Kawasaki

Ninja 250R



Motorcycle Service Manual

Quick Reference Guide

General Information	1
Periodic Maintenance	2
Fuel System	3
Cooling System	4
Engine Top End	5
Clutch	6
Engine Lubrication System	7
Engine Removal/Installation	8
Crankshaft/Transmission	9
Wheels/Tires	10
Final Drive	11
Brakes	12
Suspension	13
Steering	14
Frame	15
Electrical System	16
Appendix	17

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.

Kawasaki

Ninja 250R

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 Division/Consumer Products & Machinery Company/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.

© 2007 Kawasaki Heavy Industries, Ltd. First Edition (1): Nov. 15, 2007 (M)

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	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)		

COUNTRY AND AREA CODES

AT	Austria	GB	United Kingdom
AU	Australia	MY	Malaysia
CA	Canada	US	United States
CAL	California	ID	Indonesia
CH	Switzerland	PH	Philippines
DE	Germany	WVTA	Whole Vehicle Type Approval
FR	France		

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 inlet 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 fuel injection 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, ignition, and exhaust systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

The exhaust system of this model motorcycle manufactured primarily for sale in California includes a catalytic converter system.

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.

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 inlet system by cutting, drilling, or other means if such modifications result in increased noise levels.

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 vehicle:

- 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 Service 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 this manual, the product is divided into its major systems and these systems make up the manual's chapters.

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.

For example, if you want ignition coil information, 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 ignition coil 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.

General Information

Table of Contents

Before Servicing 1-2
Model Identification..... 1-7
General Specifications..... 1-8
Unit Conversion Table 1-11

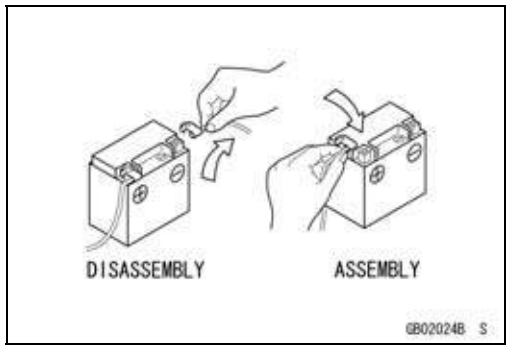
Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a motorcycle, read the precautions given below. To facilitate actual operations, notes, illustrations, photographs, cautions, and detailed descriptions have been included in each chapter wherever necessary. This section explains the items that require particular attention during the removal and reinstallation or disassembly and reassembly of general parts.

Especially note the following.

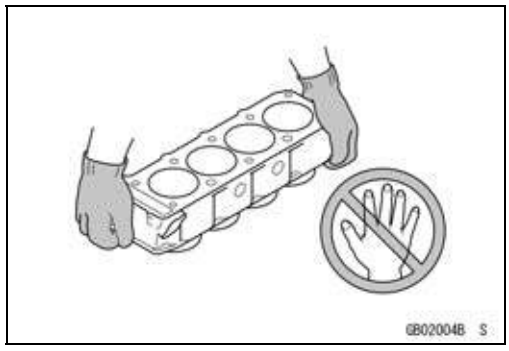
Battery Ground

Before completing any service on the motorcycle, disconnect the battery cables from the battery to prevent the engine from accidentally turning over. Disconnect the ground cable (–) first and then the positive (+). When completed with the service, first connect the positive (+) cable to the positive (+) terminal of the battery then the negative (–) cable to the negative terminal.



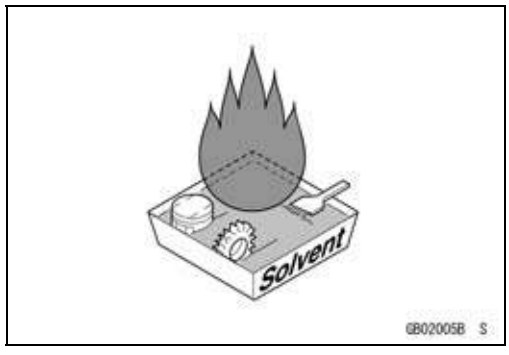
Edges of Parts

Lift large or heavy parts wearing gloves to prevent injury from possible sharp edges on the parts.



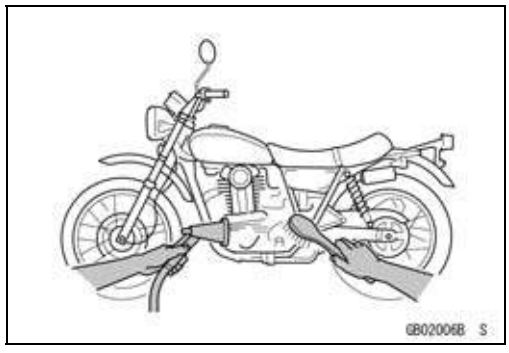
Solvent

Use a high-flush point solvent when cleaning parts. High -flush point solvent should be used according to directions of the solvent manufacturer.



Cleaning vehicle before disassembly

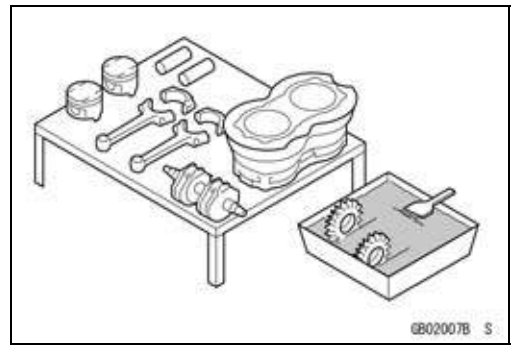
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



Before Servicing

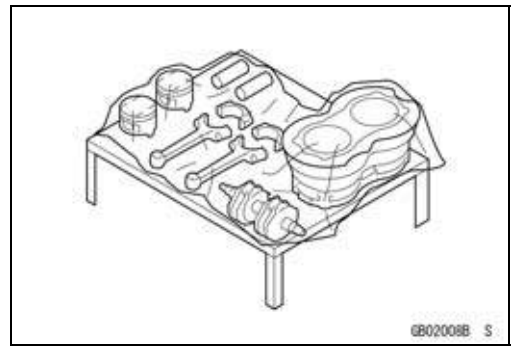
Arrangement and Cleaning of Removed Parts

Disassembled parts are easy to confuse. Arrange the parts according to the order the parts were disassembled and clean the parts in order prior to assembly.



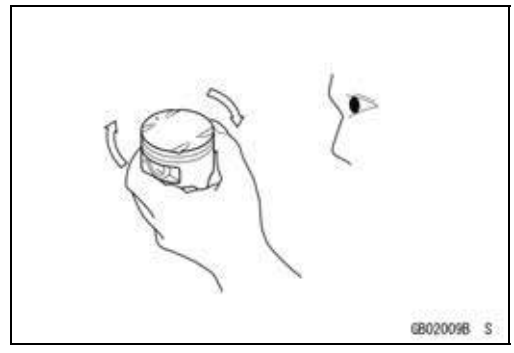
Storage of Removed Parts

After all the parts including subassembly parts have been cleaned, store the parts in a clean area. Put a clean cloth or plastic sheet over the parts to protect from any foreign materials that may collect before re-assembly.



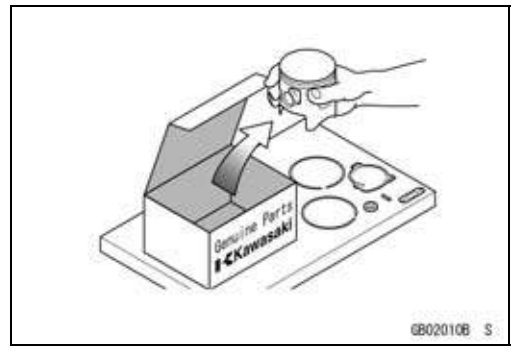
Inspection

Reuse of worn or damaged parts may lead to serious accident. Visually inspect removed parts for corrosion, discoloration, or other damage. Refer to the appropriate sections of this manual for service limits on individual parts. Replace the parts if any damage has been found or if the part is beyond its service limit.



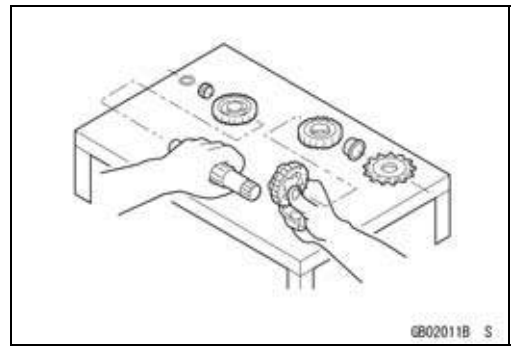
Replacement Parts

Replacement Parts must be KAWASAKI genuine or recommended by KAWASAKI. Gaskets, O-rings, oil seals, grease seals, circlips or cotter pins must be replaced with new ones whenever disassembled.



Assembly Order

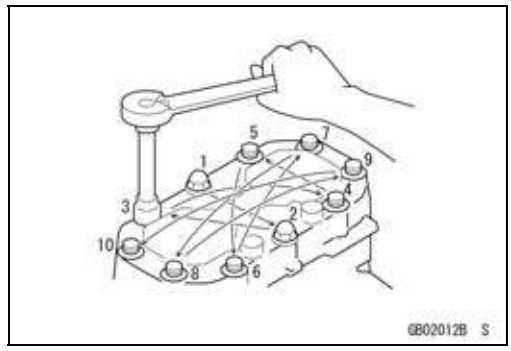
In most cases assembly order is the reverse of disassembly, however, if assembly order is provided in this Service Manual, follow the procedures given.



Before Servicing

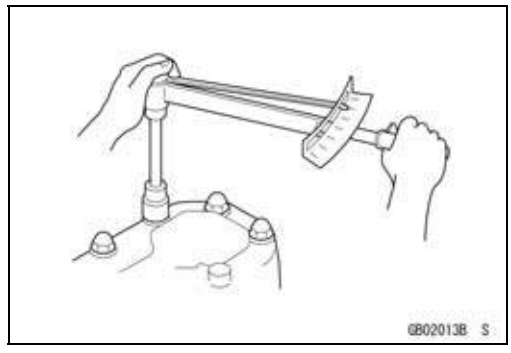
Tightening Sequence

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 according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. If the specified tightening sequence is not indicated, tighten the fasteners alternating diagonally.



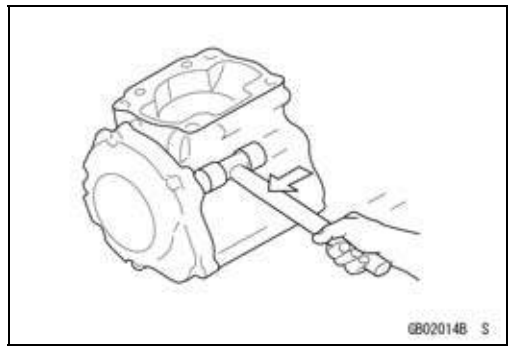
Tightening Torque

Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench.



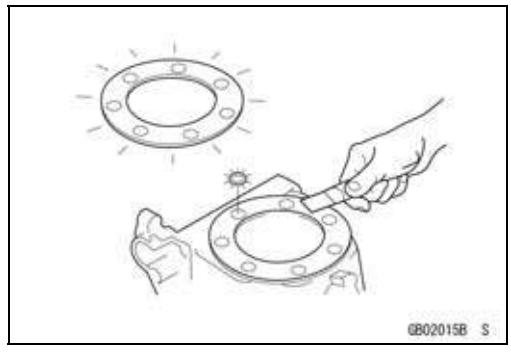
Force

Use common sense during disassembly and assembly, excessive force can cause expensive or hard to repair damage. When necessary, remove screws that have a non-permanent locking agent applied using an impact driver. Use a plastic-faced mallet whenever tapping is necessary.



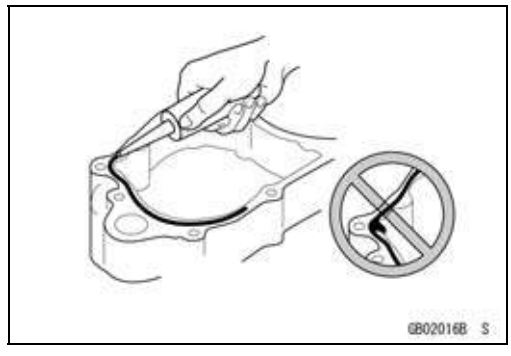
Gasket, O-ring

Hardening, shrinkage, or damage of both gaskets and O-rings after disassembly can reduce sealing performance. Remove the old gaskets and clean the sealing surfaces thoroughly so that no gasket material or other material remains. Install the new gaskets and replace the used O-rings when re-assembling



Liquid Gasket, Non-permanent Locking Agent

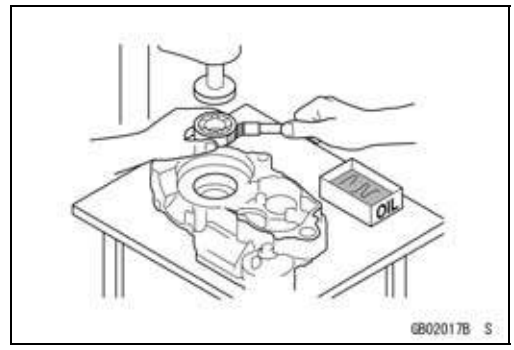
For applications that require Liquid Gasket or a Non-permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



Before Servicing

Press

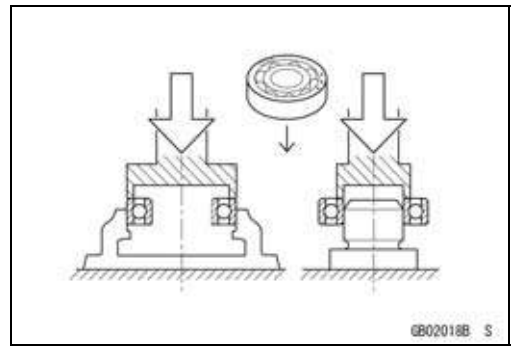
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



Ball Bearing and Needle Bearing

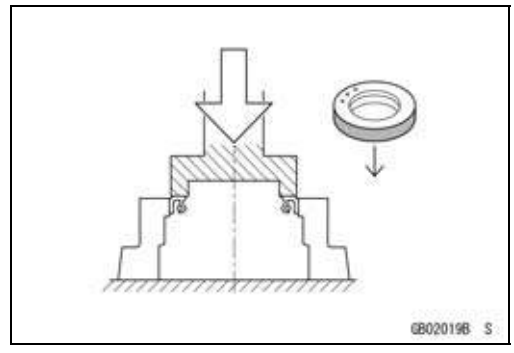
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

Pressing the incorrect race can cause pressure between the inner and outer race and result in bearing damage.

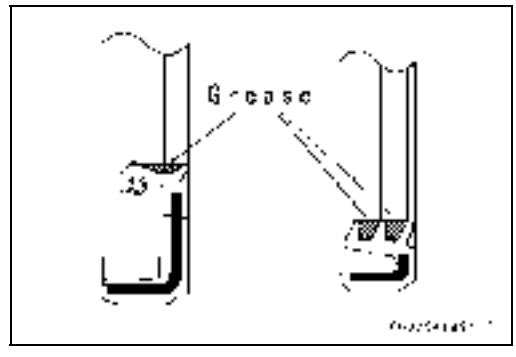


Oil Seal, Grease Seal

Do not remove pressed oil or grease seals unless removal is necessary. Replace with new ones whenever removed. Press new oil seals with manufacture and size marks facing out. Make sure the seal is aligned properly when installing.

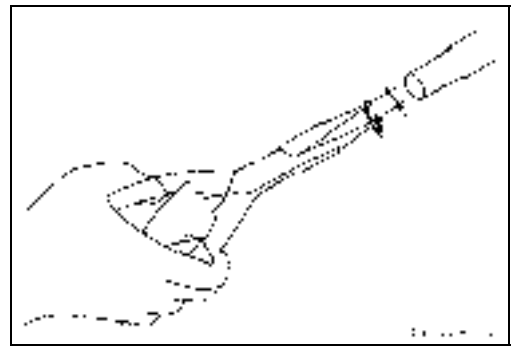


Apply specified grease to the lip of seal before installing the seal.



Circlips, Cotter Pins

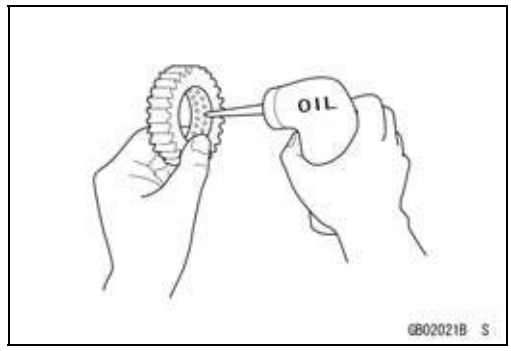
Replace the circlips or cotter pins that were removed with new ones. Take care not to open the clip excessively when installing to prevent deformation.



Before Servicing

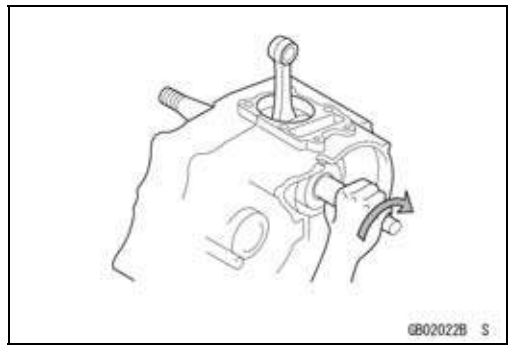
Lubrication

It is important to lubricate rotating or sliding parts during assembly to minimize wear during initial operation. Lubrication points are called out throughout this manual, apply the specific oil or grease as specified.



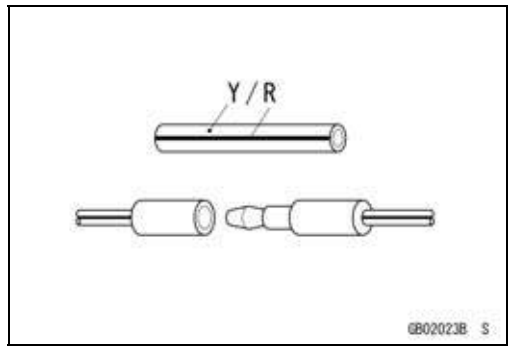
Direction of Engine Rotation

When rotating the crankshaft by hand, the free play amount of rotating direction will affect the adjustment. Rotate the crankshaft to positive direction (clockwise viewed from output side).



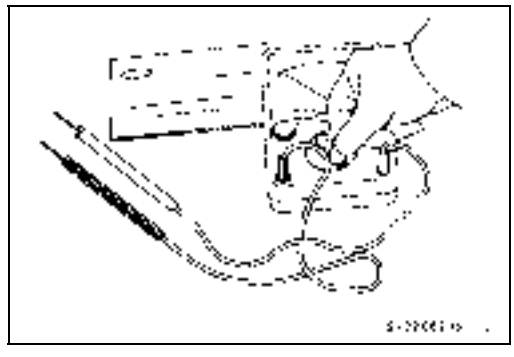
Electrical Wires

A two-color wire is identified first by the primary color and then the stripe color. Unless instructed otherwise, electrical wires must be connected to those of the same color.



Instrument

Use a meter that has enough accuracy for an accurate measurement. Read the manufacture's instructions thoroughly before using the meter. Incorrect values may lead to improper adjustments.



Model Identification

EX250J8F Left Side View (United States and Canada)



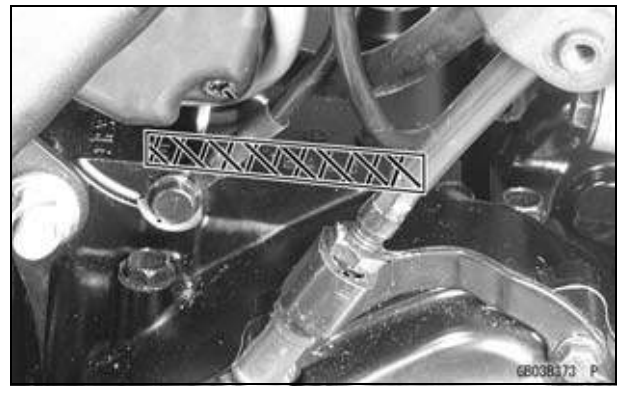
EX250J8F Right Side View (United States and Canada)



Frame Number



Engine Number



General Specifications

Items	EX250J8F
Dimensions	
Overall Length	2 085 mm (82.1 in.)
Overall Width	715 mm (28.1 in.)
Overall Height	1 110 mm (43.7 in.)
Wheelbase	1 400 mm (55.1 in.)
Road Clearance	130 mm (5.1 in.)
Seat Height	775 mm (30.5 in.)
Dry Mass	152 kg, (335 lb)
Curb Mass:	
Front	82 kg (181 lb)
Rear	87 kg (192 lb)
Fuel Tank Capacity	18.0 L (4.8 US gal)
Performance	
Minimum Turning Radius	2.7 m (8.9 ft)
Engine	
Type	4-stroke, DOHC, 2-cylinder
Cooling System	Liquid-cooled
Bore And Stroke	62.0× 41.2 mm (2.5 × 1.6 in.)
Displacement	249 cm^3 (15.2 cu in.)
Compression Ratio	11.6
Maximum Horsepower	23.4 kW (31.8 PS) @11 000 r/min (rpm),
Maximum Torque	22.0 N·m (2.24 kg·m, 16.2 ft·lb) @9 500 r/min (rpm),
Carburetion System	Carburetor, Keihin CVK 30× 2
Starting System	Electric starter
Ignition System	Battery and coil (transistorized)
Timing Advance	Electronically advanced
Ignition Timing	From 10° BTDC @1 300 r/min (rpm) 35° BTDC @4 000 r/min (rpm)
Spark Plug	NGK CR8E or ND U24ESR-N
Cylinder Numbering Method	Left to Right, 1-2
Firing Order	1-2
Valve Timing:	
Inlet	
Open	36° BTDC
Close	56° ABDC
Duration	272°
Exhaust	
Open	61° BBDC
Close	31° ATDC
Duration	272°

General Specifications

Items	EX250J8F
Lubrication System	Forced ubrication (wet sump)
Engine Oil:	
Grade	API SE, SF or SG API SH, SJ or SL with JASO MA
Viscosity	SAE10W-40
Capacity	1.7 L (1.80 US qt)
Drive Train	
Primary Reduction System:	
Type	Gear
Reduction Tatio	3.087 (71/23)
Clutch Type	Wet multi disc
Transmission:	
Type	6-speed, constant mesh, return shift
Gear Ratios:	
1st	2.600 (39/15)
2nd	1.789 (34/19)
3rd	1.409 (31/22)
4th	1.160 (29/25)
5th	1.000 (27/27)
6th	0.893 (25/28)
Final Drive System:	
Type	Chain drive
Reduction Ratio	3.214 (45/14) (AU) 3.071 (43/14)
Overall Drive Ratio	8.859 @Top gear (AU) 8.466 @Top gear
Frame	
Type	Tubular, diamond
Caster (Rake Angle)	26°
Trail	82 mm (3.2 in.)
Front Wheel:	
Tire Type	Tubeless
Tire Size	100/70-17M/C 54H
Rim Size	17 × 2.75
Rear Wheel:	
Tire Type	Tubeless
Tire Size	130/70-17M/C 62H
Rim Size	17 × 3.50
Front suspension:	
Type	Telescopic fork
Wheel Travel	120 mm (4.7 in.)
Rear Suspension:	
Type	Swingarm (uni-trak)
Wheel Travel	130 mm (5.1 in.)

General Specifications

Items	EX250J8F
Brake Type:	
Front	Single disc
Rear	Single disc
Electrical Equipment	
Battery	12 V 6 Ah
Headlight:	
Type	Semi-sealed beam
Bulb:	
High	12 V 55 W + 55 W (quartz-halogen)
Low	12 V 55 W (quartz-halogen)
Tail/brake Light	12 V 5/21 W
Alternator:	
Type	Three-phase AC
Rated Output	19 A @5 000 r/min (rpm), 14 V

Specifications are subject to change without notice, and may not apply to every country.
AU: Australia Model

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	=	kgf·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb
kgf·m	×	9.807	=	N·m
kgf·m	×	7.233	=	ft·lb
kgf·m	×	86.80	=	in·lb

Units of Pressure:

kPa	×	0.01020	=	kgf/cm²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cm Hg
kgf/cm²	×	98.07	=	kPa
kgf/cm²	×	14.22	=	psi
cm Hg	×	1.333	=	kPa

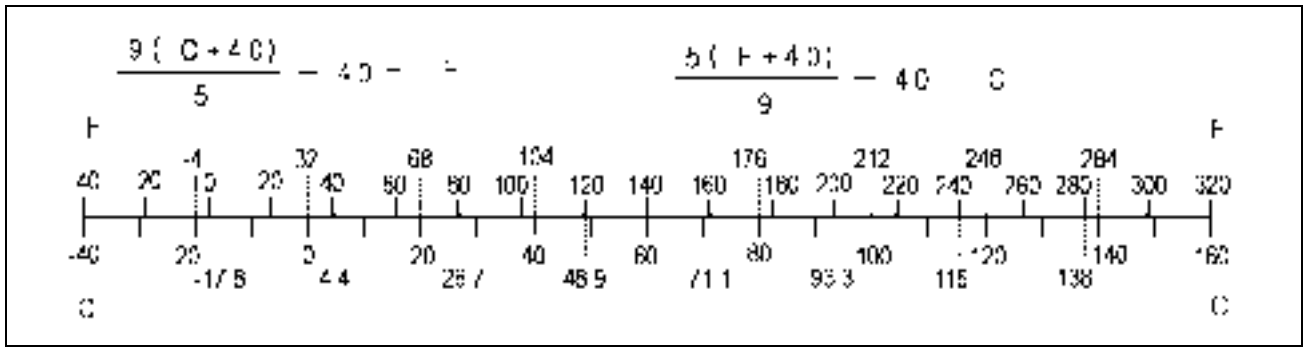
Units of Speed:

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:



Periodic Maintenance

Table of Contents

Periodic Maintenance Chart 2-3
Torque and Locking Agent 2-6
Specifications 2-11
Special Tools 2-13
Periodic Maintenance Procedures 2-14
Fuel System 2-14
Air Cleaner Element Cleaning 2-14
Air Cleaner Element Installation 2-15
Throttle Control System Inspection 2-15
Choke Operation Inspection 2-17
Engine Vacuum Synchronization Inspection 2-17
Idle Speed Inspection 2-18
Idle Speed Adjustment 2-18
Fuel Hose Inspection (fuel leak, damage, installation condition) 2-19
Evaporative Emission Control System (California Model) 2-19
Evaporative Emission Control System Inspection 2-19
Cooling System 2-20
Coolant Level Inspection 2-20
Radiator Hose Damage and Installation Condition Inspection 2-21
Coolant Filter Cleaning (Australia Model) 2-21
Air Suction System 2-21
Air Suction System Damage Inspection 2-21
Engine Top End 2-22
Valve Clearance Inspection 2-22
Valve Clearance Adjustment 2-23
Clutch 2-26
Clutch Operation Inspection 2-26
Wheels/Tires 2-27
Air Pressure Inspection 2-27
Wheel/Tire Damage Inspection 2-27
Tire Tread Wear, Abnormal Wear Inspection 2-27
Wheel Bearing Damage Inspection 2-28
Drive Train 2-29
Drive Chain Lubrication Condition Inspection 2-29
Drive Chain Slack Inspection 2-29
Drive Chain Slack Adjustment 2-30
Wheel Alignment Inspection 2-31
Drive Chain Wear Inspection 2-31
Chain Guide Inspection 2-32
Brake System 2-32
Brake Fluid Leak (Brake Hose and Pipe) Inspection 2-32
Brake Hose and Pipe Damage and Installation Condition Inspection 2-32
Brake Operation Inspection 2-32
Brake Fluid Level Inspection 2-33
Brake Pad Wear Inspection 2-33
Brake Light Switch Operation Inspection 2-34
Suspensions 2-34
Front Forks/Rear Shock Absorber Operation Inspection 2-34
Front Fork Oil Leak Inspection 2-35
Rear Shock Absorber Oil Leak Inspection 2-35

Rocker Arm Operation Inspection 2-35
Tie-Rod Operation Inspection 2-35
Swingarm Pivot Lubrication 2-36
Steering System 2-36
Steering Play Inspection 2-36
Steering Play Adjustment 2-36
Steering Stem Bearing Lubrication 2-37
Electrical System 2-37
Lights and Switches Operation Inspection 2-37
Headlight Aiming Inspection 2-39
Sidestand Switch Operation Inspection 2-40
Engine Stop Switch Operation Inspection 2-41
Others 2-42
Chassis Parts Lubrication 2-42
Bolts, Nuts and Fasteners Tightness Inspection 2-43
Replacement Parts 2-44
Air Cleaner Element Replacement 2-44
Fuel Hose Replacement 2-44
Coolant Change 2-44
Radiator Hose and O-ring Replacement 2-46
Engine Oil Change 2-47
Oil Filter Replacement 2-47
Brake Hose and Pipe Replacement 2-48
Brake Fluid Change 2-48
Master Cylinder Rubber Parts Replacement 2-50
Caliper Rubber Parts Replacement 2-51
Spark Plug Replacement 2-52

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.**

Periodic Inspection

FREQUENCY / INSPECTION	Whichever comes first ➡ / Every ⬇	* ODOMETER READING × 1 000 km (× 1 000 mile) 1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)	See Page
Fuel System									
Air cleaner element - clean				●		●		●	2-14
Throttle control system (play, smooth return, no drag) - inspect	year	●		●		●		●	2-15
Choke operation - inspect	year	●		●		●		●	2-17
Engine vacuum synchronization - inspect				●		●		●	2-17
Idle speed - inspect		●		●		●		●	2-18
Fuel leak (fuel hose and pipe) - inspect	year	●		●		●		●	2-19
Fuel hose and pipe damage - inspect	year	●		●		●		●	2-19
Fuel hose and pipe installation condition - inspect	year	●		●		●		●	2-19
Evaporative Emission Control System (CAL)									
Evaporative emission control system function - inspect		●	●	●	●	●	●	●	2-19
Cooling System									
Coolant level - inspect		●		●		●		●	2-20
Coolant leak (radiator hose and pipe) - inspect	year	●		●		●		●	2-21
Radiator hose damage - inspect	year	●		●		●		●	2-21
Radiator hose installation condition - inspect	year	●		●		●		●	2-21
Coolant filter - clean	year								
Air Suction System									
Air suction system damage - inspect				●		●		●	2-21
Engine Top End									
Valve clearance - inspect				●		●		●	2-22
Clutch									
Clutch operation (play, disengagement, engagement) - inspect		●		●		●		●	2-26
Wheels and Tires									
Tire air pressure - inspect	year			●		●		●	2-27
Wheel/tire damage - inspect				●		●		●	2-27
Tire tread wear, abnormal wear - inspect				●		●		●	2-27
Wheel bearing damage - inspect	year			●		●		●	2-28
Drive Train									
Drive chain lubrication condition - inspect #	Every 600 km (400 mile)								2-29

2-4 PERIODIC MAINTENANCE

Periodic Maintenance Chart

FREQUENCY / INSPECTION	Whichever comes first ➡ / Every ⬇	* ODOMETER READING × 1 000 km (× 1 000 mile)							See Page
		1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)	
Drive chain slack - inspect #	Every 1 000 km (600 mile)								2-29
Drive chain wear - inspect #				●		●		●	2-31
Drive chain guide wear - inspect				●		●		●	2-32
Brake System									
Brake fluid leak (brake hose and pipe) - inspect	year	●	●	●	●	●	●	●	2-32
Brake hose and pipe damage - inspect	year	●	●	●	●	●	●	●	2-32
Brake hose and pipe installation condition - inspect	year	●	●	●	●	●	●	●	2-32
Brake operation (effectiveness, play, no drag) - inspect	year	●	●	●	●	●	●	●	2-32
Brake fluid level - inspect	6 months	●	●	●	●	●	●	●	2-33
Brake pad wear - inspect #			●	●	●	●	●	●	2-33
Brake light switch operation - inspect		●	●	●	●	●	●	●	2-34
Suspensions									
Front forks/rear shock absorber operation (damping and smooth stroke) - inspect				●		●		●	2-34
Front forks/rear shock absorber oil leak - inspect	year			●		●		●	2-35
Rocker arm operation - inspect				●		●		●	2-35
Tie-rods operation - inspect				●		●		●	2-35
Swingarm pivot - lubricate						●			2-36
Steering System									
Steering play - inspect	year	●		●		●		●	2-36
Steering stem bearings - lubricate	2 years					●			2-37
Electrical System									
Lights and switches operation - inspect	year			●		●		●	2-37
Headlight aiming - inspect	year			●		●		●	2-39
Sidestand switch operation - inspect	year			●		●		●	2-40
Engine stop switch operation - inspect	year			●		●		●	2-41
Others									
Chassis parts - lubricate	year			●		●		●	2-42
Bolts and nuts tightness - inspect		●		●		●		●	2-43

#: 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.

Periodic Maintenance Chart

Periodic Replacement Parts

FREQUENCY / CHANGE/REPLACE ITEM	Whichever comes first ➡ / ⬇ Every	* ODOMETER READING × 1 000 km (× 1 000 mile) 1 (0.6)	12 (7.5)	24 (15)	36 (24)	48 (30)	See Page
Air cleaner element #	2 years						2-44
Fuel hose	4 years					●	2-44
Coolant	3 years				●		2-44
Radiator hose and O-ring	3 years				●		2-46
Engine oil #	year	●	●	●	●	●	2-47
Oil filter	year	●	●	●	●	●	2-47
Brake hose and pipe	4 years					●	2-48
Brake fluid	2 years			●		●	2-48
Rubber parts of master cylinder and caliper	4 years					●	2-50
Spark plug			●	●	●	●	2-52

#: 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.

Torque and Locking Agent

Use a torque wrench to tighten bolts and nuts to their specified torque values. If too little torque is applied, the bolts and nuts could loosen and fall out. If too much torque is applied, the threads could be sheared off.

To tighten a bolt or a nut, or to check their torque, loosen the bolt or nut one-half turn before tightening it to the specified torque.

Letters used in the “Remarks” column mean:
EO: Apply engine oil.
G: Apply grease.
L: Apply a non-permanent locking agent to the threads.
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil solution.
R: Replacement Parts
S: Tighten the fasteners following the specified sequence.
Si: Apply silicone grease.
SS: Apply silicone sealant.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System				
Fuel Tap Mounting Bolts	2.5	0.25	22 in·lb	
Fuel Gauge Mounting Bolts	6.9	0.7	61 in·lb	
Air Cleaner Housing Cap Bolts	2.5	0.25	22 in·lb	
Air Cleaner Housing Screws	1.15	0.12	10 in·lb	
Air Cleaner Housing Mounting Bolts	9.8	1.0	87 in·lb	
Air Cleaner Housing Clamp Screws	2.0	0.2	18 in·lb	
Separate Bracket Bolt	9.8	1.0	87 in·lb	
Cooling System				
Water Temperature Switch	7.5	0.76	66 in·lb	SS
Thermostat Cover Bolts	9.8	1.0	87 in·lb	
Thermostat Housing Mounting Bolts	9.8	1.0	87 in·lb	
Radiator Fan Switch	23.5	2.4	17	
Radiator Bolts	9.8	1.0	87 in·lb	
Radiator Cap Bracket Bolt	9.8	1.0	87 in·lb	
Water Pipe Bolts	9.8	1.0	87 in·lb	
Water Hose Clamp Screws	1.5	0.15	13 in·lb	
Drain Bolt	9.8	1.0	87 in·lb	
Water Pump Cover Bolts	9.8	1.0	87 in·lb	
Water Pump Bolts	9.8	1.0	87 in·lb	
Reserve Tank Cap	–	–	–	Hand-Tighten
Reserve Tank Bolts	9.8	1.0	87 in·lb	
Reserve Tank Bracket Bolt	9.8	1.0	87 in·lb	
Engine Top End				
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	
Camshaft Sprocket Bolts	15	1.5	11	L
Chain Tensioner Cap Bolt	5.0	0.5	44 in·lb	
Air Suction Cover Bolts	9.8	1.0	87 in·lb	
Vacuum Switch Valve Bracket Bolts	9.8	1.0	87 in·lb	
Rear Camshaft Chain Guide Bolt-Lower	17	1.7	13	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Chain Tensioner Mounting Bolts	9.8	1.0	87 in·lb	
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Camshaft Cap Bolts	12	1.2	106 in·lb	S
Cylinder Head Bolt (M6)	12	1.2	106 in·lb	MO, S
Cylinder Head Bolts (M8)	24.5	2.5	18	MO, S
Water Passage Plugs	20	2.0	15	L
Carburetor Holder Clamp Screws	2.0	0.2	18 in·lb	
Water Drain Bolt	5.9	0.6	52 in·lb	
Muffler Body Rear Cover Bolts	9.8	1.0	87 in·lb	L
Muffler Body Mounting Bolt	30	3.1	22	
Muffler Body Clamp Bolt	17	1.7	13	
Muffler Cover Bolts	9.8	1.0	87 in·lb	
Muffler Cover Clamp Screw	6.9	0.70	61 in·lb	
Exhaust Pipe Mounting Bolt	9.8	1.0	87 in·lb	
Exhaust Pipe Holder Nuts	12	1.2	104 in·lb	
Clutch				
Clutch Lever Holder Clamp Bolts	8.8	0.9	78 in·lb	
Clutch Spring Bolts	8.8	0.9	78 in·lb	
Clutch Hub Nut	132	13.5	97.4	
Oil Filler Plug	–	–	–	Hand-Tighten
Clutch Cover Bolts	9.8	1.0	87 in·lb	
Engine Lubrication System				
Oil Hose Banjo Bolts	19.6	2.0	14.5	
Oil Pressure Relief Valve	15	1.5	11	L
Crankcase Oil Passage Plug	15	1.5	11	
Oil Passage Plugs for Oil Pump	20	2.0	15	L
Oil Pipe Banjo Bolts	12	1.2	104 in·lb	
Oil Drain Bolt	19.6	2.0	14.5	
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	
Oil Filter Mounting Bolts	19.6	2.0	14.5	
Oil Breather Mounting Bolts	9.8	1.0	87 in·lb	L
Oil Pump Mounting Bolts	9.8	1.0	87 in·lb	L
Oil Screen Cover Bolts	9.8	1.0	87 in·lb	
Plug	19.6	2.0	14.5	
Breather Bolt	9.8	1.0	87 in·lb	
Engine Removal/Installation				
Engine Mounting Bracket Bolts and Nuts	64	6.5	47	
Engine Mounting Nuts	64	6.5	47	
Crankshaft/Transmission				
Oil Breather Mounting Bolts	9.8	1.0	87 in·lb	L
Crankcase Bolts ϕ6	12	1.2	104 in·lb	
Crankcase Bolts ϕ8 (L = 90)	24	2.4	18	MO, S

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Crankcase Bolts ϕ8 (L = 73)	19	1.9	14	MO, S
Starter Motor Clutch Bolts	34.3	3.5	25	L
Connecting Rod Big End Cap Nuts	27.5	2.8	20	MO
Shift Drum Bearing Holder Bolt	12	1.2	104 in·lb	L
Shift Drum Pin Plate Bolt	9.0	0.9	80 in·lb	L
Neutral Switch	15	1.5	11	
External Shift Mechanism Return Spring Pin	19.6	2.0	14.5	L
Shift Drum Positioning Bolt	24.5	2.5	18	
Shift Lever Link Bolt	12	1.2	104 in·lb	
Front Tie-Rod Locknut (Left-Hand Threads)	7.0	0.7	62 in·lb	
Rear Tie-Rod Locknut (Right-Hand Threads)	7.0	0.7	62 in·lb	
Shift Pedal Mounting Bolt	25	2.5	18	
Wheels/Tires				
Front Axle Nut	88	9.0	65	
Rear Axle Nut	98	10.0	72	
Final Drive				
Engine Sprocket Cover Bolts	9.8	1.0	87 in·lb	
Engine Sprocket Nut	127	13	94	MO
Rear Sprocket Nuts	59	6.0	44	
Rear Sprocket Studs	–	–	–	L
Brakes				
Brake Lever Pivot Bolt Locknut	5.9	0.6	52 in·lb	
Bleed Valve	5.5	0.55	49 in·lb	
Front Master Cylinder Clamp Bolts	8.8	0.9	78 in·lb	S
Brake Disc Mounting Bolts	27	2.8	20	L
Brake Hose Banjo Bolts	25	2.5	18	
Front Caliper Mounting Bolts	25	2.5	18	
Front Brake Light Switch Screw	1.0	0.1	9 in·lb	
Brake Lever Pivot Bolt	1.0	0.1	9 in·lb	
Front Reservoir Cap Screws	1.5	0.15	13 in·lb	
Reservoir Mounting Bolt	6.9	0.7	61 in·lb	
Bleed Valve	5.5	0.55	49 in·lb	
Brake Pedal Pivot Bolt	8.8	0.9	78 in·lb	L
Push Rod Locknut	18	1.8	13	
Brake Disc Mounting Bolts	27	2.8	20	L
Brake Hose Banjo Bolts	25	2.5	18	
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Caliper Mounting Bolts	25	2.5	18	
Suspension				
Front Fork Clamp Bolts (Upper)	21	2.1	15	
Front Fork Top Plugs	23	2.3	16.5	
Front Fork Clamp Bolts (Lower)	30	3.1	22	
Front Fork Bottom Allen Bolts	20	2.0	15	L

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Rocker Arm Pivot Nut	59	6.0	44	
Tie-Rod Nuts	59	6.0	44	
Rear Shock Absorber Mounting Nuts	59	6.0	44	
Swingarm Pivot Nut	98	10.0	72	
Steering				
Steering Stem Nut	4.9	0.5	43 in·lb	
Handlebar Holder Mounting Bolts	25	2.5	18	
Steering Stem Head Bolt	44	4.5	32	
Front Fork Clamp Bolts (Upper)	20	2.0	15	
Front Fork Clamp Bolts (Lower)	30	3.1	22	
Frame				
Sidestand Nut	44	4.5	32	
Front Footpeg Bracket Mounting Bolts	25	2.5	18	
Rear Footpeg Bracket Mounting Bolts	25	2.5	18	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Windshield Mounting Screws	0.42	0.043	3.7 in·lb	
Electrical System				
Tail/Brake Light Mounting Bolts	5.9	0.6	52 in·lb	
Plugs on Alternator Cover	–	–	–	Hand-Tighten
Alternator Cover Bolts	9.8	1.0	87 in·lb	
Alternator Rotor Bolt	68.6	7.0	51	
Alternator Stator Bolts	12	1.2	104 in·lb	
Regulator/Rectifier Bolts	9.8	1.0	87 in·lb	
Starter Motor Clutch Bolts	34.3	3.5	25	L
Crankshaft Sensor Screws	3.0	0.30	27 in·lb	
Ignition Coil Bolts	–	–	–	see text
Spark Plugs	13	1.3	115 in·lb	
Starter Motor Terminal Locknut	9.8	1.0	87 in·lb	
Starter Motor Assembly Bolts	3.5	0.36	31 in·lb	
Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	
Starter Relay Terminal Nut	5.0	0.5	44 in·lb	
Oil Pressure Switch	15	1.5	11	SS
Neutral Switch	15	1.5	11	

2-10 PERIODIC MAINTENANCE

Torque and Locking Agent

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	kgf·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

Specifications

Item	Standard	Service Limit
Fuel System		
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	– – –
Idle Speed	1 300 ±50 r/min (rpm)	– – –
Carburetor Synchronization Vacuum	Less than 2.7 kpa (2 cmHg) difference between two carburetors	– – –
Air Cleaner Element	Polyurethane foam	– – –
Cooling System		
Coolant:		
Type (Recommended)	Permanent type antifreeze	– – –
Color	Green	– – –
Mixed Ratio	Soft water 50%, coolant 50%	– – –
Freezing Point	–35°C (–31°F)	– – –
Capacity	1.5 L (1.59 US qt)	– – –
Engine Top End		
Valve Clearance:		
Inlet	0.15 ~ 0.24 mm (0.0059 ~ 0.0094 in.)	– – –
Exhaust	0.22 ~ 0.29 mm (0.0087 ~ 0.0114 in.)	– – –
Clutch		
Clutch Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	– – –
Engine Lubrication System		
Engine Oil:		
Grade	API SE, SF or SG API SH, SJ or SL with JASO MA	– – –
Viscosity	SAE 10W-40	– – –
Capacity	1.3 L (1.4 US qt) (when filter is not removed) 1.6 L (1.7 US qt) (when filter is removed)	– – –
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after idling or running)	– – –
Wheels/Tires		
Tread Depth:		
Front:		
BRIDGESTONE	4.6 mm (0.181 in.)	1 mm (0.04 in.)
DUNLOP	4.5 mm (0.177 in.)	
Rear:		
BRIDGESTONE	7.0 mm (0.276 in.)	2 mm (0.08 in.) up to 130 km/h (80 mph) 3 mm (0.12 in.) over 130 km/h (80 mph)
DUNLOP	7.4 mm (0.291 in.)	
Air pressure: (when Cold)		
Front	Up to 170 kg (375 lb) load: 200 kPa (2.0 kgf/cm², 28 psi)	– – –
Rear	Up to 170 kg (375 lb) load: 225 kPa (2.25 kgf/cm², 32 psi)	– – –
Final Drive		
Drive Chain Slack	20 ~ 30 mm (0.8 ~ 1.2 in.)	– – –

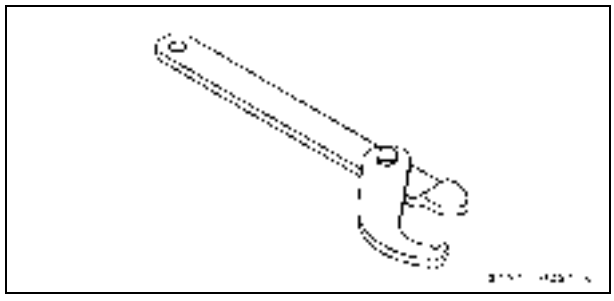
2-12 PERIODIC MAINTENANCE

Specifications

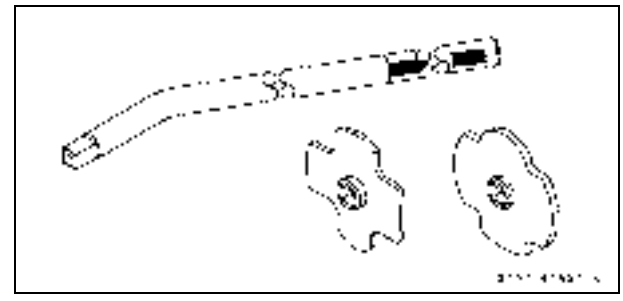
Item	Standard	Service Limit
Brakes		
Brake Fluid:		
Grade	DOT4	– – –
Brake Pad Lining Thickness:	4.5 mm (0.18 in.)	1 mm (0.04 in.)
Brake Light Timing:		– – –
Front	Pulled ON	
Rear	ON after 10 mm (0.39 in.) of pedal travel	
Electrical System		
Type	CR8E, U24ESR-N	– – –

Special Tools

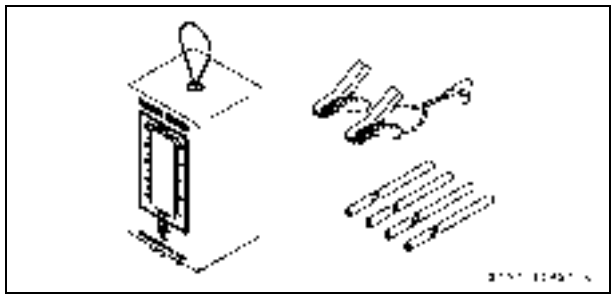
Steering Stem Nut Wrench:
57001-1100



Filler Cap Driver:
57001-1454



Vacuum Gauge KEK-55-5:
57001-1369

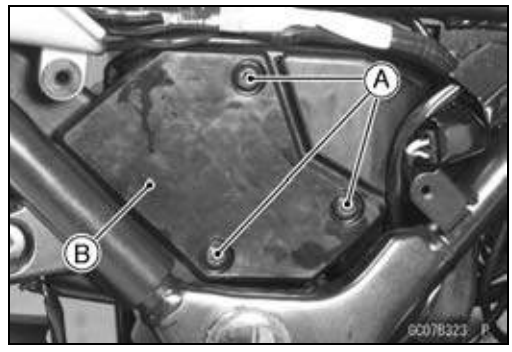


Periodic Maintenance Procedures

Fuel System

Air Cleaner Element Cleaning

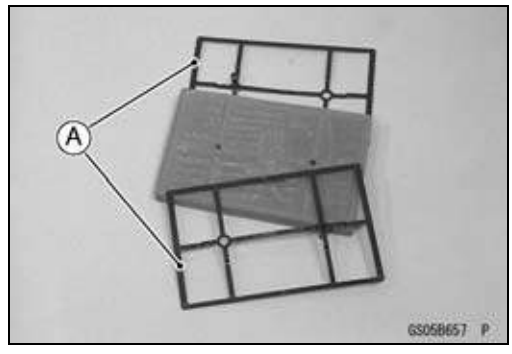
● Remove:
Right Side Cover (see Side Cover Removal in the Frame chapter)
Air Cleaner Cap Bolts [A]
Air Cleaner Cap [B]



● Pull out the air cleaner element [A].



● Separate the plastic holders [A].



⚠ WARNING

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

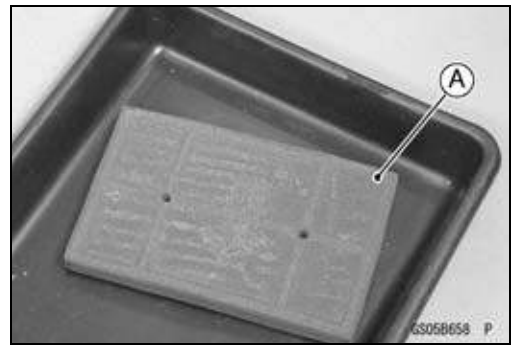
CAUTION

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

Periodic Maintenance Procedures

⚠ WARNING

Clean the element in a well-ventilated area, and make sure 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 a low-flash point solvent to clean the element.



- Clean the element [A] in a bath of high-flash point solvent, and then dry it with compressed air or by shaking it.
- After cleaning, saturate a clean, lint-free towel with SE, SF, or SG class SAE 30 oil and apply the oil to the element by tapping the element outside with the towel.
- Visually check the element for tears or breaks.
- If the element has any tears or breaks, replace the element.

Air Cleaner Element Installation

- Install the removed parts in reverse of removal.
- Torque the air cleaner cap bolts.

Torque - Air Cleaner Cap Bolts: 2.5 N·m (0.25 kgf·m, 22 in·lb)

Throttle Control System Inspection

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

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



- Check the throttle grip free play [A].

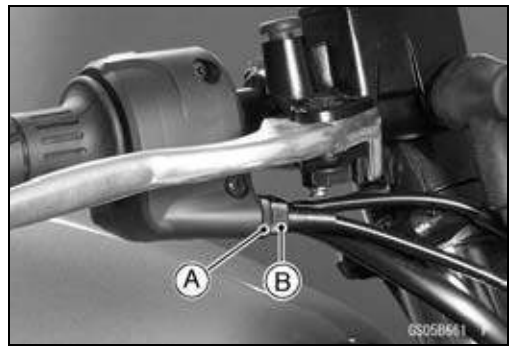
★If the free play is incorrect, adjust the throttle cable.

Throttle Grip Free Play
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)



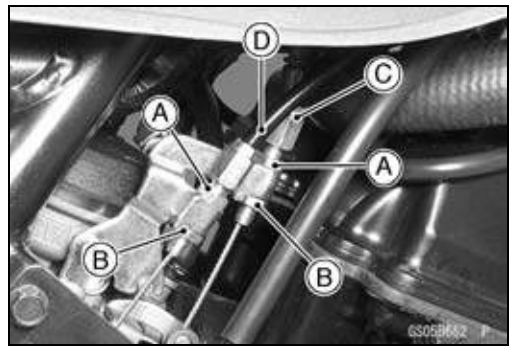
Periodic Maintenance Procedures

- Loosen the locknut [A], and screw accelerator cable adjuster [B] in completely so as to give the throttle grip plenty of play.
- Turn the accelerator cable adjuster until 2 ~ 3 mm (0.08 ~ 0.12 in.) of throttle grip play is obtained.
- Tighten the locknut.

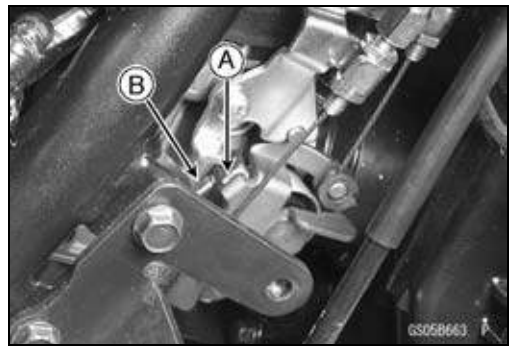


★If the throttle cables can not be adjusted by using the cable adjuster at the upper end of the throttle cable, use the cable adjusters at the lower ends of the throttle cables.

- Remove:
  Side Cover (see Side Cover Removal in the Frame chapter)
  Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)
- To make service easy, unscrew the reserver tank bolts and remove the reserver tank with hoses
- Turn out both upper nuts [A] and turn in both lower nuts [B] as far as they will go so as to give the throttle grip plenty of play.
- With the throttle grip completely closed, turn out the lower nut and turn in the upper nut of the decelerator cable [C] until the inner cable just becomes tight.
- Turn out the lower nut and turn in the upper nut of the accelerator cable [D] until the correct free play is obtained.

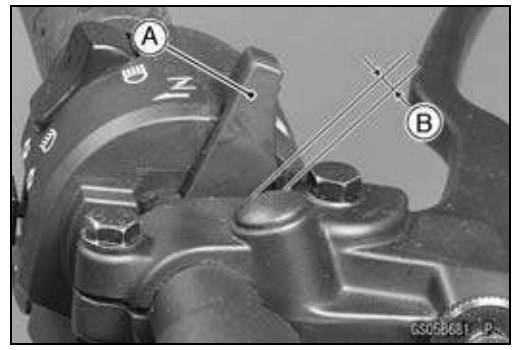


- Check that the throttle linkage lever [A] stops against the idle adjusting screw [B] with the throttle grip closed.



Periodic Maintenance Procedures

Choke Operation Inspection

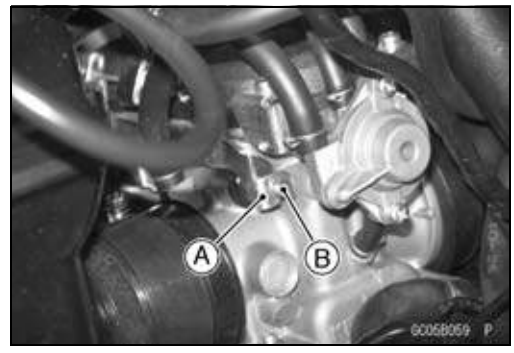


- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal)
  Side Covers (see Side Cover Removal in the Frame chapter)
  Lower Fairings (see Lower Fairing Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal)
- Push the choke lever [A] back all the way to its released position.
- Check choke cable free play [B].

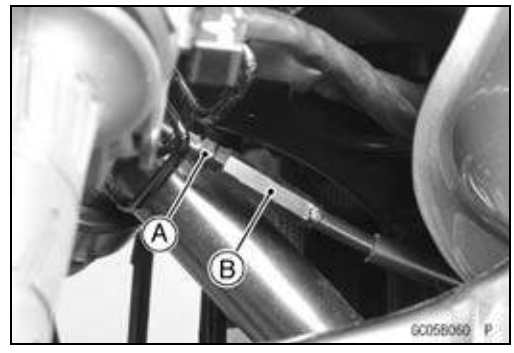
○Determine the amount of choke cable play at the choke lever.

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

Choke Cable Free Play
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

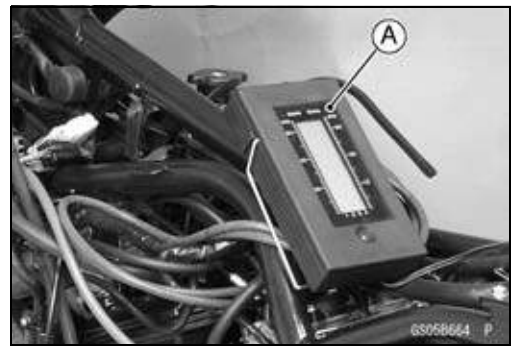


- Push the choke lever back all the way to its released position.
- Pull the choke lever until the starter plunger lever [A] at the carburetor touches the starter plunger [B]; the amount of choke lever travel is the amount of choke cable play.



- Loosen the locknut [A], and turn the adjuster [B] until the cable has the proper amount of free play.
- Tighten the locknut securely.

Engine Vacuum Synchronization Inspection



- Situate the motorcycle using the center stand so that it is perpendicular to the ground.
- Remove the fuel tank, and connect the sub-fuel tank to supply the fuel.
- Remove the right lower fairing.
- Warm up the engine.
- Check the idle speed and adjust if necessary.
- Pull the vacuum hoses off, and attach vacuum gauge [A] to the vacuum hose fittings on the carburetors.

Special Tool - Vacuum Gauge KEK-55-5: 57001-1369

Periodic Maintenance Procedures

● Start the engine and let it idle to measure the carburetor intake vacuum.
★If the intake vacuum difference between the two cylinders exceeds the limit, adjust the synchronization.

Engine Vacuum Synchronization
Less than 2.7 kPa (2 cmHg) difference between both cylinders

● Turn the adjusting screw [A] to synchronize the carburetor.
★If the carburetor synchronization cannot be obtained by using the adjusting screw, check for dirt or blockage, and then check the pilot screw settings.
● Check the Carburetor Synchronization again.



NOTE

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

Idle Speed Inspection

● Start the engine and warm it up thoroughly.
● With the engine idling, turn the handlebar to both sides [A].
★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 Throttle Control System Inspection or Cable, Wire, and Hose Routing section in the Appendix chapter).



⚠ WARNING

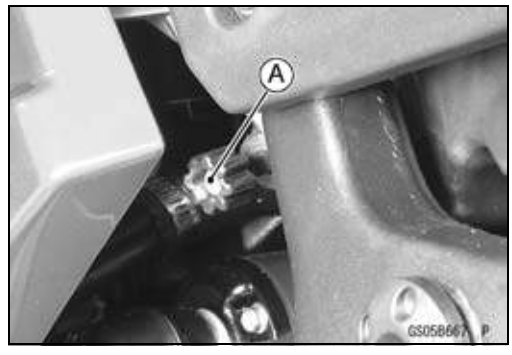
Operation with improperly adjusted, incorrectly routed or damaged cables could result in an unsafe riding condition.

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

Idle Speed
Standard: 1 300 ±50 r/min (rpm)

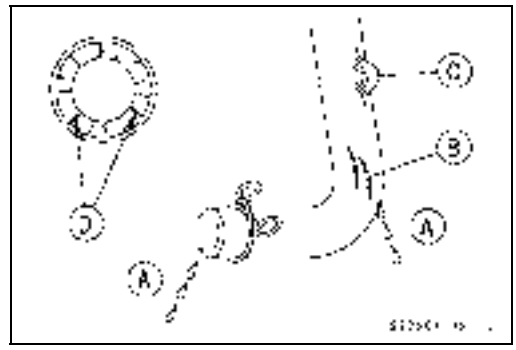
Idle Speed Adjustment

● 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.



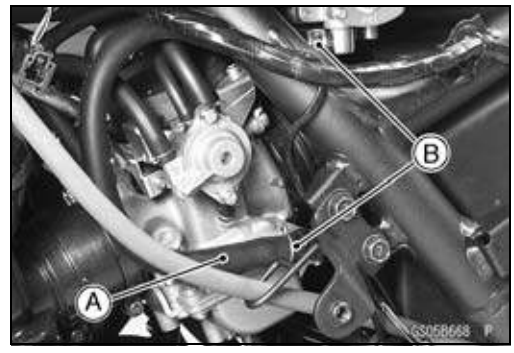
Periodic Maintenance Procedures

Fuel Hose Inspection (fuel leak, damage, installation condition)



○The fuel hose is designed to be used throughout the motorcycle's life without any maintenance. However, if the motorcycle is not properly handled, the high pressure inside the fuel line can cause fuel to leak [A] or the hose to burst. Remove the fuel tank (see Fuel Tank Removal in the Fuel System chapter) and check the fuel hose.

★Replace the fuel hose if any fraying, cracks [B], bulges [C] or ozone cracks [D] are noticed.



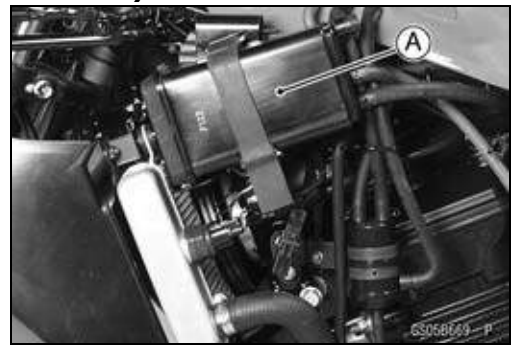
● Check that the hose [A] are securely connected and clamps [B] are tightened correctly.

● Check that the hoses are routed according to Cable, Wire, and Hose Routing section in the Appendix chapter.

★Replace the hose if it has been sharply bent or kinked.

Evaporative Emission Control System (California Model)

Evaporative Emission Control System Inspection



● Inspect the canister as follows.

○Remove:

Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)

○Remove the canister [A], and disconnect the hoses from the canister.

○Visually inspect the canister for cracks or 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.*

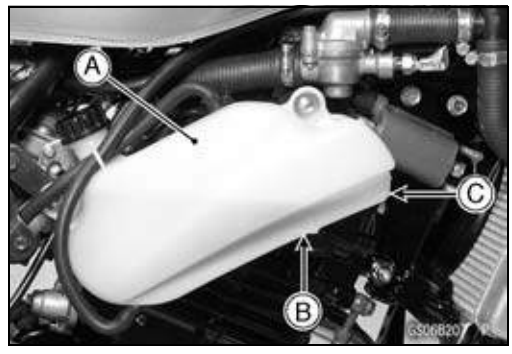
Periodic Maintenance Procedures



● Check the liquid/vapor separator as follows.
○Remove:
Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)
○Disconnect the hoses from the separator, and remove the separator [B] from the motorcycle left side.
○Visually inspect the separator for cracks and other damage.
★If the separator has any cracks or damage, replace it with a new one.
○To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.
● Check the hoses of the evaporative emission control system as follows.
○Check that the hoses are securely connected and clips are in position.
○Replace any kinked, deteriorated or damaged hoses.
○Route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
○When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses with a minimum of bending so that the emission flow will not be obstructed.

Cooling System

Coolant Level Inspection



NOTE

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

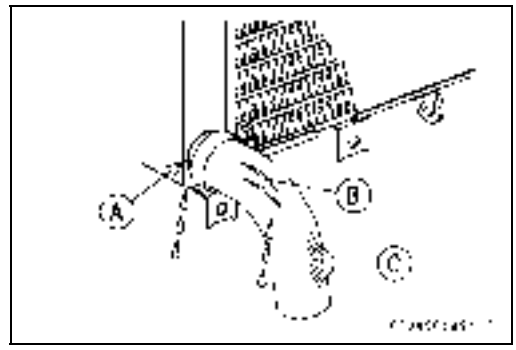
● Check the coolant level in the reserve tank [A] with the motorcycle held perpendicular (Do not use the sidestand).
★If the coolant level is lower than the “L” level line [B], remove the right center fairing (see Center Fairing Removal in the Frame chapter) and unscrew the reserve tank cap, and add coolant to the “F” level line [C].
“L”: low
“F”: full

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 alone can be added. But the diluted coolant must be returned to the correct mixture ratio within a few days.
If coolant must be added often or the reservoir tank has run completely dry, there is probably leakage in the cooling system. Check the system for leaks.
Coolant ruins painted surfaces. Immediately wash away any coolant that spills on the frame, engine, wheels or other painted parts.

Periodic Maintenance Procedures

Radiator Hose Damage and Installation Condition Inspection



○The high pressure inside the radiator hose and pipe can cause coolant to leak [A] or the hose to burst if the line is not properly maintained.

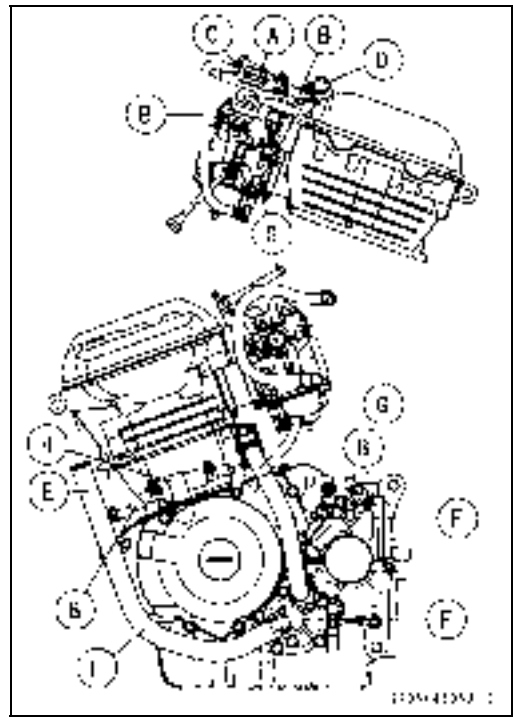
● Visually inspect the hoses for signs of deterioration. Squeeze the hoses. A hose should not be hard and brittle, nor should it be soft or swollen.

★Replace the hose if any fraying, cracks [B] or bulges [C] are noticed.

● Check that the hoses are securely connected and clamps are tightened correctly.

Torque - Radiator Hose Clamp Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)

Coolant Filter Cleaning (Australia Model)



● Remove the fuel tank (see Fuel Tank Removal in the Fuel System chapter).

● Drain the coolant (see Coolant Change).

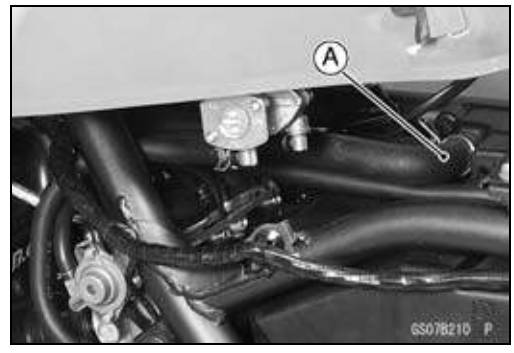
● Remove the filter [A] from the water hoses [B] of carburetor system.

● Blow off dirt and sediment on the filter with compressed air.

Filter Body [C]
Water Pipe [D]
Coolant Valve Assy [E]
Water Pump [F]
Carburetor [G]
Damper [H]

Air Suction System

Air Suction System Damage Inspection



● Pull the vacuum switch valve hose [A] out of the air cleaner.

Periodic Maintenance Procedures

● Start the engine and run it at idle speed.
● Plug [A] the vacuum switch valve hose end 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 or air suction valve (see Engine Top End chapter).



Engine Top End

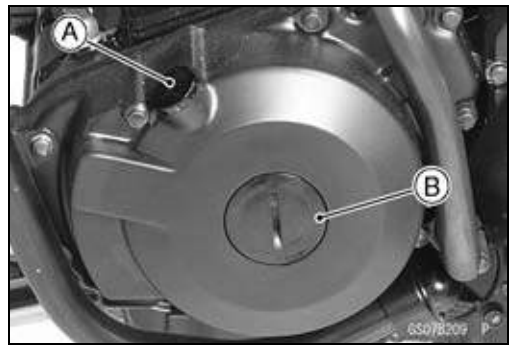
Valve Clearance Inspection

NOTE

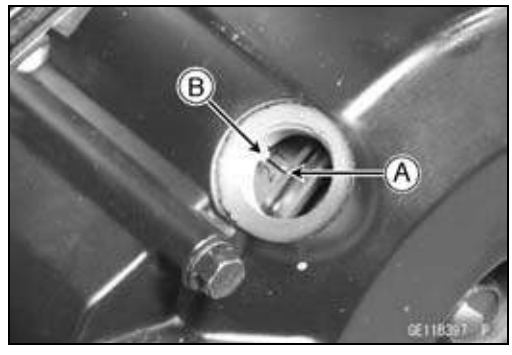
○*Valve clearance must be checked and adjusted when the engine is cold (room temperature).*

● Remove:
Cylinder Head Cover (see Cylinder Head Cover Removal in the Engine Top End chapter)
Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)
● Unscrew the two plugs [A], [B] on the alternator cover.

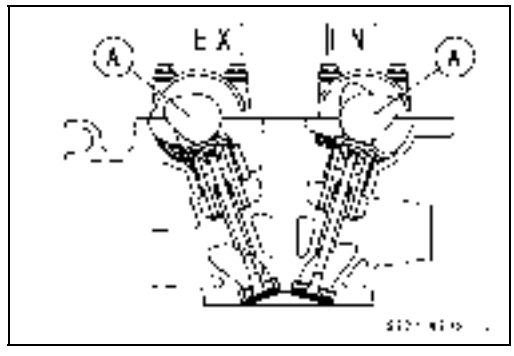
Special Tool - Filler Cap Driver: 57001-1454



● Check the valve clearance when the pistons are at TDC.
○The pistons are numbered beginning with the engine left side.
● Using a wrench on the crankshaft rotation bolt, turn the crankshaft clockwise until the "2/T" [A] mark on the timing rotor is aligned with the projection [B] in the inspection window on the alternator cover.



○Measure the valve clearance of the valves for which the cam [A] are turned away from each other.



Periodic Maintenance Procedures

● Using the thickness gauge [A], measure the valve clearance between cam and valve lifter.



Valve Clearance
Standard:
Exhaust 0.22 ~ 0.29 mm (0.0087 ~ 0.0114 in.)
Inlet 0.15 ~ 0.24 mm (0.0059 ~ 0.0094 in.)

○Each piston has two inlet and two exhaust valves. Measure these two inlet or exhaust valves at the same crankshaft position.

Valve Clearance Measuring Position
#1 Piston TDC at End of Compression Stroke →
Inlet valve clearances of #1 piston, and
Exhaust valve clearances of #1 piston

NOTE

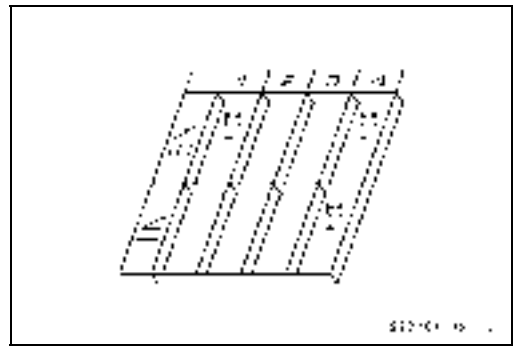
○*Check the valve clearance using this method only. Checking the clearance at any other cam position may result in improper valve clearance.*

Valve Clearance Measuring Position
#2 Piston TDC at End of Compression Stroke →
Inlet valve clearances of #2 piston, and
Exhaust valve clearances of #2 piston

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

Valve Clearance Adjustment

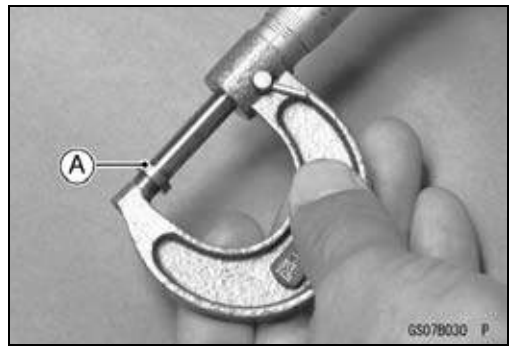
● To change the valve clearance, remove the camshaft chain tensioner, camshafts and valve lifters. Replace the shim with one of a different thickness.



NOTE

○*Mark and record the locations of the valve lifters and shims so that they can be reinstalled in their original positions.*

Periodic Maintenance Procedures



- Clean the shim to remove any dust or oil.
- Measure the thickness of the removed shim [A].
- Select a new shim thickness calculation as follows.
  a + b – c = d
  [a] Present Shim Thickness
  [b] Measured Valve Clearance
  [c] Specified Valve Clearance (Mean Value = 0.255 mm (Exhaust), 0.195 mm (Inlet))
  [d] Replace Shim Thickness

Example (Inlet):
2.90 + 0.45 – 0.195 = 3.155 mm

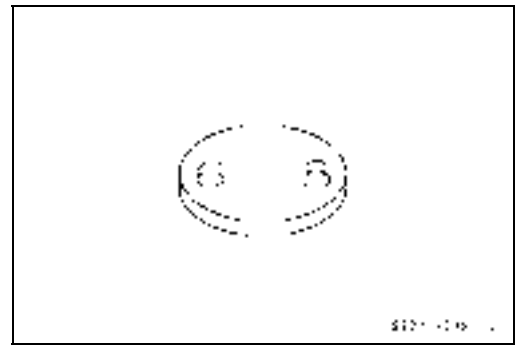
○Exchange the shim for the 3.175 size shim.

CAUTION
Don't use the shims for another models. This could cause wear of the valve stem end, and valve stem damage.

Periodic Maintenance Procedures

Adjustment Shims

Thickness	Part Number	Mark
2.50	92180-1014	50
2.55	92180-1016	55
2.60	92180-1018	60
2.65	92180-1020	65
2.675	92180-1174	68
2.70	92180-1022	70
2.725	92180-1175	73
2.75	92180-1024	75
2.775	92180-1176	78
2.80	92180-1026	80
2.825	92180-1177	83
2.85	92180-1028	85
2.875	92180-1178	88
2.90	92180-1030	90
2.925	92180-1179	93
2.95	92180-1032	95
2.975	92180-1180	98
3.00	92180-1034	00
3.025	92180-1181	03
3.05	92180-1036	05
3.075	92180-1182	08
3.10	92180-1038	10
3.125	92180-1183	13
3.15	92180-1040	15
3.175	92180-1184	18
3.20	92180-1042	20
3.25	92180-1044	25
3.30	92180-1046	30
3.35	92180-1048	35
3.40	92180-1050	40
3.45	92180-1052	45
3.50	92180-1054	50



Periodic Maintenance Procedures

Clutch

Clutch Operation Inspection



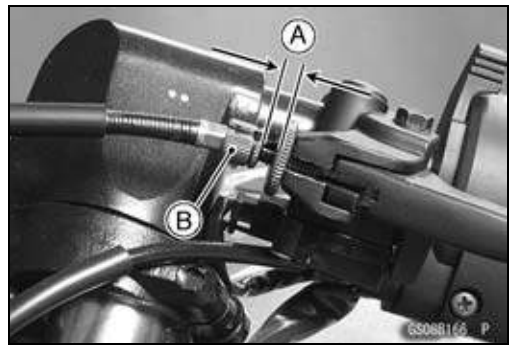
- Pull the clutch lever just enough to take up the free play [A].
- Measure the gap between the lever and the lever holder.

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

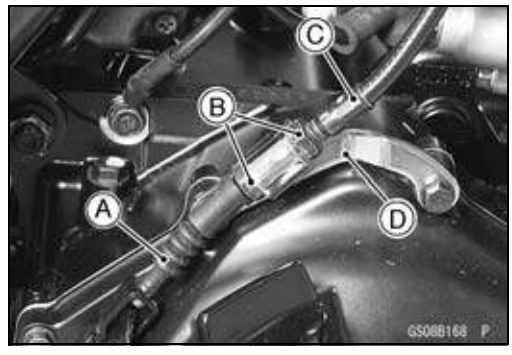
Clutch Lever Free Play
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

⚠ WARNING

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



- Turn the adjuster [B] so that 5 ~ 6 mm (0.20 ~ 0.24 in.) [A] of threads are visible.



- Remove the right lower fairing (see Lower Fairing Removal in the Frame chapter).
- Slide the dust cover [A] from the clutch cable lower end out of place.
- Loosen both adjusting nuts [B] at the clutch cover as far as they will go.
- Pull the clutch outer cable [C] tight and tighten the adjusting nuts against the bracket [D].
- Slip the rubber dust cover back onto place.
- Turn the adjuster at the clutch lever until the free play is correct.

⚠ WARNING

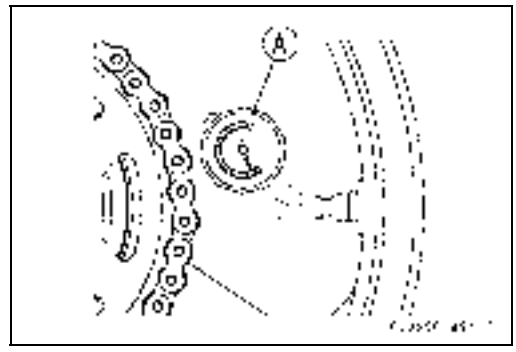
Be sure that the outer cable end at the clutch lever is fully seated in the adjuster at the clutch lever, or it could slip into place later, creating enough cable play to prevent clutch disengagement.

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

Periodic Maintenance Procedures

Wheels/Tires

Air Pressure Inspection

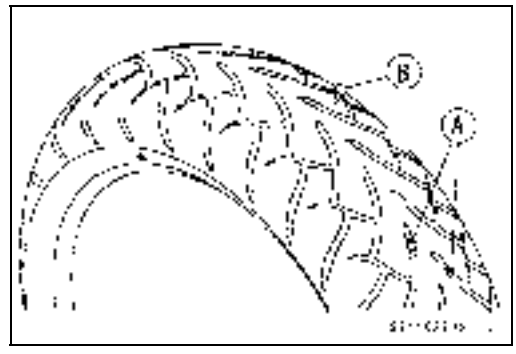


- Remove the air valve cap.
- Measure the tire air pressure with an air pressure gauge [A] when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).
- Install the air valve cap.
- ★Adjust the tire air pressure according to the specifications if necessary.

Air Pressure (when Cold)

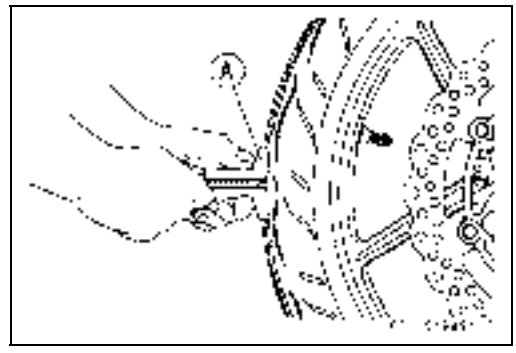
Front:	**Up to 170 kg (375 lb)** **200 kPa (2.00 kgf/cm², 28 psi)**
Rear:	**Up to 170 kg (375 lb)** **225 kPa (2.25 kgf/cm², 32 psi)**

Wheel/Tire Damage Inspection



- Remove any imbedded stones [A] or other foreign particles [B] from tread.
- Visually inspect the tire for cracks and cuts, and replace the tire if necessary. Swelling or high spots indicate internal damage, requiring tire replacement.
- Visually inspect the wheel for cracks, cuts and dents damage.
- ★If any damage is found, replace the wheel if necessary.

Tire Tread Wear, Abnormal Wear 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.

- 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 (see Tire Removal/Installation in the Wheels/Tires chapter).

Periodic Maintenance Procedures

Tread Depth
Standard:
Front:

BRIDGESTONE	**4.6 mm (0.181 in.)**
DUNLOP	**4.5 mm (0.177 in.)**

Rear:

BRIDGESTONE	**7.0 mm (0.276 in.)**
DUNLOP	**7.4 mm (0.291 in.)**

Service Limit:

Front	**1 mm (0.04 in.)**
Rear	**2 mm (0.08 in.) (Up to 130 km/h (80 mph))**
	3 mm (0.12 in.) (Over 130 km/h (80 mph))

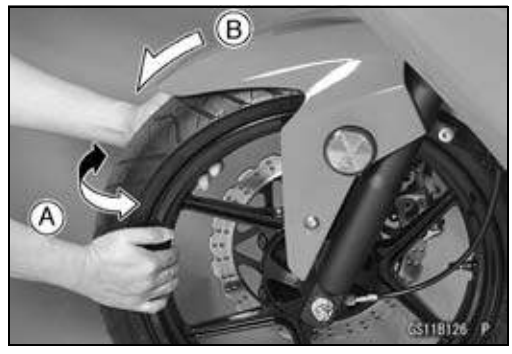
⚠ WARNING

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

NOTE

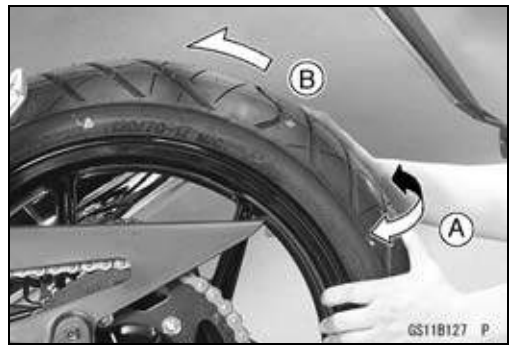
○*Most countries may have their own regulations a minimum tire tread depth: be sure to follow them.*
○*Check and balance the wheel when a tire is replaced with a new one.*

Wheel Bearing Damage Inspection



- Raise the front wheel off the ground with jack (see Front Wheel Removal in the Wheels/Tires chapter).
- Turn the handlebar all the way to the right or left.
- Inspect the roughness of the front wheel bearing by pushing and pulling [A] the wheel.
- Spin [B] the front wheel lightly, and check for smoothly turn, roughness, binding or noise.

★If roughness, binding or noise is found, remove the front wheel and inspect the wheel bearing (see Front Wheel Removal, Hub Bearing Inspection in the Wheels/Tires chapter).



- Raise the rear wheel off the ground with stand (see Rear Wheel Removal in the Wheels/Tires chapter).
- Inspect the roughness of the rear wheel bearing by pushing and pulling [A] the wheel.
- Spin [B] the rear wheel lightly, and check for smoothly turn, roughness, binding or noise.

★If roughness, binding or noise is found, remove the rear wheel and inspect the wheel bearing (see Rear Wheel Removal, Hub Bearing Inspection in the Wheels/Tires chapter) and coupling (see Coupling Bearing Inspection in the Final Drive chapter).

Periodic Maintenance Procedures

Drive Train

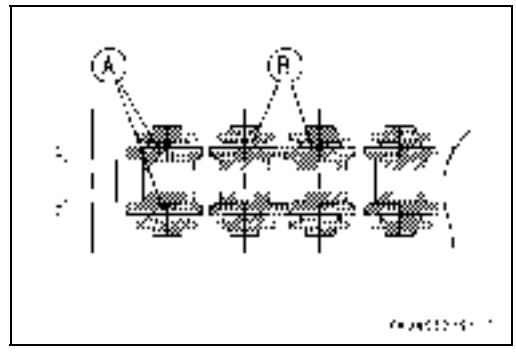
Drive Chain Lubrication Condition Inspection

- If a special lubricant is not available, a heavy oil such as SAE 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.
- If the chain appears especially dirty, 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-rings [B]



Drive Chain Slack Inspection

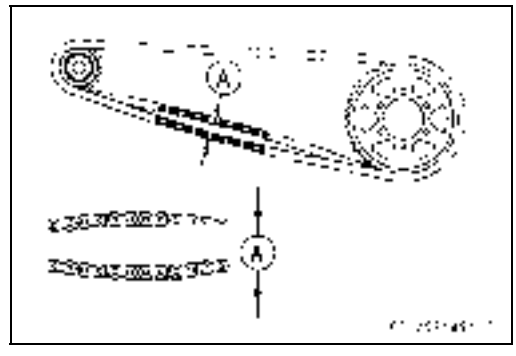
NOTE

○*Check the slack with the motorcycle setting on its sidestand.*
○*Clean the chain 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.

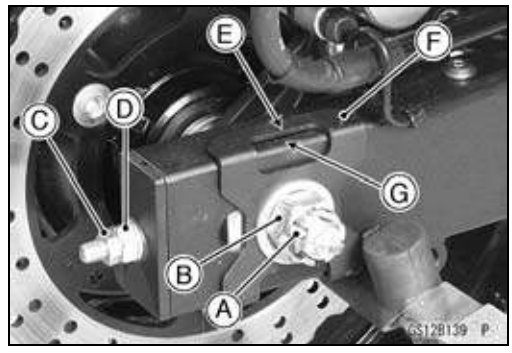
★If the chain slack exceeds the standard, adjust it.

Chain Slack
Standard: 20 ~ 30 mm (0.8 ~ 1.2 in.)



Periodic Maintenance Procedures

Drive Chain Slack Adjustment



- Remove the cotter pin [A], and loosen the axle nut [B].
- Loosen the both chain adjuster locknuts [C].

★If the chain is too loose, turn in the left and right chain adjuster nuts [D] evenly.

★If the chain is too tight, turn out the left and right chain adjuster nuts evenly, and kick the wheel forward.

- Turn both chain adjuster nuts evenly until the drive chain has the correct amount of slack. To keep the chain and wheel properly aligned, the notch [E] on the left wheel alignment indicator [F] should align with the same swingarm mark or position [G] that the right indicator notch aligns with.

⚠ WARNING

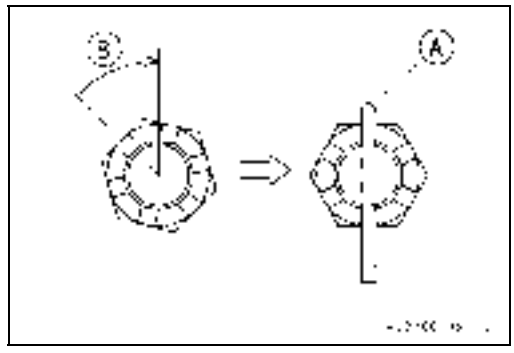
Misalignment of the wheel will result in abnormal wear and may result in an unsafe riding condition.

- Tighten both chain adjuster locknuts securely.
- Tighten the axle nut.

Torque - Rear Axle Nut: 98 N·m (10.0 kgf·m, 72 ft·lb)

- Turn the wheel, measure the chain slack again at the tightest position, and readjust if necessary.

- Insert a new cotter pin [A].



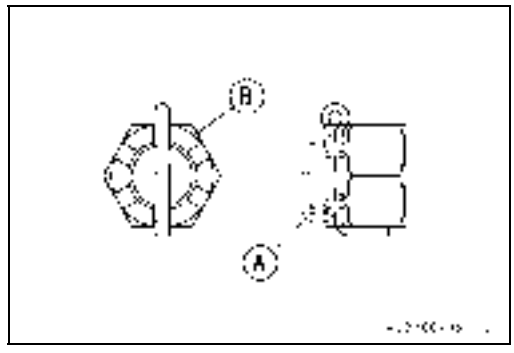
NOTE

○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle, tighten the nut clockwise [B] up to next alignment.*

○*It should be within 30°.*

○*Loosen once and tighten again when the slot goes past the nearest hole.*

- Bend the cotter pin [A] over the nut [B].

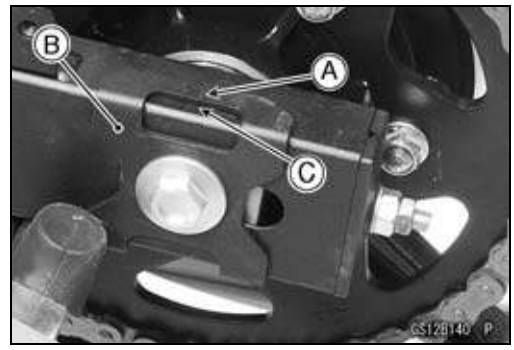


⚠ WARNING

If the rear axle nut is not securely tightened or the cotter pin is not installed, an unsafe riding condition may result.

Periodic Maintenance Procedures

Wheel Alignment Inspection



- Check that the notch [A] on the right wheel alignment indicator [B] aligns with the same swingarm mark or position [C] that the left alignment indicator notch aligns with.

★If they do not, adjust the chain slack and align the wheel alignment (see Drive Chain Slack Adjustment).

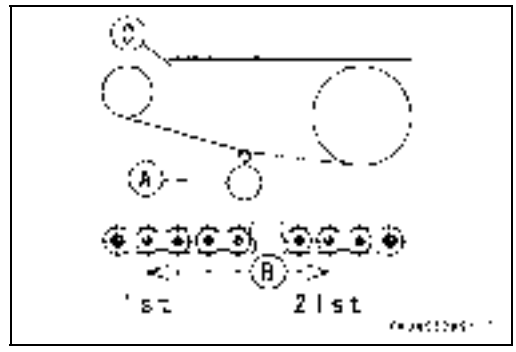
NOTE

○*Wheel alignment can be also checked using the straightedge or string method.*

⚠ WARNING

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

Drive Chain Wear Inspection



- Remove:
  Chain Cover (see Swingarm Removal in the Suspension chapter)
- 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, 20 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 ~ 318.1 mm (12.50 ~ 12.52 in.)**
Service Limit:	**323 mm (12.72 in.)**

⚠ WARNING

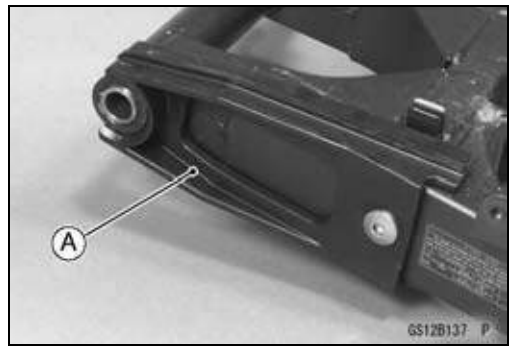
If the drive chain wear exceeds the service limit, replace the chain or an unsafe riding condition may result. A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.
For safely, use only the standard chain. It is an endless type and should not be cut for installation.

Standard Chain

Make:	**ENUMA**
Type:	**EK520SR-O_2**
Link:	**106 links**

Periodic Maintenance Procedures

Chain Guide Inspection

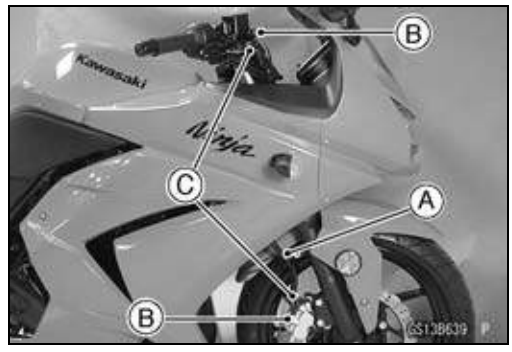


- Remove:
  Swingarm (see Swingarm Removal in the Suspension chapter)
- Visually inspect the chain guide [A].

★Replace the chain guide if it shows any signs of abnormal wear or damage.

Brake System

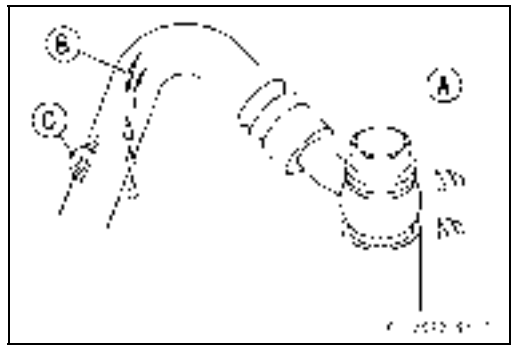
Brake Fluid Leak (Brake Hose and Pipe) Inspection



- Apply the brake lever or pedal and inspect the brake fluid leak from the brake hoses [A], fittings [B] and pipes [C].

★If the brake fluid leaked from any position, inspect or replace the problem part.

Brake Hose and Pipe Damage and Installation Condition Inspection



- Inspect the brake hoses, fittings and pipes for deterioration, cracks and signs of leakage.

○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 the hose and pipe if any crack [B], bulge [C] or leakage is noticed.

★Tighten any brake hose banjo bolts and brake pipe joint nuts.

Torque - Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Inspect the brake hose routing.

★If any brake hose routing is incorrect, route the brake hose according to Cable, Wire, and Hose Routing section in the Appendix chapter.

Brake Operation Inspection

- Inspect the operation of the front and rear brake by running the vehicle on the dry road.

★If the brake operation is insufficiency, inspect the brake system.

⚠ WARNING

When inspecting by running the vehicle, note a surrounding traffic situation enough in the place of safety.

Periodic Maintenance Procedures

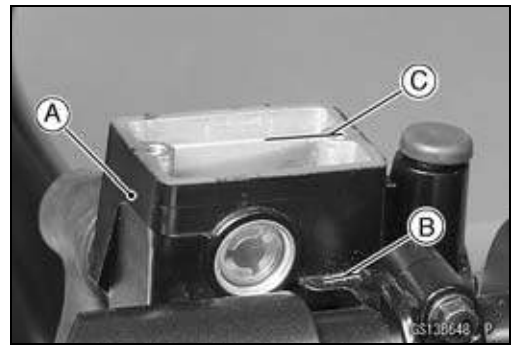
Brake Fluid Level Inspection

● 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 [C] in the reservoir.



● 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, fill the reservoir to the upper level line [C].



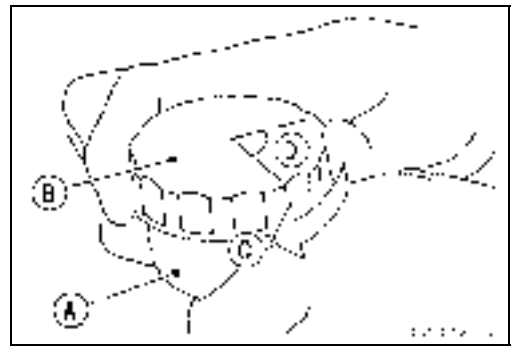
⚠ WARNING

Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that 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: DOT4

● Follow the procedure below to install the rear brake fluid reservoir cap correctly.

○First, tighten the rear brake fluid reservoir cap [B] clockwise [C] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body, then tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir body [A].



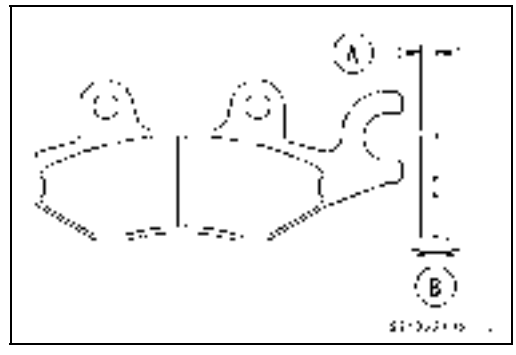
Brake Pad Wear Inspection

● 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.

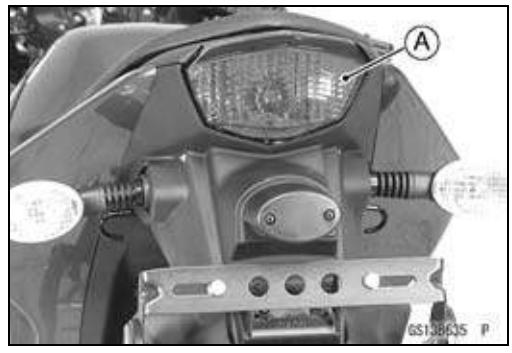
Pad Lining Thickness

Standard:	**4.5 mm (0.18 in.)**
Service Limit:	**1 mm (0.04 in.)**



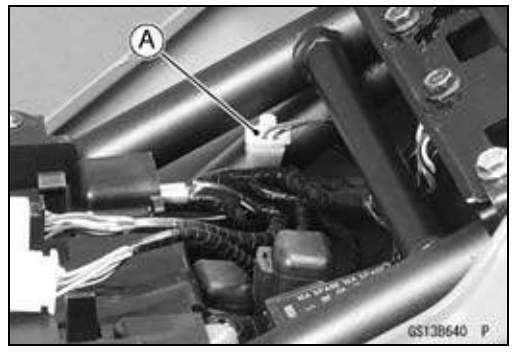
Periodic Maintenance Procedures

Brake Light Switch Operation Inspection



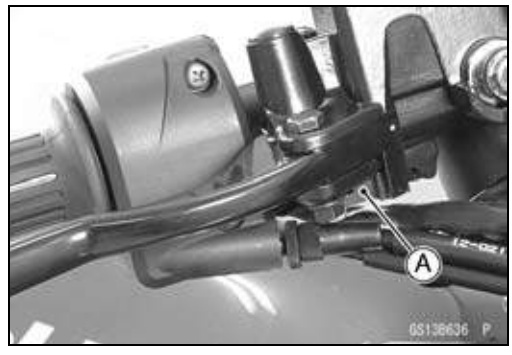
- Turn on the ignition switch.
- The brake light [A] should go on when the brake lever is applied or after the brake pedal is depressed about 10 mm (0.39 in.).

★If it does not, adjust the brake light switch.



- Disconnect the connector [A].
- Turn the brake light switch to adjust the switch.
- Connect the connector.

★If it does not go on, inspect or replace the following items.
Battery (see Charging Condition Inspection in the Electrical System chapter)
Brake Light (see Tail/Brake Light Removal in the Electrical System chapter)
Main Fuse 30 A and Taillight Fuse 10 A (see Fuse Inspection in the Electrical System chapter)
Front Brake Light Switch [A] (see Switch Inspection in the Electrical System chapter)
Rear Brake Light Switch (see Switch Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)



Suspensions

Front Forks/Rear Shock Absorber Operation Inspection

- Pump the forks down and up [A] 4 or 5 times, and inspect the smooth stroke.

★If the forks do not smoothly or noise is found, inspect the fork oil level or fork clamps (see Front Fork Oil Change in the Suspension chapter).



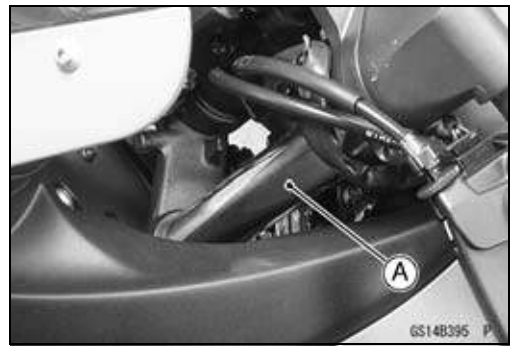
Periodic Maintenance Procedures

● Pump the seat down and up [A] 4 or 5 times, and inspect the smooth stroke.
★If the shock absorber does not smoothly stroke or noise is found, inspect the oil leak (see Rear Shock Absorber Oil Leak Inspection).



Front Fork Oil Leak Inspection

● Visually inspect the front forks [A] for oil leakage.
★Replace or repair any defective parts, if necessary.



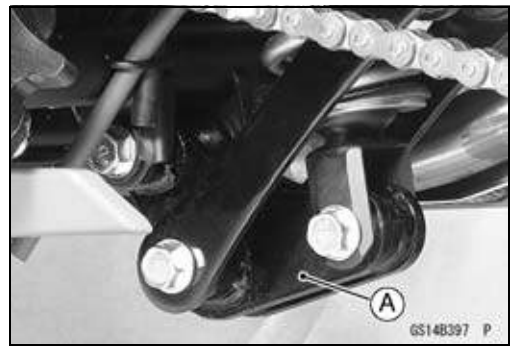
Rear Shock Absorber Oil Leak Inspection

● Visually inspect the shock absorber [A] for oil leakage.
★If the oil leakage is found on it, replace the shock absorber with a new one.



Rocker Arm Operation Inspection

● Pump the seat down and up 4 or 5 times, and inspect the smooth stroke.
★If the rocker arm [A] does not smoothly stroke or noise is found, inspect the fasteners and bushings (see Rocker Arm/Tie-Rod Bushing, Sleeve Inspection in the Suspension chapter).



Tie-Rod Operation Inspection

● Pump the seat down and up 4 or 5 times, and inspect the smooth stroke.
★If the tie-rod [A] do not smoothly stroke or noise is found, inspect the fasteners and tie-rod bushings (see Rocker Arm/Tie-Rod Bushing, Sleeve Inspection in the Suspension chapter).



Periodic Maintenance Procedures

Swingarm Pivot Lubrication

- Remove the swingarm bearing (see Swingarm Bearing Removal in the Suspension chapter).
- Supply grease to the needle bearings and grease seals in accordance with the Periodic Maintenance chart.

Steering System

Steering Play Inspection



- Raise the front wheel off the ground with jack (see Front Wheel Removal in the Wheels/Tires chapter).
- 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.

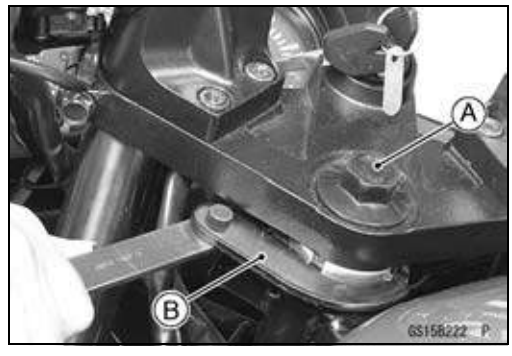
- Feel for steering looseness by pushing and pulling the forks.

★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 Play Adjustment



- Loosen:
  Front Fork Clamp Bolts (lower) (both sides)
  Stem Head Bolt [A]
- Adjust the steering.

★If the steering is too loose, tighten the steering stem nut a fraction of a turn using the special tool [B].

★If the steering is too tight, loosen the stem nut a fraction of a turn.

Special Tool - Steering Stem Nut Wrench: 57001-1100

NOTE

○*Turn the stem nut 1/8 turn at a time maximum.*

- Tighten:

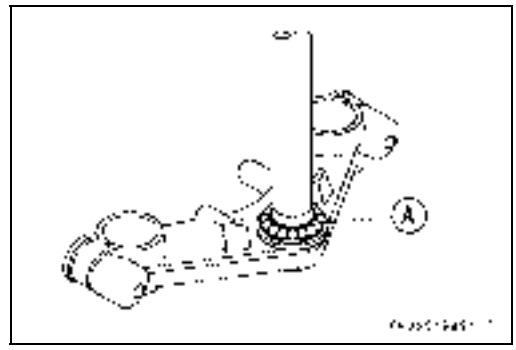
Torque - Steering Stem Head Bolt: 44 N·m (4.5 kgf·m, 32 ft·lb)
Front Fork Clamp Bolts (lower): 30 N·m (3.1 kgf·m, 22 ft·lb)

- Check the steering again.

★If the steering is still too tight or too loose, repeat the adjustment.

Periodic Maintenance Procedures

Steering Stem Bearing Lubrication



- Remove the steering stem (see Stem, Stem Bearing Removal in the Steering chapter).
- Using a high-flash point solvent, wash the upper and lower ball bearings, and wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean off grease and dirt.
- Visually check the outer races and the ball bearings.

★Replace them if they show wear or damage.

- Apply a light coat of grease to the upper and lower [A] ball bearings and outer races.
- Install the steering stem (see Stem, Stem Bearing Installation in the Steering chapter).
- Adjust the steering (see Steering Play Adjustment).

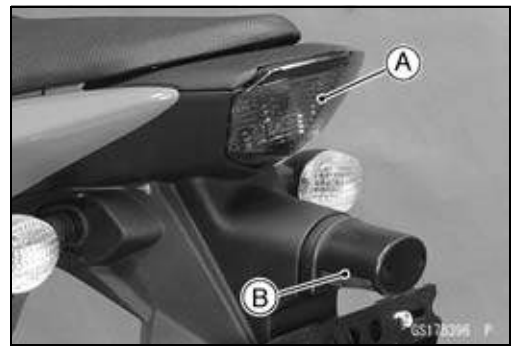
Electrical System

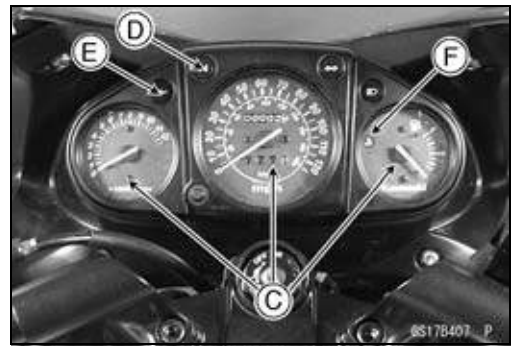
Lights and Switches Operation Inspection

First Step

- Turn on the ignition switch.
- The following lights should go on according to below table.

Taillight [A]	goes on
License Plate Light [B]	goes on
Meter Panel Lights [C]	goes on
Neutral Indicator Light [D]	goes on
Oil Pressure Warning Indicator Light [E]	goes on
Water Temperature Warning Indicator Light [F]	goes on





★If the light does not go on, inspect or replace the following item.

Battery (see Charging Condition Inspection in the Electrical System chapter)
Applicable Bulb (see Wiring Diagram in the Electrical System chapter)
Meter Unit for Meter Lights (see Meter Unit Inspection in the Electrical System chapter)
Meter Unit for Neutral Indicator Light (see Meter Unit Inspection in the Electrical System chapter)
Meter Unit for Oil Pressure Warning Indicator Light (see Meter Unit Inspection in the Electrical System chapter)
Meter Unit for Water Temperature Warning Indicator Light (see Meter Unit Inspection in the Electrical System chapter)
Main Fuse 30 A and Taillight Fuse 10 A (see Fuse Inspection in the Electrical System chapter)
Ignition Switch (see Switch Inspection in the Electrical System chapter)
Neutral Switch (see Switch Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)

- Turn off the ignition switch.
- The all lights should go off.

★If the light does not go off, replace the ignition switch.

Periodic Maintenance Procedures

Second Step

- Turn on the turn signal switch [A] (left or right position).
- The left or right turn signal lights [B] (front and rear) according to the switch position should flash.
- The turn signal indicator light [C] in the meter unit should flash.

★If the each light does not flash, inspect or replace the following item.

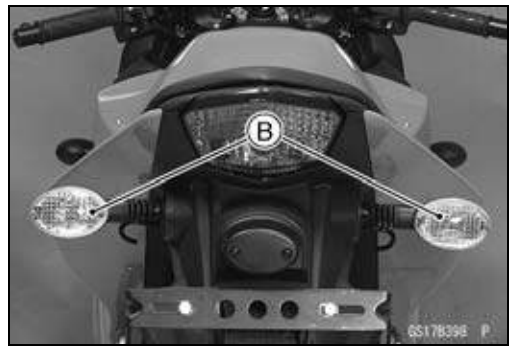
Turn Signal Light Bulb (see Turn Signal Light Bulb Replacement in the Electrical System chapter)
Meter Unit for Turn Signal Light Indicator Light (see Meter Unit Inspection in the Electrical System chapter)
Turn Signal Relay Fuse 10 A (see Fuse Inspection in the Electrical System chapter)
Turn Signal Switch (see Switch Inspection in the Electrical System chapter)
Turn Signal Relay (see Turn Signal Relay Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)

- Push the turn signal switch.
- The turn signal lights and indicator light should go off.

★If the light does not go off, inspect or replace the following item.

Turn Signal Switch (see Switch Inspection in the Electrical System chapter)
Turn Signal Relay (see Turn Signal Relay Inspection in the Electrical System chapter)





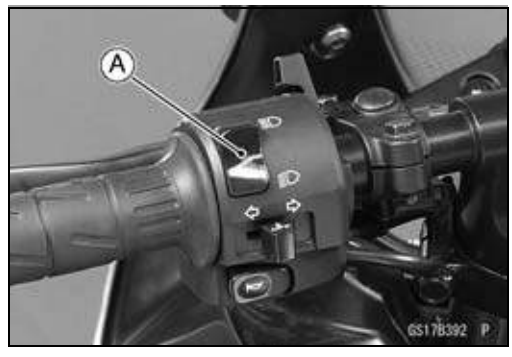


Third Step

- Set the dimmer switch [A] to low beam position.
- Start the engine.
- The low beam headlight should go on.

★If the low beam headlight does not go on, inspect or replace the following item.

Headlight Low Beam Bulb (see Headlight Bulb Replacement in the Electrical System chapter)
Headlight Fuse 10 A (see Fuse Inspection in the Electrical System chapter)
Dimmer Switch (see Switch Inspection in the Electrical System chapter)
Headlight Relay (see Relay Circuit Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)



Periodic Maintenance Procedures

- Set the dimmer switch to high beam position.
- The low beam [A] and high beam [B] headlights should go on.
- The high beam indicator light [C] should go on.

★If the high beam headlight and/or high beam indicator light does not go on, inspect or replace the following item.
Headlight High Beam Bulb (see Headlight Bulb Replacement in the Electrical System chapter)
Dimmer Switch (see Switch Inspection in the Electrical System chapter)

- Turn off the engine stop switch.
- The low beam and high beam headlights should stay going on.

★If the headlights and high beam indicator light does go off, inspect or replace the following item.
Headlight Relay (see Relay Circuit Inspection in the Electrical System chapter)

- Turn off the ignition switch.
- The headlights and high beam indicator light should go off.





Headlight Aiming Inspection

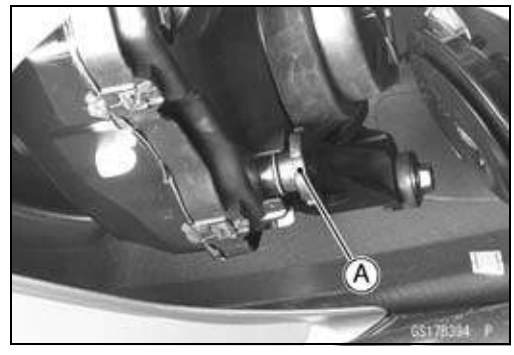
- Inspect the headlight beam for aiming.

★If the headlight beam points to one side rather than straight ahead, adjust the horizontal beam.

Headlight Beam Horizontal Adjustment

- Turn the horizontal adjuster [A] on the headlight with the screwdriver in or out until the beam points straight ahead.

★If the headlight beam points too low or high, adjust the vertical beam.



Headlight Beam Vertical Adjustment

- Turn the vertical adjuster [A] on the headlight with the screwdriver in or out to adjust the headlight vertically.

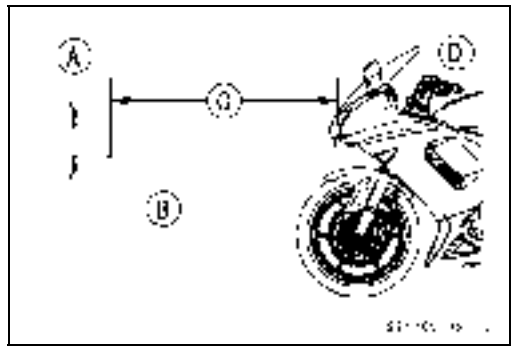


Periodic Maintenance Procedures

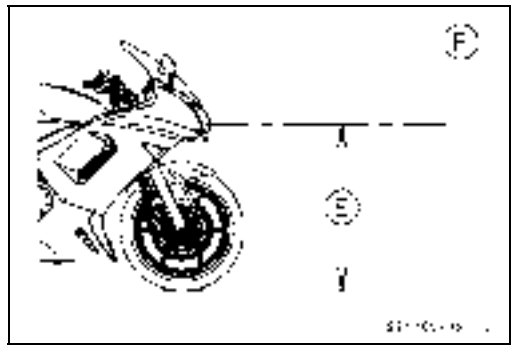
NOTE

○*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.*

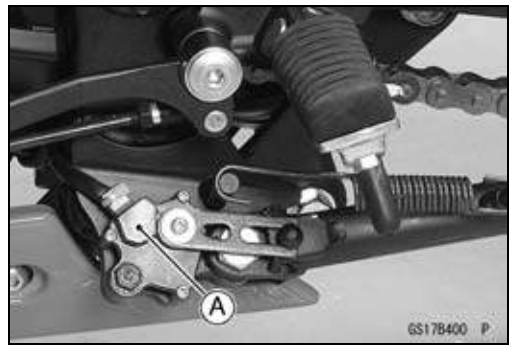


50 mm (2 in.) [A]
Center of Brightest Spot [B]
7.6 m (25 ft) [C]
Low Beam [D]
Height of Headlight Center [E]
High Beam [F]



Sidestand Switch Operation Inspection

● Inspect the sidestand switch [A] operation accordance to below table.



Sidestand Switch Operation

Sidestand	Gear Position	Clutch Lever	Engine Start	Engine Run
Up	Neutral	Released	Starts	Continue running
Up	Neutral	Pulled in	Starts	Continue running
Up	In Gear	Released	Doesn't start	Stops
Up	In Gear	Pulled in	Starts	Continue running
Down	Neutral	Released	Starts	Continue running
Down	Neutral	Pulled in	Starts	Continue running
Down	In Gear	Released	Doesn't start	Stops
Down	In Gear	Pulled in	Doesn't start	Stops

Periodic Maintenance Procedures

★If the sidestand switch operation does not work, inspect or replace the following item.
Battery (see Charging Condition Inspection in the Electrical System chapter)
Main Fuse 30 A (see Fuse Inspection in the Electrical System chapter)
Ignition Fuse 10 A (see Fuse Inspection in the Electrical System chapter)
Ignition Switch (see Switch Inspection in the Electrical System chapter)
Sidestand Switch (see Switch Inspection in the Electrical System chapter)
Engine Stop Switch (see Switch Inspection in the Electrical System chapter)
Starter Button (see Switch Inspection in the Electrical System chapter)
Neutral Switch (see Switch Inspection in the Electrical System chapter)
Starter Relay (see Starter Relay Inspection in the Electrical System chapter)
Starter Circuit Relay (see Relay Circuit Inspection in the Electrical System chapter)
Harness (see Wiring Inspection in the Electrical System chapter)
★If the all parts are good condition, replace the IC Igniter.

Engine Stop Switch Operation Inspection

First Step

- Turn on the ignition switch.
- Set the neutral position.
- Turn the engine stop switch to stop position [A].
- Push the starter button.
- The engine does not start.

★If the engine starts, inspect or replace the following item.
Engine Stop Switch (see Switch Inspection in the Electrical System chapter)



Second Step

- Turn on the ignition switch.
- Set the neutral position.
- Turn the engine stop switch to run position [A].
- Push the starter button and run the engine.
- Turn the engine stop switch to stop position.
- Immediately the engine should be stop.

★If the engine does not stop, inspect or replace the following item.
Engine Stop Switch (see Switch Inspection in the Electrical System chapter)
★If the engine stop switch is good condition, replace the IC Igniter.



Periodic Maintenance Procedures

Others

Chassis Parts Lubrication

- Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
- Lubricate the points listed below with indicated lubricant.

NOTE

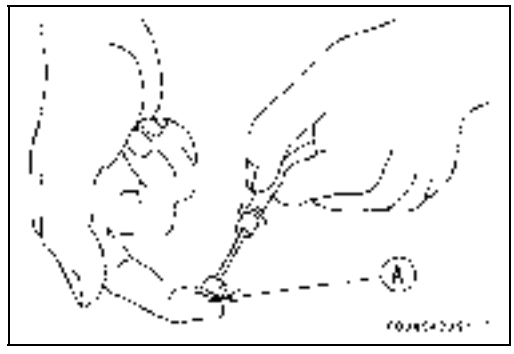
○*Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure water spray, perform the general lubrication.*

Pivots: Lubricate with Grease.

Brake Lever
Brake Pedal
Clutch Lever
Rear Brake Joint Pin
Sidestand

Points: Lubricate with Grease.

Clutch Inner Cable Upper and Lower Ends [A]
Throttle Inner Cable Upper and Lower Ends



Cables: Lubricate with Rust Inhibitor.

Clutch Cable
Throttle Cables

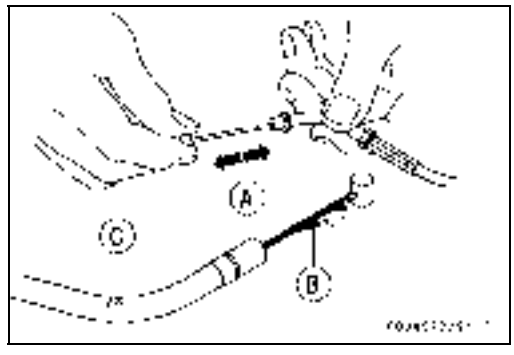
- Lubricate the cables by seeping the oil between the cable and housing.

○The cable may be lubricated by using a commercially available pressure cable lubricator with an aerosol cable lubricant.



- With the cable disconnected at both ends, the inner 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.



Periodic Maintenance Procedures

Bolts, Nuts and Fasteners Tightness Inspection

● Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○*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 for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. For each fastener, first loosen it by 1/2 turn, then tighten it.

★If cotter pins are damaged, replace them with new ones.

Bolt, Nut and Fastener to be checked

Engine:
- Clutch Lever Pivot Nut
- Engine Mounting Bolts and Nuts
- Exhaust Pipe Manifold Holder Nuts
- Muffler Body Mounting Bolts

Wheels:
- Front Axle
- Rear Axle Nut
- Rear Axle Nut Cotter Pin

Brakes:
- Brake Lever Pivot Nut
- Brake Pedal Bolt
- Brake Rod Joint Cotter Pin
- Caliper Mounting Bolts
- Front Master Cylinder Clamp Bolts
- Rear Master Cylinder Mounting Bolts

Suspension:
- Front Fork Clamp Bolts
- Rear Shock Absorber Bolt and Nut
- Swingarm Pivot Shaft Nut

Steering:
- Steering Stem Head Bolt
- Handlebar Holder Bolts

Others:
- Footpeg Stay Bolts
- Front Fender Bolts
- Sidestand Bolt

Periodic Maintenance Procedures

Replacement Parts

Air Cleaner Element Replacement

- Refer to the Air Cleaner Element Cleaning (see Air Cleaner Element Cleaning).

Fuel Hose Replacement

- Refer to Fuel Hose Inspection (see Fuel Hose Inspection).

Coolant Change

⚠ WARNING

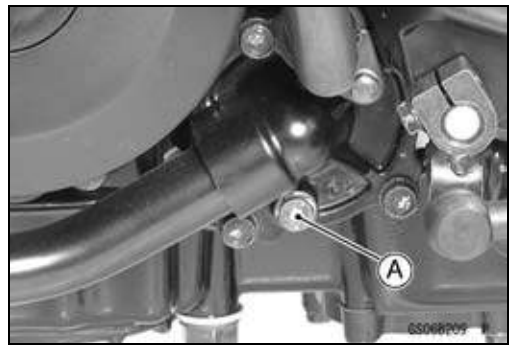
To avoid burns, do not remove the radiator cap or try to change the coolant when the engine is still hot. Wait until it cools down. Coolant on tires will make them slippery and can cause an accident and injury. Immediately wipe up or wash away any coolant that spills on the frame, engine, or other painted parts.
Since coolant is harmful to the human body, do not use for drinking.

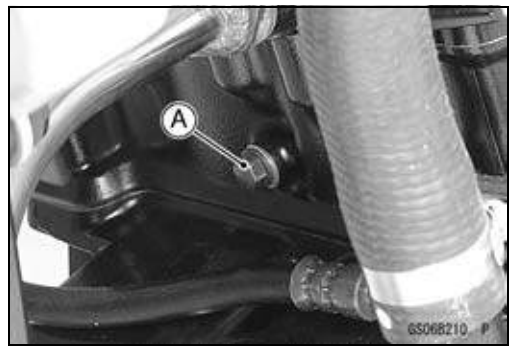
- Remove:
  Lower Fairings (see Lower Fairing Removal in the Frame chapter)
  Radiator Cap [A]



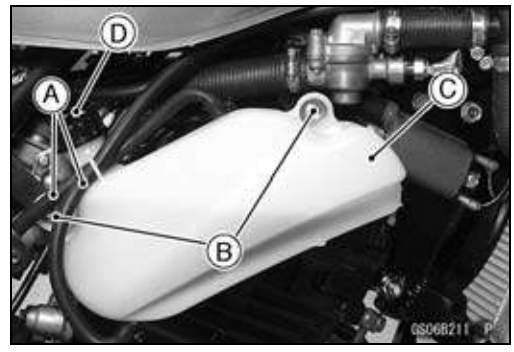
- Place a container under the drain bolts [A] at the bottom of the water pump cover and cylinder.
- Drain the coolant from the radiator and engine by removing the drain bolts.

Torque - Drain Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)





Periodic Maintenance Procedures



- Remove:
  Hoses [A]
  Mounting Bolts [B] and Reserve Tank [C]
- Remove the cap [D] and pour the coolant of the reserve tank into the container.



- Install:
  Hoses
  Reserve Tank
- Tighten the drain bolt with the specified torque.

  Torque - Drain Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)
- Fill the radiator up to the radiator 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 below for antifreeze) in the cooling system.
If hard water is used in the system, it causes scales accumulation in the water passages, and considerably reduces the efficiency of the cooling system.

Water and Coolant Mixture Ratio (Recommended)

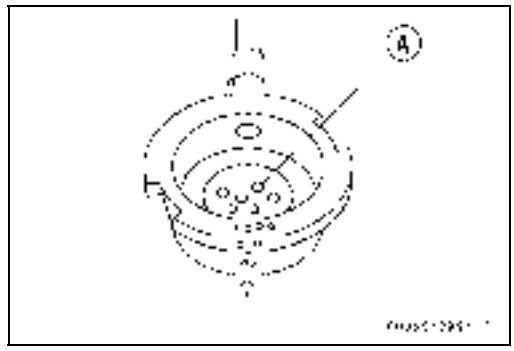
Soft Water:	**50%**
Coolant:	**50%**
Freezing Point:	**−35°C (−31°F)**
Capacity:	**1.5 L (1.59 US qt)**

NOTE

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

Periodic Maintenance Procedures

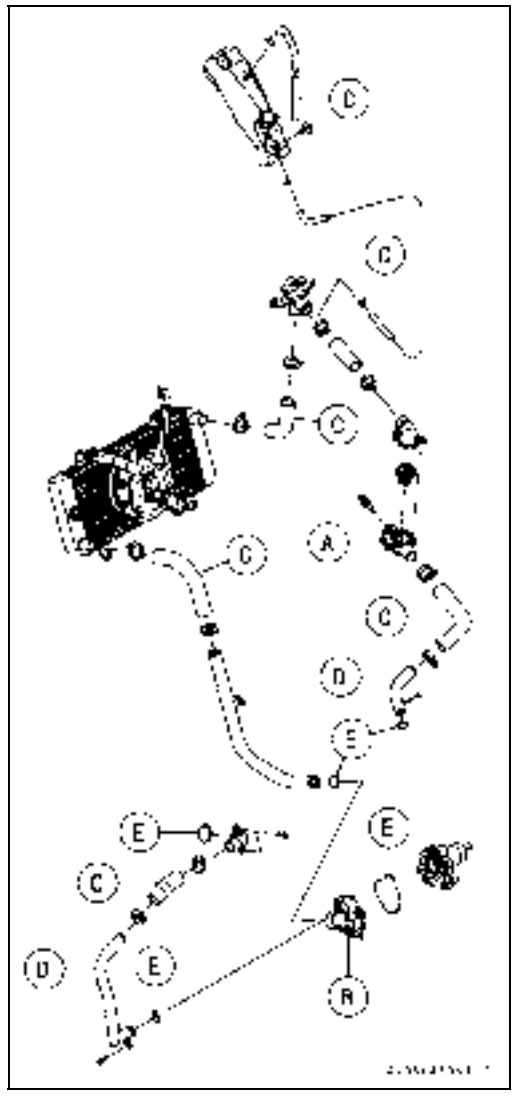
● Bleed the air from the cooling system as follows.
○Start the engine with the radiator cap removed and run it until no more air bubbles [A] can be seen in the coolant.
○Tap the radiator hoses to force any air bubbles caught inside.
○Stop the engine and add coolant up to the radiator filler neck.
● Install the radiator cap.
● Start the engine, warm it up thoroughly until the radiator fan turns on and then stop the engine.
● 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.

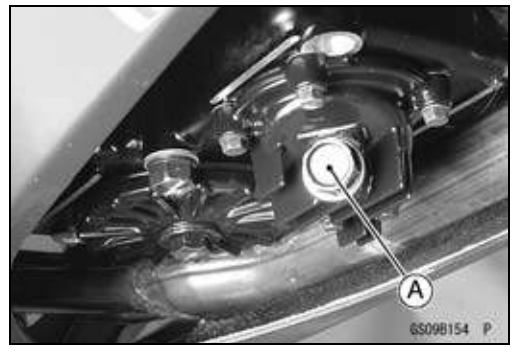
Radiator Hose and O-ring Replacement

● Drain the coolant (see Coolant Change).
● Remove:
Thermostat Housing [A] (see Water Pump Removal in the Cooling System chapter)
Water Pump Cover [B] (see Water Pump Removal in the Cooling System chapter)
Hoses [C]
Pipe [D]
O-rings [E]
● Apply grease to the new O-rings and install them.
● Install the new hoses and tighten the clamps securely.
● Fill the coolant (see Coolant Change).
● Check the cooling system for leaks.



Periodic Maintenance Procedures

Engine Oil Change



⚠ WARNING

To avoid a serious burn, never touch the exhaust pipe during oil change.

- Warm up the engine sufficiently with the motorcycle standing on its side stand, and stop the engine.
- Place an oil pan under the engine and remove the drain bolt [A] to drain the oil.
- Replace the drain bolt gaskets with new ones if they are damaged.

○The oil in the oil filter can be drained by removing the filter.

- After draining the oil, tighten the drain bolts.

Torque - Oil Drain Bolts: 19.6 N·m (2.0 kgf·m, 14.5 ft·lb)
Oil Filter Mounting Bolt: 19.6 N·m (2.0 kgf·m, 14.5 ft·lb)

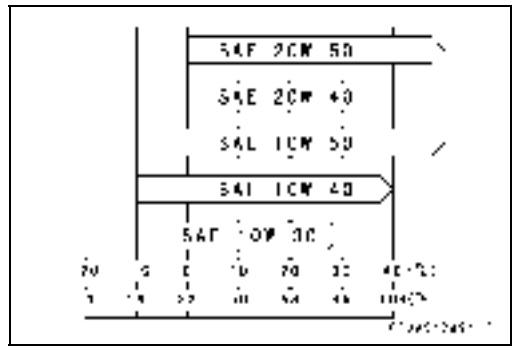
- Pour in the specified type and amount of oil.

Recommended Engine Oil

Type:	**API SE, SF or SG**
	API SH, SJ or SL with JASO MA
Viscosity:	**SAE 10W - 40**
Capacity:	**1.3 L (1.4 US qt) (When filter is not removed)**
	1.6 L (1.7 US qt) (When filter is removed)

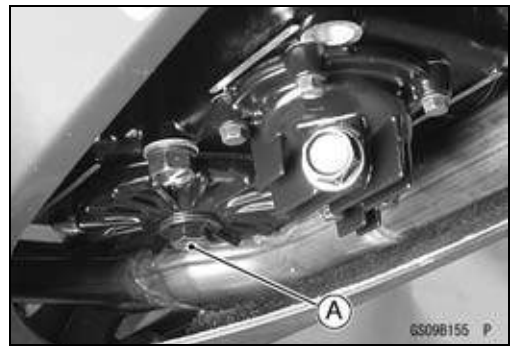
NOTE

○*Although 10W-40 engine oil is the recommended oil for most conditions, the oil viscosity may need to be changed to accommodate atmospheric conditions in your riding area.*



Oil Filter Replacement

- Drain the engine oil (see Engine Oil change).
- Remove the oil filter mounting bolt [A].

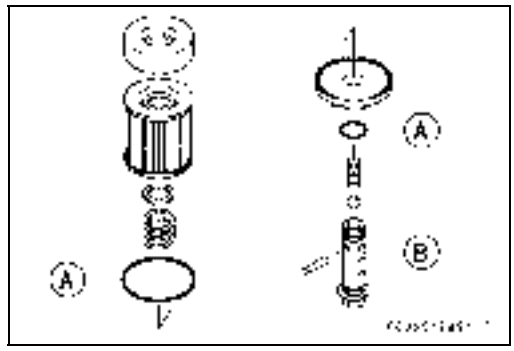


Periodic Maintenance Procedures

- Replace the oil filter with a new one.
- Apply engine oil to the O-rings [A] before installation after inspecting its damage.
- Install the oil filter mounting bolt [B] with a specified torque.

Torque - Oil Filter Mounting Bolt: 19.6 N·m (2.0 kgf·m, 14.5 ft·lb)

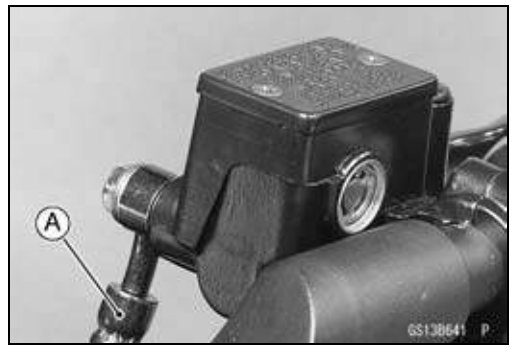
- Pour in the specified type and amount of oil (see Engine Oil Change).



Brake Hose and Pipe Replacement

CAUTION

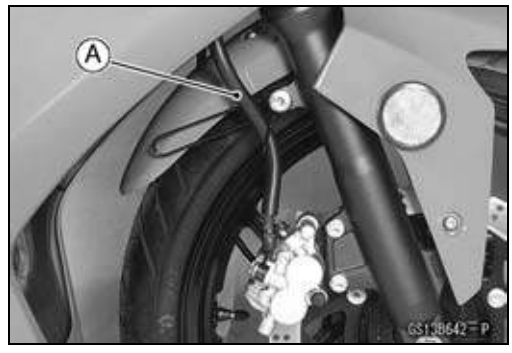
Brake fluid quickly ruins painted plastic surfaces; any spilled fluid should be completely washed away immediately.

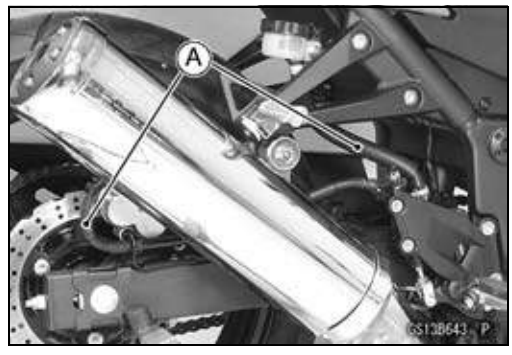


- Remove the banjo bolts.
- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hoses [A], temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.
- Immediately wash away any brake fluid that spills.
- There are washers on each side of the brake hose fitting. Replace them with new ones when installing.
- Tighten:

Torque - Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- When installing the hoses [A], avoid sharp bending, kinking, flatting or twisting, and route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- Fill the brake line after installing the brake hose (see Brake Fluid Change).



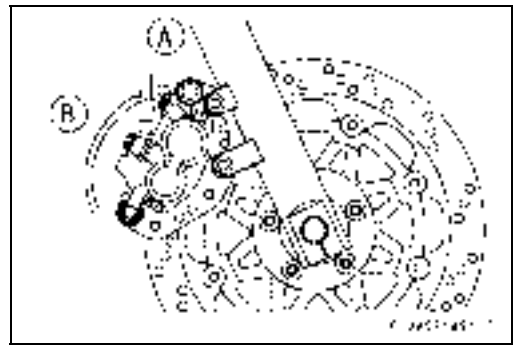


Brake Fluid Change

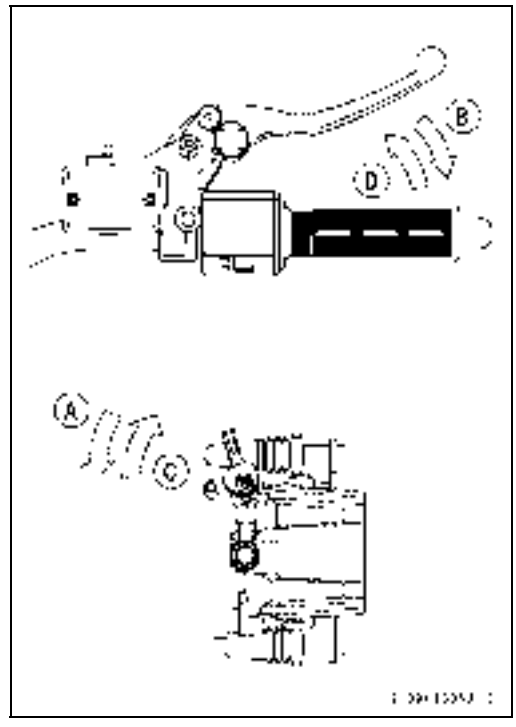
NOTE

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

Periodic Maintenance Procedures



- Level the brake fluid reservoir.
- Remove the reservoir cap and diaphragm.
- 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.



- 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].

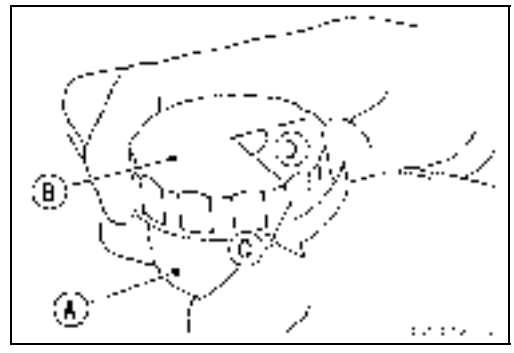
NOTE

○*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.*

- Remove the clear plastic hose.
- Install the diaphragm and reservoir cap.
- Tighten:

Torque - Front Brake Reservoir Cap Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)



- Follow the procedure below to install the rear brake fluid reservoir cap correctly.

○First, tighten the rear brake fluid reservoir cap [B] clockwise [C] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body, then tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir body [A].

- Tighten the bleed valve, and install the rubber cap.

Torque - Bleed Valve: 5.5 N·m (0.55 kgf·m, 49 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.

Periodic Maintenance Procedures

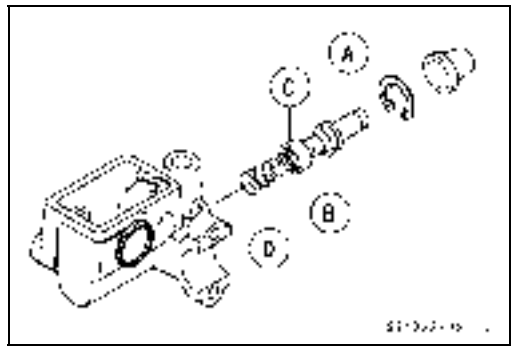
Master Cylinder Rubber Parts Replacement

Front Master Cylinder Disassembly

- Remove the front master cylinder (see Front Master Cylinder Removal in the Brakes chapter).
- 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 Tool - 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.

Rear Master Cylinder Disassembly

NOTE

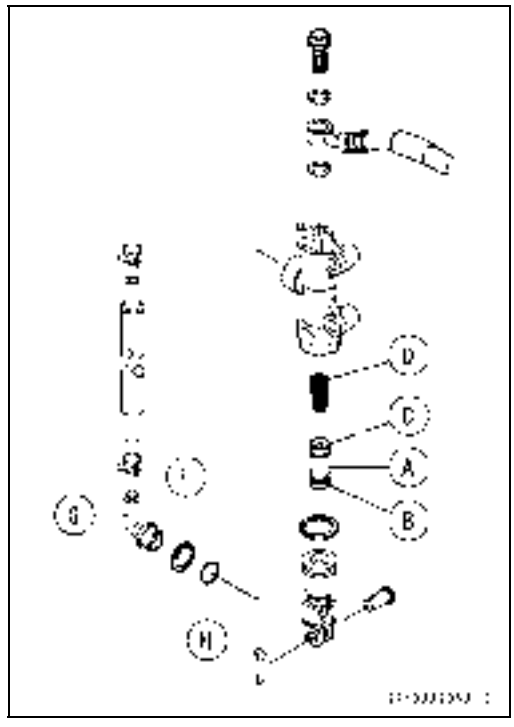
○*Do not remove the push rod clevis for master cylinder disassembly since removal requires brake position adjustment.*

- Remove the rear master cylinder (see Rear Master Cylinder Removal in the Brakes chapter).
- Remove the circlip.

Special Tool - 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].
- Remove the circlip [F] and pull out the brake hose connector [G] and O-ring [H].

Special Tool - Inside Circlip Pliers: 57001-143



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 Pivot Bolt
  Brake Lever Pivot Contact
  Push Rod Contact (Rear)
  Dust Cover
- Tighten:

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

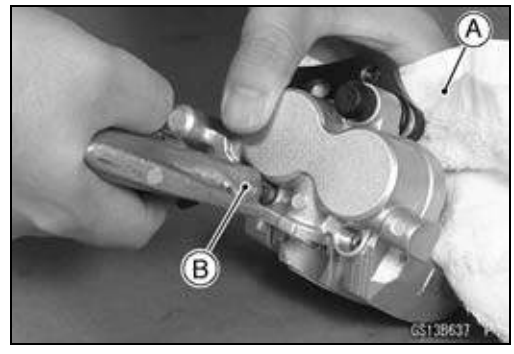
Caliper Rubber Parts Replacement

Caliper Disassembly

- Remove a front Caliper (see Front Caliper Removal in the Brakes chapter).
- Remove the pads and anti-rattle spring (see Pad Removal in the Brakes chapter).

★If compressed air is available, the piston may be removed using compressed air as follows.

- Insert the wooden board of 5 mm (0.2 in.) thick inside the caliper opening or cover the caliper opening with a clean, heavy cloth [A].
- Lightly apply compressed air [B] to the hose joint opening until the pistons hit the wooden board or heavy cloth.



⚠ 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.
- Immediately wipe up any brake fluid that spills. It may ruin painted or plated surfaces.
- Remove the dust seals and fluid seals.
- Remove the bleed valve and rubber cap.

NOTE

○If compressed air is not available, do as follows for both calipers coincidentally, with the brake hose connected to the caliper.
○Prepare a container for brake fluid, and perform the work above it.
○Remove the spring and pads (see Brake Pad Removal).
○Pump the brake lever or pedal until the pistons come out of the cylinders, and then disassemble the caliper.

Periodic Maintenance Procedures

Caliper Assembly

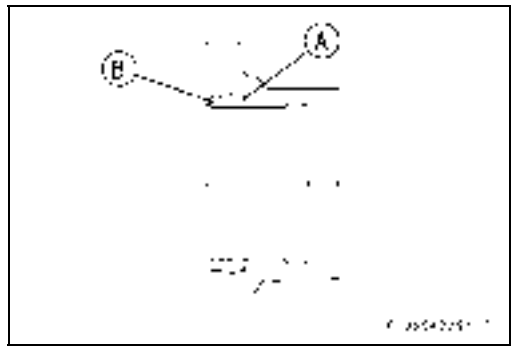
● Clean the caliper parts except for the pads.

CAUTION
For cleaning of the parts, use only disc brake fluid, ispopropyl alcohol, or ethyl alcohol.

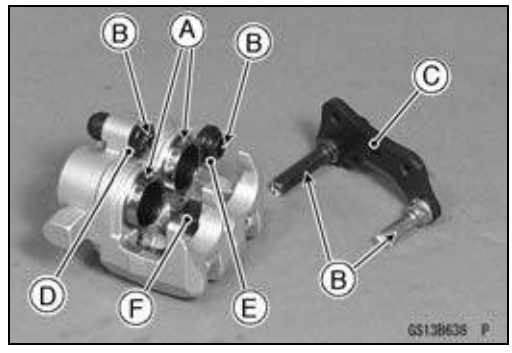
● Install the bleed valve and rubber cap.

Torque - Bleed Valve: 5.5 N·m (0.55 kgf·m, 49 in·lb)

● Replace the fluid seals [A] and dust seals [B] with new one.
● Apply brake fluid to the fluid seals and dust seals, and install them into the cylinder by hand.



● Apply brake fluid [A] to the outside of the pistons and push them into each cylinder by hand without scratching the cylinder and piston skirt.
● Apply silicone grease [B] to the caliper holder shaft and holder holes, and install the caliper holder [C], rubber boot [D] and dust cover [E].
● Install the anti-rattle spring [F] and pads in the caliper (see Pad Installation in the Brakes chapter).



Spark Plug Replacement

● Remove:
Spark Plugs (see Spark Plug Removal in the Electrical System chapter)
● Remove the spark plugs using the 16 mm plug wrench [A].

Owner's Tool - Spark Plug Wrench, 16 mm: 92110-0044



● Insert the spark plug vertically into the plug hole with the spark plug installed in the plug wrench [A].

Owner's Tool - Spark Plug Wrench, 16 mm: 92110-0044

● Tighten:

Torque - Spark Plugs: 13 N·m (1.3 kgf·m, 115 in·lb)

● Install:
Spark Plugs (see Spark Plug Installation in the Electrical System chapter)

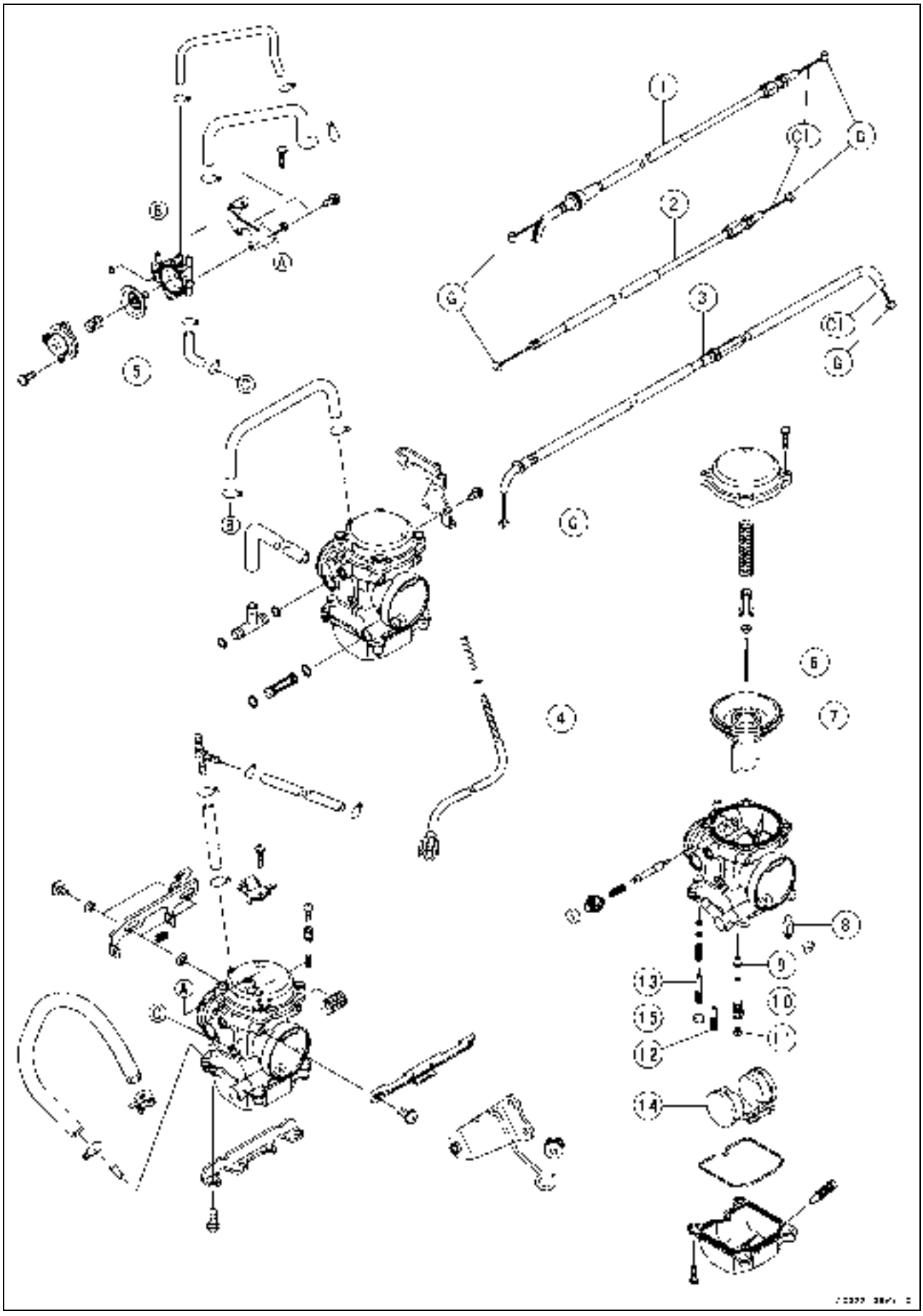


Fuel System

Table of Contents

Exploded View 3-2
Specifications 3-8
Special Tools 3-9
Throttle Grip and Cables 3-10
  Free Play Inspection 3-10
  Free Play Adjustment 3-10
  Throttle Cable Removal 3-10
  Throttle Cable Installation 3-10
  Throttle Cable Lubrication 3-10
Choke Cable 3-11
  Free Play Inspection 3-11
  Free Play Adjustment 3-11
  Choke Cable Removal 3-11
  Choke Cable Installation 3-11
  Choke Cable Lubrication and Inspection 3-11
Carburetors 3-12
  Idle Speed Inspection 3-12
  Idle Speed Adjustment 3-12
  Engine Vacuum Synchronization Inspection 3-12
  Engine Vacuum Synchronization Adjustment 3-12
  Pilot Screw Adjustment 3-12
  Service Fuel Level Inspection 3-13
  Service Fuel Level Adjustment 3-14
  Fuel System Cleanliness Inspection 3-15
  Carburetor Removal 3-16
  Carburetor Installation 3-17
  Carburetor Separation 3-17
  Carburetor Joining 3-17
  Carburetor Disassembly 3-19
  Carburetor Assembly 3-19
  Carburetor Cleaning 3-20
  Carburetor Inspection 3-21
Air Cleaner 3-23
  Air Cleaner Element Removal 3-23
  Air Cleaner Element Installation 3-23
  Air Cleaner Housing Removal 3-23
  Air Cleaner Housing Installation 3-24
  Air Cleaner Housing Disassembly 3-24
  Air Cleaner Housing Assembly 3-24
  Oil Draining 3-25
Fuel Tank 3-26
  Fuel Tank Removal 3-26
  Fuel Tank Installation 3-26
  Fuel Tap Removal 3-27
  Fuel Tap Installation 3-27
  Fuel Tank and Tap Cleaning 3-27
  Fuel Tap Inspection 3-28
  Fuel Tank and Cap Inspection 3-28

Exploded View

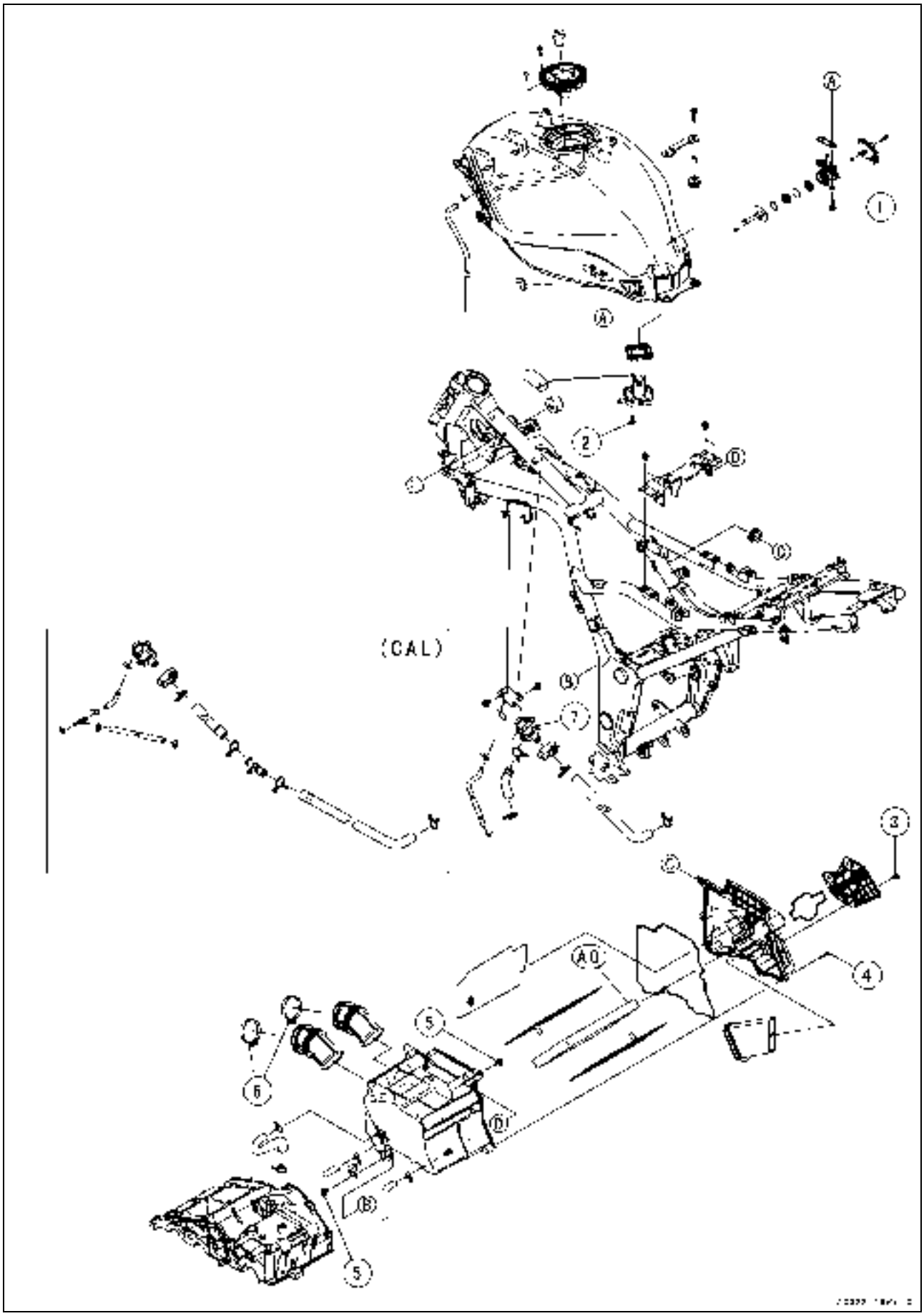


Exploded View

1. Throttle Cable (accelerator)
2. Throttle Cable (decelerator)
3. Choke Cable
4. Idle Adjusting Screw
5. Air Cut Valve
6. Jet Needle
7. Vacuum Valve
8. Float Valve
9. Needle Jet
10. Needle Jet Holder
11. Main Jet
12. Pilot Jet
13. Pilot Air Screw
14. Float
15. Plug

CL: Apply cable lubricant.
G: Apply grease.

Exploded View



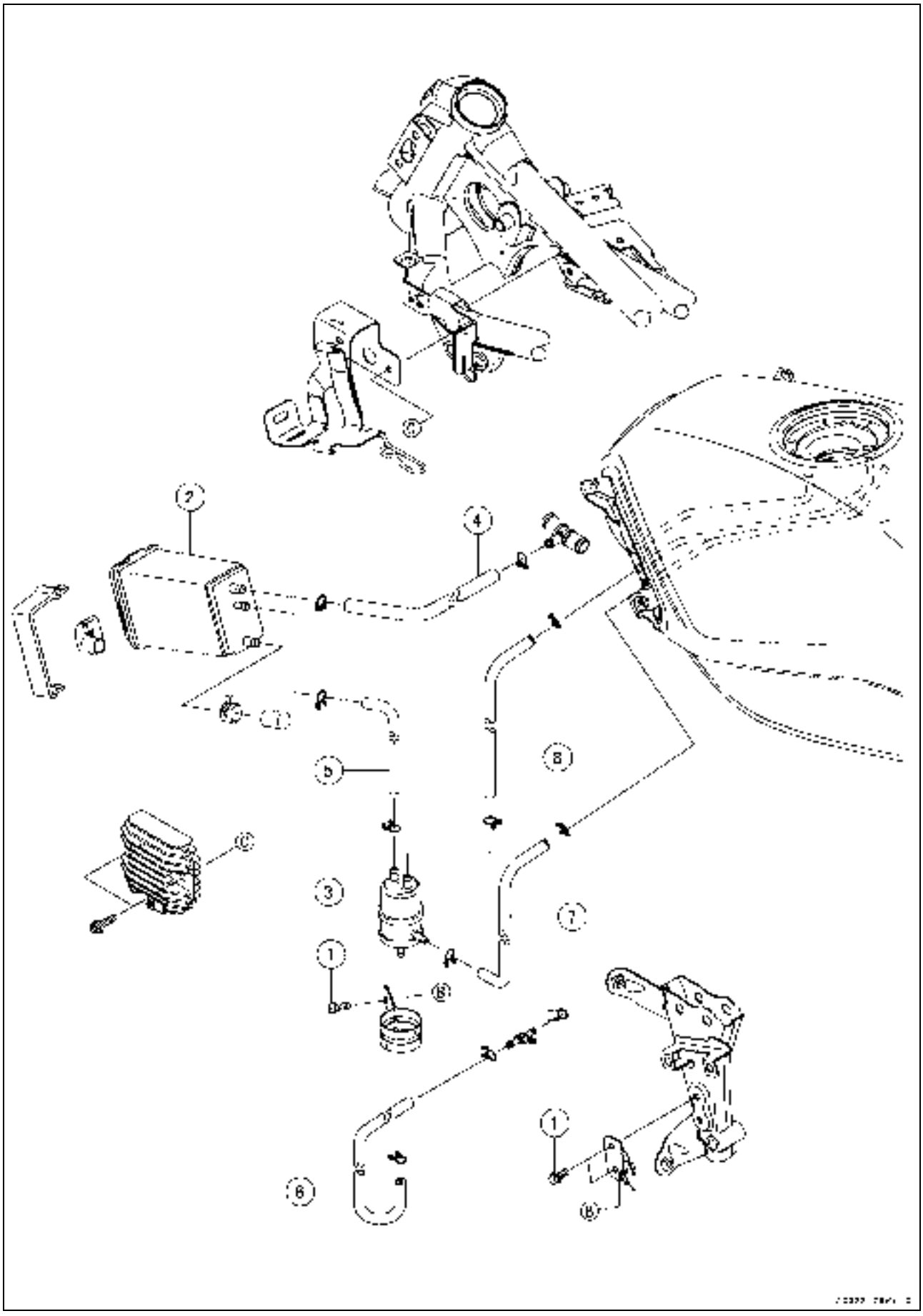
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Fuel Tap Mounting Bolts	2.5	0.25	22 in·lb	
2	Fuel Gauge Mounting Bolts	6.9	0.7	61 in·lb	
3	Air Cleaner Housing Cap Bolts	2.5	0.25	22 in·lb	
4	Air Cleaner Housing Screws	1.15	0.12	10 in·lb	
5	Air Cleaner Housing Mounting Bolts	9.8	1.0	87 in·lb	
6	Air Cleaner Housing Clamp Screws	2.0	0.2	18 in·lb	

7. Vacuum Switch Valve

AO: Apply motor oil (SE, SF or SG class SAE 10W-30).

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Separate Bracket Bolt	9.8	1.0	87 in·lb	

2. Canister
3. Separator
4. Green Hose
5. Blue Hose
6. White Hose
7. Red Hose

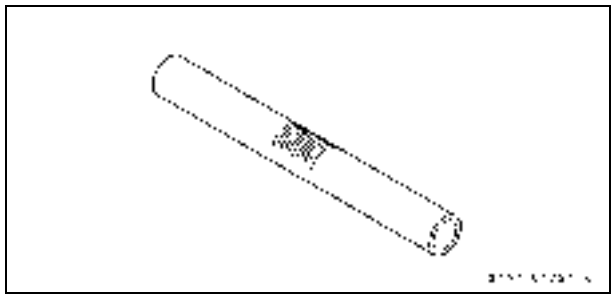
3-8 FUEL SYSTEM

Specifications

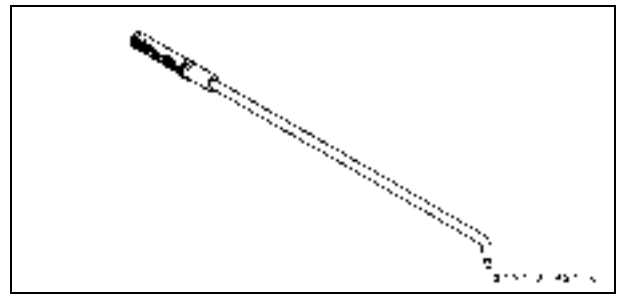
Item	Standard
Throttle Grip and Cable	
Throttle Grip Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Choke Cable Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Carburetor	
Make, Type	Keihin, CVK30
Main Jet	#98
Optional Main Jet	#92, 95, 100, 102
Main Air Jet	#100
Jet Needle	#L: N9VU, #R: N9VW
Needle Jet	#6
Pilot Jet	#38
Pilot Air Jet	#100
Starter Jet	#48
Pilot Screw (turns out)	#L: 2 1/2, #R: 1 3/4
Throttle Valve	11° 00’
Idle Speed	1 300 ±50 r/min (rpm)
Carburetor Synchronization Vacuum	Less than 2.7 kPa (2 cmHg) difference between two carburetors.
Service Fuel Level	0.5 ±1 mm (0.02 ±0.04 in.) above the mating surface of carburetor float bowl.
Float Height	17 ±2 mm (0.67 ±0.08 in.)
Air Cleaner Element	
Type	Polyurethane foam

Special Tools

Fuel Level Gauge:
57001-1017



Pilot Screw Adjuster, A:
57001-1239



Throttle Grip and Cables

Free Play Inspection

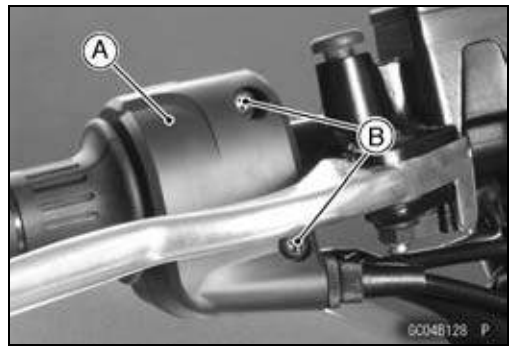
- Refer to Throttle Control System Inspection in the Periodic Maintenance chapter (see Throttle Control System Inspection in the Periodic Maintenance chapter).

Free Play Adjustment

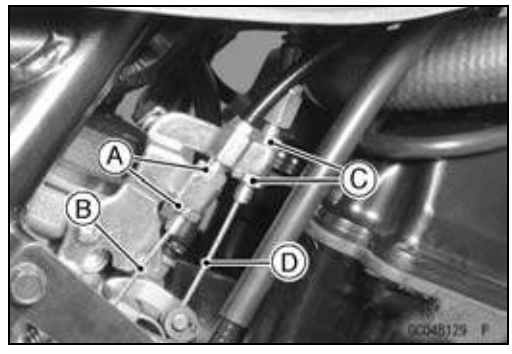
- Refer to Throttle Control System Inspection in the Periodic Maintenance chapter (see Throttle Control System Inspection in the Periodic Maintenance chapter).

Throttle Cable Removal

- Split the right handlebar switch housing [A] removing the screws [B], and remove the throttle cable upper ends from the throttle grip.
- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Side Cover (see Side Cover Removal in the Frame chapter)
  Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)



- Loosen the locknuts [A] and remove the lower end of the accelerator cable [B] from the pulley.
- Loosen the locknuts [C] and remove the lower end of the decelerator cable [D] from the pulley.
- Pull out the throttle cables upward



Throttle Cable Installation

- Install the throttle cables in accordance with the Cable, Wire and Hose Routing in the Appendix chapter.
- Install the accelerator cable first and then decelerator cable.
- After installation, adjust each cable properly (see Throttle Cable Inspection in the Periodic Maintenance chapter).

⚠ WARNING

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

Throttle Cable Lubrication

- Refer to Chassis Parts Lubrication Perform in the Periodic Maintenance chapter (see Chassis Parts Lubrication Perform in the Periodic Maintenance chapter).

Choke Cable

Free Play Inspection

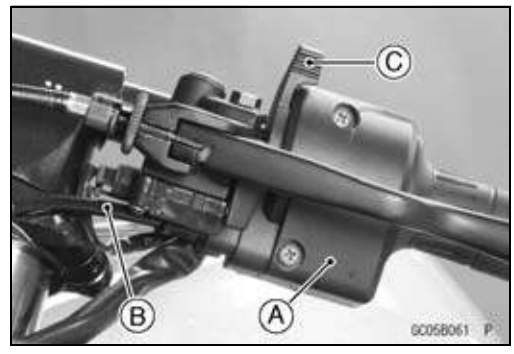
- Refer to Choke Operation Inspection in the Periodic Maintenance chapter (see Choke Operation in the Periodic Maintenance chapter).

Free Play Adjustment

- Refer to Choke Operation Inspection in the Periodic Maintenance chapter (see Choke Operation in the Periodic Maintenance chapter).

Choke Cable Removal

- Split the left handlebar switch housing [A], and remove the choke cable [B] upper end from the choke lever [C].
- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal)
- Remove the choke cable end from the cable bracket of carburetor.
- Pull out the choke cable upward.



Choke Cable Installation

- Install the choke cable in accordance with the Cable, Wire, and Hose Routing section in Appendix chapter.
- After installation, adjust the cable properly.

⚠ WARNING

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

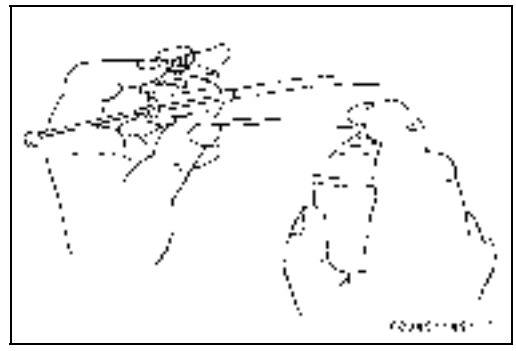
Choke Cable Lubrication and Inspection

- Whenever the cable is removed, or in accordance with the Periodic Maintenance Chart, lubricate the choke cable (see General Lubrication in the Appendix chapter).

○Apply a thin coating of grease to the cable lower end.

○Use a commercially available pressure cable lubricator to lubricate the cable.

○With the cable disconnected at both ends, the cable should move freely in the cable housing.



Carburetors

Idle Speed Inspection

● Refer to Idle Speed Inspection in the Periodic Maintenance chapter (see Idle Speed Inspection in the Periodic Maintenance chapter).

Idle Speed Adjustment

● Refer to Idle Speed Adjustment in the Periodic Maintenance chapter (see Idle Speed Adjustment in the Periodic Maintenance chapter).

Engine Vacuum Synchronization Inspection

● Refer to Engine Vacuum Synchronization Inspection in the Periodic Maintenance chapter (see Engine Vacuum Synchronization Inspection in the Periodic Maintenance chapter).

Engine Vacuum Synchronization Adjustment

● Refer to Engine Vacuum Synchronization Inspection in the Periodic Maintenance chapter (see Engine Vacuum Synchronization Inspection in the Periodic Maintenance chapter).

Pilot Screw Adjustment

★If the engine idle is still not stable, adjust the pilot screw to obtain the proper idle speed using the pilot screw adjuster [A].

Special Tool - Pilot Screw Adjuster: 57001-1239



○Turn in the pilot screw fully but not tightly, and then back it out the specified turns. To set the screw to its original position.

Pilot Screw Setting:

#L: 2 1/2

#R: 1 3/4

NOTE

○*The standard number of turns the pilot screw must be backed out varies by carburetor. The values given in the specifications should be used only when the number of the original back out turns is unavailable.*

Carburetors

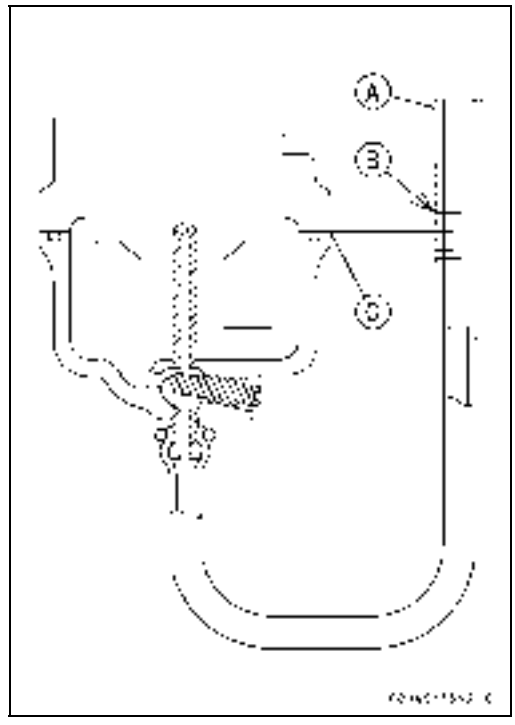
Service Fuel Level Inspection

⚠ 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.

- Situate the motorcycle so that it is perpendicular to the ground.
- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal)
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetor.
- Prepare a fuel hose.
- 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 mating surface [C] of the carburetor float bowl.
- Feed fuel to the carburetor, then turn the carburetor drain plug out a few turns.
- Wait until the fuel level in the gauge settles.

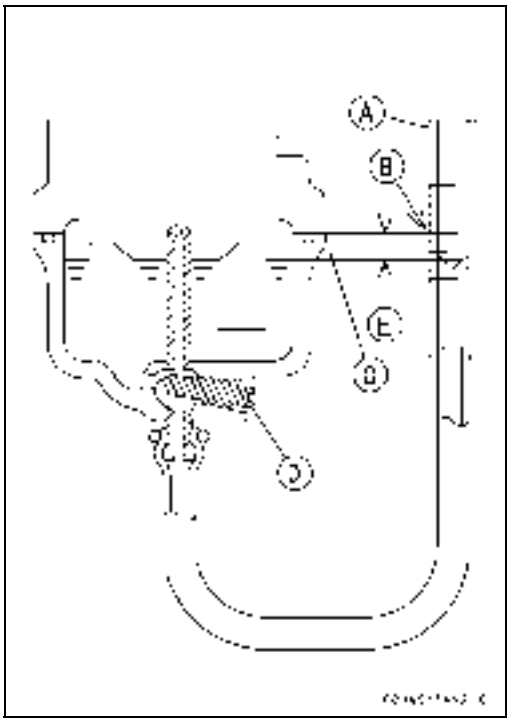


Carburetors

● Keeping the gauge vertical, align the “middle” line with the mating surface.

NOTE

○*Do not lower the “middle” line below the mating surface of the carburetor float bowl. 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.
● Screw in the carburetor drain plug [D].
● Stop feeding and remove the fuel level gauge.
★If the fuel level is incorrect, adjust it (see Service Fuel Level Adjustment).

Service Fuel Level (above the mating surface of carburetor float bowl)
Standard: 0.5 mm ±1 mm (0.02 ±0.04 in.)

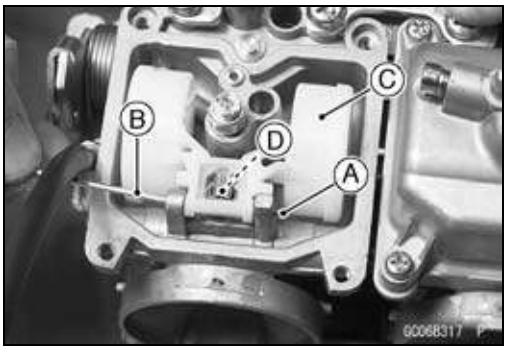
Service Fuel Level Adjustment

⚠ 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 carburetor, and drain the fuel into a suitable container.
● Remove the fittings with water hose.
● Remove the float bowl.

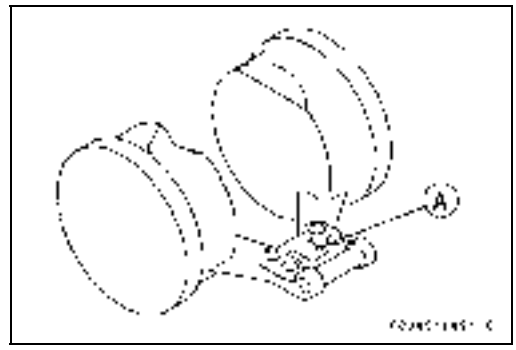
● Slide out the pivot pin [A] with a suitable tool [B], and remove the float [C] and float valve needle [D].



Carburetors

● Bend the tang [A] on the float arm very slightly to change the float height. Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.

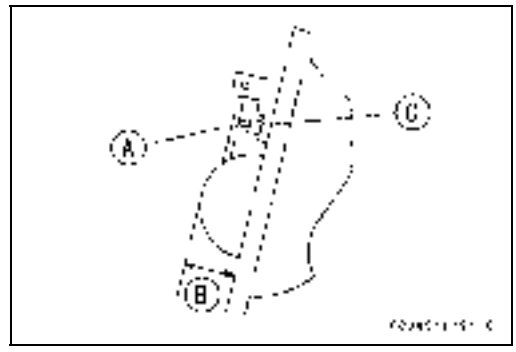
Float height
Standard: 17 ±2 mm (0.67 ±0.08 in.)



NOTE

○*Do not push the needle rod [A] in during the float height measurement [B].*

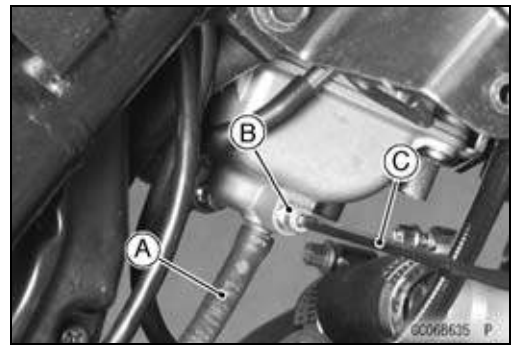
● Assemble the carburetor, and recheck the fuel level.
★If the fuel level cannot be adjusted by this method, the float or the float valve [C] is damaged.



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.



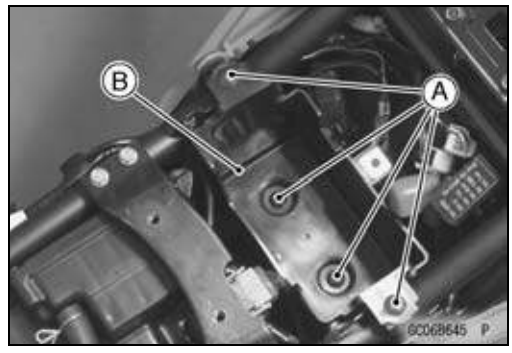
● Remove:
Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)
● Connect a suitable hose [A] to the fitting at the bottom of each carburetor float bowl.
● Run the lower end of the carburetor drain hose into a suitable container.
● Turn out each drain plug [B] a few turns and drain the float bowls with a hexagon wrench [C].
● Check to see if water or dirt comes out.
● Tighten the drain plug.
★If any water or dirt appears during the above inspection, clean the fuel system (see Carburetor Cleaning and Fuel Tank Cleaning).

Carburetors

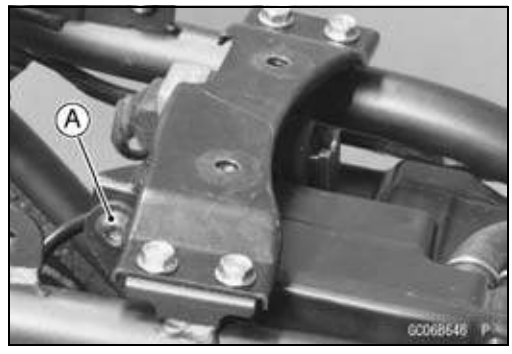
Carburetor Removal

⚠ WARNING

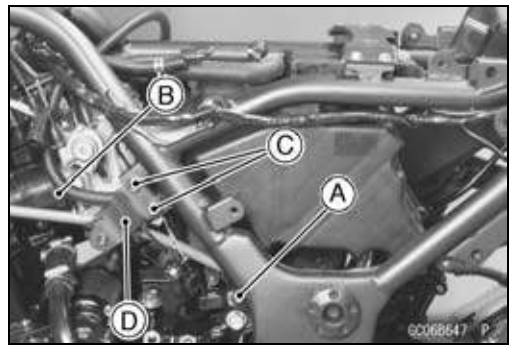
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.



- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal)
  Lower Fairings (see Lower Fairing Removal in the Frame chapter)
  Battery (see Battery Removal in the Electrical System chapter)
  Battery Damper
  Battery Case Screws [A]
  Battery Case [B]



- Remove the air cleaner housing mounting bolts [A].
- Loosen the carburetor holder clamps [B] off the air cleaner ducts.
- Pull the air cleaner housing rearward.
- Remove the throttle cable and choke cable (see Throttle Cable and Choke Cable Removal)
- Remove:
  Bolts [C]
  Bracket [D]
  Carburetor [E]
- Stuff the pieces of lint-free, clean cloths into the carburetor holder and the air cleaner duct to keep dirt out of the engine and air cleaner.

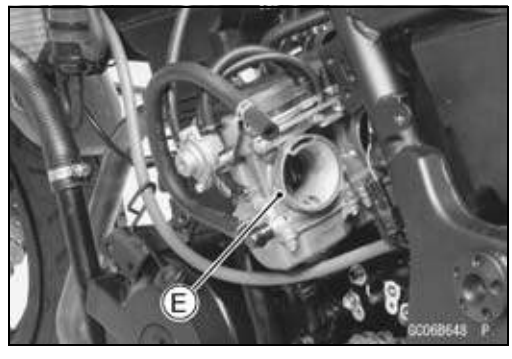


⚠ WARNING

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.



Carburetors

Carburetor Installation

- Route the cables, harness, and hoses correctly (see Cable, Wire and Hose Routing section in the Appendix chapter).
- Tighten the clamps for the carburetor holders and slide back the spring bands for the air cleaner housing securely.
- Check fuel leakage from the carburetor.

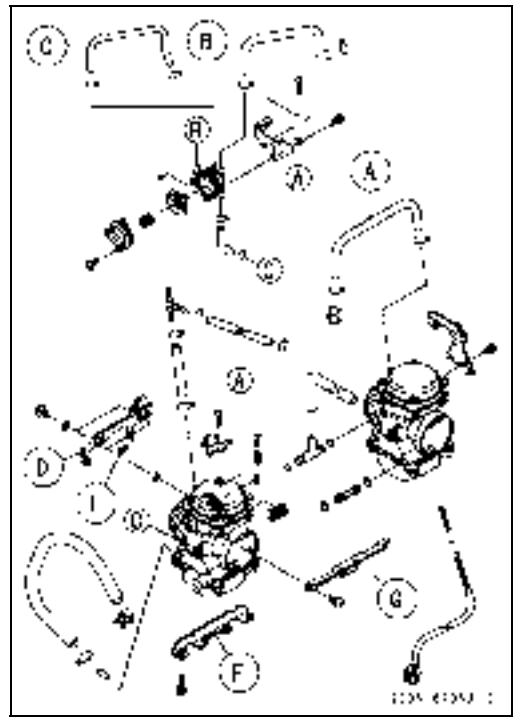
⚠ WARNING

Fuel spilled from the carburetor is hazardous.

- Adjust the following items if necessary.
  Idle Speed (see Idle Speed Adjustment in the Periodic Maintenance chapter)
  Carburetor Synchronization (see Carburetor Synchronization Adjustment in the Periodic Maintenance chapter)
  Throttle Cable (see Throttle Control System Inspection in the Periodic Maintenance chapter)
  Choke Cable

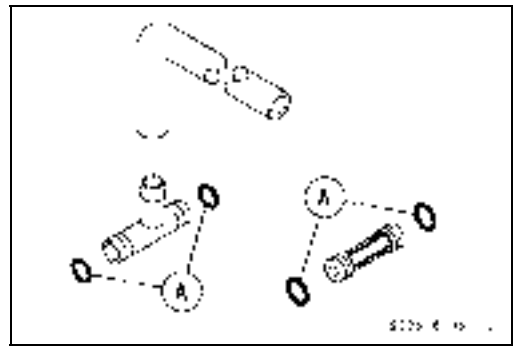
Carburetor Separation

- Remove the carburetor (see Carburetor Removal).
- Pull out the air cut valve hoses [A], [B], [C] of the air cut valve.
- Remove the choke plunger lever [D], spring [E] and carburetor mounting plates [F], [G].
- Gently, separately the carburetors each other.



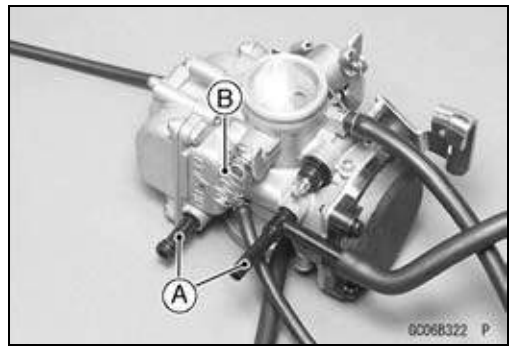
Carburetor Joining

- When installing the carburetor, check to see that the O -rings [A] are in place.

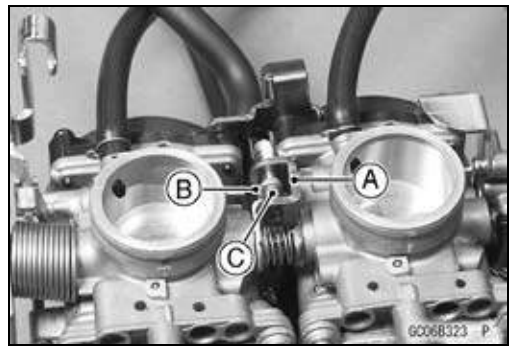


Carburetors

● Install the fitting [A] and spring [B] as shown.



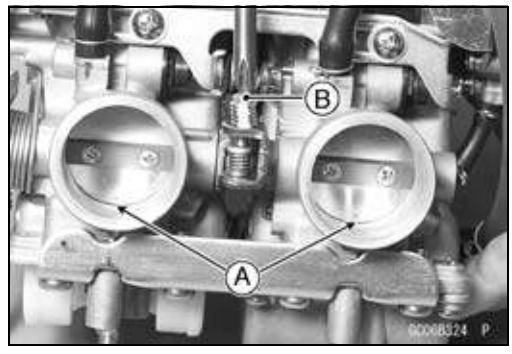
● Install the connecting plates [A] [B] and spring [C] as shown.



● The center lines of the carburetor bores must be parallel both horizontally and vertically. If they are not, loosen the mounting screws and align the carburetors on a flat surface. Retighten the mounting screws.
● After installing the choke mechanism, check to see that the choke plunger lever slides right to left smoothly without abnormal friction.

CAUTION
Fuel mixture trouble could result if the choke plunger does not 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 two carburetors, turn the balance adjusting screw [B] to obtain the same clearance.
● Install the carburetors (see Carburetor Installation).
● Adjust the synchronization (see Carburetor Synchronization Adjustment in the Periodic Maintenance Chapter).



Carburetors

Carburetor Disassembly

- Remove the carburetors (see Carburetor Removal).

⚠ WARNING

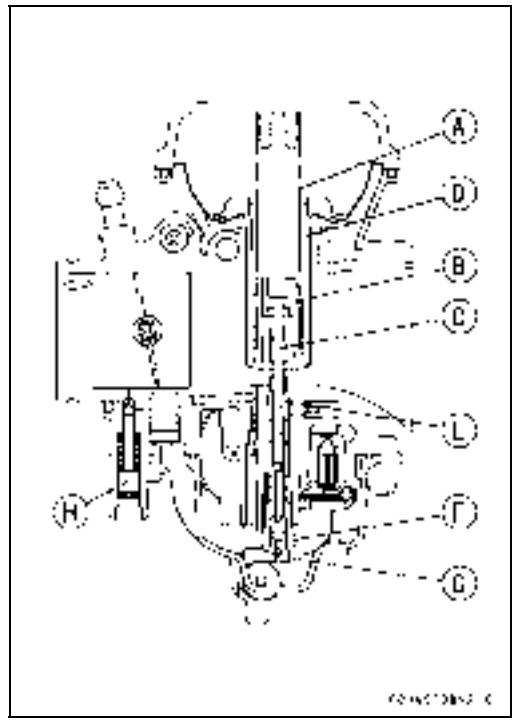
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- For the Canada model, remove the pilot screw plug as follows: punch a hole in the plug and pry there with an awl or other suitable tool.
- Turn in the pilot screw and count the number of turns until it seats fully but not tightly, and then remove the screw. This is to set the screw to its original position when assembling.

CAUTION

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

- Remove:
  Spring [A]
  Spring Seat [B]
  Jet Needle [C]
  Vacuum Piston [D]
  Needle Jet [E]
  Needle Jet Holder [F] and Main Jet [G]
  Pilot Screw [H]

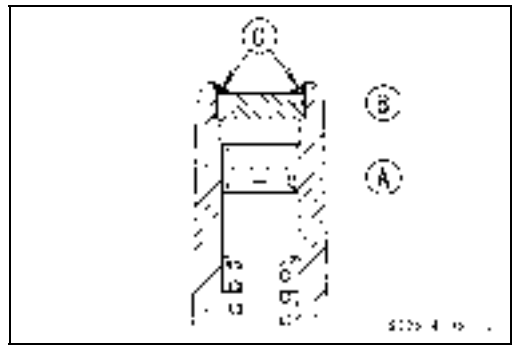


Carburetor Assembly

- Turn in the pilot screw [A] fully but not tightly, and then back it out the same number of turns counted during disassembly.
- Install the pilot screw plug as follows: install a new plug [B] in the pilot screw hole of the carburetor body, and apply a small amount of a bonding agent [C] to the circumference of the plug to fix the plug.

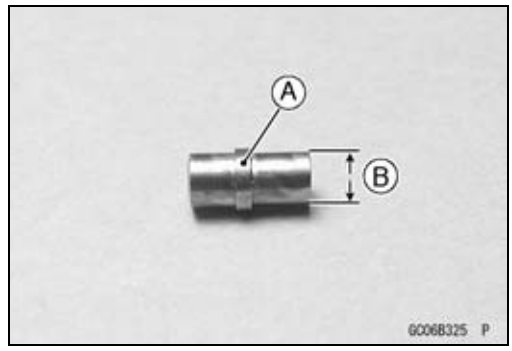
CAUTION

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

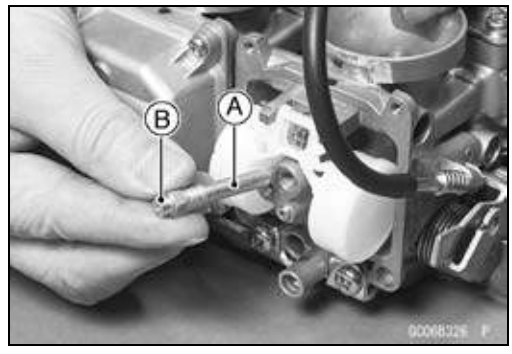


Carburetors

- To install the needle jet [A], turn the carburetor body up -side down, and drop the needle jet into place so that the smaller diameter end [B] of the jet goes in first.



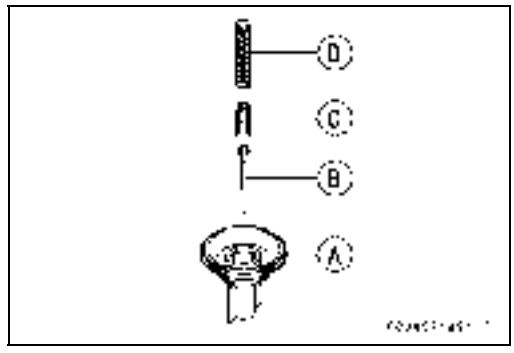
- Carefully screw in the needle jet holder [A]. It will seat against the needle jet, pushing the end of the jet into the carburetor bore.
  Main Jet [B]



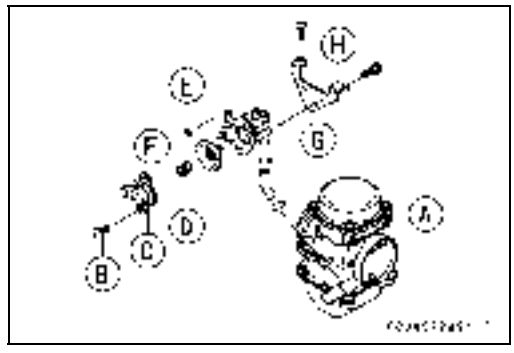
CAUTION

Do not apply force to the jet or overtighten it, as this could damage the jet or the carburetor body, requiring replacement.

- Install the float bowl.
- Slip the jet needle [B] through the hole in the center of the vacuum piston, and put the spring seat [C] on the top of the needle. Turn the seat so that it does not block the hole at the bottom of the vacuum piston [A].
  Spring [D]
- Install the carburetor top cover.
- Turn in the pilot screw fully but not tightly, and then back it out the same number of turns counted during disassembly.



- When removing the air cut valve assembly, unscrew the mounting screws [B] and remove the cover [C], spring [D], O-ring [E] and diaphragm [F].
- Install:
  Left Carburetor [A]
  Air Cut Valve Body [G]
  Air Cut Valve Mounting Plate [H]



Carburetor Cleaning

⚠ WARNING

Clean the carburetor 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 carburetor.

Carburetors

CAUTION

Do not use compressed air on an assembled carburetor, or the floats may be crushed by the pressure, and the vacuum piston diaphragm may be damaged. Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor with a cleaning solution. 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 Carburetor Disassembly).
- Immerse all the metal parts in a carburetor cleaning solution.
- Rinse the parts in water.
- When the parts are clean, dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Assemble the carburetor (see Carburetor Assembly).

Carburetor Inspection

⚠ WARNING

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

- Remove the carburetors (see Carburetor Removal).
- Before disassembling the carburetors, check the fuel level (see Fuel Level Inspection).

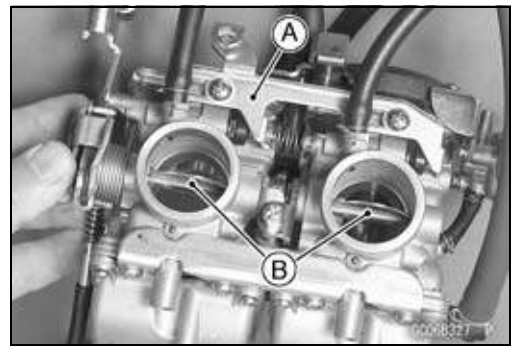
★If the fuel level is incorrect, inspect the rest of the carburetor before correcting it.

- Slide the choke plunger lever [A] right to the left to check that the choke plungers move smoothly.

★If the choke plungers do not work properly, replace the carburetors.

- Turn the throttle cable pulley to check that the throttle butterfly valves [B] move smoothly and return by spring tension.

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



Carburetors

- Disassemble the carburetors (see Carburetor Disassembly).
- Clean the carburetors (see Carburetor Cleaning).
- Check that the O-rings on the float bowl and pilot screw and the diaphragm on the vacuum piston are in good condition.

★If any of the O-rings or diaphragms are not in good condition, replace them.

- Check the O-ring and diaphragm of coasting enricher system.

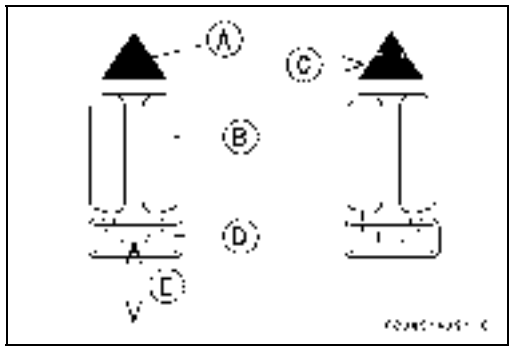
★If any of the O-ring or diaphragm are not in good condition, replace them.

- 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.

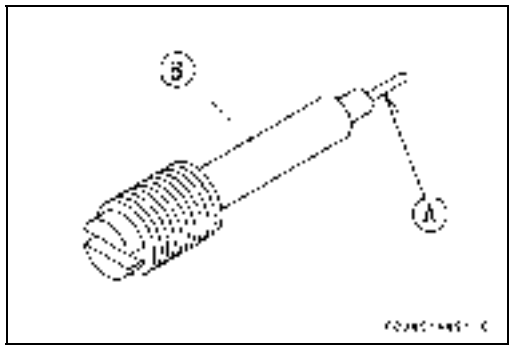
- Push the rod [D] in the other end of the float valve needle, and then release it [E].

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



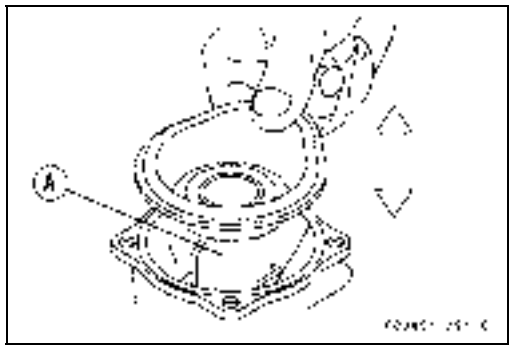
- Check the tapered portion [A] of the pilot screw [B] for wear or damage.

★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 vacuum piston [A] 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 carburetor.



Air Cleaner

Air Cleaner Element Removal

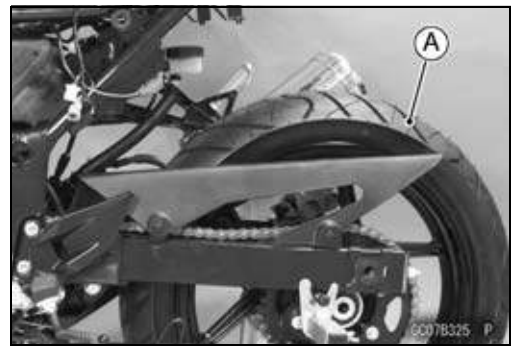
- Refer to Air Cleaner Cleaning in the Periodic Maintenance chapter (see Air Cleaner Cleaning in the Periodic Maintenance chapter).

Air Cleaner Element Installation

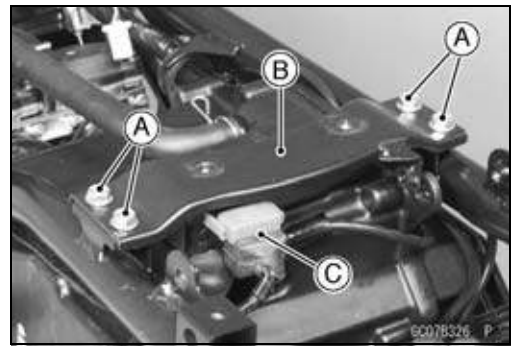
- Refer to Air Cleaner Cleaning in the Periodic Maintenance chapter (see Air Cleaner Cleaning in the Periodic Maintenance chapter).

Air Cleaner Housing Removal

- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Rear Seat (see Rear Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal)
  Rear Fender (see Rear Fender Removal in the Frame chapter)
- Pull out the rear axle and place the rear wheel [A] on the ground.



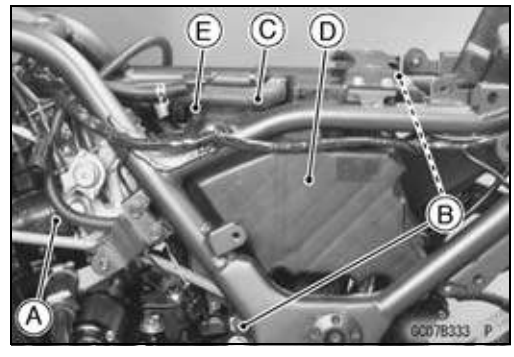
- Take out the bolts [A] and remove the fuel tank bracket [B].
- Pull out the starter relay [C].



- Remove the rear brake reservoir bolt [A] and disconnect the clamp [B], and free the rear brake reservoir and main harness from the frame.
- Remove the air cleaner cap [C].



- Remove:
  Carburetor Holder Clamps [A] (Loosen)
  Air Cleaner Housing Mounting Bolts [B]
  Air Suction Valve Hose [C]
- Remove the air cleaner housing [D], pulling out the duct portion [E] from the grommet.



Air Cleaner

● Cover the carburetors intakes with a clean, lint-free towel to keep dirt or other foreign material from entering.

⚠ WARNING

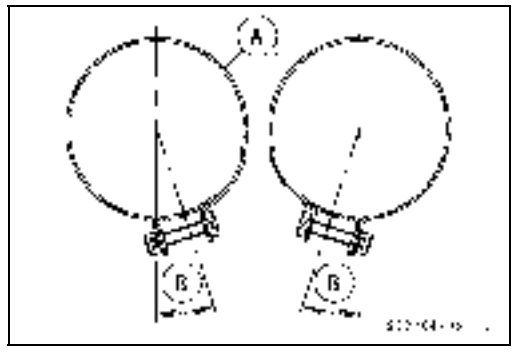
If dirt or dust is allowed to pass through into the carburetors, the butterfly valves may become stuck, possibly causing an accident.

CAUTION

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

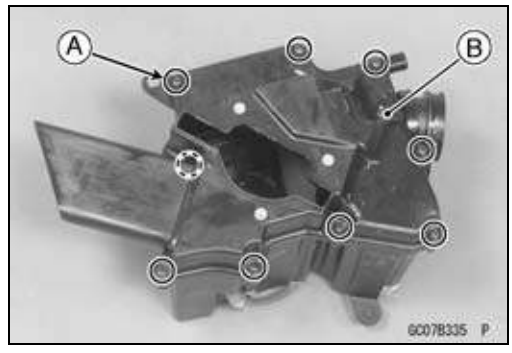
Air Cleaner Housing Installation

● Install the air cleaner housing clamps [A] as shown.
Approx. 18° [B]



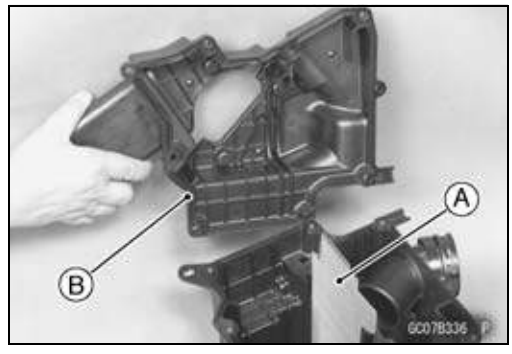
Air Cleaner Housing Disassembly

● Remove:
Air Cleaner Housing (see Air Cleaner Housing Removal)
Air Cleaner Element (see Air Element Removal in the Periodic Maintenance chapter)
Screw [A]
Right Cover [B]
Flame Arrester



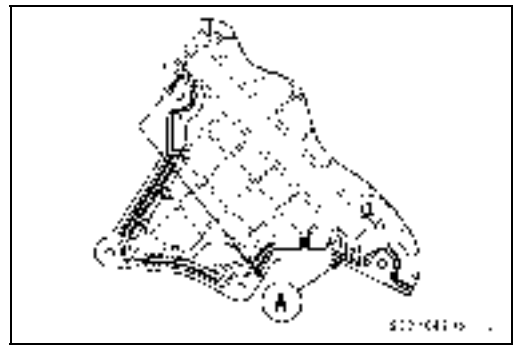
Air Cleaner Housing Assembly

● Install the flame arrester [A].
● Be sure the O-ring [B] is in position.



Air Cleaner

- Apply a bonding agent to the slash portion [A] of the air cleaner housing.



Oil Draining

- Remove the drain cap [A] at the lower end of the air cleaner housing and drain water or oil accumulates in the air cleaner housing.
- Be sure to install the cap firmly, or the air is drawn in through it.



⚠ WARNING

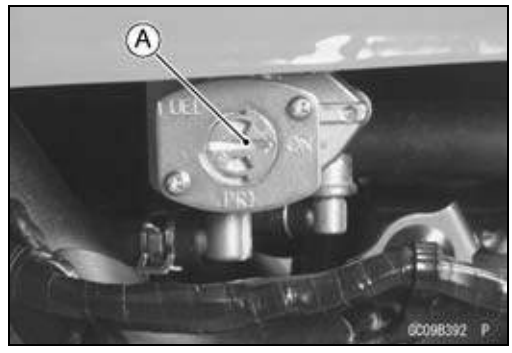
Be sure to install the cap in the air cleaner housing after draining. Oil on tires make them slippery and can cause an accident and injury.

Fuel Tank

Fuel Tank Removal

⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light. Do not smoke. Turn the ignition switch OFF. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately.



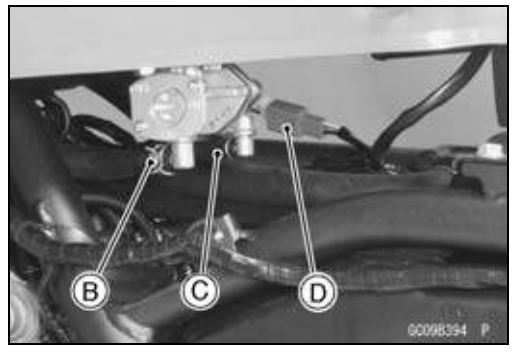
- Remove the side covers (see Side Covers Removal in the Frame chapter).
- Turn the fuel tap position to the ON [A] position.



- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Lower Fairings (see Lower Fairing Removal in the Frame chapter)
  Fuel Tank Mounting Bolts [A]
  Fuel Hose [B]
  Vacuum Hose [C]
  Fuel Level Sensor Connector [D]
  Fuel Tank
- Drain the fuel tank if necessary.

○Arrange a suitable container under the fuel tap.

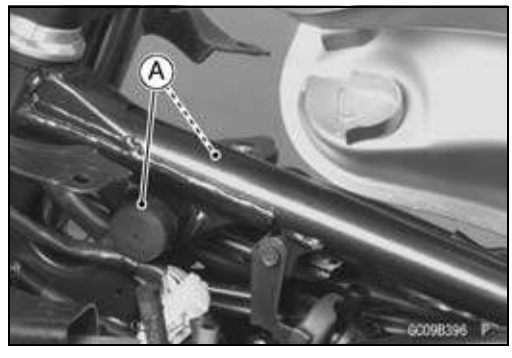
○Turn the fuel tap position to the PRI position to drain the fuel into the container.



Fuel Tank Installation

- Read the above WARNING mentioned in Fuel Tank Removal.
- Route the hose correctly.
- Be sure the hoses are clamped securely to prevent fuel leaks.
- Be sure the rubber dampers [A] are in position.

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

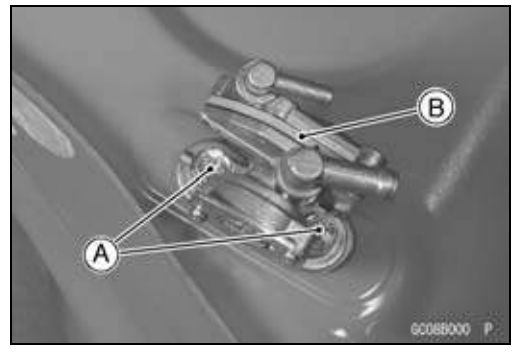


Fuel Tank

Fuel Tap Removal

⚠ WARNING

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



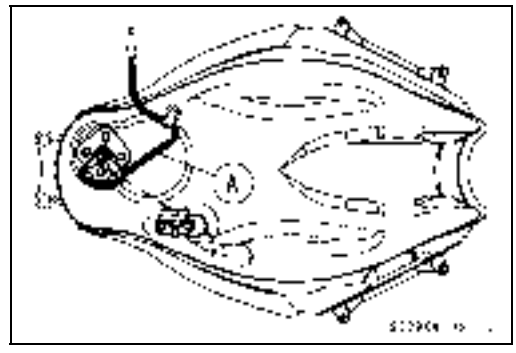
- Remove the fuel tank (see Fuel Tank Removal).
- Drain the fuel into a suitable container.
- Remove the bolts [A] and take out the fuel tap [B].

Fuel Tap Installation

- Fuel tap installation is the reverse of removal. Note the following.

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

- Be sure to clamp the fuel hose to the tap to prevent leaks.
- Be sure the fuel level sensor leads [A] are routed as shown.



Fuel Tank and Tap Cleaning

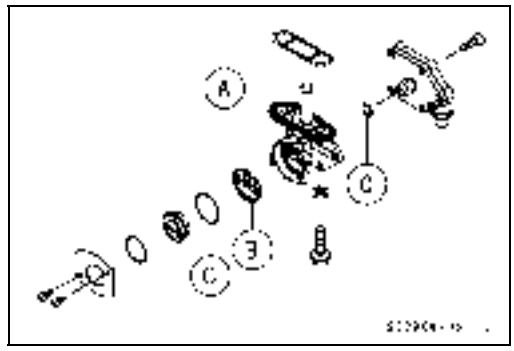
⚠ WARNING

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 high flash-point solvent.
- Pour the solvent out of the tank.
- Remove the fuel tap from the tank by taking out the bolts.
- Clean the fuel tap in a high flash-point solvent.
- Pour high flash-point solvent through the tap in ON and PRI positions.
- Dry the tank and tap with compressed air.
- Install the tap in the tank.
- Install the fuel tank (see Fuel Tank Installation).

Fuel Tank

Fuel Tap Inspection

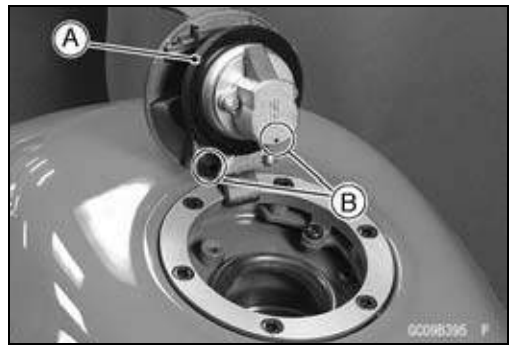


- Remove the fuel tap (see Fuel Tap Removal).
- Check the fuel tap filter screen [A] for any breaks or deterioration.

★If the fuel tap 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 ON or PRI without engine running, replace the damaged gasket [B] or O-rings [C].

Fuel Tank and Cap Inspection



- Open the tank cap.
- Visually inspect the gaskets [A] on the tank cap for any damage.

★Replace the gaskets if they are damaged.

- Remove the drain pipes and check to see if the pipes in the tank do not clogged up. Check the tank cap breather also.

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

CAUTION

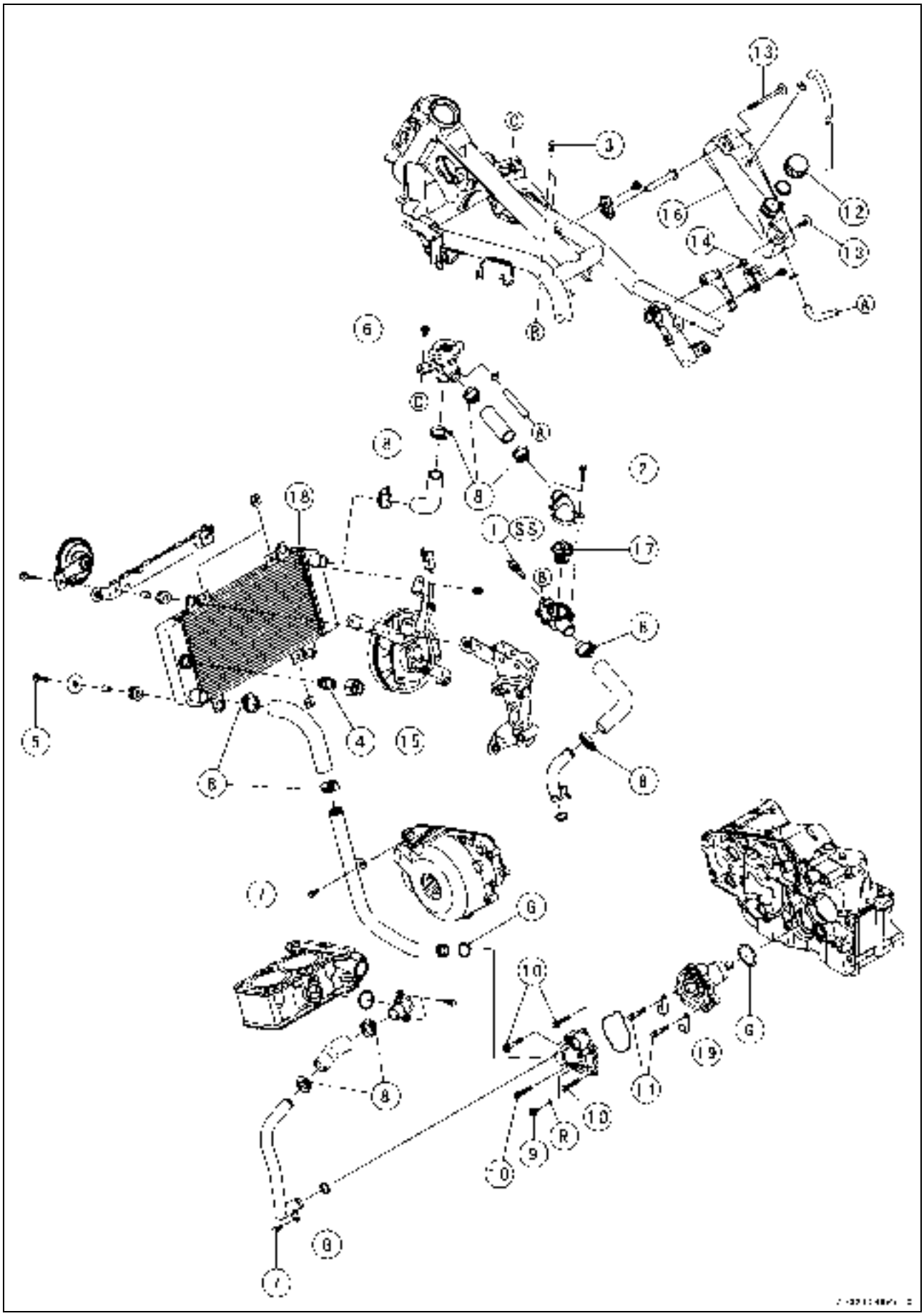
Do not apply compressed air to the air vent holes [B] in the tank cap. This could cause damage and clogging of the labyrinth in the cap.

Cooling System

Table of Contents

Exploded View 4-2
Specifications 4-4
Sealant 4-5
Coolant Flow Chart 4-6
Coolant 4-8
Coolant Deterioration Inspection 4-8
Coolant Level Inspection 4-8
Coolant Draining 4-8
Coolant Filling 4-8
Pressure Testing 4-8
Cooling System Flushing 4-9
Water Pump 4-10
Pump Cover Removal 4-10
Pump Cover Installation 4-10
Water Pump Removal 4-10
Water Pump Installation 4-10
Pump Impeller Inspection 4-11
Radiator, Radiator Fan 4-12
Radiator and Radiator Fan Removal 4-12
Radiator Inspection 4-13
Radiator Cleaning 4-13
Radiator Cap Inspection 4-13
Radiator Filler Neck Inspection 4-14
Thermostat 4-15
Thermostat Removal 4-15
Thermostat Installation 4-15
Thermostat Housing Removal 4-15
Thermostat Housing Installation Note 4-15
Thermostat Inspection 4-16
Hoses and Pipes 4-17
Hose Installation 4-17
Hose Inspection 4-17
Radiator Fan Switch, Water Temperature Switch 4-18
Radiator Fan Switch, Water Temperature Switch Removal 4-18
Radiator Fan Switch, Water Temperature Switch Installation 4-18
Radiator Fan Switch, Water Temperature Switch Inspection 4-18

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Water Temperature Switch	7.5	0.76	66 in·lb	SS
2	Thermostat Cover Bolts	9.8	1.0	87 in·lb	
3	Thermostat Housing Mounting Bolts	9.8	1.0	87 in·lb	
4	Radiator Fan Switch	23.5	2.4	17	
5	Radiator Bolts	9.8	1.0	87 in·lb	
6	Radiator Cap Bracket Bolt	9.8	1.0	87 in·lb	
7	Water Pipe Bolts	9.8	1.0	87 in·lb	
8	Water Hose Clamp Screws	1.5	0.15	13 in·lb	
9	Drain Bolt	9.8	1.0	87 in·lb	
10	Water Pump Cover Bolts	9.8	1.0	87 in·lb	
11	Water Pump Bolts	9.8	1.0	87 in·lb	
12	Reserve Tank Cap	–	–	–	Hand-Tighten
13	Reserve Tank Bolts	9.8	1.0	87 in·lb	
14	Reserve Tank Bracket Bolt	9.8	1.0	87 in·lb	

15. Radiator Fan
16. Reserve Tank
17. Thermostat
18. Radiator
19. Water Pump

G: Apply grease.
R: Replacement Part
SS: Apply silicone sealant to the threads.

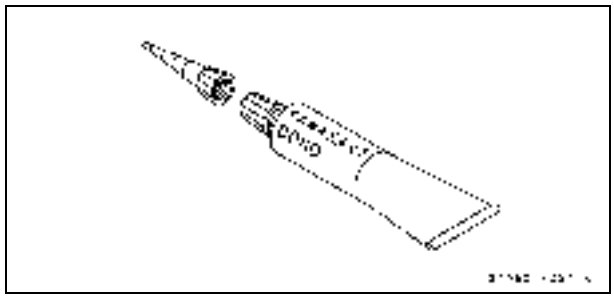
4-4 COOLING SYSTEM

Specifications

Item	Standard
Coolant	
Type	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)
Mixed Ratio	Soft water 50%, coolant 50%
Freezing Point	−35°C (−31°F)
Total Capacity	1.5 L (1.59 US qt)
Radiator	
Radiator Cap Relief Pressure	93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi)
Thermostat	
Valve Opening Temperature	63.5 ~ 66.5°C (146 ~ 152°F)
Valve Full Opening Lift	More than 6 mm (0.24 in.) @80°C (176°F)

Sealant

Kawasaki Bond (Silicone Sealant):
56019-120



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 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 63.5 ~ 66.5°C (146 ~ 152°F), 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 63.5 ~ 66.5°C (146 ~ 152°F), the thermostat opens and the coolant flows.

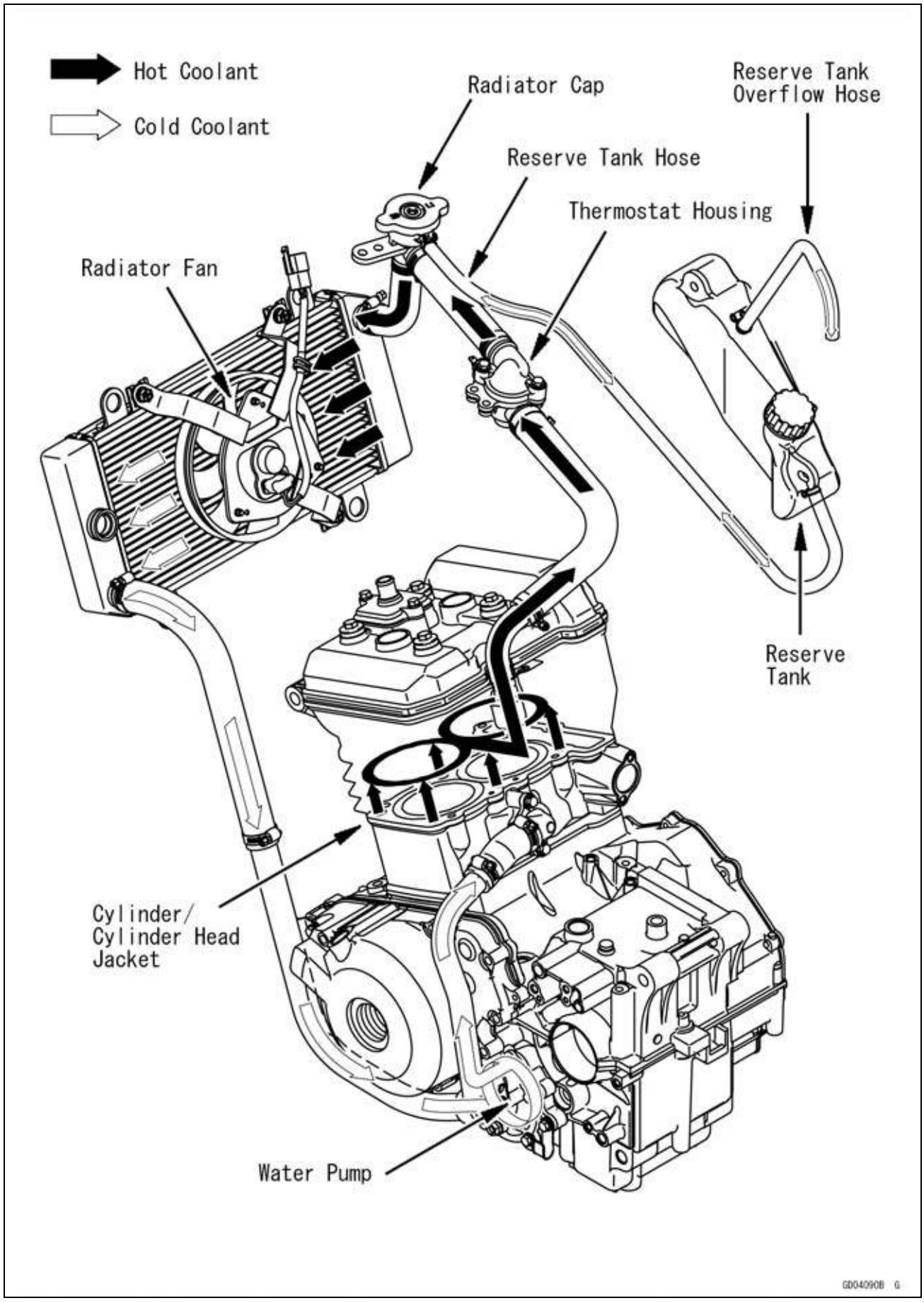
When the coolant temperature goes up beyond 96 ~ 100°C (205 ~ 212°F), the radiator fan switch conducts to operate the radiator fan. The radiator fan draws air through the radiator core when there is not sufficient air flow such as at low speeds. This increases up the cooling action of the radiator. When the temperature is below 91°C (196°F), 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 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi) 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 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi). 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



Coolant

Coolant Deterioration Inspection

- Remove the right lower fairing (see Lower Fairing Removal in the Frame chapter).
- Visually inspect the coolant in the reserve tank.

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

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

Coolant Level Inspection

- Refer to Coolant Level Inspection in the Periodic Maintenance chapter (see Coolant Level Inspection in the Periodic Maintenance chapter).

Coolant Draining

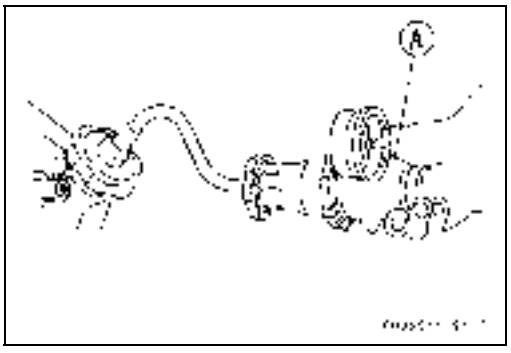
- Refer to Coolant Change in the Periodic Maintenance chapter (see Coolant Change in the Periodic Maintenance chapter).

Coolant Filling

- Refer to Coolant Change in the Periodic Maintenance chapter (see Coolant Change in the Periodic Maintenance chapter).

Pressure Testing

- Remove:
  Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)
- Remove the radiator cap, and install a cooling system pressure tester [A] on the filler neck.



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 kgf/cm², 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 kgf/cm², 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 and the water pump.

- Remove the pressure tester, replenish the coolant, and install the radiator cap.

Coolant

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 considerable reduce the efficiency of the cooling system.

- Drain the cooling system (see Coolant Change in the Periodic Maintenance chapter).
- Fill the cooling system with fresh water mixed with a flushing compound.

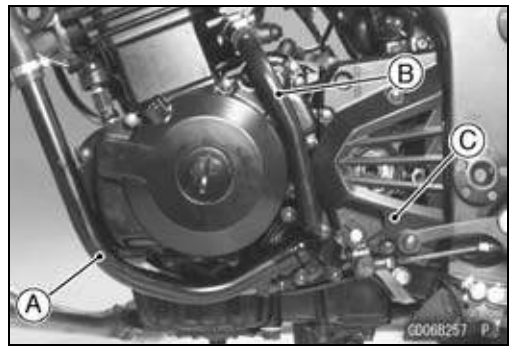
CAUTION
Do not use a flushing compound which is harmful to the aluminum engine and radiator. Carefully follow the instructions supplied by the manufacturer of the cleaning product.

- 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 Change in the Periodic Maintenance chapter).

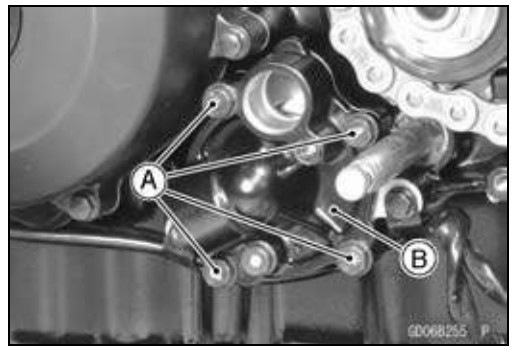
Water Pump

Pump Cover Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)
  Coolant Pipes [A], [B]
  Engine Sprocket Cover [C] (see Engine Sprocket Removal in the Final chapter)



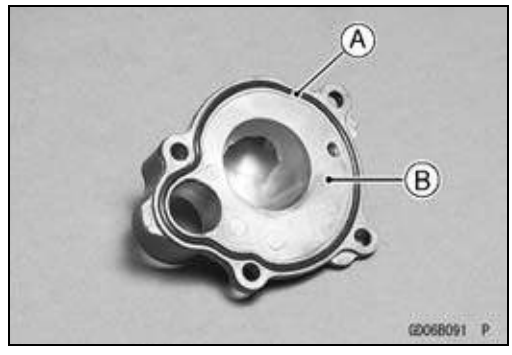
- Remove the water pump mounting bolts [A] and water pump cover [B].



Pump Cover Installation

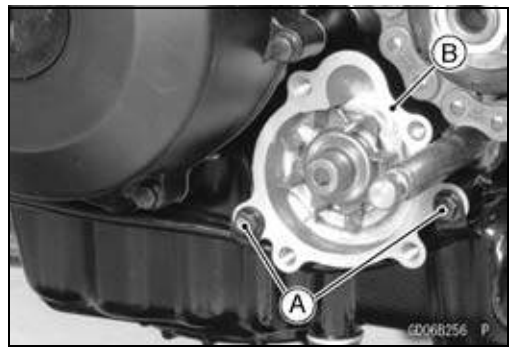
- Fit the O-ring [A] into the groove of the pump cover [B].
- Install the removed parts

Torque - Water Hose Clamp Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)



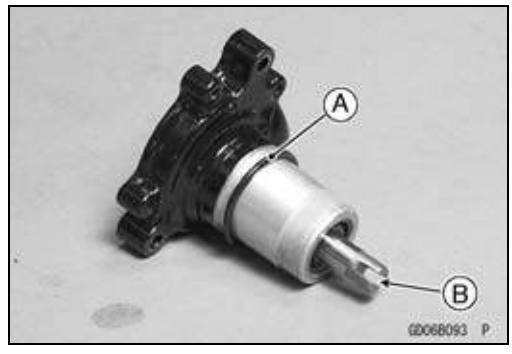
Water Pump Removal

- Remove:
  Pump Cover (see Pump Cover Removal)
- Remove the water pump mounting bolts [A], and remove the water pump [B].



Water Pump Installation

- Check the O-ring [A] visually whether or not there is a damage on it.
- Grease the O-ring.
- Install the water pump aligning the slit [B] of water pump shaft with the oil pump shaft.

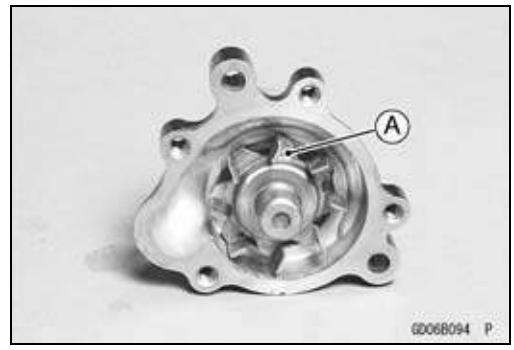


Water Pump

Pump Impeller Inspection

● Visually check the impeller [A].

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



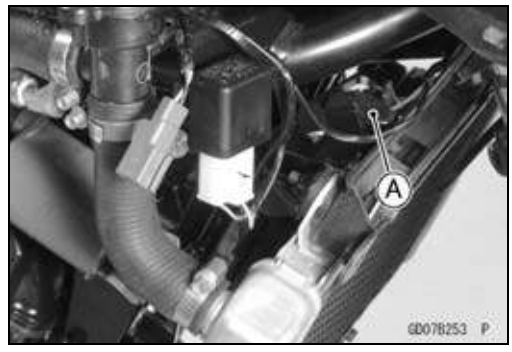
Radiator, Radiator Fan

Radiator and Radiator Fan Removal

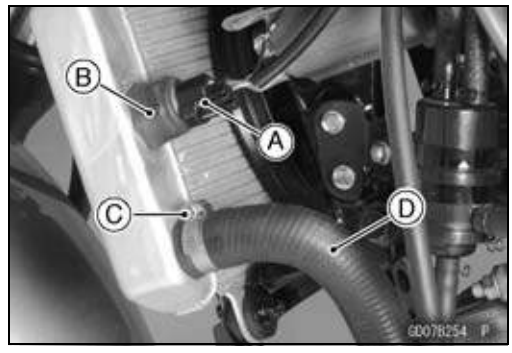
⚠ WARNING

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.

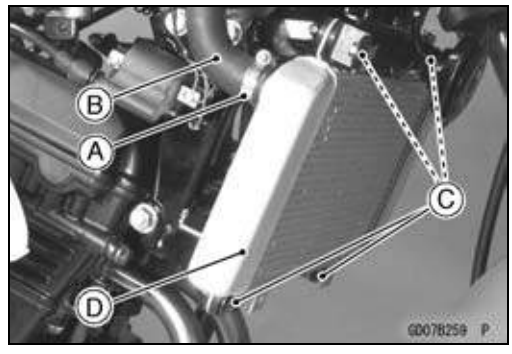
- Remove the lower fairings (see Lower Fairing Removal in the Frame chapter).
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Disconnect the fan motor lead connector [A] before removal of the radiator or radiator fan.



- Disconnect the fan switch lead connector [A].
  Fan Switch [B]
- Loosen the hose clamp [C] and pull off the water hose [D].



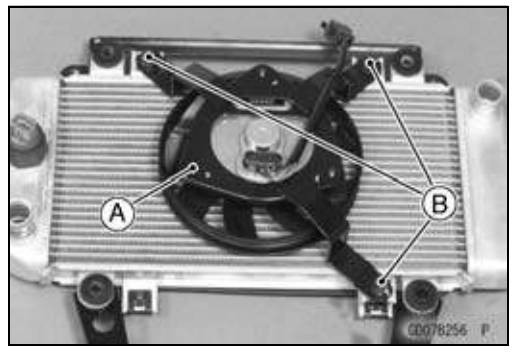
- Loosen the hose clamp [A] and pull off the water hose [B].
- Remove the radiator bolts [C] and take the radiator [D] off the frame.



- Separate the filler and water hose from the radiator.
- Separate the radiator fan [A] from the radiator.
  Radiator Fan Screws [B]

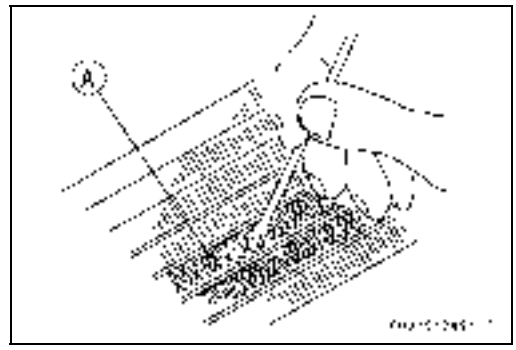
CAUTION

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



Radiator, Radiator Fan

Radiator Inspection



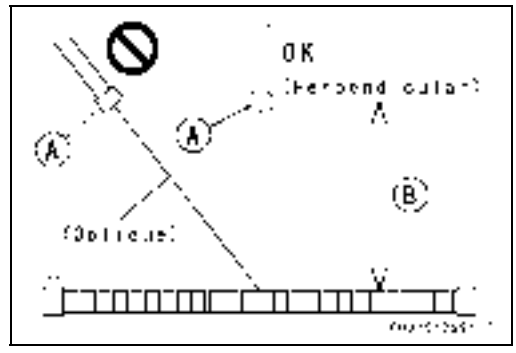
- Check the radiator core.

★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.

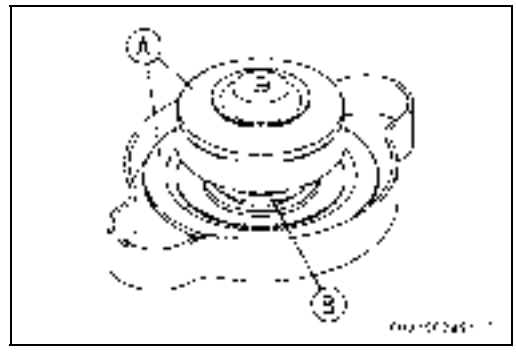
Radiator Cleaning



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 (1.6 ft) [B] from the radiator core.
Hold the steam gun perpendicular to the core surface.
Run the steam gun following the core fin direction.

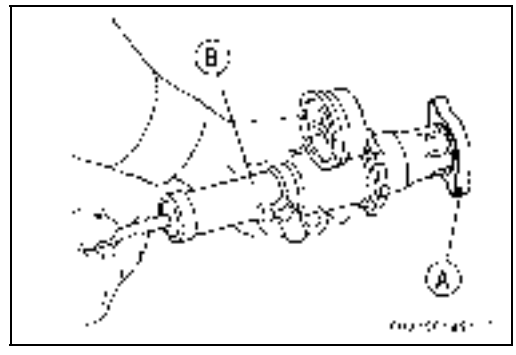
Radiator Cap Inspection



- Remove the right lower fairing (see Lower Fairing Removal in the Frame chapter).
- Check the condition of the top and bottom valve seals [A] and valve spring [B].

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

- 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 hand 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 hand must remain within the same range at least 6 seconds.

Radiator Cap Relief Pressure

Standard:	**93 ~ 123 kPa (0.95 ~ 1.25 kgf/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, Radiator Fan

Radiator Filler Neck Inspection

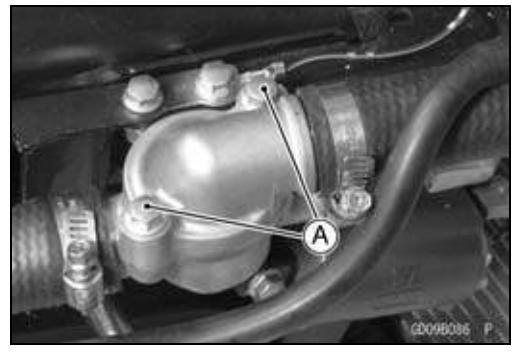
- Check the radiator filler neck for signs of damage.
- Check the condition of the top and bottom sealing seats [A] in the filler neck. They must be smooth and clean for the radiator cap to function properly.



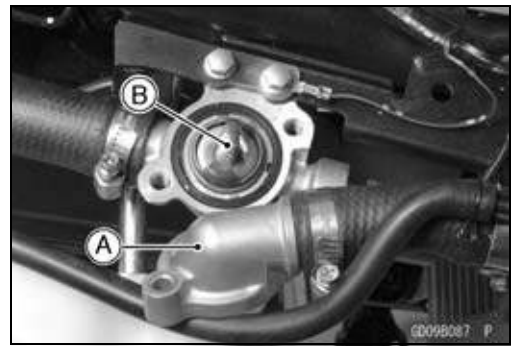
Thermostat

Thermostat Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Thermostat Cover Bolts [A]

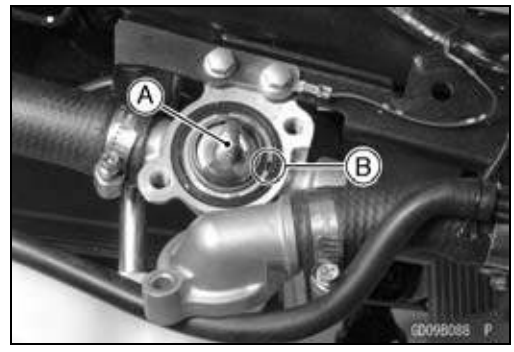


- Move the thermostat cover [A] outwards and remove the thermostat [B].



Thermostat Installation

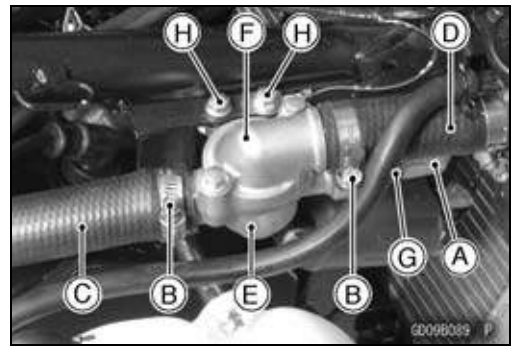
- Install the removed part in reverse of removal.
- Fit the thermostat [A] in the housing so that the air bleeder hole [B] faces as shown.
- Fill the radiator with coolant.



Thermostat Housing Removal

- Drain the Coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)

- Disconnect the water temperature switch lead connector [A].
- Loosen the water hose clamps [B] and slide the hoses [C], [D] back and forth from the thermostat housing [E] and cover [F].
  Water Temperature Switch [G]
- Remove the thermostat housing mounting bolts [H] and pull the housing out of the frame.
- Remove the thermostat cover and pull out the thermostat if necessary.

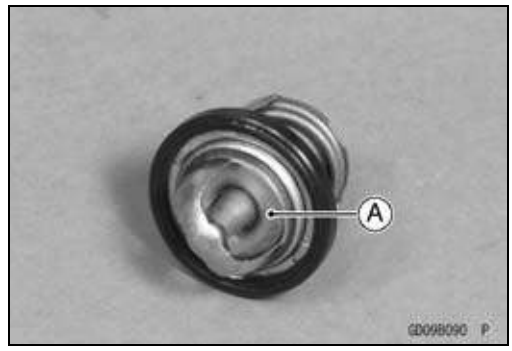


Thermostat Housing Installation Note

- Be sure to install the ground lead on the thermostat housing mounting bolt.

Thermostat

Thermostat Inspection



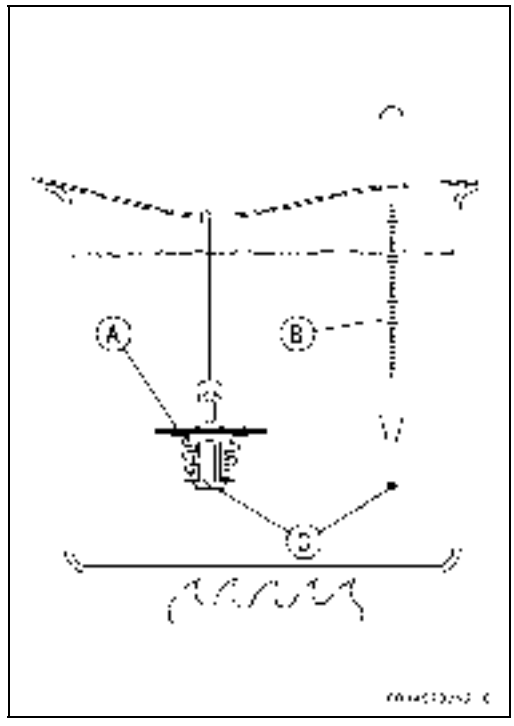
- Remove the thermostat, and visually inspect the thermostat valve [A] at room temperature.

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

- 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.

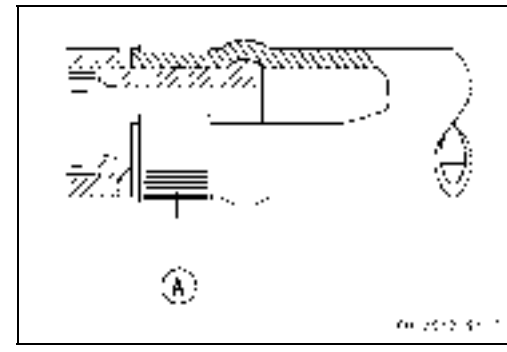
★If the measurement is out of the specified range, replace the thermostat with a new one.



Thermostat Valve Opening Temperature
63.5 ~66.5°C (146 ~ 152°F)

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 anything.

Torque - Water Hose Clamp Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)

Hose Inspection

- Refer to Radiator Hose and Connection Inspection in the Periodic Maintenance chapter (see Radiator Hose and Connection Inspection in the Periodic Maintenance chapter).

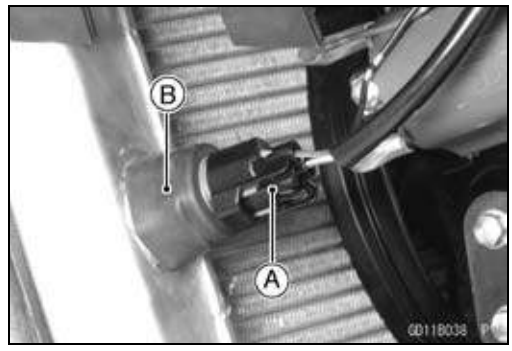
Radiator Fan Switch, Water Temperature Switch

Radiator Fan Switch, Water Temperature Switch Removal

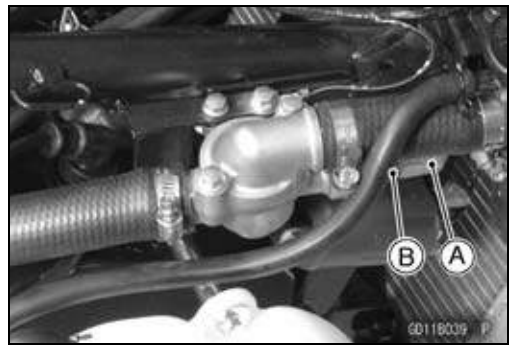
CAUTION

The fan switch or the water temperature switch should never be allowed to fall on a hard surface. Such a shock to their parts can damage them.

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Radiator Fan Switch Lead Connector [A]
  Radiator Fan Switch [B]



  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Water Temperature Switch Lead Connector [A]
  Water Temperature Switch [B]



Radiator Fan Switch, Water Temperature Switch Installation

- Apply silicone sealant to the threads of the water temperature switch.

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

- Tighten the fan switch and water temperature sensor.

  Torque - Radiator Fan Switch: 23.5 N·m (2.4 kgf·m, 17 ft·lb)
  Water Temperature Switch: 7.5 N·m (0.76 kgf·m, 66 in·lb)

- Fill the coolant and bleed the air from cooling system (see Coolant Change in the Periodic Maintenance chapter).

Radiator Fan Switch, Water Temperature Switch Inspection

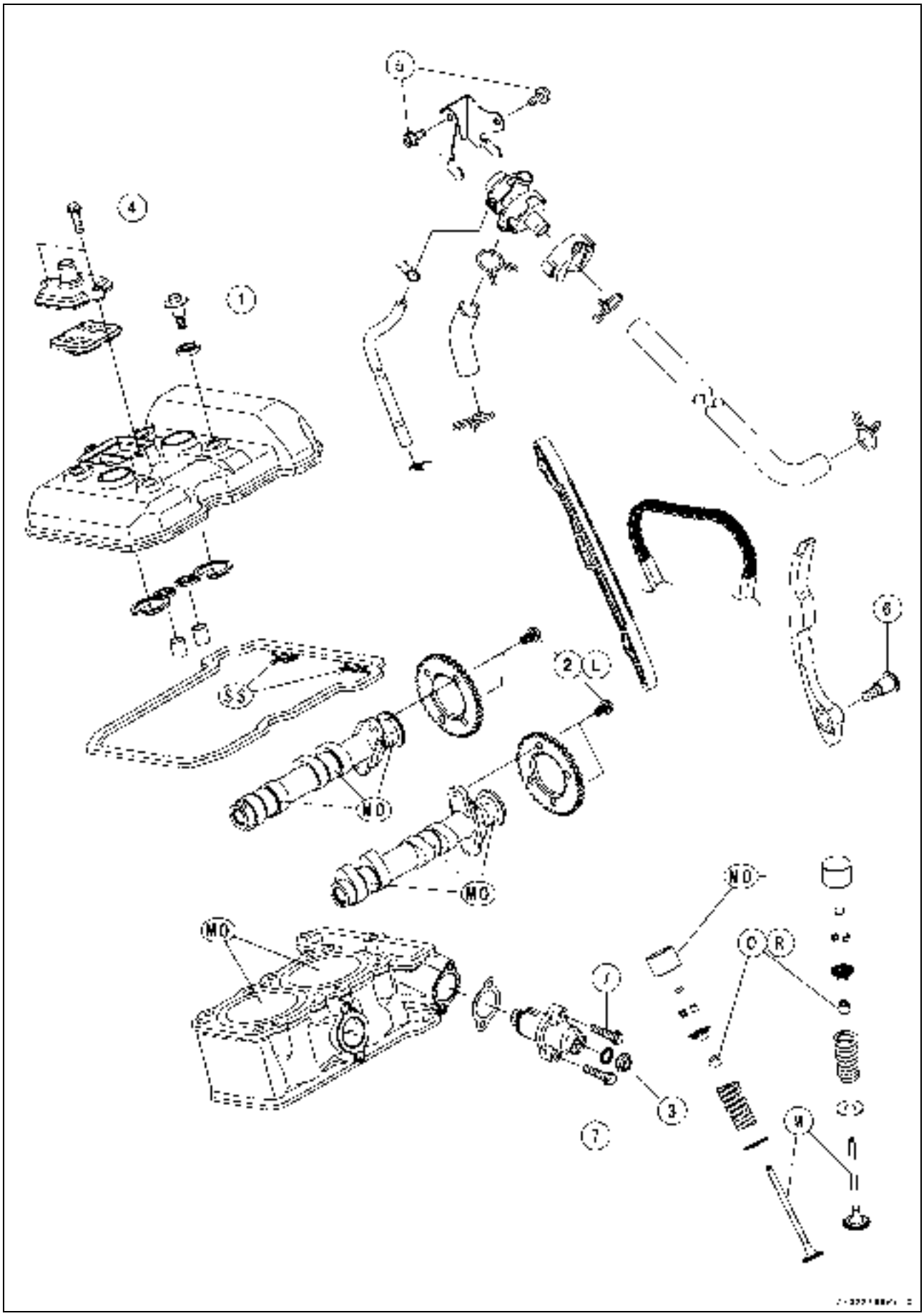
- Refer to Water Temperature Switch Inspection in the Electrical System chapter (see Water Temperature Switch Inspection in the Electrical System chapter).

Engine Top End

Table of Contents

Exploded View 5-2
Exhaust System 5-6
Specifications 5-7
Special Tools 5-9
Clean Air System 5-11
  Vacuum Switch Valve Removal ... 5-11
  Vacuum Switch Valve Installation 5-11
  Vacuum Switch Valve Operation Test 5-11
  Vacuum Switch Valve Unit Test 5-11
  Air Suction Valve Removal 5-12
  Air Suction Valve Installation 5-12
  Air Suction Valve Inspection 5-12
  Clean Air System Hose Inspection 5-13
Cylinder Head Cover 5-14
  Cylinder Head Cover Removal 5-14
  Cylinder Head Cover Installation . 5-14
Camshaft Chain Tensioner 5-15
  Camshaft Chain Tensioner Removal 5-15
  Camshaft Chain Tensioner Installation 5-15
Camshaft, Camshaft Chain 5-17
  Camshaft Removal 5-17
  Camshaft Installation 5-17
  Camshaft and Sprocket Assembly 5-19
  Camshaft and Camshaft Cap Wear Inspection 5-19
  Camshaft Runout Inspection 5-20
  Cam Wear Inspection 5-20
  Camshaft Chain Guide Wear Inspection 5-20
Cylinder Head 5-21
  Cylinder Compression Measurement 5-21
  Cylinder Head Removal 5-22
  Cylinder Head Installation 5-22
  Cylinder Head Warp Inspection ... 5-23
  Cylinder Head Cleaning 5-24
Valves 5-25
  Valve Clearance Inspection 5-25
  Valve Clearance Adjustment 5-25
  Valve Removal 5-25
  Valve Installation 5-25
  Valve Guide Removal 5-25
  Valve Guide Installation 5-25
  Valve-to-Guide Clearance Measurement (Wobble Method) 5-26
  Valve Seat Inspection 5-27
  Valve Seat Repair 5-27
Cylinder, Pistons 5-32
  Cylinder Removal 5-32
  Cylinder Installation 5-32
  Piston Removal 5-33
  Piston Installation 5-33
  Cylinder Wear Inspection 5-34
  Piston Wear Inspection 5-34
  Piston Ring, Piston Ring Groove Wear Insepction 5-35
  Piston Ring Groove Width Inspection 5-35
  Piston Ring Thickness Inspection 5-35
  Piston Ring End Gap Inspection .. 5-36
  Boring, Honing 5-36
Carburetor Holder 5-37
  Carburetor Holder Installation 5-37
Muffler 5-38
  Muffler Removal 5-38
  Muffler Installation 5-38
  Exhaust System Inspection 5-39

Exploded View

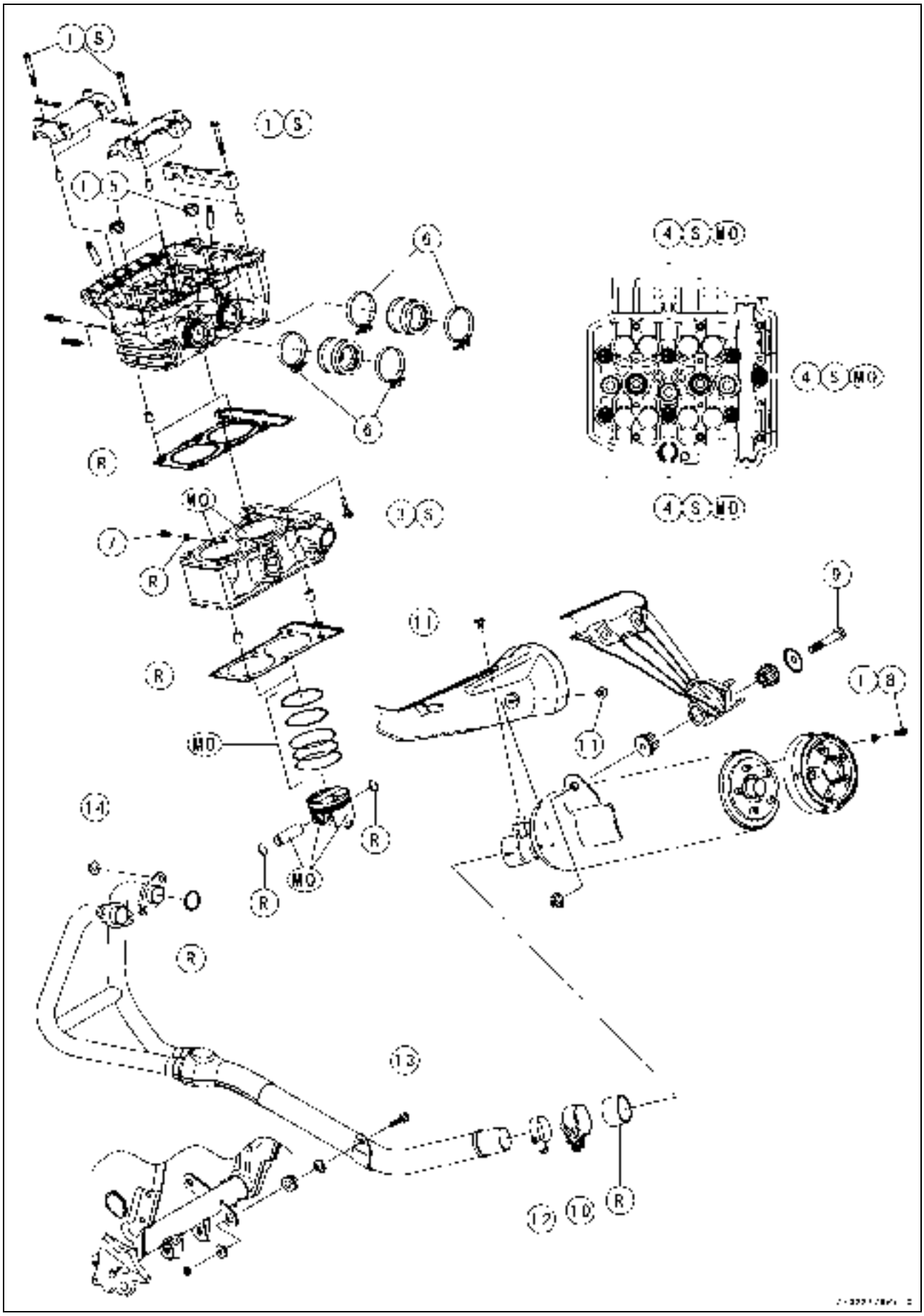


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	
2	Camshaft Sprocket Bolts	15	1.5	11	L
3	Chain Tensioner Cap Bolt	5.0	0.5	44 in·lb	
4	Air Suction Cover Bolts	9.8	1.0	87 in·lb	
5	Vacuum Switch Valve Bracket Bolts	9.8	1.0	87 in·lb	
6	Rear Camshaft Chain Guide Bolt-Lower	17	1.7	13	
7	Chain Tensioner Mounting Bolts	9.8	1.0	87 in·lb	

EO: Apply engine oil.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil solution (mixture of the engine oil and molybdenum disufide grease in a weight ratio 10 : 1).
R: Replacement Parts
SS: Apply silicon sealant (Kawasaki Bond: 92104-0004).

Exploded View



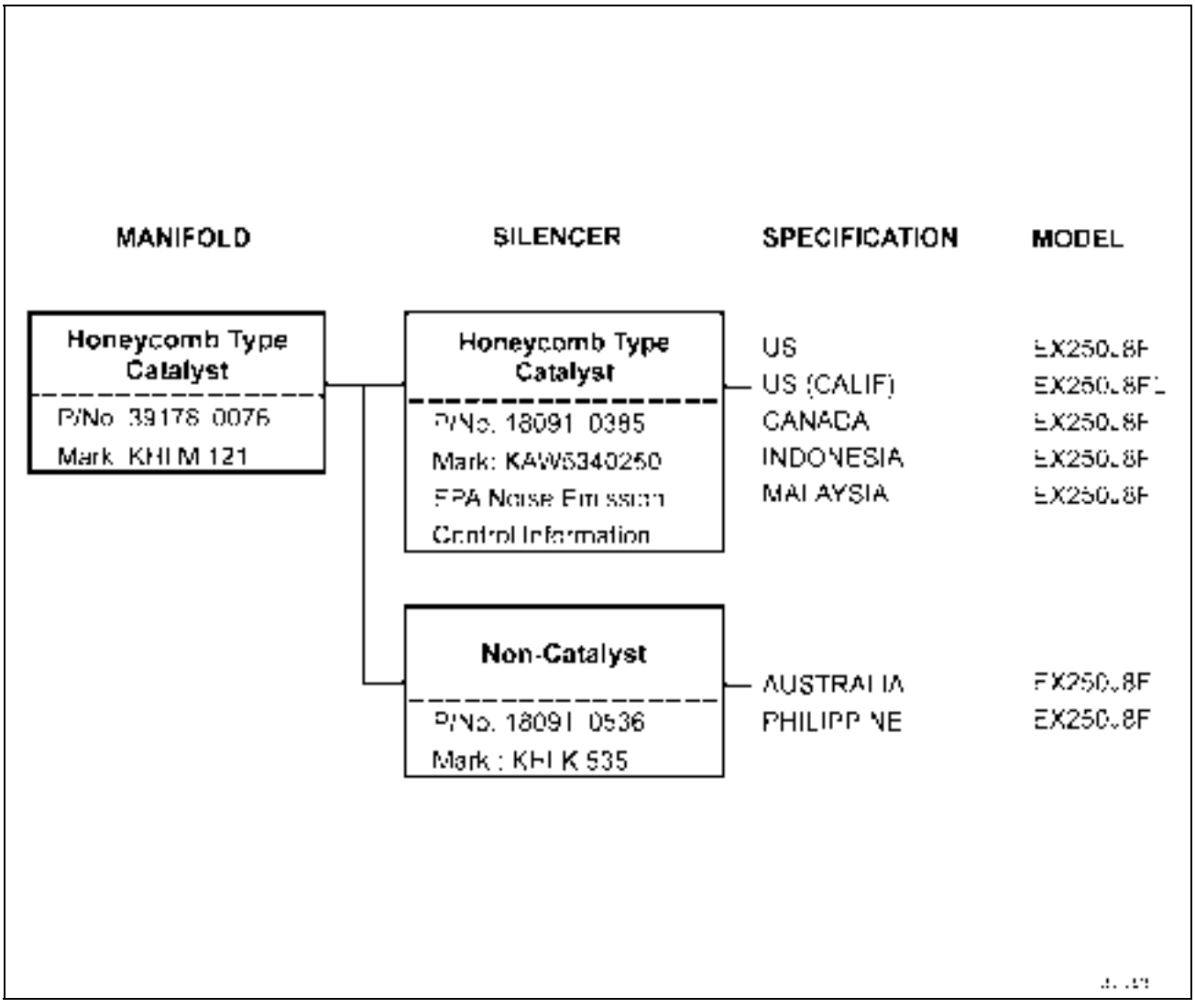
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Camshaft Cap Bolts	12	1.2	106 in·lb	S
2	Camshaft Cap Bolts	12	1.2	106 in·lb	S
3	Cylinder Head Bolt (M6)	12	1.2	106 in·lb	S
4	Cylinder Head Bolts (M8)	24.5	2.5	18	MO, S
5	Water Passage Plugs	20	2.0	15	L
6	Carburetor Holder Clamp Screws	2.0	0.2	18 in·lb	
7	Water Drain Bolt	5.9	0.6	52 in·lb	
8	Muffler Body Rear Cover Bolts	9.8	1.0	87 in·lb	L
9	Muffler Body Mounting Bolt	30	3.1	22	
10	Muffler Body Clamp Bolt	17	1.7	13	
11	Muffler Cover Bolts	9.8	1.0	87 in·lb	
12	Muffler Cover Clamp Screw	6.9	0.70	61 in·lb	
13	Exhaust Pipe Mounting Bolt	9.8	1.0	87 in·lb	
14	Exhaust Pipe Holder Nuts	12	1.2	104 in·lb	

EO: Apply engine oil.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil solution (mixture of the engine oil and molybdenum disufide grease in a weight ratio 10 : 1).
S: Follow the specific tightening sequence.
SS: Apply silicon sealant.

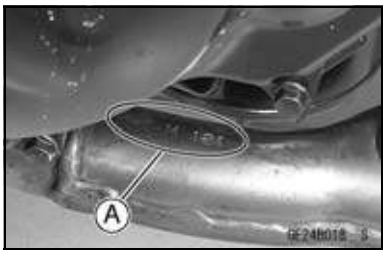
Exhaust System

Exhaust System

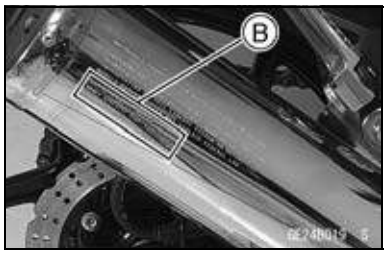


H: Honeycomb Type Catalyst

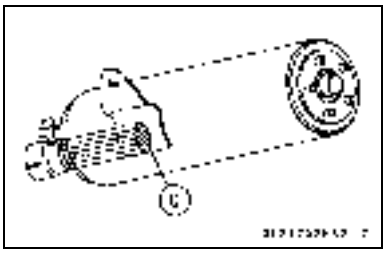
Manifold Mark Position [A]



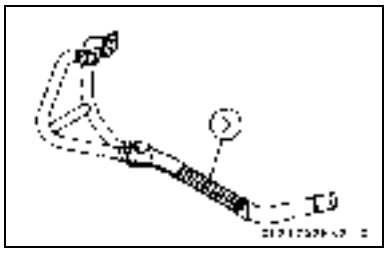
Silencer Mark Position [B]



Honeycomb Type Catalyst Position [C] of Silencer



Honeycomb Type Catalyst Position [D] of Manifold



Specifications

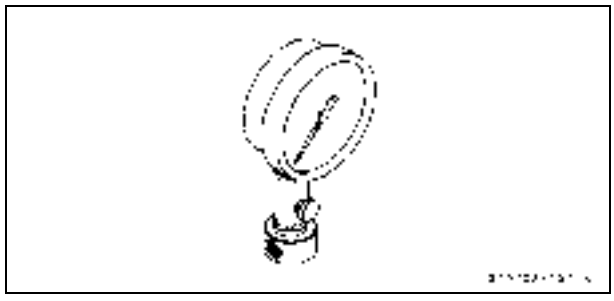
Item	Standard	Service Limit
Clean Air System		
Vacuum Switch Valve Closing Pressure	Open → Close 41.3 ~ 49.3 kPa (310 ~ 370 mmHg)	– – –
Camshafts, Camshaft Chain, Rocker Arms		
Cam Height:		
Exhaust	32.843 ~ 32.957 mm (1.2930 ~ 1.2975 in.)	32.74 mm (1.289 in.)
Inlet	33.843 ~ 33.957 mm (1.3324 ~ 1.3369 in.)	33.74 mm (1.328 in.)
Camshaft Journal, Camshaft Cap Clearance	0.028 ~ 0.071 mm (0.0011 ~ 0.0071 in.)	0.16 mm (0.0063 in.)
Camshaft Journal Diameter	23.950 ~ 23.972 mm (0.9429 ~ 0.9438 in.)	23.92 mm (0.942 in.)
Camshaft Bearing Inside Diameter	24.000 ~ 24.021 mm (0.9449 ~ 0.9457 in.)	24.08 mm (0.948 in.)
Camshaft Runout	TIR 0.02 mm (0.0008 in.) or less	TIR 0.1 mm (0.004 in.)
Cylinder Head		
Cylinder Compression	(Usable Range) 980 ~ 1 500 kPa (10.0 ~ 15.3 kgf/cm², 142 ~ 218 psi) @470 r/min (rpm)	– – –
Cylinder Head Warp	– – –	0.05 mm (0.002 in.)
Valves		
Valve Clearance:		
Inlet	0.15 ~ 0.24 mm (0.0059 ~ 0.0094 in.)	– – –
Exhaust	0.22 ~ 0.29 mm (0.0087 ~ 0.0114 in.)	– – –
Valve Head Thickness:		
Inlet	0.50 mm (0.0197 in.)	0.3 mm (0.012 in.)
Exhaust	0.80 mm (0.0315 in.)	0.5 mm (0.020 in.)
Valve Stem Bend	– – –	0.05 mm (0.002 in.) TIR
Valve Stem Diameter:		
Inlet	4.475 ~ 4.490 mm (0.1762 ~ 0.1768 in.)	4.46 mm (0.176 in.)
Exhaust	4.455 ~ 4.470 mm (0.1754 ~ 0.1760 in.)	4.44 mm (0.175 in.)
Valve Guide Inside Diameter	4.500 ~ 4.512 mm (0.1772 ~ 0.1776 in.)	4.58 mm (0.180 in.)
Valve/valve Guide Clearance (Wobble Method):		
Inlet	0.03 ~ 0.09 mm (0.0012 ~ 0.035 in.)	0.27 mm (0.011 in.)
Exhaust	0.08 ~ 0.15 mm (0.0031 ~ 0.0059 in.)	0.33 mm (0.013 in.)
Valve Seating Surface:		
Outside Diameter:		
Inlet	21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in.)	– – –
Exhaust	19.3 ~ 19.5 mm (0.7598 ~ 0.7677 in.)	– – –
Width	0.5 ~ 1.0 mm (0.0197 ~ 0.0394 in.)	– – –
Valve Spring Free Length:		
Inlet	39.5 mm (1.555 in.)	38.0 mm (1.15 in.)
Exhaust	39.5 mm (1.555 in.)	38.0 mm (1.31 in.)
Valve Seat Cutting Angle	32°, 45°, 67.5°	– – –

Specifications

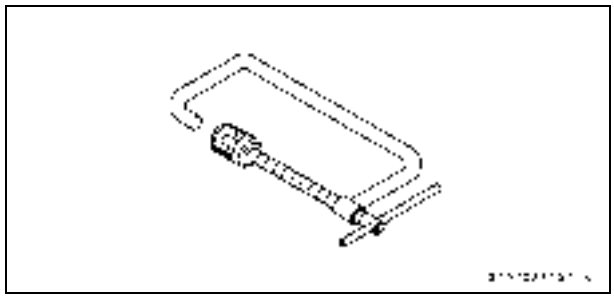
Item	Standard	Service Limit
Cylinder, Piston		
Cylinder Inside Diameter	62.000 ~ 62.012 mm (2.4409 ~ 2.4414 in.)	62.10 mm (2.44 in.)
Piston Diameter	61.942 ~ 61.957 mm (2.4387 ~ 2.4392 in.)	61.80 mm (2.43 in.)
Piston/Cylinder Clearance	0.043 ~ 0.070 mm (0.0017 ~ 0.0028 in.)	– – –
Oversize Pistons and Rings	+0.5 mm (0.020 in.)	– – –
Piston Ring/Groove Clearance:		
Top	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)	0.17 mm (0.0067 in.)
Second	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)	0.16 mm (0.0063 in.)
Piston Ring Groove Width:		
Top	0.82 ~ 0.84 mm (0.0323 ~ 0.0331 in.)	0.92 mm (0.0362 in.)
Second	0.81 ~ 0.83 mm (0.0319 ~ 0.0327 in.)	0.91 mm (0.0358 in.)
Oil	1.51 ~ 1.53 mm (0.0594 ~ 0.0602 in.)	1.61 mm (0.0634 in.)
Piston Ring Thickness:		
Top, Second	0.77 ~ 0.79 mm (0.0303 ~ 0.0311 in.)	0.7 mm (0.028 in.)
Piston Ring End Gap:		
Top	0.15 ~ 0.30 mm (0.0059 ~ 0.0118 in.)	0.6 mm (0.024 in.)
Second	0.40 ~ 0.55 mm (0.0157 ~ 0.0217 in.)	0.9 mm (0.035 in.)
Oil	0.20 ~ 0.80 mm (0.0079 ~ 0.0315 in.)	1.1 mm (0.043 in.)

Special Tools

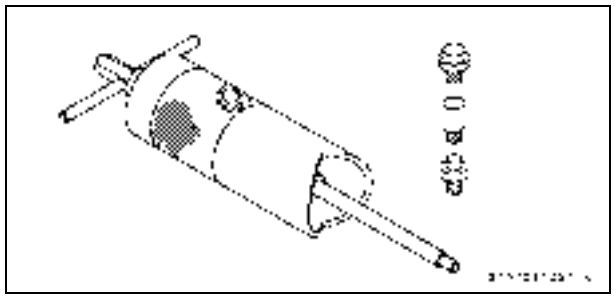
Compression Gauge, 20 kgf/cm²:
57001-221



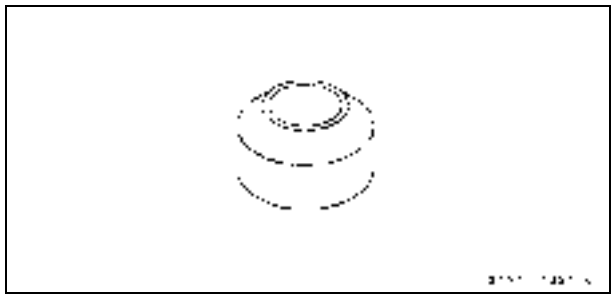
Valve Spring Compressor Assembly:
57001-241



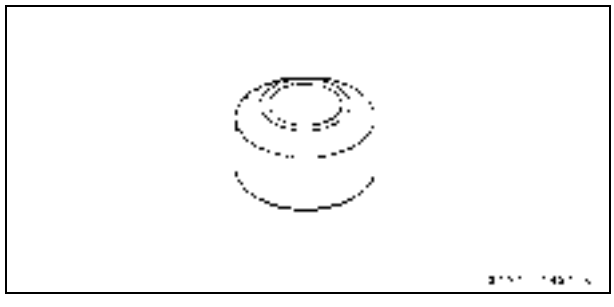
Piston Pin Puller Assembly:
57001-910



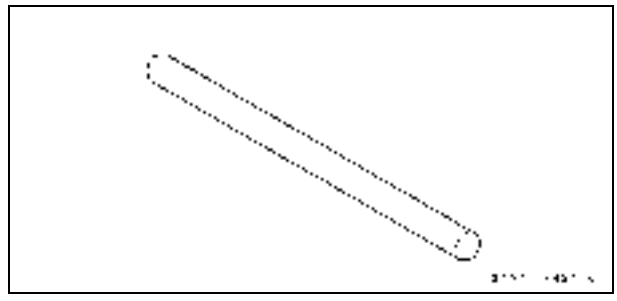
Valve Seat Cutter, 45° - ϕ24.5:
57001-1113



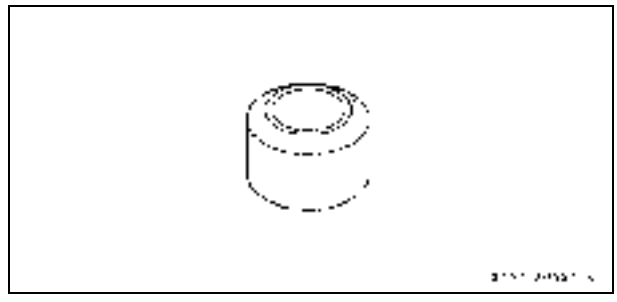
Valve Seat Cutter, 32° - ϕ25:
57001-1118



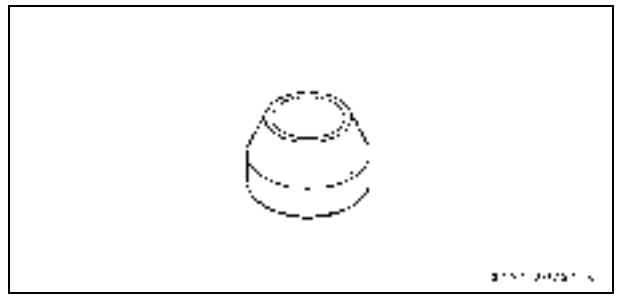
Valve Seat Cutter Holder Bar:
57001-1128



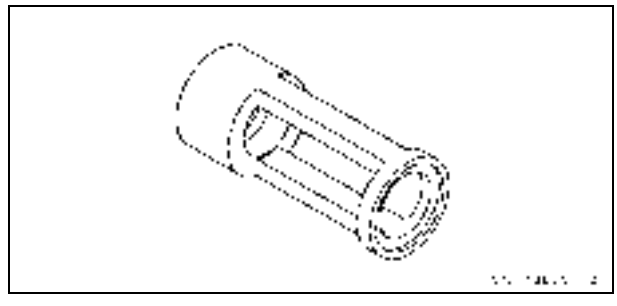
Valve Seat Cutter, 32° - ϕ22:
57001-1206



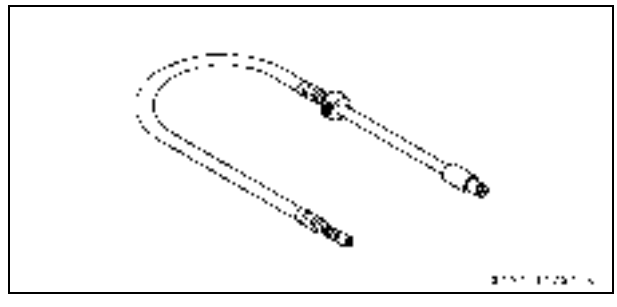
Valve Seat Cutter, 67.5° - ϕ22:
57001-1207



Valve Spring Compressor Adapter, ϕ16:
57001-1305

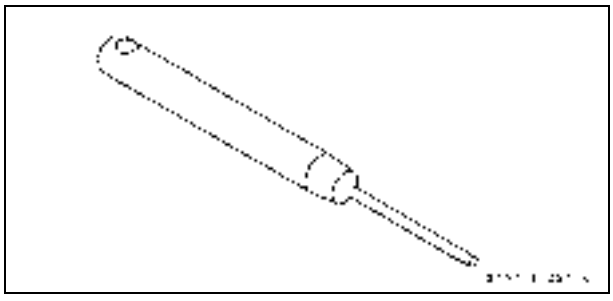


Compression Gauge Adapter, M10 × 1.0:
57001-1317

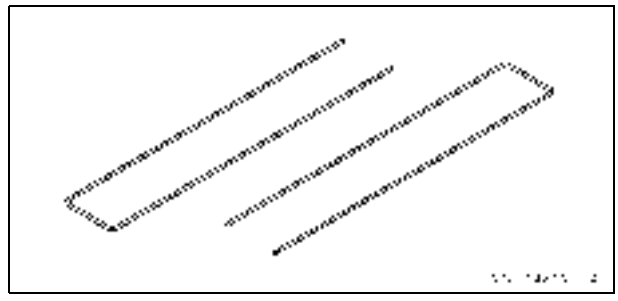


Special Tools

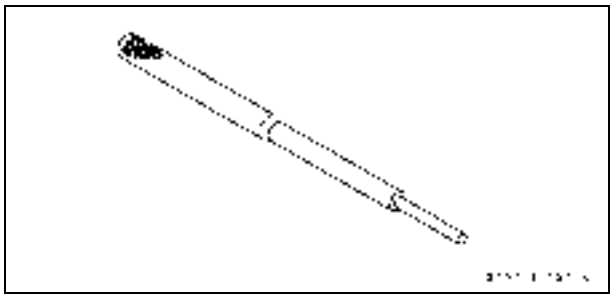
Valve Seat Cutter Holder, ϕ4.5:
57001-1330



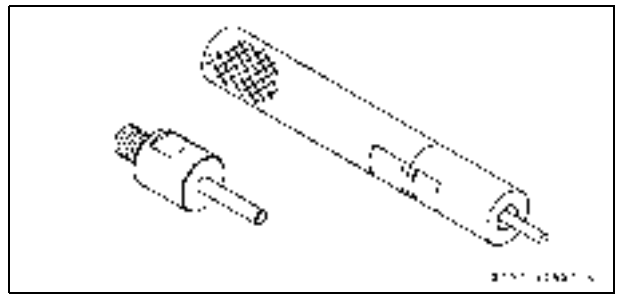
Piston Base, ϕ2.3:
57001-1336



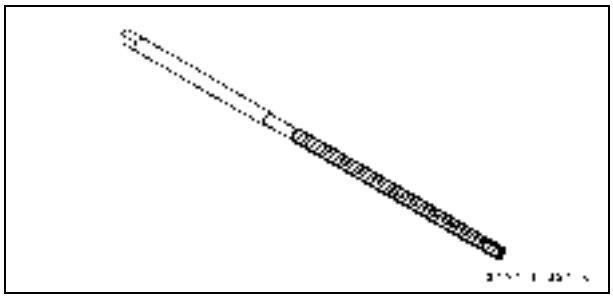
Valve Guide Arbor, ϕ4.5:
57001-1331



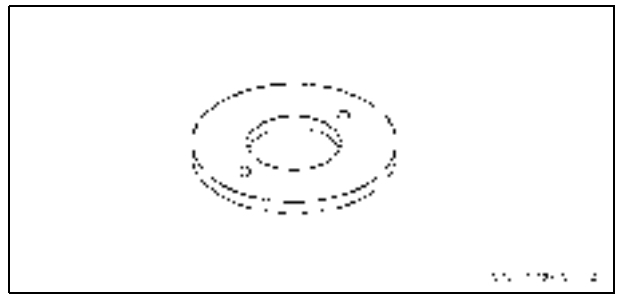
Valve Guide Driver:
57001-1564



Valve Guide Reamer, ϕ4.5:
57001-1333

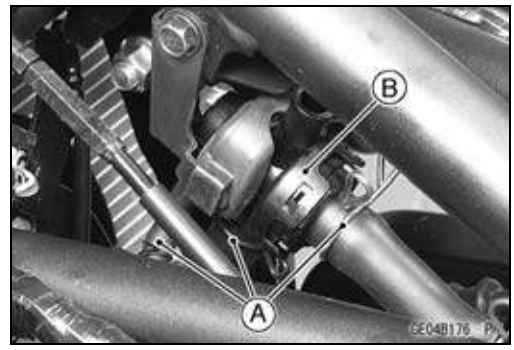


Washer:
57001-1720



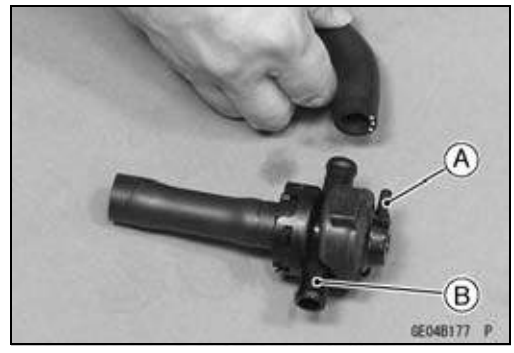
Clean Air System

Vacuum Switch Valve Removal



- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System Chapter)
  Vacuum Switch Valve Hose Ends [A]
  Vacuum Switch Valve [B]

Vacuum Switch Valve Installation



- Install the vacuum switch valve so that the vacuum hose fitting [A] faces downwards (see Cable, Wire, and Hose Routing in the Appendix chapter).

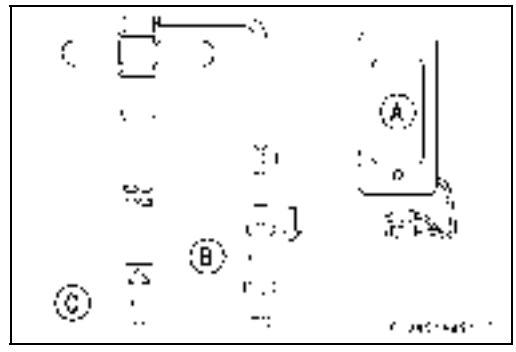
NOTE

○*This hose fitting [B] side is plugged.*

Vacuum Switch Valve Operation Test

- Refer to Air Suction System Damage Inspection in the Periodic Maintenance chapter (see Air Suction System Damage Inspection in the Periodic Maintenance chapter).

Vacuum Switch Valve Unit Test



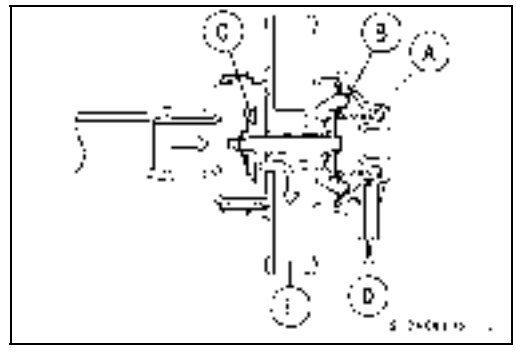
- Remove the fuel tank (see Fuel Tank Removal in the Fuel System chapter).

○Do not remove the vacuum switch valve.

- Connect a vacuum gauge [A] and syringe [B] or the fork oil level gauge to the vacuum hose 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]

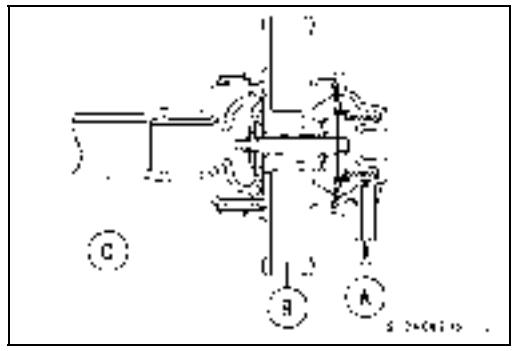
Clean Air System

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

NOTE

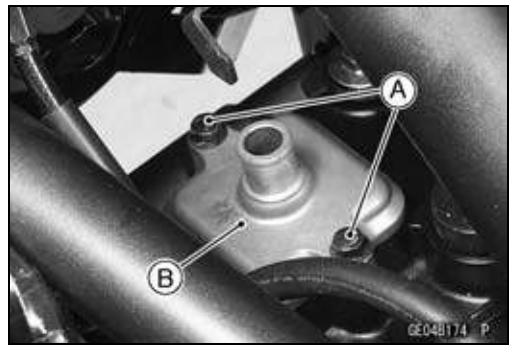
○*To check air flow through the vacuum switch valve, just blow through the vacuum switch hose [C].*

Vacuum Switch Valve Closing Pressure (Open → Close)
Standard: 41.3 ~ 49.3 kPa (310 ~ 370 mmHg)
High Vacuum [A]
Secondary air cannot flow [B]



Air Suction Valve Removal

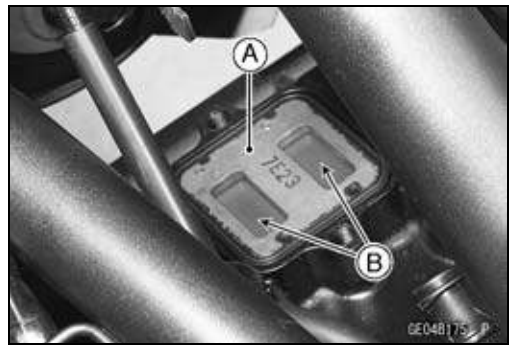
● Remove:
Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
Vacuum Switch Valve (see Vacuum Switch Valve Removal)
● Unscrew the bolts [A] and remove the air suction valve covers [B].



Air Suction Valve Installation

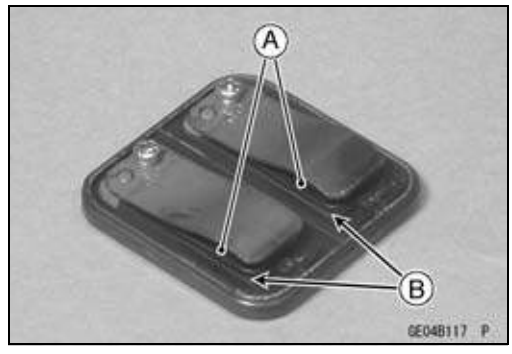
● Install the air suction valve [A] so that its reed opening side [B] faces backwards.

Torque - Air Suction Valve Cover Bolts : 9.8 N·m (1.0 kgf·m, 87 in·lb)



Air Suction Valve Inspection

● Remove the air suction valve (see Air Suction Valve Removal).
● Visually inspect the reeds for cracks, folds, warps, heat damage or other damage.
★If there is any doubt as to the condition of the reeds [A], 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 clean 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

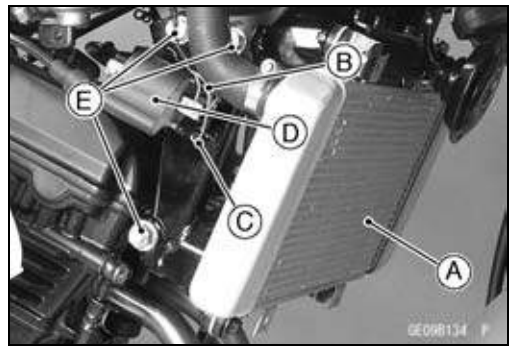
Clean Air System Hose Inspection

- Be certain that all the hoses are routed without being flattened or kinked, and are connected correctly to the air cleaner housing, carburetor assembly and cylinder head cover (see Cable, Wire, and Hose Routing section in the Appendix chapter).

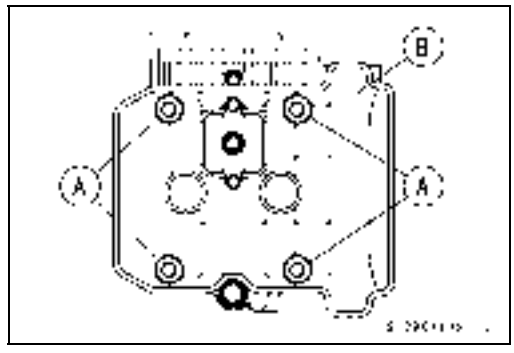
★If they are not, correct them. Replace them if they are damaged.

Cylinder Head Cover

Cylinder Head Cover Removal

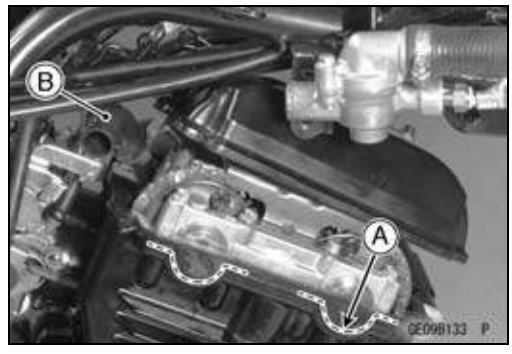


- Drain the Coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Spark Plug Caps
  Radiator [A] (see Radiator and Radiator Fan Removal in the Cooling System chapter)
- Disconnect the primary lead [B] and ground lead [C] connectors of the #2(right) ignition coil [D].
- Remove the right engine bracket mounting bolts [E], and remove the engine bracket with the right ignition coil.

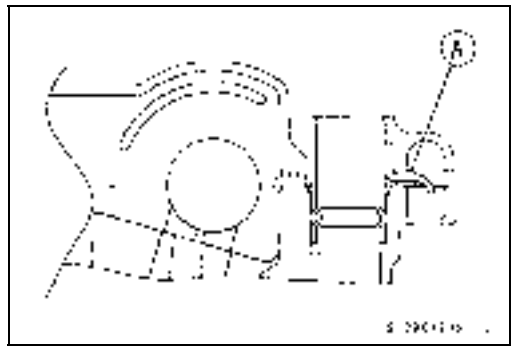


- Disconnect the air suction valve hose.
- Remove the cylinder head cover bolts [A].
- Remove the cylinder head cover [B].

Cylinder Head Cover Installation



- Scrape off the old silicone sealant [A] on the cylinder head mating surface, and apply silicone sealant [A] on the mating surface.
- Be sure the water pipe [B] is in place.



- Be sure the damper [A] on the water pipe is in position.
- Install the new cylinder head cover gasket and install the cylinder head cover with the specified torque.

  Torque - Cylinder Head Cover Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the removed parts.

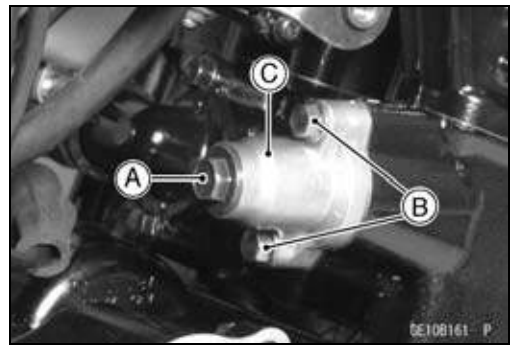
Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

CAUTION

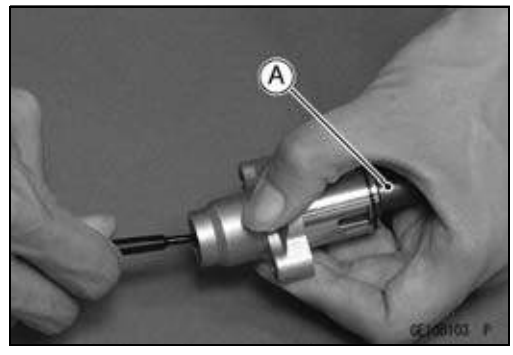
This is a non-return type camshaft chain tensioner. The push rod does not return to its original position once it moves out to take up camshaft chain slack. Observe all the rules listed below:
When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts 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 camshaft chain timing and damage the valves.

- Remove the right lower fairing (see Lower Fairing Removal in the Frame chapter).
- Loosen the cap bolt [A]
- Remove the tensioner mounting bolts [B], and remove the chain tensioner body [C].



Camshaft Chain Tensioner Installation

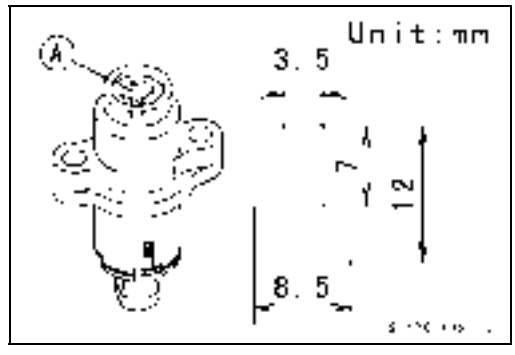
- Remove the tensioner cap bolt and O-ring.
- While compressing the push rod [A], turn it clockwise with a suitable screwdriver until the rod stopped.



CAUTION

Do not turn the rod counterclockwise at installation. This could detach the rod and the tensioner cannot be reinstalled.

- While holding the rod in position with a suitable push rod holder plate [A] install the tensioner on the cylinder block.



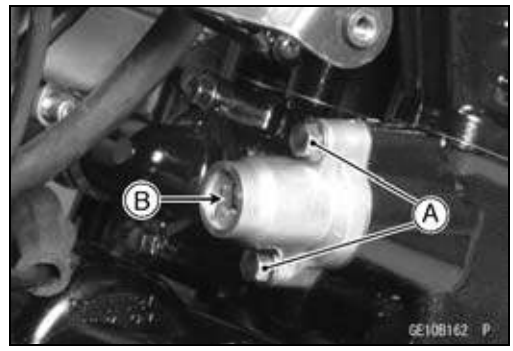
Camshaft Chain Tensioner

- Replace the chain tensioner gasket with a new one.
- Tighten:

Torque - Chain Tensioner Mounting Bolts [A]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Take out the holder plate [B].
- Install the O-ring and tighten the cap bolt.

Torque - Chain Tensioner Cap Bolt: 5.0 N·m (0.5 kgf·m, 44 in·lb)

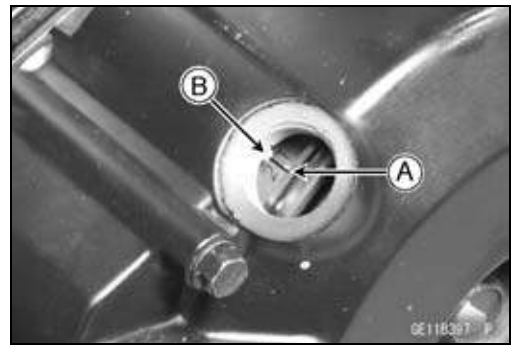


Camshaft, Camshaft Chain

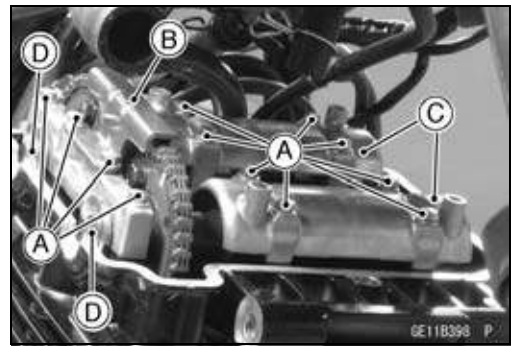
Camshaft Removal

- Remove the cylinder head cover (see Cylinder Head Cover Removal).
- Remove the inspection plugs on the alternator cover.
- Position the crankshaft at #2 piston TDC.

○Using a wrench on the crankshaft rotation bolts, turn the crankshaft clockwise until the "2T" mark [A] on the alternator rotor is aligned with the projection [B] in the inspection window on the alternator cover.



- Remove:
  Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal).
  Camshaft Cap Bolts [A]
  Plates
  Camshaft Top Chain Guide [B]
  Camshaft Caps [C]
  Camshafts [D]



- Stuff a clean cloth into the camshaft 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

- Apply molybdenum disulfide oil solution to the cam and journal surfaces.

NOTE

○*Be sure to operate from the engine left side.*

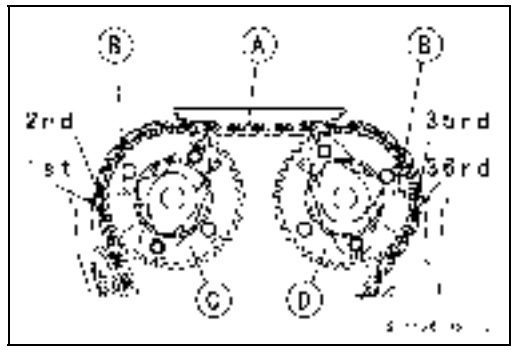
- Position the crankshaft at #2 piston TDC (see Camshaft Removal).

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, Camshaft Chain

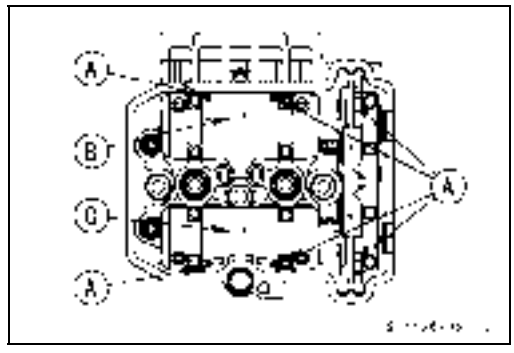
● Engage the camshaft chain [A] with the camshaft sprockets.
○Pull the tension side (exhaust side) of the chain taut to install the chain on the sprockets.
○Timing marks [B] align with the cylinder head upper surface.
Exhaust Camshaft Sprocket [C]
Inlet Camshaft Sprocket [D]
○Count the camshaft chain link pins as shown to verify that the sprocket are positioned correctly.



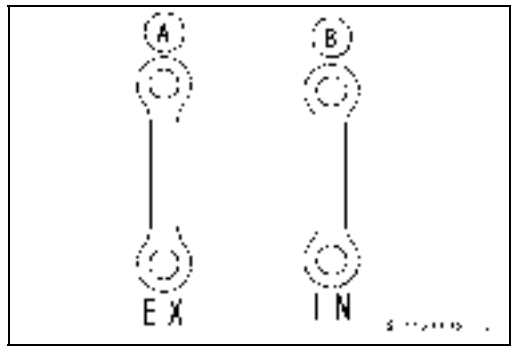
● Place the six dowel pins on the ★ marks [A].
● Install the camshaft caps as shown, noting the “EX” [B] and “IN” [C] marks.

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.



● Put the plates on the bearing caps.
○The exhaust side plates [A] is longer the inlet side plates [B].

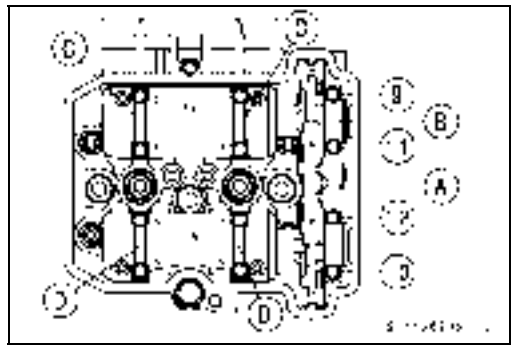


● First tighten down the chain guide [A] and bearing caps [B] evenly to seat the camshafts in place, then tighten all bolts following the specified tightening sequence.

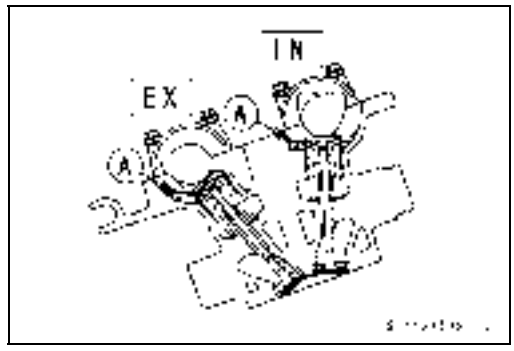
Torque - Camshaft Cap Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

Plates (EX) [C]
Plates (IN) [D]

● Install the camshaft chain tensioner (see Camshaft Chain Tensioner Installation).
● Check the chain timing.

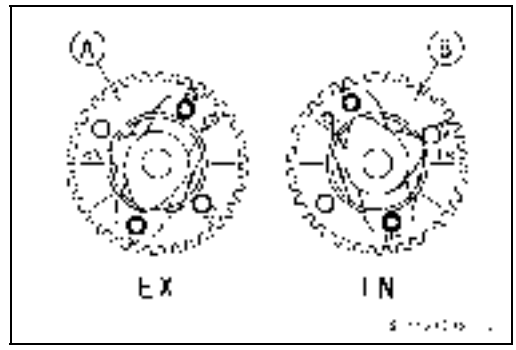


● Finally, inject [A] engine oil into 8 places on the cylinder head, as shown.

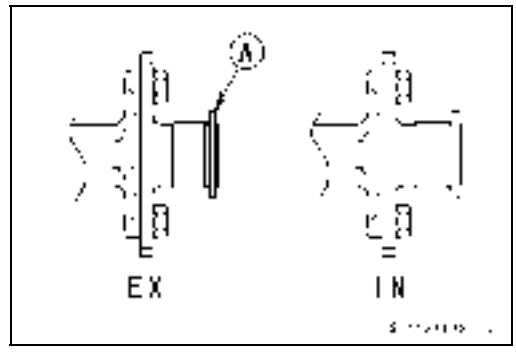


Camshaft, Camshaft Chain

Camshaft and Sprocket Assembly



- Install the cam sprockets as shown in figure.
  Exhaust Cam Sprocket [A]
  Inlet Cam Sprocket [B]



- Apply a non-permanent locking agent to the camshaft sprocket bolts and tighten them.

  Torque - Camshaft Sprocket Bolts: 15 N·m (1.5 kgf·m, 11 ft·lb)

★If a new camshaft is to be used, apply a thin coat of a molybdenum disulfide grease to the cam surfaces.

NOTE

○*The exhaust camshaft has a groove [A] and the inlet camshaft has no groove. Be careful not to mix up these shafts.*

Camshaft and Camshaft Cap Wear Inspection



- Remove:
  Camshaft Top Guide
  Camshaft Caps
- Cut the strips of plastigauge to journal parallel to the camshaft installed in the correct position.
- Measure each clearance between the camshaft journal and the camshaft cap using the plastigauge (press gauge) [A].
- Tighten:

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

NOTE

○*Do not turn the camshaft when the plastigauge is between the journal and camshaft cap.*

Camshaft Journal, Camshaft Cap Clearance
Standard: 0.028 ~ 0.071 mm (0.0011 ~ 0.0071 in.)
Service Limit: 0.16 mm (0.0063 in.)

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

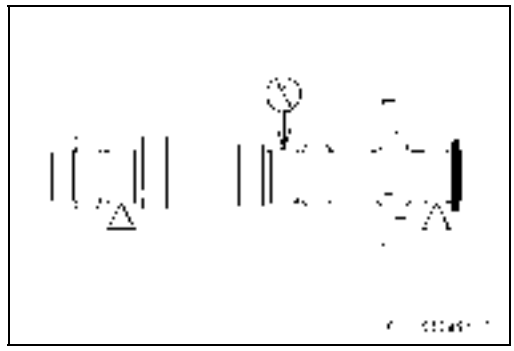
Camshaft Journal Diameter
Standard: 23.950 ~ 23.972 mm (0.9429 ~ 0.9438 in.)
Service Limit: 23.92 mm (0.942 in.)

★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 service limit, replace the cylinder head unit.

Camshaft, Camshaft Chain

Camshaft Runout Inspection



- Remove the camshaft.
- Set the camshaft in a camshaft alignment jig or on V blocks.
- Measure the runout with a dial gauge at the specified place as shown.

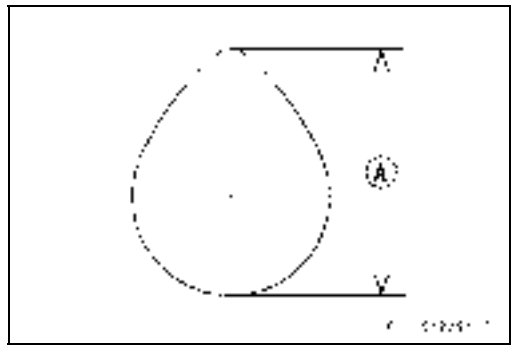
★If the runout exceeds the service limit, replace the shaft.

Camshaft Runout

Standard: TIR 0.02 mm (0.0008 in.)

Service Limit: TIR 0.1 mm (0.004 in.)

Cam Wear Inspection



- Remove the camshaft (see Camshaft Removal).
- Measure the height [A] of each cam with a micrometer.

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

Cam Height

Standard:

Exhaust 32.843 ~ 32.957 mm (1.2930 ~ 1.2975 in.)

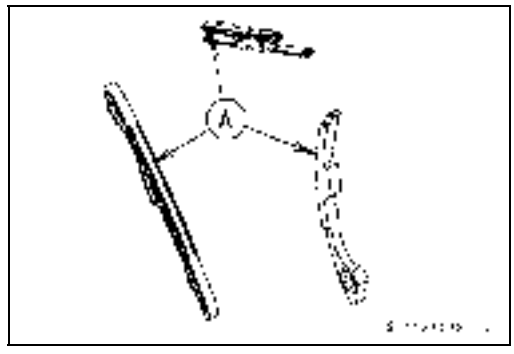
Inlet 33.843 ~ 33.957 mm (1.3324 ~ 1.3369 in.)

Service Limit:

Exhaust 32.74 mm (1.289 in.)

Inlet 33.74 mm (1.328 in.)

Camshaft Chain Guide Wear Inspection



- Visually inspect the rubber [A] on the guide.
- If the rubber is damaged or cut, replace the guides.

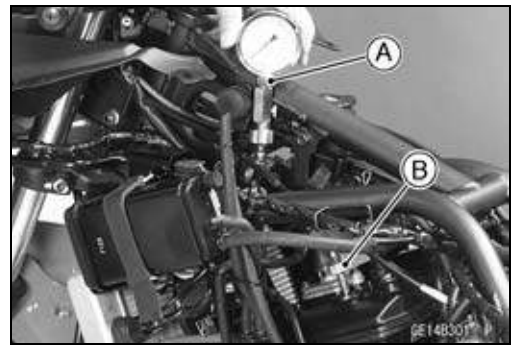
Cylinder Head

Cylinder Compression Measurement

NOTE

○*Use the battery which is fully charged.*

- Warm up the engine thoroughly.
- Stop the engine.
- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Spark Plug (see Spark Plug Replacement in the Periodic Maintenance chapter)



- Attach the compression gauge [A] and adapter [B] firmly into the spark plug hole.
- 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 Tool - Compression Gauge: 57001-221
Compression Gauge Adapter M10 × 1.0: 57001-1317

Cylinder Compression
Usable Range: 961 ~ 1 471 kPa (9.8 ~ 15.0 kgf/cm², 139 ~ 213 psi) @470r/min (rpm)

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

Torque - Spark Plug: 13 N·m (1.3 kgf·m, 115 in·lb)

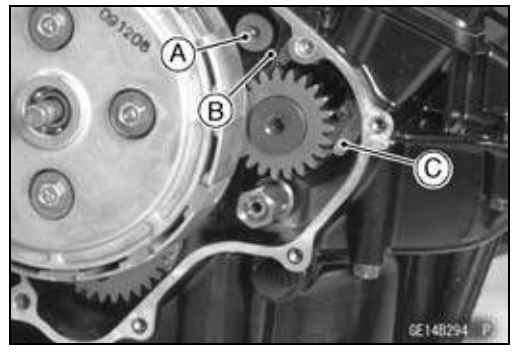
Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon accumulation on piston and in combustion chamber possibly due to damaged valve stem oil seal and/or damaged piston oil rings (This may be indicated by white exhaust smoke.)	Remove the carbon deposits and replace 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 seating	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/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

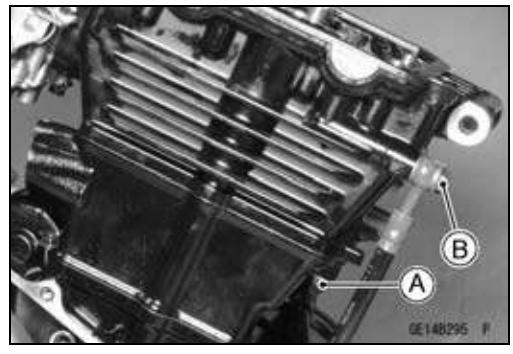
Cylinder Head Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Lower Fairing (see Lower Fairing Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Radiator (see Radiator, Radiator Fan Removal in the Cooling System chapter)
  Muffler (see Muffler Removal)
  Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal)
  Left and Right Engine Bracket with Ignition Coils

- Remove:
  Cylinder Head Cover
  Camshafts
  Rear Camshafts Chain Guide Bolt (Lower) [A] and Chain Guide [B]
  Front Camshaft Chain Guide [C]



- Pull out the water pipe.
- Remove the 6 mm cylinder head bolt [A] first, then remove the 8 mm cylinder head bolts.
- Remove the oil hose banjo bolt [B].
- Before removing the cylinder head, hold the carburetor to the air cleaner ducts securely.

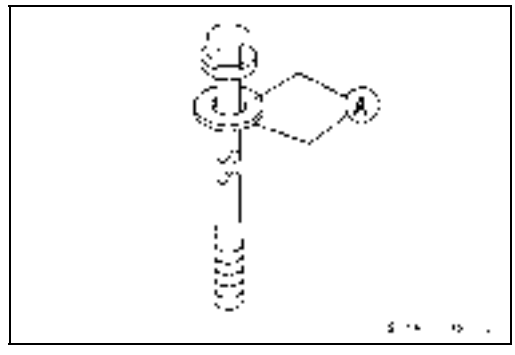


Cylinder Head Installation

NOTE

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

- Install the pin and new cylinder head gasket.
- Apply molybdenum disulfide oil to the both sides [A] of the 8 mm cylinder head bolt washers.



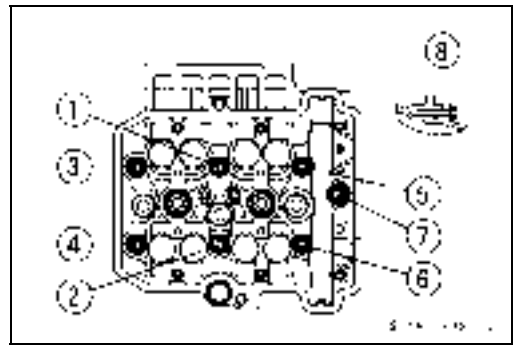
Cylinder Head

- Tighten the 8 mm cylinder head bolts [1 ~ 7] following the tightening sequence.

  Torque - Cylinder Head Bolts: 24.5 N·m (2.5 kgf·m, 18 ft·lb)

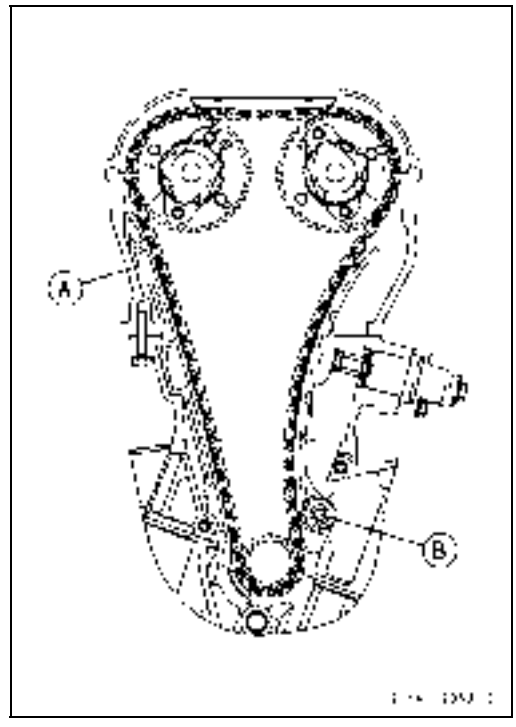
- Tighten the 6 mm cylinder head bolt [8] following the tightening sequence.

  Torque - Cylinder Head Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)



- After cylinder head installation, install the front camshaft chain guide [A].
- Tighten the rear camshaft chain guide bolt (lower) [B] to the specified torque.
- Tighten the oil hose banjo bolt to the specified torque.

  Torque - Camshaft Chain Guide Bolt (lower): 17 N·m (1.7 kgf·m, 13 ft·lb)
  Oil Hose Banjo Bolt: 19.6 N·m (2.0 kgf·m, 14.5 ft·lb)



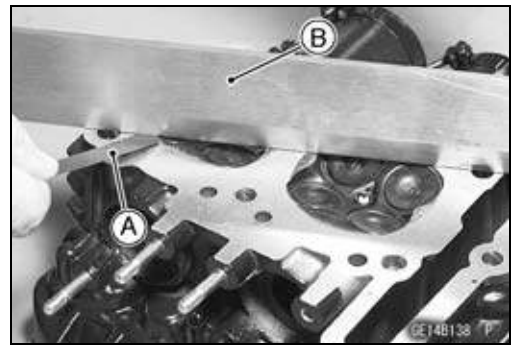
Cylinder Head Warp Inspection

- 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 straightedge [B] and the head.

  Cylinder Head Warp
  Standard: – – –
  Service Limit: 0.05 mm (0.002 in.)

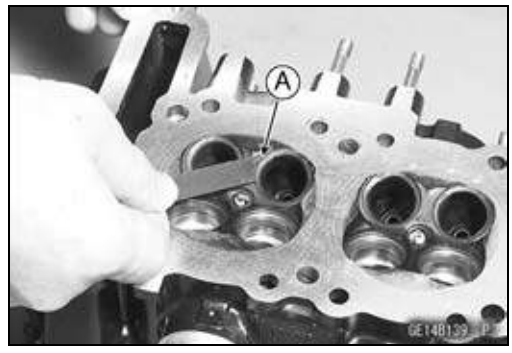
★If the cylinder head is warped more than the service limit, replace it.

★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).

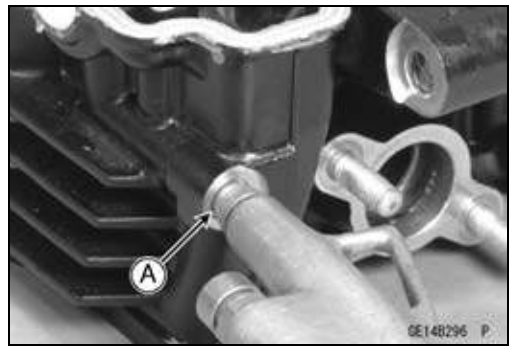


Cylinder Head

Cylinder Head Cleaning



- Remove:
  Cylinder Head (see Cylinder Head Removal)
  Valves (see Valve Removal)
- Scrape [A] the carbon out of the combustion chamber and exhaust port with a suitable tool.
- Wash the cylinder head with a high-flash point solvent.



- Using compressed air, blow out any particles which may obstruct the oil passage [A] in the cylinder head.
- Install the valve (see Valve Installation).
- Install the cylinder head (see Cylinder Head Installation).

Valves

Valve Clearance Inspection

- Refer to Valve Clearance Inspection in the Periodic Maintenance chapter.

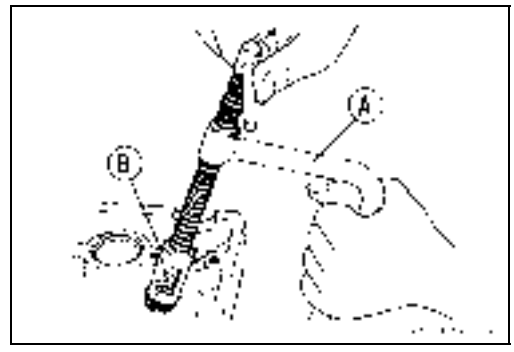
Valve Clearance Adjustment

- Refer to Valve Clearance Adjustment in the Periodic Maintenance chapter.

Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Use the valve spring compressor assembly and the adapter to press down the valve spring retainer.

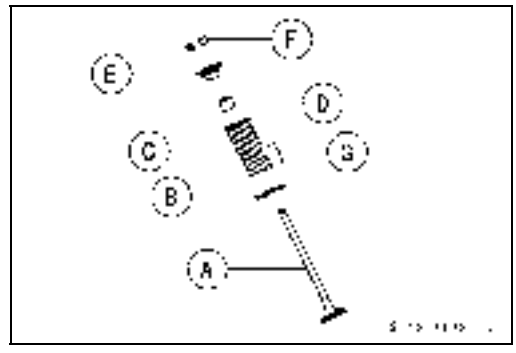
Special Tools - Valve Spring Compressor Assembly: 57001 -241 [A]
Valve Spring Compressor Adapter, ϕ16: 57001-1305 [B]



Valve Installation

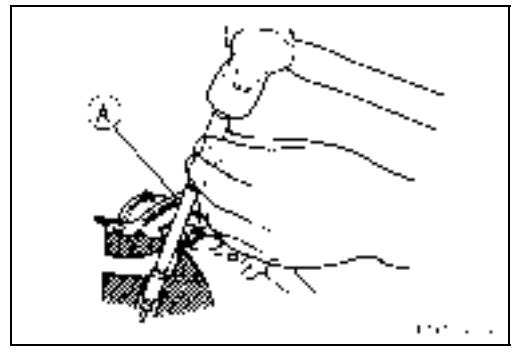
- Replace the oil seal with a new one.
- Apply engine oil to the lip of oil seal.
- Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.
- Install the spring so that the closed coil end faces downwards.

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



Valve Guide Removal

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



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

Special Tool - Valve Guide Arbor, ϕ4.5: 57001-1331

Valve Guide Installation

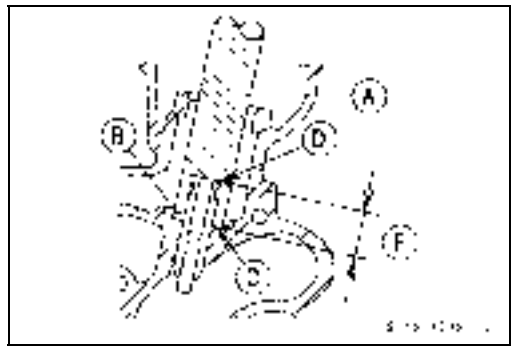
- Apply a thin coat of oil to the outer surface of the valve guide.
- Heat the area around the valve guide up to 120 ~ 150°C (248 ~ 302°F).

CAUTION
Do not heat the cylinder head with a torch. This will warp the cylinder head. Soak the cylinder head and heat the oil.

Valves

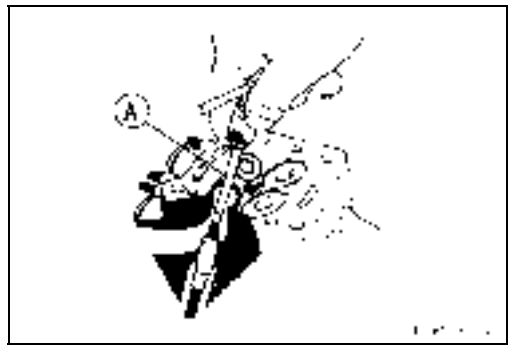
● Using the valve guide driver [A] and washer [B], press and insert the valve guide in until the washer surface [C] touches the head surface [D].
15.3 ~ 15.5 mm [E]

Special Tools - Valve Guide Driver, ϕ4.5: 57001-1564
Washer: 57001-1720



● 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 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 thoroughly.

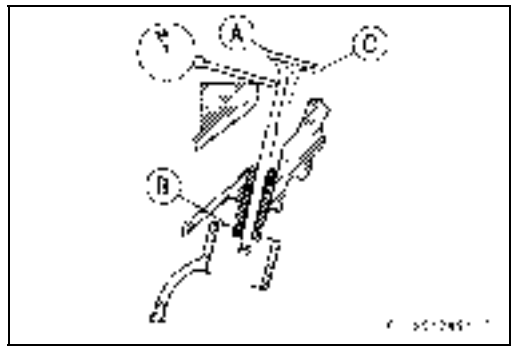
Special Tool - Valve Guide Reamer, ϕ4.5: 57001-1333



Valve-to-Guide Clearance Measurement (Wobble Method)

If a small bore gauge is not available, inspect the valve guide wear by measuring the valve to valve guide clearance with the wobble method as indicated below.

● 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/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.



NOTE

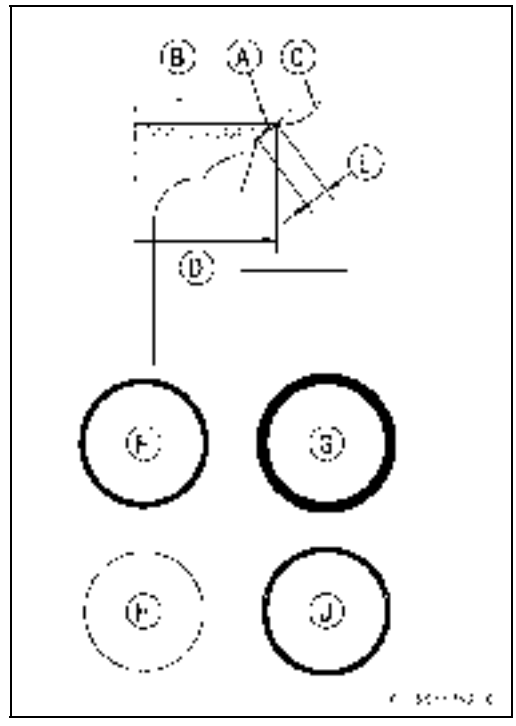
○*The reading is not actual valve/valve guide clearance because the measuring point is above the guide.*

Valve/Valve Guide Clearance (Wobble Method)

Standard:	
Inlet	**0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in.)**
Exhaust	**0.08 ~ 0.15 mm (0.0031 ~ 0.0059 in.)**
Service Limit:	
Inlet	**0.27 mm (0.011 in.)**
Exhaust	**0.33 mm (0.013 in.)**

Valves

Valve Seat Inspection



- Remove the valve (see Valve Removal).
- Check the valve seating 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).

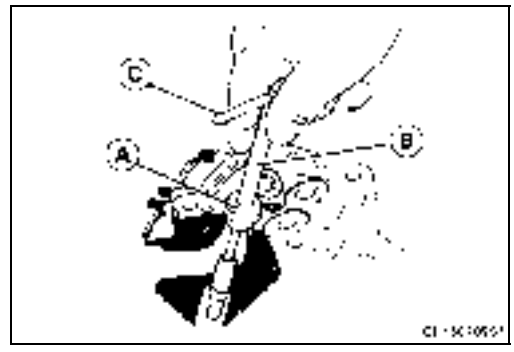
Valve Seating Surface Outside Diameter
Standard:
Inlet 21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in.)
Exhaust 19.3 ~ 19.5 mm (0.7598 ~ 0.7677 in.)

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

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

Valve Seating Surface Width
Standard:
Inlet, Exhaust 0.5 ~ 1.0 mm (0.0197 ~ 0.0394 in.)

Valve Seat Repair



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

Special Tools - Valve Seat Cutter Holder, φ4.5: 57001-1330 [B]
Valve Seat Cutter Holder Bar: 57001-1128 [C]

For Inlet Valve Seat

Valve Seat Cutter, 45° - φ24.5: 57001-1113
Valve Seat Cutter, 32° - φ25: 57001-1118
Valve Seat Cutter, 67.5° - φ22: 57001-1207

For Exhaust Valve Seat

Valve Seat Cutter, 45° - φ24.5: 57001-1113
Valve Seat Cutter, 32° - φ22: 57001-1206
Valve Seat Cutter, 67.5° - φ22: 57001-1207

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

Valves

Seat Cutter Operation Cares

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.

NOTE

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

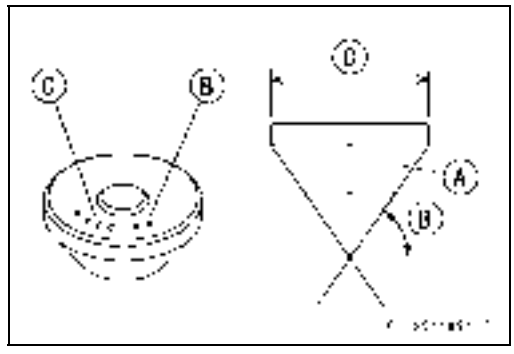
4. Setting the valve seat cutter holder in position, operate the cutter in one hand. Do not apply too much force to the diamond portion.

NOTE

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

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

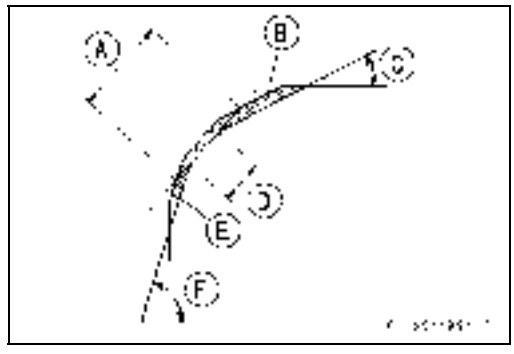
Marks Stamped on the Cutter



The marks stamped on the back of the cutter [A] represent the following.
60° ..... Cutter angle [B]
37.5ϕ ..... Outer diameter of cutter [C]

Operating Procedures

- Clean the seat area carefully.
- Coat the seat with machinist's dye.
- Fit a 45° cutter into the holder and slide it into the valve guide.
- Press down lightly on the handle and turn it right or left. Grind the seating 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.

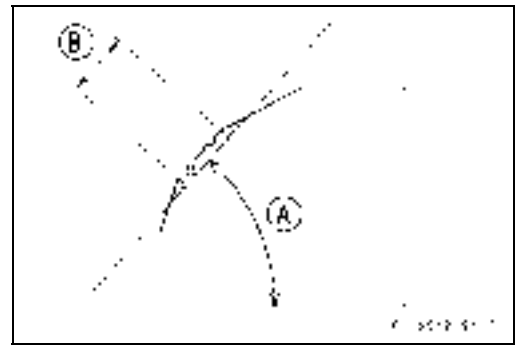
Widened Width [A] of engagement by machining with 45° cutter
Ground Volume [B] by 32° cutter
32° [C]
Correct Width [D]
Ground Volume [E] by 67.5° cutter
67.5° [F]

Valves

● Measure the outside diameter (O.D.) of the seating surface with a vernier caliper.

★If the outside diameter of the seating surface is too small, repeat the 45° grind [A] until the diameter is within the specified range.

Original Seating Surface [B]



NOTE

○*Remove all pittings of flaws from 45° ground surface.*

○*After grinding with 45° cutter, apply thin coat of machinist's dye to seating surface. This makes seating surface distinct and 32° and 67.5° grinding operation easier.*

○*When the valve guide is replaced, be sure to grind with 45° cutter for centering and good contact.*

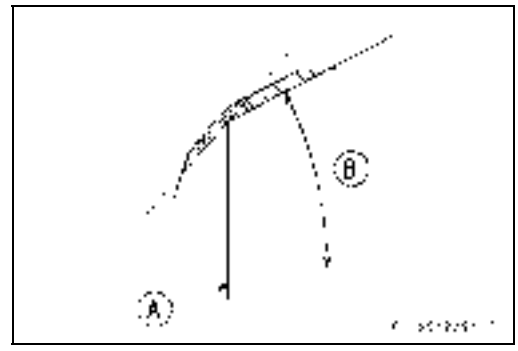
★If the outside diameter of the seating surface is too large, make the 32° grind described below.

● If the outside diameter [A] of the seating surface is within the specified range, measure the seat width as described below.

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

○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.

○After making the 32° grind, return to the seat O.D. measurement step above.

● To measure the seat width, use a vernier caliper to measure the width of the 45° angle portion of the seat at several places around the seat.

★If the seat width is too narrow, repeat the 45° grind until the seat is slightly too wide, and then return to the seat O.D. measurement step above.

★If the seat width is too wide, make the 67.5° [A] grind described below.

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

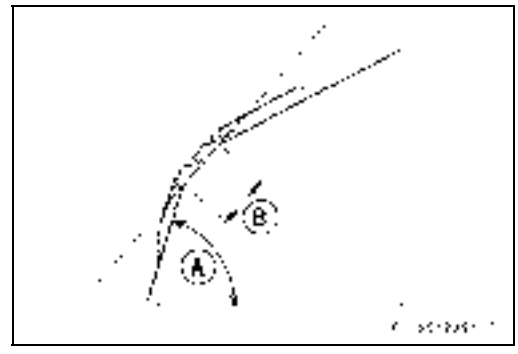
● Grind the seat at a 67.5° angle until the seat width is within the specified range.

○To make the 67.5° grind, fit a 67.5° cutter into the holder, and slide it into the valve guide.

○Turn the holder, while pressing down lightly.

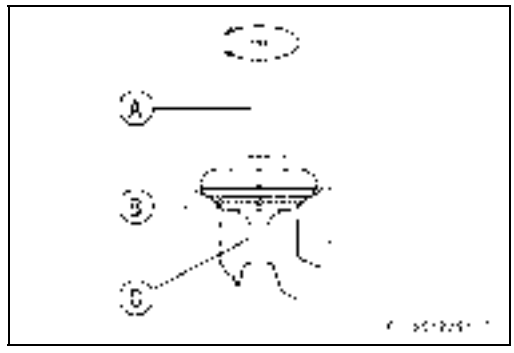
○After making the 67.5° grind, return to the seat width measurement step above.

Correct Width [B]

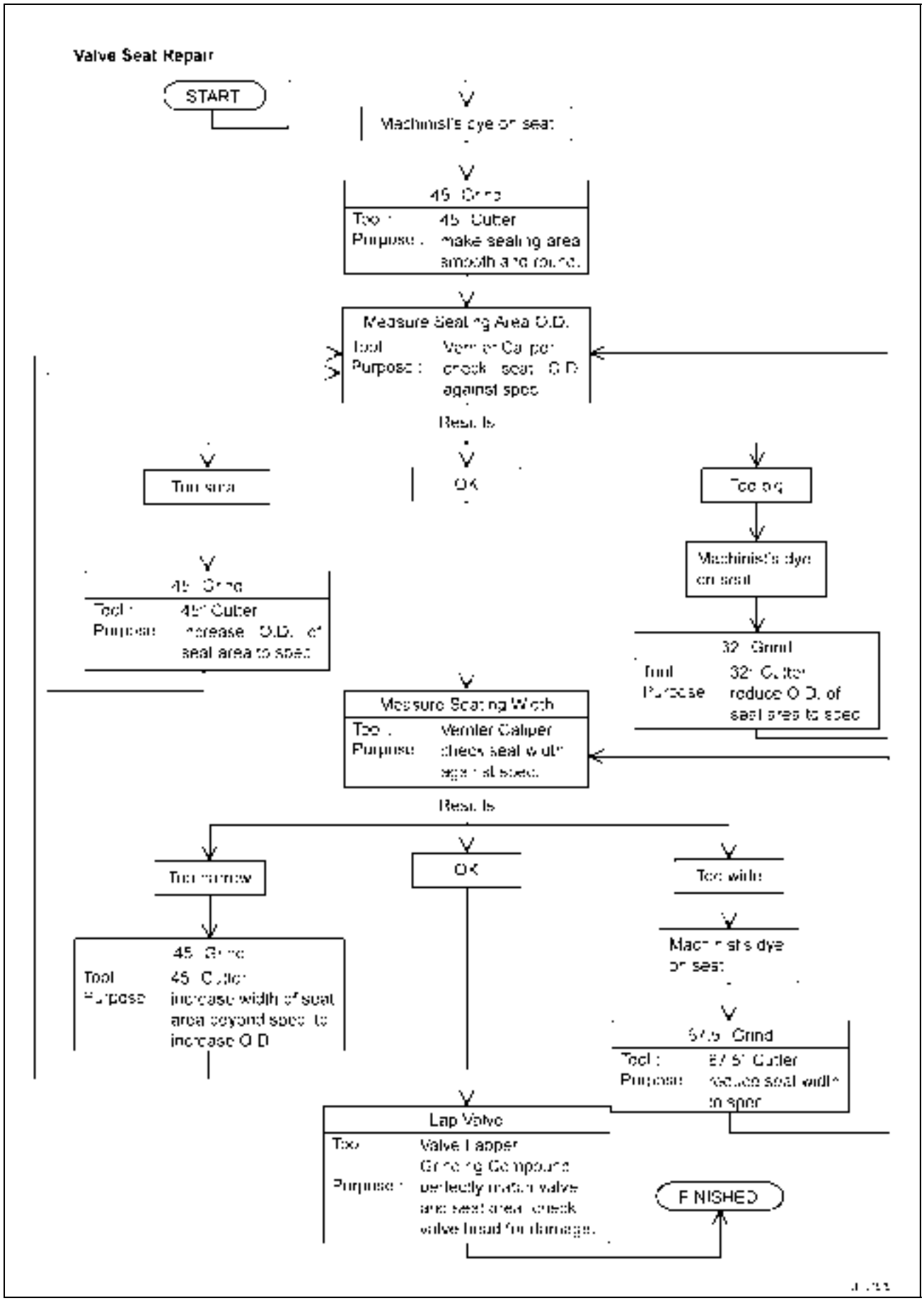


Valves

● 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.
[A] Lapper
[B] Valve Seat
[C] Valve
● The seating 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 engine is assembled, be sure to adjust the valve clearance (see Engine Top End in the Periodic Maintenance chapter).



Valves

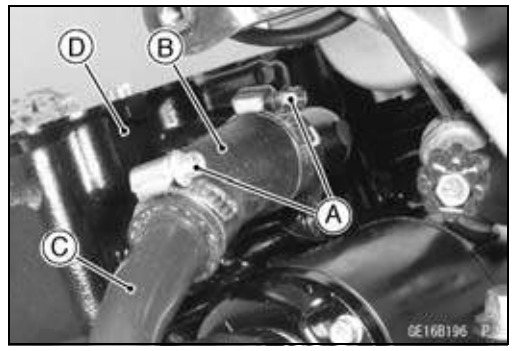

Valve Seat Repair
START
Machinist's dye on seat
45° Grind
Tool : 45° Cutter
Purpose : make sealing area smooth and round
Measure Seating Area O.D.
Tool : Vernier Caliper
Purpose : check seat O.D. against spec
Result
Too small
OK
Too big
Machinist's dye on seat
45° Grind
Tool : 45° Cutter
Purpose : increase O.D. of seat area to spec
32° Grind
Tool : 32° Cutter
Purpose : reduce O.D. of seat area to spec
Measure Seating Width
Tool : Vernier Caliper
Purpose : check seat width against spec
Result
Too narrow
OK
Too wide
45° Grind
Tool : 45° Cutter
Purpose : increase width of seat area beyond spec to increase O.D.
Machinist's dye on seat
45° Grind
Tool : 45° Cutter
Purpose : reduce seat width to spec
Lap Valve
Tool : Valve Lapper
Grinding Compound
Purpose : perfectly match valve and seat area, check valve head for damage.
FINISHED

Cylinder, Pistons

Cylinder Removal

- Remove:
  Cylinder Head (see Cylinder Head Removal)

- Loosen the clamps [A], and take off the water hose [B] and pipe [C].
- Remove the cylinder [D].

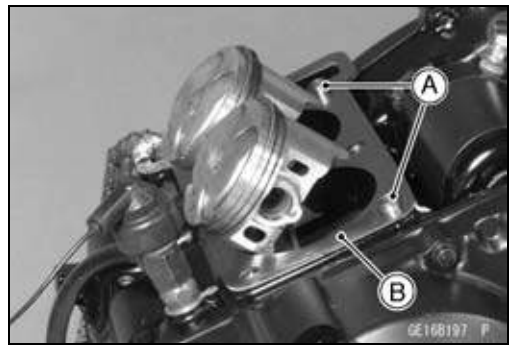


Cylinder Installation

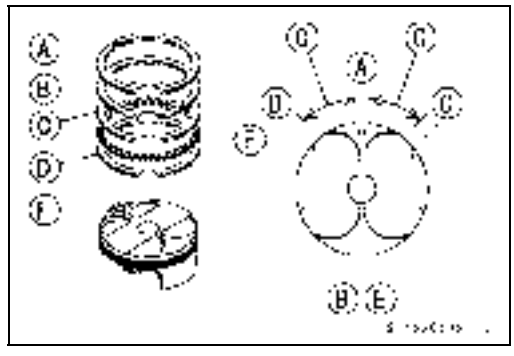
NOTE

○*If a new cylinder is used, use a new piston ring.*

- Install the pins [A] and new cylinder gasket [B].
- Apply molybdenum disulfide oil solution to the cylinder bore, piston rings and pistons.



- 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° of angle from the opening of the top ring.
  [A] Top Ring
  [B] Second Ring
  [C] Oil Ring Steel Rail (Lower)
  [D] Oil Ring Steel Rail (Upper)
  [E] Oil Ring Expander
  [F] Arrow Mark
  [G] 30 ~ 40°



- Slip the piston base [A] as shown to hold piston level, and install the cylinder.

Special Tool - Piston Base, ϕ2.3: 57001-1336



Cylinder, Pistons

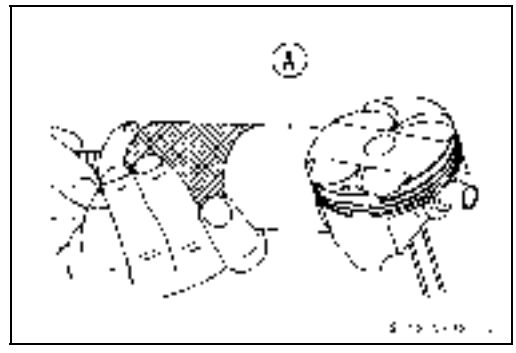
Piston Removal

- 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.

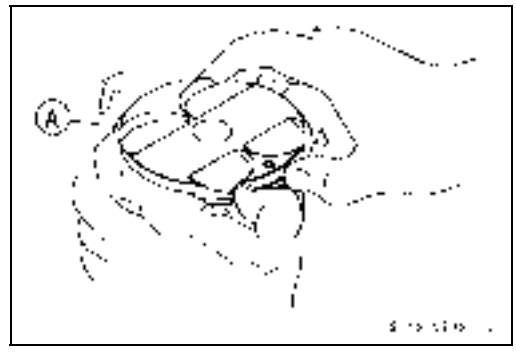


- Remove the piston pins.

Special Tool - Piston Pin Puller Assembly: 57001-910 [A]



- 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.



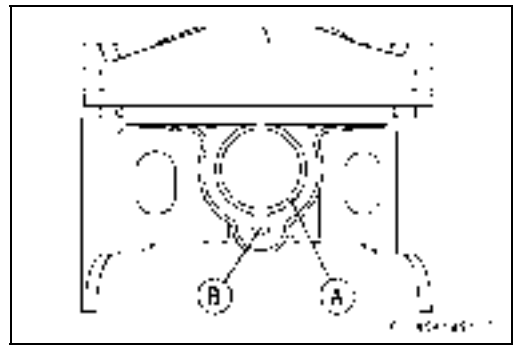
Piston Installation

NOTE

○*If a new piston is used, use a new piston ring.*

- Install the piston with its marking hollow facing forward.
- 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.

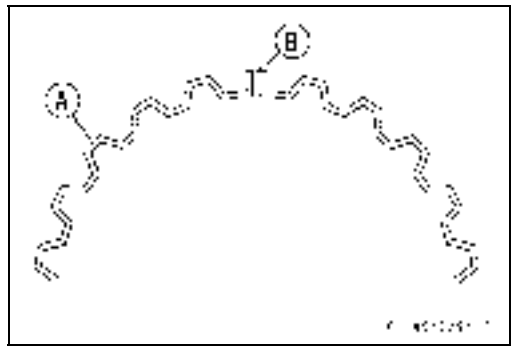


CAUTION

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

Cylinder, Pistons

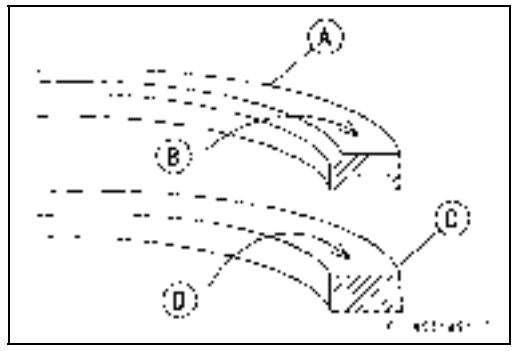
● Install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
● Install the oil ring steel rails, one above the expander and one below it.
○Spread the rail with your thumbs, but only enough to fit the rail over the piston.
○Release the rail into the bottom piston ring groove.



NOTE

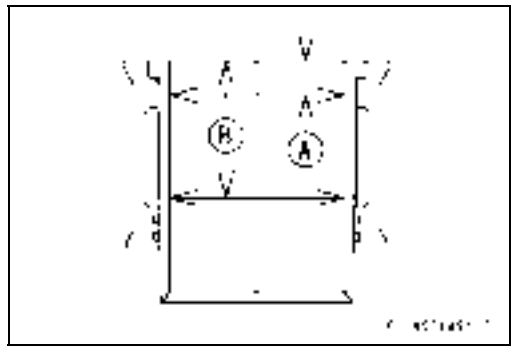
○*The oil ring rails have no "top" or "bottom".*

● Do not mix up the top and second ring.
● Install the top ring [A] so that the "R" mark [B] faces up.
● Install the second ring [C] so that the "RN" mark [D] faces up.
○Apply molybdenum disulfide oil solution to the piston rings.



Cylinder Wear Inspection

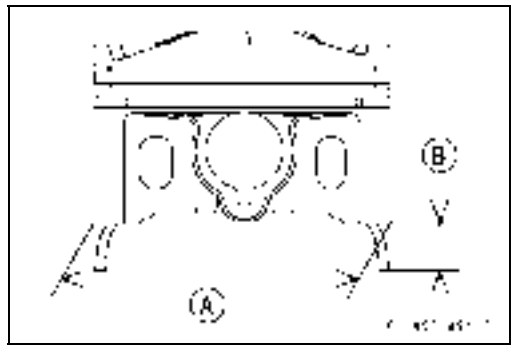
● Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement at each of the two locations (total of four measurements) shown in the figure.
★If any of the cylinder inside diameter measurements exceeds the service limit, replace the cylinder.
[A] 10 mm
[B] 60 mm



Cylinder Inside Diameter
Standard: 62.000 ~ 62.012 mm (2.4409 ~ 2.4414 in.)
Service Limit: 62.10 mm (2.44 in.)

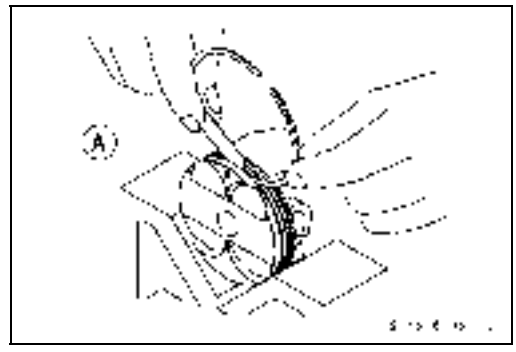
Piston Wear Inspection

● 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 service limit, replace the piston.



Piston Diameter
Standard: 61.942 ~ 61.957 mm (2.4387 ~ 2.4392 in.)
Service Limit: 61.80 mm (2.43 in.)

Cylinder, Pistons



Piston Ring, Piston Ring Groove Wear Insepction

● Check for uneven groove wear by inspecting the ring seating.

★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:

Top	**0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)**
Second	**0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)**

Service Limit:

Top	**0.17 mm (0.0067 in.)**
Second	**0.16 mm (0.0063 in.)**

Piston Ring Groove Width Inspection

● Measure the piston ring groove width.

○Use a vernier caliper at several points around the piston.

Piston Ring/Groove Width

Standard:

Top	**0.82 ~ 0.84 mm (0.0323 ~ 0.0331 in.)**
Second	**0.81 ~ 0.83 mm (0.0319 ~ 0.0327)**
Oil	**1.51 ~ 1.53 mm (0.0594 ~ 0.0602 in.)**

Service Limit:

Top	**0.92 mm (0.0362 in.)**
Second	**0.91 mm (0.0358 in.)**
Oil	**1.61 mm (0.0634 in.)**

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

Piston Ring Thickness Inspection

● Measure the piston ring thickness.

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

Piston Ring Thickness

Standard:

Top	**0.77 ~ 0.79 mm (0.0303 ~ 0.0311 in.)**
Second	**0.77 ~ 0.79 mm (0.0303 ~ 0.0311 in.)**

Service Limit:

Top	**0.70 mm (0.028 in.)**
Second	**0.70 mm (0.028 in.)**

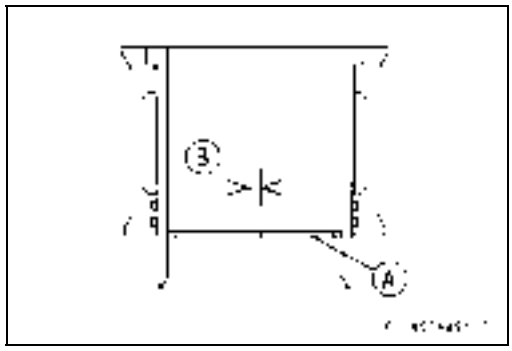
★If any of the measurements is less than the service limit on either of the rings, replace all the rings.

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.*

Cylinder, Pistons

Piston Ring End Gap Inspection



- 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:

Top	**0.15 ~ 0.30 mm (0.0059 ~ 0.0118 in.)**
Second	**0.40 ~ 0.55 mm (0.0157 ~ 0.0217 in.)**
Oil	**0.20 ~ 0.80 mm (0.0079 ~ 0.0315 in.)**

Service Limit:

Top	**0.6 mm (0.024 in.)**
Second	**0.9 mm (0.035 in.)**
Oil	**1.1 mm (0.043 in.)**

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

Boring, Honing

When boring and honing a cylinder, note the following:

○There is one size of oversize piston available. Oversize piston require oversize rings.

Oversize Piston and Ring

0.5 mm Oversize

○Before boring a cylinder, first measure the exact diameter of the oversize piston, and then, according to the standard clearance in the Service Specification Section, determine the rebore diameter. However, if the amount of boring necessary would make the inside diameter greater than **0.5 mm** oversize, the cylinder block must be replaced.

○Cylinder inside diameter must not vary more than **0.01 mm (0.0004 in.)** at any point.

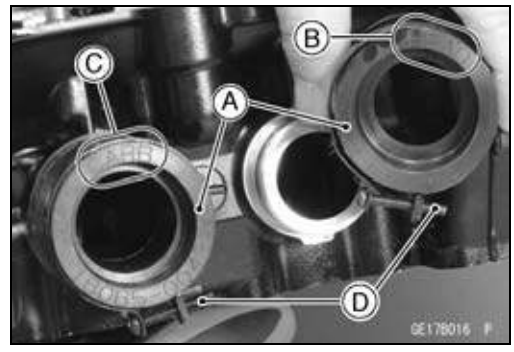
○Be wary of measurements taken immediately after boring since the heat affects cylinder diameter.

○In the case of a rebored cylinder and oversize piston, the service limit for the cylinder is the diameter that the cylinder was bored to plus **0.1 mm (0.004 in.)** and the service limit for the piston is the oversize piston original diameter minus **0.15 mm (0.006 in.).** If the exact figure for the rebored diameter is unknown, it can be roughly determined by measuring the diameter at the base of the cylinder.

○Never separate the liner from the cylinder, because the top surface of cylinder and liner is machined at the factory as an assembly.

Carburetor Holder

Carburetor Holder Installation



- Install the carburetor holders [A] so that the “HEAD” marks [B] faces forward (cylinder head side), and “CARB” mark [C] faces backward (carburetor side).
- Install the holder clamps as shown being careful of the screw [D] position and the screw head direction.

⚠ WARNING

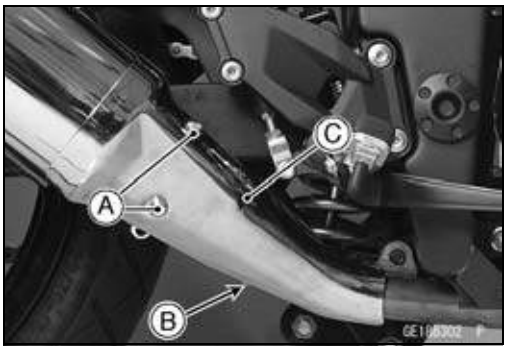
Install the clamp screws horizontally. Otherwise the screws could come in contact with the vacuum adjusting screws, resulting in an unsafe riding condition.

Muffler

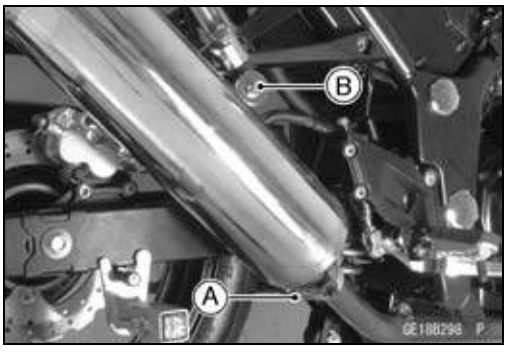
Muffler Removal

● Remove:
Lower Fairings (see Lower Fairing Removal in the Frame chapter)

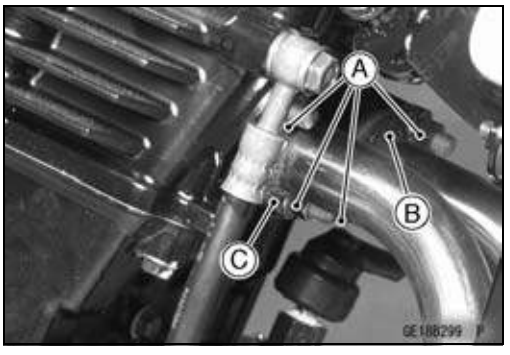
● Remove:
Muffler Cover Bolts [A]
Muffler Cover Clamp Bolt [B]
Muffler Cover [C]



● Loosen the muffler clamp bolt [A] until the clamp turns freely on the mufflers..
● Remove the muffler mounting bolt [B] and nuts at the rear footpeg bracket, and take off the left and right mufflers.



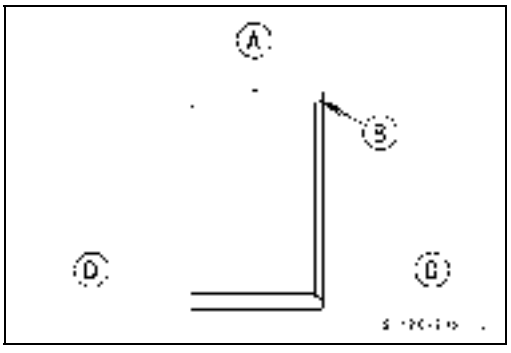
● Remove the exhaust pipe holder nuts [A], and slide the holders [B] [C] off its cylinder head studs.
● Remove the split keepers.
● Pull the exhaust pipe toward the front and remove it.
● Remove the gaskets and the exhaust pipe holders from the exhaust pipe.



CAUTION
Be careful not to touch the radiator fins during work. The fins are easily deformed.

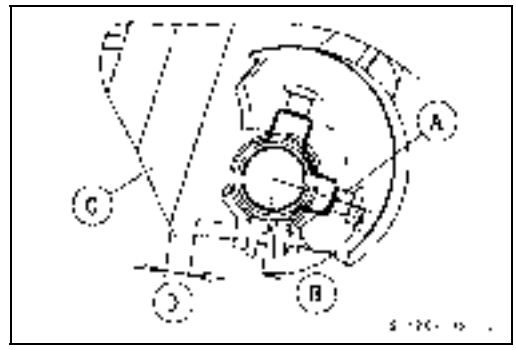
Muffler Installation

● Smear a little grease on a new exhaust pipe gasket and stick it into the exhaust port in the cylinder head.
● Slip the exhaust pipe holder over the exhaust pipe.
● Attach the exhaust pipe loosely to the cylinder head.
○Position the exhaust pipe in the exhaust port.
○Slide the holders into the studs holding the split keeper in place.
○Screw in the nuts loosely on the studs so that the holders does not fall down.
● Slip the muffler into place from the rear of the frame so that it fits over the exhaust pipe.
● Install the gasket [A] so that its chamfer side [B] faces manifold side.
Manifold Side [C]
Muffler Side [D]
● Hold the muffler up and install the mounting bolts not to tighten them securely.
● Tighten the exhaust pipe holder nuts evenly and securely.
● Tighten the muffler mounting bolts securely.

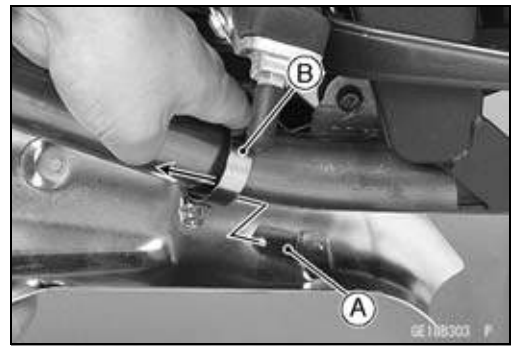


Muffler

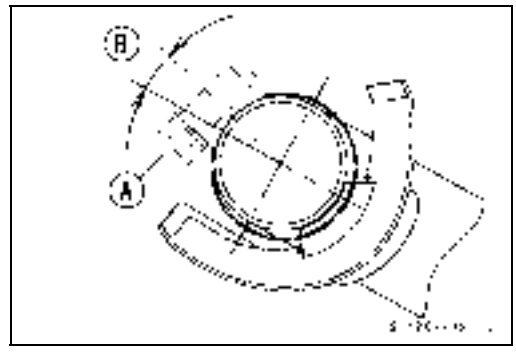
● Tighten the muffler clamp bolt [A] securely waving the direction of the clamp bolts.
74° ~ 84° [B]
○Be sure that the distance between the clamp bolt end and the swingarm [C] is more than 15 mm [D].



● Insert the claw [A] into the cover clamp [B] and tighten the clamp screw securely.



○Be sure that the position of muffler cover clamp screw [A] is as shown.
approx. 15° [B]



Exhaust System Inspection

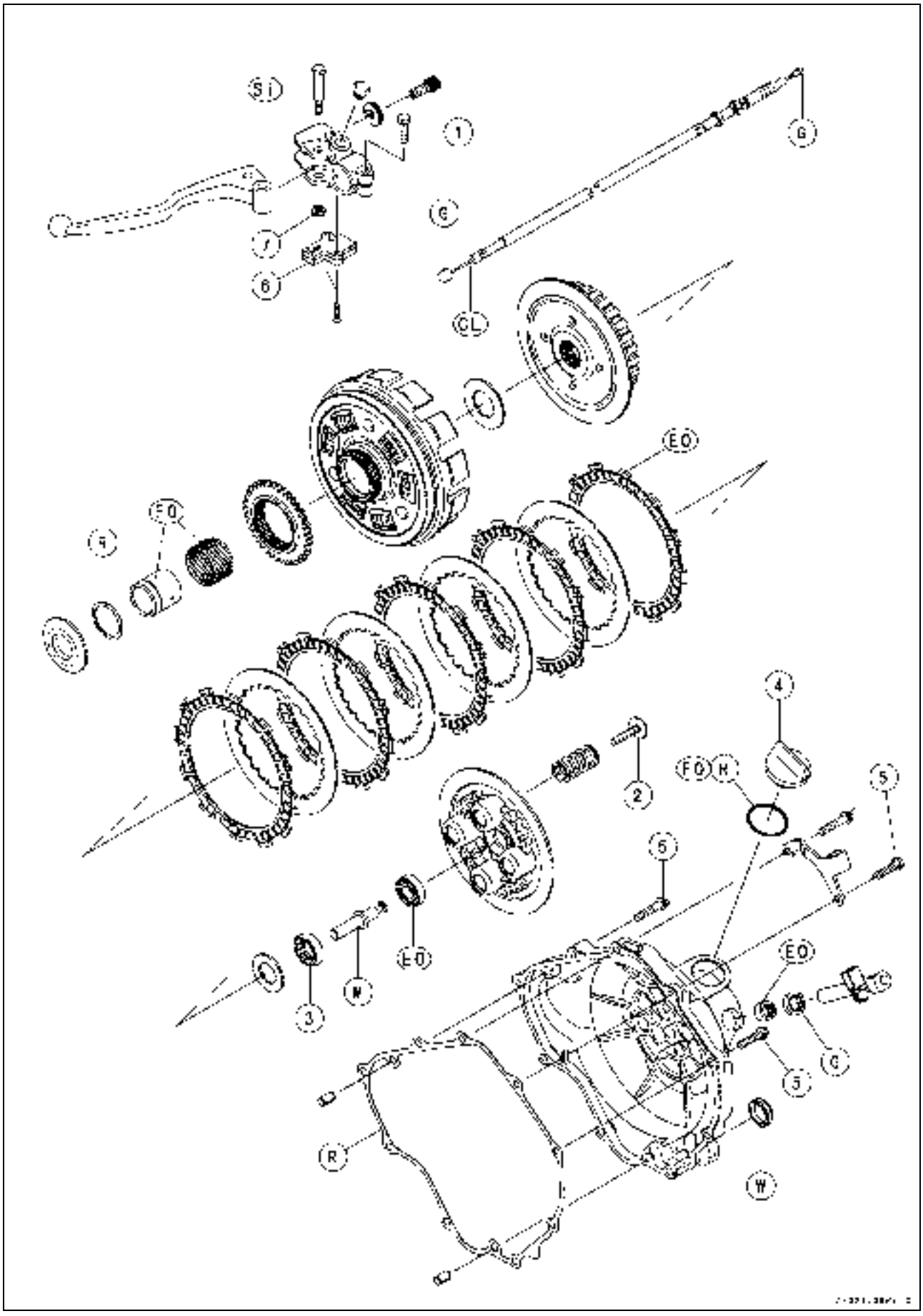
● Before removing the exhaust system, check for signs of leakage at the exhaust pipe gasket in the cylinder head and at the muffler clamp.
★If there are signs of leakage around the exhaust pipe gasket, it should be replaced. If the muffler to exhaust pipe joint leaks, tighten the clamp.
● Remove the exhaust system (see Muffler Removal).
● Inspect the gasket for damage and signs of leakage.
★If the gasket is damaged or has been leaking, replace it.
● Check the exhaust pipe and muffler for dents, cracks, rust and holes.
★If the exhaust pipe or muffler is damaged or holes, it should be replaced for best performance and least noise.

Clutch

Table of Contents

Exploded View 6-2
Specifications 6-4
Special Tool and Sealant 6-5
Clutch Lever and Cable 6-6
Clutch Lever Free Play Inspection 6-6
Clutch Lever Free Play Adjustment 6-6
Clutch Cable Removal 6-6
Clutch Cable Lubrication 6-6
Clutch Lever Removal 6-6
Clutch Cover 6-7
Clutch Cover Removal 6-7
Clutch Cover Installation Note 6-7
Clutch Release Shaft Removal 6-7
Clutch Release Shaft Installation 6-7
Clutch 6-8
Clutch Removal 6-8
Clutch Installation 6-8
Clutch Plate Wear and Damage Inspection 6-10
Clutch Plate Warp Inspection 6-10
Clutch Spring Free Length Inspection 6-10
Clutch Housing Finger Damage Inspection 6-11
Clutch Hub Spline Damage Inspection 6-11

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Clutch Lever Holder Clamp Bolts	8.8	0.9	78 in·lb	
2	Clutch Spring Bolts	8.8	0.9	78 in·lb	
3	Clutch Hub Nut	132	13.5	97.4	
4	Oil Filler Plug	–	–	–	Hand-Tighten
5	Clutch Cover Bolts	9.8	1.0	87 in·lb	

6. Starter Lockout Switch
7. Clutch Lever Pivot Nut

CL: Apply cable lubricant.
EO: Apply engine oil.
G: Apply grease.
M: Apply molybdenum disulfide grease.
R: Replacement Parts
Si: Apply silicone grease.
W: Apply water.

6-4 CLUTCH

Specifications

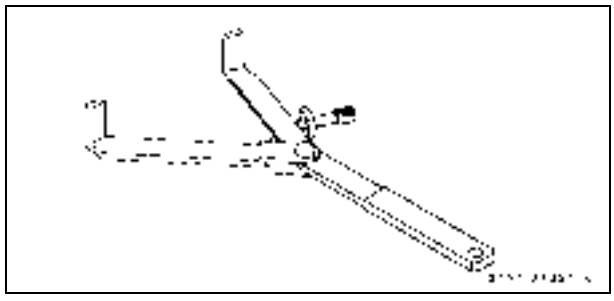
Item	Standard	Service Limit
Clutch		
Clutch Lever Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	– – –
Clutch Spring Free Play	38.5 mm (1.52 in.)	36.8 mm (1.45 in.)
Friction Plate Thickness	2.92 ~ 3.08 mm (0.115 ~ 0.121 in.)	2.6 mm (0.10 in.)
Friction and Steel Plate Warp	0.15 mm (0.0059 in.) or less	0.3 mm (0.012 in.)

Clutch Housing Gear Selection when Replacing Clutch Housing Gear

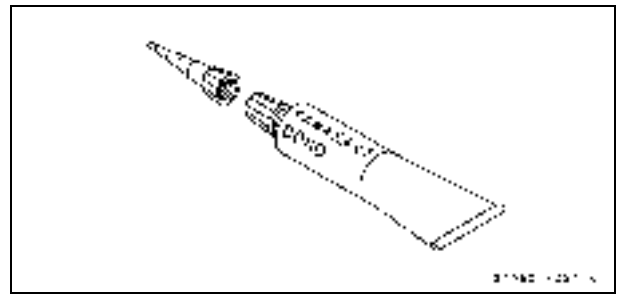
Crankshaft		Clutch Housing		
Primary Gear Marking [C]	**Color [D]**	**Gear Marking [E]**	**Color [F]**	**Part Number**
A	White	A	White	13095-0095
A	White	B	Red	13095-0096
B	Red	B	Red	13095-0096
B	Red	C	None	13095-0097
C	None	C	None	13095-0097
C	None	D	Yellow	13095-0098
D	Yellow	D	Yellow	13095-0098

Special Tool and Sealant

Clutch Holder:
57001-1243



Kawasaki Bond (Silicone Sealant):
56019-120



Clutch Lever and Cable

Clutch Lever Free Play Inspection

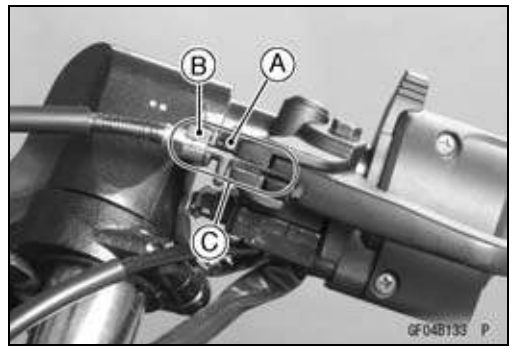
- Refer to Clutch Operation Inspection in the Periodic Maintenance chapter (see Clutch Operation Inspection in the Periodic Maintenance chapter).

Clutch Lever Free Play Adjustment

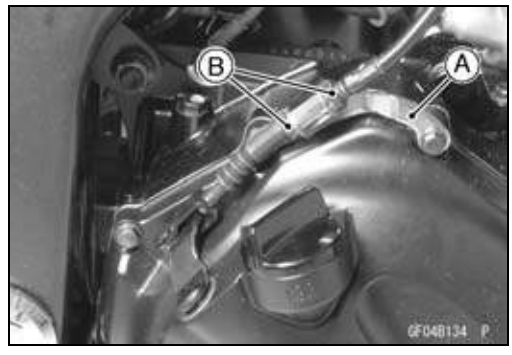
- Refer to Clutch Operation Inspection in the Periodic Maintenance chapter (see Clutch Operation Inspection in the Periodic Maintenance chapter).

Clutch Cable Removal

- Remove:
  Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)
- Loosen the knurled locknut [A] at the clutch lever, and screw in the adjuster [B].
- Line up the slots [C] in the clutch lever, locknut, and adjuster and then free the cable from the lever.



- Remove the lower cable adjuster of clutch cable from the cable holder [A] loosening the cable adjuster lock nuts [B].
- Free the clutch inner cable tip from the clutch release lever.

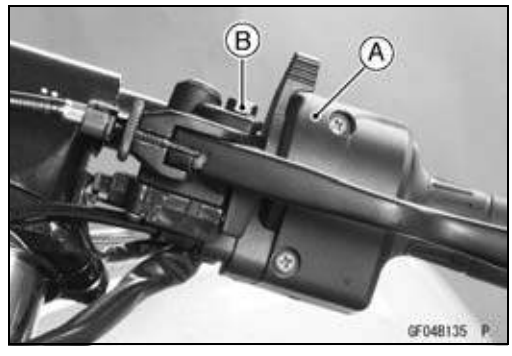


Clutch Cable Lubrication

- Refer to Chassis Parts Lubrication in the Periodic Maintenance chapter (see Chassis Parts Lubrication in the Periodic Maintenance chapter).

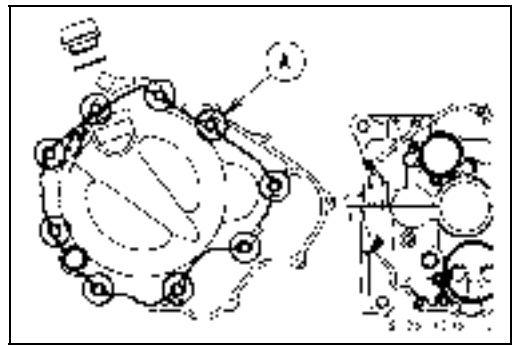
Clutch Lever Removal

- Remove the upper end of clutch cable.
- Remove the left switch housing [A].
- Remove the clutch lever mounting bolt [B] and nut, and remove the clutch lever.



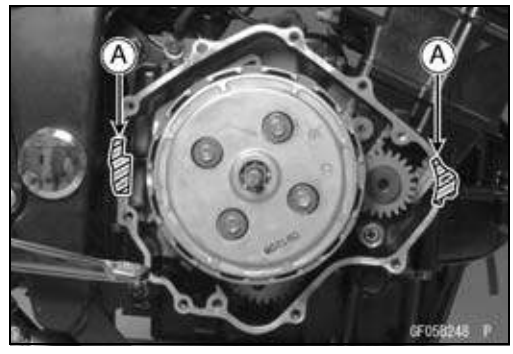
Clutch Cover

Clutch Cover Removal



- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove:
  Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)
  Clutch Cable (see Clutch Cable Removal)
  Oil Filler Plug
- Remove the clutch cover mounting bolts [A] and the clutch cable guide.
- Turn the clutch release lever couterclockwise fully to release the clutch release shaft.

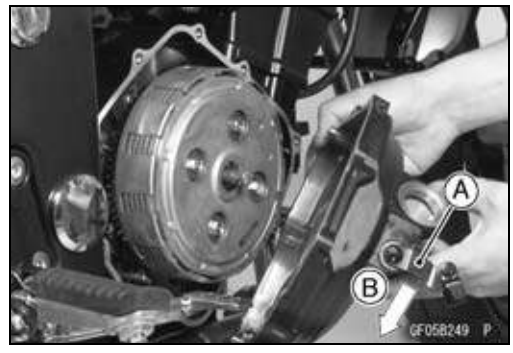
Clutch Cover Installation Note



- Scrape the old gasket from the surface of clutch cover and crankcase, and apply silicone sealant on the mating surface [A] of the crankcases.
- Install the new clutch cover gasket.

Special Tool - Kawasaki Bond (Silicone Sealant): 92104 -0004

- Turn the clutch release lever [A] counterclockwise fully [B] and install the clutch cover.



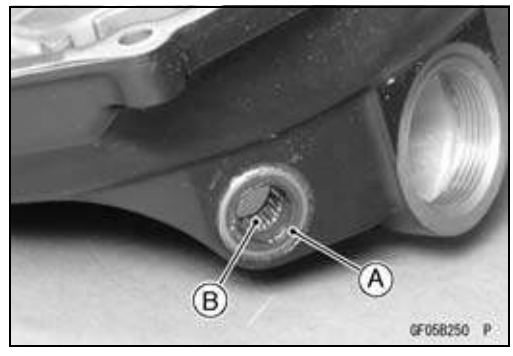
Clutch Release Shaft Removal

- Remove:
  Clutch Cable (see Clutch Cable Removal)
  Clutch Cover (see Clutch Cover Removal)
- Pull out the clutch release shaft from the clutch cover.

NOTE

○*Do not damage the oil seal when it shall be inserted into the clutch cover hole.*

Clutch Release Shaft Installation

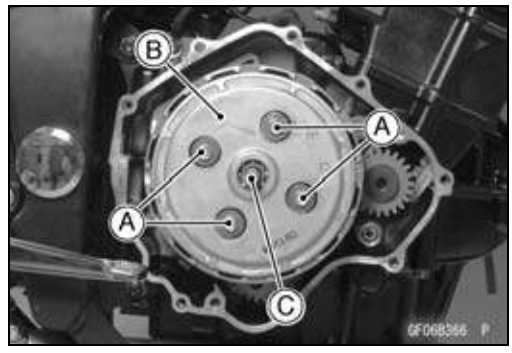


- Apply engine oil to the oil seal [A] and needle bearing [B].
- Insert the clutch release shaft into the clutch cover hole.
- Install:
  Clutch Cover (see Clutch Cover Installation)
  Clutch Cable (see Clutch Cable Installation)

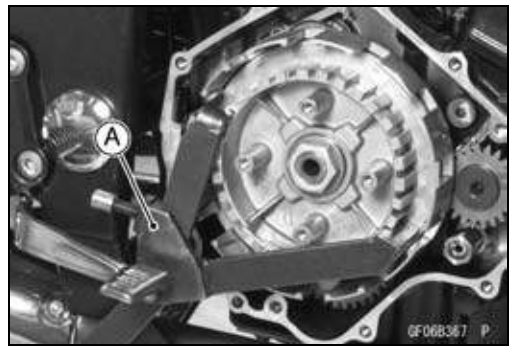
CAUTION
When inserting the release shaft, be careful not to remove the spring of the oil seal.

Clutch

Clutch Removal



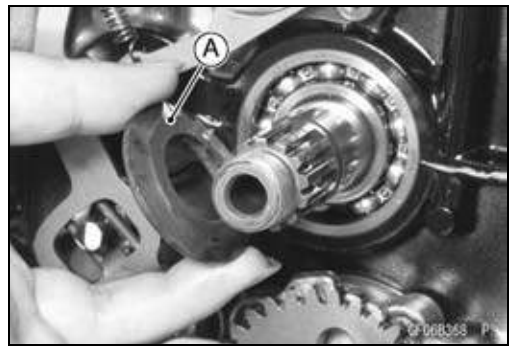
- Remove:
  Clutch Cable (see Clutch Cable Removal)
  Clutch Cover (see Clutch Cover Removal)
- Remove the clutch spring mounting bolts [A], springs, clutch operating plate [B] with the clutch push rod [C].
- Remove the clutch steel plates and friction plates.



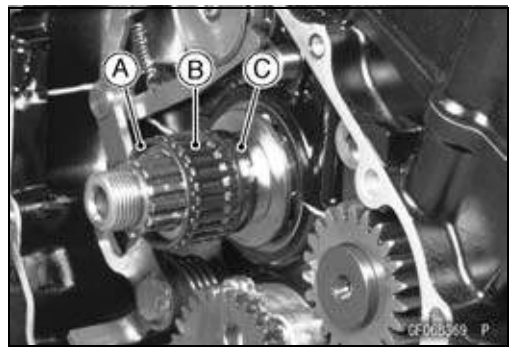
- Remove the clutch hub nut using the special tool [A].
- Remove the washer, clutch housing, needle bearing, bushing and the thrust spacer.

Special Tool - Clutch Holder: 57001-1243

Clutch Installation



- Install the thrust spacer [A] so that the chamfer side of it faces to inside of the engine.



- Install the spacer bushing [A] and needle bearing [B].
- ○Install the snap ring [C] on the bushing so that it faces to inside of the engine.

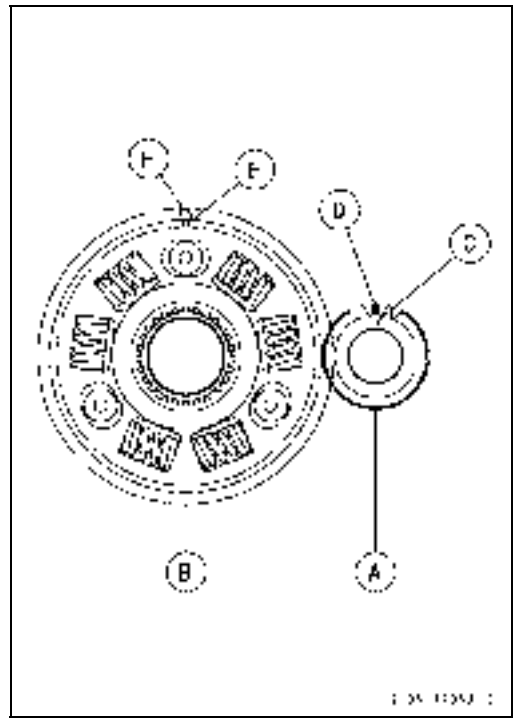
- Install the clutch housing, clutch hub, washer and the clutch hub nut.
- Tighten the clutch hub nut with the specified torque.

Special Tool - Clutch Holder: 57001-1243

Torque - Clutch Hub Nut: 132 N·m (13.5 kgf·m, 97.4 ft·lb)

Clutch

- If the clutch housing is replaced with a new one, select the proper clutch housing in accordance with the combination of the clutch housing gear and crankshaft primary gear markings with colors.
  Crankshaft Primary Gear [A]
  Clutch Housing Gear [B]
- Be sure to confirm the marking and color on the clutch housing gear.



Clutch Housing Gear Selection when Replacing Clutch Housing Gear

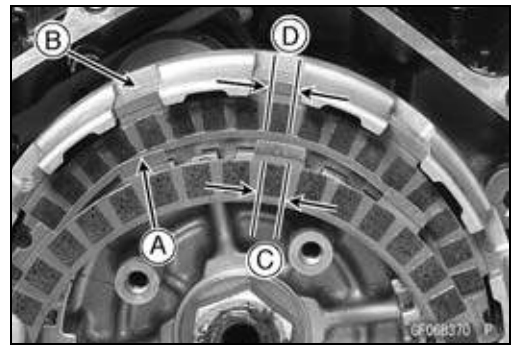
Crankshaft		Clutch Housing		
Primary Gear Marking [C]	Color [D]	Gear Marking [E]	Color [F]	Part Number
A	White	A	White	13095-0095
A	White	B	Red	13095-0096
B	Red	B	Red	13095-0096
B	Red	C	None	13095-0097
C	None	C	None	13095-0097
C	None	D	Yellow	13095-0098
D	Yellow	D	Yellow	13095-0098

NOTE

○*If the selection mark and color are missing or not selection, refer to the selection section in the specifications of the Crankshaft/Transmission chapter.*

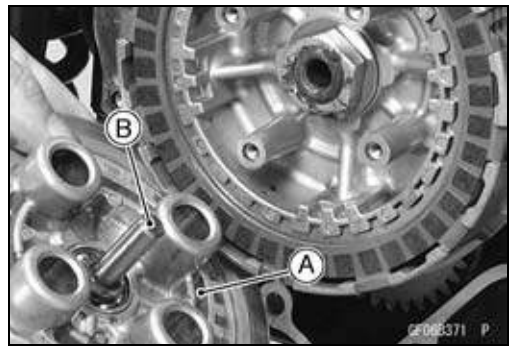
- Install the friction plate first and clutch steel plate, and afterward install them alternately.

○The outer-end [A] and inner-end [B] friction plate blocks are wider than the others.
Wider [C]
Narrower [D]



Clutch

● Install the clutch operating plate [A] with the clutch push rod [B].



● Install the springs and tighten the clutch spring bolts with specified torque.

Torque - Clutch Spring Bolts: 8.8 N·m (0.9 kgf·m, 78 in·lb)

● Install the clutch cover (see Clutch Cover Installation).

Clutch Plate Wear and Damage Inspection

● Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration), or uneven wear.

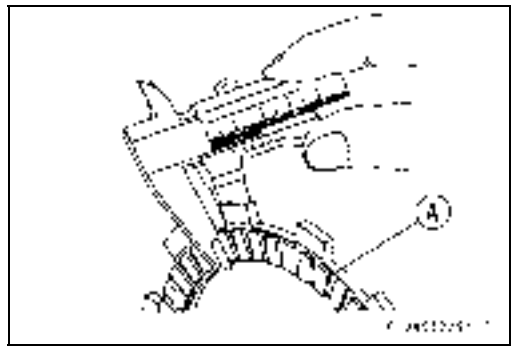
● Measure the thickness of each friction plate [A] at several points.

★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: 2.92 ~ 3.08 mm (0.115 ~ 0.121 in.)

Service Limit: 2.6 mm (0.10 in.)



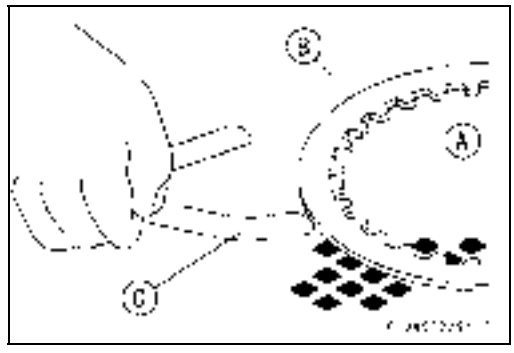
Clutch Plate Warp Inspection

● 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 and Steel Plate Warp

Service Limit: 0.3 mm (0.012 in.)



Clutch Spring Free Length Inspection

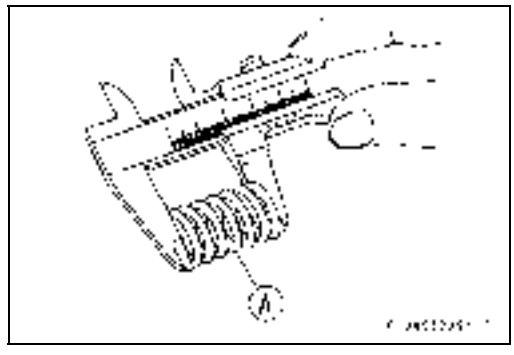
● Measure the free length of the clutch springs [A].

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

Clutch Spring Free Length

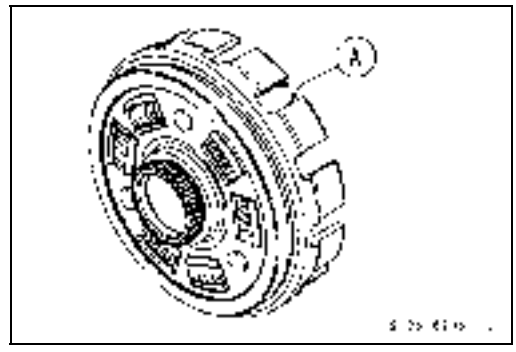
Standard: 38.5 mm (1.52 in.)

Service Limit: 36.8 mm (1.45 in.)



Clutch

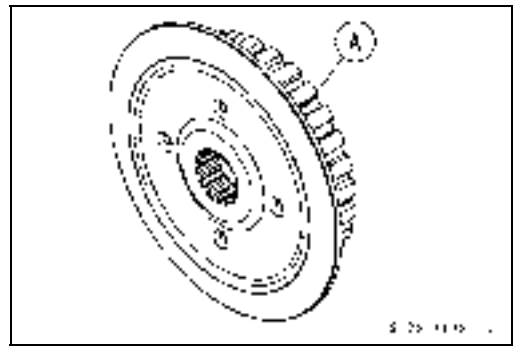
Clutch Housing Finger Damage Inspection



- Visually inspect the clutch housing fingers [A] that come in contact with the friction plate tangs.

★If they are damaged or if there are groove cuts in the areas that come in contact with the tangs, replace the housing. Replace the friction plates if their tangs are damaged as well.

Clutch Hub Spline Damage Inspection



- Visually inspect the areas of the clutch hub splines that come in contact with the teeth of the steel plates.

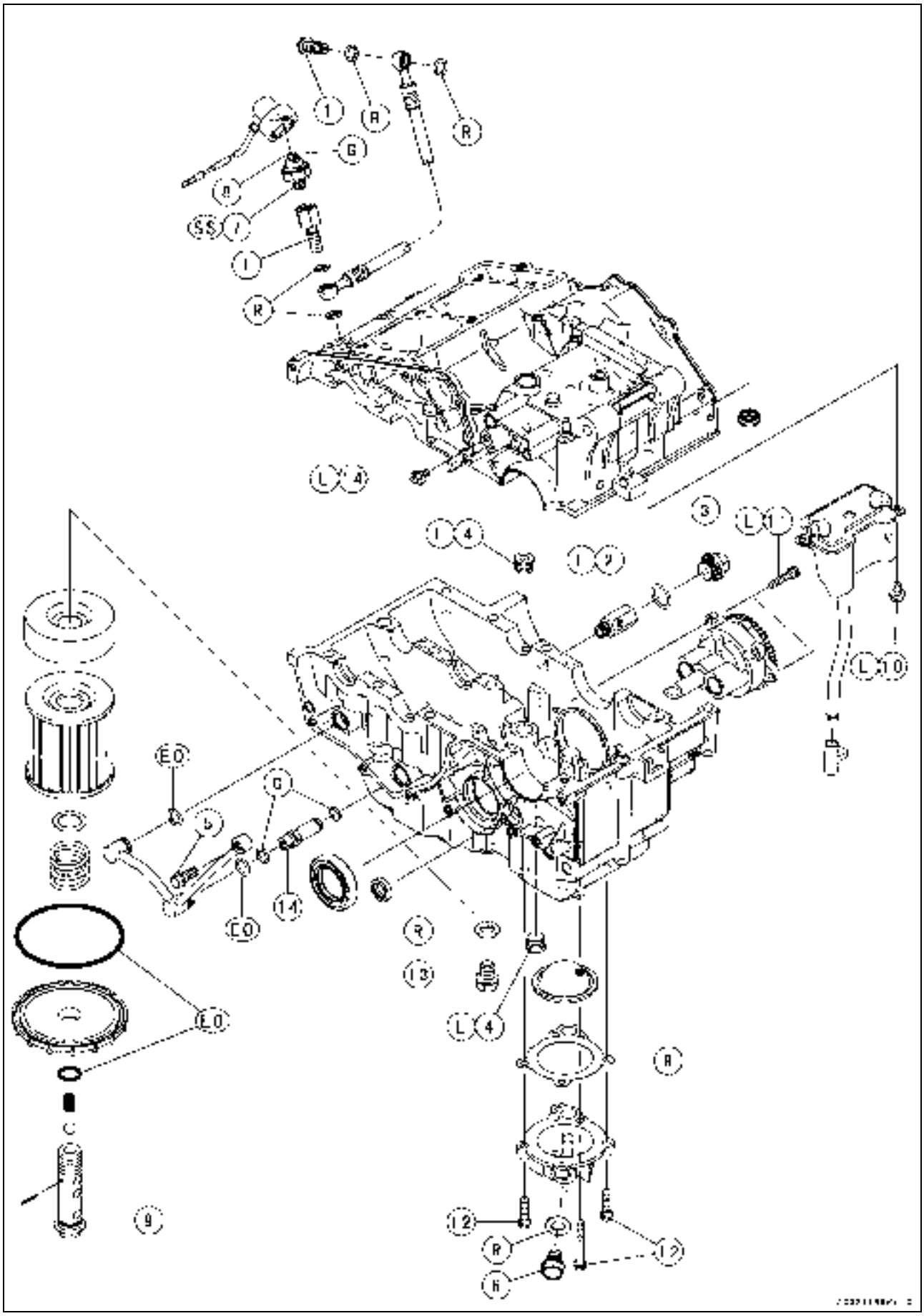
★If there are notches worn into the clutch hub splines [A], replace the clutch hub. Replace the steel plates if their teeth are damaged as well.

Engine Lubrication System

Table of Contents

Exploded View 7-2
Specifications 7-4
Special Tools and Sealant 7-5
Engine Oil Flow Chart 7-6
Engine Oil and Oil Filter 7-7
  Oil Level Inspection 7-7
  Engine Oil Change 7-7
  Oil Filter Replacement 7-7
  Bypass Valve Disassembly 7-8
  Bypass Valve Assembly 7-8
  Bypass Valve Cleaning and Inspection 7-8
  Oil Screen Cleaning and Inspection 7-9
Oil Pressure Relief Valve 7-10
  Oil Pressure Relief Valve Removal 7-10
  Oil Pressure Relief Valve Installation 7-10
  Oil Pressure Relief Valve Inspection 7-10
Oil Pump 7-11
  Oil Pump Removal 7-11
  Oil Pump Installation 7-11
  Oil Pump Disassembly 7-11
  Oil Pump Assembly 7-11
  Oil Pump Inspection 7-11
Oil Pressure Measurement 7-12
  Oil Pressure Measurement 7-12
Oil Pressure Switch 7-13
  Oil Pressure Switch Removal 7-13
  Oil Pressure Switch Installation 7-13

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Oil Hose Banjo Bolts	19.6	2.0	14.5	
2	Oil Pressure Relief Valve	15	1.5	11	L
3	Crankcase Oil Passage Plug	15	1.5	11	
4	Oil Passage Plugs for Oil Pump	20	2.0	15	L
5	Oil Pipe Banjo Bolts	12	1.2	104 in·lb	
6	Oil Drain Bolt	19.6	2.0	14.5	
7	Oil Pressure Switch	15	1.5	11	SS
8	Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	
9	Oil Filter Mounting Bolts	19.6	2.0	14.5	
10	Oil Breather Mounting Bolts	9.8	1.0	87 in·lb	L
11	Oil Pump Mounting Bolts	9.8	1.0	87 in·lb	L
12	Oil Screen Cover Bolts	9.8	1.0	87 in·lb	
13	Plug	19.6	2.0	14.5	
14	Breather Bolt	9.8	1.0	87 in·lb	

EO: Apply engine oil.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
SS: Apply silicone sealant (Kawasaki Bond: 56019-120).

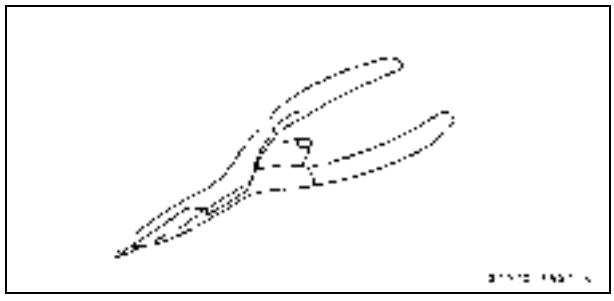
7-4 ENGINE LUBRICATION SYSTEM

Specifications

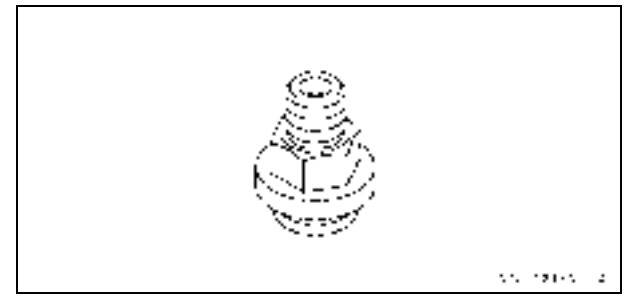
Item	Standard
Engine Oil	
Grade	API SE, SF or SG API SH, SJ or SL with JASO MA
Viscosity	SAE 10W-40
Capacity	1.3 L (1.37 US gt) (when filter is not removed) 1.6 L (1.69 US gt) (when filter is removed) 1.7 L (1.80 US gt) (when engine is completely dry)
Oil Pressure Measurement	
Oil Pressure @4 000 r/min (rpm), Oil Temperature 90°C (194°F)	98 ~ 147 kPa (1.0 ~ 1.5 kgf/cm², 14 ~ 21 psi)

Special Tools and Sealant

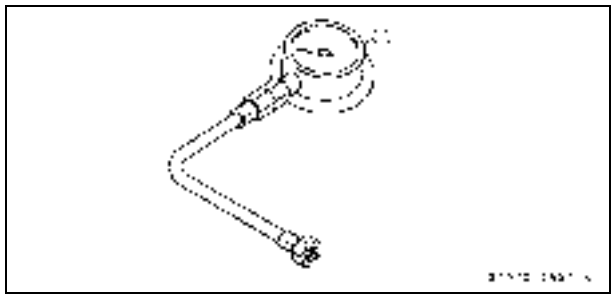
Outside Circlip Pliers:
57001-144



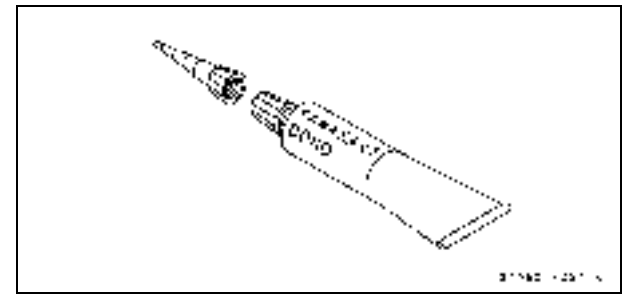
Oil Pressure Gauge Adapter, M18 × 1.5:
57001-1278



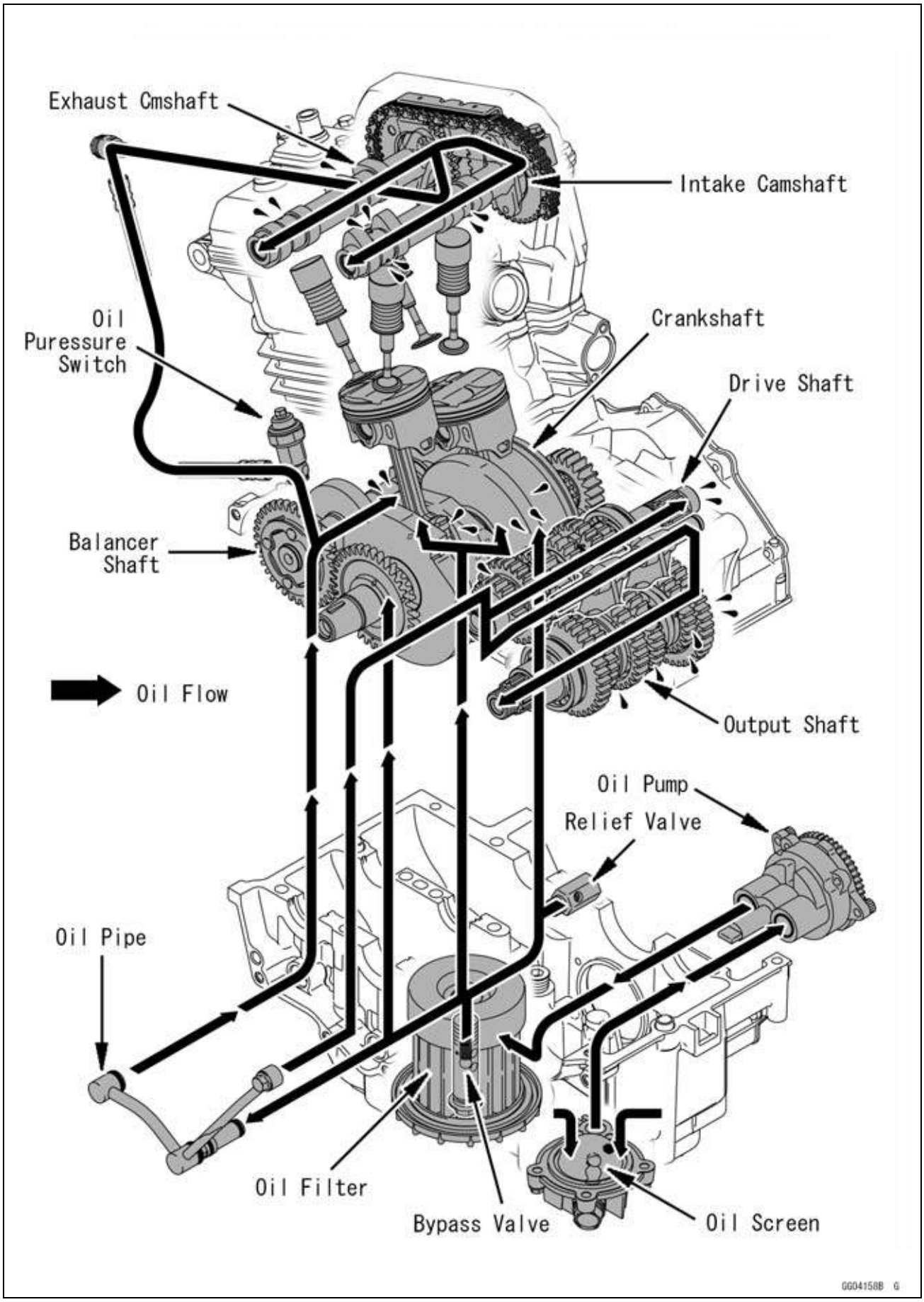
Oil Pressure Gauge, 10 kgf/cm²:
57001-164



Kawasaki Bond (Silicone Sealant):
56019-120



Engine Oil Flow Chart

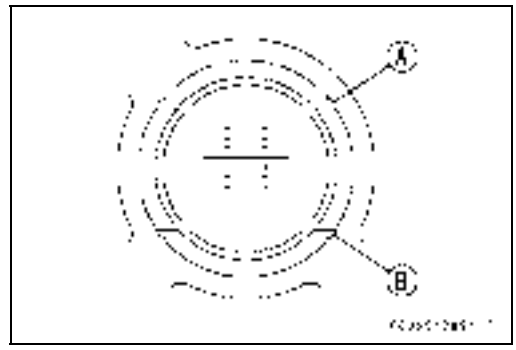


Engine Oil and Oil Filter

⚠ 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



- Check that the engine oil level is between the upper [A] and lower [B] levels in the gauge.

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

★If the oil level is too low, add 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

○*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.*

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

CAUTION

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

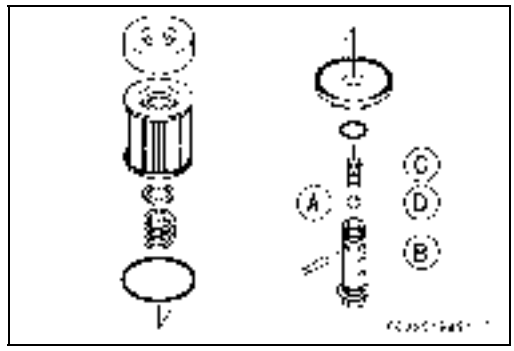
Engine Oil Change

- Refer to Engine Oil Change in the Periodic Maintenance chapter (see Engine Oil Change in the Periodic Maintenance chapter).

Oil Filter Replacement

- Refer to Oil Filter Replacement in the Periodic Maintenance chapter (see Oil Filter Replacement in the Periodic Maintenance chapter).

Engine Oil and Oil Filter



Bypass Valve Disassembly

- Remove the oil filter (see Oil Filter Replacement in the Periodic Maintenance chapter).

NOTE

○*Oil draining is not necessary, but place the oil pan under the oil filter because oil drain a little at the oil filter removal.*

- Drive the retaining pin [A] out of the filter mounting bolt [B].
- Drop out the spring [C] and the bypass valve steel ball [D].

Bypass Valve Assembly

- Drop the bypass valve steel ball into the filter mounting bolt.
- Put the spring into the mounting bolt and compress it beyond the small hole.
- Drive the retaining pin into the small hole to hold the spring.
- Install the oil filter (see Oil Filter Replacement in the Periodic Maintenance chapter).

Bypass Valve Cleaning and Inspection

- Remove the oil filter (see Oil Filter Replacement in the Periodic Maintenance chapter).
- Disassemble the bypass valve (see Bypass Valve Disassembly).
- Clean the bypass valve parts in a high flash-point solvent.

⚠ WARNING

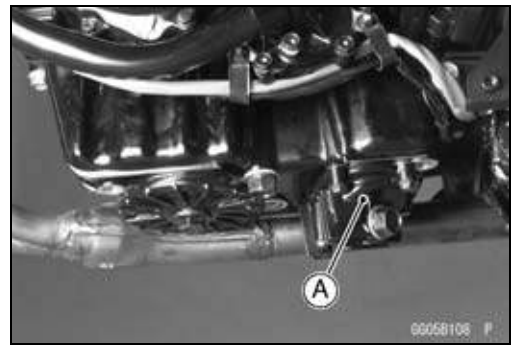
Clean the parts in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area. Because of the danger of highly flammable liquids, do not use gasoline or low flash -point solvent.

- Visually inspect the bypass valve parts.

★If there is any damaged part, replace it.

Engine Oil and Oil Filter

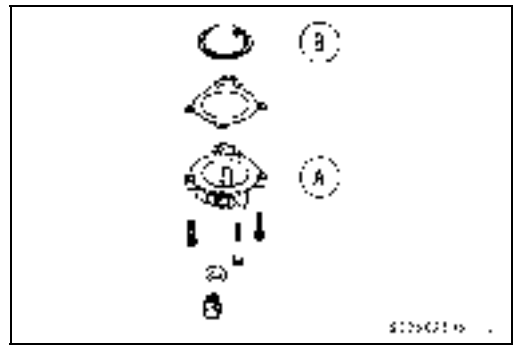
Oil Screen Cleaning and Inspection



- Remove the oil screen cover [A].
- Clean the oil pump screen [B] with high flash-point solvent and remove any particles stuck to it.

⚠ WARNING

Clean the screen 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

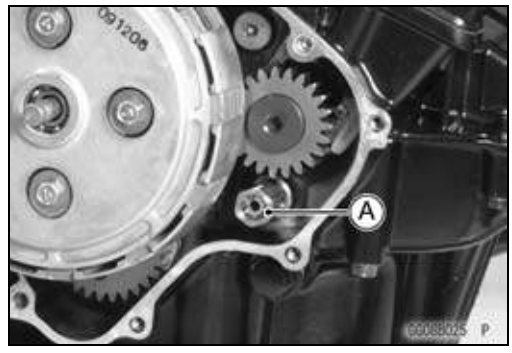
○*While cleaning the screen, check for any metal particles that might indicate internal engine damage.*

- Check the screen carefully for any damage: holes and broken wires.

★If the screen is damaged, replace the oil screen assembly.

Oil Pressure Relief Valve

Oil Pressure Relief Valve Removal



- Remove the clutch cover (see Clutch Cover Removal in the Clutch chapter).
- Unscrew the oil pressure relief valve [A] from the crankcase.

Oil Pressure Relief Valve Installation

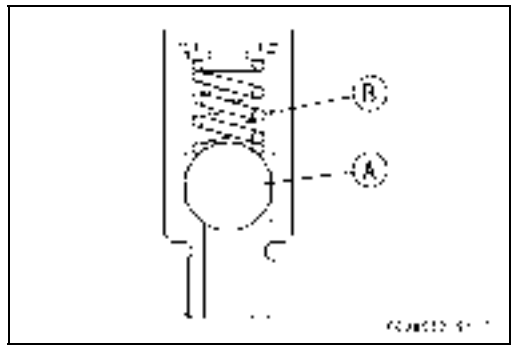
- Apply a non-permanent locking agent to the threads of the relief valve, and tighten it with the specified torque.

Torque - Oil Pressure Relief Valve: 15 N·m (1.5 kgf·m, 11 ft·lb)

CAUTION

Do not over apply a non-permanent locking agent to the threads. This may block the oil passage.

Oil Pressure Relief Valve Inspection



- 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 oil pressure 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 low-flash point solvent.

★If cleaning does not solve the problem, replace the oil pressure relief valve as an assembly. The oil pressure relief valve is precision made with no allowance for replacement of individual parts.

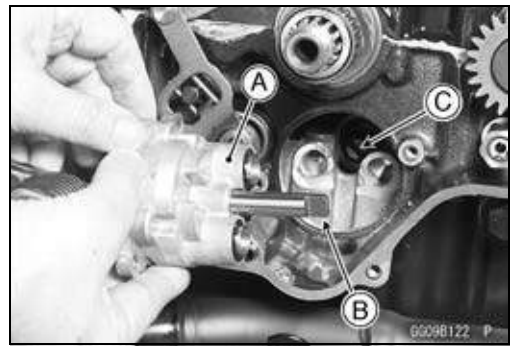
Oil Pump

Oil Pump Removal



- Remove the clutch cover (see Clutch Cover Removal in the Clutch chapter).
- Remove the clutch (see Clutch Removal in the Clutch chapter).
- Remove the circlip and oil pump gear.
- Remove the oil pump mounting Allen bolts [A].
- Pull the oil pump [B] off the crankcase.

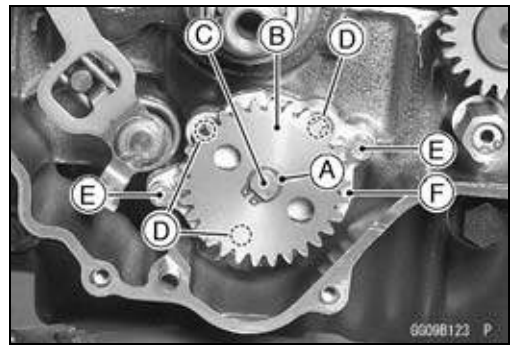
Oil Pump Installation



- Fill the oil pump with engine oil for initial lubrication.
- When installing the oil pump [A], note the position of the water pump shaft slot [C] and turn the oil pump shaft so that the projection [B] fits into the slot.
- Apply a non-permanent locking agent to the threads of the oil pump mounting Allen bolts, and tighten them securely.

Torque - Oil Pump Mounting Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

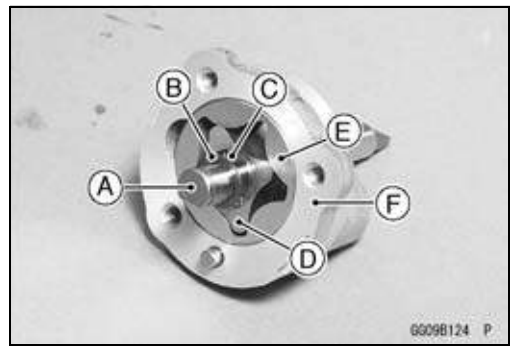
Oil Pump Disassembly



- Remove the circlip [A] with circlip plire on the oil pump shaft end.

Special Tool - Outside Circlip Pliers: 57001-144

- Take off the gear [B] from the shaft [C].
- Loosen the screws [D] before removing the oil pump mounting bolts [E].
- Remove the oil pump (see Oil Pump Removal).
- Unscrew the oil pump cover screws [D] and take off the cover [F].



- Pull the oil pump shaft [A], washer [B], pins [C], inner rotor [D] and outer rotor [E] from the pump body [F].

Oil Pump Assembly

- Oil pump assembly is the reverse of disassembly.
- After completing the oil pump assembly, check that the rotor shaft and rotor turn smoothly.

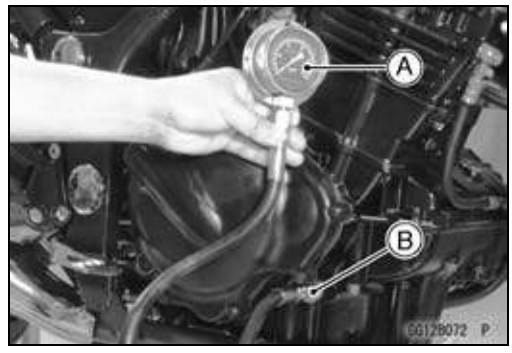
Oil Pump Inspection

- Disassemble the oil pump (see Oil Pump Disassembly).
- Visually inspect the oil pump body, inner and outer rotors and covers.

★If there is any damage or uneven wear, replace the oil pump as an assembly.

Oil Pressure Measurement

Oil Pressure Measurement



- Remove the lower fairing (see Lower Fairing Removal in the Frame chapter).
- Remove the oil plug, and attach the adapter [B] and gauge [A] to the plug hole.

Special Tools - Oil Pressure Gauge, 10 kgf/cm²: 57001-164
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 and oil pump relief valve.

★If the reading is much higher than the standard, check the oil passages for clogging.

Oil Pressure
Standard: 98 ~ 147 kPa (1.0 ~ 1.5 kgf/cm², 14 ~ 21 psi) @ 4 000 r/min (rpm), oil temperature 90°C (194°F)

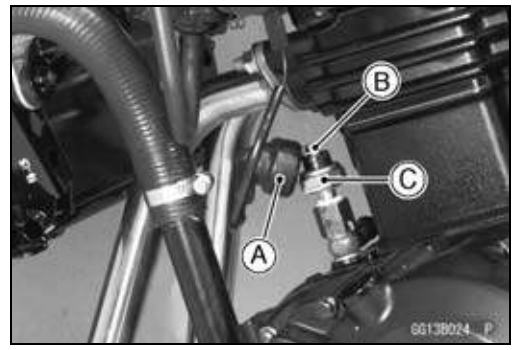
- Stop the engine.
- Remove the oil pressure gauge and adapter.

⚠ WARNING

Take care against burns form hot engine oil that will drain through the oil passage when the gauge adapter is removed.

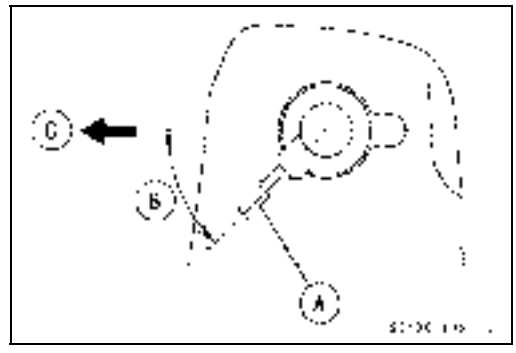
Oil Pressure Switch

Oil Pressure Switch Removal



● Remove:
Lower Fairing (see Lower Fairing Removal in the Frame chapter)
Switch Cover [A]
Switch Terminal [B]
Oil Pressure Switch [C]

Oil Pressure Switch Installation



● Apply silicone sealant to the 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 kgf·m, 11 ft·lb)

● Tighten the oil pressure switch terminal bolt.

Torque - Oil Pressure Switch Terminal Bolt: 1.5 N·m (0.15 kgf·m, 13 in·lb)

○Install the oil pressure switch lead [A] as shown.
Front [B]
45° [C]

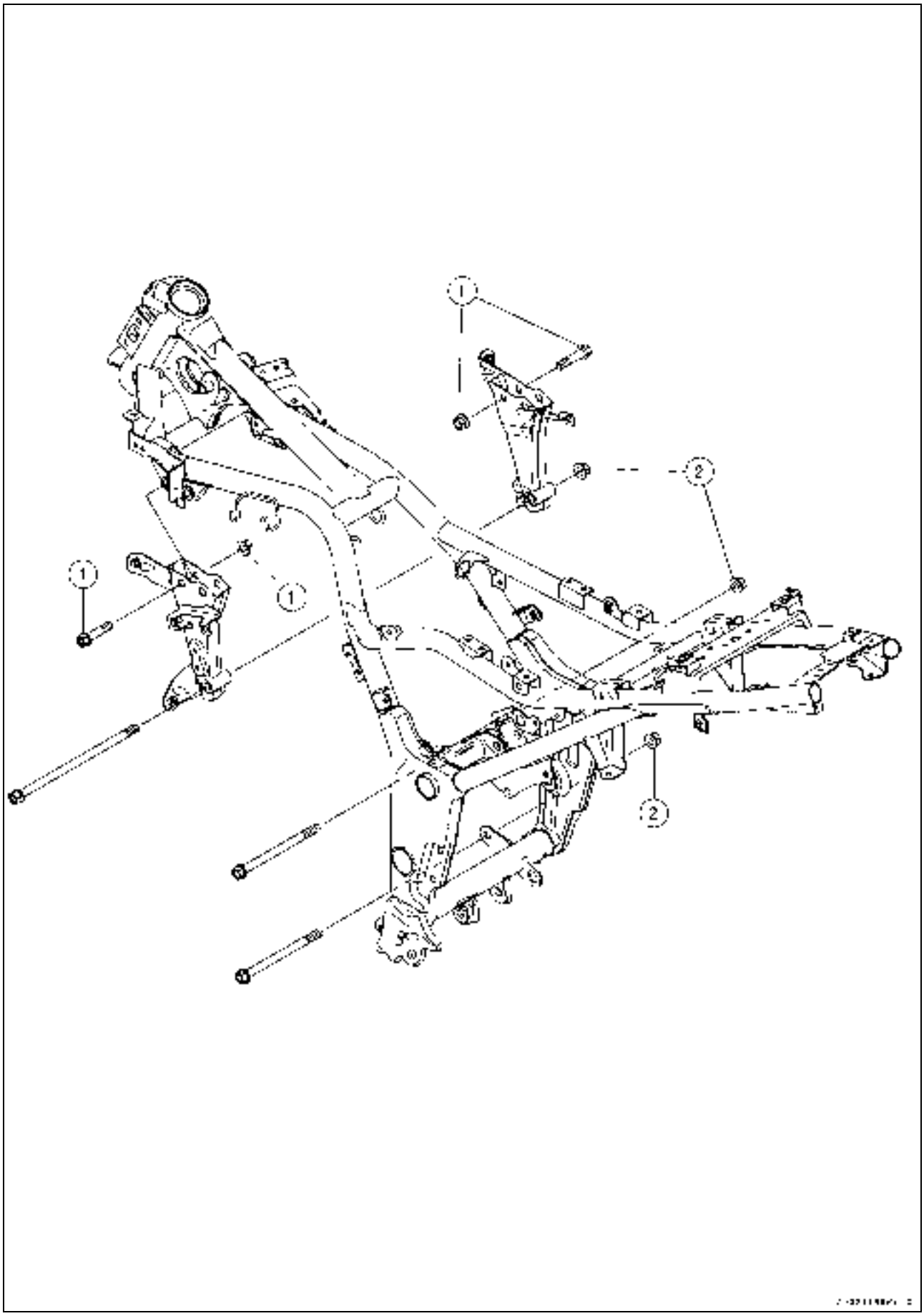
● Apply grease to the terminal.

Engine Removal/Installation

Table of Contents

Exploded View 8-2
Engine Removal/Installation 8-4
Engine Removal 8-4
Engine Installation 8-6

Exploded View



Exploded View

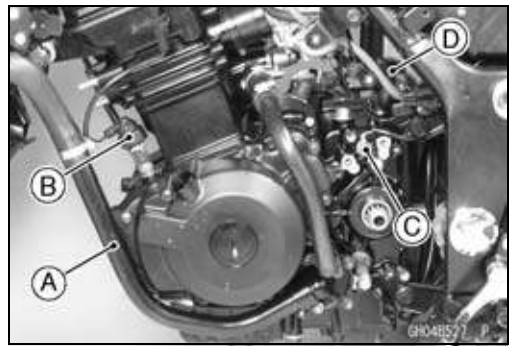
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Mounting Bracket Bolts and Nuts	64	6.5	47	
2	Engine Mounting Nuts	64	6.5	47	

Engine Removal/Installation

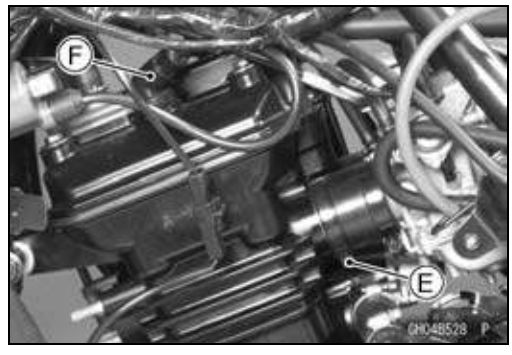
Engine Removal

- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Side Covers (see Side Cover Removal in the Frame chapter)
  Lower Fairings (see Lower Fairing Removal in the Frame chapter)
  Upper Fairings (see Upper Fairing Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Throttle Cable (see Throttle Cable Removal in the Fuel System chapter)
  Choke Cable (see Choke Cable Removal in the Fuel System chapter)
  Clutch Cable Lower End (see Clutch Cable Removal in the Clutch chapter)
  Muffler (see Muffler Removal in the Engine Top End chapter)
  Engine Sprocket (see Drive Chain Removal in the Final Drive chapter)

- Remove:
  Left Side Coolant Pipe [A]
  Oil Pressure Switch Lead Connector [B]
  Neutral Switch Terminal [C]
  Breather Hose [D] at Air Cleaner Housing

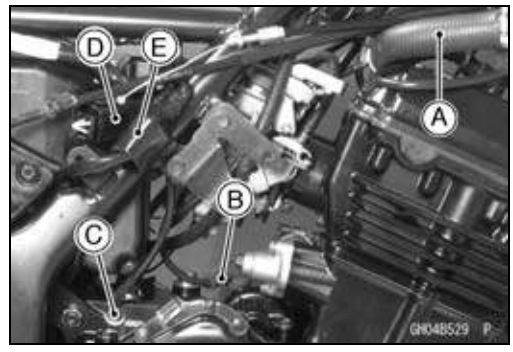


  Carburetor Holder Clamp (Loosen) [E]
  Spark Plug Caps [F]

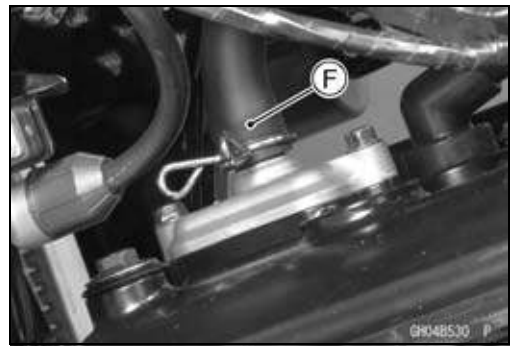


Engine Removal/Installation

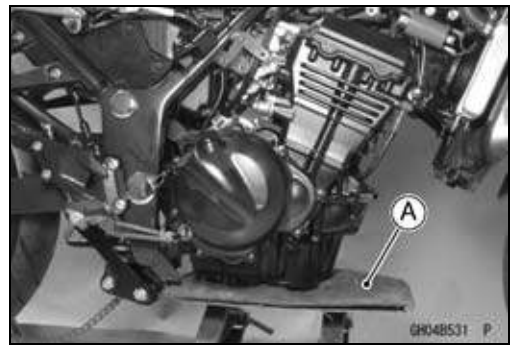
● Remove or disconnect:
Cooling Hose [A] at Cylinder Head
Starter Motor Cable [B]
Engine Ground Terminal [C]
Alternator Lead Connector [D]
Crankshaft Sensor Lead Connector [E]



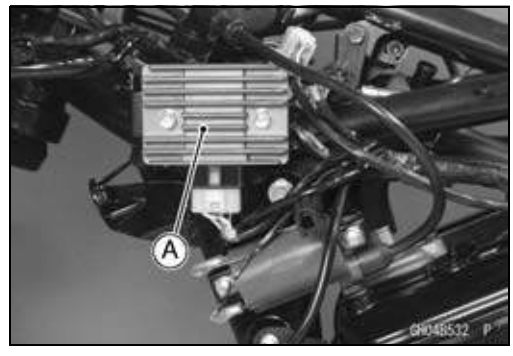
Air Suction Hose [F]



● Support the engine with a suitable stand [A].



● Remove the regulator/rectifier [A] and the engine mounting bracket bolts and nuts.



● Remove:
Engine Mounting Bolts and Nuts [A]
Engine Assembly [B]



Engine Removal/Installation

Engine Installation



- Engine installation is the reverse of removal, and note the following point.

○Insert the lower engine mounting bolt [A] first while supporting the engine. Then insert the upper engine mounting bolt [B], and tighten the nut loosely.

○Before tightening the mounting bolts, install the engine brackets. When inserting the front engine mounting bolt, use the suitable stand under the engine to lift it.

Torque - Engine Mounting Bracket Bolts, Nuts: 64 N·m (6.5 kgf·m, 47 ft·lb)
Engine Mounting Nuts: 64 N·m (6.5 kgf·m, 47 ft·lb)

○Route the wiring harness correctly (see Cable, Wire and Hose Routing in the Appendix chapter).

○Adjust the following items after engine installation.
Throttle cable (see Throttle Control System Inspection in the Periodic Maintenance chapter)
Choke Cable (see Choke Cable Free Play Inspection in the Fuel System chapter)
Clutch Cable (see Clutch Operation Inspection in the Periodic Maintenance chapter)
Drive Chain Slack (see Drive Chain Slack Inspection in the Periodic Maintenance chapter)
Carburetor Idling (see Idle Speed Inspection in the Periodic Maintenance chapter)

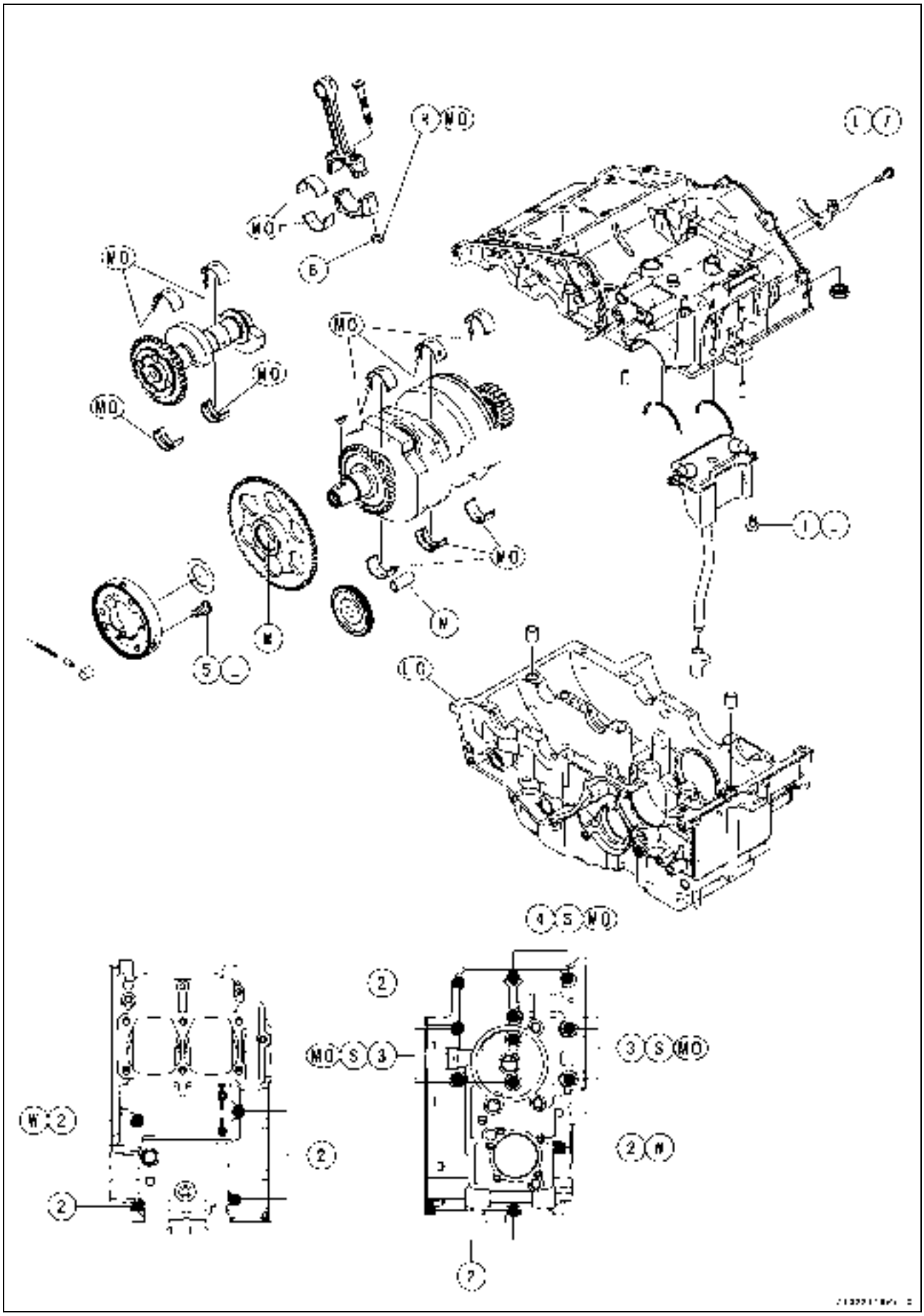
- Fill the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Fill the coolant (see Coolant Change in the Periodic Maintenance chapter).

Crankshaft/Transmission

Table of Contents

Exploded View 9-2
Specifications 9-6
Special Tools and Sealants 9-9
Crankcase 9-10
  Crankcase Splitting 9-10
  Crankcase Assembly 9-11
  Crankcase Exchange 9-13
Crankshaft and Connecting Rods 9-14
  Crankshaft Removal 9-14
  Crankshaft Installation 9-14
  Connecting Rod Removal 9-15
  Connecting Rod Installation 9-15
  Crankshaft/Connecting Rod Cleaning 9-16
  Connecting Rod Bend Inspection 9-16
  Connecting Rod Twist Inspection. 9-16
  Connecting Rod Big End Side Clearance Inspection 9-17
  Connecting Rod Big End Bearing Insert/Crankpin Wear Inspection 9-17
  Crankshaft Side Clearance Inspection 9-18
  Crankshaft Runout Inspection 9-19
  Crankshaft Main Bearing Insert/Journal Wear Inspection . 9-19
Starter Motor Clutch 9-21
  Starter Motor Clutch Removal/Installation 9-21
  Starter Motor Clutch Inspection ... 9-21
  Starter Motor Clutch Disassembly 9-21
  Starter Motor Clutch Assembly 9-21
Balancer 9-22
  Balancer Removal 9-22
  Balancer Installation 9-22
  Balancer Shaft Bearing Insert/Journal Wear Inspection . 9-22
Transmission 9-24
  External Shift Mechanism Removal 9-24
  External Shift Mechanism Installation 9-24
  External Shift Mechanism Inspection 9-25
  Transmission Removal 9-25
  Transmission Installation 9-26
  Transmission Shaft Disassembly . 9-26
  Transmission Shaft Assembly 9-27
  Shift Drum and Fork Removal 9-28
  Shift Drum and Fork Installation ... 9-28
  Shift Drum Disassembly 9-29
  Shift Drum Assembly 9-29
  Gear Backlash Inspection 9-30
  Shift Fork Bending Inspection 9-30
  Shift Fork/Gear Groove Wear Inspection 9-30
  Shift Fork Guide Pin/Drum Groove Wear Inspection 9-30
  Gear Dog and Gear Dog Hole Damage Inspection 9-31
  Ball and Needle Bearing Wear Inspection 9-31

Exploded View

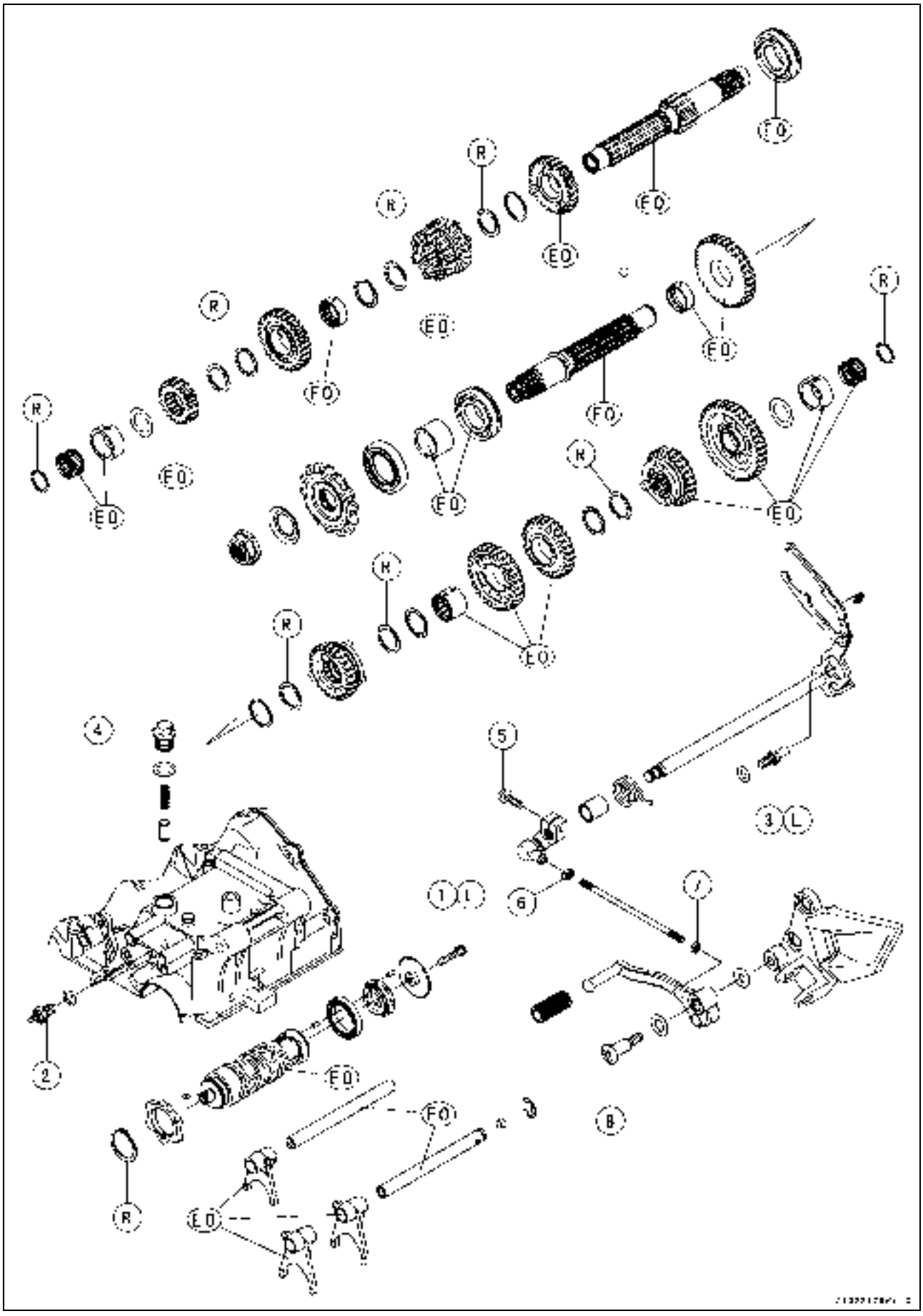


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Oil Breather Mounting Bolts	9.8	1.0	87 in·lb	L
2	Crankcase Bolts ϕ6	12	1.2	104 in·lb	
3	Crankcase Bolts ϕ8 (L = 90)	24	2.4	18	MO, S
4	Crankcase Bolts ϕ8 (L = 73)	19	1.9	14	MO, S
5	Starter Motor Clutch Bolts	34.3	3.5	25	L
6	Connecting Rod Big End Cap Nuts	27.5	2.8	20	MO
7	Shift Drum Bearing Holder Bolt	12	1.2	104 in·lb	L

L: Apply a non-permanent locking agent.
LG: Apply liquid gasket (Kawasaki Bond: 92104-1064).
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil solution (mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1).
R: Replacement Parts
S: Follow the specified tightening sequence.
W: Washer

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Shift Drum Pin Plate Bolt	9.0	0.9	80 in·lb	L
2	Neutral Switch	15	1.5	11	
3	External Shift Mechanism Return Spring Pin	19.6	2.0	14.5	L
4	Shift Drum Positioning Bolt	24.5	2.5	18	
5	Shift Lever Link Bolt	12	1.2	104 in·lb	
6	Front Tie-Rod Locknut (Left-Hand Threads)	7.0	0.7	62 in·lb	
7	Rear Tie-Rod Locknut (Right-Hand Threads)	7.0	0.7	62 in·lb	
8	Shift Pedal Mounting Bolt	25	2.5	18	

EO: Apply engine oil.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts

Specifications

Item	Standard	Service Limit
Crankshaft, Connecting Rods		
Connecting Rod Bend	– – –	0.2/100 mm (0.008/3.94 in.)
Connecting Rod Twist	– – –	0.2/100 mm (0.008/3.94 in.)
Connecting Rod Big End Side Clearance	0.13 ~ 0.38 mm (0.005 ~ 0.015 in.)	0.50 mm (0.020 in.)
Connecting Rod Big End Bearing Insert/Crankpin Clearance	0.031 ~ 0.059 mm (0.0012 ~ 0.0023 in.)	0.10 mm (0.004 in.)
Crankpin Diameter:	29.984 ~ 30.000 (1.1805 ~ 1.1811 in.)	29.97 mm (1.18 in.)
Marking		
None	29.984 ~ 29.994 mm (1.1805 ~ 1.1809 in.)	– – –
○	29.995 ~ 30.000 (1.1809 ~ 1.1811 in.)	– – –
Connecting Rod Big End Bore Diameter	33.000 ~ 33.016 mm (1.2992 ~ 1.2998 in.)	– – –
Marking		
None	33.000 ~ 33.008 mm (1.2992 ~ 1.2995 in.)	– – –
○	33.009 ~ 33.016 mm (1.2996 ~ 1.2998 in.)	– – –
Connecting Rod Big End Bearing Insert Thickness:		
Brown	1.480 ~ 1.485 mm (0.0583 ~ 0.0585 in.)	– – –
Black	1.485 ~ 1.490 mm (0.0585 ~ 0.0587 in.)	– – –
Blue	1.489 ~ 1.494 mm (0.0586 ~ 0.0588 in.)	– – –
Crankshaft Runout	– – –	0.05 mm (0.0020 in.) TIR
Crankshaft Main Bearing Insert/Journal Clearance	0.014 ~ 0.038 mm* (0.0006 ~ 0.0015 in.)	0.08 mm (0.0031 in.)
Crankshaft Main Journal Diameter:	27.984 ~ 28.000 mm (1.1017 ~ 1.1024 in.)	27.96 mm (1.101 in.)
Marking		
None	27.984 ~ 27.992 mm (1.1017 ~ 1.1020 in.)	– – –
1	27.993 ~ 28.000 (1.1021 ~ 1.1024 in.)	– – –
Crankcase Main Bearing Bore Diameter:	31.000 ~ 31.016 mm (1.2205 ~ 1.2211 in.)	– – –
Marking		
○	31.000 ~ 31.008 mm (1.2205 ~ 1.2208 in.)	– – –

Specifications

Item	Standard	Service Limit
None	31.009 ~ 31.016 mm (1.2208 ~ 1.2211 in.)	– – –
Crankshaft Main Bearing Insert Thickness:		
Black	1.495 ~ 1.499 mm (0.0589 ~ 0.0590 in.)	– – –
Blue	1.499 ~ 1.503 mm (0.0590 ~ 0.0592 in.)	– – –
Yellow	1.503 ~ 1.507 mm (0.0592 ~ 0.0593 in.)	– – –
Crankshaft Side Clearance	0.05 ~ 0.20 mm (0.002 ~ 0.008 in.)	0.40 mm (0.016 in.)
Balancer		
Balancer Shaft Bearing Insert/Journal Clearance	0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in.)	0.08 mm (0.0031 in.)
Balancer Shaft Journal Diameter:	25.984 ~ 26.000 (1.0230 ~ 1.0236 in.)	25.96 mm (1.022 in.)
Marking		
None	25.984 ~ 25.994 mm (1.0230 ~ 1.0234 in.)	– – –
○	25.995 ~ 26.000 mm (1.0234 ~ 1.0236 in.)	– – –
Crankcase Balancer Shaft Bore Diameter:	29.000 ~ 29.016 mm (1.1417 ~ 1.1424 in.)	– – –
Marking		
○	29.000 ~ 29.008 mm (1.1417 ~ 1.1420 in.)	– – –
None	29.009 ~ 29.016 mm (1.1421 ~ 1.1424 in.)	– – –
Balancer Shaft Bearing Insert Thickness:		
Brown	1.495 ~ 1.499 mm (0.0589 ~ 0.0590 in.)	– – –
Black	1.499 ~ 1.503 mm (0.0590 ~ 0.0592 in.)	– – –
Blue	1.503 ~ 1.507 mm (0.0592 ~ 0.0593 in.)	– – –
Transmission		
Gear Backlash	0 ~ 0.17 mm (0 ~ 0.0067 in.)	0.25 mm (0.010 in.)
Gear Shift Fork Groove Width	5.05 ~ 5.15 mm (0.1988 ~ 0.2028 in.)	5.3 mm (0.209 in.)
Shift Fork Ear Thickness	4.9 ~ 5.0 mm (0.1929 ~ 0.1969 in.)	4.8 mm (0.189 in.)
Shift Fork Guide Pin Diameter	5.9 ~ 6.0 mm (0.2323 ~ 0.2362 in.)	5.8 mm (0.228 in.)
Shift Drum Groove Width	6.05 ~ 6.20 mm (0.2382 ~ 0.2441 in.)	6.3 mm (0.248 in.)

*: Journal clearance less than 0.025 mm (0.0010 in.) can not be measured by plastigage, however, using genuine parts maintains the minimum standard clearance.

Specifications

Connecting Rod Big End Bearing Insert Selection

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

Crankshaft Main Bearing Insert Selection

Crankcase Main Bearing Bore Diameter Marking	Crankpin Main Journal Diameter Marking	Bearing Insert**		
		Size Color	Parts Number	Journal Nos.
○	1	Black	92028-1487	1, 3
			92028-1490	2
None	None	Yellow	92028-1582	1, 3
			92028-1586	2
○	None	Blue	92028-1486	1, 3
None	1		92028-1489	2

**: The bearing inserts for No.2 journal have an oil groove.

Balancer Shaft Bearing Insert Selection

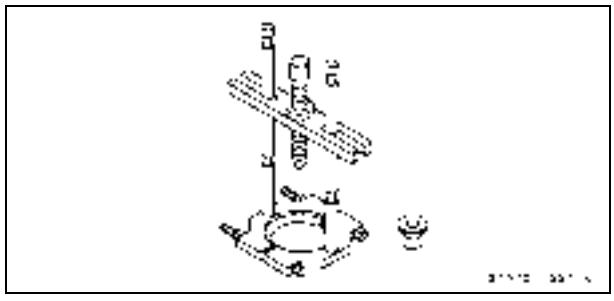
Balancer Shaft Journal Diameter Marking	Crankcase Balancer Shaft Bore Diameter Marking	Bearing Insert	
		Size Color	Parts Number
○	○	Brown	92028-1424
○	None	Black	92028-1423
None	○		
None	None	Blue	92028-1422

Crankshaft Selection when Replacing Crankshaft

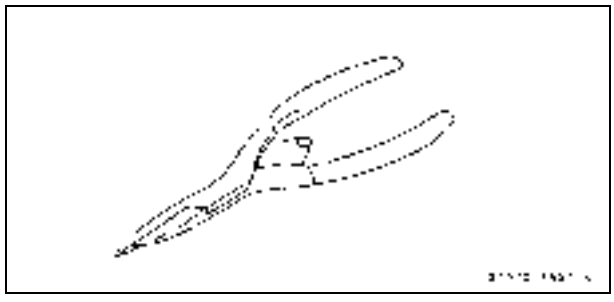
Clutch Housing		Crankshaft		
Gear Marking [E]	Color [F]	Primary Gear Marking [C]	Color [D]	Part Number
A	White	A	White	13031-0111
B	Red	A	White	13031-0111
B	Red	B	Red	13031-0112
C	None	B	Red	13031-0112
C	None	C	None	13031-0113
D	Yellow	C	None	13031-0113
D	Yellow	D	Yellow	13031-0114

Special Tools and Sealants

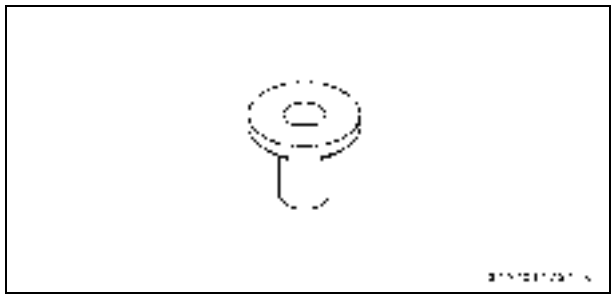
Bearing Puller:
57001-135



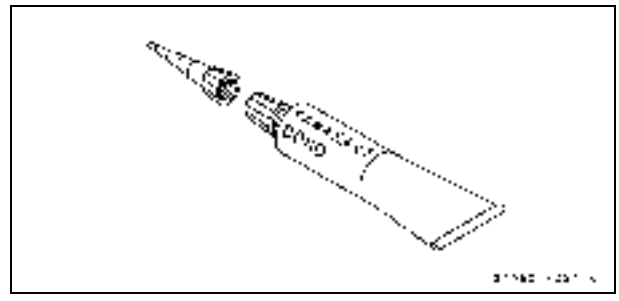
Outside Circlip Pliers:
57001-144



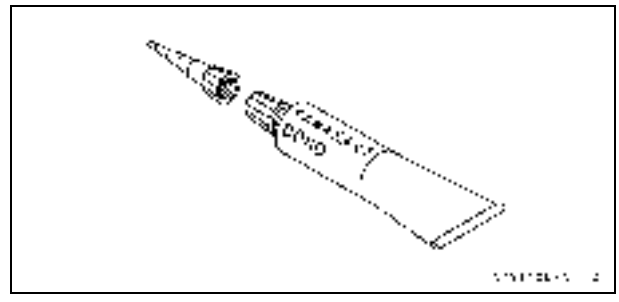
Bearing Puller Adapter:
57001-317



Kawasaki Bond (Silicone Sealant):
56019-120



Kawasaki Bond(Liquid Gasket - Black):
92104-1064



Crankcase

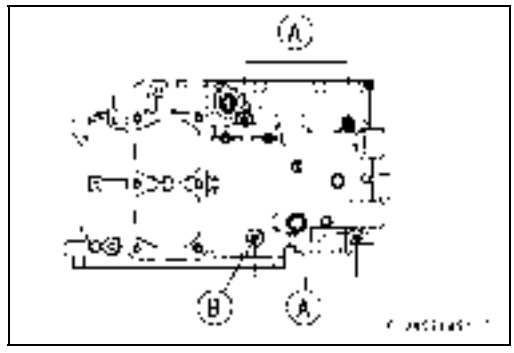
Crankcase Splitting

- Remove the engine (see Engine Removal in the Engine Removal/Installation chapter).
- Set the engine on a clean surface or, preferably mount it on an engine stand to hold the engine steady while parts are being removed.
- Remove the water pipe and hose (cylinder rearward).

NOTE

○*If the engine is to be mounted on an engine stand, the upper crankcase half bolts [A] shown must be removed before mounting the engine.*

Washer [B]

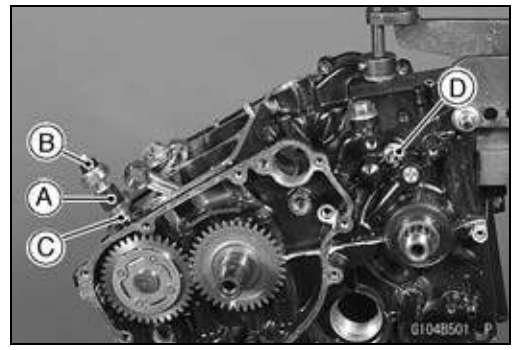


- Remove:

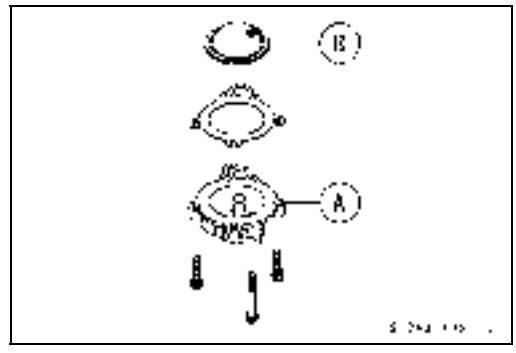
Alternator Cover (see Alternator Cover Removal in the Electrical System chapter)
Water Pump, Hose and Pipe (see Water Pump Removal in the Cooling System chapter)
Starter Motor Clutch Gear
Oil Pipe and Banjo Bolt
Starter Motor (see Starter Motor Removal in the Electrical System chapter)
Oil Pump (see Oil Pump Removal in the Engine Lubrication System chapter)
Cylinder Head Cover (see Cylinder Head Cover Removal in the Engine Top End chapter)
Alternator Rotor (see Alternator Rotor Removal in the Electrical System chapter)
One Way Clutch Gear
Oil Hose Banjo Bolt
Camshafts Chain Tensioner (see Camshafts Chain Tensioner Removal in the Engine Top End chapter)
Clutch Cover (see Clutch Cover Removal in the Clutch chapter)
Camshafts (see Camshaft Removal in the Engine Top End chapter)
Cylinder Head (see Cylinder Head Removal in the Engine Top End chapter)
Cylinder (see Cylinder Removal in the Engine Top End chapter)
Pistons (see Piston Removal in the Engine Top End chapter)

Crankcase

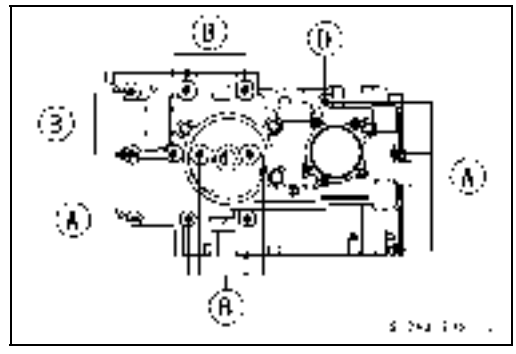
- Remove the clutch only if the transmission drive shaft assembly is to be removed.
- Remove the oil pressure bolt [A] with the oil pressure switch [B] and oil hose [C].
- Remove the neutral switch [D].

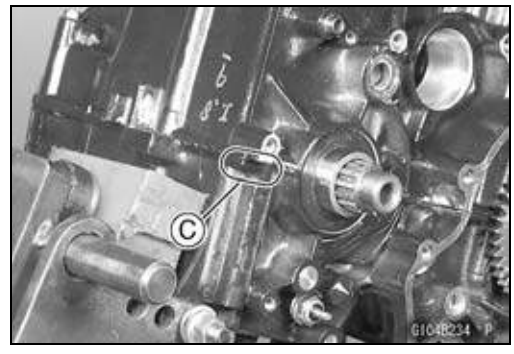


- Remove the upper crankcase half bolt (1) (3 were removed just after engine removal).
- Turn the engine upside down.
- Remove the oil filter mounting bolt, oil filter, and large O-ring.
- Remove the oil screen cover [A] and screen [B].



- Remove the 6 mm [A] and 8 mm [B] lower crankcase half bolt, ply the point [C] shown to split the two crankcase halves apart, and lift off the lower crankcase half.
  Washer [D]





Crankcase Assembly

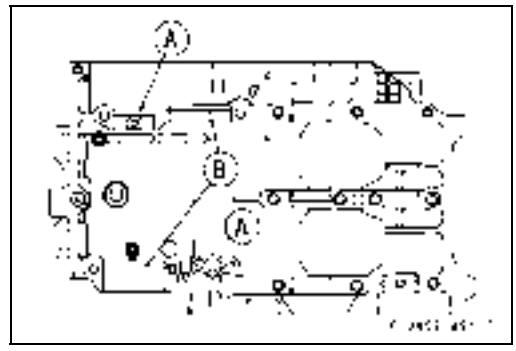
NOTE

○*The upper/lower crankcase halves are machined at the factory as an assembly, so the crankcase halves must be replaced as a set.*

- Assembly is the reverse of splitting. Be careful of the following items.

○With a high flash-point solvent, clean off the mating surface of the crankcase halves and wipe dry.

○When installing the output and drive shafts, the crankcase set pins [A] must go into the holes in the needle bearing outer races, and the set rings [B] must fit into the grooves in the ball bearings.



Crankcase

○When the oil pressure switch is installed, apply the silicone sealant to the threads of the switch.

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

CAUTION

Make sure the crankcase set pins are properly aligned to avoid damage to the crankcases upon installation.
Don't use usual set pins because the set pins of this model are different from usual pins. They are hollow and also used to pass oil. If you use usual pins by mistake, the engine always seized.

○Check that the knock pins (2) are in place.
○Apply a little engine oil to the transmission gears ball bearings, shift drum, and crankshaft main bearing inserts.

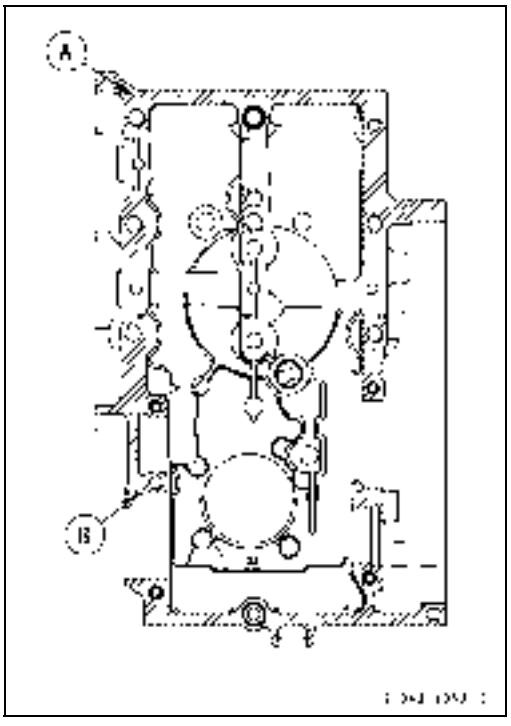
● Apply liquid gasket to the mating surface of the lower crankcase half.

Special Tool - Kawasaki Bond (Liquid Gasket - Black): 92104-1064 [A]

○After assembling the crankcase halves, wipe off excess liquid gasket on the inside portion [B].

CAUTION

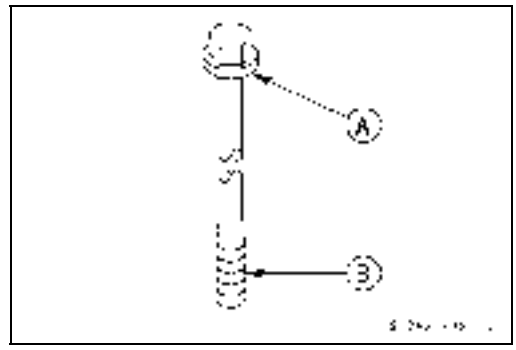
If liquid gasket adheres to any areas not indicated, the engine oil passage may be obstructed, causing engine seizure.



○Check to see that the shift drum is in the neutral position, that is, the projection at operating plate is seen from neutral switch hole at the upper crankcase half.
○When fitting the lower crankcase half on the upper crankcase half, each shift fork must fit in its gear groove.
○Loosely tighten all lower crankcase half bolts to a snug fit.

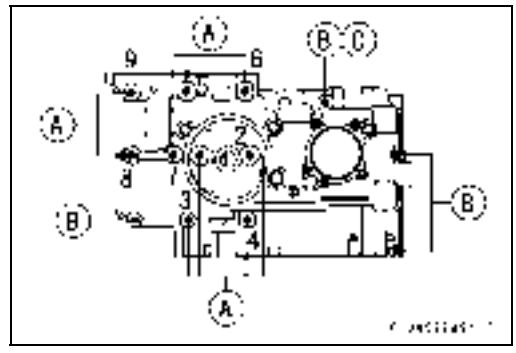
Crankcase

● Apply molybdenum disulfide oil solution to flange [A] and the threads [B] of the M8 bolts which is tightening order is [1 ~ 8] only (see the next figure).



○Following the sequence numbers on the lower crankcase half, tighten the 8 mm bolts [A] first to about one half of the specified torque, and finally to the specified torque in the same sequence.
○Replace the copper washer [C] with a new one.
○Tighten the 6 mm bolts [B] on the lower crankcase half to the specified torque.

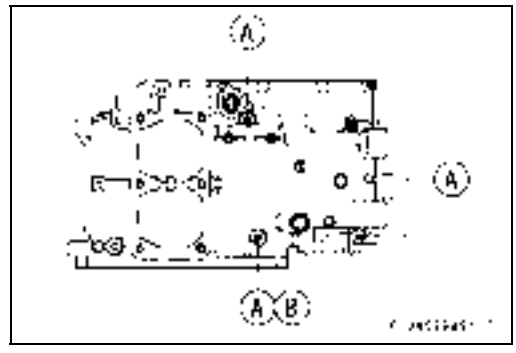
Torque - Crankcase Bolts (ϕ8, L = 90):
First: 10 N·m (1.0 kgf·m, 89 in·lb)
Final: 24 N·m (2.4 kgf·m, 18 ft·lb)
Crankcase Bolts (ϕ8, L = 73):
First: 10 N·m (1.0 kgf·m, 89 in·lb)
Final: 19 N·m (1.9 kgf·m, 14 ft·lb)



○Replace the copper washer [B] with a new one.
○Tighten the 6 mm bolts [A] on the upper crankcase half to the specified torque.

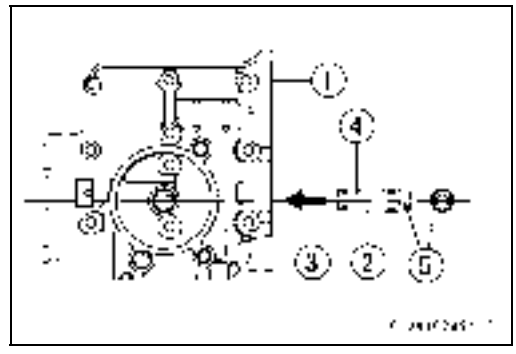
Torque - Crankcase Bolts (ϕ6): 12 N·m (1.2 kgf·m, 104 in·lb)

● After tightening all crankcase bolts, check the following items.
○Drive shaft and output shaft turn freely.
○While spinning the output shaft, shift the transmission smoothly from 1st to 6th gear, and back,
○Unless the output shaft is turning, the transmission cannot be shifted to 2nd gear or other higher gear positions.



Crankcase Exchange

★If the crankcase is damaged, replace it with a new one.
● Remove the crankcase parts from the damaged case, and install it to the new case. Pay attention to the following items.
○When installing the oil passage plug must be inserted as shown.
[1] Lower Crankcase Half
[2] Oil Passage Pipe
[3] Press
[4] Small Hall (Up)
[5] Slit (Horizontal)



○Fit the oil passage O-ring on the breather body. Replace the O-ring with new ones, if deteriorated or damage. The flat side of the O-ring must face down.
○Apply a non-permanent locking agent to the threads of the breather bolts, and tighten them.

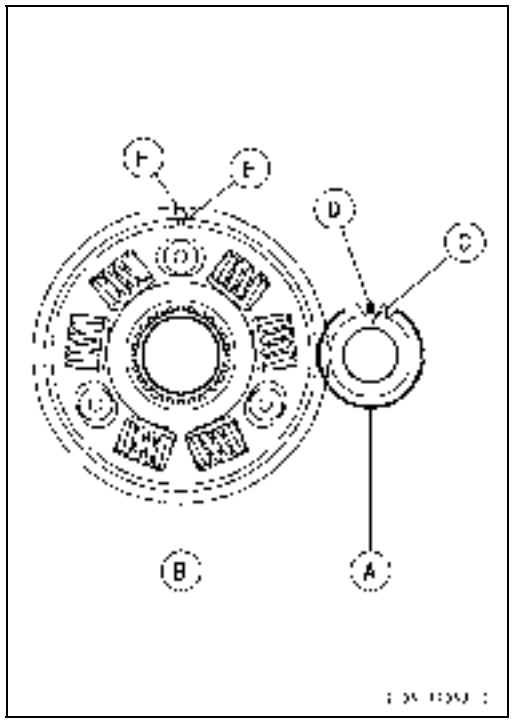
Crankshaft and Connecting Rods

Crankshaft Removal

- Split the crankcase (see Crankcase Splitting).
- Take the crankshaft out of the upper crankcase.

Crankshaft Installation

- If the crankshaft is replaced with a new one, select the proper crankshaft in accordance with the combination of the crankshaft primary gear and clutch housing gear markings with colors.
  Crankshaft Primary Gear [A]
  Clutch Housing Gear [B]
- Be sure to confirm the marking and color on the crankshaft primary gear.



Crankshaft Selection when Replacing Crankshaft

Clutch Housing		Crankshaft		
Gear Marking [E]	Color [F]	Primary Gear Marking [C]	Color [D]	Part Number
A	White	A	White	13031-0111
B	Red	A	White	13031-0111
B	Red	B	Red	13031-0112
C	None	B	Red	13031-0112
C	None	C	None	13031-0113
D	Yellow	C	None	13031-0113
D	Yellow	D	Yellow	13031-0114

NOTE

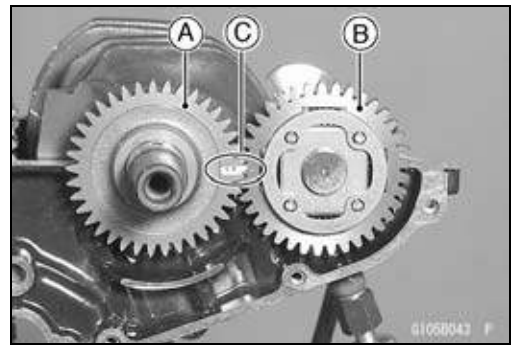
○*If the selection mark and color are missing or not selection, refer to the selection section in the specifications.*

○*If the crankshaft is replaced with a new one, refer to the Connecting Rod Big End Bearing/Crankshaft Main Bearing Insert Selection in the Selection Section.*

CAUTION

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

Crankshaft and Connecting Rods



- Align the timing mark [C] on the balancer drive gear [A] with the timing mark [C] on the balancer gear [B].
- Apply molybdenum disulfide oil solution to the crankshaft main bearing inserts.
- Install the crankshaft.

Connecting Rod Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the connecting rod big end cap nuts.
- Remove the crankshaft.

NOTE

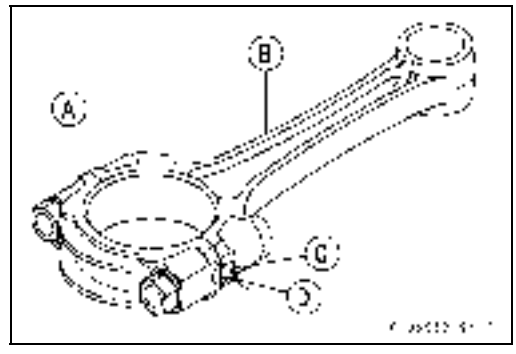
○*Mark and record the locations of the connecting rods and their big end caps so that they can be reassembled in their original positions.*

- 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 to bump against the crankpins.

Connecting Rod Installation



CAUTION

To minimize vibration, the connecting rods should have the same weight mark.

Big End Cap [A]
Connecting Rod [B]
Weight Mark, Alphabet [C]
Diameter Mark (Around Weight Mark) [D]: "○" or no mark

CAUTION

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

CAUTION

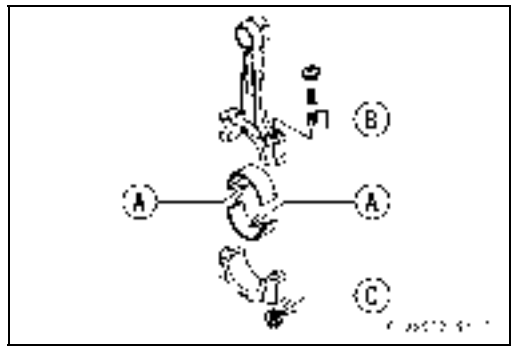
The connecting rod bolts are designed to stretch when tightened. Never reuse them.

- Replace the connecting rod big end bolts and nuts with new ones.

Crankshaft and Connecting Rods

- Apply molybdenum disulfide oil solution to the inner surface of upper and lower bearing inserts [A].
- Apply molybdenum disulfide oil solution to the threads [B] and seating surface [C] of the connecting rod nuts.

Torque - Connecting Rod Big End Cap Nuts: 27.5 N·m (2.8 kgf·m, 20 ft·lb)



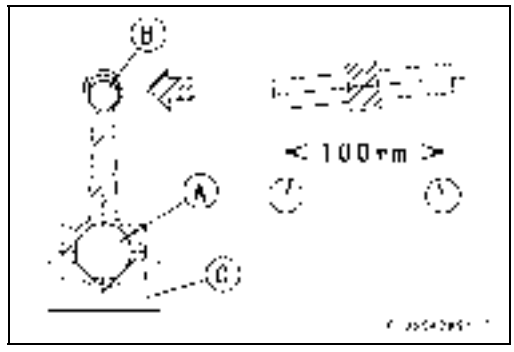
Crankshaft/Connecting Rod Cleaning

- 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.

Connecting Rod Bend Inspection

- 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 (3.94 in.) long, and insert the arbor [B] through the connecting rod small end.
- On a surface plate, set the big-end arbor on V block [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 (3.94 in.) length to determine the amount of connecting rod bend.

★If the connecting rod bend exceeds the service limit, the connecting rod must be replaced.

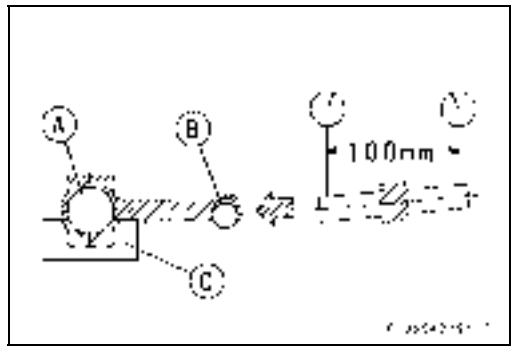


Connecting Rod Bend
Service Limit: TIR 0.2/100 mm (0.008/3.94 in.)

Connecting Rod Twist Inspection

- With the big-end arbor [A] still on V block [C], hold the connecting rod horizontally and measure the amount that the arbor [B] varies from being paralleled with the surface plate over a 100 mm (3.94 in.) length of the arbor to determine the amount of connecting rod twist.

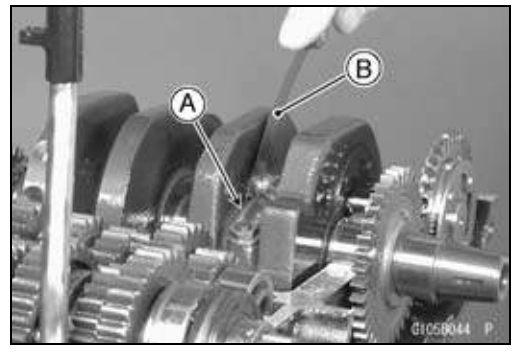
★If the connecting rod twist exceeds the service limit, the connecting rod must be replaced.



Connecting Rod Twist
Service Limit: TIR 0.2/100 mm (0.008/3.94 in.)

Crankshaft and Connecting Rods

Connecting Rod Big End Side Clearance Inspection

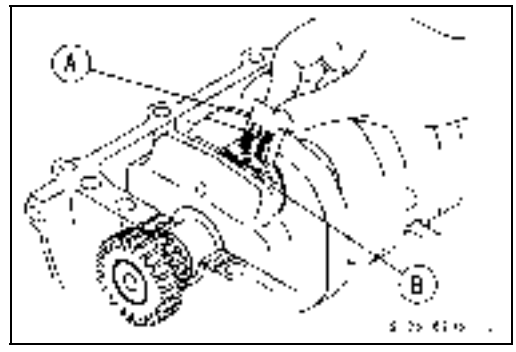


● Measure the connecting rod big end side clearance [A].
○Insert a thickness gauge [B] between the big end and the crank web to determine clearance.

Connecting Rod Big End Side Clearance
Standard: 0.13 ~ 0.38 mm (0.005 ~ 0.015 in.)
Service Limit: 0.5 mm (0.020 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 Insert/Crankpin Wear Inspection

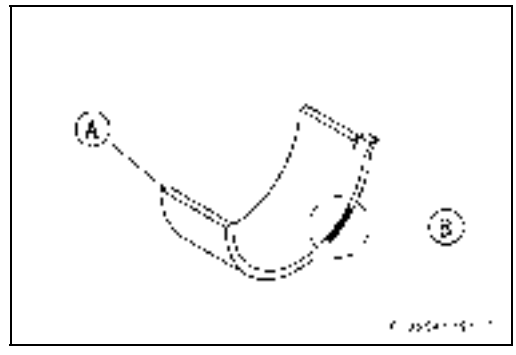


● Measure the bearing insert/crankpin clearance [B] with plastigage [A].
● Tighten the big end nuts to the specified torque (see Connecting Rod Installation).

NOTE

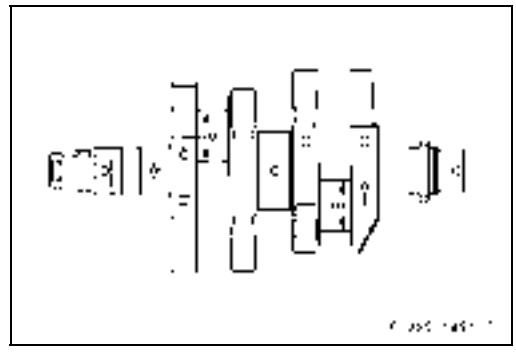
○*Do not move the connecting rod and crankshaft during clearance measurement.*

Connecting Rod Big End Bearing Insert/Crankpin Clearance
Standard: 0.031 ~ 0.059 mm (0.0012 ~ 0.0023 in.)
Service Limit: 0.10 mm (0.004 in.)



★If the clearance is within the standard, no bearing replacement is required.
★If the clearance is between 0.059 mm (0.0023 in.) and the service limit 0.10 mm (0.004 in.), replace the bearing inserts [A] with inserts painted black [B]. Check the insert/crankpin clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
★If the clearance exceeds the service limit, measure the diameter of the crankpins.

Crankpin Diameter
Standard: 29.984 ~ 30.000 mm (1.1805 ~ 1.1811 in.)
Service Limit: 29.97 mm (1.18 in.)

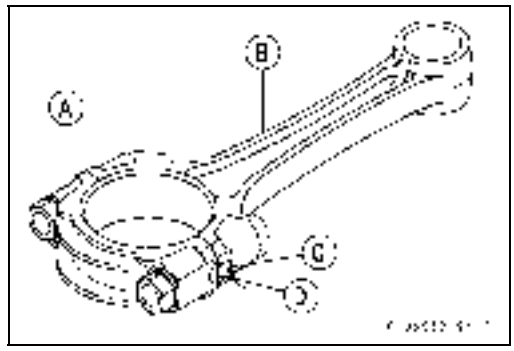


★If any crankpin has worn past the service limit, replace the crankshaft with a new one.
★If the measured crankpin diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

Crankpin Diameter Marks
None: 29.984 ~ 29.994 mm (1.1805 ~ 1.1809 in.)
○: 29.995 ~ 30.000 mm (1.1809 ~ 1.1811 in.)

◊: Crankpin Diameter Marks, "○" mark or no mark.

Crankshaft and Connecting Rods



- Measure the connecting rod big end bore diameter, and mark each connecting rod big end in accordance with the bore diameter.
- Tighten the big end nuts to the specified torque (see Connecting Rod Installation).

NOTE

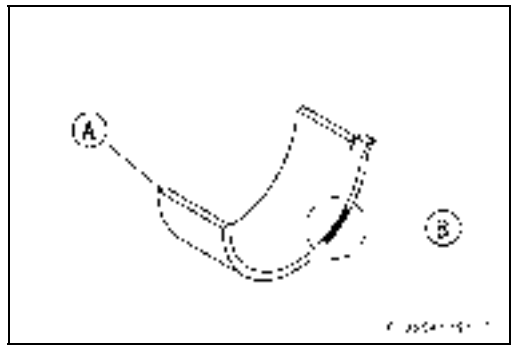
○*The mark already on the big end should almost coincide with the measurement because of little wear.*

Connecting Rod Big End Bore Diameter Marks

None: 33.000 ~ 33.008 mm (1.2992 ~ 1.2995 in.)

○: 33.009 ~ 33.016 mm (1.2996 ~ 1.2998 in.)

Big End Cap [A]
Connecting Rod [B]
Weight Mark, Alphabet [C]
Diameter Mark (Around Weight Mark) [D]: "○" or no mark



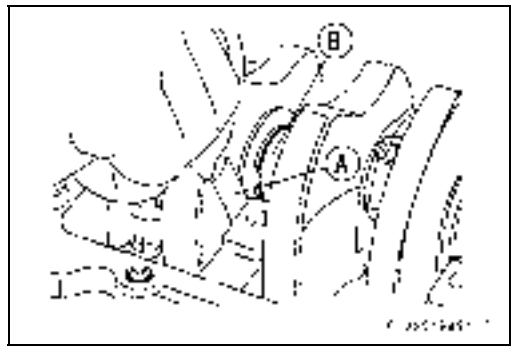
- Select the proper bearing insert [A] in accordance with the combination of the connecting rod and crankshaft coding.

Size Color [B]

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

- Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.

Crankshaft Side Clearance Inspection



- Insert a thickness gauge [A] between the 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 as a set.

NOTE

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

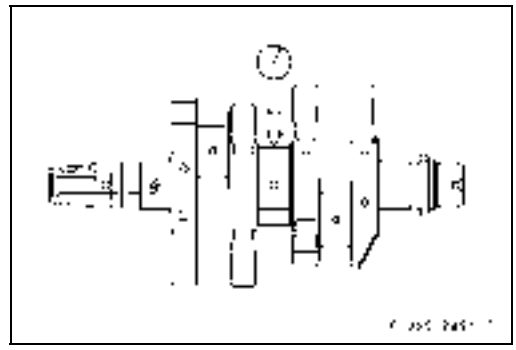
Crankshaft Side Clearance

Standard: 0.05 ~ 0.20 mm (0.002 ~ 0.008 in.)

Service Limit: 0.40 mm (0.016 in.)

Crankshaft and Connecting Rods

Crankshaft Runout Inspection



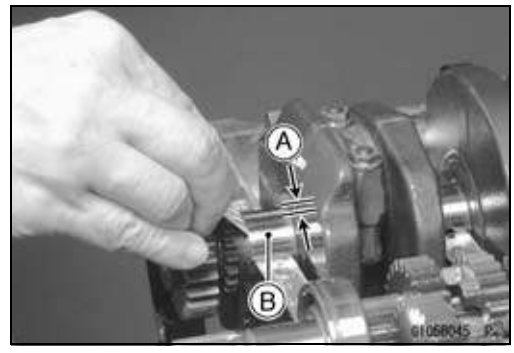
● Measure the crankshaft runout.

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

Crankshaft Runout

Service Limit: TIR 0.05 mm (0.002 in.)

Crankshaft Main Bearing Insert/Journal Wear Inspection



● Using a plastigage (press gauge), measure the bearing insert/journal [B] clearance [A].

NOTE

○*Tighten the crankcase bolts to the specified torque (see Crankcase Assembly).*

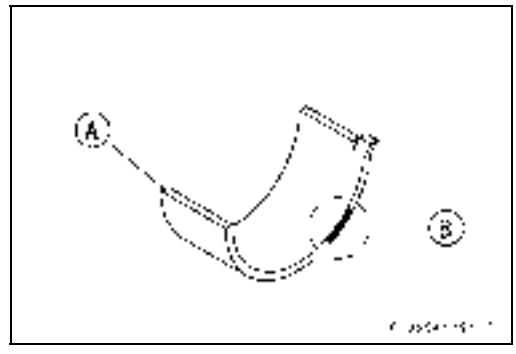
○*Do not turn the crankshaft during clearance measurement.*

○*Journal clearance less than 0.025 mm (0.001 in.) can not be measured by plastigage, however, using genuine parts maintains the minimum standard clearance.*

Crankshaft Main Bearing Insert/Journal Clearance

Standard: 0.014 ~ 0.038 mm (0.0006 ~ 0.0015 in.)

Service Limit: 0.08 mm (0.0031 in.)



★If the clearance is within the standard, no bearing replacement is required.

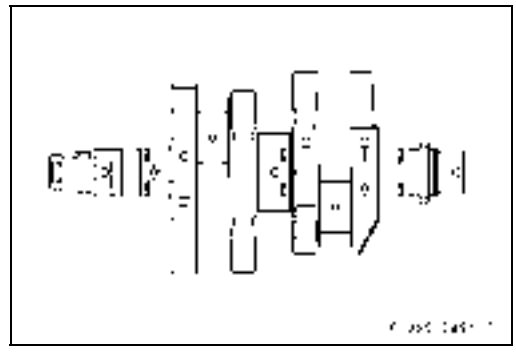
★If the clearance is between 0.038 mm (0.0015 in.) and the service limit 0.08 mm (0.0031 in.), replace the bearing inserts with inserts [A] painted blue [B]. Check insert/journal clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

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

Crankshaft Main Journal Diameter

Standard: 27.984 ~ 28.000 mm (1.1017 ~ 1.1024 in.)

Service Limit: 27.96 mm (1.101 in.)



★If any journal has worn past the service limit, replace the crankshaft with a new one.

★If the measured journal diameters are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

Crankshaft Main Journal Diameter Marks

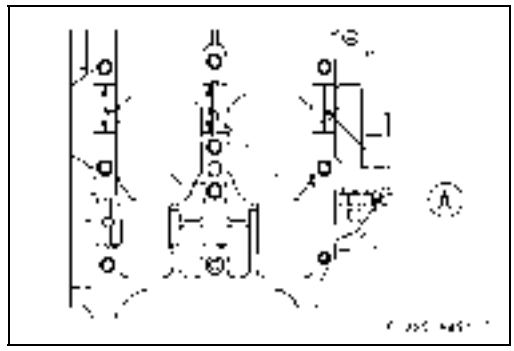
None: 27.984 ~ 27.992 mm (1.1017 ~ 1.1020 in.)

1: 27.993 ~ 28.000 mm (1.1021 ~ 1.1024 in.)

□: Crankshaft Main Journal Diameter Marks, "1" mark or no mark.

Crankshaft and Connecting Rods

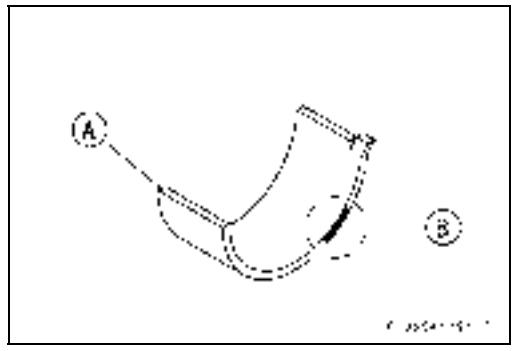
● Measure the main bearing bore diameter, and mark the upper crankcase half in accordance with the bore diameter.
A: Crankcase Main Bearing Bore Diameter Marks, "○" mark or no mark.



NOTE

○*Tighten the crankcase 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 Marks
○: 31.000 ~ 31.008 mm (1.2205 ~ 1.2208 in.)
None: 31.009 ~ 31.016 mm (1.2208 ~ 1.2211 in.)



● Select the proper bearing insert [A] in accordance with the combination of the crankcase and crankshaft coding.
Size Color [B]

Crankcase Main Bearing Bore Diameter Marking	Crankshaft Main Journal Diameter Marking	Bearing Insert*		
		Size Color	Part Number	Journal Nos.
○	1	Black	92028-1487	1, 3
			92028-1490	2
None	1	Blue	29028-1486	1, 3
○	None		92028-1489	2
None	None	Yellow	92028-1582	1, 3
			92028-1586	2

*The bearing insert for No.2 journal have an oil groove.

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

Starter Motor Clutch

Starter Motor Clutch Removal/Installation

● Refer to Alternator Rotor Removal and Installation in the Electrical System chapter (see Alternator Rotor Removal and Installation in the Electrical System chapter).

Starter Motor Clutch Inspection

● Remove:
Alternator Cover (see Alternator Cover Removal in the Electrical System chapter)
Starter Idle Gear

● Turn the starter motor clutch gear [A] by hand. The starter motor clutch gear should turn clockwise [B] freely, but should not turn counterclockwise [C].

★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.

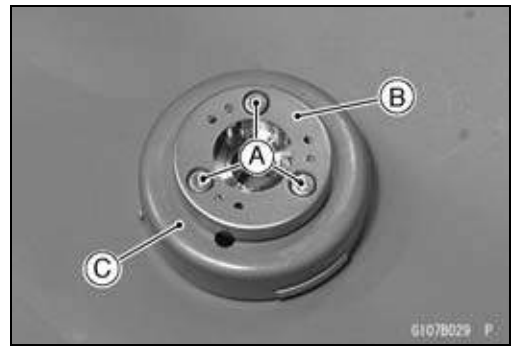


NOTE

○*Examine the starter motor clutch gear as well. Replace it if is worn or damage.*

Starter Motor Clutch Disassembly

● Remove:
Alternator Rotor (see Alternator Rotor Removal in the Electrical System chapter)
Starter Motor Clutch Bolts [A] and Starter Motor Clutch [B]
Alternator Rotor [C]



Starter Motor Clutch Assembly

● Apply a non-permanent locking agent to the threads of the starter motor clutch bolts and tighten them.

Torque - Starter Motor Clutch Bolts: 34.3 N·m (3.5 kgf·m, 25 ft·lb)

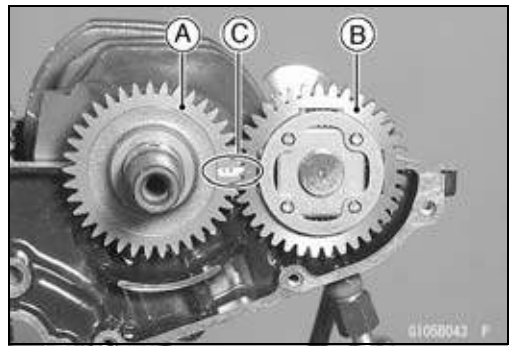
Balancer

Balancer Removal

- Split the crankcase (see Crankcase Splitting).
- Pull the balancer shaft with the balancer gear out of the crankcase.

Balancer Installation

- Balancer installation is the reverse of removal.
- Apply oil to the inside of the balancer shaft bearing insert.
- Align the timing mark [C] on the balancer gear [B] with the timing mark [C] on the balancer drive gear [A] of the crankshaft.



Balancer Shaft Bearing Insert/Journal Wear Inspection

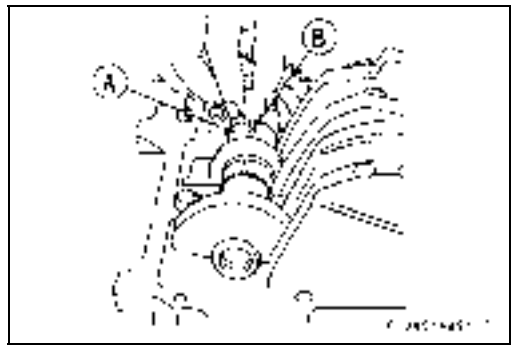
- Measure the bearing insert/journal clearance.

○Split the crankcase and wipe each bearing insert and journal [A] surface clean of oil.

○Cut strips of plastigage (press gauge) [B] to bearing insert width, and place a strip on each journal parallel to the balancer shaft so that the plastigage will be compressed between the journal and the bearing insert.

○Install the lower crankcase half, and tighten the case bolts to the specified torque.

Torque - Crankcase Bolts ϕ8: 27 N·m (2.8 kgf·m, 20 ft·lb)
Crankcase Bolts ϕ6: 12 N·m (1.2 kgf·m, 104 in·lb)



NOTE

○*Do not turn the balancer shaft during clearance measurement.*

○Remove the lower crankcase half and measure the plastigage width to determine the bearing insert/journal clearance.

Balancer Shaft Bearing Insert/Journal Clearance
Standard: 0.020 ~ 0.044 mm (0.0008 ~ 0.0017 in.)
Service Limit: 0.08 mm (0.0031 in.)

★If the clearance is within the standard, no bearing replacement is required.

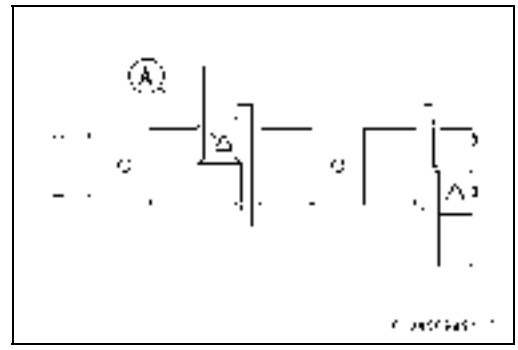
★If the clearance is between 0.044 mm (0.0017 in.) and the service limit 0.08 mm (0.0031 in.), replace the bearing inserts with inserts painted blue. Check insert/journal clearance with plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.

★If the clearance exceeds the service limit; measure the diameter of the balancer shaft journal.

Balancer Shaft Journal Diameter
Standard: 25.984 ~ 26.000 (1.0230 ~ 1.0236 in.)
Service Limit: 25.96 mm (1.022 in.)

Balancer

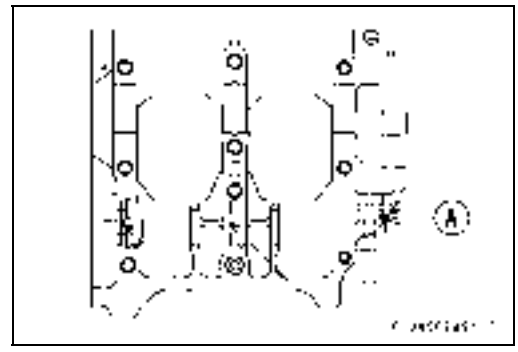
★If either journal has worn past the service limit, replace the balancer shaft with a new one.
★If the measured journal diameter is not less than the service limit, but does not coincide with the original diameter markings [A] on the balancer shaft, write new marks on it.



Balancer Shaft Journal Diameter Marks
None: 25.984 ~ 25.994 (1.0230 ~ 1.0234 in.)
○: 25.995 ~ 26.000 mm (1.0234 ~ 1.0236 in.)

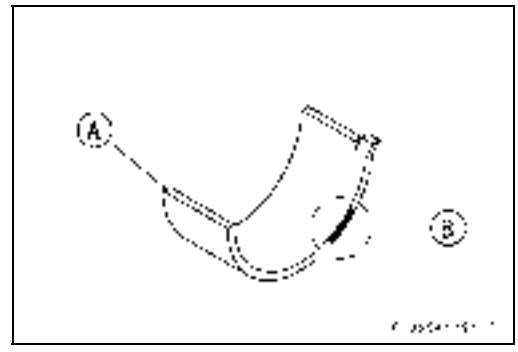
- Put the lower crankcase half on the upper crankcase half without bearing inserts, and tighten the case bolts to the specified torque and sequence (see Crankcase Assembly).
- Measure the main bearing inside diameter, and mark the upper crankcase half in accordance with the inside diameter.

NOTE
○*The mark [A] already on the upper crankcase half should almost coincide with the measurement.*



Crankcase Bearing Inside Diameter Marks
○: 29.000 ~ 29.008 mm (1.1417 ~ 1.1420 in.)
None: 29.009 ~ 29.016 mm (1.1421 ~ 1.1424 in.)

- Select the proper bearing insert [A] in accordance with the combination of the crankcase and balancer shaft coding.
- Install the new insert in the crankcase and check insert/journal clearance with plastigage.



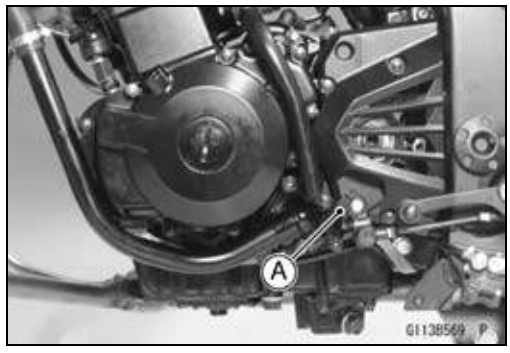
Size Color [B]

Crankcase Bearing Inside Diameter Mark	Balancer Shaft Journal Diameter Mark	Bearing Insert	
		Size Color	Part Number
○	○	Brown	92028-1424
None	None	Blue	92028-1422
○	None	Black	92028-1423
None	○		

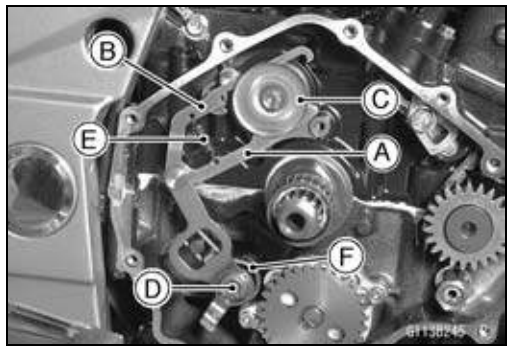
Transmission

External Shift Mechanism Removal

- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove the shift lever link bolt [A] and pull the lever link off the shift shaft end.

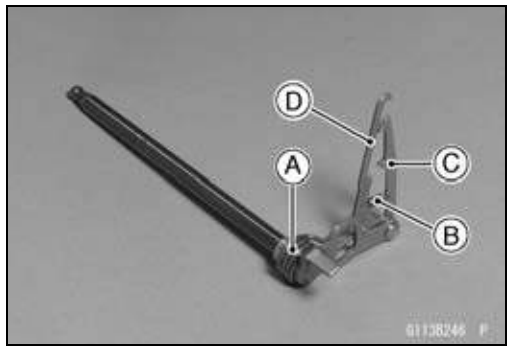


- Remove the clutch (see Clutch Removal in the Clutch chapter).
- Move the shift mechanism arm [A] and over shift limiter [B] out of their positions on the end of the shift drum [C], and pull out the shift shaft [D] with the arm, pawl spring [E] and return spring [F].

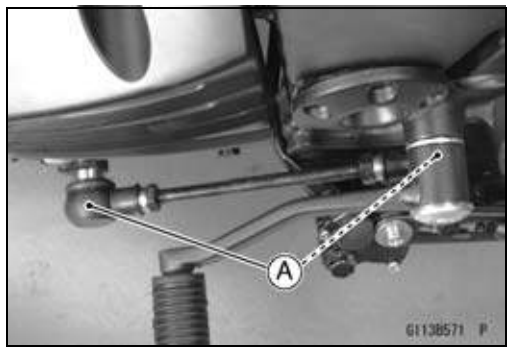


External Shift Mechanism Installation

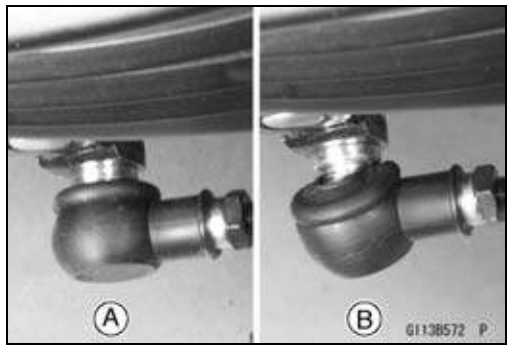
- Check that the return spring [A] and pawl spring [B] are properly fitted on the mechanism, install the external shift mechanism, and place the shift mechanism arm [C] and over shift limiter [D] on the shift drum pins.
- Add the engine oil (see Lubrication System in the Periodic Maintenance chapter).



- Be sure the sealing lip of the rubber boot [A] fits into the groove of the ball joint after installing the shift lever link.

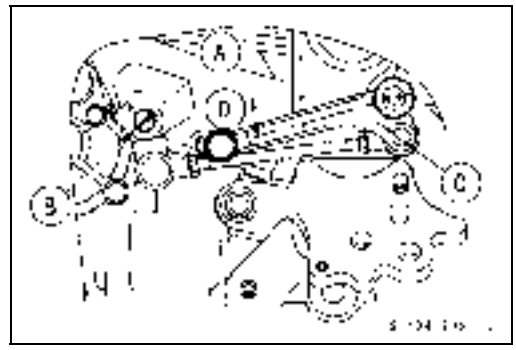


○Correctly Boot Fitting Position [A]
○Incorrectly Boot Position [B]



Transmission

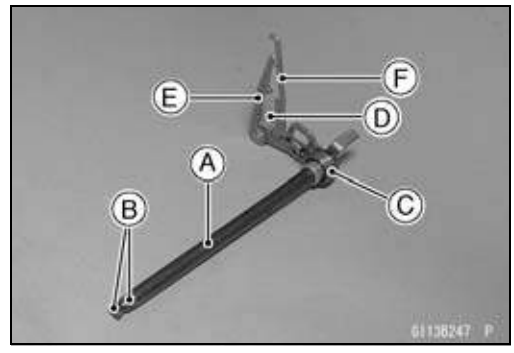
- Align the mark [A] on the shift shaft with the mark [B] on the shift lever link.
- Position the shift lever [C] as shown.
  Approx. 15° [D]



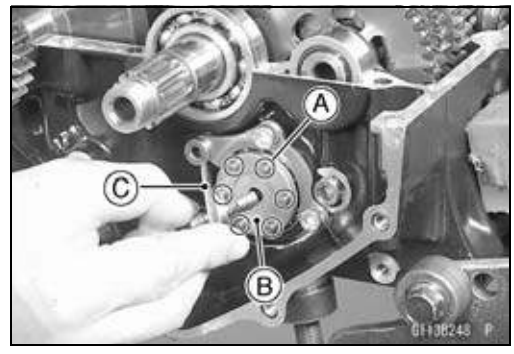
External Shift Mechanism Inspection

- Examine the shift shaft for any damage.
- ★If the shift shaft [A] is bent, straighten or replace it.
- ★If the splines [B] are damaged, replace the shaft.
- ★If the return spring [C] or pawl spring [D] is broken or distorted, replace them.
- ★If the shift mechanism arm [E] or over shift limiter [F] is distorted, replace the shift shaft.
- Check the return spring pin is not loose.
- ★If it is loose, unscrew it and apply a non-permanent locking agent to the threads, and tighten it.

Torque - External Shift Mechanism Return Spring Pin: 19.6 N·m (2.0 kgf·m, 14.5 ft·lb)

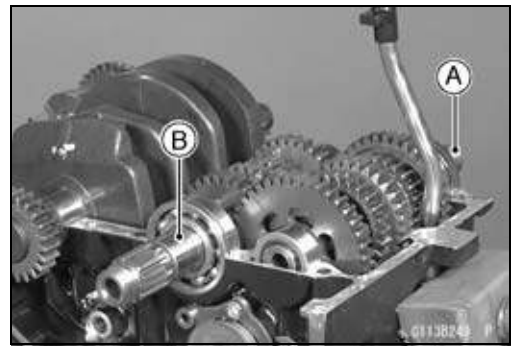


- Visually inspect the shift drum pins [A], pin holder [B] and pin plate [C].
- ★If they are badly worn or if they show any damage, replace them.



Transmission Removal

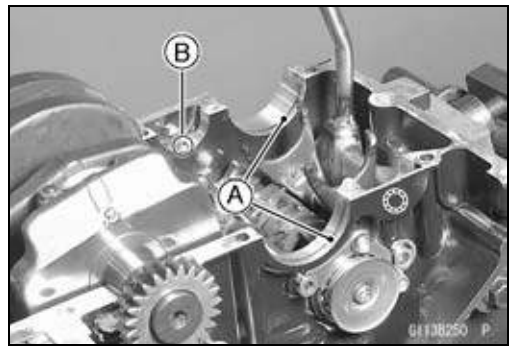
- Split the crankcase (see Crankcase Splitting).
- Remove the drive shaft [A] and output shaft [B].



Transmission

Transmission Installation

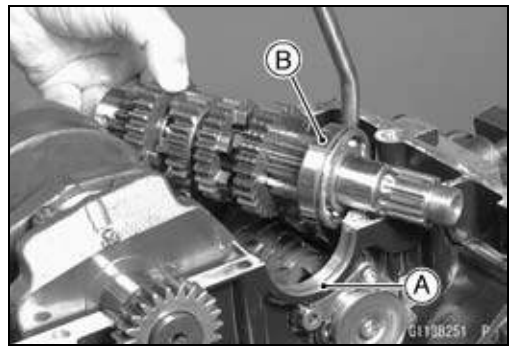
- With a high flash-point solvent, clean off the outer circumferences of the transmission ball bearings and needle bearing housings, and wipe dry.
- Check to see that the set rings [A] and set pins [B] are in place in the transmission bearing housings clean with compressed air.



- Install the drive shaft and output shaft into the upper crankcase half.
- Apply engine 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 [A] and the bearing outer races [B].

- Assemble the crankcase.



Transmission Shaft Disassembly

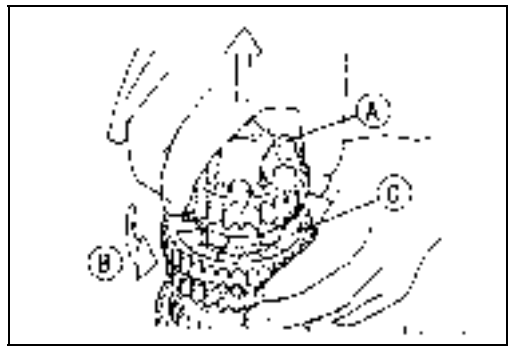
- Remove the transmission shafts (see Transmission Shaft Removal).
- Remove the circlips, disassemble the transmission shafts.

Special Tool - Outside Circlip Pliers: 57001-144

- The 5th gear [A] on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism. Remove the 5th gear.

○Set the output shaft in a vertical position holding the 3rd gear [C].

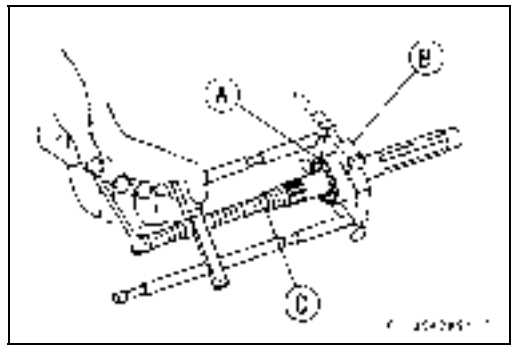
○Spin the 5th gear quickly [B] and pull it off upward.



- Remove the ball bearing [A] from each shafts.

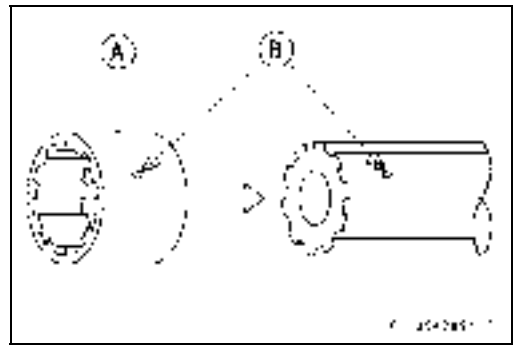
Special Tools - Bearing Puller: 57001-135 [B]
Bearing Puller Adapter: 57001-317 [C]

- Discard the bearing.



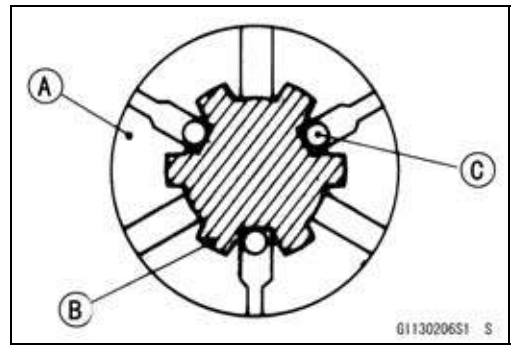
Transmission

Transmission Shaft Assembly



- Install the ball bearing on the drive shaft with the groove toward the clutch side.
- Install the gear bushing [A] on the shafts with their oil holes [B] aligned.

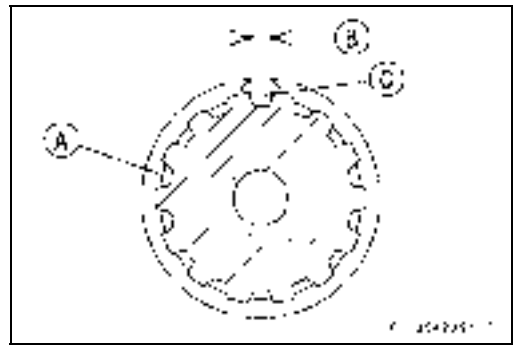
- The drive shaft gears can be recognized by size: the gear with the smallest diameter is 1st gear, and the largest one is 6th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- The output shaft gears can be recognized by size: the gear with the largest diameter is 1st gear, and the smallest one is 6th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.



- Fit the steel balls into the 5th gear holes in the output shaft as shown.
  View A - A' (see CRANKSHAFT/TRANSMISSION 9-30)
  [A] Gear (5th)
  [B] Shaft
  [C] Steel Balls

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

○Check the ball-locking effect that the 5th gear does not come out of the output shaft when moving it up and down by hand.

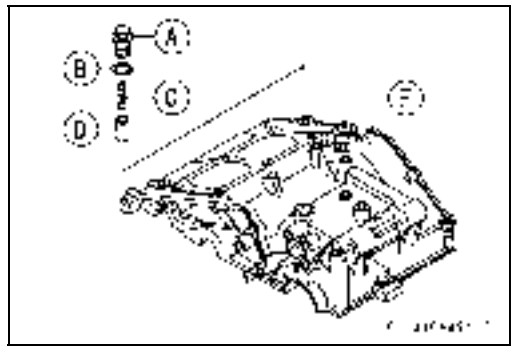


- Replace any circlip that were removed with new ones.
- Install the circlips [A] so that opening [B] is aligned with a spline groove [C].
- Check that each gear spins or slides freely on the transmission shafts without binding after assembly.

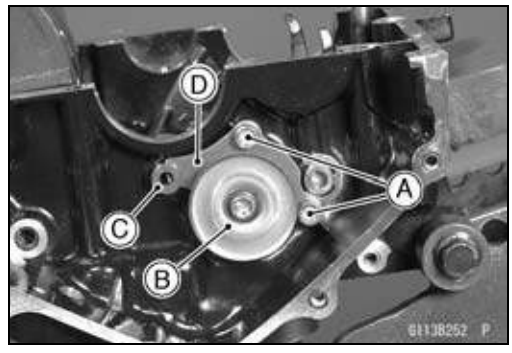
Transmission

Shift Drum and Fork Removal

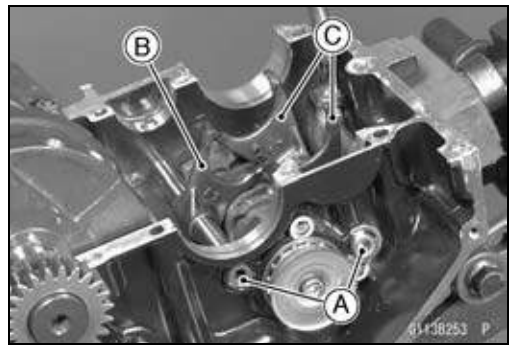
- Split the crankcase (see Crankcase Splitting).
- Remove the neutral positioning bolt [A] and take off the washer [B], spring [C] and pin [D] from the upper crankcase half [E].



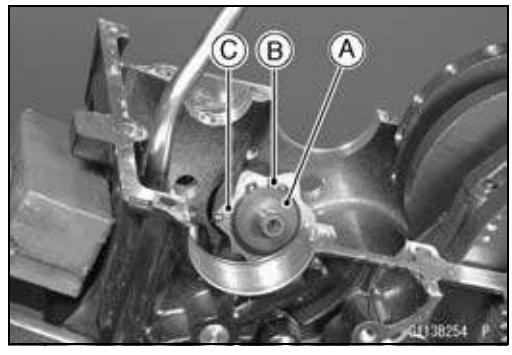
- Remove the shift drum bearing holder bolts [A] and take the holder plate [D] out of the shift drum [B] and shift rod [C].



- Pull the shift rods [A] off the right side of the upper crankcase half, and take off the drive shaft shift fork [B] and the output shaft shift forks [C].



- Pull out the shift drum [A] about half of it, and remove the circlip [B] and the operating plate [C].
- Pull out the shift drum fully from the upper crankcase.

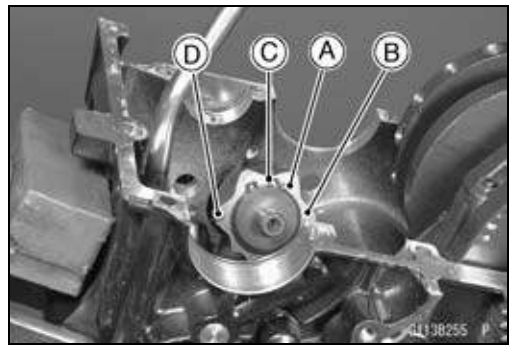


Shift Drum and Fork Installation

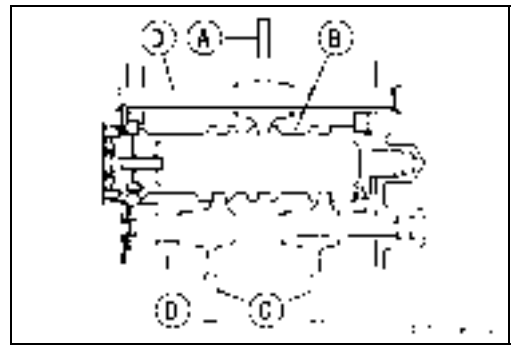
- Set the transmission gear in the neutral position.
- Insert the shift drum into the upper crankcase half, and install the operating plate pin [A], operating plate [B] and circlip [C].

NOTE

○*When installing the operating plate the projection [D] faces toward the outside.*



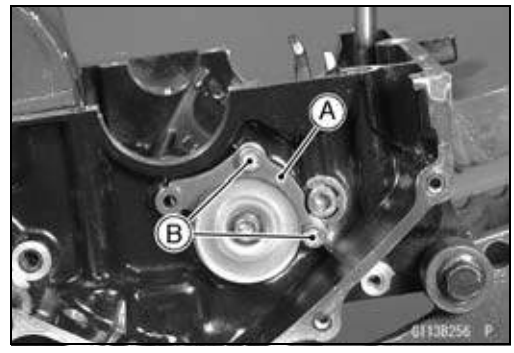
Transmission



- Apply a little engine oil to the shift rods and shift fork fingers.
- Insert the shift rods [D] running them through the shift forks, fitting each shift fork guide pin into the shift drum grooves.

○Position the one with shortest ear [A] on the drive shaft and place the guide pin in the center groove in the shift drum [B].

○The two forks [C] on the output shaft are identical.



- Install the shift drum bearing holder plate [A].

○Apply a non-permanent locking agent to the threads of the shift drum bearing holder bolts [B], and tighten them with the specified torque.

Torque - Shift Drum Bearing Holder Bolts: 12 N·m (1.2 kgf·m, 104 in·lb)

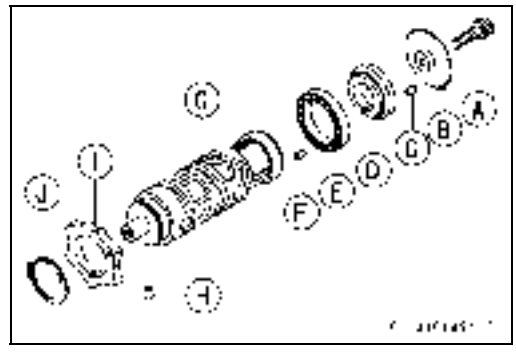
- Install the neutral positioning bolt with the specified torque to the upper crankcase.

Torque - Shift Drum Positioning Bolt: 24.5 N·m (2.5 kgf·m, 18 ft·lb)

Shift Drum Disassembly

- Remove the shift drum (see Shift Drum Removal).
- When holding the shift drum with a vise, remove the shift drum pin plate bolt.

Shift Drum Assembly



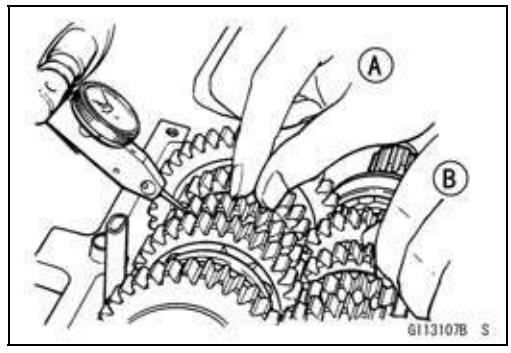
- Be sure to install the dowel pin [F].
- The shift drum pins [C] are identical.
- Apply a non-permanent locking agent to the threads of the shift drum pin plate bolt [A], and tighten it.

Torque - Shift Drum Pin Plate Bolt: 9.0 N·m (0.9 kgf·m, 80 in·lb)

Shift Drum Pin Plate [B]
Shift Drum Bearing Holder [D]
Shift Drum Bearing [E]
Shift Drum [G]
Operating Plate Pin [H]
Operating Plate [I]
Circlip [J]

Transmission

Gear Backlash Inspection



- Split the crankcase leaving the transmission in place.
- Set a dial gauge against the teeth on one gear, and move the gear back and forth [A] while holding the other gear steady [B]. The difference between the highest and the lowest gauge readings is the amount of backlash.

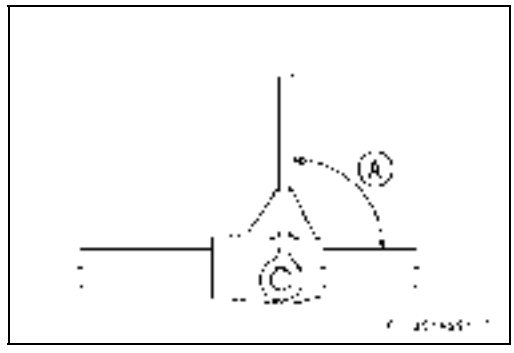
★Replace both gears if the amount of backlash exceeds the service limit.

Gear Backlash

Standard: 0 ~ 0.17 mm (0 ~ 0.0067 in.)

Service Limit: 0.25 mm (0.010 in.)

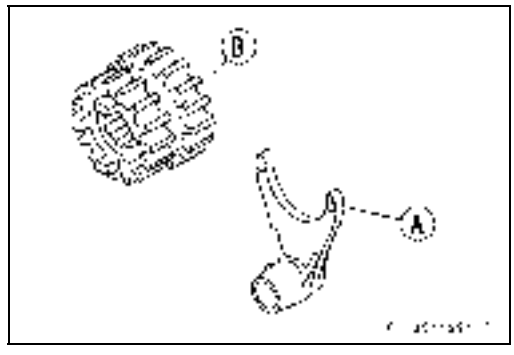
Shift Fork Bending Inspection



- 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 when under power.

90° [A]

Shift Fork/Gear Groove Wear Inspection



- 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 (0.1929 ~ 0.1969 in.)

Service Limit: 4.8 mm (0.189 in.)

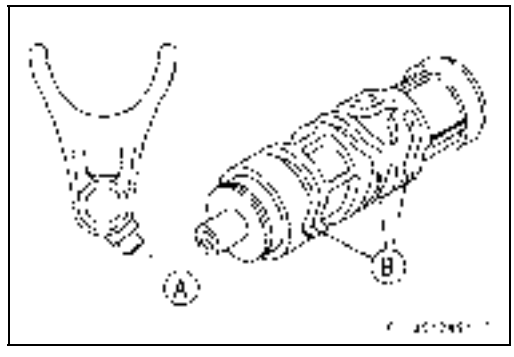
★If the gear groove is worn over the service limit, the gear must be replaced.

Gear Groove Width

Standard: 5.05 ~ 5.15 mm (0.1988 ~ 0.2028 in.)

Service Limit: 5.3 mm (0.209 in.)

Shift Fork Guide Pin/Drum Groove Wear Inspection



- Measure the diameter of 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: 5.9 ~ 6.0 mm (0.2323 ~ 0.2362 in.)

Service Limit: 5.8 mm (0.228 in.)

★If any shift drum groove is worn over the service limit, the drum must be replaced.

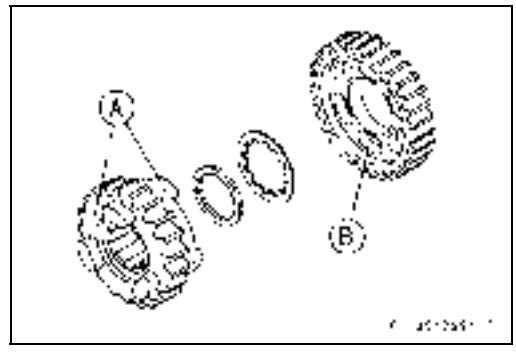
Shift Drum Groove Width

Standard: 6.05 ~ 6.20 mm (0.2382 ~ 0.2441 in.)

Service Limit: 6.3 mm (0.248 in.)

Transmission

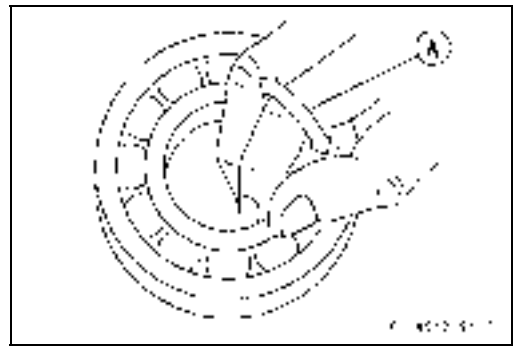
Gear Dog and Gear Dog Hole Damage Inspection



● Visually inspect the gear dogs [A] and gear dog holes [B].
★Replace any damaged gears or gears with excessively worn dogs or dog holes.

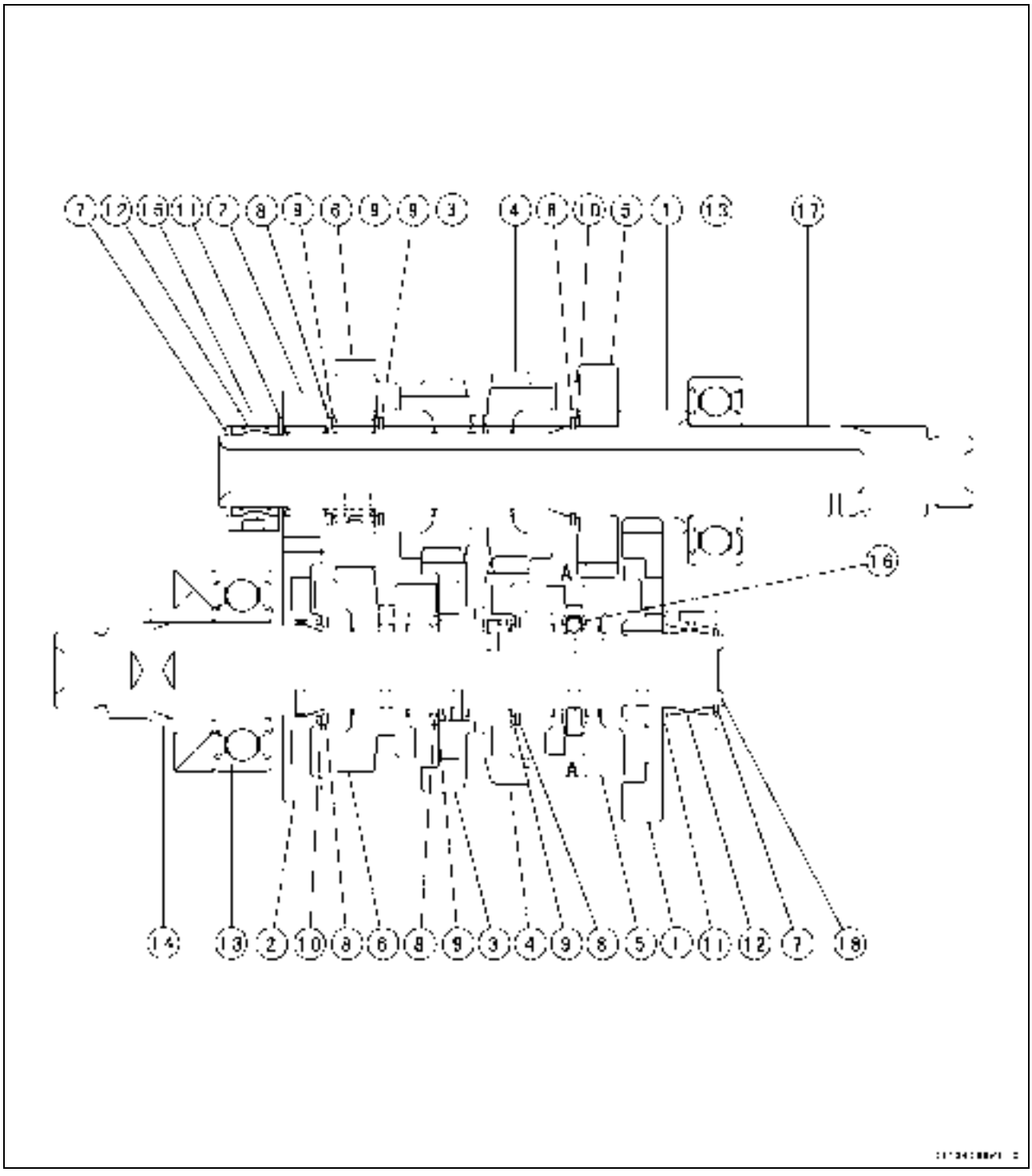
Ball and Needle Bearing Wear Inspection

● Check the following ball bearings: right hand drive shaft, left hand output shaft, and right hand shift drum.
○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 following needle bearing: left hand drive shaft, and right hand output shaft.
○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.

Transmission



1. 1st Gear
2. 2nd Gear
3. 3rd Gear
4. 4th Gear
5. 5th Gear
6. 6th (Top) Gear
7. Circlip
8. Circlip
9. Toothed Washer
10. Washer
11. Thrust Washer
12. Needle Bearing
13. Ball Bearing
14. Collar
15. Bearing Outer Race
16. Steel Ball
17. Drive Shaft
18. Output Shaft

Wheels/Tires

Table of Contents

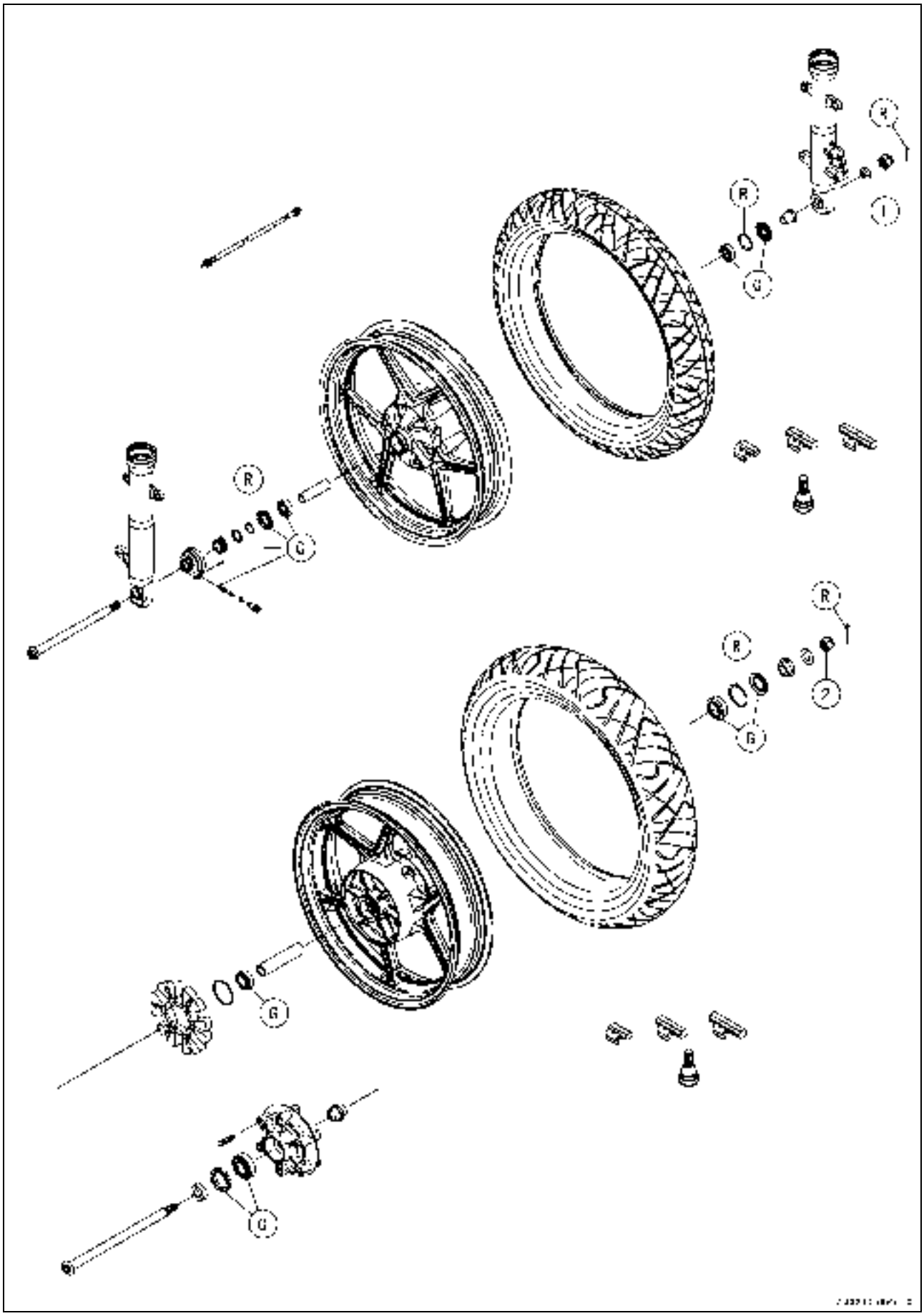
Exploded View 10-2
Specifications 10-4
Special Tools 10-5
Wheels (Rims) 10-6
- Front Wheel Removal 10-6
- Front Wheel Installation 10-6
- Rear Wheel Removal 10-7
- Rear Wheel Installation 10-7
- Wheel Inspection 10-9
- Axle Inspection 10-9
- Balance Inspection 10-10
- Balance Adjustment 10-10
- Balance Weight Removal 10-10
- Balance Weight Installation 10-10

Tires 10-12
- Air Pressure Inspection/Adjustment 10-12
- Tire Inspection 10-12
- Tire Removal 10-12
- Tire Installation 10-13
- Tire Repair 10-15

Hub Bearing 10-16
- Hub Bearing Removal 10-16
- Hub Bearing Installation 10-16
- Hub Bearing Inspection 10-17
- Hub Bearing Lubrication 10-17

Speedometer Gear Housing 10-18
- Speedometer Gear Housing Disassembly 10-18
- Speedometer Gear Housing Assembly 10-18
- Speedometer Gear Housing Lubrication 10-19

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Axle Nut	88	9.0	65	
2	Rear Axle Nut	98	10.0	72	

G: Apply grease.
R: Replacement Parts

Specifications

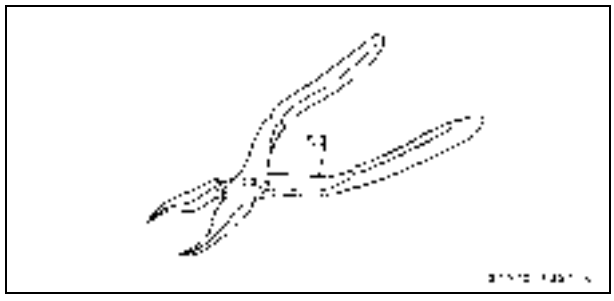
Item	Standard	Service Limit
Wheels (Rims)		
Rim Runout:		
Axial	TIR 0.5 mm (0.02 in.) or less	TIR 1.0 mm (0.04 in.)
Radial	TIR 0.8 mm (0.03 in.) or less	TIR 1.0 mm (0.04 in.)
Axle Runout/100 mm (3.94 in.)	TIR 0.03 mm (0.0012 in.) or less	TIR 0.2 mm (0.008 in.)
Wheel Balance	10 g (0.35 oz.) or less	– – –
Balance Weights	10 g (0.35 oz.), 20 g (0.71 oz.), 30 g (1.06 oz.)	– – –
Rim Size:		
Front	17 × 2.75	– – –
Rear	17 × 3.50	– – –
Tires		
Air Pressure (when Cold):		
Front	Up to 170 kg (375 lb) load: 200 kPa (2.00 kgf/cm², 28 psi)	– – –
Rear	Up to 170 kg (375 lb) load: 225 kPa (2.25 kgf/cm², 32 psi)	– – –
Tread Depth:		
Front:		
BRIDGESTONE	4.6 mm (0.181 in.)	1 mm (0.04 in.)
DUNLOP	4.5 mm (0.177 in.)	
Rear:		
BRIDGESTONE	7.0 mm (0.276 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.)
DUNLOP	7.4 mm (0.291 in.)	Over 130 km/h (80 mph): 3 mm (0.12 in.)
Standard Tires:	Make, Type	Size
Front	BRIDGESTONE BATTLAX BT45F DUNLOP GT 501FG T/L	110/70 17 M/C (54 H)
Rear	BRIDGESTONE BATTLAX BT45R DUNLOP GT501 T/L	130/70 17 M/C (62 H)

⚠ WARNING

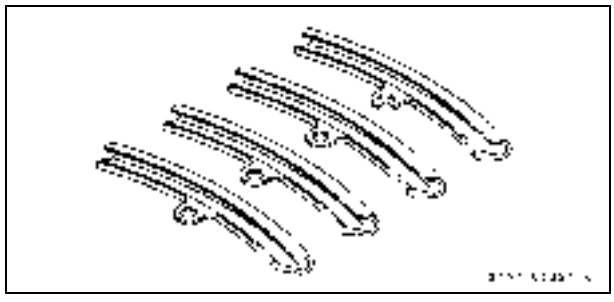
Use the same manufacturer's tires on both front and rear wheels.

Special Tools

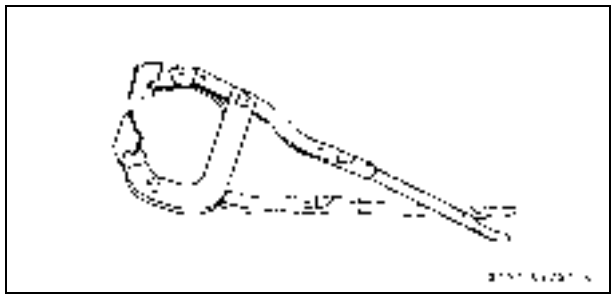
Inside Circlip Pliers:
57001-143



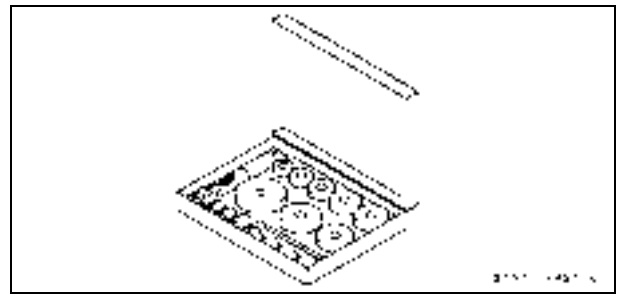
Rim Protector:
57001-1063



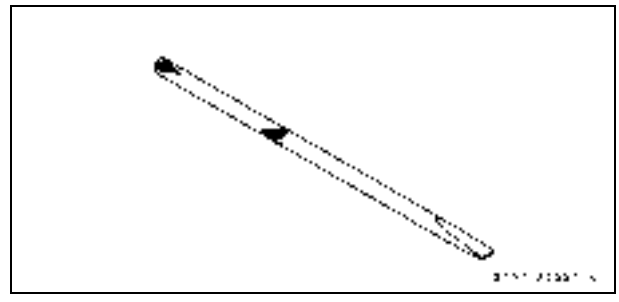
Bead Breaker Assembly:
57001-1072



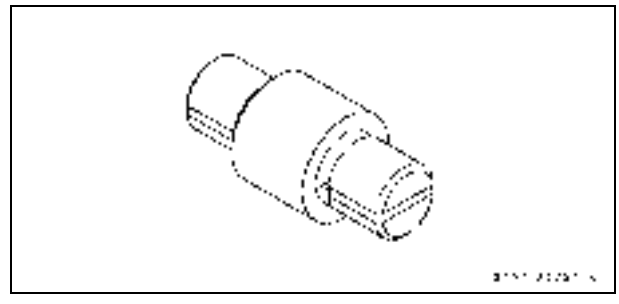
Bearing Driver Set:
57001-1129



Bearing Remover Shaft, ϕ9:
57001-1265

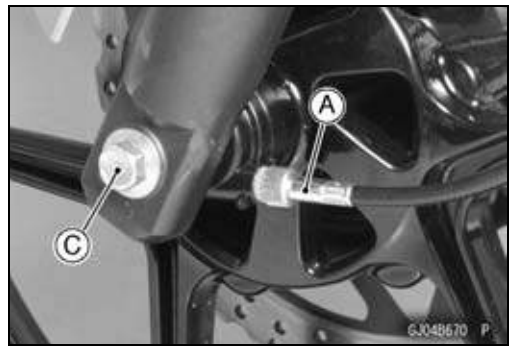


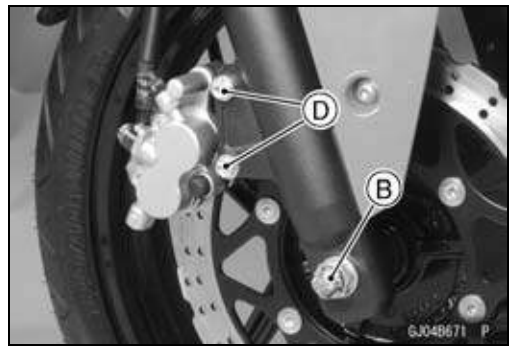
Bearing Remover Head, ϕ15 × ϕ17:
57001-1267



Wheels (Rims)

Front Wheel Removal



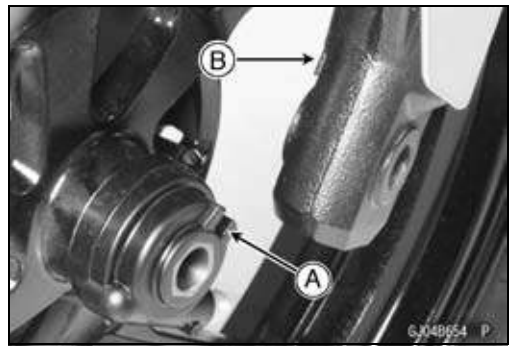


- Remove:
  Speedometer Cable Lower End [A]
  Axle Nut Cotter Pin [B]
  Axle (Loosen) [C]
  Front Caliper Mounting Bolts [D]
- Using a jack, raise the front wheel off the ground.
- Pull the axle and remove the front wheel.

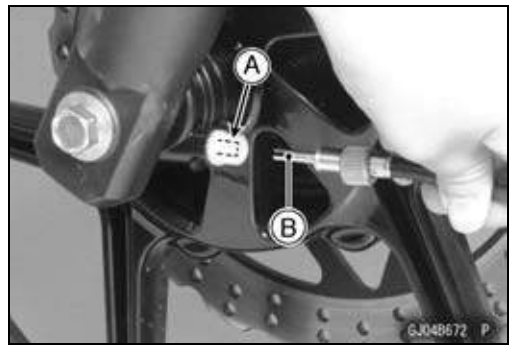
CAUTION

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.

Front Wheel Installation



- Apply a high-temperature grease to the grease seal lips.
- Install the speedometer gear housing to the front wheel.
- Install the front wheel so that the speedometer gear housing stop [A] fit into the fork leg stops [B].



- Install the speedometer cable so that the drive notch [B] of it fits into the projection [A] of the speedometer gear in the housing.
- Tighten the front axle nut with the specified torque.

Torque - Front Axle Nut: 88 N·m (9.0 kgf·m, 65 ft·lb)

Wheels (Rims)

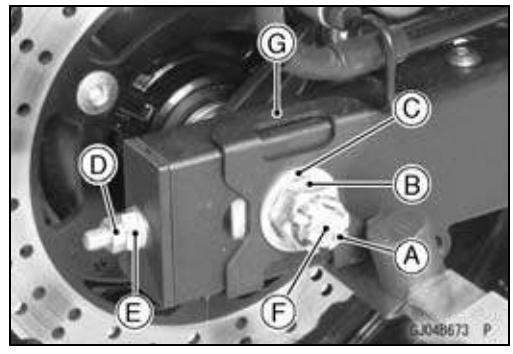
● Check the front brake effectiveness (see Brake Operation Inspection in the Periodic Maintenance chapter).

⚠ WARNING

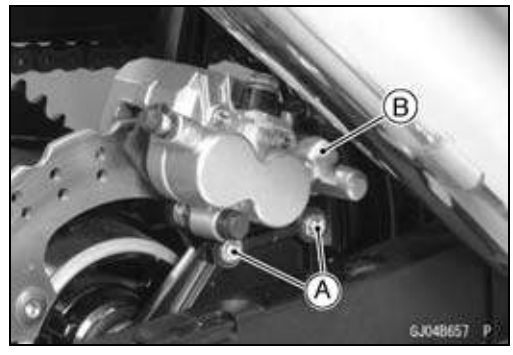
Do not attempt to drive the motorcycle until a full brake lever is obtained by pumping the brake lever until the pads are against the disc. The brake will not function on the first application of the lever if this is not done.

Rear Wheel Removal

● Remove:
Axle Nut Cotter Pin [A]
Axle Nut [B] and Washer [C]
Chain Locknuts (Loosen) [D] and Adjusting Nuts [E]
Axle [F]
Alignment Indicators [G]



● Remove:
Rear Caliper Mounting Bolts [A]
Rear Caliper [B]



● Raise the rear wheel off the ground with the stand.
● Free the drive chain from the rear sprocket, 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.

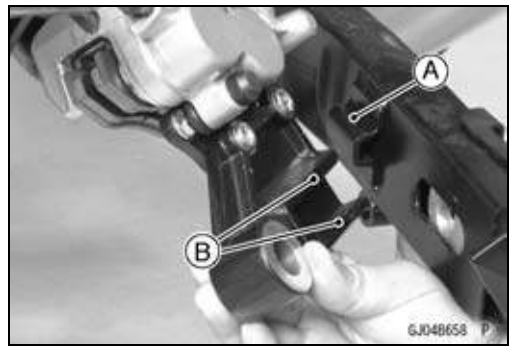
Rear Wheel Installation

● Apply a high temperature grease to the grease seal lips and coupling, wheel sliding portions.

Wheels (Rims)

● Fit the swingarm stop [A] into the caliper holder stops [B].
● Install:
Alignment Indicators
Axle
Chain Adjusting Nuts and Locknuts
Axle Nut and Washer
Axle Nut Cotter Pin

Torque - Rear Axle Nut: 98 N·m (10.0 kgf·m, 72 ft·lb)



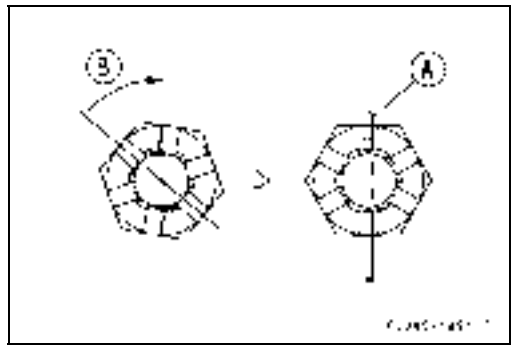
NOTE

○*Insert the axle from the right side of the wheel, and tighten the axle nut.*

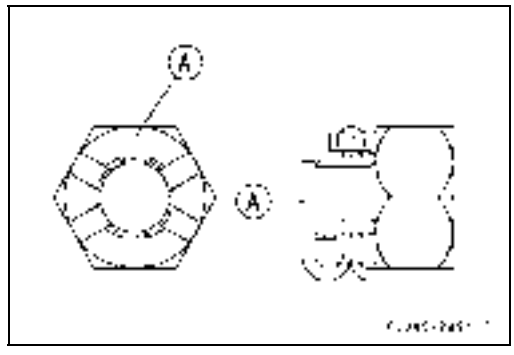
● Install a new cotter pin.

NOTE

○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle, tighten the nut clockwise [B] up to next alignment.*
○*It should be within 30 degree.*
○*Loosen once and tighten again when the slot goes past the nearest hole.*



● Bend the cotter pin [A] over the nut.



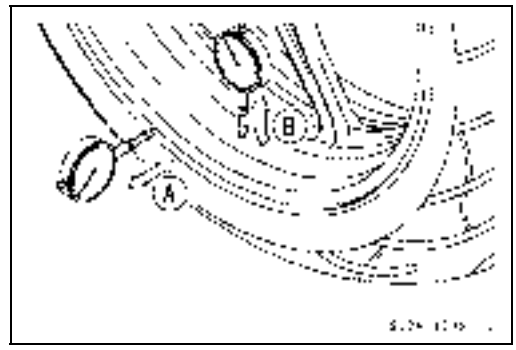
● Adjust the drive chain slack (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).
● Check the rear brake (see Brake Operation Inspection in the Periodic Maintenance chapter).

⚠ WARNING

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

Wheels (Rims)

Wheel Inspection



- Raise the front/rear wheel off the ground.
- Spin the wheel lightly, and check for roughness or binding.

★If the 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.

- Measure the rim runout, radial [B] and axial [A], with a dial gauge.

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

★If the problem is not due to the bearings, replace the wheel.

Rim Runout (with tire installed)

Standard:

Axial	**TIR 0.5 mm (0.02 in.) or less**
Radial	**TIR 0.8 mm (0.03 in.) or less**

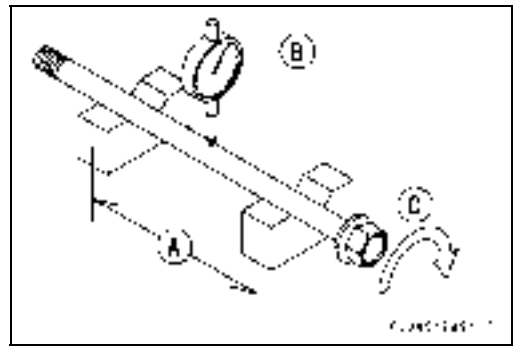
Service Limit:

Axial	**TIR 1.0 mm (0.04 in.)**
Radial	**TIR 1.0 mm (0.04 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



- Remove the front and rear axles.
- Visually inspect the front and rear axle for damages.

★If the axle is damaged or bent, replace it.

- Place the axle in V blocks that are 100 mm (3.94 in.) [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.

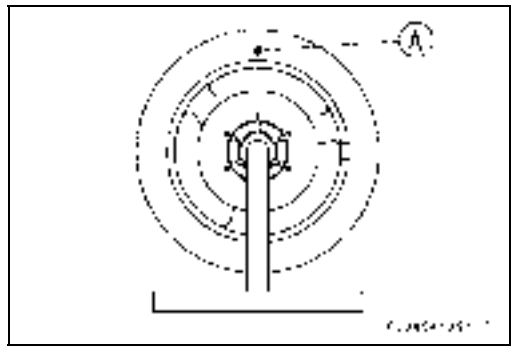
★If the axle runout exceeds the service limit, replace the axle.

Axle Runout/100 mm (3.94 in.)

Standard:	**TIR 0.10 mm (0.0394 in.) or less**
Service Limit:	**TIR 0.2 mm (0.008 in.)**

Wheels (Rims)

Balance Inspection

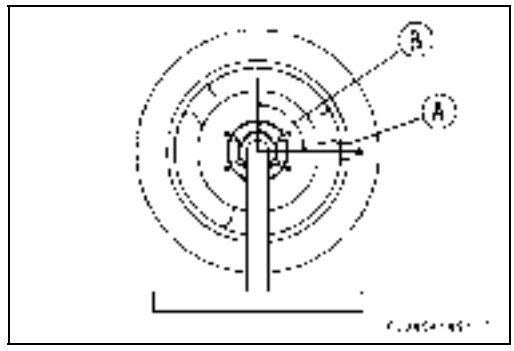


- Remove the wheel.
- Support the wheel so that it can be spun freely.
- Spin the wheel lightly, and mark [A] the wheel at the top when the wheel stops.

○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.

Balance Adjustment

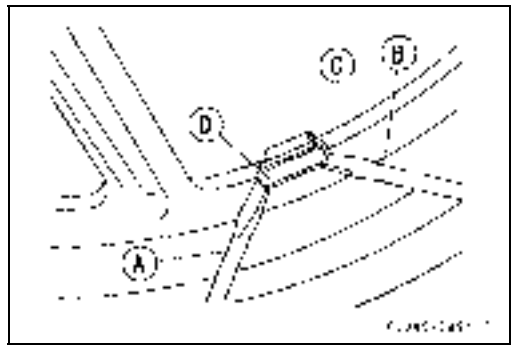


- If the wheel always stops in one position, provisionally attach a balance weight [A] on the rim at the marking using adhesive tape.
- Rotate the wheel 1/4 turn [B], and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.

★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

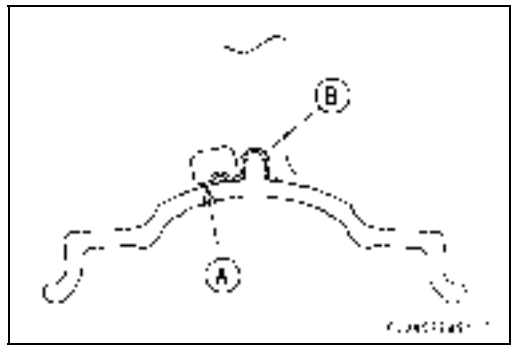


- Insert a regular tip screwdrivers [A] [B] between the rib [C] and weight [D] as shown.
- Pry the balance weight with two screwdrivers and remove the balance weight.
- Discard the used balance weight.

CAUTION

Do not tap the screwdrivers. The rim could be damaged.

Balance Weight Installation



- Check if the weight portion has any play on the blade [A] and clip [B].

★If it does, discard it.

⚠ WARNING

If the balance weight has any play on the rib of the rim, the blade and/or clip have been stretched. Replace the loose balance weight.
Do not reuse used balance weight.
Unbalanced wheels can create an unsafe riding condition.

Wheels (Rims)

Balance Weight

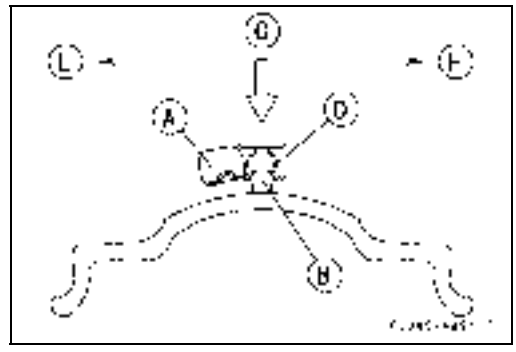
Part Number	Weight
41075-0007	10 g (0.35 oz.)
41075-0008	20 g (0.71 oz.)
41075-0009	30 g (1.06 oz.)

NOTE

○*Balance weights are available from Kawasaki dealers in 10, 20, and 30 gram (0.35 oz., 0.71 oz., and 1.06 oz.) sizes. An imbalance of less than 10 grams (0.35 oz.) will not usually affect running stability.*

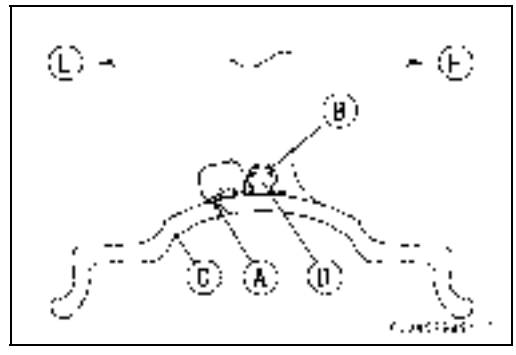
○*Do not use four or more balance weight (more than 90 gram). If the wheel requires an excess balance weight, disassemble the wheel to find the cause.*

● Slip the balance weight [A] on to the rib [B], by pushing or lightly hammering [C] the clip [D].
Left Side [E]
Right Side [F]



● Be sure to install the balance weight.

○Check that the blade [A] and clip [B] are fully seated on the rim [C] and that the clip is hooked over the rib [D].
Left Side [E]
Right Side [F]



Tires

Air Pressure Inspection/Adjustment

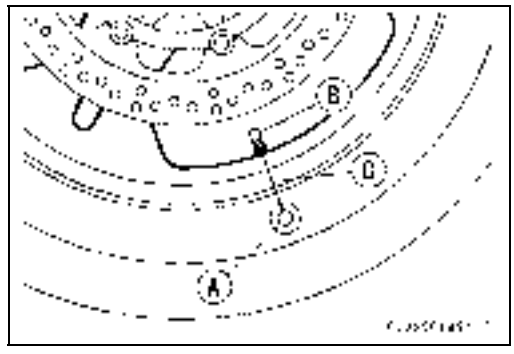
- Refer to Air Pressure Inspection in the Periodic Maintenance chapter (see Air Pressure Inspection in the Periodic Maintenance chapter).

Tire Inspection

- Refer to Wheels/Tires Damage Inspection in the Periodic Maintenance chapter (see Wheels/Tires Damage Inspection in the Periodic Maintenance chapter).

Tire Removal

- Remove:
  Wheel (see Wheel Removal)
  Disc
  Valve Core (let out the air)
- To maintain wheel balance, mark the air valve 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]

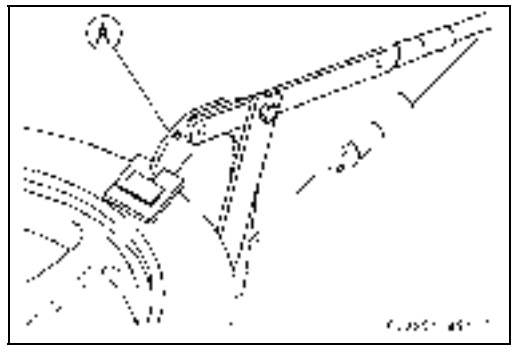


- Lubricate the tire beads and rim flanges on both sides with a soap and water solution or rubber lubricant. This helps the tire beads slip off the rim flanges.

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

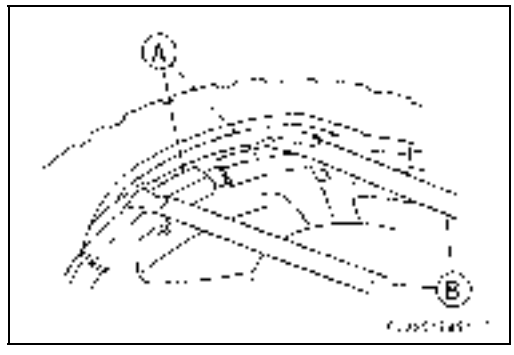
- Brake the beads away from both sides of the rim with the bead breaker [A].

  Special Tool - Bead Breaker Assembly: 57001-1072



- Step on the side of the tire opposite the valve stem and start prying the tire off the rim near the air valve with tire irons.

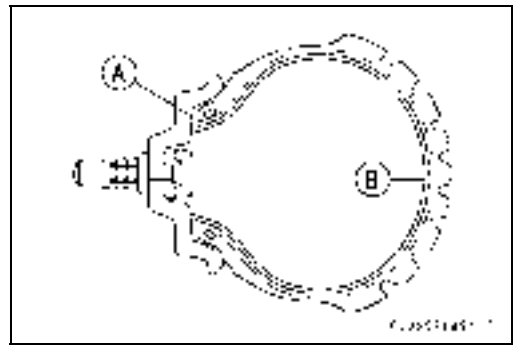
  Special Tools - Rim Protector: 57001-1063 [A]
  Tire Irons of the Bead Breaker Assembly: 57001-1072 [B]



Tires

NOTE

○*For easier removal, always position the tire bead opposite the valve stem in the rim well, and pry the tire bead a little at a time.*



CAUTION

Be careful not to scratch the inner liner and air sealing surfaces of the rim and tire with the tire irons. A scratched inner liner [B] or sealing surface [A] may allow air to leak.

- After removing the bead on one side, remove the other bead from the same side.
- Remove the rim from the tire.

Tire Installation

⚠ WARNING

Use the same manufacture's on both front and rear wheels.

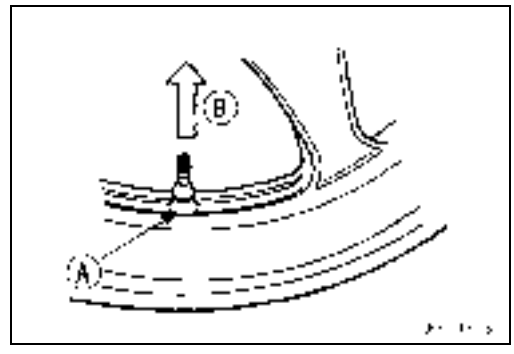
- Inspect the rim and tire, and replace them if necessary.
- Clean the sealing surfaces of the rim and tire, and smooth the sealing surfaces of the rim with a fine emery cloth if necessary.
- Remove the air valve and discard it.

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.

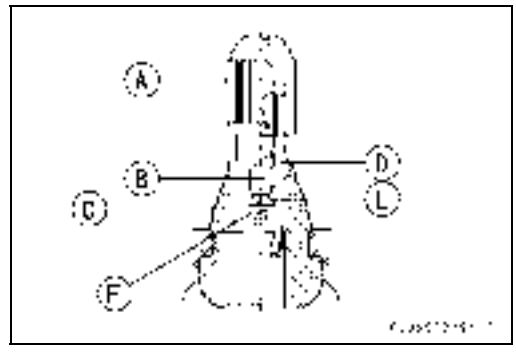


CAUTION

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

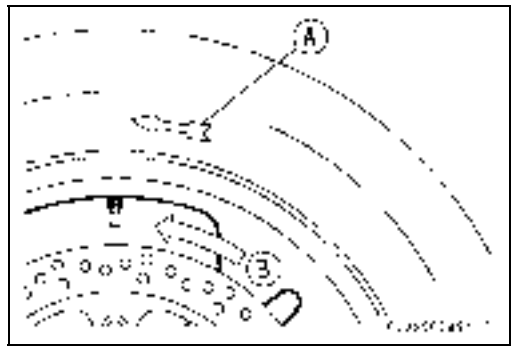
○The air valve is shown in the figure.

[A] Valve Cap
[B] Valve Core
[C] Stem Seal
[D] Valve Stem
[E] Valve Seat
[F] Valve Opened

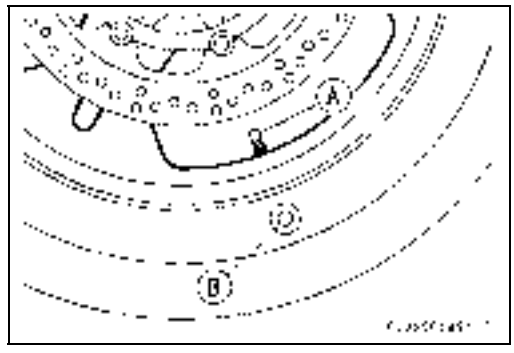


Tires

- Apply a soap and water solution, or rubber lubricant to the rim flange and tire beads.
- Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.
  Tire Rotation Mark [A]
  Rotating Direction [B]



- Position the tire on the rim so that the air valve [A] is at the tire balance mark [B] (the chalk mark made during removal, or the yellow paint mark on a new tire).



- By hand, slide as much as possible of the lower side of the tire bead over the rim flange, starting at the side opposite the valve.
- Fit the rim protectors and tire irons to install the remaining part of the tire bead which cannot be installed by hand. For easy tire installation, position the parts of the bead which is already over the rim flange in the rim well.

NOTE

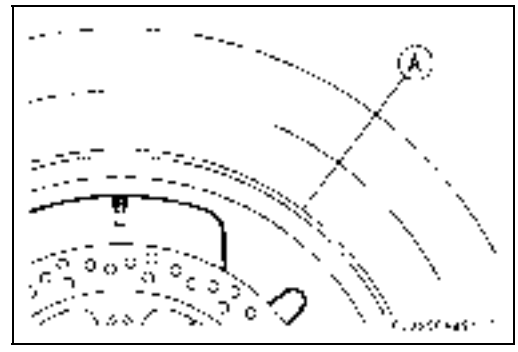
○*To prevent rim damage, be sure to place the rim protectors at any place the tire irons are applied.*

- Install the other side of the tire bead onto the rim in the same manner.
- 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 kgf/cm², 57 psi). Overinflation can explode the tire with possibility of injury and loss of life.

Tires



- 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.

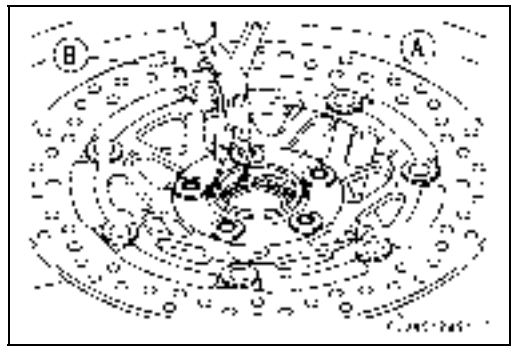
- Adjust the air pressure to the specified pressure (see Wheels/Tires in the Periodic Maintenance chapter).
- Install the brake disc(s) so that the marked side faces out (see Brake Disc Installation in the Brakes chapter).
- Adjust the wheel balance (see Balance Adjustment).

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 Bearing

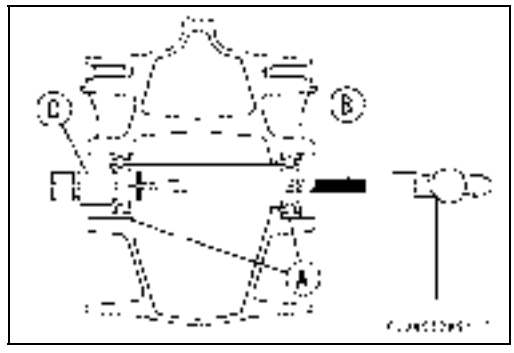
Hub Bearing Removal



- Remove the wheel, and take out the following.
  Collars
  Speedometer Gear Drive (out of front hub)
  Coupling (out of rear hub)
  Grease Seals
  Circlips [A]

Special Tool - Inside Circlip Pliers: 57001-143 [B]

- Use the bearing remover to remove the hub bearing [A].

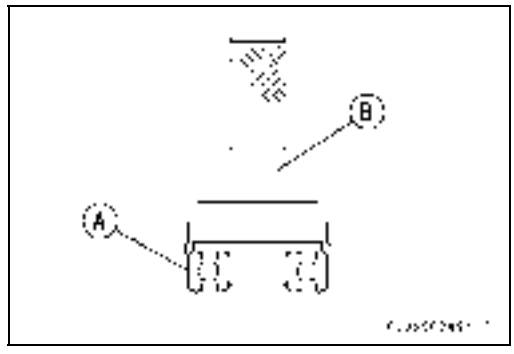


CAUTION

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, ϕ15 × ϕ17: 57001-1267 [C]

Hub Bearing Installation



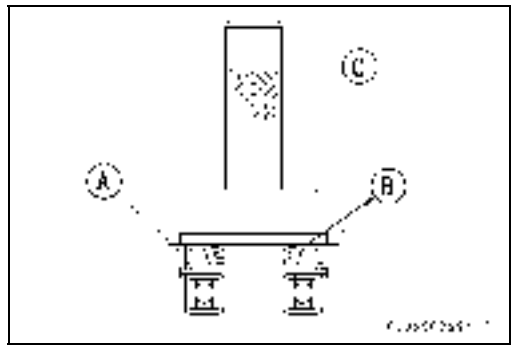
- Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
- Replace the bearings with new ones.

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 bearings [A] until they are bottomed.

Special Tool - Bearing Driver Set: 57001-1129 [B]



- Replace the circlips with new ones.

Special Tool - Inside Circlip Pliers: 57001-143

- Replace the grease seals with new ones.
- Press in the grease seals [A] so that the seal surface is flush [B] with the end of the hole.

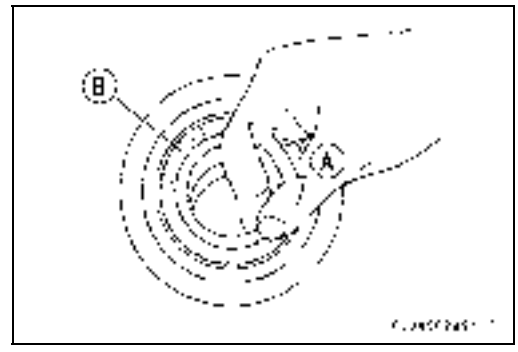
○Apply high temperature grease to the grease seal lips.

Special Tool - Bearing Driver Set: 57001-1129 [C]

Hub Bearing

Hub Bearing Inspection

Since the hub bearings are made to extremely close tolerances, the clearance can not 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.

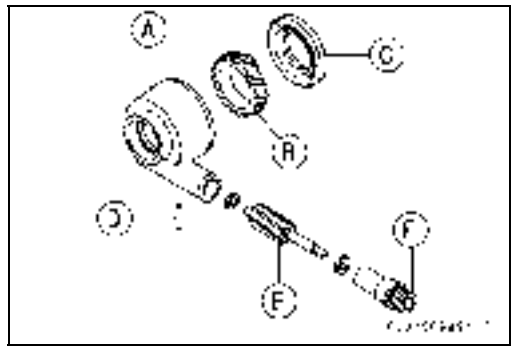
Hub Bearing Lubrication

NOTE

○*Since the hub bearings are packed with grease and sealed, lubrication is not required.*

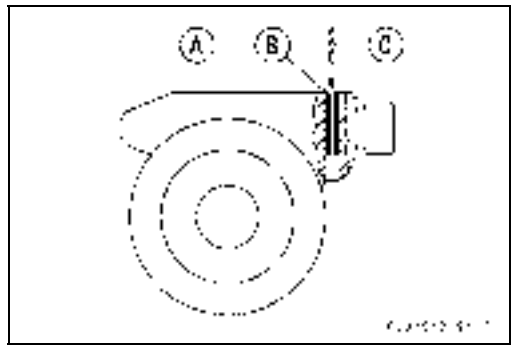
Speedometer Gear Housing

Speedometer Gear Housing Disassembly

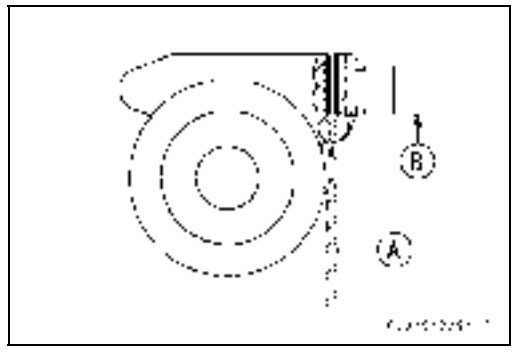


- Pull the speedometer gear housing [A] off the front wheel.
- Pull out the grease seal [C] using a hook.
- Pull out the speedometer gear [B].
- If the speedometer cable housing [F] or speedometer pinion [E] needs to be removed, work in accordance with following procedures.

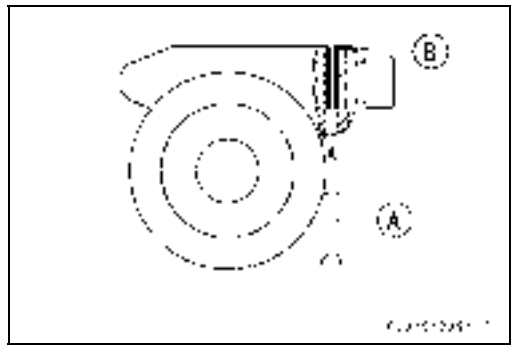
  Pin [D]



- First drill the housing [A] through the spring pin [B] using a 1.0 ~ 1.5 mm drill bit [C].



- Drill the housing from the under side to the pin end [B] using 3.0 ~ 3.5 mm drill bit [A].



- Using a 3 mm (0.12 in.) rod [A], tap out the pin [B], and then pull out the speedometer cable bushing, speedometer pinion and washers.

NOTE

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

Speedometer Gear Housing Assembly

- When assembling the speedometer gear housing, be careful of the following items.

○After inserting a new pin, stake the housing hole to secure the pin in place.

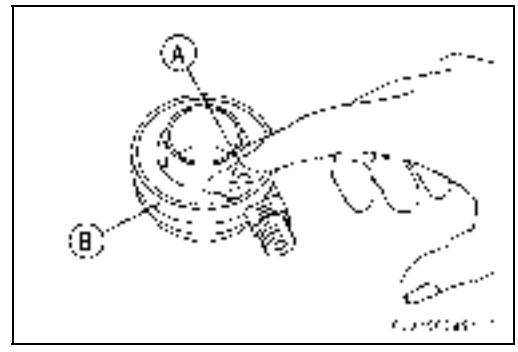
○Replace the grease seal with a new one. Apply a little grease to the seal. Install it using a press or a suitable driver so that the face of the seal is level with the surface of the housing.

○Regrease the speedometer gear.

○Install the speedometer gear housing so that it fits in the speedometer gear drive notches.

Speedometer Gear Housing

Speedometer Gear Housing Lubrication



● Clean and grease [A] the speedometer gear housing [B].

Final Drive

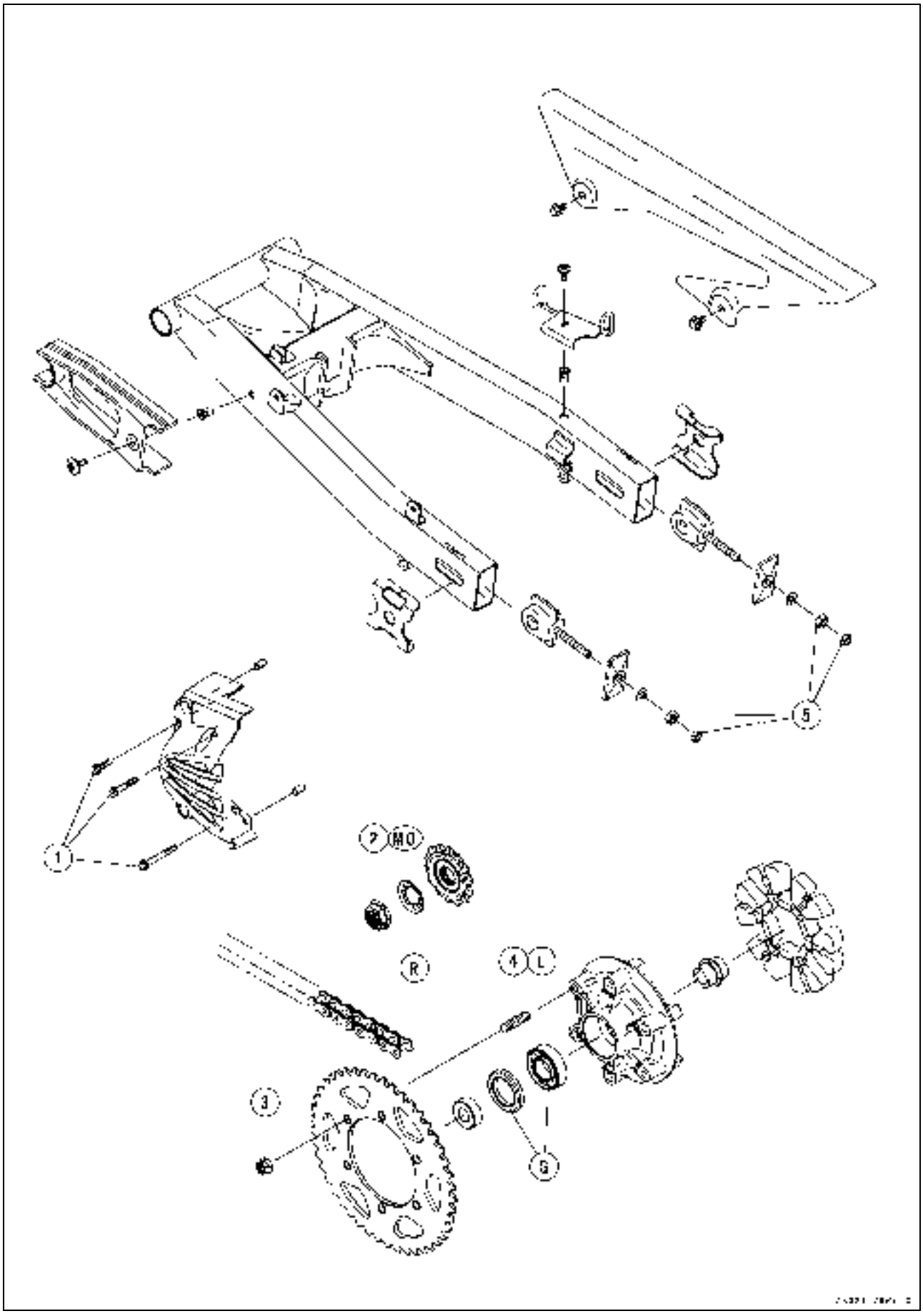
Table of Contents

Exploded View 11-2
Specifications 11-4
Special Tool 11-5
Drive Chain 11-6
- Drive Chain Slack Inspection 11-6
- Drive Chain Slack Adjustment 11-6
- Wheel Alignment Inspection/Adjustment 11-6
- Drive Chain Wear Inspection 11-6
- Drive Chain Lubrication 11-6
- Drive Chain Removal 11-6
- Drive Chain Installation 11-7

Drive Chain 11-8
- Drive Chain Replacement 11-8

Sprocket, Coupling 11-11
- Engine Sprocket Removal 11-11
- Engine Sprocket Installation 11-11
- Rear Sprocket Removal 11-12
- Rear Sprocket Installation 11-12
- Coupling Installation 11-12
- Coupling Bearing Removal 11-12
- Coupling Bearing Installation 11-13
- Coupling Bearing Inspection 11-13
- Coupling Bearing Lubrication 11-13
- Coupling Damper Inspection 11-14
- Grease Seal Inspection and Lubrication 11-14
- Sprocket Wear Inspection 11-14
- Rear Sprocket Warp Inspection 11-14

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Sprocket Cover Bolts	9.8	1.0	87 in·lb	
2	Engine Sprocket Nut	127	13	94	MO
3	Rear Sprocket Nuts	59	6.0	44	
4	Rear Sprocket Studs	–	–	–	L

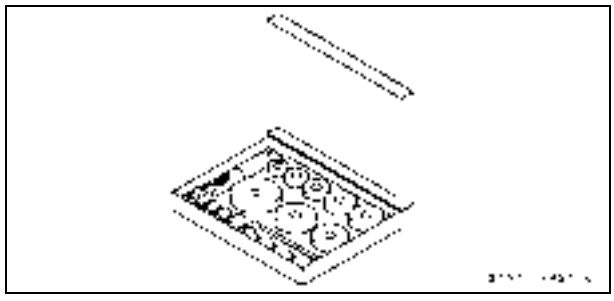
5. Chain Adjusting Nuts and Locknuts
G: Apply grease.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil solution. (mixture of engine oil and molybdenum disulfide grease in a weight ratio 10 : 1).
R: Replacement Parts

Specifications

Item	Standard	Service Limit
Drive Chain		
Make	Enuma	– – –
Type	EK520SR-O_2	– – –
Link	106 Links	– – –
Sprockets		
Rear Sprocket Warp	TIR 0.4 mm (0.016 in.) or less	TIR 0.5 mm (0.02 in.)

Special Tool

Bearing Driver Set:
57001-1129



Drive Chain

Drive Chain Slack Inspection

- Refer to Drive Chain Slack Inspection in the Periodic Maintenance chapter (see Drive Chain Slack Inspection in the Periodic Maintenance chapter).

Drive Chain Slack Adjustment

- Refer to Drive Chain Slack Inspection in the Periodic Maintenance chapter (see Drive Chain Slack Inspection in the Periodic Maintenance chapter).

Wheel Alignment Inspection/Adjustment

- Refer to Wheel Alignment Inspection in the Periodic Maintenance chapter (see Wheel Alignment Inspection in the Periodic Maintenance chapter).

Drive Chain Wear Inspection

- Refer to Drive Chain Wear Inspection in the Periodic Maintenance chapter (see Drive Chain Wear Inspection in the Periodic Maintenance chapter).

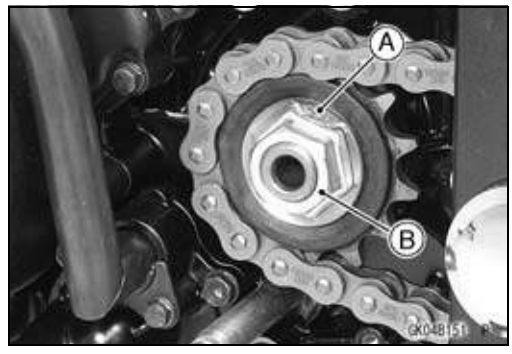
Drive Chain Lubrication

- Refer to Drive Chain Lubrication Condition in the Periodic Maintenance chapter (see Drive Chain Lubrication Condition in the Periodic Maintenance chapter).

Drive Chain Removal

- Remove:
  Engine Sprocket Cover
  Drive Chain Cover
  Rear Shock Absorber (see Rear Shock Absorber Removal in the Suspension chapter)
  Swingarm Pivot Shaft (see Swingarm Removal in the Suspension chapter)

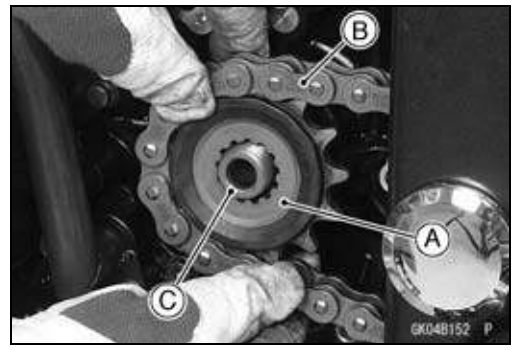
- Flatten out the bended washer [A].
- Remove the engine sprocket nut [B] and washer.



NOTE

○*When loosening the engine sprocket nut, hold the rear brake on.*

Drive Chain



- Raise the rear wheel off the ground.
- Remove the axle cotter pin, and loosen the rear axle nut.
- Loosen the both chain adjuster locknut to loosen the drive chain.
- Remove the drive chain from the rear sprocket toward the right.
- Pull the engine sprocket [A] with drive chain [B] off the output shaft [C].
- Disengage the drive chain from the engine sprocket.

NOTE

○*The swingarm may be moved with the rear wheel left installed on it.*

Drive Chain Installation



- Replace the sprocket washer and axle cotter pin.
- Install the engine sprocket onto the shaft the protruding side [A] of it faces in.
- Apply molybdenum disulfide oil solution to the threads of the output shaft and the seating surface of the engine sprocket nut.
- After torquing the engine sprocket nut, bend the one side of the washer over the nut.

NOTE

○*Tighten the nut while applying the rear brake.*

Torque - Engine Sprocket Nut: 127 N·m (13 kgf·m, 94 ft·lb)

- Adjust the drive chain slack after installing the sprocket (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).

- Install:
  Swingarm (see Swingarm Installation in the Suspension chapter)
  Rear Shock Absorber (see Rear Shock Absorber Installation in the Suspension chapter)
  Drive Chain Cover
  Engine Sprocket Cover

Torque - Rear Shock Absorber Mounting Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)
Swingarm Pivot Nut: 98 N·m (10 kgf·m, 72 ft·lb)

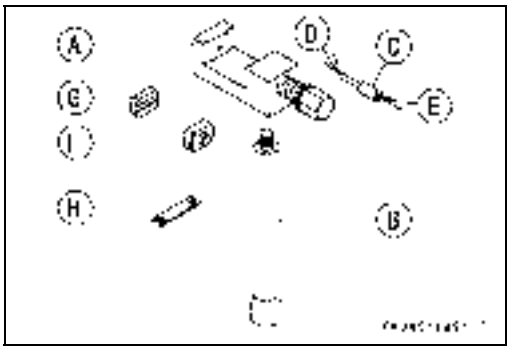
- Adjust the drive chain slack after installing the chain (see Drive Chain Slack Inspection in the Periodic Maintenance chapter).

Drive Chain

Drive Chain Replacement

CAUTION

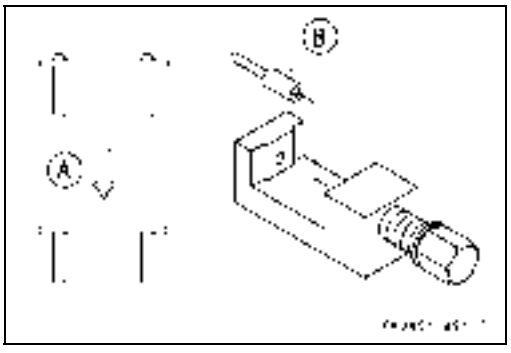
For safety, if the drive chain shall be replaced, replace it using a recommended tool.



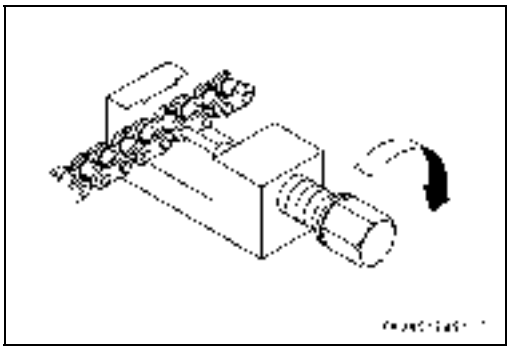
Recommended Tool - Type: EK JOINT Tool #50
Brand: ENUMA CHAIN

Body [A]
Handlebar [B]
Cutting and Riveting Pin [C]
For Cutting [D]
For Riveting [E]
Plate Holder (A) [F]
Plate Holder (B) [G]
Gauge [H]

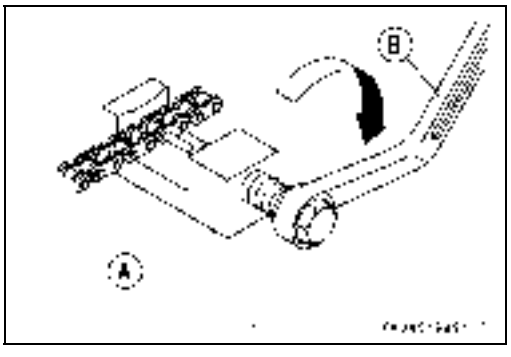
- Remove:
  Chain Cover (see Drive Chain Removal)
  Engine Sprocket Cover (see Engine Sprocket Removal)



- Grind [A] the pin head to make it flat.
- Set the cutting and rivetting pin [B] as shown.



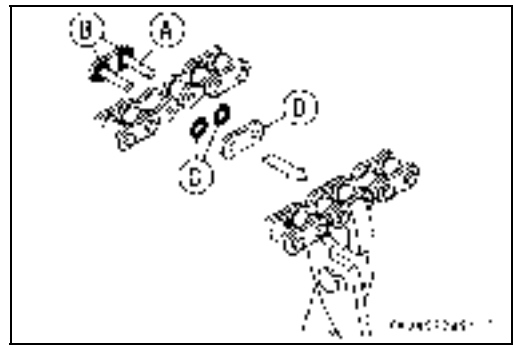
- Screw the pin holder until it touches the link pin.
- Be sure that the cutting pin hits center of the link pin.



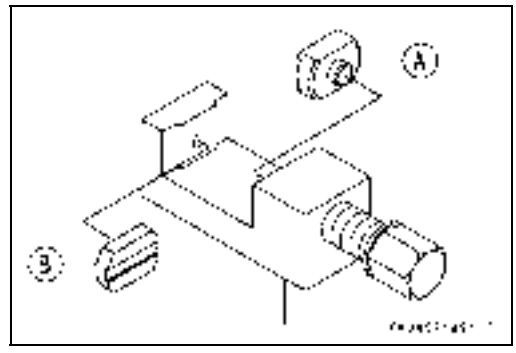
- Screw the handlebar [A] into the body.
- Turn the pin holder with the wrench [B] clockwise to extract the link pin.

Drive Chain

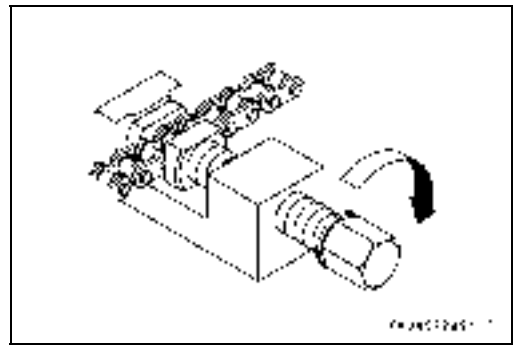
- Replace the link pin, link plate and grease seals.
- Apply grease to the link pins [A] and grease the seals [B] [C].
- Engage the drive chain on the engine and rear sprockets.
- Insert the link pins in the drive chain ends.
- Install the grease seals [C].
- Install the link plate [D] so that the mark faces out.
- Push the link plate by hand or plier to fix it.
- Be sure to set the grease seals correctly.



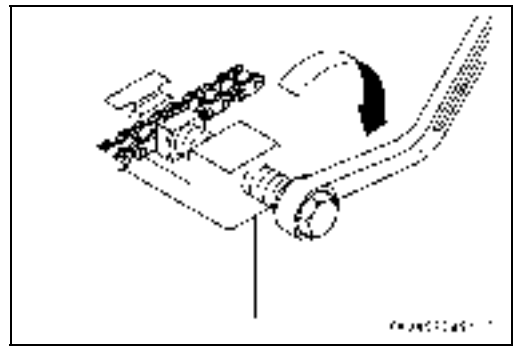
- Set the plate holder (A) [A] and plate holder (B) [B] on the body.



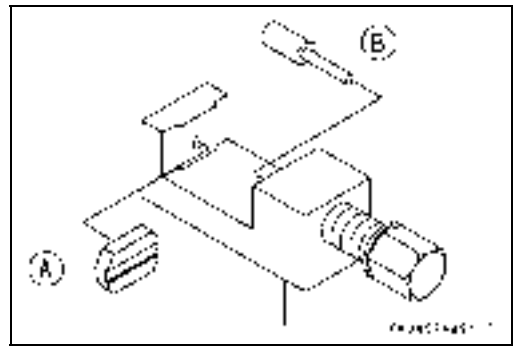
- Fit the plate holder (A) to the link plate.
- Turn the pin holder by hand until the plate holder (B) touches the other link plate.



- Turn the pin holder by a wrench clockwise until two pins of link come into groove of the plate holder (A).
- Take off the plate holder.

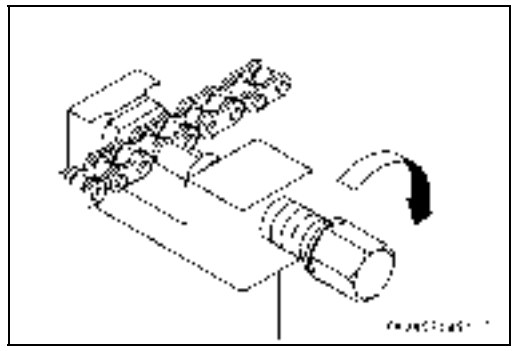


- Set the plate holder (B) [A] and the cutting and rivetting pin [B] as shown.

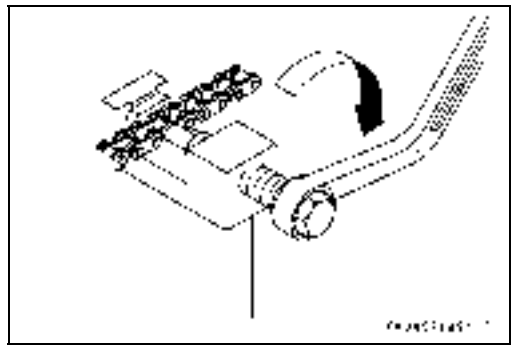


Drive Chain

- Turn the pin holder until the rivetting pin touches the link pin.



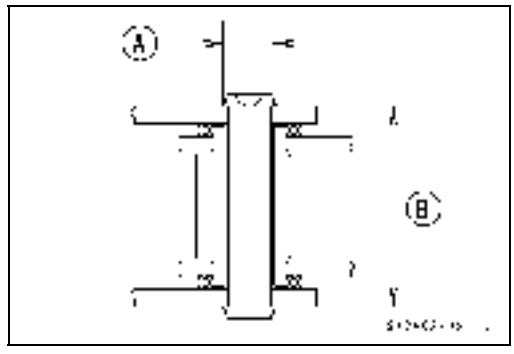
- Turn the wrench clockwise until the tip of rivetting pin contact with the link pin.
- Rivet it.
- Repeat the same procedure for the other link pin.



- After staking, check the staked area of the link pin for cracks.
- Measure the outside diameter [A] of the link pin and link plates width [B].

Link Pin Outside Diameter
Standard: 5.3 ~ 5.7 mm (0.21 ~ 0.22 in.)

Link Plates Outside Width
Standard: 17.35 ~ 17.50 mm (0.68 ~ 0.69 in.)

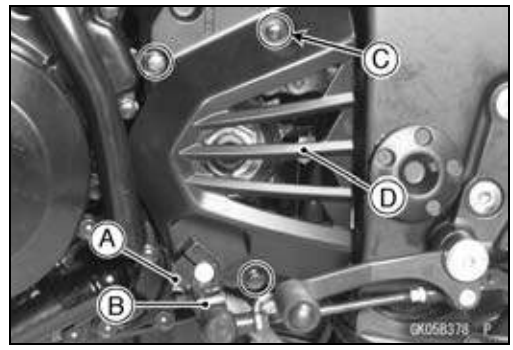


★If the reading exceeds the specified length, cut and rejoin the chain again.

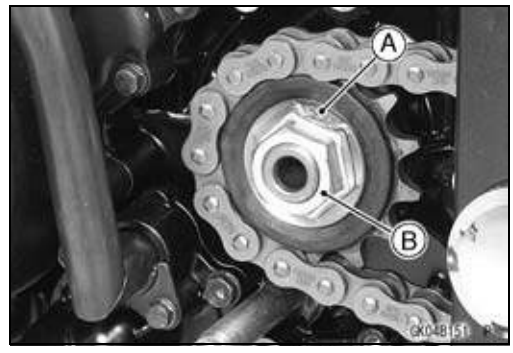
- Check:
  Movement of the Rollers
- Adjust the drive chain slack after installing the chain (see Drive Chain Slack Inspection in the Periodic Maintenance chapter).

Sprocket, Coupling

Engine Sprocket Removal



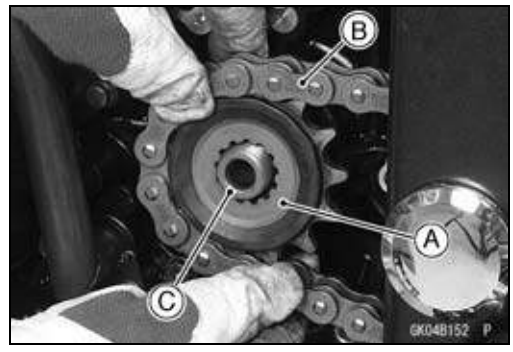
- Remove:
  Shift Lever Link Bolt [A]
  Shift Shaft [B]
  Engine Sprocket Cover Bolts [C]
- Remove the engine sprocket cover [D].



- Flatten out the bended washer [A].
- Remove the engine sprocket nut [B] and washer.

NOTE

○*When loosening the engine sprocket nut, hold the rear brake on.*



- Raise the rear wheel off the ground.
- Remove the axle cotter pin, and loosen the rear axle nut.
- Loosen the both chain adjuster locknut to loosen the drive chain.
- Remove the drive chain from the rear sprocket toward the right.
- Pull the engine sprocket [A] with drive chain [B] off the output shaft [C].
- Disengage the drive chain from the engine sprocket.

Engine Sprocket Installation



- Replace the sprocket washer and axle cotter pin.
- Install the engine sprocket onto the shaft the protruding side [A] of it faces in.
- Apply molybdenum disulfide oil solution to the threads of the output shaft and the seating surface of the engine sprocket nut.
- After torquing the engine sprocket nut, bend the one side of the washer over the nut.

NOTE

○*Tighten the nut while applying the rear brake.*

Torque - Engine Sprocket Nut: 127 N·m (13 kgf·m, 94 ft·lb)

- Adjust the drive chain slack after installing the sprocket (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).
- Install the new axle cotter pin, and bend the end of it surely.
- Install the engine sprocket cover.
- Install the shift lever onto the shift shaft aligning the mark which is marked before removing.

Sprocket, Coupling

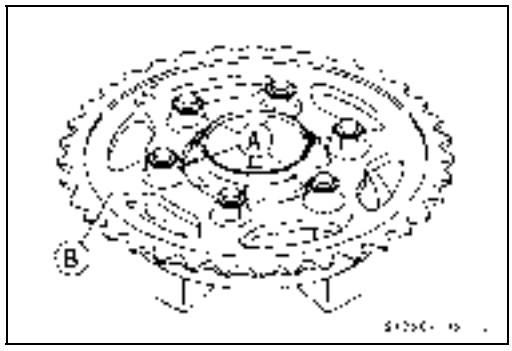
Rear Sprocket Removal

- Remove the rear wheel (see Rear Wheel removal in the Wheel/Tires chapter).

CAUTION

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

- Pull out the coupling collar from the left, and coupling sleeve from the right.
- Remove the rear sprocket nuts [A].
- Remove the rear sprocket [B].

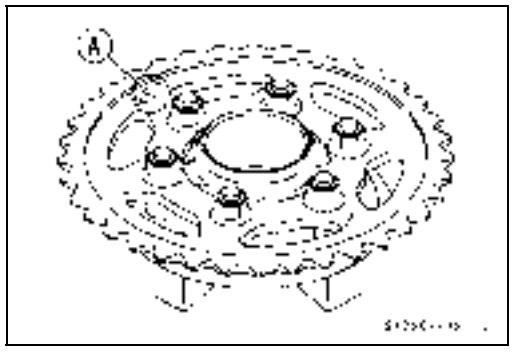


Rear Sprocket Installation

- Install the sprocket with the tooth number marking [A] outward.
- Install the rear sprocket nuts.

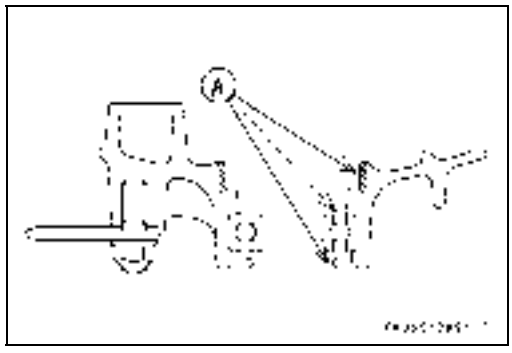
  Torque - Rear Sprocket Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)

- Install the rear wheel (see Rear Wheel Installation in the Wheels/Tires chapter).



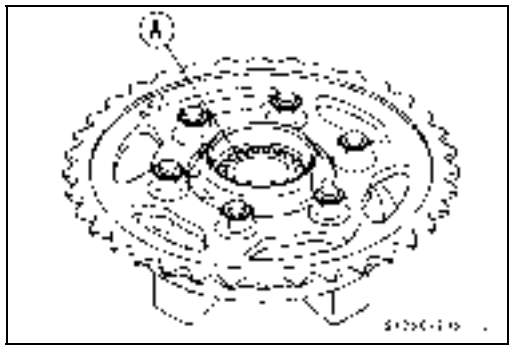
Coupling Installation

- Grease the following and install the coupling.
  Coupling Grease Seal [A]
  Coupling Internal Surface [A]
  Ball Bearing [A]



Coupling Bearing Removal

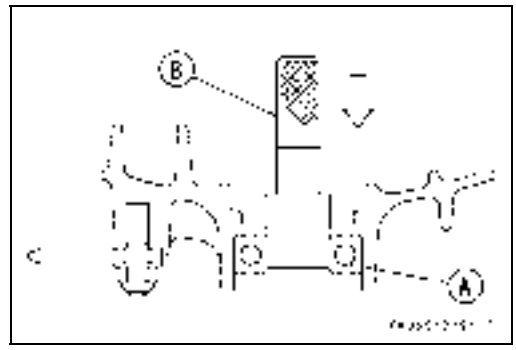
- Remove:
  Coupling
  Grease Seal
  Bearing [A]



Sprocket, Coupling

● Remove the bearing [A] by tapping from the wheel side.

Special Tool - Bearing Driver Set: 57001-1129 [B]

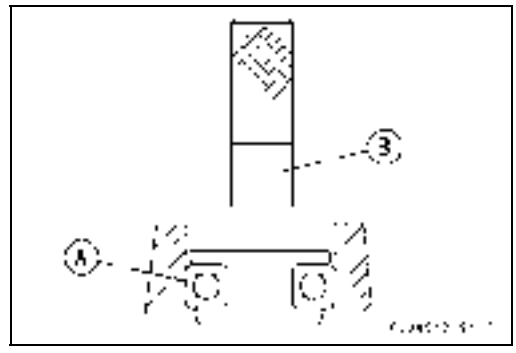


Coupling Bearing Installation

● 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 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 lips.

Special Tool - Bearing Driver Set: 57001-1129

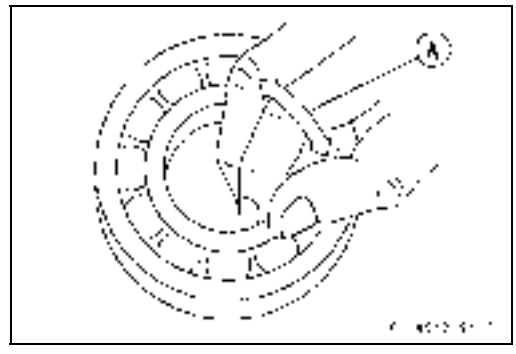
Coupling Bearing Inspection

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 the bearing play, roughness, or binding is found, replace the bearing.

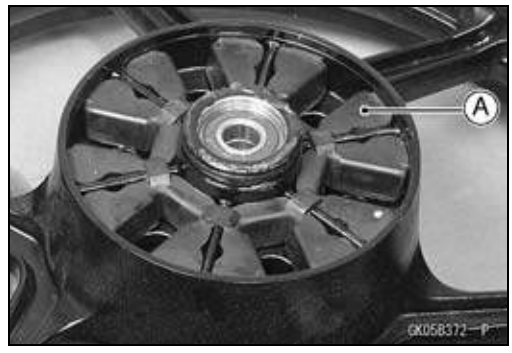


Coupling Bearing Lubrication

● Pack the bearing with high temperature grease. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.

Sprocket, Coupling

Coupling Damper Inspection

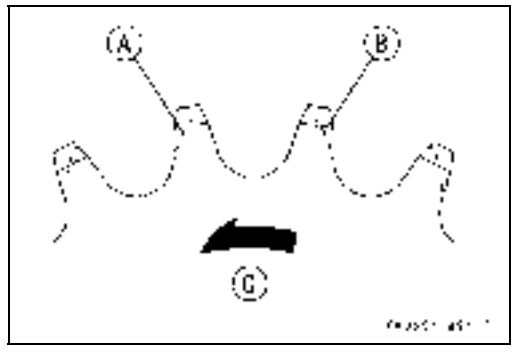


- Remove the rear wheel coupling, and inspect the rubber dampers [A].
- Replace the damper if it appears damaged or deteriorated.

Grease Seal Inspection and Lubrication

If the grease seals are examined without removing the seals themselves, look for discoloration (indicating the rubber has deteriorated), hardening, damage to the internal ribbing, or other damage. If the seal or internal ribbing has hardened, the clearance between the seal and the axle sleeve will not be take up, which will allow dirt and moisture to enter and reach the bearing. If in doubt as to its condition and whenever the seal is removed for greasing the bearing, the seal should be replace. The seals are generally damaged upon removal.

Sprocket Wear Inspection



- Visually inspect the engine and rear sprocket teeth for wear and damage.

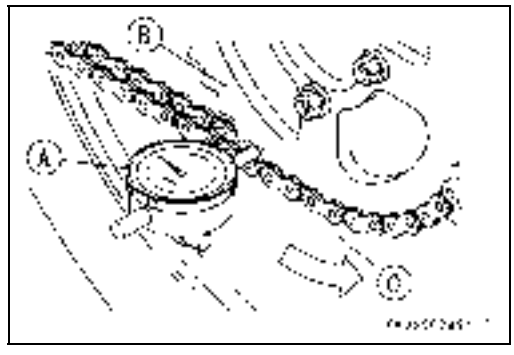
★If the teeth are worn as illustrated, replace the sprocket, and inspect the drive chain wear (see Drive Chain Wear Inspection in the Periodic Maintenance chapter).

[A] Worn Tooth (Engine Sprocket)
[B] Worn Tooth (Rear Sprocket)
[C] Direction of Rotation

NOTE

○*If a sprocket requires replacement, the chain is probably worn also. When replacing a sprocket, inspect the chain.*

Rear Sprocket Warp Inspection



- Raise the rear wheel off the ground using the jack 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

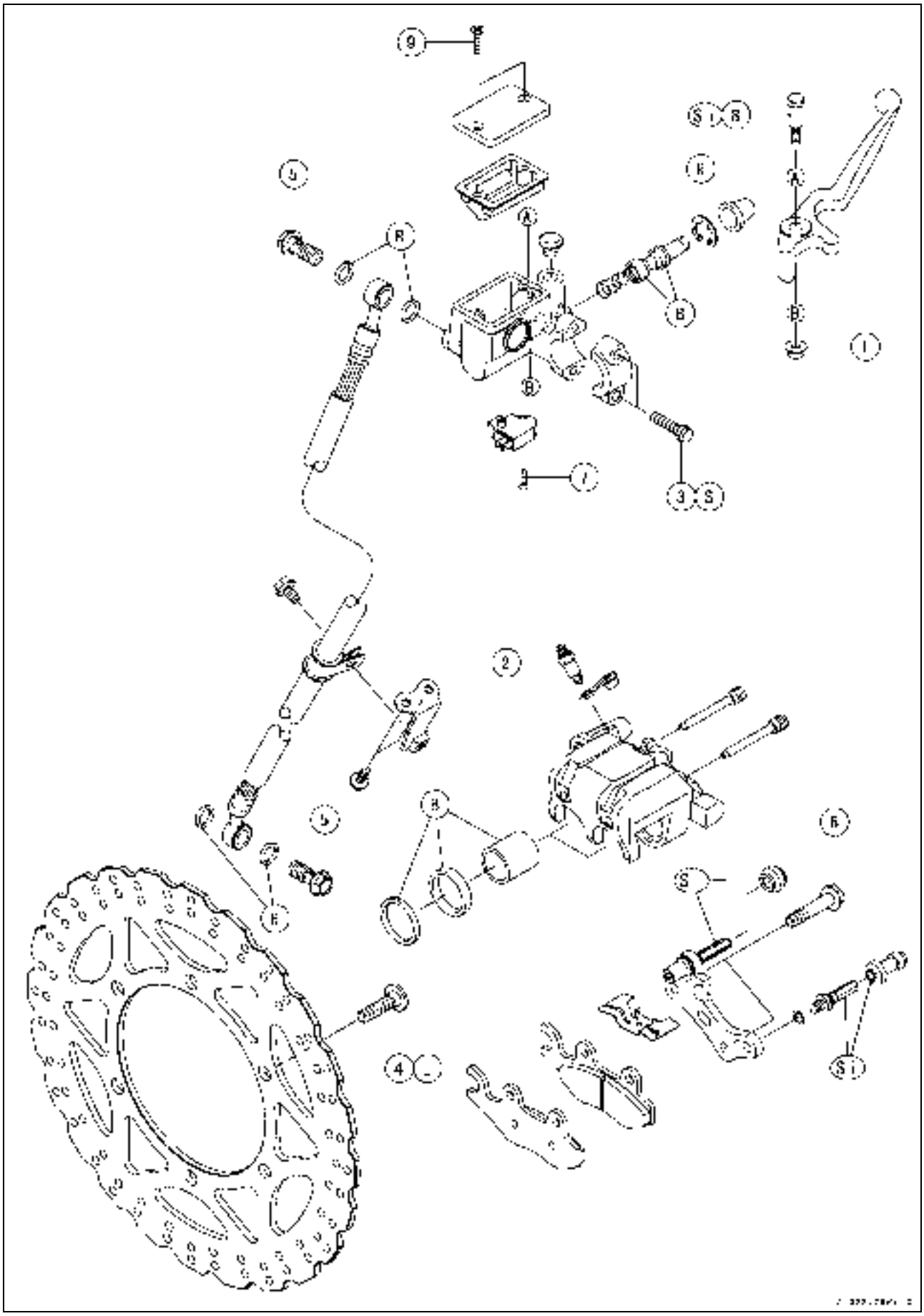
Standard:	**TIR 0.4 mm (0.016 in.) or less**
Service Limit:	**TIR 0.5 mm (0.02 in.)**

Brakes

Table of Contents

Exploded View 12-2
Specifications 12-6
Special Tool 12-7
Brake Lever, Brake Pedal 12-8
  Brake Pedal Position Inspection 12-8
  Brake Pedal Position Adjustment 12-8
Calipers 12-9
  Front Caliper Removal 12-9
  Rear Caliper Removal 12-9
  Caliper Installation 12-9
  Caliper Disassembly 12-10
  Caliper Assembly 12-10
  Caliper Fluid Seal Damage 12-10
  Rear Caliper Dust Boot and Friction Boot Damage 12-10
  Caliper Piston and Cylinder Damage Inspection 12-11
  Caliper Holder Shaft Wear 12-11
Brake Pads 12-12
  Brake Pad Removal 12-12
  Brake Pad Installation 12-12
  Brake Pad Wear Inspection 12-12
Master Cylinder 12-13
  Front Master Cylinder Removal 12-13
  Front Master Cylinder Installation 12-13
  Rear Master Cylinder Removal 12-14
  Rear Master Cylinder Installation 12-14
  Rear Brake Reservoir Removal 12-15
  Rear Brake Reservoir Installation 12-15
  Front Master Cylinder Disassembly 12-15
  Rear Master Cylinder Disassembly 12-15
  Master Cylinder Assembly 12-15
  Master Cylinder Inspection 12-16
Brake Disc 12-17
  Brake Disc Removal 12-17
  Brake Disc Installation 12-17
  Brake Disc Wear Inspection 12-17
  Brake Disc Warp Inspection 12-17
Brake Fluid 12-18
  Brake Fluid Level Inspection 12-18
  Brake Fluid Change 12-18
  Brake Line Bleeding 12-18
Brake Hose 12-21
  Brake Hose Removal/Installation 12-21
  Brake Hose Inspection 12-21

Exploded View

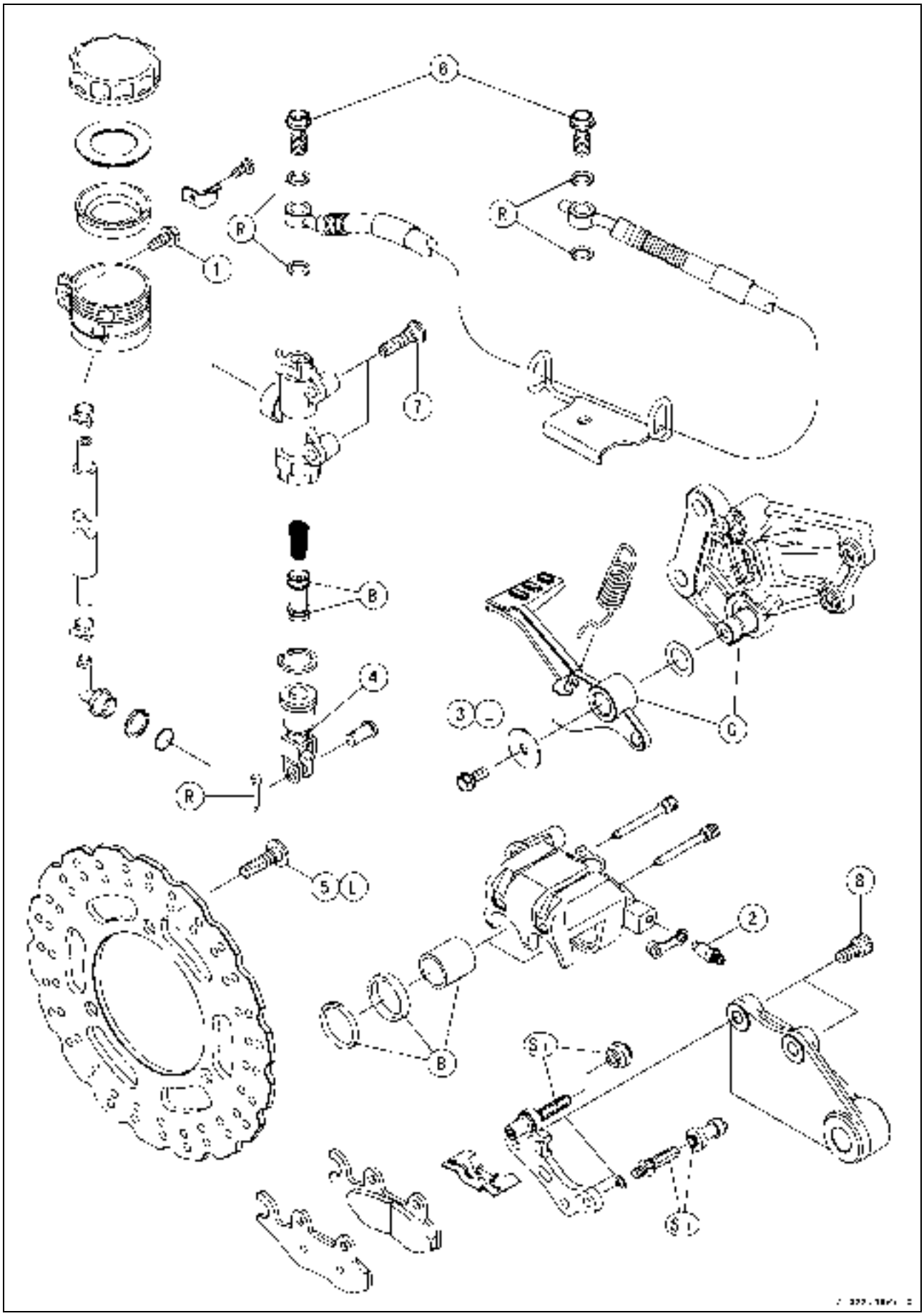


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Brake Lever Pivot Bolt Locknut	5.9	0.6	52 in·lb	
2	Bleed Valve	5.5	0.55	49 in·lb	
3	Front Master Cylinder Clamp Bolts	8.8	0.9	78 in·lb	S
4	Brake Disc Mounting Bolts	27	2.8	20	L
5	Brake Hose Banjo Bolts	25	2.5	18	
6	Front Caliper Mounting Bolts	25	2.5	18	
7	Front Brake Light Switch Screw	1.0	0.1	9 in·lb	
8	Brake Lever Pivot Bolt	1.0	0.1	9 in·lb	
9	Front Reservoir Cap Screws	1.5	0.15	13 in·lb	

B: Apply brake fluid.
L: Apply a non-permanent locking agent.
R: Replacement parts
S: Follow the specific tightening sequence.
Si: Apply silicone grease.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Reservoir Mounting Bolt	6.9	0.7	61 in·lb	
2	Bleed Valve	5.5	0.55	49 in·lb	
3	Brake Pedal Pivot Bolt	8.8	0.9	78 in·lb	L
4	Push Rod Locknut	18	1.8	13	
5	Brake Disc Mounting Bolts	27	2.8	20	L
6	Brake Hose Banjo Bolts	25	2.5	18	
7	Rear Master Cylinder Mounting Bolts	25	2.5	18	
8	Rear Caliper Mounting Bolts	25	2.5	18	

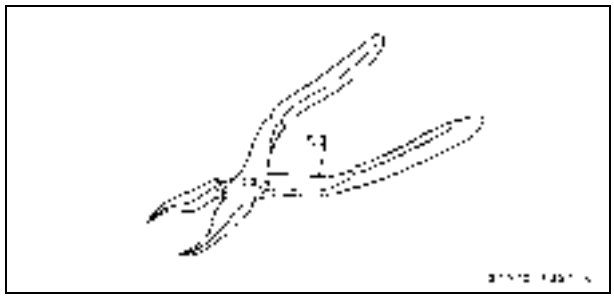
B: Apply brake fluid.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement parts
Si: Apply silicone grease.

Specifications

Item	Standard	Service Limit
Brake Pedal		
Pedal Free Play	Non-adjustable	– – –
Pedal Position	About 40 mm (1.6 in.) below footpeg top	– – –
Brake Discs		
Thickness:		
Front	4.3 ~ 4.6 mm (0.17 ~ 0.18 in.)	4.0 mm (0.16 in.)
Rear	4.8 ~ 5.1 mm (0.19 ~ 0.20 in.)	4.5 mm (0.18 in.)
Runout	TIR 0.15 mm (0.006 in.) or less	TIR 0.3 mm (0.01 in.)

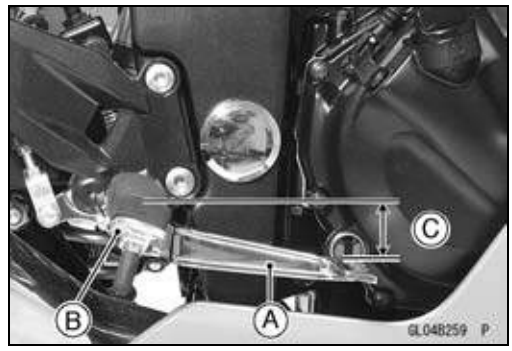
Special Tool

Inside Circlip Pliers:
57001-143



Brake Lever, Brake Pedal

Brake Pedal Position Inspection



● Check that the brake pedal [A] is in the correct position.
[B] Footpeg

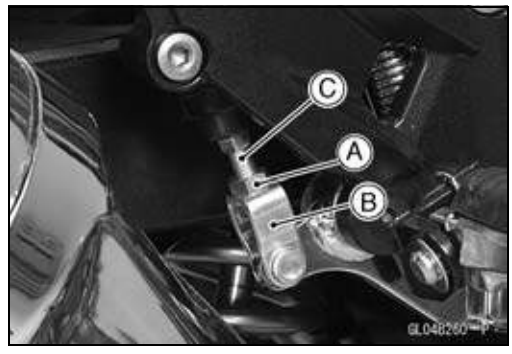
Pedal Position
Standard: About 40 mm (1.6 in.) [C] below top of footpeg

★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 push rod locknut has been loosened.*

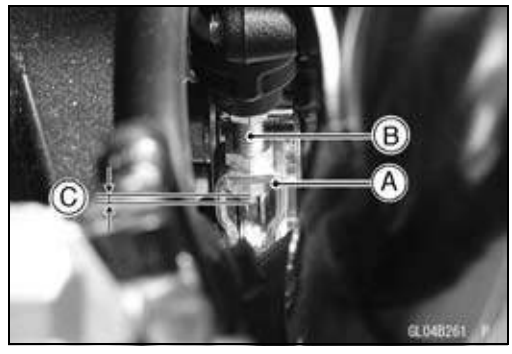


● Loosen the locknut [A] and up or down the clevis [B] by turning the adjuster [C] to adjust the brake pedal position.
● Tighten the locknut with specified torque.

Torque - Push Rod Locknut: 18 N·m (1.8 kgf·m, 13 ft·lb)

NOTE

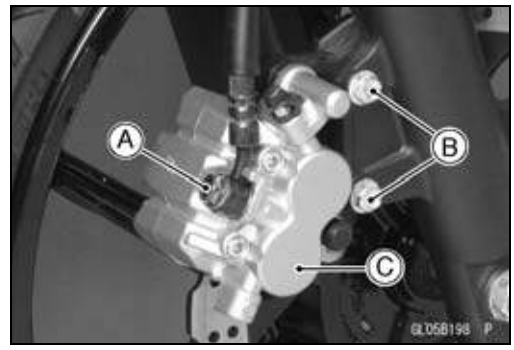
○*If the pedal position cannot be adjusted by turning the clevis [A], the brake pedal may be deformed or incorrectly installed.*
○*If the brake rod [B] protrusion is 3.5 ~ 5.5 mm (0.14 ~ 0.22 in.) [C] below the nut, the pedal position will be with in the standard range (about 40 mm (1.6 in.)).*



● Check the brake pedal position, and readjust it if necessary.

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 caliper assembly bolts. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper assembly bolts will cause brake fluid leakage.

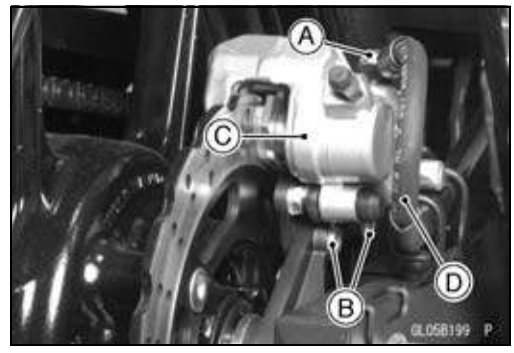
- Unscrew the banjo bolt and remove the brake hose from the caliper (see Brake Hose Removal/Installation).

CAUTION
Immediately wash away any brake fluid that spills.

NOTE

○*If the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed (see Caliper Rubber Parts Replacement in the Periodic Maintenance chapter).*

Rear 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.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper (see Brake Hose Removal/Installation).

CAUTION
Immediately wash away any brake fluid that spills.

NOTE

○*If the caliper is to be disassembled after removal and if compressed air is not available, disassemble the caliper before the brake hose is removed (see Caliper Rubber Parts Replacement in the Periodic Maintenance chapter).*

Caliper Installation

- Install the caliper and brake hose lower end.

○Replace the washers on each side of hose fitting with new ones.

- Tighten:

Torque - Front Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Rear Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Calipers

- Check the fluid level in the brake reservoirs.
- Bleed the brake line (see Brake Line Bleeding).
- 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 and 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.

Caliper Disassembly

- Refer to Caliper Rubber Parts Replacement in the Periodic Maintenance chapter (see Caliper Rubber Parts Replacement in the Periodic Maintenance chapter).

Caliper Assembly

- Refer to Caliper Rubber Parts Replacement in the Periodic Maintenance chapter (see Caliper Rubber Parts Replacement in the Periodic Maintenance chapter).

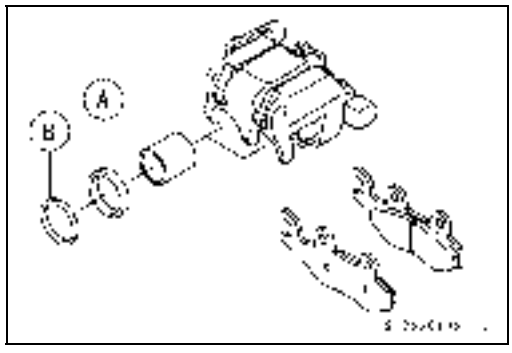
Caliper Fluid Seal Damage

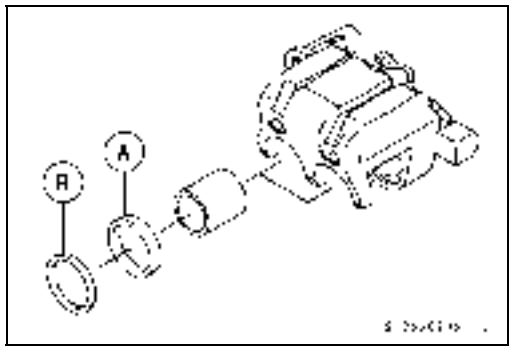
The fluid seal (piston seal) [A] is placed around the piston to maintain clearance between the pad and the disc. If the seal is in a poor condition, it could lead the pad to wear excessively or the brake to drag, which may cause the temperature of the discs or the brake fluid to increase.

- Replace the fluid seal if it exhibits any of the conditions listed below.

○Brake fluid leakage around the pad.
○Brakes overheat.
○Considerable difference in inner and outer pad wear.
○Seal and piston are stuck together.

★If the fluid seal is replaced, replace the dust seal [B] as well. Also, replace all seals every other time the pads are changed.

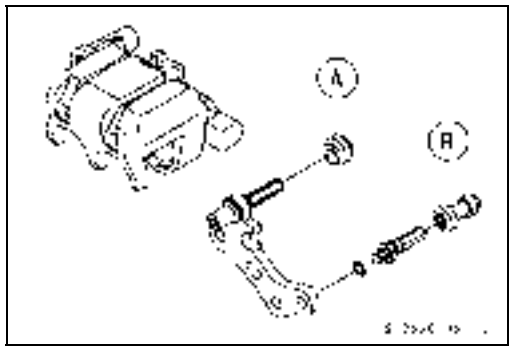




Rear Caliper Dust Boot and Friction Boot Damage

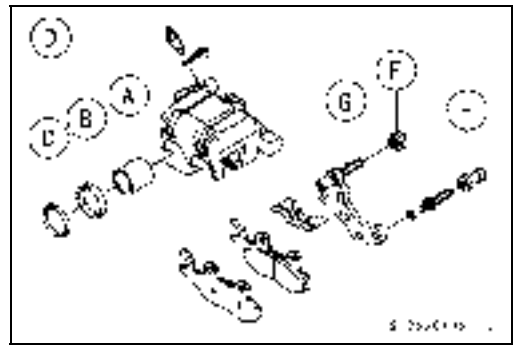
- Check that the dust boot [A] and friction boot [B] are not cracked, worn, swollen, or otherwise damaged.

★If they show any damage, replace it.



Calipers

Caliper Piston and Cylinder Damage Inspection

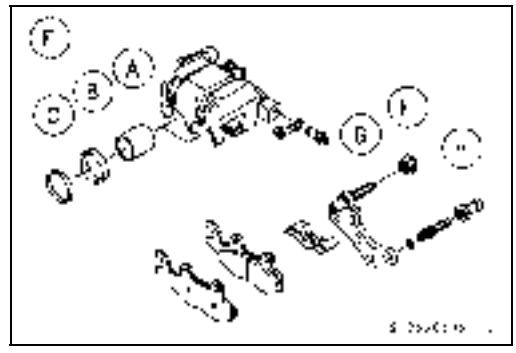


- Visually inspect the piston [A] and cylinder surfaces.

★Replace the caliper if the cylinder and piston are badly scores or rusty.

Fluid Seal [B]
Dust Seal [C]
Front Caliper [D]
Rear Caliper [E]
Dust Boot [F]

Caliper Holder Shaft Wear



The caliper body must slide smoothly on the caliper holder shafts [G]. If the body does not slide smoothly, one pad will wear more than the other, pad wear will increase, and constant drag on the disc will raise brake and brake fluid temperature.

- Check to see that the caliper holder shafts are not badly worn or stepped, and that the rubber boots [H] are not damaged.

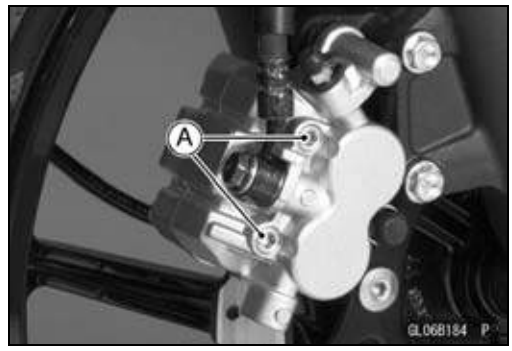
★If the rubber boot is damaged, replace the rubber boot. To replace the rubber boot, remove the pads and the caliper bracket.

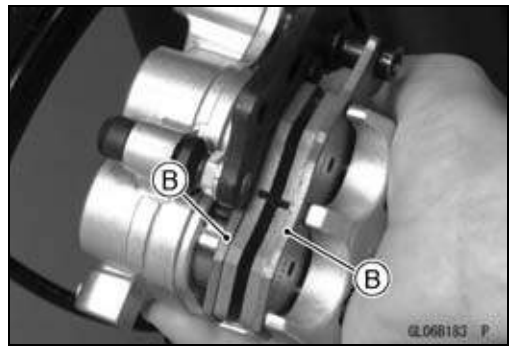
★If the caliper holder shaft is damage, replace the caliper bracket.

Brake Pads

Brake Pad Removal

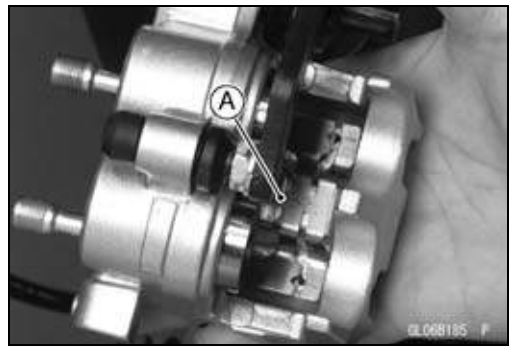
- Loosen the holder shaft [A].
- Remove the caliper (see Front/Rear Caliper Removal).
- Draw out the holder shaft.
- Remove the pads [B].





Brake Pad Installation

- Push the caliper pistons by hand as far as they will go.
- Install the pad on the piston side first, then install the other pad.
- Install the anti-rattle spring [A] in its correct position.



⚠ WARNING

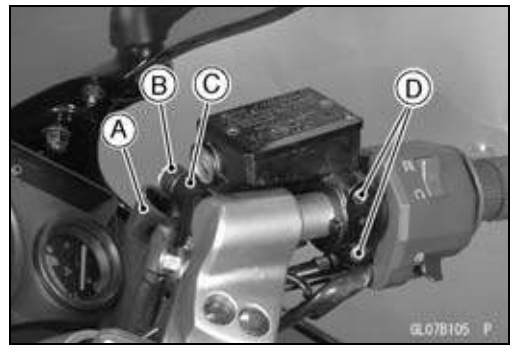
Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal and the pads are against the disc. The brake will not function on the first application of the lever or pedal if this is not done.

Brake Pad Wear Inspection

- Refer to Brake Pad Wear Inspection in the Periodic Maintenance chapter (see Brake Pad Wear Inspection in the Periodic Maintenance chapter).

Master Cylinder

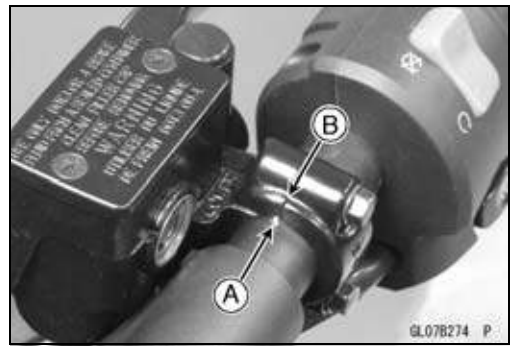
Front Master Cylinder Removal



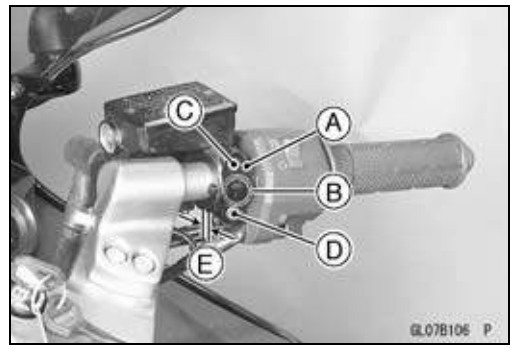
- Slide the dust cover [A], and remove the banjo bolt [B] to disconnect the upper brake hose from the master cylinder [C]. There are flat washers on each side of the hose fitting.
- Remove the front master cylinder clamp bolts [D], and take off the master cylinder.

CAUTION
Immediately wash away any brake fluid that spills.

Front Master Cylinder Installation



- Install the front master cylinder so that the punch mark [A] of the handlebar is aligned with the mating surface [B] of the master cylinder clamp to level the reservoir.



- Install the master cylinder clamp [A] pointing with the arrow mark [B] upward.
- Tighten the upper clamp bolt [C] first, and then the lower clamp bolt [D] with a specified torque. There will be a gap [E] at the lower part of the clamp after tightening.
- Tighten the banjo bolt with a specified torque after installing a new flat washer on each side of the brake hose fitting.

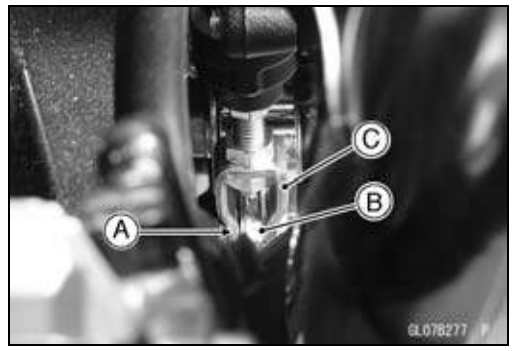
Torque - Front Master Cylinder Clamp Bolts: 8.8 N·m (0.9 kgf·m, 78 in·lb)
Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Bleed the brake line (see Brakes Line Bleeding).
- Check the brake for good braking power, no brake drag and no brake fluid leakage.

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

Master Cylinder

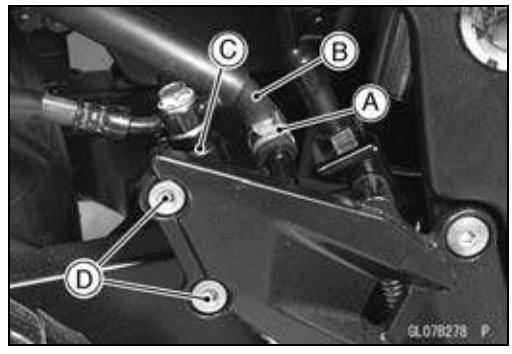
Rear Master Cylinder Removal



- Remove the cotter pin [A] and then pull the joint pin [B] out of the push rod clevis [C] and brake pedal.

NOTE

○*Pull off the joint pin while pressing down the brake pedal.*



- Slide the brake hose clamp [A] out of place (see Brake Hose and Pipe Replacement in the Periodic Maintenance chapter).
- Disconnect the brake hoses [B] from the brake hose connector of the master cylinder [C], and temporarily secure the end of the brake hose so some high place to keep fluid loss to a minimum and immediately wipe up any brake fluid that spills.
- Remove the master cylinder mounting bolts [D] and take the master cylinder off the footpeg bracket.
- Remove the banjo bolt [E] to disconnect the brake hose from the master cylinder and temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum. There are flat washers on each side of the hose fitting.

CAUTION
Immediately wash away any brake fluid that spills.

Rear Master Cylinder Installation

- Tighten the banjo bolt with a specified torque after installing a new flat washer on each side of the brake hose fitting. Be sure that the metal pipe is properly fitted into the U-shaped notch in the master cylinder.

Torque - Brake Hose Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Tighten the rear master cylinder mounting bolts with a specified torque.

Torque - Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Connect the brake hose to the master cylinder and replace the brake hose clamp in place.

Master Cylinder

- Connect the push rod clevis to the brake pedal with the joint pin.
- Install the cotter pin and bend the end of it securely.
- Bleed the brake line (see Brake Line Bleeding).
- Check the brake for good braking power, no brake drag and no brake fluid leakage.

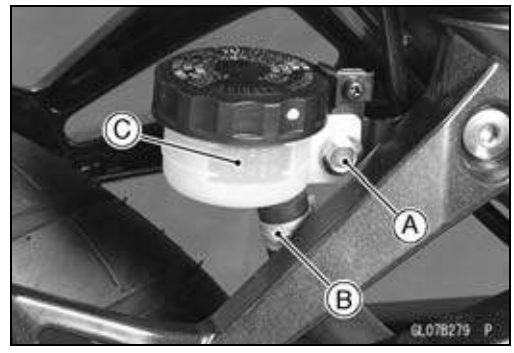
⚠ WARNING

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

- Check the brake pedal position (see Brake Pedal Position Inspection).
- Check the rear brake light switch (see Rear Brake Light Switch Operation Inspection in the Periodic Maintenance chapter).

Rear Brake Reservoir Removal

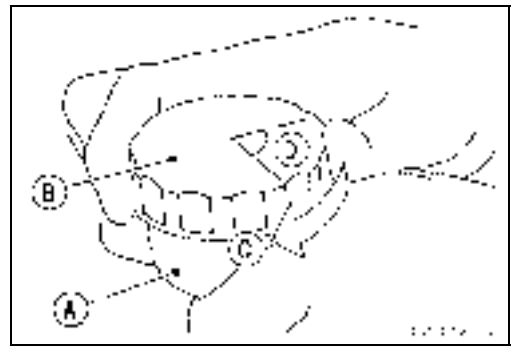
- Remove:
  Reservoir mounting Bolt [A]
  Brake Hose Clamp (Slide) [B]
  Reservoir [C]



CAUTION

Immediately wash away any brake fluid that spills.

Rear Brake Reservoir Installation



- Install the clamp for the brake hose end.
- Fill the reservoir with fresh brake fluid and bleed the brake line (see Brake Line Bleeding).
- Follow the procedure below to install the rear brake fluid reservoir cap correctly.

○First, tighten the rear brake fluid reservoir cap [B] clockwise [C] by hand until the resistance is felt fully; then, tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir [A] body.

Front Master Cylinder Disassembly

- Refer to Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter (see Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter).

Rear Master Cylinder Disassembly

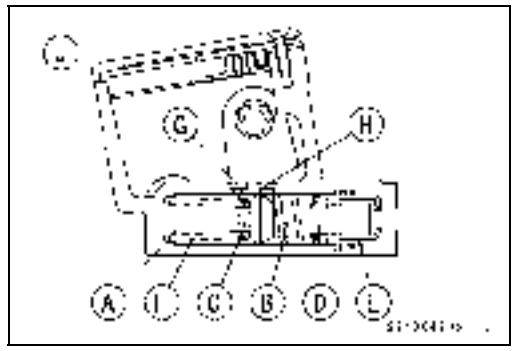
- Refer to Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter (see Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter).

Master Cylinder Assembly

- Refer to Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter (see Master Cylinder Rubber Parts Replacement in the Periodic Maintenance chapter).

Master Cylinder

Master Cylinder Inspection



- Remove the master cylinders (see Front/Rear Master Cylinder Removal).
- 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].

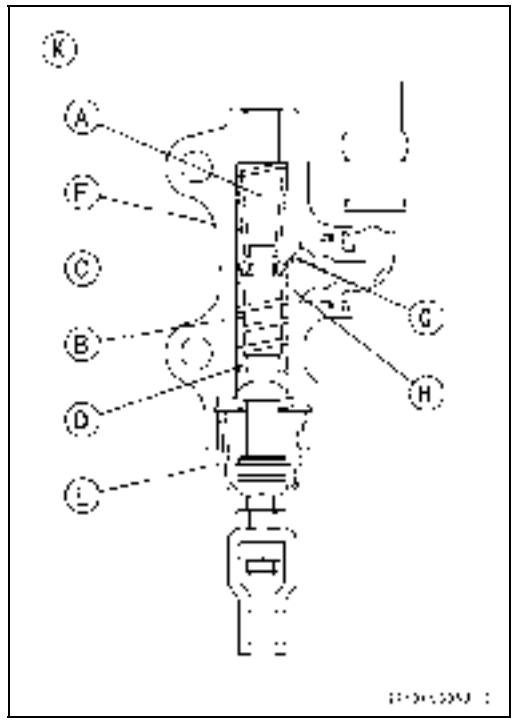
★If a master cylinder or piston shows any damage, replace them.

- Inspect the primary 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 cups.

★If fluid leakage is noted at the brake lever, the piston assembly should be replaced to renew the cups.

Front Master Cylinder [J]



- Check the dust covers [E] for damage.

★If they are damaged, replace them.

- Check the piston return springs [F] for any damage.

★If the springs 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

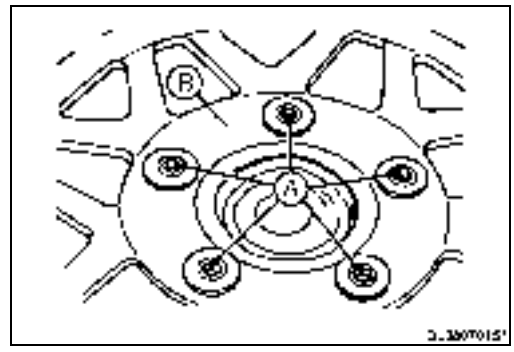
Brake Disc Removal

- Remove the wheel (see Front/Rear Wheel Removal in the Wheels/Tires chapter).
- Unscrew the mounting bolts, and take off the disc.

Brake Disc Installation

- Install the brake disc on the wheel so that the marked side [B] faces out.
- Apply a non-permanent locking agent to the threads of the brake disc mounting bolts [A].
- Tighten:

Torque - Brake Disc Mounting Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)

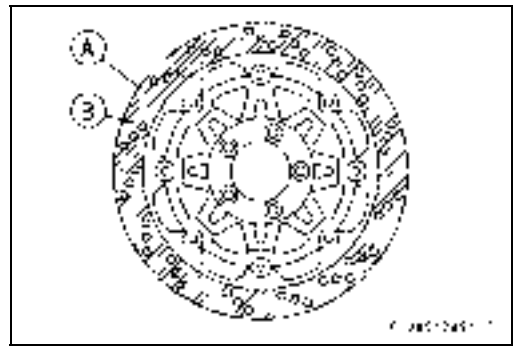


Brake Disc Wear Inspection

- 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.

Measuring Area [B]



Disc Thickness

Standard:

Front	**4.3 ~ 4.6 mm (0.17 ~ 0.18 in.)**
Rear	**4.8 ~ 5.1 mm (0.19 ~ 0.20 in.)**

Service Limit:

Front	**4.0 mm (0.16 in.)**
Rear	**4.5 mm (0.18 in.)**

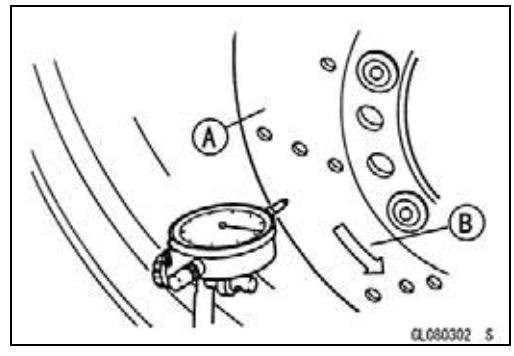
Brake Disc Warp Inspection

- Jack up the motorcycle so that the wheel is off the ground (see Front/Rear Removal in the Wheels/Tires chapter).

○For front disc inspection, turn the handlebar fully to one side.

- Set up a dial gauge against the disc [A] as shown and measure the disc runout, while turning [B] the wheel by hand.

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



Disc Runout

Service Limit: 0.3 mm (0.01 in.) TIR

Brake Fluid

Brake Fluid Level Inspection

- Refer to Brake Fluid Level Inspection in the Periodic Maintenance chapter (see Brake Fluid Level Inspection in the Periodic Maintenance chapter).

Brake Fluid Change

- Refer to Brake Fluid Change in the Periodic Maintenance chapter (see Brake Fluid Change in the Periodic Maintenance chapter).

Brake Line Bleeding

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

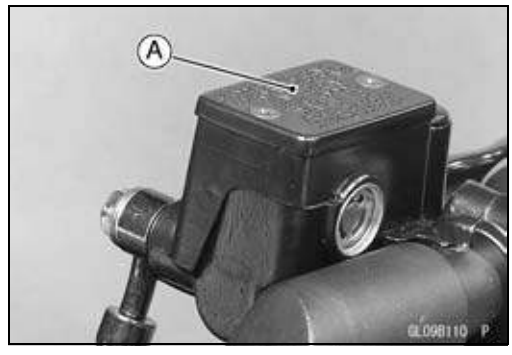
Be sure to bleed the air from the brake line whenever brake lever or pedal action feels soft or spongy after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.

NOTE

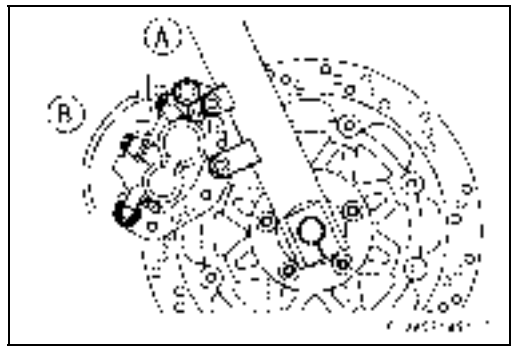
○*The procedure to bleed the front brake line is as follows. Bleeding the rear brake line is the same as for the front brake.*

- Remove the reservoir cap [A] and diaphragm.
- Fill the reservoir with fresh brake fluid to the upper level line in the reservoir.
- 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.

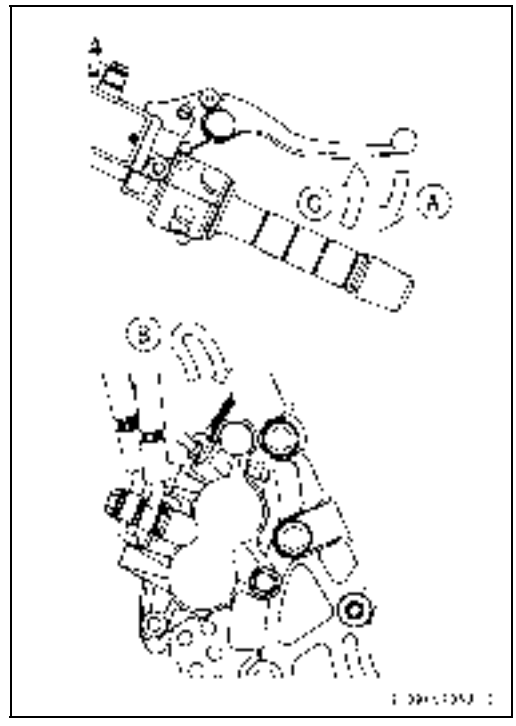


- Remove the rubber cap from the bleed valve [A] on the caliper.
- Attach a clear plastic hose [B] to the bleed valve, and run the other end of the hose into a container.



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].



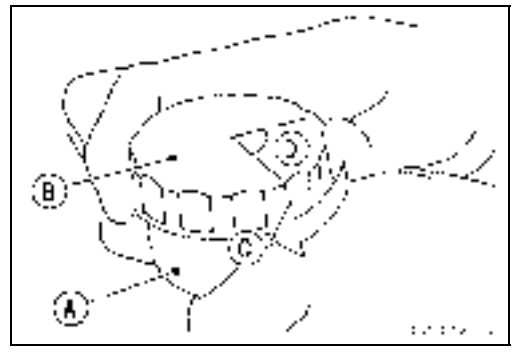
NOTE

○*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: First bleeding the right caliper then repeat the above steps for the left caliper.*

● Remove the clear plastic hose.
● Install the diaphragm and reservoir cap.
● Tighten:

Torque - Front Brake Reservoir Cap Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)

● Follow the procedure below to install the rear brake fluid reservoir cap correctly.
○First, tighten the rear brake fluid reservoir cap [B] clockwise [C] by hand until slight resistance is felt indicating that the cap is seated on the reservoir body, then tighten the cap an additional 1/6 turn [D] while holding the brake fluid reservoir body [A].



● Tighten the bleed valve, and install the rubber cap.

Torque - Bleed Valve: 5.5 N·m (0.55 kgf·m, 49 in·lb)

● Check the fluid level (see Brake Fluid Level Inspection in the Periodic Maintenance chapter).
● After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.

Brake Fluid

⚠ 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 of the 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.**

Brake Hose

Brake Hose Removal/Installation

- Refer to the Brake Hose and Pipe Replacement in the Periodic Maintenance chapter (see Brake Hose and Pipe Replacement in the Periodic Maintenance chapter).

Brake Hose Inspection

- Refer to Brake Hose Damage and Installation Condition Inspection in the Periodic Maintenance chapter (see Brake Hose Damage and Installation Condition Inspection in the Periodic Maintenance chapter).

Suspension

Table of Contents

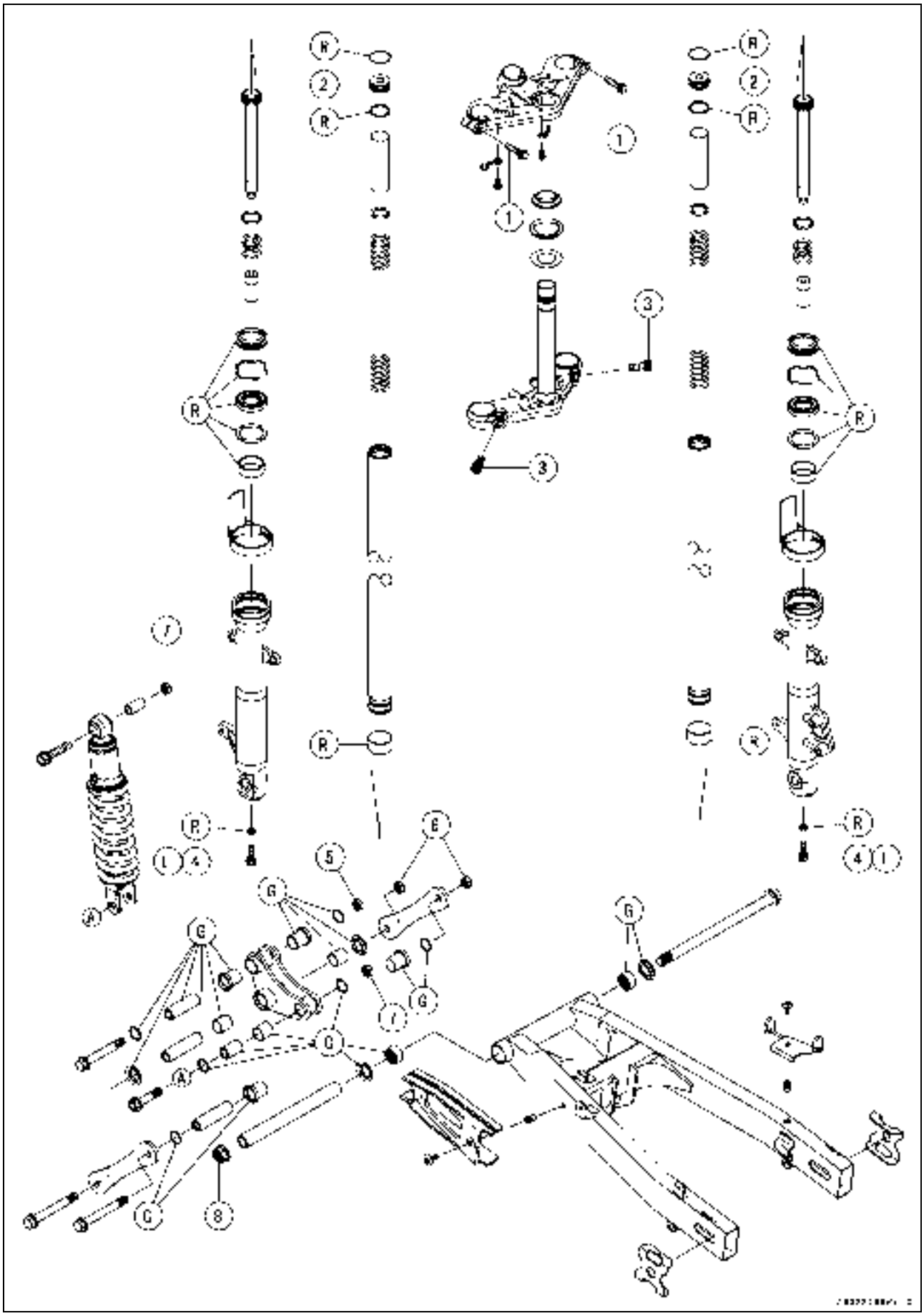
Exploded View 13-2
Specifications 13-4
Special Tools 13-5
Front Fork 13-7
- Front Fork Removal 13-7
- Front Fork Installation (each fork leg) 13-7
- Front Fork Oil Change 13-8
- Front Fork Disassembly 13-9
- Front Fork Assembly 13-10
- Inner Tube/Outer Tube Inspection 13-11
- Fork Spring Inspection 13-11
- Oil Seal/Dust Seal Inspection 13-11

Rear Shock Absorber 13-12
- Spring Preload Adjustment 13-12
- Rear Shock Absorber Removal 13-12
- Rear Shock Absorber Installation 13-13
- Rear Shock Absorber Scrapping 13-13

Swingarm 13-14
- Swingarm Removal 13-14
- Swingarm Installation 13-14
- Swingarm Bearing Removal 13-15
- Swingarm Bearing Installation 13-15
- Swingarm Bearing, Sleeve Inspection 13-15
- Swingarm Lubrication 13-16
- Chain Guide Inspection 13-16

Tie-Rod, Rocker Arm 13-17
- Tie-rods Removal 13-17
- Tie-Rod Installation 13-17
- Rocker Arm Removal 13-17
- Rocker Arm Installation 13-17
- Tie-rod, Rocker Arm Bushing Inspection 13-17
- Tie-rod, Rocker Arm Sleeve Inspection 13-17

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Fork Clamp Bolts (Upper)	21	2.1	15	
2	Front Fork Top Plugs	23	2.3	16.5	
3	Front Fork Clamp Bolts (Lower)	30	3.1	22	
4	Front Fork Bottom Allen Bolts	20	2.0	15	L
5	Rocker Arm Pivot Nut	59	6.0	44	
6	Tie-Rod Nuts	59	6.0	44	
7	Rear Shock Absorber Mounting Nuts	59	6.0	44	
8	Swingarm Pivot Nut	98	10.0	72	

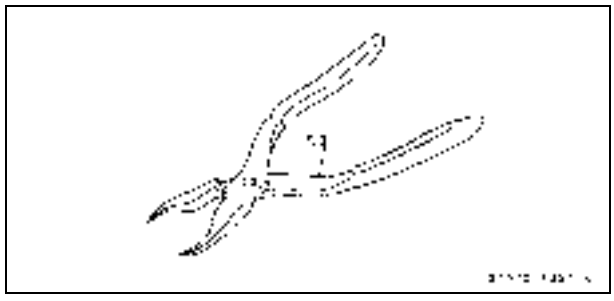
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
R: Replacement Parts

Specifications

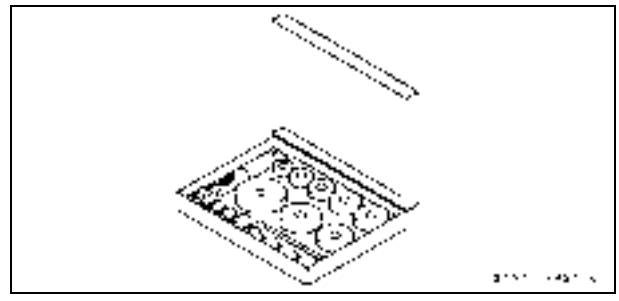
Item	Standard	Service Limit
Front Fork		
Fork oil:		
Viscosity	KAYABA SS-8 or equivalent	– – –
Amount (Per Side)	310 mL (10.5 US oz) (when changing oil) 360 ±2.5 mL (12.2 ±0.08 US oz.) (after disassembly and completely dry)	– – – – – –
Fork oil level	108 ±2 mm (4.3 ±0.08 in.) (Fully compressed, without spring)	– – –
Fork spring free length	420.5 mm (16.6 in.)	412 mm (16.2 in.)
Rear Suspension		
Rear shock absorber spring preload adjustment	1st position	1 ~ 5 (Usable range)
Rear shock absorber gas pressure (non-adjustable)	980 kPa (10 kgf/cm², 142 psi)	– – –

Special Tools

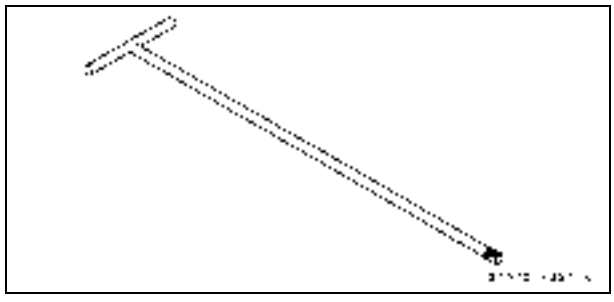
Inside Circlip Pliers:
57001-143



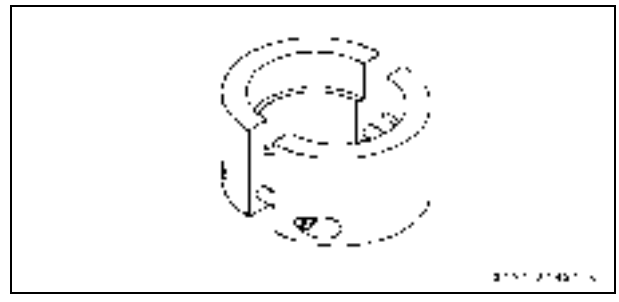
Bearing Driver Set:
57001-1129



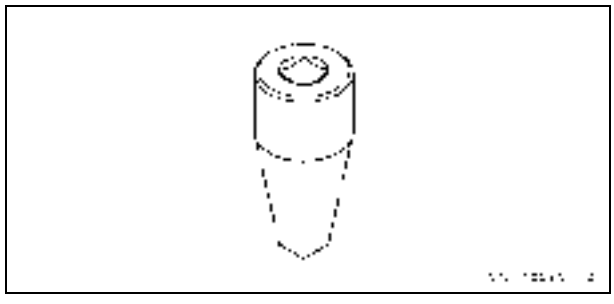
Fork Cylinder Holder Handle:
57001-183



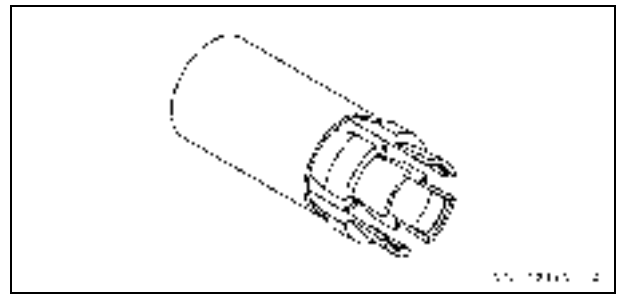
Fork Outer Tube Weight:
57001-1218



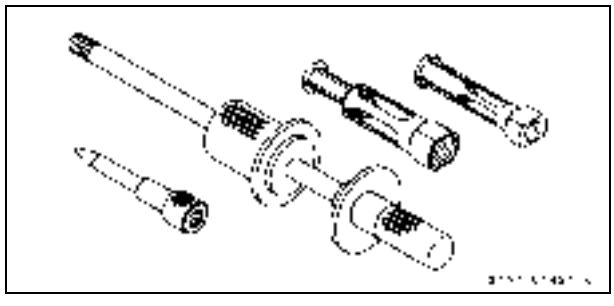
Fork Cylinder Holder Adapter:
57001-1057



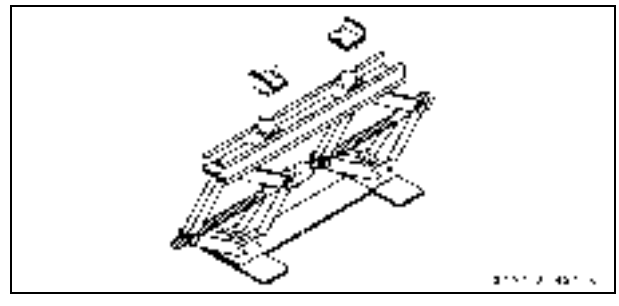
Front Fork Oil Seal Driver:
57001-1219



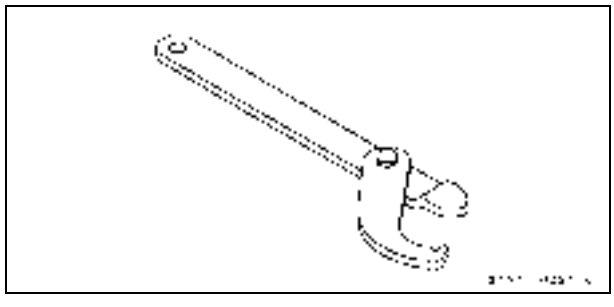
Oil Seal & Bearing Remover:
57001-1058



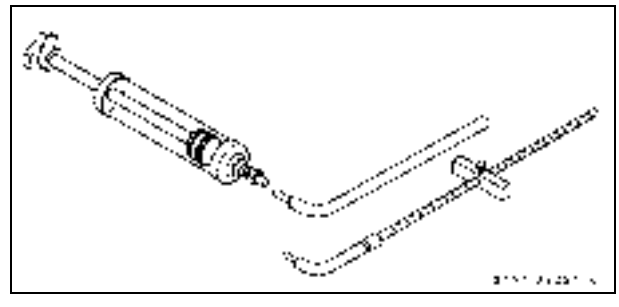
Jack:
57001-1238



Steering Stem Nut Wrench:
57001-1100

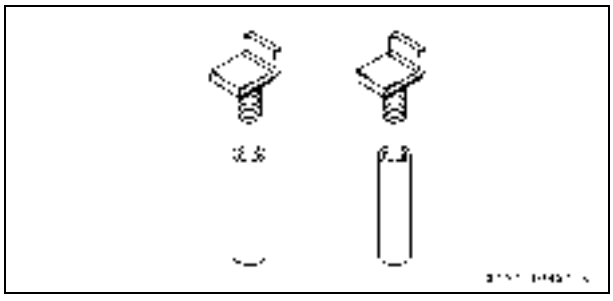


Fork Oil Level Gauge:
57001-1290



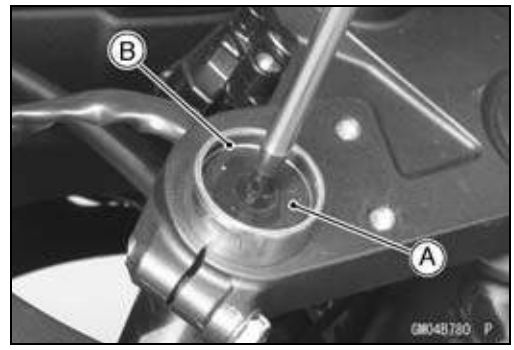
Special Tools

Jack Attachment:
57001-1608



Front Fork

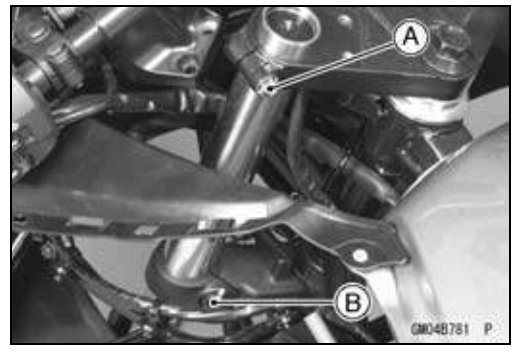
Front Fork Removal



NOTE

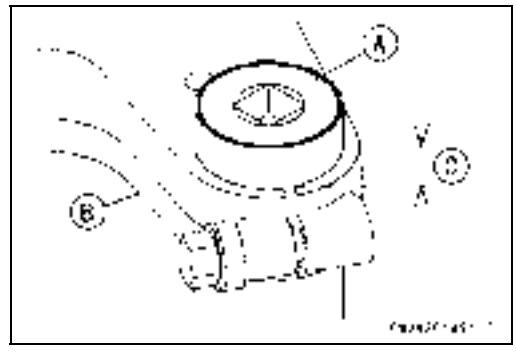
○Remove the handlebar holder and remove the fork top plug [A] beforehand if the fork leg is to be disassembled.

- To remove the top plug, remove the snap ring [B] pushing down the top plug with the screwdriver.
- Remove:
  Front Brake Caliper (see Front Caliper Removal in the Brakes chapter)
  Front Wheel (see Front Wheel Removal in the Wheels/Tires chapter)
  Front Fender (see Front Fender Removal in the Frame chapter)
  Lower Fairings (see Lower Fairing Removal in the Frame chapter)
- Remove the clamps and free the brake hose from the fork leg.



- Loosen the front fork upper [A] and lower [B] clamp bolts.
- With a twisting motion, remove the fork leg down and out.

Front Fork Installation (each fork leg)



- Insert the fork leg until the inner tube top hit the handlebar holder lightly, that is, the distance between the inner tube top [A] and the steering stem head surface [B] is approximate 12 mm (0.47 in.) [C].

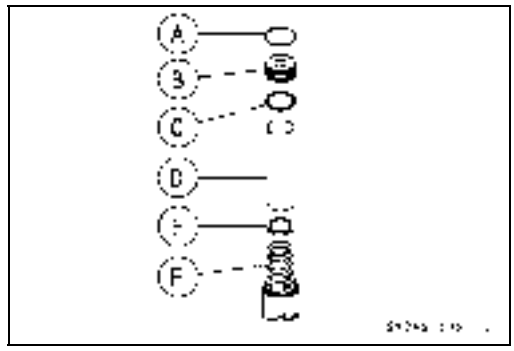
Torque - Front Fork Clamp Bolts (Upper): 21 N·m (2.1 kgf·m, 15 ft·lb)
Front Fork Clamp Bolts (Lower): 30 N·m (3.1 kgf·m, 22 ft·lb)

- Route the brake hoses and clamp it to the right fork leg.
- Install:
  Handlebar Holder
  Front Brake Caliper (see Caliper Installation in the Brakes chapter)
  Front Wheel (see Front Wheel Installation in the Wheels/Tires chapter)
  Front Fender
  Lower Fairings (see Lower Fairing Removal in the Frame chapter)

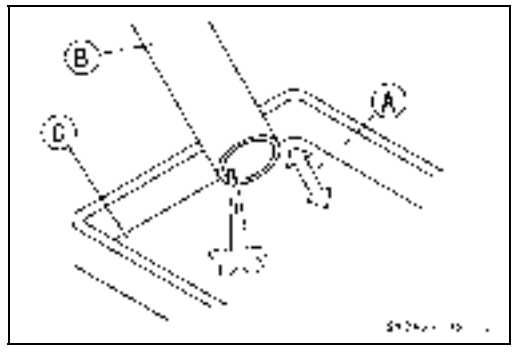
Torque - Handlebar Holder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Front Fork

Front Fork Oil Change



- Remove the front fork (see Front Fork Removal).
- Remove:
  Snap Ring [A] (see Front Fork Removal)
  Top Plug [B] with O-ring [C]
  Collar [D]
  Fork Spring Seat [E]
  Fork Spring [F]



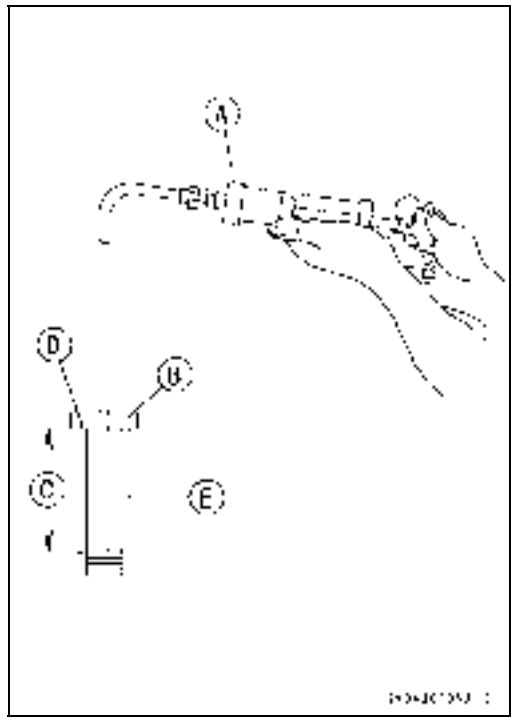
- Compress [A] the fork [B] upside down to draw out the oil into the suitable container [C].
- Pour in the specified amount of oil.

Fork Oil

Viscosity:	**KAYABA SS-8 or equivalent**
Amount (Per Side):	
When changing oil	**310 mL (10.5 US oz.)**
After disassembly and completely dry	**360 ±2.5 mL (12.2 ±0.08 US oz.)**

NOTE

○*Move the outer tube up and down a few times to remove the air that is trapped in the fork oil in order to stabilize the oil level.*



- Hold the outer tube vertically in a vise and compress the fork completely.
- Wait until the oil level stabilizes.
- Use the fork oil level gauge [A] to measure the distance between the top of the inner tube to the oil level.

Special Tool - Fork Oil Level Gauge: 57001-1290

○Set the oil level gauge stopper [B] so that the distance [C] from the bottom of the stopper to the lower end of the pipe is the standard oil level distance.

○A correct measurement can not be obtained unless the level gauge pipe is placed in the center of the inner tube.

Oil Level (fully compressed, without spring)

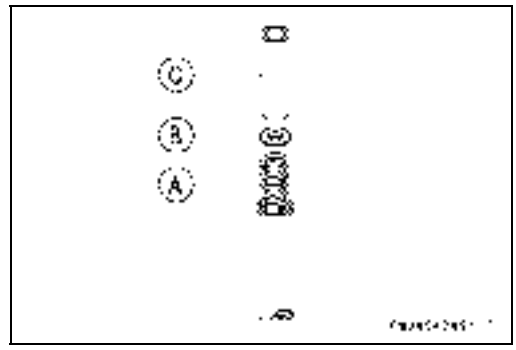
Standard:	**108 ±2 mm (4.3 ±0.08 in.)**

○Place the stopper of the level gauge at the top [D] of the inner tube [E] and pull the handle slowly to draw out the excess oil from fork into the gauge, thus attaining the standard level.

○If not oil is drawn out, there is not enough oil in the fork. Pour in some more oil and measure again.

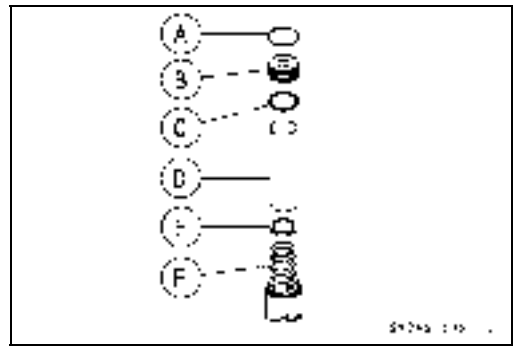
Front Fork

- Repeat the same procedure for adjusting the other fork.
- Install the fork spring [A], fork spring seat [B] and collar [C].
- Inspect the top plug O-ring and snap ring and replace them with new ones.
- Install the front fork (see Front Fork Installation).



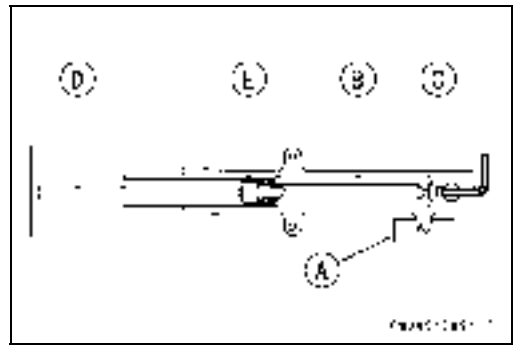
Front Fork Disassembly

- Remove the front fork (see Front Fork Removal).
- Remove:
  Snap Ring [A] (see Front Fork Removal)
  Top Plug [B] with O-ring [C]
  Collar [D]
  Fork Spring Seat [E]
  Fork Spring [F]



- Hold the front fork leg horizontally in a vise [A].
- Stop the cylinder unit [B] from turning by using the special tools.
- Unscrew the front fork bottom Allen bolt [C], and then take out the bolt and gasket out of the bottom of the outer tube.

  Special Tools - Fork Cylinder Holder Handle: 57001-183 [D]
  Fork Cylinder Holder Adapter: 57001-1057 [E]
- Take the cylinder unit out of the inner tube.

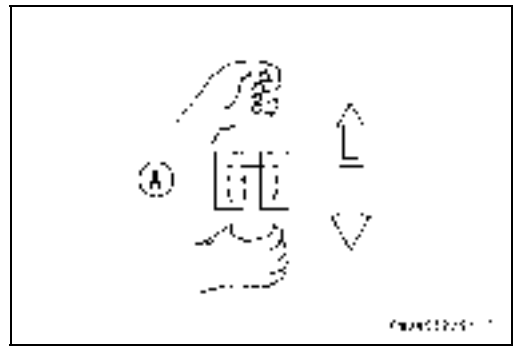


- Remove the following from the top of the outer tube.
  Dust Seal [A]
  Retaining Ring [B]



- Use the fork outer tube weight [A] to separate the inner tube from the outer tube. Holding the inner tube by hand in a vertical position, pull down the outer tube several times to pull out the inner tube.

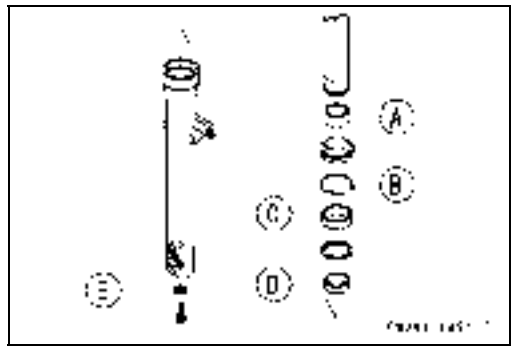
  Special Tool - Fork Outer Tuber Weight: 57001-1218
- Take out the cylinder base from the outer tube bottom.



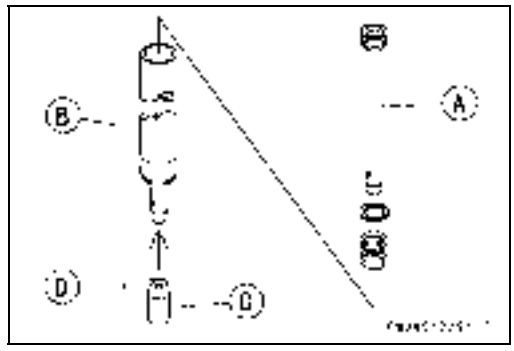
- Remove the inner guide bushing from the inner tube.

Front Fork

Front Fork Assembly



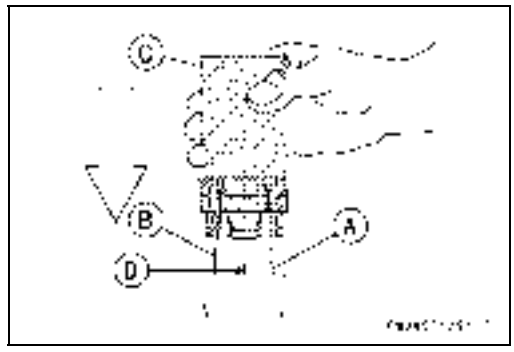
- Check the top plug O-ring and snap ring and replace them with new ones if necessary.
- Replace the following parts with new ones.
  Inner Guide Bushing [A]
  Retaining Ring [B]
  Oil Seal [C]
  Outer Guide Bushing [D]
  Bottom Allen Bolt Gasket [E]



- Put the cylinder unit [A] with the spring into the inner tube [B] protruding from the inner tube, and install the cylinder base [C] onto the bottom end of the cylinder unit.

○Install the cylinder base with the tapered end [D] facing upward.

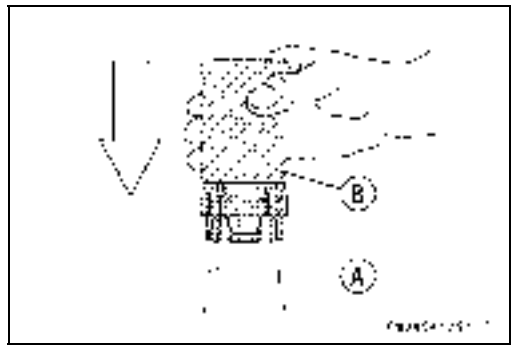
- Install the inner tube, cylinder unit, and cylinder base as a set into the outer tube.



- Install the new guide bushing [A] with a use one [B] on it by tapping the use one with the fork oil seal driver [C].

○The split [D] of the bushing should face toward the side of the vehicle.

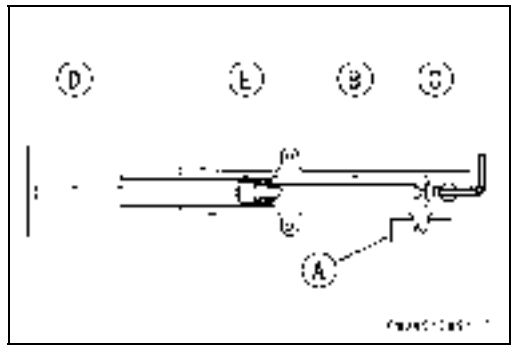
Special Tool - Front Fork Oil Seal Driver: 57001-1219



- Apply molybdenum disulfide grease to the oil seal lips and install the washer and the oil seal [A] into the outer tube.

Special Tool - Front Fork Oil Seal Driver: 57001-1219 [B]

- Install the retaining ring on the outer tube.



- Install a new bottom Allen bolt gasket.
- Apply a non-permanent locking agent to the threads of the bottom Allen bolt and screw the Allen bolt into the bottom of the outer tube.
- Hold the outer tube in a vise [A], hold the cylinder unit [B] with the special tools, then tighten the Allen bolt [C].

○Apply a non-permanent locking agent to the front fork bottom Allen bolt.

Special Tools - Fork Cylinder Holder Handle: 57001-183 [D]
Fork Cylinder Holder Adapter: 57001-1057 [E]

Torque - Front Fork Bottom Allen Bolt: 20 N·m (2.0 kgf·m, 15 ft·lb)

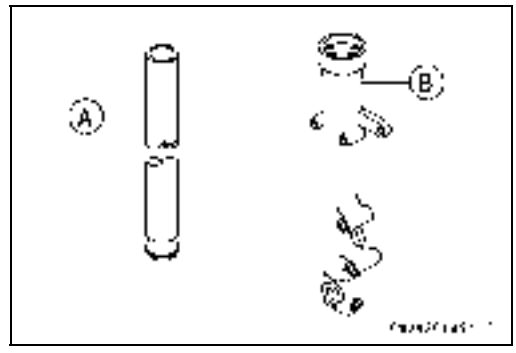
Front Fork

- Fill with the specified type of oil and install the parts removed (see Fork Oil change).
- Install the dust seals.

Fork Oil: **KAYABA SS-8 or equivalent**

Capacity (per one unit): **360 ±2.5 mL (12.2 ±0.08 US oz), (after fork disassembly and completely dry)**

Inner Tube/Outer Tube Inspection



- Visually inspect the inner tube [A] 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 tube is repaired or replace.

CAUTION

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

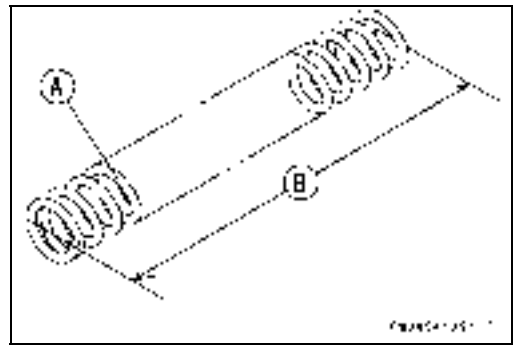
- Temporarily assemble the inner tube and outer tube [B], and pump them back and forth manually to check for smooth operation.

★If it does not operate smoothly, replace both the inner tube and the outer tube.

⚠ WARNING

A straightened inner or outer fork tube may fail 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.

Fork Spring Inspection



- Measure the free length [B] of the fork spring [A].

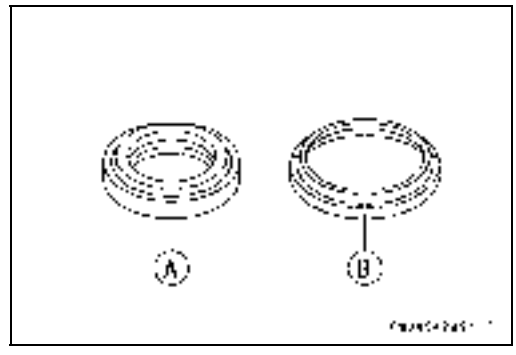
★If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of the replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork legs balanced for motorcycle stability.

Fork Spring Free Length

Standard: **420.5 mm (16.6 in.)**

Service Limit: **412 mm (16.2 in.)**

Oil Seal/Dust Seal Inspection

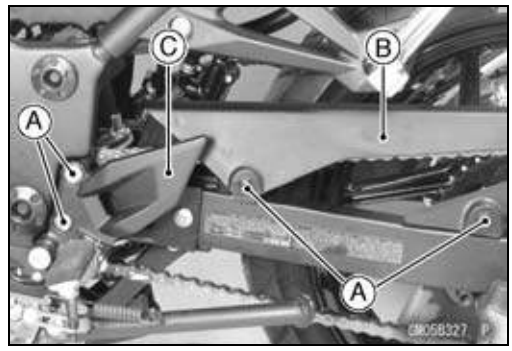


- Inspect the oil seal [A] and dust seal [B] for any signs of deterioration or damage.

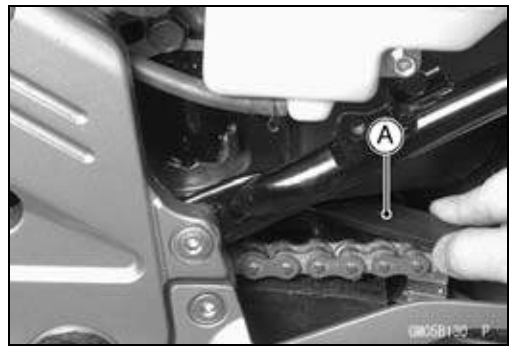
★Replace it if necessary.

Rear Shock Absorber

Spring Preload Adjustment



- Remove the bolts [A], chain cover [B] and left foot guard [C] to turn the wrench.



- Using the steering stem nut wrench [A], turn the adjusting nut to adjust the spring preload.

  Special Tool - Steering Stem Nut Wrench: 57001-1100

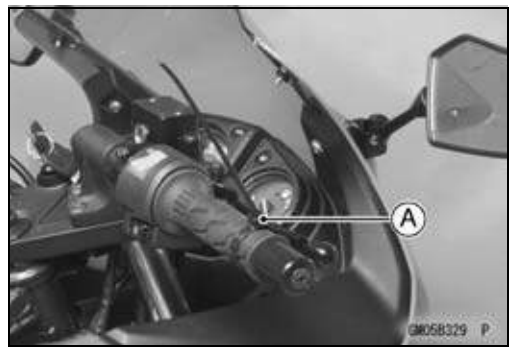
- The spring preload can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Preload Adjustment

Adjuster Position	Spring Force	Setting	Load	Road	Speed
1	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
5	Strong	Hard	Heavy	Bad	High

- The standard adjuster setting for an average build rider of 68 kg (150 lb) with no passenger and no accessories is 1 step.

Rear Shock Absorber Removal



- Remove the lower fairings (see Lower Fairing in the Frame chapter).
- Raise the rear wheel off the ground with jack.

  Special Tools - Jack: 57001-1238
  Jack Attachment: 57001-1608

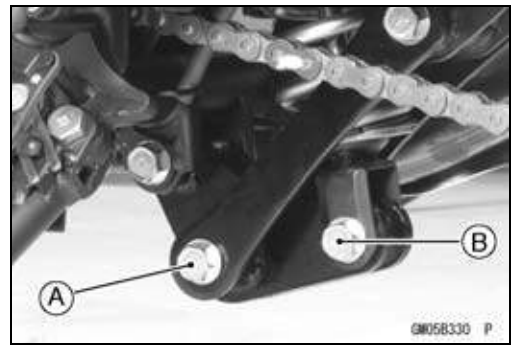
- Squeeze the brake lever slowly and hold it with the band [A].

⚠ WARNING

Be sure to hold the front brake when removing the shock absorber, or the motorcycle may tall over. It could cause an accident and injury.

Rear Shock Absorber

● Remove:
Tie-rod Lower and Bolt [A]
Rear Shock Absorber Nuts and Bolts [B]



Rear Shock Absorber Installation

● Install the rear shock absorber.
● Tighten the tie-rod lower bolt and nut.

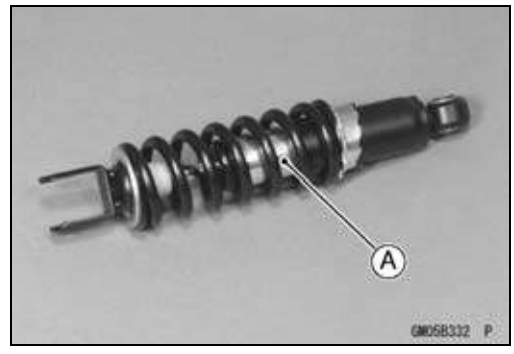
Torque - Rear Shock Absorber Mounting Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)
Tie-rod Nut (Lower): 59 N·m (6.0 kgf·m, 44 ft·lb)

● Adjust the rear shock absorber spring preload in response to riding condition (see Spring Preload Adjustment).

Rear Shock Absorber Scrapping

⚠ WARNING

Since the rear shock absorber contains nitrogen gas, do not incinerate the rear shock absorber without first releasing the gas or it may explode.
Before a rear shock absorber is scrapped, drill a hole at the point [A] shown to release the nitrogen gas completely. Wear safety glasses when drilling the hole, as the gas may below out bits of drilled metal when the hole opens.



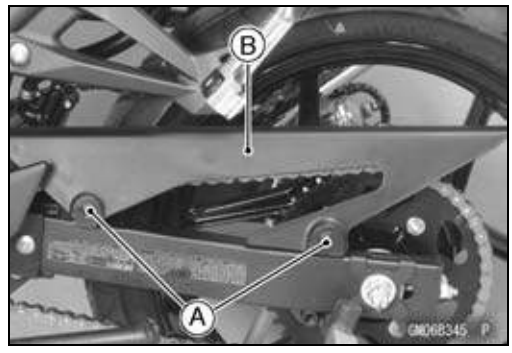
● Drill the cylinder [A] of the shock absorber using about 2 mm (0.08 in.) drill bit.

Swingarm

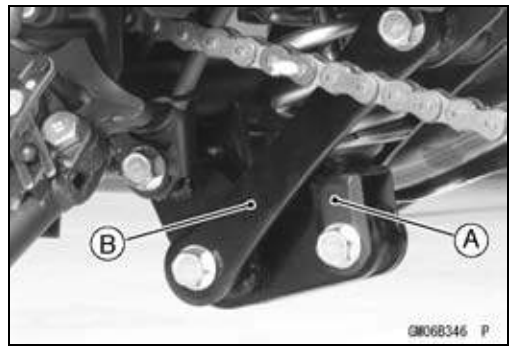
Swingarm Removal

- Remove the lower fairings (see Lower Fairing Removal in the Frame chapter).
- Remove the bolts [A] and the chain cover [B].
- Raise the rear wheel off the ground with jack.

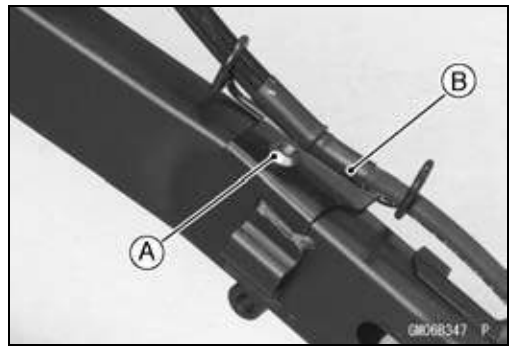
Special Tools - Jack: 57001-1238
Jack Attachment: 57001-1608



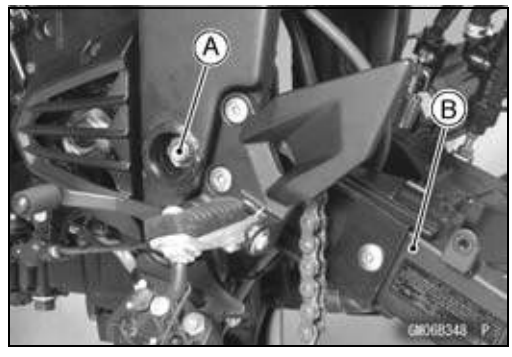
- Remove:
  Rear Wheel (see Rear Wheel Removal in the Wheels/Tire chapter)
  Rear Shock Absorber [A] (see Rear Shock Absorber Removal)
  Tie-rod [B] (see Tie-rod Removal)



- Remove:
  Brake Hose Clamp Bolt [A]
  Bracket [B] with Brake Hose



- Remove the swingarm pivot nut [A] and shaft, remove the swingarm [B].



Swingarm Installation

- Installation is the reverse of removal.

○Apply grease to the lip of oil seals.
○Be sure to install the oil seal and collar to swingarm.

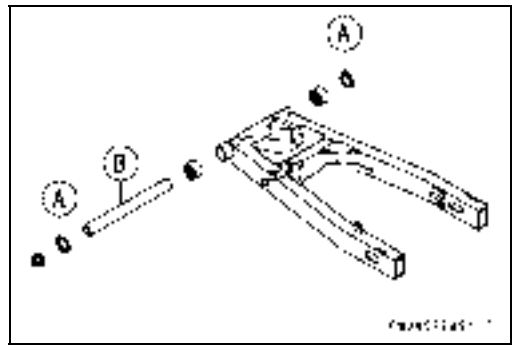
- Tighten the swingarm pivot nut.

Torque - Swingarm Pivot Nut: 98 N·m (10.0 kgf·m, 72 ft·lb)

- Install the removed parts.

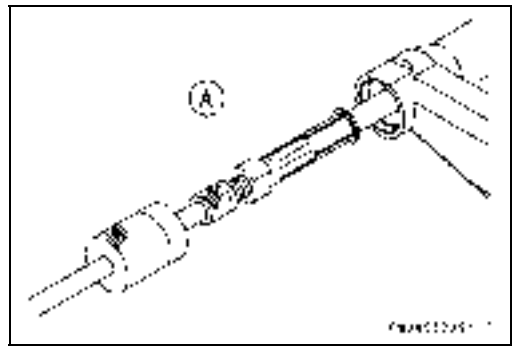
Swingarm

Swingarm Bearing Removal



- Remove:
  Swingarm (see Swingarm Removal)
  Grease Seal [A]
  Sleeve [B]

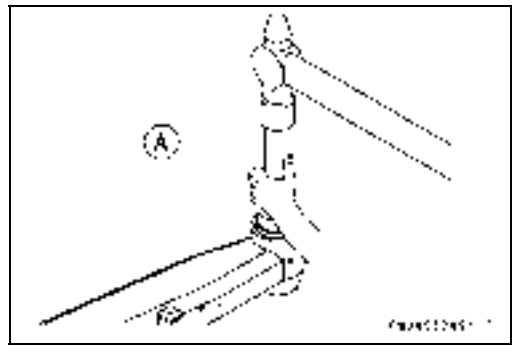
  Special Tool - Inside Circlip Pliers: 57001-143



- Remove the needle bearing.

  Special Tool - Oil Seal & Bearing Remover: 57001-1058 [A]

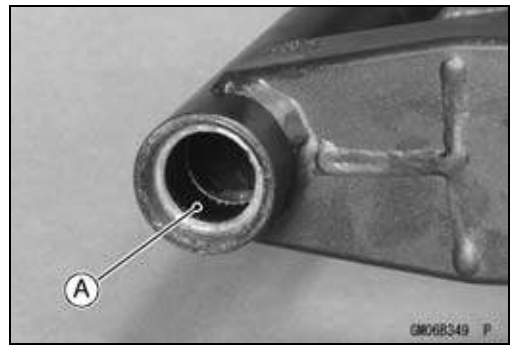
Swingarm Bearing Installation



- Apply plenty of grease to the needle bearings.
- Install the needle bearings so that the manufacturer's marks faces out.

  Special Tool - Bearing Driver Set: 57001-1129 [A]

Swingarm Bearing, Sleeve Inspection



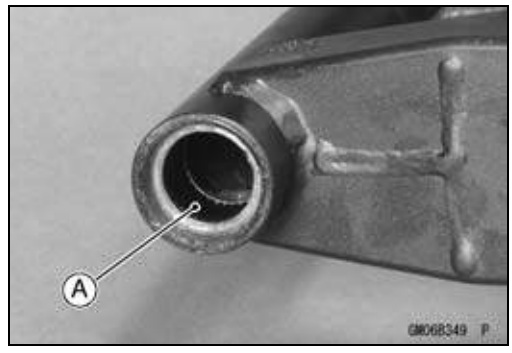
CAUTION
Do not remove the bearings for inspection. Removal many damage them.

- The rollers in a needle bearing [A] 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 set.

Swingarm

Swingarm Lubrication



- Lubricate the swingarm needle bearings [A] according to the Periodic Maintenance Chart. They are normal for a small amount of grease to seep out around the grease seals.

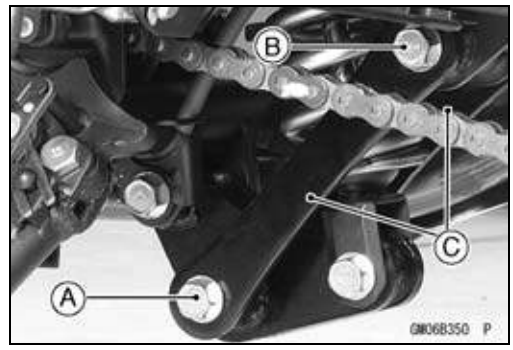
○If the swingarm pivots is disassembled, wipe all the old grease off the bearings, sleeves, and grease seals, then grease them.

Chain Guide Inspection

- Refer to the Chain Guide Wear Inspection in the Periodic Maintenance chapter (see Chain Guide Wear Inspection in the Periodic Maintenance chapter).

Tie-Rod, Rocker Arm

Tie-rods Removal



- Remove the lower fairings (see Lower Fairing Removal in the Frame chapter).
- Raise the rear wheel off the ground with jack.

Special Tools - Jack: 57001-1238
Jack Attachment: 57001-1608

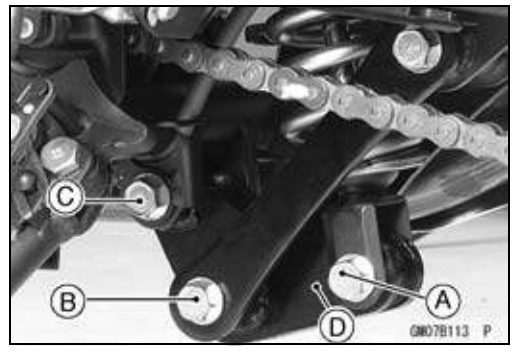
- Remove the tie-rod lower bolt [A] and nut.
- Remove the tie-rod upper bolt [B] and nut, and take off the tie-rod [C].
- Remove the other tie-rod.

Tie-Rod Installation

- Install the tie-rod upper bolt first and then the lower bolt.

Torque - Tie-rod Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)

Rocker Arm Removal



- Remove the lower fairings (see Lower Fairing Removal in the Frame chapter).
- Raise the rear wheel off the ground with jack.

Special Tools - Jack: 57001-1238
Jack Attachment: 57001-1608

- Remove:
  Rear Shock Absorber Lower Nut and Bolt [A]
  Tie-rod Lower Nut and Bolt [B]
  Rocker Arm Pivot Shaft [C]
  Rocker Arm [D]

○Support the rear wheel to remove the bolts.

CAUTION

When pulling out the bolts, lift the rear wheel slightly. Forcing or tapping on a bolt could damage the bolt and sleeve.

Rocker Arm Installation

- Apply grease to all the O-ring, bushing, sleeve, grease seal.
- Tighten:

Torque - Rocker Arm Pivot Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)
Tie-rod Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)
Rear Shock Absorber Mounting Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)

Tie-rod, Rocker Arm Bushing Inspection

- The busings wear so little that the wear is difficult to measure. Instead, inspect the bushings for abrasion, color change or other damage.

★If there is any doubt as to the condition of either bushings, replace the busing with new one.

Tie-rod, Rocker Arm Sleeve Inspection

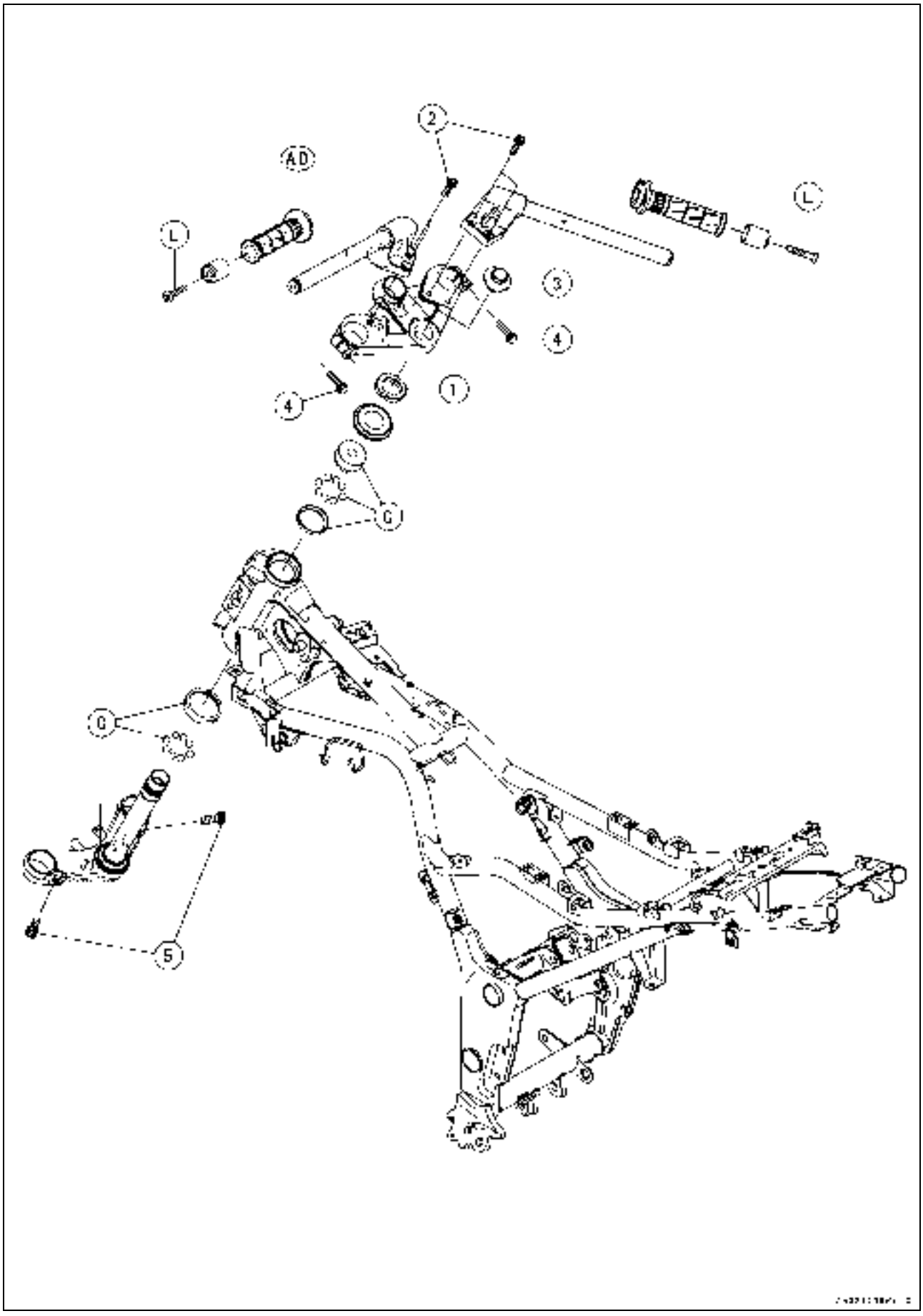
★If there is visible damage, replace the sleeve with new one.

Steering

Table of Contents

Exploded View 14-2
Special Tools 14-4
Steering 14-5
  Steering Inspection 14-5
  Steering Adjustment 14-5
Steering Stem 14-6
  Steering Stem, Stem Bearing Removal 14-6
  Steering Stem, Stem Bearing Installation 14-7
  Stem Bearing Lubrication 14-9
  Grease Seal, Deterioration, Damage Inspection 14-9
  Steering Stem Warp Inspection 14-9
Handlebars 14-10
  Right Handlebar Holder Removal 14-10
  Right Handlebar Holder Installation 14-10
  Left Handlebar Holder Removal 14-10
  Left Handlebar Holder Installation Note 14-11

Exploded View



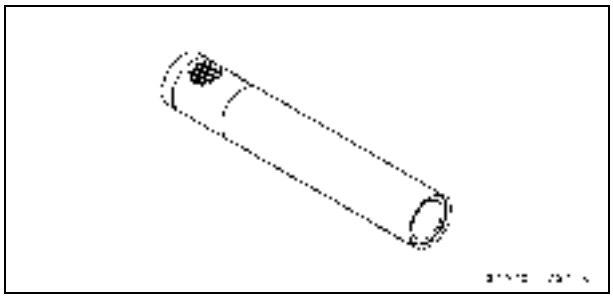
Exploded View

No	Item	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Steering Stem Nut	4.9	0.5	43 in·lb	
2	Handlebar Holder Mounting Bolts	25	2.5	18	
3	Steering Stem Head Bolt	44	4.5	32	
4	Front Fork Clamp Bolts (Upper)	20	2.0	15	
5	Front Fork Clamp Bolts (Lower)	30	3.1	22	

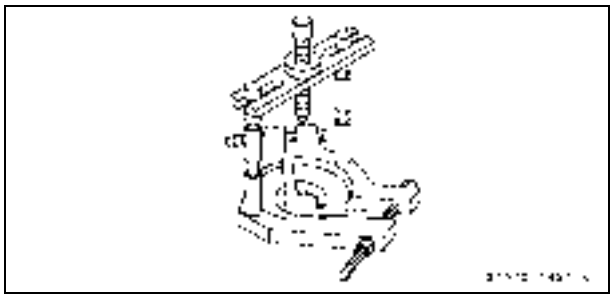
AD: Apply adhesive agent.
G: Apply grease.
L: Apply a non-permanent locking agent.

Special Tools

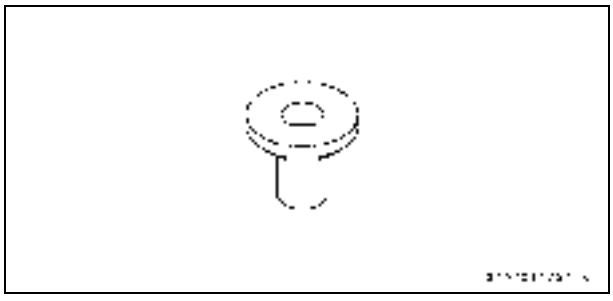
Steering Stem Bearing Driver:
57001-137



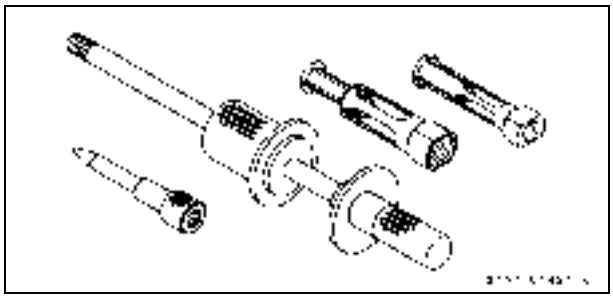
Bearing Puller:
57001-158



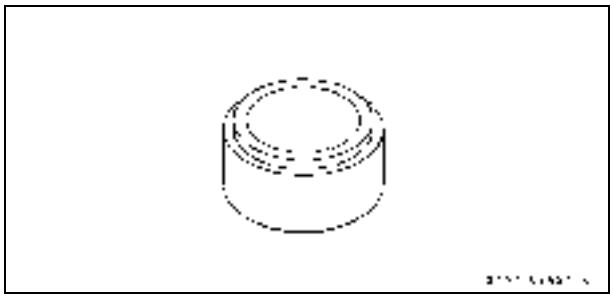
Bearing Puller Adapter:
57001-317



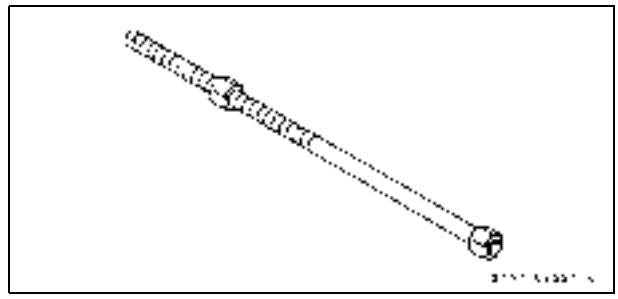
Oil Seal & Bearing Remover:
57001-1058



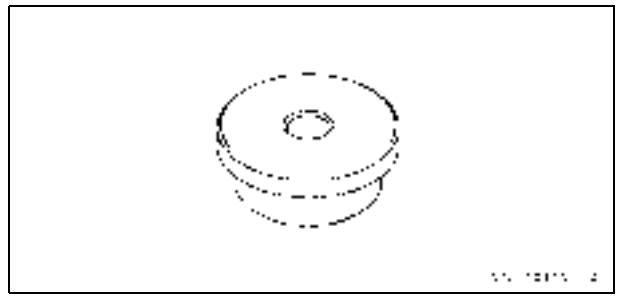
Steering Stem Bearing Driver Adapter, ϕ34.5:
57001-1074



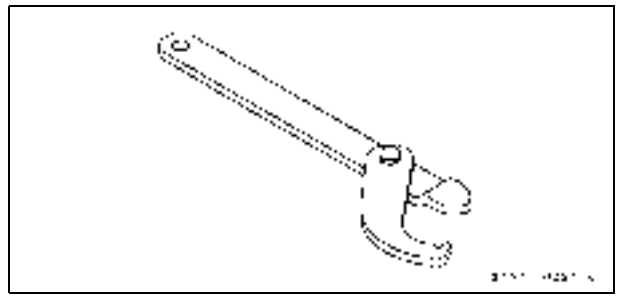
Head Pipe Outer Race Press Shaft:
57001-1075



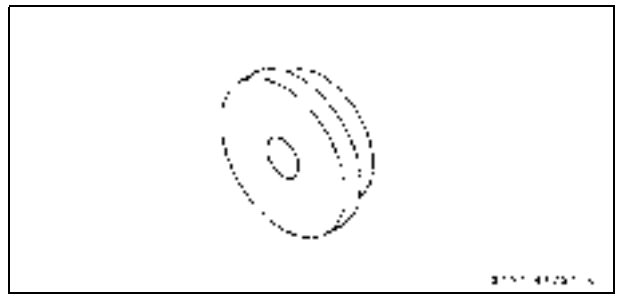
Head Pipe Outer Race Driver, ϕ51.5:
57001-1076



Steering Stem Nut Wrench:
57001-1100



Head Pipe Outer Race Driver, ϕ47:
57001-1447



Steering

Steering Inspection

- Refer to Steering Play Inspection in the Periodic Maintenance chapter (see Steering Play Inspection in the Periodic Maintenance chapter).

Steering Adjustment

- Refer to Steering Play Adjustment in the Periodic Maintenance chapter (see Steering Play Inspection in the Periodic Maintenance chapter).

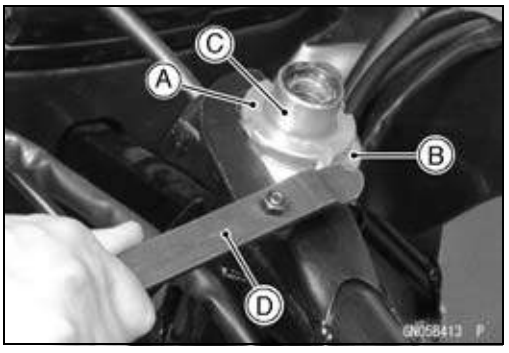
Steering Stem

Steering Stem, Stem Bearing Removal

● Remove:
Front Seat (see Front Seat Removal in the Frame chapter)
Lower Fairings (see Lower Fairing Removal in the Frame chapter)
Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
Steering Stem Head Bolt
Steering Stem Head with Handlebars
Front Wheel (see Fuel Wheel Removal in the Wheels/Tires chapter)
Front Fender (see Front Fender Removal in the Frame chapter)
Front Fork (see Front Fork Removal in the Suspension chapter)

● Pushing up the stem base by the hand, and remove the steering stem nut [A], stem cap [B], and then remove the steering stem [C].

Special Tool - Steering Stem Nut Wrench: 57001-1100 [D]



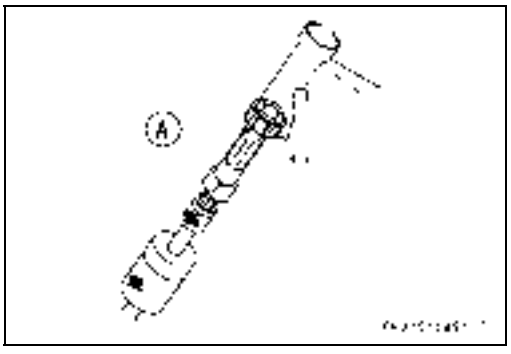
NOTE

○*Be aware of removing the steering stem so that the stem bearing steel balls are not lost.*

● Remove the upper ball bearing inner race.

● Remove the upper and lower outer races using the outer race remover [A].

Special Tool - Oil Seal & Bearing Remover: 57001-1058

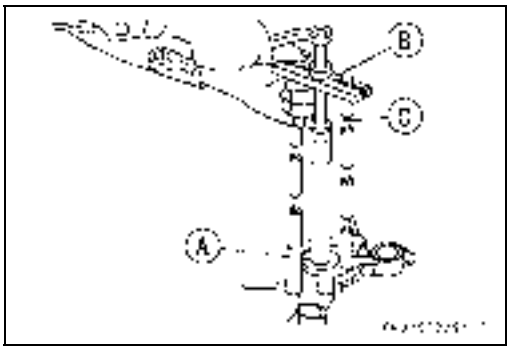


NOTE

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

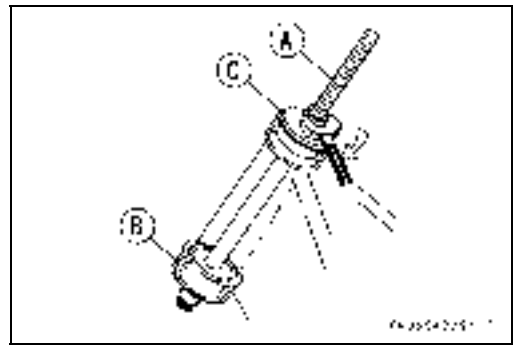
● Remove the lower bearing inner race [A] (with its grease seal) which is pressed onto the steering stem using the bearing puller [B] and adapter [C].

Special Tools - Bearing puller: 57001-158
Bearing Puller Adapter: 57001-317



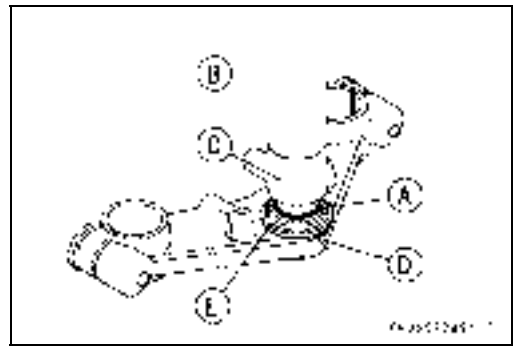
Steering Stem

Steering Stem, Stem Bearing Installation



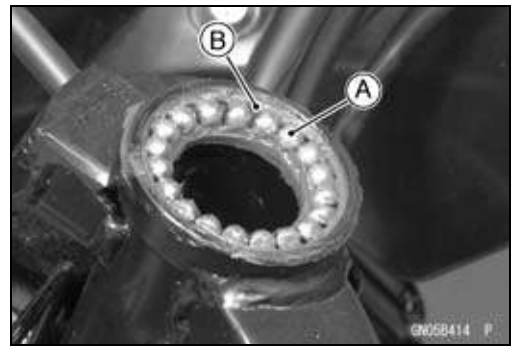
- Replace the bearing outer race with new ones.
- Apply grease to the outer races, and drive them into the head pipe at the same time.

Special Tools - Head Pipe Outer Race Press Shaft: 57001 -1075 [A]
Head Pipe Outer Race Driver: 57001-1076 [B]
Head Pipe Outer Race Driver: 57001-1447 [C]

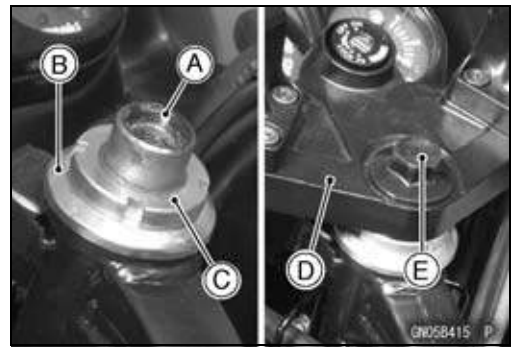


- Replace the bearing inner race with new one.
- Install the washer [D] and grease seal [E] on the steering stem, and drive the ball bearing inner race [A] applied grease onto the stem.

Special Tools - Steering Stem Bearing Driver: 57001-137 [B]
Steering Stem Bearing Driver Adapter: 57001- 1074 [C]

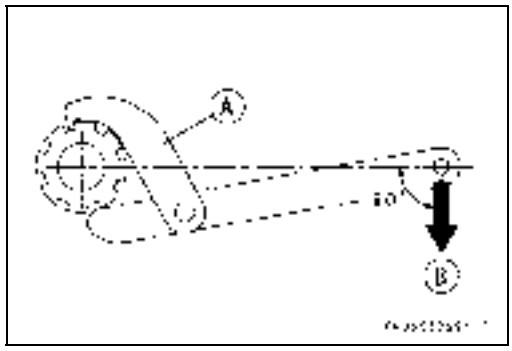


- Apply grease to the lower ball bearings (20) and stem inner race and install them onto the steering stem.
- Apply grease to the upper ball bearing (19) [A] and outer race [B], and install the ball bearings onto the outer race.



- Insert the steering stem [A] carefully through the head pipe so that the steel balls on the steering stem does not fall.
- Install the stem cap [B] and steering stem nut [C], and tighten it by hand.
- Install the stem head [D] with the handlebars.
- Tighten the stem head bolt [E] lightly.

Steering Stem



- Settle the bearings in place as follows:
  - ○Tighten the steering stem nut with 15 N·m (1.5 kgf·m, 11 ft·lb) of torque first, and loosen it a fraction of a turn until it turns lightly. (To tighten the stem nut to the specified torque, hook the wrench on the stem nut, and pull the wrench at the hole by 84 N (8.3 kg) [B] force in the direction shown.).
  - ○Tighten the steering stem nut with specified torque using a special tool [A].
  - ○Check that there is no play and the steering stem turns smoothly without rattles. If not, the steering stem bearing may be damaged.
  - ○Again back out the stem nut a fraction of 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.

Special Tool - Steering Stem Nut Wrench: 57001-1100 [A]

Torque - Steering Stem Nut: 4.9 N·m (0.5 kgf·m, 43 in·lb)

- Adjust the steering (see Steering Play Inspection in the Periodic Maintenance chapter).
- Install the front fork (see Front Fork Installation Suspension chapter).

NOTE

○*Tighten the fork upper clamp bolts first, next the stem head bolt, last the fork lower clamp bolts.*

Torque - Steering Stem Head Bolt: 44 N·m (4.5 kgf·m, 32 ft·lb)
Front Fork Clamp Bolts (Upper): 20 N·m (2.0 kgf·m, 14.5 ft·lb)
Front Fork Clamp Bolts (Lower): 30 N·m (3.1 kgf·m, 22 ft·lb)

- Install:
  Front Fender
  Front Wheel (see Front Wheel Installation in the Wheel/Tires chapter)
  Fuel Tank (see Fuel Tank Installation in the Fuel System chapter)
  Lower Fairings (see Lower Fairing Installation in the Frame chapter)
  Front Seat (see Front Seat Installation in the Frame chapter)
- Route the cables and harness correctly. (see Cable, Wire and Hose Routing in the Appendix chapter).

⚠ WARNING

Do not impede the handlebar turning by routing the cables, harnesses and hoses improperly.

- Check and adjust the following.
  Front Brake
  Clutch
  Throttle Cable
  Rear View Mirrors
  Headlight Aim

Steering Stem

Stem Bearing Lubrication

- Refer to Steering Stem Bearing Lubrication in the Periodic Maintenance chapter (see Steering Stem Bearing Lubrication in the Periodic Maintenance chapter).

Grease Seal, Deterioration, Damage Inspection

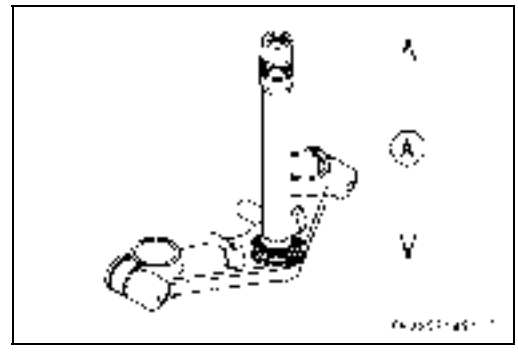
- Inspect the grease seal for any sign of deterioration or damage.

★Replace the grease seal if necessary.

Steering Stem Warp Inspection

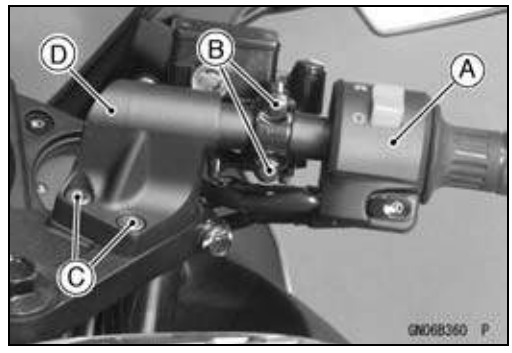
- Whenever the steering stem is removed, or if the steering can not be adjusted for smooth action, check the steering stem for straightness.

★If the steering stem [A] is bent, replace the steering stem.



Handlebars

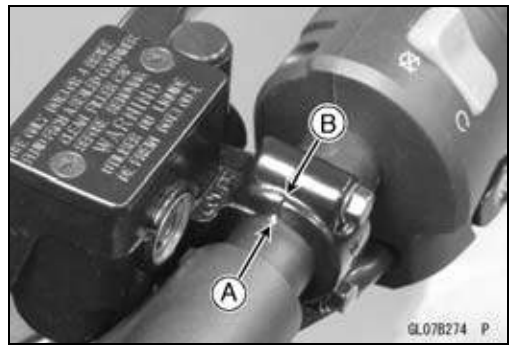
Right Handlebar Holder Removal



● Remove:
Right Switch Housing [A]
Front Master Cylinder Clamp Bolts [B]
Handlebar Holder Mounting Bolts [C]
Right Handlebar [D]

Right Handlebar Holder Installation

● Install:
Right Handlebar Holder
Right Switch Housing

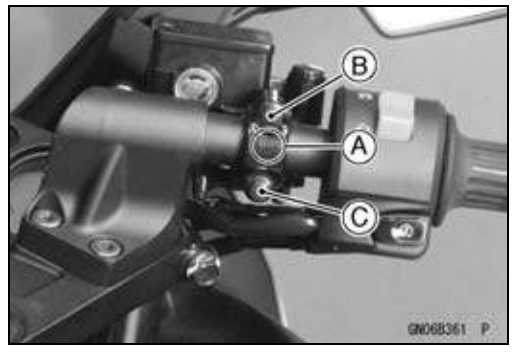


● Install the front master cylinder so that the punch mark [A] of the handlebar is aligned with the mating surface [B] of the master cylinder clamp to level the reservoir.

NOTE

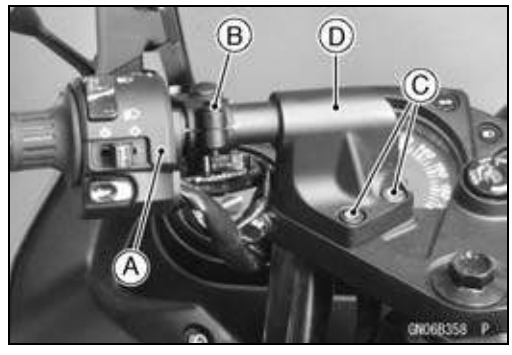
○*When the master cylinder clamp shall be installed, be sure to install it so that the arrow mark [A] on it direct upward.*

○*Tighten the upper clamp bolt [B] first, and then the lower clamp bolt [C] with a specified torque so that there will be a gap at the lower part of the clamp.*



Torque - Front Master Cylinder Clamp Bolts: 8.8 N·m (0.9 kgf·m, 78 in·lb)
Right Handlebar Holder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Left Handlebar Holder Removal



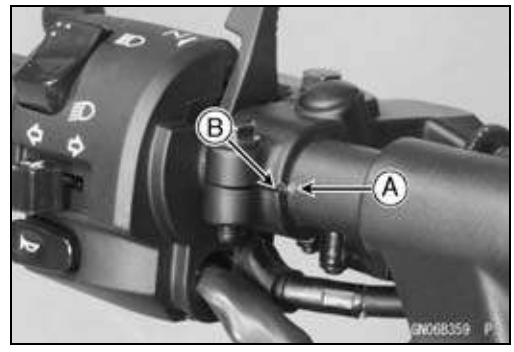
● Remove:
Left Switch Housing [A]
Clutch Lever Holder Clamp Bolt [B]
Handlebar Holder Mounting Bolts [C]
Left Handlebar [D]

Handlebars

Left Handlebar Holder Installation Note

- Install the clutch lever holder so that the punch mark [A] of the handlebar is aligned with the mating surface [B] of the clutch lever holders clamps.
- Tighten the following with the specified torque.

Torque - Clutch Lever Holder Clamp Bolts: 8.8 N·m (0.9 kgf·m, 78 in·lb)
Left Handlebar Holder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



Frame

Table of Contents

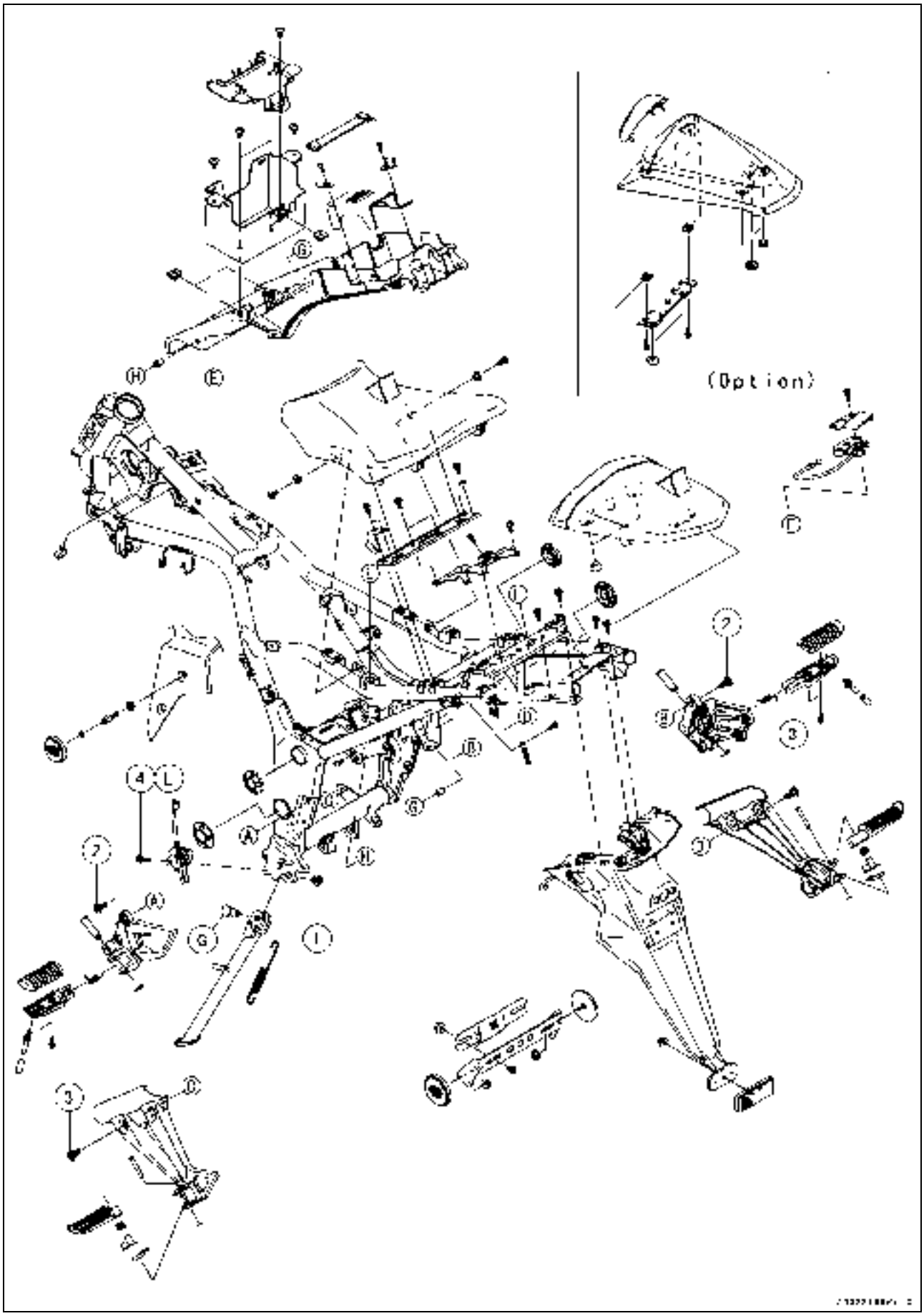
Exploded View 15-2
Seat 15-6
- Front Seat Removal 15-6
- Front Seat Installation 15-6
- Rear Seat Removal 15-6
- Rear Seat Installation 15-6

Fairings 15-7
- Lower Fairing Removal 15-7
- Lower Fairing Installation 15-7
- Upper Fairing Removal 15-8
- Upper Fairing Installation 15-9
- Upper Cover Removal 15-9
- Upper Cover Installation 15-9

Side Cover 15-10
- Side Cover Removal 15-10
- Side Cover Installation 15-10

Fenders 15-11
- Front Fender Removal 15-11
- Rear Fender Removal 15-11
- Rear Fender Installation 15-12

Exploded View

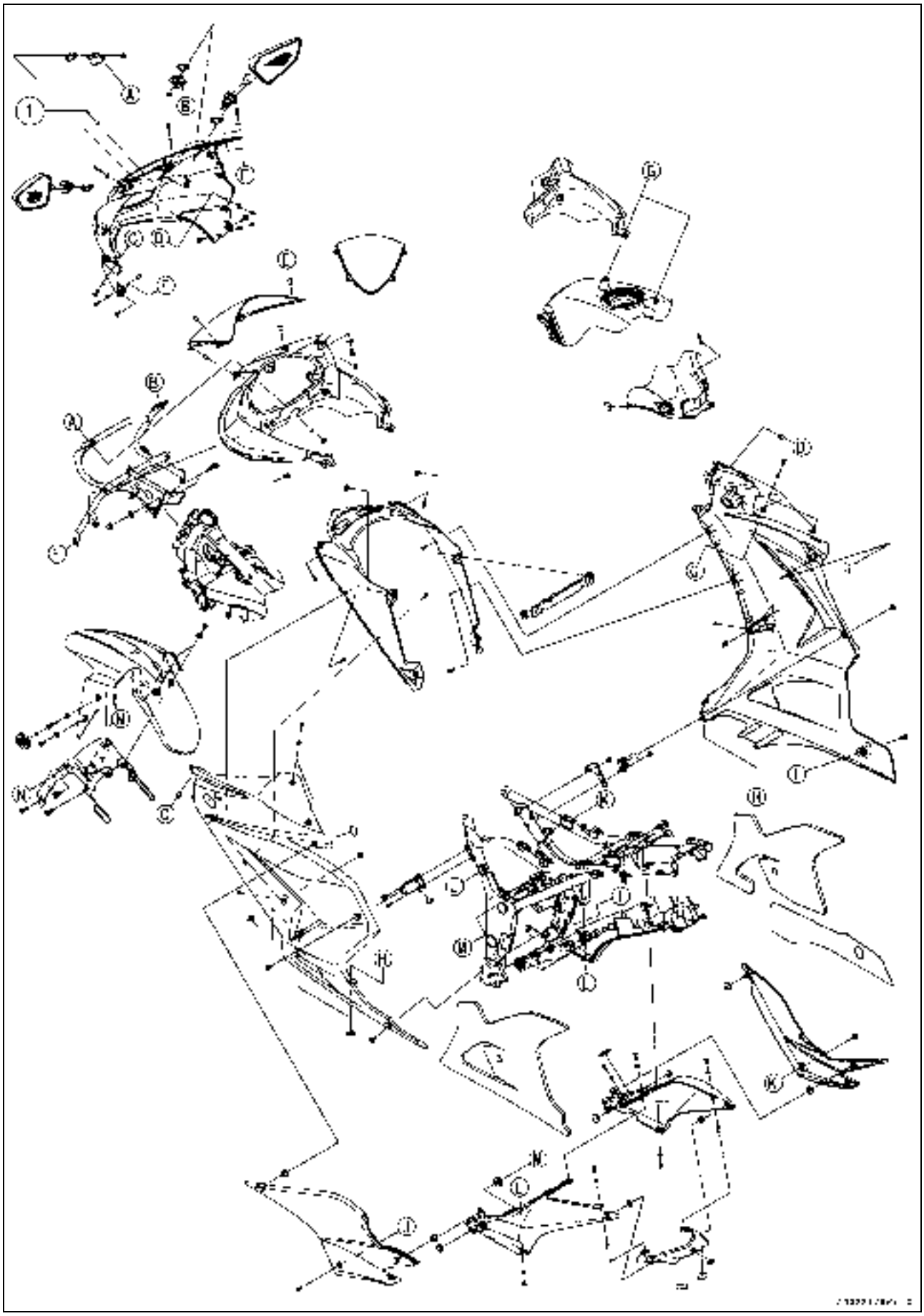


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Sidestand Nut	44	4.5	32	
2	Front Footpeg Bracket Mounting Bolts	25	2.5	18	
3	Rear Footpeg Bracket Mounting Bolts	25	2.5	18	
4	Sidestand Switch Bolt	8.8	0.90	78 in·lb	L

G: Apply grease.
L: Apply a non-permanent locking agent.

Exploded View



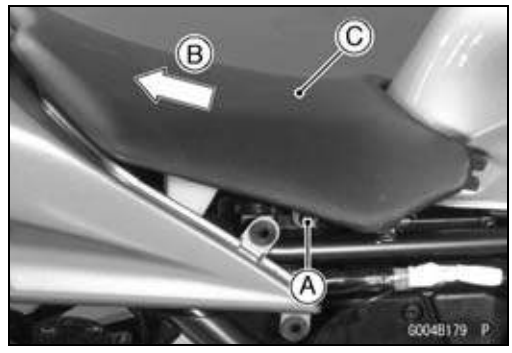
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Windshield Mounting Screws	0.42	0.043	3.7 in·lb	

Seat

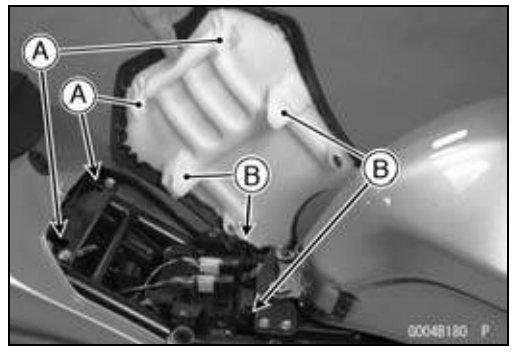
Front Seat Removal

- Remove the side covers (see Side Cover Removal).
- Remove the front seat bolts [A].
- Slide the front seat backwards [B] and remove the front seat [C].



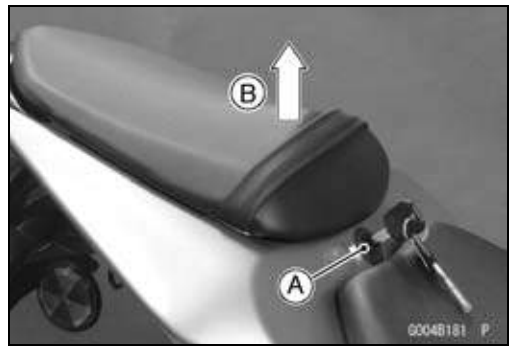
Front Seat Installation

- Slip [A] the hooks into the hollows and put [B] the projections on the frame.



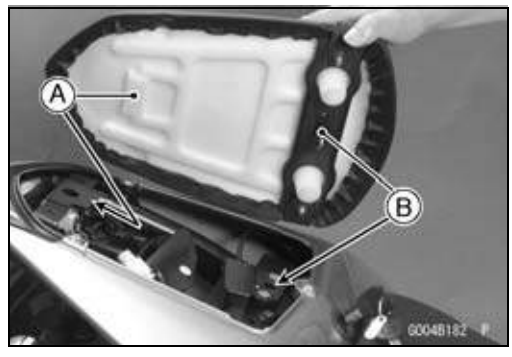
Rear Seat Removal

- Insert the ignition switch key into the seat lock [A].
- Turning the key clockwise, raise the front of the seat up [B], and pull the seat frontwards.



Rear Seat Installation

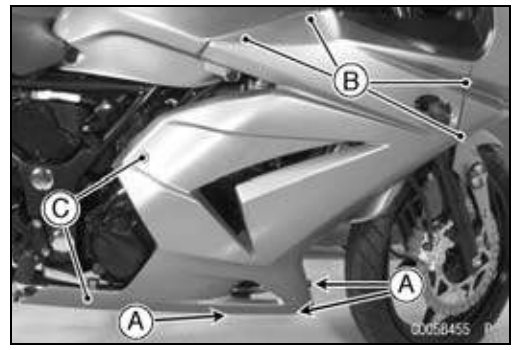
- Slip [A] the rear seat hook into the hollow cubic bracket on the frame.
- Push down the front part of the seat until the lock clicks, algining [B] the pin with the hole.

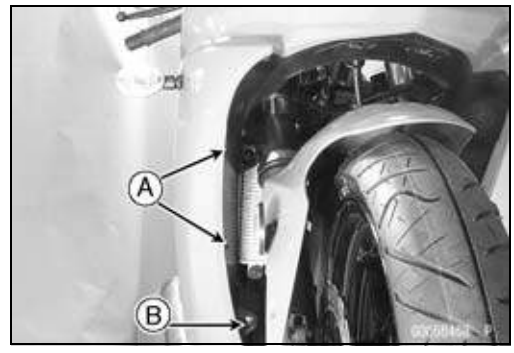


Fairings

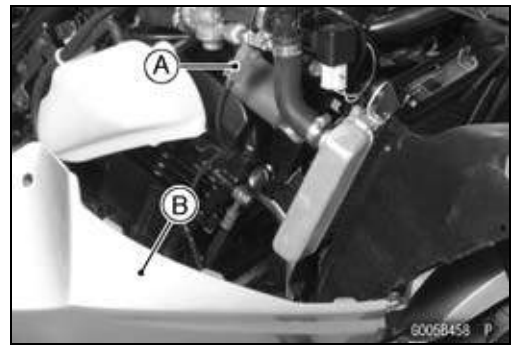
Lower Fairing Removal

- Remove the side covers (see Side Cover Removal).
- Remove the rivets [A].
- Remove the lower fairing mounting screws [B] and mounting Allen bolts [C].

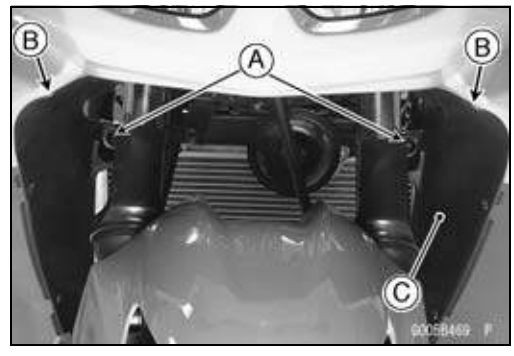




- Disconnect the front turn signal light connectors [A] and remove the lower fairings [B].

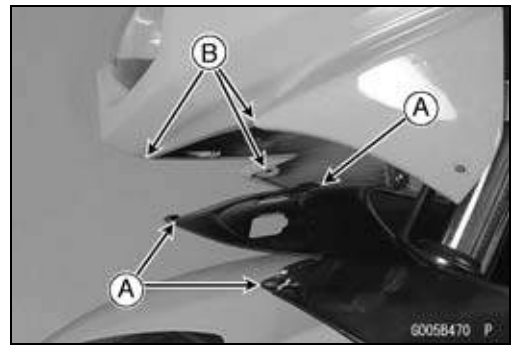


- Remove the radiator fairing screws [A] and the rivets [B], and remove the radiator fairing [C].



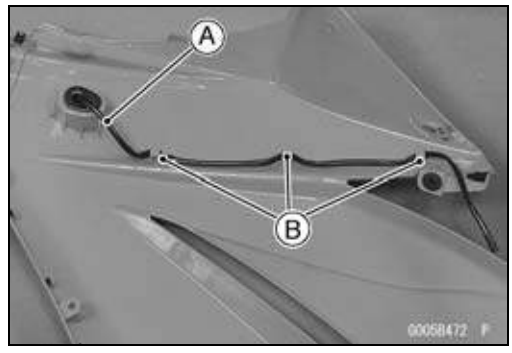
Lower Fairing Installation

- Fit the front portions [A] of radiator fairing into the lower portions [B] of upper fairing.

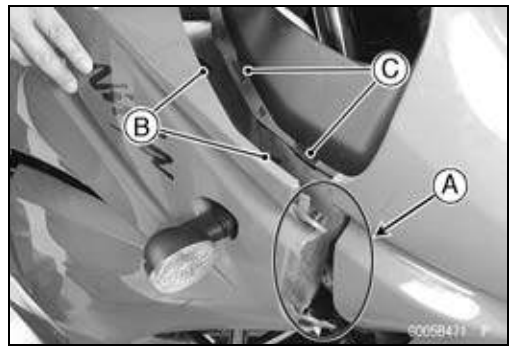


Fairings

● Route the front turn signal light lead [A] on the fooks [B].

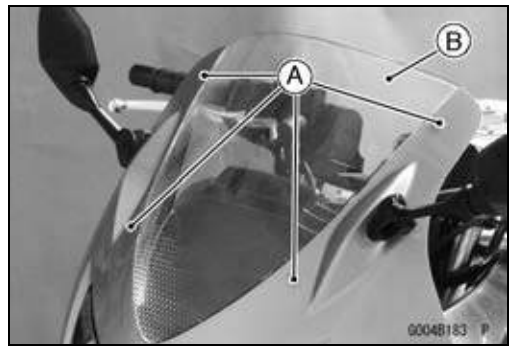


● Install the lower fairing.
○Fit the front portion of the lower fairing in the rear portion of the upper fairing.
○Install the tabs [B] on the lower fairing into the rescesses [C] on the upper cover.

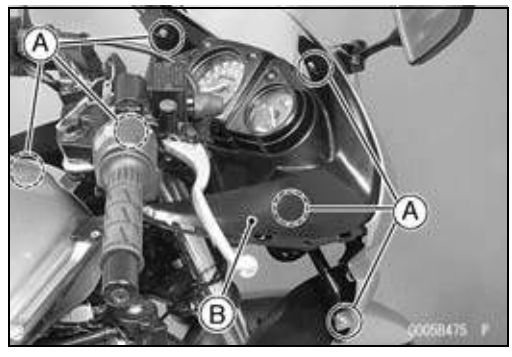


Upper Fairing Removal

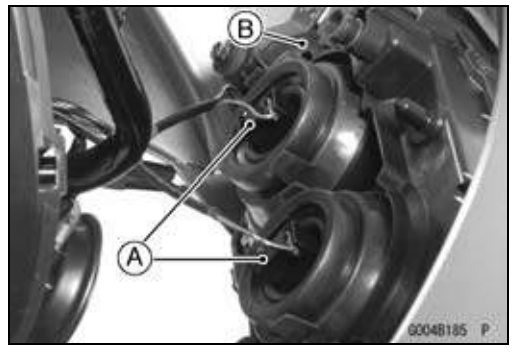
● Remove:
Lower Fairings (see Lower Fairing Removal)
Radiator Fairing (see Lower Fairing Removal)
● Remove the windshield mounting screws [A] and take out the windshield [B].



● Remove the upper fairing bolts [A] and pull the upper fairing [B] forwards.

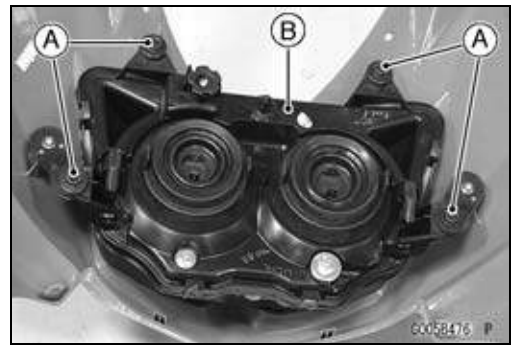


● Disconnect the headlight connectors [A] and remove the upper fairing [B].



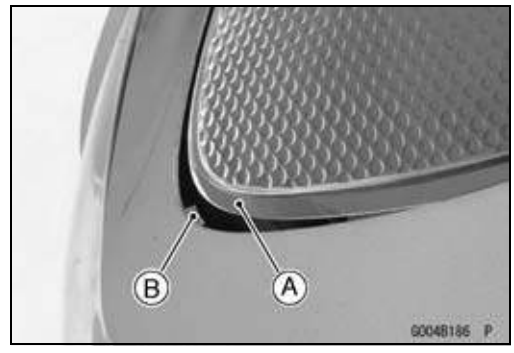
Fairings

- Remove:
  Bolts [A]
  Headlight Unit [B]



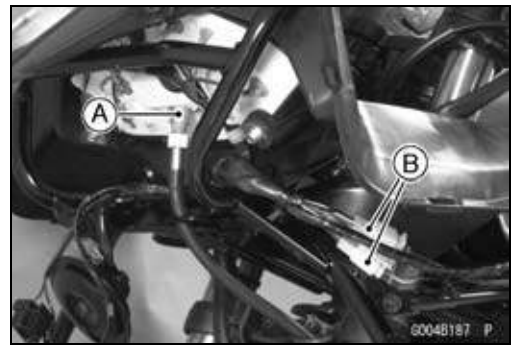
Upper Fairing Installation

- When installing the windshield, align the windshield bottom end [A] with the projection [B] on the upper fairing.

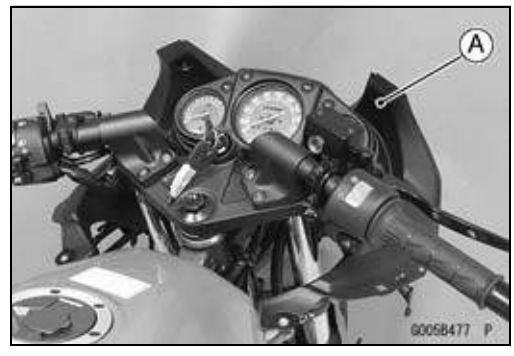


Upper Cover Removal

- Remove the upper fairing (see Upper Fairing Removal).
- Disconnect:
  Speedometer Cable Lower End [A]
  Meter Lead Connectors [B]



- Remove the upper cover [A].
- Remove the meter from the upper cover (see Meter Removal in the Electrical System chapter).

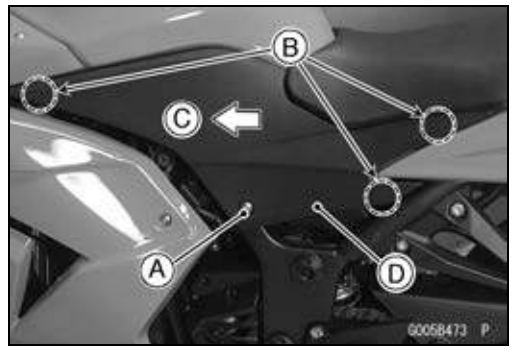


Upper Cover Installation

- Route the cable and leads correctly (see Cable, Wire and Harness Routing in the Appendix chapter).

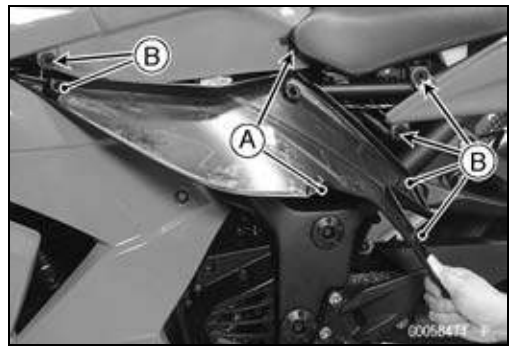
Side Cover

Side Cover Removal



- Remove the side cover bolt [A].
- Pull the side cover outwards to clear the stoppers [B].
- Slide the side cover forwards [C] and remove the side cover [D].

Side Cover Installation

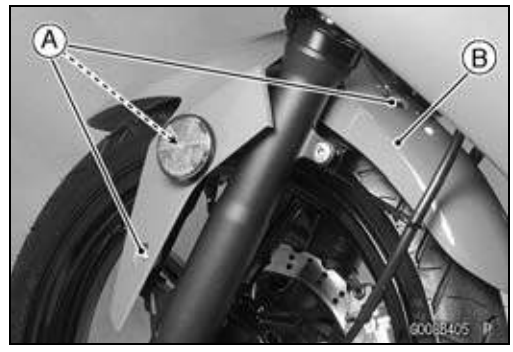


- Slip [A] the hook into the brace and put [B] the stoppers into the grommets.
- Tighten the side cover bolt securely.

Fenders

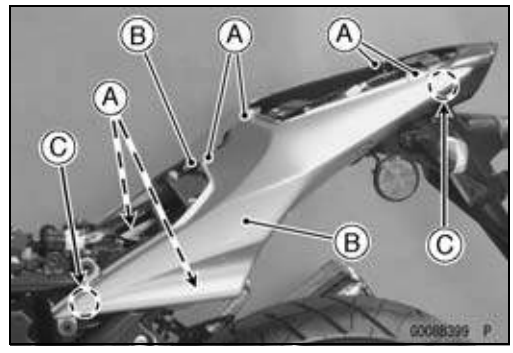
Front Fender Removal

- Remove the front fender mounting bolts [A] (both sides) and pull out the front fender [B] forward.

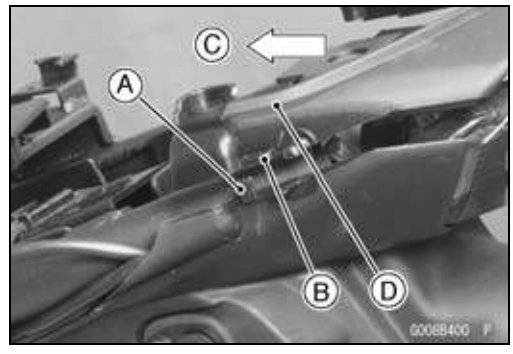


Rear Fender Removal

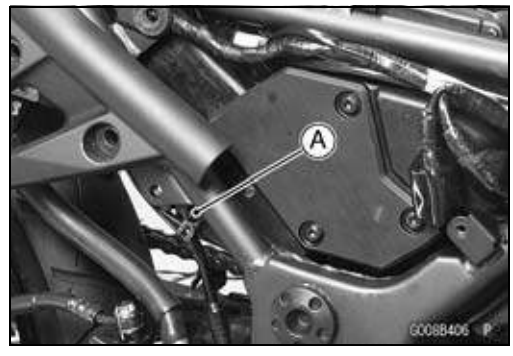
- Remove:
  Rear Seat (see Rear Seat Removal)
  Front Seat (see Front Seat Removal)
- Remove the seat cover screws [A] and pull the seat covers [B] to clear the stoppers [C].



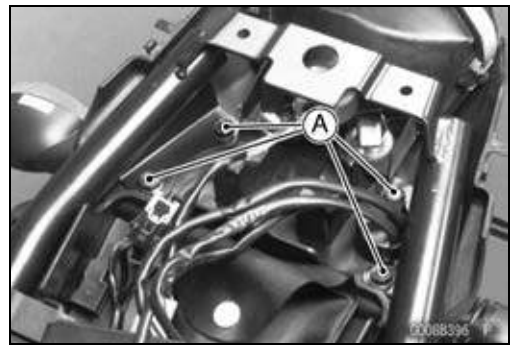
- Remove the projection [A] from the hole [B], and slide [C] the cover [D] frontwards.



- Remove:
  Rear Footpeg Bracket Bolts
  Rear Footpeg Bracket
- Remove the screws [A] (both sides).

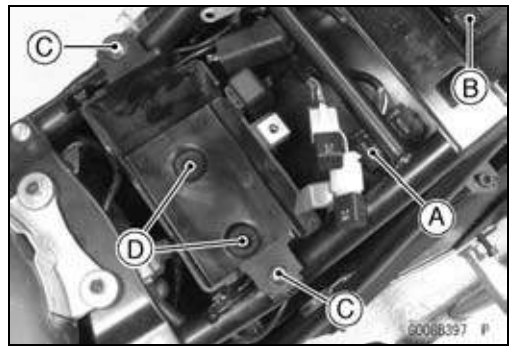


- Disconnect the electrical connectors from the main harness and remove the fender bolts (rear) [A].



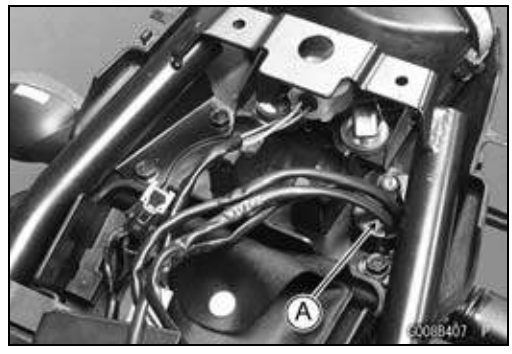
Fenders

- Remove the battery (see Battery Removal in the Electrical System chapter).
- Take out the fuse box [A] and IC igniter [B].
- Remove:
  Battery Case Screws [C]
  Rear Fender Bolts (Front) [D]
- Remove the rear fender.

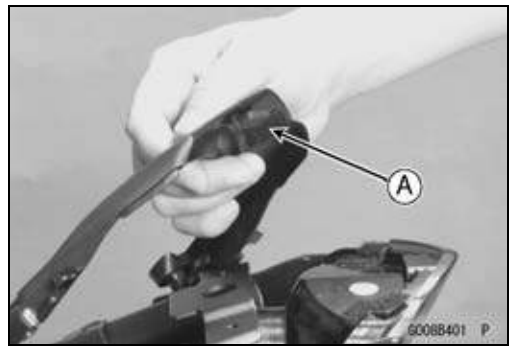


Rear Fender Installation

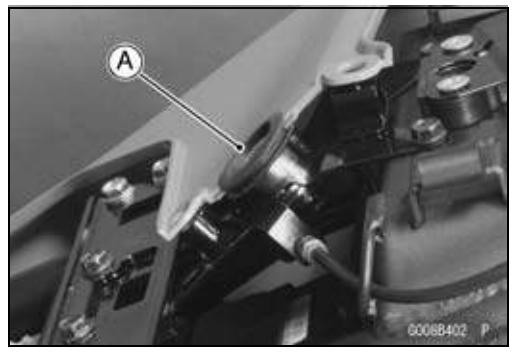
- Route the following therough the hole [A] on the rear fender.
  License Plate Light Leads
  Rear Right and Left Turn Signal Light Leads



- Install the damper to the cover so that its flatten side [A] faces downwards.



- Be sure that the damper [A] is in position.



Electrical System

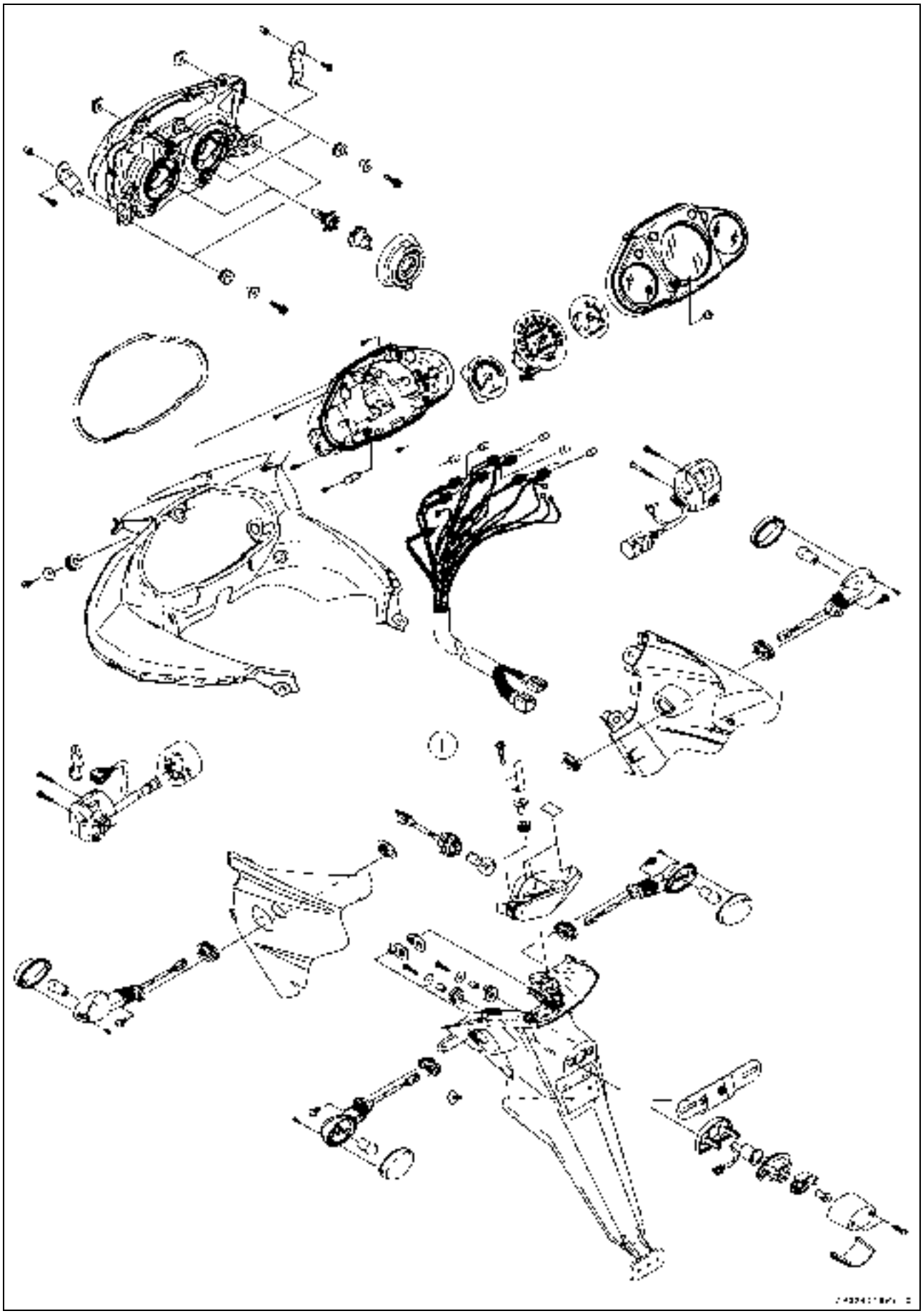
Table of Contents

Exploded View 16-4
Wiring Diagram (United States, Canada and Australia) 16-10
Wiring Diagram (Indonesia) 16-12
Specifications 16-14
Special Tools and Sealant 16-15
Parts Location 16-16
Precautions 16-17
Electrical Wiring 16-19
  Wiring Inspection 16-19
Battery 16-20
  Battery Removal 16-20
  Battery Installation 16-20
  Battery Activation 16-20
  Precautions 16-22
  Interchange 16-23
  Charging Condition Inspection 16-23
  Refreshing Charge 16-24
Charging System 16-25
  Alternator Cover Removal 16-25
  Alternator Cover Installation 16-25
  Stater Coil Removal 16-25
  Stator Coil Installation 16-26
  Alternator Rotor Removal 16-26
  Alternator Rotor Installation 16-26
  Alternator Inspection 16-27
  Regulator/Rectifier Inspection 16-28
  Charging Voltage Inspection 16-30
Ignition System 16-32
  Crankshaft Sensor Removal 16-33
  Crankshaft Sensor Installation 16-33
  Crankshaft Sensor Inspection 16-34
  Crankshaft Sensor Peak Voltage Inspection 16-34
  Ignition Coil Removal 16-34
  Ignition Coil Installation 16-35
  Ignition Coil Inspection 16-35
  Ignition Coil Primary Peak Voltage 16-36
  Spark Plug Removal 16-37
  Spark Plug Installation 16-37
  Spark Plug Condition Inspection 16-37
  IC Igniter Inspection 16-38
  IC Igniter Operation Inspection 16-38
  Diodes Inspection 16-38
Electric Starter System 16-41
  Starter Motor Removal 16-41
  Starter Motor Installation 16-41
  Starter Motor Disassembly 16-42
  Starter Motor Assembly 16-42
  Carbon Brush Inspection 16-43
  Commutator Inspection, Cleaning 16-43
  Armature Inspection 16-44

Starter System 16-45
Brush Lead Inspection 16-45
Terminal Bolt Inspection 16-45
Starter Relay Inspection 16-45
Starter Circuit Relay Inspection 16-46
Lighting System 16-48
Headlight Beam Horizontal Adjustment 16-48
Headlight Beam Vertical Adjustment 16-48
Headlight Bulb Replacement 16-48
Tail/Brake Light Bulb Replacement 16-49
Front Turn Signal Light Bulb Replacement 16-49
Rear Turn Signal Light Bulb Replacement 16-50
Turn Signal Relay Inspection 16-51
Headlight Circuit Relay Inspection 16-51
Radiator Fan System 16-55
Fan System Circuit Inspection 16-55
Fan Motor Inspection 16-55
Meters, Gauge and Indicator Unit 16-56
Meter Unit Removal 16-56
Meter Unit Disassembly 16-56
Meter Unit Installation 16-56
Indicator Light Replacement 16-57
Tachometer Inspection 16-57
Water Temperature Warning System Inspection 16-58
Switches and Sensor 16-59
Brake Light Timing Inspection 16-59
Brake Light Timing Adjustment 16-59
Switch Inspection 16-59
Radiator Fan Switch Inspection 16-61
Water Temperature Switch Inspection 16-61
Fuel Level Sensor Inspection 16-62
Fuses 16-63
30 A Main Fuse Removal 16-63
Fuse Removal 16-63
Fuse Installation 16-63
Fuse Inspection 16-63

Dummy Page

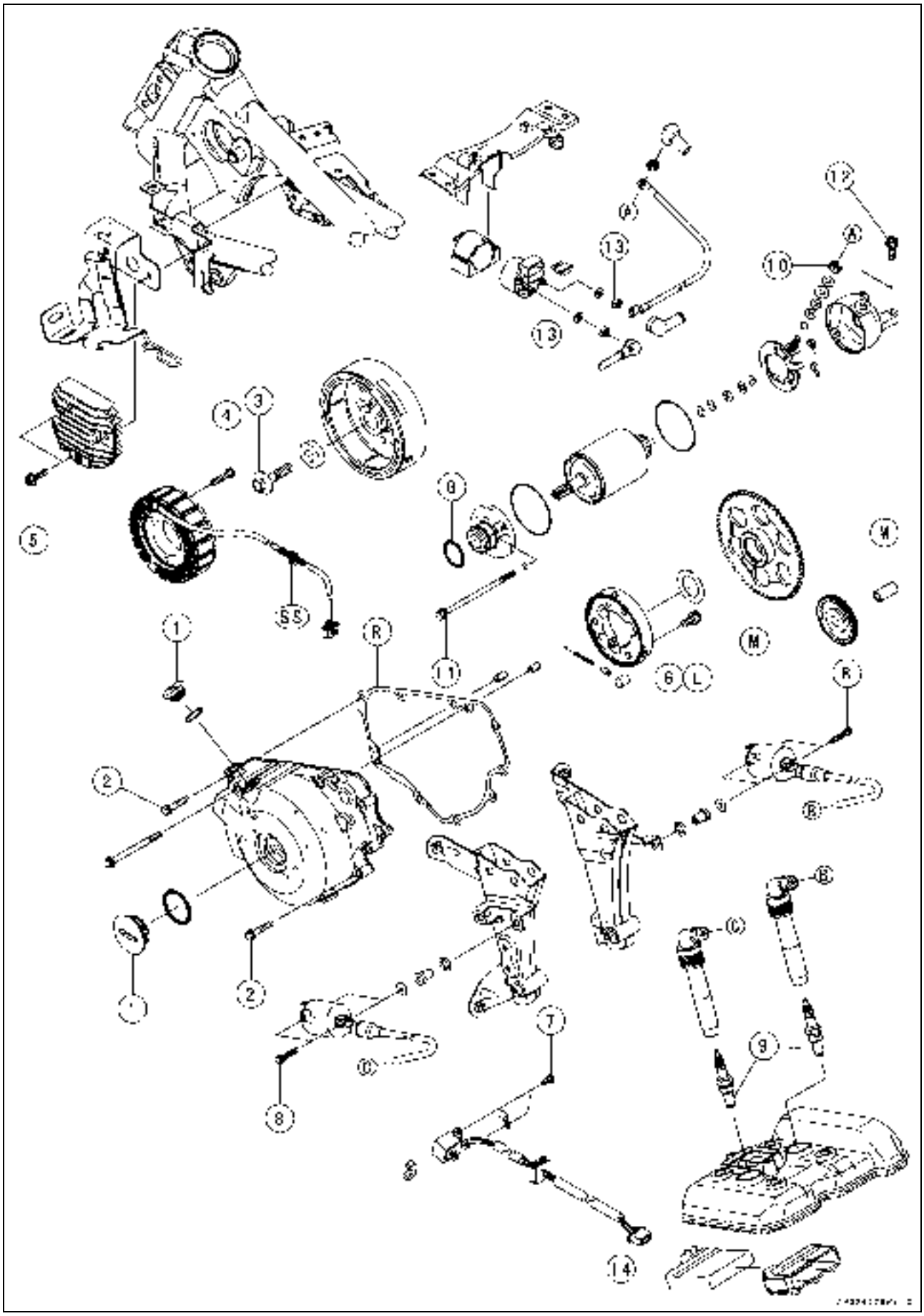
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Tail/Brake Light Mounting Bolts	5.9	0.6	52 in·lb	

Exploded View

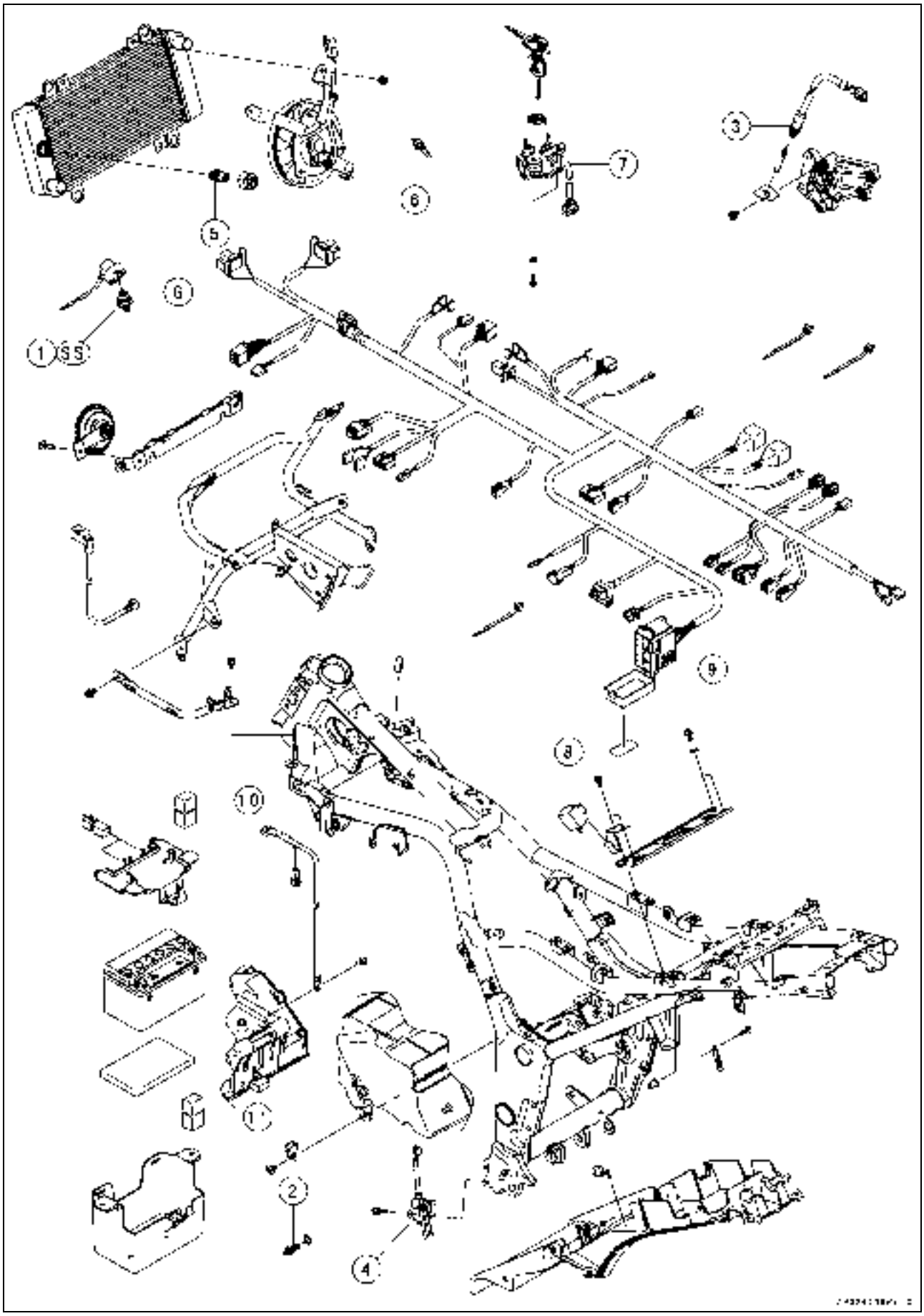


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Plugs on Alternator Cover	–	–	–	Hand-Tighten
2	Alternator Cover Bolts	9.8	1.0	87 in·lb	
3	Alternator Rotor Bolt	68.6	7.0	51	
4	Alternator Stator Bolts	12	1.2	104 in·lb	
5	Regulator/Rectifier Bolts	9.8	1.0	87 in·lb	
6	Starter Motor Clutch Bolts	34.3	3.5	25	L
7	Crankshaft Sensor Screws	3.0	0.30	27 in·lb	
8	Ignition Coil Bolts	–	–	–	see text
9	Spark Plugs	13	1.3	115 in·lb	
10	Starter Motor Terminal Locknut	9.8	1.0	87 in·lb	
11	Starter Motor Assembly Bolts	3.5	0.36	31 in·lb	
12	Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	
13	Starter Relay Terminal Nut	5.0	0.5	44 in·lb	

14. IC Igniter
G: Apply grease.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
SS: Apply silicone grease.

Exploded View



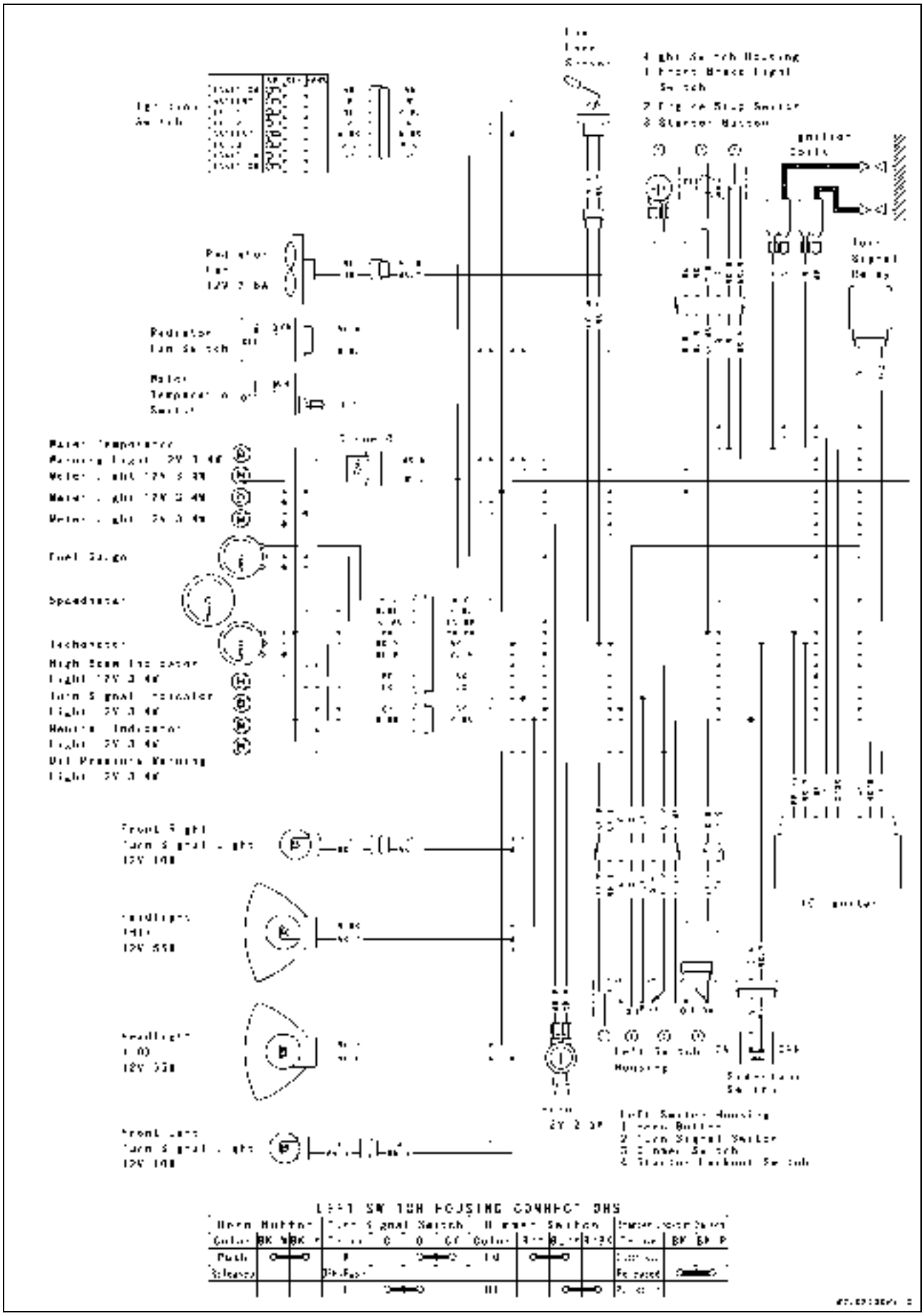
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Oil Pressure Switch	15	1.5	11	SS
2	Neutral Switch	15	1.5	11	

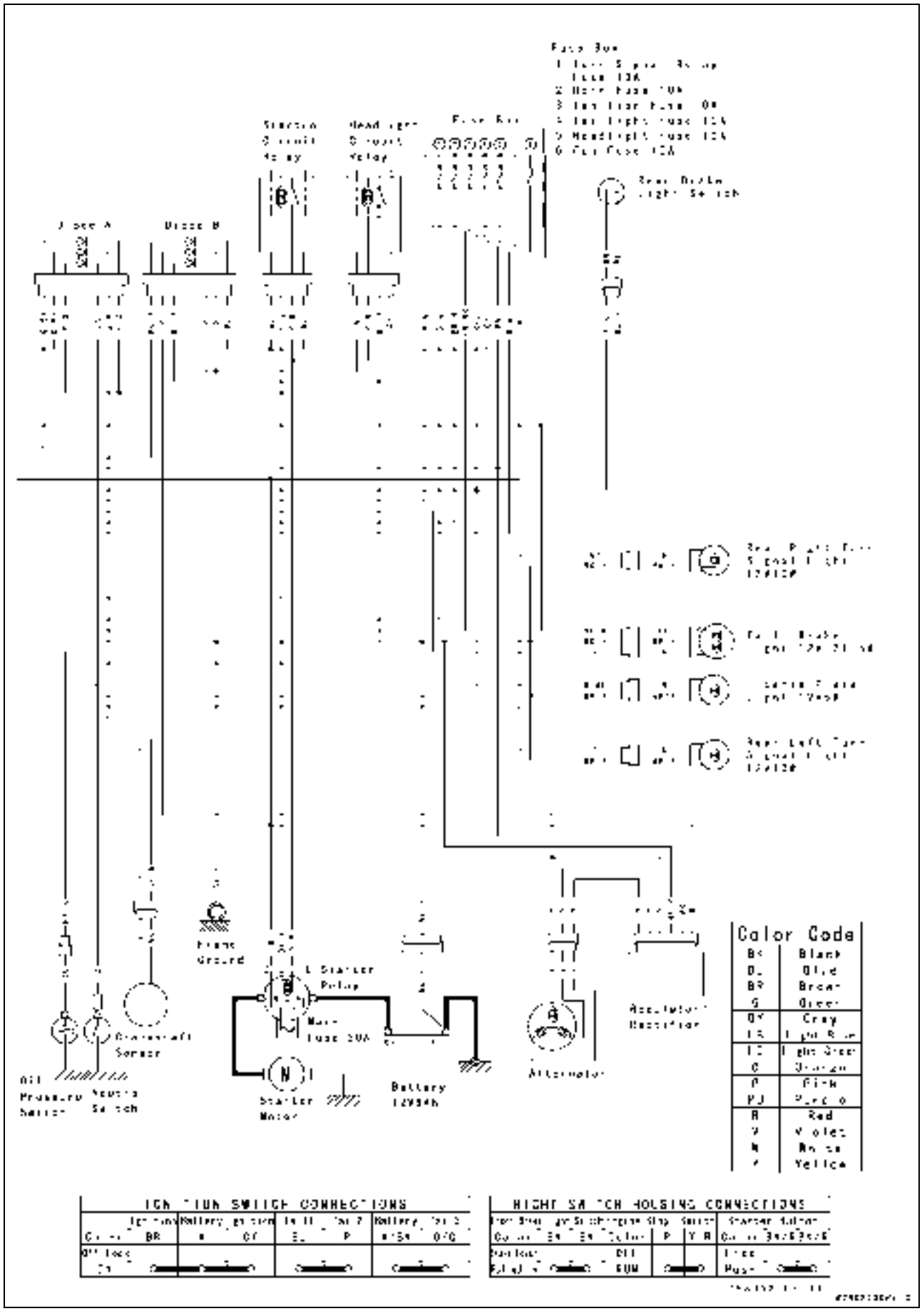
3. Rear Brake Light Switch
4. Side Stand Switch
5. Radiator Fan Switch
6. Water Temperature Switch
7. Ignition Switch
8. Turn Signal Relay
9. Fuse Box
10. Headlight Circuit Relay
11. Starter Circuit Relay

G: Apply grease.
L: Apply a non-permanent locking agent.
SS: Apply silicone grease.

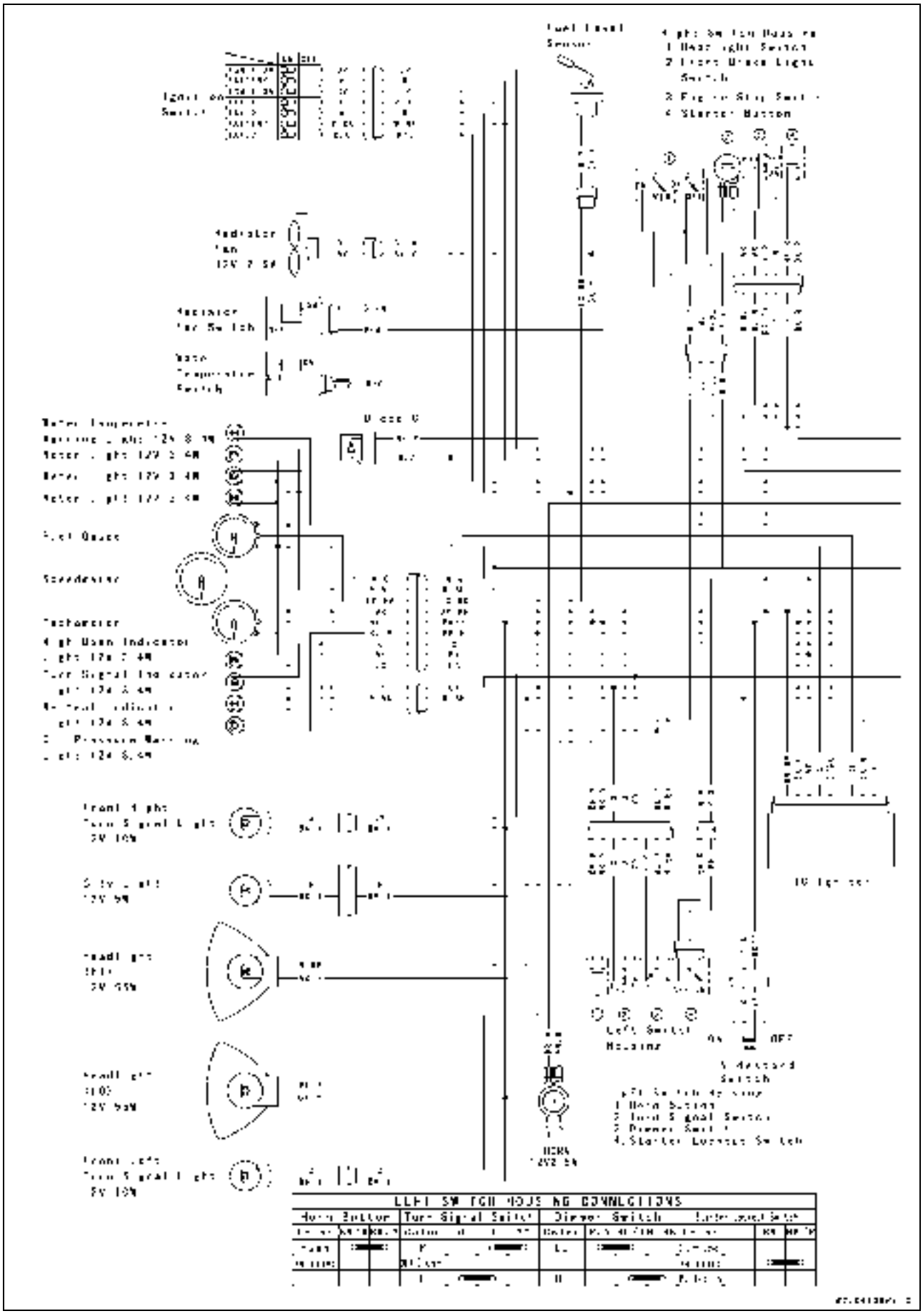
Wiring Diagram (United States, Canada and Australia)



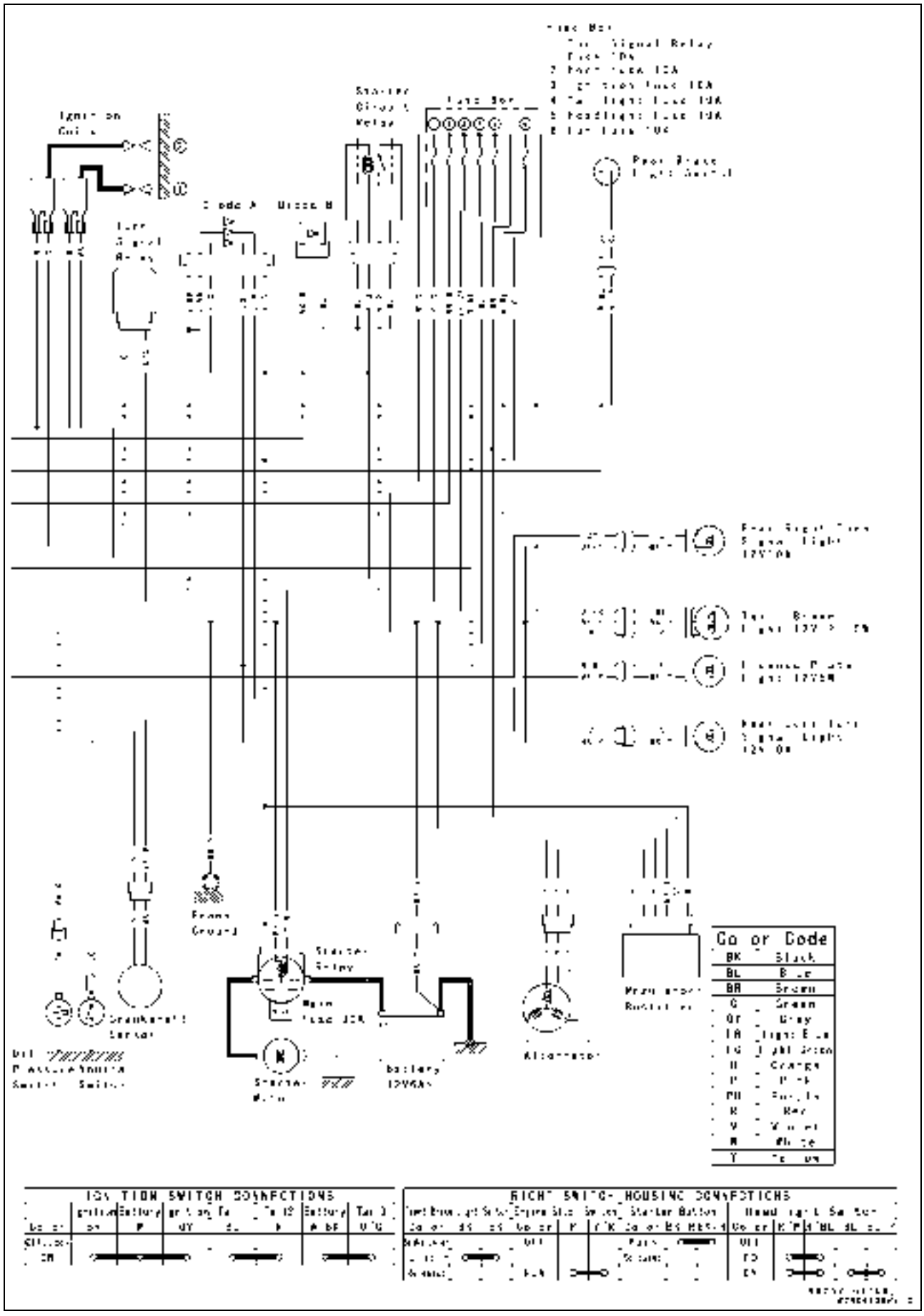
Wiring Diagram (United States, Canada and Australia)



Wiring Diagram (Indonesia)



Wiring Diagram (Indonesia)

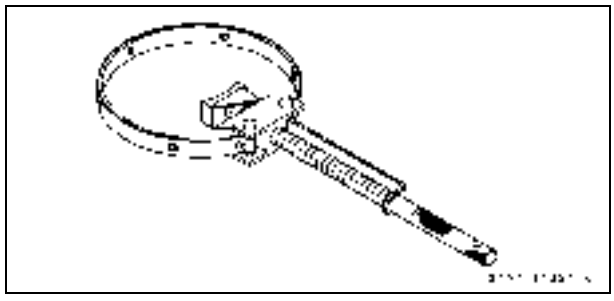


Specifications

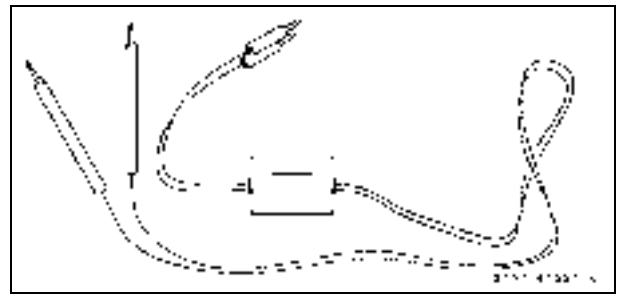
Item	Standard	Service Limit
Battery		
Type	Sealed battery	– – –
Model Name	YTX7A-BS	– – –
Capacity	12 V 6 Ah	– – –
Voltage	12.8 V or more	– – –
Charging System		
Alternator Output Voltage	40 V or more @4 000 r/min (rpm)	– – –
Alternator Stator Coil Resistance	0.05 ~ 0.6 Ω	– – –
Ignition System		
Crankshaft Sensor Air Gap	0.7 mm (0.028 in.)	– – –
Crankshaft Sensor Resistance	100 ~ 150 Ω	– – –
Ignition Coil:		
3 Needle Arcing Distance	7 mm (0.28 in.) or more	– – –
Primary Winding Resistance	2.1 ~ 2.5 Ω	– – –
Secondary Winding Resistance	10 ~ 16 kΩ	– – –
Spark Plug Gap	0.7 ~ 0.8 mm (0.028 ~ 0.032 in.)	
Electrical Stater System		
Starter Motor:		
Carbon Brush Length	10 mm (0.39 in.)	5 mm (0.20 in.)
Commutator Diameter	28 mm (1.10 in.)	27 mm (1.06 in.)
Switches and Sensors		
Rear Brake Light Switch	ON after about 10 mm (0.39 in.) pedal travel	– – –
Radiator Fan Switch connections:		
Rising Temperature	From OFF to ON @95 ~ 101°C (196 ~ 203°F)	– – –
Falling Temperature	From ON to OFF within 3 ~ 8°C (37 ~ 46°F) of “ON” temperature	– – –
	ON: less than 0.5 Ω	
	OFF: More than 1 MΩ	
Water Temperature Switch Connections:		
Rising Temperature	From OFF to ON @112 ~ 118°C (226 ~ 232°F)	– – –
Falling Temperature	From ON to OFF @108°C (226°F) ~ temperature less than ON	– – –
	ON: Less than 0.5 Ω	
	OFF: More than 1 MΩ	

Special Tools and Sealant

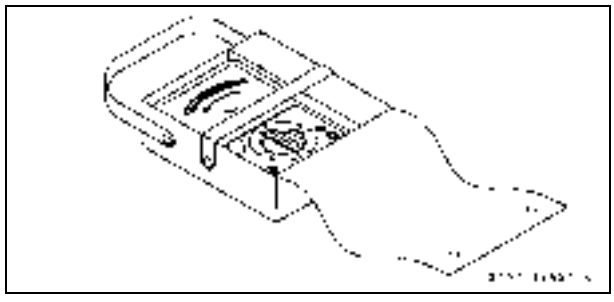
Flywheel Holder:
57001-1313



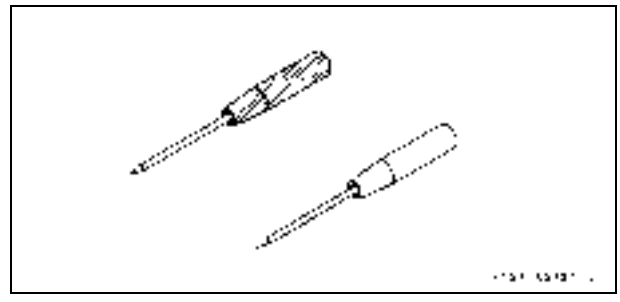
Peak Voltage Adapter:
57001-1415



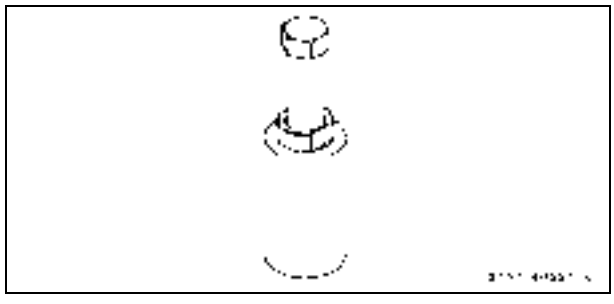
Hand Tester:
57001-1394



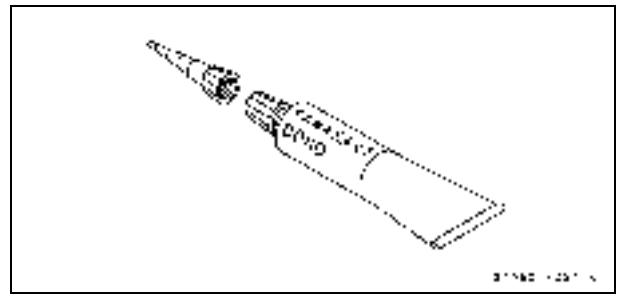
Needle Adapter Set:
57001-1457



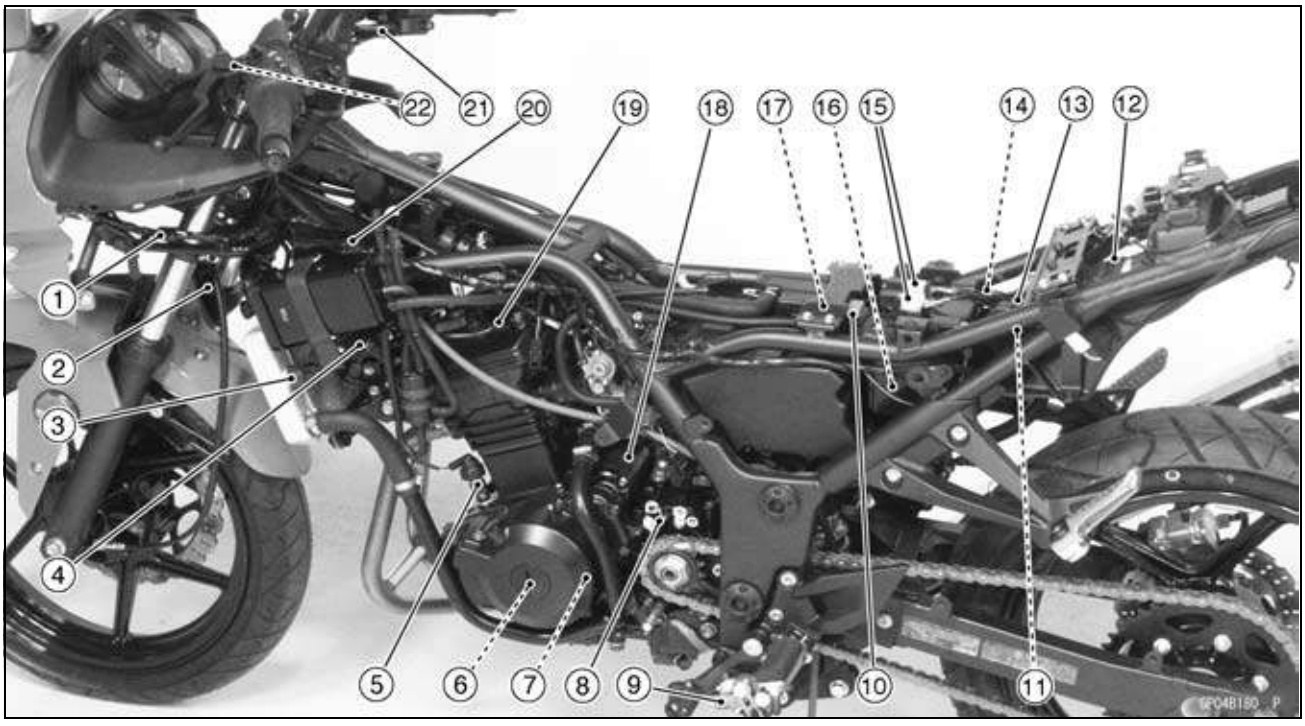
Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5:
57001-1405

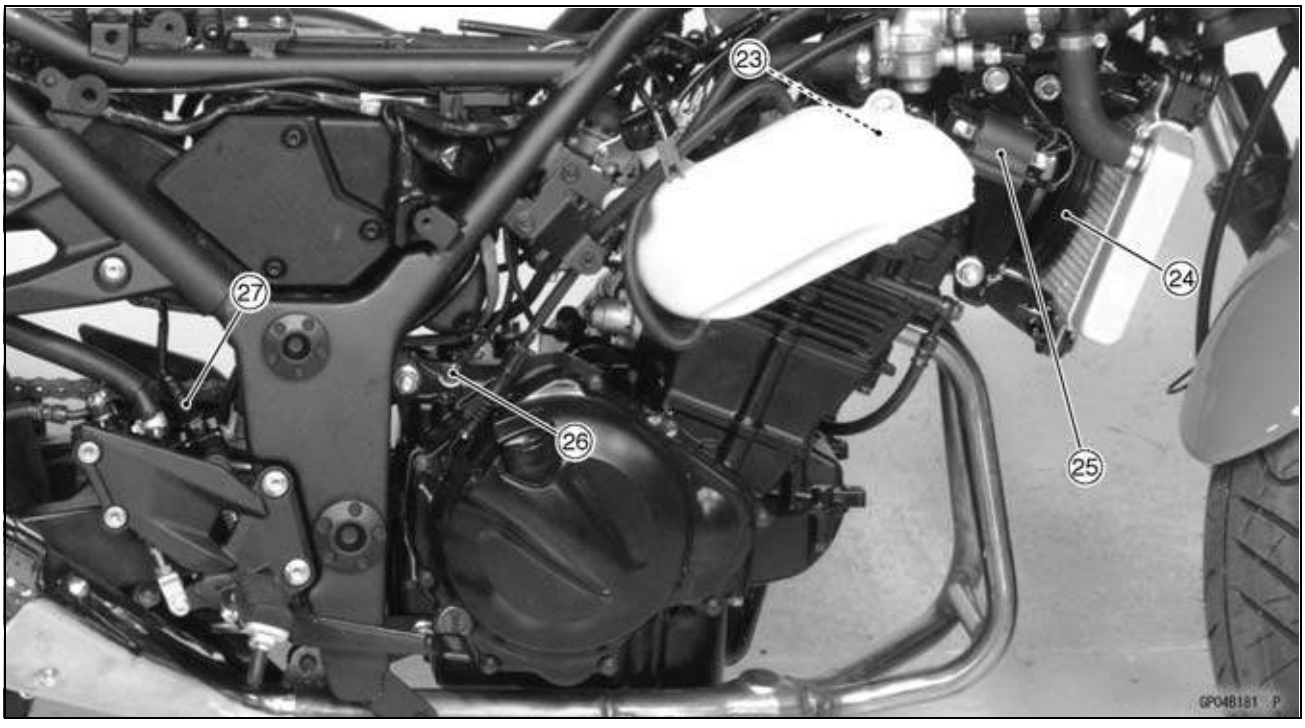


Kawasaki Bond (Silicone Sealant):
56019-120



Parts Location





1. Diode
2. Horn
3. Radiator Fan Switch
4. #1 Ignition Coil
5. Oil Pressure Switch
6. Alternator
7. Crankshaft Sensor
8. Neutral Switch
9. Sidestand Switch
10. Main Fuse (30 A)
11. Fuse Box
12. IC Igniter
13. Starter Circuit Relay
14. Headlight Circuit Relay
15. Diodes
16. Battery
17. Starter Relay
18. Starter Motor
19. #1 Spark Plug
20. Regulator/rectifier
21. Front Brake Light Switch
22. Starter Lockout Switch
23. #2 Spark Plug
24. Radiator Fan
25. #1 Ignition Coil
26. Engine Ground Terminal
27. Rear Brake Light Switch

Precautions

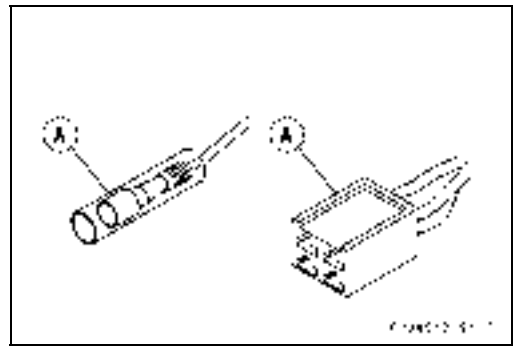
There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

- Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the large amount of current, never keep the starter 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 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 leads for signs of burning, fraying, etc. Poor leads 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

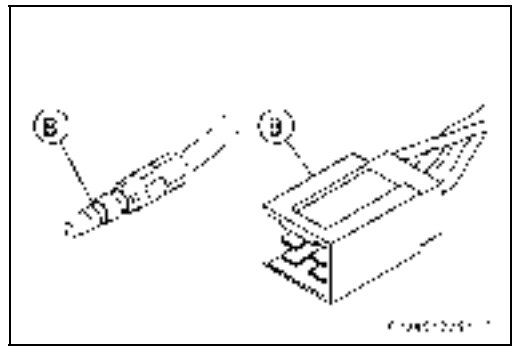
- Electrical Connectors

Connectors [A]



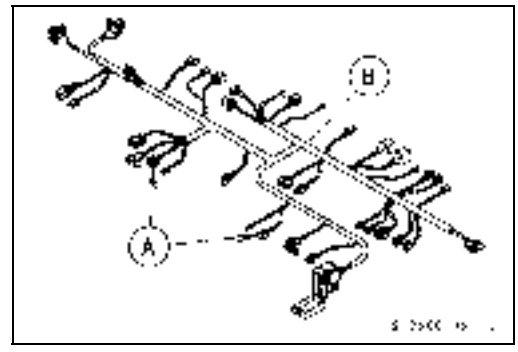
Precautions

Connectors [B]



Electrical Wiring

Wiring Inspection



- ● Visually inspect the wiring for signs of burning, fraying, etc.
- ★If any wiring is in 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.

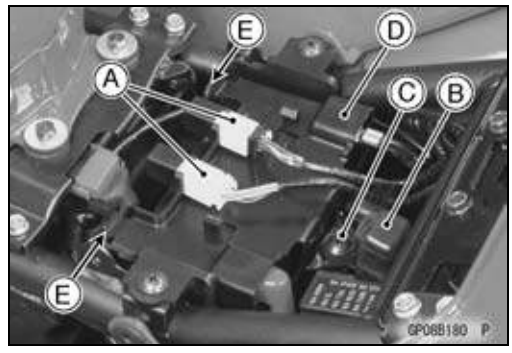
Special Tool - Hand Tester: 57001-1394

- ○Set the tester to the × 1 Ω range, and read the meter.
- ★If the tester does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness [B] if necessary.

Battery

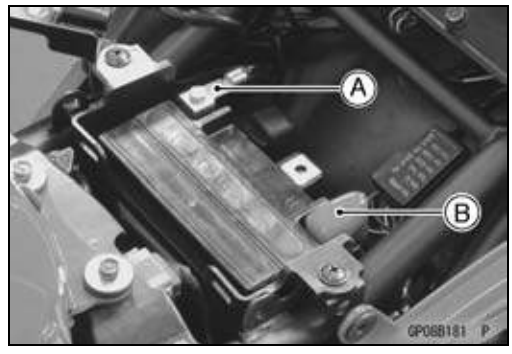
Battery Removal

- Pull the diodes [A] and headlight circuit relay [B] out of the cover.
- Unscrew the screw [C] and remove the cover [D], clearing the projections [E].

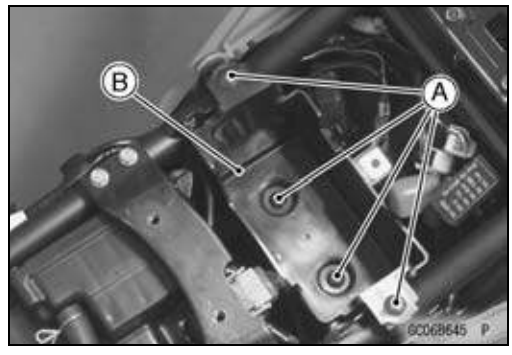


- Disconnect the negative (–) cable [A] and then the positive (+) cable [B].

CAUTION
Be sure to the disconnect the negative (–) cable first.

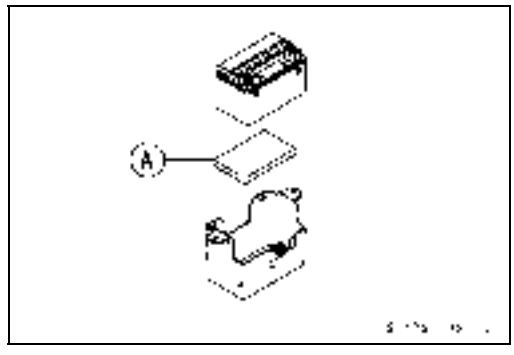


- Remove the battery.
- To remove the battery case [B], remove the screws [A].



Battery Installation

- Be sure the battery damper [A] is in position.
- Connect the positive (+) cable first, then the negative (–) cable to the battery.



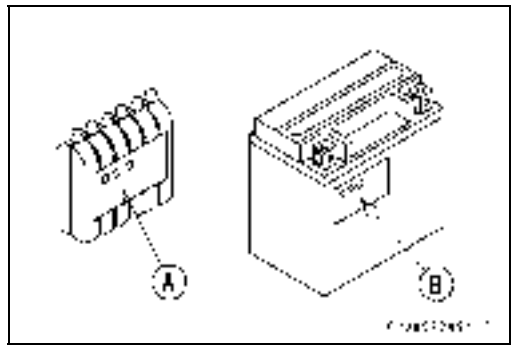
Battery Activation

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 EX250J8F: YTX7A-BS

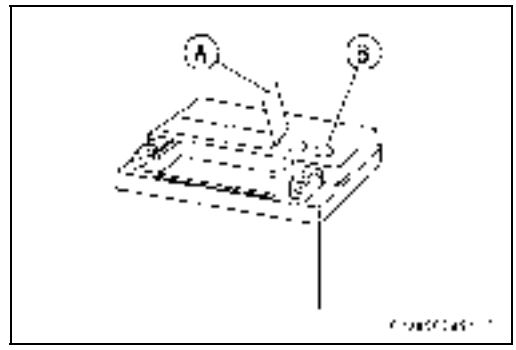
CAUTION
Be sure to use the electrolyte container with the same model name as the battery since the electrolyte volume and specific gravity vary with the battery type. This is to prevent overfilling of the electrolyte, shorting the battery life, and deterioration of the battery performance.



Battery

CAUTION

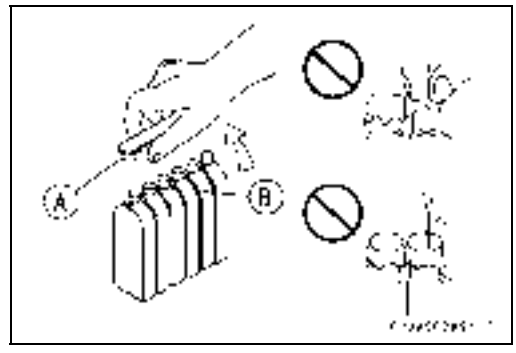
Do not remove the aluminum sealing sheet [A] from the filler ports [B] until just prior to use. Be sure to use the dedicated electrolyte container for correct electrolyte volume.



- Place the battery on a level surface.
- Check to see that the sealing sheet has no peeling, tears, or holes in it.
- Remove the sealing sheet.

NOTE

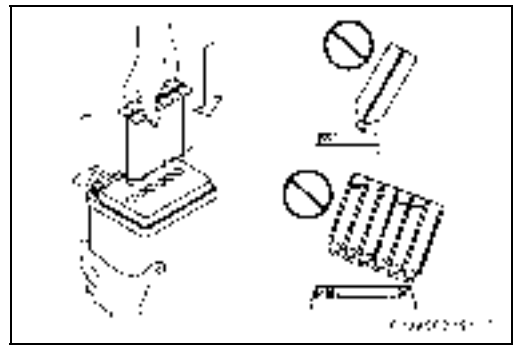
○*The battery is vacuum sealed. If the sealing sheet has leaked air into the battery, it may require a longer initial charge.*



- Remove the electrolyte container from the vinyl bag.
- Detach the strip of caps [A] from the container and set aside, these will be used later to seal the battery.

NOTE

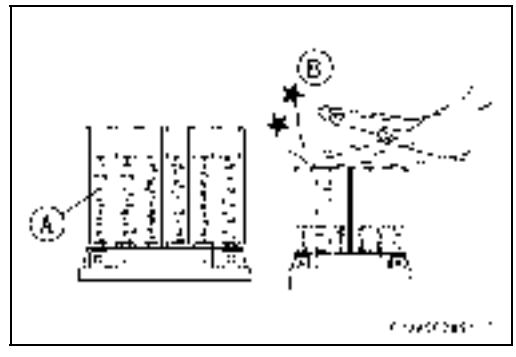
○*Do not pierce or otherwise open the sealed cells [B] of the electrolyte container. Do not attempt to separate individual cells.*



- Place the electrolyte container upside down with the six sealed cells into the filler ports of the battery. Hold the container level, push down to break the seals of all six cells. You will see air bubbles rising into each cell as the ports fill.

NOTE

○*Do not tilt the electrolyte container*



- Check the electrolyte flow.
- ★If no air bubbles [A] are coming up from the filler ports, or if the container cells have not emptied completely, tap the container [B] a few times.
- Keep the container in place for **20** minutes or more. Don't remove the container from the battery until it's empty, the battery requires all the electrolyte from the container for proper operation.

CAUTION

Removal of the container before it is completely empty can shorten the service life of the battery. Do not remove the electrolyte container until it is completely empty and 20 minutes have elapsed.

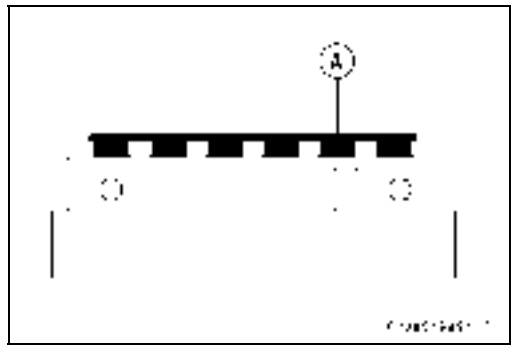
Battery

● Gently remove the container from the battery.
● Let the battery sit for **30** minutes prior to charging to allow the electrolyte to permeate into the plates for optimum performance.

NOTE

○*Charging the battery immediately after filling can shorten service life. Let the battery sit for at least **60** minutes after filling.*

Initial Charge



● Place the strip [A] of caps loosely over the filler ports.
● Newly activated sealed batteries require an initial charge.

Standard Charge: 0.7 A × 5 ~ 10 hours

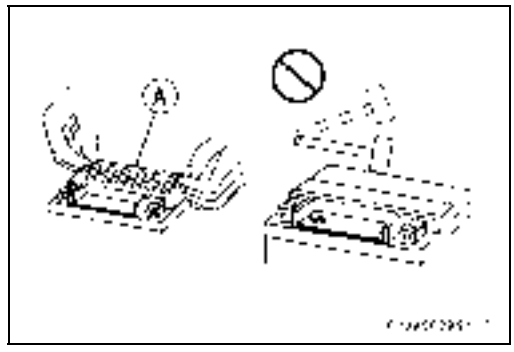
★If using a recommended battery charger, follow the charger's instructions for newly activated sealed battery.

Kawasaki-recommended chargers
Optimate III
Yuasa 1.5 Amp Automatic Charger
Battery Mate 150-9

★If the above chargers are not available, use equivalent one.

NOTE

○*Charging rates will vary depending on how long the battery has been stored, temperature, and the type of charger used. Let battery sit 30 minutes after initial charge, then check voltage using a voltmeter. If it is not at least 12.8 volts, repeat charging cycle.*



● After charging is completed, press down firmly with both hands to seat the strip of caps [A] into the battery (don't pound or hammer). When properly installed, the strip of the caps will be level with the top of the battery.

CAUTION

Once the strip of the caps [A] is installed onto the battery, never remove the caps, nor add water or electrolyte to the battery.

NOTE

○*To ensure maximum battery life and customer satisfaction, it is recommended the battery be load tested at three times its amp-hour rating for 15 seconds.*
Re-check voltage and if less than 12.8 volts repeat the charging cycle and load test. If still below 12.8 volts the battery is defective.

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 seal cap to add water is very dangerous. Never do that.

2) Refreshing charge

Battery

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 this 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 cap during refresh charge.
If by chance an excessive amount of gas is generated due to overcharging, the relief valve releases the gas to keep the battery normal.

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 cable 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 medial attention if severe.

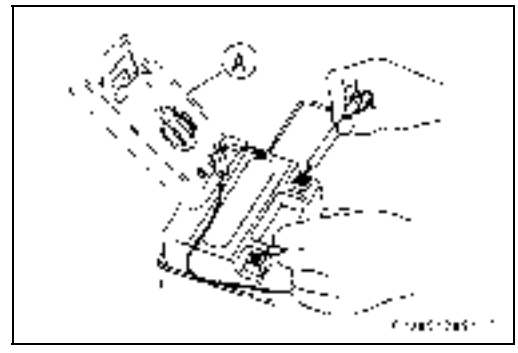
Interchange

A sealed battery can fully display its performance only when combined with a proper vehicle electric system. Therefore, replace a sealed battery only on a motorcycle which was originally equipped with a sealed battery.

Be careful, if a sealed battery is installed on a motorcycle which had an ordinary battery as original equipment, the sealed battery's life will be shortened.

Charging Condition Inspection

○Battery charging condition can be checked by measuring battery terminal voltage with a digital voltmeter [A].



● Remove:
Front Seat (see Front Seat Removal in the Frame chapter)
Battery Cover
● Disconnect the battery terminals.

CAUTION

Be sure to disconnect the negative (–) cable first.

● Measure the battery terminal voltage.

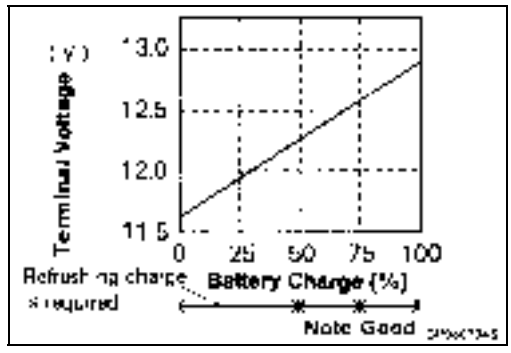
NOTE

○*Measure with a digital voltmeter which can be read one decimal place voltage.*

Battery

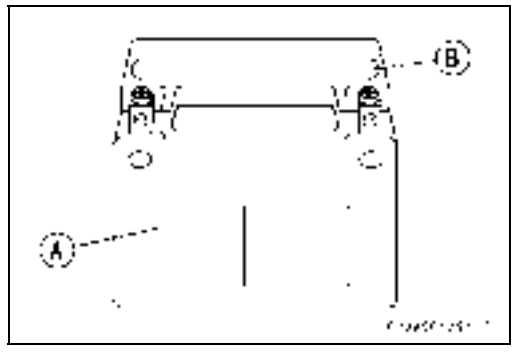
★If the reading is 12.8 V or more, no refresh charge is required, however, if the read is below the specified, refresh charge is required.

Battery Terminal Voltage
Standard: 12.8 V or more



Refreshing Charge

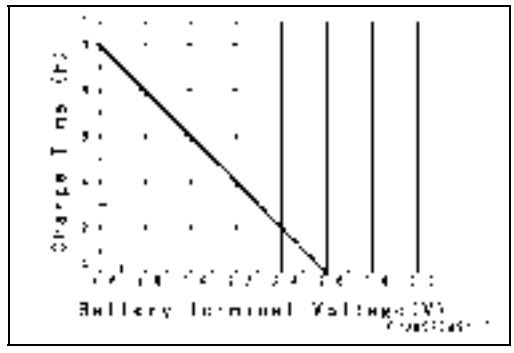
- Remove the battery [A] (see Battery Removal).
- Do refresh charge by following method according to the battery terminal voltage.



⚠ WARNING

This battery is a sealed type. Never remove sealing cap [B] even at charging. Never add water. Charge with current and time as stated below.

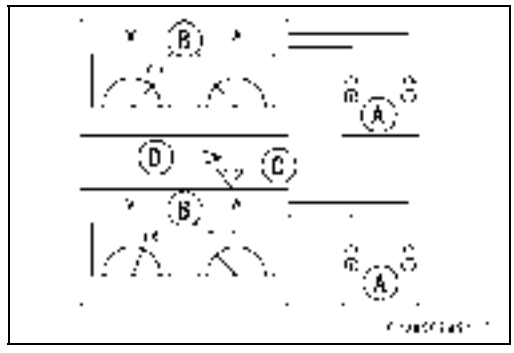
Terminal Voltage: 11.5 ~ less than 12.8 V
Standard Charge: 0.7 A × 5 ~ 10 h (see following chart)
Quick Charge: 4 A × 1 h



CAUTION

If possible, do not quick charge. If quick charge is done unavoidably, do standard charge later on.

Terminal Voltage: less than 11.5 V
Charging Method: 0.7 A × 20 h



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. 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]
Current starts to flow [D]

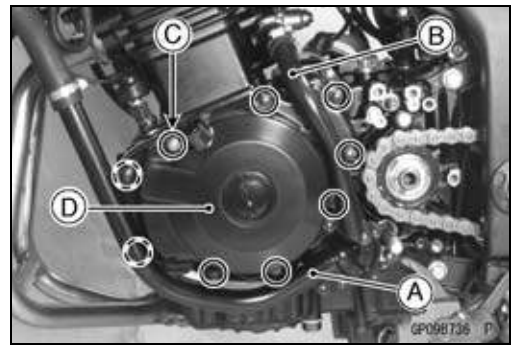
- Determine the battery condition after refresh charge.

○Determine the condition of the battery left for 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.8 V or higher	Good
12.0 ~ lower than 12.8 V	Charge insufficient → Recharge
lower than 12.0 V	Unserviceable → Replace

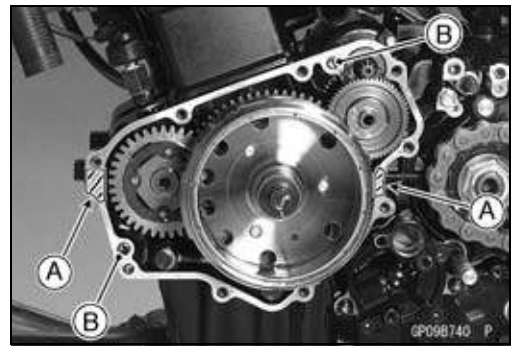
Charging System

Alternator Cover Removal



- Drain:
  Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
  Coolant (see Coolant Change in the Periodic Maintenance chapter)
- Remove:
  Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)
  Shift Lever Link
  Engine Sprocket Cover
  Coolant Pipes [A], [B]
- Remove:
  Alternator Cover Bolts [C]
  Alternator Cover [D]

Alternator Cover Installation



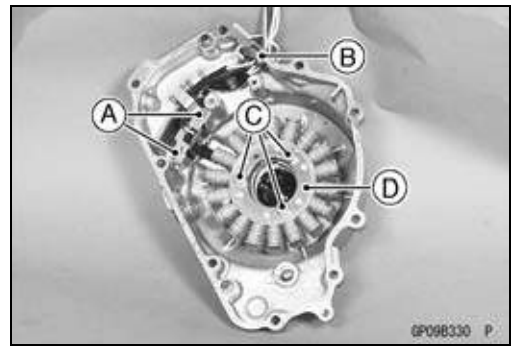
- Apply silicone sealant to the alternator lead grommet and crankcase halves mating surface [A] on the front and rear side of the cover mount.

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

- Check that the knock pins [B] are in place on the crankcase.
- Install a new gasket and the alternator cover.

  Torque - Water Hose Clamp Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)

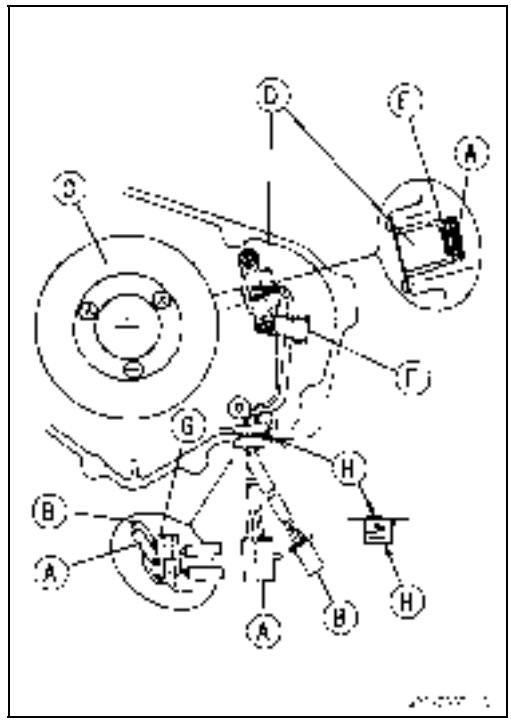
Stater Coil Removal



- Remove:
  Alternator Cover (see Alternator Cover Removal)
  Crankshaft Sensor Screws [A] and Clamps
  Alternator Lead Grommet [B]
  Stator Coil Bolts [C]
- Remove the stator coil [D] from the alternator cover.

Charging System

Stator Coil Installation



- Install the alternator leads [A] and crankshaft sensor leads [B] into the alternator cover as figure.
  - Stator Coil [C]
  - Crankshaft Sensor Coil [D]
  - Rubber Damper [E]
  - Clamp [F]
  - Grommet [G]
  - Silicone Sealant Applied Areas [H]

○Fit the alternator leads and crankshaft sensor leads into the grommet.

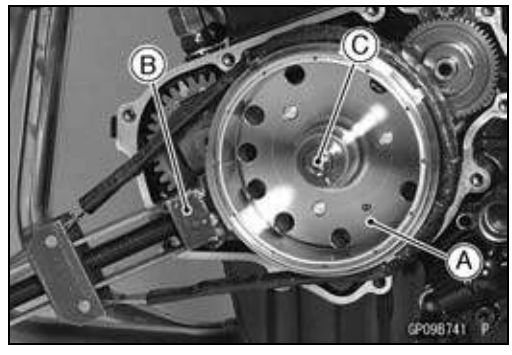
○Apply silicone sealant to the grommet, and fit it into the notch in the alternator cover.

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

- Install the crankshaft sensor.
- Clamp the harness of the crankshaft sensor leads.
- Tighten the stator bolts with the specified torque.

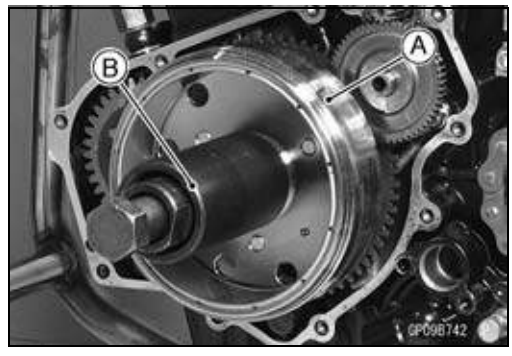
Torque - Alternator Stator Bolts: 12 N·m (1.2 kgf·m, 104 in·lb)

Alternator Rotor Removal



- Remove the alternator cover (see Alternator Cover Removal).
- Hold the alternator rotor [A] steady with the flywheel holder [B], and remove the rotor bolt [C].

Special Tool - Flywheel Holder: 57001-1313



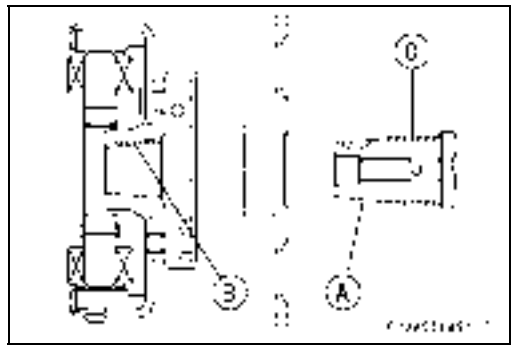
- Remove the rotor [A] using the flywheel puller assembly [B].

Special Tool - Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5: 57001-1405

CAUTION

Do not attempt to strike the alternator rotor itself. Striking the rotor can cause the magnets to lose their magnetism.

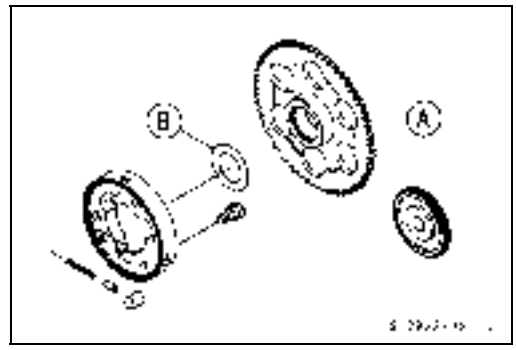
Alternator Rotor Installation



- Using a cleaning fluid, clean off any oil or dirt on the following portions, and dry them with a clean cloth.
  - Crankshaft Tapered Portion [A]
  - Alternator Rotor Tapered Portion [B]
- Apply a thin coat of molybdenum disulfide grease to the crankshaft [C].

Charging System

● Install the starter gear [A] and washer [B].
● Again, clean the crankshaft tapered portion and dry there.

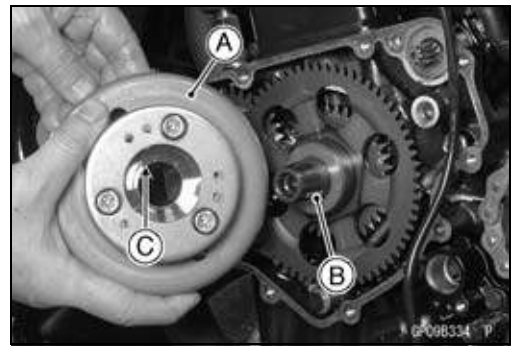


● Install the alternator rotor [A] while turning it counterclockwise to make easy to align the key [B] and key groove [C] of the rotor.

NOTE

○*Confirm the alternator rotor fit or not to the crankshaft before tighten it with the specified torque.*

○Install the rotor bolt and tighten it with 55 N·m (5.6 kgf·m, 41 ft·lb) of torque.

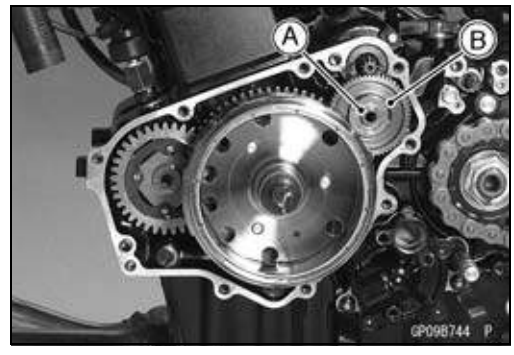


○Remove the rotor bolt.
○Check the tightening torque with flywheel puller.
★If the rotor is not pulled out with 20 N·m (2.0 kgf·m, 14.5 ft·lb) of drawing torque, it is installed correctly.
★If the rotor is pulled out with 20 N·m (2.0 kgf·m, 14.5 ft·lb) of drawing torque, clean off any oil dirt or flaw of the crankshaft and rotor tapered portion and dry them with a clean cloth. Then, confirm that it is not pulled out with above torque.

● Tighten the alternator rotor bolt with holding the alternator rotor steady with the flywheel holder.

Special Tool - Flywheel Holder: 57001-1313

Torque - Alternator Rotor Bolt: 68.6 N·m (7.0 kgf·m, 51 ft·lb)



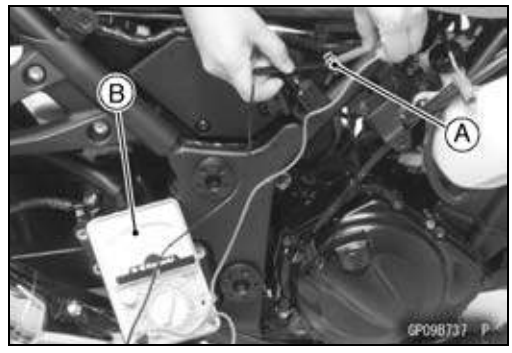
● Apply a thin coat of molybdenum disulfide grease to the shaft [A], and install it and starter idle gear [B].
● Install the alternator cover (see Alternator Cover Installation).

Alternator Inspection

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

● To check the alternator output voltage, do the following procedures.
○Turn off the ignition switch.
○Remove the right side cover (see Side Cover Removal in the Frame chapter).

Charging System



○Disconnect the alternator lead connector [A].
○Connect the hand tester [B]as shown in the table 1.
○Start the engine, and run it 4 000 rpm 5 minutes.
○Run it at the rpm given in the table 1.
○Note the voltage readings (total 3 measurements).

Table 1 Alternator Output Voltage

Tester Range	Connections		Reading @4 000 rpm
	Tester (+) to	Tester (–) to	
250 V AC	One Yellow lead	Another Yellow lead	about 40 V

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

● Check the stator coil resistance as follows.
○Stop the engine.
○Connect the hand tester as shown in the table 2.
○Note the readings (total 3 measurement).

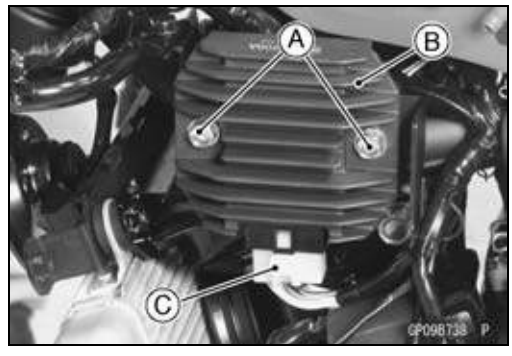
Table 2 Stator Coil Resistance

Tester Range	Connections		Reading
	Tester (+) to	Tester (–) to	
× 1 Ω	One Yellow lead	Another Yellow lead	0.05 ~ 0.6 Ω

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

Special Tool - Hand Tester: 57001-1394

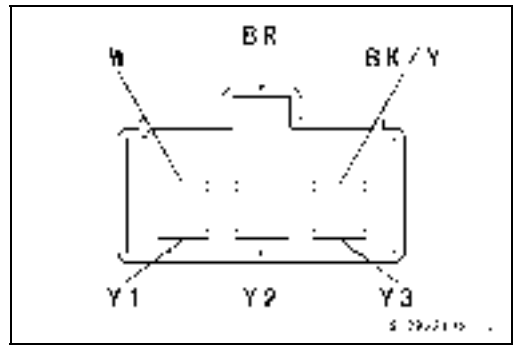
Regulator/Rectifier Inspection



● Remove:
Right Lower Fairing (see Lower Fairing Removal in the Frame chapter)
Bolts [A]
Regulator/Rectifier [B]
Connector [C] (Disconnect)

Charging System

● Check conductivity of the following pair of terminals.



Rectifier Circuit Inspection

Tester connection	W-Y1,	W-Y2,	W-Y3
	BK/Y-Y1,	BK/Y-Y2,	BK/Y-Y3

★The resistance should be low in one direction and more than ten times as much in the other direction. If any two leads are low or high in both directions, the rectifier is defective and the regulator/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.*

Regulator Circuit Check

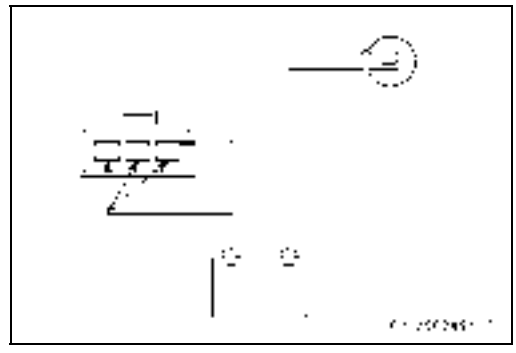
To test the regulator out of circuit, use three 12 V batteries and a test light (12 V 3 ~ 6 W bulb in a socket with leads).

CAUTION

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

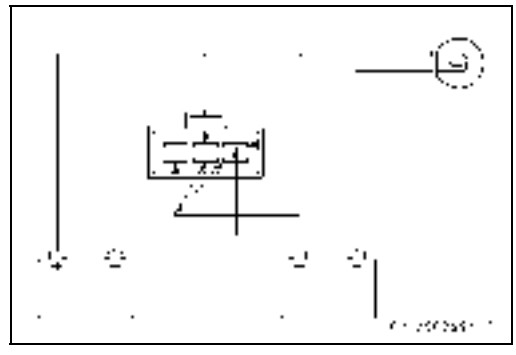
● Check to be sure the rectifier circuit is normal before continuing.

● Do the 1st step regulator circuit test.



○Connect the test light and the 12 V battery to the regulator/rectifier as shown.
○Check the Y1, Y2 and Y3 terminal respectively.
★If the test light turns on, the regulator/rectifier is defective. Replace it.
★If the test light does not turn on, continue the test.

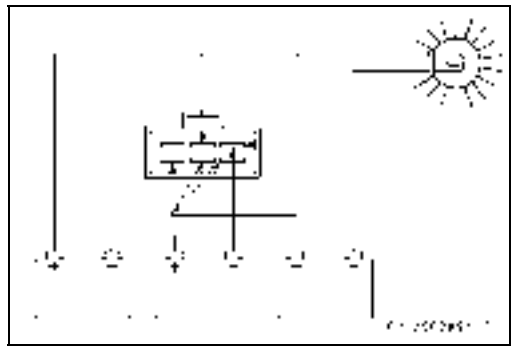
● Do the 2nd step regulator circuit test.



○Connect the test light and the 12 V battery in the same manner as specified in the “Regulator Circuit Test-1st Step”.
○Apply 12 V to the voltage BR terminal.
○Check the Y1, Y2 and Y3 terminal respectively.
★If the test light turns on, the regulator/rectifier is defective. Replace it.
★If the test light does not turn on, continue the test.

Charging System

● Do the 3rd step regulator circuit test.
○Connect the test light and the 12 V battery in the same manner as specified in the “Regulator Circuit Test-1st Step”.
○Momentarily apply 24 V to the voltage BR terminal by adding a 12 V battery.
○Check the Y1, Y2 and Y3 terminals respectively.



CAUTION

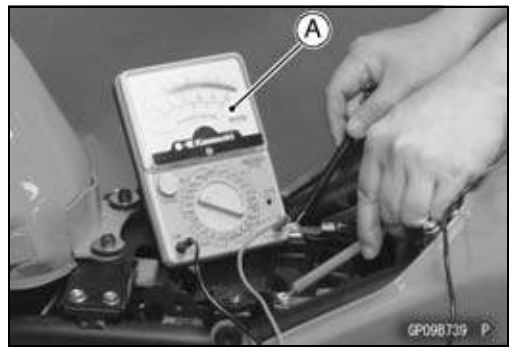
Do not apply more than 24 V. If more than 24 V is applied, the regulator/rectifier may be damaged. Do not apply 24 V more than a few seconds. If 24 V is applied for more than a few seconds, the regulator/rectifier may be damaged.

★If the test light did not light when the 24 V was applied momentarily to the voltage monitoring terminal, the regulator/rectifier is defective. Replace it.
★If the regulator/rectifier passes all of the tests described, it may still be defective. If the charging system still does not work properly after checking all of the components and the battery, test the regulator/rectifier by replacing it with a known good unit.

Torque - Regulator/Rectifier Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Charging Voltage Inspection

● Check the battery condition (see Charging Condition Inspect).
● Warm up the engine to obtain actual alternator operating conditions.
● Remove the front seat (see Front Seat Removal in the Frame chapter).
● Check that the ignition switch is turned off, and connect the hand tester [A] as shown in the table.



Special Tool - Hand Tester: 57001-1394

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

Charging Voltage

Tester Range	Connections		Reading
	Tester (+) to	Tester (–) to	
25 V DC	Battery (+)	Battery (–)	14 ~15 V

Charging System

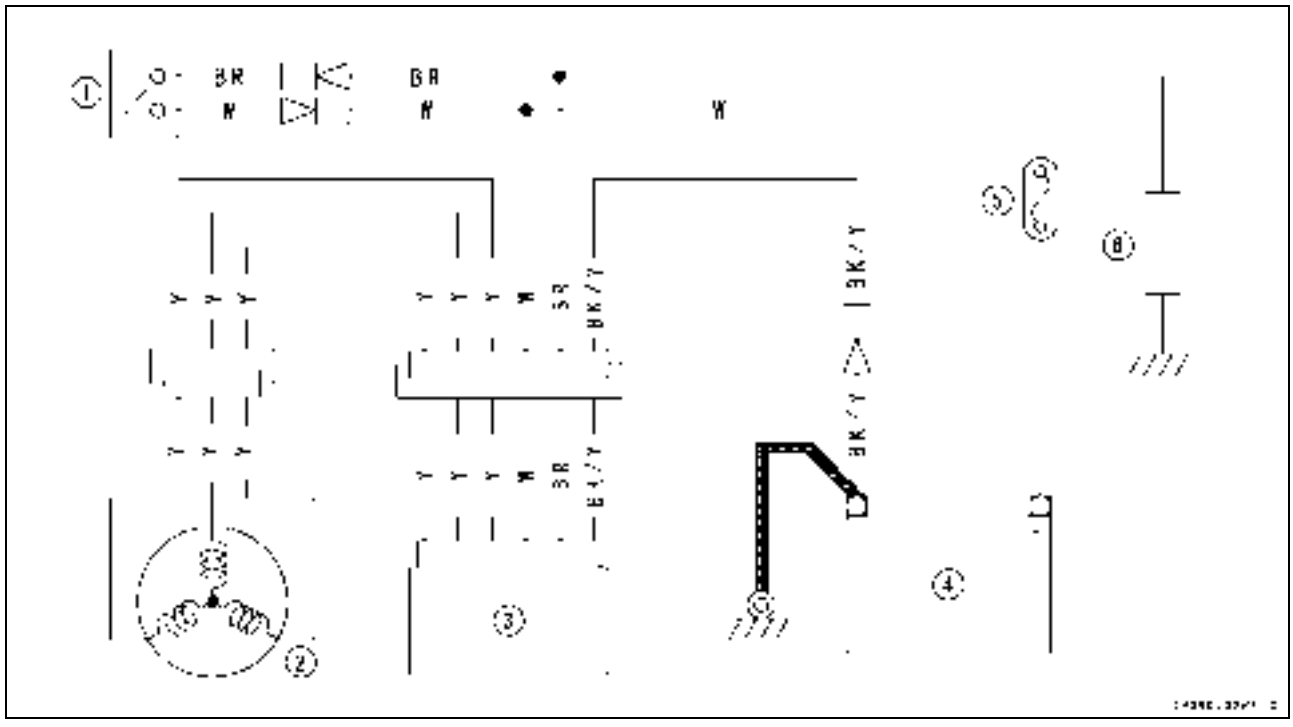
- Turn off the ignition switch to stop the engine, and disconnect the hand tester.

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

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

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

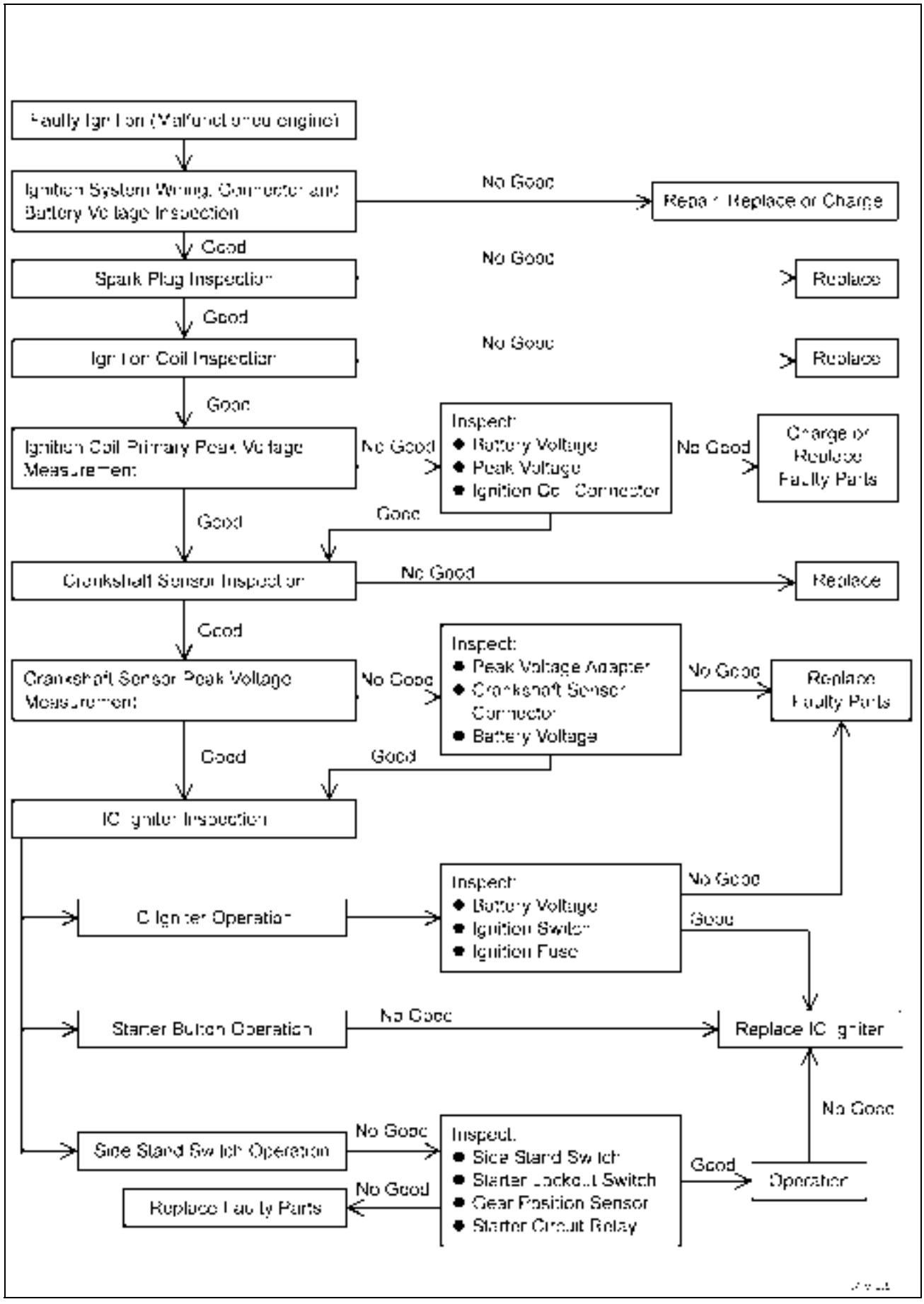
Charging System Circuit



1. Ignition Switch
2. Alternator
3. Regulator/Rectifier
4. Battery
5. Main Fuse 30 A
6. Load

Ignition System

Ignition System Troubleshooting



Ignition System

⚠ WARNING

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

CAUTION

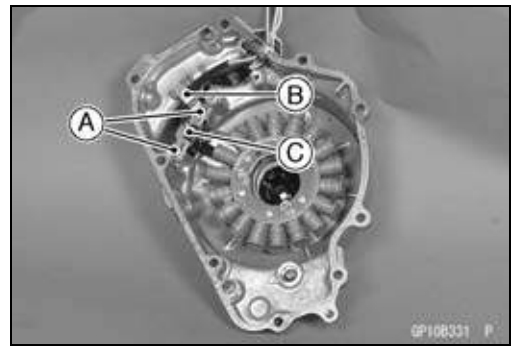
Do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent IC igniter damage.
Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and IC igniter.

Crankshaft Sensor Removal

- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)
  Alternator Cover (see Alternator Cover Removal)
- Disconnect the crankshaft sensor connector [A].



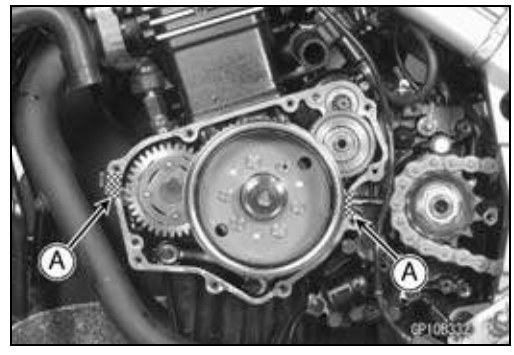
- Remove the crankshaft sensor screws [A] and clamp [B], and then remove the crankshaft sensor [C].



Crankshaft Sensor Installation

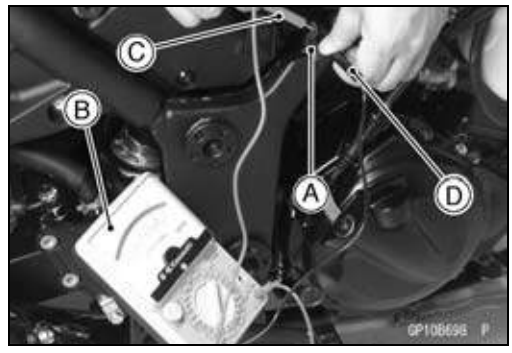
- Apply silicone sealant to the grommet and fit it into the notch in the alternator cover.
- Install the clamp and crankshaft sensor to the alternator cover.
- Clamp the harness of crankshaft sensor leads as shown.
- Apply silicone sealant to the mating surface [A] of the crankcase.
- Install the alternator cover (see Alternator Cover Installation).

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



Ignition System

Crankshaft Sensor Inspection



- Remove the right side cover (see Side Cover Removal in the Frame chapter).
- Disconnect the crankshaft sensor connector [A] from near the right side of the carburetor.
- Set the hand tester [B] to the × 100 Ω range and connect the (+) lead [C] to the black lead and (–) lead [D] to the yellow lead in the connector.

Special Tool - Hand Tester: 57001-1394

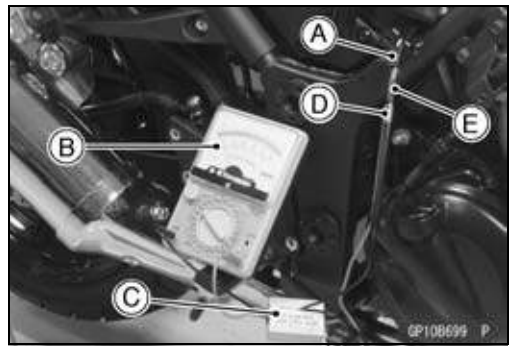
★If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

Crankshaft Sensor Resistance: 100 ~ 150 Ω

- Using the highest resistance range of the tester, measure the resistance between the crankshaft sensor leads and chassis ground.

★Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the crankshaft sensor assembly.

Crankshaft Sensor Peak Voltage Inspection

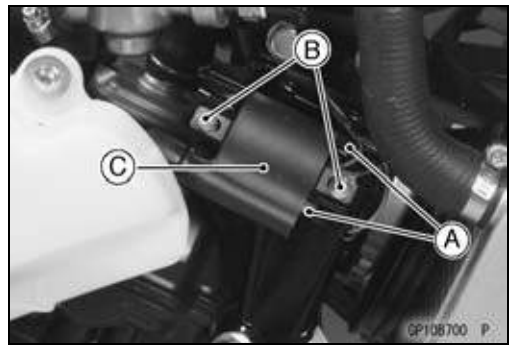


- Disconnect the crankshaft sensor connector [A].
- Set the hand tester [B] to the × 25 V DC range, and connect it the peak voltage adapter [C] as shown in the diagram.
- Using two auxiliary wires, connect the black lead (–) of the adapter to black lead [D] and red lead (+) to yellow lead [E] in the crankshaft sensor connector [A].
- Turn the ignition switch and engine stop switch on.
- Grasp the clutch lever and pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission gear in neutral to measure the crankshaft sensor peak voltage.
- Repeat the measurement 5 or more times.

Crankshaft Sensor Peak Voltage
Standard: 3.2 V or more

Special Tool - Hand Tester: 57001-1394
Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

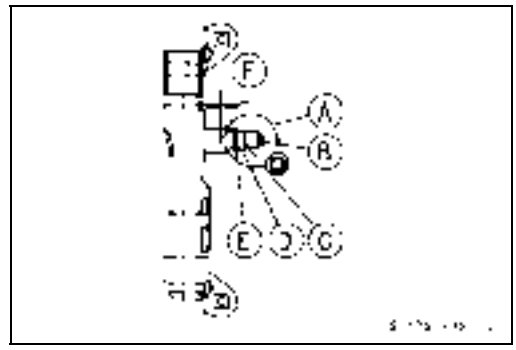
Ignition Coil Removal



- Remove:
  Front Seat (see Front Seat Removal in the Frame chapter)
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Right or Left Lower Fairing (see Lower Fairing Removal in the Frame chapter)
- Disconnect the primary winding leads [A] from the ignition coil.
- Pull out the spark plug cap from the spark plug.
- Remove the mounting bolts [B], and take out the ignition coil [C].

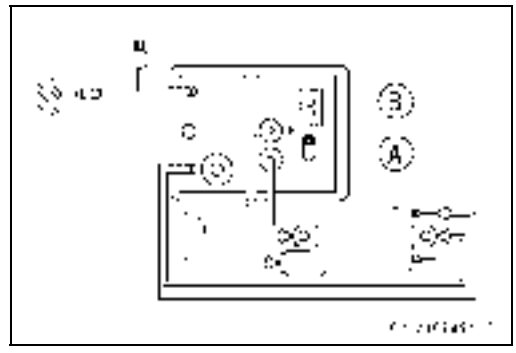
Ignition System

Ignition Coil Installation



● Install the ignition coil as shown (both sides).
Ignition Coil (Right Side) [A]
Bolt [B]
Washer [C]
Nut [D]
Washer [E]
0 ~ 3 mm (0.12 in.) [F]

Ignition Coil Inspection



● Remove the ignition coil (see ignition Coil Removal).
● Measure the arcing distance with the suitable commercially available coil tester [B] to check the condition of the ignition coil [A].
● 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.

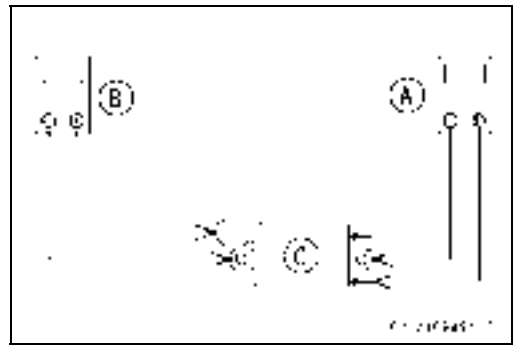
⚠ WARNING

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 cap is defective.

Ignition Coil Arcing Distance
Standard: 7 mm (0.28 in.) or more

● To determine which part is defective, measure the arcing distance again with the spark plug cap removed from the ignition coil. Remove the cap by turning it 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 [C] can be checked for a broken or badly shorted winding with the hand tester (special tool).

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 [A] as follows.
○Connect the hand tester between the coil terminal and primary winding terminal.

● Measure the secondary winding resistance [B] as follows.
○Remove the plug cap by turning it counterclockwise.
○Connect the tester between the high tension lead and the ignition coil terminal.
★If the tester does not read as specified, replace the coil.

Ignition Coil Resistance
Standard: Primary windings 2.1 ~ 3.2 Ω (× 1 Ω)
Secondary windings 10 ~ 16 kΩ (× 1 kΩ)

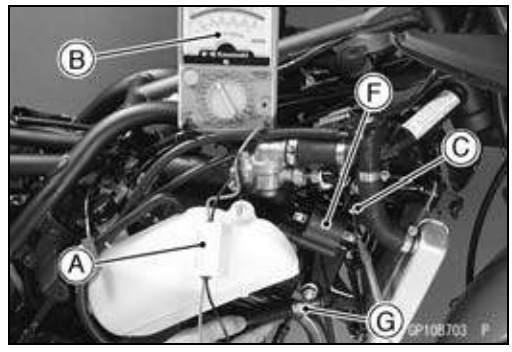
Special Tool - Hand Tester: 57001-1394

● Visually inspect the secondary winding lead.
★If it is damaged, replace the ignition coil.

Ignition Coil Primary Peak Voltage

NOTE

○*Be sure the battery is fully charged.*



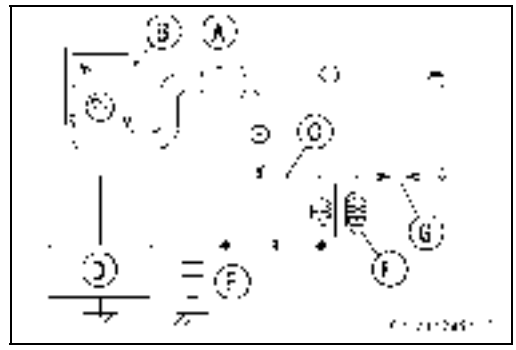
● Remove:
Front Seat (see Front Seat Removal in the Frame chapter)
Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
Right or Left Lower Fairing (see Lower Fairing in the Frame chapter)
● Remove the spark plug cap.
● Measure the ignition coil primary peak voltage as follows.
● Install the new spark plug [G] into the spark plug cap, and ground it onto the engine.
● Connect the peak voltage adapter [A] into the hand tester [B] and set it to the × 250 V DC range.

Ignition System

Adapter red lead → **Ignition Coil Primary Lead Terminal [C]**

Adapter black lead → **Ignition Coil Ground Terminal**

IC Igniter [D]
Battery [E]
Ignition Coil [F]



Special Tool - Hand Tester: 57001-1394
Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

⚠ WARNING

To avoid extremely high voltage shock, do not touch the spark plug or tester connection.

- Turn the ignition switch and engine stop switch on.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission in neutral to measure the ignition coil primary peak voltage.
- Repeat the measurement 5 or more times.

Ignition Coil Primary Peak Voltage
Standard: 223 V or more

★If the reading is less than the specified value, check the following:
Ignition Coil (see Ignition Coil Inspection)
Crankshaft Sensor (see Crankshaft Sensor Inspection)
IC Igniter (see IC Igniter Inspection)

Spark Plug Removal

- Refer to Spark Plug Replacement in the Periodic Maintenance chapter (see Spark Plug Replacement in the Periodic Maintenance chapter).

Spark Plug Installation

- Refer to Spark Plug Replacement in the Periodic Maintenance chapter (see Spark Plug Replacement in the Periodic Maintenance chapter).

Spark Plug Condition Inspection

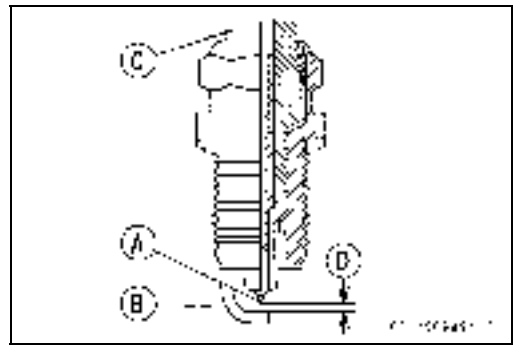
- Remove the spark plugs (see Spark Plug Replacement).
- Visually inspect the spark plugs.

★If the spark plug center electrode [A] and/or side electrode [B] are corroded or damaged, or if the insulator [C] is cracked, replace the plug.

★If the spark plug is dirtied or the carbon is accumulated, replace the spark plug.

- Measure the gap [D] with a wire-type thickness gauge.

★If the gap is incorrect, replace the spark plug.



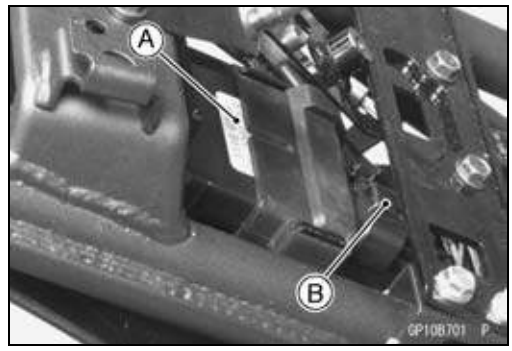
Spark Plug Gap: 0.7 ~ 0.8 mm (0.03 ~ 0.04 in.)

- Use the standard spark plug or its equivalent.

Spark Plug: CR8E or U24ESR-N

Ignition System

IC Igniter Inspection

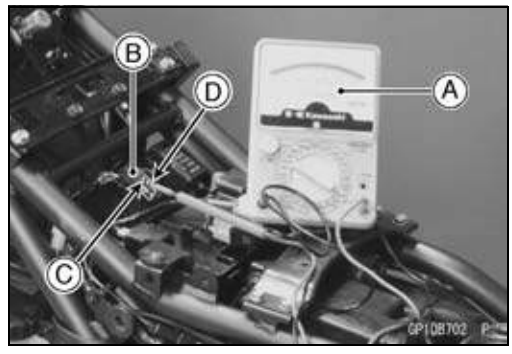


CAUTION

When inspecting the IC igniter [A], observe the following to avoid damage to the IC igniter.
Do not disconnect the IC igniter connector [B] with the ignition switch on.
This may damage the IC igniter.
Do not disconnect the battery leads while the engine is running. This may damage the IC igniter.

IC Igniter Operation Inspection

- Remove the seat cover (see Rear Fender Removal in the Frame chapter).
- Disconnect the IC Igniter connector.
- Set the hand tester [A] to the × 25 V DC range, and connect it to the connector [B] come from harness side as follows.



Tester (+) terminal [C] → BR/BK lead

Tester (–) terminal [D] → BK/Y lead

Special Tool - Hand Tester: 57001-1394
Needle Adapter Set: 57001-1457

- Turn the ignition switch on, and read the voltage.

IC Igniter Operation Voltage: Battery Voltage

★If the tester reading is not specified one, check the battery voltage, ignition switch and ignition fuse.

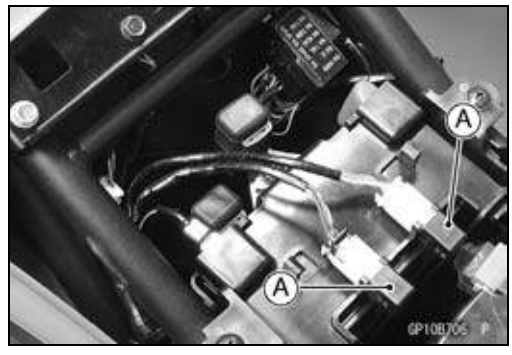
Diodes Inspection

- Remove the left lower fairing (see Lower Fairing in the Frame chapter).
- Disconnect the diode [A].



- Remove the front seat (see Front Seat Removal in the Frame chapter).
- Disconnect the diode assemblies [A].
- Zero the hand tester, and connect it to each diode terminal to check the resistance in both directions.

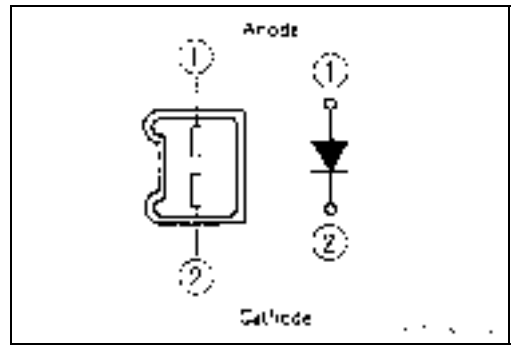
★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the diode assembly must be replaced.



Ignition System

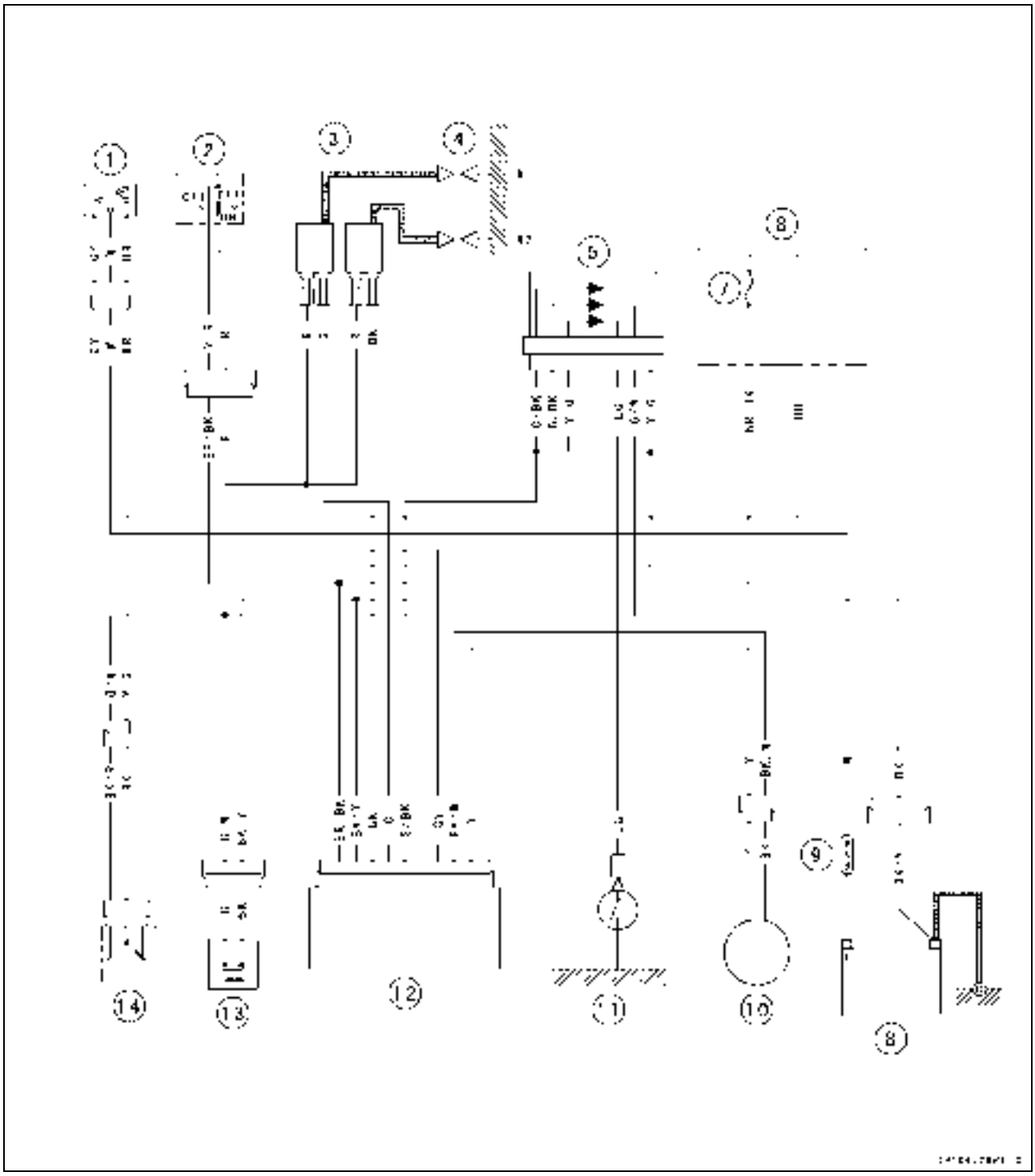
NOTE

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



Ignition System

Ignition System Circuit

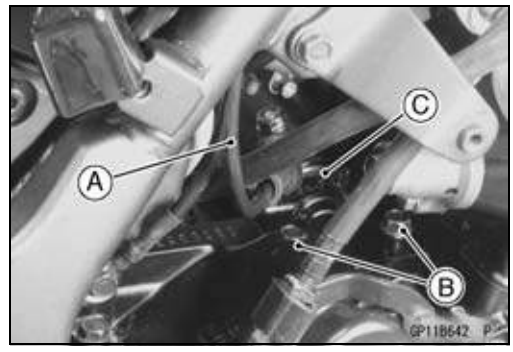


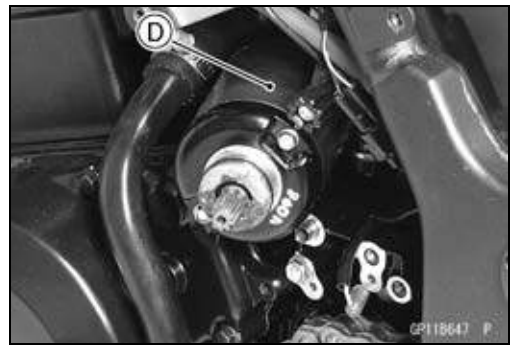
1. Ignition Switch
2. Engine Stop Switch
3. Ignition Coils
4. Spark Plugs
5. Diode A
6. Fuse Box
7. Ignition Fuse 10 A
8. Battery
9. Main Fuse 30 A
10. Pickup Coil
11. Neutral Switch
12. IC Igniter
13. Sidestand Switch
14. Starter Lockout Switch

Electric Starter System

Starter Motor Removal

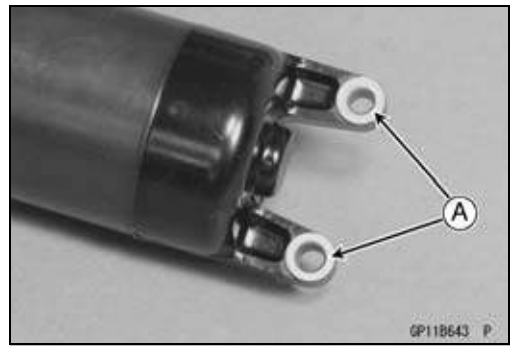
- Remove the lower fairings (see Lower Fairing Removal in the Frame chapter).
- Disconnect the starter motor lead [A] from the starter motor [C].
- Remove the starter mounting bolts [B] and pull out [D] the starter motor toward the left side.

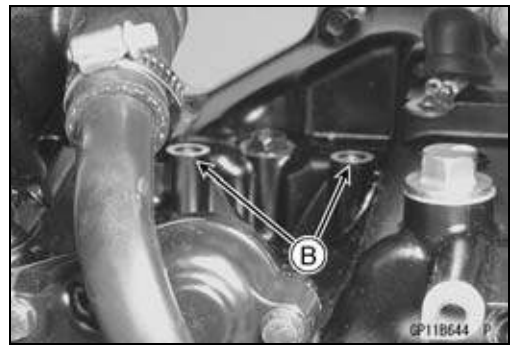




Starter Motor Installation

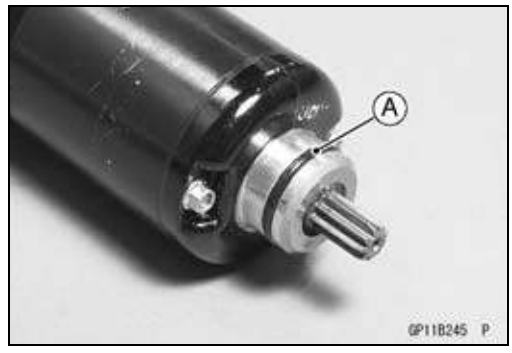
- Clean the starter motor lugs [A] and crank case surface [B] where the starter motor is grounded.





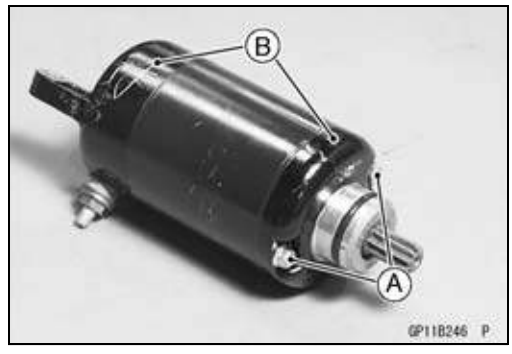
Electric Starter System

- Apply a small amount of engine oil to the O-ring [A].
- Put the starter motor on the crankcase.
- Press the part of the starter motor end cover and push the starter motor into the crankcase hole.
- Tighten the starter motor mounting bolts.
- Connect the starter motor lead to the starter motor terminal.
- Install:
  Starter Idle Gear
  Alternator Cover
  Engine Sprocket Cover
  Shift Lever
  Water Pipes

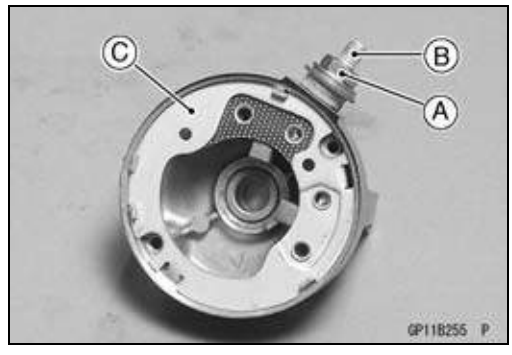


Starter Motor Disassembly

- Remove the starter motor (see Starter Motor Removal).
- Remove the bolts [A] and take out both end covers [B].
- Take the armature off from the pinion gear side of the yoke.

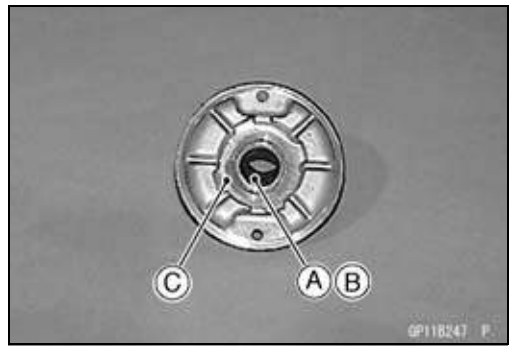


- Remove the terminal locknut [A] and washers, and then remove the brush and terminal bolt [B] with the brush plate [C] from the yoke.



Starter Motor Assembly

- Replace the O-rings with a new ones.
- Apply a thin coat of high-temperature grease to the oil seal [A] and needle bearing [B].
- Fit the toothed washer [C] into the end cover.

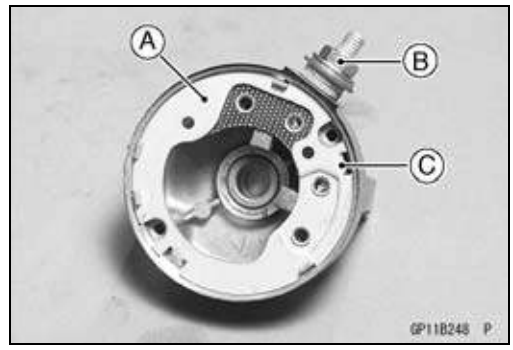


Electric Starter System

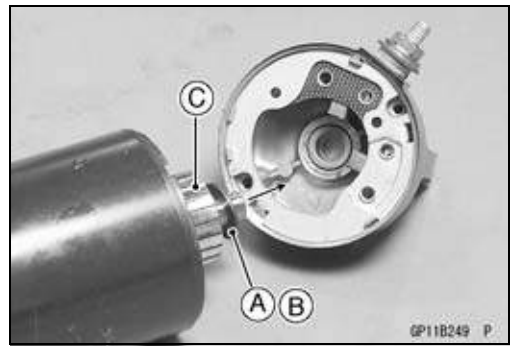
● Install the brush, terminal bolt, washers with the brush plate [A] and tighten the terminal locknut [B].

Torque - Starter Motor Terminal Locknut: 9.8 N·m (1.0 kgf·m, 87 in·lb)

● Fit the tongue [C] on the brush plate into the end cover groove.

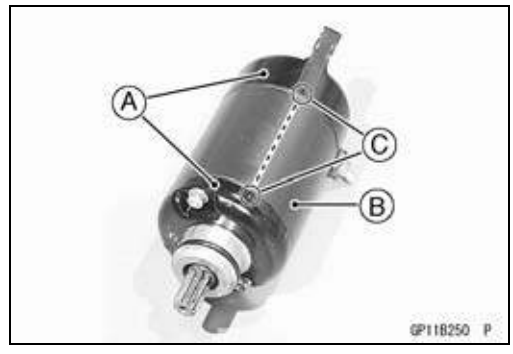


● Install the steel washer [A] and resin washer [B] into the starter shaft, and insert the armature [C] between the brushes.



● Align the end cover [A] with the mark [C] of the yoke [B].

Torque - Starter Motor Assembly Bolts: 3.5 N·m (0.36 kgf·m, 31 in·lb)



Carbon Brush Inspection

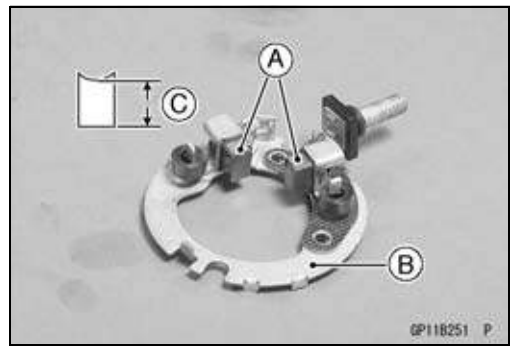
● Measure the length [C] of each brush [A].

★ If any is worn down to the service limit, replace the carbon brush holder assembly [B].

Carbon Brush Length

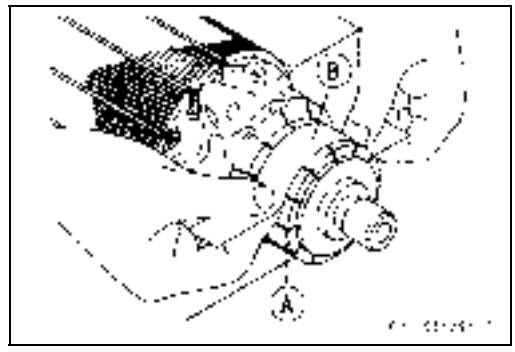
Standard: 10 mm (0.39 in.)

Service Limit: 5 mm (0.20 in.)



Commutator Inspection, Cleaning

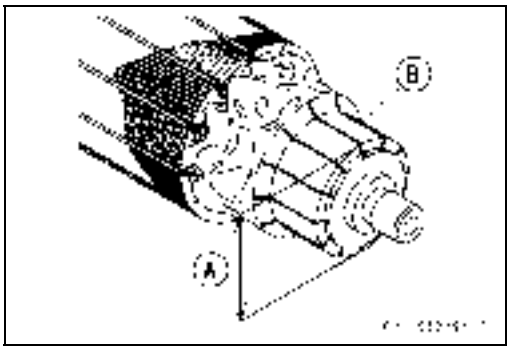
● Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.



Electric Starter System

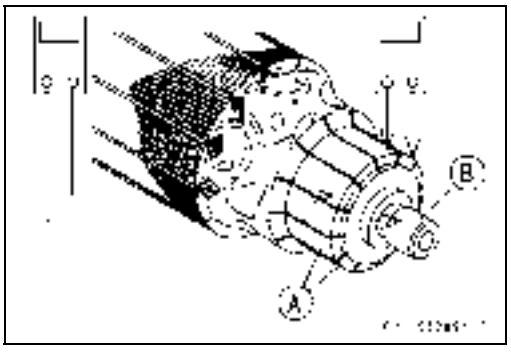
● Measure the outer diameter [A] of the commutator [B].
★ Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commutator Diameter
Standard: 28 mm (1.10 in.)
Service Limit: 27 mm (1.06 in.)



Armature Inspection

● Using the × 1 Ω hand tester range, measure the resistance between any two commutator segments [A].
★ 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].



Starter System

★If there is any reading at all, the armature has a short and the starter motor must be replaced.

Special Tool - Hand Tester: 57001-1394

NOTE

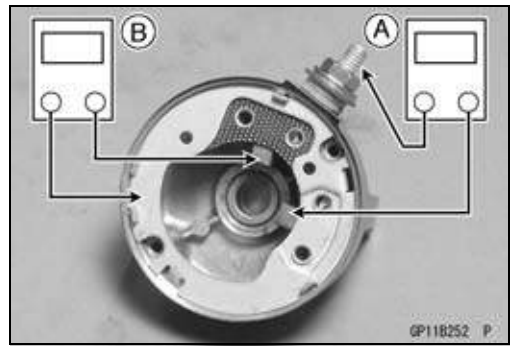
○*Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the hand tester. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.*

Brush Lead Inspection

● Using the × 1 Ω hand tester range, measure the continuity between the following:
Terminal Bolt and Positive (+) Brush [A]
Brush Plate and Negative (–) Brush [B]

★If there is not close to zero ohms, the brush lead has an open. Replace the terminal bolt assembly and/or the brush holder assembly.

Special Tool - Hand Tester: 57001-1394

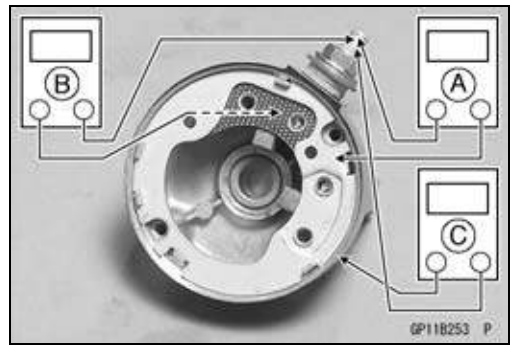


Terminal Bolt Inspection

● Using the highest hand tester range, measure the resistance as shown.
Terminal Bolt and Brush Plate [A]
Terminal Bolt and Negative Brush Holder [B]
Terminal Bolt and Yoke [C]

★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.

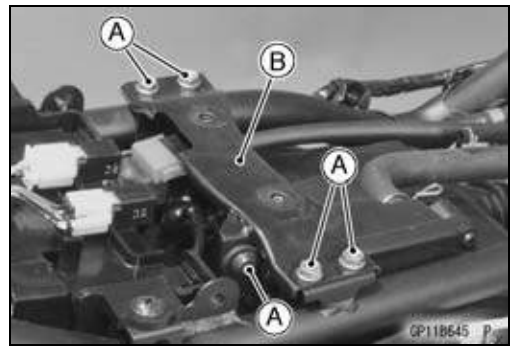
Special Tool - Hand Tester: 57001-1394



Starter Relay Inspection

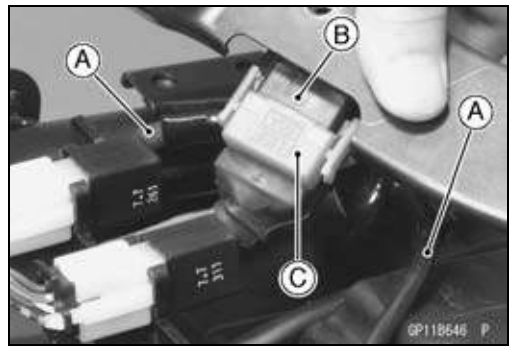
● Remove the fuel tank (see Fuel Tank Removal in the Fuel System chapter).

● Remove:
Fuel Tank Bracket Bolts [A]
Fuel Tank Bracket [B]



Starter System

- Disconnect the cables [A] and remove the starter relay [C] with the main fuse [B].
- Remove the main fuse from the starter relay.



- Connect the hand tester [A] and 12 V battery [B] to the starter relay [C] as shown.

★If the relay does not work as specified, the relay is defective. Replace the relay.

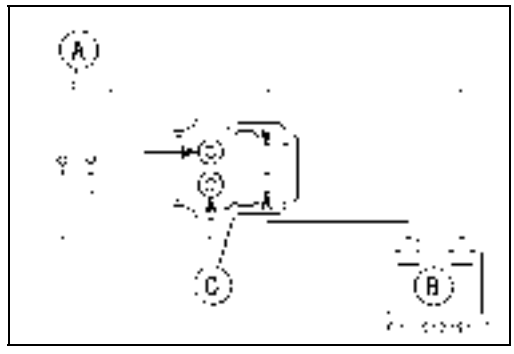
Relay Function Test

Tester Range: × 1 Ω range

Standard: When battery is connected → 0 Ω

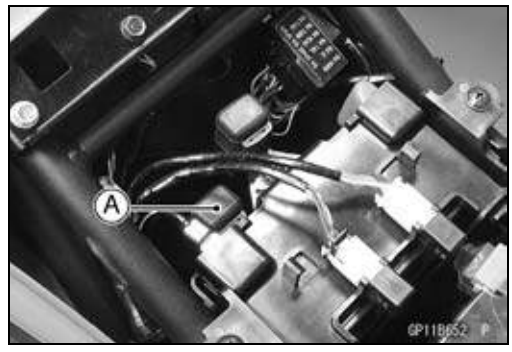
When battery is disconnected → ∞ Ω

Special Tool - Hand Tester: 57001-1394



Starter Circuit Relay Inspection

- Remove the front seat (see Front Seat Removal in the Frame chapter).
- Remove the starter circuit relay [A].



- Connect the hand tester [A] and 12 V battery [B] to the starter circuit relay [C] as shown.

★If the relay does not work as specified, the relay is defective. Replace the relay.

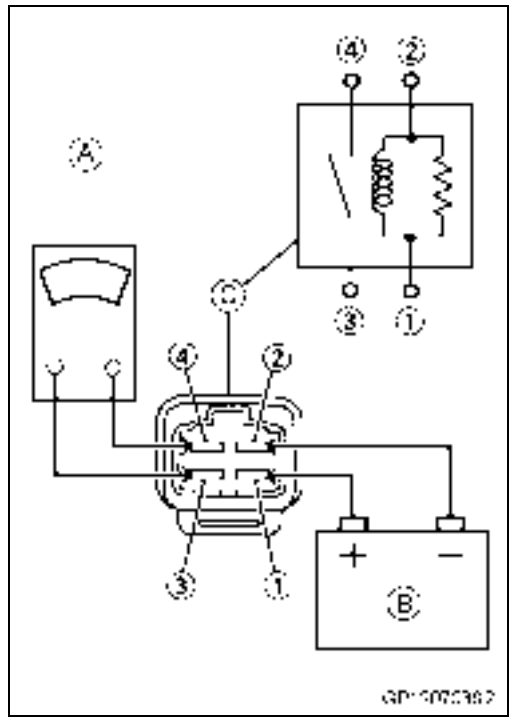
Testing Relay

Tester Range: × 1 Ω

Criteria: When battery is connected → 0 Ω

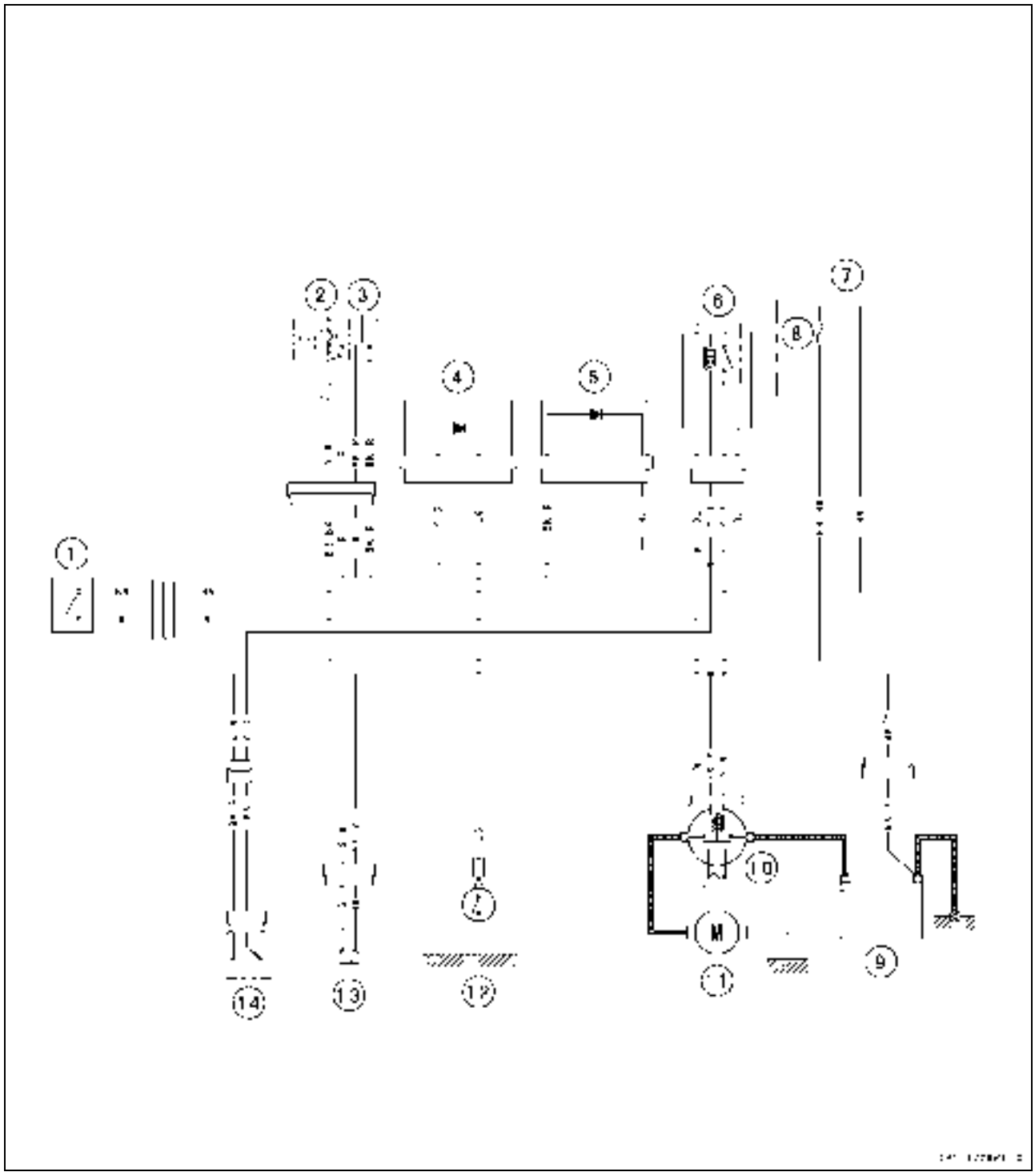
When battery is disconnected → ∞ Ω

Relay Coil Terminal [1] and [2]
Relay Switch Terminals [3] and [4]



Starter System

Electrical Starter Circuit



1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Diode A
5. Diode B
6. Starter Circuit Relay
7. Fuse Box
8. Ignition Fuse 10 A
9. Battery
10. Main Fuse 30 A
11. Starter Motor
12. Neutral Switch
13. Sidestand Switch
14. Starter Lockout Switch

Lighting System

Headlight Beam Horizontal Adjustment

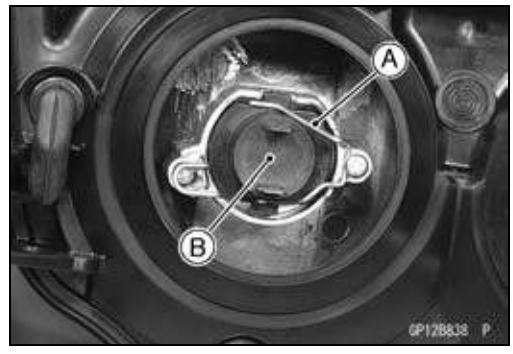
● Refer to Headlight Aiming Inspection in the Periodic Maintenance chapter (see Headlight Aiming Inspection in the Periodic Maintenance chapter).

Headlight Beam Vertical Adjustment

● Refer to Headlight Aiming Inspection in the Periodic Maintenance chapter (see Headlight Aiming Inspection in the Periodic Maintenance chapter).

Headlight Bulb Replacement

● Remove:
Upper Fairing (see Upper Fairing Removal in the Frame chapter)
Headlight Connector
Headlight Bulb Dust Cover
Clip [A] (Disconnect)
Headlight Bulb [B]



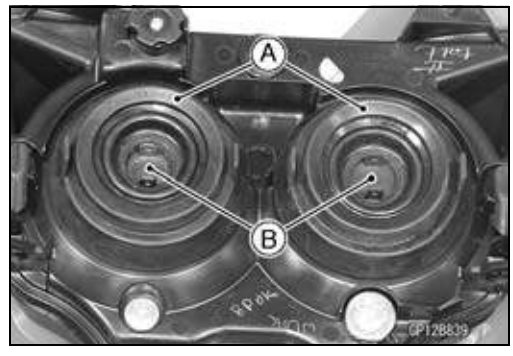
CAUTION

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.

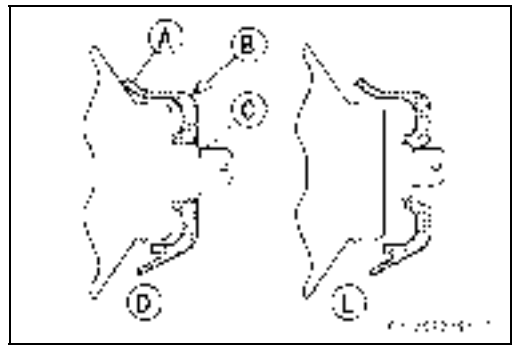
NOTE

○*Clean off any contamination that inadvertently gets on the bulb with alcohol or soap and water solution.*

● Fit the dust cover [A] firmly onto the bulb [B] as shown.



Dust Cover [A]
Top Mark [B]
Bulb [C]
Good [D]
Bad [E]

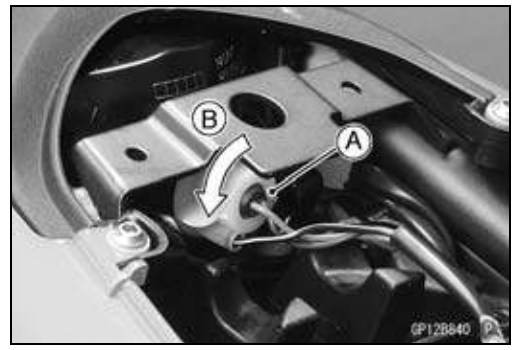


● Connect the headlight connector.
● Adjust the headlight beam (see Headlight Aiming Inspection in the Periodic Maintenance chapter).

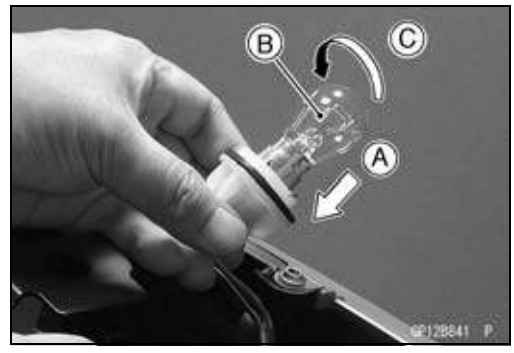
Lighting System

Tail/Brake Light Bulb Replacement

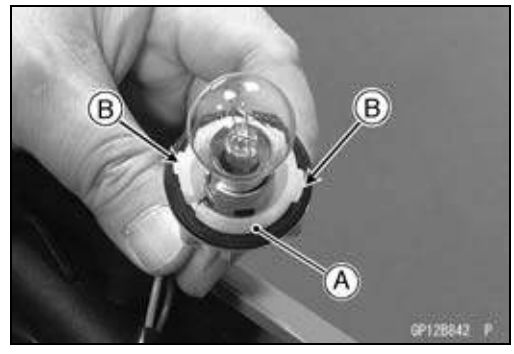
- Remove the rear seat (see Rear Seat Removal in the Frame chapter).
- Unscrew the socket [A] counterclockwise [B].

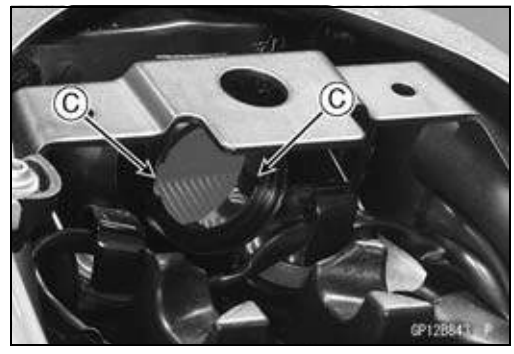


- Push [A] the bulb [B] in the socket, turn it counterclockwise [C], and pull it out.



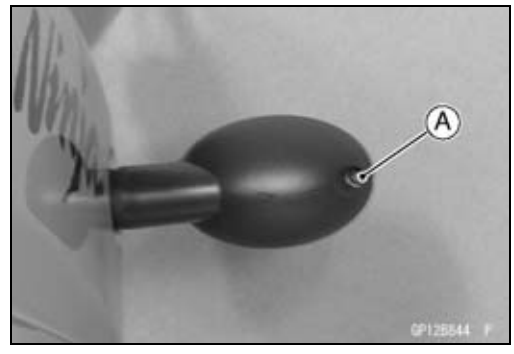
- Push the bulb in and turn it clockwise.
- Screw in the socket [A] aligning the tabs [B] with the recesses [C].





Front Turn Signal Light Bulb Replacement

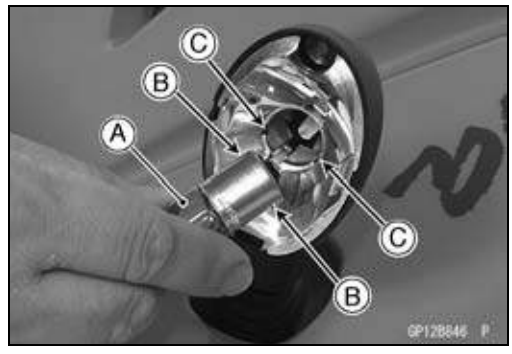
- Remove the lens mounting screw [A] and remove lens.



- Push [A] the bulb [B] in and turn [C] it counterclockwise and then remove it.

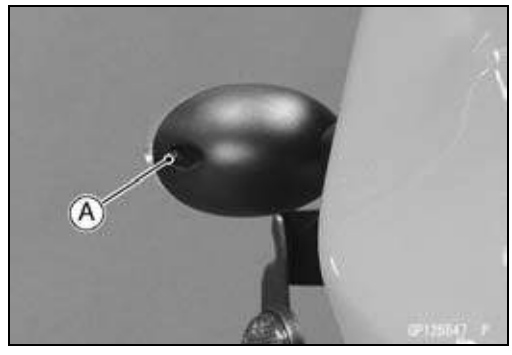


- Insert the new bulb [A] by aligning the projections [B] with the grooves [C] in the socket.
- Push the bulb and turn it clockwise and then replace it. It should lock in lock position.
- Insert the socket by aligning the projection with the notch in the wall and turn the socket clockwise.

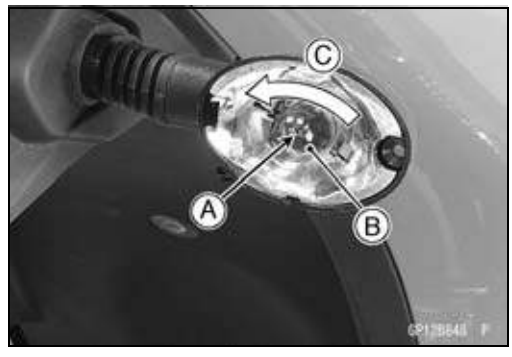


Rear Turn Signal Light Bulb Replacement

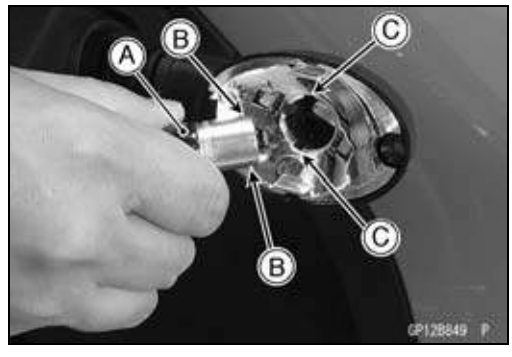
- Remove the lens mounting screw [A] and remove the lens.



- Push [A] the bulb [B] in and turn [C] it counterclockwise, and then remove it.

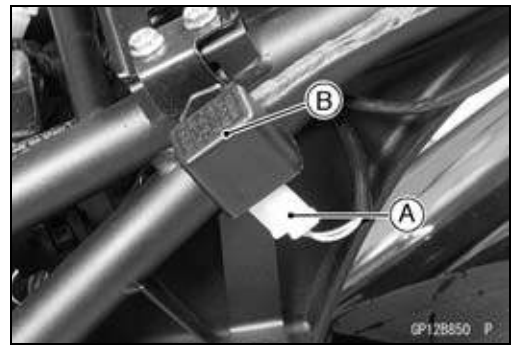


- Insert the new bulb [A] by aligning the projections [B] with the grooves [C] in the wall of the socket.
- Push the bulb in and turn it clockwise and then install it. It should lock in position.
- Install the lens, and tighten the lens mounting screw. Be careful not to overtighten the lens mounting screw.

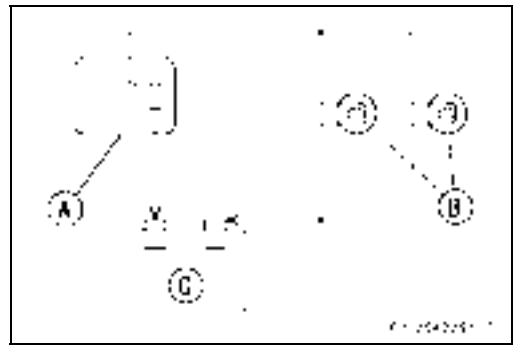


Lighting System

Turn Signal Relay Inspection



- Remove:
  Seat Cover (see Rear Fender Removal in the Frame chapter)
  Turn Signal Relay Connector [A]
  Turn Signal Relay [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]

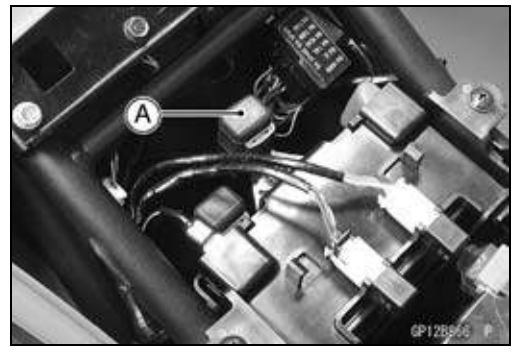
★If the lights do not flash as specified, replace the turn signal relay.

Testing Turn Signal Relay

Load		Flashing times (c/m*)
The Number of Turn Signal Lights	Wattage (W)	
1**	21 or 23	Light stays on
2	42 or 46	75-95

(*): Cycle(s) per minute
(**): Correspond to “one light burned out”

Headlight Circuit Relay Inspection



- Remove the front seat (see Front Seat Removal in the Frame chapter).
- Remove the headlight circuit relay [A].

Lighting System

● Connect the hand tester [A] and 12 V battery [B] to the starter circuit relay [C] as shown.

★ If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

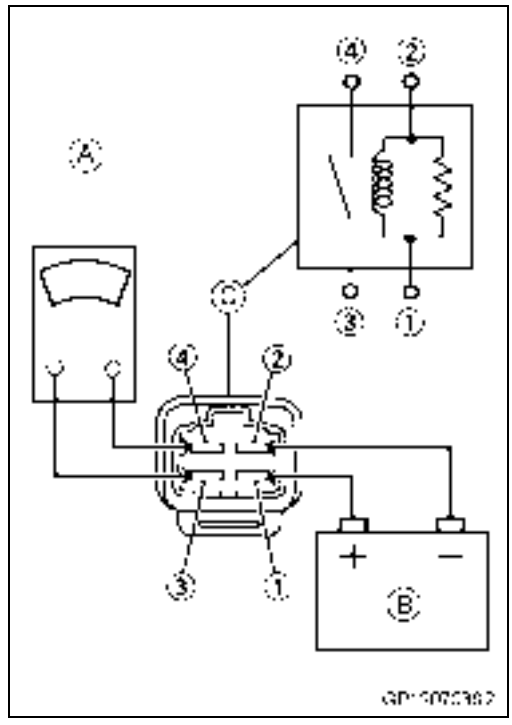
Tester Range: × 1 Ω

Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω

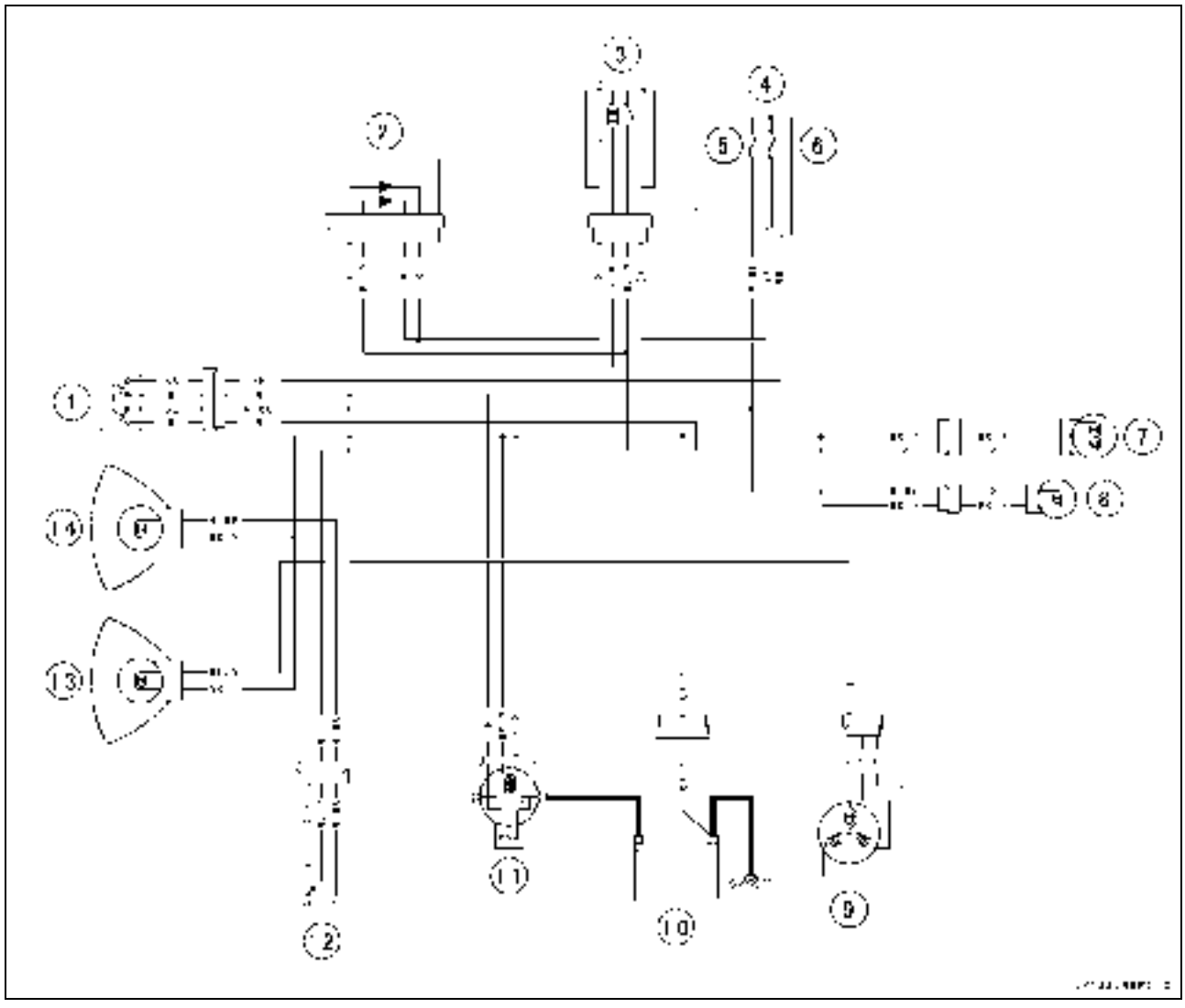
Relay Coil Terminal [1] and [2]

Relay Switch Terminals [3] and [4]



Lighting System

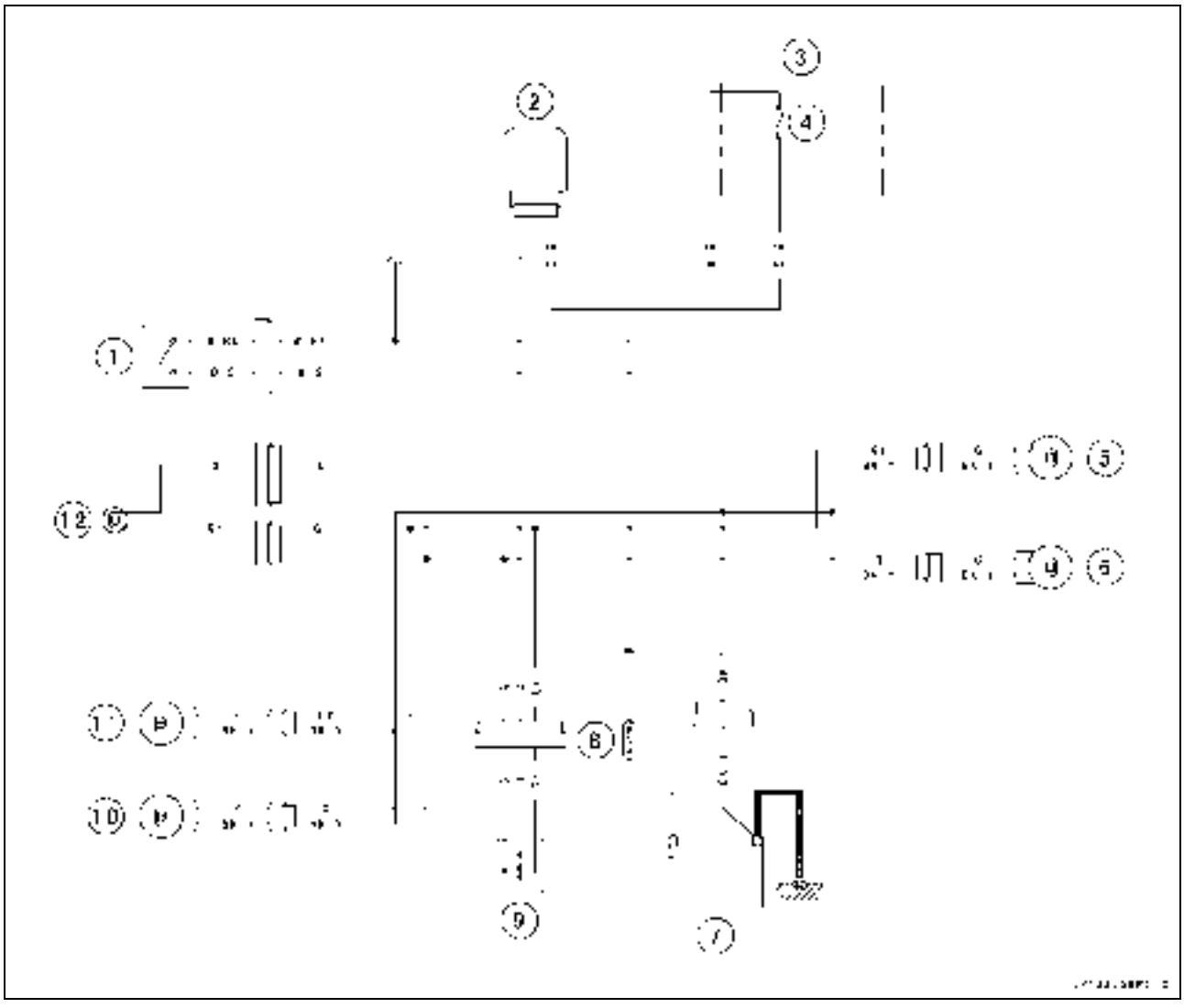
Headlight/Tail Light Circuit



1. Ignition Switch
2. Diodes B
3. Headlight Relay
4. Fuse Box
5. Tail Light Fuse 10 A
6. Headlight Fuse 10 A
7. Tail/Brake Light
8. License Plate Light
9. Alternator
10. Battery
11. Main Fuse 30 A
12. Dimmer Switch
13. Headlight (Low Beam)
14. Headlight (High Beam)

Lighting System

Turn Signal Light Circuit



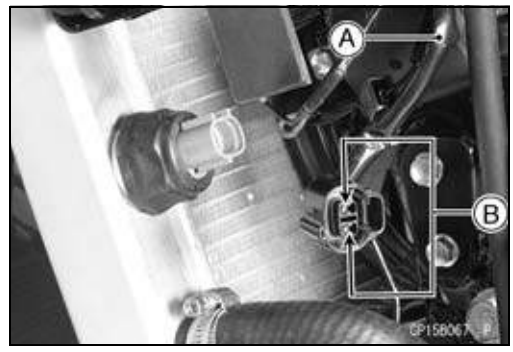
1. Ignition Switch
2. Turn Signal Relay
3. Fuse Box
4. Turn Signal Relay Fuse 10 A
5. Rear Right Turn Signal Light
6. Rear Left Turn Signal Light
7. Battery
8. Main Fuse 30 A
9. Turn Signal Switch
10. Front Left Turn Signal Light
11. Front Right Turn Signal Light
12. Turn Signal Indicator Light

Radiator Fan System

⚠ WARNING

The radiator fan is connected directly to the battery. The 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.

Fan System Circuit Inspection



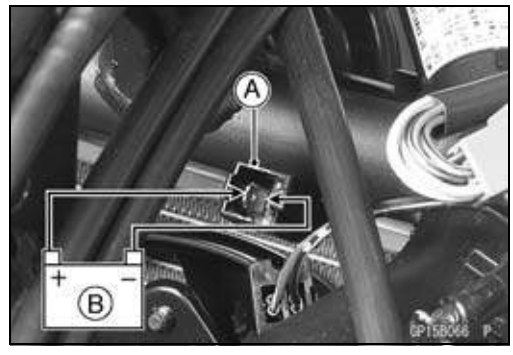
- Disconnect the leads [A] from the radiator fan switch.
- Using an auxiliary wire [B], connect the radiator fan switch leads.

★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 right lower fairing (see Frame chapter).
- Disconnect the 2-pin connector [A] in the fan motor leads.
- Using two auxiliary wires, supply battery [B] power to the fan motor.

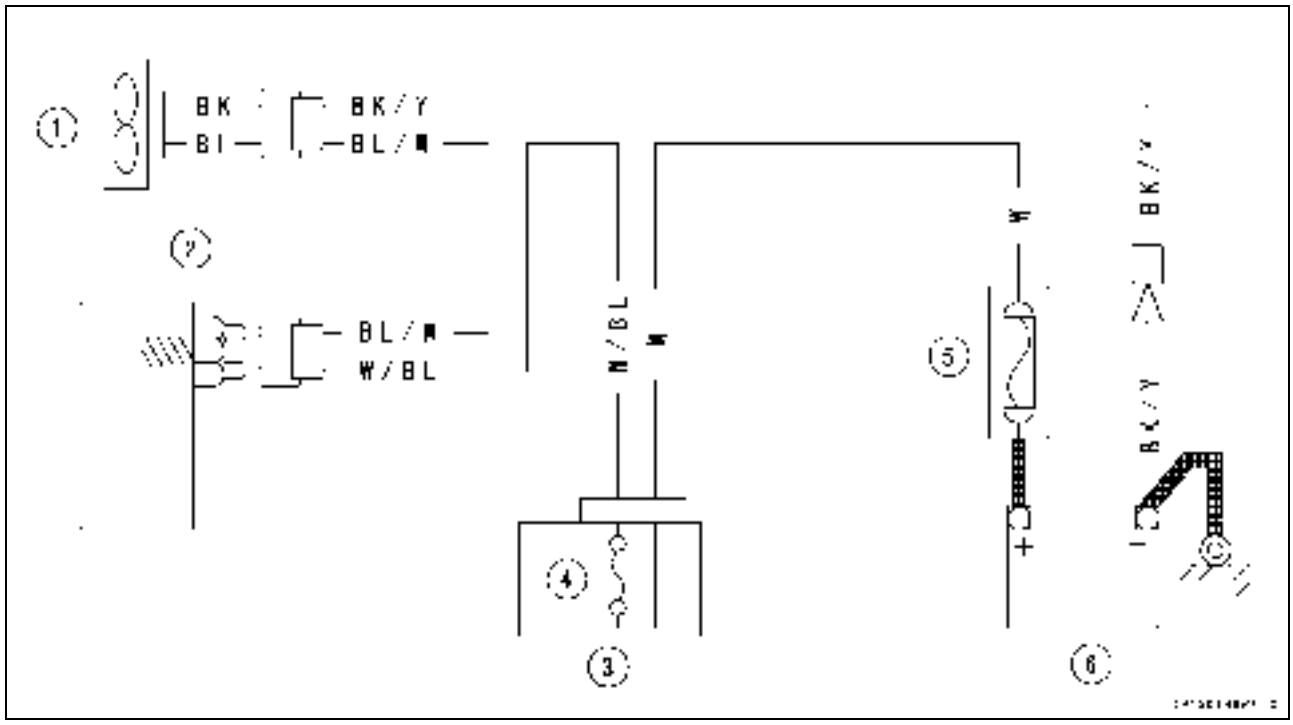
★If the fan does not rotate, the fan motor is defective and must be replaced.

Lead Connections

Battery (+) → BL Lead

Battery (–) → BK Lead

Radiator Fan Circuit

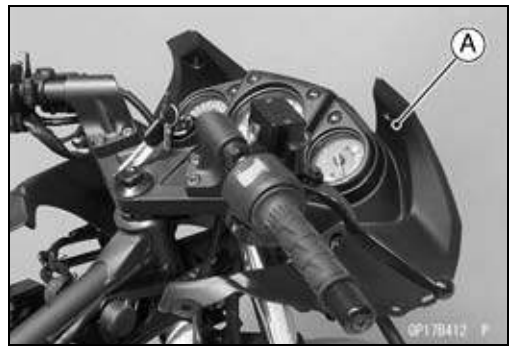


1. Radiator Fan
2. Radiator Fan Switch
3. Fuse Box
4. Fan Fuse 10 A
5. Main Fuse (30 A)
6. Battery

Meters, Gauge and Indicator Unit

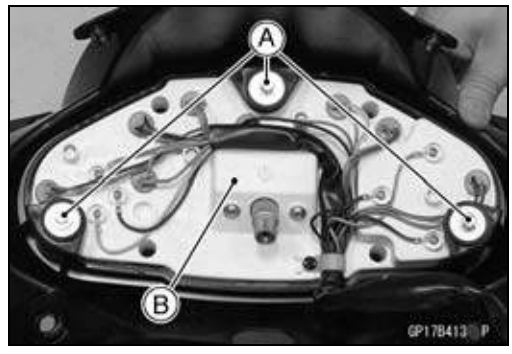
Meter Unit Removal

- Remove:
  Upper Cover [A] (see Upper Cover Removal in the Frame chapter)



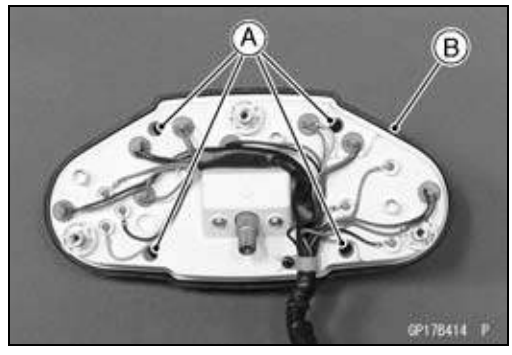
- Unscrew the bolts [A] and remove the meter unit [B] from the upper cover.

CAUTION
Place the meter unit so that the face is up. If a meter unit is left upside down or sideways for any length of time, it will malfunction.



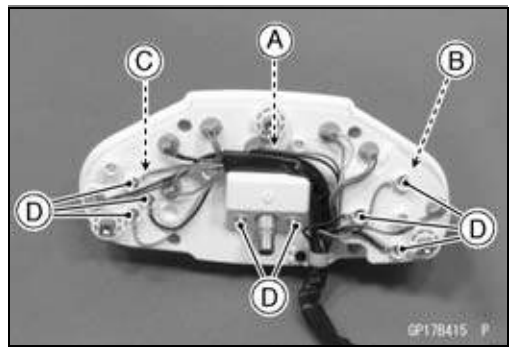
Meter Unit Disassembly

- Remove:
  Meter Unit (see Meter Unit Removal)
  Reset Knob
  Screws [A]
  Meter Cover [B]



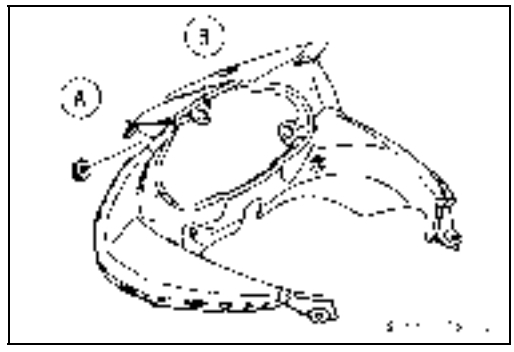
- Remove the speedometer [A], tachometer [B] and fuel gauge [C] by removing screws [D].

CAUTION
Do not remove a meter pointer unless the meter is to be replace. The pointers cannot be reinstalled. The pointer mounting is different from replacement meters.



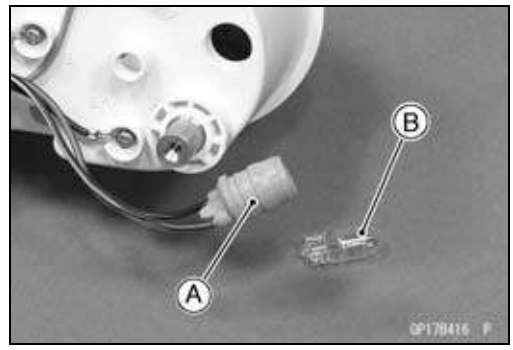
Meter Unit Installation

- Check to see that the rubber damper [A] are installed on the meter mounting bracket [B].
- The installation is a reverse of the meter unit removal.



Meters, Gauge and Indicator Unit

Indicator Light Replacement

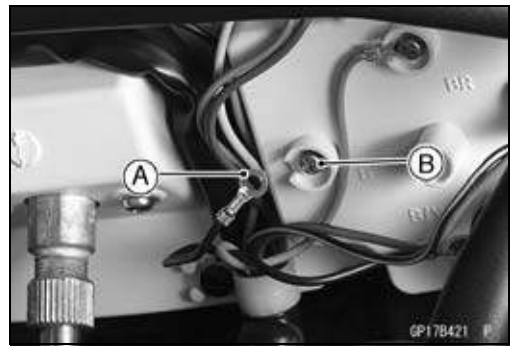


- Remove the meter unit (see Meter Unit Removal).
- To remove the wedge base type bulbs, pull out the bulb sockets [A] and pull the bulbs [B] off the sockets.

CAUTION

Do not use bulbs rated for greater wattage than the specified wattage, as the meter or gauge panel could become warped by excessive heat radiated from the bulbs.

Tachometer Inspection



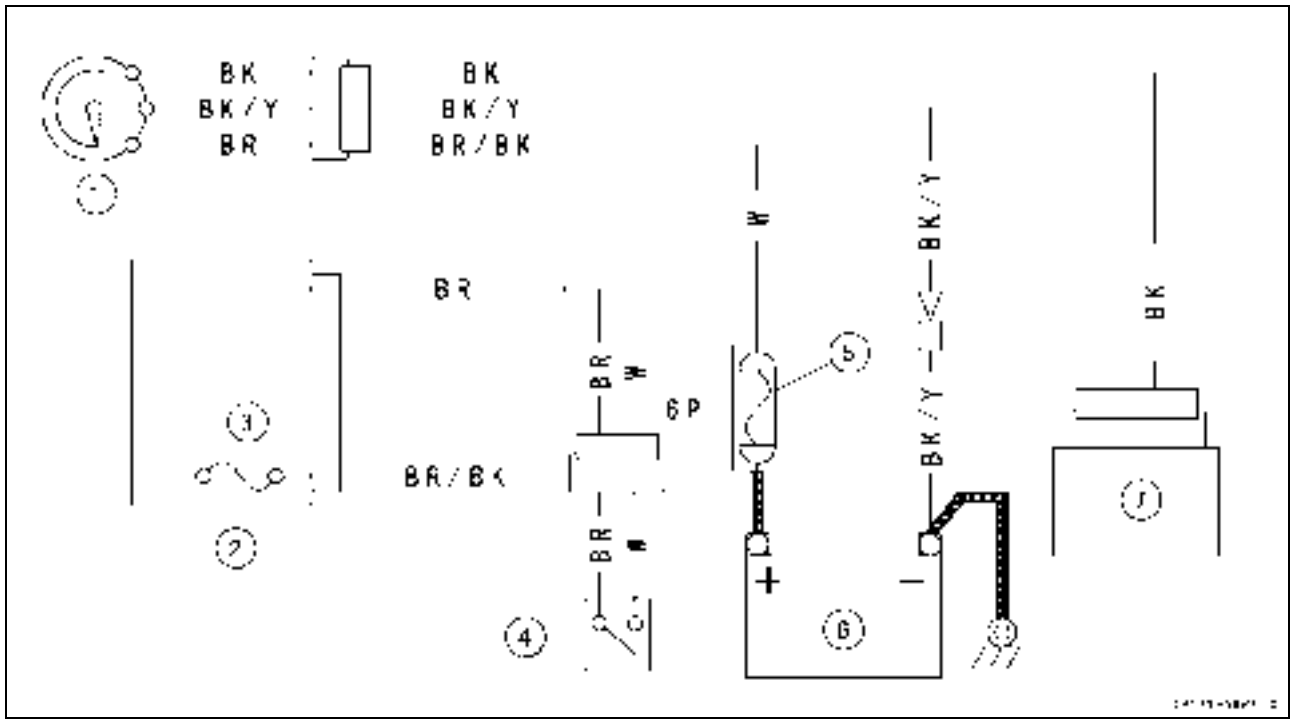
- Check the tachometer circuit wiring.

★If all wiring and components other than the tachometer unit check out good, the unit is suspect. Check the unit as shown.

- Remove the following.
  Upper Fairing (see Upper Fairing Removal in the Frame chapter)
- Disconnect the BK lead.
- Reinstall the BK terminal screw.
- Turn the engine stop switch to RUN position.
- Turn the ignition switch ON.
- Open or connect the BK lead [A] to the BK terminal screw [B]. Then the pointer should flick.
- Turn the ignition switch OFF.

★If the pointer does not flick, replace the tachometer unit.

Tachometer Circuit



1. Tachometer
2. Fuse Box
3. Ignition Fuse 10 A
4. Ignition Switch
5. Main Fuse 30 A
6. Battery
7. IC Igniter

Meters, Gauge and Indicator Unit

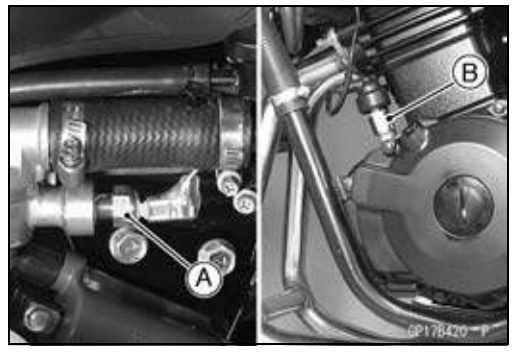
Water Temperature Warning System Inspection

The water temperature warning light goes on when the ignition switch is turned on and goes off soon after the engine starts running (oil pressure switch off) to ensure that its circuit functions properly. The warning light also goes on whenever the coolant temperature rises to **110 ~ 120°C (230 ~ 248°F)** when the motorcycles is in operation. If it stays on, stop the engine and check the coolant level in the reserve tank after the engine cools down.

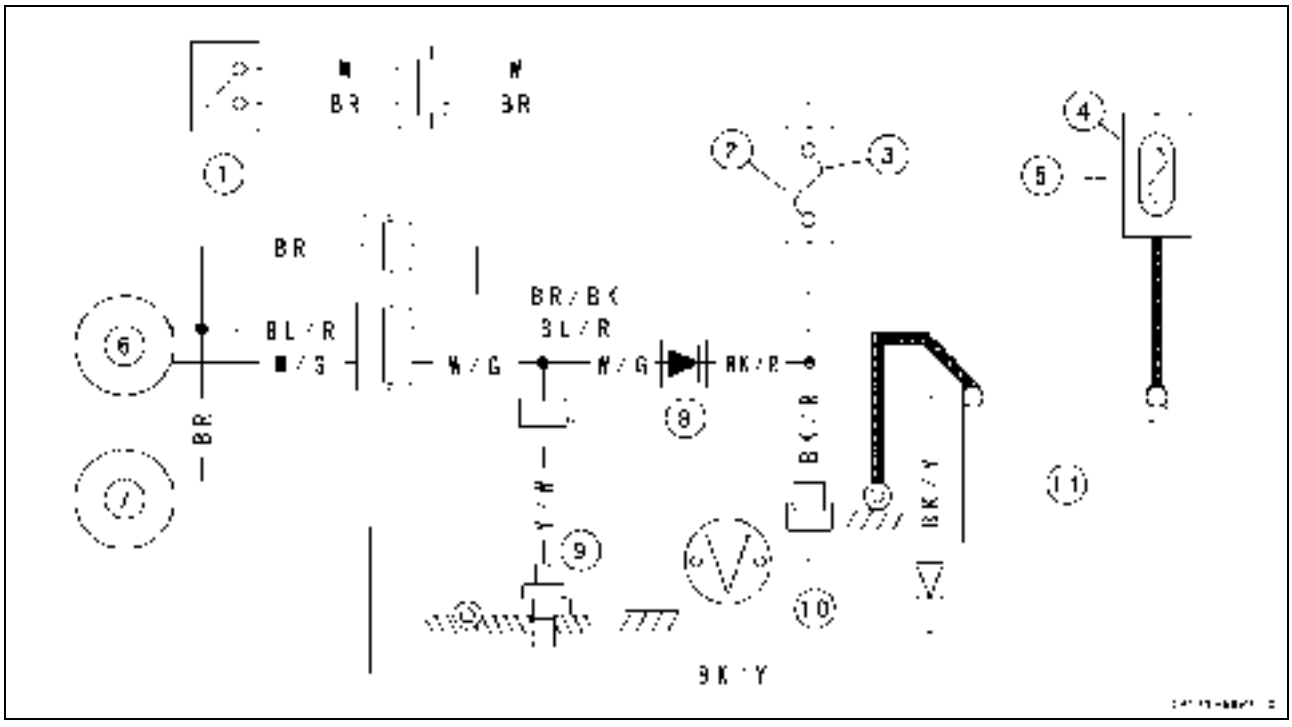
- Inspect the water temperature warning light and the system wiring (see Wiring Inspection).
- Turn on the ignition switch.
- Disconnect the water temperature switch lead [A] and oil pressure switch lead, then ground them together to the frame or engine using auxiliary lead.

★If the warning light is lit, inspect the water temperature switch (see Specifications) and the oil pressure switch [B]. Replace any switch if damaged.

★If the warning light is not lit, check the warning light bulb.



Water Temperature Warning System Circuit



1. Ignition Switch
2. Fuse Box
3. Ignition Fuse 10 A
4. Starter Relay
5. Main Fuse (30 A)
6. Water Temperature Warning Light
7. Oil Pressure Waning Light
8. Diode
9. Water Temperature Switch
10. Oil Pressure Switch
11. Battery

Switches and Sensor

Brake Light Timing Inspection

● Refer to Brake Light Switch Operation Inspection in the Periodic Maintenance chapter.

Brake Light Timing Adjustment

● Refer to Brake Light Switch Operation Inspection in the Periodic Maintenance chapter.

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			
Color	BR		BL
When brake pedal is pushed down	○	-	○
When brake pedal is released			

Side Stand Switch Connections			
Color	G		BK
When side stand is up	○	-	○
When side stand is down			

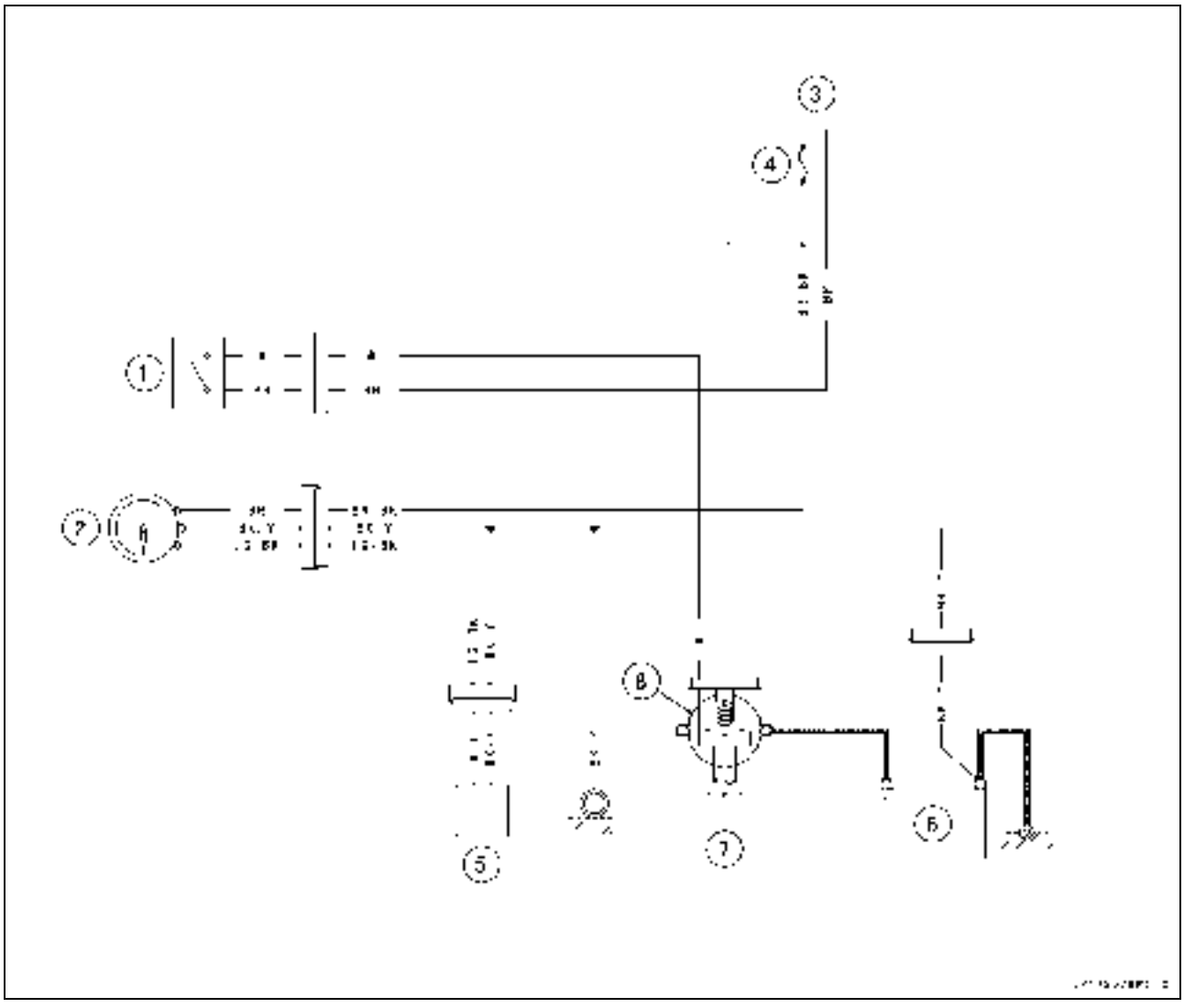
Neutral Switch Connections			
Color	SW. Terminal		Ground
When transmission is in neutral	○	-	○
When transmission is not in neutral			

Oil Pressure Switch Connections *			
Color	BK		Ground
When engine is stopped	○	-	○
When engine is running			

*: Engine lubrication system is in good condition.

Switches and Sensor

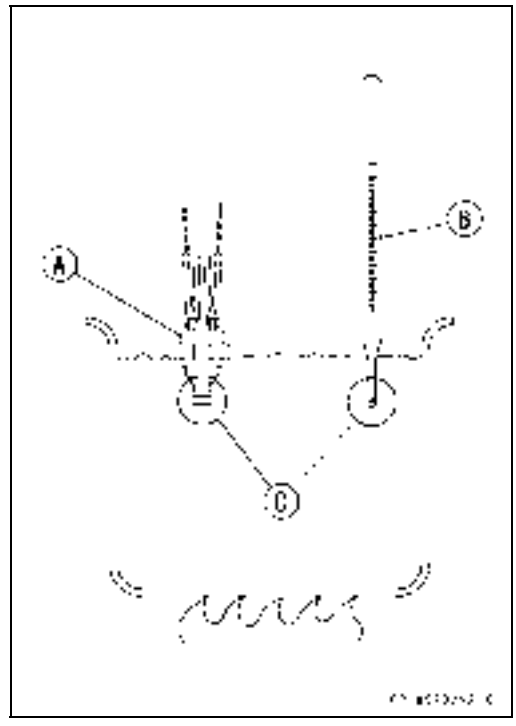
Fuel Gauge Circuit



1. Ignition Switch
2. Fuel Gauge
3. Fuse Box
4. 10 A Ignition Fuse
5. Fuel Level Sensor
6. Battery
7. 30 A Main Fuse
8. Starter Relay

Switches and Sensor

Radiator Fan Switch Inspection



- Remove the fan switch.
- 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 [C] 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 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 at 95 ~ 101°C (196 ~ 203°F)

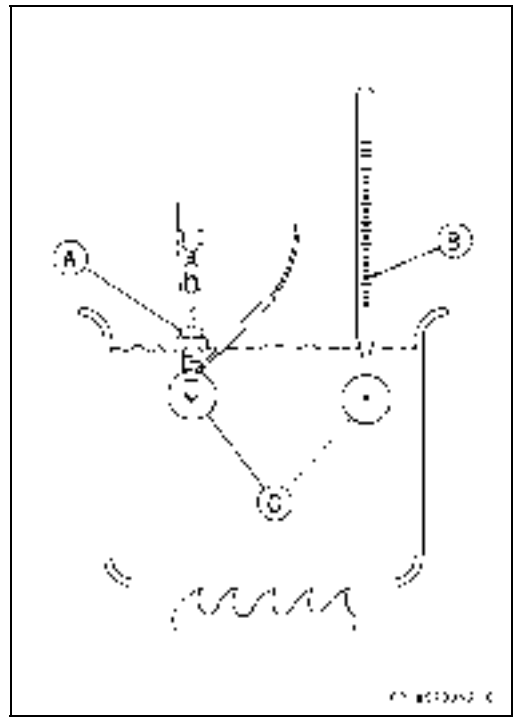
○**Falling temperature:**

From ON to OFF within 3 ~ 8°C (37 ~ 46°F) of "ON" temperature

ON: Less than 0.5 Ω

OFF: More than 1 MΩ

Water Temperature Switch Inspection



- Remove the water temperature switch.
- 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 [C] 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 sensor across the terminal and the body at the temperatures shown in the table.

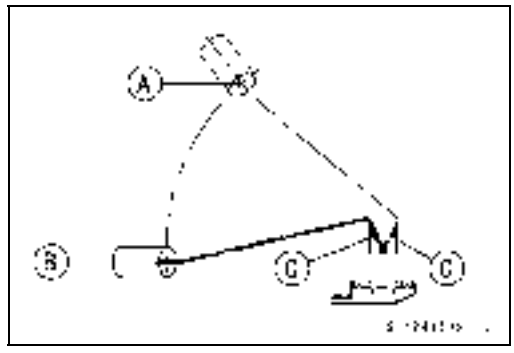
Special Tool - Hand Tester: 57001-1394

Switches and Sensor

★If the hand tester does not show the specified values, replace the switch.

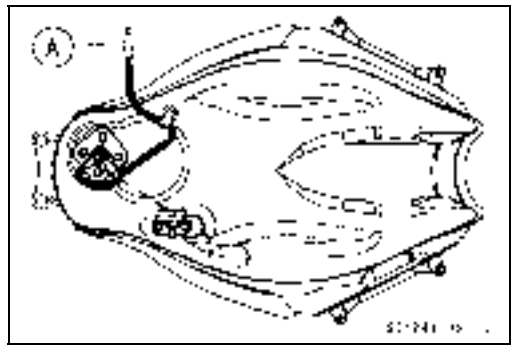
Water Temperature Switch Connections
Rising temperature:
From OFF to ON at 112 ~ 118°C (226 ~ 232°F)
Falling temperature:
From ON to OFF at 108°C (226°F) ~ temperature less than ON temperature
ON: Less than 0.5 Ω
OFF: More than 1 MΩ

Fuel Level Sensor Inspection



- Remove the fuel tank (see Fuel Tank Removal in the Fuel System chapter).
- Remove the fuel level sensor 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.
[A] Float in Full Position
[B] Float in Empty Position
[C] Float Arm Stoppers



- Using a hand tester, measure the resistance across the terminals in the fuel level sensor lead connector [A].

★If the tester reading are not as specified, or do not change smoothly according as the float moves up and down, replace the sensor.

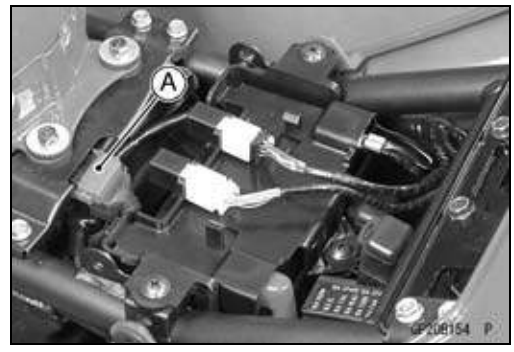
Fuel Level Sensor Resistance
Standard:

Full position:	**4 ~ 10 Ω**
Empty position:	**90 ~ 100 Ω**

Special Tool - Hand Tester: 57001-1394

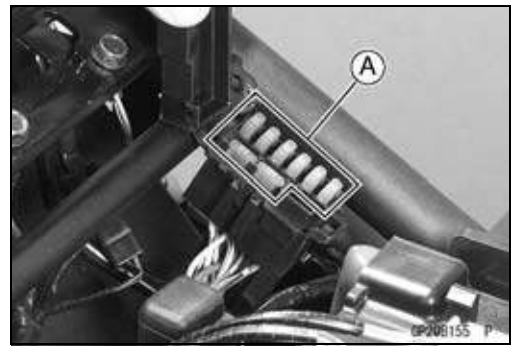
Fuses

30 A Main Fuse Removal



- Remove the front seat (see Front Seat Removal in the Frame chapter).
- Unlock the hook to clear the lids of the main fuse cover [A].
- Pull up the main fuse cover with the starter relay connector.

Fuse Removal



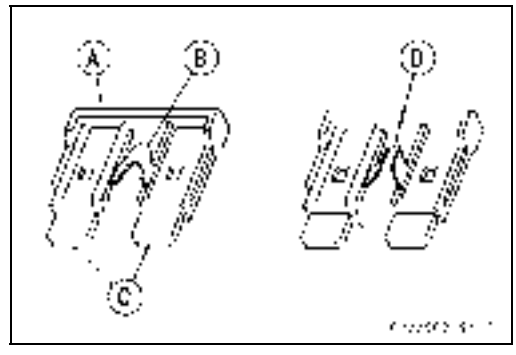
- Remove the front seat (see Front Seat Removal in the Frame chapter).
- Unlock the hook to lift up the lid from the fuse case.
- Pull the fuses [A] straight up from the fuse case with the nose plier.

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 Inspection



- Remove the fuse, and inspect the fuse element.

★If the fuse element is blown, replace the fuse.

Housing [A]
Fuse Element [B]
Terminal [C]
Blown Element [D]

NOTE

○*Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.*

CAUTION

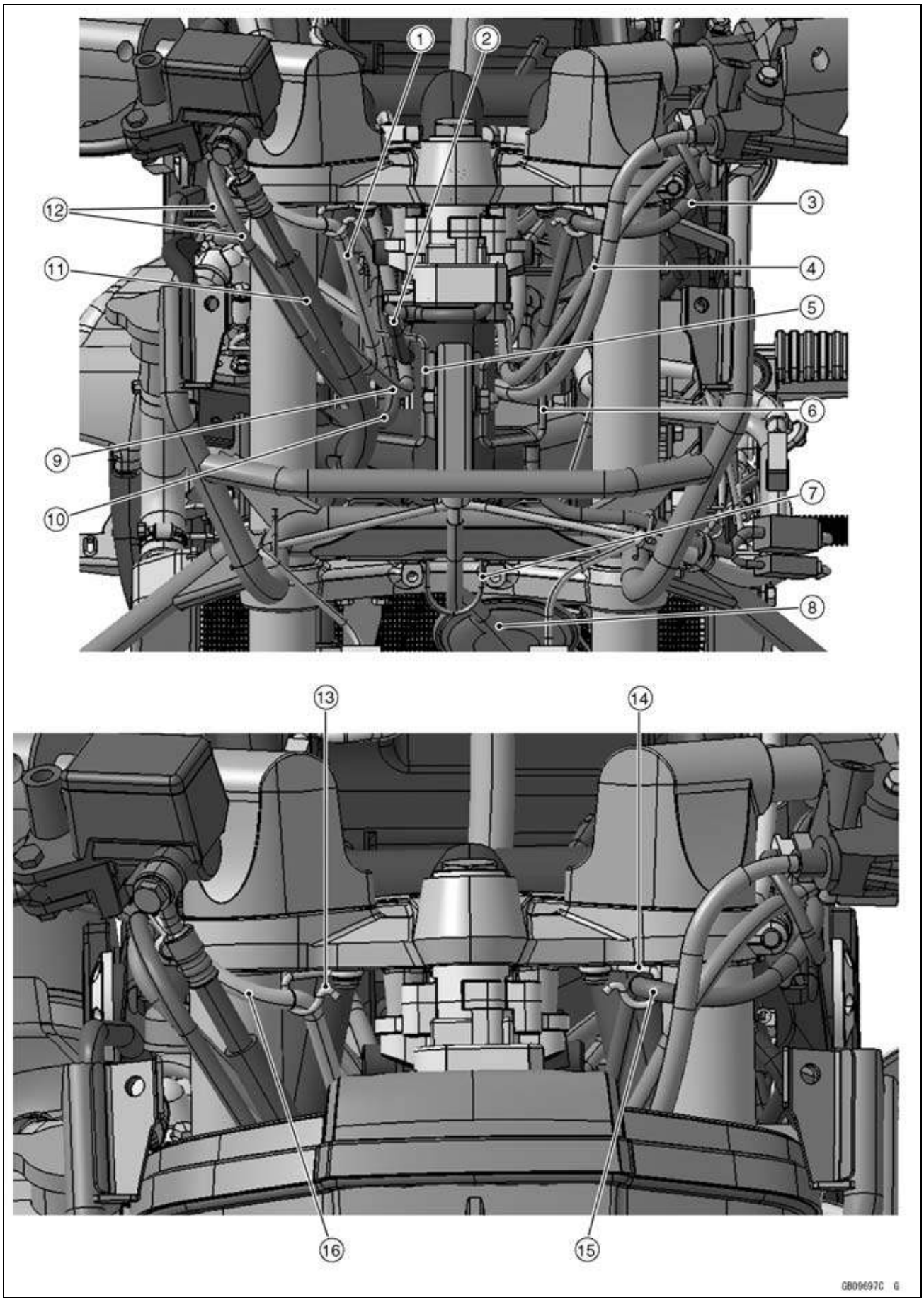
When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring ad components, and installation of a fuse with a lower rating may cause the fuse to be blown quickly.

Appendix

Table of Contents

Cable, Wire, and Hose Routing 17-2
Troubleshooting Guide 17-38

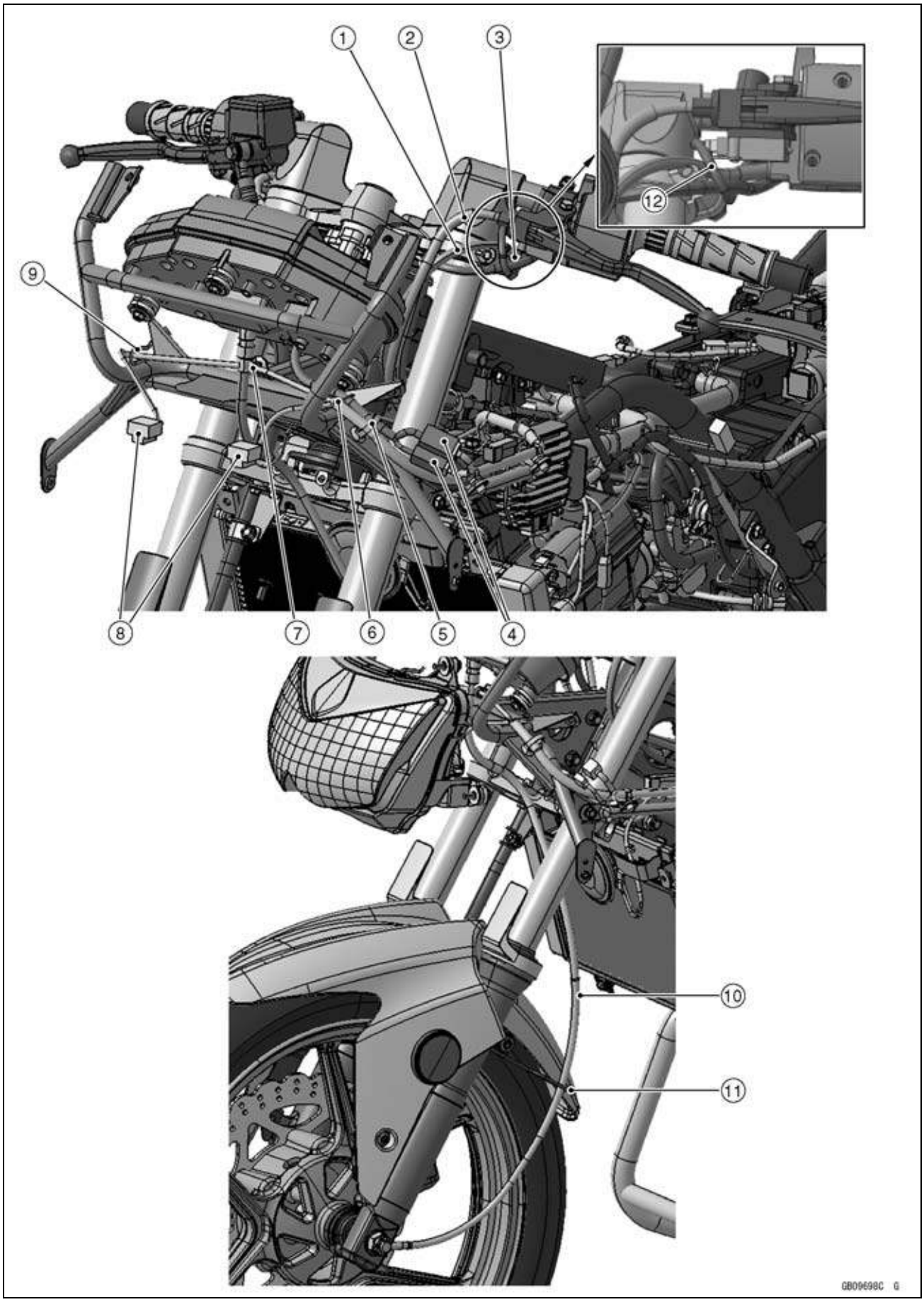
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Right Switch Housing Leads
2. Ignition Switch Leads
3. Left Switch Housing Leads
4. Choke Cable
5. Guide
6. Guide
7. Guide
8. Speedometer Cable
9. Throttle Cable (Accelerator)
10. Throttle Cable (Decelerator)
11. Brake Hose
12. Throttle Cables
13. Guide
14. Guide
15. Left Switch Housing Leads
16. Right Switch Housing Leads

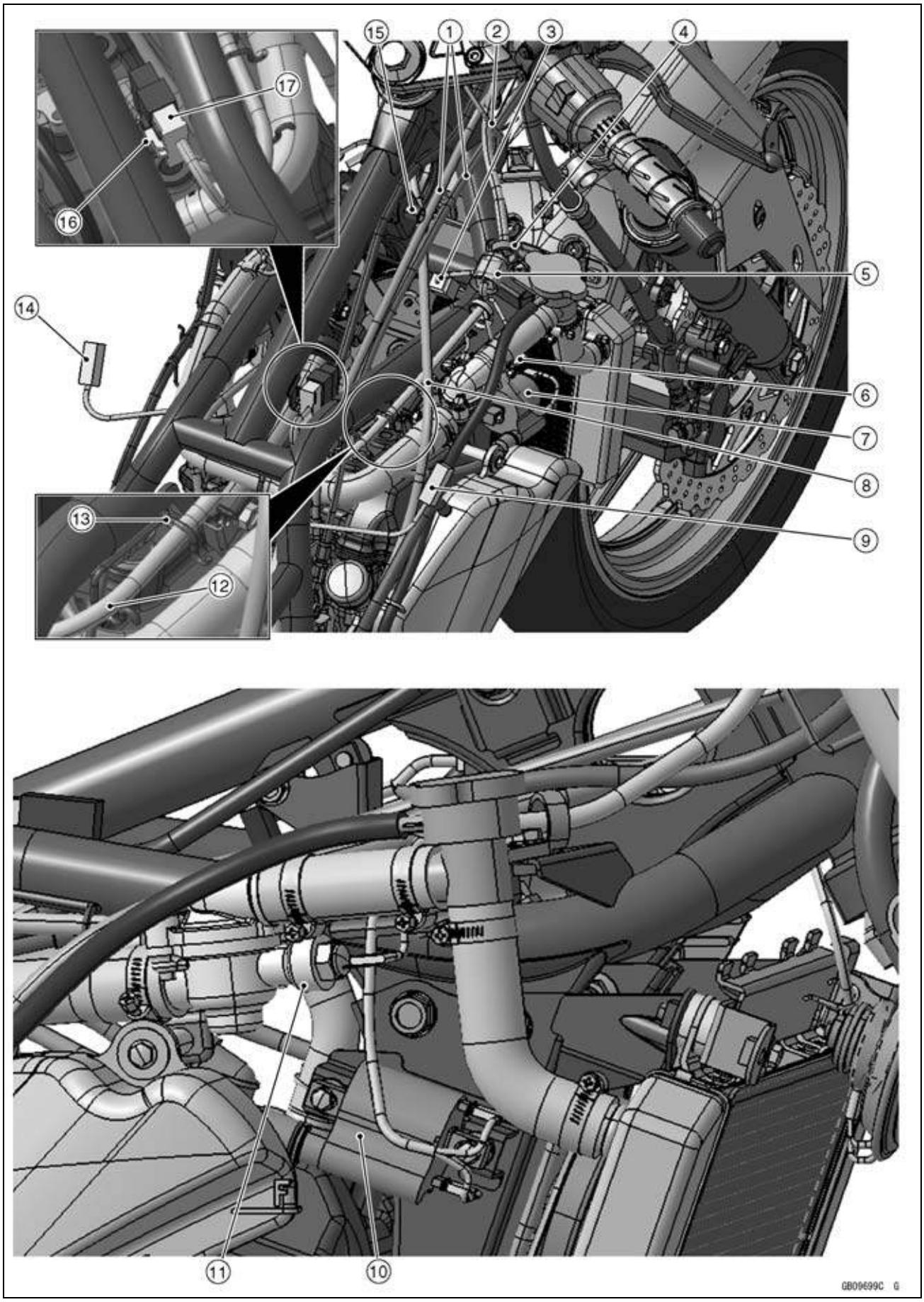
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Choke Cable
2. Clutch Cable
3. Left Switch Housing Leads
4. Meter Leads Connectors
5. Band
6. Guide
7. Band
8. Headlight Leads Connectors
9. Guide
10. Speedometer Cable
11. Guide
12. Starter Locknut Switch Lead

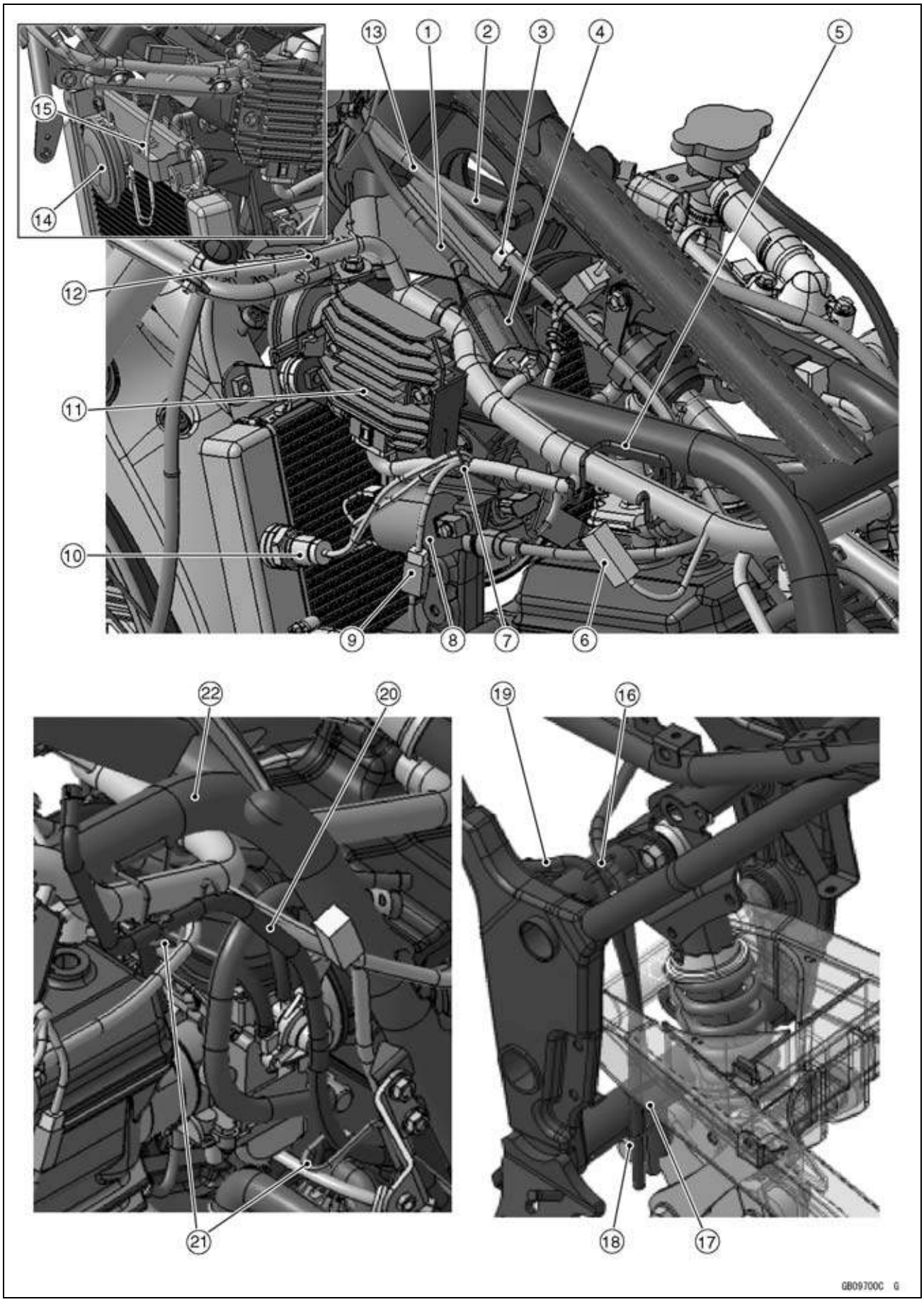
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Throttle Cables
2. Guide
3. Radiator Fan Leads Connectors
4. Clamp
5. Right Switch Housing Leads
6. Water Temperature Switch
7. #2 Ignition Coil
8. Clutch Cable
9. Front Right Turn Signal Light Connector
10. #2 Ignition Coil
11. Water Temperature Switch
12. Main Harness
13. Guide
14. Front Left Turn Signal Light Connector
15. Bracket
16. Bracket
17. Ignition Switch Leads Connector

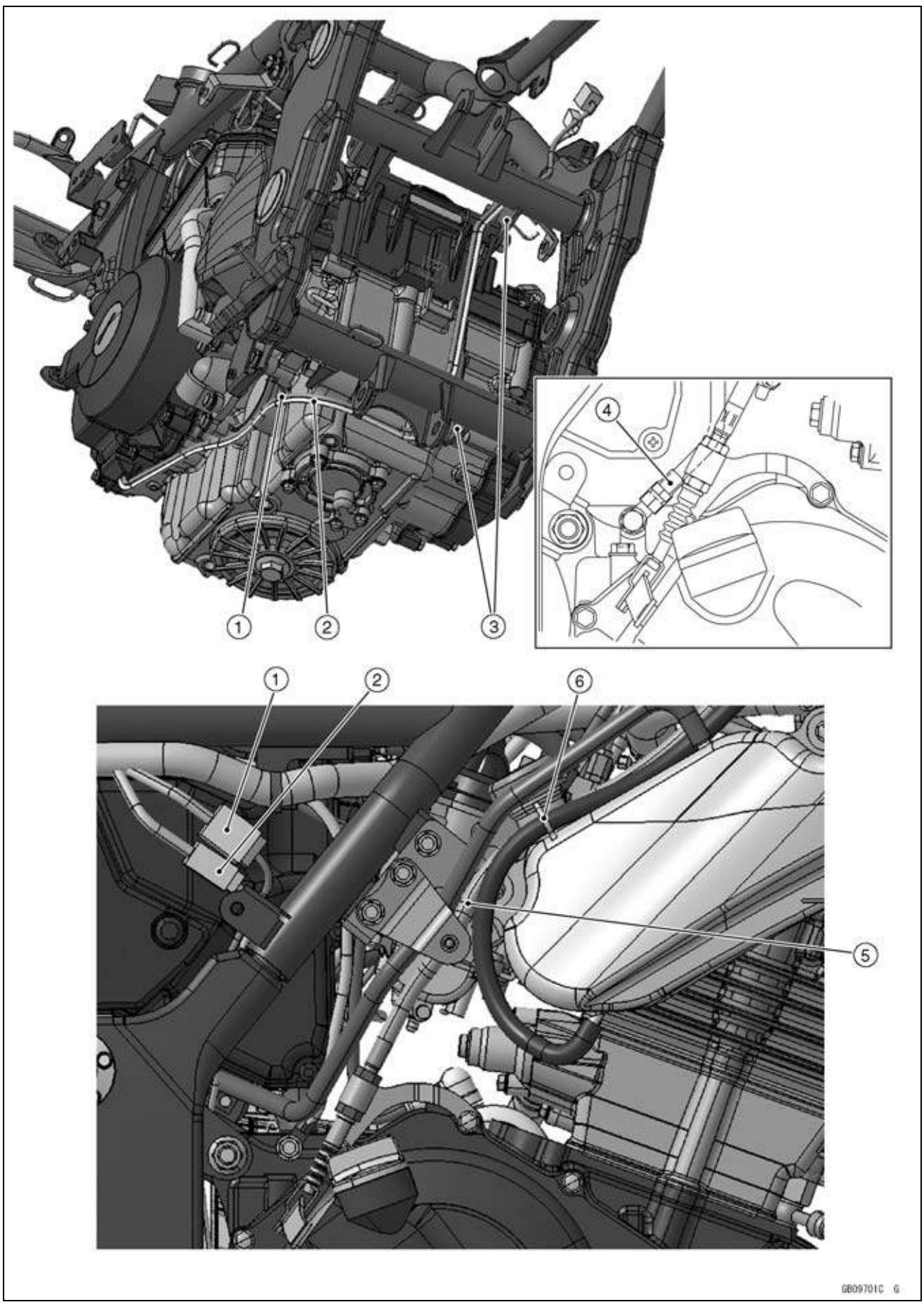
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Left Switch Housing Leads
2. Clutch Cable
3. Clamp
4. Left Switching Housing Leads Connector
5. Guide
6. Front Left Turn Signal Light Connector
7. Guide
8. #1 Ignition Coil
9. Oil Pressure Switch Connector
10. Radiator Fan Switch
11. Radiator/Rectifier
12. Guide
13. Choke Cable
14. Horn
15. Guide
16. Guide
17. Coolant Reserver Tank Breather Hose
18. Guide
19. Fuel Tank Tank Breather Hose
20. Fuel Tank Tank Breather Hose
21. Guide
22. Guide

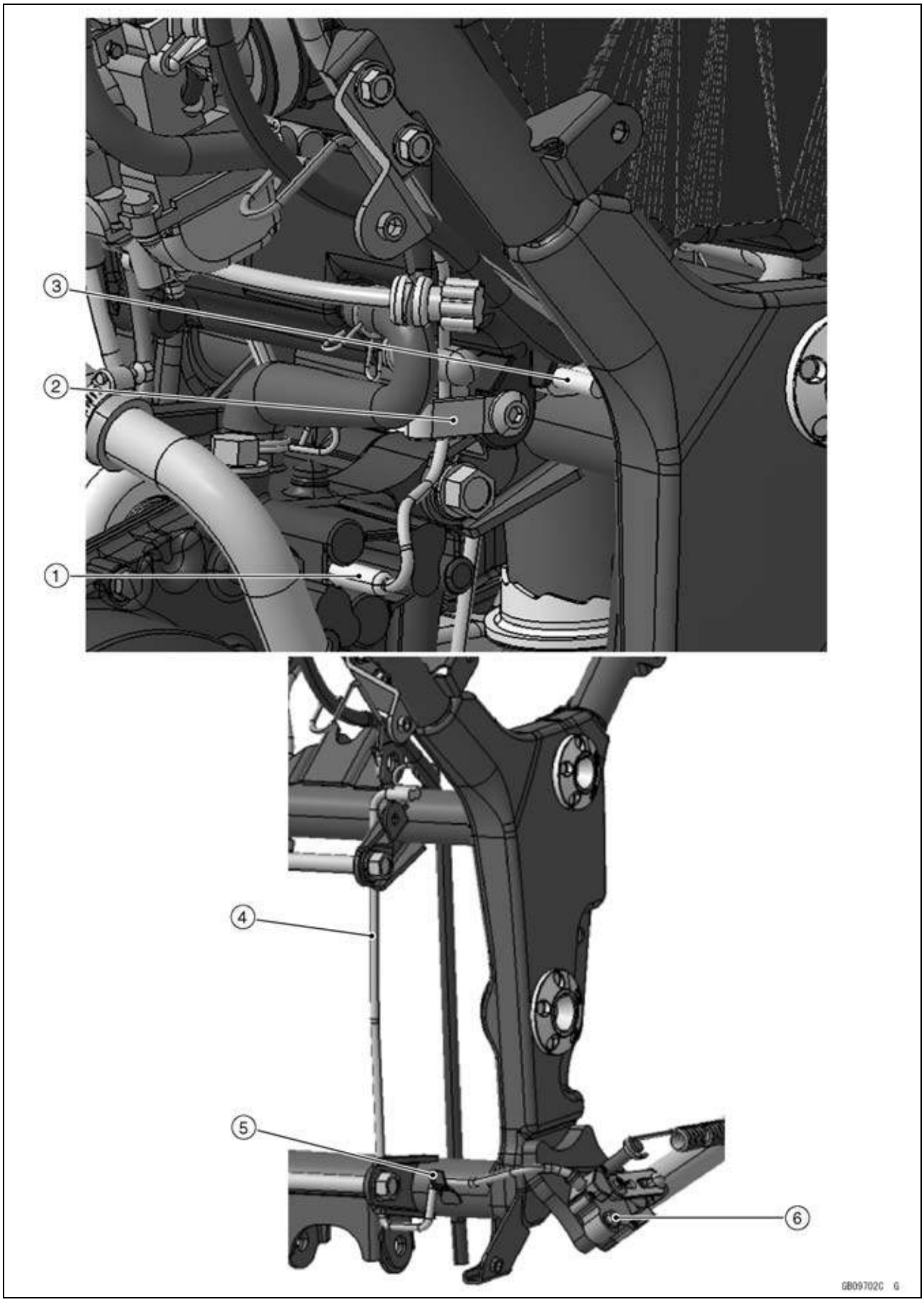
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Alternator Leads
2. Crankshaft Sensor Leads
3. Brackets
4. Engine Ground Lead
5. Clutch Cable
6. Guide

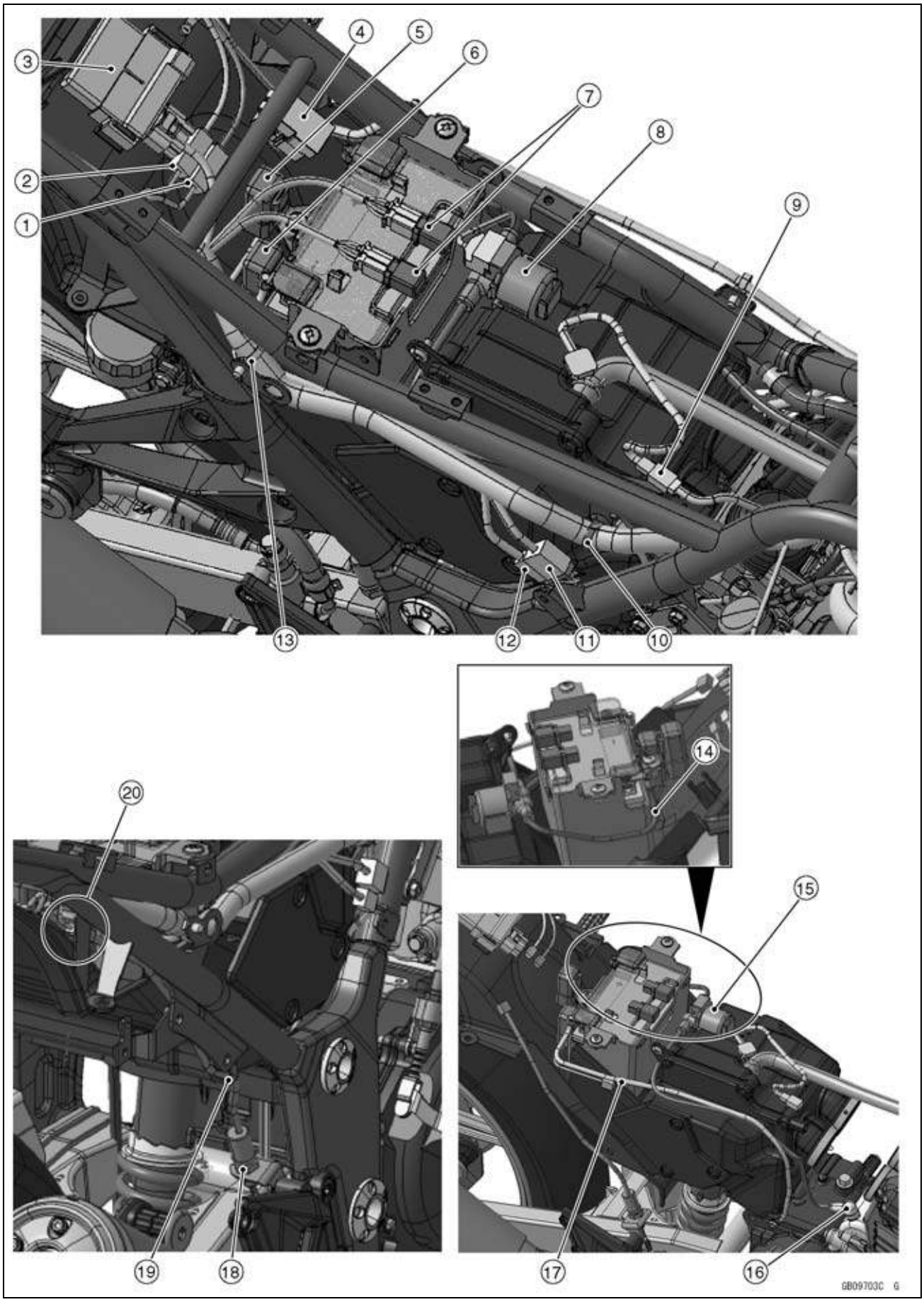
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Neutral Switch Connector
2. Clamp
3. Sidestand Switch Connector
4. Sidestand Switch Leads
5. Clamp
6. Sidestand Switch

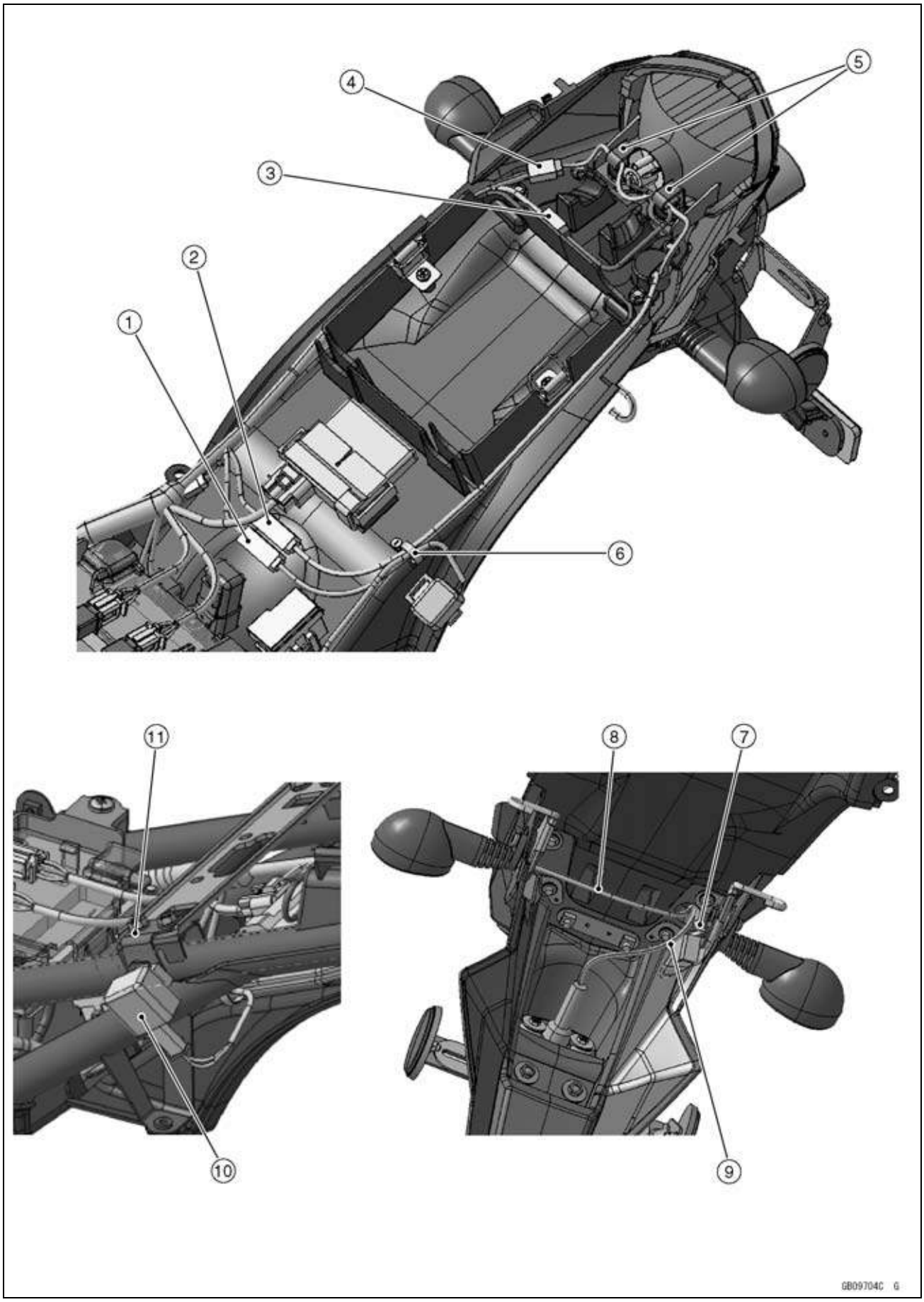
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Rear Left Turn Signal Light Connector
2. Rear Right Turn Signal Light Connector
3. IC Igniter
4. Fuse Box
5. Headlight Circuit Relay
6. Starter Circuit Relay
7. Diodes
8. Starter Relay
9. Fuel Level Sensor Connector
10. Clamp
11. Alternator Connector
12. Crankshaft Connector
13. Clamp
14. Battery (+) Cable
15. Starter Relay
16. Starter Motor Cable
17. Battery (–) Cable
18. Rear Brake Switch
19. Clamp
20. Rear Brake Switch Connector

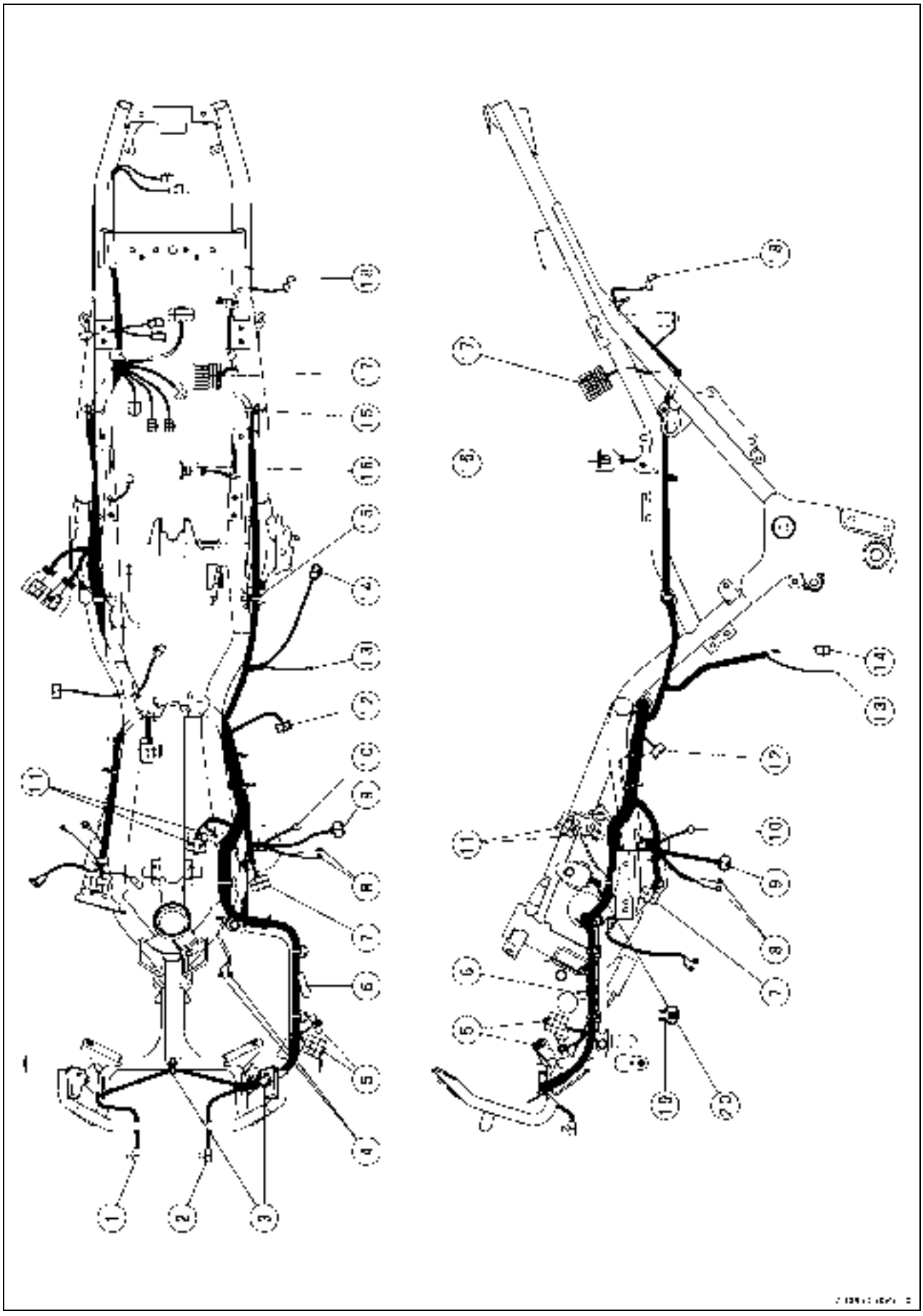
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Rear Left Turn Signal Light Connector
2. Rear Right Turn Signal Light Connector
3. Brake/Tail Light Connector
4. License Plate Light Connector
5. Clamps
6. Clamp
7. Rear Left Turn Signal Light Connector
8. Rear Right Turn Signal Light Connector
9. License Plate Light Connector
10. Turn Signal Relay
11. Bracket

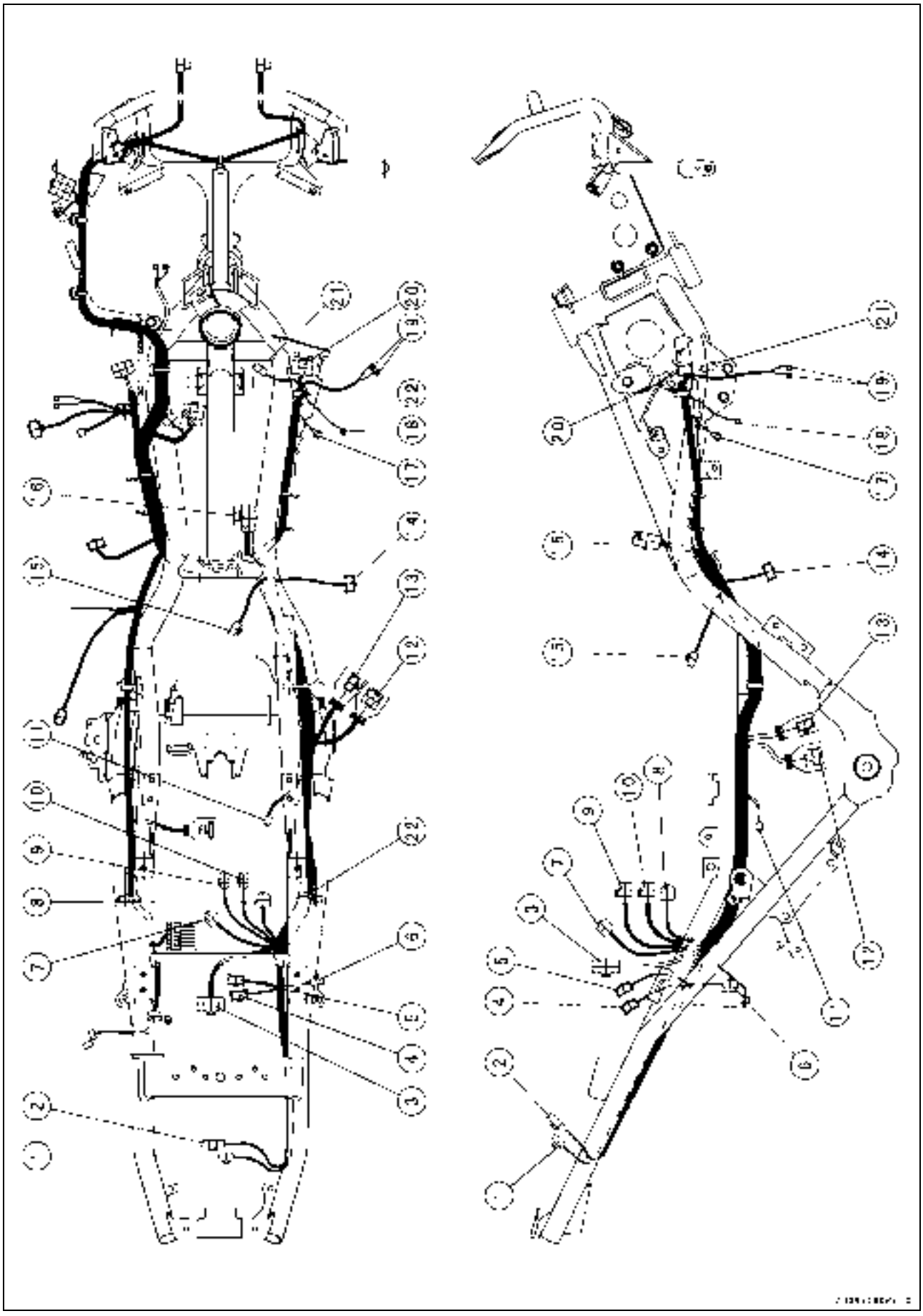
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Headlight (High) Connector
2. Headlight (Low) Connector
3. Bands
4. Horn Connector
5. Meter Connector
6. Diode Connector
7. Regulator/Rectifier Connector
8. Ignition Coil Connector
9. Radiator Fan Switch Connector
10. Oil Pressure Switch Connector
11. Left Switch Housing Connectors
12. Front Turn Signal Light Connector
13. Neutral Switch Connector
14. Sidestand Switch Connector
15. Bands
16. Starter Relay
17. Fuse Box
18. Turn Signal Relay
19. Clamp
20. Choke Cable

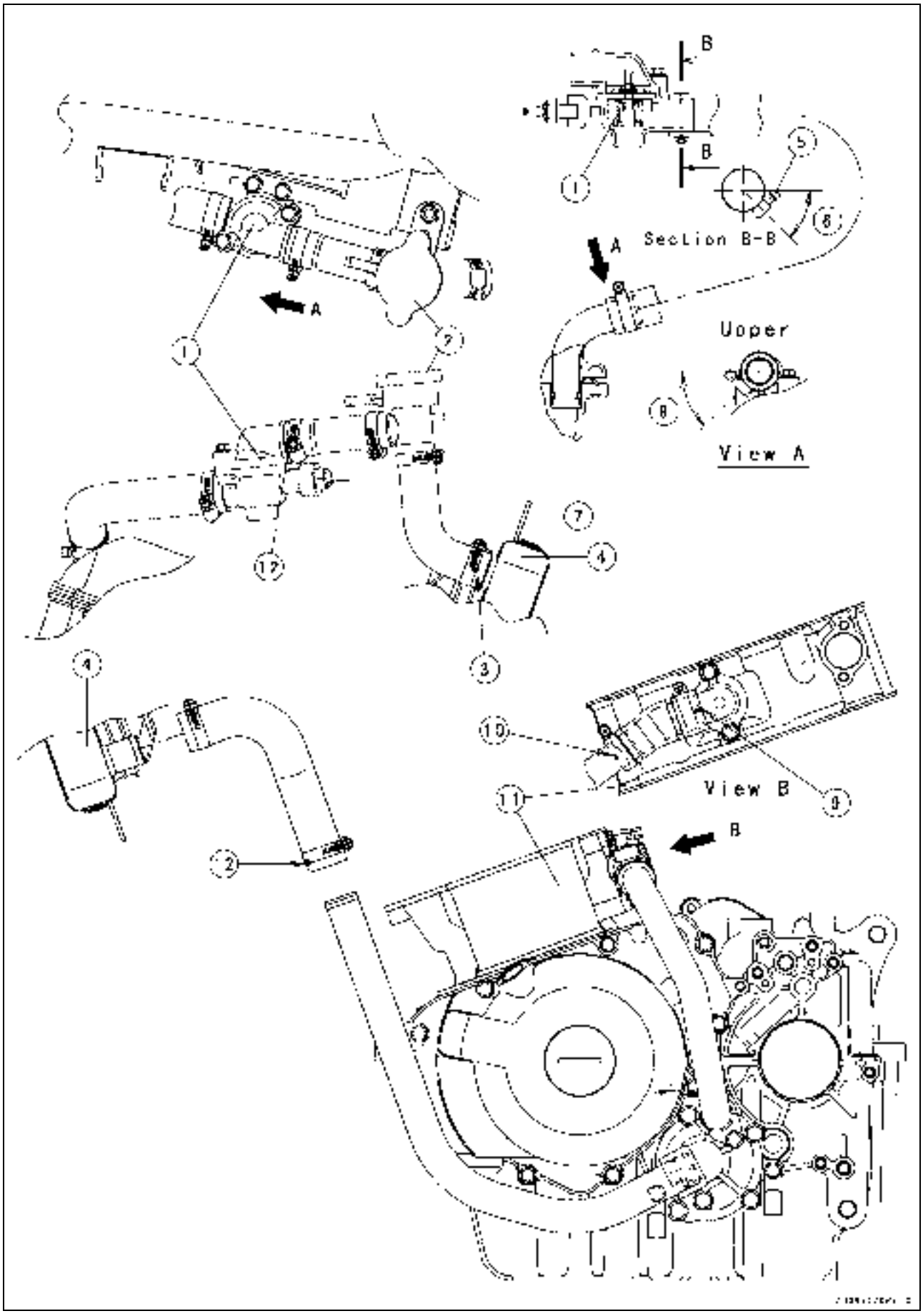
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. License Plate Light Connector
2. Tail/Brake Light Connector
3. IC Igniter Connector
4. Rear Right Turn Signal Light Connector
5. Rear Left Turn Signal Light Connector
6. Brake Light Switch Connector
7. Starter Relay Connector
8. Headlight Circuit Relay
9. Diode
10. Diode
11. Battery (–) Cable
12. Alternator Connector
13. Crankshaft Sensor Connector
14. Front Turn Signal Light Connector
15. Fuel Level Sensor Connector
16. Ignition Switch Connector
17. Frame Ground Terminal
18. Radiator Fan Switch Connector
19. Ignition Coil Connector
20. Right Switch Housing Connector
21. Radiator Fan Connector
22. Bands

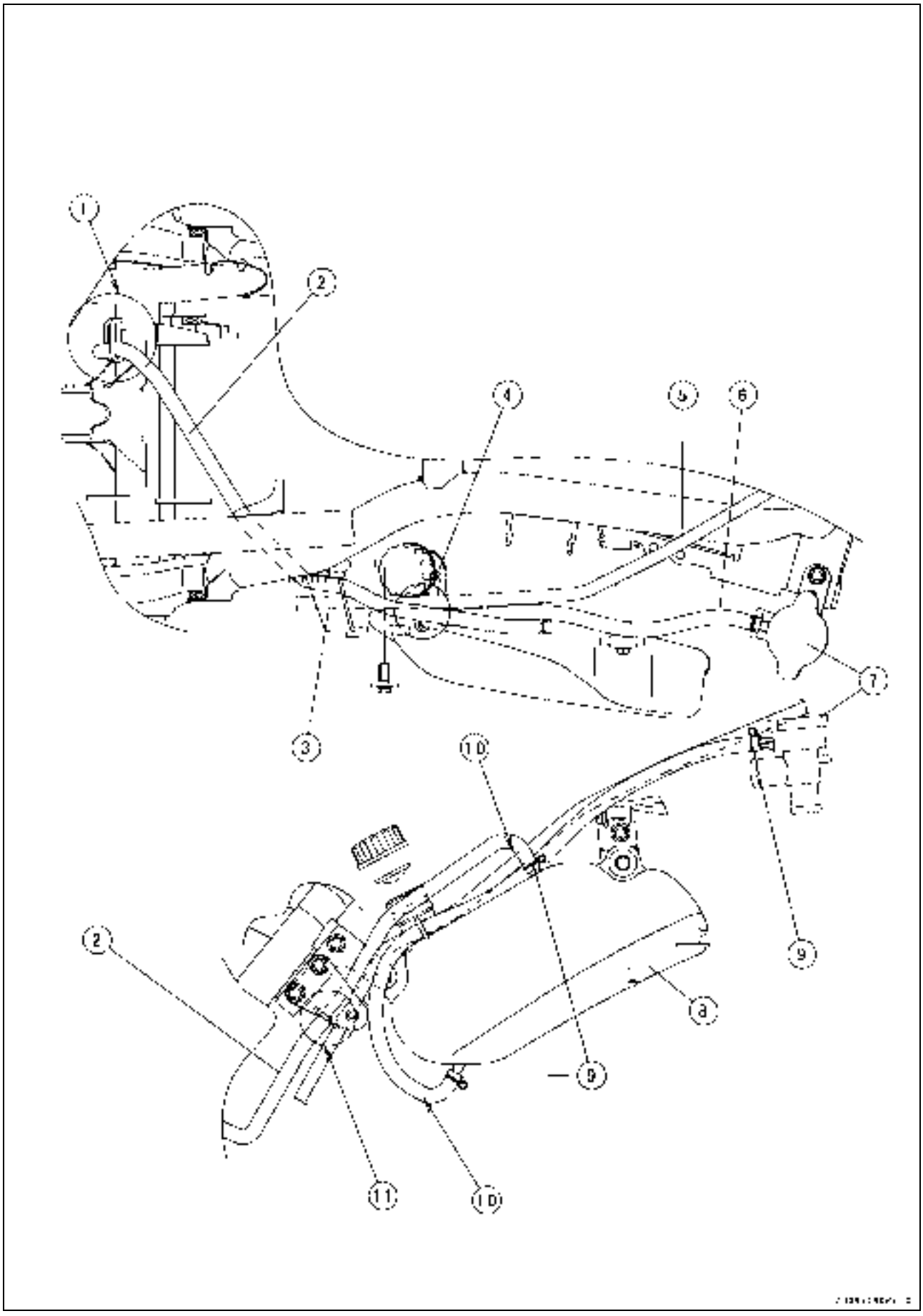
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Thermostat
2. Radiator Cap
3. Install the hose so that its white mark side faces the radiator.
4. Radiator
5. Clamp Screw
6. 45°
7. Cylinder Head
8. 45° ~ 55°
9. Align the white mark on the hose with the projection mark on the fitting.
10. Install the hose so that its end cover the white mark on the pipe.
11. Cylinder
12. Install the hose so that its white mark side faces the pipe.

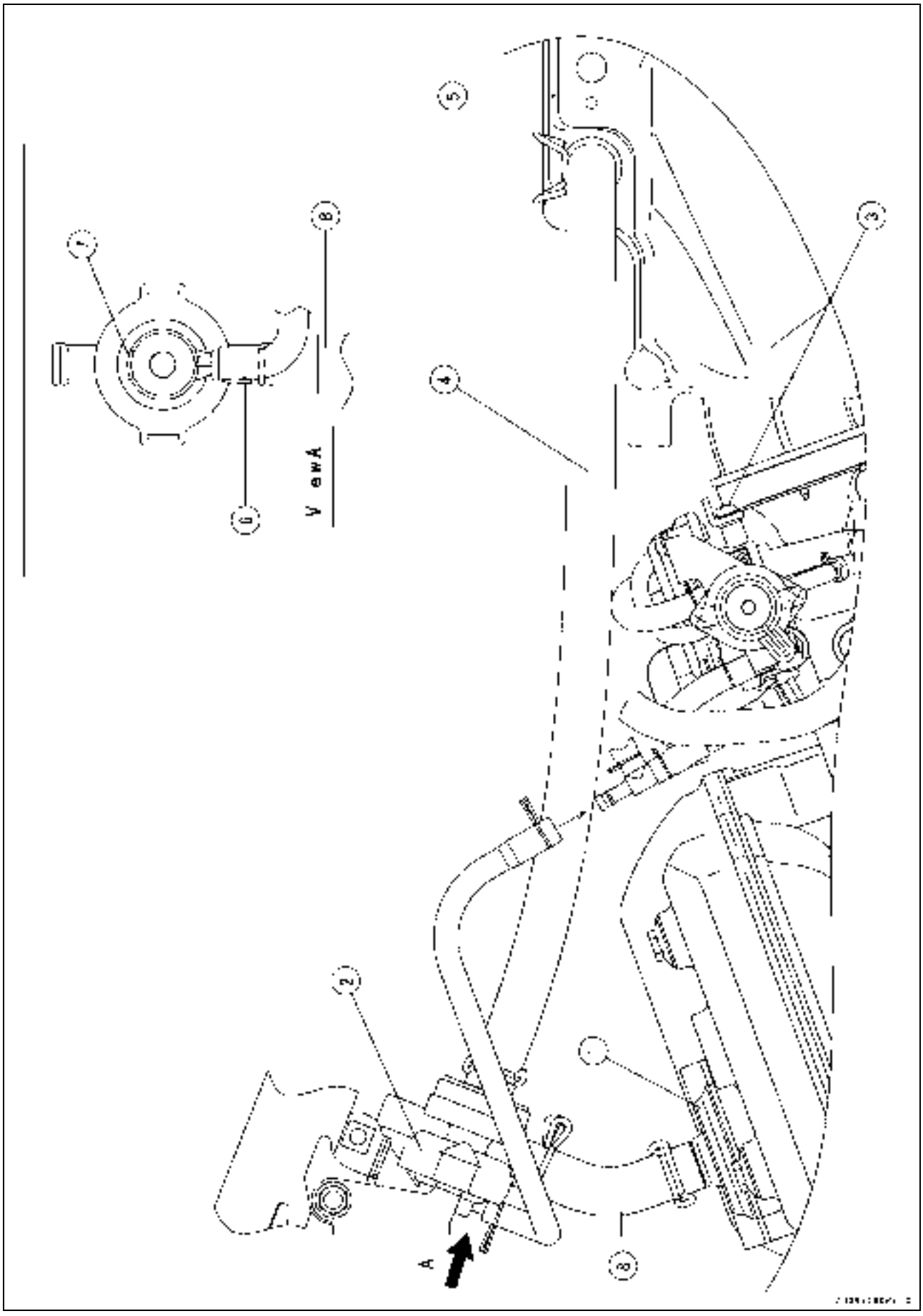
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Run the reserver tank vent hose into the guide (2 places).
2. Reserver Tank Vent Hose
3. Bracket
4. Run the clutch cable and over flow hose into the hole of the reserver tank.
5. Clutch Cable
6. Radiator Overflow Hose
7. Radiator Cap
8. Coolant Reserver Tank
9. Clamp
10. Hose Curve Side
11. Run the only reserver tank vent hose into the bracket guide.

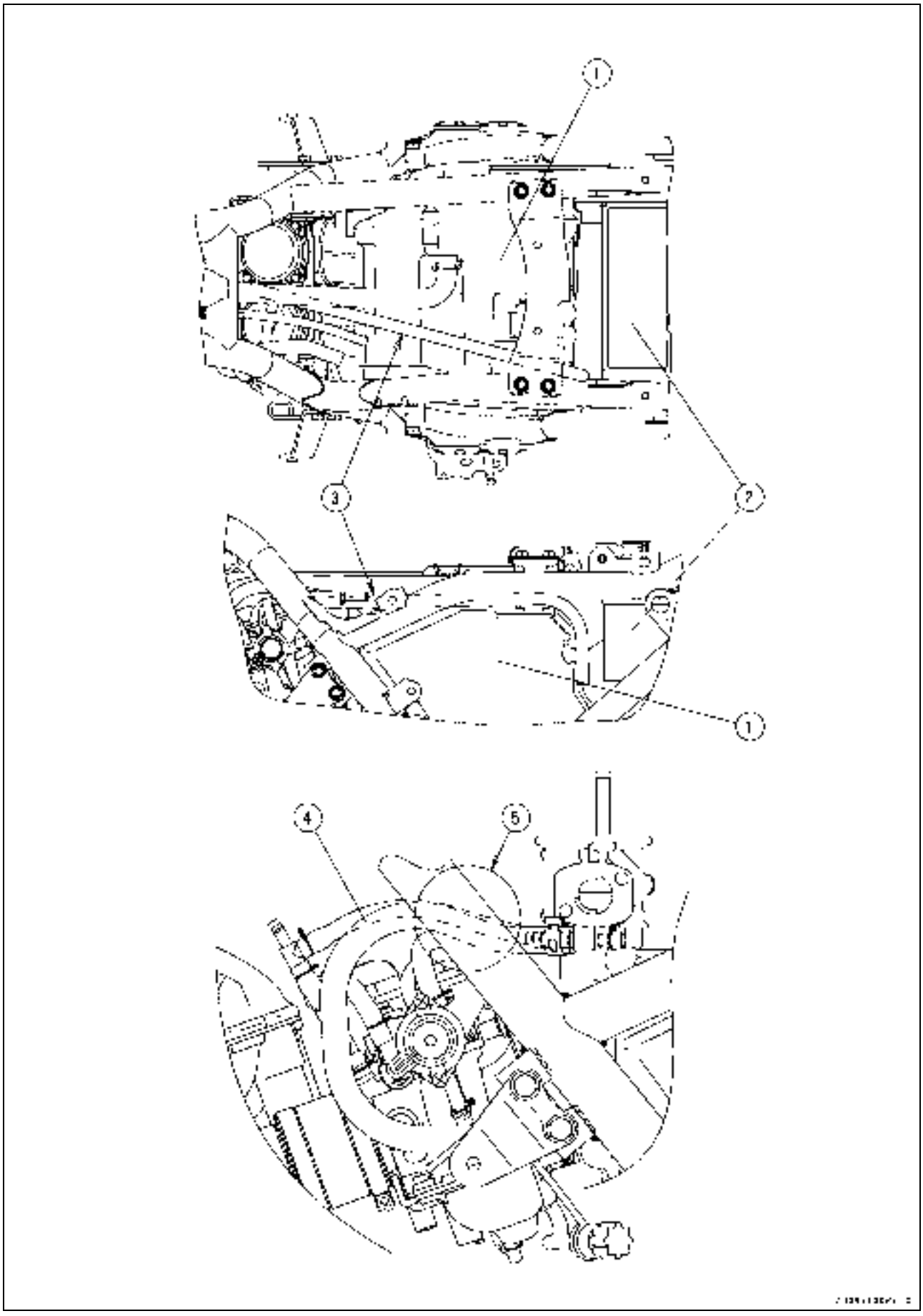
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Air Suction Valve Cover
2. Vaccum Switch Valve
3. Carburetor
4. Install the vaccum switch valve hose so that its white mark faces the air cleaner box.
5. Air Cleaner Box
6. Install the vaccum valve switch fitting so that its white mark side faces the air suction valve hose.
7. This side is closed.
8. Air Suction Valve Hose

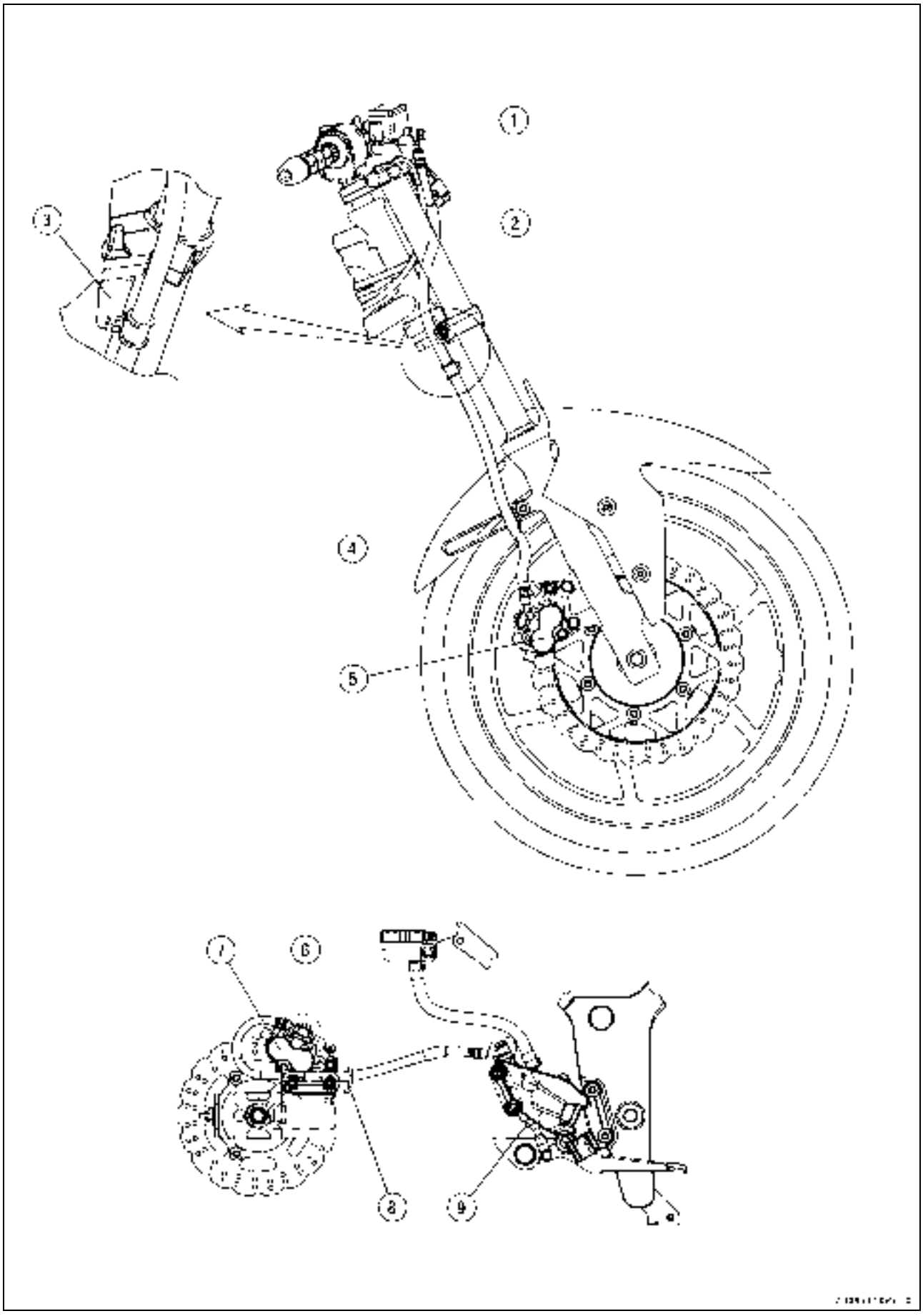
Cable, Wire, and Hose Routing



Cable, Wire, and Hose Routing

1. Air Cleaner Box
2. Battery
3. Run the carburetor vent hose between the air cleaner box and battery.
4. Fuel Hose
5. Run the fuel hose inside of the frame.

Cable, Wire, and Hose Routing

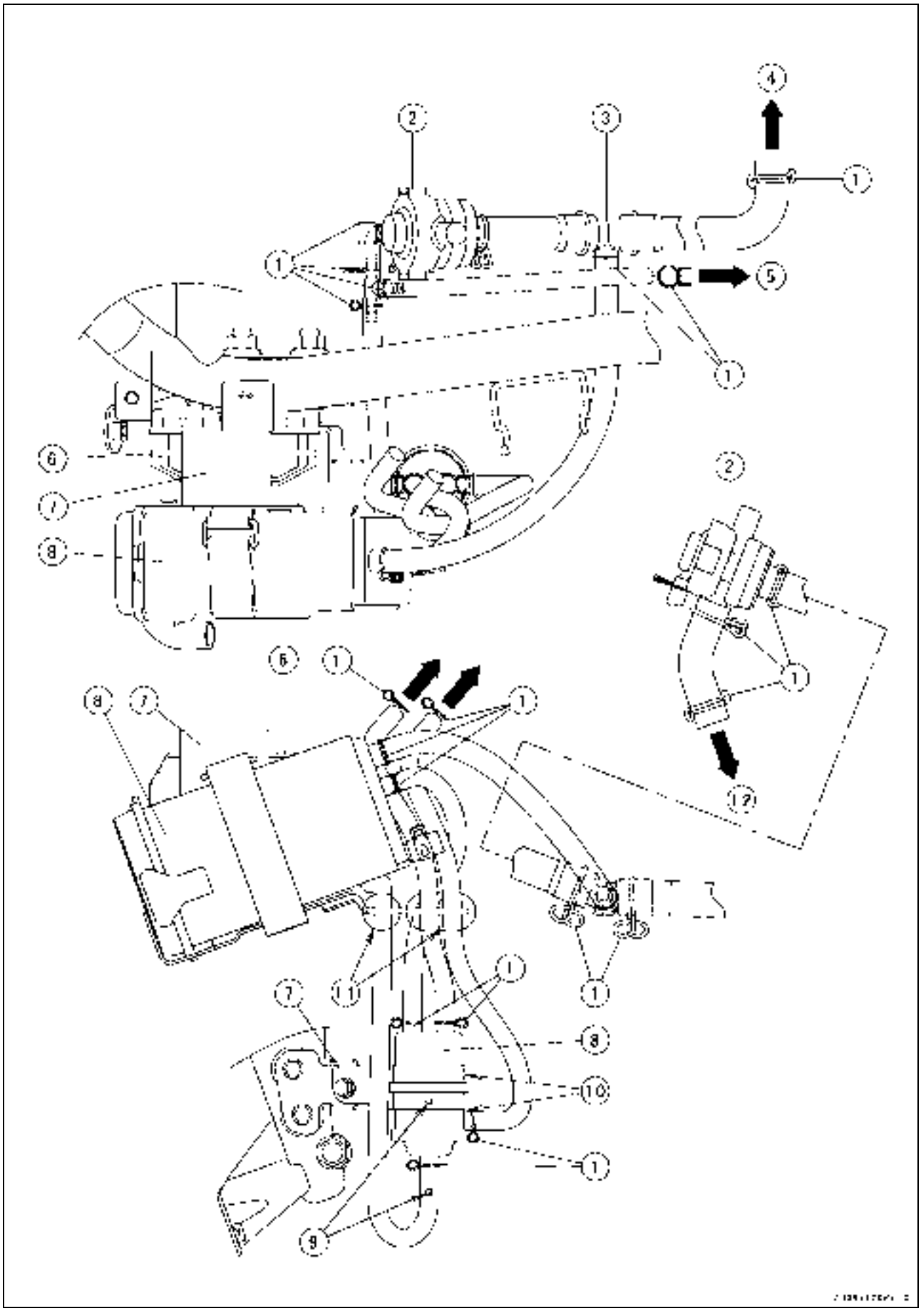


Cable, Wire, and Hose Routing

1. Front Master Cylinder
2. Front Brake Hse
3. Bracket
4. Clamp
5. Front Brake Caliper
6. Rear Brake Resevvoir
7. Rear Brake Caliper
8. Clamp
9. Rear Master Cylinder

Cable, Wire, and Hose Routing

California Model

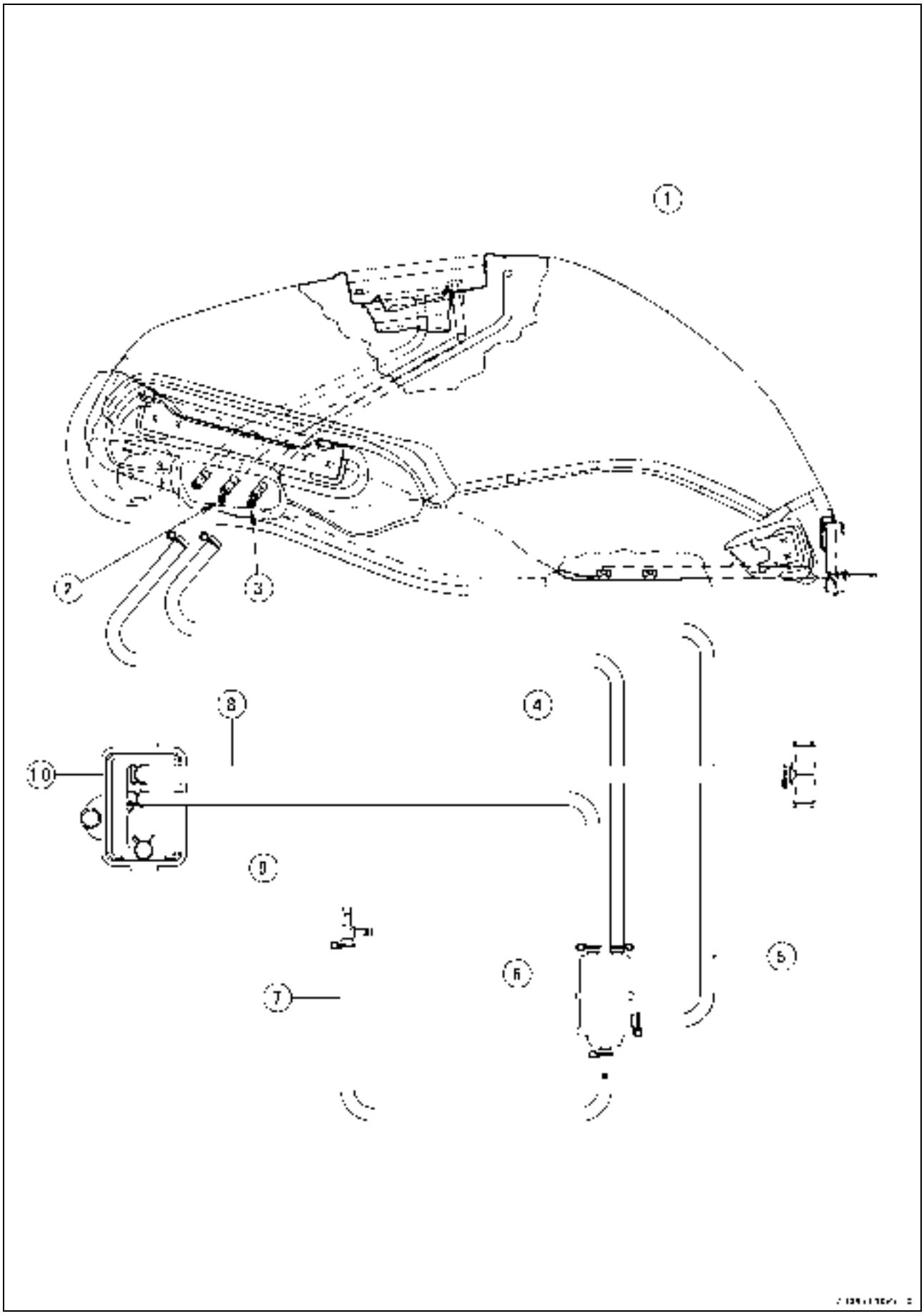


Cable, Wire, and Hose Routing

1. Install the clamps as shown, noting their clip direction.
2. Vaccum Switch Valve
3. Fitting
4. To Air Cleaner Box
5. To Carburetor
6. Regulator/Rectifier
7. Bracket
8. Canister
9. Align the hole on the separator with the white mark on the hose.
10. Align the hole on the separator with the hose direction.
11. Run the hoses through the guide of the bracket.
12. To Air Suction Volve Cover.

Cable, Wire, and Hose Routing

California Model

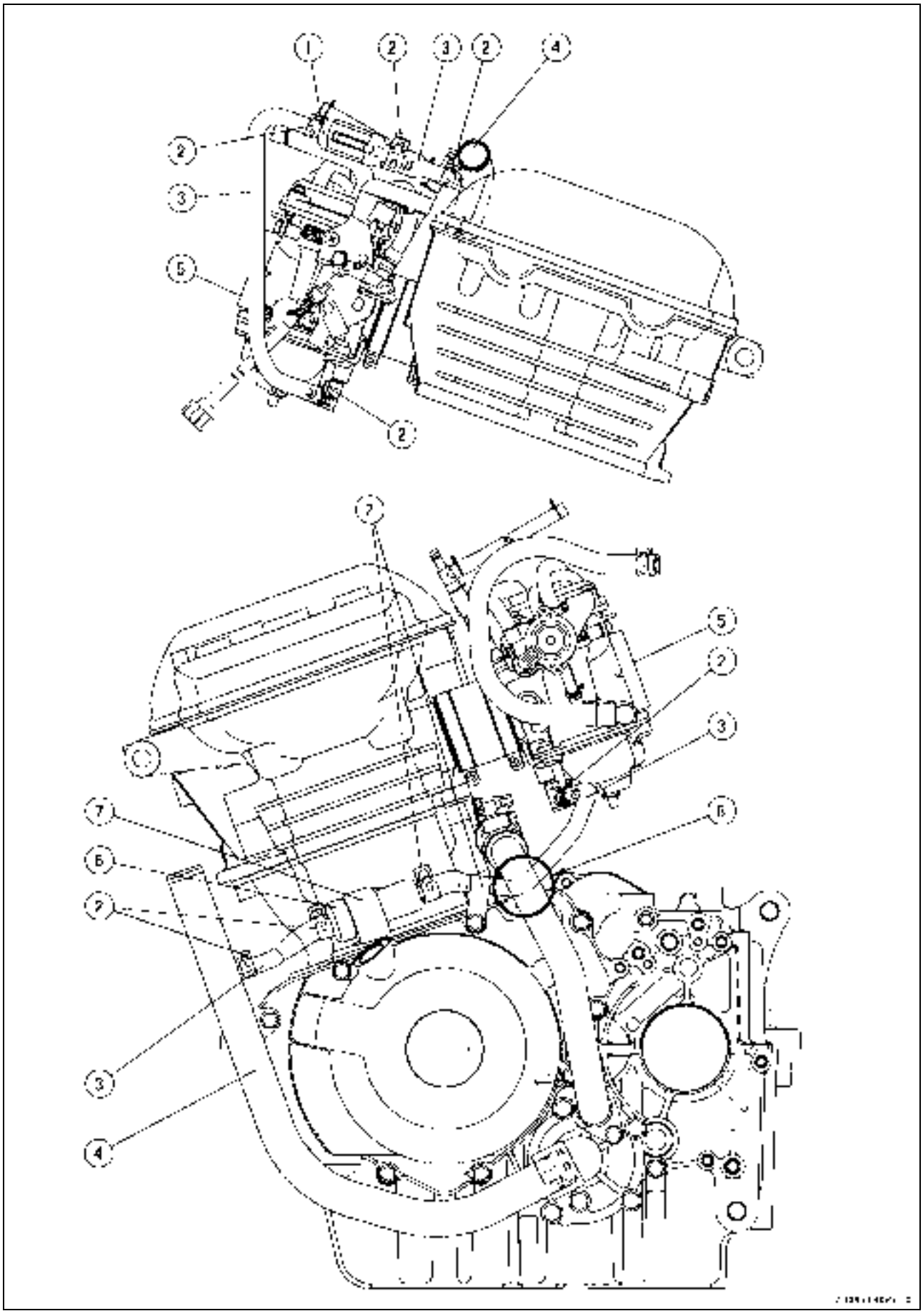


Cable, Wire, and Hose Routing

1. Fuel Tank
2. Blue Mark
3. Red Mark
4. Hose (Blue)
5. Hose (Red)
6. Separator
7. Hose (White)
8. Hose (Green)
9. Hose (Blue)
10. Canister

Cable, Wire, and Hose Routing

Australia Model



Cable, Wire, and Hose Routing

1. Filter Body
2. Clamps
3. Cooling Hose
4. Water Pipe
5. Carburetor
6. Coolant Valve Assmbly
7. Damper
8. Run the cooling hose inside of the water pipe.

Troubleshooting Guide

NOTE

○*This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.*

Engine Doesn't Start, Starting Difficulty:

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
- Main fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter motor clutch trouble

Engine won't turn over:
- Valve seizure
- Valve lifter seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Starter idle gear seizure

No fuel flow:
- No fuel in fuel tank
- Fuel tap vacuum hose clogged
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:
- Fuel level in carburetor float bowl too high
- Float valve worn or stuck open
- Starting technique faulty (When flooded, crank the engine with the throttle fully opened to allow more air to reach the engine.)

No spark; spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension wiring trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- IC igniter trouble
- Neutral, starter lockout, or sidestand switch trouble
- Crankshaft sensor trouble
- Ignition coil trouble
- Ignition or engine stop switch shorted
- Wiring shorted or open
- Main fuse blown

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)

Fuel/air mixture incorrect:
- Pilot screw or idle adjusting screw maladjusted
- Pilot jet or air bleed hole clogged
- Air cleaner clogged, poorly sealed, element missing
- Starter jet clogged

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 trouble
- Crankshaft sensor trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Pilot screw maladjusted
- Pilot jet, or air passage clogged
- Air bleed pipe bleed holes clogged
- Pilot passage clogged
- Air cleaner clogged, poorly sealed, or element missing
- Choke 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

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)

Other:
IC igniter trouble
Carburetor not synchronizing
Vacuum piston doesn't slide smoothly
Engine oil viscosity too high
Drive train trouble
Brake dragging

Poor Running or No Power at High Speed:

Firing incorrect:
Spark plug dirty, broken, or maladjusted
Spark plug cap shorted or not in good contact
Spark plug incorrect
IC igniter trouble
Crankshaft sensor trouble
Ignition coil trouble

Fuel/air mixture incorrect:
Choke 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
Bleed holes of needle jet holder or needle jet clogged
Air cleaner clogged, poorly sealed, or missing
Air cleaner duct poorly sealed
Water or foreign matter in fuel
Fuel to carburetor insufficient
Fuel tank air vent obstructed
Carburetor holder loose
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 valve won't fully open
Vacuum piston doesn't slide smoothly
Brake dragging
Clutch slipping
Overheating
Engine oil level too high
Engine oil viscosity too high
Drive train trouble

Overheating:

Firing incorrect:
Spark plug dirty, broken, or maladjusted
Spark plug incorrect
IC Igniter trouble

Fuel/air mixture incorrect:
Main jet clogged or wrong size
Fuel level in carburetor float bowl too low
Carburetor holder loose
Air cleaner poorly sealed, or missing
Air cleaner duct poorly sealed
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

Coolant incorrect:
Coolant level too low
Coolant deteriorated

Cooling system component incorrect:
Radiator fin damaged
Thermostat trouble
Radiator cap trouble
Radiator fan switch trouble
Fan relay trouble
Fan motor broken
Fan blade damaged
Water pump not turning
Water pump impeller damaged

Troubleshooting Guide

Over Cooling:

Cooling system component incorrect:
- Radiator fan switch trouble
- Thermostat trouble

Gauge incorrect:
- Water temperature gauge broken
- Water temperature sensor broken

Clutch Operation Faulty:

Clutch slipping:
- Friction plate worn or warped
- Steel plate worn or warped
- Clutch inner cable trouble
- No clutch lever play
- Clutch spring broken or weak
- Clutch release mechanism trouble
- Clutch hub or housing unevenly worn

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 release mechanism trouble
- Clutch hub spline damaged
- Clutch friction plate installed wrong
- Clutch lever play excessive
- Clutch hub nut loose

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
- Shift return spring weak or broken
- Shift return spring pin loose
- Pawl spring broken
- Shift mechanism arm broken
- Shift pawl broken

Jumps out of gear:
- Shift fork ear worn
- Gear groove worn
- Gear dogs and/or dog holes worn
- Shift drum groove worn
- Neutral positioning pin spring weak or broken
- Shift fork guide pin worn
- Drive shaft, output shaft, and/or gear splines worn

Overshifts:
- Neutral positioning lever spring weak or broken
- Pawl 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:
- Valve clearance incorrect
- Valve spring broken or weak
- Camshaft bearing worn

Other noise:
- Connecting rod small end clearance excessive
- Connecting rod big end clearance excessive
- Piston ring worn, broken, or stuck
- Piston seizure, damage
- Piston ring groove worn
- Piston ring/groove clearance excessive
- Cylinder head gasket leaking
- Exhaust pipe leaking at cylinder head connection
- Crankshaft runout excessive
- Engine mounts loose
- Crankshaft bearing worn
- Camshaft chain tensioner trouble
- Camshaft chain, sprocket, guide worn
- Alternator rotor loose
- Primary gear worn or broken

Abnormal Drive Train Noise:

Clutch noise:
- Weak or damaged damper
- Clutch housing/friction plate clearance excessive
- Clutch housing gear worn

Transmission noise:
- Bearings worn
- Transmission gears worn or chipped
- Metal chips jammed in gear teeth
- Engine oil insufficient

Drive line noise:
- Drive chain adjusted improperly
- Drive chain worn
- Rear and/or engine sprocket worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise:

Front fork noise:
- Oil insufficient or too thin

Troubleshooting Guide

Spring weak or broken
Rear shock absorber noise:
Shock absorber damaged
Disc brake noise:
Pad installed incorrectly
Pad surface glazed
Disc warped
Caliper trouble
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 viscosity too low
Camshaft bearing worn
Crankshaft bearings worn
Oil pressure switch damaged
Wiring faulty
Relief valve stuck open
O-ring at the oil passage in the crankcase damaged
Engine oil filter clogged

Exhaust Smokes Excessively:

White smoke:
Piston oil ring worn
Cylinder worn
Valve oil seal damaged
Valve guide worn
Engine oil level too high
Black smoke:
Air cleaner clogged
Main jet too large or fallen off
Choke plunger stuck open
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 poorly sealed or missing

Handling and/or Stability Unsatisfactory:

Handlebar hard to turn:
Cable routing incorrect
Hose routing incorrect
Wiring routing incorrect
Steering stem locknut 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 pivot bearings worn
Rim warped, or not balanced
Wheel bearing worn
Handlebar clamp bolts loose
Steering stem head nut loose
Front/rear axle runout too large
Handlebar pulls to one side:
Frame bent
Wheel misalignment
Swingarm bent or twisted
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)
Front fork oil insufficient and/or leaking
Front fork oil viscosity too low
Front fork, rear shock absorber spring weak
Rear shock absorber oil leaking
Rear shock absorber adjustment too soft
Tire air pressure too low

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
Master cylinder scratched inside

Battery Trouble:

Battery discharged:
Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte insufficient)
Battery cables making poor contact
Load excessive (e.g., bulb of excessive wattage)
Ignition switch trouble
Alternator trouble
Wiring faulty
Regulator/rectifier trouble
Battery overcharged:
Regulator/rectifier trouble
Battery faulty

MODEL APPLICATION

Year	Model	Beginning Frame No.
2008	EX250J8F	JKAEXMJ1□8DA00001

□:This digit in the frame number changes from one machine to another.

KAWASAKI HEAVY INDUSTRIES, LTD.
Consumer Products & Machinery Company

Part No.99924-1391-01

Printed in Japan