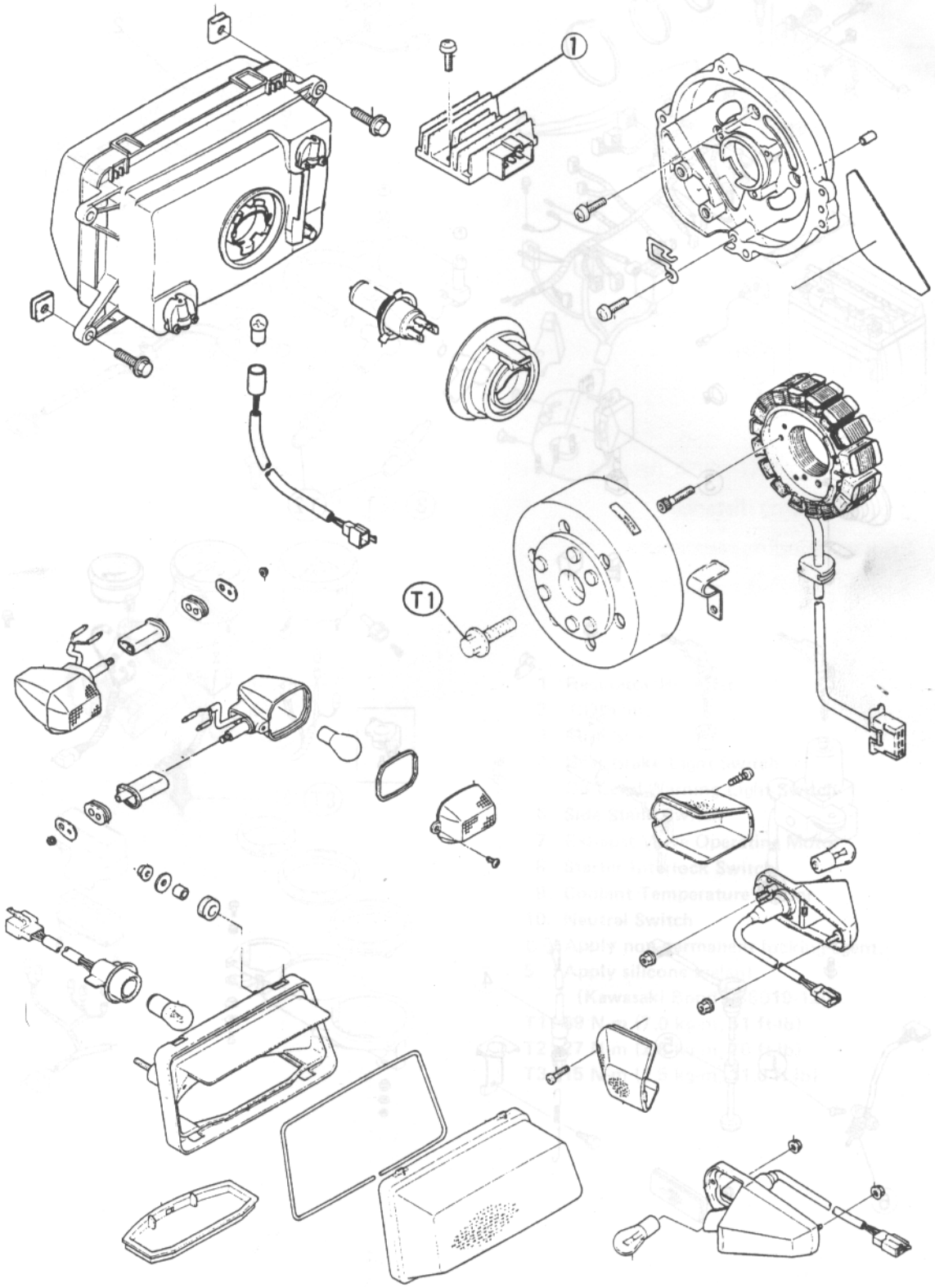
IGNITION SWITCH CONNECTIONS

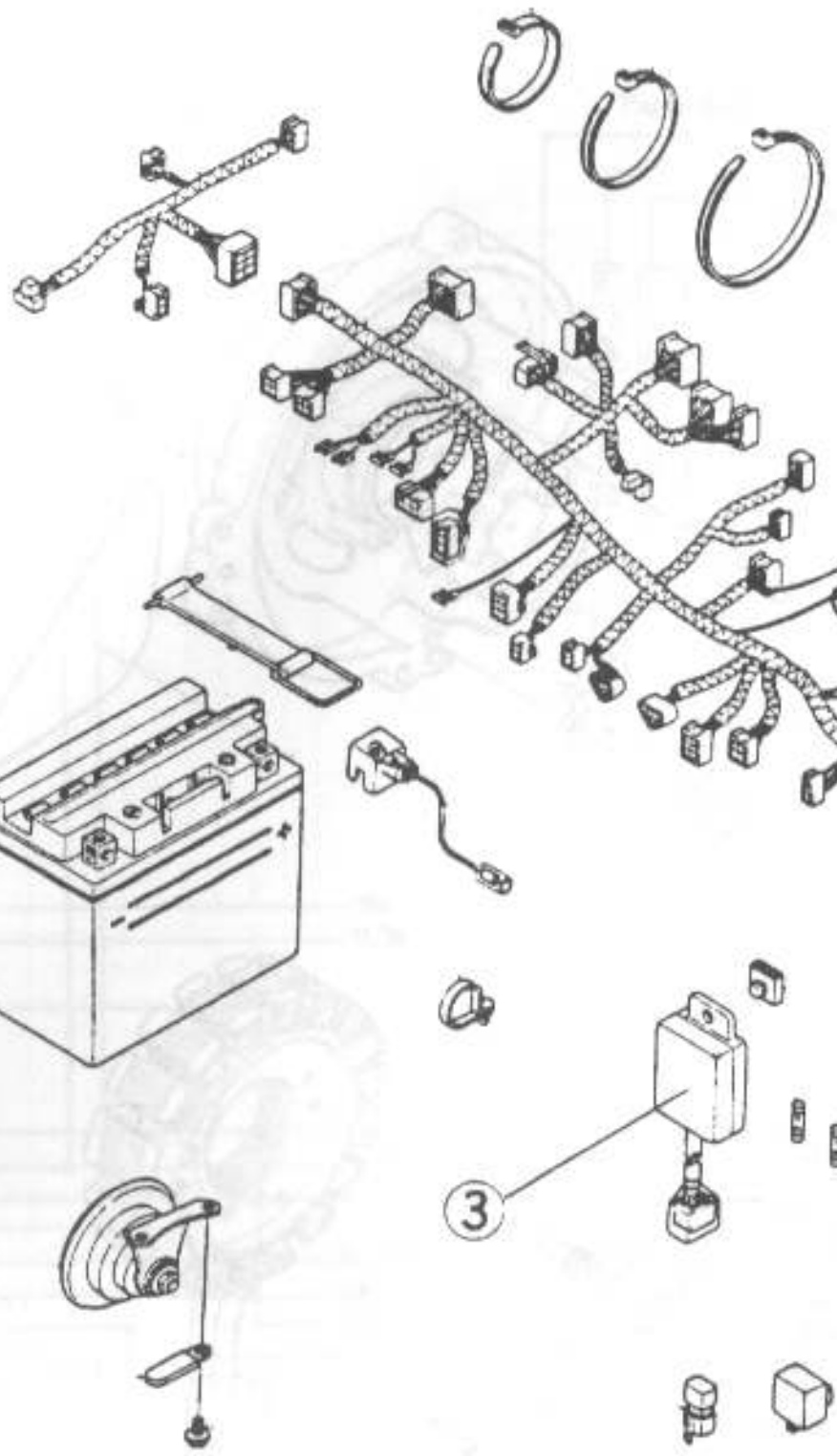
	CDI	EA	BAT	IG	TL.2	TL.1
	BK/W	BK/Y	W	BR	R/W	R
LOCK	●	●				
OFF	●	●				
ON			●	●	●	
P	●		●			

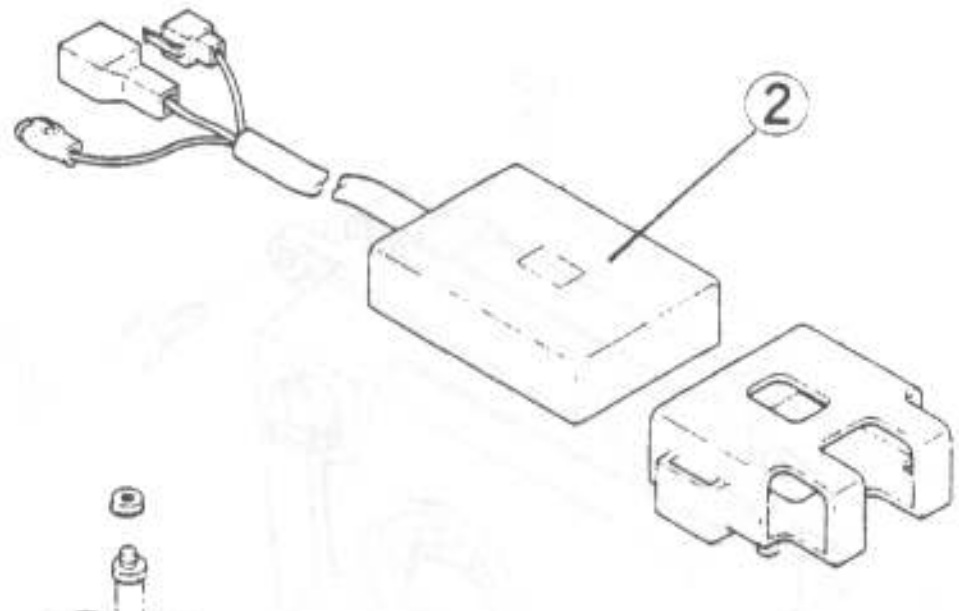
RIGHT HANDLEBAR SWITCH CONNECTIONS

Engine Stop Switch			Headlight Switch			
	R	Y/R		BL	BL/Y	R/W	R/BL
RUN			OFF				
OFF	●	●	○			●	
			ON	●	●	●	

Exploded View



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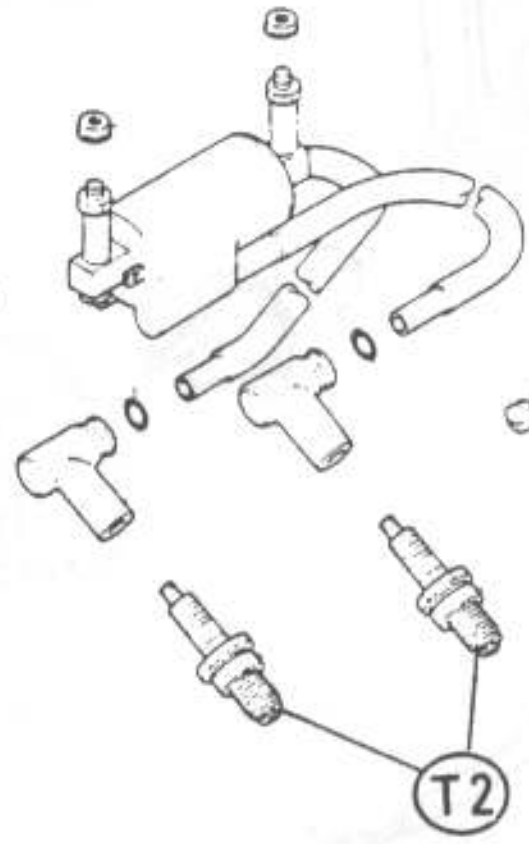

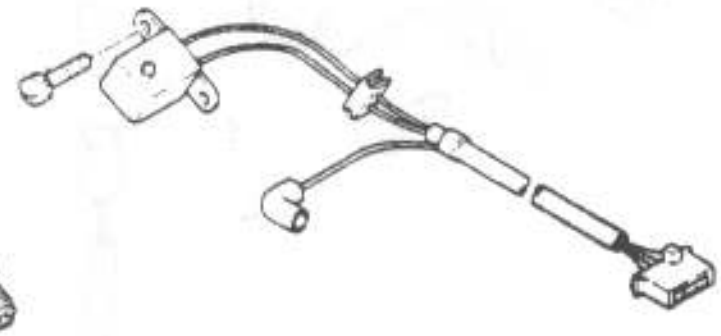

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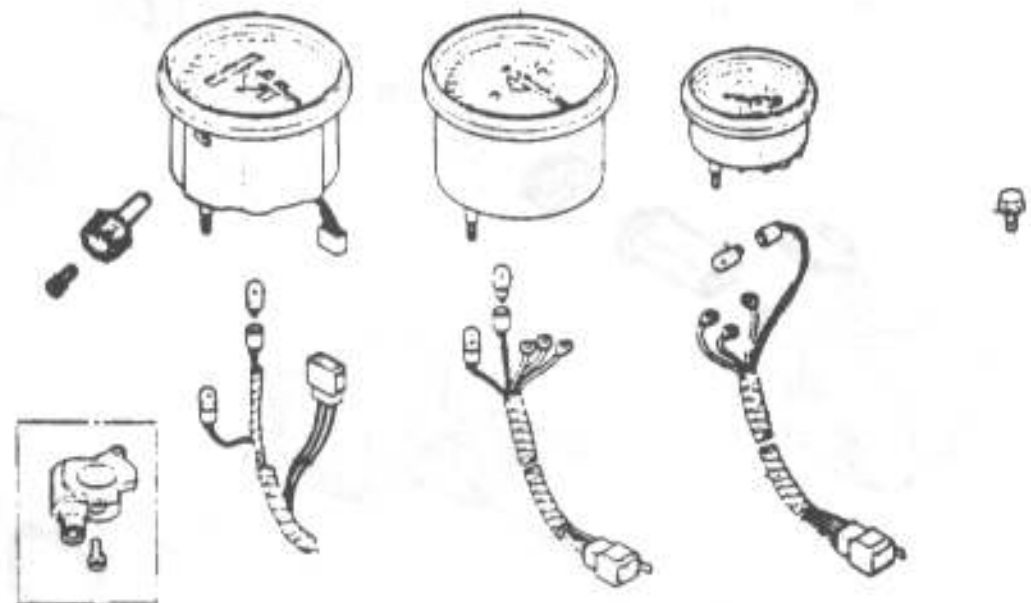

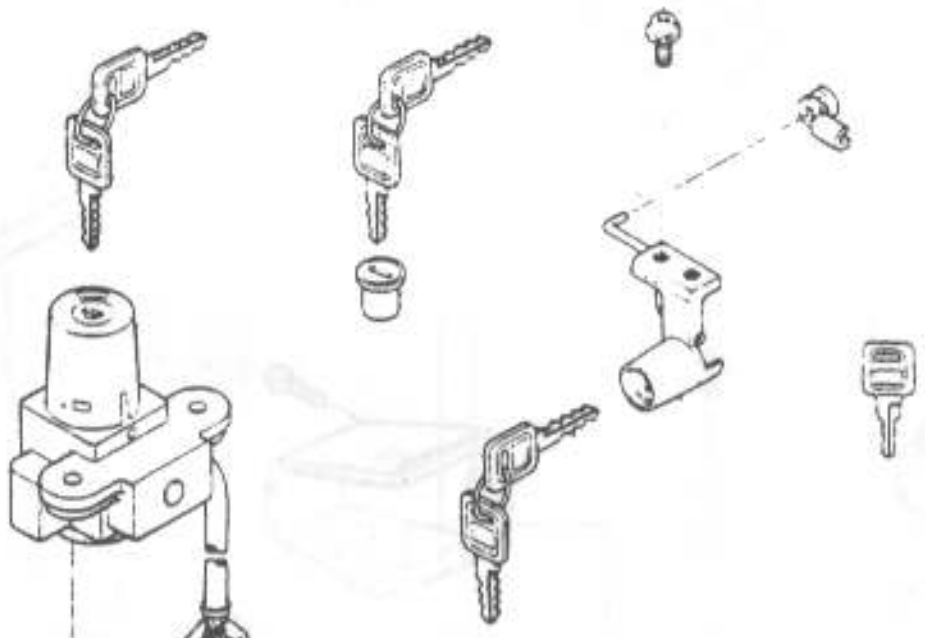

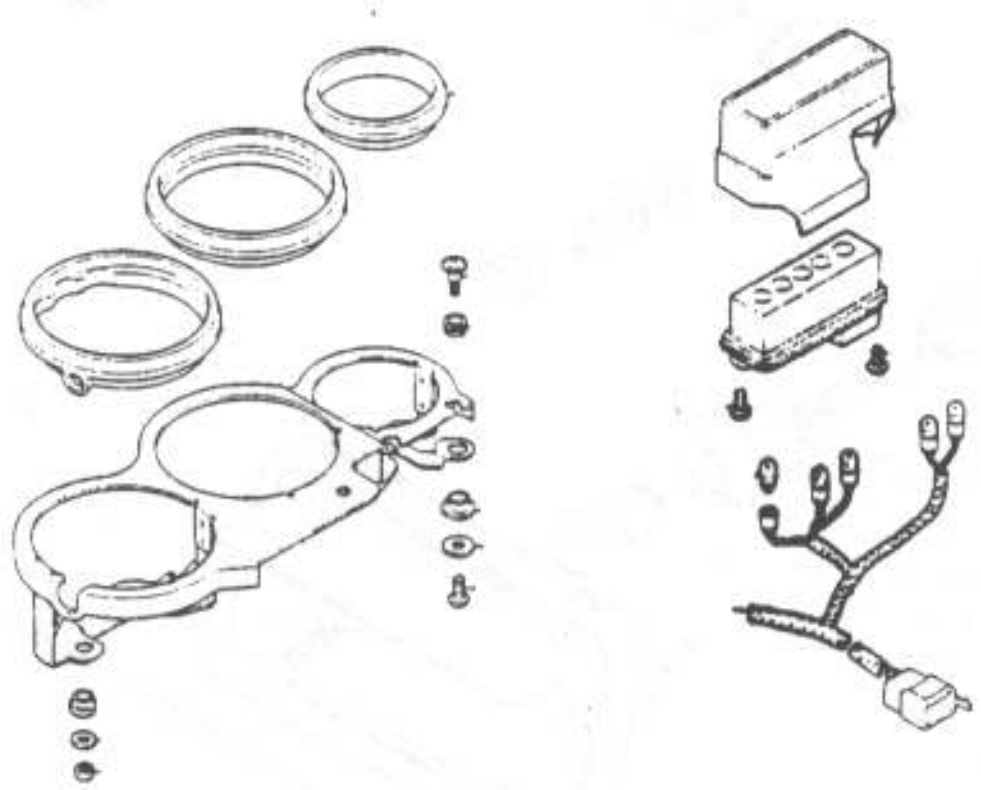

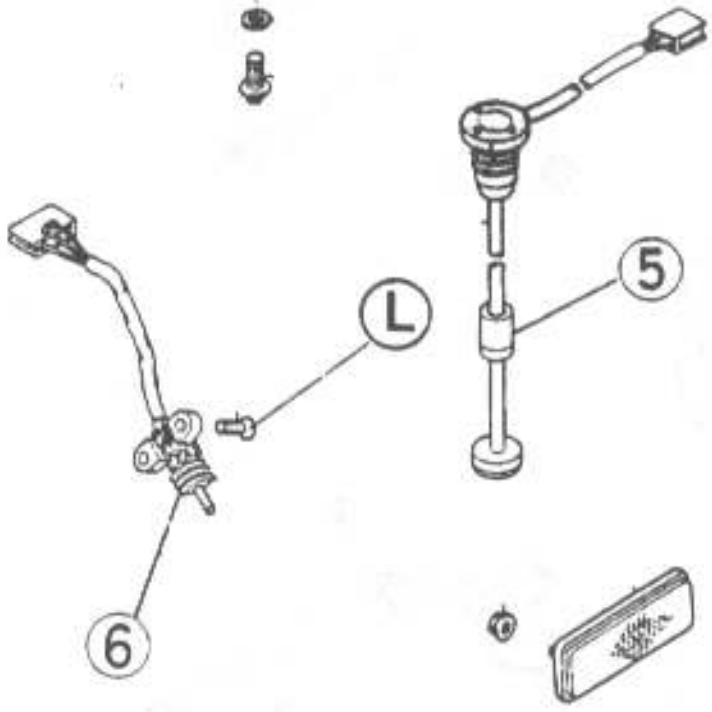
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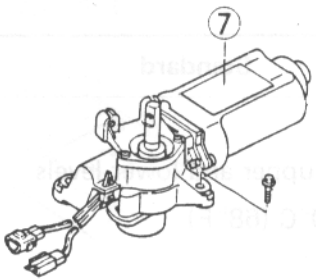
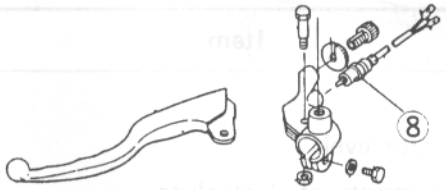
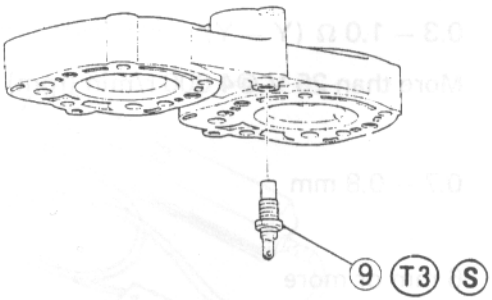
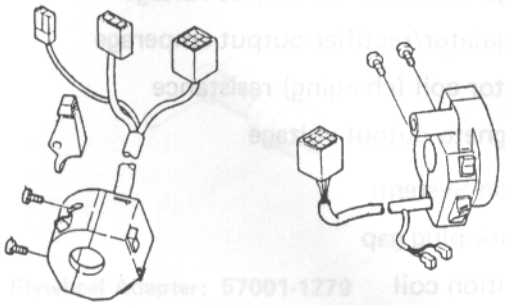
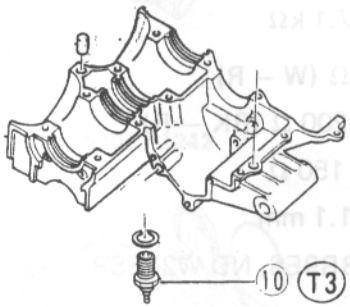










1. Regulator/Rectifier
2. CDI Unit
3. Fuse Box
4. Rear Brake Light Switch
5. Oil Level Warning Light Switch
6. Side Stand Switch
7. Exhaust Valve Operating Motor
8. Starter Interlock Switch
9. Coolant Temperature Sensor
10. Neutral Switch

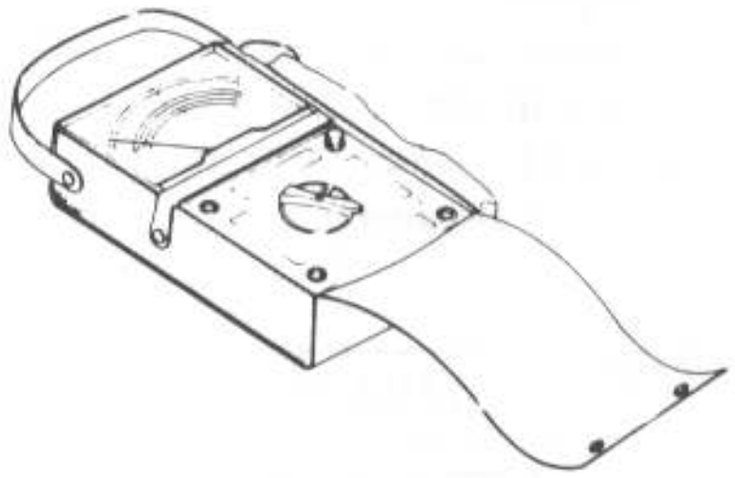
L : Apply non-permanent locking agent.
S : Apply silicone sealant
(Kawasaki Bond: 56019-120).
T1: 69 N-m (7.0 kg-m, 51 ft-lb)
T2: 27 N-m (2.8 kg-m, 20 ft-lb)
T3: 15 N-m (1.5 kg-m, 11.0 ft-lb)

Specifications

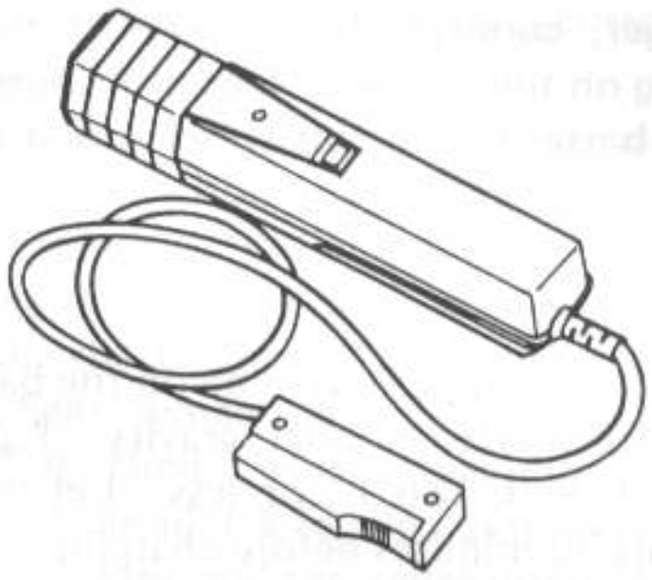
Item	Standard
Battery:	
Electrolyte level	Between upper and lower levels
Specific gravity of electrolyte	1.28 @20°C (68°F)
Charging System:	
Regulator/rectifier output voltage	Battery voltage to 14 V
Regulator/rectifier output amperage	12.5 A
Stator coil (charging) resistance	0.3 – 1.0 Ω (Y – Y)
Magneto output voltage	More than 25 V @4 000 r/min (rpm)
Ignition System:	
Spark plug gap	0.7 – 0.8 mm
Ignition coil	
3 needle arcing distance	6 mm or more
Primary winding resistance	0.28 – 0.38 Ω
Secondary winding resistance	4.7 – 7.1 kΩ
Exciter coil resistance	2 – 7 Ω (W – R) 100 – 200 Ω (BK – R)
Pickup coil resistance	100 – 150 Ω
Pickup coil air gap	0.4 – 1.1 mm
Spark plug	NGK BR9ES, ND W27ESR
Meter Unit:	
Coolant temperature sensor	48 – 57 Ω @80°C (176°F) 26 – 29 Ω @100°C (212°F)
Rear Brake Light Switch:	On after about 10 mm pedal travel

Special Tools

Hand Tester: 57001-983

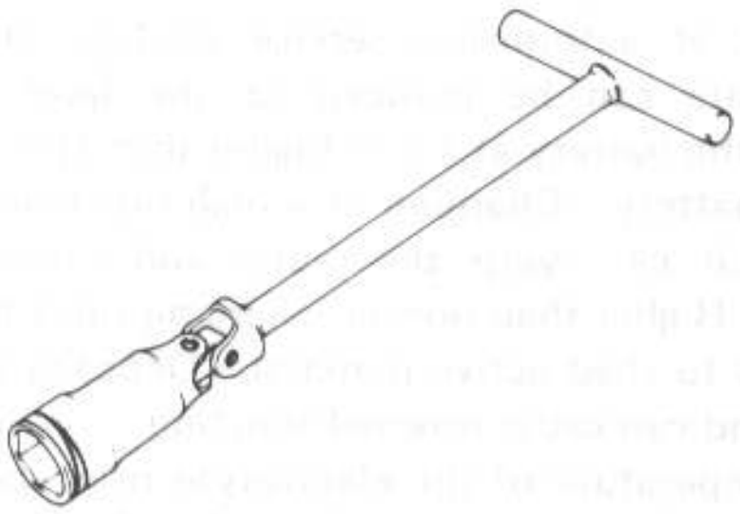


Timing Light: 57001-1241

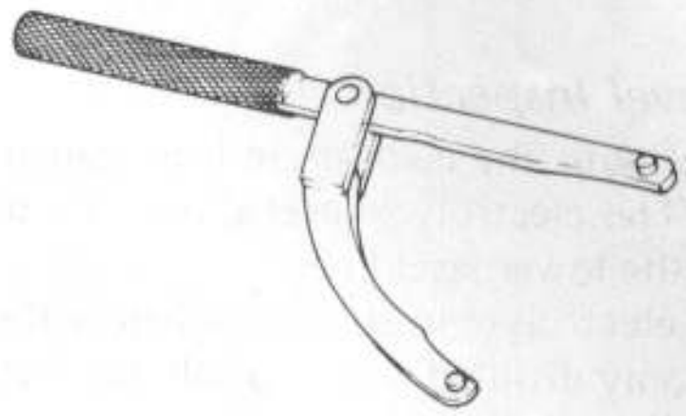


Ignition Coil Tester: 57001-1242

Spark Plug Wrench: 57001-110



Flywheel Holder: 57001-306



Flywheel Puller: 57001-252

Flywheel Adapter: 57001-1279

NOTE

○*The flywheel holder (P/N 57001-1313) can be used instead of the flywheel holder (P/N 57001-306).*

Sealant

Kawasaki Bond (Silicone Sealant): 56019-120

Battery

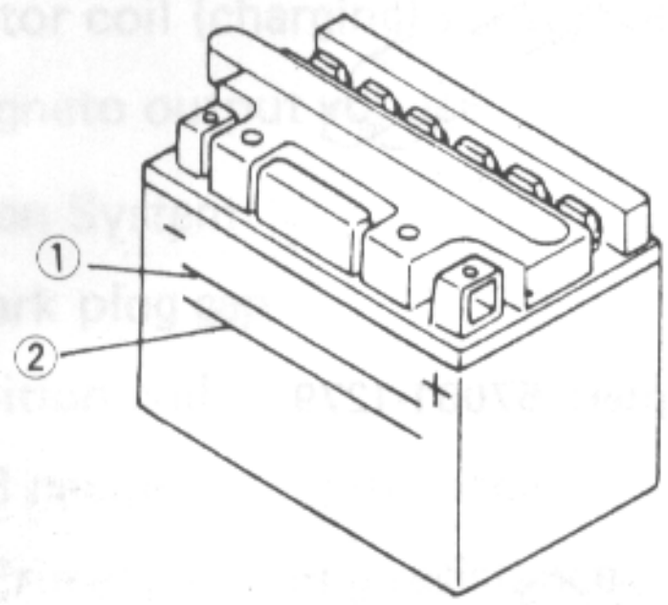
Electrolyte Level Inspection

●Check the level with the electrolyte level gauge on the battery case. The electrolyte level should be between the upper and the lower level lines.

★If the level of electrolyte in any cell is below the lower level line, add only distilled water to cell, until the level is at the upper level line.

CAUTION

○Ordinary tap water is not a substitute for distilled water and will shorten the life of the battery.



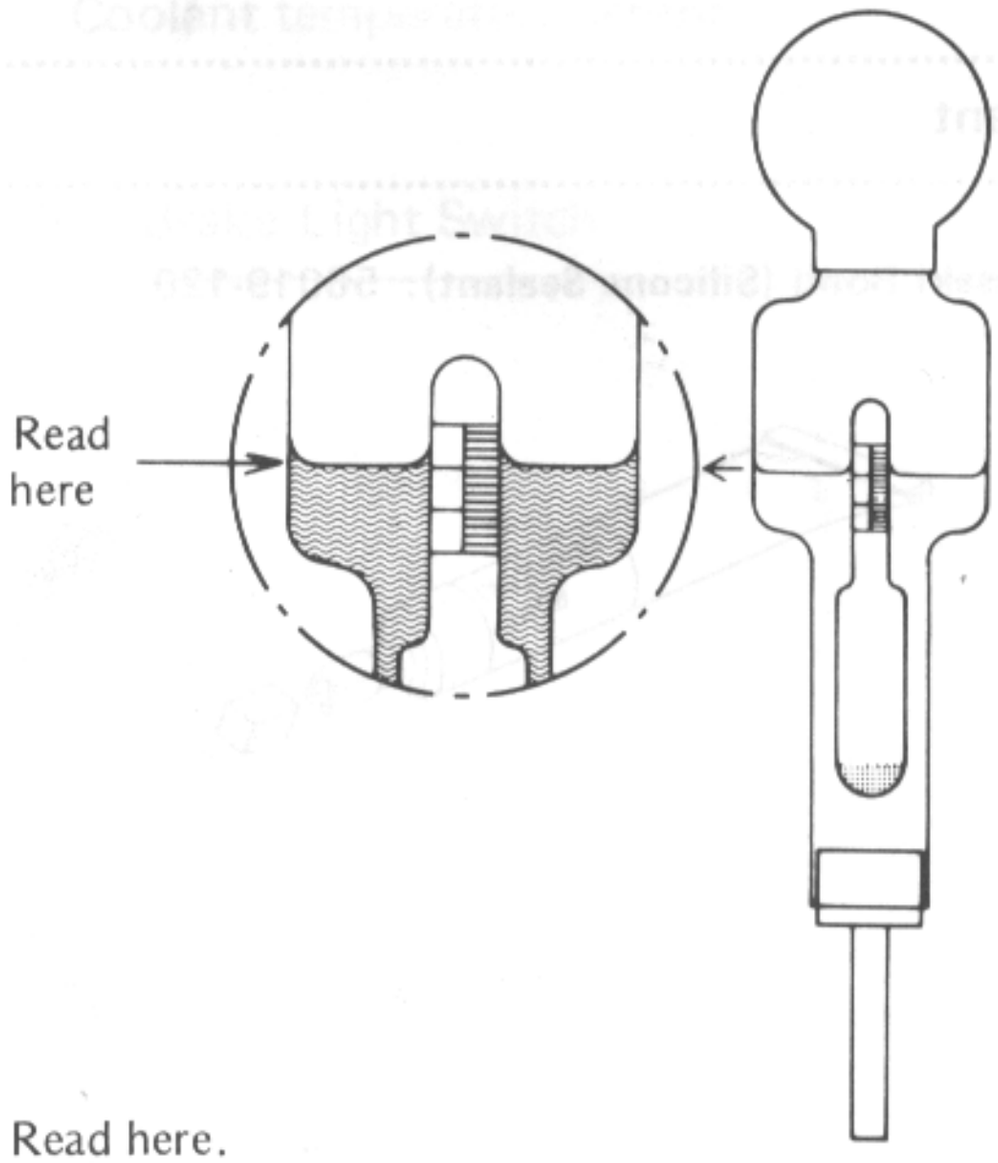
1. Upper Level Line
2. Lower Level Line

Electrolyte Specific Gravity Inspection

●Check battery condition by testing the specific gravity of the electrolyte in each cell with a hydrometer.

○Read the level of the electrolyte on the floating scale.

Hydrometer



1. Read here.

★If the specific gravity is below 1.20 (charge 60%) the battery needs to be charged.

Initial Charging

WARNING

○Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

●Fill each cell to the upper level line on the battery case with fresh electrolyte (special gravity: 1.280) at a temperature of 30°C (86°F) or less. Let the battery stand for about 30 minutes before charging.

NOTE

○*If the electrolyte level drops, add electrolyte to the upper level line before charging.*

●Set the charging rate at 1/10 the battery capacity, and **charge it for 10 hours**. For example, if the battery is rated at 12 Ah, the charging rate would be 1.2A.

CAUTION

○If the battery is not given a full initial charging, it will discharge in a few weeks. After that it can not be charged by supplement charging.

○Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.

○If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

Ordinary Charging

WARNING

○Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

CAUTION

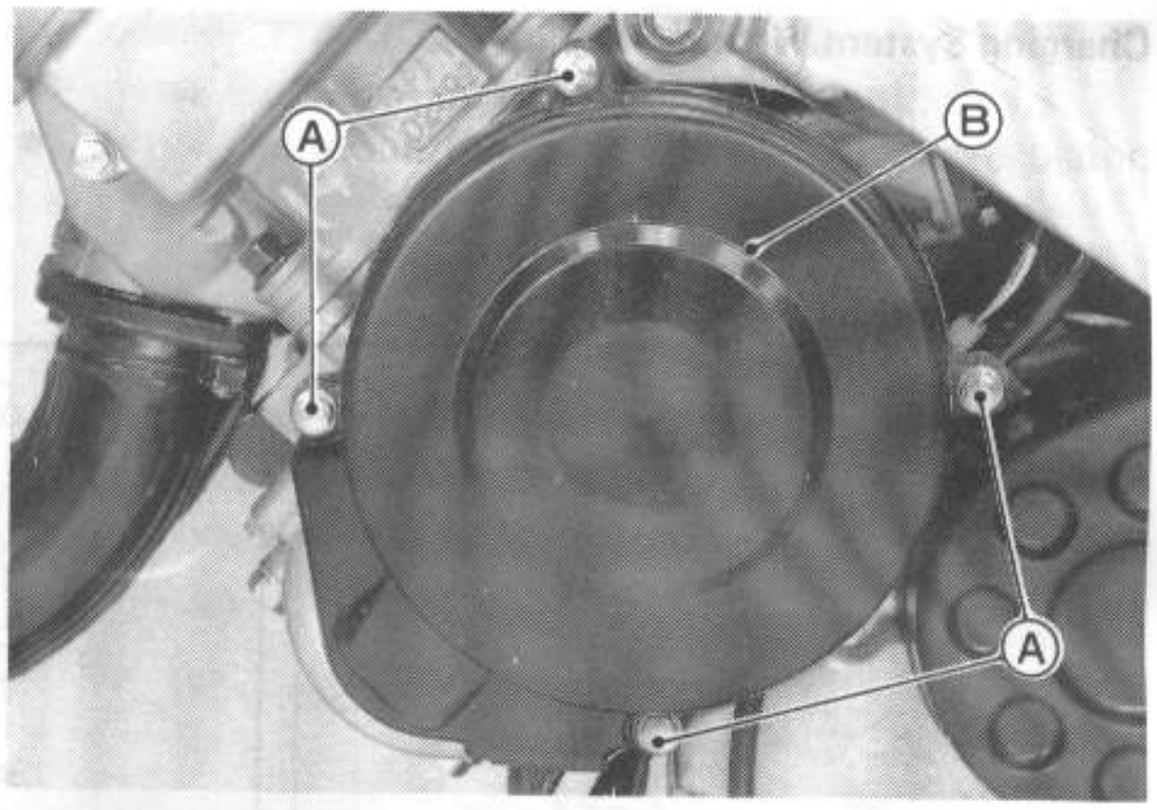
○The use of a sulfated old battery which will not accept a full charge by supplement charging will damage the CDI unit.

○Always remove the battery from the motorcycle for charging. If the battery is charged while still installed, battery electrolyte may spill and corrode the frame or other parts of the motorcycle.

○Do not use a high rate battery charger, as is typically employed at automotive service stations, unless the charger rate can be reduced to the level required. Charging the battery at a rate higher than specified may ruin the battery. Charging at a high rate causes excess heat which can warp the plates and cause internal shorting. Higher-than-normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.

○If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to lower the temperature, and increase charging time proportionately.

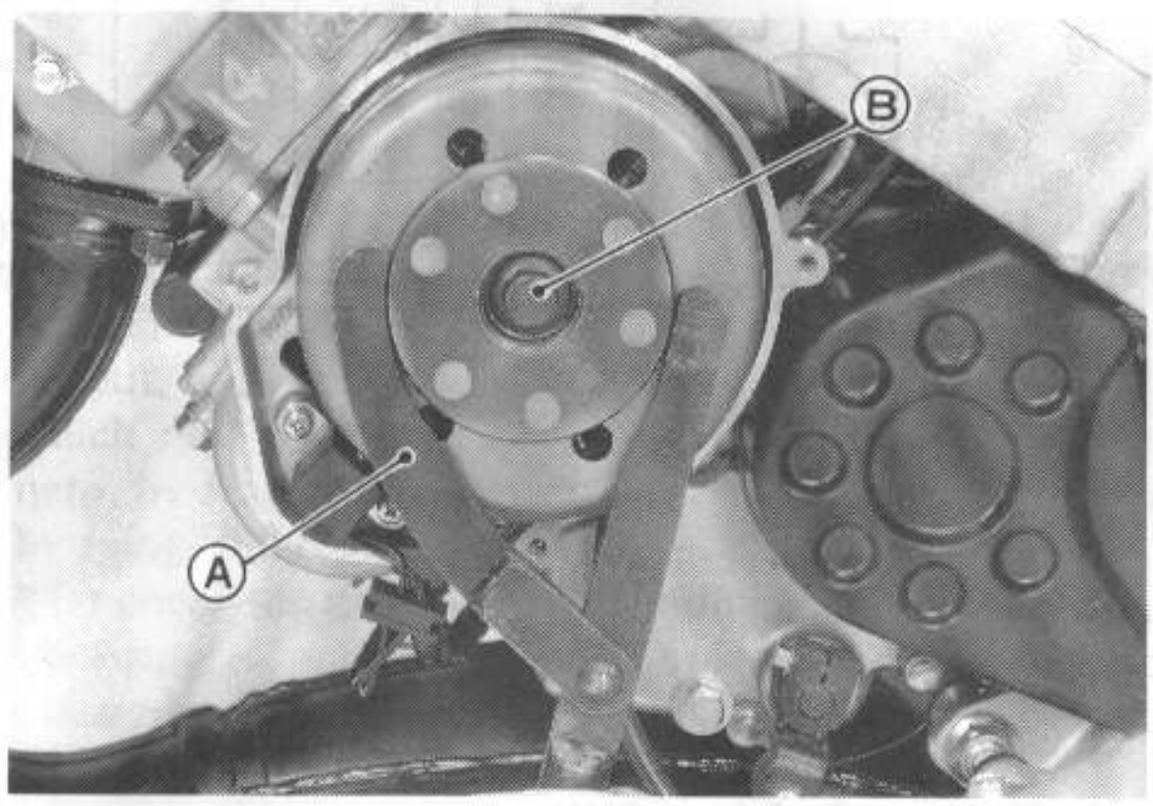
- Set the charging rate at 1/10 the battery capacity, and charge until the electrolyte gravity becomes 1.280 at a temperature of 30°C (86°F) or less.
- Check the electrolyte level after charging.



A. Mounting Bolts B. Magneto Cover

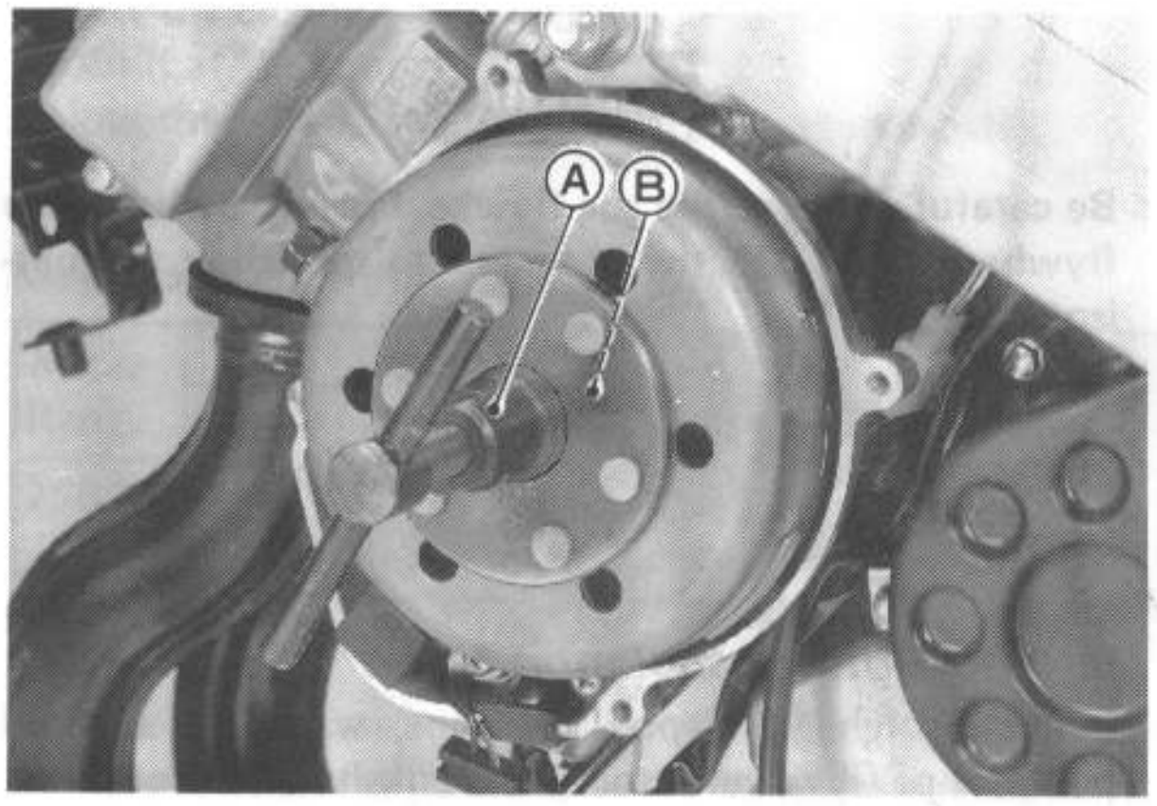
Magneto Rotor Removal

- Remove the magneto cover.
- Using the flywheel holder (special tool) to keep the flywheel from rotating, unscrew the rotor bolt.



A. Flywheel Holder: 57001-306 B. Rotor Bolt

- Using the flywheel puller (special tool) and adapter (special tool), remove the magneto rotor.



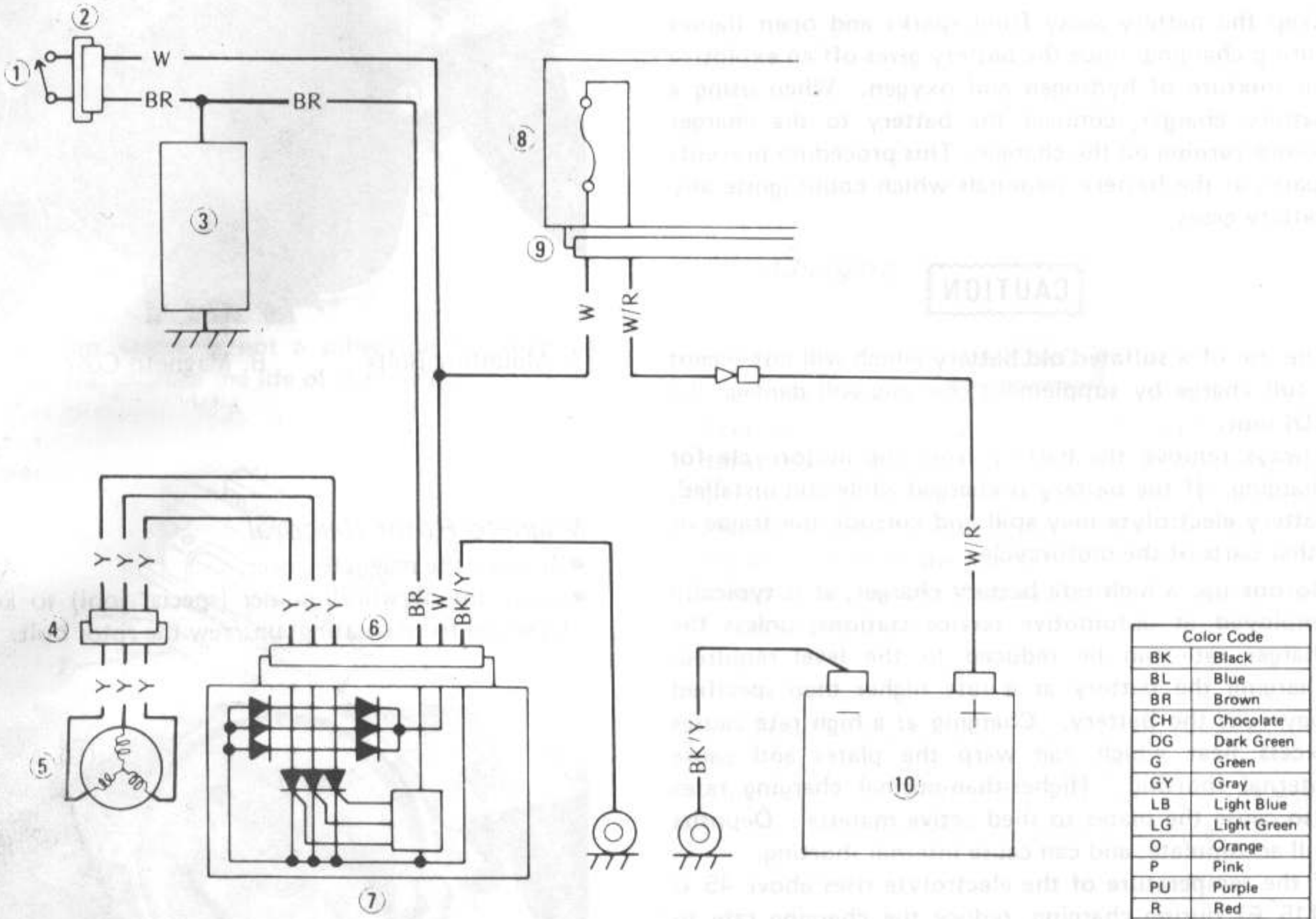
A. Flywheel Puller: 57001-252
B. Adapter: 57001-1279

Charging System

Magneto Cover Removal

- Remove the following.
  Lower Fairing

Charging System Wiring Diagram



Color Code	
BK	Black
BL	Blue
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DG	Dark Green
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

1. Ignition Switch
2. 6-pin Connector
3. Load
4. 6-pin Connector
5. Stator Coil
6. 6-pin Connector
7. Regulator/Rectifier
8. 20A Fuse
9. 6-pin Connector
10. Battery

CAUTION

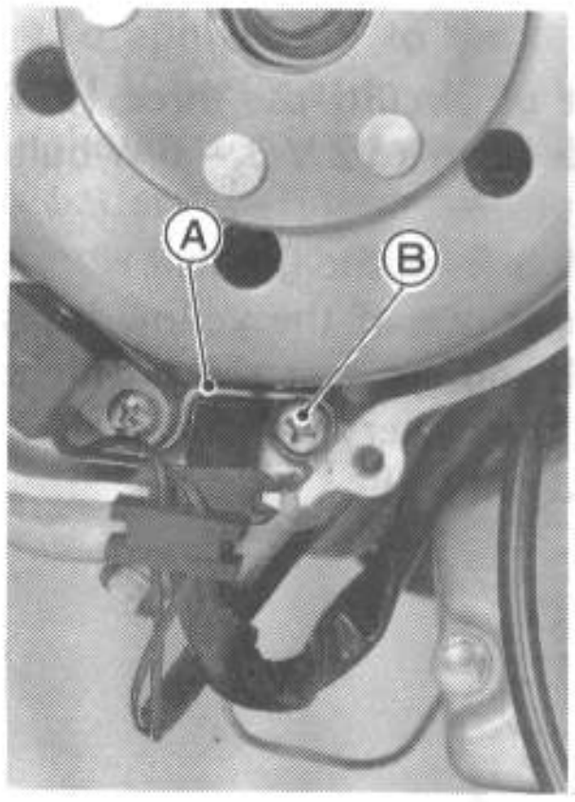
○Be careful not to strike the flywheel itself. Striking the flywheel can cause the magneto to lose their magnetism.

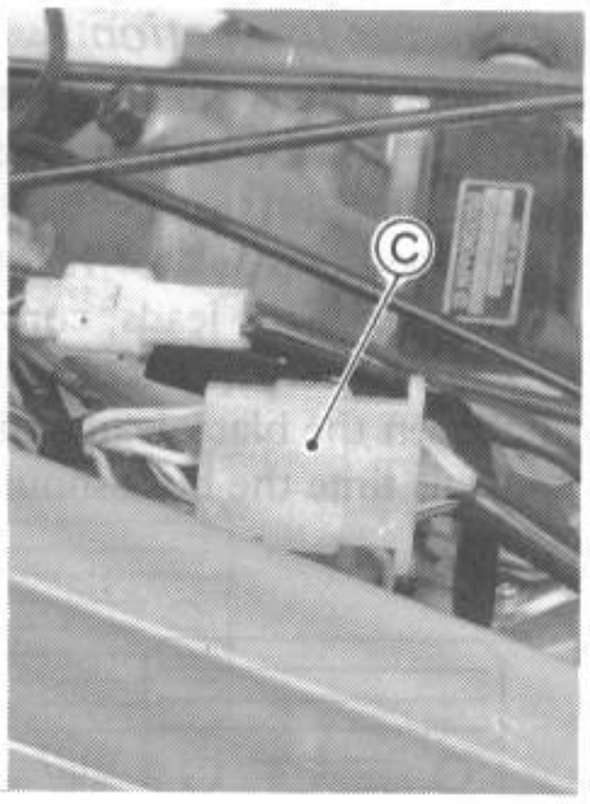
Magneto Rotor Installation Notes

- Using a high flash point solvent, wash the tapered portions of flywheel rotor and crankshaft.
- Tighten the magneto rotor bolt to the specified torque (see General Information chapter).

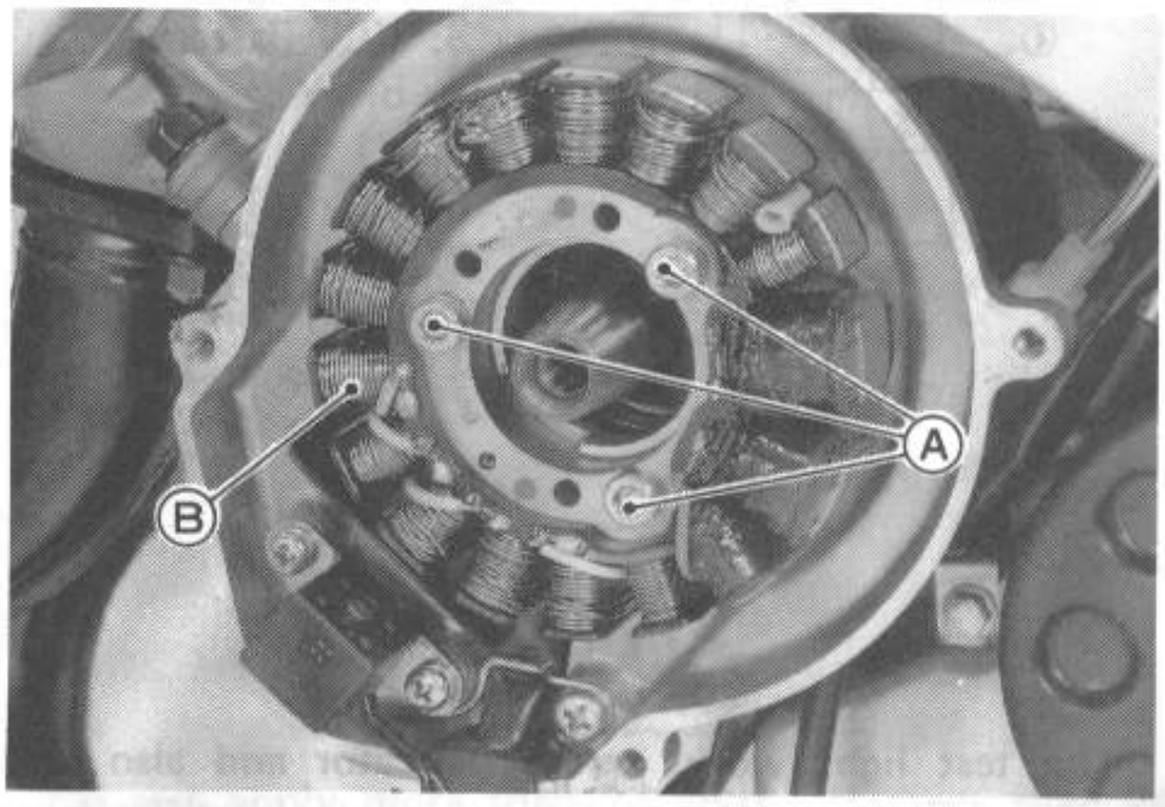
Stator Coil Removal

- Remove the magneto rotor.
- Remove the following.
  Seat
  Side Covers
  Fuel Tank





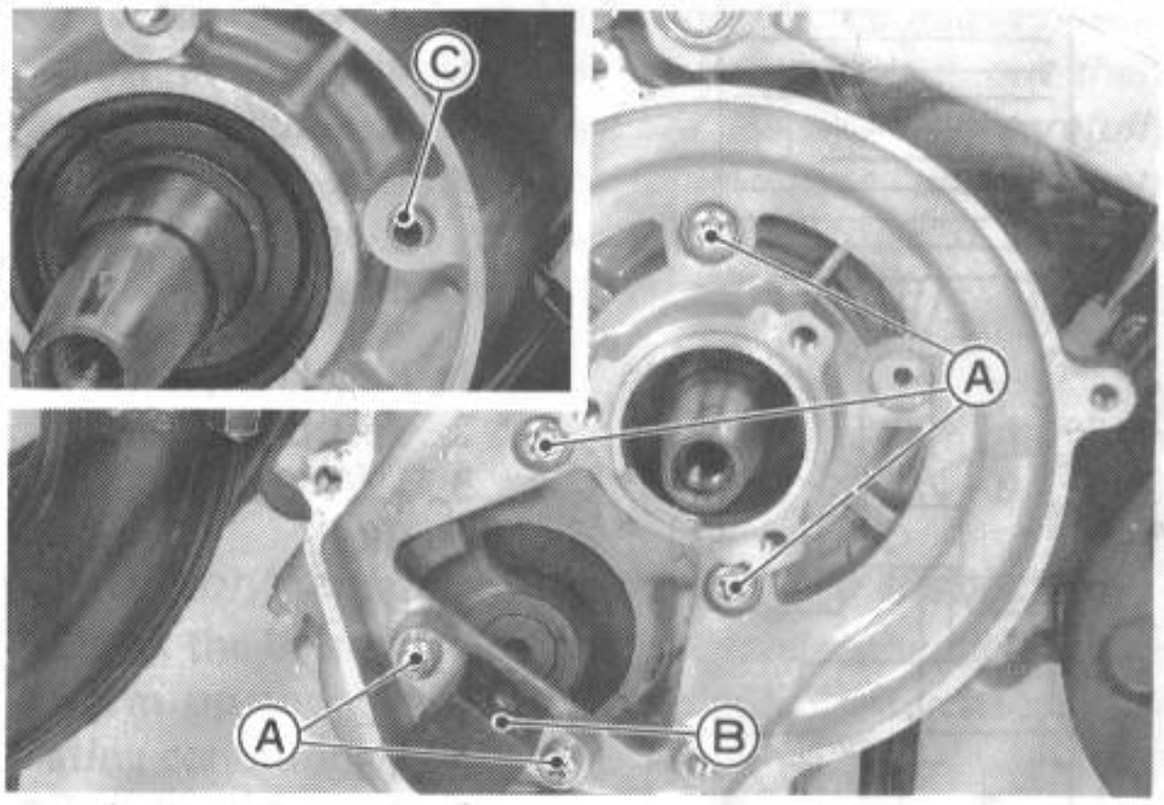
A. Stator Lead Clamp
B. Mounting Screw
C. Stator Lead Connector



A. Mounting Bolts
B. Stator Coil

Magneto Base Removal

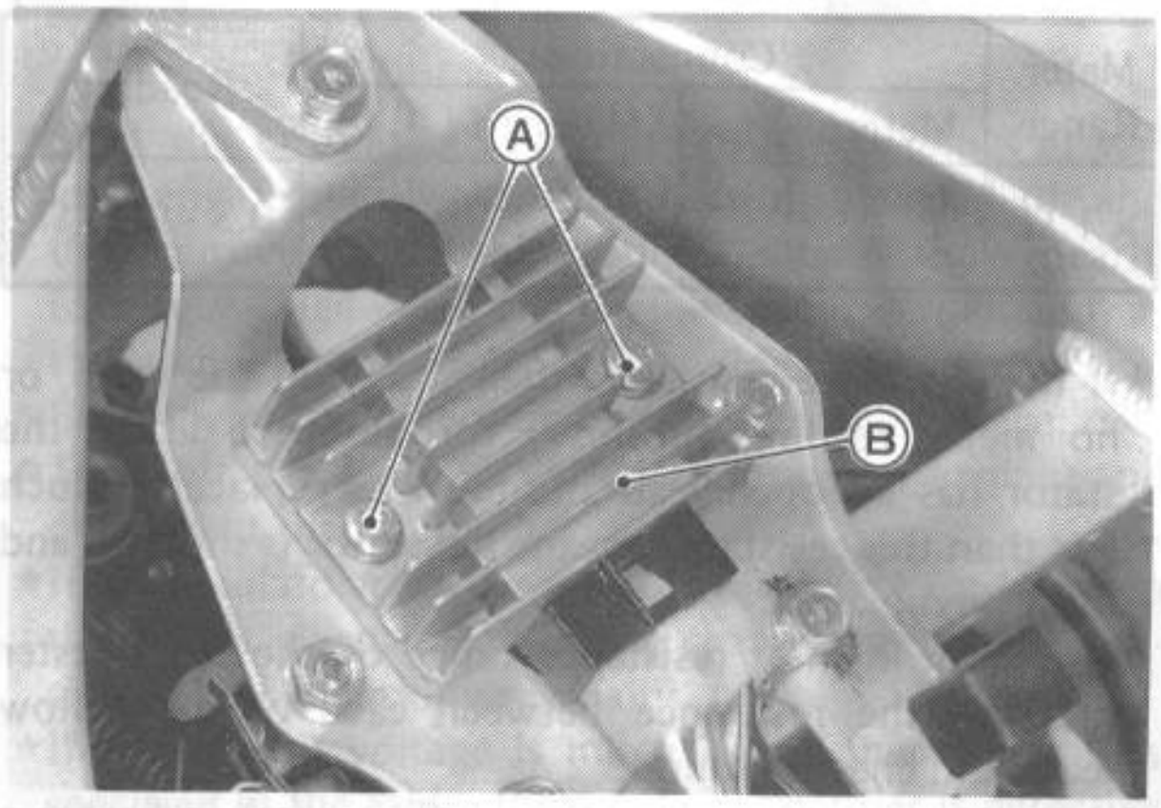
- Remove the stator coil.
- Remove the following.



A. Mounting Screws
B. Pickup Coil
C. Knock Pin

Regulator/Rectifier Removal

- Remove the seat, side covers, and fuel tank.
- Unscrew the mounting bolts, and remove the regulator/rectifier.



A. Mounting Bolts
B. Regulator/Rectifier

Magneto Inspection

There are three types of magneto failures; short, open (wire burned out), or loss in rotor magnetism. A short or open in one of the coil wires will result in either a low output, or no output at all. A loss in rotor magnetism, which may be caused by dropping or hitting the magneto, by leaving it near an electromagnetic field, or just by aging, will result in low output.

- To check the magneto output voltage, do the following procedures. Refer to the appropriate chapters and charging system Wiring Diagram.
  - ○ Turn off the ignition switch.
  - ○ Remove the seat, side covers, and fuel tank.
  - ○ Disconnect the stator lead connector (see Stator Coil Removal).
  - ○ Install the fuel tank and connect the fuel hose.
  - ○ Connect the hand tester to the stator side of the stator lead connector as shown in the table.
  - ○ Start the engine.
  - ○ Run it at the rpm given in table.
  - ○ Note the voltage readings (total 3 measurements).

Magneto Output Voltage

Meter Range	Connections		Reading @4,000 rpm
	Meter (+) to	Meter (–) to	
250 V AC	One yellow lead	Another yellow lead	more than 25 V

★If the output voltage shows the value in table, the magneto operates properly and the regulator/rectifier is damaged. A much lower reading than that given in the table indicates that the magneto is defective.

●Check the stator coil resistance as follows:
○Stop the engine
○Connect the hand tester as shown in table.
○Note the readings (total 3 measurements).

Stator Coil Resistance

Meter Range	Connections		Reading
	Meter (+) to	Meter to (–) to	
x 1 Ω	One yellow lead	Another yellow lead	0.3 – 1.0 Ω

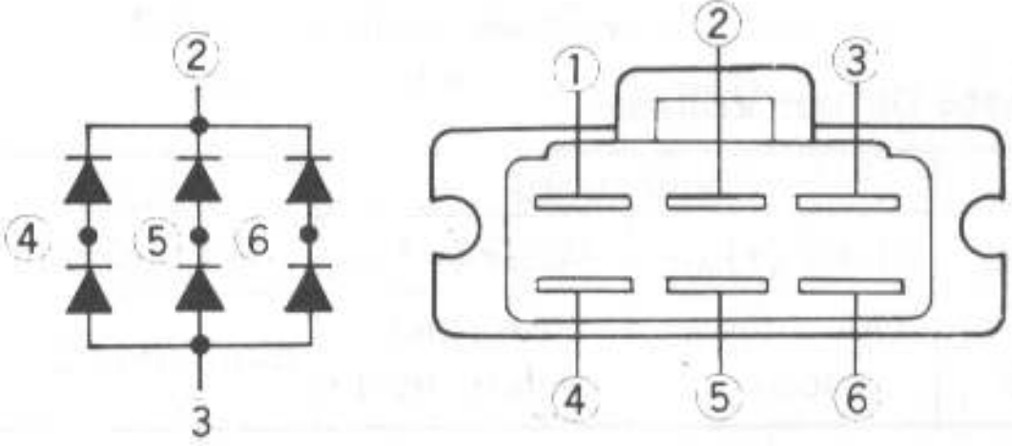
★If there is more resistance than shown in the table, or no meter reading (infinity) for any two leads, the stator has an open lead and must be replaced. Much less than this resistance means the stator is shorted, and must be replaced.
●Using the highest resistance range of the hand tester measure the resistance between each of the yellow leads and chassis ground.
★Any meter reading less than infinity (∞) indicates a short, necessitating stator replacement.
★If the stator coils have normal resistance, but the voltage check showed the magneto to be defective; then the rotor magnetism have probably weakened, and the rotor must be replaced.

Rectifier Inspection
●Remove the regulator/rectifier.
●Set the hand tester to the x 100 Ω range, and check the resistance in both directions between the terminals.
★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low high in both directions, the diodes is defective and the diode assembly must be replaced.

NOTE

○*The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to the first ½ of the scale.*

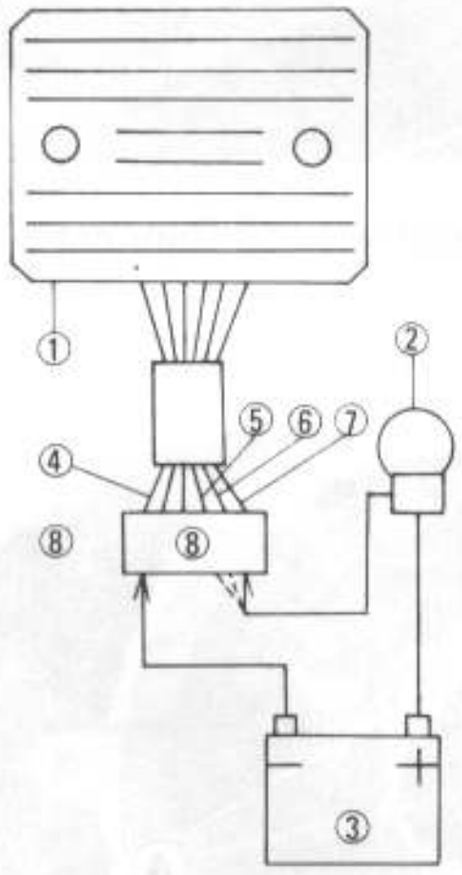
Regulator/Rectifier Internal Circuit



Internal Circuit Terminal

Regulator Inspection

To test the regulator out of circuit, use three 12 V batteries and a test light made form a 12 V 3 – 6 W bulb in a socket with leads.
●Remove the regulator/rectifier from the frame.
●Using auxiliary leads, connect one of the yellow leads to the battery (+) terminal, and connect the test light between the black lead and the battery (–) terminal.
●At this time the bulb should not be lit.

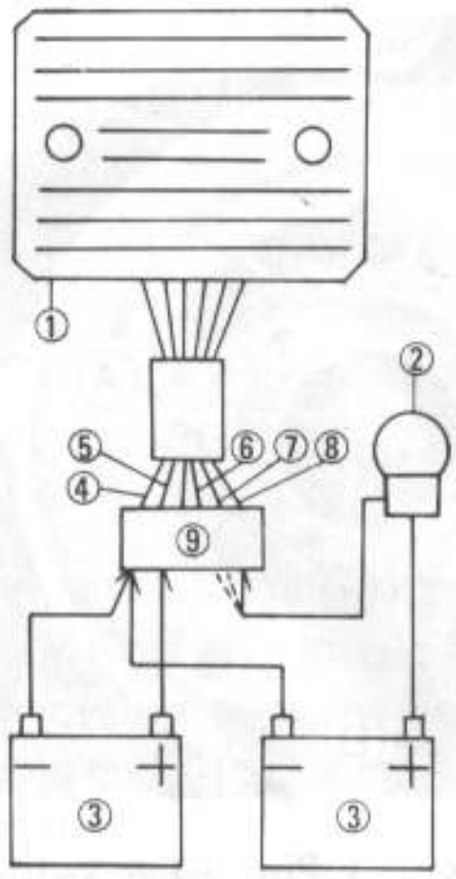


1. Regulator/Rectifier
2. Test Light
3. 12 V Battery
4. BK/Y
5. Y1
6. Y2
7. Y3
8. 6-pin Connector

CAUTION

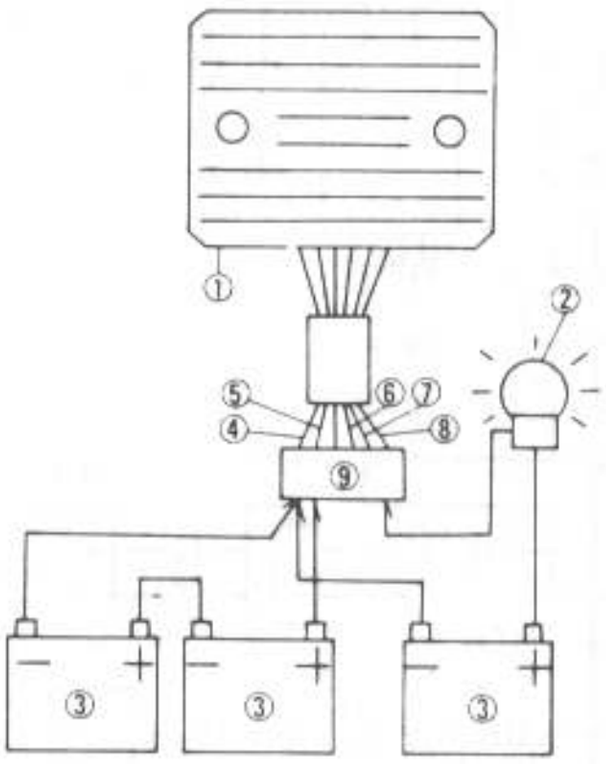
○**The test light works as an indicator and also as a current limiter to protect the regulator/rectifier from excessive current. Do not use an ammeter instead of a test light.**

●Connect the brown lead to the other battery (+) terminal and connect the black lead to the battery (–) terminal momentarily. At this time the bulb should not be lit.



1. Regulator/Rectifier
2. Test Light
3. 12 V Battery
4. BK/Y
5. BR
6. Y1
7. Y2
8. Y3
9. 6-pin Connector

●To apply 24 V to the regulator/rectifier, connect two 12 V batteries in series, and connect the brown lead to the battery (+) terminal and the black lead to the battery (–) terminal momentarily. The bulb should now light and stay on until the bulb circuit is opened.



1. Regulator/Rectifier
2. Test Light
3. 12 V Battery
4. BK/Y
5. BR
6. Y1
7. Y2
8. Y3
9. 6-pin Connector

CAUTION

○**Do not apply more than 24 volts. If more than 24 volts is applied, the regulator/rectifier may be damaged. Do not apply 24 V more than a few second, the regulator/rectifier may be damaged.**

●Repeat the above three steps for other two yellow leads (in connector 3 which leads to the regulator/rectifier).

★Replace the regulator/rectifier if the bulb does not light as described above.

NOTE

○*The above test is not foolproof. If the above checks show the regulator/rectifier is not damaged, but there is still trouble in the charging system, first carefully inspect the alternator, battery, wiring, and all connections. Replace the regulator/rectifier if all these other components turn out good.*

Regulator/Rectifier Output Voltage Inspection

●Check the battery condition (see Battery section).

●Warm up the engine to obtain actual alternator operating conditions.

●Remove the seat.

●Check that the ignition switch is turned off, and connect the hand tester as shown in table.

Regulator/Rectifier Output Voltage

Meter Range	Connectings		Reading
	Meter (+) to	Meter (–) to	
25 V DC	Battery (+) Terminal	Battery (–) Terminal	Battery voltage to 14 V

●Start the engine, and note the voltage readings at various engine speeds with the headlight turned on and then turned off. The readings should show nearly battery voltage when the engine speeds is low, and, as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage.

●Turn off the ignition switch to stop the engine, and disconnect the multimeter.

★If the regulator/rectifier output voltage is kept between the values given in table, the charging system is considered to be working normally.

★If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.

★If the battery voltage does not rise as the engine speed increases, then the regulator/rectifier is defective or the alternator output is insufficient for the loads. Check the alternator and regulator/rectifier to determine which part is defective.

Ignition System

Safety Instructions:

WARNING

○**The ignition system produces extremely high voltage. Do not touch the spark plugs, high tension coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.**

CAUTION

○**Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent CDI until damage.**

○**Operating the motorcycle without the battery will damage the CDI unit.**

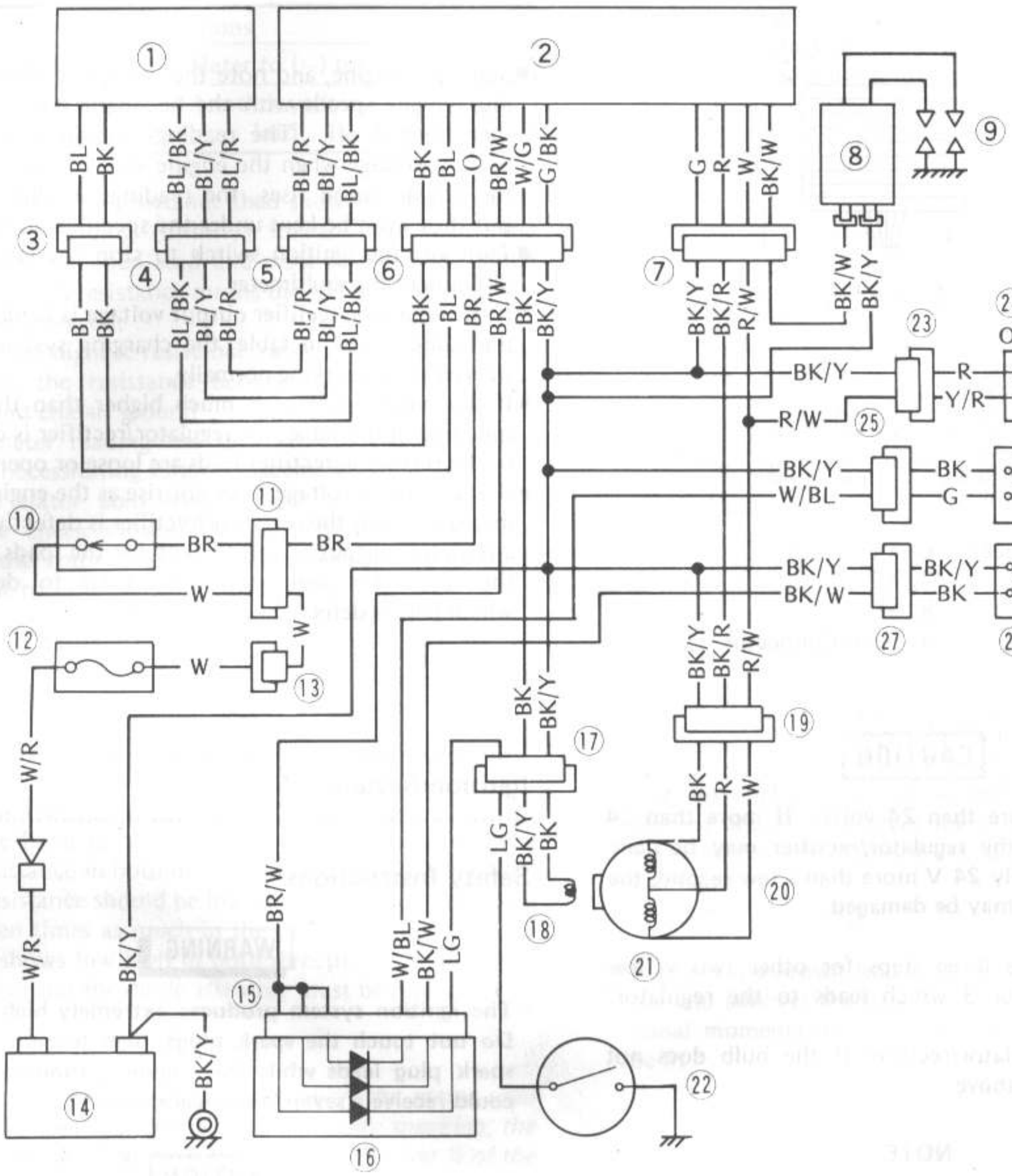
○**Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and CDI unit.**

○**The use of a sulfated old battery which will not accept a full charge by supplement charging will damage the CDI unit.**

○**The operation of the motorcycle with the 20A main fuse blown out will damage the CDI unit.**

○**Keep the CDI unit away from electrical noise during its operating such as that generated by spark plugs.**

Ignition System Wiring Diagram



1. Exhaust Valve Operating Motor
2. CDI Unit
3. 2-pin Connector
4. 3-pin Connector
5. 3-pin Connector
6. 6-pin Connector
7. 4-pin Connector
8. Ignition Coil
9. Spark Plugs
10. Ignition Switch
11. 6-pin Connector
12. 20A Fuse
13. 6-pin Connector
14. Battery
15. 6-pin Connector
16. Diode
17. 3-pin Connector
18. Pickup Coil
19. 6-pin Connector
20. Exciter Coil
21. Magneto Rotor
22. Neutral Switch
23. 9-pin Connector
24. Engine Stop Switch
25. 2-pin Connector
26. Side Stand Switch
27. 2-pin Connector
28. Starter Inter Lock Switch

Spark Plug Cleaning and Inspection

- Remove the spark plugs.
- Clean the spark plug, preferably in a sandblasting device, and then clean off any abrasive particles. The plug may also be cleaned using a high flash point solvent and a wire brush or other suitable tool.

★If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.

Spark Plug Gap

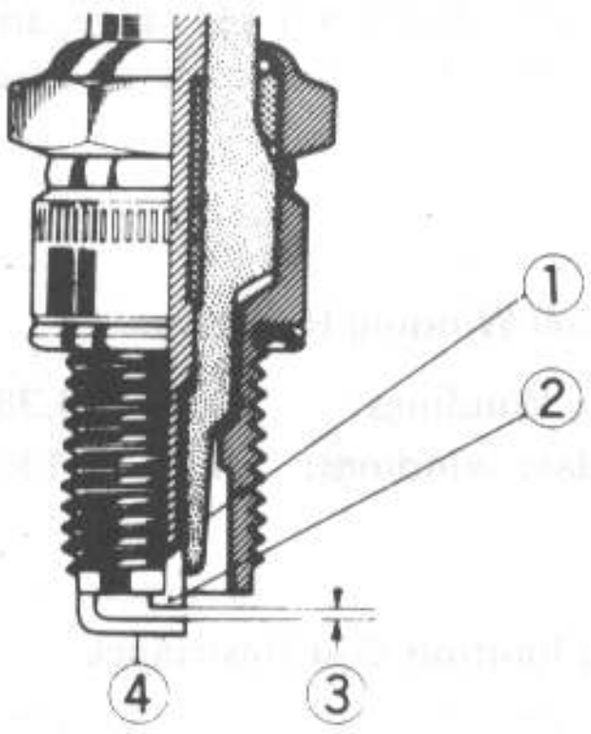
- Measure the gap with a wire-type thickness gauge.

★If the gap is incorrect, carefully bend the side electrode with a suitable tool to obtain the correct gap.

Spark Plug Gap

0.7 – 0.8 mm

Spark Plug Gap



1. Insulator
2. Center Electrode
3. Plug Gap
4. Side Electrode

Pickup Coil Removal

- Remove the magneto cover.
- Remove the pickup coil lead clamp screw and pickup coil mounting screw, then remove the pickup coil.

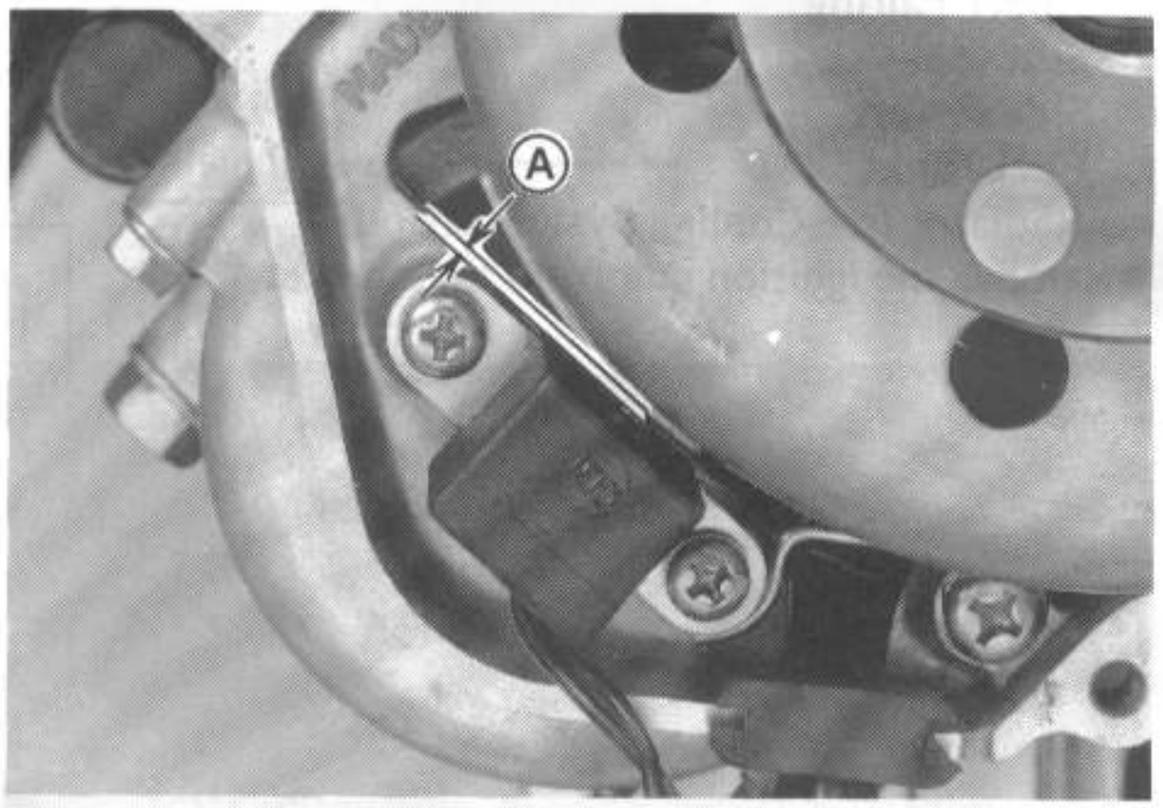
Pickup Coil Installation Note

- Check the gap between the pickup coil core and the magneto rotor at installation.

★Replace the pickup coil if necessary.

Pickup Coil Air Gap

0.4 – 1.1 mm



A. Air Gap

Pickup Coil Inspection

- Set the hand tester x 100 Ω range and connect it to pickup coil leads.

★If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

Pickup Coil Resistance

100 – 150 Ω

- Using the highest resistance range of the ohmmeter, measure the resistance between the pickup coil leads and chassis ground.

★Any meter reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.

Exciter Coil Resistance Measurement

- Set the hand tester to the x 10 Ω range, and connect it to the leads from the exciter coil to check the resistance.

★If the reading is not the specified value, replace the stator.

Exciter Coil Resistance

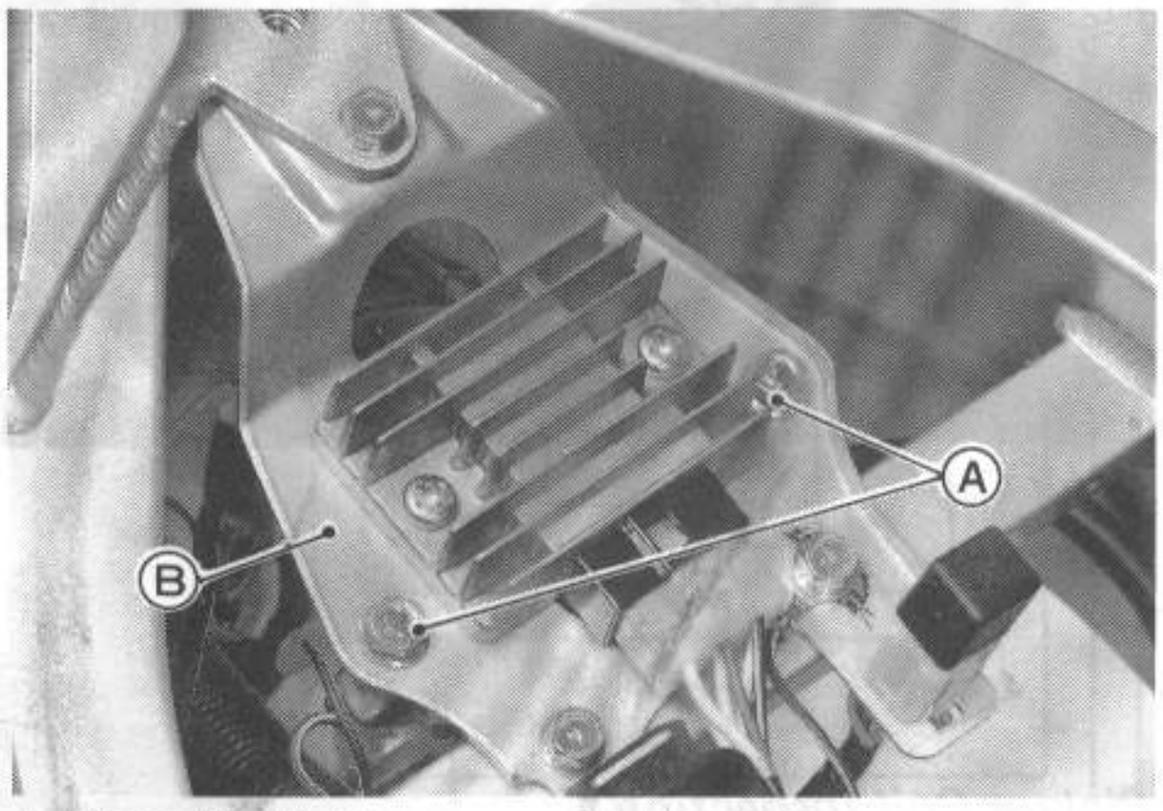
W – Meter – R:	**2 – 7 Ω**
BK – Meter – R:	**100 – 200 Ω**

- Using the highest resistance range of the hand tester, check the resistance between the exciter coil leads and chassis ground.

★Any meter reading less than infinity indicates a short, necessitating replacement of the stator.

Ignition Coil Removal

- Remove the following.
  - Lower Fairing
  - Upper Fairing
  - Seat
  - Side Covers
  - Fuel Tank
  - Radiator (see Cooling System chapter)
- Remove the ignition coil from the bracket.



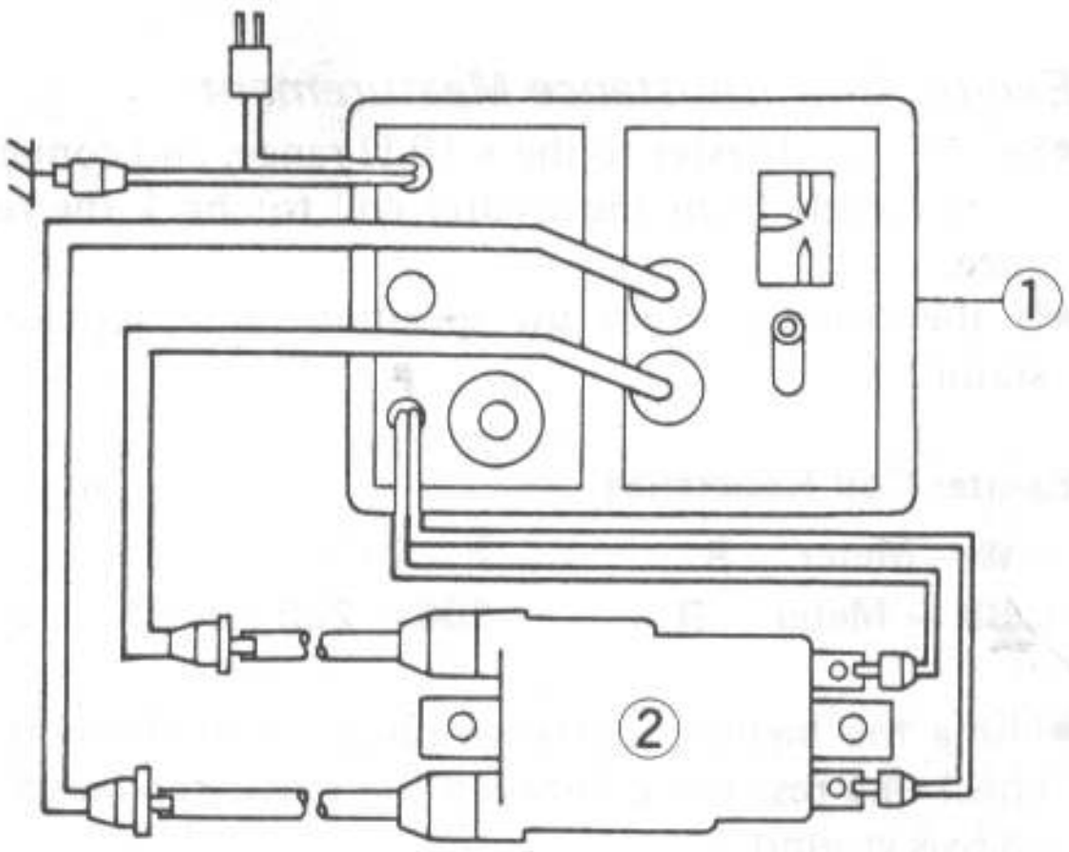
A. Mounting Bolts B. Brackets

Ignition Coil Inspection

- Measure the arcing distance with the ignition coil tester (special tool) to check the condition of the ignition coil.
- Remove the ignition coil.
- Connect the ignition coil to the tester, and measure the arcing distance.

WARNING

To avoid extremely high voltage shocks, do not touch the coil or leads.



1. Ignition Coil Tester (57001-1242)
2. Ignition Coil

★If the distance reading is less than the specified value, the ignition coil is defective, and must be replaced.

Ignition Coil Arcing Distance

6 mm or more

Ignition Coil Resistance Measurement

If the ignition coil tester is not available, the coil can be checked for a broken or badly shorted winding with an ohmmeter. However, an ohmmeter cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.

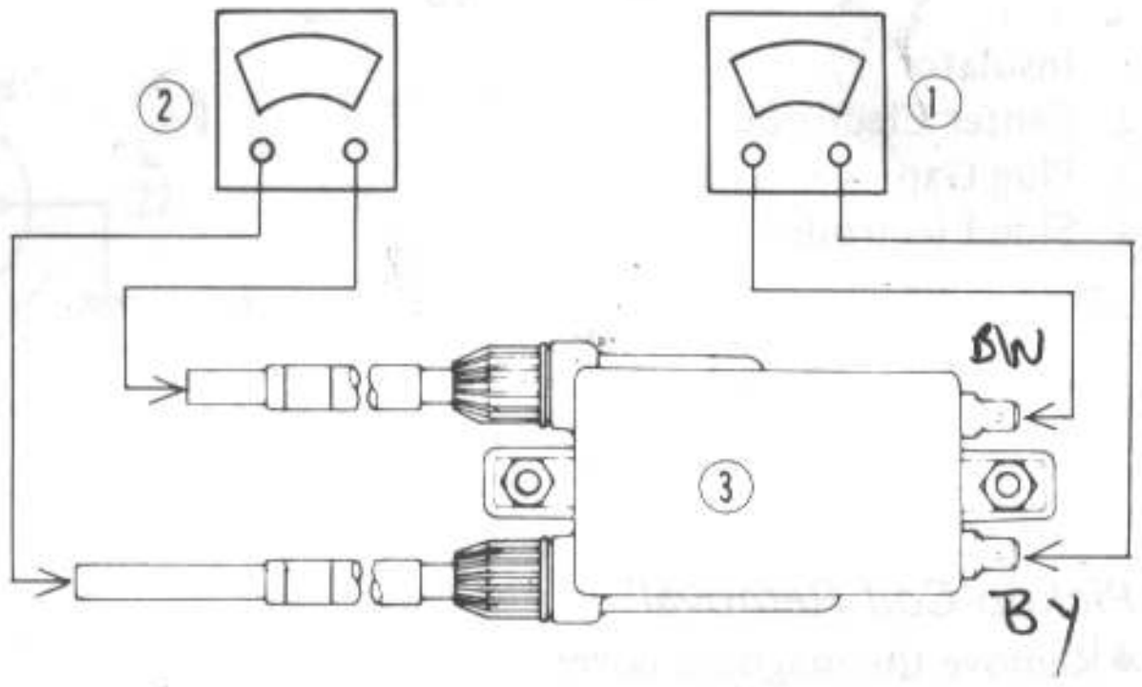
- Disconnect the primary leads from the coil terminals.
- Measure the primary winding resistance.
  - Connect an ohmmeter between the coil terminals.
  - Set the tester to the x 1 Ω range, and read the meter.
- Measure the secondary winding resistance.
  - Pull the spark plug cap off each lead.
  - Connect the hand tester between the spark plug leads.
  - Set the meter to the x 1 kΩ range, and read the meter.

★If the meter does not reads as specified, replace the coil.

Ignition Coil Winding Resistance

Primary Windings:	**0.28 – 0.38 Ω**
Secondary windings:	**4.7 – 7.1 kΩ**

Measuring Ignition Coil Resistance



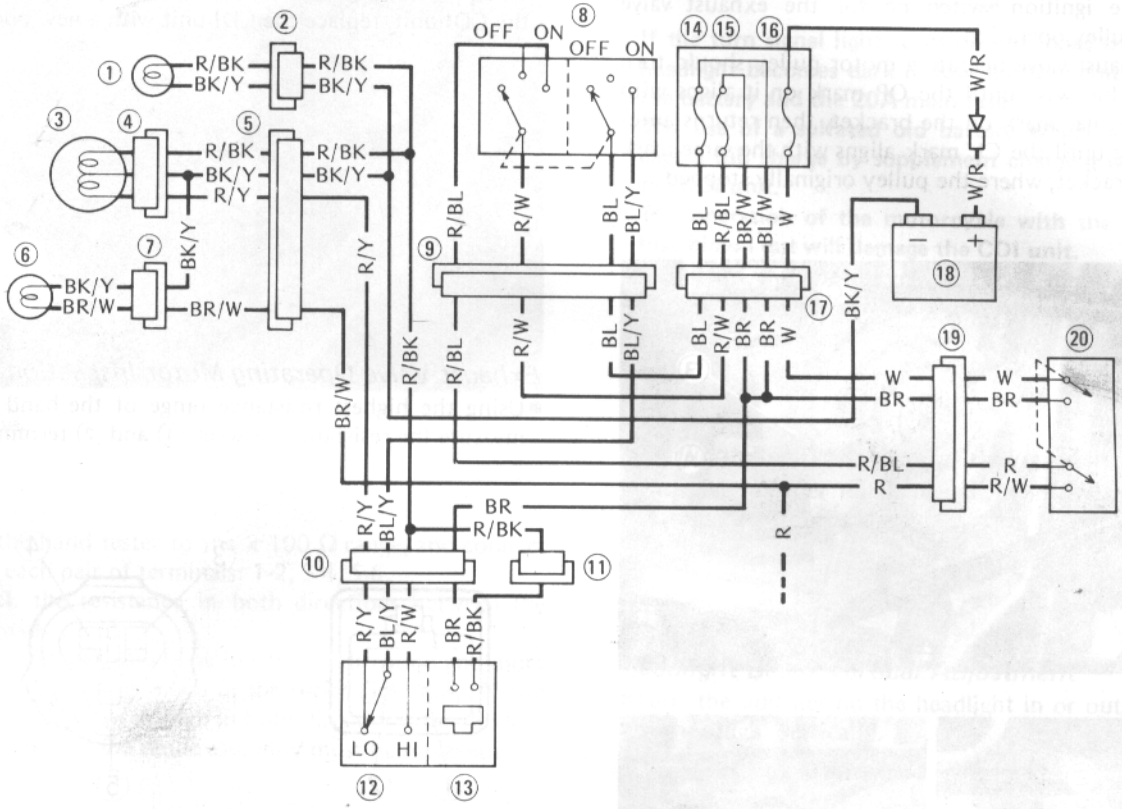
1. Measure primary winding resistance
2. Measure secondary winding resistance
3. Ignition Coil

★If the meter reads as specified, the ignition coil windings are probably good. However, if the ignition system still does not perform as it should after all other components have been checked, test replace the coil with one known to be good.

- Check the spark plug leads for visible damage.

★If any spark plug lead is damaged, replace the coil.

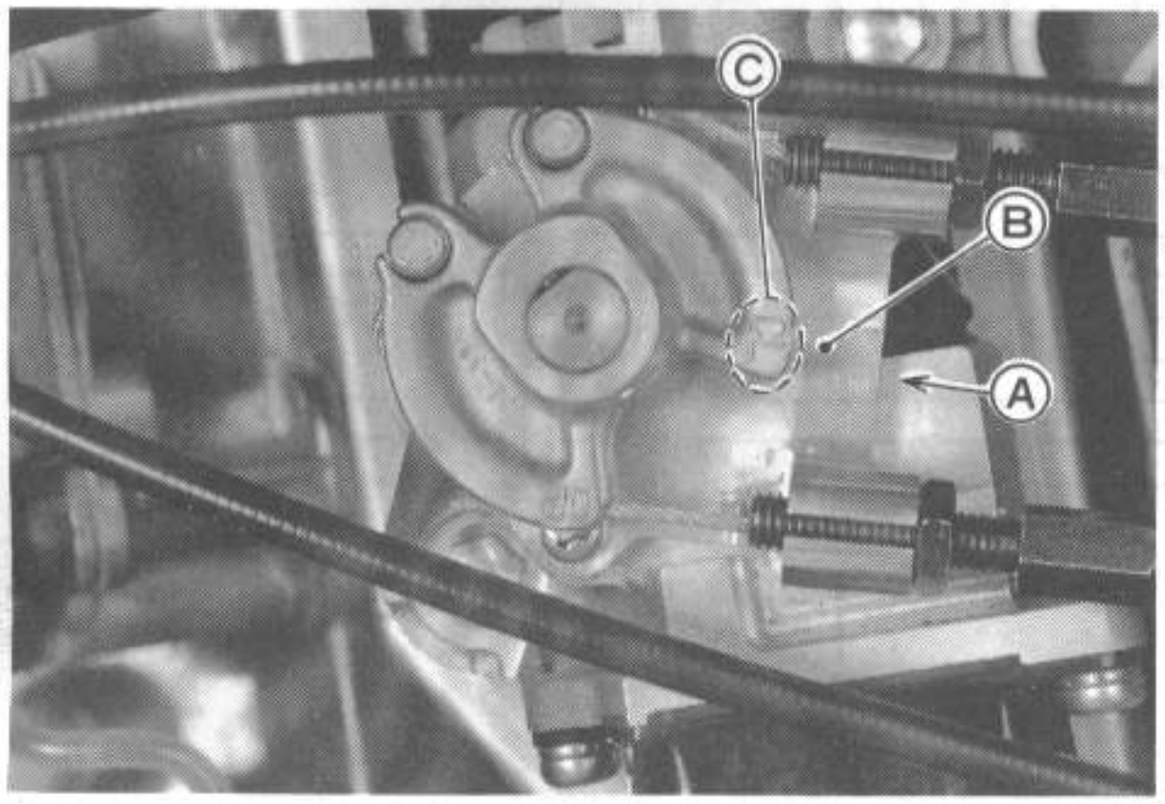
Headlight Circuit Wiring Diagram

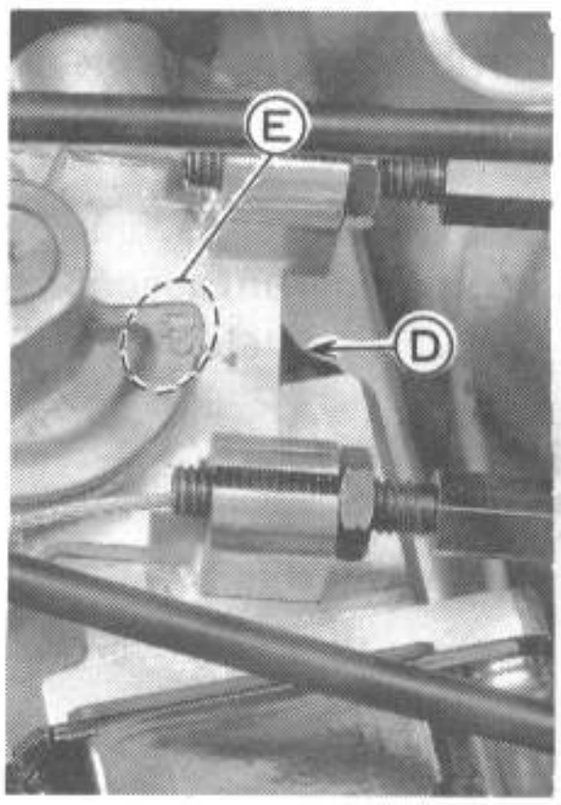


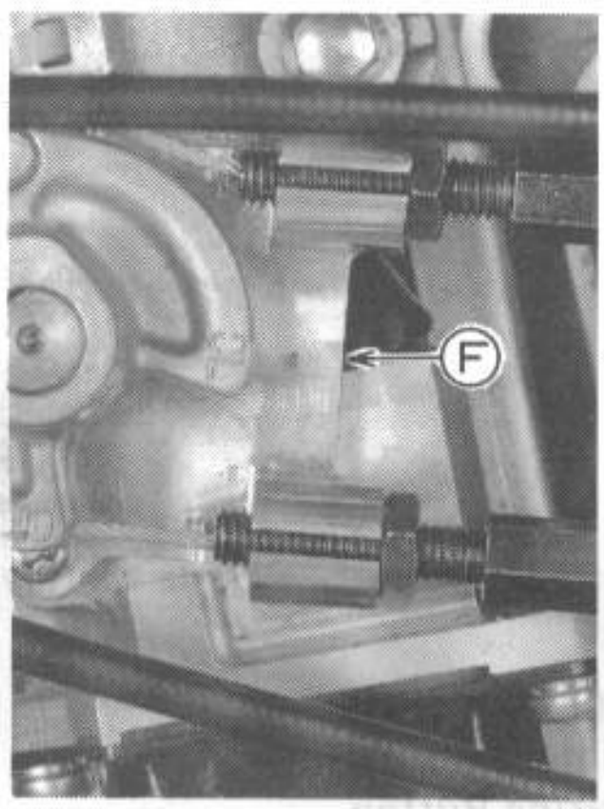
1. High Beam Indicator Light
2. 9-pin Connector
3. Headlight
4. 3-pin Connector
5. 6-pin Connector
6. City Light
7. 2-pin Connector
8. Headlight Switch
9. 9-pin Connector
10. 9-pin Connector
11. 3-pin Connector
12. Dimmer Switch
13. Passing Button
14. 10A Fuse
15. 10A Fuse
16. 20A Fuse
17. 6-pin Connector
18. Battery
19. 6-pin Connector
20. Ignition Switch

CDI Unit/Exhaust Valve Operation Inspection

- Remove the following parts.
  Seat
  Side Covers
  Fuel Tank
- Turn the ignition switch on for the exhaust valve motor pulley operation.
- The exhaust valve operating motor pulley should turn counterclockwise until the OP mark on it aligns with the triangular mark on the bracket, then returns automatically until the CL mark aligns with the same mark on the bracket, where the pulley originally stopped.







A. Normal Pulley Position with Ignition OFF
B. Mark on Bracket
C. CL Mark
D. Pulley Position when Ignition turned ON.
E. OP Mark
F. Pulley returns to the original position.

★If the pulley movement looks slow, catchy, or the pulley doesn't move at all, follow the next procedure.
- Remove the exhaust valve operating cables from the pulley and turn the ignition on.

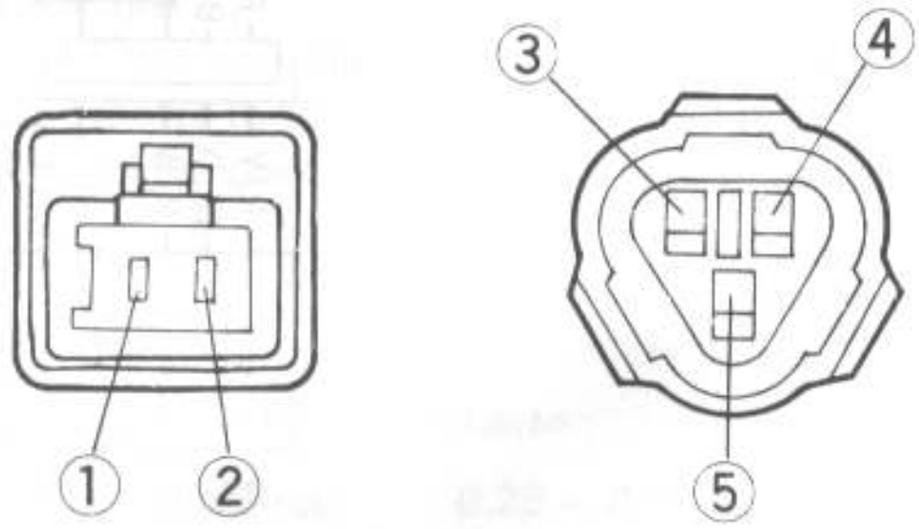
★If the marks on the pulley do not align with the mark on the bracket, or the pulley moves roughly or doesn't move at all, inspect the operating motor (see Exhaust Valve Operating Motor Inspection).

★When the pulley functions properly, check the operating cable for damage or correct adjustment, and inspect wire connections, exhaust valve operating unit and exhaust valve installation (see the Engine Top chapter).

★When no irregularities are found on all parts except for the CDI unit, replace the CDI unit with a new one.

Exhaust Valve Operating Motor Inspection

- Using the highest resistance range of the hand tester, measure the resistance between ① and ② terminals.



- If the meter reading is infinity (∞), replace the operating motor).
- Apply DC 8-16 V current between ① and ② terminals. The pulley turns clockwise or counterclockwise.

★If the pulley moves roughly or doesn't move at all, replace the operating motor.
- Measure the resistance between ③ - ④ , ③ - ⑤ , and ④ - ⑤ terminal.

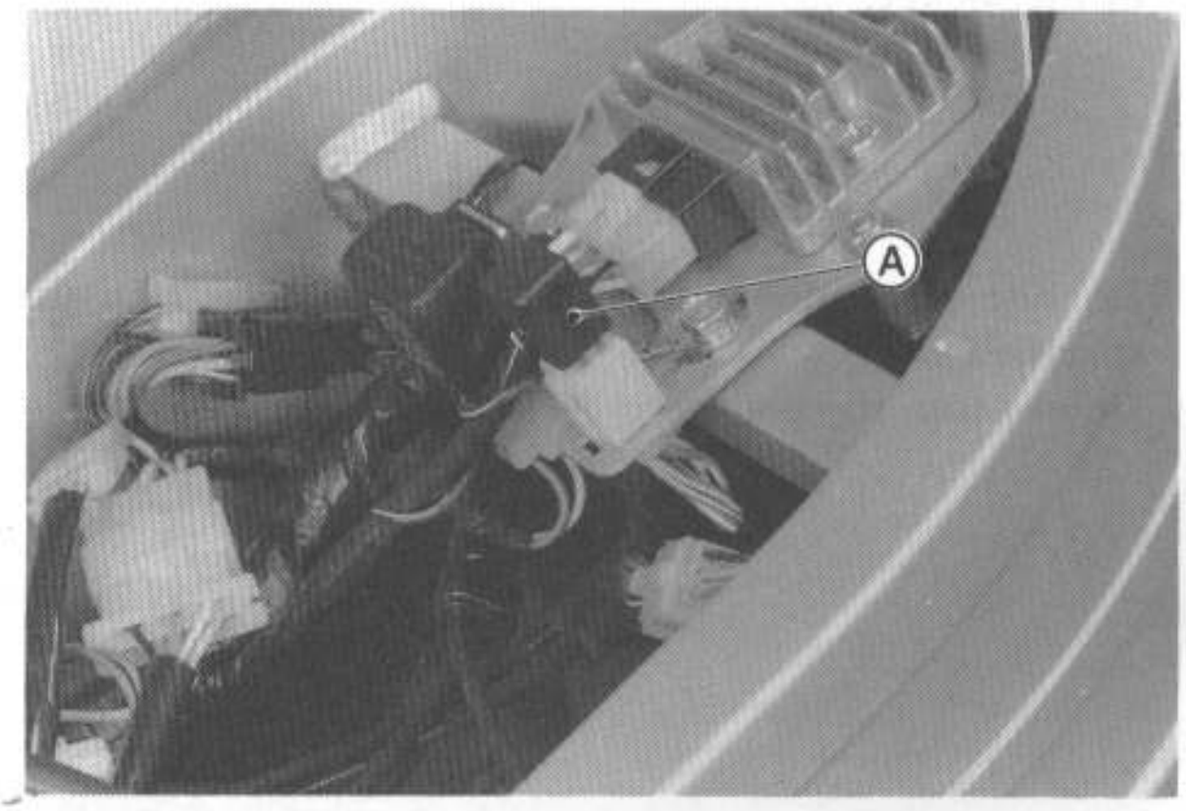
Meter Range	Connection	Standard (kΩ)
x 1 kΩ	③ – ④	0 – 6
	③ – ⑤	0 – 6
	④ – ⑤	4 – 6

★If the reading exceeds the standard, replace the operating motor.
- Visually inspect the operating motor for any kind of damages. Lightly shake the motor badly to check an abnormal noise.

★Replace the operating motor if necessary.

Diode Inspection

●Remove the diode assembly.



A. Diode

●Set the hand tester to the x 100 Ω range, and connect it to each pair of terminals: 1-2, 3-4, 5-6.

●Check the resistance in both directions between the terminals.

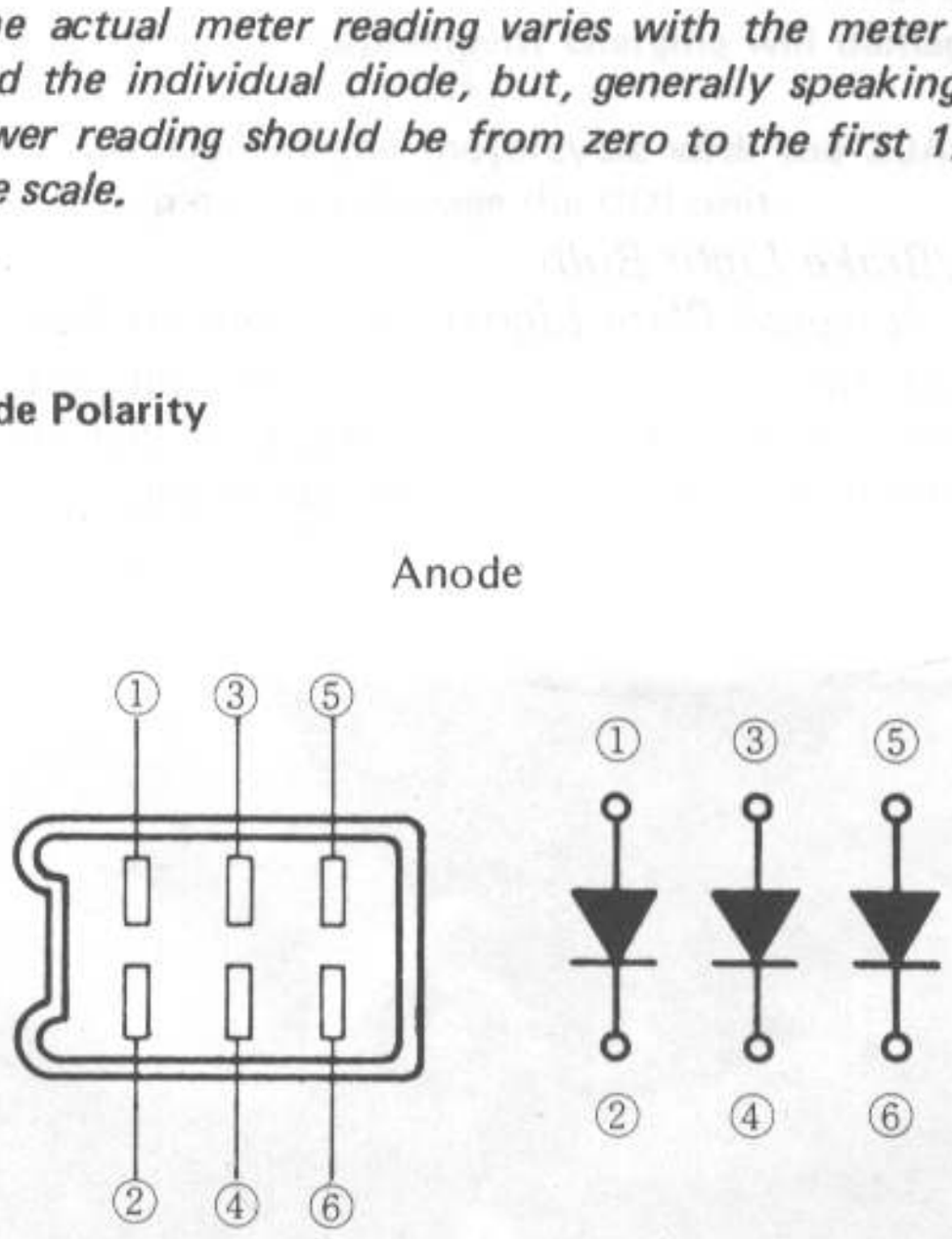
★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the diode assembly must be replaced.

NOTE

○*The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to the first 1/2 of the scale.*

Diode Polarity

Anode



Cathode

Lighting System

CAUTION

○If the turn signal light turns on but, does not flash, or headlight becomes dark at low speed operation, check the battery and the 20A main fuse.

○The use of a sulfated old battery which will not accept a full charge by supplement charging will damage the CDI unit.

○The operation of the motorcycle with the 20A main fuse blown out will damage the CDI unit.

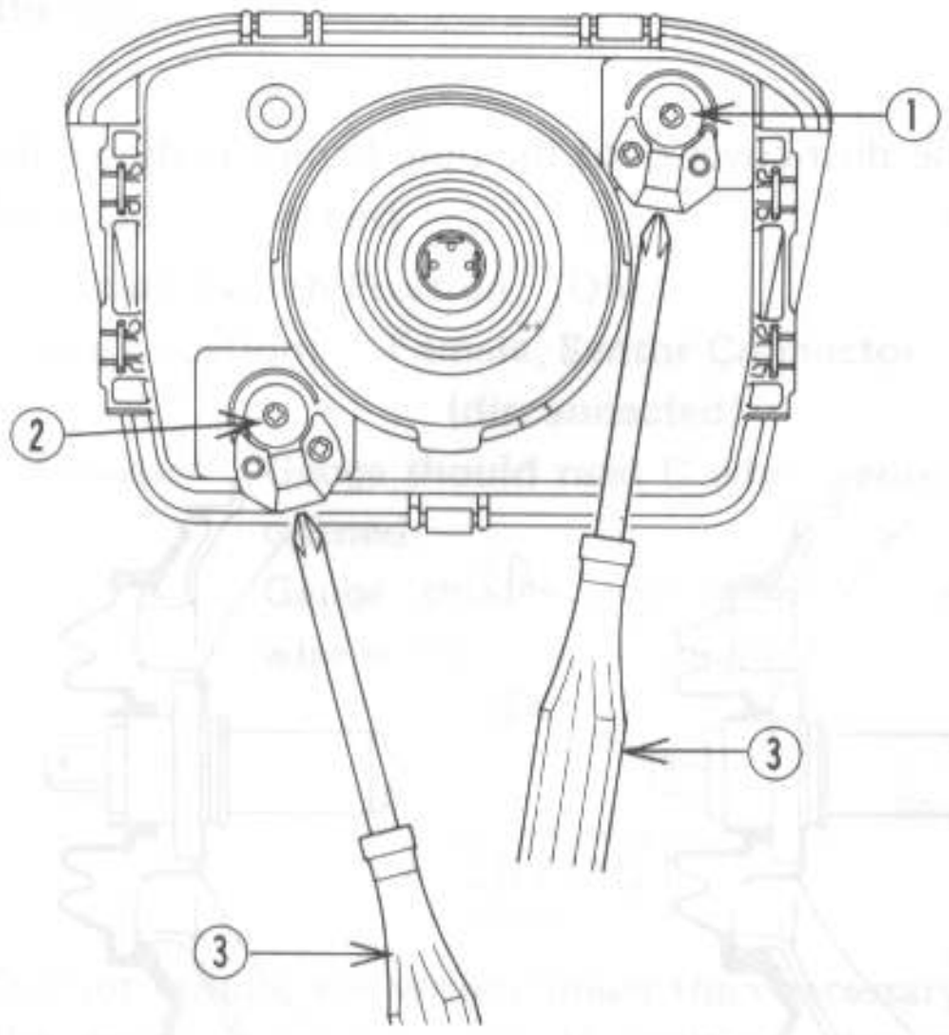
○Operating the motorcycle without the battery will damage the CDI unit.

Headlight Beam Horizontal Adjustment

●Turn the adjuster on the headlight in or out until the beam points straight ahead.

Headlight Beam Vertical Adjustment

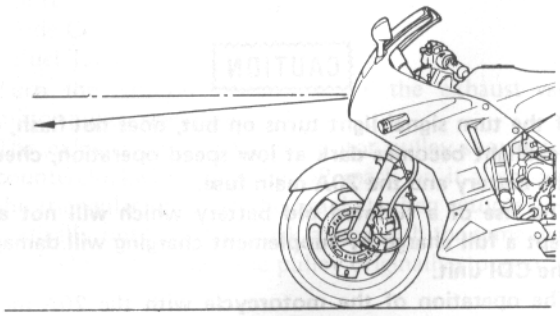
●Turn the adjuster on the headlight in or out to adjust the headlight vertically.



1. Horizontal Adjuster
2. Vertical Adjuster
3. Phillips Screwdriver

NOTE

○*On high beam, the brightest point should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight to the proper angle according to local regulations.*

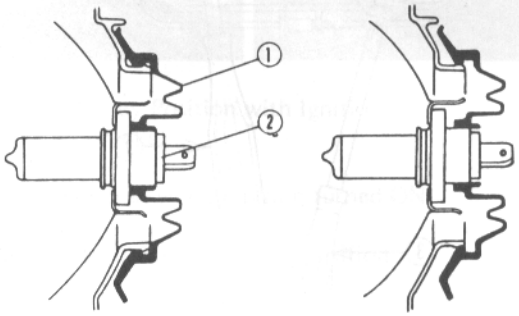


Headlight Bulb Replacement Notes

CAUTION

○**When handling the quartz-halogen bulbs, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.**

●Fit the dust cover onto the bulb firmly as shown in the figure.



Good Bad

1. Dust Cover 2. Bulb

●After installation, adjust the headlight aim.

Wedge-Base Type Bulb Replacement Note

●Note the following.

●To remove the wedge-base type bulb pull the bulb out of the socket.

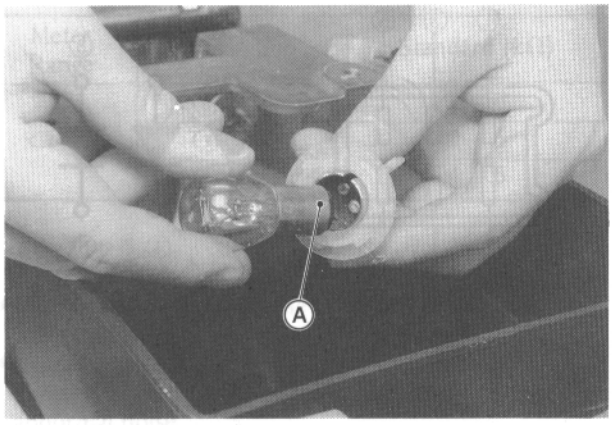
CAUTION

○**Do not use bulb rated for greater wattage than the specified value.**

○**Do not turn the bulb to prevent damage to the bulb.**

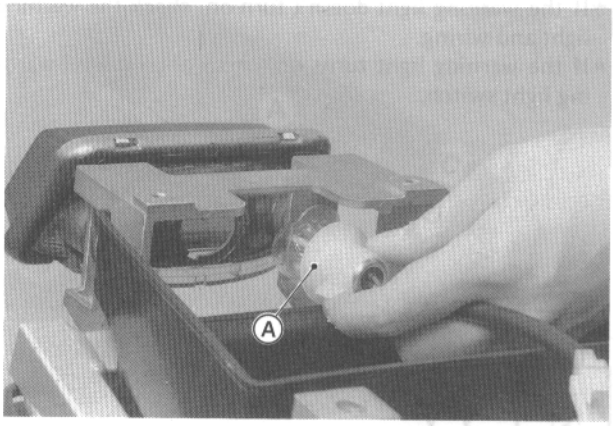
Tail/Brake Light Bulb (License Plate Light) Replacement Notes

●Insert the new bulb by aligning the pins with the grooves in the walls of the socket so that the pin closest to the bulb base is to the upper right.



A. Pin Closest to Base.

●Insert the socket by aligning the tangs with the catches in the housing so that the traiangular mark points down, and turn it clockwise.



A. Triangular Mark

Meter, Gauge

CAUTION

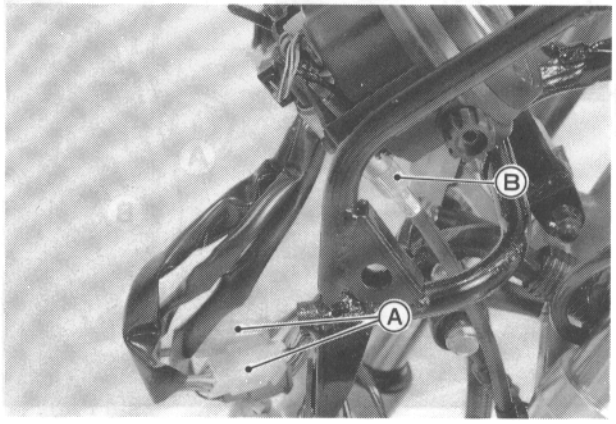
○**If the turn signal light turns on but does not flash, or headlight becomes dark at low speed operation, check the battery and the 20A main fuse.**

○**The use of a sulfated old battery which will not accept a full charge by supplement charging will damage the CDI unit.**

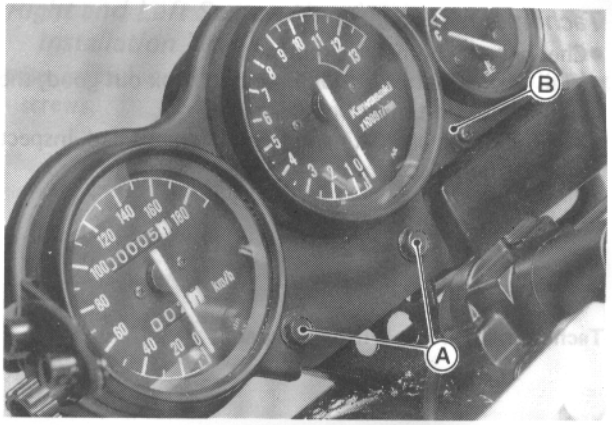
○**The operation of the motorcycle with the 20A main fuse blown out will damage the CDI unit.**

Removal

●Remove the following.
Lower Fairing
Upper Fairing



A. Connector B. Speedometer Cable Upper End



A. Mounting Bolts B. Meter Assembly

CAUTION

○**Place the meter or gauge so that the face is up. If a meter or gauge is left upside down or sideways for any length of time, it will malfunction.**

Coolant Temperature Gauge Operation Inspection

●Prepare an auxiliary wire, and check the operation of the gauge.

Gauge Operation Test

Ignition Switch Position: ON
Wire Location: Female, Sensor Connector (disconnected)
Results: Gauge should read C when sensor wire is opened.
Gauge should read H when connector wire is grounded to engine.

CAUTION

○**Do not ground the wiring longer than necessary. After the needle swings to the H position, stop the test. Otherwise the gauge could be damaged.**

★If these readings are not correct, the trouble is with the gauge and/or wiring.

●Check the coolant temperature gauge circuit wiring (see Wiring Inspection).

●If all wiring and components other than the coolant temperature gauge unit check out good, the gauge is defective.

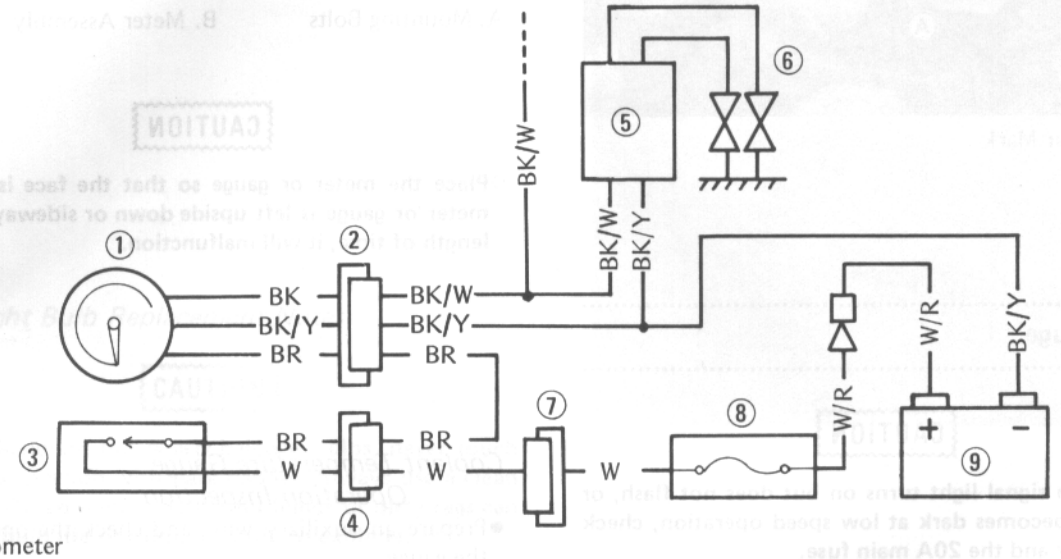
Tachometer Inspection

- Check the tachometer circuit wiring.
- ★If all wiring, battery, and 20A fuse check out good, the tachometer unit must be replaced.
- ★If the battery or 20A main fuse check out bad, inspect the CDI unit also.

Oil Level Warning Light Inspection

- Disconnect the oil level warning light lead connector.
- Ground the blue/red lead from the light using an auxiliary wire.
- ★If the warning light doesn't turn on, check the warning light and wiring.
- ★If the warning light turns on, check the oil level warning light switch.

Tachometer Circuit Wiring Diagram

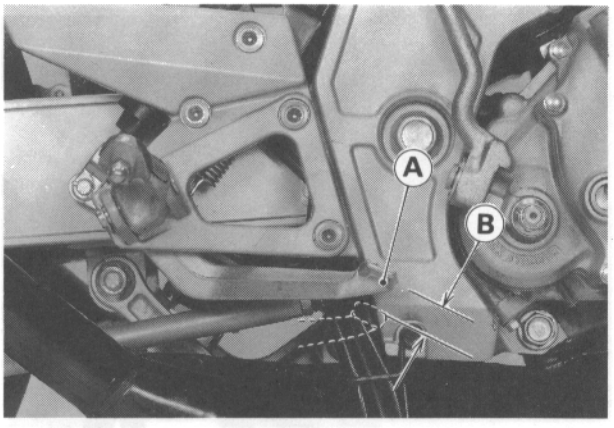


1. Tachometer
2. 4-pin Connector
3. Ignition Switch
4. 6-pin Connector
5. Ignition Coil
6. Spark Plugs
7. 6-pin Connector
8. 20A Fuse
9. Battery

Switches and Sensors

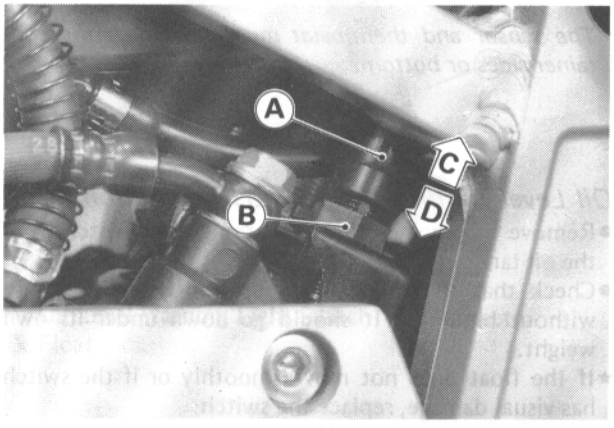
Rear Brake Light Switch Adjustment

- 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
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.**

Right and Left Switch Housing Installation Note

●Be careful not to overtighten the housing mounting screws.

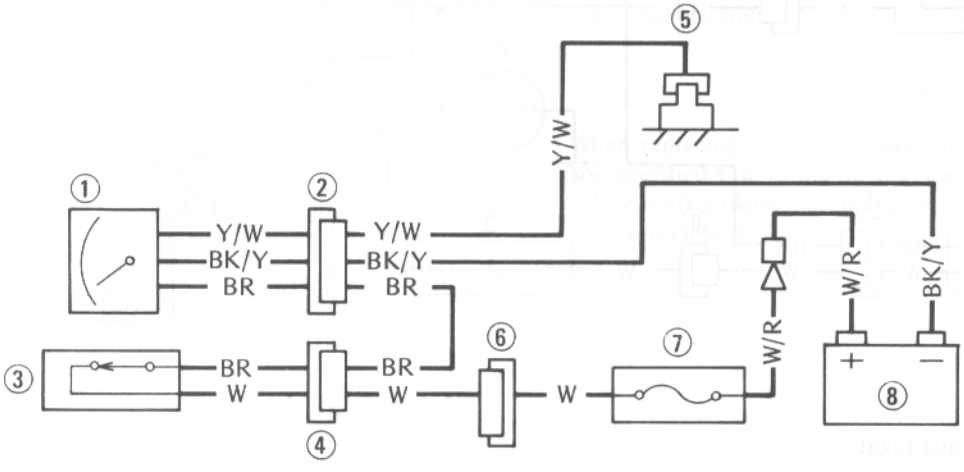
Coolant Temperature Sensor Inspection

●Suspend the sensor in a container of coolant so that the temperature sensing projection and threaded portion are submerged.
●Using an ohmmeter, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.

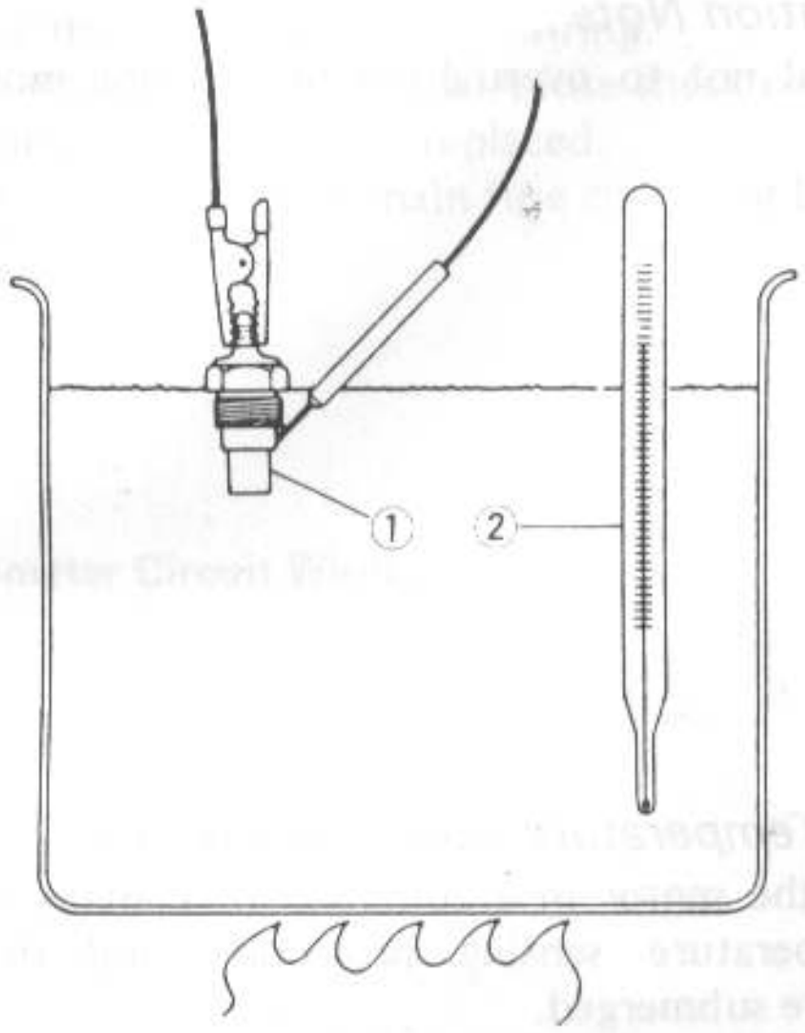
Internal Resistance of Coolant Temperature Sensor

80°C (176°F):	**48 – 57 Ω**
100°C (212°F):	**26 – 29 Ω**

Coolant Temperature Gauge Circuit Wiring Diagram



1. Coolant Temperature Gauge
2. 9-pin Connector
3. Ignition Switch
4. 6-pin Connector
5. Coolant Temperature Sensor
6. 6-pin Connector
7. 20A Fuse
8. Battery



1. Coolant Temperature Sensor 2. Thermometer

★If the ohmmeter does not show the specified values, replace the sensor.

NOTE

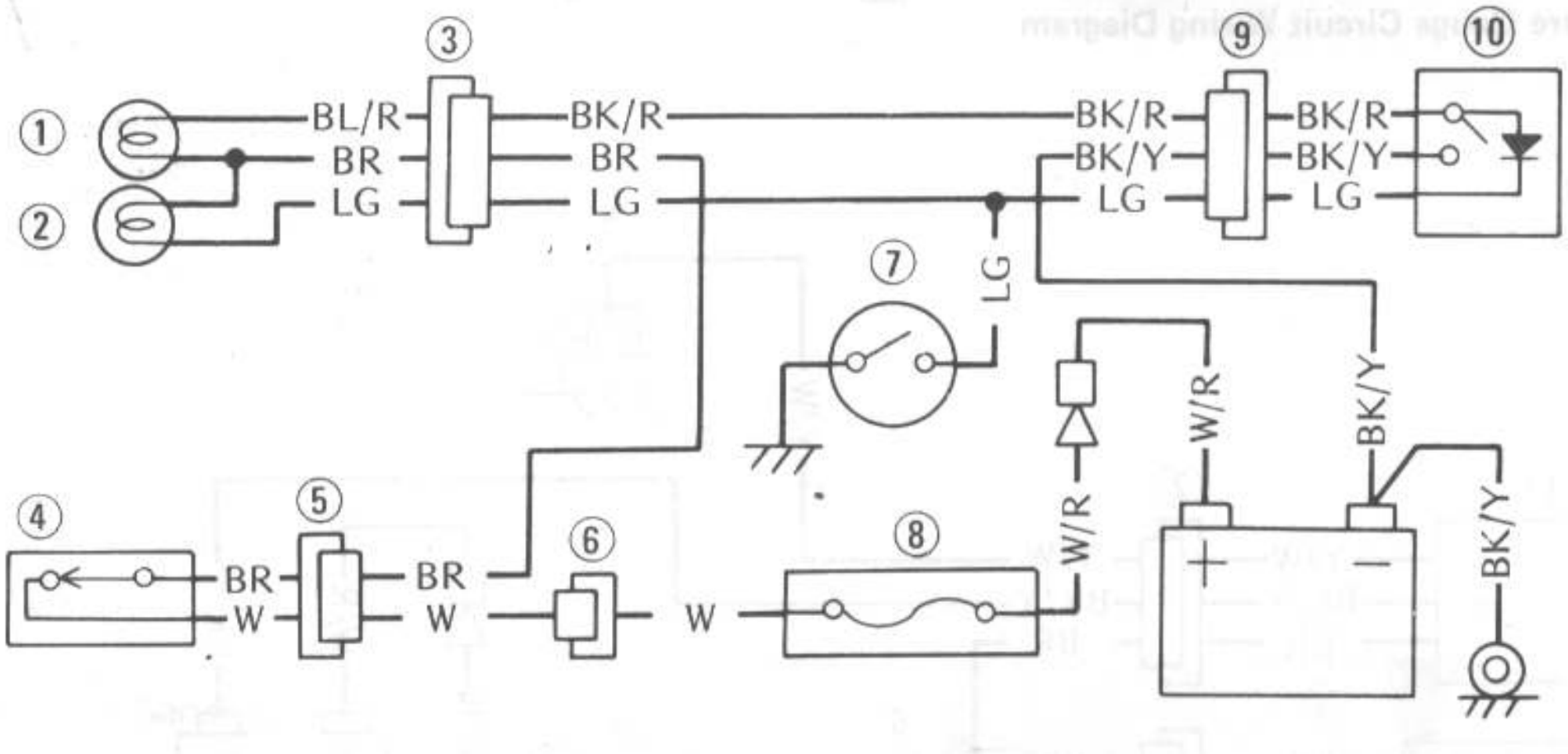
○*The sensor and thermostat must not touch the container sides or bottom.*

Oil Level Warning Light Switch Inspection

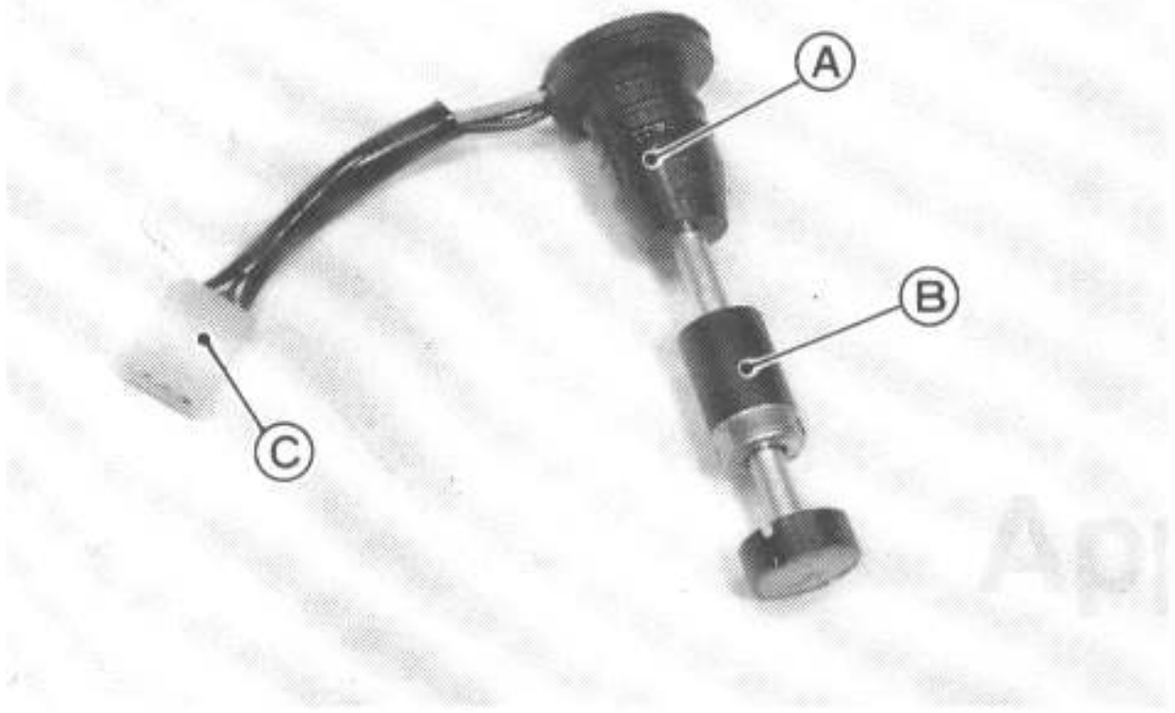
- Remove the engine oil level warning light switch from the oil tank.
- Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly or if the switch has visual damage, replace the switch.

Oil Level Warning Circuit Wiring Diagram



1. Oil Level Warning Light
2. Neutral Indicator Light
3. 9-pin Connector
4. Ignition Switch
5. 6-pin Connector
6. 6-pin Connector
7. Neutral Switch
8. 20A Fuse
9. 3-pin Connector
10. Oil Level Warning Light Switch
11. Battery



A. Oil Level Warning Light Switch C. Connector
B. Float

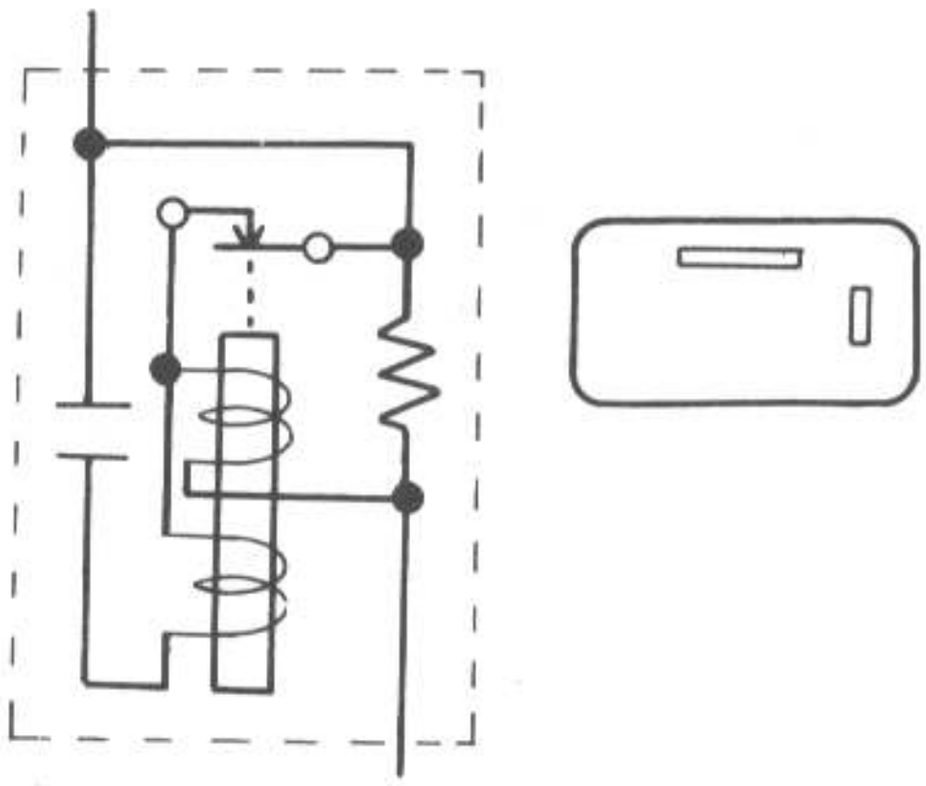
- Set the hand tester to x 10 Ω range.
- Measure the resistance between black/red and black/yellow leads.
- The tester should show continuity when the float is at the bottom.
- ★If it does not, replace the sensor.
- Measure the resistance between black/red and light green lead in both direction.
- ★If the meter does not show the specified value, replace the switch.

Meter Range	Connections		Reading
	Meter (+) Terminal	Meter (–) Terminal	
x 10 Ω	Black/Red	Light Greed	∞
	Light Green	Black/Red	first 1/2 of the scale

Turn Signal Relay

Turn Signal Relay Inspection

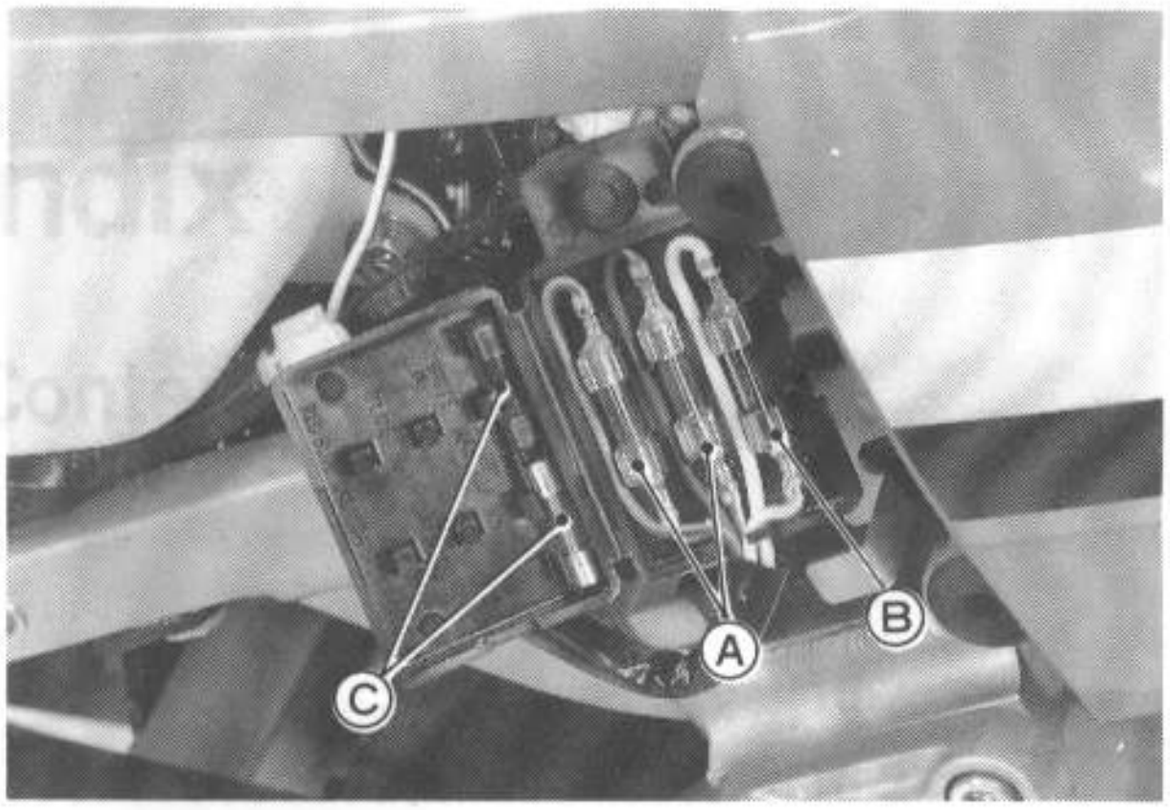
- Remove the turn signal relay.
- Set the hand tester to the x 1 Ω range, and measure the resistance between the terminals.



Fuse Box

Fuse Installation

- Install the fuses as shown.



A. 10A Fuse
B. 20A Fuse
C. Spare Fuses

Fuse Inspection

- Inspect the fuse element.
- ★If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

CAUTION

- **When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.**

Appendix

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Additional Considerations for Racing

This motorcycle has been manufactured for use in a reasonable and prudent manner and as a vehicle only. However, some may wish to subject this motorcycle to abnormal operation, such as would be experienced under racing conditions. KAWASAKI STRONGLY RECOMMENDS THAT ALL RIDERS RIDE SAFELY AND OBEY ALL LAWS AND REGULATIONS CONCERNING THEIR MOTORCYCLE AND ITS OPERATION.

Racing should be done under supervised conditions, and recognized sanctioning bodies should be contacted for further details. For those who desire to participate in competitive racing or related use, the following technical information may prove useful. However, please note the following important points.

- You are entirely responsible for the use of your motorcycle under abnormal conditions such as racing, and Kawasaki shall not be liable for any damages which might arise from such use.
- Kawasaki's Limited Motorcycle Warranty and Limited Emission Control Systems Warranty specifically exclude motorcycles which are used in competitive or related uses. Please read the warranty carefully.
- Motorcycle racing is a very sophisticated sport, subject to many variables. The following information is theoretical only, and Kawasaki shall not be liable for any damages which might arise from alterations utilizing this information.
- When the motorcycle is operated on public roads, it **must** be in its original state in order to ensure safety and compliance with applicable regulations.

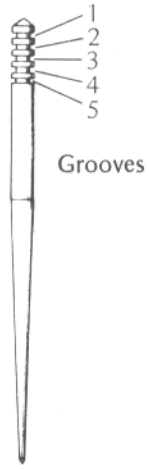
Carburetors:

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetors have been properly adjusted, and all parts cleaned and found to be functioning properly.

If the engine still exhibits symptoms of overly lean carburetion after all maintenance and adjustments are correctly performed, the main jet can be replaced with a smaller or larger one. A smaller numbered jet gives a leaner mixture and a larger numbered jet a richer mixture.

For the models other than the US model, a certain amount of adjustment can be made by changing the position of the needle. There are five grooves at the top of the needle. Changing the position of the clip to a groove closer to the bottom raises the needle, which makes the mixture richer at a given position of the throttle valve.

Jet Needle



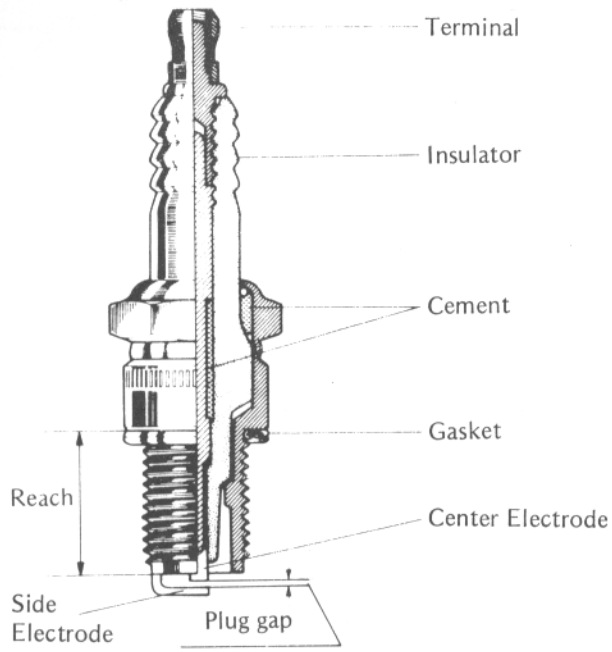
Spark Plug:

The spark plug ignites the fuel/air mixture in the combustion chamber. To do this effectively and at the proper time, the correct spark plug must be used, and the spark plug must be kept clean and adjusted.

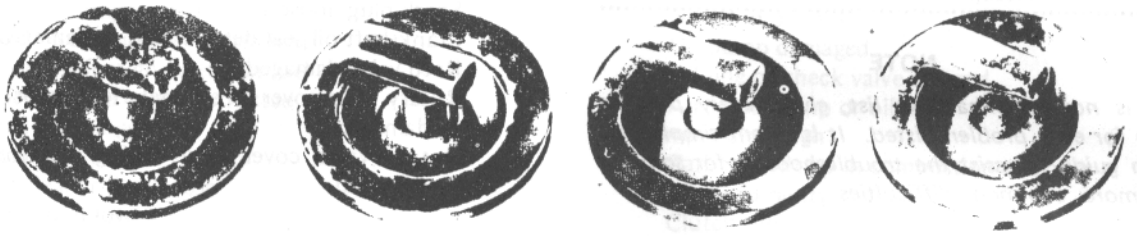
Test have shown the plug listed in the "General Specifications" section in the "General Information" chapter to be the best plug for general use.

Since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, whether or not a spark plug of a correct heat range is used should be determined by removing and inspecting the plug.

Spark Plug



Spark Plug Condition



Carbon Fouling | Oil Fouling | Normal Operation | Overheating

When a plug of the correct heat range is being used, the electrodes will stay hot enough to keep all the carbon burned off, but cool enough to keep from damaging the engine and the plug itself. This temperature is about 400 – 800°C (750 – 1,450°F) and can be judged by noting the condition and color of the ceramic insulator around the center electrode. If the ceramic is clean and of a light brown color, the plug is operating at the right temperature.

A spark plug for higher operating temperatures is used for racing. Such a plug is designed for better cooling efficiency so that it will not overheat and thus is often called a "colder" plug. If a spark plug with too high a heat range is used – that is, a "cold" plug that cools itself too well – the plug will stay too cool to burn off the carbon, and the carbon will collect on the electrodes and the ceramic insulator.

The carbon on the electrodes conducts electricity, and can short the center electrode to ground by either coating the ceramic insulator or bridging across the gap. Such a short will prevent an effective spark. Carbon build-up on the plug can also cause other troubles. It can heat up red-hot and cause preignition and knocking, which may eventually burn a hole in the top of the piston.

Spark Plug Inspection

●Remove the spark plug and inspect the ceramic insulator.

★Whether or not the right temperature plug is being used can be ascertained by noting the condition of the ceramic insulator around the electrode. A light brown color indicates the correct plug is being used. If the ceramic is black, it indicates that the plug is firing at too low a temperature, so the next hotter type (NGK B8ES) should be used instead. If the ceramic is white, the plug is operating at too high a temperature and it should be replaced with the next colder type.

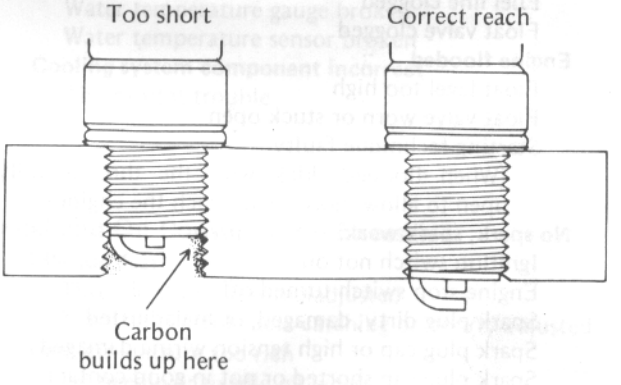
CAUTION

○**If the spark plug is replaced with a type other than the standard plug listed in the "SPECIFICATIONS" section, make certain the replacement plug has the same thread pitch and reach (length of threaded portion) and the same insulator type (regular type or projected type) as the standard plug.**

○**If the plug reach is too short, carbon will build up on the plug hole threads in the cylinder head, causing overheating and making it very difficult to insert the correct spark plug later.**

○**If the reach is too long, carbon will build up on the exposed spark plug threads causing overheating, preignition, and possibly burning a hole in the piston top. In addition, it may be impossible to remove the plug without damaging the cylinder head.**

Plug Reach



Standard Spark Plug Threads

Diameter	:	**14 mm**
Pitch	:	**1.25 mm**
Reach	:	**19.0 mm**

NOTE

○*The heat range of the spark plug functions like a thermostat for the engine. Using the wrong type of spark plug can make the engine run too hot (resulting in engine damage) or too cold (with poor performance, misfiring, and stalling). The standard plug has been selected to match the normal usage of this motorcycle in combined street and highway riding. Unusual riding conditions may require a different spark plug heat range. For racing, install the colder plug.*

Troubleshooting Guide

NOTE

○This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine Doesn't Start; Starting Difficulty

Engine won't turn over
- Cylinder, piston seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or crankcase bearing seizure
- Balancer gear or bearing seizure
- Kickstarter return spring broken
- Kick ratchet gear not engaging

No fuel flow
- No fuel in tank
- Sticking of the valve in valve in the fuel tap
- Fuel tap vacuum hose clogged
- Tank cap air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded
- Float level too high
- Float valve worn or stuck open
- Starting technique faulty
  (When flooded, kick with the throttle fully open to allow more air to reach the engine)

No spark, spark weak
- Ignition switch not on
- Engine stop switch turned off
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Exciter coil damaged
- CDI unit broken
- Pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged
- Ignition or engine stop switch shorted
- Wiring shorted or open

Fuel/air mixture incorrect
- Idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter jet clogged

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged
- Rotary valve cover oil seal deteriorated or damaged
- Rotary valve cover large O-ring deteriorated or damaged

Poor Running at Low Speed

Spark weak
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- CDI unit broken pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged

Fuel/air mixture incorrect
- Throttle stop screw maladjusted
- Carburetors not synchronizing
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter plunger stuck open
- Float level too high or too low
- Fuel tank air vent obstructed

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged

Poor Running No Power at High Speed

Firing incorrect
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Ignition timing malfunction
- Exciter coil damaged
- CDI unit broken
- Pickup coil broken or maladjusted

Fuel/air mixture incorrect
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Jet needle clip in wrong position
- Float level too high or too low

Air jet or air passage clogged
Air cleaner clogged, poorly sealed, or missing
Starter plunger stuck open
Fuel to carburetor insufficient
Water or foreign matter in fuel
Fuel tank air vent obstructed
Fuel line clogged
Fuel tap clogged
Air cleaner duct loose

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Sprak plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged

Oil and fuel/air mixture incorrect
Oil pump cable maladjusted
Throttle control cable maladjusted
Crankshaft oil seal deteriorated or damaged
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Engine rpm will not rise properly
Starter plunger stuck open
Float level too high or too low
Main jet clogged
Throttle valve does not fully open
Air cleaner clogged
Muffler clogged
Water or foreign matter in fuel
Cylinder exhaust port clogged
Brake dragging
Clutch slipping
Overheating
Transmission oil level too high
Transmission oil viscosity too high
Crankshaft bearing worn or damged

Knocking
Ignition timing malfunction
Carbon built up in combustion chamber
Fuel poor quality or inccorect
Spark plug incorrect

Overheating

Firing incorrect
Spark plug dirty, damaged, or maladjusted
Ignition timing malfunction

Fuel/air mixture incorrect
Main jet clogged or wrong size
Float level too low
Air cleaner clogged
Air cleaner duct loose

Oil and fuel/air mixture incorrect
Throttle control cable maladjusted
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Compression high
Carbon built up in combustion chamber

Engine load faulty
Clutch slipping
Transmission oil level too high
Brake dragging

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Coolant incorrect
Coolant leve too low
Coolant deteriorated

Cooling system component incorrect
Radiator clogged
Thermostat trouble
Radiator cap trouble
Water pump not rotating
Water pump impeller damaged

Overcooling

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Cooling system component incorrect
Thermostat trouble

Fuel and Oil Consumption Excessive

Idle too fast
Throttle stop screw maladjusted
Throttle control cable catching or poorly adjusted

Fuel/air mixture too rich
Jet needle or needle jet worn
Starter plunger stuck open
Float level too high
Air cleaner clogged

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Spark plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary vlave cover large O-ring deteriorated or damaged

Exhaust obstructed
Muffler clogged
Cylinder exhaust port clogged

Engine load faulty
- Clutch slipping
- Transmission oil level too high
- Brake dragging

Clutch Operation Faulty

Clutch slipping
- No clutch lever play
- Friction plate worn or warped
- Steel plate worn or warped
- Clutch spring weak
- Clutch cable maladjusted
- Clutch inner cable catching
- Clutch release mechanism trouble
- Clutch hub or housing unevenly worn

Clutch not disengaging properly
- Clutch lever play excessive
- Clutch plate warped or too rough
- Clutch spring tension uneven
- Transmission oil deteriorated
- Transmission oil viscosity too high
- Clutch housing gear frozen on drive shaft
- Clutch release mechanism trouble

Gear Shift Faulty

Doesn't into gear; shift pedal doesn't return
- Clutch not disengaging
- Shift fork bent or seized
- Shift return spring weak or broken
- Shift lever broken
- Set levers binding
- External shift mechanism arm worn

Jumps out of gear
- Shift fork worn
- Gear groove worn
- Gear dogs, holes, and/or recesses worn
- Shift drum groove worn
- Shift drum set lever spring weak or broken
- Shift fork guide pin or collar worn
- Drive shaft, output shaft, and/or gear splines worn

Overshifts
- Shift drum set lever spring weak or broken

Abnormal Engine Noise

Knocking
- Ignition timing malfunction
- Carbon built up in combustion chamber
- Fuel poor quality or incorrect
- Overheating
- Spark plug incorrect

Piston slap
- Cylinder/piston clearance excessive
- Cylinder, piston worn
- Connecting rod bent
- Piston pin, piston pin hole worn

Other noise
- Connecting rod small end clearance excessive
- Connecting rod big end clearance excessive
- Piston ring worn, broken, or stuck
- Piston seizure or damaged
- Cylinder head gasket leaking
- Exhaust pipe leaking at cylinder connection
- Crankshaft runout excessive
- Engine mount loose
- Crankshaft bearing worn

Abnormal Drive Train Noise

Clutch noise
- Clutch housing/friction plate clearance excessive
- Clutch housing gear/primary gear backlash excessive
- Metal chip jammed in clutch housing gear teeth

Transmission noise
- Crankcase bearing worn
- Transmission gear worn or chipped
- Metal chip jammed in gear teeth
- Transmission oil insufficient or too thin
- Kick ratchet gear not properly disengaging from kick gear
- Kick idle gear worn or chipped

Drive chain noise
- Chain worn
- Rear and/or engine sprocket(s) worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise

Front fork noise
- Oil insufficient or too thin
- Spring weak or broken

Rear shock absorber noise
- Shock absorber damaged

Disc brake noise
- Pad installed incorrectly
- Pad surface glazed
- Disc warped
- Caliper damaged
- Cylinder damaged

Other noise
- Bracket, nut, bolt, etc. not properly mounted or tightened

Exhaust Smoke

Excessive white smoke
- Oil pump cable maladjusted
- Throttle control cable maladjusted
- Engine oil poor quality or incorrect
- Crankshaft oil seal damaged

Brownish smoke
- Air cleaner clogged
- Main jet too large or fallen off
- Starter plunger stuck open
- Float level too high

Handling and/or Stability Unsatisfactory

Handlebar hard to turn
- Control cable routing incorrect
- Wiring routing incorrect
- Steering stem locknut too tight
- Bearing roller damaged
- Bearing race dented or worn
- Steering stem lubrication inadequate
- Steering stem bent
- Tire air pressure too low

Handlebar shakes or excessively vibrates
- Tire worn
- Swing arm bushing or needle bearing damaged
- Rim warped
- Front, rear axle runout excessive
- Wheel bearing worn
- Handlebar clamp loose

Handlebar pulls to one side
- Frame bent
- Wheel misalignment
- Swing arm bent or twisted
- Swing arm pivot shaft runout excessive
- Steering stem bent
- Front fork leg bent
- Right/left front fork oil level uneven

Shock absorption unsatisfactory
- (Too hard)
- Front fork oil excessive
- Front fork oil viscosity too high
- Tire air pressure too high
- Rear suspension maladjusted
- (Too soft)
- Front fork oil insufficient and/or leaking
- Front fork oil viscosity too low
- Front fork, rear shock absorber spring(s) weak
- Rear shock absorber oil leaking
- Rear shock absorber gas leaking

Brake Doesn't Hold

Disc brake
- Air in the brake line
- Pad or disc worn
- Brake fluid leak
- Disc warped
- Contaminated pad
- Brake fluid deteriorated
- Primary cup or secondary cup damaged
- Master cylinder scratched inside

Battery Discharged

- Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
- Battery lead making poor contact
- Regulator/rectifier damaged
- Ignition switch damaged
- Load excessive (e.g., bulb of excessive wattage)
- Flywheel magneto damaged
- Stator coil open or short
- Wiring faulty

Battery Overcharged

- Battery damaged
- Regulator/rectifier trouble

General Lubrication

Lubrication

●Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
●Lubricate the points listed below with indicated lubricant.

NOTE

○*Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure spray water, perform the general lubrication.*

Pivots: Lubricate with Motor Oil.
Side Stand
Clutch Lever
Brake Lever
Brake Pedal Shaft
Kick Pedal

Points: Lubricate with Grease.
Clutch Inner Cable Ends
Speedometer Inner Cable*
*Grease the lower part of the inner cable sparingly.

Cables: Lubricate with Motor Oil.
Choke Cable
Throttle Cable
Oil Pump Cable
Clutch Cable

Nut, Bolt, and Fastener Tightness

Tighteness Inspeciton

●Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○*Check engine fastener tightness when the engine is cold (at room temperature).*

○If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. First loosen each fastener by ½ turn, then tighten it.
★If cotter pins are damaged, replace them with new ones.

Nut, Bolt, and Fastener to be checked
Wheels:
Front Axle Nut
Front Axle Clamp Bolts
Rear Axle Nut
Rear Axle Nut Clip
Brakes:
Front Master Cylinder Clamp Bolts
Front Caliper Mounting Bolts
Rear Master Cylinder Mounting Bolts
Torque Link Nuts
Torque Link Nut Clip
Brake Lever Pivot Nut
Brake Pedal Bolt
Suspension:
Front Fork Clamp Bolts
Front Fork Top Plug
Rear Shock Absorber Mounting Bolts
Swing Arm Pivot Shaft Nut
Uni-trak Link Nuts
Steering:
Stem Head Nut
Handlebar Holder Bolts
Handlebar Clamp Bolts
Engine:
Engine Mounting Bolts
Cylinder Head Bolts
Muffler Mounting Nuts
Muffler Mounting Bolts
Cylinder Nuts
Others:
Side Stand Bolts
Front Footpeg Mounting Bolts
Rear Footpeg Mounting Bolts
Front Footpeg Clip
Rear Footpeg Clip

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	x 1,000,000
kilo	k	x 1,000
centi	c	x 0.01
milli	m	x 0.001
micro	μ	x 0.000001

Units of Mass:

kg	x	2.205	=	lb
g	x	0.03527	=	oz

Units of Volume:

L	x	0.2642	=	gal (US)
L	x	0.2200	=	gal (imp)
L	x	1.057	=	qt (US)
L	x	0.8799	=	qt (imp)
L	x	2.113	=	pint (US)
L	x	1.816	=	pint (imp)
mL	x	0.03381	=	oz (US)
mL	x	0.02816	=	oz (imp)
mL	x	0.06102	=	cu in

Units of Force:

N	x	0.1020	=	kg
N	x	0.2248	=	lb
kg	x	9.807	=	N
kg	x	2.205	=	lb

Units of Length:

km	x	0.6214	=	mile
m	x	3.281	=	ft
mm	x	0.03937	=	in

Units of Torque:

N-m	x	0.1020	=	kg-m
N-m	x	0.7376	=	ft-lb
N-m	x	8.851	=	in-lb
kg-m	x	9.807	=	N-m
kg-m	x	7.233	=	ft-lb
kg-m	x	86.80	=	in-lb

Units of Pressure:

kPa	x	0.01020	=	kg/cm^2
kPa	x	0.1450	=	psi
kPa	x	0.7501	=	cm Hg
kg/cm^2	x	98.07	=	kPa
kg/cm^2	x	14.22	=	psi
cm Hg	x	1.333	=	kPa

Units of Speed:

km/h	x	0.6214	=	mph

Units of Power:

kW	x	1.360	=	PS
kW	x	1.341	=	HP
PS	x	0.7355	=	kW
PS	x	0.9863	=	HP

Units of Temperature:

$$\frac{9\,(°C + 40)}{5} - 40 = °F$$

$$\frac{5\,(°F + 40)}{9} - 40 = °C$$