Kawasaki

ZRX1200R
ZRX1200S
ZRX1200



Motorcycle Service Manual

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

- Replacement of the original exhaust system or muffler with a component not in compliance with Federal regulations.
- Removal of the muffler(s) or any internal portion of the muffler(s).
- Removal of the air box or air box cover.
- Modifications to the muffler(s) or air intake system by cutting, drilling, or other means if such modifications result in increased noise levels.

Quick Reference Guide

CLICK RED BOX TO GO TO CHAPTER

General Information	1
Fuel System	2
Cooling System	3
Engine Top End	4
Clutch	5
Engine Lubrication System	6
Engine Removal/Installation	7
Crankshaft/Transmission	8
Wheels/Tires	9
Final Drive	10
Brakes	11
Suspension	12
Steering	13
Frame	14
Electrical System	15
Appendix	16

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

- Bend the pages back to match the black tab of the desired chapter number with the black tab on the edge at each table of contents page.
- Refer to the sectional table of contents for the exact pages to locate the specific topic required.

Foreword

This manual is designed primarily for use by trained mechanics in a properly equipped shop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. A basic knowledge of mechanics, the proper use of tools, and workshop procedures must be understood in order to carry out maintenance and repair satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair should be carried out only by qualified mechanics.

In order to perform the work efficiently and to avoid costly mistakes, read the text, thoroughly familiarize yourself with the procedures before starting work, and then do the work carefully in a clean area. Whenever special tools or equipment are specified, do not use makeshift tools or equipment. Precision measurements can only be made if the proper instruments are used, and the use of substitute tools may adversely affect safe operation.

For the duration of the warranty period, we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. Any owner maintenance or repair procedure not performed in accordance with this manual may void the warranty.

To get the longest life out of your motorcycle:

- Follow the Periodic Maintenance Chart in the Service Manual.
- Be alert for problems and non-scheduled maintenance.
- Use proper tools and genuine Kawasaki Motorcycle parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki motorcycles are introduced by the Special Tool Catalog or Manual. Genuine parts provided as spare parts are listed in the Parts Catalog.
- Follow the procedures in this manual carefully. Don't take shortcuts.
- Remember to keep complete records of maintenance and repair with dates and any new parts installed.

How to Use This Manual

In preparing this manual, we divided the product into its major systems. These systems became the manual's chapters. All information for a particular system from adjustment through disassembly and inspection is located in a single chapter.

The Quick Reference Guide shows you all of the product's system and assists in locating their chapters. Each chapter in turn has its own comprehensive Table of Contents.

The Periodic Maintenance Chart is located in the General Information chapter. The chart gives a time schedule for required maintenance operations.

If you want spark plug information, for example, go to the Periodic Maintenance Chart first. The chart tells you how frequently to clean and gap the plug. Next, use the Quick Reference Guide to locate the Electrical System chapter. Then, use the Table of Contents on the first page of the chapter to find the Spark Plug section.

Whenever you see these WARNING and CAUTION symbols, heed their instructions! Always follow safe operating and maintenance practices.

⚠WARNING

This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION

This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

This manual contains four more symbols (in addition to WARNING and CAUTION) which will help you distinguish different types of information.

NOTE

○ *This note symbol indicates points of particular interest for more efficient and convenient operation.*

- Indicates a procedural step or work to be done.
○ Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.
★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

In most chapters an exploded view illustration of the system components follows the Table of Contents. In these illustrations you will find the instructions indicating which parts require specified tightening torque, oil, grease or a locking agent during assembly.

LIST OF ABBREVIATIONS

A	ampere(s)	lb	pound(s)
ABDC	after bottom dead center	m	meter(s)
AC	alternating current	min	minute(s)
ATDC	after top dead center	N	newton(s)
BBDC	before bottom dead center	Pa	pascal(s)
BDC	bottom dead center	PS	horsepower
BTDC	before top dead center	psi	pound(s) per square inch
°C	degree(s) Celsius	r	revolution
DC	direct current	r/min, rpm	revolution(s) per minute
F	farad(s)	TDC	top dead center
°F	degree(s) Fahrenheit	TIR	total indicator reading
ft	foot, feet	V	volt(s)
g	gram(s)	W	watt(s)
h	hour(s)	Ω	ohm(s)
L	liter(s)		

Read OWNER'S MANUAL before operating.

EMISSION CONTROL INFORMATION

To protect the environment in which we all live, Kawasaki has incorporated crankcase emission (1) and exhaust emission (2) control systems in compliance with applicable regulations of the United States Environmental Protection Agency and California Air Resources Board. Additionally, Kawasaki has incorporated an evaporative emission control system (3) in compliance with applicable regulations of the California Air Resources Board on vehicles sold in California only.

1. Crankcase Emission Control System
   This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the intake side of the engine. While the engine is operating, the vapors are drawn into combustion chamber, where they are burned along with the fuel and air supplied by the carburetion system.
2. Exhaust Emission Control System
   This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel and ignition systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.
3. Evaporative Emission Control System
   Vapors caused by fuel evaporation in the fuel system are not vented into the atmosphere. Instead, fuel vapors are routed into the running engine to be burned, or stored in a canister when the engine is stopped. Liquid fuel is caught by a vapor separator and returned to the fuel tank.

The Clean Air Act, which is the Federal law covering motor vehicle pollution, contains what is commonly referred to as the Act's "tampering provisions."

"Sec. 203(a) The following acts and the causing thereof are prohibited...

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.

(3)(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser..."

NOTE

- *The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:*
  1. *Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.*
  2. *Tampering could include:*
     a. *Maladjustment of vehicle components such that the emission standards are exceeded.*
     b. *Use of replacement parts or accessories which adversely affect the performance or durability of the motorcycle.*
     c. *Addition of components or accessories that result in the vehicle exceeding the standards.*
     d. *Permanently removing, disconnecting, or rendering inoperative any component or element of design of the emission control systems.*

WE RECOMMEND THAT ALL DEALERS OBSERVE THESE PROVISIONS OF FEDERAL LAW, THE VIOLATION OF WHICH IS PUNISHABLE BY CIVIL PENALTIES NOT EXCEEDING $10,000 PER VIOLATION.

Kawasaki

ZRX1200R
ZRX1200S
ZRX1200

Motorcycle
Service Manual

All rights reserved. No parts of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic mechanical photocopying, recording or otherwise, without the prior written permission of Quality Assurance Department/Consumer Products & Machinery Group/Kawasaki Heavy Industries, Ltd., Japan.

No liability can be accepted for any inaccuracies or omissions in this publication, although every possible care has been taken to make it as complete and accurate as possible.

The right is reserved to make changes at any time without prior notice and without incurring an obligation to make such changes to products manufactured previously. See your Motorcycle dealer for the latest information on product improvements incorporated after this publication.

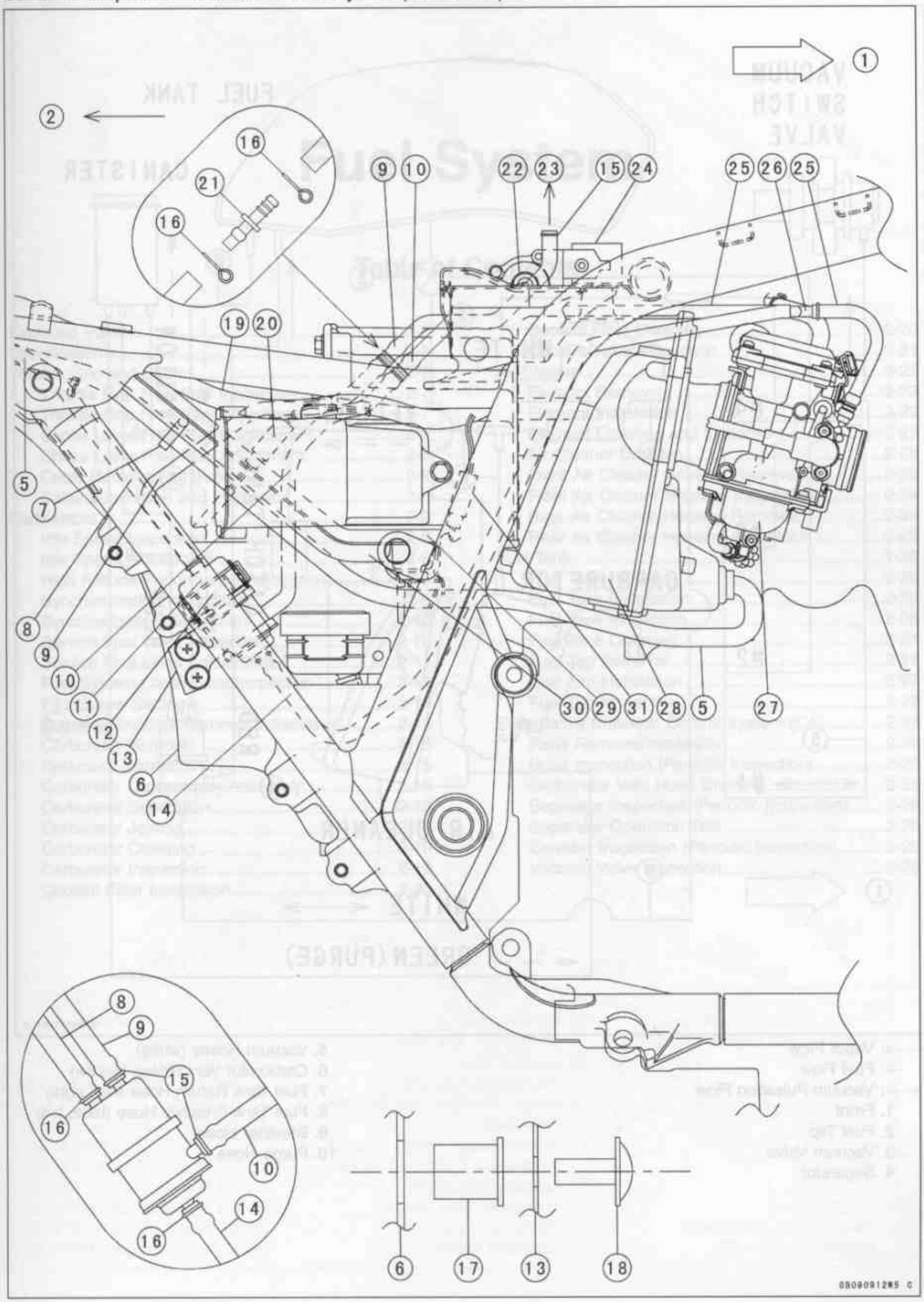
All information contained in this publication is based on the latest product information available at the time of publication. Illustrations and photographs in this publication are intended for reference use only and may not depict actual model component parts.

©Kawasaki Heavy Industries, Ltd., 2001

First Edition (1) :Jan. 31, 2001 (M)

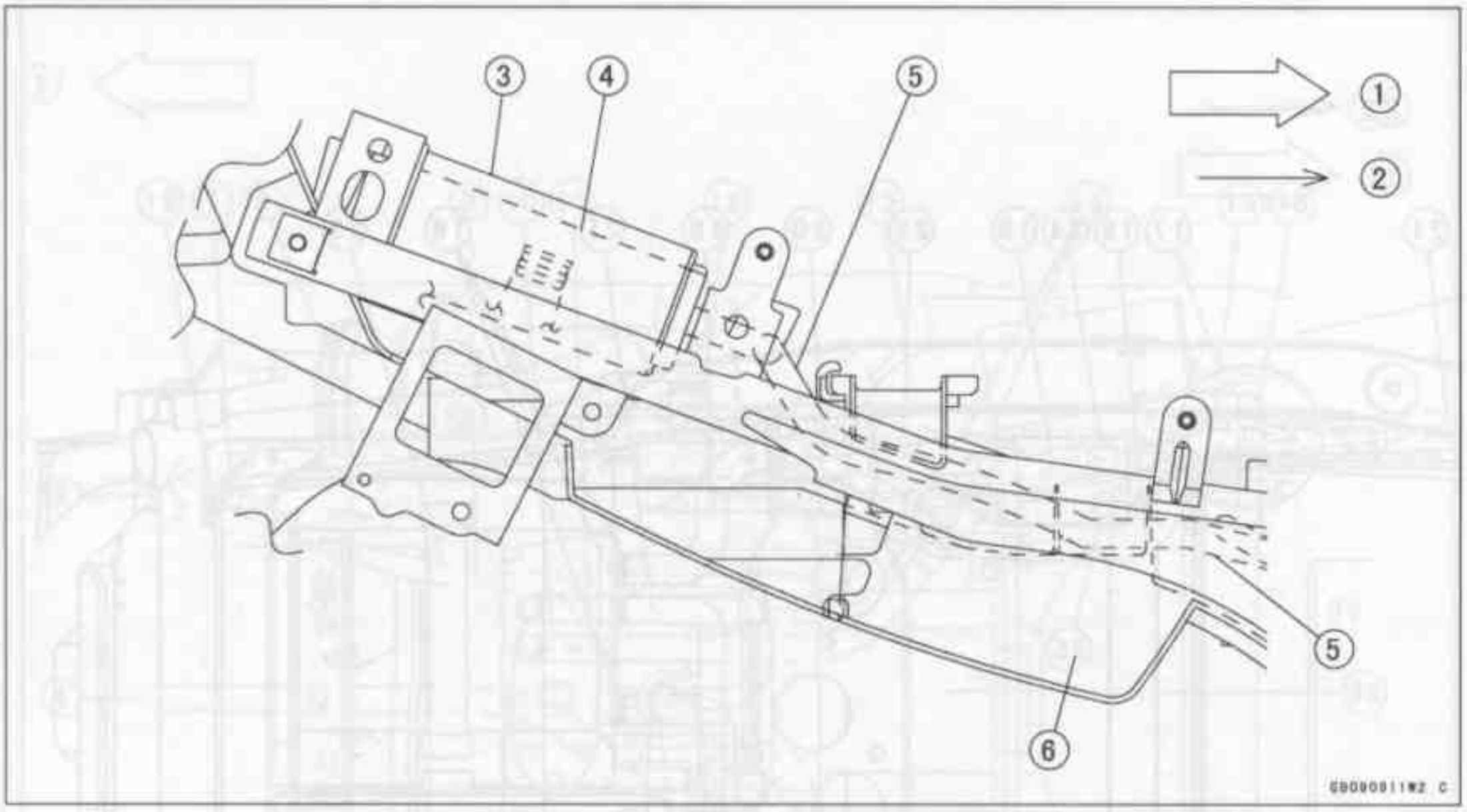
Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200–A1)



Cable, Wire, and Hose Routing

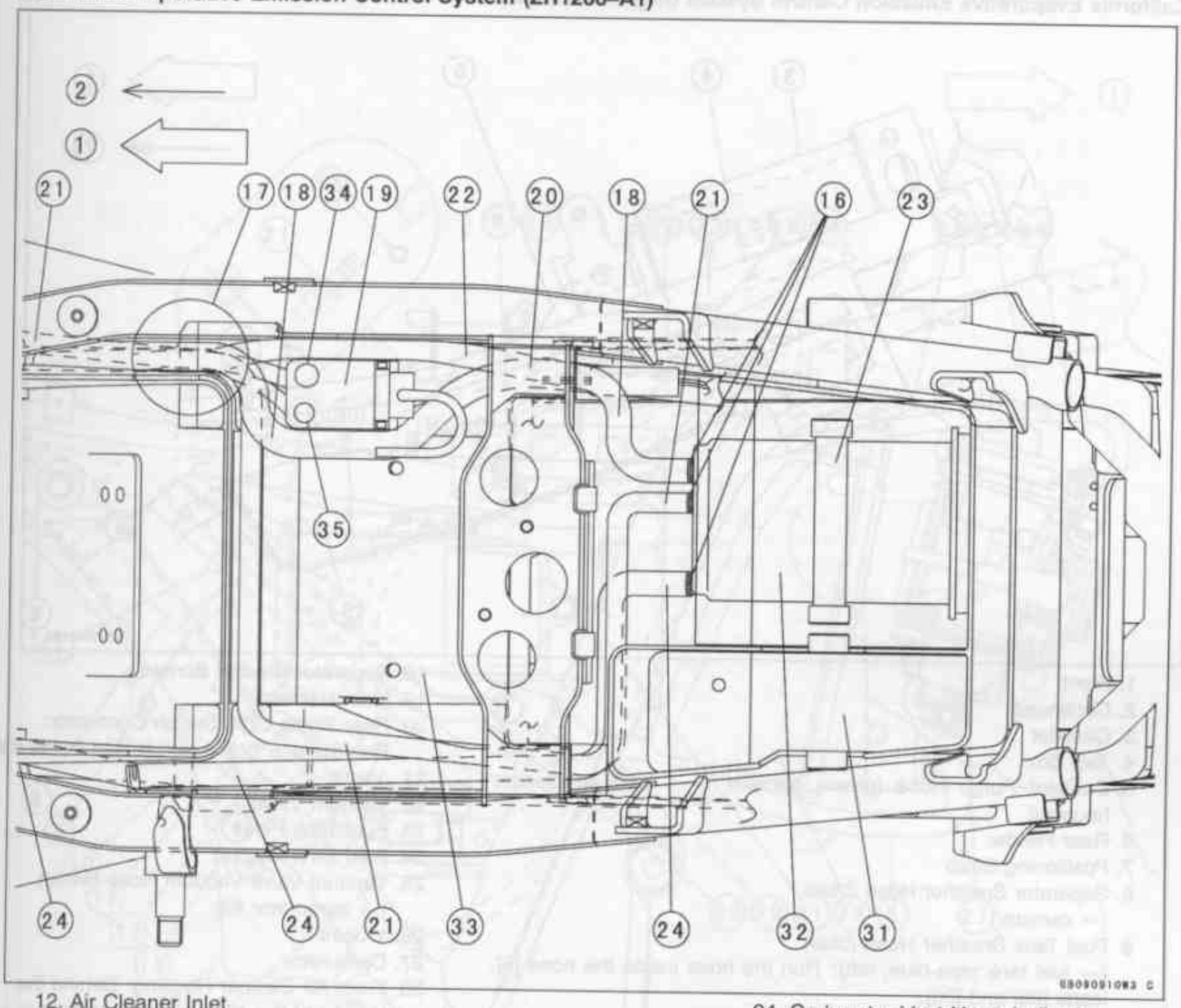
California Evaporative Emission Control System (Right Side View)



1. Front
2. Continued
3. Canister
4. Tool Box
5. Canister Purge Hose (green, canister ←→ front air cleaner housing)
6. Rear Fender
7. Positioning Strap
8. Separator Breather Hose (blue) (→ canister)
9. Fuel Tank Breather Hose (blue) (→ fuel tank pipe-blue, left): Run the hose inside the hose [5], leads [29] and [30].
10. Fuel Tank Return Hose (red) (→ fuel tank pipe-red, right): Run the hose inside the hose [5], leads [29] and [30].
11. Separator
12. Rubber Band
13. Bracket
14. Separator Vacuum Hose (white)
15. Clips (inside diameter ϕ10 mm)
16. Clips (inside diameter ϕ9 mm)
17. Weil Nuts
18. Separator Bracket Screws
19. Main Harness
20. Rear Brake Light Switch Connector: Run the rear brake switch lead inside the hoses.
21. Joints
22. Vacuum Valve
23. Fuel Tank Pipes
24. Fuel Tank Bracket
25. Vacuum Valve Vacuum Hose (white) (→ carburetor #3)
26. Y-Joint
27. Carburetor
28. Front Air Cleaner Housing: Behind the bottom of this air cleaner housing, run the following hoses and leads in the order from the outside to the inside of the frame.
    Hose [5] → Fuel Tank Drain Hose → Hose [14] → Lead [29]
29. Starter Motor Lead
30. Battery (+) Lead
31. Battery (–) Lead Connector

Cable, Wire, and Hose Routing

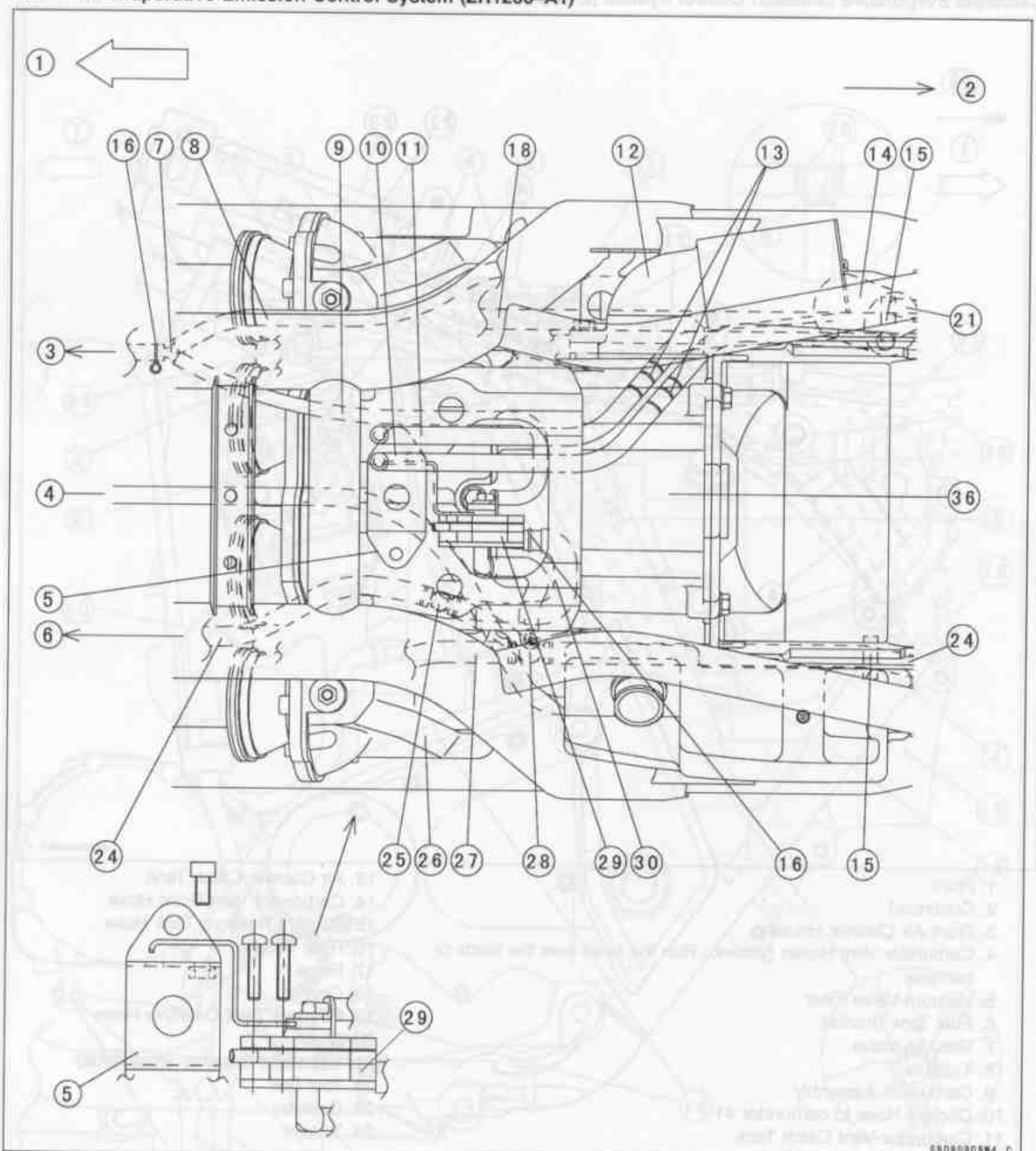
California Evaporative Emission Control System (ZR1200–A1)



12. Air Cleaner Inlet
13. Joints
14. Separator
15. Hose Clamps
16. Clips
17. Run the main harness [22], starter motor lead, battery leads, hoses [18], and [21] in descending order of position.
18. Canister Purge Hose (green, front air cleaner housing ←→ canister)
19. Starter Relay
20. Run the hose [18] over the main harness [22].
21. Separator Breather Hose (blue)
22. Main Harness
23. Rubber Band
24. Carburetor Vent Hose (yellow)
25. T-Joint (upper)
26. Front Air Cleaner Housing
27. Carburetor Vent Drain Hose to catch tank
28. T-Joint (lower)
29. Vacuum Valve
30. Yellow Tape
31. Tool Box
32. Canister
33. Rear Fender
34. Battery (+) Lead Terminal
35. Starter Motor Lead Terminal
36. Rear Air Cleaner Housing

Cable, Wire, and Hose Routing

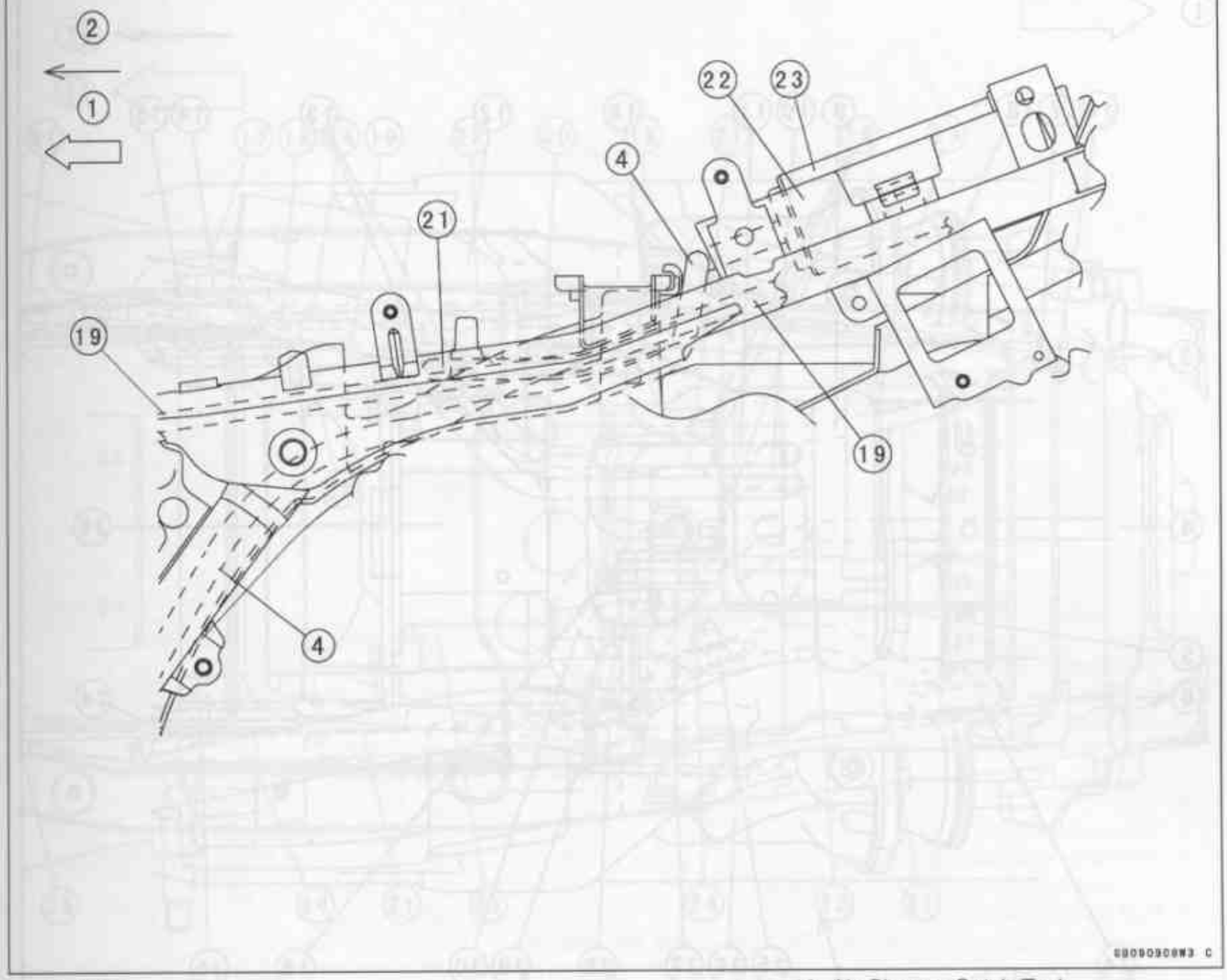
California Evaporative Emission Control System (ZR1200–A1)



1. Front
2. Continued
3. Carburetor #3
4. Coolant Reserve Tank Hose to Radiator Cap
5. Fuel Tank Bracket
6. Carburetor Assembly
7. Y-Joint
8. Separator Vacuum Hose (white)
9. Vacuum Valve Vacuum Hose (white)
10. Fuel Tank Breather Hose (blue) (→ fuel tank pipe-blue)
11. Fuel Tank Return Hose (red) (→ fuel tank pipe-red)

Cable, Wire, and Hose Routing

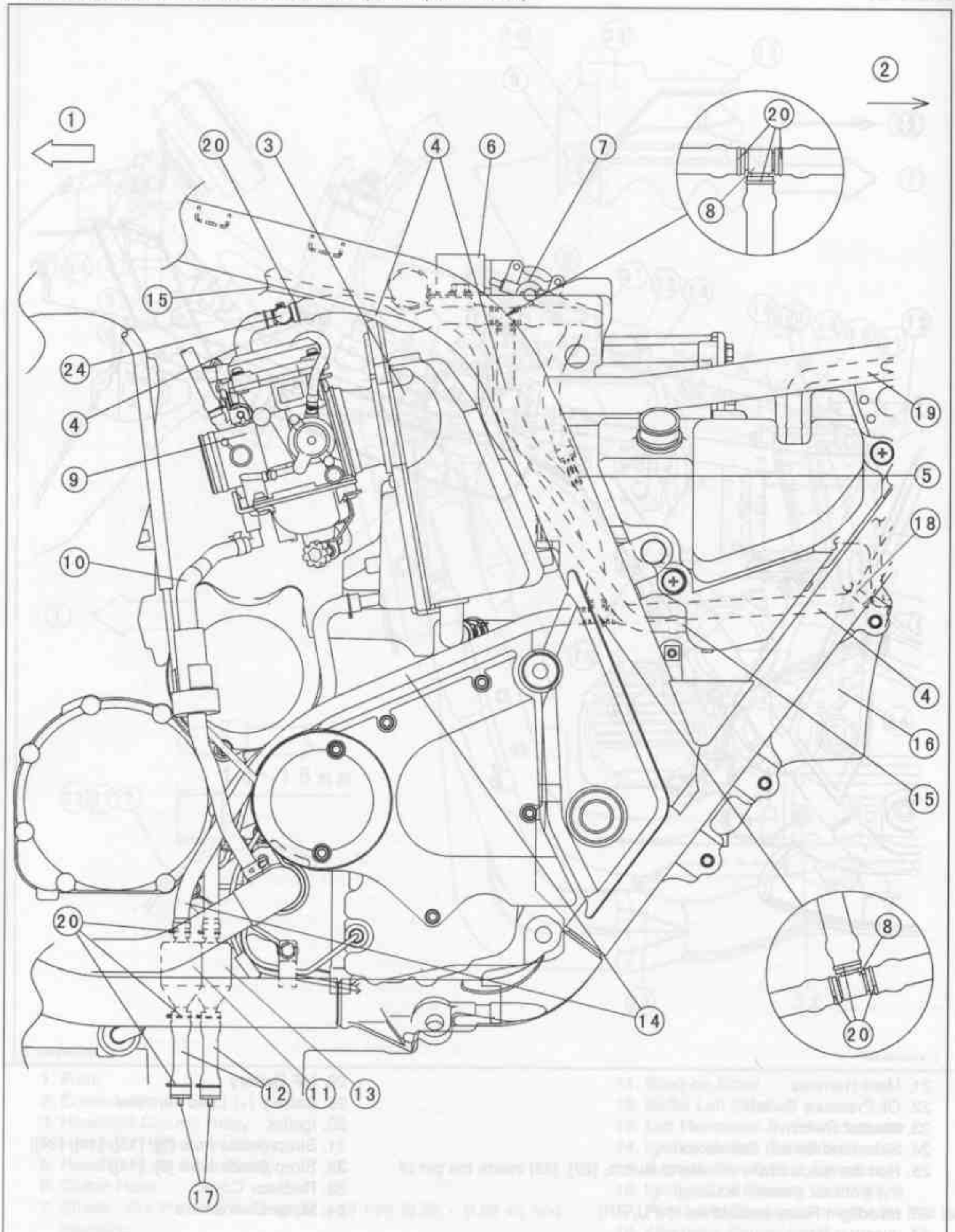
California Evaporative Emission Control System (ZR1200–A1)



1. Front
2. Continued
3. Front Air Cleaner Housing
4. Carburetor Vent Hoses (yellow): Run the hose over the leads or harness.
5. Vacuum Valve Filter
6. Fuel Tank Bracket
7. Vacuum Valve
8. T-Joints
9. Carburetor Assembly
10. Coolant Hose to carburetor #1
11. Carburetor Vent Catch Tank
12. Catch Tank Drain Hoses
13. Air Cleaner Catch Tank
14. Carburetor Vent Drain Hose
15. Coolant Reserve Tank Hose
16. Rear Fender
17. Plugs
18. Clamp
19. Reserve Tank Overflow Hose
20. Clips
21. Seperator Breather Hose (blue)
22. Tool Box
23. Canister
24. Y-Joint

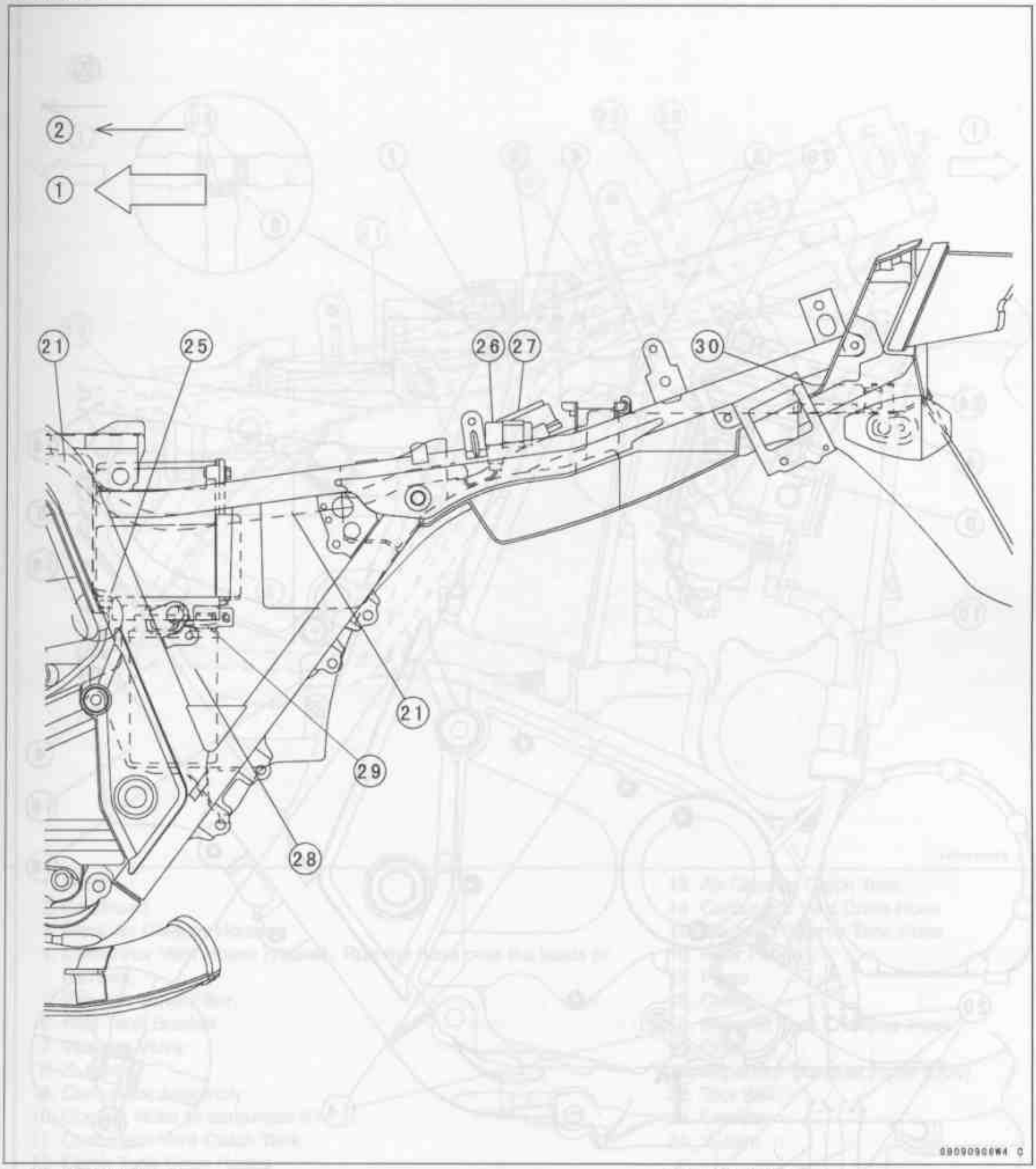
Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200–A1)



Cable, Wire, and Hose Routing

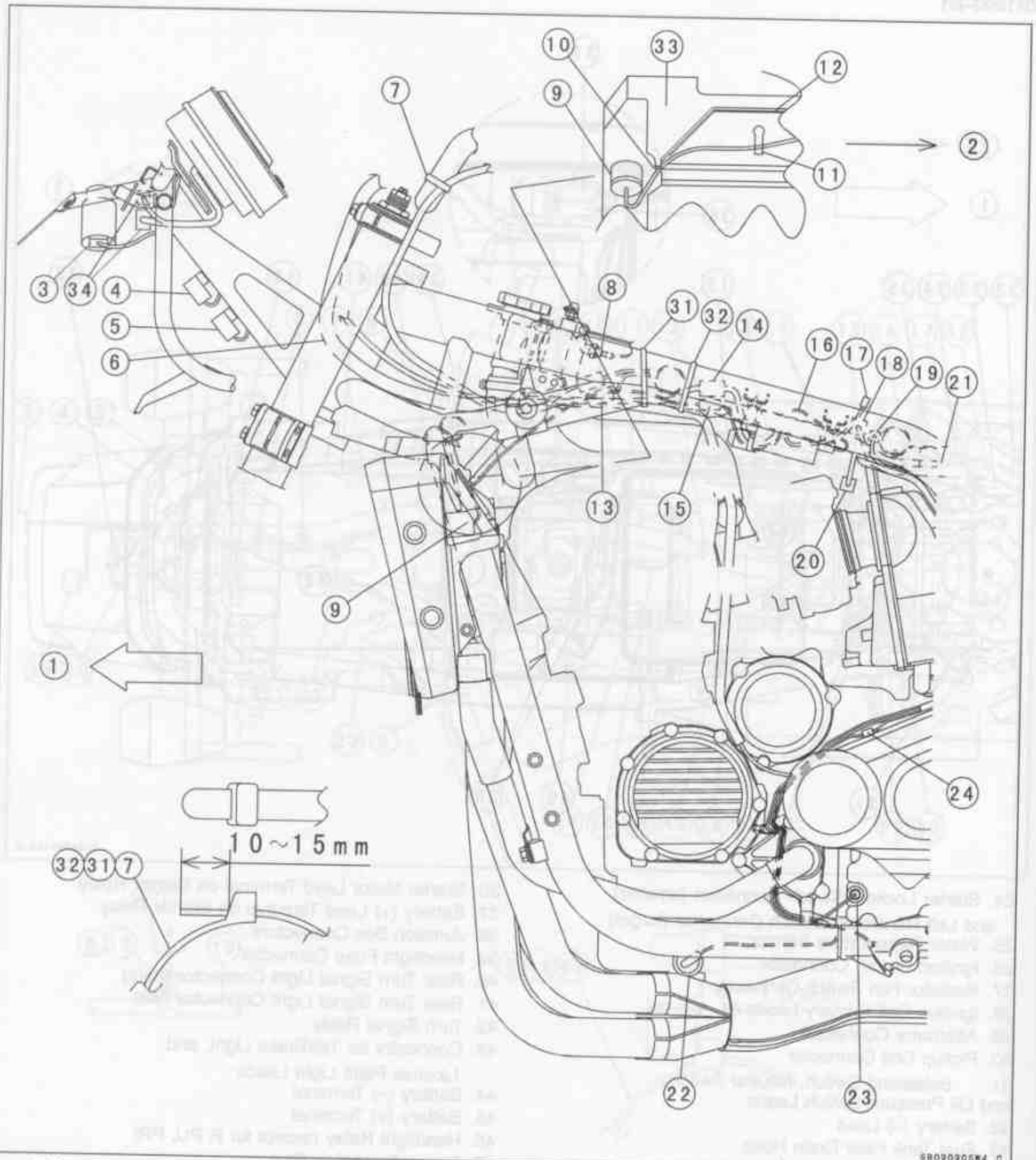
ZR1200-B1



21. Main Harness
22. Oil Pressure Switch
23. Neutral Switch
24. Sidestand Switch Connector
25. Run the leads of the sidestand switch, [22], [23] inside the pin of the front air cleaner housing.
26. Headlight Relay (except for P, PU, PR)
27. Junction Box
28. MF Battery
29. Battery (+) Lead Terminal
30. Igniter
31. Strap (leads from [9], [13], [14], [24])
32. Strap (leads from [9], [14])
33. Radiator Cover
34. Meter Connectors

Cable, Wire, and Hose Routing

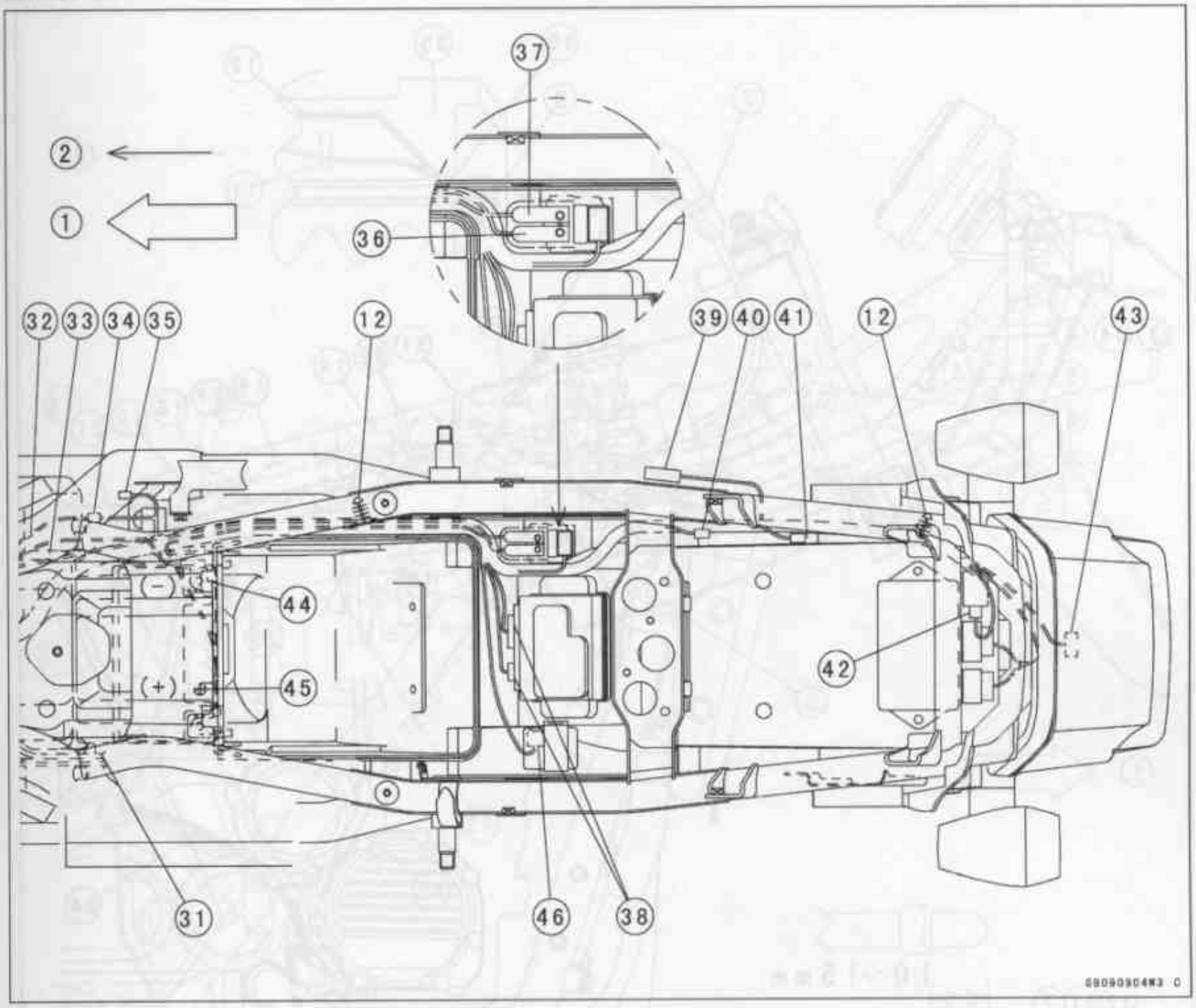
ZR1200-B1



1. Front
2. Continued
3. Headlight Ground Relay
4. Headlight High Beam Relay
5. Headlight Low Beam Relay
6. Clutch Hose
7. Straps: Cut the end, leaving 10 ~ 15 mm (0.39 ~ 0.59 in) and rounding.
8. Water Temperature Sensor
9. Radiator Fan Switch
10. Run the lead between [12] and [33].
11. Snap-on Strap
12. Baffle Left Side
13. Left Handlebar Switch Connector
14. Ignition Switch Connector
15. Radiator Fan Switch Connector
16. Ignition Coil Primary Leads #1, 4
17. Fuel Level Sensor Connector (to fuel tank)
18. Alternator Connector
19. Pickup Coil Connector
20. Throttle Sensor Connector

Cable, Wire, and Hose Routing

ZR1200–B1

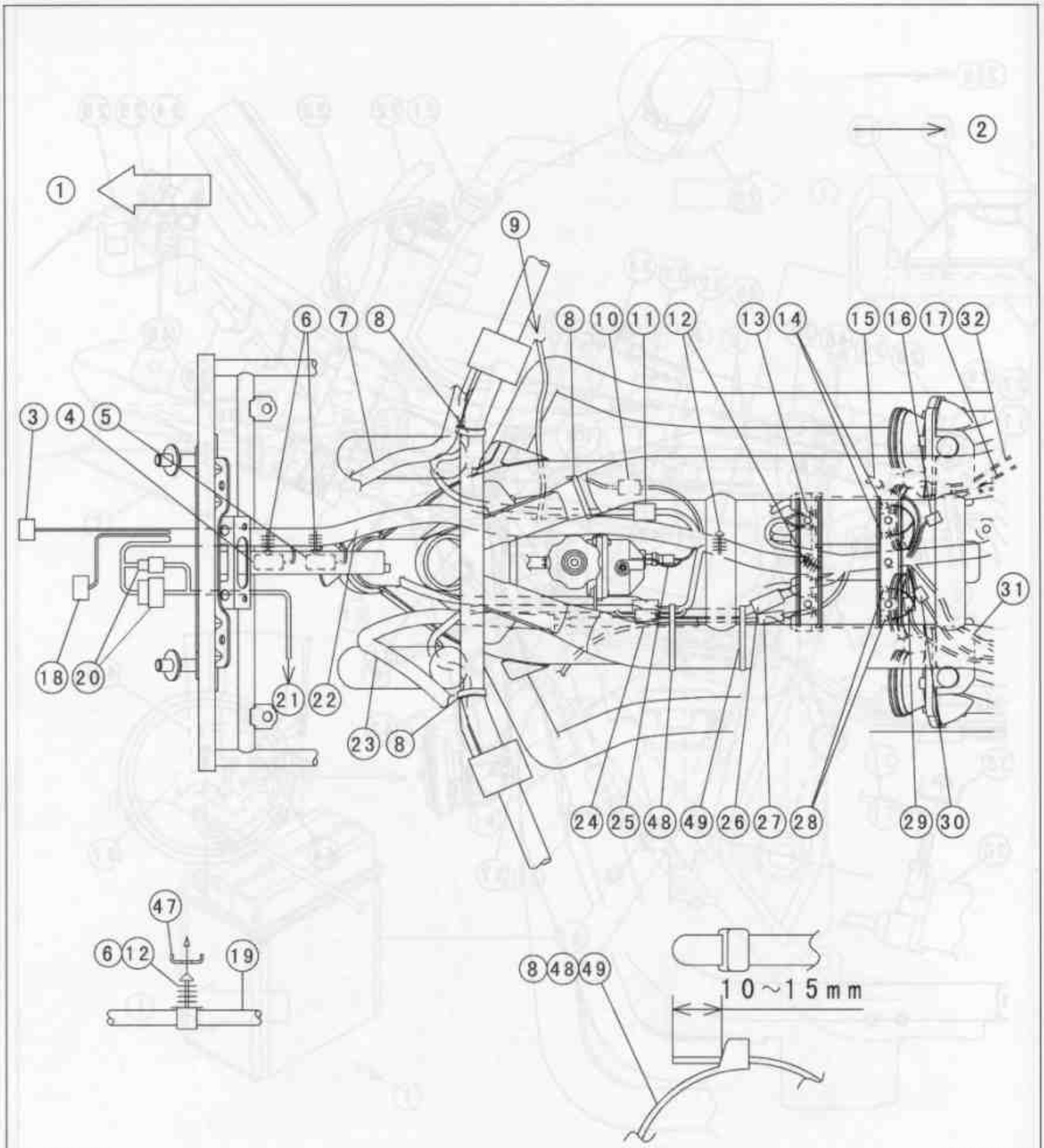


24. Starter Lockout Switch Connector (smaller) and Left Handlebar Switch Connector (larger)
25. Water Temperature Sensor
26. Ignition Switch Connector
27. Radiator Fan Switch Connector
28. Ignition Coil Primary Leads #1, 4
29. Alternator Connector
30. Pickup Coil Connector
31. Sidestand Switch, Neutral Switch, and Oil Pressure Switch Leads
32. Battery (–) Lead
33. Fuel Tank Filler Drain Hose
34. Battery (–) Lead Connector
35. Rear Brake Light Switch Connector
36. Starter Motor Lead Terminal on Starter Relay
37. Battery (+) Lead Terminal on Starter Relay
38. Junction Box Connectors
39. Headlight Fuse Connector
40. Rear Turn Signal Light Connector (right)
41. Rear Turn Signal Light Connector (left)
42. Turn Signal Relay
43. Connector for Tail/Brake Light, and License Plate Light Leads
44. Battery (–) Terminal
45. Battery (+) Terminal
46. Headlight Relay (except for P, PU, PR)
47. Frame Bracket or Pipe
48. Strap (leads from [24], [26], [27])
49. Strap (leads from [26], [27])

(P): WVTA Approval Model with pipe catalytic converter
(PU): WVTA Approval Model with pipe catalytic converter (United Kingdom Model)
(PR): WVTA Approval Model with pipe catalytic converter (Restricted Model)

Cable, Wire, and Hose Routing

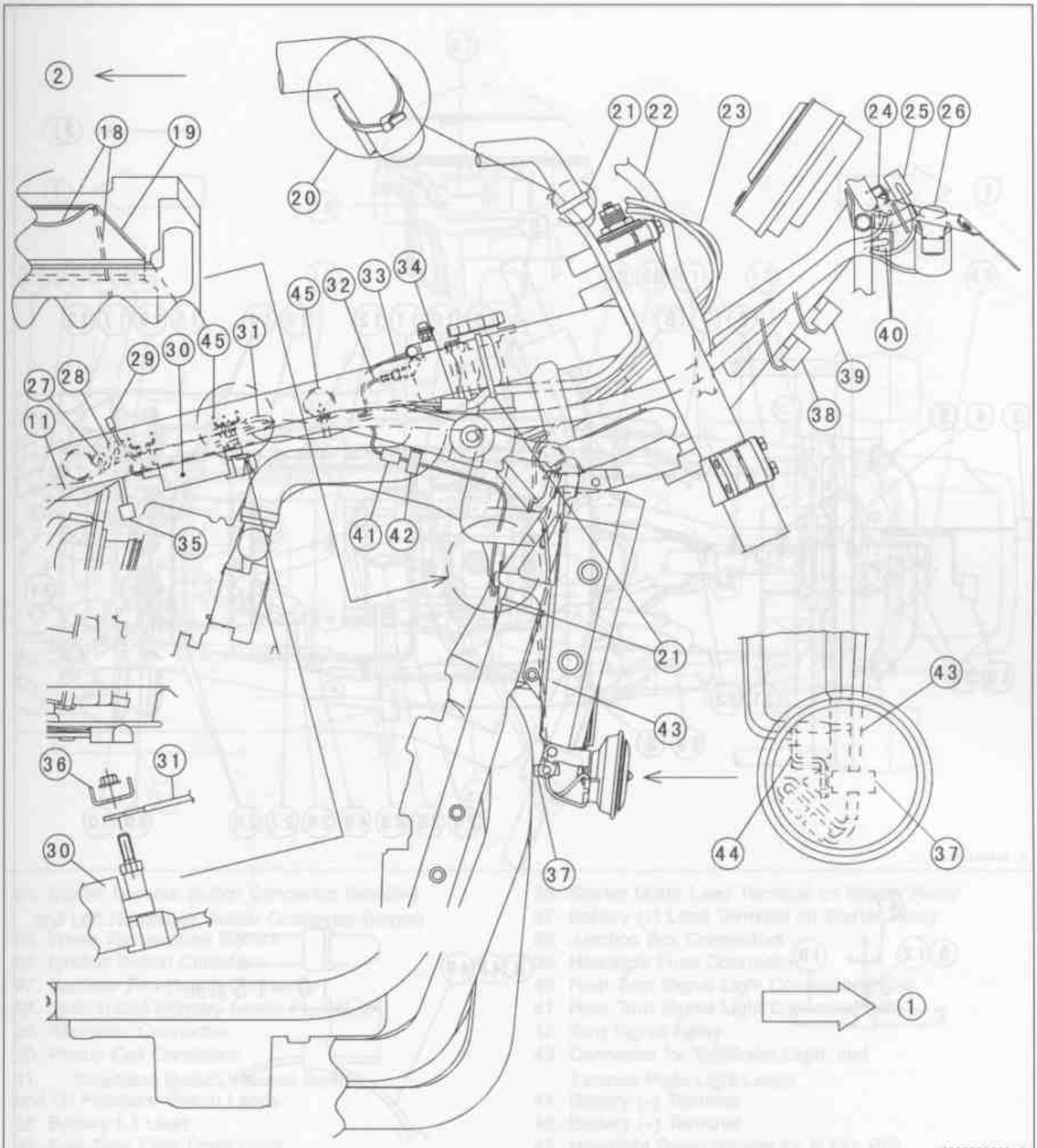
ZR1200-B1



1. Front
2. Continued
3. Headlight Ground Relay (MY)
4. Headlight High Beam Relay
5. Headlight Low Beam Relay
6. Positioning Straps : Fit them in the frame upwards.
7. Front Brake Hose
8. Straps: Bind the leads and cut the end, leaving 10 ~ 15 mm (0.39 ~ 0.59 in) and rounding.
9. Horn Harness
10. Radiator Fan Motor Connector
11. Right Handlebar Harness Connector
12. Positioning Straps: Fit them in the frame upwards.
13. Frame Ground Terminal (under the bracket and through the ignition coil bolt)
14. Ignition Coil Primary Leads #2, #3
15. Throttle Sensor Connector
16. Fuel Level Sensor Connector
17. Starter Motor Lead
18. Front Harness Connector
19. Harness
20. Meter Connectors
21. To Meter Unit
22. Main Harness
23. Clutch Hose

Cable, Wire, and Hose Routing

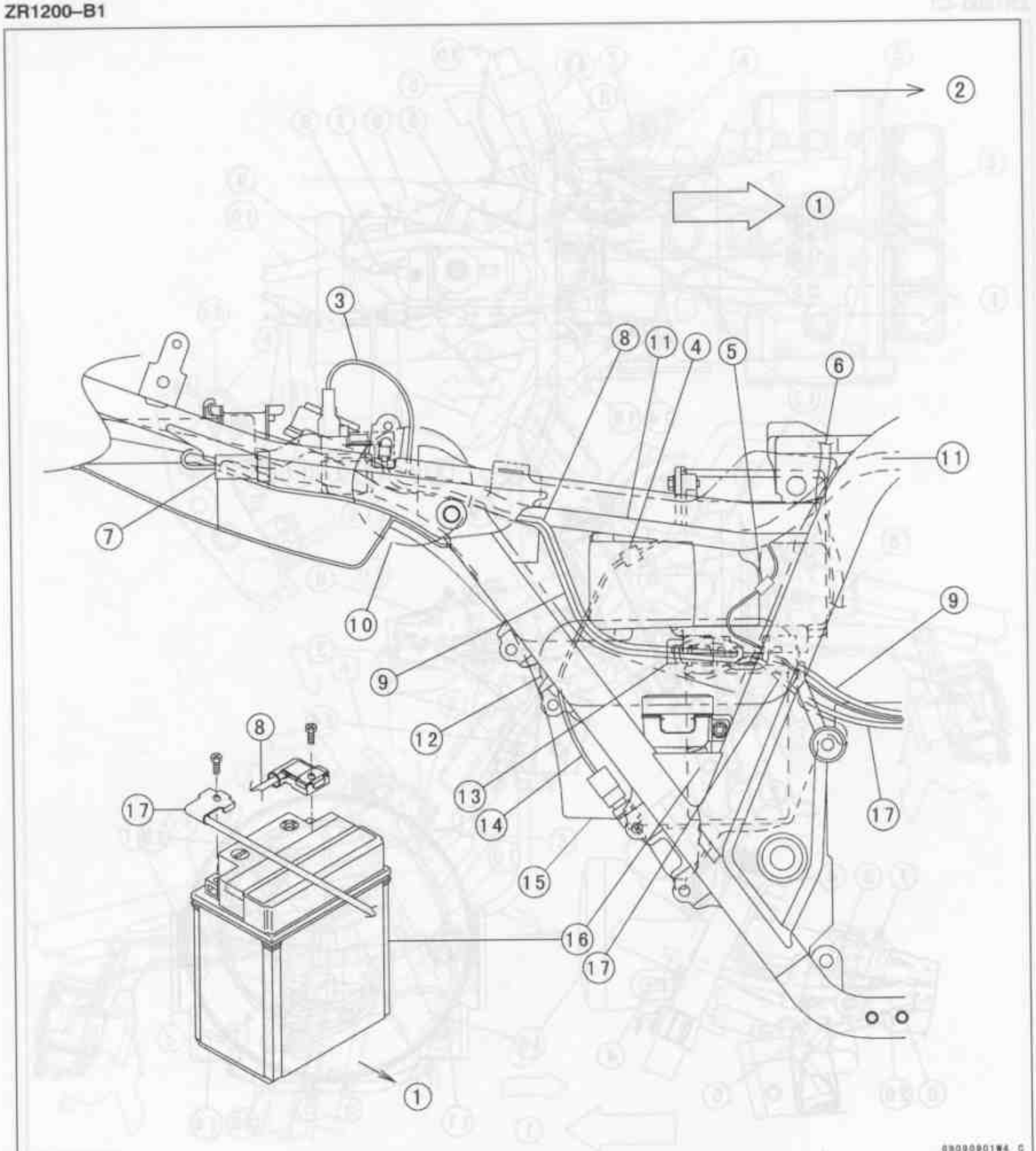
ZR1200-B1



19. Right Side of Baffle
20. Wind the strap [21] counter-clockwise.
21. Straps
22. Front Brake Hose
23. Throttle Cable (decelerator)
24. Rear View Mirror Bracket
25. Front Harness Connector
26. Headlight Ground Relay
27. Pickup Coil Connector
28. Alternator Connector
29. Fuel Level Sensor Connector
30. Ignition Coils
31. Frame Ground Lead
32. Water Temperature Sensor
33. Sensor Ground Lead
34. Right Handlebar Switch Connector
35. Throttle Sensor Connector
36. Frame Bracket
37. Snap-on Strap: Insert it from the inside to the outside of the bracket [44].
38. Low Beam Headlight Relay
39. High Beam Headlight Relay
40. Meter Connectors
41. Radiator Fan Motor Connector
42. Snap-on Strap
43. Horn Harness: Run it with a slack as little as possible, so it doesn't touch the exhaust pipes.
44. Horn Bracket
45. Positioning Straps

Cable, Wire, and Hose Routing

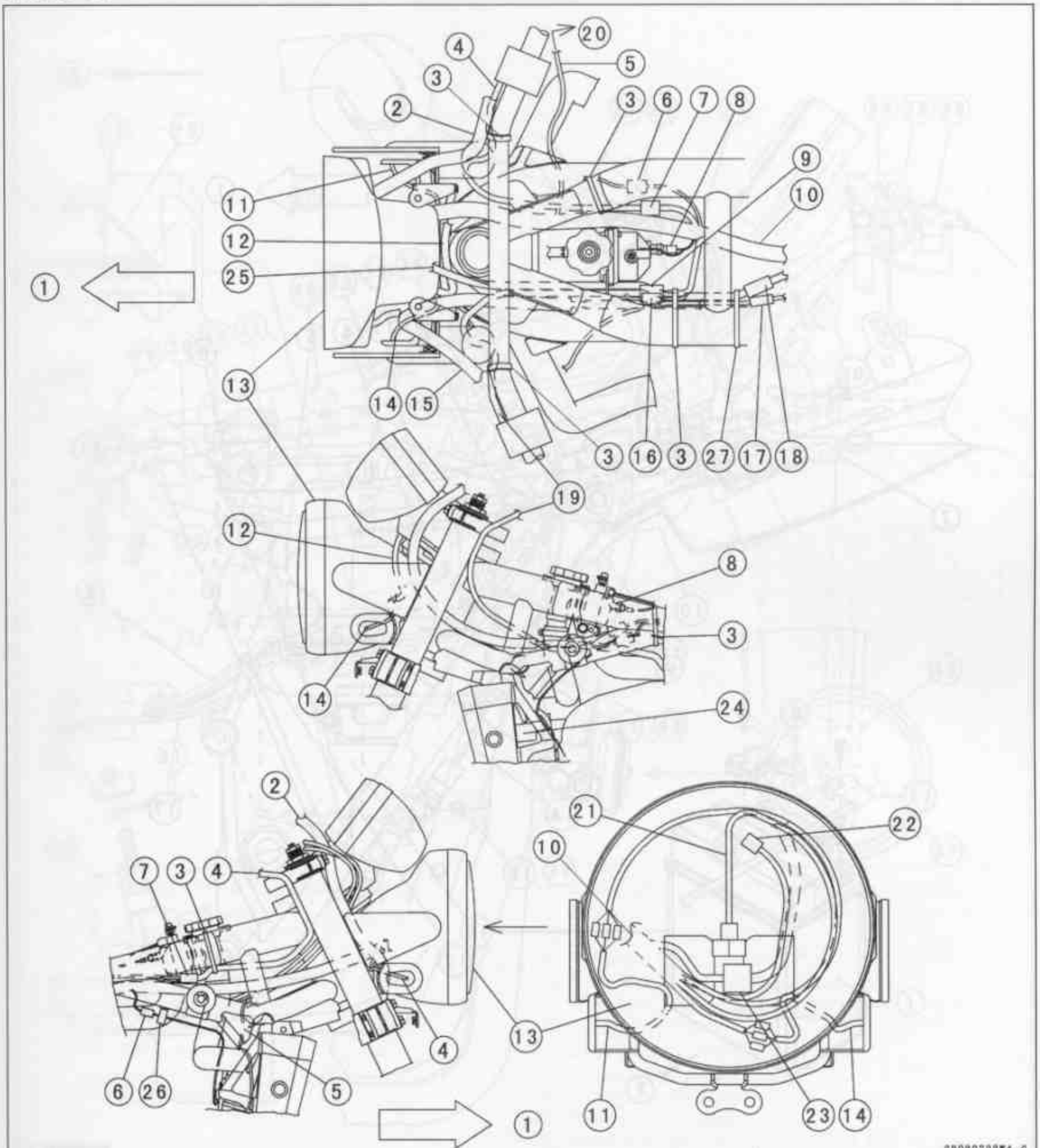
ZR1200–B1



1. Front
2. Continued
3. Starter Relay Lead
4. Connector of the lead [14]
5. Battery (–) Lead Connector
6. Fuel Tank Filler Drain Hose
7. Headlight Fuse
8. Battery (+) Lead
9. Starter Motor Lead
10. Run the leads [8], [9] under the harness [11].
11. Main Harness
12. Run the leads [8], [9], [14] within the right side cover.
13. Battery Case Window (rear fender right side): Run the leads [8], [17] through the window.
14. Rear Brake Light Switch Lead: Install the rear brake light switch spring from the frame inside (Open ends of the hook face the footpeg bracket) with the longer hook up.
15. Rear Fender
16. MF Battery
17. Battery (–) Lead (cable)
18. Radiator Fan Leads

Cable, Wire, and Hose Routing

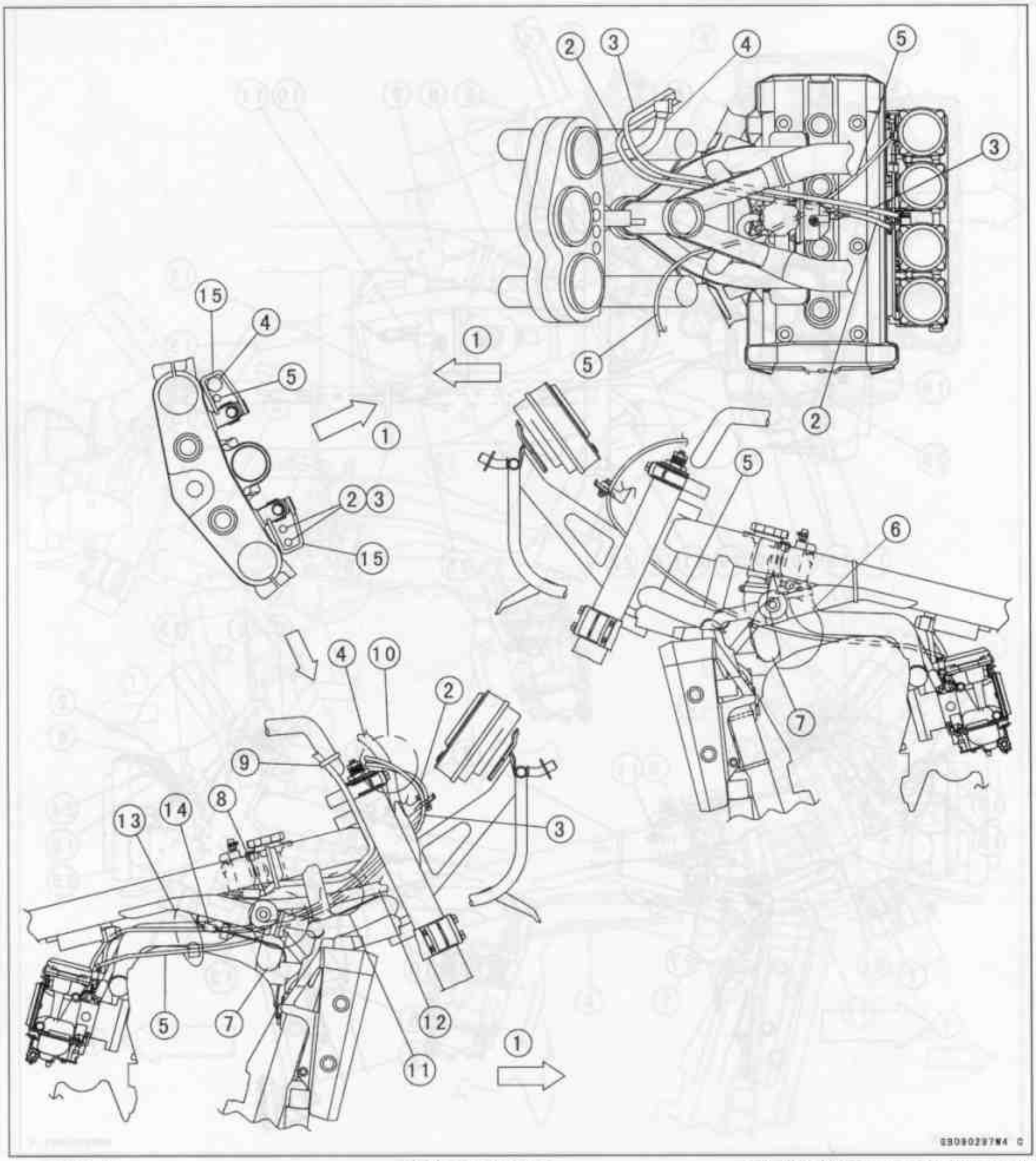
ZR1200–C1



1. Front
2. Front Brake Hose
3. Straps (harness [19], leads from [16], [17], [18])
4. Right Handlebar Switch Harness
5. Horn Harness: under the throttle cables.
6. Radiator Fan Motor Connector
7. Connector of the harness [4]
8. Water Temperature Switch
9. Connector of Harness [19]
10. Main Harness
11. Front Turn Signal Light Harness (right) behind the hose [2]
12. Meter Harness
13. Headlight Unit
14. Front Turn Signal Light Leads (left)
15. Clutch Hose
16. Starter Lockout Switch Connector
17. Radiator Fan Switch Connector
18. Ignition Switch Connector
19. Left Handlebar Switch Harness
20. Horn
21. Headlight Leads
22. City Light Connector
23. Meter Harness Connector
24. Radiator Fan Switch
25. Ignition Switch Lead
26. Snap-on Strap
27. Strap(leads from [17], [18])

Cable, Wire, and Hose Routing

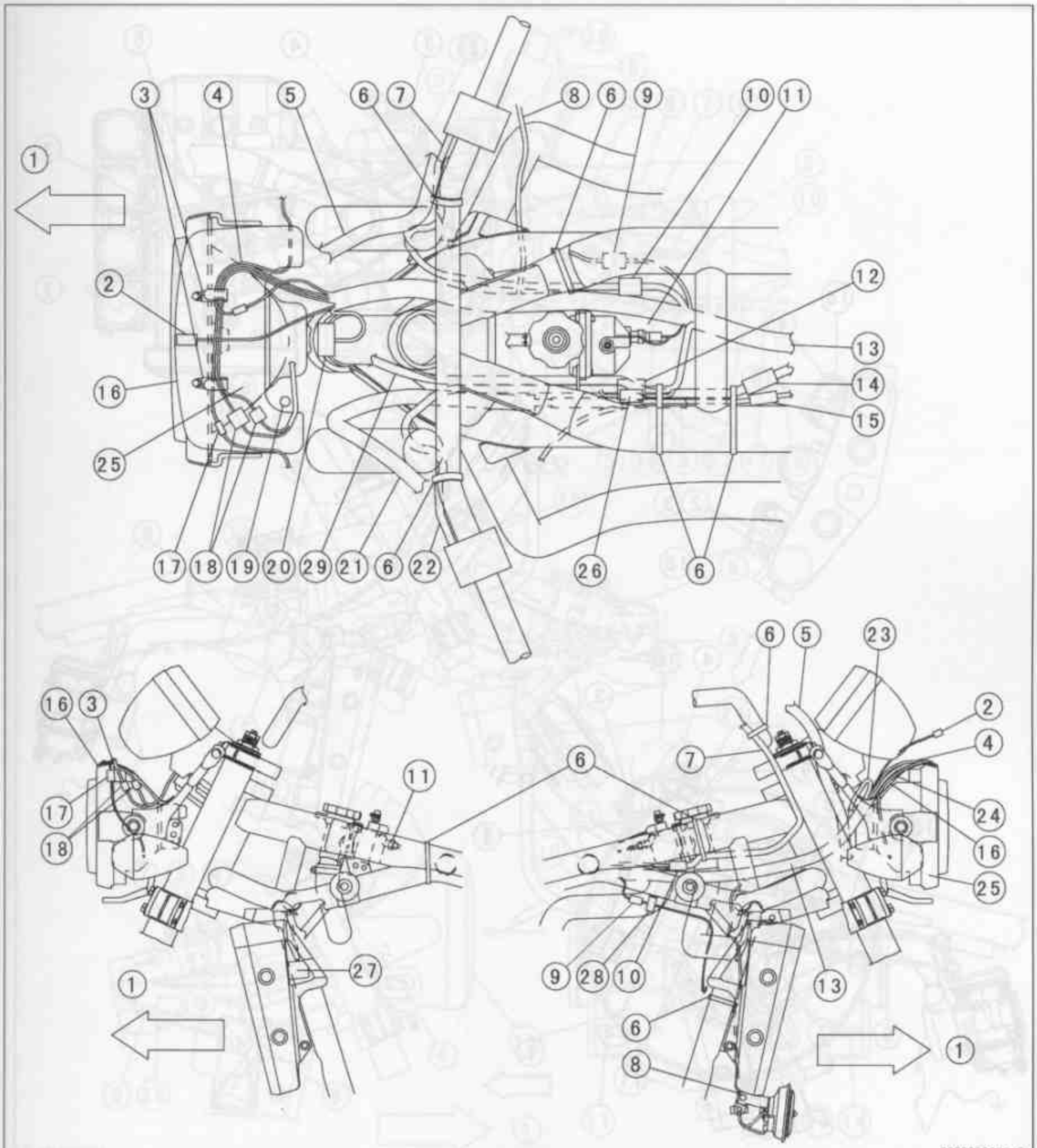
ZR1200–B1



1. Front
2. Throttle Cable (decelerator)
3. Throttle Cable (accelerator)
4. Front Brake Hose
5. Choke Cable
6. Run the choke cable [5] on the left side of the radiator hose [7].
7. Radiator Hose
8. Run the throttle cables on the right side of the radiator hose [7].
9. Strap
10. Run the throttle cables on the left side of the hose [4].
11. Run the throttle cables on the inside of the harness [12].
12. Main Harness
13. Run the throttle cables and choke cable under the main harness.
14. Radiator Fan Motor Connector
15. Holders

Cable, Wire, and Hose Routing

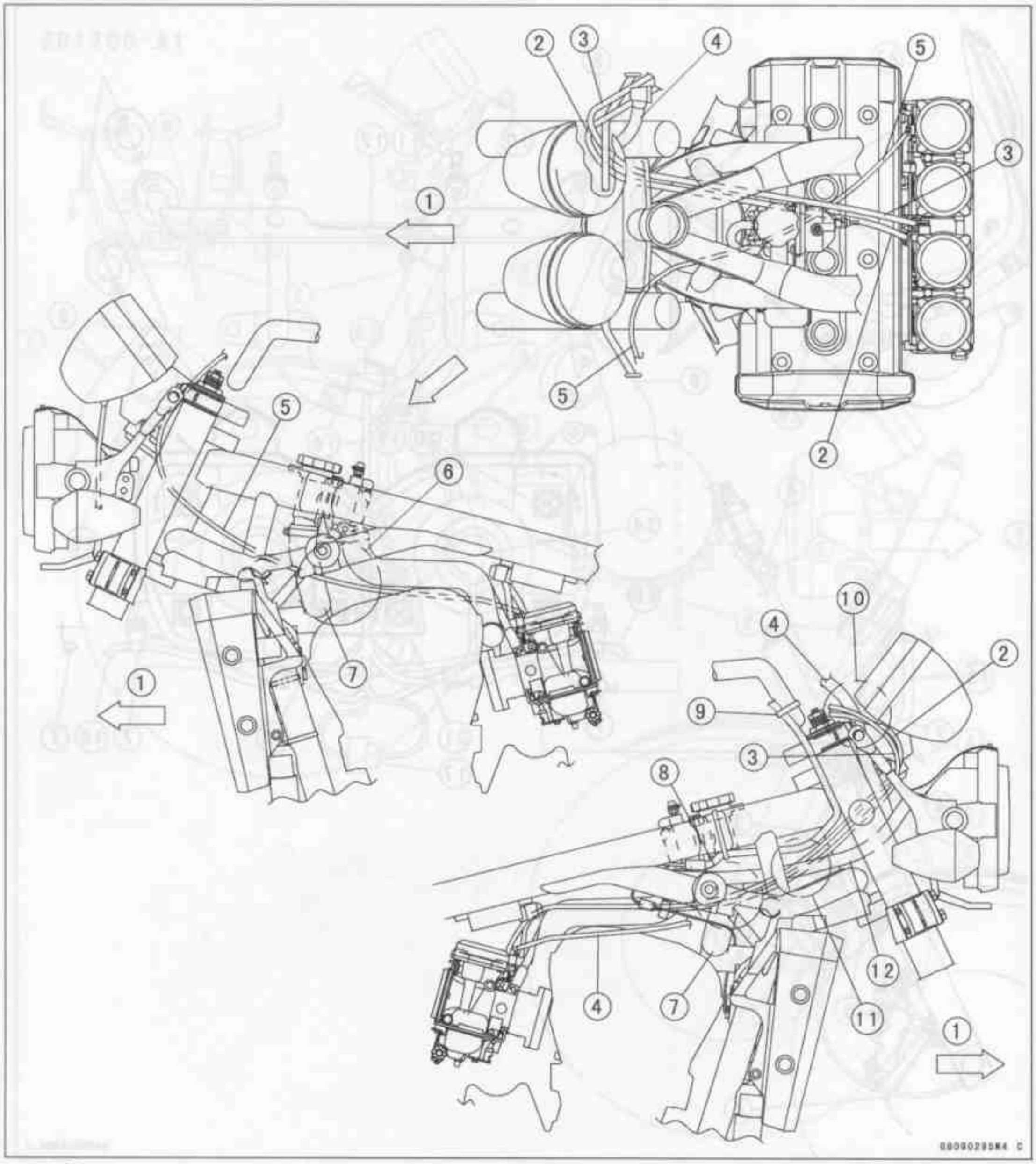
ZR1200–A1



1. Front
2. City Light (P, PU, PR)
3. Clamps
4. Front Turn Signal Light Leads (right)
5. Front Brake Hose
6. Straps
7. Right Handlebar Switch Harness
8. Horn Harness: under the throttle cables
9. Radiator Fan Motor Connector
10. Connector of the harness [7]
11. Water Temperature Switch
12. Connector of Harness [22]
13. Main Harness
14. Ignition Switch Connector
15. Radiator Fan Switch Connector
16. Rubber Cover
17. Front Turn Signal Light Connector (left)
18. Meter Connectors: Run the harness outside the cable [19] from the meter.
19. Speedometer Cable
20. Headlight Connector
21. Clutch Hose
22. Left Handlebar Switch Harness
23. Headlight Harness
24. Lead of Connector [17]
25. Headlight Unit
26. Starter Lockout Switch Connector
27. Radiator Fan Switch
28. Snap-on Strap
29. Ignition Switch Lead

Cable, Wire, and Hose Routing

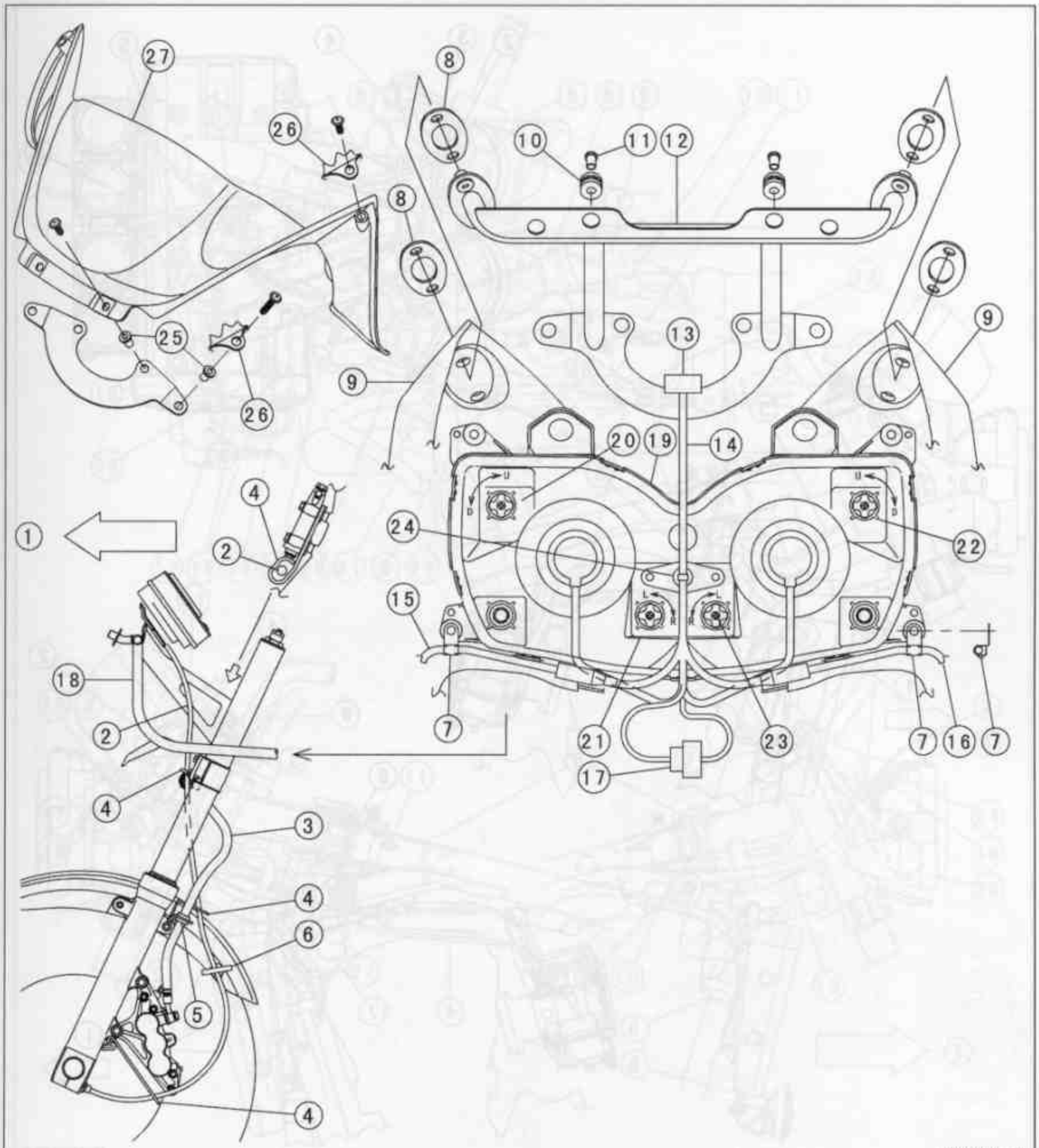
ZR1200–A1, C1



1. Front
2. Throttle Cable (decelerator)
3. Throttle Cable (accelerator)
4. Front Brake Hose
5. Choke Cable
6. Run the choke cable [5] on the left side of the hose [7].
7. Radiator Hose
8. Run the throttle cables on the right side of the hose [7]
9. Strap
10. Run the throttle cables on the outside of the hose [4]
11. Run the throttle cables inside the harness [12].
12. Main Harness

Cable, Wire, and Hose Routing

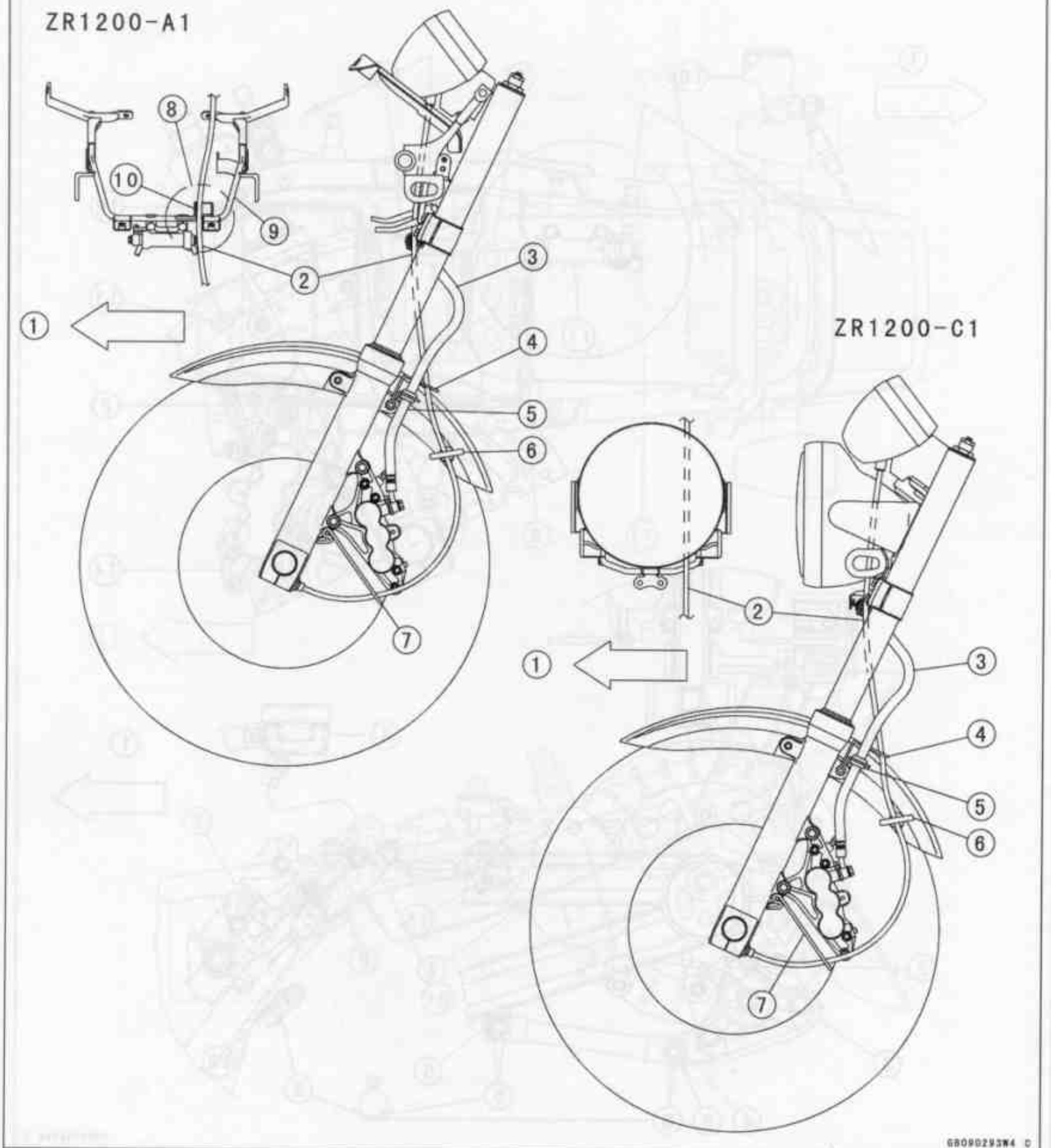
ZR1200–B1



1. Front
2. Speedometer Cable
3. Front Brake Hose
4. Cable Holders
5. Rubber Grommet
6. Plastic Cable Holder
7. Clamps
8. Rubber Grommets
9. Fairing
10. Rubber Grommets
11. Collar
12. Rear View Mirror Bracket
13. Connector to Main Harness
14. Front Harness
15. Front Turn Signal Light Harness (left)
16. Front Turn Signal Light Harness (right)
17. City Light Connector (P, PU, PR Models)
18. Fairing Bracket
19. Headlight Unit: When installing the upper fairing, be careful not to pinch the connectors. Put them between the headlight unit bottom and the upper fairing.
20. Up-down Headlight Adjuster (left)
21. Right-left Headlight Adjuster (left)
22. Up-down Headlight Adjuster (right)
23. Right-left Headlight Adjuster (right)
24. Snap-on Strap
25. Well Nuts
26. Windshield
27. Upper Inner Cover

Cable, Wire, and Hose Routing

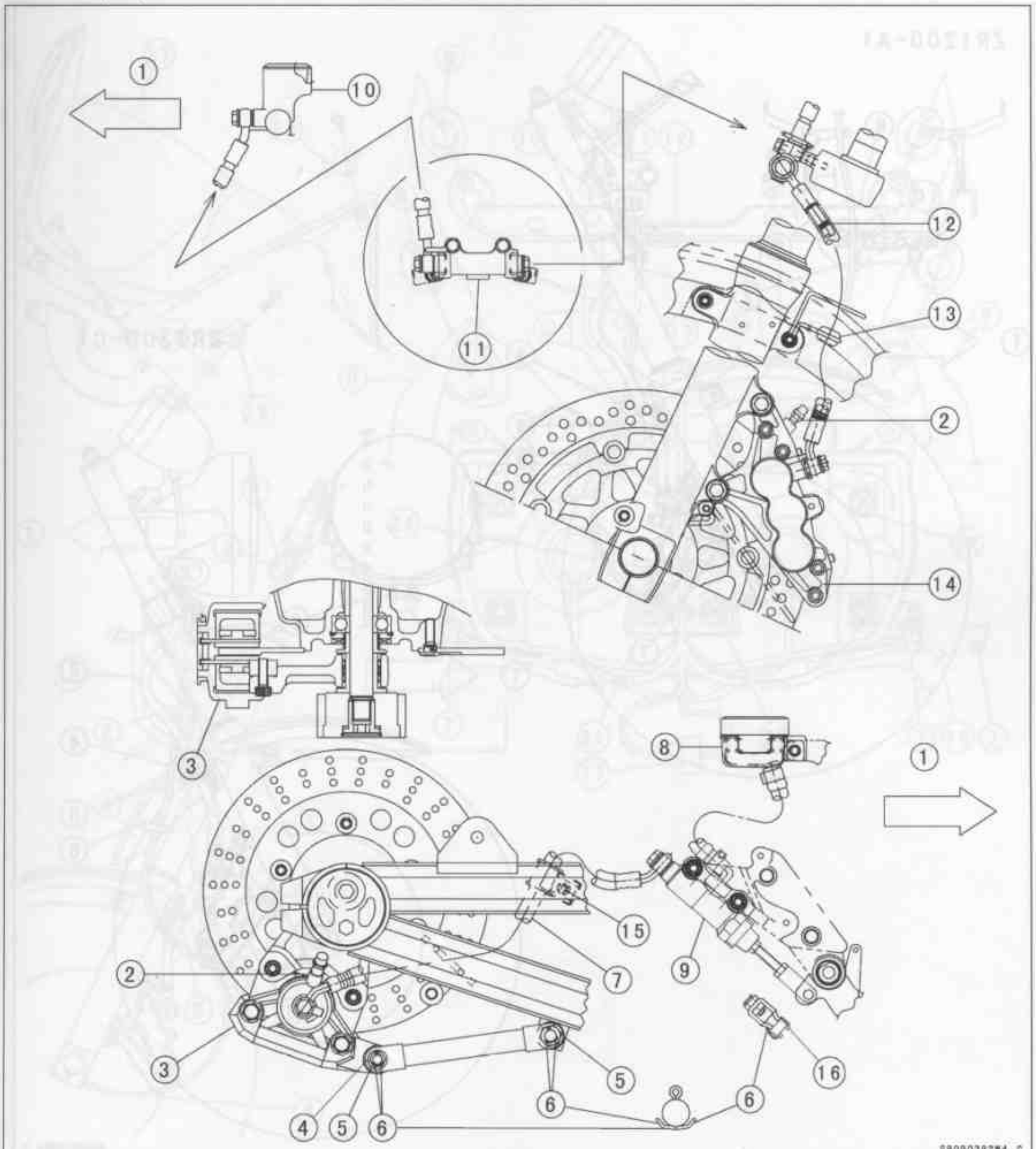
ZR1200–A1, C1



1. Front
2. Speedometer Cable
3. Front Brake Hose
4. Cable Holder
5. Rubber Grommet
6. Plastic Cable Holder
7. Cable Holder
8. Run the speedometer cable between the bracket [9] and the headlight adjuster bracket [10].
9. Fairing Bracket
10. Headlight Adjuster Bracket [10]

Cable, Wire, and Hose Routing

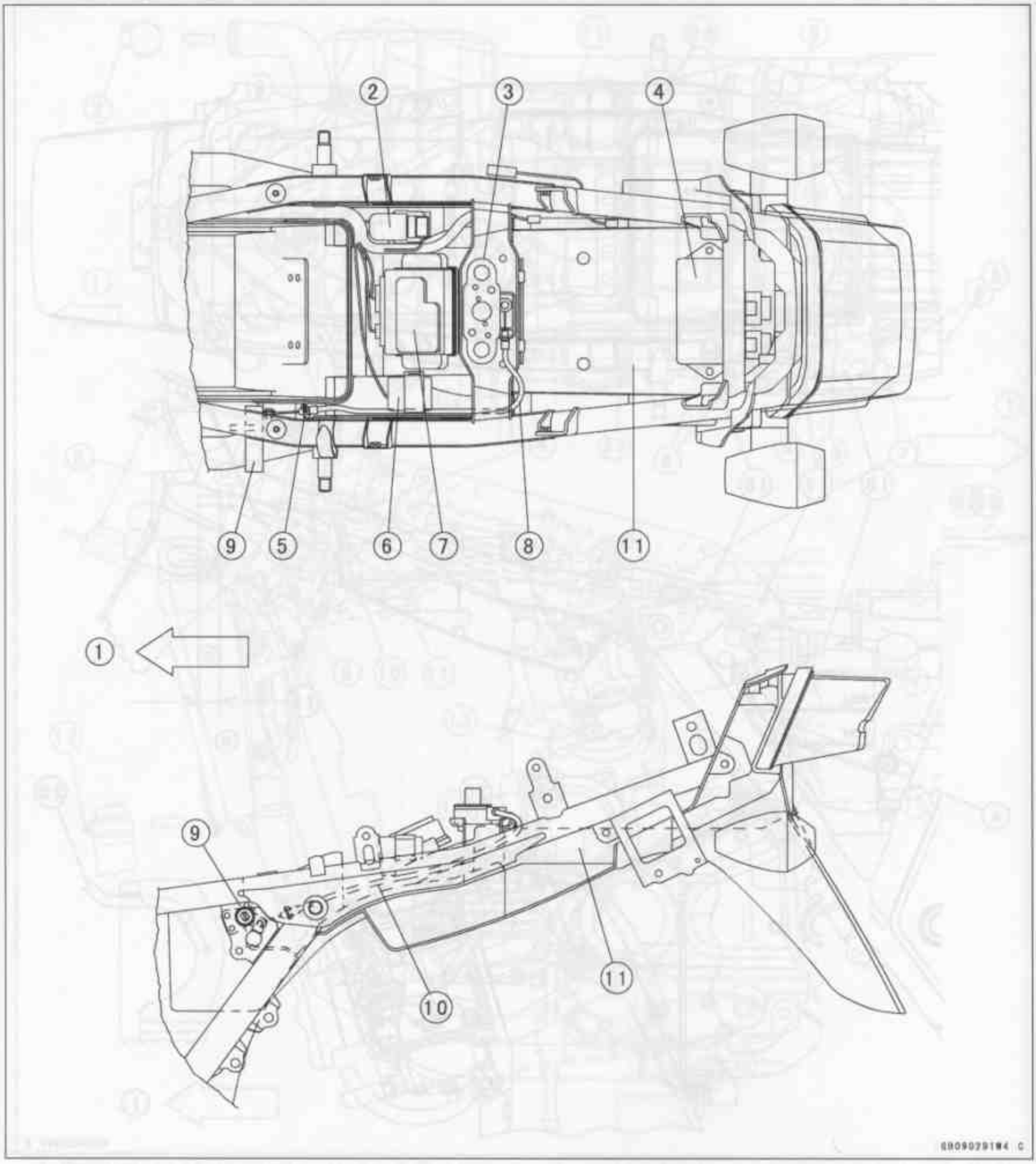
ZR1200–A1, B1, C1



1. Front
2. Caliper Air Bleeders
3. Rear Caliper
4. Sleeve
5. Rubber Boots
6. Bend both ends of the cotter pins.
7. Rear Brake Hose
8. Rear Brake Reservoir
9. Rear Master Cylinder:Install the rear brake light switch spring from the frame inside (Open ends of the hook face the footpeg bracket) with the longer hook up.
10. Front Brake Reservoir
11. Brake Joint
12. Front Brake Hoses: left hose (blue paint mark),right hose (white paint mark)
13. Brake Hose Grommets
14. Front Brake Calipers
15. Clamp
16. Joint Pin

Cable, Wire, and Hose Routing

ZR1200–A1, B1, C1

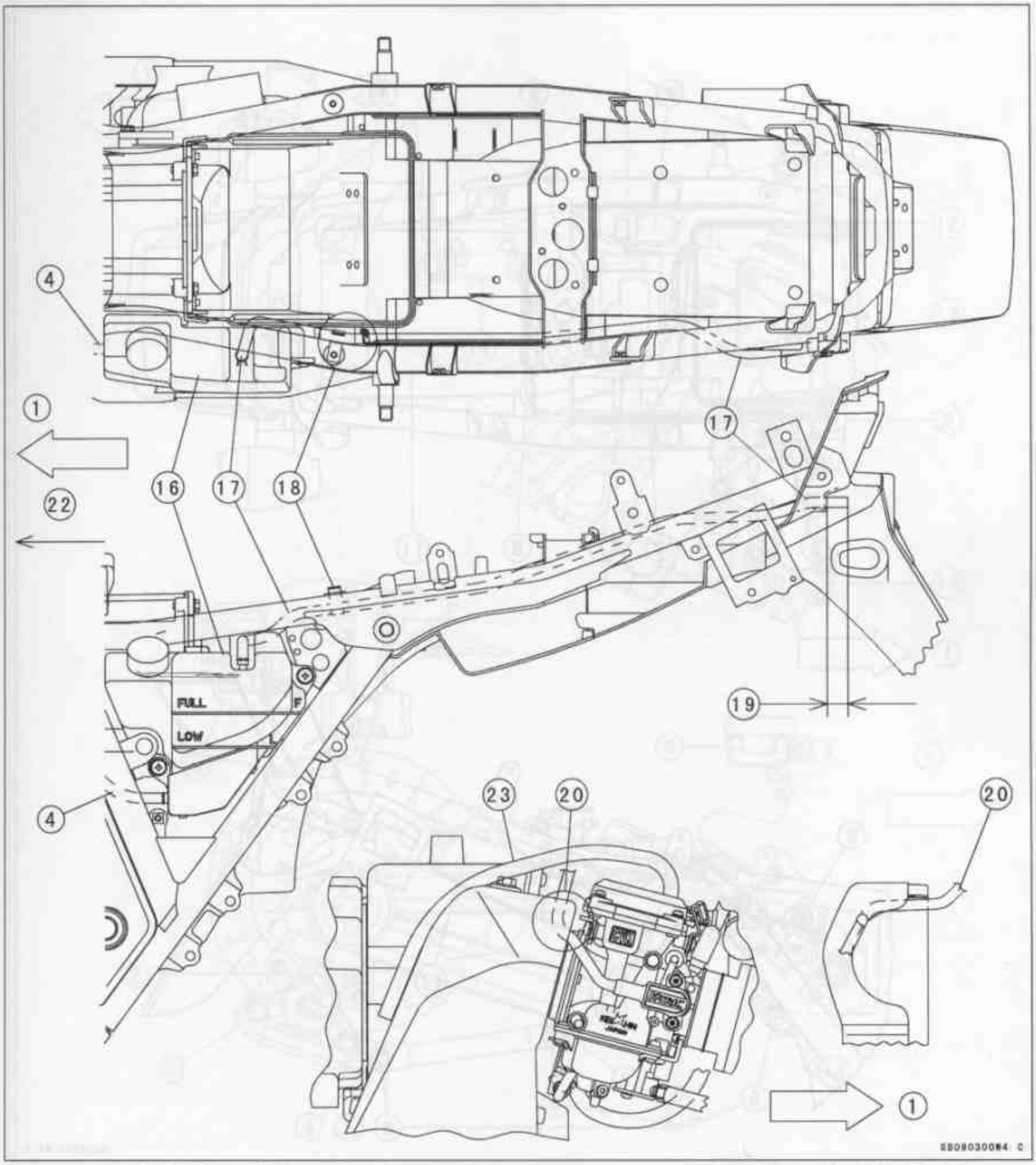


(P): WVTA Approval Model with pipe catalytic converter
(PU): WVTA Approval Model with pipe catalytic converter (Uniter Kingdom Model)
(PR): WVTA Approval Model with pipe catalytic converter (Restricted Model)

1. Front
2. Starter Relay
3. Seat Lock
4. Igniter
5. Welded Clamp
6. Headlight Relay (except for P, PU, PR)
7. Junction Box
8. Seat Lock Cable
9. Seat Lock Key
10. Run the cable [8] so it doesn't get pinched between the rear fender [11] and the frame.
11. Rear Fender

Cable, Wire, and Hose Routing

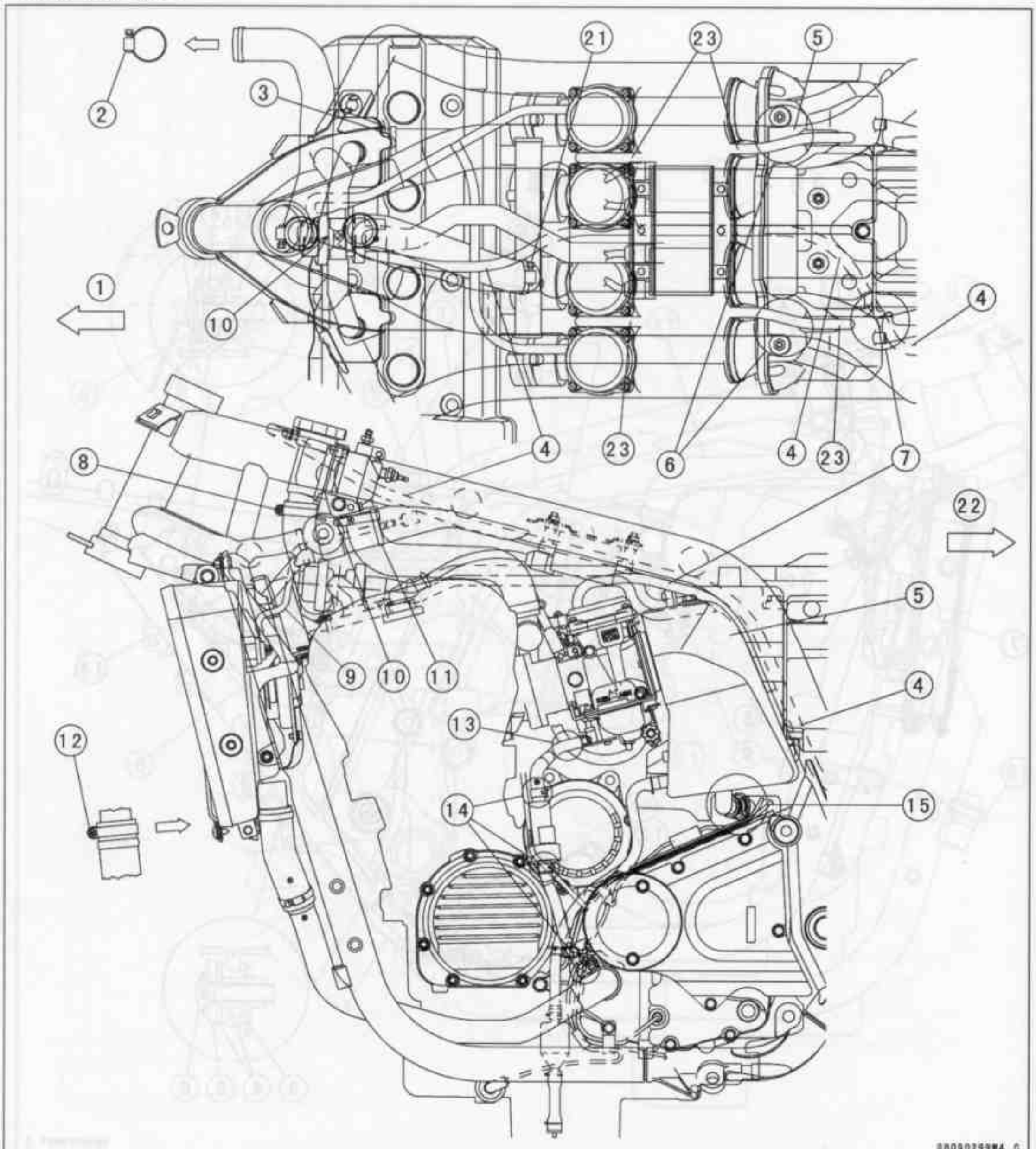
ZR1200–A1, B1, C1



13. Run the fuel hose inside the coolant hose.
14. Position the clamp tabs back and slightly outwards.
15. Position the clamp tabs back.
16. Coolant Reserve Tank
17. Reserve Tank Overflow Hose
18. Do not pinch the hose [17] with the seat lock cable.
19. About 30 mm (1.18 in): Fit the end of the hose [17] into the hole of the rear fender so the hose end protrudes about 30 mm. Otherwise the hose is pulled tight and it could be pinched with the seat cover.
20. Throttle Sensor Leads: Run the leads inside the right air cleaner cover.
21. Position the clamp screw head right.
22. Continued
23. Carburetor Vent Hoses

Cable, Wire, and Hose Routing

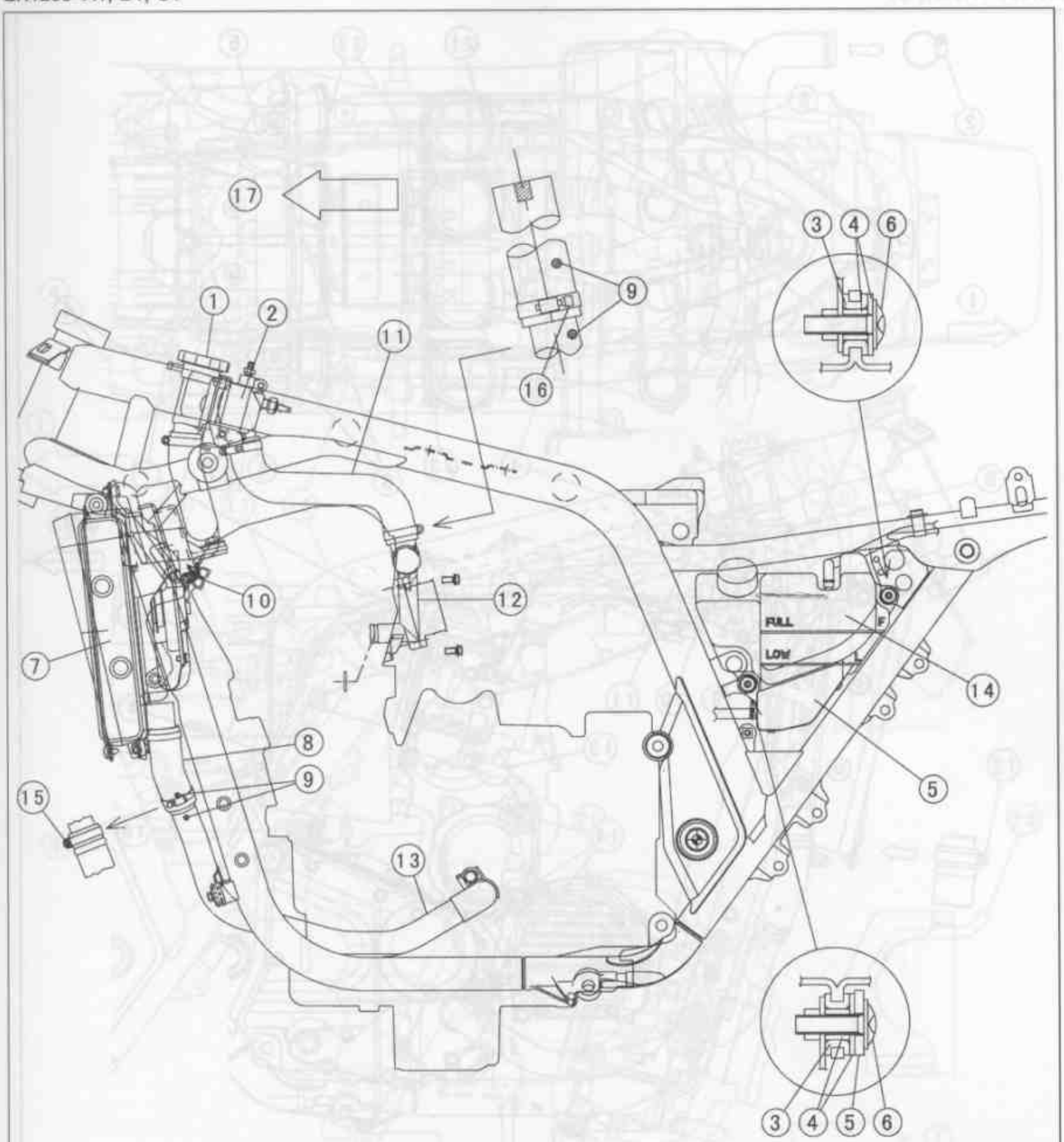
ZR1200–A1, B1, C1



1. Front
2. Position the clamp screw down and the screw head right.
3. Strap on the frame pipe (fan motor lead)
4. Reserve Tank Hose: Run it on the left side of the radiator cap.
5. Front Air Cleaner Housing
6. Run the carburetor vent hoses inside the bosses and into the grooves of the housing [5].
7. Run the hose [4] inside the boss and between the housing [5] and frame pipe without being pinched.
8. Position the clamp screw forwards and the screw head left.
9. Radiator Fan Switch Lead
10. Position the clamp screw forwards and the screw head tilted 45° left as shown.
11. Strap (radiator fan switch lead)
12. Position the screw inward and the screw head forwards.

Cable, Wire, and Hose Routing

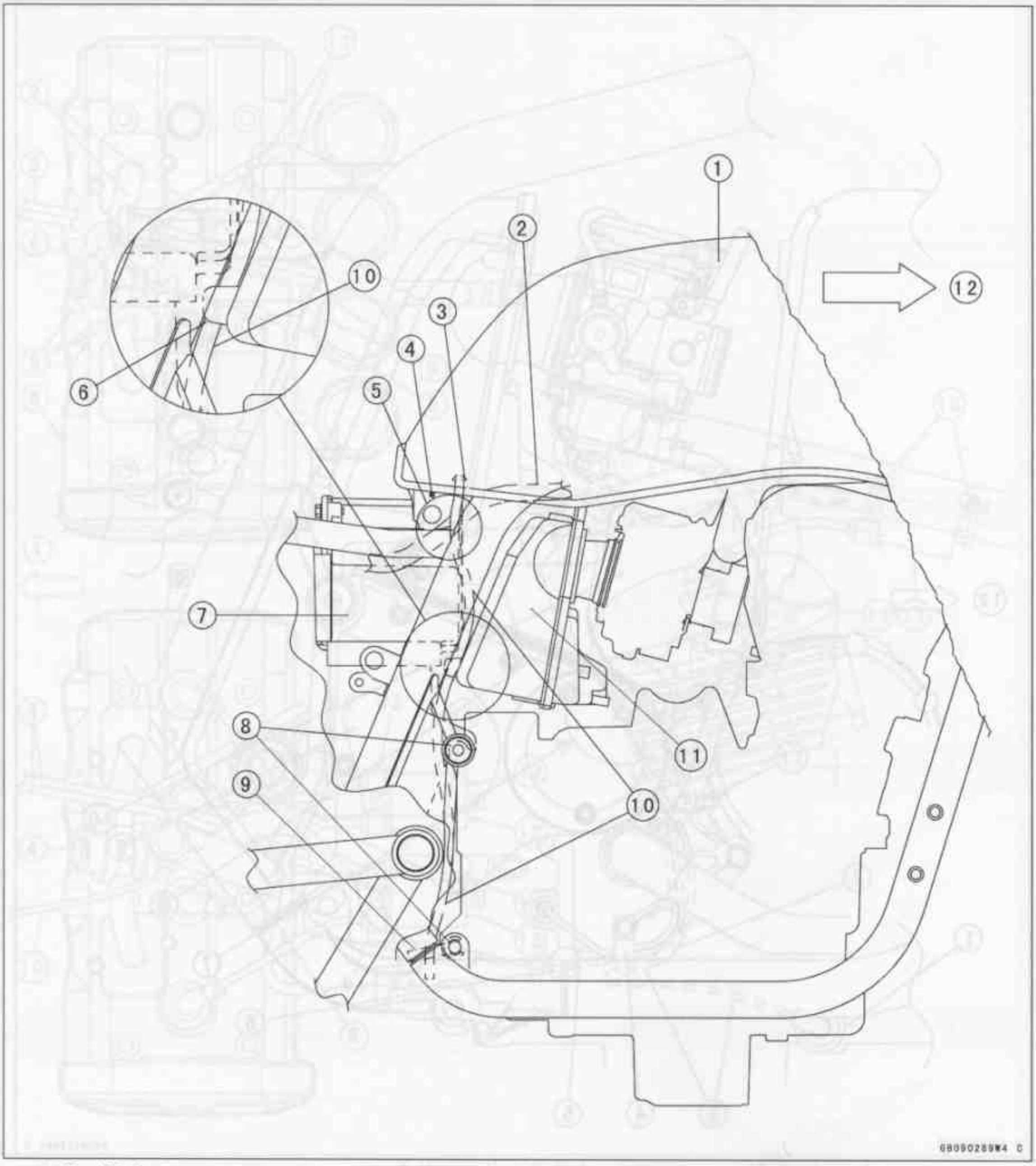
ZR1200–A1, B1, C1



1. Radiator Cap
2. Thermostat Housing
3. Rubber Dampers
4. Collars
5. Reserve Tank Cover
6. Screws
7. Radiator
8. Radiator Outlet Hose (Apply water to the inside of each end when installing.)
9. Align these white marks.
10. Baffle
11. Water Hose (Apply water to the inside of each end when installing).
12. Water Pipe (outlet)
13. Water Pipe (inlet)
14. Coolant Reserve Tank
15. Install the clamp with the screw head inwards.
16. Install the clamp with the screw head right.
17. Front

Cable, Wire, and Hose Routing

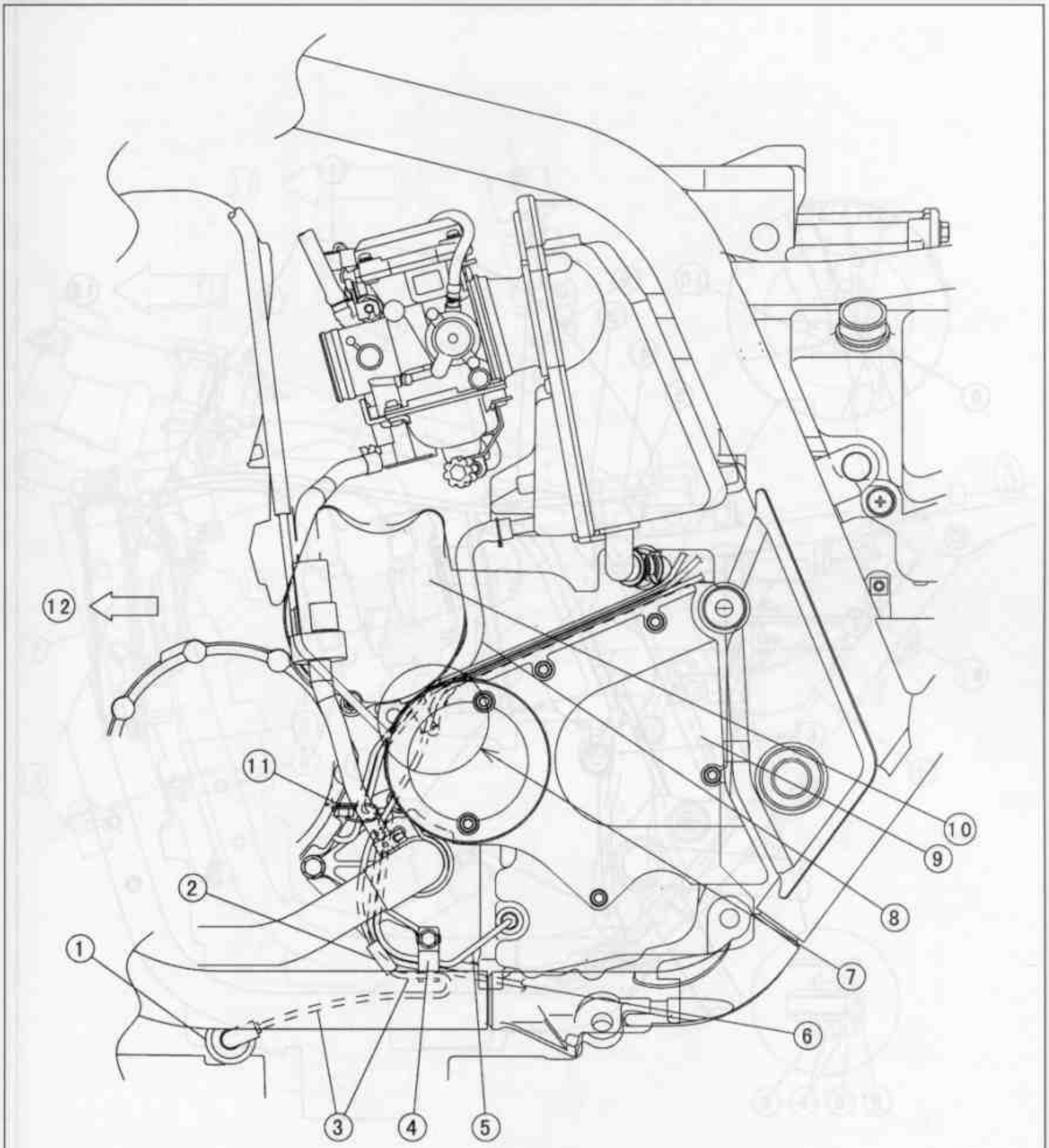
ZR1200–A1, B1, C1



1. Fuel Tank
2. Main Harness
3. Clip
4. Fuel Tank Bracket
5. Run the filler drain hose [10] between the bracket [4] and frame.
6. Air Cleaner Housing Pin: Run the hose [10] inside the pin.
7. Rear Air Cleaner Housing
8. Engine Mounting Bolts
9. Clamp tightened by the bolt [8].
10. Fuel Tank Filler Drain Hose
11. Front Air Cleaner Housing
12. Front

Cable, Wire, and Hose Routing

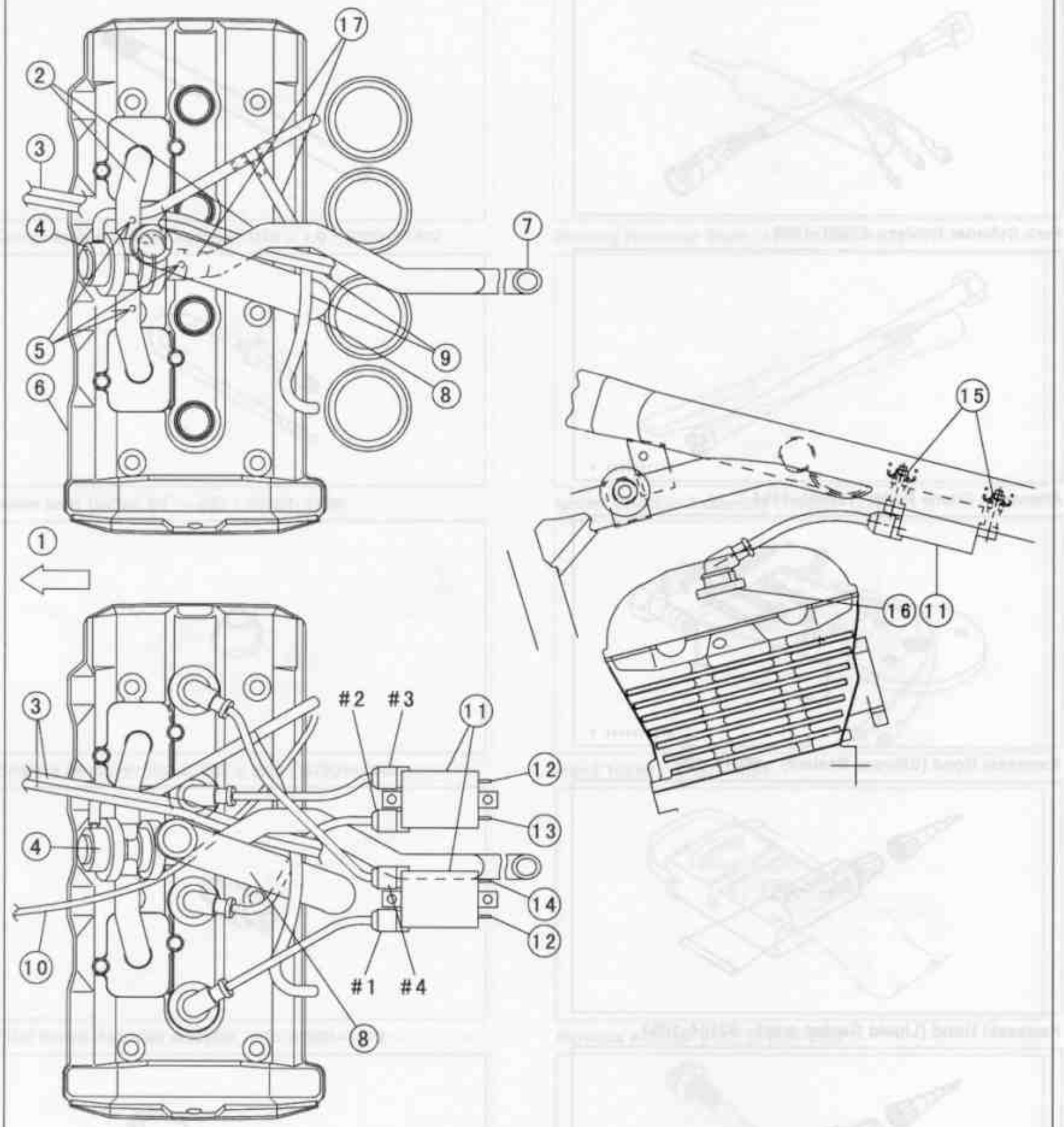
ZR1200–A1, B1, C1



1. Oil Pressure Switch
2. Connector in front of the clamp [4]
3. Clamp the lead with a slack as little as possible.
4. Clamp ([3], [5], [6])
5. Neutral Switch Lead
6. Sidestand Switch Lead
7. Run these leads and the hose [8] between [9] and [10].
8. Air Cleaner Drain Hose
9. Chain Cover
10. Alternator
11. Clamp on the lower crankcase (pickup coil leads)

Cable, Wire, and Hose Routing

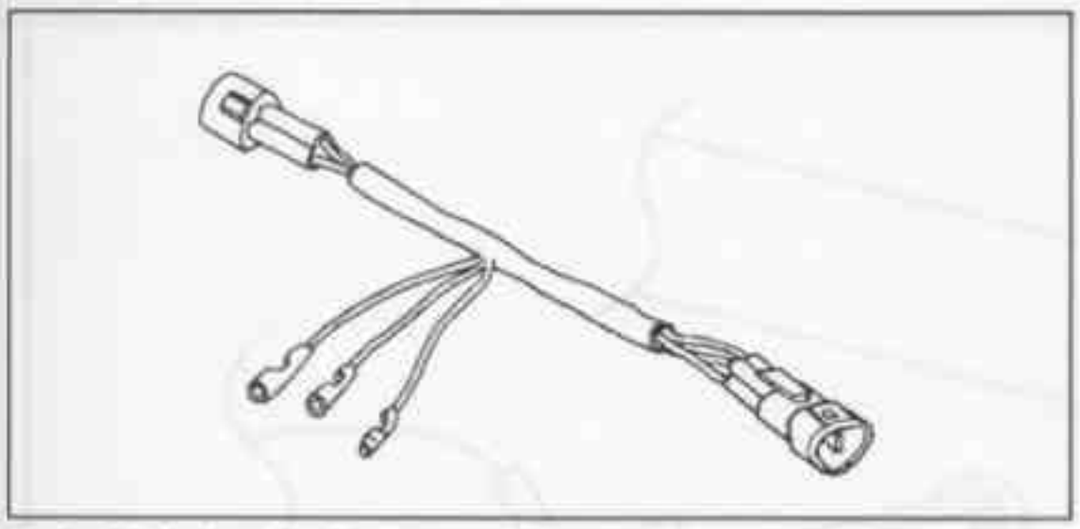
ZR1200–A1, B1, C1



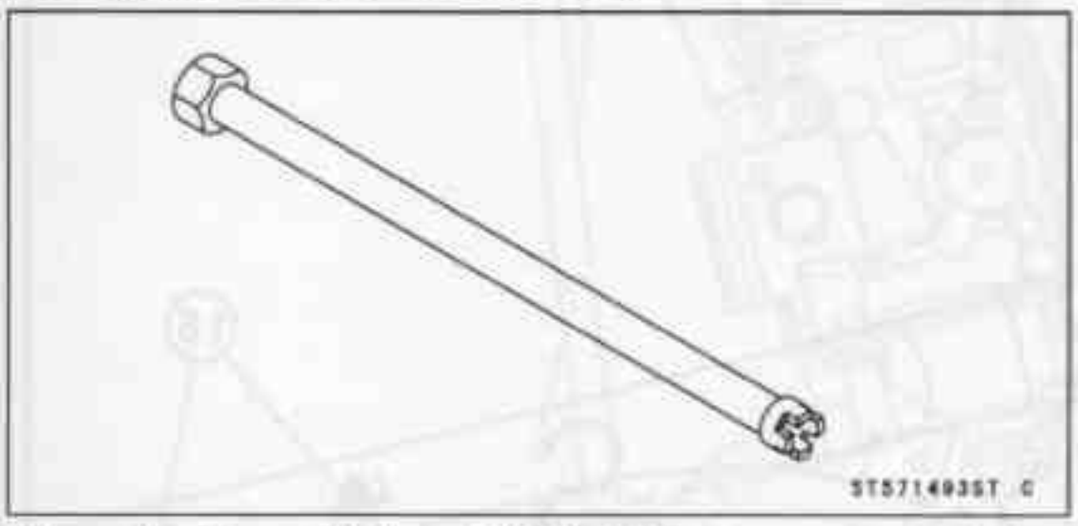
1. Front
2. Vacuum Switch Valve Hoses
3. Throttle Cable over the hose [2]
4. Vacuum Switch Valve
5. Raised Marks facing upwards
6. Cylinder Head Cover
7. Apply water to the end of the hose and fit it into the grommet of the front air cleaner housing.
8. Water Hose (outlet)
9. Run the hose [17] under the cables [3] and behind the hose [8]
10. Choke Cable
11. Ignition Coils
12. To Red Leads
13. To Green Lead
14. To Black Lead
15. Nuts
16. Plug Cap
17. Vacuum Hose under the hoses [2] and [8]

Special Tools and Sealant

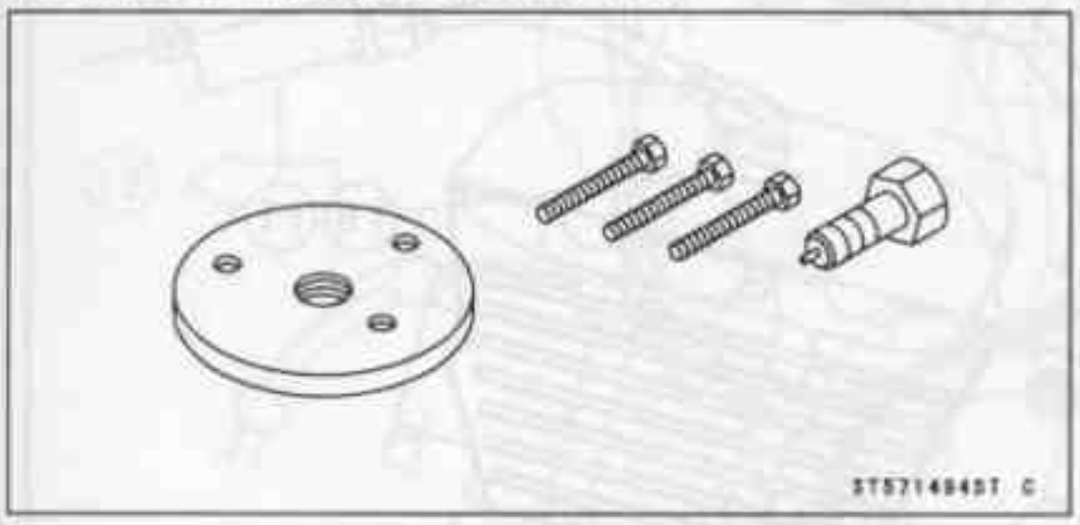
Throttle Sensor Setting Adapter #1 : 57001–1400



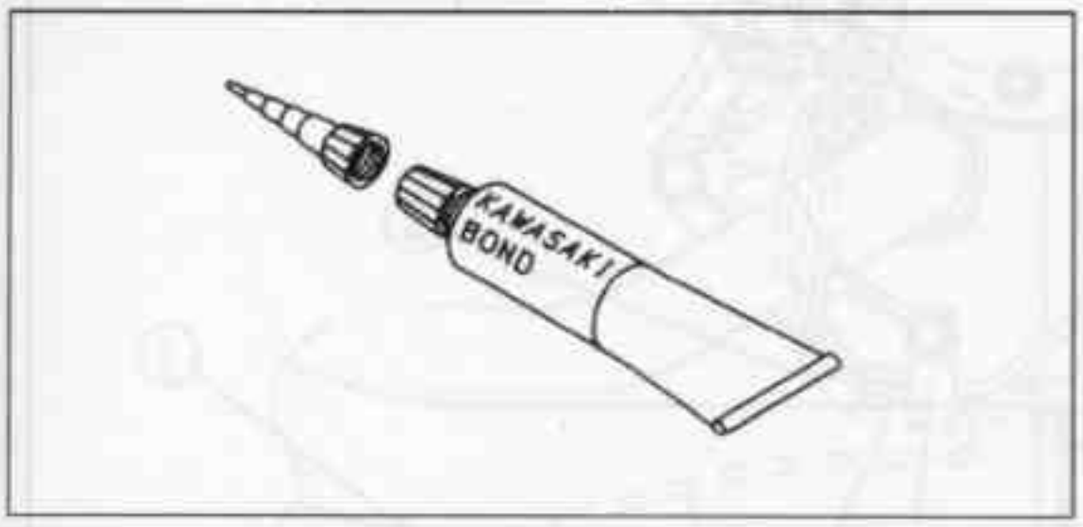
Fork Cylinder Holder : 57001–1493



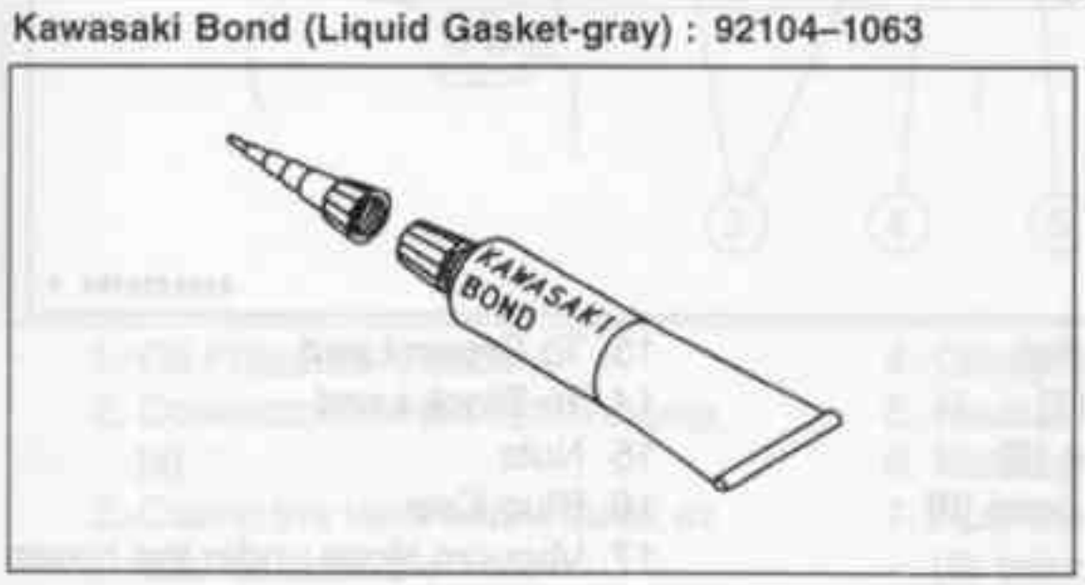
Alternator Frame Puller : 57001–1494



Kawasaki Bond (Silicone Sealant) : 56019–120

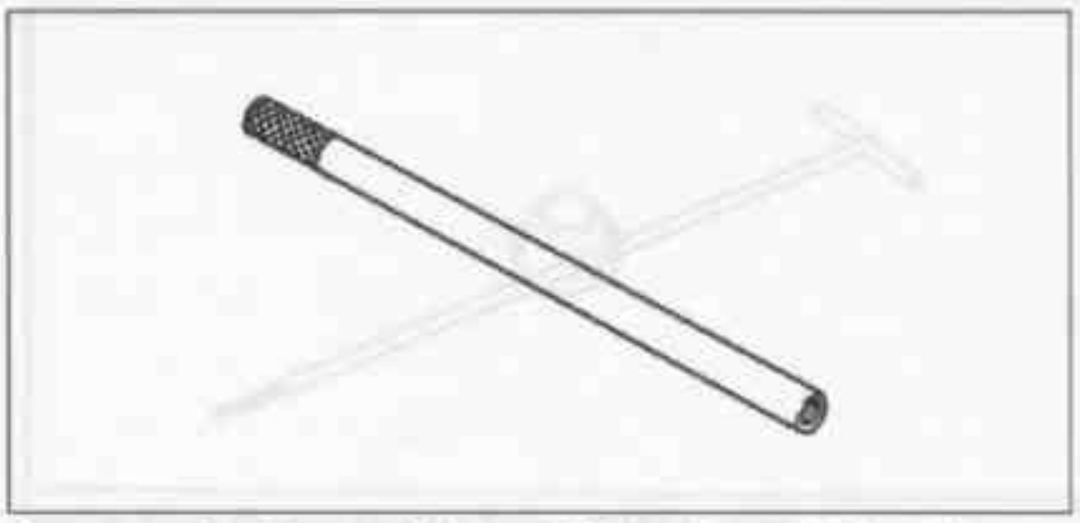


Kawasaki Bond (Liquid Gasket-gray) : 92104–1063

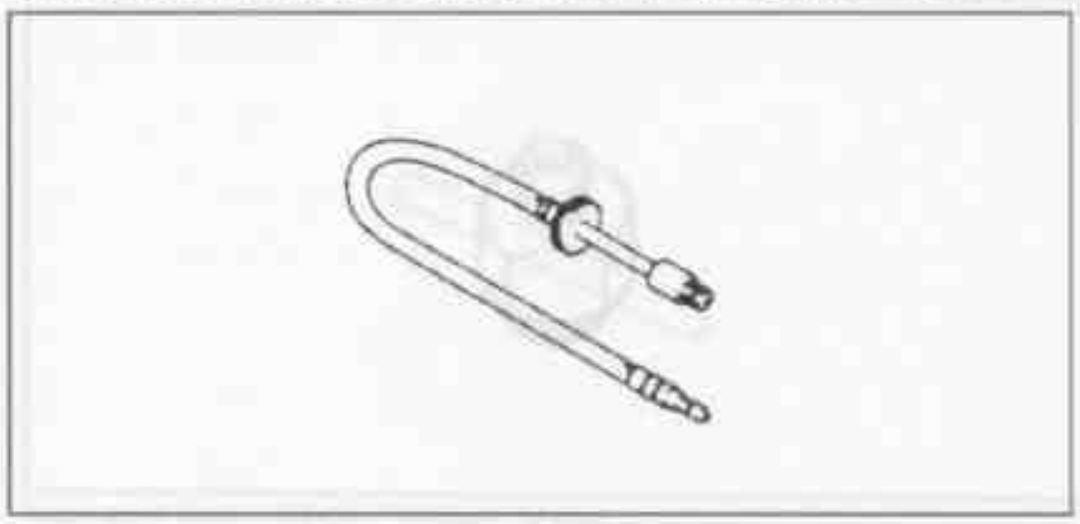


Special Tools and Sealant

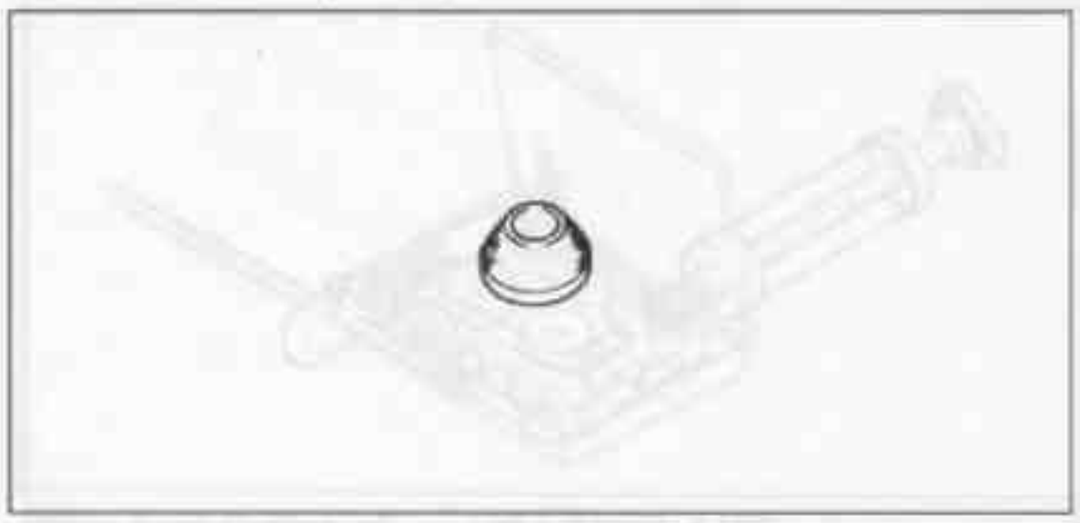
Fork Piston Rod Puller, M10 x 1.0 : 57001–1298



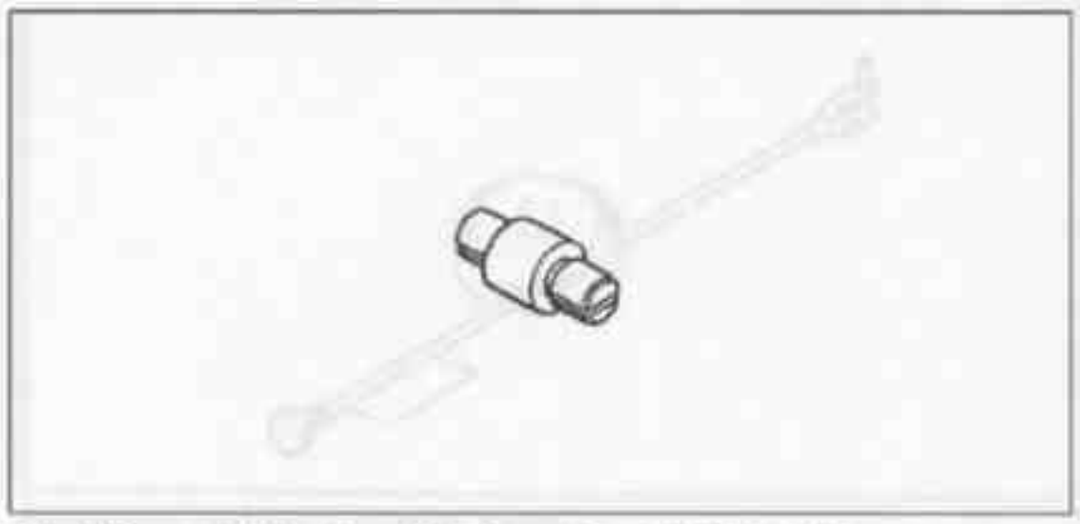
Compression Gauge Adapter, M10 x 1.0 : 57001–1317



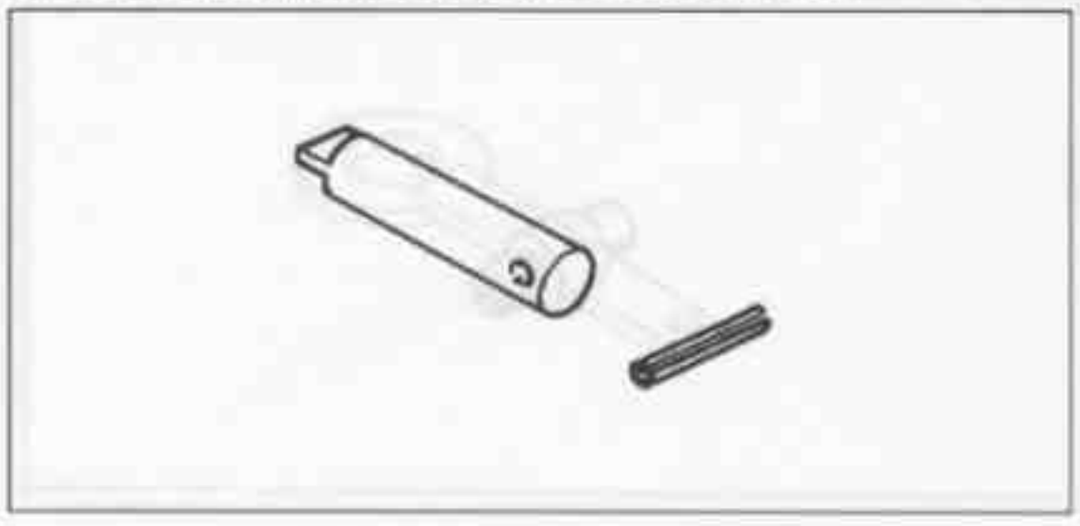
Valve Seat Cutter, 60° – φ33 : 57001–1334



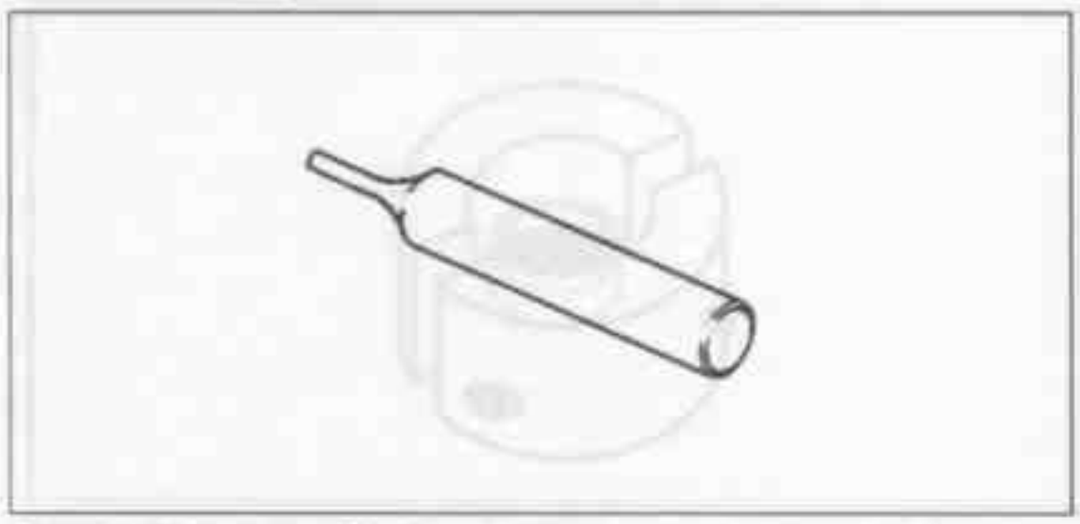
Bearing Remover Head, φ25 x φ28 : 57001–1346



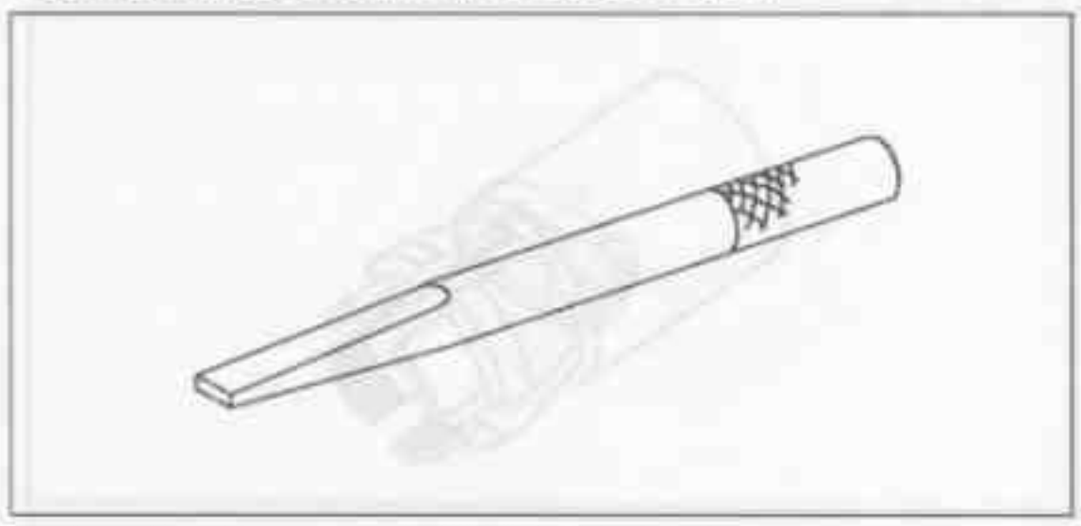
Pilot Screw Adjuster Adapter, φ5 : 57001–1372



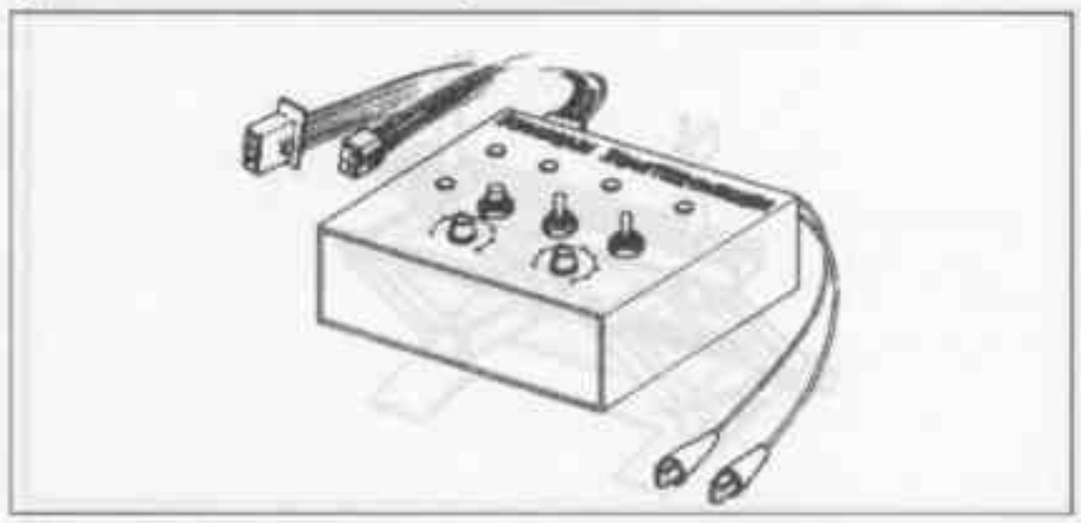
Pilot Screw Adjuster Driver : 57001–1373



Bearing Remover Shaft, φ13 : 57001–1377

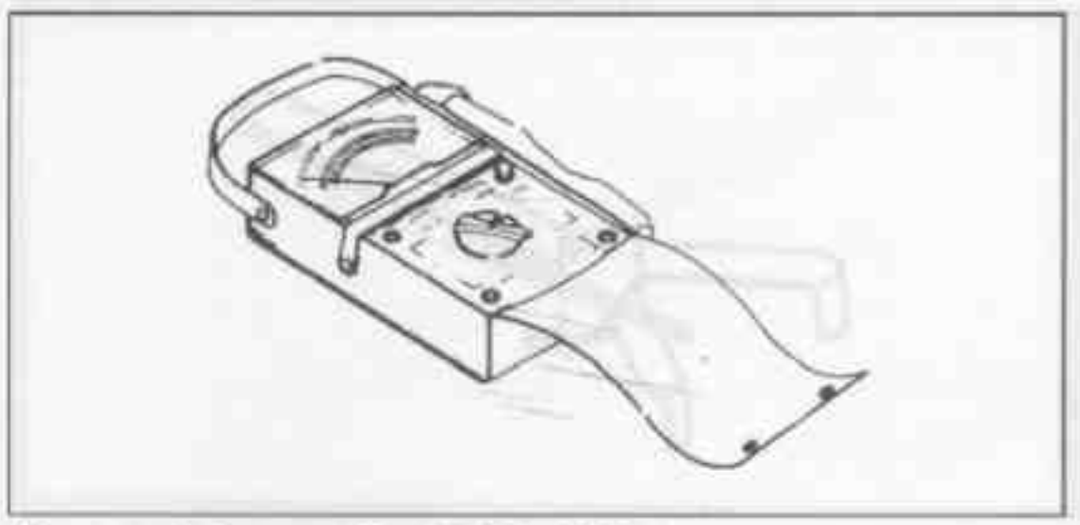


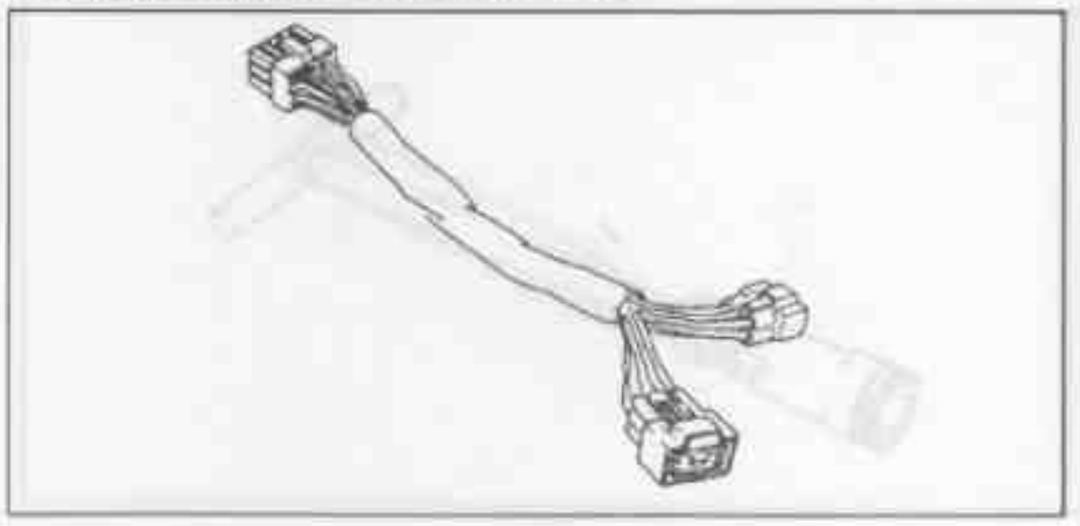
Igniter Checker Assembly : 57001–1378



Hand Tester : 57001–1394

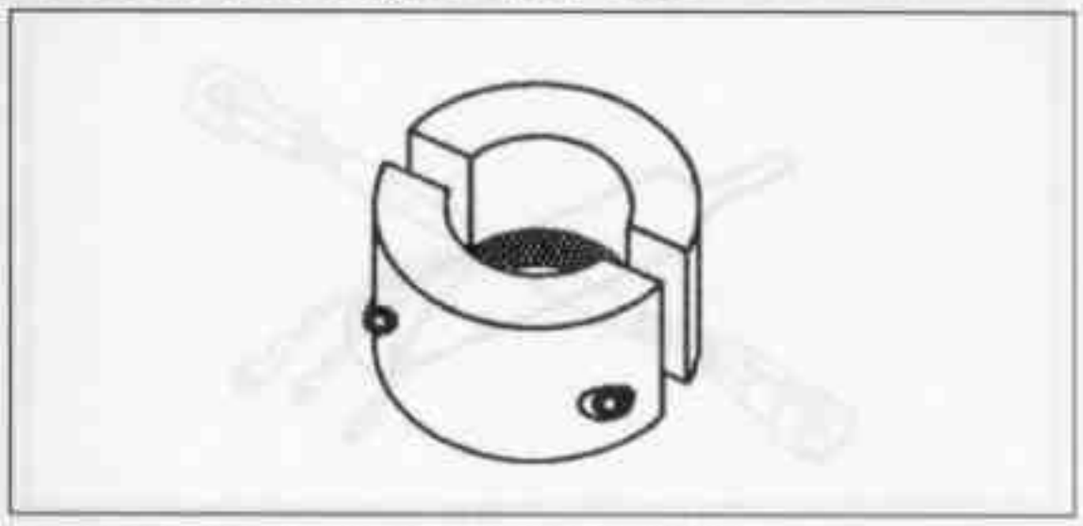
Harness Adapter #13 : 57001–1399



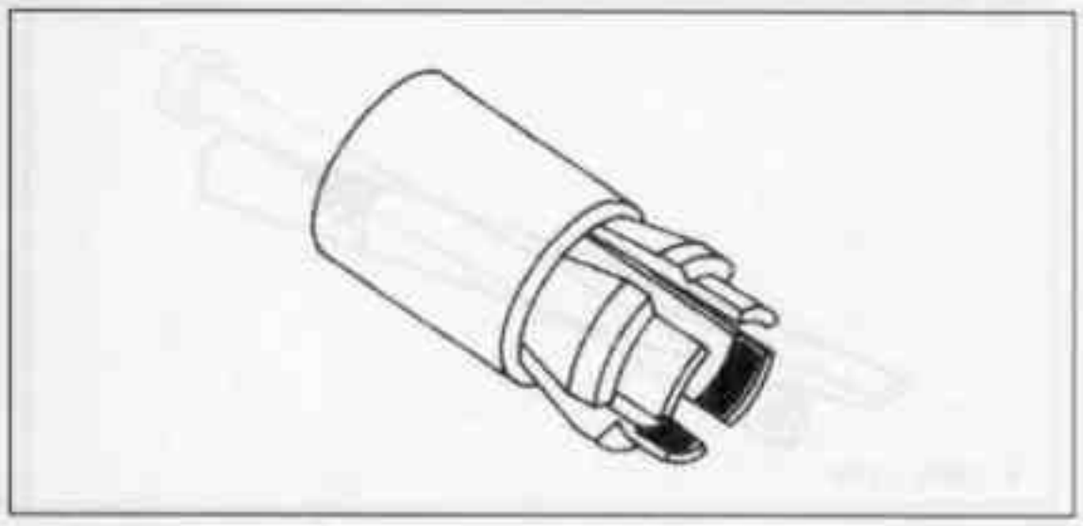


Special Tools and Sealant

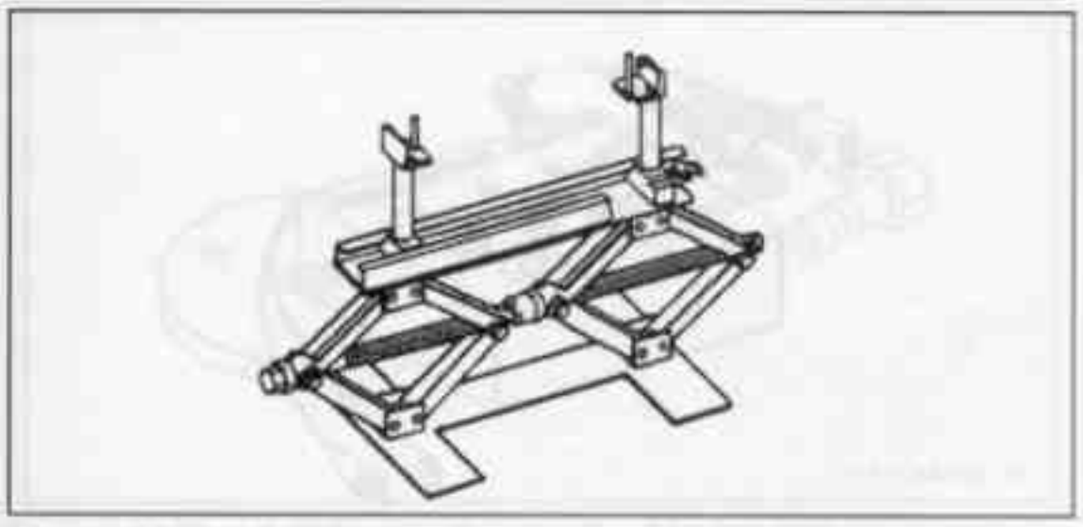
Fork Outer Tube Weight : 57001–1218



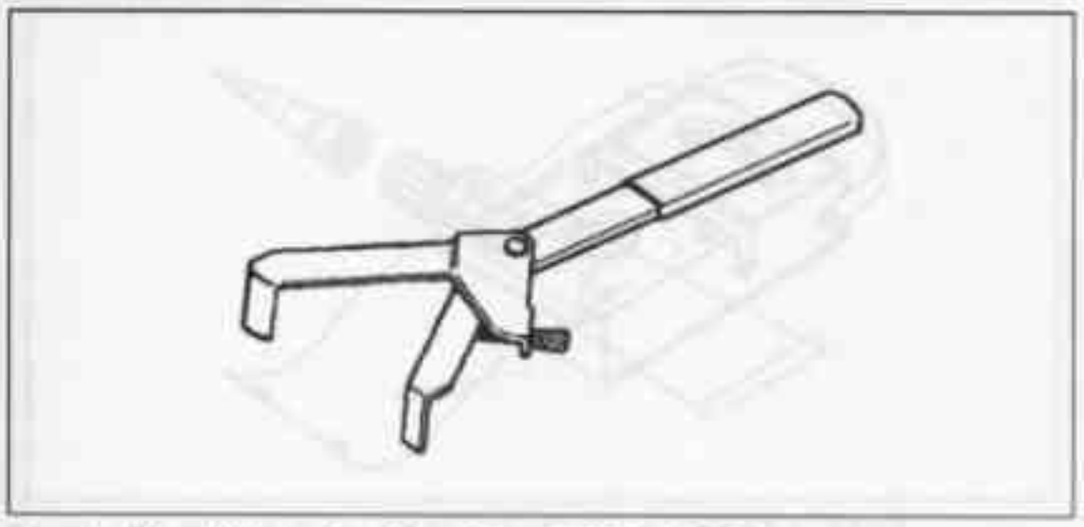
Front Fork Oil Seal Driver : 57001–1219



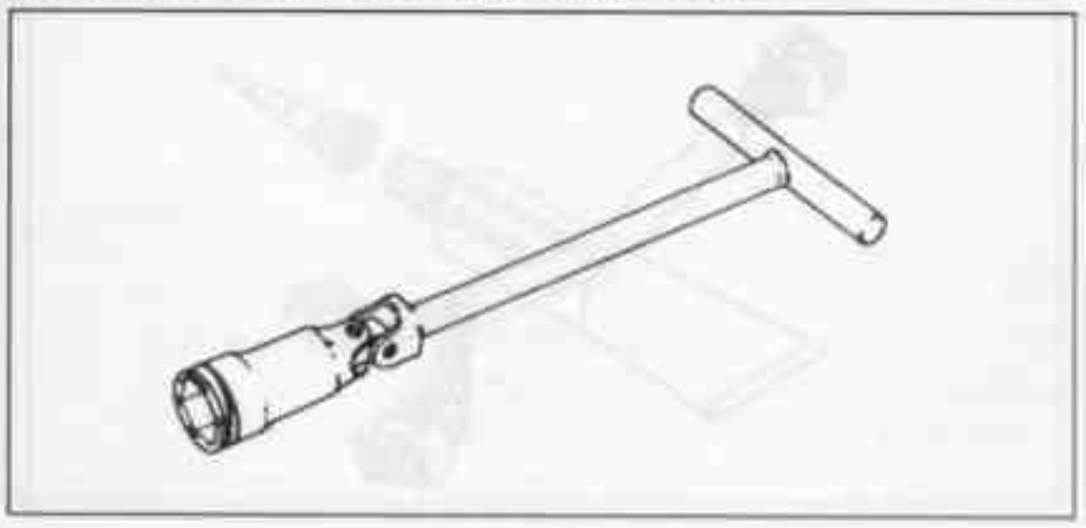
Jack : 57001–1238



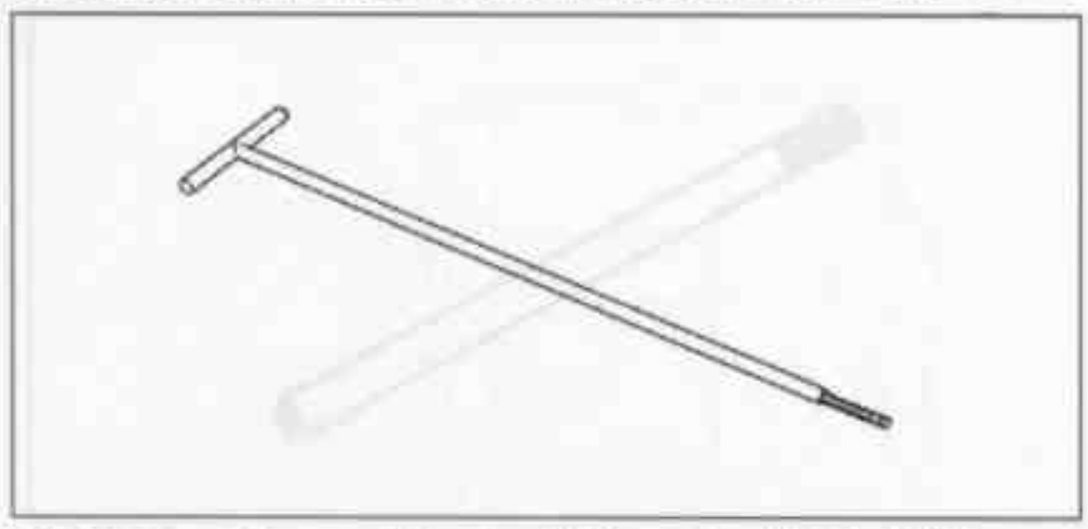
Clutch Holder : 57001–1243



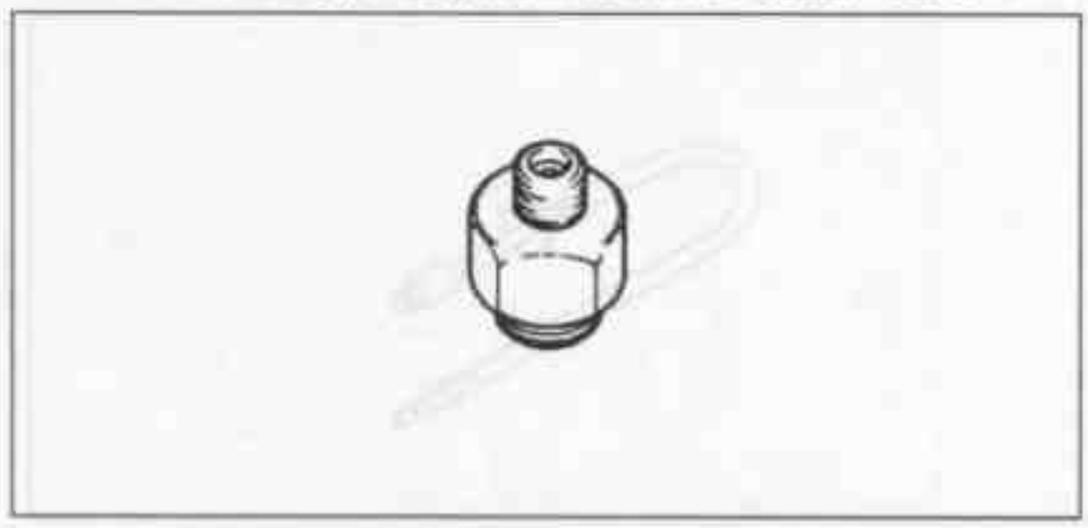
Spark Plug Wrench, Hex 16 : 57001–1262



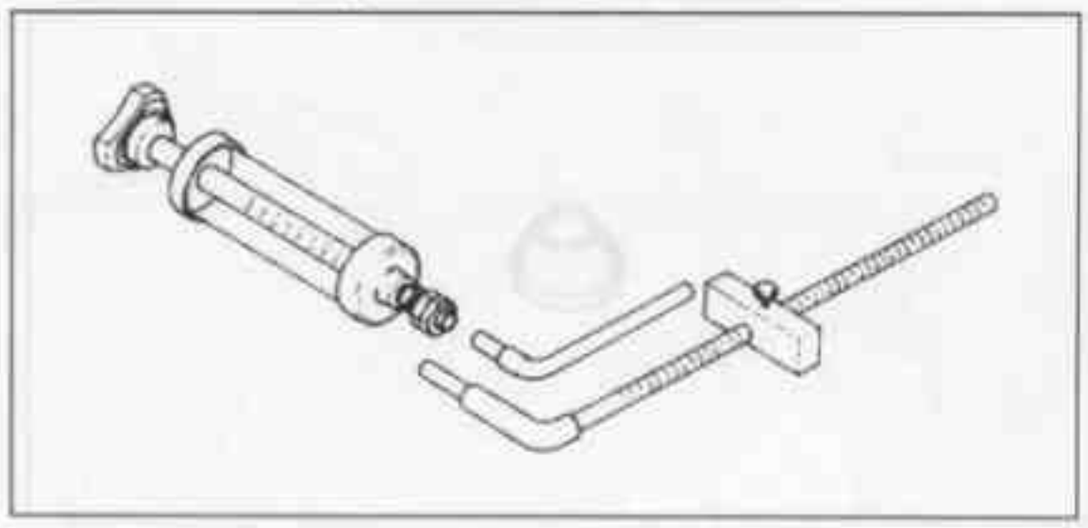
Carburetor Drain Plug Wrench, Hex 3 : 57001–1269



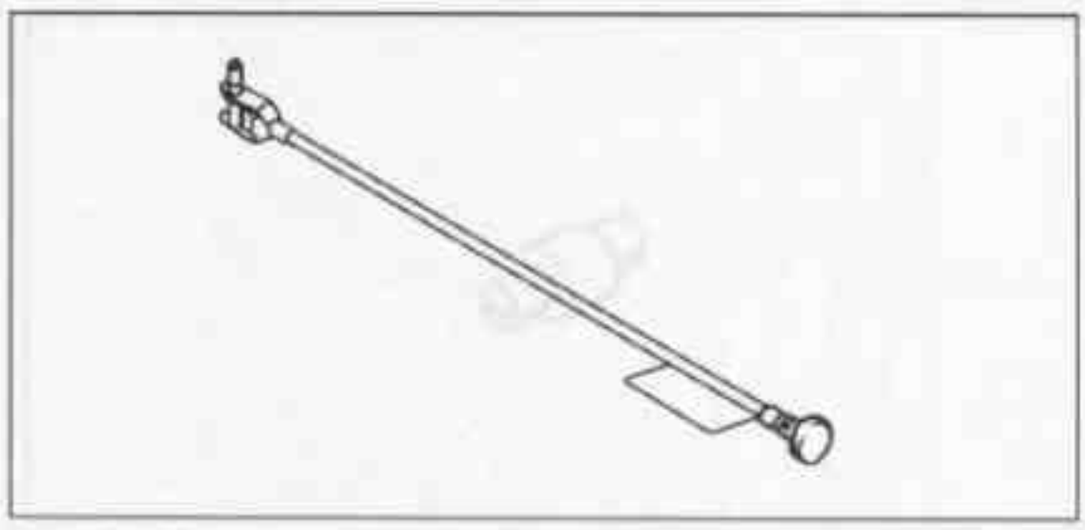
Oil Pressure Gauge Adapter, M18 x 1.5 : 57001–1278



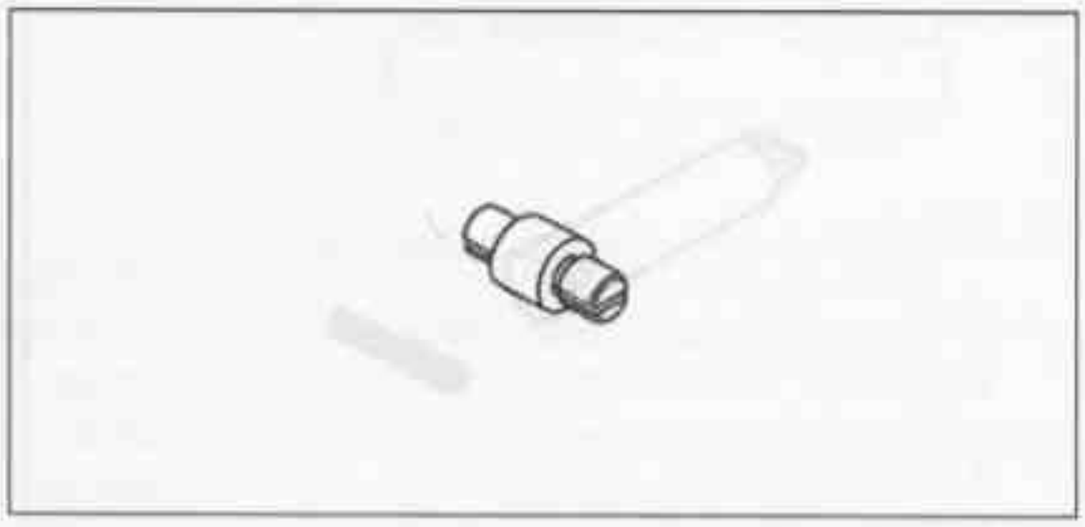
Fork Oil Level Gauge : 57001–1290



Pilot Screw Adjuster, C : 57001–1292

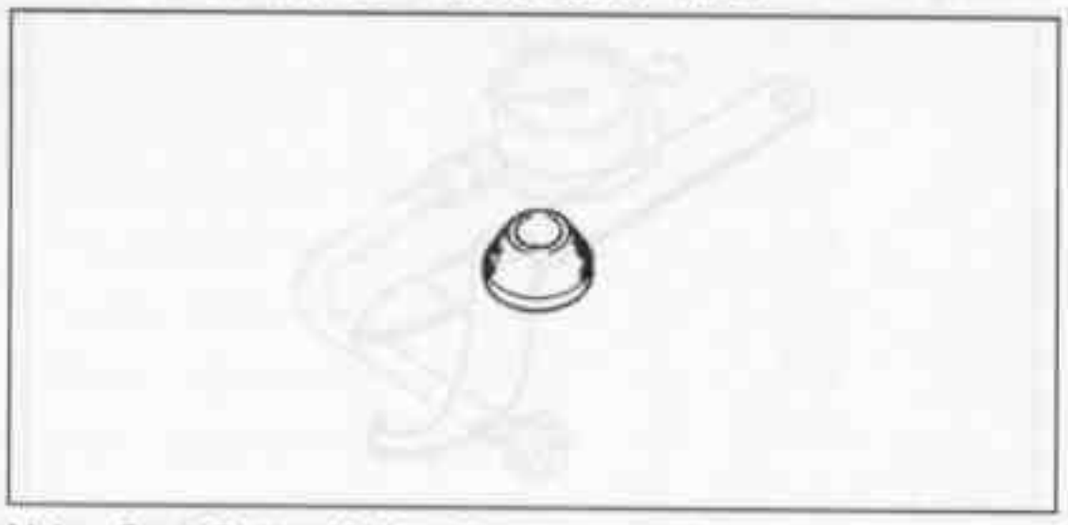


Bearing Remover Head, ϕ20 x ϕ22 : 57001–1293

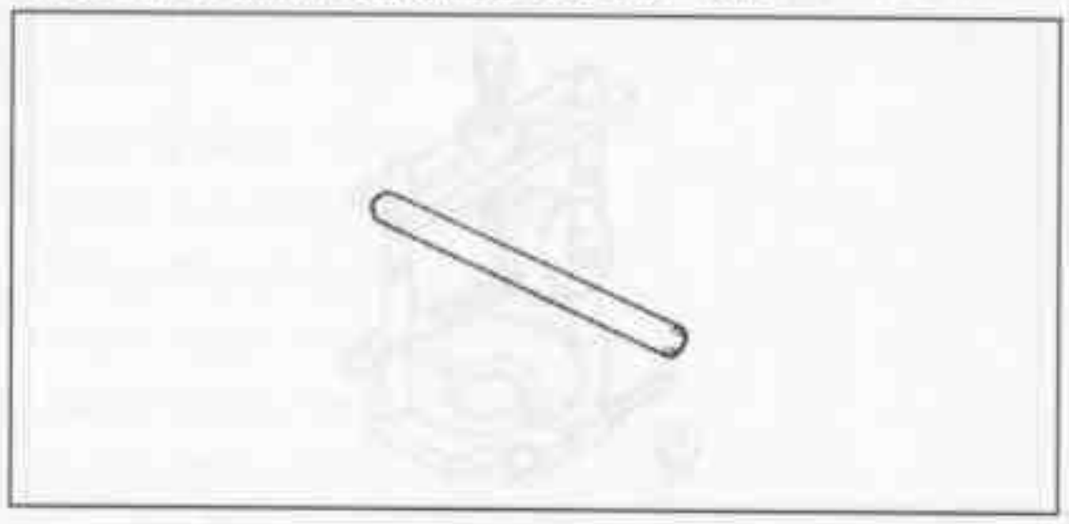


Special Tools and Sealant

Valve Seat Cutter, 60° – φ30 : 57001–1123



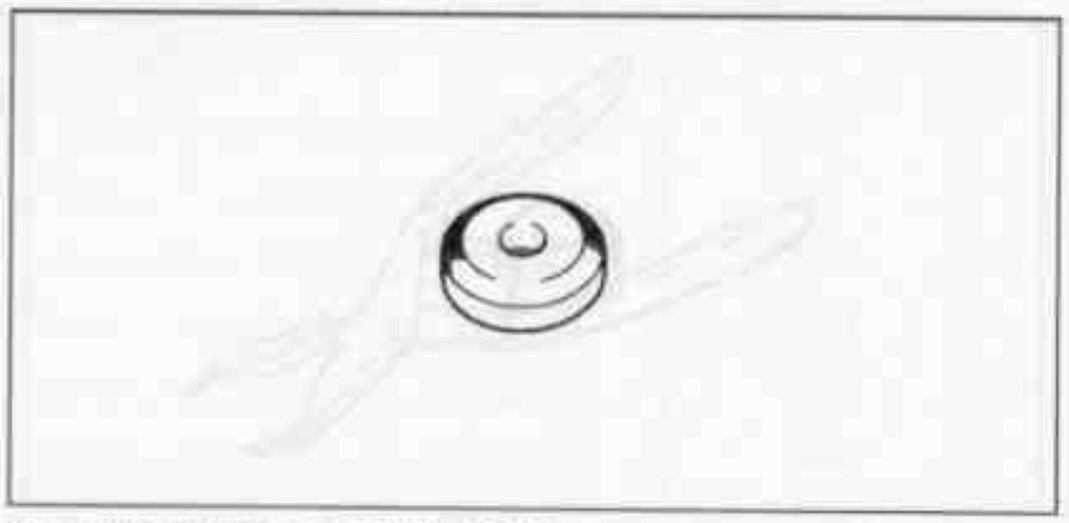
Valve Seat Cutter Holder Bar : 57001–1128



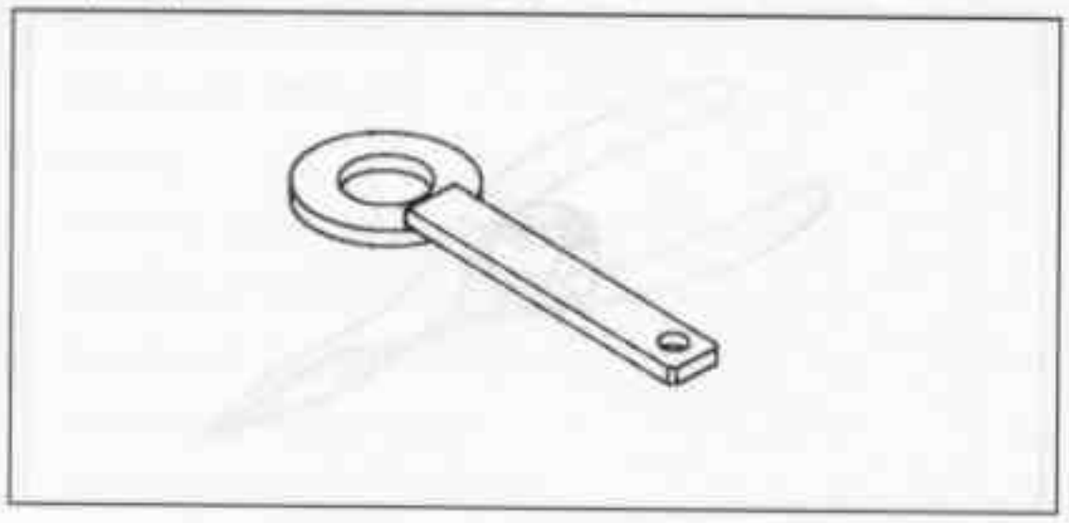
Bearing Driver Set : 57001–1129



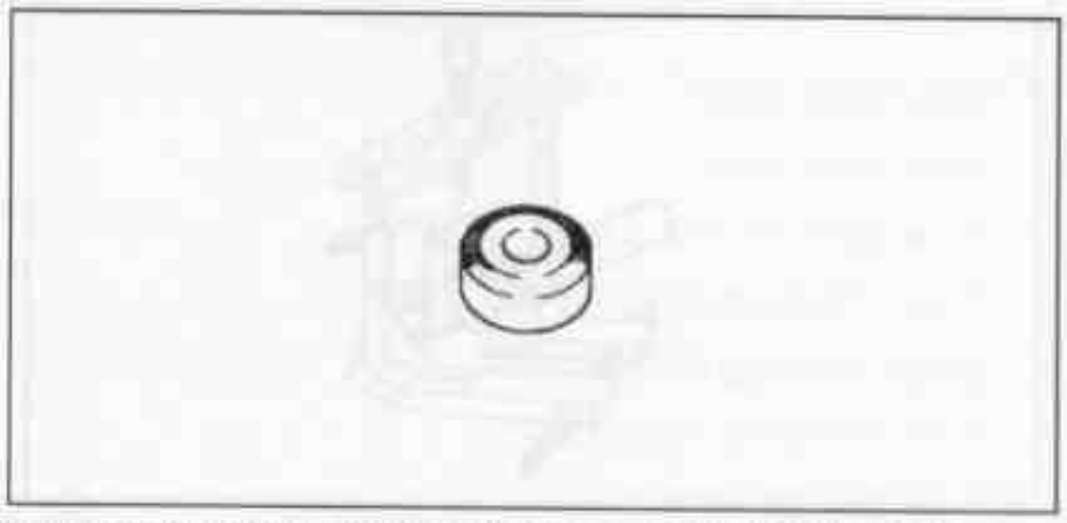
Valve Seat Cutter, 45° – φ30 : 57001–1187



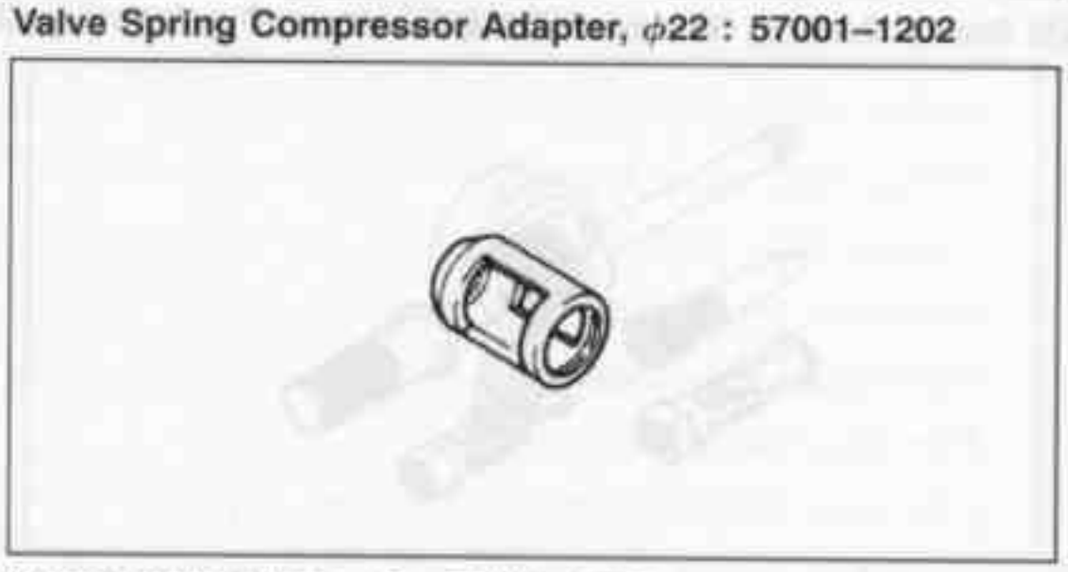
Coupling Holder : 57001–1189



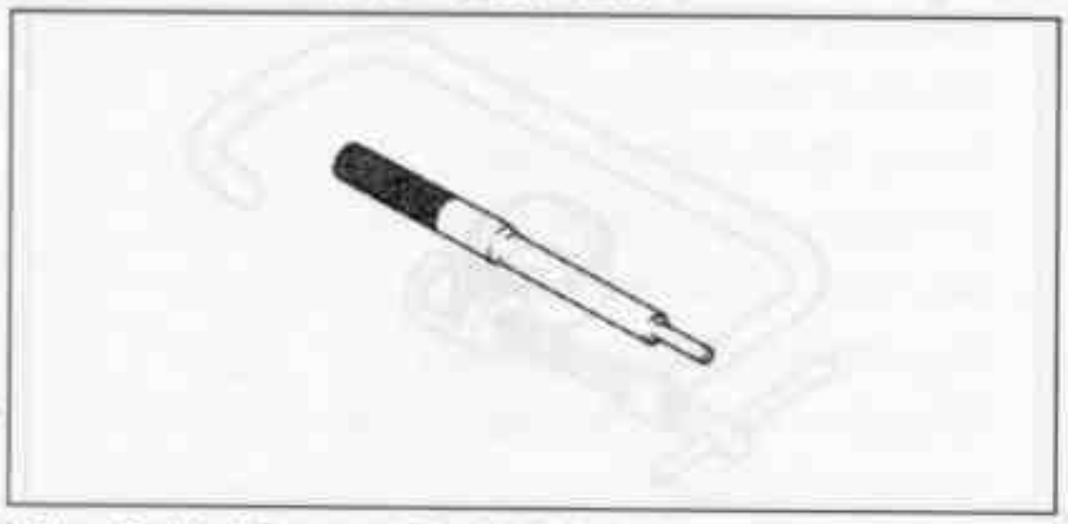
Valve Seat Cutter, 30° – φ33 : 57001–1199



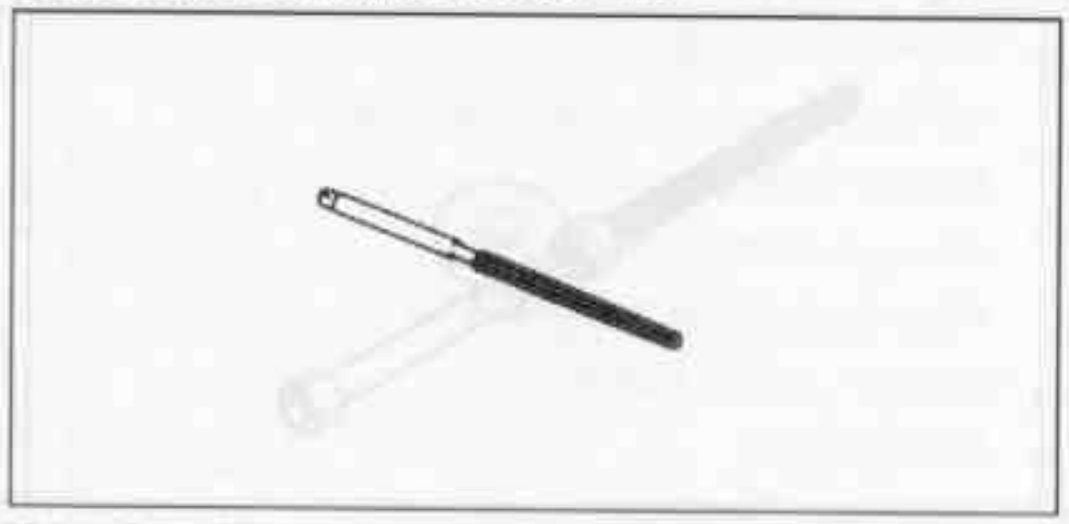
Valve Spring Compressor Adapter, φ22 : 57001–1202



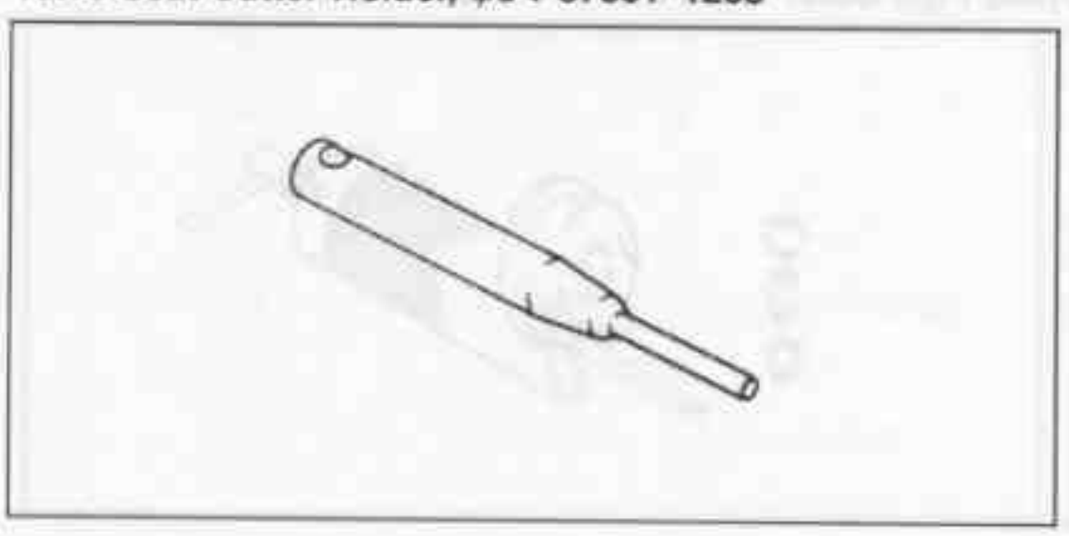
Valve Guide Arbor, φ5 : 57001–1203



Valve Guide Reamer, φ5 : 57001–1204

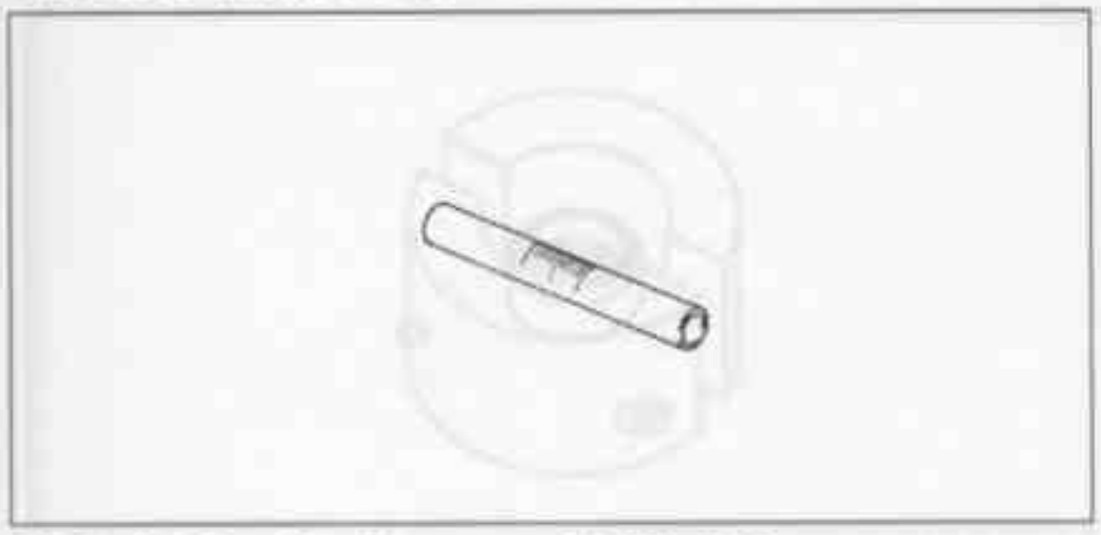


Valve Seat Cutter Holder, φ5 : 57001–1208

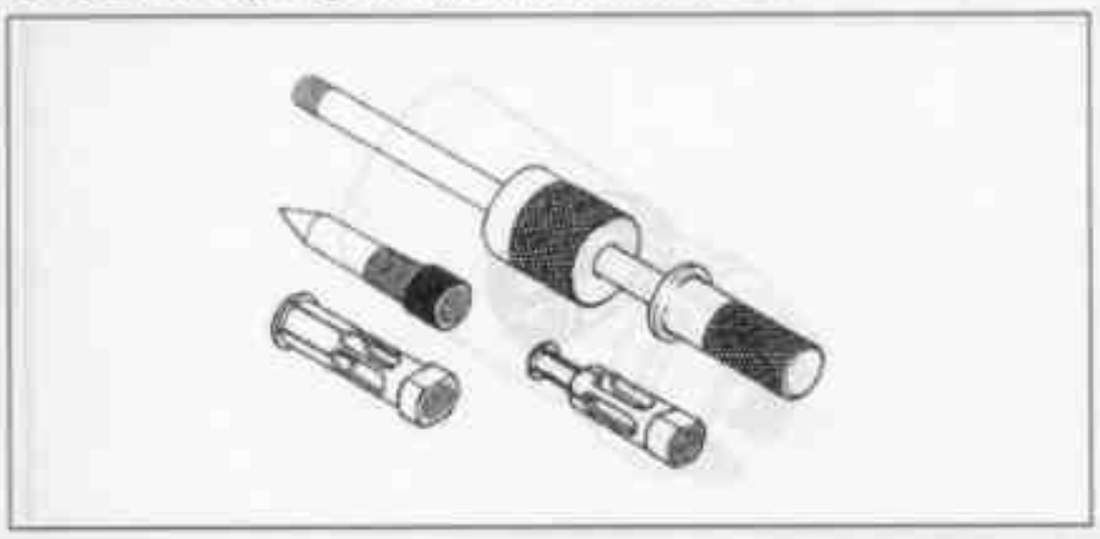


Special Tools and Sealant

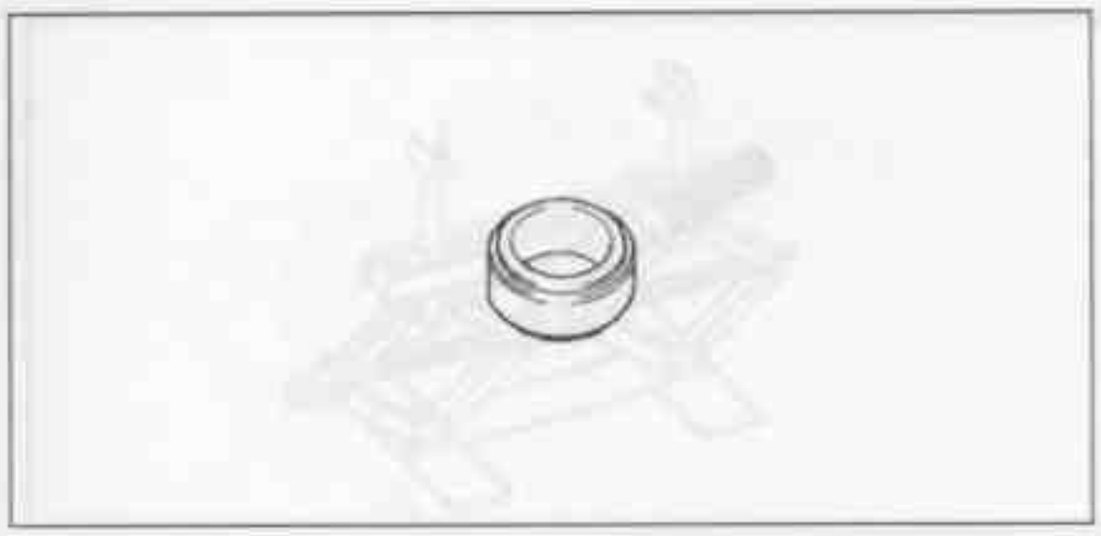
Fuel Level Gauge : 57001–1017



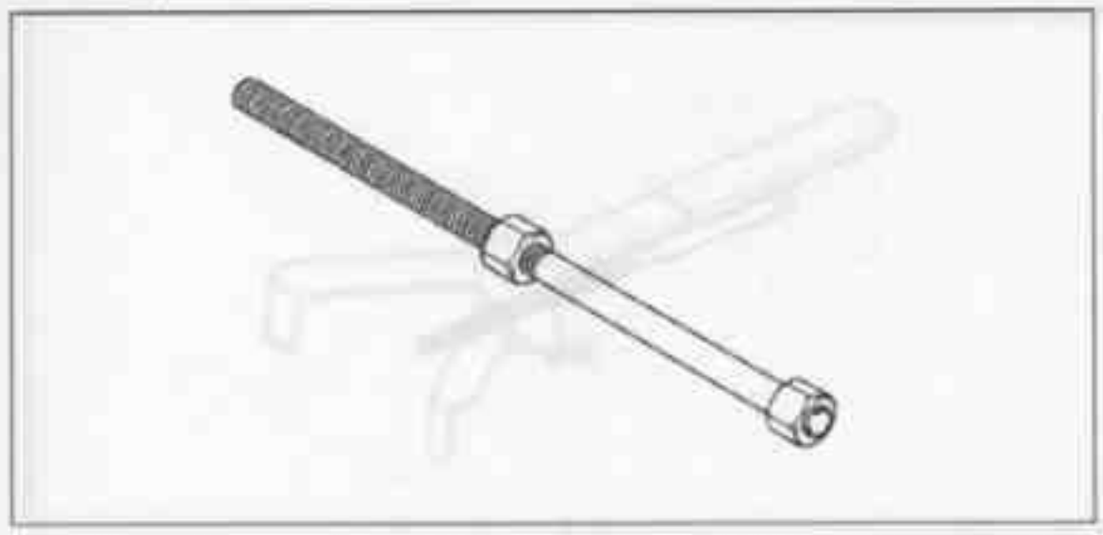
Oil Seal & Bearing Remover : 57001–1058



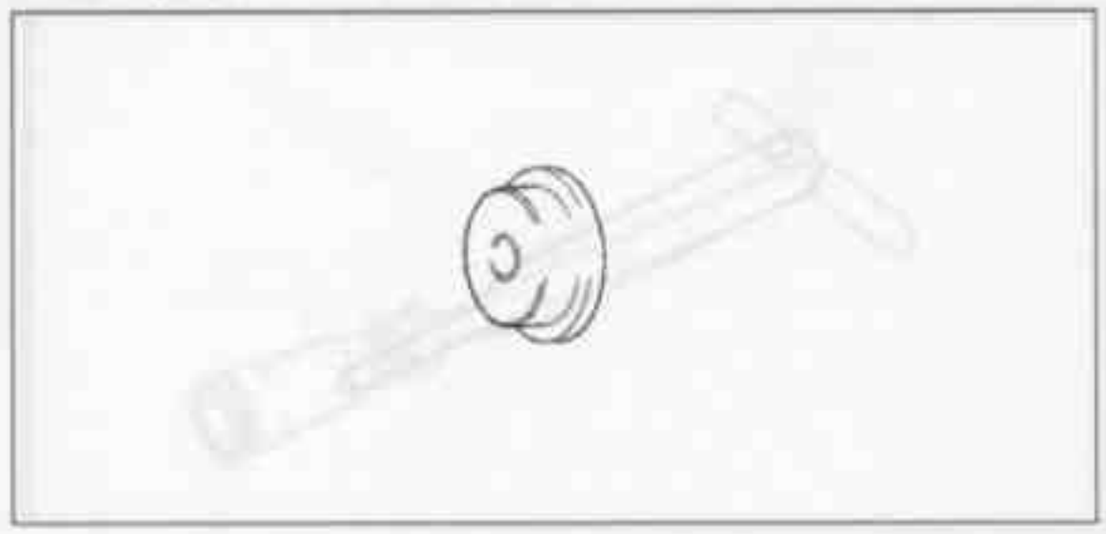
Steering Stem Bearing Driver Adapter : 57001–1074



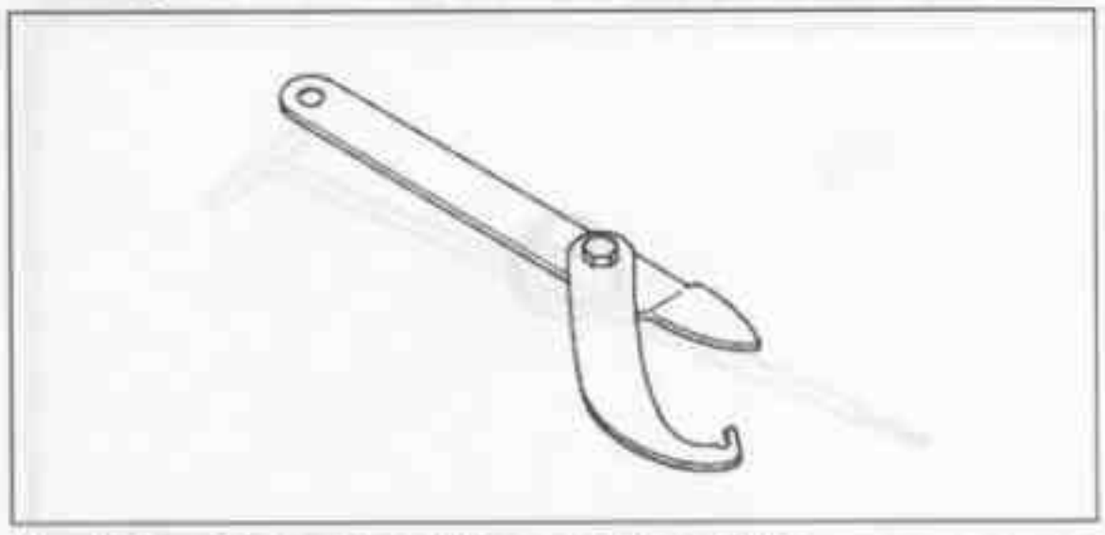
Head Pipe Outer Race Press Shaft : 57001–1075



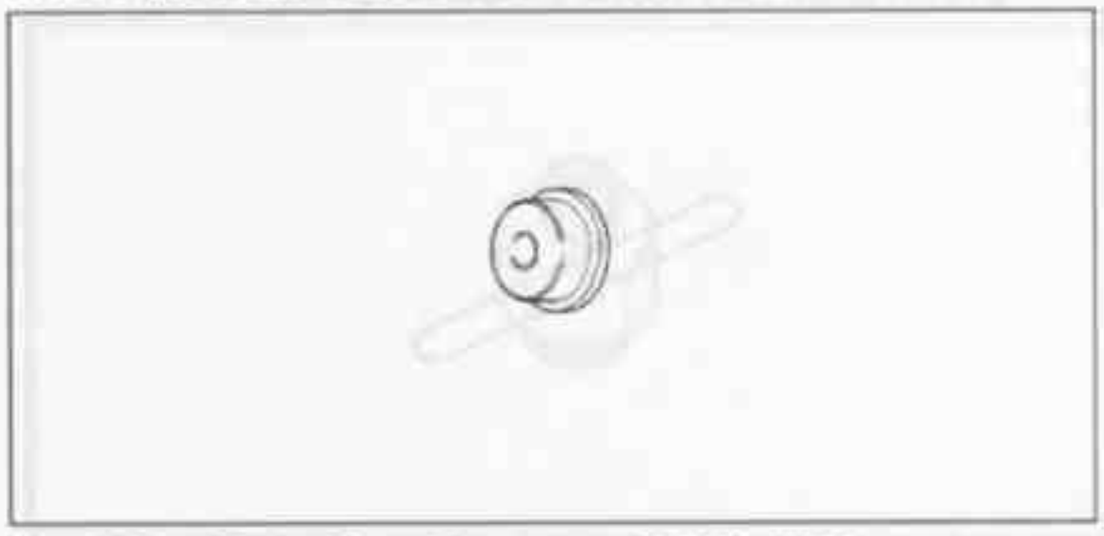
Head Pipe Outer Race Driver : 57001–1076



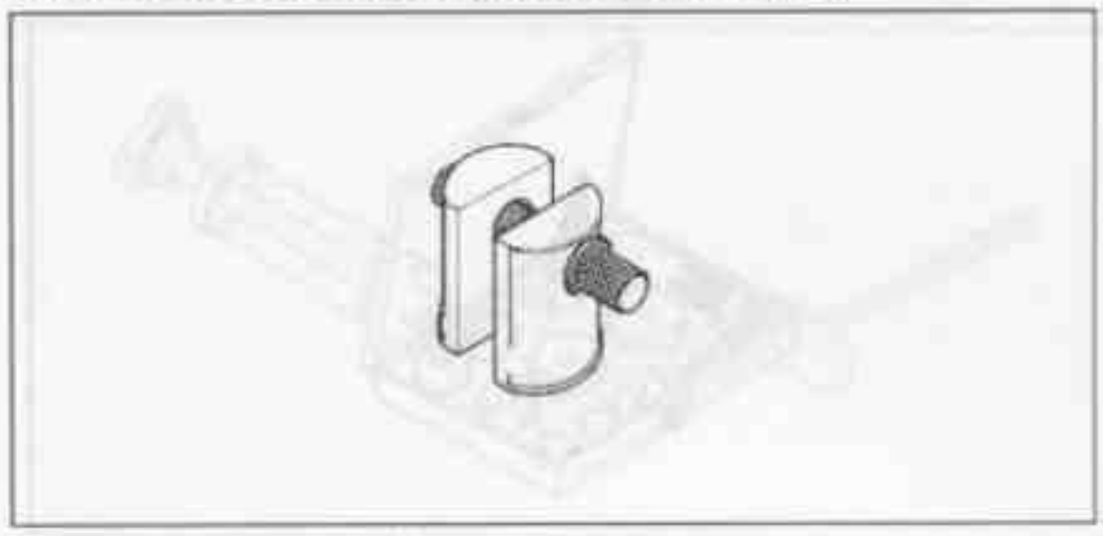
Steering Stem Nut Wrench : 57001–1100



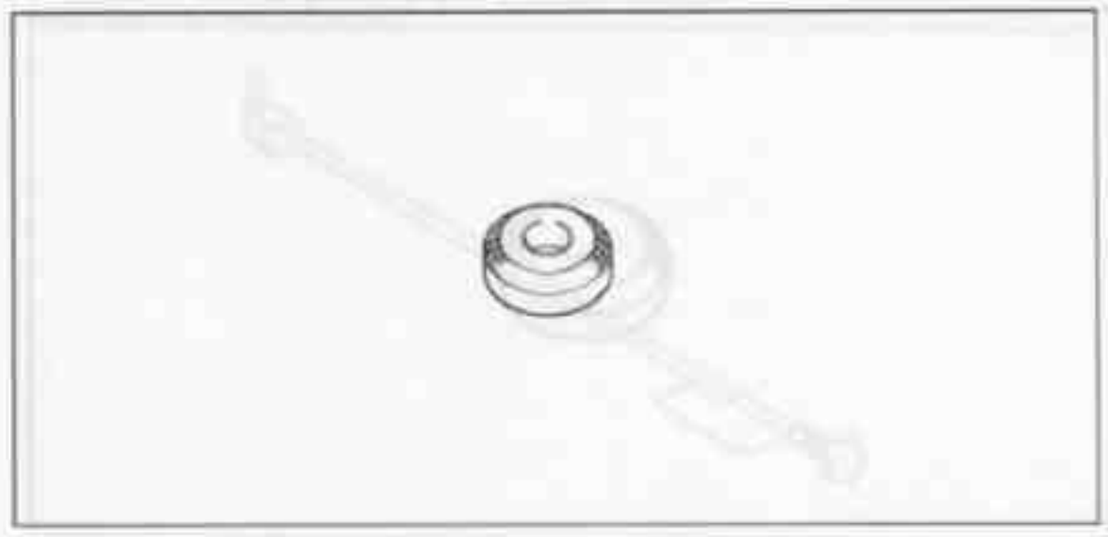
Head Pipe Outer Race Driver : 57001–1106



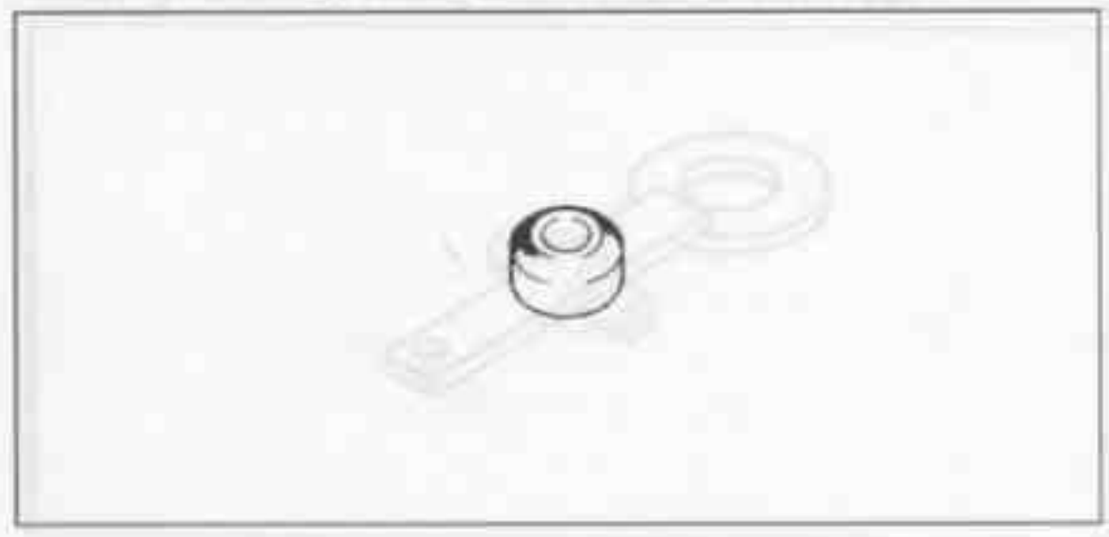
Head Pipe Outer Race Remover : 57001–1107



Valve Seat Cutter, 45° – ϕ32 : 57001–1115

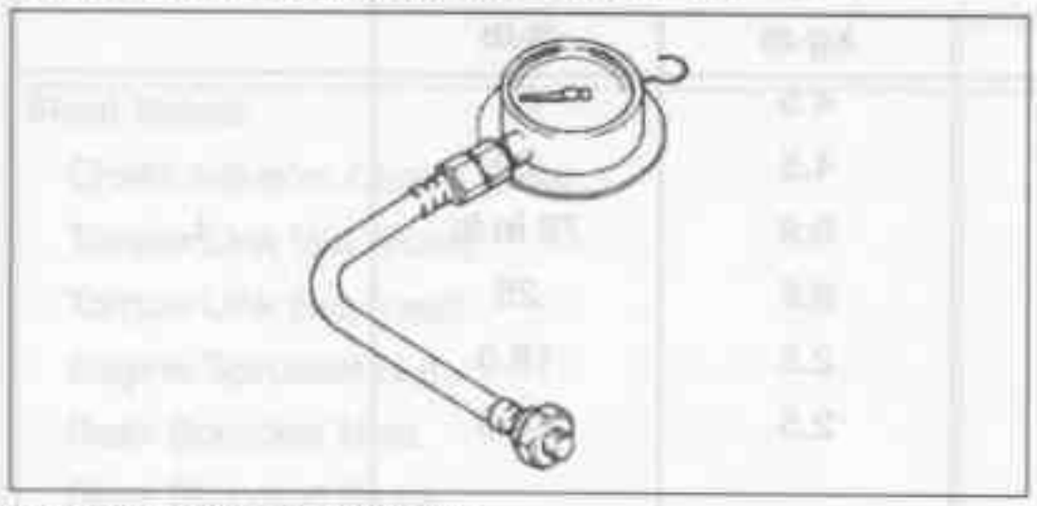


Valve Seat Cutter, 32° – ϕ28 : 57001–1119

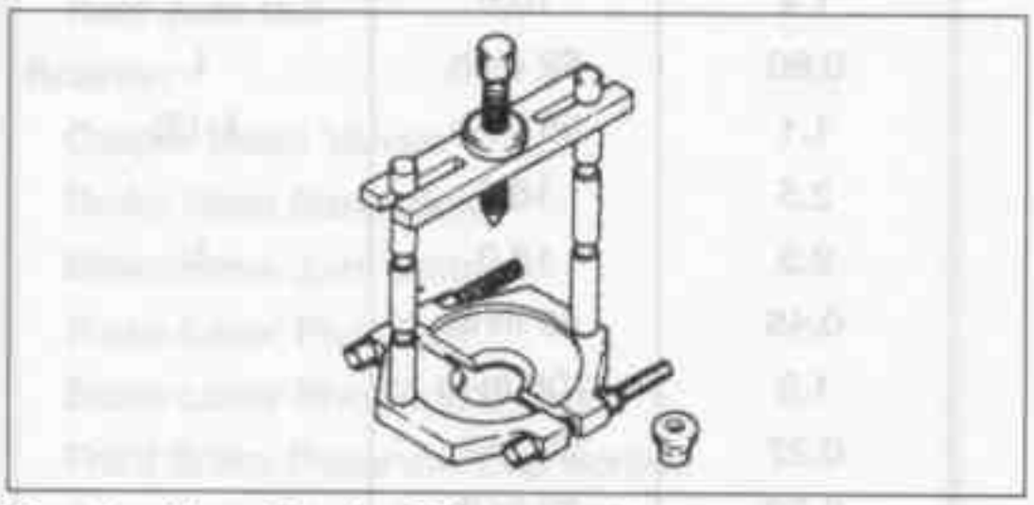


Special Tools and Sealant

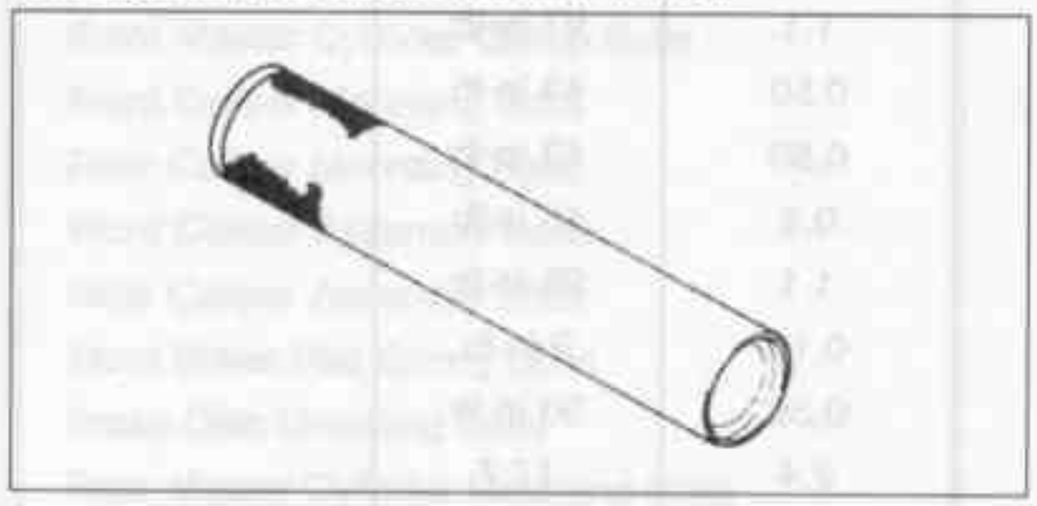
Oil Pressure Gauge, 5 kg/cm^2 : 57001–125



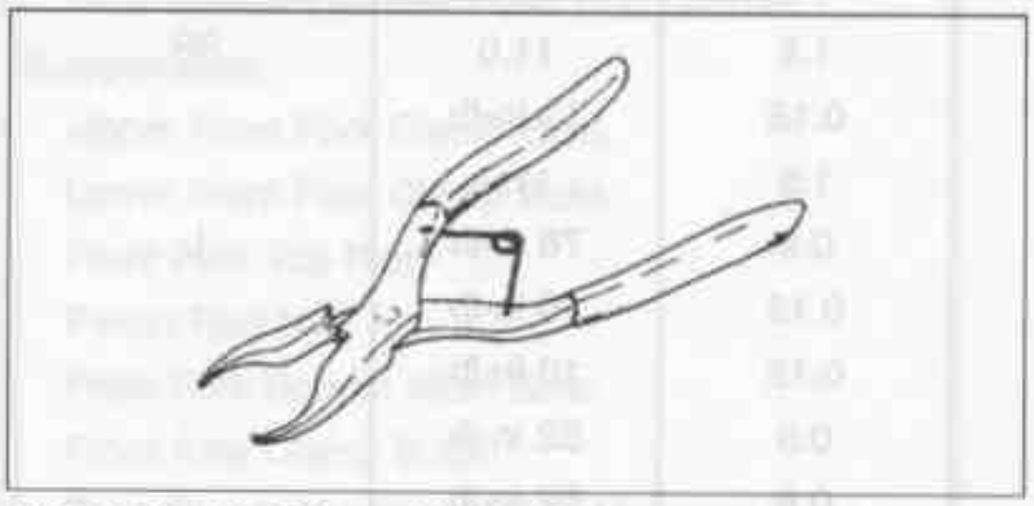
Bearing Puller : 57001–135



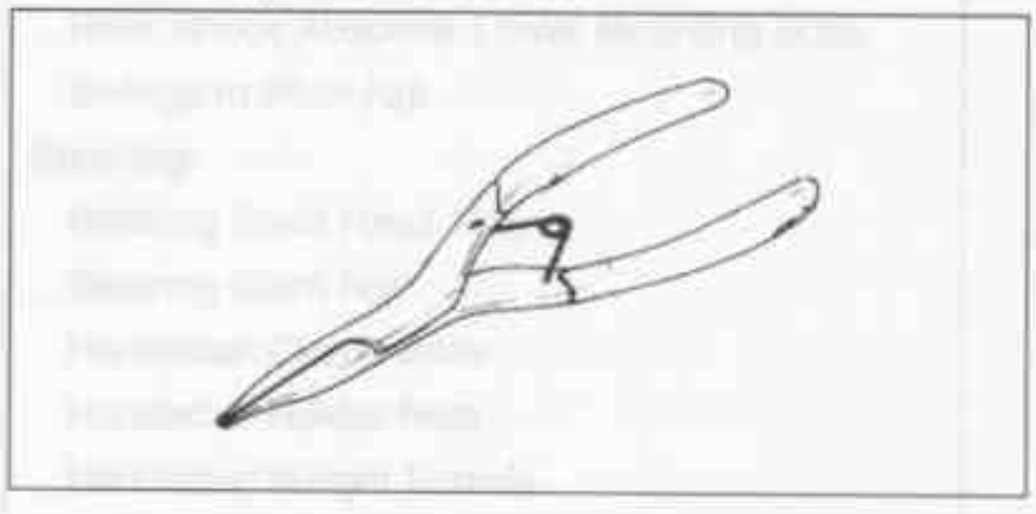
Steering Stem Bearing Driver : 57001–137



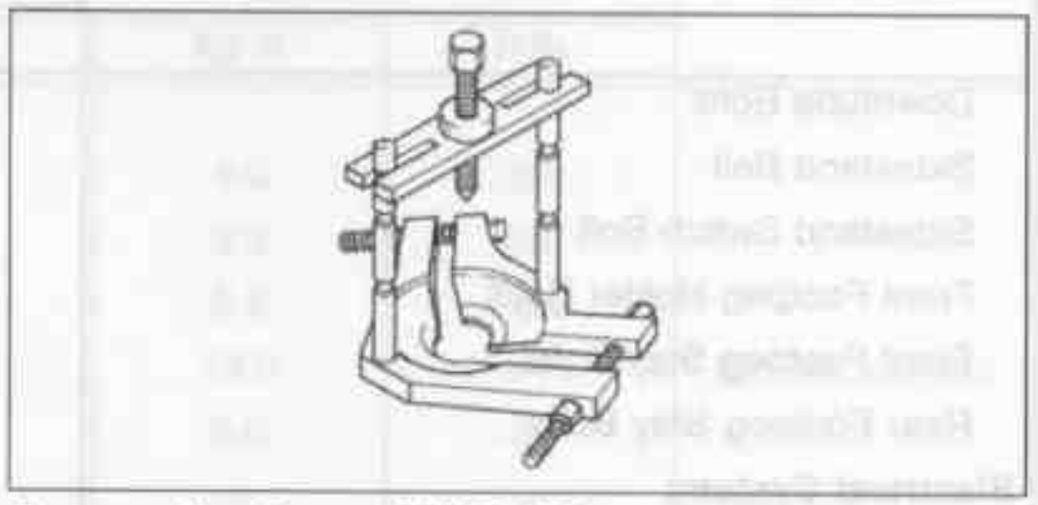
Inside Circlip Pliers : 57001–143



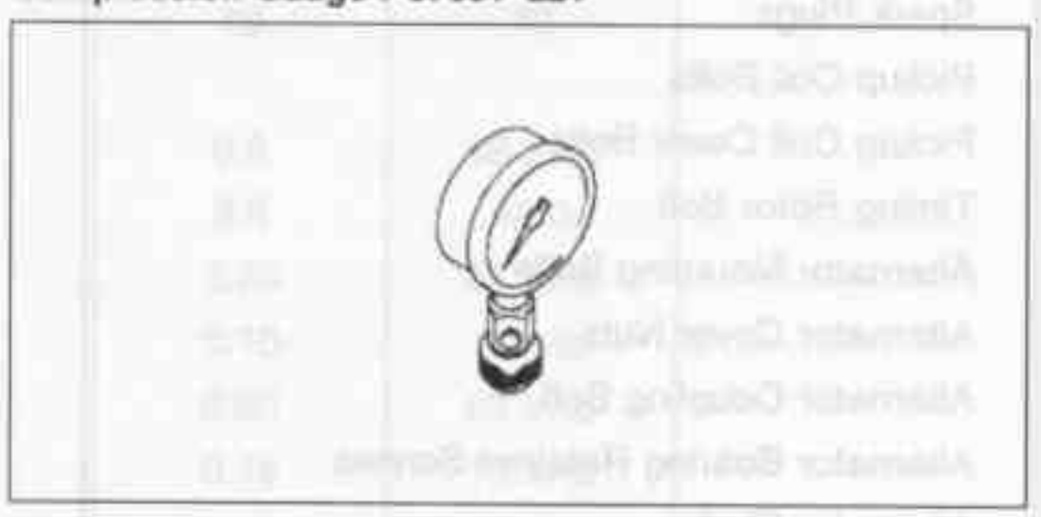
Outside Circlip Pliers : 57001–144



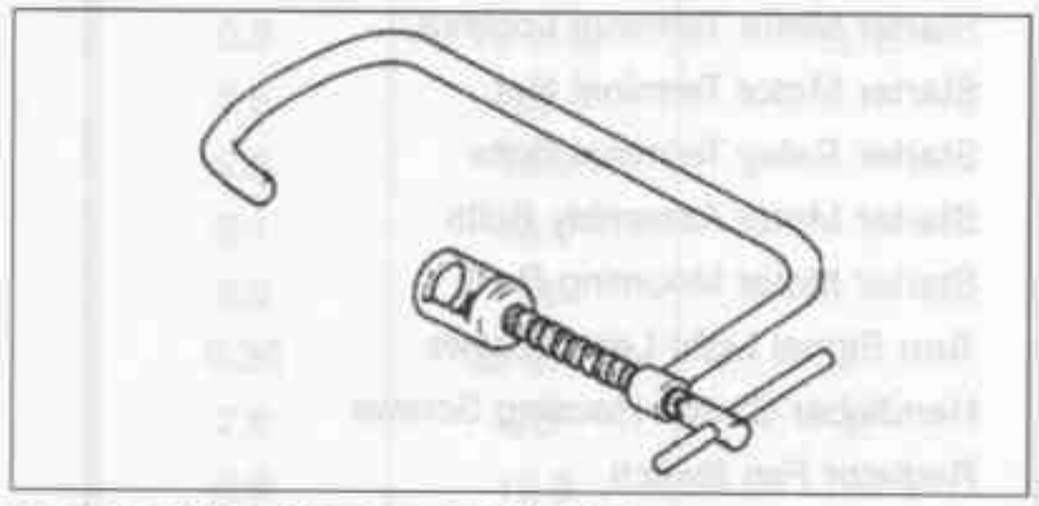
Bearing Puller : 57001–158



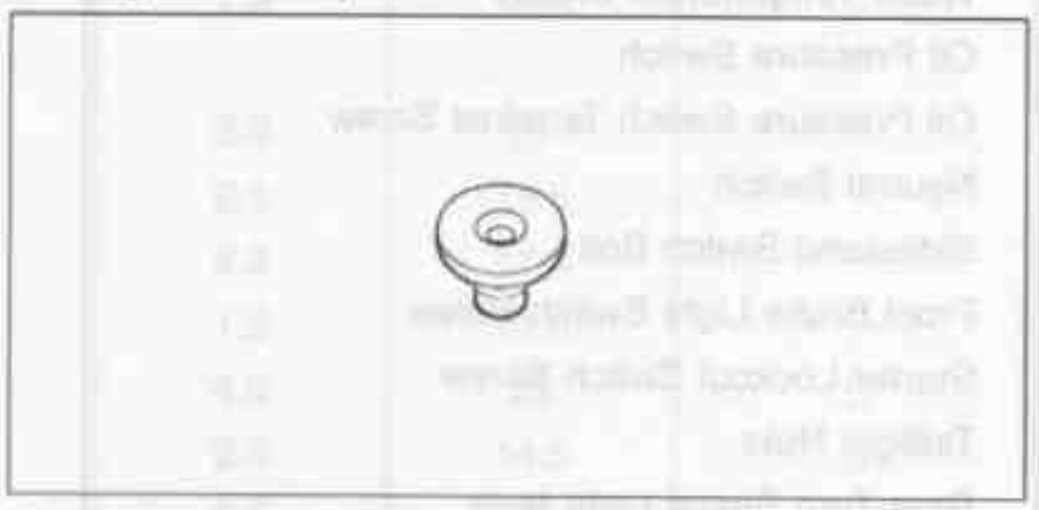
Compression Gauge : 57001–221



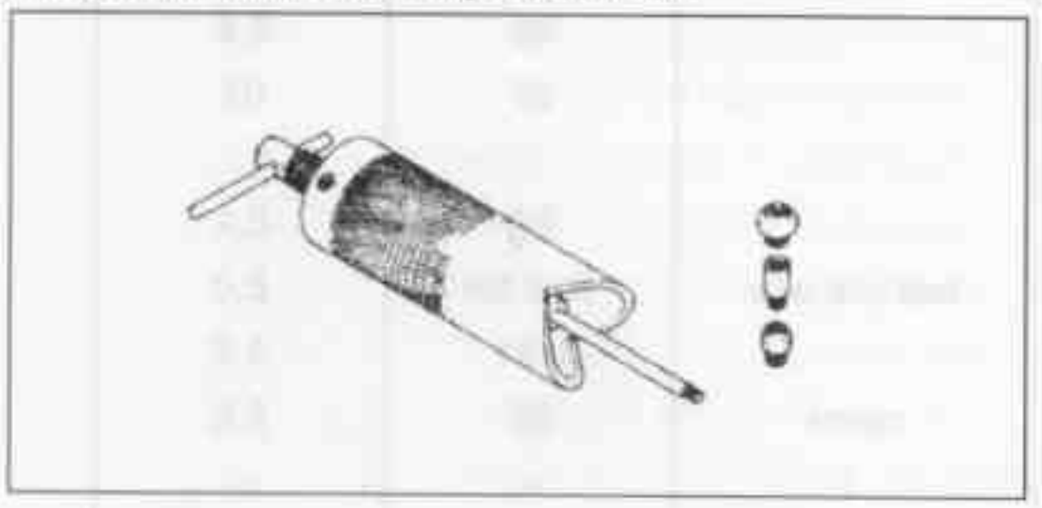
Valve Spring Compressor Assembly : 57001–241



Bearing Puller Adapter : 57001–317



Piston Pin Puller Assembly : 57001–910



Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kg·m	ft·lb	
Downtube Bolts	44	4.5	32	
Sidestand Bolt	44	4.5	32	
Sidestand Switch Bolt	8.8	0.9	78 in·lb	L
Front Footpeg Holder Bolts	34	3.5	25	
Front Footpeg Stay Bolts	25	2.5	18.0	
Rear Footpeg Stay Bolts	25	2.5	18.0	
Electrical System:				
Spark Plugs	14	1.4	10.0	
Pickup Coil Bolts	5.9	0.60	52 in·lb	L
Pickup Coil Cover Bolts	11	1.1	95 in·lb	L (2)
Timing Rotor Bolt	25	2.5	18.0	
Alternator Mounting Bolts	25	2.5	18.0	L
Alternator Cover Nuts	4.5	0.46	40 in·lb	
Alternator Coupling Bolt	12	1.2	106 in·lb	
Alternator Bearing Retainer Screws	2.6	0.27	23 in·lb	
Alternator Studs	8.8	0.90	78 in·lb	
Starter Motor Terminal Locknut	11	1.1	97 in·lb	
Starter Motor Terminal Nut	4.9	0.50	43 in·lb	
Starter Relay Terminal Bolts	4.9	0.50	43 in·lb	
Starter Motor Assembly Bolts	4.9	0.5	43 in·lb	
Starter Motor Mounting Bolts	11	1.1	95 in·lb	
Turn Signal Light Lens Screws	1.0	0.10	9 in·lb	
Handlebar Switch Housing Screws	3.4	0.35	30 in·lb	
Radiator Fan Switch	24	2.4	17.7	
Water Temperature Switch	7.8	0.8	69 in·lb	SS
Oil Pressure Switch	15	1.5	11.0	SS
Oil Pressure Switch Terminal Screw	1.5	0.15	13 in·lb	
Neutral Switch	15	1.5	11.0	
Sidestand Switch Bolt	8.8	0.9	78 in·lb	L
Front Brake Light Switch Screw	1.2	0.12	10 in·lb	
Starter Lockout Switch Screw	1.2	0.12	10 in·lb	
Taillight Nuts	5.9	0.6	52 in·lb	
Rear Turn Singal Light Nuts	5.9	0.6	52 in·lb	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kg·m	ft·lb	
Final Drive:				
Chain Adjuster Clamp Bolts	39	4.0	29	
Torque Link Nut (front)	34	3.5	25	
Torque Link Nut (rear)	25	2.5	18.0	
Engine Sprocket Nut	125	13.0	94	MO (th, se, ws)
Rear Sprocket Nuts	59	6.0	44	
Rear Sprocket Studs	–	–	–	L
Rear Axle Nut	98	10	72	
Brakes:				
Caliper Bleed Valves	7.8	0.8	69 in·lb	
Brake Hose Banjo Bolts	25	2.5	18.0	
Brake Hose Joint Bolts	6.9	0.70	61 in·lb	
Brake Lever Pivot Bolt	1.0	0.10	9 in·lb	
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Front Brake Reservoir Cap Screws	1.5	0.15	13 in·lb	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Front Master Cylinder Clamp Bolts	8.8	0.9	78 in·lb	G, S
Front Caliper Mounting Bolts	34	3.5	25	
Rear Caliper Mounting Bolts	25	2.5	18.0	
Front Caliper Assembly Bolts	21	2.1	15.0	
Rear Caliper Assembly Bolts	32	3.3	24	
Front Brake Pad Spring Bolts	2.9	0.30	26 in·lb	
Brake Disc Mounting Bolts	27	2.8	20	L
Rear Master Cylinder Mounting Bolts	25	2.5	18.0	
Rear Master Cylinder Push Rod Locknut	18	1.8	13.0	
Suspension:				
Upper Front Fork Clamp Bolts	29	3.0	21	
Lower Front Fork Clamp Bolts	21	2.1	15.5	
Front Fork Top Plug	23	2.3	17.0	
Piston Rod Nut	15	1.5	11.0	
Front Fork Bottom Allen Bolts	39	4.0	29	L
Front Axle Clamp Bolts	20	2.0	14.5	S
Rear Shock Absorber Upper Mounting Bolts	59	6.0	44	hook
Rear Shock Absorber Lower Mounting Bolts	34	3.5	25	
Swingarm Pivot Nut	98	10	72	
Steering:				
Steering Stem Head Nut	44	4.5	33	
Steering Stem Nut	4.9	0.5	43 in·lb	see the text
Handlebar Clamp Bolts	25	2.5	18.0	
Handlebar Holder Nuts	34	3.5	25	lower
Handlebar Weight Screws	–	–	–	L
Handlebar Switch Housing Screws	3.4	0.35	30 in·lb	
Upper Front Fork Clamp Bolts	34	3.5	25	
Lower Front Fork Clamp Bolts	21	2.1	15	
Frame:				
Windshield Screws	0.40	0.041	3.5 in·lb	

Torque and Locking Agent

Fastener		Torque			Remarks
		N·m	kg·m	ft·lb	
Main Oil Passage Plug		18	1.8	13.0	
Oil Pan Plug PT 1/8		15	1.5	11.0	L
Oil Screen Holder Screws		5.0	0.50	44 in·lb	
Oil Separator Screws		5.1	0.52	45 in·lb	
Crankcase Breather Cover Bolts		10	1.0	89 in·lb	
Engine Removal/Installation:					
Downtube Bolts		44	4.5	33	
Engine Mounting Bolts and Nuts		44	4.5	33	
Front Engine Bracket Bolts (left)		30	3.1	22	
Rear Bracket Bolts (lower)		17	1.7	13	
Crankshaft/Transmission:					
Lower Crankcase Plug	ϕ 25 mm	18	1.8	13.0	
Crankcase Bolts:	ϕ9 mm	32	3.3	24	S
	ϕ8 mm	27	2.8	20	S
	ϕ7 mm	18	1.8	13.0	S
	ϕ6 mm	15	1.5	11.0	S
Main Oil Passage Plug		18	1.8	13.0	
Connecting Rod Big End Nuts		in the text	←	←	MO (th, se)
Main Bearing Cap Bolts		32	3.3	24	
Balancer Shaft Lever Bolt		9.8	1.0	87 in·lb	L
Balancer Shaft Plate Bolt		9.8	1.0	87 in·lb	L
Balancer Shaft Clamp Bolt		9.8	1.0	87 in·lb	
Alternator Shaft Nut		59	6.0	43	
Alternator Shaft Bolt		25	2.5	18.0	
Alternator Chain Tensioner Bolt		9.8	1.0	87 in·lb	L
Alternator Chain Sprocket Bolt		25	2.5	18.0	
Alternator Chain Guide Bolt		9.8	1.0	87 in·lb	L
Starter Motor Clutch Bolts		12	1.2	106 in·lb	L
Timing Rotor Bolt		25	2.5	18.0	
External Shift Mechanism Cover Bolts		9.8	1.0	87 in·lb	L (4)
Shift Shaft Return Spring Pin (bolt)		30	3.1	22	L
Neutral Switch		15	1.5	11.0	
Shift Drum Bearing Holder Bolts		13	1.3	113 in·lb	L
Shift Drum Cam Screw		–	–	–	L
Bearing Holder Bolts		9.8	1.0	87 in·lb	
Transmission Oil Pipe Holder Bolt		9.8	1.0	87 in·lb	
Gear Set Lever Nuts		10	1.0	89 in·lb	
Crankcase Breather Cover Bolts		10	1.0	89 in·lb	
Oil Separator Screws		5.1	0.52	45 in·lb	
Oil Screen Holder Screws		5.0	0.51	44 in·lb	
Wheels/Tires:					
Front Axle Clamp Bolts		20	2.0	14.5	
Front Axle Nut		125	13	94	
Rear Axle Nut		98	10	72	
Disc Mounting Bolts		27	2.8	20	L

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kg·m	ft·lb	
Cylinder Water Pipe Mounting Bolts (front)	10	1.0	89 in·lb	L
Cylinder Water Pipe Mounting Bolts (rear)	10	1.0	89 in·lb	L (1, middle)
Water Hose Clamp Screws	2.5	0.25	22 in·lb	
Oil Hose Banjo Bolt	25	2.5	18.0	
Cylinder Head Bolts: ϕ11 mm	57	5.8	42	S, MO (ws, se)
ϕ10 mm	41	4.2	30	S, MO (ws, se)
ϕ6 mm	9.8	1.0	87 in·lb	S
Cylinder Bolts ϕ6 mm	15	1.5	11.0	S
Cylinder Coolant Drain Bolts	10	1.0	89 in·lb	
Rocker Shaft End Bolts	25	2.5	18.0	
Rear Camshaft Chain Guide Bolt	20	2.0	14.5	L
Camshaft Chain Plate Bolts	9.8	1.0	87 in·lb	lower, L
Carburetor Holder Bolts	12	1.2	106 in·lb	L
Muffler Clamp Bolt	34	3.5	25	
Muffler Body Clamp Bolt and Nut	34	3.5	25	
Muffler Body Mounting Nuts	25	2.5	18.0	
Clutch:				
Clutch Lever Pivot Bolt	1.0	0.10	9 in·lb	
Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Clutch Slave Cylinder Bleed Valve	7.8	0.80	69 in·lb	
Clutch Slave Cylinder Bolts	–	–	–	L (2)
Clutch Hose Banjo Bolt	25	2.5	18.0	
Clutch Pipe Banjo Bolt	25	2.5	18.0	
Clutch Reservoir Cap Screws	1.5	0.15	13 in·lb	
Clutch Master Cylinder Clamp Bolts	9.8	1.0	87 in·lb	S
Starter Locknout Switch Screw	1.0	0.10	9 in·lb	
Clutch Cover Bolts	9.8	1.0	87 in·lb	L (4)
Clutch Cover Damper Bolts	9.8	1.0	87 in·lb	L
Clutch Cover Oil Pipe Banjo Bolt	12	1.2	106 in·lb	
Clutch Cover Oil Pipe Mounting Screw	5.9	0.60	52 in·lb	
Clutch Spring Bolts	11	1.1	97 in·lb	
Clutch Hub Nut	135	13.8	100	R
Engine Lubrication System:				
Oil Filler Cap	1.5	0.15	13 in·lb	
Engine Drain Plug	20	2.0	14.5	
Oil Filter Bolt	20	2.0	14.5	EO
Oil Pan Bolts	15	1.5	11.0	L (6)
Oil Pressure Relief Valve	15	1.5	11.0	L
Oil Pressure Switch Terminal Screw	1.6	0.16	14 in·lb	
Oil Pressure Switch	15	1.5	11.0	SS
Oil Pump Mounting Bolts	12	1.2	106 in·lb	
Oil Pump Drive Gear Holder Screws	5.2	0.53	46 in·lb	L
Oil Pipe Banjo Bolts	25	2.5	18.0	L
Oil Hose Banjo Bolts ϕ12 mm	25	2.5	18.0	
Return Oil Pipe Banjo Bolts ϕ14 mm	34	3.5	25	Oil pan
Oil Pump Bracket Bolts	9.8	1.0	87 in·lb	

Torque and Locking Agent

The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent .

Letters used in the "Remarks" column mean:
EO: Apply engine oil to the threads.
G: Apply grease to the threads.
L: Apply a non-permanent locking agent to the threads.
Lh: Left-hand threads.
MO: Apply molybdenum disulfide oil. The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1).
R: Replacement parts
S: Tighten the fasteners following the specified sequence.
se: Seating Surface
SS: Apply silicone sealant.
th: Threads
ws: Washer

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.

Basic Torque for 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 ~ 23.0	125 ~ 165
20	225 ~ 325	23 ~ 33	165 ~ 240

Fastener	Torque			Remarks
	N·m	kg·m	ft·lb	
Fuel System:				
Fuel Tap Bolts	2.5	0.25	22 in·lb	
Fuel Tap Plate Screws	0.8	0.08	7 in·lb	
Fuel Tap Diaphragm Cover Screws	1.0	0.10	9 in·lb	
Fuel Tap Knob Screw	1.5	0.15	13 in·lb	
Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	
Carburetor Holder Bolts	12	1.2	106 in·lb	L
Cooling System:				
Water Hose Clamp Screws	2.5	0.25	22 in·lb	
Water Pipe Mounting Bolts	9.8	1.0	87 in·lb	L(1)
Water Pump Air Bleeder Bolt	9.8	1.0	87 in·lb	
Thermostat Housing Air Bleeder Bolt	7.8	0.80	69 in·lb	
Coolant Drain Plug (water pipe)	7.8	0.80	69 in·lb	
Radiator Fan Switch	24	2.4	17.7	
Water Temperature Switch	7.8	0.80	69 in·lb	SS
Water Pump Outlet Pipe Flange Bolt	9.8	1.0	87 in·lb	
Water Pump Inlet Pipe Bolt	9.8	1.0	87 in·lb	L
Water Pump Mounting Bolts	9.8	1.0	87 in·lb	
Water Pump Cover Bolts	9.8	1.0	87 in·lb	
Engine Top End:				
Spark Plugs	14	1.4	10.0	
Air Suction Valve Cover Bolts	10	1.0	89 in·lb	
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	
Pickup Coil Cover Bolts	10	1.0	89 in·lb	L(2)
Chain Tensioner Mountring Bolts	10	1.0	89 in·lb	L
Chain Tensioner Cap	20	2.0	14.5	
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Camshaft Bracket Bolts	12	1.2	106 in·lb	S
Camshaft Sprocket Bolts	15	1.5	11.0	L
Upper Chain Guide Bolts	12	1.2	106 in·lb	L

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.**

FREQUENCY	Whichever comes first → ↓	* ODOMETER READING: 1 000 km (600 mile)	6 000 km (4 000 mile)	12 000 km (7 500 mile)	18 000 km (12 000 mile)	24 000 km (15 000 mile)	30 000 km (20 000 mile)	36 000 km (24000 mile)
OPERATION	Every							
Spark plug - clean and gap †			●	●	●	●	●	●
Valve clearance - check †				●		●		●
Air suction valve - check †			●	●	●	●	●	●
Air cleaner element - clean†#				●		●		●
Throttle grip play - check †		●		●		●		●
Idle speed - check †		●		●		●		●
Carburetor synchronization - check †				●		●		●
Fuel hoses, connections - check †			●	●	●	●	●	●
Engine oil - change #	6 months	●	●	●	●	●	●	●
Oil filter - replace		●		●		●		●
Evaporative emission control system (CA) - check		●	●	●	●	●	●	●
Drive chain wear - check † #			●	●	●	●	●	●
Brake pad wear - check † #			●	●	●	●	●	●
Brake light switch - check †		●	●	●	●	●	●	●
Steering - check †		●	●	●	●	●	●	●
Front fork oil - change	2 years					●		
Rear shock absorber oil leak - check †				●		●		●
Front fork oil leak - check †				●		●		●
Tire wear - check †			●	●	●	●	●	●
Swingarm pivot - lubricate				●		●		●
General lubrication - perform				●		●		●
Nut, bolt, and fastener tightness - check †		●		●		●		●
Drive chain - lubricate #	600 km		●	●	●	●	●	●
Drive chain slack - check † #	1000 km	●	●	●	●	●	●	●
Brake/clutch hoses, connections - check †			●	●	●	●	●	●
Brake/clutch fluid level - check †	month	●	●	●	●	●	●	●
Radiator hoses, connections - check †		●						
Brake/clutch fluid - change	2 years					●		
Brake/clutch master cylinder cup and dust seal - replace	4 years							
Coolant - change	2 years					●		
Caliper piston seal and dust seal - replace	4 years							
Steering stem bearing - lubricate	2 years					●		
Clutch slave cylinder piston seal - replace	4 years							
Coolant filter (except for CA, CN, US) - clean	year							

: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed or frequent starting / stopping.

* : For higher odometer readings, repeat at the frequency interval established here.

† : Replace, add, adjust, clean, or torque if necessary.

(CA): California Model (US): United States Model

(CN): Canadian Model

General Specifications

Items		ZR1200-A1/B1/C1
Clutch type		Wet multi disc
Transmission:		
Type		5-speed, constant mesh, return shift
Gear ratios:		
	1st	2.733 (41/15)
	2nd	1.947 (37/19)
	3rd	1.478 (34/23)
	4th	1.192 (31/26)
	5th	1.035 (29/28)
Final drive system:		
Type		Chain drive
Reduction ratio		2.470 (42/17)
Overall drive ratio		4.191 @Top gear
Frame:		
Type		Tubular, double cradle
Caster (rake angle)		25°
Trail		106 mm (4.17 in)
Front tire:	Type	Tubeless
	Size	120/70 ZR17 (58W)
Rear tire:	Type	Tubeless
	Size	180/55 ZR17 (73W)
Front suspension:		
	Type	Telescopic fork
	Wheel travel	120 mm (4.72 in)
Rear suspension:		
	Type	Swingarm
	Wheel travel	123 mm (4.84 in)
Brake Type:	Front	Dual discs
	Rear	Single disc
Electrical Equipment:		
Battery		12 V 14 Ah (MF battery)
Headlight:	Type	Semi-sealed beam
	Bulb	12 V 60/55 W (quartz-halogen), (B1) 12 V 60/55 W × 2
Tail/brake light		12 V 5/21 W × 2
Alternator:	Type	Three-phase AC
	Rated output	28.6 A/ 14 V @6 000 r/min (rpm)

Specifications are subject to change without notice, and may not apply to every country.
CA: California Model
CN: Canadian Model
MY: Malaysian Model
US: United States of America Model
PR: WVTA Approval Model with pipe catalytic converter (restricted model)

General Specifications

Items		ZR1200-A1/B1/C1
Dimensions:		
Overall length		2120 mm (83.5 in)
Overall width		780 mm (30.7 in)
Overall height		1150 mm (45.3 in), (B1) 1230 mm (48.4 in), (C1) 1095 mm (43.1 in)
Wheelbase		1465 mm (57.7 in)
Road clearance		135 mm (5.31 in)
Seat height		790 mm (31.1 in)
Dry mass		(A1) 223 kg (492 lb), (B1) 227 kg (501 lb), (C1) 222 kg (490 lb)
Curb mass:	Front	122 kg (269 lb), (B1) 126 kg (278 lb), (C1) 121 kg (267 lb)
	Rear	124 kg (273 lb)
Fuel tank capacity		19.0 L (5.02 US gal)
Performance:		
Minimum turning radius		2.7 m (8.9 ft)
Engine:		
Type		4-stroke, DOHC, 4-cylinder, 4 valves per cylinder
Cooling system		Liquid-cooled
Bore and stroke		79.0 x 59.4 mm (3.11 x 2.34 in)
Displacement		1164 mL (71.03 cu in)
Compression ratio		10.1 : 1
Maximum horsepower		90 kW (122 PS) @8 500 r/min (rpm), (PR) 78.2 kW (106.3 PS) @8 000 r/min (rpm), (MY) 92 kW (125 PS) @8 500 r/min (rpm) (CN)(US) - - -
Maximum torque		112 N·m (11.4 kg·m, 82.6 ft·lb) @7 000 r/min (rpm), (PR) 104 N·m (10.6 kg·m, 76.7 ft·lb) @6 000 r/min (rpm), (MY) 114 N·m (11.6 kg·m, 84 ft·lb) @7 000 r/min (rpm), (CN)(US) - - -
Carburetion system		Carburetors, Keihin CVK 36 × 4
Starting system		Electric starter
Ignition system		Battery and coil (transistorized)
Timing advance		Electronically advanced (digital)
Ignition timing		From 10° BTDC @1 100 r/min (rpm) and (CA) 1 200 r/min (rpm) to 32.5° BTDC @4 600 r/min (rpm),
Spark plug		NGK CR 9EK or ND U27ETR
Cylinder numbering method		Left to right, 1-2-3-4
Firing order		1-2-4-3
Valve timing:		
Inlet	Open	35° BTDC
	Close	55° ABDC
	Duration	270°
Exhaust	Open	45° BBDC
	Close	25° ATDC
	Duration	250°
Lubrication system		Forced lubrication (wet sump)
Engine oil:		
Grade		API SE, SF or SG or API SH or SJ with JASO MA
Viscosity		SAE10W-40, 10W-50, 20W-40 or 20W-50
Capacity		3.5 L (3.7 US qt.)
Drive Train:		
Primary reduction system:		
Type		Gear
Reduction ratio		1.637 (95/58)

Model Identification

ZR1200–C1 (Europe) Left Side View:



ZR1200–C1 (Europe) Right Side View:



Model Identification

ZR1200–B1 (Europe) Left Side View:



ZR1200–B1 (Europe) Right Side View:



Model Identification

ZR1200–A1 (Europe) Left Side View:



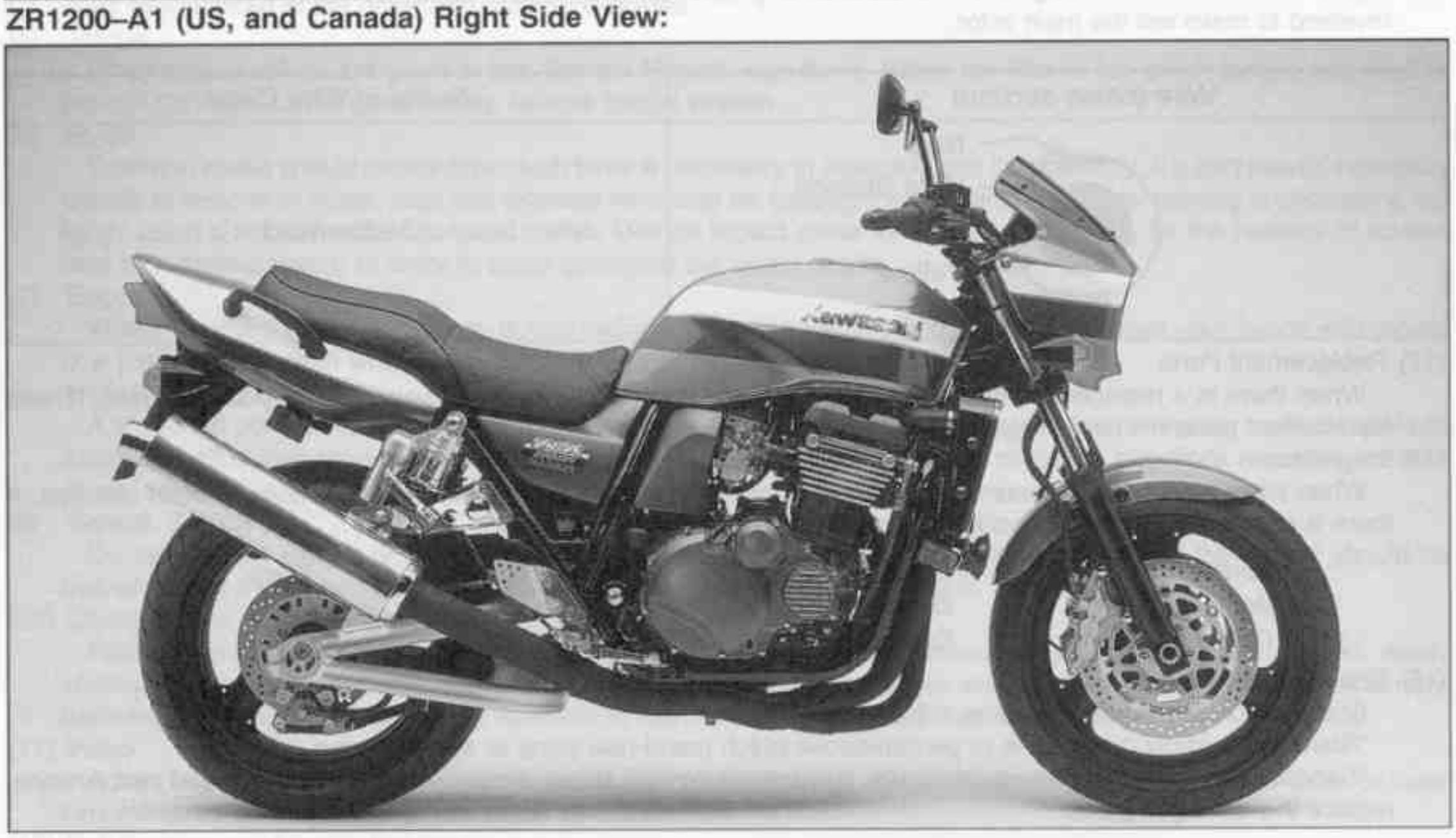
ZR1200–A1 (Europe) Right Side View:

Model Identification

ZR1200–A1 (US, and Canada) Left Side View:



ZR1200–A1 (US, and Canada) Right Side View:



LIST OF ABBREVIATIONS

A	ampere(s)	lb	pound(s)
ABDC	after bottom dead center	m	meter(s)
AC	alternating current	min	minute(s)
ATDC	after top dead center	N	newton(s)
BBDC	before bottom dead center	Pa	pascal(s)
BDC	bottom dead center	PS	horsepower
BTDC	before top dead center	psi	pound(s) per square inch
°C	degree(s) Celsius	r	revolution
DC	direct current	r/min, rpm	revolution(s) per minute
F	farad(s)	TDC	top dead center
°F	degree(s) Fahrenheit	TIR	total indicator reading
ft	foot, feet	V	volt(s)
g	gram(s)	W	watt(s)
h	hour(s)	Ω	ohm(s)
L	liter(s)		

Motorcycle
Service Manual

Read OWNER'S MANUAL before operating.

1-2 GENERAL INFORMATION

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 Leads

Disconnect the ground (-) lead from the battery before performing any disassembly operations on the motorcycle. This prevents the engine from accidentally turning over while work is being carried out, sparks from being generated while disconnecting the wires from electrical parts, as well as damage to the electrical parts themselves. For reinstallation, first connect the positive lead to the positive lead to the positive (+) terminal of the battery.

(3) Installation, Assembly

Generally, installation or assembly is the reverse of removal or disassembly. But if this Service Manual has installation or assembly procedures, follow them. Note parts locations and cable, wire, and hose routing during removal or disassembly so they can be installed or assembled in the same way. It is preferable to mark and record the locations and routing as much as possible.

(4) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them 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 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.

(5) Torque

When torque values are given in this Service Manual, use them. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(6) 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.

(7) 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.

(8) 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.

(9) 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.

(10) Liquid Gasket, Non-Permanent 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).

(11) 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.

(12) Ball Bearing and Needle Bearing

Do not remove a ball bearing or a needle bearing unless it is absolutely necessary. Replace any ball or needle bearings that were removed with new ones, as removal generally damages bearings. Install bearings with the marked side facing out applying pressure evenly with a suitable driver. Only press on the race that forms the press fit with the base component to avoid damaging the bearings. This prevents severe stress on the balls or needles and races, and prevent races and balls or needles from being dented. Press a ball bearing until it stops at the stopper in the hole or on the shaft.

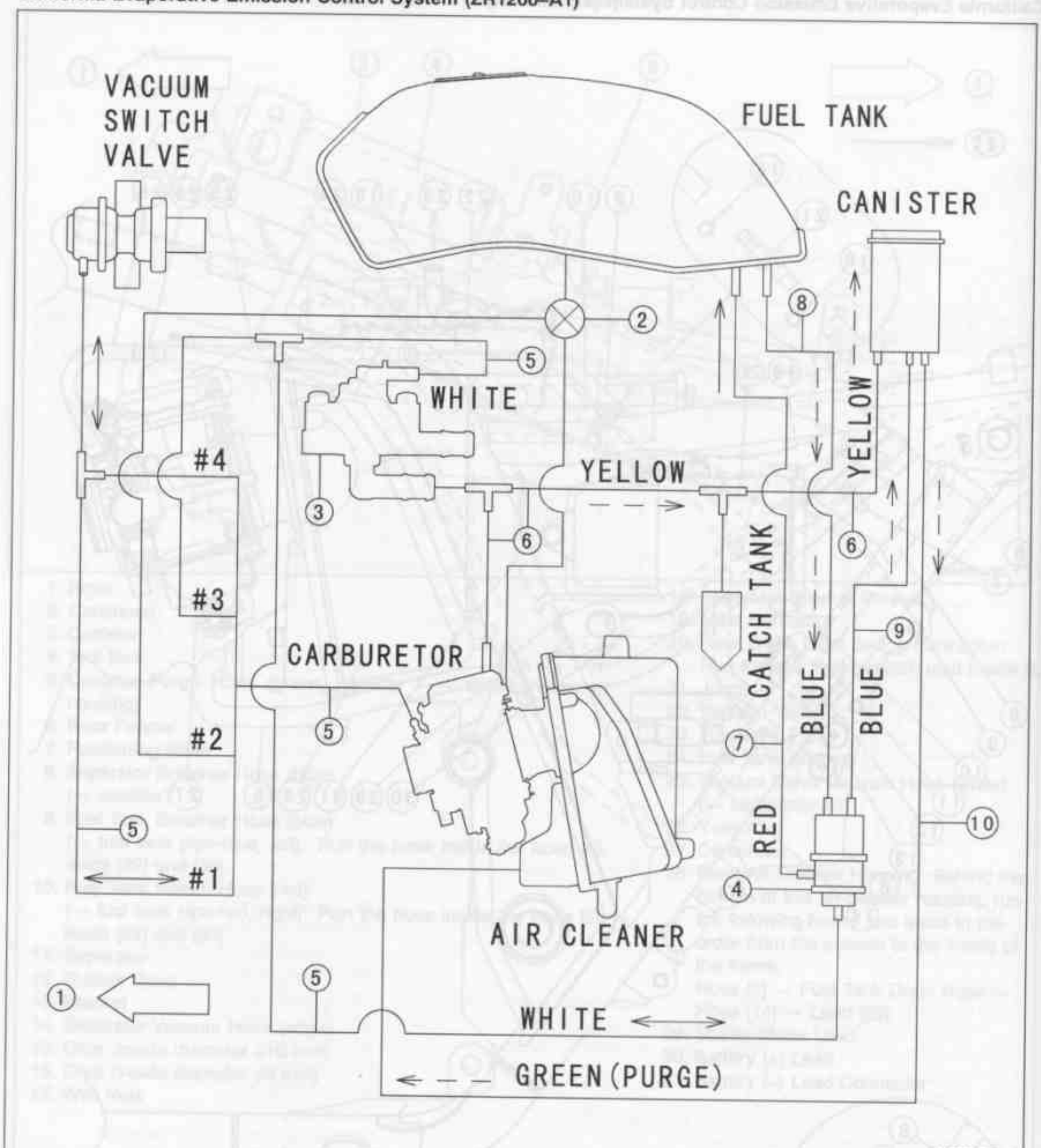
General Information

Table of Contents

Before Servicing 1-2
Model Identification 1-4
General Specifications 1-8
Periodic Maintenance Chart 1-10
Torque and Locking Agent 1-11
Special Tools and Sealant 1-16
Cable, Wire, and Hose Routing 1-22

Cable, Wire, and Hose Routing

California Evaporative Emission Control System (ZR1200–A1)



–––>: Vapor Flow
——→: Fuel Flow
←——→: Vacuum Pulsation Flow

1. Front
2. Fuel Tap
3. Vacuum Valve
4. Separator
5. Vacuum Hoses (white)
6. Carburetor Vent Hoses (yellow)
7. Fuel Tank Return Hose (red, right)
8. Fuel Tank Breather Hose (blue, left)
9. Breather Hose
10. Purge Hose

Fuel System

Table of Contents

Exploded View....2-2
Specifications....2-5
Throttle Grip and Cables....2-7
Throttle Grip Free Play Inspection....2-7
Throttle Grip Free Play Adjustment....2-7
Choke Lever Free Play Inspection....2-7
Choke Lever Free Play Adjustment....2-8
Cable Removal/Installation....2-8
Cable Lubrication and Inspection....2-8
Carburetors....2-9
Idle Speed Inspection....2-9
Idle Speed Adjustment....2-9
High Altitude Performance Adjustment....2-9
Synchronization Inspection....2-9
Synchronization Adjustment....2-10
Service Fuel Level Inspection....2-10
Service Fuel Level Adjustment....2-11
Fuel System Cleanliness Inspection....2-12
Pilot Screw Setting....2-12
Coasting Enricher Removal/Installation....2-13
Carburetor Removal....2-13
Caburetor Installation....2-15
Carburetor Disassembly/Assembly....2-16
Carburetor Separation....2-18
Carburetor Joining....2-18
Carburetor Cleaning....2-19
Carburetor Inspection....2-19
Coolant Filter Installation....2-20
Coolant Filter Cleaning....2-20
Coolant Valve Inspection....2-21
Air Cleaner....2-22
Element Removal....2-22
Element Installation....2-22
Element Cleaning and Inspection....2-22
Air Cleaner Draining....2-23
Front Air Cleaner Housing Removal....2-23
Front Air Cleaner Housing Installation....2-24
Rear Air Cleaner Housing Removal....2-24
Rear Air Cleaner Housing Installation....2-25
Fuel Tank....2-26
Fuel Tank Removal....2-26
Fuel Tank Installation....2-26
Fuel Tank Inspection....2-26
Fuel Tank Cleaning....2-27
Fuel Tap Removal....2-27
Fuel Tap Installation....2-27
Fuel Tap Inspection....2-27
Evaporative Emission Control System (CA)....2-28
Parts Removal/Installation....2-28
Hose Inspection (Periodic Inspection)....2-28
Carburetor Vent Hose Draining....2-28
Separator Inspection (Periodic Inspection)....2-29
Separator Operation Test....2-29
Canister Inspection (Periodic Inspection)....2-29
Vacuum Valve Inspection....2-29

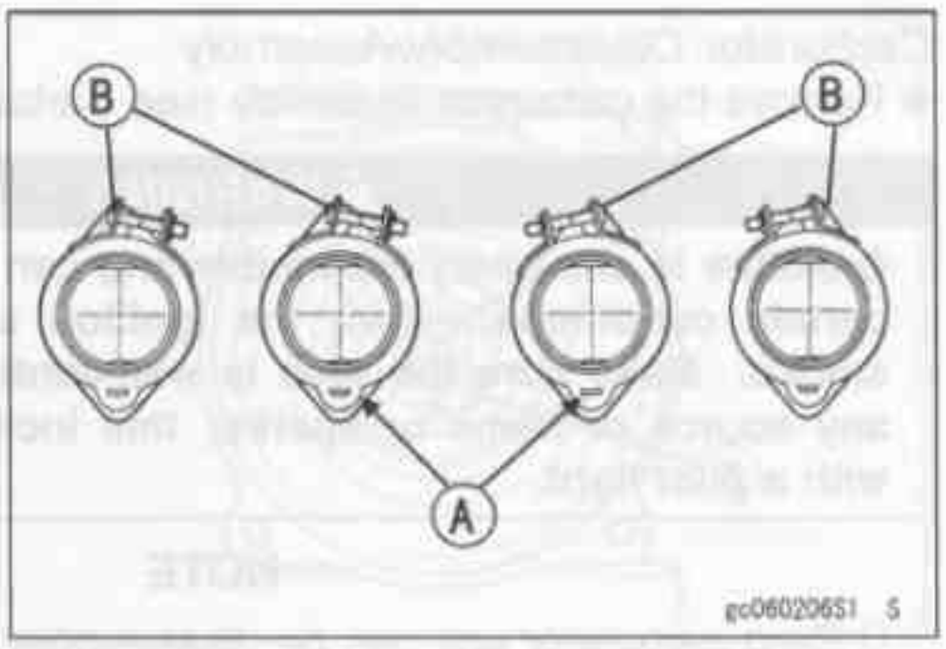
Carburetors

Caburetor Installation

- Fit the clamp nails into the slits [A] of the carburetor clamps with each screw head [B] outside and declined as shown.

Non-permanent Locking Agent - Carburetor Holder Bolts

Torque - Carburetor Holder Bolts: 12 N·m (1.2 kg·m, 106 in·lb)

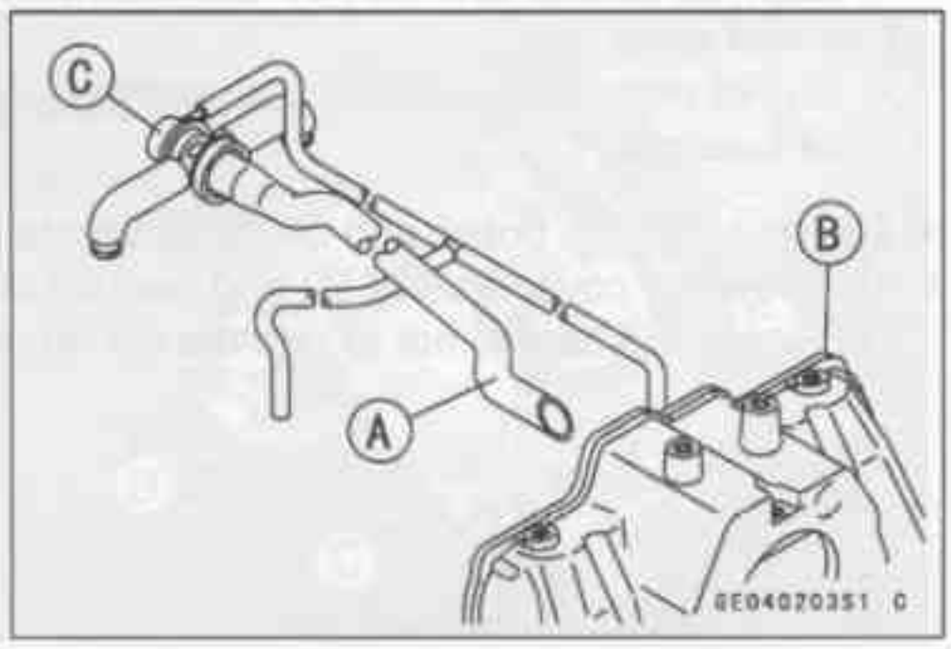


⚠ WARNING

Be sure to install the holder clamp screws in the direction shown. Or, the screws could come in contact with the throttle linkage resulting in unsafe riding condition.

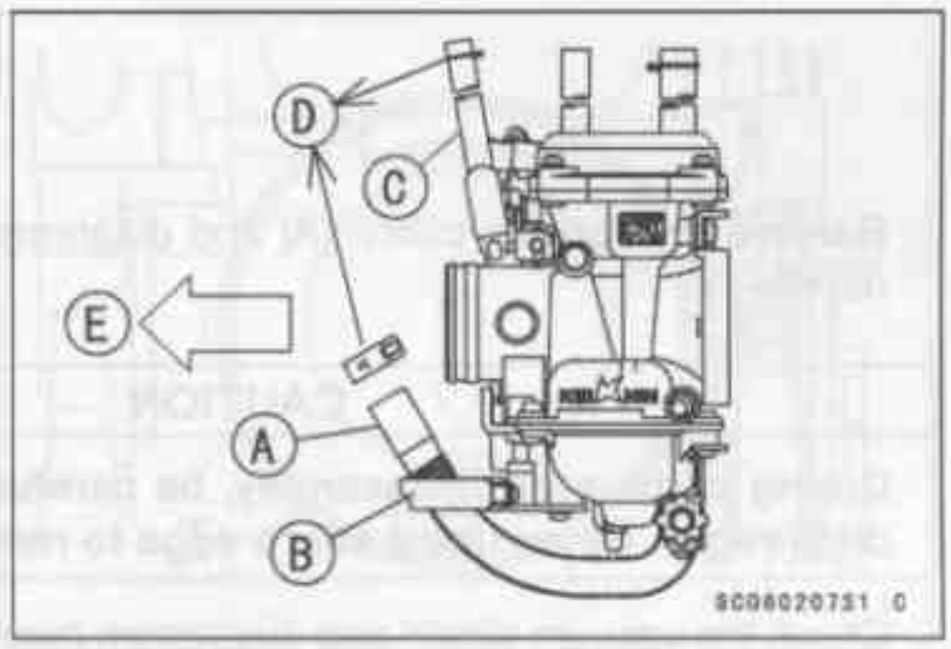
- Run the carburetor vent hose and fuel hose as shown in the Cable, Wire, and Hose Routing section of the General Information chapter.
- Check that the vacuum switch valve hose [A] is fitted into the front air cleaner housing [B].

Vacuum Switch Valve [C]



- Run the fuel hose [A] under the carburetor assembly and inside the coolant hose [B] as shown.
- Install the carburetor assembly from the vehicle right side.
- Connect the vacuum hose [C] and then the fuel hose to the fuel tap [D].

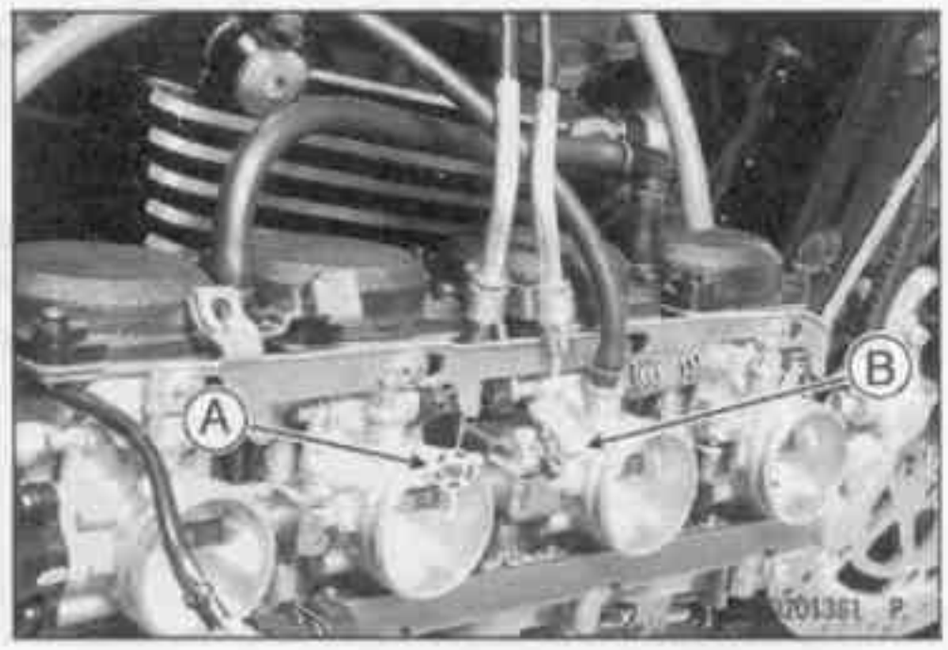
Front [E]



- Fit the accelerator cable end [A] and the decelerator cable end [B] into the throttle pulley (front view of the carburetor).
- Check fuel leakage from the carburetors.

⚠ WARNING

Fuel spilled from the carburetors is hazardous.

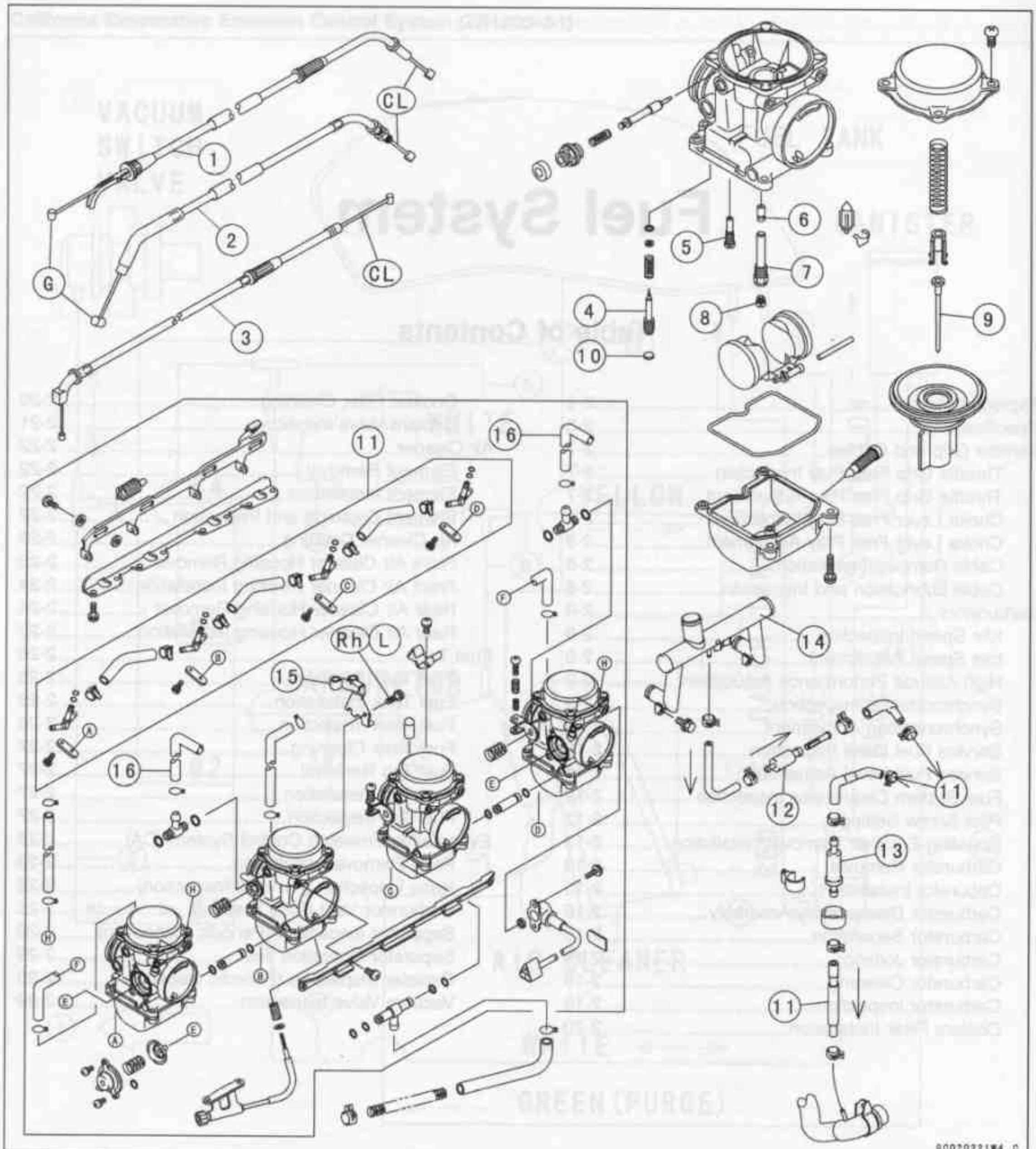


- Check the following items and adjust them if necessary.

Throttle Cables
Choke Cable
Idle Speed
Carburetor Synchronization

2-2 FUEL SYSTEM

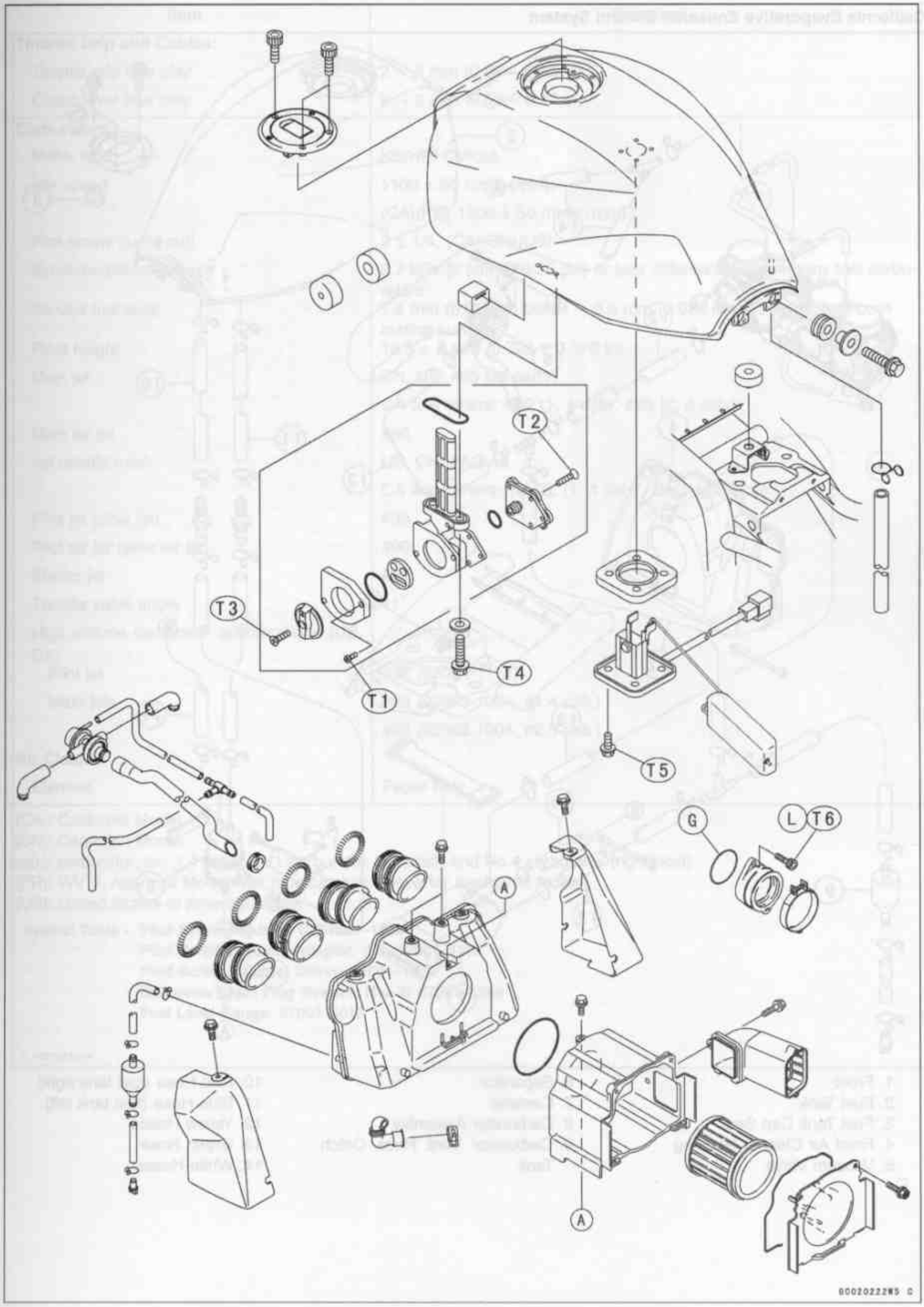
Exploded View



1. Throttle Cable (accelerator)
2. Throttle Cable (decelerator)
3. Choke Cable
4. Pilot Screw
5. Pilot (Slow) Jet
6. Needle Jet
7. Needle Jet Holder
8. Main Jet
9. Jet Needle
10. Plug (CA)
11. Carburetor Coolant Hoses (except CA, CN, US)
12. Coolant Filter (except CA, CN, US)
13. Coolant Valve (except CA, CN, US)
14. Water Pipe on the cylinder head back
15. Throttle Cable Holder: Do not remove the holder just for carburetor disassembly.
16. Carburetor Vent Hoses

CA: California Model
CN: Canadian Model
US: United States Model
G: Apply grease
CL: Apply cable lubricant
L: Apply a non-permanent locking agent.
Rh: Right-hand Threads
T1: 0.8 N·m (0.08 kg·m, 7 in·lb)
T2: 1.0 N·m (0.10 kg·m, 9 in·lb)
T3: 1.5 N·m (0.15 kg·m, 13 in·lb)
T4: 2.5 N·m (0.25 kg·m, 22 in·lb)
T5: 6.9 N·m (0.70 kg·m, 61 in·lb)
T6: 12 N·m (1.2 kg·m, 106 in·lb)

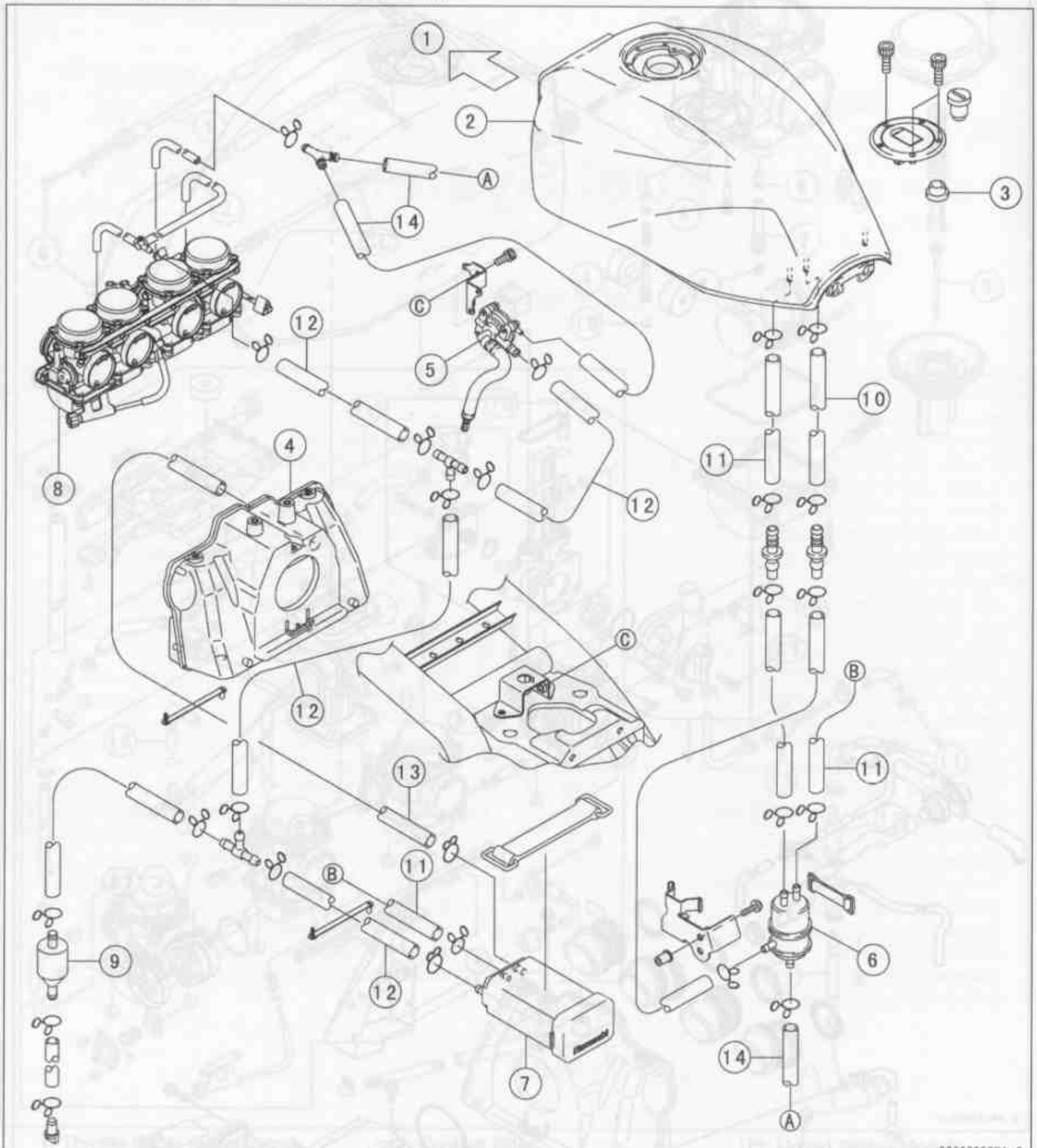
Exploded View



2-4 FUEL SYSTEM

Exploded View

California Evaporative Emission Control System



1. Front
2. Fuel Tank
3. Fuel Tank Cap Seal
4. Front Air Cleaner Housing
5. Vacuum Valve
6. Separator
7. Canister
8. Carburetor Assembly
9. Carburetor Vent Hose Catch Tank
10. Red Hose (fuel tank right)
11. Blue Hose (fuel tank left)
12. Yellow Hoses
13. Green Hose
14. White Hoses

Specifications

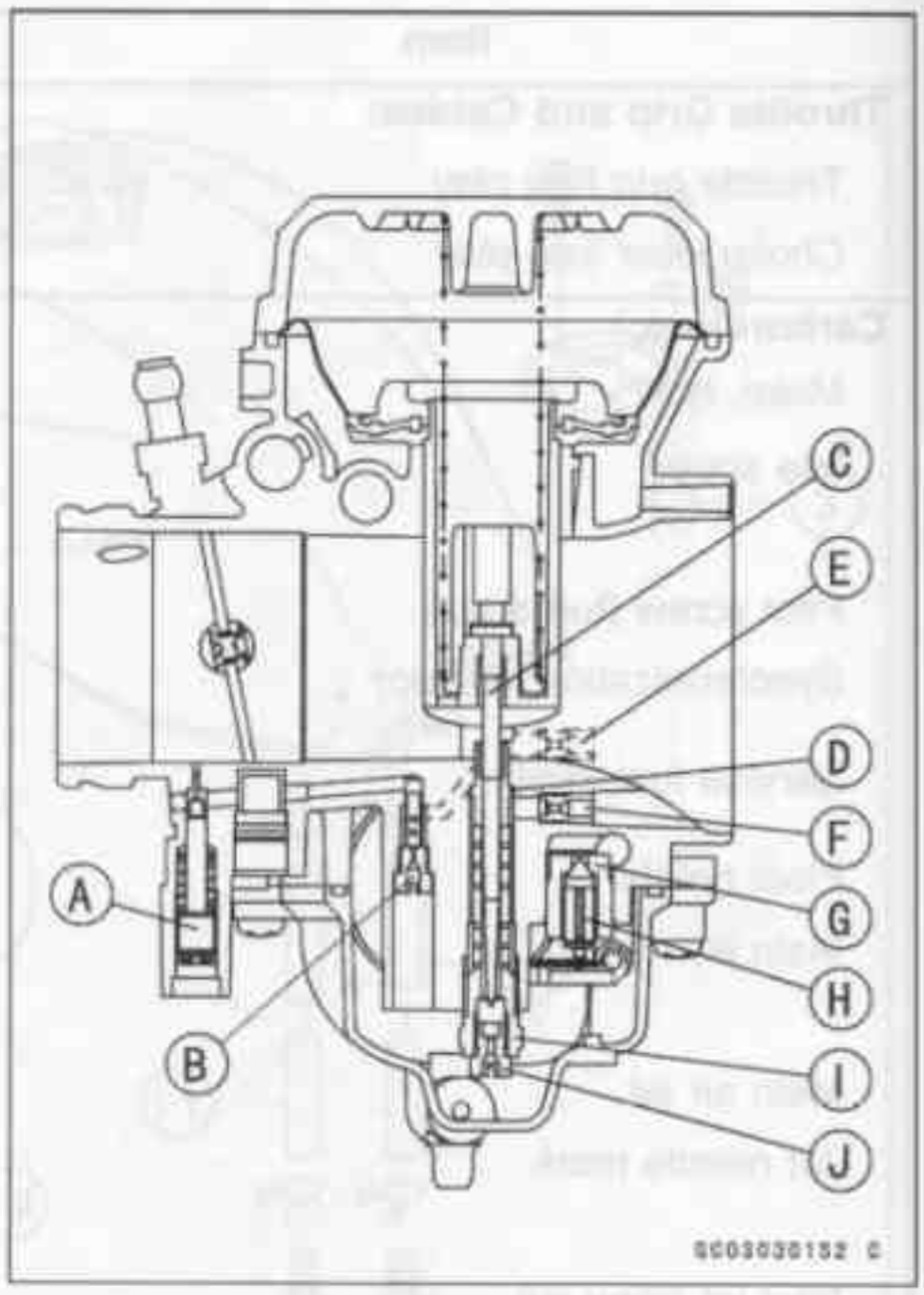
Item	Standard
Throttle Grip and Cables:	
Throttle grip free play	2 ~ 3 mm (0.08 ~ 0.12 in)
Choke lever free play	2 ~ 3 mm (0.08 ~ 0.12 in)
Carburetors:	
Make, type	KEIHIN CVK36
Idle speed	1100 ± 50 r/min (rpm), (CA)(PR) 1200 ± 50 r/min (rpm)
Pilot screw (turns out)	2 ± 1/4, (CA)(CN)(US) –
Synchronization vacuum	2.7 kPa (2 cmHg, 0.39 psi) or less difference between any two carburetors
Service fuel level	1.5 mm (0.059 in) below ~ 0.5 mm (0.020 in) above the float bowl mating surface
Float height	18.5 ± 2 mm (0.728 ± 0.078 in)
Main jet	CN, US: #95 (all cab.), CA and others: #92 (1, 4 cab), #95 (2, 3 cab.)
Main air jet	#80
Jet needle mark	US, CN: FAQ 48, CA and Others: NAGZ (1, 4 cab.), NAGU (2,3 cab.)
Pilot jet (slow jet)	#35
Pilot air jet (slow air jet)	#90
Starter jet	#52
Throttle valve angle	11°
High altitude carburetor specifications (US, CA)	
Pilot jet	#32 (92064-1117)
Main jets	#88 (92063-1024, #1,4 cab.) #92 (92063-1004, #2,3 cab.)
Air Cleaner	
Element	Paper filter

(CA): California Model
(CN): Canadian Model
(cab.): carburetor, ex. 1,4 cab.: No.1 carburetor (leftmost) and No.4 carburetor (rightmost)
(PR): WVTA Approval Model with pipe catalytic converter (restricted model)
(US): United States of America Model

Special Tools - Pilot Screw Adjuster, C: 57001–1292
Pilot Screw Adjuster Adapter, ϕ 5: 57001–1372
Pilot Screw Adjuster Driver: 57001–1373
Caburetor Drain Plug Wrench, Hex 3: 57001–1269
Fuel Level Gauge: 57001–1017

Specifications

Pilot Screw [A]
Pilot Jet [B]
Jet Needle [C]
Needle Jet [D]
Pilot Air Jet [E]
Main Air Jet [F]
Valve Seat [G]
Float Valve [H]
Needle Jet Holder [I]
Main Jet [J]



Throttle Grip and Cables

Throttle Grip Free Play Inspection

- Check the throttle grip free play [A] (rear-right view).

★If the free play is incorrect, adjust the throttle cables.

Throttle Gtip Free Play

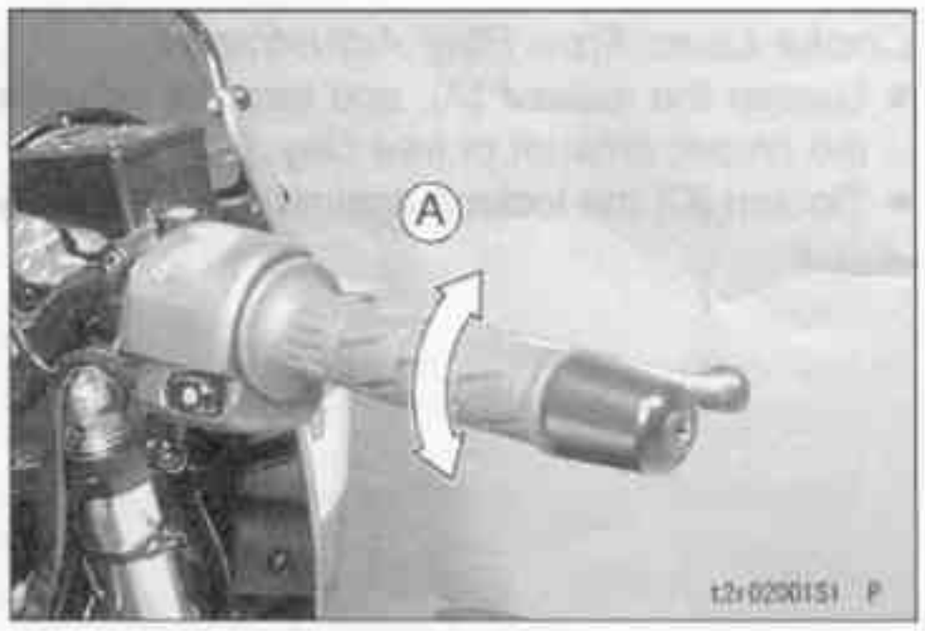
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in)

- Check that the throttle grip moves smoothly from close to full open, and the throttle closes quickly and completely in all steering positions by the return spring.

★If the throttle grip doesn't return properly, check the throttle cable routing, grip free play, and cable damage. Then lubricate the throttle cables.

- Run the engine at the idle speed, and turn the handlebar all the way to the right and left to ensure that the idle speed doesn't change.

★If the idle speed increases, check the throttle grip free play and the cable routing.

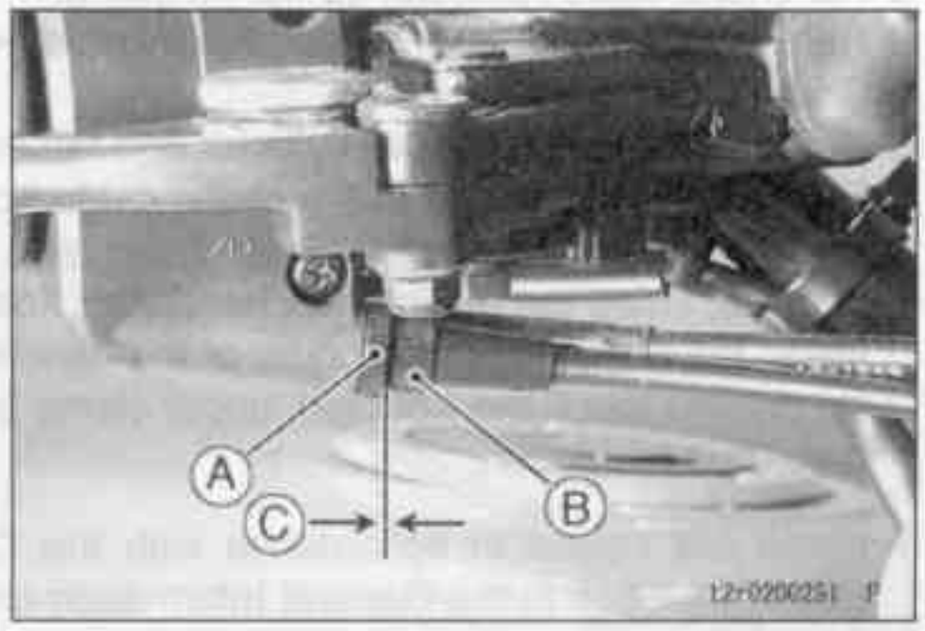


Throttle Grip Free Play Adjustment

- Loosen the locknut [A].
- Turn the adjuster [B] until the proper amount of free play can be obtained.
- Tighten [C] the locknut against the adjuster securely.

★If the throttle grip free play cannot be adjusted with the adjuster, use the adjusters in the middle of the throttle cables.

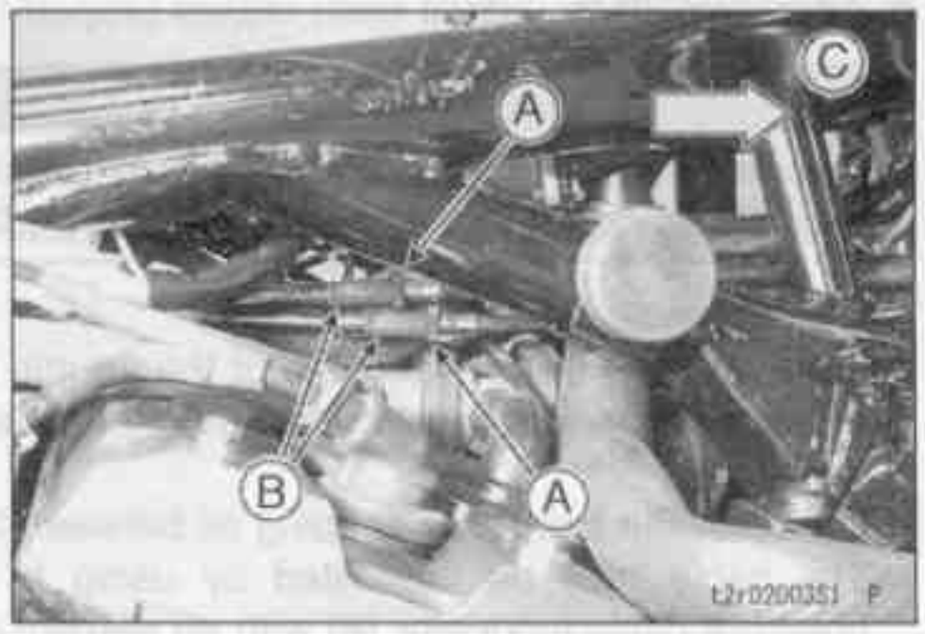
- Loosen the locknut, and screw the adjuster at the upper end of the accelerator cable all the way in.
- Tighten the locknut against the adjuster securely.



- Remove the fuel tank (see Fuel Tank Removal).
- Loosen the locknuts [A], and turn the lower adjusters [B] until the proper amount of throttle grip free play is obtained.
- Tighten the locknuts against the adjusters securely.

Front [C]

★If the throttle grip free play cannot be adjusted with the lower adjusters, use the adjuster at the upper end of the cable again.



Choke Lever Free Play Inspection

- Push the choke lever [A] all the way to the front and check the choke lever free play [D]: choke lever end travel.

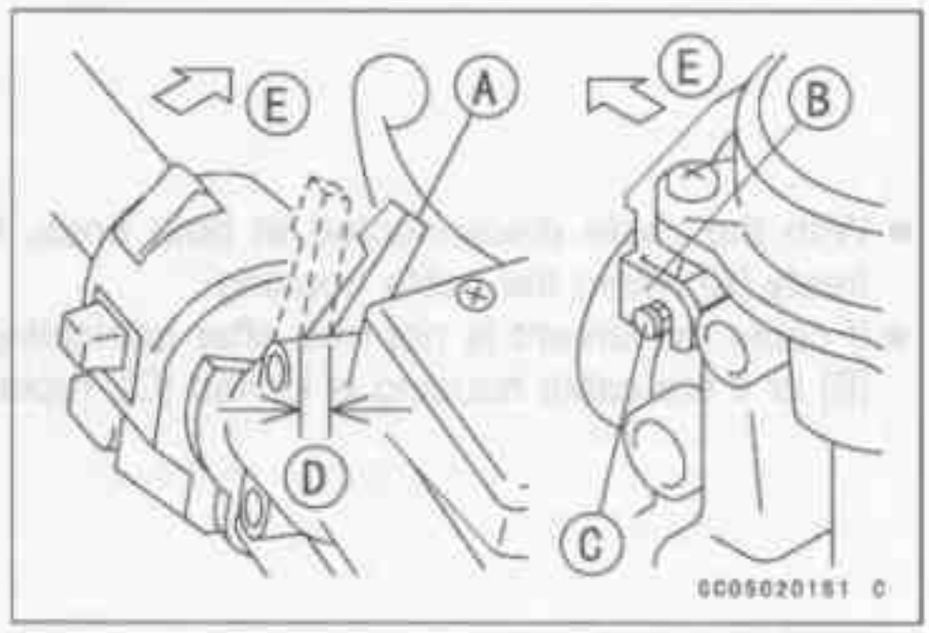
○ To determin the choke lever free play precisely, measure the choke lever end travel when the starter plunger lever [B] is retracted and then touches the starter plunger [C] at the carburetor #1.

Front [E]

★If the free play is incorrect, adjust the choke cable.

Choke Lever Free Play

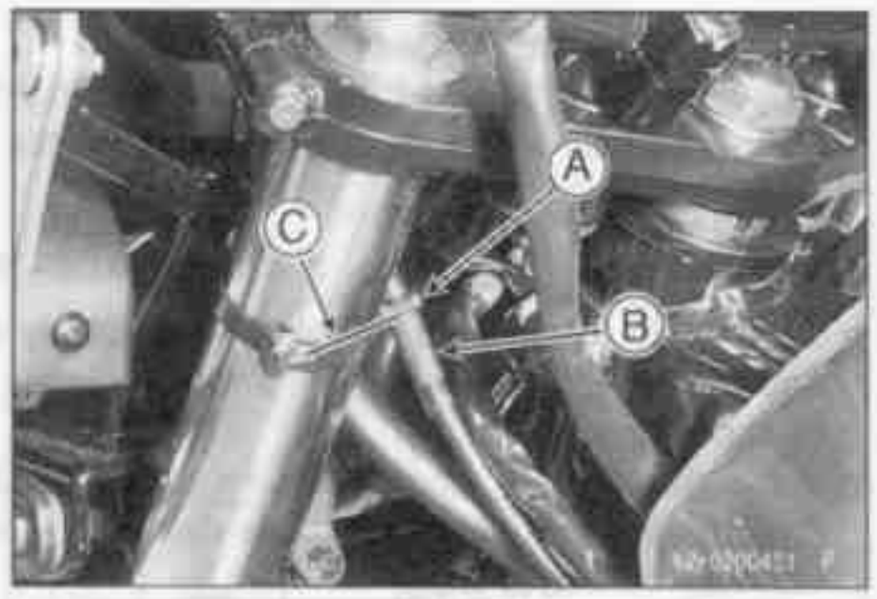
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in)



Throttle Grip and Cables

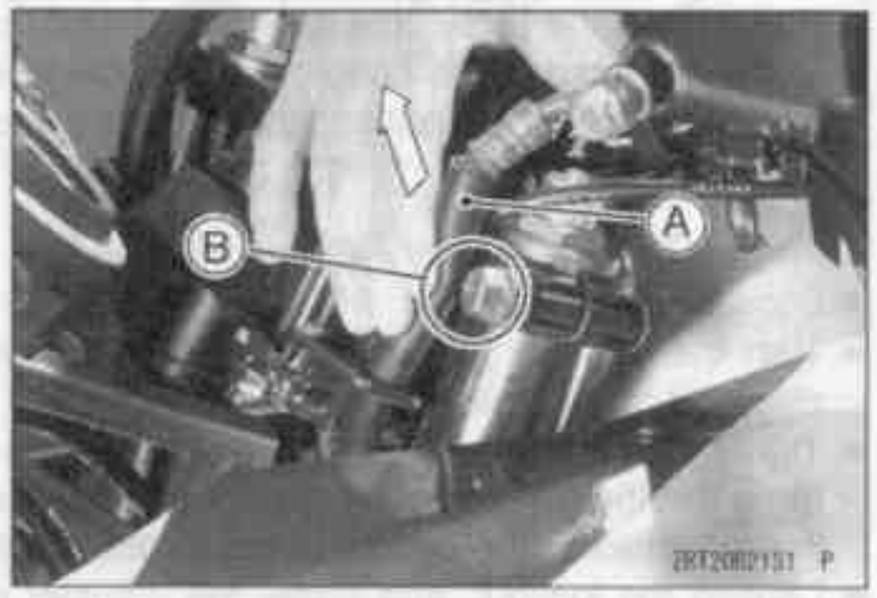
Choke Lever Free Play Adjustment

- Loosen the locknut [A], and turn the adjuster [B] until the cable has the proper amount of free play.
- Tighten [C] the locknut against the adjuster securely (left-rear view).



Cable Removal/Installation

- For throttle cable removal/installation, refer to Carburetor Removal and Installation in this chapter.
- For choke cable removal, do the following:
  - Remove the lower end of the choke cable from the carburetor (see Carburetor Removal).
  - Remove the clutch master cylinder and left switch housing.
  - Remove the upper end of the choke cable from the clutch housing.
  - After installing the choke cable upper end, install the left switch housing, fitting the pin into the handlebar hole.
  - Install the clutch master cylinder or the handlebar, so the clutch hose [A] doesn't touch the front fork upper clamp bolt [B] or the meter unit (see Clutch chapter).



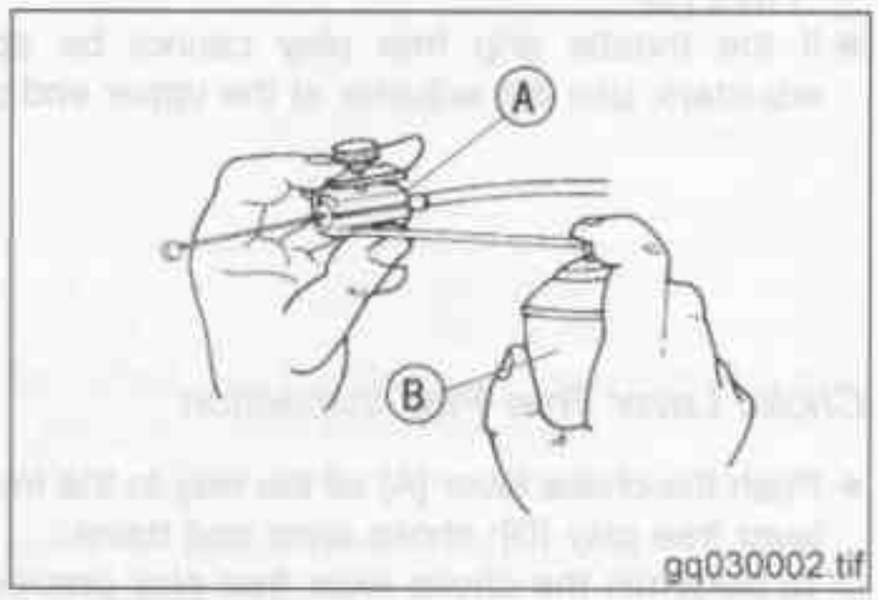
- Install the cables in accordance with the Cable, Wire, and Hose Routing section in the General Information chapter.
- After installation, adjust each cables properly.

⚠ WARNING

Operation with incorrectly routed or improperly adjusted cables could result in an unsafe riding condition.

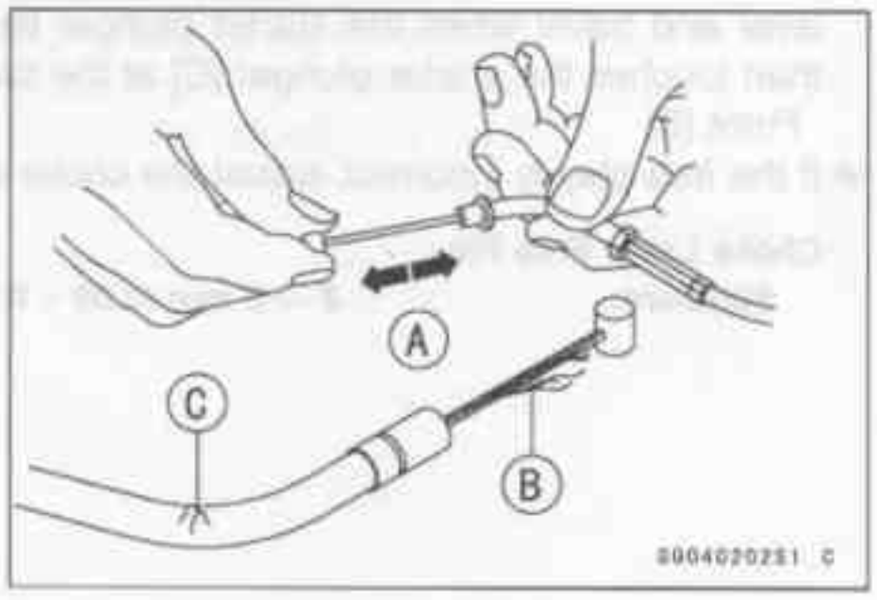
Cable Lubrication and Inspection

- Whenever the the choke cable or the throttle cables are removed, or in accordance with the Periodic Maintenance Chart, lubricate these cables.
  - Lubricate the cables by seeping oil between the cable and housing.
  - The cable may be lubricated by using a commercially available pressure cable lubricator [A] with an aerosol cable lubricant [B].



- With the cable disconnected at both ends, the cable should move freely [A] within the cable housing.

★ If cable movement is not free after lubricating, if the cable is frayed [B] or if the cable housing is kinked [C], replace the cable.



Carburetors

Idle Speed Inspection

○ In accordance with the Periodic Maintenance Chart, inspect the idle speed and adjust it if necessary.

• Start the engine and warm it up thoroughly.

• With the engine idling, turn the handlebar to both sides.

★ If handlebar movement changes the idle speed, the throttle cables may be improperly adjusted or incorrectly routed or damaged. Be sure to correct any of these conditions before riding (see Cable, Wire, and Hose Routing section in the General Information chapter).

⚠ WARNING

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

• Check idle speed.

★ If the idle speed is out of the specified range, adjust it.

Idle Speed

Standard; 1100 ± 50 r/min (rpm), (CA) 1200 ± 50 r/min (rpm)

CA: California Model

PR: WVTA Approval Models (restricted model)

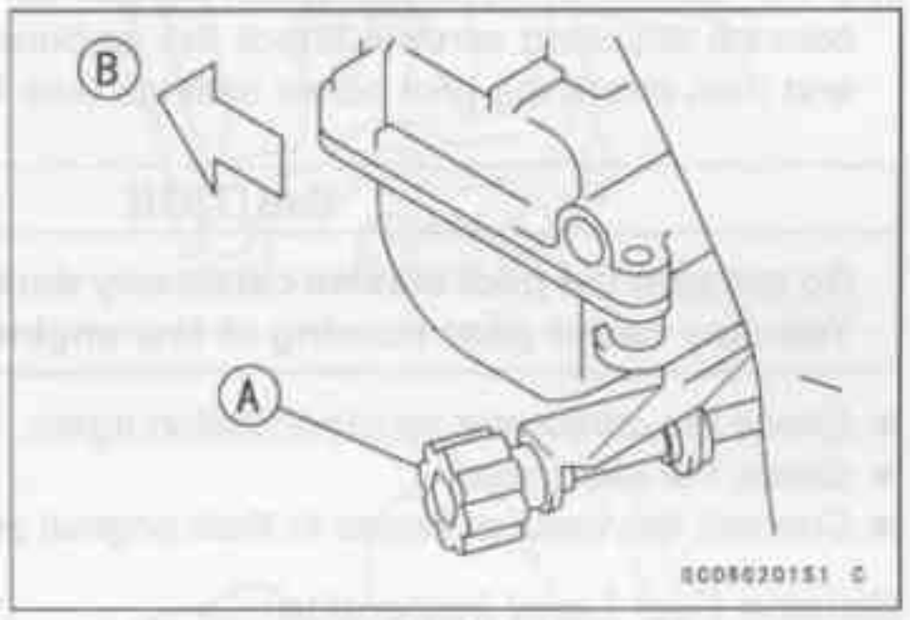
Idle Speed Adjustment

• Start the engine and warm it up thoroughly.

• Turn the adjusting screw [A] until the idle speed is correct.

○ Open and close the throttle a few times to make sure that the idle speed is within the specified range. Readjust if necessary.

Front [B]



High Altitude Performance Adjustment

○ To improve the EMISSION CONTROL PERFORMANCE of US and CA models operated above **4000 feet,** Kawasaki recommends the following Environmental Protection Agency (EPA) approved modification.

○ At high altitude, the standard carburetor air-fuel mixture will be excessively rich. Performance will decrease, and fuel consumption will increase. High altitude performance can be improved by installing a smaller diameter main jet in the carburetor.

• Change the main jet and pilot jet for high altitude use.

High Altitude Carburetor Specifications

Pilot Jet:	**#32 (92064-1117)**
Main Jets:	**#88 (92063-1024) for #1, 4 Carburetors**
	#92 (92063-1004) for #2, 3 Carburetors

Synchronization Inspection

• In accordance with the Periodic Maintenance Chart, inspect the synchronization.

• Situate the motorcycle so that it is vertical.

• Start the engine and warm it up thoroughly.

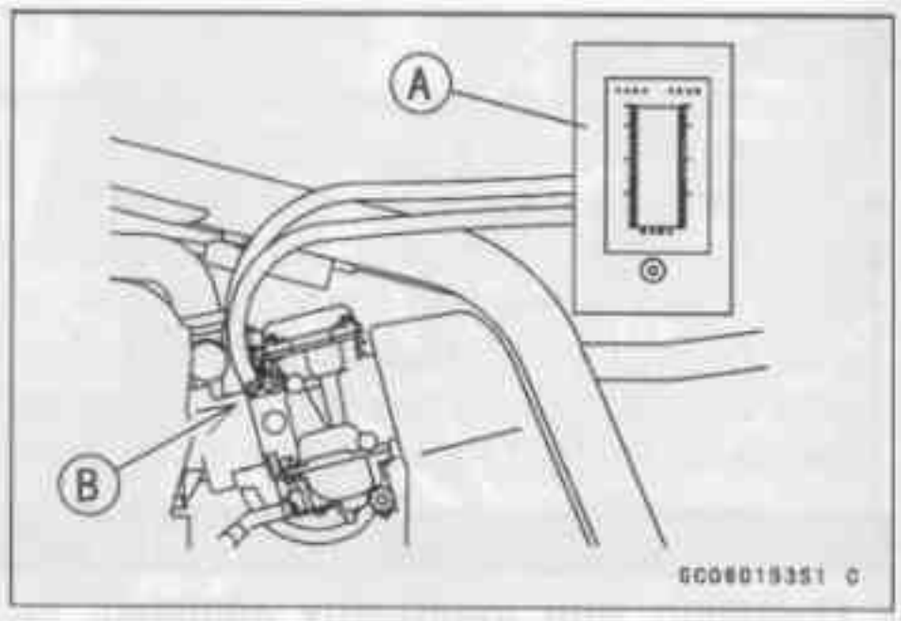
• Check idle speed. Check the engine speed, using an accurate commercially available tachometer.

★ If the engine speed is out of the specified, adjust it.

Carburetors

- Remove the fuel tank (see Fuel Tank Removal).
- Supply fuel to the carburetors with an auxiliary fuel tank.
- Pull the vacuum hoses off, and attach a commerially available vacuum gauge [A] to the fittings [B] on the carburetors (left view).
- Start the engine and let it idle to measure each carburetor inlet vacuum.

★If the vacuum is incorrect, adjust the synchronization (see this section).



Carburetor Synchronization Vacuum

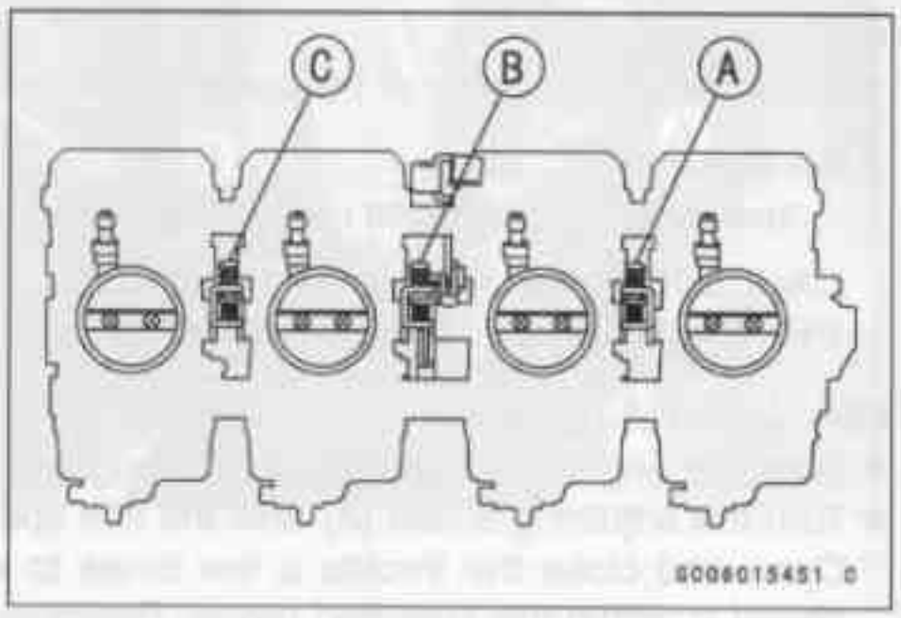
Standard: **2.7 kPa (2 cmHg, 0.39 psi) or less difference between any two carburetors.**

Synchronization Adjustment

- While idling the engine, turn the balance adjusting screws on the levers to synchronize the carburetors.

○ First synchronize the left two and then the right two carburetors by means of the left and right adjusting screws [A], [C]. Then synchronize the left two carburetors and the right two carburetors using the center balance adjusting screw [B].

★If the carburetor synchronization cannot be obtained by using the balance adjusting screws, check the carburetor for dirt or blockage, and then check the pilot screw settings (see Pilot Screw Setting).



CAUTION

Do not turn the pilot screws carelessly during synchronization. You may cause poor running at low engine speed.

- Check the carburetor synchronization again.
- Check the idle speed.
- Connect the vacuum hoses to their original positions.

Service 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.

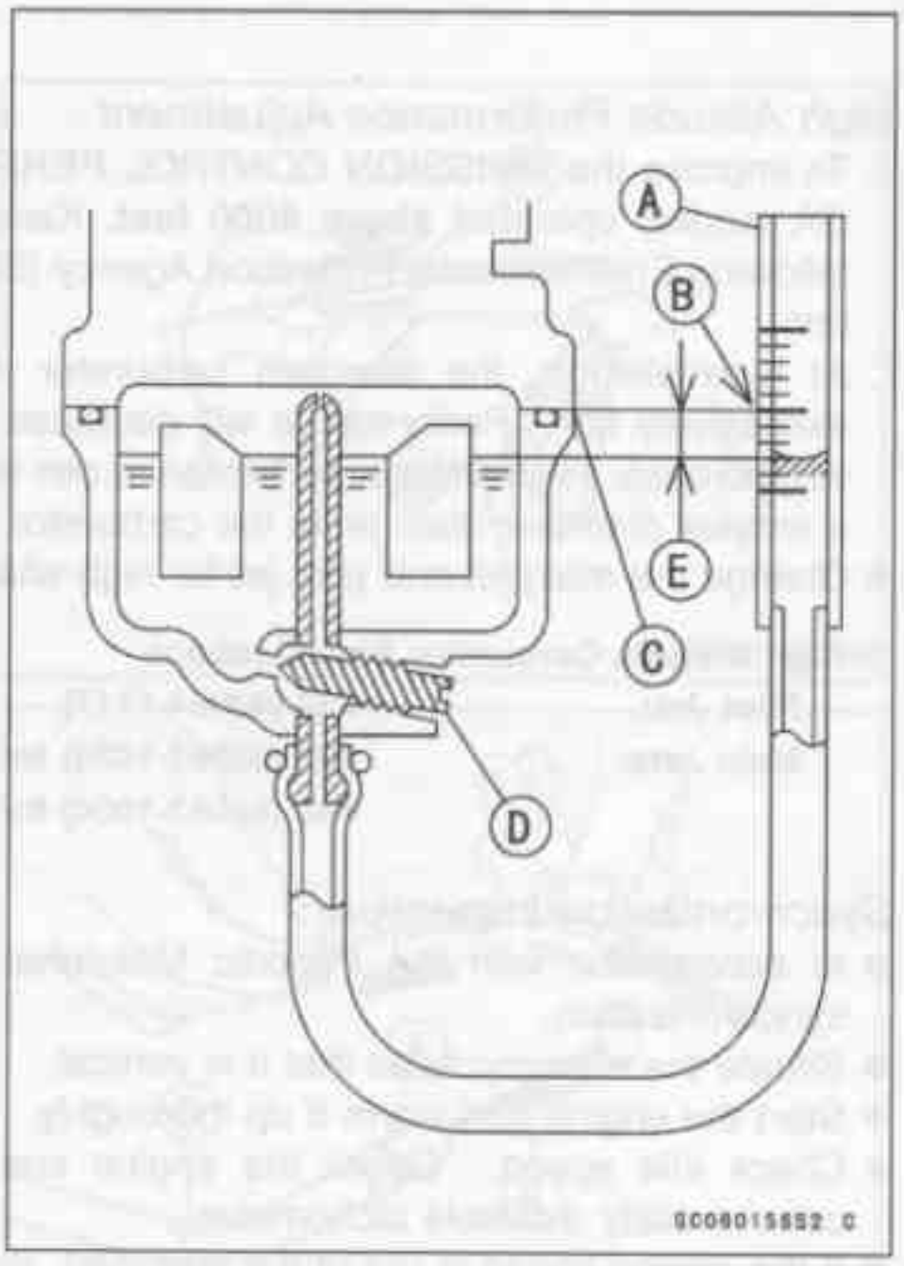
- Remove the carburetors (see Carburetor Removal), and hold them upright on a stand.
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetors.
- Prepare a fuel hose (6 mm in diameter and about 300 mm long) and connect the fuel level gauge [A] to the carburetor float bowl with the fuel hose.

Special Tool - Fuel Level Gauge: 57001–1017

- Hold the gauge vertically against the side of the carburetor body so that the middle line [B] is several millimeters higher than the float bowl mating surface [C].
- Turn the fuel tap to feed fuel to the carburetor and gauge, then turn the carburetor drain plug [D] out a few turns.

Special Tool - Caburetor Drain Plug Wrench, Hex 3: 57001–1269

- Wait until the fuel level in the gauge settles.
- Keeping the gauge vertical, slowly lower the gauge until the middle line is even with the float bowl mating surface.



Carburetors

NOTE

○ *Do not lower the middle line below the float bowl mating surface. If the gauge is lowered and then raised again, the fuel level measured shows somewhat higher than the actual fuel level. If the gauge is lowered too far, dump the fuel out of it into a suitable container and start the procedure over again.*

- Read the fuel level [E] in the gauge and compare to the specification.
- Tighten the drain plug and remove the fuel level gauge.

★ If the fuel level is incorrect, adjust it (see Service Fuel Level Adjustment).

Service Fuel Level

Standard: 1.5 mm (0.059 in) below ~ 0.5 mm (0.020 in) above the float bowl mating surface

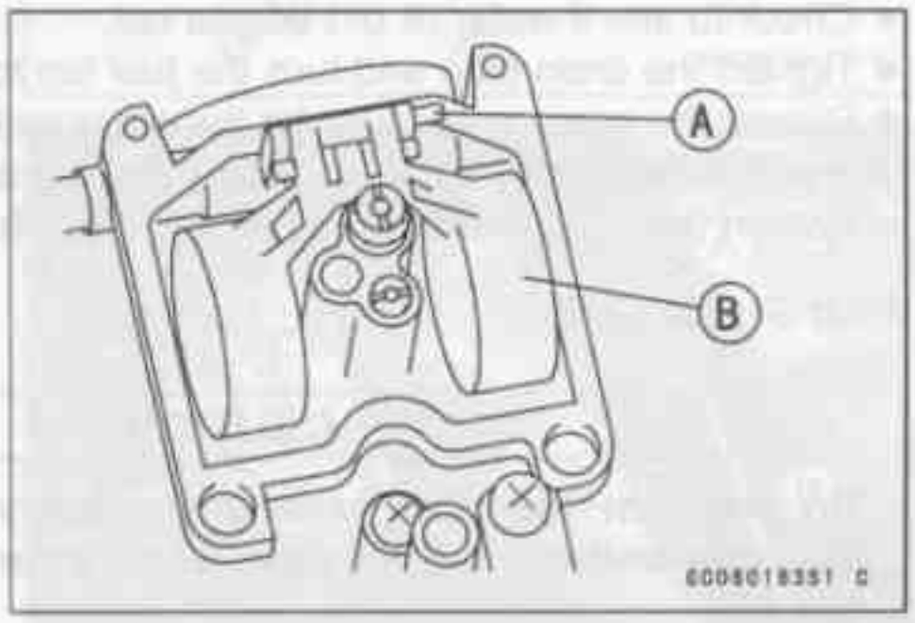
- Repeat the same procedure for the other carburetors.

Service Fuel Level Adjustment

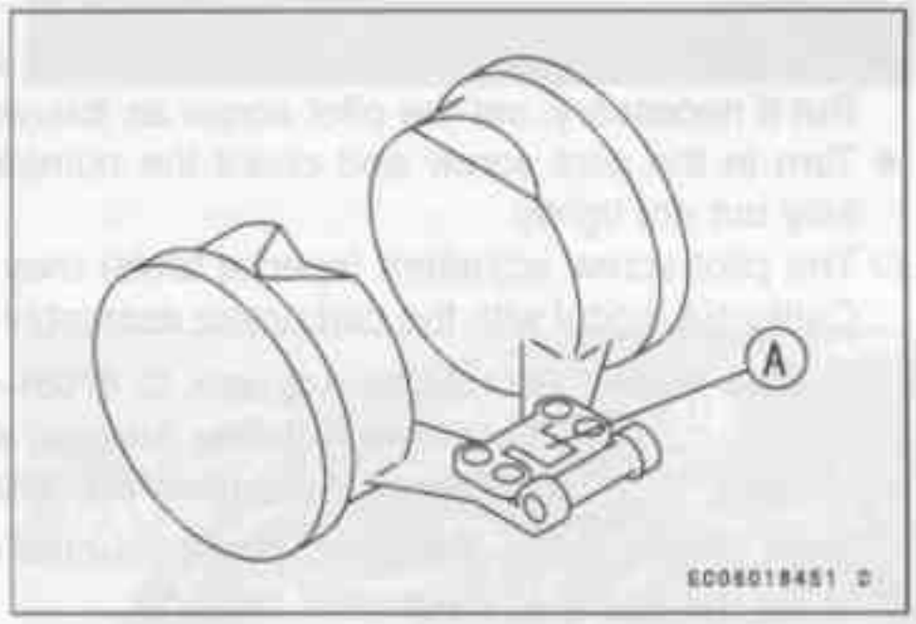
⚠ WARNING

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 drain the fuel into a suitable container.
- Remove the float bowl by taking out the screws.
- Slide out the pivot pin [A] and remove the float [B].



- Bend the tang [A] on the float arm very slightly to change the float height.



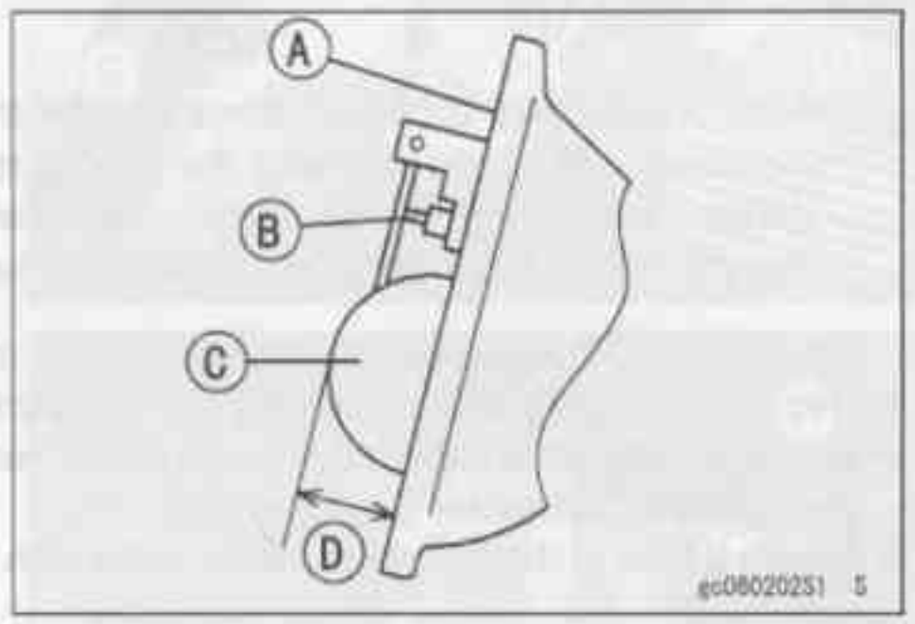
- Measure the floar height tilting the carburetor so that the tang on the float just touches the needle rod in the float valve.

○ Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.

Float Height

Standard: 18.5 ± 2 mm (0.728 ± 0.078 in)

Float Bowl Mating Surface [A]
Float Valve Needle Rod (contacted but unloaded) [B]
Float [C]
Float Height [D]



NOTE

○ *Do not push the needle rod in during float height measurement.*

- 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.

Carburetors

Fuel System Cleanliness Inspection

⚠WARNING

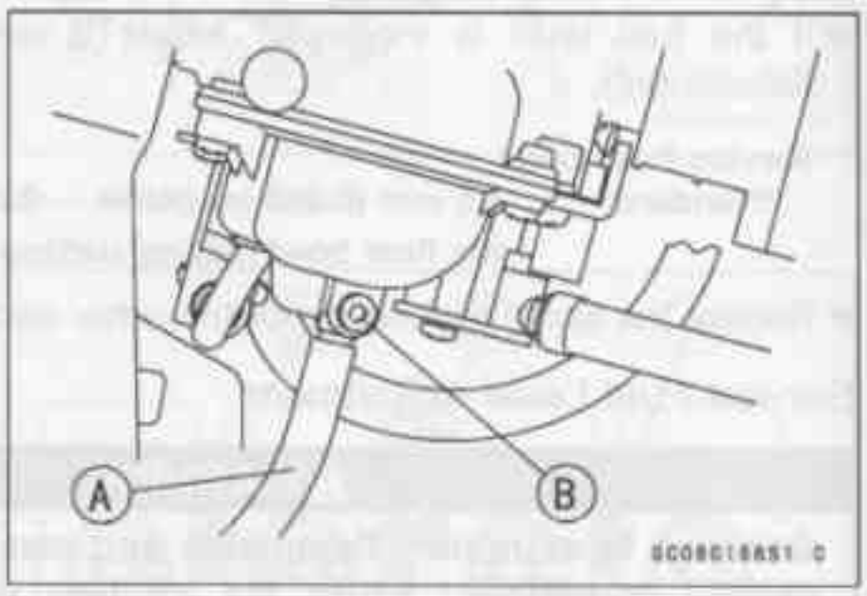
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Connect a suitable hose [A] to the fitting at the bottom of each carburetor float bowl (right side view).
- Run the lower end of the hose into a suitable container.
- Turn the fuel tap to the PRI position.
- Turn out each drain plug [B] a few turns and drain the float bowl.

Special Tool - Caburetor Drain Plug Wrench, Hex 3: 57001–1269

- Check to see if water or dirt comes out.
- Tighten the drain plug and turn the fuel tap to the ON position.
- Repeat the same procedure for the other carburetors.

★ If any water or dirt appears during above inspection, clean the fuel system (see Carburetor Cleaning and Fuel Tank Cleaning).



Pilot Screw Setting

CAUTION

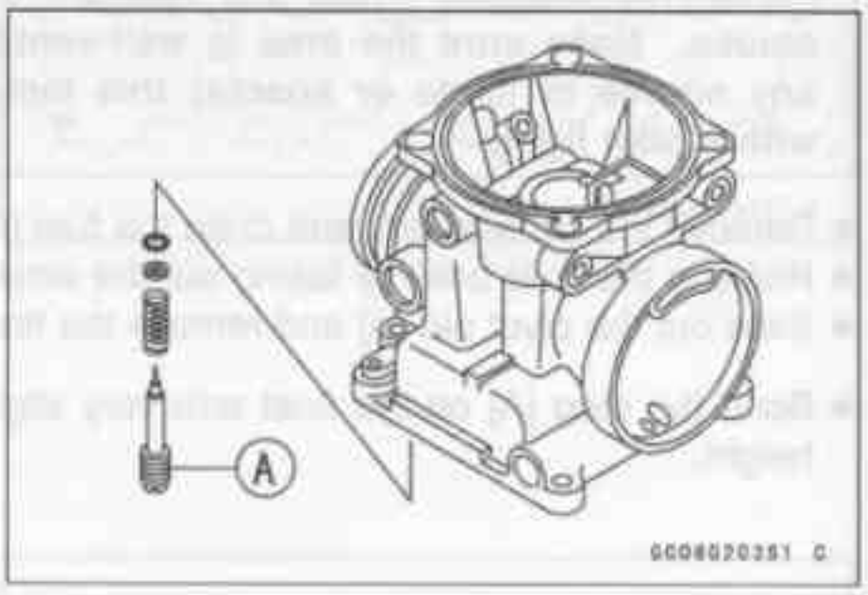
Do not turn the pilot screws carelessly during carburetor synchronization. You may cause poor running at low engine speed.

- The pilot screw [A] is set at the factory and should not be adjusted, But if necessary, set the pilot screw as follows:
- Turn in the pilot screw and count the number of turns until it seats fully but not tightly.

○ The pilot screw adjusters (special tools) may be used for other than California model with the carburetor assembly installed on the engine.

Special Tool - Pilot Screw Adjuster, C: 57001–1292
Pilot Screw Adjuster Adapter, ϕ5: 57001–1372
Pilot Screw Adjuster Drive: 57001–1373

○ Back out the same number of turns counted when turned in. This is to set the screw to its original position.

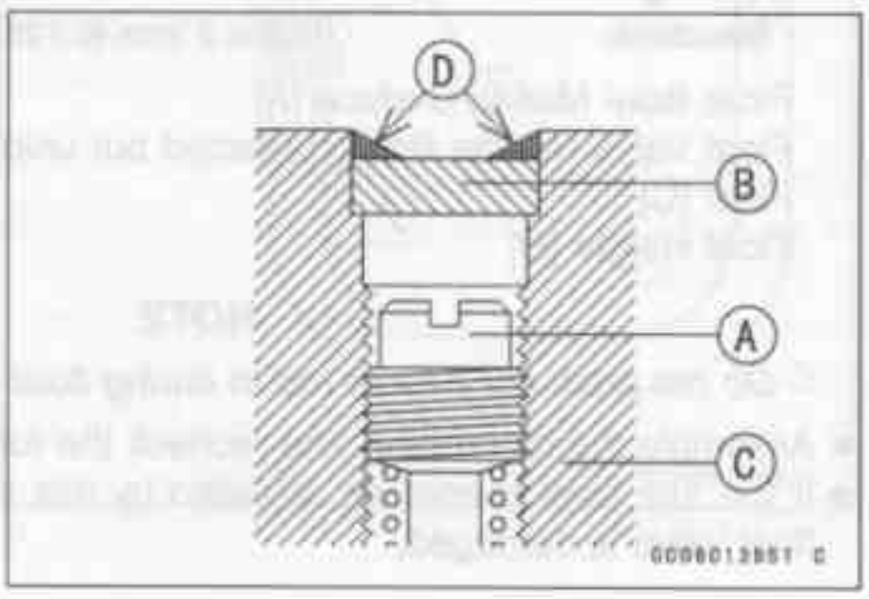


NOTE

○ *A carburetor has different "turns out" of the pilot screw for each individual unit. When setting the pilot screw, use the "turns out" determined during disassembly. Use the specifications in this manual only if the original number is unknown.*

○ For California model, set the pilot screw [A] as follows:

- Remove the carburetor assembly (see this chapter).
- With the carburetor assembly upside down, remove the float bowl and O-ring (see Carburetor Disassembly).
- Punch a hole in the plug [B] and pry it out with an awl or other suitable tool
- Set the pilot screw, using a screwdriver in the same manner as described above.
- Install a new plug in the pilot screw hole of the carburetor body [C], and apply a little bonding agent [D] to the circumference of the plug to fix the plug.



Carburetors

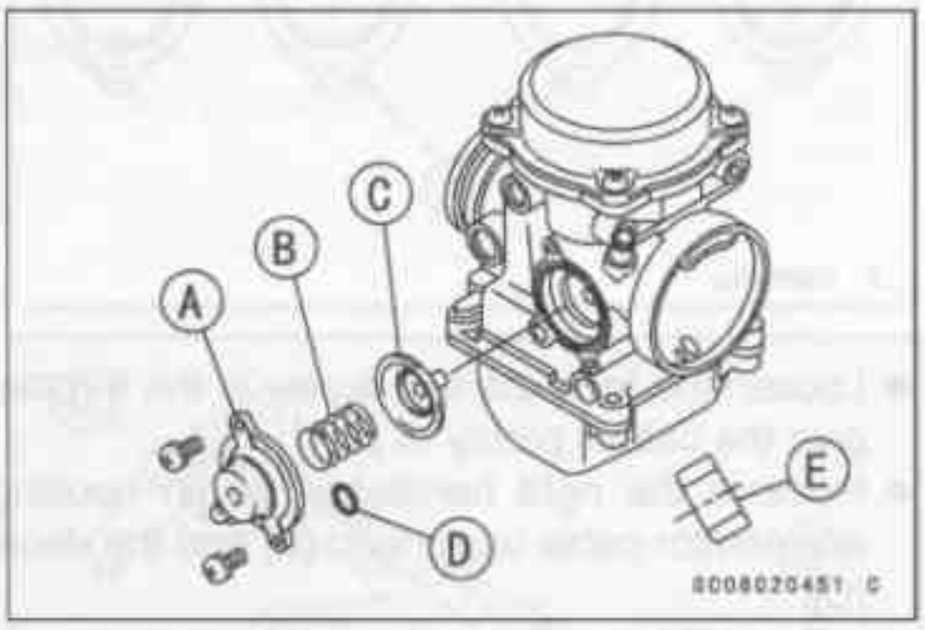
CAUTION

Do not apply too much bonding agent to the plug or the pilot screw itself may be fixed.

- Repeat the same procedure for the other carburetors.

Coasting Enricher Removal/Installation

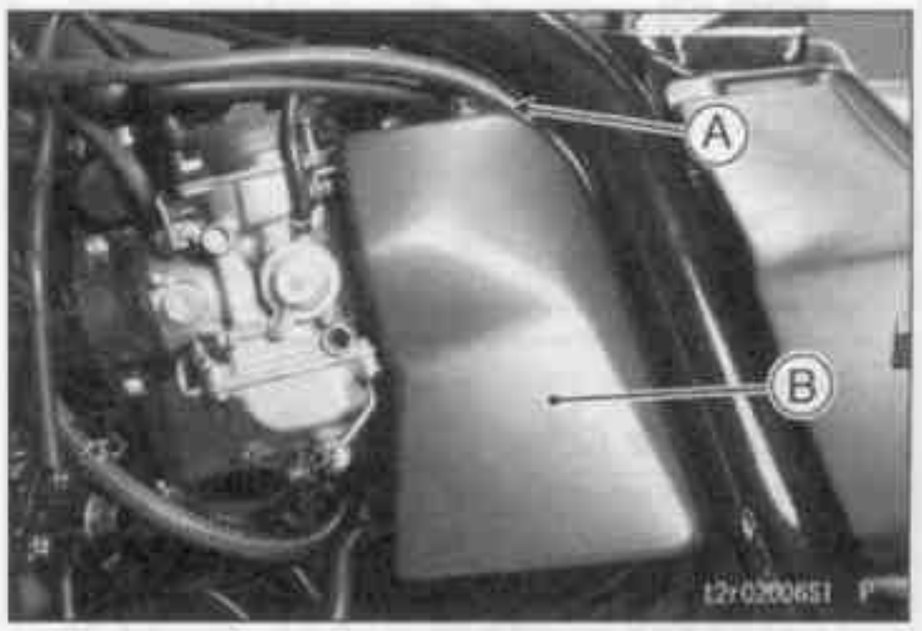
- Remove the coasting enricher cover [A] from the carburetor #1. Slowly remove the cover, being careful not to pop the spring [B] out.
- Remove the diaphragm [C] and the O-ring [D].
- Install the O-ring with its flat end [E] inward.
- When installing, be careful not to get dirt or dust on these parts. Carburetor malfunction will occur.



Carburetor Removal

⚠WARNING

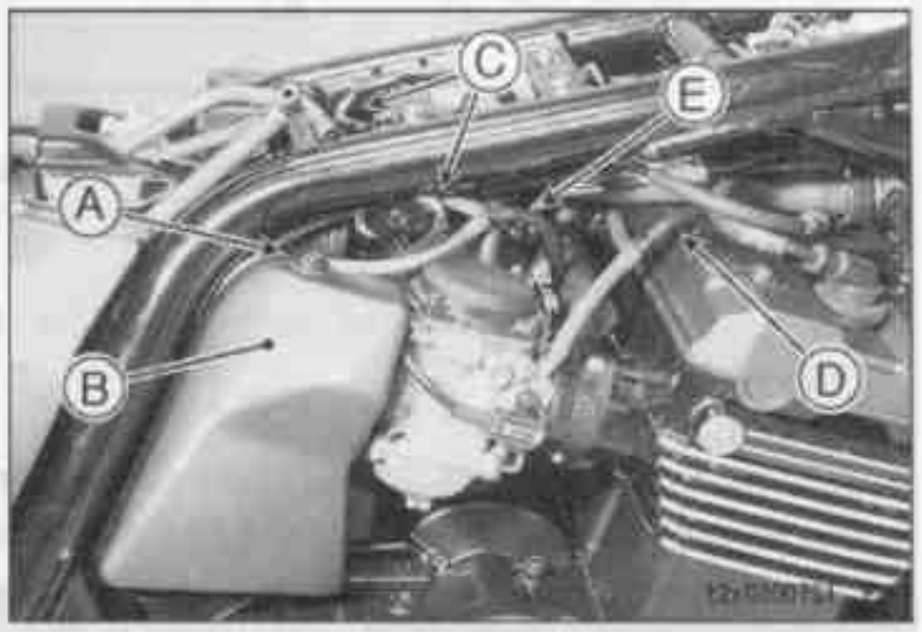
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.



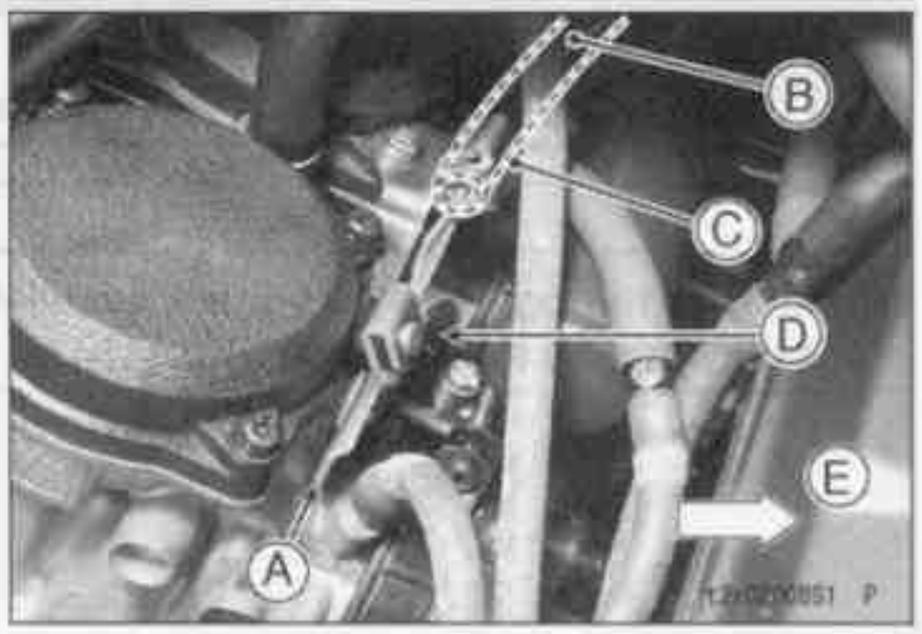
- Remove:
  Fuel Tank (see Fuel Tank Removal)
  Bolt [A] and Front Air Cleaner Side Cover [B]
  Right and Left Coolant Hoses (from the water pump inlet and water pipe)

○ Plug the coolant hoses immediately and wash away any coolant that spills on the engine.

- Remove:
  Bolt [A] and Front Air Cleaner Side Cover [B]
  Throttle Sensor and Alternator Lead Connectors [C]
  Vacuum Hose [D] for Vacuum Switch Valve
  Vacuum Hose [E] for California Vacuum Valve and Separator

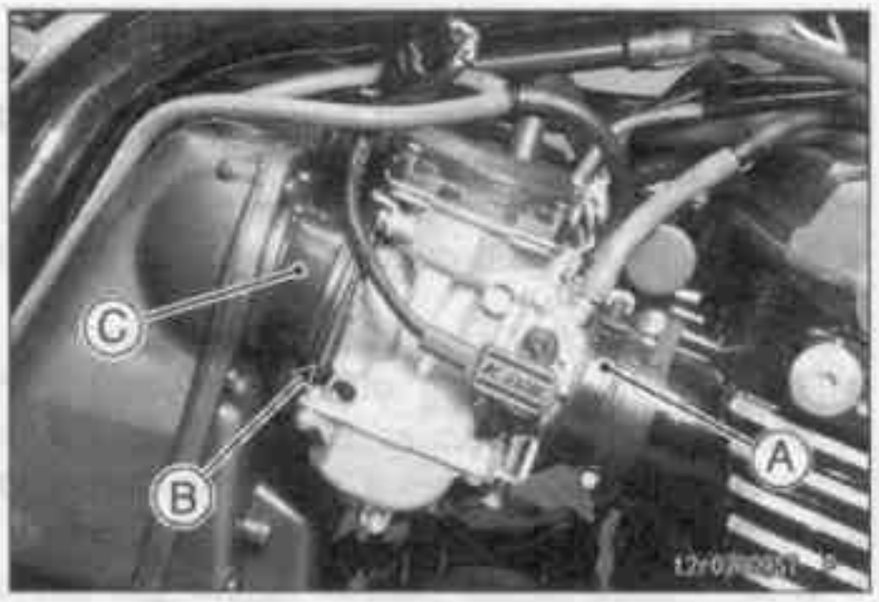


- Push the choke lever on the handlebar forward to give the choke cable plenty of play.
- Push [A] the starter plunger lever and pull out the choke cable housing [B] from the holder [C] on the carburetor #4.
- Remove the choke cable lower end [D] from the starter plunger lever.
  Front [E]

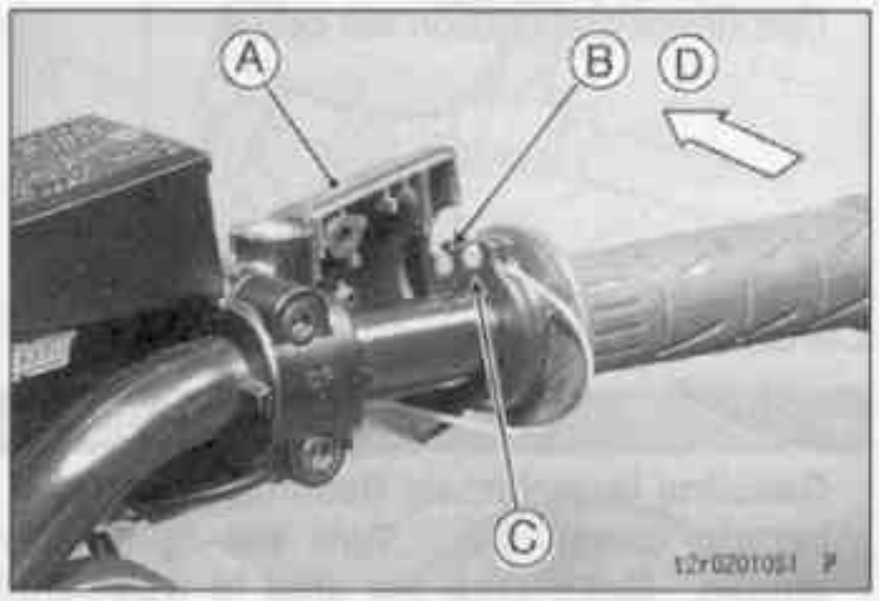


Carburetors

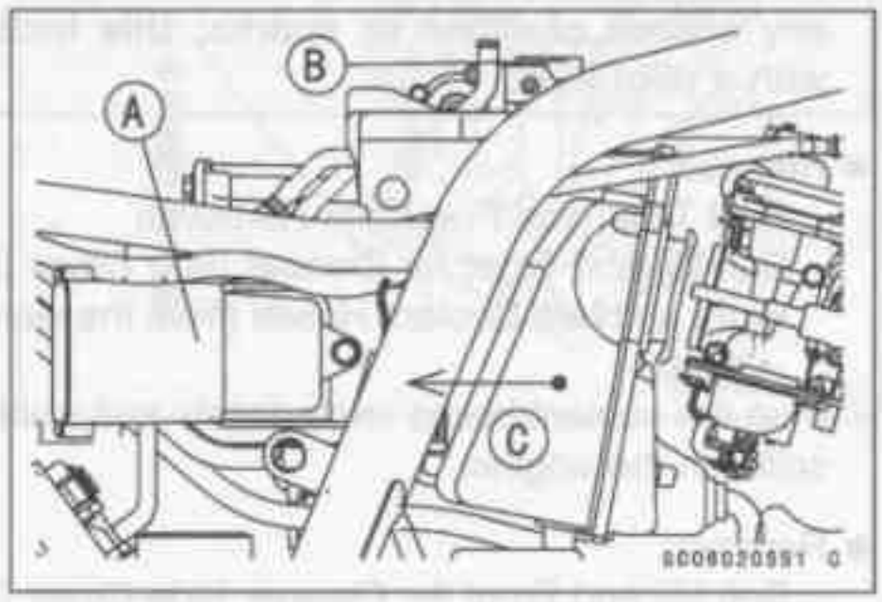
- Loosen the carburetor holder clamps [A].
- Move back the spring bands [B] and peel the air cleaner ducts [C] off from each carburetor inlet.



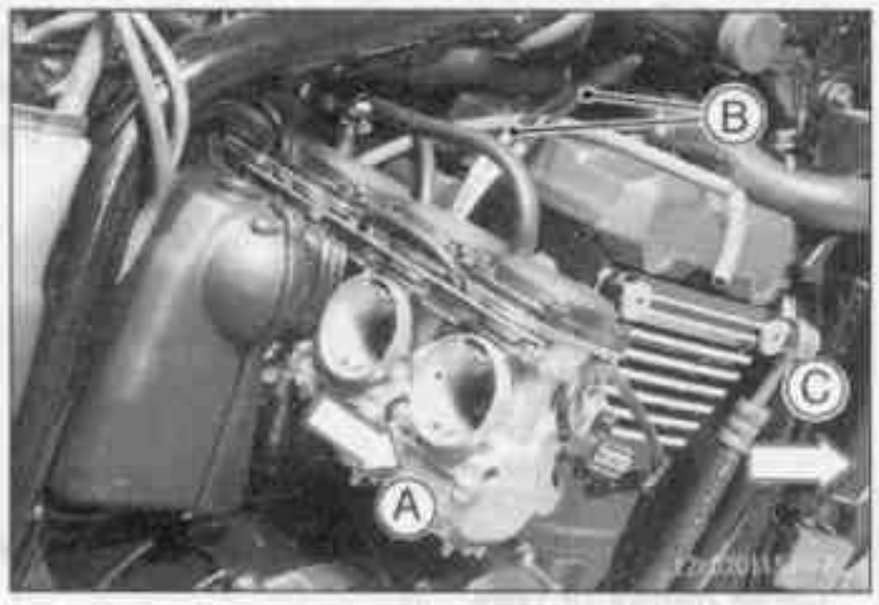
- Loosen the locknuts and screw in the throttle cable adjusters fully to give the cables plenty of play.
- Remove the right handlebar switch housing [A] and take out the accelerator cable upper end [B] and the decelerator cable upper end [C].
  Front [D]



- Remove:
  Right Side Cover
  Air Cleaner Inlet [A]
  Fuel Tank Bracket [B] and Two Bolts
  Carburetor Hoses
  Upper Main Harness, Leads, and Connectors (move them left)
  Hoses (between the front air cleaner housing and frame pipe)
- Move the air cleaner housings backwards [C].



- Pull [A] the carburetor assembly out of the carburetor holders.
- Slide the carburetor assembly right and remove it from the vehicle right side.
- Remove the throttle cable lower ends [B] to complete carburetor assembly removal.
  Front [C]
- Stuff pieces of lint-free clean cloth into the carburetor holders and the air cleaner ducts to keep dirt out of the engine and air cleaner.



⚠ WARNING

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

CAUTION

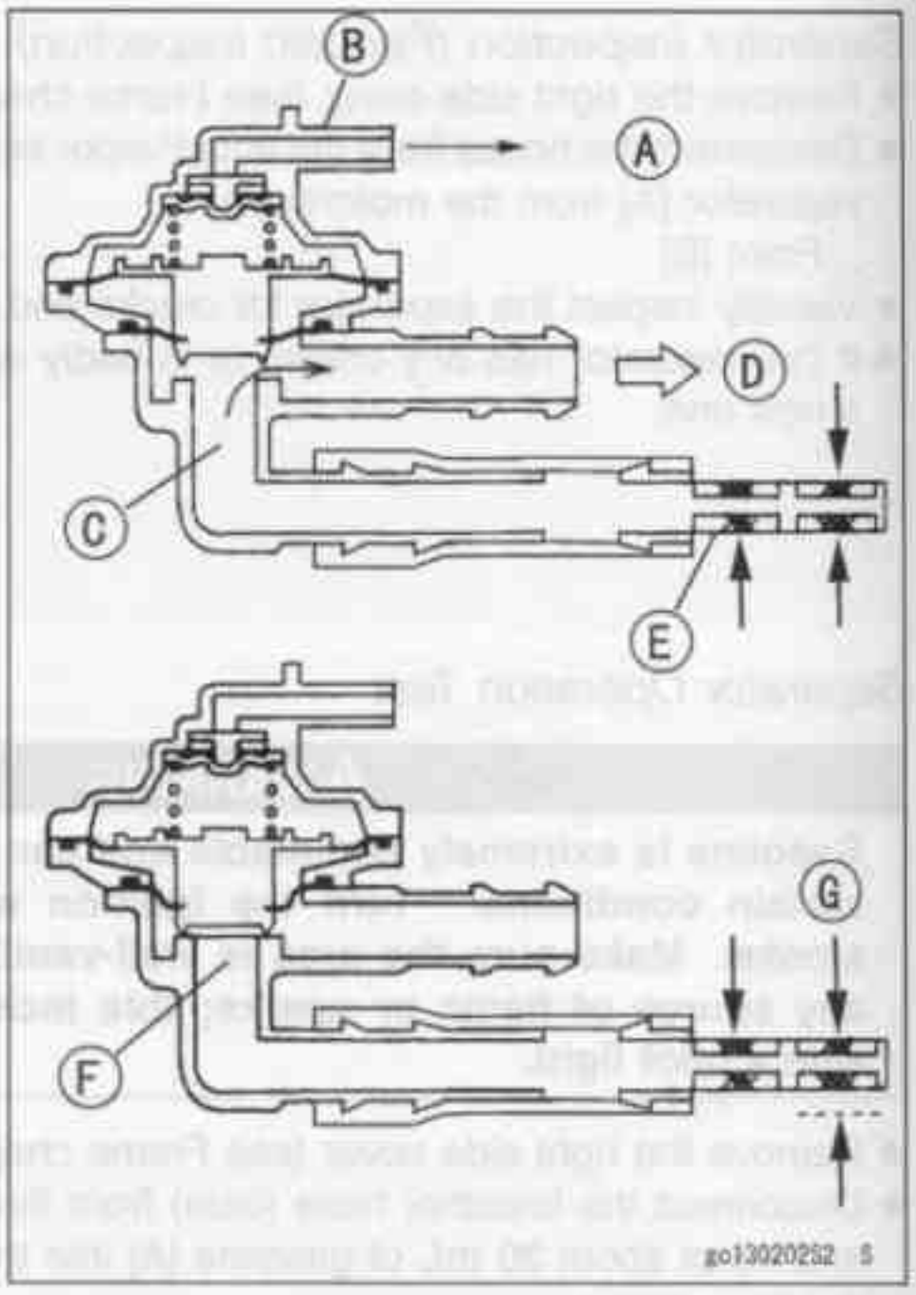
If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.

Evaporative Emission Control System (CA)

- Using the fork oil level gauge (special tool) and a commercial vacuum gauge, inspect the vacuum valve operation.

Special Tool - Fork Oil Level Gauge: 57001–1290

○ When applying vacuum (2 cmHg, 0.39 psi) [A] to the vacuum sensing fitting [B], using the fork oil level gauge, the valve is opened [C] and air flows [D] through the filter [E] to the carburetor float chamber fitting.
○ When stopping to apply vacuum, the valve is closed [F] and air does not flow [G].
★ If the vacuum valve does not operate as described, replace the valve.



CAUTION

Do not use compressed air for valve check or the vacuum valve may be damaged.

NOTE

○ *To check air flow through the vacuum valve, just blow through the air hose.*
○ *The vacuum valve is opened in order to apply atmospheric pressure to the carburetor float chambers when the engine is running, and closed to store the vapors from the float chambers in the canister when the engine is stopped.*

Carburetors

Carburetor Disassembly/Assembly

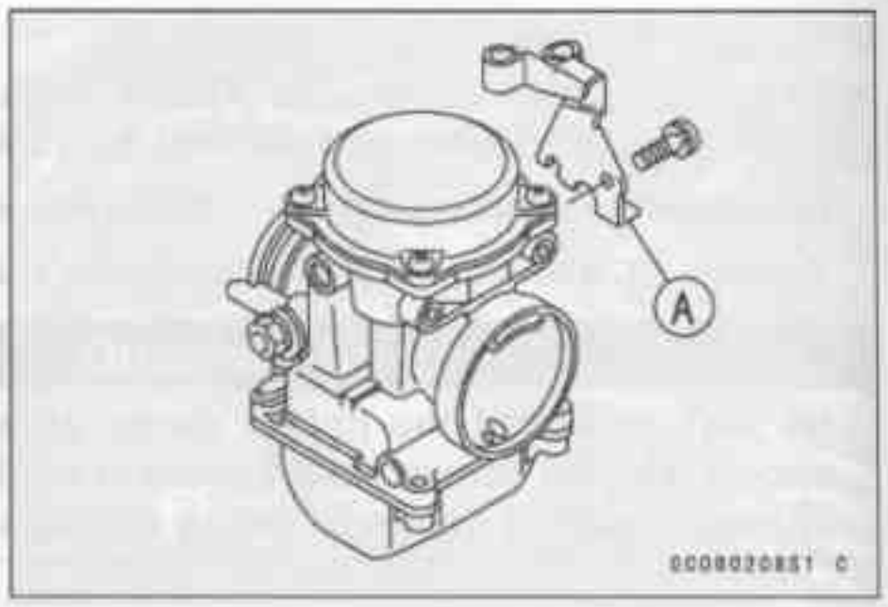
- Remove the carburetor assembly (see Carburetor Removal).

⚠ WARNING

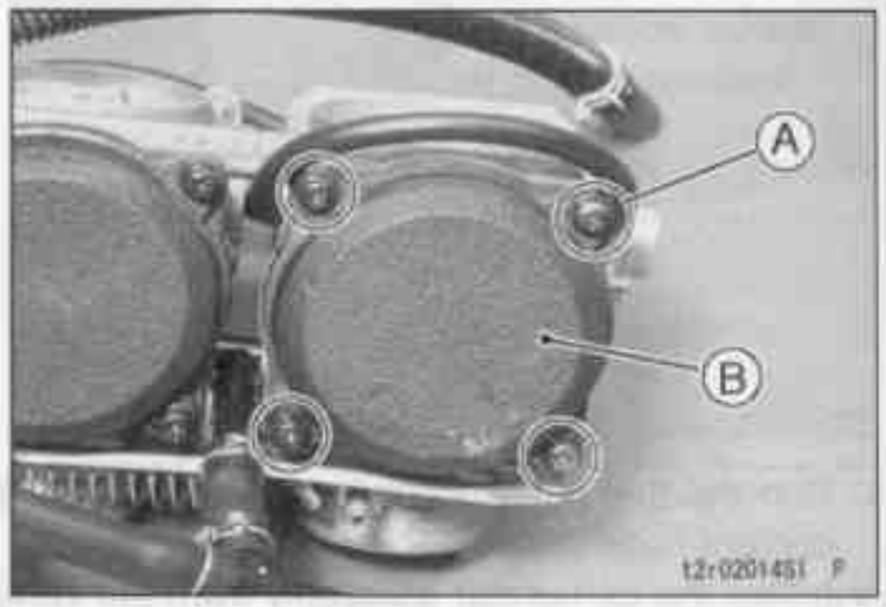
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

NOTE

- *Each carburetor unit can be disassembled and assembled in the joined state.*
- *Do not remove the throttle cable holder [A], just for disassembling carburetors.*



- Disassemble the upper end of the carburetor as follows:
- Unscrew the cover screws [A] and remove the upper chamber cover [B] slowly. Be careful not to pop the spring out.

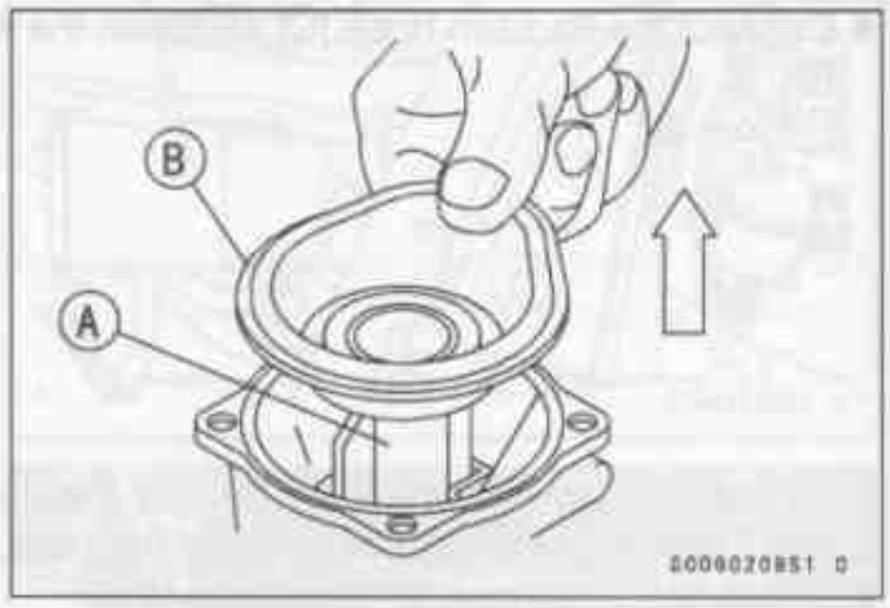


- Remove the vacuum piston [A] and diaphragm [B] along with the jet needle.

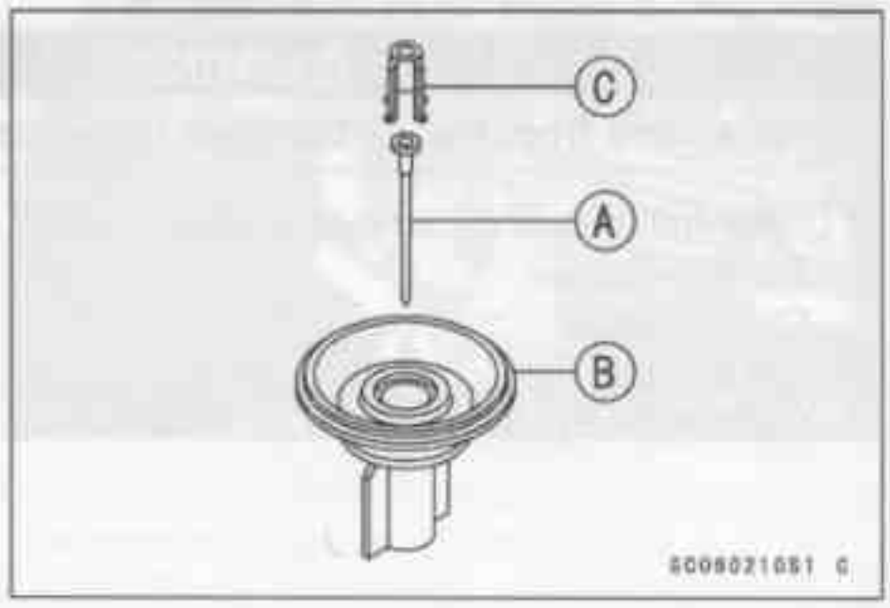
CAUTION

During carburetor disassembly, be careful not to damage the diaphragm. Never use a sharp edge to remove the diaphragm.

- Check the vacuum piston and diaphragm (see Carburetor Inspection).
- Clean the carburetor parts (see Carburetor Cleaning).

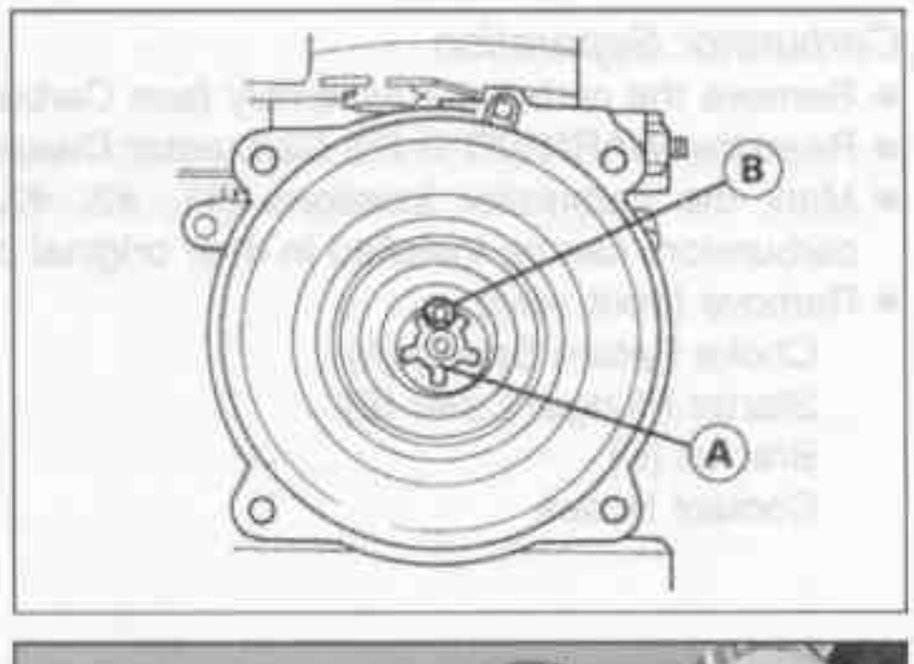


- Assemble the upper end of the carburetor as follows:
- Slip the jet needle [A] through the hole in the center of the vacuum piston [B], and put the spring seat [C] on the top of the needle.

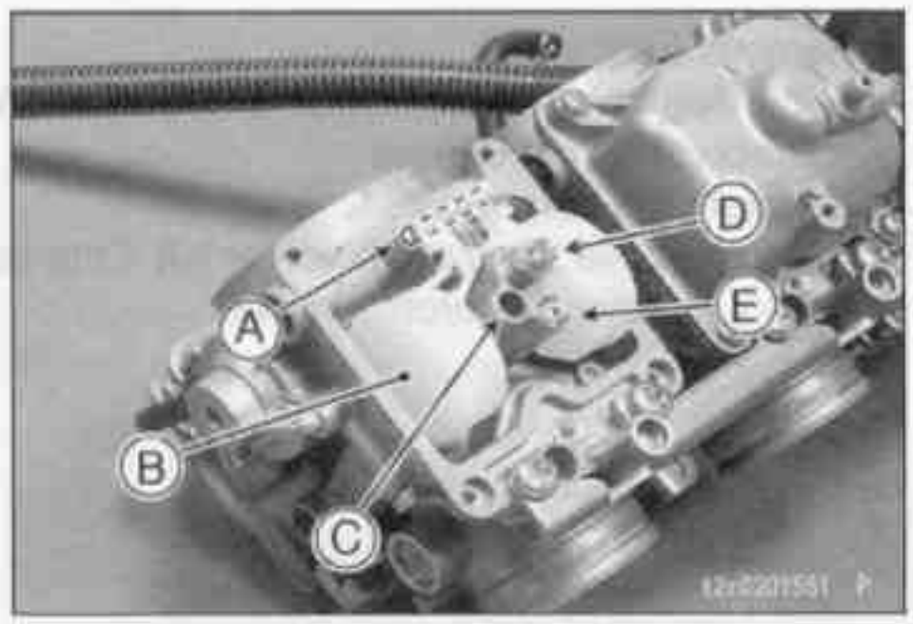


Carburetors

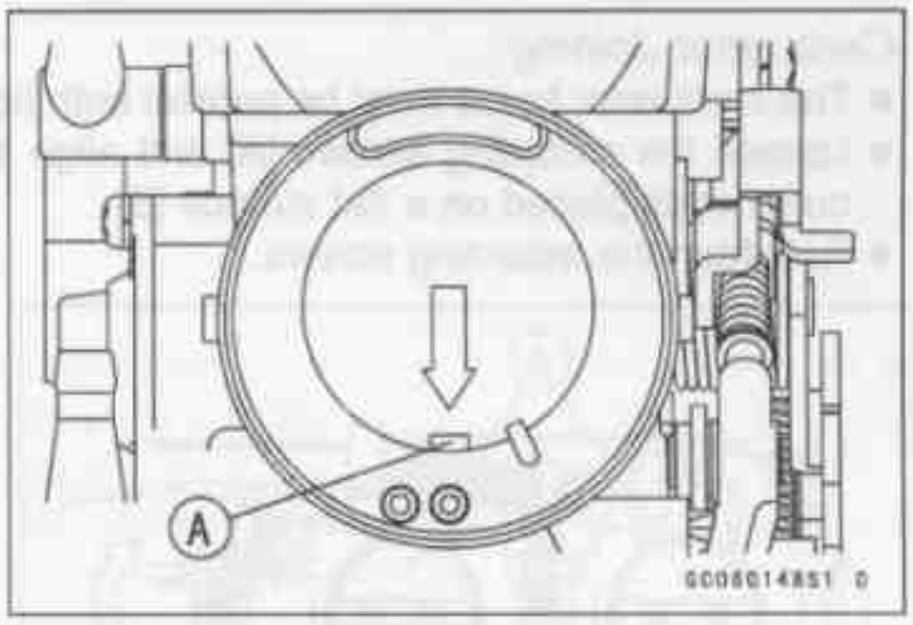
○ Turn the spring seat [A] so that it does not block the hole [B] at the bottom of the vacuum piston.
○ After installing the upper chamber cover, check that the vacuum piston slides up and down smoothly without binding in the carburetor bore.



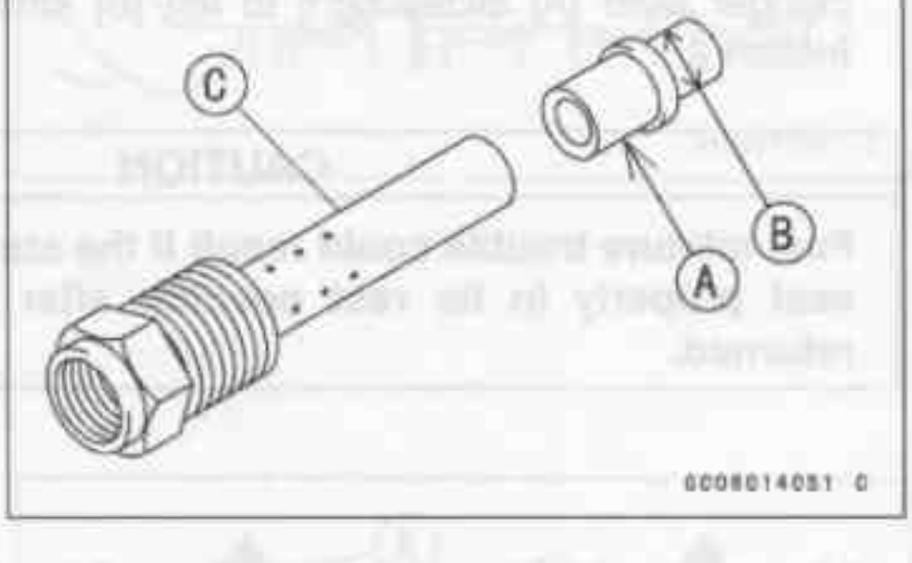
• Disassemble the lower end of the carburetor as follows:
○ Remove the float bowl and O-ring by taking out the screws.
○ Slide out the float pivot pin [A] and remove the floats [B]. The float needle valve will come out together.
○ Remove:
Pilot Jet [C]
Main Jet [D] and Needle Jet Holder
Starter Jet [E]



○ Push the needle jet [A] out from the carburetor bore with your finger.
• Check the following parts (see Carburetor Inspection):
Float Valve Needle
Pilot Screw
• Clean the carburetor parts (see Carburetor Cleaning).

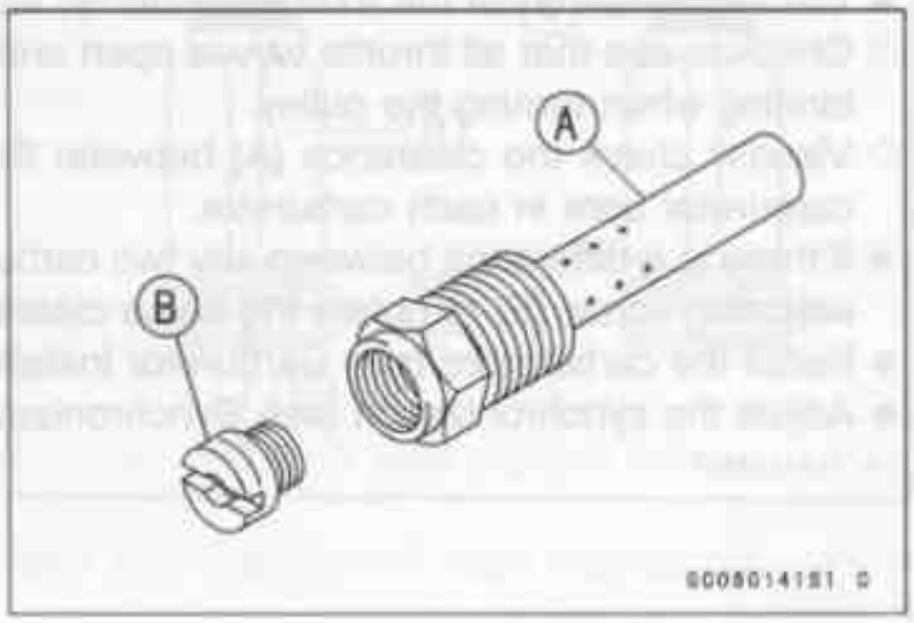


• Assemble the lower end of the carburetor as follows:
○ Turn the carburetor body upside down, and drop the needle jet [A] into place so that the smaller diameter end [B] of the jet goes in first.
○ Carefully screw in the needle jet holder [C]. It will seat against the needle jet, pushing the end of the jet into the carburetor bore.
○ Carefully screw in the main jet.



CAUTION

Do not force the needle jet holder [A] and main jet [B] or overtighten them. They could be damaged requiring replacement.

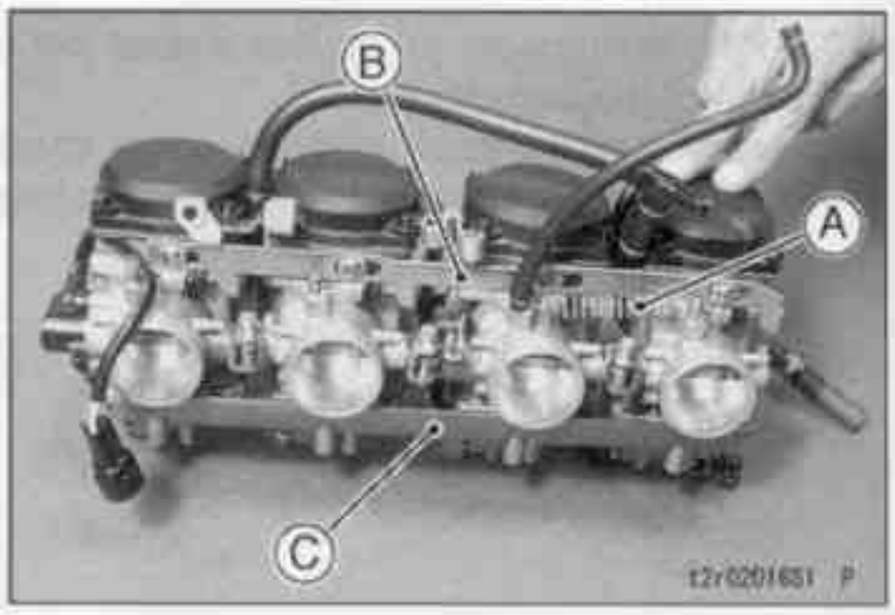


• After assembling the carburetors, check:
Fuel Level (see Fuel Level Inspection)
Starter Plunger Lever (see Carburetor Inspection)

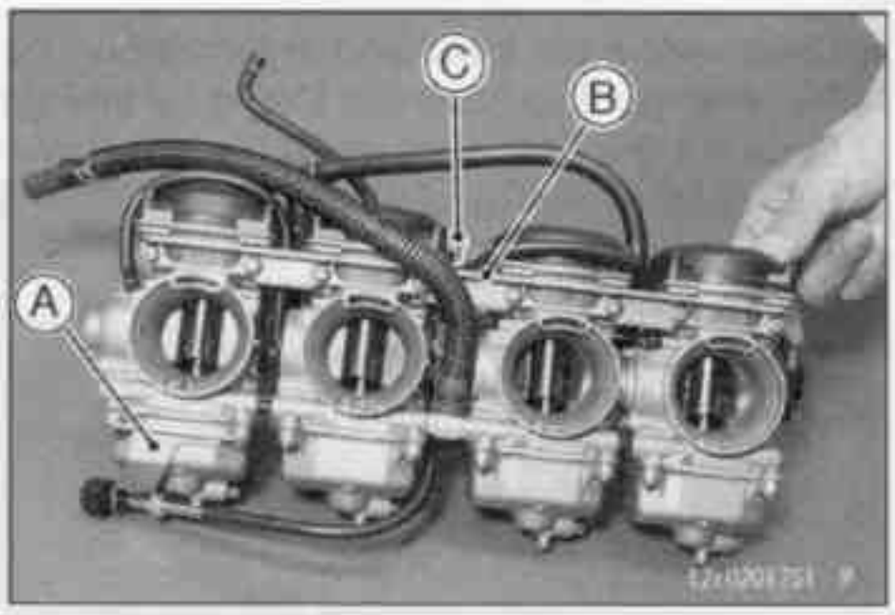
Carburetors

Carburetor Separation

- Remove the carburetor assembly (see Carburetor Removal).
- Read the WARNING in the Carburetor Disassembly/Assembly.
- Mark the carburetor locations (#1, #2, #3, and #4) so that the carburetors can be installed in their original positions.
- Remove (front view):
  Choke Return Spring [A]
  Starter Plunger Lever [B]
  Bracket [C]
  Coolant Hoses

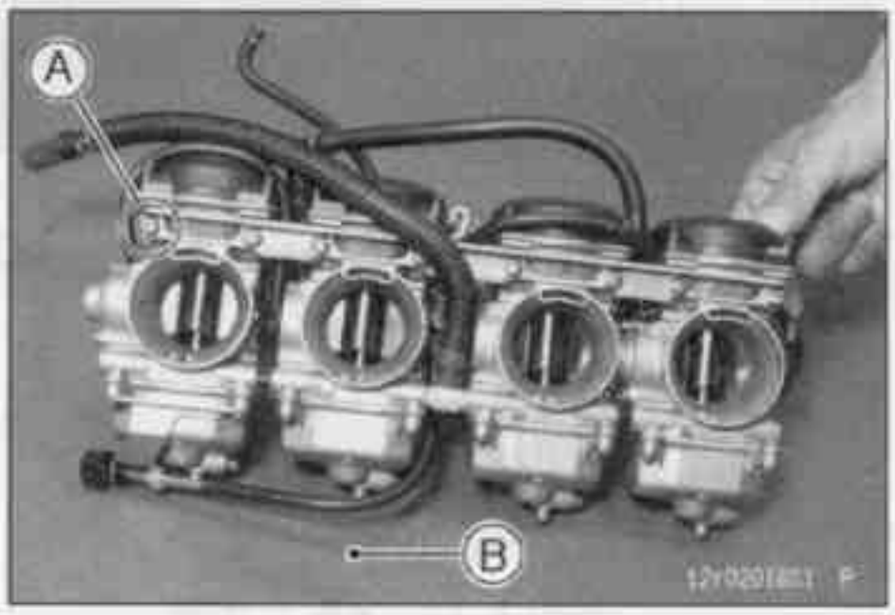


- Remove (rear view):
  Idle Adjusting Screw Holder and Screws [A]
  Bracket [B] and Screws
- Separate the carburetors.
- Do not remove the throttle holder [C] if the holder is not damaged.
- Do not remove the throttle valves.



Carburetor Joining

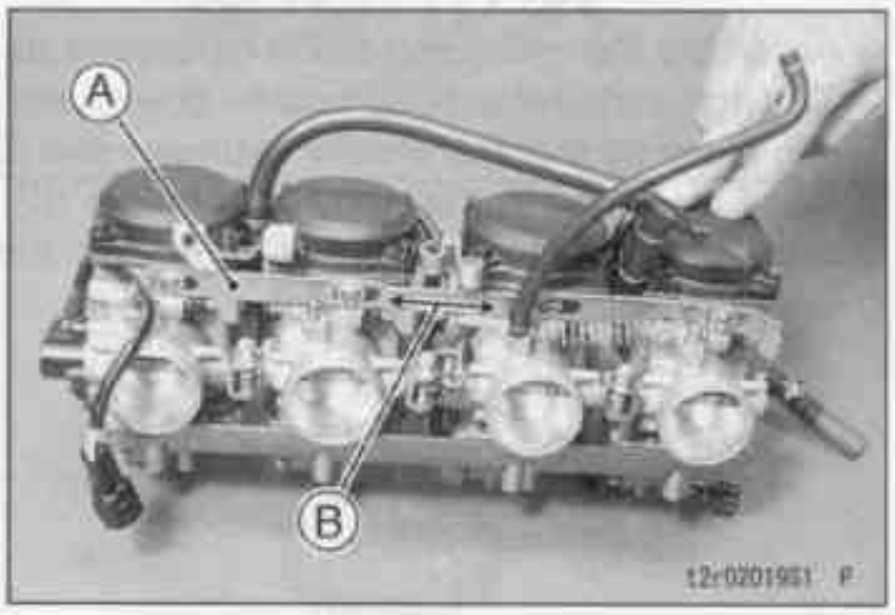
- The carburetor bores must be parallel both horizontally and vertically.
- Loosen the mounting screws [A] and align the carburetors with the outlet ends placed on a flat surface [B].
- Retighten the mounting screws.



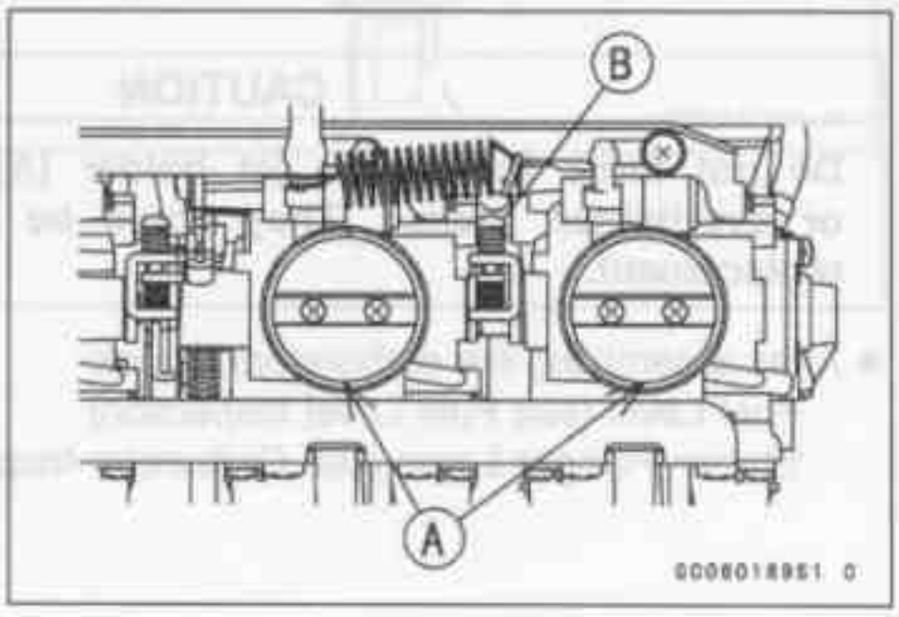
- After installing the choke mechanism, check to see that the starter plunger lever [A] slides right to left [B] smoothly without abnormal friction.

CAUTION

Fuel mixture trouble could result if the starter plunger doesn't seat properly in its rest position after the choke lever is returned.



- Visually synchronize the throttle (butterfly) valves.
  ○ Check to see that all throttle valves open and close smoothly without binding when turning the pulley.
  ○ Visually check the clearance [A] between the throttle valve and the carburetor bore in each carburetor.
  ★ If there is a difference between any two carburetors, turn the balance adjusting screw [B] to obtain the same clearance.
- Install the carburetors (see Carburetor Installation).
- Adjust the synchronization (see Synchronization Adjustment).



Carburetors

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, or the floats may be crushed by the pressure, and the vacuum piston diaphragms may be damaged.
Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor. This will prevent damage to or deterioration of the parts.
The carburetor body has plastic parts that cannot be removed. Do not use a strong carburetor cleaning solution which could attack these 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 (see this chapter).
- Immerse all the metal parts in a mild carburetor cleaning solution.
- Rinse the parts in water.
- When the parts are cleaned, dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Assemble the carburetor (see this chapter).

Carburetor Inspection

⚠ WARNING

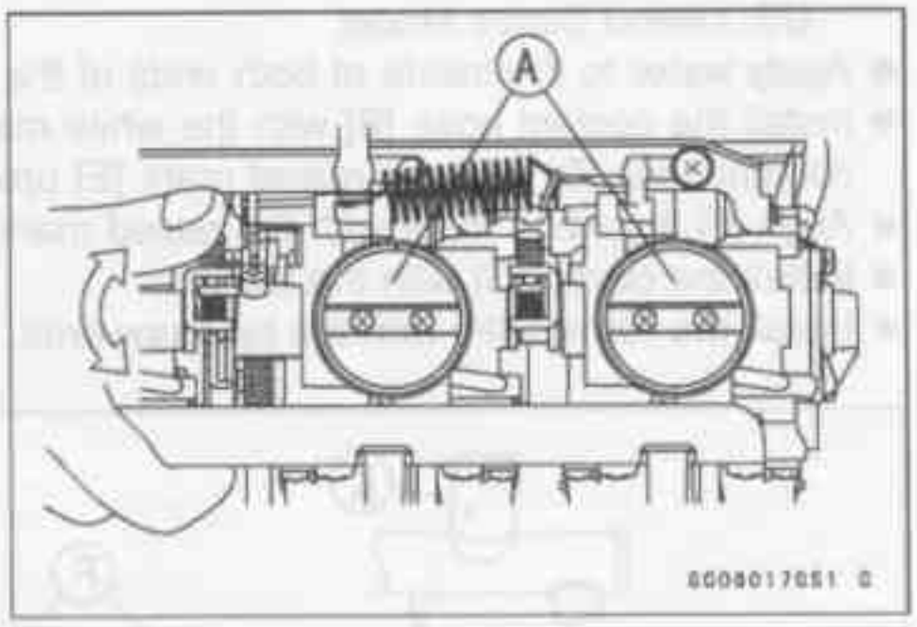
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Slide the starter plunger lever right to left to check that the starter plungers move smoothly and return with spring force.

★If the starter plungers do not work properly, replace the plungers, lever and/or the carburetors.

- Turn the throttle cable pulley to check that the throttle valves [A] move smoothly and return by spring force.

★If the throttle valves do not move smoothly, replace the carburetor assembly.

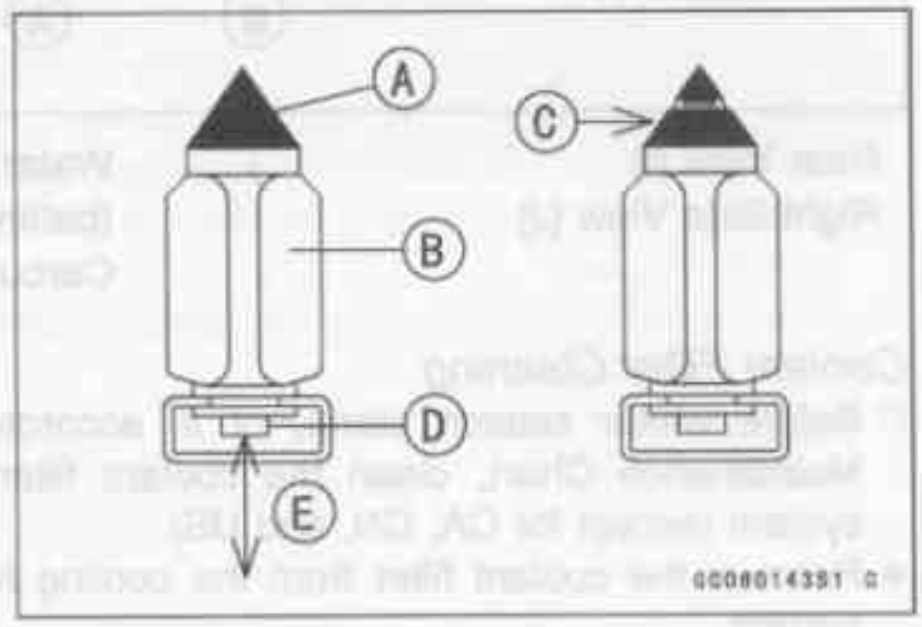


- Disassemble the carburetors (see this section).
- Check the plastic tip [A] of the float valve needle [B]. It should be smooth, without any grooves, scratches or tears.

★If the plastic tip is damaged [C], replace the needle.

- Push the rod [D] in the other end of the float valve needle, and then release it [E].

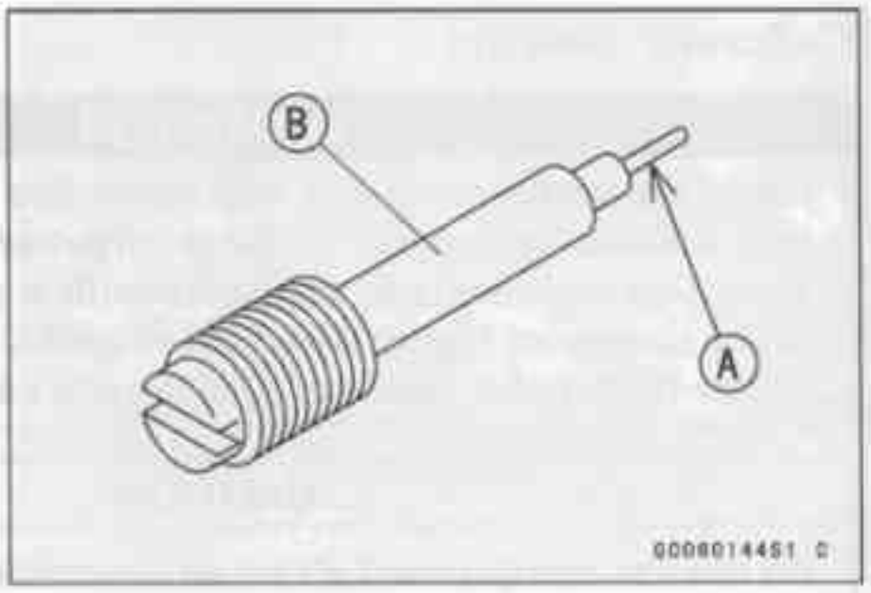
★If the rod does not spring out, replace the float valve needle.



Carburetors

- Check the tapered portion [A] of the pilot screw [B] for wear or damage.

★ If the pilot screw is worn or damaged on the tapered portion, it will prevent the engine from idling smoothly. Replace it.

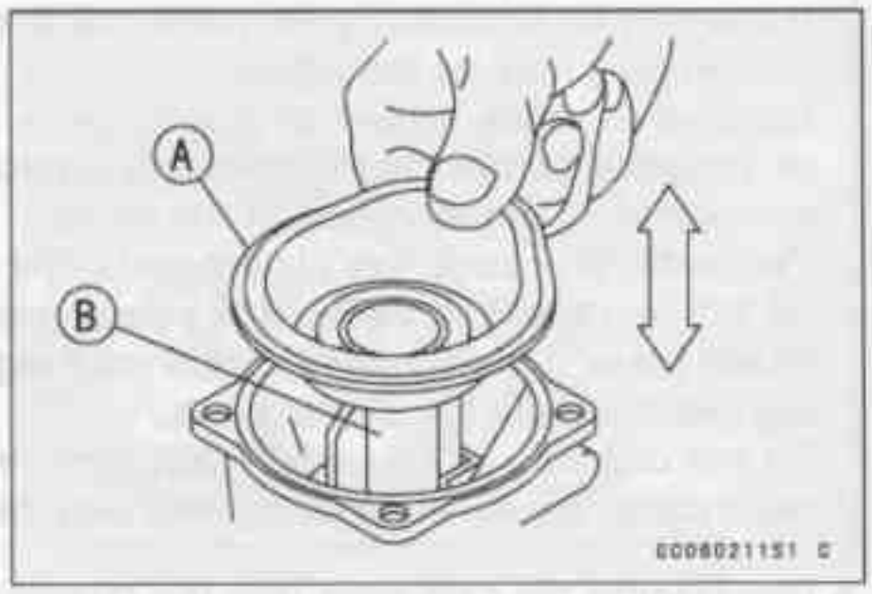


- Check that the diaphragm [A] of the vacuum piston is in good condition.

★ If the diaphragm is not in good condition, replace it.

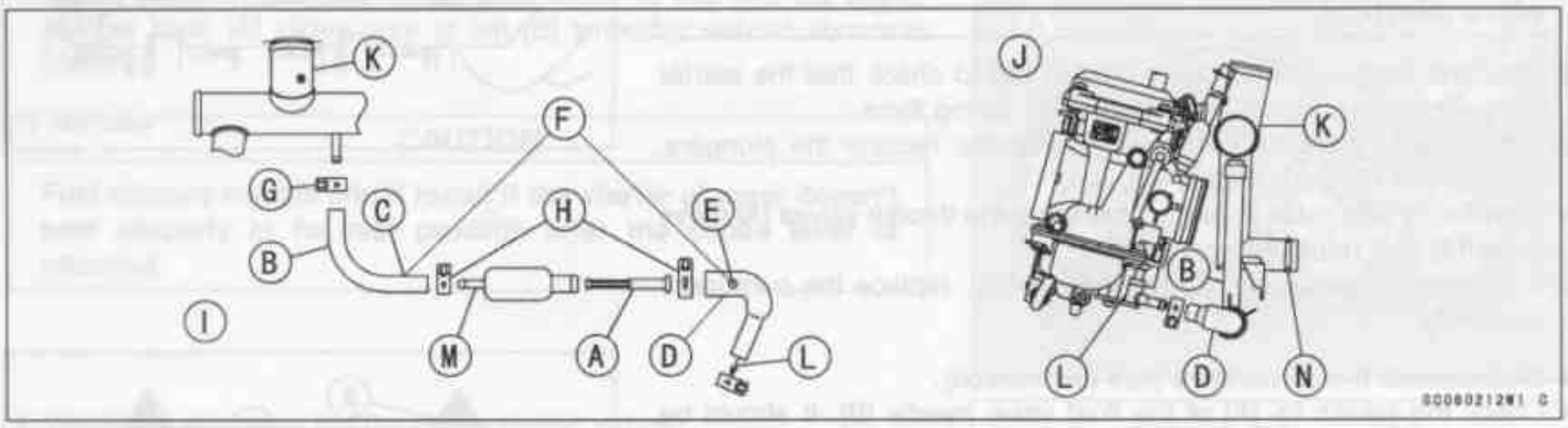
- Check that the vacuum piston [B] moves smoothly in the carburetor body. The surface of the piston must not be excessively worn.

★ If the vacuum piston does not move smoothly, or if it is very loose in carburetor body, replace the piston and/or the carburetor.



Coolant Filter Installation

- Install the coolant filter [A] (except for CA, CN, US) in the direction shown.
  CA: California Model
  CN: Canadian Model
  US: United States Model
- Apply water to the inside of both ends of the coolant hoses.
- Install the coolant hose [B] with the white mark [C] upwards and the coolant hose [D] with the raised mark [E] upwards.
- Align [F] the white mark with the raised mark.
- Install the clamp [G] with the tab left.
- Install the clamps [H] with the tabs upwards.



Rear View [I]
Right Side View [J]
Water Pipe [K] (behind the cylinder head)
Carburetor No.4 [L] (rightmost)
Coolant Filter Case [M]
Grease the O-ring [N]

Coolant Filter Cleaning

○ Before winter season starts, or in accordance with the Periodic Maintenance Chart, clean the coolant filter [A] in the carburetor system (except for CA, CN, and US).

- Remove the coolant filter from the cooling hoses in the carburetor system.
- Plug the coolant hose immediately and wash away any coolant that spills on the engine.
- Blow dirt and sediment off the filter with compressed air.

Carburetors

Coolant Valve Inspection

- Remove the coolant valve on the engine left side (except for CA, CN, and US).
- Inspect the coolant valve [A] at room temperature.

★If the valve is open, the valve is normal.

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

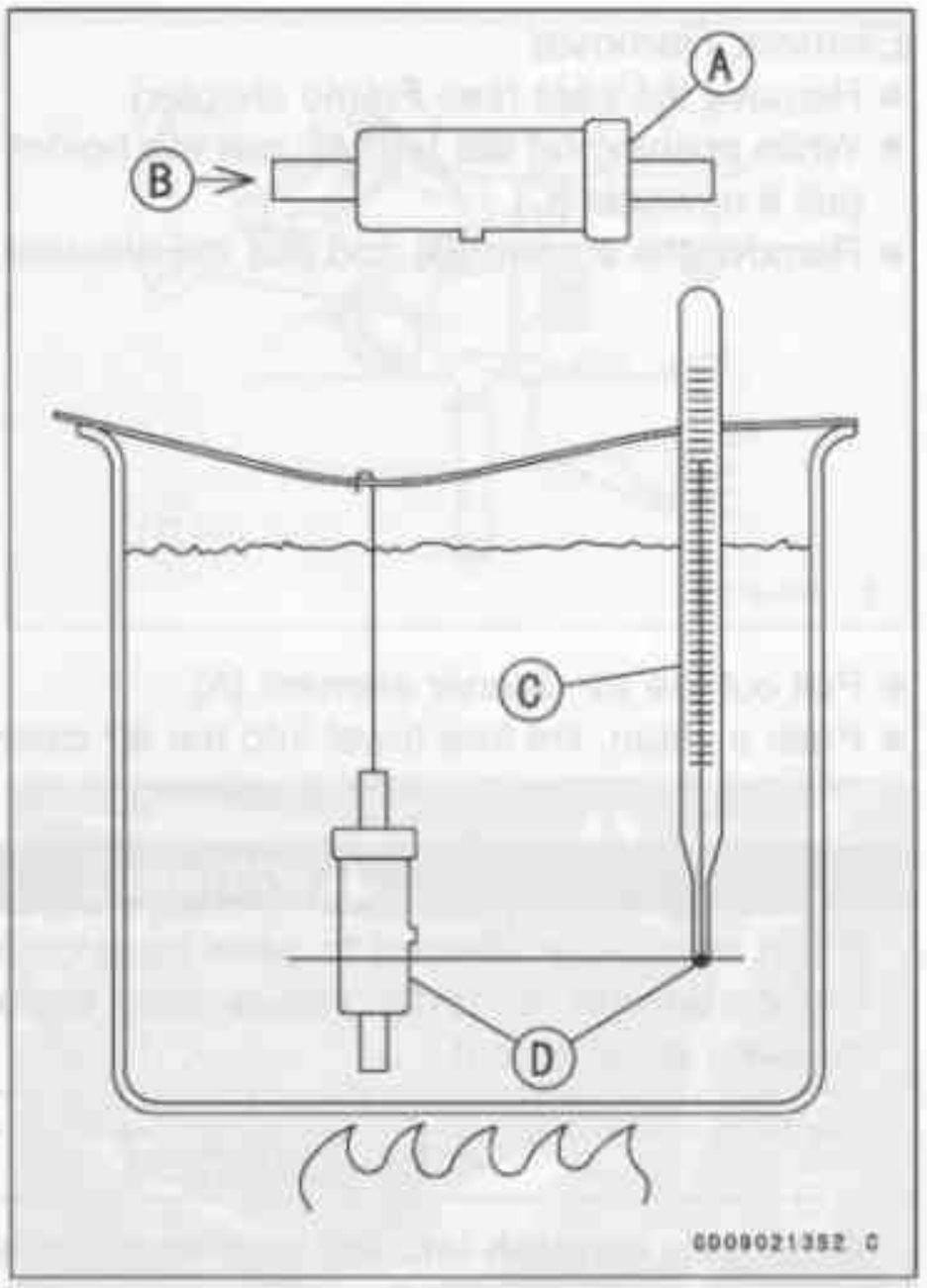
○ To check valve opening, just blow through the valve in the direction shown [B].

○ The valve closes at about 70 °C (158 °F). This is to prevent vaper lock in the fuel hoses and percolation in the float bowls.

- To check valve closing temperature roughly, suspend the coolant valve [A] and a thermometer [C] in a container of water with the heat-sensitive portions [D] in almost the same depth.
- Gradually raise the temperature of the water and wait about 5 minutes while stirring the water gently for even temperature.

Valve Closing Temperature

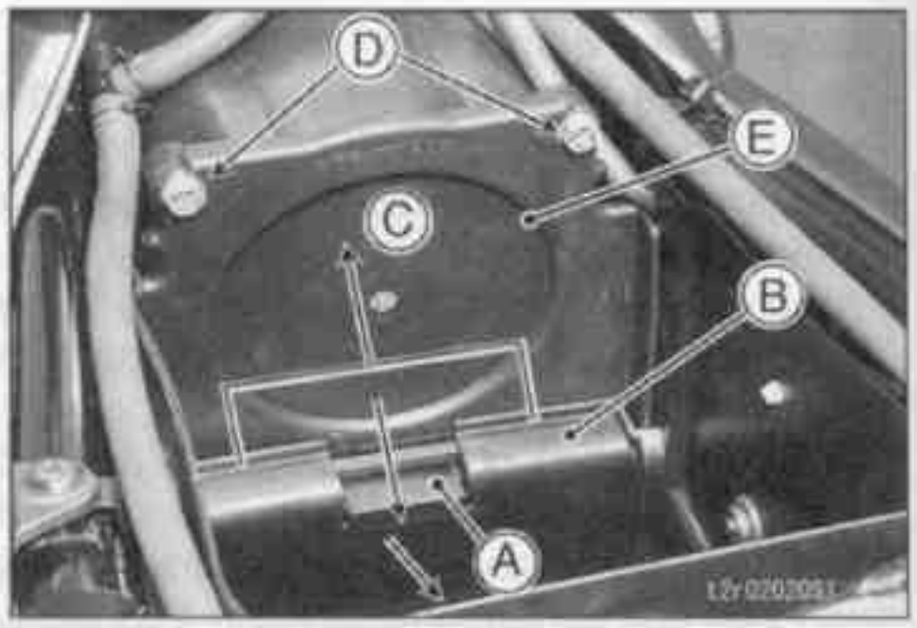
Standard: about 70° (158°F) or more



Air Cleaner

Element Removal

- Remove the seat (see Frame chapter).
- While pushing on the tab [A], pull the holder [B] back to unlatch and pull it upwards [C].
- Remove the screws [D] and pull the element cover [E] out.



- Pull out the air cleaner element [A].
- Push a clean, lint-free towel into the air cleaner housing to keep dirt or other foreign material from entering.



⚠ WARNING

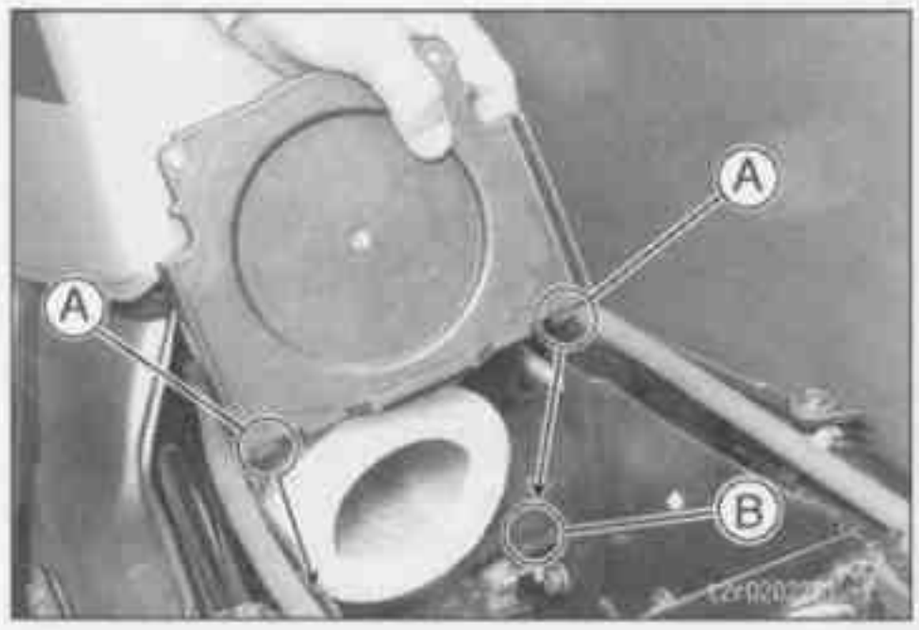
If dirt or dust is allowed to pass through into the carburetors, the carburetor butterfly valves may become stuck, possibly causing an accident.

CAUTION

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

Element Installation

- Fit the tabs [A] into the slits [B] in the rear air cleaner housing.



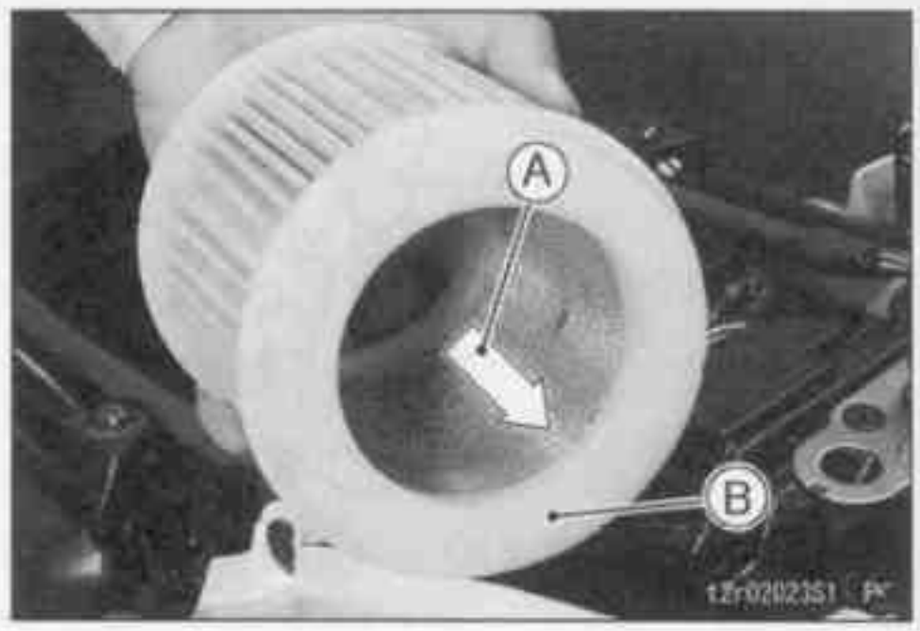
Element Cleaning and Inspection

NOTE

- *In accordance with the Periodic Maintenance Chart, clean the element.*
- *In dusty areas, the element should be cleaned more frequently than the recommende interval.*
- *After riding through rain or on muddy roads, the element should be cleaned immediately.*

- Remove the air cleaner element (see Element Removal).
- Clean the element by tapping it lightly to loosen dust.
- Blow away the remaining dust by applying compressed air [A] from the inside to the outside (from the clean side to the dirty side).
- Visually check the element for tears or breaks and check the sponge gasket [B] also.

★ If the element or gasket has any tears or breaks, replace the element.



Air Cleaner

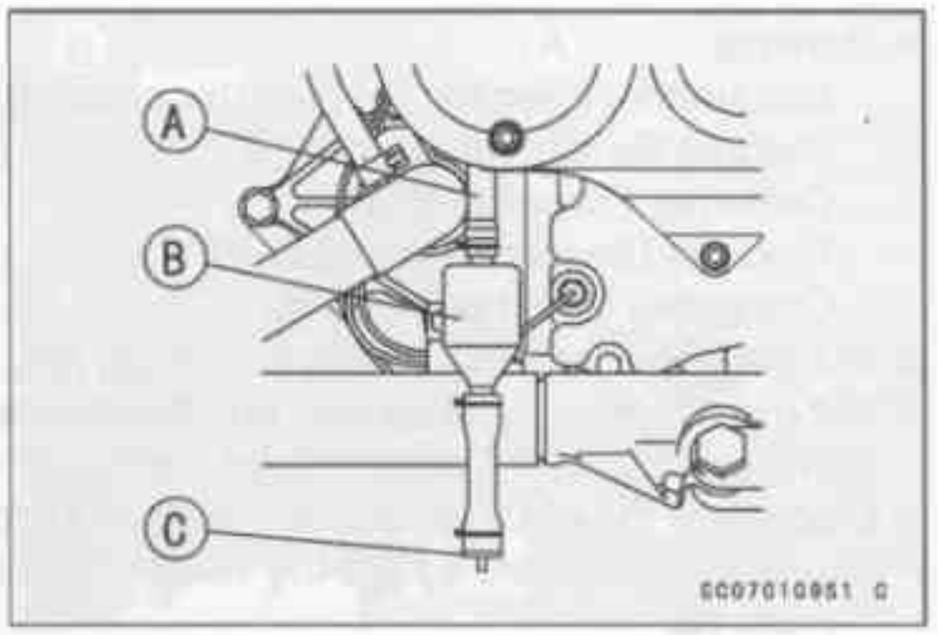
Air Cleaner Draining

○ A drain hose [A] is connected to the bottom of the front air cleaner housing to drain water or oil accumulated at the bottom of the housing.

● Visually check the catch tank [B] at the same time when changing oil or if the water or oil accumulates in the tank.

★ If any water or oil accumulates in the tank, drain it by taking off the drain plug [C] at the lower end of the drain hose.

● After draining, be sure to install the plug firmly, or the air will be drawn in through it.



⚠ WARNING

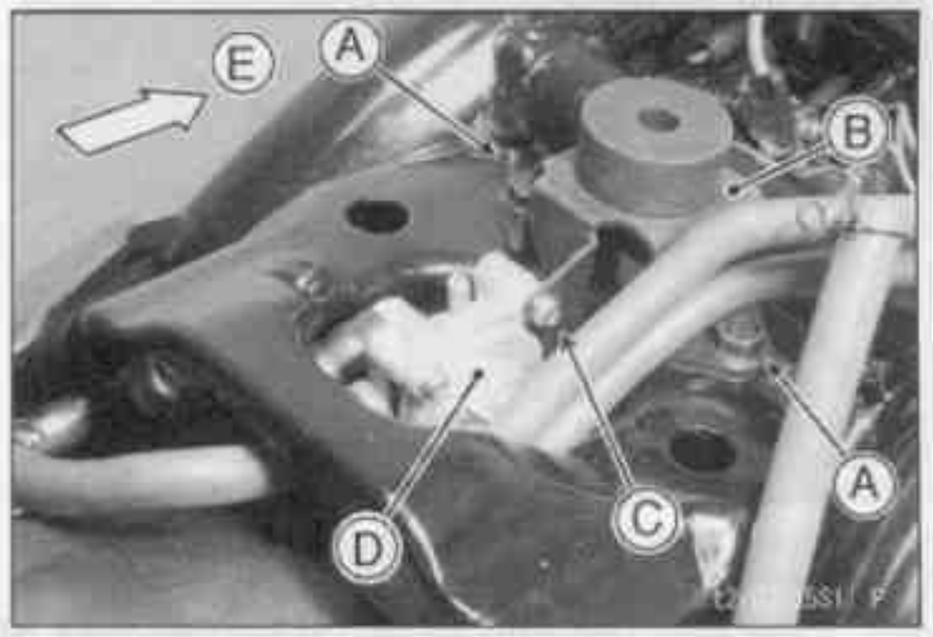
Be sure to install the plug in the drain hose after draining. Oil could drain from the open hose and get on the tires which could cause an accident and injury.

Front Air Cleaner Housing Removal

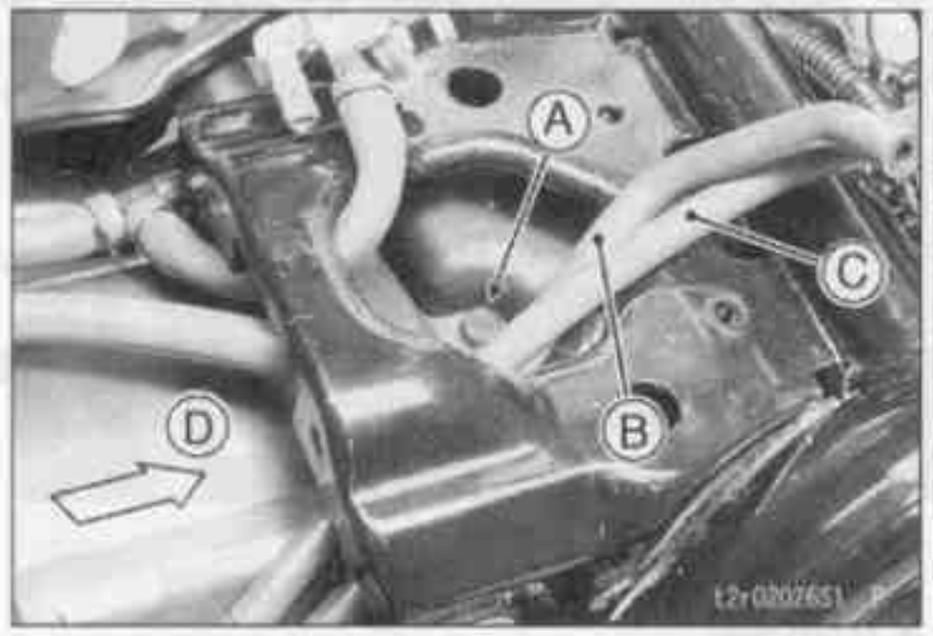
● Remove:
Right Side Cover (see Frame chapter)
Bolt [A] and Air Cleaner Inlet [B]
Front [C]



● Remove:
Seat (see Frame chapter)
Fuel Tank (see this chapter)
Bolts [A] and Fuel Tank Bracket [B]
Screws [C] and California Vacuum Valve [D]
Front [E]

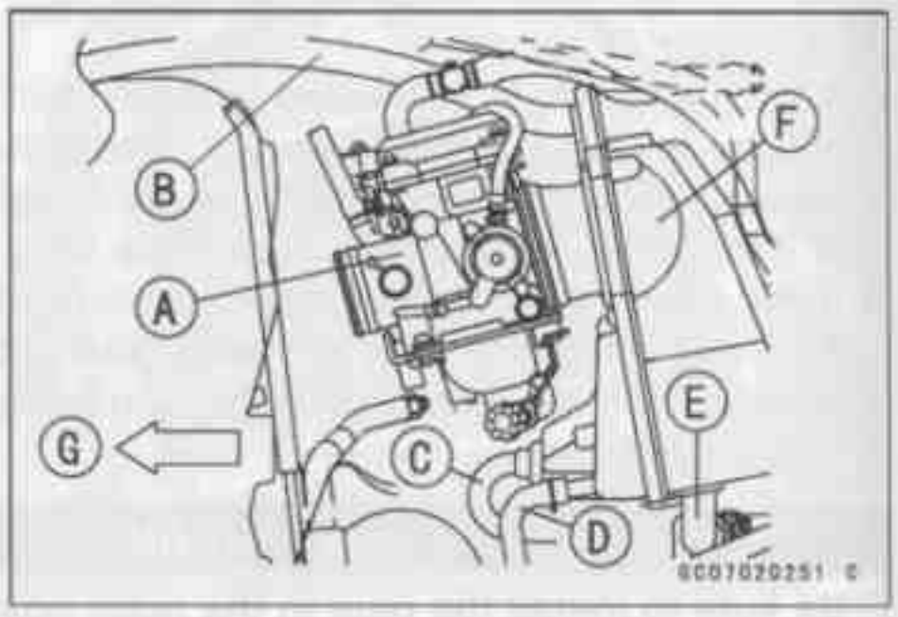


● Remove:
Fuel Tank Filler Drain Hose
Front-Rear Air Cleaner Upper Bolt [A]
Fuel Tank Breather Hose [B] (blue, left, CA)
Fuel Tank Return Hose [C] (red, right, CA)
Front [D]
(CA): California Model



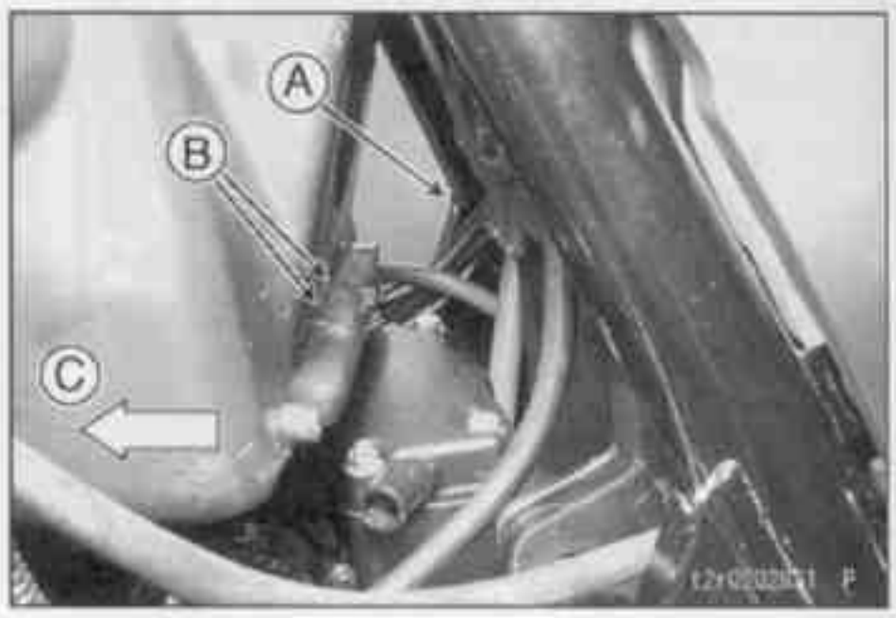
Air Cleaner

- Remove:
  Carburetor Assembly [A] (see this chapter)
  Vacuum Switch Valve Hose [B]
  California Purge Hose [C]
  Front Air Cleaner Drain Hose [D]
  Crankcase Breather Hose [E]
- Put the upper harness and leads on the left.
- Put the alternator, pickup coil, and throttle sensor connectors on the frame top to prevent them sticking on the air cleaner housing.
- Disengage the front air cleaner housing [F] from the rear air cleaner housing and remove it from the vehicle right side.
  Front [G]

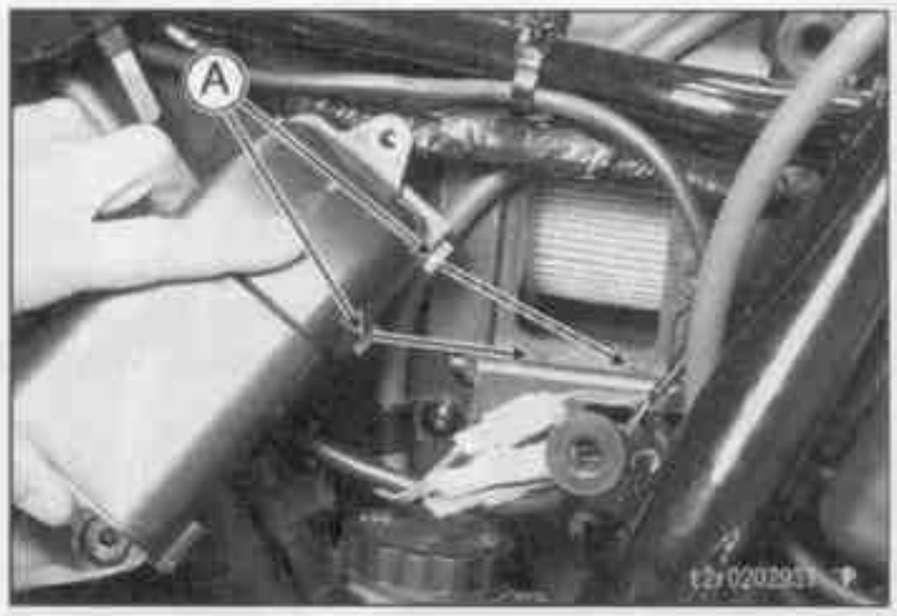


Front Air Cleaner Housing Installation

- Install the front air cleaner housing from the vehicle right side.
- Fit the rear air cleaner housing hooks [A] into the grooves [B] of the front air cleaner housing.
  Front [C]
- Tighten:
  Front-Rear Air Cleaner Upper Bolt

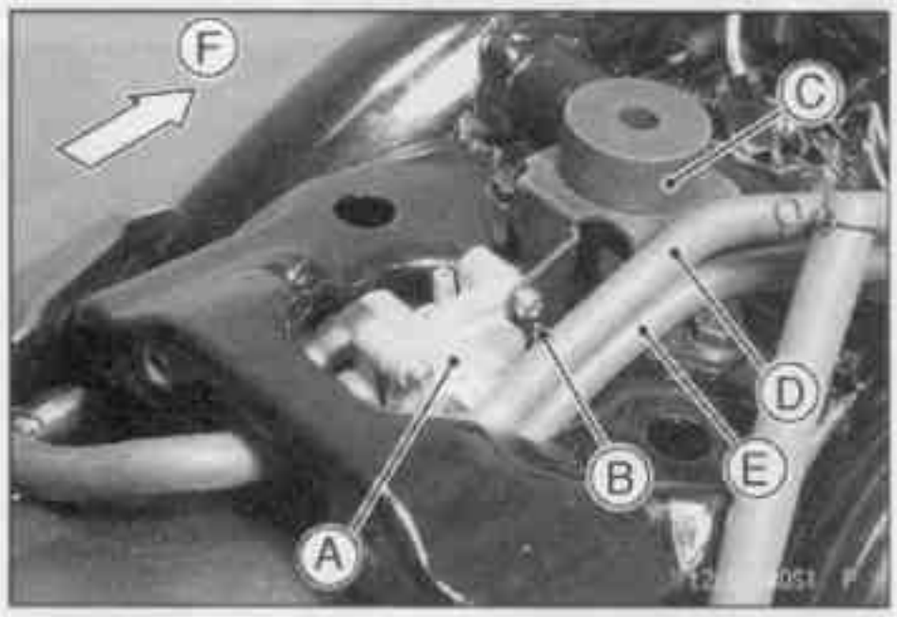


- Fit the tabs [A] of the air cleaner inlet into the slits of the rear air cleaner housing.
- Install:
  California Vacuum Switch Hose
  California Purge Hose
  Crankcase Breather Hose
  Air Cleaner Drain Hose



- Install:
  California Vacuum Valve [A] and Screws [B]
  Fuel Tank Bracket [C]
- Run the California Evaporative Emission Control hoses on the right side of the fuel tank bracket as shown.

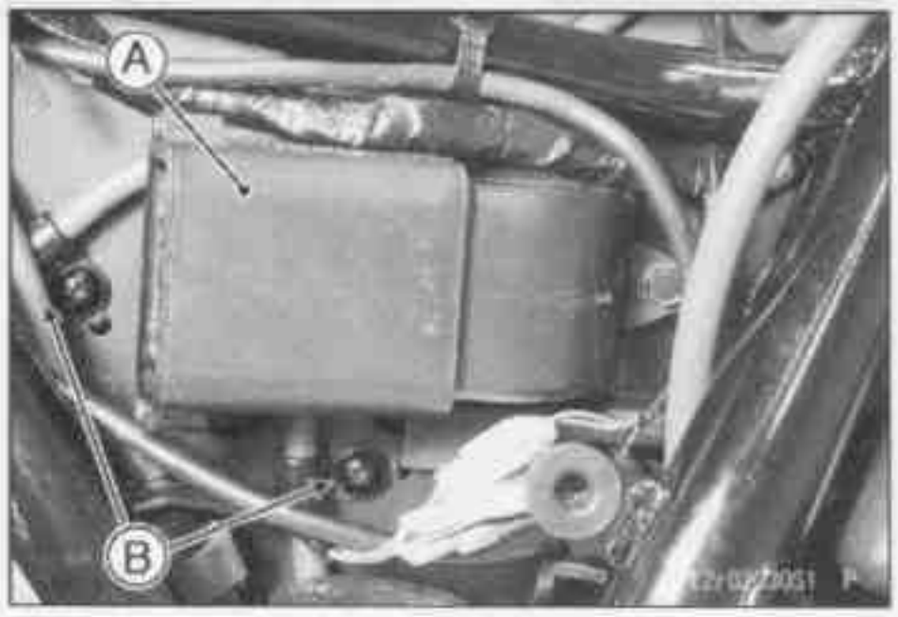
○ Connect:
Fuel Tank Breather Hose [D] (blue, left) → Left Fuel Tank Pipe with blue mark
Fuel Tank Return Hose [E] (red, right) → Right Fuel Tank Pipe with red mark
Front [F]



Rear Air Cleaner Housing Removal

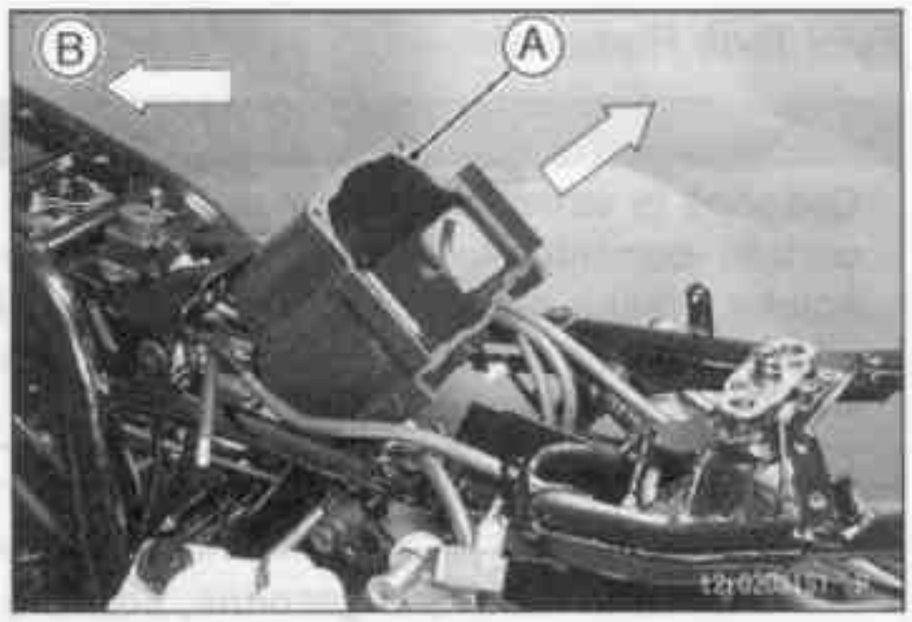
- Remove:
  Carburetor Assembly (see this chapter)
  Air Cleaner Inlet [A]
  Right Side Hoses and Clamps [B]
  Front Air Cleaner Housing (see this chapter)
  Coolant Reserve Tank (see Cooling System chapter)
  Battery and Leads (see Electrical System chapter)
- Put the battery lead terminals outside the frame.
- Remove the seat cover and rear fender (see Frame chapter).

○ Unscrew the screws and just separate the rear fender from the frame (Do not remove the rear wheel).
○ Be careful that the hoses and leads are not caught between the rear fender and the frame.

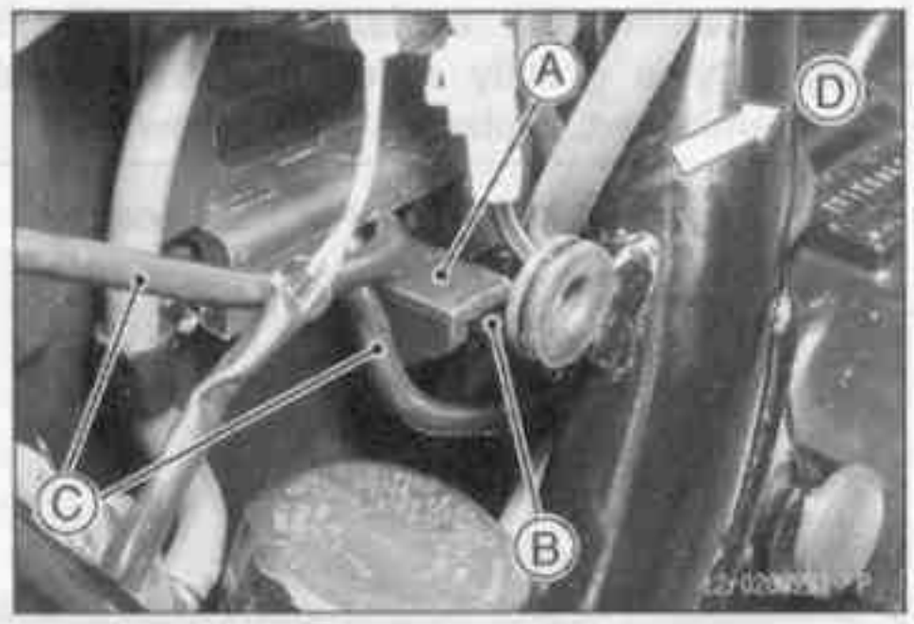


Air Cleaner

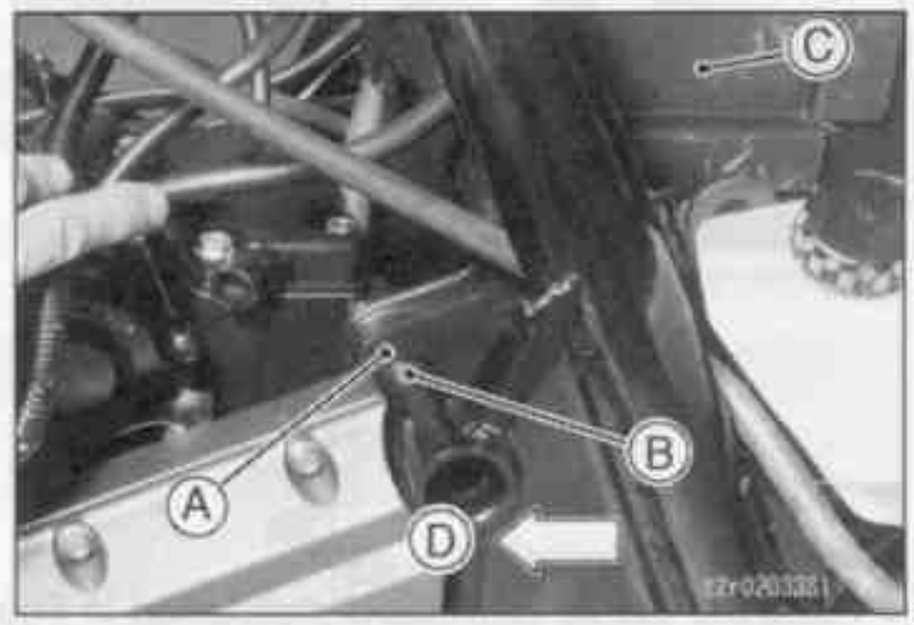
- Take the rear air cleaner housing [A] out of the frame.
  Front [B]



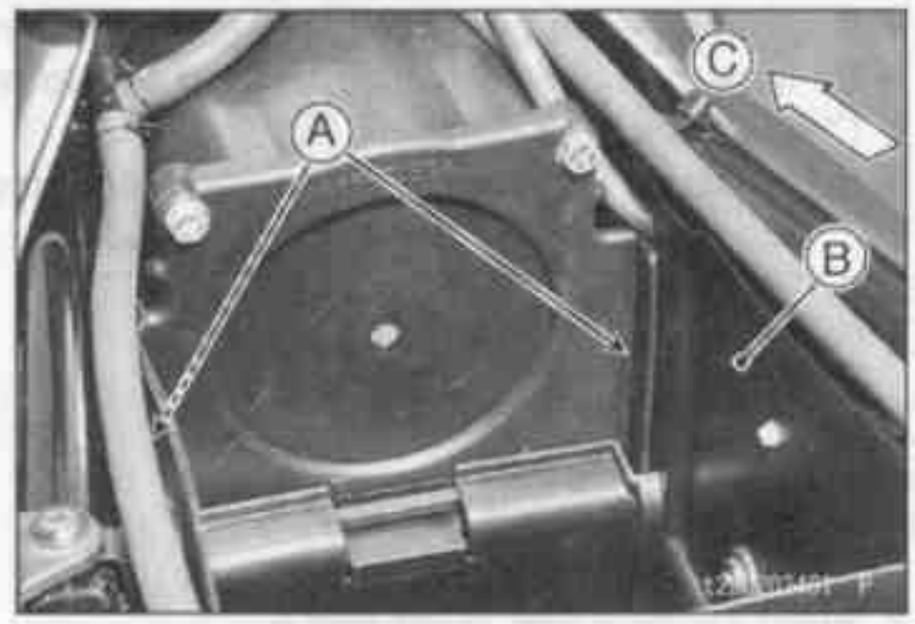
Rear Air Cleaner Housing Installation
- Install the rear fender in the original position:
  - Be careful not to pinch the hoses and leads with the rear fender.
  - Put the rear fender tab [A] onto the frame bracket [B].
  - Run the battery leads [C] into the battery case of the rear fender.
    Front [D]



  - Put the hook [A] of the rear fender onto the collar [B] of the rear engine mounting bolt.
  - Tighten the rear fender screws.
- Install the rear air cleaner housing [C].
  Front [D]



- Fit both tails [A] of the rear air cleaner housing inside the rear fender [B].
  Front [C]
- Install the front air cleaner housing (see this chapter).
- Tighten:
  Front-Rear Air Cleaner Upper Bolt
  Front Air Cleaner Upper Bolts (2)
- Install the removed parts:
  Battery (see Electrical System chapter)



Fuel Tank

Fuel Tank Removal

⚠ WARNING

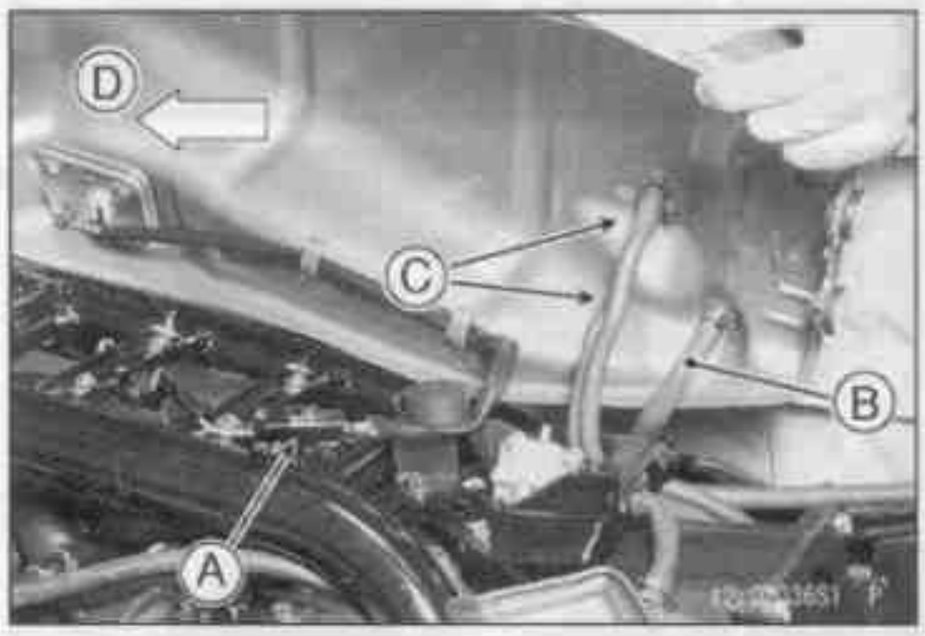
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

CAUTION

For California model, if gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced. If the canister does become contaminated, replace it with a new one.



- Turn the fuel tap to the ON or RES position.
- Remove:
  - Seat (see Frame chapter)
  - Fuel Hose [A]
  - Fuel Tap Vacuum Hose [B]
  - Fuel Tank Bolts [C]

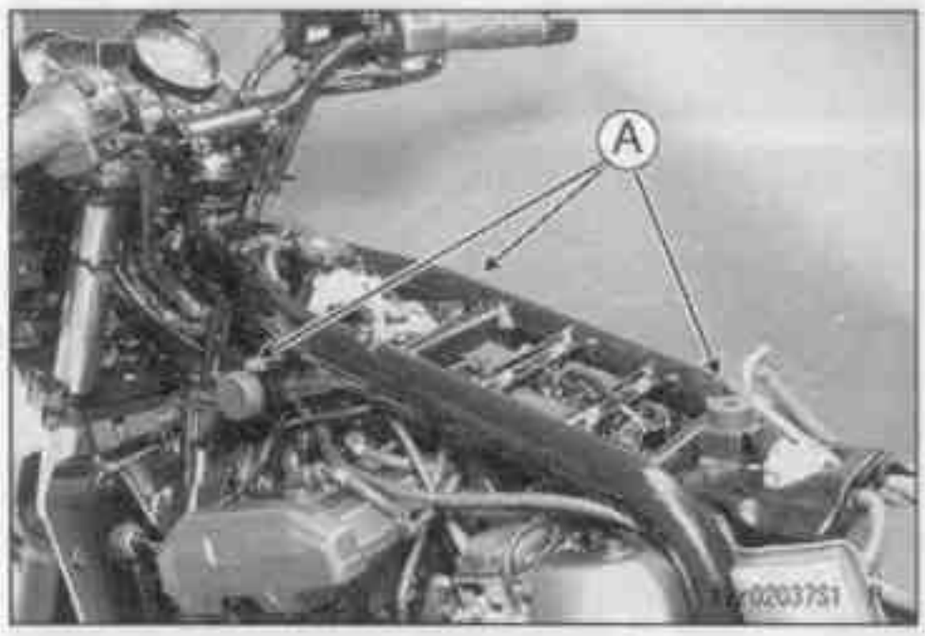


- Raise the fuel tank.
- Disconnect the fuel level sensor lead connector [A].
- Remove:
  - Fuel Tank Filler Drain Hose [B]
  - California Breather and Return Hoses [C]
  - Front [D]
- Remove the fuel tank from the frame.

Fuel Tank Installation

- Read the above WARNING mentioned in Fuel Tank removal.
- Route the hoses correctly (see General Information chapter).
- Be sure the hoses are clamped securely to prevent leaks.
- Check the rubber dampers [A].

★ If any damper is damaged or deteriorated, replace it.



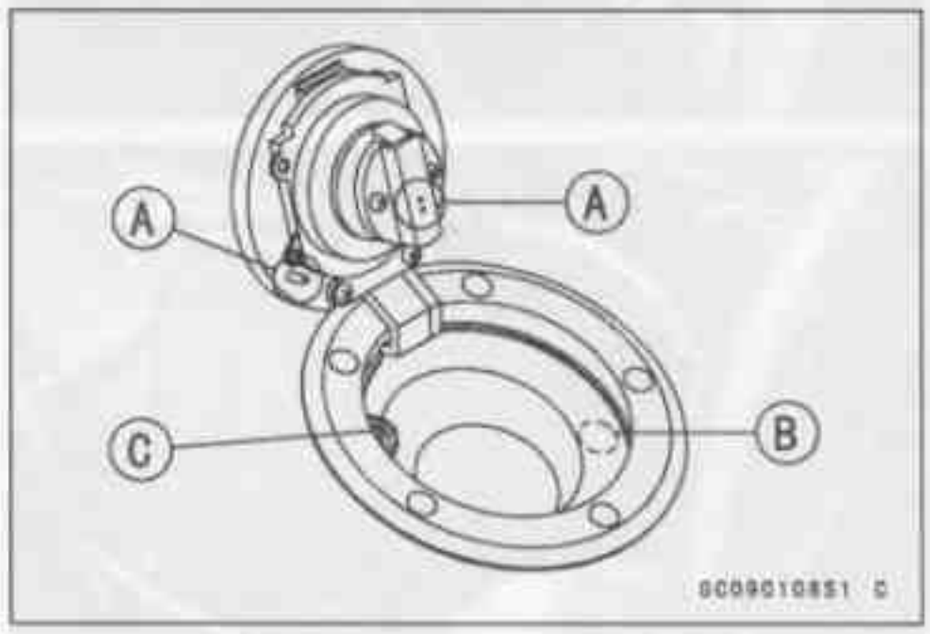
Fuel Tank Inspection

- Open the tank cap (front view).
- Check to see if the filler drain pipe [B], the California breather pipe [C] in the tank is not clogged.

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

CAUTION

Do not apply compressed air to the air vent holes [A] in the tank cap. This could cause damage and clogging of the labyrinth in the cap.



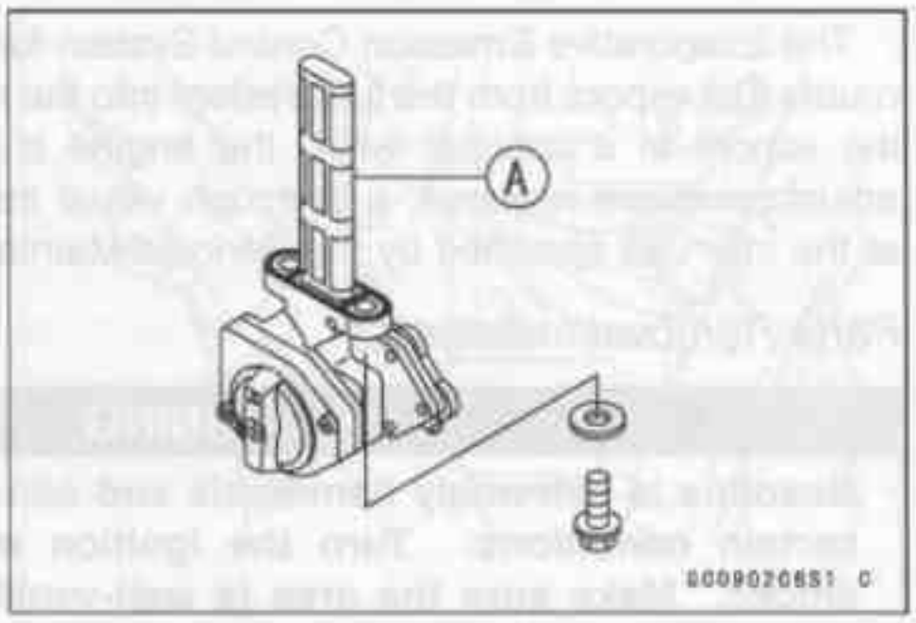
Fuel Tank

Fuel Tank Cleaning

⚠ WARNING

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

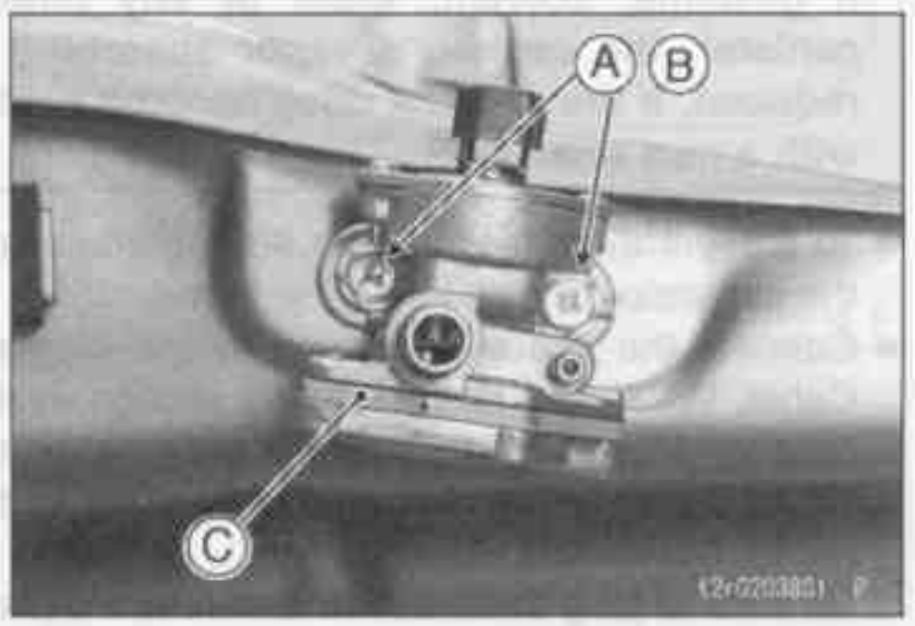
- Remove the fuel tank and drain it.
- Pour some high-flash point solvent into the fuel tank and shake the tank to remove dirt and fuel deposits.
- Pour the solvent out of the tank.
- Remove the fuel tap from the tank (see Fuel Tap Removal).
- Clean the fuel tap filter screens [A] in a high-flash point solvent.
- Dry the tank and fuel tap with compressed air.
- Install the fuel tap on the tank.
- Install the fuel tank (see Fuel Tank Installation).



Fuel Tap Removal

- Remove the fuel tank and drain it (see this chapter).
- Remove:

  Fuel Tap Bolts [A]
  Nylon Flat Washers [B]
  Fuel Tap [C]



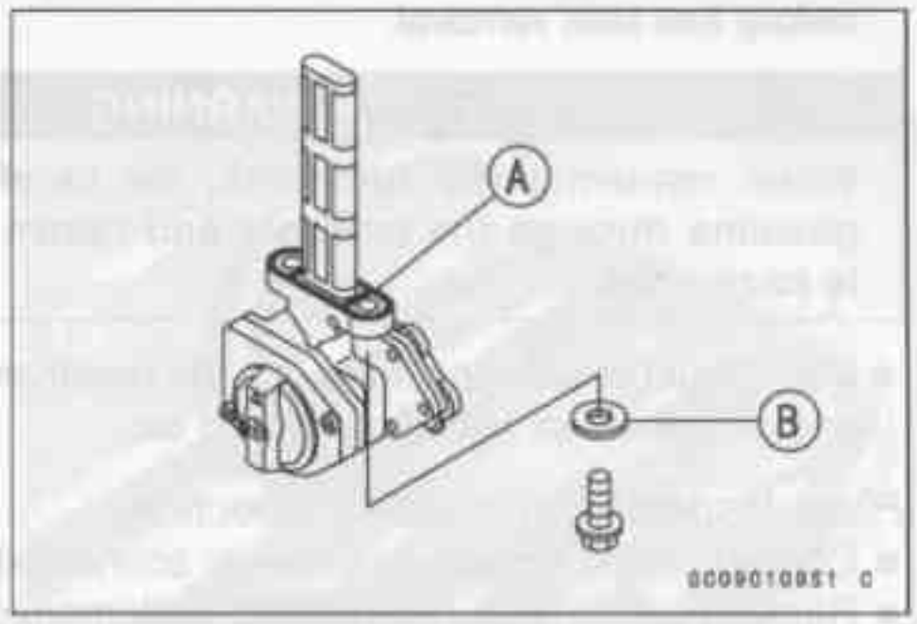
Fuel Tap Installation

- Be sure the O-ring [A] is in good condition to prevent leaks.
- Be sure the nylon flat washers [B] are in good condition to prevent leaks.

○ Do not use steel washers in place of the nylon flat washers, because they will not seal the bolts properly and fuel will leak.

- Be sure to clamp the fuel hoses to the tap to prevent leaks.

Torque - Fuel Tap Bolts: 2.5 N·m (0.25 kg-m, 22 in·lb)

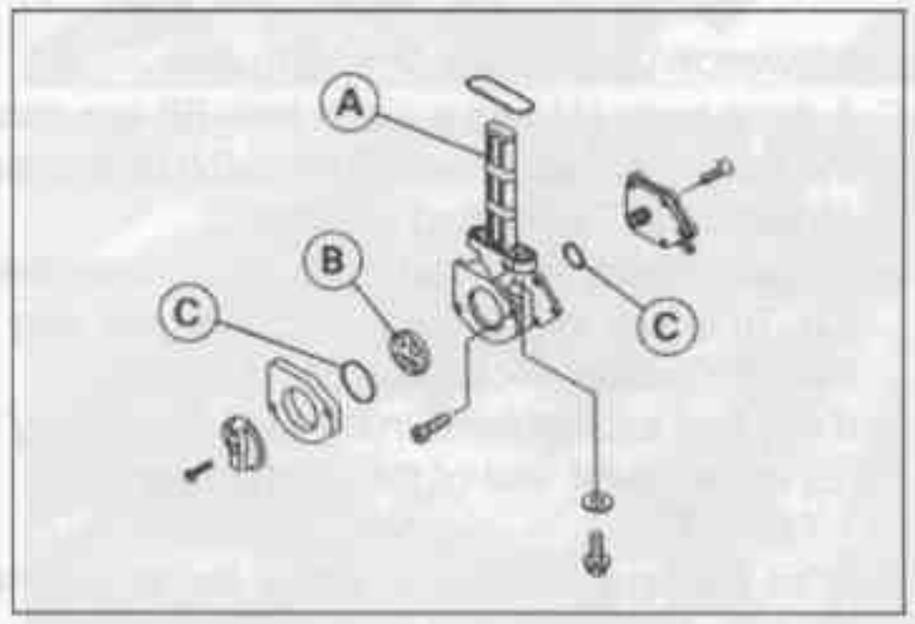


Fuel Tap Inspection

- Remove the fuel tap.
- Check the fuel tap filter screen [A] for any breaks or deterioration.

★ If the screens have any breaks or are deteriorated, they 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 at OFF position, replace the damaged gasket [B] or O-rings [C].



Evaporative Emission Control System (CA)

The Evaporative Emission Control System for California models (CA) routes fuel vapors from the fuel system into the running engine or stores the vapors in a canister when the engine is stopped. Although no adjustments are required, a thorough visual inspection must be made at the intervals specified by the Periodic Maintenance Chart.

Parts Removal/Installation

⚠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.

CAUTION

If gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced. If the canister does become contaminated, replace it with a new one.

- To prevent the gasoline from flowing into or out of the canister, hold the separator in position in the frame.
- Connect the hoses according to the diagram of the system (see Cable, Wire, and Hose Routing section in the General Information chapter).Make sure they do not get pinched or kinked.
- Route hoses with a minimum of bending so that the air or vapor will not be obstructed.
- Be sure to plug the breather and return pipes to prevent fuel spilling before fuel tank removal.

⚠WARNING

When removing the fuel tank, be careful not to spill the gasoline through the breather and return pipes. Spilled fuel is hazardous.

★ If any liquid or gasoline flows into the breather hose, remove the hose and blow it clean with compressed air.

Hose Inspection (Periodic Inspection)

- Check that the hoses are securely connected.
- Replace any kinked, deteriorated or damaged hoses.

Carburetor Vent Hose Draining

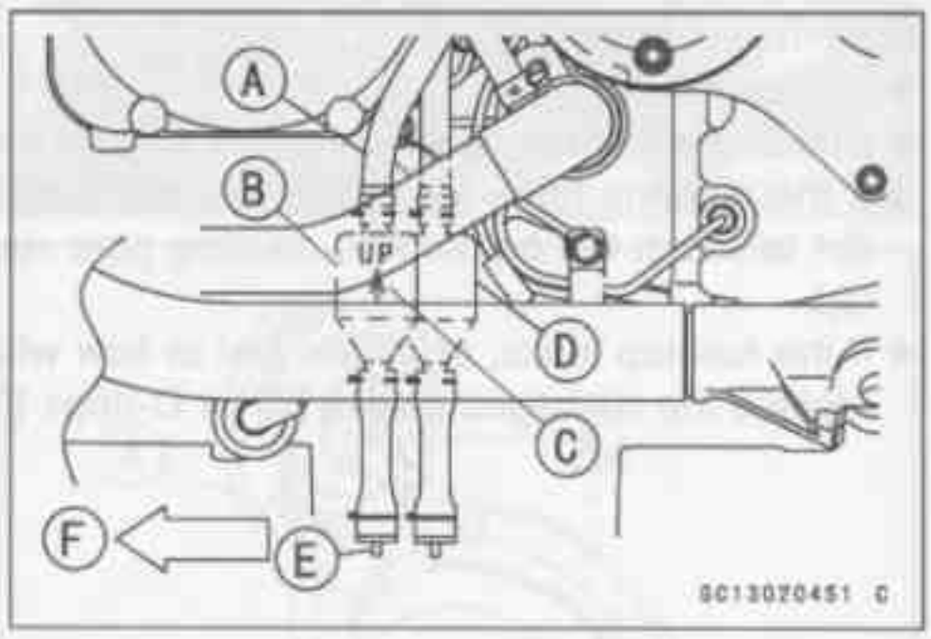
○ A drain hose [A] and a catch tank [B] are connected to the bottom of the carburetor vent hose. The catch tank should be installed with the arrow mark [C] pointing upwards.

- Visually check the catch tank along with the air cleaner catch tank [D]. To check the air cleaner catch tank, see Air Cleaner Draining in the Air Cleaner section of this chapter,

★ If any fuel accumulates in the tank, drain it by taking off the drain plug [E] at the lower end of the drain hose.

Front [F]

- After draining, be sure to install the plug firmly or the fuel vapor will escape.

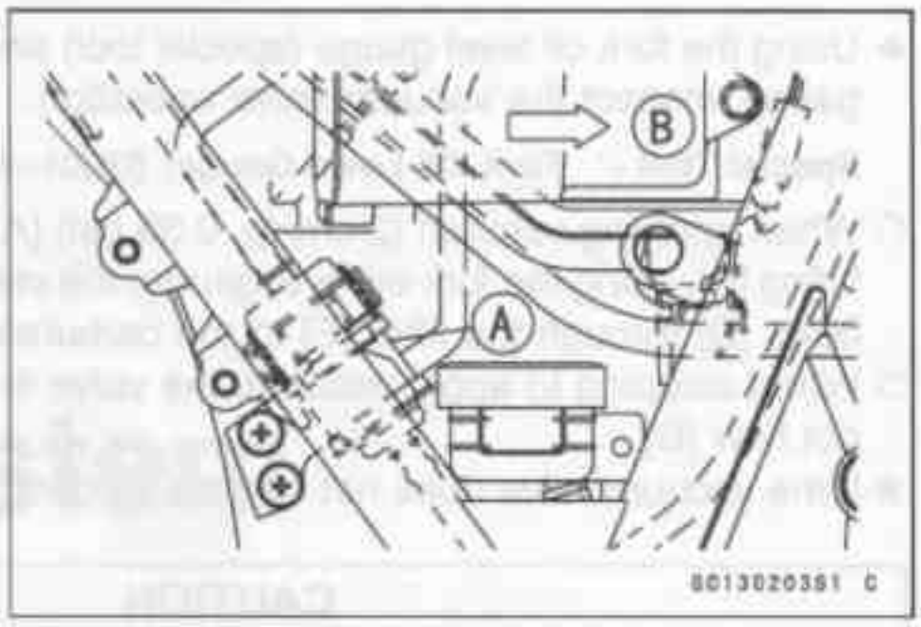


Evaporative Emission Control System (CA)

Separator Inspection (Periodic Inspection)

- Remove the right side cover (see Frame chapter).
- Disconnect the hoses from the liquid/vapor separator, and remove the separator [A] from the motorcycle.
  Front [B]
- Visually inspect the separator for cracks and other damage.

★ If the separator has any cracks or is badly damaged, replace it with a new one.



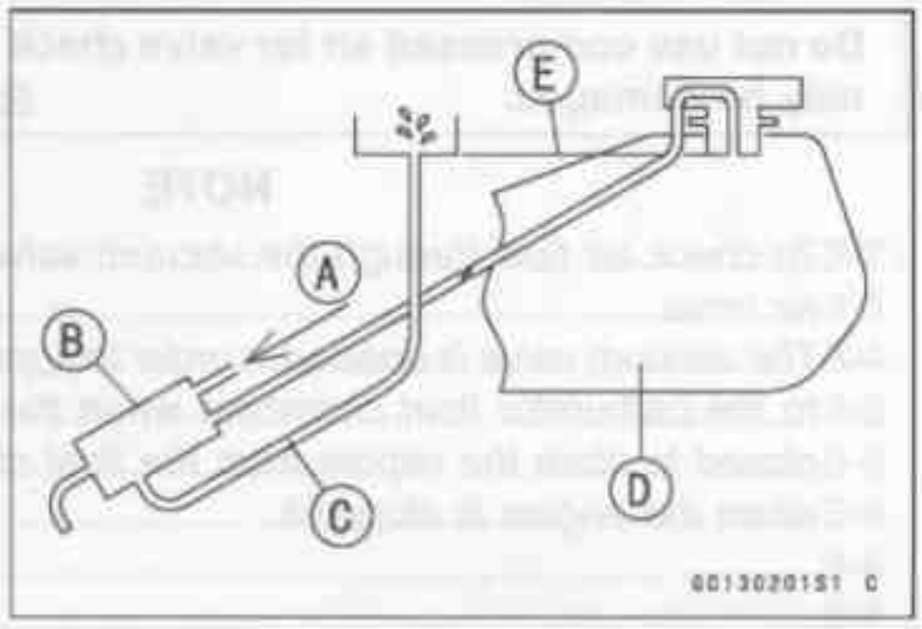
Separator Operation Test

⚠ 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 right side cover (see Frame chapter).
- Disconnect the breather hose (blue) from the separator in the frame and inject about **20 mL** of gasoline [A] into the separator [B] through the hose fitting.
- Disconnect the fuel return hose (red) [C] from the fuel tank [D].
- Run the open end of the return hose into the container level with the tank top [E].
- Start the engine, and let it idle.

★ If the gasoline in the separator comes out of the hose, the separator works well. If it does not, replace the separator with a new one.



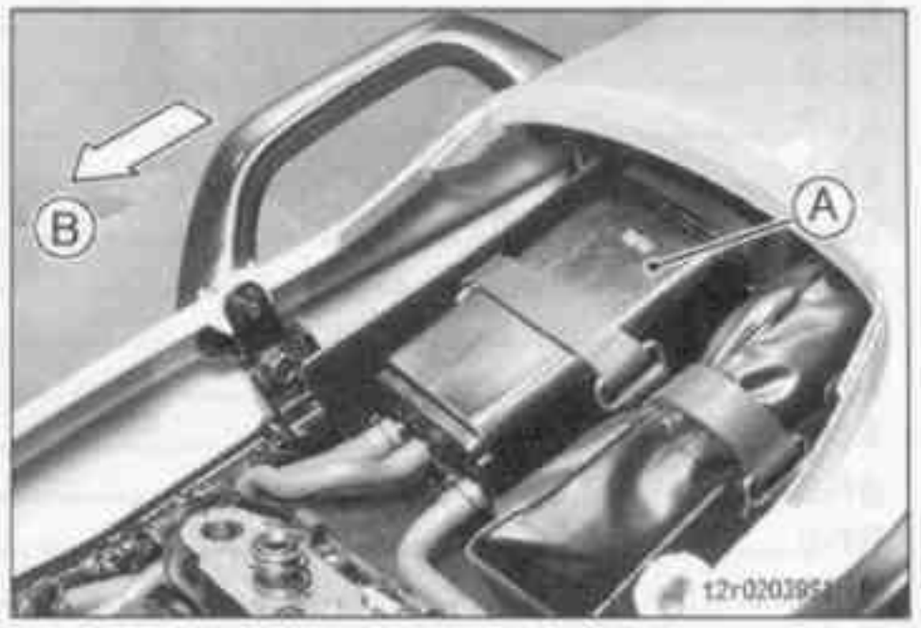
Canister Inspection (Periodic Inspection)

- Remove the seat (see Frame chapter).
- Remove the canister [A]
  Front [B]
- Visually inspect the canister for cracks and other damage.

★ If the canister has any cracks or bad damage, replace it with a new one.

NOTE

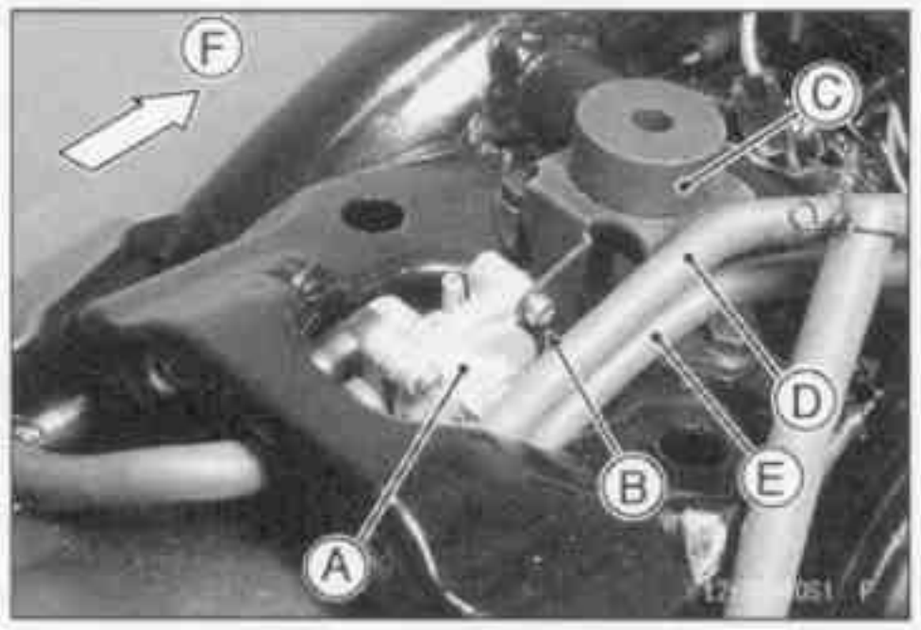
○ *The canister is designed to work well through the motorcycle's life without any maintenance if it is used under normal conditions.*



Vacuum Valve Inspection

- Remove the seat (see Frame chapter).
- Remove the fuel tank (see this chapter).
- Remove:
  Fuel Tank Bracket [C]
  Vacuum Valve [A] and Screws [B]

○ Put the California breather hose (blue) [D] and return hose (red) [E] right.
  Front [F]



Cooling System

Table of Contents

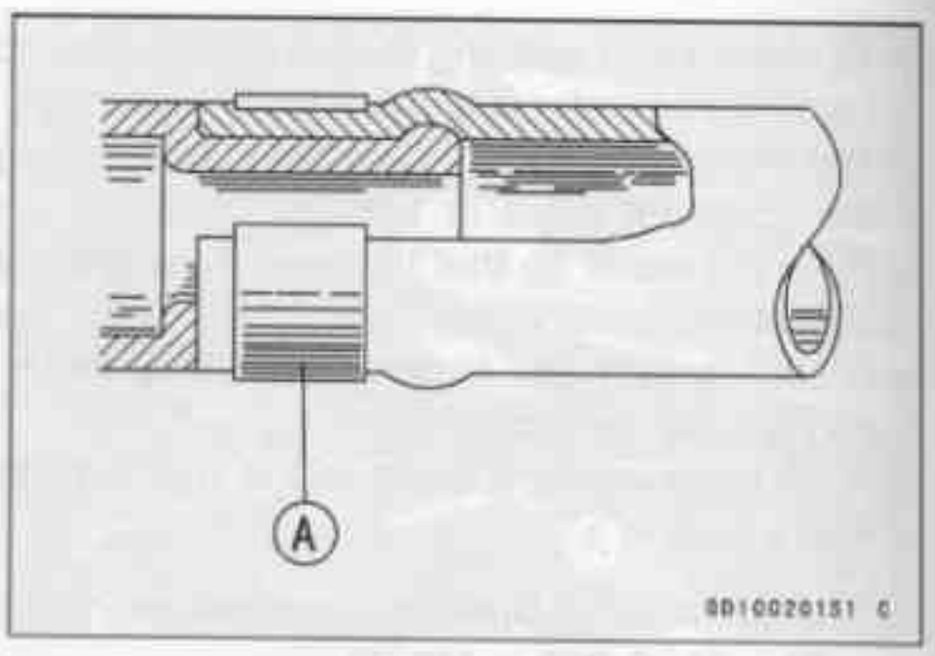
Exploded View....3-2
Specifications....3-3
Coolant Flow Chart....3-4
Coolant....3-6
Coolant Deterioration Inspection....3-6
Coolant Level Inspection....3-6
Coolant Draining....3-6
Coolant Filling....3-7
Pressure Testing....3-9
Cooling System Flushing....3-9
Coolant Filter Cleaning....3-9
Water Pump....3-10
Water Pump Removal....3-10
Water Pump Installation....3-10
Water Pump Inspection....3-11
Radiator....3-12
Radiator Removal....3-12
Radiator Inspection....3-12
Radiator Cap Inspection....3-13
Radiator Filler Neck Inspection....3-13
Thermostat....3-14
Thermostat Removal....3-14
Thermostat Installation....3-14
Thermostat Inspection....3-14
Hoses and Pipes....3-16
Hose Installation....3-16
Hose Inspection....3-16

Hoses and Pipes

Hose Installation

- Install the hoses and pipes being careful to follow bending direction. Avoid sharp bending, kinking, flattening or twisting.
- Install the clamp [A] as near as possible to the hose end to clear the raised rib of the fitting. This will prevent the hoses from working loose.
- The clamp screws should be positioned correctly to prevent the clamps from contacting the other parts.

Torque - Hose Clamp Screws: 2.5 N·m (0.25 kg·m, 22 in·lb)

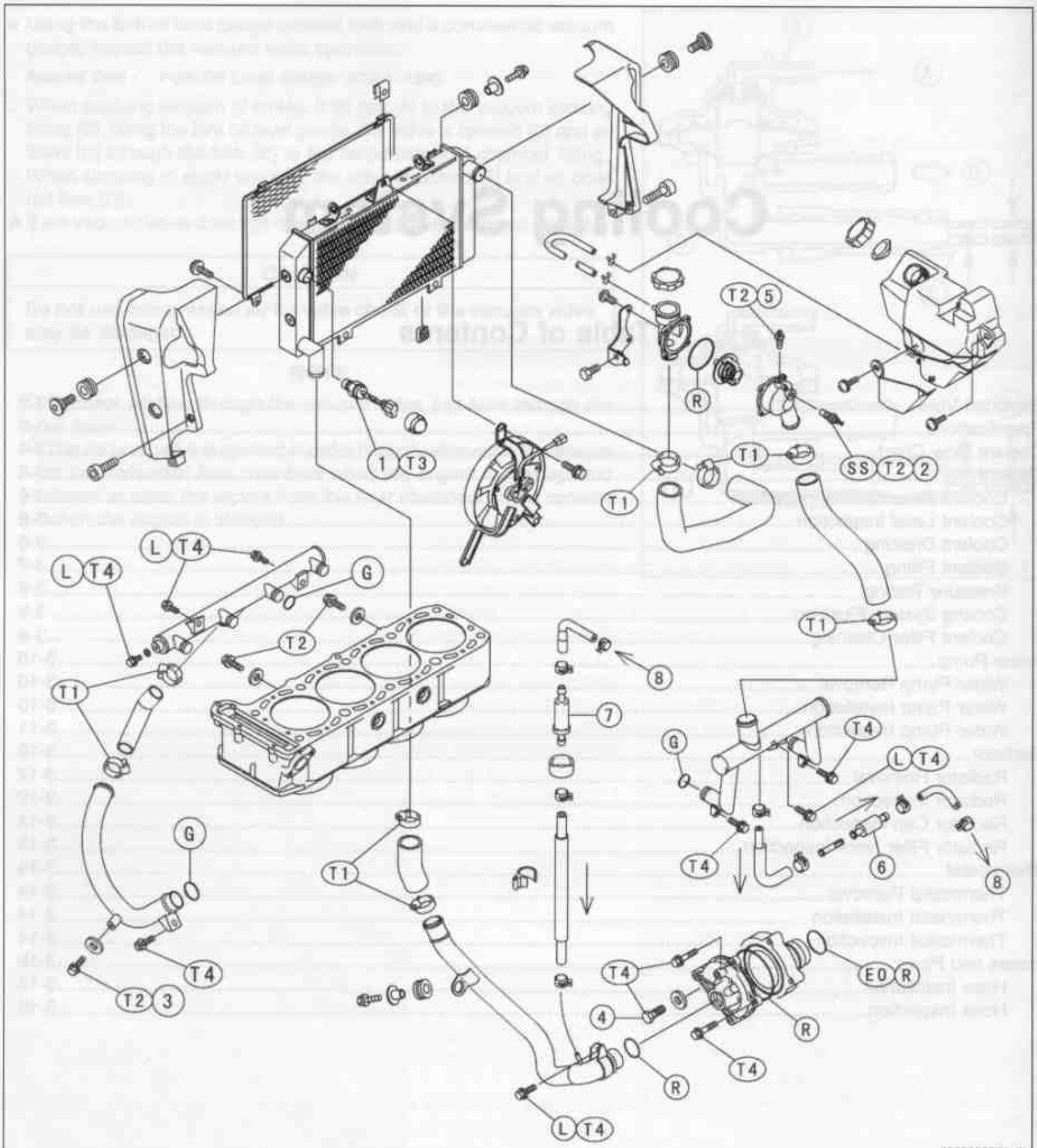


Hose Inspection

- Whenever the radiator or water hoses are removed or in accordance with the Periodic Maintenance Chart, check the radiator or water hoses and their connections.
- Visually inspect the hoses for signs of deterioration. Squeeze the hoses. A hose should not be hard and brittle, nor should it be soft or swollen.
- Replace any damaged hoses.

3-2 COOLING SYSTEM

Exploded View



1. Radiator Fan Switch
2. Water Temperature Switch, (ZR 1200B) Water Temperature Sensor
3. Coolant Drain Plugs
4. Water Pump Air Bleeder Bolt
5. Thermostat Housing Air Bleeder Bolt
6. Coolant Filter
7. Coolant Valve

EO: Apply engine oil.
R: Replacement Parts
SS: Apply silicone sealant.
L: Apply a non-permanent locking agent.
T1: 2.5 N·m (0.25 kg·m, 22 in·lb)
T2: 7.8 N·m (0.80 kg·m, 69 in·lb)
T3: 24 N·m (2.4 kg·m, 17.7 ft·lb)
T4: 9.8 N·m (1.0 kg·m, 87 in·lb)

Specifications

Item	Standard
Coolant provided when shipping:	
Type (recommended)	Permanent type of anitifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)
Color	Green
Mixed ratio	Soft water 50 %, coolant 50%
Freezing point	– 35 °C (– 31 °F)
Total amount	3L (0.79 US gal., reserve tank full level including radiator and engine)
Radiator Cap	
Radiator cap relief pressure	93 ~ 123 kPa (0.95 ~ 1.25 kg/cm^2, 14 ~ 18 psi)
Thermostat:	
Valve opening temperature	80 ~ 84 °C (176 ~ 183 °F)
Valve full opening lift	8 mm (0.3 in) or more @ 95 °C (203 °F)

Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

3-4 COOLING SYSTEM

Coolant Flow Chart

Permanent type antifreeze is used as a coolant to protect the cooling system from rust and corrosion. When the engine starts, the water pump (coupled with the oil pump) turns and the coolant circulates.

The thermostat is a wax pellet type which opens or closes with coolant temperature changes. The thermostat continuously changes its valve opening to keep the coolant temperature at the proper level. When coolant temperature is below 80 ~ 84 °C, the thermostat closes so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly. When coolant temperature is more than 80 ~ 84 °C, the thermostat opens and the coolant flows.

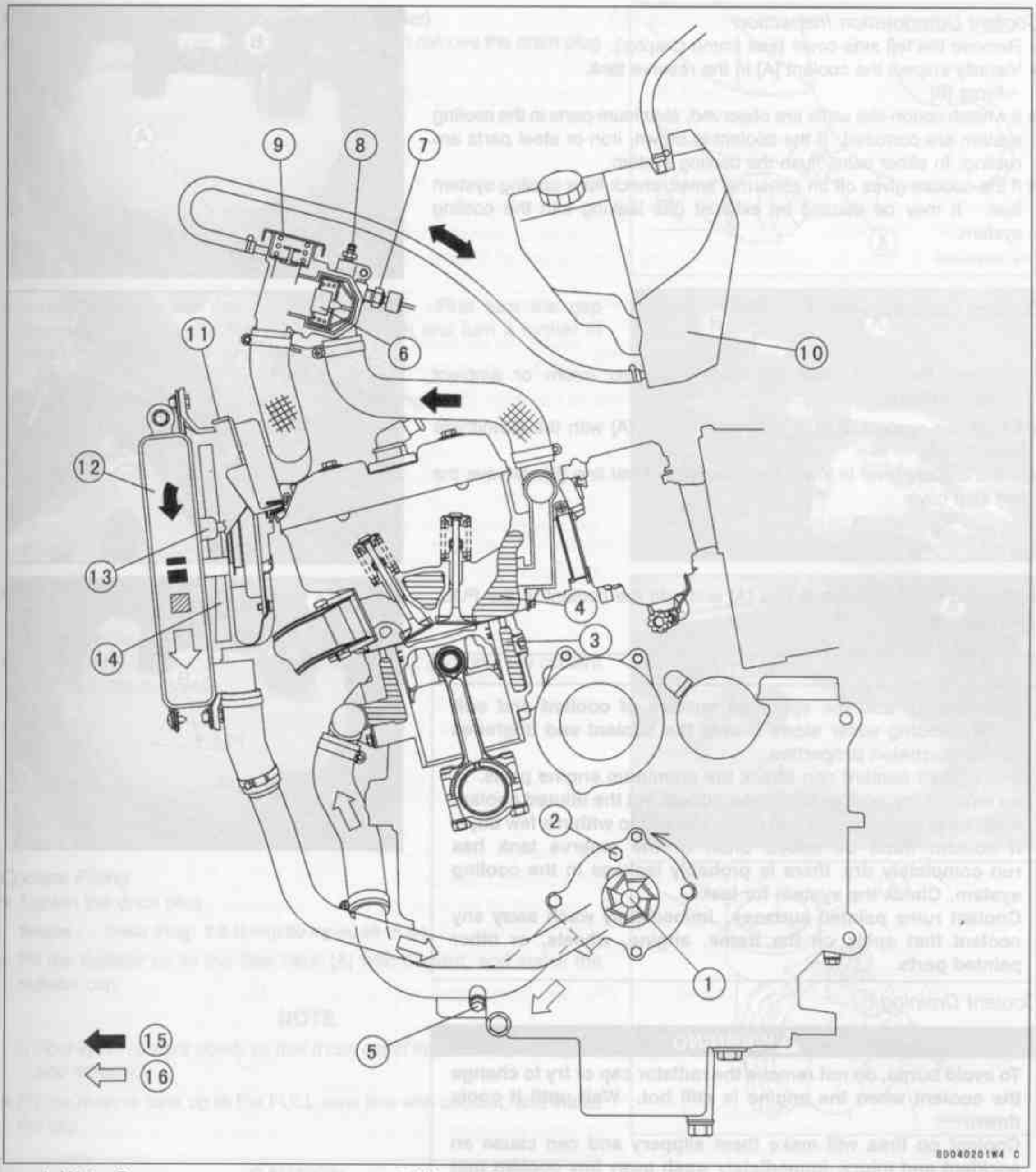
When the coolant temperature goes up beyond 93 ~ 103 °C, the radiator fan switch conducts to operate the radiator fan. The radiator fan draws air through the radiator core when there is not sufficient air flow such as at low speeds. This increases up the cooling action of the radiator. When the temperature is below 90 ~ 96 °C, the fan switch opens and the radiator fan stops.

In this way, this system controls the engine temperature within narrow limits where the engine operates most efficiently even if the engine load varies.

The system is pressurized by the radiator cap to suppress boiling and the resultant air bubbles which can cause engine overheating. As the engine warms up, the coolant in the radiator and the water jacket expands. The excess coolant flows through the radiator cap and hose to the reserve tank to be stored there temporarily. Conversely, as the engine cools down, the coolant in the radiator and the water jacket contracts, and the stored coolant flows back to the radiator from the reserve tank.

The radiator cap has two valves. One is a pressure valve which holds the pressure in the system when the engine is running. When the pressure exceeds 0.95 ~ 1.25 kg/cm^2, the pressure valve opens and releases the pressure to the reserve tank. As soon as pressure escapes, the valve closes, and keeps the pressure at 0.95 ~ 1.25 kg/cm^2. When the engine cools down, another small valve (vacuum valve) in the cap opens. As the coolant cools, the coolant contracts to form a vacuum in the system. The vacuum valve opens and allows the coolant from the reserve tank to enter the radiator.

Coolant Flow Chart



1. Water Pump
2. Water Pump Air Bleeder Bolt
3. Cylinder Jacket
4. Cylinder Head Jacket
5. Drain Bolt
6. Thermostat
7. Water Temperature Switch, (ZR1200B) Water Temperature Sensor
8. Thermostat Housing Air Bleeder Bolt
9. Radiator Cap
10. Reserve Tank
11. Baffle
12. Radiator
13. Radiator Fan Switch
14. Radiator Fan
15. Hot Coolant
16. Cold Coolant

3-6 COOLING SYSTEM

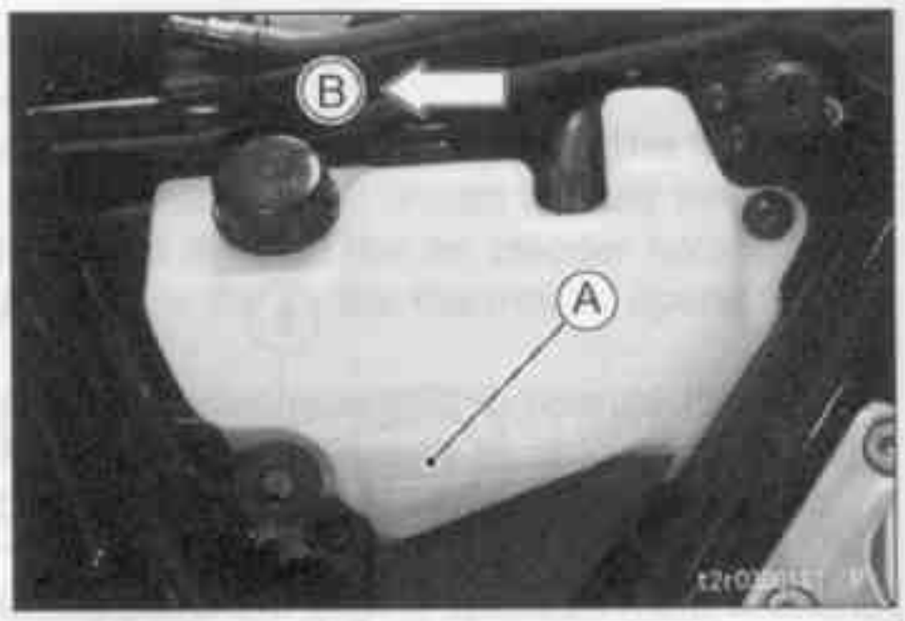
Coolant

Coolant Deterioration Inspection

- Remove the left side cover (see frame chapter).
- Visually inspect the coolant [A] in the reserve tank.
  Front [B]

★ 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, check for a cooling system leak. It may be caused by exhaust gas leaking into the cooling system.



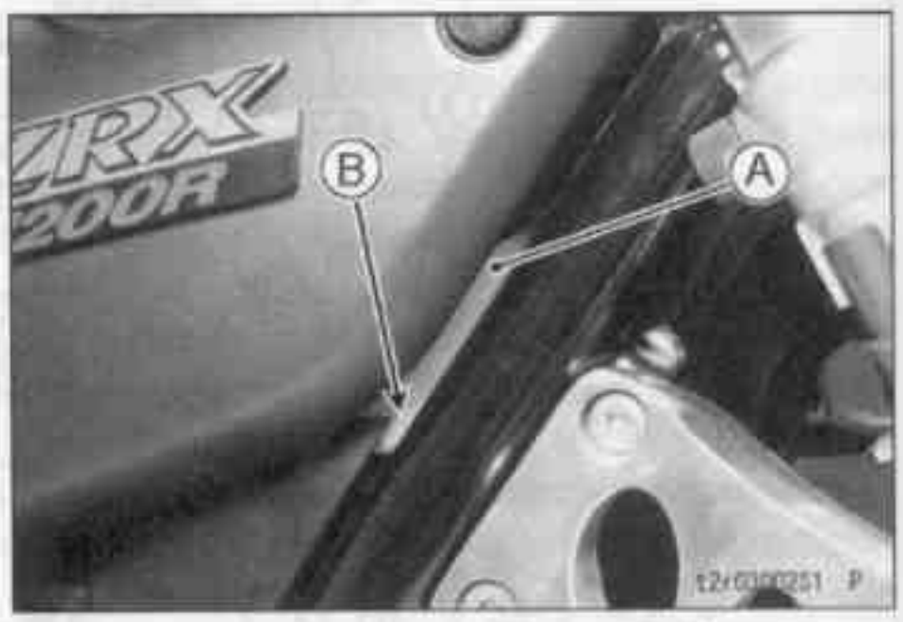
Coolant Level Inspection

NOTE

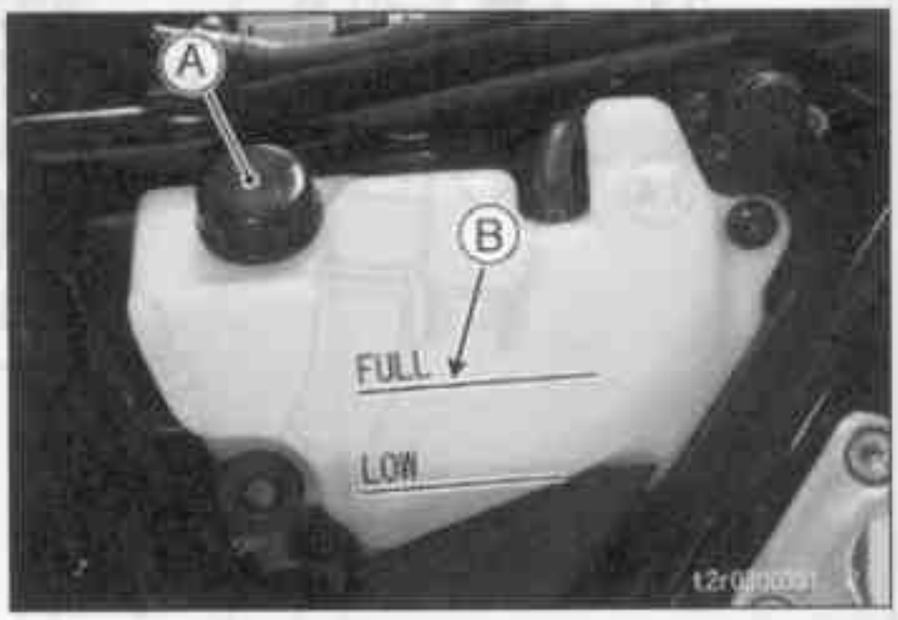
○ *Check the level when the engine is cold (room or ambient temperature).*

- Check the coolant level in the reserve tank [A] with the motorcycle held upright.

★ If the coolant level is lower than the LOW level line [B], remove the left side cover.



- Remove the reserve tank cap [A] and add the coolant to the FULL level line [B].



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 reserve tank has run completely dry, there is probably leakage in the cooling system. Check the system for leaks.
Coolant ruins painted surfaces. Immediately wash away any coolant that spills on the frame, engine, wheels, or other painted parts.

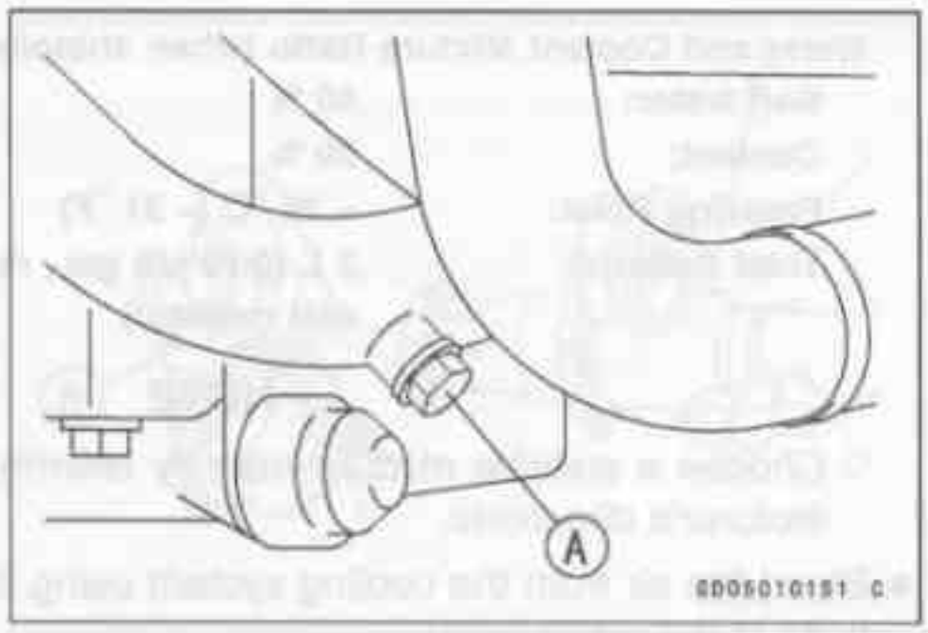
Coolant Draining

⚠ 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 on tires will make them slippery and can cause an accident and injury. Immediately wash away any coolant that spills on the wheels.
Since coolant is harmful to the human body, do not use for drinking.

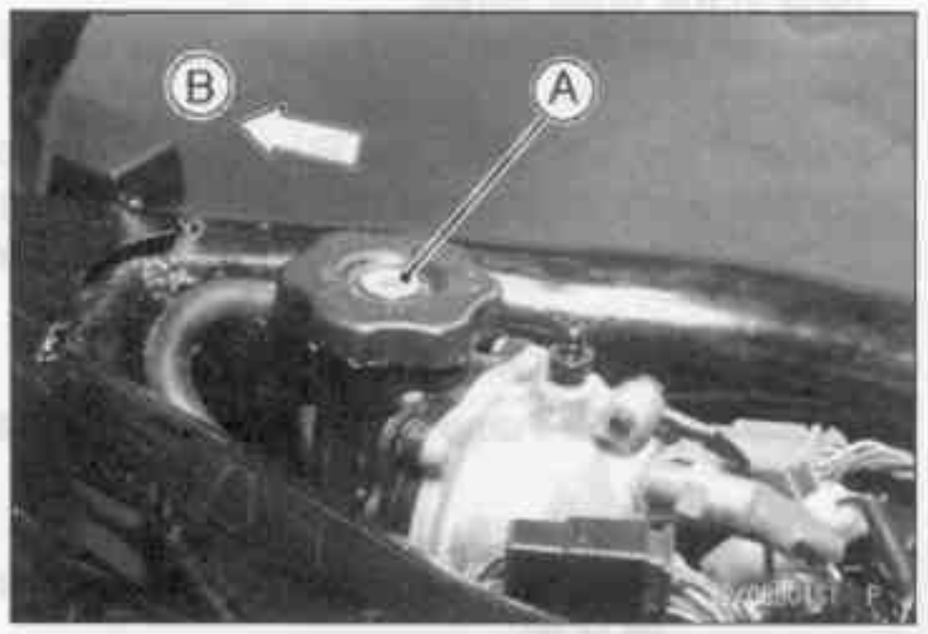
Coolant

- Remove the fuel tank (see Fuel System chapter).
- Place a container under the drain plug [A], then remove the drain plug (left-front view).



- Remove the radiator cap [A] in two steps. First turn the cap counterclockwise to the first stop. Then push and turn it further in the same direction and remove the cap.
  Front [B]

○ The coolant will drain from the radiator and engine.



- Remove:
  Left Side Cover (see Frame chapter)
  Reserve Tank Screws
- Turn over the reserve tank, remove the hose [A], and pour the coolant into a suitable container.



Coolant Filling

- Tighten the drain plug.

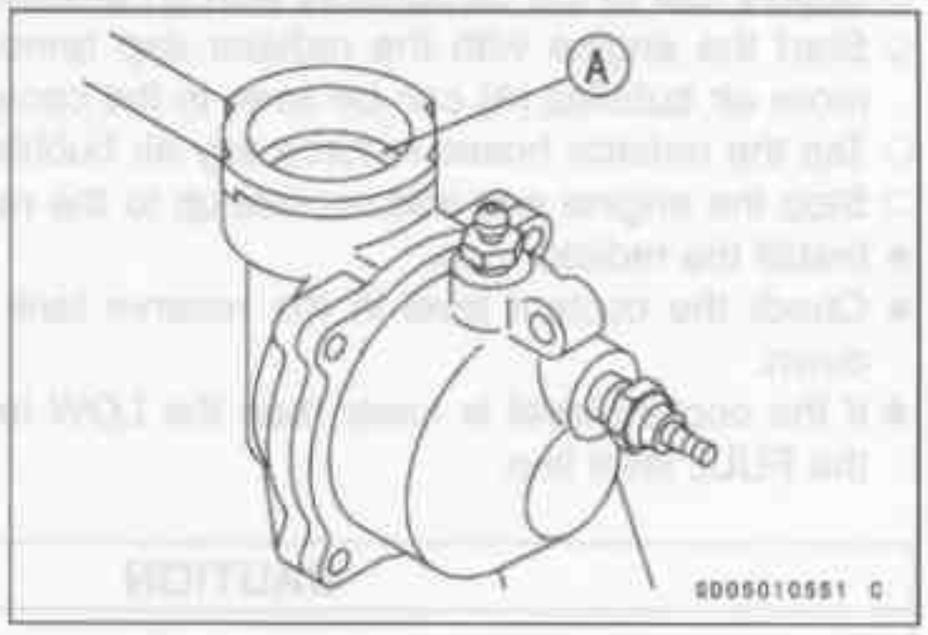
Torque - Drain Plug: 7.8 N·m(0.80 kg·m, 69 in·lb)

- Fill the radiator up to the filler neck [A] with coolant, and install the radiator cap.

NOTE

○ *Pour in the coolant slowly so that it can expel the air from the engine and radiator.*

- Fill the reserve tank up to the FULL level line with coolant, and install the cap.



CAUTION

Soft or distilled water must be used with the antifreeze (see Specifications in this chapter) in the cooling system.
If hard water is used in the system, it causes scale accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

3-8 COOLING SYSTEM

Coolant

Water and Coolant Mixture Ratio (when shipping)

Soft water:	**50 %**
Coolant:	**50 %**
Freezing Point:	**– 35 °C (– 31 °F)**
Total Amount:	**3 L (0.79 US gal., reserve tank, engine, and radiator)**

NOTE

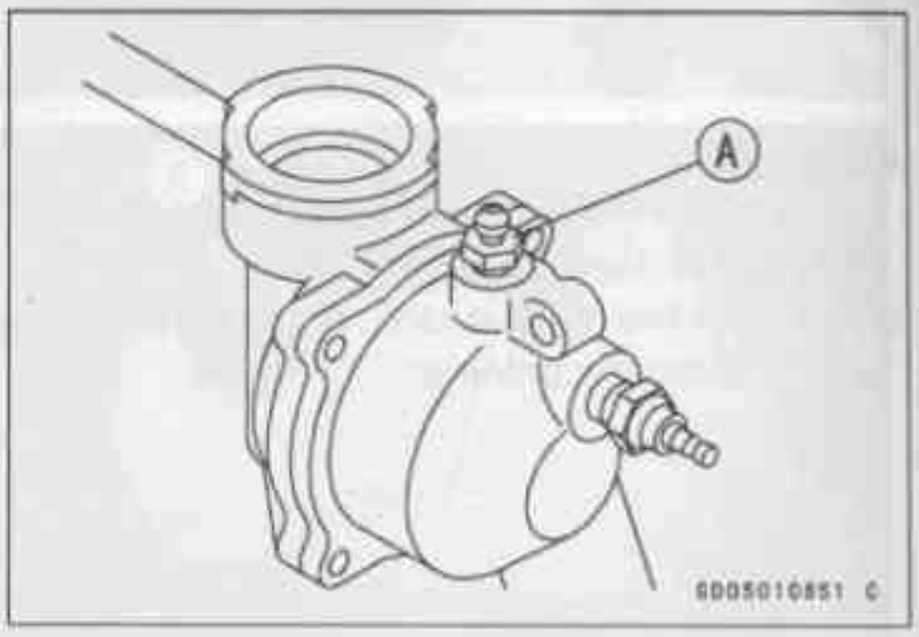
○ *Choose a suitable mixture ratio by referring to the coolant manufacturer's directions.*

- Bleed the air from the cooling system using following two air bleeder bolts in the order listed.
○ Remove the slave cylinder cover (see Water Pump Removal in this chapter).
○ Remove the fuel tank (see Fuel System chapter).
○ Loosen each air bleeder bolt until the coolant begins to flow out the air bleeder bolt hole (that is, until all the remaining air has been forced out).
○ Tighten each air bleeder bolt.

Torque - Water Pump Air Bleeder Bolt [A]: 9.8 N·m (1.0 kg·m, 87 in·lb)



Torque - Thermostat Housing Air Bleeder Bolt [A]: 7.8 N·m(0.80 kg·m, 69 in·lb)



- Bleed the air from the cooling system as follows.
○ Supply fuel to the carburetors with an anxiliary fuel tank.
○ Start the engine with the radiator cap removed and run it until no more air bubbles [A] can be seen in the coolant.
○ Tap the radiator hoses to force any air bubbles caught inside.
○ Stop the engine and add coolant up to the radiator filler neck.
- Install the radiator cap.
- Check the coolant level in the reserve tank after the engine cools down.
★ If the coolant level is lower than the LOW level line, add coolant to the FULL level line.



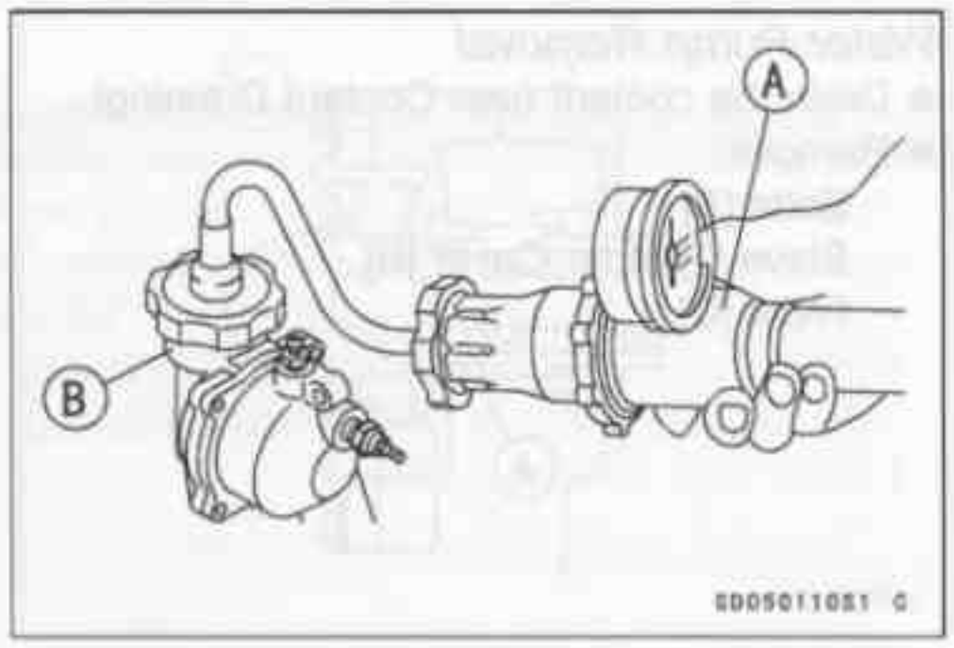
CAUTION
Do not add more coolant above the FULL level line.

- Install the left side cover.

Coolant

Pressure Testing

- Remove:
  Fuel Tank (see Fuel System chapter).
- Remove the radiator cap, and install a cooling system pressure tester [A] on the filler neck [B].



NOTE

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

- Build up pressure in the system carefully until the pressure reaches 123 kPa (1.25 kg/cm^2, 18 psi).

CAUTION

During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure is 123 kPa (1.25 kg/cm^2, 18 psi).

- Watch the gauge for at least 6 seconds.
★ If the pressure holds steady, the system is all right.
★ 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, the cylinder base gasket and the water pump.
- Remove the pressure tester, replenish the coolant, and install the radiator cap.

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 (see Coolant Draining).
- 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 (see Coolant Filling).

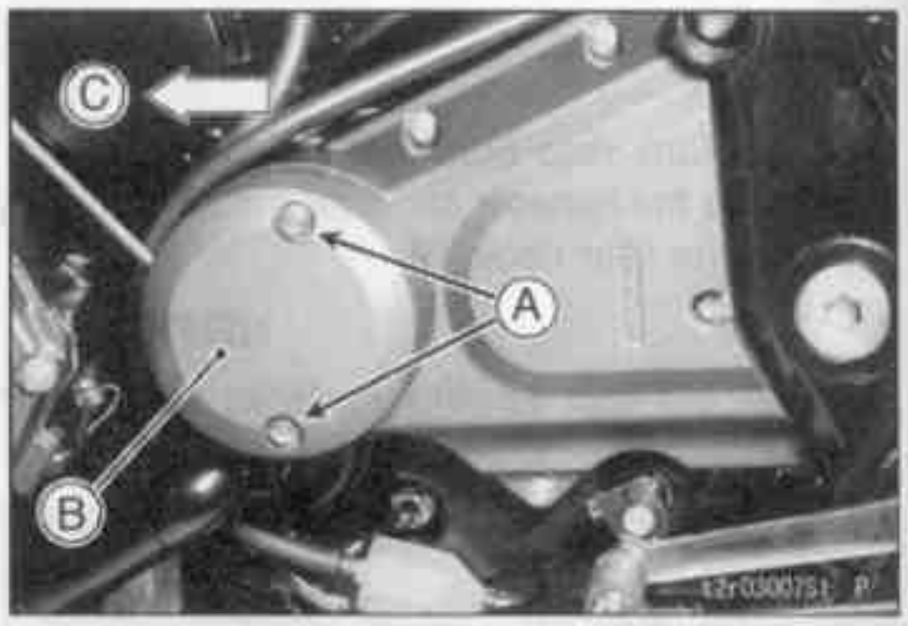
Coolant Filter Cleaning

Refer to the Fuel System chapter for the cleaning procedures.

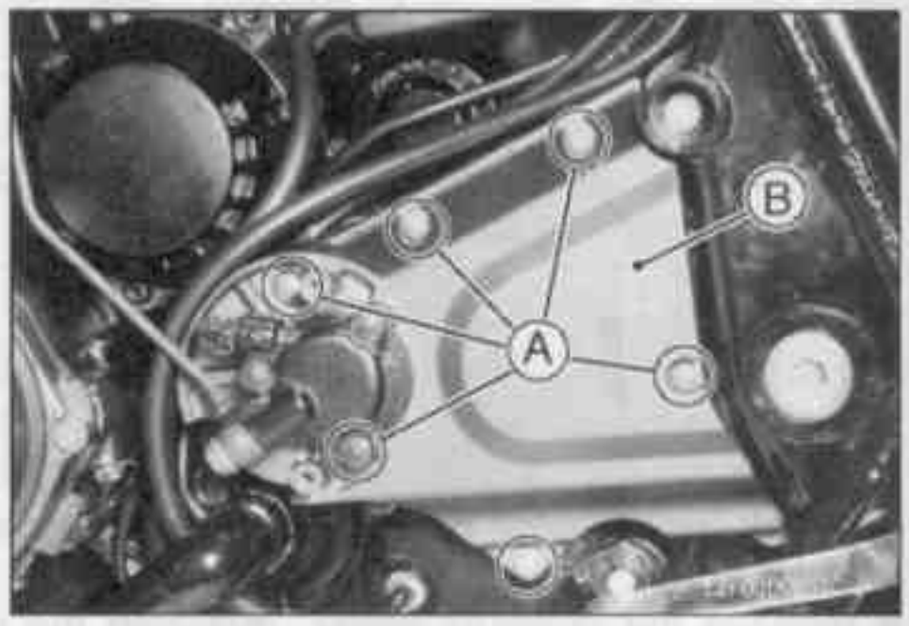
Water Pump

Water Pump Removal

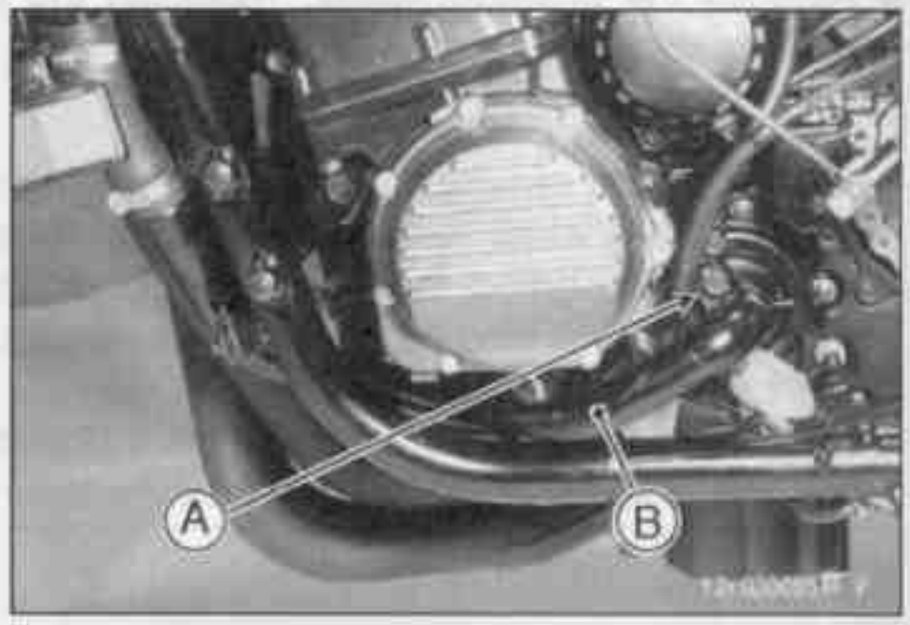
- Drain the coolant (see Coolant Draining).
- Remove:
  Bolts [A]
  Slave Cylinder Cover [B]
  Front [C]



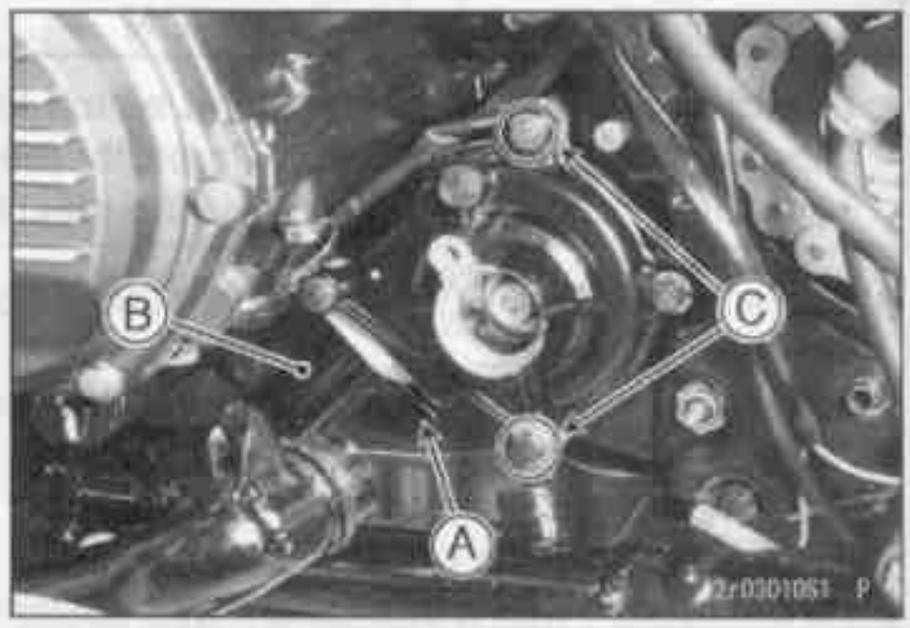
- Remove:
  Coolant Hose from Carburetor Assembly
  Bolts [A]
  Engine Sprocket Cover [B]



- Remove the pump inlet pipe bolt [A] and pull out the pump inlet pipe [B].



- Unscrew the flange bolt [A] and remove the water outlet pipe [B].
- Unscrew the two water pump mounting bolts [C], and pull out the water pump unit.



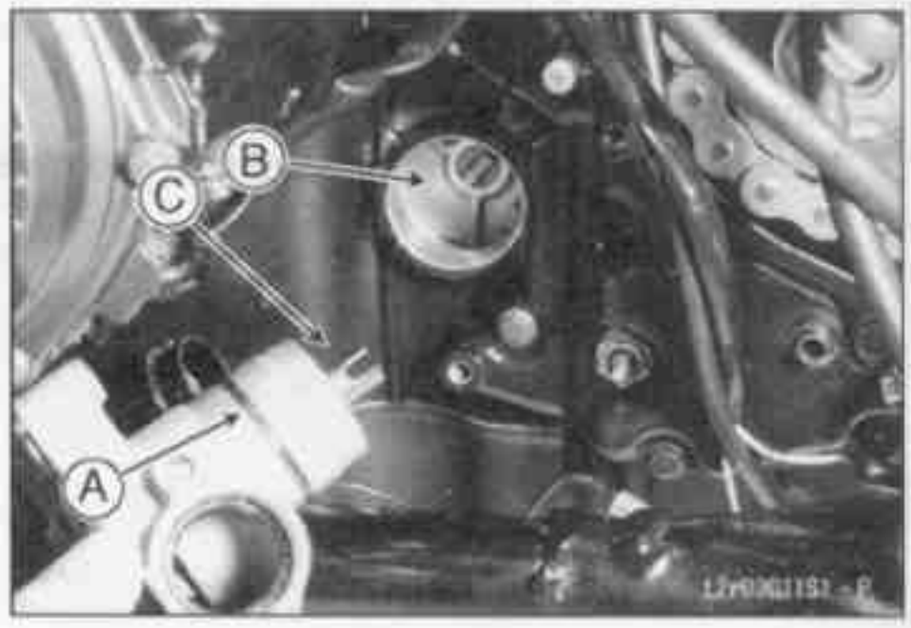
Water Pump Installation

- Apply engine oil to the O-ring [A].
- Note the position of the oil pump shaft tang [B] and turn the water pump shaft so that the tang fits into the slot [C].

Non-permanent Locking Agent - Water Pump Inlet Bolt

- Tighten:

Torque - Water Pump Mounting Bolts and Water Pump Inlet Bolt: 9.8 N·m (1.0 kg·m, 87 in·lb)

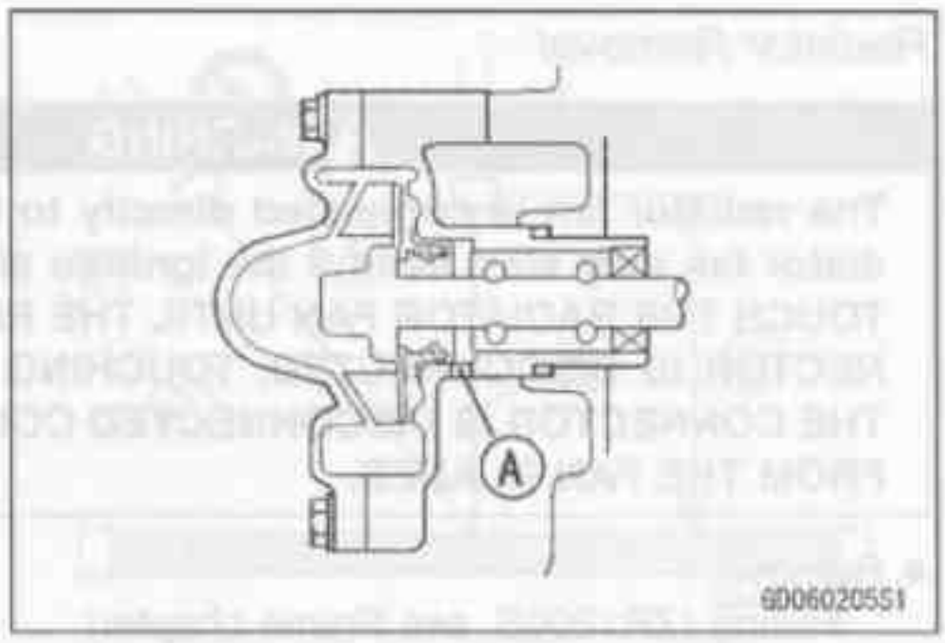


Water Pump

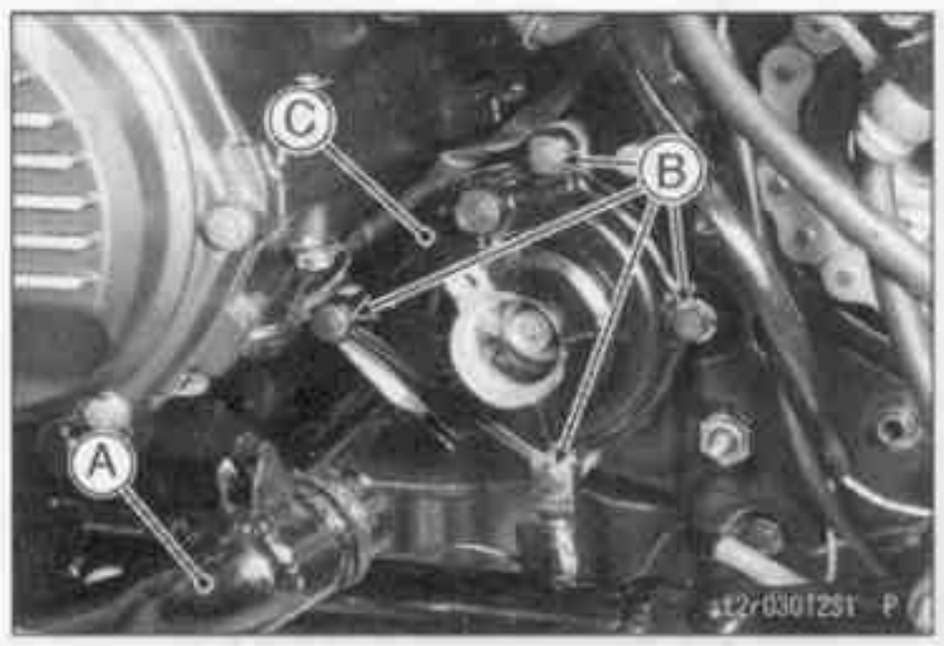
Water Pump Inspection

- Check the drainage outlet passage [A] at the bottom of the water pump for coolant leakage.

★ If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Replace the water pump unit.



- Pull out the pump inlet pipe [A] (see Water Pump Removal).
- Unscrew the four bolts [B] and take off the water pump cover [C].



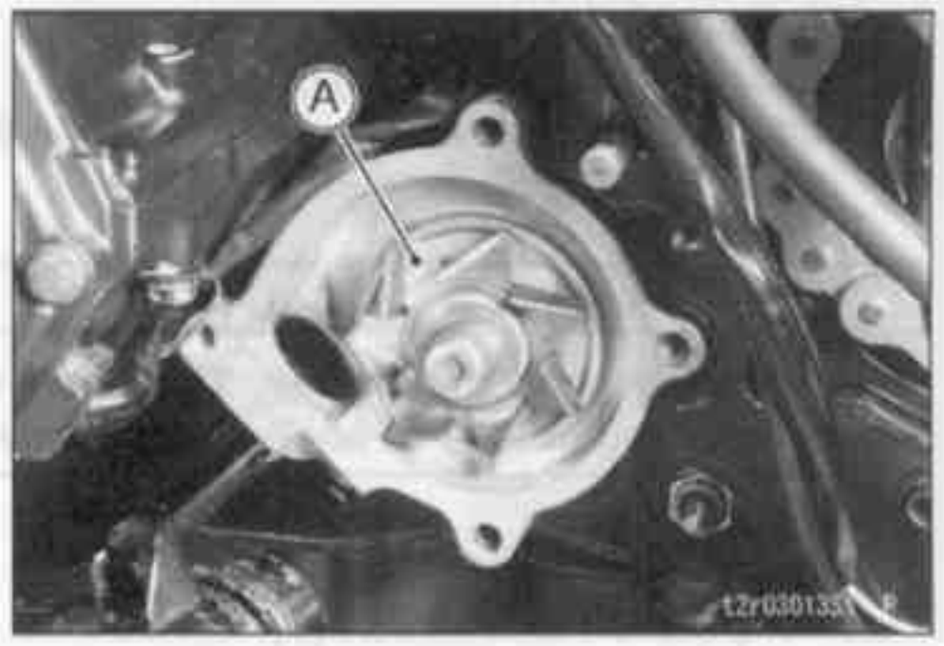
- Visually inspect the impeller [A].

★ If the surface is corroded, or if the blades are damaged, replace the water pump unit.

- Replace the O-rings with new ones.

Non-permanent Locking Agent - Water Pump Inlet Bolt

Torque - Water Pump Mounting Bolts, Water Pump Cover Bolts, and Water Pump Inlet Bolt: 9.8 N·m (1.0 kg·m, 87 in·lb)



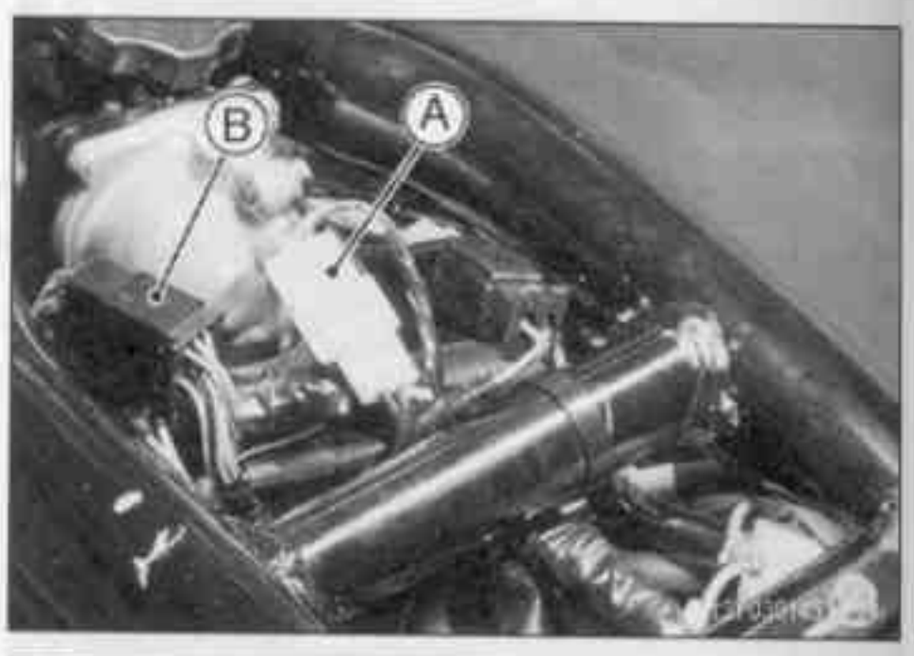
Radiator

Radiator Removal

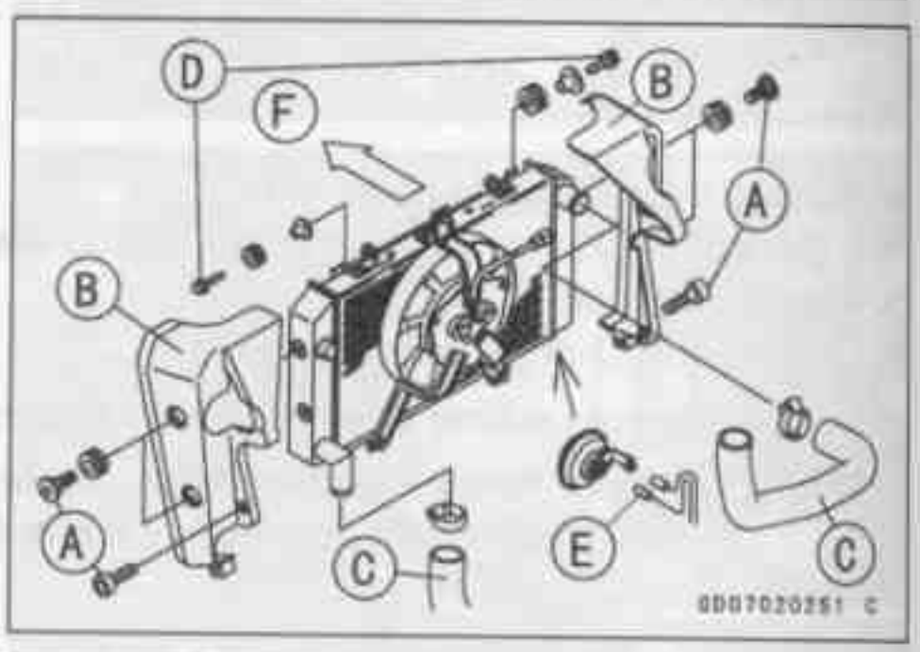
⚠ WARNING

The radiator fan is connected directly to the battery. The radiator fan may start even if the ignition switch is off. NEVER TOUCH THE RADIATOR FAN UNTIL THE RADIATOR FAN CONNECTOR IS DISCONNECTED. TOUCHING THE FAN BEFORE THE CONNECTOR IS DISCONNECTED COULD CAUSE INJURY FROM THE FAN BLADES.

- Remove:
  Fairing (ZR1200B, see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Coolant (drain)
  Radiator Fan Switch Lead Connector [A]
  Radiator Fan Lead Connector [B]



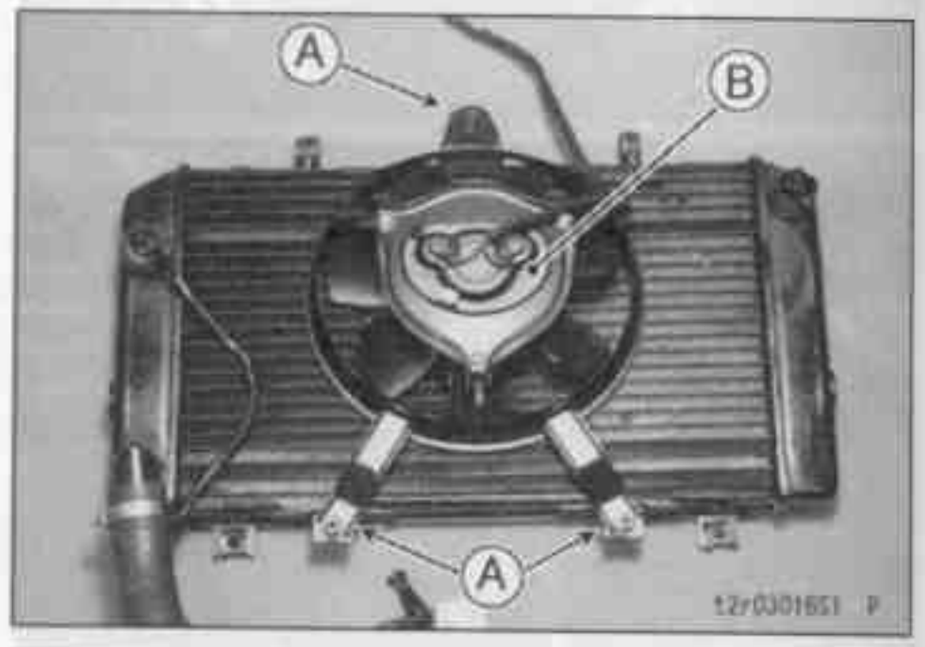
- Remove the following on both sides:
  Bolts [A] and Radiator Covers [B]
  Radiator Hoses [C]
  Radiator Mounting Bolts [D]
- Disconnect the horn lead connectors [E] on the right side.
  Front [F]



CAUTION

Do not touch the radiator core. This could damage the radiator fins, resulting in loss of cooling efficiency.

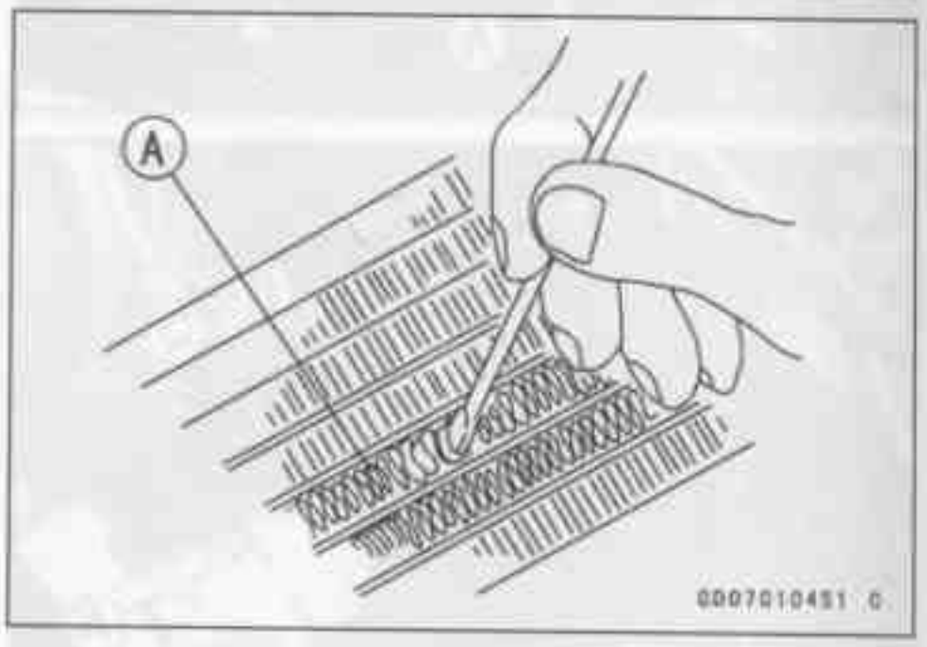
★ If necessary, remove:
  Bolts [A] and Radiator Fan [B]



Radiator Inspection

- Check the radiator core.

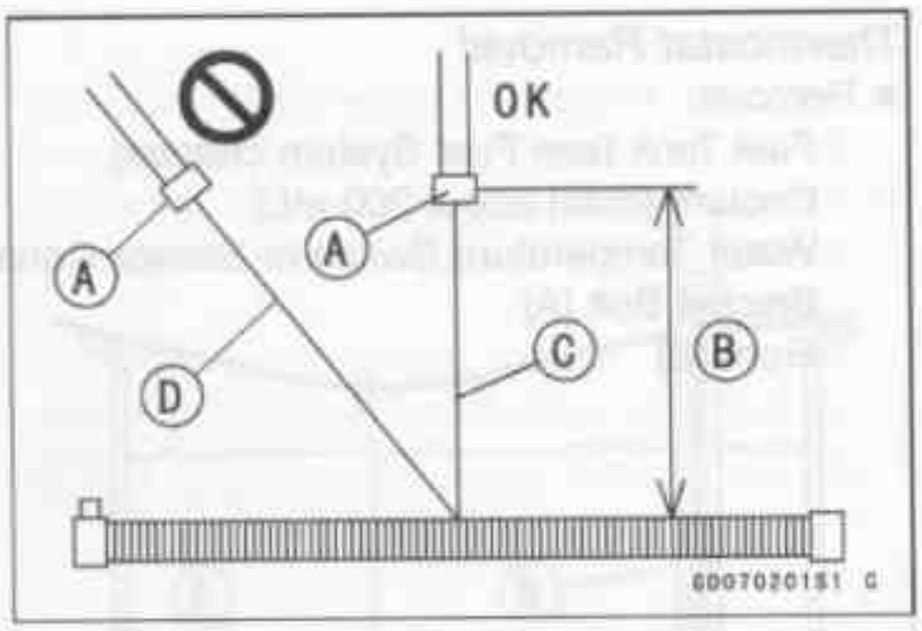
★ If there are obstructions to air flow, remove them.
★ If the corrugated fins [A] are deformed, carefully straighten them.
★ If the air passages of the radiator core are blocked more than **20 %** by unremovable obstructions or irreparably deformed fins, replace the radiator with a new one.



Radiator

CAUTION

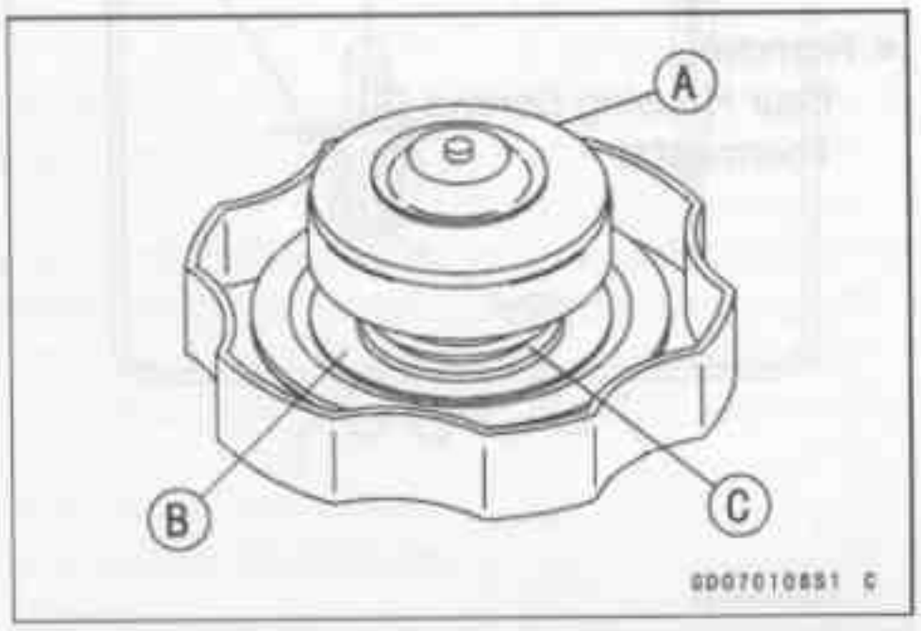
When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage:
Keep the steam gun [A] away more than 0.5 m [B] from the radiator core.
Hold the steam gun perpendicular [C] (not oblique [D]) to the core surface.
Run the steam gun following the core fin direction.



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.
Bottom Valve Seal [A]
Top Valve Seal [B]
Valve Spring [C]



- Install the cap [A] on a cooling system pressure tester [B].

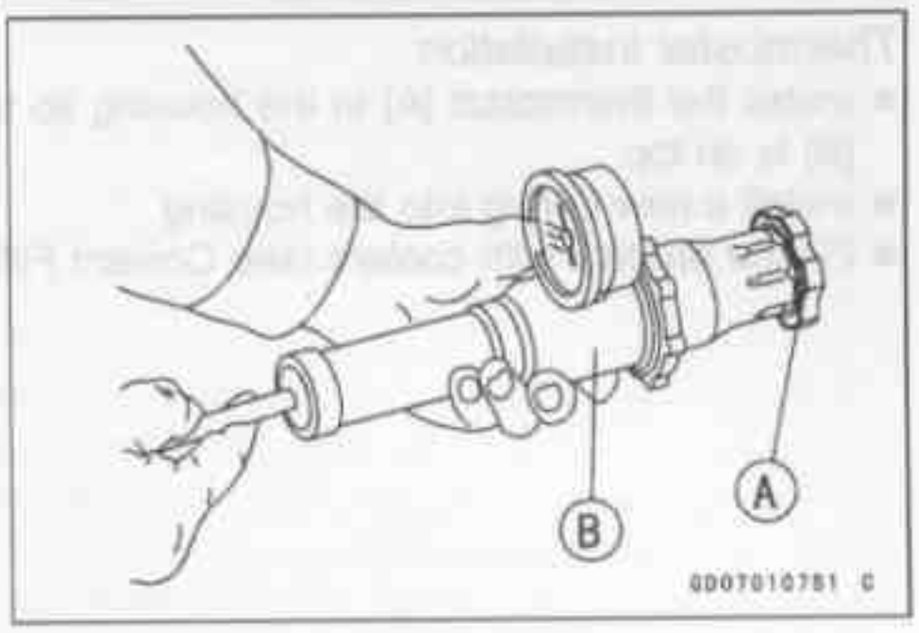
NOTE

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

- Watching the pressure gauge, pump the pressure tester to build up the pressure until the relief valve opens: the gauge needle flicks downward. Stop pumping and measure leak time at once. The relief valve must open within the specified range in the table below and the gauge needle must remain within the same range at least 6 seconds.

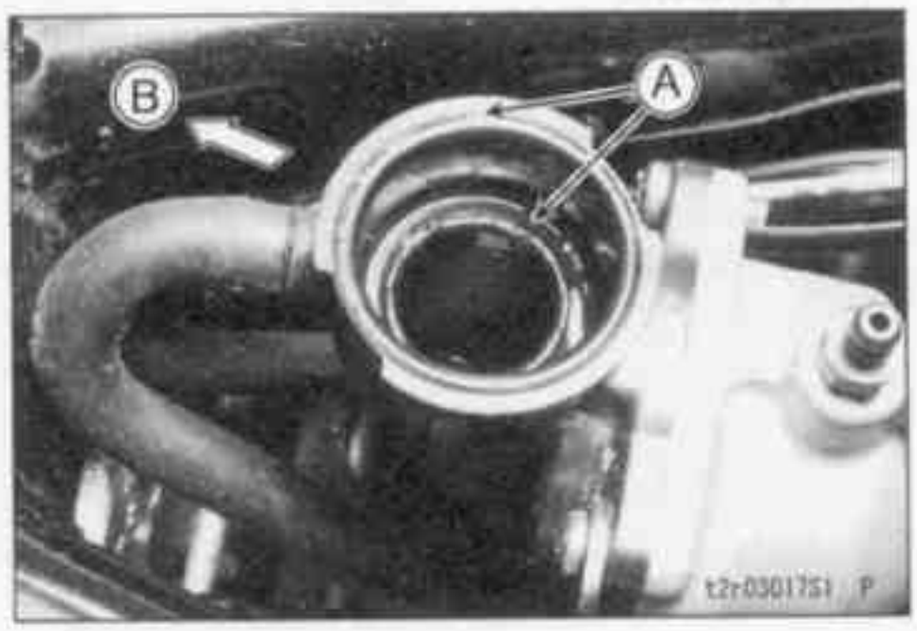
Radiator Cap Relief Pressure
Standard: 93 ~ 123 kPa (0.95 ~ 1.25 kg/cm², 14 ~ 18 psi)

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



Radiator Filler Neck Inspection

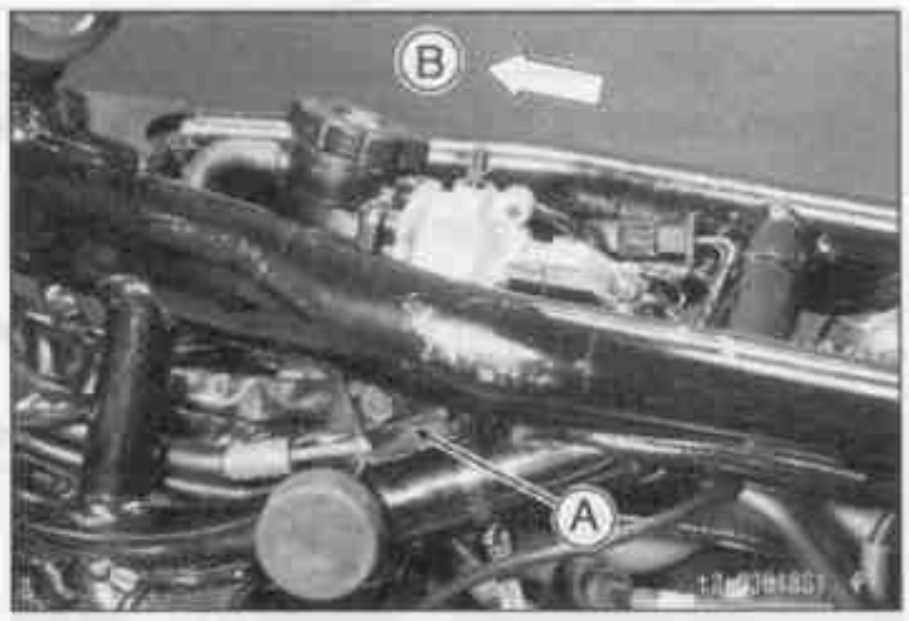
- Remove the radiator cap
- Check the radiator filler neck for signs of damage.
- Check the condition of the top and bottom sealing seats [A] in the filler neck. They must be smooth and clean for the radiator cap to function properly.
Front [B]



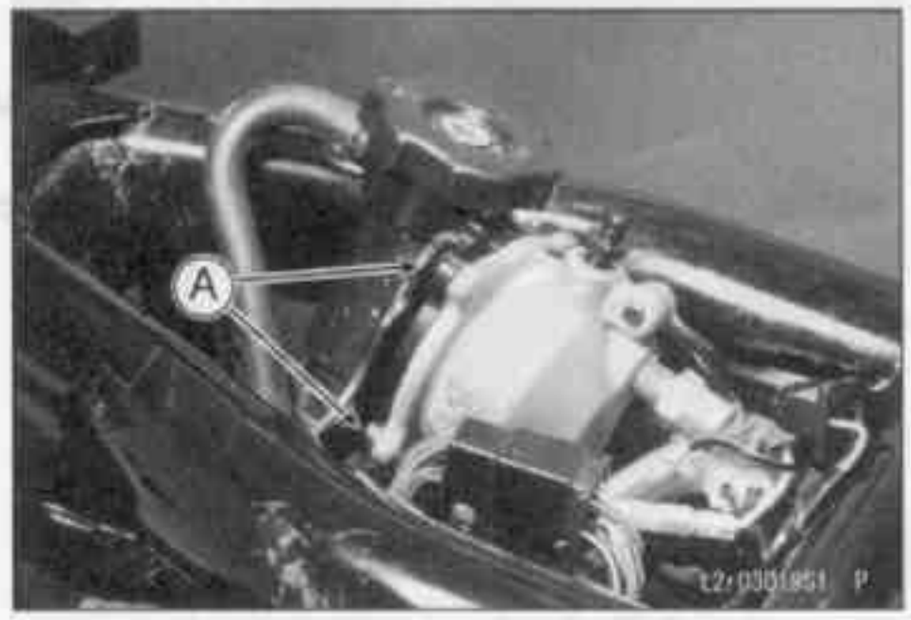
Thermostat

Thermostat Removal

- Remove:
  Fuel Tank (see Fuel System chapter)
  Coolant (drain about 200 mL)
  Water Temperature Switch or Sensor Connector
  Bracket Bolt [A]
  Front [B]

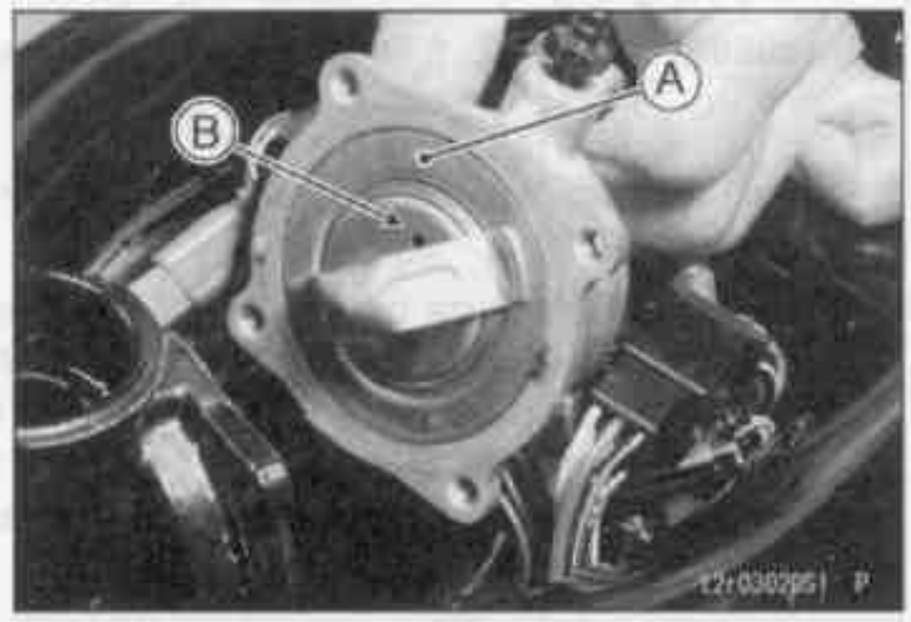


- Remove:
  Four Housing Screws [A]
  Thermostat



Thermostat Installation

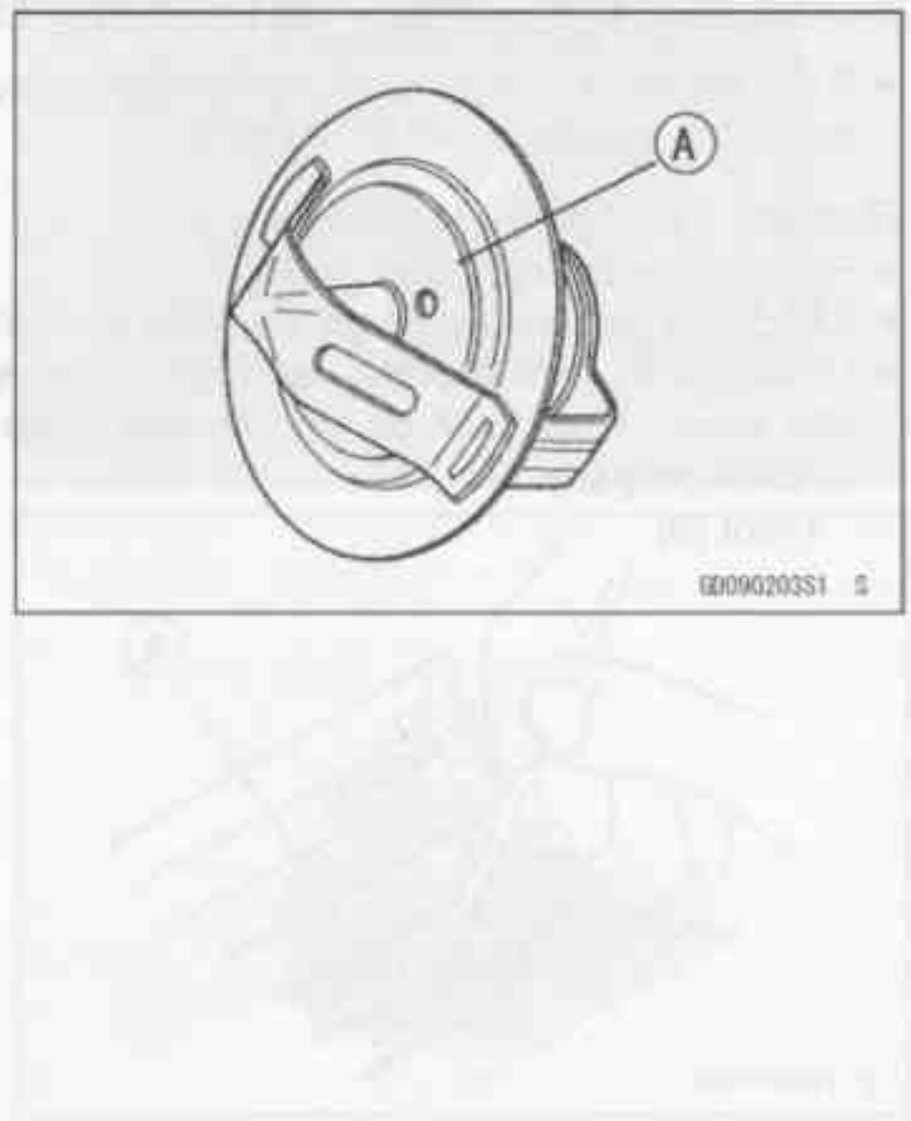
- Install the thermostat [A] in the housing so that the air bleeder hole [B] is on top.
- Install a new O-ring into the housing.
- Fill the radiator with coolant (see Coolant Filling).



Thermostat Inspection

- Remove the thermostat, and inspect the thermostat valve [A] at room temperature.

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

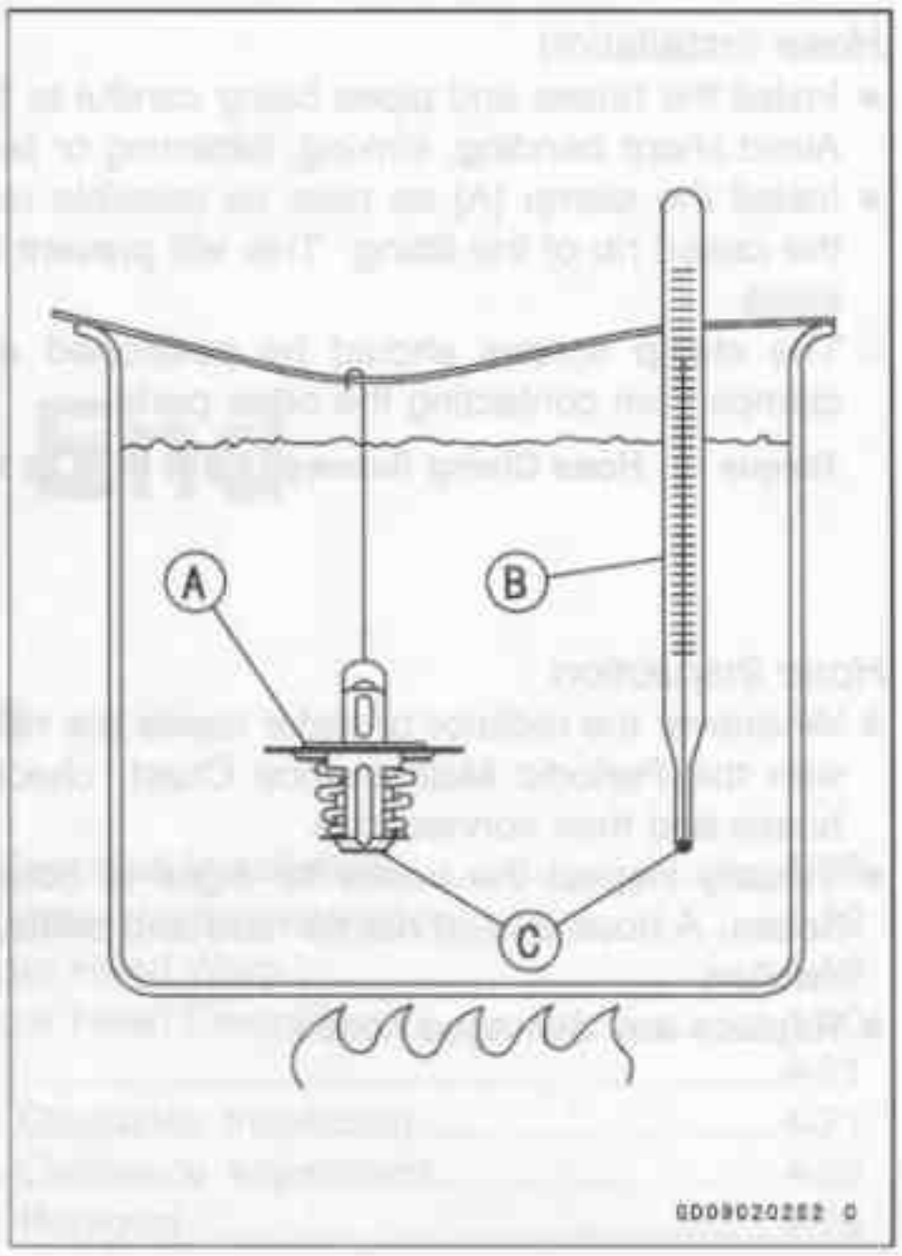


Thermostat

- To check valve opening temperature, suspend the thermostat [A] in a container of water and raise the temperature of the water.
  - The thermostat must be completely submerged and must not touch the container sides or bottom. Suspend an accurate thermometer [B] in the water so that the heat sensitive portions [C] are located in almost the same depth. It must not touch the container, either.
- Gradually raise the temperature of the water while stirring the water gently for even temperature.

★ If the measurement is out of the range, replace the thermostat with a new one.

Thermostat Valve Opening Temperature
80 ~ 84 °C (176 ~ 183 °F)



Engine Top End

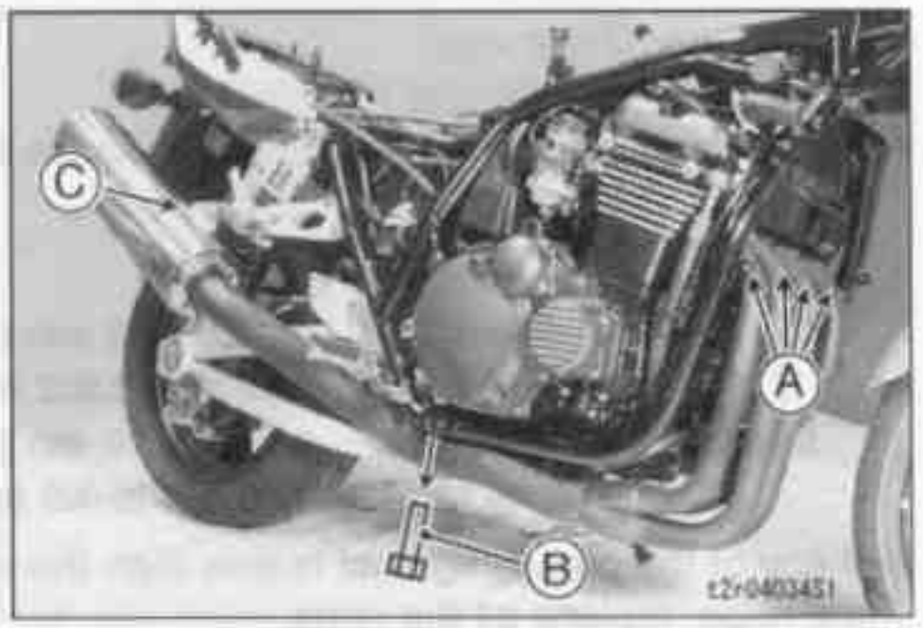
Table of Contents

Exploded View....4-2
Specifications....4-4
Clean Air System....4-7
Vacuum Switch Valve Removal....4-7
Vacuum Switch Valve Installation....4-7
Vacuum Switch Valve Operation Test....4-7
Vacuum Switch Valve Unit Test....4-8
Air Suction Valve Removal....4-9
Air Suction Valve Installation....4-9
Air Suction Valve Inspection....4-9
Clean Air System Hose Inspection....4-9
Cylinder Head Cover....4-10
Cylinder Head Cover Removal....4-10
Cylinder Head Cover Installation....4-10
Camshaft Chain Tensioner....4-11
Camshaft Chain Tensioner Removal....4-11
Camshaft Chain Tensioner Installation....4-11
Camshafts....4-12
Camshaft Removal....4-12
Camshaft Installation....4-12
Camshaft/ Camshaft Cap Wear....4-13
Camshaft Runout....4-14
Cam Wear....4-14
Camshaft Chain Removal....4-14
Camshaft Chain Wear....4-15
Camshaft and Sprocket Assembly....4-15
Rocker Shafts, Rocker Arms....4-16
Rocker Shaft, Rocker Arm Removal....4-16
Rocker Shaft, Rocker Arm Installation....4-16
Cylinder Head....4-17
Cylinder Compression Measurement....4-17
Cylinder Head Removal....4-18
Cylinder Head Installation....4-18
Carburetor Holder Installation....4-19
Cylinder Head Warp....4-19
Cylinder Head Cleaning....4-20
Valves....4-21
Valve Clearance Inspection....4-21
Valve Clearance Adjustment....4-22
Valve Removal....4-25
Valve Installation....4-25
Valve Guide Removal....4-25
Valve Guide Installation....4-25
Valve Guide Wear (Wobble Method)....4-26
Valve Seat Inspection....4-26
Valve Seat Repair....4-27
Cylinder, Pistons....4-31
Cylinder Removal....4-31
Cylinder Installation....4-31
Piston Removal....4-32
Piston Installation....4-33
Cylinder Wear....4-33
Piston Wear....4-34
Piston/Cylinder Clearance....4-34
Piston Ring, Piston Ring Groove Wear....4-34
Piston Ring Groove Width....4-34
Piston Ring Thickness....4-35
Piston Ring End Gap....4-35
Muffler....4-36
Muffler Removal....4-36
Muffler Installation....4-36
Muffler Body Removal....4-36
Muffler Body Installation....4-36
Muffler Identification....4-36

Muffler

Muffler Removal

- Remove the fairing (ZR1200B, see Frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter).
- Remove:
  Radiator (see Cooling System chapter)
  Exhaust Holder Nuts [A]
  Muffler Clamp Bolt [B]
  Muffler Body Clamp Bolt and Nut [C]
- Remove the muffler assembly.



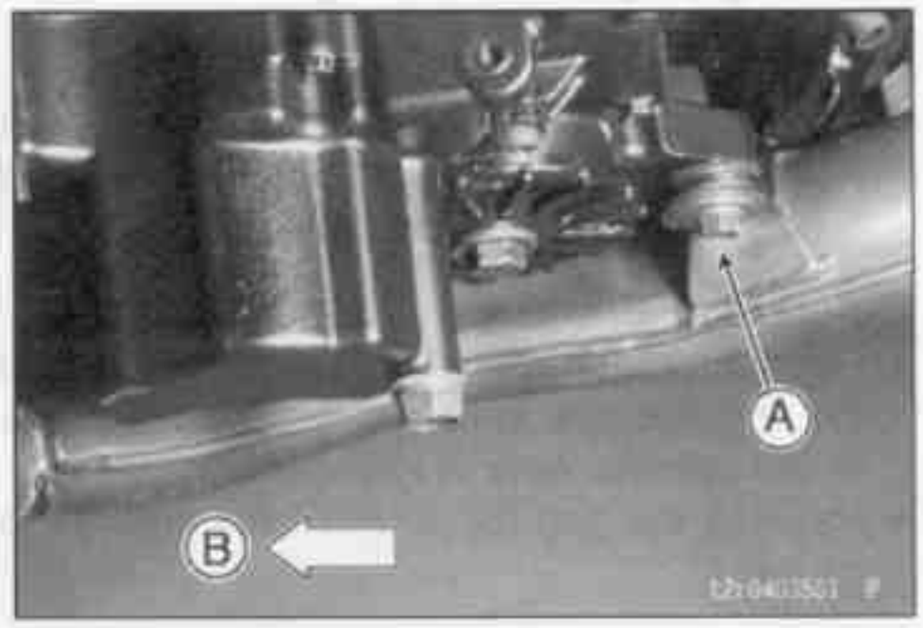
Muffler Installation

- First install the muffler body clamp bolt and nut to hold the muffler assembly on the frame.
- Tighten:

Torque - Muffler Clamp Bolt [A]: 34 N·m (3.5 kg·m, 25 ft·lb)
Muffler Body Clamp Bolt and Nut: 34 N·m (3.5 kg·m, 25 ft·lb)

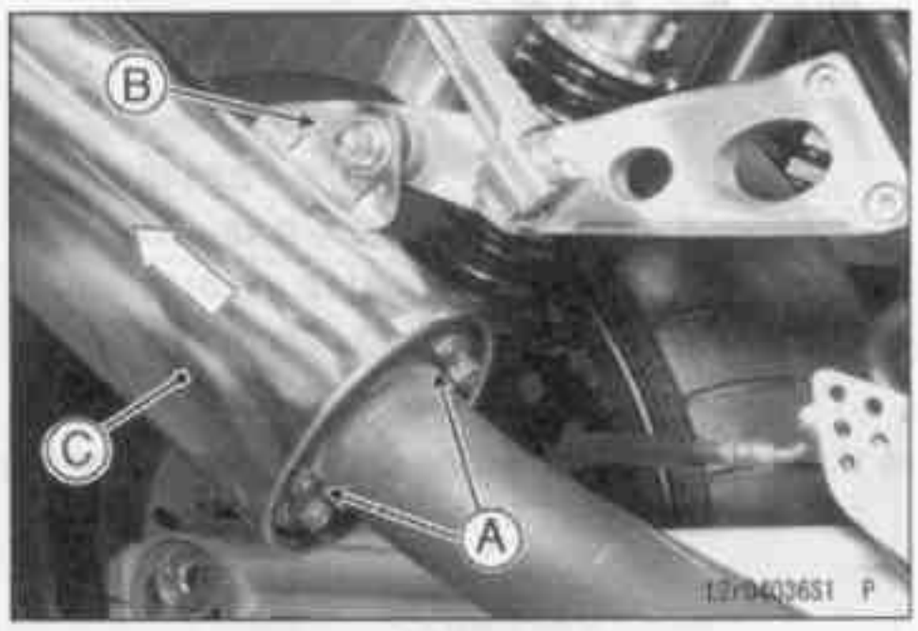
  Front [B]

- Fill the engine with coolant and bleed the air from the cooling system (see Cooling System chapter).
- Throughly warm up the engine, wait until the engine cools down, and retighten all the bolts and nuts.



Muffler Body Removal

- Remove:
  Muffler Flange Cover
  Muffler Body Mounting Nuts [A]
  Muffler Body Clamp Bolt and Nut [B]
- Remove the muffler body [C] backwards.



Muffler Body Installation

- Tighten:

Torque - Muffler Body Mounting Nuts: 25 N·m (2.5 kg·m, 18.0 ft·lb)
Muffler Body Clamp Bolt and Nut: 34 N·m (3.5 kg·m, 25 ft·lb)

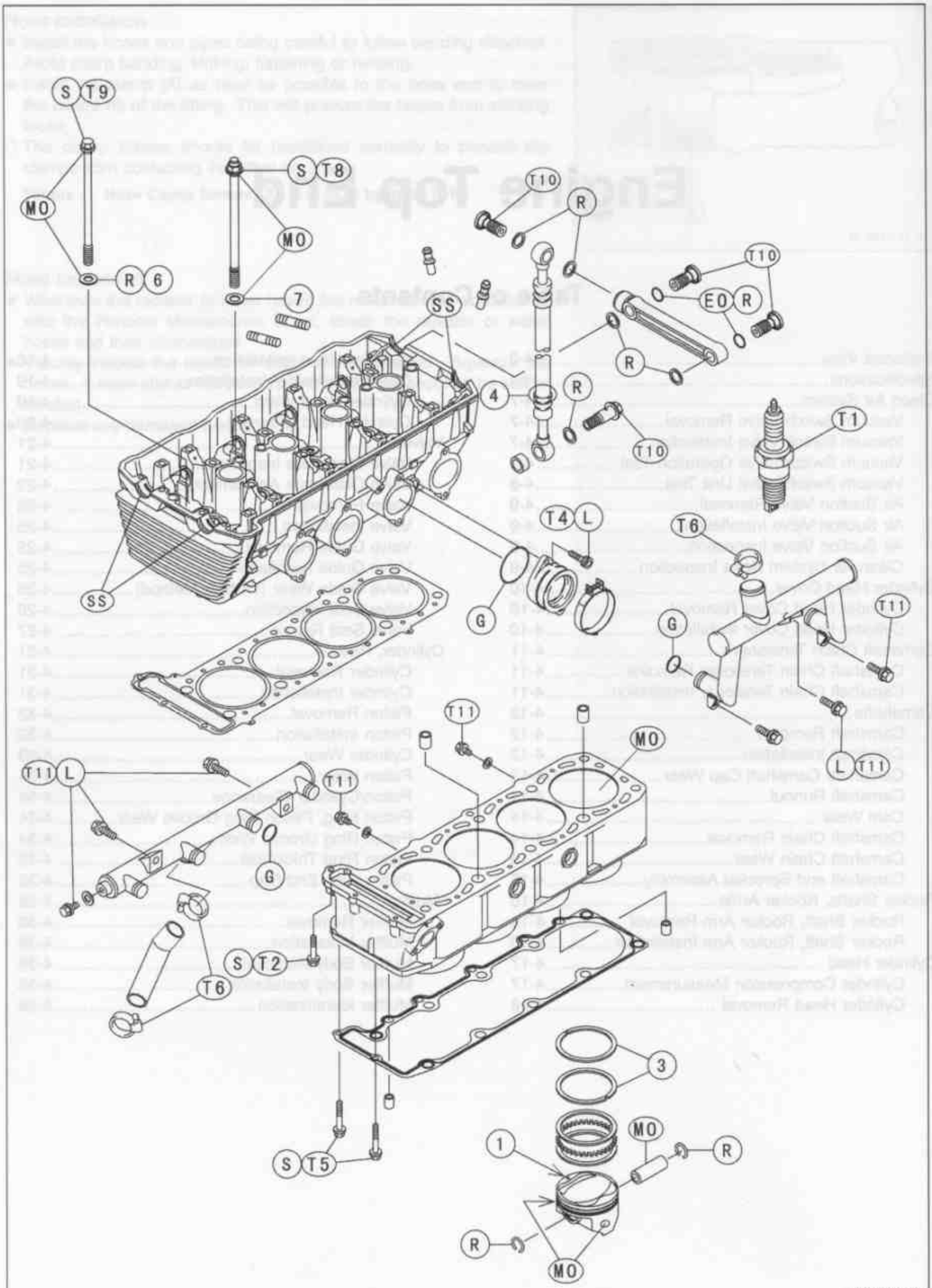
- Throughly warm up the engine, wait until the engine cools down, and retighten all the bolts and nuts.

Muffler Identification

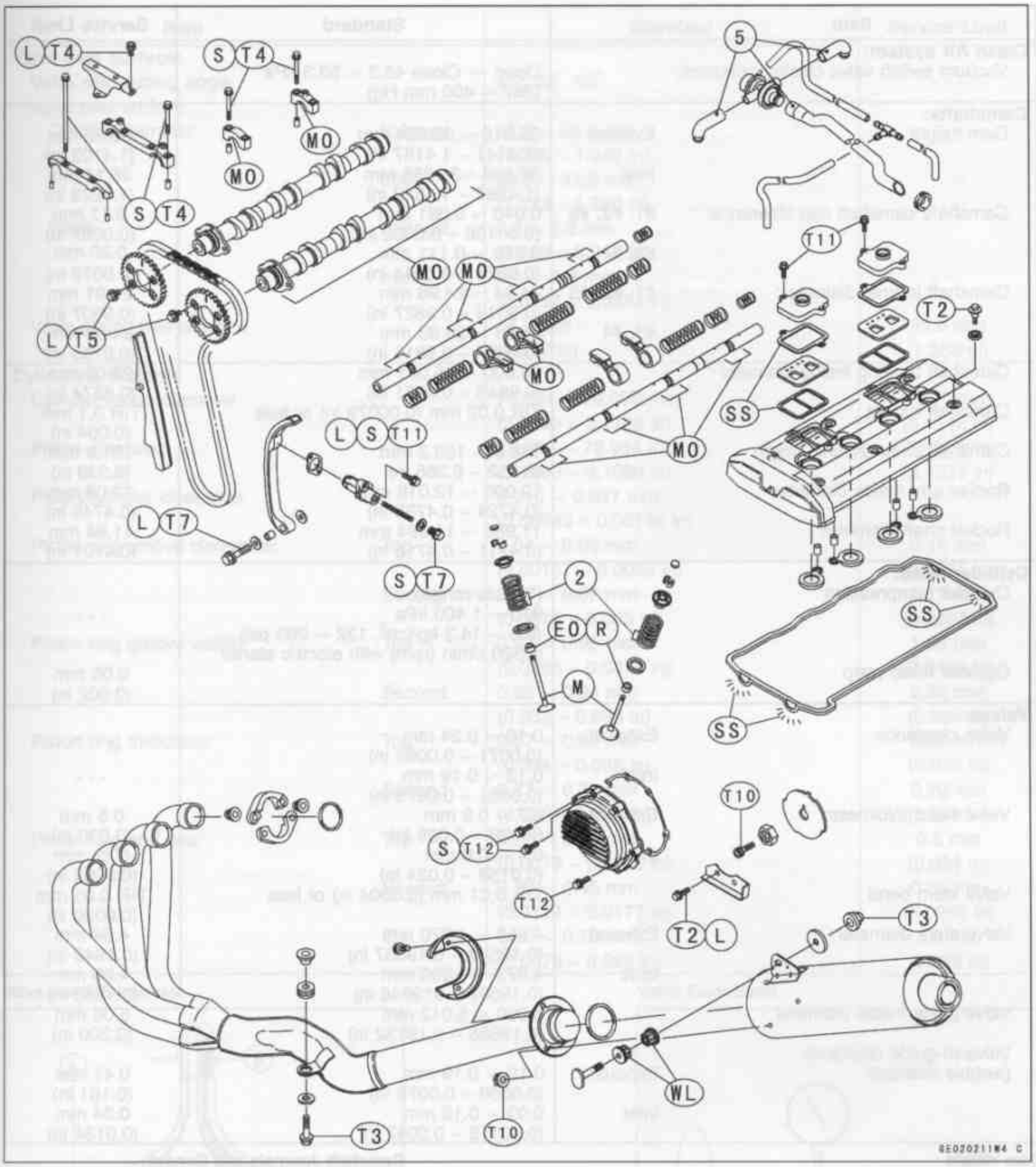
- The non-catalyst exhaust manifold has an identification No. "KHI M078" on the bottom.
- The exhaust manifold [A] with a pipe type catalytic converter [B] has an identification No. "KHI M077"[C] on the bottom although the motorcycle has no catalyst protection system. Do not mix up this exhaust manifold with the other type exhaust manifold (especially with a non-catalyst exhaust manifold). The motorcycle could not clear the emission regulation.
- Refer to the ZX900 C/D or ZX600J Service Manual (Part No. 99924–1225 or 1254) for more information about the KLEEN (theory, maintenance, and handling precautions), including the secondary air injection system.

4-2 ENGINE TOP END

Exploded View



Exploded View



1. Round mark (◯) is on the front side.
2. Closed coil end faces downward.
3. "R" marked side faces upward.
4. White mark faces forwards.
5. White marks face upwards.
6. Copper-Plated Steel Washers
7. Steel Washers

EO: Apply engine oil
G: Apply grease.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil: a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1)
R: Replacement Parts
S: Follow the specific tightening sequence.
SS: Apply silicone sealant (Kawasaki Bond: 56019-120).
WL: Apply a soap and water solution or rubber lubricant.

T1: 14 N·m (1.4 kg·m, 10.0 ft·lb)
T2: 9.8 N·m (1.0 kg·m, 87 in·lb)
T3: 34 N·m (3.5 kg·m, 25 ft·lb)
T4: 12 N·m (1.2 kg·m, 106 in·lb)
T5: 15 N·m (1.5 kg·m, 11.0 ft·lb)
T6: 2.5 N·m (0.25 kg·m, 22 in·lb)
T7: 20 N·m (2.0 kg·m, 14.5 ft·lb)
T8: 57 N·m (5.8 kg·m, 42 ft·lb)
T9: 41 N·m (4.2 kg·m, 30 ft·lb)
T10: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T11: 10 N·m (1.0 kg·m, 89 in·lb)
T12: 11 N·m (1.1 kg·m, 95 in·lb)

4-4 ENGINE TOP END

Specifications

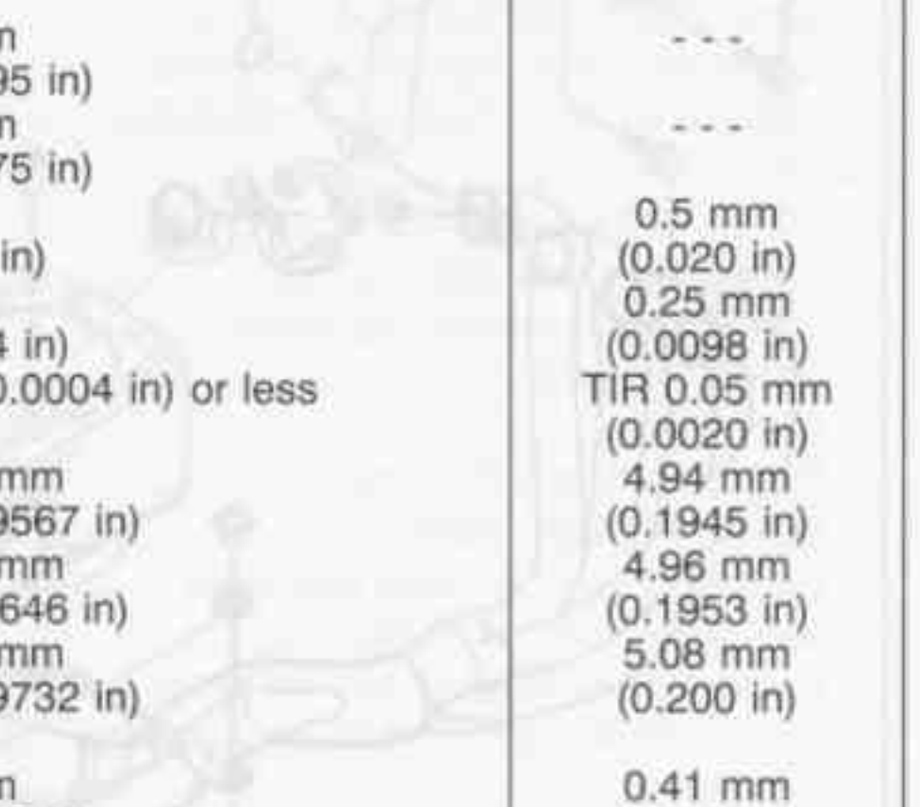
Item		Standard	Service Limit
Clean Air system:			
Vacuum switch valve closing pressure:		Open → Close 45.3 ~ 53.3 kPa (367 ~ 400 mm Hg)	- - -
Camshafts:			
Cam height:	Exhaust	35.918 ~ 36.034 mm (1.4141 ~ 1.4187 in)	35.82 mm (1.4102 in)
	Inlet	36.239 ~36.355 mm (1.4267 ~ 1.4313 in)	36.14 mm (1.4228 in)
Camshaft/ camshaft cap clearance:	#1, #2, #5	0.040 ~ 0.081 mm (0.00158 ~ 0.0032 in)	0.17 mm (0.0067 in)
	#3, #4	0.070 ~ 0.111 mm (0.0028 ~ 0.0044 in)	0.20 mm (0.0079 in)
Camshaft journal diameter:	#1, #2, #5	24.94 ~ 24.96 mm (0.9819 ~ 0.9827 in)	24.91 mm (0.9807 in)
	#3, #4	24.91 ~ 24.93 mm (0.9807 ~ 0.9815 in)	24.88 mm (0.9795 in)
Camshaft bearing inside diameter		25.000 ~ 25.021 mm (0.9843 ~ 0.9851 in)	25.08 mm (0.9874 in)
Camshaft runout		TIR 0.02 mm (0.00079 in) or less	TIR 0.1 mm (0.004 in)
Camshaft chain 20-link length		158.8 ~ 159.2 mm (6.252 ~ 6.268 in)	161.0 mm (6.339 in)
Rocker arm inside diameter		12.000 ~ 12.018 mm (0.4724 ~ 0.4735 in)	12.06 mm (0.4748 in)
Rocker shaft diameter		11.966 ~ 11.984 mm (0.4711 ~ 0.4718 in)	11.94 mm (0.4701 in)
Cylinder Head:			
Cylinder compression		(Usable range) 910 ~ 1 400 kPa (9.3 ~ 14.3 kg/cm^2, 132 ~ 203 psi) @320 r/min (rpm) with electric starter	- - -
Cylinder head warp		- - -	0.05 mm (0.002 in)
Valves:			
Valve clearance:	Exhaust	0.18 ~ 0.24 mm (0.0071 ~ 0.0095 in)	- - -
	Inlet	0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in)	- - -
Valve head thickness:	Exhaust	0.7 ~ 0.9 mm (0.028 ~ 0.035 in)	0.5 mm (0.020 in)
	Inlet	0.4 ~ 0.6 mm (0.0158 ~ 0.024 in)	0.25 mm (0.0098 in)
Valve stem bend		TIR 0.01 mm (0.0004 in) or less	TIR 0.05 mm (0.0020 in)
Valve stem diameter:	Exhaust	4.955 ~ 4.970 mm (0.19508 ~ 0.19567 in)	4.94 mm (0.1945 in)
	Inlet	4.975 ~ 4.990 mm (0.19587 ~ 019646 in)	4.96 mm (0.1953 in)
Valve guide inside diameter		5.000 ~ 5.012 mm (0.19685 ~ 0.19732 in)	5.08 mm (0.200 in)
Valve-to-guide clearance (wobble method):	Exhaust	0.10 ~ 0.19 mm (0.0039 ~ 0.0075 in)	0.41 mm (0.161 in)
	Inlet	0.03 ~ 0.12 mm (0.00118 ~ 0.0047 in)	0.34 mm (0.0134 in)

Cam Height



Cam Height (maximum) [A]

Camshaft Journals and Runout

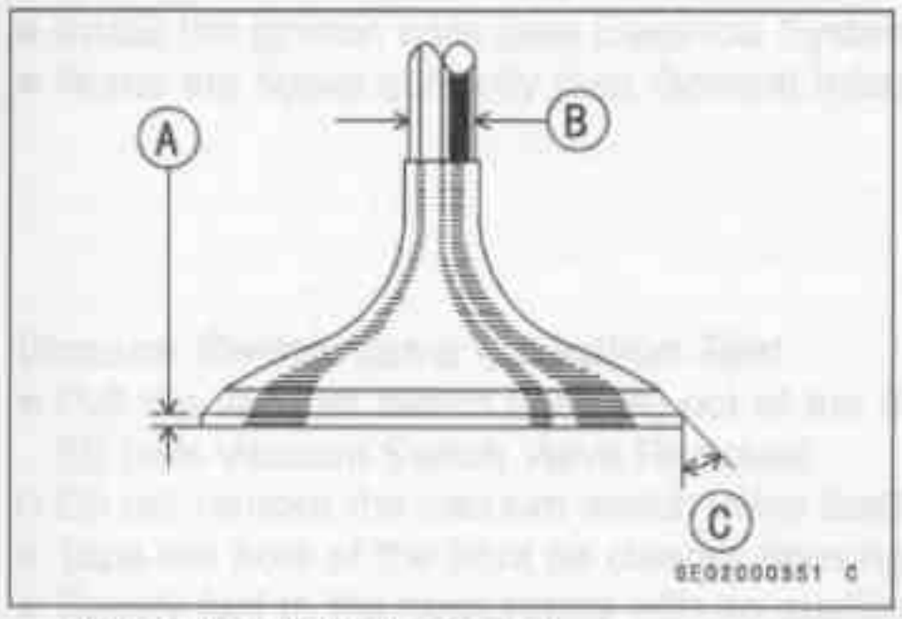


#1: left #5: right

Specifications

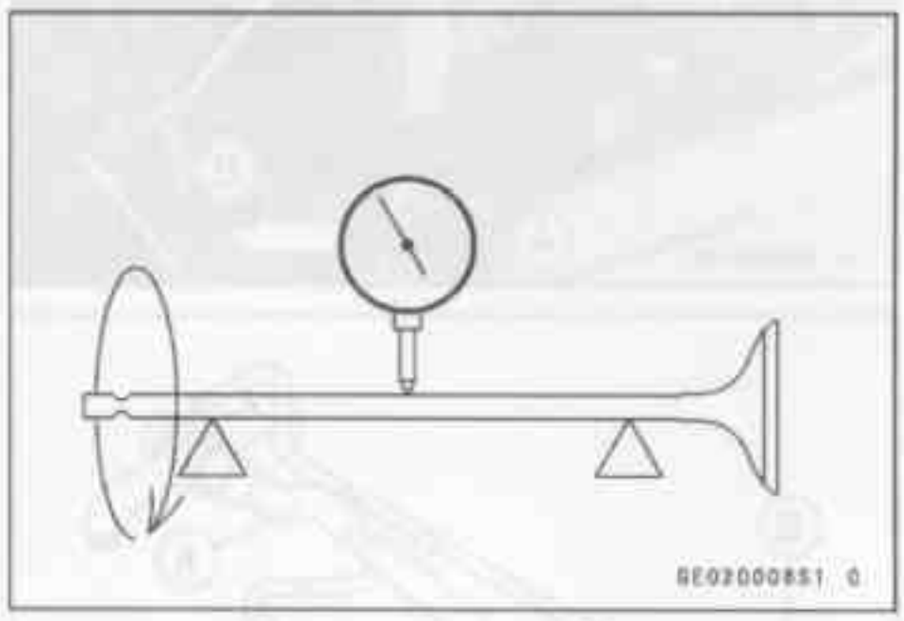
Item		Standard	Service Limit
Valve seat surface:			
Valve seat cutting angle		45°, 32°, 60°	- - -
Valve seat surface:			
Outside diameter:	Exhaust	26.3 ~ 26.5 mm (1.035 ~ 1.043 in)	- - -
	Inlet	30.8 ~ 31.0 mm (1.213 ~ 1.220 in)	- - -
Width:	Exhaust	0.8 ~ 1.2 mm (0.032 ~ 0.047 in)	- - -
	Inlet	0.5 ~ 1.0 mm (0.0197 ~ 0.0394 in)	- - -
Valve spring free length:		41.2 mm (1.622 in)	39.6 mm (1.559 in)
Cylinders, Pistons:			
Cylinder inside diameter		78.994 ~ 79.006 mm (3.1099 ~ 3.1105 in)	79.10 mm (3.1142 in)
Piston diameter		78.969 ~ 78.984 mm (3.1090 ~ 3.1096 in)	78.82 mm (3.1031 in)
Piston/cylinder clearance		0.010 ~ 0.037 mm (0.00039 ~ 0.00146 in)	- - -
Piston ring/groove clearance:	Top	0.04 ~ 0.08 mm (0.00157 ~ 0.0032 in)	0.18 mm (0.0071 in)
	Second	0.03 ~ 0.07 mm (0.0012 ~ 0.003 in)	0.17 mm (0.0067 in)
Piston ring groove width:	Top	0.93 ~ 0.95 mm (0.0366 ~ 0.0374 in)	1.03 mm (0.0406 in)
	Second	0.82 ~ 0.84 mm (0.032 ~ 0.033 in)	0.92 mm (0.036 in)
Piston ring thickness:	Top	0.87 ~ 0.89 mm (0.034 ~ 0.035 in)	0.80 mm (0.032 in)
	Second	0.77 ~ 0.79 mm (0.030 ~ 0.031 in)	0.70 mm (0.028 in)
Piston ring end gap:	Top	0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in)	0.6 mm (0.024 in)
	Second	0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in)	0.75 mm (0.0295 in)
	Oil	0.20 ~ 0.70 mm (0.0079 ~ 0.028 in)	1.0 mm (0.039 in)

Valve Head Thickness



Valve Head Thickness [A]
Valve Stem Diameter [B]
45° [C]

Valve Stem Bend



4-6 ENGINE TOP END

Specifications

Special Tools - Fork Oil Level Gauge: 57001–1290
Spark Plug Wrench, Hex 16: 57001–1262
Compression Gauge: 57001–221
Compression Gauge Adapter, M10 × 1.0: 57001–1317
Valve Spring Compressor Assembly: 57001–241
Valve Spring Compressor Adapter, ϕ22: 57001–1202
Valve Guide Arbor, ϕ5: 57001–1203
Valve Guide Reamer, ϕ5: 57001–1204
Valve Seat Cutter Holder, ϕ5: 57001–1208
Valve Seat Cutter Holder Bar: 57001–1128
Valve Seat Cutter, 45° – ϕ30: 57001–1187
Valve Seat Cutter, 32° – ϕ28: 57001–1119
Valve Seat Cutter, 60° – ϕ30: 57001–1123
Valve Seat Cutter, 45° – ϕ32: 57001–1115
Valve Seat Cutter, 32° – ϕ33: 57001–1199
Valve Seat Cutter, 60° – ϕ33: 57001–1334
Piston Pin Puller Assembly: 57001–910

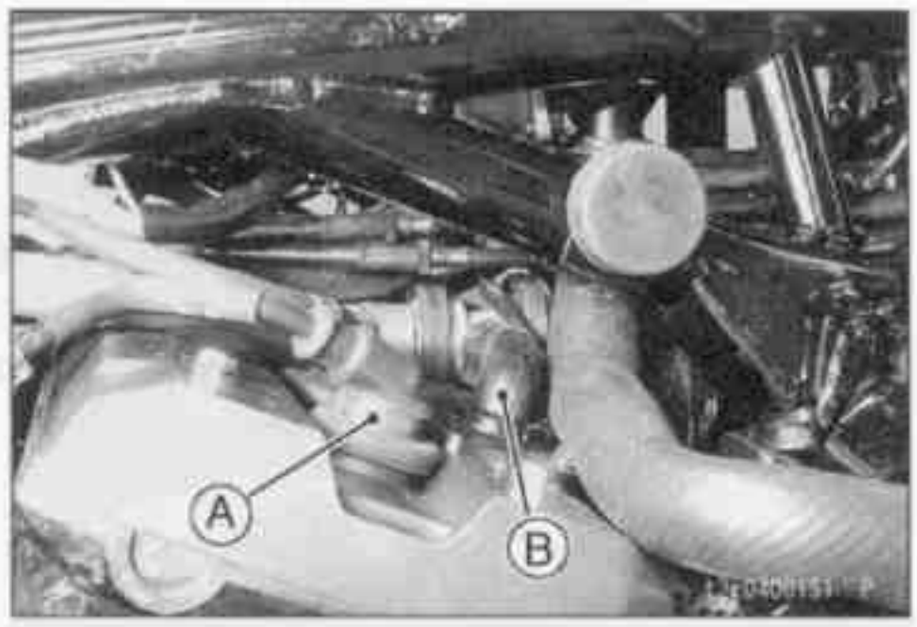
○ Two of above valve seat cutters can be sustituted for following seat cutters.
Exhaust Valve Seat Cutter
57001–1119 (32°-ϕ28) → 57001–1120 (32°-ϕ30)
Inlet Valve Seat Cutter
57001–1115 (45°-ϕ32) → 57001–1116 (45°-ϕ35)

Sealant - Kawasaki Bond (silicone Sealant): 56019–120

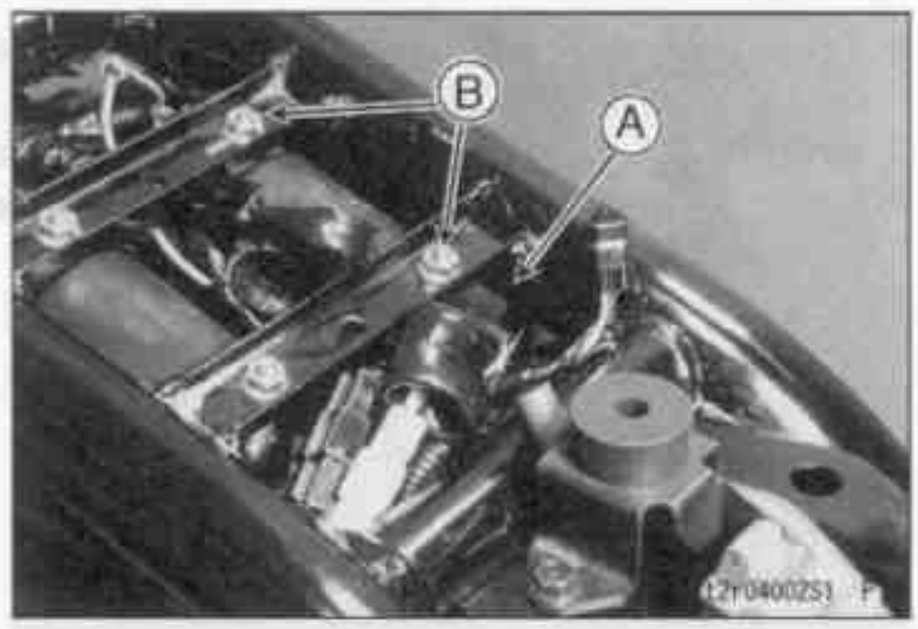
Clean Air System

Vacuum Switch Valve Removal

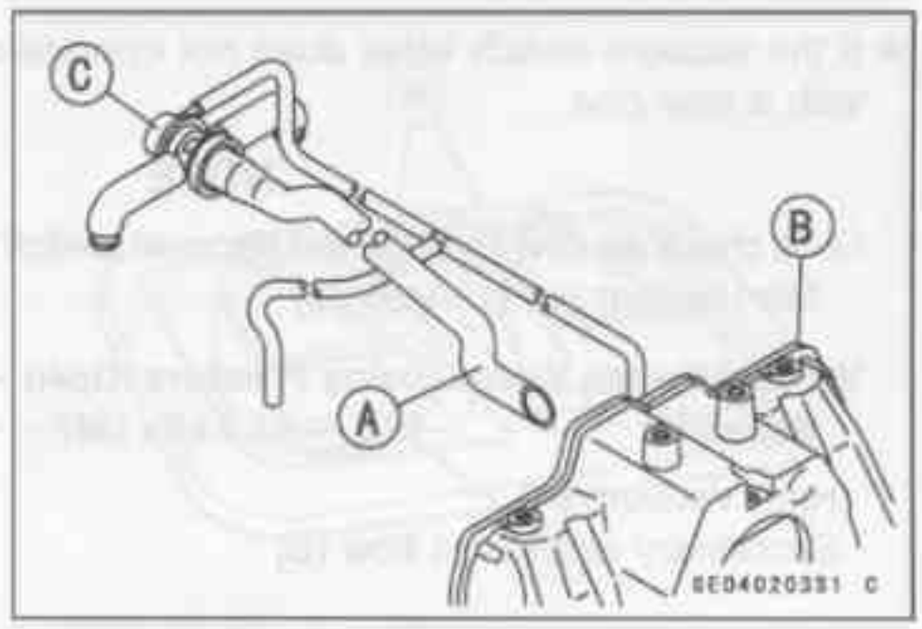
- Remove:
  Fuel Tank (See Fuel System Chapter)
  Spark Plug Caps [A]
  Vacuum Switch Valve Hose Ends [B] (from the cylinder head cover)



- Disconnect:
  Alternator, Pickup Coil, and Throttle Sensor Connectors [A]
  Ignition Coil Primary Lead Connectors (see Electrical System chapter)
- Unscrew the ignition coil mounting nuts [B], and remove the ignition coils with the second leads left installed for the access to the vacuum switch valve hose end.

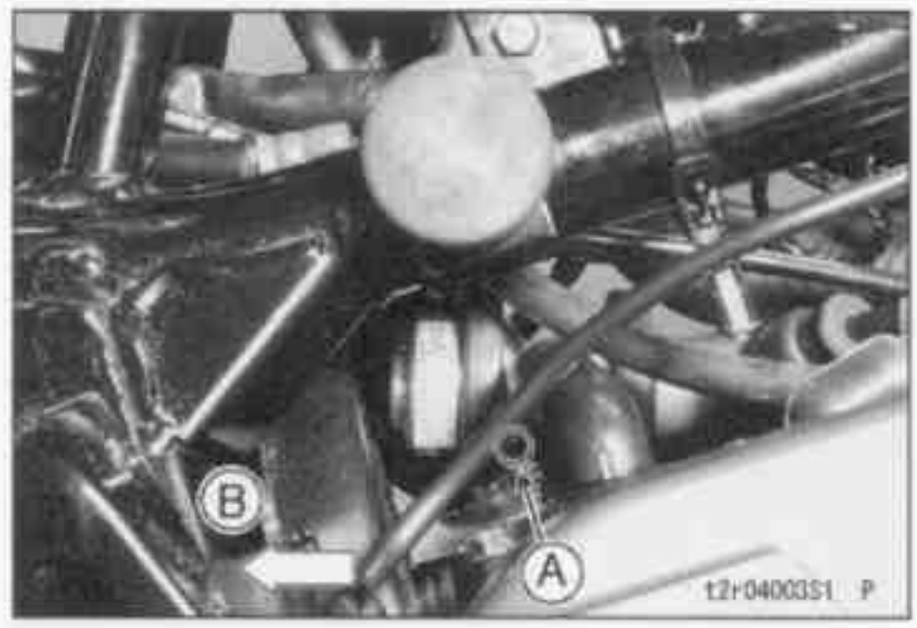


- Pull out the vacuum switch hose end [A] from the front air cleaner housing [B].
- Remove the vacuum switch valve [C] from the vehicle with the hoses installed.



Vacuum Switch Valve Installation

- Install the vacuum switch valve so that the air hole [A] faces downwards.
  Front [B]
- Apply water or rubber lubricant to the end of the vacuum switch hose and insert the hose into the front air cleaner housing.
- Install the ignition coils (see Electrical System chapter).
- Route the hoses correctly (see General Information chapter).



Vacuum Switch Valve Operation Test

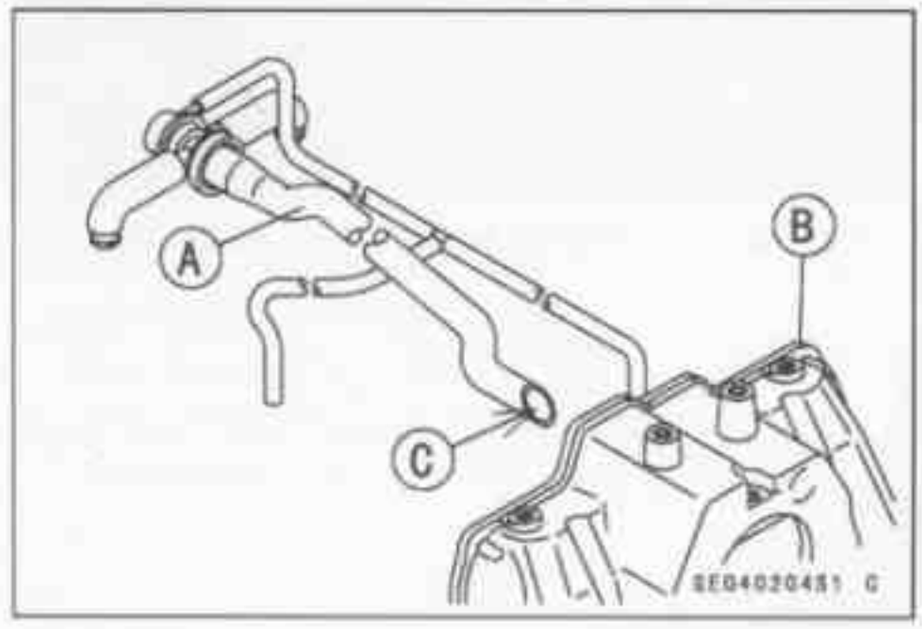
- Pull the vacuum switch hose [A] out of the front air cleaner housing [B] (see Vacuum Switch Valve Removal).

○ Do not remove the vacuum switch valve itself.

- Tape the hole of the front air cleaner housing.
- Supply fuel to the carburetors with an auxiliary fuel tank.
- Start the engine and run it at idle speed.
- Plug the vacuum switch hose end [C] with your finger and feel vacuum pulsing in the hose.

★ If there is no vacuum pulsation, check the hose line for leak. If there is no leak, check the vacuum switch valve (see Vacuum Switch Valve Unit Test).

- Apply water or rubber lubricant to the end of the vacuum switch hose and put the hose into the front air cleaner housing.



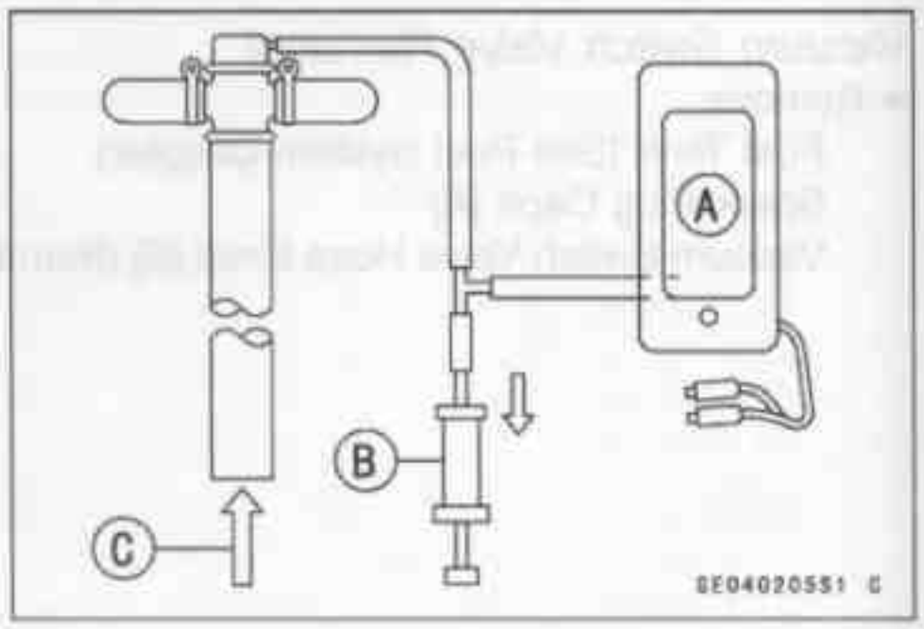
Clean Air System

Vacuum Switch Valve Unit Test

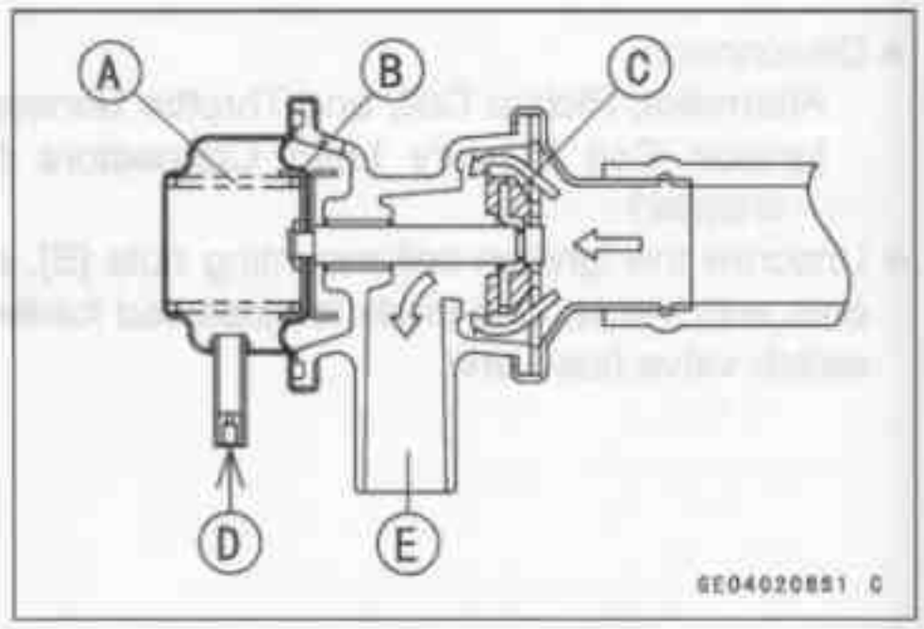
- Remove:
  Fuel Tank (see Fuel System chapter)
  Vacuum Switch Valve (see this chapter)
- Connect a vacuum gauge [A] and syringe [B] or fork oil level gauge to the vacuum hoses as shown.

Special Tool - Fork Oil Level Gauge: 57001–1290

Air Flow [C]



- Gradually raise the vacuum (lower the pressure) applied to the vacuum switch valve, and check the valve operation. When the vacuum is low, the vacuum switch valve should permit air to flow. When the vacuum is raised to valve closing pressure, the valve should stop air flow.
  Spring [A]
  Diaphragm [B]
  Valve [C]
  Low Vacuum [D]
  Secondary Air Flow [E]



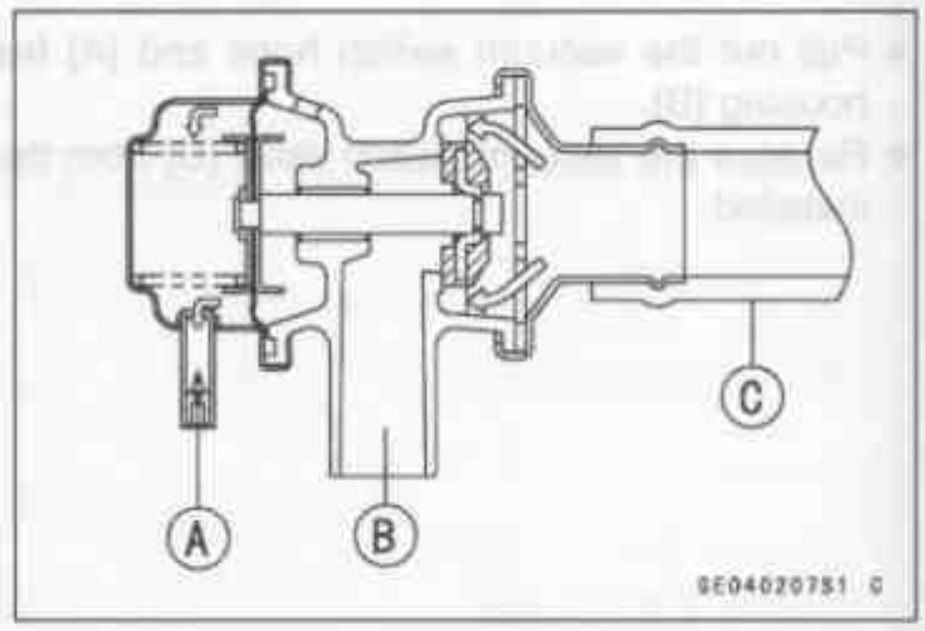
★If the vacuum switch valve does not operate as described, replace it with a new one.

NOTE

○ *To check air flow through the vacuum switch valve, just blow through the vacuum switch hose [C].*

Vacuum Switch Valve Closing Pressure (Open → Close)
Standard: 45.3 ~ 53.3 kPa (367 ~ 400 mmHg)

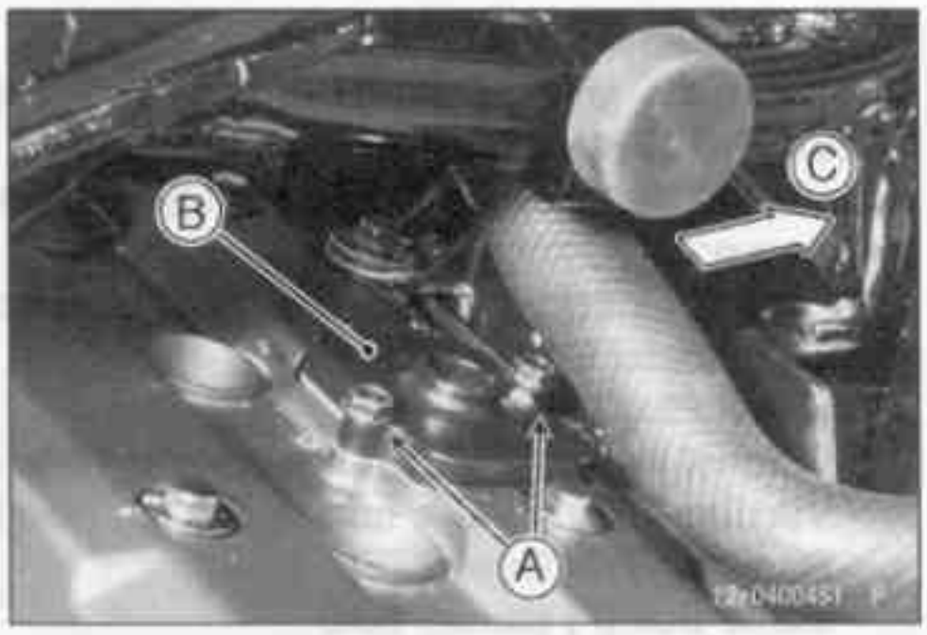
High Vacuum [A]
Secondary air cannot flow [B]



Clean Air System

Air Suction Valve Removal

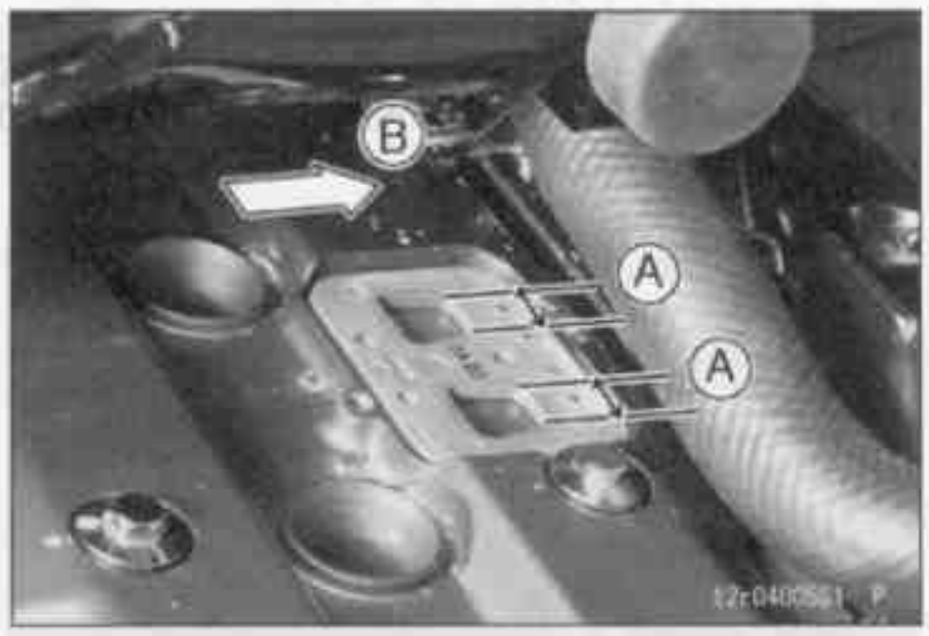
- Remove:
  Fuel Tank (See Fuel System Chapter)
  Vacuum Switch Valve Hose Ends (from the cylinder head cover)
- Put the vacuum switch valve aside.
- Unscrew the bolts [A] and remove the air suction valve covers [B].
  Front [C]



Air Suction Valve Installation

- Replace the gaskets with new ones.
- Apply Kawasaki Bond (Silicone Sealant: 56019-120) to both sides of the gasket sparingly.
- Install the air suction valve so that its narrower sides [A] of the reed face the front [B].

Torque - Air Suction Valve Cover Bolts : 10 N·m (1.0 kg·m, 89 in·lb)



Air Suction Valve Inspection

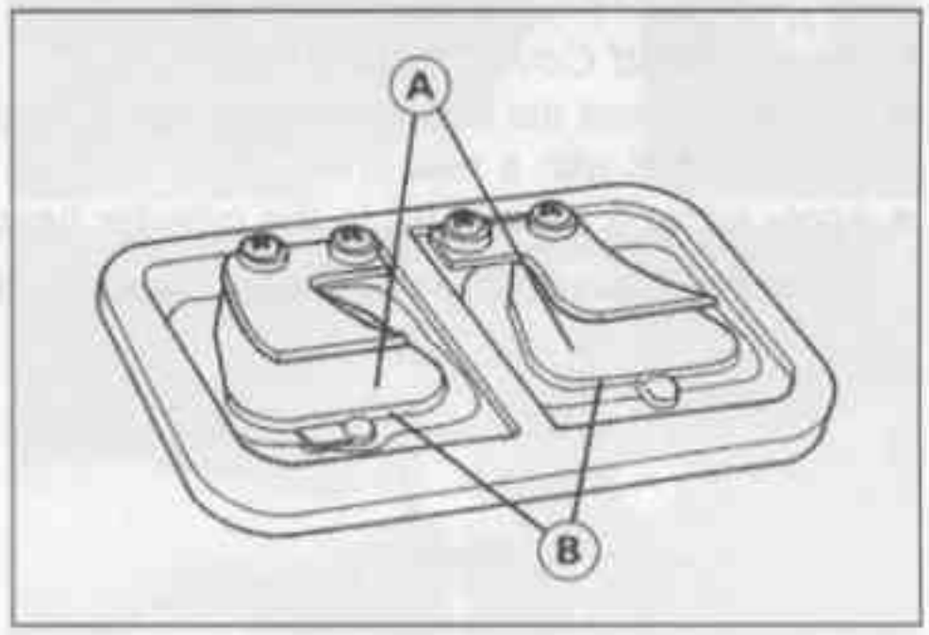
- Visually inspect the reeds [A] for cracks, folds, warps, heat damage, or other damage.

★If there is any doubt as to the condition of the reed, replace the air suction valve as an assembly.

- Check the reed contact areas [B] of the valve holder for grooves, scratches, any signs of separation from the holder, or heat damage.

★If there is any doubt as to the condition of the reed contact areas, replace the air suction valve as an assembly.

- If any carbon or other foreign particles have accumulated between the reed and the reed contact area, wash the valve assembly with a high-flash point solvent.



CAUTION

Do not scrape off the deposits with a scraper as this could damage the rubber, requiring replacement of the suction valve assembly.

Clean Air System Hose Inspection

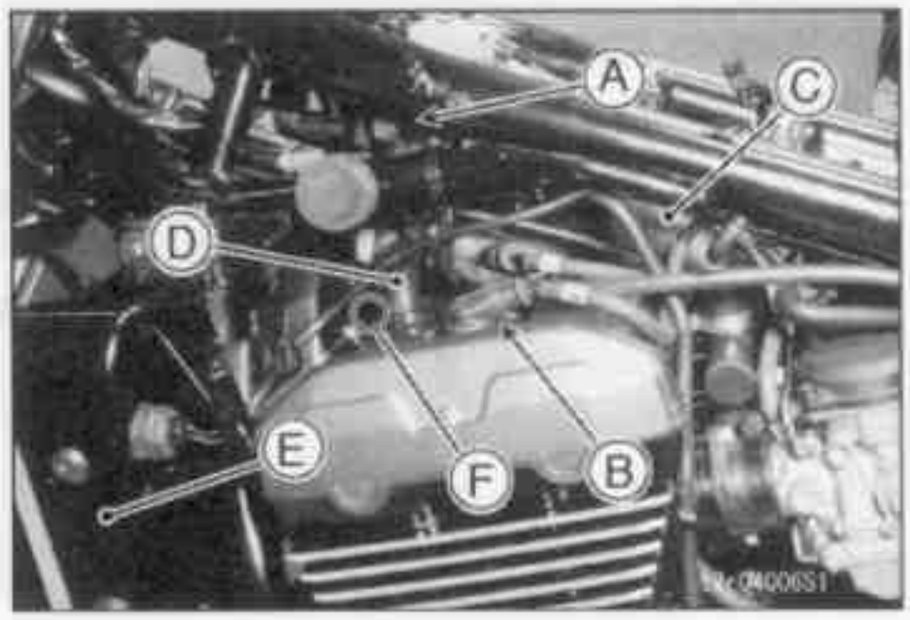
- Be certain that all the hoses are routed without being flattened or kinked, and are connected correctly to the air cleaner housing, vacuum switch valve, carburetor assembly and air suction valve covers (see Cable, Wire, and Hose Routing section in the General Information chapter).

★If they are not, correct them. Replace them if they are damaged.

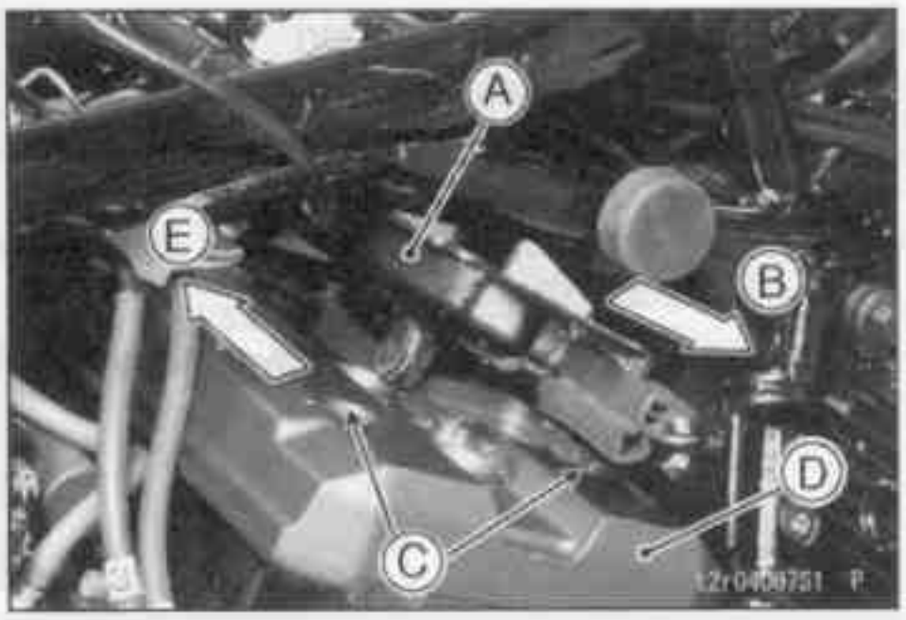
Cylinder Head Cover

Cylinder Head Cover Removal

- Remove the fairing (ZR1200B, see frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter)
- Remove:
  Lead Connectors (above the Cylinder Head)
  Thermostat Bracket Bolt [A]
  Spark Plug Caps [B]
  Coolant Hoses [C] (over the cylinder head cover)
  Vacuum Switch Valve and Hoses [D] (see this section)
  Radiator Side Covers [E]
  Baffle Bolt [F] (center bolt)



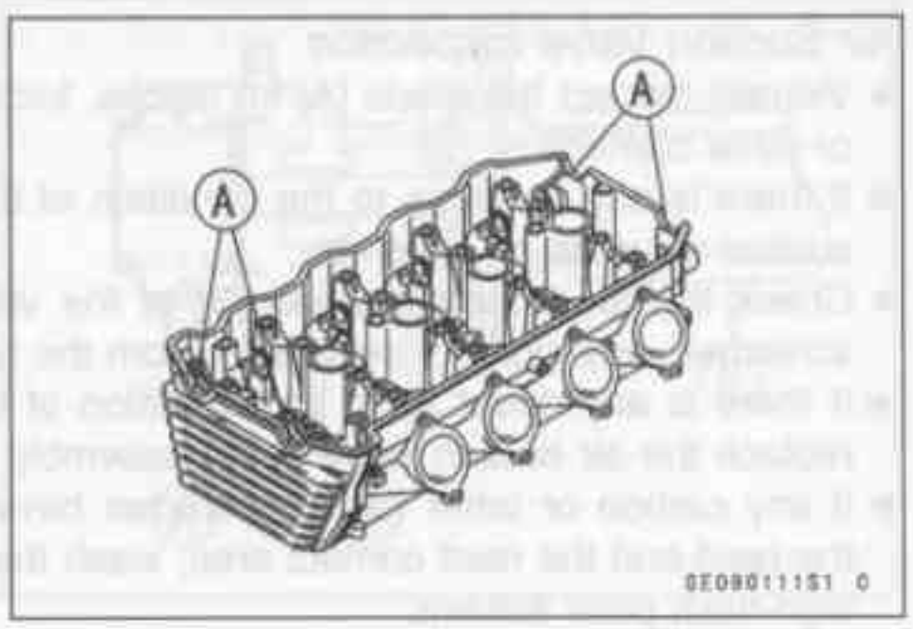
- Remove the baffle [A] from the motorcycle right side [B]
- Unscrew the bolts [C] and remove the cylinder head cover [D] from the left side [E].



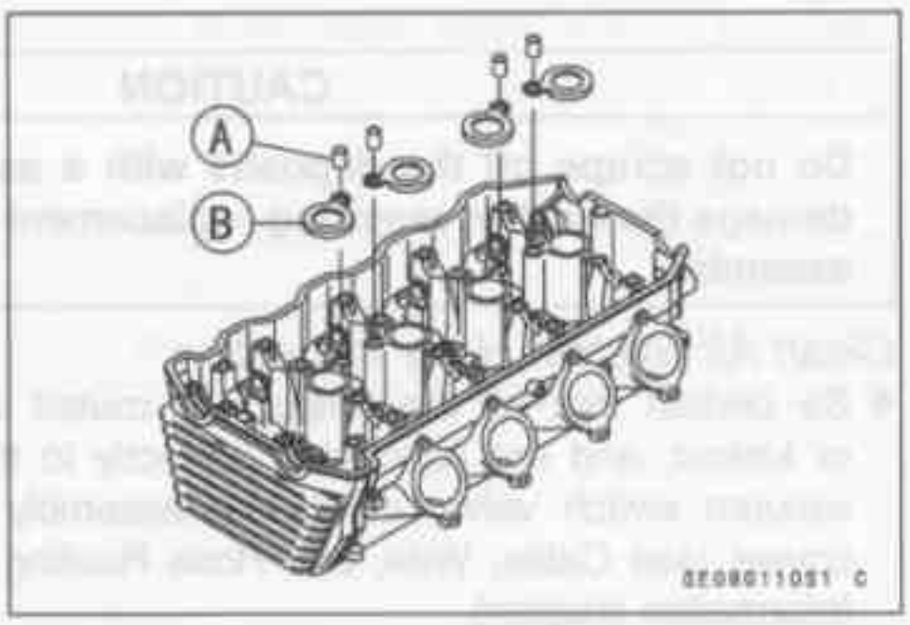
Cylinder Head Cover Installation

- Visually inspect the head cover gasket. If damaged, replace the head cover gasket with a new one.
- Apply silicone sealant [A] to the cylinder head as shown.

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

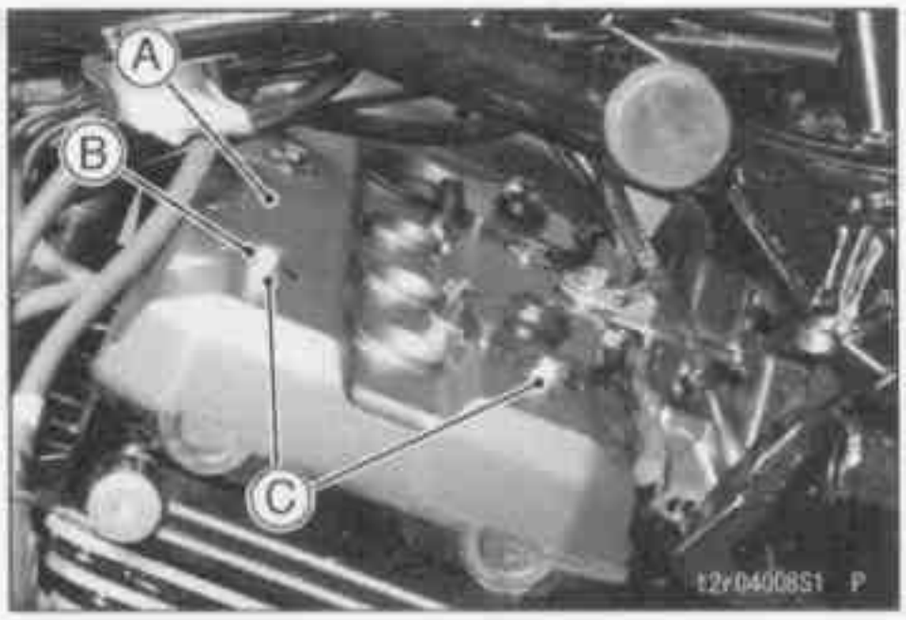


- Install:
  Dowel Pins [A]
  Plug Hole Gaskets [B] (with the flat side up)



- Install the cylinder head cover [A].
- Install the washers [B] with the metal side upwards.
- Tighten:

Torque - Cylinder Head Cover Bolts [C] : 9.8 N·m (1.0 kg·m, 87 in·lb)



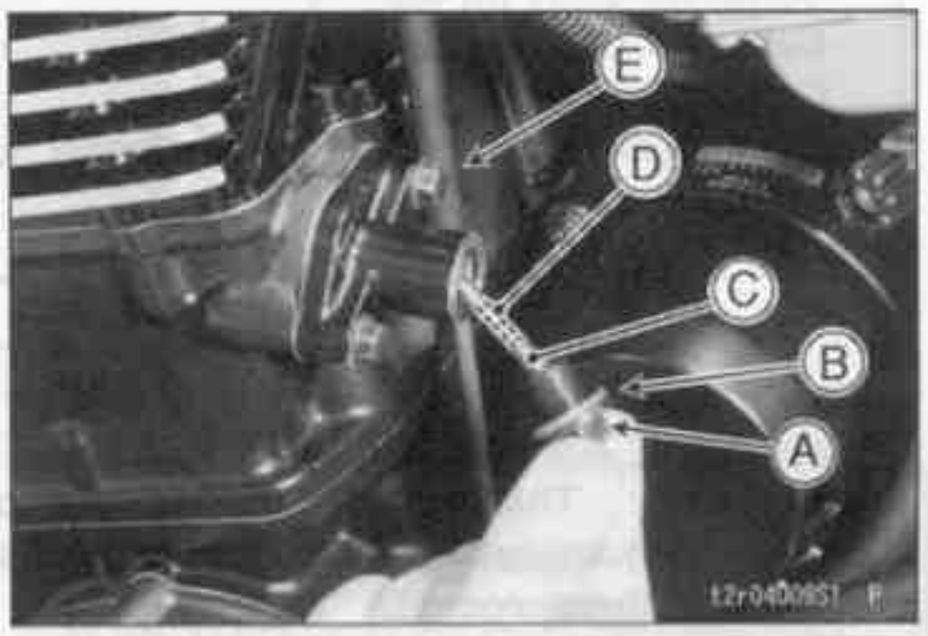
Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

CAUTION

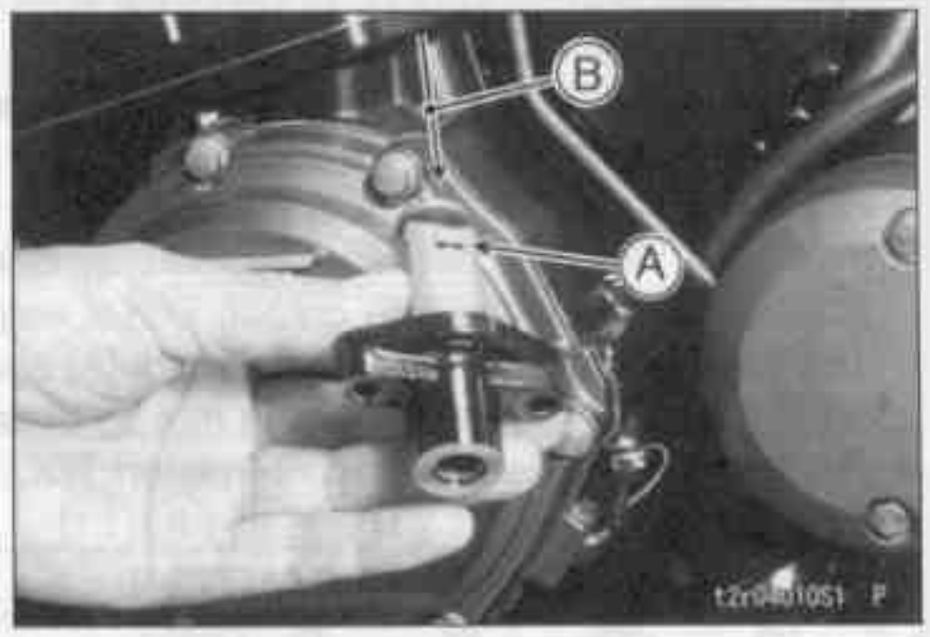
This is a non-return type cam chain tensioner. The push rod does not return to its original position once it moves out to take up camshaft chain slack. Observe all the rules listed below:
When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts from this position could damage the tensioner and the camshaft chain. Once the bolts are loosened, the tensioner must be removed and reset as described in "Camshaft Chain Tensioner Installation."
Do not turn over the crankshaft while the tensioner is removed. This could upset the cam chain timing, and damage the valves.

- Remove:
  Pickup Coil Cover (see Valve Clearance Inspection).
  Chain Tensioner Cap [A]
  Washer [B]
  Spring [C] and Pin [D]
  Tensioner Mounting Bolts [E]
- Take the camshaft chain tensioner off the cylinder.



Camshaft Chain Tensioner Installation

- Push the stopper [A] to release the ratchet and push [B] the push rod into the tensioner body.



- Install the tensioner body [A] with the arrow mark [B] pointing upwards.

Non-permanent Locking Agent - Chain Tensioner Mounting Bolts

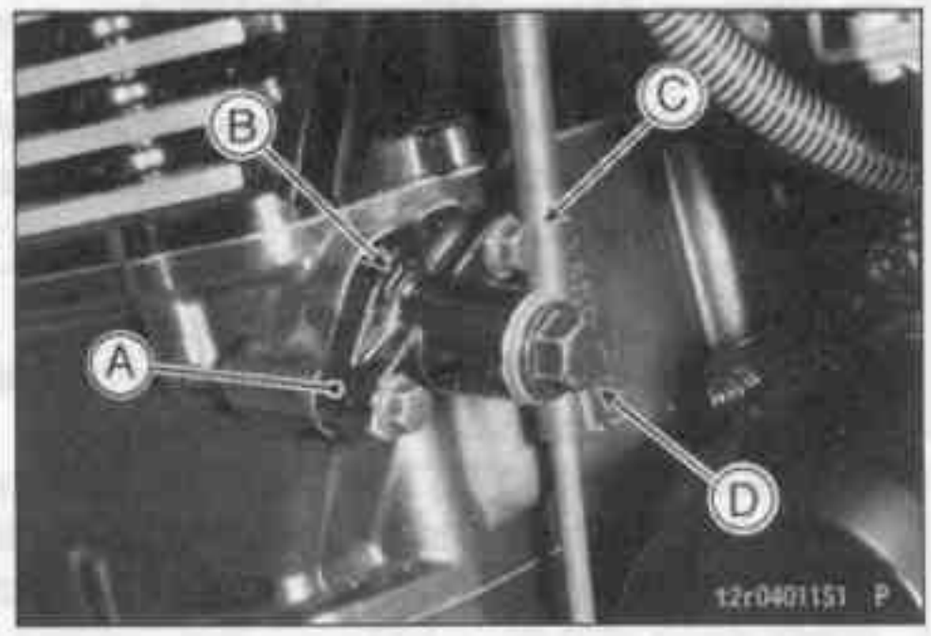
- Tighten:

Torque - Chain Tensioner Mounting Bolts [C]: 10 N·m (1.0 kg·m, 89 in·lb)

- Install the pin, spring, and washer.
- Tighten:

Torque - Chain Tensioner Cap [D]: 20 N·m (2.0 kg·m, 14.5 ft·lb)

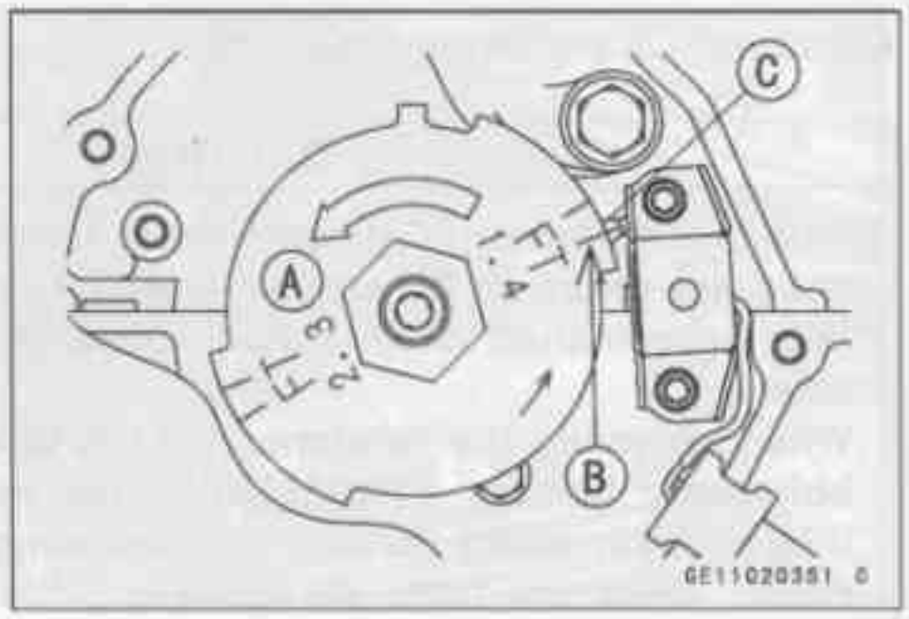
- Turn the crankshaft 2 turns counterclockwise to allow the tensioner to expand.
- Install the pickup coil cover (see Valve Clearance Adjustment).



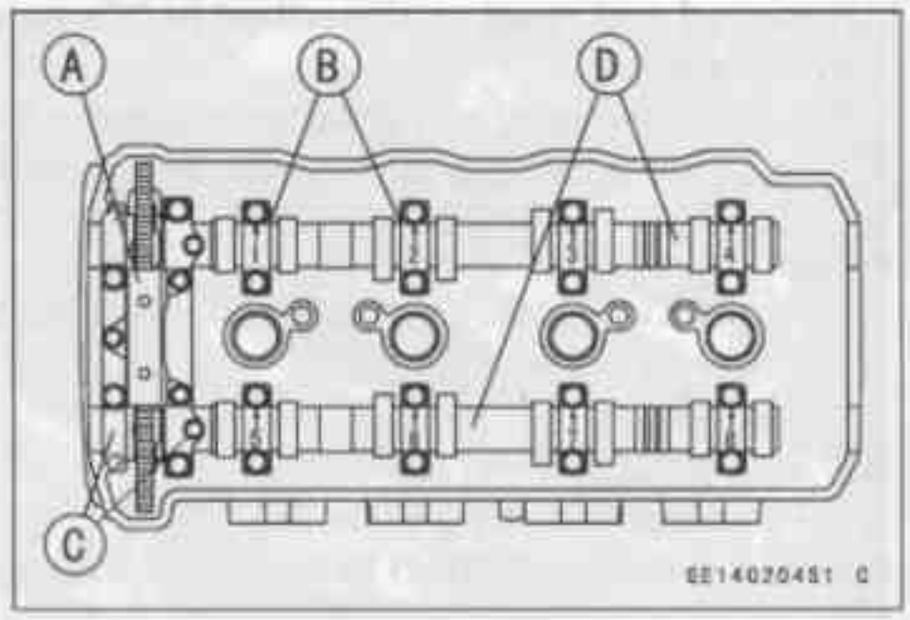
Camshafts

Camshaft Removal

- Remove:
  Cylinder Head Cover (see this chapter)
  Pickup Coil Cover
- Turn the crankshaft counterclockwise [A] and set the crankshaft at #1, 4 piston TDC.
  TDC Mark [B] for #1, 4 Pistons
  Crankcase Mark [C]



- Remove:
  Camshaft Chain Tensioner (see this chapter)
  Upper Chain Guide [A]
  Camshaft Caps [B]
  Camshaft Brackets [C]
  Camshafts [D]
- Stuff a clean cloth into the chain tunnel to keep any parts from dropping into the crankcase.

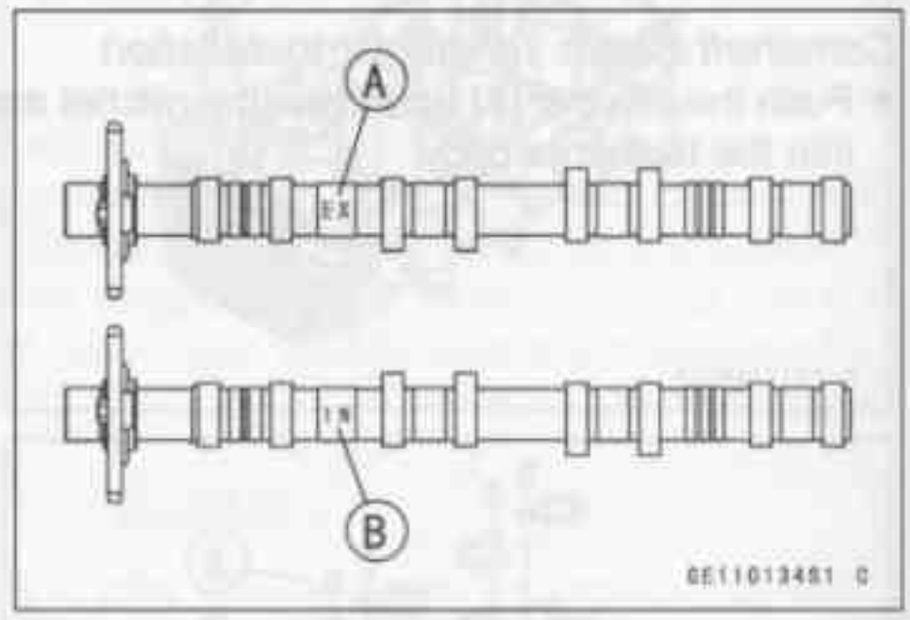


CAUTION

The crankshaft may be turned while the camshafts are removed. Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

Camshaft Installation

- If a new camshaft is to be used, apply a thin coat of molybdenum disulfide grease to the cam surfaces.
- Apply molybdenum disulfide oil to all cam parts, left steps, and journals. The molybdenum disulfide oil is a mixture of engine oil and molubdenum disulfide grease with a weight ratio (10 : 1).
- The exhaust camshaft has an EX mark [A] and the inlet camshaft has an IN mark [B]. Be careful not to mix up these shafts.
- Position the crankshaft at #1, #4 piston TDC.

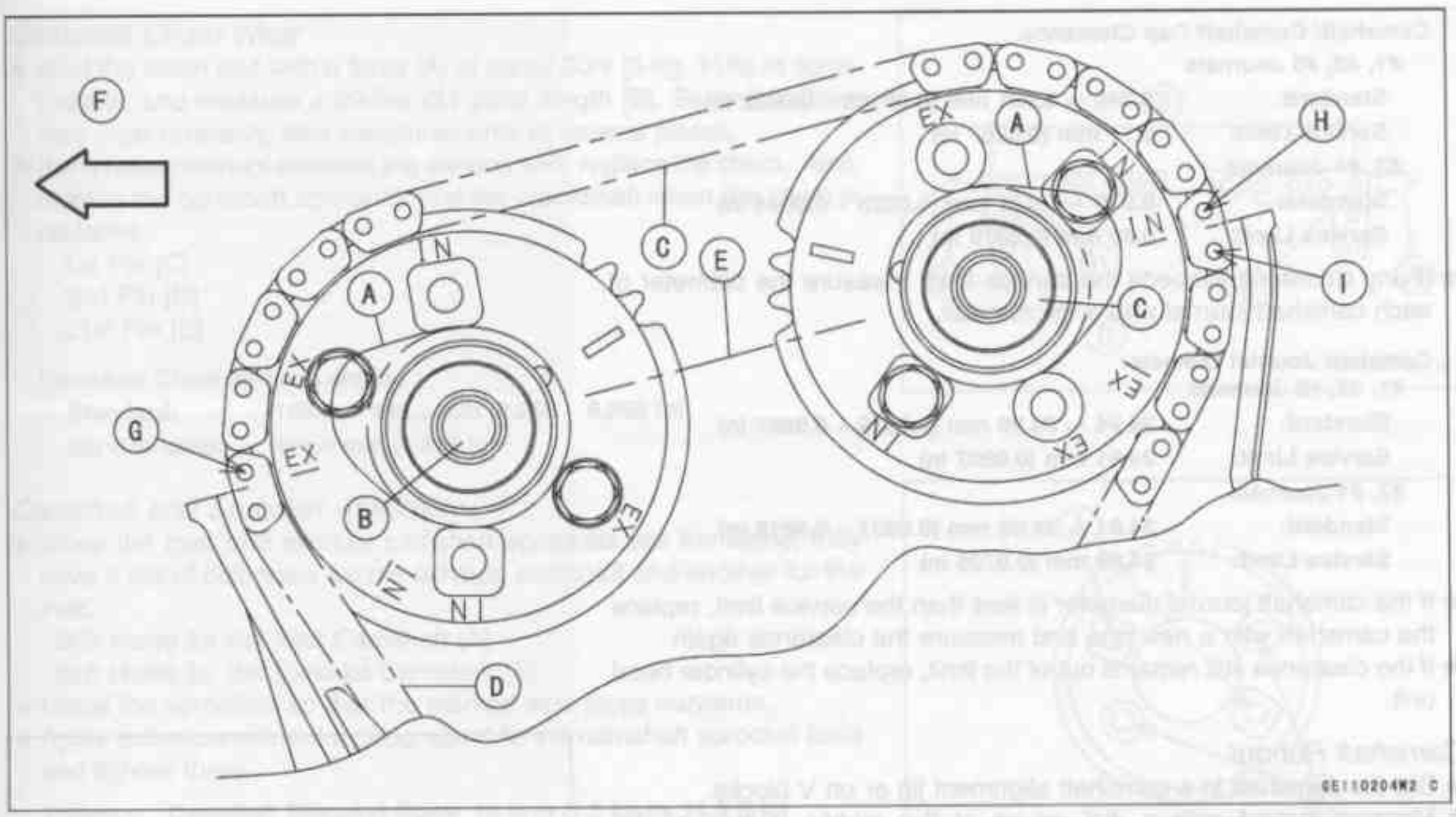


CAUTION

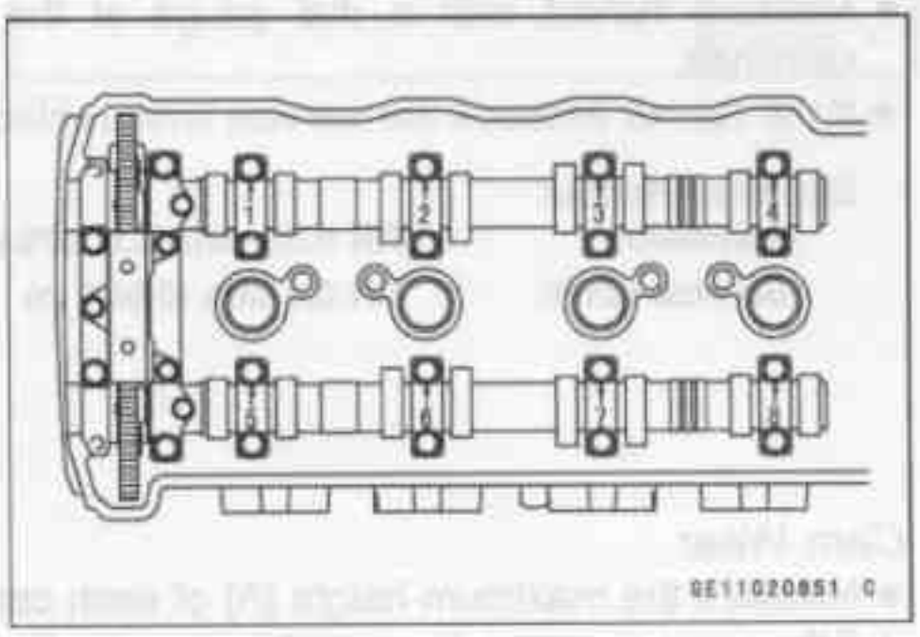
The crankshaft may be turned while the camshafts are removed, but always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower (crankshaft) sprocket. A kinked chain could damage both the chain and the sprocket.

- Install the camshafts in the order listed.
- Install these camshafts so the #4 cams [A] point away from the locker arm for easy timing.
  Exhaust Camshaft [B] and Caps (time the camshaft)
  Inlet Camshaft [C] and Caps (time the camshaft)
- Pull the tension side (exhaust side) of the chain taut [D] to install the chain.
- Engage the camshaft chain with the camshaft sprockets so that the timing marks on the sprockets are positioned as shown.
- The timing marks must be aligned with the cylinder head upper surface [E] and positioned respectively as shown after the camshaft chain slack is taken up by the tensioner.
  Front [F]
  1 st Pin [G]
  30 th Pin [H]
  31 st Pin [I]

Camshafts



- Install the camshaft caps in the correct positions shown.
- The camshaft cap locations are numbered and the arrow mark must point forward.



CAUTION

The camshaft caps are machined with the cylinder head. So, if a cap is installed in a wrong location, the camshaft may seize because of improper oil clearance in the bearings.

- Tighten the camshaft cap and bracket bolts in the order numbered.

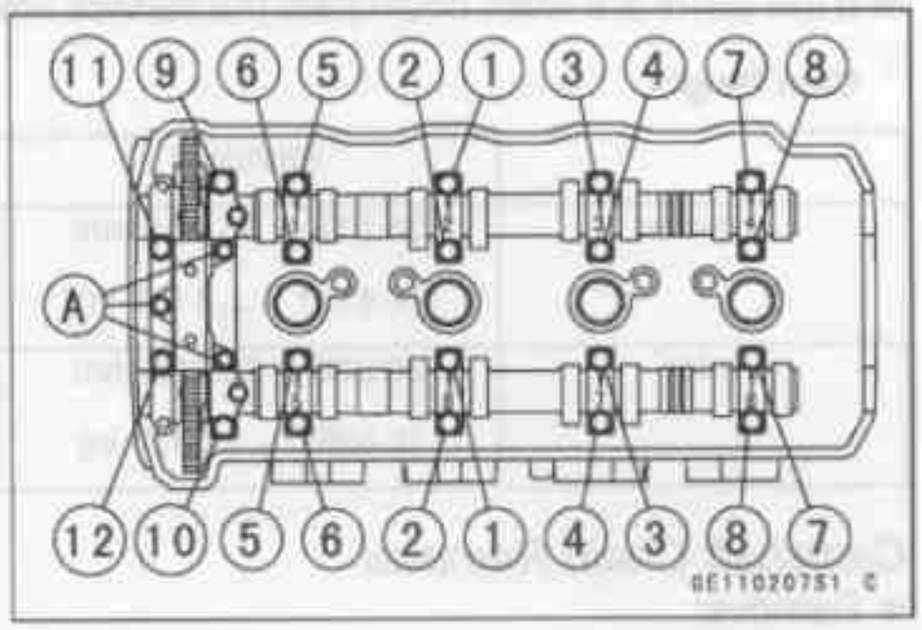
Torque - Camshaft Cap and Bracket Bolts: 12 N·m (1.2 kg·m, 106 in·lb)

- Tighten:

Non-permanent Locking Agent — Upper Chain Guide Bolts

Torque - Upper Chain Guide Bolts [A]: 12 N·m (1.2 kg·m, 106 in·lb)

- Install the camshaft chain tensioner (see this chapter). Turn the crankeshaft 2 turns counterclockwise to allow the tensioner to expand and recheck the camshaft chain timing.
- Install the pickup coil cover (see Valve Clearance Adjustment).



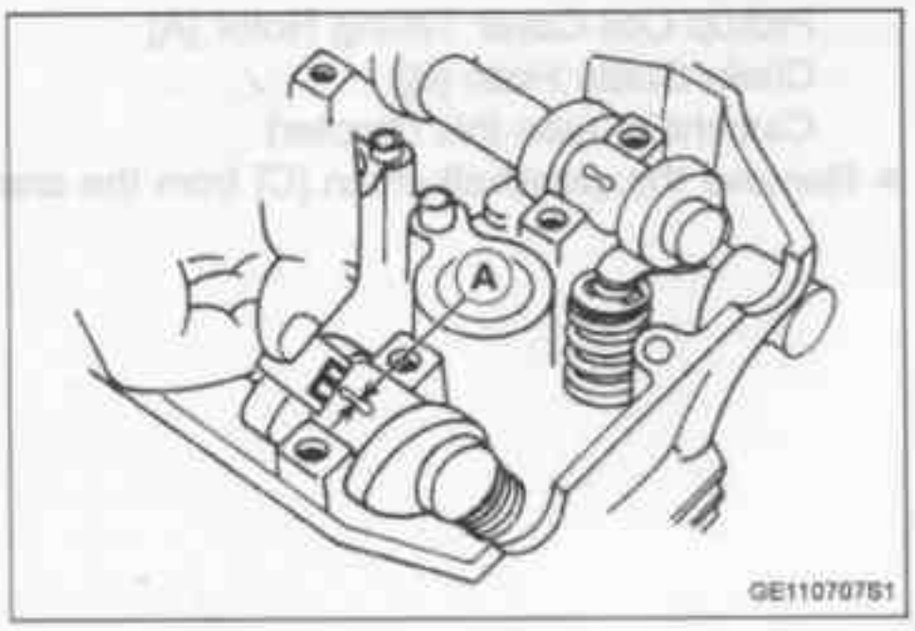
Camshaft/ Camshaft Cap Wear

- Cut strips of plastigage to journal width. Place a strip on each journal parallel to the camshaft installed in the correct position.
- Measure each clearance between the camshaft journal and the camshaft cap using plastigage [A].
- Tighten:

Torque - Camshaft Cap Bolts: 12 N·m (1.2 kg·m, 106 in·lb)

NOTE

- *Do not turn the camshaft when the plastigage is between the journal and camshaft cap.*



Camshafts

Camshaft/ Camshaft Cap Clearance
#1, #2, #5 Journals
Standard: 0.040 ~ 0.081 mm (0.00158 ~ 0.0032 in)
Service Limit: 0.17 mm (0.0067 in)
#3, #4 Journals
Standard: 0.070 ~ 0.111 mm (0.0028 ~ 0.0044 in)
Service Limit: 0.20 mm (0.0079 in)

★ If any clearance exceeds the service limit, measure the diameter of each camshaft journal with a micrometer.

Camshaft Journal Diameter
#1, #2, #5 Journals
Standard: 24.94 ~ 24.96 mm (0.9819 ~ 0.9827 in)
Service Limit: 24.91 mm (0.9807 in)
#3, #4 Journals
Standard: 24.91 ~ 24.93 mm (0.9807 ~ 0.9815 in)
Service Limit: 24.88 mm (0.9795 in)

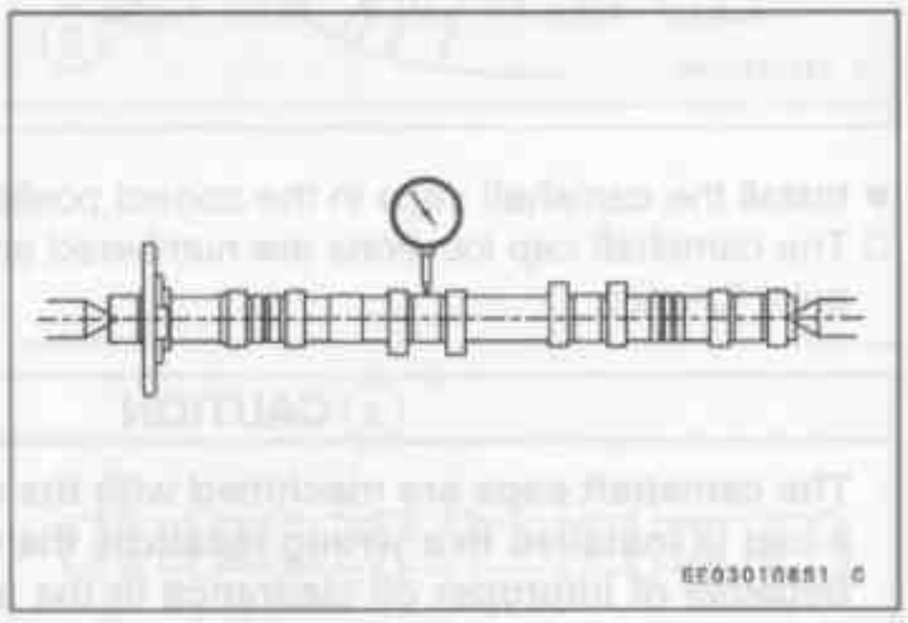
★ If the camshaft journal diameter is less than the service limit, replace the camshaft with a new one and measure the clearance again.
★ If the clearance still remains out of the limit, replace the cylinder head unit.

Camshaft Runout

- Set the camshaft in a camshaft alignment jig or on V blocks.
- Measure runout with a dial gauge at the middle journal of the camshaft.

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

Camshaft Runout
Standard: TIR 0.02 mm (0.00079 in) or less
Service Limit: TIR 0.1 mm (0.004 in)



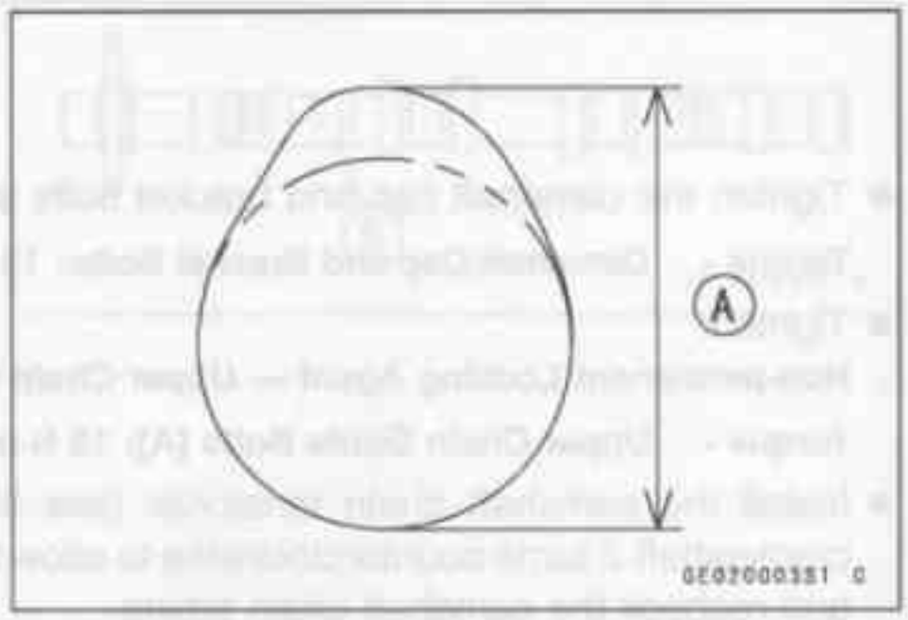
Cam Wear

- Measure the maximum height [A] of each cam with a micrometer.

★ If the cams are worn down past the service limit, replace the camshaft.

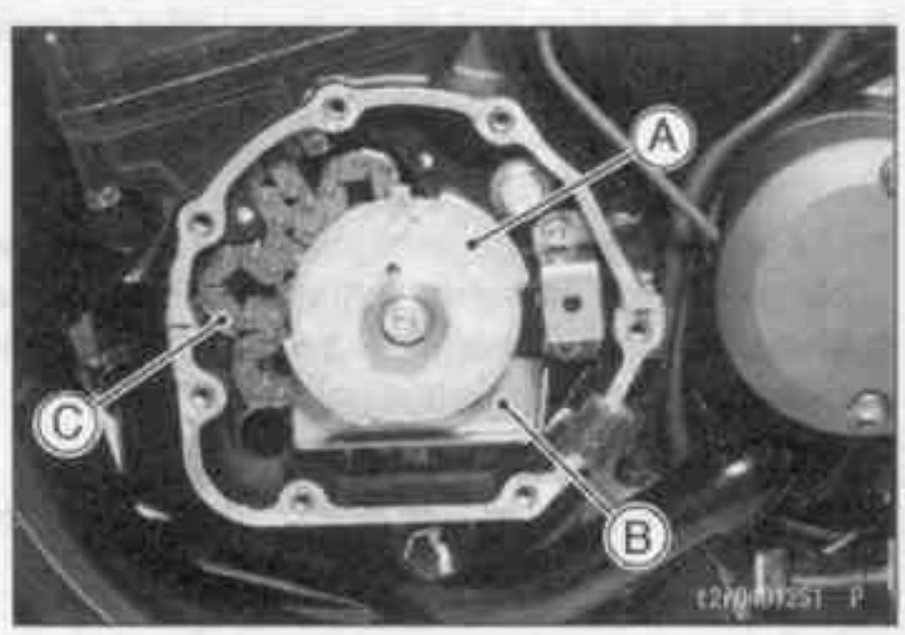
Cam Height

	Standard	Service Limit
Exhaust	35.918 ~ 36.034 mm (1.4141 ~ 1.4187 in)	35.82 mm (1.4102 in)
Inlet	36.239 ~ 36.355 mm (1.4267 ~ 1.4313 in)	36.14 mm (1.4228 in)



Camshaft Chain Removal

- Remove:
  Pickup Coil Cover Timing Rotor [A]
  Chain Guide Plate [B]
  Camshafts (see this chapter)
- Remove the camshaft chain [C] from the crankshaft sprocket.



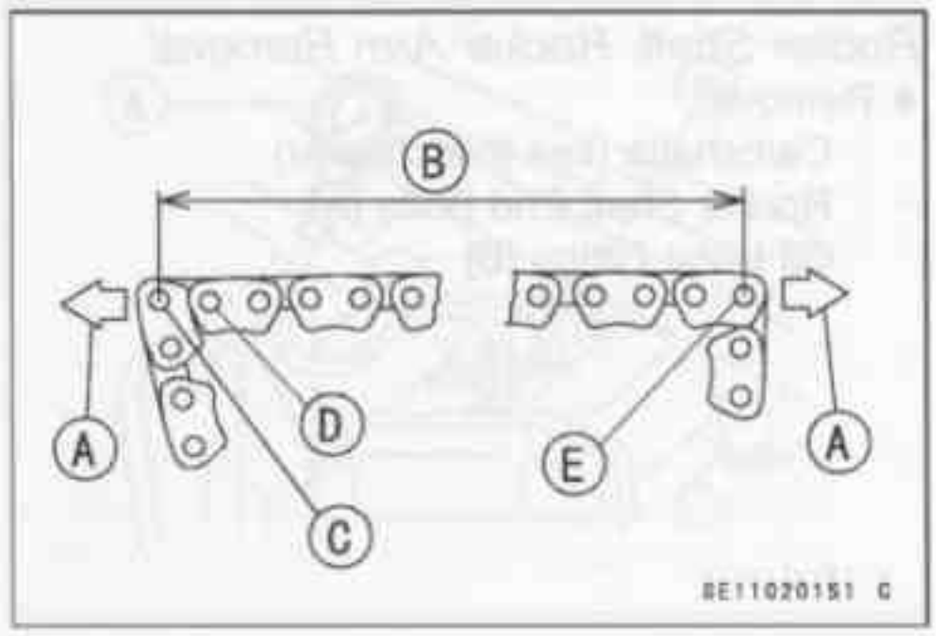
Camshafts

Camshaft Chain Wear

- Hold the chain taut with a force [A] of about 50N (5 kg, 11lb) in some manner, and measure a 20-link (21 pins) length [B]. Since the chain may wear unevenly, take measurements at several places.

★ If any measurement exceeds the service limit, replace the chain. Also, replace the camshaft sprockets and the crankshaft when the chain is replaced.

1st Pin [C]
2nd Pin [D]
21st Pin [E]



Camshaft Chain 20-link Length

Standard: 158.8 ~ 159.2 mm (6.252 - 6.268 in)
Service Limit: 161.0 mm (6.339 in)

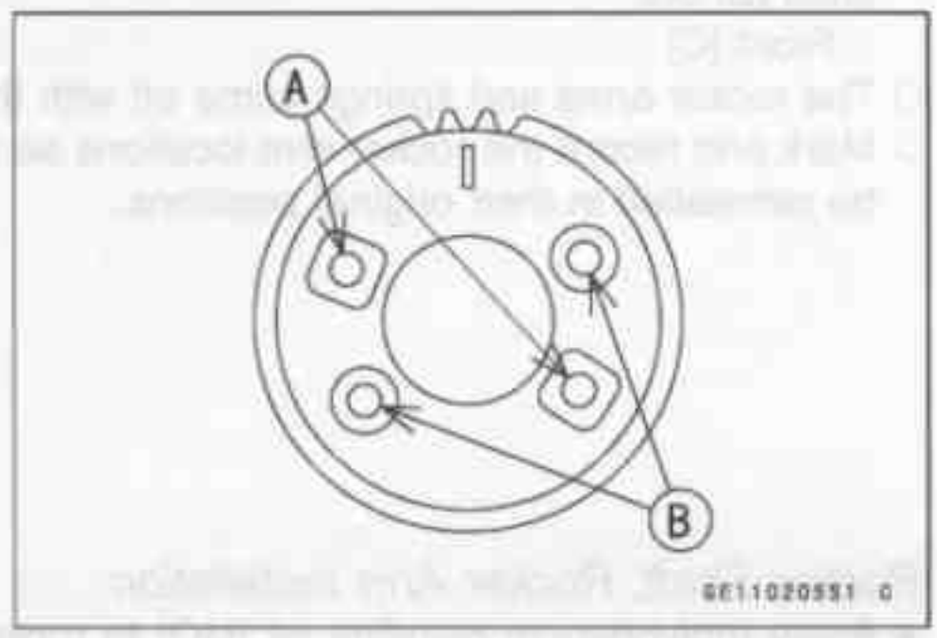
Camshaft and Sprocket Assembly

- Since the inlet and exhaust camshaft sprockets are the same, they have a set of bolt holes for the exhaust camshaft and another for the inlet.

Bolt Holes for the Inlet Camshaft [A]
Bolt Holes for the Exhaust Camshaft [B]

- Install the sprockets so that the marked side faces outwards.
- Apply a non-permanent locking agent to the camshaft sprocket bolts and tighten them.

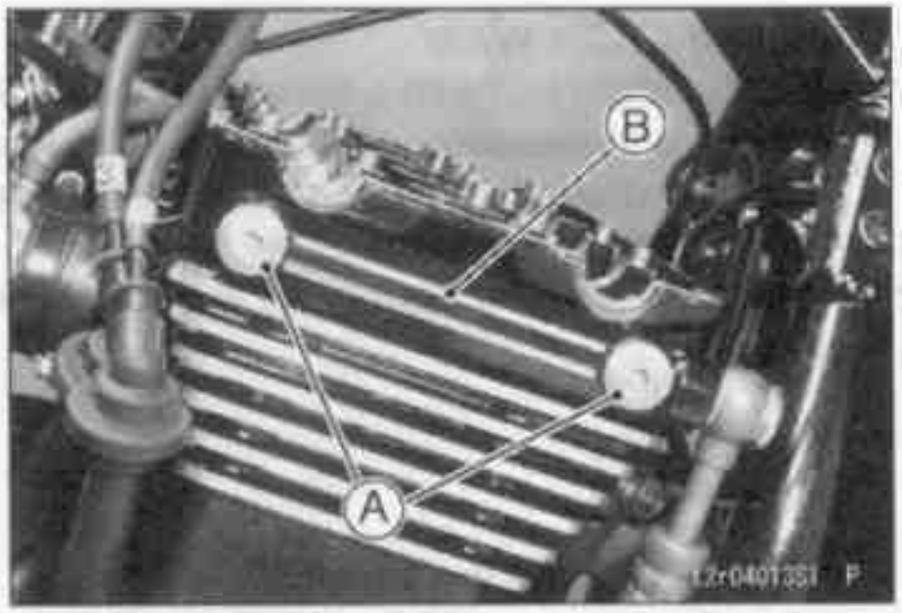
Torque - Camshaft Sprocket Bolts: 15 N·m (1.5 kg·m, 11.0 ft·lb)



Rocker Shafts, Rocker Arms

Rocker Shaft, Rocker Arm Removal

- Remove:
  Camshafts (see this chapter)
  Rocker Shaft End Bolts [A]
  Oil Hose Fitting [B]



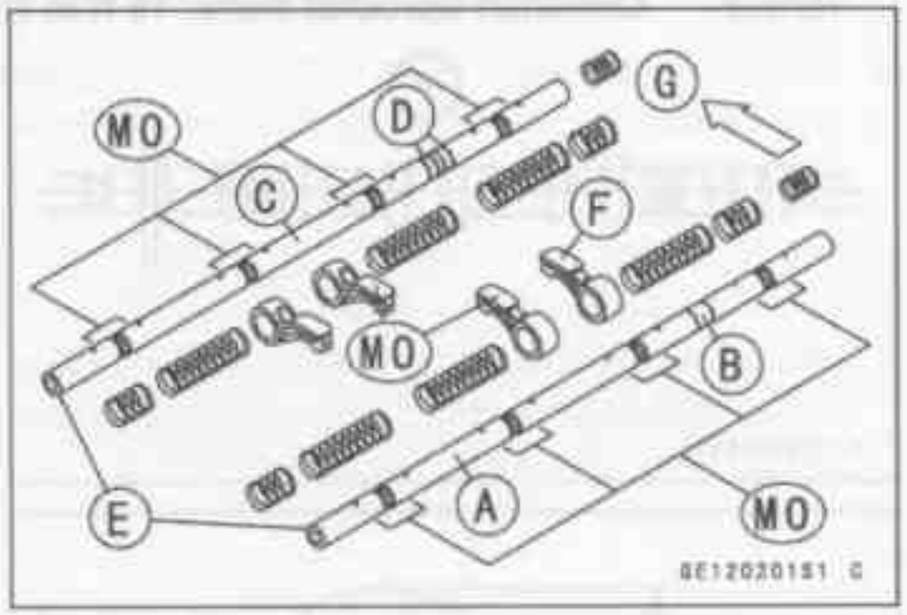
- Using a bolt (M8 P1.25 ~ more than 20 mm long) [A], pull the rocker shaft [B] out.
  Front [C]
  ○ The rocker arms and springs come off with the rocker shaft.
  ○ Mark and record the rocker arm locations so that the rocker arm can be reinstalled in their original positions.



Rocker Shaft, Rocker Arm Installation

- Apply molybdenum disulfide oil [MO] to rocker arms and the rocker shafts as shown.
  ○ The inlet rocker shaft [A] has a blue paint mark [B] and the exhaust rocker shaft [C] a red paint mark [D]. Be careful not to mix up the inlet and exhaust rocker shafts.
- Install the rocker shaft from the right side of the cylinder head so that the non-threaded end [E] goes in first.
- Install the rocker arms [F] in their original positions in order to keep valve clearances correct.
- Install the spring as shown.
  Front [G]
- Push the rocker shaft all the way in.
- Tighten:

Torque - Rocker Shaft End Bolts: 25 N·m (2.5 kg·m, 18.0 ft·lb)



Cylinder Head

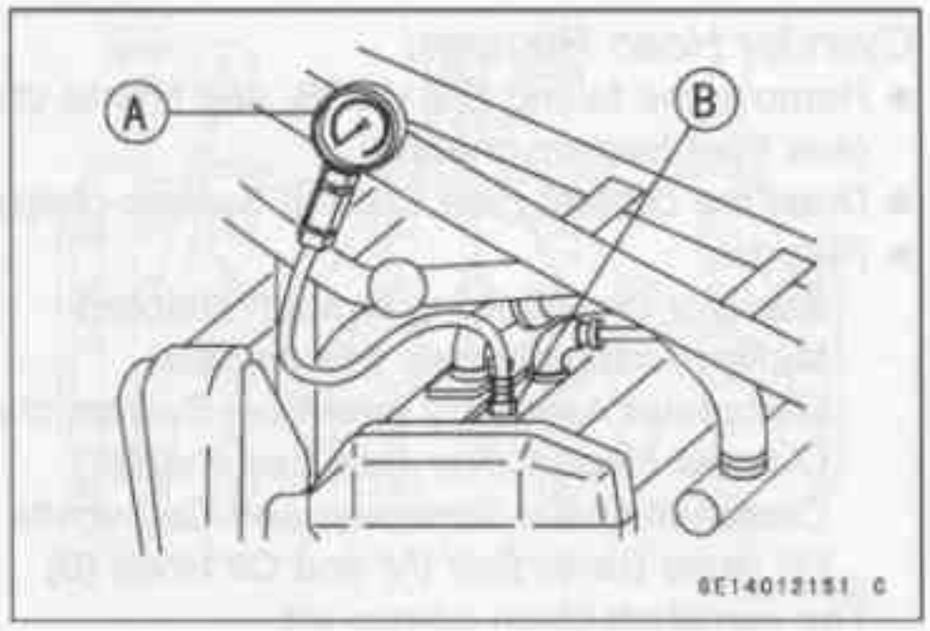
Cylinder Compression Measurement

NOTE

○ *Use the battery which is fully charged*

- Warm up the engine thoroughly.
- Stop the engine.
- Remove:
  Fuel Tank (see Fuel System chapter)
  Spark Plugs

Special Tool - Spark Plug Wrench, Hex 16: 57001–1262



- Attach the compression gauge [A] and adapter [B] firmly into the spark plug hole (left side view).
- Using the starter motor, turn the engine over with the throttle fully open until the compression gauge stops rising; the compression is the highest reading obtainable.

Special Tools - Compression Gauge: 57001–221
Compression Gauge Adapter, M10 × 1.0: 57001–1317

Cylinder Compression
Standard: 910 ~ 1400 kPa (9.3 ~ 14.3 kg/cm², 132 ~ 203 psi)
@ 320 r/min (rpm)

- Repeat the measurement for the other cylinders.
- Install the spark plugs.

Torque - Spark Plugs : 14 N·m (1.4 kg·m, 10.0 ft·lb)

○ The following table should be consulted if the obtainable compression reading is not within the usable range.

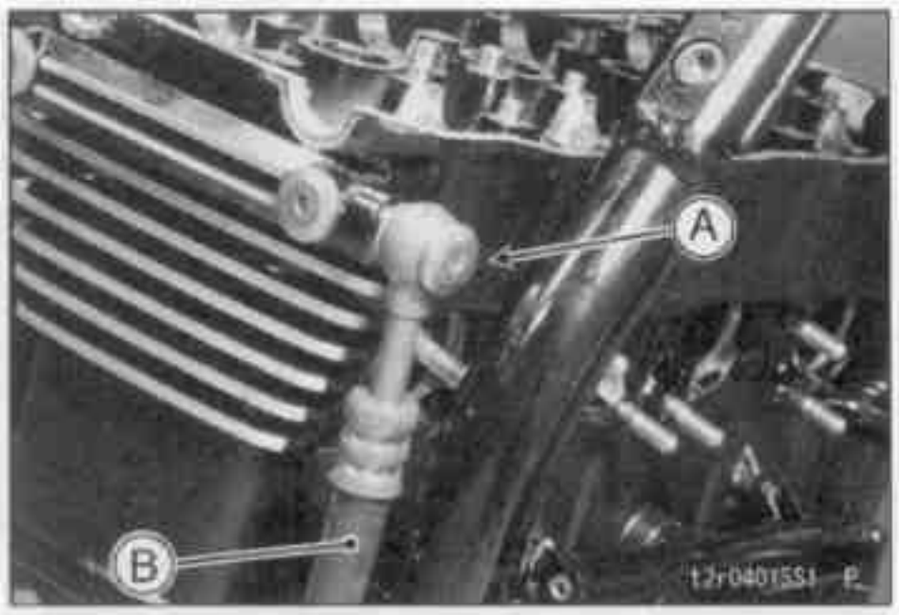
Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon buildup on piston and in combustion chamber possibly due to damaged valve stem, valve guide Stem oil seal and/or damaged piston oil rings (This may be indicated by white exhaust smoke).	Remove the carbon deposits and replace damaged parts if necessary.
	Incorrect cylinder head gasket thickness.	Replace the gasket with a standard part.
Cylinder compression is lower than usable range	Gas leakage around cylinder head	Replace damaged gasket and check cylinder head warp.
	Bad condition of valve seats, valves, and valve spring	Repair if necessary.
	Incorrect valve clearance.	Adjust the valve clearance.
	Incorrect piston/cylinder clearance	Replace the piston and/or cylinder.
	Piston seizure.	Inspect the cylinder and replace or repair the cylinder and/or piston as necessary.
	Bad condition of piston ring and/or piston ring grooves	Replace the piston and/or the piston rings.

Cylinder Head

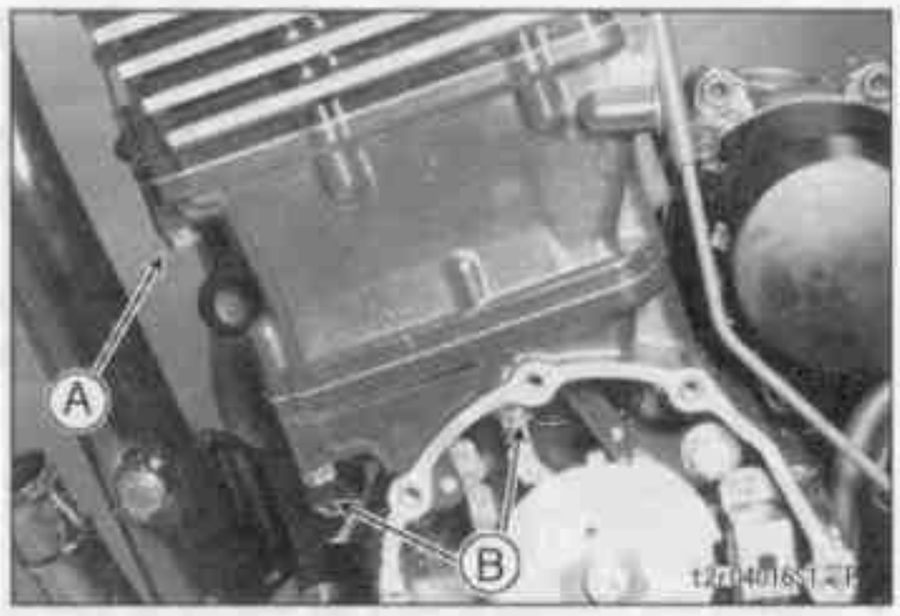
Cylinder Head Removal

- Remove the fairing (ZR1200B, see Frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter).
- Remove:
  Radiator (see Cooling System chapter)
  Muffler Assembly (see this chapter)
  Carburetor Assembly (see Fuel System chapter)
  Cylinder Head Cover (see this chapter)
  Camshaft Chain Tensioner and Camshafts (see this chapter)
  Oil Hose Banjo Bolt [A] and Oil Hose [B]

○ The camshaft chain comes off.



- Remove the 6 mm cylinder head bolt [A] first, loosen the 6 mm cylinder bolts [B], and then remove the 10 and 11 mm cylinder head bolts. This prevents excessive stress on the 6 mm bolts.



- Tap lightly up the cylinder head with a plastic mallet [A] to separate from the cylinder.
- Remove the cylinder head gasket.

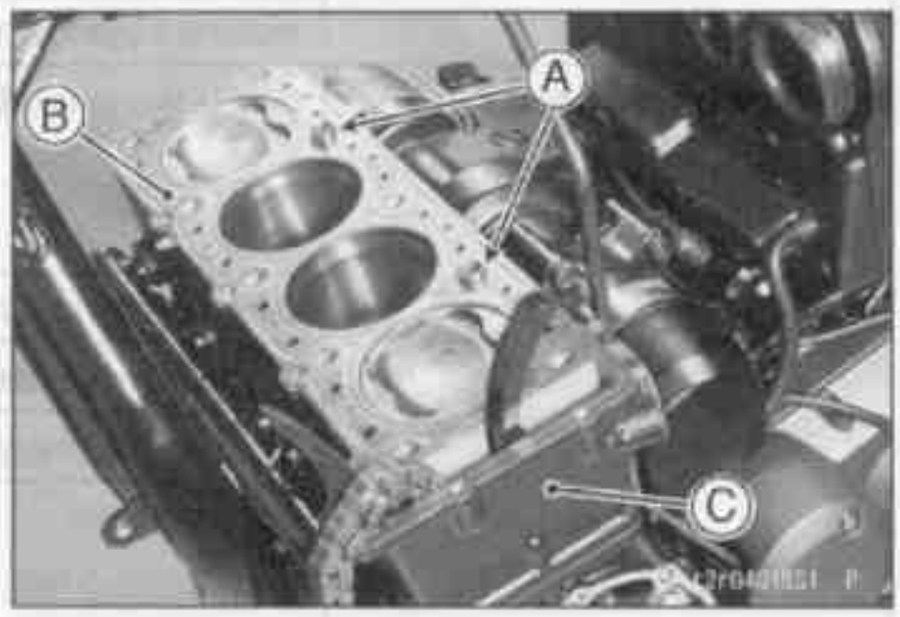


Cylinder Head Installation

NOTE

○ *The camshaft caps are machined with the cylinder head, so if a new cylinder head is installed, use the caps that are supplied with the new head.*

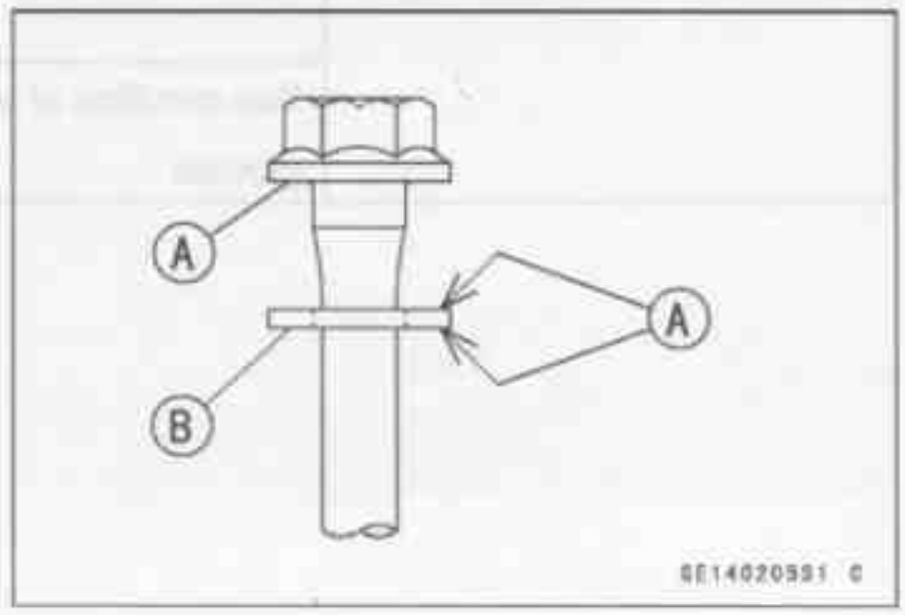
- Install:
  Dowel Pins [A]
  New Cylinder Head Gasket [B]
- Install the cylinder head on the cylinder [C].



- To ensure proper oil seal and uniform tightening torque, replace all the 10 mm cylinder head bolt washers with new ones.

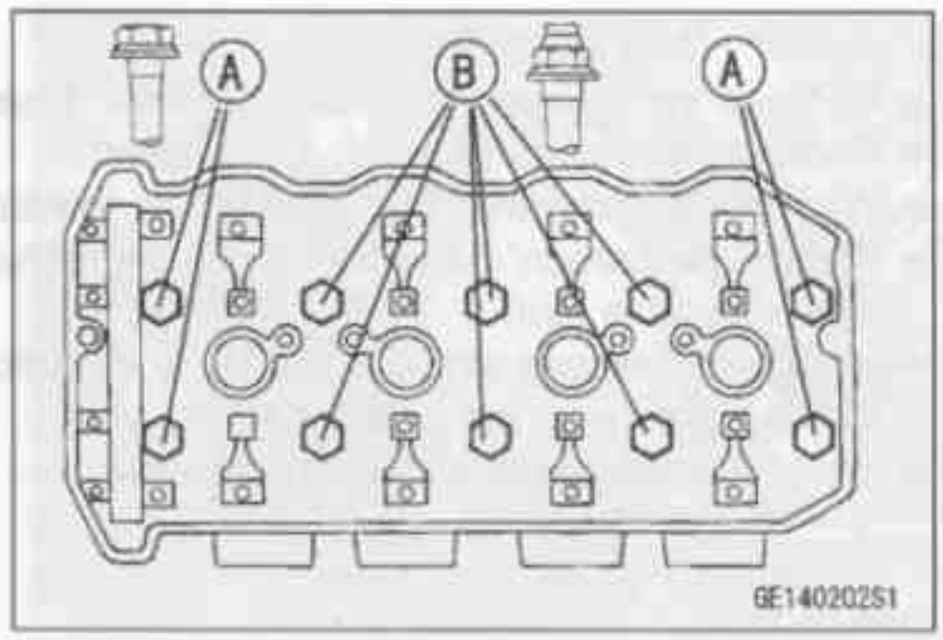
○ The 10 mm cylinder head bolt washers are copper-plated, and they could leak oil if reused.

- Apply molybdenum disulfide oil [A] to the 10 mm and 11 mm cylinder head bolt seating surfaces and both sides of washers [B].



Cylinder Head

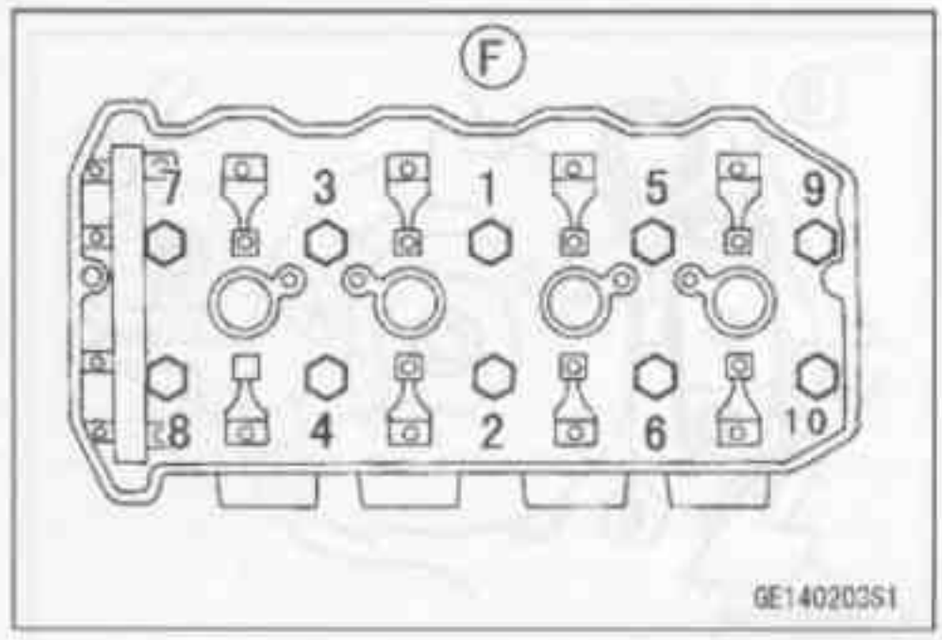
- Install the cylinder head bolts and washers as shown.
  10 mm Bolts [A] and New Copper-Plated Steel Washers
  11 mm Bolts [B] and Steel Washers



- Tighten the cylinder head bolts (11, 10mm), following the tightening sequence.
  Front [F]

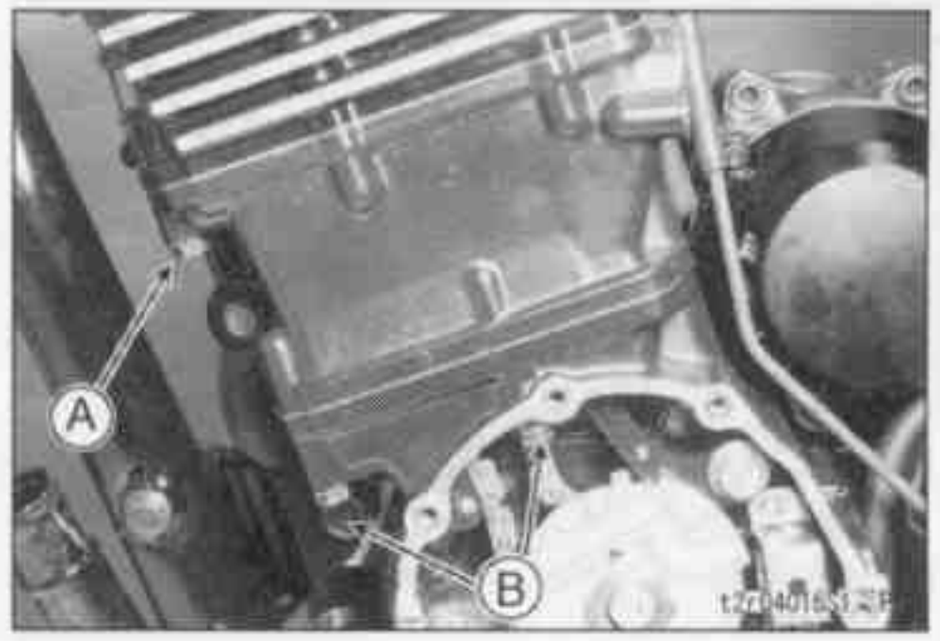
Torque - Cylinder Head Bolts:

First	**20 N·m (2.0 kg·m, 14.5 ft·lb)**
Final	**11 mm: 57 N·m (5.8 kg·m, 42 ft·lb)**
	10 mm: 41 N·m (4.2 kg·m, 30 ft·lb)



- Tighten:

Torque - Cylinder Head Bolt [A] (6 mm) : 9.8 N·m (1.0 kg·m, 87 in·lb)
Cylinder Bolts [B] (6 mm) : 15 N·m (1.5 kg·m, 11.0 ft·lb)
Oil Hose Banjo Bolt: 25 N·m (2.5 kg·m, 18.0 ft·lb)



Carburetor Holder Installation

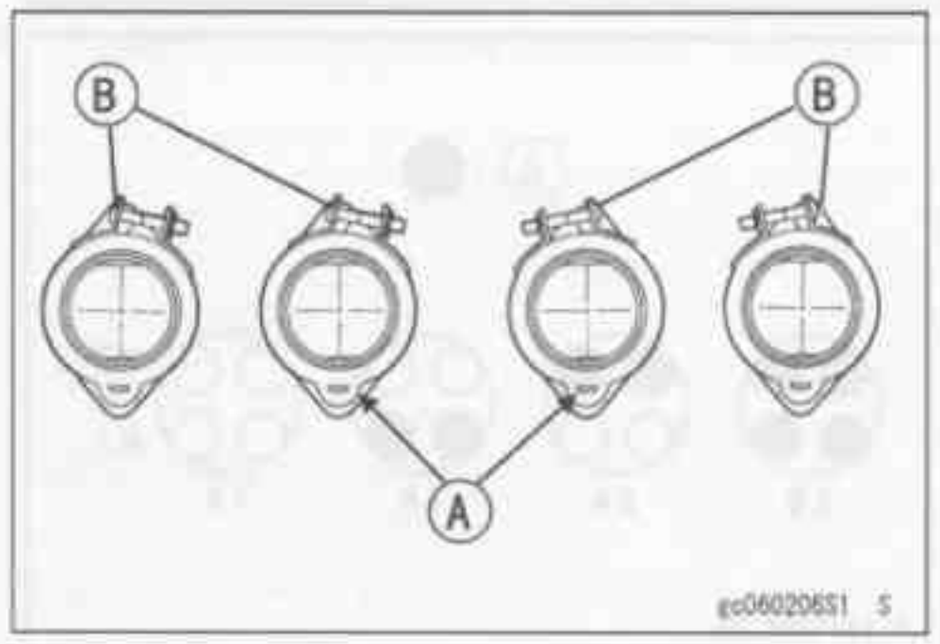
- Fit the clamp nails into the slits [A] of the carburetor clamps with each screw head [B] outside and declined as shown.

Non-permanent Locking Agent - Carburetor Holder Bolts

Torque - Carburetor Holder Bolts: 12 N·m (1.2 kg·m, 106 in·lb)

⚠ WARNING

Be sure to install the holder clamp screws in the direction shown. Or, the screws could come in contact with the throttle linkage resulting in unsafe riding condition.



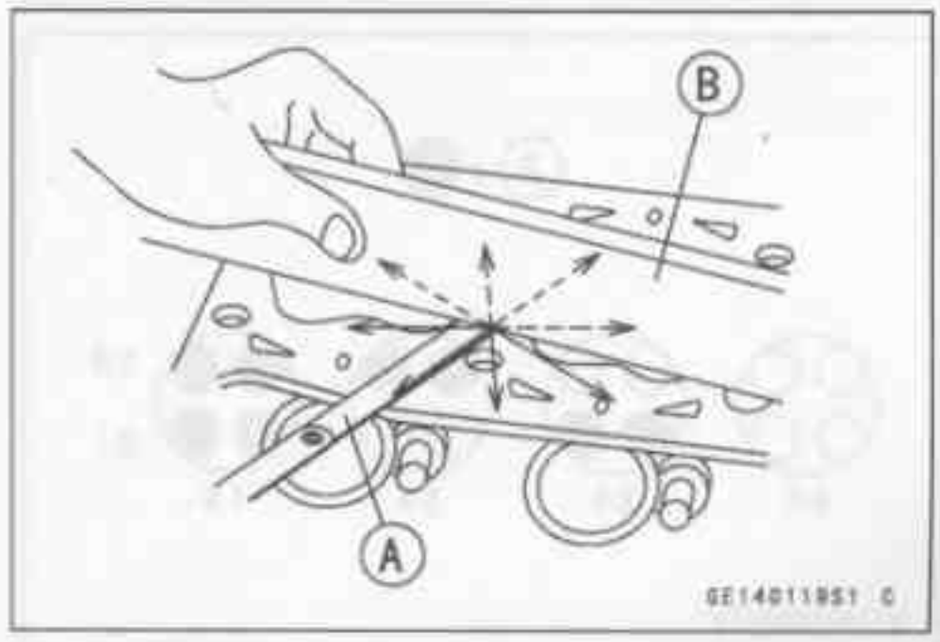
Cylinder Head Warp

- Lay a straightedge across the lower surface of the cylinder head at several positions.
- Use a thickness gauge [A] to measure the space between the straight edge [B] and the head.

Cylinder Head Warp

Standard:	**- - -**
Service Limit:	**0.05 mm (0.002 in)**

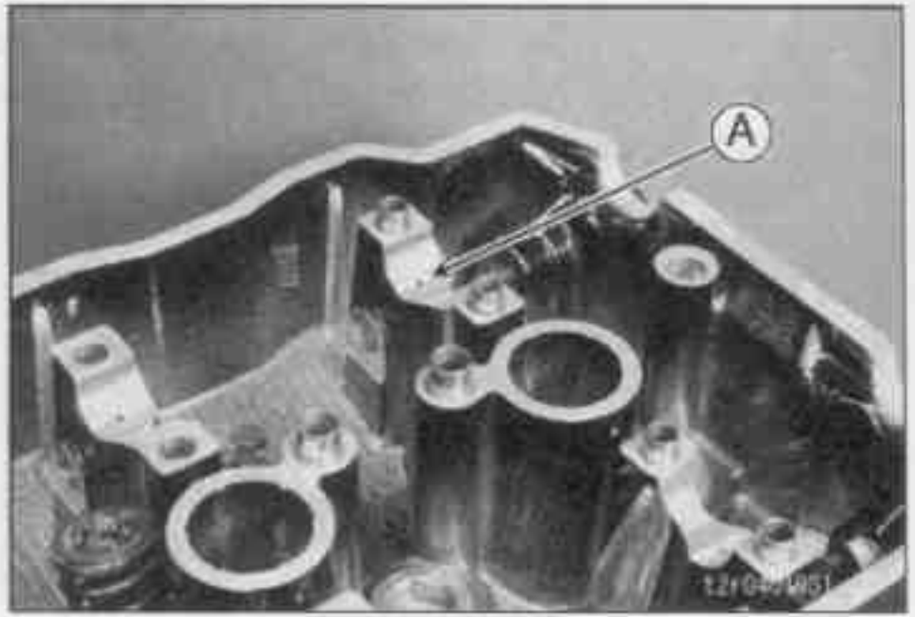
★ If the cylinder head is warped more than the service limit, replace it.
★ If the cylinder head is warped less than the service limit, repair the head by rubbing the lower surface on emery paper secured to a surface plate (first No.200, then No.400).



Cylinder Head

Cylinder Head Cleaning

- Remove the cylinder head (see Cylinder Head Removal).
- Remove the valves (see Valve Removal).
- Wash the head with a high-flash point solvent.
- Scrape the carbon out of the combustion chamber and exhasut port with a suitable tool.
- Using compressed air, blow out [A] any particles which may obstruct the oil passage in the cylinder head.
- Install the valves (see Valve Installation).



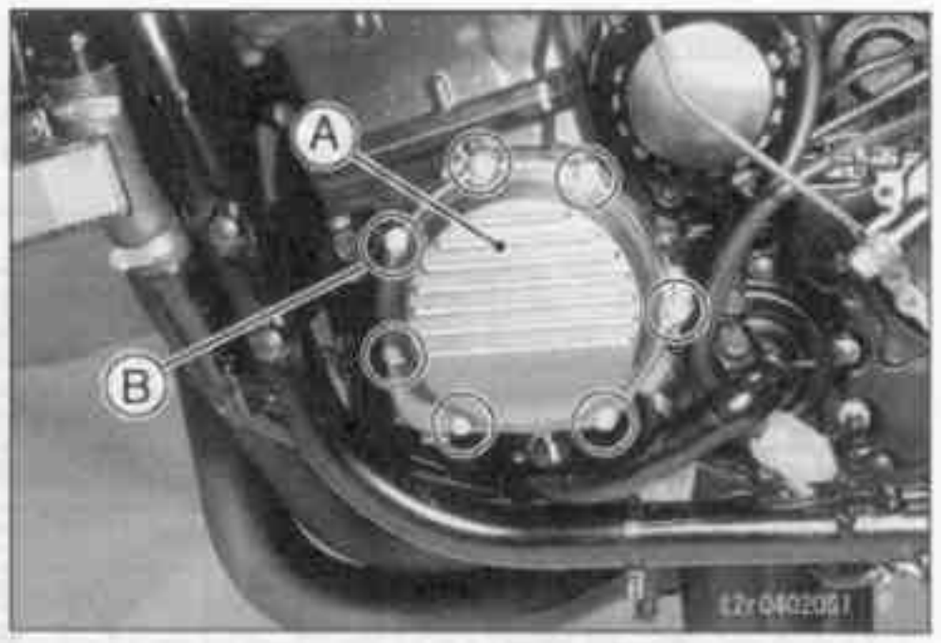
Valves

Valve Clearance Inspection

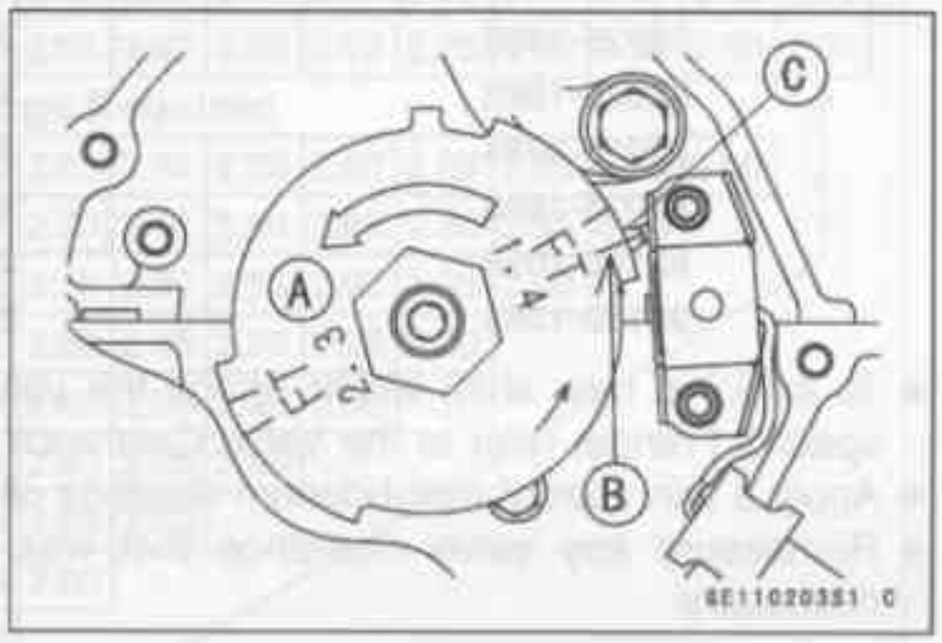
NOTE

○ *Valve clearance must be checked and adjusted when the engine is cold (at room temperature).*

- Remove the fairing (ZR1200B, see Frame chapter) and the fuel tank (see Fuel System chapter).
- Drain the coolant (see Cooling System chapter).
- Remove:
  Coolant Hoses (over the cylinder head cover)
  Cylinder Head Cover (see this chapter)
  Pickup Coil Cover [A] and Bolts [B]



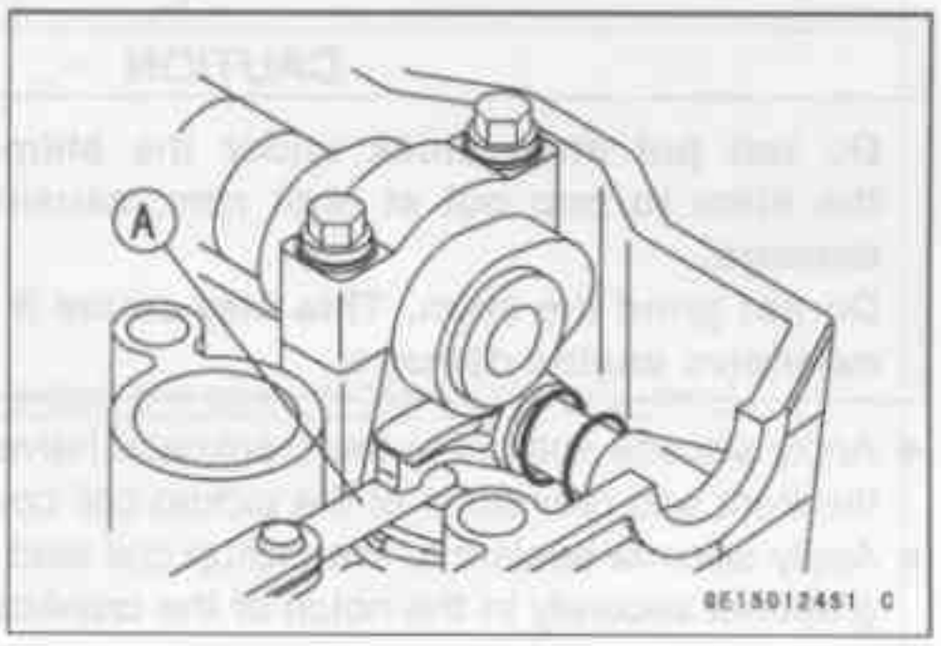
- Turn the crankshaft counterclockwise [A] and set the crankshaft at 1,4 piston TDC.
  TDC Mark [B] #1, 4 Pistons
  Crankcase Mark [C]



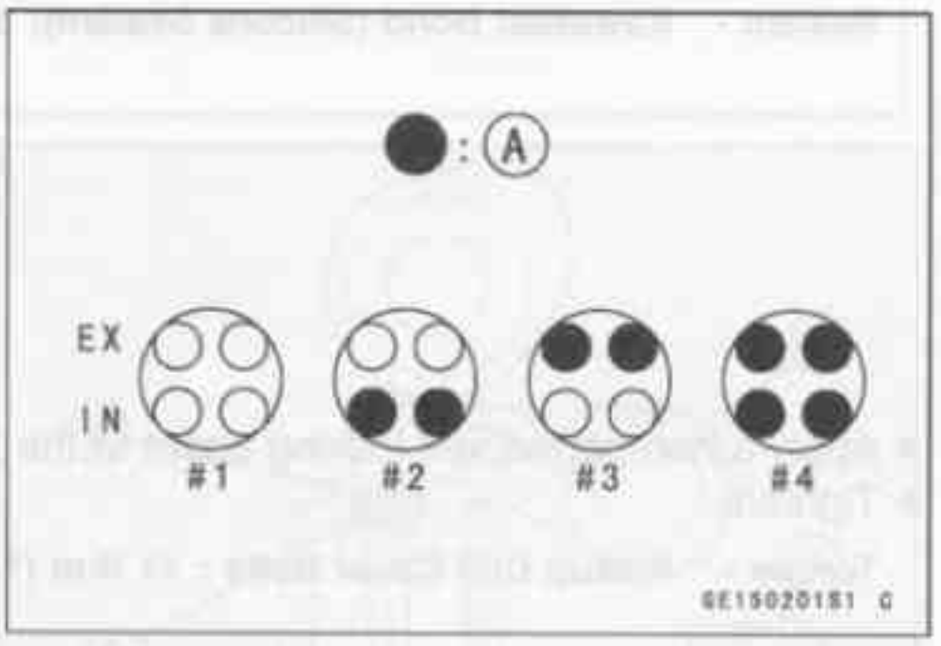
- Using a thickness gauge [A], measure the valve clearance between the rocker arm and the shim.

Valve Clearance

Standard:	**Exhaust: 0.18 ~ 0.24 mm (0.0071 ~ 0.0095 in)**
	Inlet: 0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in)

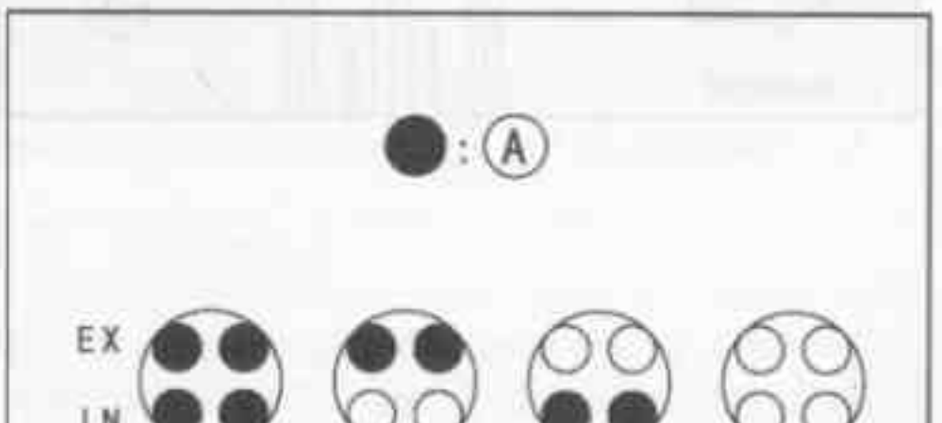


○ When positioning #4 piston TDC at the end of the compression stroke, measure the following valves [A]:
  Exhaust valve clearance of #3 and #4 cylinders
  Inlet valve clearance of #2 and #4 cylinders



○ When positioning #1 piston TDC at the end of the compression stroke measure the following valves [A]:
  Exhaust valve clearance of #1 and #2 cylinders.
  Inlet valve clearance of #1 and #3 cylinders

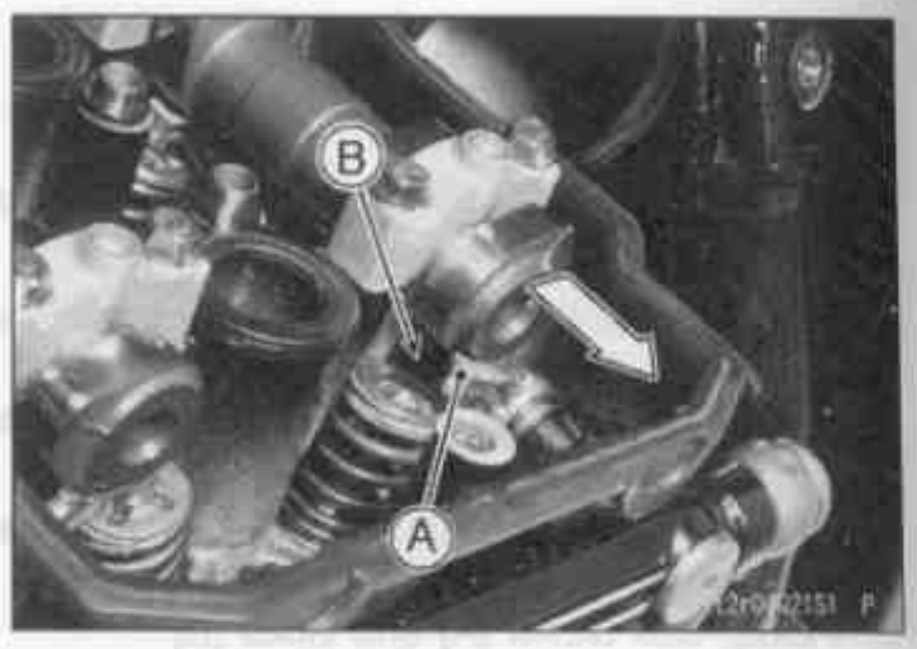
★ If the valve clearance is not within the specified range, first record the clearance, and then adjust it.



Valves

Valve Clearance Adjustment

- To change the valve clearance, slide the rocker arm [A] sideways and change the shim [B]. Replace the shim with one of a different thickness.



NOTE

○ *Mark and record the shim locations so that the shims can be reinstalled in their original positions.*

○ Besides the standard shims in the valve clearance adjustment charts, the following additional shims may be used.

Additional Shims

Parts Nos.	Thickness
92025-1982	2.425 mm
92025-1983	2.475 mm
92025-1984	2.525 mm
92025-1985	2.575 mm
92180-1058	2.375 mm
92180-1059	2.625 mm

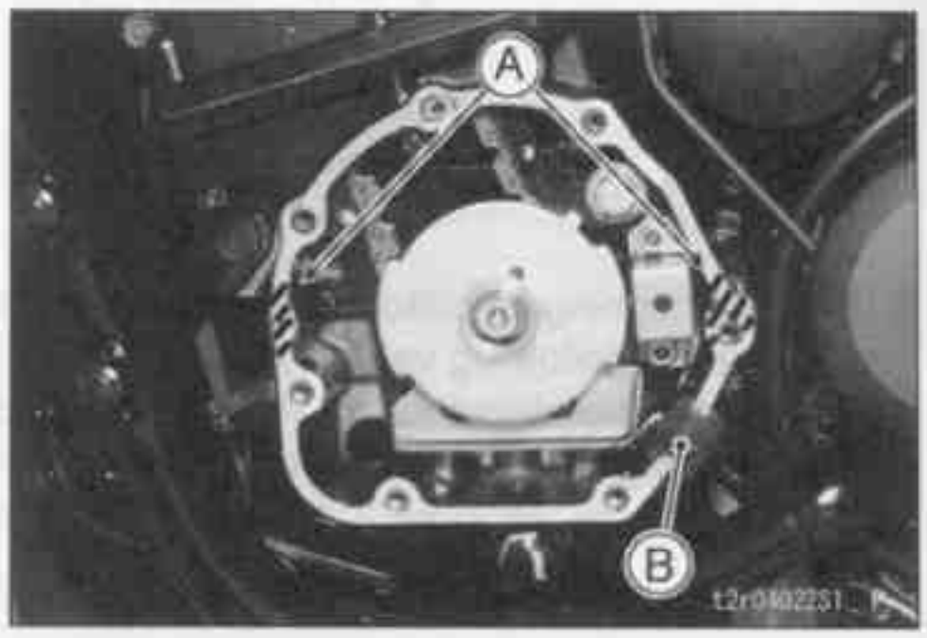
- To select a new shim which brings the valve clearance within the specified range, refer to the Valve Clearance Adjustment Charts.
- Apply a thin coat of molybdenum disulfide oil to the rocker arms.
- Remeasure any valve clearance that was adjusted. Readjust if necessary.

CAUTION

Do not put shim stock under the shim. This may cause the shim to pop out at high rpm, causing extensive engine damage.
Do not grind the shim. This may cause it to fracture, causing extensive engine damage.

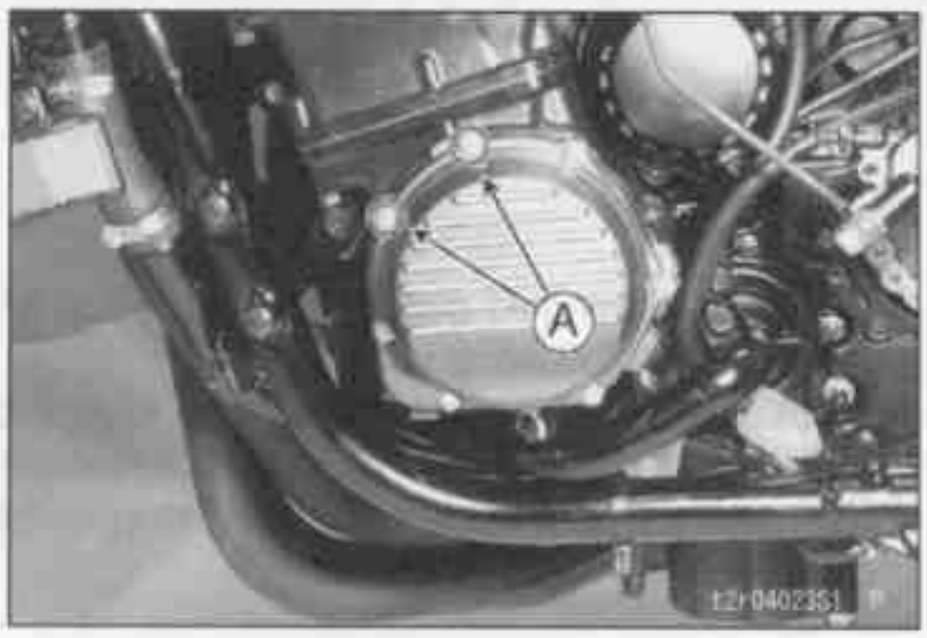
- Apply silicone sealant to the crankcase halves mating surface [A] on the front and rear sides of the pickup coil cover mount.
- Apply silicone sealant to the pickup coil lead grommet [B] and fit the grommet securely in the notch of the crankcase.

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120



- Apply a non-permanent locking agent to the two bolts [A] shown.
- Tighten:

Torque - Pickup Coil Cover Bolts : 11 N·m (1.1 kg·m, 95 in·lb)



Valves

EXHAUST- VALVE CLEARANCE ADJUSTMENT CHART

	Present Shim ← Example																				
Part No. (92025)	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
Mark	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	00
Thickness (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00

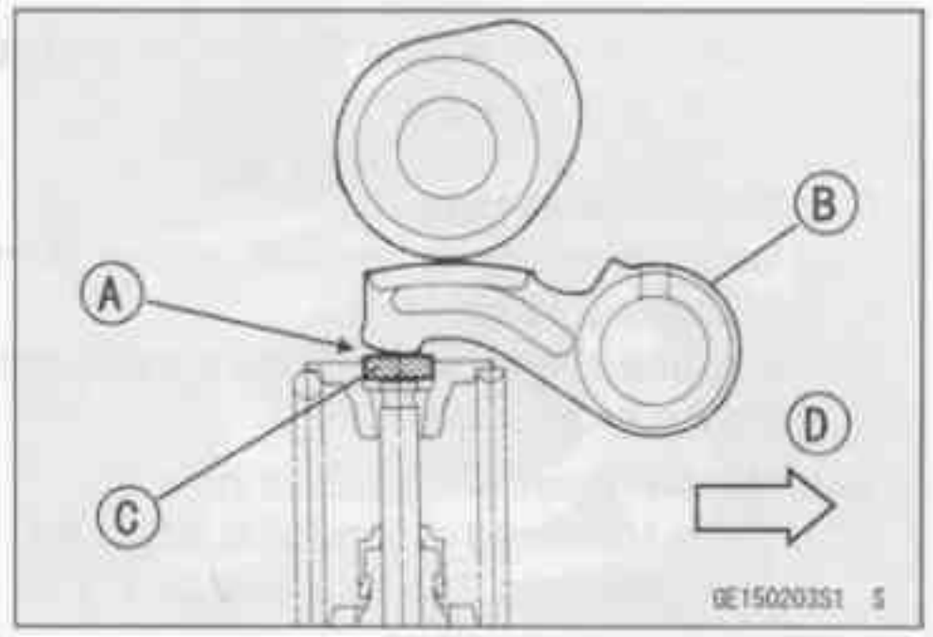
Valve Clearance Measurement (mm) ← Example	Present Shim ← Example																				
0.00 ~ 0.03	—	—	—	—	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80
0.04 ~ 0.08	—	—	—	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85
0.09 ~ 0.13	—	—	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90
0.14 ~ 0.17	—	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
0.18 ~ 0.24	Specified Clearance / No Change Required																				
0.25 ~ 0.29	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	
0.30 ~ 0.34	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00		
0.35 ~ 0.39	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00			
0.40 ~ 0.44	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00				
0.45 ~ 0.49	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00					
0.50 ~ 0.54	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00						
0.55 ~ 0.59	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00							
0.60 ~ 0.64	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00								
0.65 ~ 0.69	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00									
0.70 ~ 0.74	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00										
0.75 ~ 0.79	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00											
0.80 ~ 0.84	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00												
0.85 ~ 0.89	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00													
0.90 ~ 0.94	2.70	2.75	2.80	2.85	2.90	2.95	3.00														
0.95 ~ 0.99	2.75	2.80	2.85	2.90	2.95	3.00															
1.00 ~ 1.04	2.80	2.85	2.90	2.95	3.00																
1.05 ~ 1.09	2.85	2.90	2.95	3.00																	
1.10 ~ 1.14	2.90	2.95	3.00																		
1.15 ~ 1.19	2.95	3.00																			
1.20 ~ 1.24	3.00																				

Install the shim of this thickness (mm).

1. Measure the clearance [A] (with engine cold) between the rocker arm [B] and shim [C].
   Front [D]
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. Install the shim specified where the lines intersect. This shim will give the proper clearance.

Example: Present shim is **2.60 mm.**
Measured clearance is **0.30 mm.**
Replace **2.60 mm** shim with **2.70 mm** shim

5. Remeasure the valve clearance and readjust if necessary.



CAUTION

Be sure to remeasure the clearance after selecting a shim according to the table. The clearance can be out of the specified range because of the shim tolerance.

NOTE

○ *If the valve clearance is smaller (larger) than the standard, select a thinner (thicker) shim and then measure the clearance again.*

Valves

INLET- VALVE CLEARANCE ADJUSTMENT CHART

	Present Shim ← Example																				
Part No. (92025)	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
Mark	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	00
Thickness (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00

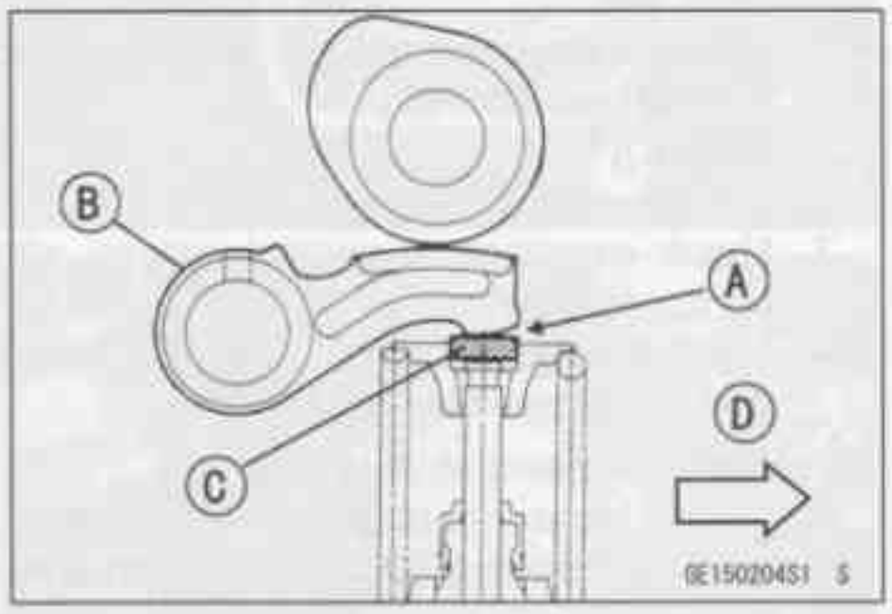
Valve Clearance Measurement (mm) ← Example																					
0.00 ~ 0.03	—	—	—	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85
0.04 ~ 0.08	—	—	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90
0.09 ~ 0.12	—	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
0.13 ~ 0.19	Specified Clearance / No Change Required																				
0.20 ~ 0.24	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	
0.25 ~ 0.29	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00		
0.30 ~ 0.34	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00			
0.35 ~ 0.39	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00				
0.40 ~ 0.44	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00					
0.45 ~ 0.49	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00						
0.50 ~ 0.54	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00							
0.55 ~ 0.59	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00								
0.60 ~ 0.64	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00									
0.65 ~ 0.69	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00										
0.70 ~ 0.74	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00											
0.75 ~ 0.79	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00												
0.80 ~ 0.84	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00													
0.85 ~ 0.89	2.70	2.75	2.80	2.85	2.90	2.95	3.00														
0.90 ~ 0.94	2.75	2.80	2.85	2.90	2.95	3.00															
0.95 ~ 0.99	2.80	2.85	2.90	2.95	3.00																
1.00 ~ 1.04	2.85	2.90	2.95	3.00																	
1.05 ~ 1.09	2.90	2.95	3.00																		
1.10 ~ 1.14	2.95	3.00																			
1.15 ~ 1.19	3.00																				

Install the shim of this thickness (mm).

1. Measure the clearance [A] (with engine cold) between the rocker arm [B] and shim [C].
   Front [D]
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. Install the shim specified where the lines intersect. This shim will give the proper clearance.

Example: Present shim is **2.55 mm.**
Measured clearance is **0.35 mm.**
Replace **2.55 mm** shim with **2.75 mm** shim

5. Remeasure the valve clearance and readjust if necessary.



CAUTION

Be sure to remeasure the clearance after selecting a shim according to the table. The clearance can be out of the specified range because of the shim tolerance.

NOTE

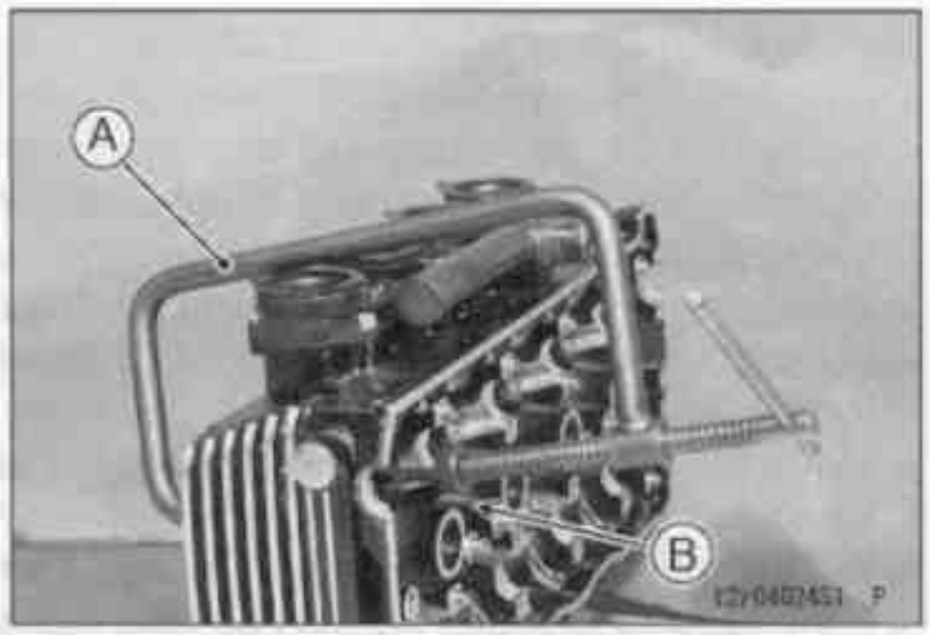
○ *If the valve clearance is smaller (larger) than the standard, select a thinner (thicker) shim and then measure the clearance again.*

Valves

Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Swing open the rocker arms, and then remove the shims.
  - Mark and record the shim locations so that the shims can be installed in their original positions.
- Using the valve spring compressor assembly, remove the valve.

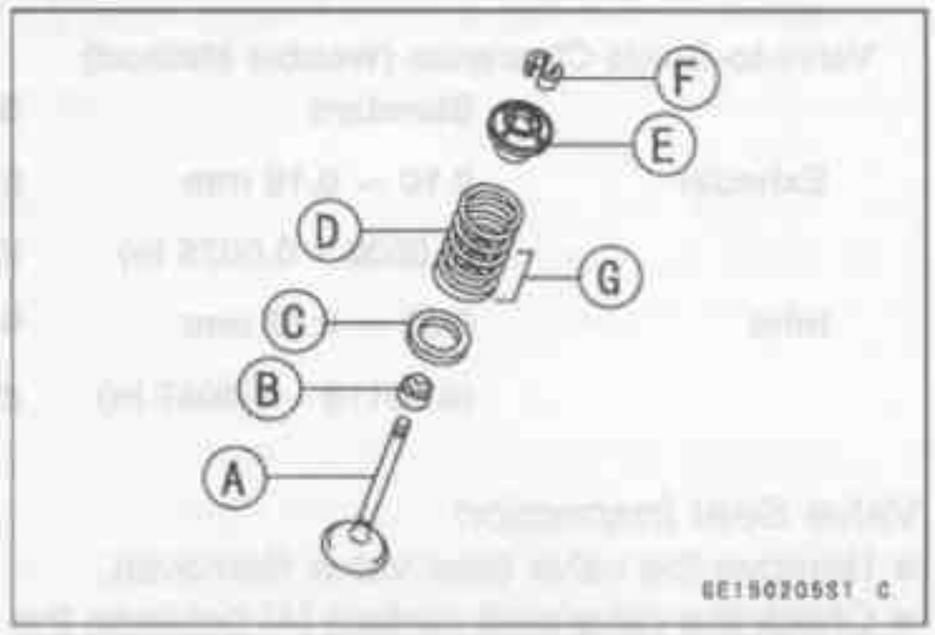
Special Tools - Valve Spring Compressor Assembly [A]: 57001–241
Valve Spring Compressor Adapter, ϕ22 [B] : 57001–1202



Valve Installation

- Replace the stem oil seal with a new one.
- Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.
- Install the springs so that the closed coil end faces downwards.

Valve Stem [A]
Stem Oil Seal [B]
Spring Seat [C]
Vavle Spring [D]
Retainer [E]
Split Keepers [F]
Closed Coil End [G]



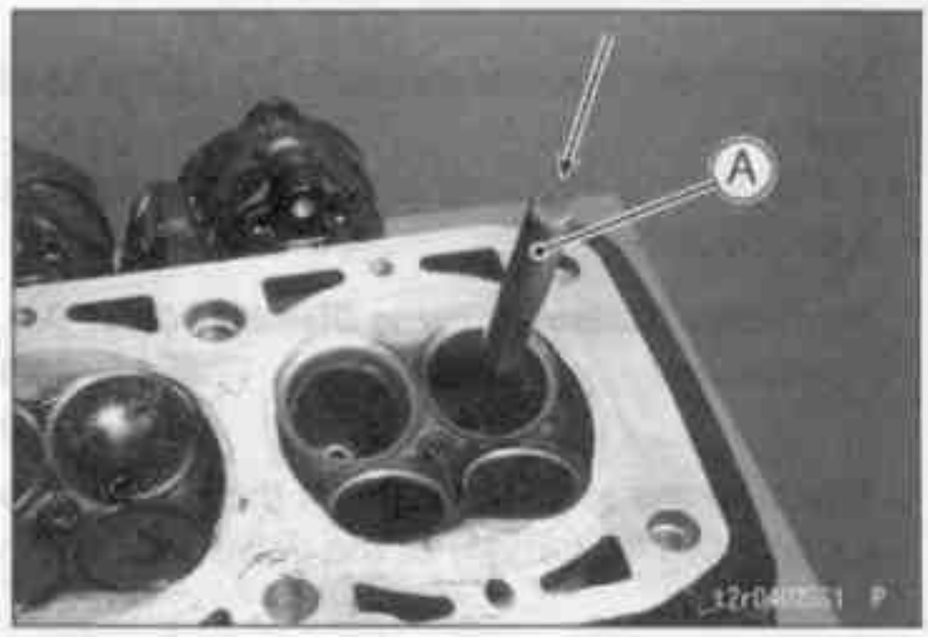
Valve Guide Removal

- Remove (from the cylinder head):
  Valve (see Valve Removal)
  Stem Oil Seal and Spring Seat
- Heat the area around the valve guide to 120 ~ 150 °C (248 ~ 302 °F)in engine oil, and hammer lightly on the valve guide arbor [A] to remove the guide from the top of the cylinder head.

CAUTION

Do not heat the cylinder head with a blowtorch. This will warp the cylinder head. Soak the cylinder head in oil and heat the oil.

Special Tool - Valve Guide Arbor, ϕ5: 57001–1203



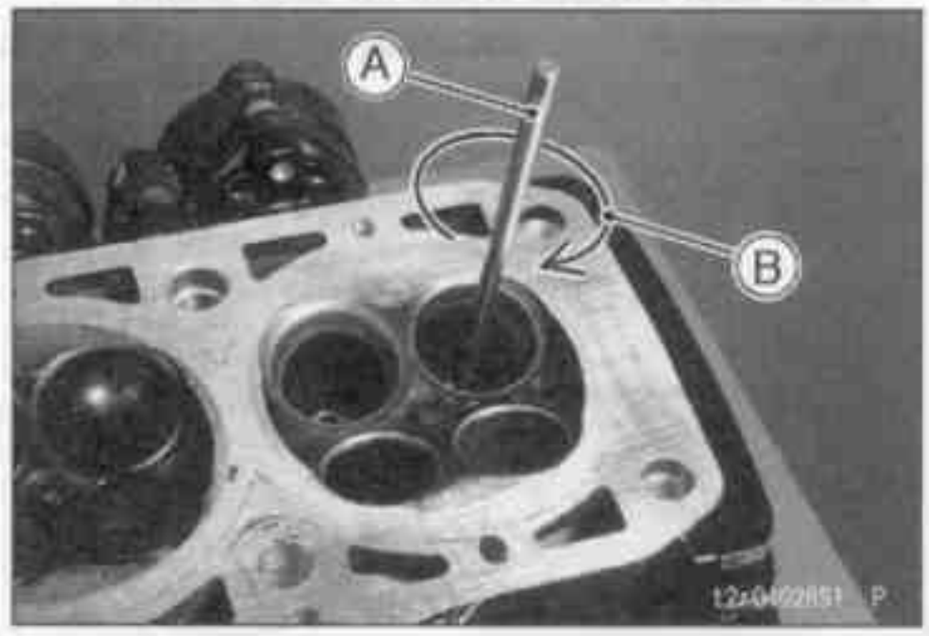
Valve Guide Installation

- Apply engine oil to the valve guide outer surface before installation.
- Heat the area around the valve guide hole to about 120 ~ 150 °C (248 ~ 302 °F) in engine oil.
- Drive the valve guide in from the top of the head using the valve guide arbor. The flange stops the guide from going in too far.

Special Tool - Valve Guide Arbor, ϕ5: 57001–1203

- Wait until the cylinder head cools down and then ream the valve guide with the valve guide reamer [A] even if the old guide is reused.
  - Turn the reamer in a clockwise direction [B] until the reamer turns freely in the guide. Never turn the reamer counterclockwise or it will be dulled.
  - Once the guides are reamed, they must be cleaned throughly.

Special Tool - Valve Guide Reamer, ϕ5: 57001–1204



Valves

Valve Guide Wear (Wobble Method)

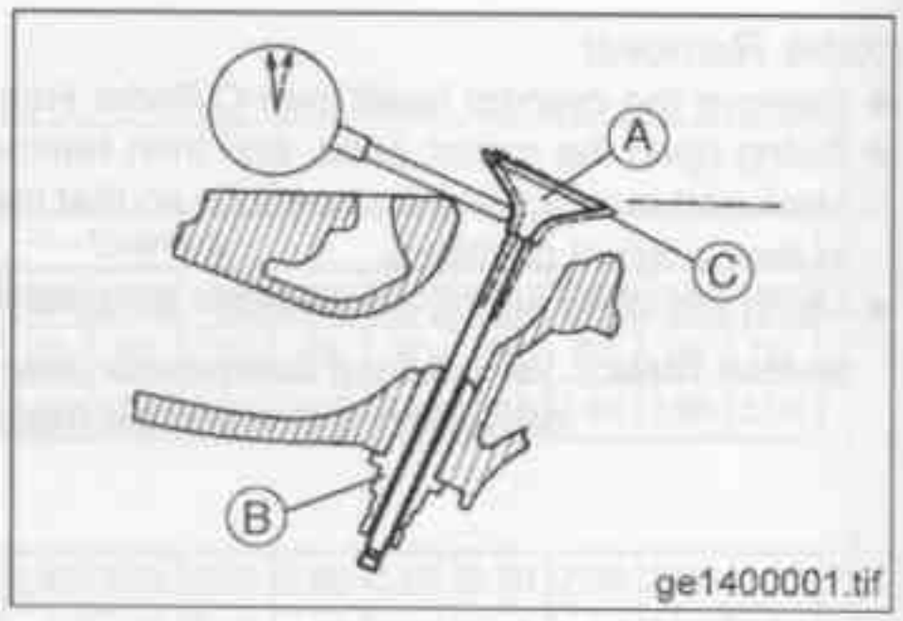
○ If a small bore gauge is not available, inspect the valve guide wear by measuring the valve-to-guide clearance with the wobble method as indicated below. The reading is not actual valve-to-guide clearance because the measuring point is above the guide.

• Insert a new valve [A] into the guide [B] and set a dial gauge against the stem perpendicular to it as close as possible to the cylinder head mating surface.

• Move the stem back and forth [C] to measure valve-to-valve guide clearance.

• Repeat the measurement in a direction at a right angle to the first.

★ If the reading exceeds the service limit, replace the guide.



ge1400001.tif

Valve-to-Guide Clearance (Wobble Method)

	Standard	Service Limit
Exhaust	0.10 ~ 0.19 mm	0.41 mm
	(0.0039 ~ 0.0075 in)	(0.0161 in)
Inlet	0.03 ~ 0.12 mm	0.34 mm
	(0.00118 ~ 0.0047 in)	(0.0134 in)

Valve Seat Inspection

• Remove the valve (see Valve Removal).

• Check the valve seat surface [A] between the valve [B] and valve seat [C].

○ Measure the outside diameter [D] of the seating pattern on the valve seat.

★ If the outside diameter is too large or too small, repair the seat (see Seat Repair).

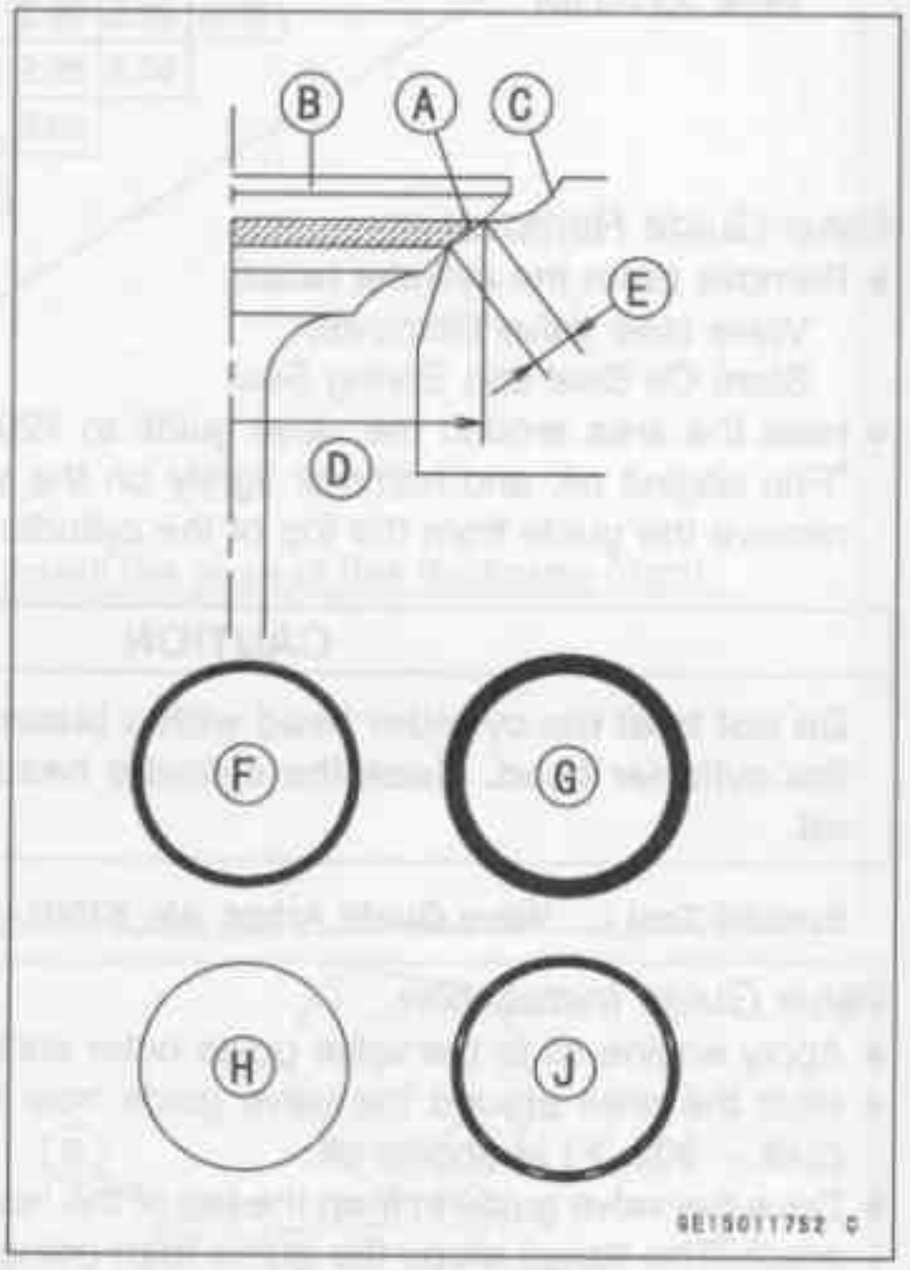
Valve Seat Surface Outside Diameter (Seat O.D.)

Standard:	Exhaust	26.3 ~ 26.5 mm (1.035 ~ 1.043 in)
	Inlet	30.8 ~ 31.0 mm (1.213 ~ 1.220 in)

○ Measure the seat width [E] of the portion where there is no build-up carbon (white portion) of the valve seat with vernier calipers.

Good [F]

★ If the width is too wide [G], too narrow [H] or uneven [J], repair the seat (see Valve Seat Repair).



9E15011752 ○

Valve Seat Surface Width (or Seat Width)

Standard:	Exhaust:	0.8 ~ 1.2 mm (0.032 ~ 0.047 in)
	Inlet:	0.5 ~ 1.0 mm (0.0197~ 0.0394 in)

Valves

Valve Seat Repair

• Repair the valve seat with the valve seat cutters [A].

Special Tools - Valve Seat Cutter Holder, φ5 [B]: 57001–1208
Valve Seat Cutter Holder Bar [C]: 57001–1128

[For Exhaust Valve Seat]
Valve Seat Cutter, 45° – φ30: 57001-1187
Valve Seat Cutter, 32° – φ28: 57001-1119 (or - φ30: 57001-1120)
Valve Seat Cutter, 60° – φ30: 57001-1123

[For Inlet Valve Seat]
Valve Seat Cutter, 45° – φ32: 57001-1115 (or - φ35: 57001-1116)
Valve Seat Cutter, 32° – φ33: 57001-1119
Valve Seat Cutter, 60° – φ33: 57001-1334

★ If the manufacturer's instructions are not available, use the following procedure.

Seat Cutter Operation Care:

1. This valve seat cutter is developed to grind the valve for repair. Therefore the cutter must not be used for other purposes than seat repair.
2. Do not drop or shock the valve seat cutter or the diamond particles may fall off.
3. Do not fail to apply engine oil to the valve seat cutter before grinding the seat surface. Also wash off ground particles sticking to the cutter with washing oil.

CAUTION
Do not use a wire brush to remove the metal particles from the cutter. It will take off the diamond particles.

4. Setting the valve seat cutter holder in position, operate the cutter in one hand. Do not apply too much force to the diamond portion.

NOTE

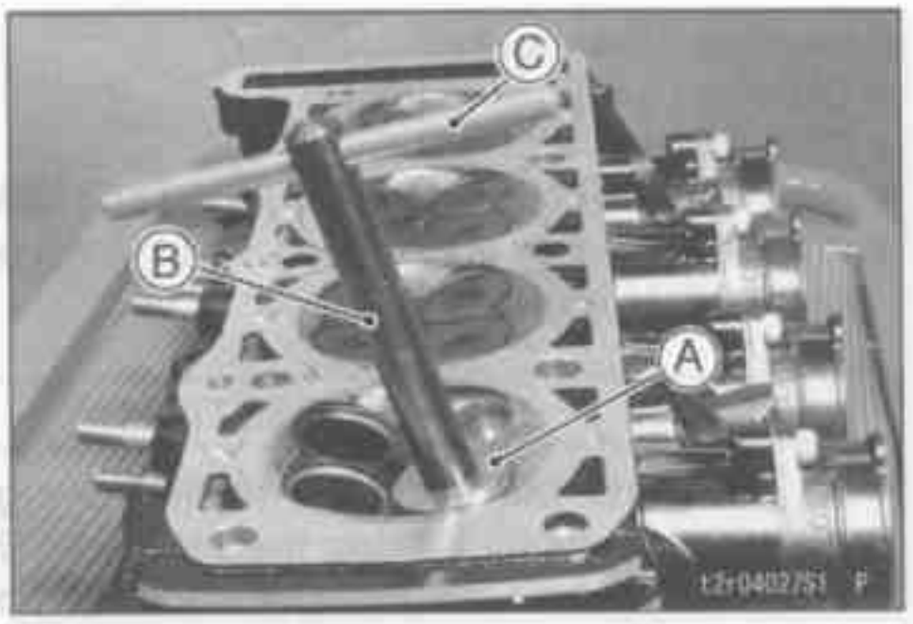
○ *Prior to grinding, apply engine oil to the cutter. During operation, wash off any ground particles sticking to the cutter with washing oil.*

5. After use, wash it with washing oil and apply a thin layer of engine oil before storing.

Marks Stamped on the Cutter:

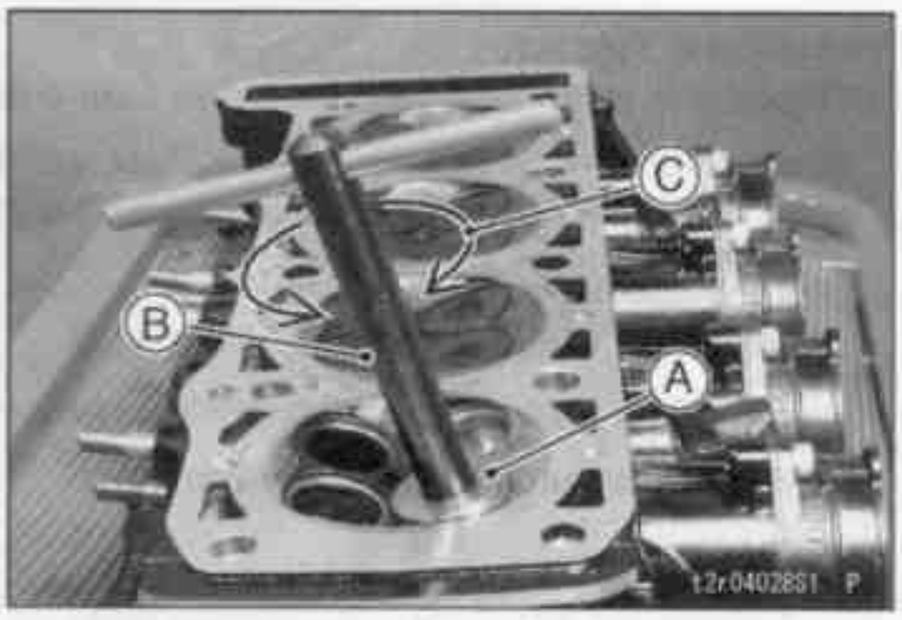
The marks stamped on the back of the cutter [A] represent the following.

60° ..... Cutter Angle [B]
37.5 φ ..... Outer Diameter of Cutter [C]



Valves

Operating Procedures:
- Clean the seat area carefully.
- Coat the seat with machinist's dye.
- Fit a 45° cutter [A] into the holder [B] and slide it into the valve guide.
- Press down lightly on the handle and turn it right or left [C]. Grind the seat surface only until it is smooth.



CAUTION

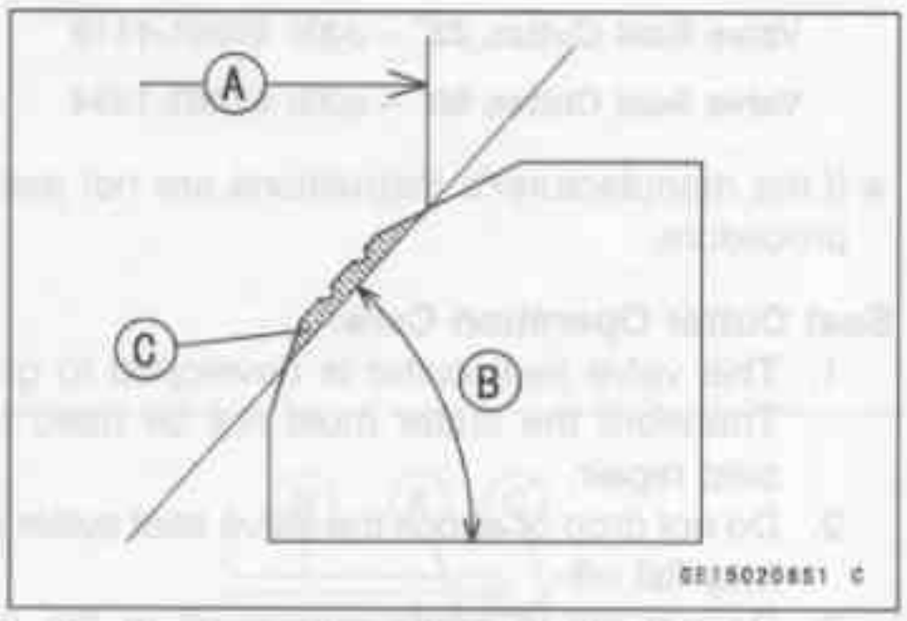
Do not grind the seat too much. Overgrinding will reduce valve clearance by sinking the valve into the head. If the valve sinks too far into the head, it will be impossible to adjust the clearance, and the cylinder head must be replaced.

- Measure the outside diameter [A] of the seat surface (seat O.D.) with vernier calipers.

★ If the seat O.D. is too small, repeat the 45° grind [B] until the diameter is within the specified range.
Ground Voluum [C]

NOTE

- *Remove all pittings or flaws from 45° ground surface.*
- *After grinding with 45° cutter, apply thin coat of machinist's dye to seat surface. This makes seat surface distinct and 32° and 60° grinding operation easier.*
- *When the valve guide is replaced, be sure to grind with 45° cutter for centering and good contact.*



★ If the seat O.D. is too large, make the 32° grind described below.
- To make the 32° grind, fit a 32° cutter into the holder, and slide it into the valve guide.
- Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.

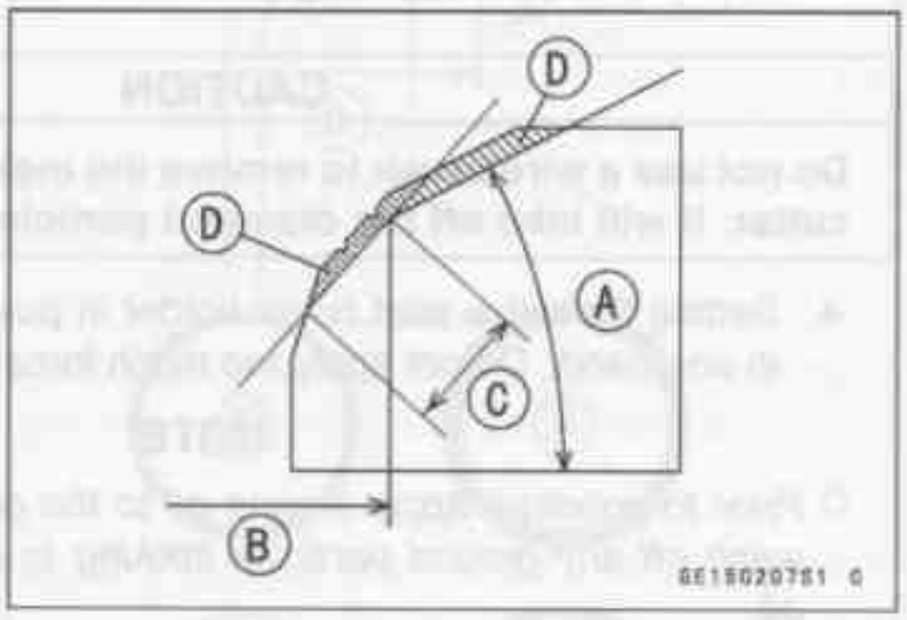
CAUTION

The 32° cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

- Grind the seat at a 32° angle [A] until the seat O.D. [B] is within the specified range.

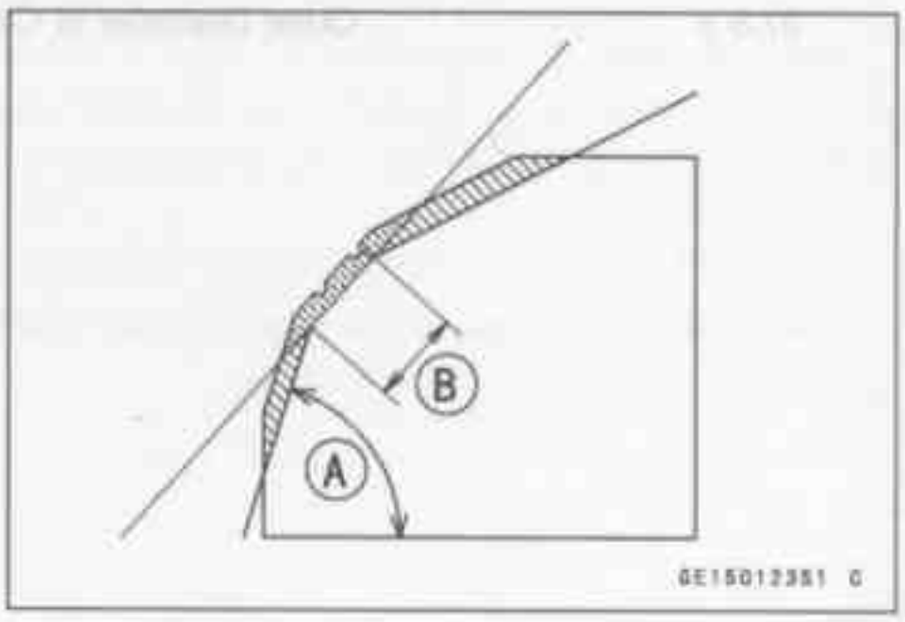
★ If the seat O.D. is within the specified range, measure the seat width as described below.
- To measure the seat width, use vernier calipers to measure the width [C] of the 45° angle portion of the seat at several places around the seat.
Ground Voluum [D]

★ If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then measure the seat O.D..



★ If the seat width is too wide, make the 60° grind described below.
- To make the 60° grind, fit 60° cutter into the holder, and slide it into the valve guide.
- Turn the holder, while pressing down lightly.
- Grind the seat at a 60° angle [A] until the seat width [B] is within the specified range.

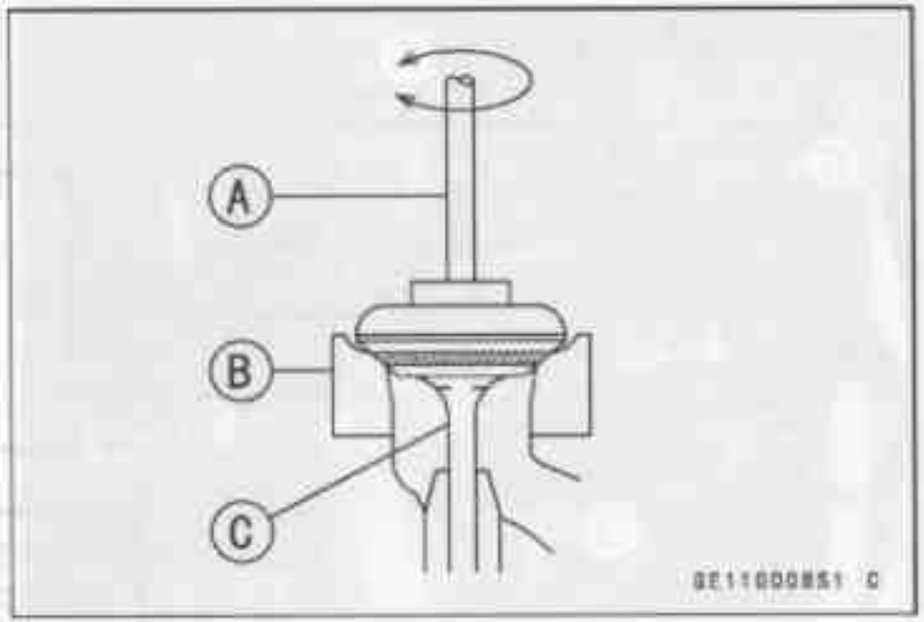
★ If the seat width is within the specified range, lap the valve to the seat as described below.



Valves

- Lap the valve to the seat, once the seat width and O.D. are within the ranges specified above.
- Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.
- Spin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.
- Repeat the process with a fine grinding compound.

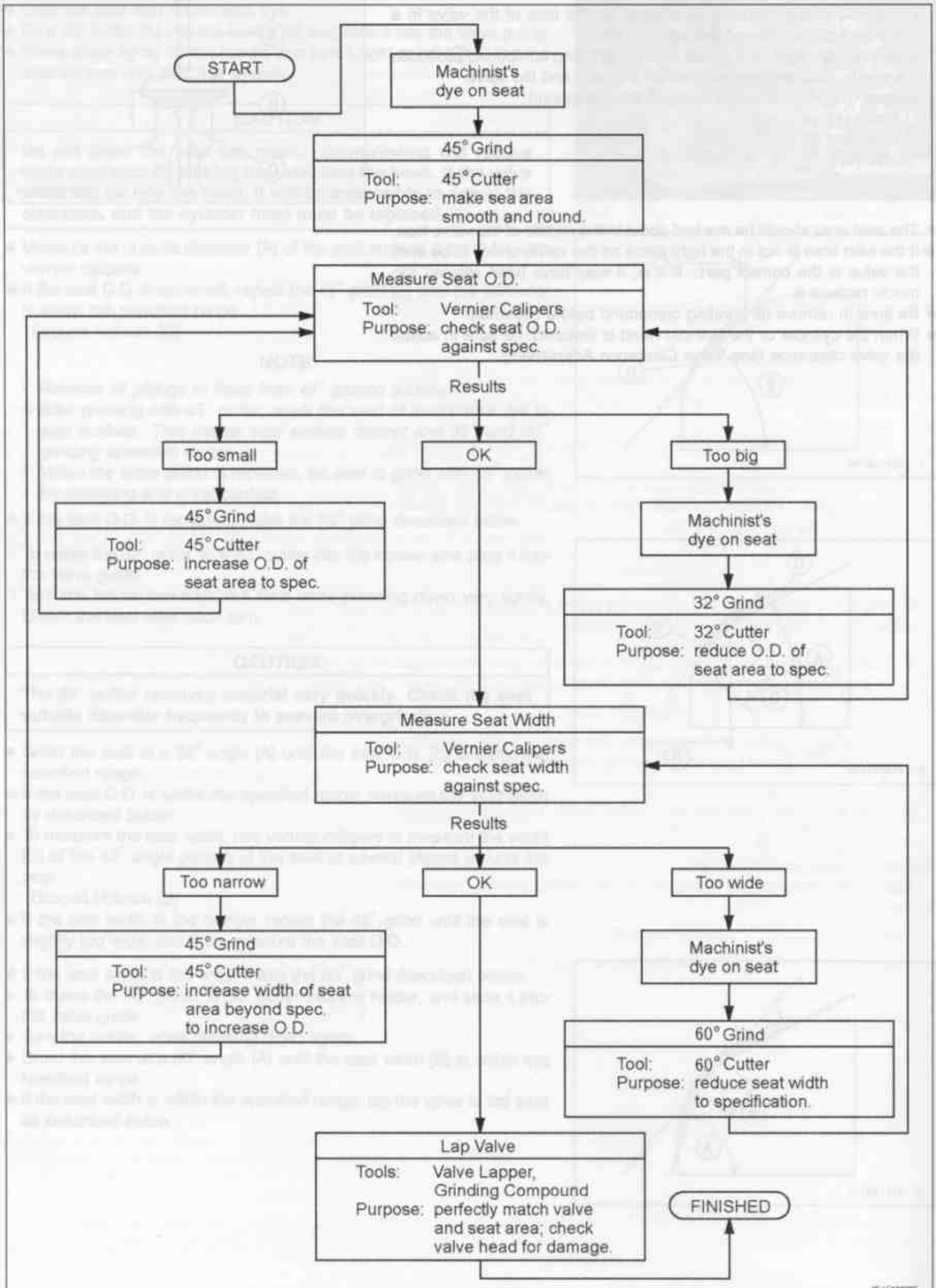
Lapper [A]
Valve Seat [B]
Valve [C]



- The seat area should be marked about in the middle of the valve face.
- ★If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.
- Be sure to remove all grinding compound before assembly.
- When the cylinder or the cylinder head is Installed, be sure to adjust the valve clearance (see Valve Clearance Adjustment).

Valves

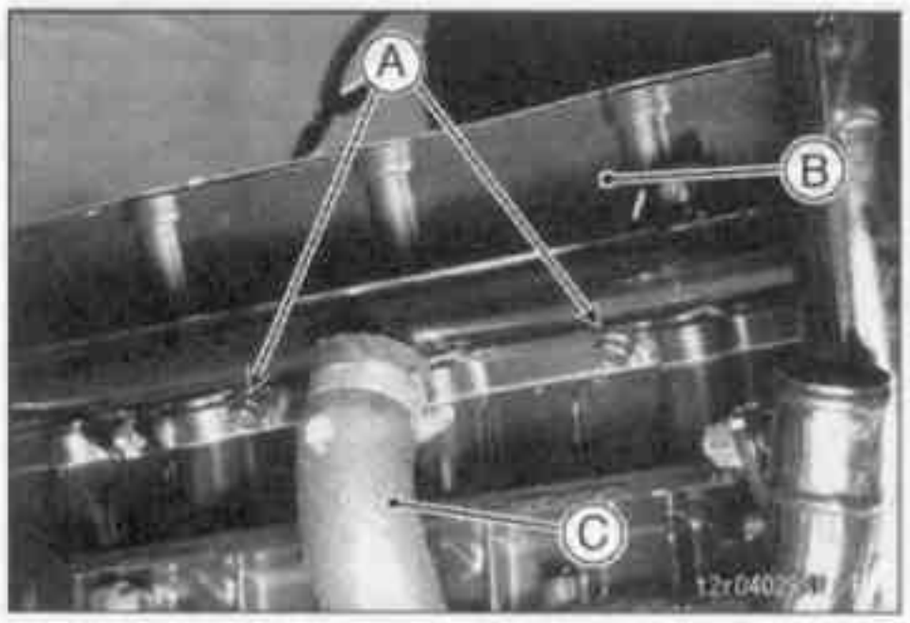
Valve Seat Repair



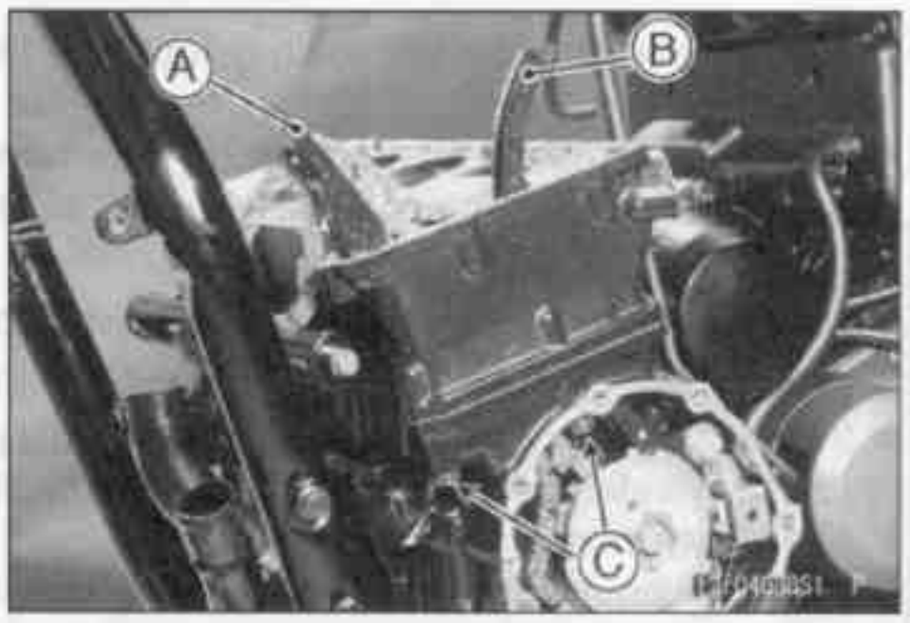
Cylinder, Pistons

Cylinder Removal

- Remove the cylinder head (see Cylinder Head Removal in this chapter).
- Remove the coolant drain plugs [A] and drain the coolant from the cylinder [B].
- Remove the coolant hose [C].



- Remove:
  Front Camshaft Chain Guide [A] (pull it out)
  Rear Camshaft Chain Guide [B] (if necessary)
  Cylinder Bolts [C]
- Tap lightly up the cylinder with a plastic mallet to separate from the crankcase.
- Remove the cylinder and base gasket.



Cylinder Installation

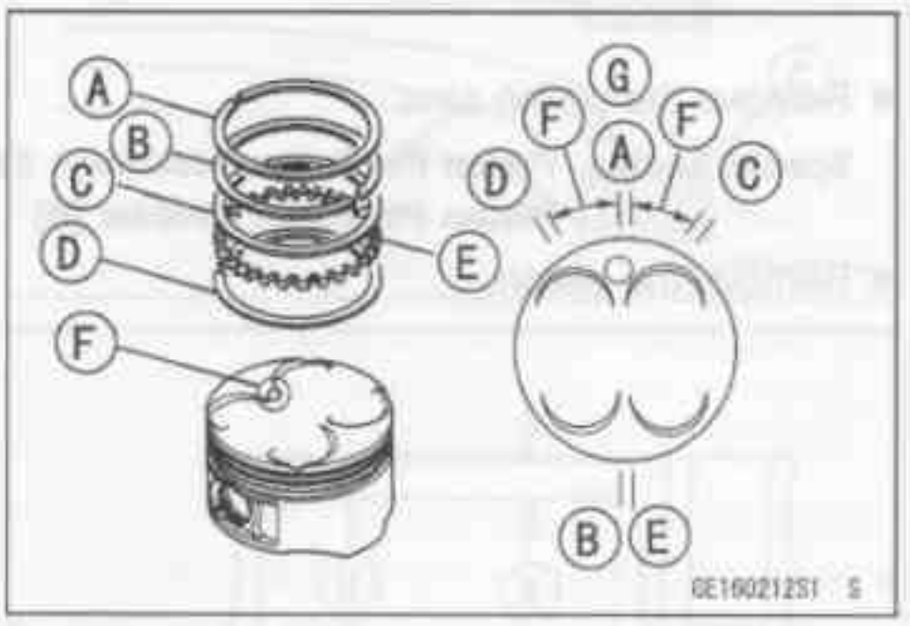
NOTE

○ *If a new piston or cylinder is used, check piston to cylinder clearance (see Piston/Cylinder Clearance), and use new piston ring.*

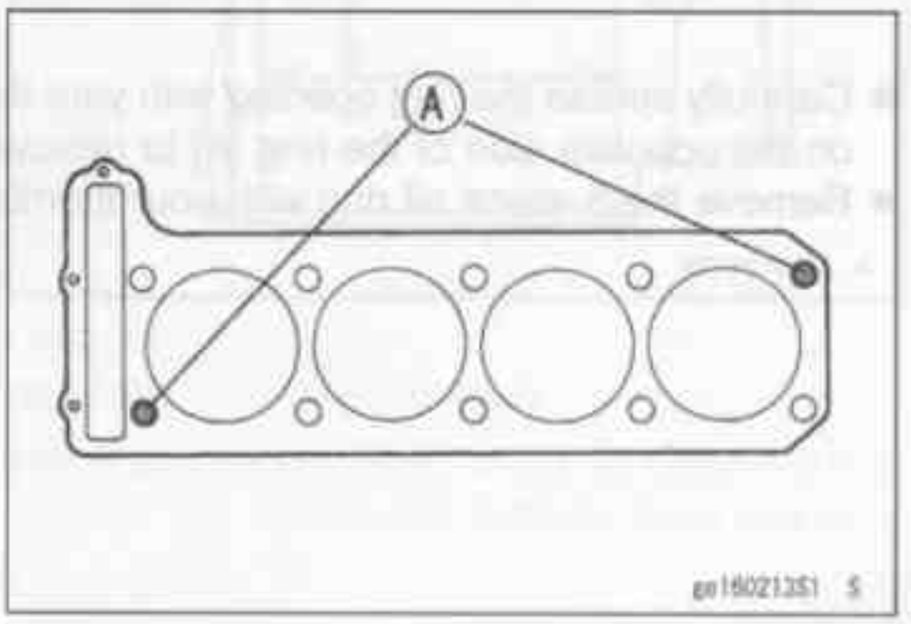
- Install:
  Dowel Pins [A]
  New Cylinder Base Gasket [B]



- The piston ring openings must be positioned as shown in the figure. The openings of the oil ring steel rails must be about 30 ~ 40° [F] of angle from the opening of the top ring.
  Top Ring [A]
  Second Ring [B]
  Upper Oil Ring Steel Rail [C]
  Lower Oil Ring Steel Rail [D]
  Oil Ring Expander [E]
  Round Mark [F] (must be on the front side)
  Opening Positions [G]



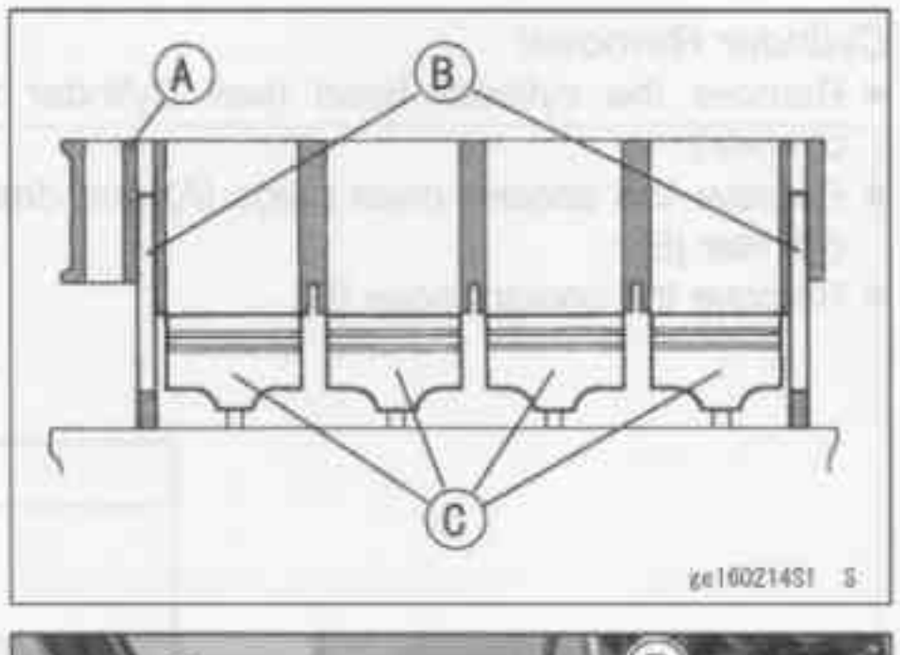
- Apply molybdenum disulfide oil to the cylinder bore.
- Prepare two auxiliary head bolts with their head cut.
- Install the two bolts [A] diagonally in the crankcase.
- Apply molybdenum disulfide oil to the front and the rear of the piston skirts.



Cylinder, Pistons

- Position the crankshaft so that all the piston heads are almost level.
- Install the cylinder block [A].
  Auxiliary Head Bolts [B]
  Pistons [C]

○ Insert the piston rings with your thumbs.

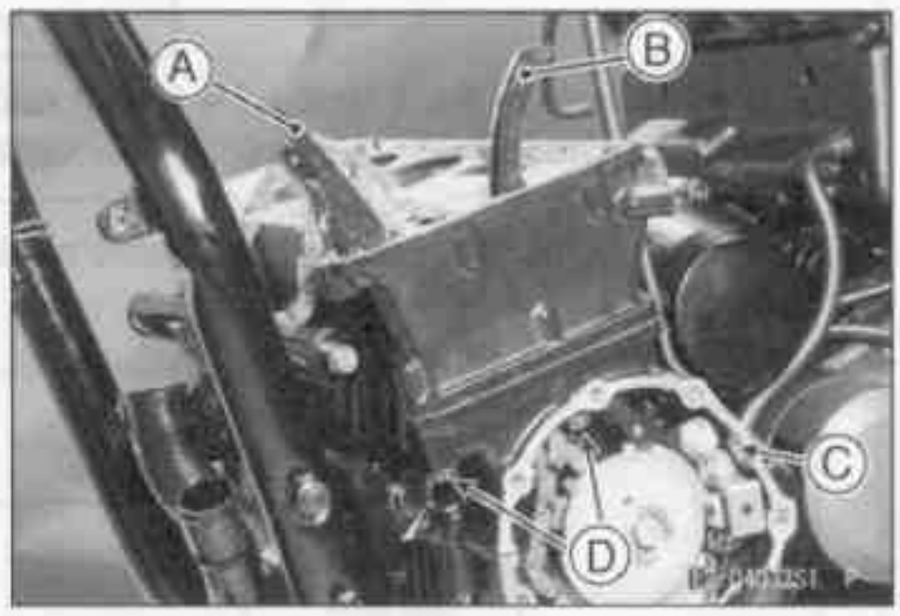


- Insert the front camshaft chain guide [A]. Push the guide all the way down.
- If the rear camshaft chain guide [B] is removed, install it.

○ Apply a non-permanent locking agent to the threads of the rear camshaft chain guide bolt [C] and tighten it.

Torque - Rear Camshaft Chain Guide Bolt : 20 N·m (2.0 kg·m, 14.5 ft·lb)

- Check that the chain guide swings smoothly by hand.
- Install the cylinder bolts (6 mm) [D] and tighten them temporarily (these cylinder bolts are tightened to the specified torque after cylinder head installation).
- Turn the crankshaft counterclockwise and check that the pistons reciprocate smoothly.



Piston Removal

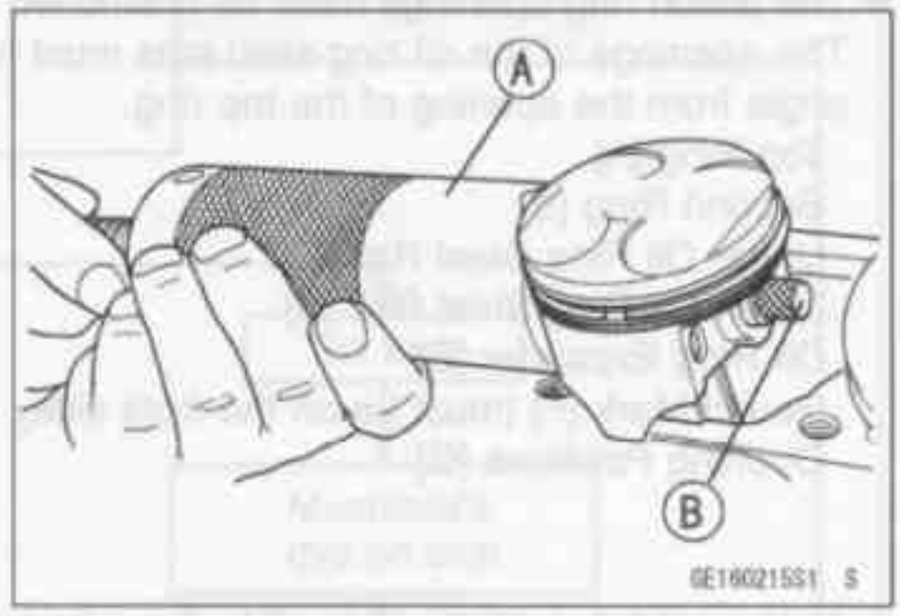
- Remove the cylinder (see Cylinder Removal).
- Place a clean cloth under the pistons and remove the piston pin snap ring [A] from the outside of each piston.



- Remove the piston pins.

Special Tools - Piston Pin Puller Assembly: 57001–910 [A]
Piston Pin Puller Adapter [B]

- Remove the piston.



- Carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring [A] to remove it.
- Remove the 3–piece oil ring with your thumbs in the same manner.

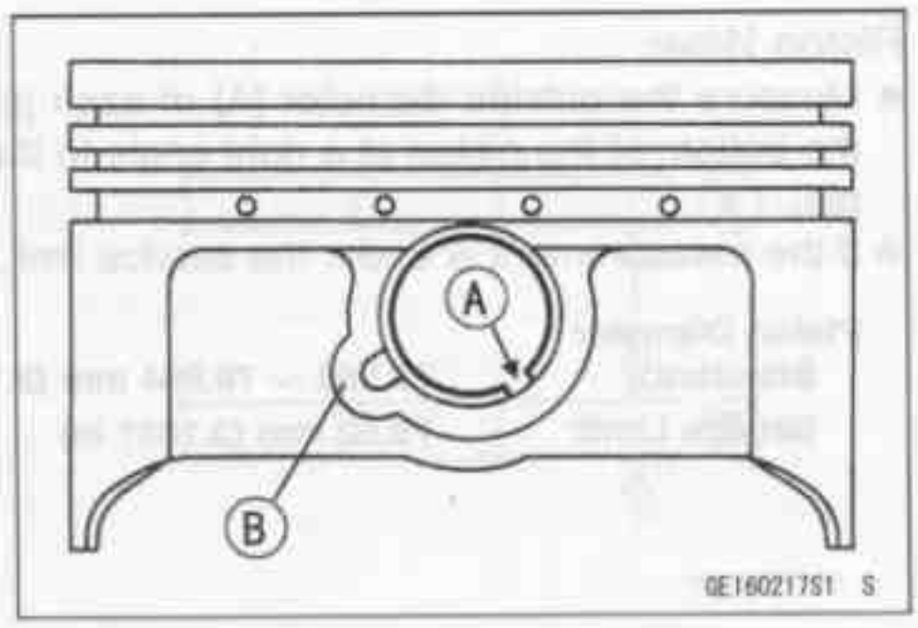


Cylinder, Pistons

Piston Installation

NOTE

○ *If a new piston or cylinder is used, check the piston to cylinder clearance (see Piston/Cylinder Clearance), and use new piston ring.*



- The front mark (0) on the piston head must be on the front side of the engine.
- Apply molybdenum disulfide oil to the outer circumference of the piston pins.
- Fit a new piston pin snap ring into the side of the piston so that the ring opening [A] does not coincide with the slit [B] of the piston pin hole.

○ When installing the piston pin snap ring, compress it only enough to install it and no more.

CAUTION

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

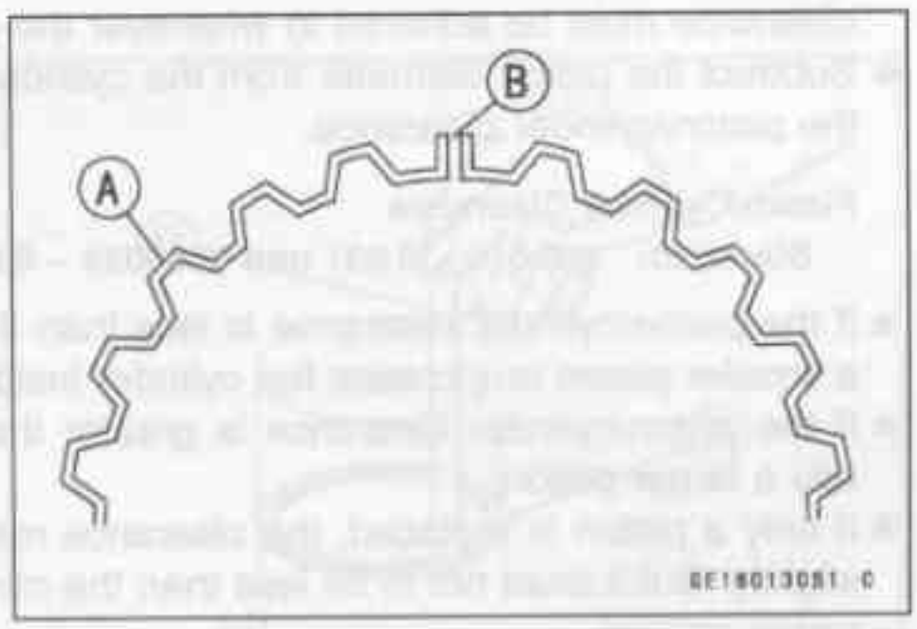
NOTE

○ *The oil ring rails have no "top" or "bottom".*

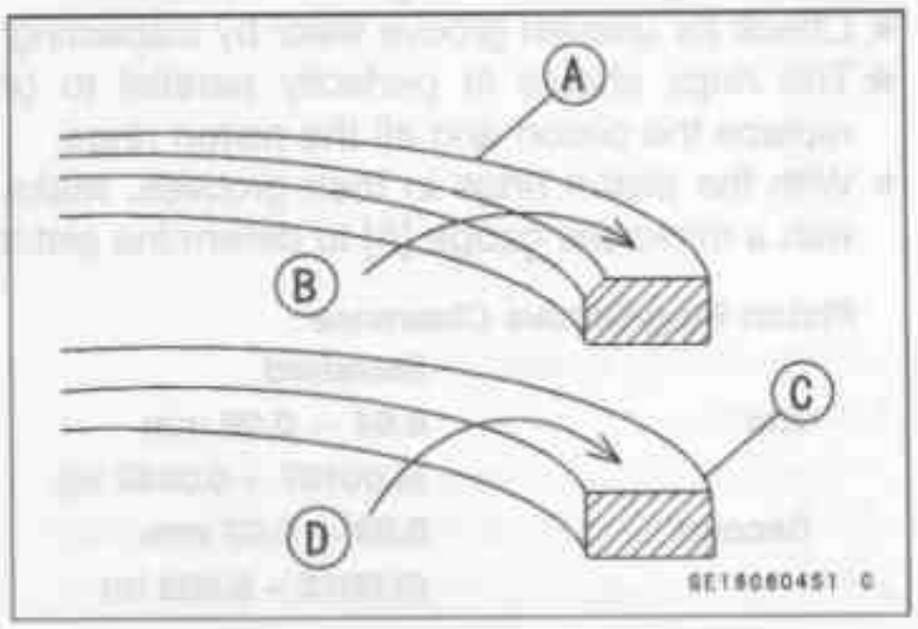
- Install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
- Install the oil ring steel rails, one above the expander and one below it.

○ Spread the rail with your thumbs, but only enough to fit the rail over the piston.

○ Release the rail into the bottom piston ring groove.



- Do not mix up the top ring and second ring.
- Install the top ring [A] so that the "R" mark [B] faces up.
- Install the second ring [C] so that the "R" mark [D] faces up.

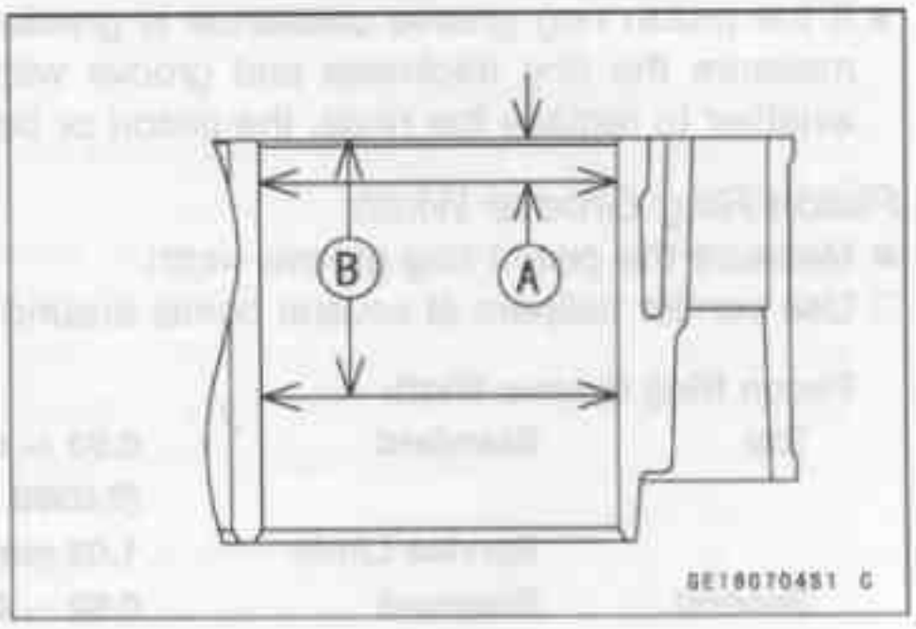


Cylinder Wear

- 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 two locations (total of four measurements) shown in the figure.

★ If any of the cylinder inside diameter measurements exceeds the service limit, replace the cylinder.

10 mm [A]
60 mm [B]



Cylinder Inside Diameter

Standard:	**78.994 ~ 79.006 mm (3.1099 ~ 3.1105 in), and less than 0.01 mm (0.00039 in) difference between any two measurements.**
Service Limit:	**79.10 mm (3.1142 in), or 0.05 mm (0.00197 in) difference between any two measurements.**

Cylinder, Pistons

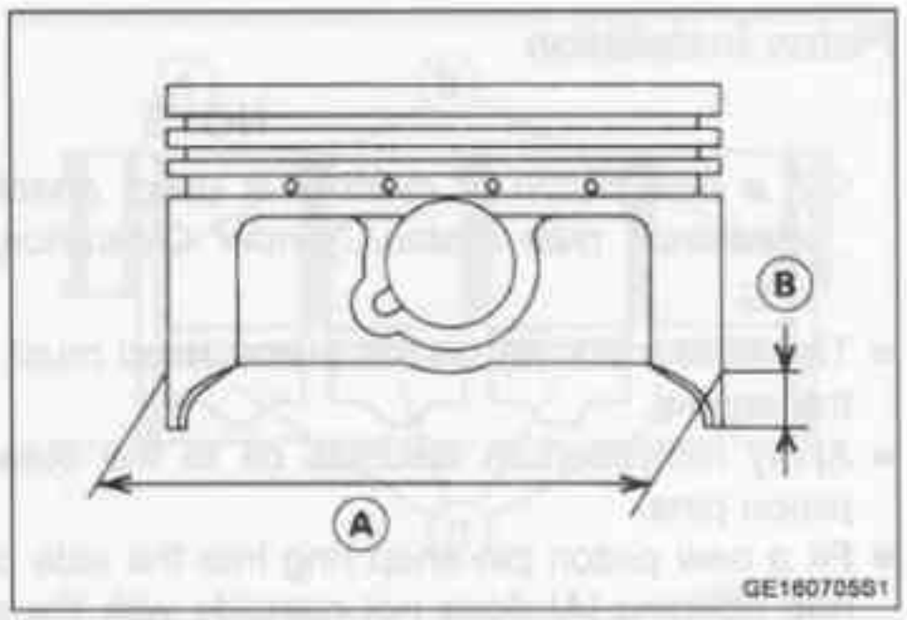
Piston Wear

- Measure the outside diameter [A] of each piston 5 mm [B] up from the bottom of the piston at a right angle to the direction of the piston pin.

★ If the measurement is under the service limit, replace the piston.

Piston Diameter

Standard:	**78.969 ~ 78.984 mm (3.1090 - 3.1696 in)**
Service Limit:	**78.82 mm (3.1031 in)**



Piston/Cylinder Clearance

○ The piston/cylinder clearance is measured whenever a piston or cylinder is replaced with a new one. The standard piston/cylinder clearance must be adhered to whenever the cylinder is replaced.

- Subtract the piston diameter from the cylinder inside diameter to get the piston/cylinder clearance.

Piston/Cylinder Clearance

Standard:	**0.010 ~ 0.037 mm (0.00039 ~ 0.00146 in)**

★ If the piston/cylinder clearance is less than the specified range, use a smaller piston or increase the cylinder inside diameter by honing.

★ If the piston/cylinder clearance is greater than the specified range, use a larger piston.

★ If only a piston is replaced, the clearance may exceed the standard slightly. But it must not to be less than the minimum in order to avoid piston seizure.

Piston Ring, Piston Ring Groove Wear

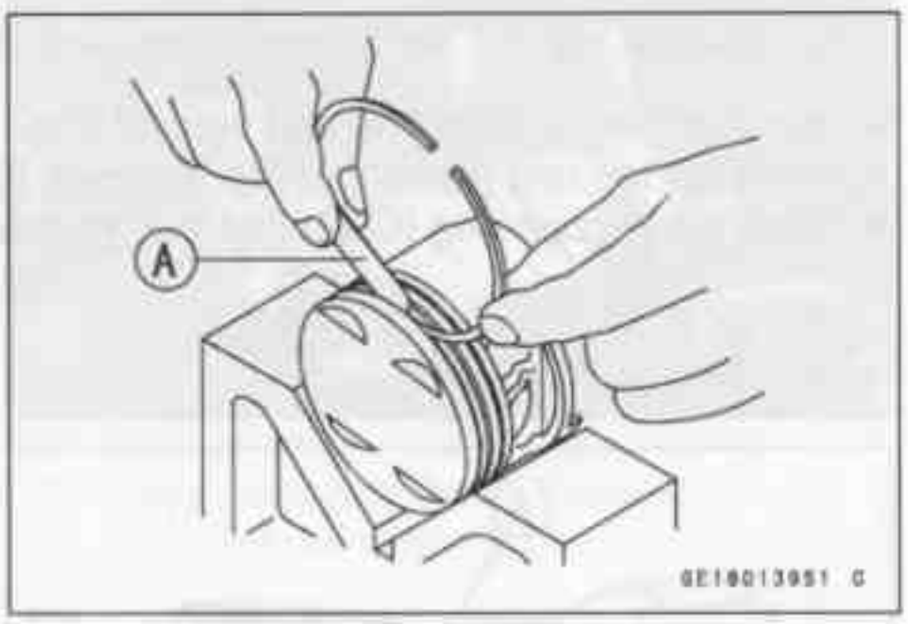
- Check for uneven groove wear by inspecting the ring seat.

★ The rings should fit perfectly parallel to groove surfaces. If not, replace the piston and all the piston rings.

- With the piston rings in their grooves, make several measurements with a thickness gauge [A] to determine piston ring/groove clearance.

Piston Ring/Groove Clearance

	Standard	Service Limit
Top	**0.04 ~ 0.08 mm (0.00157 ~ 0.0032 in)**	**0.18 mm (0.0071 in)**
Second	**0.03 ~ 0.07 mm (0.0012 ~ 0.003 in)**	**0.17 mm (0.0067 in)**



★ If the piston ring groove clearance is greater than the service limit, measure the ring thickness and groove width as follows to decide whether to replace the rings, the piston or both.

Piston Ring Groove Width

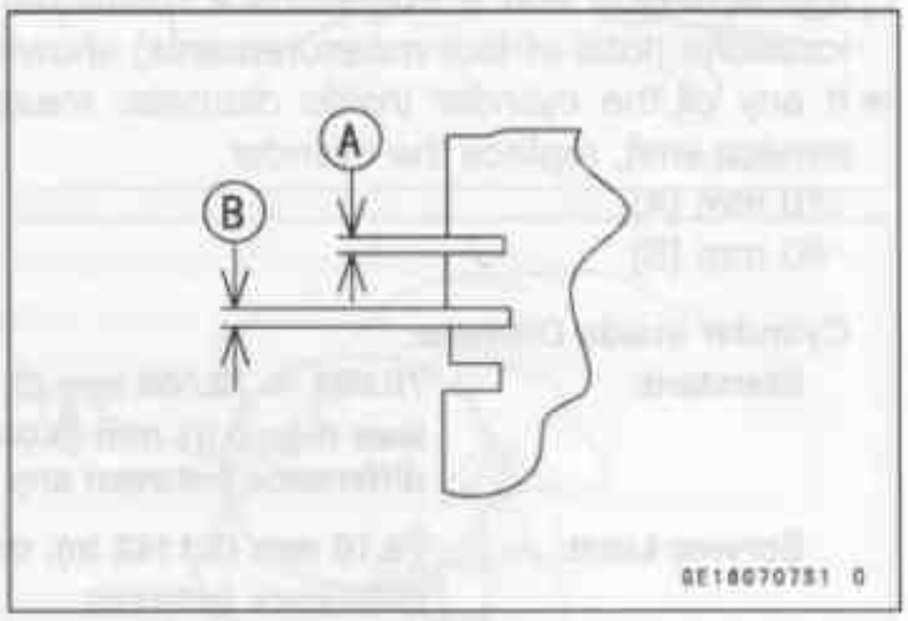
- Measure the piston ring groove width.

○ Use vernier calipers at several points around the piston.

Piston Ring Groove Width

Top	**Standard**	**0.93 ~ 0.95 mm (0.0366 ~ 0.0374 in)**
	Service Limit:	**1.03 mm (0.0406 in)**
Second	**Standard**	**0.82 ~ 0.84 mm (0.032 ~ 0.033 in)**
	Service Limit:	**0.92 mm (0.036 in)**

★ If the width of any of the two grooves is wider than the service limit at any point, replace the piston.

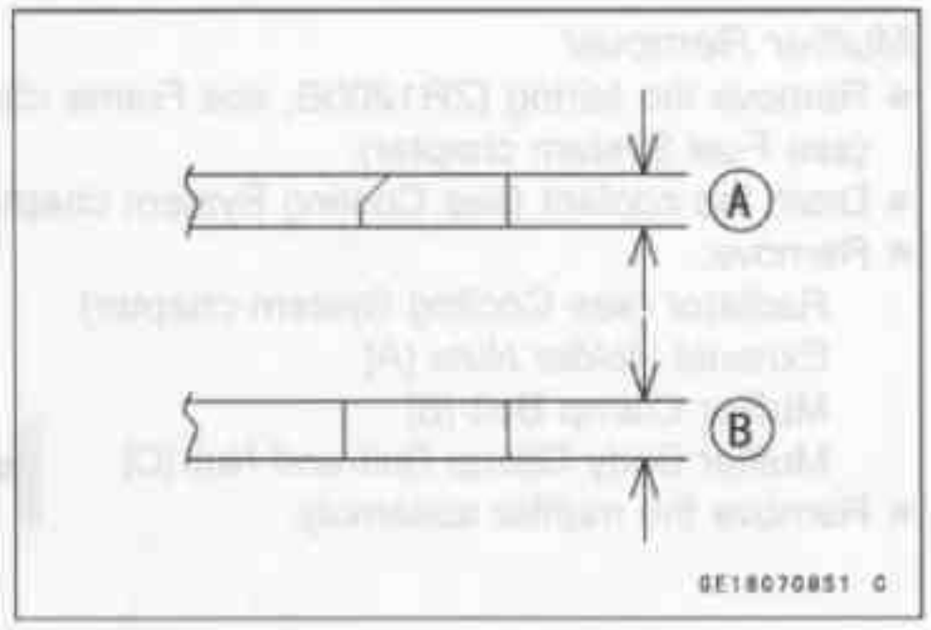


Cylinder, Pistons

Piston Ring Thickness

- Measure the piston ring thickness.

○ Use a micrometer to measure the thickness at several points around the ring.



Piston Ring Thickness

Top	**Standard:**	**0.87 ~ 0.89 mm (0.034 ~ 0.035 in)**
	Service Limit:	**0.80 mm (0.032 in)**
Second	**Standard:**	**0.77 ~ 0.79 mm (0.030 ~ 0.031 in)**
	Service Limit:	**0.70 mm (0.028 in)**

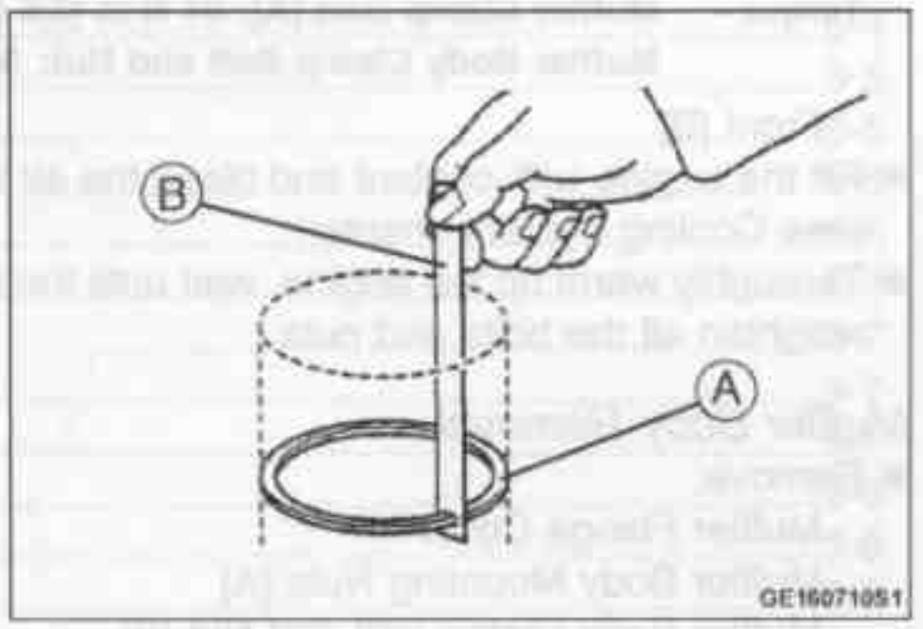
★ If any of the measurements is less than the service limit on either of the rings, replace all the rings.

NOTE

○ *When using new rings in a used piston, check for uneven groove wear. The rings should fit perfectly parallel to the groove sides. If not, replace the piston.*

Piston Ring End Gap

- Place the piston ring [A] 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 [B] between the ends of the ring with a thickness gauge.



Piston Ring End Gap

	Standard	Service Limit
Top	**0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in)**	**0.6 mm (0.024 in)**
Second	**0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in)**	**0.75 mm (0.0295 in)**
Oil	**0.20 ~ 0.70 mm (0.0079 ~ 0.028 in)**	**1.0 mm (0.039 in)**

★ If the end gap of either ring is greater than the service limit, replace all the rings.

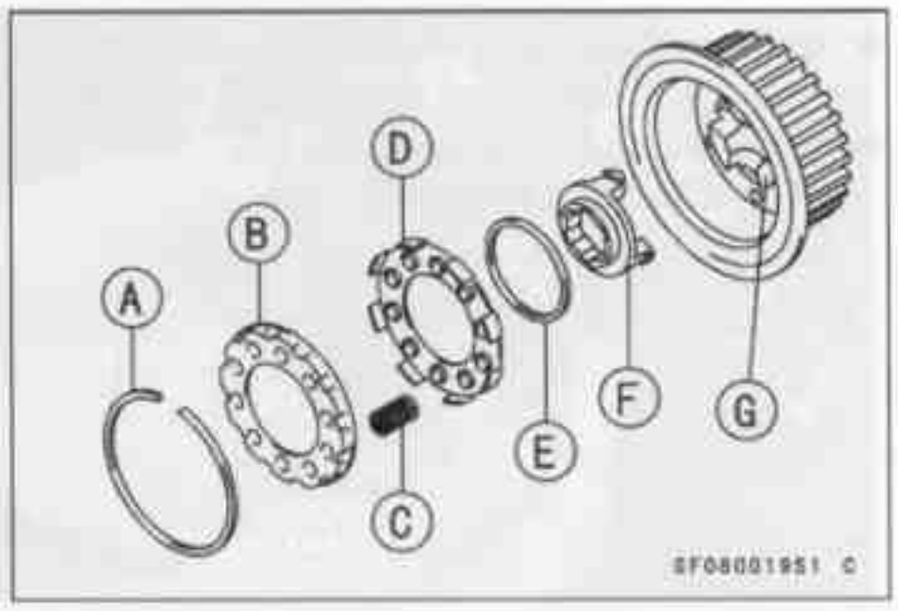
CLUTCH

Table of Contents

Exploded View 5-2
Specifications 5-4
Clutch Lever Adjuster 5-5
  Lever Position Adjustment 5-5
Clutch Fluid 5-6
  Fluid Level Inspection 5-6
  Clutch Fluid Change 5-6
  Bleeding the Clutch Line 5-7
  Clutch Hose Removal/Installation 5-7
  Clutch Hose or Pipe Inspection 5-7
Clutch Master Cylinder 5-8
  Clutch Master Cylinder Removal 5-8
  Clutch Master Cylinder Installation 5-8
  Clutch Master Cylinder Disassembly 5-9
  Clutch Master Cylinder Assembly 5-10
  Clutch Master Cylinder Inspection 5-10
Clutch Slave Cylinder 5-11
  Clutch Slave Cylinder Removal 5-11
  Clutch Slave Cylinder Installation 5-11
  Clutch Slave Cylinder Disassembly 5-12
  Clutch Slave Cylinder Assembly 5-12
Clutch 5-13
  Clutch Removal 5-13
  Clutch Installation 5-14
  Clutch Hub Disassembly 5-15
  Friction or Steel Plate Damage, Wear Inspection 5-16
  Friction or Steel Plate Warp Inspection 5-16
  Clutch Spring Free Length Measurement 5-16
  Clutch Housing Finger Inspection 5-16
  Clutch Hub Spline Inspection 5-17
  Cam Damper Inspection 5-17

Clutch

- Remove:
  Retaining Ring [A]
  Spring Holder [B]
  Damper Spring [C]
  Spring Holder [D]
  Spacer [E]
  Damper Cam [F]
  Clutch Hub [G]



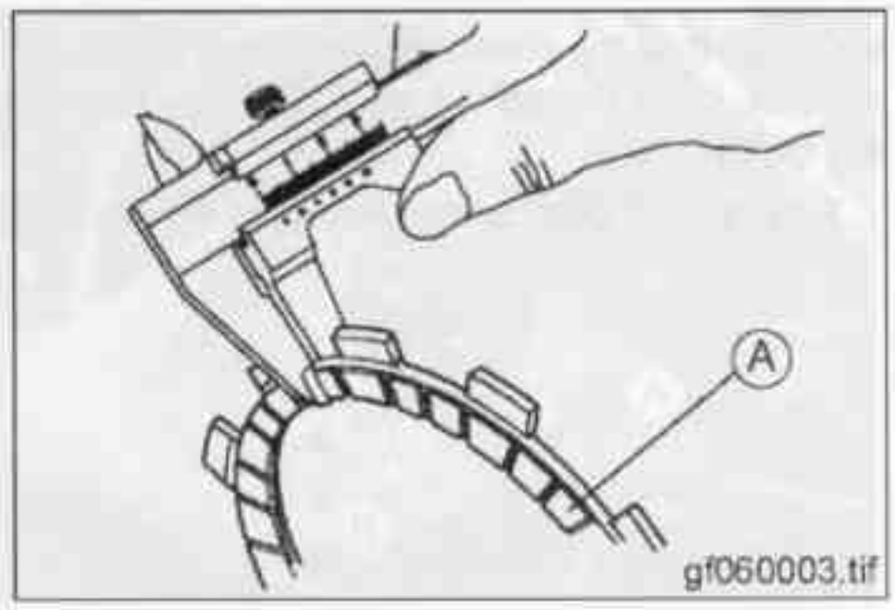
Friction or Steel Plate Damage, Wear Inspection

- Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration) or uneven wear.
- Measure the thickness of the friction plates [A] at several points.

★ If any plates show signs of damage or if they have worn past the service limit, replace them with new ones.

Friction Plate Thickness

Standard:	**2.9 ~ 3.1 mm (0.114 ~ 0.122 in)**
Service Limit:	**2.8 mm (0.110 in)**



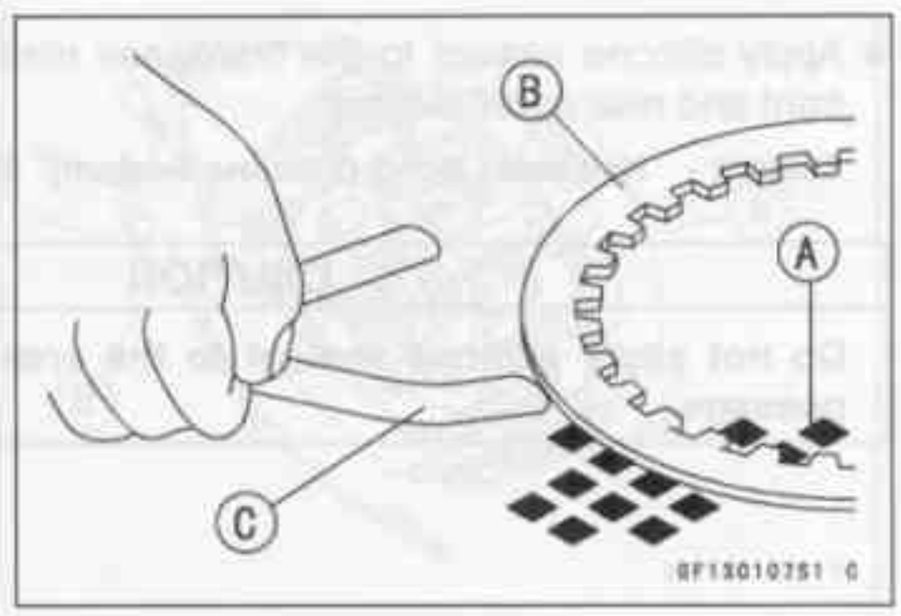
Friction or Steel Plate Warp Inspection

- Place each friction plate or steel plate on a surface plate, and measure the gap between the surface plate [A] and each friction plate or steel plate [B] with a thickness gauge [C]. 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

Standard:	**0.2 mm (0.008 in) or less**
Service Limit:	**0.3 mm (0.012 in)**



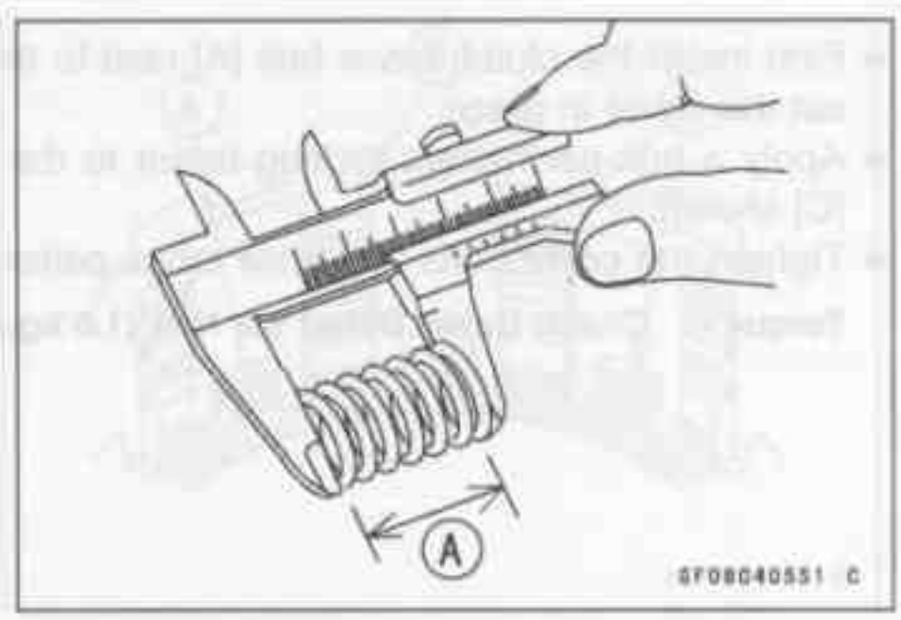
Clutch Spring Free Length Measurement

- Measure the free length of the clutch springs [A].

★ If any spring is shorter than the service limit, it must be replaced.

Clutch Spring Free Length

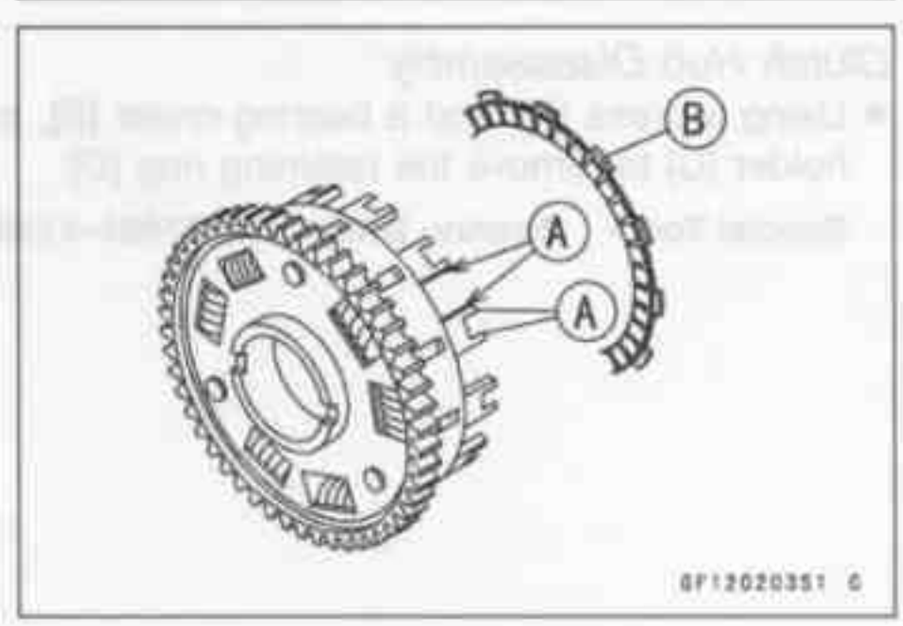
Standard:	**33.2 mm (1.307 in)**
Service Limit:	**32.1 mm (1.264 in)**



Clutch Housing Finger Inspection

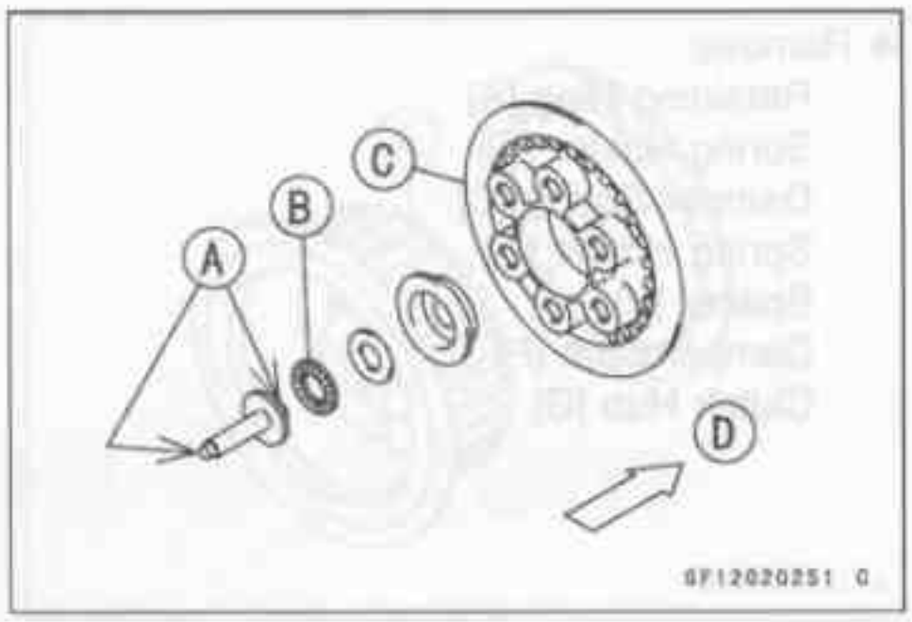
- Visually inspect the clutch housing fingers [A] where the friction plate tangs [B] hit them.

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



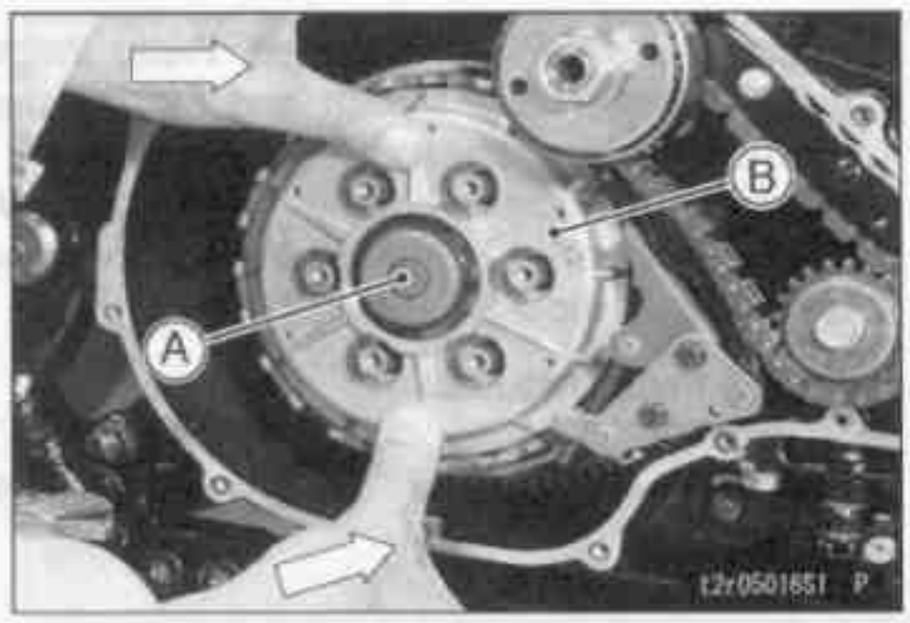
Clutch

- Apply molybdenum disulfide grease to the ends [A] of the clutch pusher and the thrust bearing [B] and install them.
- Install the clutch spring plate [C].
  Right Side (outside) [D]



- Check that the clutch pusher [A] is in the retracted position.
★ If not, push the spring plate [B] in by hands.
- Tighten:

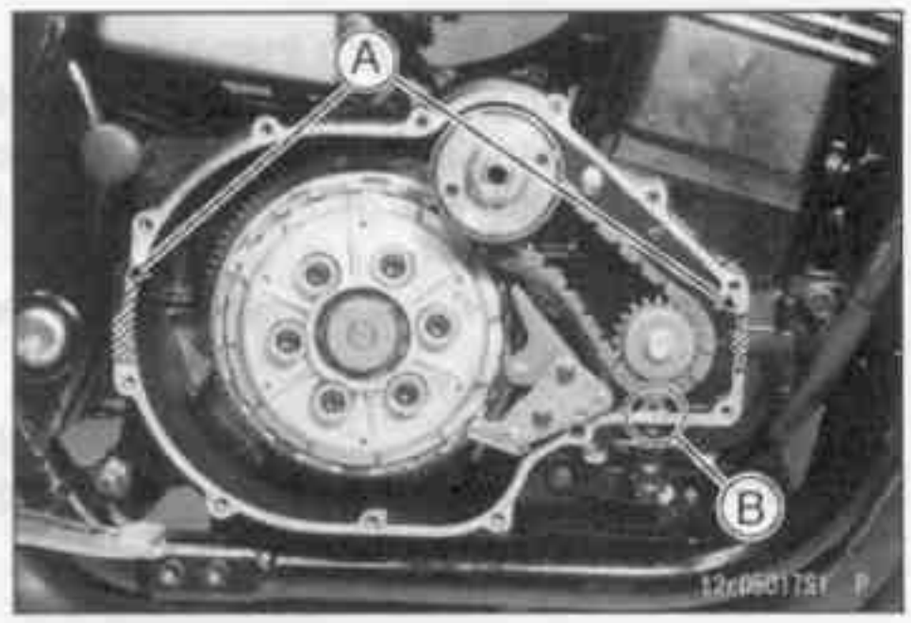
Torque - Clutch Spring Bolts: 11 N·m (1.1 kg·m, 97 in·lb)



- Apply silicone sealant to the crankcase mating surfaces [A] on the front and rear cover mounts.

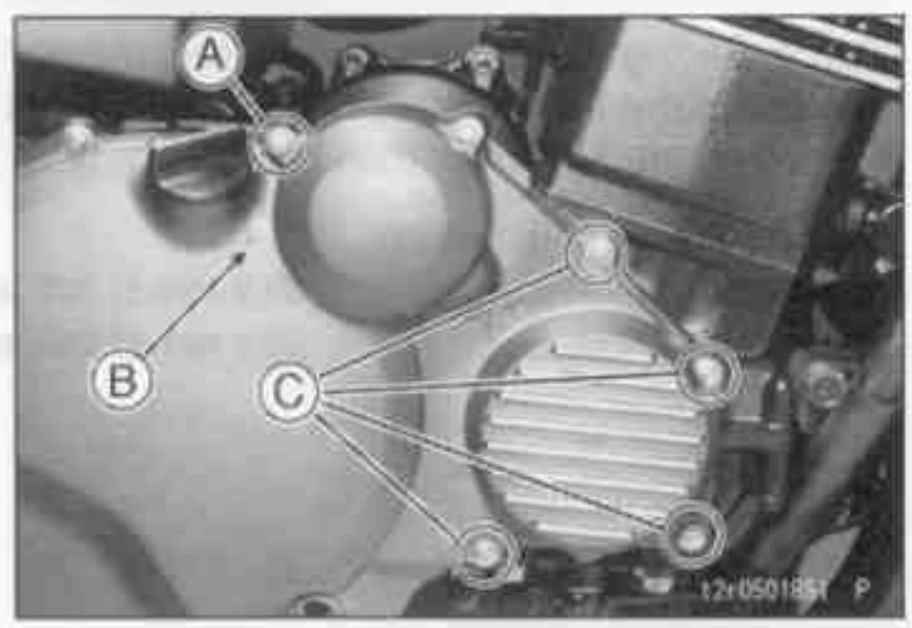
Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

CAUTION
Do not apply silicone sealant to the area [B] around the oil passage.



- First install the clutch cover bolt [A] next to the triangular mark [B] to set the cover in place.
- Apply a non-permanent locking agent to the four clutch cover bolts [C] shown.
- Tighten the cover bolts in a criss cross pattern.

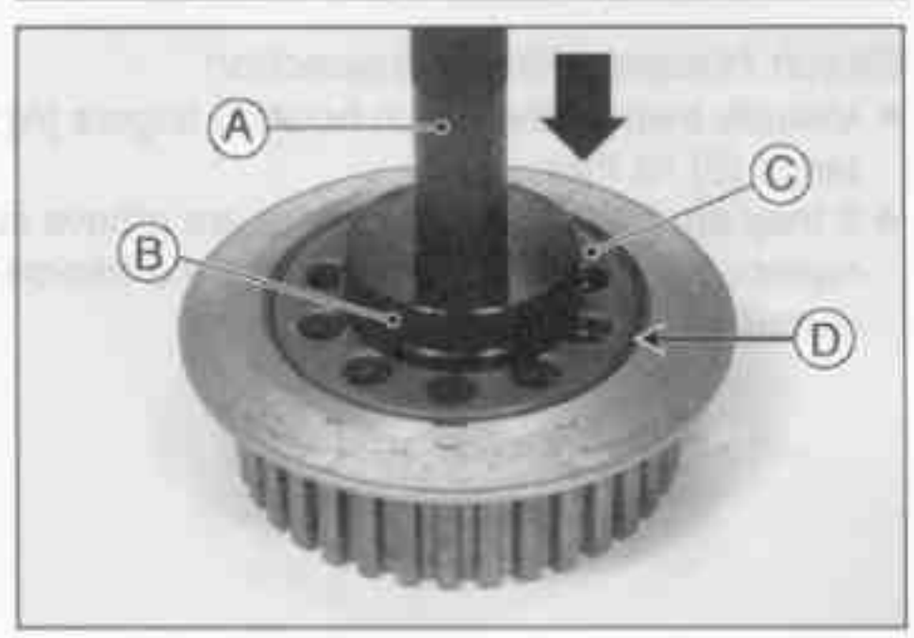
Torque - Clutch Cover Bolts: 9.8 N·m (1.0 kg·m, 87 in·lb)



Clutch Hub Disassembly

- Using a press [A], and a bearing driver [B], push the damper spring holder [C] to remove the retaining ring [D].

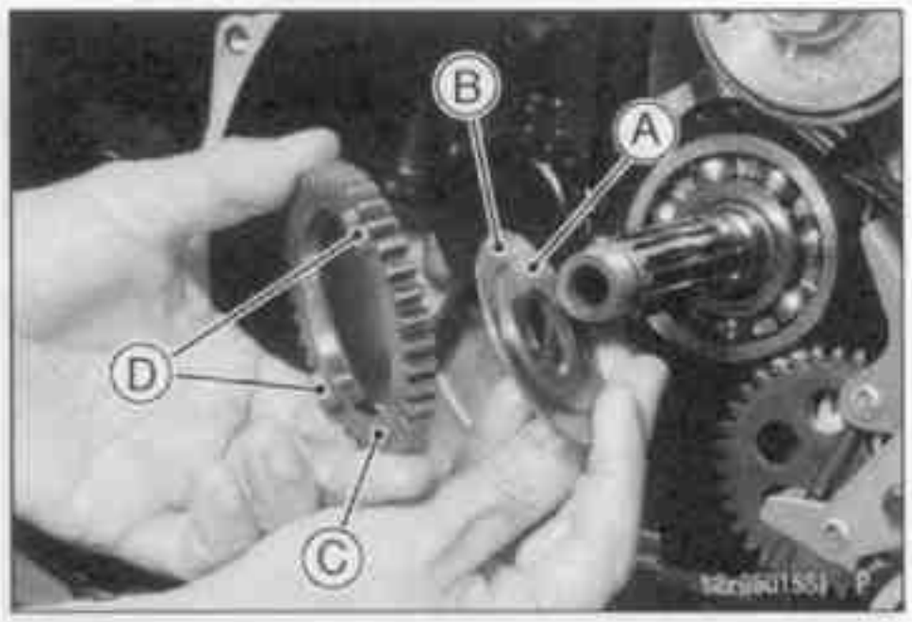
Special Tool - Bearing Driver Set: 57001–1129



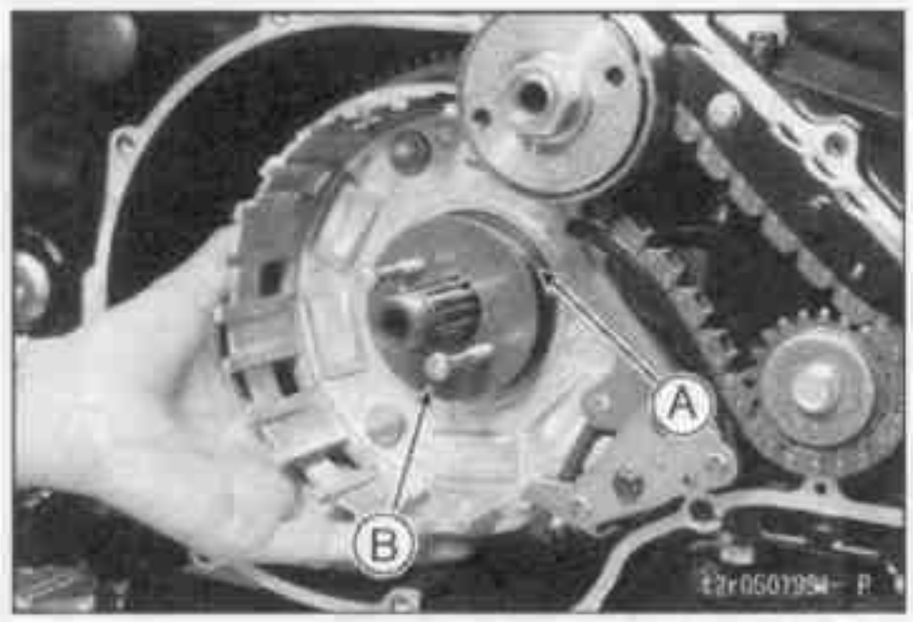
Clutch

Clutch Installation

- Install the smaller spacer [A] first, then install the larger one [B].
- Install the oil pump drive gear [C] with the dogs [D] facing outward.
- Install the clutch housing, meshing the dogs.



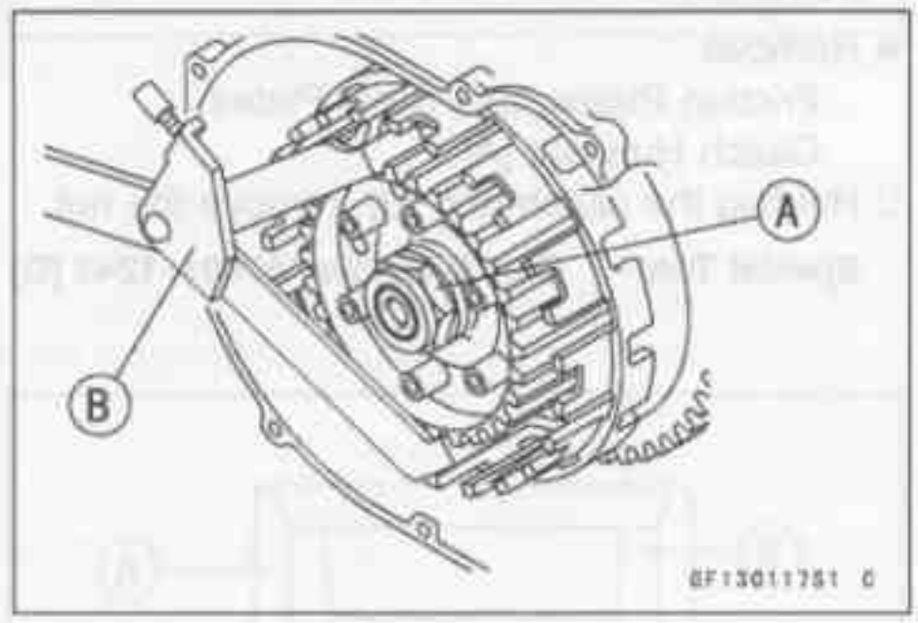
- Install the needle bearing [A] into the clutch housing.
- Install the sleeve with the tapped side [B] facing outward.



- Discard the used clutch hub nut, and install a new nut.
- Tighten the clutch hub nut [A], while holding the clutch hub with the clutch holder [B].

Special Tool - Clutch Holder: 57001–1243

Torque - Clutch Hub Nut: 135 N·m (13.8 kg·m, 100 ft·lb)

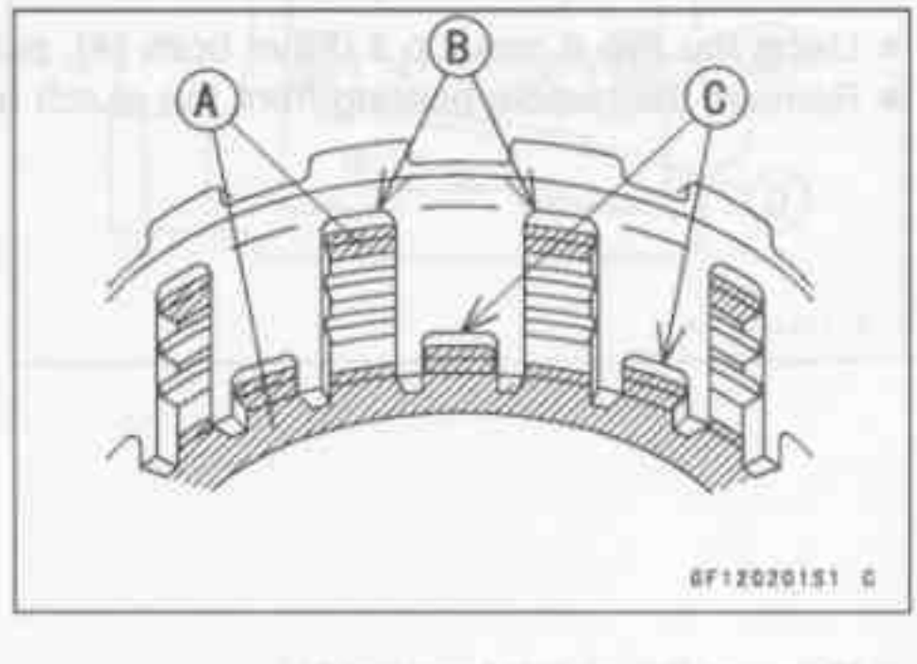


○ There are two brown friction plates of cork [A], which should be installed on the outermost and the inmost positions of the clutch hub. Do not confuse them with the other yellowish friction plates.

CAUTION

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

- First, install the brown friction plate fitting the tangs in the deeper grooves [B].
- Secondly, install the steel plates, and then the yellowish friction plates alternately, fitting their tangs in the same grooves.
- Finally, install the another brown friction plate, fitting the tangs in the shallower grooves [C].

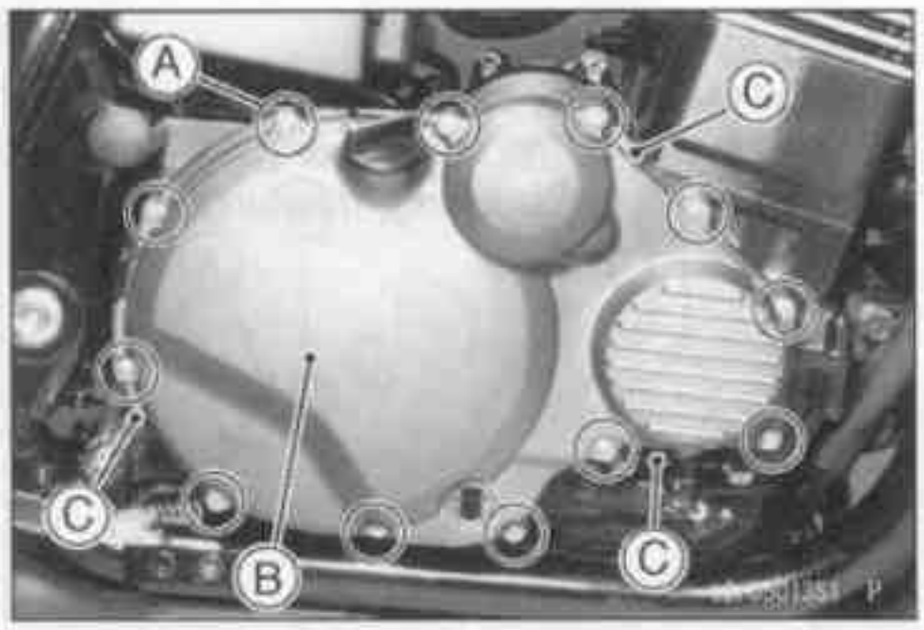


Clutch

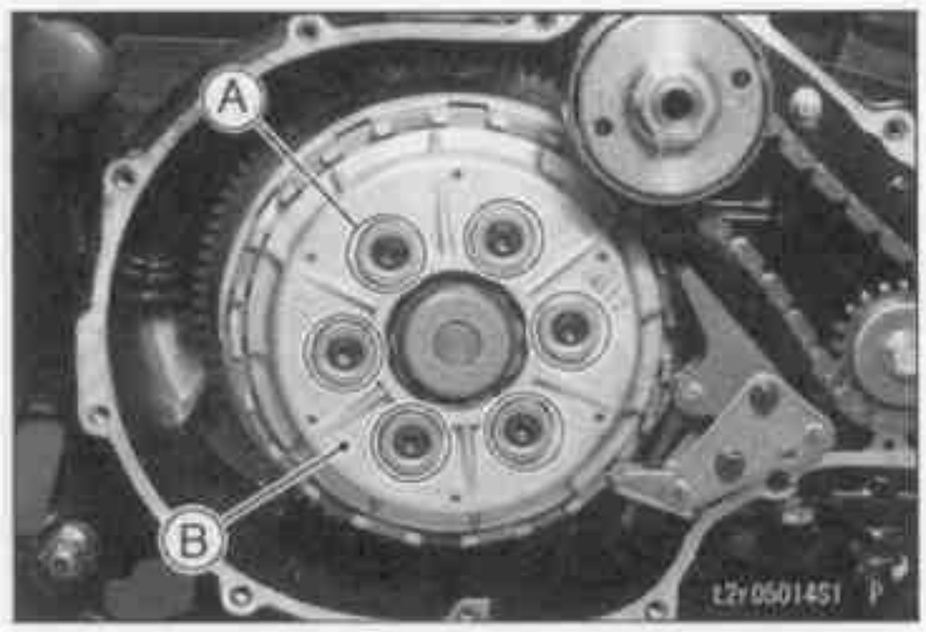
Clutch Removal

- Drain the engine oil (see Engine Lubrication System chapter).
- Remove:
  Twelve Clutch Cover Bolts [A]
  Clutch Cover [B]

○ Use the three pry points [C] to take off the cover.



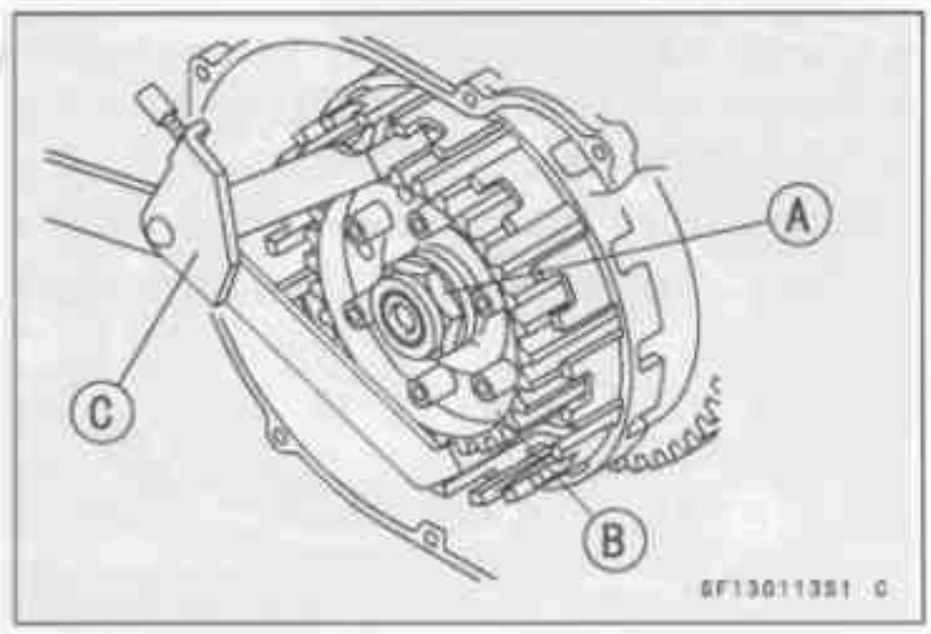
- Remove:
  Clutch Spring Bolts [A]
  Clutch Springs
  Clutch Spring Plate [B] (with thrust bearing and clutch pusher).



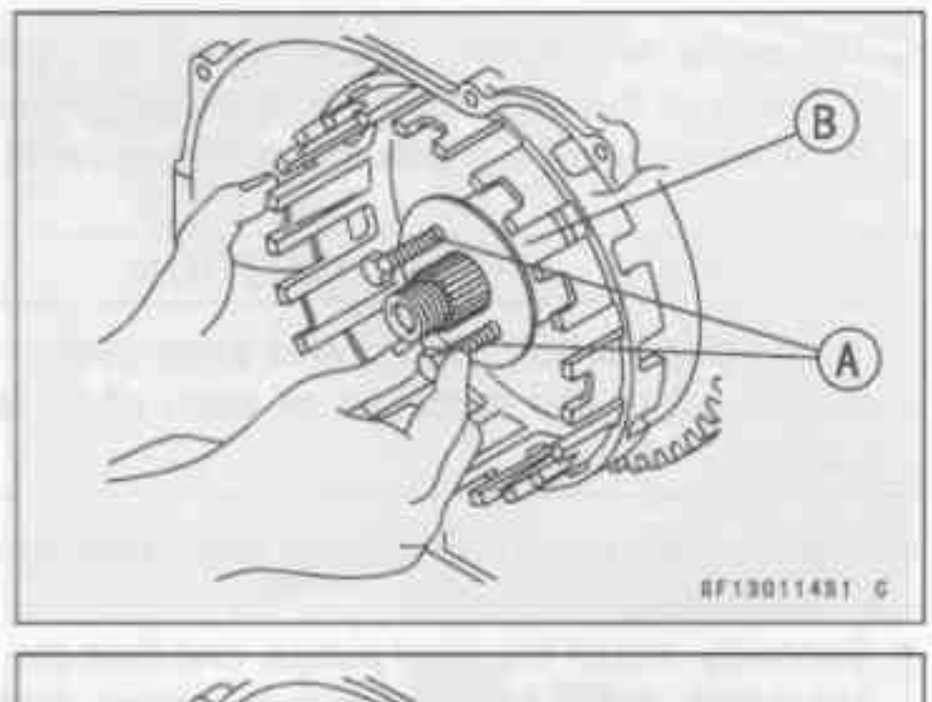
- Remove:
  Friction Plates, and Steel Plates
  Clutch Hub Nut [A]

○ Holding the clutch hub [B], remove the nut.

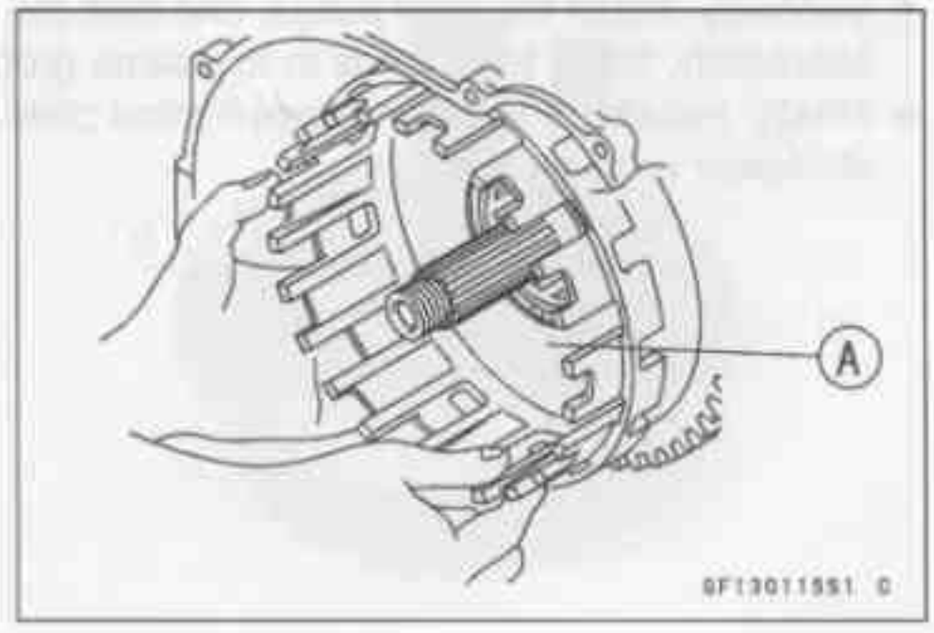
Special Tool - Clutch Holder: 57001–1243 [C]



- Using the two 6 mm x p 1.0 mm bolts [A], pull out the sleeve [B].
- Remove the needle bearing from the clutch housing.



- Remove the clutch housing [A].

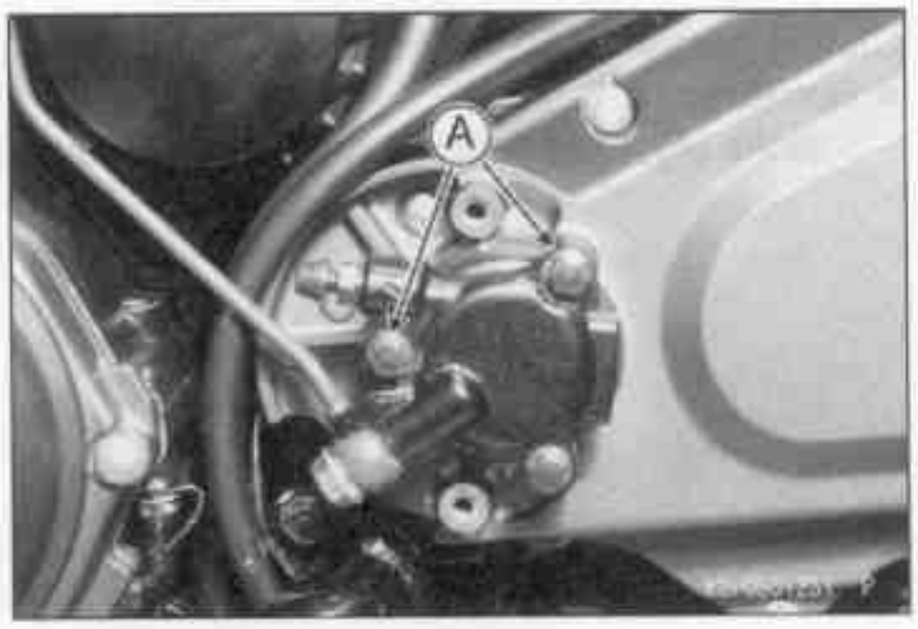


Clutch Slave Cylinder

- Apply a non-permanent locking agent to the threads of the two shorter slave cylinder bolts [A] shown.
- Finger tighten the clutch slave cylinder bolts.
- Remove the band from the clutch lever and release the clutch lever.
- Tighten the slave cylinder bolts.
- Replace the washer on each side of the clutch hose fitting with new one.
- Tighten the banjo bolt to the specified torque.

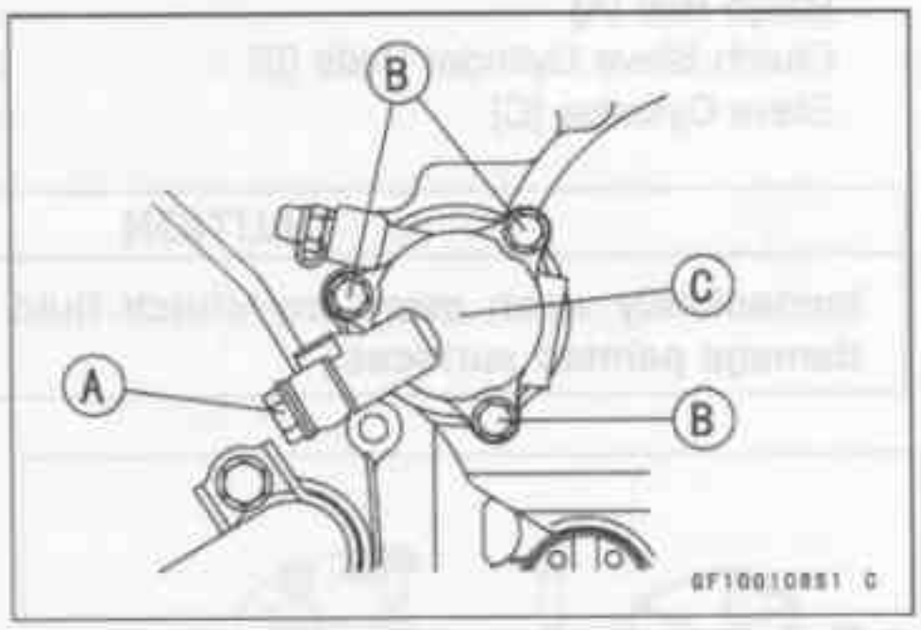
Torque - Clutch Pipe Banjo Bolt: 25 N·m (2.5 kg·m, 18 ft·lb)

- Check the fluid level in the master cylinder reservoir, and bleed the air in the clutch line.
- Check the clutch operation.



Clutch Slave Cylinder Disassembly

- Loosen the banjo bolt [A] at the slave cylinder, and tighten it loosely.
- Unscrew the slave cylinder bolts [B] and detach the slave cylinder with the pipe installed from the engine.
- Pump the clutch lever until the piston comes out of the cylinder.
- Unscrew the banjo bolt and remove the slave cylinder [C].



CAUTION

Immediately wash away any clutch fluid that spills. It may damage painted surfaces.

NOTE

○ *If the clutch slave cylinder is removed and left alone, the piston will be pushed out by spring force.*

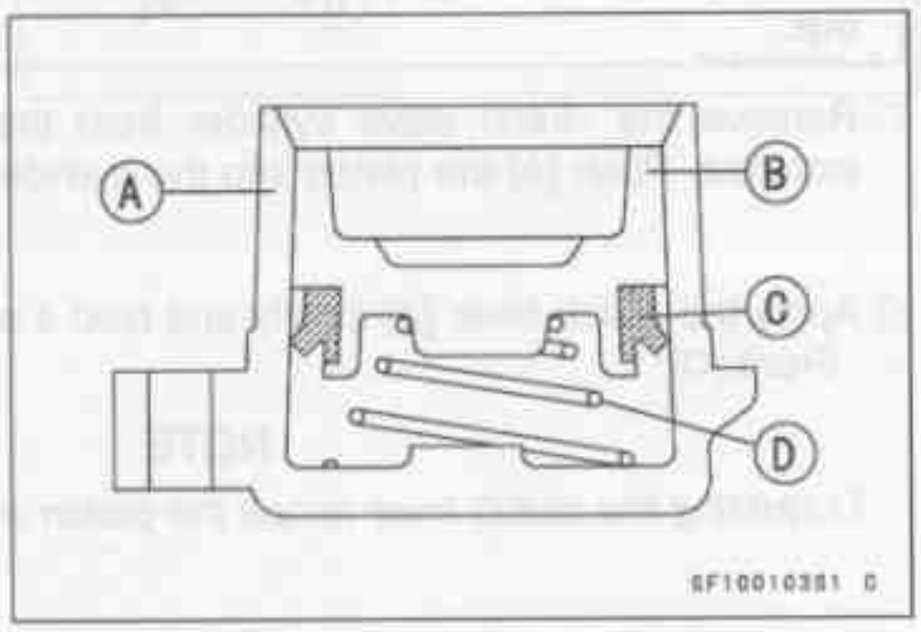
- Remove:
  Spring
  Fluid Seal .

Clutch Slave Cylinder Assembly

CAUTION

Replace the fluid seal with a new one if it was removed from the piston.

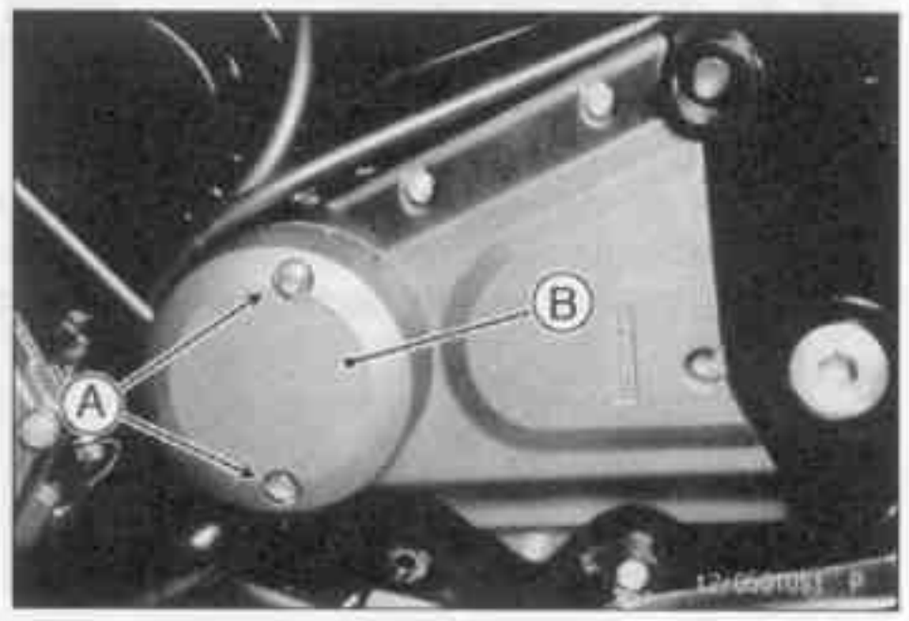
- Apply clutch fluid to the outside of the piston and the fluid seal.
- Install the fluid seal as shown.
  Cylinder [A]
  Piston [B]
  Fluid Seal [C]
  Spring [D]



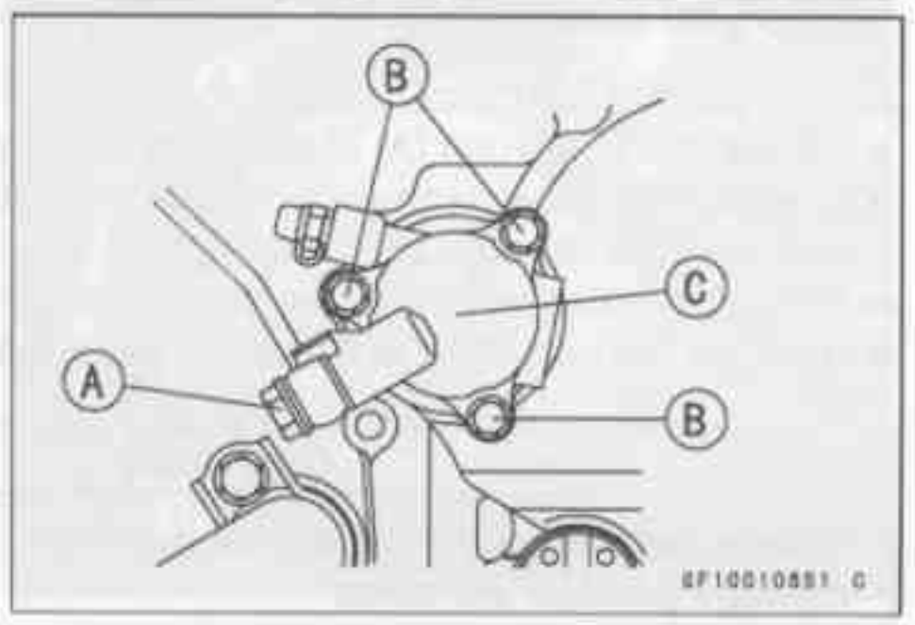
Clutch Slave Cylinder

Clutch Slave Cylinder Removal

- Remove:
  Bolts [A] and Clutch Slave Cylinder Cover [B]



Banjo Bolt [A]
Clutch Slave Cylinder Bolts [B]
Slave Cylinder [C]



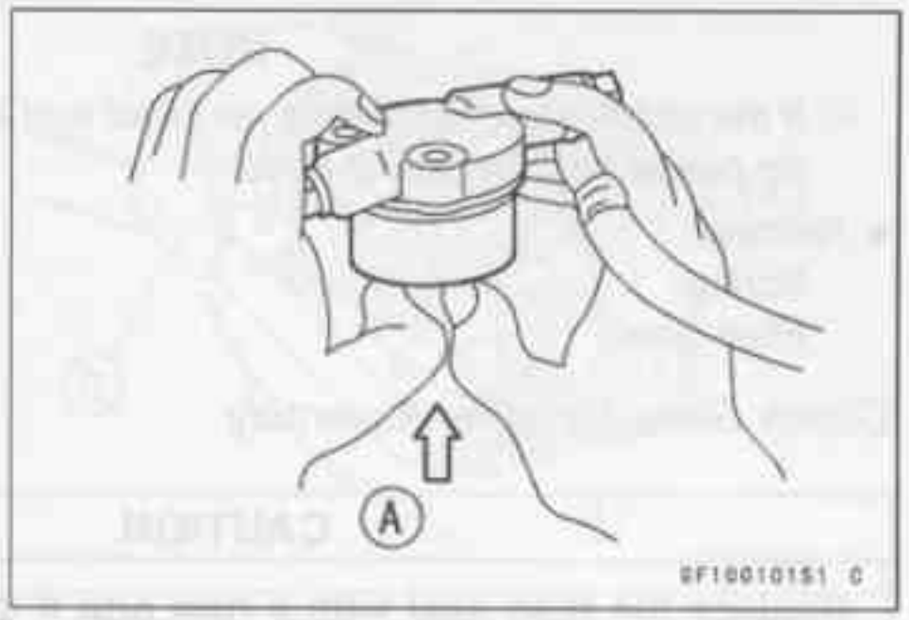
CAUTION

Immediately wash away any clutch fluid that spills. It may damage painted surfaces.

- Perform the following if the clutch slave cylinder is to be removed but not disassembled.

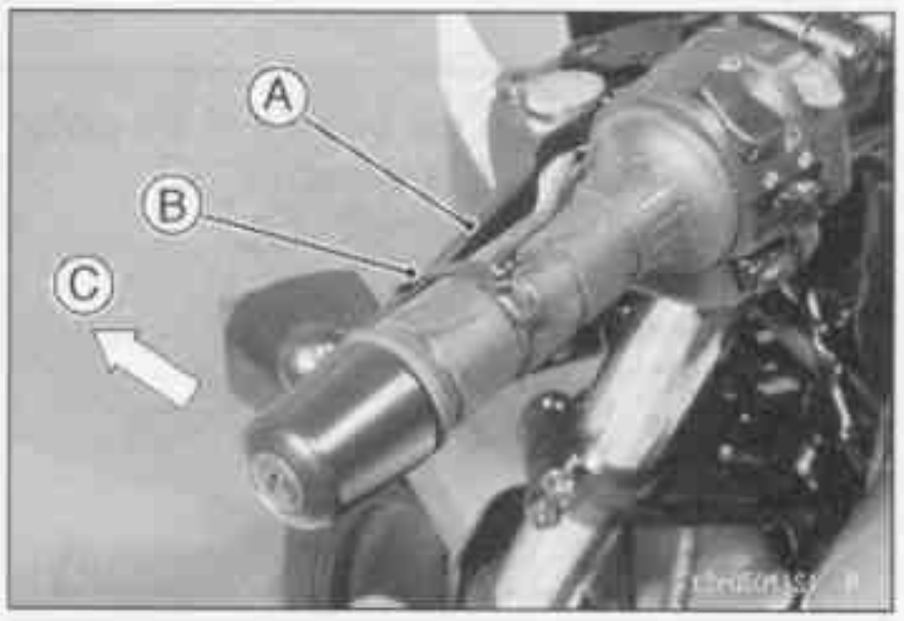
CAUTION

If the clutch slave cylinder is removed and left alone, the piston will be pushed out by spring force and the clutch fluid will drain out.



○ Remove the clutch slave cylinder from the engine with the pipe installed. Push [A] the piston into the cylinder as far as it will go.

○ Apply the clutch lever [A] slowly and hold it with a band [B].
Front [C]

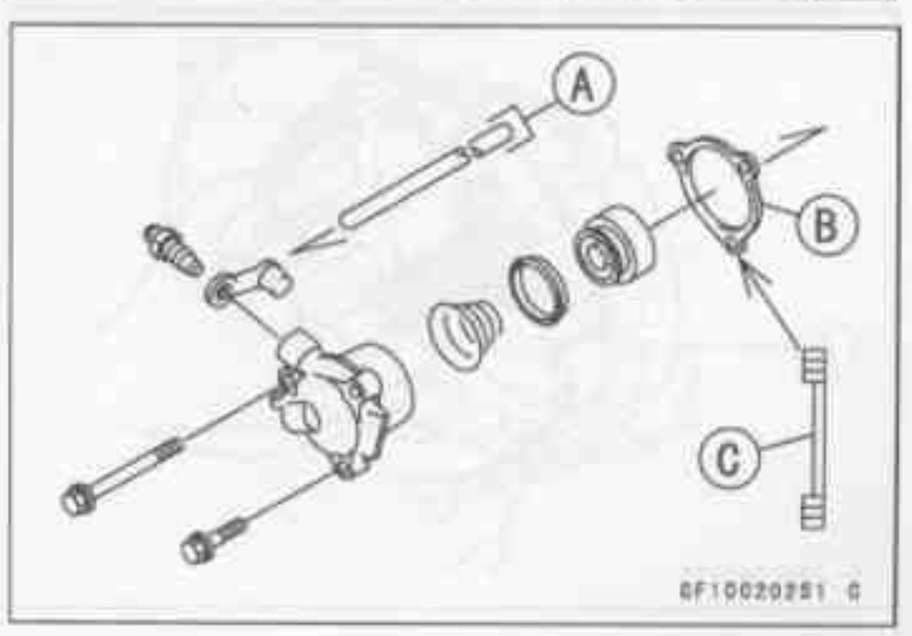


NOTE

○ *Holding the clutch lever keeps the piston from coming out.*

Clutch Slave Cylinder Installation

- Apply molybdenum disulfide grease to either end [A] of the push rod, and install the push rod so that the greased end faces in.
- Replace the spacer [B] of the clutch slave cylinder with a new one.
- Install the spacer so that the stepped side [C] faces outward.



Clutch Master Cylinder

Clutch Master Cylinder Assembly

- Before assembling, clean all parts including the master cylinder with clutch fluid or alcohol.

CAUTION

Use only disc brake fluid, isopropyl alcohol, or ethyl alcohol, for cleaning 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 cylinder.

- Apply clutch fluid to the parts removed and to the inner wall of the cylinder.
- Take care not to scratch the piston or the inner wall of the cylinder.
- Install the push rod with the dust seal fitted into the groove.
- The push rod round end must be faced inwards.

Torque - Clutch Lever Pivot Bolt: 1.0 N·m (0.10 kg·m, 9 in·lb)
Clutch Lever Pivot Bolt Locknut: 5.9 N·m (0.60 kg·m, 52 in·lb)

- Install the clutch master cylinder (see this chapter).

Clutch Master Cylinder Inspection

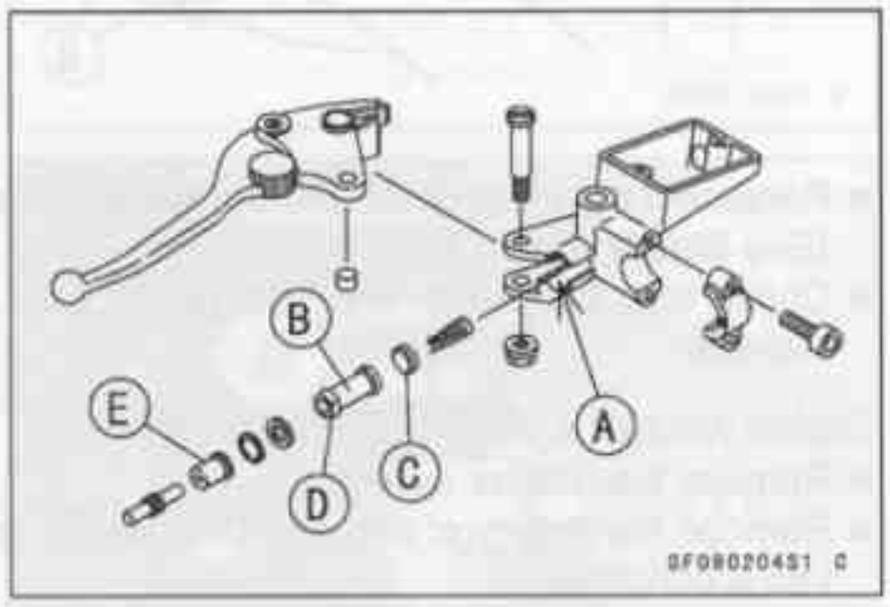
- Disassemble the clutch master cylinder.
- Check that there are no scratches, rust or pitting on the inside of the master cylinder [A] and on the outside of the piston [B].

★If the master cylinder or piston shows any damage, replace them.

- Inspect the primary cup [C] and secondary cup [D].

★If a cup is worn, damaged, softened (rotted), or swollen, the piston assembly should be replaced to renew the cup.

- If fluid leakage is noted at the clutch lever, the piston assembly should be replaced to renew the cup.
- Check the dust cover [E] for damage.
- If it is damaged, replace it.



- Check that the relief and supply ports are not plugged.

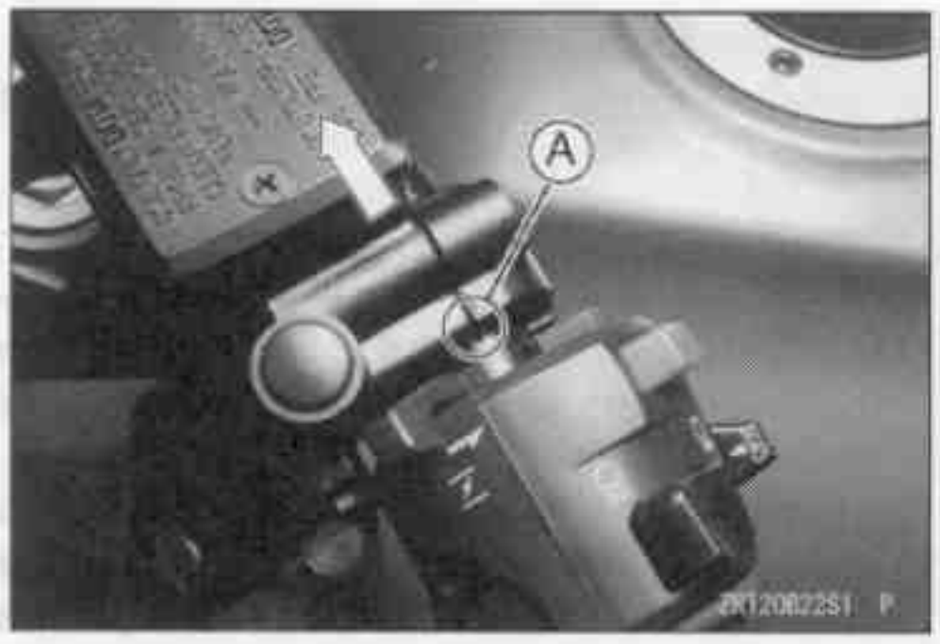
★If the small relief port becomes plugged, the clutch will drag. Blow the ports clean with compressed air.

- Check the piston return spring for any damage.

★If the spring is damaged, replace it.

Clutch Master Cylinder

★If the clutch hose touches the clamp bolt or the meter unit, first move the clutch master cylinder about 5 mm (0.2 in) inwards from the punch mark [A]. Move the clutch master cylinder along the extension through the punch mark and mating surface.
★If the problem is not solved, adjust the handlebar clamping angle slightly.

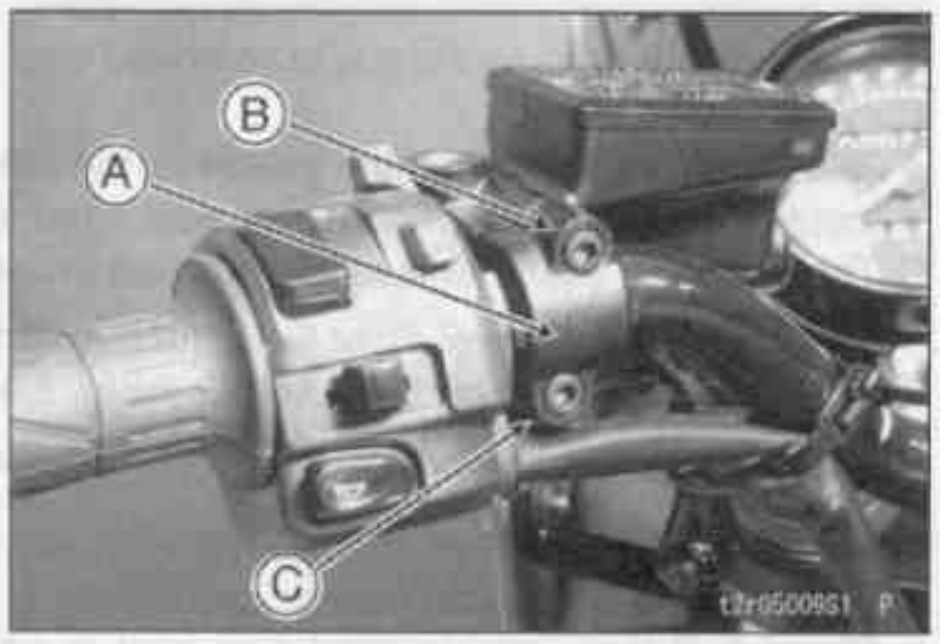


- Install the master cylinder clamp with the triangular mark [A] up.
- Tighten the upper clamp bolt [B] first, and then the lower clamp bolt [C]. There will be a gap at the lower part of the clamp after tightening.

Torque - Master Cylinder Clamp Bolts: 9.8 N·m (1.0 kg·m, 87 in·lb)

- Use a new flat washer on each side of the clutch hose fitting.

Torque - Clutch Hose Banjo Bolt: 25 N·m (2.5 kg·m, 18.0 ft·lb)



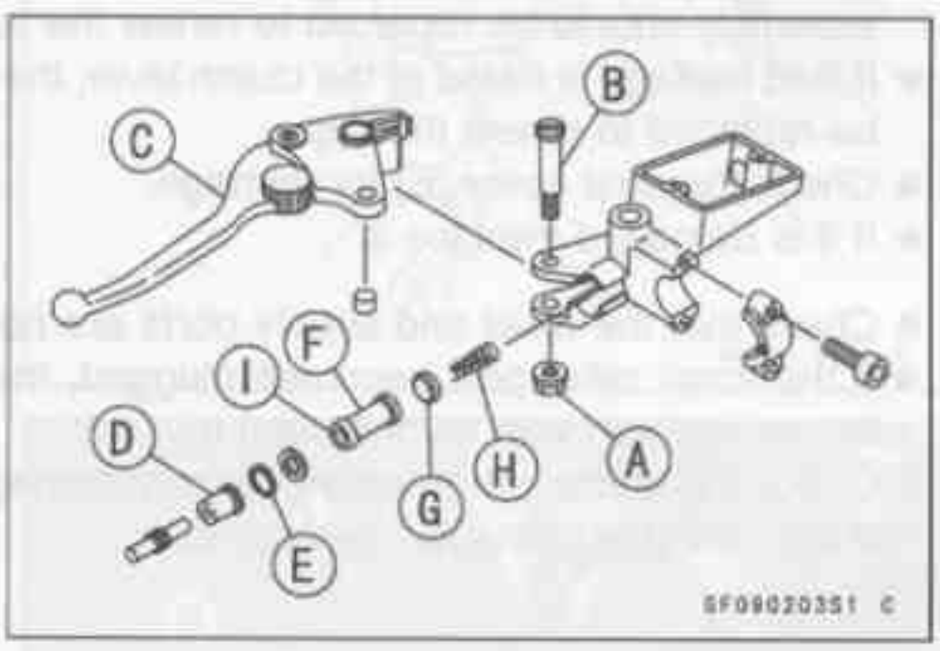
- Replenish the clutch fluid into the reservoir and bleed the clutch line (See Bleeding the Clutch Line).
- Check that the clutch line has proper fluid pressure and no fluid leakage.

Clutch Master Cylinder Disassembly

- Remove the master cylinder.
- Remove the reservoir cap and diaphragm, and pour the clutch fluid into a container.
- Unscrew the locknut [A] and pivot bolt [B], and remove the clutch lever [C].
- Pull the dust cover [D] out of place, and remove the circlip [E].

Special Tool - Inside Circlip Pliers: 57001–143

- Pull out the piston assembly [F], primary cup, and return spring [H].



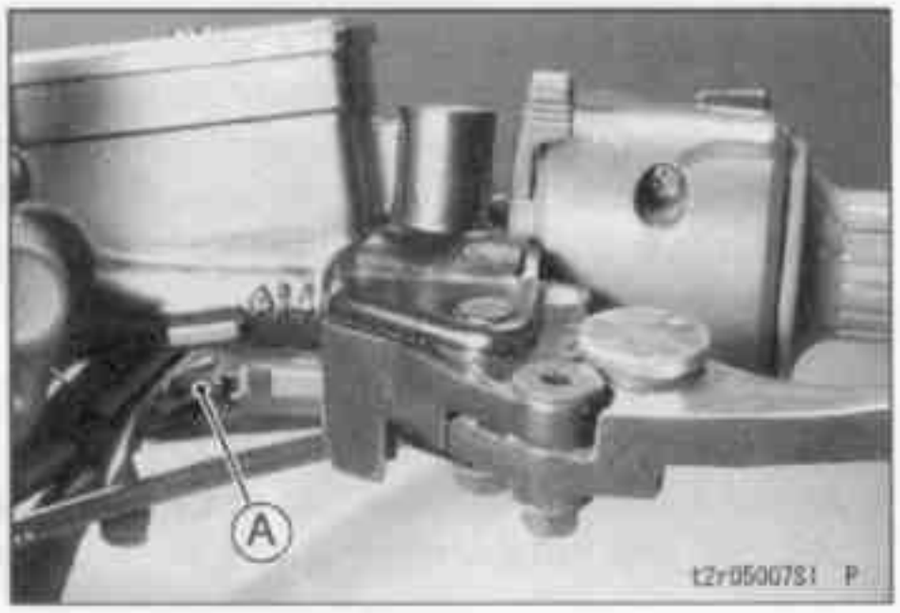
CAUTION

Do not remove the secondary cup [I] from the piston since removal will damage it.

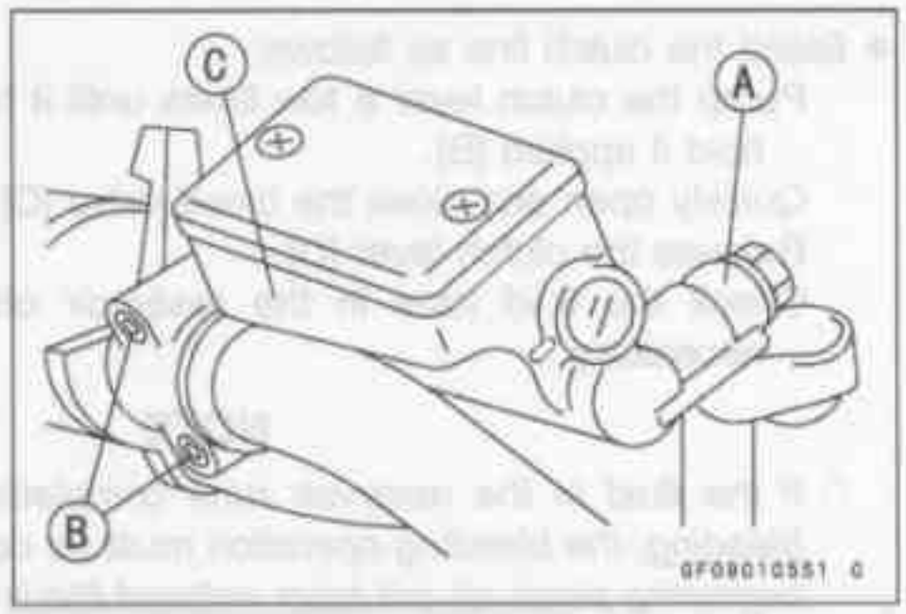
Clutch Master Cylinder

Clutch Master Cylinder Removal

- Disconnect the starter lockout switch connector [A] (front view).
- Drain the clutch fluid from the reservoir (see Clutch Fluid Change).



- Remove the banjo bolt [A] to disconnect the clutch hose from the master cylinder (rear view).
- Unscrew the clamp bolts [B], and take off the master cylinder [C] as an assembly with the clutch reservoir, clutch lever, and starter lockout switch installed.

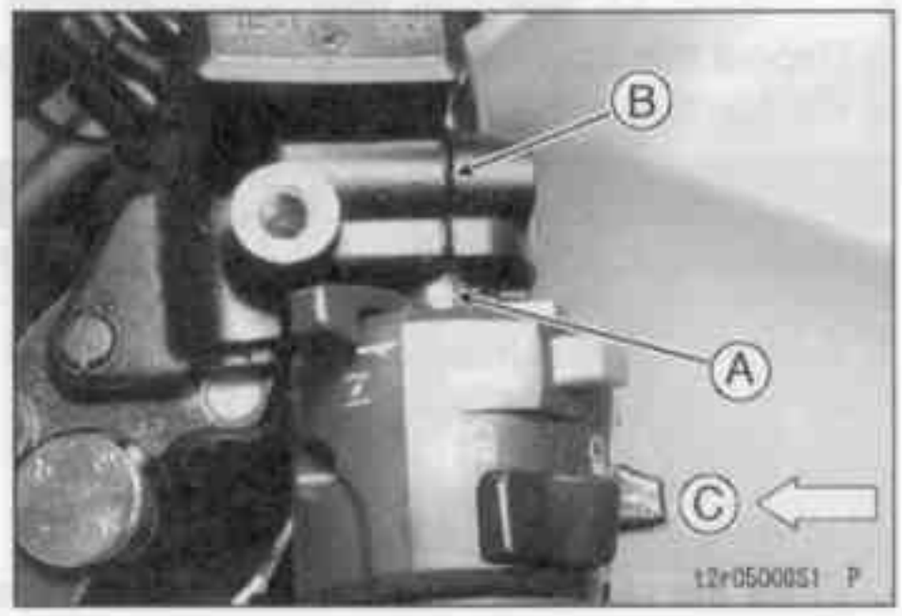


CAUTION

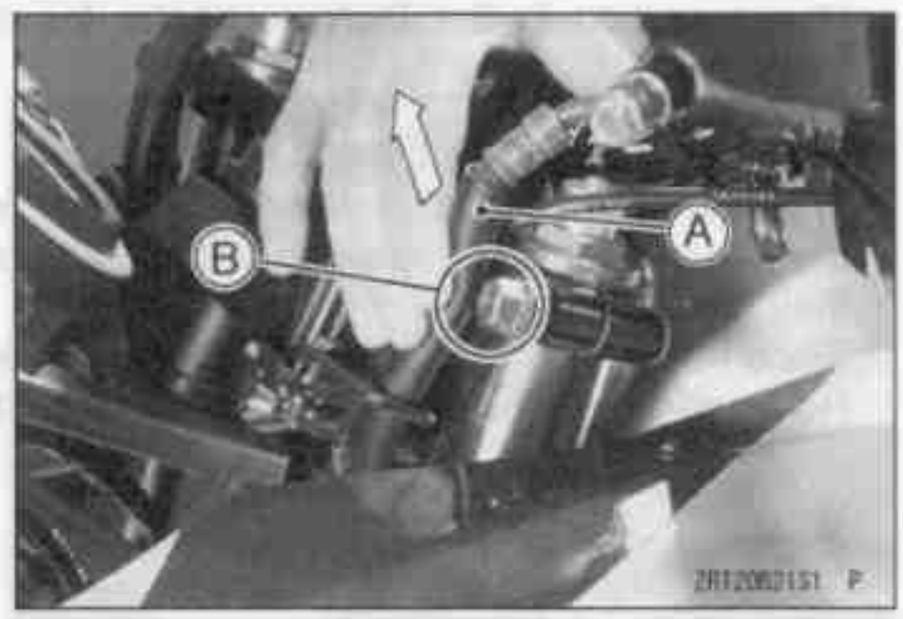
Clutch fluid quickly ruins painted surface; any spilled fluid should be completely washed away immediately.

Clutch Master Cylinder Installation

- Align the punch mark [A] on the handlebar with the mating surface [B] of the master cylinder clamp (left view).
  Front [C]



- Check that the clutch hose [A] doesn't touch the front fork upper clamp bolt [B].



- And for the ZR1200B, check that the clutch hose [A] doesn't touch the meter unit either when the steering is turned right.



Clutch Fluid

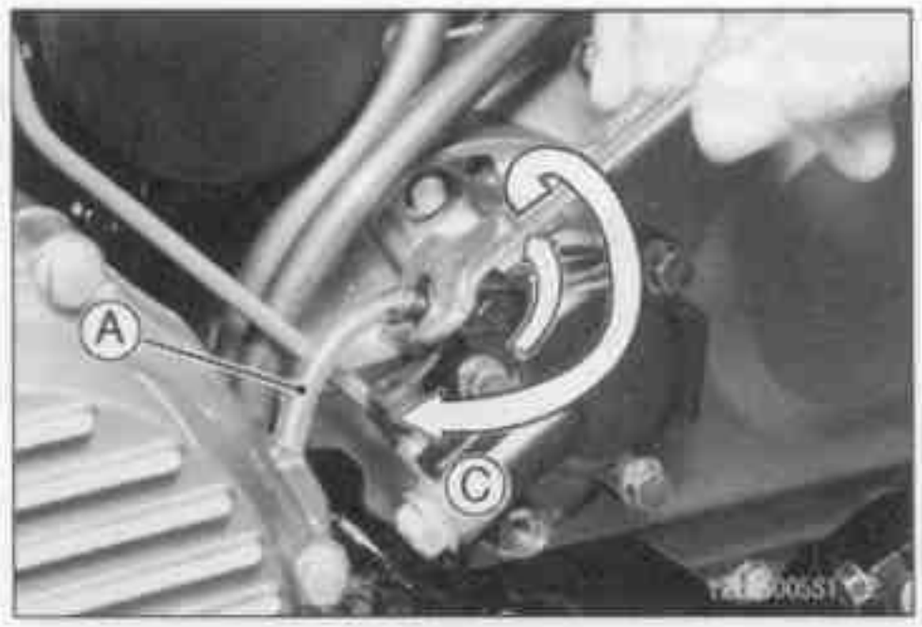
Bleeding the Clutch Line

- With the reservoir cap off, slowly pump the clutch lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir. This bleeds the air from the master cylinder end of the line.

NOTE

○ *Tap the clutch hose lightly going from the lower end to the upper end and bleed the air off at the reservoir.*

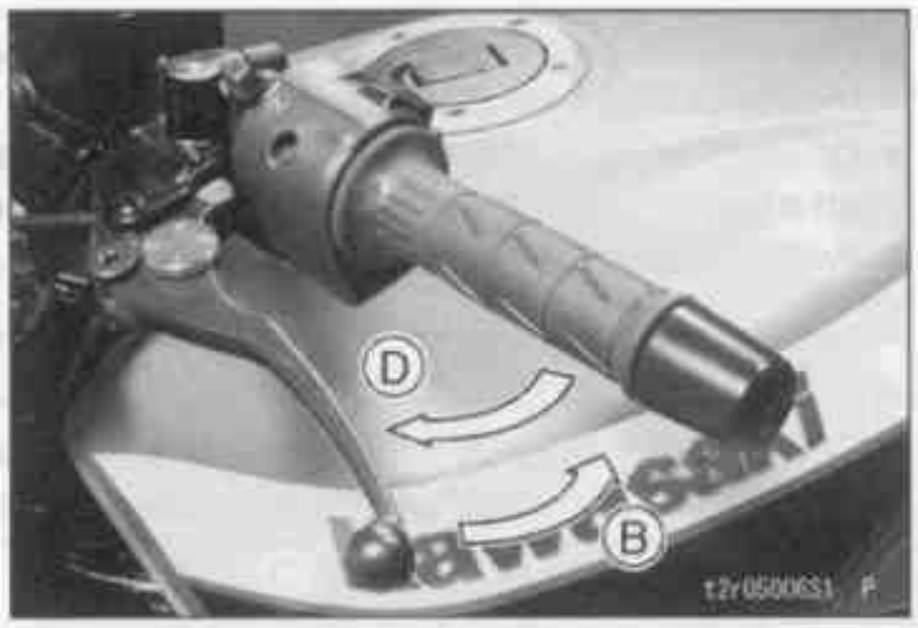
- Attach a clear plastic hose [A] to the bleed valve on the clutch slave cylinder, and run the other end of the hose into a container.



- Bleed the clutch line as follows:
  Pump the clutch lever a few times until it becomes hard and then hold it applied [B].
  Quickly open and close the bleed valve [C].
  Release the clutch lever [D].
  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.*



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

⚠WARNING

Do not mix different grades and brands of fluid.

Torque - Clutch Reservoir Cap Screws: 1.5 N·m (0.15 kg·m, 13 in·lb)
Clutch Slave Cylinder Bleed Valve: 7.8 N·m (0.80 kg·m, 69 in·lb)

Clutch Hose Removal/Installation

○ Since the clutch hose is the same as the brake fluid, refer to Brake Hoses section in the Brakes chapter for clutch hose removal or installation.

Clutch Hose or Pipe Inspection

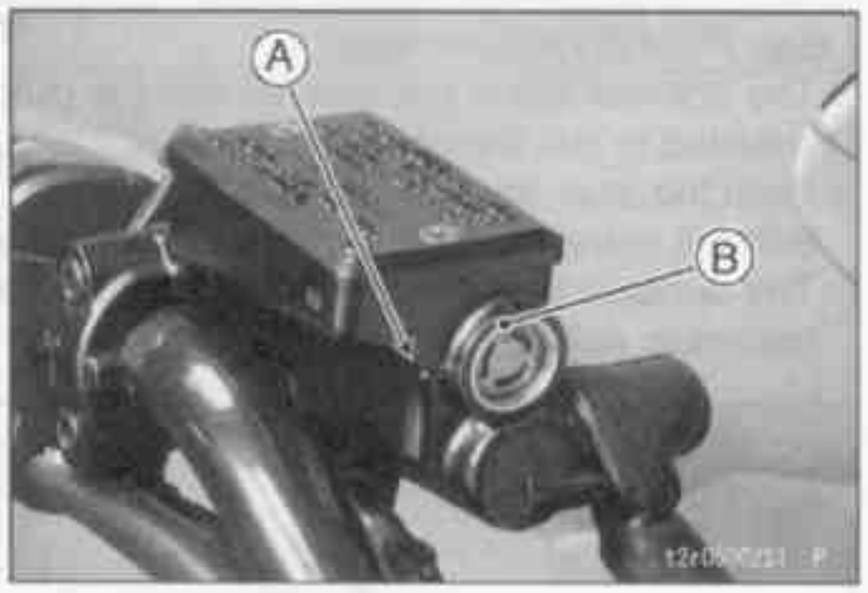
- Whenever the clutch hose or pipe is removed or in accodance with the Periodic Maintenance Chart, check the clutch hose or pipe and their connections.

○ Since the clutch hose is the same as the brake hose, refer to Brake Hoses section in the Brakes chapter for clutch hose or pipe inspection.

Clutch Fluid

Fluid Level Inspection

- Check that the brake fluid level in the clutch reservoir is between the lower [A] and the upper [B] level lines.



NOTE

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

★ If the fluid level is lower than the lower level line, fill the reservoir to the upper level line in the reservoir.

⚠ WARNING

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

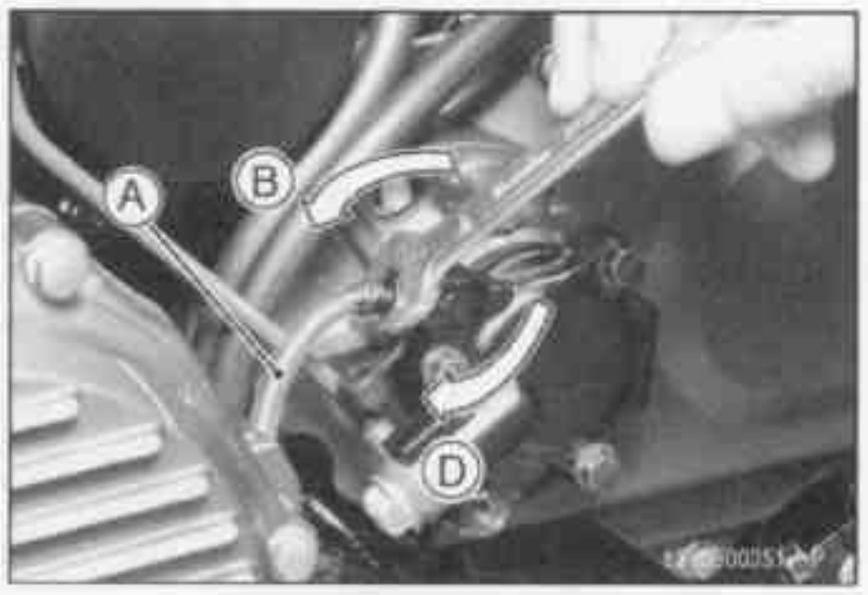
NOTE

○ *Since the clutch fluid is the same as the brake fluid, refer to Brake Fluid Section in Brakes chapter for further details.*

Torque - Clutch Reservoir Cap Screws: 1.5 N·m (0.15 kg·m, 13 in·lb)

Clutch Fluid Change

- Remove the clutch slave cylinder cover (see Clutch Slave Cylinder Removal).
- Level the clutch fluid reservoir and remove the reservoir cap.
- Remove the rubber cap from the bleed valve on the clutch slave cylinder.
- Attach a clear plastic hose [A] to the bleed valve and run the other end of the hose into a container.
- Fill the reservoir with fresh fluid.
- Change the clutch fluid as follows:
  Open the bleed valve [B], using a wrench.
  Pump the clutch lever and hold it [C].
  Close the bleed valve [D].
  Release the clutch lever [E].





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

⚠ WARNING

Do not mix different grades and brands of fluid.

- After changing the fluid, check the clutch for good clutch power and no fluid leakage.

★ If necessary, bleed the air from the lines (see Bleeding the Clutch Line).

- Remove the clear plastic hose.
- Install the reservoir cap.
- Tighten the bleed valve, and install the rubber cap.

Torque - Clutch Reservoir Cap Screws: 1.5 N·m (0.15 kg·m, 13 in·lb)
Clutch Slave Cylinder Bleed Valve: 7.8 N·m (0.80 kg·m, 69 in·lb)

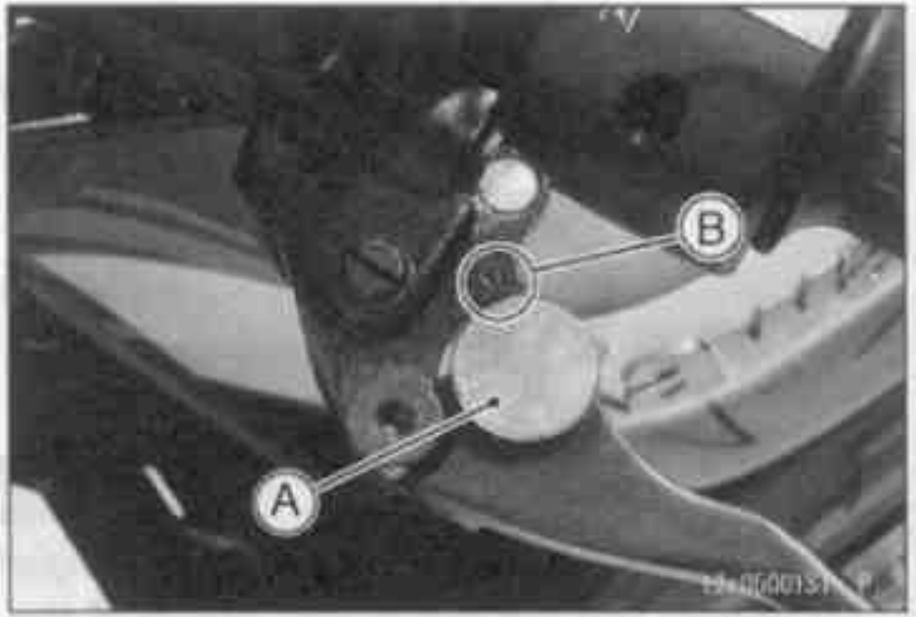
Clutch Lever Adjuster

Lever Position Adjustment

○ The adjuster has 4 positions so that the clutch lever position can be adjusted to suit the operator's hand.

• Push the lever forward and turn the adjuster [A] to align the number with the triangular mark [B] on the lever holder (front view).

○ The distance from the grip to the lever is minimum at Number 4 and maximum at Number 1.



5-4 CLUTCH

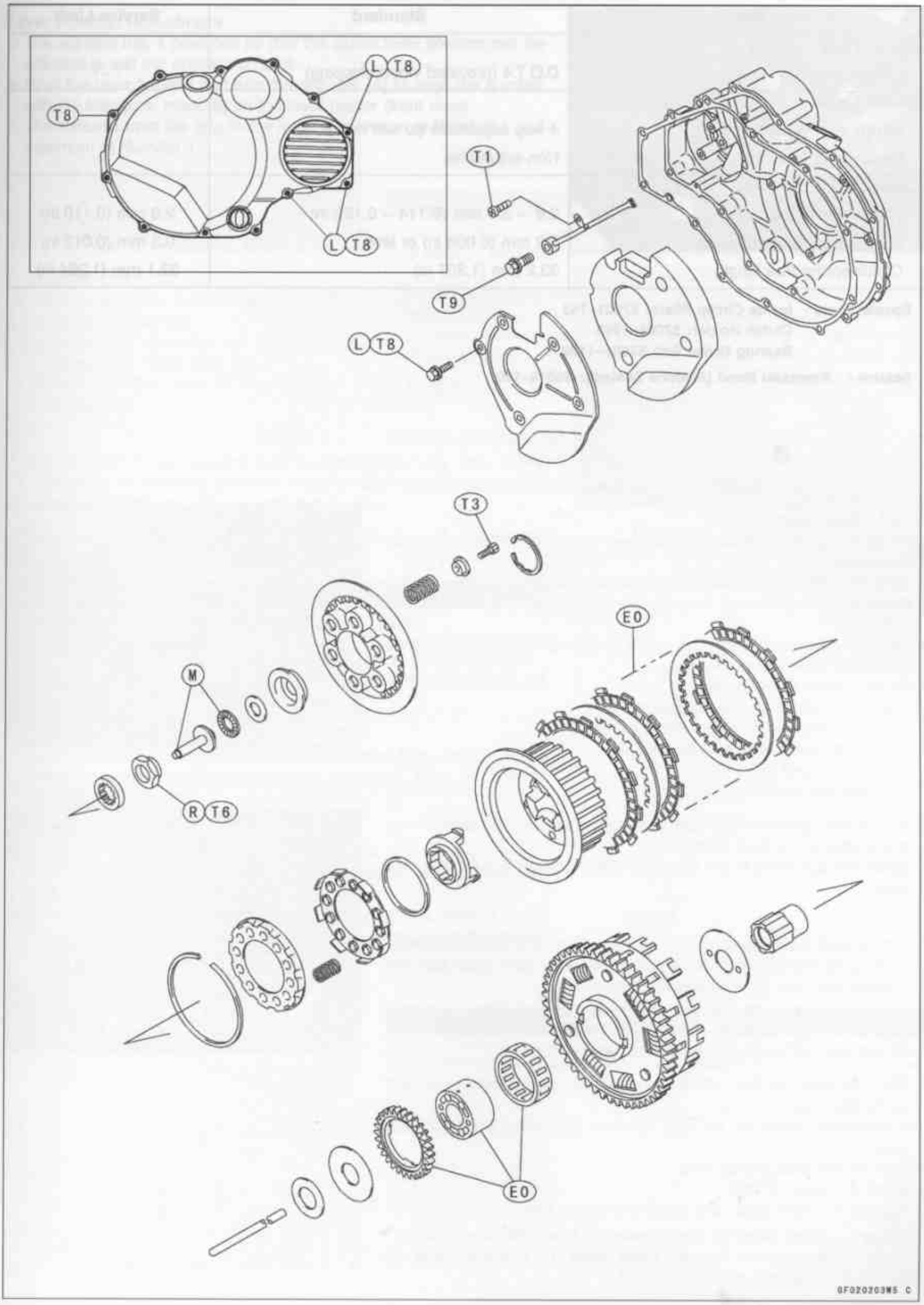
Specifications

Item	Standard	Service Limit
Clutch Fluid:		
Grade	D.O.T.4 (provided when shipping)	- - -
Clutch Lever:		
Clutch lever position	4-way adjustable (to suit rider)	- - -
Clutch lever free play	Non-adjustable	- - -
Clutch:		
Friction plate thickness	2.9 ~ 3.1 mm (0.114 ~ 0.122 in)	2.8 mm (0.110 in)
Friction or steel plate warp	0.2 mm (0.008 in) or less	0.3 mm (0.012 in)
Clutch spring free length	33.2 mm (1.307 in)	32.1 mm (1.264 in)

Special Tools - Inside Circlip Pliers: 57001–143
Clutch Holder: 57001–1243
Bearing Driver Set: 57001–1129

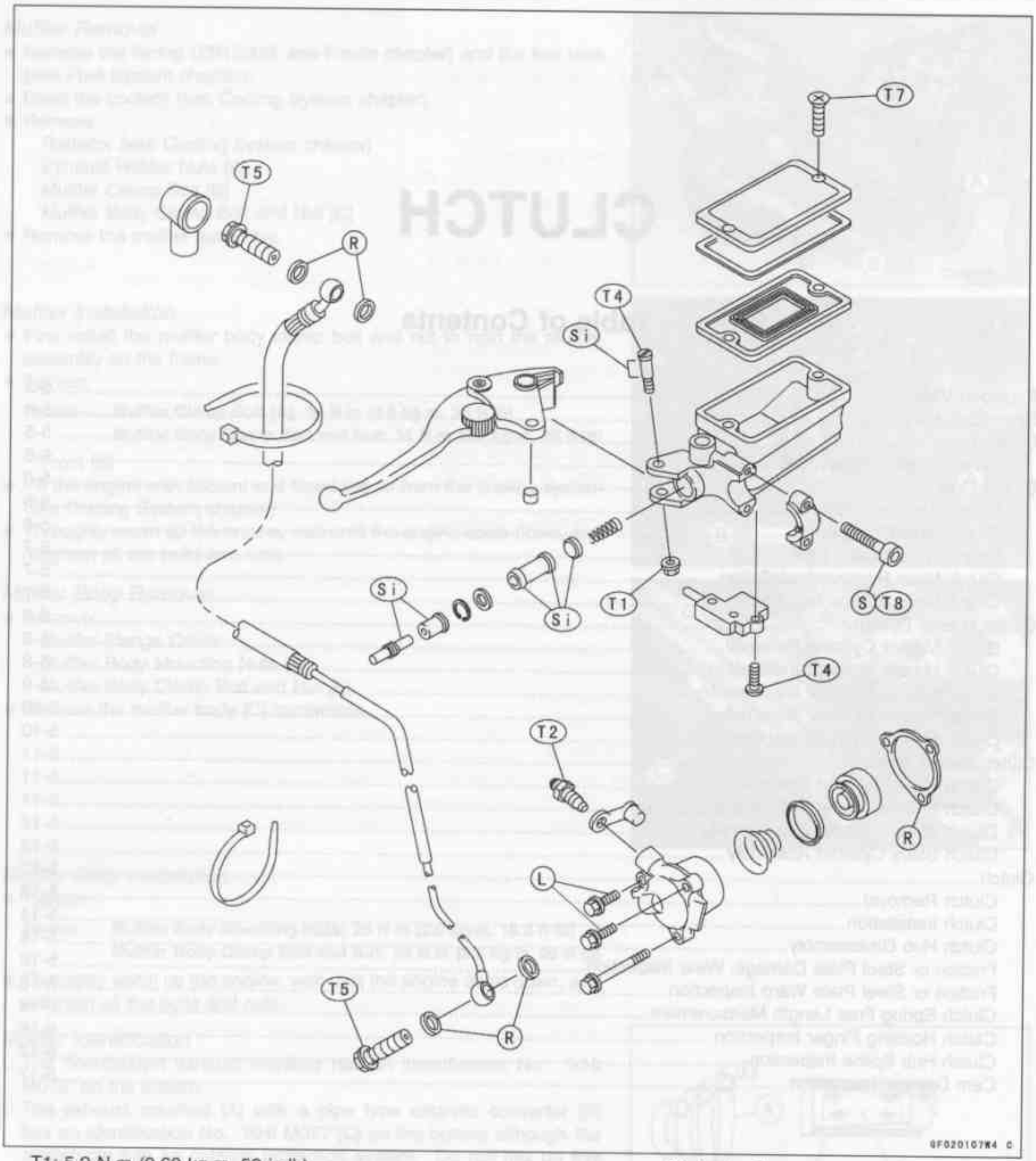
Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

Exploded View



5-2 CLUTCH

Exploded View



T1: 5.9 N·m (0.60 kg·m, 52 in·lb)
T2: 7.8 N·m (0.80 kg·m, 69 in·lb)
T3: 11 N·m (1.1 kg·m, 95 in·lb)
T4: 1.0 N·m (0.10 kg·m, 9 in·lb)
T5: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T6: 135 N·m (13.8 kg·m, 100 ft·lb)
T7: 1.5 N·m (0.15 kg·m, 13 in·lb)
T8: 9.8 N·m (1.0 kg·m, 87 in·lb)
T9: 12 N·m (1.2 kg·m, 106 in·lb)

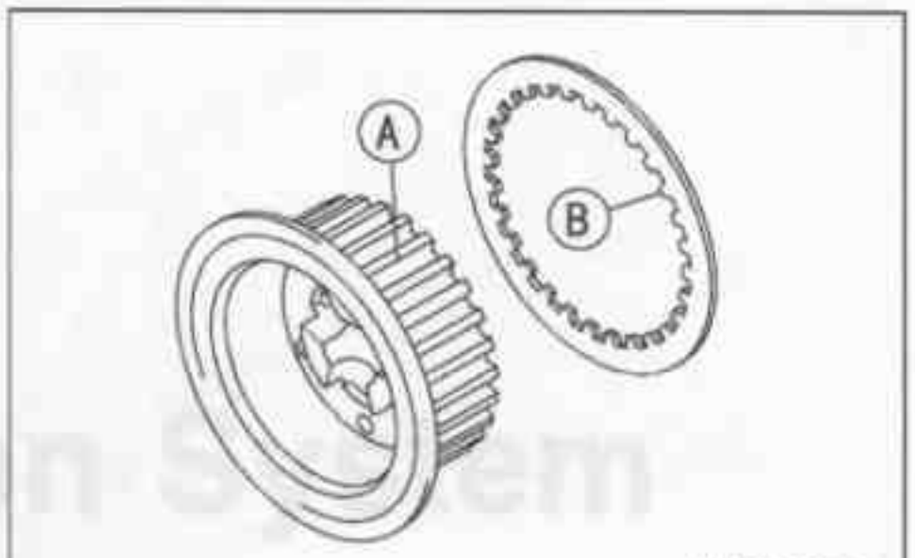
Si: Apply silicone grease.
EO: Apply engine oil.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
R: Replacement Parts
S: Follow the specified tightening sequence.

Clutch

Clutch Hub Spline Inspection

- Visually inspect where the teeth [B] on the steel plates wear against the clutch hub splines [A].

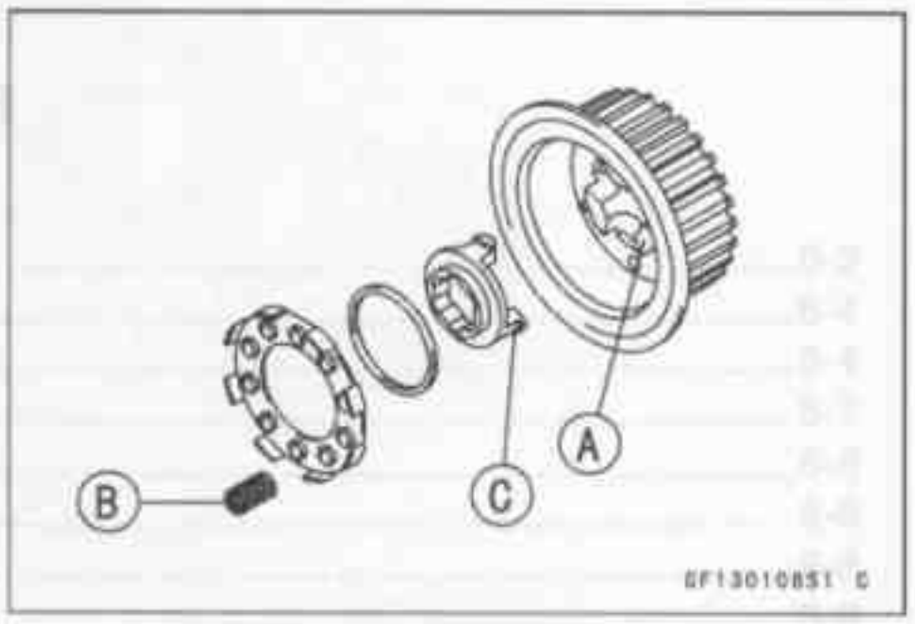
★ If there are notches worn into the splines, replace the clutch hub. Also, replace the steel plates if their teeth are damaged.



Cam Damper Inspection

- Disassemble the clutch hub. (see this chapter).
- Visually inspect the damper cams [A], damper springs [B], and cam follower [C].

★ Replace any part that appears damaged.



Engine Lubrication System

Table of Contents

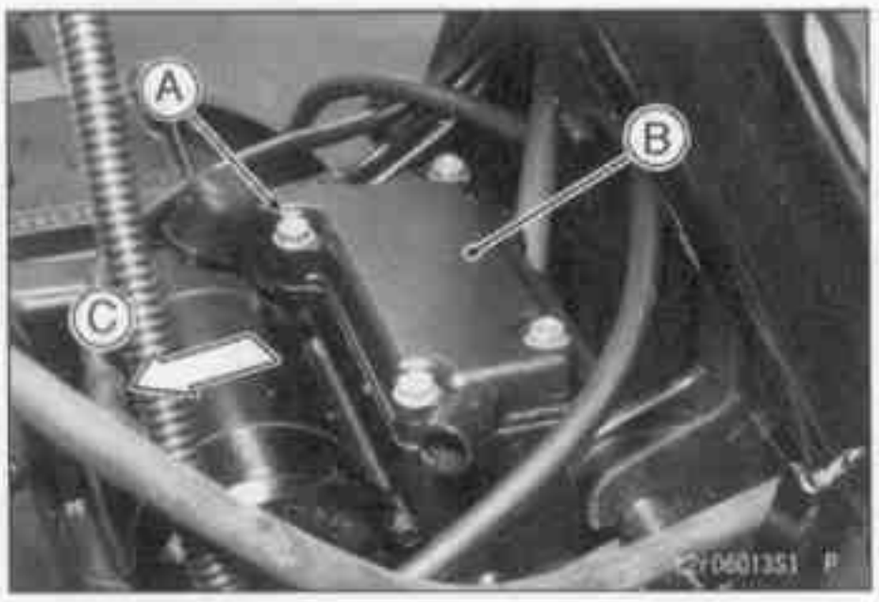
Exploded View 6-2
Engine Oil Flow Chart 6-4
  Rear View 6-4
Specifications 6-7
Engine Oil and Oil Filter 6-8
    Oil Level Inspection 6-8
    Engine Oil Change 6-8
    Oil Filter Change 6-9
Oil Pan 6-10
    Oil Pan Removal 6-10
    Oil Pan Installation 6-10
Oil Pump 6-12
    Oil Pump Removal 6-12
    Oil Pump Installation 6-12
    Oil Pump Disassembly 6-13
    Oil Pump Assembly 6-13
    Oil Pump Inspection 6-13
    Oil Pump Drive Gear Removal 6-13
    Oil Pump Drive Gear Installation 6-14
    Relief Valve Inspection 6-14
Oil Pressure 6-15
    Oil Pressure Measurement 6-15
    Oil Pressure Switch Removal 6-15
    Oil Pressure Switch Installation 6-15
Oil Hose and Pipes 6-16
    Breather Removal/Installation 6-16
    Blowby Gas System Inspection 6-16

Oil Hose and Pipes

Breather Removal/Installation

- Remove the front air cleaner (see Fuel System Chapter).
- Unscrew the bolts [A] and take off the crankcase breather cover [B] along with the oil separator.

Front [C]

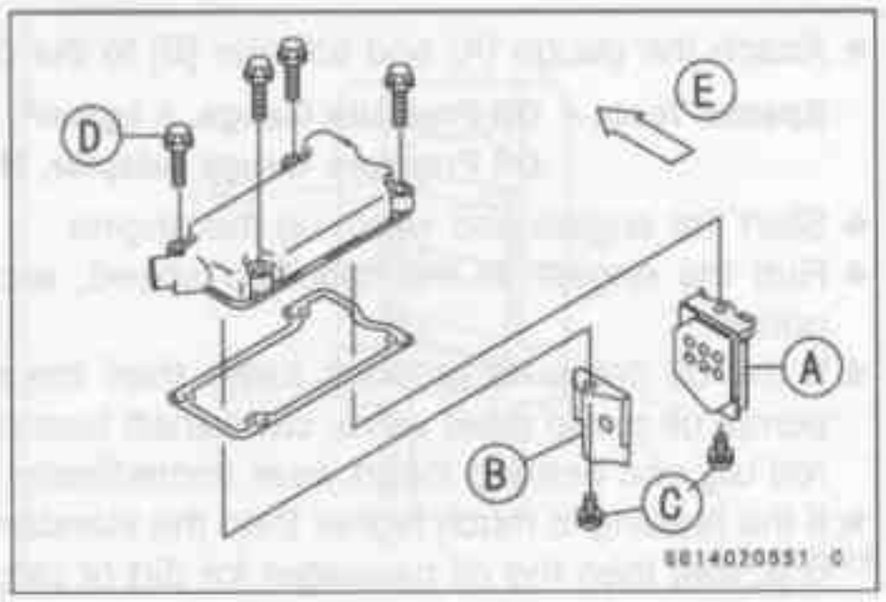


- Install:

Oil Separator [A]
Breather Plate [B]

Torque - Oil Separator Screws [C]: 5.1 N·m (0.52 kg·m, 45 in·lb)
Crankcase Breather Cover Bolts [D]: 10 N·m (1.0 kg·m, 89 in·lb)

Front [E]



Blowby Gas System Inspection

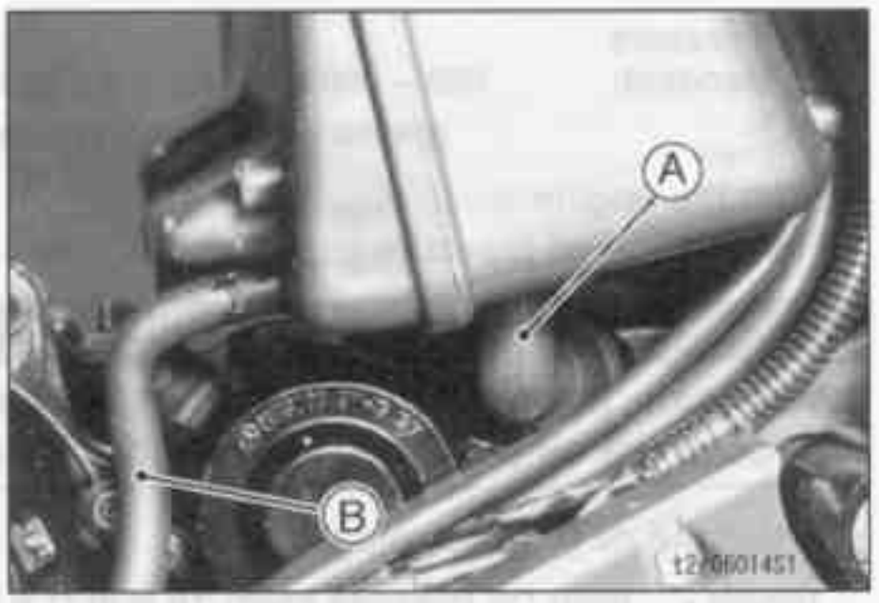
- Be certain that the breather hose [A] and air cleaner drain hose [B] are routed without being flattened or kinked, and are connected correctly to the crankcase breather cover and front air cleaner housing.

★If they are not, correct them.

- Inspect these hoses for damage or signs of deterioration. Squeeze the hoses. These hoses should not be hard and brittle, nor should be soft or swollen.

★Replace any damaged hoses.

- Check that the hoses are securely connected.

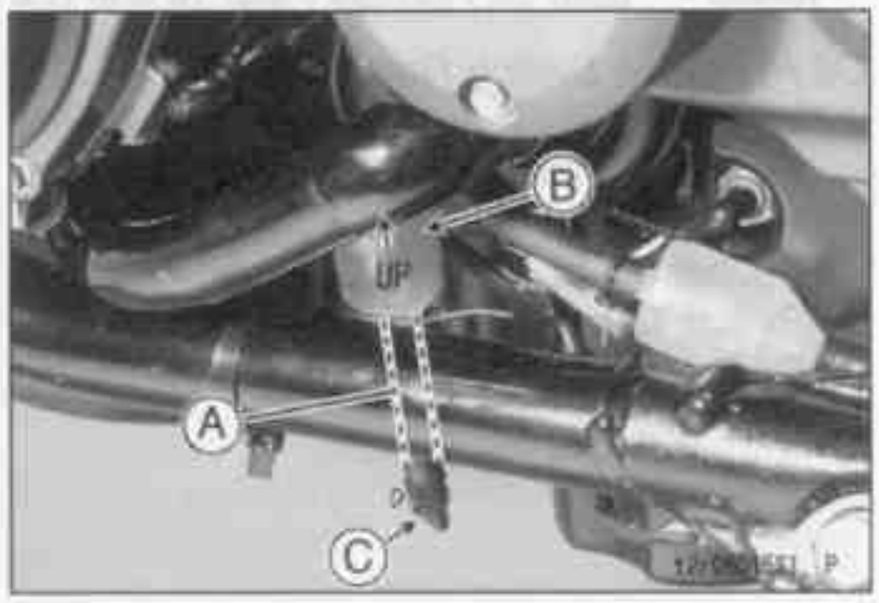


○ A catch tank [A] is provided beneath the air cleaner drain hose from the front air cleaner housing. The tank should be installed with the arrow mark [B] pointing upward.

○ The catch tank catches the water or breather oil from the bottom of the air cleaner housing. Usually water or oil does not collect at the bottom of the housing. Usually water or oil does not collect at the bottom of the housing. In the event that rain water is drawn in through the air cleaner or if engine oil is blown back, drain the housing.

- Visually check the catch tank, especially when changing engine oil, whether the water or oil accumulates in the tank.

★If any water or oil accumulates in the tank, drain it by taking off the drain plug [C] at the lower end of the drain hose.



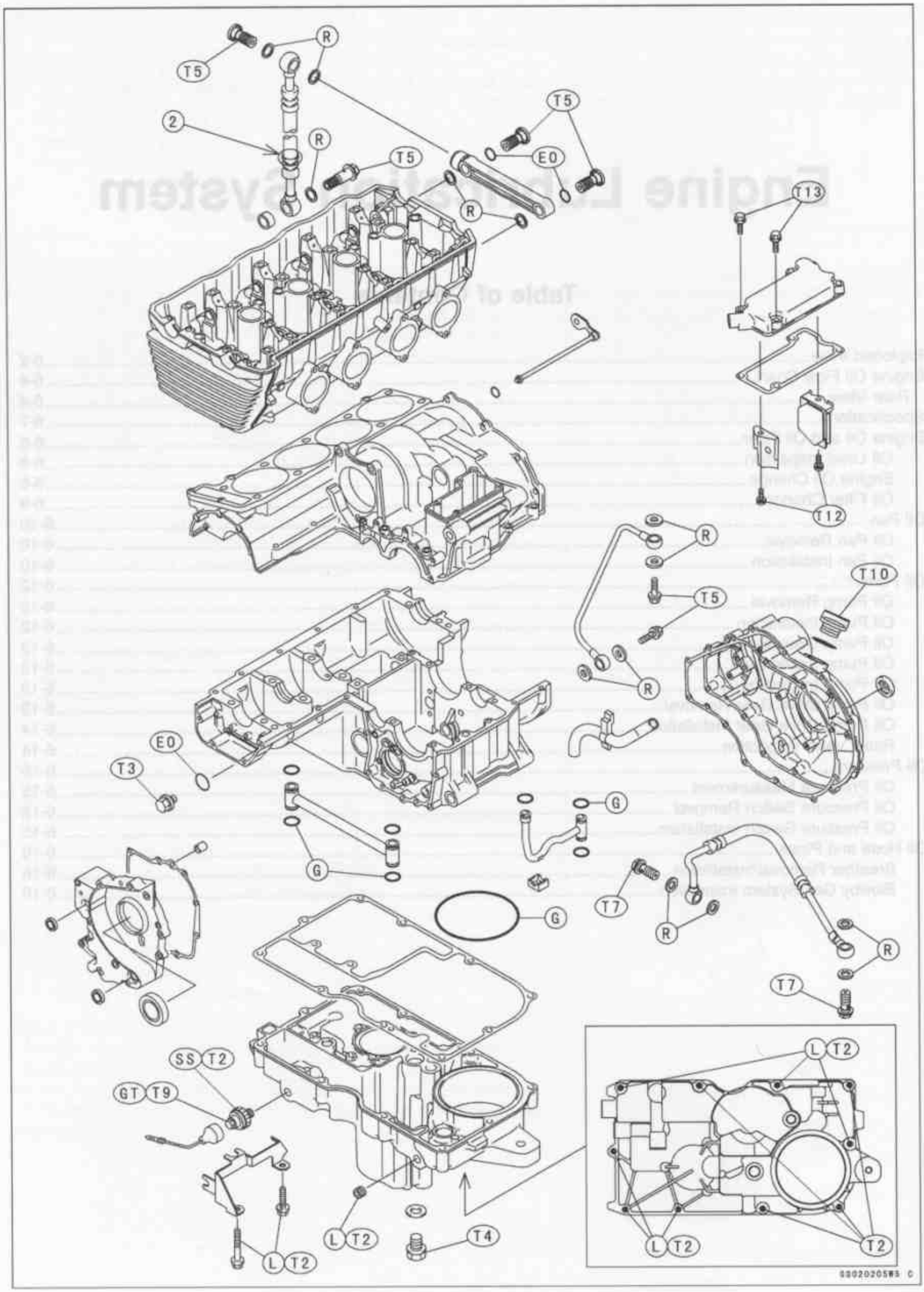
- Be sure to install the plug firmly or the air will be drawn in through it.

⚠WARNING

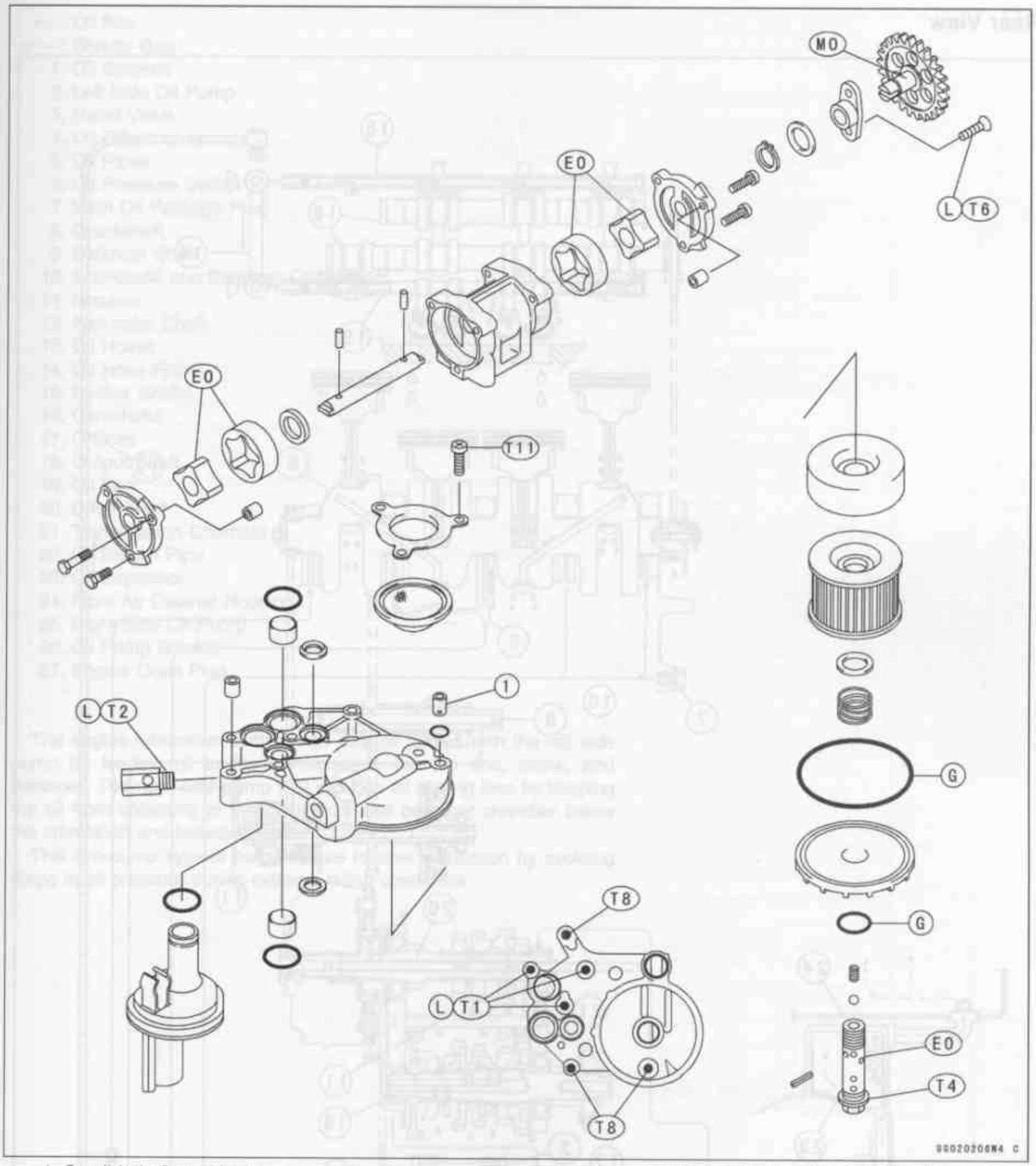
Be sure to install the plug in the drain hose after draining. Oil could drain from the open hose and get on the tires which could cause an accident and injury.

6-2 ENGINE LUBRICATION SYSTEM

Exploded View



Exploded View



1. Small hole faces down.
2. White Mark (Face the mark forward).

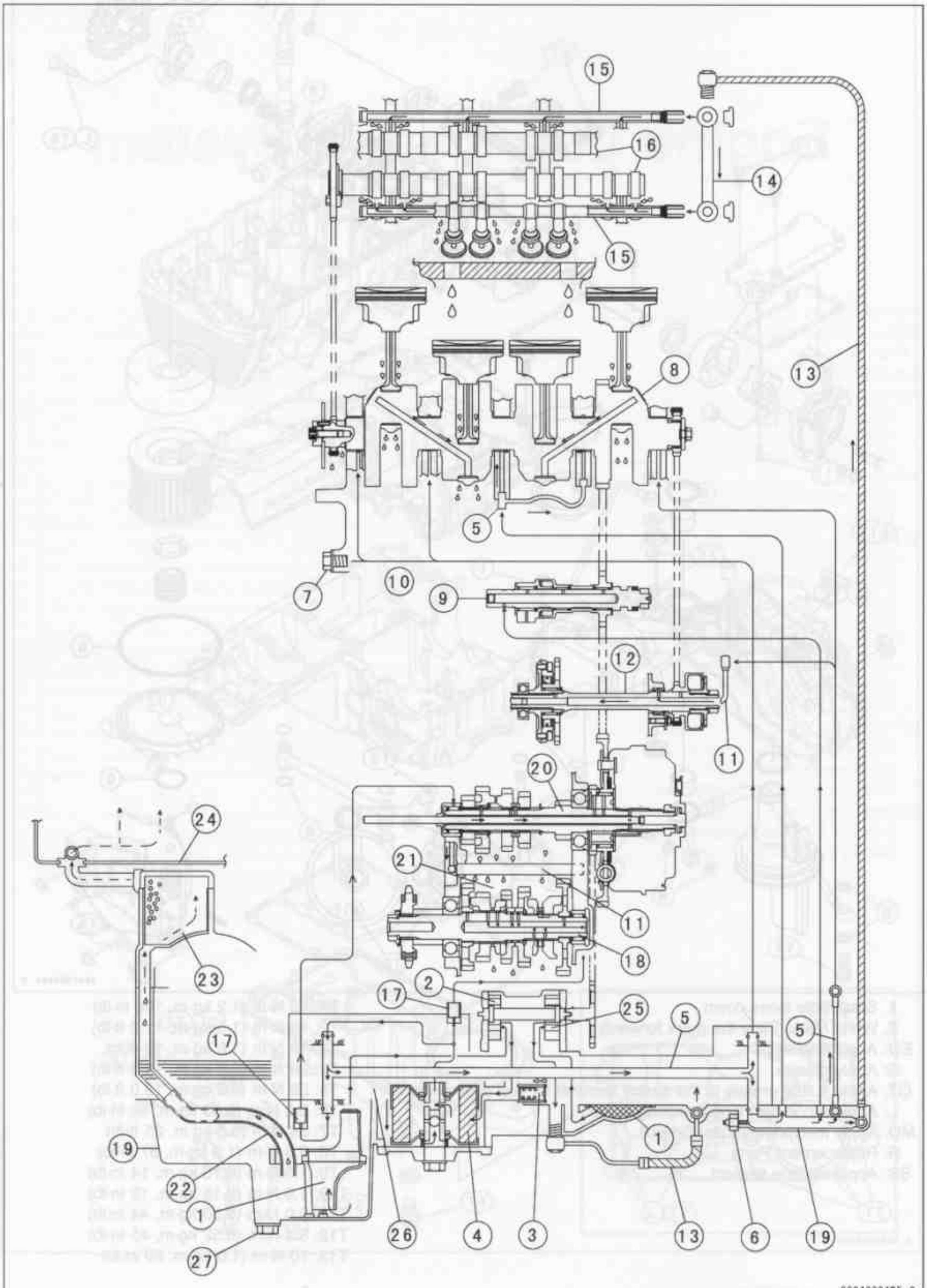
EO: Apply engine oil.
G: Apply grease.
GT: Apply a little grease to the switch terminal for rust prevention.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil.
R: Replacement Parts
SS: Apply silicone sealant.

T1: 12 N·m (1.2 kg·m, 106 in·lb)
T2: 15 N·m (1.5 kg·m, 11.0 ft·lb)
T3: 18 N·m (1.8 kg·m, 13 ft·lb)
T4: 20 N·m (2.0 kg·m, 14.5 ft·lb)
T5: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T6: 5.2 N·m (0.53 kg·m, 46 in·lb)
T7: 34 N·m (3.5 kg·m, 25 ft·lb)
T8: 9.8 N·m (1.0 kg·m, 87 in·lb)
T9: 1.6 N·m (0.16 kg·m, 14 in·lb)
T10: 1.5 N·m (0.15 kg·m, 13 in·lb)
T11: 5.0 N·m (0.50 kg·m, 44 in·lb)
T12: 5.1 N·m (0.52 kg·m, 45 in·lb)
T13: 10 N·m (1.0 kg·m, 89 in·lb)

6-4 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart

Rear View



0804020485 C

Engine Oil Flow Chart

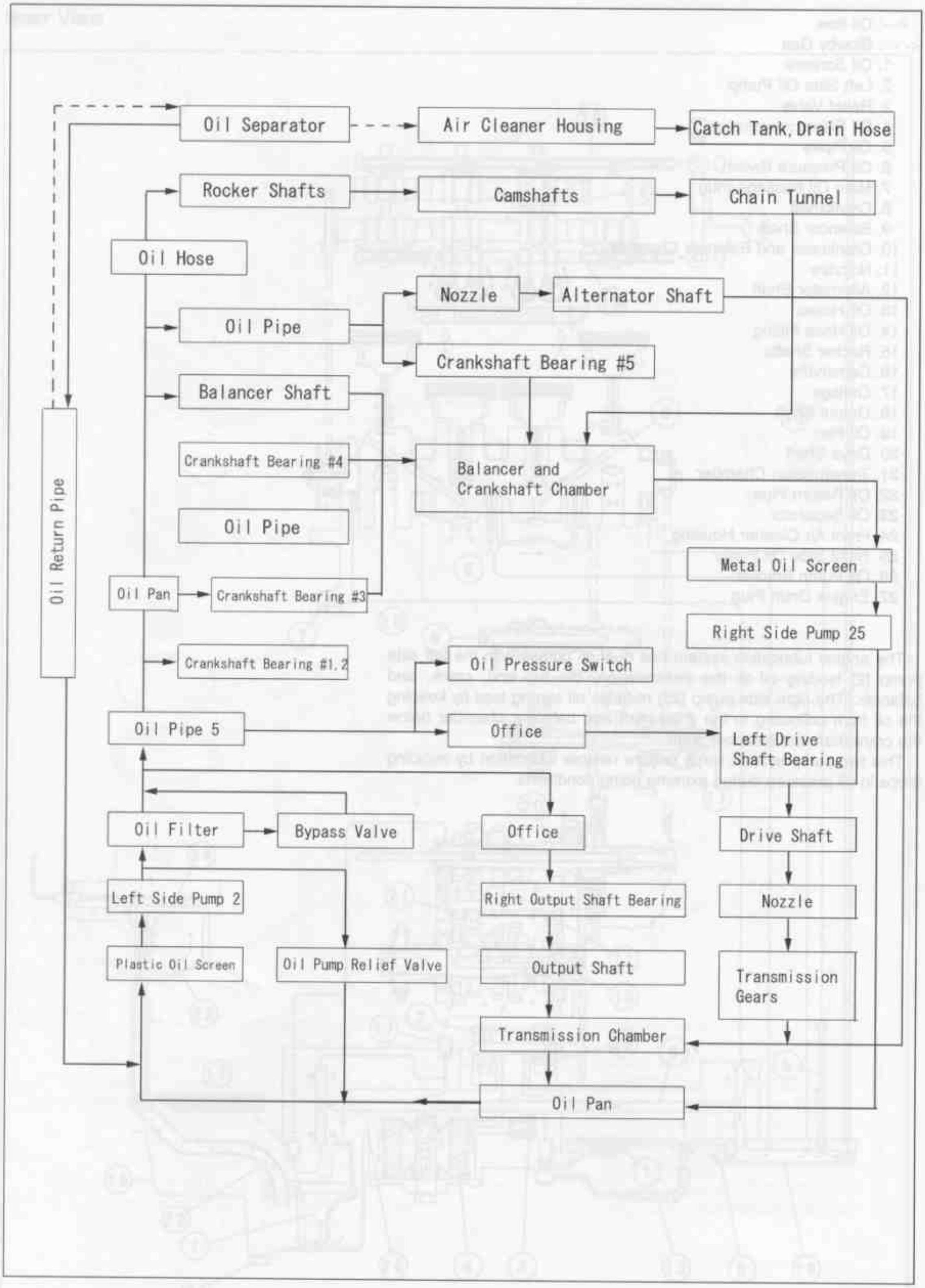
<—: Oil flow
<- - -: Blowby Gas
1. Oil Screens
2. Left Side Oil Pump
3. Relief Valve
4. Oil Filter
5. Oil Pipes
6. Oil Pressure Switch
7. Main Oil Passage Plug
8. Crankshaft
9. Balancer Shaft
10. Crankcase and Balancer Chamber
11. Nozzles
12. Alternator Shaft
13. Oil Hoses
14. Oil Hose Fitting
15. Rocker Shafts
16. Camshafts
17. Orifices
18. Output Shaft
19. Oil Pan
20. Drive Shaft
21. Transmission Chamber
22. Oil Return Pipe
23. Oil Separator
24. Front Air Cleaner Housing
25. Right Side Oil Pump
26. Oil Pump Bracket
27. Engine Drain Plug

The engine lubrication system has dual oil pumps with the left side pump [2] feeding oil to the transmission, the top end, crank, and balancer. The right side pump [25] reduces oil stirring loss by keeping the oil from collecting in the crankshaft and balancer chamber below the crankshaft and balancer shaft.

This two-pump system helps ensure reliable lubrication by avoiding drops in oil pressure during extreme riding conditions.

6-6 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart



Specifications

Item	Standard
Engine Oil:	
Type	API Service Classification: SH (JASO MA), SJ (JASO MA), SE, SF, or SG class
Viscosity	SAE 10W-40, 10W-50, 20W-40 or 20W-50
Capacity	2.7 L (when filter is not removed) 3.0 L (when filter is removed) 3.5 L (when engine is completely dry)
Level (after idling or running)	Between upper and lower level lines
Oil Pressure Measurement:	
Oil pressure @ engine speed 4000 r/min (rpm), oil temp. 90°C (194°F)	200 ~ 290 kPa (2.0 ~ 3.0 kg/cm^2, 28 ~ 43 psi)

Special Tools - Outside Circlip Pliers: 57001–144
Oil Pressure Gauge, 5 kg/cm^2: 57001–125
Oil Pressure Gauge Adapter, M18 × 1.5: 57001–1278

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

6-8 ENGINE LUBRICATION SYSTEM

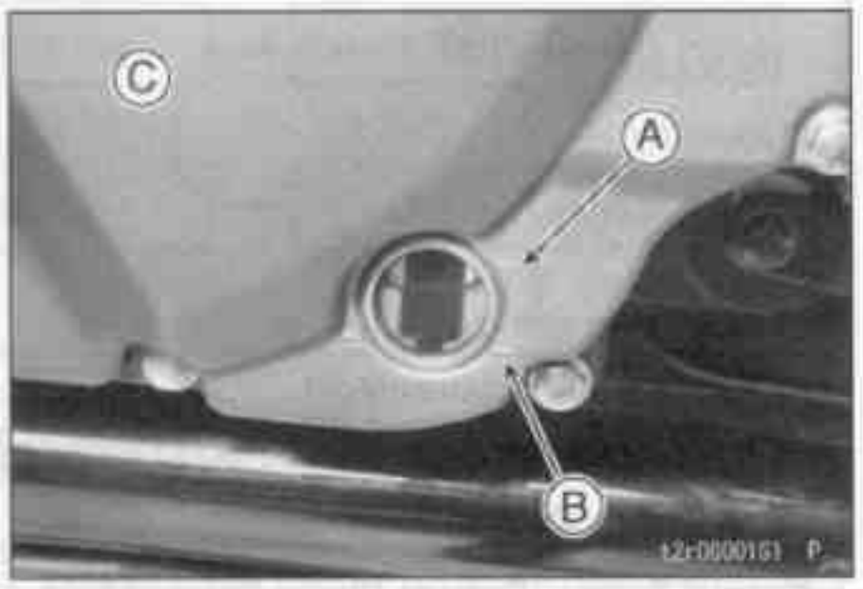
Engine Oil and Oil Filter

⚠ WARNING

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

Oil Level Inspection

- Situate the motorcycle so that it is vertical.
- Check that the engine oil level is between the upper [A] and lower [B] levels in the gauge of the clutch cover [C].



NOTE

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

CAUTION

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

★ 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 the correct amount of oil through the oil filler opening. Use the same type and make of oil that is already in the engine.

NOTE

- *If the engine oil type and make are unknown, use any brand of the specified oil to top off the level in preference to running the engine with the oil level low. Then at your earliest convenience, change the oil completely.*

Engine Oil Change

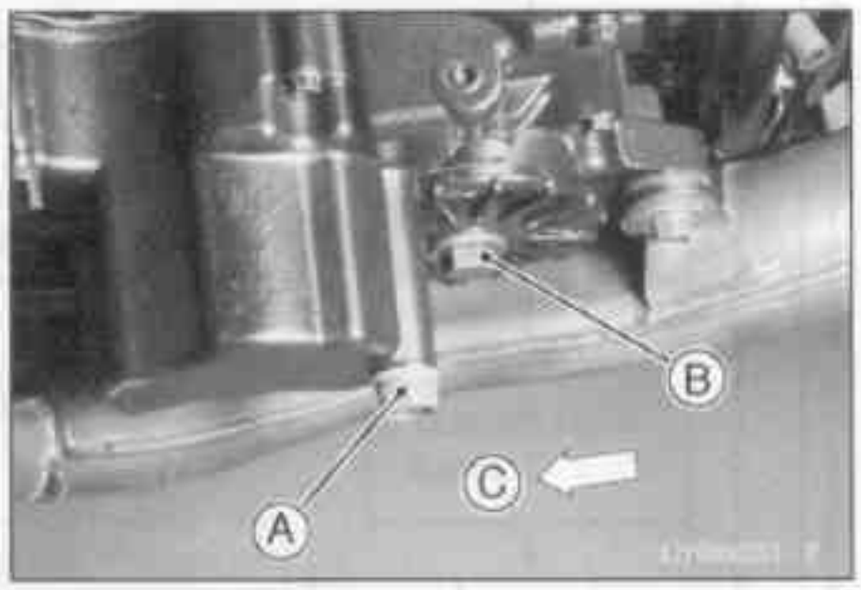
- Situate the motorcycle so that it is vertical after warming up the engine.
- Remove the engine drain plug [A] and drain the oil.
- The oil in the oil filter can be drained by removing the oil filter bolt [B] and oil filter (see Oil Filter Change).

Front [C]

★ Replace the drain plug gasket with a new one if it is damaged.

- Tighten:

Torque - Engine Drain Plug: 20 N·m (2.0 kg·m, 14.5 ft·lb)
Oil Filter Bolt: 20 N·m (2.0 kg·m, 14.5 ft·lb)



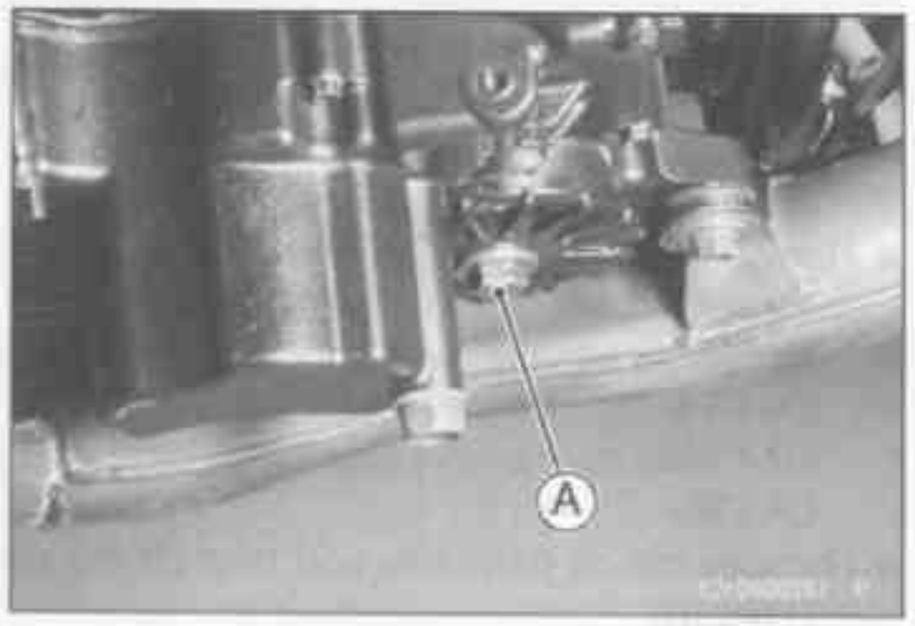
- Pour in the specified type and amount of oil.

Engine Oil
Type: API Service Classification: SH (JASO MA), SJ (JASO MA), SE, SF or SG class
Viscosity: SAE 10W-40, 10W-50, 20W-40 or 20W-50
Amount: 2.7 L (when filter is not removed)
3.0 L (when filter is removed)
3.5 L (when engine is completely dry)

Engine Oil and Oil Filter

Oil Filter Change

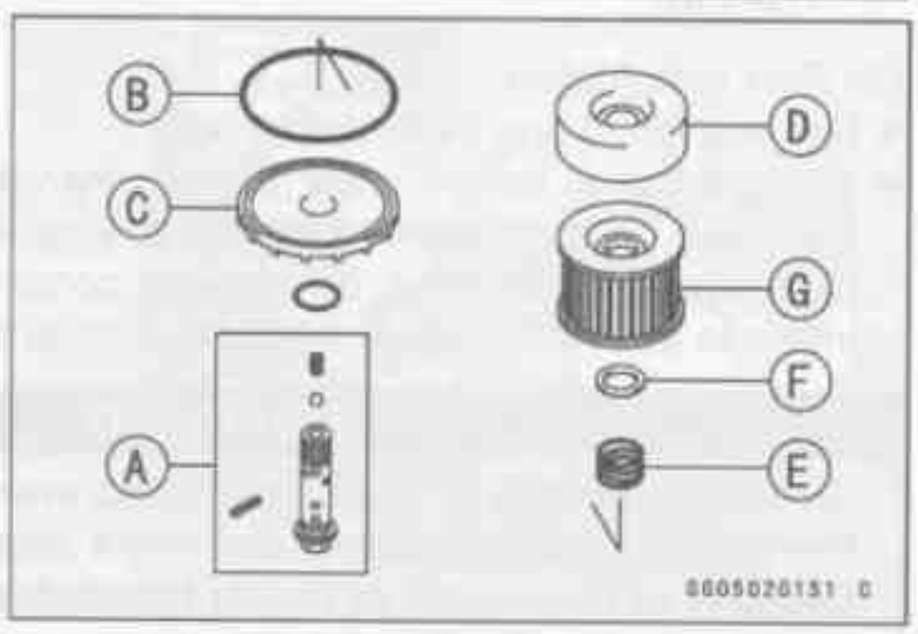
- Drain the engine oil (see Engine Oil Change).
- Remove the oil filter bolt [A] and take off the filter assembly.



NOTE

○ *The oil filter bypass valve is assembled in the filter bolt.*

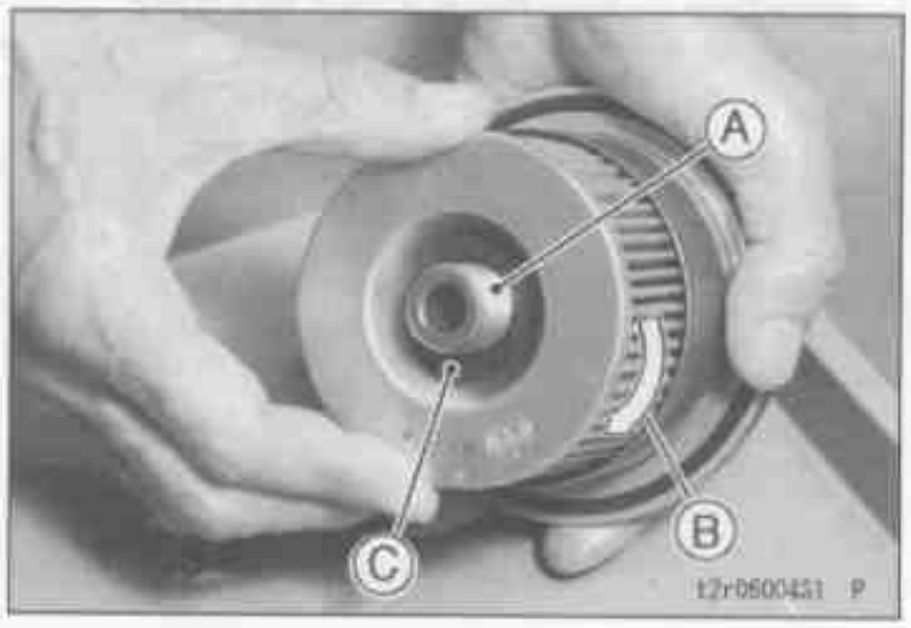
Filter Bolt [A]
O-ring [B]
Filter Cover [C]
Oil Fence [D]
Spring [E]
Washer [F]
Filter [G]



- Replace the filter with a new one.
- Apply engine oil to the filter bolt [A], and turn [B] the filter or the filter bolt to work the filter into place. Be careful that the filter grommets [C] do not slip out of place.
- Tighten the filter bolt.

Torque - Oil Filter Bolt: 20 N·m (2.0 kg·m, 14.5 ft·lb)

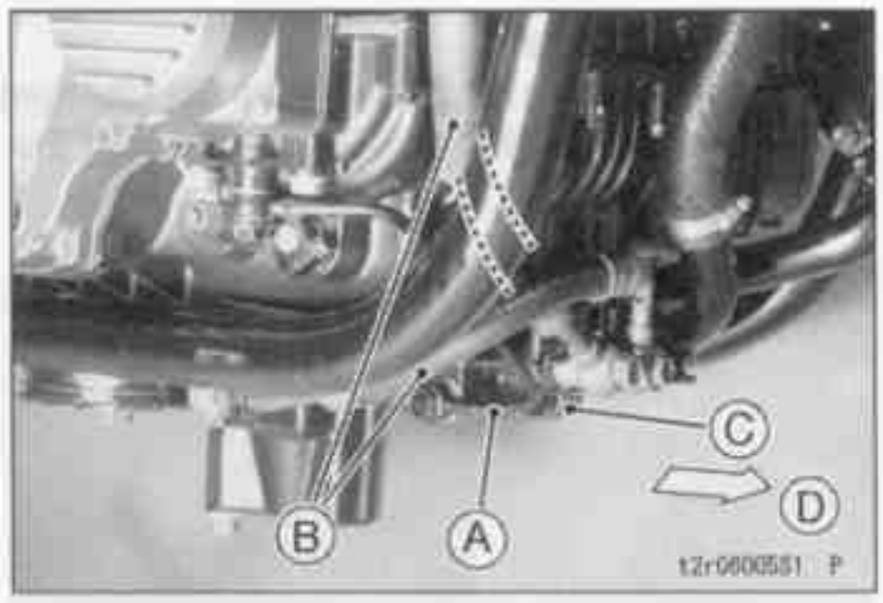
- Pour in the specified type and amount of oil (see Engine Oil Change).



Oil Pan

Oil Pan Removal

- Drain:
  - Coolant (see Cooling System chapter)
  - Engine Oil (see Oil Change)
- Remove:
  - Radiator (see Cooling System chapter)
  - Muffler Assembly (see Engine Top End Chapter)
  - Oil Pipe [A] and Oil Hoses [B]
  - Oil Pressure Switch Lead Terminal and Screw
  - Oil Filter
- Remove the oil pan bolts and take off the oil pan [C].
  - Front [D]



Oil Pan Installation

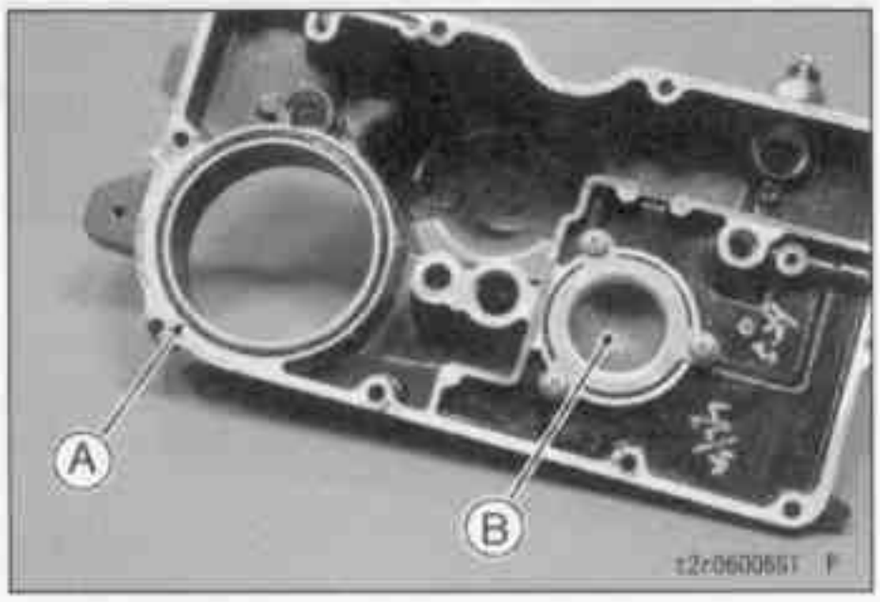
- Replace the O-ring [A] in the oil pan.
- Remove the oil screen units [B] and clean these oil screens with a high-flash point solvent and remove any particles stuck to them.
- ○ Blow away the particles by applying compressed air [C] from the inside to the outside (from the clean side to the dirty side).

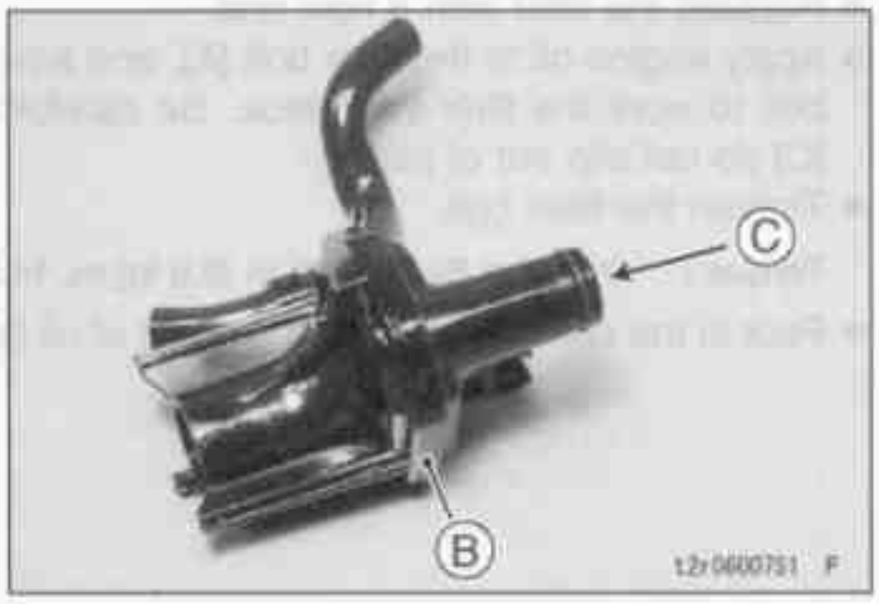
⚠ WARNING

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

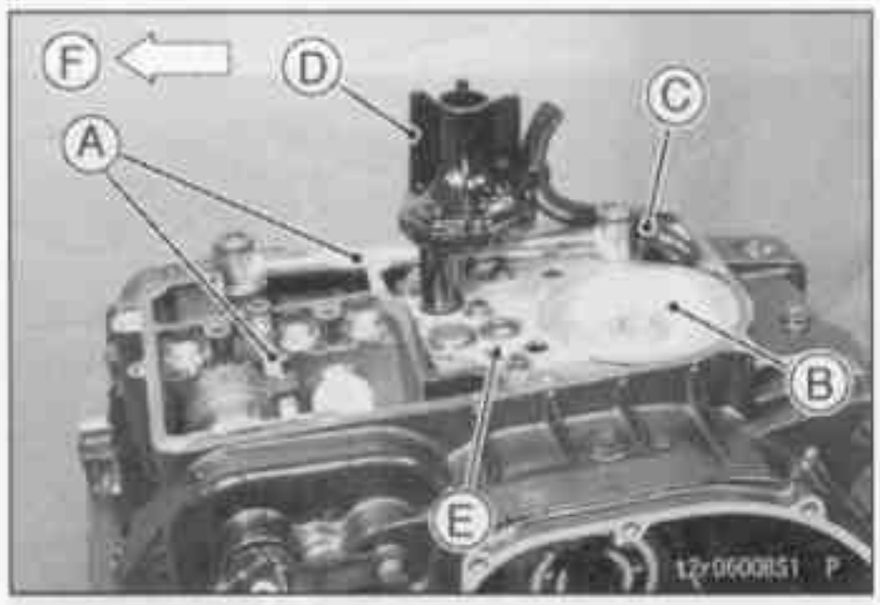
NOTE

- ○ *While cleaning the screens, check for any metal particles that might indicate internal engine damage.*
- Check the screens carefully for any damage: holes and broken wires.
- ★ If the screen is damaged, replace the unit.





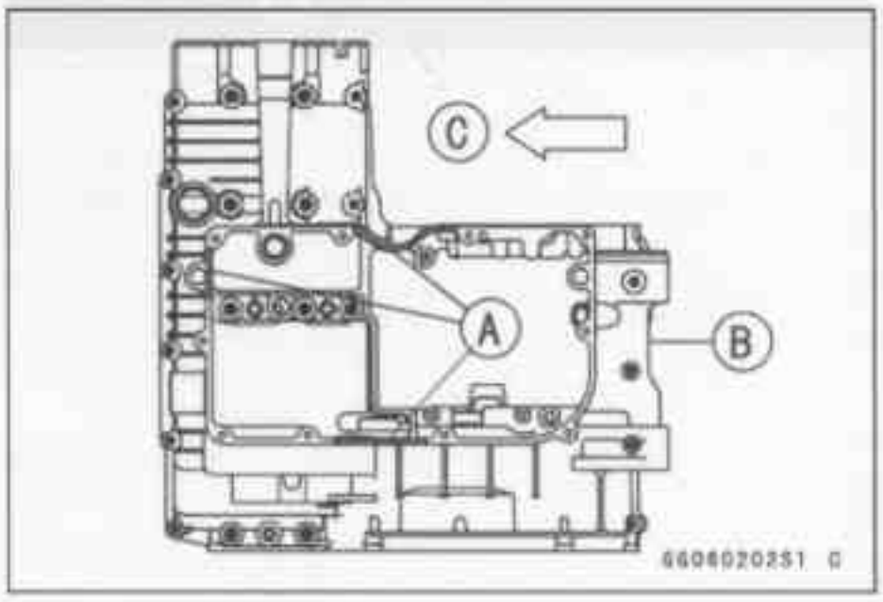
- ○ The crankcase bottom is shown.
- Use a new flat washer on each side of the oil hose or oil pipe banjo bolt.
- Replace the oil pan gasket with a new one.
- Replace the O-rings of the oil pipes [A] and the oil pump bracket [B] with new ones.
- While inserting the oil return pipe [C] into the lower crankcase, install the plastic oil filter unit [D].
- ○ Install the pump outlet side O-ring [E] with the flat side facing to the bracket.
  - Front [F]



- Apply silicone sealant to three areas [A] shown.

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

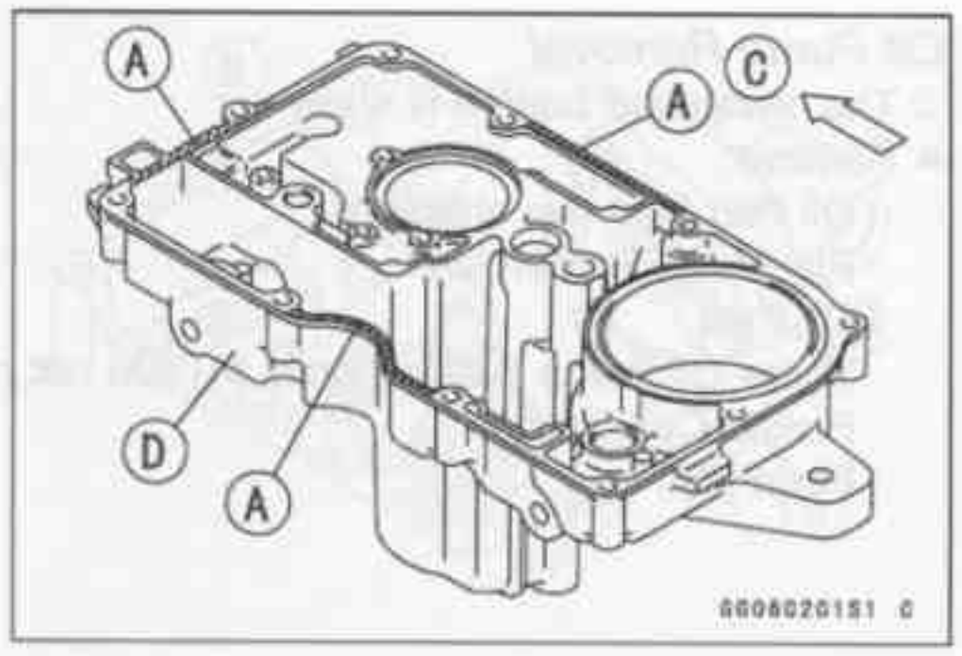
Bottom [B] of Lower Crankcase
Front [C]



Oil Pan

- Apply silicone sealant to three areas [A] shown.
  Front [C]
  Oil Pan [D]

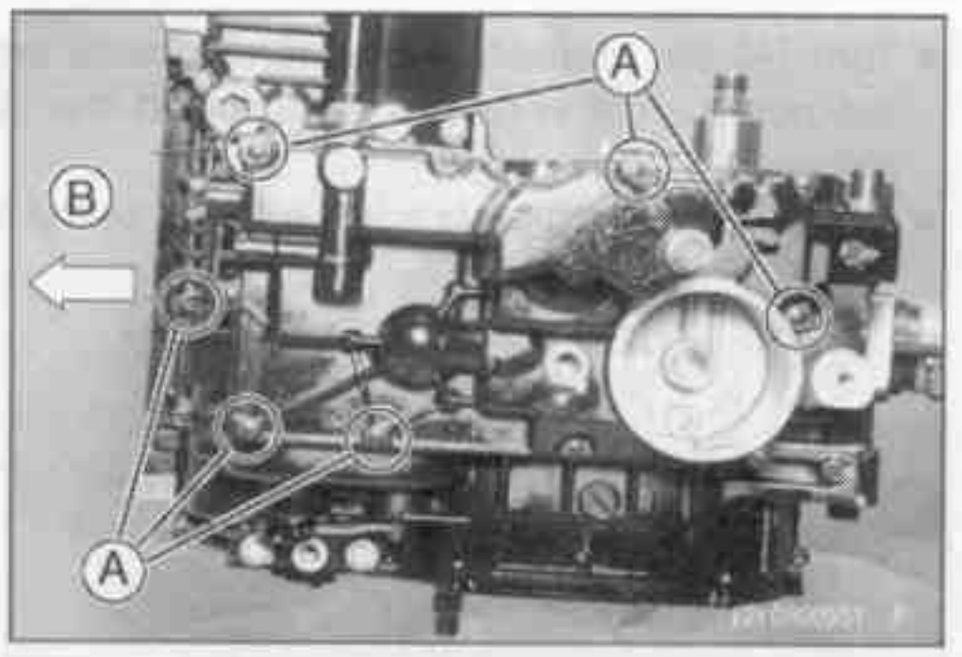
  Sealant - Kawasaki Bond (Silicone Sealant): 56019–120



- Apply a non-permanent locking agent to the threads of the six oil pan bolts [A] on the oil pan.
- Tighten the oil pan bolts.

  Torque - Oil Pan Bolts: 15 N·m (1.5 kg·m, 11.0 in·lb)

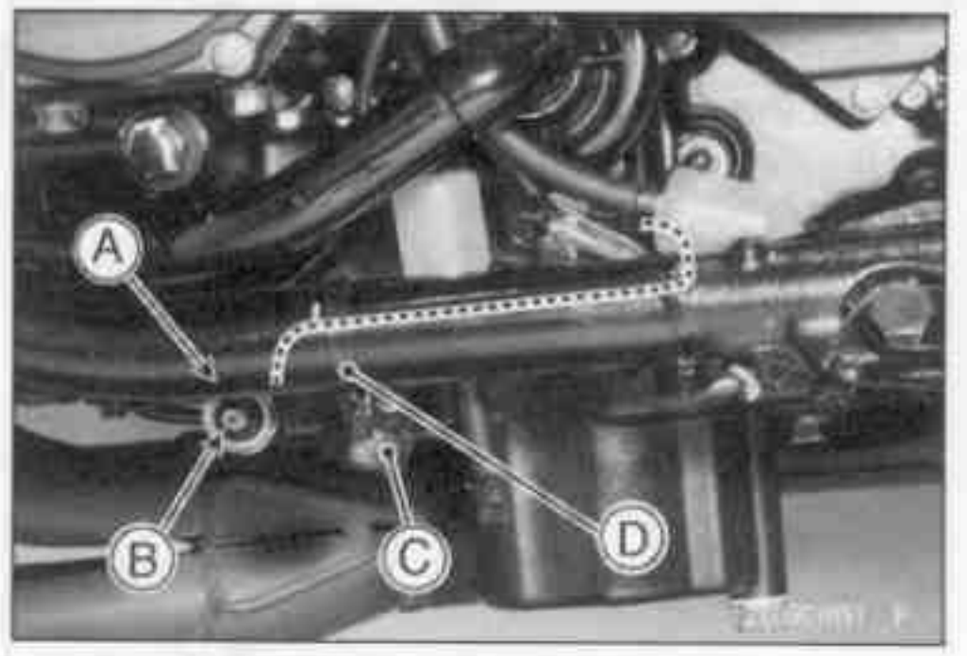
  Front [B]



- If the oil pressure switch [A] has been removed, apply silicone sealant to threads and tighten it to the specified torque.

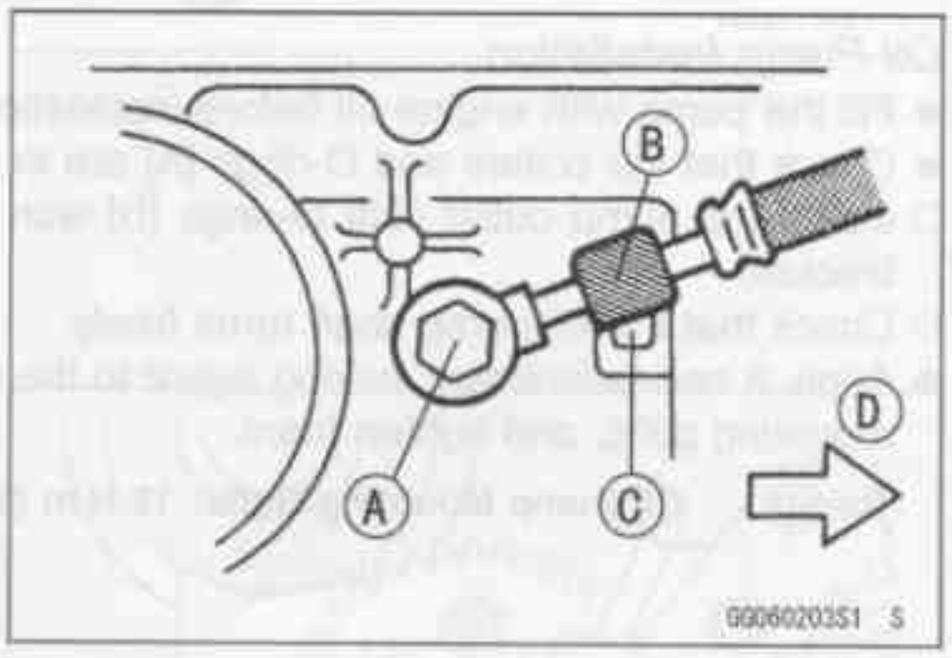
  Torque - Oil Pressure Switch: 15 N·m (1.5 kg·m, 18.0 ft·lb)
  Oil Pressure Switch Terminal Screw [B]: 1.6 N·m (0.16 kg·m, 14 in·lb)

- Install the rubber cap [C].
- Secure the switch lead with the strap [D].



- Tighten the oil hose banjo bolt [A] so that the damper [B] contacts the stopper [C] on the bottom of the oil pan.
  Front [D]
- Tighten:

  Torque - Oil Pipe Banjo Bolts: 25 N·m (2.5 kg·m, 18.0 ft·lb)
  Oil Hose Banjo Bolts (12 mm): 25 N·m (2.5 kg·m, 18.0 ft·lb)
  Oil Hose Banjo Bolts (14 mm): 34 N·m (3.5 kg·m, 25 ft·lb)

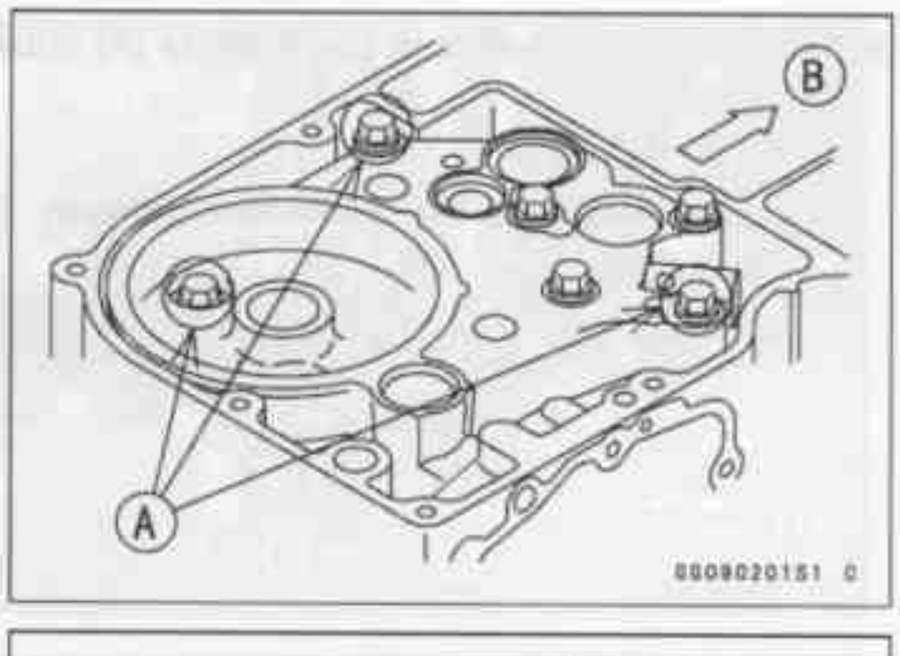


Oil Pump

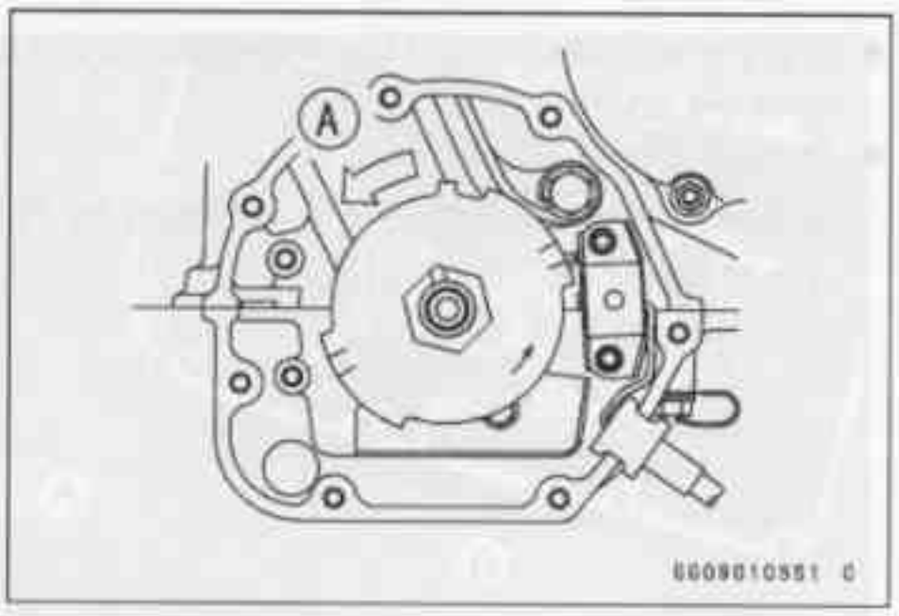
Oil Pump Removal

○ The crankcase bottom is shown.

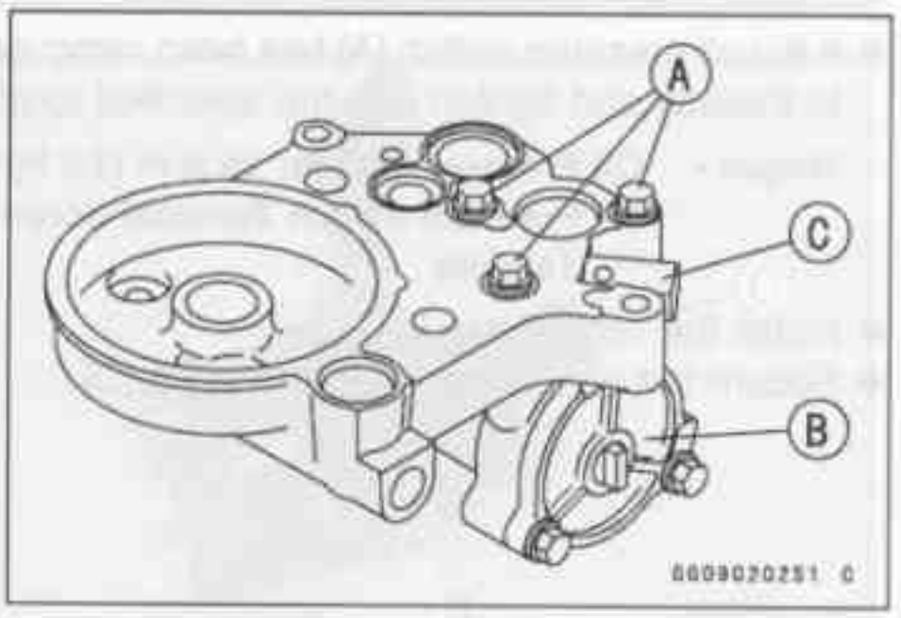
● Remove:
Oil Pan (see this chapter)
Plastic Oil Screen Unit
Oil Pipe
Three Oil Pump Bracket Bolts [A] (Do not remove the other bolts)
Pickup Coil Cover
Front [B]



● Turn [A] the crankshaft counterclockwise until the tang and slot of the pump shaft ends are vertical and the oil pump bracket can be removed.
● Pull out the oil pump bracket with the pump left installed.



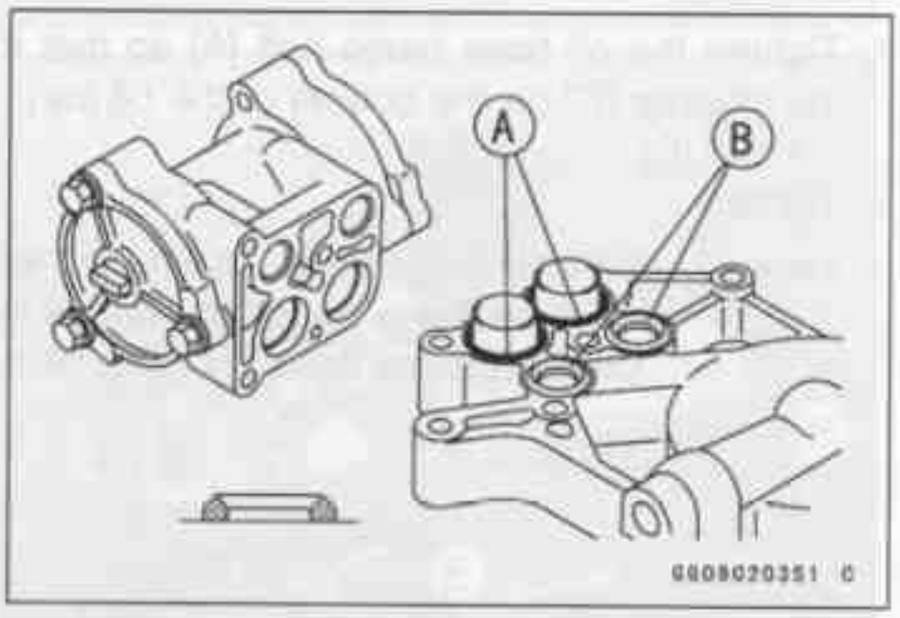
● Remove the oil pump mounting bolts [A] and separate the pump [B] from the oil pump bracket.
● Unscrew the relief valve [C] if necessary.



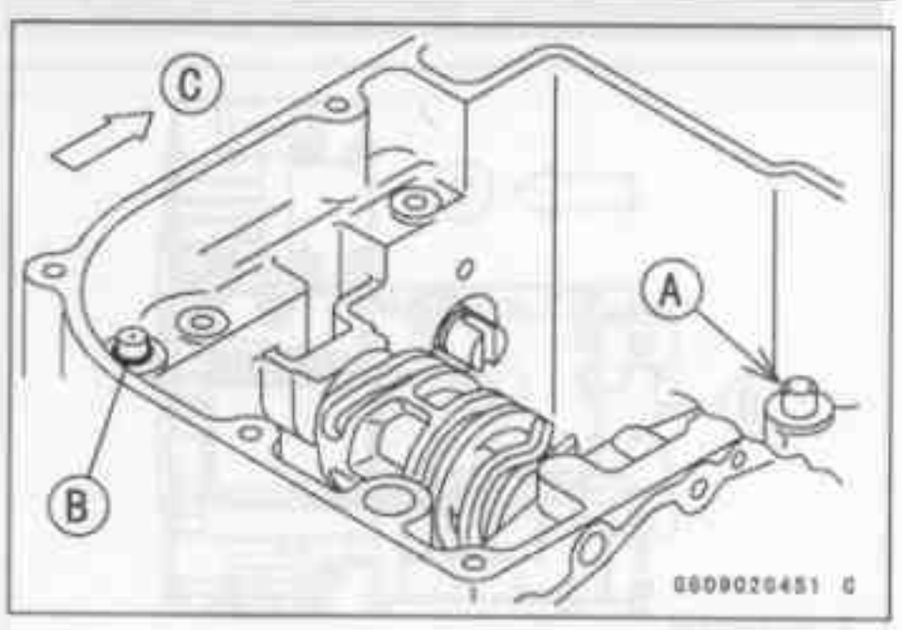
Oil Pump Installation

● Fill the pump with engine oil before installation.
● Check that the collars and O-rings [A] are in place.
○ Install the pump outlet side O-rings [B] with the flat side facing the bracket.
○ Check that the oil pump shaft turns freely.
● Apply a non-permanent locking agent to the threads of the oil pump mounting bolts, and tighten them.

Torque - Oil Pump Mounting Bolts: 12 N·m (1.2 kg·m, 106 in·lb)



● Check that the dowel pin [A], orifice and its O-ring [B] are in place. The small hole of the orifice must face the oil pump bracket.
Front [C]

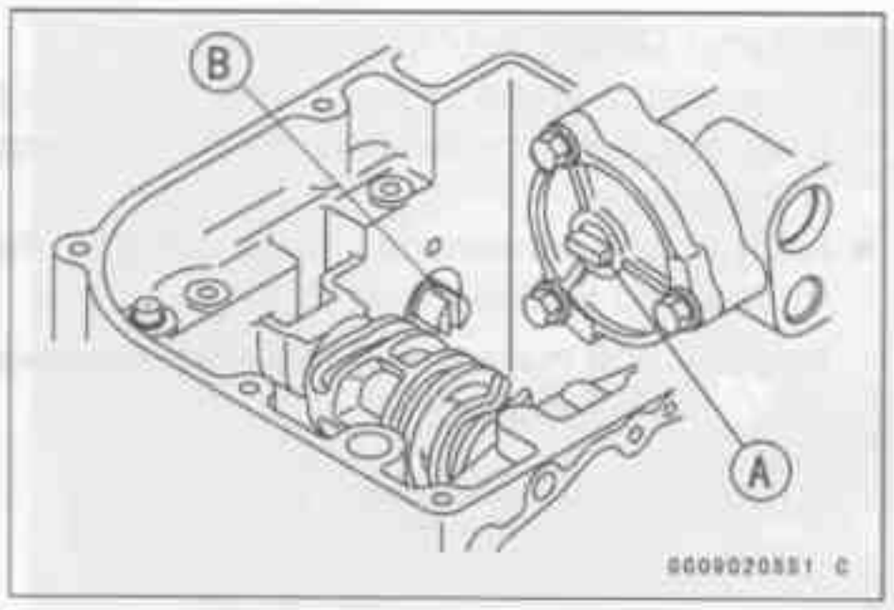


Oil Pump

- Turn the oil pump shafts so that the tang [A] and slot [B] are both vertical.
- Install the oil pump bracket and tighten the bolts.

Torque - Oil Pump Bracket Bolts: 9.8 N·m (1.0 kg·m, 87 in·lb)

- Apply a non-permanent locking agent to the threads of the relief valve, and tighten it.



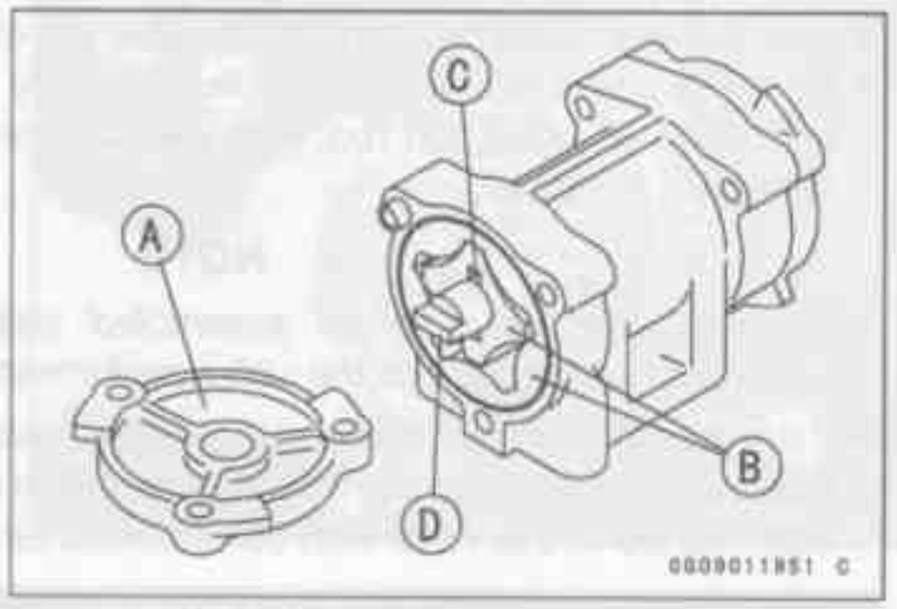
CAUTION

Do not apply too much non-permanent locking agent to the threads of the relief valve. This may block the oil passage.

Torque - Oil Pressure Relief Valve: 15 N·m (1.5 kg·m, 11 ft·lb)

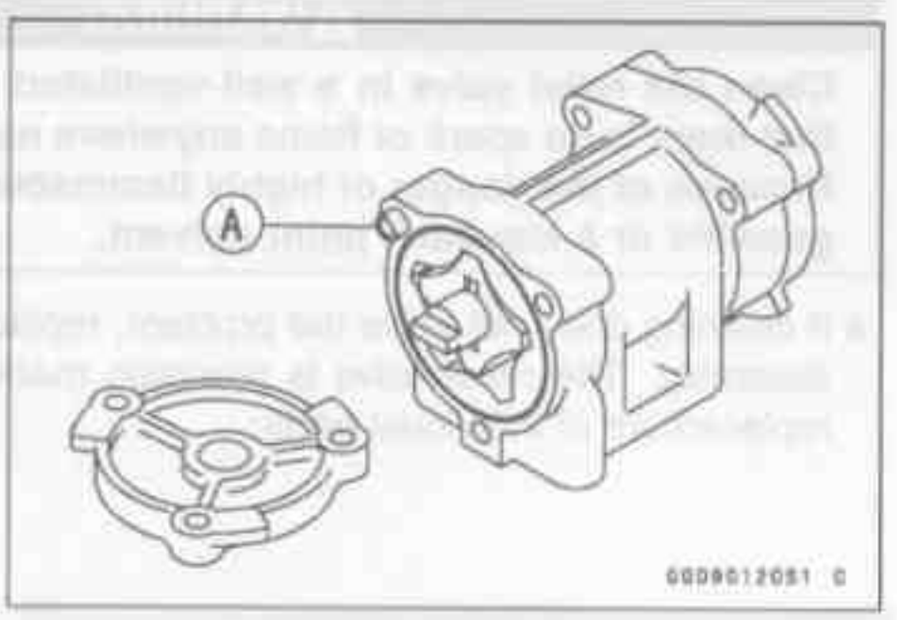
Oil Pump Disassembly

- Remove:
  - Oil Pump (see this chapter)
  - Oil Pump Cover Screws
  - Oil Pump Cover [A]
- Take the rotors [B] out of the pump body.
- Pull the pin [C] off the pump shaft.
- Remove the rotors from the other side of the pump in the same manner.
- Pull the oil pump shaft [D] out of the body.



Oil Pump Assembly

- Be sure the dowel pin [A] is in place in the pump body.
- Apply engine oil to the rotors.
- Check that the pump shaft turns freely after assembling.



Oil Pump Inspection

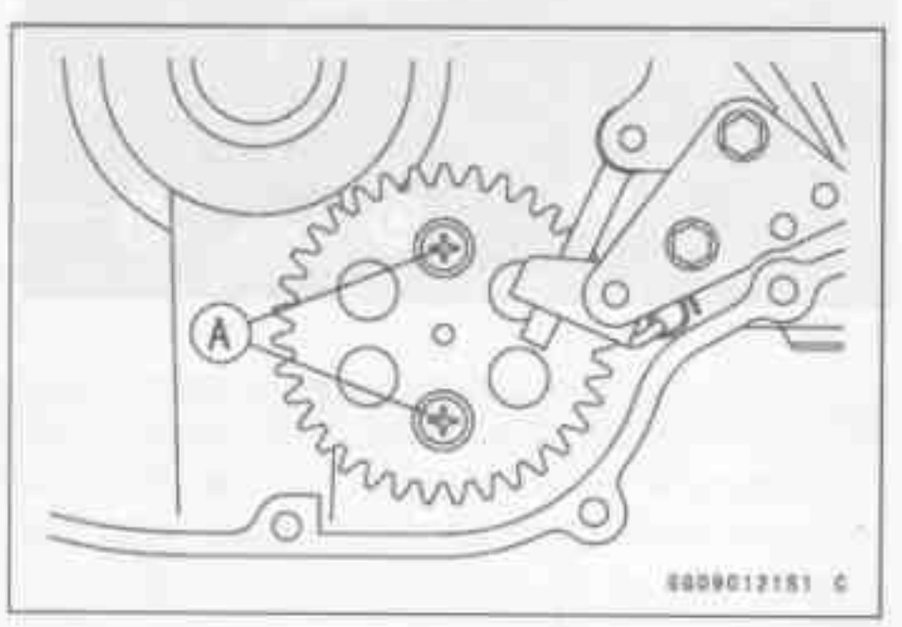
- Disassemble the oil pump.
- Visually inspect the oil pump body, outer and inner rotors and covers.

★If there is any damage or uneven wear, replace the rotors or the oil pump assembly.

Oil Pump Drive Gear Removal

- Remove the clutch (see Clutch chapter).
- Turn the oil pump gear so that the gear holder screws [A] can be removed through the pump gear holes.
- Take out the screws and remove the oil pump gear with the holder.
- Remove the circlip and separate the gear from the holder.

Special Tool - Outside Circlip Pliers: 57001–144

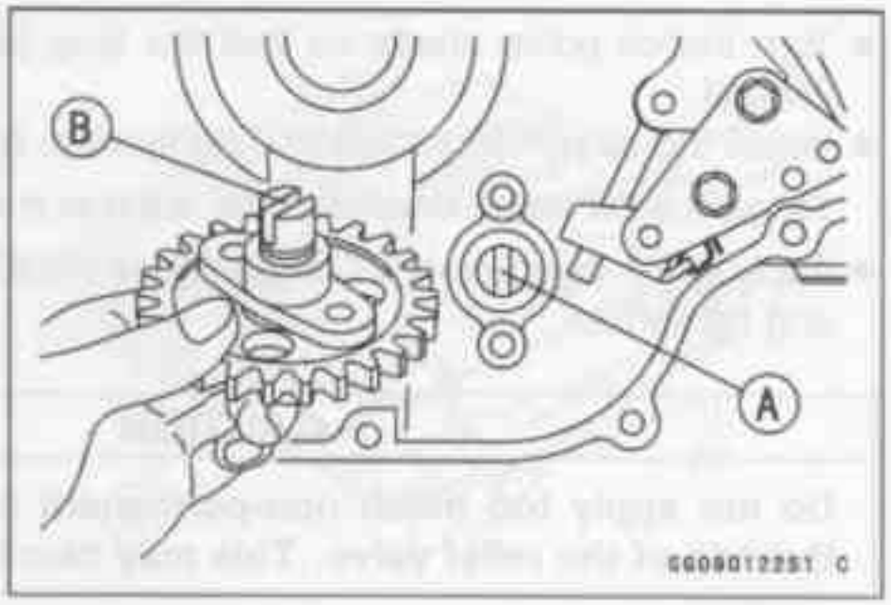


Oil Pump

Oil Pump Drive Gear Installation

- When installing the oil pump gear, note the position of the oil pump shaft tang and turn the gear so that the tang [A] fits into the slot [B] of the shaft.
- Apply a non-permanent locking agent to the threads of the holder screws, and tighten them.

Torque - Oil Pump Drive Gear Holder Screws: 5.2 N·m (0.53 kg·m, 46 in·lb)



Relief Valve Inspection

- Remove the oil pump and then remove the oil pressure relief valve.
- Check to see if the valve [A] slides smoothly when pushing it in with a wooden or other soft rod, and see if it comes back to its seat by spring [B] pressure.

NOTE

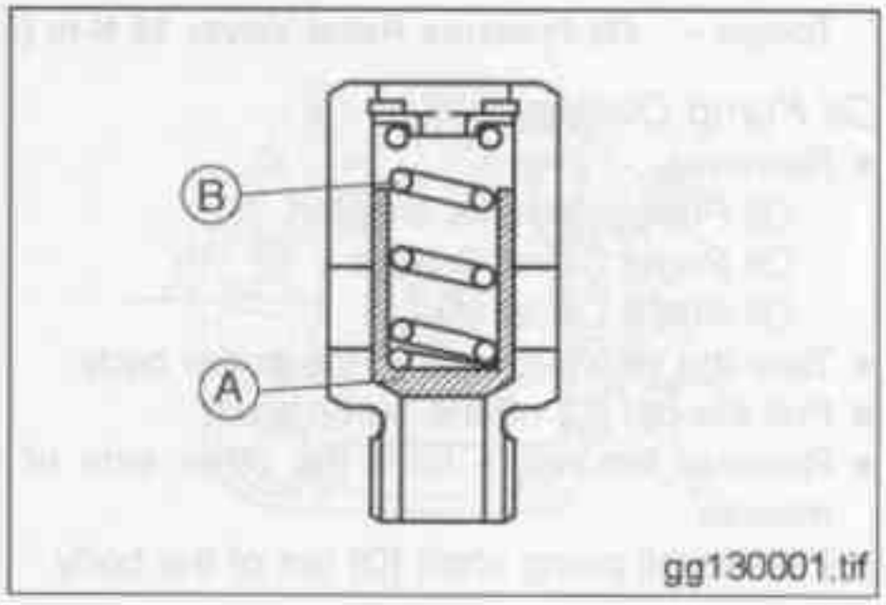
○ *Inspect the valve in its assembled state. Disassembly and assembly may change the valve performance.*

★ If any rough spots are found during above inspection, wash the valve clean with a high-flash point solvent and blow out any foreign particles that may be in the valve with compressed air.

⚠ WARNING

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

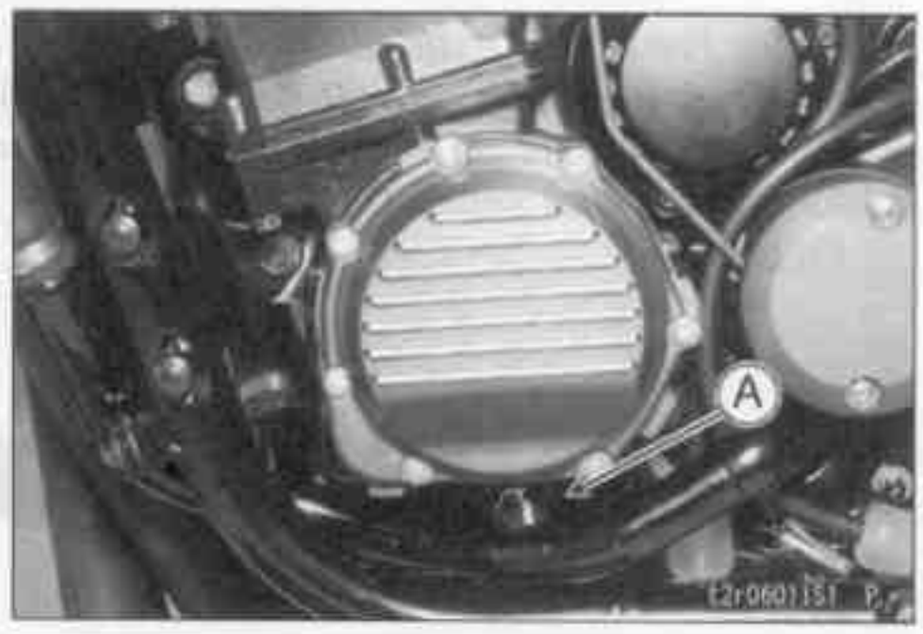
★ If cleaning does not solve the problem, replace the relief valve as an assembly. The relief valve is precision made with no allowance for replacement of individual parts.



Oil Pressure

Oil Pressure Measurement

- Remove the main oil passage plug [A].



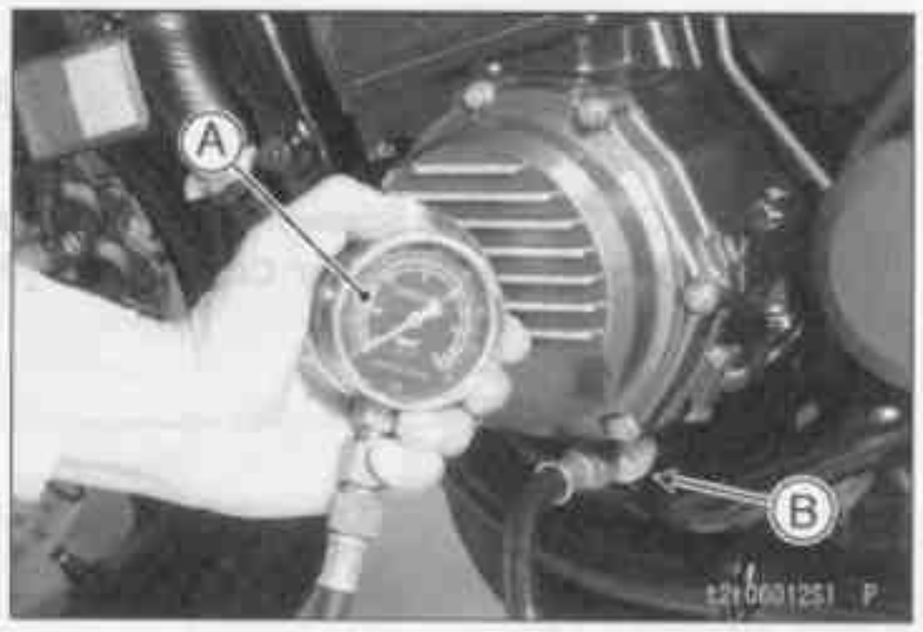
- Attach the gauge [A] and adapter [B] to the plug hole.

Special Tools - Oil Pressure Gauge, 5 kg/cm^2: 57001–125
Oil Pressure Gauge Adapter, M18 × 1.5: 57001–1278

- Start the engine and warm up the engine.
- Run the engine at the specified speed, and read the oil pressure gauge.

★If the oil pressure is much lower than the standard, check the oil pump, oil pump relief valve, crankshaft bearing insert wear, and con-rod big end bearing insert wear immediately.

★If the reading is much higher than the standard, check the oil screens first, and then the oil passages for dirt or clogging.



Oil Pressure
Standard: 200 ~ 290 kPa (2.0 ~ 3.0 kg/cm^2, 28 ~ 43 psi)
@4000 r/min (rpm), oil temp. 90°C (194°F)

- Stop the engine.
- Remove the oil pressure gauge and adapter.

⚠ WARNING

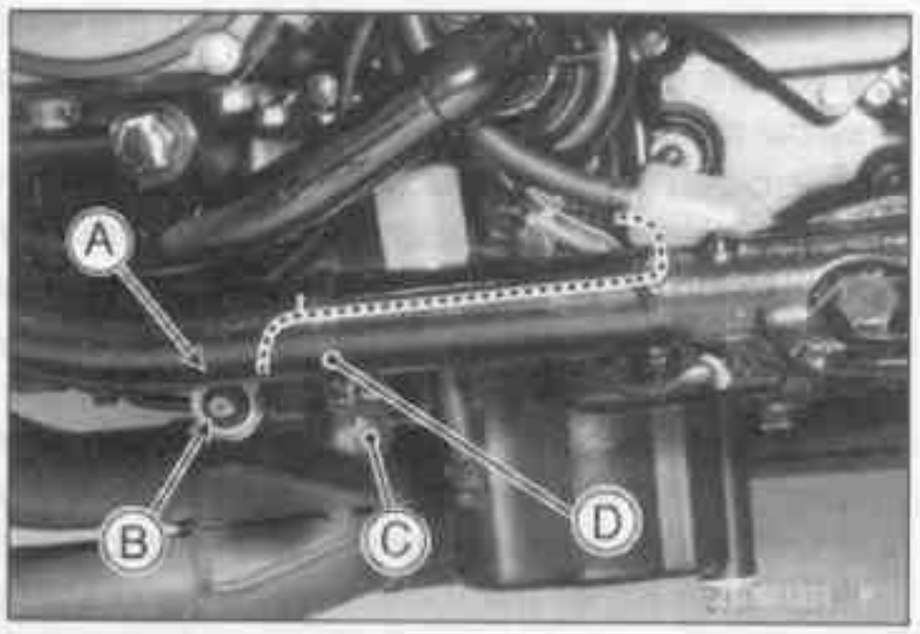
Take care against burns from hot engine oil that will drain through the oil passage when the plug is removed.

- Install the oil passage plug.

Torque - Main Oil Passage Plug: 18 N·m (1.8 kg·m, 13 ft·lb)

Oil Pressure Switch Removal

- Remove:
  Engine Oil (drain, see Engine Oil Change)
  Strap [D]
  Rubber Switch Cover [C]
  Switch Terminal Screw [B]
  Oil Pressure Switch [A]



Oil Pressure Switch Installation

- Apply silicone sealant to threads of the oil pressure switch and tighten it.

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

Torque - Oil Pressure Switch: 15 N·m (1.5 kg·m, 11 ft·lb)

- Tighten:

Torque - Oil Pressure Switch Terminal Screw: 1.6 N·m (0.16 kg·m, 14 in·lb)

- Apply a little grease to the terminal for rust protection.
- Install the rubber cover.

Engine Removal/Installation

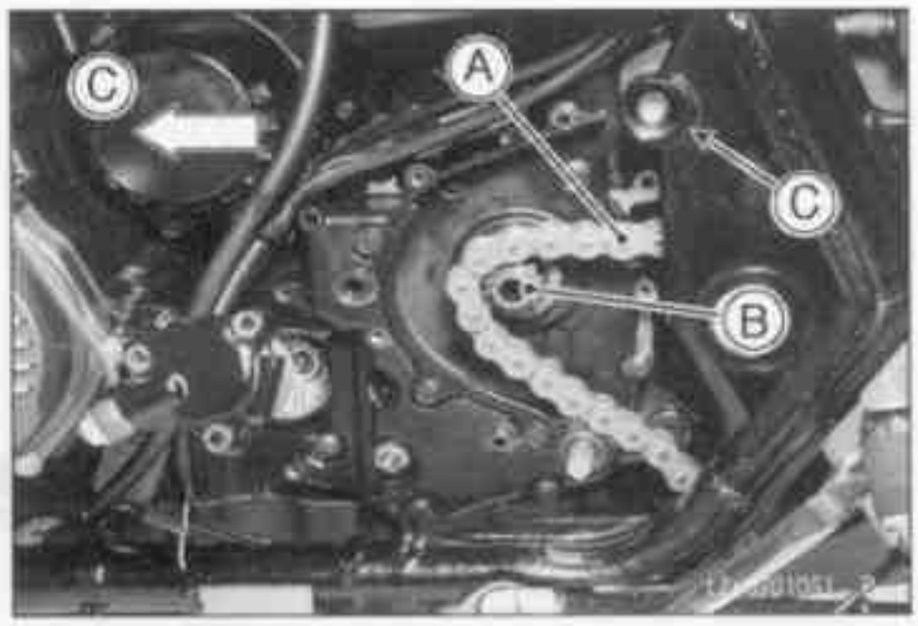
Table of Contents

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

Engine Removal/Installation

- Hang the drive chain [A] over the output shaft [B] just before moving the engine into its final position in the frame.
  Front [C]
- Insert the rear mounting bolts [C] from the left side of the engine.
- Install the collar on the rear upper mounting bolt.
- Tighten:

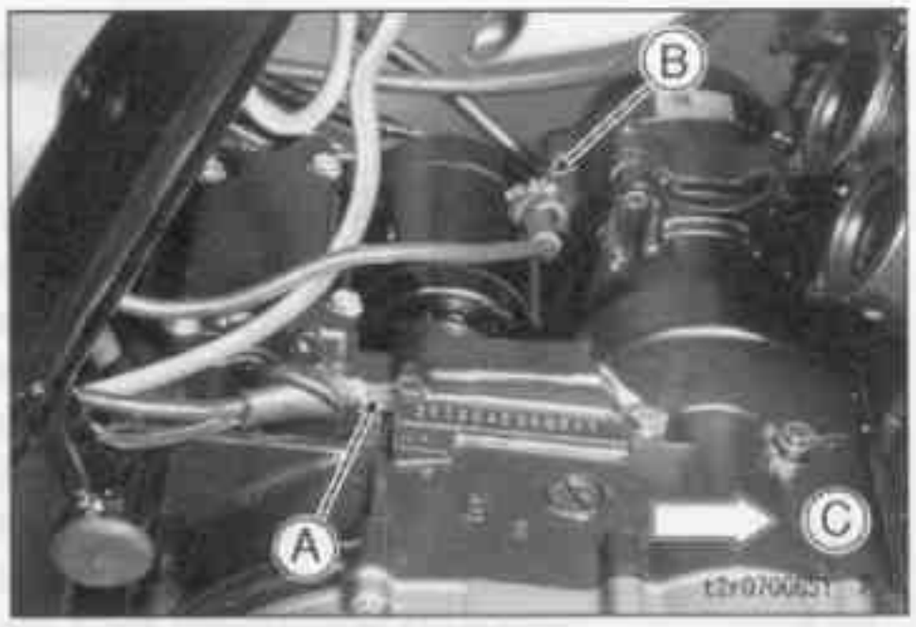
Torque - Downtube Bolts: 44 N·m (4.5 kg·m, 32 ft·lb)
Front Engine Bracket Bolts: 30 N·m (3.1 kg·m, 22 ft·lb)
Rear Engine Bracket Bolts: 17 N·m (1.7 kg·m, 13 ft·lb)
Engine Mounting Bolts and Nuts: 44 N·m (4.5 kg·m, 32 ft·lb)
Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kg·m, 18.0 ft·lb)



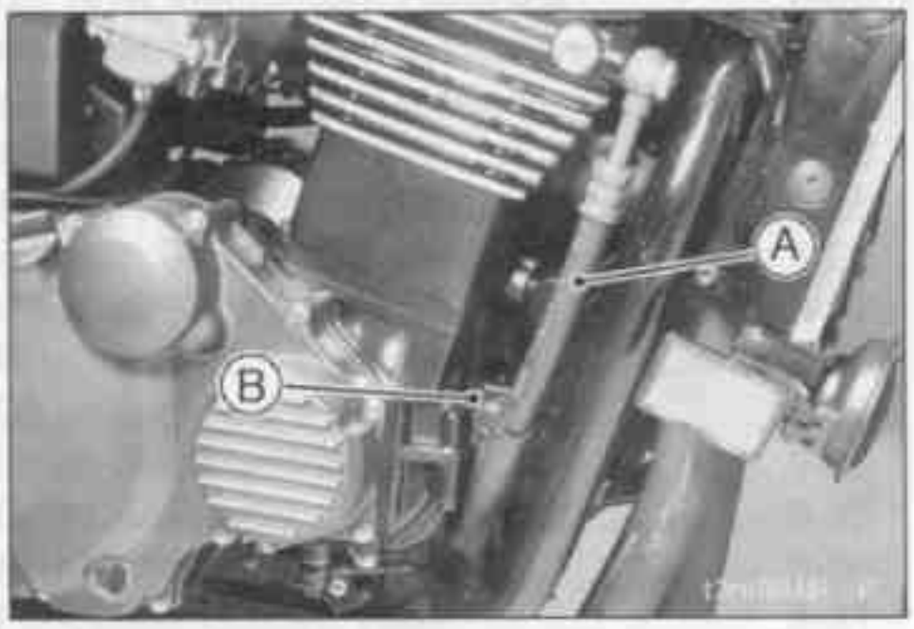
- Install the removed parts (see appropriate chapters).

Torque - Engine Ground Lead Terminal Bolt [A]: 15 N·m (1.5 kg·m, 11 ft·lb)
Starter Motor Terminal Nut [B]: 4.9 N·m (0.50 kg·m, 43 in·lb)

Front [C]



- Run the leads, cables and hoses correctly (see Cable, Wire and Hose Routing section in the General Information chapter).
  - Run the oil hose [A] outside the engine bracket [B].
- Adjust:
  Throttle Cables (see Fuel System chapter)
  Choke Cable (see Fuel System chapter)
  Drive Chain (see Final Drive chapter)
- Fill the engine with engine oil (see Engine Lubrication System Chapter).
- Fill the engine with coolant and bleed the air from the cooling system (See Cooling System Chapter).
- Check the clutch operation.
- Check the brake effevtiveness.

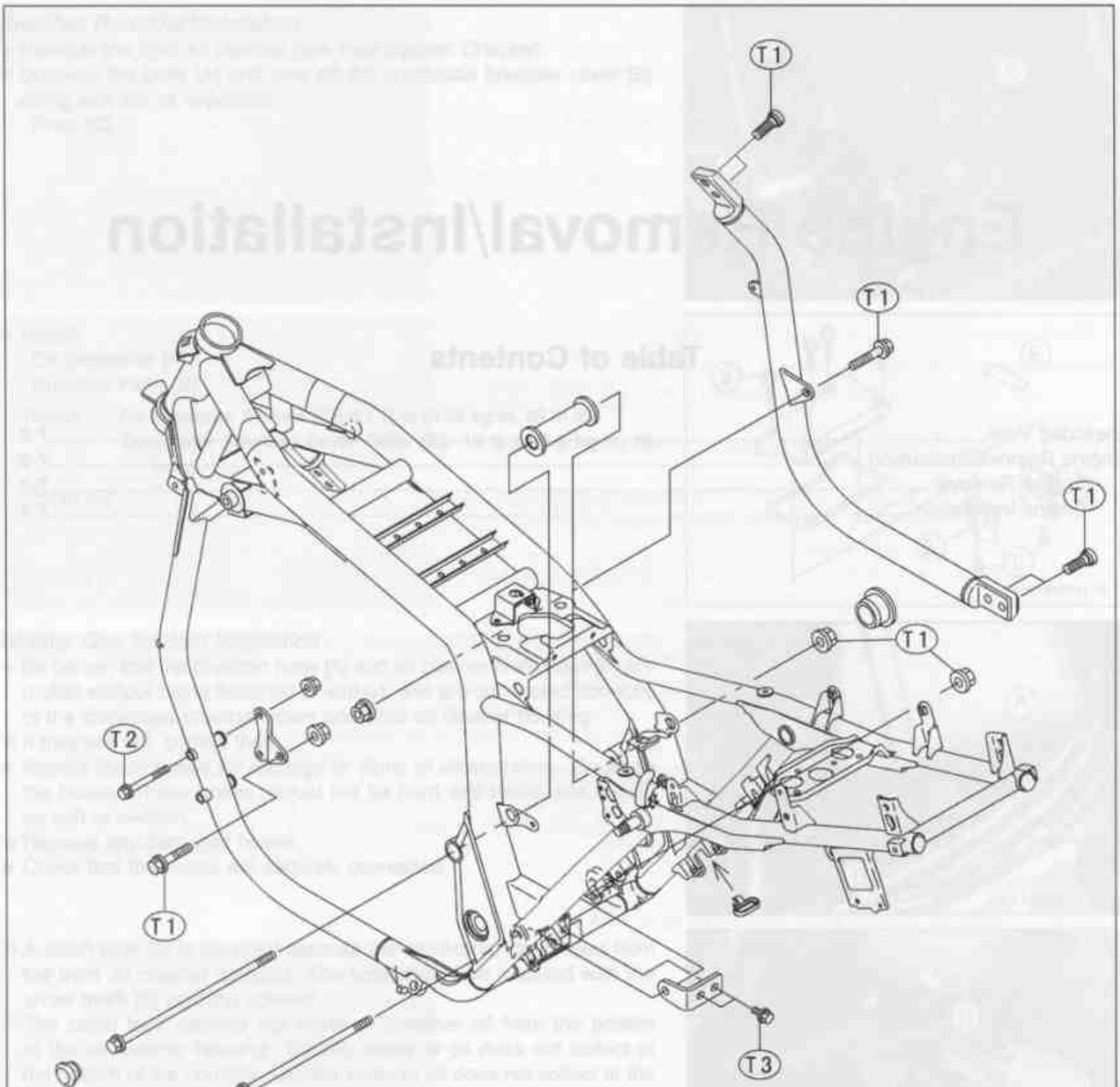


⚠ WARNING

Do not attempt to ride 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.

7-2 ENGINE REMOVAL/INSTALLATION

Exploded View



T1: 44 N·m (4.5 kg·m, 32 ft·lb)
T2: 30 N·m (3.1 kg·m, 22 ft·lb)
T3: 17 N·m (1.7 kg·m, 13 ft·lb)

Engine Removal/Installation

Engine Removal

- Support the frame with a commercially available stand [A].



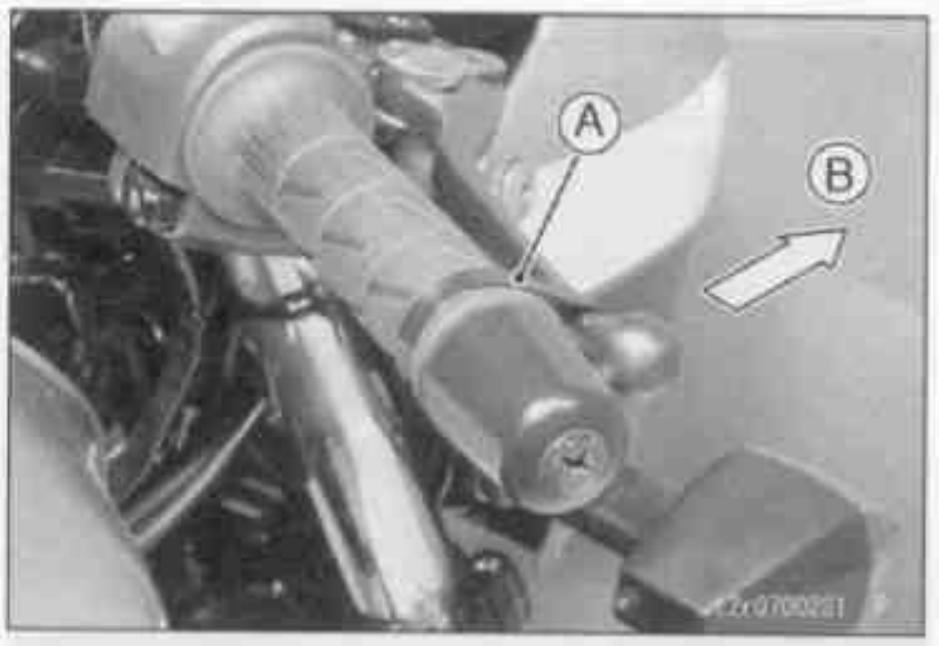
- Squeeze the brake lever slowly and hold it with a band [A].
  Front [B]

⚠ WARNING

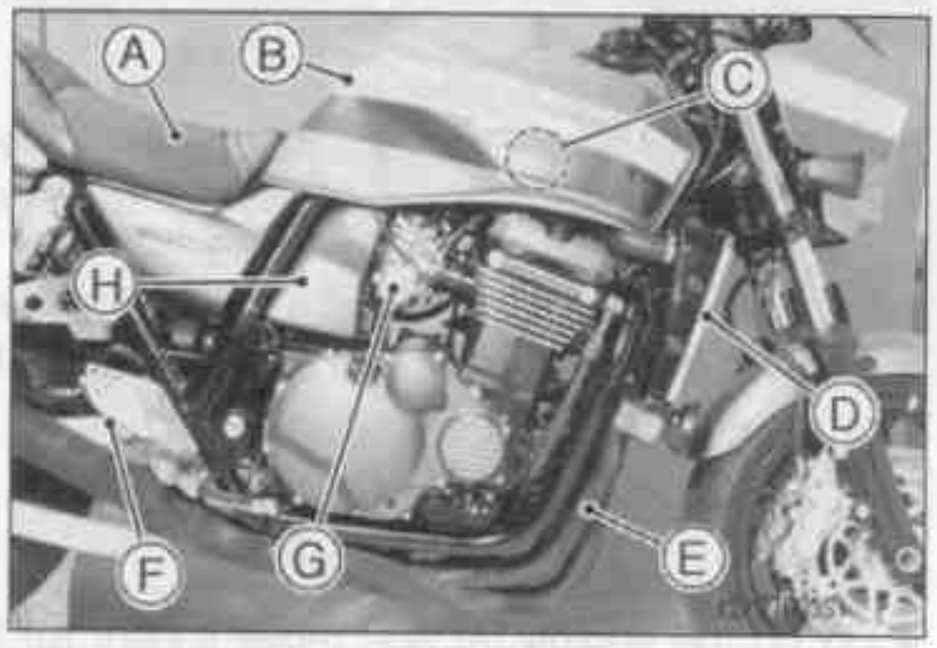
Be sure to hold the front brake when removing the engine, or the motorcycle may fall over. It could cause an accident and injury.

CAUTION

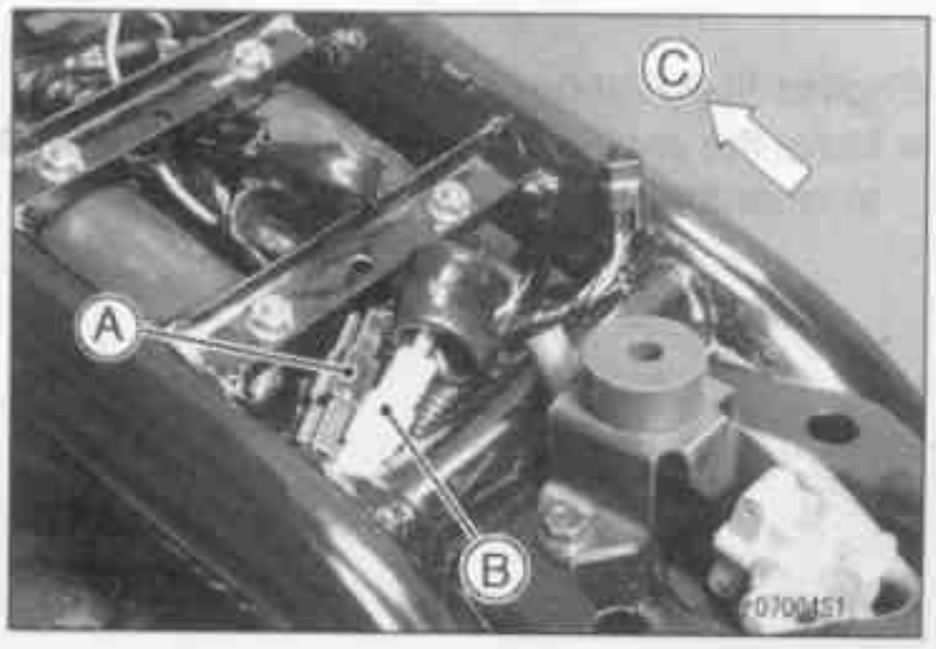
Be sure to hold the front brake when removing the engine, or the motorcycle may fall over. The engine or the motorcycle could be damaged.



- Remove:
  Fairing (ZR1200B, see Frame chapter)
  Seat [A] (see Frame chapter)
  Battery Negative Terminal (see Electrical System chapter)
  Fuel Tank [B] (see Fuel System chapter)
- Drain:
  Coolant (see Cooling System chapter)
  Engine Oil (see Engine Lubrication System chapter)
- Remove:
  Thermostat Housing [C] (see Cooling System chapter)
  Radiator [D] (see Cooling System chapter)
  Muffler Assembly [E] (see Engine Top End chapter)
  Rear Master Cylinder [F] (with the brake pedal and the hose left installed)
  Carburetor Assembly [G] (see Fuel System chapter)
  Front Air Cleaner Housing [H] (see Fuel System chapter)
  Spark Plug Caps
  Vacuum Switch Valve and Hoses
  Clutch Slave Cylinder (with the pipe left installed)
  Shift Pedal
  Water Pump (see Cooling System chapter)
  Engine Sprocket (see Final Drive chapter)

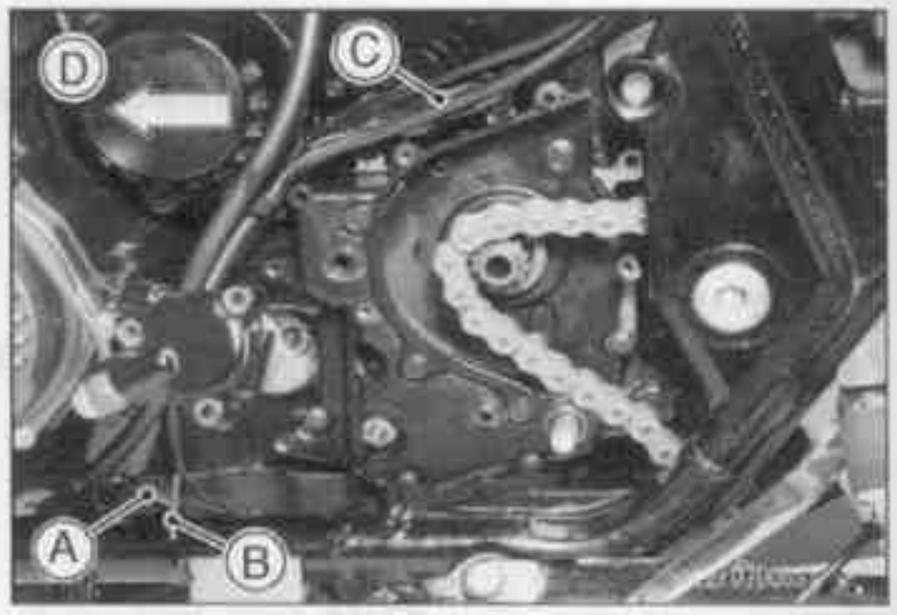


- Pull off the connectors and free the wiring from the frame.
  Pickup Coil Lead Connector [A]
  Alternator Lead Connector [B]
  Front [C]

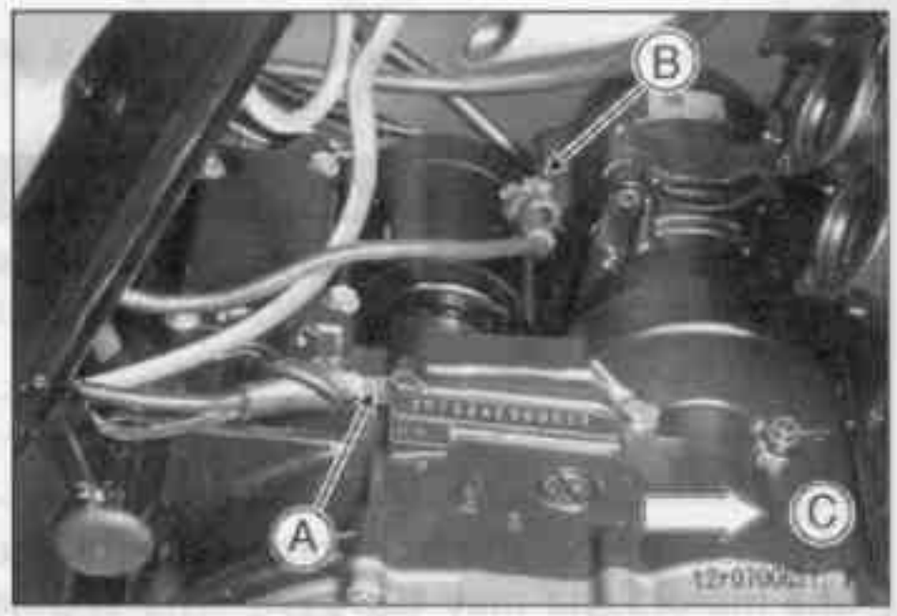


Engine Removal/Installation

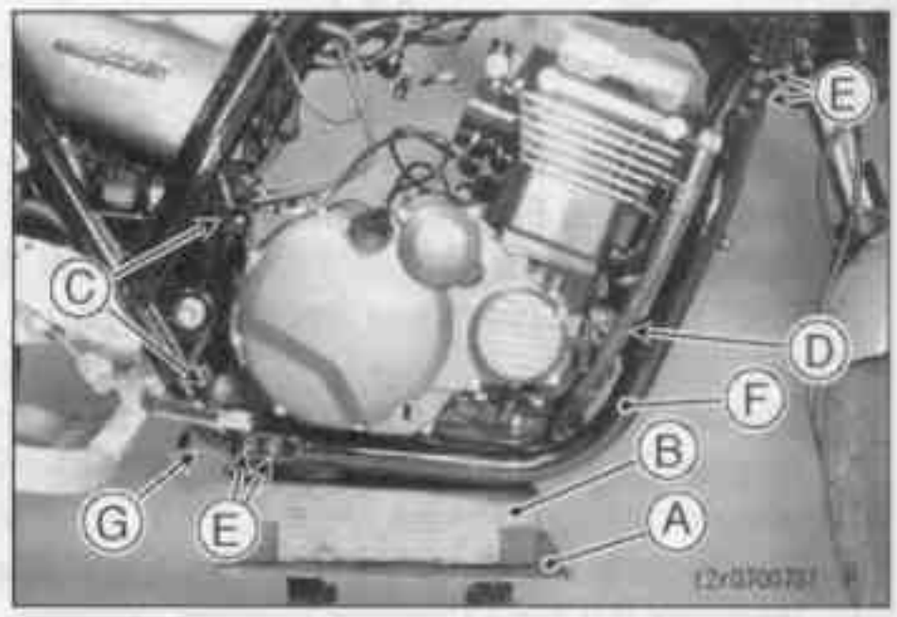
- Free from the frame:
  Oil Pressure Switch Lead [A] (from the switch terminal)
  Neutral Switch Lead [B] (from the pin of the switch)
  Sidestand Switch Lead Connector [C] (disconnect)
  Front [D]



- Disconnect:
  Engine Ground Lead Terminal [A]
  Starter Motor Lead Terminal [B]
  Front [C]



- Support the engine with a stand or jack [A] along with a wooden block [B].
- Remove the rear bracket bolts [G].
- Remove the rubber caps for the upper rear engine mount bolt.
- Remove the rear upper, lower engine mounting bolts [C], rear brackt and collar.
- Remove the front engine mounting bolt and left engine bracket [D].
- Remove the downtube bolts [E] and take off the downtube [F].

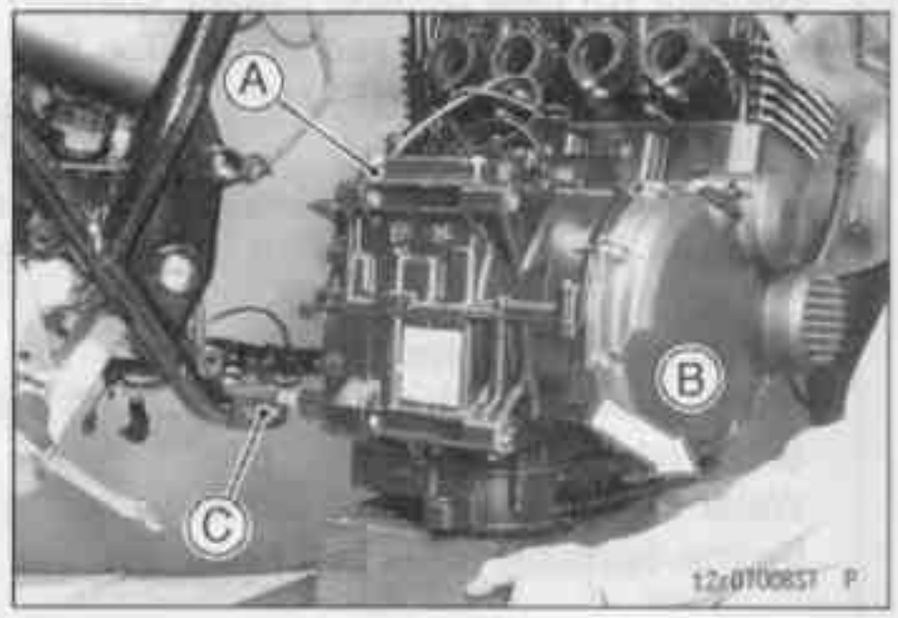


- Lift up the engine [A] and move it right [B] to free the output shaft from the drive chain.

NOTE

○ *The drive chain will be removed from the output shaft when removing the engine.*

- Remove the engine from the vehicle right side. Clear the lower frame bracket [C], while twisting the engine unit.



Engine Installation

- Move the engine into the frame from the left top and twist the engine to clear the lower bracket [B].



Crankshaft/Transmission

Table of Contents

Exploded View....8-2
Specifications....8-4
Crankcase....8-6
Crankcase Splitting....8-6
Crankcase Assembly....8-7
Crankshaft and Connecting Rods....8-9
Crankshaft Removal....8-9
Crankshaft Installation....8-9
Connecting Rod Removal....8-9
Connecting Rod Installation....8-9
Crankshaft, Connecting Rod Cleaning....8-12
Connecting Rod Bend....8-13
Connecting Rod Twist....8-13
Connecting Rod Big End Side Clearance....8-13
Connecting Rod Big End Bearing Wear....8-13
Crankshaft Side Clearance....8-15
Crankshaft Runout....8-15
Crankshaft Main Bearing Wear....8-15
Balancer....8-17
Balancer Removal....8-17
Balancer Installation....8-17
Balancer Damper Inspection....8-18
Alternator Shaft, Starter Motor Clutch....8-19
Alternator Chain and Tensioner Removal....8-19
Alternator Chain and Tensioner Installation....8-19
Alternator Shaft Removal....8-20
Alternator Shaft Installation....8-21
Coupling Damper Inspection....8-21
Alternator Chain Guide Wear....8-21
Starter Motor Clutch Inspection....8-21
Starter Motor Clutch Disassembly....8-21
Starter Motor Clutch Assembly....8-22
Transmission....8-23
Shift Pedal Removal....8-23
Shift Pedal Installation....8-23
Shift Lever Assembly....8-23
External Shift Mechanism Removal....8-23
External Shift Mechanism Installation....8-25
External Shift Mechanism Inspection....8-25
Transmission Shaft Removal....8-26
Transmission Shaft Installation....8-26
Transmission Shaft Disassembly....8-26
Transmission Shaft Assembly....8-27
Shift Drum and Fork Removal....8-30
Shift Drum and Fork Installation....8-30
Shift Drum Disassembly....8-30
Shift Drum Assembly....8-30
Shift Fork Bending....8-30
Shift Fork/Gear Groove Wear....8-31
Shift Fork Guide Pin/Drum Groove Wear....8-31
Gear Dog and Gear Dog Hole Damage....8-31
Ball Bearing, Needle Bearing, and Oil Seal....8-32
Ball Bearing Replacement....8-32
Ball and Needle Bearing Wear....8-32
Oil Seal Inspection....8-32

Ball Bearing, Needle Bearing, and Oil Seal

Ball Bearing Replacement

CAUTION

Do not remove the ball bearings unless it is necessary. Removal may damage them.

- Using a press or puller, remove the ball bearing.

NOTE

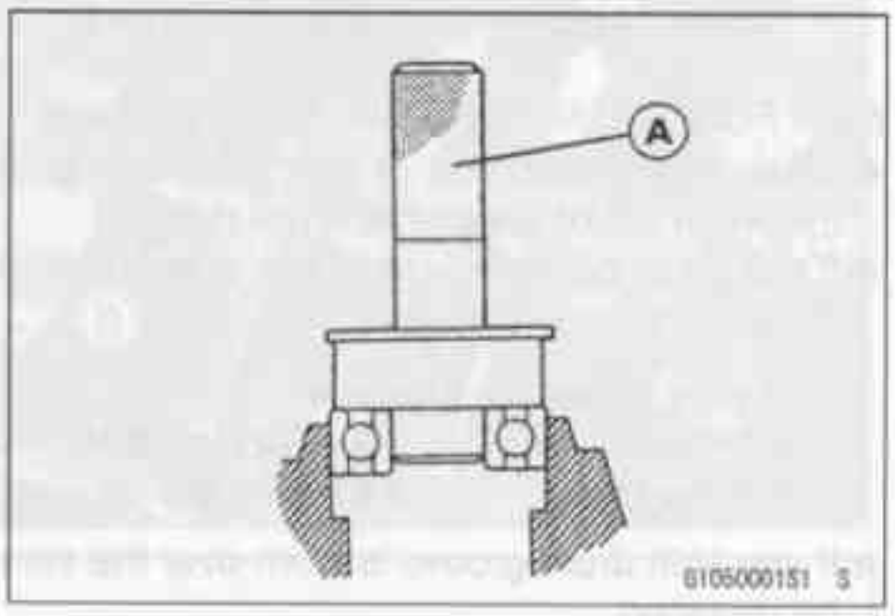
○ *In the absence of the above mentioned tools, satisfactory results may be obtained by heating the case with engine oil to approximately 93°C (200°F) max., and tapping the bearing in or out.*

CAUTION

Do not heat the case with a blowtorch. This will warp the case. Soak the case in engine oil and heat the oil.

- Using a press and the bearing driver [A], install the new bearing until it stops at the bottom of its housing.

Special Tool - Bearing Driver Set: 57001–1129

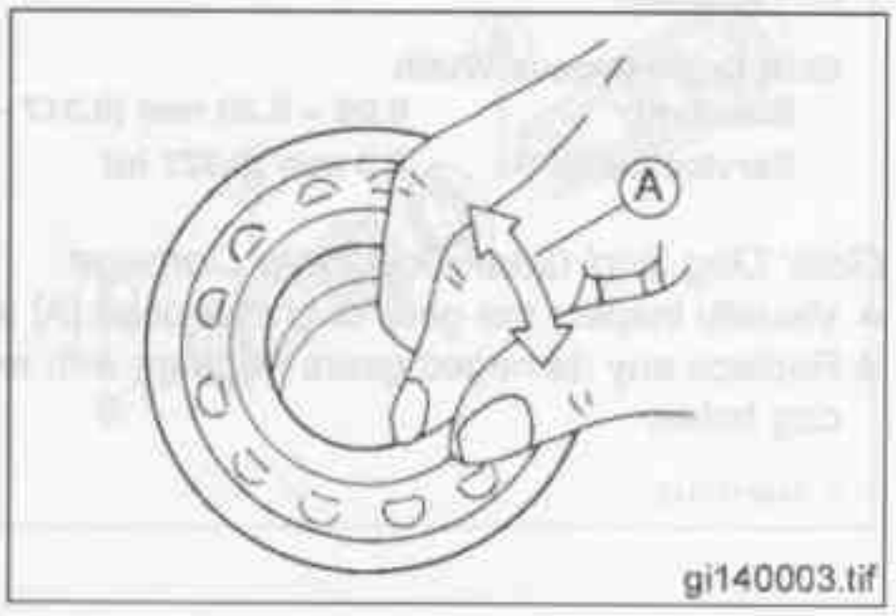


Ball and Needle Bearing Wear

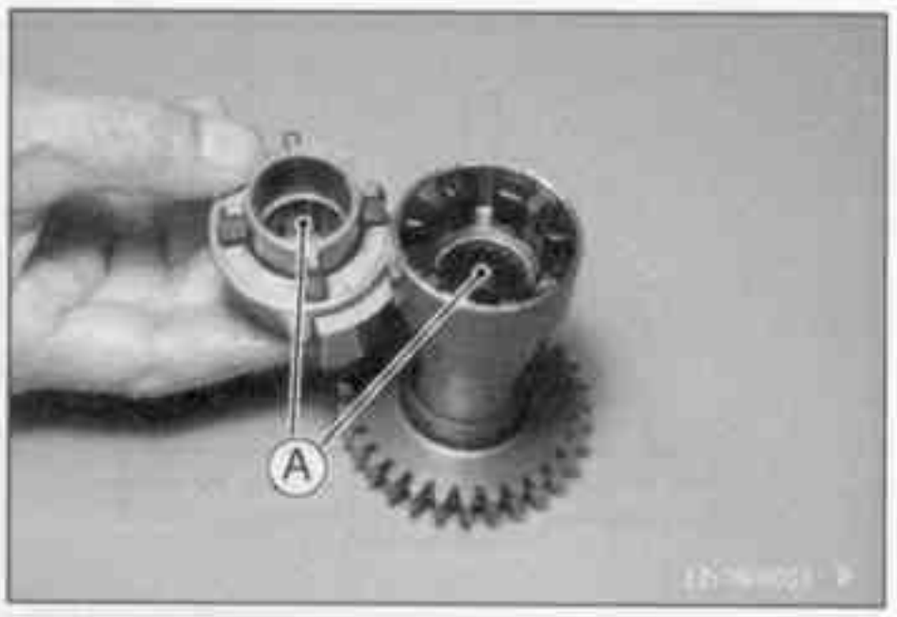
CAUTION

Do not remove the ball bearings for inspection. Removal may damage them.

- Check the ball bearings.
○ Since the ball bearings are made to extremely close tolerances, the wear must be judged by feel rather than measurement. Clean each bearing in a high-flash point solvent, dry it (do not spin the bearing while it is dry), and oil it with engine oil.
○ Spin [A] the bearing by hand to check its condition.
★ If the bearing is noisy, does not spin smoothly, or has any rough spots, replace it.



- Check the needle bearings [A].
○ The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.
★ If there is any doubt as to the condition of a needle bearing, replace it.

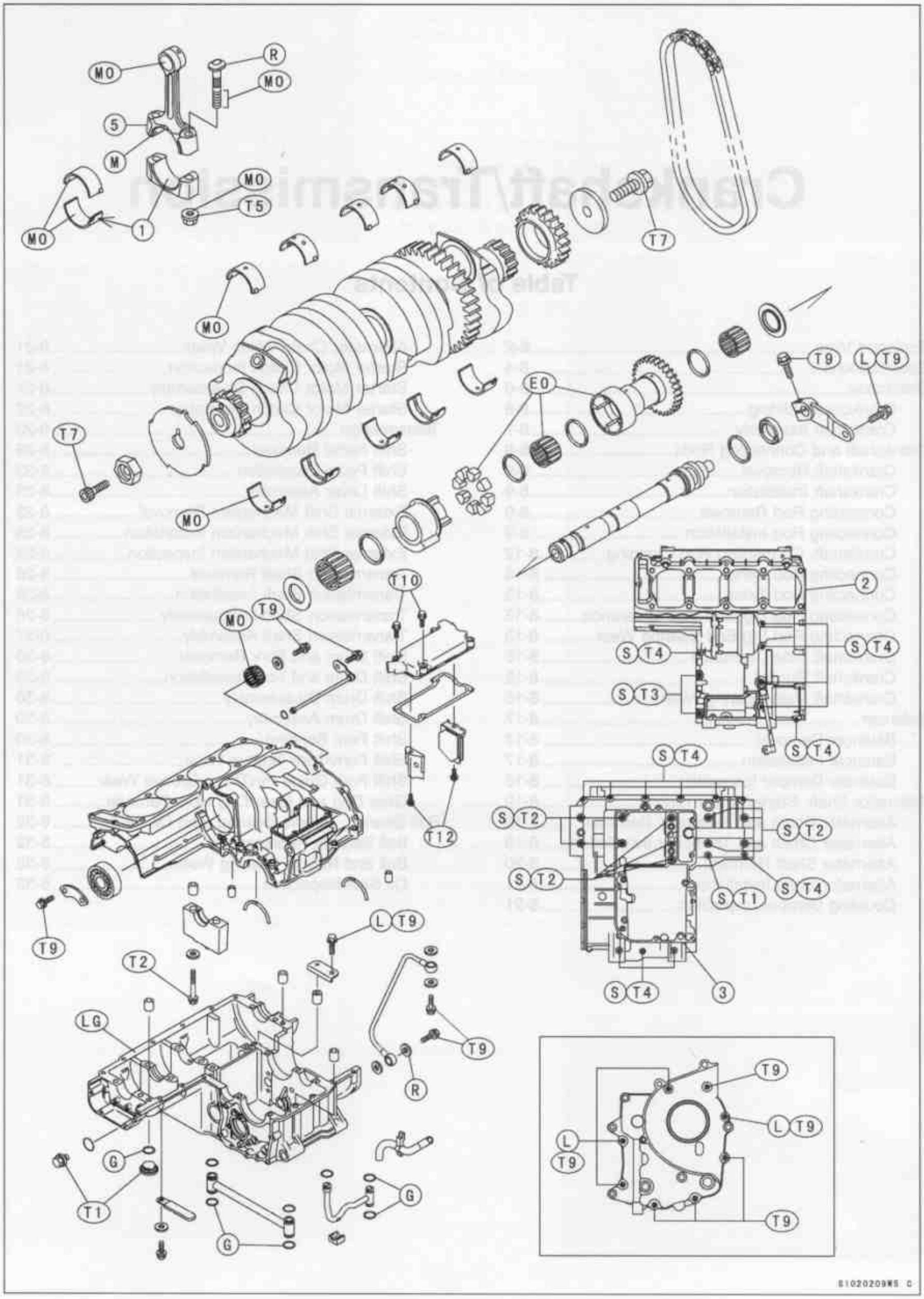


Oil Seal Inspection

- Inspect the oil seals.
★ Replace it if the lips are misshapen, discolored (indicating that the rubber has deteriorated), hardened or otherwise damaged.

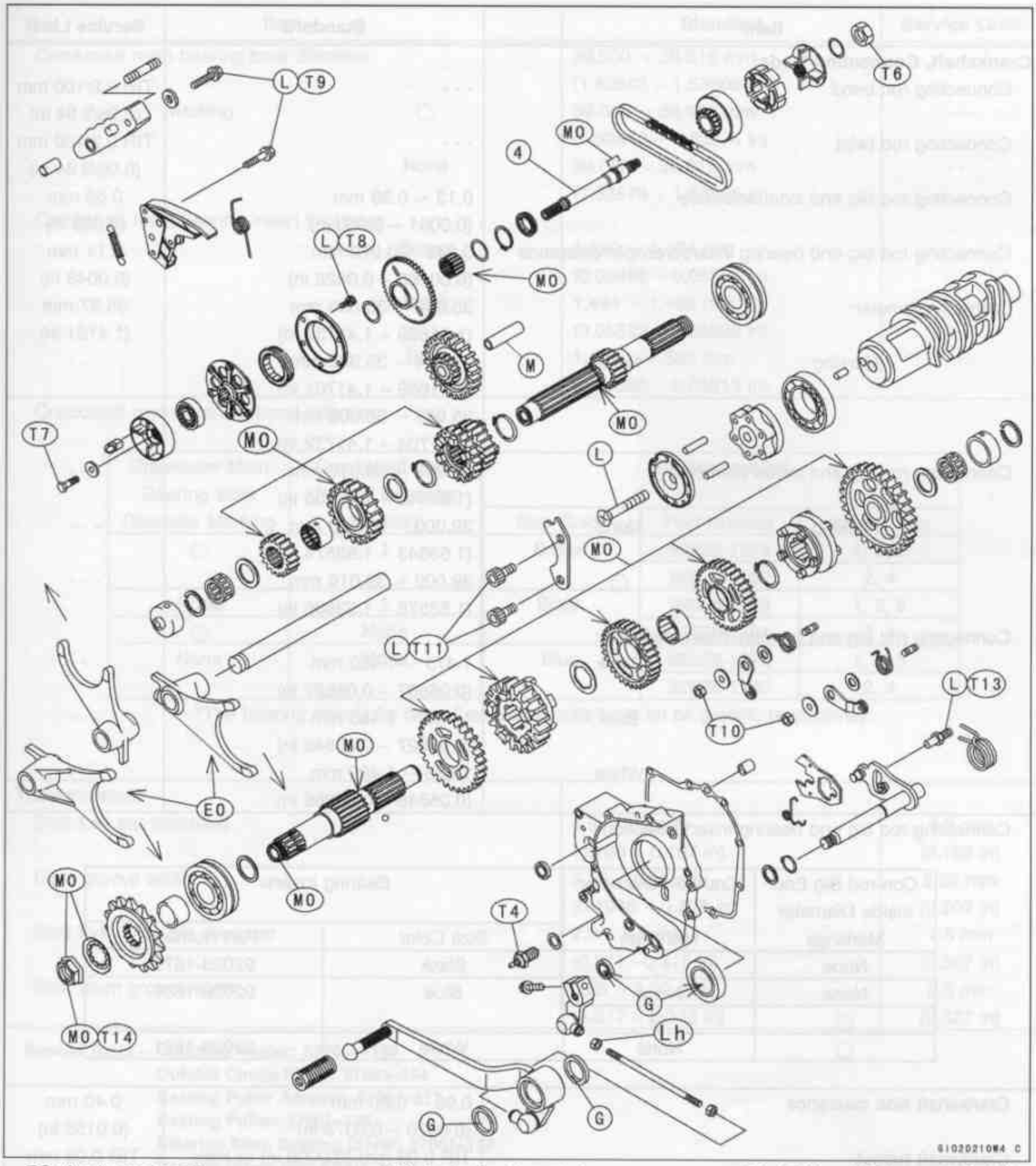
8-2 CRANKSHAFT/TRANSMISSION

Exploded View



B102020WE5 C

Exploded View



EO: Apply engine oil.
G: Apply grease.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil: a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1).
R: Replacement Parts
S: Follow the specific tightening sequence.
LG: Apply liquid gasket (Kawasaki Bond:92104–1063).
1. Do not apply any grease or oil.
2. Upper Crankcase
3. Lower Crankcase
4. Alternator Shaft
5. Face the mass mark forward with the rod pointing the engine top.

T1: 18 N·m (1.8 kg·m, 13.0 ft·lb)
T2: 32 N·m (3.3 kg·m, 24 ft·lb)
T3: 27 N·m (2.8 kg·m, 20 ft·lb)
T4: 15 N·m (1.5 kg·m, 11.0 ft·lb)
T5: see the text.
T6: 59 N·m (6.0 kg·m, 44 ft·lb)
T7: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T8: 12 N·m (1.2 kg·m, 106 in·lb)
T9: 9.8 N·m (1.0 kg·m, 87 in·lb)
T10: 10 N·m (1.0 kg·m, 89 in·lb)
T11: 13 N·m (1.3 kg·m, 120 in·lb)
T12: 5.1 N·m (0.52 kg·m, 45 in·lb)
T13: 30 N·m (3.1 kg·m, 22 ft·lb)
T14: 125 N·m (12.7 kg·m, 92.2 ft·lb)

8-4 CRANKSHAFT/TRANSMISSION

Specifications

Item		Standard	Service Limit
Crankshaft, Connecting Rods:			
Connecting rod bend		- - -	TIR 0.2/100 mm (0.08/3.94 in)
Connecting rod twist		- - -	TIR 0.2/100 mm (0.08/3.94 in)
Connecting rod big end side clearance		0.13 ~ 0.38 mm (0.0051 - 0.050 in)	0.58 mm (0.023 in)
Connecting rod big end bearing insert/crankpin clearance		0.042 ~ 0.070 mm (0.00165 - 0.0028 in)	0.11 mm (0.0043 in)
Crankpin diameter:		35.984 ~ 36.000 mm (1.41669 - 1.41732 in)	35.97 mm (1.4161 in)
Marking	None	35.984 ~ 35.992 mm (1.41669 - 1.41701 in)	- - -
	○	35.993 ~ 36.000 mm (1.41704 - 1.41732 in)	- - -
Connecting rod big end inside diameter:		39.000 ~ 39.016 mm (1.53543 - 1.53606 in)	- - -
Marking	None	39.000 ~ 39.008 mm (1.53543 - 1.53574 in)	- - -
	○	39.009 ~ 39.016 mm (1.53578 - 1.53606 in)	- - -
Connecting rod big end bearing insert thickness:			
	Black	1.475 ~ 1.480 mm (0.05807 - 0.05827 in)	- - -
	Blue	1.480 ~ 1.485 mm (0.05827 - 0.05846 in)	- - -
	White	1.485 ~ 1.490 mm (0.05846 - 0.05866 in)	- - -

Connecting rod big end bearing insert selection:

Con-rod Big End Inside Diameter Markings	Crankpin Diameter Markings	Bearing Inserts	
		Size Color	Part Number
None	○	Black	92028-1679
None	None	Blue	92028-1680
○	○		
○	None	White	92028-1681

Crankshaft side clearance		0.05 ~ 0.20 mm (0.0020 - 0.0079 in)	0.40 mm (0.0158 in)
Crankshaft runout		TIR 0.02 mm (0.0008 in) or less	TIR 0.05 mm (0.0020 in)
Crankshaft main bearing insert/journal clearance		0.020 ~ 0.044 mm (0.00079 - 0.00173 in)	0.08 mm (0.0032 in)
Crankshaft main journal diameter:		35.984 ~ 36.000 mm (1.41669 - 1.41732 in)	35.96 mm (1.4158 in)
Marking	None	35.984 ~ 35.992 mm (1.41669 - 1.41701 in)	- - -
	1	35.993 ~ 36.000 mm (1.41704 - 1.41732 in)	- - -

Specifications

Item		Standard	Service Limit
Crankcase main bearing bore diameter:		39.000 ~ 39.016 mm (1.53543 ~ 1.53606 in)	- - -
Marking	○	39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in)	- - -
	None	39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in)	- - -
Crankshaft main bearing insert thickness:			
	Brown	1.490 ~ 1.494 mm (0.05866 ~ 0.05822 in)	- - -
	Black	1.494 ~ 1.498 mm (0.05822 ~ 0.05898 in)	- - -
	Blue	1.498 ~ 1.502 mm (0.05898 ~ 0.05913 in)	- - -

Crankshaft main bearing insert selection:

Crankcase Main Bearing Bore Diameter Marking	Crankshaft Main Journal Diameter Marking	Bearing Inserts*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92028-1274	1, 3, 5
			92028-1102	2, 4
None	1	Black	92028-1273	1, 3, 5
○	None		92028-1101	2, 4
None	None	Blue	92028-1272	1, 3, 5
			92028-1100	2, 4

*The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.

Transmission:		
Shift fork ear thickness	4.9 ~ 5.0 mm (0.193 ~ 0.197 in)	4.8 mm (0.189 in)
Gear groove width	5.05 ~ 5.15 mm (0.1988 ~ 0.203 in)	5.25 mm (0.207 in)
Shift fork guide pin diameter	7.9 ~ 8.0 mm (0.311 ~0.315 in)	7.8 mm (0.307 in)
Shift drum groove width	8.05 ~ 8.20 mm (0.317 ~ 0.323 in)	8.3 mm (0.327 in)

Special Tools - Coupling Holder: 57001–1189
Outside Circlip Pliers: 57001–144
Bearing Puller Adapter: 57001–317
Bearing Puller: 57001–135
Steering Stem Bearing Driver: 57001–137
Bearing Driver Set: 57001–1129

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120
Kawasaki Bond (Liquid Gasket- gray): 92104–1063

8-6 CRANKSHAFT/TRANSMISSION

Crankcase

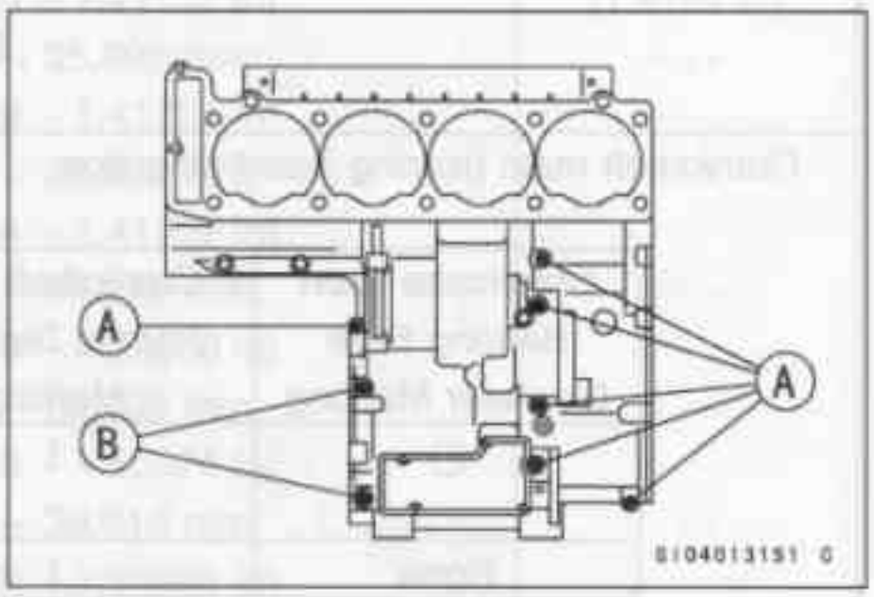
Crankcase Splitting

- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove the following parts from the engine.
  Starter Motor
  Alternator
  Clutch Cover
  External Shift Mechanism (see this chapter)

★ If the crankshaft is to be removed, remove the following:
  Cylinder and Pistons (see Engine Top End chapter)
  Alternator Shaft Chain, Coupling and Sprocket (see this chapter)

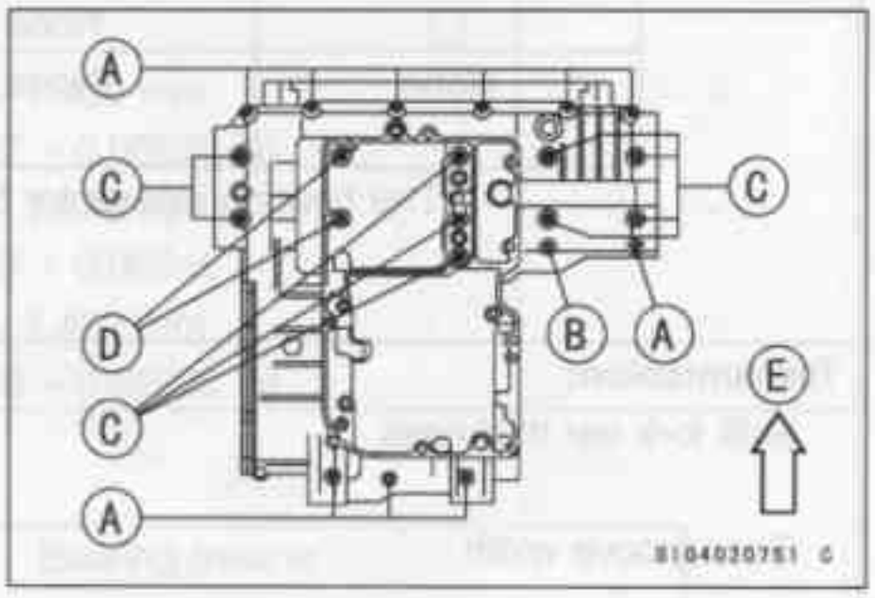
★ If the transmission drive shaft is to be removed, remove the clutch (see Clutch chapter).

- Remove the upper crankcase bolts in the order listed.
  6 mm Bolts [A]
  8 mm Bolts [B]



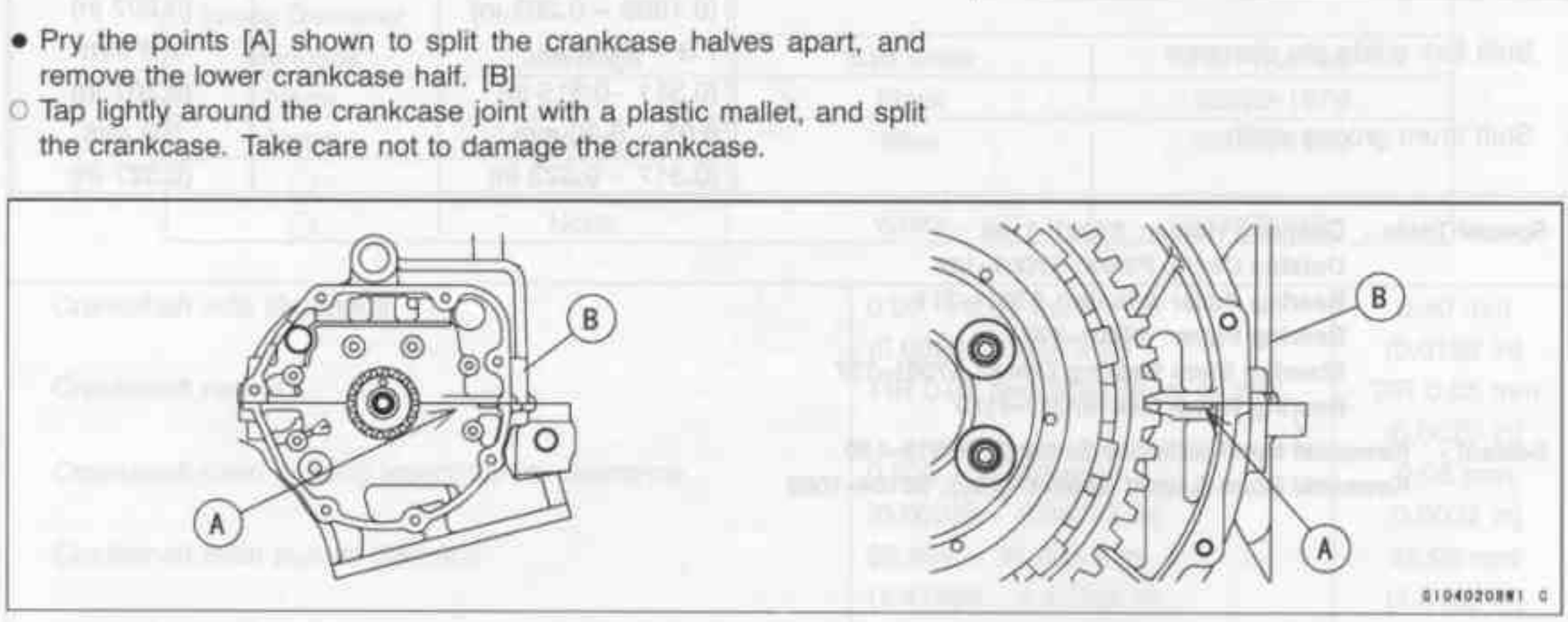
- Turn the engine upside down, and remove:
  Oil Pan (See Engine Lubrication System Chapter)
  Oil Pump along with Bracket
- Remove the lower crankcase bolts in the order listed.
  6 mm Bolts [A]
  7 mm Bolt [B]
  9 mm Bolts [C]

○ Do not remove the main bearing cap bolts [D] if the crankshaft is not to be removed.



- Pry the points [A] shown to split the crankcase halves apart, and remove the lower crankcase half. [B]

○ Tap lightly around the crankcase joint with a plastic mallet, and split the crankcase. Take care not to damage the crankcase.



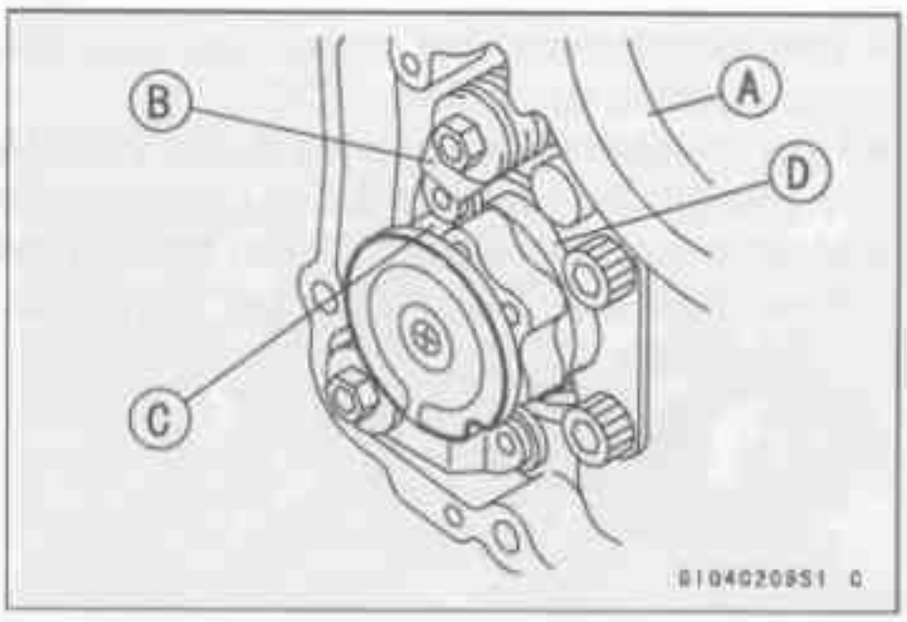
Crankcase

Crankcase Assembly

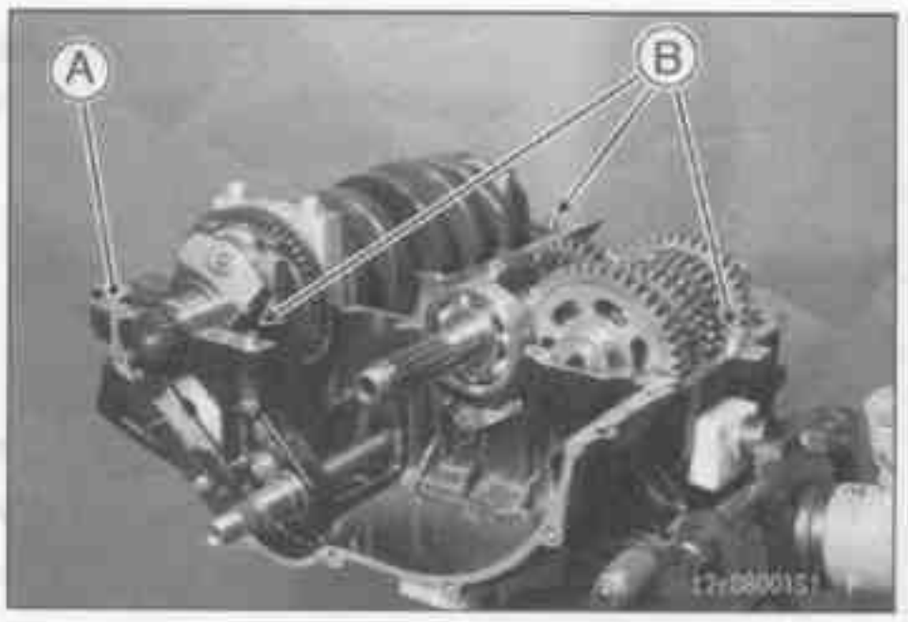
NOTE

○ *The upper crankcase half, the lower crankcase half, and the crankshaft main bearing cap are machined at the factory in the assembled state, so the crankcase halves and the main bearing cap must be replaced together as a set.*

- Install the shift drum and forks into the upper crankcase (see Transmission section in this chapter).
- In the upper crankcase [A], set the shift drum in the neutral position (the neutral set lover [B] fits into the detent [C] of the neutral cam [D]).



- With a high-flash point solvent, clean off the mating surface of the upper crankcase half [A] and wipe dry.
- Check that the dowel pins [B] are in place.
- Install (see this chapter):
  Alternator Shaft (upper crankcase)
  Transmission (upper crankcase)
  Crankshaft (upper crankcase)
  Balancer Shaft (lower crankcase)



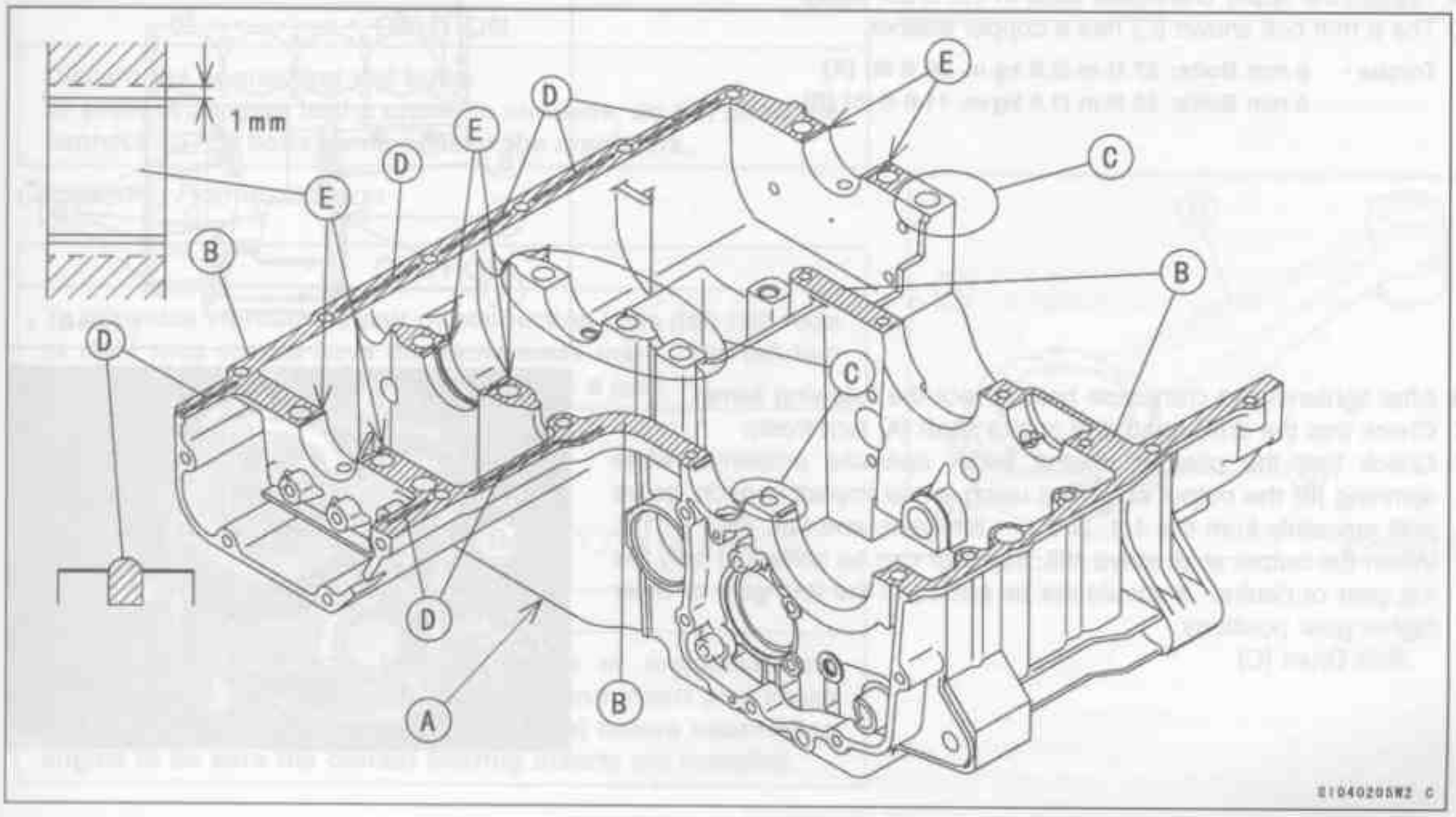
- With a high-flash point solvent, clean off the mating surface of the lower crankcase half [A] and wipe dry.
- Apply liquid gasket [B] to the mating surface of the lower crankcase half. Finish applying gasket in five minutes.

Sealant - Kawasaki Bond (Liquid Gasket- gray): 92104–1063

○ Fill the grooves [D] with the gasket, so its surface swells a little to prevent leakage.

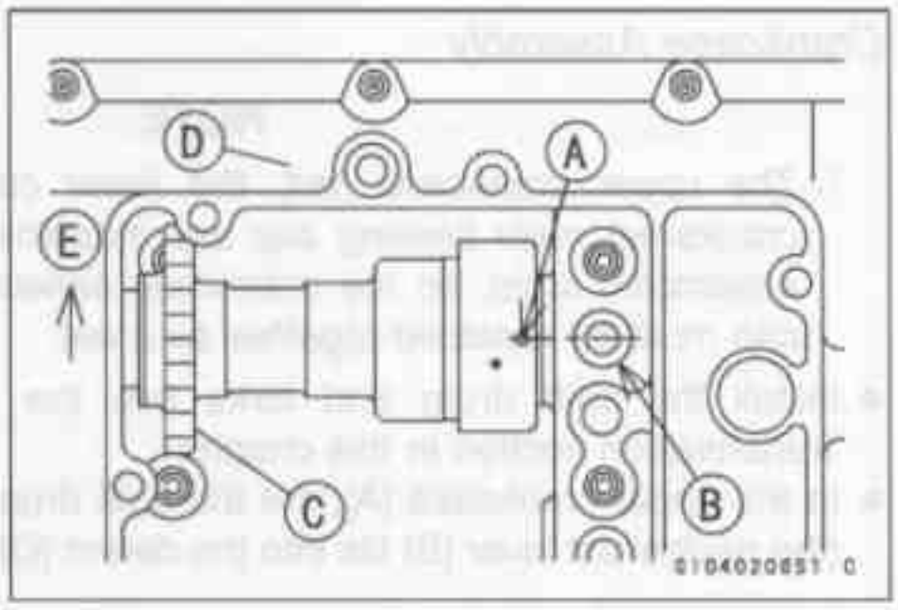
CAUTION

Do not apply the liquid gasket to the areas [C], around the bearing inserts [E], and oil passages.



Crankcase

- Temporarily, install the timing rotor and nut, and then position the crankshaft at #1, 4 piston TDC.
- Hold the balancer so that the punch mark [A] on the balancer mass aligns with the center of the oil passage hole [B].
- Mesh the balancer gear [C] with the crankshaft gear and install the lower crankcase [D] on the upper crankcase.
  Front [E]



- Tighten the lower crankcase bolts using the following steps.
○ The three 9 mm bolts (No. 1 ~3) have a flat washer, respectively.
○ First, tighten the 9 mm bolts.

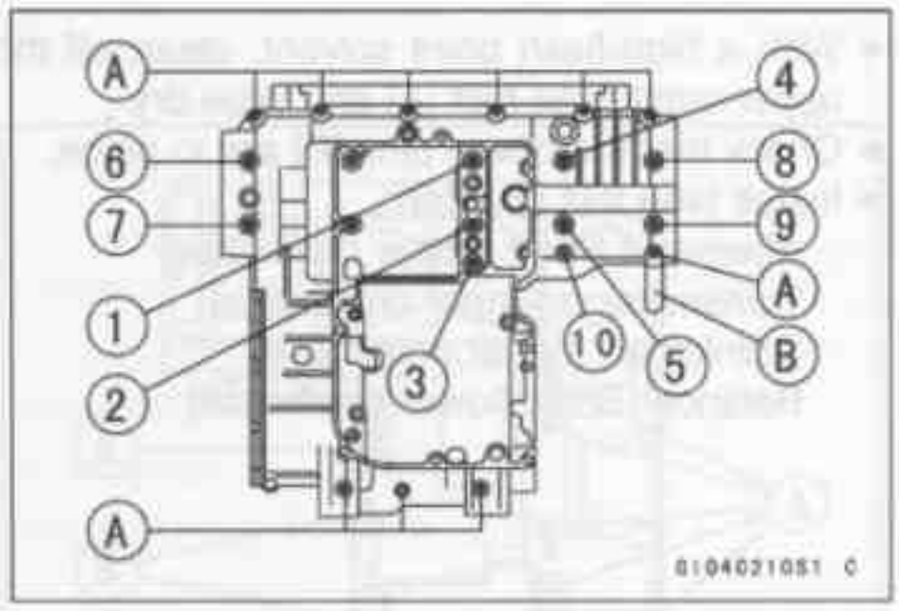
Torque - 9 mm Bolts (No. 1 ~ 9)
First: 9.8 N·m (1.0 kg·m, 87 in·lb)
Final: 32 N·m (3.3 kg·m, 24 ft·lb)

○ Secondly, tighten the 7 mm bolt.

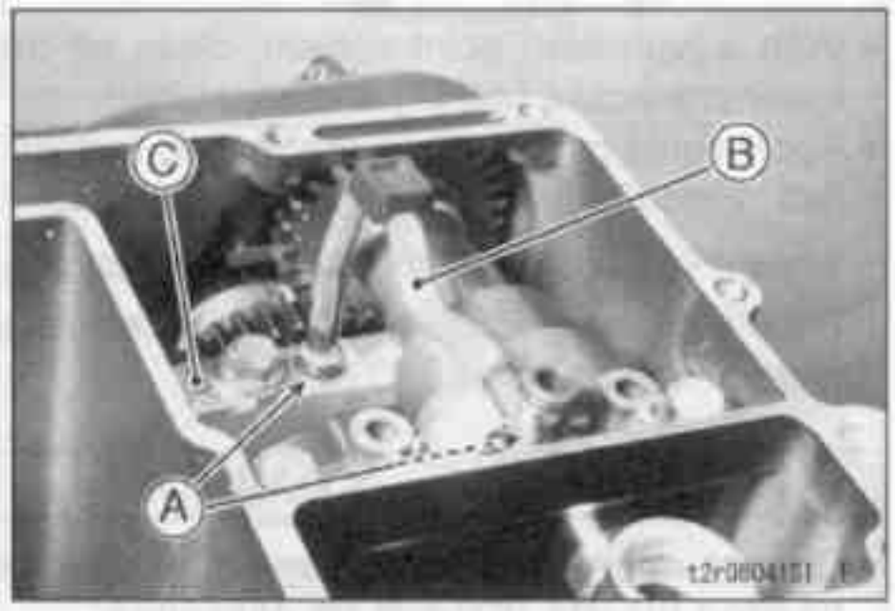
Torque - 7 mm Bolt (No. 10): 18 N·m (1.8 kg·m, 13.0 ft·lb)

○ Finally, tighten the 6 mm bolts evenly along with a clamp [B].

Torque - 6 mm Bolts [A]: 15 N·m (1.5 kg·m, 11.0 ft·lb)

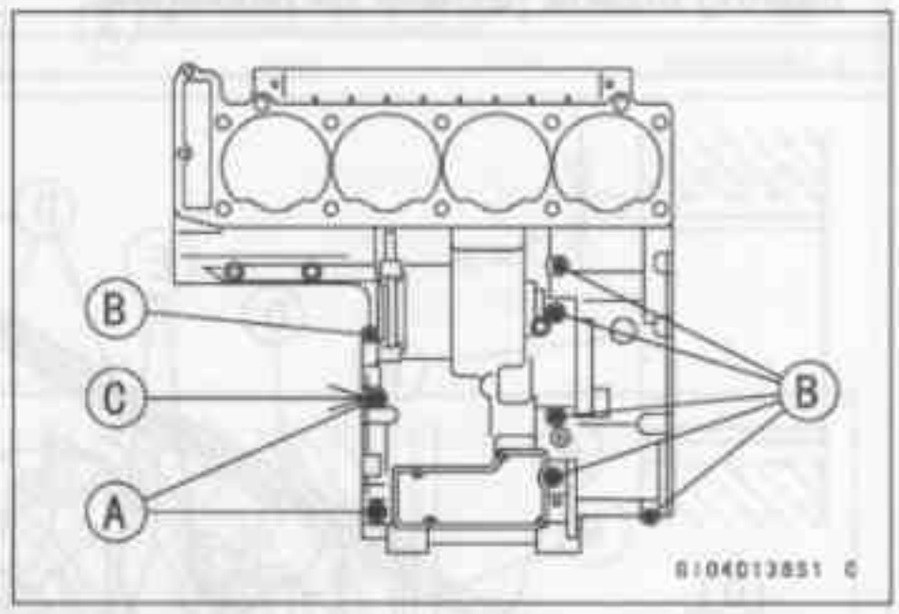


- Apply grease to the O-rings [A] and install the oil pipe [B] into the main bearing cap [C] and lower crankcase bearing housing.
- Install (see Engine Lubrication System Chapter):
  Oil Pump along with Pump Bracket
  Oil Pan

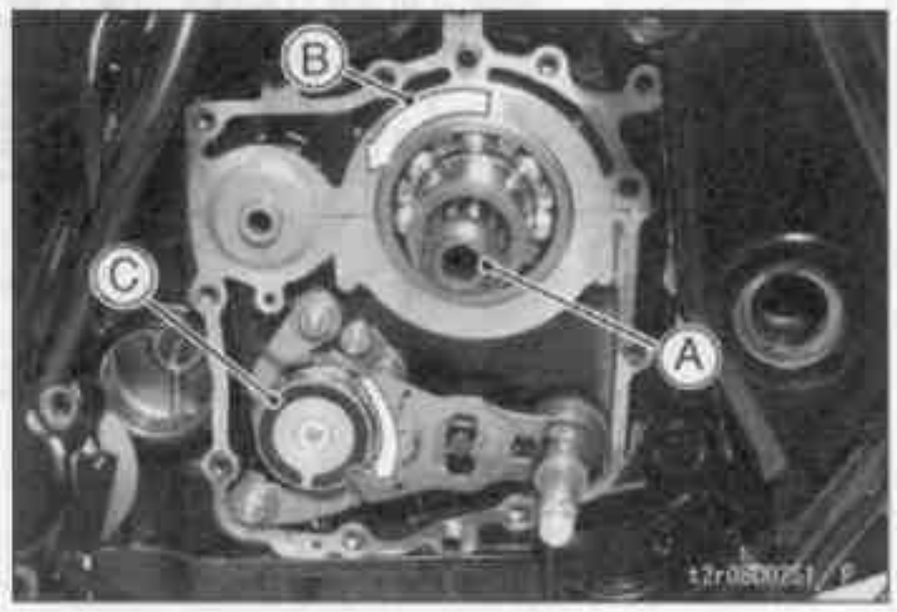


- Tighten the upper crankcase bolts in the order listed.
○ The 8 mm bolt shown [C] has a copper washer.

Torque - 8 mm Bolts: 27 N·m (2.8 kg·m, 20 ft·lb) [A]
6 mm Bolts: 15 N·m (1.5 kg·m, 11.0 ft·lb) [B]



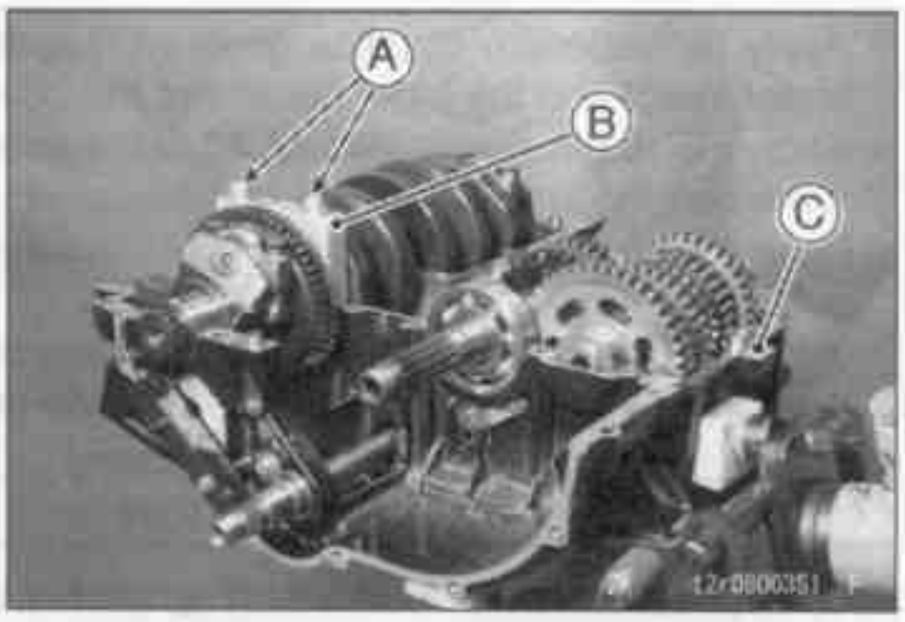
- After tightening all crankcase bolts, check the following items.
○ Check that the drive shaft and output shaft [A] turn freely.
○ Check that the positive neutral finder operates properly: while spinning [B] the output shaft fast using an air impact wrench, gears shift smoothly from the 1st, 2nd · · · 5th gear, and 5th, 4th · · · 1st. When the output shaft stays still, the gear can be shifted to only the 1st gear or neutral. It should not be shifted to the 2nd gear or other higher gear positions.
  Shift Drum [C]



Crankshaft and Connecting Rods

Crankshaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the main bearing cap bolts [A] with flat washers, and take off the cap [B] from the upper crankcase [C].
- Remove the crankshaft.



Crankshaft Installation

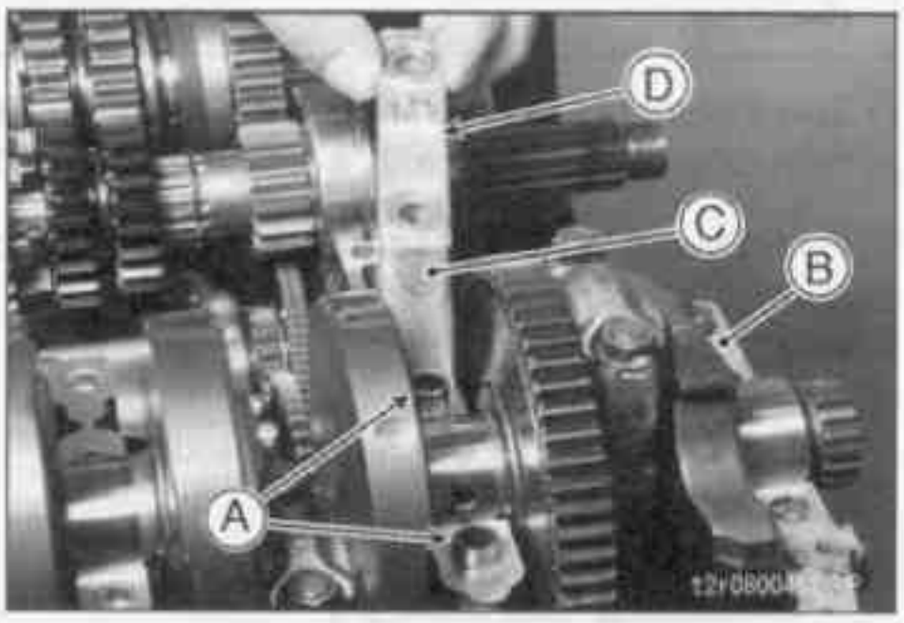
CAUTION

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

- Check that the dowel pins [A] are in the upper crankcase [B].
- Install the main bearing cap [C] with the arrow mark [D] on it pointing forward.

○ Tighten the main bearing cap bolts.

Torque - Main Bearing Cap Bolts: 32 N·m (3.3 kg·m, 24 ft·lb)



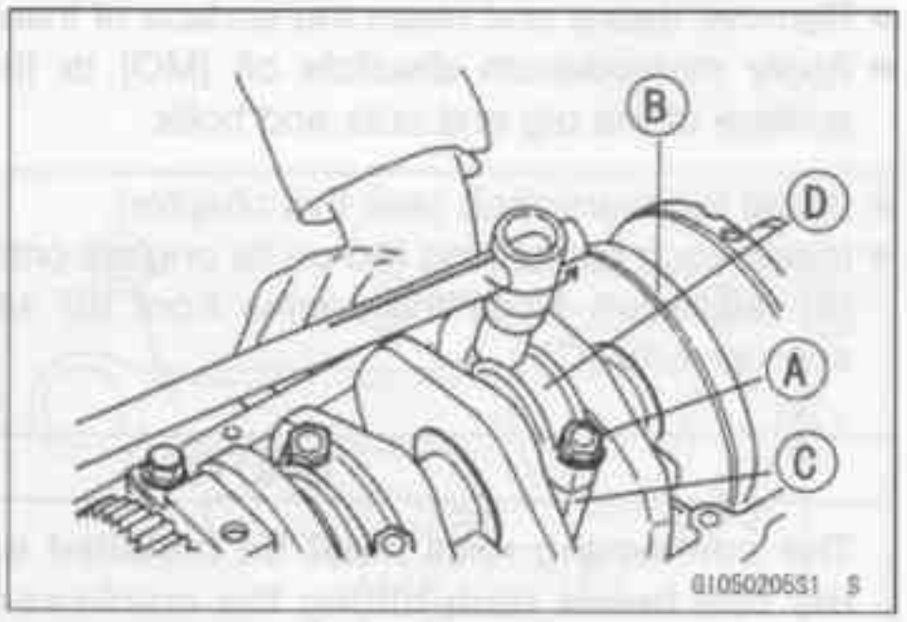
Connecting Rod Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the connecting rod nuts [A].
- Remove the crankshaft [B].

NOTE

○ *Mark and record the locations of the connecting rods [C] and their big end caps [D] so that they can be reassembled in their original positions.*

- Remove the connecting rods from the crankshaft.



CAUTION

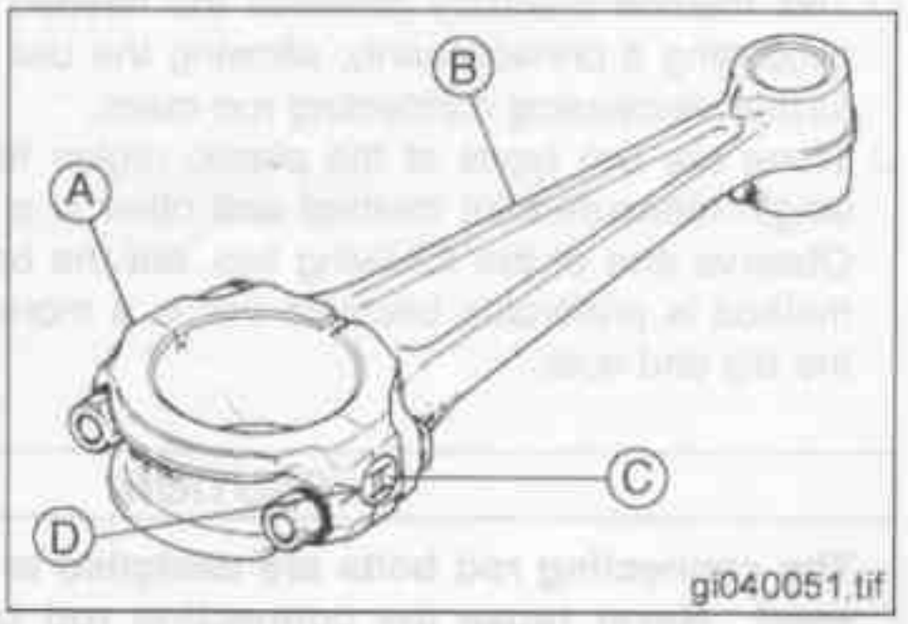
Discard the connecting rod bolts.
To prevent damage to the crankpin surfaces, do not allow the connecting rod bolts bump against the crankpins.

Connecting Rod Installation

CAUTION

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

Big End Cap [A]
Connecting Rod [B]
Mass Mark (alphabet) [C]
Diameter Mark [D] (around weight mark) : "○" or no mark



CAUTION

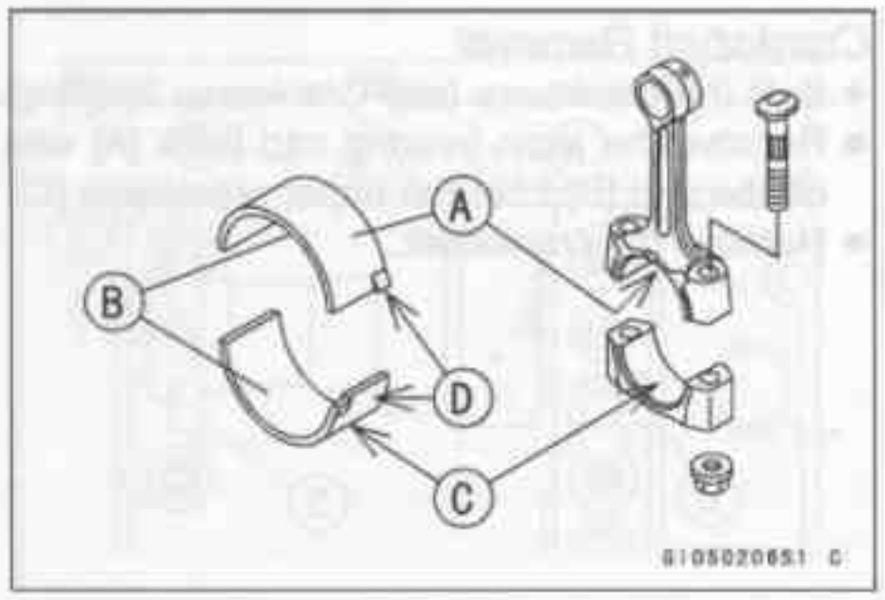
If the connecting rods, bearing inserts or crankshaft are replaced with new ones, select the bearing insert and check clearance with a plastigage (press gauge) before assembling engine to be sure the correct bearing inserts are installed.

Crankshaft and Connecting Rods

- Apply molybdenum disulfide grease [A] to the outer surface of the upper insert and the inner surface of the connecting rod big end.
- Apply molybdenum disulfide oil [B] to the inner surfaces of upper and lower bearing inserts.

○ Do not apply any grease or oil [C] to the cap inside and cap insert outside.

○ Install the inserts so that their nails [D] are on the same side and fit them into the recess of the connecting rod and cap.

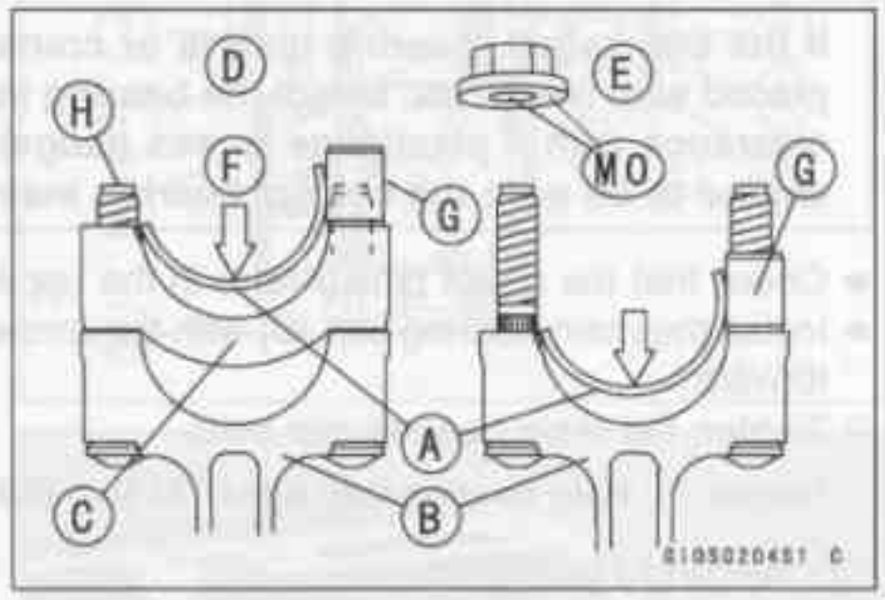


CAUTION

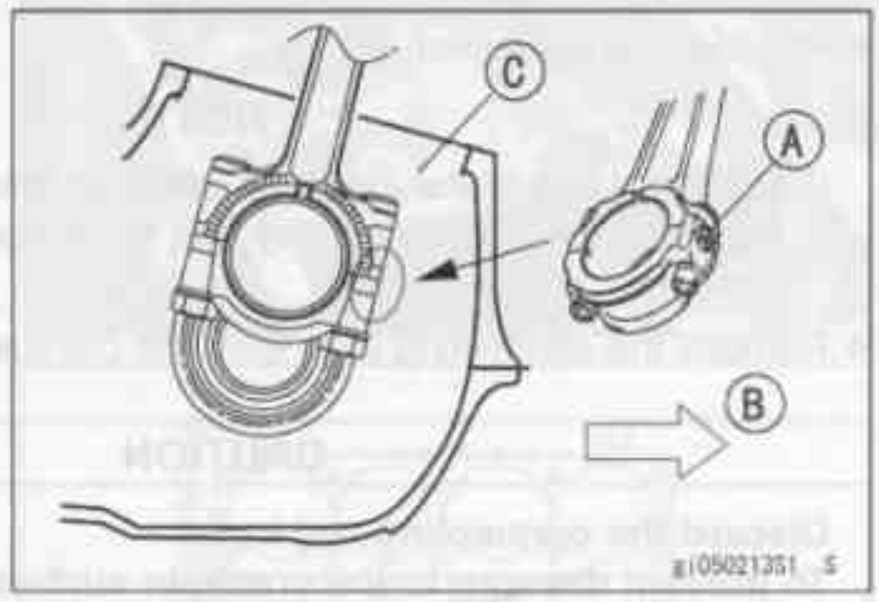
Wrong application of oil and grease could cause bearing damage.

○ The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10:1).

○ When installing the inserts [A], be careful not to damage the insert surface with the edge of the connecting rod [B] or the cap [C]. One way to install inserts is as follows:
Installation [D] to Cap
Installation [E] to Connecting Rod
Push [F]
Dowel Pin [G]
Connecting Rod Bolts [H]



- Install the cap on the connecting rod, aligning the mass and diameter marks.
- Remove debris and clean the surface of inserts.
- Apply molybdenum disulfide oil [MO] to the threads and seating surface of the big end nuts and bolts.
- Install the crankshaft (see this chapter).
- Install each connecting rod on its original crankpin so the mass mark [A] (alphabet) faces the engine front [B] with the rod through the cylinder hole [C].



CAUTION

The connecting rods must be installed as shown to prevent the bolt heads from hitting the crankcase possibly while the engine is running.

○ The connecting rod big end is bolted using the "plastic region fastening method".

○ This method precisely achieves the needed clamping force without exceeding it unnecessarily, allowing the use of thinner, lighter bolts further decreasing connecting rod mass.

○ There are two types of the plastic region fastening. One is a bolt length measurement method and other is a rotation angle method. Observe one of the following two, but the bolt length measurement method is preferable because this is a more reliable way to tighten the big end nuts.

CAUTION

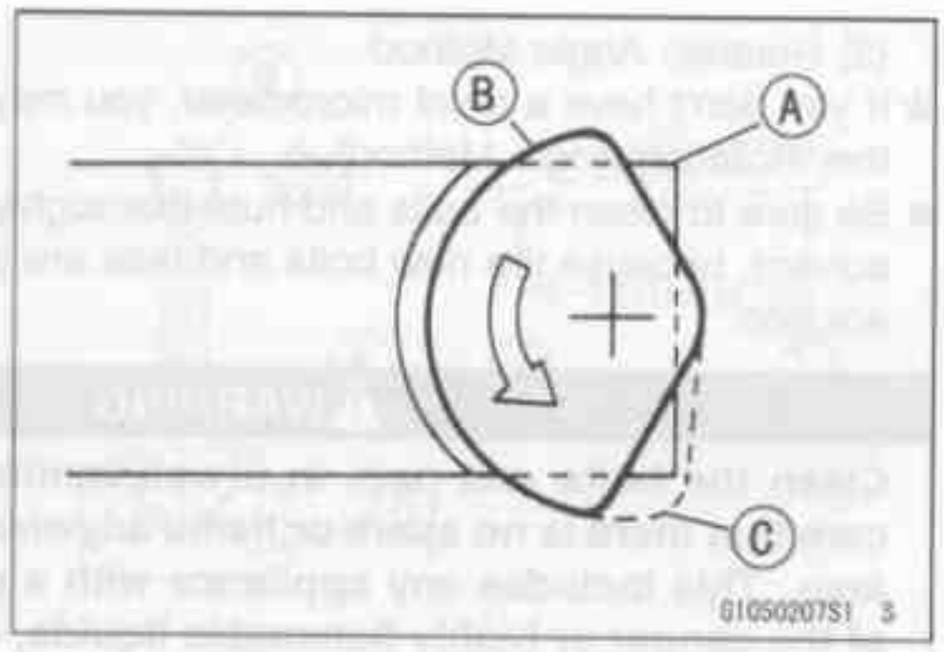
The connecting rod bolts are designed to stretch when tightened. Never reuse the connecting rod bolts. See the table below for correct bolt and nut usage.

CAUTION

Be careful not to overtighten the nuts.
Do not turn the connecting rod bolts during nut tightening. The bolts must be positioned correctly to prevent the bolt heads from hitting the crankcase while the engine is running.

Crankshaft and Connecting Rods

Connecting Rod Big End Shoulder [A]
Correct Position of Bolt Head [B]
Wrong Position of Bolt Head [C]



(1) Bolt Length Measurement Method

- Be sure to clean the bolts, nuts, and connecting rods thoroughly with a high-flash point solvent, because the new connecting rods, bolts, and nuts are treated with an anti-rust solution.

⚠ WARNING

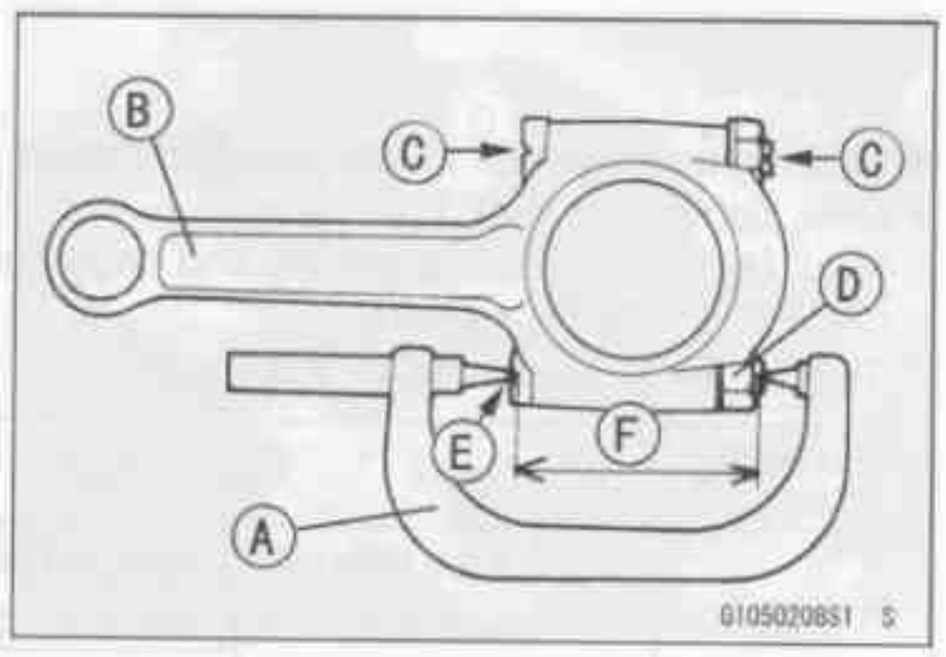
Clean the bolts, nuts, and connecting rods in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area. This includes any appliance with a pilot light. Because of the danger of highly flammable liquids, do not use gasoline or low-flash point solvents to clean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

CAUTION

Immediately dry the bolts and nuts with compressed air after cleaning.
Clean and dry the bolts and nuts completely.

- Install new bolts in reused connecting rods.
- Dent both bolt head and bolt tip with a punch as shown.
- Before tightening, use a point micrometer [A] to measure the length of new connecting rod bolts and record the values to find the bolt stretch.
  Connecting Rod [B]
  Mark here with a punch [C].
  Nuts [D]
  Fit micrometer pins into punch marks [E].
- Apply a small amount of molybdenum disulfide oil to the following:
  Threads of Nuts and Bolts.
  Seating Surfaces of Nuts and Con-rods.
- Tighten the big end nuts until the bolt elongation reaches the length specified in the table.
- Check the length [F] of the connecting rod bolts.

★ If the stretch is more than the usable range, the bolt has stretched too much. An overelongated bolt may break in use.



Bolt Length after tightening − Bolt Length before tightening = Bolt Stretch

Connecting Rod Assy	Bolt	Nut	Usable Range of Connecting Rod Bolt Stretch
New	Use the bolts attached to new con-rod	Attached to new con-rod	0.22 ~ 0.30 mm (0.0087 ~ 0.0118 in)
		New	
Used	Replace the bolts with new ones.	Used	0.22 ~ 0.30 mm (0.0087 ~ 0.0118 in)
		New	

Crankshaft and Connecting Rods

(2) Rotation Angle Method

★ If you don't have a point micrometer, you may tighten the nuts using the "Rotation Angle Method".

- Be sure to clean the bolts and nuts thoroughly with a high-flash point solvent, because the new bolts and nuts are treated with an anti-rust solution.

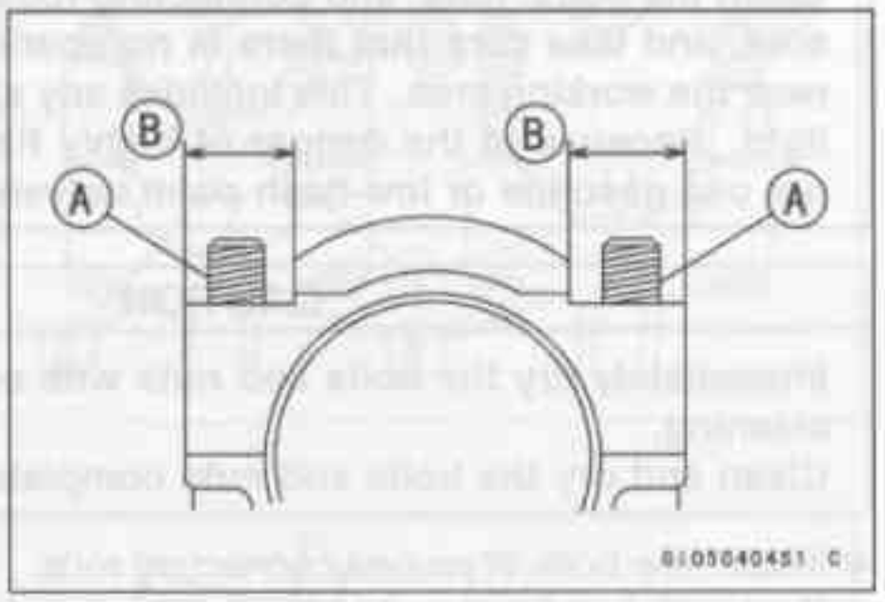
⚠ WARNING

Clean the bolts and nuts 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 or highly flammable liquids, do not use gasoline or low-flash point solvents to clean them.

CAUTION

Immediately dry the bolts and nuts with compressed air after cleaning.
Clean and dry the bolts and nuts completely.

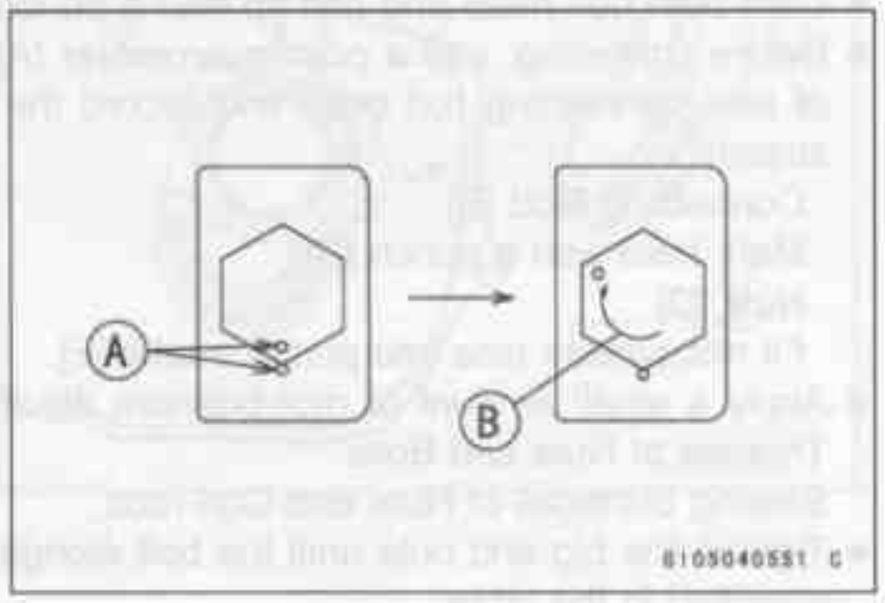
- Install new bolts in reused connecting rods.
- Apply a small amount of molybdenum disulfide oil to the following:
  Threads [A] of Nuts and Bolts.
  Seating Surfaces [B] of Nuts and Con-rods.



- First, tighten the nuts to the specified torque. See the table below.
- Next, tighten the nuts **120°** more.

○ Mark [A] the connecting rod big end caps and nuts so that nuts can be turned 120° [B] properly.

○ Tighten the hexagon nut by 2 corners.



Connecting Rod	Bolt	Nut	Torque + Angle N·m (kg·m, ft·lb)
New	Use the bolts attached to new con-rod	Attached to new con-rod	ALL 15 ± 1 (1.5 ± 0.1, 11 ± 0.7) + 120° ± 5°
		New	
Used	Replace the bolts with new ones	Used	
		New	

Crankshaft, Connecting Rod Cleaning

- After removing the connecting rods from the crankshaft, clean them with a high-flash point solvent.
- Blow the crankshaft oil passages with compressed air to remove any foreign particles or residue that may have accumulated in the passages.

Crankshaft and Connecting Rods

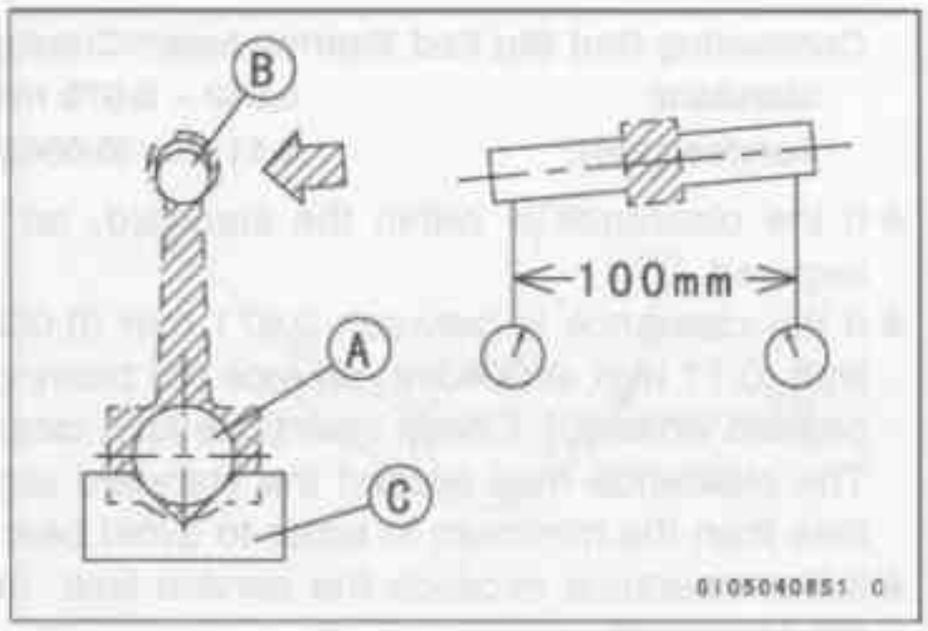
Connecting Rod Bend

- Remove the connecting rod big end bearing inserts, and reinstall the connecting rod big end cap.
- Select an arbor [A] of the same diameter as the connecting rod big end, and insert the arbor through the connecting rod big end.
- Select an arbor of the same diameter as the piston pin and at least 100 mm long, and insert the arbor [B] through the connecting rod small end.
- On a surface plate, set the big-end arbor on V blocks [C].
- With the connecting rod held vertically, use a height gauge to measure the difference in the height of the arbor above the surface plate over a 100 mm length to determine the amount of connecting rod bend.

★ If connecting rod bend exceeds the service limit, the connecting rod must be replaced.

Connecting Rod Bend

Service Limit:	**TIR 0.2/100 mm(0.08/3.94 in)**



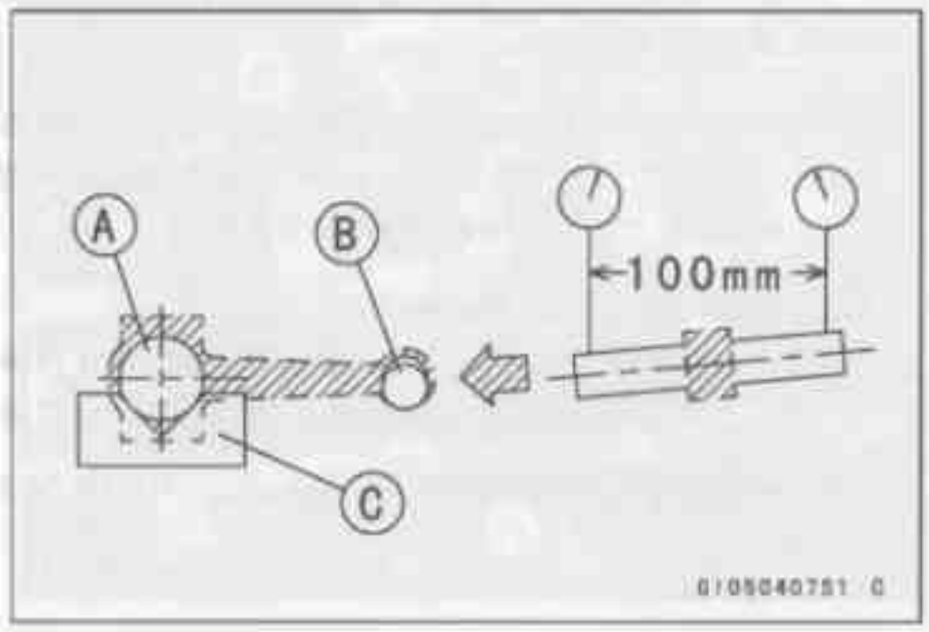
Connecting Rod Twist

- With the big-end arbor [A] still on V blocks [C], hold the connecting rod horizontally and measure the amount that the arbor [B] varies from being parallel with the surface plate over a 100 mm length of the arbor to determine the amount of connecting rod twist.

★ If connecting rod twist exceeds the service limit, the connecting rod must be replaced.

Connecting Rod Twist

Service Limit:	**TIR 0.2/100 mm(0.08/3.94 in)**



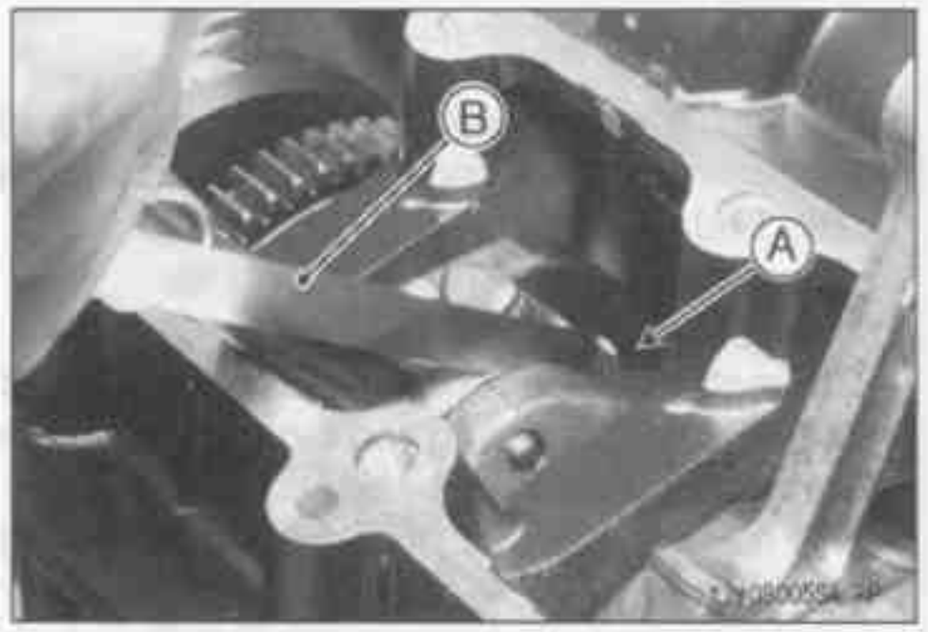
Connecting Rod Big End Side Clearance

- Measure connecting rod big end side clearance [A].
- Insert a thickness gauge [B] between the big end and either crank web to determine clearance.

Connecting Rod Big End Side Clearance

Standard:	**0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in)**
Service Limit:	**0.58 mm (0.023 in)**

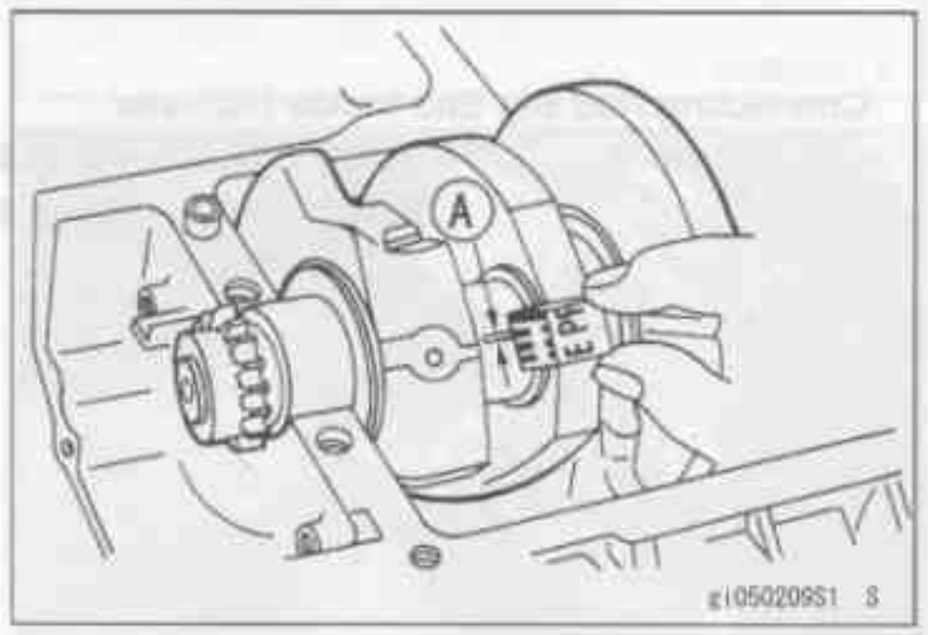
★ If the clearance exceeds the service limit, replace the connecting rod with new one and then check the clearance again. If the clearance is too large after connecting rod replacement, the crankshaft also must be replaced.



Connecting Rod Big End Bearing Wear

- Measure the bearing insert/crankpin clearance with a plastigage [A].
- Tighten the big end nuts to the specified torque.
- Do not move the connecting rod and crankshaft during clearance measurement.

CAUTION
After measurement, replace the connecting rod bolts.



Crankshaft and Connecting Rods

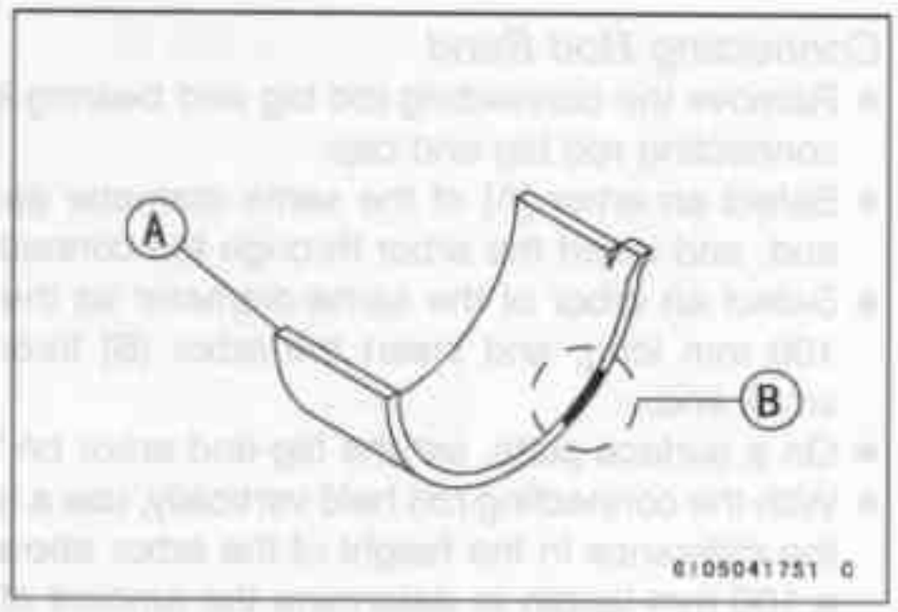
Connecting Rod Big End Bearing Insert/Crankpin Clearance

Standard:	**0.042 ~ 0.070 mm (0.00165 ~ 0.00275 in)**
Service Limit:	**0.11 mm (0.0043 in)**

★ If the clearance is within the standard, no bearing replacement is required.

★ If the clearance is between 0.071 mm (0.00279 in) and the service limit (0.11 mm, 0.0043in), replace the bearing inserts [A] with inserts painted white [B]. Check insert/crankpin clearance with a plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

★ If the clearance exceeds the service limit, measure the diameter of the crankpins.



Crankpin Diameter

Standard:	**35.984 ~ 36.000 mm (1.41669 ~ 1.41732 in)**
Service Limit:	**35.97 mm (1.4161 in)**

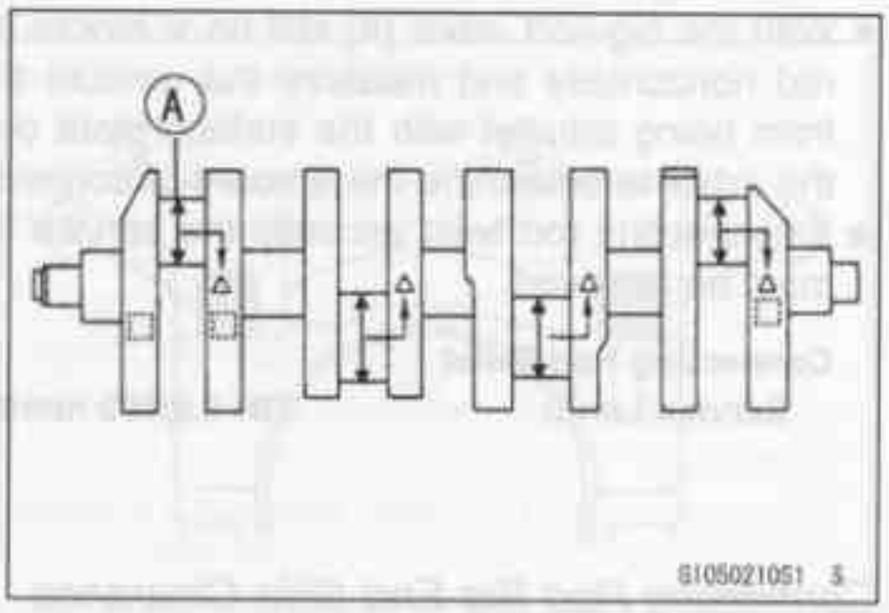
★ If any crankpin has worn past the service limit, replace the crankshaft with a new one.

★ If the measured crankpin diameters [A] are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

Crankpin Diameter Marks

None	**35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in)**
○	**35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in)**

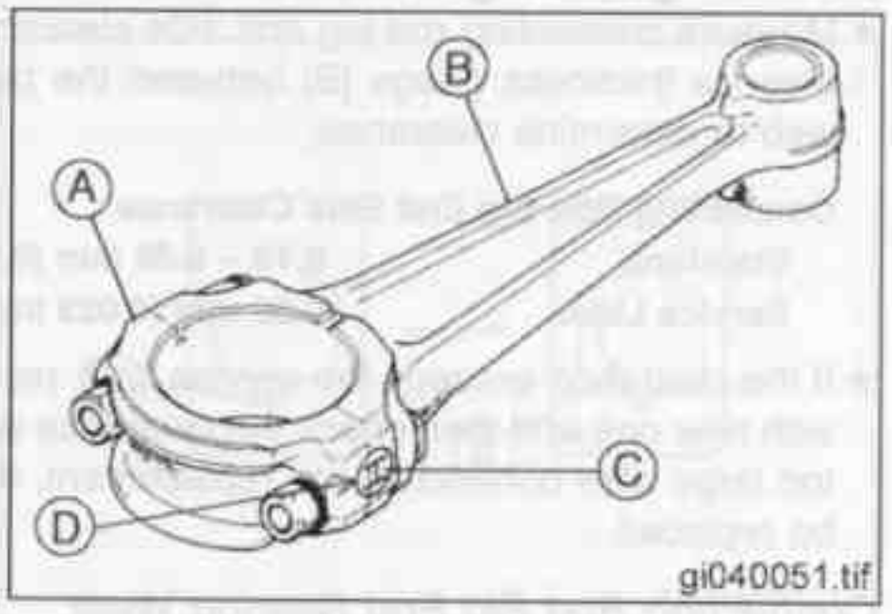
△: Crankpin Diameter Marks, "○" mark or no mark.



- Measure the connecting rod big end inside diameter, and mark each connecting rod big end in accordance with the inside diameter.
  Big End Cap [A]
  Connecting Rod [B]
  Mass Mark, alphabet [C]
  Diameter Mark (around mass mark) [D]: "○" or no mark

○ Tighten the connecting rod big end nuts to the specified torque (see Connecting Rod Installation).

○ The mark already on the big end should almost coincide with the measurement.

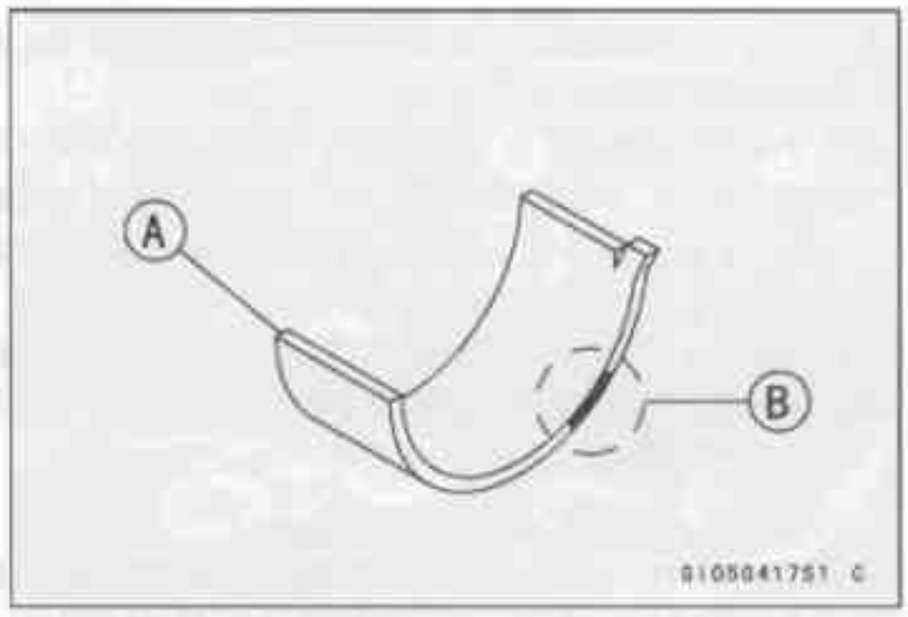


Connecting Rod Big End Inside Diameter

None	**39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in)**
○	**39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in)**

Crankshaft and Connecting Rods

- Select the proper bearing insert [A] identified by the size color [B] in accordance with the combination of the connecting rod and crankshaft coding.
- Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.



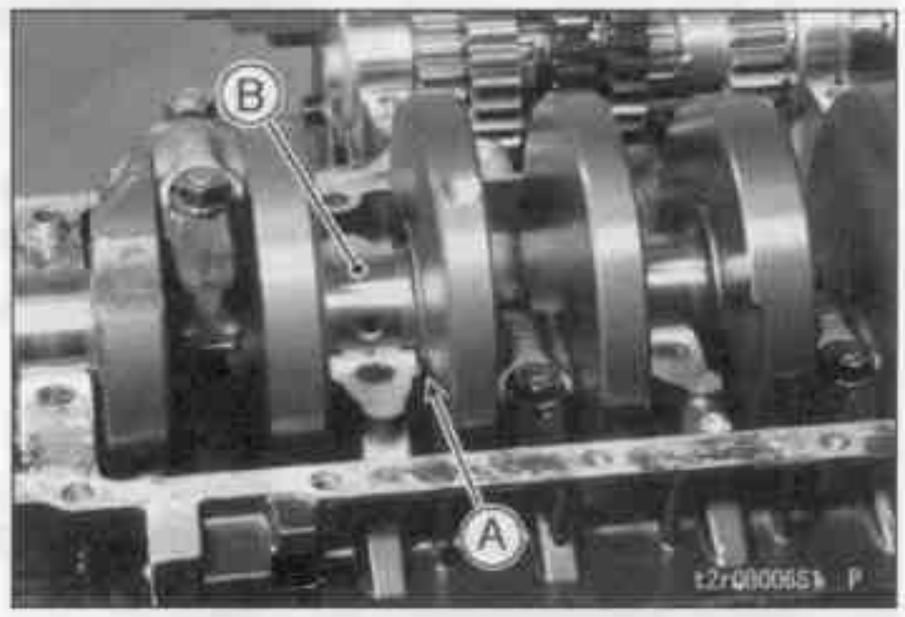
Big End Bearing Insert Selection

Con-rod Big End Inside Diameter Marking	Crankpin Diameter Marking	Bearing Insert	
		Size Color	Part Number
None	○	Black	92028-1679
None	None	Blue	92028-1680
○	○		
○	None	White	92028-1681

Crankshaft Side Clearance

- Insert a thickness gauge [A] between the upper crankcase main bearing and the crank web at the No.2 journal [B] to determine clearance.

★If the clearance exceeds the service limit, replace the crankcase halves and main bearing cap as a set.



NOTE

○ *The upper crankcase half, lower crankcase half, and main bearing cap are machined at the factory in the assembled state, so they must be replaced as a set.*

Crankshaft Side Clearance

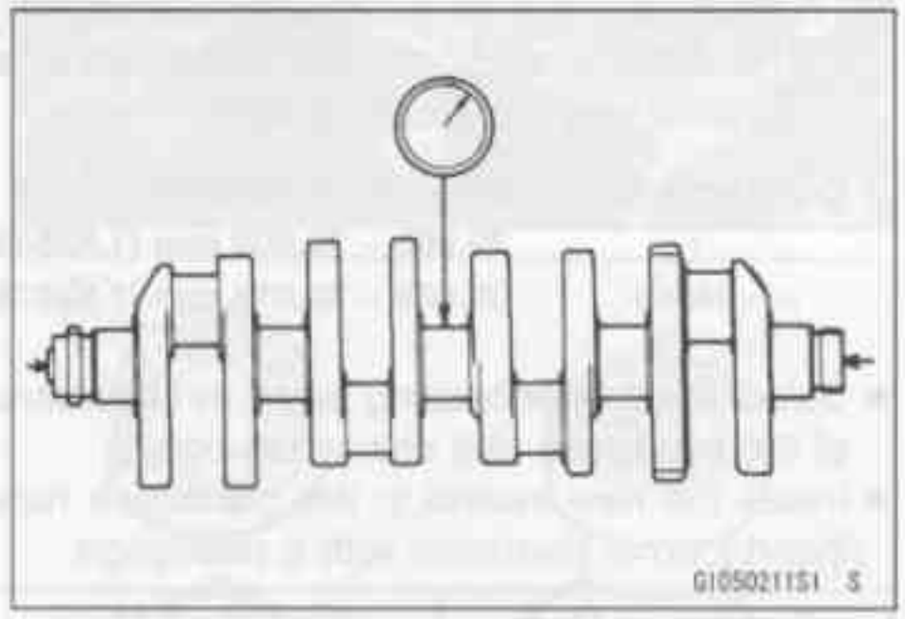
Standard: **0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in)**

Service Limit: **0.40 mm (0.0158 in)**

Crankshaft Runout

- Measure the crankshaft runout.

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



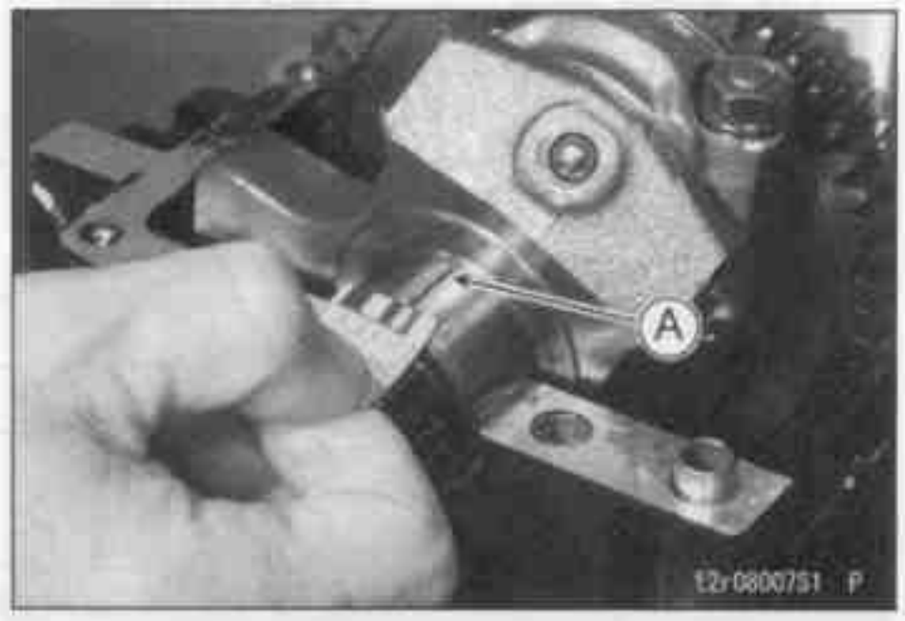
Crankshaft Runout

Standard: **TIR 0.02 mm (0.0008 in) or less**

Service Limit: **TIR 0.05 mm (0.0020 in)**

Crankshaft Main Bearing Wear

- Using a plastigage (press gauge) [A], measure the bearing insert/journal clearance.



NOTE

○ *Tighten the crankcase bolts and main bearing cap bolts to the specified torque (see Crankcase Assembly).*

○ *Do not turn the crankshaft during clearance measurement.*

○ *Journal clearance less than 0.025 mm (0.00098 in) can not be measured by plastigauge, however, using genuine parts maintain the minimum standard clearance.*

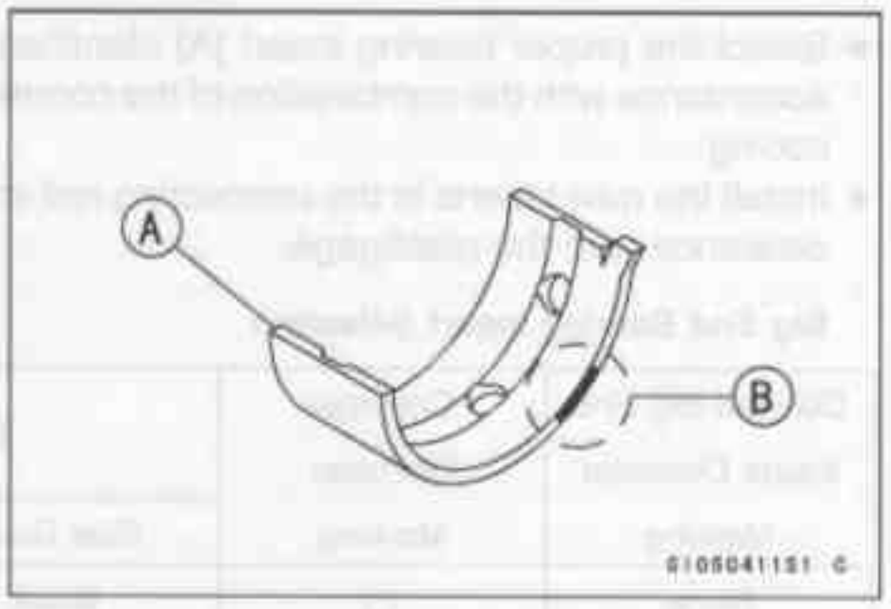
Crankshaft Main Bearing Insert/Journal Clearance

Standard: **0.020 ~ 0.044 mm (0.00079 ~ 0.00173 in)**

Service Limit: **0.08 mm (0.0032 in)**

Crankshaft and Connecting Rods

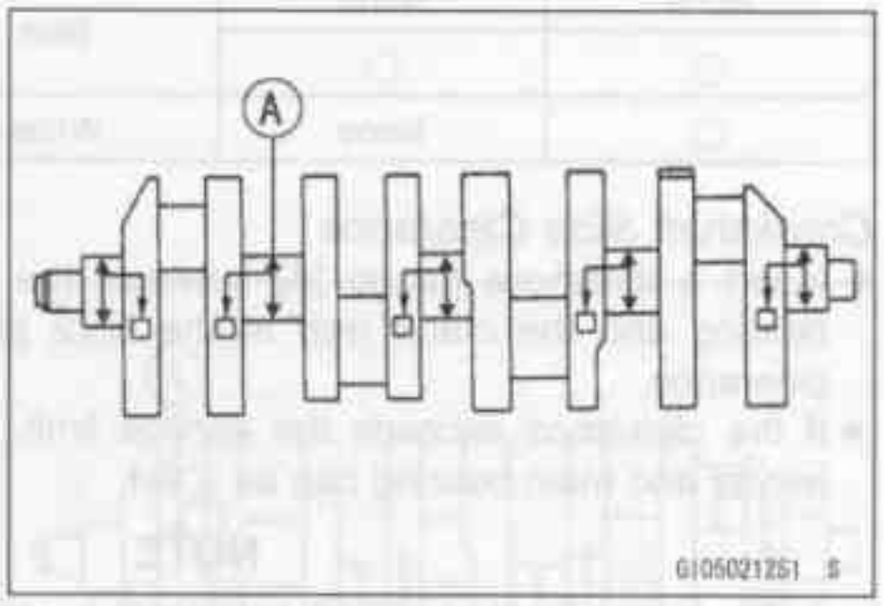
★If the clearance is within the standard, no bearing replacement is required.
★If the clearance is between 0.045 mm (0.00177 in) and the service limit (0.08 mm, 0.0032 in), replace the bearing inserts [A] with inserts painted blue [B]. Check the insert/journal clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
★If the clearance exceeds the service limit, measure the diameter of the crankshaft main journal.



Crankshaft Main Journal Diameter

Standard:	**35.984 ~ 36.000 mm (1.4669 ~ 1.41732 in)**
Service Limit:	**35.96 mm (1.4158 in)**

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

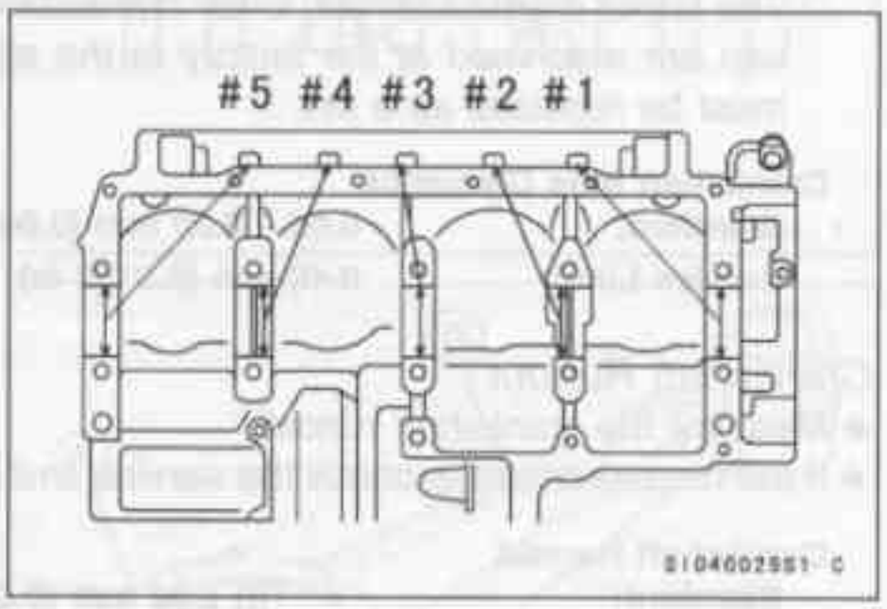


Crankshaft Main Journal Diameter Marks

None	**35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in)**
1	**35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in)**

□ : Crankshaft Main Journal Diameter Marks, "1" mark or no mark

- Measure the main bearing bore diameter, and mark the upper crankcase half in accordance with the bore diameter.
  Bore Diameter Mark: "○" or no mark



NOTE

○ *Tighten the crankcase bolts and main bearing cap bolts to the specified torque (see Crankcase Assembly).*
○ *The mark already on the upper crankcase half should almost coincide with the measurement.*

Crankcase Main Bearing Bore Diameter

○	**39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in)**
None	**39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in)**

- Select the proper bearing insert in accordance with the combination of the crankcase and crankshaft coding.
- Install the new inserts in the crankcase halves and cap and check insert/journal clearance with a plastigage.

Crankcase Main Bearing Bore Diameter Markings	Crankshaft Main Journal Diameter Markings	Bearing Inserts*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92028-1274	1, 3, 5
			92028-1102	2, 4
None	1	Black	92028-1273	1, 3, 5
○	None		92028-1101	2, 4
None	None	Blue	92028-1272	1, 3, 5
			92028-1100	2, 4

*The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.

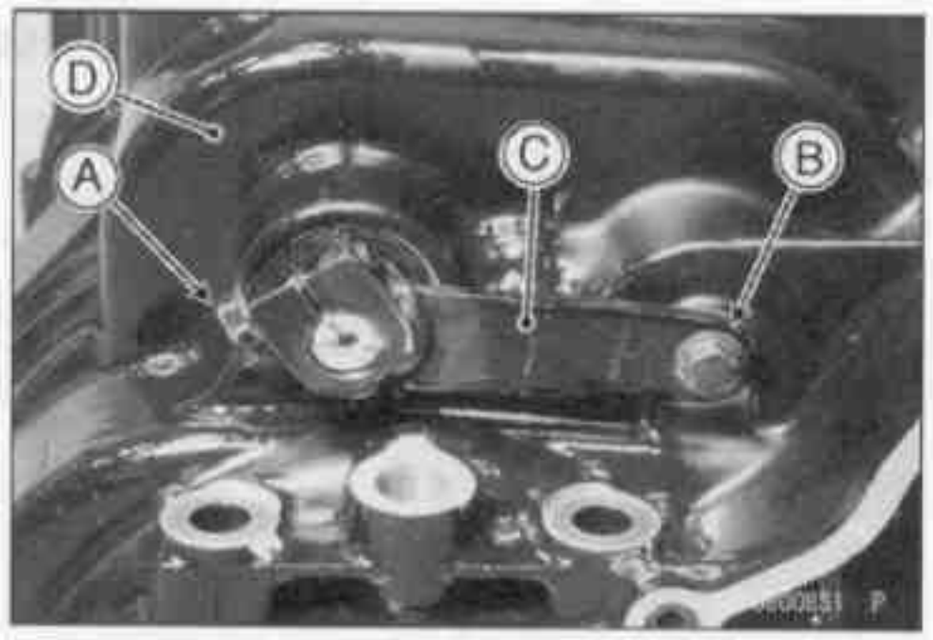
Balancer

Balancer Removal

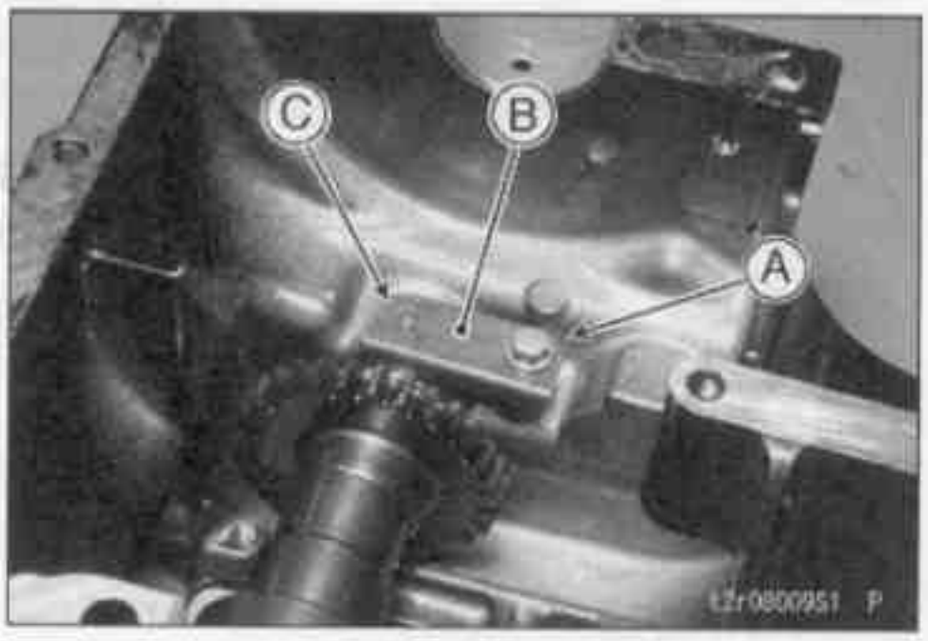
- Split the crankcase (see this chapter).

○ The oil pan is removed.

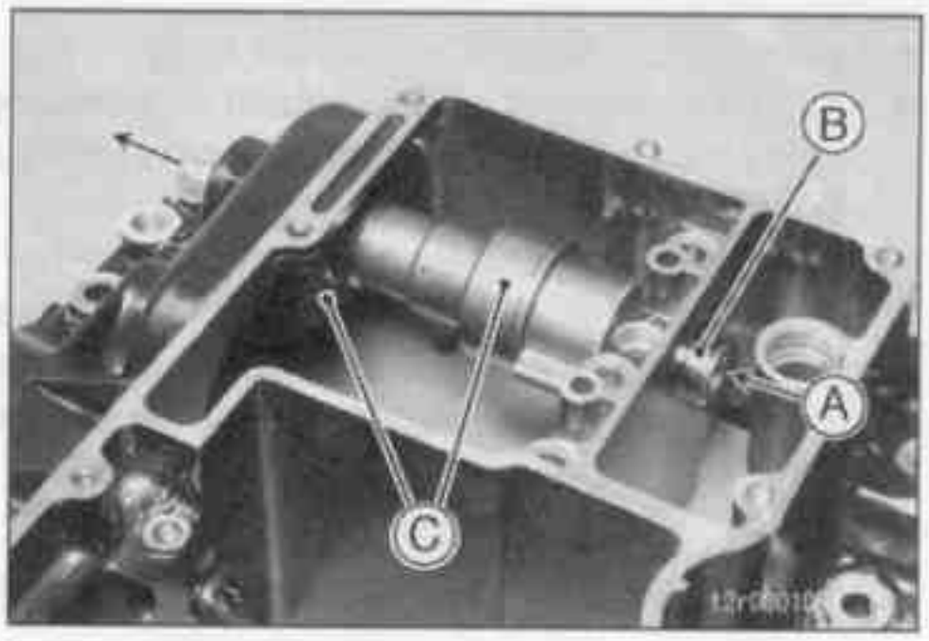
- Unscrew the balancer shaft clamp bolt [A], and balancer lever bolt [B], and pull off the balancer lever [C] from the lower crankcase half [D].



- Unscrew the balancer shaft plate bolt [A], and take off the plate [B] and guide pin [C] from the upper side of the lower crankcase.



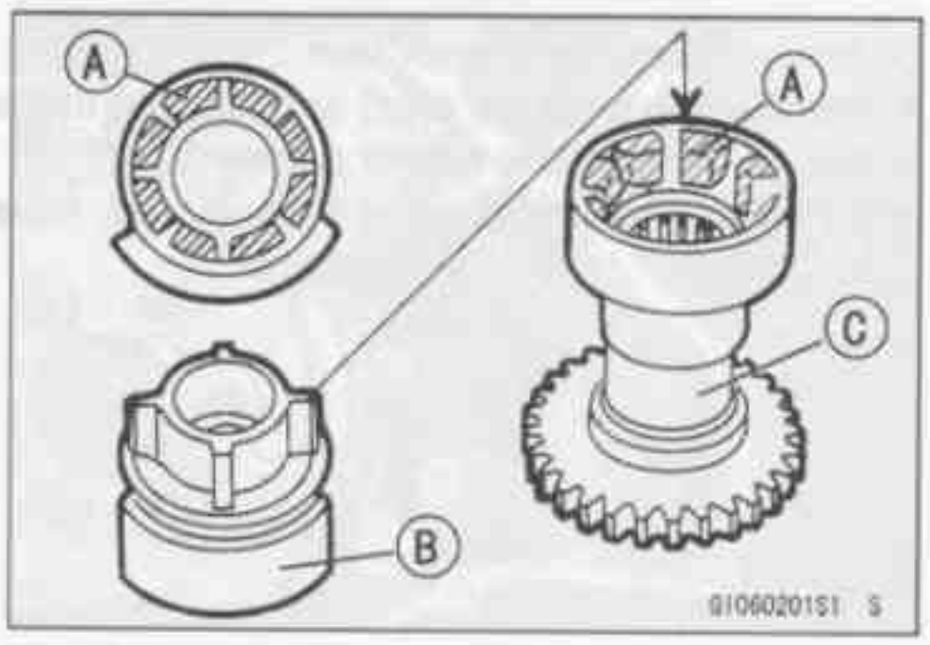
- Push [A] the balancer shaft [B] with the oil seal installed out of the crankcase. The balancer mass and balancer gear [C] come off from the balancer shaft.



Balancer Installation

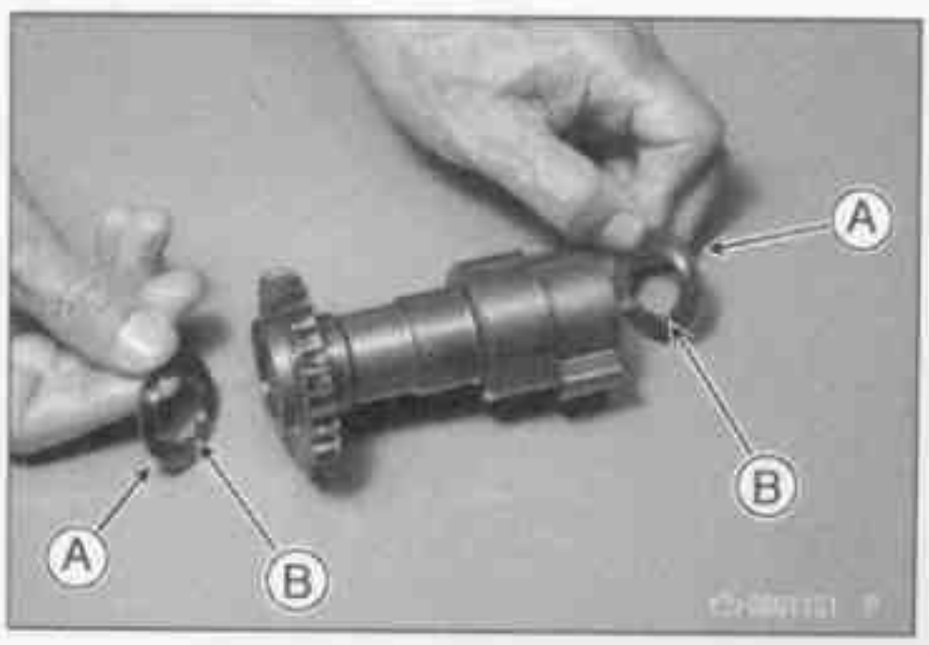
- Check that the rubber dampers [A] are in place as shown.
- Install the balancer mass [B] into the balancer gear [C].

○ Any engagement of the vanes will do.



- Fit the copper washers [A] on both ends of the mass and gear assembly. The projected sides [B] face inward.
- Install the mass and gear assembly.
- Install the balancer shaft plate and guide pin.
- Apply a non-permanent locking agent to the threads of the plate bolt, and tighten it.

Torque - Balancer Shaft Plate Bolt: 9.8 N·m (1.0 kg·m, 87 in·lb)



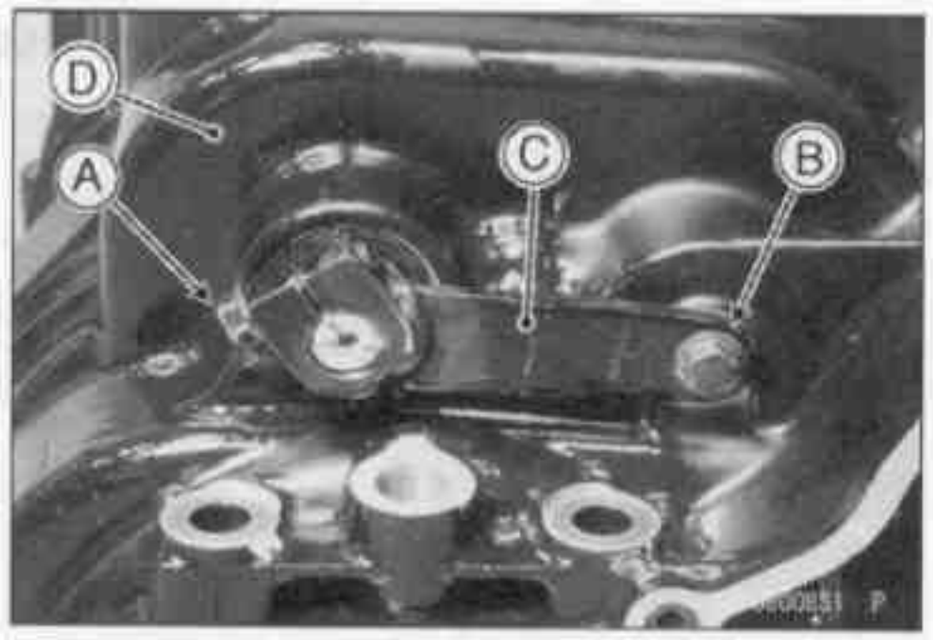
Balancer

Balancer Removal

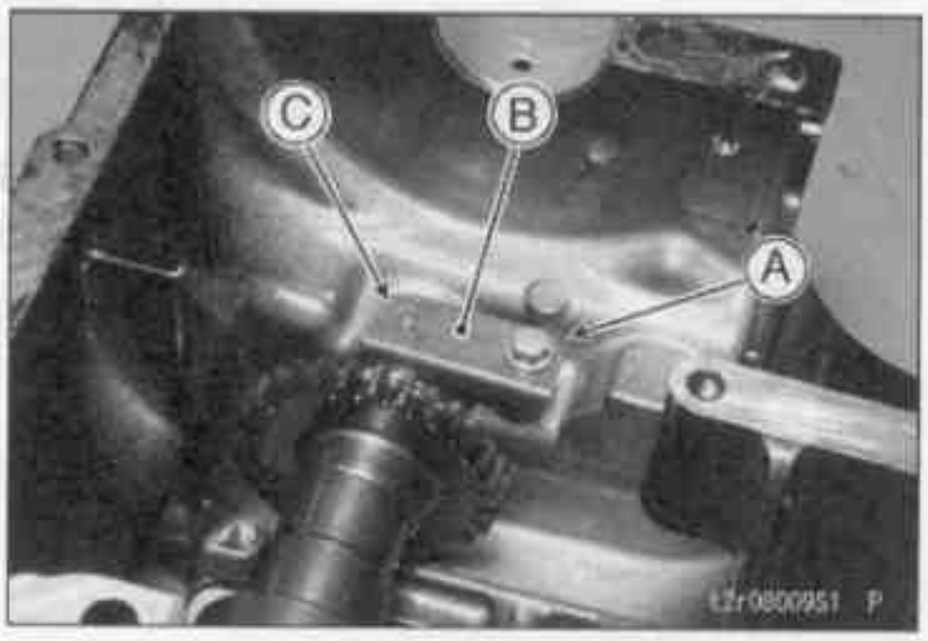
- Split the crankcase (see this chapter).

○ The oil pan is removed.

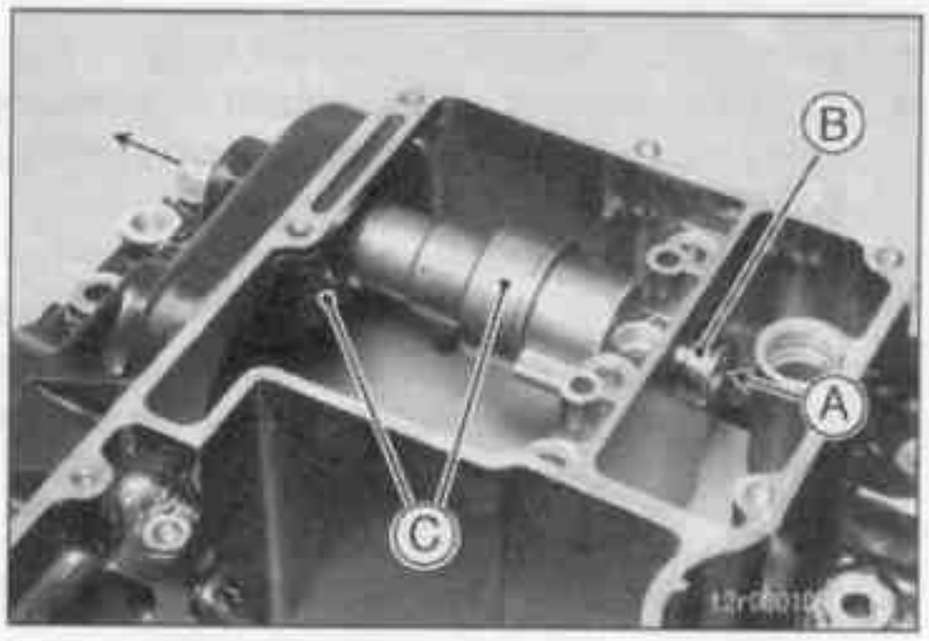
- Unscrew the balancer shaft clamp bolt [A], and balancer lever bolt [B], and pull off the balancer lever [C] from the lower crankcase half [D].



- Unscrew the balancer shaft plate bolt [A], and take off the plate [B] and guide pin [C] from the upper side of the lower crankcase.



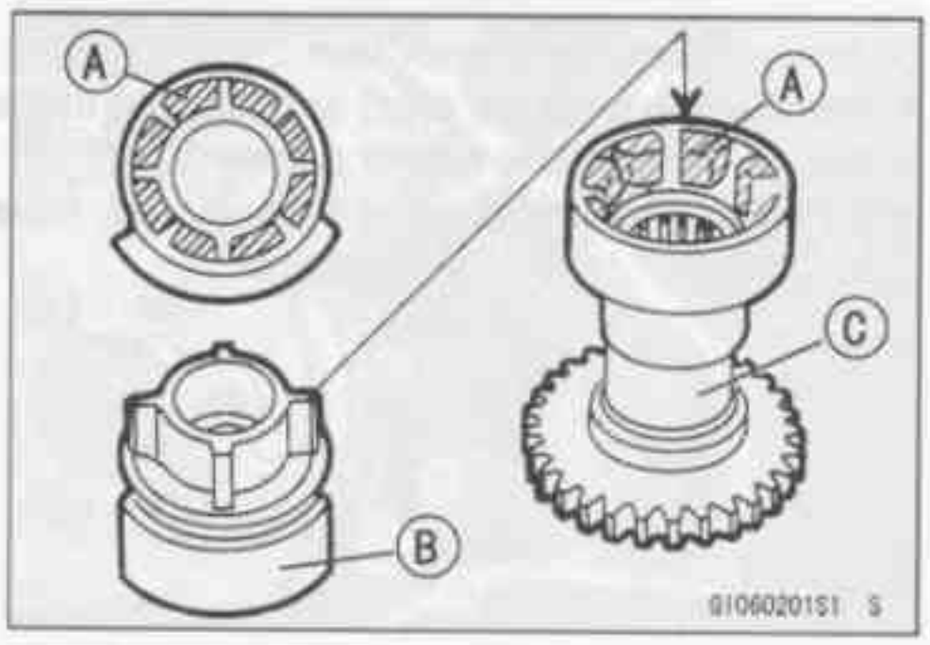
- Push [A] the balancer shaft [B] with the oil seal installed out of the crankcase. The balancer mass and balancer gear [C] come off from the balancer shaft.



Balancer Installation

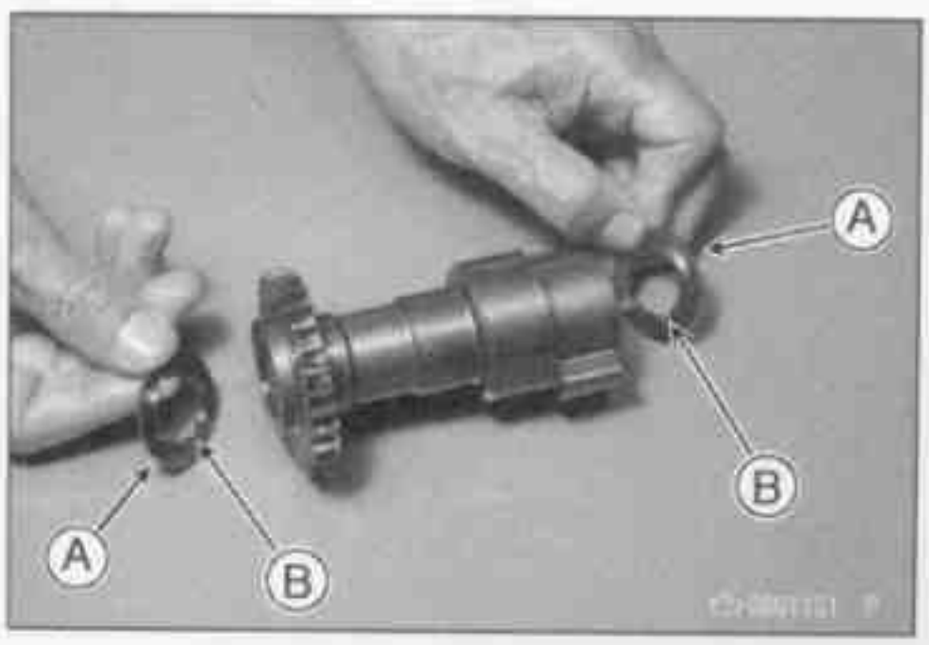
- Check that the rubber dampers [A] are in place as shown.
- Install the balancer mass [B] into the balancer gear [C].

○ Any engagement of the vanes will do.



- Fit the copper washers [A] on both ends of the mass and gear assembly. The projected sides [B] face inward.
- Install the mass and gear assembly.
- Install the balancer shaft plate and guide pin.
- Apply a non-permanent locking agent to the threads of the plate bolt, and tighten it.

Torque - Balancer Shaft Plate Bolt: 9.8 N·m (1.0 kg·m, 87 in·lb)

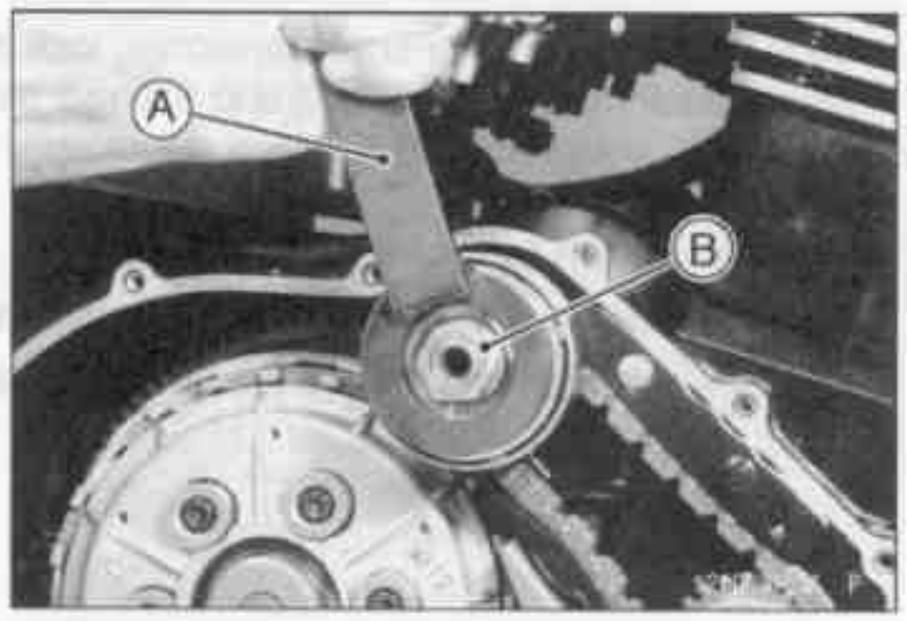


Alternator Shaft, Starter Motor Clutch

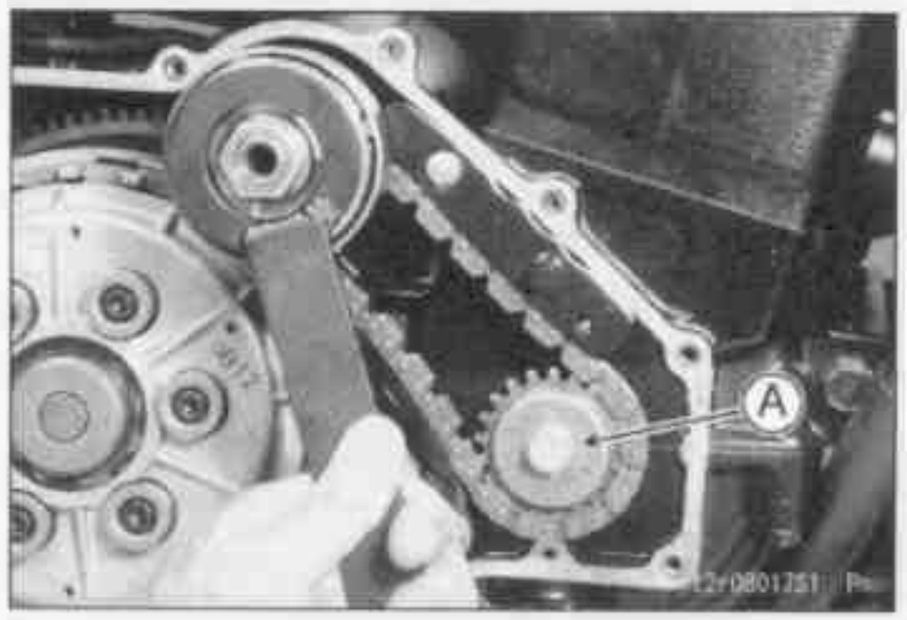
Alternator Chain and Tensioner Removal

- Remove the clutch cover (see Clutch chapter).
- Holding the right alternator coupling with the coupling holder [A], loosen the alternator shaft nut [B].

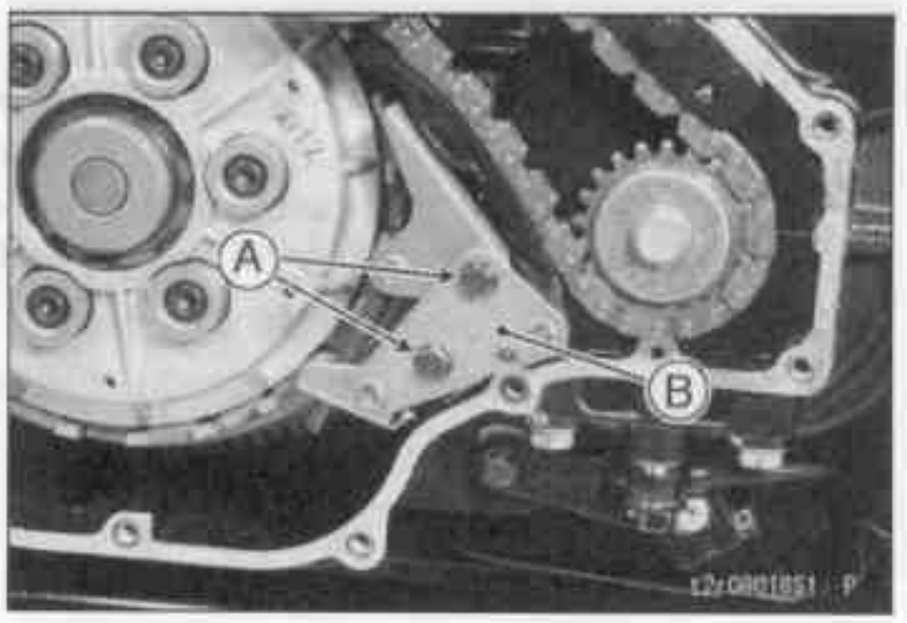
Special Tool - Coupling Holder: 57001–1189



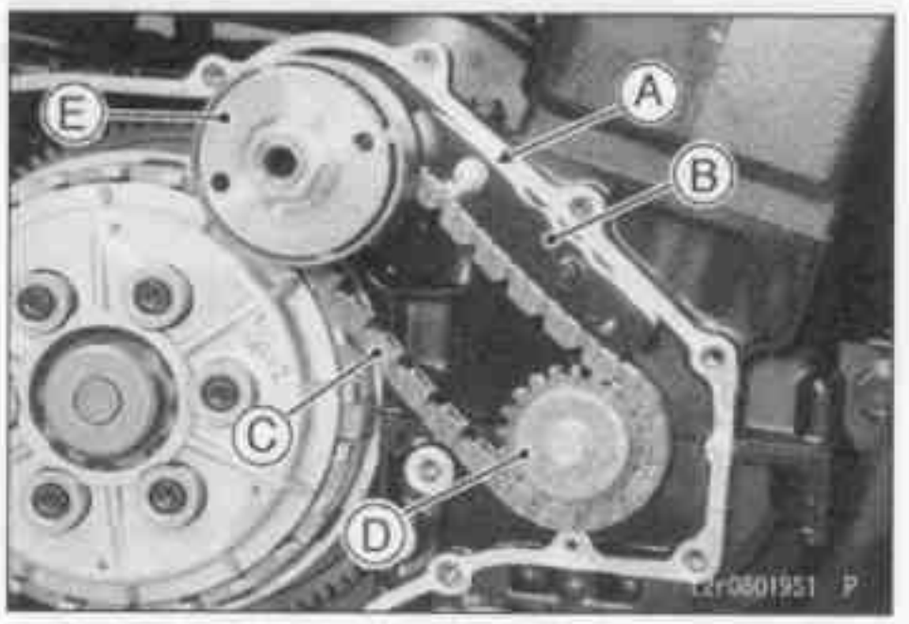
- With the right alternator coupling held with the coupling holder, loosen the alternator sprocket bolt [A] of the crankshaft.



- Remove:
  Alternator Chain Tensioner Bolts [A]
  Alternator Chain Tensioner [B]



- Remove:
  Alternator Chain Guide Bolt [A]
  Alternator Chain Guide [B]
  Alternator Chain Sprocket Bolt
  Alternator Shaft Nut
- Pull off the alternator chain [C], sprocket [D], and right coupling [E] as a set.



Alternator Chain and Tensioner Installation

- Tighten the alternator shaft nut and alternator chain sprocket bolt.

Special Tool - Coupling Holder: 57001–1189

Non-permanent Locking Agent - Alternator Chain Guide Bolt

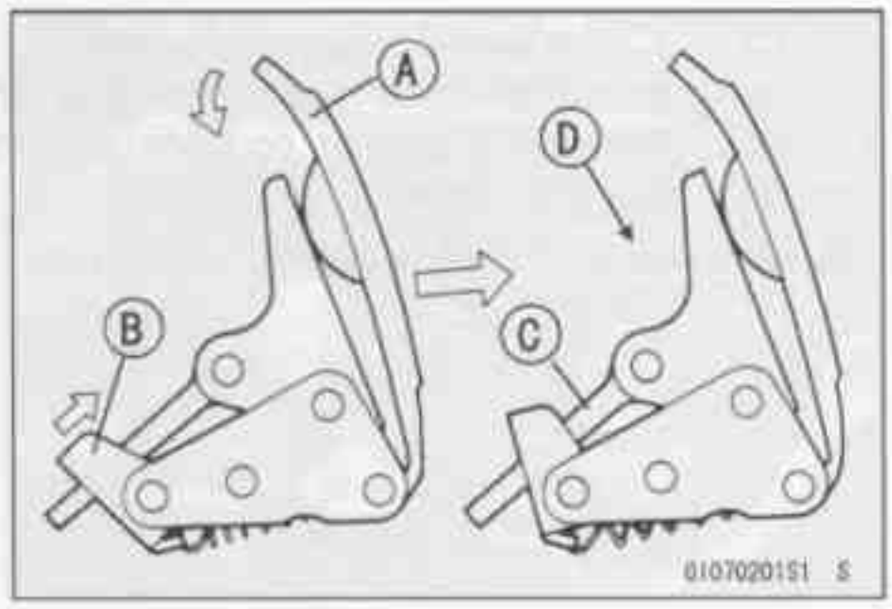
Torque - Alternator Shaft Nut: 59 N·m (6.0 kg·m, 44 ft·lb)
Alternator Chain Sprocket Bolt: 25 N·m (2.5 kg·m, 18.0 ft·lb)
Alternator Chain Guide Bolt: 9.8 N·m (1.0 kg·m, 87 in·lb)

Alternator Shaft, Starter Motor Clutch

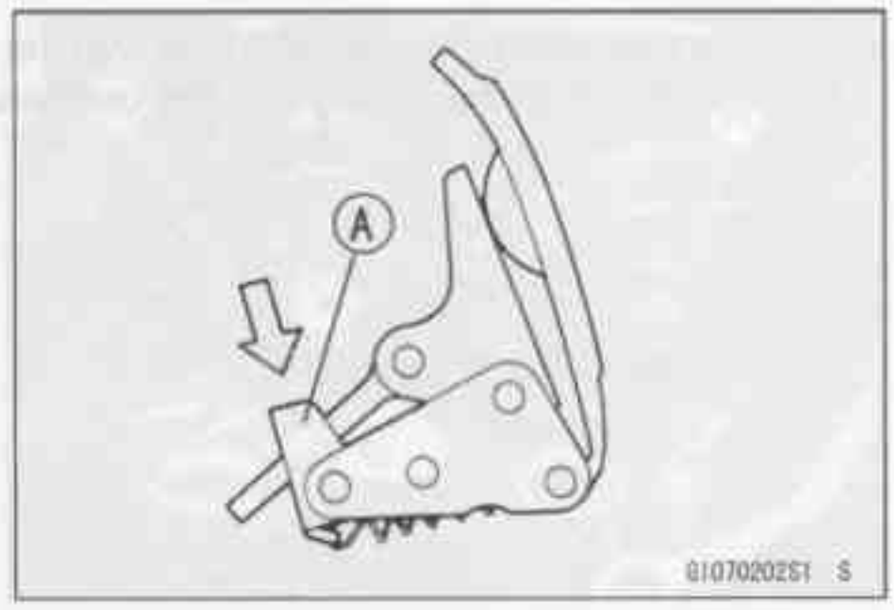
- To install the alternator chain tensioner, lock the tensioner as follows:
  - Push the tensioner guide [A] and the rod stop lover [B] so that the stop lever keeps the rod [C] from returning.
    Lock Position [D]
- Install the chain tensioner.

Non-permanent Locking Agent - Alternator Chain Tensioner Bolts

Torque - Alternator Chain Tensioner Bolts: 9.8 N·m (1.0 kg·m, 87 in·lb)



- Free the tensioner by tapping the rod stop lever [A] lightly with a screwdriver.

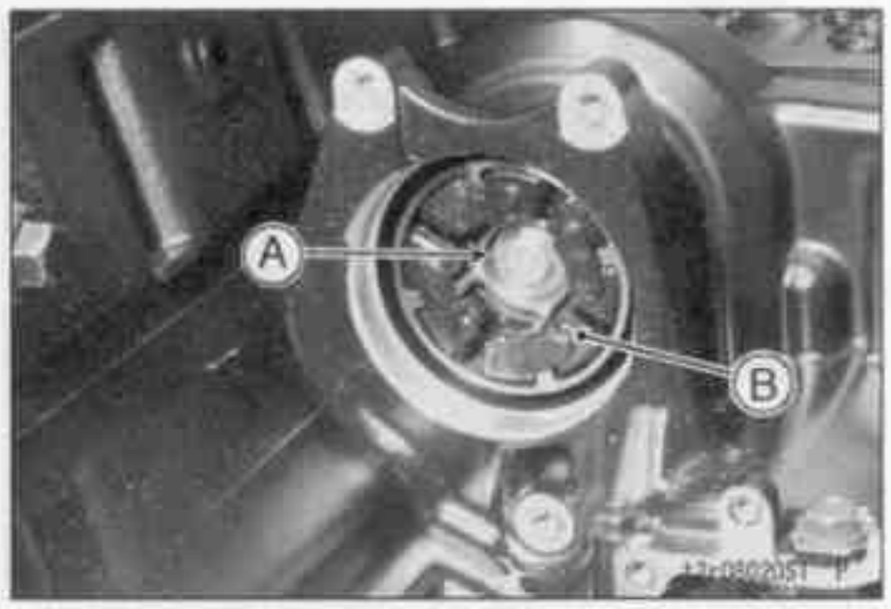


Alternator Shaft Removal

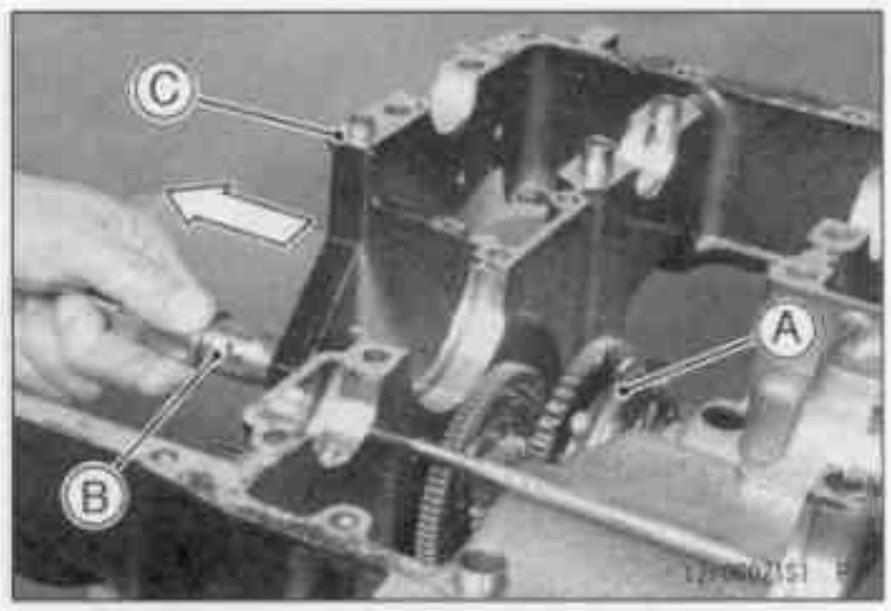
- Remove the alternator chain (see this section).
- Remove the alternator (see Electrical System chapter).
- Holding the right alternator coupling with the coupling holder (special tool), remove the alternator shaft bolt [A] and left coupling [B].

Special Tool - Coupling Holder: 57001–1189

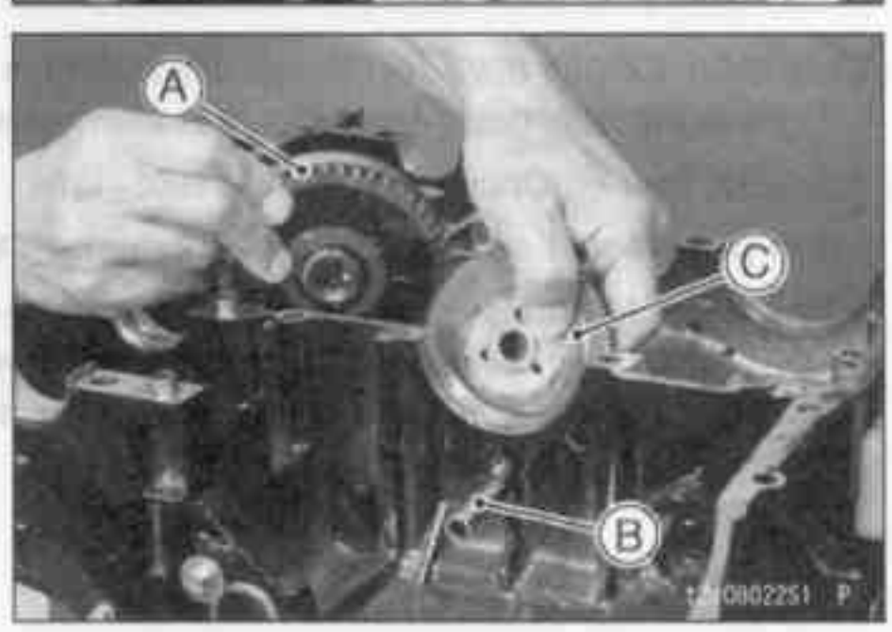
- Split the crankcase (see this chapter) and remove the crankshaft from the upper crankcase.



- Holding the starter motor clutch [A], pull the alternator shaft [B] off the upper crankcase [C].



- Remove:
  Startor Motor Clutch [A]
  Idle Gear Shaft [B] and Starter Motor Idle Gear [C]



Alternator Shaft, Starter Motor Clutch

Alternator Shaft Installation

- Install the starter motor idle gear [A] as shown.

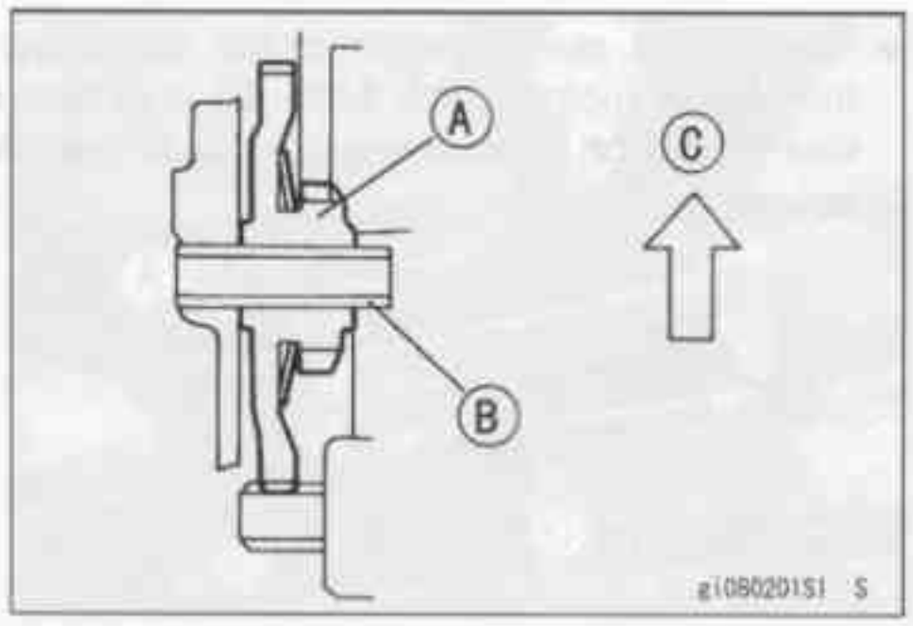
Molybdenum Disulfide Grease- Idle Gear Shaft [B]

Front [C]

- Tighten the alternator shaft bolt.

Special Tool - Coupling Holder: 57001–1189

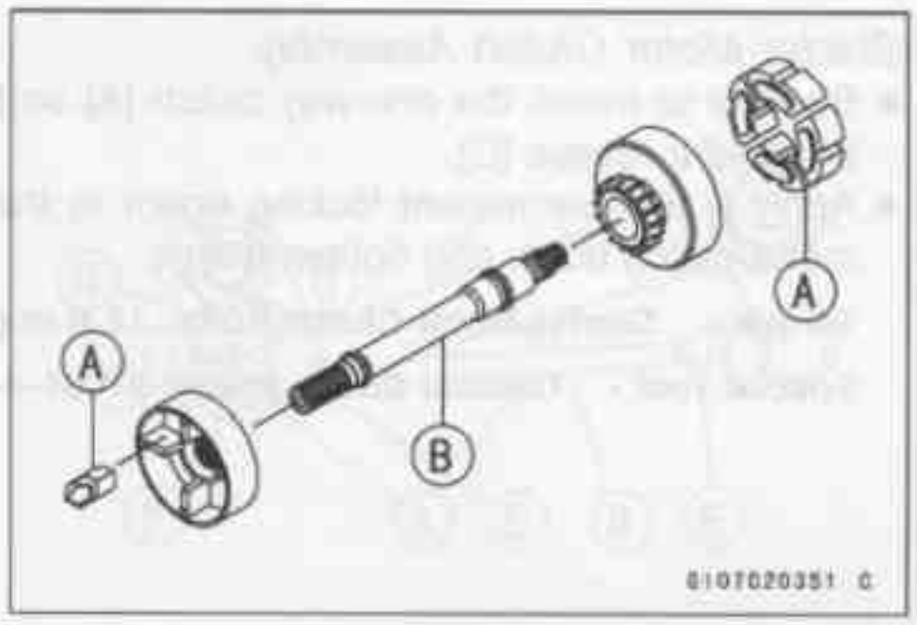
Torque - Alternator Shaft Bolt: 25 N·m (2.5 kg·m, 18 ft·lb)



Coupling Damper Inspection

- Visually inspect the rubber dampers [A] in the couplings at both ends of the alternator shaft [B].

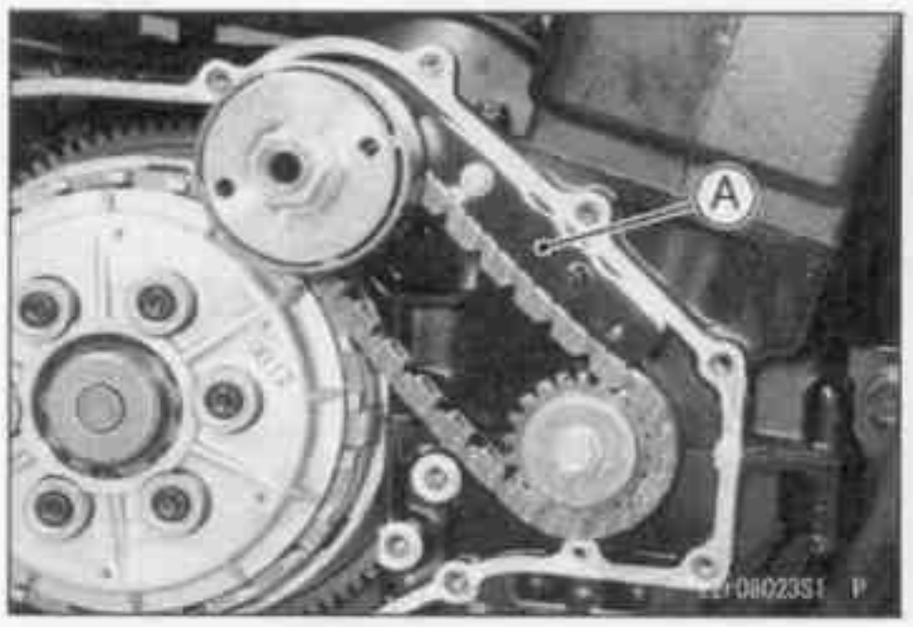
★ If they appear damaged or deteriorated, replace the dampers.



Alternator Chain Guide Wear

- Visually inspect the rubber [A] on the guide.

★ If the rubber is cut or damaged in any way, replace the guide.



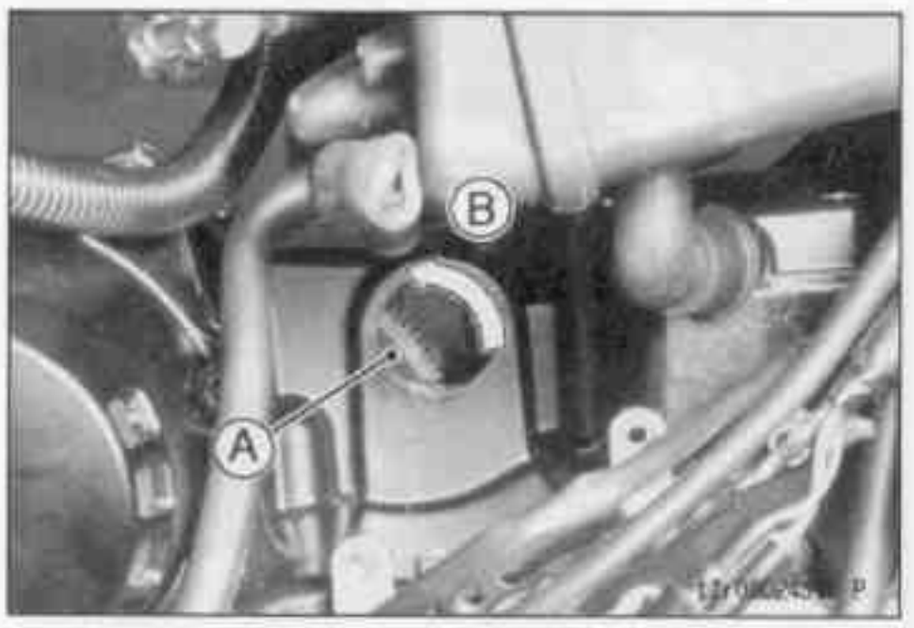
Starter Motor Clutch Inspection

- Remove the starter motor (see Electrical System chapter).
- Turn the starter motor idle gear [A] by hand. When viewed from the left side of the engine, the idle gear should turn counterclockwise freely [B], but should not turn clockwise.

★ If the starter motor clutch does not operate as it should or if it makes noise, go to the next step.

- Disassemble the starter motor clutch, and visually inspect the clutch parts.
- If there is any worn or damaged part, replace it.

○ Examine the starter motor clutch gear as well. Replace the clutch gear if it is worn or damaged.

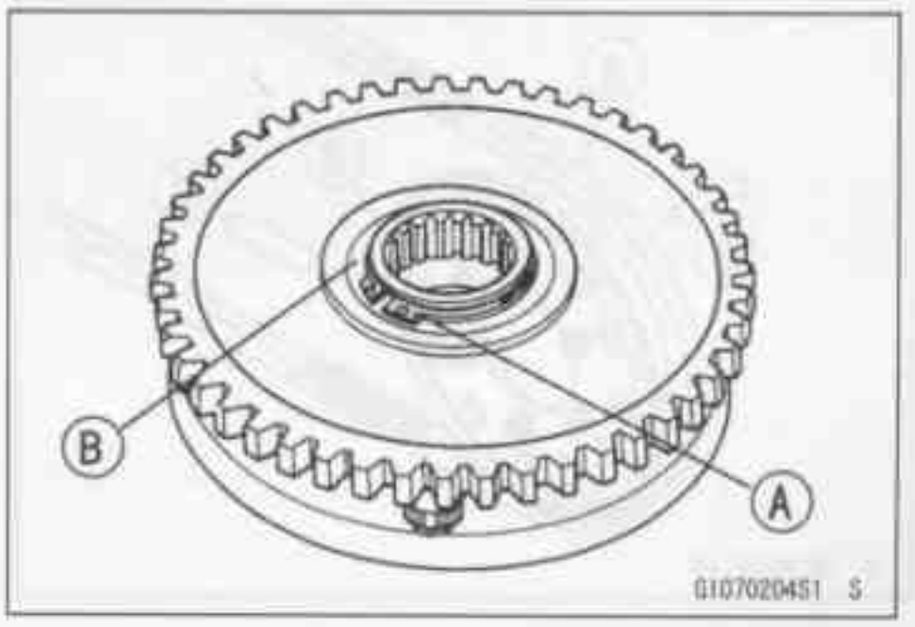


Starter Motor Clutch Disassembly

- Remove the circlip [A] and flat washer [B].

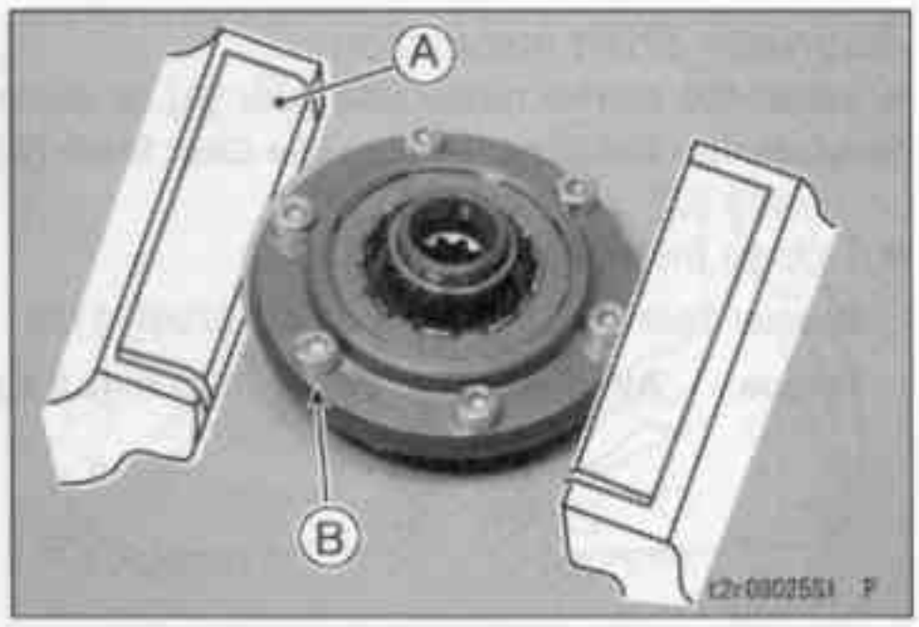
Special Tool - Outside Circlip Pliers: 57001–144

- Pull the starter motor clutch gear and take off the needle bearing and flat washer.



Alternator Shaft, Starter Motor Clutch

- Holding the starter motor clutch assembly in a vise [A], remove the starter motor clutch bolts [B] and take off the one-way clutch. Use rubber or aluminum plates [C] to prevent damage to the clutch assembly.

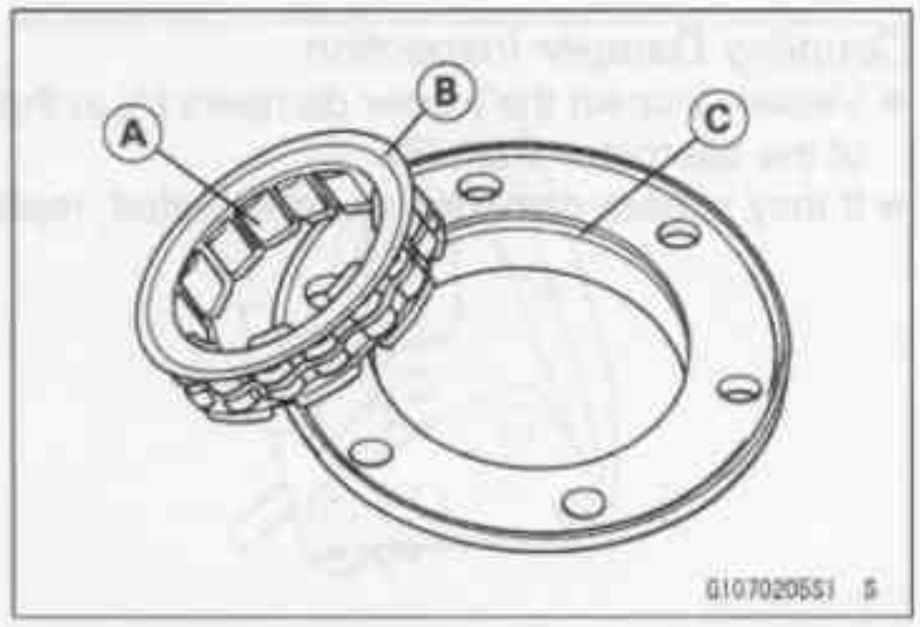


Starter Motor Clutch Assembly

- Be sure to install the one-way clutch [A] so that its flange [B] fits in the holder recess [C].
- Apply a non-permanent locking agent to the threads of the starter motor clutch bolts, and tighten them.

Torque - Starter Motor Clutch Bolts: 12 N·m (1.2 kg·m, 106 in·lb)

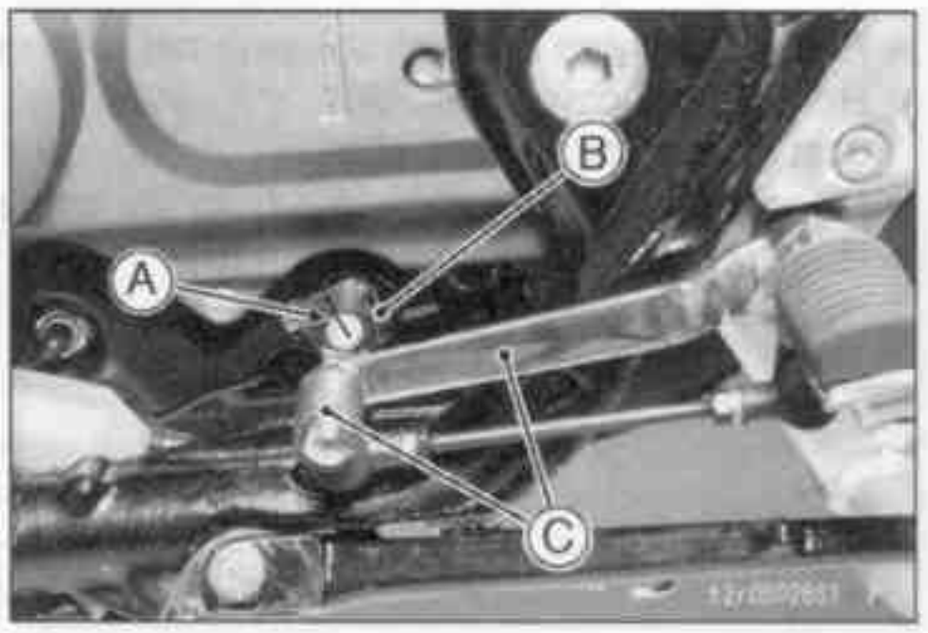
Special Tool - Outside Circlip Pliers: 57001–144



Transmission

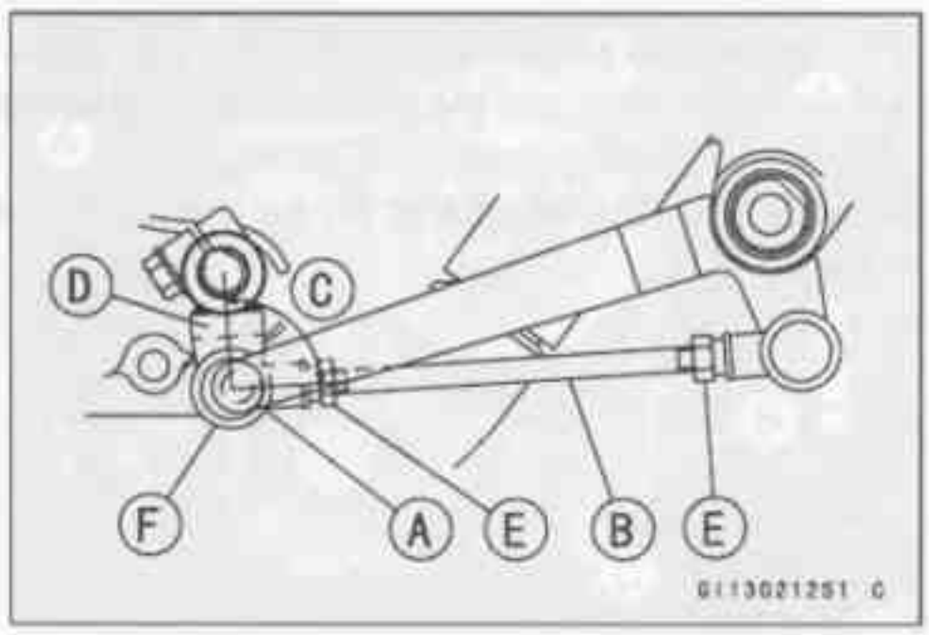
Shift Pedal Removal

- Mark [A] the position of the shift lever [B] on the shift shaft so that it can be installed later in the same position
- Remove the shift lever and shift pedal [C].



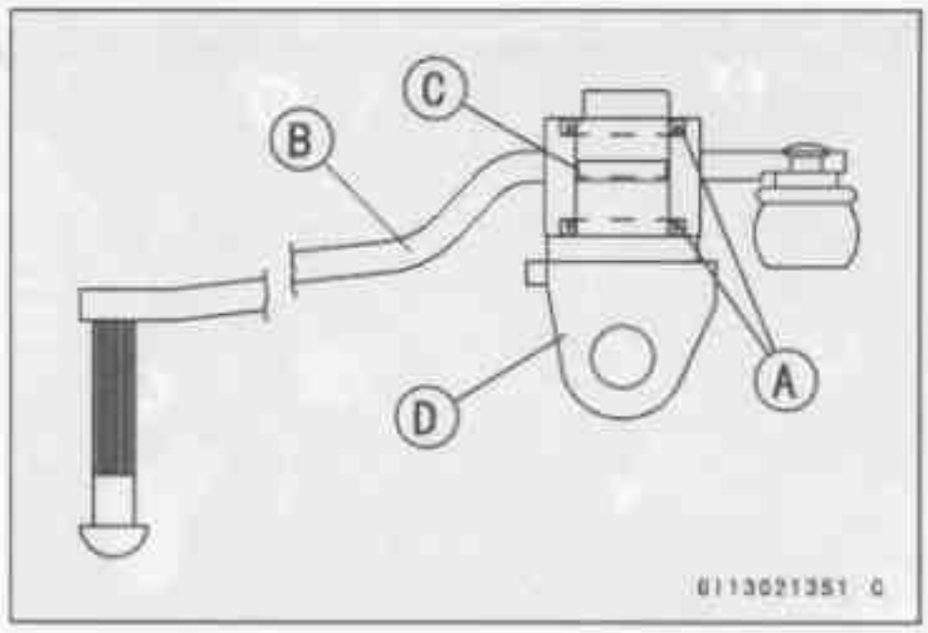
Shift Pedal Installation

- Install the shift pedal [A] so that the shift rod [B] is at a right angle (90°) [C] to the shift lever [D].
- Loosen the front and rear rod locknuts [E].
- ○ The front locknut has left-hand threads.
- Turn the rod to adjust the pedal position. Note the relative position to the rod end [F].
- Tighten the locknuts securely.



Shift Lever Assembly

- Install the oil seals [A] in both sides of the boss of the shift lever [B] with the lips inward.
- Apply grease to the lips of the oil seal.
- Apply grease to the stem [C] of the front peg.
- Install the shift lever assembly onto the stem of the front peg holder [D].

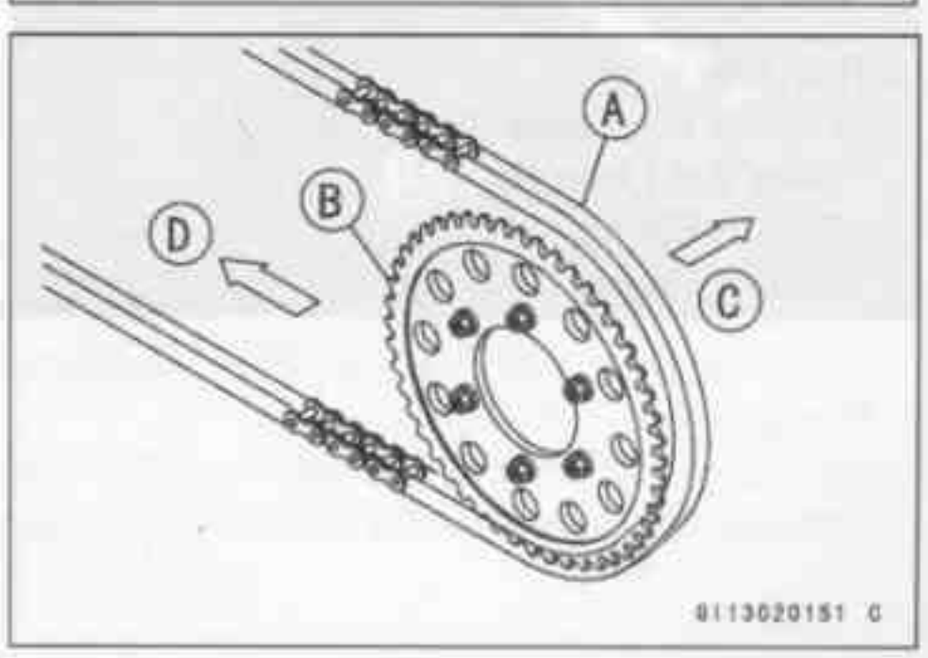


External Shift Mechanism Removal

- Support the frame with a commercially available stand [A] to raise the rear wheel off the ground (see Engine Removal in Engine Removal/ Installation chapter).
- Drain the engine oil (see Engine Lubrication System chapter).

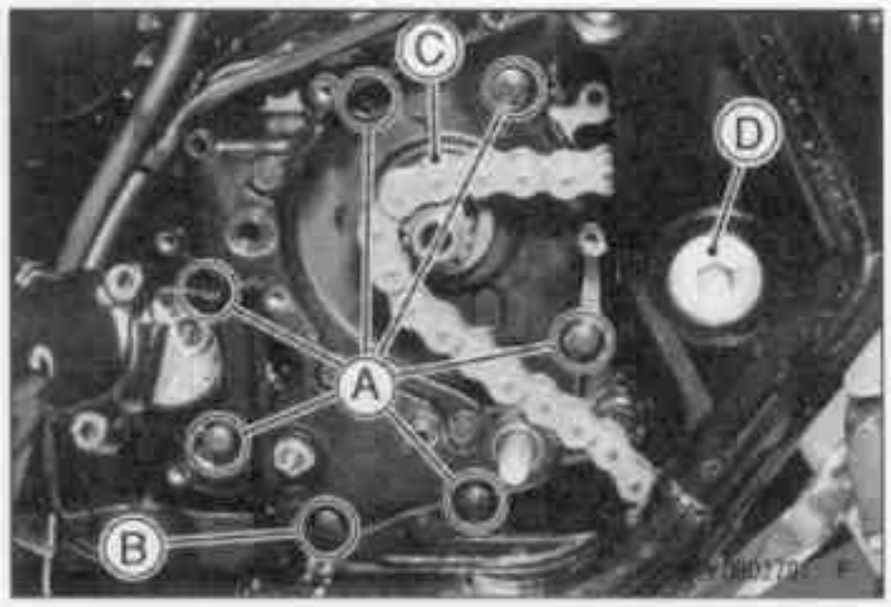


- Remove:
  - Drive Chain Cover
  - Rear Axle Shaft (see Wheels/Tires chapter)
  - Engine Sprocket (see Final Drive chapter)
- Disengage the drive chain [A] from the rear sprocket [B] towards the right [C].
  - Front [D]
- Remove:
  - Water Pump
  - Shift Pedal and Lever
  - Oil Pressure Switch Lead Terminal
  - Sidestand Switch Lead Connector
  - Lead Connector from Neutral Switch

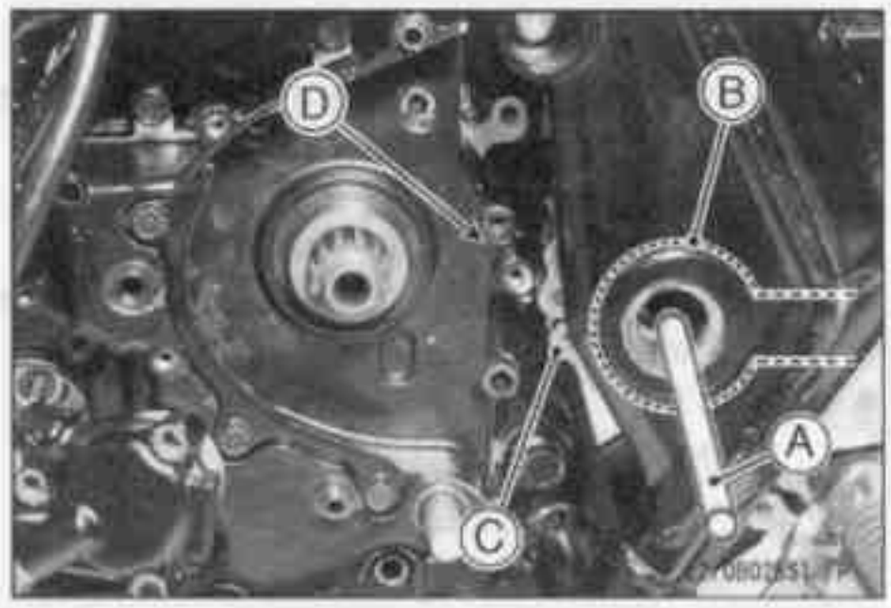


Transmission

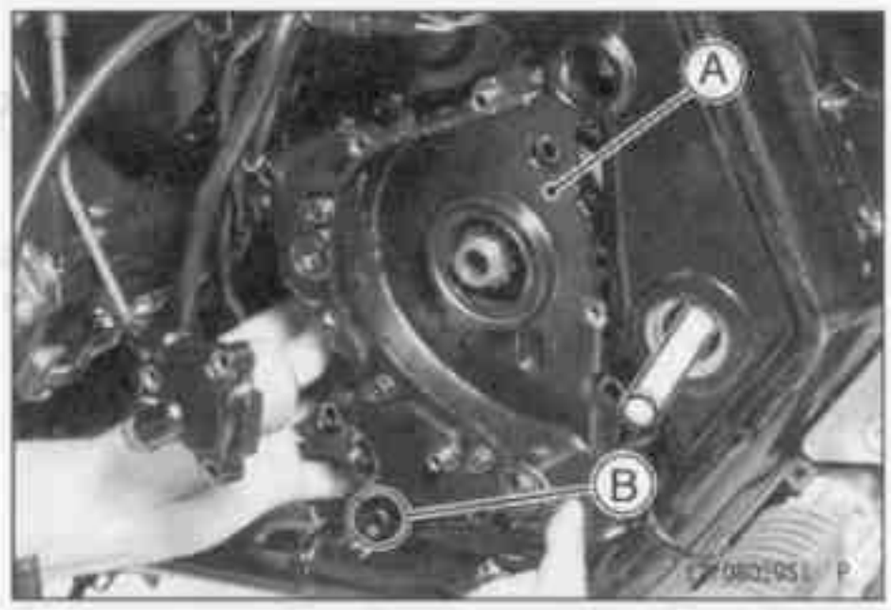
- Place an oil pan beneath the external shift mechanism cover.
- Remove the cover bolts [A].
- ○ Just loosen the bolt [B] shown.
- Disengage the drive chain [C] from the output shaft.
- Remove the swingarm pivot nut [D].



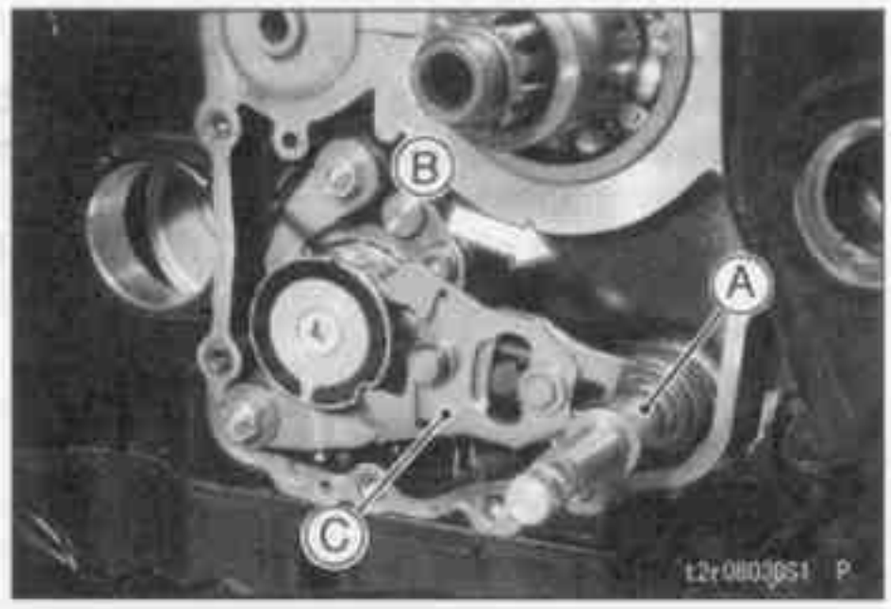
- Unscrew the pivot shaft, and pull it out while turning the shaft.
- Insert a thinner bar [A] than the pivot shaft into the pivot to avoid the swingarm falling down.
- Move back the swingarm [B] for the drive chain [C] to clear the boss [D].



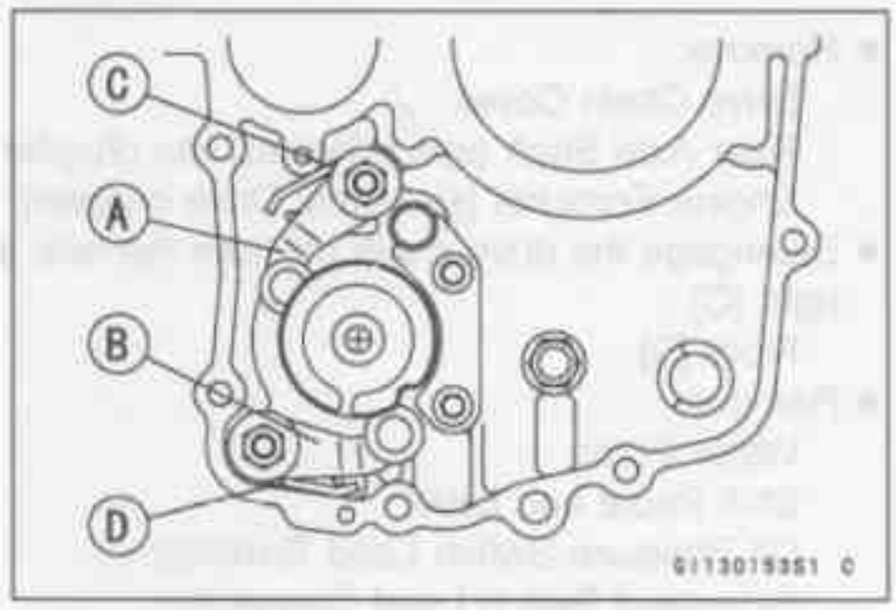
- Remove the external shift mechanism cover [A] along with one of the cover bolt [B].



- Remove the shift shaft [A], while pushing [B] the shift mechanism arm [C] toward the shaft.



- Remove:
  Neutral Set Lever [A]
  Gear Set Lever [B]
  Return Spring [C]
  Return Spring [D]

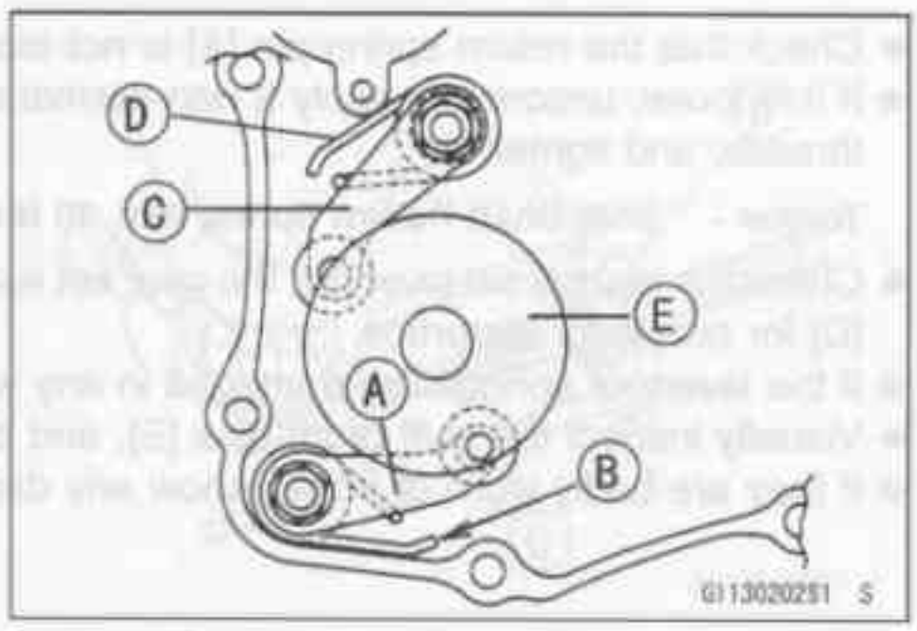


Transmission

External Shift Mechanism Installation

○ The gear set lever [A] has a white mark and its return spring [B] has a blue mark.
○ The neutral set lever [C] has no mark and its return spring [D] has a green mark.
○ Be careful not to mix up these springs and levers.
Shift Drum [E]

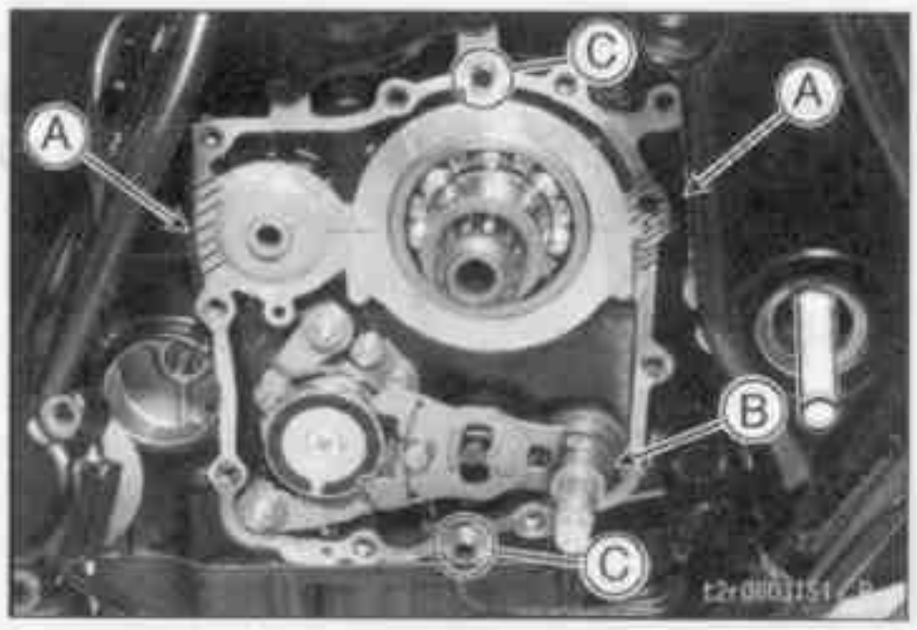
Torque - Gear Set Lever Nut, Neutral Set Lever Nut: 10 N·m (1.0 kg·m, 89 in·lb)



- Apply silicone sealant [A] to the crankcase halves mating surface on the front and rear sides of the external shift mechanism cover mount.

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

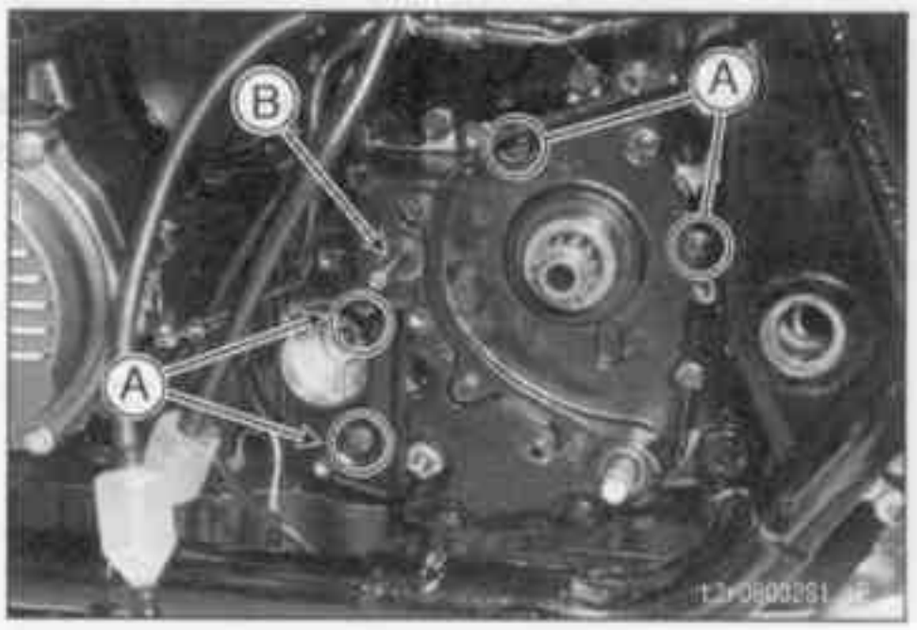
- Be sure to install the washer [B].
- Make sure that dowel pins [C] are in place.



- Replace the cover gasket with a new one.
- Apply high temperature grease to the lips of cover oil seals.
- Install the cover and tighten the cover bolts.
- Apply a non-permanent locking agent to the cover bolts [A] shown.

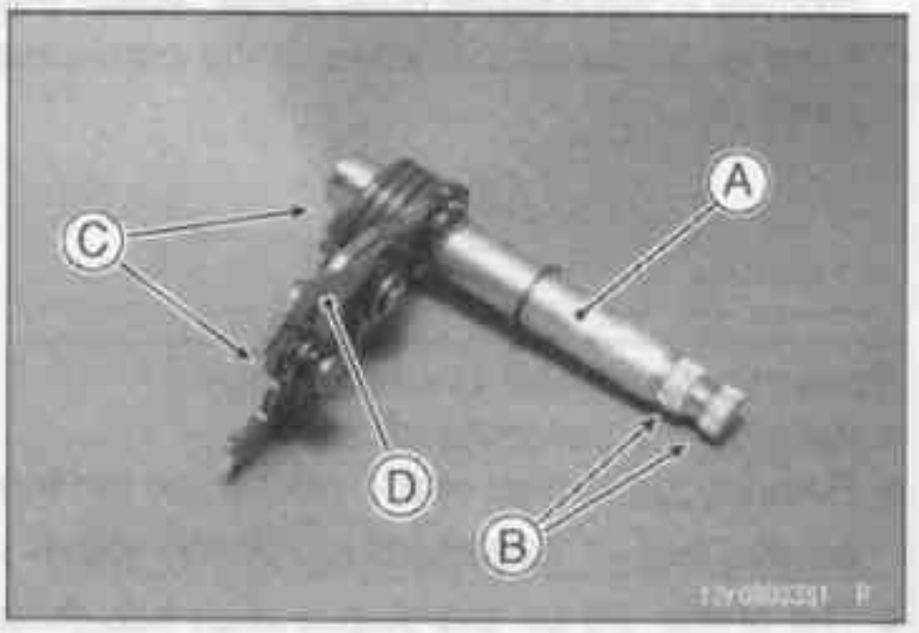
Torque - External Shift Mechanism Cover Bolts: 9.8 N·m (1.0 kg·m, 87 in·lb)

- Apply molybdenum disulfide grease to either end of the clutch push rod [B], install it with the greased end going first.
- Install:
Water Pump (see Cooling System chapter)
Engine Sprocket (see Final Drive chapter)
Drive Chain
Swingarm (see Suspension chapter)
- Adjust the shift pedal position (see this chapter).
- Fill:
Engine Oil (see Engine Lubrication System chapter)
Coolant (see Cooling System chapter)



External Shift Mechanism Inspection

- Remove the external shift mechanism cover (see this chapter).
- Examine the shift shaft [A] for any damage.
★ If the shaft is bent, straighten or replace it.
★ If the serrations [B] are damaged, replace the shaft.
★ If the springs [C] are damaged in any way, replace them.
★ If the shift mechanism arm [D] is damaged in any way, replace the arm.

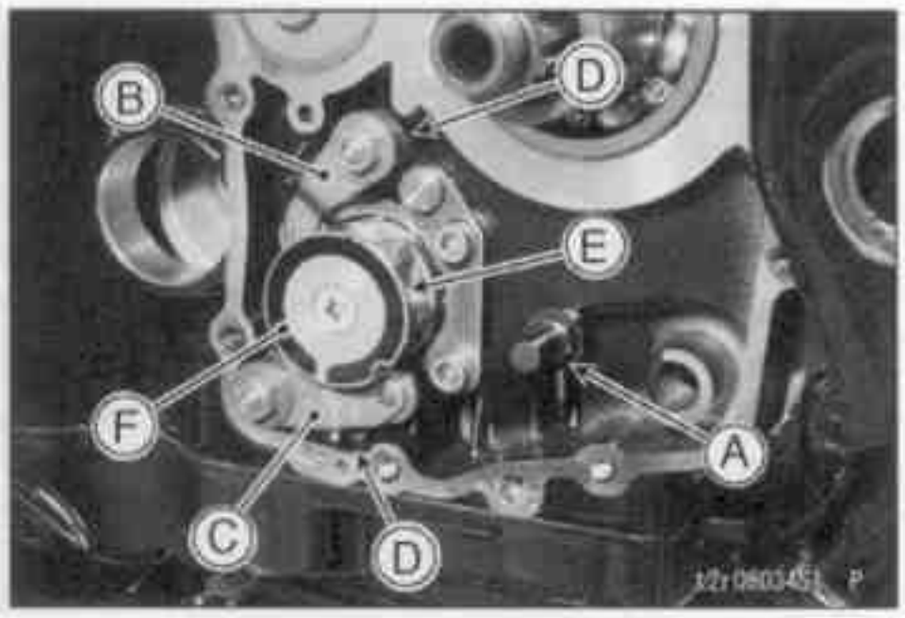


Transmission

- Check that the return spring pin [A] is not loose.
★ If it is loose, unscrew it, apply a non-permanent locking agent to the threads, and tighten it.

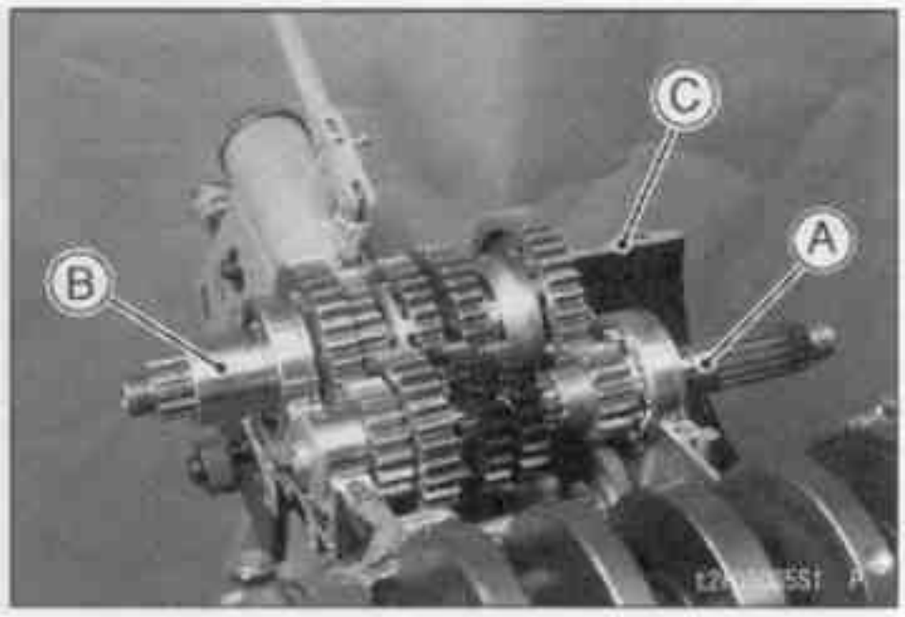
Torque - Shift Shaft Return Spring Pin: 30 N·m (3.1 kg·m, 22 ft·lb)

- Check the neutral set lever [B], the gear set lever [C], and their springs [D] for breaks or distortion.
★ If the levers or springs are damaged in any way, replace them.
- Visually inspect the shift drum pins [E], and pin holder [F].
★ If they are badly worn or if they show any damage, replace them.



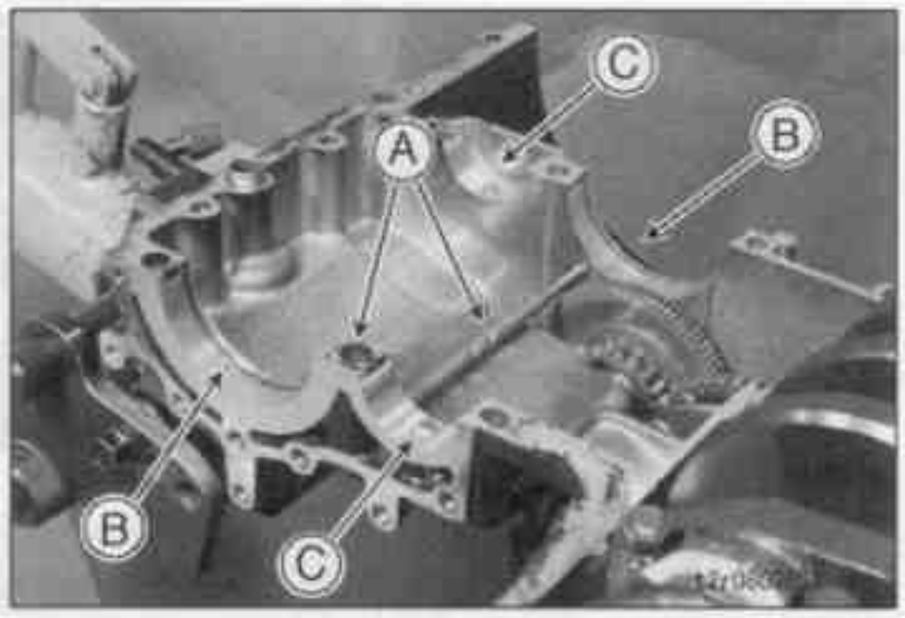
Transmission Shaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the drive shaft assembly [A] and output shaft assembly [B] from the upper crankcase [C].

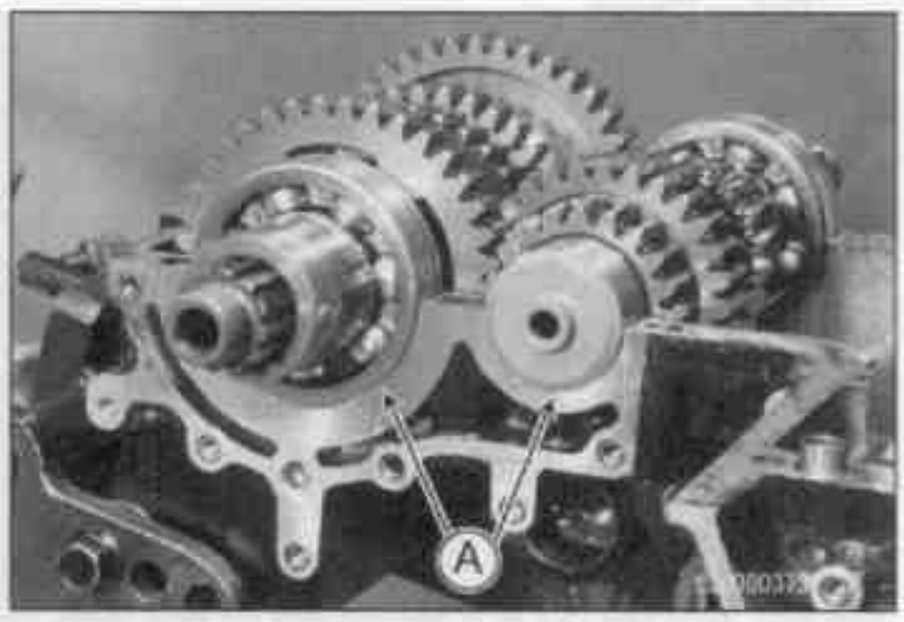


Transmission Shaft Installation

- Blow the oil passages [A] clean with compressed air.
- Check to see that the set rings [B] and set pins [C] are in place in the transmission bearing housings.



- Install the drive shaft and output shaft assemblies into the upper crankcase half.
- Apply molybdenum disulfide oil to the sliding surfaces of the gears and bearings.
○ The bearing set pins and rings must match properly with the holes or grooves in the bearing outer races. When they are properly matched, there is no clearance between the crankcase and the bearing outer races [A].

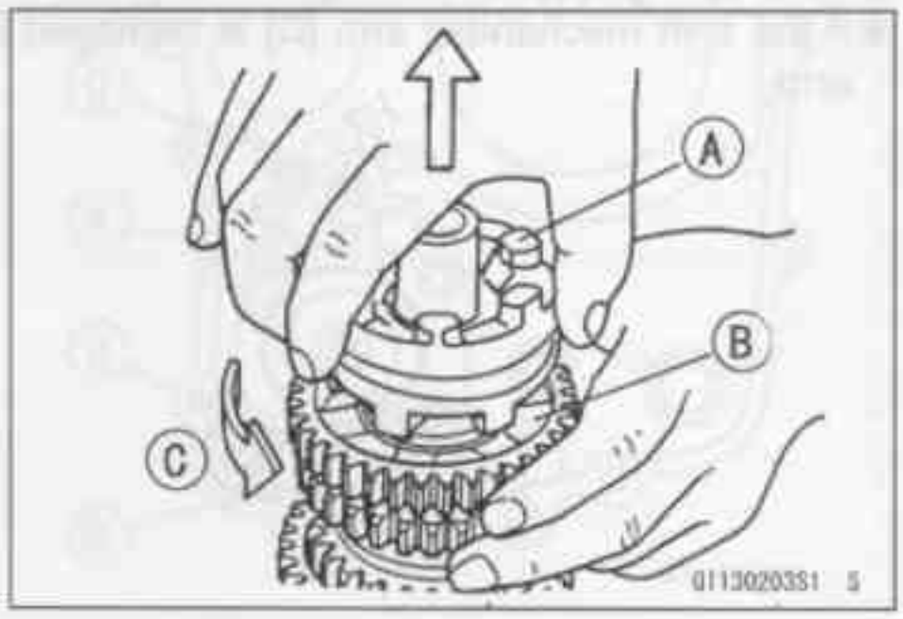


Transmission Shaft Disassembly

- Remove the transmission shafts.
- Remove the circlips and disassemble the transmission shafts.

Special Tool - Outside Circlip Pliers: 57001–144

- The shifter [A] on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism.
- Remove the shifter as follows.
○ Set the output shaft in a vertical position holding the 3rd gear [B].
○ Spin [C] the shifter quickly and pull it off upward.

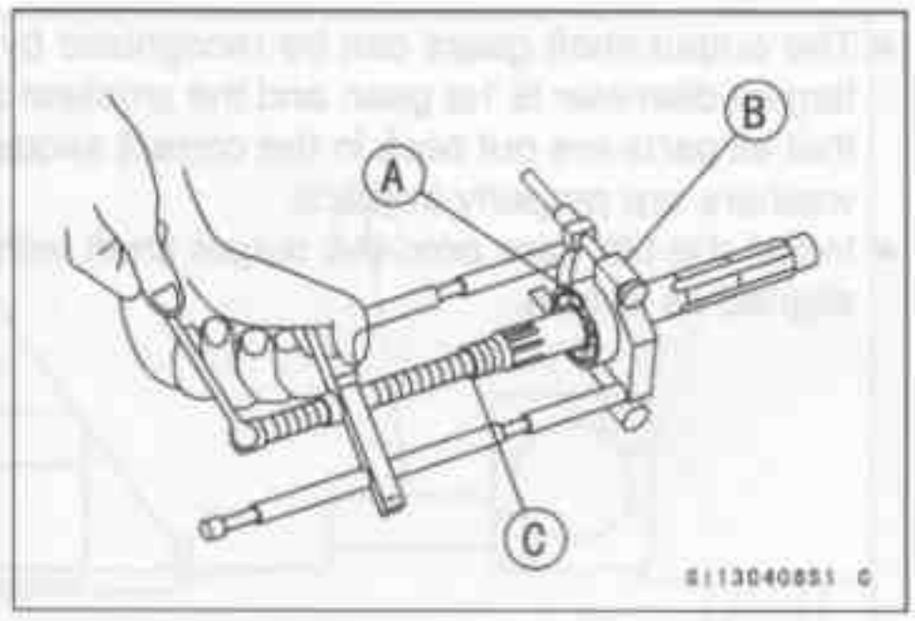


Transmission

- Remove the ball bearing [A] from each shaft.

Special Tool - Bearing Puller: 57001–135 [B]
Bearing Puller Adapter: 57001–317 [C]

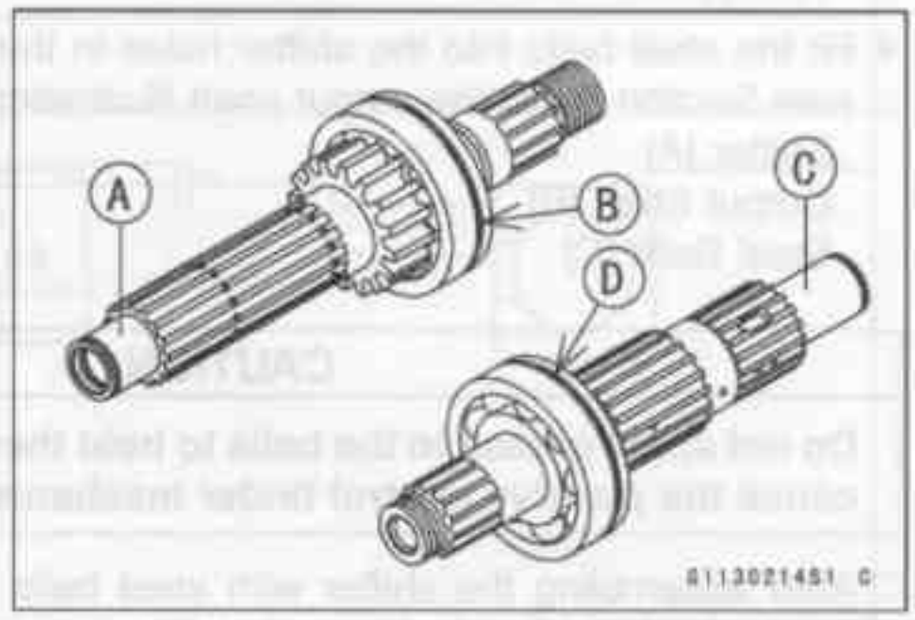
- Discard the bearing.



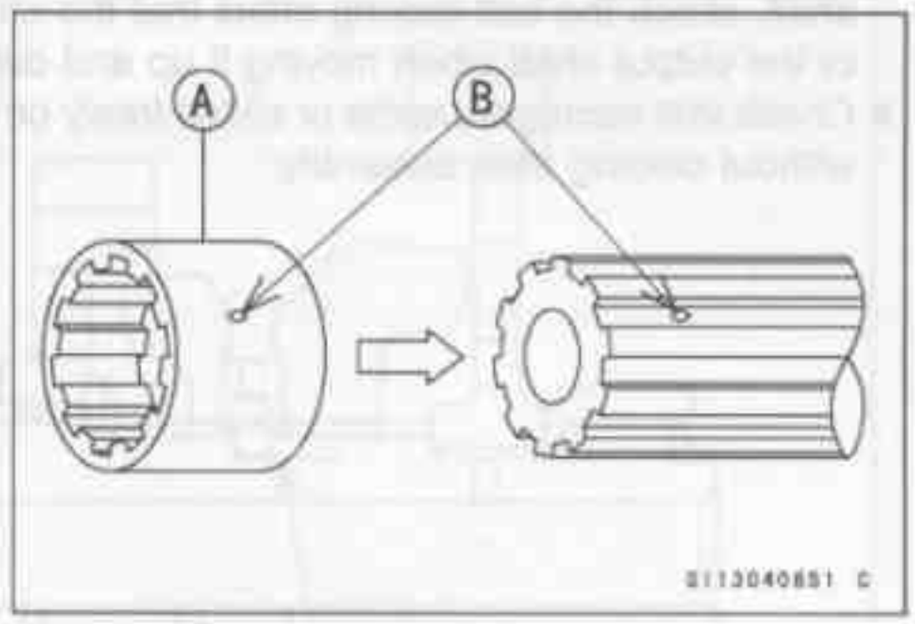
Transmission Shaft Assembly

- Install the ball bearing on the drive shaft [A] with the groove [B] toward the clutch side using the steering stem bearing driver (special tool).
- Install the ball bearing on the output shaft [C] with the groove [D] away from the engine sprocket side.

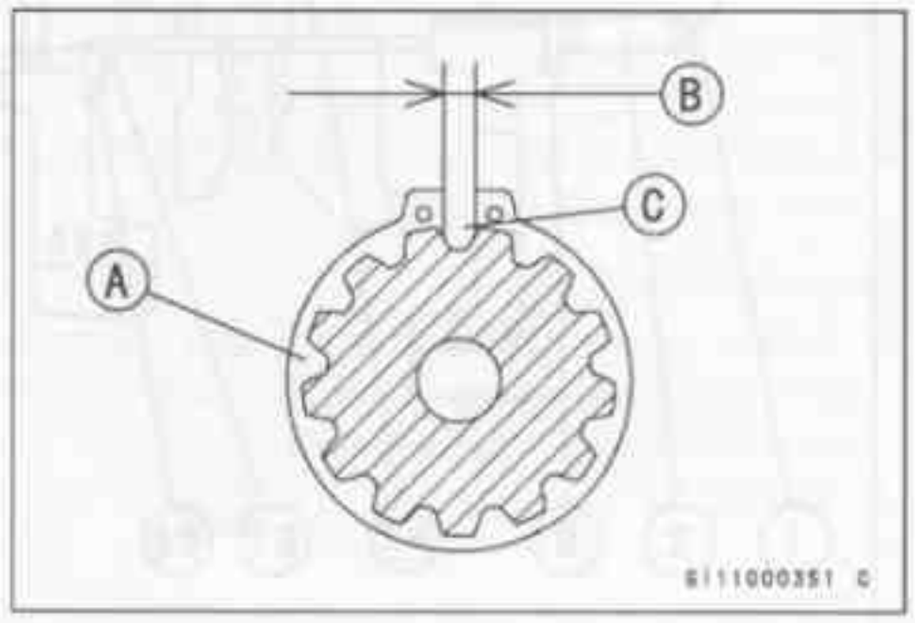
Special Tool - Steering Stem Bearing Driver: 57001–137



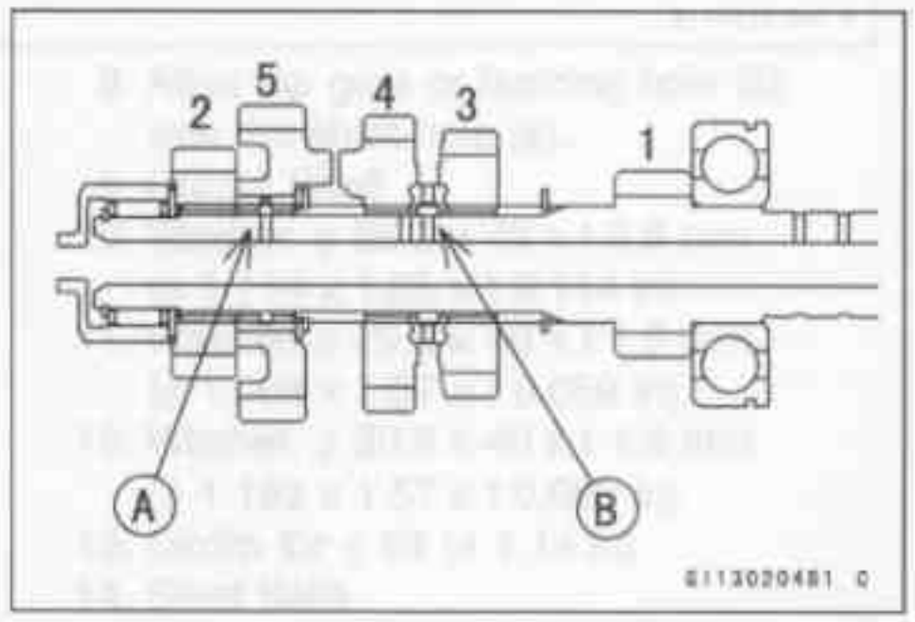
- Apply molybdenum disulfide oil to the gear-sliding surfaces on the shafts.
- Install the 5th gear bushing [A] onto the drive shaft with their holes [B] aligned.



- Replace any circlips removed with new ones.
- Install the circlips [A] so that the opening [B] is aligned with a spline groove [C].

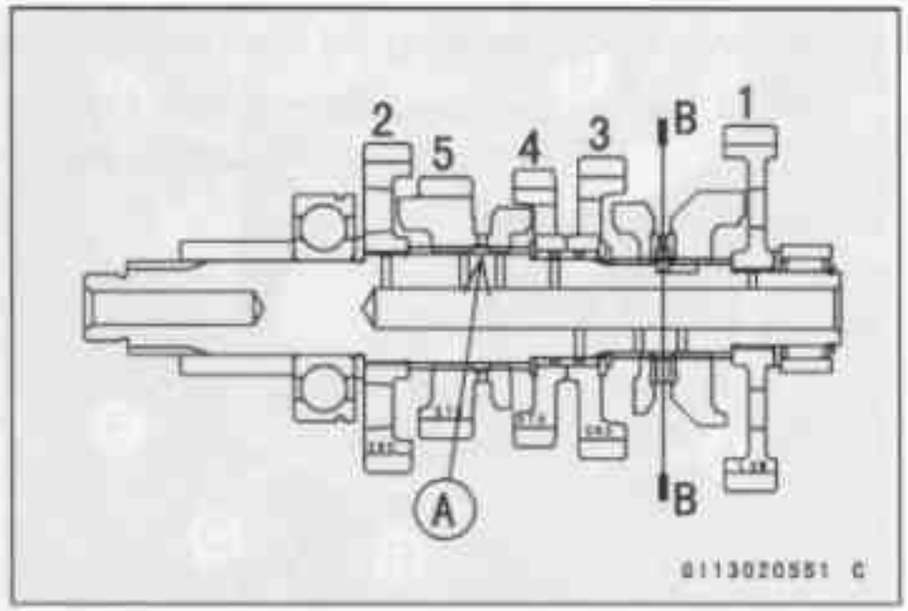


- The drive shaft gears can be recognized by size: the gear with the smallest diameter is 1st gear, and the largest one is 5th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- Install the 3rd/4th gear onto the drive shaft with their holes [A] and [B] aligned.



Transmission

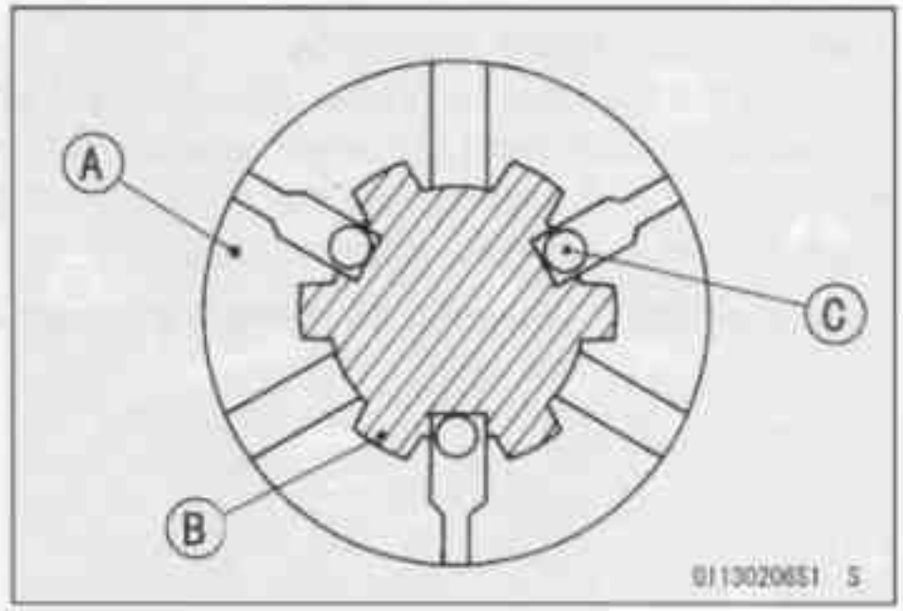
- The output shaft gears can be recognized by size: the gear with the largest diameter is 1st gear, and the smallest one is 5th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- Install the 5th gear onto the output shaft with their holes [A] and [B] aligned as shown.



- Fit the steel balls into the shifter holes in the output shaft as shown (see Section BB in the output shaft illustration).
  Shifter [A]
  Output Shaft [B]
  Steel Balls [C]

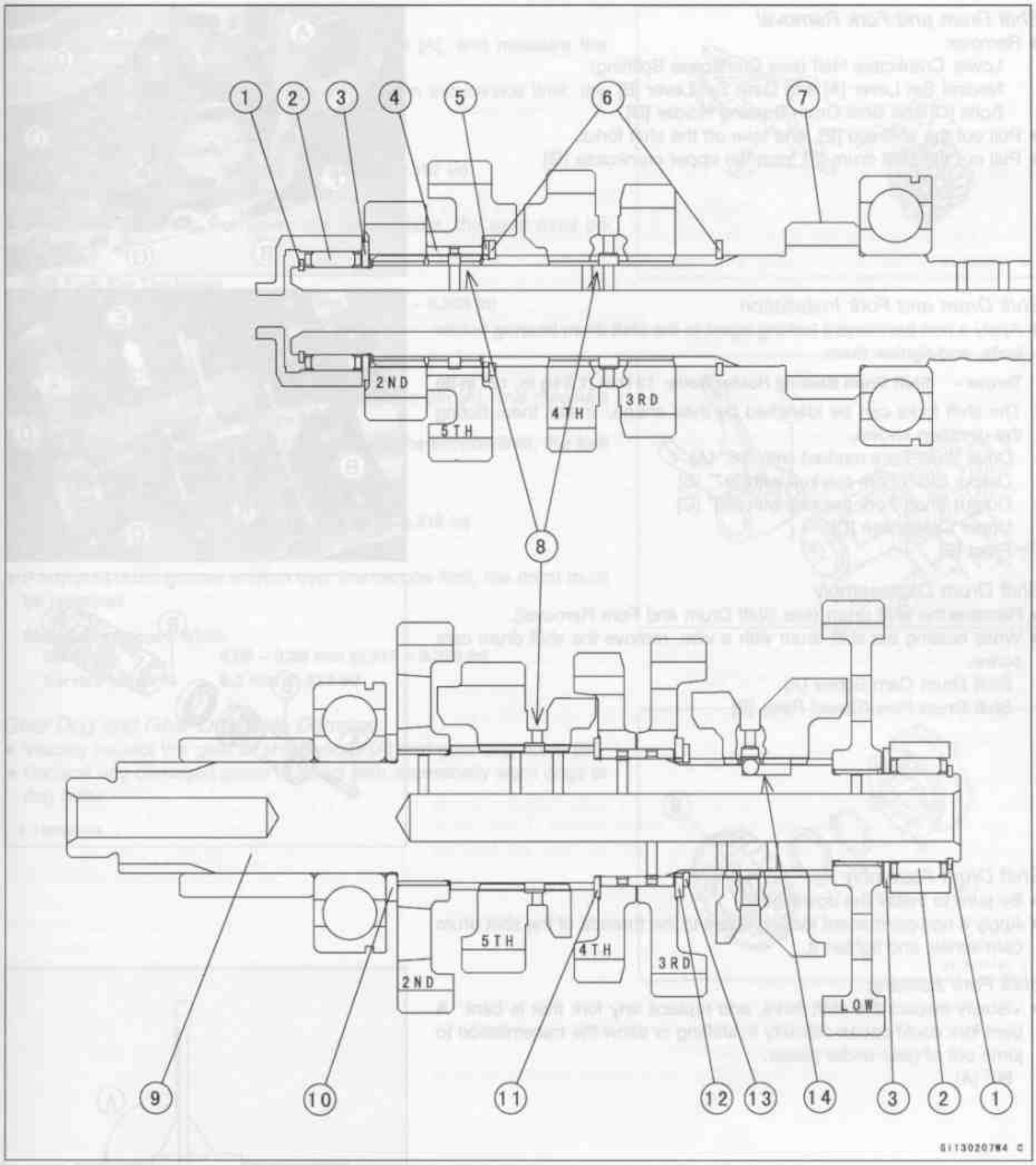
CAUTION

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



- After assembling the shifter with steel balls in place on the output shaft, check the ball-locking effect that the shifter does not come out of the output shaft when moving it up and down by hand.
- Check that each gear spins or slides freely on the transmission shafts without binding after assembly.

Transmission

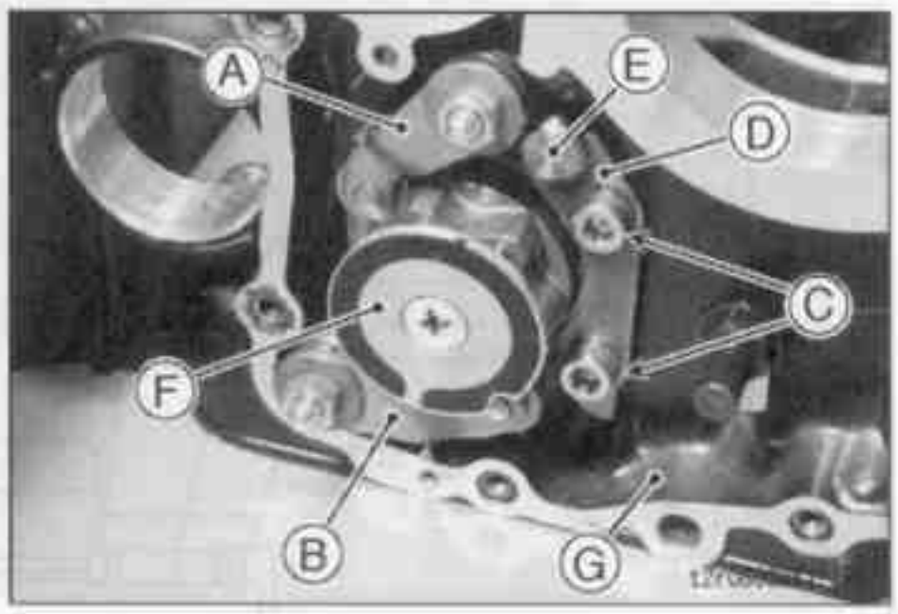


1. Two Washers, ϕ 20 x 25.5 x t 1.2 mm (ϕ 0.78 x 1.004 x t 0.047 in)
2. Two Needle Bearings
3. Two Washers, ϕ 22.3 x 35 x t 1.6 mm (ϕ 0.878 x 1.38 x t 0.063 in)
4. Bushing (5th gear)
5. Washer, ϕ 28.5 x 35.5 x t 1.5 mm (ϕ 1.122 x 1.398 x t 0.059 in)
6. Circlip for ϕ 28 mm (ϕ 1.10 in)
7. Low Gear (drive shaft)
8. Align the gear or bushing hole (s) with the shaft hole (s).
9. Output Shaft
10. Washer, ϕ 28.3 x 42 x t 2.9 mm (ϕ 1.114 x 1.65 x t 0.114 in)
11. Washer, ϕ 29.9 x 40 x t 1.5 mm (ϕ 1.008 x 1.57 x t 0.059 in)
12. Washer, ϕ 30.3 x 40 x t 1.5 mm (ϕ 1.193 x 1.57 x t 0.059 in)
13. Circlip for ϕ 29 (ϕ 1.14 in)
14. Steel Balls

Transmission

Shift Drum and Fork Removal

- Remove:
  - Lower Crankcase Half (see Crankcase Splitting)
  - Neutral Set Lever [A] and Gear Set Lever [B]
  - Bolts [C] and Shift Drum Bearing Holder [D]
- Pull out the shift rod [E], and take off the shift forks.
- Pull out the shift drum [F] from the upper crankcase [G].

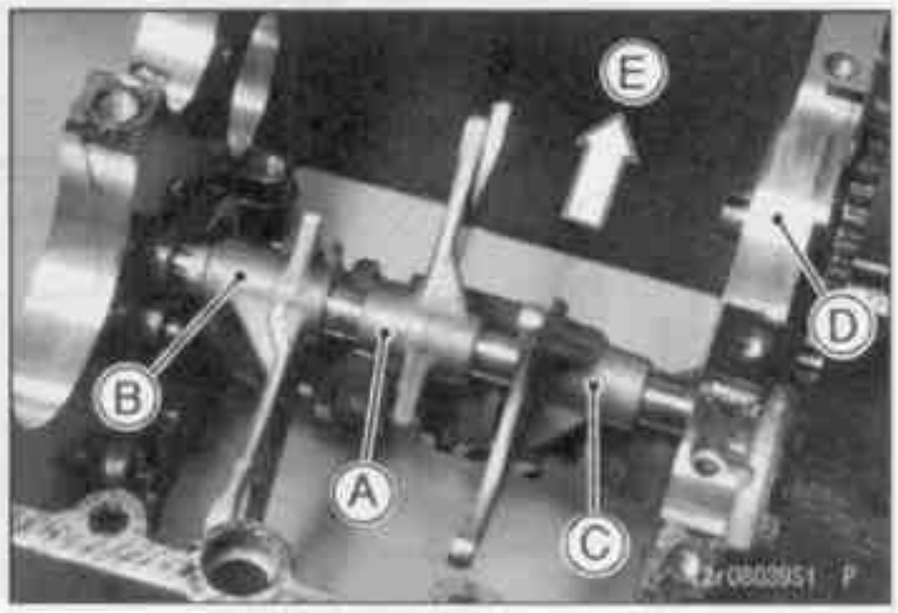


Shift Drum and Fork Installation

- Apply a non-permanent locking agent to the shift drum bearing holder bolts, and tighten them.

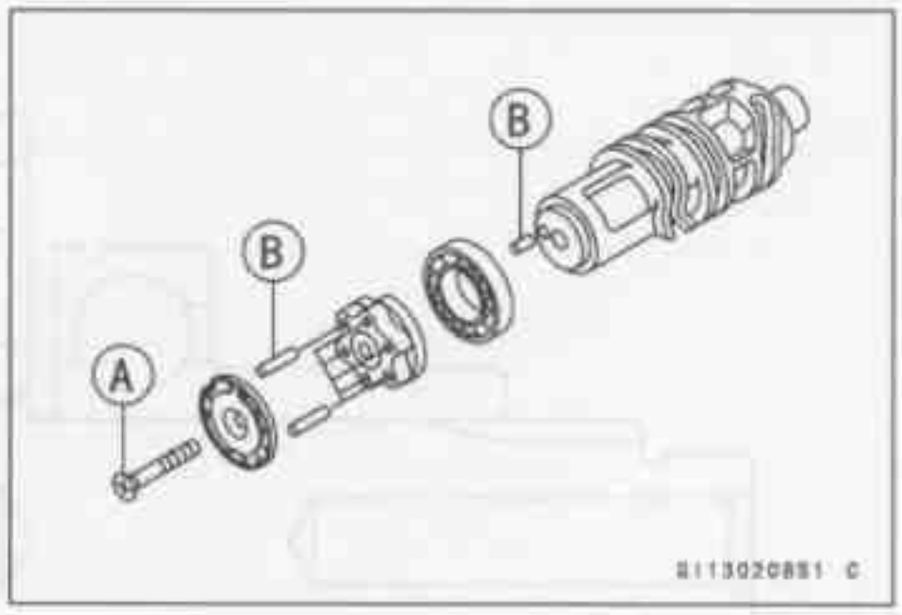
Torque - Shift Drum Bearing Holder Bolts: 13 N·m (1.3 kg·m, 120 in·lb)

- The shift forks can be identified by their shape. Install them noting the direction shown.
  - Drive Shaft Fork marked with "96" [A]
  - Output Shaft Fork marked with "97" [B]
  - Output Shaft Fork marked with "98" [C]
  - Upper Crankcase [D]
  - Front [E]



Shift Drum Disassembly

- Remove the shift drum (see Shift Drum and Fork Removal).
- While holding the shift drum with a vise, remove the shift drum cam screw.
  - Shift Drum Cam Screw [A]
  - Shift Drum Pins (Dowel Pins) [B]

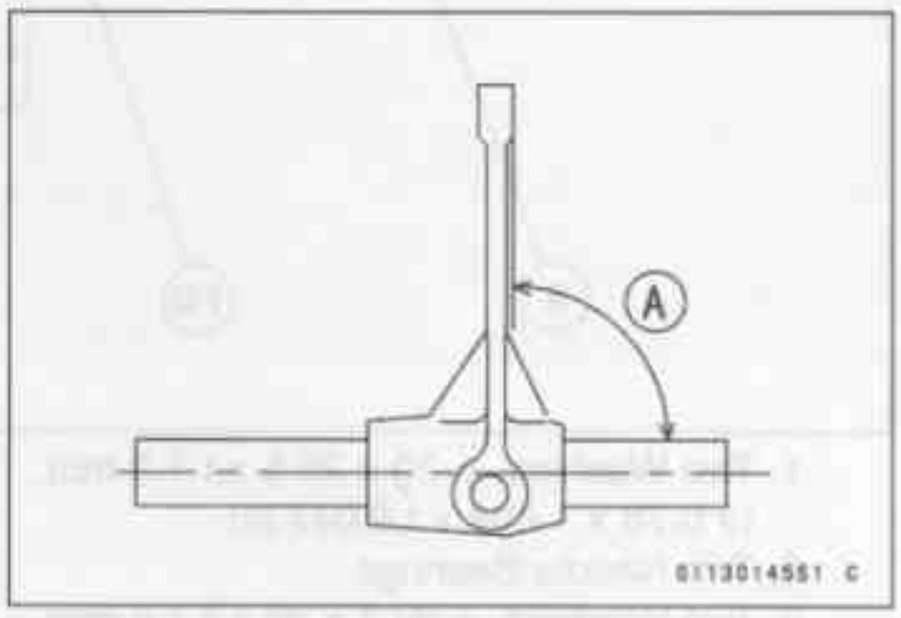


Shift Drum Assembly

- Be sure to install the dowel pins.
- Apply a non-permanent locking agent to the threads of the shift drum cam screw, and tighten it.

Shift Fork Bending

- Visually inspect the shift forks, and replace any fork that is bent. A bent fork could cause difficulty in shifting or allow the transmission to jump out of gear under power.
  - 90° [A]



Transmission

Shift Fork/Gear Groove Wear

- Measure the thickness of the shift fork ears [A], and measure the width [B] of the gear grooves.

★ If the thickness of a shift fork ear is less than the service limit, the shift fork must be replaced.

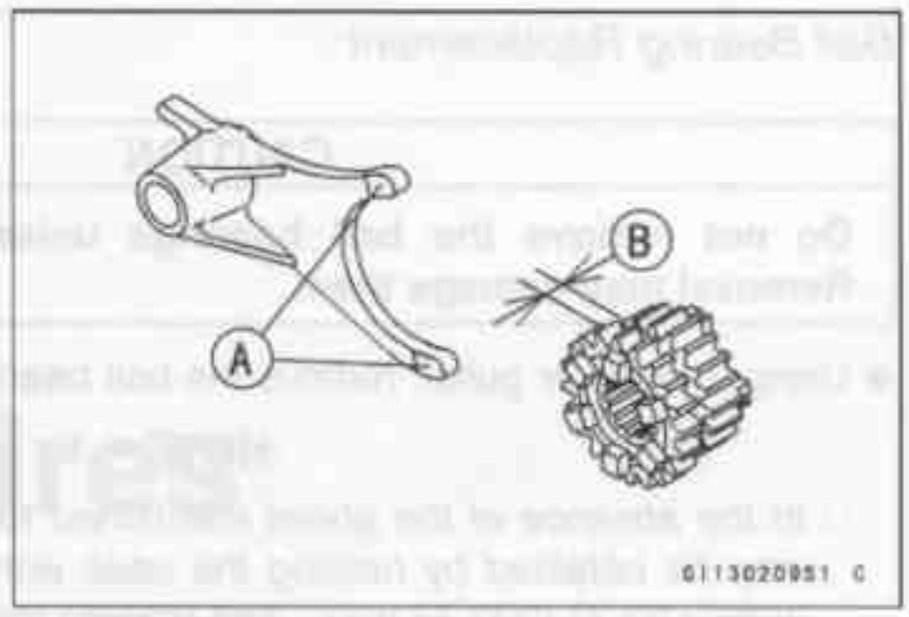
Shift Fork Ear Thickness

Standard:	**4.9 ~ 5.0 mm (0.193 ~ 0.197 in)**
Service Limit:	**4.8 mm (0.189 in)**

★ If the gear groove is worn over the service limit, the gear must be replaced.

Shift Fork Ear Thickness

Standard:	**5.05 ~ 5.15 mm (0.1988 ~ 0.203 in)**
Service Limit:	**5.25 mm (0.207 in)**



Shift Fork Guide Pin/Drum Groove Wear

- Measure the diameter or each shift fork guide pin [A], and measure the width [B] of each shift drum groove.

★ If the guide pin on any shift fork is less than the service limit, the fork must be replaced.

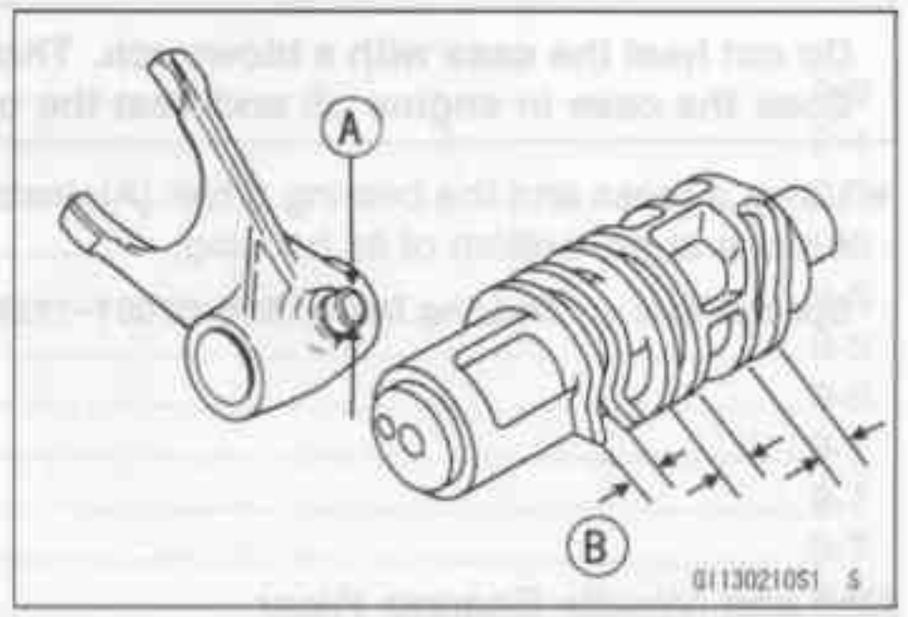
Shift Fork Guide Pin Diameter

Standard:	**7.9 ~ 8.0 mm (0.311 ~ 0.315 in)**
Service Limit:	**7.8 mm (0.307 in)**

★ If any shift drum groove is worn over the service limit, the drum must be replaced.

Shift Drum Groove Width

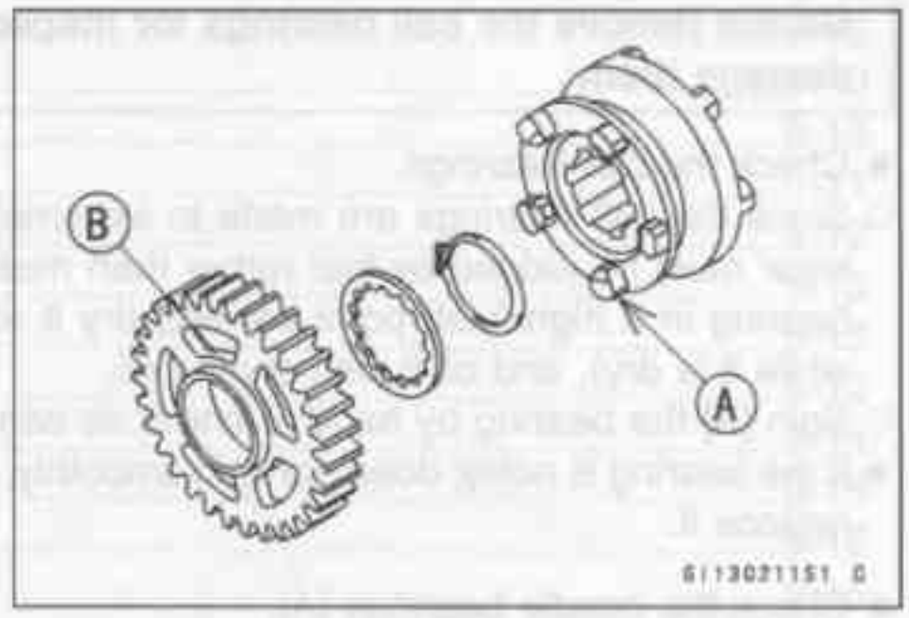
Standard:	**8.05 ~ 8.20 mm (0.317 ~ 0.323 in)**
Service Limit:	**8.3 mm (0.327 in)**



Gear Dog and Gear Dog Hole Damage

- Visually inspect the gear or shifter dogs [A] and gear dog holes [B].

★ Replace any damaged gears or gears with excessively worn dogs or dog holes.



Wheels / Tires

Table of Contents

Exploded View....9-2
Specifications....9-4
Wheels (Rims)....9-5
- Front Wheel Removal....9-5
- Front Wheel Installation....9-5
- Rear Wheel Removal....9-6
- Rear Wheel Installation....9-6
- Wheel Inspection....9-7
- Axle Inspection....9-7
- Balance Inspection....9-7
- Balance Adjustment....9-8
- Balance Weight Removal....9-8
- Balance Weight Installation....9-8

Tires....9-10
- Air Pressure Inspection/Adjustment....9-10
- Tire Inspection....9-10
- Tire Removal....9-10
- Tire Installation....9-11
- Tire Repair....9-12

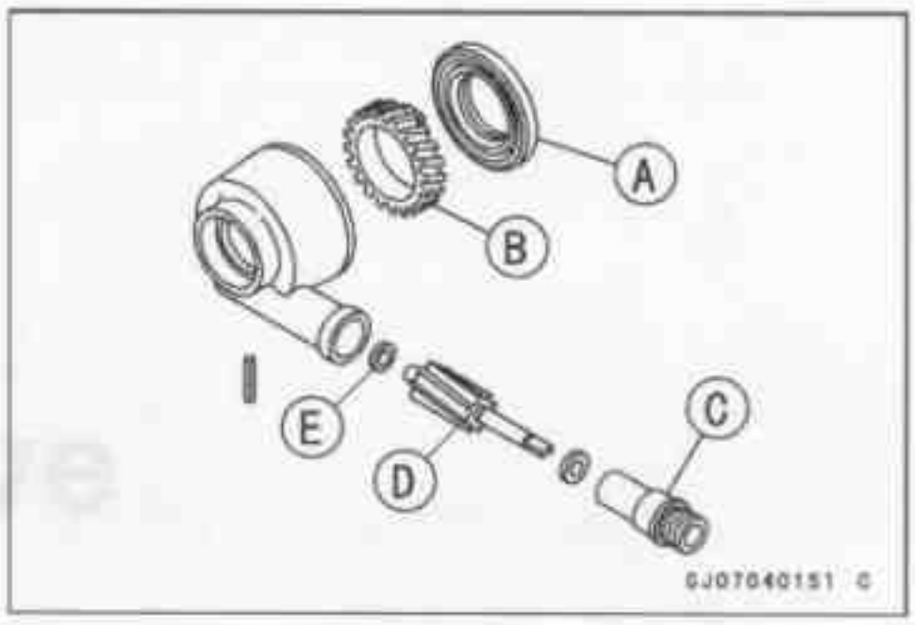
Hub Bearings (Wheel Bearings)....9-13
- Hub Bearing Removal....9-13
- Hub Bearing Installation....9-13
- Hub Bearing Inspection....9-14

Speedometer Gear Housing....9-15
- Disassembly/Assembly....9-15
- Lubrication....9-15

Speedometer Gear Housing

Disassembly/Assembly

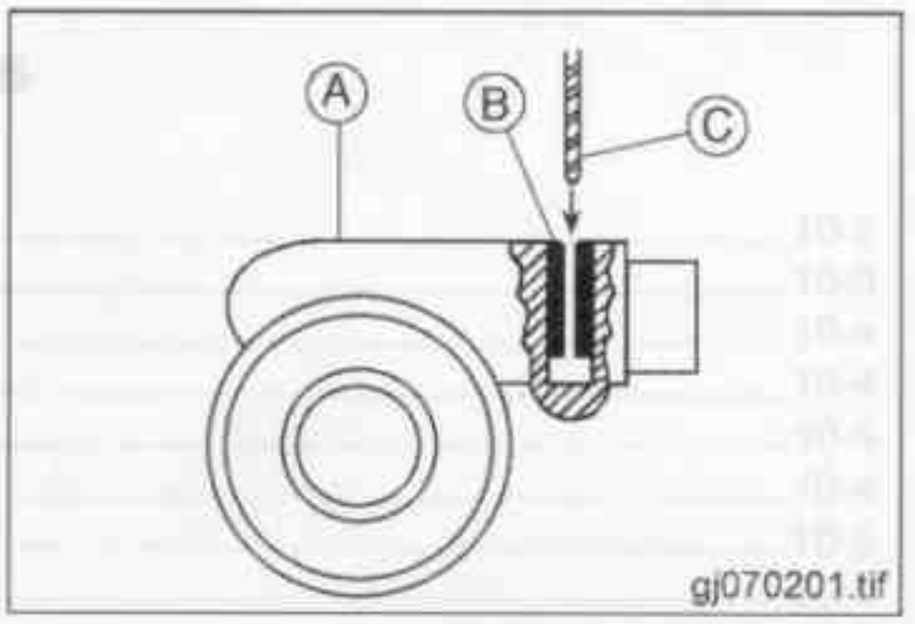
- Pull out the grease seal [A] using a thin-bladed screwdriver.
- Pull out the speedometer gear [B].



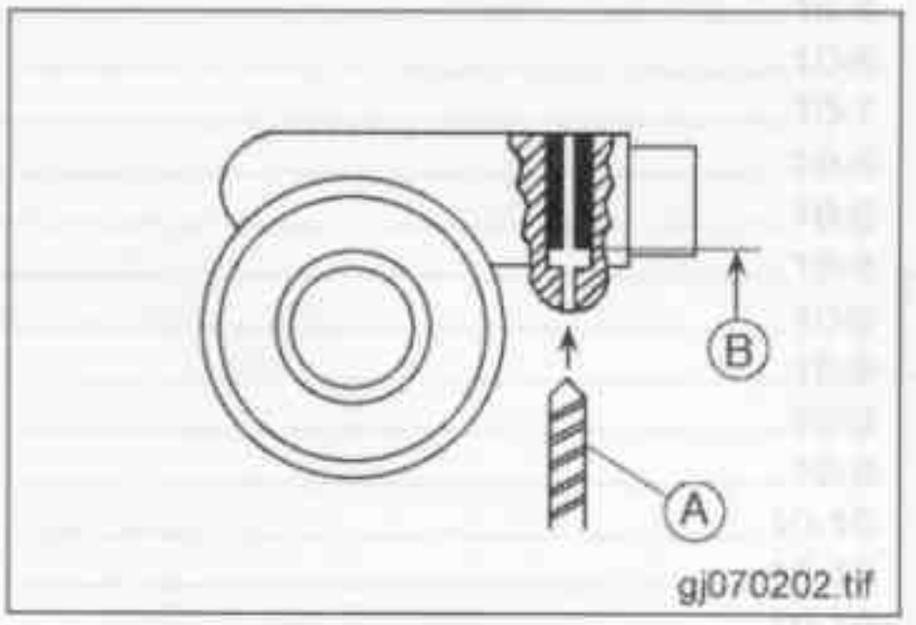
NOTE

○ *It is recommended that the speedometer unit be replaced rather than attempting to replace the bushing [C], pinion [D], and washers [E]. However, if you wish, replace them as follows.*

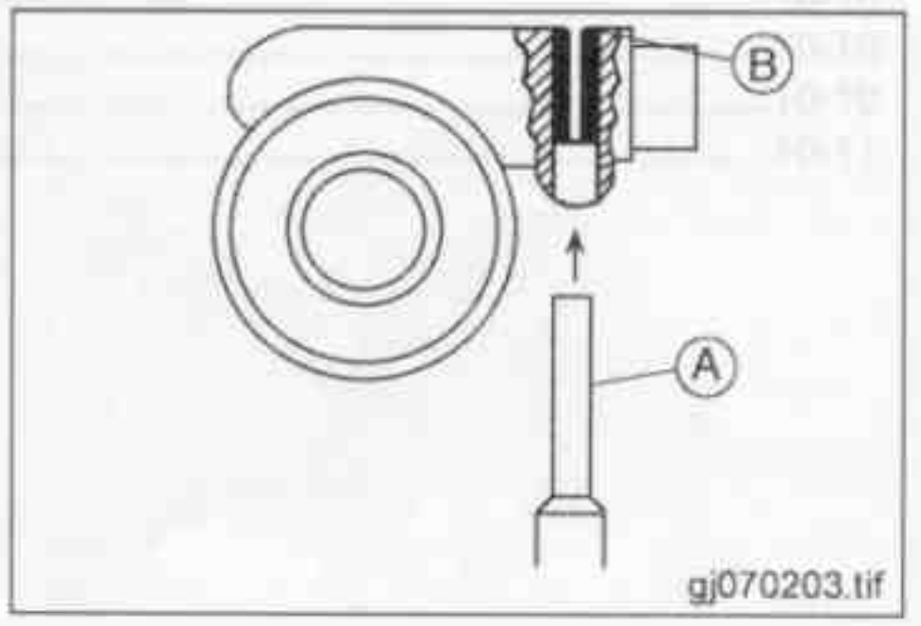
- First, drill the inner hole of the spring pin [B] in the housing [A] using a 1.0 to 1.5 mm drill bit [C].



- Drill the housing from the opposite side to the pin end [B], using a 3.0 to 3.5 mm drill bit [A].

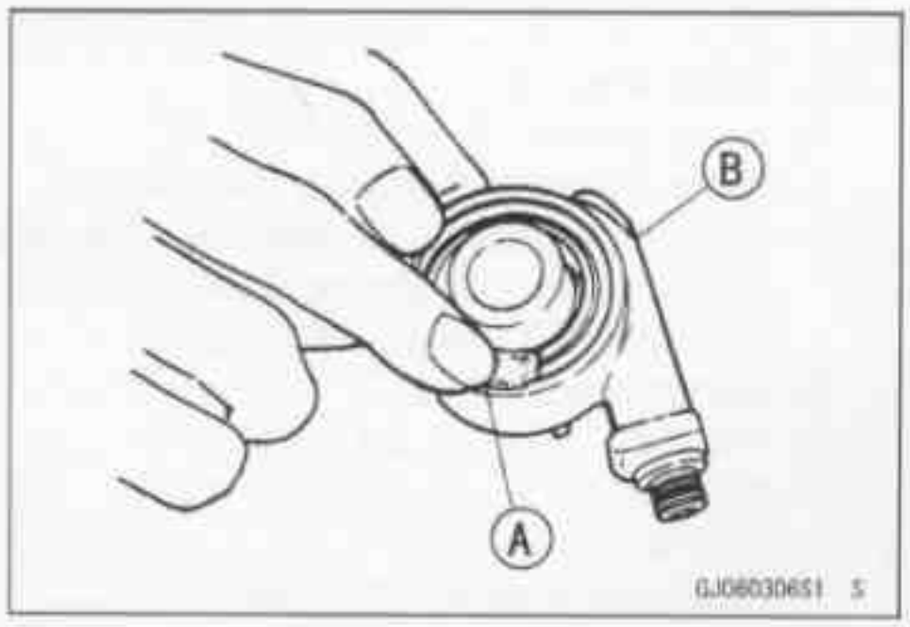


- Using a 3 mm rod [A], tap the pin [B] out, and then pull out the speedometer cable bushing, pinion, and washers.
- Apply grease to the gear, pinion, grease seal, and washers (see Exploded View).
- After inserting a new spring pin, stake the housing hole to secure the pin in place.
- Replace the grease seal.
- Press in the grease seal so that the seal end is flush with the end of the hole.
- Apply high temperature grease to the seal lips.

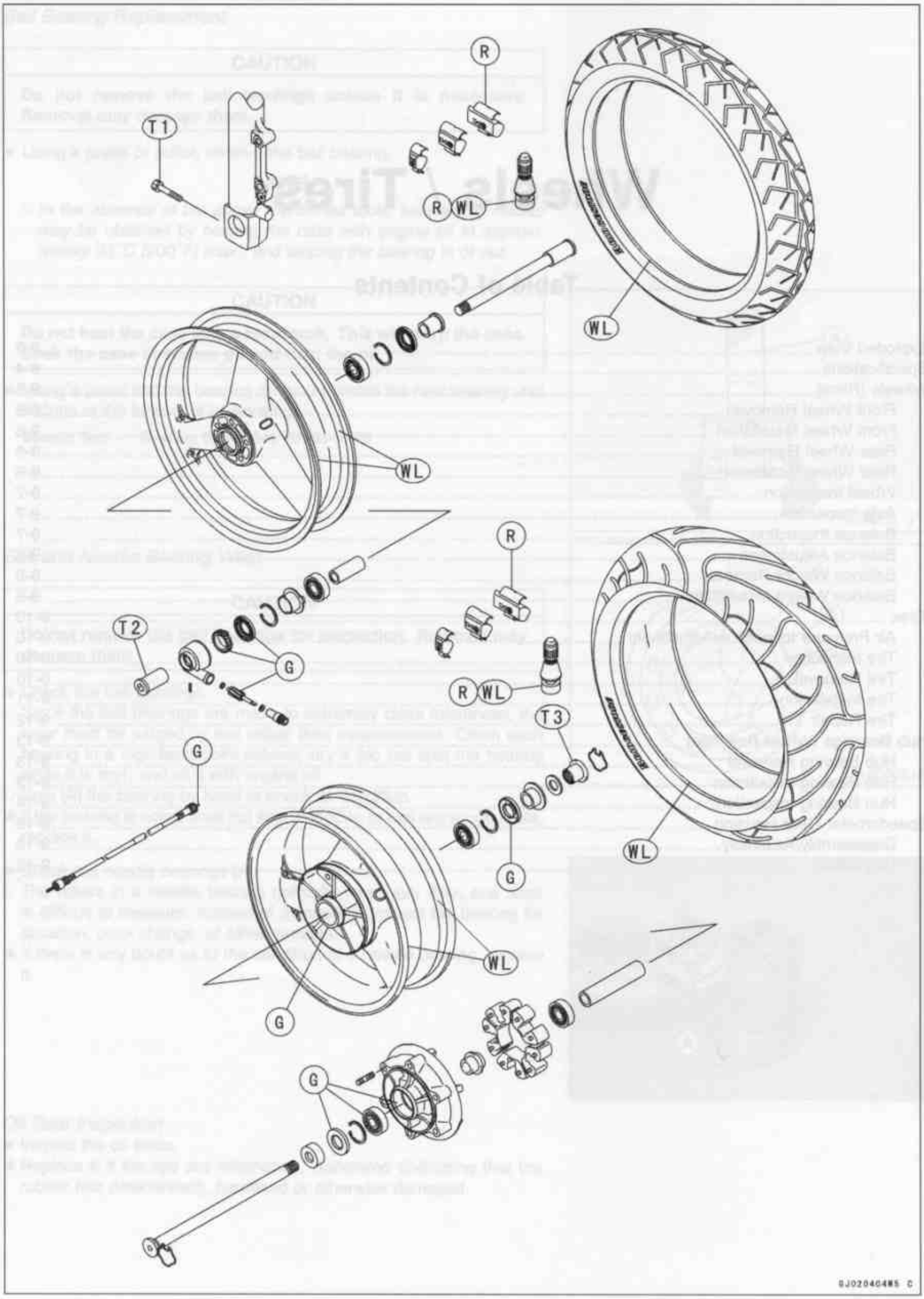


Lubrication

- Clean and grease [A] the speedometer gear housing [B]



Exploded View



Exploded View

G: Apply grease.
R: Replacement Parts
WL: Apply soap and water solution or rubber lubricant.
T1: 20 N·m (2.0 kg·m, 14.5 ft·lb)
T2: 125 N·m (13 kg·m, 94 ft·lb)
T3: 98 N·m (10 kg·m, 72 ft·lb)

Specifications

Item		Standard	Service Limit
Wheels (Rims)			
Rim runout:	Axial	– – –	TIR 0.5 mm (0.020 in.)
	Radial	– – –	TIR 0.8 mm (0.031 in.)
Axie runout/100 mm		TIR 0.1 mm (0.004 in.) or less	TIR 0.2 mm (0.008 in.)
Wheel balance		10g or less	– – –
Balance weights		10g, 20g, 30g	– – –
Tires: Air pressire (when cold)	Front	250 kPa (2.5 kg/cm^2, 36 psi)	– – –
	Rear	250 kPa (2.5 kg/cm^2, 36 psi)	– – –
Tread depth:	Front	4.3 mm (0.17 in.)	1 mm (0.04 in.) (DE,AT,CH) 1.6 mm (0.062 in.)
	Rear	7 mm (0.28 in.)	up to 130 km/h (80 mph): 2 mm (0.08 in.) over 130 km/h (80 mph): 3 mm (0.12 in.)
Standard tires:		Make, Type	
	Front: ZR1200A/C	BRIDGESTONE BATTLAX BT020F RADIAL L, tubeless	120/70 ZR17 (58W)
	ZR1200B	BRIDGESTONE BATTLAX BT020F RADIAL W, tubeless	
	Rear: ZR1200A/C	BRIDGESTONE BATTLAX BT020R RADIAL L, tubeless	180/55 ZR17 (73W)
	ZR1200B	BRIDGESTONE BATTLAX BT020R RADIAL W, tubeless	

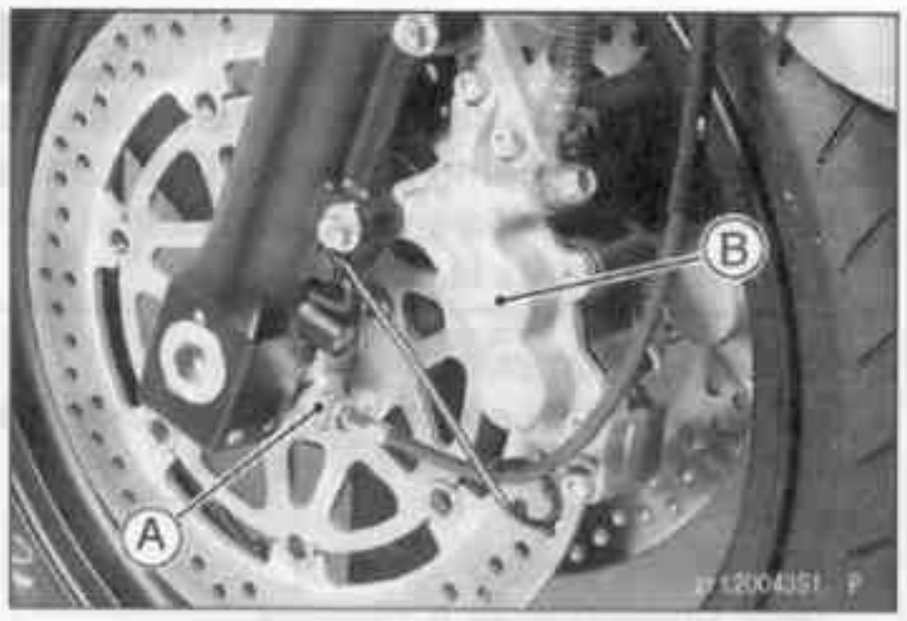
Special Tools - Jack: 57001–1238
Inside Circlip Pliers: 57001–143
Bearing Driver Set: 57001–1129
Bearing Remover Shaft, ϕ9: 57001–1265
Bearing Remover Head, ϕ20 × ϕ22: 57001–1293
Bearing Remover Head, ϕ25 × ϕ28: 57001–1346

DE: Federal Republic of Germany
AT: Republic of Austria
CH: Swiss Confederation

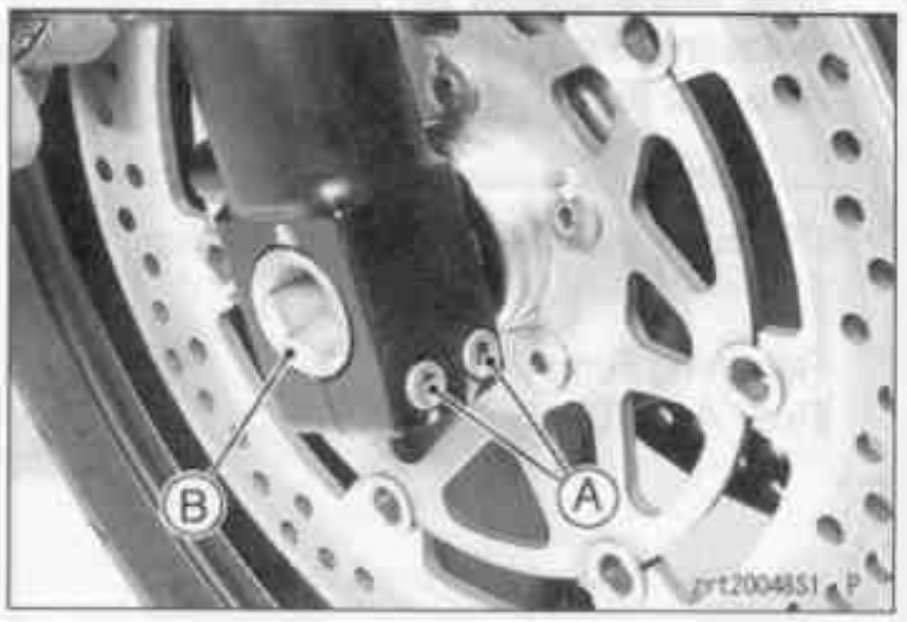
Wheels (Rims)

Front Wheel Removal

- Remove the speedometer cable lower end [A]
- Remove both brake calipers [B] with the hoses installed.



- Loosen:
  Right Side Axle Clamp Bolts [A]
  Front Axle [B]



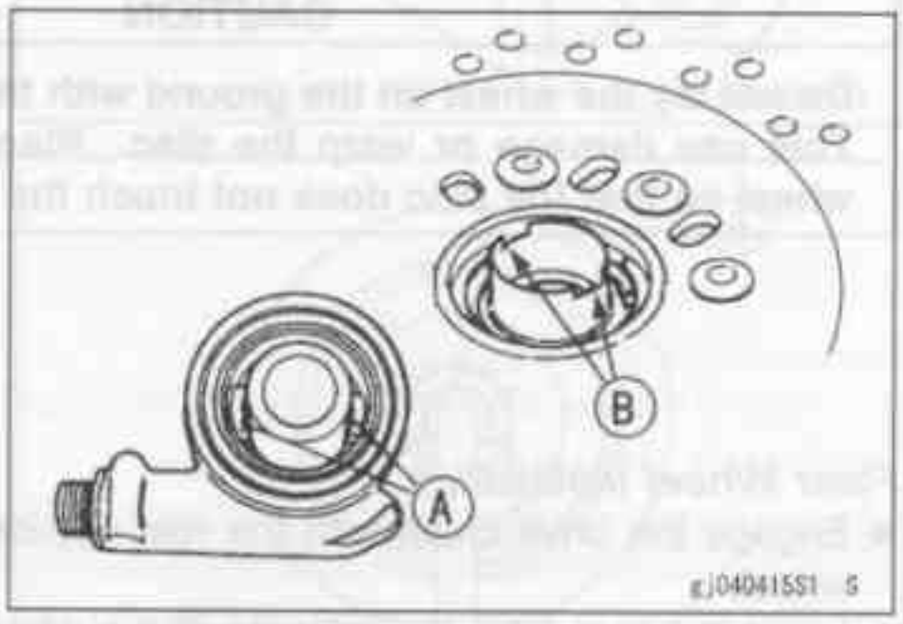
- Raise the front wheel off the ground, using the jack.
  Special Tools - Jack: 5700–1238
- Pull out the axle to the right and drop the front wheel out of the forks.

CAUTION

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

Front Wheel Installation

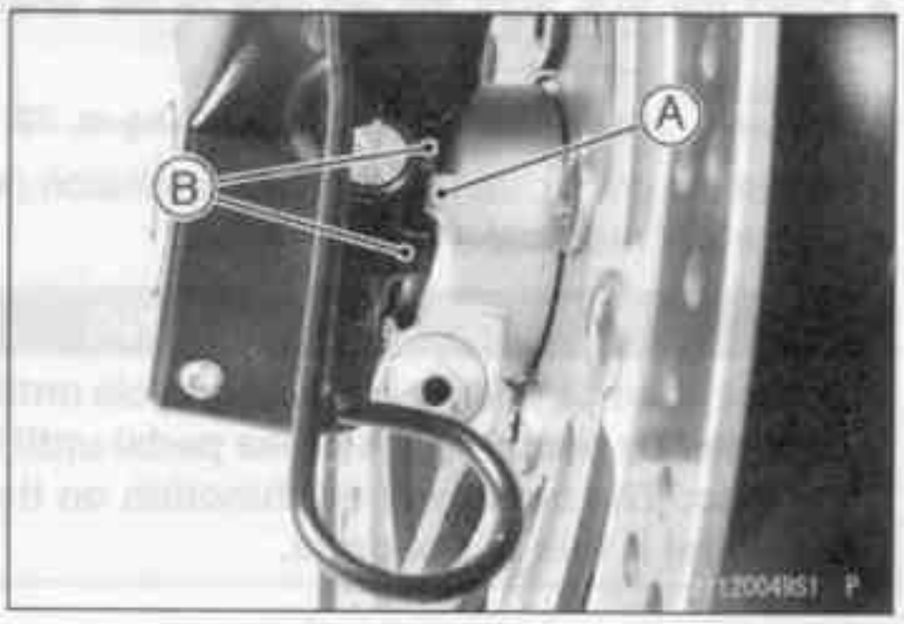
- Install the speedometer gear housing so that the projections [A] fit in the drive notches [B].



- Fit the collar on the right side of the hub.
- Fit the speedometer gear housing stop [A] between the fork leg stops [B].
- Tighten the axle and right axle clamp bolts.

  Torque - Front Axle: 125 N·m(13 kg·m, 94 ft·lb)
  Front Axle Clamp Bolts: 20 N·m(2.0 kg·m, 14.5 ft·lb)

- Install the front brake calipers (see Brakes chapter).
- Check the front brake effectiveness.



Wheels (Rims)

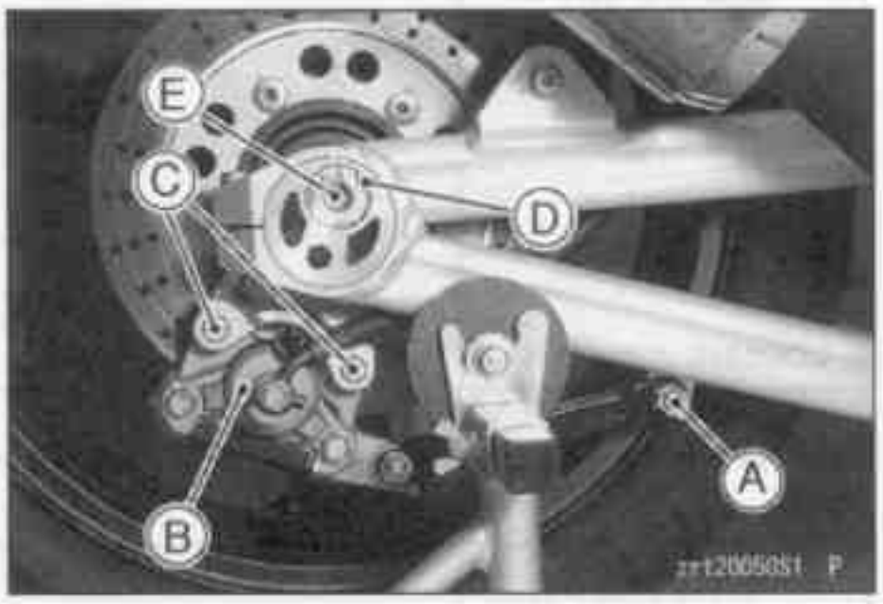
⚠ WARNING

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

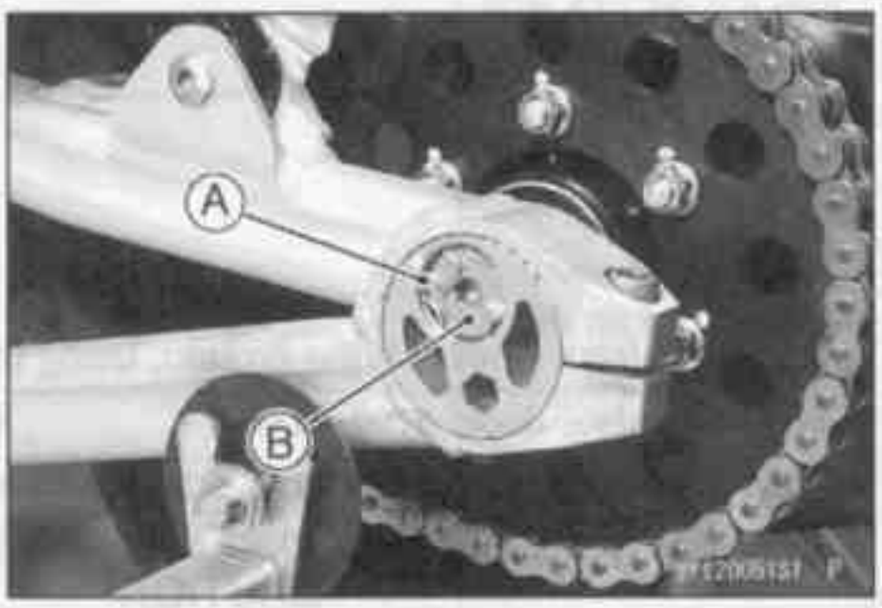
Rear Wheel Removal

- Raise the rear wheel off the ground, using the stand.
- Loosen the front torque link nut [A].

Remove:
Rear Brake Caliper Bolts [B]
Rear Brake Caliper [C]
Retaining Ring [D]
Axle Nut [E]



Retaining Ring [A]
Rear Axle [B]



- Disengage the drive chain from the rear sprocket toward the left and remove the rear wheel.



CAUTION

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

Rear Wheel Installation

- Engage the drive chain with the rear sprocket, and install the rear wheel.
- Insert the axle from the left side of the wheel, and tighten the axle nut.

Torque - Rear Axle Nut: 98 N·m (10 kg·m, 72 ft·lb)

- Adjust the drive chain slack after installation (see Final Drive chapter).
- Check the rear brake effectiveness.

⚠ 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.

Wheels (Rims)

Wheel Inspection

- Raise the front/rear wheel off the ground.

Special Tools - Jack: 57001–1238

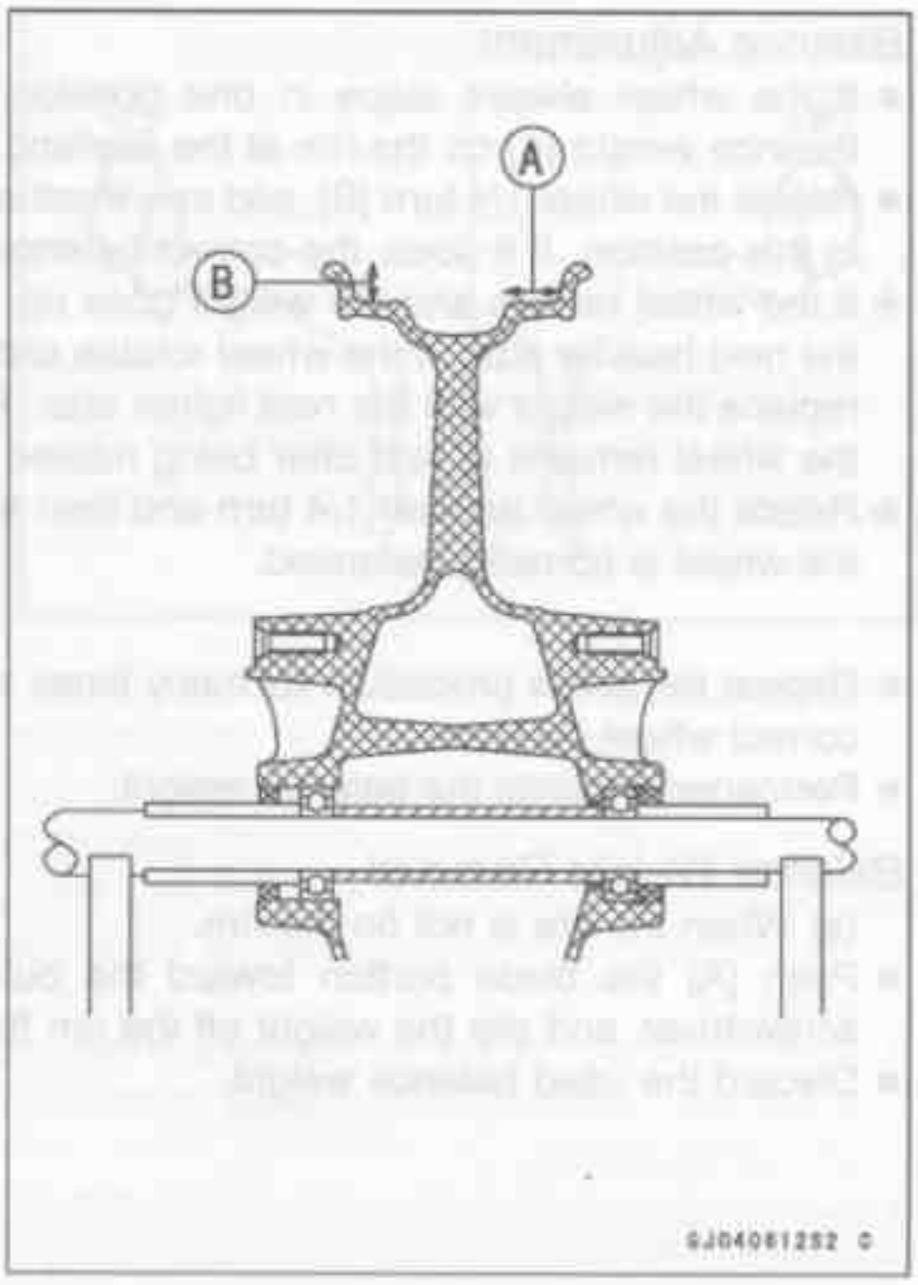
- Spin the wheel lightly, and check for roughness or binding.
★ If roughness or binding is found, replace the hub bearings.
- Inspect the wheel for small cracks, dents, bending, or warp.
★ If there is any damage to the wheel, replace the wheel.
- Remove the wheel, and support it without the tire by the axle.
- Measure the radial [B] and axial [A] rim runout with a dial gauge.
★ If rim runout exceeds the service limit, check the hub bearings.
★ If the problem is not due to the bearings, replace the wheel.

Rim Runout

Service Limit:	**Axial:**	**TIR 0.5 mm (0.020 in.)**
	Radial:	**TIR 0.8 mm (0.031 in.)**

⚠ 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.

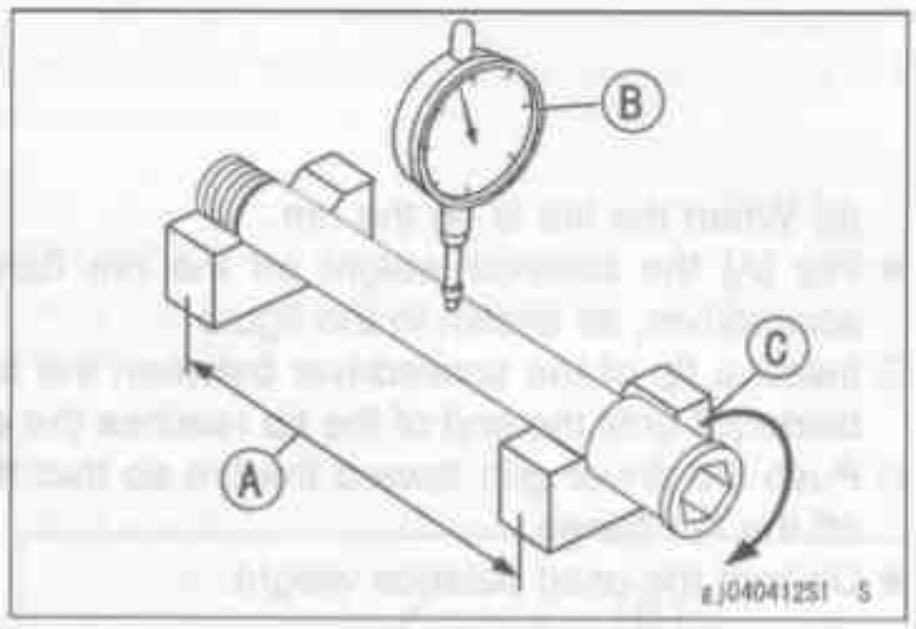


Axle Inspection

- Visually inspect the front or rear axle for damages.
★ If the axle is damaged or bent, replace it.
- Place the axle in V blocks that are 100 mm [A] apart, and set a dial gauge [B] on the axle at a point halfway between the blocks. Turn [C] the axle to measure the runout. The difference between the highest and lowest dial readings is the amount of runout.
★ If axle runout exceeds the service limit, replace the axle.

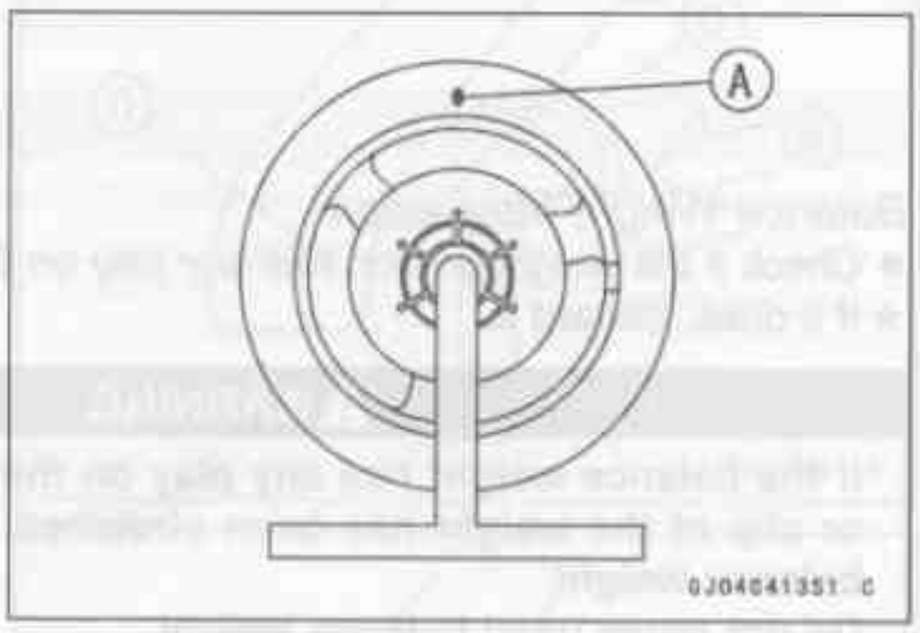
Axle Runout/100 mm

Standard:	**TIR 0.1 mm (0.004 in.) or less**
Service Limit:	**TIR 0.2 mm (0.008 in.)**



Balance Inspection

- Remove the wheel.
- Support the wheel so that it can be spun freely.
- Spin the wheel lightly, and mark [A] the wheel at the top when the wheel stops.
○ Repeat this procedure several times. If the wheel stops of its own accord in various positions, it is well balanced.
★ If the wheel always stops in one position, adjust the wheel balance.



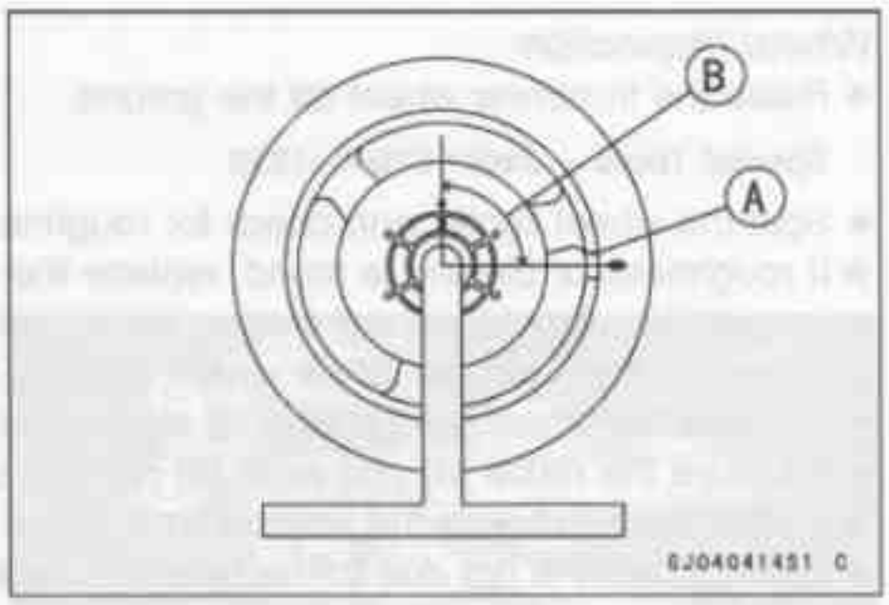
Wheels (Rims)

Balance Adjustment

- If the wheel always stops in one position, provisionally attach a balance weight [A] on the rim at the marking using adhesive tape.
- Rotate the wheel 1/4 turn [B], and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.

★ If the wheel rotates and the weight goes up, replace the weight with the next heavier size. If the wheel rotates and the weight goes down, replace the weight with the next lighter size. Repeat these steps until the wheel remains at rest after being rotated 1/4 turn.

★ Rotate the wheel another 1/4 turn and then another 1/4 turn to see if the wheel is correctly balanced.

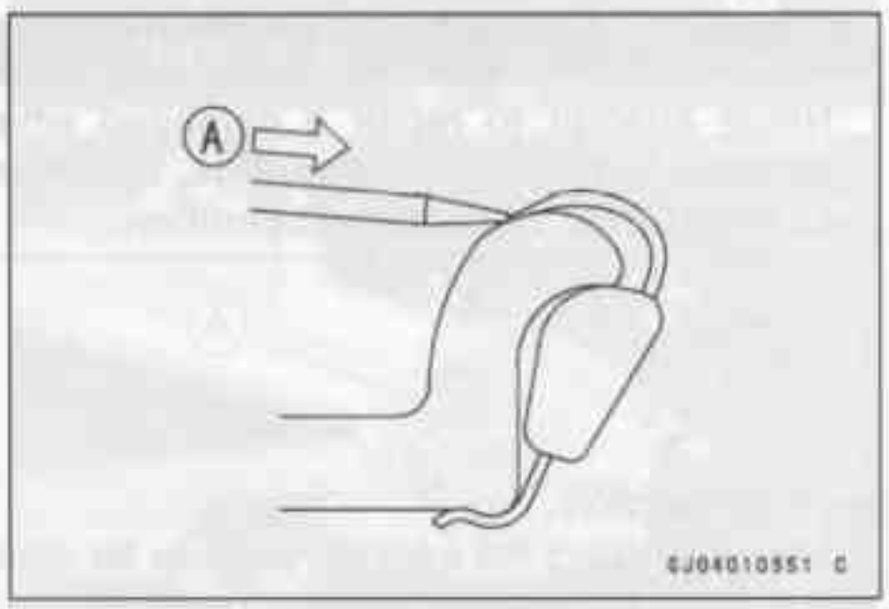


- Repeat the entire procedure as many times as necessary to achieve correct wheel balance.
- Permanently install the balance weight.

Balance Weight Removal

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

- Push [A] the blade portion toward the outside with a regular tip screwdriver, and slip the weight off the rim flange.
- Discard the used balance weight.



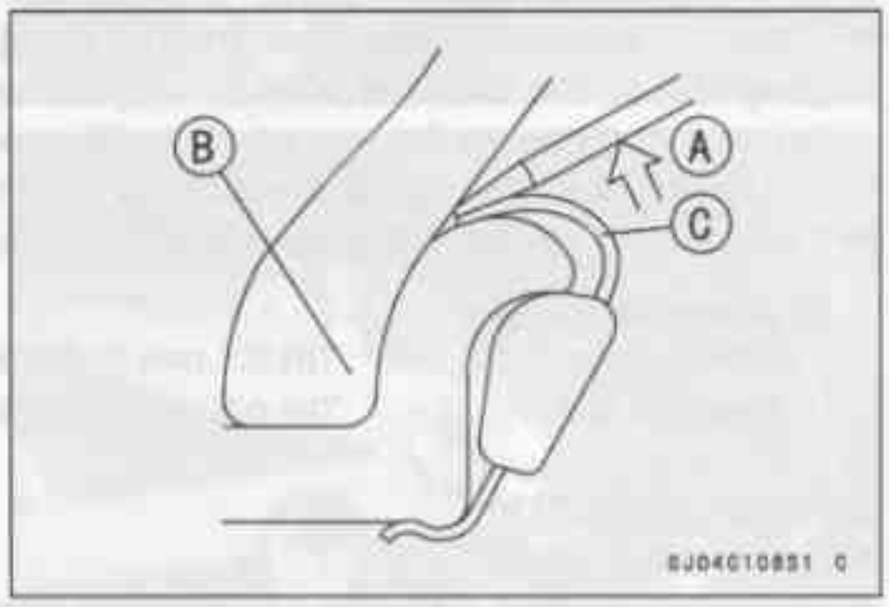
(b) When the tire is on the rim.

- Pry [A] the balance weight off the rim flange using a regular tip screwdriver, as shown in the figure.

○ Insert a tip of the screwdriver between the tire bead [B] and weight blade [C] 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.



Balance Weight Installation

- Check if the weight portion has any play on the blade and clip.

★ If it does, discard it.

⚠ WARNING

If the balance weight has any play on the rim, the blade and/or clip of the weight has been stretched. Replace the loose balance weight.
Do not reuse used balance weight.
Unbalanced wheels can create an unsafe riding condition.

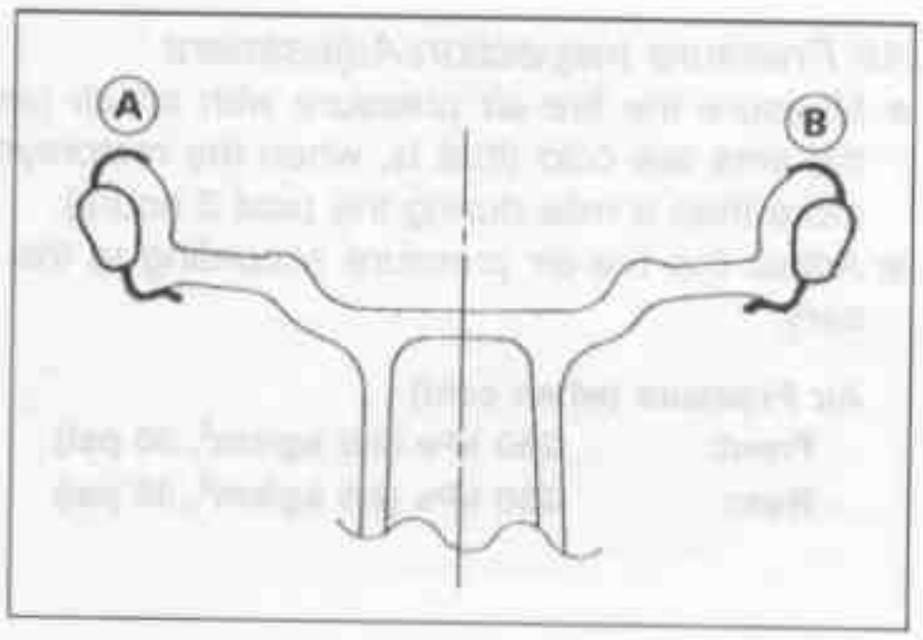
- Lubricate the balance weight blade, tire bead, and rim flange with a soap and water solution or rubber lubricant. This helps the balance weight slip onto the rim flange.

CAUTION

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

Wheels (Rims)

- When installing the balance weight 20g (0.71 oz.) or more, install the balance weights at both sides of rim flange as shown.



Required Total Weight	Weight selection	
	One Side [A]	Other Side [B]
10g (0.35 oz.)	10g (0.35 oz.)	–
20g (0.71 oz.)	10g (0.35 oz.)	10g (0.35 oz.)
30g (1.1 oz.)	20g (0.71 oz.)	10g (0.35 oz.)
40g (1.4 oz.)	20g (0.71 oz.)	20g (0.71 oz.)
50g (1.8 oz.)	30g (1.1 oz.)	20g (0.71 oz.)
60g (2.1 oz.)	30g (1.1 oz.)	30g (1.1 oz.)
70g (2.5 oz.)	20g (0.71 oz.) + 20g (0.71 oz.)	30g (1.1 oz.)
80g (2.8 oz.)	20g (0.71 oz.) + 20g (0.71 oz.)	20g (0.71 oz.) + 20g (0.71 oz.)
90g (3.2 oz.)	20g (0.71 oz.) + 30g (1.1 oz.)	20g (0.71 oz.) + 20g (0.71 oz.)

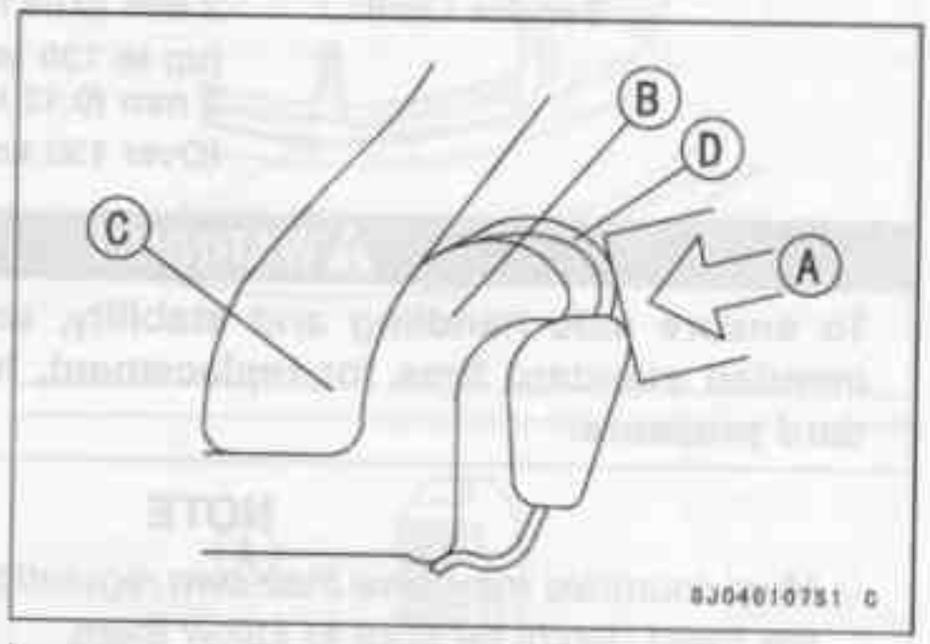
Balance Weight

Part Number	Weight(grams)
41075-1014	10 (0.35 oz.)
41075-1015	20 (0.71 oz.)
41075-1016	30 (1.1 oz.)

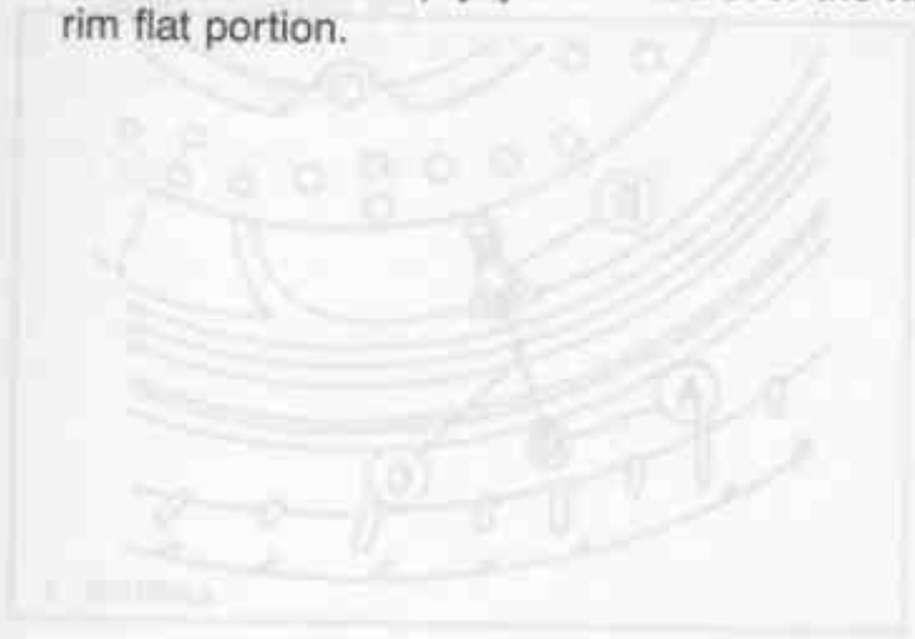
NOTE

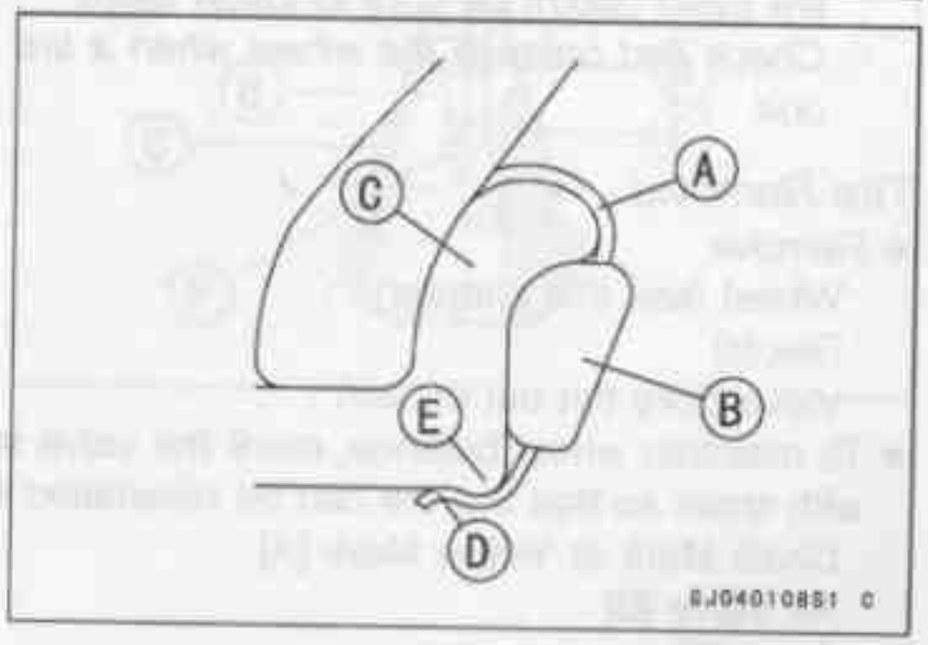
- *Balance weights are available from Kawasaki dealers in 10, 20, and 30 gram (0.35, 0.71 and 1.1 ounce) sizes. An imbalance of less than 10 grams will not usually affect running stability.*
- *Do not use four or more balance weight (more than 90 gram 3.2 ounce). If the wheel requires an excess balance weight, disassemble the wheel to find the cause.*

- Install the balance weight on the rim.
  - Slip the weight on the rim flange by pushing or lightly hammering the weight in the direction shown in the figure.
    Push or Hammer [A]
    Rim Flange [B]
    Tire Bead [C]
    Blade [D]



  - Check that the blade [A] and weight [B] seat fully on the rim flange [C], and that the clip [D] is hooked over the rim ridge [E] and reaches rim flat portion.





Tires

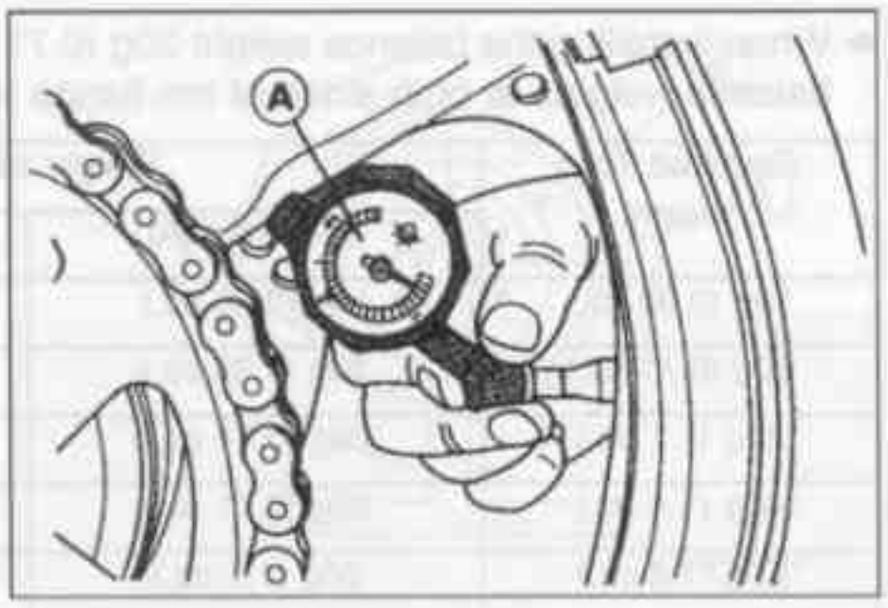
Air Pressure Inspection/Adjustment

- Measure the tire air pressure with an air pressure gauge [A] when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).

★ Adjust the tire air pressure according to the specifications if necessary.

Air Pressure (when cold)

Front:	**250 kPa (2.5 kg/cm², 36 psi)**
Rear:	**250 kPa (2.5 kg/cm², 36 psi)**

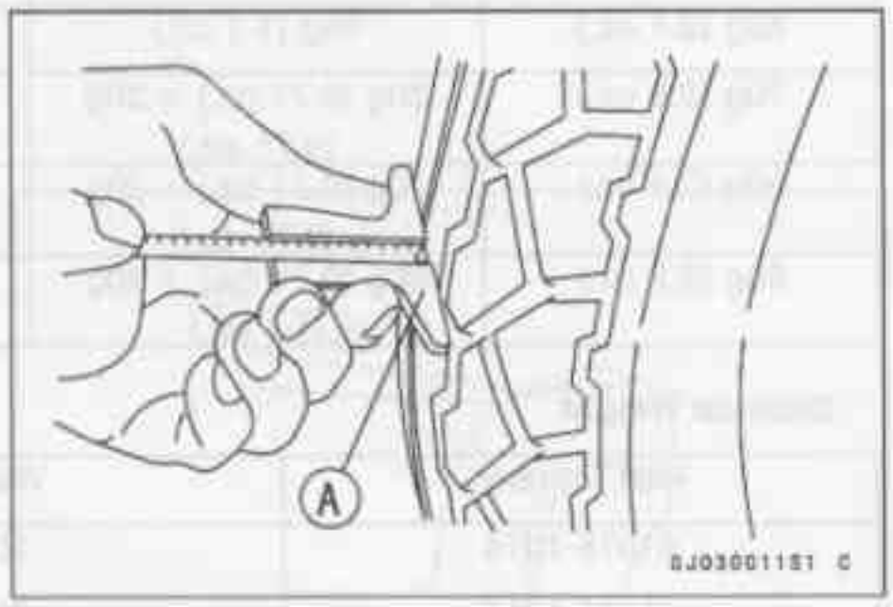


Tire Inspection

As the tire tread wears down, the tire becomes more susceptible to puncture and failure. An accepted estimate is that 90% of all tire failures occur during the last 10% of tread life (90% worn). So it is false economy and unsafe to use the tires until they are bald.

- Remove any imbedded stones or other foreign particles from the tread.
- Visually inspect the tire for cracks and cuts, replacing the tire in case of damage. Swelling or high spots indicate internal damage, requiring tire replacement.
- Measure the tread depth at the center of the tread with a depth gauge [A] Since the tire may wear unevenly, take measurement at several places.

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



Tread Depth

Front:

Standard:	**4.3 mm (0.17 in.)**
Service Limit:	**1 mm (0.04 in.)**
	(DE, AT, CH) 1.6 mm (0.062 in.)

Rear:

Standard:	**7 mm (0.28 in)**
Service Limit:	**2 mm (0.08 in.)**
	(up to 130 km/h, 80 mph)
	3 mm (0.12 in.)
	(Over 130 km/h, 80 mph)

⚠ WARNING

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

NOTE

○ *Most countries may have their own regulations requiring a minimum tire tread depth; be sure to follow them.*

○ *Check and balance the wheel when a tire is replaced with a new one.*

Tire Removal

- Remove:
  Wheel (see this chapter)
  Disc(s)
  Valve Core (let out the air)
- To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.
  Chalk Mark or Yellow Mark [A]
  Air Valve [B]
  Align [C]

Tires

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

CAUTION

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

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

NOTE

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

Tire Installation

⚠ WARNING

Use the same manufacture's on both front and rear wheels.

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

CAUTION

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

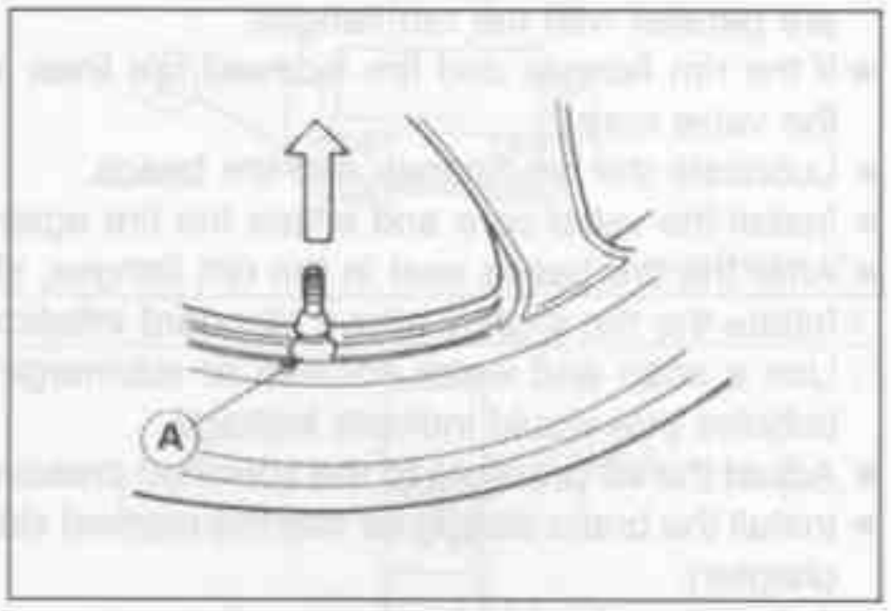
- Install a new valve in the rim.

○ Remove the valve cap, lubricate the stem seal [A] with a soap and water solution or rubber lubricant, and pull the valve stem through the rim from the inside out until it snaps into place.

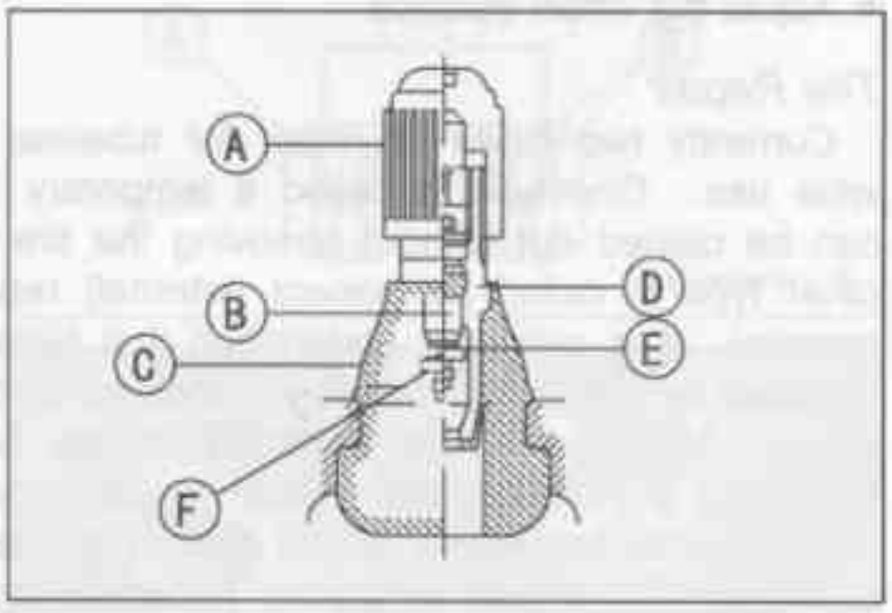
CAUTION

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

- Apply a soap and water solution, or rubber lubricant to the rim frange and tire beads.

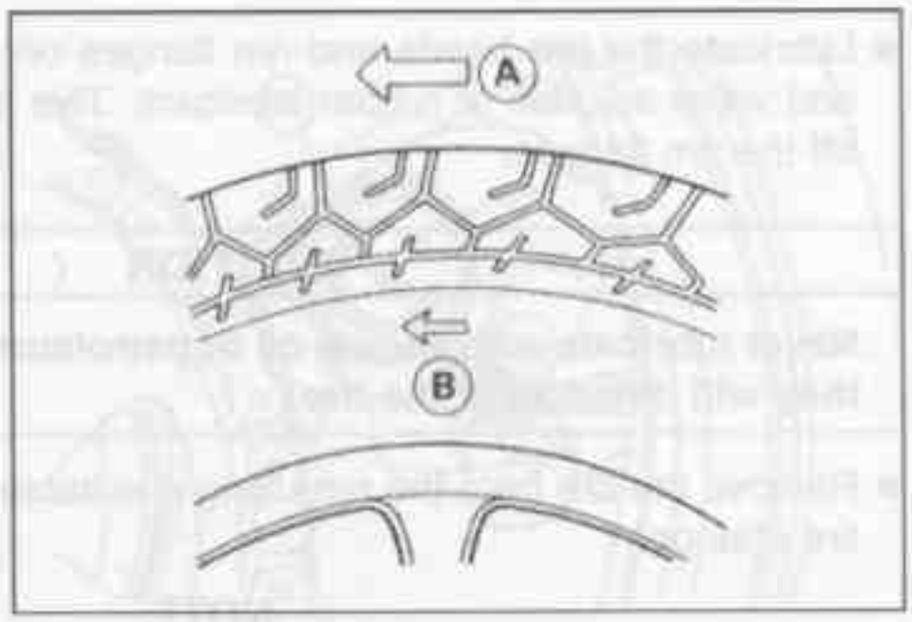


○ The air valve is shown in the figure.
Valve Cap [A]
Valve Core [B]
Stem Seal [C]
Valve Stem [D]
Valve Seat [E]
Valve Opened [F]

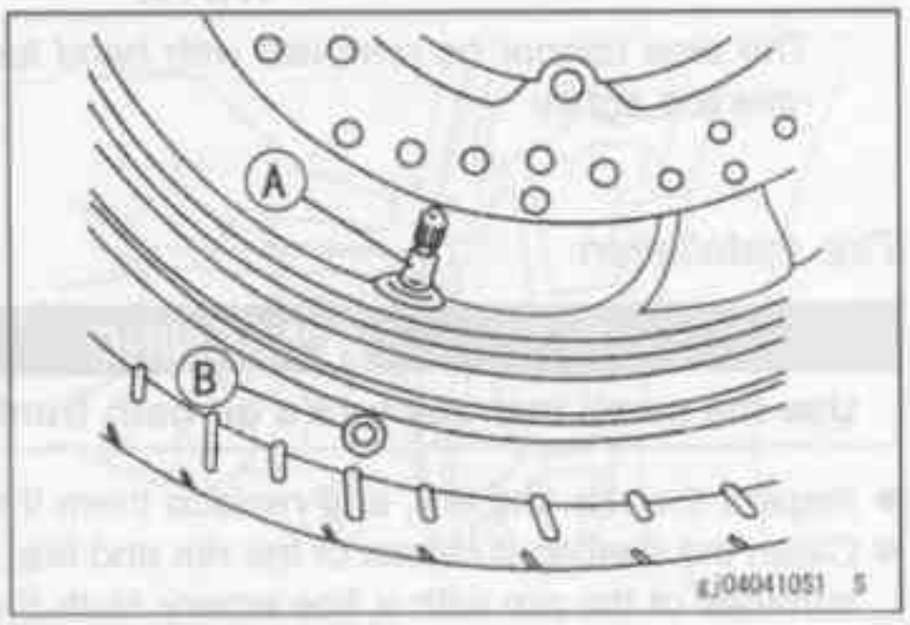


Tires

- Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.
  Rotation Direction [A]
  Tire Rotation Mark [B]



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



⚠WARNING

Be sure to install the valve core whenever inflating the tire, and do not inflate the tire to more than 400 kPa(4.0 kg/cm², 57 psi). Overinflation can explode the tire with possibility of injury and loss of life.

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

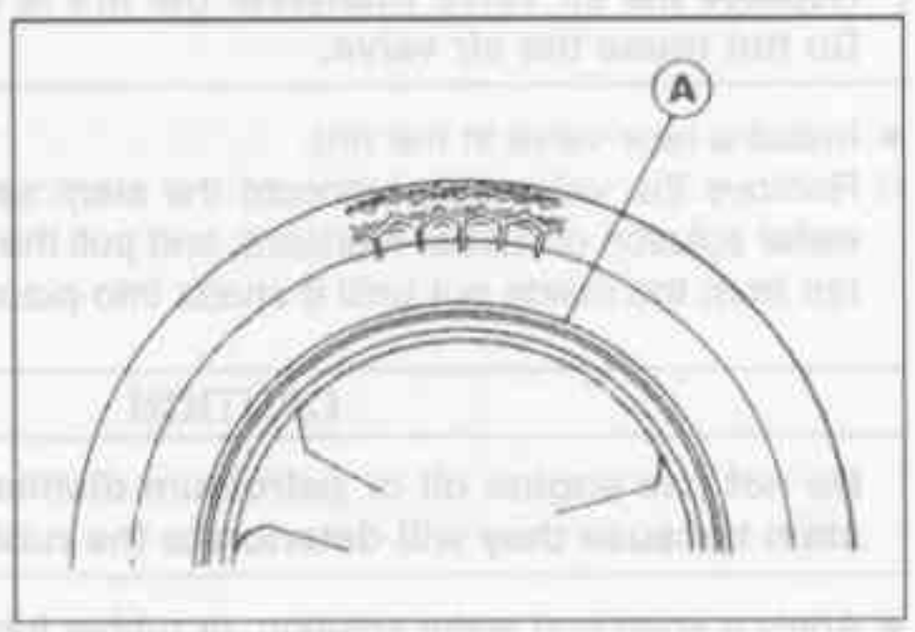
★ If the rim flanges and tire sidewall rim lines are not parallel, remove the valve core.

- Lubricate the rim flanges and tire beads.
- Install the valve core and inflate the tire again.
- After the tire beads seat in the rim flanges, check for air leakage.

○ Inflate the tire slightly above standard inflation.

○ Use a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.

- Adjust the air pressure to the specified pressure (see Tire Inspection).
- Install the brake disc(s) so that the marked side faces out (see Brakes chapter).
- Adjust the wheel balance.



Tire Repair

Currently two types of repair for tubeless tires have come into wide use. One type is called a temporary (external) repair which can be carried out without removing the tire from the rim, and the other type is called permanent (internal) repair which requires tire removal. It is generally understood that higher running durability is obtained by permanent (internal) repairs than by temporary (external) ones. Also, permanent (internal) repairs have the advantage of permitting a thorough examination for secondary damage not visible from external inspection of the tire. For these reasons, Kawasaki does not recommend temporary (external) repair. Only appropriate permanent (internal) repairs are recommended. Repair methods may vary slightly from make to make. Follow the repair methods indicated by the manufacturer of the repair tools and materials so that safe results can be obtained.

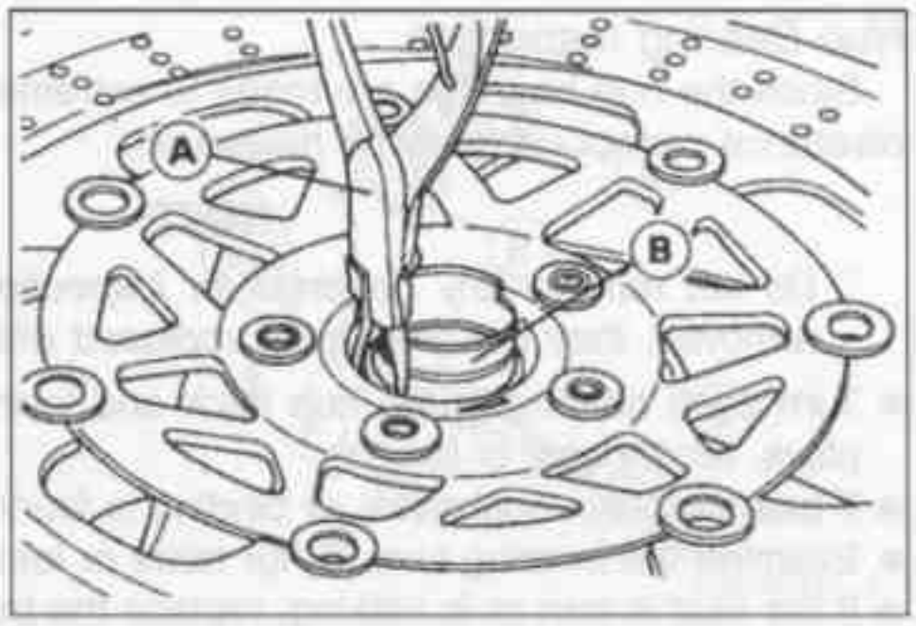
Hub Bearings (Wheel Bearings)

Hub Bearing Removal

- Remove the wheel, and take out the following.
  - Collars
  - Coupling (out of rear hub)
  - Grease Seals
  - Circlips

Special Tools - Inside Circlip Pliers: 57001–143 [A]

Speedometer Gear Drive [B] (out of front hub)

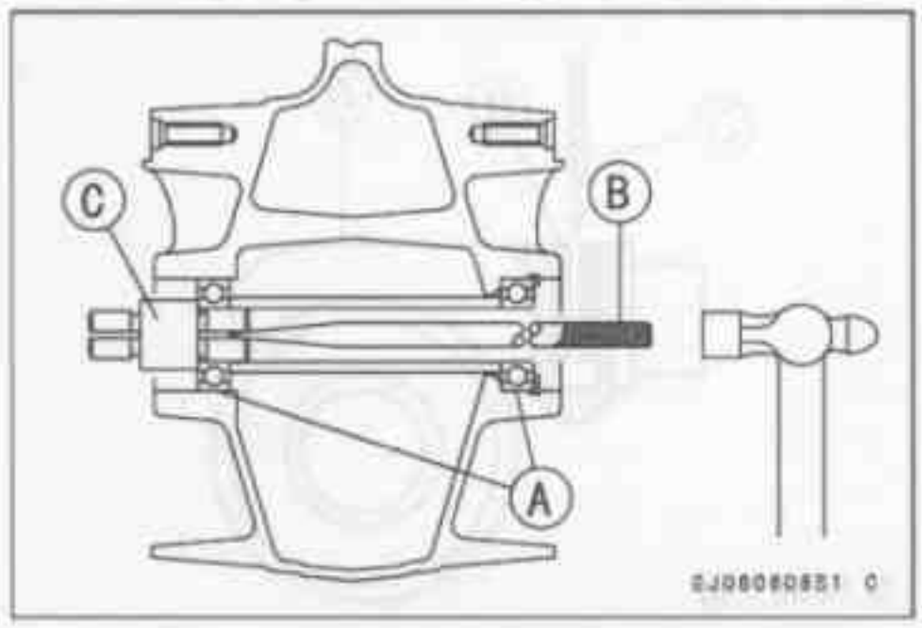


- Use the bearing remover to remove the hub bearings [A]

CAUTION

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

Special Tools - Bearing Remover Shaft, ϕ9: 57001–1265 [B]
Bearing Remover Head, ϕ20 × ϕ22: 57001–1293 [C]
Bearing Remover Head, ϕ25 × ϕ28: 57001–1346 [C]



Hub Bearing Installation

- Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
- Replace the bearings with new ones.

NOTE

○ *Install the bearings so that the marked side faces out.*

- Install the bearings by using the bearing driver set which does not contact the bearing inner race.
- Press in each right bearing [A] until it bottoms out.

Special Tools - Bearing Driver Set: 57001–1129 [B]

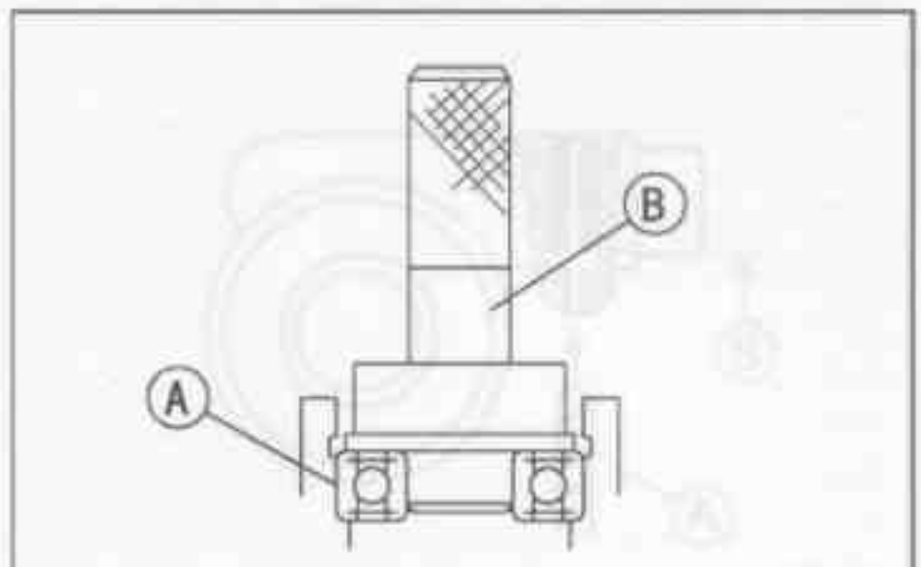
- Replace the circlips with new ones.

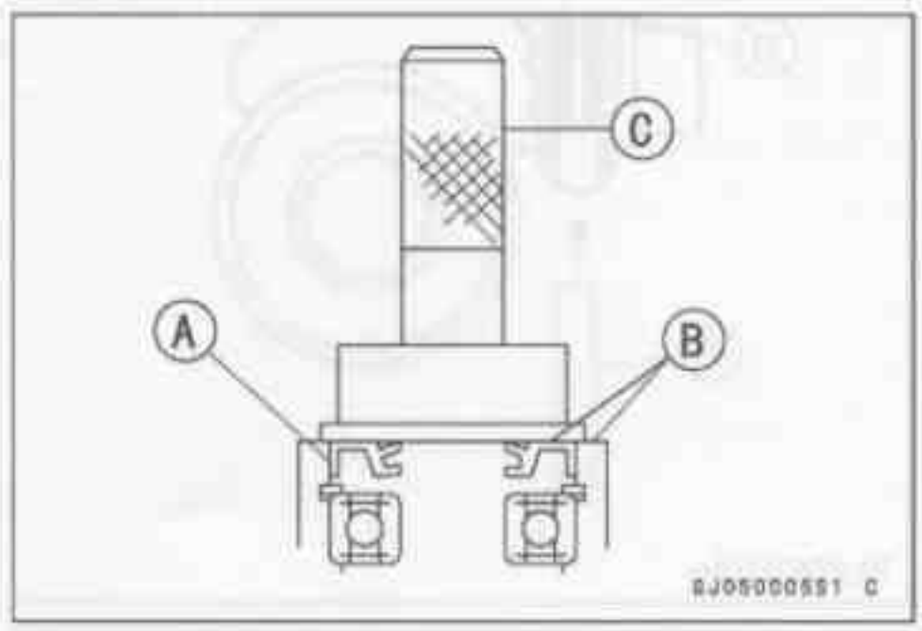
Special Tools - Inside Circlip Pliers: 57001–143

- Replace the grease seals with new ones.
- Press in the grease seals [A] so that seal surface is flush [B] with the end of the hole.

○ Apply high temperature grease to the grease seal lips.

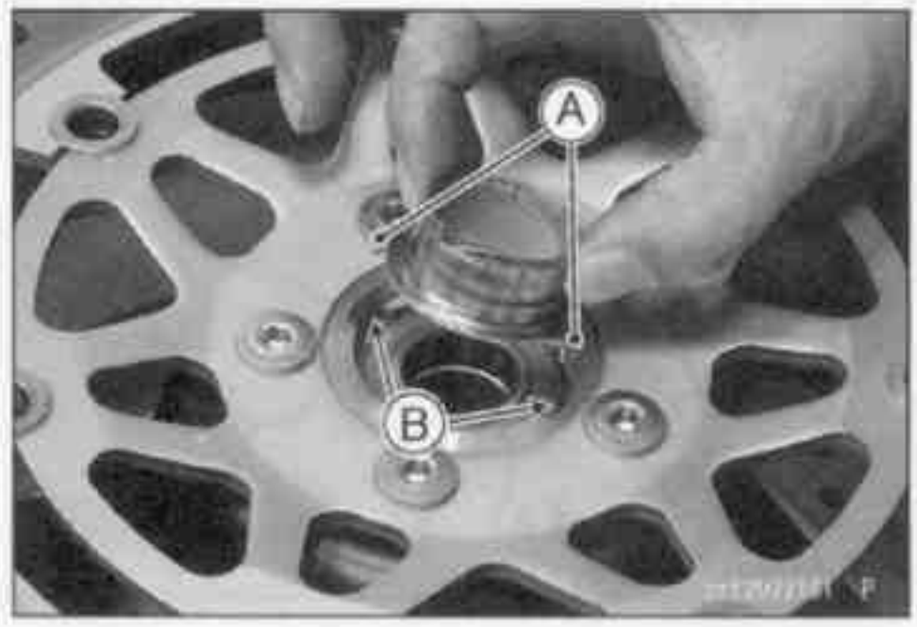
Special Tools - Bearing Driver Set: 57001–1129 [C]





- Put the speedometer gear drive [A] onto the front wheel hub notches [B], then install the circlip.

Special Tools - Inside Circlip Pliers: 57001–143



Hub Bearings (Wheel Bearings)

Hub Bearing Inspection

Since the hub bearings are made to extremely close tolerances, the clearance cannot normally be measured.

NOTE

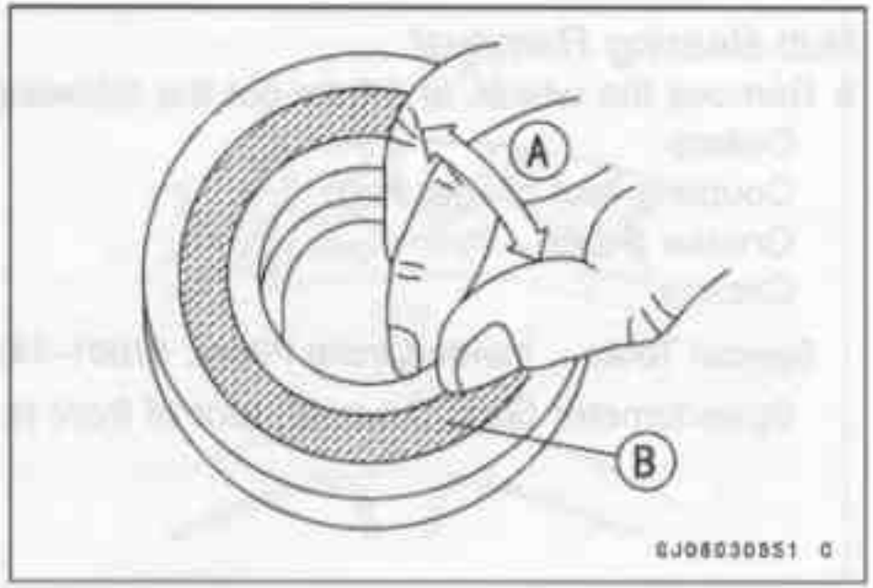
○ *Do not remove any bearings for inspection. If any bearings are removed, they will need to be replaced with new ones.*

- Turn each bearing in the hub back and forth [A] while checking for plays, roughness, or binding.

★ If bearing play, roughness, or binding is found, replace the bearing.

- Examine the bearing seal [B] for tears or leakage.

★ If the seal is torn or is leaking, replace the bearing.



Final Drive

Table of Contents

Exploded View 10-2
Specifications 10-3
Drive Chain 10-4
Drive Chain Slack Inspection 10-4
Drive Chain Slack Adjustment 10-4
Wheel Alignment Inspection 10-4
Wheel Alignment Adjustment 10-5
Drive Chain Wear Inspection 10-5
Drive Chain Lubrication 10-6
Drive Chain Removal 10-6
Drive Chain Installation 10-7
Sprocket, Coupling 10-8
Engine Sprocket Removal 10-8
Engine Sprocket Installation 10-8
Rear Sprocket Removal 10-9
Rear Sprocket Installation 10-9
Coupling Installation 10-9
Coupling Bearing Removal 10-9
Coupling Bearing Installation 10-10
Coupling Bearing Inspection 10-10
Coupling Bearing Lubrication 10-10
Coupling Damper Inspection 10-10
Sprocker Wear Inspection 10-10
Rear Sprocket Warp Inspection 10-11

Sprocket, Coupling

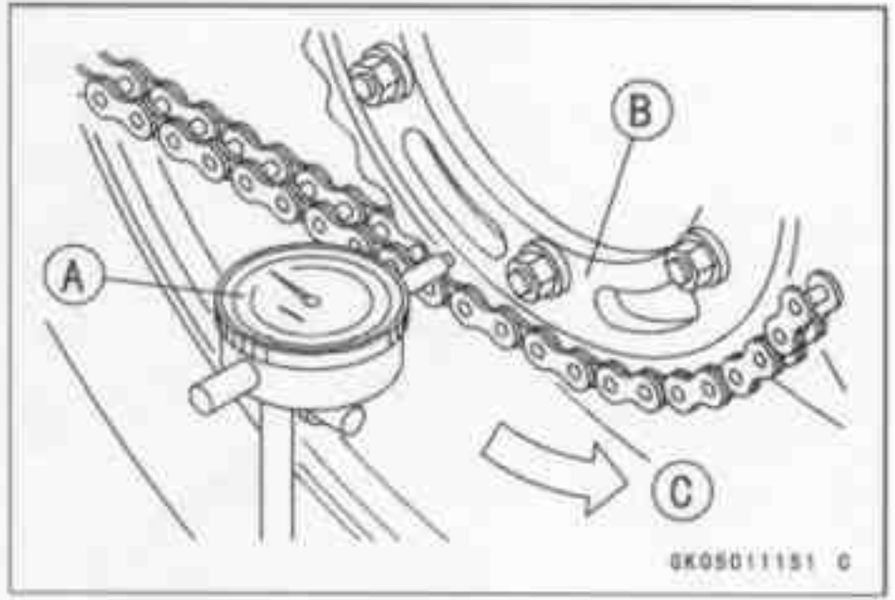
Rear Sprocket Warp Inspection

- Raise the rear wheel off the ground (see Wheels/Tires chapter) so that it will turn freely.
- Set a dial gauge [A] against the rear sprocket [B] near the teeth as shown, and rotate [C] the rear wheel to measure the sprocket runout (warp). 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.

Rear Sprocket Warp

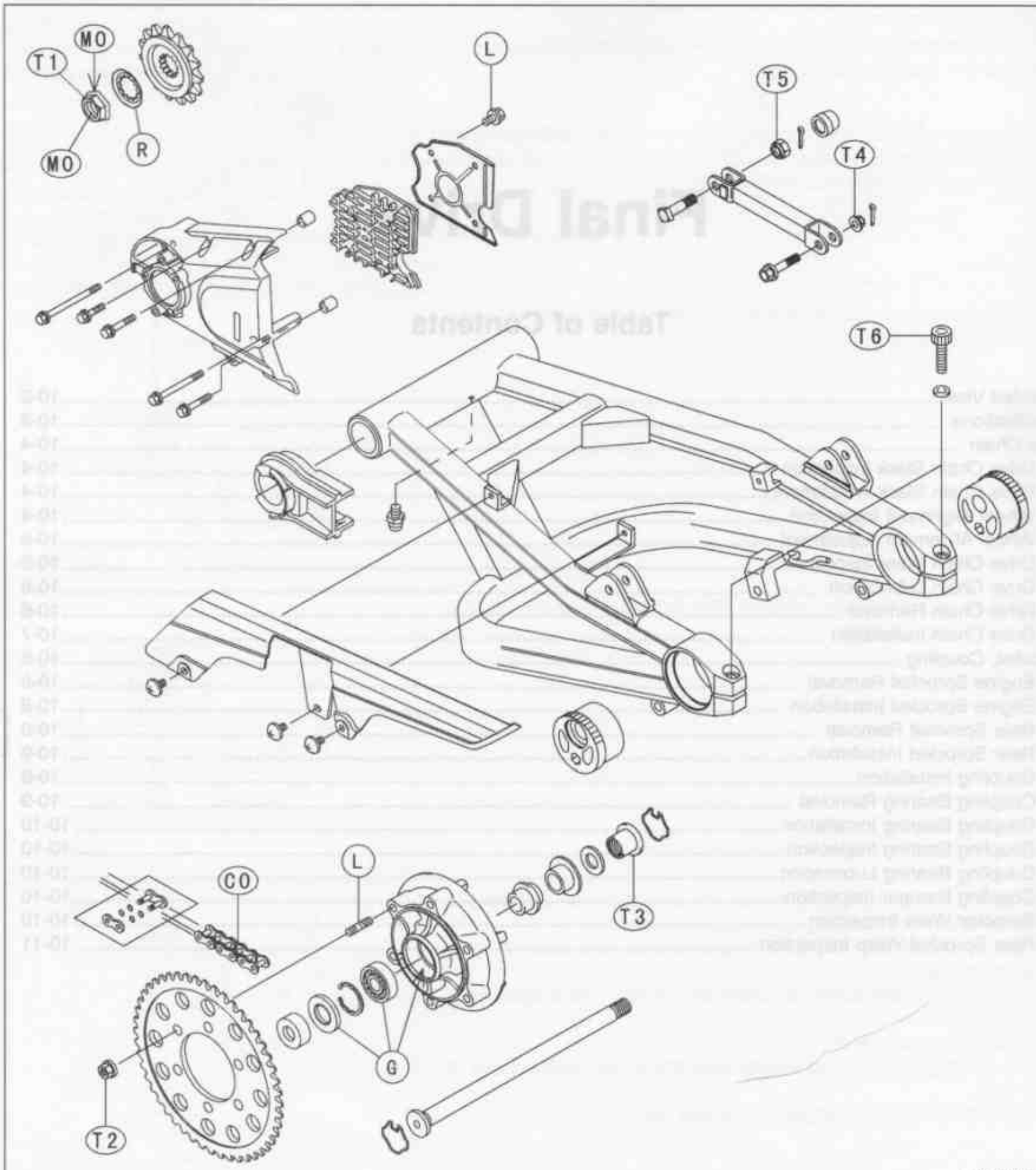
Standard:	**TIR 0.4 mm (0.016 in.) or less**
Service Limit:	**TIR 0.5 mm (0.020 in.)**



Brakes
Table of Contents

10-2 FINAL DRIVE

Exploded View



CO: Apply chain oil.
G: Apply grease.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfied oil. The molybdenum disulfied oil is a mixture of engine oil and molybdenum disulfied grease with a weight ratio (10:1).
R: Replacement Parts.
T1: 125 N·m (13 kg·m, 94 ft·lb)
T2: 59 N·m (6.0 kg·m, 43 ft·lb)
T3: 98 N·m (10 kg·m, 72 ft·lb)
T4: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T5: 34 N·m (3.5 kg·m, 25 ft·lb)
T6: 39 N·m (4.0 kg·m, 29 ft·lb)

Specifications

Item	Standard	Service Limit
Drive Chain		
Standard Chain		
Make	DAIDO	- - -
Type	DID 50ZV2 Joint Endless	- - -
Link	110 links	- - -
Chain slack	25 ~ 35 mm (0.98 ~ 1.38 in.)	Too tight: less than 25 mm (0.98 in) Too loose: more than 40 mm (1.57 in.)
Chain 20-link length	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Link pin outside diameter	5.50 ~ 5.80 mm (0.22~ 0.23 in.)	- - -
Link plates outside width	22.3 ~ 22.5 mm (0.88 ~ 0.89 in.)	- - -
Sprockets:		
Rear sprocket warp	TIR 0.4 mm (0.016 in.) or less	TIR 0.5 mm (0.020 in.)

Special Tools - Inside Circlip Pliers: 57001–143
Bearing Driver Set: 57001–1129

Drive Chain

Drive Chain Slack Inspection

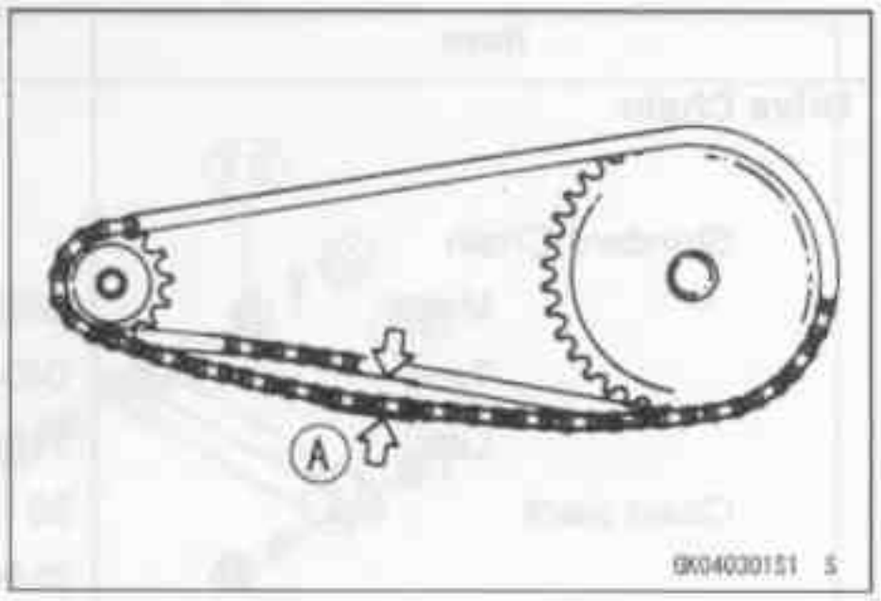
NOTE

○ *Check the slack with the motorcycle setting on its side stand.*
○ *Clean the chin if it is dirty, and lubricate it if it appears dry.*

- Check the wheel alignment (see Wheel Alignment Inspection).
- Rotate the rear wheel to find the position where the chain is tightest.
- Measure the vertical movement (chain slack) [A] midway between the sprockets.

★ If the chain slack exceeds the standard, adjust it.

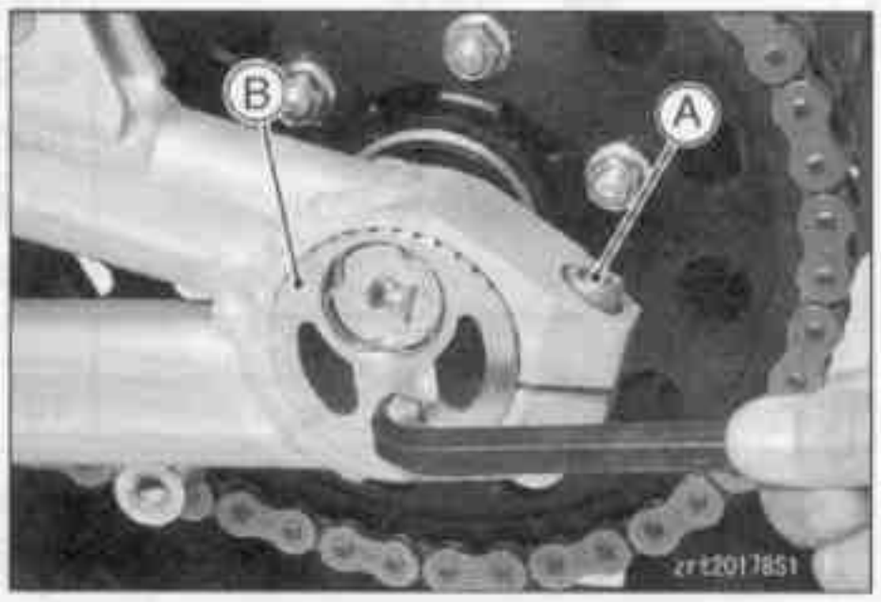
Chain Slack
Standard: 25 ~ 35 mm
Usable Range: 25 ~ 40 mm

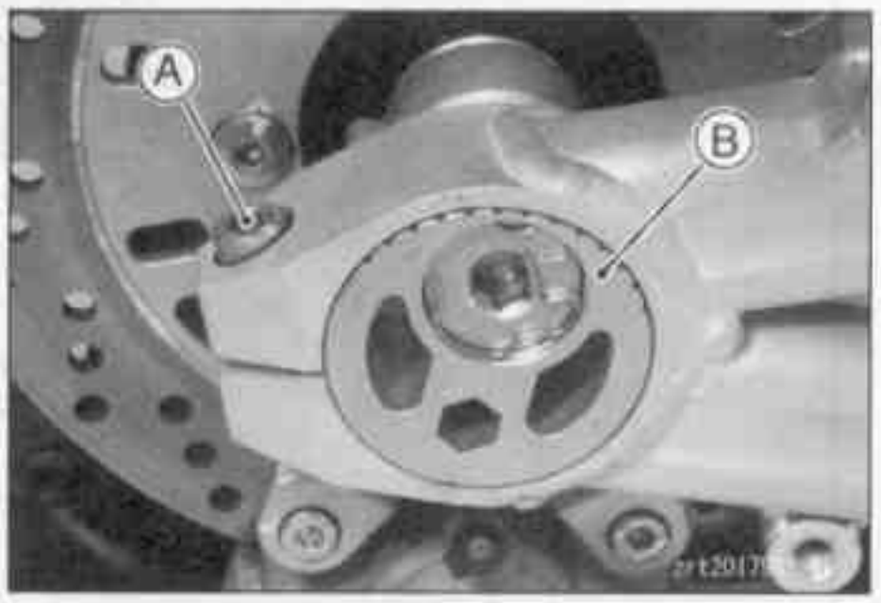


Drive Chain Slack Adjustment

- Loosen the left and right chain adjuster clamp bolts [A].
- Using an Allen wrench, turn the adjusters [B] forward or rearward until the drive chain has the correct amount of chain slack.
- Tighten the chain adjuster clamp bolts.

Torque - Chain Adjuster Clamp Bolts: 39 N·m (4.0 kg·m, 29 ft·lb)





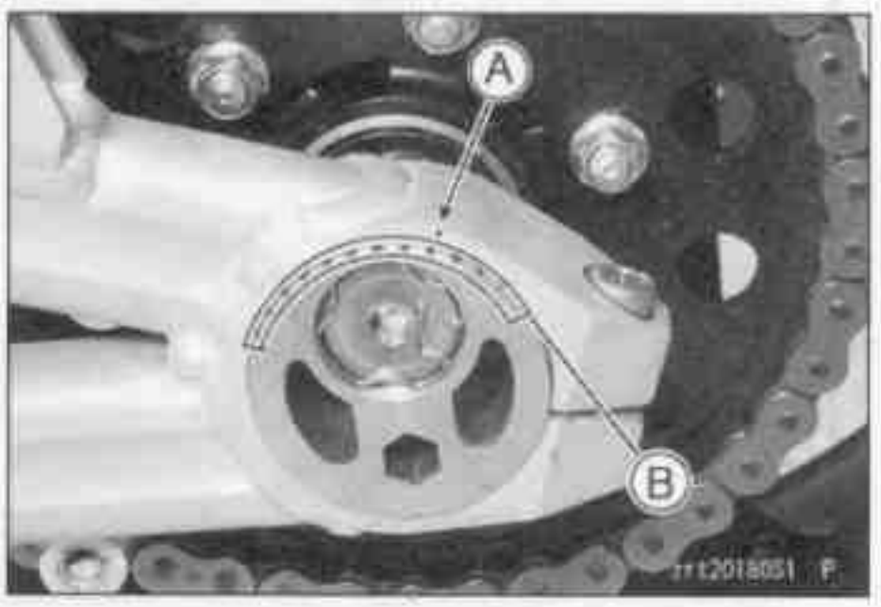
Wheel Alignment Inspection

- Check that the left and right notches [A] the swingarm should point to the same marks or positions [B] on the left and right adjuster.

★ If they do not, adjust the chain slack and align the wheel alignment (see slack Adjustment).

⚠ WARNING

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

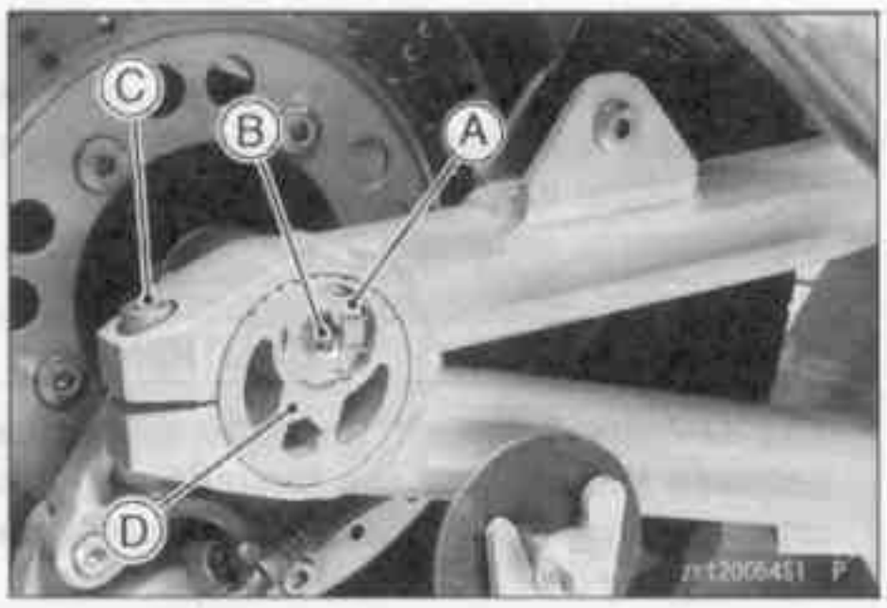


Drive Chain

Wheel Alignment Adjustment

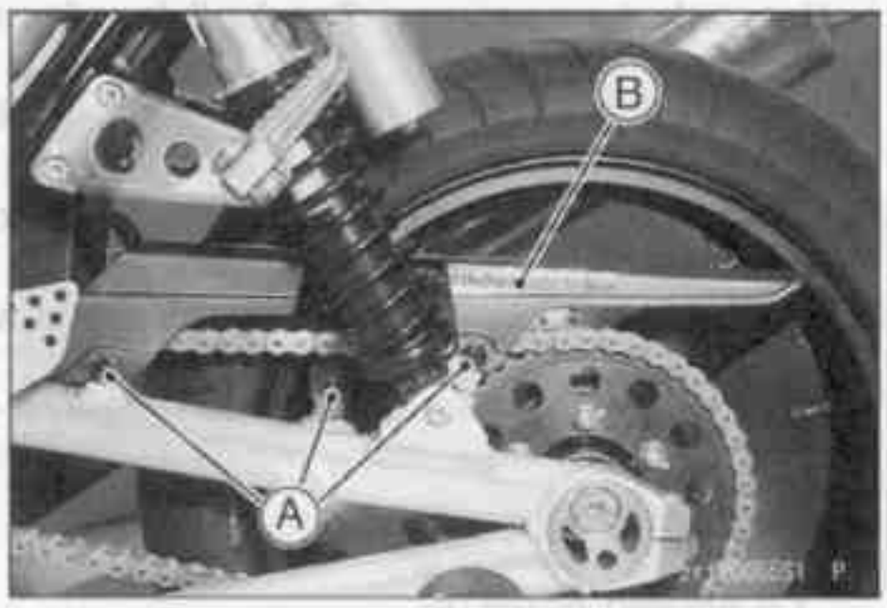
- Remove the right retaining ring [A] from the axle shaft.
- Loosen the axle nut [B].
- Loosen the right chain adjuster clamp bolt [C],and turn the right chain adjuster [D] so that the left and right notches on the swingarm may point to the same marks or positions on the left and right adjusters.
- Tighten:

Torque - Chain Adjuster Clamp Bolt: 39 N·m(4.0 kg·m, 29 ft·lb)
Rear Axle Nut: 98 N·m (10 kg·m, 72 ft·lb)



Drive Chain Wear Inspection

- Remove:
  Mounting Screws [A]
  Drive Chain Cover [B]



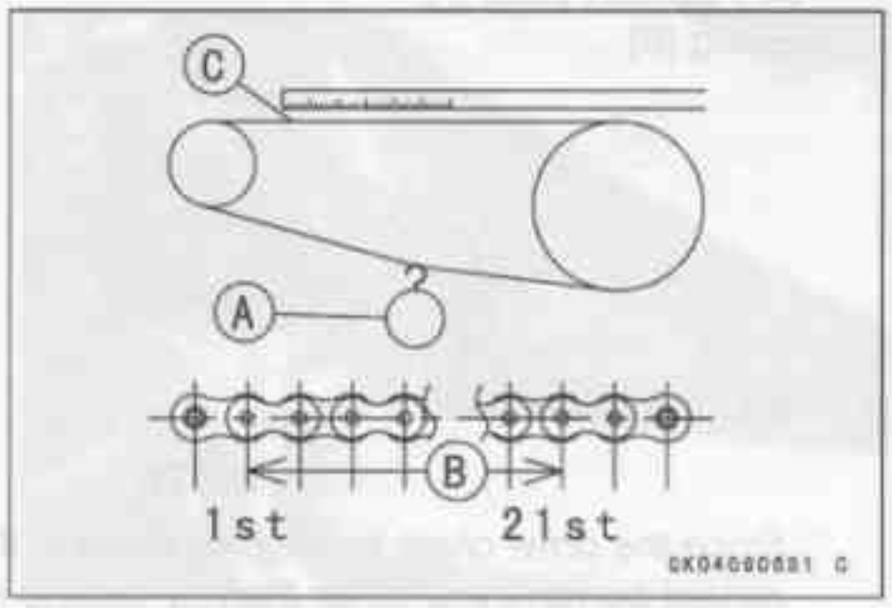
- Rotate the rear wheel to inspect the drive chain for damaged rollers, and loose pins and links.

★If there is any irregularity, replace the drive chain.

★Lubricate the drive chain if it appears dry.

- Stretch the chain taut by hanging a 98 N (10 kg, 22 lb) weight [A] on the chain.
- Measure the length of 20 links [B] on the straight part [C] of the chain from the pin center of the 1st pin to the pin center of the 21st pin. Since the chain may wear unevenly, take measurements at several places.

★If any measurements exceed the service limit, replace the chain. Also, replace the front and rear sprockets when the drive chain is replaced.



Drive Chain 20-link Length

Standard:	**317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)**
Service Limit:	**323 mm (12.7 in.)**

⚠WARNING

If the drive chain wear exceeds the service limit, replace the chain or an unsafe riding condition may result. A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.
For safety, use only the standard chain. It is an endless type, when it should be replace, be careful at assembling it.

Standard Chain

Make:	**DAIDO**
Type:	**DID 50ZV2**
Link:	**110 Links**

Drive Chain

Drive Chain Lubrication

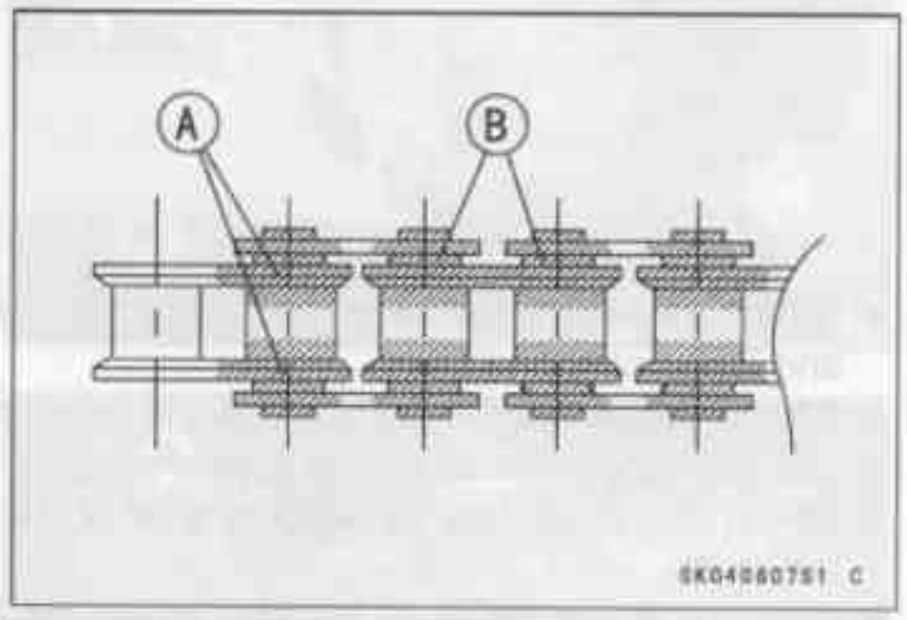
- If a special lubricant is not available, a heavy oil such as SAE 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.
- If the chain is especially dirty, clean it before lubrication.

CAUTION

The O-rings between the side plates seal in the lubricant between the pin and the bushing. To avoid damaging the O-rings and resultant loss of lubricant, observe the following rules.
Use only kerosene or diesel oil for cleaning an O-ring drive chain.
Any other cleaning solution such as gasoline or trichloroethylene will cause deterioration and swelling of the O-ring.
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.

Oil Applied Areas [A]
O-ring [B]

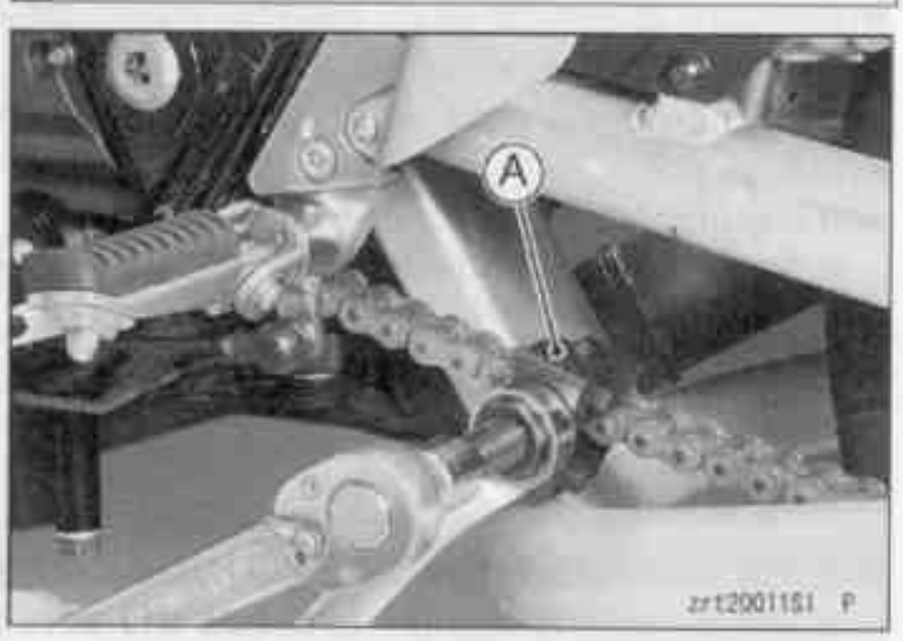


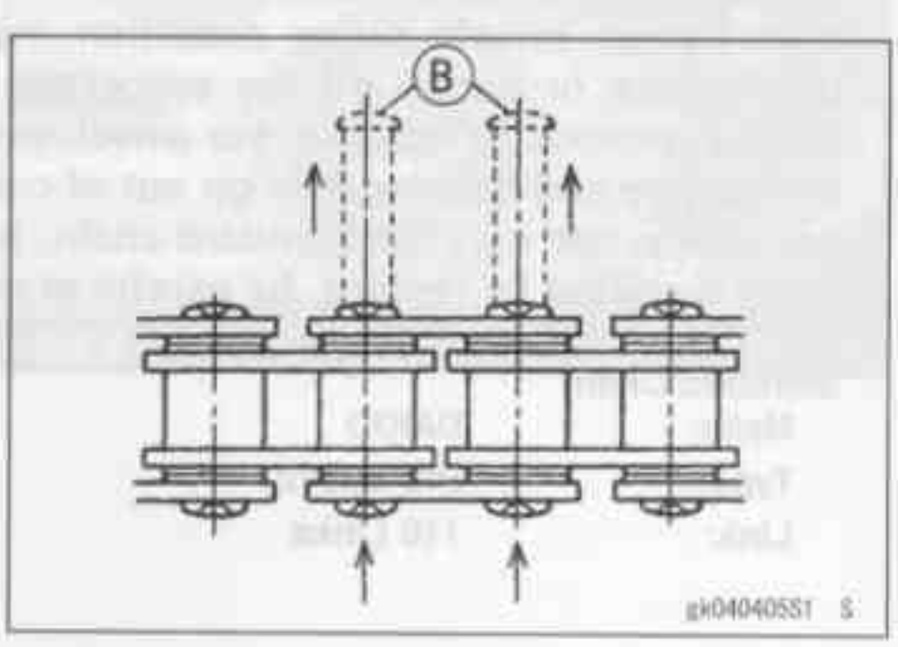
Drive Chain Removal

NOTE

○ *Since the drive chain is installed through the swingarm, The chain cannot be removed other than by cutting it. Prepare the new link pin, link plate, grease seals, and tools for rejoining the chain.*

- Remove the chain cover (see Drive Chain Wear Inspection).
- Using a suitable tool [A], cut the drive chain by removing the link pins [B]

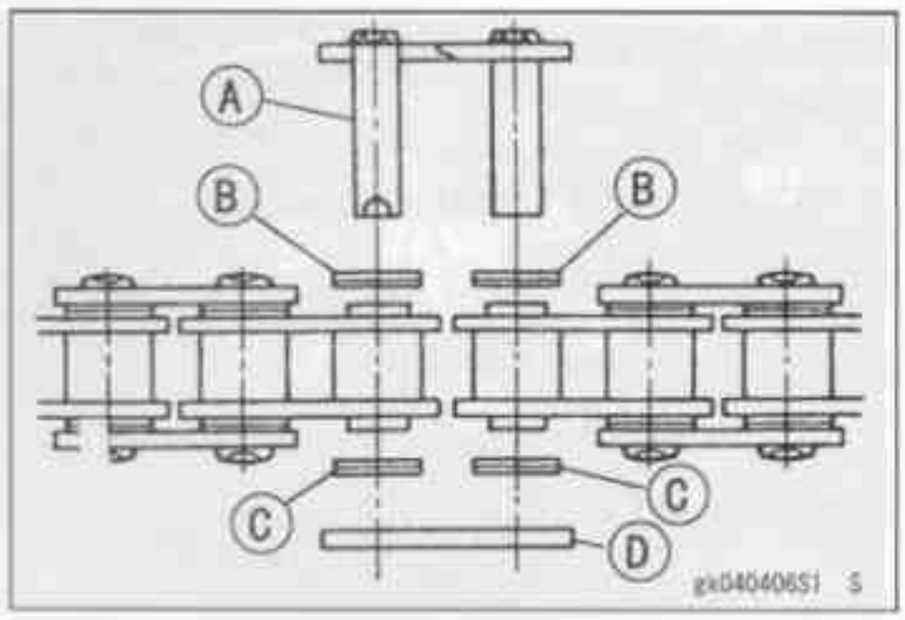




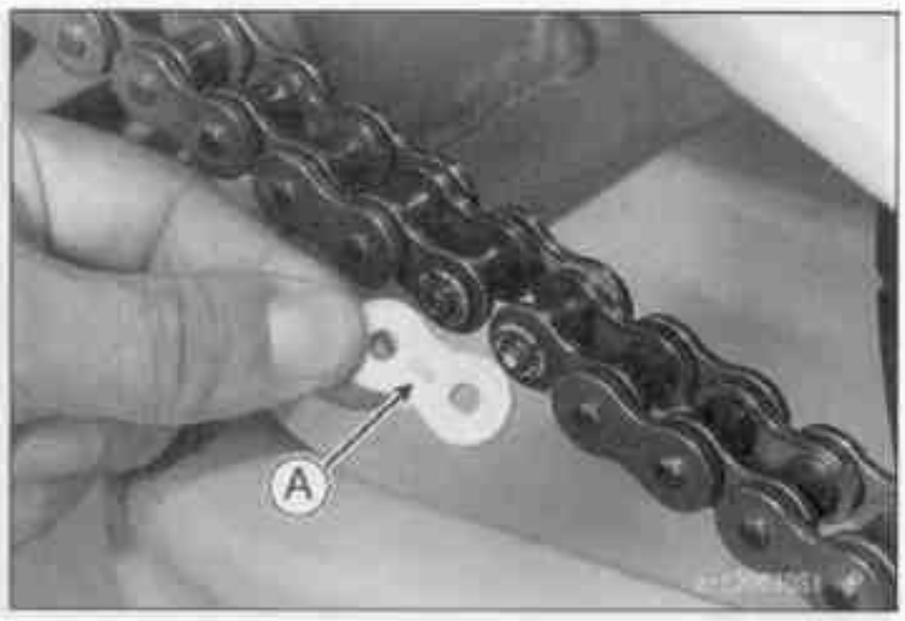
Drive Chain

Drive Chain Installation

- Replace the link pin, link plate and grease seals.
- Apply grease to the link pins [A] and grease seals.
- Engage the drive chain on the engine and rear sprockets through the swingarm.
- Install the grease seals [B] on the link pins.
- Insert the link pins in the drive chain ends.
- Install:
  Grease Seals [C]
  Link Plate [D]



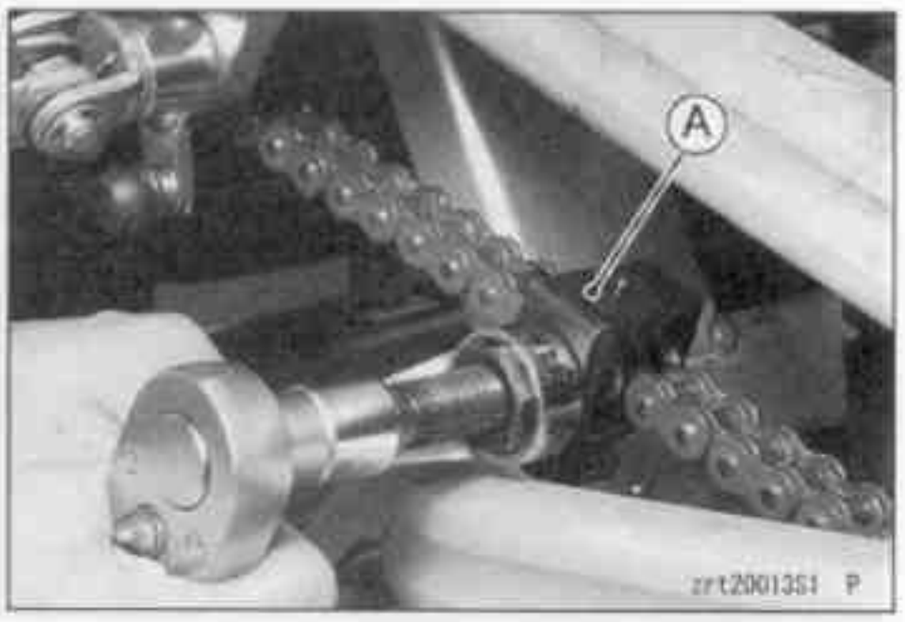
○ Install the link plate so that the mark [A] faces out.



○ Using a suitable tool [A], press in the link plate to the link pins.



- Using a suitable tool [A], stake the link pin ends projecting from the plate.



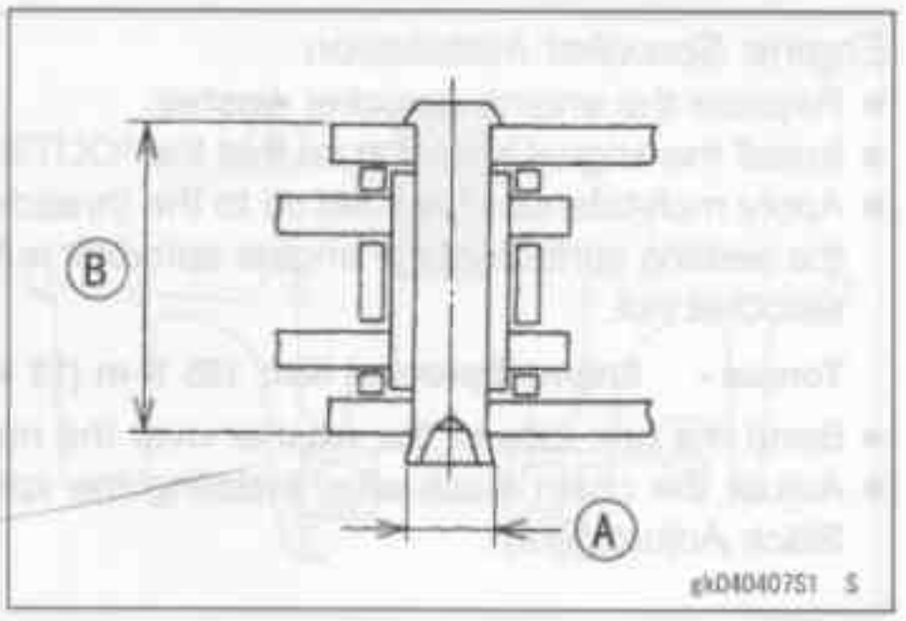
- After staking, measure the outside diameter [A] of the link pin and link plates width [B].

Link Pin Outside Diameter
Standard: 5.50 ~ 5.80 mm (0.22 ~ 0.23 in.)

Link Plates Outside Width
Standard: 22.3 ~ 22.5 mm (0.88 ~ 0.89 in.)

★ If the reading exceeds the specified length, cut and rejoin the chain again.

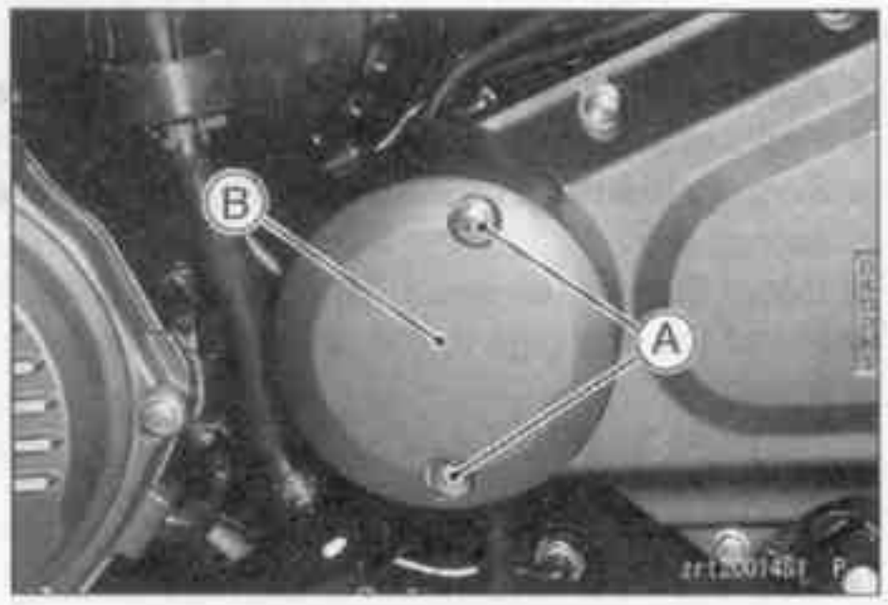
- Check:
  Movement of the Rollers
- Adjust the chain slack after installing the chain (See Slack Adjustment).



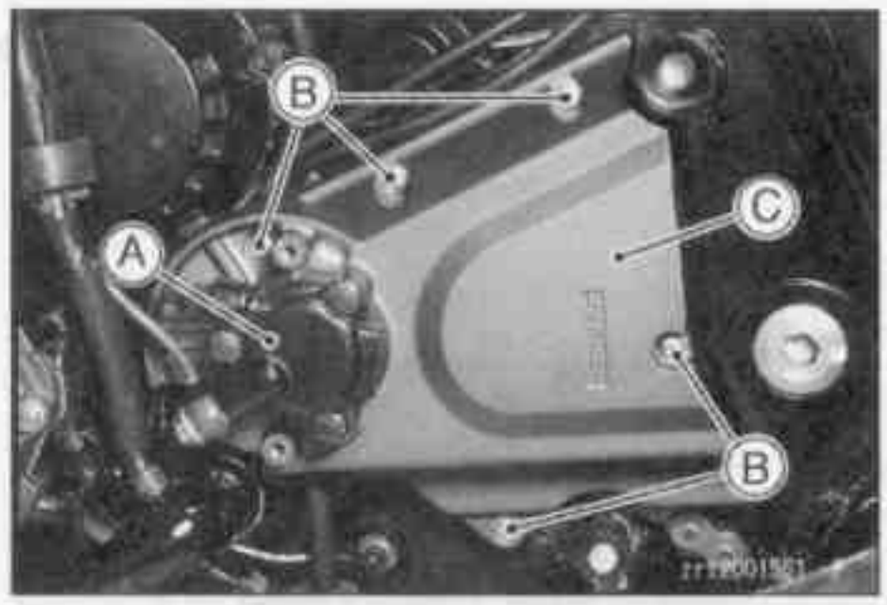
Sprocket, Coupling

Engine Sprocket Removal

- Remove:
  Bolts [A]
  Clutch Slave Cylinder Cover [B]



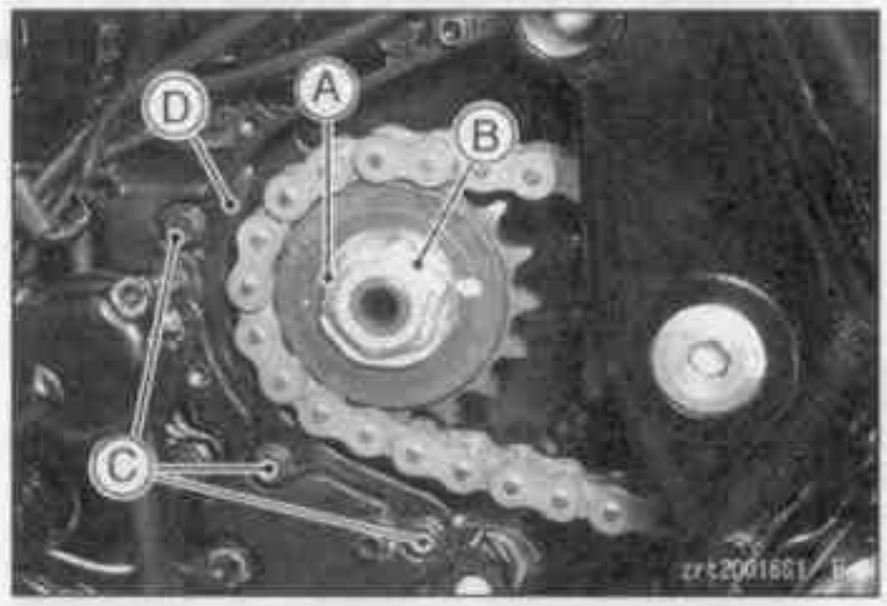
- Remove:
  Clutch Slave Cylinder [A] (Clutch chapter)
  Engine Sprocket Cover Bolts [B]
  Engine Sprocket Cover [C]



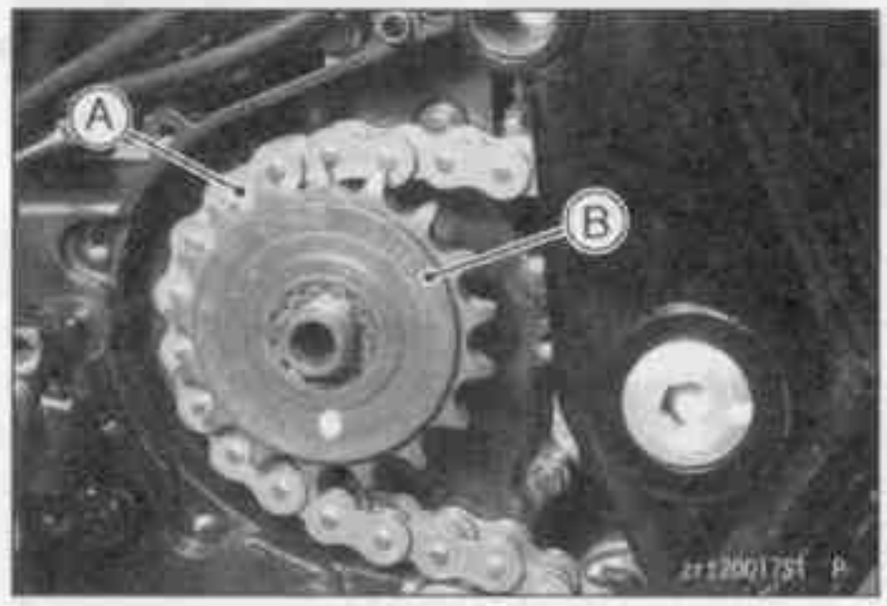
- Flatten out the bent washer [A].
- Remove:
  Engine Sprocket Nut [B] and Washer
  Chain Guide Bolts [C] and Chain Guide [D]

NOTE

○ *When loosening the engine sprocket nut, hold the rear brake on.*



- Raise the rear wheel off the ground.
- Loosen the drive chain (see Drive Chain Slack Adjustment).
- Remove the drive chain [A] from the engine sprocket toward in.
- Pull the engine sprocket [B] off the output shaft.
- Remove the engine sprocket.

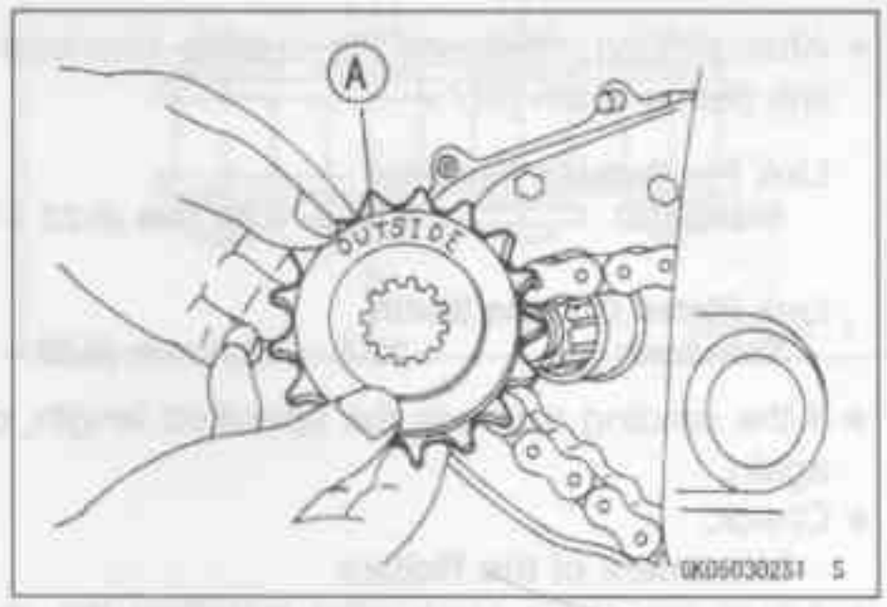


Engine Sprocket Installation

- Replace the engine sprocket washer.
- Install the engine sprocket so that the "OUTSIDE" mark [A] faces out.
- Apply molybdenum disulfied oil to the threads of the output shaft and the seating surface of the engine sprocket nut, and tighten the engine sprocket nut.

  Torque - Engine Sprocket Nut: 125 N·m (13 kg·m, 94 ft·lb)

- Bend the one side of the washer over the nut.
- Adjust the chain slack after instaling the sprocket (see Drive Chain Slack Adjustment).



Sprocket, Coupling

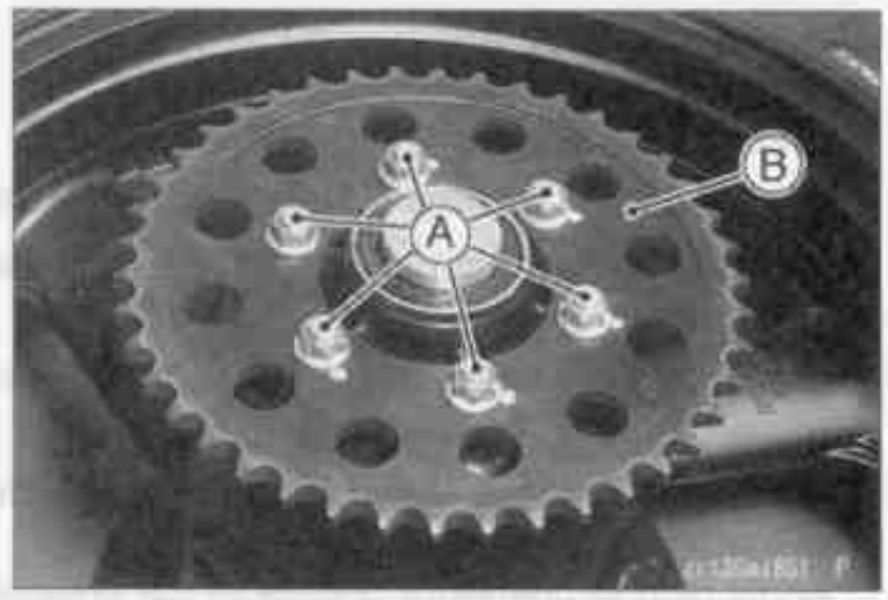
Rear Sprocket Removal

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

CAUTION

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

- Remove the rear sprocket nuts [A].
- Remove the rear sprocket [B].



Rear Sprocket Installation

- Install the sprocket facing the tooth number marking [A] outward.
- Tighten the rear sprocket nuts.

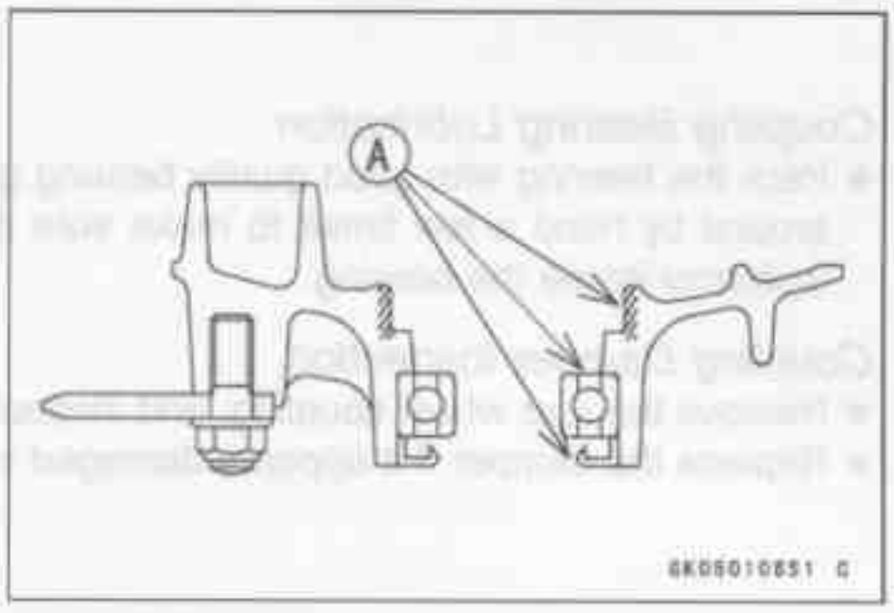
Torque - Rear Sprocket Nuts: 59 N·m (6.0 kg·m, 43 ft·lb)

- Install the rear wheel (See Wheels/Tires chapter)



Coupling Installation

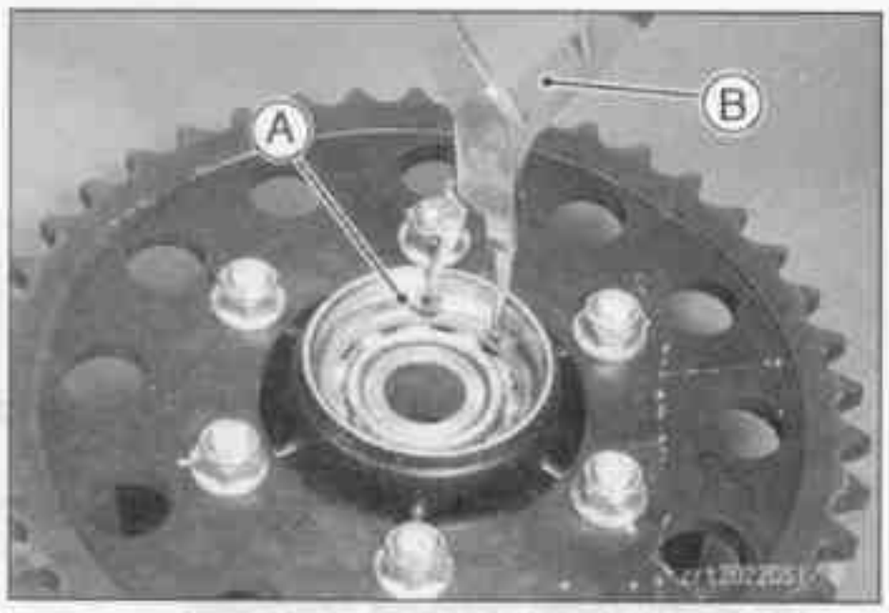
- Grease [A] the following and install the coupling.
  - Ball Bearing
  - Grease Seal
  - Coupling Internal Surface



Coupling Bearing Removal

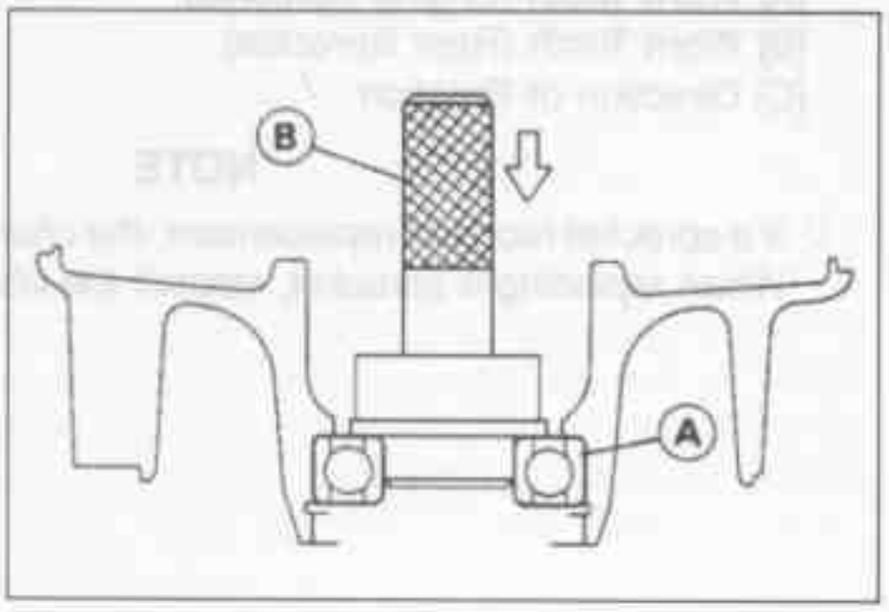
- Remove:
  - Coupling
  - Grease Seal
  - Circlip [A]

Special Tool - Inside Circlip Pliers: 57001–143 [B]



- Remove the bearing [A] by tapping from the wheel side.

Special Tool - Bearing Driver Set: 57001–1129 [B]



Sprocket, Coupling

Coupling Bearing Installation

- Replace the bearing with a new one.
- Press in the bearing [A] until it is bottomed.

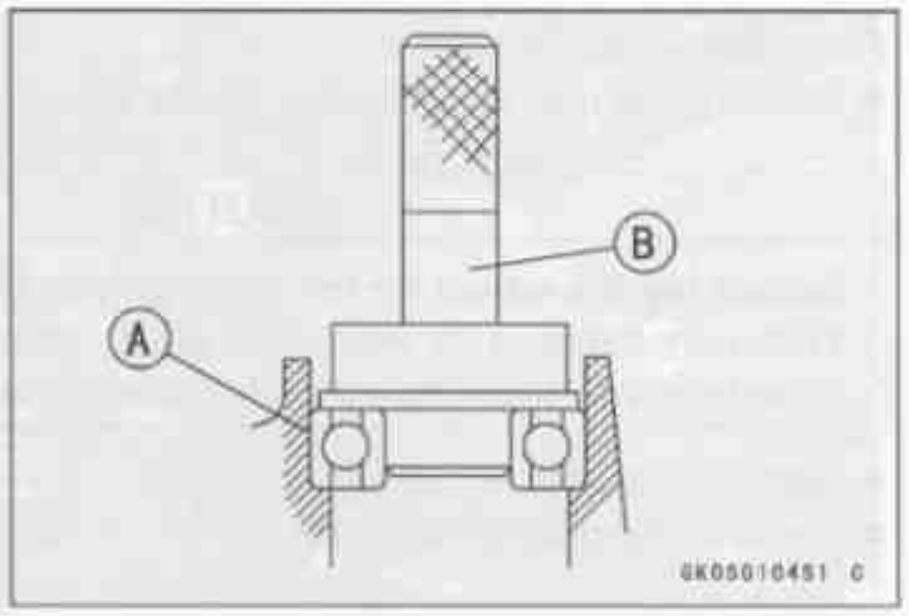
Special Tool - Bearing Driver Set: 57001–1129 [B]

- Pack the bearing with high temperature grease.
- Replace the circlip with a new one.

Special Tool - Inside Circlip Pliers: 57001–143

- Replace the grease seal with a new one.
- Press in the grease seal so that the seal surface is flush with the end of the hole.
- ○ Apply high temperature grease to the grease seal lip.

Special Tool - Bearing Driver Set: 57001–1129



Coupling Bearing Inspection

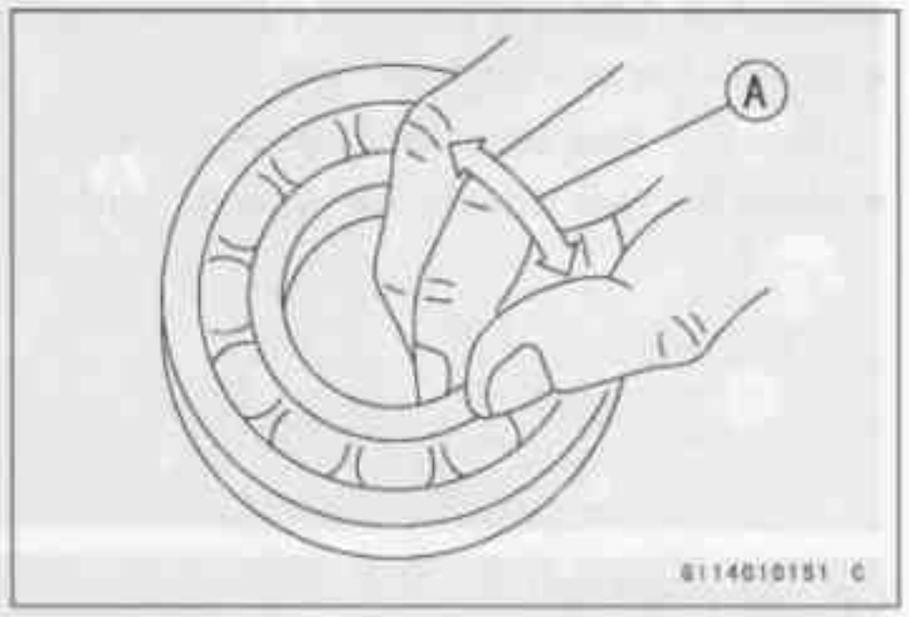
Since the coupling bearing is made to extremely close tolerances, the clearance can not normally be measured.

NOTE

○ *It is not necessary to remove the coupling bearing for inspection. If the bearing is removed, it will need to be replaced with a new one.*

- Turn the bearing in the coupling back and forth [A] while checking for plays, roughness, or binding.

★ If bearing play, roughness or binding is found, replace the bearing.

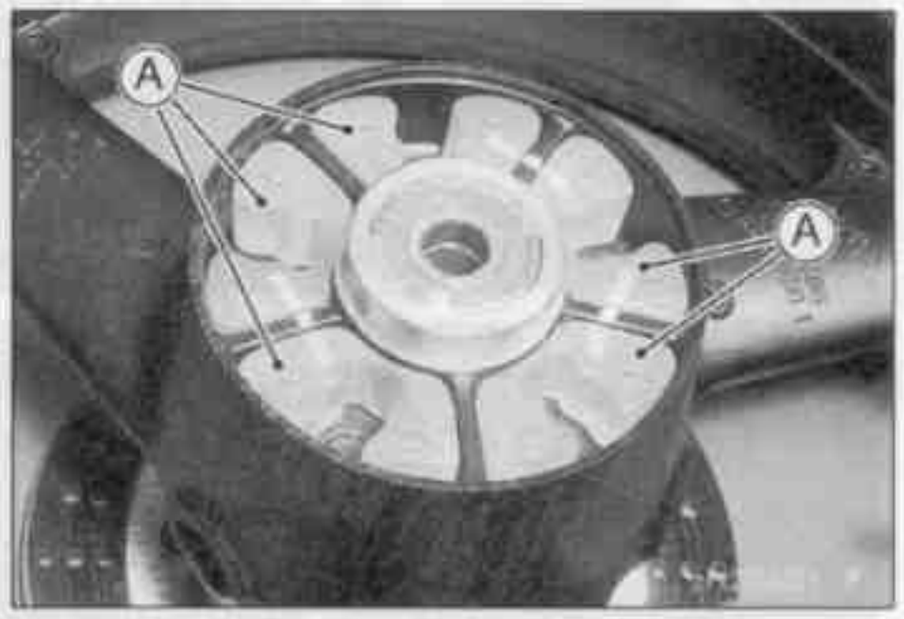


Coupling Bearing Lubrication

- Pack the bearing with good quality bearing grease. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.

Coupling Damper Inspection

- Remove the rear wheel coupling, and inspect the rubber damper [A].
- Replace the damper if it appears damaged or deteriorated.



Sprocker Wear Inspection

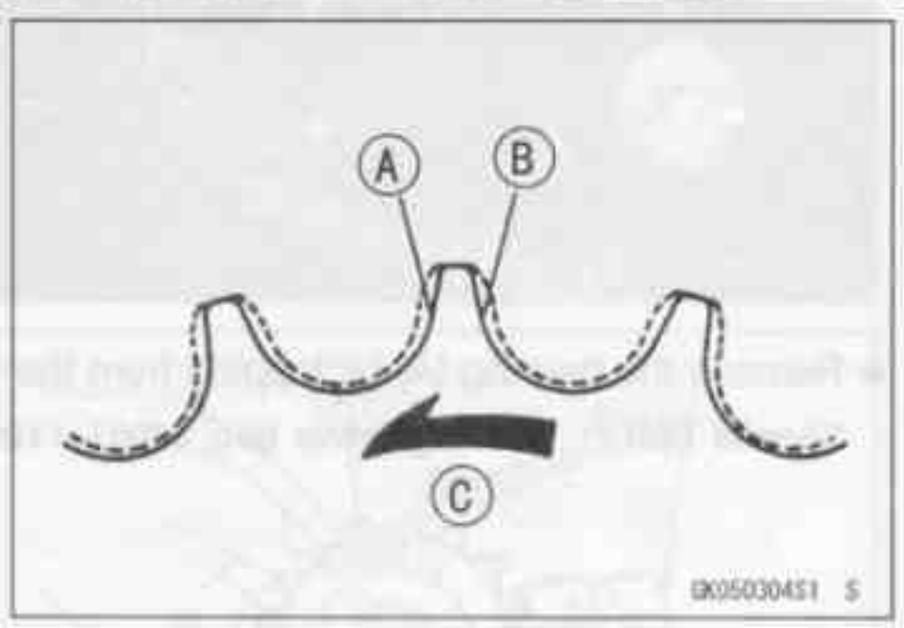
- Visually inspect the engine and rear sprocket teeth for wear and damage.

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

[A] Worn Tooth (Engine Sprocket)
[B] Worn Tooth (Rear Sprocket)
[C] Direction of Rotation

NOTE

○ *If a sprocket requires replacement, the chain is probably worm also. When replacing a sprocket, inspect the chain.*



Brakes

Table of Contents

Exploded View 11-2
Specifications 11-4
Brake Pedal, Brake Lever 11-5
  Brake Lever Position Adjustment 11-5
  Brake Pedal Position Inspection 11-5
  Brake Pedal Position Adjustment 11-5
Calipers 11-6
  Front Caliper Removal 11-6
  Rear Caliper Removal 11-6
  Caliper Installation 11-6
  Front Caliper Disassembly 11-7
  Rear Caliper Disassembly 11-7
  Caliper Assembly 11-8
  Caliper Fluid Seal Damage 11-8
  Caliper Dust Seal Damage 11-9
  Caliper Piston and Cylinder Damage 11-9
Brake Pads 11-10
  Front Brake Pad Removal 11-10
  Front Brake Pad Installation 11-10
  Rear Brake Pad Removal 11-10
  Rear Brake Pad Installation 11-11
  Brake Pad Wear Inspection 11-11
Master Cylinder 11-12
  Front Master Cylinder Removal 11-12
  Front Master Cylinder Installation 11-12
  Rear Master Cylinder Removal 11-12
  Rear Master Cylinder Installation 11-13
  Front Master Cylinder Disassembly 11-13
  Rear Master Cylinder Disassembly 11-14
  Master Cylinder Assembly 11-14
  Master Cylinder Inspection (Visual Inspection) 11-14
Brake Disc 11-16
  Brake Disc Removal 11-16
  Brake Disc Installation 11-16
  Brake Disc Wear 11-16
  Brake Disc Warp 11-16
Brake Fluid 11-17
  Brake Fluid Level Inspection 11-17
  Brake Fluid Change 11-17
  Bleeding the Brake Line 11-18
Brake Hose 11-20
  Brake Hose Removal/Installation 11-20
  Brake Hose Inspection 11-20

Brake Hose

Brake Hose Removal/Installation

CAUTION

Brake fluid quickly ruins painted or plastic surfaces; any spilled fluid should be completely wiped up immediately with wet cloth.

- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.
- There are washers on each side of the brake hose fitting. Replace them with new ones when installing.
- When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses according to Cable, Wire and Hose Routing Section in General information chapter.
- Tighten:

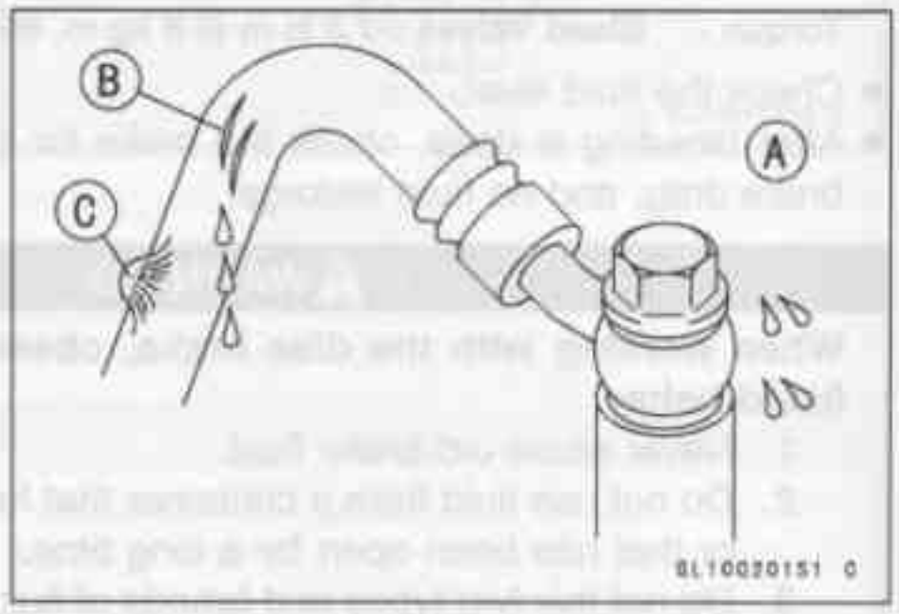
Torque - Brake Hose Banjo Bolts: 25 N·m (2.5 kg·m, 18.0 ft·lb)

- Bleed the brake line after installing the brake hose (see Bleeding the Brake Line).

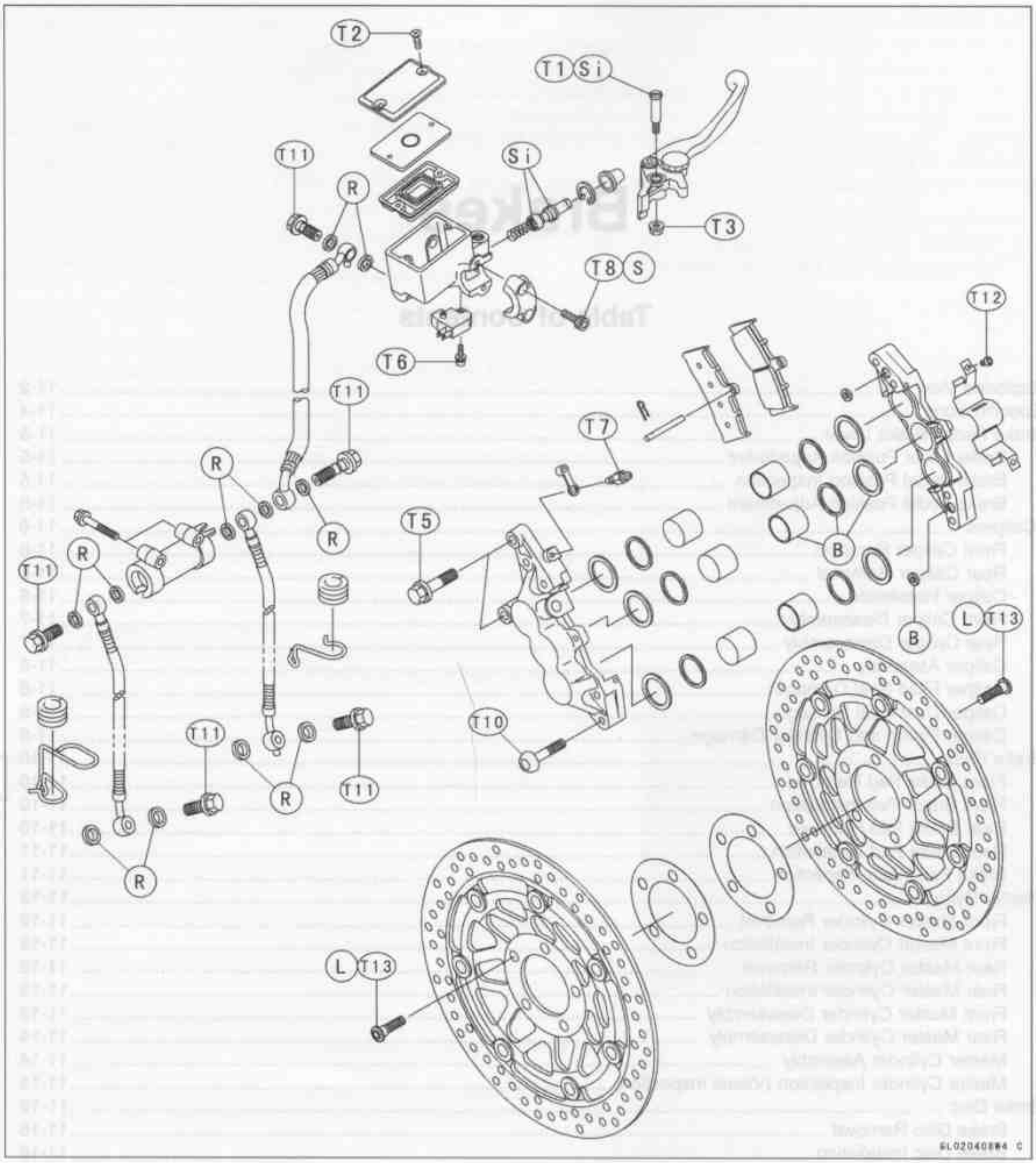
Brake Hose Inspection

- The high pressure inside the brake line can cause fluid to leak [A] or the hose to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.

★Replace it if any cracks [B] or bulges [C] are noticed.

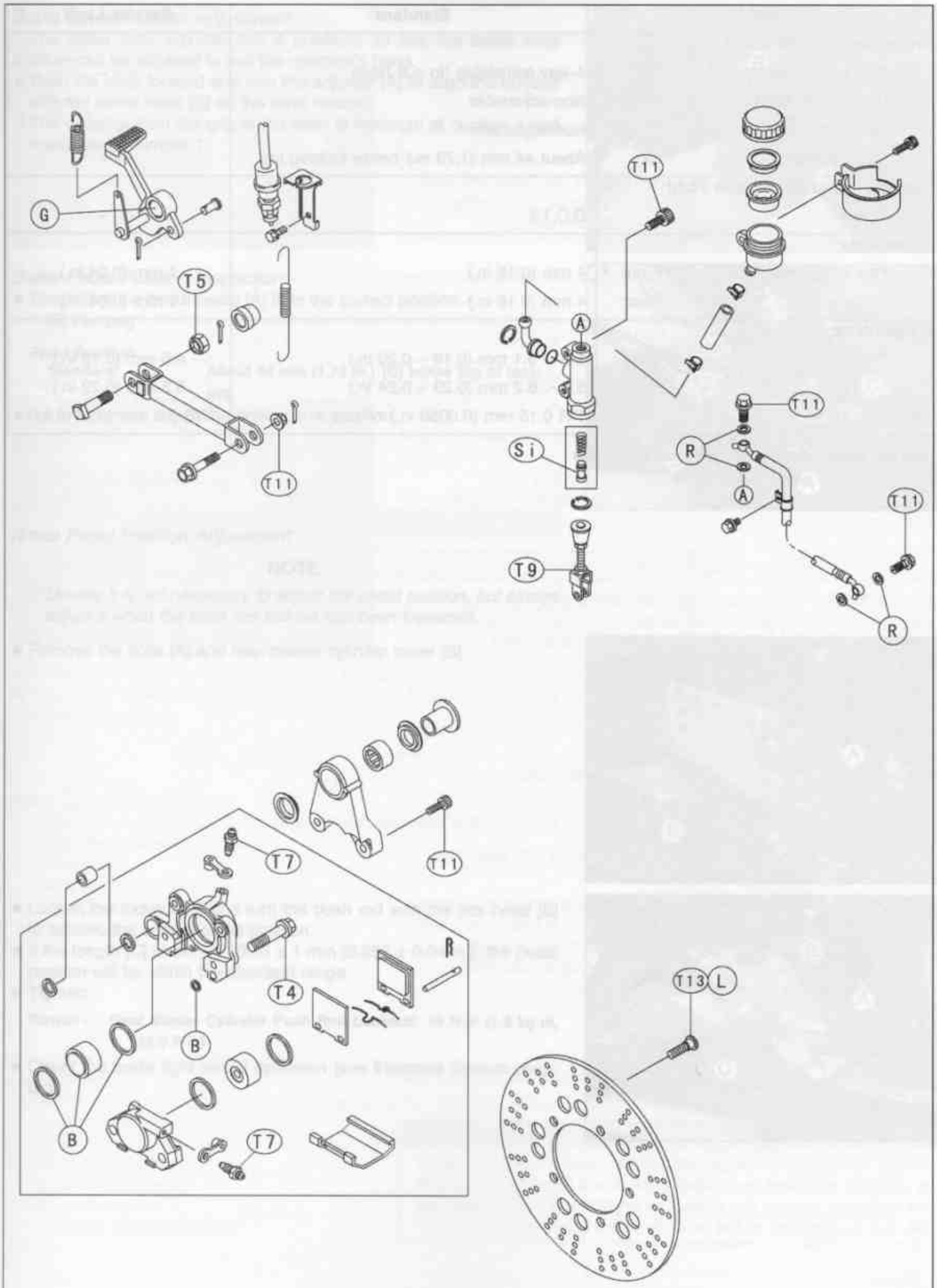


Exploded View



B: Apply brake fluid.
G: Apply grease.
R: Replacement Parts
S: Follow the specific tightening sequence.
Si: Apply silicone grease (ex. PBC grease).
L: Apply a non-permanent locking agent.
T1: 1.0 N·m (0.10 kg·m, 9 in·lb)
T2: 1.5 N·m (0.15 kg·m, 13 in·lb)
T3: 5.9 N·m (0.60 kg·m, 52 in·lb)
T4: 32 N·m (3.3 kg·m, 24 ft·lb)
T5: 34 N·m (3.5 kg·m, 25 ft·lb)
T6: 1.2 N·m (0.12 kg·m, 10 in·lb)
T7: 7.8 N·m (0.8 kg·m, 69 in·lb)
T8: 8.8 N·m (0.9 kg·m, 78 in·lb)
T9: 18 N·m (1.8 kg·m, 13.0 ft·lb)
T10: 21 N·m (2.1 kg·m, 15.0 ft·lb)
T11: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T12: 2.9 N·m (0.30 kg·m, 26 in·lb)
T13: 27 N·m (2.8 kg·m, 20 ft·lb)

Exploded View



GL0Z0407W5 C

Specifications

Item		Standard	Service Limit
Brake Lever, Brake Pedal:			
Brake lever position		4-way adjustable (to suit rider)	– – –
Brake lever free play		Non-adjustable	– – –
Pedal free play		Non-adjustable	– – –
Pedal position		About 44 mm (1.73 in.) below footpeg top	– – –
Recommended Disc Brake Fluid:			
Grade		D.O.T.4	– – –
Brake Pads:			
Pad lining thickness:	Front	4 mm (0.16 in.)	1 mm (0.04 in.)
	Rear	4 mm (0.16 in.)	1 mm (0.04 in.)
Brake Discs:			
Thickness:	Front	4.8 ~ 5.1 mm (0.19 ~ 0.20 in.)	4.5 mm (0.18 in.)
	Rear	5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)	5.5 mm (0.22 in.)
Runout		TIR 0.15 mm (0.0059 in.) or less	TIR 0.3 mm (0.0118 in.)

Special Tools - Inside Circlip Pliers: 57001–143
Jack: 57001–1238

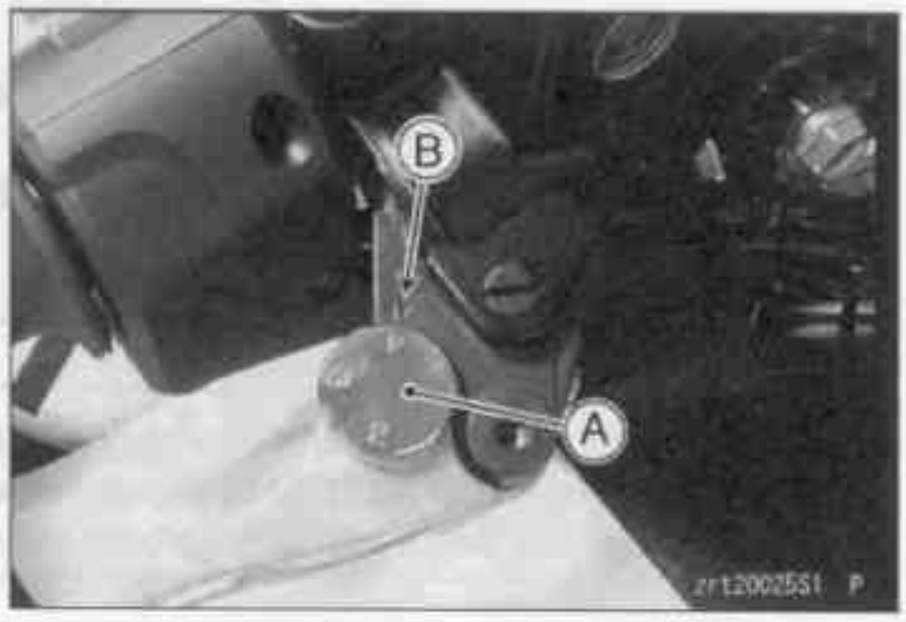
Brake Pedal, Brake Lever

Brake Lever Position Adjustment

The brake lever adjuster has 4 positions so that the brake lever position can be adjusted to suit the operator's hand.

- Push the lever forward and turn the adjuster [A] to align the number with the arrow mark [B] on the lever holder.

○ The distance from the grip to the lever is minimum at number 4 and maximum at number 1.

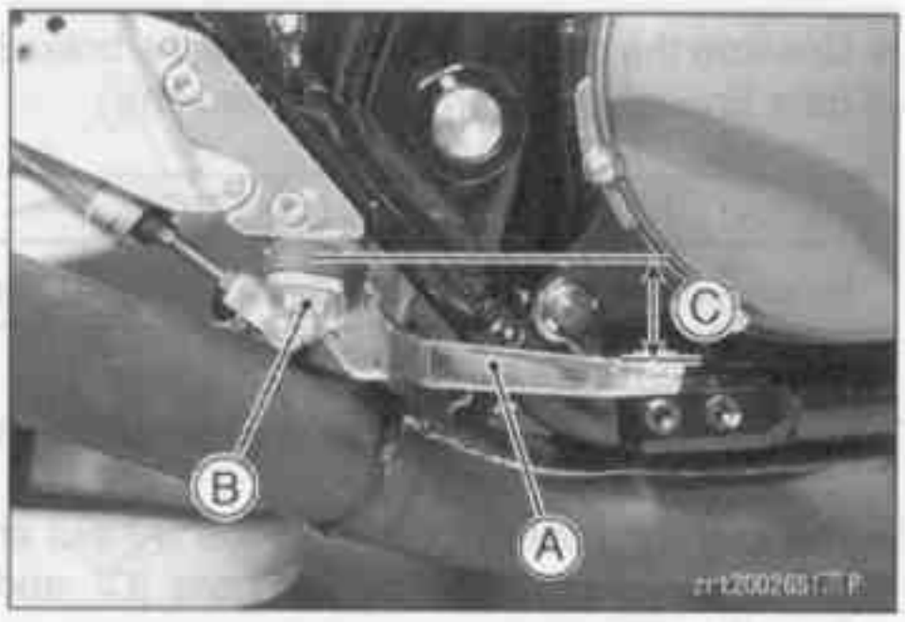


Brake Pedal Position Inspection

- Check that the brake pedal [A] is in the correct position.
  [B] Footpeg

Pedal Position
Standard: About 44 mm (1.73 in.) [C] below top of footpeg

★ If it is incorrect, adjust the brake pedal position.

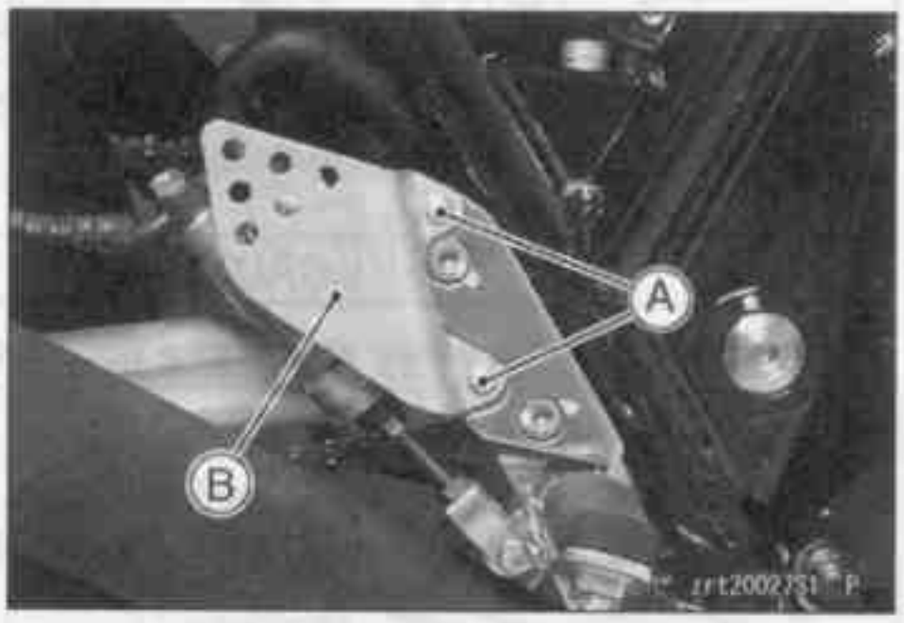


Brake Pedal Position Adjustment

NOTE

○ *Usually it is not necessary to adjust the pedal position, but always adjust it when the push rod locknut has been loosened.*

- Remove the bolts [A] and rear master cylinder cover [B].



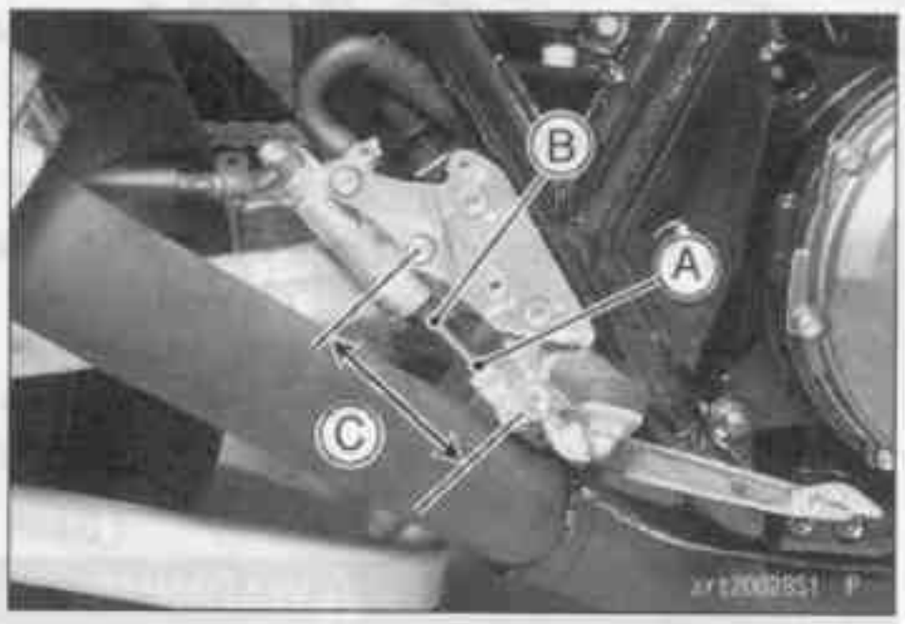
- Loosen the locknut [A] and turn the push rod with the hex head [B] to achieve the correct pedal position.

★ If the length [C] shown is 100.5 ± 1 mm (3.957 ± 0.04 in.), the pedal position will be within the standard range.

- Tighten:

Torque - Rear Master Cylinder Push Rod Locknut: 18 N·m (1.8 kg·m, 13.0 ft·lb)

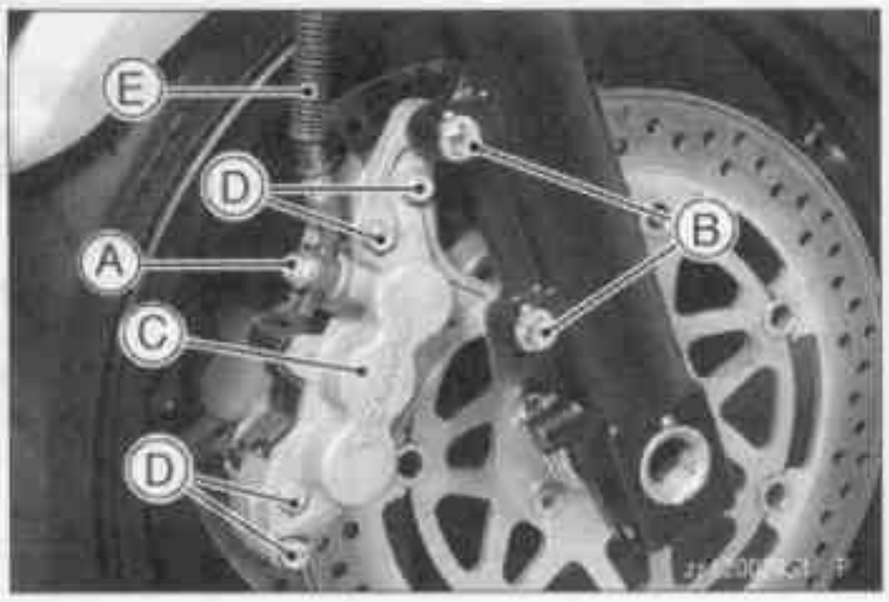
- Check the brake light switch operation (see Electrical System chapter).



Calipers

Front Caliper Removal

- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.



CAUTION

Do not loosen the calipper assembly bolts [D]. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper assembly bolts will cause brake fluid leakage.

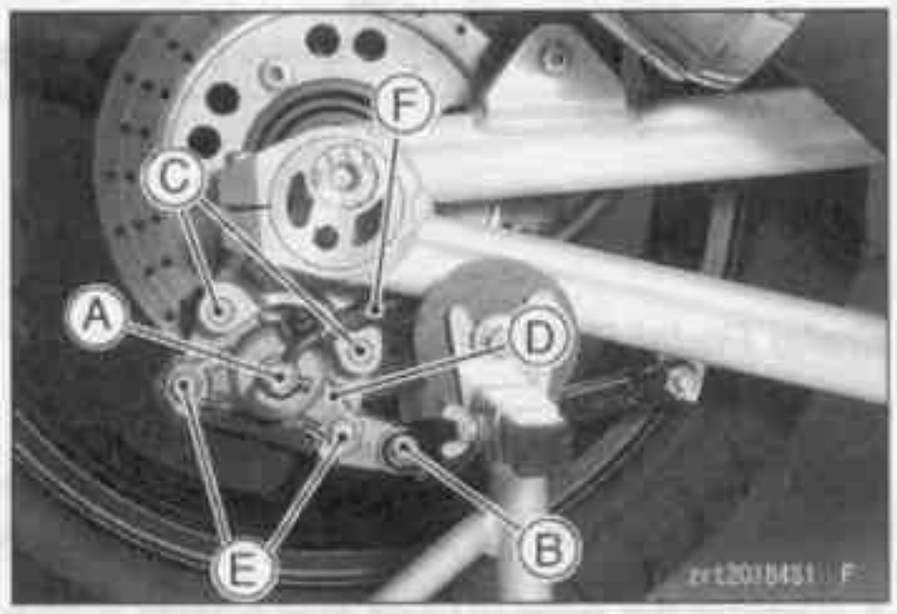
- Unscrew the banjo bolt and remove the brake hose [E] from the caliper (see Brake Hose Removal/Installation).

CAUTION

Immediately wash away any brake fluid that spills.

Rear Caliper Removal

- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Remove the cotter pin, rear torque link nut and bolt [B].
- Unscrew the caliper mounting bolts [C], and detach the caliper [D] from the disc.



CAUTION

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

- Unscrew the banjo bolt and remove the brake hose [F] from the caliper (see Brake Hose Removal/Installation).

CAUTION

Immediately wash away any brake fluid that spills.

Caliper Installation

- Install the caliper and brake hose lower end.
- Replace the washers on each side of hose fitting with new ones.
- Tighten:

Torque - Caliper Mounting Bolts (Front): 34 N·m (3.5 kg·m, 25 ft·lb)
Caliper Mounting Bolts (Rear): 25 N·m (2.5 kg·m, 18.0 ft·lb)
Torque Link Nut (Rear): 25 N·m (2.5 kg·m, 18.0 ft·lb)
Brake Hose Banjo Bolt: 25 N·m (2.5 kg·m, 18.0 ft·lb)

- Install a new cotter pin on the rear torque link bolt.
- Make sure Spread the cotter pin ends.
- Check the fluid level in the brake reservoirs.
- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

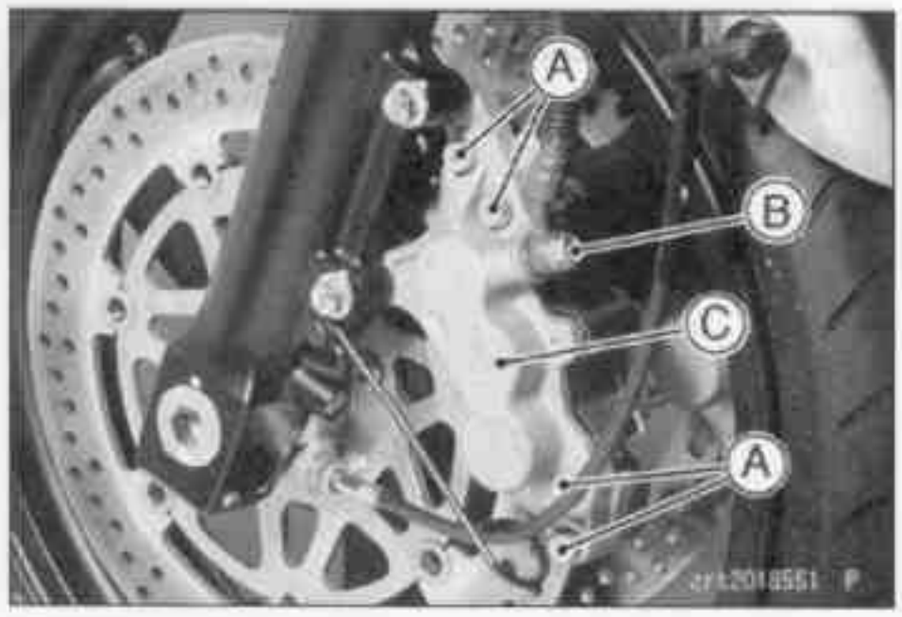
⚠WARNING

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

Calipers

Front Caliper Disassembly

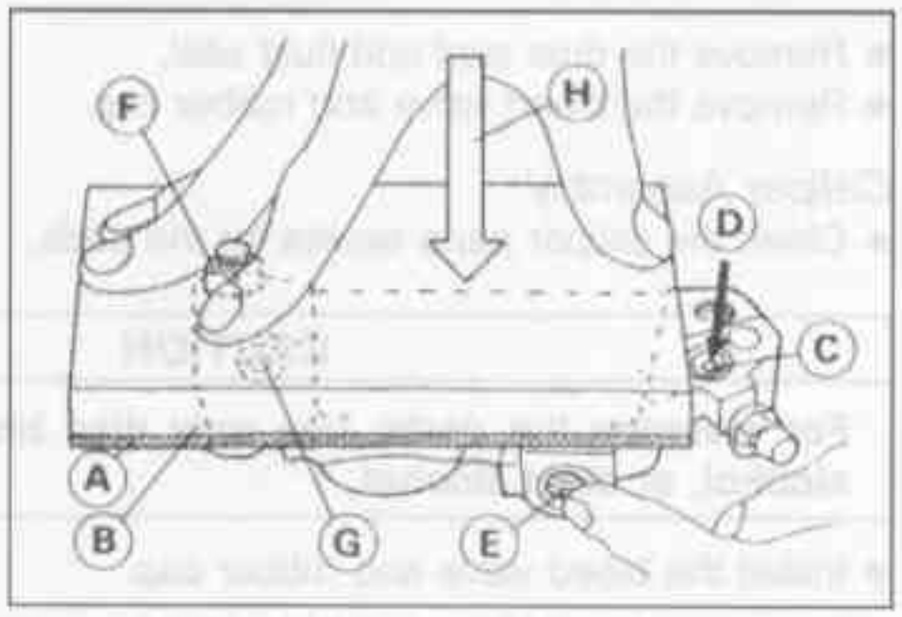
- Loosen the front caliper assembly bolts [A], and banjo bolt [B], and tighten them loosely.
- Remove:
  Front Caliper (see Caliper Removal) [C]
  Brake Pads (see Brake Pad Removal)
  Front Caliper Assembly Bolts
  O-rings



- Using compressed air, remove the pistons. One way to remove the pistons is as follows.

○ Install a rubber gasket [A] and a wooden board [B] more than 10 mm thick on the caliper half, and fasten them together with a suitable bolt and nut as shown. Leave one of the oil passages [C] open.

○ Lightly apply compressed air [D] to the oil passage until the pistons hit the rubber gasket. Block the hose joint opening [E] during this operation if the caliper half has the opening.
  [F] Bolt and Nut
  [G] Oil Passage sealed by Rubber Gasket.
  [H] Push down.

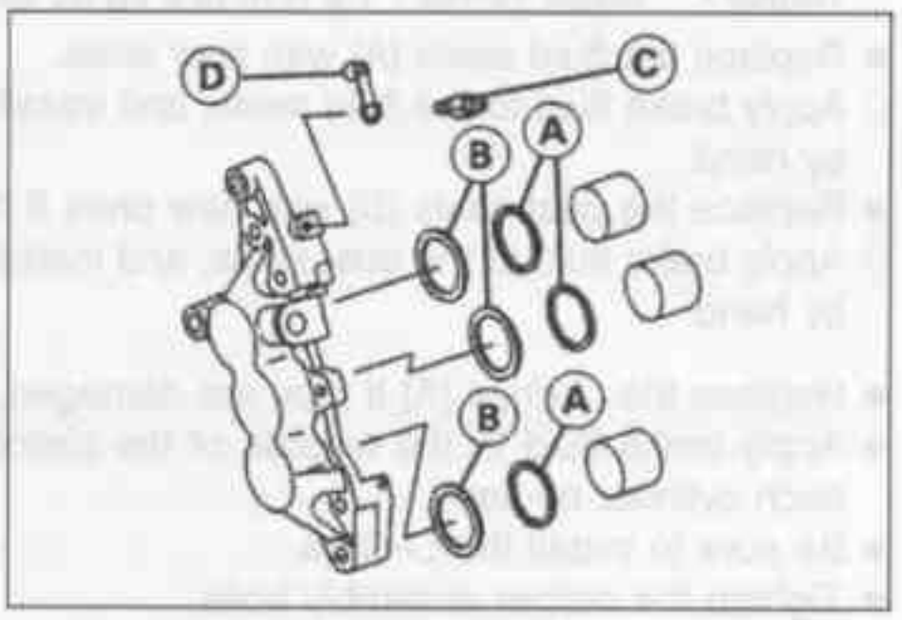


⚠ WARNING

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

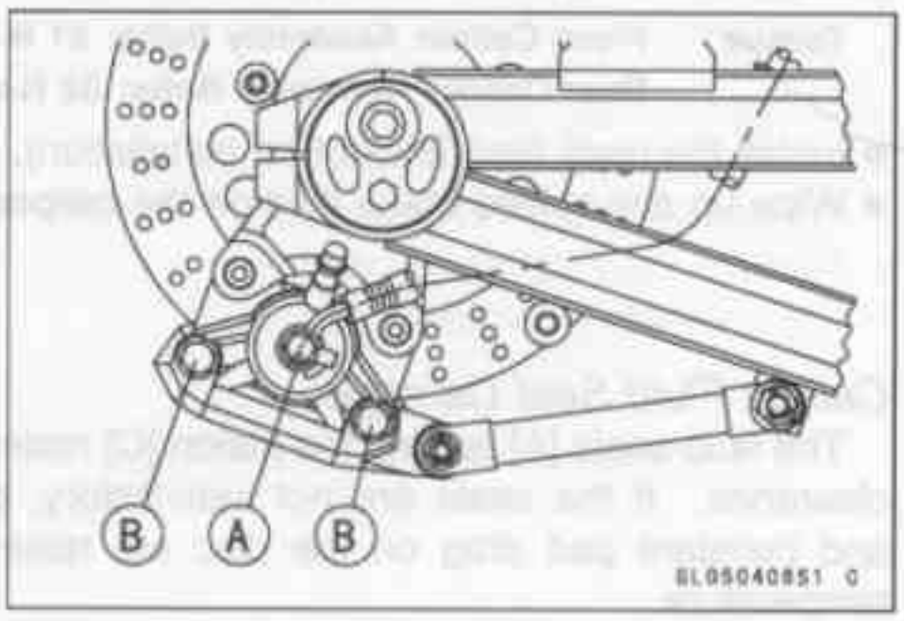
○ Pull out the pistons by hand.

- Remove the dust seals [A] and fluid seals [B].
- Remove the bleed valve [C] and rubber cap [D].
- Repeat the previous step to remove the pistons from the other side of the caliper body.



Rear Caliper Disassembly

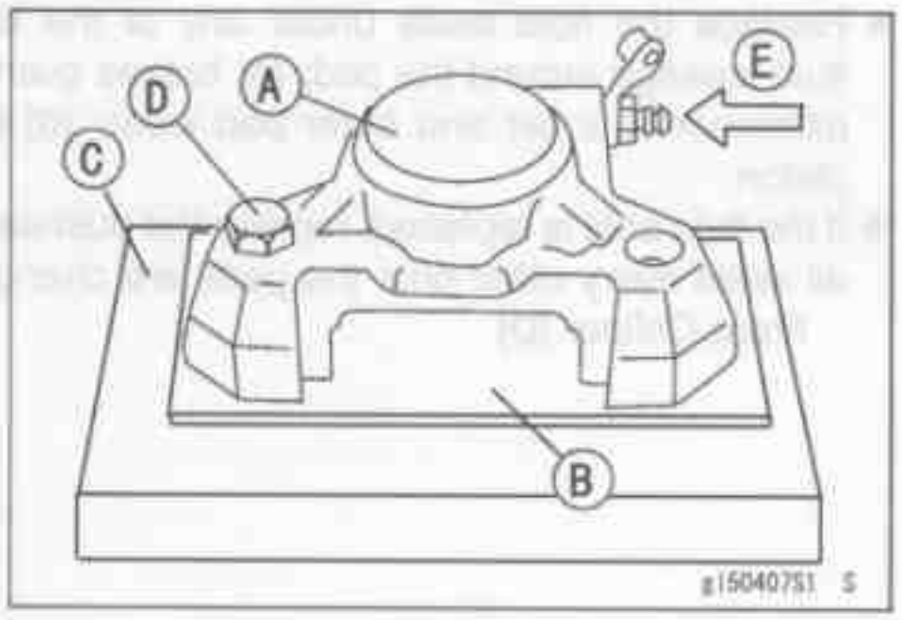
- Loosen the banjo bolt [A] and rear caliper assembly bolts [B], and tighten them loosely.
- Remove:
  Rear Caliper (see Caliper Removal)
  Brake Pads (see Brake Pad Removal)
  Rear Caliper Assembly Bolts
  O-rings



- Remove the pistons as follows:

Left Side Piston

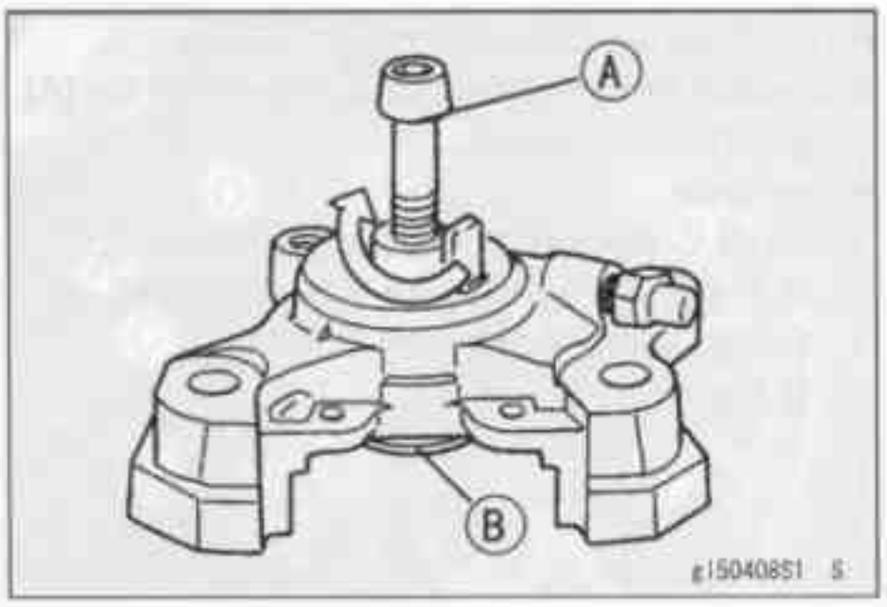
○ Removal of the left side piston is the same as for the front caliper (see Front Caliper Disassembly).
  [A] Left Side Caliper
  [B] Rubber Gasket
  [C] Wooden Board
  [D] Bolt and Nut
  [E] Apply compressed air



Calipers

Right Side Piston

○ Using the rear caliper assembly bolt [A], remove the piston [B] as shown.



- Remove the dust seal and fluid seal.
- Remove the bleed valve and rubber cap.

Caliper Assembly

- Clean the caliper parts except for the pads.

CAUTION

For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valve and rubber cap.

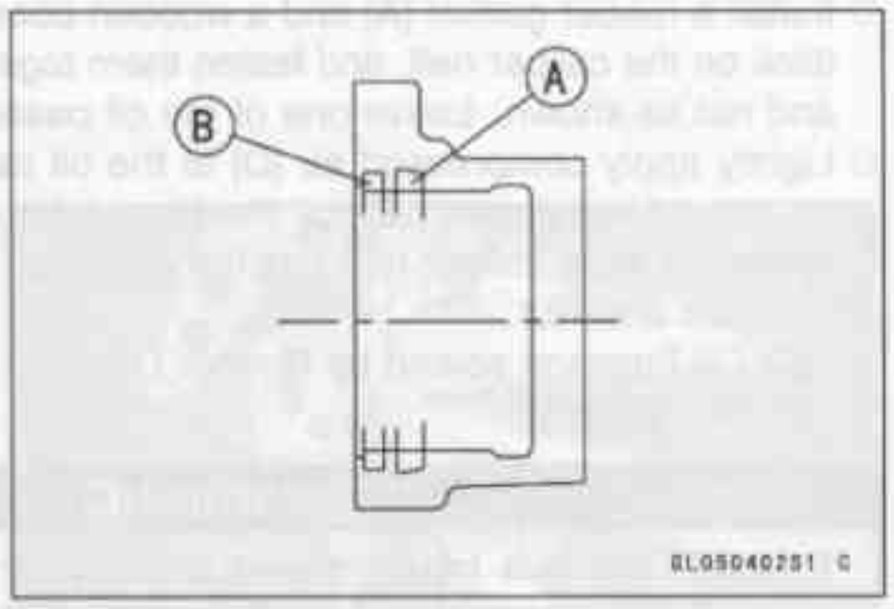
Torque - Bleed Valves : 7.8 N·m (0.8 kg·m, 69 in·lb)

- Replace the fluid seals [A] with new ones.

○ Apply brake fluid to the fluid seals, and install them into the cylinders by hand.

- Replace the dust seals [B] with new ones if they are damaged.

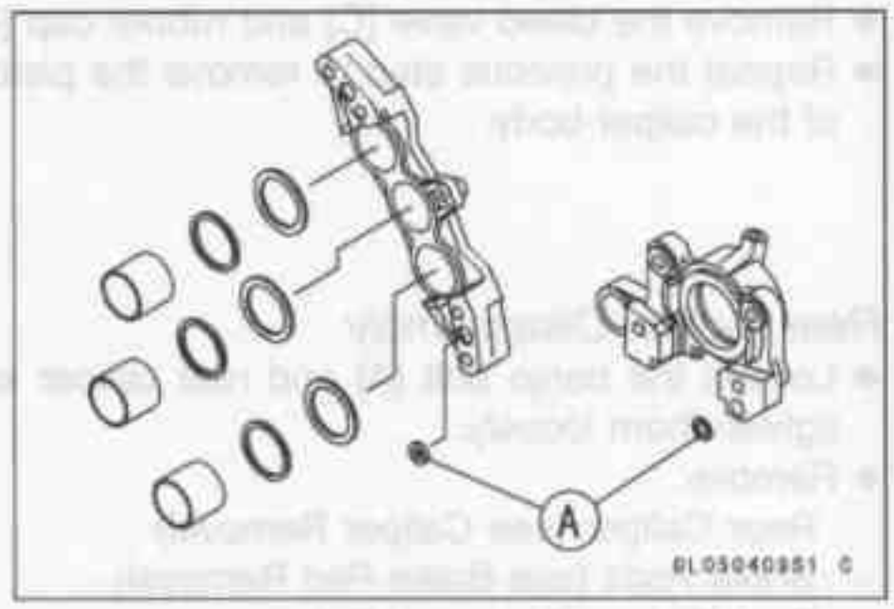
○ Apply brake fluid to the dust seals, and install them into the cylinders by hand.



- Replace the O-rings [A] if they are damaged.
- Apply brake fluid to the outside of the pistons, and push them into each cylinder by hand.
- Be sure to install the O-rings.
- Tighten the caliper assembly bolts.

Torque - Front Caliper Assembly Bolts: 21 N·m (2.1 kg·m, 15.0 ft·lb)
Rear Caliper Assembly Bolts: 32 N·m (3.3 kg·m, 24 ft·lb)

- Install the pads (see Brake Pad Installation).
- Wipe up any spilled brake fluid on the caliper with wet cloth.



Caliper Fluid Seal Damage

The fluid seals [A] around the piston [C] maintain the proper pad/disc clearance. If the seals are not satisfactory, pad wear will increase, and constant pad drag on the disc will raise brake and brake fluid temperature.

- Replace the fluid seals under any of the following conditions; (a) fluid leakage around the pad; (b) brakes overheat (c) there is a large difference in inner and outer pad wear; (d) the seal is stuck to the piston

★ If the fluid seal is replaced, replace the dust seal as well. Also, replace all seals every other time the pads are changed.

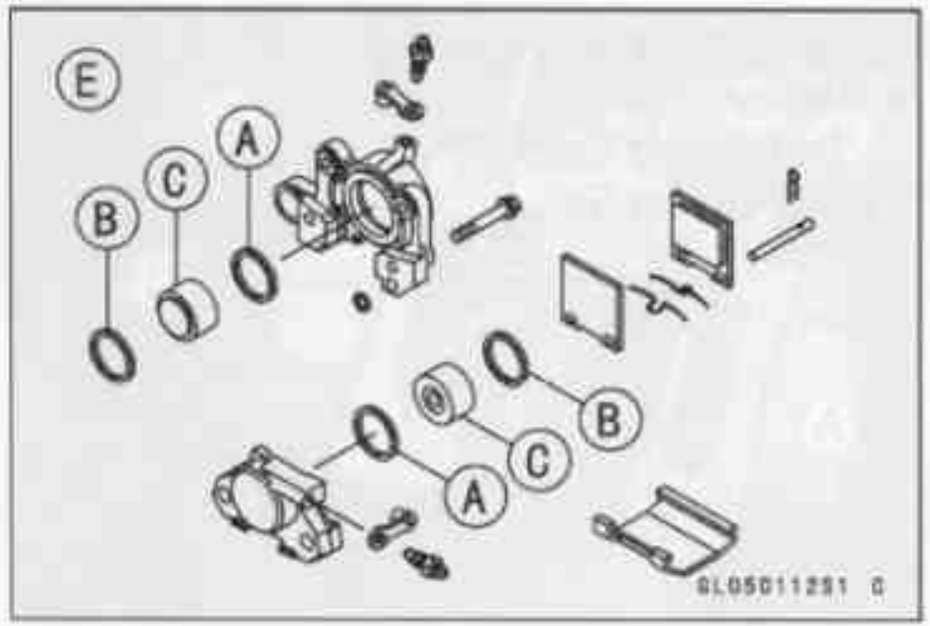
Front Caliper [D]

Calipers

Caliper Dust Seal Damage

- Check that the dust seals [B] is not cracked, worn, swollen, or otherwise damaged.
- If it show any damage, remove the caliper bracket and replace it.

Rear Caliper [E]



Caliper Piston and Cylinder Damage

- Visually inspect the piston [C] and cylinder surfaces.

★ Replace the caliper if the cylinder and piston are badly scores or rusty.

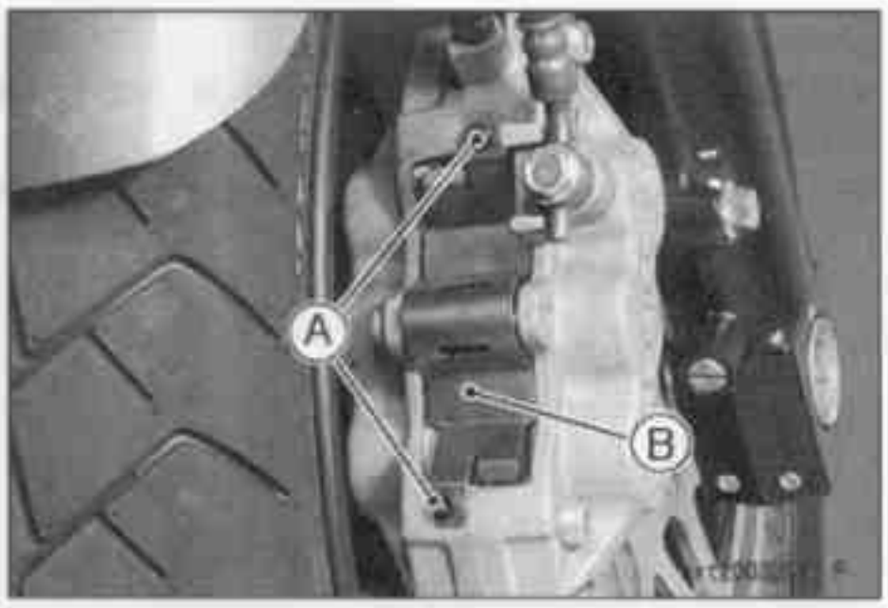
Front Caliper [D]

Rear Caliper [E]

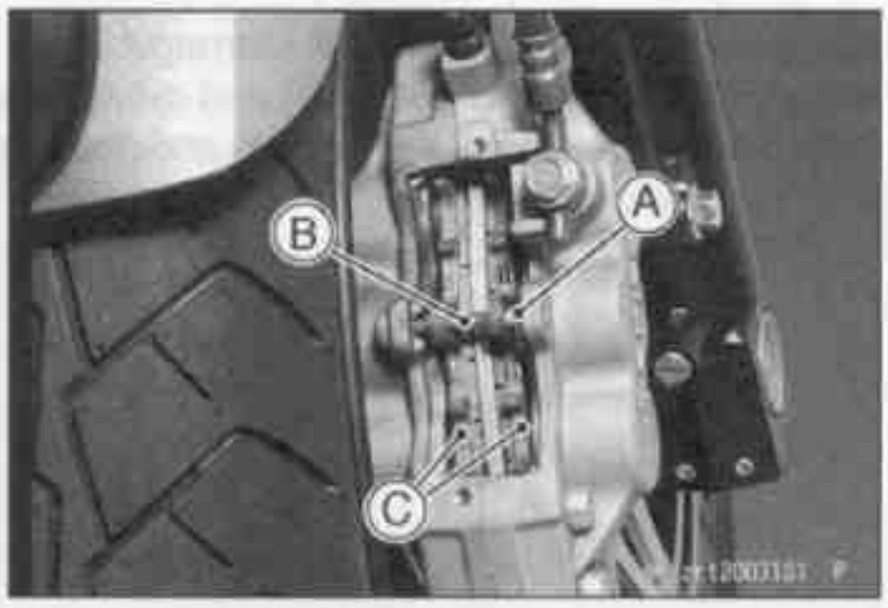
Brake Pads

Front Brake Pad Removal

- Remove:
  Pad Spring Bolts [A]
  Pad Spring [B]



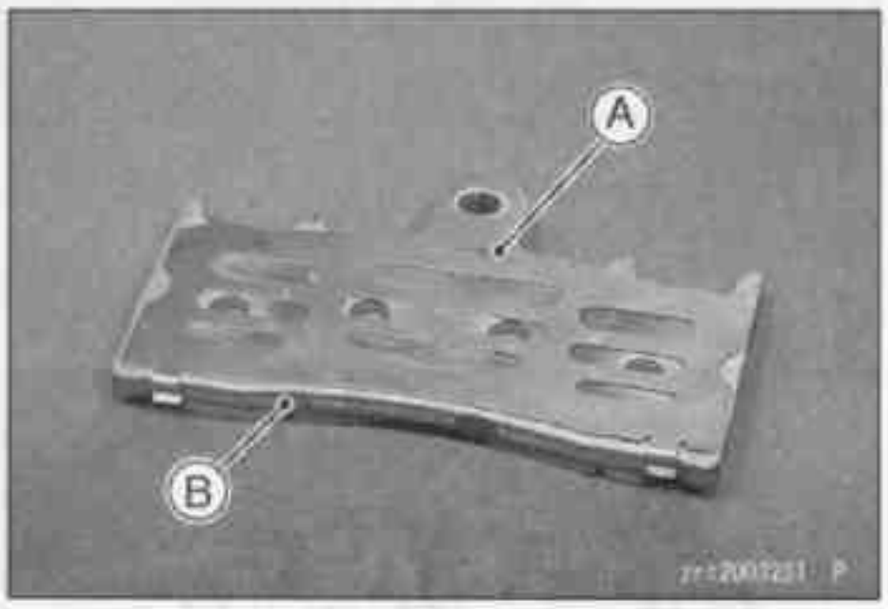
Clip [A]
Pad Pin [B]
Brake Pads [C]



Front Brake Pad Installation

- Push the caliper pistons in by hand as far as they will go.
- Check to see that the pad plate [A] is in place on the pad [B].
- Install the brake pads.
- Install the pad pin and clip. The clip must be "outside" of the pads.
- Install the pad spring and tighten the pad spring bolts.

Torque - Front Brake Pad Spring Bolts: 2.9 N·m (0.30 kg·m, 26 in·lb)

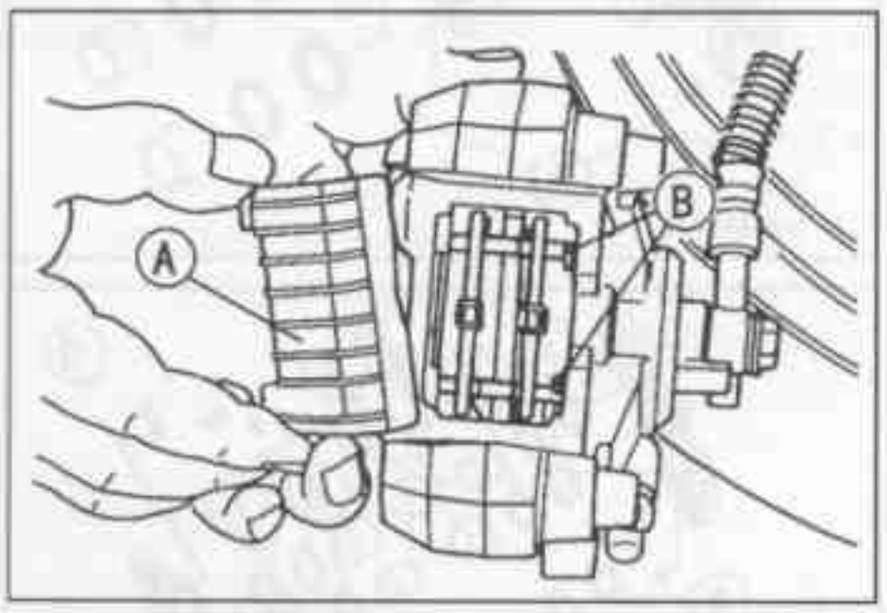


⚠ WARNING

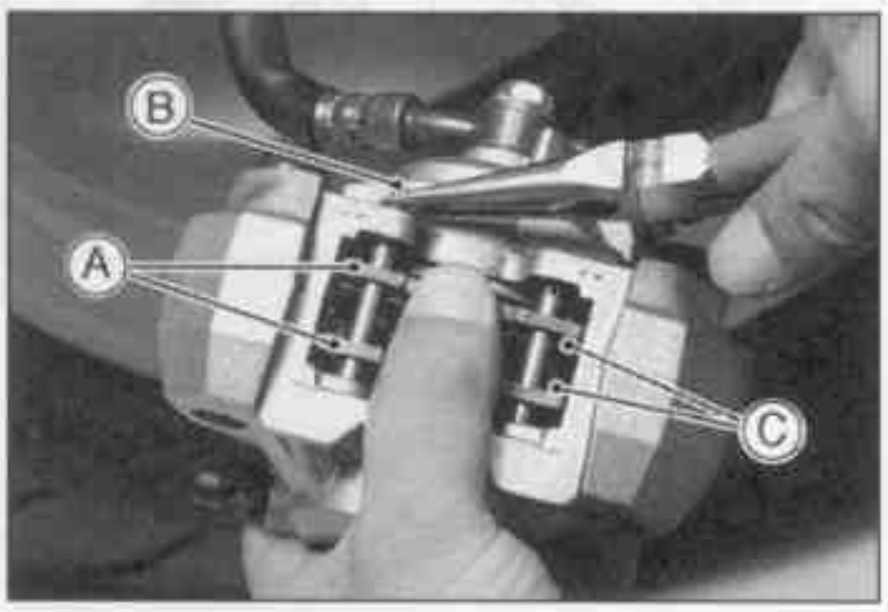
Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

Rear Brake Pad Removal

- Unscrew the caliper mounting bolts.
- Detach the caliper from the disc.
- Remove the piston pad cover [A].
- Draw out the clips [B] upward.



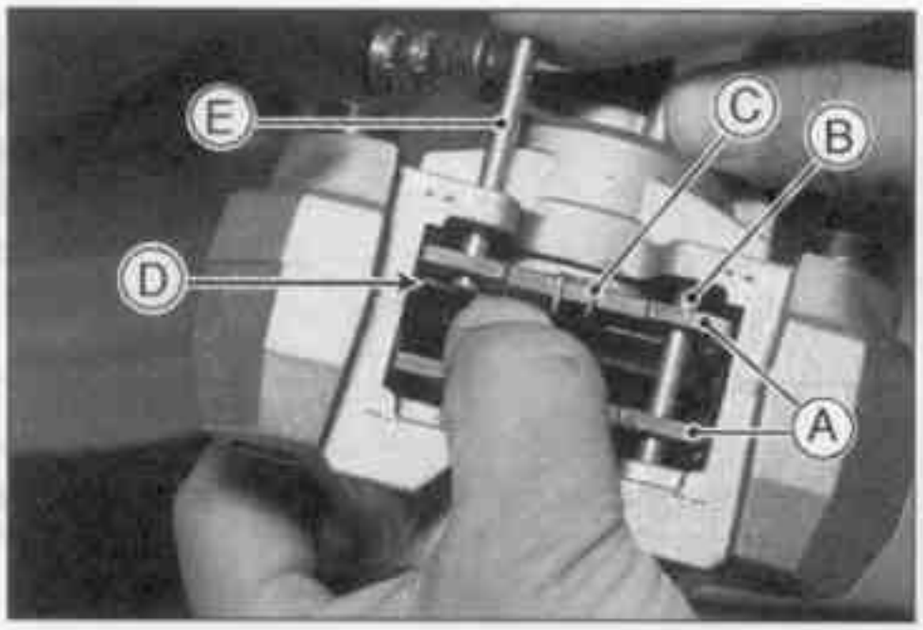
- Pushing either ends [A] of the pads lightly and then take off the push side pin [B].
- Remove the pad springs [C] and brake pads.



Brake Pads

Rear Brake Pad Installation

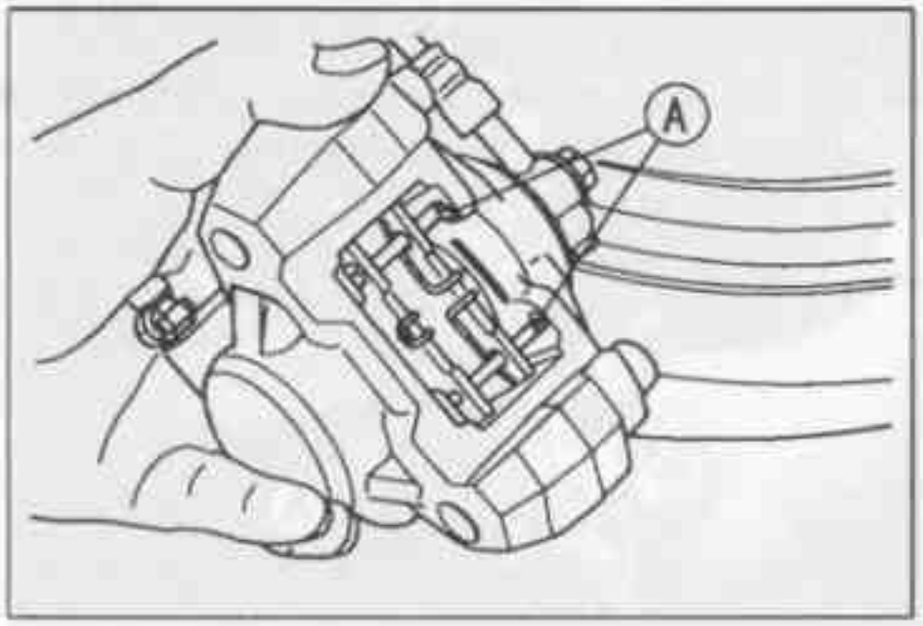
- Push the caliper piston in by hand as far as it will go.
- Put the pads [A] in the caliper, using pin [B].
- Install the anti-rattle spring [C] in place.
- ○ Push the spring end [D], and insert the pin [E].
- Install other side anti-rattle spring.



- Insert the clips [A]. The clip must be "outside" of the pads.
- Install the caliper (see Caliper Installation).

⚠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.

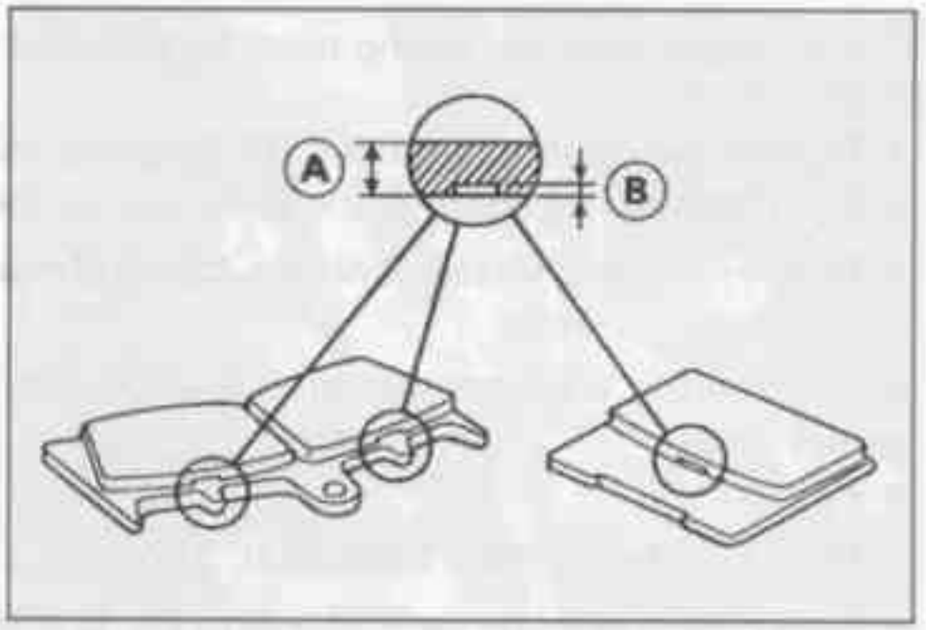


Brake Pad Wear Inspection

- Check the lining thickness [A] of the pads in each caliper.
- ★ If the lining thickness of either pad is less than the service limit [B], replace both pads in the caliper as a set.

Pad Lining Thickness

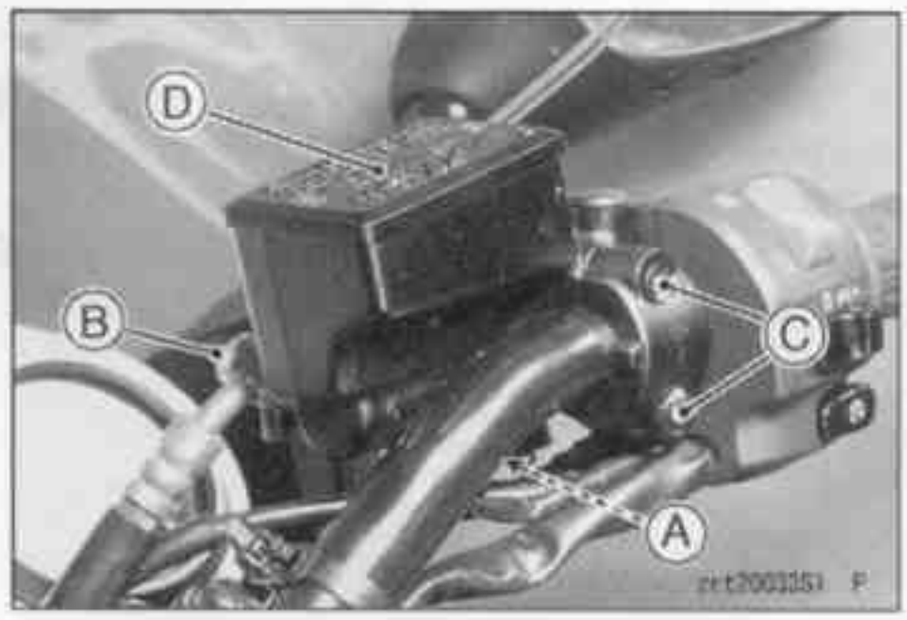
Standard:	**Front**	**4 mm (0.16 in)**
	Rear	**4 mm (0.16 in)**
Service Limit:		**1 mm (0.04 in)**



Master Cylinder

Front Master Cylinder Removal

- Disconnect the front brake light switch connectors [A].
- Remove the banjo bolt [B] to disconnect the brake hose from the master cylinder (see Brake Hose Removal/Installation).
- Unscrew the clamp bolts [C], and take off the master cylinder [D] as an assembly with the reservoir, brake lever, and brake switch installed.

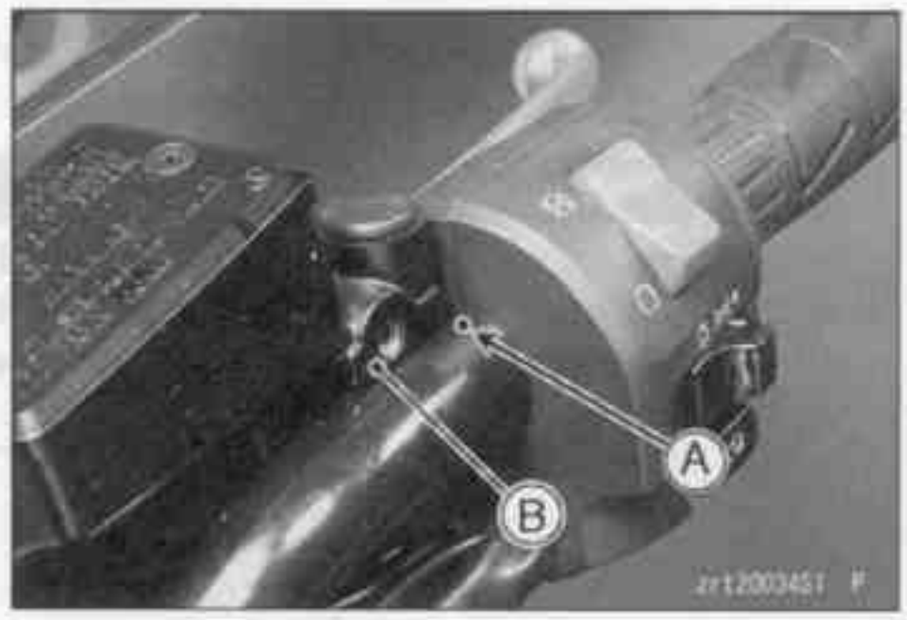


CAUTION

Immediately wash away any brake fluid that spills.

Front Master Cylinder Installation

- Set the front master cylinder to match its mating surface [B] to the punch mark [A] of the handlebar.



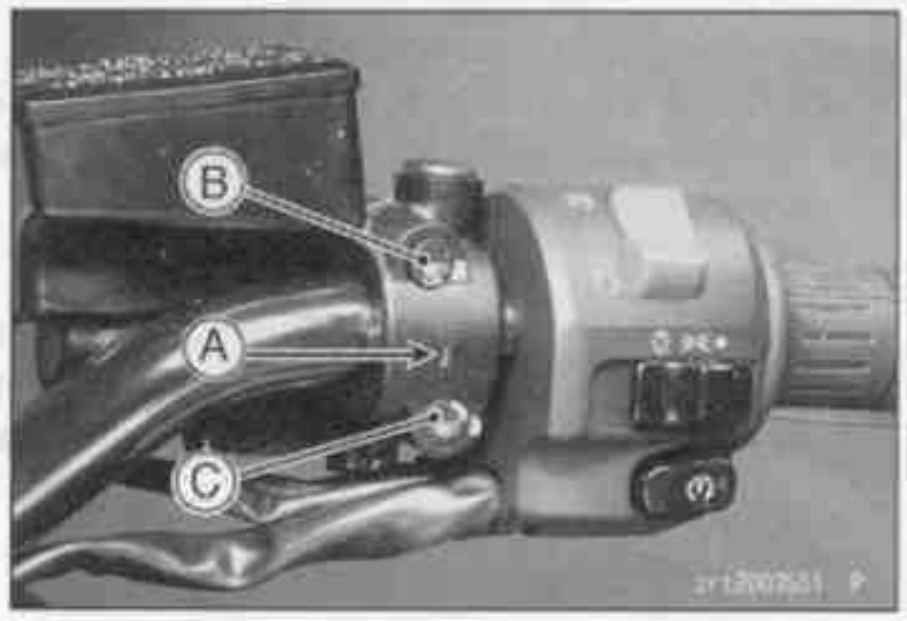
- The master cylinder clamp must be installed with the arrow mark [A] upward.
- Tighten the upper clamp bolt [B] first, and then the lower clamp bolt [C]. There will be a gap at the lower part of the clamp after tightening.

  Torque - Front Master Cylinder Clamp Bolts: 8.8 N·m (0.9 kg·m, 78 in·lb)

- Replace the washers that are on each side of the hose fitting with new ones.
- Tighten:

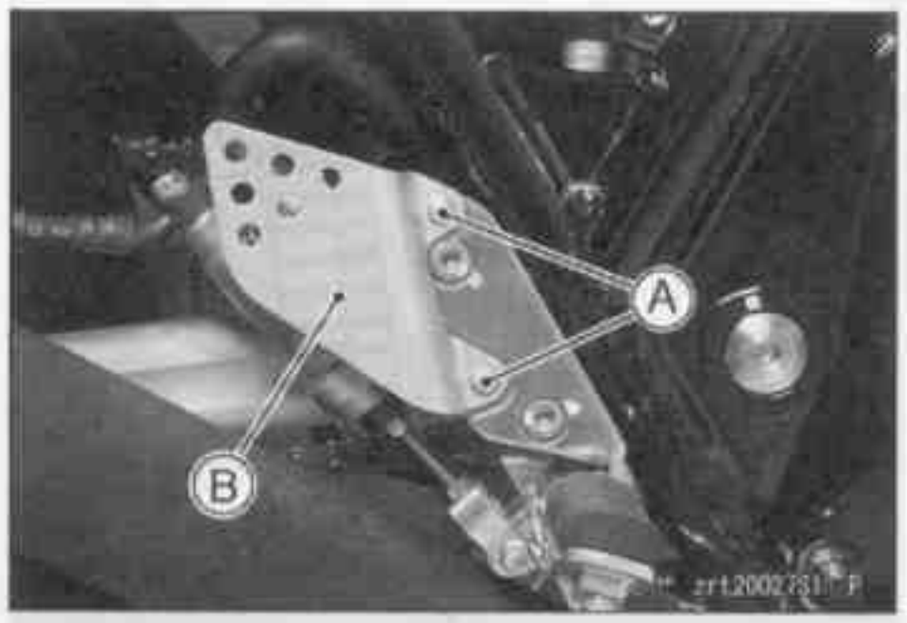
  Torque - Brake Hose Banjo Bolt: 25 N·m (2.5 kg·m, 18.0 ft·lb)

- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

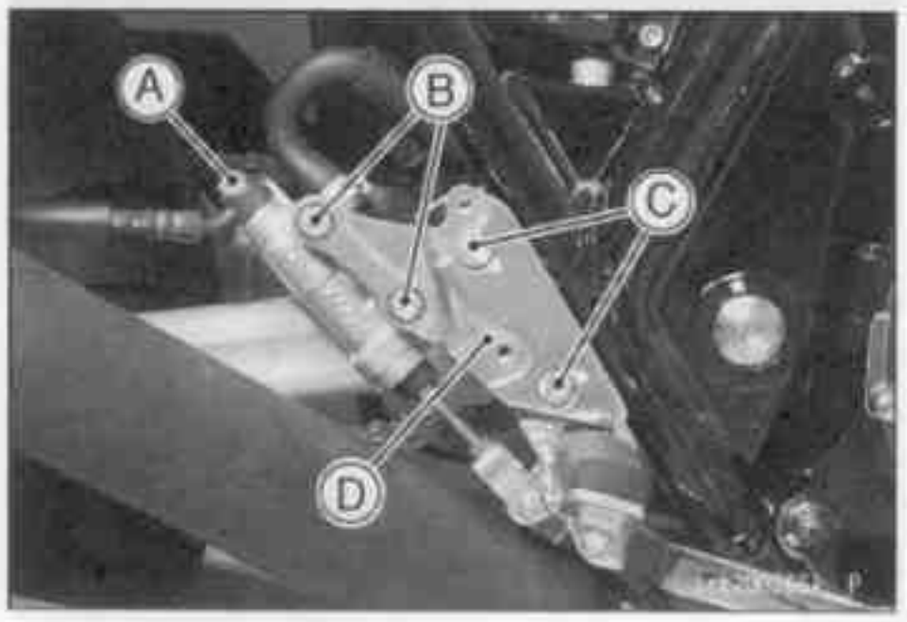


Rear Master Cylinder Removal

- Remove the bolts [A] and rear master cylinder cover [B].



- Unscrew the brake hose banjo bolt [A] on the master cylinder (see Brake Hose Removal/Installation).
- Loosen the master cylinder mounting bolts [B].
- Unscrew the footpeg stay bolts [C] and remove the stay [D].



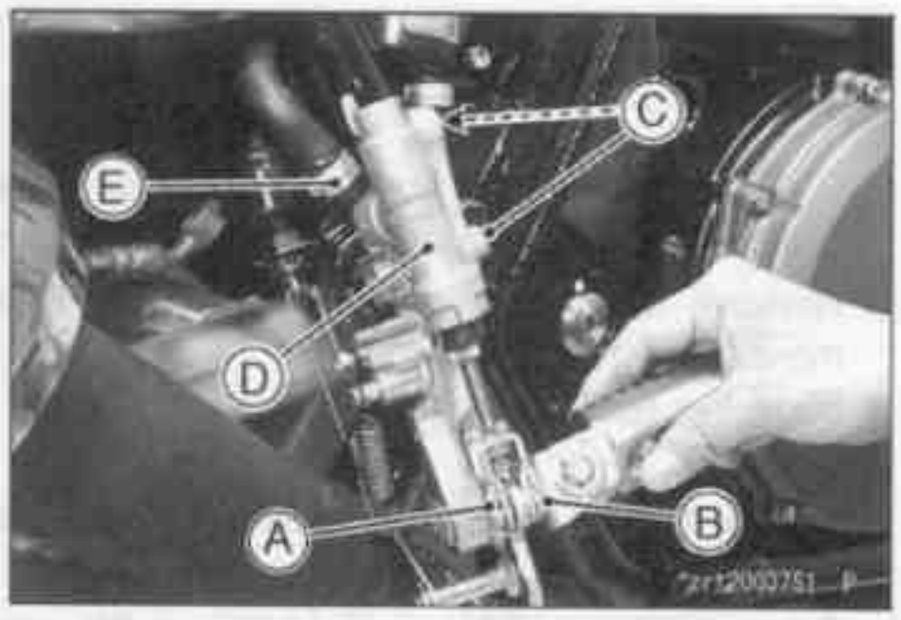
Master Cylinder

- Remove the cotter pin [A] and joint pin [B].

NOTE

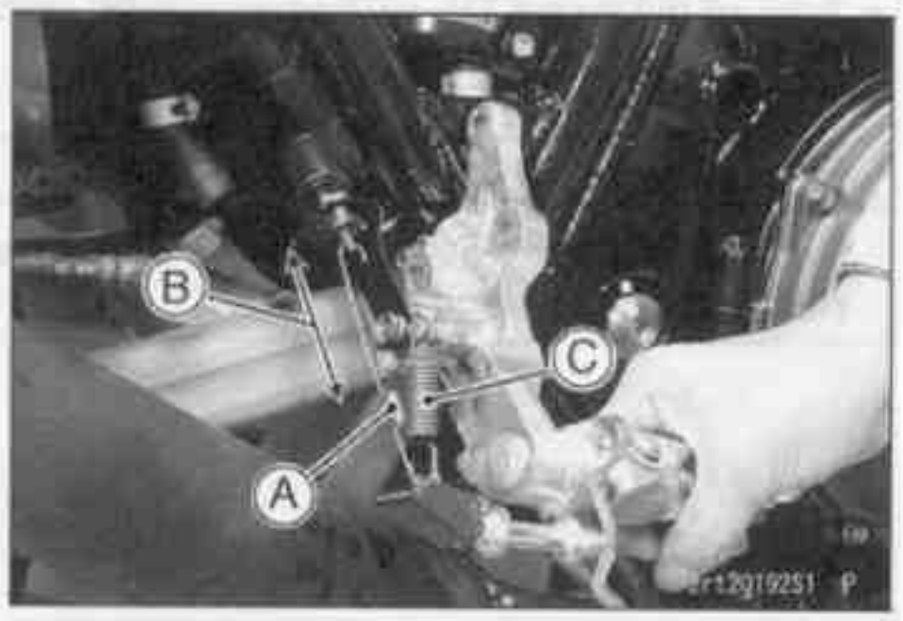
○ *Pull off the joint pin while pressing down the brake pedal.*

- Unscrew the master cylinder mounting bolts [C], and take off the master cylinder [D].
- Pull off the reservoir hose lower end [E], and drain the brake fluid into a container.



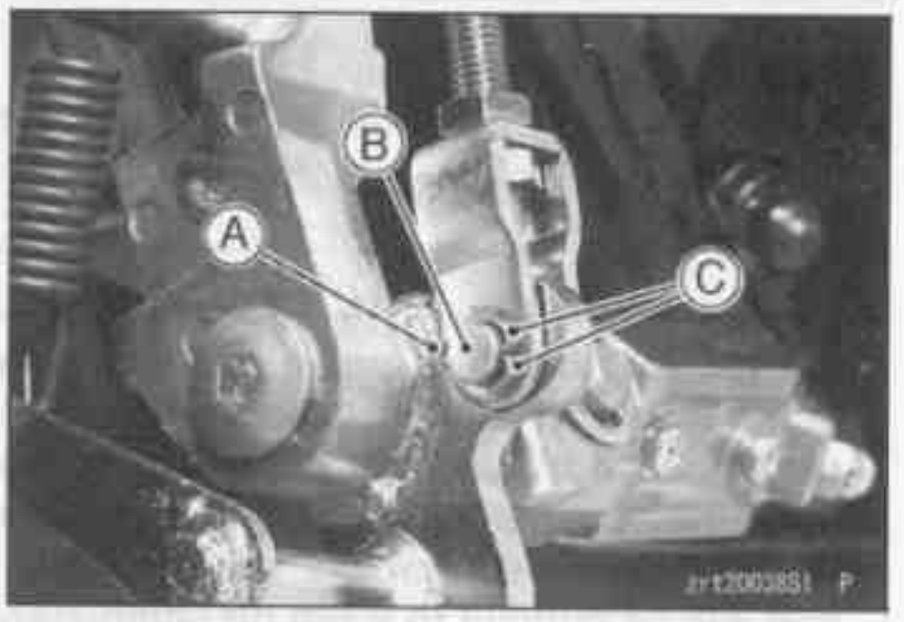
Rear Master Cylinder Installation

- If the rear brake light switch spring [A] was removed, install the spring direction as shown.
  Longer Side [B]
- If the brake pedal return spring [C] was removed, install the spring direction as shown.



- Replace the cotter pin with a new one.
- Insert the cotter pin [A] to the hole of the joint pin [B] and separate [C] the cotter pin ends.
- Replace the washers that are on each side of hose fitting with new ones.
- Tighten:

Torque - Front Footpeg Stay Bolts: 25 N·m (2.5 kg·m, 18.0 ft·lb)
Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kg·m, 18.0 ft·lb)
Brake Hose Banjo Bolt: 25 N·m (2.5 kg·m, 18.0 ft·lb)



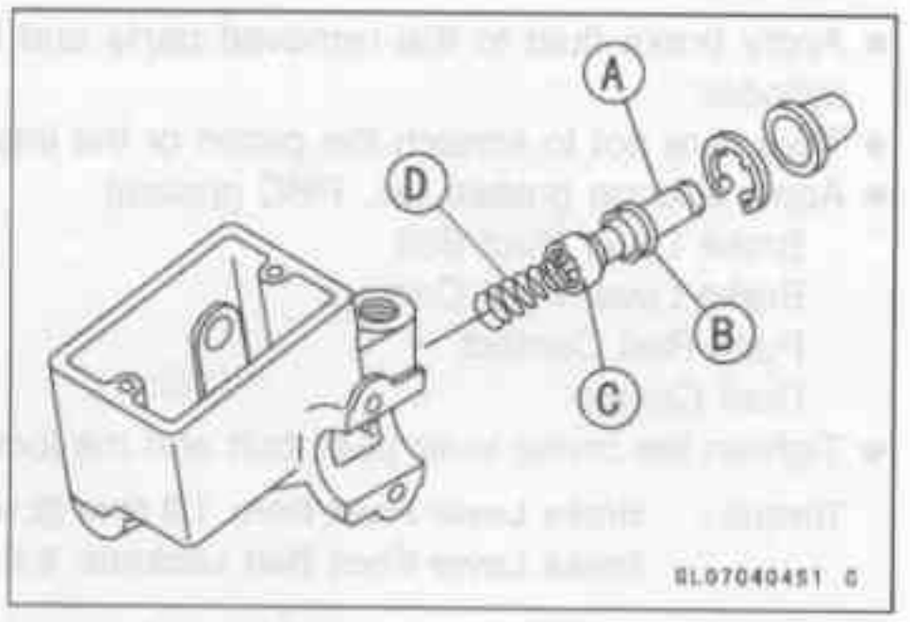
- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

Front Master Cylinder Disassembly

- Remove the front master cylinder (see Front Master Cylinder Removal).
- Remove the reservoir cap and diaphragm, and pour the brake fluid into a container.
- Unscrew the locknut and pivot bolt, and remove the brake lever.
- Pull the dust cover out of place, and remove the circlip.

Special Tools - Inside Circlip Pliers: 57001–143

- Pull out the piston [A], secondary cup [B], primary cup [C], and return spring [D].



CAUTION

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

Master Cylinder

Rear Master Cylinder Disassembly

NOTE

○ *Do not remove the push rod clevis for master cylinder disassembly since removal requires brake position adjustment.*

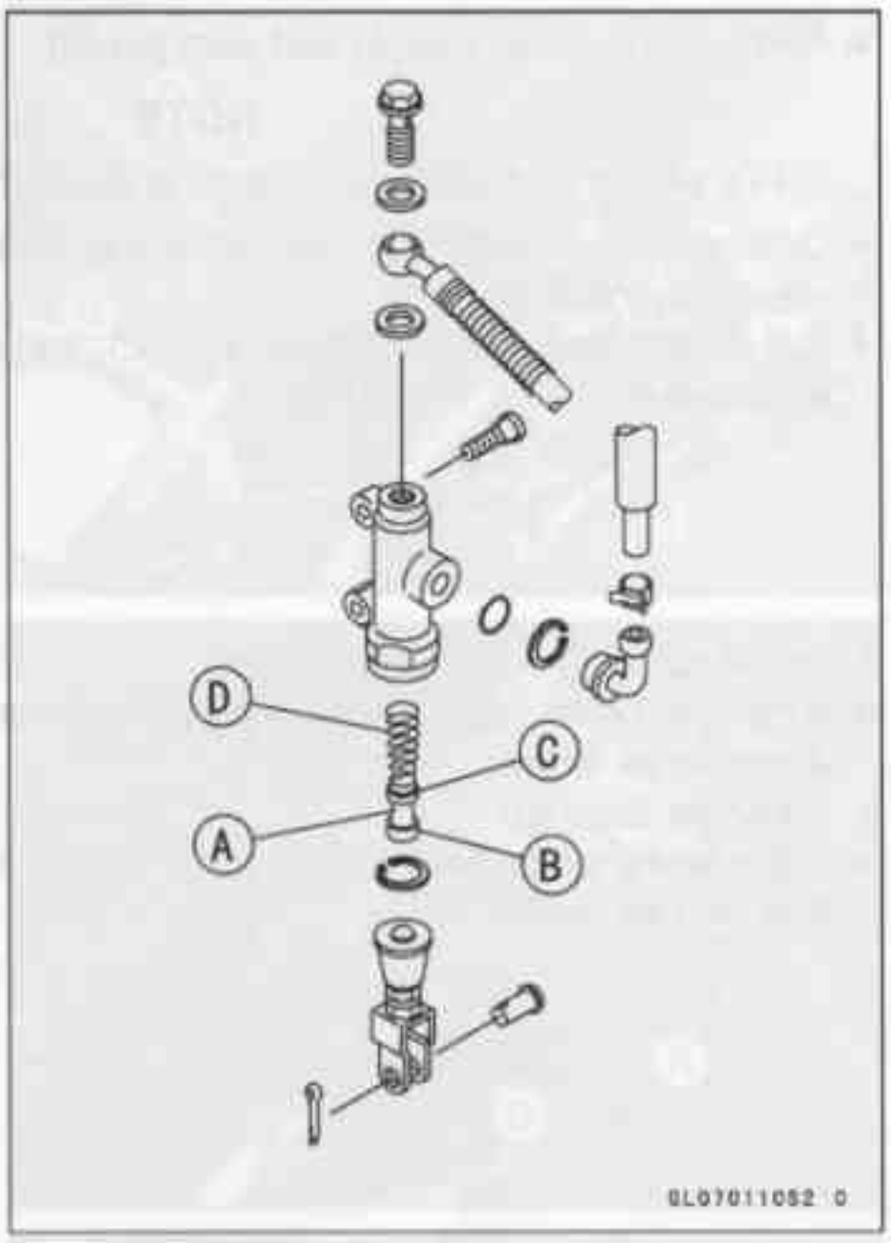
- Remove the rear master cylinder (see Rear Master Cylinder Removal).
- Slide the dust cover on the push rod out of place, and remove the circlip.

Special Tools - Inside Circlip Pliers: 57001–143

- Pull out the push rod with the piston stop.
- Take off the piston [A], secondary cup [B], primary cup [C], and return spring [D].

CAUTION

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



Master Cylinder Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

CAUTION

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

- Apply brake fluid to the removed parts and to the inner wall of the cylinder.
- Take care not to scratch the piston or the inner wall of the cylinder.
- Apply silicone grease (ex. PBC grease)
  - Brake Lever Pirot Bolt
  - Brake Lever Pirot Contact
  - Push Rod Contact
  - Dust Covers
- Tighten the brake lever pivot bolt and the locknut.

Torque - Brake Lever Pivot Bolt: 1.0 N·m (0.10 kg·m, 9 in·lb)
Brake Lever Pivot Bolt Locknut: 5.9 N·m (0.6 kg·m, 52 in·lb)

Master Cylinder Inspection (Visual Inspection)

- Disassemble the front and rear master cylinders.
- Check that there are no scratches, rust or pitting on the inner wall [A] of each master cylinder and on the outside of each piston [B].

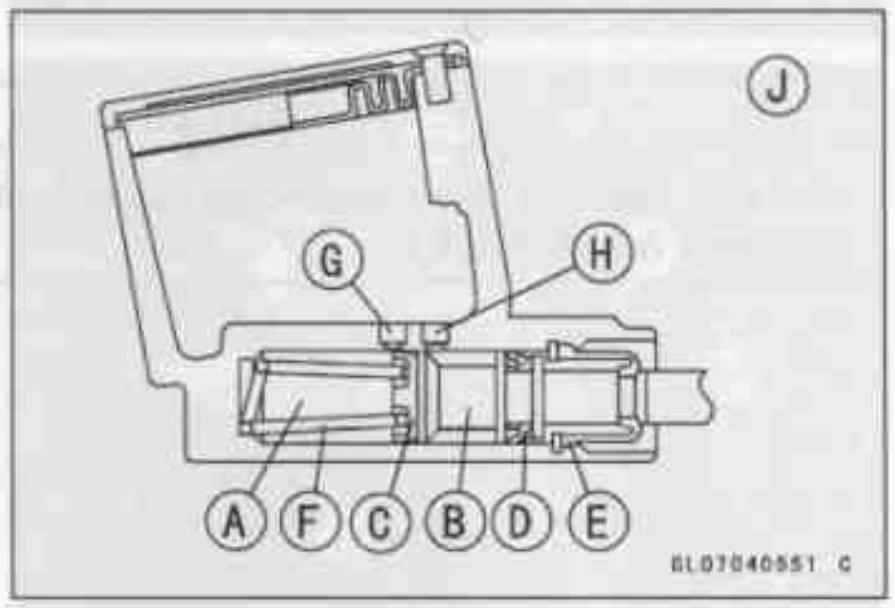
★ If a master cylinder or piston shows any damage, replace them.

- Inspect the primary cap [C] and secondary cap [D].

★ If a cup is worn, damaged softened (rotted), or swollen, the piston assembly should be replaced to renew the cups.

★ If fluid leakage is noted at the brake lever, the piston assembly should be replaced to renew the cups.

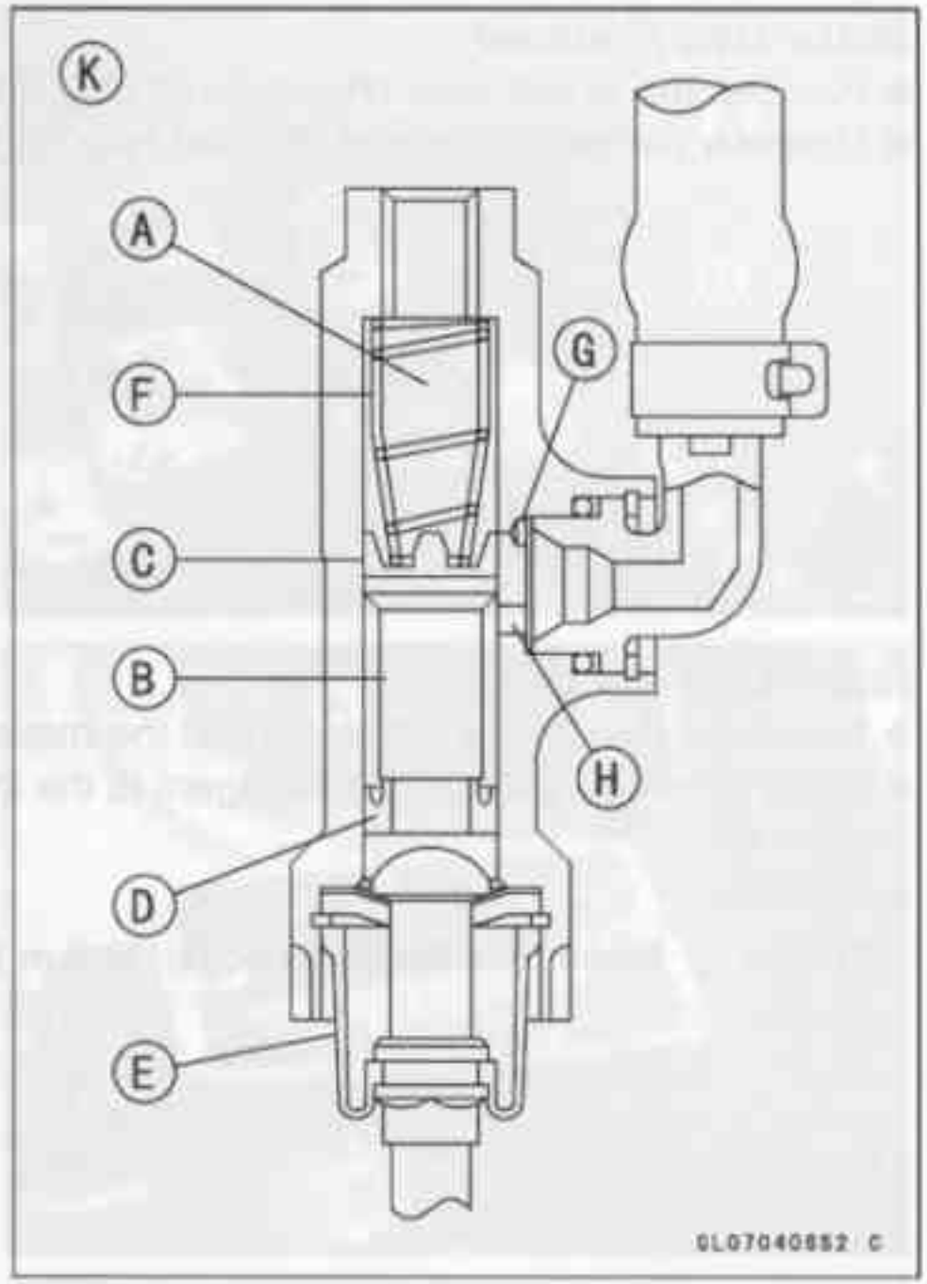
Front Master Cylinder [J]



Master Cylinder

- Check the dust covers [E] for damage.
★ If they are damaged, replace them.
- Check the piston return spring [F] for any damage.
★ If the spring are damaged, replace them.
- Check that relief port [G] and supply port [H] are not plugged.
★ If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.

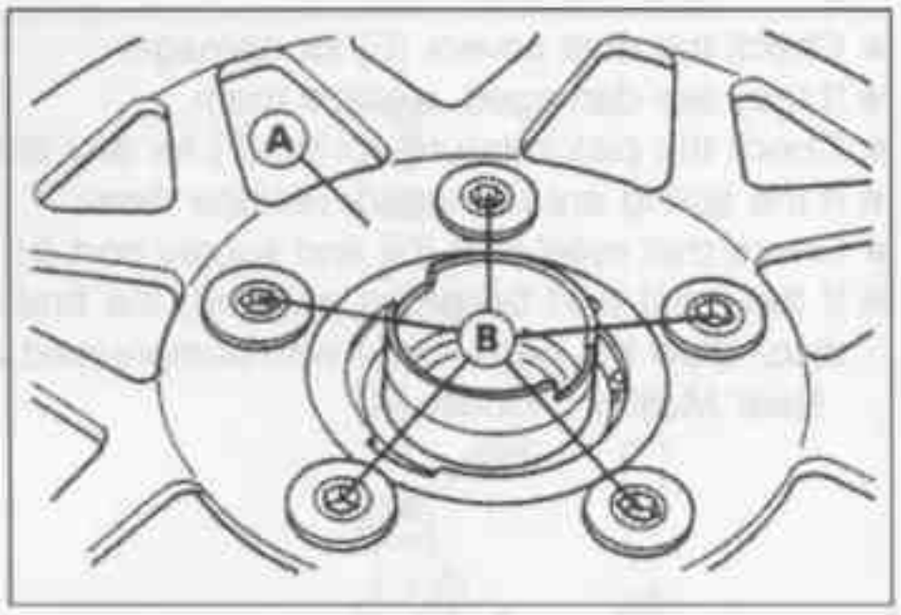
Rear Master Cylinder [K]



Brake Disc

Brake Disc Removal

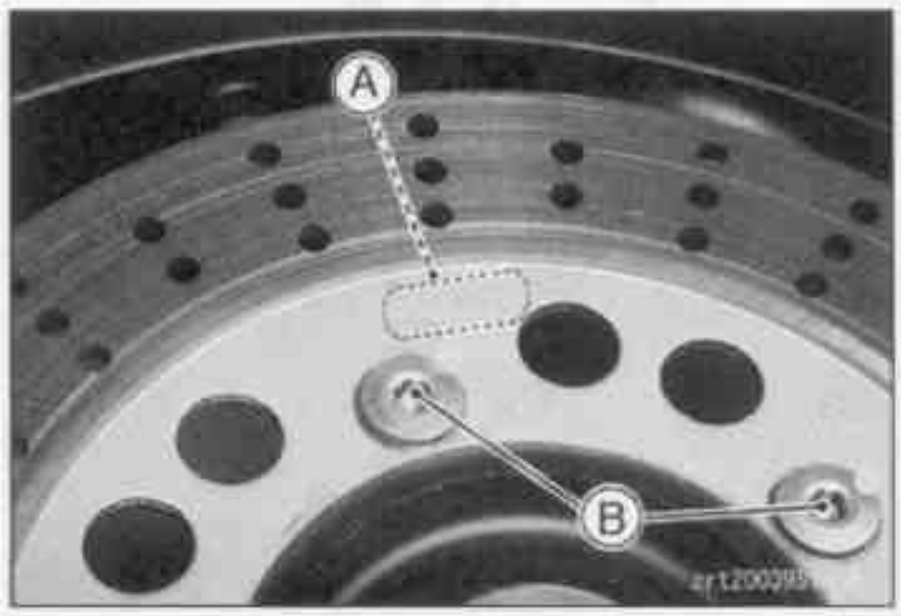
- Remove the wheel (see Wheels/Tires chapter).
- Unscrew the mounting bolts [B], and take off the disc [A].



Brake Disc Installation

- Install the disc on the wheel so that the marked side [A] faces out.
- Apply a non-permanent locking agent to the threads of the brake disc bolts [B].
- Tighten:

Torque - Brake Disc Mounting bolts: 27 N·m (2.8 kg·m, 20 ft·lb)



Brake Disc Wear

- Measure the thickness of each disc [A] at the point where it has worn the most.

★If the disc has worn past the service limit, replace it.

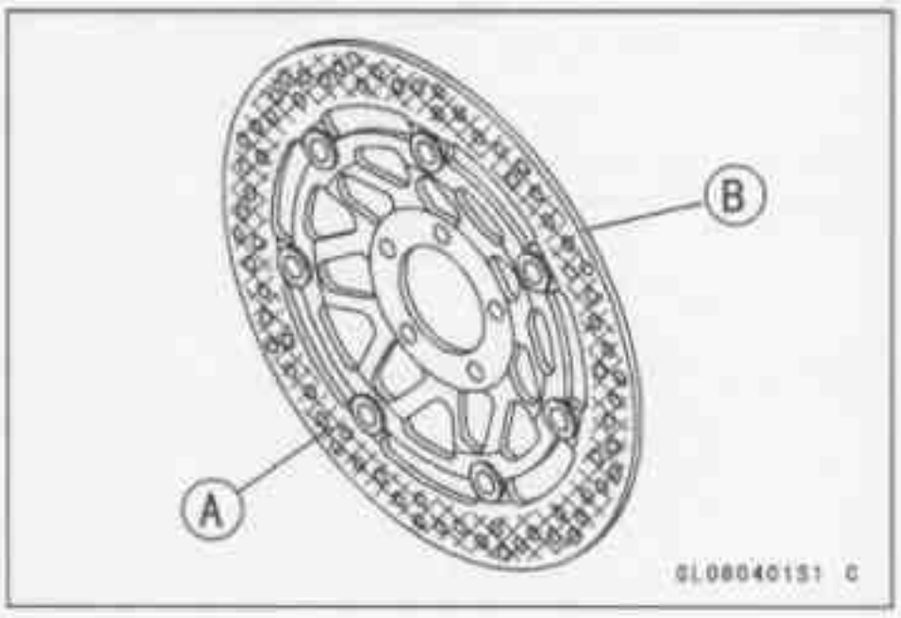
[B] Measuring Area

Front Disc Thickness

Standard:	**4.8 ~ 5.1 mm (0.19 - 0.20 in)**
Service Limit:	**4.5 mm (0.18 in)**

Rear Disc Thickness

Standard:	**5.8 ~ 6.2 mm (0.23 - 0.24 in)**
Service Limit:	**5.5 mm (0.22 in)**



Brake Disc Warp

- Jack up the motorcycle so that the wheel is off the ground (see Wheels/Tires chapter).

Special Tools - Jack: 57001-1238

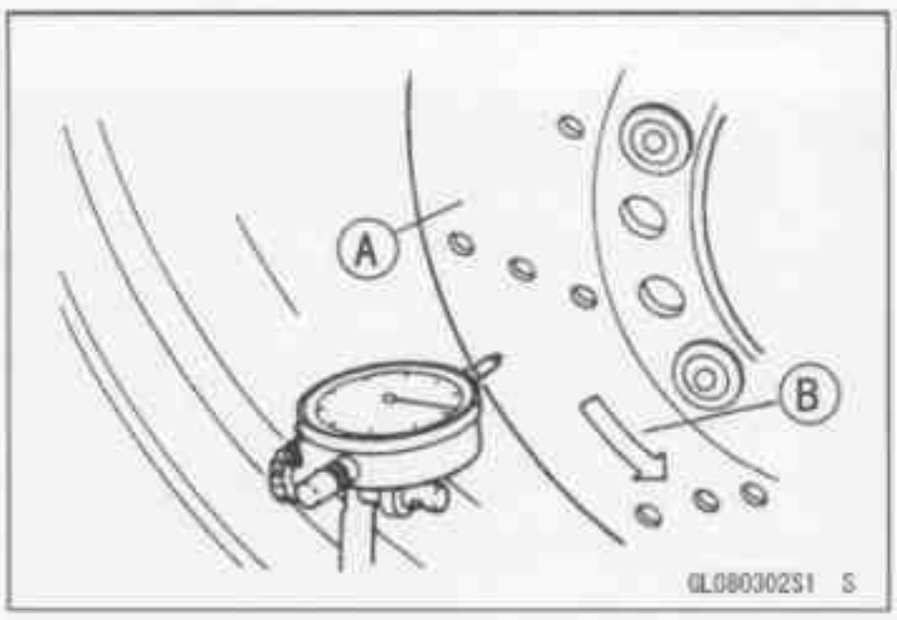
○ For front disc inspection, turn the handlebar fully to one side.

- Set up a dial gauge against the disc [A] as shown and measure disc runout, while turning [B] the wheel by hand.

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

Disc Runout

Standard:	**TIR 0.15 mm (0.0059 in.) or less**
Service Limit:	**TIR 0.3 mm (0.0118 in.)**



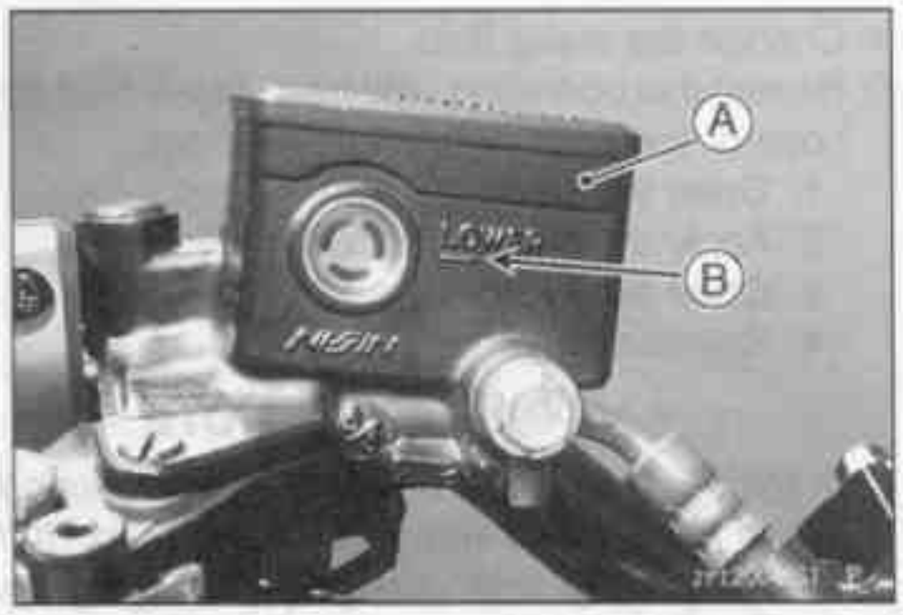
Brake Fluid

Brake Fluid Level Inspection

- Check that the brake fluid level in the front brake reservoir [A] is above the lower level line [B].

NOTE

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

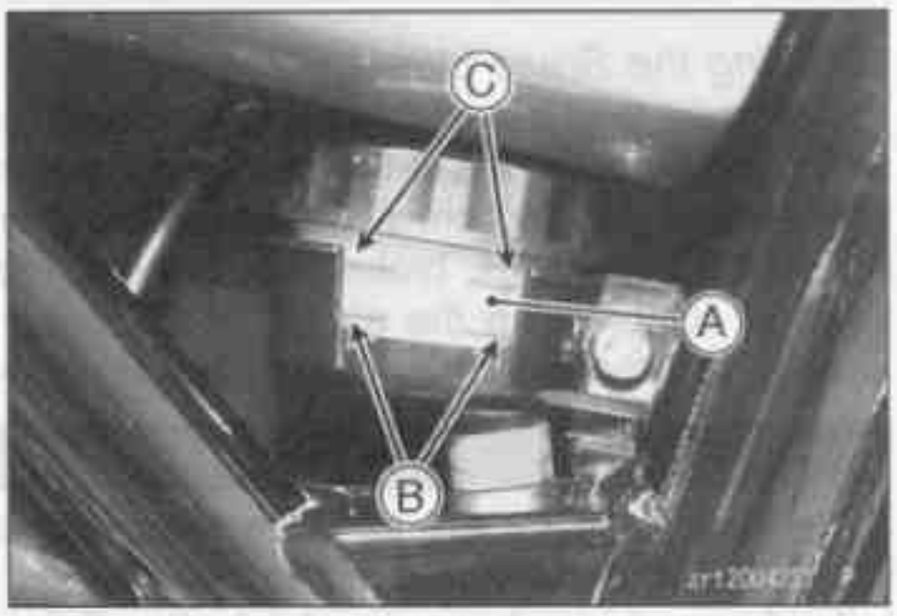


★ If the fluid level is lower than the lower level line, fill the reservoir to the upper level line [A].



- Check that the brake fluid level in the rear brake reservoir [A] is above the lower level line [B].

★ If the fluid level is lower than the lower level line, remove the side cover and fill the reservoir to the upper level line [C].



⚠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. After changing the fluid, use only the same type and brand of fluid thereafter.

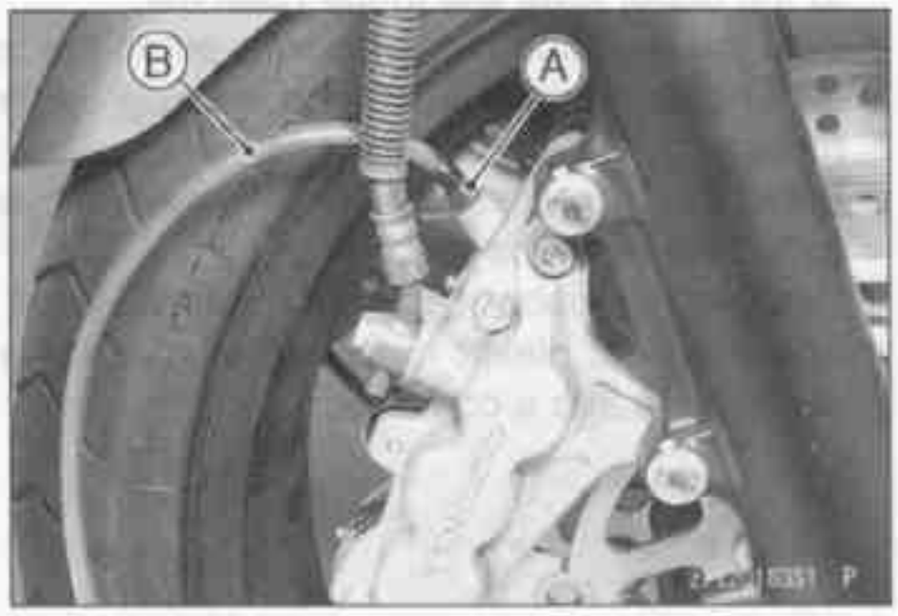
Recommended Disc Brake Fluid
Grade: D.O.T.4

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.*

- Level the brake fluid reservoir.
- Remove the reservoir cap.
- Remove the rubber cap from the bleed valve [A] on the caliper.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.
- Fill the reservoir with fresh specified brake fluid.



Brake Fluid

- Change the brake fluid.

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

1. Open the bleed valve [A]
2. Apply the brake and hold it [B]
3. Close the bleed valve [C]
4. Release the brake [D]

NOTE

○ *The fluid level must be checked often during the changing operation and replenished with fresh brake fluid. If the fluid in the reservoir runs out any time during the changing operation, the brakes will need to be bled since air will have entered the brake line.*

○ *Front Brake: Repeat the above steps for the other caliper.*

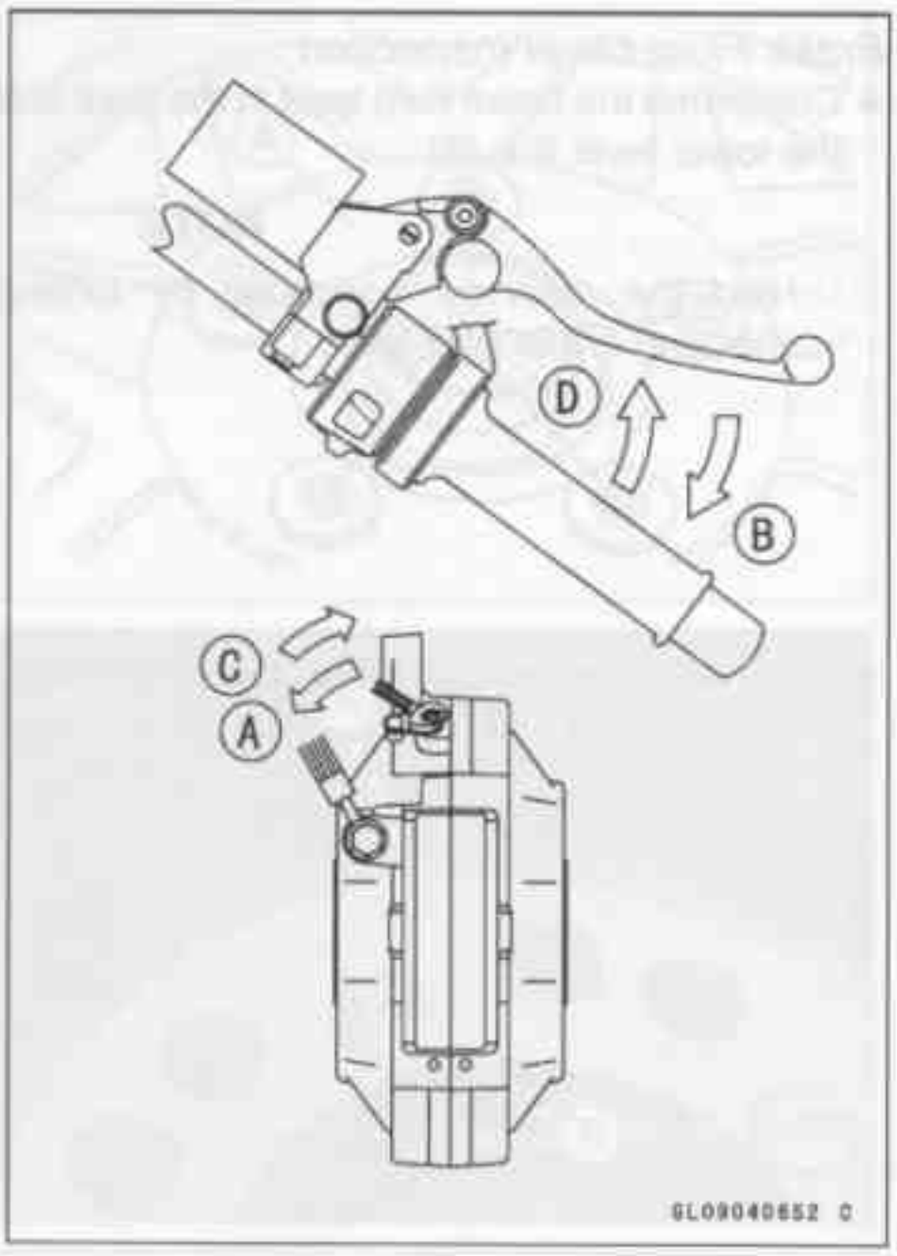
○ *Rear Brake: Repeat the above steps for the other bleed valve.*

- Remove the clear plastic hose.
- Install the reservoir cap.
- Tighten the bleed valve, and install the rubber cap.

Torque - Bleed Valves : 7.8 N·m (0.8 kg·m, 69 in·lb)

- After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.

★ If necessary, bleed the air from the lines.



Bleeding the Brake Line

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

⚠ WARNING

Be sure to bleed the air from the brake line whenever brake lever or pedal action feels soft or spongy after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.

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.*

- Remove the reservoir cap, and fill the reservoir with fresh brake fluid to the upper level line in the reservoir.
- With the reservoir cap off, slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.

○ Bleed the air completely from the master cylinder by this operation.

- Install the reservoir cap.
- Remove the rubber cap from the bleed valve on the caliper.
- Attach a clear plastic hose to the bleed valve, and run the other end of the hose into a container.

Brake Fluid

- Bleed the brake line and the caliper.

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

1. Pump the brake lever until it becomes hard, and apply the brake and hold it [A]
2. Quickly open and close [B] the bleed valve while holding the brake applied.
3. Release the brake [C]

NOTE

○ *The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. 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.*

○ *Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*

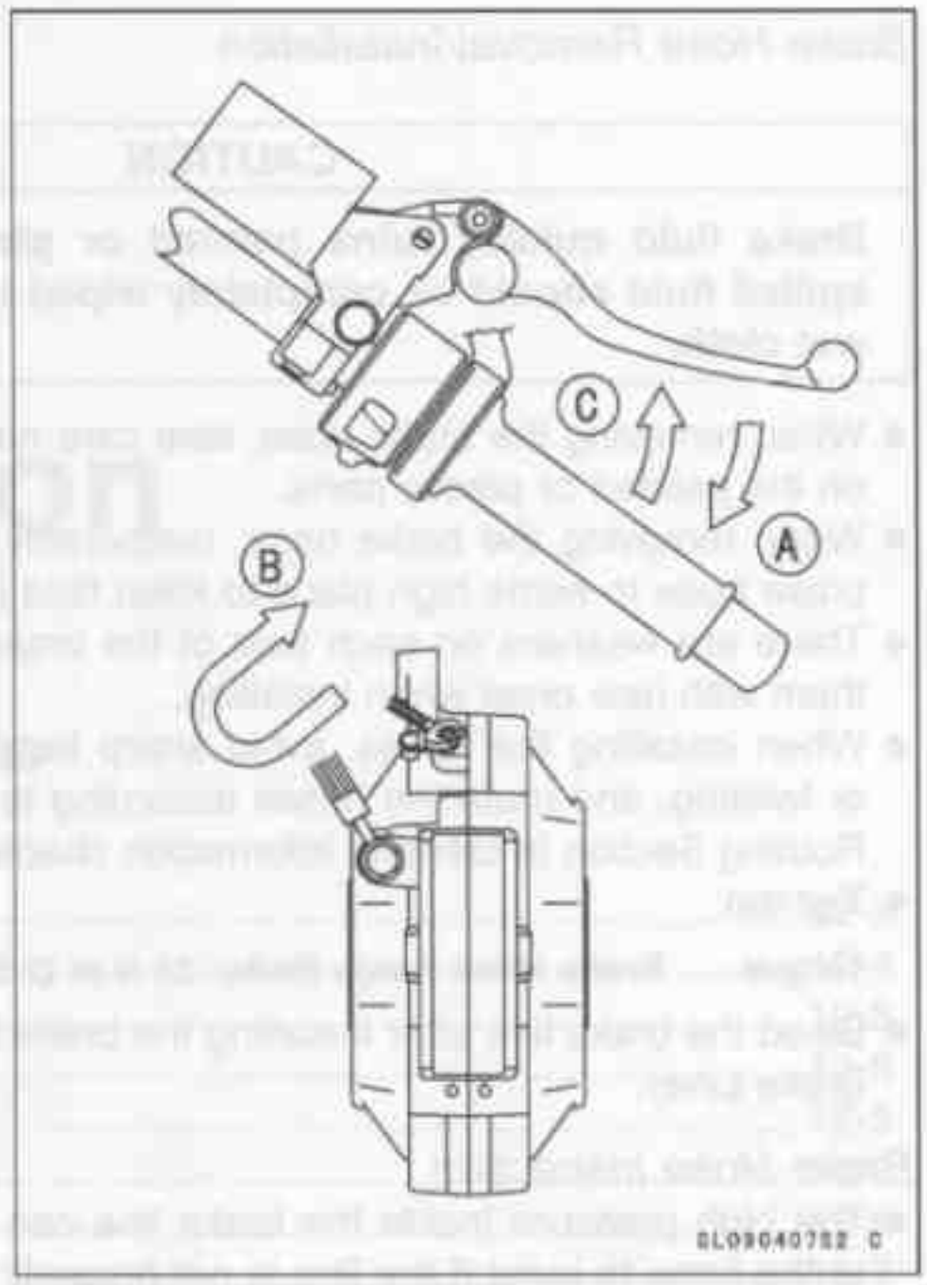
○ *Front Brake: Repeat the above steps for the other caliper.*

○ *Rear Brake: Repeat the above steps for the other bleed valve.*

- Remove the clear plastic hose.
- Tighten the bleed valve, and install the rubber cap.

Torque - Bleed Valves : 7.8 N·m (0.8 kg·m, 69 in·lb)

- Check the fluid level.
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.



⚠ WARNING

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

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

Suspension

Table of Contents

Exploded View 12-2
Specifications 12-4
Front Fork 12-5
- Rebound Damping Force Adjustment 12-5
- Compression Damping Force Adjustment 12-5
- Spring Preload Adjustment 12-6
- Front Fork Removal (each fork leg) 12-6
- Front Fork Installation 12-7
- Fork Oil Change 12-7
- Front Fork Disassembly 12-9
- Front Fork Assembly 12-10
- Inner Tube, Outer Tube Inspection 12-11
- Dust Seal Inspection 12-12
- Spring Tension 12-12

Rear Shock Absorber 12-13
- Rebound Damping Force Adjustment 12-13
- Compression Damping Force Adjustment 12-13
- Spring Preload Adjustment 12-13
- Rear Shock Absorber Removal 12-14
- Rear Shock Absorber Installation 12-14
- Rear Shock Absorber Inspection 12-14
- Rear Shock Absorber Scrapping 12-14

Swingarm 12-15
- Swingarm Removal 12-15
- Swingarm Installation 12-15
- Swingarm Bearing Removal 12-15
- Swingarm Bearing Installation 12-16
- Swingarm Bearing Sleeve Inspection 12-16
- Swingarm Lubrication 12-16
- Chain Slider Inspection 12-16

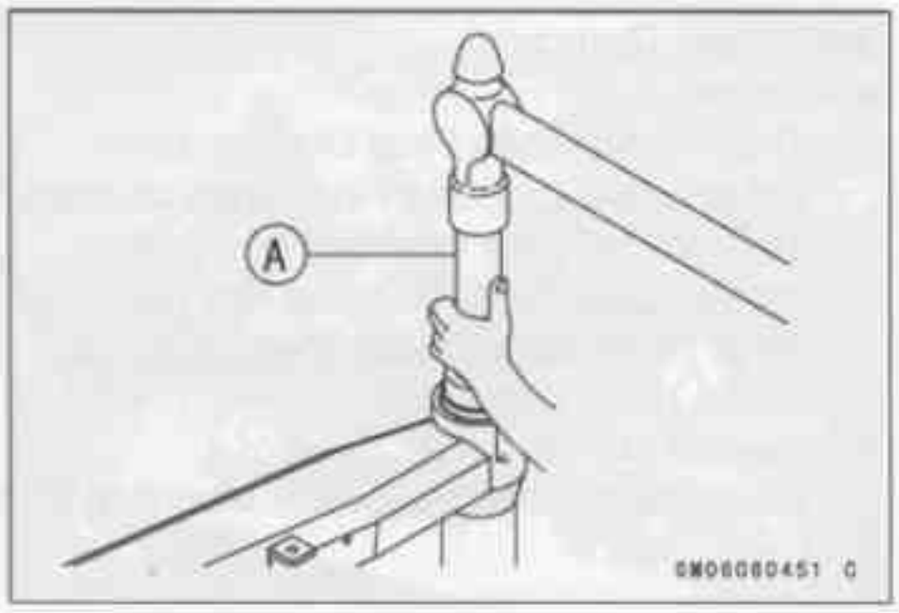
Swingarm

Swingarm Bearing Installation

- Apply plenty of high-temperature grease to the ball bearing and the inside of the needle bearings, and grease seals.
- Install the ball bearing, needle bearings, circlip, and grease seals.

○ For all bearings, face the marked side out.

Special Tools - Bearing Driver Set: 57001–1129 [A]



Swingarm Bearing Sleeve Inspection

CAUTION

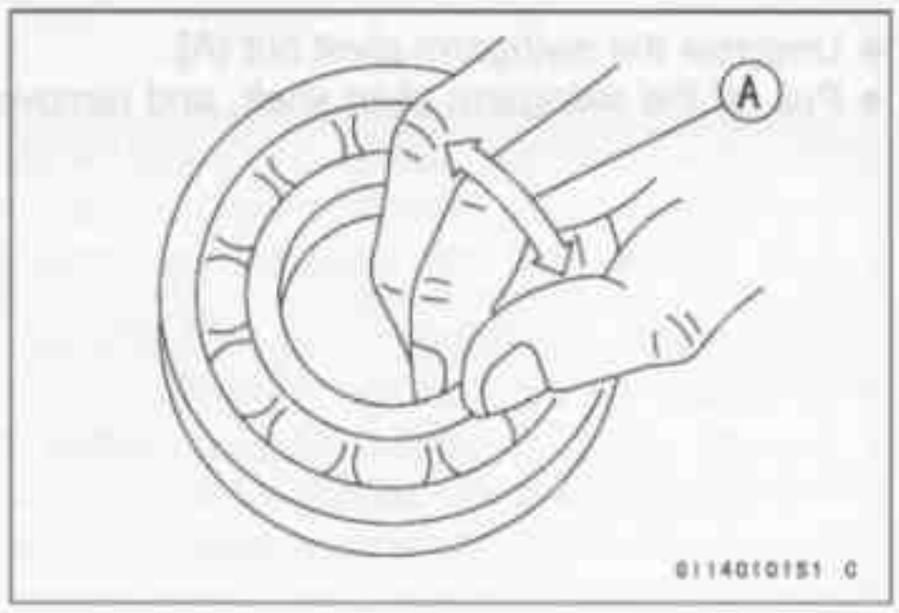
Do not remove the bearings for inspection. Remove may damage them.

- Check the ball bearing.

○ Since the ball bearing is made to extremely close tolerances, the wear must be judged by feel rather than measurement.

- Turn [A] the bearing in the swingarm back and forth while checking for plays, roughness, or binding. If bearing play, roughness, or binding is found, replace the bearing.
- The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing in the swingarm for abrasion, color change, or other damage.

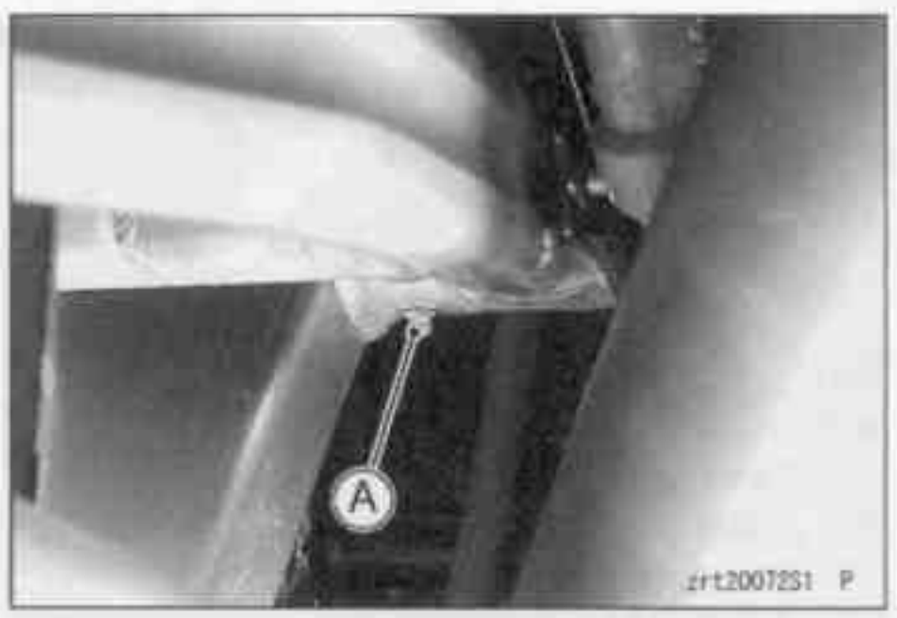
★ If there is any doubt as to the condition of any of the needle bearings or sleeve, replace the sleeve, and needle bearings as a seat.



Swingarm Lubrication

- Lubricate the swing arm pivot with molybdenum disulfide grease through the grease nipple [A] using a grease gun according to the Periodic Maintenance Chart (see General Information chapter). It is normal for a small amount of grease to seep out around the grease seals.

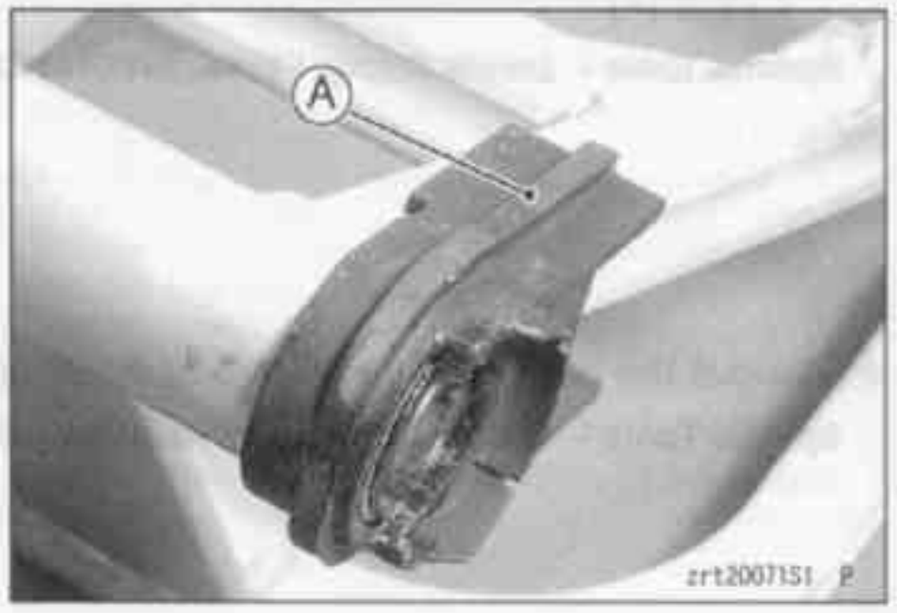
○ If the swing arm pivot is disassembled, wipe all the old grease off the bearings, sleeves, and grease seals, then grease them.



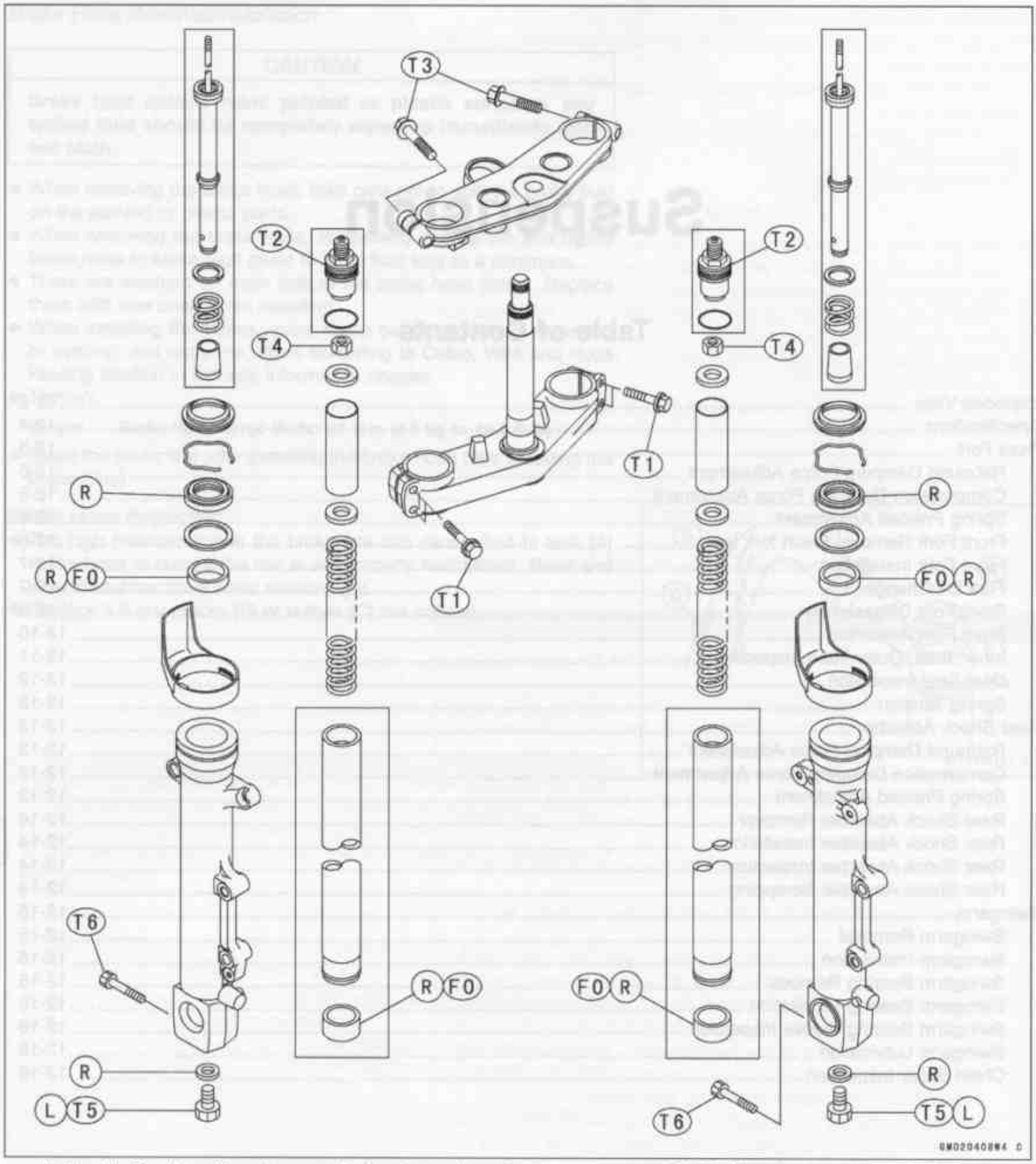
Chain Slider Inspection

- Visually inspect the chain slider [A].

★ Replace the chain slider if it shows any signs of abnormal wear or damage.



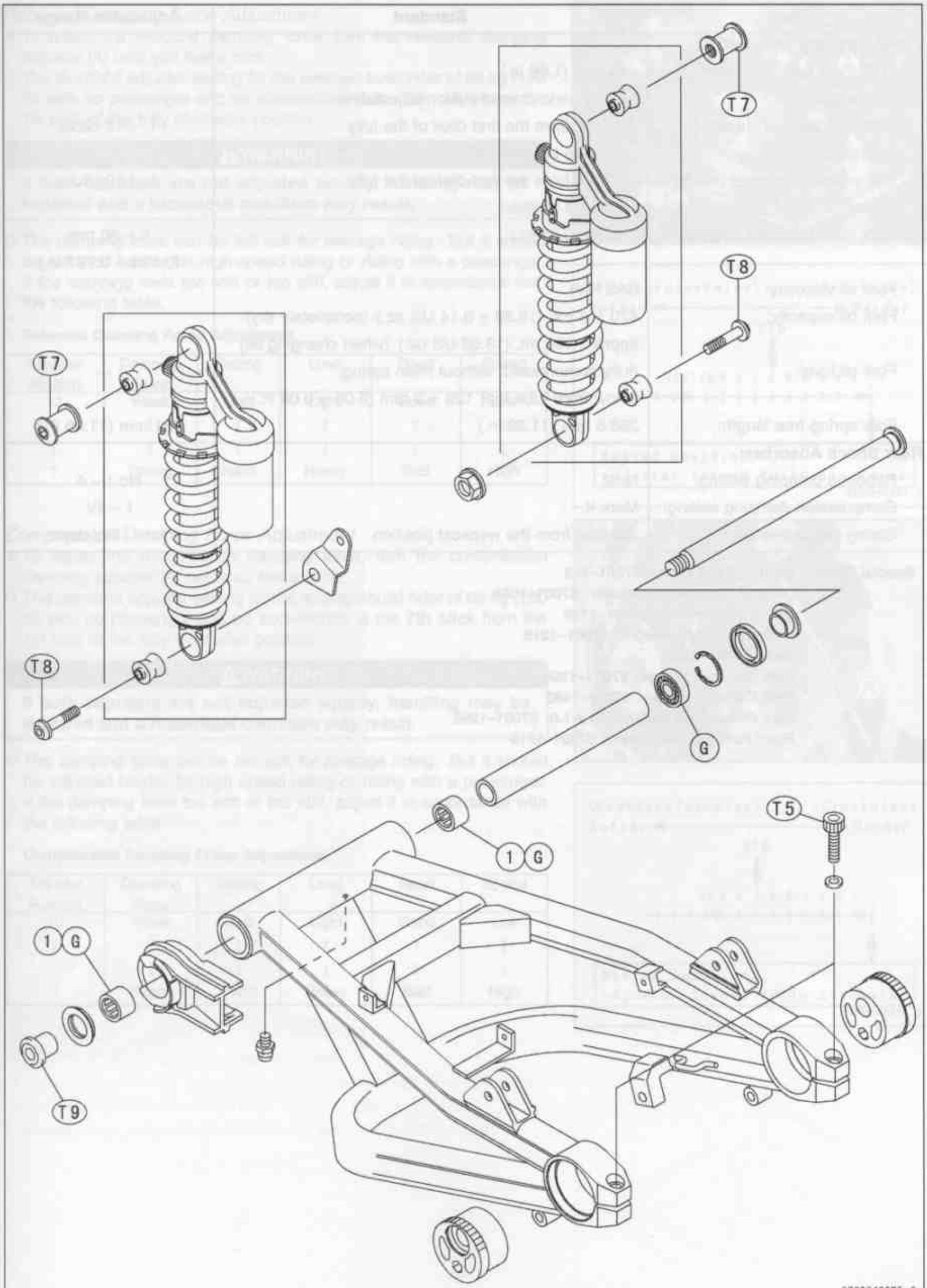
Exploded View



1. Needle Bearing: Face the manufacturer's marks out.
FO: Apply fork oil.
G: Apply high-temperature grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts

T1: 21 N·m (2.1 kg·m, 15.0 ft·lb)
T2: 23 N·m (2.3 kg·m, 16.5 ft·lb)
T3: 29 N·m (3.0 kg·m, 22 ft·lb)
T4: 15 N·m (1.5 kg·m, 11.0 ft·lb)
T5: 39 N·m (4.0 kg·m, 29 ft·lb)
T6: 20 N·m (2.0 kg·m, 14.5 ft·lb)
T7: 59 N·m (6.0 kg·m, 44 ft·lb)
T8: 34 N·m (3.5 kg·m, 25 ft·lb)
T9: 98 N·m (10 kg·m, 72 ft·lb)

Exploded View



12-4 SUSPENSION

Specifications

Item	Standard	Adjustable Range
Front Fork (per one unit):		
Fork inner tube diameter:	ϕ43 mm (1.69 in.)	- - -
Air pressure	Atmospheric pressure (Non-adjustable)	
Rebound damper (upper) setting:	6th click from the first click of the fully clockwise position	1 ~ 12 clicks
Compression damper (lower) setting:	7th click from the first click of the fully clockwise position	1 ~ 10 clicks
Fork spring preload length:	14 mm (0.55 in.)	5 ~ 20 mm (0.196 ~ 0.787 in.)
Fork oil viscosity:	SAE10W	- - -
Fork oil capacity:	470 ± 4 mL (15.89 ± 0.14 US oz.) (completely dry)	- - -
	approx. 400 mL (13.52 US oz.) (when changing oil)	- - -
Fork oil level:	(fully compressed, without main spring, below from tube top) 129 ± 2 mm (5.08 ± 0.08 in.)	- - -
Fork spring free length:	286.8 mm (11.29 in.)	281 mm (11.06 in.)
Rear Shock Absorber:		
Rebound damping setting:	No.2	No.1~ 4
Compression damping setting:	Mark II	I ~ IV
Spring preload setting:	2rd step from the weakest position	1st ~ 5th steps

Special Tools - Inside Circlip Pliers: 57001–143
Oil Seal & Bearing Remover: 57001–1058
Bearing Driver Set: 57001–1129
Fork Outer Tube Weight: 57001–1218
Jack: 57001–1238
Fork Oil Level Gauge: 57001–1290
Fork Cylinder Holder: 57001–1493
Fork Piston Rod Puller, M10 x 1.0: 57001–1298
Front Fork Oil Seal Driver: 57001–1219

Front Fork

Rebound Damping Force Adjustment

- To adjust the rebound damping force, turn the rebound damping adjuster [A] until you feel a click.

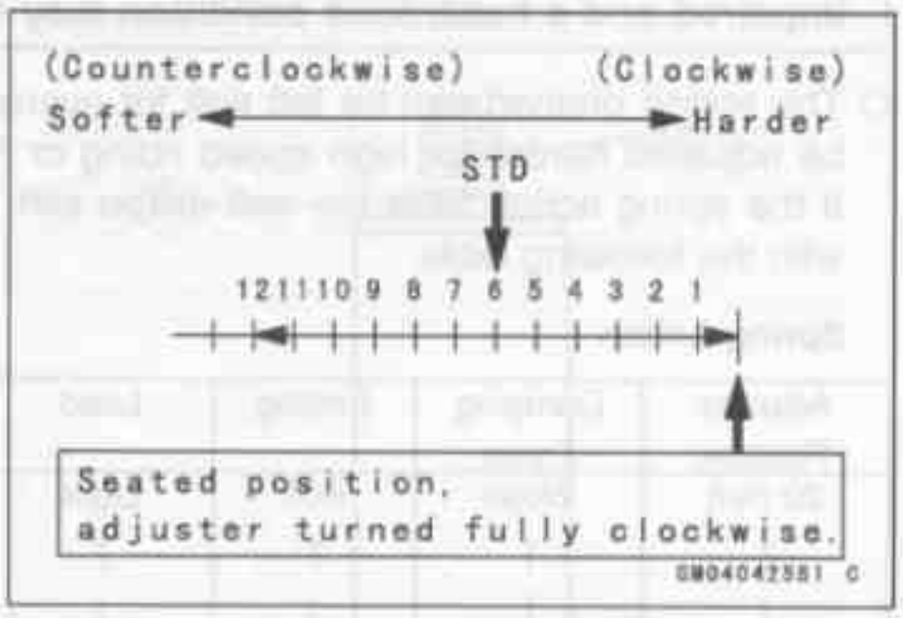
○ The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is the **6th click** from the 1st click of the fully clockwise position.

⚠ WARNING

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

○ The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table.





Rebound Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
12	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
1	Strong	Hard	Heavy	Bad	High

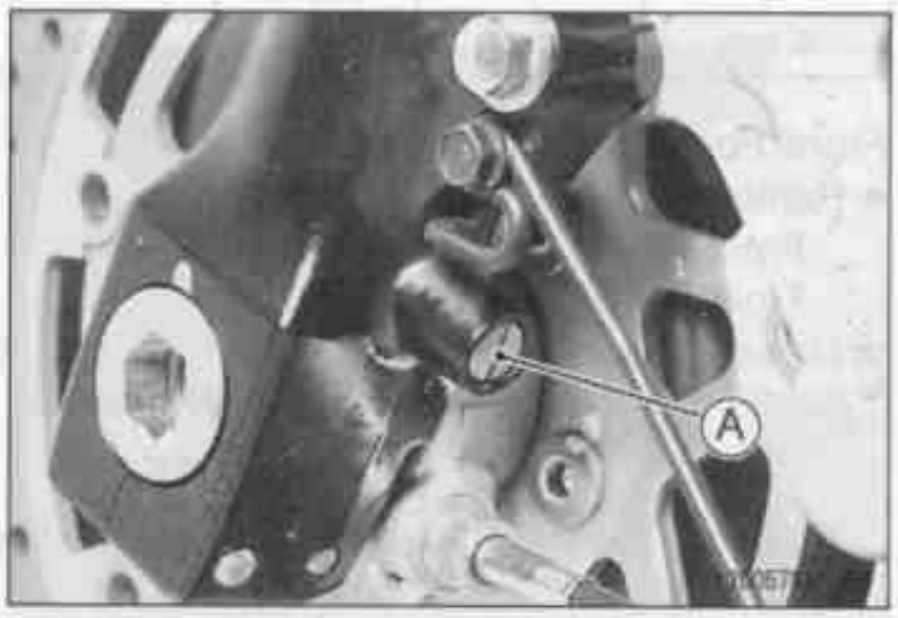
Compression Damping Force Adjustment

- To adjust the compression damping force, turn the compression damping adjuster [A] until you feel a click.

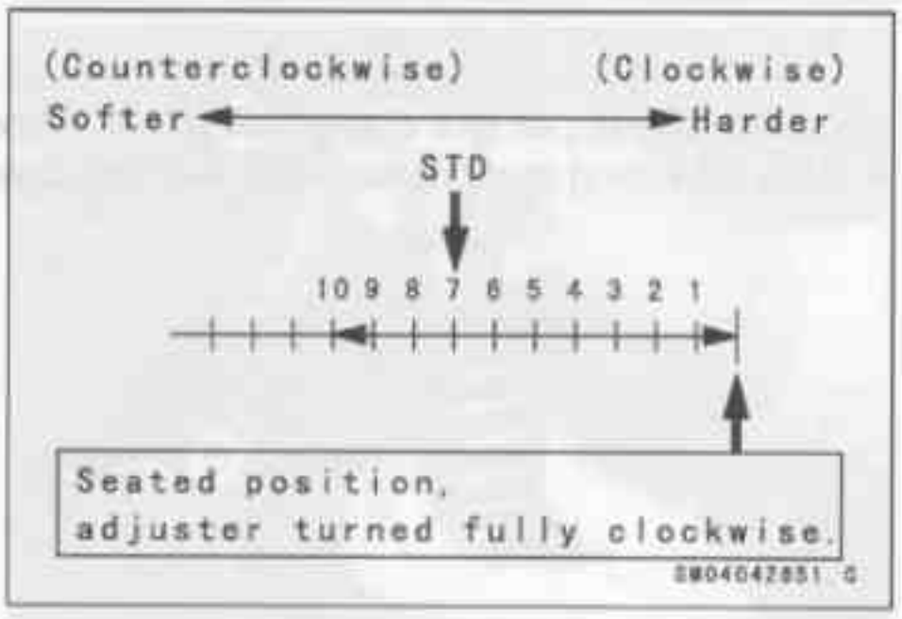
○ The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is the **7th click** from the 1st click of the fully clockwise position.

⚠ WARNING

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



○ The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table.



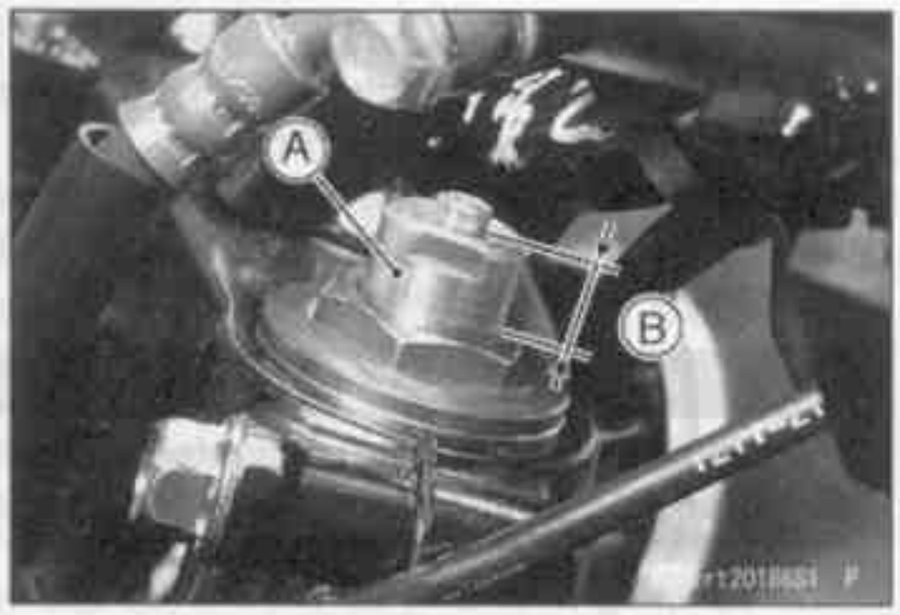
Compression Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
10	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
1	Strong	Hard	Heavy	Bad	High

Front Fork

Spring Preload Adjustment

- Turn the spring preload adjuster [A] to change spring preload setting.
- The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is the 14 mm [B] from top as shown.



Adjuster Protrusion (from top)

Standard:	**14 mm (0.55 in.)**
Service Limit:	**5 ~ 20 mm (0.196 ~ 0.787 in.)**

⚠WARNING

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

- The spring preload can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

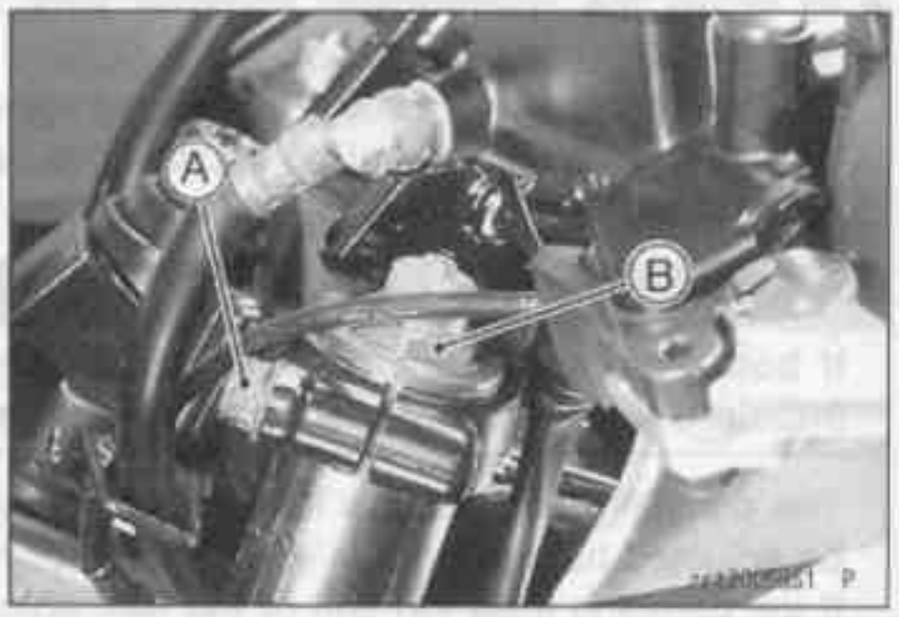
Spring Action

Adjuster Position	Dumping Force	Setting	Load	Road	Speed
20 mm	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
5 mm	Strong	Hard	Heavy	Bad	High

Front Fork Removal (each fork leg)

- Remove:
  - Front Wheel (see Wheels/Tires chapter)
  - Front Fender (see Frame chapter)

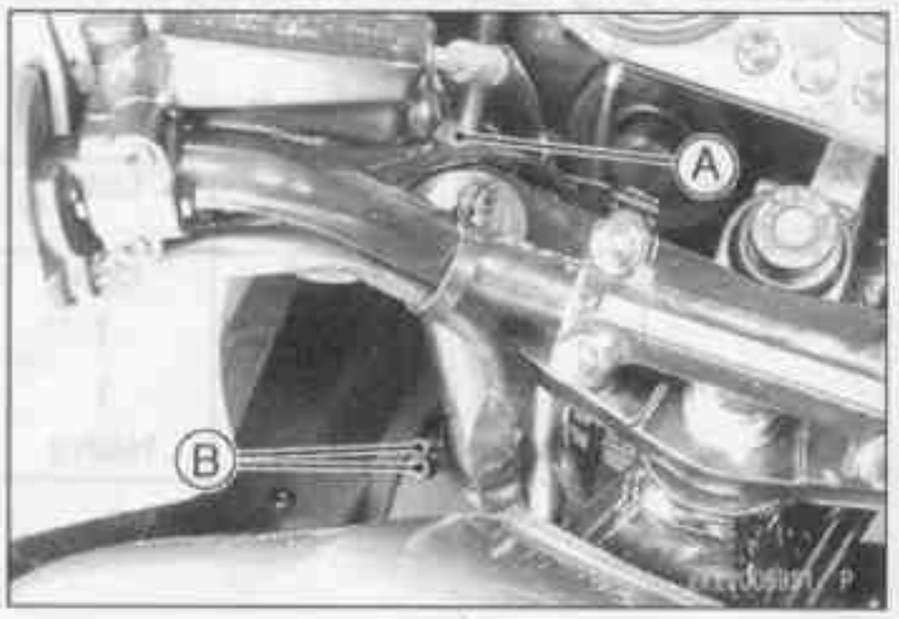
★Loosen the upper fork clamp bolt [A], and fork top plug [B] beforehand if the fork leg is to be disassembled.



NOTE

- *Loosen the top plug after loosening the upper fork clamp bolt.*

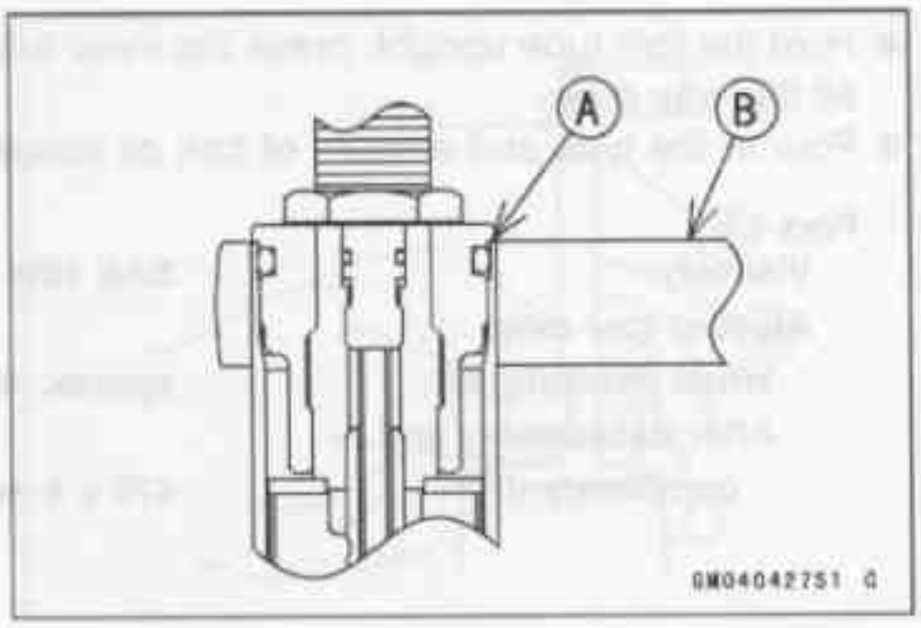
- Loosen the upper fork clamp bolt [A], and lower fork clamp bolts [B].
- With a twisting motion, work the fork leg down and out.



Front Fork

Front Fork Installation

- Install the fork so that the top end [A] of the inner tube is flush with the upper surface [B] of the steering stem head.



- Tighten:

Torque - Lower Front Fork Clamp Bolt: 21 N·m (2.1 kg·m, 15.0 ft·lb)
Front Fork Top Plug: 23 N·m (2.3 kg·m, 16.5 ft·lb)

NOTE

○ *Tighten the top plug before tightening the upper fork clamp bolt.*

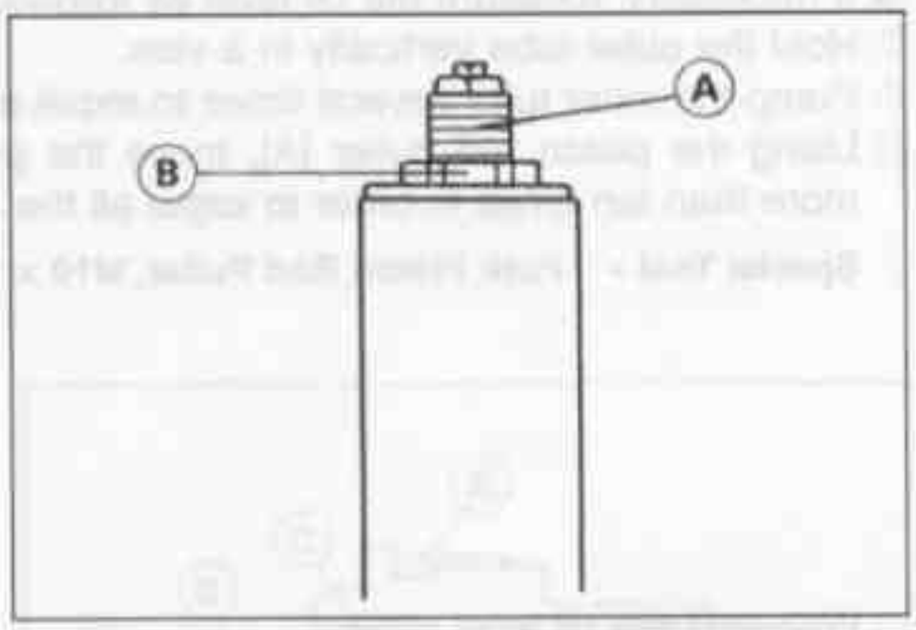
- Tighten:

Torque - Upper Front Fork Clamp Bolt: 29 N·m (3.0 kg·m, 22 ft·lb)

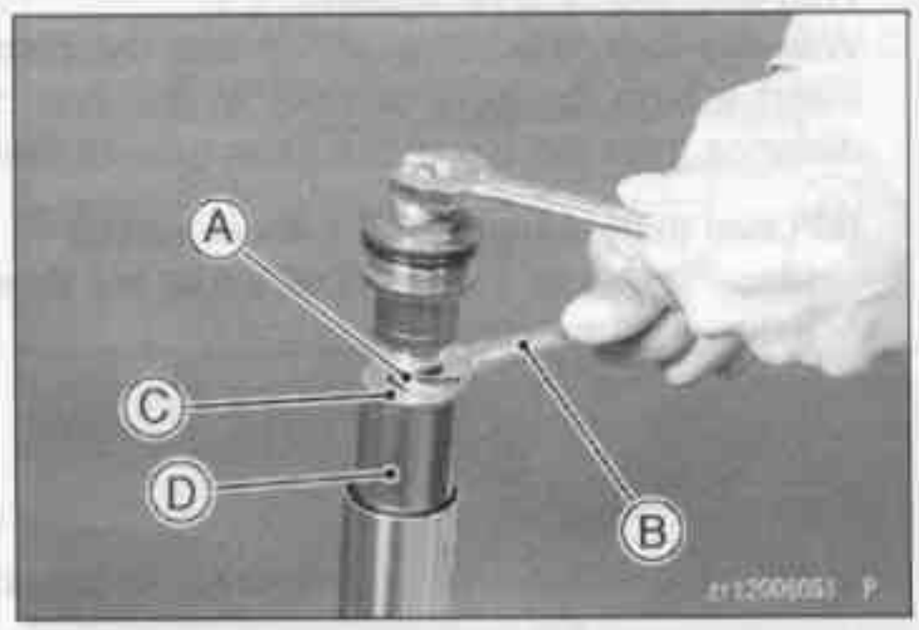
- Adjust the spring preload and the damping force.

Fork Oil Change

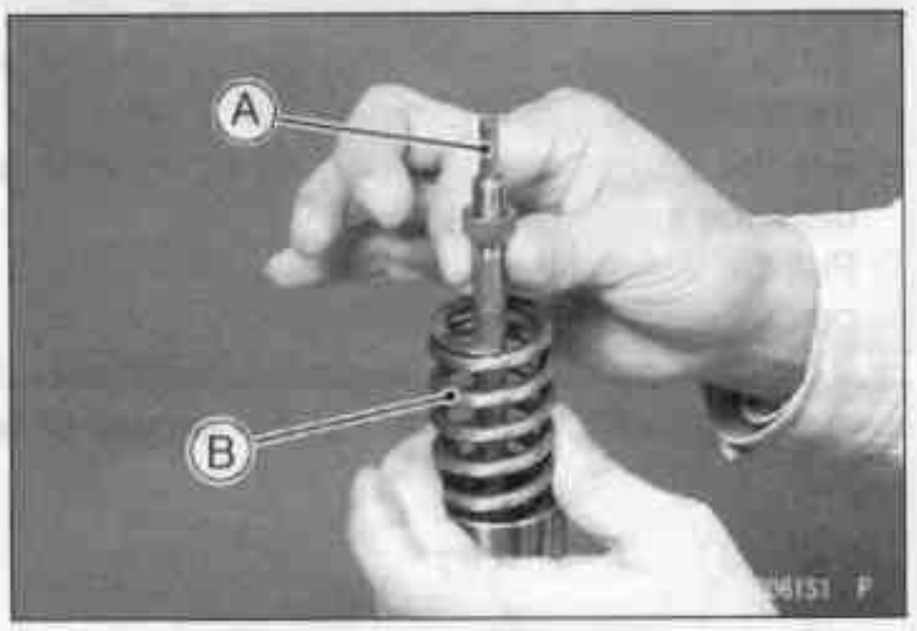
- Remove the front fork (see Front Fork Removal).
- Turn the spring preload adjuster [A] counterclockwise until the fully position.
- Remove the top plug [B] from the inner tube.



- Holding the piston rod nut [A] with a wrench [B], remove the top plug from the piston rod.
- Remove:
  Washer [C]
  Spacer [D]

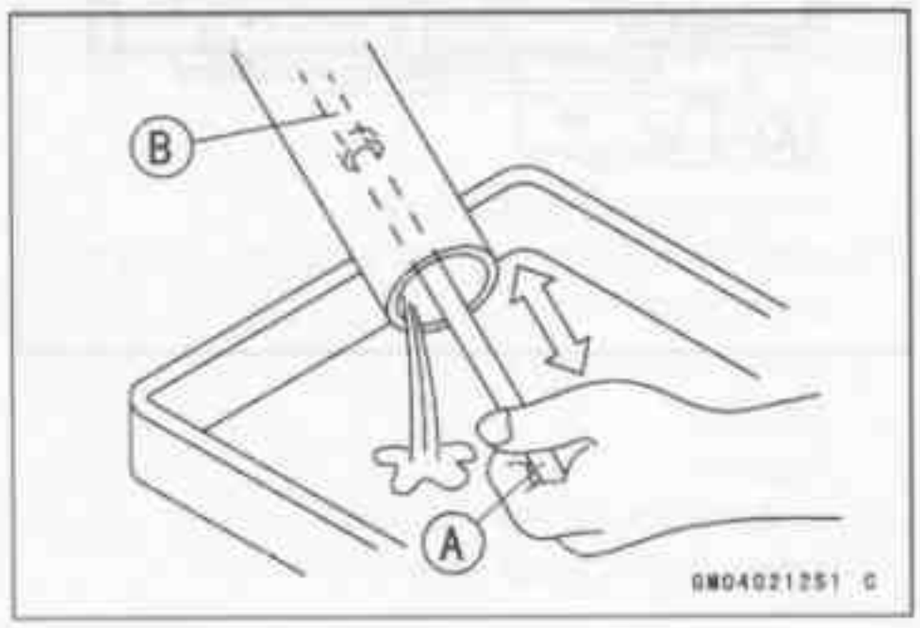


- Remove:
  Washer
  Rebound Damping Adjuster Rod [A]
  Fork Spring [B]



- Drain the fork oil into a suitable container.
○ Using the piston rod puller [A], pump the piston rod [B] up and down at least ten times to expel the oil from the fork.

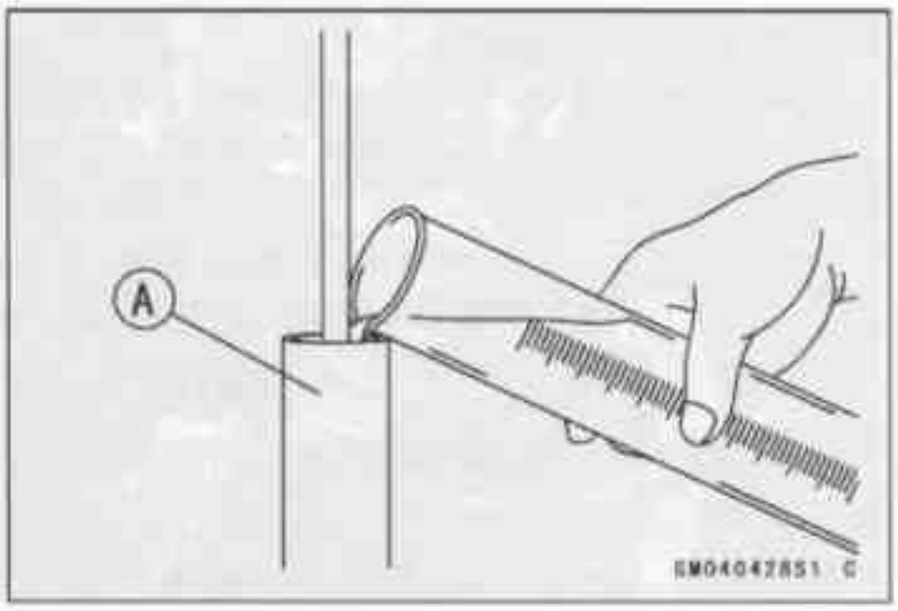
Special Tool - Fork Piston Rod Puller, M10 × 1.0: 57001–1298



Front Fork

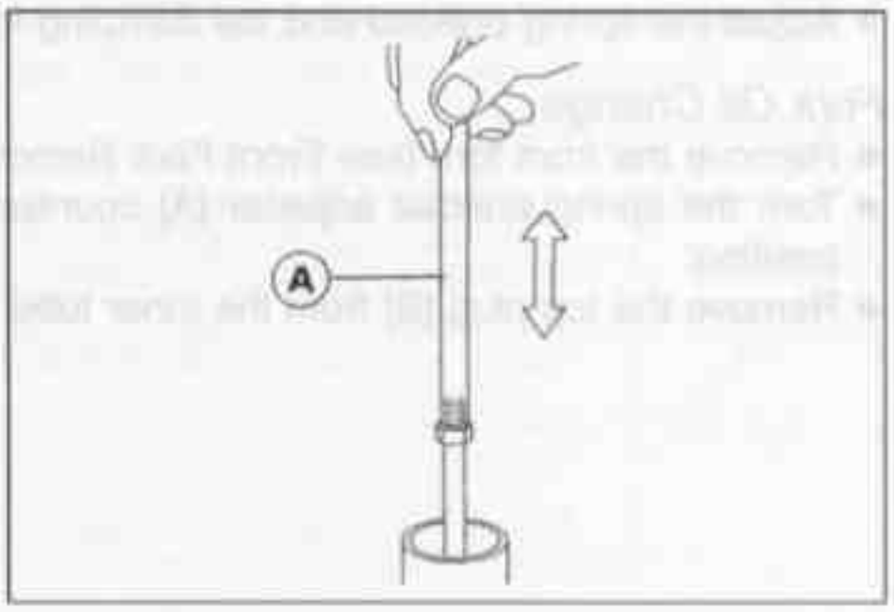
- Hold the fork tube upright, press the inner tube [A] and the piston rod all the way down.
- Pour in the type and amount of fork oil specified.

Fork Oil
Viscosiy: **SAE 10W**
Amount (per side)
When changing oil: **approx. 400 mL (13.52 US oz.)**
After dsassembly and completely dry: **470 ± 4 mL (15.89 ± 0.14 US oz.)**



★ If necessary, measure the oil level as follows.
○ Hold the outer tube vertically in a vise.
○ Pump the inner tube several times to expel air bubbles.
○ Using the piston rod puller [A], move the piston rod up and down more than ten times in order to expel all the air from the fork oil.

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



○ Wait until the oil level settles.
○ With the fork fully compressed and the piston rod fully pushed in, insert a tape measure or rod into the inner tube, and measure the distance from the top of the inner tube of the oil.

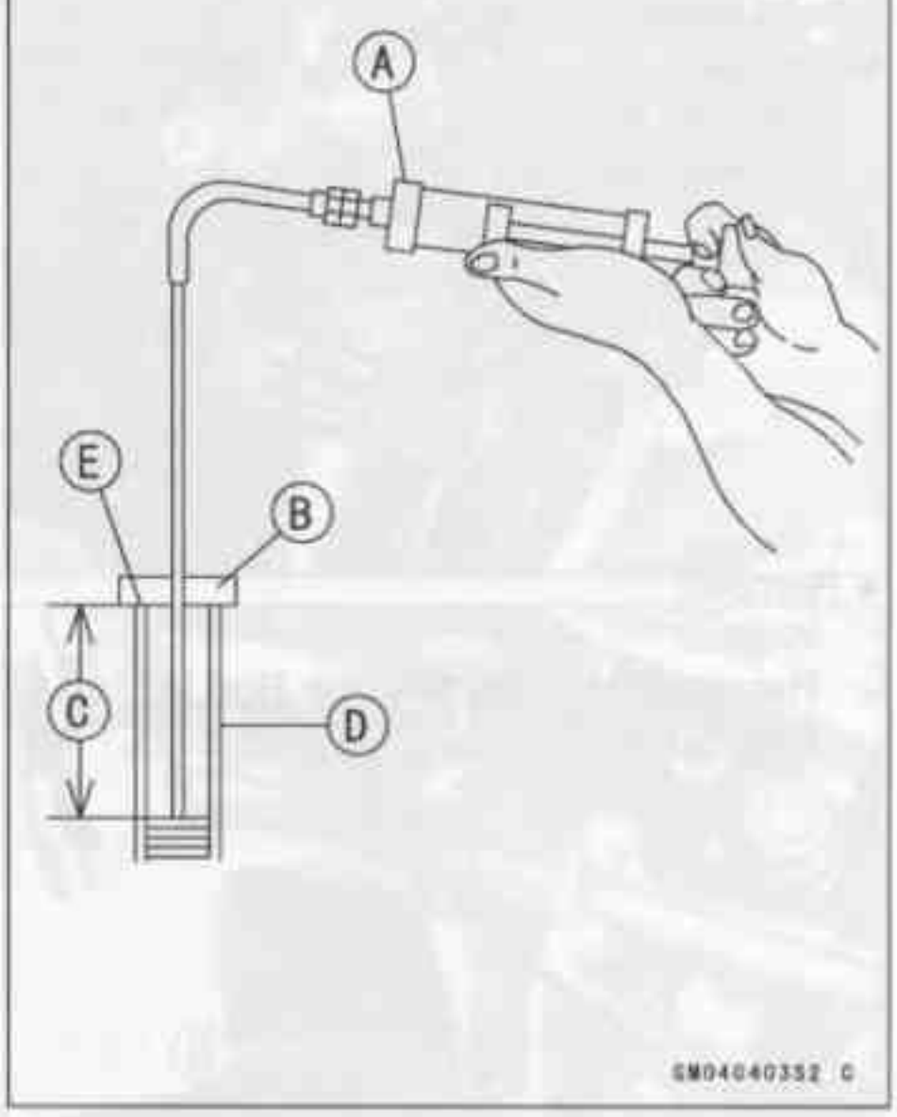
Oil Level (fully compressed, without spring)
Stan-dard: **129 ± 2 mm (5.08 ± 0.08 in.) (from the top of the inner tube)**

NOTE

○ *Fork oil level may also be measured using the fork oil level gauge.*

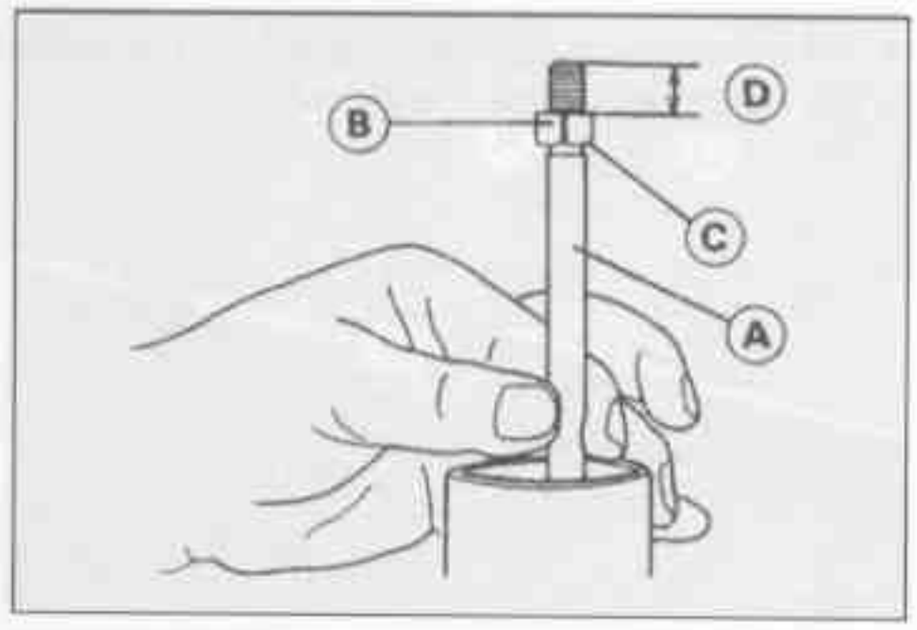
Special Tool - Fork Oil Lever Gauge: 57001–1290 [A]

○ With the fork fully compressed and without fork spring, insert the gauge tube into the inner tube [D] and position the stopper across the top end [E] of the inner tube.
○ Set the gauge stopper [B] so that its lower side shows the oil level distance specified [C].
○ Pull the handle slowly to pump out the excess oil until the oil no longer comes out.
★ If no oil is pumped out, there is insufficient oil in the inner tube. Pour in enough oil, then pump out the excess oil as shown above.



Front Fork

- Pull the piston rod [A] up above the inner tube top.
- Screw the rod nut [B] on to the piston rod with the chamfered side [C] down.
  - Check that the visible thread length is at least 11 mm [D].

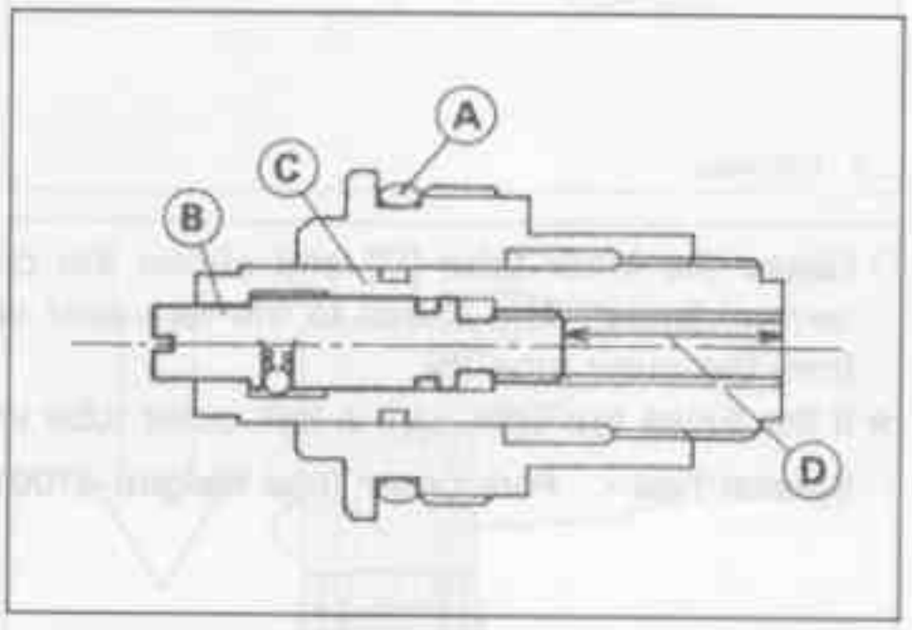


- Insert the rebound damping adjuster rod into the piston rod.
- Screw the fork piston rod puller onto the end of the rod.

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

- Install:
  Washer
  Spacer
  Washer

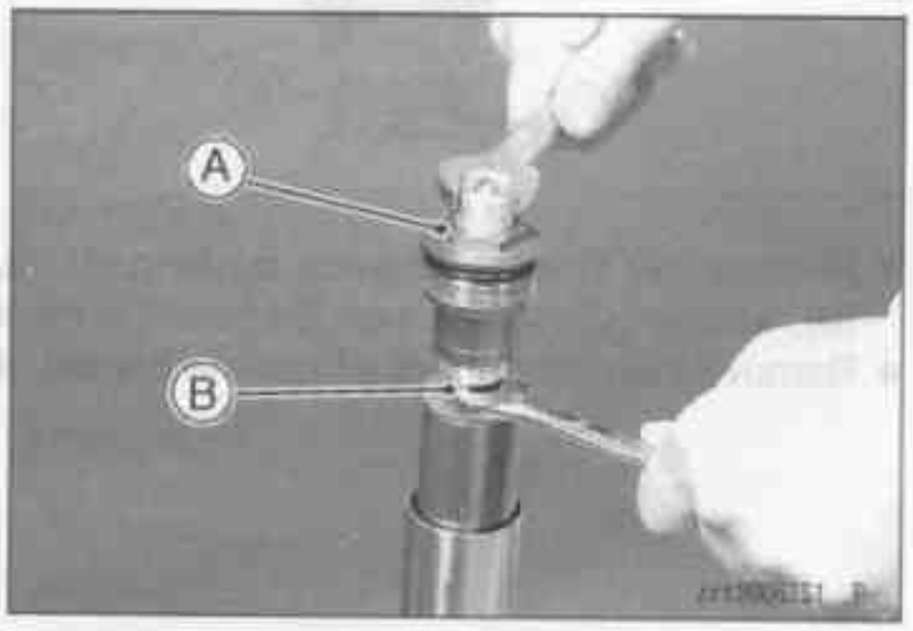
- Check the O-ring [A] on the top plug and replace it with a new one if damaged.
- Screw in the damper adjuster [B] of the top plug so that the distance between the adjuster bottom and the spring adjuster [C] end is 25 mm [D].



- Holding the top plug [A] with a wrench, tighten the piston rod nut [B] against the top plug.

Torque - Piston Rod Nut: 15 N·m (1.5 kg·m, 11.0 ft·lb)

- Raise the inner tube and screw the top plug into it.
- Install the front fork (see Front Fork Installation).

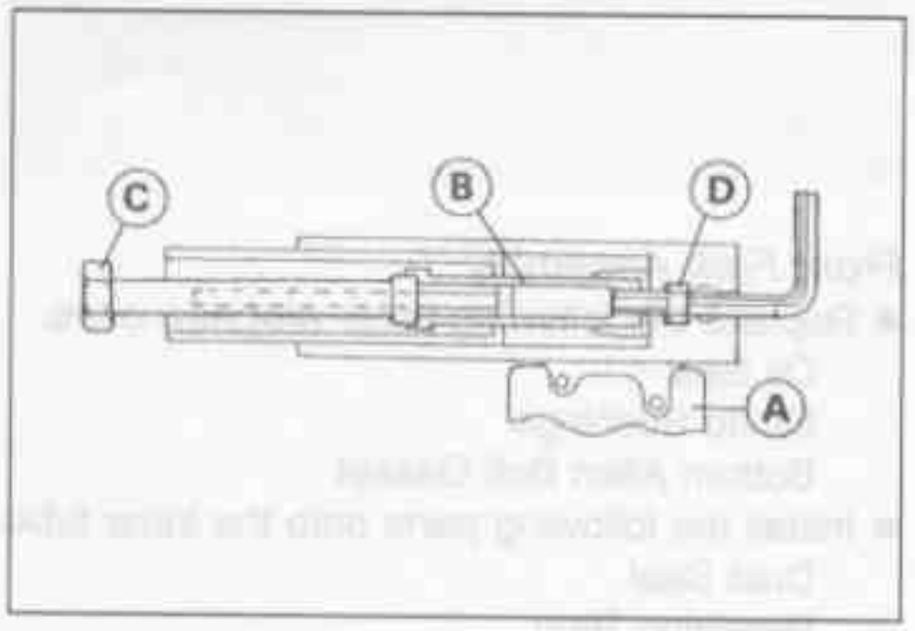


Front Fork Disassembly

- Remove the front fork (see Front Fork Removal).
- Drain the fork oil (see Fork Oil Change).
- Hold the front fork in a vise [A].
- Stop the cylinder [B] from turning by using the fork cylinder holder [C].

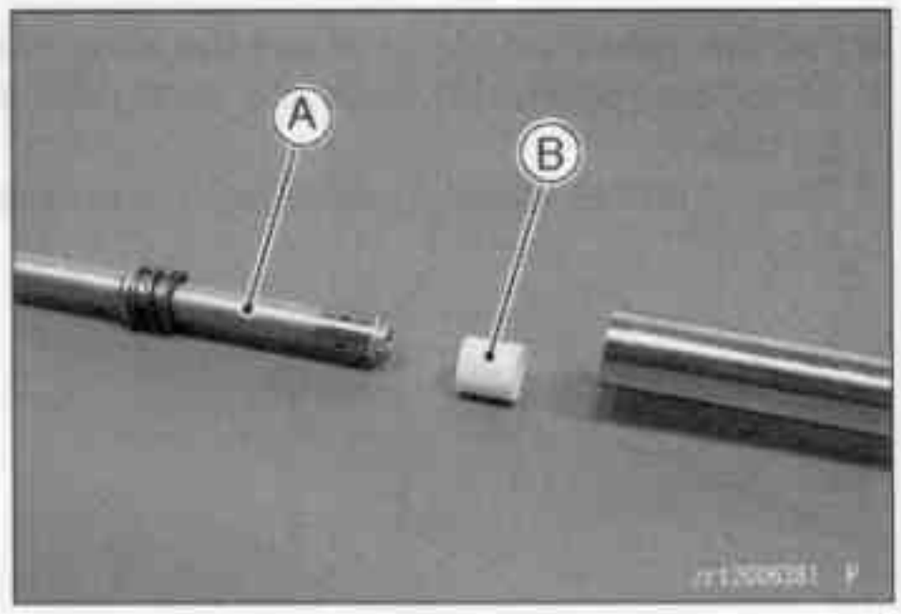
Special Tool - Fork Cylinder Holder: 57001–1493

- Unscrew the Allen bolt [D], then take the bolt and gasket out of the bottom of the outer tube.

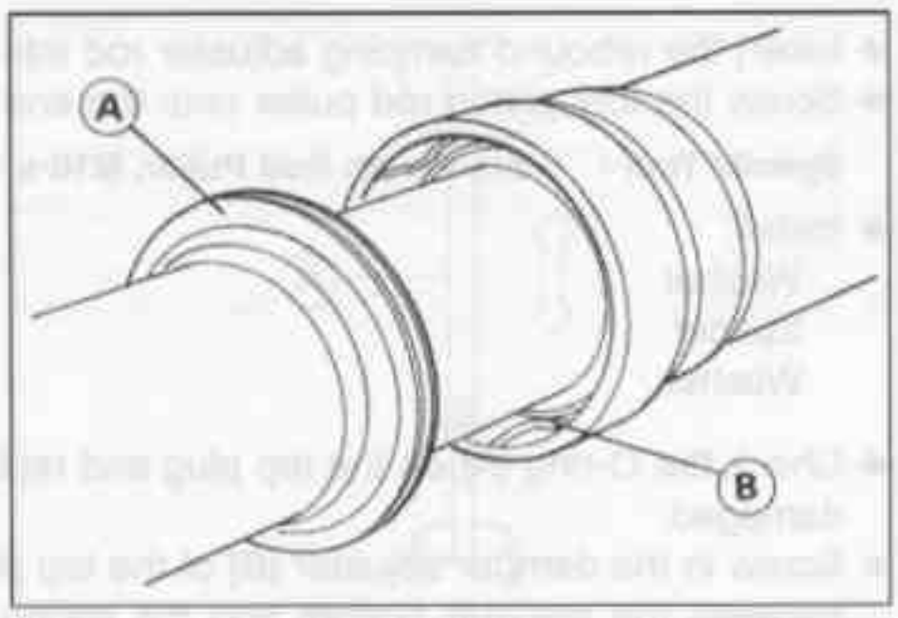


Front Fork

- Take the piston cylinder unit [A] and cylinder base [B].
  - Do not disassemble the cylinder unit.



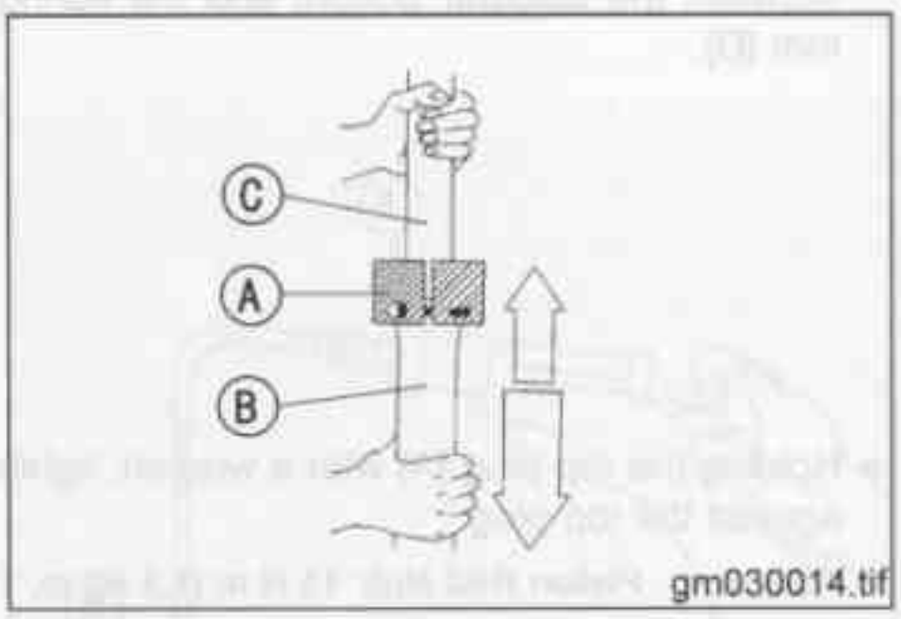
- Separate the inner tube from the outer tube as follows.
  - Slide up the dust seal [A].
  - Remove the retaining ring [B] from the outer tube.



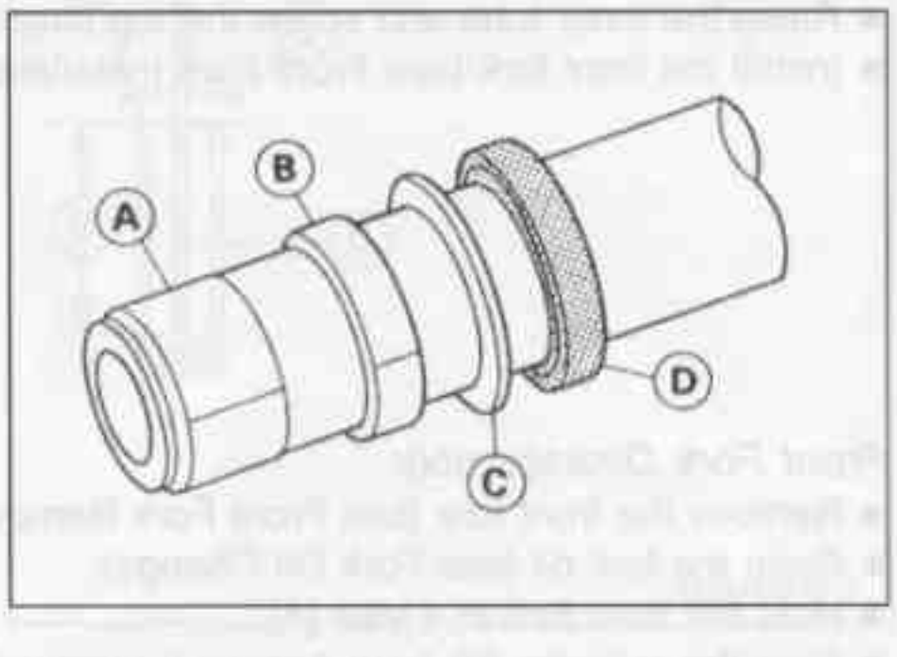
  - Grasp the inner tube [C] and stroke the outer tube up and down several times. The shock to the fork seal separates the inner tube from the outer tube [B].

★ If the tubes are tight, use a fork outer tube weight [A].

Special Tool - Fork Outer Tube Weight: 57001–1218



- Remove the inner tube guide bushing [A], outer tube guide bushing [B], washer [C] and oil seal [D] from the inner tube.
- Remove the cylinder base from the bottom of the outer tube.

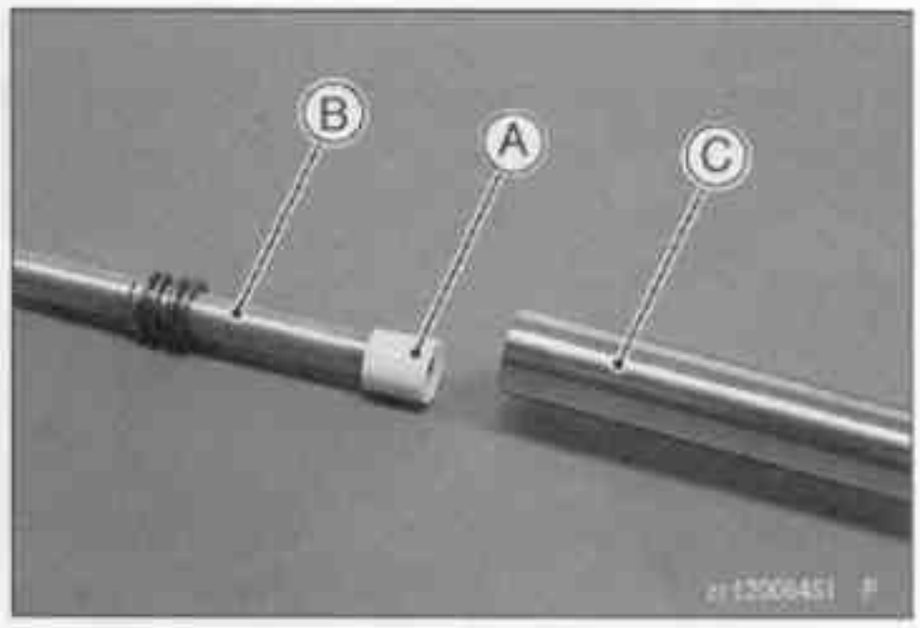


Front Fork Assembly

- Replace the following parts with new ones.
  - Oil Seal
  - Guide Bushings
  - Bottom Allen Bolt Gasket
- Install the following parts onto the inner tube.
  - Dust Seal
  - Retaining Ring
  - Oil Seal
  - Washer
  - Outer Tube Guide Bushing
  - Inner Tube Guide Bushing

Front Fork

- Install the cylinder base [A] on the cylinder unit.
- Insert the cylinder unit [B] into the inner tube [C].

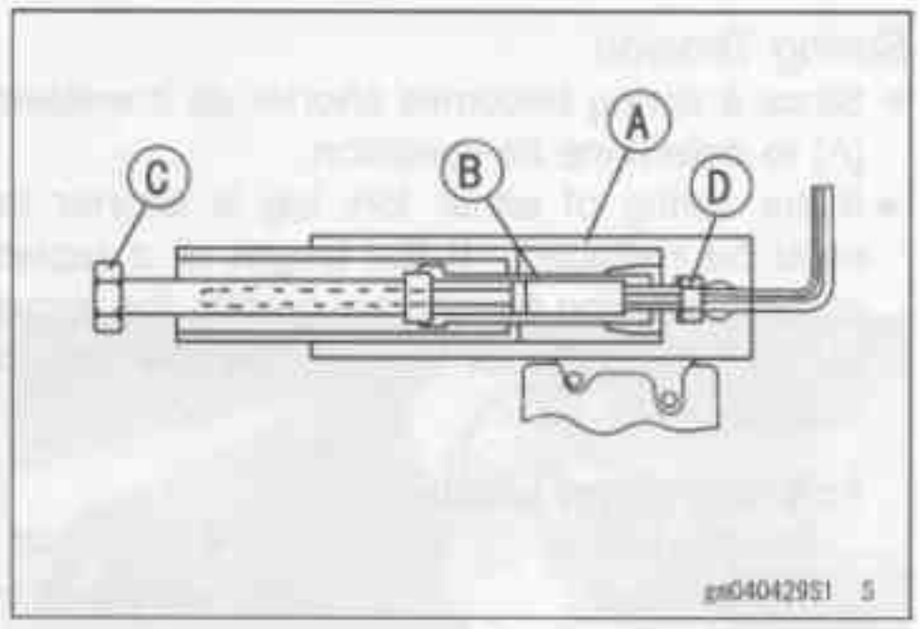


- Insert the inner tube, cylinder unit, cylinder base as a set into the outer tube [A].
- Replace the bottom Allen bolt gasket with a new one.
- Stop the cylinder [B] from turning by using the fork cylinder holder [C].

Special Tool - Fork Cylinder Holder: 57001–1493

- Apply a non-permanent locking agent to the Allen bolt [D] and tighten it.

Torque - Front Fork Bottom Allen Bolt: 39 N·m (4.0 kg·m, 29 ft·lb)

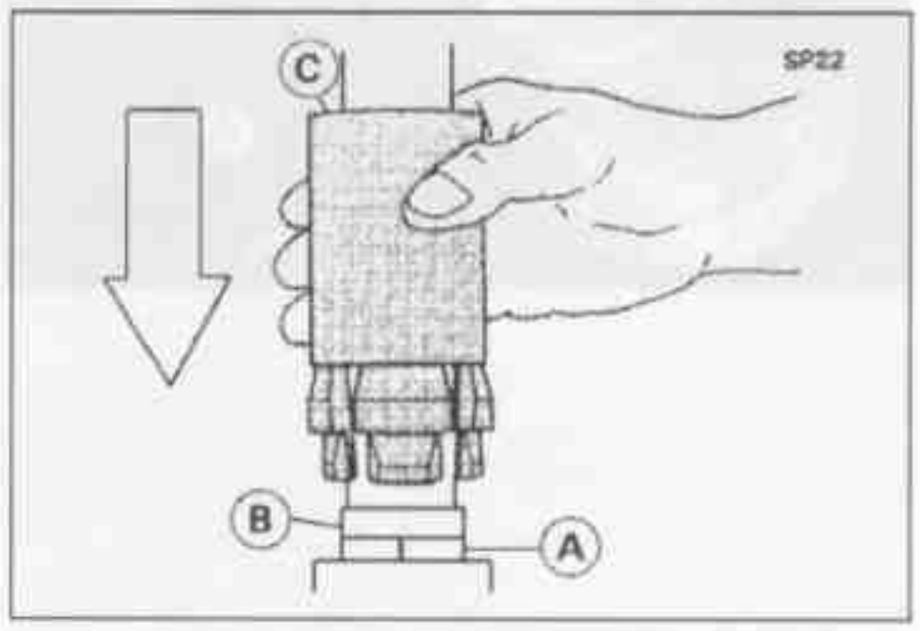


- Fit the new outer guide bush [A] into the outer tube.

NOTE

○ *When assembling the new outer tube guide bushing, hold the used guide bushing [B] against the new bushing and tap the used guide bushing with the fork oil seal driver [C] until it stops.*

Special Tool - Front Fork Oil Seal Driver: 57001–1219



- After installing the washer, install the oil seal by using the fork oil seal driver.
- Install the retaining ring and dust seal by hand.
- Pour in the specified type of oil (see Fork Oil Change).

Inner Tube, Outer Tube Inspection

- Visually inspect the inner tube and repair any damage.
- Nick 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 tune 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.

- Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check smooth operation.

★ If you feel binding or catching, the inner and outer tubes must be replaced.

⚠ WARNING

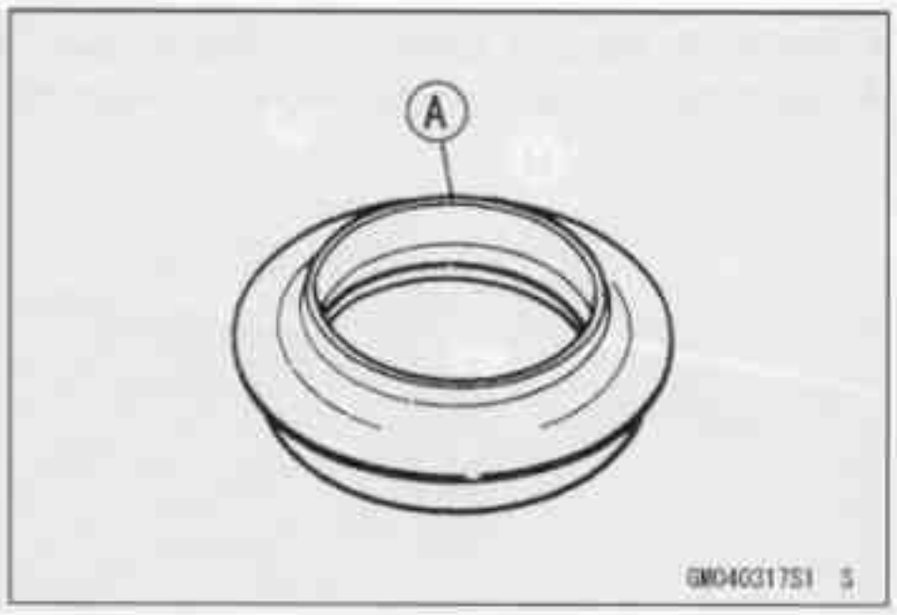
A straightened inner or outer fork tube may fall in use, possibly causing an accident. Replace a badly bent or damaged inner or outer tube and inspect the other tube carefully before reusing it.

Front Fork

Dust Seal Inspection

- Inspect the dust seal [A] for any signs of deterioration or damage.

★ Replace it if necessary.



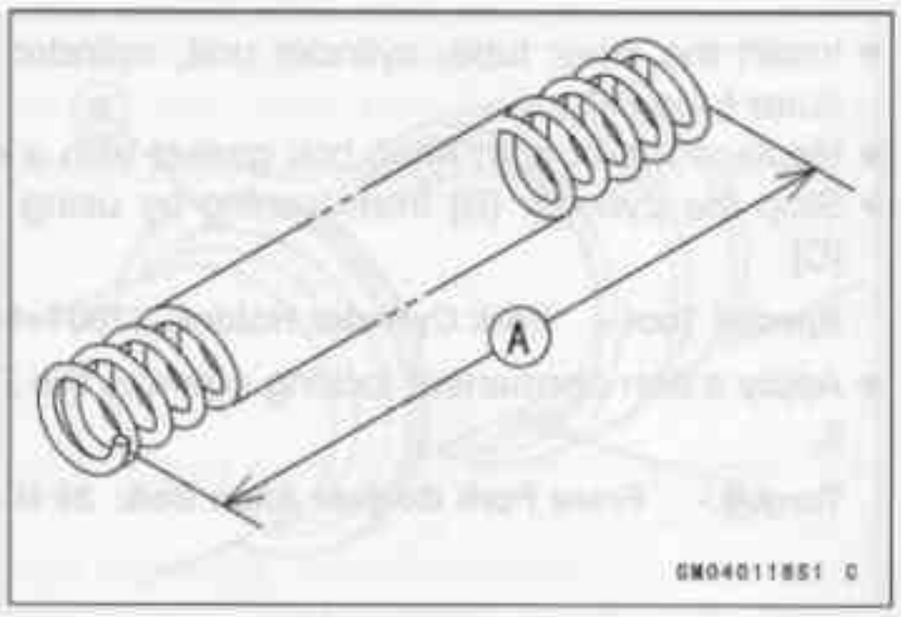
Spring Tension

- Since a spring becomes shorter as it weakens, check its free length [A] to determine its condition.

★ 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:	**286.8 mm (11.29 in.)**
Service Limit:	**281 mm (11.06 in.)**



Rear Shock Absorber

Rebound Damping Force Adjustment

- To adjust the rebound damping force, turn the lower damping adjuster [A] to the desired position until you feel a click.

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



Rebound Damping Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
I	Weak	Soft	Light	Good	Low
II	↑	↑	↑	↑	↑
III	↓	↓	↓	↓	↓
IIII	Strong	Hard	Heavy	Bad	High

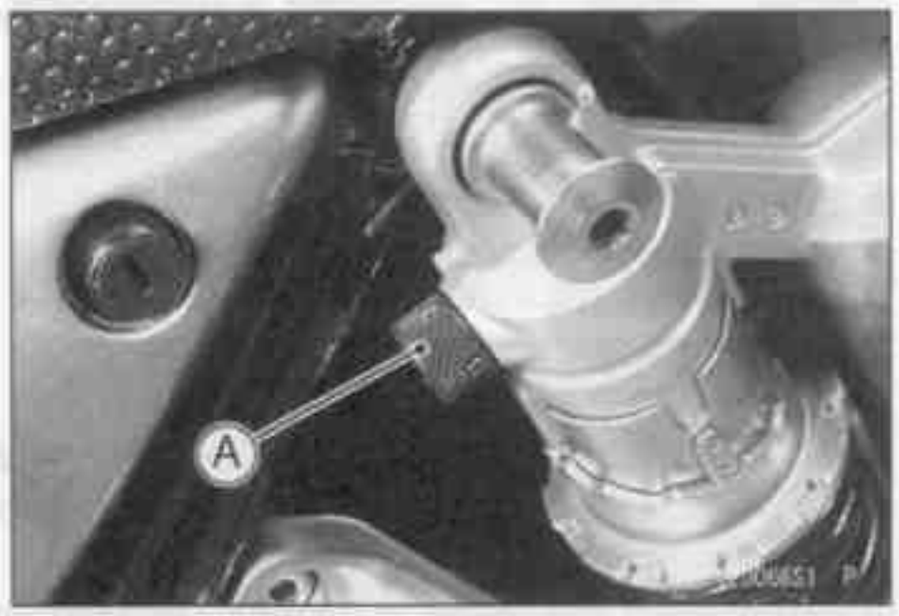
⚠WARNING

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

Compression Damping Force Adjustment

- To adjust the compression damping force, turn the upper damping adjuster [A] to the desired number aligning it with the mark.

○ The standard adjuster setting for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is number 2.



Compression Damping Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
1	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
4	Strong	Hard	Heavy	Bad	High

⚠WARNING

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

Spring Preload Adjustment

- To adjust the spring force, turn the adjuster [A] on each shock absorber to the desired position.

○ The standard adjuster position for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is 2nd step from the weakest position.



Spring Preload Adjustment

Adjust Position	1	2	3	4	5
Spring Tension	→			Stronger	

⚠WARNING

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

Rear Shock Absorber

Rear Shock Absorber Removal

- Raise the rear wheel off the ground.

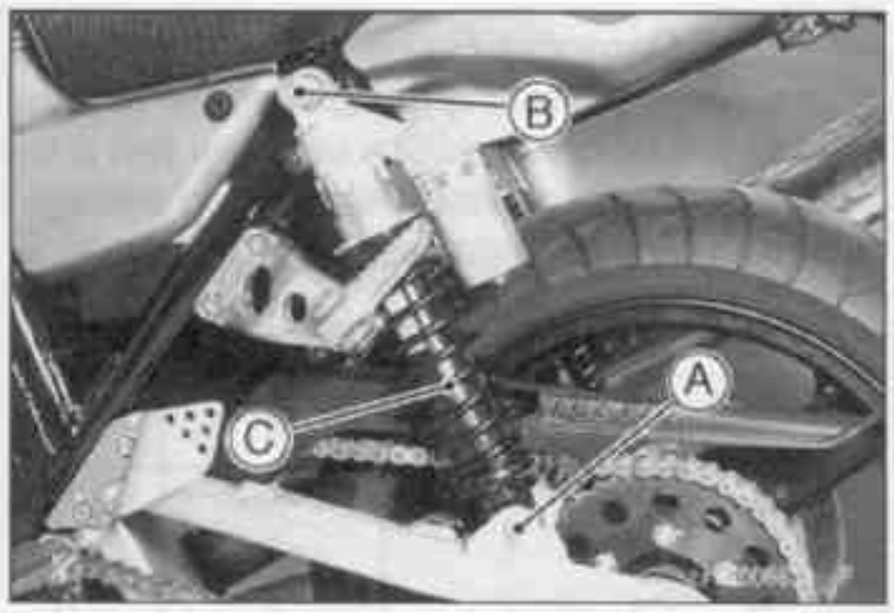
Special Tools - Jack: 57001–1238

- Unscrew the lower mounting bolt [A], and lift the shock absorber lower end out of the mounting bracket.

NOTE

○ *Pull off the mounting bolt while freeing stress on the bolt by lifting the swingarm (rear wheel) slightly.*

- Unscrew the upper mounting nut [B], and remove the rear shock absorber [C].



Rear Shock Absorber Installation

- Fit the shock absorber onto the upper mounting bolt and the lower mounting bracket, and fasten it with the mounting nut and bolt.

Torque - Rear Shock Absorber Upper Mounting Nuts: 59 N·m (6.0 kg·m, 44 ft·lb)
Rear Shock Absorber Lower Mounting Bolts: 34 N·m (3.5 kg·m, 25 ft·lb)

Rear Shock Absorber Inspection

- Remove the rear shock absorbers.
- Visually inspect the following items.
  Smooth Stroke
  Oil Leakage
  Crack or Dent

★If there is any damage to the rear shock absorber, one unit feels weaker than the other, replace both shock absorber as a set.

★Visually inspect the rubber bushings.

★If they show any signs of damage, replace them.

Rear Shock Absorber Scrapping

⚠WARNING

Since the reservoir tank of the rear shock absorber contains nitrogen gas, do not incinerate the reservoir tank without first releasing the gas or it may explode.

- Remove the valve cap [A] and release the nitorogen gas completely from the gas reservoir.

○ Drill the buttom of the reservoir using a 2 ~ 3 mm (0.08 ~ 0.12 in.) drillbit.



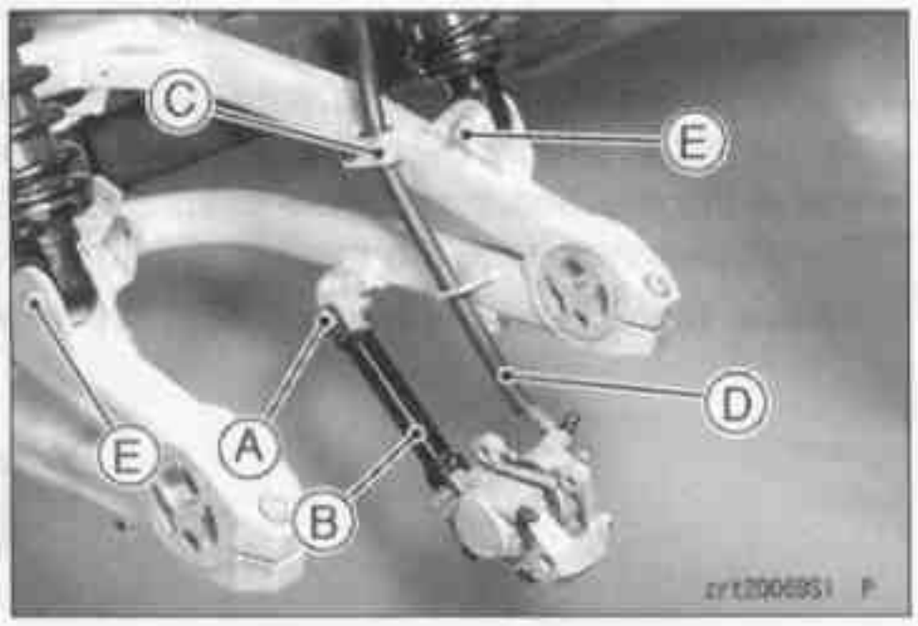
⚠WARNING

Since the high pressure gas is dangerous, do not point the drill toward your face body.

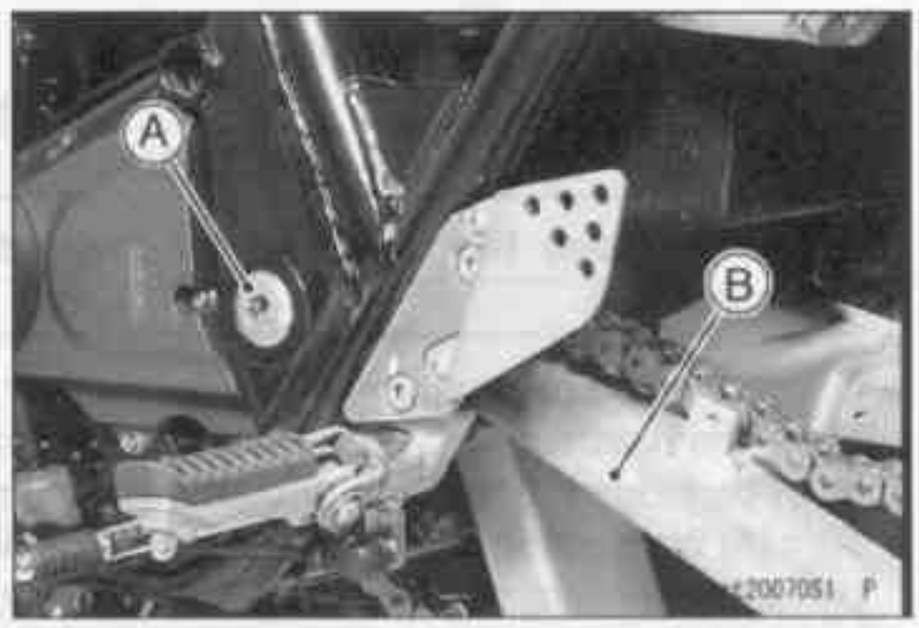
Swingarm

Swingarm Removal

- Remove:
  Chain Cover (see Final Drive chapter)
  Drive Chain (cut, see Final Drive chapter)
  Rear Wheel (see Wheels/Tires chapter)
  Torque Link Front Mounting Bolt [A]
  Rear Brake Caliper with Torque Link [B]
  Brake Hose Clamp [C]
  Rear Brake Hose [D]
  Rear Shock Absorber Lower Mounting Bolts [E]



- Unscrew the swingarm pivot nut [A].
- Pull off the swingarm pivot shaft, and remove the swingarm [B].



Swingarm Installation

- Apply plenty of a high temperature grease to the ball bearing and the inside of the needle bearings, and grease seals.
- Tighten:

Torque - Swingarm Pivot Nut: 98 N·m (10 kg·m, 72 ft·lb)

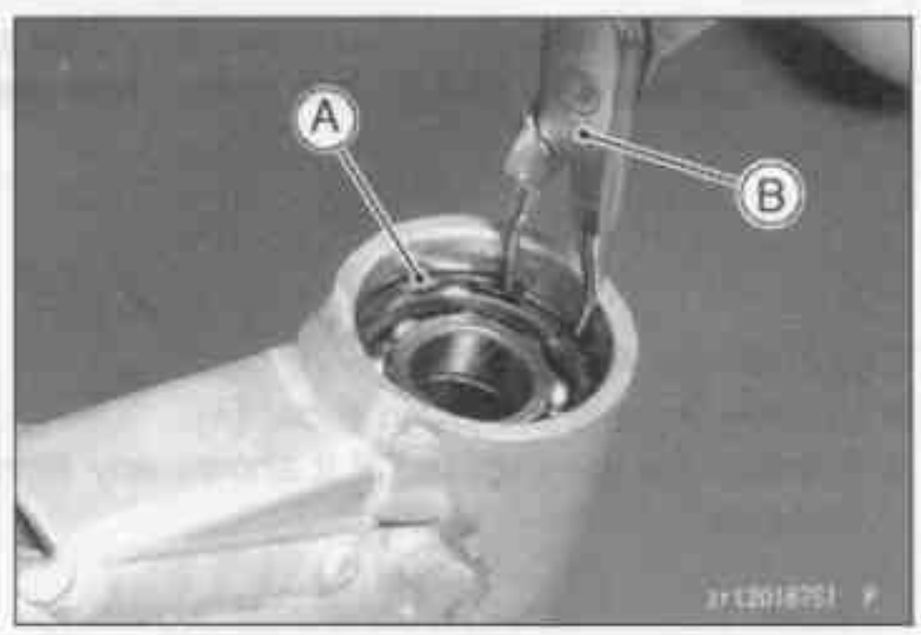
- Move the swingarm up and down [A] to check for abnormal friction.
- Install the other removed parts.



Swingarm Bearing Removal

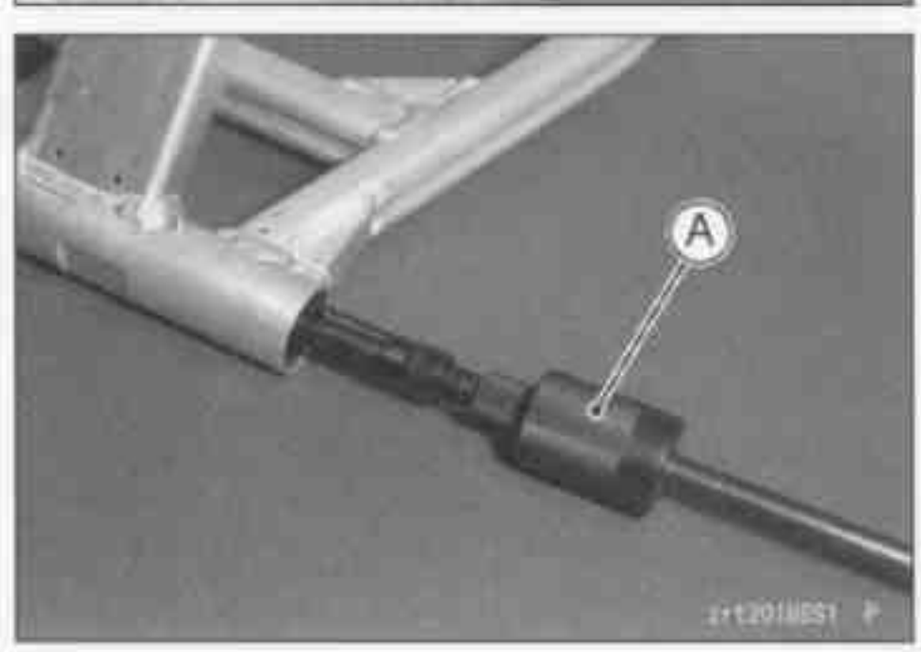
- Remove:
  Swingarm
  Collar
  Grease Seals
  Circlip [A]

Special Tools - Inside Circlip Pliers: 57001–143 [B]



- Remove the ball bearing and needle bearings.

Special Tools - Oil Seal & Bearing Remover: 57001–1058 [A]



Steering

Table of Contents

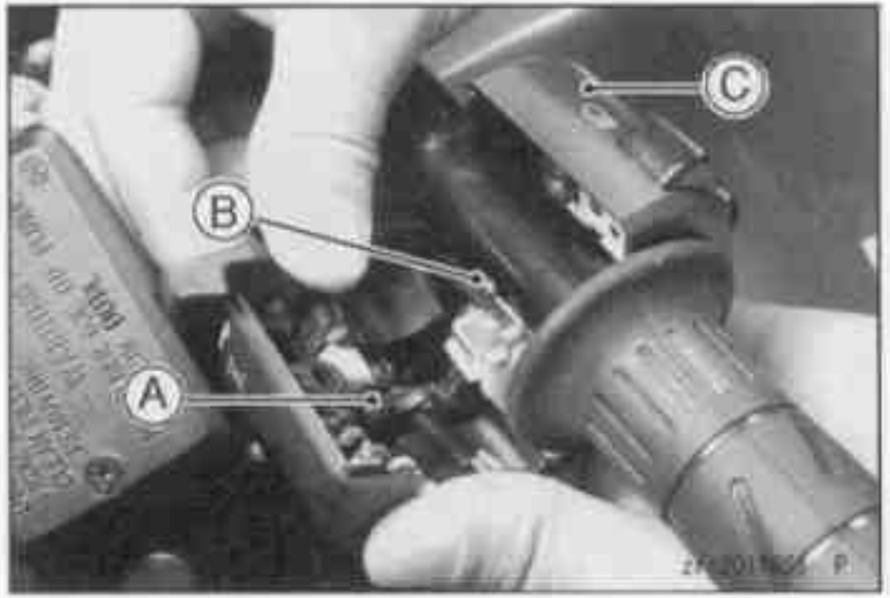
Exploded View 13-2
Steering 13-4
  Steering Inspection 13-4
  Steering Adjustment 13-4
Steering Stem 13-5
  Stem, Stem Bearing Removal 13-5
  Stem, Stem Bearing Installation 13-6
  Stem Bearing Lubrication 13-8
  Steering Stem Warp 13-8
Handlebar 13-9
  Handlebar Removal 13-9
  Handlebar Installation 13-9

Handlebar

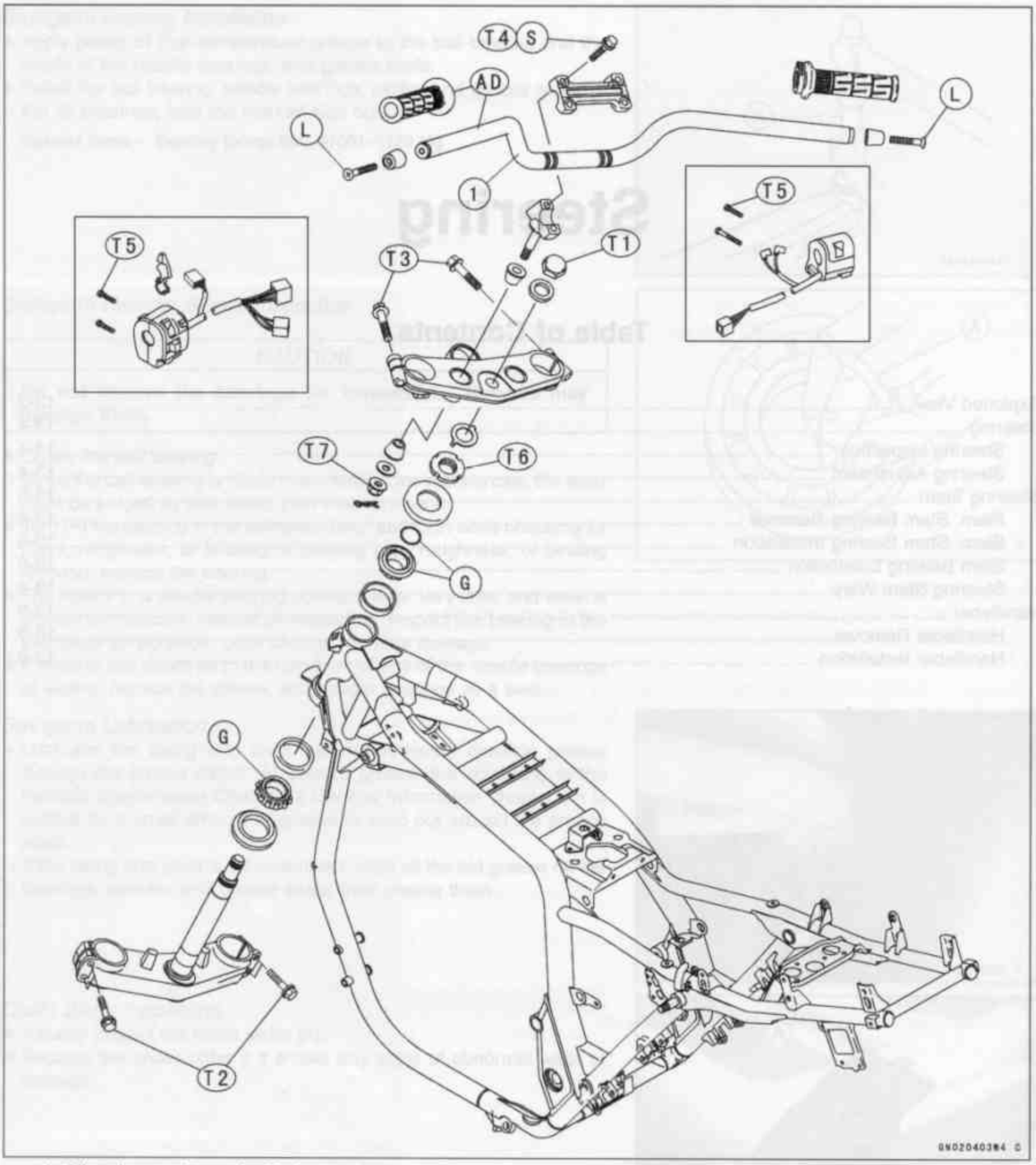
- The front half of the right and left switch housings [A] has a small protrusion [B]. Engage this protrusion with the hole [C] in the handlebar.
- Install the handlebar switch housings.

Torque - Handlebar Switch Housing Screws: 3.4 N·m (0.35 kg·m, 30 in·lb)

- Install the clutch lever holder (see Clutch chapter).
- Install the front master cylinder (see Brake chapter).
- Install the throttle and left grip.
- Apply a non-permanent locking agent to the threads of the weight screws and tighten it.



Exploded View



1. Align the punch mark with the gap between the handlebar lower holder and upper holder.

AD: Apply adhesive.
G: Apply grease.
L: Apply a non-permanent locking agent.
S: Follow the specific tightening sequence.

T1: 44 N·m (4.5 kg·m, 33 ft·lb)
T2: 21 N·m(2.1 kg·m, 15.0 ft·lb)
T3: 29 N·m (3.0 kg·m, 22 ft·lb)
T4: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T5: 3.4 N·m (0.35 kg·m, 30 in·lb)
T6: 4.9 N·m (0.5 kg·m, 43 ft·lb) see the text.
T7: 34 N·m (3.5 kg·m, 25 ft·lb)

Exploded View

Special Tools - Jack: 57001–1238
Steering Stem Nut Wrench: 57001–1100
Head Pipe Outer Race Remover: 57001–1107
Head Pipe Outer Race Press Shaft: 57001–1075
Head Pipe Outer Race Driver: 57001–1076
Head Pipe Outer Race Driver: 57001–1106
Steering Stem Bearing Driver: 57001–137
Steering Stem Bearing Driver Adapter: 57001–1074
Bearing Puller: 57001–158
Bearing Puller Adapter: 57001–317

Steering

Steering Inspection

- Lift the front wheel off the ground using the jack.

Special Tool - Jack: 57001–1238

- 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.

★If the wheel binds or catches before the stop, the steering is too tight.

- Feel for steering looseness by pushing and pulling [A] the forks.

★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.*

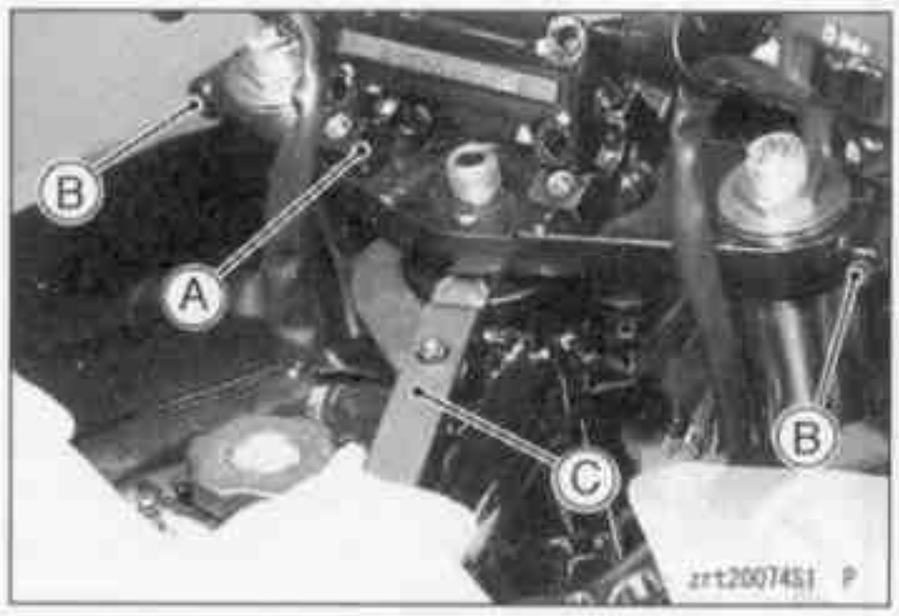
Steering Adjustment

- Remove:
  Fuel Tank (see Fuel System chapter)
  Handlebar (place on one side with cables, harnesses and hoses installed)
  Stem Head Nut
  Steering Stem Head Bracket (see Steering Stem Bearing Removal)
- Remove the lock washer and reinstall the stem head bracket [A].
- Tighten the upper fork clamp bolts [B]

Torque - Upper Fork Clamp Bolts: 29 N·m (3.0 kg·m, 22 ft·lb)

- Loosen:
  Lower Fork Clamp Bolts (both sides)
- Adjust the steering.

Special Tool - Steering Stem Nut Wrench: 57001–1100 [C]



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

NOTE

○ *Turn the stem nut 1/8 turn at a time maximum.*

- Install the lock washer (see Steering Bearing Installation).
- Tighten:

Torque - Steering Stem Head Nut: 44 N·m (4.5 kg·m, 33 ft·lb)
Lower Front Fork Clamp Bolts: 21 N·m (2.1 kg·m, 15.0 ft·lb)

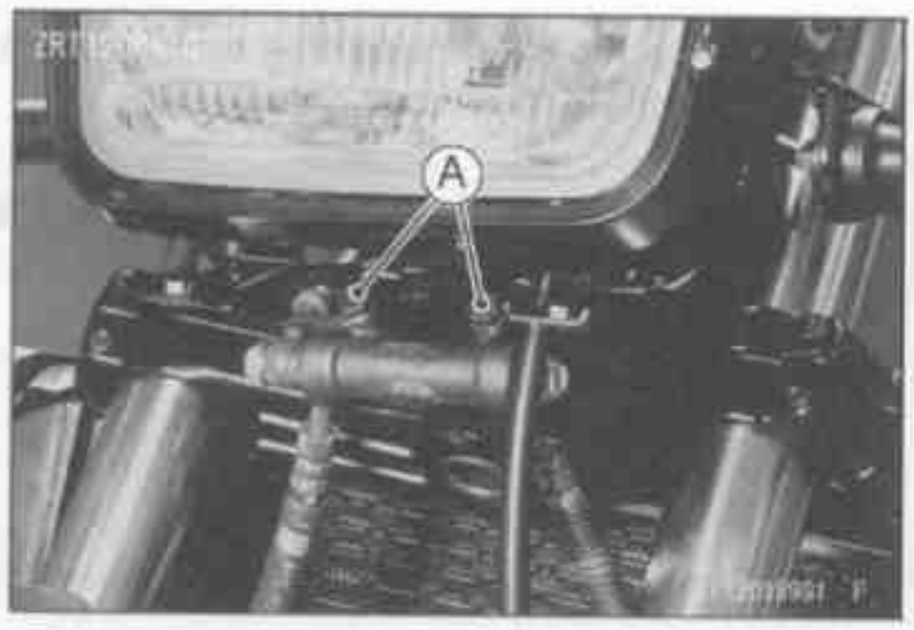
- Check the steering again.

★If the steering is still too tight or too loose, repeat the adjustment.

Steering Stem

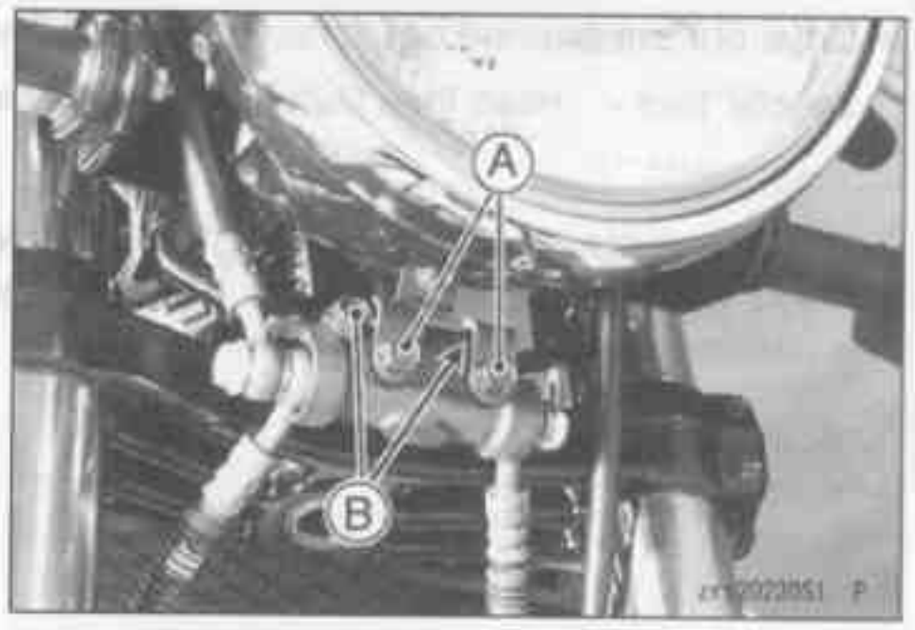
Stem, Stem Bearing Removal

- Remove:
  Fuel Tank (see Fuel System Chapter)
  Fairing (ZR1200A, see Frame chapter)
  Handlebar (place on one side with cables, harnesses and hoses installed)
  Brake Joint Bolts [A]

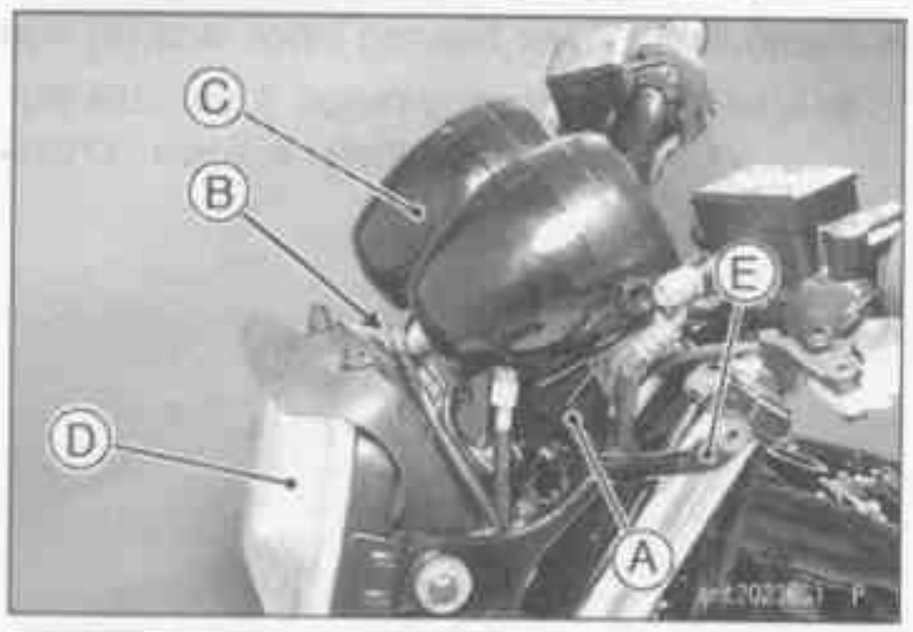




- Remove (ZR1200C):
  Headlight Vatical Adjuster Bolts [A]
  Brake Joint Bolts [B]



- Remove (ZR1200A/C):
  Upper Bracket Nuts [A]
  Connectors [B]
  Meter Unit [C]
  Headlight Unit [D]
  Fairing Bracket [E] (Headlight Bracket as for ZR1200C)



- Remove:
  Steering Stem Head Nut [A]
  Front Wheel (see Wheels/Tires chapter)
  Front Fork [B] (see Suspension chapter)
  Clamp Bolts [C] (ZR1200B)
  Steering Stem Head [D]

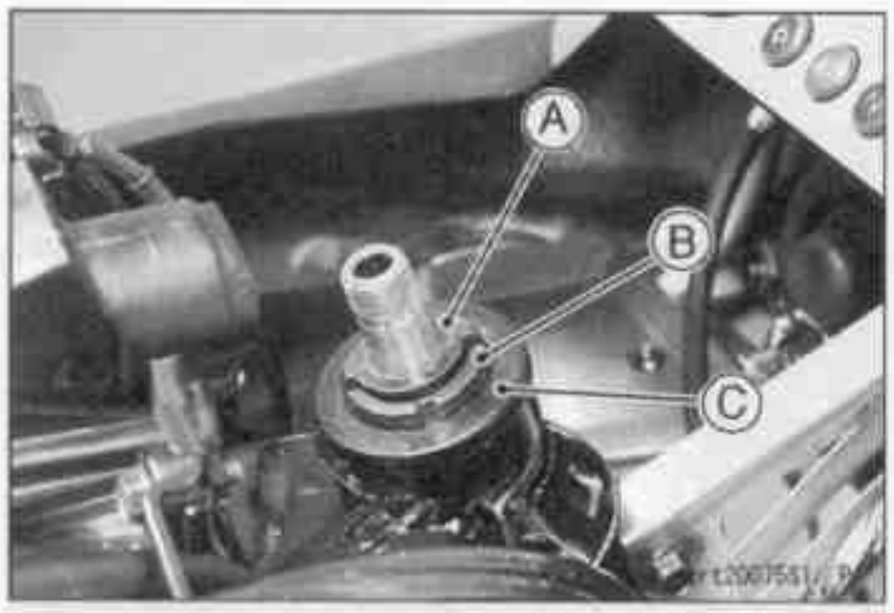


Steering Stem

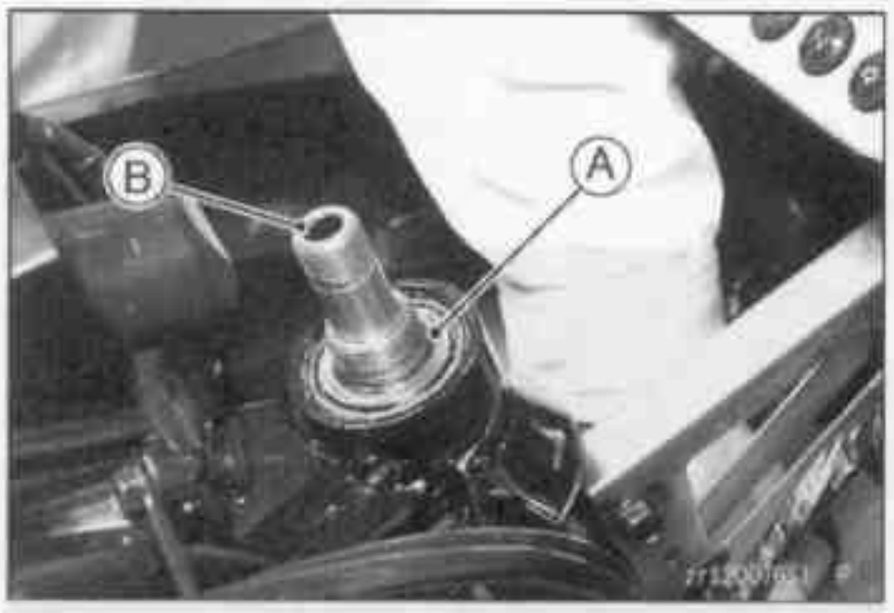
- Pushing up the stem base, and remove the following parts.
  Lock Washer [A]
  Stem Nut [B]

Special Tool - Steering Stem Nut Wrench: 57001–1100

Stem Cap [C]



O-ring [A]
Steering Stem [B]

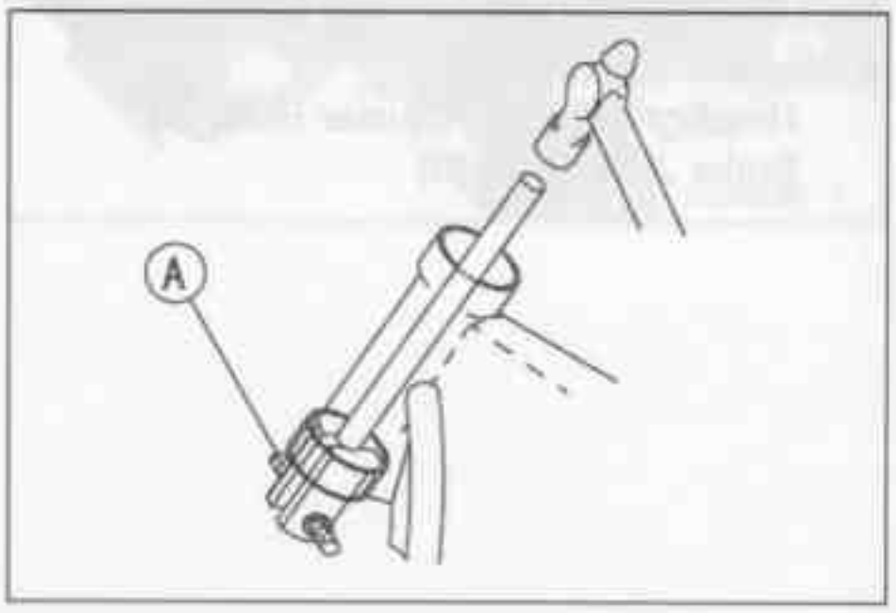


- Drive out the bearing outer races from the head pipe.

Special Tool - Head Pipe Outer Race Remover: 57001–1107 [A]

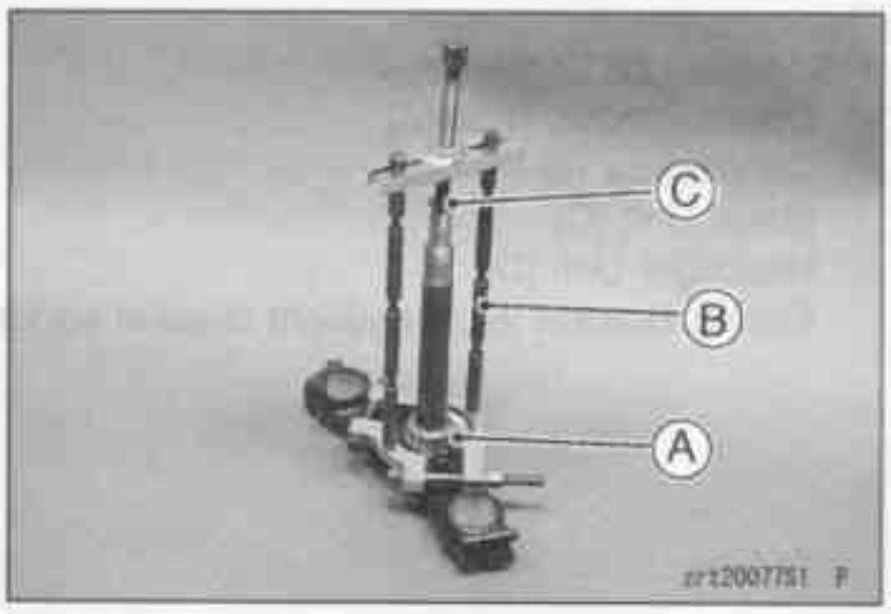
NOTE

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



- Remove the lower bearing inner race [A] from the stem.

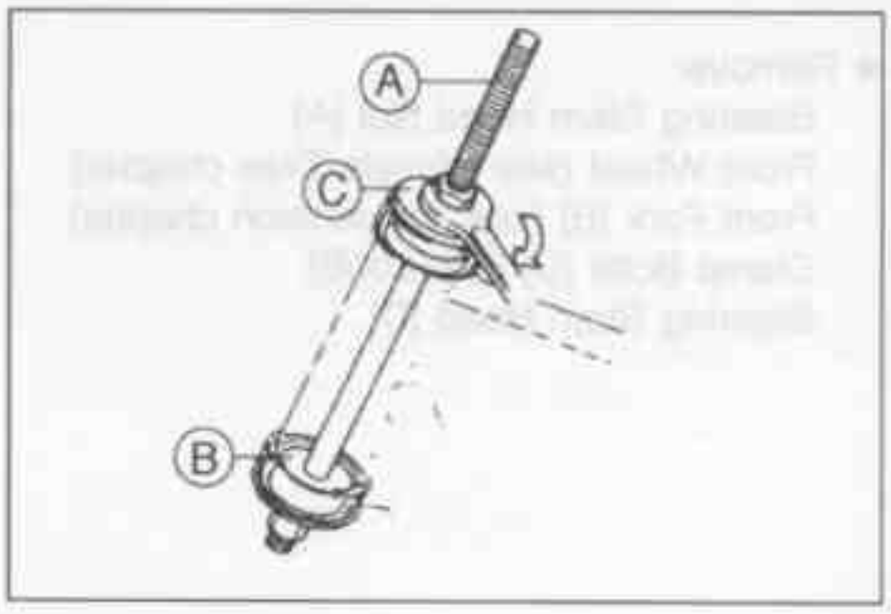
Special Tools - Bearing Puller: 57001–158 [B]
Bearing Puller Adapter: 57001–317 [C]



Stem, Stem Bearing Installation

- Replace the bearing outer races with new ones.
- Apply grease to the outer races, and drive them into the head pipe at the same time.

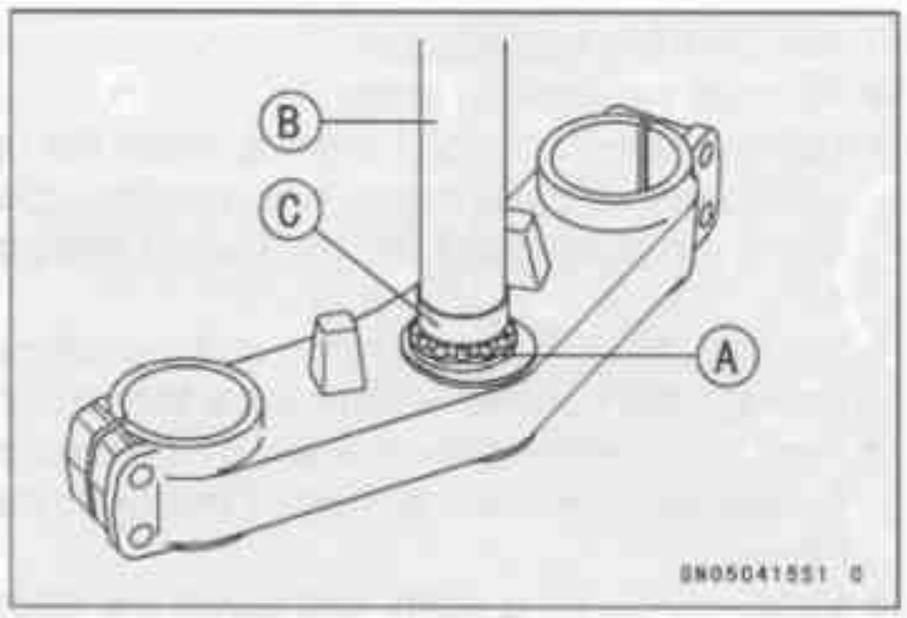
Special Tools - Head Pipe Outer Race Press Shaft: 57001–1075 [A]
Head Pipe Outer Race Driver: 57001–1076 [B]
Head Pipe Outer Race Driver: 57001–1106 [C]



Steering Stem

- Replace the bearing inner races with new ones.
- Apply grease to the lower bearing inner race [A], and drive it onto the stem.

Special Tools - Steering Stem Bearing Driver: 57001–137 [B]
Steering Stem Bearing Adapter: 57001–1074 [C]



- Apply grease to the upper bearing inner race, and install it in the head pipe.
- Apply grease to the O-ring.
- Install the stem through the head pipe and the upper bearing inner race, and install the O-ring on the stem shaft while pushing up on stem base.
- Install the stem cap, and hand tighten the stem nut.

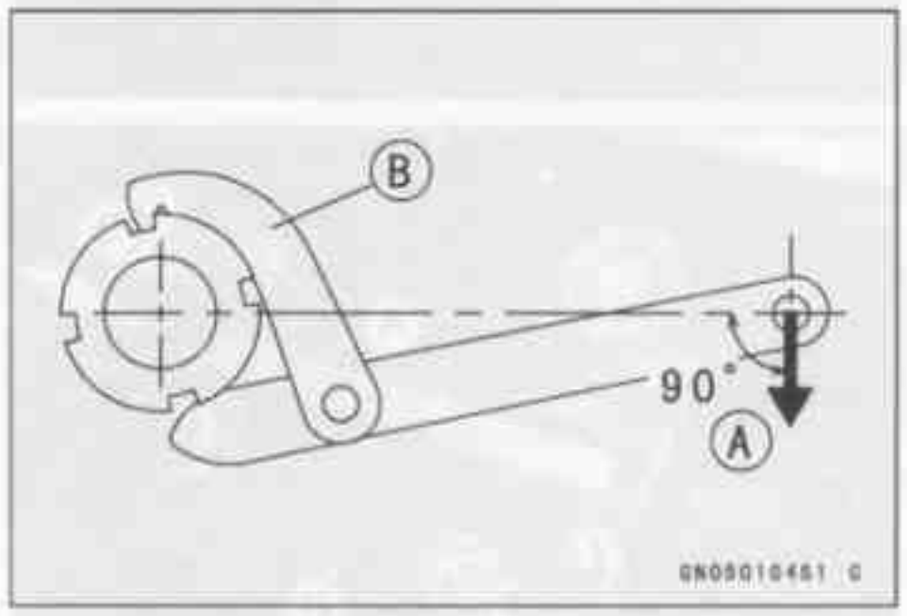
NOTE

○ *Install the stem nut so that the stepped side faces down.*

- Settle the bearings in place as follows:

○ Tighten the stem nut to 39 N·m (4.0 kg·m, 29 ft·lb) of torque. (To tighten the stem nut to the specified torque, hook the wrench on the stem nut, and pull the wrench at the hole by 220 N (22.2 kg, 49 lb) [A] force in the direction shown.

Special Tool - Steering Stem Nut Wrench: 57001–1100 [B]



○ Check that there is no play and the steering stem turns smoothly without rattles. If not, the steering stem bearings may be damaged.

○ Again back out the stem nut a fraction of a turn until it turns lightly.

- Turn the stem nut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.

Torque - Steering Stem Nut: 4.9 N·m (0.5 kg·m, 43 in·lb)

- Install the lock washer.
- Install the stem head.
- Install the washer, and tighten the stem head nut.
- Install the front fork (see Suspension chapter).

NOTE

○ *Tighten the fork upper clamp bolts first, next the stem head nut, last the fork lower clamp bolts.*

Torque - Upper Front Fork Clamp Bolts: 29 N·m (3.0 kg·m, 22 ft·lb)
Steering Stem Head Nut: 44 N·m (4.5 kg·m, 33 ft·lb)
Lower Front Fork Clamp Bolts: 21 N·m (2.1 kg·m, 15 ft·lb)

⚠ WARNING

Do not impede the handlebar turning by routing the cables, harnesses and hoses improperly (see General Information chapter).

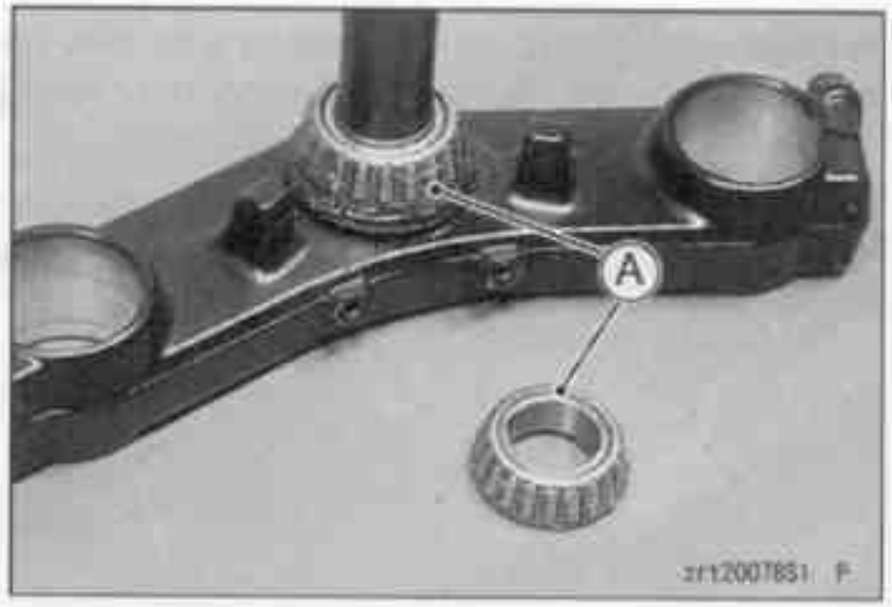
Steering Stem

Stem Bearing Lubrication

- Remove the steering stem.
- Using a high-flash point solvent, wash the upper and lower tapered roller bearings in the cages, and 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.

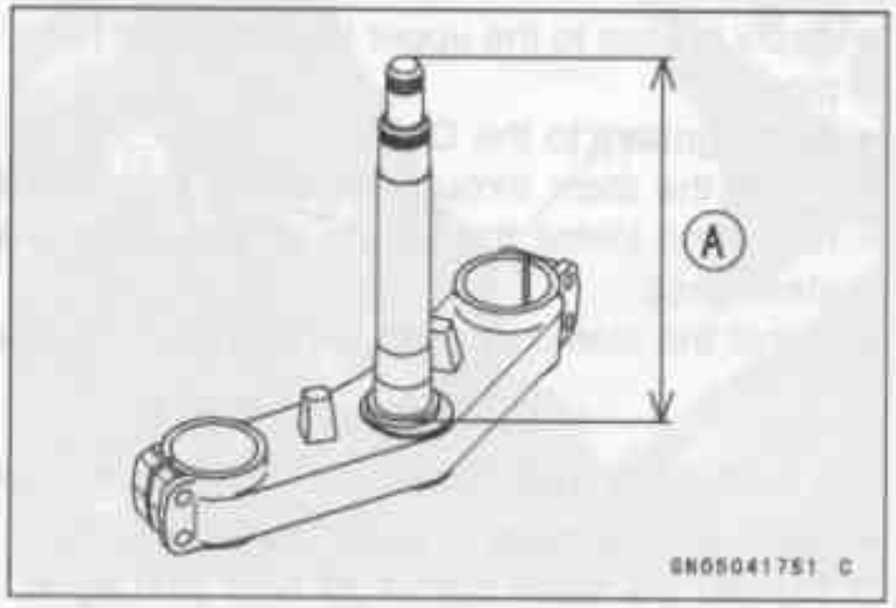
- Pack the upper and lower tapered roller bearings [A] in the cages with grease, and apply a light coat of grease to the upper and lower outer races.
- Install the steering stem, and adjust the steering.



Steering Stem Warp

- Whenever the steering stem is removed, or if the steering cannot be adjusted for smooth action, check the steering stem for straightness.

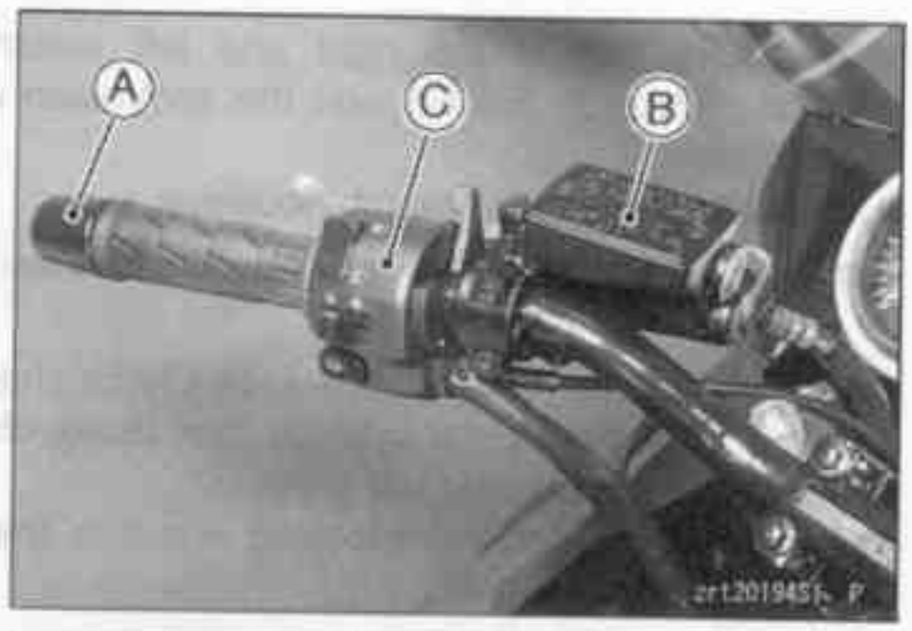
★ If the steering stem [A] is bent, replace the steering stem.



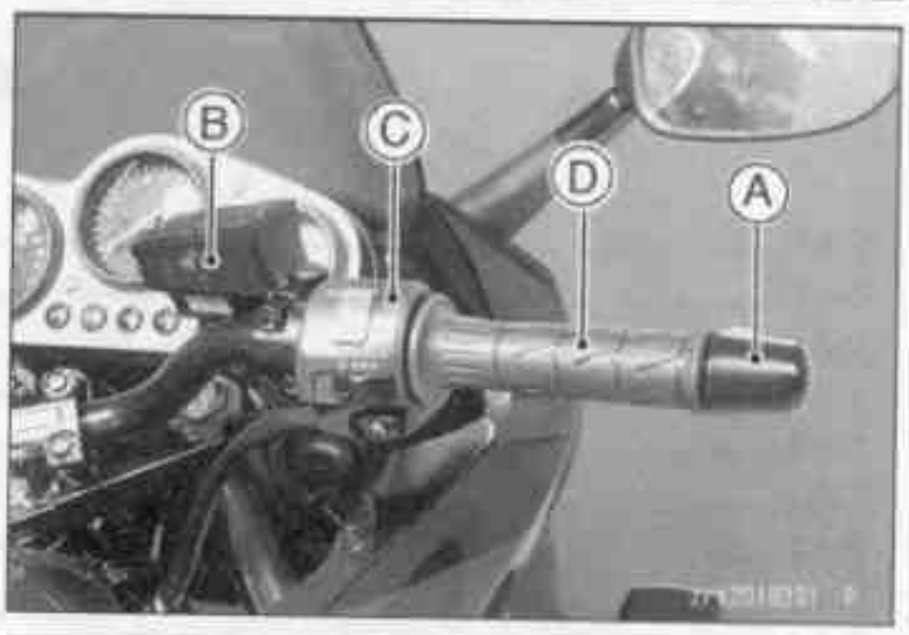
Handlebar

Handlebar Removal

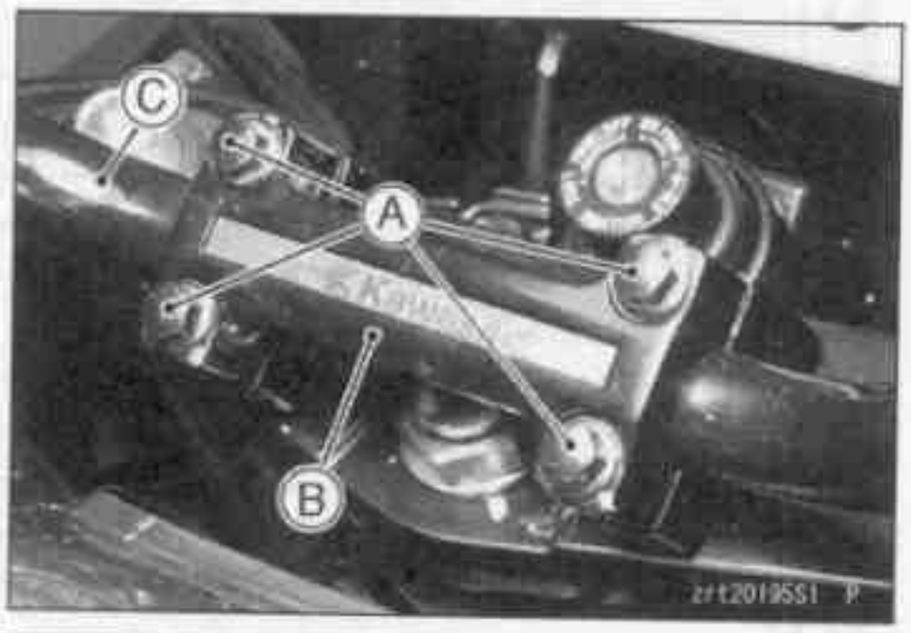
- Remove:
  Handlebar Weight [A]
  Clutch Lever Assy [B]
  Left Switch Housing [C]



Handlebar Weight [A]
Front Brake Master Cylinder [B]
Right Switch Housing [C]
Throttle Grip [D]

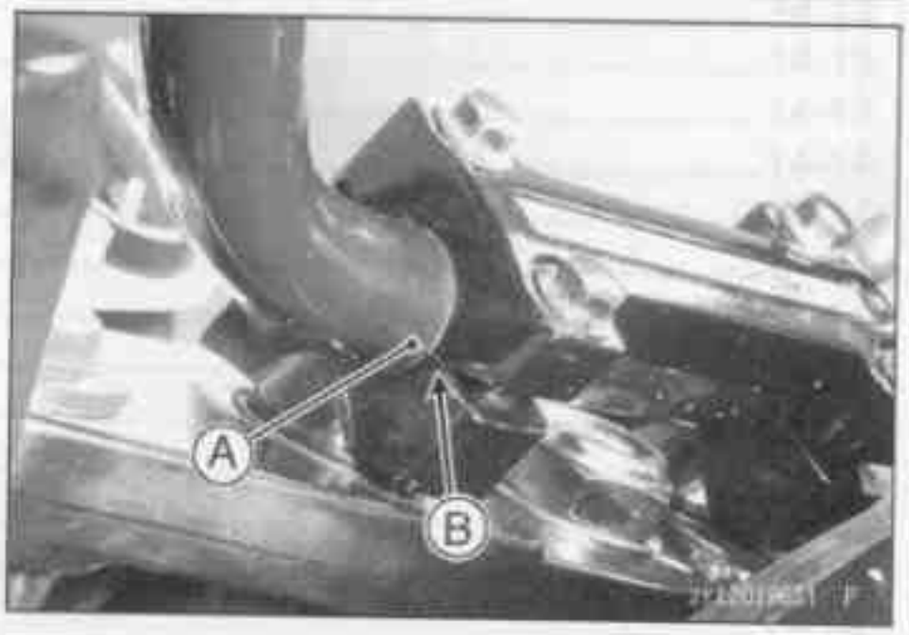


- Remove the handlebar clamp bolts [A].
- Remove the handlebar clamp [B] and take out the handlebar [C].



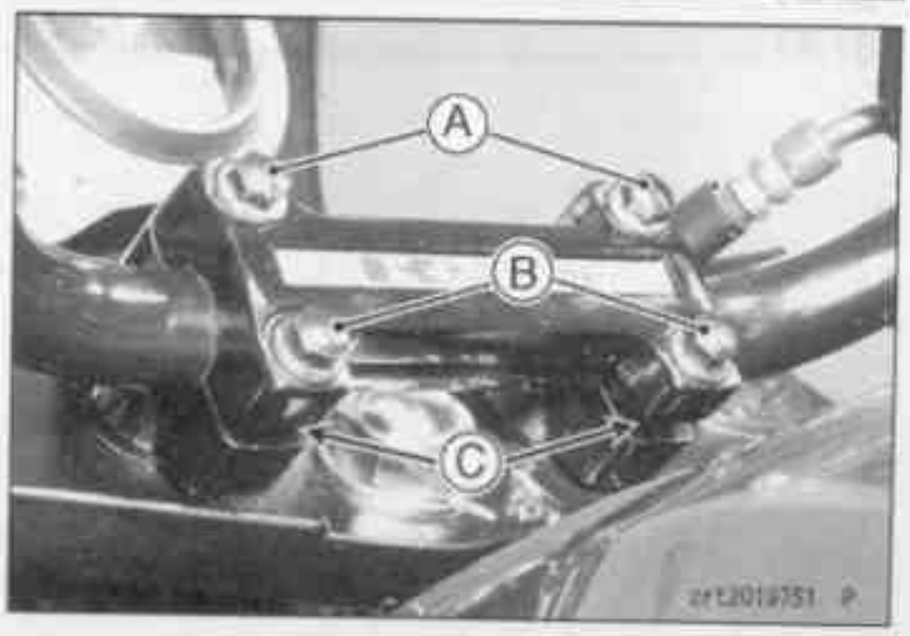
Handlebar Installation

- Align the punch mark [A] on the handlebar with the gap [B] between the left holder and the left clamp.



- First tighten the front clamp bolts [A]. Then, tighten the rear clamp bolts [B]. After tightening the bolts, a clearance [C] will be created behind the clamps.

Torque - Handlebar Clamp Bolts: 25 N·m (2.5 kg·m, 18.0 ft·lb)



Frame

Table of Contents

Exploded View 14-2
Specifications 14-6
Seat 14-7
  Seat Removal 14-7
  Seat Installation 14-7
  Seat Lock Cable Lubrication and Inspection 14-7
Fairing (ZR1200A) 14-8
  Wind Shield Removal 14-8
  Wind Shield Installation 14-8
  Fairing Removal 14-8
Fairing (ZR1200B) 14-9
  Wind Shield Removal 14-9
  Wind Shield Installation 14-9
  Fairing Removal 14-9
  Fairing Installation 14-9
  Fairing Disassembly 14-10
  Fairing Installation 14-11
  Fairing Lower Inner Cover Removal 14-11
Side Covers 14-12
  Side Cover Removal 14-12
  Side Cover Installation 14-12
Seat Cover 14-13
  Seat Cover Removal 14-13
Fenders 14-14
  Front Fender Removal 14-14
  Rear Fender Rear Removal 14-14
  Rear Fender Rear Installation 14-14
  Rear Fender Front Removal 14-14
  Rear Fender Front Installation 14-15
Frame 14-16
  Frame Inspection 14-16
  Fairing Bracket Removal (ZR1200B) 14-16
  Fairing Bracket Removal (ZR1200A/C) 14-16
Sidestand Installation 14-16

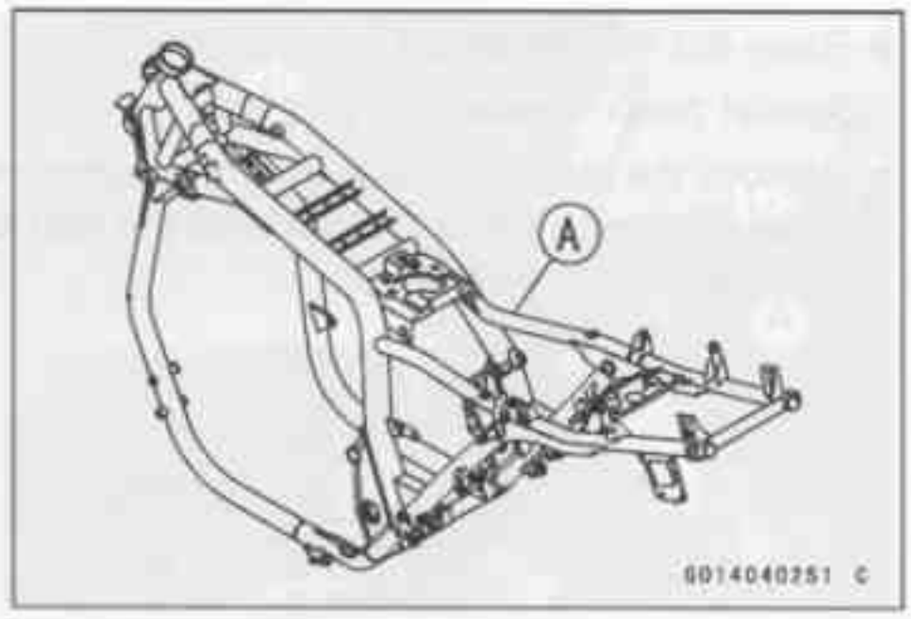
Frame

Frame Inspection

- Visually inspect the frame [A] for cracks, dents, bending, or warp.
- ★ If there is any damage to the frame, replace it.

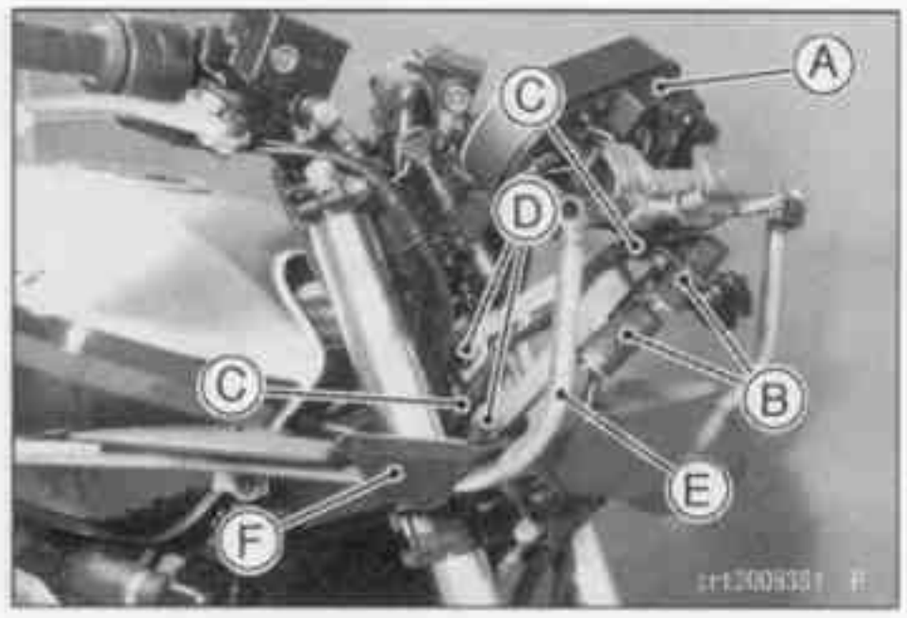
⚠ WARNING

A repaired frame may fail in use, possibly causing an accident. If the frame is bent, dented, cracked, or warped, replace it.



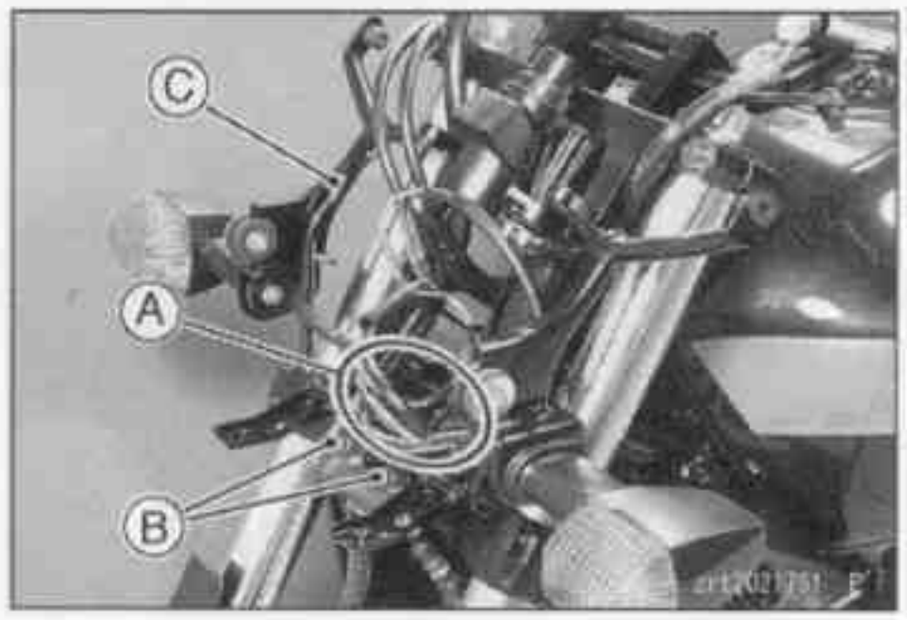
Fairing Bracket Removal (ZR1200B)

- Remove:
  - Fairing (see Fairing Removal)
  - Meter Unit [A] (see Electrical System chapter)
  - Headlight Relays [B]
  - Main Harness Clamps [C]
  - Bolts [D]
  - Fairing Bracket [E] with Fairing Lower Inner Cover [F]



Fairing Bracket Removal (ZR1200A/C)

- Remove:
  - Fairing (ZR1200A, see Fairing Removal)
  - Meter Unit (see Electrical System chapter)
  - Headlight (see Electrical System chaoter)
  - Headlight Body (ZR1200C)
  - Turn Signal Light Connector [A]
  - Bolts [B]
  - Fairing Bracket [C] (Headlight Bracket as for ZR1200C)

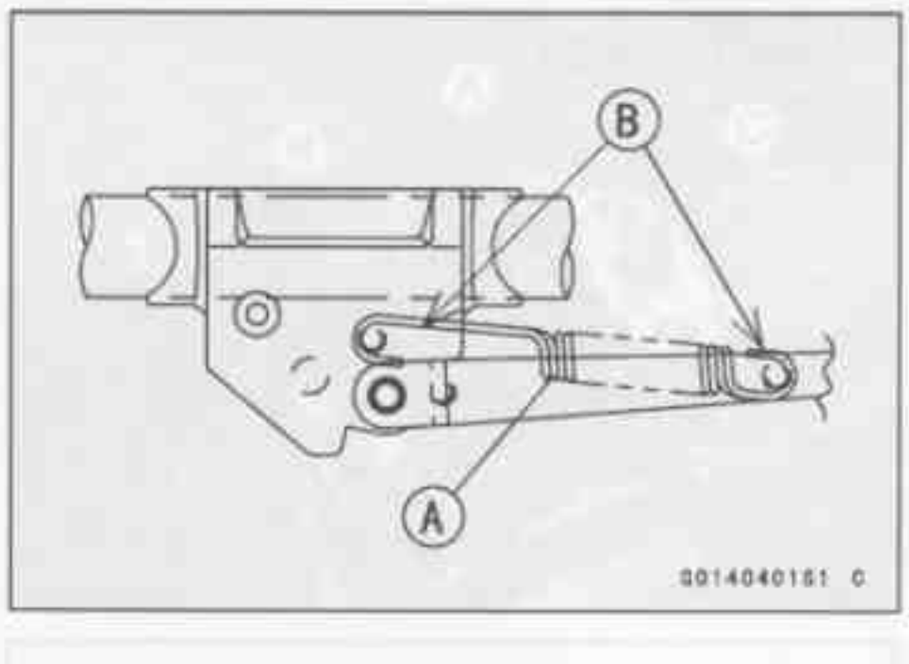


Sidestand Installation

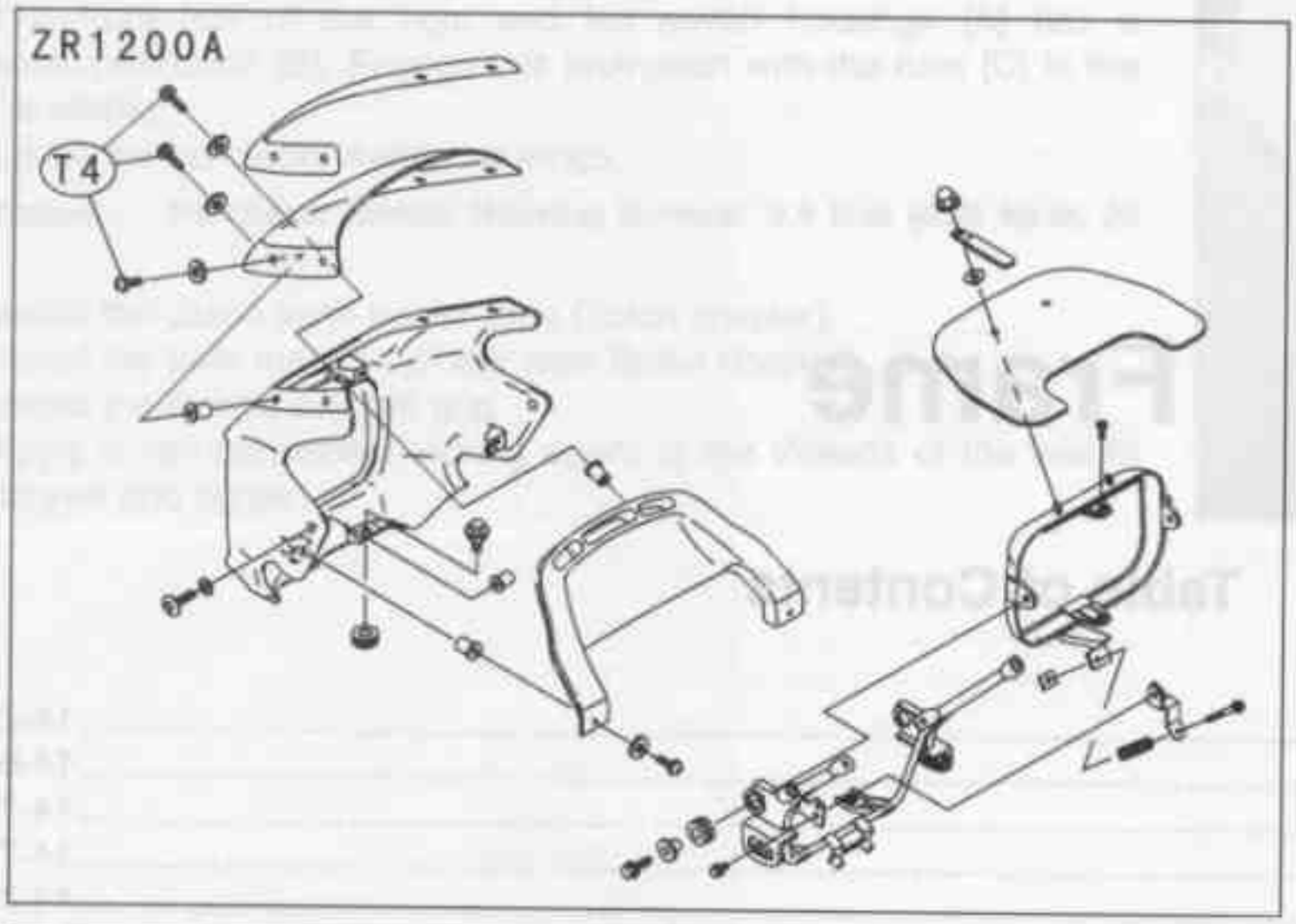
- Tighten:

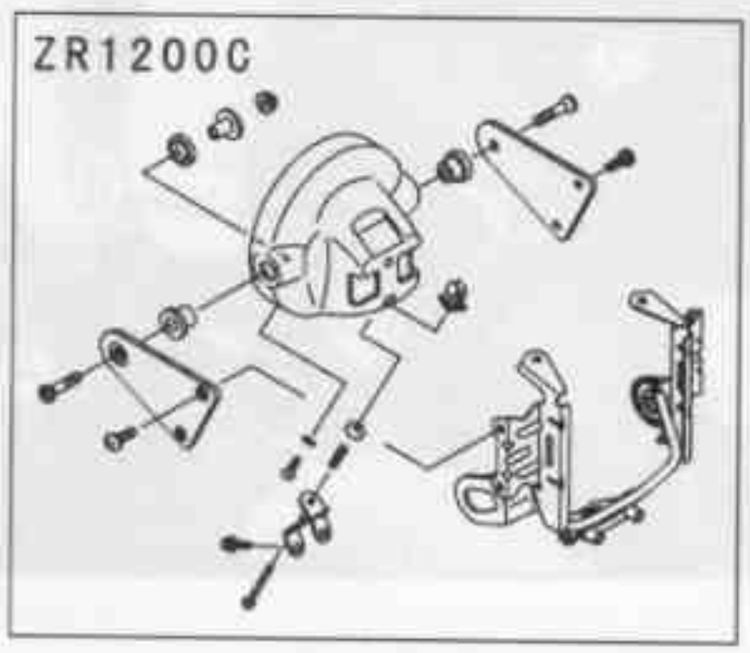
Torque - Sidestand Bolt: 44 N·m (4.5 kg·m, 32 ft·lb)

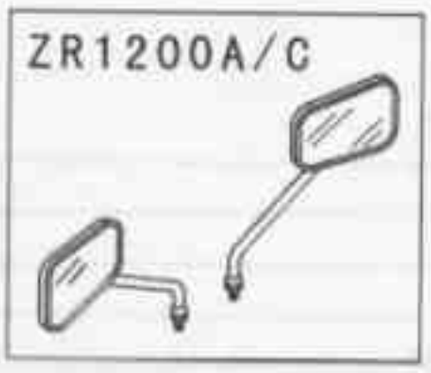
- Install the sidestand spring [A], noting the direction of the hooks [B].

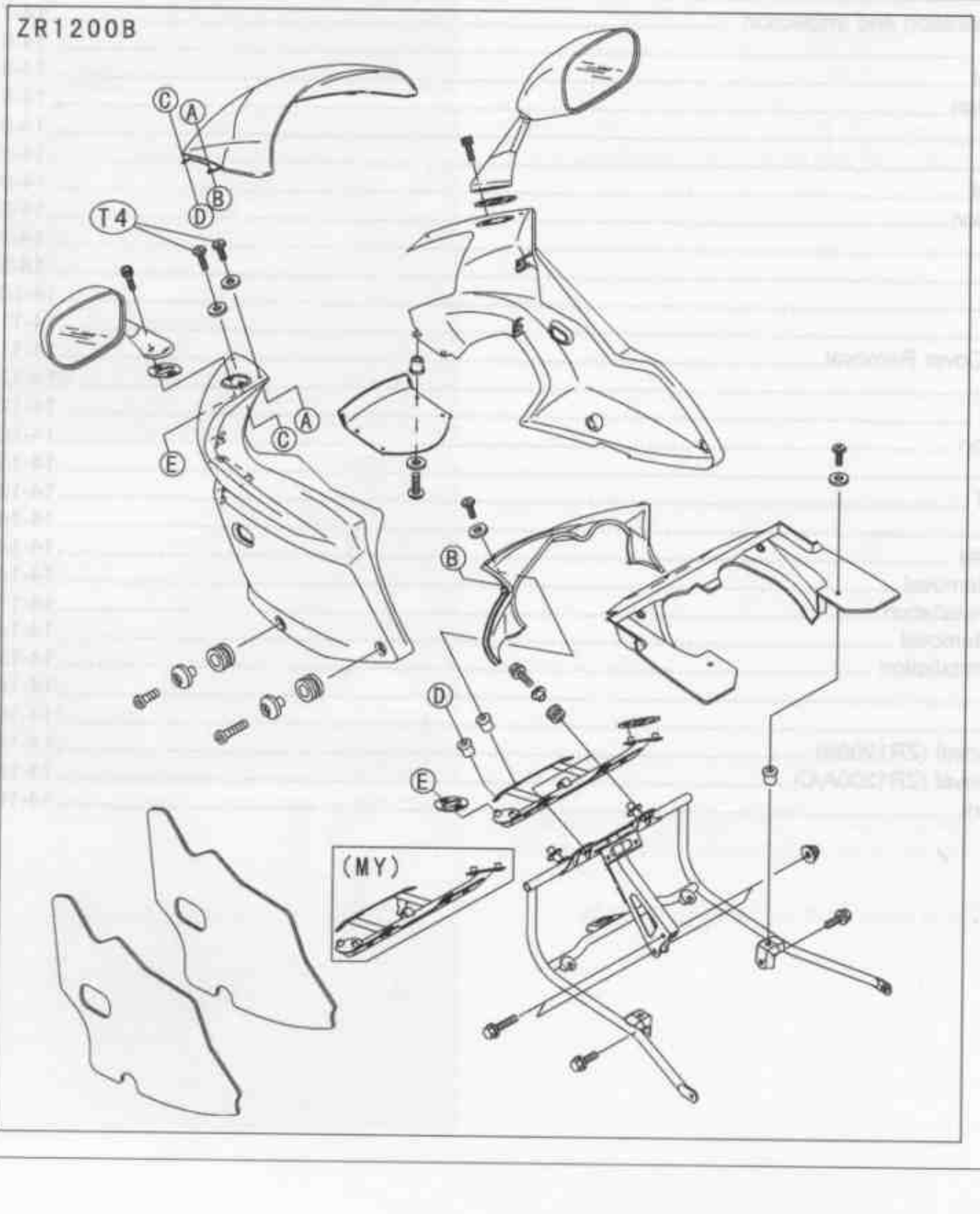


Exploded View

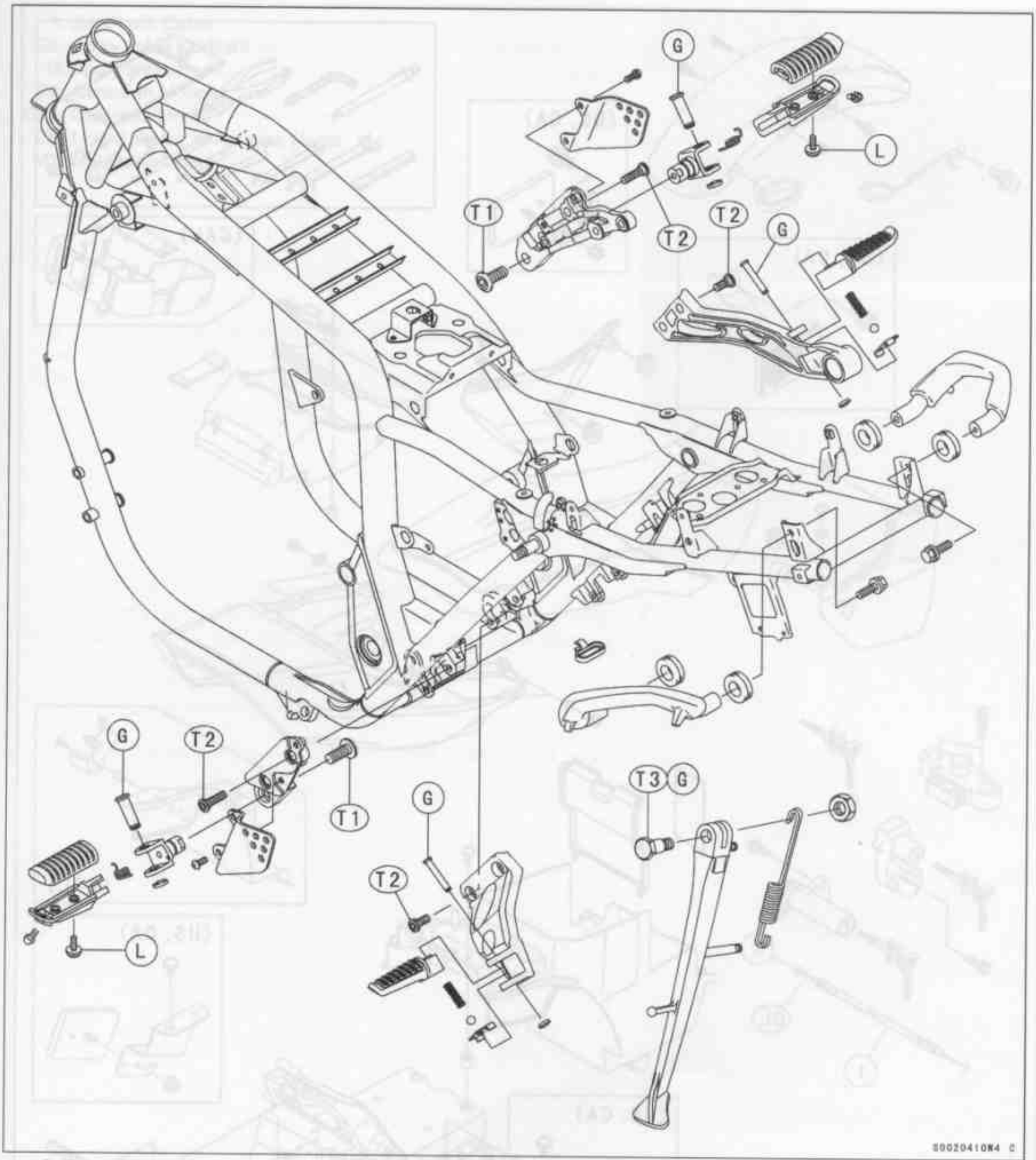






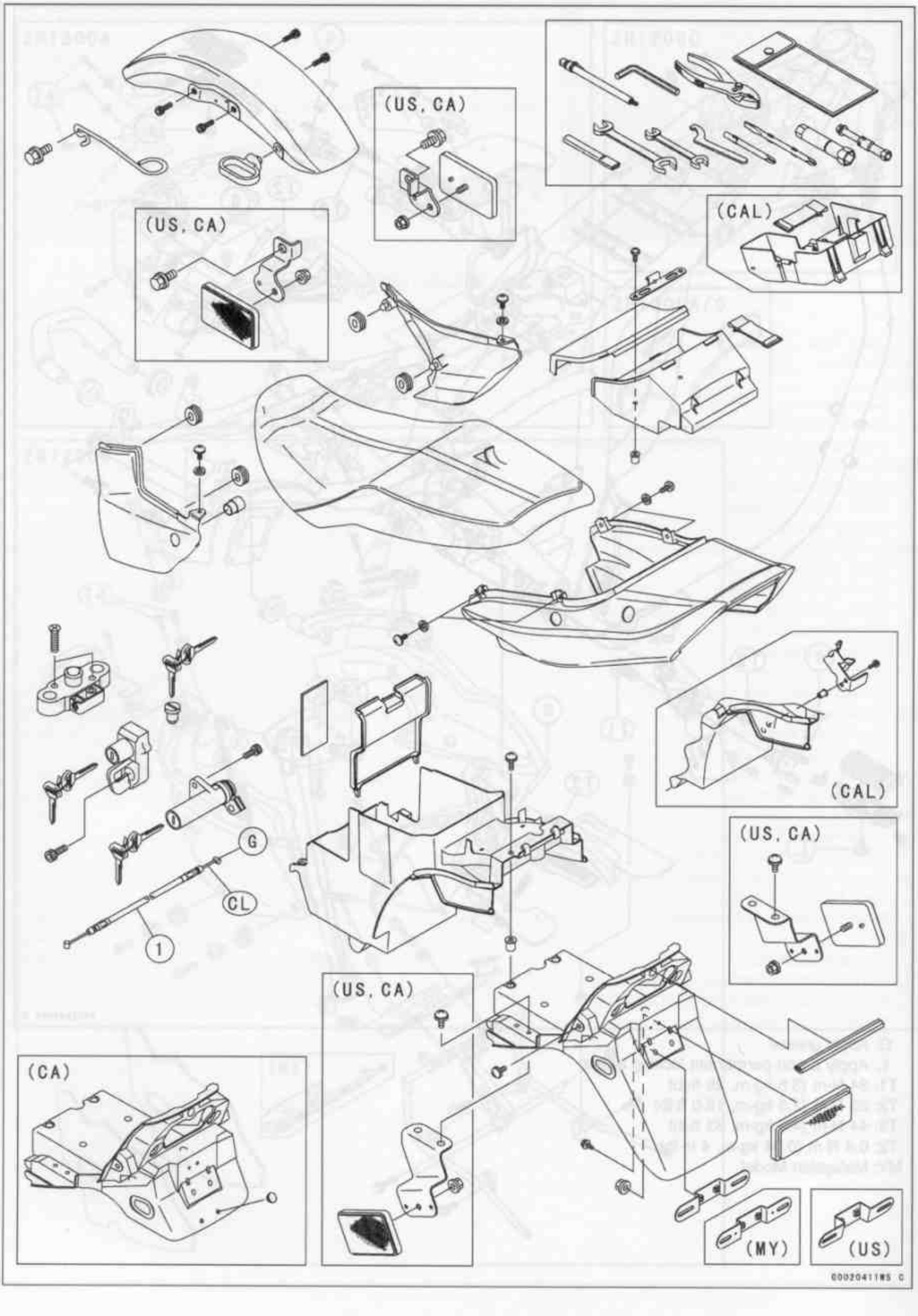


Exploded View



G: Apply grease.
L: Apply a non-permanent locking agent.
T1: 34 N·m (3.5 kg·m, 25 ft·lb)
T2: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T3: 44 N·m (4.5 kg·m, 33 ft·lb)
T2: 0.4 N·m (0.04 kg·m, 4 in·lb)
MY: Malaysian Model

Exploded View



Exploded View

1. Seat Lock Cable
CL: Apply cable lubricant
G: Apply grease
CA: Canadian Model
CAL: California Model
US: United States of America Model
MY: Malaysian Model

Specifications

Special Tool - Jack: 57001–1238

Seat

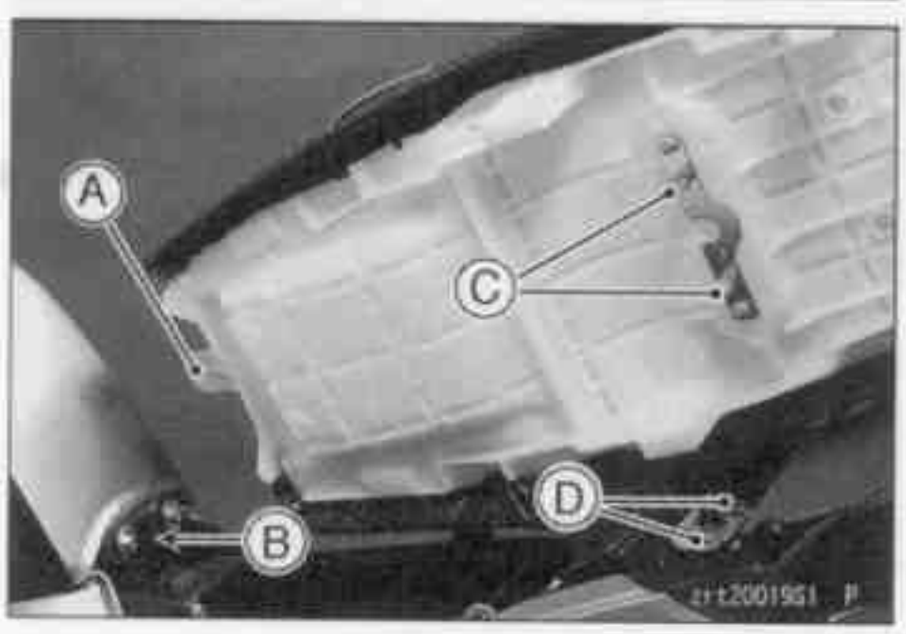
Seat Removal

- Insert the ignition switch key into the seat lock [A], turning the key counterclockwise, pulling up on the rear of the seat, and pulling the seat backward.



Seat Installation

- Slip the seat hook [A] under the brace [B] on the fuel tank bracket.
- Insert the seat pins [C] into the latch holes [D].
- Push down the rear part of the seat until the lock clicks.



Seat Lock Cable Lubrication and Inspection

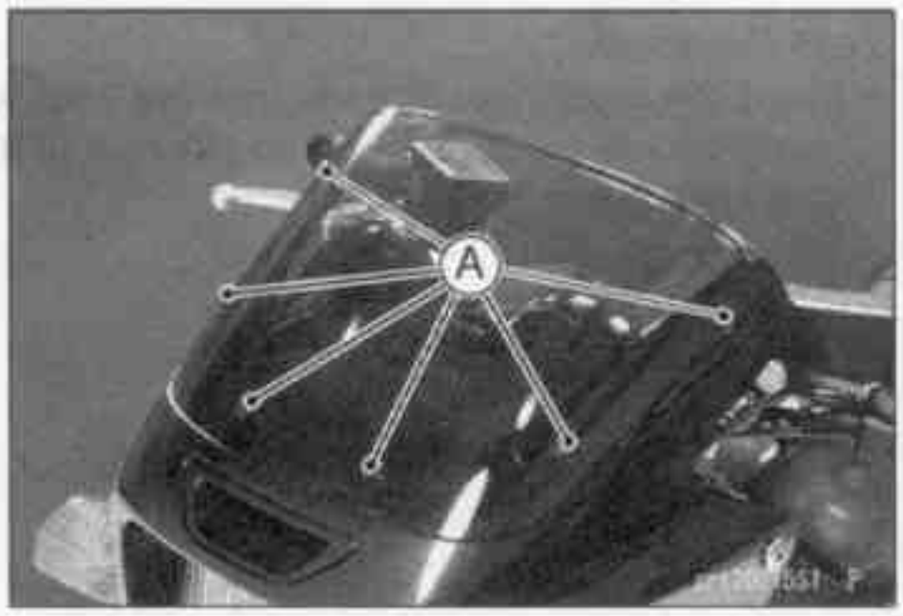
- Whenever the seat lock cable is removed, or in accordance with the Periodic Maintenance Chart, lubricate the cable (see General Lubrication in the Appendix chapter).
- Apply a thin coating of grease to the cable ends.
- Use the pressure cable luber to lubricate the cable.

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

Fairing (ZR1200A)

Wind Shield Removal

- Remove:
  Screws [A]
  Wind Shield [B]



Wind Shield Installation

- Tighten:

Torque - Wind Shield Screws: 0.4 N·m (0.04 kg·m, 4 in·lb)

Fairing Removal

- Remove:
  Bolts [A]
  Bolts [B] (both sides)
  Fairing [C]



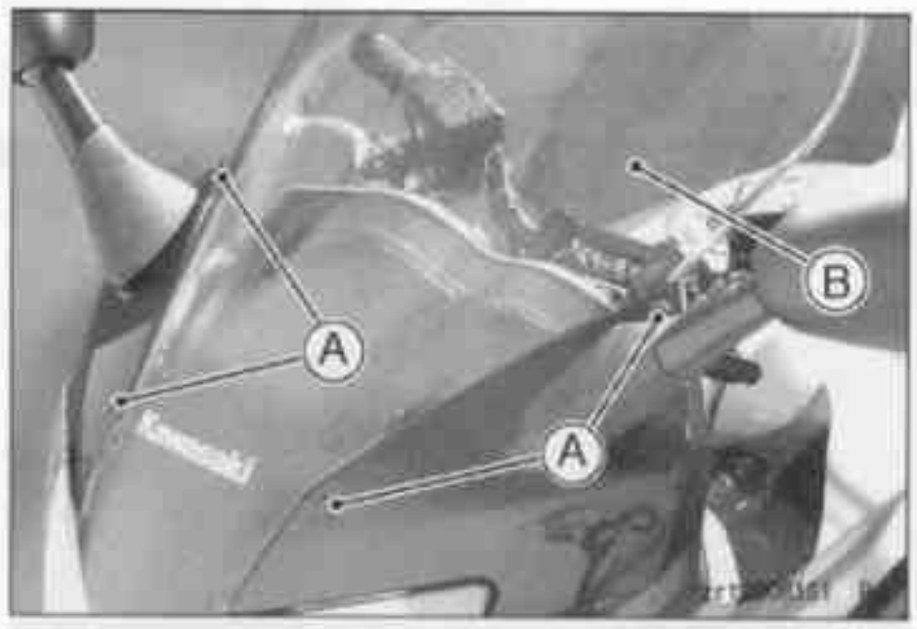
- For europian models; Remove the city light [A] from the fairing.



Fairing (ZR1200B)

Wind Shield Removal

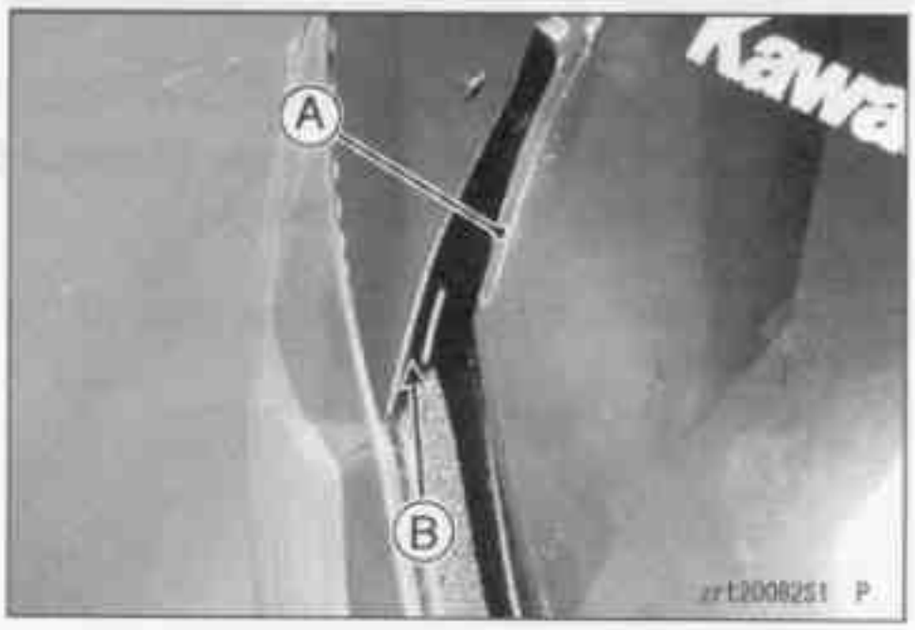
- Remove:
  Screws [A]
- Pull the wind shield [B] up ward and remove the shield.



Wind Shield Installation

- Put the both side edges [A] of the shield in the grooves [B] of the fairing.

Torque - Wind Shield Screws: 0.4 N·m (0.04 kg·m, 4 in·lb)

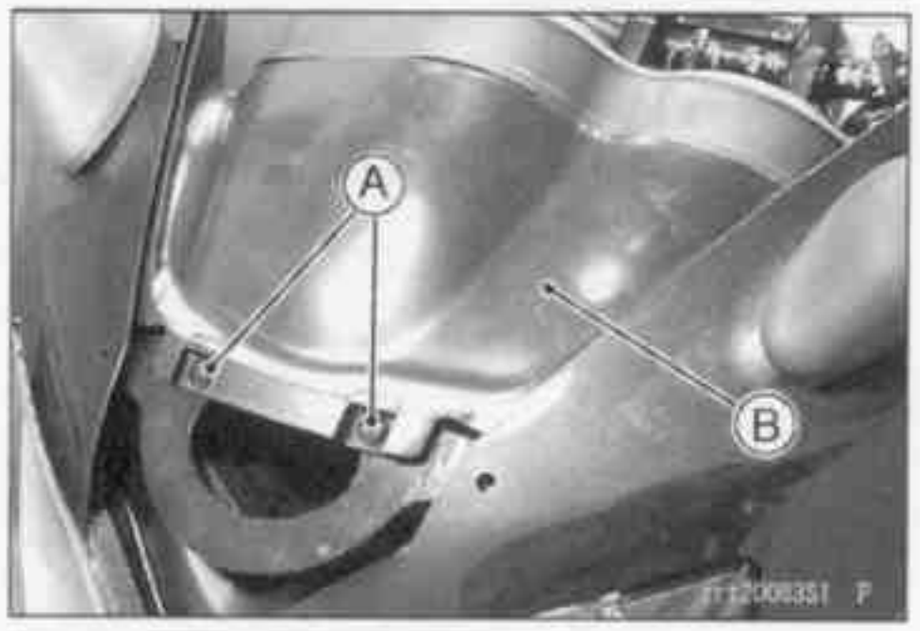


Fairing Removal

CAUTION

Be careful not to scratch the painted surface during removal or installation.

- Remove:
  Wind Shield
  Screws [A]
  Upper Inner Cover [B]

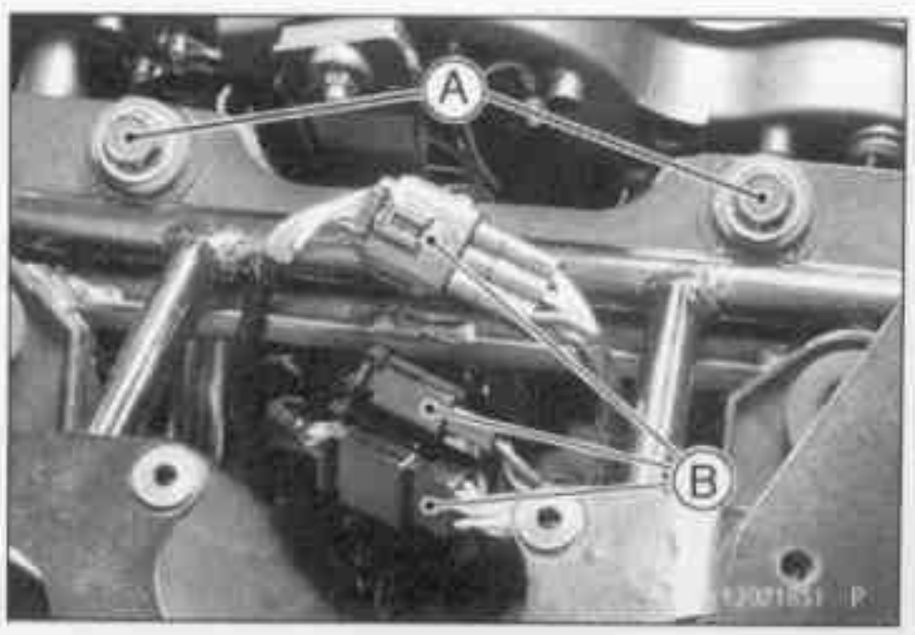


- Remove:
  Bolts [A] (both sides)
  Connector [B]
- Pull the fairing assembly forward.



Fairing Installation

- Fairing installation is the reverse of removal.

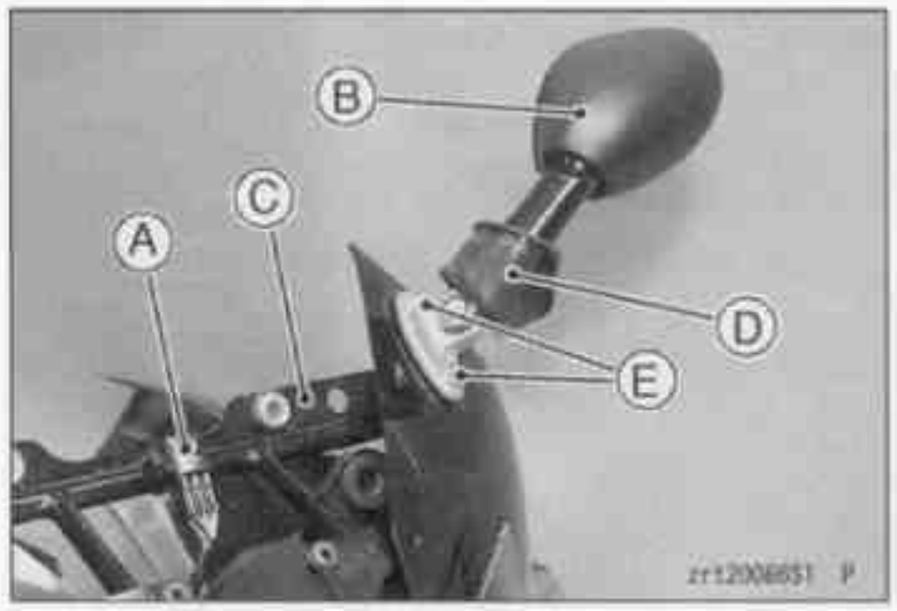


Fairing (ZR1200B)

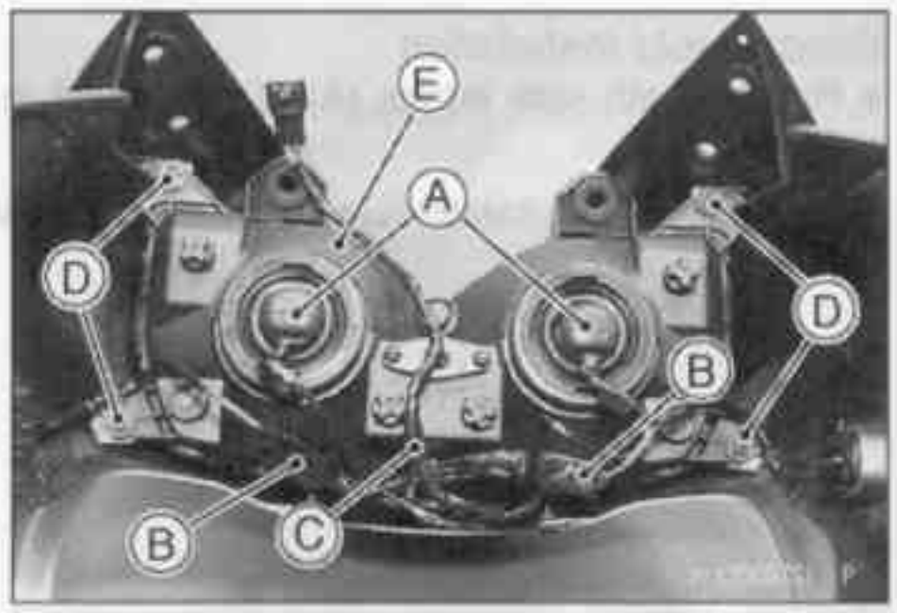
Fairing Disassembly

- Remove the connector [A].
- Remove the rear view mirrors [B] and bracket [C].

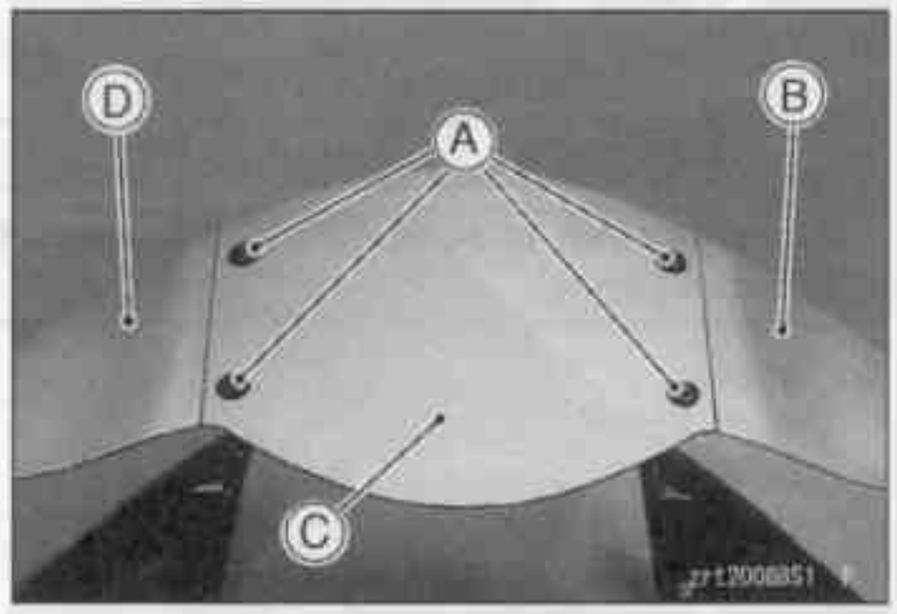
○ Slide the rubber covers [D] and unscrew the bolts [E].



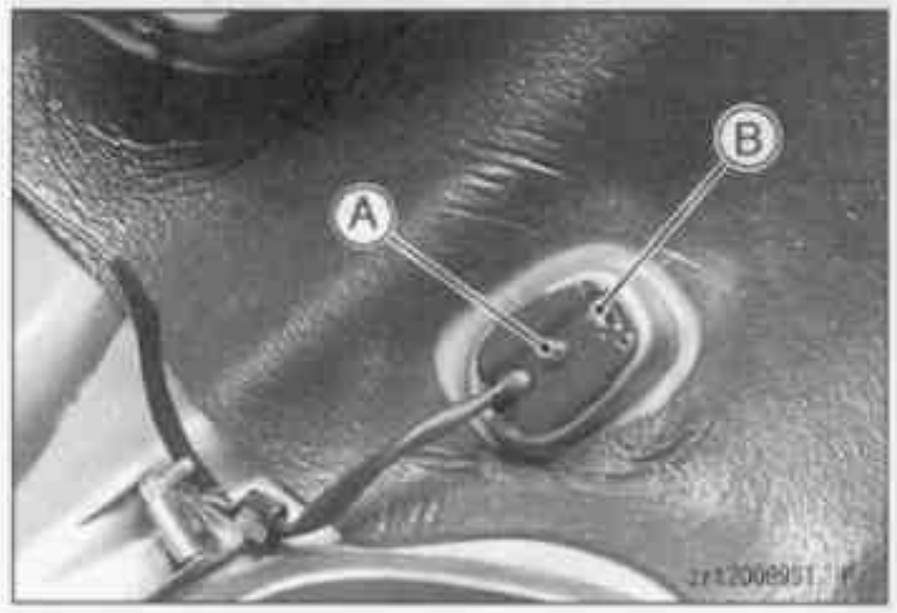
- Disconnect:
  Headlight Connectors [A]
  City Light (Europian Model, see Electrical System chapter)
  Turn Signal Light Connectors [B]
- Remove:
  Headlight/Turn Signal Light harness [C]
  Bolts [D]
  Headlight Unit [E]

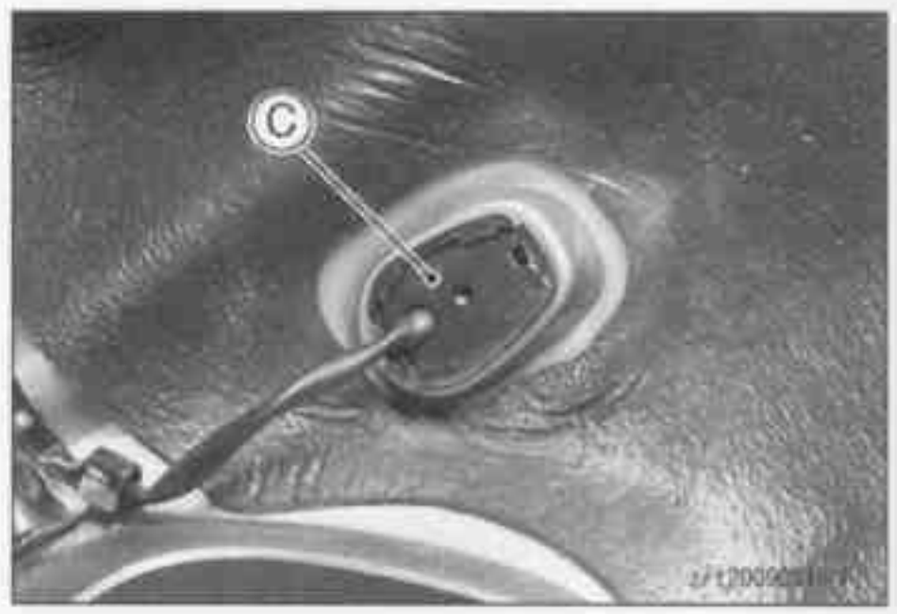


- Remove:
  Screws [A]
- Separate the right fairing [B], joint covers [C] and left fairing [D].



- Remove:
  Screw [A]
- Remove the turn signal outer holder [B] and pull out the inner holder [C].
- Remove the turn signal.





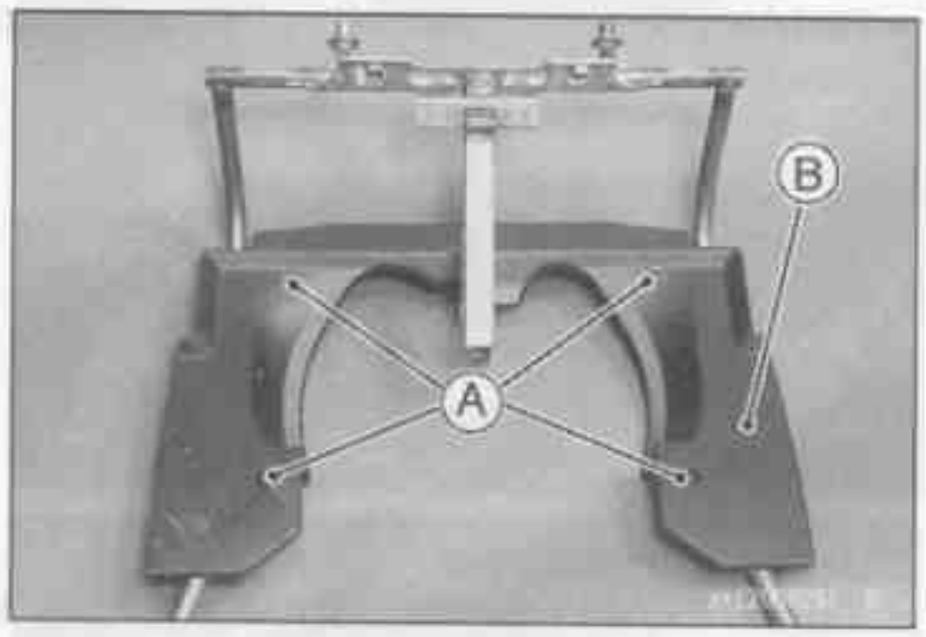
Fairing (ZR1200B)

Fairing Installation

- Fairing assembly is the reverse of disassembly.

Fairing Lower Inner Cover Removal

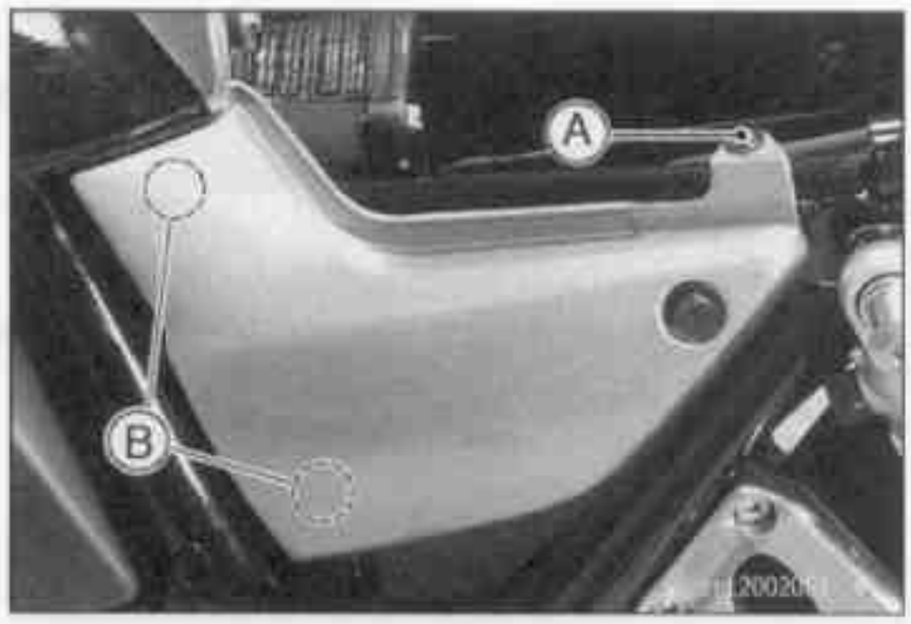
- Remove:
  Meter Unit (see Electrical System chapter)
  Fairing Bracket (see Fairing Bracket Removal)
  Screws [A]
  Lower Inner Cover [B]



Side Covers

Side Cover Removal

- Remove the seat.
- Remove the screw [A], and pull the front parts of the side cover outward to clear the stoppers [B].



Side Cover Installation

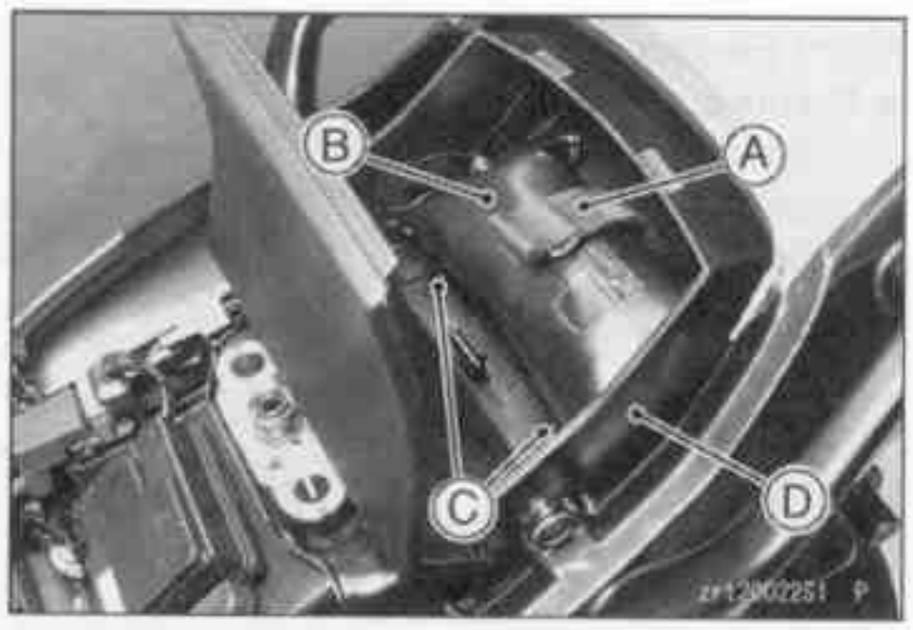
- Tighten the left side cover screw together with the hose clamp [A].



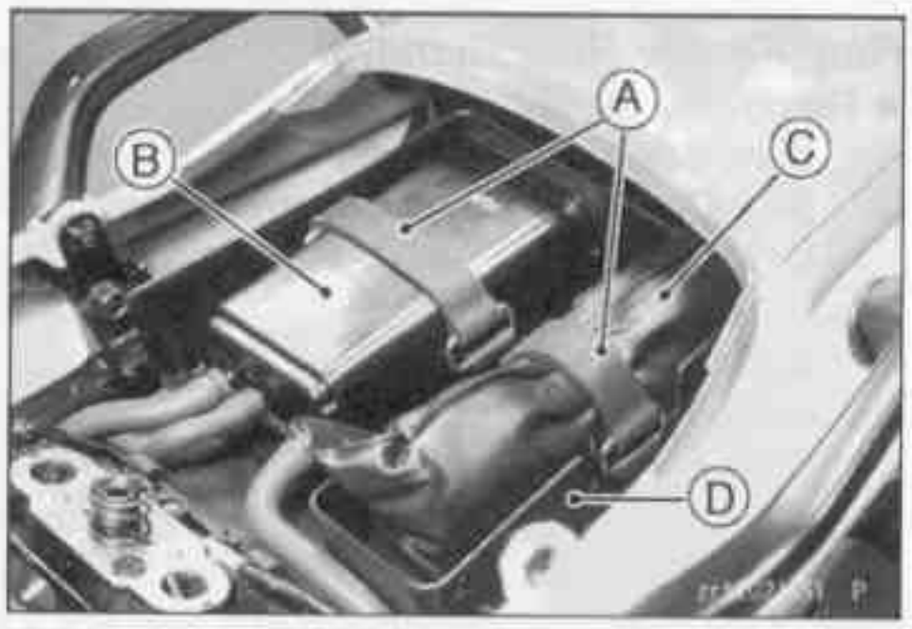
Seat Cover

Seat Cover Removal

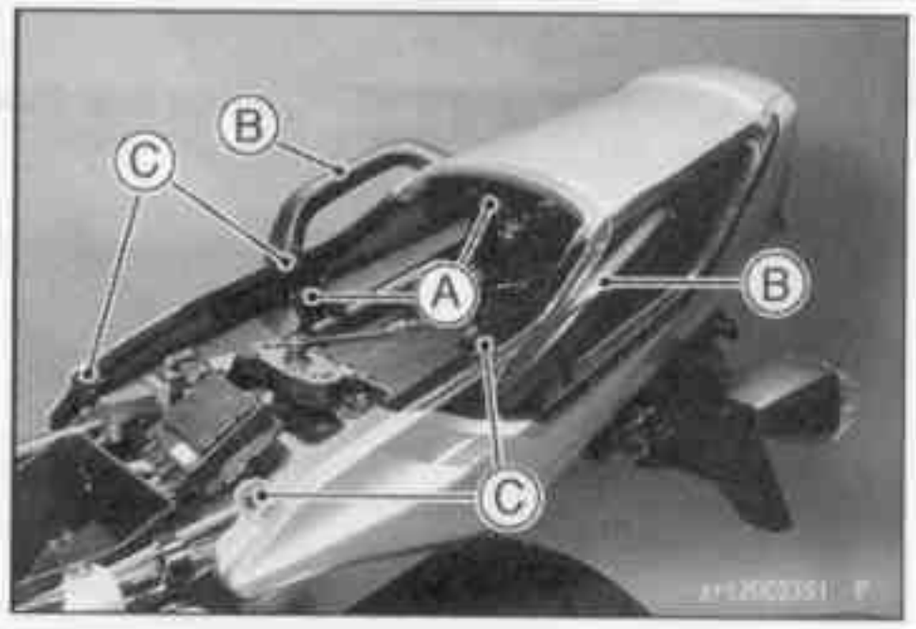
- Remove:
  Seat (see Seat Removal)
  Band [A]
  Tool Kit Case [B]
  Screws [C] and Tool Kit Compartment [D]



- For california model, remove the bands [A], canister [B], tool kit case [C], screws, and compartment [D].

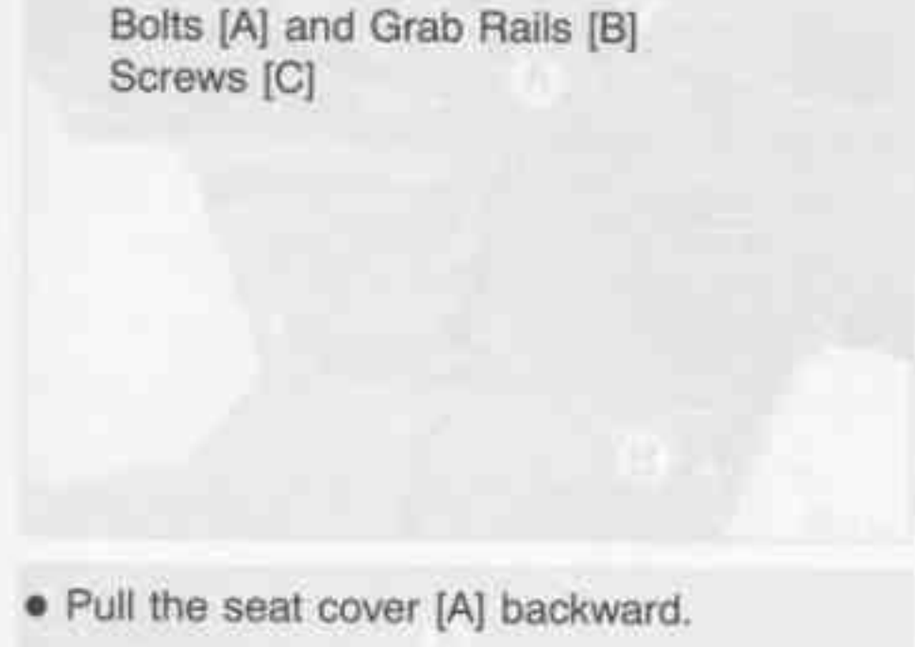


- Remove:
  Bolts [A] and Grab Rails [B]
  Screws [C]



- Pull the seat cover [A] backward.



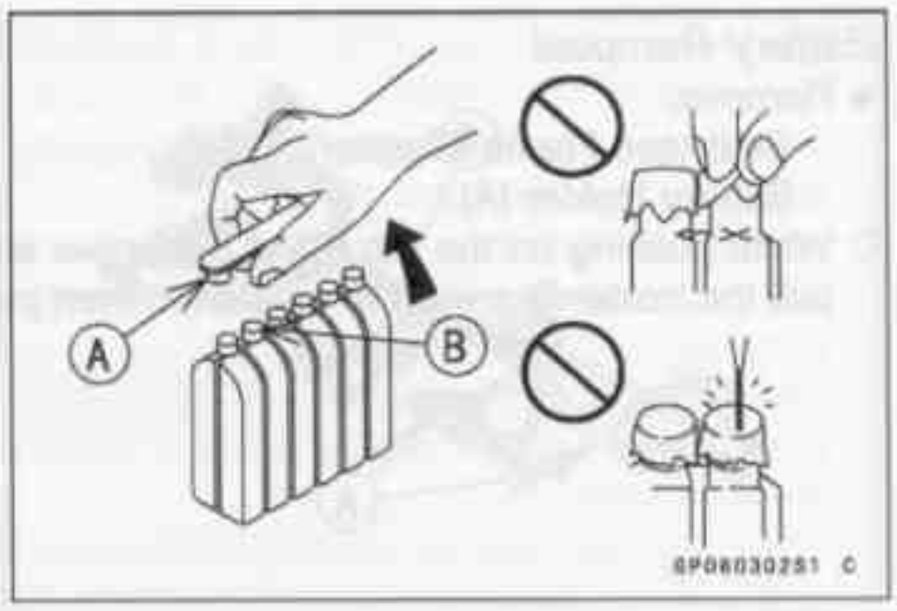


Battery

- Take the electrolyte container out of the vinyl bag.
- Detach the seal caps [A] from the container.

NOTE

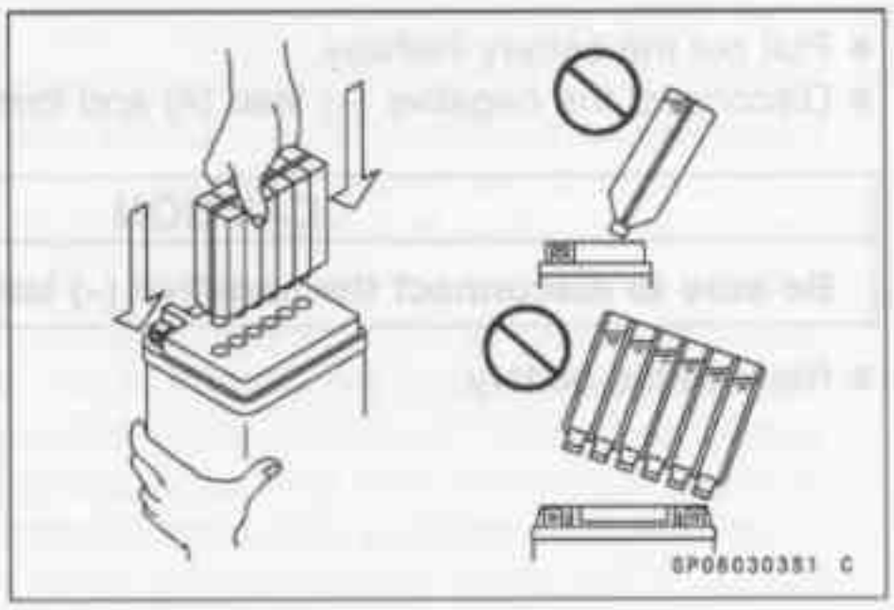
○ *Do not discard the seal caps because it is used as the battery plugs later.*
○ *Do not peel back or pierce the seals [B] on the container.*



- Place the electrolyte container upside down aligning the six seals with the six battery filler ports.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

○ *Do not tilt the container as the electrolyte flow may be interrupted.*

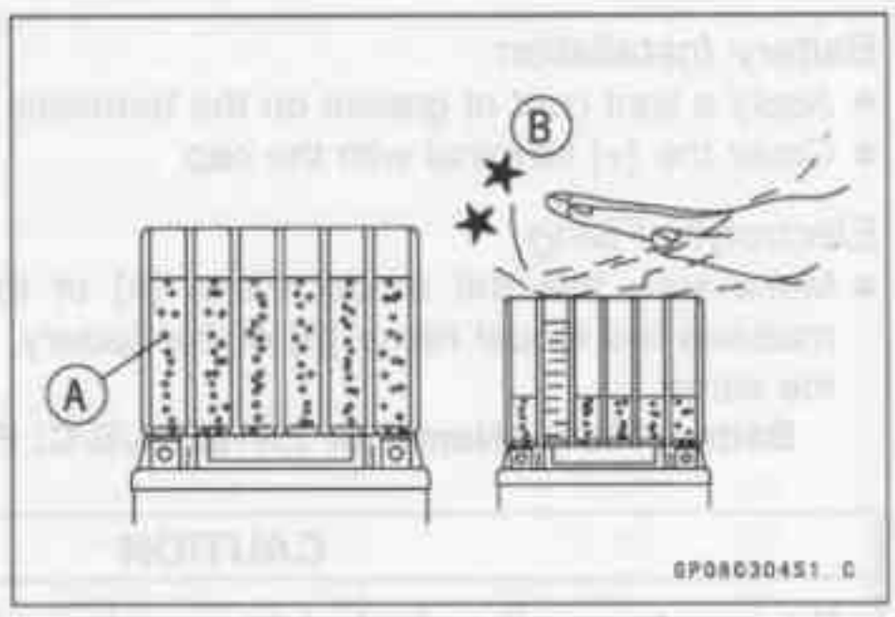


- Make sure air bubbles [A] are coming up from all six filler ports.

○ Leave the container this way for 5 minutes or longer.

NOTE

○ *If no air bubbles are coming up from a filler port, tap [B] the bottom of the bottle two or three times. Never remove the container from the battery.*



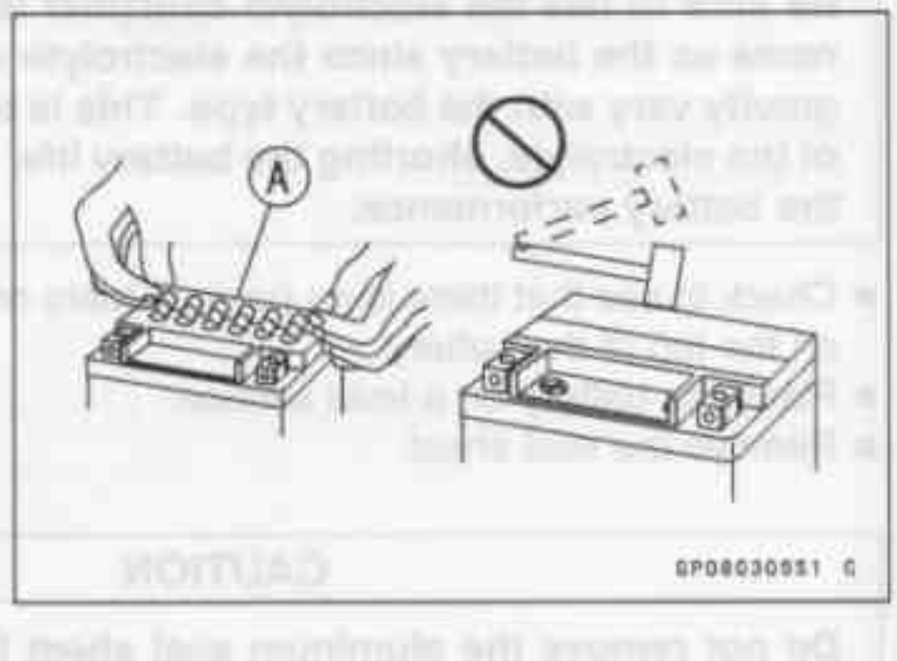
CAUTION

Fill the electrolyte into the battery until the container is completely emptied.

- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for **20** minutes. During this time, the electrolyte permeates the special separators and the gas generated by chemical reaction is released.
- Fit the seal caps [A] tightly into the filler ports until the seal caps are at the same level as the top of the battery.

NOTE

○ *Do not hammer. Press down evenly with both hands.*



CAUTION

Once you installed the seal caps after filling the battery, never remove it, nor add any water or electrolyte.

Fenders

- Raise the rear wheel off the ground.

  Special Tool - Jack: 57001–1238

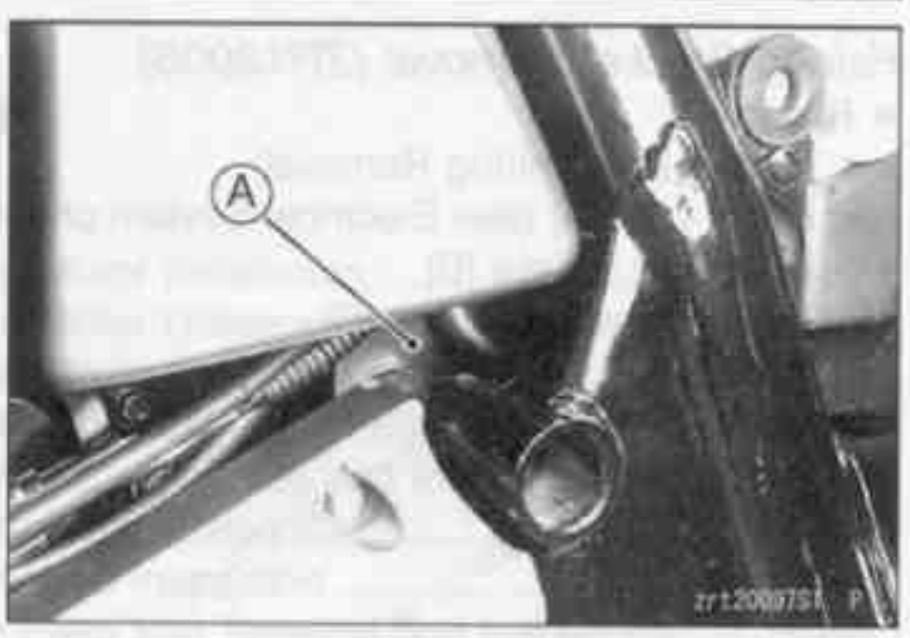
- Remove the rear shock absorber lower mounting bolts on both sides.
- Raise the frame using the jack until the rear fender front [A] removes out of the frame as shown.



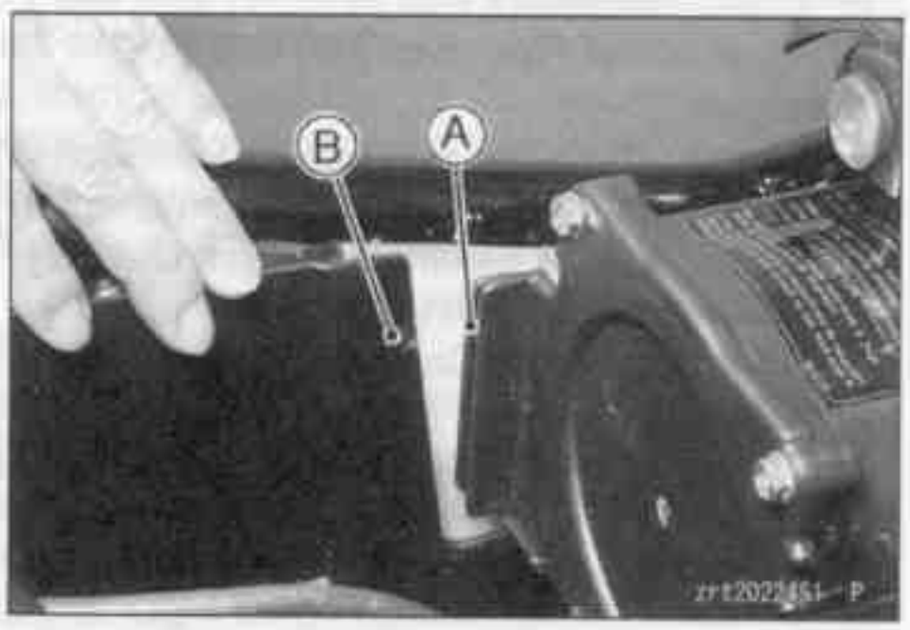
Rear Fender Front Installation

- Be sure to fit the following hooks and fitting.

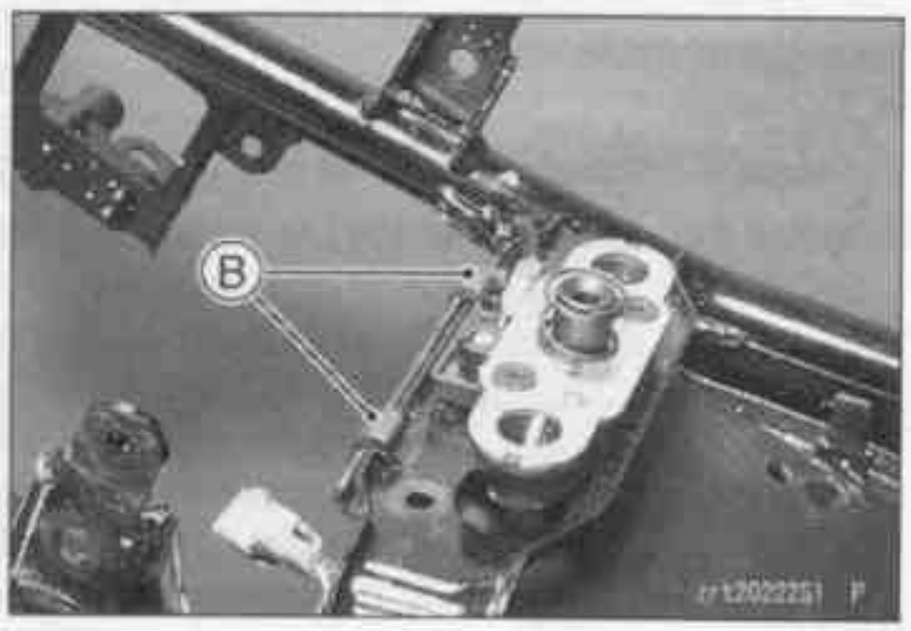
  Front Left Side Hook [A]



Grooves [A]
Edges [B]



Rear Hooks [B]



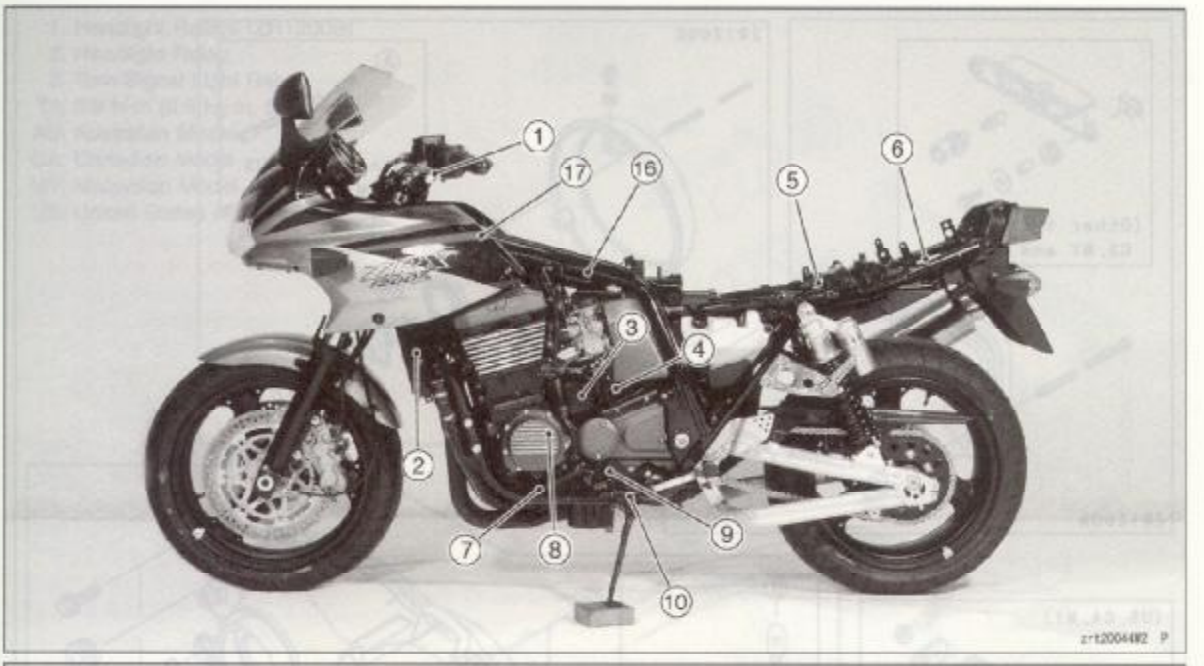
Electrical System

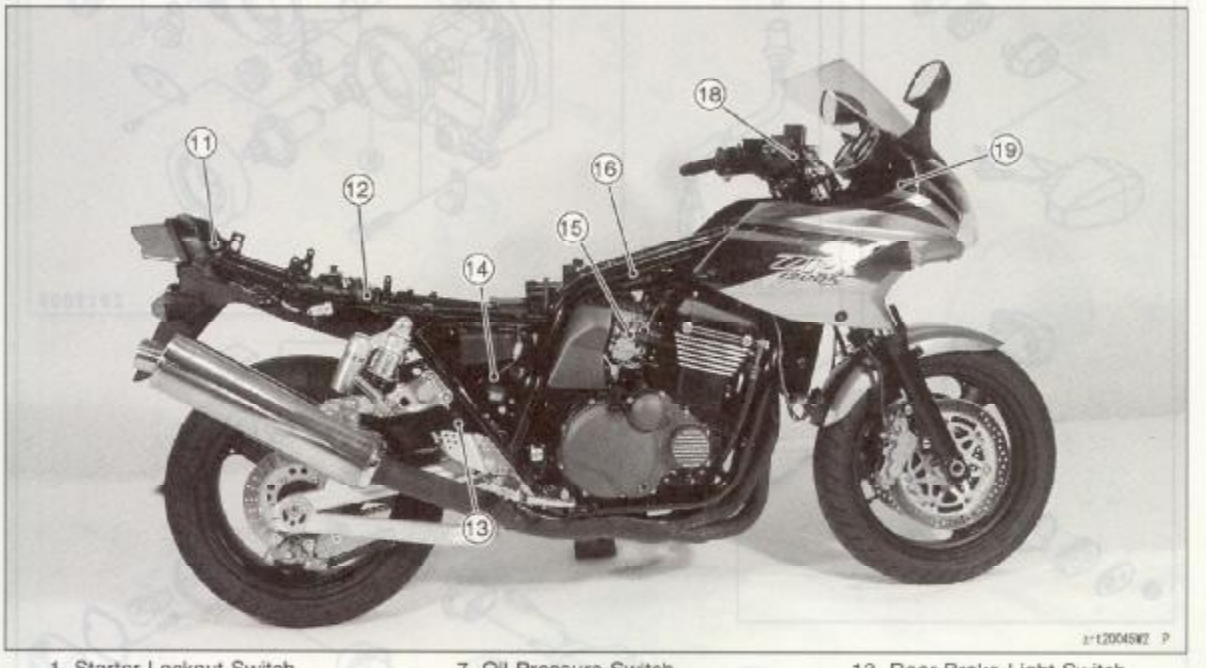
Table of Contents

Parts Location 15-3
Exploded View 15-4
Specifications 15-10
Precautions 15-11
Electrical Wiring 15-12
  Wiring Inspection 15-12
Battery 15-13
  Battery Removal 15-13
  Battery Installation 15-13
  Electrolyte Filling 15-13
  Initial Charge 15-15
  Precautions 15-15
  Interchange 15-15
  Charging Condition Inspection 15-16
  Refreshing Charge 15-16
Charging System 15-18
  Alternator Removal 15-18
  Alternator Installation 15-18
  Alternator Disassembly 15-18
  Alternator Assembly 15-20
  Operational Inspection 15-23
  Stator Coil Inspection 15-24
  Rotor Coil Inspection 15-24
  Slip Ring Cleaning 15-24
  Slip Ring Diameter 15-24
  Carbon Brush Length 15-24
  Rectifier Inspection 15-25
  Regulator Inspection 15-26
  Alternator Ball Bearing Inspection 15-26
Ignition System 15-28
  Ignition System Troubleshooting 15-28
  Pickup Coil Removal 15-29
  Pickup Coil Installation 15-29
  Pickup Coil Inspection 15-30
  Pickup Coil Peak Voltage 15-31
  Ignition Coil Removal 15-31
  Ignition Coil Installation 15-31
  Ignition Coil Inspection 15-32
  Ignition Coil Primary Peak Voltage 15-32
  Spark Plug Removal 15-33
  Spark Plug Installation 15-33
  Spark Plug Cleaning and Inspection 15-33
  Spark Plug Gap Inspection 15-34
  IC Igniter Inspection 15-34
Electrical Starter System 15-37
  Starter Motor Removal 15-37
  Starter Motor Installation 15-37
  Starter Motor Disassembly 15-37
  Starter Motor Assembly 15-38
  Brush Inspection 15-39
  Commutator Cleaning and Inspection 15-39
  Armature Inspection 15-40
  Brush Lead Inspection 15-40
  Brush Plate and Terminal Bolt Inspection 15-40
  Starter Relay Inspection 15-40
Lighting System 15-42
  Headlight Beam Horizontal Adjustment 15-42
  Headlight Beam Vertical Adjustment 15-43
  Headlight Bulb Replacement 15-44
  City Light Bulb Replacement (European Model) 15-45
  Headlight Removal/Installation 15-46
  Headlight Relay Inspection 15-47
  Headlight Relay Unit Inspection (ZR1200B) 15-47
  Tail/Brake Light Bulb Replacement 15-52
  Turn Signal Light Bulb Replacement 15-52
  Turn Signal Relay Inspection 15-53
Radiator Fan System 15-55
  Fan System Circuit Inspection 15-55
  Fan Motor Inspection 15-55
Meters, Gauges, Indicator Unit 15-56
  Meter Unit Removal 15-56
  Meter, Gauge Disassembly 15-57
  Meter Unit Assembly 15-60
  Meter Bulb Replacement 15-61
  Tachometer Inspection 15-62
  Fuel Level Gauge Inspection 15-63
  Water Temperature Gauge Inspection (ZR1200B) 15-64
Switch and Sensors 15-66
  Brake Light Timing Inspection 15-66
  Brake Light Timing Adjustment 15-66
  Switch Inspection 15-66
  Radiator Fan Switch Inspection 15-67
  Water Temperature Switch Inspection (ZR1200A/C) 15-67
  Water Temperature Sensor Inspection (ZR1200B) 15-68
  Fuel Level Sensor Inspection 15-68
  Throttle Position Sensor Removal/Installation 15-69
  Throttle Position Sensor Inspection 15-69
  Throttle Position Sensor Position Adjustment 15-70

Diode (Rectifier) Inspection 15-70
Junction Box 15-71
Junction Box Fuse Circuit Inspection 15-71
Starter Circuit/Headlight Relay Inspection 15-71
Diode Circuit Inspection 15-72
Fuse 15-74
30A Main Fuse Removal 15-74
20A Headlight Fuse Removal (ZR1200B) 15-74
Junction Box Fuse Removal 15-74
Fuse Installation 15-74
Fuse Inspection 15-75
ZR1200–A/C Wiring Diagram (Australia) 15-76
ZR1200–A/C Wiring Diagram (Europe) 15-78
ZR1200–A Wiring Diagram (Malaysia) 15-80
ZR1200–A Wiring Diagram (United States of America and Canada) 15-82
ZR1200–B Wiring Diagram (Australia) 15-84
ZR1200–B Wiring Diagram (Europe) 15-86
ZR1200–B Wiring Diagram (Malaysia) 15-88

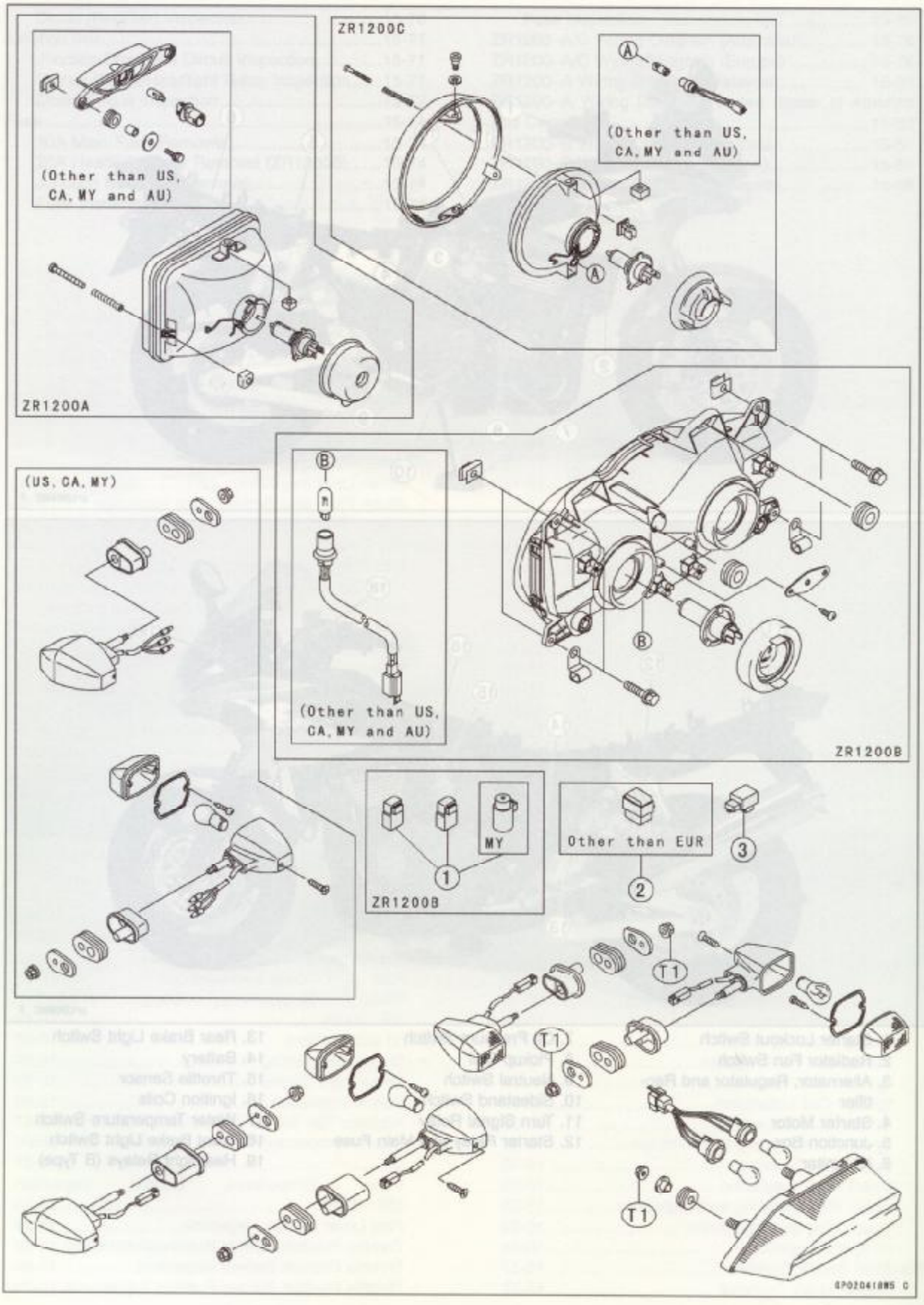
Parts Location





1. Starter Lockout Switch
2. Radiator Fan Switch
3. Alternator, Regulator and Rectifier
4. Starter Motor
5. Junction Box
6. IC Igniter
7. Oil Pressure Switch
8. Pickup Coil
9. Neutral Switch
10. Sidestand Switch
11. Turn Signal Relay
12. Starter Relay and Main Fuse
13. Rear Brake Light Switch
14. Battery
15. Throttle Sensor
16. Ignition Coils
17. Water Temperature Switch
18. Front Brake Light Switch
19. Headlight Relays (B Type)

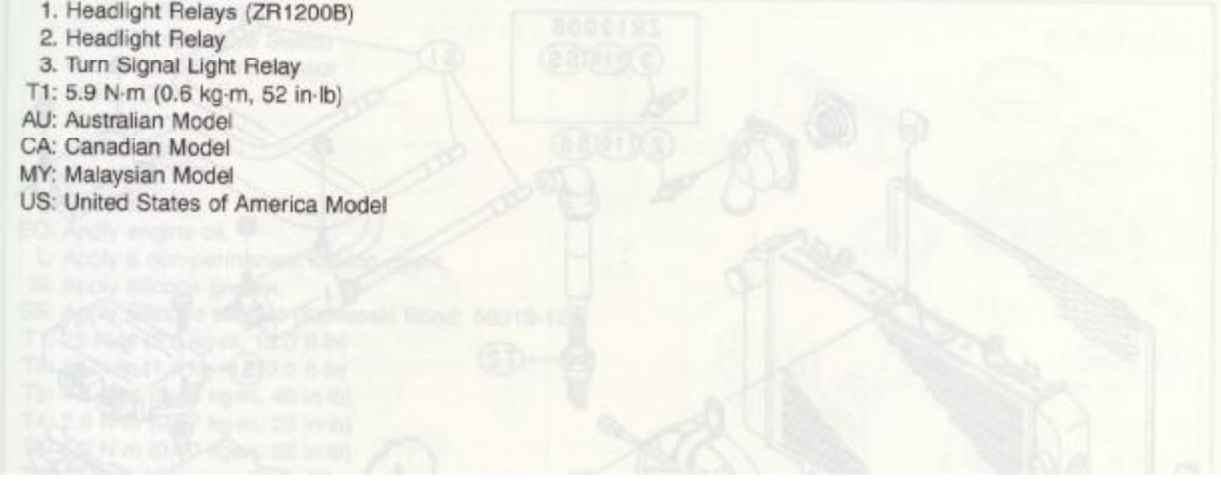
Exploded View



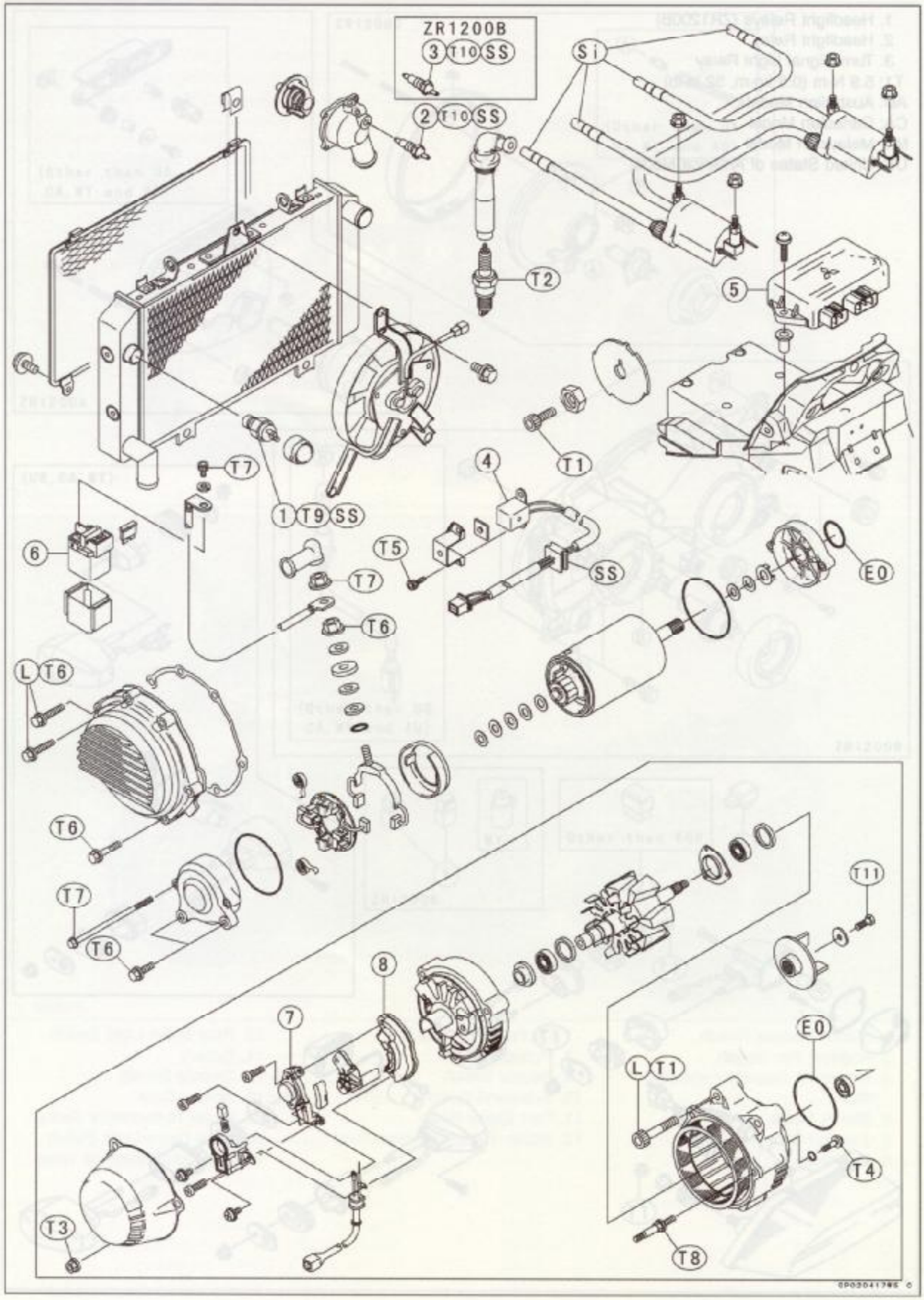
Exploded View

1. Headlight Relays (ZR1200B)
2. Headlight Relay
3. Turn Signal Light Relay

T1: 5.9 N·m (0.6 kg·m, 52 in·lb)
AU: Australian Model
CA: Canadian Model
MY: Malaysian Model
US: United States of America Model



Exploded View



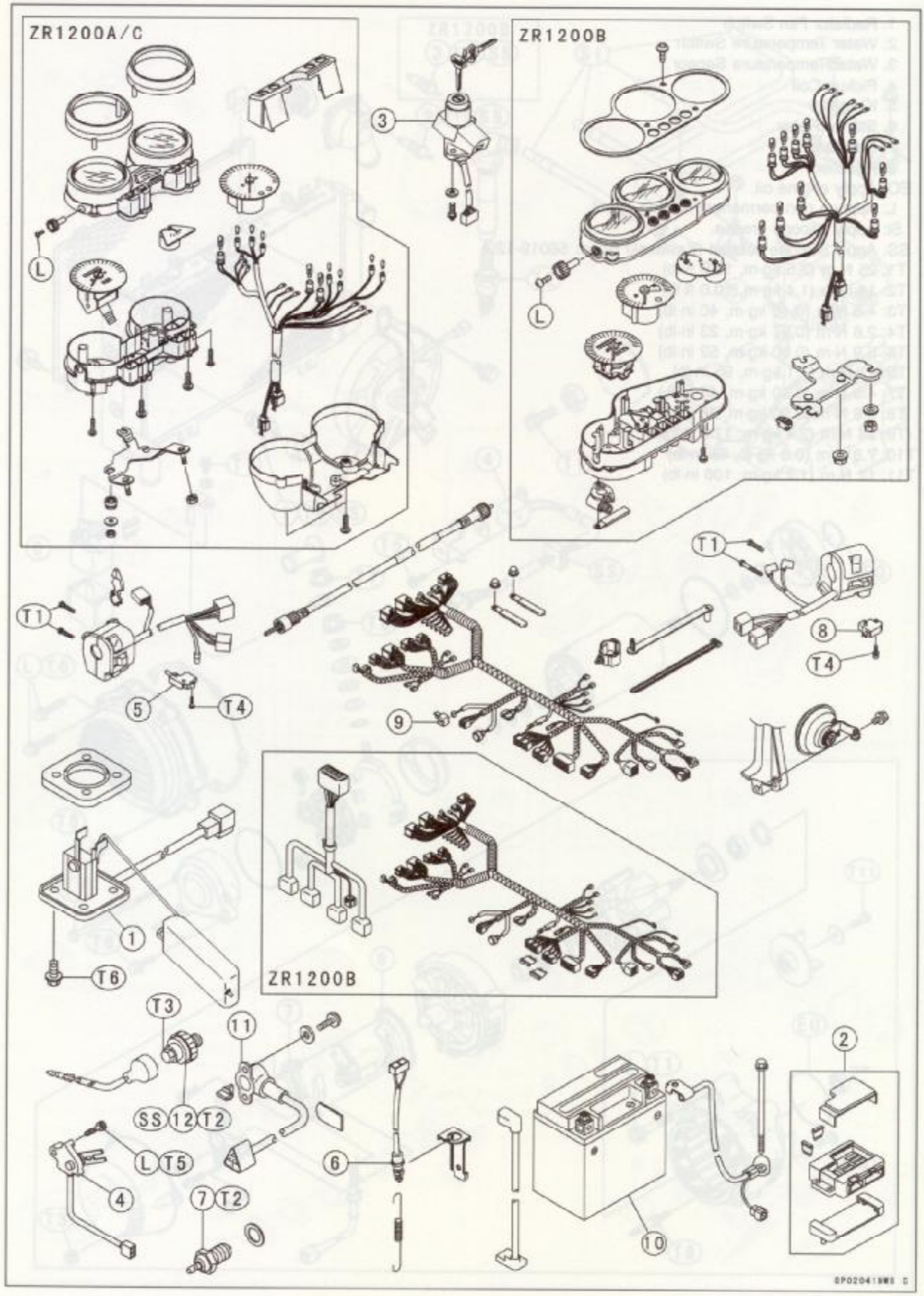
Exploded View

1. Radiator Fan Switch
2. Water Temperature Switch
3. Water Temperature Sensor
4. Pickup Coil
5. IC Igniter
6. Starter Relay
7. Regulator
8. Rectifier

EO: Apply engine oil.
L: Apply a non-permanent locking agent.
Si: Apply silicone grease.
SS: Apply Silicone sealant (Kawasaki Bond: 56019-120)
T1: 25 N·m (2.5 kg·m, 18.0 ft·lb)
T2: 14 N·m (1.4 kg·m, 10.0 ft·lb)
T3: 4.5 N·m (0.46 kg·m, 40 in·lb)
T4: 2.6 N·m (0.27 kg·m, 23 in·lb)
T5: 5.9 N·m (0.60 kg·m, 52 in·lb)
T6: 11 N·m (1.1 kg·m, 95 in·lb)
T7: 4.9 N·m (0.50 kg·m, 43 in·lb)
T8: 8.8 N·m (0.90 kg·m, 78 in·lb)
T9: 24 N·m (2.4 kg·m, 17.5 ft·lb)
T10: 7.8 N·m (0.8 kg·m, 69 in·lb)
T11: 12 N·m (1.2 kg·m, 106 in·lb)



Exploded View



Exploded View

1. Fuel Level Sensor
2. Junction Box
3. Ignition Switch
4. Sidestand Switch
5. Starter Lockout Switch
6. Rear Brake Light Switch
7. Neutral Switch
8. Front Brake Light Switch
9. Diode
10. Battery 12V 14Ah
11. Throttle Position Sensor
12. Oil Pressure Switch

L: Apply a non-permanent locking agent.
SS: Apply silicone sealant (Kawasaki Bond: 56019–120).
T1: 3.4 N·m (0.35 kg·m, 30 in·lb)
T2: 15 N·m (1.5 kg·m, 11.0 ft·lb)
T3: 1.5 N·m (0.15 kg·m, 13 in·lb)
T4: 1.2 N·m (0.12 kg·m, 10 in·lb)
T5: 8.8 N·m (0.9 kg·m, 78 in·lb)
T6: 6.9 N·m (0.7 kg·m, 61 in·lb)

Specifications

Item	Staandard	Service Limit
Battery:		
Type	MF (Maintenance Free) Battery	- - -
Capacity	12 V 14 Ah	- - -
Voltage	12.6 V or more	- - -
Alternator (Charging System):		
Type	Three-phase AC (built-in regulator/rectifier)	- - -
Charging voltage	14.2 ~ 14.8 V @4000 r/min(rpm)	- - -
Stator coil resistance	1.0 Ω or less	- - -
Rotor coil resistance	2.3 ~ 3.5 Ω	- - -
Slip ring diameter	14.4 mm (0.57 in.)	14.0 mm (0.55 in)
Carbon brush length	10.5 mm (0.41 in.)	4.5 mm (0.18 in.)
Ignition System:		
Pickup coil resistance	380 ~ 570 Ω	- - -
Ignition coil:		
3 needle arcing distance	6 mm (0.24 in.) or more	- - -
Primary winding resistance	2.3 ~ 3.5 Ω	- - -
Secondary winding resistance	12 ~ 18 kΩ	- - -
Spark plug:		
Type	NGK CR9EK or ND U27ETR	- - -
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	- - -
IC igniter inspection	in the text	- - -
Electric Starter System:		
Starter motor:		
Brush length	12 ~ 12.5 mm (0.47 ~ 0.49 in.)	7 mm (0.28 in.)
Commutator diameter	28 mm (1.1 in.)	27 mm (1.06 in.)
Switch and Sensor:		
Rear breake light switch timing	ON after about 10 mm (0.39 in) pedal travel	- - -
Engine oil pressure switch connections:	When engine is stopped: ON	- - -
	When engine is running: OFF	- - -
Fan switch resistance:		
Rising temperature	From OFF to ON @95 ~ 101 °C (203 ~ 214 °F)	- - -
Falling temperature	From ON to OFF @90 ~ 96 °C (194 ~ 205 °F)	- - -
	ON: Less than 0.5 Ω	
	OFF: More than 1 MΩ	
Water temperature sensor internal resistance	in the text	- - -
Water temperature switch resistance:		
Rising temperature	From OFF to ON @112 ~118 °C (236 ~ 238 °F)	- - -
Falling temperature	From ON to OFF @ above 108	- - -
	ON: Less than 0.5 Ω	- - -
	OFF: More than 1 MΩ	- - -
Fuel level sensor resistance		
Full position	4 ~ 10 Ω	- - -
Empty position	90 ~ 100 Ω	- - -
Throttle sensor output voltage:	When engine is idling: 0.9 ~ 1.1 V	- - -
	When grip is fully opened: 4.06 ~ 4.26 V	- - -

Special Tools - Bearing Driver Set: 57001–1129
Hand Tester: 57001–1394
Spark Plug Wrench, Hex 16: 57001–1262
Igniter Checker Assembly: 57001–1378
Harness Adapter #13: 57001–1399
Throttle Sensor Setting Adapter: 57001–1400
Alternator Frame Puller: 57001–1494

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120

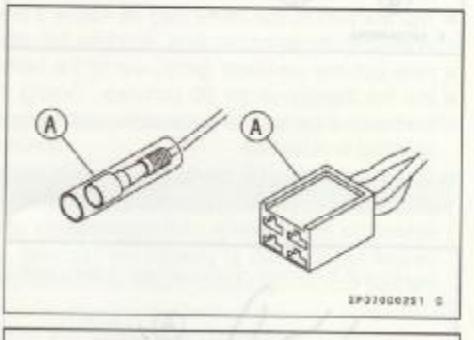
Precautions

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

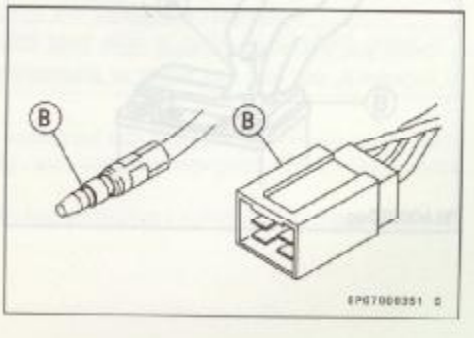
- Do not reverse the battery lead connections. This will burn out the diodes on the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should 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 button 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 caused 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.
- Measure coil and winding resistance when the part is cold (at room temperature).
- Color Codes:

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

- Electrical Connectors
  Female Connectors [A]



Male Connectors [B]



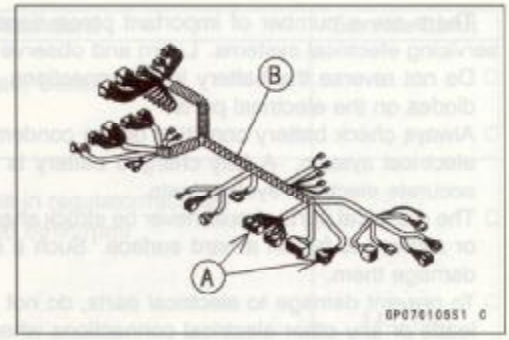
Electrical Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.
★ If any wiring is poor, replace the damaged wiring.
- Pull each connector [A] apart and inspect it for corrosion, dirt, and damage.
★ If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.
- Check the wiring for continuity.
○ Use the wiring diagram to find the ends of the lead which is suspected of being a problem.
○ Connect the hand tester between the ends of the leads.

Special Tool - Hand Tester: 57001–1394

○ Set the tester to the x 1 Ω range, and read the tester.
★ If the tester does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness [B] if necessary.

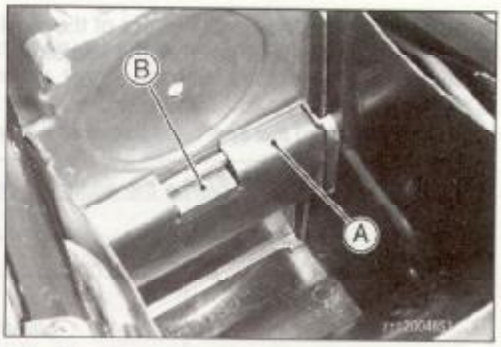


Battery

Battery Removal

- Remove:
  Seat (see Frame Chapter)
  Battery Holder [A]

○ While pushing on the tab [B] at the upper end of the battery holder, pull the holder rearward to unlatch it, then pull it up.



- Pull out the battery halfway.
- Disconnect the negative (–) lead [A] and then positive (+) lead [B].



CAUTION

Be sure to disconnect the negative (–) lead first.

- Remove the battery.

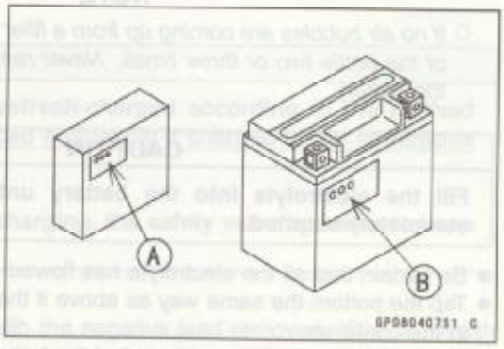
Battery Installation

- Apply a light coat of grease on the terminals to revent corrosion.
- Cover the (+) terminal with the cap.

Electrolyte Filling

- Make sure that the model name [A] of the electrolyte container matches the model name [B] of the battery. These names must be the same.

Battery Model Name for ZR1200A/B/C: FTZ14–BS



CAUTION

Be sure to use the electrolyte container with the same model name as the battery since the electrolyte volume and specific gravity vary with the battery type. This is to prevent overfilling of the electrolyte, shorting the battery life, and deterioration of the battery performance.

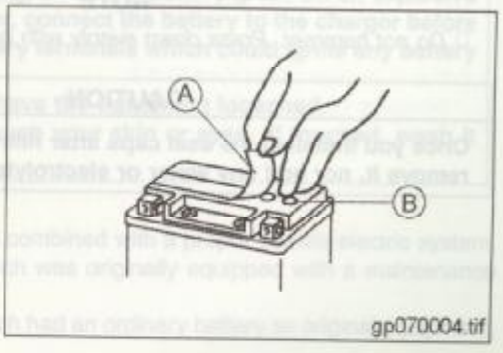
- Check to see that there is no peeling, tears or holes in the seal sheet on the top of the battery.
- Place the battery on a level surface.
- Remove the seal sheet.

CAUTION

Do not remove the aluminum seal sheet [A] sealing the filler ports [B] until just before use.

NOTE

○ *A battery whose seal sheet has any peeling, tears, holes, or from which the air-sucking sound was not heard requires a refreshing charge (initial charge).*

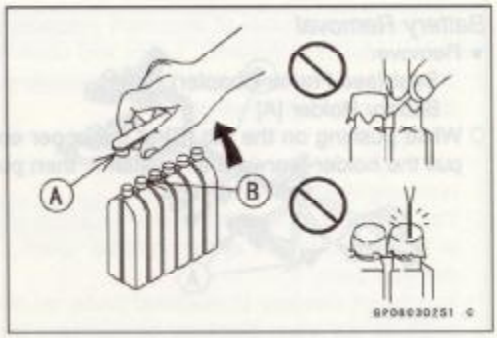


Battery

- Take the electrolyte container out of the vinyl bag.
- Detach the seal caps [A] from the container.

NOTE

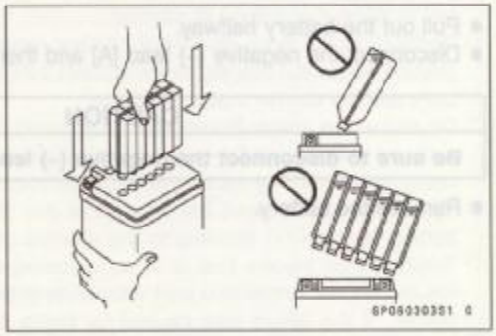
○ *Do not discard the seal caps because it is used as the battery plugs later.*
○ *Do not peel back or pierce the seals [B] on the container.*



- Place the electrolyte container upside down aligning the six seals with the six battery filler ports.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

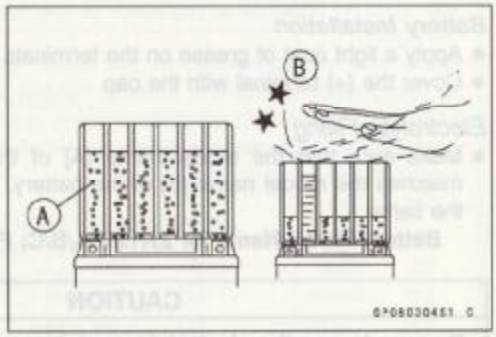
○ *Do not tilt the container as the electrolyte flow may be interrupted.*



- Make sure air bubbles [A] are coming up from all six filler ports.
○ Leave the container this way for 5 minutes or longer.

NOTE

○ *If no air bubbles are coming up from a filler port, tap [B] the bottom of the bottle two or three times. Never remove the container from the battery.*



CAUTION

Fill the electrolyte into the battery until the container is completely emptied.

- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for **20** minutes. During this time, the electrolyte permeates the special separators and the gas generated by chemical reaction is released.
- Fit the seal caps [A] tightly into the filler ports until the seal caps are at the same level as the top of the battery.

NOTE

○ *Do not hammer. Press down evenly with both hands.*



CAUTION

Once you installed the seal caps after filling the battery, never remove it, nor add any water or electrolyte.

Battery

Initial Charge

While a maintenance free battery can be used after only filling with electrolyte, a battery may not be able to sufficiently move a starter motor to start an engine in the cases shown in the table below, where an initial charge is required before use. However, if a battery shows a terminal voltage of higher than 12.5 V after 10 minutes of filling (Note 1), no initial charge is necessary.

Condition requiring initial charge	Charging method
At low temperatures (lower than 0°C)	1.4 A x 2 ~ 3 hours
Battery has been stroed in high temperature and humidity.	1.4 A x 15 ~ 20 hours
Seal has been removed, or broken - peeling, tear or hole. (If you did not hear the air-sucking sound "Shoosh" as you removed the seal.)	
Battery as old as 2 years or more after manufacture. Battery manufacturing date is printed on batteru top. Example) 12 (Day) 10 (Month) 99 (Year) T1 (Mfg. location)	

Note 1 : Terminal voltage — To measure battery terminal voltage, use a digital voltmeter.

Precautions

1) No need of topping-up

No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the sealing plug to add water is very dangerous. Never do that.

2) Refreshing charge

If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see the Electrical System chapter).

When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. However, the battery's performance may be reduced noticeably if charged under conditions other than given above.
Never remove the seal caps during refresh charge.
If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

3) When you do not use the motorcycle for months

Give a refresh charge before you store the motorcycle and store it with the negative lead removed. Give a refresh charge once a month during storage.

4) Battery life

If the battery will not start the engine even after several refresh charges, the battery has exceeded its useful life. Replace it. (Provided, however, the vehicle's starting system has no problem.)

⚠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.
No fire should be drawn near the battery, or no terminals should have the tightening loosened.
The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

Interchange

A maintenance free battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace a maintenance free battery only on a motorcycle which was originally equipped with a maintenance free battery.

Be careful, if a maintenance free battery is installed on a motorcycle which had an ordinary battery as original equipment, the maintenance free battery's life will be shortened.

Battery

Charging Condition Inspection

Battery charging condition can be checked by measuring battery terminal voltage.

- Remove the battery (see Battery Removal).

CAUTION

Be sure to disconnect the negative (–) lead first.

- Measure the battery terminal voltage.

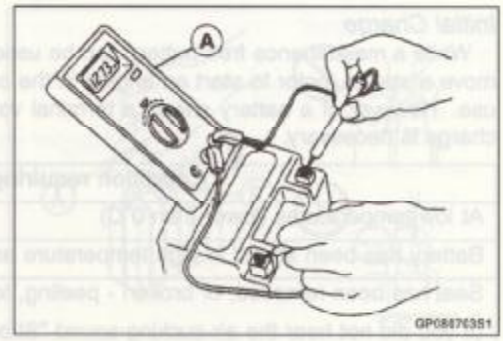
NOTE

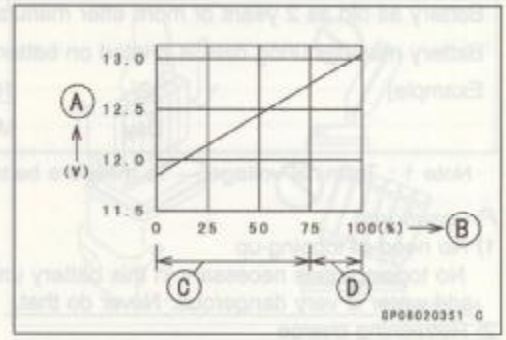
○ *Measure with a digital voltmeter [A] which can be read to one decimal place voltage.*

★ If the reading is below the specified, refreshing charge is required.

Battery Terminal Voltage

Standard: **12.6 V or more**





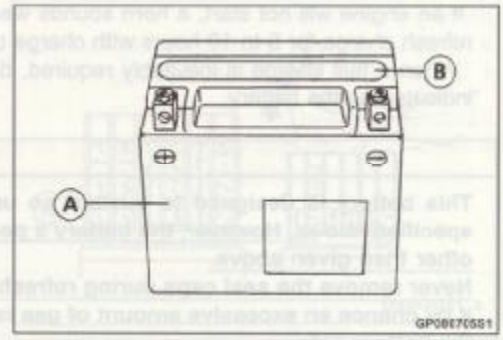
Terminal Voltage (V) [A]
Battery Charge Rate (%) [B]
Refresh charge is required [C]
Good [D]

Refreshing Charge

- Remove the battery [A] (see Battery Removal).
- Refresh-charge by following method according to the battery terminal voltage.

⚠ WARNING

This battery is sealed type. Never remove seal sheet [B] even at charging. Never add water. Charge with current and time as stated below.



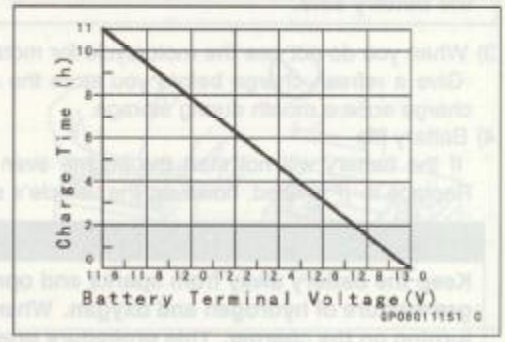
Terminal Voltage: 11.5 ~ less than 12.6 V

Standard Charge

1.4 A x 5 ~ 10 h (see following chart)

Quick Charge

7.0 A x 1.0 h



CAUTION

If possible, do not quick charge. If the quick charge is done due to unavoidable circumstances, do standard charge later on.

Terminal Voltage : less than 11.5 V

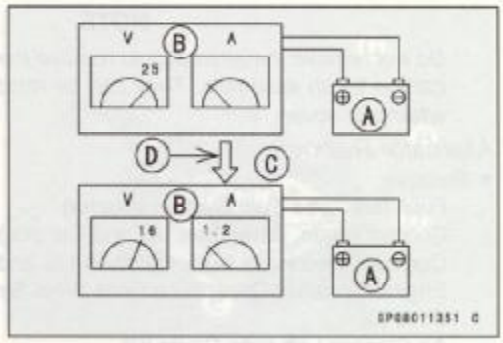
Charging Method: 1.4 A x 20 h

Battery

NOTE

○ *Increase the charging voltage to a maximum voltage of 25 V if the battery will not accept current initially. Charge for no more than 5 minutes at the increased voltage then check if the battery is drawing current [D]. If the battery will accept current decrease the voltage and charge by the standard charging method described on the battery case. If the battery will not accept current after 5 minutes, replace the battery.*

Battery [A]
Battery Charger [B]
Standard Value [C]



- Determine battery condition after refreshing charge.

○ Determine the condition of the battery 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.6 V or higher	Good
12.0 ~ 12.6 V or lower	Charge insufficient → Recharge.
12.0 V or lower	Unserviceable → Replace

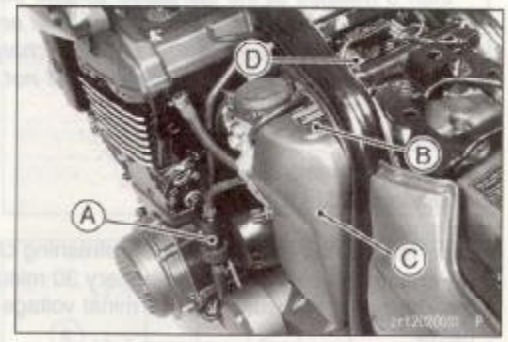
Charging System

NOTE

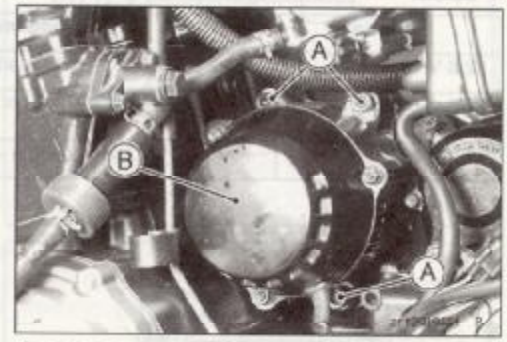
○ *Do not remove the alternator to remove the rectifier, regulator, and carbon brush assembly. They can be removed after removing the alternator cover.*

Alternator Removal

- Remove:
  Fuel Tank (see Fuel System chapter)
  Coolant (drain, other than US and Canada)
  Coolant Valve Hose [A] (other than US and Canada)
  Engine Sprocket Cover (see Final Drive System chapter)
  Bolts [B]
  Air Cleaner Left Side Cover [C]
  Alternator Lead Connector [D]



- Remove the alternator mounting bolts [A]
- Remove the alternator [B].



Alternator Installation

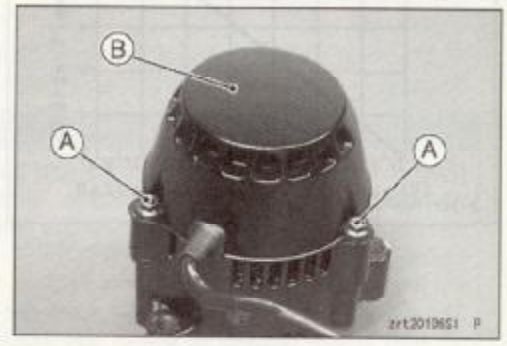
- Replace the O-ring [A] with the new one and apply a small amount of engine oil to the O-ring.
- Clean the alternator legs and crankcase where the alternator is grounded [B].
- Apply a non-permanent locking agent to the threads of the alternator mounting bolts.
- Tighten:

Torque - Alternator Mounting Bolts: 25 N·m(2.5 kg·m, 18.0 ft·lb)



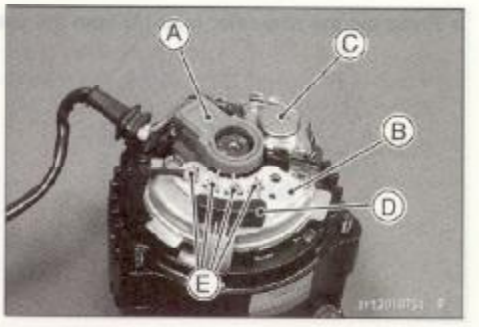
Alternator Disassembly

- Remove the alternator (see this chapter).
- Remove:
  Alternator Nuts [A] and Cover [B]



Charging System

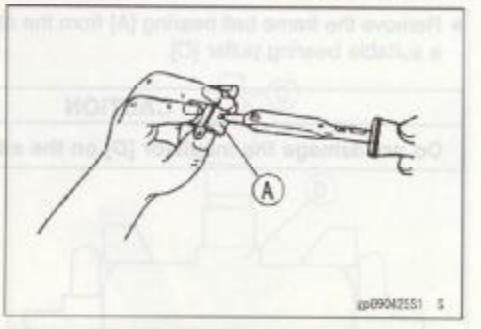
- Remove:
  Brush Assembly [A]
  Rectifier [B]
  Regulator [C]
  Rubber Holder [D]
  ○ Unsolder the leads [E] on the rectifier.



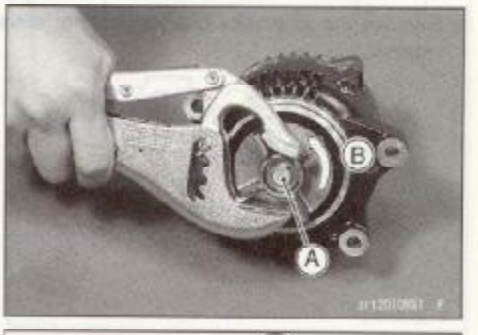
CAUTION

When unsoldering the alternator leads on the rectifier terminals, do it quickly. If high temperatures are applied for more than a few seconds, the rectifier's diodes may be damaged.

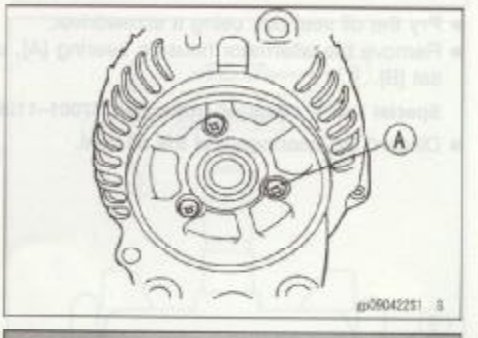
- If it is necessary to remove the carbon brush, unsolder the brush lead [A].



- Remove the alternator coupling to disassemble the rest of the parts as follows.
  ○ Hold the alternator with a vise and unscrew the coupling bolt [A].
  ○ The coupling bolt has right-hand threads and turn the bolt counterclockwise [B].
  ○ Remove the coupling bolt and coupling.

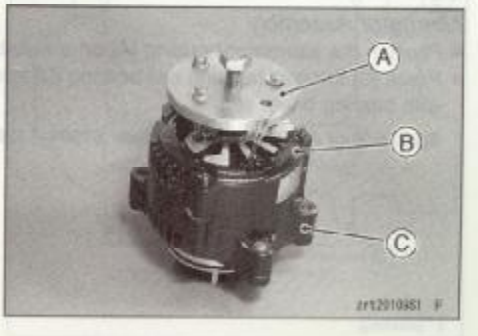


- Do not remove the alternator bearing retainer screws [A] yet.

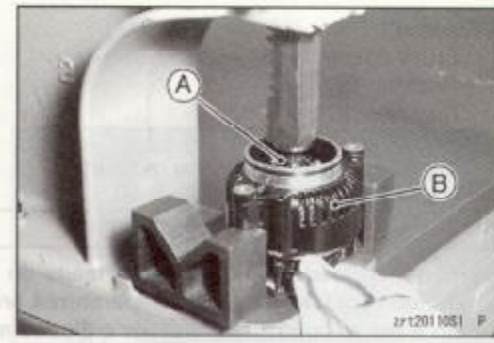


- Using the frame puller [A], separate the alternator frame [B] from the alternator housing [C].

Special Tool - Alternator Frame Puller: 57001–1494

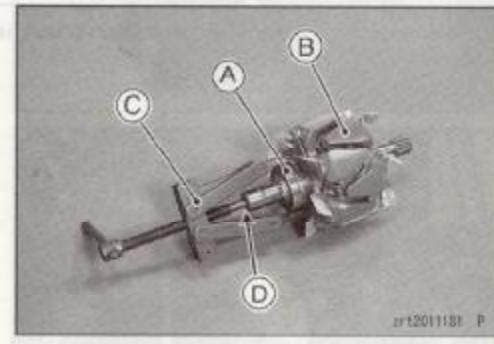


- Press out the alternator rotor [A] from the alternator housing [B].

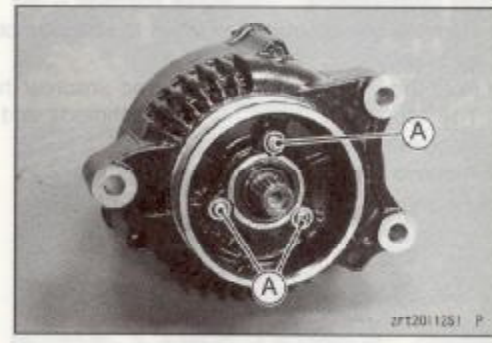


- Remove the frame ball bearing [A] from the alternator rotor [B], using a suitable bearing puller [C].

CAUTION
Do not damage the insulator [D] on the alternator rotor end.



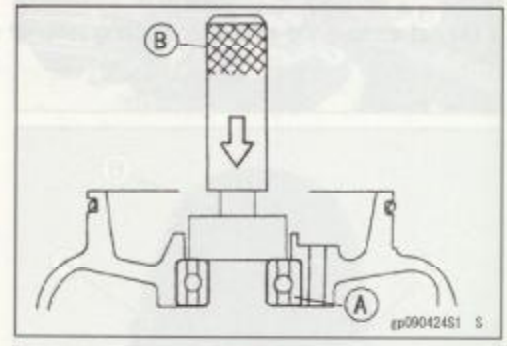
- Remove the alternator bearing retainer screws [A] and the bearing retainer.



- Pry the oil seal out, using a screwdriver.
- Remove the alternator housing bearing [A], using the bearing driver set [B].

Special Tool - Bearing Driver Set: 57001–1129

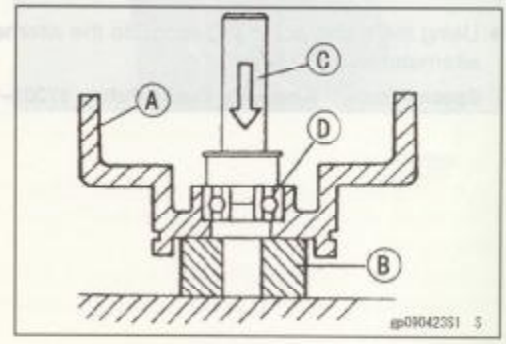
- Discard the bearings and the oil seal.



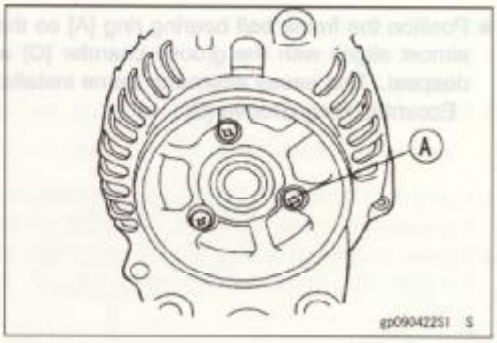
Alternator Assembly

- Position the alternator housing [A] on a suitable press fixture [B].
- Press [C] the new housing ball bearing [D] into the alternator housing with bearing driver set.

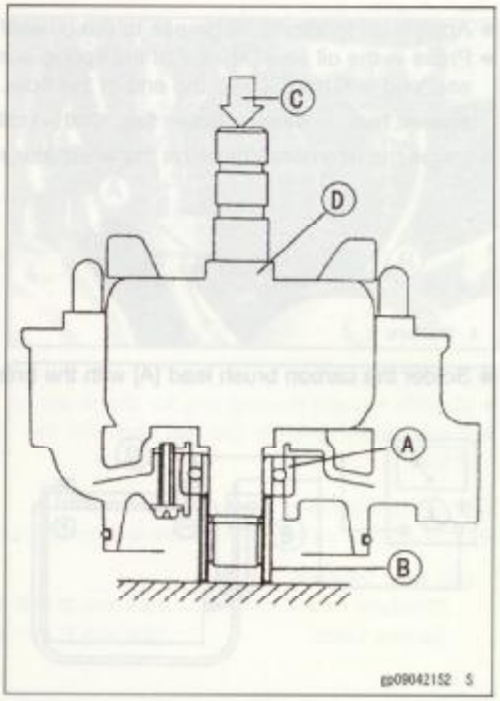
Special Tool - Bearing Driver Set: 57001–1129



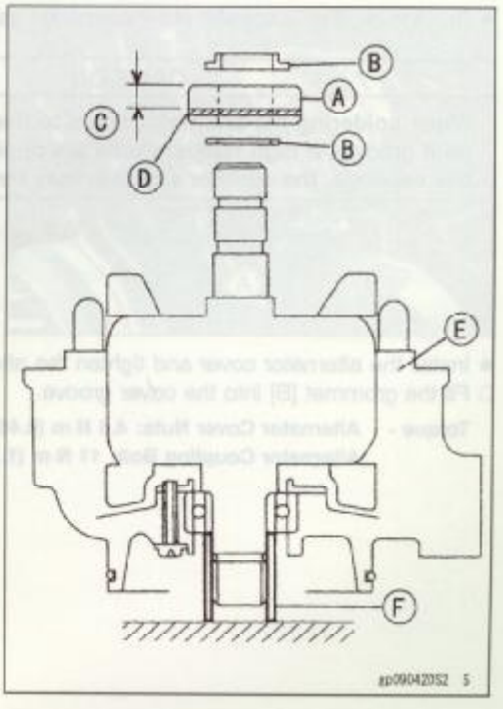
- Install the bearing retainer with its screws [A].



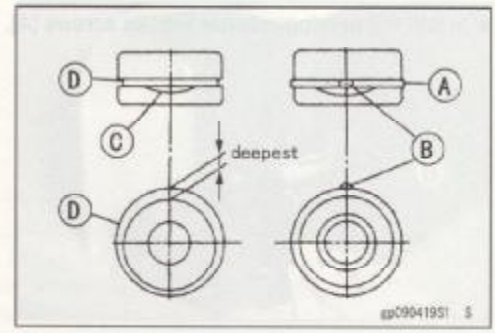
- Position the housing ball bearing [A] so that the inner race is seated on a suitable press fixture [B].
- Press [C] the alternator rotor [D] into the housing ball bearing.



- Press the new frame ball bearing [A] and bearing covers [B] onto the rotor shaft. The wider band [C] on the outer race goes up.
  Ring [D]
  Alternator Housing [E]
  Press Fixture [F]



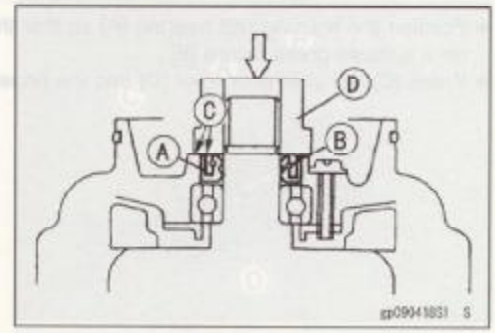
- Position the frame ball bearing ring [A] so that the ring projection [B] almost aligns with the groove chamfer [C] where the groove is the deepest. This eases alternator frame installation.
  Eccentric Ring Groove [D]



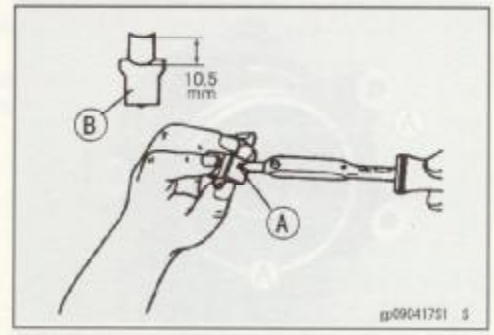
- Apply high temperature grease to the oil seal lips.
- Press in the oil seal [A] so that the spring band [B] faces out and the seal end is flush [C] with the end of the hole.

  Special Tool - Bearing Driver Set: 57001-1129 [D]

- Install the alternator frame on the alternator rotor.



- Solder the carbon brush lead [A] with the brush holder [B] as shown.



- Run the rectifier leads [A] into the grooves as shown.

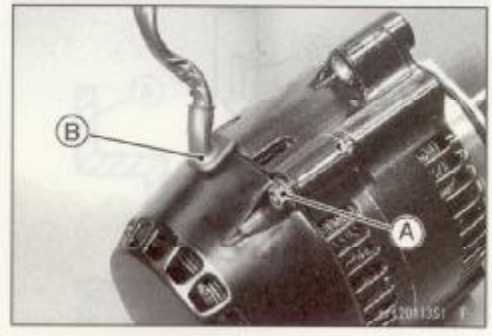


CAUTION

When soldering the alternator leads to the rectifier terminals, do it quickly. If high temperatures are applied for more than a few seconds, the rectifier's diodes may be damaged.

- Install the alternator cover and tighten the alternator cover nuts [A].
- Fit the grommet [B] into the cover groove.

  Torque - Alternator Cover Nuts: 4.5 N·m (0.46 kg·m, 40 in·lb)
  Alternator Coupling Bolt: 11 N·m (1.1 kg·m, 95 in·lb)



Charging System

Operational Inspection

For any charging system problems, always check the charging system wiring first (see Wiring Inspection), and then check the system with the following tests shown in the troubleshooting guide.

Troubleshooting Guide

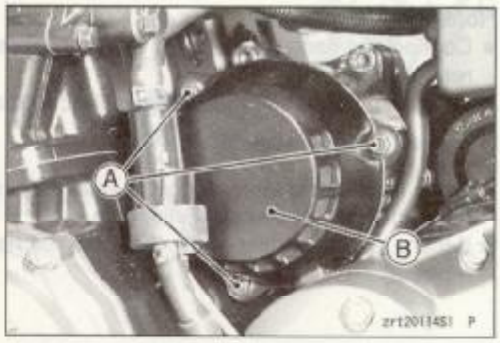
Test No.	Trouble	Symptoms
1	Battery discharged	Starter not rotating
2	Battery overcharged	Electrolyte level lowering quickly
3	Noise	Alternator or alternator chain noise

Test No. 1-Battery Discharged

- Remove the alternator cover nuts [A], and take off the cover [B].
- Check that the alternator leads and connectors are in good condition.

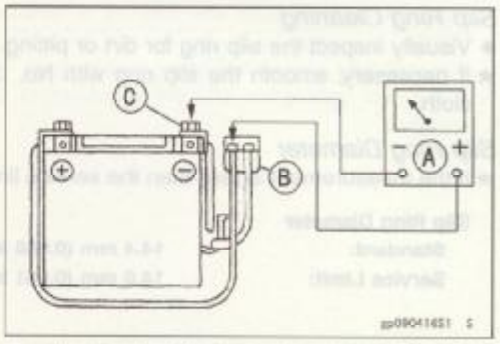
★ If not, repair or replace the damaged parts.

- Replace the discharged battery with a good battery.



- Connect the hand tester [A] to the battery leads as shown.

Starter Relay [B] Battery Negative Terminal [C]



- Check charging voltage with the engine running.

★ If the charging voltage is higher than 13.5 V, the charging system is in good condition.

★ If the charging voltage is lower than 13.5 V, go to the next test.

Charging Voltage 14.2 ~ 14.8 V @4000 r/min(rpm)

- Ground the F terminal [A] of the regulator to the engine with an auxiliary wire.
- Start the engine, and check the charging voltage with the engine running.

★ If the charging voltage is higher than 13.5 V, check the regulator.

★ If the charging voltage is lower than 13.5 V, check the following.

Alternator Output Voltage
Stator Coil
Rotor Coil
Slip Rings
Carbon Brushes
Rectifier



Test No. 2-Battery Overcharged

- Check the regulator and/or rotor.

★ Repair or replace the damaged parts.

Test No. 3-Noise

- Check the alternator chain slack and replace the chain if necessary (see Crankshaft/Transmission chapter).
- Check the alternator shaft ball bearings if they make a noise.
- Check the alternator ball bearings, stator coil, and/or rectifier if the alternator makes a noise.

★ Repair or replace the damaged parts.

Charging System

Stator Coil Inspection

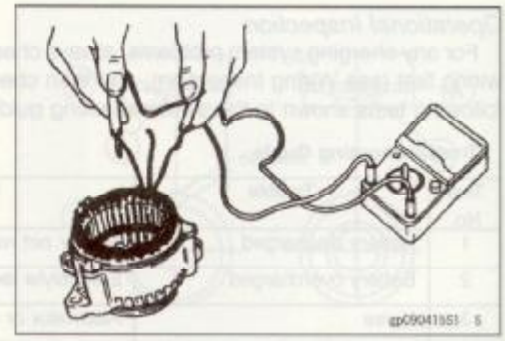
- Connect the hand tester (x 1 Ω range) between the coil leads and read the tester.

★ If the tester does not read as specified, replace the alternator frame.

Startor Coil Resistance: 1.0 Ω or less

- Using the highest hand tester range, measure the resistance between the stator coil core and each of the coil windings.

★ If there is any reading at all, the stator coil winding has a short and the alternator frame must be replaced.



Rotor Coil Inspection

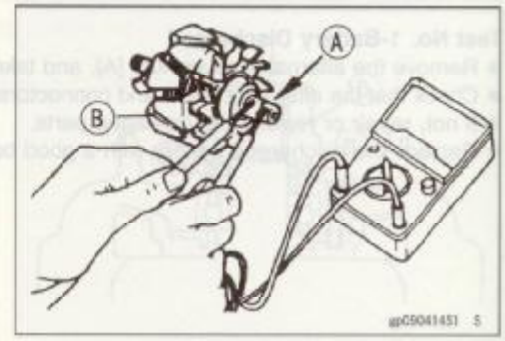
- Connect the hand tester (x 1 Ω range) between the slip rings [A] and read the tester.

★ If the tester does not read as specified, replace the rotor [B].

Rotor Coil Resistance: 2.3 ~ 3.5Ω

- Using the highest tester range, measure the resistance between the rotor shaft and each of the slip rings.

★ If there is any reading at all, the rotor coil has a short and must be replaced.



Slip Ring Cleaning

- Visually inspect the slip ring for dirt or pitting.

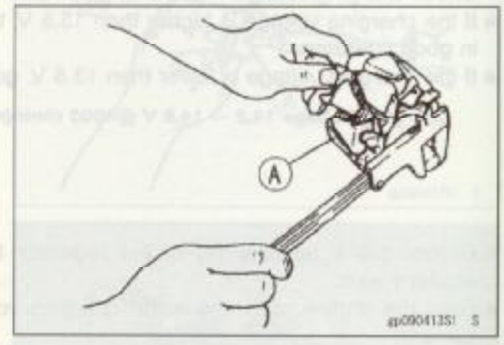
★ If necessary, smooth the slip ring with No. 300 ~ No. 500 emery cloth.

Slip Ring Diameter

★ If the measurement is less than the service limit, replace the rotor [A]

Slip Ring Diameter

Standard:	**14.4 mm (0.566 in.)**
Service Limit:	**14.0 mm (0.551 in.)**



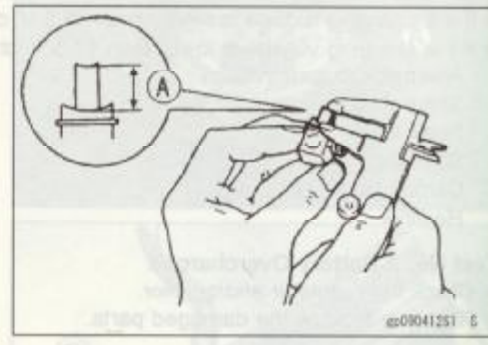
Carbon Brush Length

- Measure the length [A] both carbon brushes that stick out of the holder.

★ If either one is worn down to less than the service limit, replace it.

Carbon Brush Length (projected portion)

Standard:	**10.5 mm (0.413 in.)**
Service Limit:	**4.5 mm (0.18 in.)**



Rectifier Inspection

- Set the hand tester to the 1 kΩ range.
- Zero the hand tester, and connect it to each terminal [A] to check the resistance in both directions.

○ The resistance should be low in one direction and more than ten times as much in the other direction. If the rectifier [B] shows low or high in both directions, the rectifier is defective and the rectifier must be replaced.



NOTE

○ *The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking, the lower reading should be from zero to one half the scale.*

CAUTION

If a megger or a meter with a large-capacity battery is used, the rectifier will be damaged.

Charging System

Regulator Inspection

- Prepare testing tools.

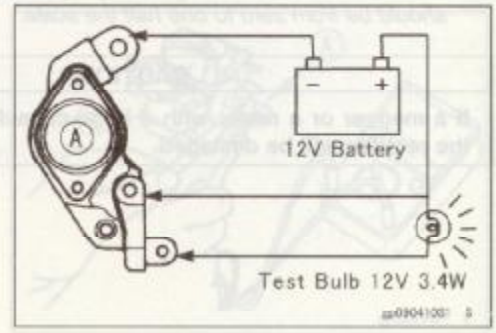
Test light:	Bulb rated 12 V 3.4 W
Batteries:	Two 12 V batteries
Test wires:	Three auxiliary wires

CAUTION

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

- Connect the test light and the 12 V battery to the regulator [A] as shown.

○ The test light should go on at this time.



CAUTION

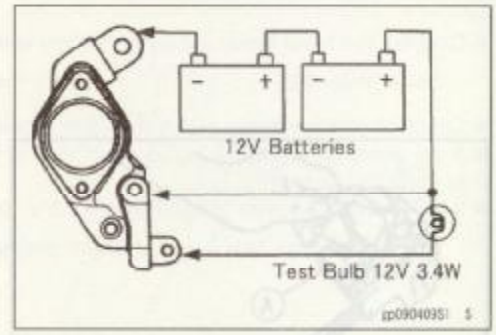
Do not contact the regulator metal case with the wires from the battery (+) or (-) terminal during the test.

★ If the test light does not go on, the regulator is damaged and must be replaced.

- Connect the test light and two 12 V batteries to the regulator as shown.

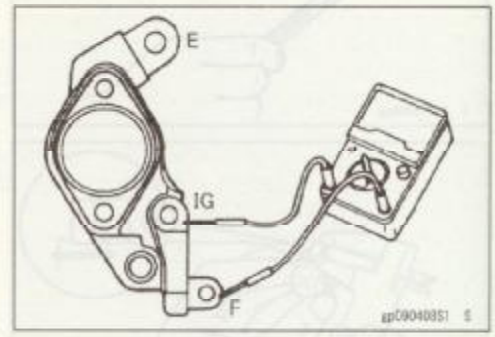
○ The test light should not go on at this time.

★ If the test light goes on, the regulator is damaged and must be replaced.



- Set the hand tester to the 1 kΩ range.
- Check the resistance between IG and F terminals in both directions.

★ If the reading shows zero or infinity (no reading) in both directions, the regulator is defective and must be replaced.



Alternator Ball Bearing Inspection

CAUTION

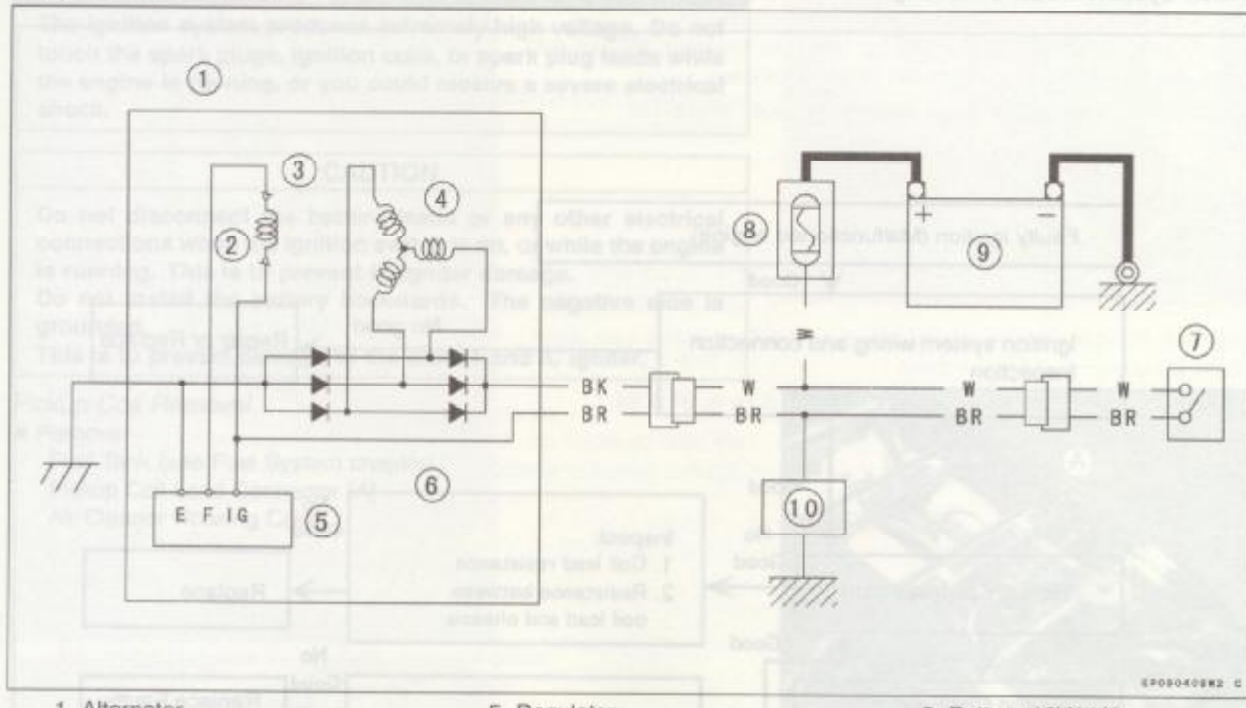
Do not disassemble the alternator for bearing inspection since disassembling the alternator damages the bearings.

- Turn the alternator rotor shaft back and forth while checking for plays, roughness or binding of bearings.

★ If bearing play, roughness, or binding is found, disassemble the alternator and replace the bearings.

Charging System

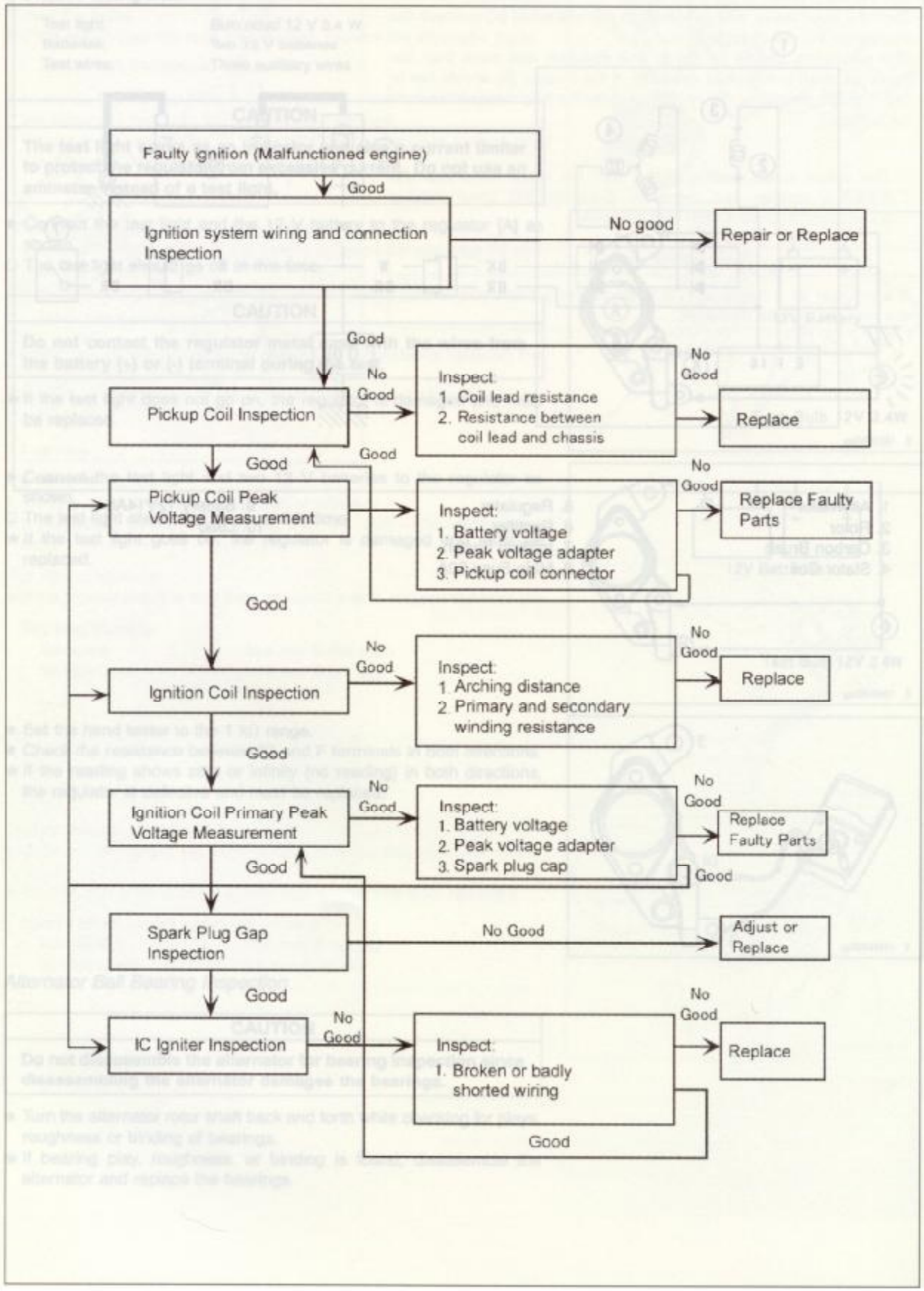
Charging System Circuit



1. Alternator
2. Rotor
3. Carbon Brush
4. Stator Coil
5. Regulator
6. Rectifier
7. Ignition Switch
8. Main Fuse 30A
9. Battery 12V14Ah
10. Load

Ignition System

Ignition System Troublreshooting



Ignition System

⚠ WARNING

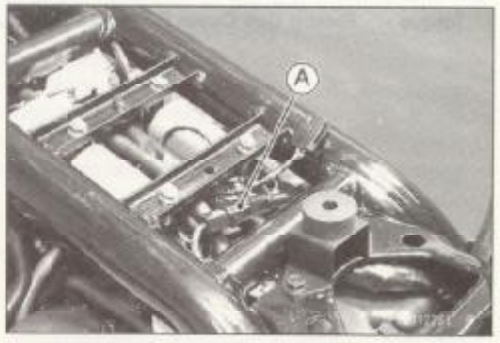
The ignition system produces extremely high voltage. Do not touch the spark plugs, ignition coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.

CAUTION

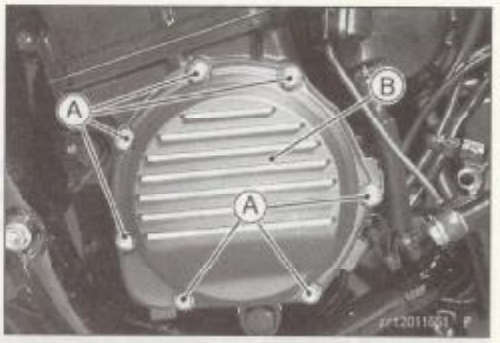
Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent IC igniter damage.
Do not install the battery backwards. The negative side is grounded.
This is to prevent damage to the diodes and IC igniter.

Pickup Coil Removal

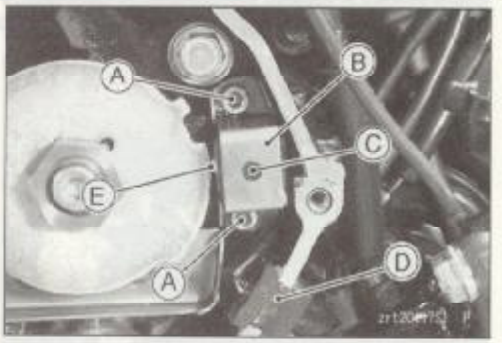
- Remove:
  Fuel Tank (see Fuel System chapter)
  Pickup Coil Lead Connector [A]
  Air Cleaner Housing Cover



Bolts [A]
Pickup Coil Cover [B]
Engine Sprocket Cover (see Fainal Draive chapter)



- Remove:
  Pickup Coil Bolts [A]
  Holder [B]
  Damper [C]
  Grommet [D]
  Pickup Coil [E]



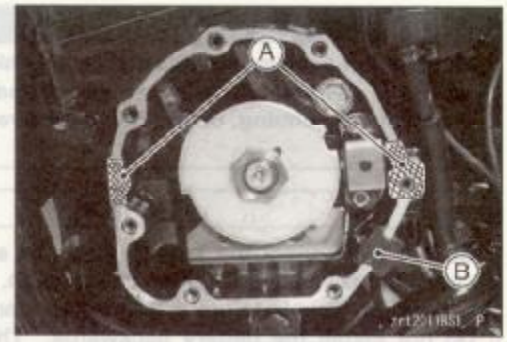
Pickup Coil Installation

- Route the pickup coil lead correctly (see Cable, Wire, and Hose Routing in the General Information chapter).
- Apply a non-permanent locking agent to the threads of the pick up coil bolts.
- Install the pickup coil and tighten the pickup coil bolts.

Torque - Pickup Coil Bolts: 5.9 N·m (0.60 kg·m, 52 in·lb)

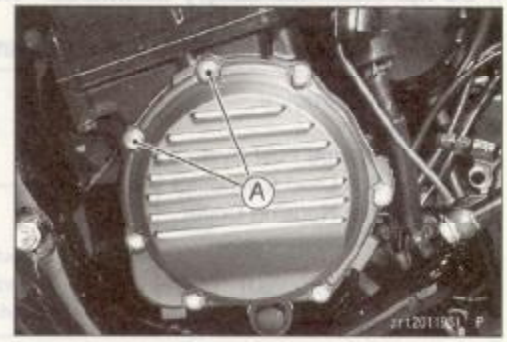
- Apply silicone sealant to the crankcase halves mating surface [A] on the front and rear sides of the pickup coil cover mount.
- Apply silicone sealant to the pick up coil lead grommet [B] and set the grommet securely in the notch of the crankcase.

Sealant - Kawasaki Bond (Silicone Sealant): 56019–120



- Apply a non-permanent locking agent to the two pickup coil cover bolts [A] shown and tighten them.

Torque - Pickup Coil Cover Bolts: 9.8 N·m (1.0 kg·m, 87 in·lb)



Pickup Coil Inspection

- Remove:
  Fuel Tank (see Fuel System chapter)
  Pickup Coil Lead Connector [A]
- Set the hand tester to the x 100 Ω range and connect it to the pickup coil lead connector.

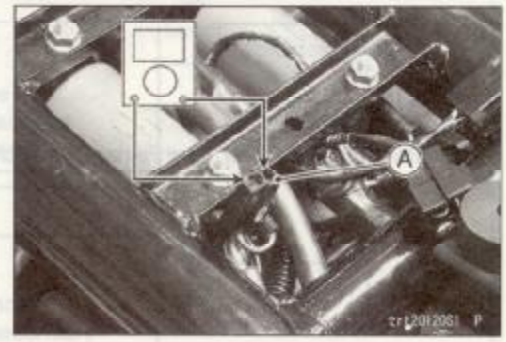
Special Tool - Hand Tester: 57001–1394

★ 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: 380 ~ 570 Ω

★ Using the highest resistance range of the tester, measure the resistance between the pickup coil leads and chassis ground.

★ Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.

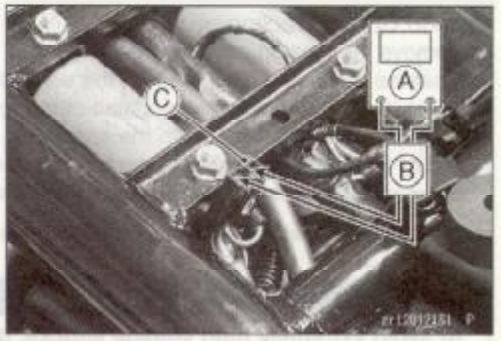


Ignition System

Pickup Coil Peak Voltage

NOTE

○ *Be sure the battery is fully charged.*
○ *Using the peak voltage adapter is a more reliable way to determine the condition of the pickup coil than pickup coil internal resistance measurements.*



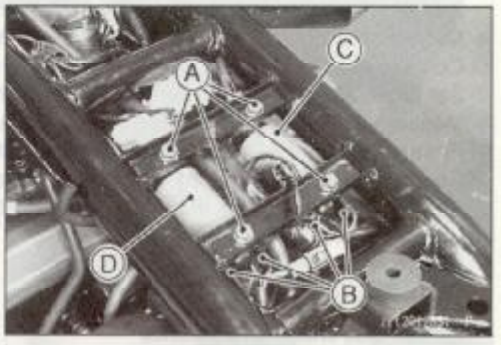
- Remove:
  Fuel Tank (see Fuel System chapter)
  Pickup Coil Lead Connector
- Set the Hand Tester [A] to the x 25 V DC range, and connect it a commercially available Peak Voltage Adapter [B] as shown in the diagram.
- Connect the black lead of the Adapter to black/white and red lead to yellow lead in the Pickup Coil connector [C].
- Turn the ignition switch and engine stop switch on.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission gear in neutral to measure the pickup coil peak voltage.
- Repeat the measurement 5 or more times.

Pickup Coil Peak Voltage
Standard: **1.6 V or more**

Special Tool - Hand Tester: 57001-1394
Recommended Tool - Peak Voltage Adapter
Type: KEK-54-9-B
Brand: KOWA SEIKI

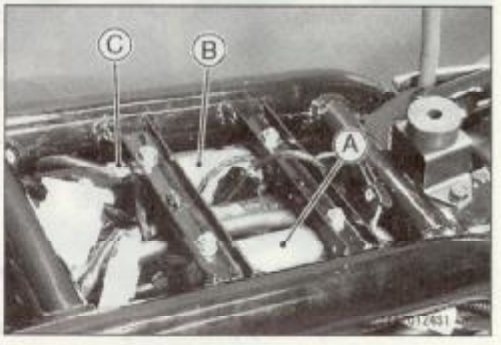
★ If the tester reading is not specidied one, check the pickup coil.

Ignition Coil Removal



- Remove:
  Fuel Tank (see Fuel System chapter)
  Spark Plug Caps
  Mounting Nuts [A]
  Primary Lead Connectors [B]
  Ignition Coil #2, 3 [C]
  Ignition Coil #1, 4 [D]

Ignition Coil Installation

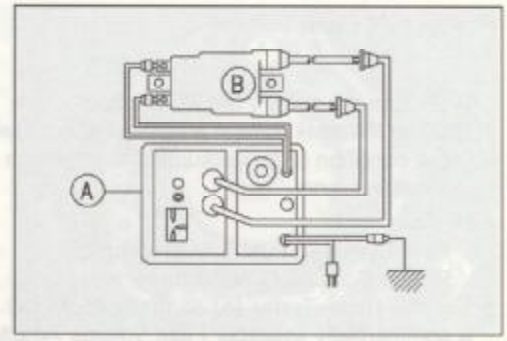


- Install the ignition coils.
○ Connect the primary winding leads to the ignition coil terminals.
  Black Lead → to #1, #4 Coil [A]
  Green Lead → to #2, #3 Coil [B]
  Red Leads → to both Coils
○ Tighten the chassis ground lead [C] with the #2, #3 coil.

Ignition Coil Inspection

- Remove the ignition coils (see this chapter).
- Measure the arcing distance with the suitable commercially available coil tester [A] to check the condition of the ignition coil [B].
- Connect the ignition coil (with the spark plug cap left attached at the end of the spark plug lead) to the tester in the manner prescribed by the manufacturer and measure the arcing distance.

Ignition Coil Arcing Distance: 6 mm or more



⚠ WARNING

To avoid extremely high voltage shocks, do not touch the coil body or leads.

★ If the distance reading is less than the specified value, the ignition coil or spark plug caps are defective.

- To determine which part is defective, measure the arcing distance again with the spark plug caps removed from the ignition coil. Remove the caps by turning them counterclockwise.

★ If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug cap.

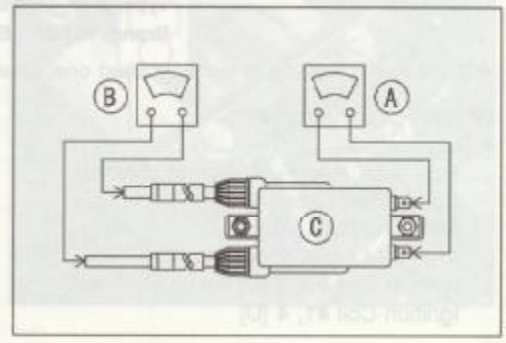
★ If the coil tester is not available, the coil can be checked for a broken or badly shorted winding with the hand tester.

Special Tool - Hand Tester: 57001-1394

NOTE

○ *The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.*

- Measure the primary winding resistance as follows.
○ Connect the hand tester between the coil terminals.
○ Set the tester to the x 1 Ω range, and read the tester.
- Measure the secondary winding resistance as follows.
○ Remove the plug caps by turning them counterclockwise.
○ Connect the tester between the spark plug leads.
○ Set the tester to the x 1 kΩ range and read the tester.



Measure primary winding resistance [A]
Measure secondary winding resistance [B]
Ignition Coil [C]

Ignition Coil Winding Resistance

Primary Windings:	**2.3 ~ 3.5 Ω**
Secondary Windings:	**12 ~ 18 kΩ**

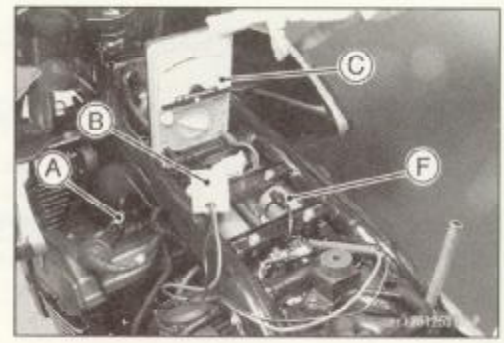
★ If the tester does not read as specified, replace the coil.
○ To install the plug cap, turn it clockwise.

Ignition Coil Primary Peak Voltage

NOTE

○ *Be sure the battery is fully charged.*

- Remove the spark plug caps (see this chapter), but do not remove the spark plugs.
- Measure the primary peak voltage as follows.
○ Install the new spark plug [A] into each spark plug cap, and ground them onto the engine.
○ Connect a commercially peak voltage adapter [B] into the hand tester [C] which is set to the x 1000 V DC range.
○ Connect the adapter between the ignition coil primary lead terminal [D] and the engine ground with the primary lead left connected.



IC igniter [G]
Battery [E]
Ignition coil [F]

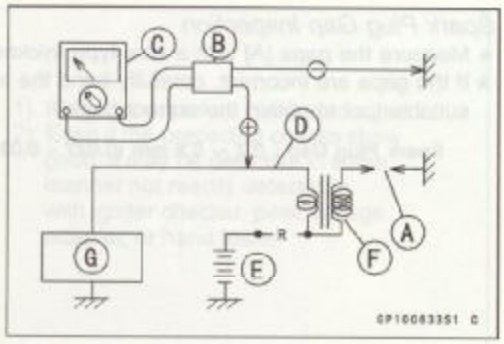
Ignition System

Recommended Tool- Peak Voltage Adapter
Type: KEK-54-9-B
Brand: KOWA SEIKI

Special Tool - Hand Tester: 57001–1394

Primary Lead Connection

	Adapter (R, +)	Adapter (BK, -)
Ignition Coil #1, 4	BK	R or Ground
Ignition Coil #2, 3	G	R or Ground



⚠ WARNING

To avoid extremely high voltage shocks, do not touch the spark plugs or tester connections.

- Turn the ignition switch and the engine stop switch ON.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission in neutral to measure the primary peak voltage
- Repeat the measurements 5 times for one ignition coil.

Ignition Coil Primary Peak Voltage
Standard: 280 V or more

- Repeat the test for the other ignition coil.

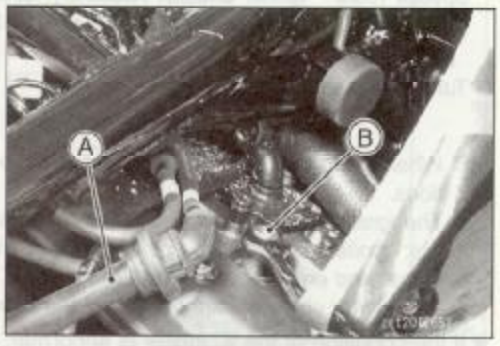
★If the reading is less than the specified value, check the following.
Ignition Coils (see Ignition Coil Inspection)
Pickup Coil (see Pickup Coil Inspection)
IC Igniter (see IC Igniter Inspection)

Spark Plug Removal

- Remove:
  Fuel Tank (see Fuel System chapter)
- Take out the spark plug cap [A] and remove the spark plug.

Owner's Tool - Spark Plug Wrench: 92110–1132 [B]

Special Tool - Spark Plug Wrench, Hex 16: 57001–1262



Spark Plug Installation

- Insert the spark plug vertically into the plug hole with the plug installed in the plug wrench [A].

Owner's Tool - Spark Plug Wrench: 92110–1132

Special Tool - Spark Plug Wrench, Hex 16: 57001–1262

- Tighten the plugs.

Torque - Spark Plugs: 14 N·m (1.4 kg·m, 10.0 ft·lb)

- Fit the plug caps securely.



Spark Plug Cleaning and Inspection

- Remove the spark plug, and visually inspect.
- 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.

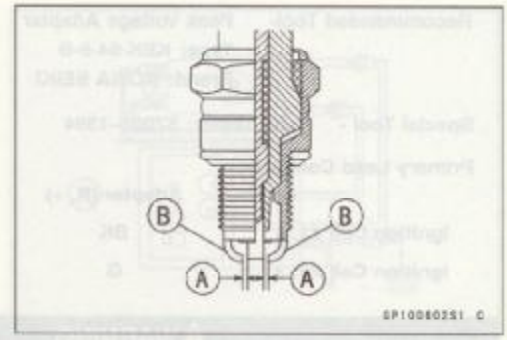
★If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug plug or its equivalent.

Spark Plug Gap Inspection

- Measure the gaps [A] with a wire-type thickness gauge.

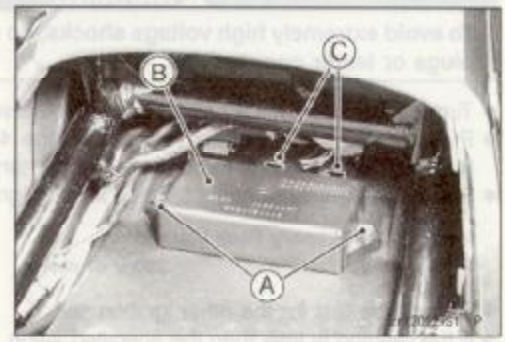
★ If the gaps are incorrect, carefully bend the side electrode [B] with a suitable tool to obtain the correct gaps.

Spark Plug Gap : 0.7 ~ 0.8 mm (0.027 - 0.031 in.)



IC Igniter Inspection

- Remove:
  - Seat (Frame chapter)
  - Tool Kit Compartment (see Frame chapter)
  - Canister (California Model only)
  - Screws [A]
  - IC Igniter [B]
  - Connectors [C]

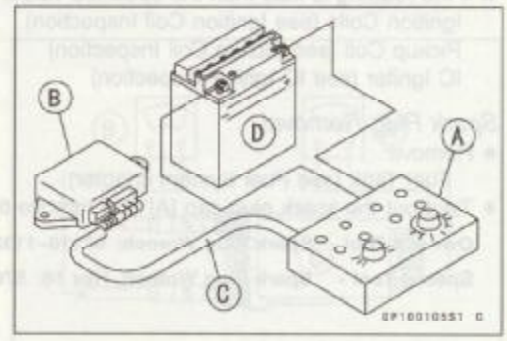


- To check the condition of the IC igniter, connect the igniter checker [A] to the IC igniter [B] as shown.

Special Tools - Igniter Checker Assembly: 57001-1378
Harness Adapter #13: 57001-1399 [B]

Battery [D]

○ Turn the select knob to "A" position.



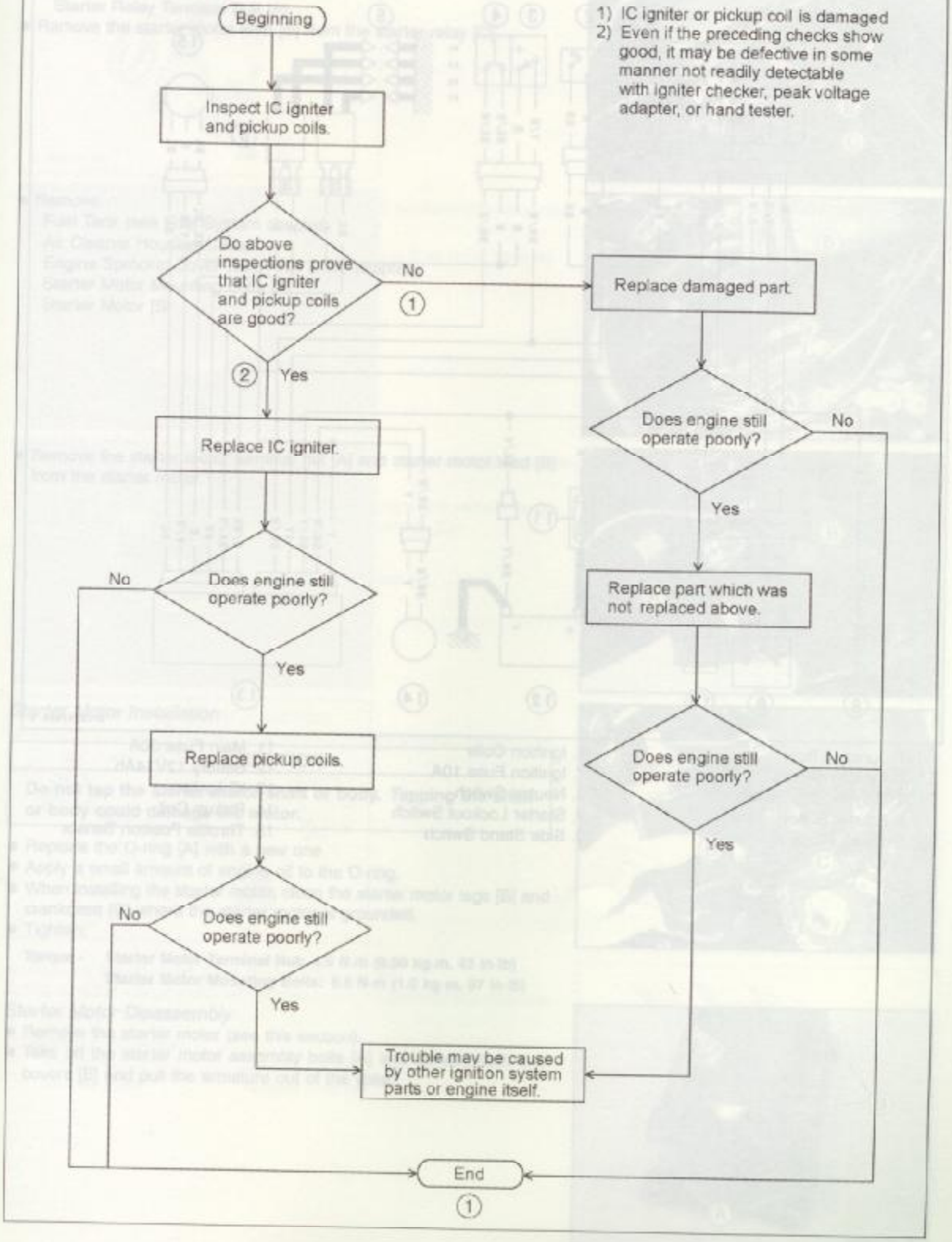
NOTE

- ○ *When using the igniter checker, refer to the manufacturer's instructions.*
- ○ *The igniter checker can detect the simulated dynamic characteristics: igniter response to r.p.m., interlock circuit signal, tachometer signal and engine overspeed limiter signal.*
- ○ *The igniter checker cannot inspect the condition of the CDI unit.*

★ If the condition of the IC igniter is abnormal, replace the IC igniter.

★ If the igniter checker is not available, replace the IC igniter with a new one and check ignition coil primary peak voltage again. If the peak voltage is abnormal as before, the trouble is not with the IC igniter. If the peak voltage is now normal, the trouble is with the IC igniter.

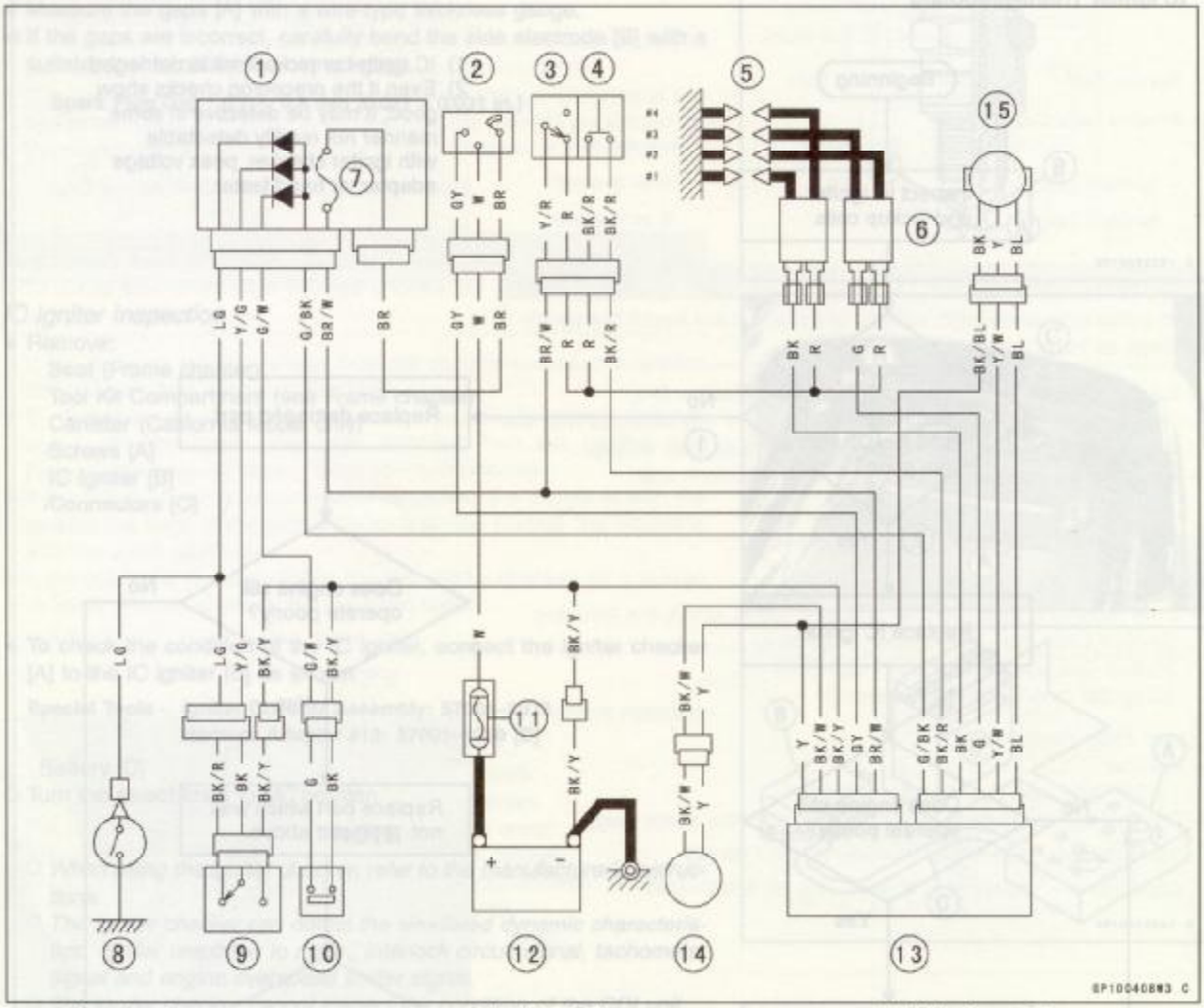
IC Igniter Troubleshooting



1) IC igniter or pickup coil is damaged
2) Even if the preceding checks show good, it may be defective in some manner not readily detectable with igniter checker, peak voltage adapter, or hand tester.

Ignition System

Ignition System Circuit

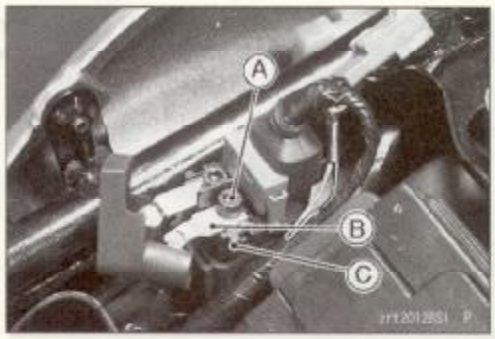


1. Junction Box
2. Ignition Switch
3. Engine Stop Switch
4. Starter Button
5. Spark Plugs
6. Ignition Coils
7. Ignition Fuse 10A
8. Neutral Switch
9. Starter Lockout Switch
10. Side Stand Switch
11. Main Fuse 30A
12. Battery 12V14Ah
13. IC Igniter
14. Pickup Coil
15. Throttle Position Sensor

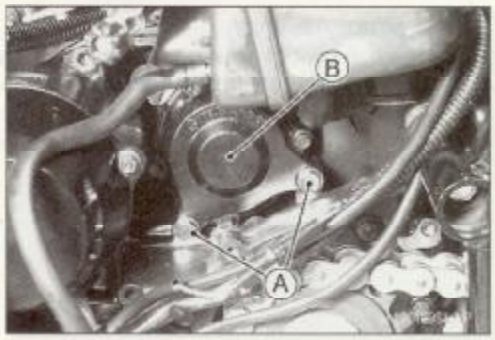
Electrical Starter System

Starter Motor Removal

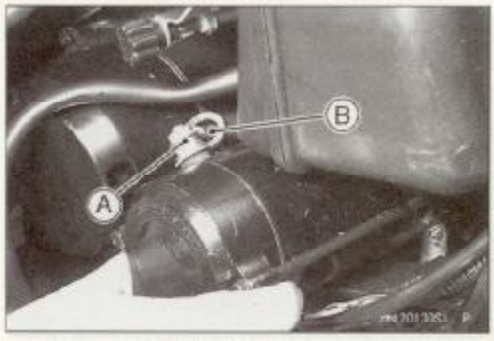
- Remove:
  Seat (see Frame chapter)
  Starter Relay Terminal Bolt [A]
- Remove the starter motor lead [B] from the starter relay [C].



- Remove:
  Fuel Tank (see Fuel System chapter)
  Air Cleaner Housing Cover
  Engine Sprocket Cover (see Final Drive chapter)
  Starter Motor Mounting Bolts [A]
  Starter Motor [B]



- Remove the starter motor terminal nut [A] and starter motor lead [B] from the starter motor.



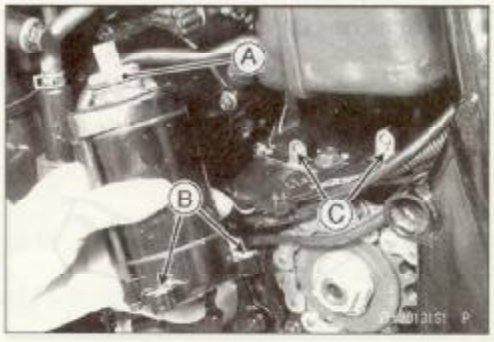
Starter Motor Installation

CAUTION

Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.

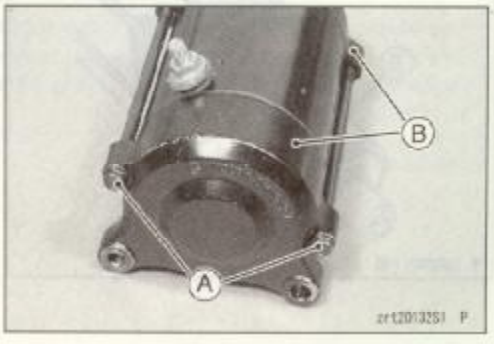
- Replace the O-ring [A] with a new one.
- Apply a small amount of engine oil to the O-ring.
- When installing the starter motor, clean the starter motor legs [B] and crankcase [C] where the starter motor is grounded.
- Tighten:

Torque - Starter Motor Terminal Nut: 4.9 N·m (0.50 kg·m, 43 in·lb)
Starter Motor Mounting Bolts: 9.8 N·m (1.0 kg·m, 87 in·lb)

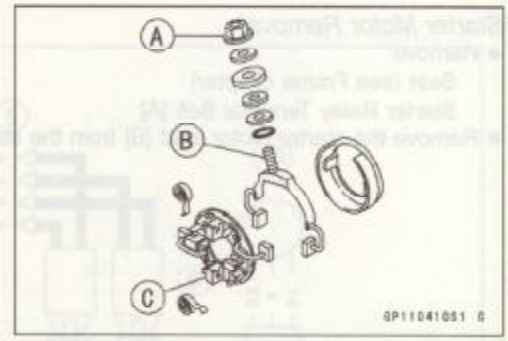


Starter Motor Disassembly

- Remove the starter motor (see this section).
- Take off the starter motor assembly bolts [A] and remove both end covers [B] and pull the armature out of the yoke.

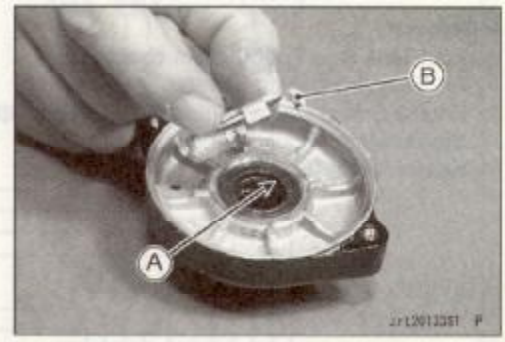


- Remove the terminal locknut [A] and terminal bolt [B] , and then remove the brush with the brush plate [C] from the yoke.

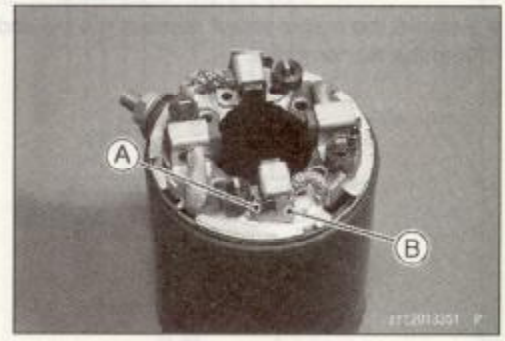


Starter Motor Assembly

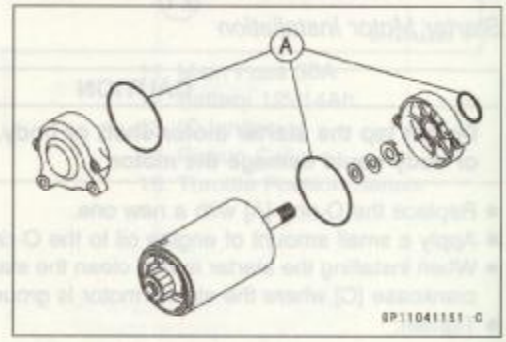
- Apply a thin coat of grease to the oil seal [A].
- Fit the toothed washer [B] into the end cover.



- Holding the spring ends [A] with suitable washers [B], put the armature among the brushes.

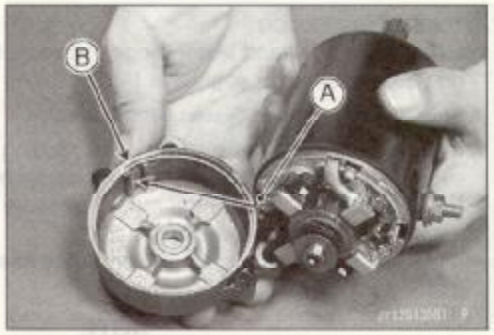


- Install the new O-rings [A] as shown.



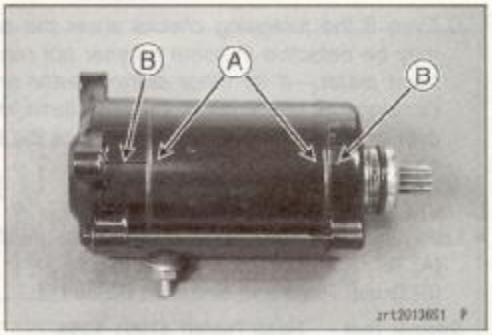
Electrical Starter System

- Fit the tongue [A] on the brush plate into the end cover groove [B].



- Align the lines [A] on the yoke with the lines [B] on the both end cover.
- Tighten:

Torque - Starter Motor Assembly Bolts: 4.9 N·m (0.50 kg·m, 43 in·lb)

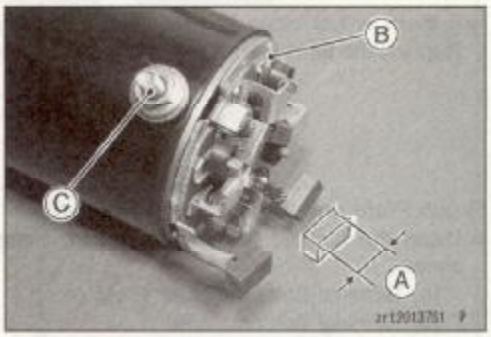


Brush Inspection

- Measure the length [A] of each brush.
- ★If any is worn down to the service limit, replace the carbon brush holder assembly [B] and the terminal bolt assembly [C].

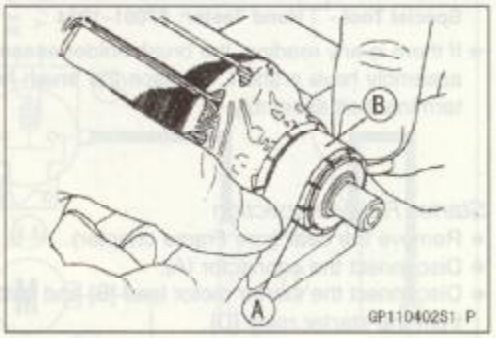
Starter Motor Brush Length

Standard:	**12 ~ 12.5 mm (0.47 ~ 0.492 in.)**
Service Limit:	**7 mm (0.3 in.)**



Commutator Cleaning and Inspection

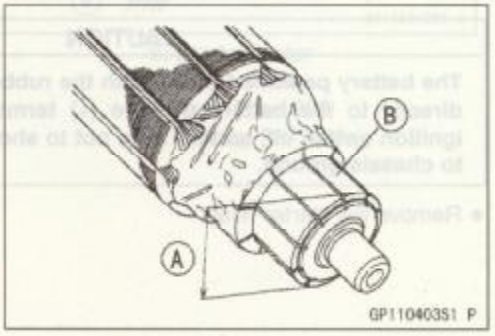
- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.



- Measure the diameter [A] of the commutator [B].
- ★Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commulator Diameter

Standard:	**28 mm (1.1 in.)**
Service Limit:	**27 mm (1.06 in.)**



Armature Inspection

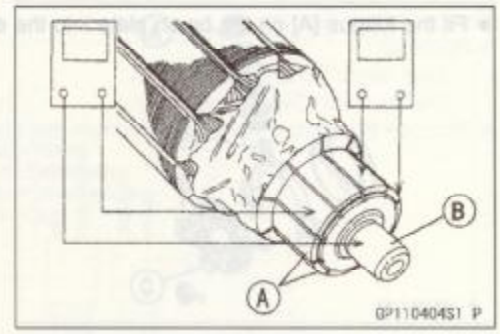
- Using the x 1 Ω hand tester range, measure the resistance between any two commutator segments [A].

Special Tool - Hand Tester: 57001–1394

★ If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.

- Using the highest hand tester range, measure the resistance between the segments and the shaft [B].

★ If there is any reading at all, the armature has a short and the starter motor must be replaced.



NOTE

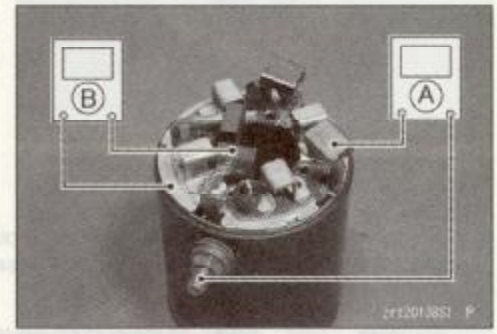
○ *Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the hand tester. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.*

Brush Lead Inspection

- Using the x 1 Ω hand tester range, measure the resistance as shown.
  [A] Terminal Bolt and Positive Brush
  [B] Brush Plate and Negative Brush

Special Tool - Hand Tester: 57001–1394

★ If there is nct close to zero ohms, the brush lead has an open. Replace the terminal bolt assembly and/or the brush holder assembly.

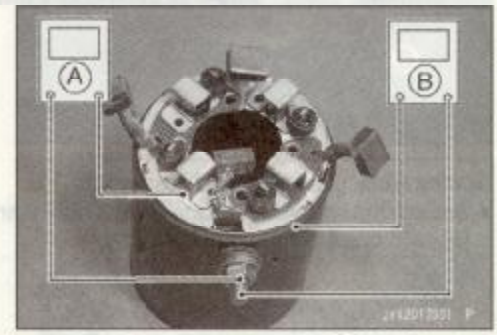


Brush Plate and Terminal Bolt Inspection

- Using the highest hand tester range, measure the resistance as shown.
  [A] Terminal Bolt and Brush Plate
  [B] Terminal Bolt and Yoke

Special Tool - Hand Tester: 57001–1394

★ If there is any reading, the brush holder assembly and/or terminal bolt assembly have a short. Replace the brush holder assembly and the terminal bolt assembly.



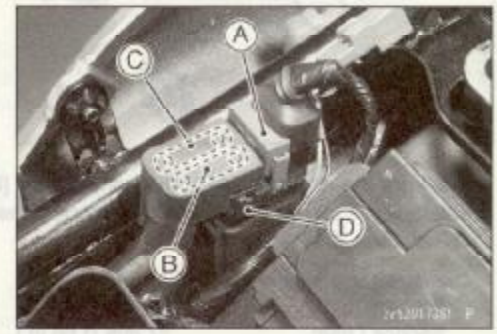
Starter Relay Inspection

- Remove the seat (see Frame chapter).
- Disconnect the connector [A].
- Disconnect the starter motor lead [B] and battery positive (+) lead [C] from the starter relay [D].

CAUTION

The battery positive (+) lead with the rubber cap is connected directly to the battery positive (+) terminal even when the ignition switch off, so take care not to short the removed lead to chassis ground.

- Remove the starter relay.



Electrical Starter System

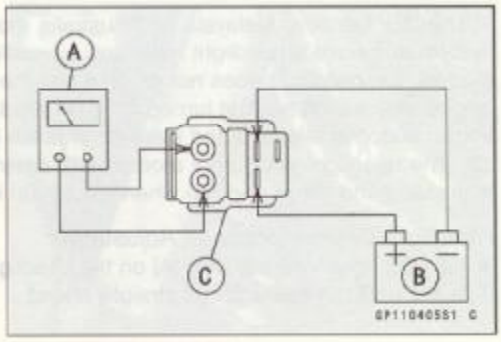
- Connect the hand tester [A] and 12 V battery [B] to the starter relay [C] as shown.

Special Tool - Hane Tester: 57001–1394

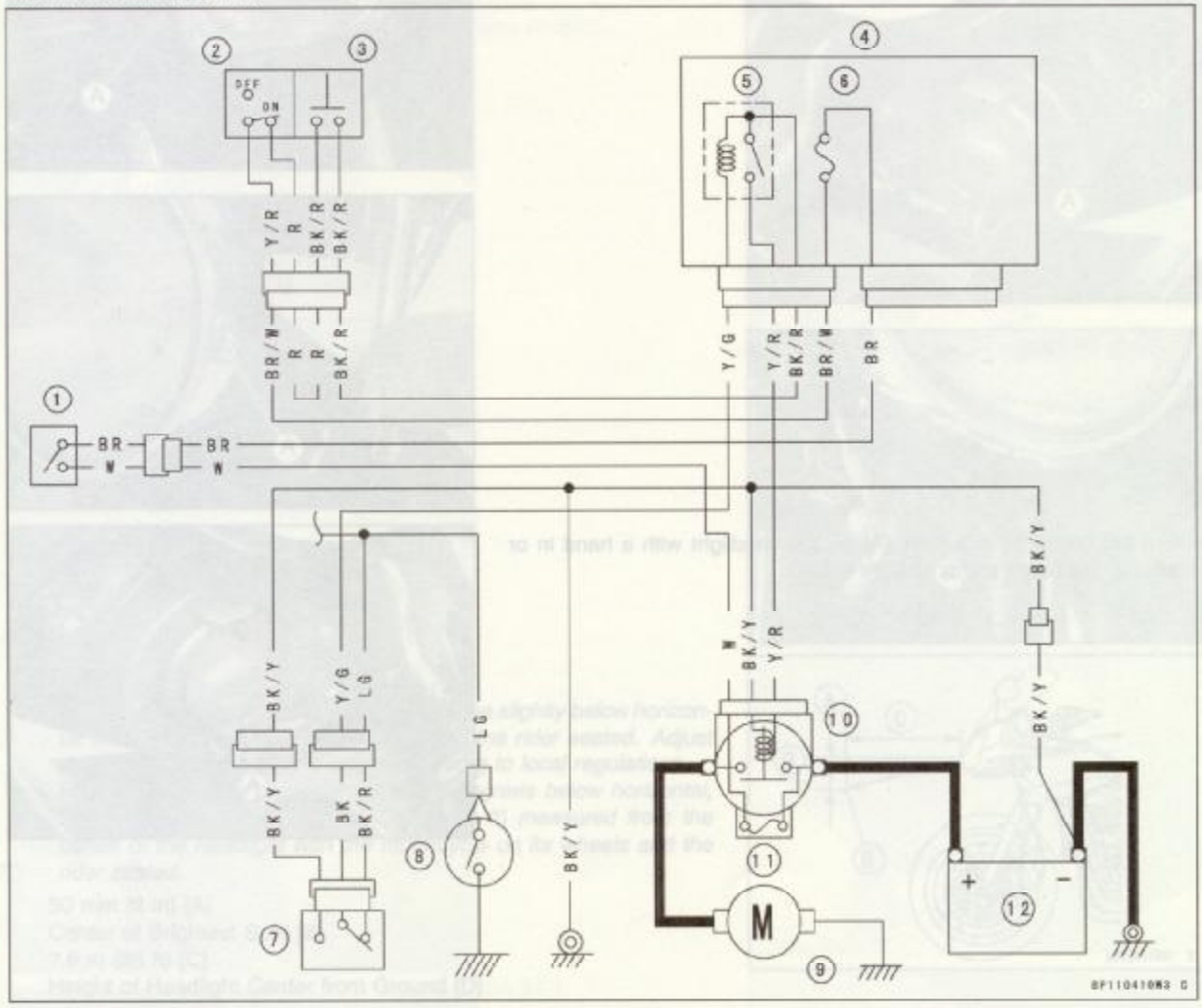
★ If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Tester Range:	**x 1 Ω range**
Criteria:	**When battery is connected → 0 Ω**
	When battery is disconnected → ∞ Ω



Electrical Starter Circuit



1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Junction Box
5. Starter Circuit Relay
6. Ignition Fuse 10A
7. Starter Lockout Switch
8. Neutral Switch
9. Starter Motor
10. Starter Relay
11. Main Fuse 30A
12. Battery 12V14Ah

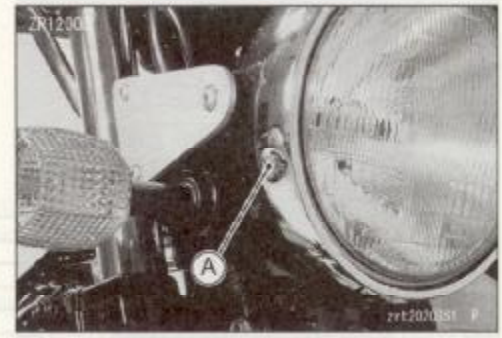
Lighting System

The US, Canada, Malaysia and Australia models adapt the daylight system and have a headlight relay and a headlight relay unit. In these models, the headlight does not go on when the ignition switch and the engine stop switch are first turned on. The headlight comes on after the starter button is released and stays on until the ignition switch is turned off. The headlight will go out momentarily whenever the starter button is pressed and come back on when the button is released.

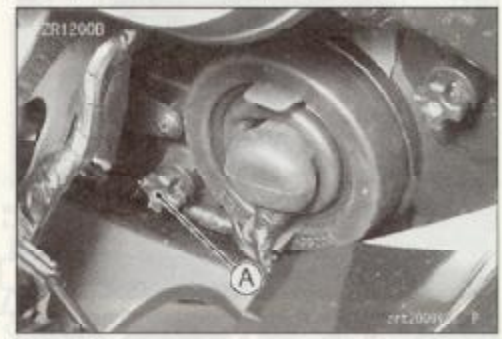
Headlight Beam Horizontal Adjustment

- Turn the horizontal adjuster [A] on the headlight with a screwdriver in or out until the beam points straight ahead.





- Turn the horizontal adjusters [A] on the headlight with a hand in or out until the beam points straight ahead.

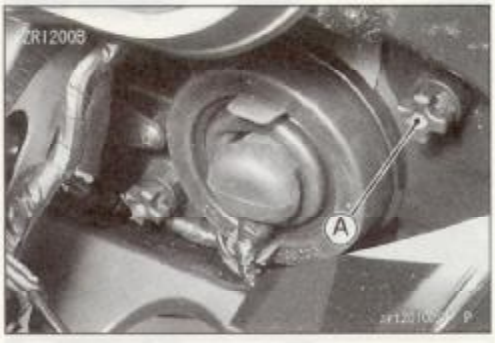


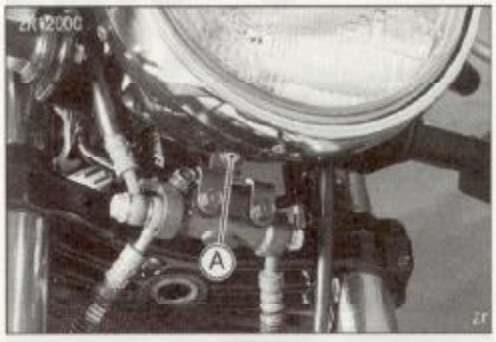
Lighting System

Headlight Beam Vertical Adjustment

- Turn the vertical adjuster [A] on the headlight with a hand in or out to adjust the headlight vertically.



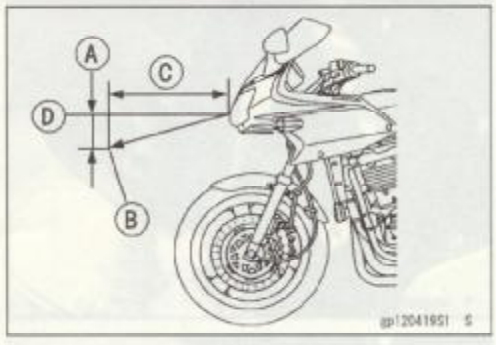




NOTE

- *On high beam, the brightest points 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.*
- *For US model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2 in) drop at 7.6 m (25 ft) measured from the center of the headlight with the motorcycle on its wheels and the rider seated.*

50 mm (2 in) [A]
Center of Brightest Spot [B]
7.6 m (25 ft) [C]
Height of Headlight Center from Ground [D]



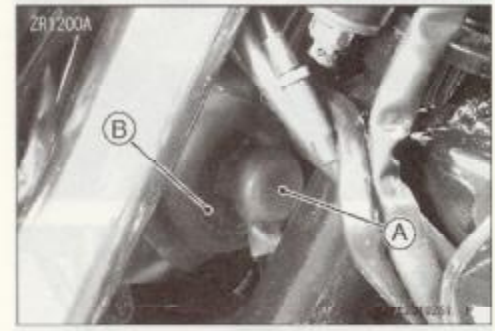
Lighting System

Headlight Bulb Replacement

- Remove: (ZR1200C)
  Headlight Mounting Screws [A]
  Headlight Unit [B]



- Remove:
  Headlight Connector [A]
  Headlight Bulb Dust Cover [B]







- Remove the hook [A].

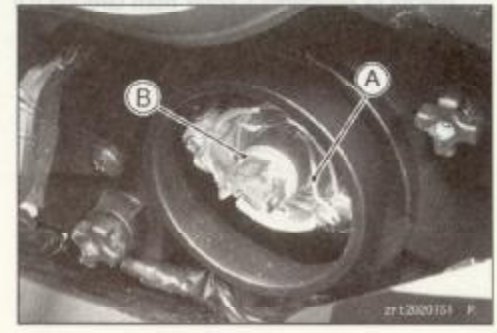
CAUTION

When handling the quartz-halogen bulb, 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.

NOTE

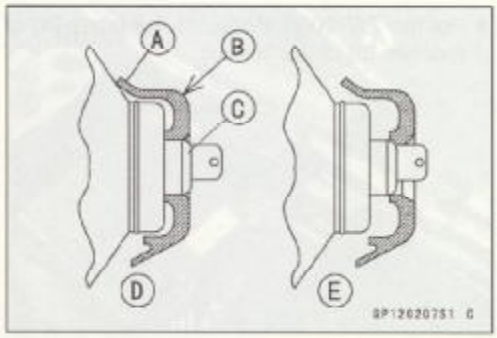
○ *Clean off any contamination that inadvertently gets on the bulb with alcohol or soap and water solution.*

- Replace the headlight bulb [B].



Lighting System

- Fit the dust cover [A] with the TOP mark [B] upward onto the bulb [C] firmly as shown.
  Good [D]
  Bad [E]
- After installation, adjust the headlight aim (see this chapter).

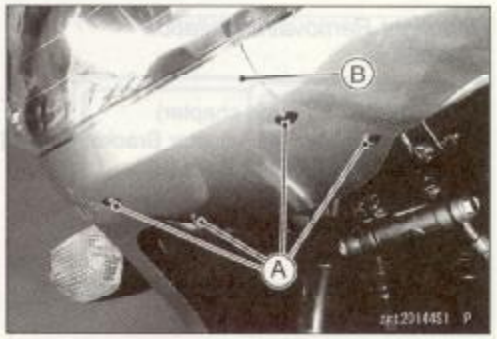


City Light Bulb Replacement (European Model)

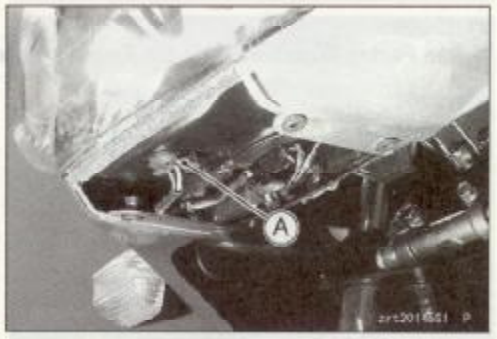
- For ZR1200A, see Fairing Removal in the Frame chapter.

ZR1200B;

- Remove:
  Screws [A]
  Joint Cover [B]



- Pull out the socket [A] together with the bulb.

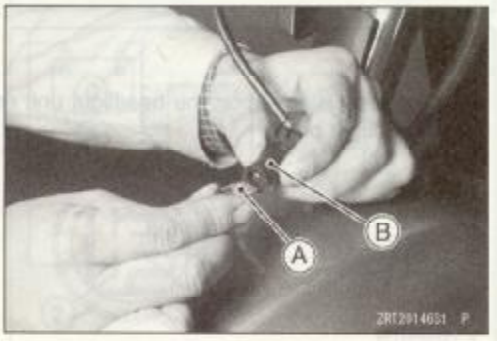


ZR1200C;

- Remove:
  Headlight (see Headlight Removal/Installation)
- Pull out the socket [A] together with the bulb.



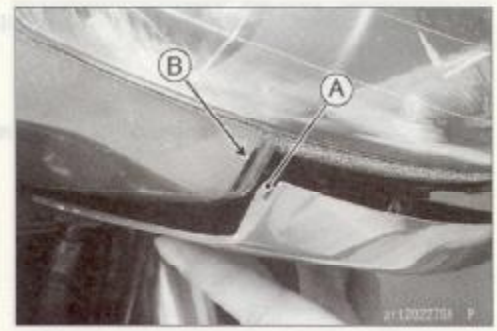
- Pull the bulb [A] out of the socket [B] (ZR1200A/B/C).



CAUTION

Do not turn the bulb. Pull the bulb out to prevent damage to the bulb. Do not use bulb rated for greater wattage than the specified value.

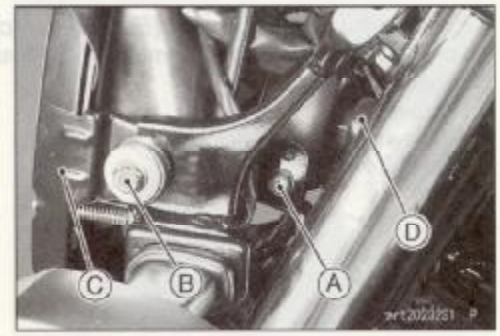
- For the ZR1200B Model, fit the tabus [A] of the joint cover into the grooves [B] of the fairings.



Headlight Removal/Installation

ZR1200A;

- Remove:
  - Fairing (see Frame chapter)
  - Headlight Vertical Adjuster Bracket Bolt [A]
  - Headlight Mounting Bolts [B]
  - Headlight Unit [C]
  - Headlight Connector [D]



ZR1200B;

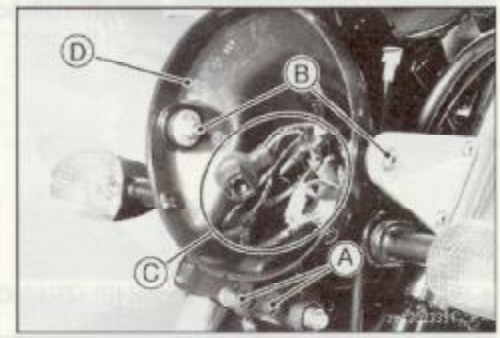
- See Fairing Disassembly in the Frame chapter

ZR1200C;

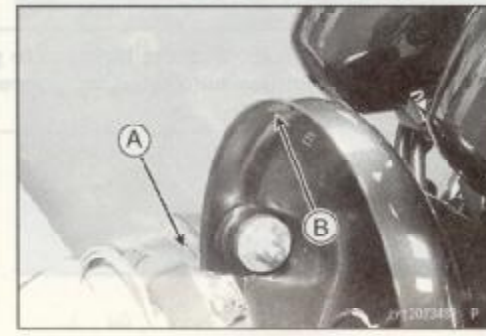
- Remove:
  - Screws [A]
  - Headlight Unit [B]
  - Connectors



- Remove:
  - Headlight Vartical Adjuster Bracket Bolts [A]
  - Headlight Stay Bolts [B]
- Pull out the connector [C] from the hole of the headlight body [D].



- Fit the protrusion [A] on the headlight unit rim into the recess [B] of the headlight body.



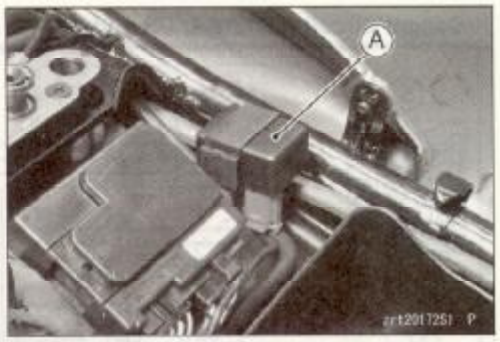
Lighting System

Headlight Relay Inspection

- Remove the seat (see Frame chapter).
- Take off the headlight relay [A].
- Set the hand tester to the x 1kΩ range and make the measurements shown in the table.

Special Tool - Hand Tester: 57001–1394

★ If the tester readings are not as specified, replace the headlight relay.



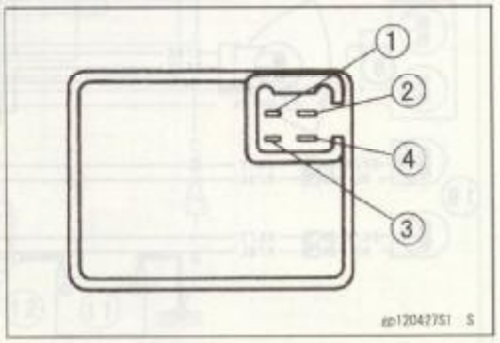
CAUTION

Use only Hand Tester 57001–1394 for this test. An ohmmeter other than the Kawasaki Hand Tester may show different readings. If a megger or a meter with a large-capacity battery is used, the headlight relay will be damaged.

Headlight Relay Internal Resistance

Range × 1 kΩ		Tester (+) Lead Connection			
		1	2	3	4
* (–)	1	—	∞	∞	∞
	2	∞	—	∞	∞
	3	∞	10 ~ 100	—	∞
	4	∞	20 ~ 200	1 ~ 5	—

(–)*: Tester (–) Lead Connection



Headlight Relay Unit Inspection (ZR1200B)

- Remove the windshield and upper inner cover (see Frame chapter).
- Take off the headlight relay units [A].
- Set the hand tester to the × 1Ω range and make the measurements shown in the figure.

12 V Battery [C]

Special Tool - Hand Tester: 57001–1394 [B]

★ If the tester readings are not as specified, replace the headlight relay unit.

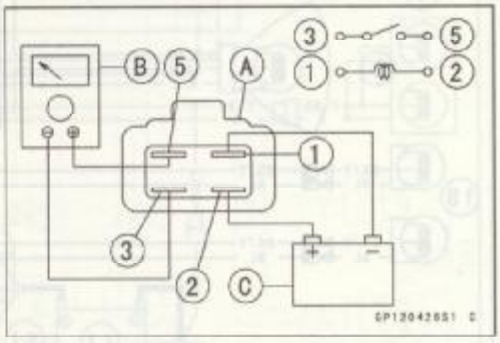


CAUTION

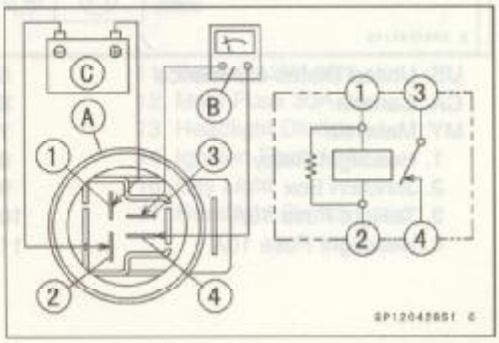
Use only Hand Tester 57001–1394 for this test. An ohmmeter other than the Kawasaki Hand Tester may show different readings. If a megger or a meter with a large-capacity battery is used, the headlight relay will be damaged.

Testing Relay

Criteria **When battery is connected → 0Ω**
When battery is disconnected → ∞Ω

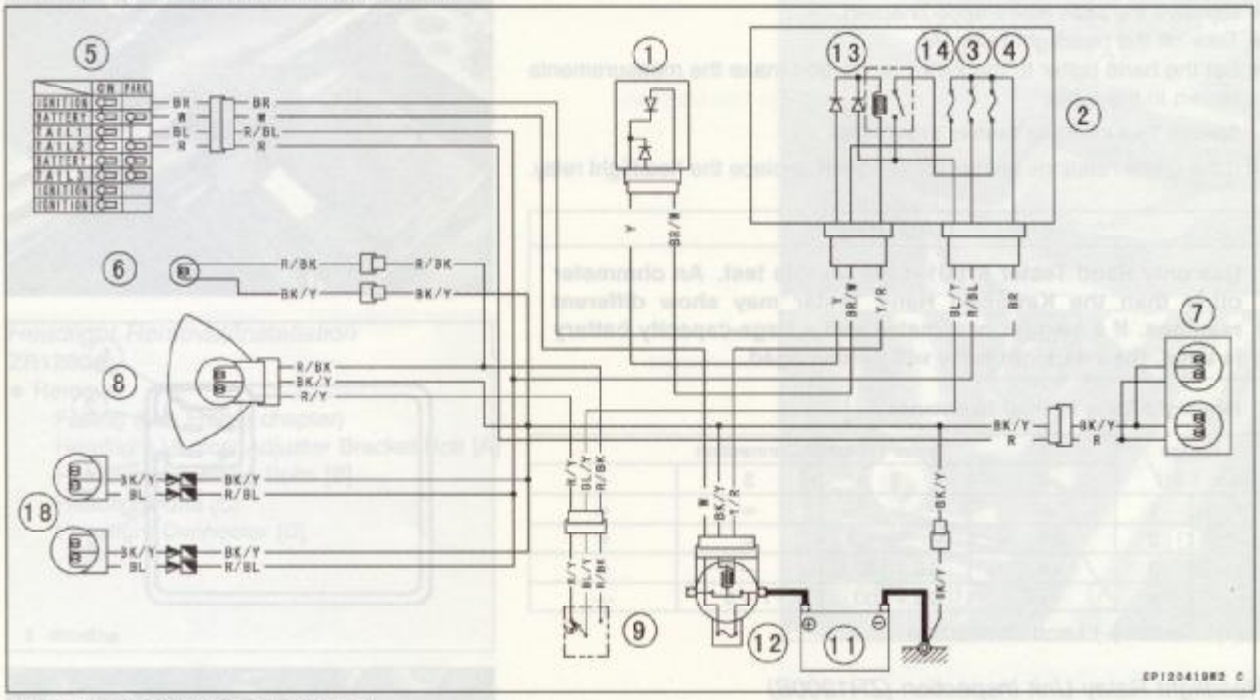


- For the Malaysian Model.

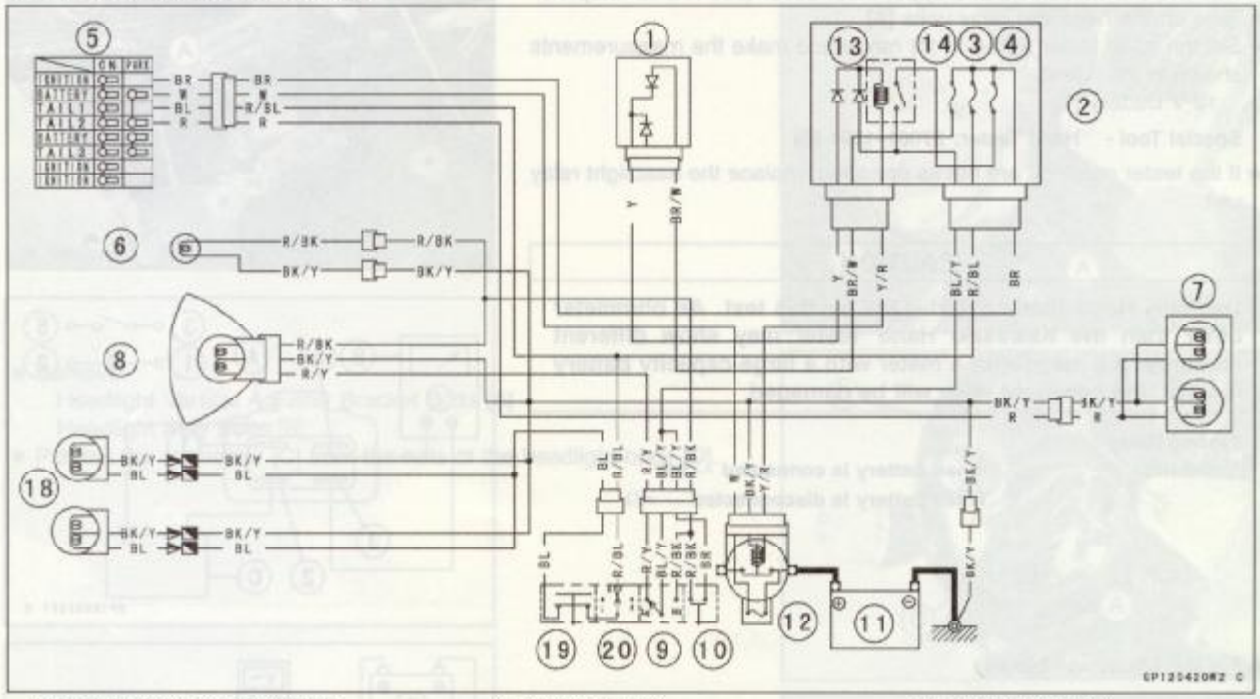


Lighting System

Headlight Circuit (ZR1200A: US and CA)



Headlight Circuit (ZR1200A: MY)

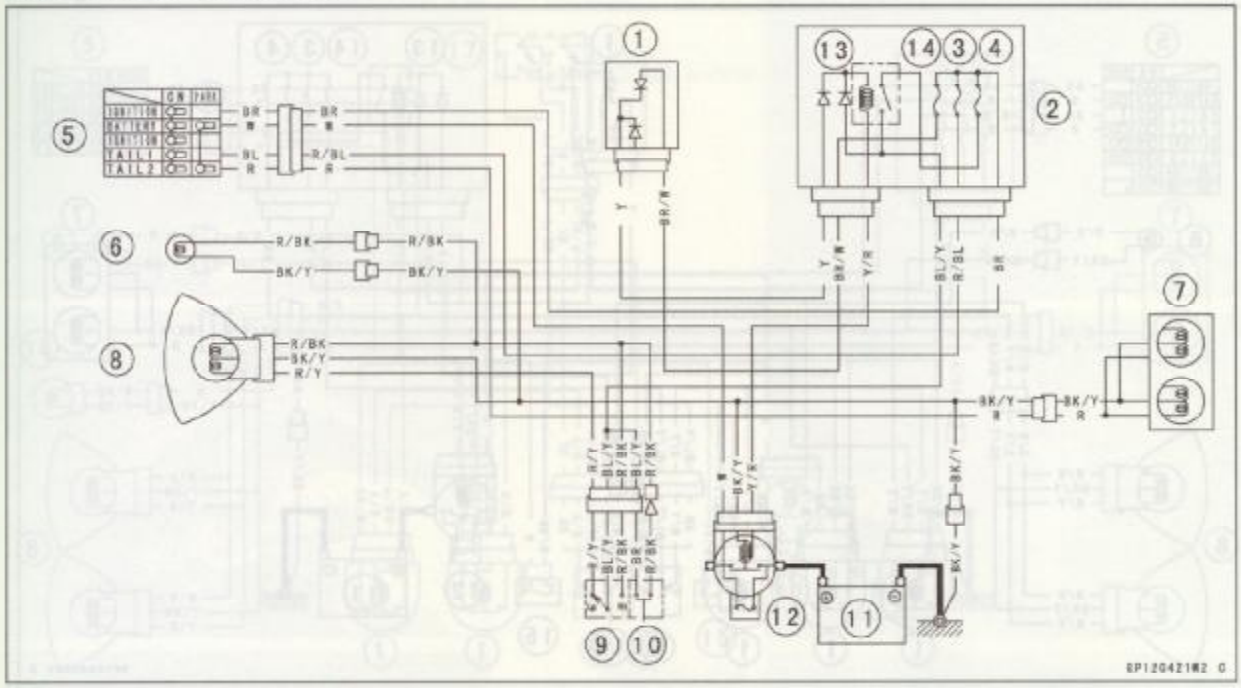


US: United States of America
CA: Canada
MY: Malaysia

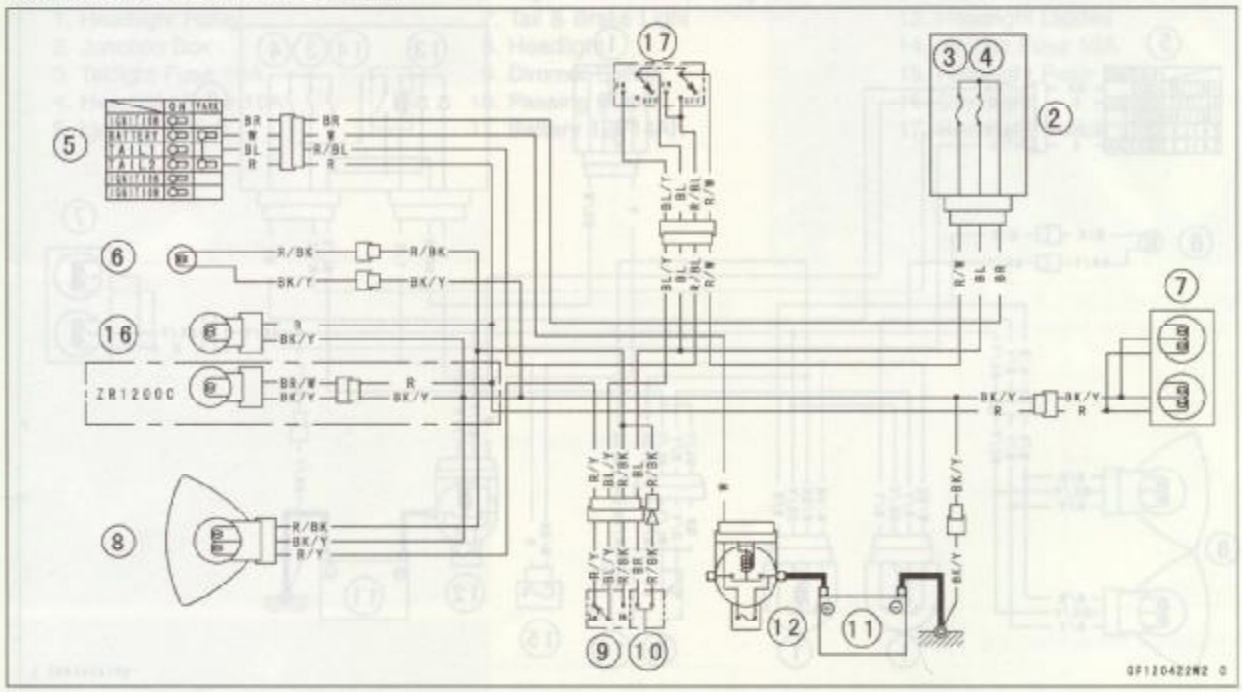
1. Headlight Relay
2. Junction Box
3. Taillight Fuse 10A
4. Headlight Fuse 10A
5. Ignition Switch
6. High Beam Indicator Light
7. Tail & Brake Lights
8. Headlight
9. Dimmer Switch
10. Passing Button
11. Battery 12V14Ah
12. Main Fuse 30A
13. Headlight Diodes
14. Ignition Fuse 10A
18. Turn Signal/Running Position Lights
19. Hazard Switch
20. Turn Signal Switch

Lighting System

Headlight Circuit (ZR1200A: AU)



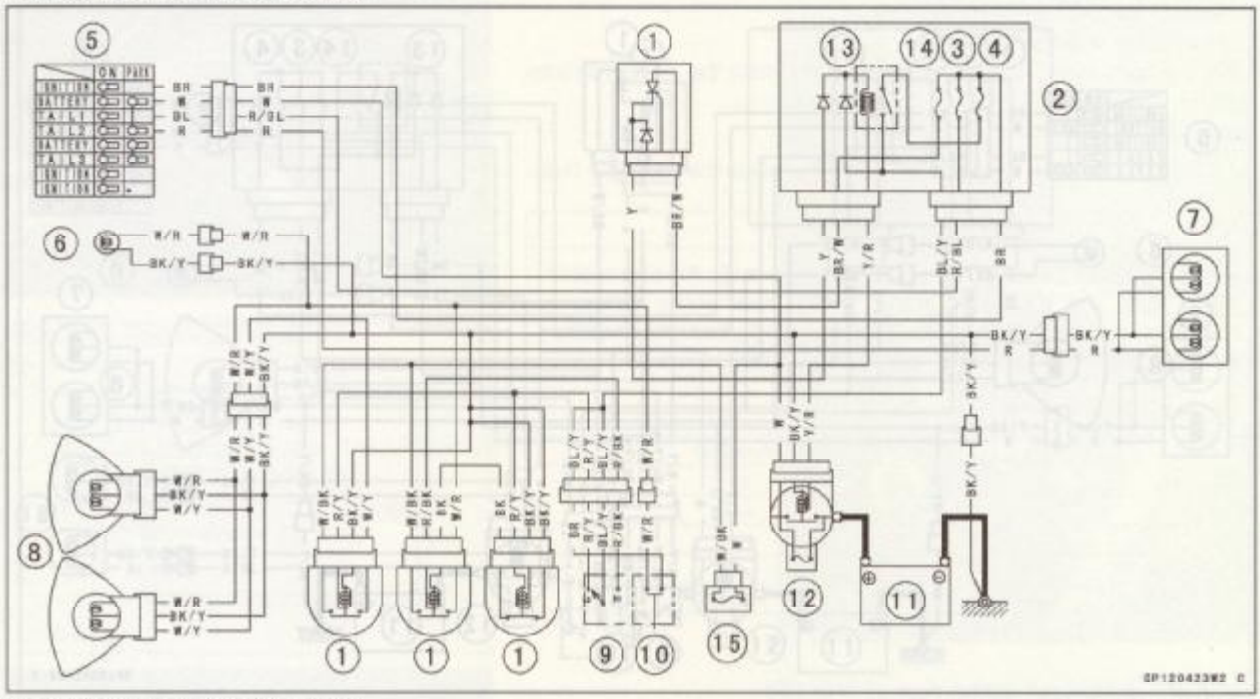
Headlight Circuit (ZR1200A/C: EUR)



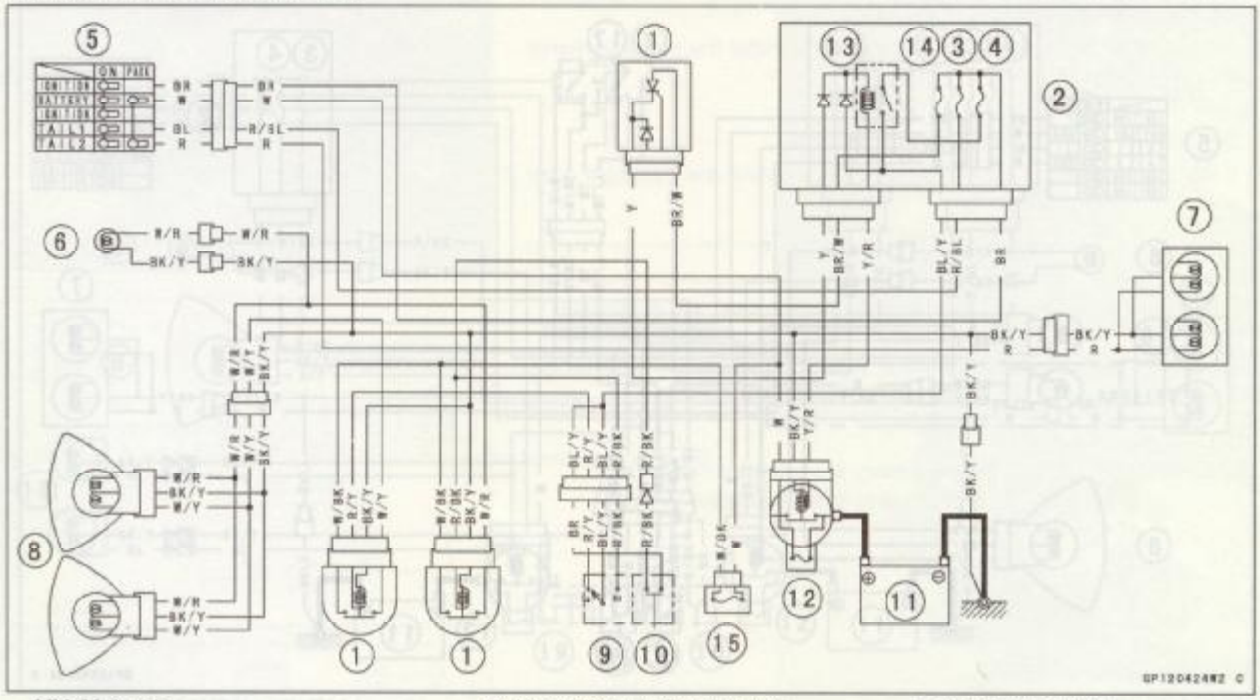
AU: Australia
EUR: Europe
1. Headlight Relay
2. Junction Box
3. Taillight Fuse 10A
4. Headlight Fuse 10A
5. Ignition Switch
6. High Beam Indicator Light
7. Tail & Brake Light
8. Headlight
9. Dimmer Switch
10. Passing Button
11. Battery 12V14Ah
12. Main Fuse 30A
13. Headlight Diodes
14. Ignition Fuse 10A
16. City Light
17. Headlight Switch

Lighting System

Headlight Circuit (ZR1200B: MY)



Headlight Circuit (ZR1200B: AU)

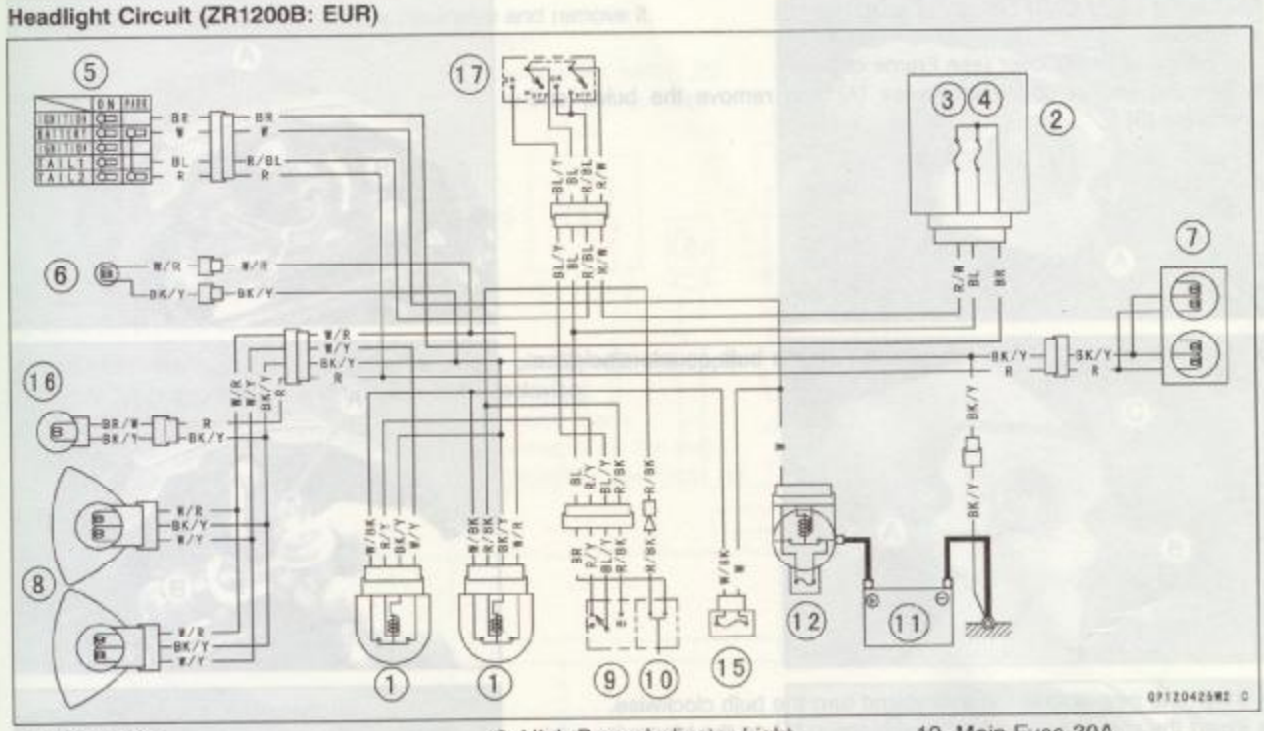


MY: Malaysia
AU: Australia

1. Headlight Relay
2. Junction Box
3. Taillight Fuse 10A
4. Headlight Fuse 10A
5. Ignition Switch
6. High Beam Indicator Light
7. Tail & Brake Light
8. Headlight
9. Dimmer Switch
10. Passing Button
11. Battery 12V14Ah
12. Main Fuse 30A
13. Headlight Diodes
14. Ignition Fuse 10A
15. Headlight Fuse 10A
16. City Light
17. Headlight Switch

Lighting System

Headlight Circuit (ZR1200B: EUR)



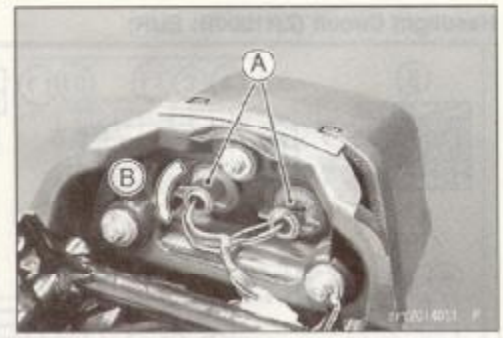
EUR: Eurcpe

1. Headlight Relay
2. Junction Box
3. Taillight Fuse 10A
4. Headlight Fuse 10A
5. Ignition Switch
6. High Beam Indicator Light
7. Tail & Brake Light
8. Headlight
9. Dimmer Switch
10. Passing Button
11. Battery 12V14Ah
12. Main Fuse 30A
13. Headlight Dicdes
14. Ignition Fuse 10A
15. Headlight Fuse 10A
16. City Light
17. Headlight Switch

Lighting System

Tail/Brake Light Bulb Replacement

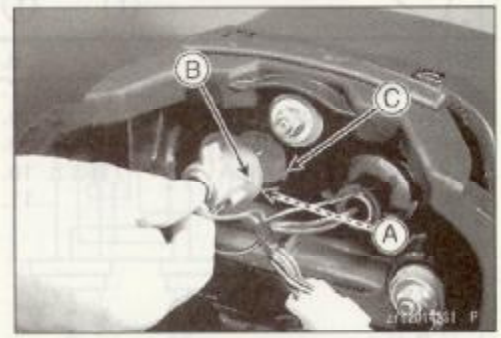
- Remove:
  Seat and Seat Cover (see Frame chapter)
- Turn the socket counterclockwise [A] and remove the bulds and sockets [B].



- Push the bulb [A] in the socket and turn the bulb counterclockwise [B].

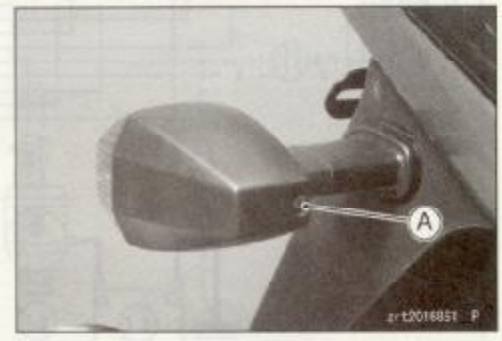


- Insert the new bulb in the socket and turn the bulb clockwise.
- Insert the socket by aligning the projection [A] on the triangular mark [B] with the notch [C] and turn the socket clockwise.



Turn Signal Light Bulb Replacement

- Unscrew the screw [A].



- Unscrew the screws [A].

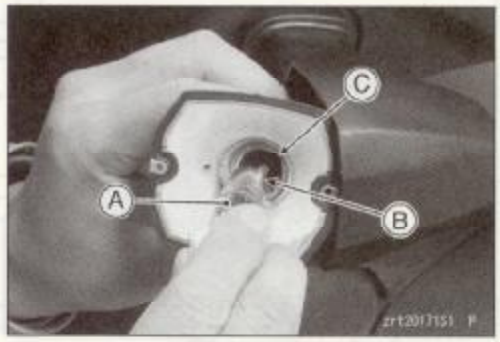


Lighting System

- Push and turn the bulb [A] counter clockwise and remove it.



- Insert the new bulb [A] by aligning its upper pin [B] with the upper groove [C] in the socket, and turn the bulb clockwise.



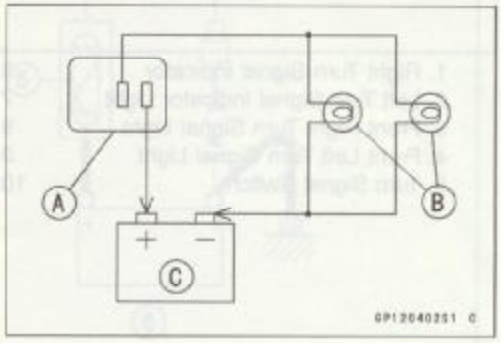
Turn Signal Relay Inspection

- Remove:
  Seat and Seat Cover (see Frame chapter).
  Turn Signal Relay [A]
- Disconnect:
  Turn Signal Connector [B]



- Connect one 12 V battery and turn signal lights as indicated in the figure, and count how many times the lights flash for one minute.
  Turn Signal Relay [A]
  Turn Signal Lights [B]
  12 V Battery [C]

★If the lights do not flash as specified, replace the turn signal relay.



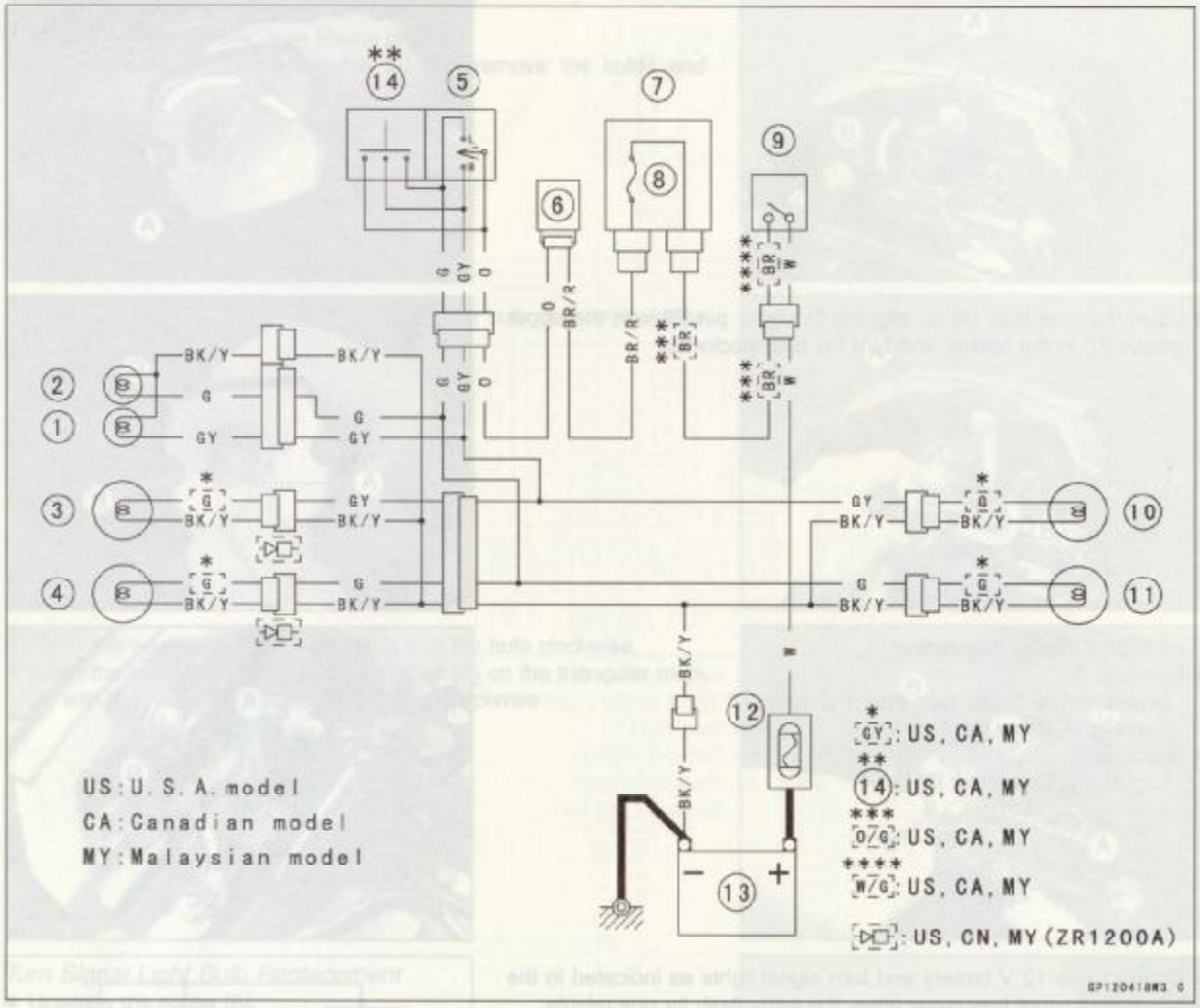
Testing Turn Signal Relay

Load		
The Number of Turn Signal Lights	Wattage(W)	Flashing times (c/m*)
1**	21 - 23	Light stays on
2	42 - 46	75 - 95

(*): Cycle(s) per minute
(**): corresponds to "One light burned out".

Lighting System

Turn Signal Light Circuit



1. Right Turn Signal Indicator
2. Left Turn Signal Indicator Light
3. Front Right Turn Signal Light
4. Front Left Turn Signal Light
5. Turn Signal Switch
6. Turn Signal Relay
7. Junction Box
8. Turn Signal Fuse 10A
9. Ignition Switch
10. Rear Right Turn Signal Light
11. Rear Left Turn Signal Light
12. Main Fuse 30A
13. Battery 12V14Ah

Radiator Fan System

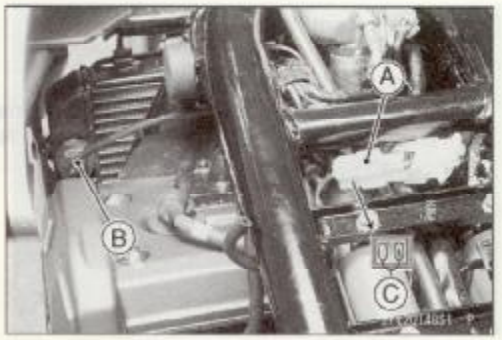
Fan System Circuit Inspection

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the 2 pin connector [A] from the radiator fan switch [B].
- Using an auxiliary wire [C], connect the radiator fan switch leads of the main harness side.
- Turn the ignition switch ON.

★ If the fan rotates, inspect the fan switch.

★ If the fan does not rotate, inspect the following.

Leads and Connectors
Main Fuse and Fan Fuse
Fan Motor



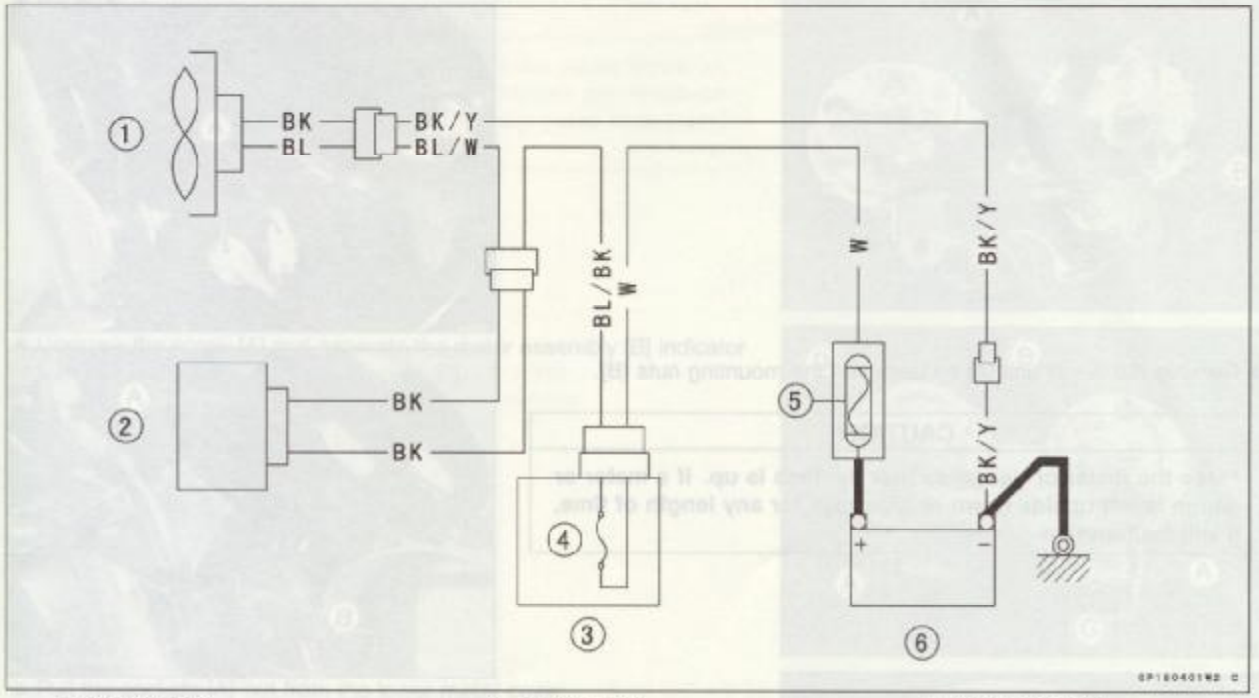
Fan Motor Inspection

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the 2-pin connector [A] in the fan motor leads.
- Using two auxiliary wires, supply battery [B] power to the fan motor.

★ If the fan does not rotate, the fan motor is defective and must be replaced.



Radiator Fan Circuit

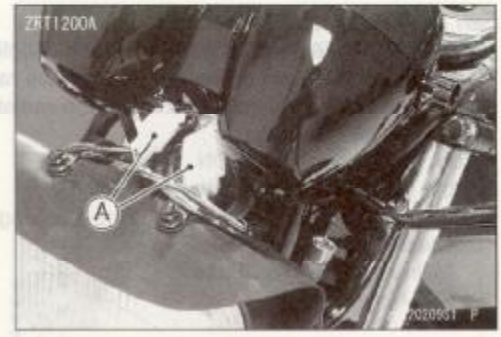


1. Radiator Fan
2. Radiator Fan Switch
3. Junction Box
4. Fan Fuse 10A
5. Main Fuse 30A
6. Battery 12V14Ah

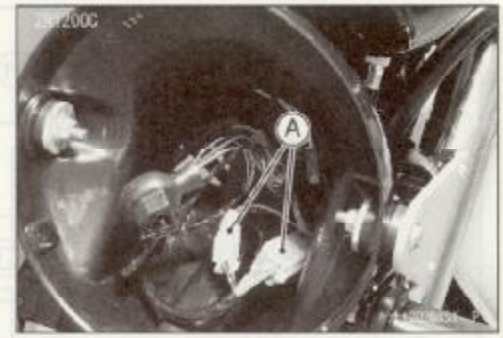
Meters, Gauges, Indicator Unit

Meter Unit Removal

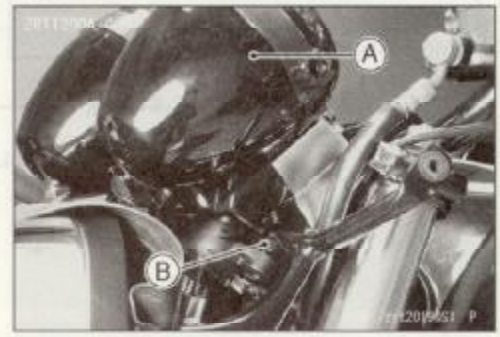
- Remove:
  Fairing (ZR1200A, see Frame chapter)
  Wind Shield and Cover (ZR1200B, see Frame chapter)
  Headlight (ZR1200C, see Headlight Bulb Replacement)
  Speedometer Cable Upper End
  Meter Connectors [A]





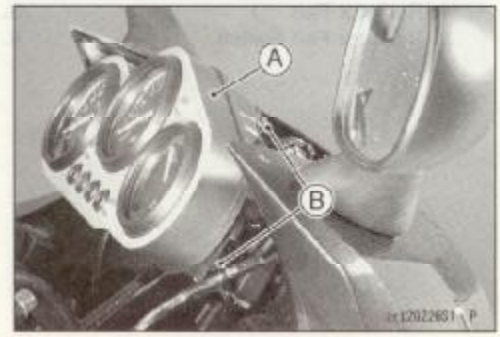


- Remove the meter unit [A] by taking off the mounting nuts [B].



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.

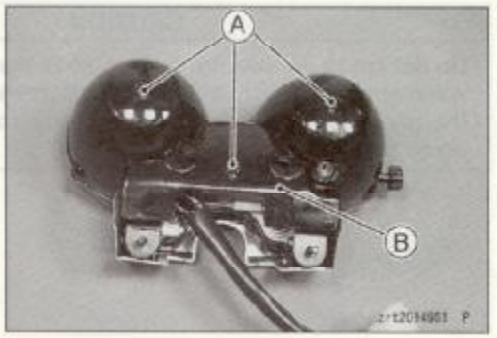


Meters, Gauges, Indicator Unit

Meter, Gauge Disassembly

ZR1200A/C:

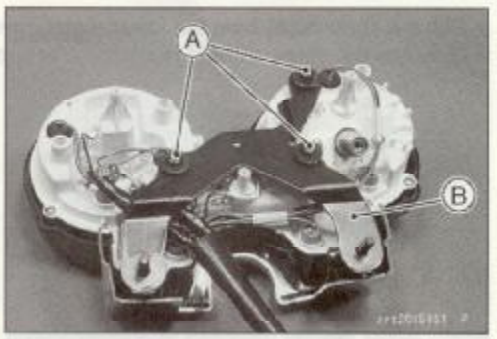
- Remove:
  Meter Unit
  Cover Screws [A]
  Meter Unit Cover [B]



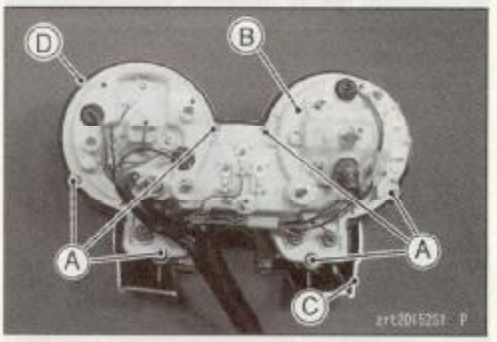
- Unscrew the screw and remove the trip meter knob [A].



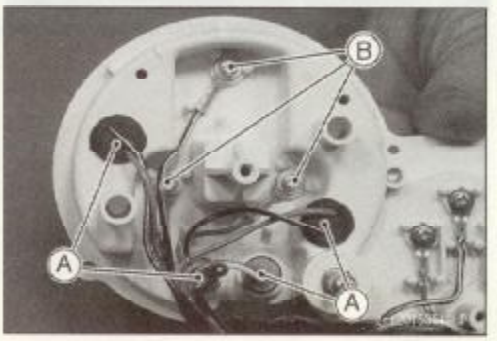
- Remove:
  Bracket Nuts [A]
  Meter Unit Bracket [B]



- Unscrew the screw [A] and separate the meter assembly [B] indicator light cover [C] and upper meter cover [D].



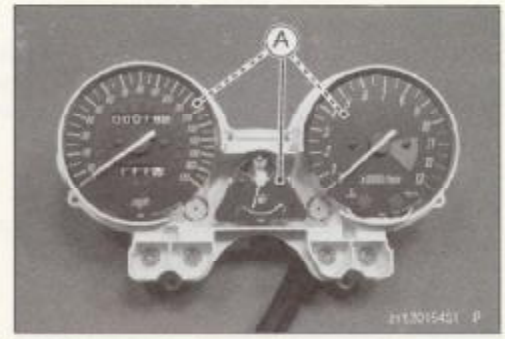
- Pull the sockets [A] out from the lower meter cover.
- Unscrew the screws [B] and remove the tachometer.



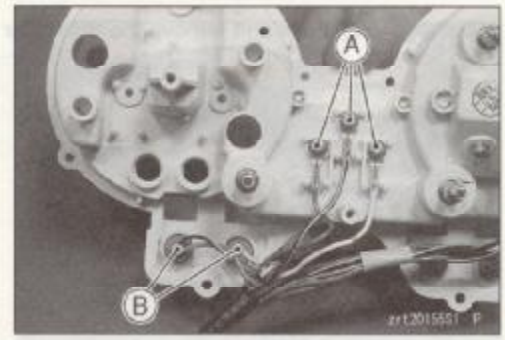
Meters, Gauges, Indicator Unit

CAUTION

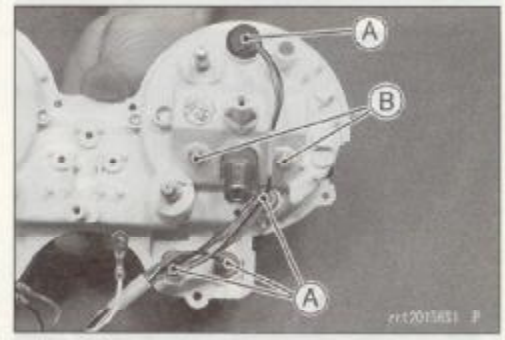
Do not fail to remove the screws while the meter faced up [A] when removing each meters. If the screws are removed while the meter faced down, the meter may come down, and the meter may be damaged.



- Unscrew the screws [A] and remove the fuel gauge.
- Pull the sockets [B] out from the lever meter cover.

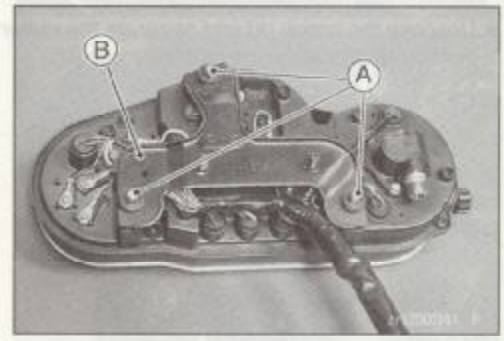


- Pull the sockets [A] from the lower meter cover.
- Unscrew the screw [B] and remove the speedometer.



ZR1200B;

- Remove:
  Meter Unit (see Meter Unit Removal)
  Nuts [A]
  Meter Unit Bracket [B]

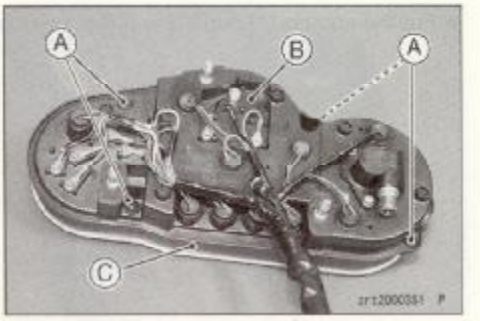


- Unscrew the trip meter knob screw and take off the trip meter knob [A].



Meters, Gauges, Indicator Unit

- Unscrew the screws [A] and separate the meter assembly [B] and upper meter cover [C].

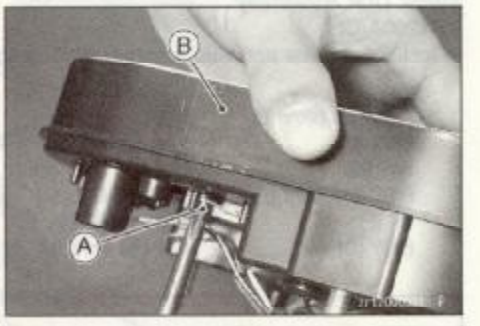


- Unscrew the screws [A] and remove the fuel/water temperature gauge.
- Pull the meter socket [B] out from the lower meter cover.

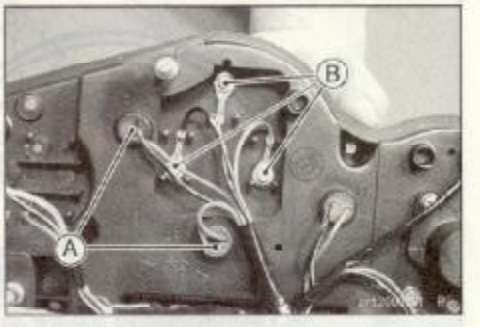


CAUTION

Do not fail to remove the screws [A] while the meter faced up [B] when removing each meters. If the screws are removed while the meter faced down, the meter may come down, and the meter may be damage.

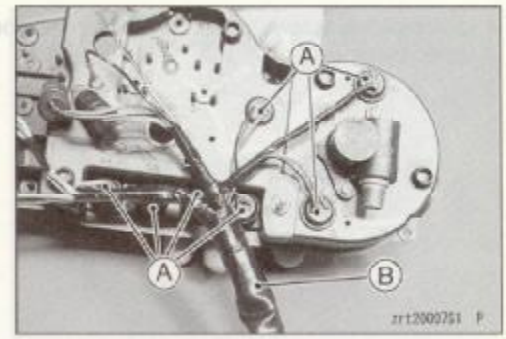


- Pull the sockets [A] out from the lower meter cover.
- Unscrew the screws [B] and remove the tachometer.

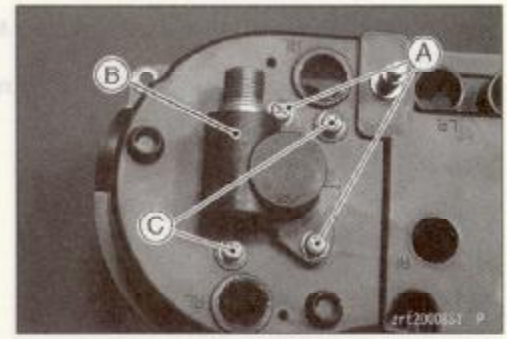


Meters, Gauges, Indicator Unit

- Pull the sockets [A] out and take the meter harness [B].



- Unscrew the screws [A] and remove the speedometer upper gear assembly [B].
- Unscrew the screws [C] and remove the speedometer.

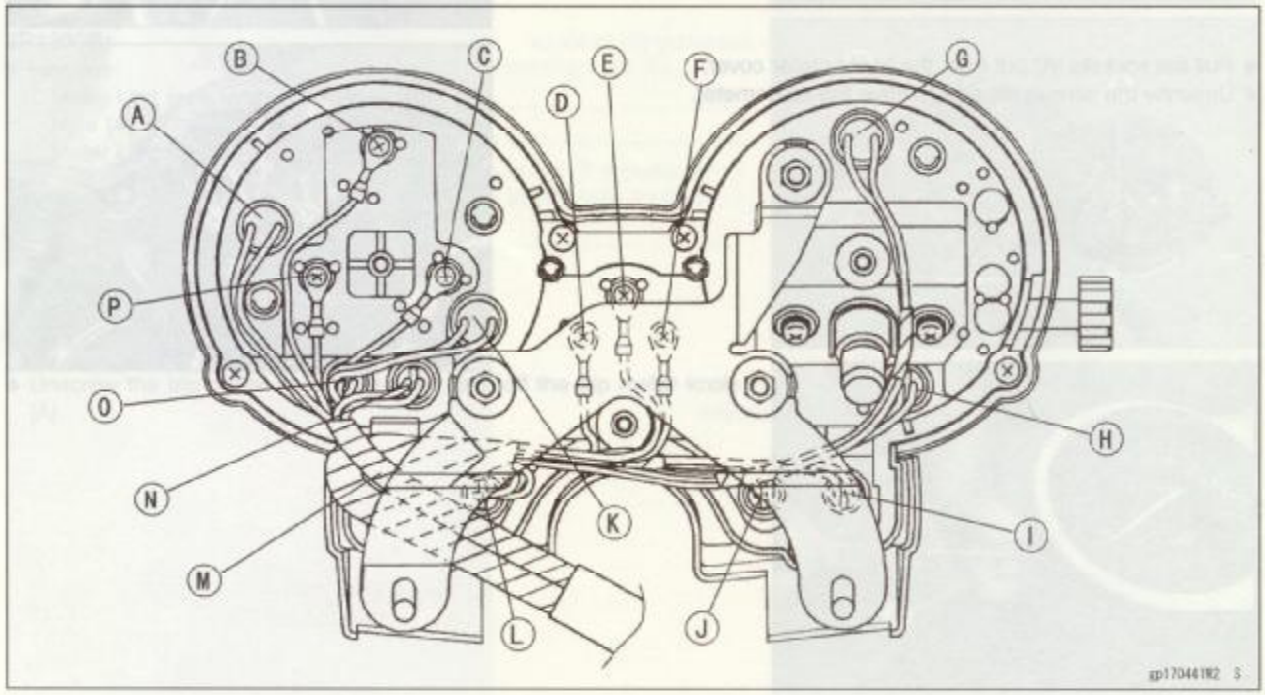


Meter Unit Assembly

ZR1200A/C:

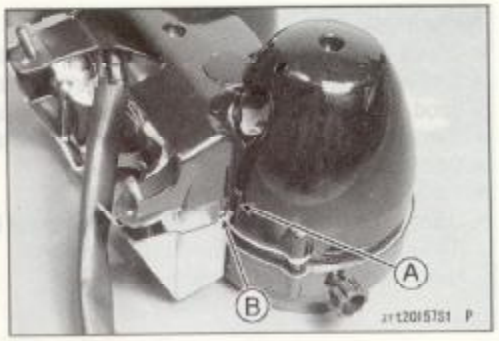
- Install the bulbs and wire termnals in the original positions.

Y/W [A]	BL/R and BK/Y [H]	LG and BR [O]
R/BL and BK/Y [B]	BR [I]	GY and BK/Y [P]
BK/Y [C]	R/BL and BK/Y [J]	BR [Q]
W/Y [D]	R/BL and BK/Y [K]	BR [R]
R/BL and BK/Y [E]	R/BL and BK/Y [L]	BK/Y [S]
BK [F]	G and BK/Y [M]	
BK/Y [G]	W/R and BK/Y [N]	



Meters, Gauges, Indicator Unit

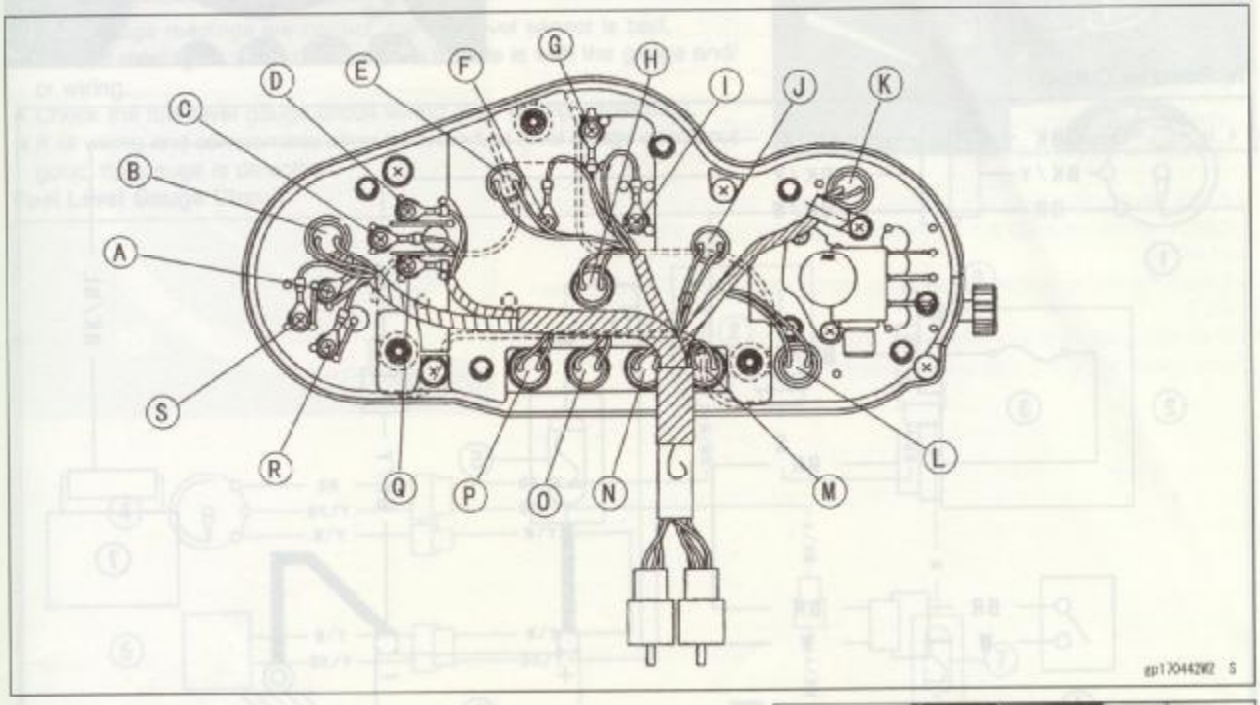
- Fit the slits [A] of the meter unit cover into the walls [B] of the indicator light cover.



ZR1200B:

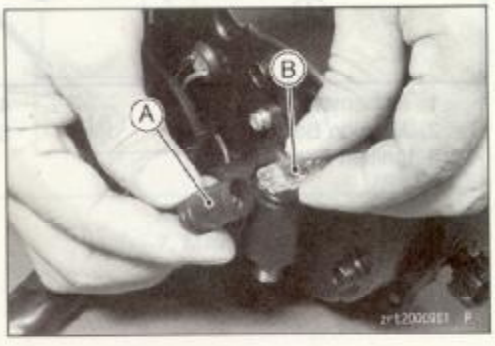
- Install the bulbs and wire termnals in the original positions.

R/BL and BK/Y [A]	R/BL and BK/Y [G]	GY and BK/Y [M]
BK/Y [B]	R/BL and BK/Y [H]	Y/W and BR [N]
BR [C]	G and BK/Y [I]	BL/R and BR [O]
BR [D]	R/BK and BK/Y [J]	W/Y [P]
BK/Y [E]	R/BL and BK/Y [K]	
W/Y[F]	LG and BR [L]	



Meter Bulb Replacement

- Remove the meter Unit (see Meter Unit Removal).
- Pull the meter socket [A] out from the meter unit.
- To remove the wedge-base type bulb [A], pull the bulb out of the socket.



CAUTION

Do not turn the bulb. Pull the bulb out to prevent damage to the bulb.
Do not use bulb rated for greater wattage than the specified value.

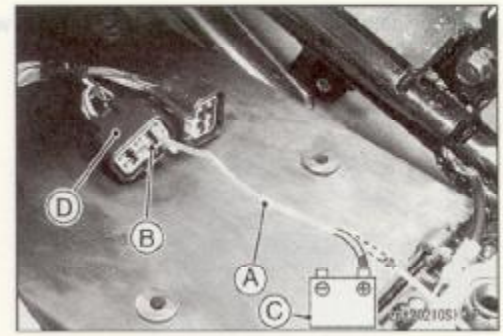
Meters, Gauges, Indicator Unit

Tachometer Inspection

- Check the tachometer circuit wiring (see Wiring Inspection).

★ If all wiring and components other than the tachometer unit check out good, the unit is suspect. Check the unit as shown.

- Remove the IC igniter (see IC Igniter Inspection).
- Disconnect the connecter.
- Turn the ignition switch ON.
- Using an auxiliary wire [A], open and connect the BK/BL lead terminal [B] to the battery (+) terminal [C] repeatedly.
  Main Harness Side Connecter [D]



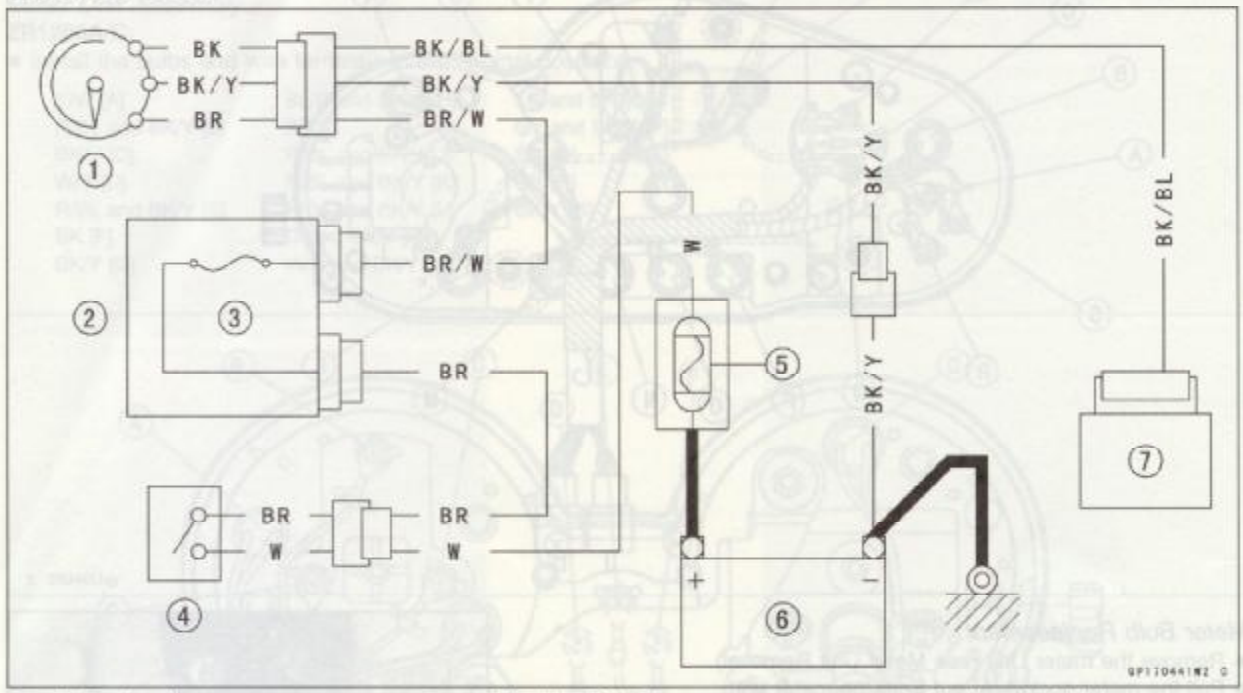
- Then the tachometer [A] needle should flick [B].
- Turn the ignition switch OFF.

★ If the hand does not flick, replace the tachometer unit.

- Install the IC igniter.



Tachometer Circuit



1. Tachometer
2. Junction Box
3. Ignition Fuse 10A
4. Ignition Switch
5. Main Fuse 30A
6. Battery 12V14Ah
7. IC Igniter

Meters, Gauges, Indicator Unit

Fuel Level Gauge Inspection

- Remove the fuel tank (see Fuel System chapter).
- Using auxiliary wire [A], short the terminals of the connect [B] on the main harness. At this time, check the movement of the fuel level gauge needle.



Fuel Level Gauge Operation Check

Ignition Switch Position: ON

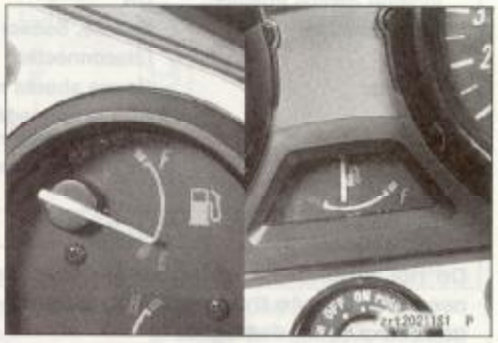
Wire Location: Female 2-pin sensor connector (disconnected)

Results: Gauge should read E when connector wires are opened.

Gauge should read F when connector wires are shorted.

CAUTION

Do not short circuit the leads longer than necessary.
When the hand swings to the "F" position, stop short-circuiting.
Otherwise a good gauge could be damaged.

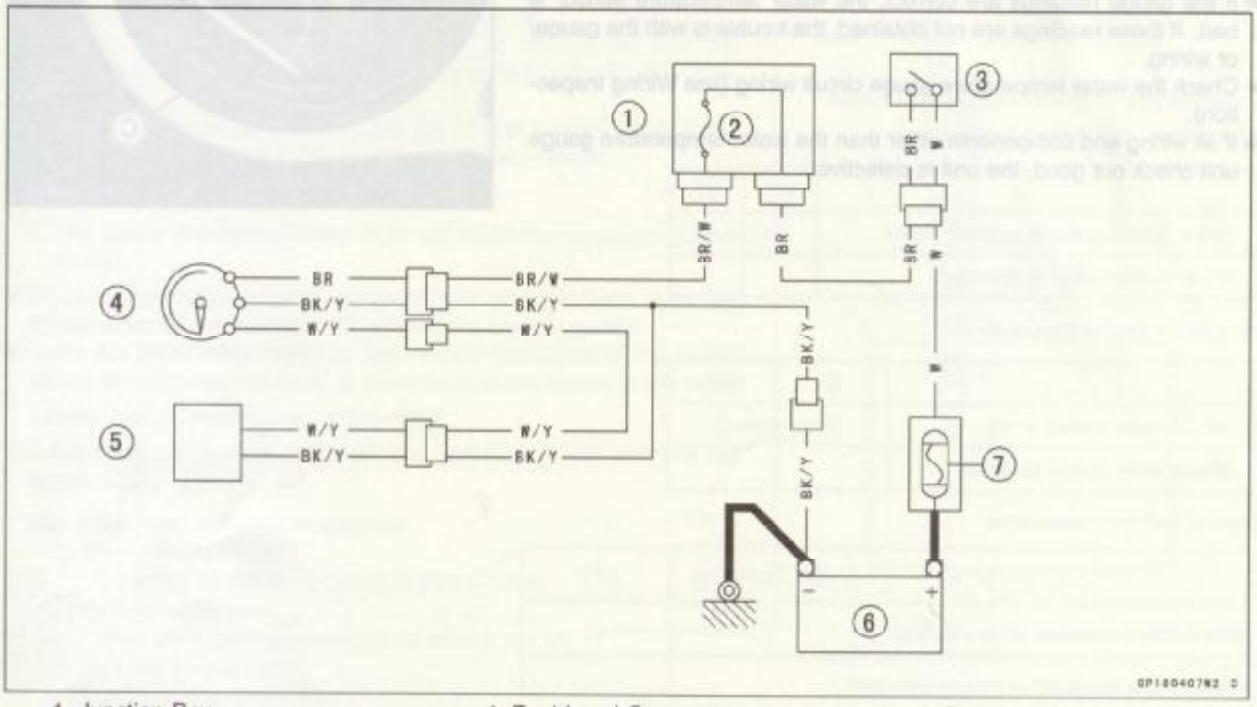


★ If the gauge readings are correct, the fuel level sensor is bad.
★ If these readings are not obtained, the trouble is with the gauge and/or wiring.

- Check the fuel level gauge circuit wiring (see Wiring Inspection).

★ If all wiring and components other than the fuel level gauge check out good, the gauge is defective.

Fuel Level Gauge Circuit



1. Junction Box
2. Ignition Fuse 10A
3. Ignition Switch
4. Fuel Level Gauge
5. Fuel Level Sensor
6. Battery 12V14Ah
7. Main Fuse 30A

Water Temperature Gauge Inspection (ZR1200B)

- Remove the fuel tank (see Fuel System chapter).
- Pull off the water temperature sensor connector [A].



- Prepare auxiliary wire [B], and check the operation of the gauge [C].

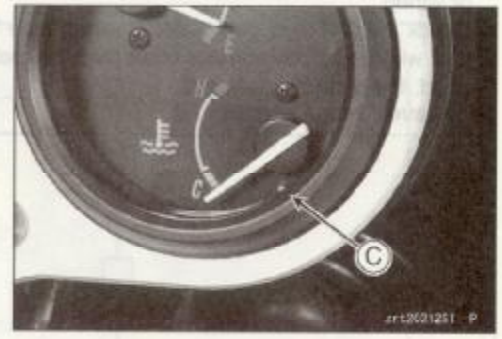


Wate Temperature Gauge Operation check

Ignition Switch Position:	**ON**
Wire Location:	**Female, Sensor Connector (disconnected)**
Results:	**Gauge should read C when connector 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.



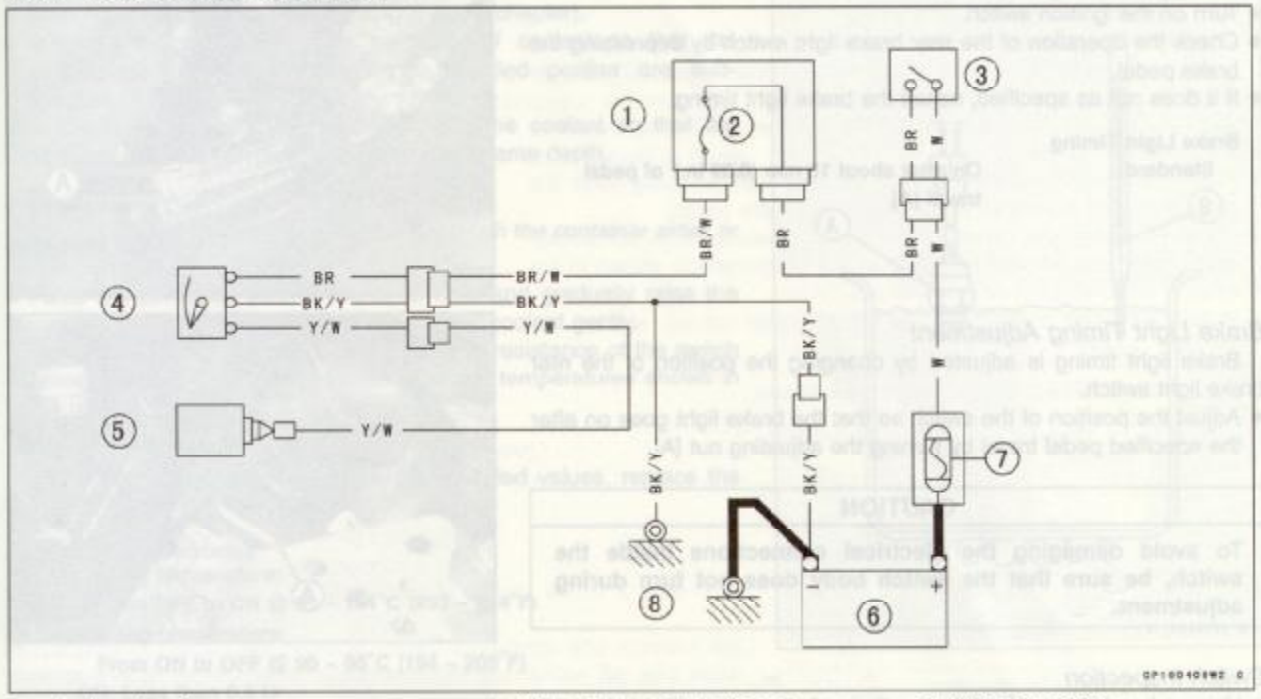
★ If the gauge readings are correct, the water temperature sensor is bad. If these readings are not obtained, the trouble is with the gauge/or wiring.

- Check the water temperature gauge circuit wiring (see Wiring Inspection).

★ If all wiring and components other than the water temperature gauge unit check out good, the unit is defective.

Meters, Gauges, Indicator Unit

Water Temperature Gauge Circuit



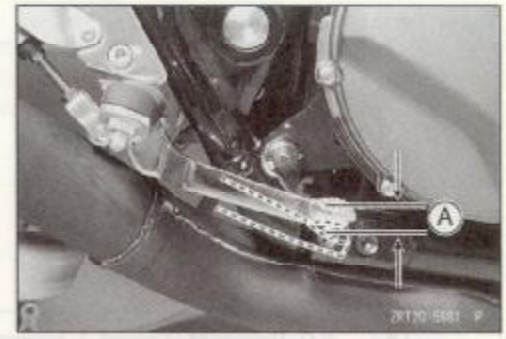
1. Junction Box
2. Ignition Fuse 10A
3. Ignition Switch
4. Water Temperature Gauge
5. Water Temperature Sensor
6. Battery 12V14Ah
7. Main Fuse 30A
8. Water Temperature Sensor Ground

Brake Light Timing Inspection

- Turn on the ignition switch.
- Check the operation of the rear brake light switch by depressing the brake pedal.
- If it does not as specified, adjust the brake light timing.

Brake Light Timing

Standard: **On after about 10 mm (0.39 in.) of pedal travel [A]**



Brake Light Timing Adjustment

Brake light timing is adjusted by changing the position of the rear brake light switch.

- Adjust the position of the switch so that the brake light goes on after the specified pedal travel by turning the adjusting nut [A].



CAUTION

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

Switch Inspection

- Using a hand tester, check to see that only the connections shown in the table have continuity (about zero ohms).
- For the handlebar switches and the ignition switch, refer to the tables in the Wiring Diagram.
- ★ If the switch has an open or short, repair it or replace it with a new one.

Special Tool - Hand Tester: 57001-1394

Rear Brake Light Switch Connections

	BR	BL
When brake pedal is pushed down	○——	——○
When brake pedal is released		

Side Stand Switch Connections

	G	BK
When side stand is up	○——	——○
When side stand is down		

Neutral Switch Connections

	SW.Terminal	⏚
When transmission is in neutral	○——	——○
When transmission is not in neutral		

Engine Oil Pressure Switch Connections*

	SW. Terminal	⏚
When engine is stopped	○——	——○
When engine is running		

*: Engine lubrication system is in good condition

Switch and Sensors

Radiator Fan Switch Inspection

- Remove the fan switch (see Cooling System chapter).
- Suspend the switch [A] in a container of coolant so that the temperature-sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant so that the sensitive portions are located in almost the same depth.

NOTE

○ *The switch and thermometer must not touch the container sides or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the terminals in the connector at the temperatures shown in the table.

Special Tool - Hand Tester: 57001-1394

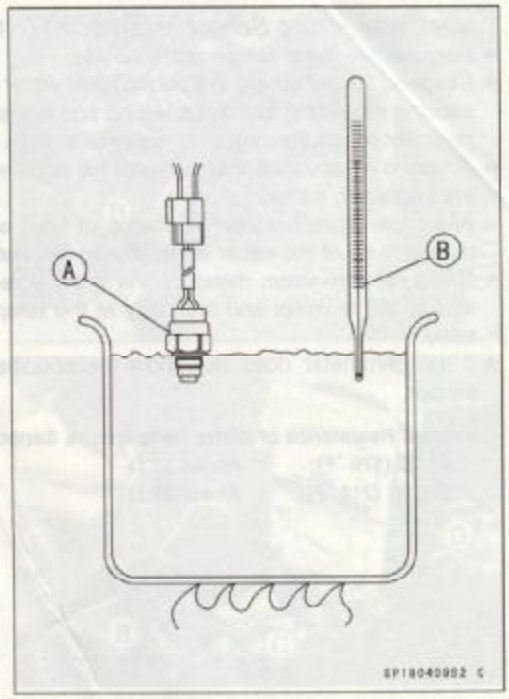
★If the hand tester does not show the specified values, replace the switch.

Fan Switch Resistance

○ **Rising temperature:**
From OFF to ON @ 95 ~ 101°C (203 ~ 214°F)

○ **Falling temperature:**
From ON to OFF @ 90 ~ 96°C (194 ~ 205°F)

ON: Less than 0.5 Ω
OFF: More than 1 MΩ



Water Temperature Switch Inspection (ZR1200A/C)

- Remove the switch (see Cooling System chapter).
- Suspend the switch [A] in a container of coolant so that the temperature-sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant so that the sensitive portions are located in almost the same depth.

NOTE

○ *The switch and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the terminal and body at the temperatures shown in the table.

Special Tool - Hand Tester: 57001-1394

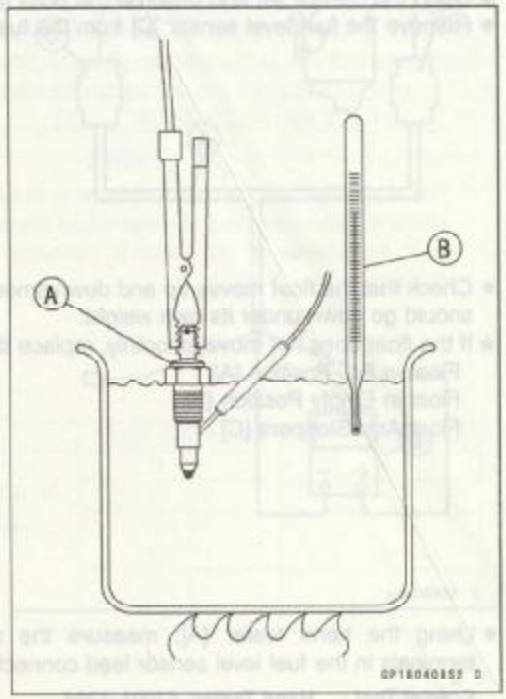
★If the hand tester does not show the specified values, replace the switch.

Water Temperature Switch Resistance

○ **Rising temperature:**
From OFF to ON @ 112 ~ 118°C (236 ~ 238°F)

○ **Falling temperature:**
From ON to OFF @ above 108 °C (above 227 °F)

ON: Less than 0.5 Ω
OFF: More than 1 MΩ



Switch and Sensors

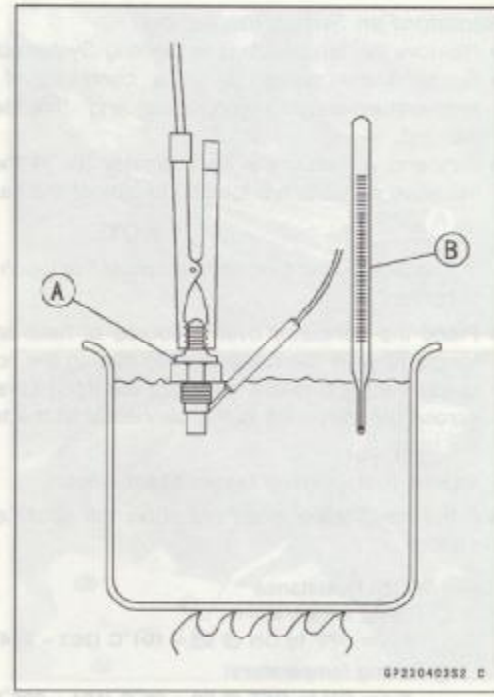
Water Temperature Sensor Inspection (ZR1200B)

- Remove the water temperature sensor.
- Suspend the sensor [A] in a container of water so that the temperature sensing projection and threaded portion are submerged. The sensor must not touch the container sides or bottom.
- Suspend an accurate thermometer [B] in the water. It must not touch the container, either.
- Place the container over a source of heat and gradually raise the temperature of the water while stirring the water gently.
- Using an ohmmeter, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.

★ If the ohmmeter does not show the specified values, replace the sensor.

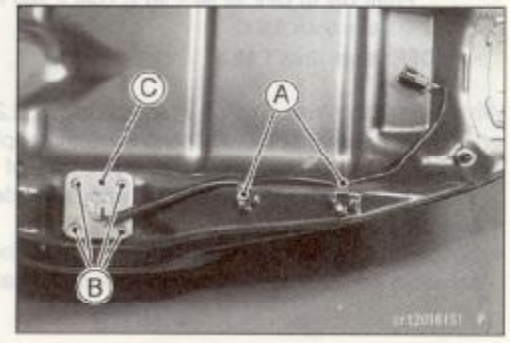
Internal Resistance of Water Temperature Sensor

80 °C (176 °F):	**About 52 Ω**
100 °C (212 °F):	**About 27 Ω**



Fuel Level Sensor Inspection

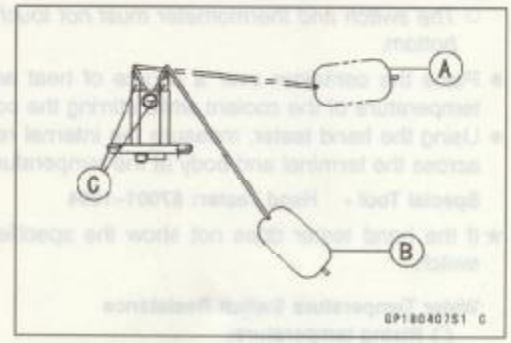
- Remove the fuel tank (see Fuel System chapter).
- Open the clamps [A] and unscrew the bolts [B].
- Remove the fuel level sensor [C] from the fuel tank.



- 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, replace the sensor.

Float in Full Position [A]
Float in Empty Position [B]
Float Arm Stoppers [C]



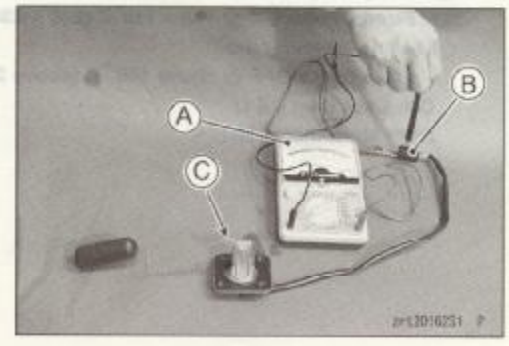
- Using the hand tester [A], measure the resistance across the terminals in the fuel level sensor lead connector [B].

Special Tool - Hand Tester: 57001-1394

★ If the tester readings are not as specified, or do not change smoothly according as the float moves up and down, replace the sensor.

Fuel Level Sensor Resistance

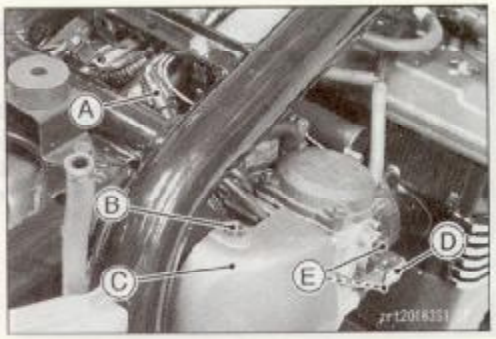
Standard:	**Full position: 4 ~ 10 Ω**
	Empty position [C]: 90 ~ 100 Ω



Switch and Sensors

Throttle Position Sensor Removal/Installation

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the throttle sensor connector [A].
- Unscrew the bolt [D] and remove the air cleanar housing cover [E].
- Remove the throttle position sensor [B] by unscrewing the mounting screws [C].
- Be sure to adjust the throttle position sensor when installing (See throttle Position Sensor Adjustment).



Throttle Position Sensor Inspection

NOTE

○ *Be sure the battery is fully charged.*

- Remove the fuel tank (see Fuel System chapter).
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetor.
- Start the engine and warm it up thoroughly.
- Check idle speed and stop the engine.

★If the idle speed is out of the specified range, adjust it (see Fuel System chapter).

- Disconnect the throttle position sensor connector and connect the setting adapter [A] between the sensor connector [B] and main harness connector [C].
- Set the hand tester to the DC 25V range and connect the hand tester [D] to the adapter.
  Hand Tester (+) → BL Lead (color of lead on the sensor)
  Hand Tester (-) → BK Lead (color of lead on the sensor)

Special Tools - Throttle Sensor Setting Adapter: 57001–1400 [B]
Hand Tester: 57001–1394

- Measure the sensor input voltage with the engine stopped, and with the connector joined.
- Turn the ignition SW ON.

Throttle Position Sensor Input Voltage
Standard: 4.75 ~ 5.25 V

★If the reading is not within the specified range, check the wiring/or IC igniter.

★If the reading is within the specified range, check the sensor output voltage.

- Connect the hand tester [D] to the adapter.
  Hand Tester (+) → Y Lead (color of lead on the sensor)
  Hand Tester (-) → BK Lead (color of lead on the sensor)
- Turn on the ignition switch.
- Measure the sensor output voltage with the engine stopped and with the idle throttle opening.

Throttle Position Sensor Output Voltage
Standard: 0.9 ~ 1.1 V (at idle throttle opening)

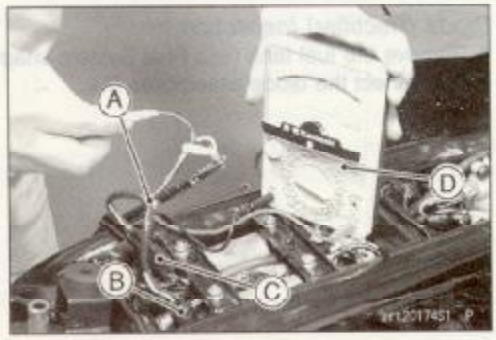
★If the reading is not within the specified range, adjust the throttle sensor position (see Throttle Sensor Position Adjustment).

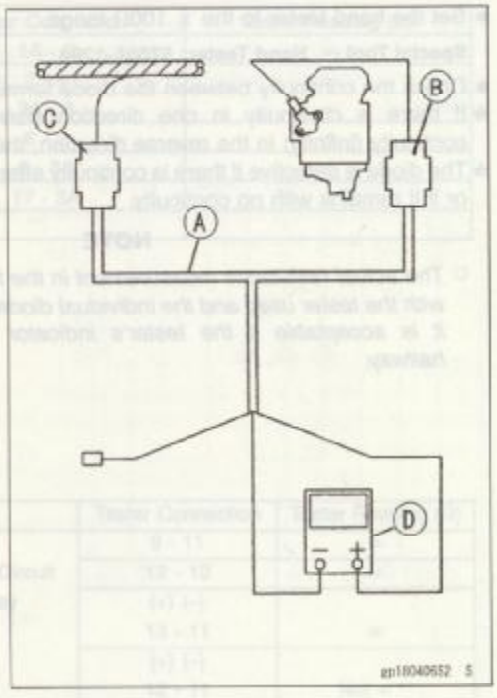
★If the reading is within the specified range, check the sensor output voltage at full throttle opening.

Throttle Position Sensor Output Voltage
Standard: 4.06 ~ 4.26 V (at full throttle opening)

★If the reading is not within the specified range, readjust the sensor.

★If the throttle sensor cannot be adjusted, replace the sensor.





Throttle Position Sensor Position Adjustment

- Check the throttle sensor output voltage (see Throttle Sensor Inspection).
- If the output voltage is out of the range, adjust it as follows.

○ Loosen the throttle sensor mounting screws [A].
○ Adjust the position of the sensor until the output voltage is within the specified range (see Throttle Sensor Inspection).



Diode (Rectifier) Inspection

- Remove the fuel tank (see Fuel System chapter).
- Disconnect the diode assemblies [A].

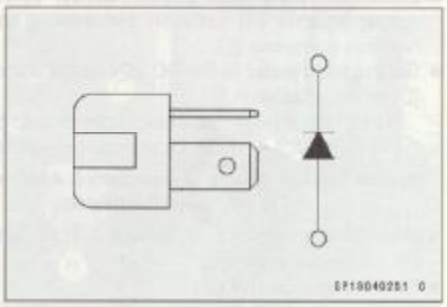


- Set the hand tester to the × 100Ω range.

Special Tool - Hand Tester: 57001–1394

- Check the continuity between the diode terminals in both directions.

★If there is continuity in one direction (forward direction) but no continuity (infinity) in the reverse direction, the diode is normal.
★The diode is defective if there is continuity after changing the direction, or if it remains with no continuity.

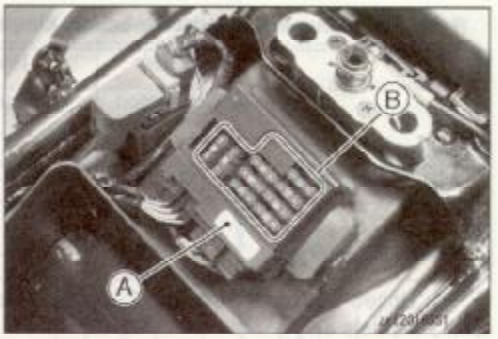


NOTE

○ *The actual resistance measurement in the forward direction varies with the tester used and the individual diodes. Generally speaking, it is acceptable if the tester's indicator swings approximately halfway.*

Junction Box

The junction box [A] has fuses [B], relays, and diodes. The relays and diodes can not be removed.



Junction Box Fuse Circuit Inspection

- Remove the seat (see Frame chapter).
- Remove the junction box.
- Pull off the connectors from the junction box.
- Make sure all connector terminals are clean and tight, and none of them have been bent.

★ Clean the dirty terminals, and straighten slightly-bent terminals.

- Check conductivity of the numbered terminals with the hand tester.

★ If the tester does not read as specified, replace the junction box.

Special Tool - Hand Tester: 57001–1394

Fuse Circuit Inspection

Tester Connection	Tester Reading (Ω)
1 - 1A	0
1 - 2	0
3A - 4	0
6 - 5	0
6 - 10	0
6 - 7	0
6 - 17	0

Tester Connection	Tester Reading (Ω)
1A - 6	∞
2 - 8	∞
3A - 6	∞
6 - 2	∞
6 - 3A	∞
17 - 3A	∞

Starter Circuit/Headlight Relay Inspection

- Remove the junction box.
- Check conductivity of the following numbered terminals by connecting the hand tester and one 12 V battery to the junction box as shown.

★ If the tester does not read as specified, replace the junction box.

Special Tool - Hand Tester: 57001–1394

Relay Circuit Inspection (with the battery disconnected)

	Tester Connection	Tester Reading (Ω)
Headlight Relay	*7 - 8	∞
	*7 - 13	∞
	(+) (–) *13 - 9	Not ∞ **

	Tester Connection	Tester Reading (Ω)
Starter Circuit Relay	9 - 11	∞
	12 - 13	∞
	(+) (–) 13 - 11	∞
	(+) (–) 12 - 11	Not ∞ **

(*): United States of America, Canadian, Australian, and Malaysian Models only

(**): The actual reading varies with the hand tester used.

(+): Apply tester positive wire.

(–): Apply tester negative wire.

Junction Box

Relay Circuit Inspection (with the battery connected)

	Battery Connection (+) (-)	Tester Connection	Tester Reading (Ω)
Headlight Relay	*9 - 13	*7 - 8	0
Starter Circuit Relay	11 - 12	(+) (-) 13 - 11	Not ∞ **

(*): United States of America, Canadian, Malaysian, and Australian Models only
(**): The actual reading varies with the hand tester used.
(+): Apply tester positive lead.
(–): Apply tester negative lead.

Diode Circuit Inspection

- Remove the junction box.
- Check conductivity of the following pairs of terminals.

Diode Circuit Inspection

Tester Connection	*13-8, *13-9, 12-11, 12-14, 15-14, 16-14

(*): United States of America, Canadian, Malaysian, and Australian Models only

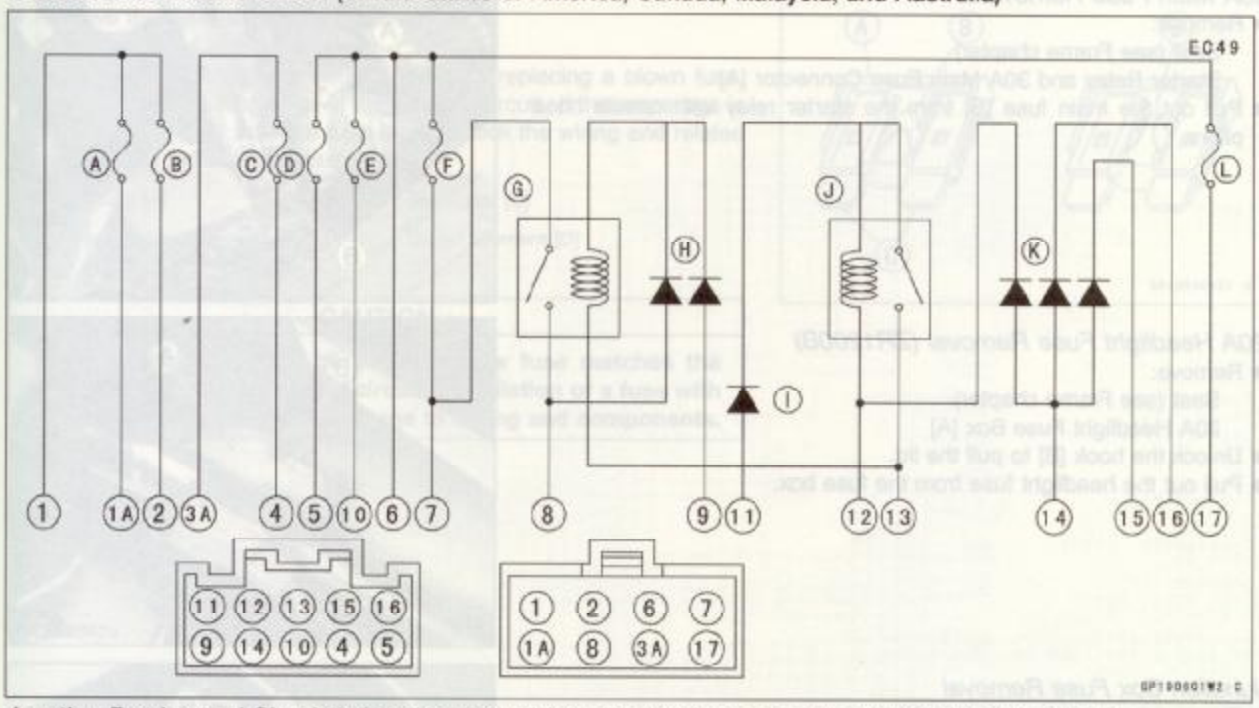
★ The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the junction box must be replaced.

NOTE

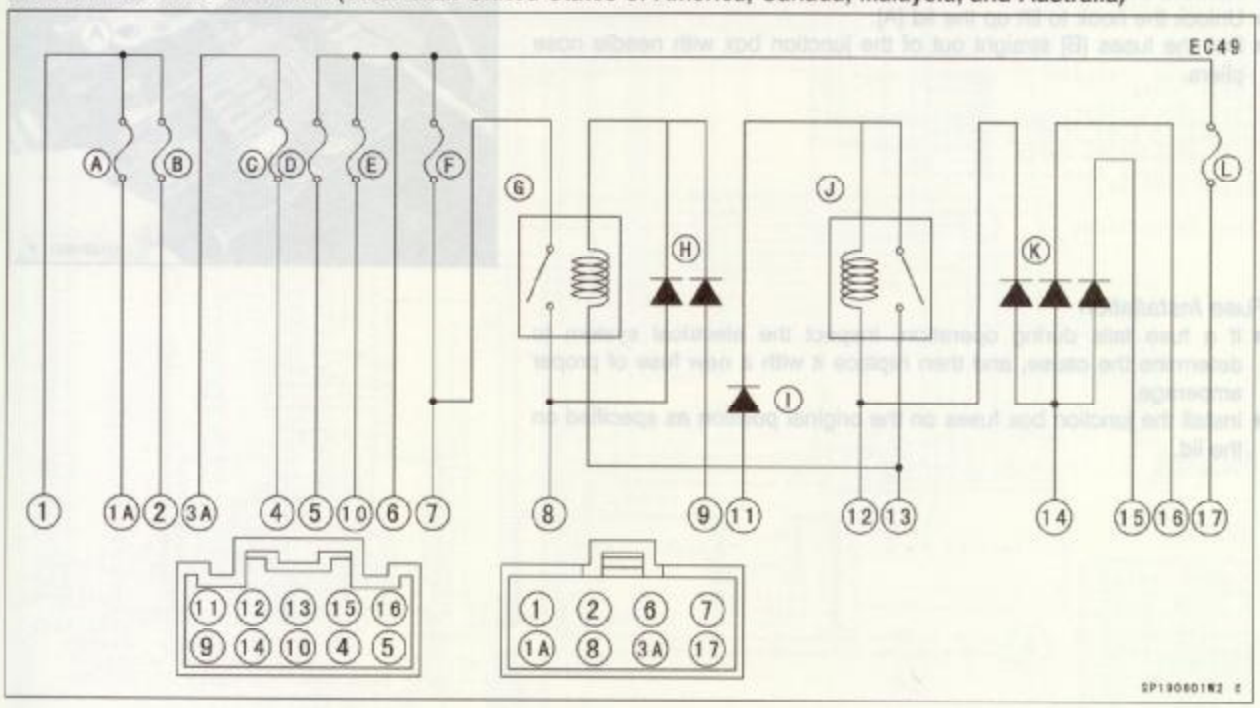
○ *The actual meter reading varies with the meter used and the individual diodes, but generally speaking, the lower reading should be from zero to one half the scale.*

Junction Box

Junction Box Internal Circuit (United States of America, Canada, Malaysia, and Australia)



Junction Box Internal Circuit (other than United States of America, Canada, Malaysia, and Australia)

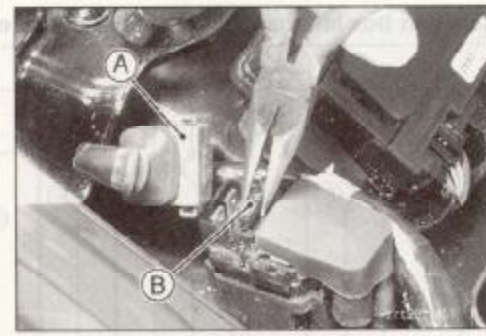


A. Accessory Fuse 10A
B. Fan Fuse 10A
C. Turn Signal Fuse 10A
D. Horn Fuse 10A
E. Ignition Fuse 10A
F. Headlight Fuse 10A
G. Headlight Relay
H. Headlight Diodes
I. Starter Diode
J. Starter Circuit Relay
K. Interlock Diodes
L. Taillight Fuse 10A

Fuse

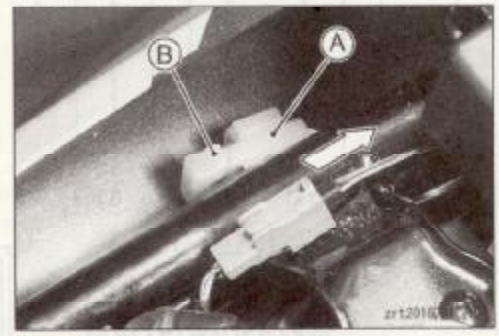
30A Main Fuse Removal

- Remove:
  Seat (see Frame chapter)
  Starter Relay and 30A Main Fuse Connector [A]
- Pull out the main fuse [B] from the starter relay with needle nose pliers.



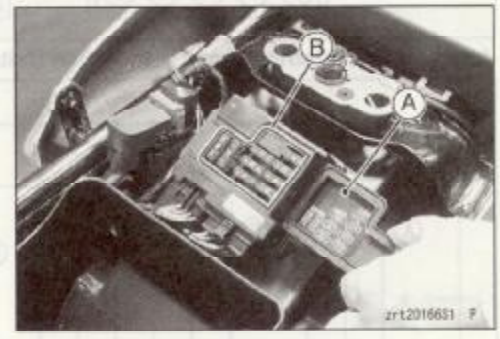
20A Headlight Fuse Removal (ZR1200B)

- Remove:
  Seat (see Frame chapter)
  20A Headlight Fuse Box [A]
- Unlock the hook [B] to pull the lid.
- Pull out the headlight fuse from the fuse box.



Junction Box Fuse Removal

- Remove the seat (see Frame chapter).
- Unlock the hook to lift up the lid [A].
- Pull the fuses [B] straight out of the junction box with needle nose pliers.



Fuse Installation

- If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.
- Install the junction box fuses on the original position as specified on the lid.

Fuse

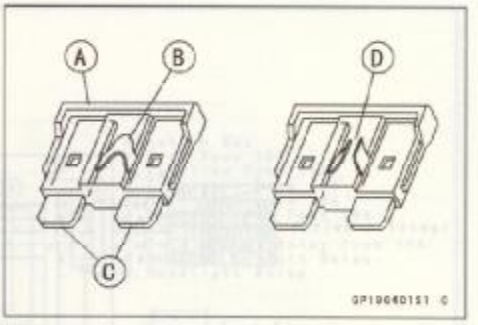
Fuse Inspection

- Remove the fuse (see Fuse Removal).
- 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.

Housing [A] Terminals [C]

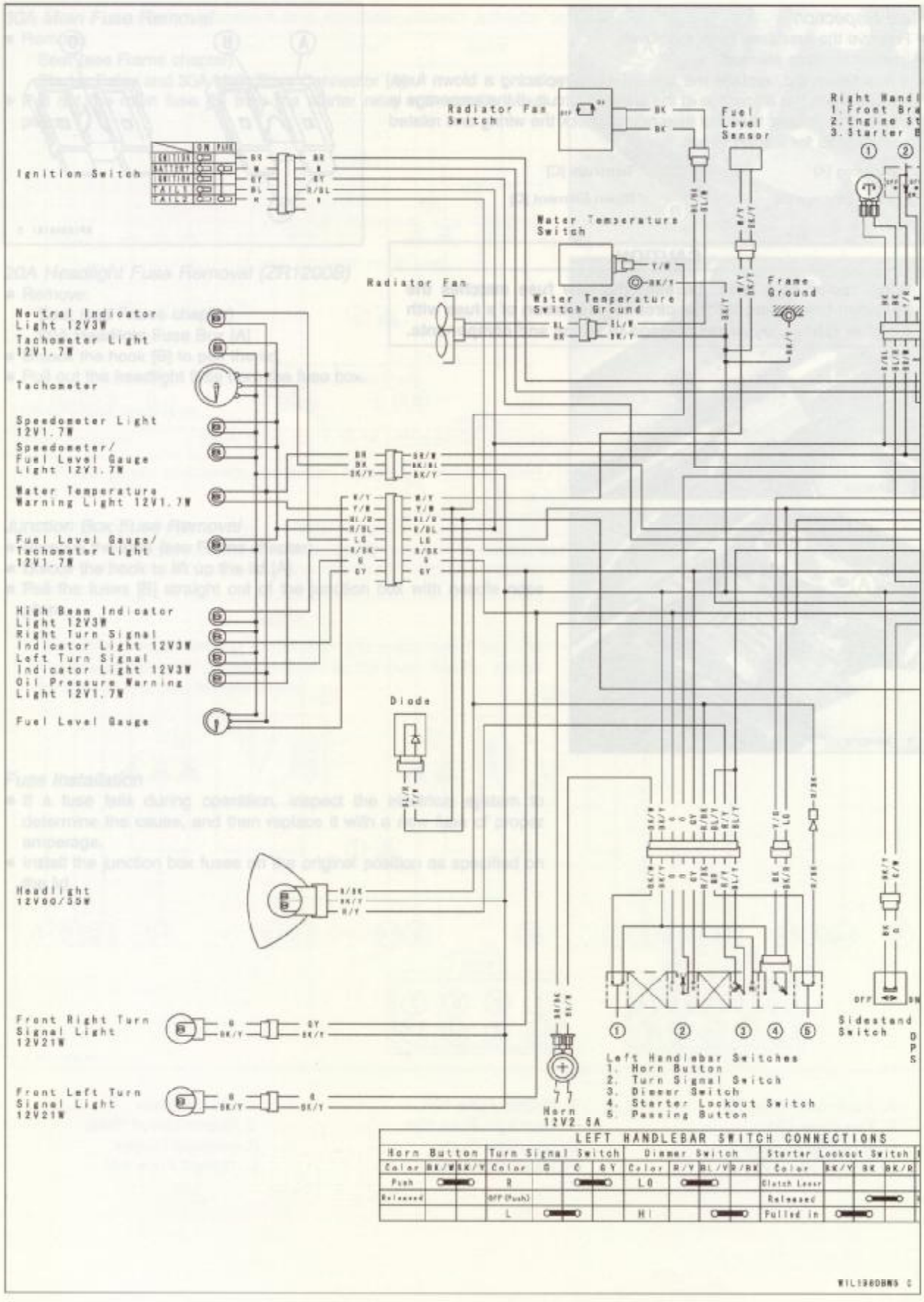
Fuse Element [B] Blown Element [D]



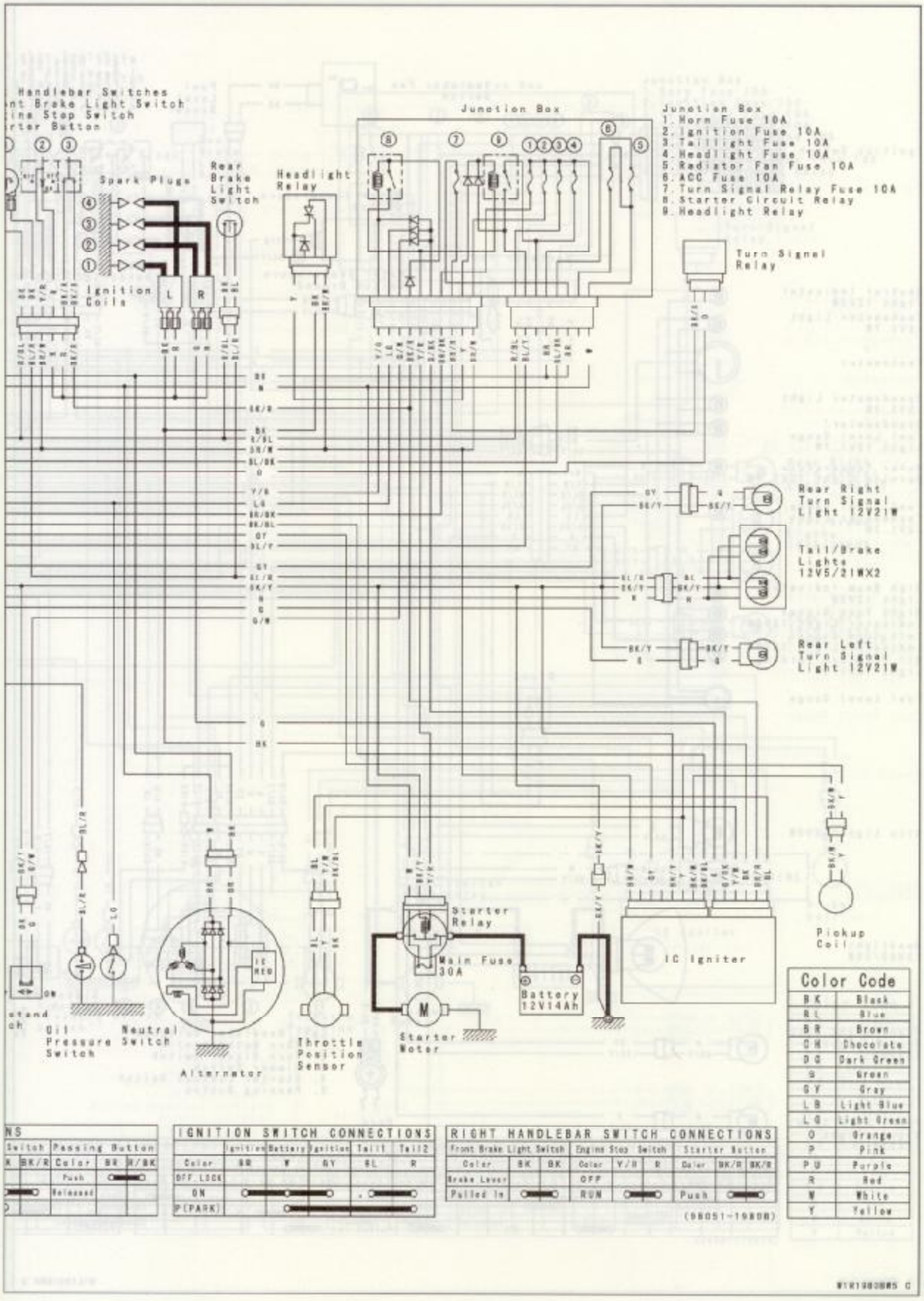
CAUTION

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.

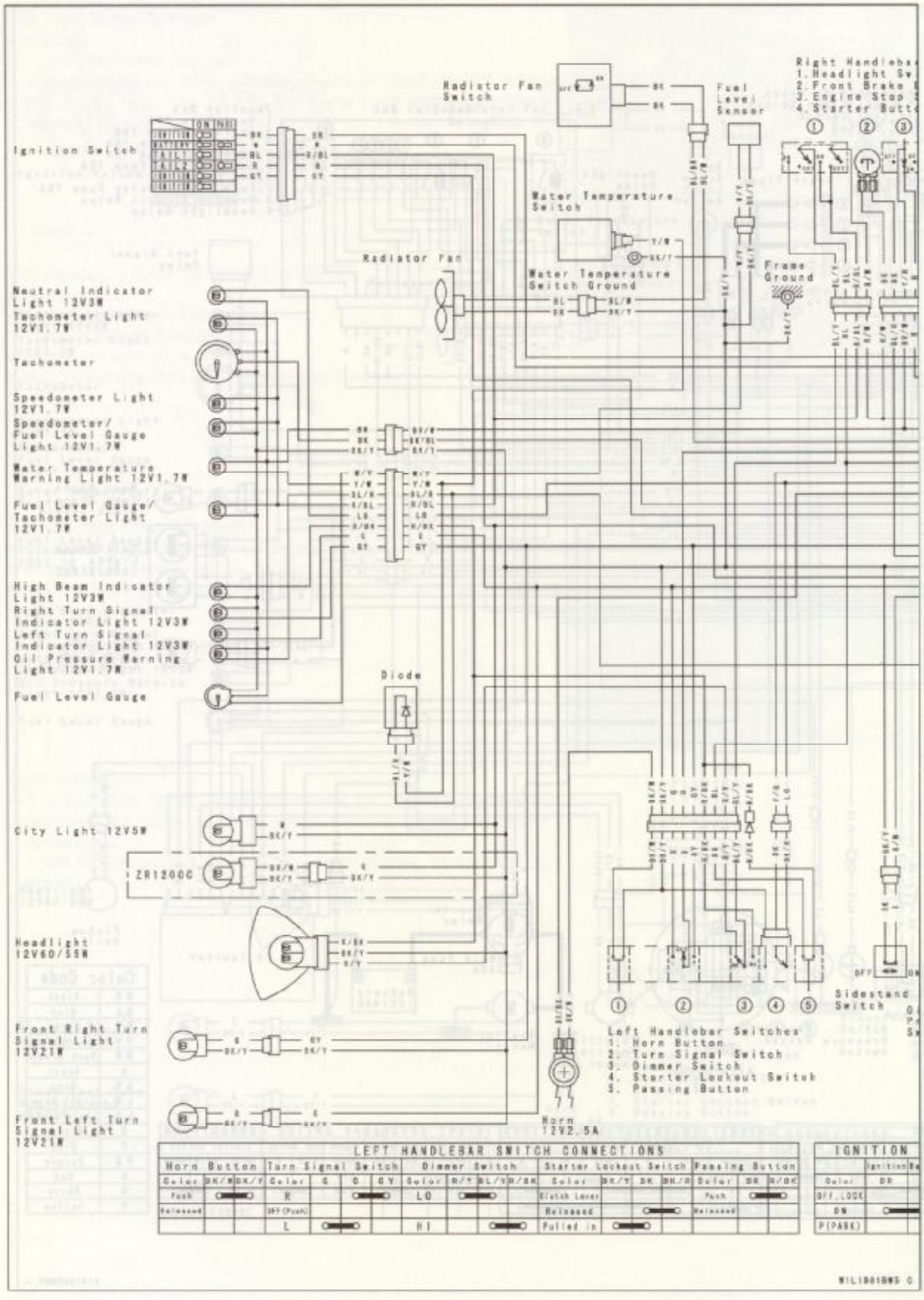
ZR1200–A/C Wiring Diagram (Australia)



ZR1200–A/C Wiring Diagram (Australia)



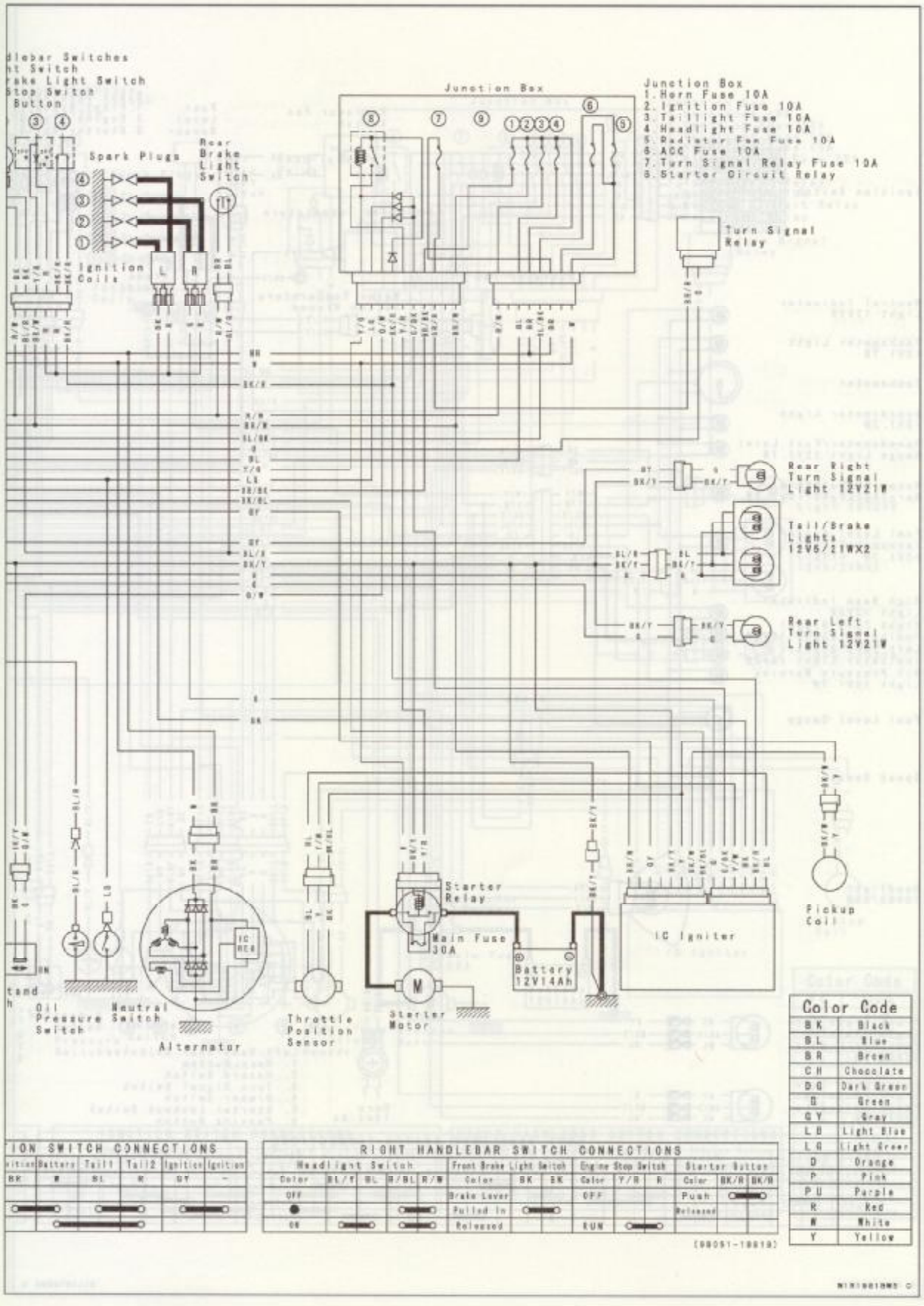
ZR1200–A/C Wiring Diagram (Europe)



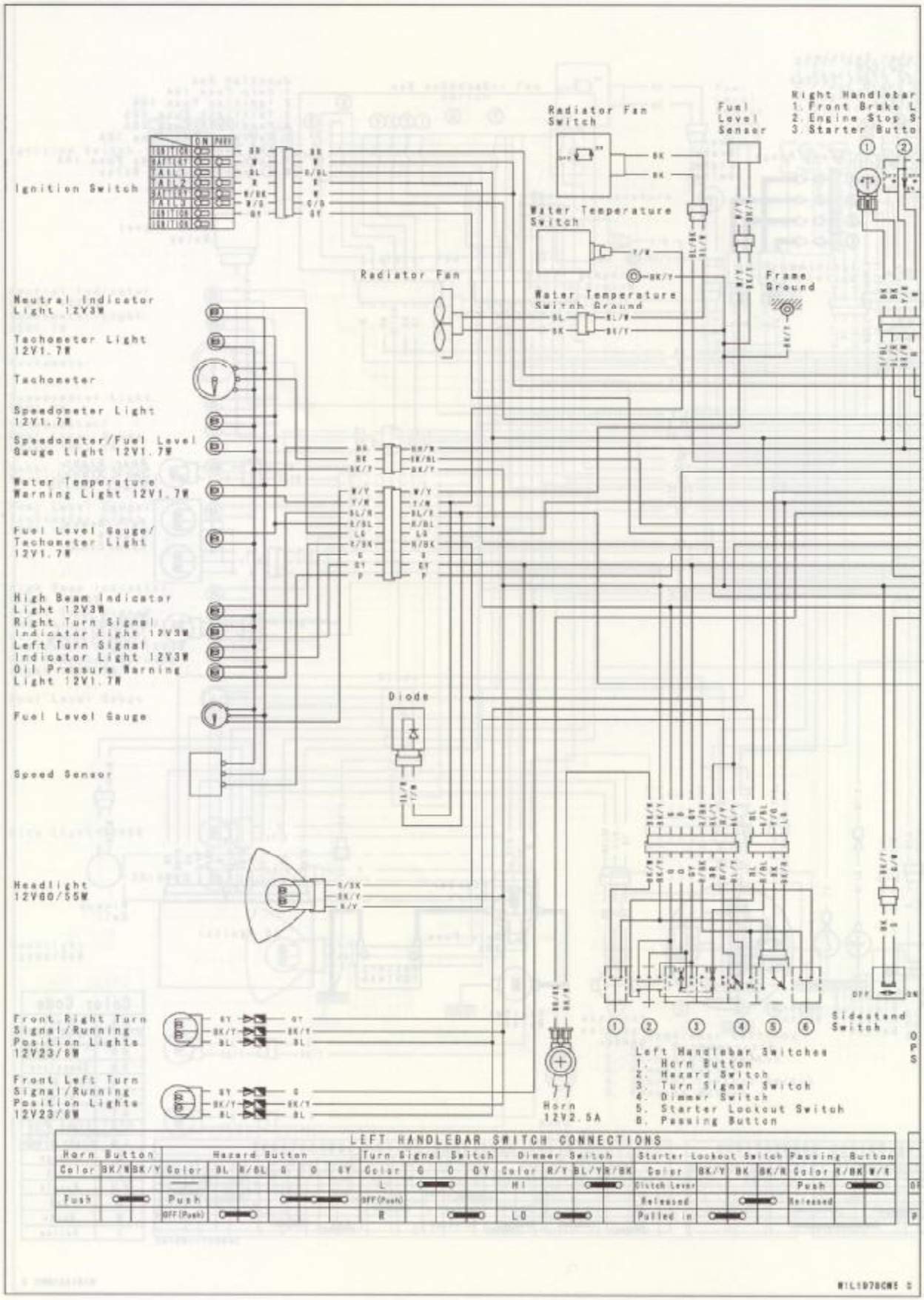
LEFT HANDLEBAR SWITCH CONNECTIONS																							
Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button								
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	BK	R/BK						
Push	●		R		●		LO	●			Clutch Lever				Push	●							
Released			OFF (Push)								Released		●		Released								
			L	●			HI		●		Pulled in	●											

IGNITION		
	Ignition	Be
Color	BR	
OFF_LOCK		
ON	●	
P(PARK)		

ZR1200–A/C Wiring Diagram (Europe)



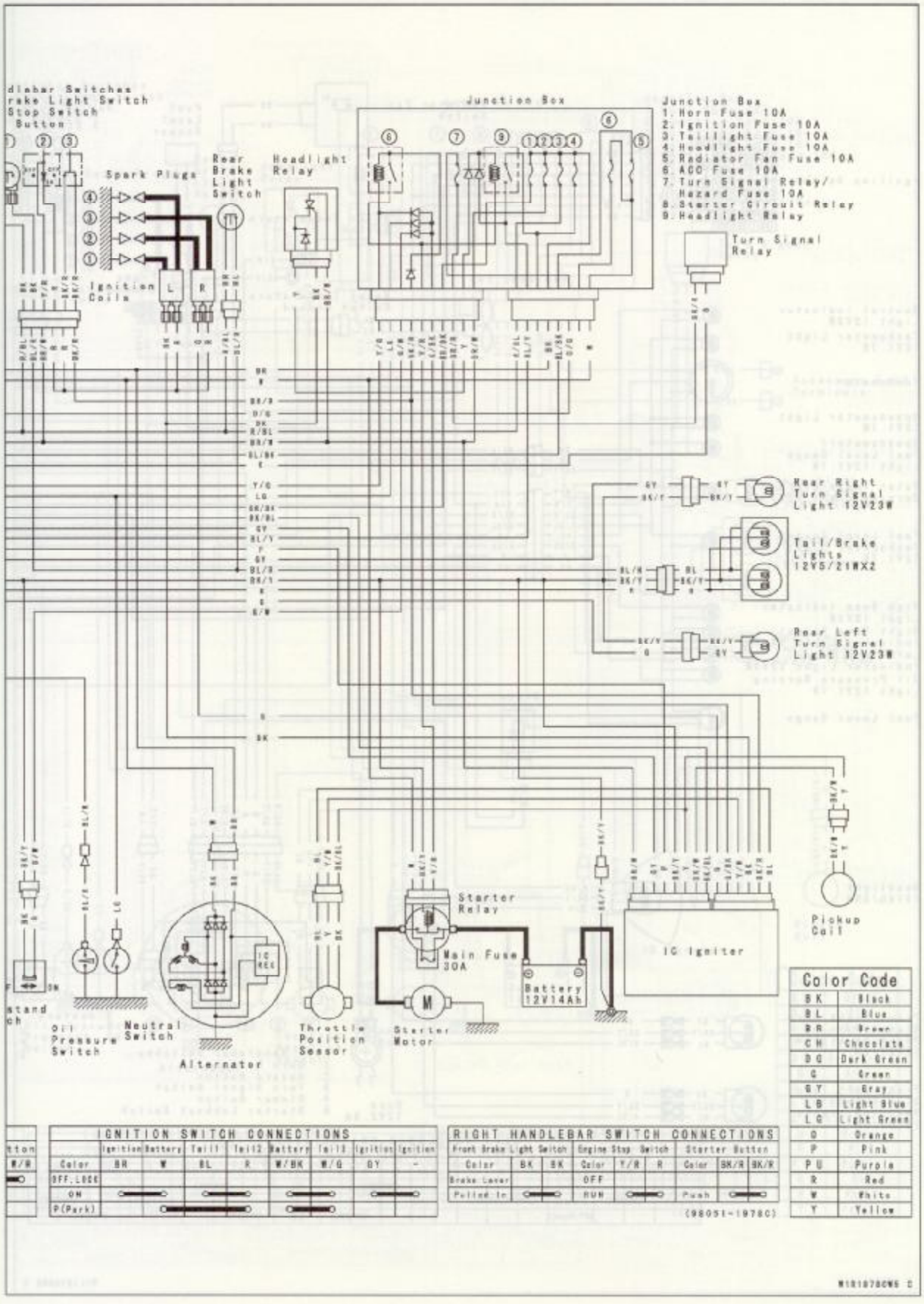
ZR1200–A Wiring Diagram (Malaysia)



LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Hazard Button						Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button			
Color	BK/W	BK/Y	Color	BL	R/BL	G	O	GY	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	R/BK	W/R	
			—						L	○			HI		○		Clutch Lever				Push	○		
Push	○		Push			○			OFF (Push)								Released		○		Released			
			OFF (Push)	○					R		○		LO	○			Pulled in	○						

ZR1200–A Wiring Diagram (Malaysia)



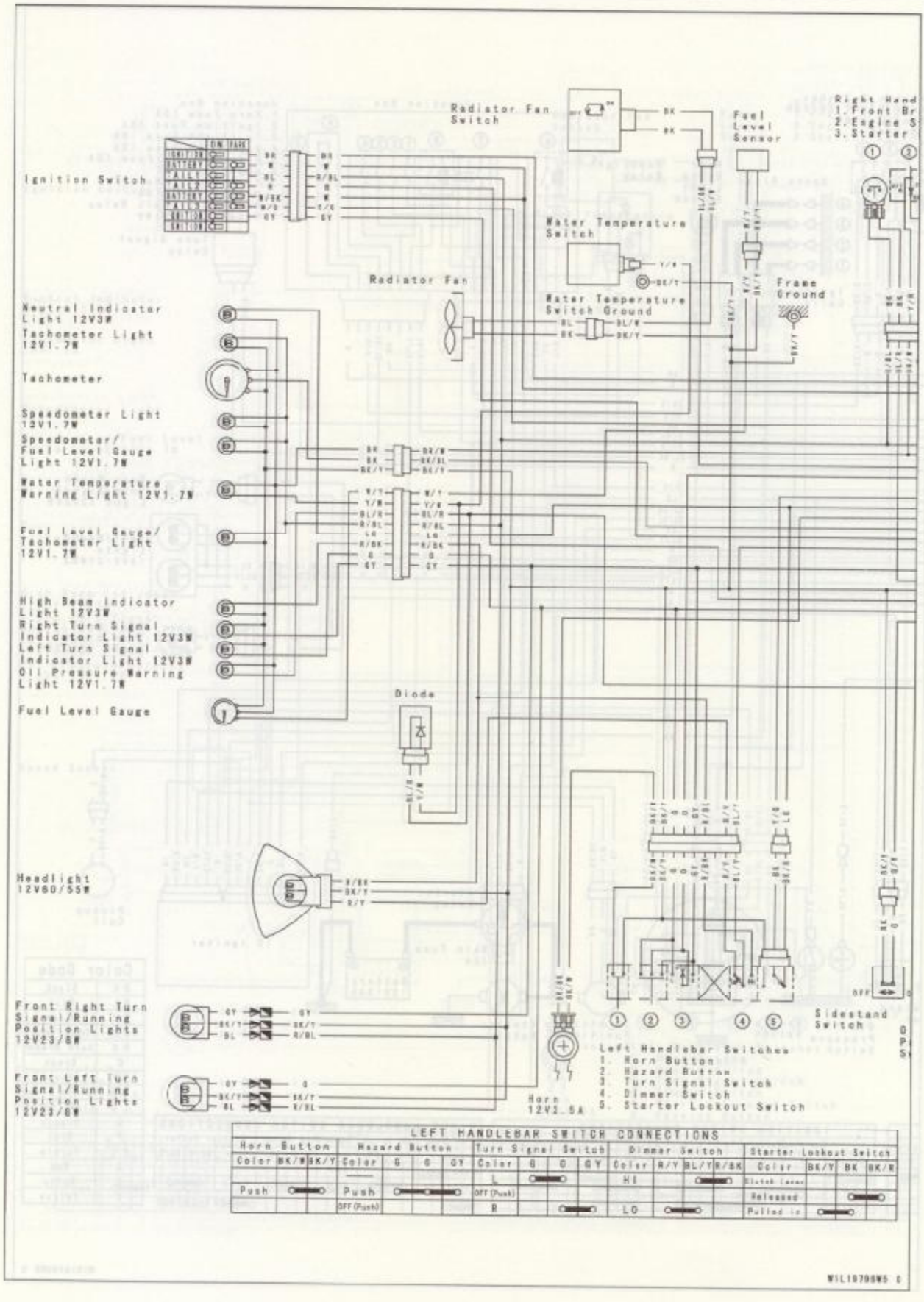
IGNITION SWITCH CONNECTIONS								
	Ignition	Battery	Tail	Tail	Battery	Tail	Ignition	Ignition
Color	BR	W	BL	R	W/BK	W/G	GY	-
OFF, LOCK								
ON	○		○		○		○	○
P(Park)		○		○	○			

RIGHT HANDLEBAR SWITCH CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	BK/R	BK/R
Brake Lever			OFF					
Pulled In	○	○	RUN	○	○	Push	○	○

(98051-1978C)

Color Code	
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

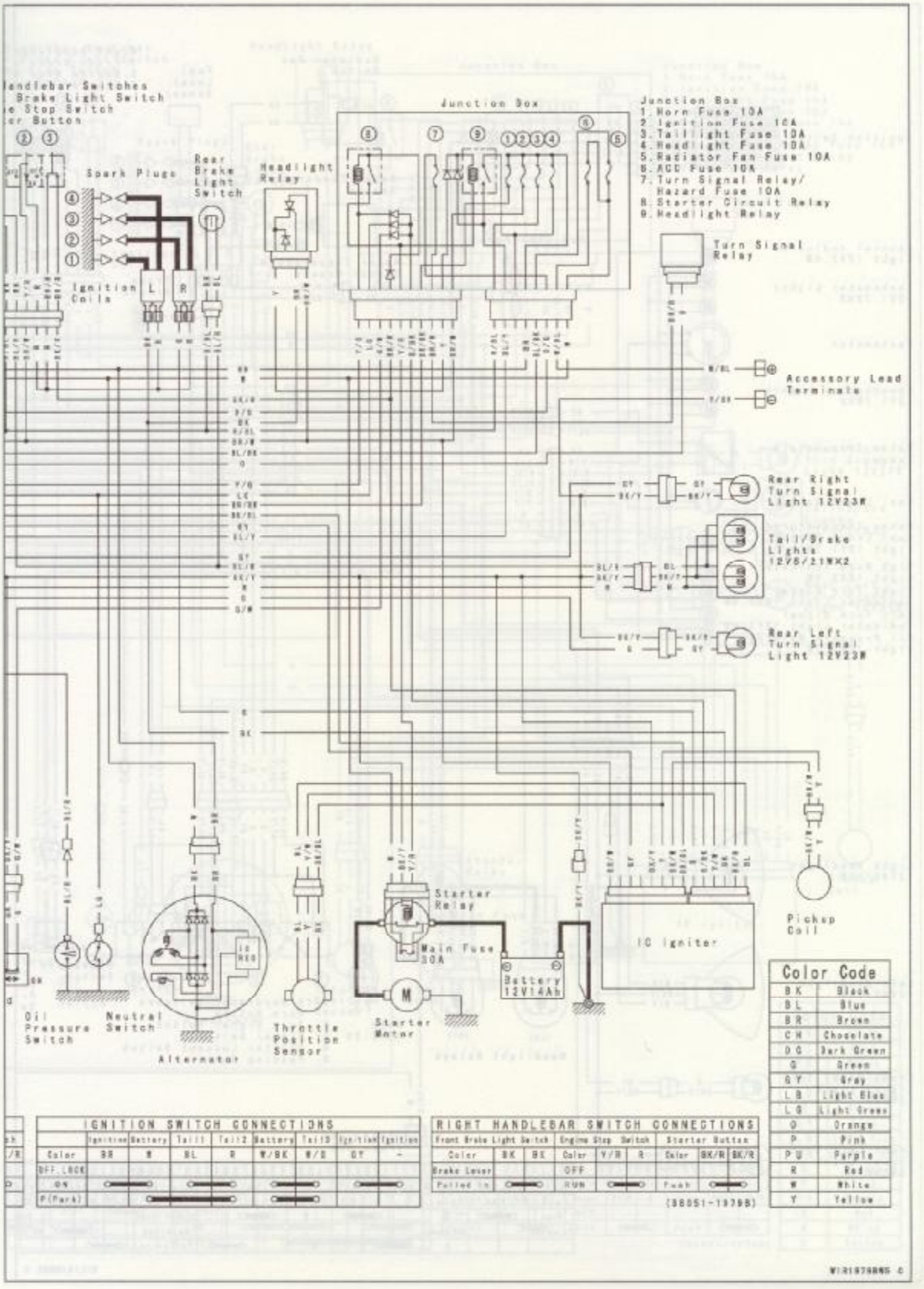
ZR1200–A Wiring Diagram (United States of America and Canada)



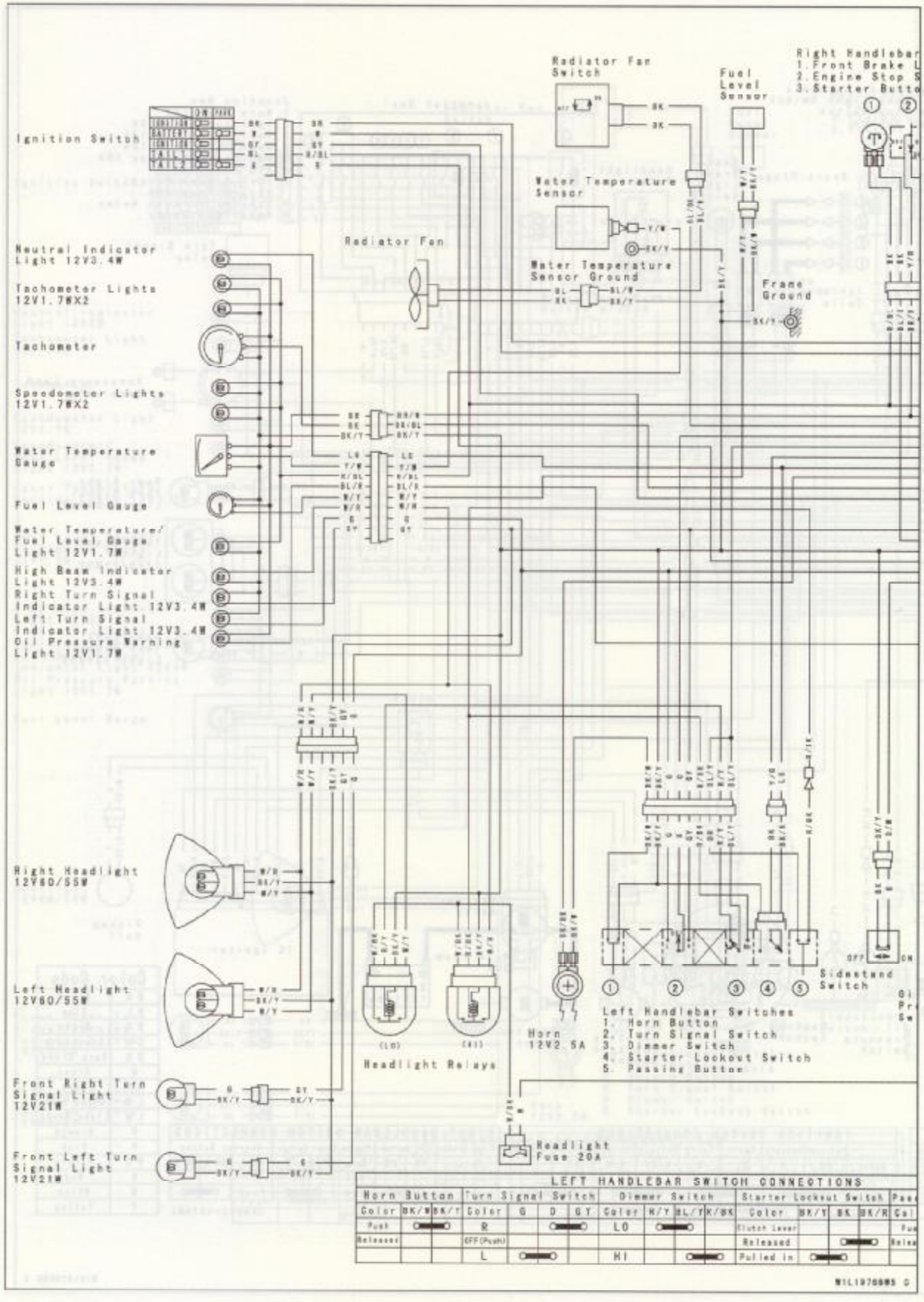
LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Hazard Button				Turn Signal Switch				Dimmer Switch				Starter Lockout Switch			
Color	BK/W	BK/Y	Color	G	O	GY	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R
			———				L				HI				Clutch Lever			
Push			Push				OFF (Push)								Released			
			OFF (Push)				R				LO				Pulled in			

ZR1200–A Wiring Diagram (United States of America and Canada)



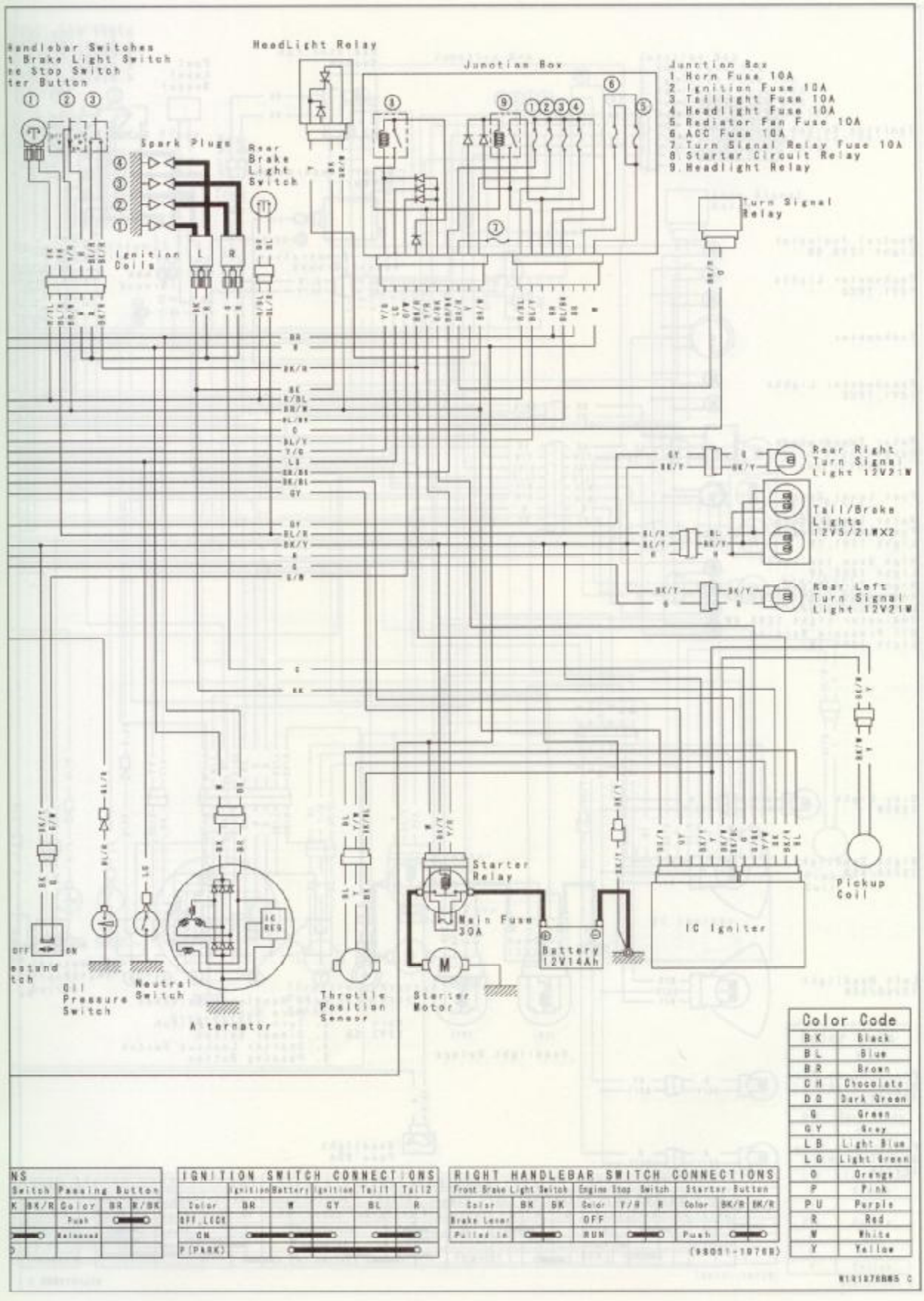
ZR1200–B Wiring Diagram (Australia)



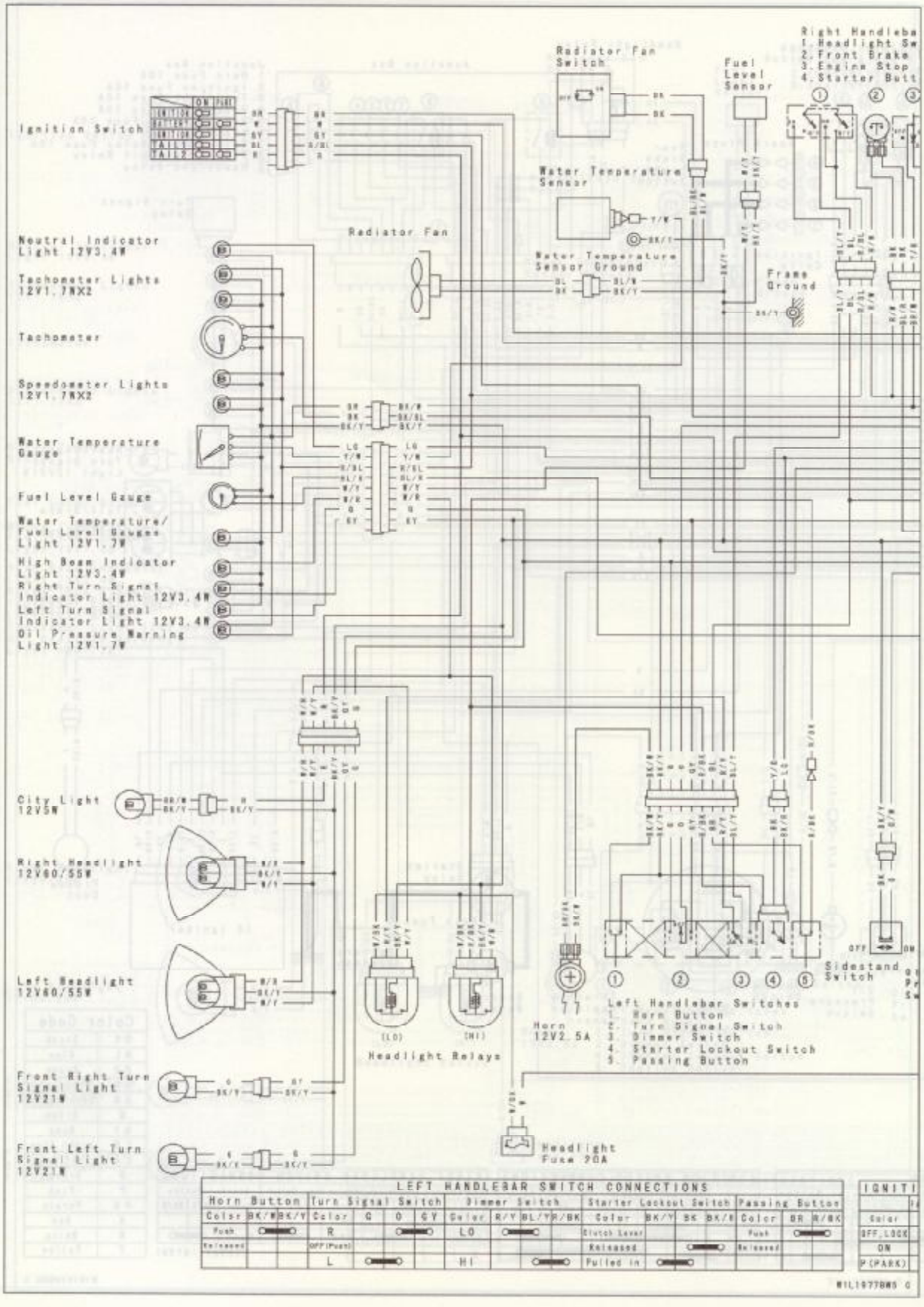
LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Pass
Color	BK/W	BK/Y	Color	G	O	GY	Color	H/Y	BL/Y	K/BK	Color	BK/Y	BK	BK/R	Col
Push	○	●	R		●		LO	●			Clutch Lever				Pus
Release			OFF (Push)								Released		●		Relea
			L	●			HI		●		Pulled in	●			

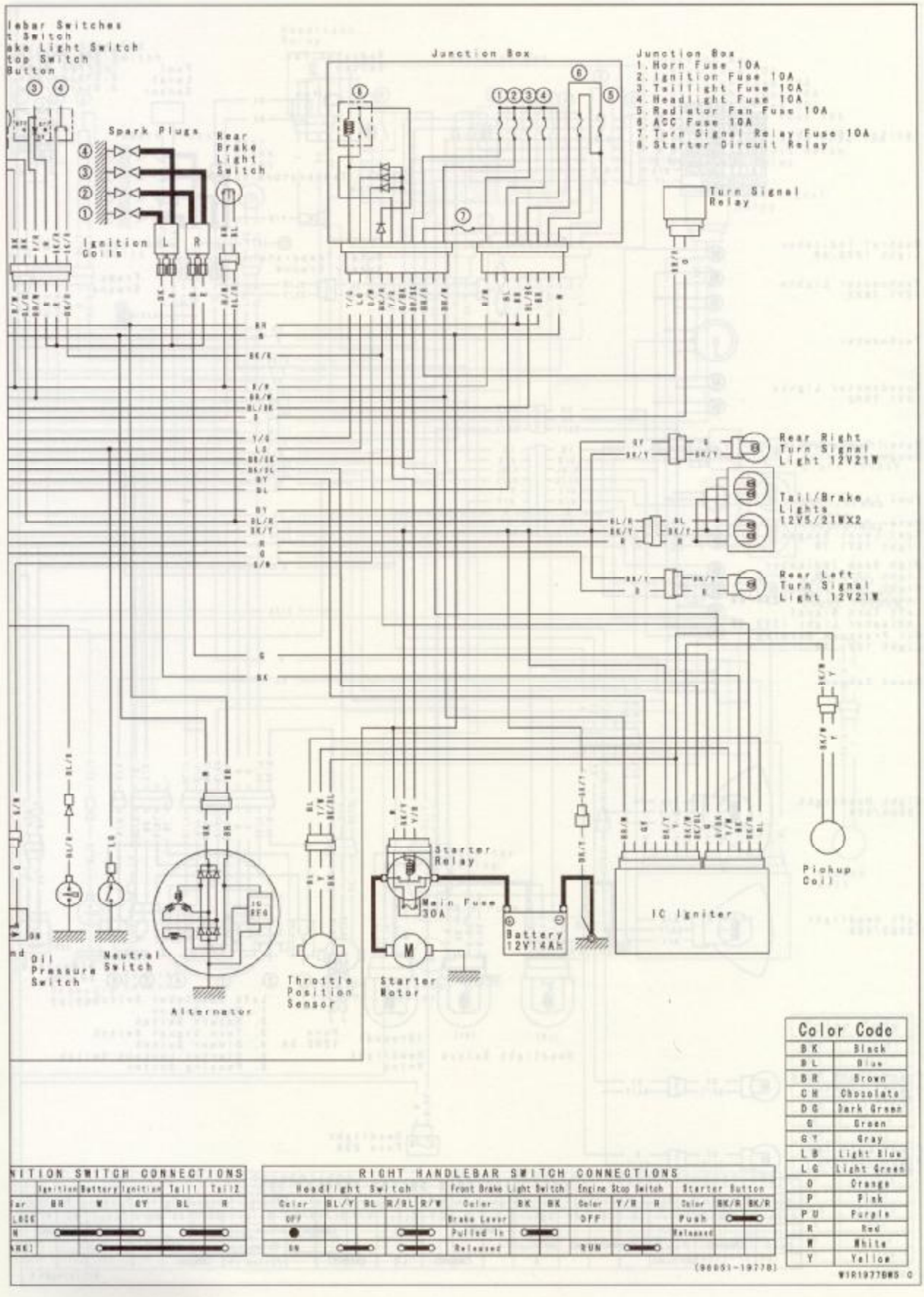
ZR1200–B Wiring Diagram (Australia)



ZR1200–B Wiring Diagram (Europe)



ZR1200–B Wiring Diagram (Europe)



Color Code	
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

NITION SWITCH CONNECTIONS

	Ignition	Battery	Ignition	Tail	Tail
	BR	W	GY	BL	R
LOCK					
N					
SHKI					

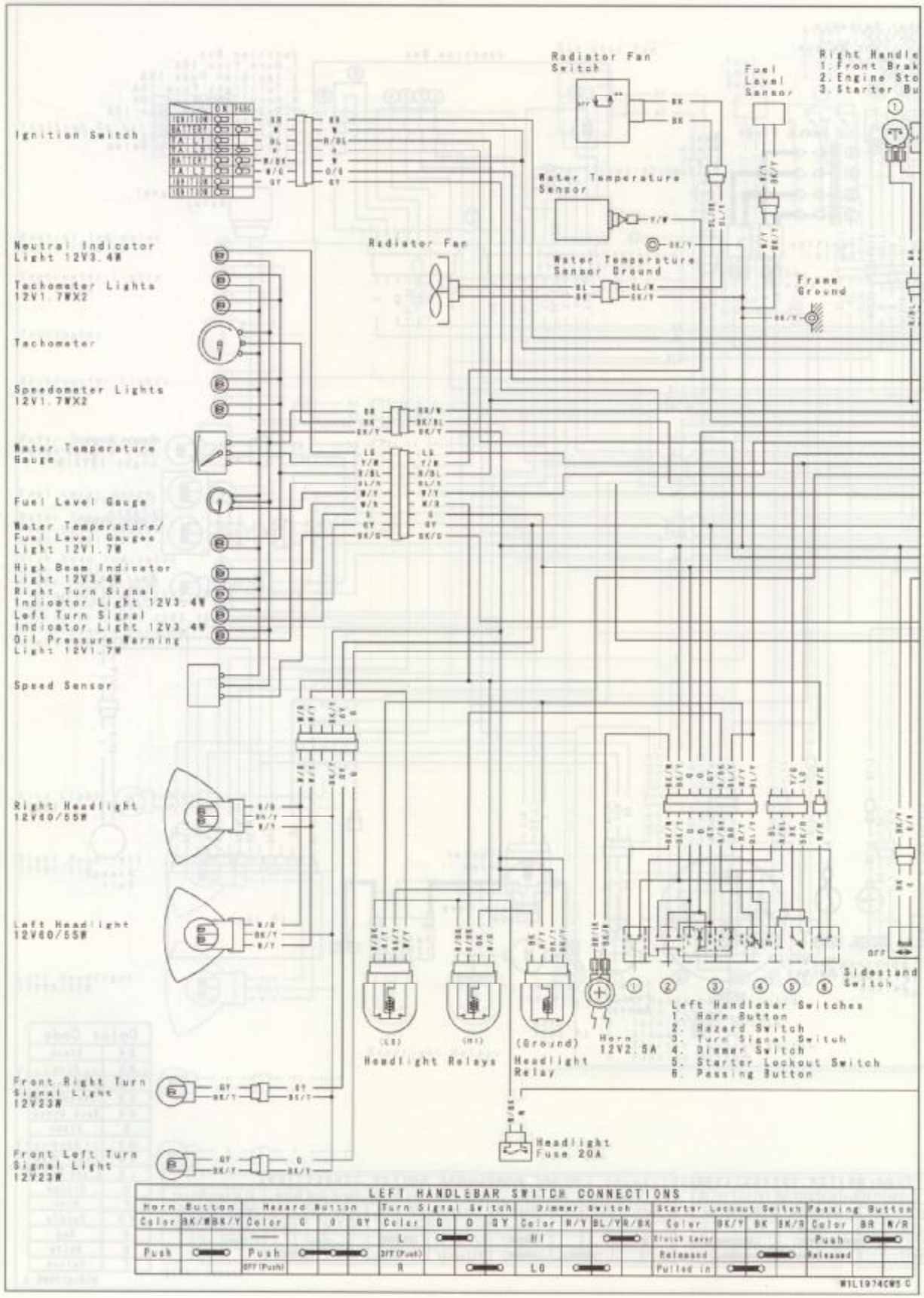
RIGHT HANDLEBAR SWITCH CONNECTIONS

Headlight Switch					Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BL/Y	BL	R/BL	R/W	Color	BK	BK	Color	Y/R	R	Color	BK/R	BK/R
OFF					Brake Lever			OFF			Push		
●					Pulled In						Released		
ON					Released			RUN					

(90051-1977B)

W1R1977BMS-0

ZR1200–B Wiring Diagram (Malaysia)

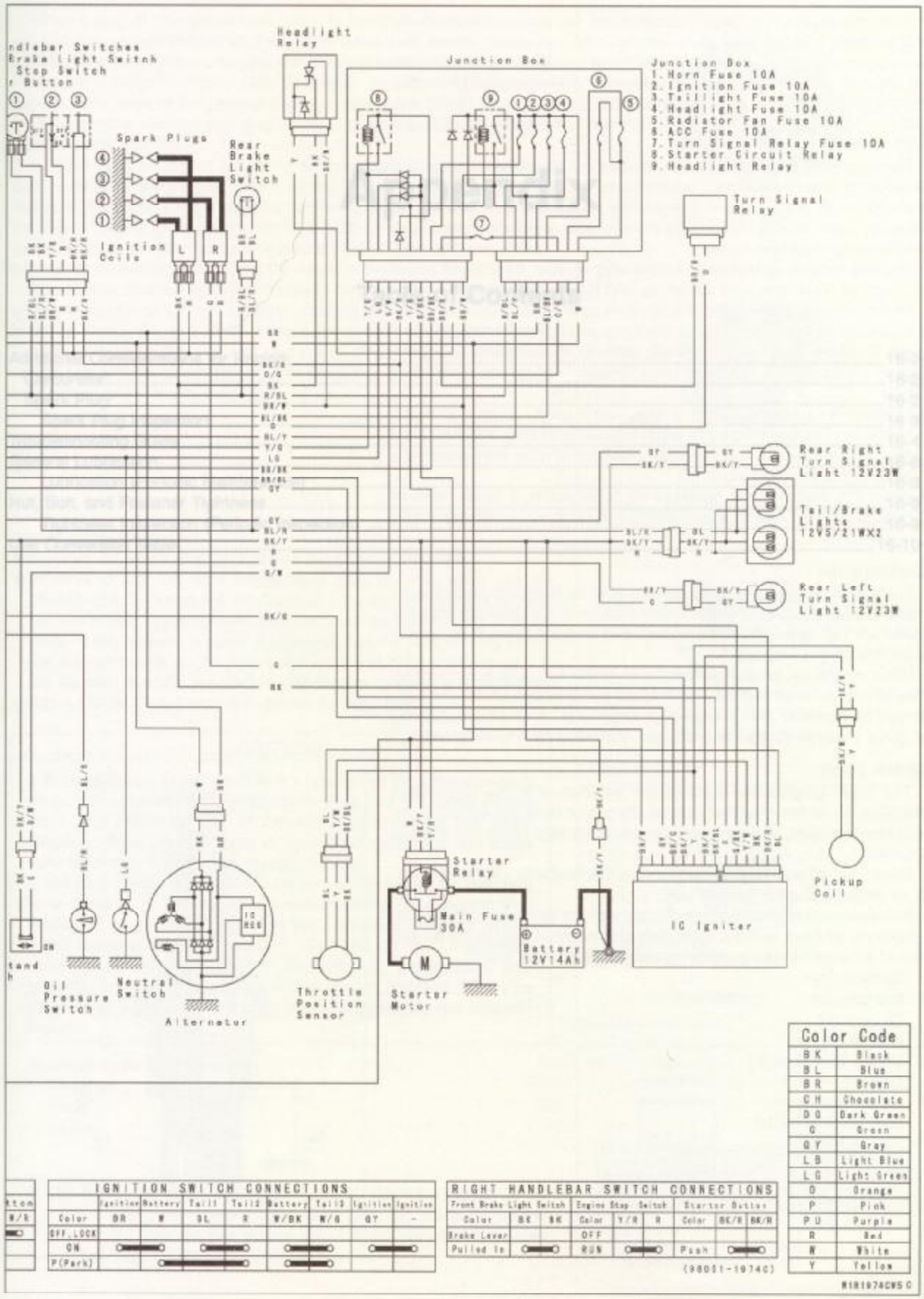


LEFT HANDLEBAR SWITCH CONNECTIONS

Horn Button			Hazard Button				Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button		
Color	BK/W	BK/Y	Color	G	O	GY	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	BR	R/R
			—				L	●			HI		●		Clutch Lever				Push	●	
Push	●		Push	●	●	●	OFF (Push)								Released		●		Released		
			OFF (Push)				R		●		LO	●			Pulled in	●					

W1L1974CW5 0

ZR1200–B Wiring Diagram (Malaysia)



Color Code	
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

IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Tail1	Tail2	Battery	Tail3	Ignition	Ignition
Color	BR	W	BL	R	W/BK	W/G	GY	-
OFF, LOCK								
ON	●	●	●	●	●	●	●	
P(Park)		●	●	●	●			

RIGHT HANDLEBAR SWITCH CONNECTIONS

Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	BK/R	BK/R
Brake Lever			OFF					
Pulled In	●	●	RUN	●	●	Push	●	

(98051-1974C)

Appendix

Table of Contents

Additional Considerations for Racing 16-2
Carburetor: 16-2
Spark Plug: 16-2
Spark Plug Inspection 16-3
Troubleshooting Guide 16-4
General Lubrication 16-8
Lubrication (Periodic Maintenance) 16-8
Nut, Bolt, and Fastener Tightness 16-9
Tightness Inspection (Periodic Inspection) 16-9
Unit Conversion Table 16-10

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	× 1 000 000
kilo	k	× 1 000
centi	c	× 0.01
milli	m	× 0.001
micro	μ	× 0.000001

Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume:

L	×	0.2642	=	gal (US)
L	×	0.2200	=	gal (imp)
L	×	1.057	=	qt (US)
L	×	0.8799	=	qt (imp)
L	×	2.113	=	pint (US)
L	×	1.816	=	pint (imp)
mL	×	0.03381	=	oz (US)
mL	×	0.02816	=	oz (imp)
mL	×	0.06102	=	cu in

Units of Force:

N	×	0.1020	=	kg
N	×	0.2248	=	lb
kg	×	9.807	=	N
kg	×	2.205	=	lb

Units of Length:

km	×	0.6214	=	mile
m	×	3.281	=	ft
mm	×	0.03937	=	in

Units of Torque:

N·m	×	0.1020	=	kg·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb
kg·m	×	9.807	=	N·m
kg·m	×	7.233	=	ft·lb
kg·m	×	86.80	=	in·lb

Units of Pressure:

kPa	×	0.01020	=	kg/cm^2
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cm Hg
kg/cm^2	×	98.07	=	kPa
kg/cm^2	×	14.22	=	psi
cm Hg	×	1.333	=	kPa

Units of Speed:

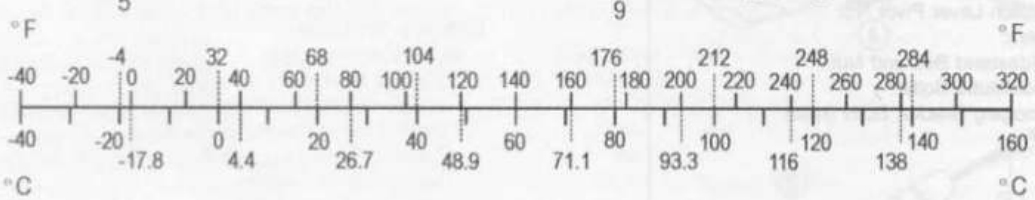
km/h	×	0.6214	=	mph

Units of Power:

kW	×	1.360	=	PS
kW	×	1.341	=	HP
PS	×	0.7355	=	kW
PS	×	0.9863	=	HP

Units of Temperature:

$$\frac{9(°C+40)}{5} - 40 = °F \qquad \frac{5(°F+40)}{9} - 40 = °C$$



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 notes.

- 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 competition 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.

Carburetor:

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetor has been properly adjusted, and all parts cleaned and found to be functioning properly.

If the engine still exhibits symptoms of overly rich or 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.

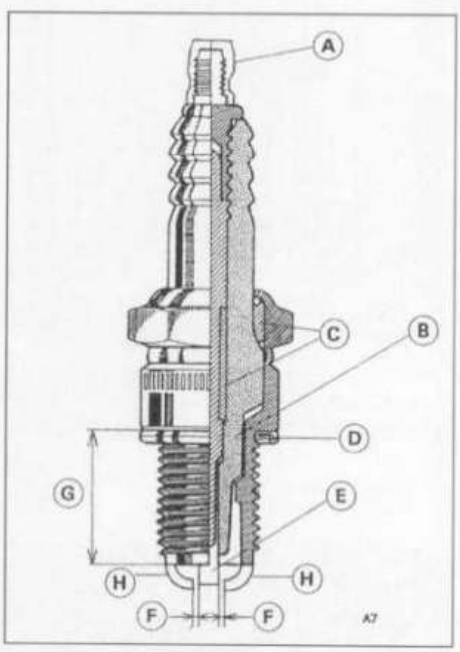
Spark Plug:

The spark plug ignites the fuel and 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 the gap adjusted.

Tests have shown the plug listed in the "General Information Chapter" to be the best plug for general use.

Since spark plug requirements change with the ignition and with riding conditions, whether or not a spark plug of the correct heat range is used should be determined by removing and inspecting the plug.

Terminal [A]
Insulator [B]
Cement [C]
Gasket [D]
Center Electrode [E]
Gap [F]
Reach [G]
Side Electrodes [H]



Additional Considerations for Racing

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 ~ 1450°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.



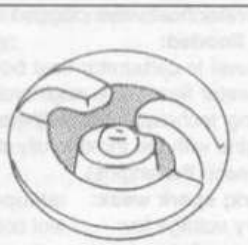
Carbon Fouling



Oil Fouling



Normal Operation



Overheating

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 electrodes. 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 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

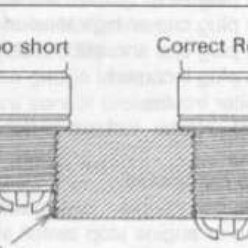
If the spark plug is replaced with a type other than the standard plug, make certain the replacement plug has the same thread pitch and reach (length of threaded portion) and the same insulator type (regular type or projected type) and the same side electrode type as the standard plug.

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.

Standard Spark Plug Threads

Diameter:	**10 mm**
Pitch:	**1.0 mm**
Reach:	**19 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).*

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:

Starter motor not rotating:
- Starter lockout switch or neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Starter relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter clutch trouble

Engine won't turn over:
- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Alternator shaft bearing seizure
- Starter idle gear seizure
- Balancer bearing seizure

No fuel flow:
- No fuel in tank
- Fuel tank air vent obstructed
- Fuel tap vacuum hose clogged
- Fuel tap clogged
- Fuel line clogged
- Carburetor float valve clogged

Engine flooded:
- Fuel level in carburetor float bowl too high
- Carburetor float valve worn or stuck open
- Starting technique faulty (When flooded, crank the engine with the throttle fully open to allow more air to reach the engine).

No spark; spark weak:
- Battery voltage low
- Ignition switch not on
- Engine stop switch turned off
- Clutch lever not pulled in or gear not in neutral
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Neutral, starter lockout switch or sidestand switch trouble
- Pickup coil trouble
- Ignition coil trouble
- Ignition or engine stop switch shorted
- Wiring shorted or open
- Fuse blown

Fuel/air mixture incorrect:
- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet, or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

Compression Low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:
- Battery voltage low
- Spark plug dirty, broken or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter in trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Pilot screw maladjusted
- Pilot jet or air passage clogged
- Air bleed pipe bleed holes or needle jet clogged
- Pilot passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Fuel level in carburetor float bowl too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose
- Fuel tap clogged
- Air cleaner O-ring damaged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken or sticking)
- Piston ring/groove clearance excessive
- Cylinder head warped
- Cylinder head gasket damaged
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Troubleshooting Guide

Other:
- IC igniter trouble
- Carburetors not synchronizing
- Carburetor vacuum piston doesn't slide smoothly
- Carburetor vacuum piston diaphragm damage
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging
- Engine overheating
- Clutch slipping
- Backfiring when deceleration: vacuum switch valve broken
- Air suction valve trouble

Poor Running or No Power at High Speed:

Firing incorrect:
- Spark plug dirty, broken or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Starter plunger stuck open
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Air jet clogged
- Fuel level in carburetor float bowl too high or too low
- Air bleed pipe bleed holes or needle jet clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Air cleaner O-ring damaged
- Fuel to carburetor insufficient
- Water or foreign matter in fuel
- Carburetor holder loose
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn or carbon accumulation on the seating surface.)

Knocking:
- Carbon built up in combustion chamber
- Fuel poor quality or incorrect
- Spark plug incorrect
- IC igniter trouble

Miscellaneous:
- Throttle valves won't fully open
- Carburetor vacuum piston doesn't slide smoothly
- Carburetor vacuum piston diaphragm damaged
- Engine oil level too high
- Engine oil viscosity too high
- Drive train trouble
- Air suction valve trouble
- Vacuum switch valve trouble
- Balancer mechanism malfunctioning
- Catalytic converter overheats and melts down due to misfire (KLEEN)

Overheating:

Firing incorrect:
- Spark plug dirty, broken, or maladjusted
- Spark plug incorrect
- IC igniter trouble

Muffler overheating:
- Advice to user on KLEEN: do not run the engine even if with only one cylinder misfiring or poor running (Request the nearest service facility to correct it)
- Advice to user on KLEEN: do not push-start with a dead battery (Connect another full-charged battery with jumper cables, and start the engine using the electric starter)
- Advice to user on KLEEN: do not start the engine under misfire due to spark plug fouling or poor connection of the spark plug
- Advice to user on KLEEN: do not coast the motorcycle with the ignition switch off (Turn the ignition switch ON and run the engine)

Fuel/air mixture incorrect:
- Main jet clogged or wrong size
- Fuel level in carburetor float bowl too low
- Carburetor holder loose
- Air cleaner duct loose
- Air cleaner poorly sealed or missing
- Air cleaner O-ring damaged
- Air cleaner clogged

Compression high:
- Carbon built up in combustion chamber

Engine load faulty:
- Clutch slipping
- Engine oil level too high
- Engine oil viscosity too high
- Drive train trouble
- Brake dragging

Lubrication inadequate:
- Engine oil level too low
- Engine oil poor quality or incorrect

Water temperature warning system incorrect (ZR1200A,C):
- Water temperature warning light broken
- Water temperature switch broken

Gauge incorrect (ZR1200B):
- Water temperature gauge broken
- Water temperature sensor broken

Coolant incorrect:
- Coolant level too low
- Coolant deteriorated
- Wrong coolant mixed ratio

Cooling system component incorrect:
Radiator fin damaged
Radiator clogged
Thermostat trouble
Radiator cap trouble
Radiator fan switch trouble
Fan motor broken
Fan blade damaged
Water pump not turning
Water pump impeller damaged

Over Cooling:

Gauge incorrect (ZR1200B):
Water temperature gauge broken
Water temperature sensor broken
Cooling system component incorrect:
Radiator fan switch trouble
Thermostat trouble

Clutch Operation Faulty:

Clutch slipping:
Friction plate worn or warped
Steel plate worn or warped
Clutch spring broken or weak
Clutch slave cylinder trouble
Clutch hub or housing unevenly worn
Clutch master cylinder trouble
Clutch not disengaging properly:
Clutch plate warped or too rough
Clutch spring compression uneven
Engine oil deteriorated
Engine oil viscosity too high
Engine oil level too high
Clutch housing frozen on drive shaft
Clutch slave cylinder trouble
Clutch hub nut loose
Air in clutch fluid line
Clutch hub spline damaged
Clutch friction plate installed wrong
Clutch fluid leakage
Clutch fluid deteriorated
Clutch master cylinder primary or secondary cup damaged
Clutch master cylinder scratched inside

Gear Shifting Faulty:

Doesn't go into gear; shift pedal doesn't return:
Clutch not disengaging
Shift fork bent or seized
Gear stuck on the shaft
Gear set lever binding
Neutral set lever binding
Shift return spring weak or broken
Shift return spring pin loose
Shift mechanism arm spring broken
Shift mechanism arm broken
Jumps out of gear:
Shift fork ear worn, bent
Gear groove worn
Gear dogs and/or dog holes worn
Shift drum groove worn
Gear set lever spring weak or broken
Shift fork guide pin worn
Drive shaft, output shaft, and/or gear splines worn
Overshifts:
Gear set lever spring weak or broken
Shift mechanism arm spring broken

Abnormal Engine Noise:

Knocking:
IC igniter trouble
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
Overheating
Piston slap:
Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston pin hole worn
Valve noise:
Engine operated in red zone
Valve clearance incorrect
Valve spring broken or weak
Camshaft bearing portion worn
Other noise:
Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken or stuck
Piston seizure, damage
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder head connection
Crankshaft runout excessive
Engine mounts loose
Crankshaft bearing worn
Primary gear worn or chipped
Camshaft chain tensioner trouble
Camshaft chain, sprocket, guide worn
Air suction valve damaged
Vacuum switch valve damaged
Catalytic converter melts down due to misfire (KLEEN)
Balancer gear worn or chipped
Balancer shaft position maladjusted
Balancer bearing worn
Balancer shaft coupling rubber damper damaged
Alternator coupling rubber damper damaged
Alternator chain tensioner trouble
Alternator chain, sprocket, guide worn

Abnormal Drive Train Noise:

Clutch noise:
Clutch rubber damper weak or damaged
Clutch housing finger/friction plate tang clearance excessive
Clutch housing gear worn
Wrong installation of outermost friction plate
Transmission noise:
Bearings worn
Transmission gears worn or chipped
Metal chips jammed in gear teeth
Engine oil insufficient

Troubleshooting Guide

Drive chain noise:
- Drive chain adjusted improperly
- Drive chain worn
- Rear and/or engine sprocket worn
- Chain lubrication insufficient

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 trouble
- Master cylinder damaged

Other noise:
- Bracket, nut, bolt, etc. not properly mounted or tightened

Oil Pressure Warning Light Goes On:

- Engine oil pump damaged
- Engine oil screen clogged
- Engine oil level too low
- Engine oil filter clogged
- Engine oil viscosity too low
- Camshaft bearing portion worn
- Crankshaft bearings worn
- Connecting rod big bearings worn
- Oil pressure switch damaged
- Oil pressure switch lead damaged
- Relief valve stuck open
- O-ring at the oil passage damaged

Exhaust Smokes Excessively:

White smoke:
- Piston oil ring worn
- Cylinder worn
- Valve stem oil seal damaged
- Valve guide worn
- Engine oil level too high

Black smoke:
- Air cleaner clogged
- Main jet too large or fallen off
- Starter plunger stuck open or choke lever left pulled
- Fuel level in carburetor float bowl too high

Brown smoke:
- Main jet too small
- Fuel level in carburetor float bowl too low
- Air cleaner duct loose
- Air cleaner O-ring damaged
- Air cleaner poorly sealed or missing

Handling and/or Stability Unsatisfactory:

Handlebar hard to turn:
- Cable routing incorrect
- Hose routing incorrect
- Wiring routing incorrect
- Steering stem nut too tight
- Steering stem bearing damaged
- Steering stem bearing lubrication inadequate
- Steering stem bent
- Tire air pressure too low

Handlebar shakes or excessively vibrates:
- Tire worn
- Swingarm sleeves or pivot bearings worn
- Wheel rim warped or not balanced
- Wheel bearing worn
- Handlebar clamp bolts loose
- Handlebar holder nuts loose
- Steering stem head nut loose
- Front, rear axle runout excessive

Handlebar pulls to one side:
- Frame bent
- Swingarm bent or twisted
- Swingarm pivot shaft bent
- Steering maladjusted
- Front fork bent
- Right and left front fork oil level uneven

Shock absorption unsatisfactory:
- (Too hard)
- Front fork oil excessive
- Front fork oil viscosity too high
- Rear shock absorber adjustment too hard
- Tire air pressure too high
- Front fork bent
- (Too soft)
- Tire air pressure too low
- Front fork oil insufficient and/or leaking
- Front fork oil viscosity too low
- Rear shock adjustment too soft
- Front fork, rear shock absorber spring weak
- Front fork oil leaking
- Rear shock absorber oil leaking

Brake Doesn't Hold:

- Air in the brake line
- Pad or disc worn
- Brake fluid leakage
- Disc warped
- Contaminated pad
- Brake fluid deteriorated
- Primary or secondary cup damaged in master cylinder
- Brake master cylinder scratched inside

Battery Trouble:

Battery discharged:
- Charge insufficient
- Battery faulty (too low terminal voltage)
- Battery leads making poor contact
- Load excessive (e.g., bulb of excessive wattage)
- Ignition switch trouble
- Alternator trouble
- Wiring faulty

Battery overcharged:
- Alternator trouble
- Battery faulty (temperature rises, relief valve opens, terminal voltage lowers)

General Lubrication

Lubrication (Periodic Maintenance)

- 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

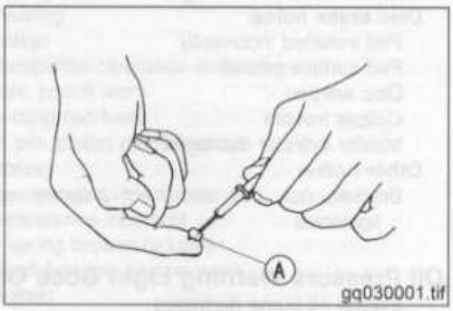
○ *Perform the general lubrication in accordance with the Periodic Maintenance Chart or whenever the vehicle has been operated under wet or rainy conditions or especially after using a high-pressure water spray.*

Pivots: Lubricate with Motor Oil.

Rear Brake Rod Joint

Points: Lubricate with Grease.

Throttle Inner Cable Upper Ends [A]
Speedometer Inner Cable Lower End (Apply sparingly.)
Sidestand
Front and Rear Footpegs
Clutch Lever (Apply silicone grease)
Brake Lever (Apply silicone grease)



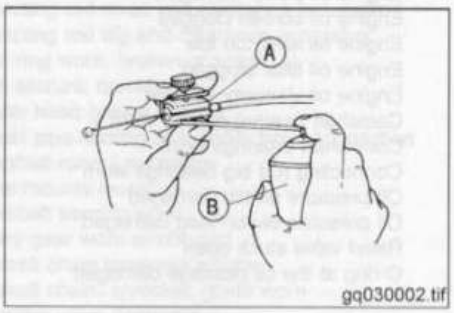
gq030001.tif

Cables: Lubricate with Cable Lubricant.

Choke Cable
Throttle Cables
Seat Lock Cable

- Lubricate the cables by seeping the oil between the cable and housing.

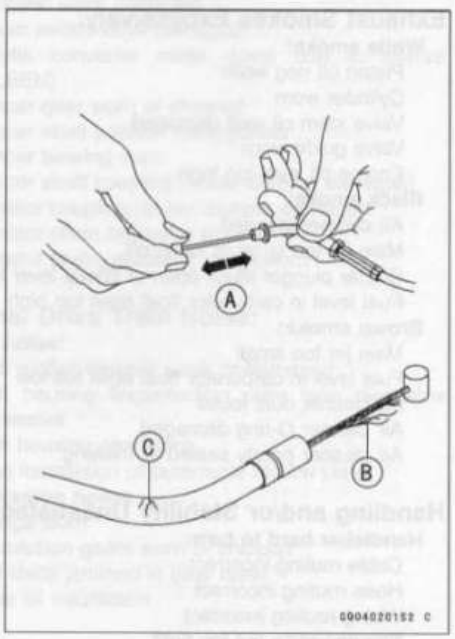
○ The cable may be lubricated by using a commercially available pressure cable lubricator [A] with an aerosol cable lubricant [B].



gq030002.tif

- With the cable disconnected at both ends, the cable should move freely [A] within the cable housing.

★ If cable movement is not free after lubricating, if the cable is frayed [B] or if the cable housing is kinked [C], replace the cable.



Nut, Bolt, and Fastener Tightness

Tightness Inspection (Periodic Inspection)

- Check the tightness of the bolts and nuts listed here in accordance with the Periodic Maintenance Chart. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○ *For the engine fasteners, check the tightness of them when the engine is cold (at room temperature).*

★ If there are loose fasteners, retighten them to the specified torque, following the specified tightening sequence. Refer to the appropriate chapter or "Torque and Locking Agent" in the General Information chapter for torque specifications. If not specified in the text, see the Basic Torque for General Fasteners of "Torque and Locking Agent". For each fastener, first loosen it by 1/2 turn, then tighten it.

★ If cotter pins are damaged, replace them with new ones.

Nut, Bolt and Fastener to be checked

Wheels:
- Front Fender Mounting Bolts
- Front Axle Nut
- Front Axle Clamp Bolts
- Rear Axle Nut

Final Drive
- Chain Adjuster Clamp Bolts
- Rear Sprocket Nuts

Brakes:
- Front Master Cylinder Clamp Bolts
- Caliper Mounting Bolts
- Rear Master Cylinder Mounting Bolts
- Brake Lever Pivot Nut
- Brake Rod Joint Cotter Pins
- Torque Link Nuts and Cotter Pins

Suspension:
- Front Fork Clamp Bolts
- Rear Shock Absorber Mounting Bolts and Nuts
- Swingarm Pivot Nut

Steering:
- Stem Head Nut
- Handlebar Clamp Bolts

Engine:
- Throttle Cable Adjuster Locknut (upper)
- Choke Cable Adjuster Locknut
- Engine Mounting Bolts and Nuts
- Engine Mounting Bracket Bolts
- Shift Pedal Bolt
- Muffler Clamp Bolt
- Muffler Body Clamp Bolt and Nut
- Clutch Master Cylinder Clamp Bolts
- Clutch Lever Pivot Nut

Others:
- Sidestand Bolt and Nut
- Downtube Bolts
- Footpeg Bracket Bolts (rear)