

Kawasaki

KFX700



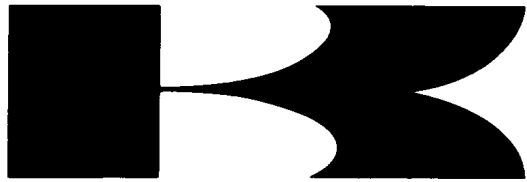
All Terrain Vehicle Service Manual

Quick Reference Guide

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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.



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All Terrain Vehicle Service Manual

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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 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.

LIST OF ABBREVIATIONS

A	ampere(s)	lb	pounds(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) Celcius	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)		

Read OWNER'S MANUAL before operating.

EMISSION CONTROL INFORMATION

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

1. Crankcase Emission Control System

A sealed-type crankcase emission control system is used to eliminate blow-by gases. The blow-by gases are led to the breather chamber through the crankcase. Then, it is led to the air cleaner. Oil is separated from the gases while passing through the inside of the breather chamber from the crankcase, and then returned back to the bottom of crankcase.

2. Exhaust Emission Control System

The exhaust emission control system applied to this engine family is engine modifications that consist of a modified carburetor and an ignition system having optimum ignition timing characteristics.

The carburetor has been calibrated to provide lean air/fuel mixture characteristics and optimum fuel economy with a suitable air cleaner and exhaust system.

A maintenance free ignition system provides the most favorable ignition timing and helps maintain a thorough combustion process within the engine which contributes to a reduction of exhaust pollutants entering the atmosphere.

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 vehicle.*
 - 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.

**PLEASE DO NOT TAMPER WITH NOISE CONTROL SYSTEM
(US MODEL only)**

TAMPERING WITH EMISSION CONTROL SYSTEM PROHIBITED:

Federal regulations and California State law prohibit 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 purposes of emission 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.

Do not tamper with the original emission related parts:

- Carburetor or internal parts
- Spark Plug
- Magneto ignition system
- Air Cleaner element

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED:

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

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

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

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 Vehicle parts. Special tools, gauges, and testers that are necessary when servicing Kawasaki vehicles 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

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1-2 GENERAL INFORMATION

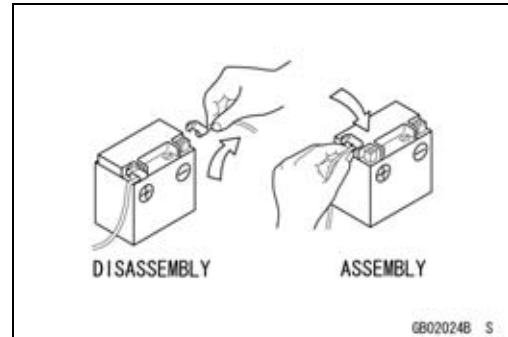
Before Servicing

Before starting to perform an inspection service or carry out a disassembly and reassembly operation on a vehicle, 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:

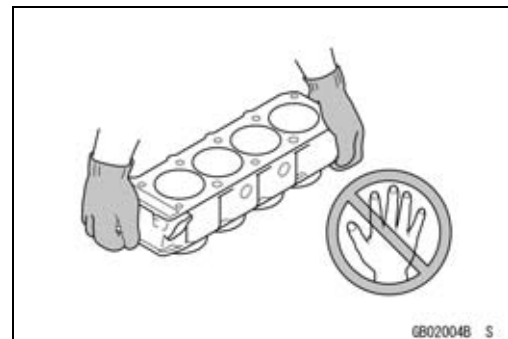
Battery Ground

Before completing any service on the vehicle, 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.



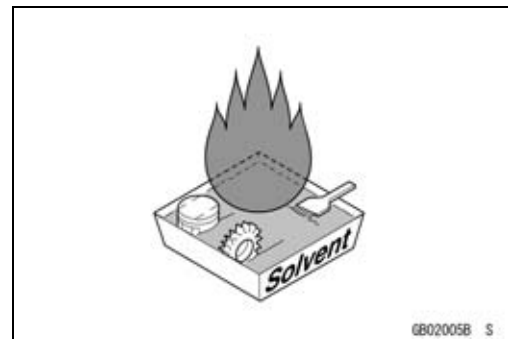
Edges of Parts

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



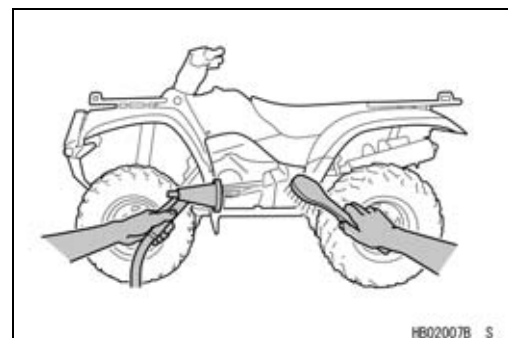
Solvent

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



Cleaning vehicle before disassembly

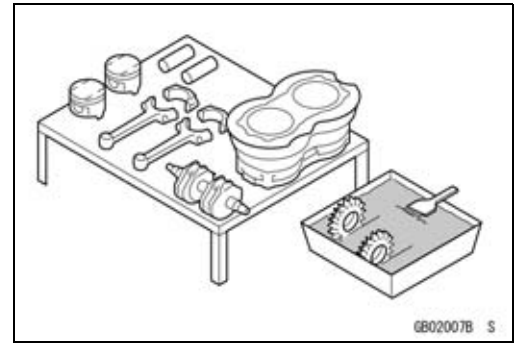
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



Before Servicing

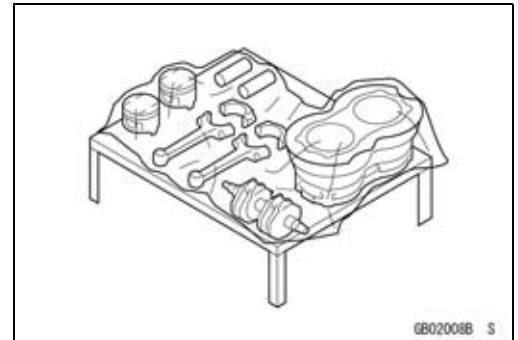
Arrangement and Cleaning of Removed Parts

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.



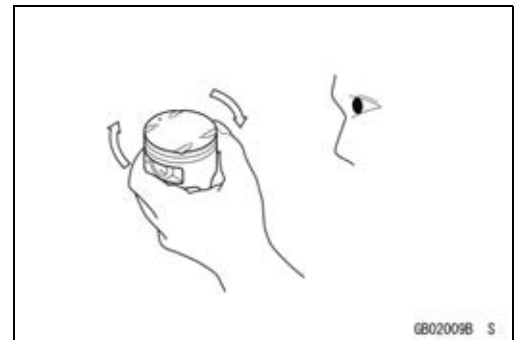
Storage of Removed Parts

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.



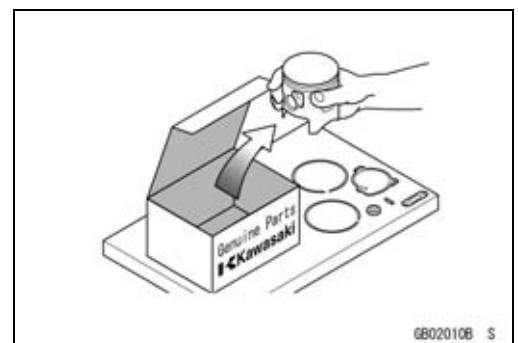
Inspection

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.



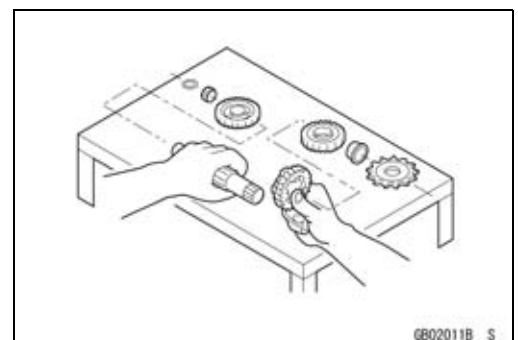
Replacement Parts

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.

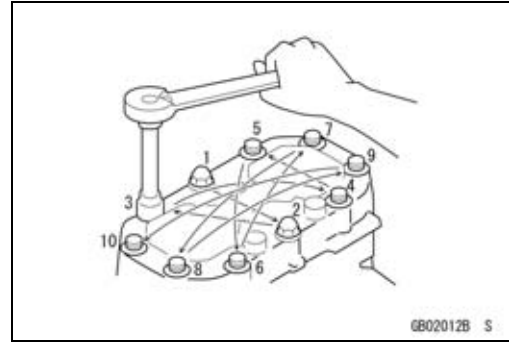


1-4 GENERAL INFORMATION

Before Servicing

Tightening Sequence

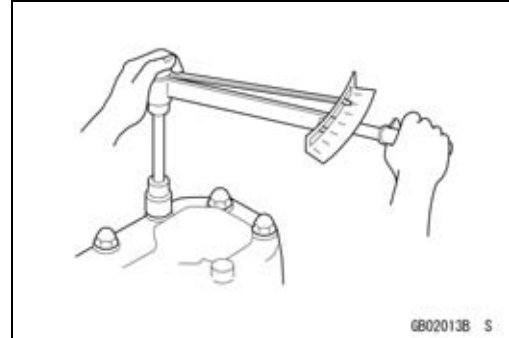
Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or 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

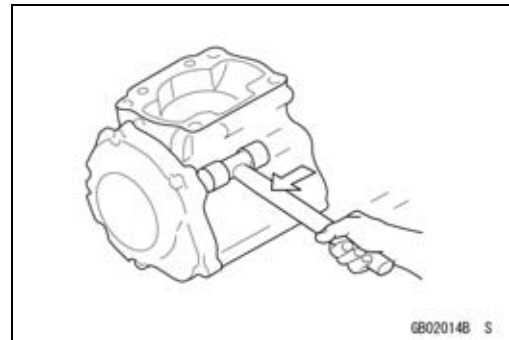
Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench.

Often, the tightening sequence is followed twice initial tightening and final tightening with torque wrench.



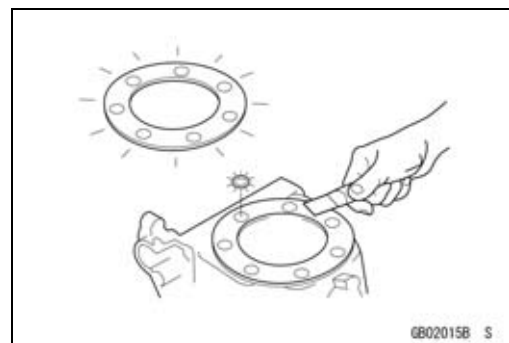
Force

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 old gaskets and clean the sealing surfaces thoroughly so that no gasket material or other material remains. Install new gaskets and replace used O-rings when re-assembling.



Liquid Gasket, Locking Agent

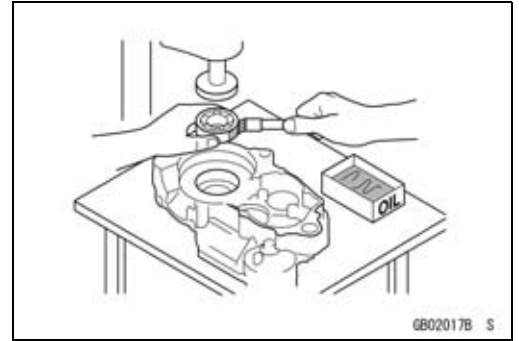
For applications that require Liquid Gasket or a Non-permanent Locking agent, clean the surfaces so that no oil residue remains before applying liquid gasket or non-permanent locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



Before Servicing

Press

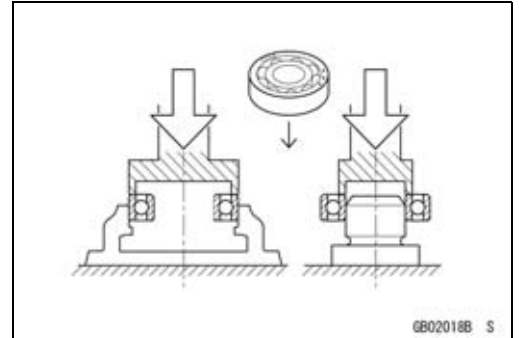
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



Ball Bearing and Needle Bearing

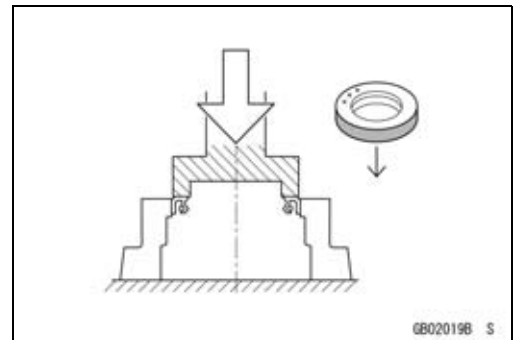
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

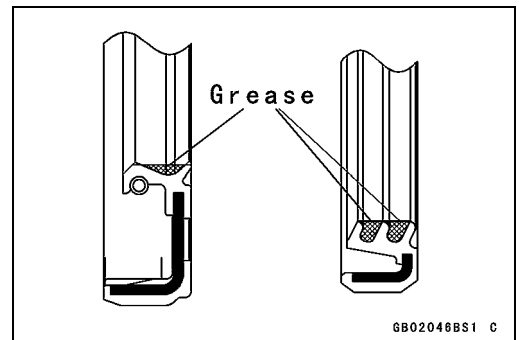


Oil Seal, Grease Seal

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.

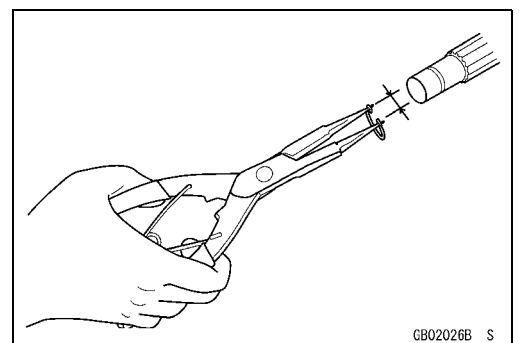


Apply specified grease to the lip of seal before installing the seal.



Circlips, Cotter Pins

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

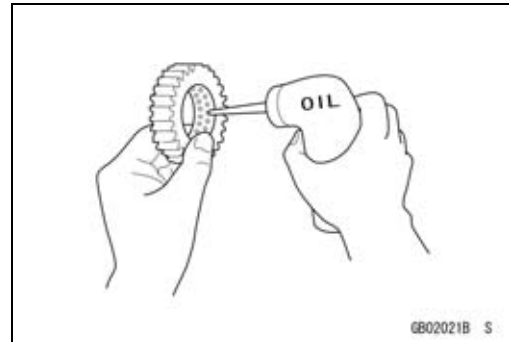


1-6 GENERAL INFORMATION

Before Servicing

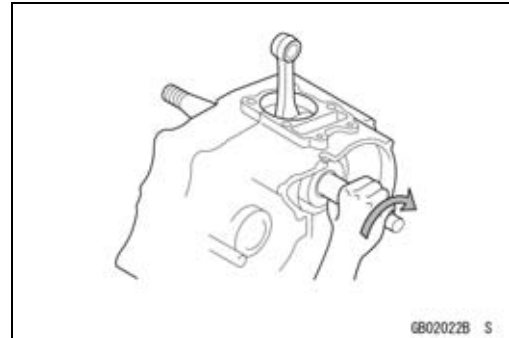
Lubrication

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.



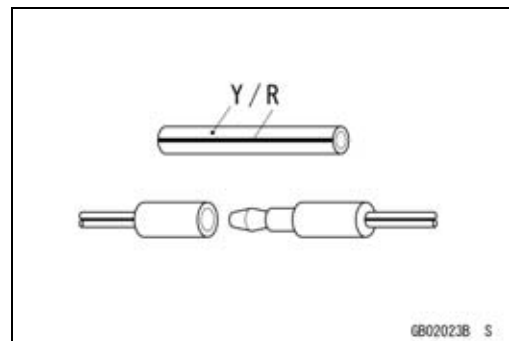
Direction of Engine Rotation

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 Leads

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

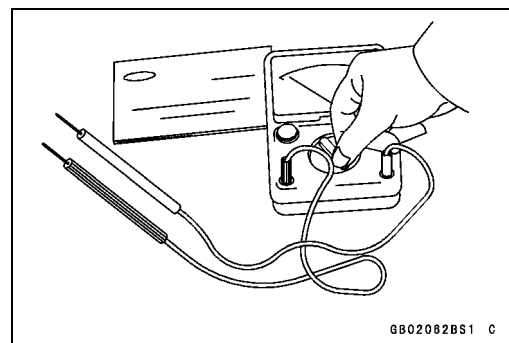


Instrument

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

KSV700-A1 Left Side View



KSV700-A1 Right Side View



1-8 GENERAL INFORMATION

Model Identification

KSV700-B1 Left Side View



KSV700-B1 Right Side View



General Specifications

Items	KSV700-A1 ~ A2, A6F ~/B1 ~B2, B6F ~/C6F
Dimensions	
Overall Length	1 985 mm (78.15 in.)
Overall Width	1 195 mm (47.05 in.)
Overall Height	1 170 mm (46.06 in.)
Wheelbase	1 285 mm (50.60 in.)
Ground Clearance:	
Rear Final Gear Case	160 mm (6.30 in.)
Center of Frame	245 mm (9.65 in.)
Seat Height	850 mm (33.46 in.)
Dry Mass	(KSV700-A1 ~ A8F/B1 ~ B8F/C6F) 234 kg (516 lb)
Curb Mass:	(KSV700A9F (US, AU)/B9F) 250 kg (551 lb)
	(KSV700A9F (EUR)) 251 kg (553 lb)
Front	115 kg (254 lb)
	(KSV700A9F (EUR)) 115.5 kg (255 lb)
Rear	135 kg (298 lb)
	(KSV700A9F (EUR)) 135.5 kg (299 lb)
Fuel Tank Capacity	12 L (3.2 US gal)
Performance	
Minimum Turning Radius	3.2 m (10.50 ft)
Engine	
Type	4-stroke, SOHC, V2-cylinders
Cooling System	Liquid-cooled
Bore and Stroke	82.0 × 66.0 mm (3.23 × 2.60 in.)
Displacement	697 cm ³ (42.5 cu in.)
Compression Ratio	9.9 : 1
Maximum Horsepower	36.3 kW (49.4 PS) @6 500 r/min (rpm), (US) -
Maximum Torque	59.2 N·m (6.04 kgf·m, 43.67 ft·lb) @5 000 r/min (rpm)
Carburetion System	Carburetor, Keihin CVKR-D32
Starting System	Electric Starter
Ignition System	Digital DC-CDI
Timing Advance	Electronically advanced
Ignition Timing	From 5° BTDC @1 100 r/min (rpm) to 28° BTDC @5 000 r/min (rpm)
Spark Plug	NGK CR7E
Valve Timing:	
Inlet	
Open	20° BTDC
Close	44° ABDC
Duration	244°
Exhaust:	
Open	44° BBDC
Close	20° ATDC
Duration	244°
Lubrication System	Forced lubrication (wet sump)

1-10 GENERAL INFORMATION

General Specifications

Items	KSV700-A1 ~ A2, A6F ~/B1 ~B2, B6F ~/C6F
Engine Oil: Grade Viscosity Capacity	API SF or SG API SH, or SJ with JASO MA, MA1 or MA2 (KSV700-A1 ~ A6F/B1 ~ B6F/C6F) API SH, SJ or SL with JASO MA, MA1 or MA2 SAE 10W-40 2.2 L (2.33 US qt)
Drive Train Primary Reduction System: Type Reduction Ratio Transmission: Type Gear Ratios: Forward: Reverse Final Drive System: Type Reduction Ratio Overall Drive Ratio: Forward: Reverse Final Gear Case Oil: Type Capacity	Belt converter 3.122 ~ 0.635 1-speed and reverse 2.416 (29/27 × 27/20 × 20/12) 4.285 (16/12 × 20/14 × 27/20 × 20/12) Shaft 2WD 4.375 (35/8) 32.999 ~ 6.711 58.527 ~ 11.904 MOBIL Fluid 424 or CITGO TRANSGARD TRACTOR HYDRAULIC FLUID or EXXON HYDRAUL 560 900 mL (0.95 US qt)
Frame Type Caster (rake angle) Camber King Pin Angle Trail Tread: Front Rear Rim Size: Front Rear Front Tire: Type Size Rear Tire: Type Size	Double cradle, tubular steel 4.5° -0.5° 12.5° 20 mm (0.79 in.) 1 000 mm (39.37 in.) 900 mm (35.43 in.) 10 × 5.5 10 × 8.5 Tubeless AT22 X 7-10 Tubeless AT22 X 11-10

General Specifications

Items	KSV700-A1 ~ A2, A6F ~/B1 ~B2, B6F ~/C6F
Suspension: Front: Type Wheel Travel Rear: Type Wheel Travel Brake: Front Rear	Double A-arms 236 mm (9.29 in.) Swingarm 200 mm (7.87 in.) Disc x 2 Enclosed wet multi-plate
Electrical Equipment Battery Headlight: Type Bulb Tail/brake Light: Bulb Alternator: Type Rated output	12 V 12 Ah Semi-sealed beam 12 V 45/45 W x 2 12 V 21/5 W Three - phase AC 25 A, 14 V @6 000 r/min (rpm)

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

AU: Australia Model

EUR: Europe Model

US: United States Model

1-12 GENERAL INFORMATION

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	× 1 000 000
kilo	k	× 1 000
centi	c	× 0.01
milli	m	× 0.001
micro	μ	× 0.000001

Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume:

L	×	0.2642	=	gal (US)
L	×	0.2200	=	gal (imp)
L	×	1.057	=	qt (US)
L	×	0.8799	=	qt (imp)
L	×	2.113	=	pint (US)
L	×	1.816	=	pint (imp)
mL	×	0.03381	=	oz (US)
mL	×	0.02816	=	oz (imp)
mL	×	0.06102	=	cu in

Units of Force:

N	×	0.1020	=	kg
N	×	0.2248	=	lb
kg	×	9.807	=	N
kg	×	2.205	=	lb

Units of Length:

km	×	0.6214	=	mile
m	×	3.281	=	ft
mm	×	0.03937	=	in

Units of Torque:

N·m	×	0.1020	=	kg·m
N·m	×	0.7376	=	ft·lb
N·m	×	8.851	=	in·lb
kg·m	×	9.807	=	N·m
kg·m	×	7.233	=	ft·lb
kg·m	×	86.80	=	in·lb

Units of Pressure:

kPa	×	0.01020	=	kg/cm ²
kPa	×	0.1450	=	psi
kPa	×	0.7501	=	cmHg
kg/cm ²	×	98.07	=	kPa
kg/cm ²	×	14.22	=	psi
cm Hg	×	1.333	=	kPa

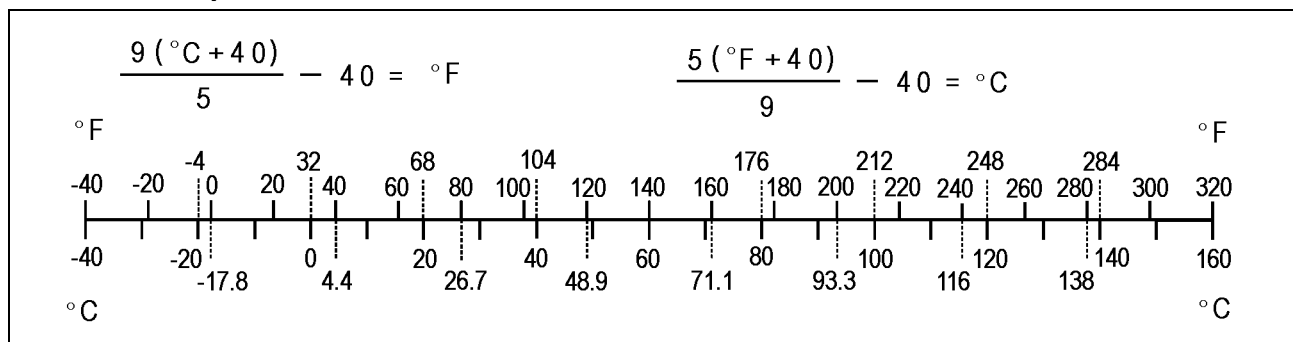
Units of Speed:

km/h	×	0.6214	=	mph
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Units of Power:

kW	×	1.360	=	PS
kW	×	1.341	=	HP
PS	×	0.7355	=	kW
PS	×	0.9863	=	HP

Units of Temperature:



Periodic Maintenance

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2-2 PERIODIC MAINTENANCE

Periodic Maintenance Chart

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

FREQUENCY	Regular Service					
	First Service			Every 90 days, 1 700 km (1 100 mi.) of use or when belt indicator light turns on (100 hrs of use) whichever comes first	Every year of use	See page
OPERATION	After 10 hrs. or 100 km (60 mi.) of use	Every 10 days or 200 km (120 mi.) of use	Every 30 days or 600 km (360 mi.) of use			
ENGINE						
Converter drive belt wear-inspect *				●		2-23
Converter drive belt deflection - inspect *				●		2-24
Air cleaner element-clean and inspect *	●	●				2-15
Throttle lever free play-inspect	●	●				2-13
Shift control grip play-inspect *	●	●				2-26
Idle speed-inspect			●			2-14
Valve clearance-inspect	First 1 700 km (1 100 mi); thereafter every 3 400 km (2 200 mi)					2-20
Fuel system cleanliness -inspect *	●			●		2-15
Engine oil-change *	●			●		2-25
Oil filter-replace *	●			●		2-26
Spark plug cleaning and gap-inspect	●			●		2-33
Spark arrester-clean					●	2-22
Fuel hoses and connections-inspect				●		2-16
Fuel hose and fuel filter-replace	4 years					2-16
Radiator-clean*	●	●				2-17
Water hoses, and connections-inspect*					●	2-18
Coolant-change*	2 years					2-18
Coolant filter-clean					●	2-20
CHASSIS						
Propeller shaft joint boots-inspect *	●	●				2-28
Rear brake pedal and lever play-inspect *	●	●				2-32
Rear brake pedal and lever play-adjust	●	●				2-33

Periodic Maintenance Chart

FREQUENCY	First Service	Regular Service				
	After 10 hrs. or 100 km (60 mi.) of use	Every 10 days or 200 km (120 mi.) of use	Every 30 days or 600 km (360 mi.) of use	Every 90 days, 1 700 km (1 100 mi.) of use or when belt indicator light turns on (100 hrs of use) whichever comes first	Every year of use	See page
OPERATION						
Rear brake plates-replace *	every 9 600 km (6 000 mi.)					2-32
Bolts and nuts tightness-inspect	●	●				2-36
Front brake pad wear-inspect *	●		●			2-28
Brake light switch-inspect *	●		●			2-34
Steering-inspect	●			●		2-33
Tire wear-inspect *			●			2-27
Rear final gear case oil-change	●				●	2-28
General lubrication -perform*			●			2-34
Front brake fluid level-inspect	●		●			2-29
Front brake fluid-change					●	2-30
Front brake master cylinder piston assembly and dust cover-replace	2 years					2-31
Front brake caliper fluid seal and dust seal-replace	2 years					2-32
Front brake hoses and connections-inspect				●		2-29
Front brake hose-replace	4 years					2-29

*: Service more frequently when operated in mud, dust, or other harsh riding conditions, or when carrying heavy loads or pulling a trailer.

●: Clean, adjust, lubricate, torque, or replace parts as necessary.

2-4 PERIODIC MAINTENANCE

Torque and Locking Agent

The following tables list the tightening torque for the major fasteners, and the parts requiring use of a non-permanent locking agent or liquid gasket.

Letters used in the "Remarks" column mean:

L: Apply a non-permanent locking agent.

Lh: Left-hand Threads

MO: Apply molybdenum disulfide oil (mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1).

R: Replacement Parts

S: Follow the specific tightening sequence.

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

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System				
Throttle Limiter Screw	3.7	0.38	33 in·lb	
Throttle Limiter Locknut	3.7	0.38	33 in·lb	
Throttle Case Screws	3.7	0.38	33 in·lb	
Throttle Cable Cover Screws	1.3	0.13	11 in·lb	
Choke Lever Mounting Screw	3.5	0.36	31 in·lb	
Left Handlebar Switches Assembly Screws	3.5	0.36	31 in·lb	
Air Cleaner Housing Bolts (M5)	5.9	0.60	52 in·lb	
Air Cleaner Housing Bolts (M6)	8.8	0.90	78 in·lb	
Air Cleaner Element Bracket Screws	4.9	0.50	43 in·lb	
Fuel Tap Plate Screws	0.8	0.08	7 in·lb	
Fuel Tap Cover Screws	1.0	0.10	8 in·lb	
Fuel Pump Bolts	2.0	0.20	17 in·lb	
Cooling System				
Radiator Fan Switch	18	1.8	13	
Water Pump Fitting Bolt	9.8	1.0	87 in·lb	
Water Pump Impeller	7.8	0.80	69 in·lb	
Thermostat Housing Cover Bolts	8.8	0.90	78 in·lb	
Water Temperature Sensor	7.8	0.80	69 in·lb	SS
Radiator Fan Assembly Bolts	8.8	0.90	78 in·lb	
Radiator Mounting Bolts	8.8	0.90	78 in·lb	
Water Pump Cover Bolts	8.8	0.90	78 in·lb	
Coolant Drain Bolt	8.8	0.90	78 in·lb	
Shroud Mounting Screws	3.9	0.40	35 in·lb	
Radiator Screen Mounting Screws	3.9	0.40	35 in·lb	
Reserve Tank Mounting Screws	3.9	0.40	35 in·lb	
Engine Top End				
Rocker Case Bolts 55 mm (2.2 in.)	8.8	0.90	78 in·lb	S
Rocker Case Bolts 130 mm (5.1 in.)	9.8	1.0	87 in·lb	S
Rocker Case Bolts 30 mm (1.2 in.)	9.8	1.0	87 in·lb	
Rocker Case Bolts 25 mm (1.0 in.)	9.8	1.0	87 in·lb	S
Cylinder Head Bolts (M10), First Torque	25	2.5	18	S, MO
Cylinder Head Bolt (M10), Final Torque	49	5.0	36	S
Cylinder Head Bolts (M6)	9.8	1.0	87 in·lb	

PERIODIC MAINTENANCE 2-5

Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Carburetor Holder Bolts (M6)	14	1.4	10	L
Valve Adjusting Cap Bolts (M6)	8.8	0.90	78 in-lb	
Valve Adjusting Screw Locknuts	12	1.2	104 in-lb	
Rocker Shaft Bolts (KSV700-A1/B1)	8.8	0.90	78 in-lb	
Rocker Shaft Bolts	22	2.2	16	
Water Pipe Bolts	9.8	1.0	87 in-lb	
Chain Tensioner Mounting Bolts	8.8	0.90	78 in-lb	
Chain Tensioner Cap Bolt	22	2.2	16	
Intermediate Shaft Sprocket Nut	44	4.5	33	
Intermediate Shaft Chain Guide Bolts	8.8	0.90	78 in-lb	
Intermediate Shaft Chain Tensioner Bolts	8.8	0.90	78 in-lb	
Camshaft Sprocket Bolts	12	1.2	104 in-lb	L
Position Plate Bolts	8.8	0.90	78 in-lb	
Cylinder Bolts 40 mm (1.6 in.)	9.8	1.0	87 in-lb	
Cylinder Bolts 30 mm (1.2 in.)	9.8	1.0	87 in-lb	
Front Cylinder Camshaft Chain Guide Bolt	20	2.0	14	
Rear Cylinder Camshaft Chain Guide Bolt	20	2.0	14	
Cylinder Drain Bolt	8.8	0.90	78 in-lb	
Exhaust Pipe Cover Bolts	8.8	0.90	78 in-lb	
Muffler Cover Bolts	8.8	0.90	78 in-lb	
Muffler Mounting Bolts	20	2.0	14	
Exhaust Pipe Holder Nuts	17	1.7	12	
Exhaust Pipe Clamp Bolts	8.8	0.90	78 in-lb	
Converter System				
Drive Pulley Bolt	93	9.5	69	R, Lh
Driven Pulley Nut	93	9.5	69	
Drive Pulley Cover Bolts	13	1.3	113 in-lb	
Ramp Weight Nuts	6.9	0.70	61 in-lb	
Spider	275	28	203	Lh
Converter Cover Bolts	8.8	0.90	78 in-lb	S
Joint Duct Bolts	8.8	0.90	78 in-lb	
Exhaust Duct Bolt	8.8	0.90	78 in-lb	
Converter Inlet Duct Bolt	8.8	0.90	78 in-lb	
Engine Lubrication System				
Oil Filter	18	1.8	13	R
Oil Pressure Switch	15	1.5	11	SS
Oil Pipe Bolts	8.8	0.90	78 in-lb	
Engine Drain Bolt	20	2.0	14	
Oil Pressure Relief Valve	15	1.5	11	L
Oil Pump Bolt	8.8	0.90	78 in-lb	
Chain Guide Bolts	8.8	0.90	78 in-lb	
Oil Pump Drive Chain Tensioner Bolt	25	2.5	18	
Oil Filter Mounting Bolt	25	2.5	18	L (15 mm)

2-6 PERIODIC MAINTENANCE

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	
Engine Removal/Installation				
Engine Mounting Bracket Bolts	52	5.3	38	
Engine Mounting Nut	62	6.3	46	
Crankshaft/Transmission				
Connecting Rod Big End Cap Nuts	34	3.5	25	MO
Engine Drain Bolt	20	2.0	14	
Crankcase Bolts (M8)	20	2.0	14	S, L (1)
Crankcase Bolts (M6)	9.8	1.0	87 in·lb	
Position Plate Mounting Screws	4.9	0.50	43 in·lb	L
Output Driven Bevel Gear Housing Cap Bolt	8.8	0.90	78 in·lb	
Rear Cylinder Camshaft Chain Guide Bolt	20	2.0	14	
Shift Shaft Lever Nut	8.8	0.90	78 in·lb	
Shift Shaft Positioning Bolt	25	2.5	18	
Shift Shaft Spring Bolt	25	2.5	18	L
Shift Shaft Cover Bolts	8.8	0.90	78 in·lb	
Neutral Position Switch	15	1.5	11	
Reverse Position Switch	15	1.5	11	
Shift Shaft Lever Bolts	14	1.4	10	
Reverse Cable Bracket Mounting Bolts	8.8	0.90	78 in·lb	
Reverse Cable Locknut	12	1.2	104 in·lb	
Cable Holder Mounting Bolts	9.8	1.0	87 in·lb	
Wheels/Tires				
Tie-Rod End Nuts	42	4.3	31	
Tie-Rod Adjusting Locknuts	22	2.2	16	
Wheel Nuts	78	8.0	58	
Front Axle Nuts	52	5.3	38	
Rear Axle Nuts	265	27	195	
Final Drive				
(Output Bevel Gears)				
Output Driven Bevel Gear Housing Bolts	26	2.7	20	
Output Drive Bevel Gear Housing Bolts	26	2.7	20	
Output Driven Bevel Gear Bearing Holder	250	25.5	184	L
Bevel Gear Holder Nut	200	20.4	148	L
Output Drive Bevel Gear Bearing Holder	118	12	87	L
Output Shaft Holder Nut	200	20.4	148	L
Output Drive Bevel Gear Cover Bolts	8.8	0.90	78 in·lb	
Converter Fan Cover Bolts	8.8	0.90	78 in·lb	
(Final Gear Case)				
Oil Filler Cap	29	3.0	22	
Oil Drain Bolt	20	2.0	14	
Pinion Gear Bearing Holder	137	14	101	L
Pinion Gear Bearing Holder Nut	157	16	116	L

PERIODIC MAINTENANCE 2-7

Torque and Locking Agent

Fastener	Torque			Remarks
	N-m	kgf-m	ft-lb	
Final Gear Case Left Cover Bolts	49	5.0	36	L
Final Gear Case Bolts	42	4.3	31	S
Final Gear Case Right Cover Bolts (M8)	24	2.4	17	L,S
Final Gear Case Right Cover Bolts (M10)	49	5.0	36	L,S
Final Gear Case Right Cover Bolts (M12)	94	9.6	69	L,S
Brakes				
Front Brake Reservoir Cap Screws	1.5	0.15	13 in-lb	
Front Brake Lever Pivot Bolt	5.9	0.60	52 in-lb	
Front Brake Lever Pivot Nut	5.9	0.60	52 in-lb	
Front Brake Master Cylinder Clamp Bolts	8.8	0.90	78 in-lb	
Brake Switch Mounting Bolt	1.2	0.12	10 in-lb	
Brake Hose Banjo Bolts	25	2.5	18	
Front Brake Caliper Mounting Bolts	25	2.5	18	
Bleed Valves	7.8	0.80	69 in-lb	
Disc Mounting Bolts	37	3.8	27	L
Rear (Parking) Brake Lever Screw	–	–	–	L
Gasket Screws	–	–	–	L
Brake Pedal Bolt	8.8	0.90	78 in-lb	
Suspension				
Front Shock Absorber Mounting Nuts	42	4.3	31	
Rear Shock Absorber Mounting Nuts	62	6.3	46	
Suspension Arm Pivot Bolts	42	4.3	31	
Steering Knuckle Joint Nuts	29	3.0	21	
Swingarm Pivot Right Shaft	152	15.5	112	L
Swingarm Pivot Left Shaft	20	2.0	14	L
Swingarm Pivot Left Nut	152	15.5	112	
Steering				
Steering Stem Bearing Joint Bolts	21	2.1	15	L
Steering Stem Bottom End Nut	40	4.1	30	
Steering Stem Clamp Bolts	25	2.5	18	
Tie-Rod End Nuts	42	4.3	31	
Steering Knuckle Joint Nuts	29	3.0	22	
Tie-Rod Adjusting Locknuts	22	2.2	16	
Handlebar Holder Bolts	29	3.0	22	S
Master Cylinder Clamp Bolts	8.8	0.90	78 in-lb	
Frame				
Engine Mounting Bracket Bolts	52	5.3	38	
Engine Mounting Nut	62	6.3	46	
Footpeg Mounting Bolts	44	4.5	33	
Electrical System				
Battery Cable Bolt	5.9	0.60	52 in-lb	
Alternator Cover Bolts	8.8	0.90	78 in-lb	
Alternator Flywheel Bolt Cover Bolts	8.8	0.90	78 in-lb	

2-8 PERIODIC MAINTENANCE

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Alternator Flywheel Bolt	127	13	94	
Alternator Stator Bolts	13	1.3	113 in·lb	
Alternator Cover Plugs	18	1.8	13	
Spark Plug	13	1.3	113 in·lb	
Ignition Coil Mounting Bolts	6.9	0.70	61 in·lb	
Crankshaft Sensor Mounting Bolts	5.9	0.60	52 in·lb	
Igniter Mounting Bolts	2.3	0.23	20 in·lb	
Starter Motor Mounting Bolts	8.8	0.90	78 in·lb	
Starter Motor Terminal Nut	6.9	0.70	61 in·lb	
Starter Motor Terminal Locknut	6.9	0.70	61 in·lb	
Starter Motor Bolts	4.9	0.50	43 in·lb	
Starter Motor Clutch Bolts	34	3.5	25	L
Reverse Position Switch	15	1.5	11	
Neutral Position Switch	15	1.5	11	
Oil Pressure Switch	15	1.5	11	SS
Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	
Radiator Fan Switch	18	1.8	13	
Water Temperature Sensor	7.8	0.80	69 in·lb	SS
Regulator/Rectifier Bolts	8.8	0.90	78 in·lb	
Fuel Pump Mounting Bolts	2.0	0.20	17 in·lb	
Harness Clamp Mounting Bolt	8.8	0.90	78 in·lb	

Torque and Locking Agent

The tables 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 of Engine Parts

Threads dia. mm	Mark of bolt head	Torque		
		N·m	kgf·m	ft·lb
5	4T	2.2 ~ 2.6	0.22 ~ 0.27	19 ~ 23 in·lb
6	9T	12 ~ 15	1.2 ~ 1.5	104 ~ 130 in·lb
6	7T	7.8 ~ 9.8	0.80 ~ 1.0	69 ~ 87 in·lb
6	4T	3.9 ~ 4.9	0.40 ~ 0.50	35 ~ 43 in·lb
8	7T	18 ~ 22	1.8 ~ 2.2	13 ~ 16
8	4T	10 ~ 14	1.0 ~ 1.4	87 ~ 122 in·lb
10	7T	39 ~ 44	4.0 ~ 4.5	29 ~ 33
10	4T	20 ~ 24	2.0 ~ 2.4	14 ~ 17

Basic Torque for General Fasteners of Frame Parts

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 ~ 14
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	54 ~ 72
16	115 ~ 155	11.5 ~ 16	83 ~ 155
18	165 ~ 225	17 ~ 23	125 ~ 165
20	225 ~ 325	23 ~ 33	165 ~ 240

2-10 PERIODIC MAINTENANCE

Specifications

Item	Standard	Service Limit
Fuel System		
Throttle Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	---
Air Cleaner Element Oil	High-quality foam air filter oil	---
Cooling System		
Coolant		
Type (Recommended)	Permanent type antifreeze	---
Color	Green	---
Mixed Ratio	Soft water 50%, coolant 50%	---
Freezing Point	-35°C (-31°F)	---
Total Amount	2.5 L (2.64 US qt)	---
Engine Top End		
Valve Clearance		
Exhaust	0.20 ~ 0.25 mm (0.0079 ~ 0.0098 in.)	---
Inlet	0.10 ~ 0.15 mm (0.0039 ~ 0.0059 in.)	---
Converter System		
Belt Width	29.7 ~ 30.3 mm (1.169 ~ 1.193 in.)	28.0 mm (1.102 in.)
Belt Deflection	22 ~ 27 mm (0.87 ~ 1.06 in.)	---
Engine Lubrication System		
Engine Oil:		
Grade	API SF or SG API SH or SJ with JASO MA, MA1 or MA2 (KSV700-A1 ~ A6F/B1 ~ B6F/C6F) API SH, SJ or SL with JASO MA, MA1 or MA2	---
Viscosity	SAE10W-40	---
Capacity	1.7 L (1.80 US qt) (When filter is not removed) 1.9 L (2.01 US qt) (When filter is removed) 2.2 L (2.33 US qt) (When engine is completely dry)	---
Wheels/Tires		
Tire Tread Depth:		
Front	---	3 mm (0.12 in.)
Rear	---	3 mm (0.12 in.)
Standard Tire:		
Front	AT 22 X 7-10 CARLISLE, HOLE SHOT XC	---
Rear	AT 22 X 11-10 CARLISLE, HOLE SHOT XCT	---
Final Drive		
Final Gear Case:		
Gear Case Oil:		
Type	MOBIL Fluid 424 or CITGO TRANSGARD TRACTOR HYDRAULIC FLUID or EXXON HYDRAUL 560	---

Specifications

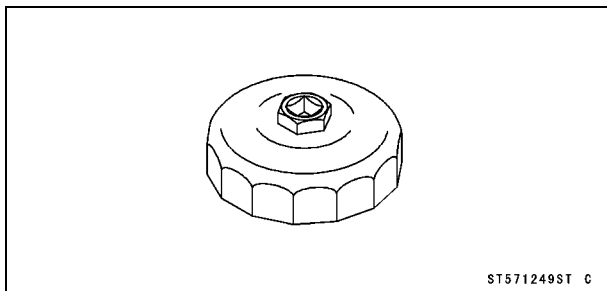
Item	Standard	Service Limit
Oil level Capacity	Filler opening bottom 900 mL (0.95 US qt)	--- ---
Brakes Front Brake Fluid: Type Front Disc Brake: Pad Lining Thickness Rear Brake Lever, Pedal and Cables: Rear Brake Lever Free Play Brake Pedal Free Play	DOT 3 or DOT 4 4 mm (0.16 in.) 1 ~ 2 mm (0.04 ~ 0.08 in.) 15 ~ 25 mm (0.6 ~ 1.0 in.)	--- 1 mm (0.04 in.) --- ---
Electrical System Spark Plug Gap Rear Brake Light Switch Timing	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.) On after 10 mm (0.4 in.) of pedal travel	--- ---

2-12 PERIODIC MAINTENANCE

Special Tools

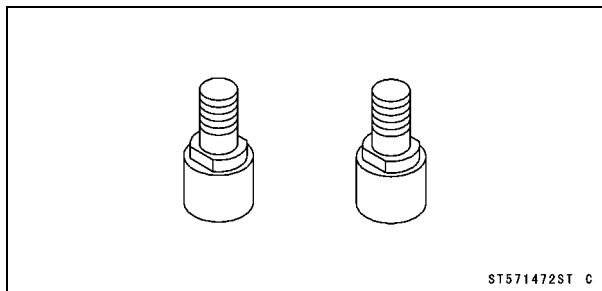
Oil Filter Wrench:

57001-1249



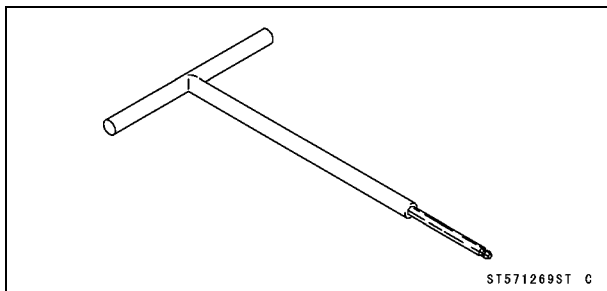
Pulley Holder Attachment:

57001-1472



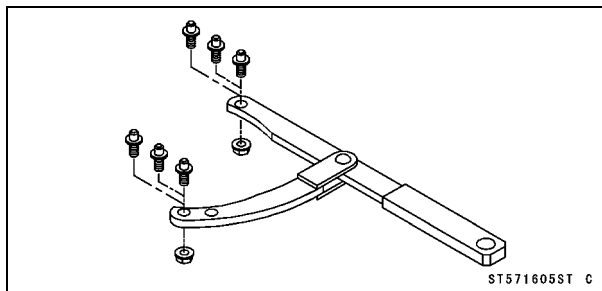
Carburetor Drain Plug Wrench, Hex 3:

57001-1269



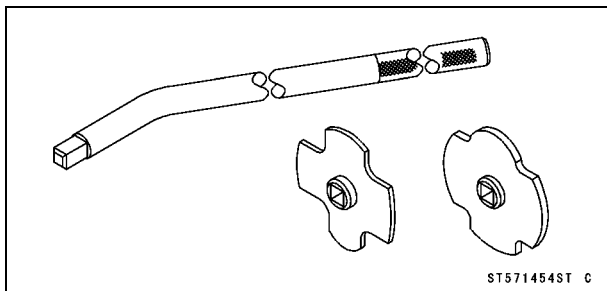
Flywheel & Pulley Holder:

57001-1605



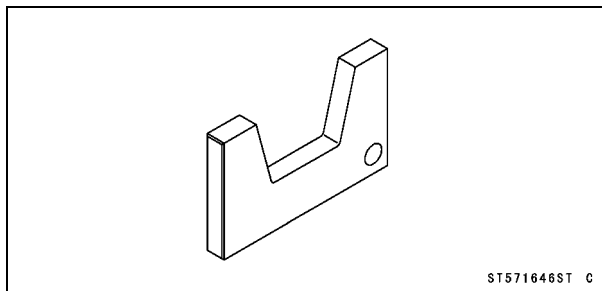
Filler Cap Driver:

57001-1454



Belt Measuring Gauge:

57001-1646

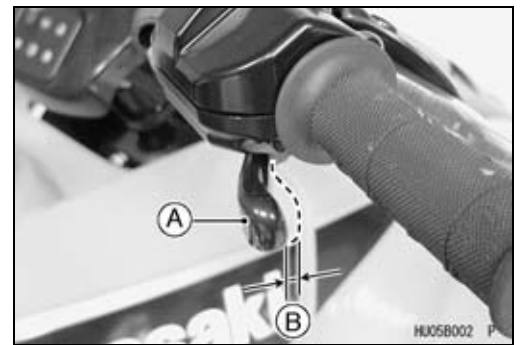


Periodic Maintenance Procedures

Fuel System

Throttle Lever Free Play Inspection

- Check that the throttle lever [A] moves smoothly from full open to close, and the throttle closes quickly and completely in all steering positions by the return spring.
- ★ If the throttle lever does not return properly, check the throttle cable routing, lever free play, and possible cable damage. Then lubricate the throttle cable.
- Run the engine at the idle speed, and turn the handlebar all the way to the right and left to ensure that the idle speed does not change.
- ★ If the idle speed increases, check the throttle lever free play and the cable routing.
- Stop the engine and check the throttle lever free play [B].



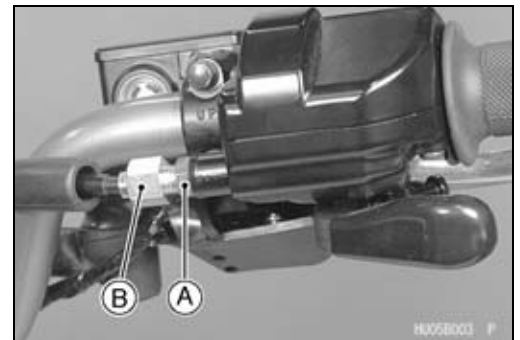
Throttle Lever Free Play

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

- ★ If the free play is not within the specified range, adjust the cable.

Throttle Lever Free Play Adjustment

- Slide the rubber cover off the adjuster at the throttle case.
- Loosen the locknut [A] and turn the throttle cable upper adjuster [B] until the cable has proper amount of play.
- Tighten the locknut and slide the rubber cover on the adjuster.

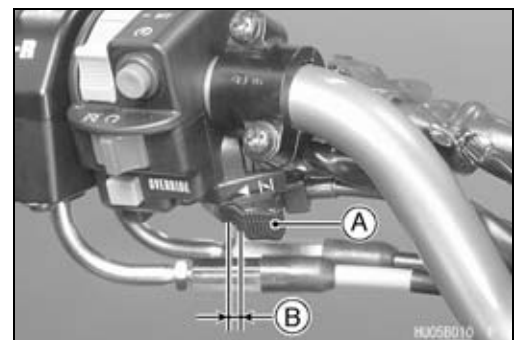


- ★ If the free play cannot be adjusted by using the upper cable adjuster, remove the air cleaner cover and then use the cable adjusting nuts [A] at the lower end of the throttle cable and make the necessary free play.



Choke Lever Free Play Inspection

- Check if the choke lever [A] returns properly and if the inner cable slides smoothly.
- Make sure that the choke lever returns to its released position all the way.
- To determine the amount of choke cable play at the lever, pull the choke lever to the left until it feels that the operation of lever is tough; the amount of choke lever is equivalent to that of cable play.
- The proper amount of play ranges about 3 mm (0.12 in.) at the choke lever.



Choke Lever Free Play [B]

Standard: about 3 mm (0.12 in.)

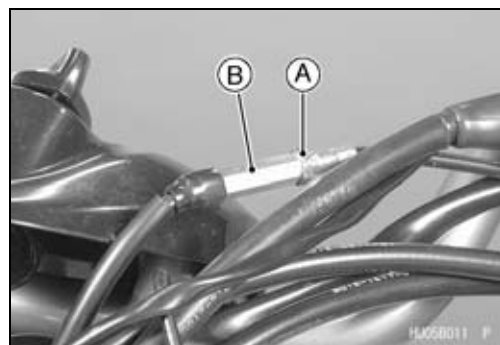
- ★ If the free play is not within the specified range, adjust the cable.

2-14 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Choke Lever Free Play Adjustment

- Loosen the locknut [A] of the choke cable.
- Turn the adjuster [B] until the cable has proper amount of play.
- Tighten the locknut securely.



Idle Speed Inspection

- Start the engine and warm it up thoroughly.
- With the engine idling, turn the handlebar to both sides to check for any changes in the idle speed.
- ★ If handlebar movement changes the idle speed, the throttle cable may be improperly adjusted, incorrectly routed, or damaged. Be sure to correct any of these conditions before riding.

⚠ WARNING

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

- Check the idle speed with a suitable tachometer.

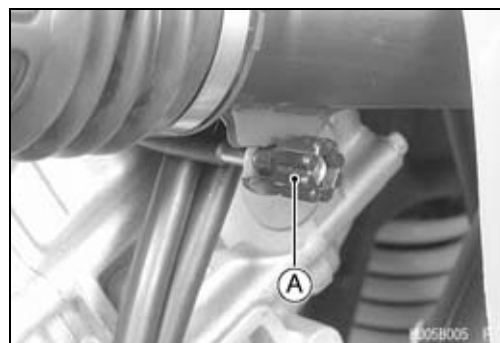
Idle Speed

Standard: 1 100 ±50 r/min (rpm)

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

Idle Speed Adjustment

- Start the engine and warm it up thoroughly.
- Turn the idle 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.



Periodic Maintenance Procedures

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.

- Turn the fuel tap to the OFF position.
- Place the suitable container under the drain plugs [A].
- Turn out the carburetor drain plug a few turns and drain the fuel system.

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

- 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 (carburetor, fuel tank, fuel hose).

Air Cleaner Element Cleaning and Inspection

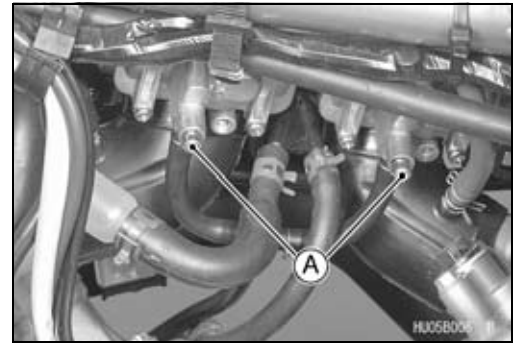
NOTE

- In dusty areas, the element should be cleaned more frequently than the recommended interval.
- After riding through rain or muddy terrains, the element should be cleaned immediately.
- Also, if there is a break in the element material or any other damage to the element, replace the element with a new one.

⚠ WARNING

Clean the element in a well-ventilated area, and take care that there are no sparks 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 a low-flash point solvent to clean the foam element.

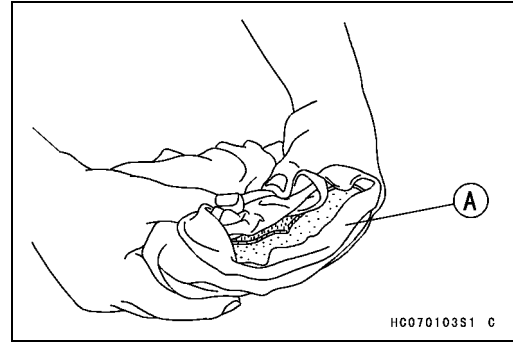
- Remove the air cleaner element (see Air Cleaner Element Removal in the Fuel System chapter).
- Clean the element [A] in a bath of high-flash point solvent.



2-16 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

- Squeeze it dry in a clean towel [A]. Do not wring the element or blow it dry; the element can be damaged.
- Inspect the element for damage.
- ★ If it is torn, punctured, or hardened, replace it.
- After cleaning, saturate the element with a high-quality foam-air-filter oil, squeeze out the excess oil, then wrap it in a clean rag and squeeze it as dry as possible. Be careful not to tear the element.



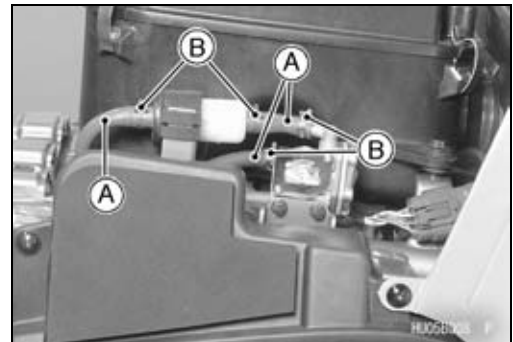
Air Cleaner Draining

- If any water or oil accumulates in the tube, drain it by taking off the tube plug [A]. After draining, be sure to install the tube plug and clamp firmly.



Fuel Hoses and Connections Inspection

- Remove the air cleaner cover (see Air Cleaner Cover Removal in the Frame chapter).
- Turn the fuel tap to the OFF position.
- Check the fuel hoses [A].
- ★ If the fuel hose is frayed, cracked, or bulged, replace the fuel hose.
- Check that the hose is securely connected and clamps [B] are tightened.
- ★ If the fuel hose has been sharply bent or kinked, replace the fuel hose.
- ★ If the clamps are loosened or damaged, replace the clamps.
- When installing the fuel hose, route the hose according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- When installing the fuel hose, avoid sharp bending, kinking, flattening or twisting, and route the fuel hose with a minimum of bending so that the fuel flow will not be obstructed.



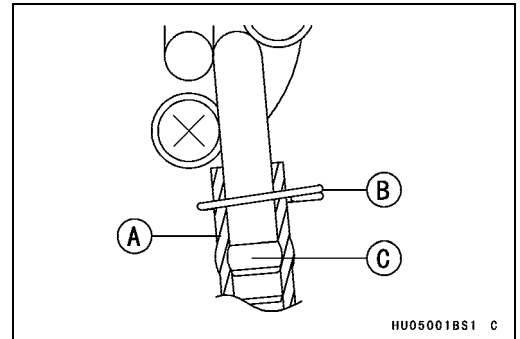
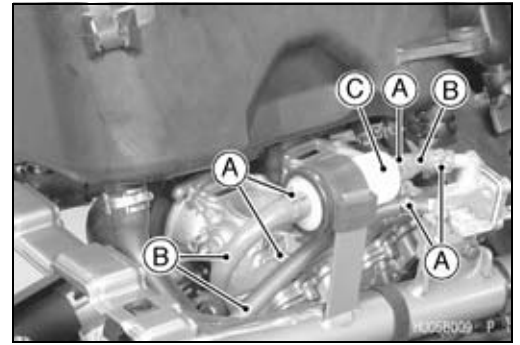
Fuel Hose and Fuel Filter Replacement

⚠ 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.

Periodic Maintenance Procedures

- Remove the air cleaner cover (see Air Cleaner Cover Removal in the Frame chapter).
- Turn the fuel tap to the OFF position.
- Remove:
 - Clamps [A]
 - Clamp (Fuel Tank Side)
 - Fuel Hoses [B]
 - Fuel Filter [C]
- Replace the fuel hoses and fuel filter with a new one.
- When installing the fuel hose, route the hose according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- When installing the fuel hose, avoid sharp bending, kinking, flattening or twisting, and route the fuel hose with a minimum of bending so that the fuel flow will not be obstructed.
- Fit the fuel hose [A] onto the pipe fully and install the clamps [B] beyond the raised rib [C].



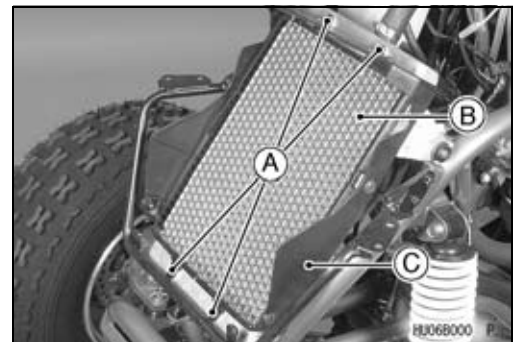
Cooling System

Radiator Cleaning

CAUTION

Clean the radiator screen and the radiator in accordance with the Periodic Maintenance Chart. In dusty areas, they should be cleaned more frequently than the recommended interval. After riding through muddy terrains, the radiator screen and the radiator should be cleaned immediately.

- Remove:
 - Radiator Cover (see Radiator Cover Removal in the Frame chapter)
 - Radiator Screen Mounting Screws [A]
 - Radiator Screen [B] (With the Shroud [C])
- Clean the radiator screen in a bath of tap water, and then dry it with compressed air or by shaking it.



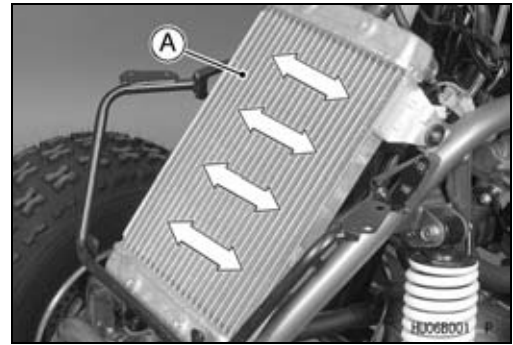
2-18 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

- Clean the radiator.

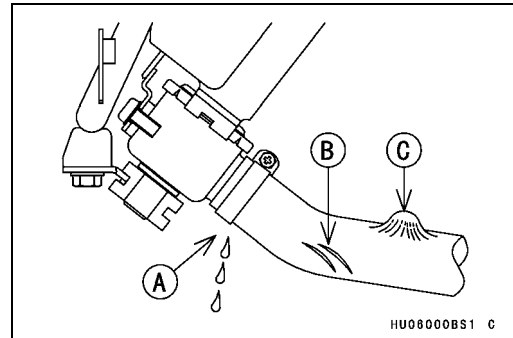
CAUTION

When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage. Keep the steam gun away more than 0.5 m (20 in.) from the radiator core [A]. Hold the steam gun perpendicular to the core surface. Run the steam gun following the core fin direction.



water Hoses and Connections Inspection

- The high pressure inside the water hose 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.



Coolant Change

⚠ WARNING

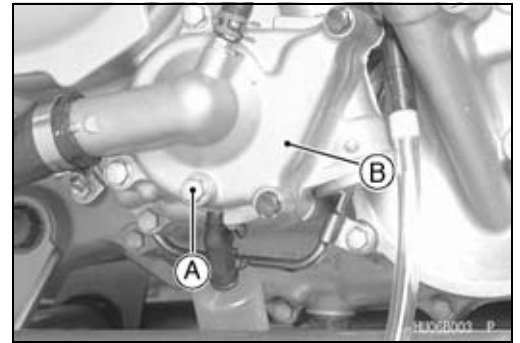
To avoid burns, do not remove the radiator cap or try to change the coolant when the engine is still hot. Wait until it cools down. Coolant on tires will make them slippery and can cause an accident and injury. Immediately wash away any coolant that spills on the frame, engine, or wheels. Since coolant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

- Remove:
 - Front Fender (see Front Fender Removal in the Frame chapter)
 - Reserve Tank Cap
- Place the container under the reserve tank.
- Pull off the water hose [A], and drain the coolant.

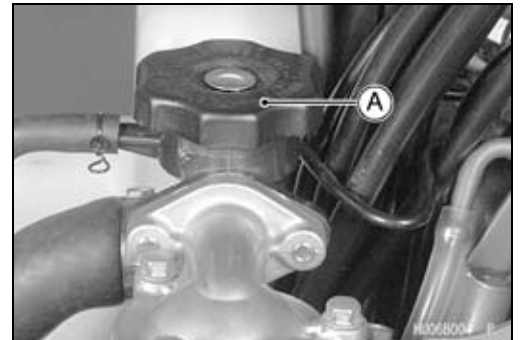


Periodic Maintenance Procedures

- Place a container under the drain bolt [A] at the bottom of the water pump [B], then remove the drain bolt.



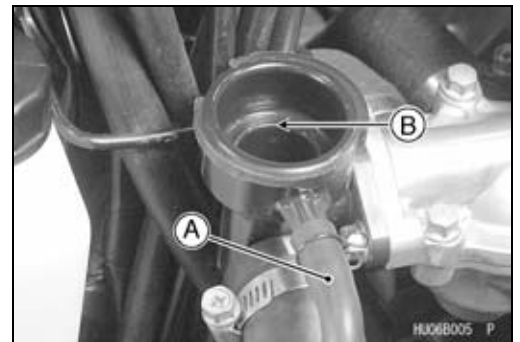
- Remove the radiator cap [A] in two steps. First turn the cap counterclockwise to the first step. Then push and turn it further in the same direction and remove the cap.
- The coolant will drain from the radiator and engine.



- Install the water hose [A].
- Tighten the drain bolt.

Torque - Coolant Drain Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Support the vehicle on a stand or the jack so that the front wheels are off the ground. This makes air bleeding easier.
- Fill the radiator up to the radiator filler neck [B] with coolant.



NOTE

○Pour in the coolant slowly so that the air in the engine and radiator can escape.

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

CAUTION

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

Water and Coolant Mixture Ratio (when shipping)

Soft Water:	50%
Coolant:	50%
Freezing Point:	-35°C (-31°F)
Total Amount:	2.5 L (2.64 US qt)

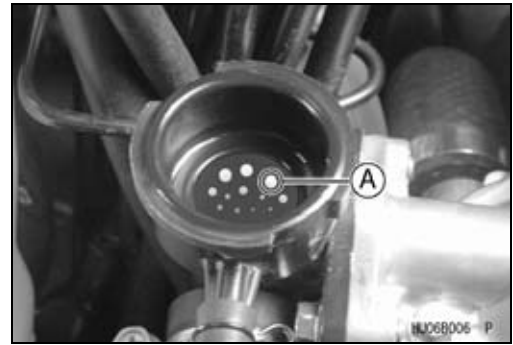
NOTE

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

2-20 PERIODIC MAINTENANCE

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 water 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.

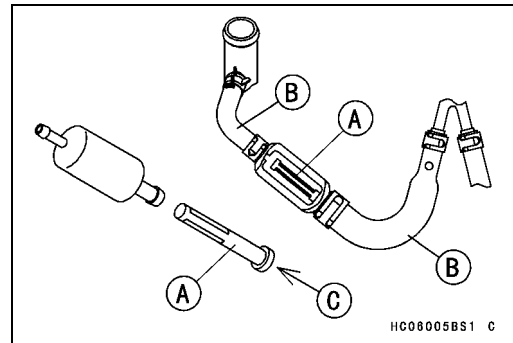


CAUTION

Do not add more coolant above the full level line.

Coolant Filter Cleaning

- Drain the coolant (see Coolant change).
- Remove the filter [A] from the water hoses [B] of carburetor system.
- Blow [C] off dirt and sediment on the filter with compressed air.



Engine Top End

Valve Clearance Inspection

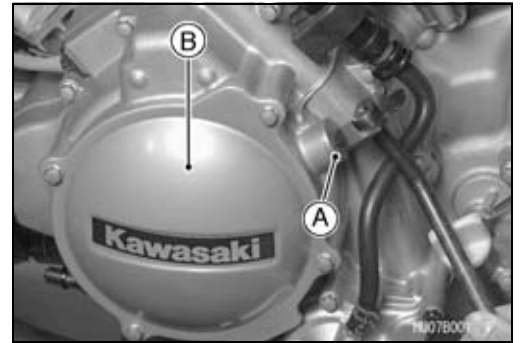
NOTE

- Check the valve clearance only when the engine is cold (at room temperature).
- Remove:
 - Air Cleaner Cover (see Air Cleaner Cover Removal in the Frame chapter)
 - Air Cleaner Housing (see Air Cleaner Housing Removal in the Fuel System chapter)
 - Front Fender (see Front Fender Removal in the Frame chapter)
 - Valve Adjusting Caps [A]

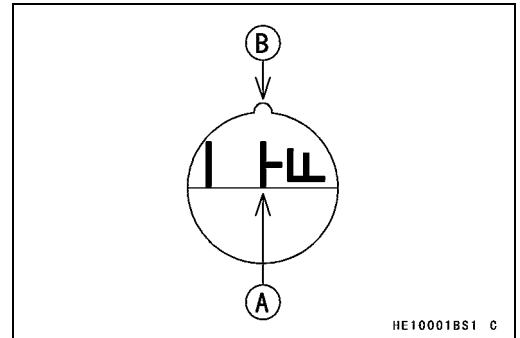


Periodic Maintenance Procedures

- Remove the timing inspection plug [A].
Special Tool - Filler Cap Driver: 57001-1454
- Remove the alternator flywheel bolt cover [B].



- Turn the crankshaft **counterclockwise** with a wrench on the alternator flywheel bolt until “T-F” mark [A] on the alternator flywheel aligns with the notch [B] as shown: the end of the compression stroke in the front cylinder head.



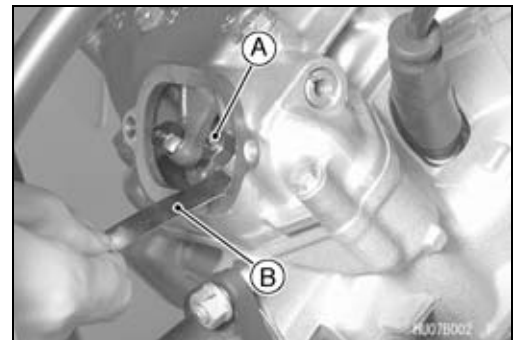
- Measure the clearance for all four valves, one at a time between the end of the valve stem and the adjusting screw [A] with the thickness gauge [B].

Valve Clearance (when cold)

Exhaust: 0.20 ~ 0.25 mm (0.0079 ~ 0.0098 in.)

Inlet: 0.10 ~ 0.15 mm (0.0039 ~ 0.0059 in.)

- ★ If the valve clearance is not correct, adjust it (see Valve Clearance Adjustment).



- Then, turn the crankshaft **counterclockwise** with a wrench on the alternator flywheel bolt until “T-R” mark [A] on the alternator flywheel aligns with the notch [B] as shown: the end of the compression stroke in the rear cylinder head.

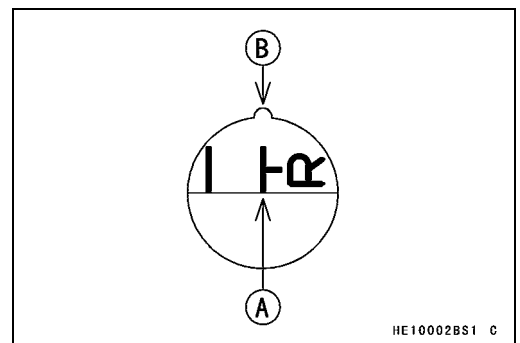
- Measure the clearance for all four valves, one at a time between the end of the valve stem and the adjusting screw with the thickness gauge.

Valve Clearance (when cold)

Exhaust: 0.20 ~ 0.25 mm (0.0079 ~ 0.0098 in.)

Inlet: 0.10 ~ 0.15 mm (0.0039 ~ 0.0059 in.)

- ★ If the valve clearance is not correct, adjust it (see Valve Clearance Adjustment).



2-22 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Valve Clearance Adjustment

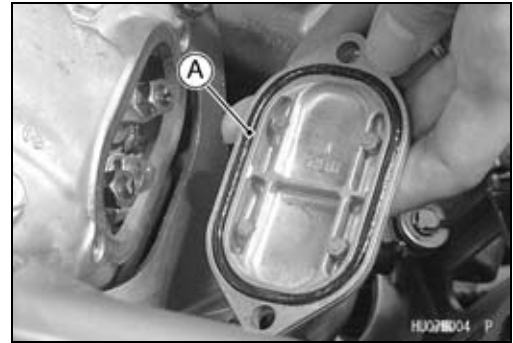
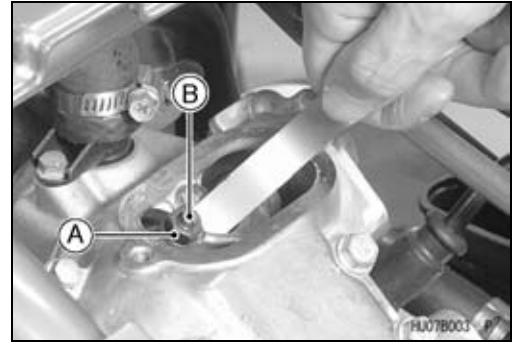
- Remove the valve adjusting caps.
- Loosen the locknut [A] and turn the adjusting screw [B] until the clearance is correct.
- Hold the adjusting screw from turning and tighten the locknut to the specified torque.

Torque - Valve Adjusting Screw Locknuts: 12 N·m (1.2 kgf·m, 104 in·lb)

- Recheck the clearance.
- ★ If the clearance is incorrect, repeat the adjustment procedure.
- ★ If the clearance is correct, perform the adjustment procedure on the other valve.

- Apply grease to the O-rings [A].

Torque - Valve Adjusting Cap Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)



Spark Arrester Cleaning

⚠ WARNING

To avoid burns, wear gloves while cleaning the spark arrester. Since the engine must be run during this procedure, the muffler will become hot.

- Remove the drain bolt [A] on the muffler.
- In an open area away from combustible materials, start the engine with the transmission in neutral.
- Raise and lower engine speed while tapping on the muffler with a rubber mallet until carbon particles are purged from the muffler.

⚠ WARNING

Do not run the engine in a closed area. Exhaust gases contain carbon monoxide; a colorless, odorless, poisonous gas. Breathing exhaust gas leads to carbon monoxide poisoning, asphyxiation, and death.

- Stop the engine.
- Install the drain bolt.



Periodic Maintenance Procedures

Converter System

Drive Belt Wear Inspection

Inspection of the drive belt is required at least every 90 days of vehicle use (average 12 mile/day) not to exceed 1,700 km (1,100 mile) or belt indicator light turn on (100 hours of use) counted by the hour meter. More frequent inspection is necessary if the vehicle is subjected to hard usage.

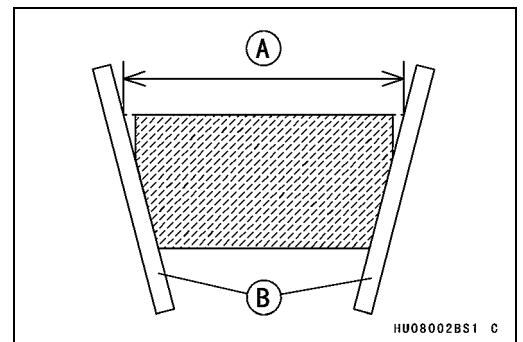
⚠ WARNING

Neglect, abuse, or failure to maintain the transmission can result in a severely worn or damaged drive belt locking up the transmission and wheels. This can cause the operator to lose control and have an accident resulting in injury or death.

- Remove the torque converter cover (see Torque Converter Cover Removal in the Converter System chapter).
- Measure the width [A] of the belt at several locations with a pair of suitable straightedges [B] as shown.
- ★ If any measurements exceed the service limit, replace the belt.

Belt Width

- Standard:** 29.7 ~ 30.3 mm (1.169 ~ 1.193 in.)
- Service Limit:** 28.0 mm (1.102 in.)

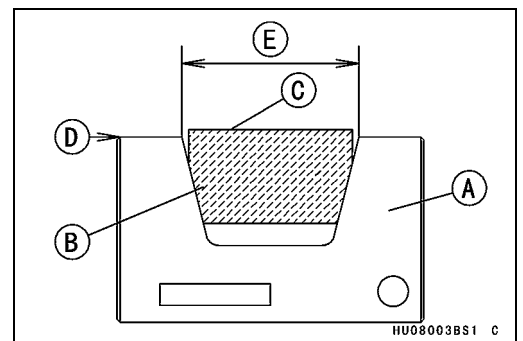


NOTE

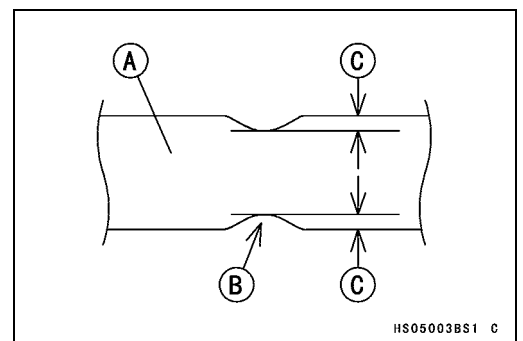
○ Use the belt measuring gauge [A] in order to make easy to inspect the drive belt width.

Special Tool - Belt Measuring Gauge: 57001-1646

- Fit the belt measuring gauge [A] to the drive belt [B].
- ★ If the upper surface [C] of the belt lowers than the upper surface [D] of the gauge, replace the belt. [E] 28 mm (1.102 in.)



- Check the belt [A] for abnormal wear [B].
- Measure the width [C] of the belt at abnormal wear point.
- ★ If any measurements exceed 0.5 mm (0.02 in.), replace the belt.



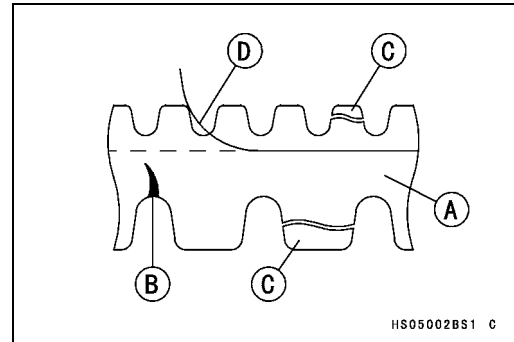
2-24 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

- Check the belt for cracks, breaks, or peeling.
- ★ If necessary, replace the belt with a new one.
 - Belt [A]
 - Crack [B]
 - Broken [C]
 - Peeling [D]

NOTE

○ Whenever the belt is replaced, inspect the drive and the driven pulleys.



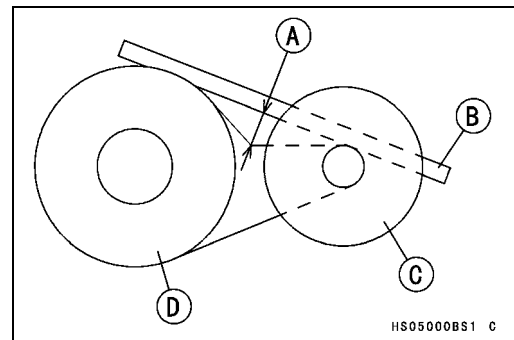
Drive Belt Deflection Inspection

- Remove the torque converter cover (see Torque Converter Cover Removal in the Converter System chapter).
- Put the transmission in neutral and rotate the driven pulley by hand to make sure the belt is shifted all the way to the top of the driven pulley.
- Measure the belt deflection [A] as shown:
 - Place a straightedge [B] on top of the belt between the drive pulley [C] and the driven pulley [D].
 - Use a ruler to push the belt away from the straightedge. Push hard, but with no more force than 59 N (6 kgf, 13 lb).

Belt Deflection

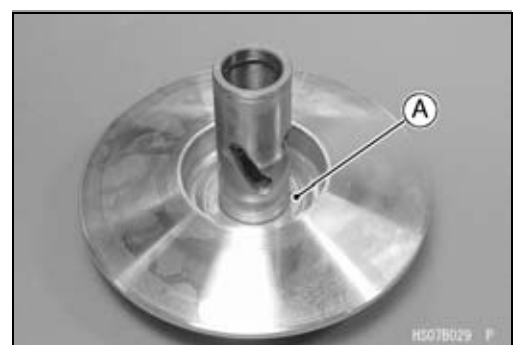
Standard: 22 ~ 27 mm (0.87 ~ 1.06 in.)

- ★ If the belt deflection is not within the specified range, first measure the height of the belt parallel portion (see Drive Belt Inspection). Adjust the deflection by adding or removing spacers on the fixed sheave.
- When adjusting the deflection, less is better than more. Less deflection will maintain better performance for more time as the belt width decreases by normal wear, which causes the deflection to increase with usage.



Drive Belt Deflection Adjustment

- Disassemble the driven pulley (see Driven Pulley Disassembly in the Converter System chapter).
- ★ If the belt deflection is more than 27 mm (1.06 in.), remove the spacers to decrease it.
 - The rule-of-thumb is: 0.1 mm (0.004 in.) change in spacer thickness equals about 1.3 mm (0.051 in.) change in belt deflection.
- ★ If the belt deflection is less than 22 mm (0.87 in.), add the spacers [A] to increase it.
 - The rule-of-thumb is: 0.1 mm (0.004 in.) change in spacer thickness equals about 1.6 mm (0.063 in.) change in belt deflection.



Spacers

Part No.	Thickness
92026-0034	0.3 mm (0.012 in.)
92026-1569	0.6 mm (0.024 in.)
92026-1617	0.8 mm (0.032 in.)
92026-1565	1.0 mm (0.039 in.)
92026-1570	1.4 mm (0.055 in.)

Periodic Maintenance Procedures

- Assemble the driven pulley (see Converter System chapter).
- With the transmission in neutral, rotate the driven pulley to allow the belt to return to the top of the sheaves before measuring the belt deflection.
- Measure the belt deflection again and repeat the above procedures until it is within the standard range.
- Using the flywheel & pulley holder and adapter, tighten the driven pulley nut.

Special Tools - Flywheel & Pulley Holder: 57001-1605

Pulley Holder Attachment: 57001-1472

Torque - Driven Pulley Nut: 93 N·m (9.5 kgf·m, 69 ft·lb)

Engine Lubrication System

Engine Oil Change

- Support the vehicle so that it is level side to side and front to back after warming up the engine.
- Remove the engine drain bolt [A] to drain the oil.
- The oil in the filter can be drained by removing the filter (see Oil Filter Change).
- ★ Replace the drain plug gasket with a new one.
- Tighten:

Torque - Engine Drain Bolt: 20 N·m (2.0 kgf·m, 14 ft·lb)

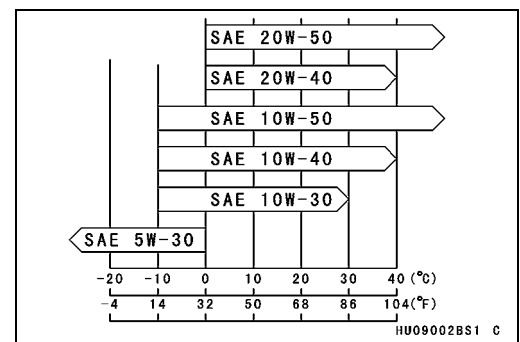
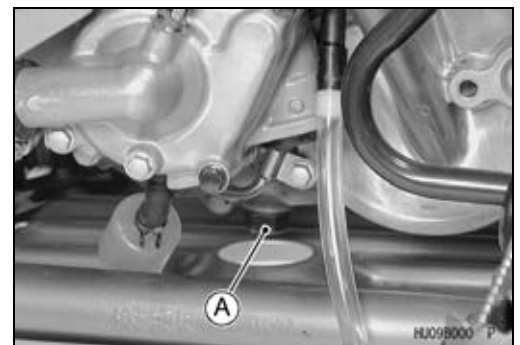
- Pour in the specified type and amount of oil.

Engine Oil

Grade: API SF or SG
 API SH or SJ with JASO MA, MA1 or MA2 (KSV700-A1 ~ A6F/B1 ~ B6F/C6F)
 API SH, SJ or SL with JASO MA, MA1 or MA2

Viscosity: SAE10W-40

Amount: 1.7 L (1.80 US qt)
 (When filter is not removed)
 1.9 L (2.01 US qt)
 (When filter is removed)
 2.2 L (2.33 US qt)
 (When engine is completely dry)



NOTE

- Do not add any chemical additive to the oil. Oils fulfilling the above requirements are fully formulated and provide adequate lubrication for both the engine and the clutch.
- 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.

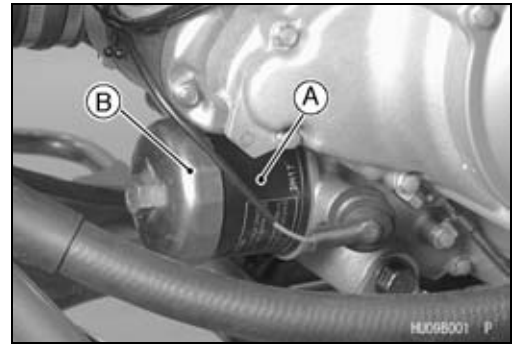
2-26 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Oil Filter Replacement

- Drain the engine oil.
- Remove the oil filter [A] with the oil filter wrench [B].

Special Tool - Oil Filter Wrench: 57001-1249

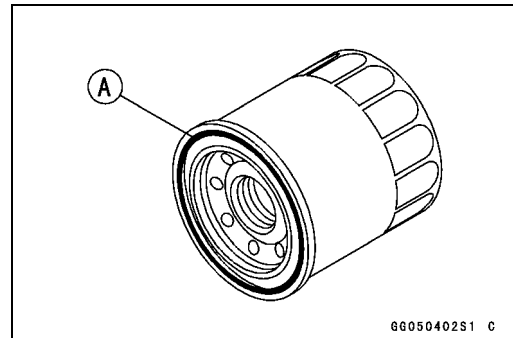


- Replace the filter with a new one.
- When installing the oil filter, be careful of the following.
 - Apply oil to the gasket [A] before installation.
 - Tighten the filter with the oil filter wrench.

Special Tool - Oil Filter Wrench: 57001-1249

Torque - Oil Filter: 18 N·m (1.8 kgf·m, 13 ft·lb)

- Pour in the specified type and amount of oil.



Crankshaft/Transmission

Shift Control Grip Free Play Inspection

- Measure the distance the shift control grip moves with the push button depressed.
- Check the shift control cable free play of both directions.

Shift Control Cable Grip Free play [A]

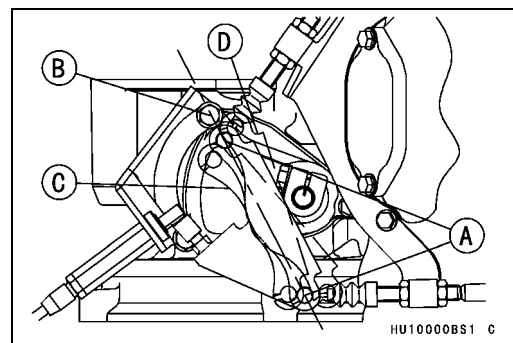
Standard: 0 ~ 2 mm (0 ~ 0.08 in.)

- ★ If the free play is not within the specified range, adjust the cable.



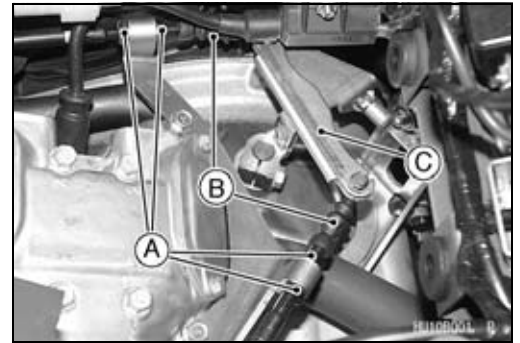
Shift Control Grip Free Play Adjustment

- Remove the battery with the battery case (see Battery Removal in the Electrical System).
- Make sure that the shift control grip is in neutral position.
- Make sure that the gear change lever is in neutral position.
- Neutral position is the shift cable lower ends [A] and reverse lock cable bracket bolt [B] aligned state.
 - Drive Position [C]
 - Reverse Position [D]

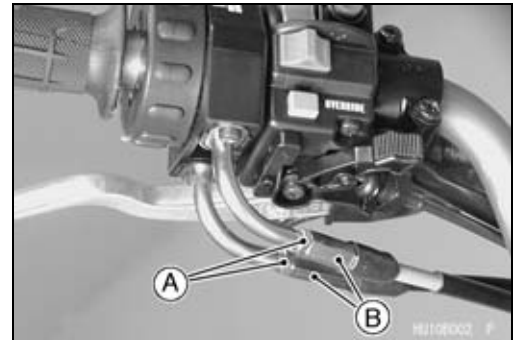


Periodic Maintenance Procedures

- Turn the adjusting nuts [A] at shift control cable lower end to make the inner cables [B] tight with no free play.
- Turn the shift control grip from “N” to “D” and to “R” respectively and make sure the change lever [C] works correctly.
- Tighten the all adjusting nuts securely.



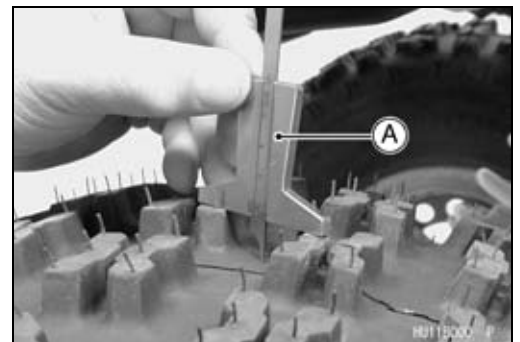
- Slide back the rubber covers.
- Loosen the locknuts [A] and turn the shift cable upper adjusters [B] to obtain the specified free play.
- Tighten the locknuts securely and install the rubber covers.



Wheels/Tires

Tire Wear Inspection

- Inspect the tire for damage and wear.
- ★ If the tire is cut or cracked, replace it.
- Lumps or high spots on the tread or sidewalls indicate internal damage requiring tire replacement.
- Remove any foreign objects from the tread. After removal, check for leaks with a soap and water solution.
- Measure the tread depth at the center of the tread with a depth gauge [A]. Since the tire may wear unevenly, take measurements at several places.



Tire Tread Depth

Service Limit:

Front:	3 mm (0.12 in.)
Rear:	3 mm (0.12 in.)

Standard Tire

Front:	AT 22 X 7-10 CARLISLE, HOLE SHOT XC
Rear:	AT 22 X 11-10 CARLISLE, HOLE SHOT XCT

- ★ If any measurements are less than the service limit, replace the tire.

2-28 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Final Drive

Rear Final Gear Case Oil Change

- Warm up the oil by running the vehicle so that the oil will pick up any sediment and drain easily. Then stop the vehicle.
- Park the vehicle so that it is level, both side-to-side and front-to-rear.
- Place an oil pan beneath the rear final gear case and remove the drain bolt [A].

WARNING

When draining or filling the final gear case, be careful that no oil gets on the tire or rim because oil will deteriorate the tire. Clean off any oil that inadvertently gets on them with a high-flash point solvent.

- After the oil has completely drained out, install the drain bolt with a new aluminum gasket.

Torque - Oil Drain Bolt: 20 N·m (2.0 kgf·m, 14 ft·lb)

- Fill the final gear case up to the bottom of filler opening with the oil specified below.

Final Gear Case Oil

Type: MOBIL Fluid 424 or CITGO TRANSGARD TRACTOR HYDRAULIC FLUID or EXXON HYDRAUL 560

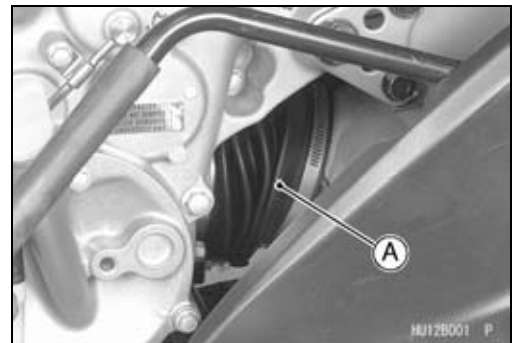
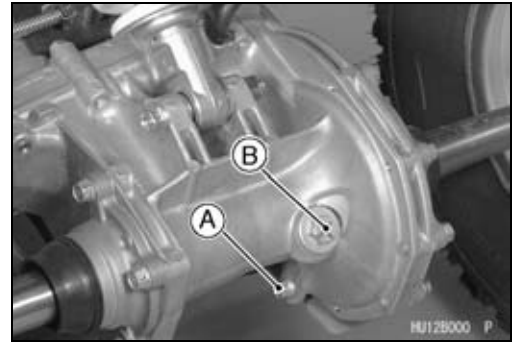
Capacity: 900 mL (0.95 US qt)

- Be sure the O-ring is in place.

Torque - Oil Filler Cap [B]: 29 N·m (3.0 kgf·m, 22 ft·lb)

Propeller Shaft Joint Boot Inspection

- Visually inspect the rear propeller shaft joint boot [A] in accordance with the Periodic Maintenance Chart or if the shaft is noisy during operation.
- ★ If the joint boot is torn, worn, or deteriorated, replace the joint boot and check the propeller shaft (see Propeller Shaft Removal in the Final Drive chapter).



Brakes

Front Brake Pad Wear Inspection

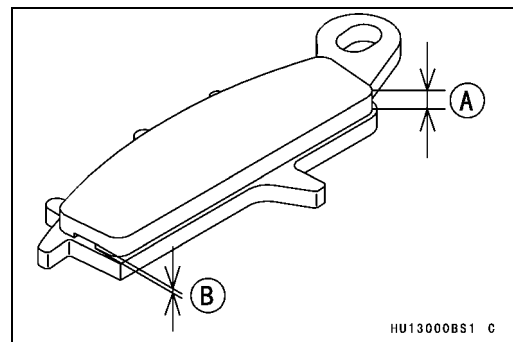
- Check the lining thickness [A] of the pads in each caliper.

Pad Lining Thickness

Standard: 4 mm (0.16 in.)

Service Limit: 1 mm (0.04 in.)

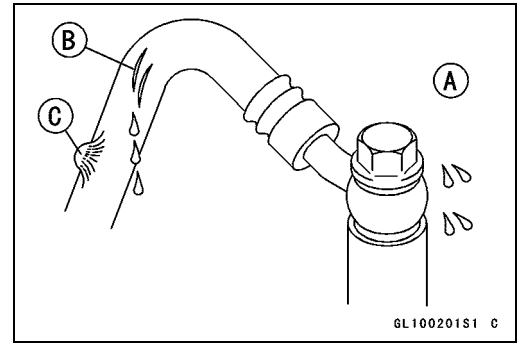
- ★ If the lining thickness of either pad is less than the service limit [B], replace both pads in the caliper as a set.



Periodic Maintenance Procedures

Front Brake Hoses and Connections Inspection

- Inspect the brake hose and fittings 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 if any cracks [B] or bulges [C] are noticed.
- Tighten any loose fittings.



Front Brake Hose Replacement

- Pump the brake fluid out of the line as explained in the Brake Fluid Change.
- Remove the banjo bolts at both ends of the brake hose, and pull the hose off the vehicle.
- Immediately wipe up any brake fluid that spills.

CAUTION

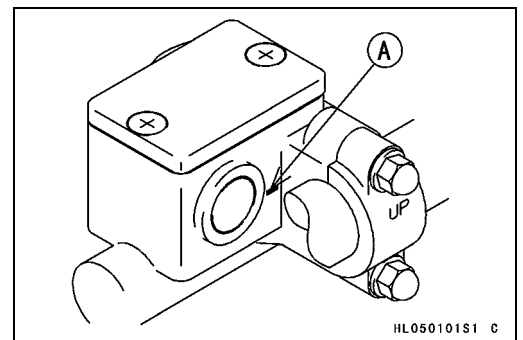
Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely washed away immediately.

- Use a new flat washer for each side of the hose fittings.
- Install the new brake hose in its place (see Cable, Wire and Hose Routing in the Appendix chapter), and tighten the banjo bolts.

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

Front Brake Fluid Level Inspection

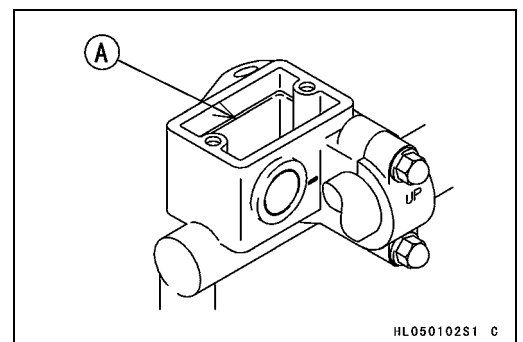
- Position the reservoir horizontal, and check that the fluid level in the reservoir is higher than the lower level line [A].
- ★ If the fluid level is lower than the lower level line, check for fluid leakage of the brake line, and add the fluid as follows:



- Remove the reservoir cap, and fill the reservoir to the upper level line [A] in the reservoir with the same type and brand of the fluid that is already in the reservoir. And then install the reservoir cap.

⚠ WARNING

Change the fluid in the brake line completely if the fluid must be refilled but the type and brand of the fluid that is already in the reservoir are unidentified.



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

2-30 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Front Brake Fluid Change

Front Brake Fluid Change

- Remove the reservoir cap and the rubber cap on the bleed valve.
- Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
- Fill the reservoir with new brake fluid.
- Change the brake fluid as follows:
 - Open the bleed valve [A].
 - Apply the brake lever and hold it [B].
 - Close the bleed valve [C].
 - Release the brake lever [D].
- Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

○ If the fluid in the reservoir runs completely out any time during fluid changing, air will enter the line, and the system must be bled.

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

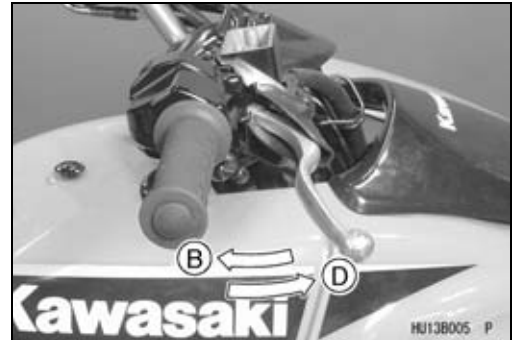
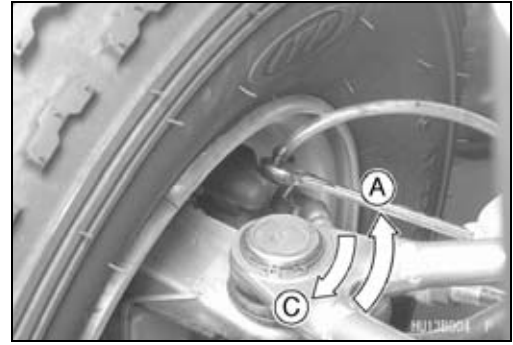
⚠ WARNING

Do not mix two brands of fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are not known.

- Tighten:
 - Torque - Bleed Valves: 7.8 N·m (0.80 kgf·m, 69 in·lb)
 - Front Brake Reservoir Cap Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)
- Apply the brake lever forcefully for a few seconds, and check for fluid leakage around the fittings.
- ★ If necessary, bleed the air from the brake line (see Brake Line Air Bleeding).

⚠ WARNING

If the brake lever has a soft or "spongy feeling" when it is applied, there might be air in the brake line or the brake may be defective. Since it is dangerous to operate the vehicle under such conditions, bleed the air from the brake line immediately.



Periodic Maintenance Procedures

Front Brake Line Air Bleeding

- Bleed the air whenever brake parts are replaced or re-assembled.
- Remove the reservoir cap and fill the reservoir with new brake fluid.
- Slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the hose at the bottom of the reservoir. This bleeds the air from the master cylinder and the brake line.

NOTE

○ Tap the brake hose lightly going from the caliper to the reservoir side and bleed the air off at the reservoir.

- Attach a clear plastic hose to the bleed valve on the caliper, and run the other end of the hose into a container.
- Bleed the brake line and the caliper as follows:
 - Hold the brake lever applied [A].
 - Quickly open and close the valve [B].
 - Release the brake lever [C].
- The fluid level must be checked several times during the bleeding operation and replenished as necessary.

NOTE

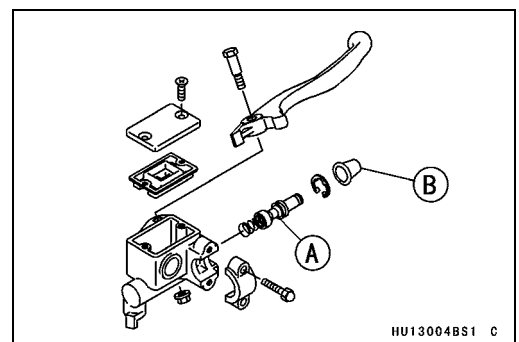
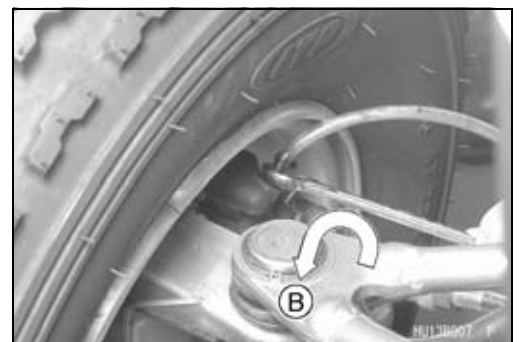
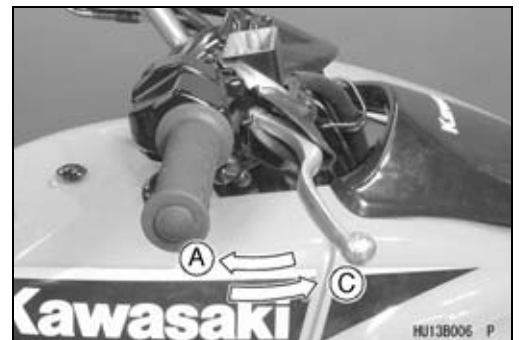
○ If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.

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

- Tighten:
 - Torque - Bleed Valves: 7.8 N·m (0.80 kgf·m, 69 in·lb)**
 - Front Brake Reservoir Cap Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)**
- Apply the brake lever forcefully for a few seconds, and check for fluid leakage around the fittings.

Front Brake Master Cylinder Piston Assembly and Dust Cover Replacement

- Disassemble the master cylinder (see Front Brake Master Cylinder Disassembly in the Brakes chapter).
- Replace the piston assembly [A] and dust cover [B].



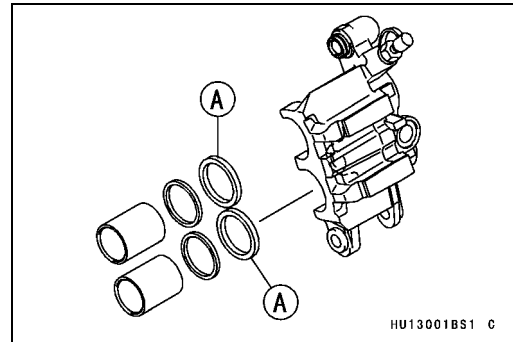
2-32 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Front Brake Caliper Fluid Seal Replacement

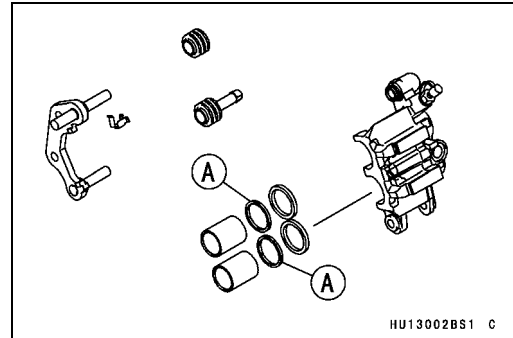
The fluid seals [A] around the piston maintain the proper pad/disc clearance. If the seals are not satisfactory, pad wear will increase, and constant pad drag on the disc will raise brake and brake fluid temperature.

- Disassemble the brake caliper (see Front Brake Caliper Disassembly in the Brakes chapter).
- Replace the fluid seals.



Front Brake Caliper Dust Seal Replacement

- Disassemble the brake caliper (see Front Brake Caliper Disassembly in the Brakes chapter).
- Replace the dust seals [A].



Rear Brake Plates Replacement

- Disassemble the internal wet brake (see Internal Wet Brake Disassembly in the Brakes chapter).
- Replace the steel pressure plates, steel plates and friction plates in accordance with the specified interval.

Rear (Parking) Brake Lever Free Play Inspection

- Check the rear brake lever free play [A].
- Pull the rear brake lever lightly until the brake is applied.

Rear Brake Lever Free Play

Standard: 1 ~ 2 mm (0.04 ~ 0.08 in.)

- ★ If the play is incorrect, adjust it.



Rear Brake Pedal Free Play Inspection

- Check the brake pedal free play [A].
- Depress the brake pedal lightly by hand until the brake is applied.

Brake Pedal Free Play

Standard: 15 ~ 25 mm (0.6 ~ 1.0 in.)

- ★ If the free play is incorrect, adjust it.



Periodic Maintenance Procedures

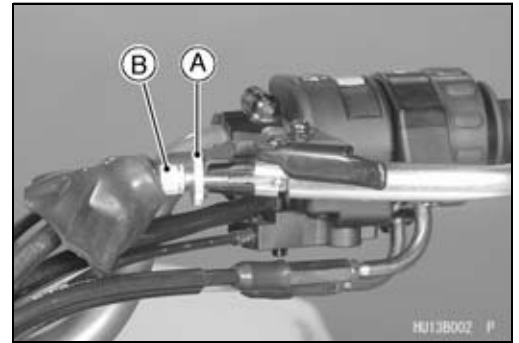
Rear (Parking) Brake Lever and Pedal Free Play Adjustment

NOTE

○ Since the rear brake lever and pedal free play adjustments affect each other, make them at the same time.

Rear (Parking) Brake Lever

- Loosen the knurled locknut [A] and turn the adjuster [B] at the rear brake lever in as far as it will go.
- Tighten the locknut.
- Turn the brake lever adjuster [A] at the rear end of the brake cable until the rear brake lever has the correct amount of play.



Rear Brake Pedal

- Turn the brake pedal adjuster [A] at the rear end of the brake cable until the brake pedal has the correct amount of play.
- Operate the pedal a few times to see that it returns to its rest position immediately after release.
- Rotate the rear wheels to check for brake drag.
- Check braking effectiveness.
- ★ If there is any doubt as to the conditions of the brake, check the brake parts for wear or damage.



Steering

Steering Inspection

- Turn the handlebar left and right, and check the steering action.
- ★ If the steering action is not smooth, or if the steering binds or catches before the stop, lubricate the steering stem bearing.

NOTE

○ The cables and wires will have some effect on the steering action which must be taken into account.

- Check the steering action again.
- ★ If steering stem bearing lubrication does not remedy the problem, inspect the steering stem for straightness, steering stem clamps, and tie-rod bearings.
- ★ If you feel looseness, or if the steering rattles as it turns, check the tightness of the steering bolts and nuts.
- Tighten loose bolts and nuts to the specified torque (see Steering chapter), and check the steering action again.
- ★ If the steering action does not change by tightening the bolts and nuts, inspect the steering stem clamps, steering stem bearings, tie-rod bearings, and steering knuckle joints.

2-34 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Electrical System

Spark Plug Cleaning/Inspection

- Remove the spark plug (see Spark Plug Removal in the Electrical System chapter).
- Clean the spark plug, preferably in a sandblasting device, and then clean off any abrasive particles. The plug may also be cleaned using a wire brush or other suitable tool.
- ★ If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.

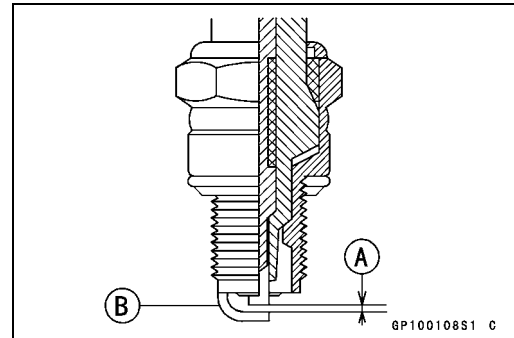
Spark Plug Gap Inspection

- Measure the gap [A] with a wire-type thickness gauge.

Spark Plug Gap

0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)

- ★ If the gap is incorrect, carefully bend the side electrode [B] with a suitable tool to obtain the correct gap.



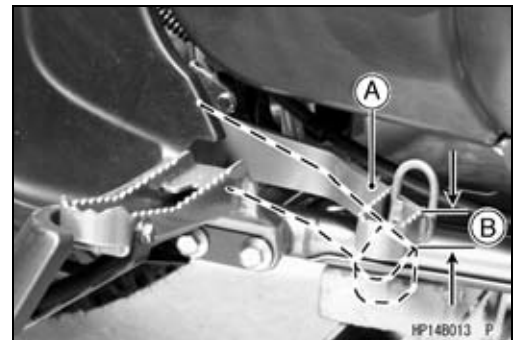
Brake Light Switch Inspection

- Turn on the ignition switch.
- Check the operation of the rear brake light switch by depressing the brake pedal [A].

Brake Light Timing

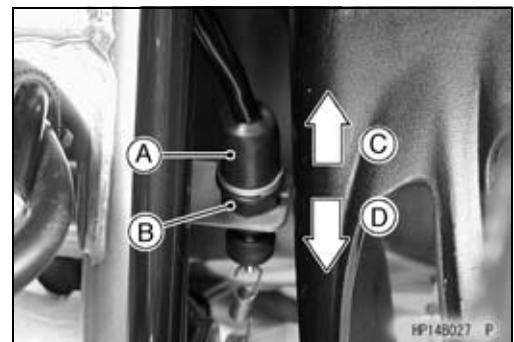
Standard: On after about 10 mm (0.4 in.) of pedal travel [B]

- ★ If it does not as specified, adjust the brake light timing.



Brake Light Timing Adjustment

- Remove the foot guard (see Foot Guard and Stay Removal in the Frame chapter).
- Adjust the brake light switch [A] up or down. To change the switch position, turn the adjusting nut [B].
 - [C] Light Sooner
 - [D] Light Later



CAUTION

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

General Lubrication

Lubrication

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

NOTE

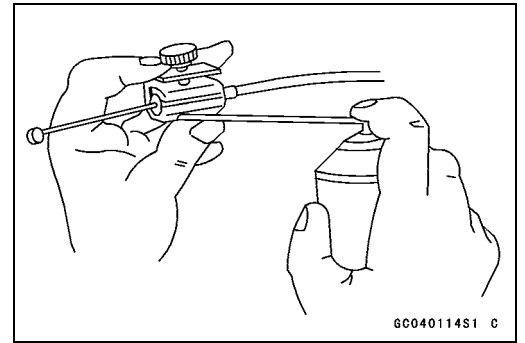
○ Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure spray water, perform the general lubrication.

Periodic Maintenance Procedures

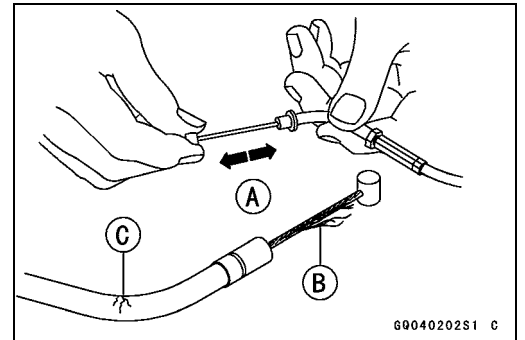
Cables: Lubricate with Cable Lubricant

- Brake Inner Cables
- Throttle Inner Cable
- Choke Inner Cable
- Shift Control Inner Cables

- Lubricate the cables by seeping the oil between the cable and housing.
- The cable may be lubricated by using a pressure cable luber with an aerosol cable lubricant.

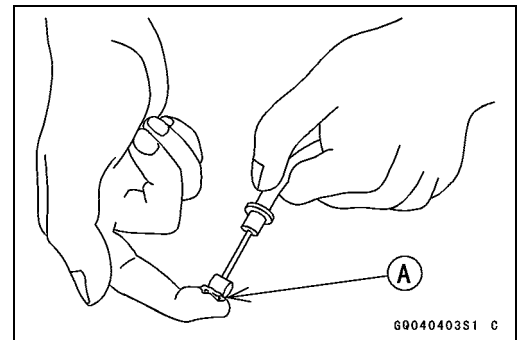


- With the cable disconnected at the both ends, the cable should move freely [A] within the cable housing.
- ★ If cable movement is not free after lubricating, if the cable is frayed [B], or if the cable housing is kinked [C], replace the cable.



Points: Lubricate with Grease.

- Throttle Inner Cable Upper End [A]
- Choke Cable Upper End
- Brake Cable Upper End
- Shift Control Cable Ends



Slide Points: Lubricate with grease.

- Brake Lever Pivot Bolt
- Brake Pedal Pivot Shaft
- Throttle Lever Shaft

2-36 PERIODIC MAINTENANCE

Periodic Maintenance Procedures

Bolt, Nuts, and Fastener Tightness

Tightness Inspection

- Check the tightness of the bolts and nuts listed here in accordance with the Periodic Maintenance Chart. Also, check to see that each cotter pin is in place and in good condition.
- ★ If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not listed in the appropriate chapter, see the Basic Torque Table (see Torque and Locking Agent). For each fastener, first loosen it by 1/2 turn, then tighten it.
- ★ If cotter pins are damaged, replace them with new ones.

Bolts, Nuts, and Fasteners to be checked

Wheels:

- Front Axle Nuts and Cotter Pins
- Rear Axle Nuts and Cotter Pins
- Wheel Nuts

Brakes:

- Front Brake Master Cylinder Clamp Bolts
- Front Brake Lever Pivot Bolt
- Front Brake Lever Pivot Bolt Locknut
- Front Brake Caliper Mounting Bolts
- Brake Pedal Cotter Pin

Steering/Suspension:

- Handlebar Holder Bolts
- Steering Stem Clamp Bolts
- Steering Stem Bearing Joint Bolts
- Tie-Rod End Nuts and Cotter Pins
- Tie-Rod Adjusting Locknuts
- Shock Absorber Mounting Bolts and Nuts
- Suspension Arm Pivot Bolts

Engine:

- Engine Mounting Nut
- Engine Mounting Bracket Bolts
- Exhaust Pipe Holder Nuts
- Muffler Mounting Bolts
- Exhaust Pipe Clamp Bolt

Others:

- Footpeg Mounting Bolts
- Throttle Case Screws

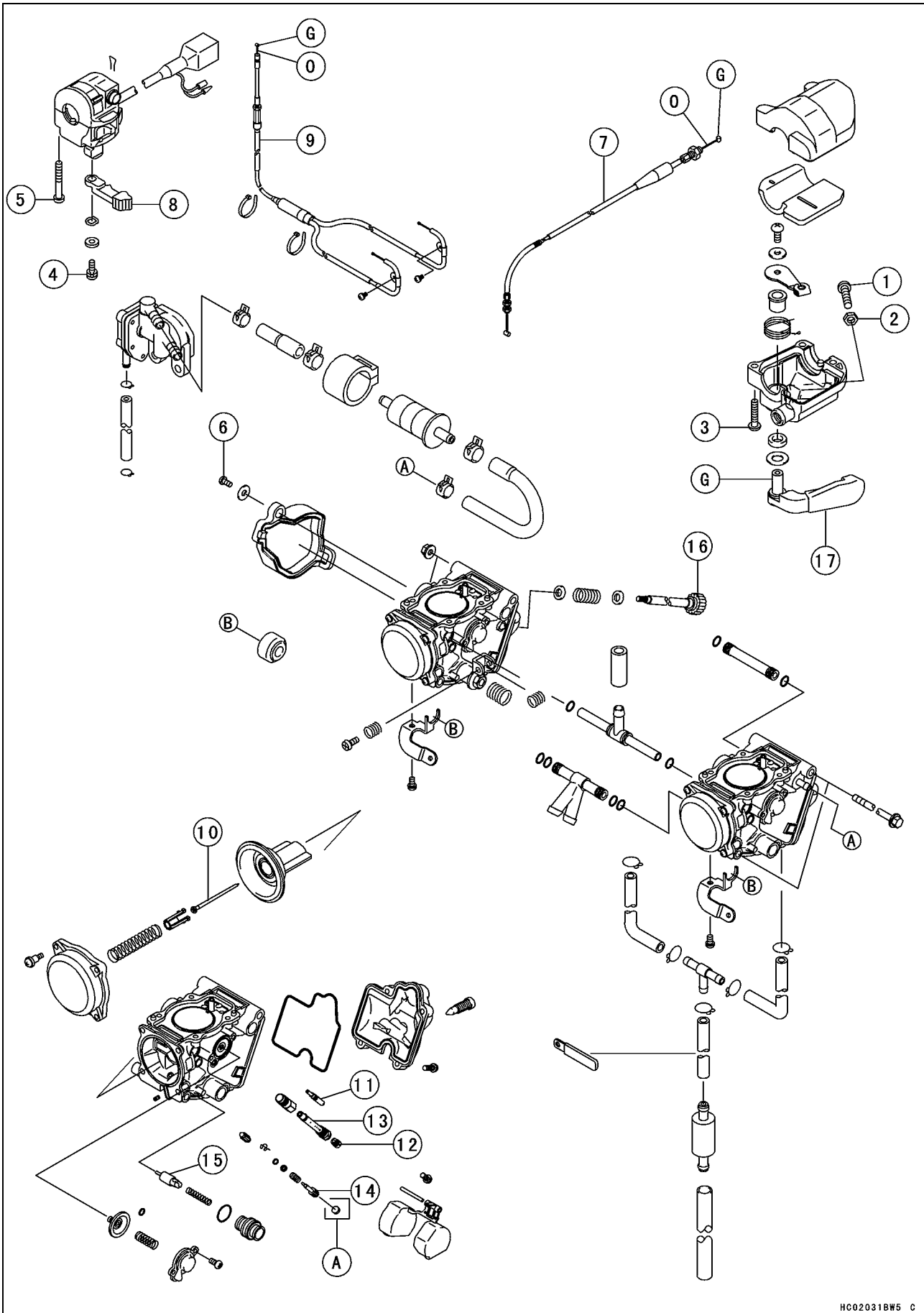
Fuel System

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3-2 FUEL SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Throttle Limiter Screw	3.7	0.38	33 in·lb	
2	Throttle Limiter Locknut	3.7	0.38	33 in·lb	
3	Throttle Case Screws	3.7	0.38	33 in·lb	
4	Choke Lever Mounting Screw	3.5	0.36	31 in·lb	
5	Left Handlebar Switches Assembly Screws	3.5	0.36	31 in·lb	
6	Throttle Cable Cover Screw	1.3	0.13	11 in·lb	

- 7. Throttle Cable
- 8. Choke Lever
- 9. Choke Cable
- 10. Jet Needle
- 11. Pilot Jet
- 12. Main Jet
- 13. Needle Jet
- 14. Pilot Screw
- 15. Choke plunger
- 16. Idle Adjusting Screw
- 17. Throttle Lever
- A: KSV700A6F ~/B6F ~/C6F (United States Model)
- G: Apply grease.
- O: Apply engine oil.

Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Air Cleaner Housing Bolts (M5)	5.9	0.60	52 in-lb	L
2	Air Cleaner Housing Bolts (M6)	8.8	0.90	78 in-lb	
3	Air Cleaner Element Bracket Screws	4.9	0.50	43 in-lb	
4	Fuel Tap Plate Screws	0.8	0.08	7 in-lb	
5	Fuel Tap Cover Screws	1.0	0.10	8 in-lb	
6	Fuel Pump Bolts	2.0	0.20	17 in-lb	
7	Air Cleaner Vent Clamp Bolt	8.8	0.90	78 in-lb	

8. Check Valve

9. Fuel Pump

G: Apply grease.

L: Apply a non-permanent locking agent.

R: Replacement Parts

3-6 FUEL SYSTEM

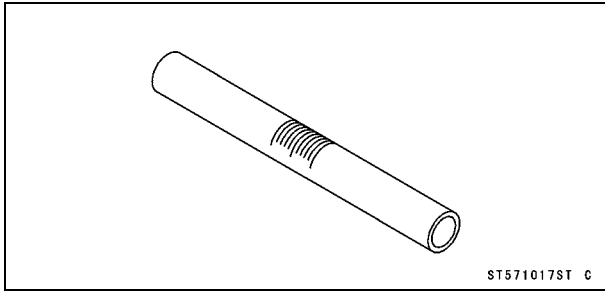
Specifications

Item	Standard	Service Limit
Throttle Case and Cable		
Throttle Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in.)	— — —
Choke Lever and Cable		
Choke Lever Free Play	about 3 mm (0.12 in.)	— — —
Carburetor		
Make/Type	KEIHIN, CVKR32	— — —
Main Jet:		
Front	#135	— — —
Rear	#140	— — —
Main Air Jet	#80	— — —
Needle Jet	#6	— — —
Jet Needle	NBZH	— — —
Pilot Jet	#40	— — —
Pilot Air Jet	#130	— — —
Pilot Screw	1 1/2 turns out	— — —
Carburetor Synchronization Vacuum	less than 2.7 kPa (2 cmHg) difference between carburetors	— — —
Starter Jet	#95	— — —
Idle Speed	1 100 ±50 r/min (rpm)	— — —
Service Fuel Level	12 ±1 mm (0.47 ±0.04 in.) below the punch mark	— — —
Float Height	4.0 ±1 mm (0.16 ±0.04 in.)	— — —
Optional Parts:		
Main Jet:		
*Altitude:		
0 ~ 500 m (0 ~ 1600 ft):		
Front	#135 (92063-1014)	— — —
Rear	#140 (92063-1013)	— — —
500 ~ 1500 m (1600 ~ 4900 ft):		
Front	#132 (92063-1076)	— — —
Rear	#138 (92063-1015)	— — —
1500 ~ 2500 m (4900 ~ 8200 ft):		
Front	#130 (92063-1075)	— — —
Rear	#135 (92063-1014)	— — —
2500 ~ 3500 m (8200 ~ 11500 ft):		
Front	#128 (92063-1074)	— — —
Rear	#130 (92063-1075)	— — —
3500 ~ 4500 m (11500 ~ 14800 ft):		
Front	#120 (92063-1073)	— — —
Rear	#125 (92063-1069)	— — —
Air Cleaner		
Air Cleaner Element Oil	High-quality foam air filter oil	— — —

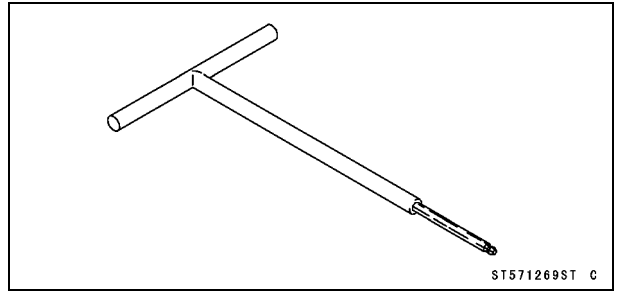
*: Refer to Page 6-24 for High Altitude Setting Information in the Converter System.

Special Tools

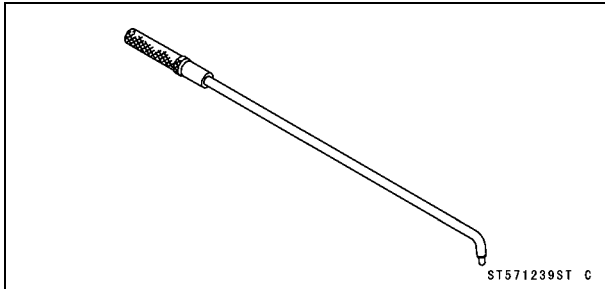
Fuel Level Gauge:
57001-1017



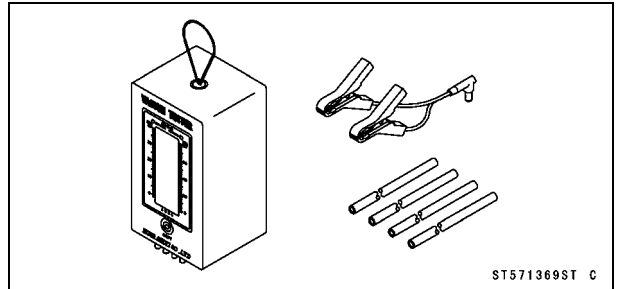
Carburetor Drain Plug Wrench, Hex 3:
57001-1269



Pilot Screw Adjuster, A:
57001-1239



Vacuum Gauge:
57001-1369



3-8 FUEL SYSTEM

Throttle Lever and Cable

Throttle Lever Free Play Inspection

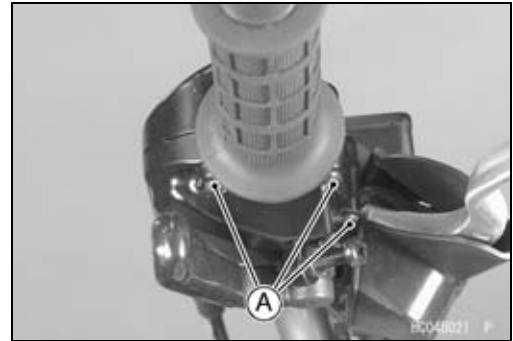
- Refer to the Throttle Lever Free Play Inspection in the Periodic Maintenance chapter.

Throttle Lever Free Play Adjustment

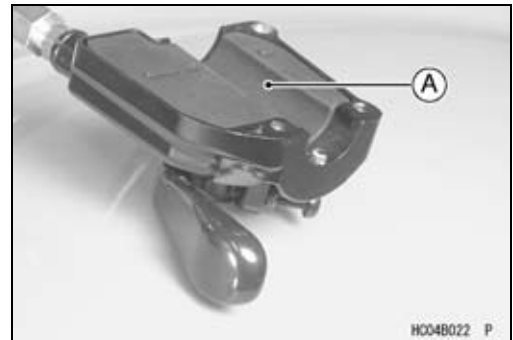
- Refer to the Throttle Lever Free Play Adjustment in the Periodic Maintenance chapter.

Throttle Case Removal/Disassembly

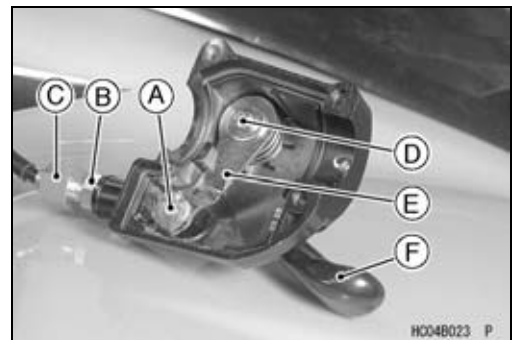
- Remove the throttle case screws [A] and pull the case open.
- Slide the cable adjuster dust cover out of place.



- Remove the rubber cover [A].



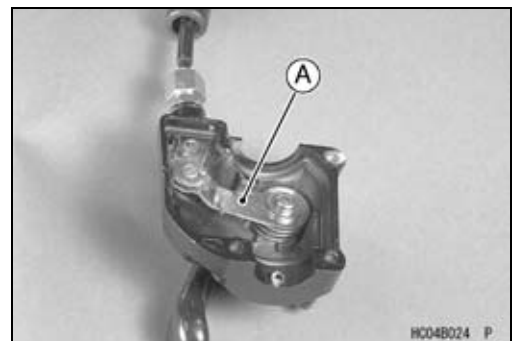
- Pull the cable tip [A] out of the throttle lever catch with the throttle lever opened.
- Loosen the locknut [B] and unscrew the adjuster [C].
- Disassemble the throttle case as follows:
 - Remove the throttle lever screw [D], lockwasher, and flat washer, and lift the throttle lever [E] and return spring from the case.
 - Pull the throttle control lever [F] out of the case.



Throttle Case Assembly/Installation

- Lubricate the throttle case and cable before assembly/installation.
- Be certain that the return spring is correctly installed on the throttle lever [A].
- Install the throttle case so that the projection on the lower throttle case fit the hole on the handlebar.
- Tighten the throttle case screws.

Torque - Throttle Case Screws: 3.7 N·m (0.38 kgf·m, 33 in·lb)



Throttle Lever and Cable

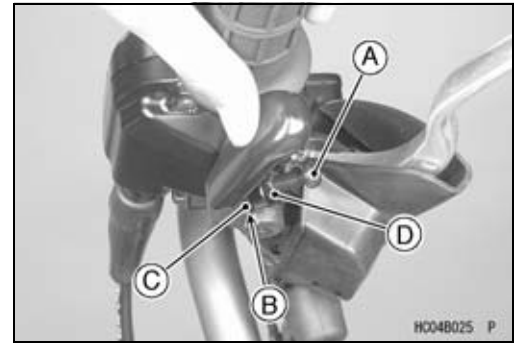
- Push the throttle control lever so that the carburetor throttle valve is fully open. Turn the throttle limiter screw [A] until it is spaced about 1 mm (0.04 in.) [B] away from the throttle lever stop [C]. Tighten the locknut [D].

Torque - Throttle Limiter Screw: 3.7 N·m (0.38 kgf·m, 33 in·lb)

Throttle Limiter Locknut: 3.7 N·m (0.38 kgf·m, 33 in·lb)

NOTE

- Refer to the Owner's Manual for the function of the throttle limiter and adjustment procedure of it.



⚠ WARNING

Operation with an improperly assembled throttle case could result in an unsafe riding condition.

- Check the throttle lever free play (see Throttle Lever Free Play Inspection in the Periodic Maintenance chapter).
- Slide back the cable adjuster dust cover to the original position.

Throttle Cable Installation

- Lubricate the throttle cable before installation.
- Route the cable correctly according to the Appendix chapter.

⚠ WARNING

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

- Check the throttle cable (see Throttle Lever Free Play Inspection in the Periodic Maintenance chapter).

Throttle Case Inspection

- With the throttle cable disconnected from the throttle lever, the lever should move freely and return smoothly by spring.
- ★ If the lever is heavy, disassemble the throttle case, clean and lubricate the throttle case.
- Inspect the lever and case for cracks. Replace the case assembly if it is cracked.



Throttle Cable Lubrication and Inspection

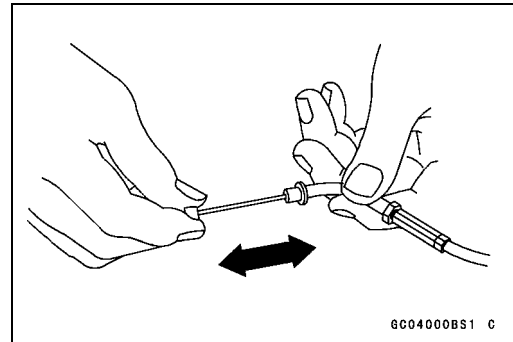
- Whenever the throttle cable is removed or in accordance with the Periodic Maintenance Chart in the Periodic Maintenance chapter, lubricate the cable.
- Refer to the General Lubrication in the Periodic Maintenance chapter.

3-10 FUEL SYSTEM

Throttle Lever and Cable

Throttle Cable Inspection

- With the throttle cable disconnected at both ends, the cable should move freely within the cable housing.
- ★ If the cable does not move freely after lubricating, if the cable is frayed, or if the housing is kinked, replace the cable.



Choke Lever and Cable

Choke Lever Free Play Inspection

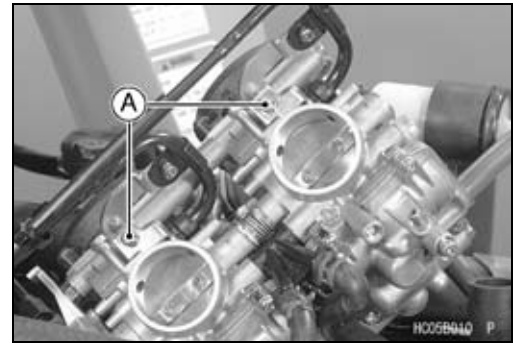
- Refer to the Choke Lever Free Play Inspection in the Periodic Maintenance chapter.

Choke Lever Free Play Adjustment

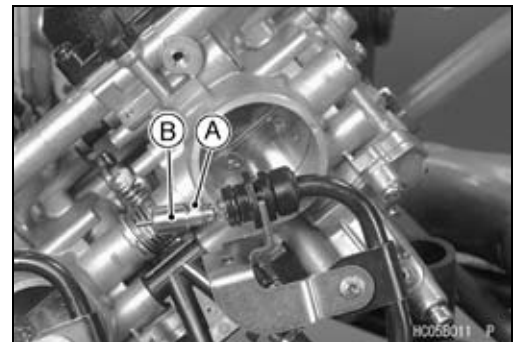
- Refer to the Choke Lever Free Play Adjustment in the Periodic Maintenance chapter.

Choke Lever and Cable Removal

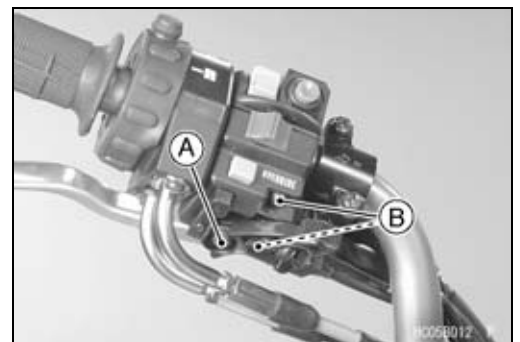
- Remove the air cleaner housing (see Air Cleaner Housing Removal).
- Remove the carburetor from the carburetor holder.
- Remove the water hoses and fuel hose.
- Remove the screws [A] and holder plates.
- Pull out the choke plungers.



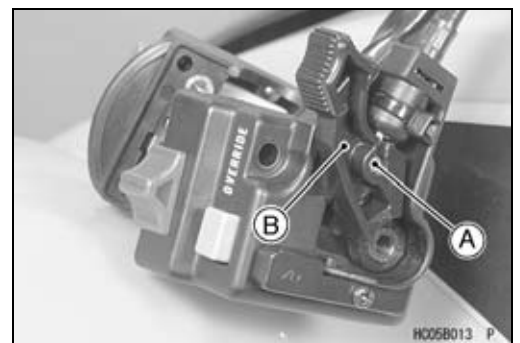
- Hold the choke plunger springs compressed, and free the choke cable lower ends [A] from the plungers [B].



- Remove:
Choke Lever Mounting Screw [A], Plane Washer, and Wave Washer
Switch Case Mounting Screws [B]



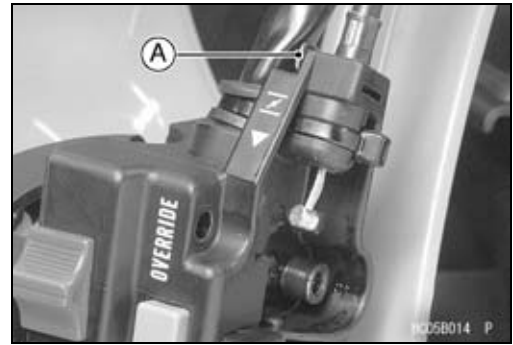
- Free the choke cable upper end [A] from the choke lever [B].



3-12 FUEL SYSTEM

Choke Lever and Cable

- Pull off the retaining clip [A].
- Pull the cable out of the vehicle.



Choke Lever and Cable Installation

- Lubricate the choke cable before installation.
- Install the wave washer, plain washer and screw in that order.
- Route the choke cable according to Cable, Wire, and Hose Routing in the Appendix chapter.

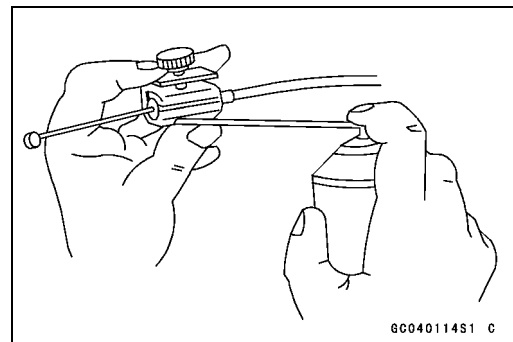
⚠ WARNING

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

Choke Cable Lubrication

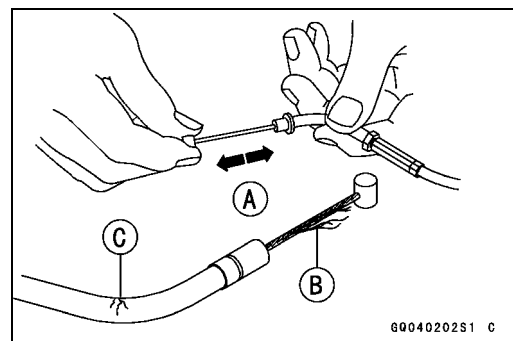
Whenever the choke cable is removed, lubricate the cable as follows:

- Lubricate the cable with a penetrating rust inhibitor through the pressure cable luber.



Choke Cable Inspection

- With the choke cable disconnected at both ends, the cable should move freely [A] in the cable housing.
- ★ If the cable does not move freely after lubricating, if the cable is frayed [B], or if the housing is kinked [C], replace the cable.



Carburetor

Idling Speed Inspection

- Refer to the Idling Speed Inspection in the Periodic Maintenance chapter.

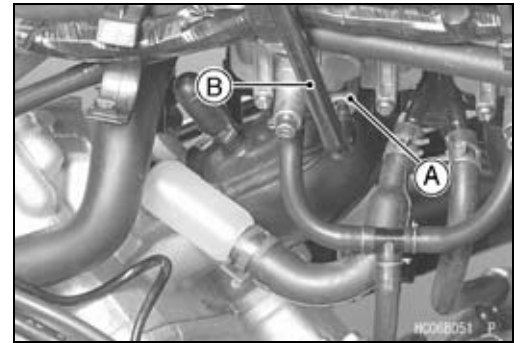
Idle Speed Adjustment

- Refer to the Idling Speed Inspection in the Periodic Maintenance chapter.

Pilot Screw Adjustment

- Adjust the pilot screw if necessary.
- For United States model (KSV700-A6F ~/B6F ~/C6F), it is necessary to remove the plug (see Carburetor Disassembly).
- Remove the converter exhaust joint duct (see Converter Exhaust Duct Removal in the Converter System chapter).
- Turn the carburetor pilot screw [A] all the way in until it seats lightly.

Special Tool - Pilot Screw Adjuster, A: 57001-1239 [B]



CAUTION

Do not overtighten the pilot screw or the carburetor body will be damaged and require replacement.

- Back the pilot screw out the specified number of turns.

Carburetor Pilot Screw Setting

Standard: 1 1/2 turns out

Service Fuel Level Inspection

⚠ WARNING

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

- Remove the carburetor (see Carburetor Removal).

3-14 FUEL SYSTEM

Carburetor

- Set the carburetor [A], fuel level gauge [B], and fuel [C] as follows.

Special Tool - Fuel Level Gauge: 57001-1017

- Place the additional graduation [D] 10 mm (0.39 in.) higher than the top graduation [E].
- Put the carburetor horizontally and so that the outlet side faces downward.
- Connect the fuel gauge and hose to the drain fitting of the carburetor.
- Connect the fuel to the fuel inlet fitting.
 - 210 mm (8.27 in.) [F]
 - 15 mm (0.59 in.) [G]
- Hold the gauge so that the additional graduation is placed slightly higher than the punch mark [H].
- Feed the fuel into the carburetor, then loosen the carburetor drain screw.

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

- Wait until the fuel level in the gauge settles.
- Hold the gauge vertically and lower it slowly so that the additional graduation aligns with the punch mark.

NOTE

- Do not align the additional graduation on the gauge lower than the punch mark. If it is lowered and then raised, the gauge will show a fluid level that is higher than the actual level, which will require a remeasurement.

- Read the fuel level [G].

Service Fuel Level

Standard: 12 ± 1 mm (0.47 ± 0.04 in.) below the punch mark

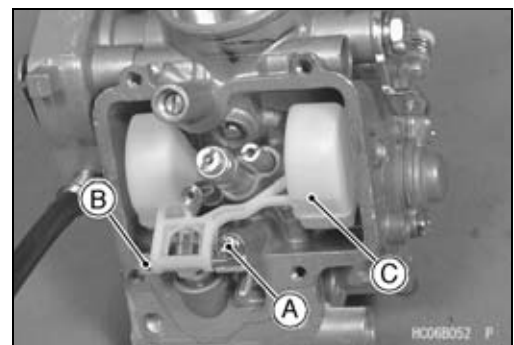
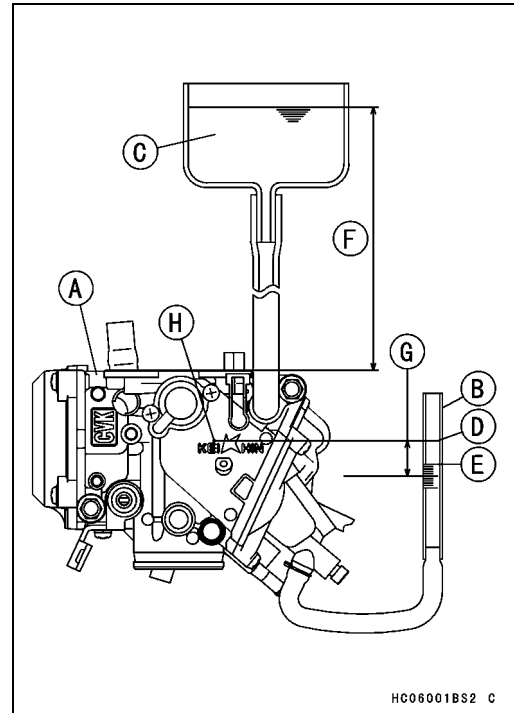
- ★ If the fuel level is incorrect, adjust it.
- Tighten the drain screw.
- Repeat the same procedure for the other carburetor.

Service Fuel Level Adjustment

⚠ WARNING

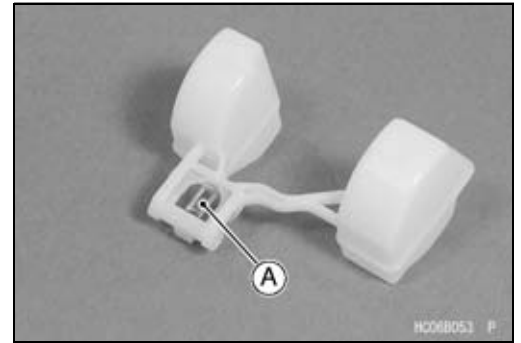
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch to OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove the carburetors, and drain the fuel.
- Remove the float chamber.
- Remove the screw [A].
- Slide out the pivot pin [B] and remove the float [C].



Carburetor

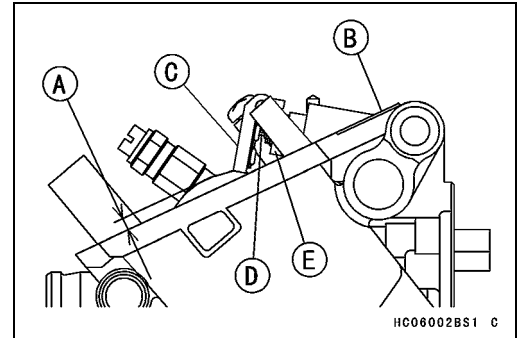
- Bend the tang [A] on the float arm very slightly to change the float height.



Float Height

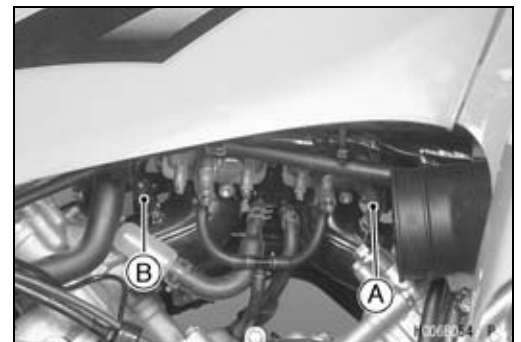
Standard: 4.0 ±1 mm (0.157 ±0.040 in.)

- Measure the float height [A] from the mating surface [B] of float by tilting the carburetor so that the tang of the float [C] just touches the needle rod [D]. At this time, the float valve [E] must not be depressed.
- Increasing the float height lowers the fuel level and decreasing the float height raises the fuel level.
- Assemble the carburetor and recheck the fuel level.
- ★ If the fuel level cannot be adjusted by this method, the float or the float valve is damaged.

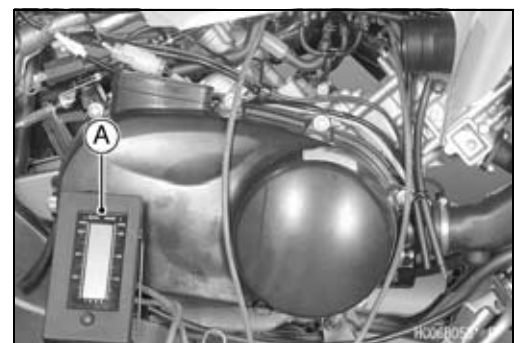


Carburetor Synchronization Inspection

- Check the idle speed.
- Remove:
 - Converter Exhaust Joint Duct (see Converter Exhaust Duct Removal in the Converter System chapter)
 - Fuel Tap Vacuum Hose [A]
 - Caps [B] on the Carburetor Holder



- Connect the battery cables to the battery.
- Attach the vacuum gauge [A] to the fitting on the carburetor holder.
- Start the engine and read the intake vacuum of each carburetor when idling.
- ★ If the vacuum is out of the specified range, adjust it.



Carburetor Synchronization Vacuum

Standard: Less than 2.7 kPa (2 cmHg) difference between carburetors

Special Tool - Vacuum Gauge: 57001-1369

3-16 FUEL SYSTEM

Carburetor

Carburetor Synchronization Adjustment

- Remove the air cleaner cover (see Air Cleaner Cover Removal in the Frame chapter).
- Turn the adjust screw [A] to synchronize the carburetors.
- ★ 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.

- Check the idle speed.

Fuel System Cleanliness Inspection

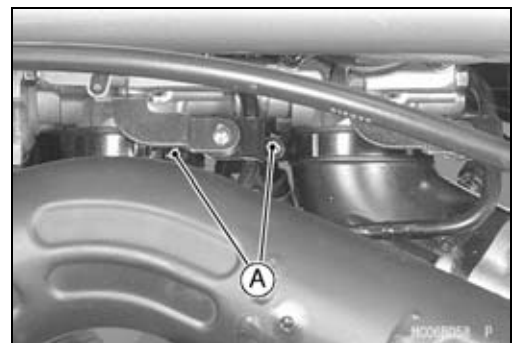
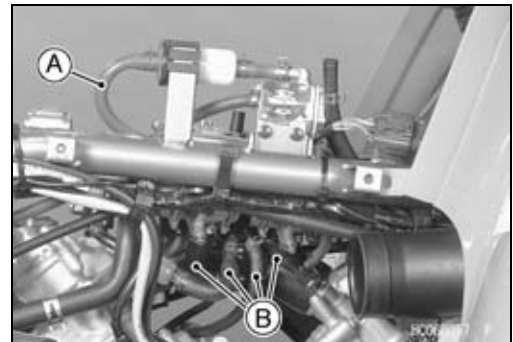
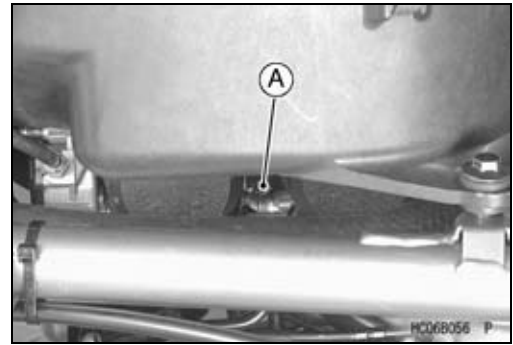
- Refer to the Fuel System Cleanliness Inspection in the Periodic Maintenance chapter.

Carburetor Removal

⚠ WARNING

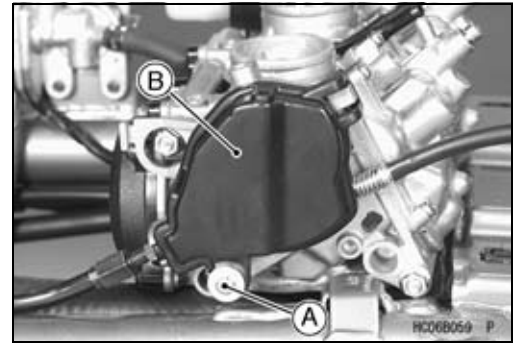
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
 - Air Cleaner Housing (see Air Cleaner Housing Removal)
 - Side Inner Cover (see Side Inner Cover Removal in the Frame chapter)
 - Fuel Hose [A]
 - Water Hoses [B]
- Loosen the clamp screws [A] on the carburetor holders.
- Remove the carburetor out of the frame.

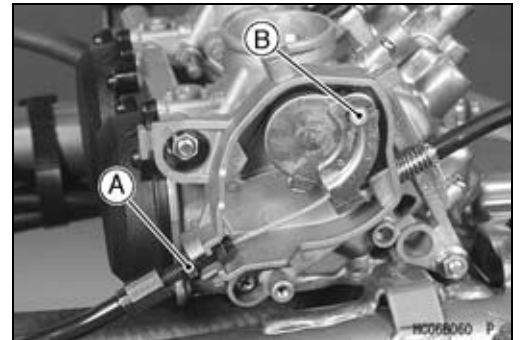


Carburetor

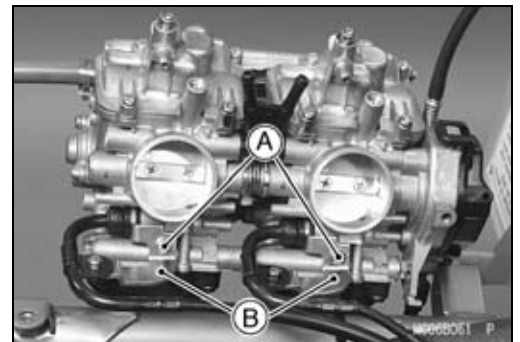
- Remove the throttle cable cover screw [A] and throttle cable cover [B].



- Loosen the nut [A] on the throttle cable.
- Remove the throttle cable lower end [B].



- Remove the screws [A] and holder plates [B].
- Pull out of the choke plungers.



Carburetor Installation

- Check fuel leakage from the carburetors.

⚠ WARNING

Fuel spilled from the carburetors is hazardous.

- Adjust the idle speed (see Idle Speed Adjustment in the Periodic Maintenance chapter).
- Check the throttle cable (see Throttle Lever Free Play Inspection in the Periodic Maintenance chapter).

Carburetor Disassembly

- Remove the carburetors (see Carburetor Removal).

⚠ WARNING

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

NOTE

- The carburetors can be disassembled in the joined state.

3-18 FUEL SYSTEM

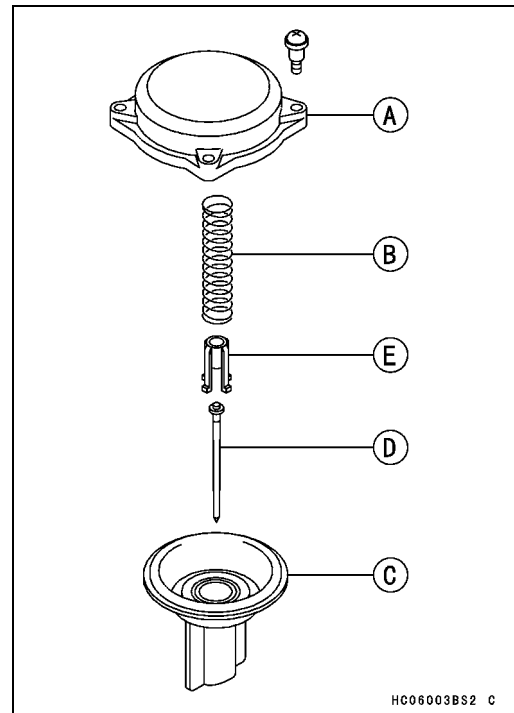
Carburetor

- Remove the pilot screw with spring washer and O-ring.
- For the United States model (KSV700-A6F ~/B6F ~/C6F), remove the pilot screw plug as follows: punch a hole in the plug and pry it 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.
- Remove the upper chamber cover [A], spring [B], and vacuum piston [C].

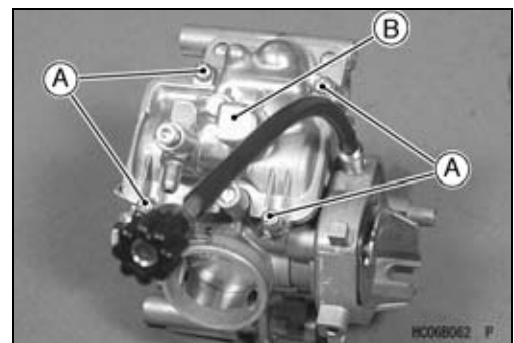
CAUTION

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

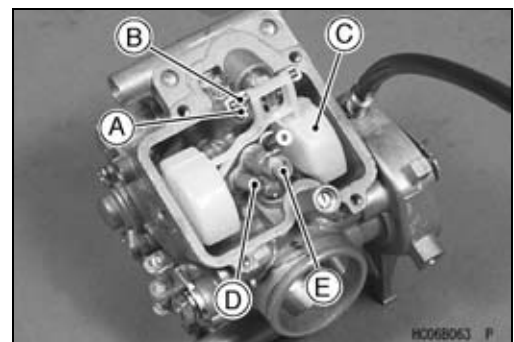
- Remove the jet needle [D] from the vacuum piston. These can be detached together with the spring seat [E].



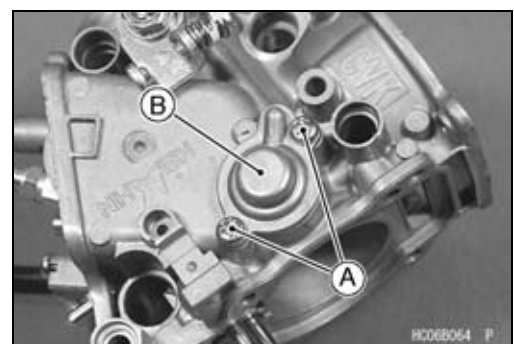
- Remove:
Screws [A]
Float Chamber [B]



- Remove:
Screw [A]
Float Pivot Pin [B], Float [C], and Float Needle Valve
Pilot Jet [D]
Main Jet [E]

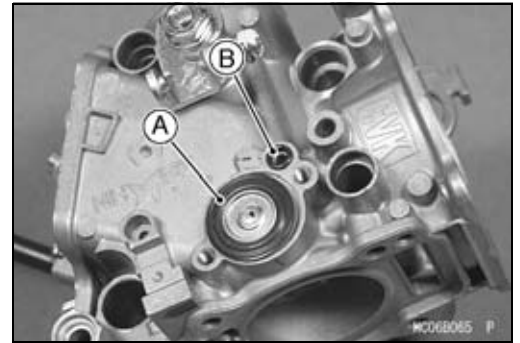


- Remove:
Screws [A]
Coasting Enricher Cover [B]



Carburetor

- Remove:
Diaphragm [A]
O-ring [B]



Carburetor Assembly

⚠ WARNING

Fuel spilled from the carburetors is hazardous.

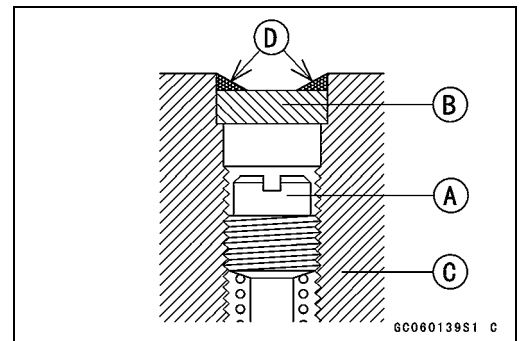
CAUTION

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

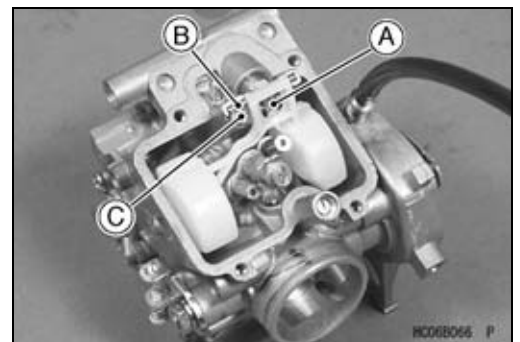
- Turn in the pilot screw [A] fully but not tightly, and then back it out the same number of turns counted during disassembly.
- For the United States model (KSV700-A6F ~/B6F ~/C6F), install the pilot screw plug as follows: install a new plug [B] in the pilot screw hole of the carburetor body [C], and apply a small amount of a bonding agent [D] 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.



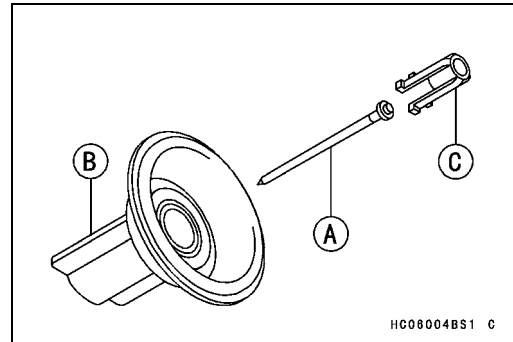
- Install the float valve needle in the valve seat and hook the needle hanger [A] onto the float tang.
- Insert the float pivot pin [B] into the pivot post and the float.
- Tighten the screw [C].
- Set the float to the standard height (see Service Fuel Level Adjustment).



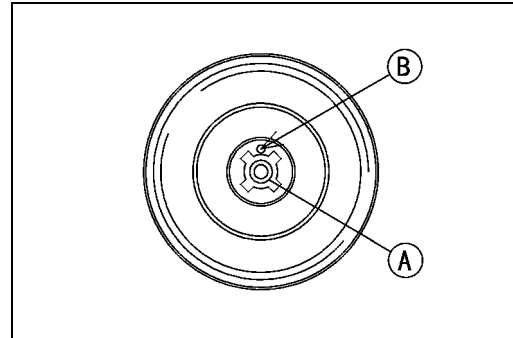
3-20 FUEL SYSTEM

Carburetor

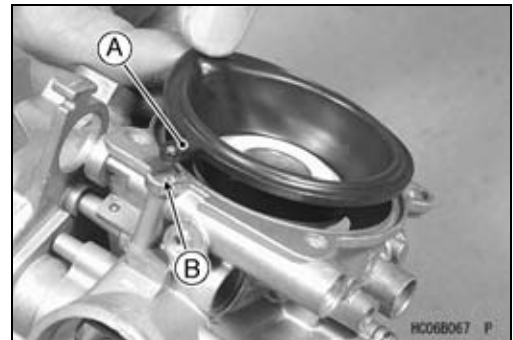
- Insert the jet needle [A] into the hole in the center of the vacuum piston [B], and place the spring seat [C] over the needle.



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

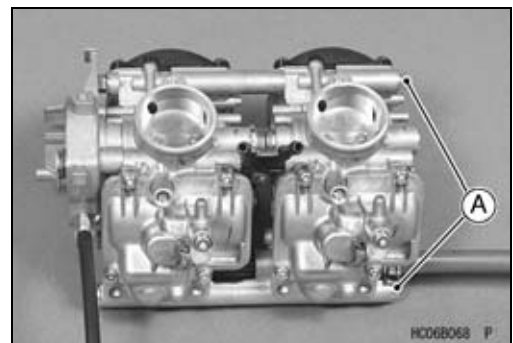


- Fit the projection [A] of the vacuum piston diaphragm in the recess [B] of the body.
- After installing the upper chamber cover, check to make sure that the vacuum piston moves smoothly in the carburetor body.



Carburetor Separation

- Remove:
 - Carburetor (see Carburetor Removal)
 - Carburetor Joining Bolts [A] and Nuts
- Separate the carburetors.

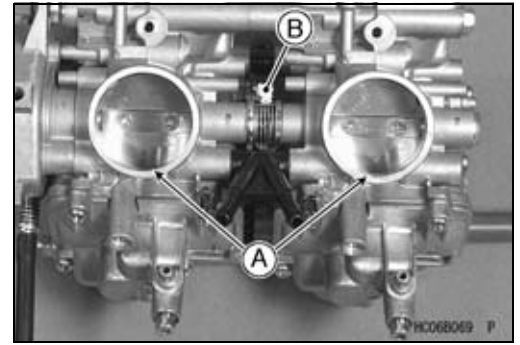


Carburetor Joining

- The center lines of the carburetor bores must be parallel both horizontally and vertically. If they are not, loosen the carburetor joining bolts and align the carburetors on a flat surface.
- Retighten the carburetor joining bolts.

Carburetor

- 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 Synchronization Adjustment).



Carburetor Cleaning

⚠ WARNING

Clean the carburetor in a well-ventilated area and take care that there are no sparks 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.

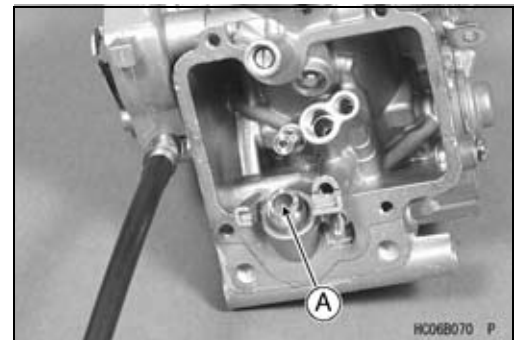
CAUTION

Do not use compressed air on an assembled carburetor, the float 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 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 and clean all the metal parts in a carburetor cleaning solution.
- Rinse the parts in water and dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Remove the float valve, spray cleaning solution from the valve seating surface into the fuel passage, and clean the strainer (press-fitted) with compressed air [A].
- Assemble the carburetor (see Carburetor Assembly).



3-22 FUEL SYSTEM

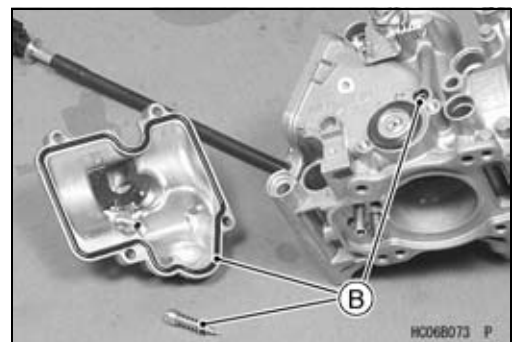
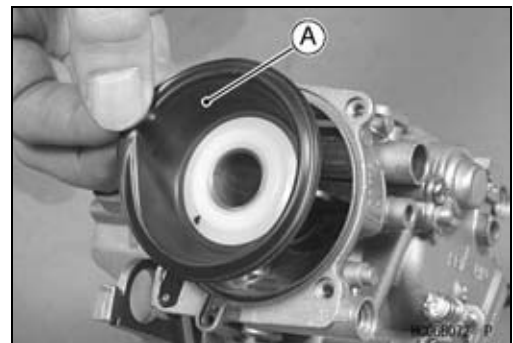
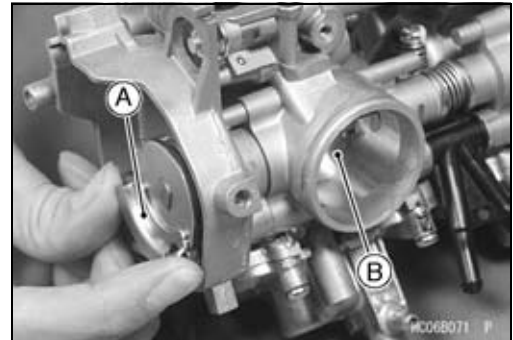
Carburetor

Carburetor Inspection

⚠ WARNING

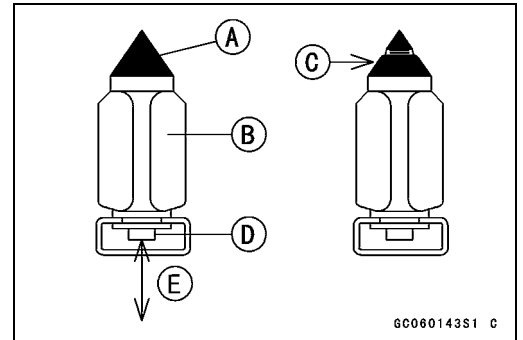
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Remove the carburetor (see Carburetor Removal).
 - Before disassembling the carburetors, check the fuel level (see Service Fuel Level Inspection).
 - Turn the throttle cable pulley [A] to check that the throttle butterfly valve [B] moves smoothly and return back with the spring tension.
 - ★ If the throttle valve does not move smoothly, replace the carburetor.
-
- Disassemble the carburetors (see Carburetor Disassembly).
 - Clean the carburetor (see Carburetor Cleaning).
 - Check the vacuum piston diaphragm [A], and the O-rings [B] on the float bowl, pilot screw, coasting enricher, and starter plunger cap.
 - ★ If any of the diaphragm or O-rings are not in good condition, replace them.

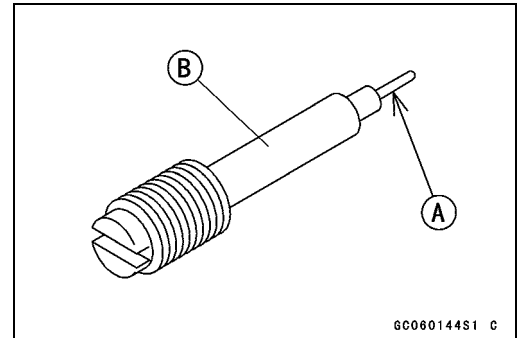


Carburetor

- Check the plastic tip [A] of the float valve needle. It should be smooth, without any grooves, scratches, or tears.
- ★ If the plastic tip is damaged [C], replace the float valve [B].
- Push the rod [D] in the other end of the float valve needle and then release it [E].
- ★ If it does not spring out, replace the float valve.



- 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.



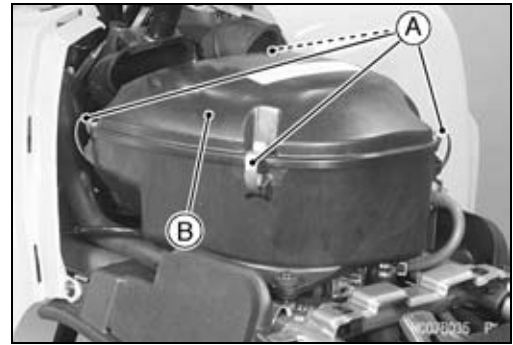
- Check that the vacuum piston moves smoothly in the carburetor body. The surface of the piston must not be excessively worn.
- ★ If the vacuum piston does not move smoothly, or if it is very loose in the carburetor body, replace both the body and the vacuum piston.

3-24 FUEL SYSTEM

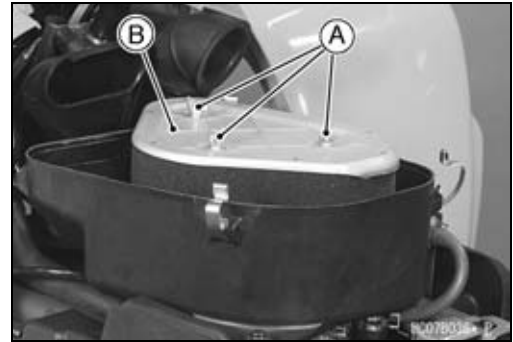
Air Cleaner

Air Cleaner Element Removal

- Remove:
 - Air Cleaner Cover (see Air Cleaner Cover Removal in the Frame chapter)
 - Clips [A]
 - Air Cleaner Housing Cap [B]



- Remove:
 - Thumbscrews [A]
 - Metal mesh [B] with element
- After removing the element, stuff pieces of lint-free, clean cloth into the air cleaner ducts to keep dirt out of the carburetor and engine.



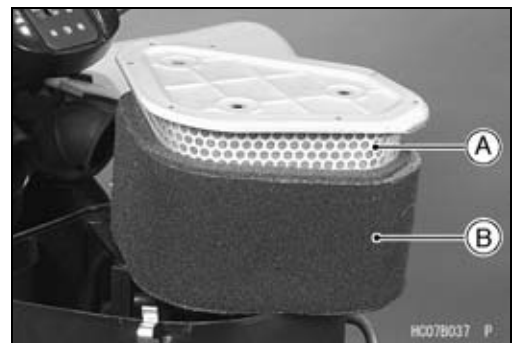
⚠ WARNING

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

CAUTION

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

- Separate metal mesh [A] and element [B].



Air Cleaner Element Cleaning and Inspection

- Refer to the Air Cleaner Element Cleaning and Inspection in the Periodic Maintenance chapter.

Air Cleaner Draining

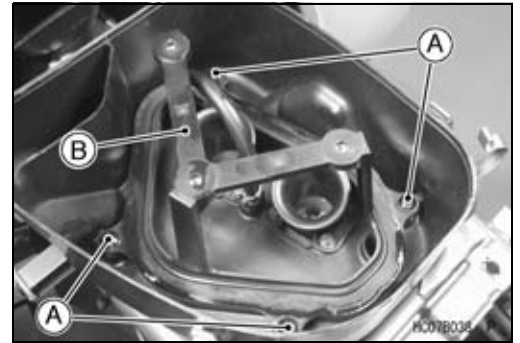
- Refer to the Air Cleaner Draining in the Periodic Maintenance chapter.

Air Cleaner Housing Removal

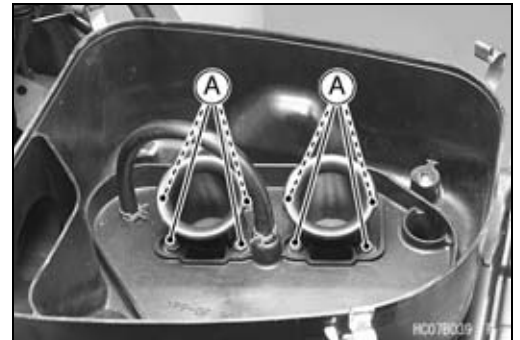
- Remove:
 - Air Cleaner Cover (see Air Cleaner Cover Removal in the Frame chapter)
 - Air Cleaner Housing Cap
 - Air Cleaner Element (Air Cleaner Element Removal)

Air Cleaner

- Remove:
Screws [A]
Element Bracket [B]



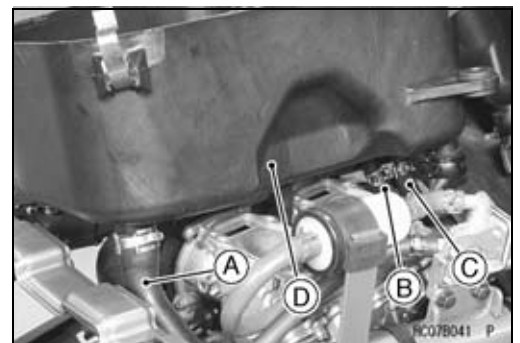
- Remove:
Air Cleaner Housing Bolts (M5) [A]



- Remove:
Air Cleaner Housing Bolts [A]

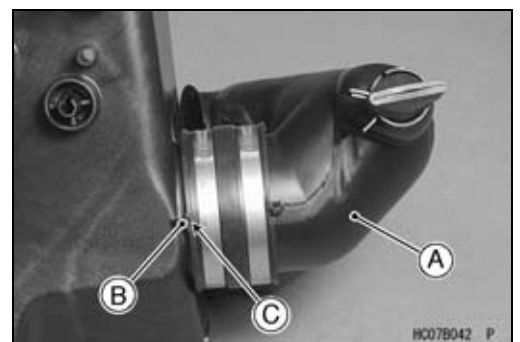


- Remove:
Breather Hose [A]
Air Vent Hose [B]
Drain Hose [C]
Air Cleaner Housing [D]



Air Cleaner Housing Installation

- Insert the fitting of the housing in the duct [A], and fit the projection [B] under the fitting in the groove [C] in the duct.
- Tighten the clamp screws.

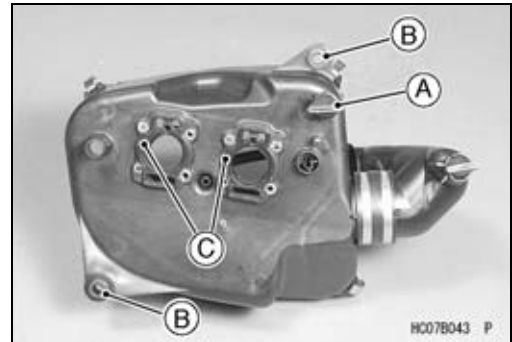


3-26 FUEL SYSTEM

Air Cleaner

- Install:

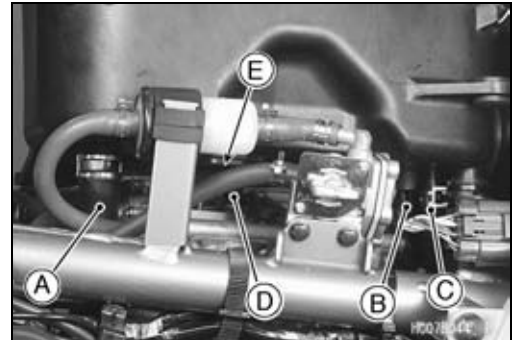
- Drain Hose [A]
- Grommets [B]
- Air Ducts [C]



- Install:

- Breather Hose [A]
- Air Vent Hose [B]
- Drain Hose [C]

- Insert the carburetor air vent hose [D] in the fitting [E] of the housing.



- Apply a non-permanent locking agent to the air cleaner housing bolts (M5) [A] and tighten them.

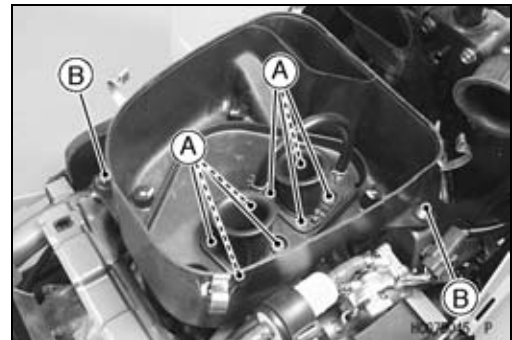
Torque - Air Cleaner Housing Bolts (M5): 5.9 N-m (0.60 kgf-m, 52 in-lb)

- Tighten:

Torque - Air Cleaner Housing Bolts (M6) [B]: 8.8 N-m (0.90 kgf-m, 78 in-lb)

- Install:

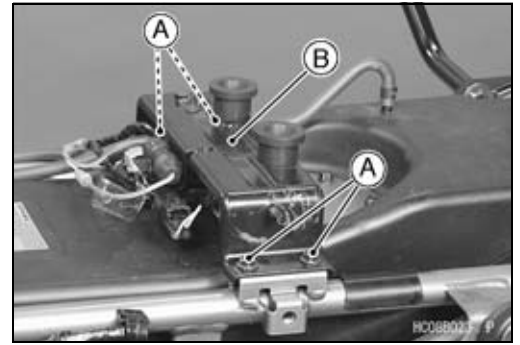
- Air Cleaner Element
- Air Cleaner Housing Cap



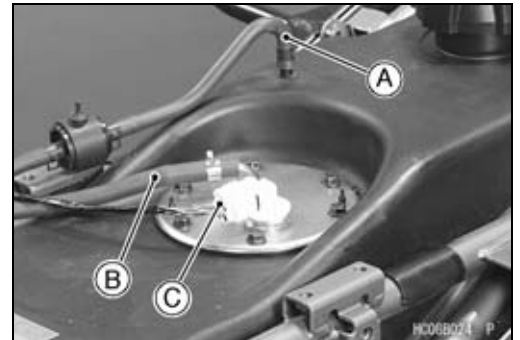
Fuel Tank

Fuel Tank Removal

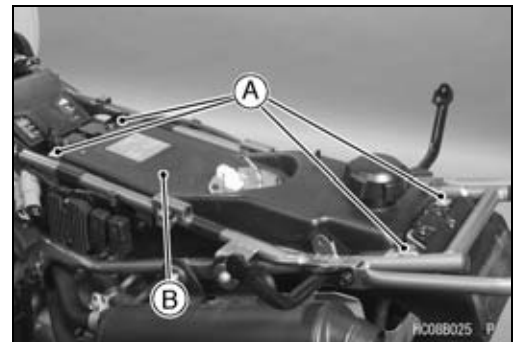
- Remove:
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
 - Bolts [A]
 - Seat Bracket [B]



- Disconnect:
 - Breather Hose [A]
 - Fuel Hose [B]
 - Fuel Pump Lead Connector [C]

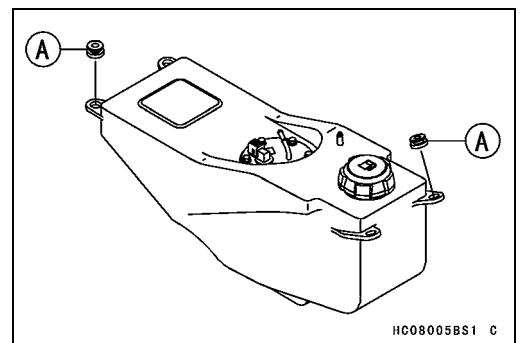


- Remove:
 - Fuel Tank Bolts [A]
 - Fuel Tank [B]

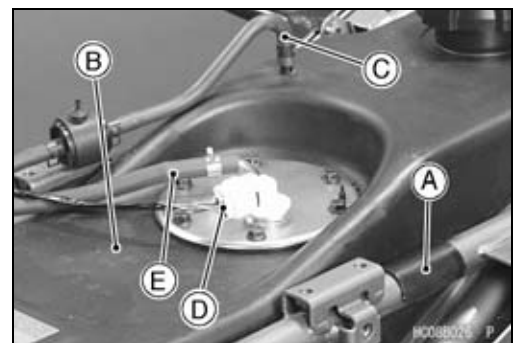


Fuel Tank Installation

- Check the rubber dampers [A].
- ★ If the dampers are damaged or deteriorated, replace them.



- Install:
 - Fuel Tank Cover [A]
 - Fuel Tank [B]
 - Grommets and Collars
- Tighten the fuel tank bolts.
- Connect:
 - Breather Hose [C]
 - Fuel Pump Lead Connector [D]
 - Fuel Hose [E]
- Be sure the fuel hose is clamped to the fuel pump fitting.



3-28 FUEL SYSTEM

Fuel Tank

Fuel Tank Cleaning

- Remove the fuel tank and drain it (see Fuel Tank Removal).
- Pour some high flash-point solvent into the fuel tank and shake the tank to remove dirt and fuel deposits.

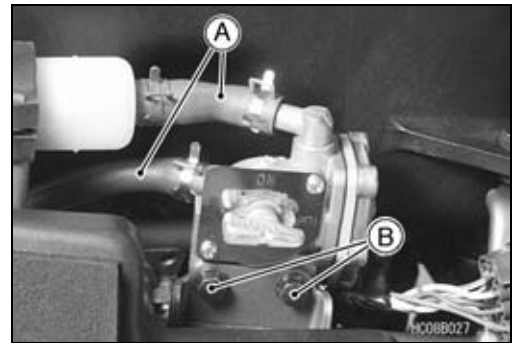
⚠ WARNING

Clean the tank in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area; 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 tank. A fire or explosion could result.

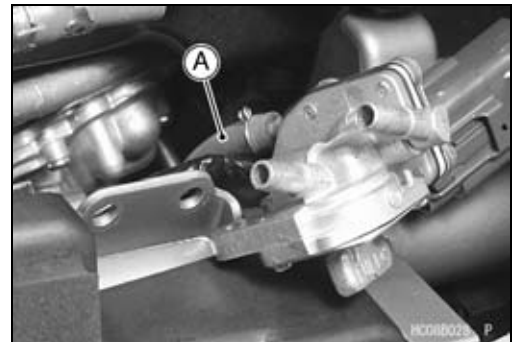
- Pour the solvent out the tank.
- Install the fuel tank (see Fuel Tank Installation).

Fuel Tap Removal

- Remove:
 - Fuel Hoses [A]
 - Fuel Tap Mounting Bolts [B]

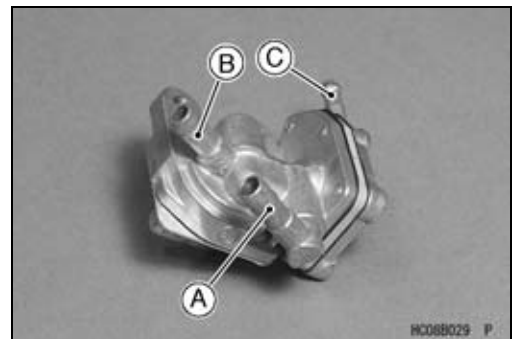


- Remove:
 - Fuel Tap Vacuum Hose [A]



Fuel Tap Installation

- Connect the fuel hoses to the fuel tap as follows.
 - Fuel Filter Hose to Fitting [A]
 - Fuel Tank Hose to Fitting [B]
 - Fuel Tap Vacuum Hose to Fitting [C]
- Be sure to clamp the fuel hoses to the fuel tap to prevent leakage.



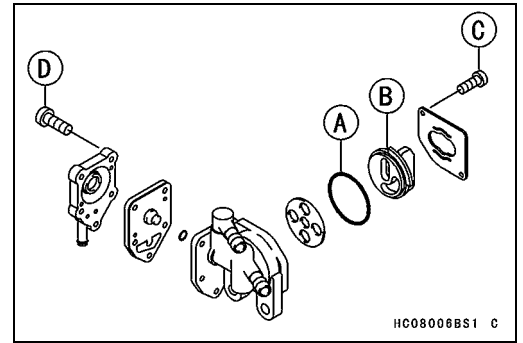
Fuel Tank

Fuel Tap Inspection

- Be sure the O-ring [A] is in good condition to prevent leakage.
- Apply grease to the lever [B].
- Tighten:

Torque - Fuel Tap Plate Screws [C]: 0.8 N·m (0.08 kgf·m, 7 in·lb)

Fuel Tap Cover Screws [D]: 1.0 N·m (0.10 kgf·m, 8 in·lb)



3-30 FUEL SYSTEM

Fuel Pump

Fuel Pump Removal

CAUTION

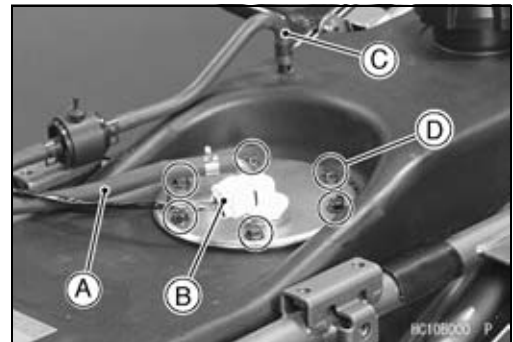
Never drop the fuel pump, especially on a hard surface. Such a shock to the pump can damage it.

⚠ 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. Disconnect the battery (-) terminal.

To make fuel spillage minimum, draw the fuel out from the fuel tank when the engine is cold. Be prepared for fuel spillage; any spilled fuel must be completely wiped up immediately.

- Remove:
 - Seat Bracket
 - Fuel Hose [A]
 - Fuel Pump Lead Connector [B]
 - Breather Hose [C]
- Unscrew the fuel pump bolts [D], and take out the fuel pump assembly and gasket.
- Do not contact the fuel filter with the fuel tank.
- Discard the fuel pump gasket.

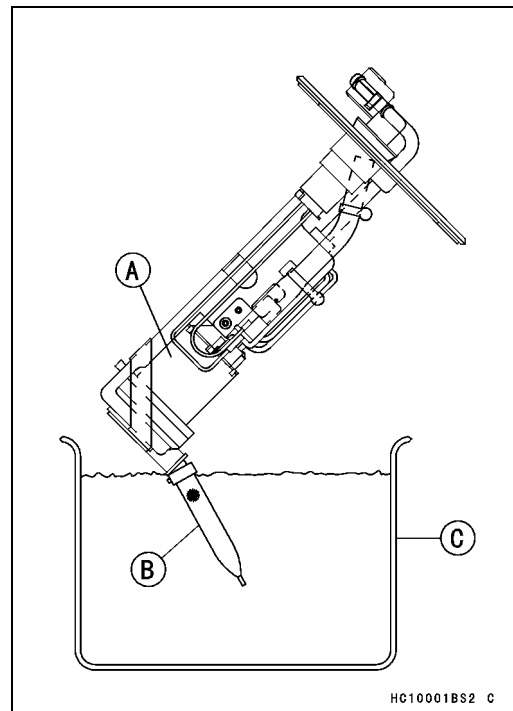


Pump Filter Cleaning

⚠ WARNING

Clean the pump filter 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 solvent to clean the pump filter.

- Remove the fuel pump [A] along with the pump filter [B].
- Prepare a container [C] filled with a high-flash point solvent.
- Dip and shake the fuel filter only in the solvent to remove dirt and fuel deposits from the filter.
- Dry the pump and filter by lightly applying compressed air.
- Install the fuel pump (see Fuel Pump Installation).



Fuel Pump

Fuel Pump Installation

- Clean the pump filter (see Pump Filter Cleaning).
- Remove dirt or dust from the fuel pump by lightly applying compressed air.
- Replace the fuel pump gasket [A] with a new one.
- Install the fuel pump assembly so that the fuel filter do not contact with the fuel tank.



Fuel Pump Inspection

- Refer to the Fuel Pump Inspection in the Electrical System chapter.

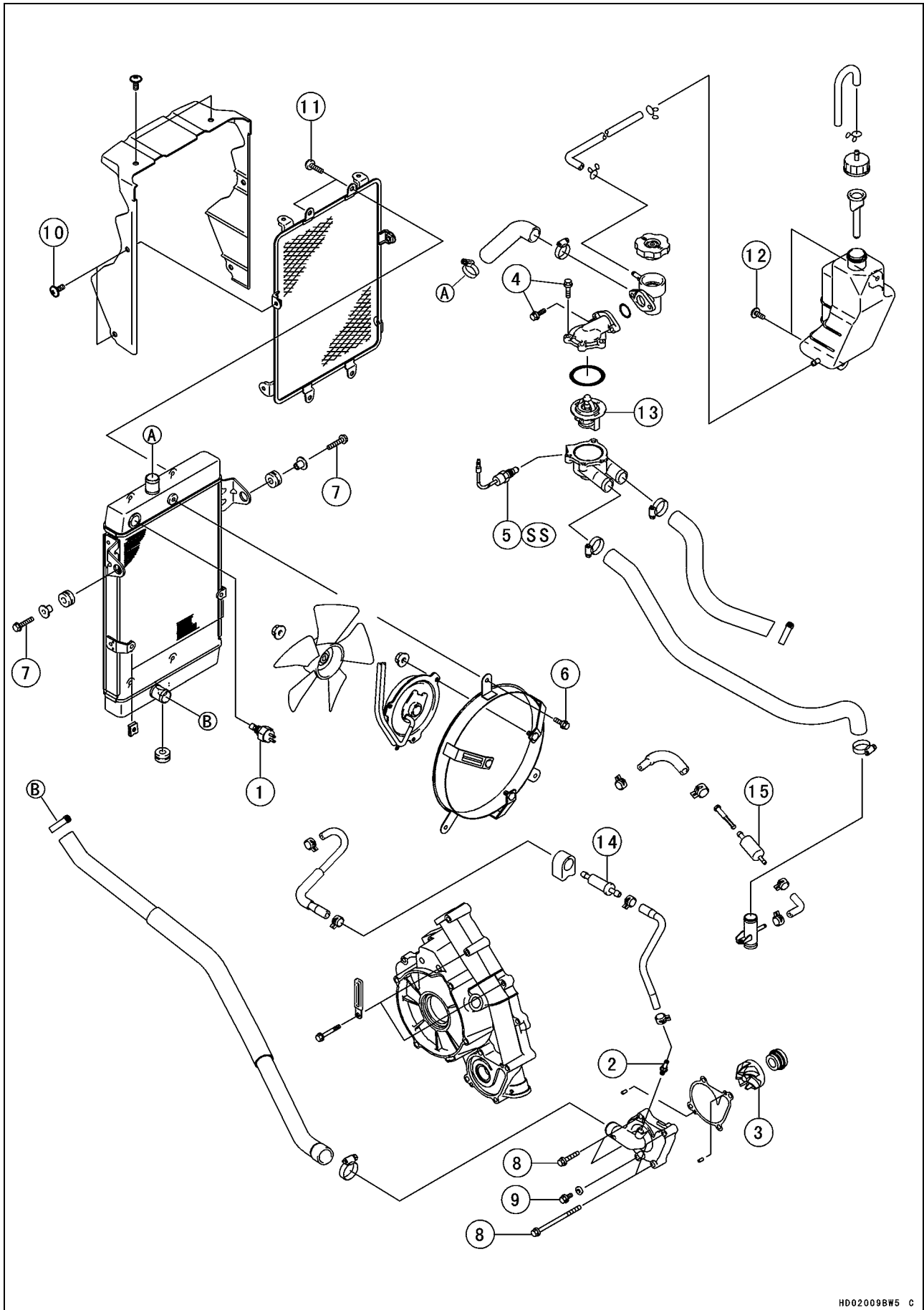
Cooling System

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4-2 COOLING SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Radiator Fan Switch	18	1.8	13	
2	Water Pump Fitting Bolt	9.8	1.0	87 in-lb	
3	Water Pump Impeller	7.8	0.80	69 in-lb	
4	Thermostat Housing Cover Bolts	8.8	0.90	78 in-lb	
5	Water Temperature Sensor	7.8	0.80	69 in-lb	SS
6	Radiator Fan Assembly Bolts	8.8	0.90	78 in-lb	
7	Radiator Mounting Bolts	8.8	0.90	78 in-lb	
8	Water Pump Cover Bolts	8.8	0.90	78 in-lb	
9	Coolant Drain Bolt	8.8	0.90	78 in-lb	
10	Shroud Mounting Screws	3.9	0.40	35 in-lb	
11	Radiator Screen Mounting Screws	3.9	0.40	35 in-lb	
12	Reserve Tank Mounting Screws	3.9	0.40	35 in-lb	

13. Thermostat

14. Coolant Valve

15. Coolant Filter

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

4-4 COOLING SYSTEM

Coolant Flow Chart

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

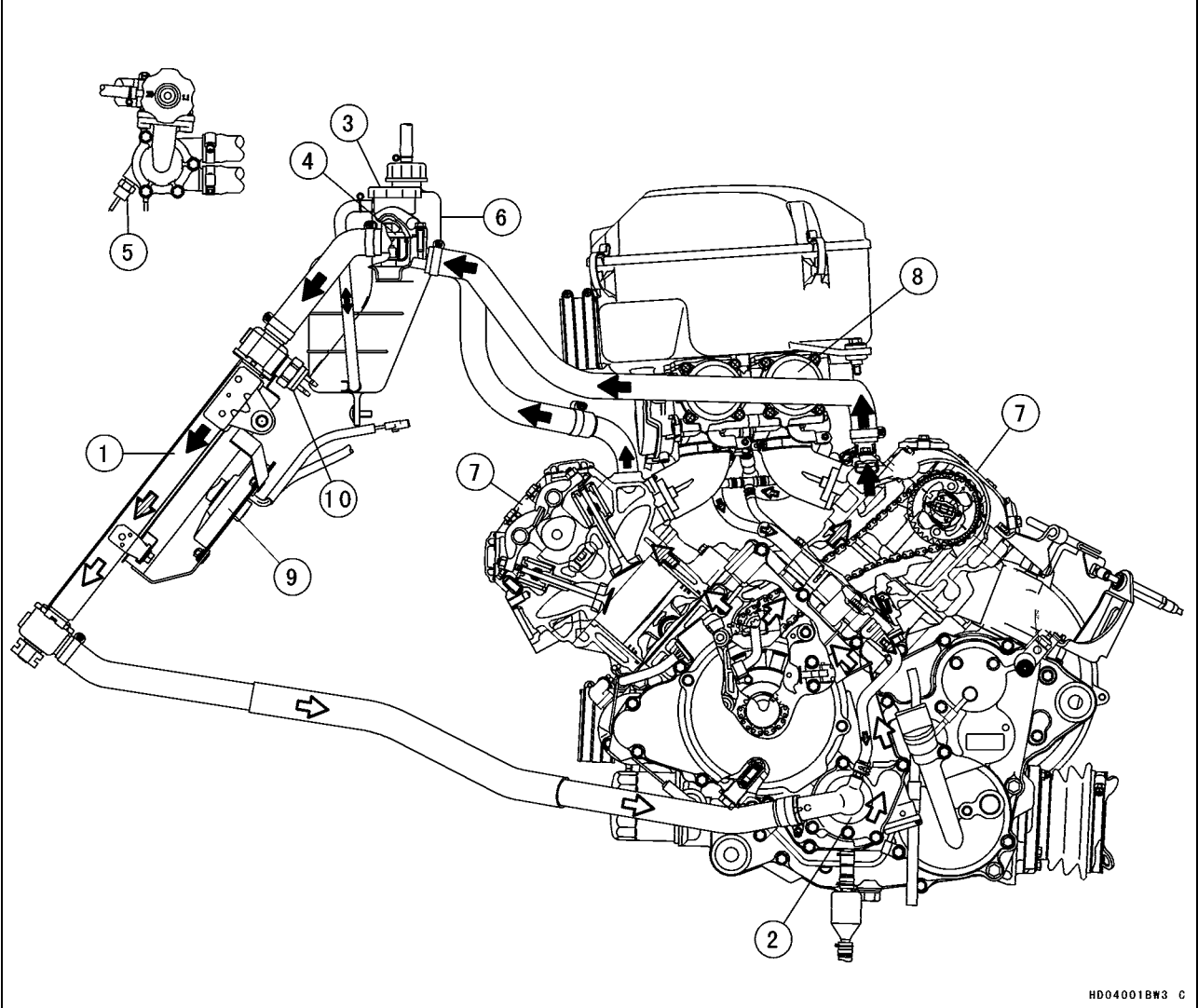
The thermostat is a wax pellet type which opens or closes with coolant temperature changes. The thermostat continuously changes its valve opening to keep the coolant temperature at the proper level. When coolant temperature is below 67°C (153°F), the thermostat closes so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly. When coolant temperature is more than 69.5 ~ 72.5°C (157 ~ 163°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 ~ 95°C (196 ~ 203°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 contract, 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



HD04001BW3 C

- 1. Radiator
- 2. Water Pump
- 3. Radiator Cap
- 4. Thermostat
- 5. Water Temperature Sensor
- 6. Reserve Tank
- 7. Cylinder, Cylinder Head
- 8. Carburetor
- 9. Radiator Fan
- 10. Radiator Fan Switch

Black Painted Arrow: Hot Coolant
White Painted Arrow: Cold Coolant

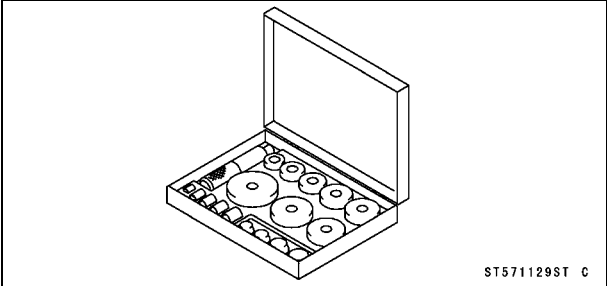
4-6 COOLING SYSTEM

Specifications

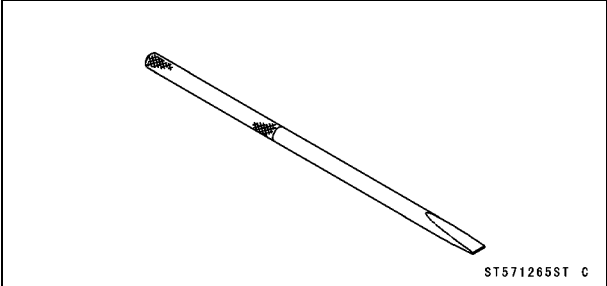
Item	Standard	Service Limit
Coolant Provided When Shipping		
Type	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)	— — —
Color	Green	— — —
Mixed Ratio	Soft water 50%, coolant 50%	— — —
Freezing Point	-35°C (-31°F)	— — —
Total Amount	2.5 L (2.64 US qt) (reserve tank full level including radiator and engine)	— — —
Radiator Cap		
Relief Pressure	93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm ² , 14 ~ 18 psi)	— — —
Thermostat		
Valve Opening Temperature	69.5 ~ 72.5°C (157 ~ 163°F)	— — —
Valve Full Opening Lift	8 mm (0.3 in.) or more @85°C (185°F)	— — —
Coolant Filter/Valve		
Coolant Valve Closing Temperature (for reference)	78 ~ 82°C (172 ~ 180°F) or more @24.5 kPa (0.25 kgf/cm ² , 3.6 psi)	— — —

Special Tools and Sealant

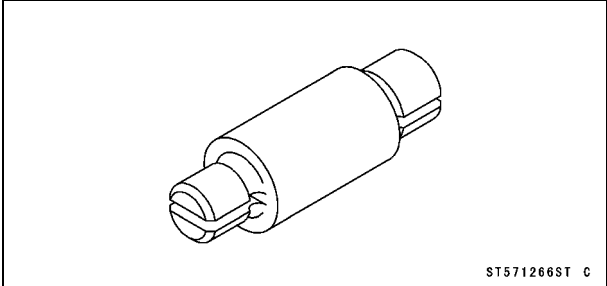
**Bearing Driver Set:
57001-1129**



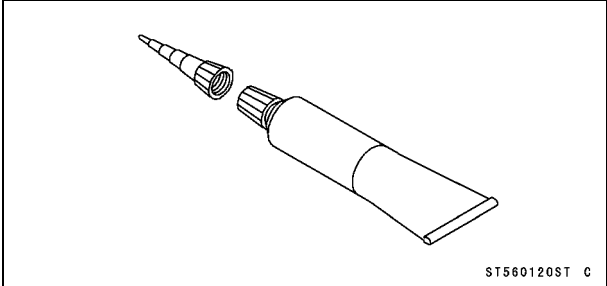
**Bearing Remover Shaft, $\phi 9$:
57001-1265**



**Bearing Remover Head, $\phi 10 \times \phi 12$:
57001-1266**



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

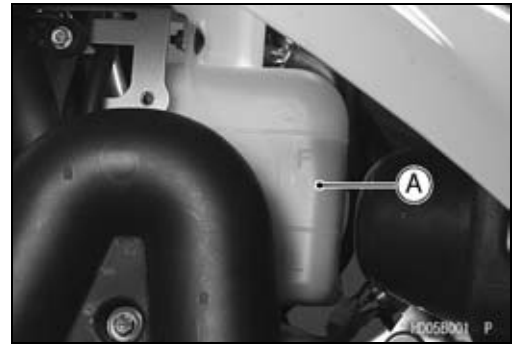


4-8 COOLING SYSTEM

Coolant

Coolant Deterioration Inspection

- Visually inspect the coolant in the reserve tank [A].
- ★ 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 cooling system leak. It may be caused by exhaust gas leaking into the cooling system.

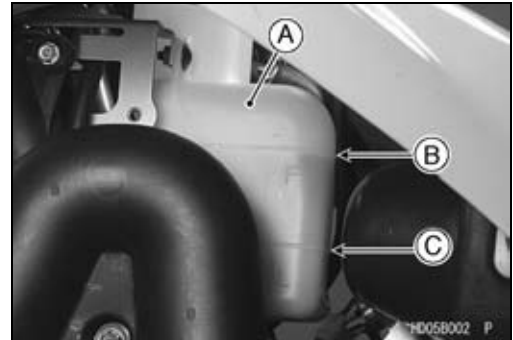


Coolant Level Inspection

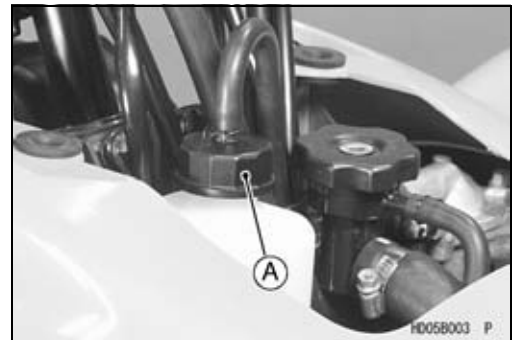
NOTE

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

- Check the coolant level in the reserve tank with the vehicle held perpendicularly.
 - Reserve Tank [A]
 - F (full) Mark [B]
 - L (low) Mark [C]



- ★ If the coolant level is lower than the L mark, Remove the upper front cover and reserve tank cap [A], then add coolant to the F mark [B].



CAUTION

For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties. The diluted coolant can attack the aluminum engine parts. In an emergency, soft water can be added. But the diluted coolant must be returned to the correct mixture ration within a few days. If coolant must be added often, or the reserve tank has run completely dry; there is probably leakage in the cooling system. Check the system for leaks.



Coolant Draining

- Refer to the Coolant Change in the Periodic Maintenance chapter.

Coolant Filling

- Refer to the Coolant Change in the Periodic Maintenance chapter.

Coolant

Pressure Testing

- Remove the upper front cover and radiator cap, then install a cooling system pressure tester [A] on the radiator filler neck.

NOTE

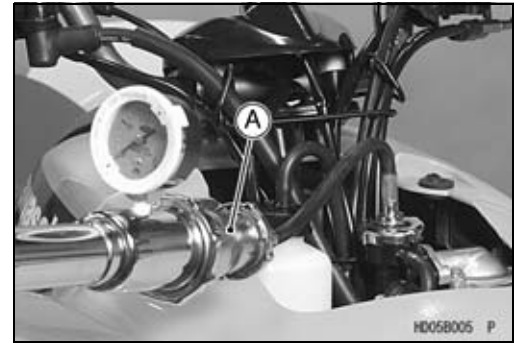
○ *Wet the cap sealing surfaces with water or coolant to prevent pressure leakage.*

- 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 alright.
- ★ If the pressure drops soon, check for leaks.

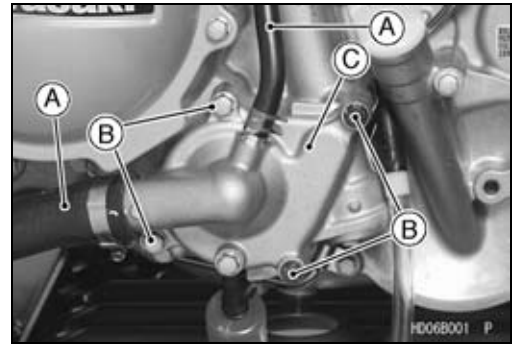


4-10 COOLING SYSTEM

Water Pump

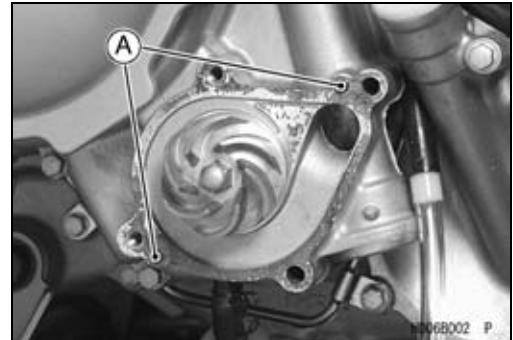
Water Pump Cover Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
 - Foot Guards (Left Side)
 - Water Hoses [A]
 - Water Pump Cover Bolts [B]
 - Water Pump Cover [C]



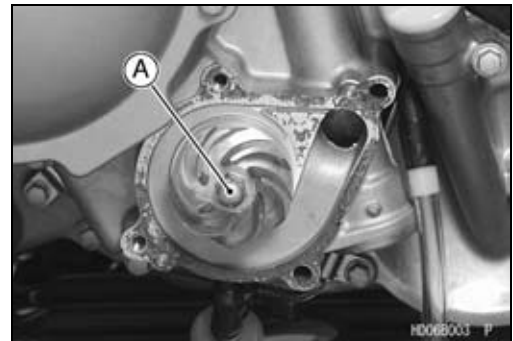
Water Pump Cover Installation

- Install:
 - Knock Pins [A]
 - New Gasket
- Tighten:
 - Torque - Water Pump Cover Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)**



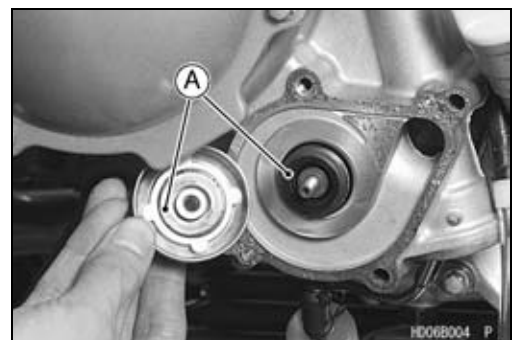
Impeller Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove the water pump cover (see Water Pump Cover Removal).
- Loosen the water pump impeller [A] counterclockwise.



Water Pump Impeller Installation

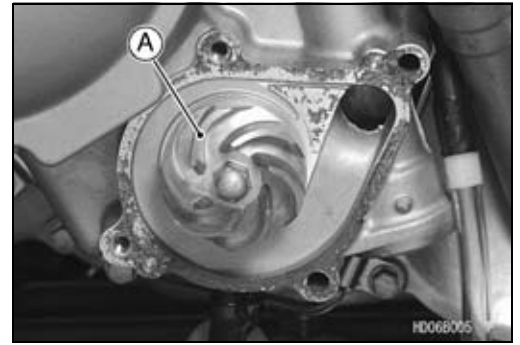
- Apply a small amount of coolant on the sliding surface [A] of the mechanical seal and the sealing seat.
- Install the impeller on the water pump shaft and tighten the impeller.
 - Torque - Water Pump Impeller: 7.8 N-m (0.80 kgf-m, 69 in-lb)**



Water Pump

Water Pump Impeller Inspection

- Visually inspect the impeller [A].
- ★ If the surface is corroded or the blades are damaged, replace the impeller.



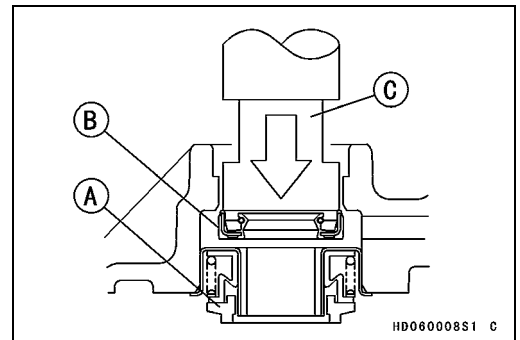
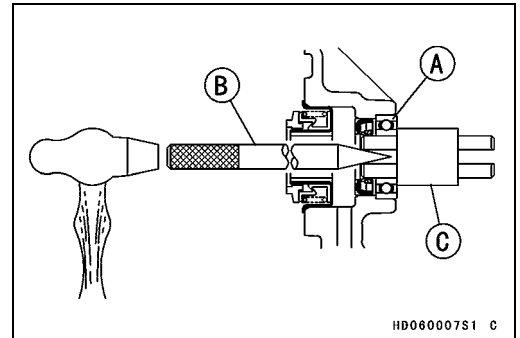
Mechanical Seal Replacement

- Remove:
 - Water Pump Impeller (see Water Pump Impeller Removal)
 - Alternator Cover (see Alternator Cover Removal in the Electrical System chapter)
- Take the bearing [A] out of the alternator cover, using the bearing remover.

**Special Tools - Bearing Remover Shaft, $\phi 9$: 57001-1265 [B]
 Bearing Remover Head, $\phi 10 \times \phi 12$: 57001-1266 [C]**

- Press out the mechanical seal [A] and oil seal [B] from the inside of the alternator cover with the bearing driver set [C].

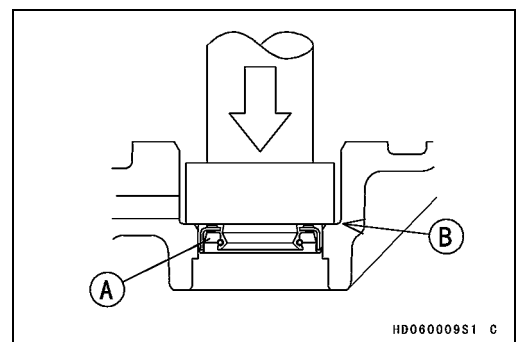
Special Tool - Bearing Driver Set: 57001-1129



CAUTION
<p>If either the mechanical seal, oil seal, or the ball bearing is removed, make sure to replace all of them simultaneously with a new one.</p> <p>Be careful not to block the inspection hole with the oil seal. If the inspection hole is blocked, the coolant may pass through the oil seal and flow into the crankcase.</p>

- Apply heat-resistance grease on the oil seal lip.
- From outside of the alternator cover, press and insert the oil seal [A] so that its surface is flush [B] with the end of the hole of the cover as shown.

Special Tool - Bearing Driver Set: 57001-1129

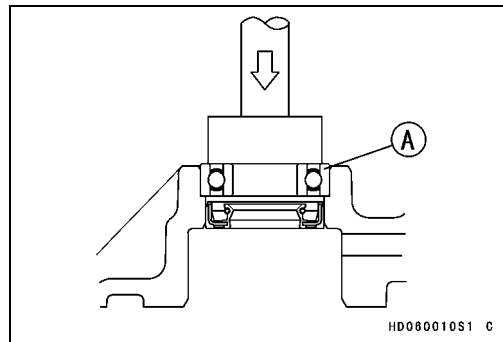


4-12 COOLING SYSTEM

Water Pump

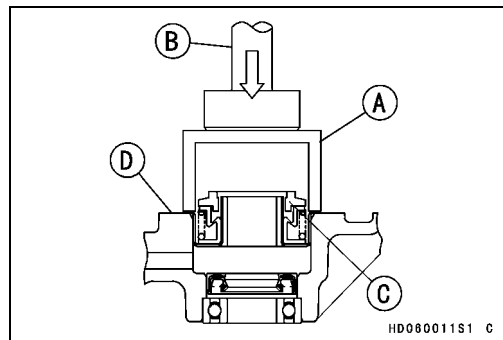
- From inside of the alternator cover, press and insert the ball bearing [A] until it is bottomed.

Special Tool - Bearing Driver Set: 57001-1129



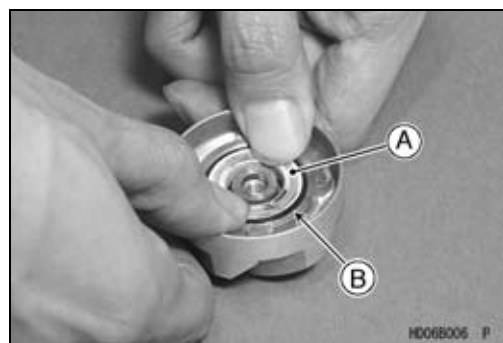
- Using a suitable socket [A] and the bearing driver [B], press and insert a new mechanical seal [C] until its flange stops at the step [D] of the hole.

Special Tool - Bearing Driver Set: 57001-1129



- Clean the sliding surface of a new mechanical seal with a high flash-point solvent, and apply a little coolant to the sliding surface to give the mechanical seal initial lubrication.
- Apply coolant to the surfaces of the rubber seal and sealing seat [A], and press the rubber seal [B] and sealing seat into the impeller by hand until the seat bottoms out.
- Tighten the water pump impeller by turning the bolt clockwise.

Torque - Water Pump Impeller: 7.8 N·m (0.80 kgf·m, 69 in·lb)



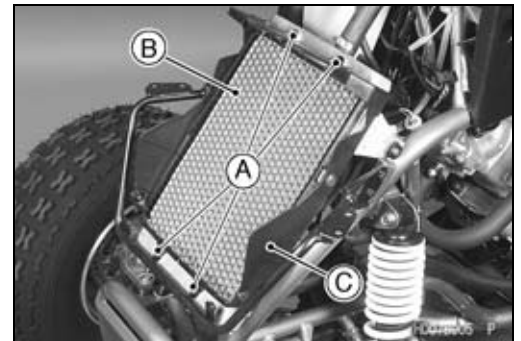
Radiator

Radiator Removal

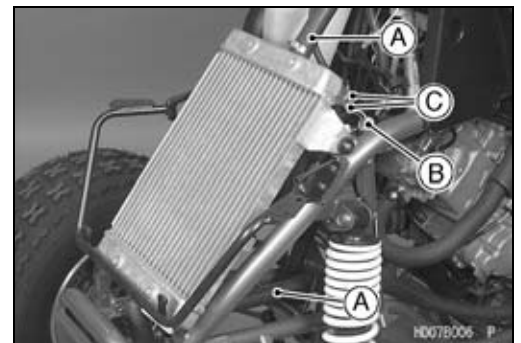
⚠ WARNING

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

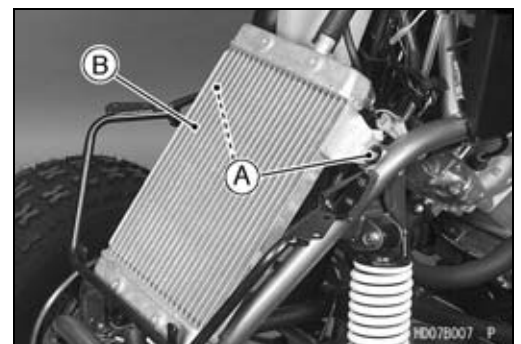
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
 - Front Fender (see Front Fender Removal in the Frame chapter)
 - Radiator Cover (see Radiator Cover Removal in the Frame chapter)
 - Radiator Screen Mounting Screws [A]
 - Radiator Screen [B] (With the Shroud [C])



- Remove:
 - Water Hoses [A]
 - Radiator Fan Wire Connector [B]
 - Radiator Fan Switch Connectors [C]



- Remove:
 - Radiator Mounting Bolts [A]
 - Radiator [B]



CAUTION

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

Radiator Installation

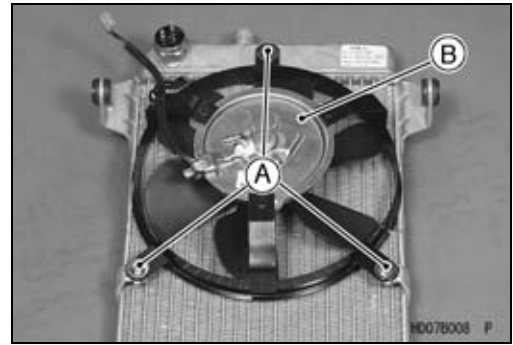
- Installation is the reverse of the removal.
 - Torque - Radiator Mounting Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)**
 - Radiator Screen Mounting Screws: 3.9 N-m (0.40 kgf-m, 35 in-lb)**
 - Shroud Mounting Screws: 3.9 N-m (0.40 kgf-m, 35 in-lb)**

4-14 COOLING SYSTEM

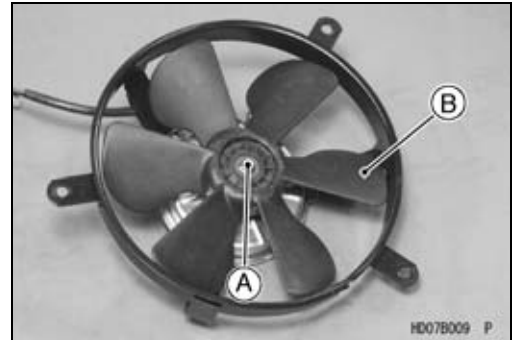
Radiator

Radiator Fan Removal

- Remove:
 - Radiator (see Radiator Removal)
 - Radiator Fan Assembly Bolts [A]
 - Fan Assembly [B]

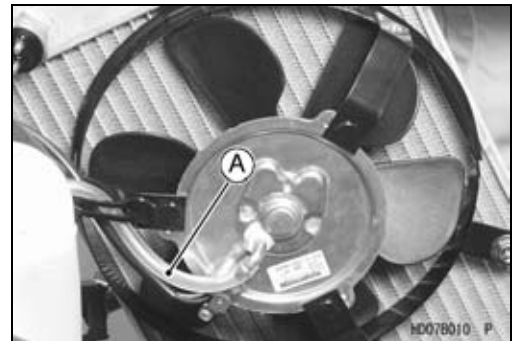


- Remove:
 - Radiator Fan Mounting Nut [A]
 - Radiator Fan [B]



NOTE

○ When removing and installing the fan motor tube [A], do not crush the tube.

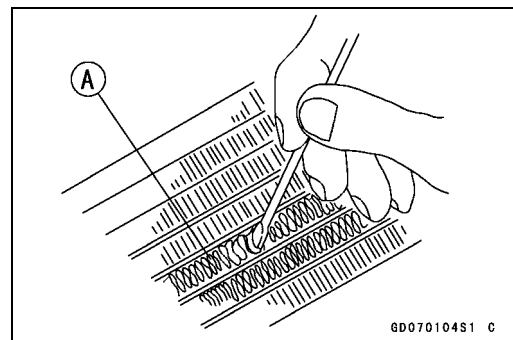


Radiator Fan Installation

- Install:
 - Radiator Fan
 - Radiator Fan Assembly
- Tighten:
 - Torque - Radiator Fan Assembly Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)**

Radiator Inspection

- Check the radiator core.
 - ★ If there are obstructions to air flow, remove the radiator and remove obstructions.
 - ★ 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

- Refer to the Radiator Cleaning in the Periodic Maintenance chapter.

Radiator

Radiator Cap Inspection

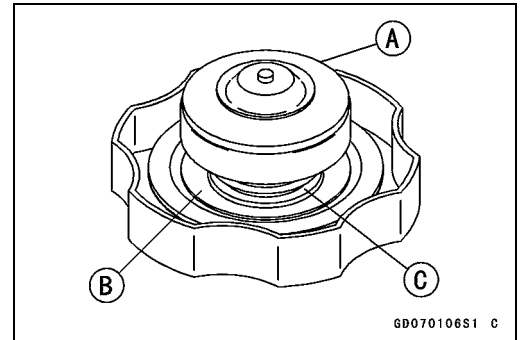
● Check the condition of the top and bottom valve seals of the radiator cap.

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

Bottom Valve Seal [A]

Top Valve Seal [B]

Valve Spring [C]



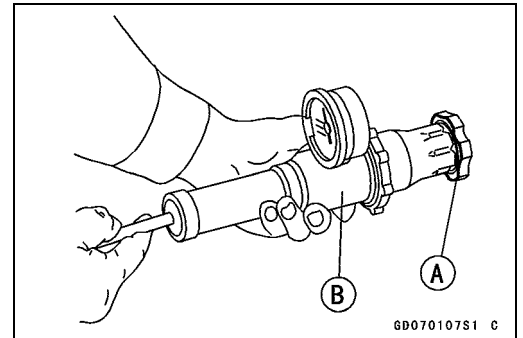
● Install the cap [A] on a cooling system pressure tester [B].

NOTE

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

● Watching the pressure gauge, slowly pump the pressure tester to build up the pressure. The relief valve opens, indicated by the gauge hand flicks downward.

○ The relief valve must open within the relief pressure range in the table below and the gauge hand must remain within the specified range at least 6 second.



Radiator Cap Relief Pressure

Standard: 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm², 14 ~ 18 psi)

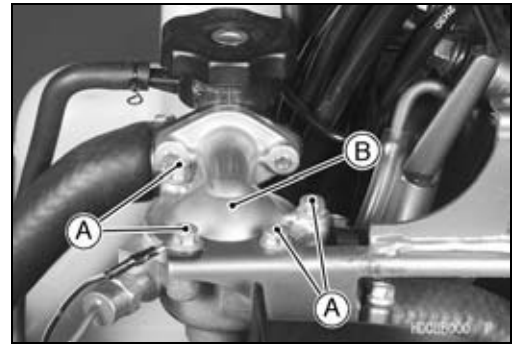
★ If the cap cannot hold the specified pressure, or if it holds too much pressure, replace it with a new one.

4-16 COOLING SYSTEM

Thermostat

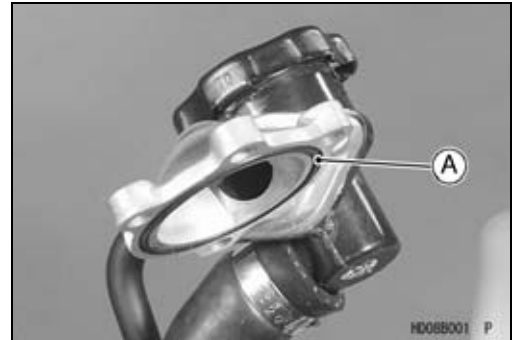
Thermostat Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
 - Front Fender (see Front Fender Removal in the Frame chapter)
 - Thermostat Housing Cover Bolts [A]
 - Thermostat Housing Cover [B]

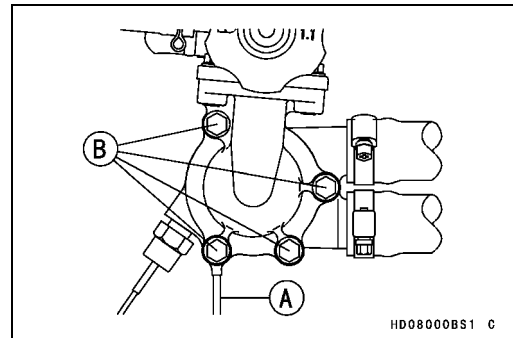


Thermostat Installation

- Be sure to install the O-ring [A] on the housing cover.

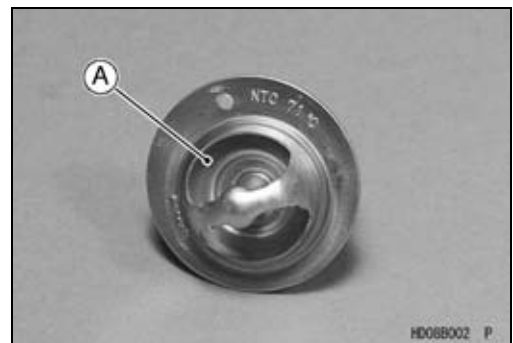


- Install the ground wire terminal [A] as shown.
- Tighten:
 - Torque - Thermostat Housing Cover Bolts [B]: 8.8 N·m (0.90 kgf·m, 78 in·lb)**
- Add coolant (see Coolant Change in the Periodic Maintenance chapter).



Thermostat Inspection

- Remove the thermostat, and inspect the thermostat valve [A] at room temperature.
- ★ If the valve is open, replace the valve with a new one.



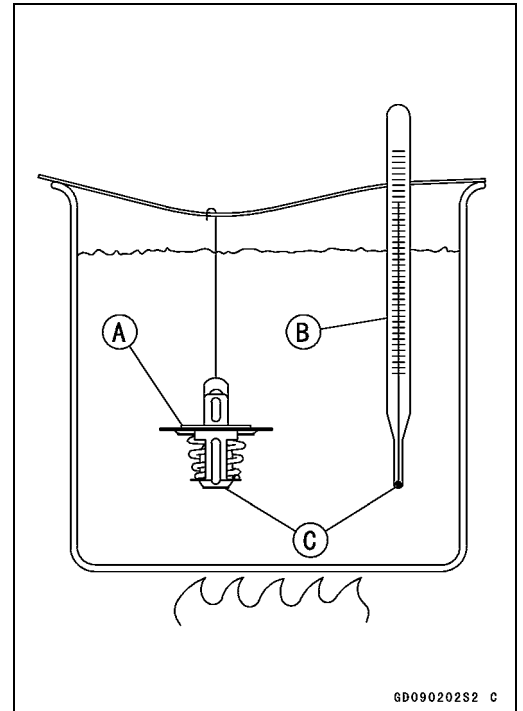
Thermostat

- To check valve opening temperature, suspend the thermostat [A] and an accurate thermometer [B] in a container of water with the heat-sensitive portions [C] in almost the same depth.

NOTE

- *The thermostat must be completely submerged and the thermostat and thermometer must not touch the container sides or bottom.*
- Gradually raise the temperature of the water while stirring the water gently for even temperature.
- ★ If the measurement is out of the range, replace the thermostat.

Thermostat Valve Opening Temperature
69.5 ~ 72.5°C (157 ~ 163°F)



6D090202S2 C

4-18 COOLING SYSTEM

Radiator Fan Switch

Radiator Fan Switch Removal

CAUTION

The fan switch should never be allowed to fall on a hard surface. Such a shock to the part can damage it.

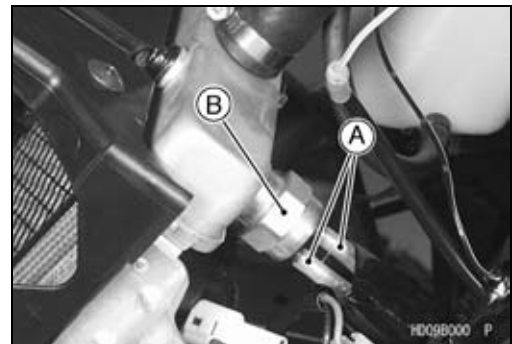
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Disconnect the fan switch leads [A].
- Remove the radiator fan switch [B].

Radiator Fan Switch Installation

- Tighten:
 - Torque - Radiator Fan Switch: 18 N·m (1.8 kgf·m, 13 ft·lb)**
- Fill the coolant (see Coolant Change in the Periodic Maintenance chapter).

Radiator Fan Switch Inspection

- Refer to the Radiator Fan Switch Inspection in the Electrical System chapter.



Water Temperature Sensor

Water Temperature Sensor Removal

CAUTION

The water temperature sensor should never be allowed to fall on a hard surface. Such a shock to the part can damage it.

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Disconnect the sensor lead [A].
- Remove the sensor [B].

Water Temperature Sensor Installation

- Apply silicone sealant to the threads of the sensor and tighten it.

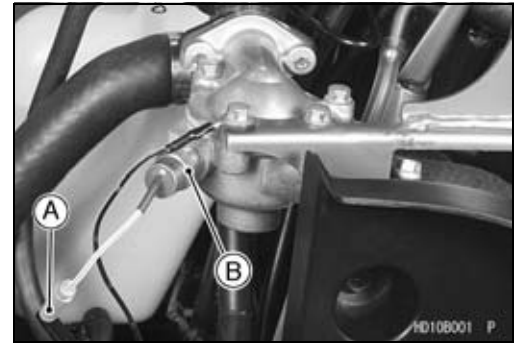
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120

Torque - Water Temperature Sensor: 7.8 N·m (0.80 kgf·m, 69 in·lb)

- Fill the coolant (see Coolant Change in the Periodic Maintenance chapter).

Water Temperature Sensor Inspection

- Refer to the Water Temperature Sensor Inspection in the Electrical System chapter.



4-20 COOLING SYSTEM

Coolant Filter/Valve

Coolant Filter Cleaning

- Refer to the Coolant Filter Cleaning in the Periodic Maintenance chapter.

Coolant Valve Inspection

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove the coolant valve [A] on the engine left side.
- Inspect the coolant valve at room temperature.
- ★ If the valve is closed, replace the valve with a new one.
- To check valve opening just blow through the valve.

Valve Closing Temperature (for reference)

Standard: 78 ~ 82°C (172 ~ 180°F) or more at 24.5 kPa (0.25 kgf/cm², 3.6 psi)



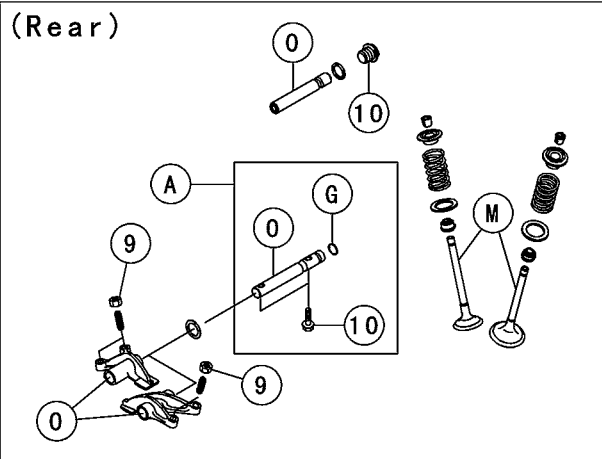
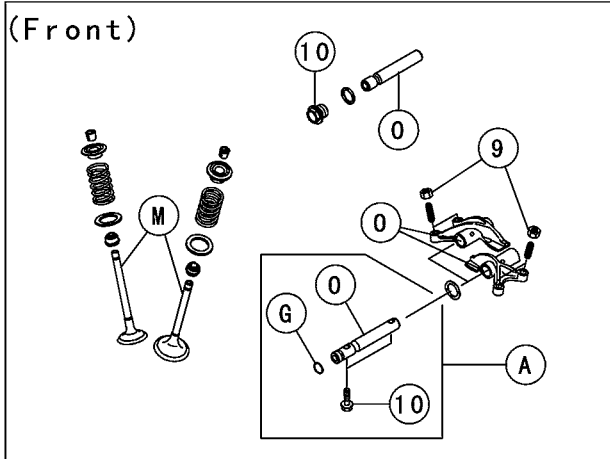
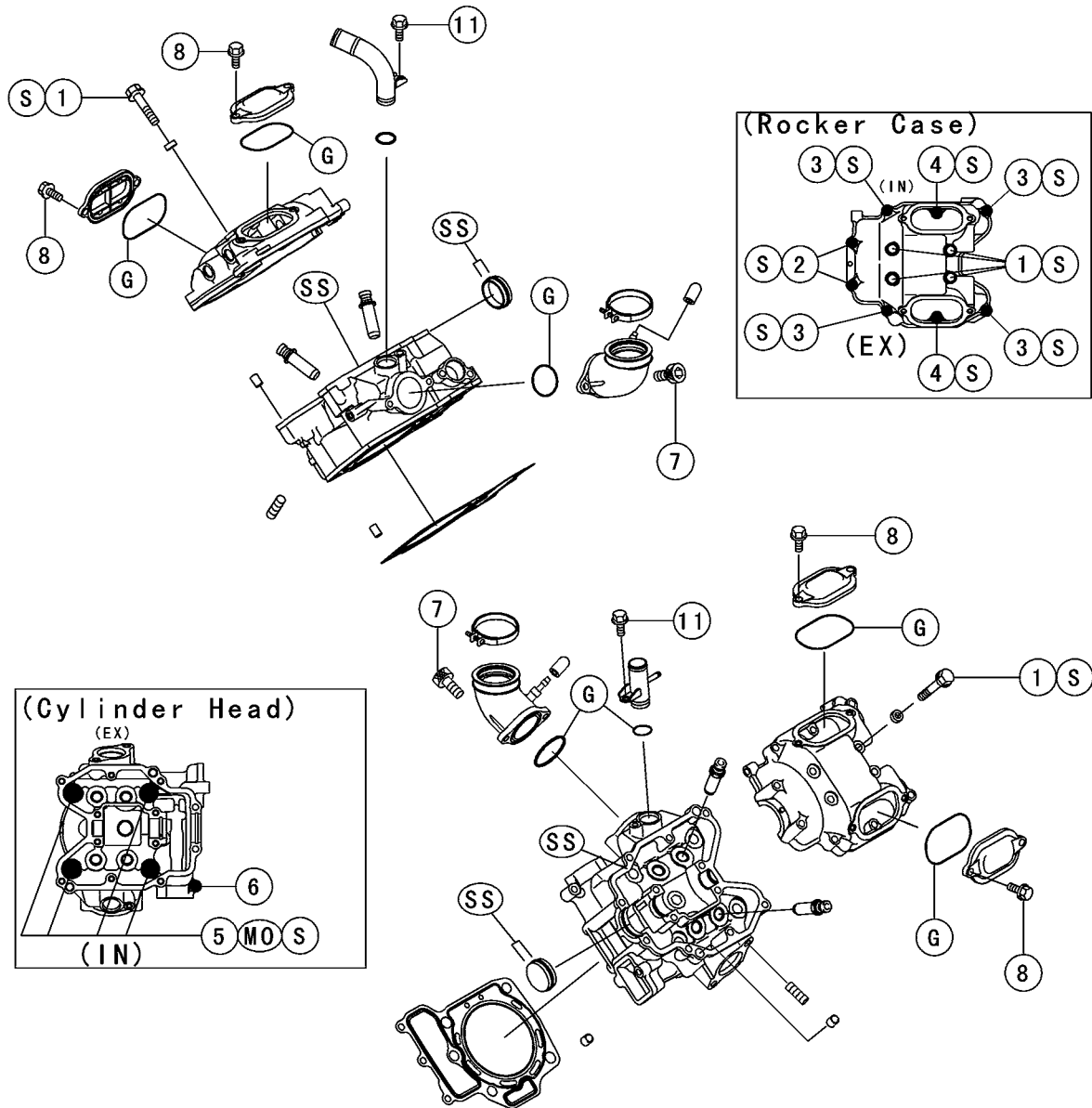
Engine Top End

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5-2 ENGINE TOP END

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rocker Case Bolts 55 mm (2.2 in.)	8.8	0.90	78 in·lb	S
2	Rocker Case Bolts 130 mm (5.1 in.)	9.8	1.0	87 in·lb	S
3	Rocker Case Bolts 30 mm (1.2 in.)	9.8	1.0	87 in·lb	
4	Rocker Case Bolts 25 mm (1.0 in.)	9.8	1.0	87 in·lb	S
5	Cylinder Head Bolts (M10), First Torque	25	2.5	18	S,MO
	Cylinder Head Bolts (M10), Final Torque	49	5.0	36	
6	Cylinder Head Bolts (M6)	9.8	1.0	87 in·lb	
7	Carburetor Holder Bolts (M6)	14	1.4	10	
8	Valve Adjusting Cap Bolts (M6)	8.8	0.90	78 in·lb	
9	Valve Adjusting Screw Locknuts	12	1.2	104 in·lb	
10	Rocker Shaft Bolts (KSV700-A1/B1)	8.8	0.90	78 in·lb	
	Rocker Shaft Bolts	22	2.2	16	
11	Water Pipe Bolts	9.8	1.0	87 in·lb	

G: Apply grease for oil seal and O-ring.

M: Apply molybdenum disulfide grease.

MO: Apply molybdenum disulfide oil.

O: Apply engine oil.

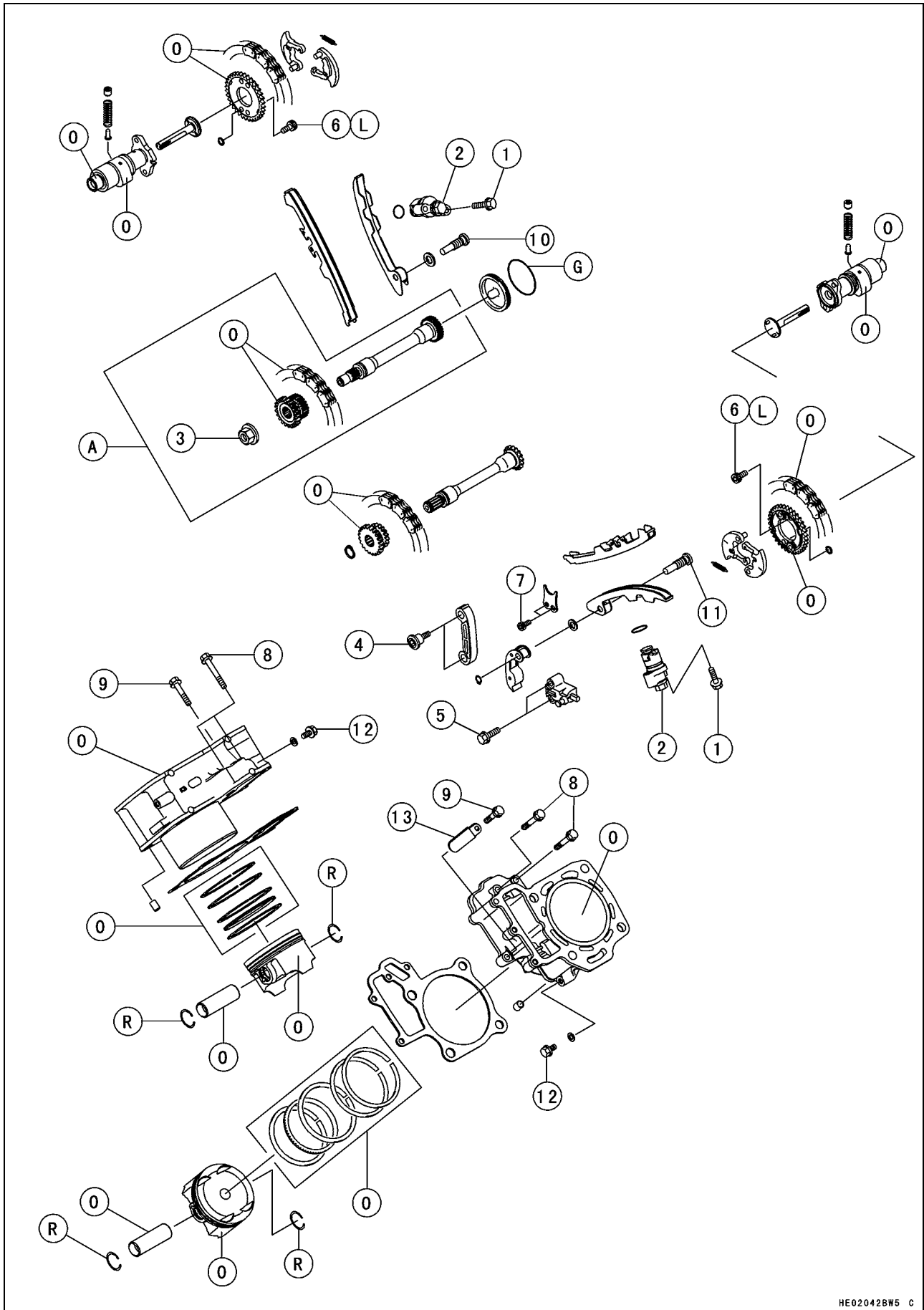
S: Follow the specific tightening sequence.

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

A: KSV700-A1/B1 Models

5-4 ENGINE TOP END

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Chain Tensioner Mounting Bolts	8.8	0.90	78 in-lb	
2	Chain Tensioner Cap Bolt	22	2.2	16	
3	Intermediate Shaft Sprocket Nut	44	4.5	33	
4	Intermediate Shaft Chain Guide Bolts	8.8	0.90	78 in-lb	
5	Intermediate Shaft Chain Tensioner Bolts	8.8	0.90	78 in-lb	
6	Camshaft Sprocket Bolts	12	1.2	104 in-lb	L
7	Position Plate Bolts	8.8	0.90	78 in-lb	
8	Cylinder Bolts 40 mm (1.6 in.)	9.8	1.0	87 in-lb	
9	Cylinder Bolts 30 mm (1.2 in.)	9.8	1.0	87 in-lb	
10	Front Cylinder Camshaft Chain Guide Bolt	20	2.0	14	
11	Rear Cylinder Camshaft Chain Guide Bolt	20	2.0	14	
12	Cylinder Drain Bolt	8.8	0.90	78 in-lb	

13. Clamp

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

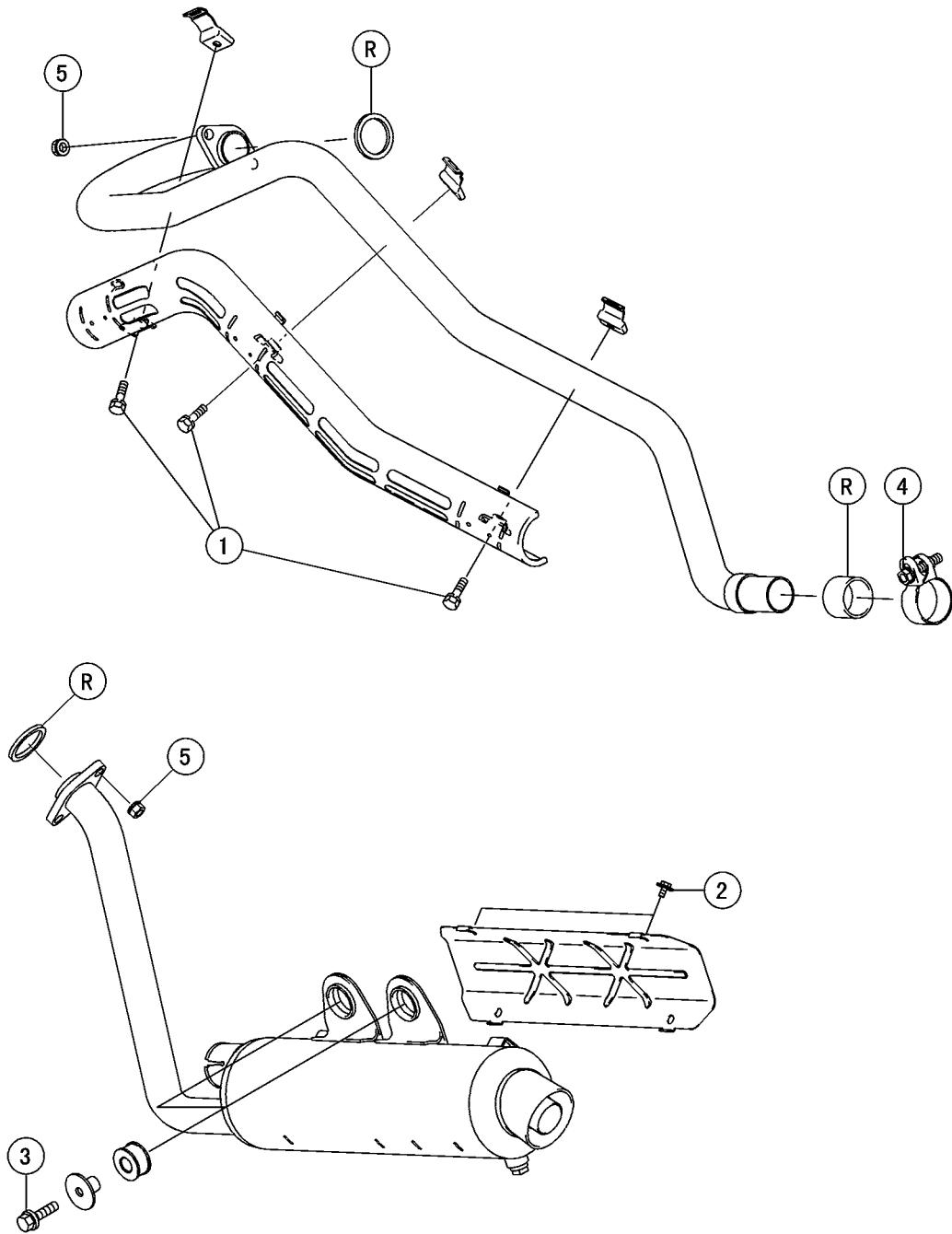
O: Apply engine oil.

R: Replacement parts

A: KSV700-A1/B1 Models

5-6 ENGINE TOP END

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Exhaust Pipe Cover Bolts	8.8	0.90	78 in·lb	
2	Muffler Cover Bolts	8.8	0.90	78 in·lb	
3	Muffler Mounting Bolts	20	2.0	14	
4	Exhaust Pipe Clamp Bolt	8.8	0.90	78 in·lb	
5	Exhaust Pipe Holder Nuts	17	1.7	12	

R: Replacement parts

5-8 ENGINE TOP END

Specifications

Item	Standard	Service Limit
Rocker Case		
Rocker Arm Inside Diameter	12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in.)	12.05 mm (0.474 in.)
Rocker Shaft Diameter (KSV700-A1/B1 Model)	11.973 ~ 11.984 mm (0.4714 ~ 0.4718 in.)	11.95 mm (0.470 in.)
	11.983 ~ 11.994 mm (0.4718 ~ 0.4722 in.)	11.96 mm (0.471 in.)
Camshafts		
Cam Height:		
Exhaust	35.363 ~ 35.477 mm (1.3932 ~ 1.3967 in.)	35.26 mm (1.388 in.)
Inlet	35.622 ~ 35.736 mm (1.4024 ~ 1.4069 in.)	35.52 mm (1.398 in.)
Camshaft Bearing Clearance:		
ϕ 18	0.016 ~ 0.052 mm (0.0006 ~ 0.0020 in.)	0.14 mm (0.0055 in.)
ϕ 22	0.020 ~ 0.062 mm (0.0008 ~ 0.0024 in.)	0.15 mm (0.0059 in.)
Camshaft Journal Diameter:		
ϕ 18	17.966 ~ 17.984 mm (0.7073 ~ 0.7080 in.)	17.94 mm (0.706 in.)
ϕ 22	21.959 ~ 21.980 mm (0.8645 ~ 0.8653 in.)	21.93 mm (0.863 in.)
Camshaft Bearing Inside Diameter:		
ϕ 18	18.000 ~ 18.018 mm (0.7087 ~ 0.7094 in.)	18.08 mm (0.712 in.)
ϕ 22	22.000 ~ 22.021 mm (0.8661 ~ 0.8670 in.)	22.08 mm (0.870 in.)
Camshaft Runout	TIR 0.02 mm (0.0008 in.) or less	TIR 0.1 mm (0.0039 in.)
KACR (Kawasaki Automatic Compression Release):		
KACR Operating Engine Speed	760 \pm 30 r/min (rpm)	— — —
Cylinder Head		
Cylinder Compression (usable range)		
Electric Starter	290 ~ 520 kPa (3.0 ~ 5.3 kgf/cm ² , 43 ~ 75 psi) @290 r/min (rpm)	— — —
Cylinder Head Warp	— — —	0.05 mm (0.002 in.)
Valve		
Valve Clearance:		
Exhaust	0.20 ~ 0.25 mm (0.0079 ~ 0.0098 in.)	— — —
Inlet	0.10 ~ 0.15 mm (0.0039 ~ 0.0059 in.)	— — —
Valve head thickness:		
Exhaust	0.8 mm (0.031 in.)	0.5 mm (0.020 in.)
Inlet	0.5 mm (0.020 in.)	0.3 mm (0.012 in.)
Valve stem bend	— — —	TIR 0.05 mm (0.002 in.)
Valve Stem Diameter:		
Exhaust	4.955 ~ 4.970 mm (0.1951 ~ 0.1957 in.)	4.94 mm (0.1945 in.)
Inlet	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in.)	4.96 mm (0.1953 in.)

Specifications

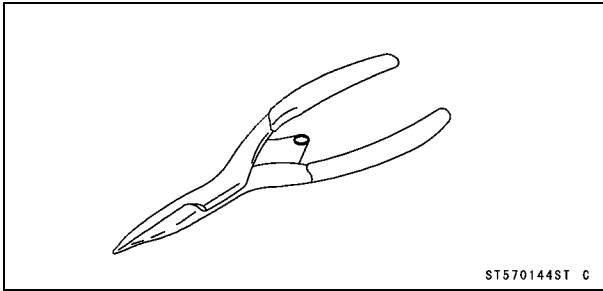
Item	Standard	Service Limit
Valve Guide Inside Diameter:		
Exhaust	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in.)	5.08 mm (0.20 in.)
Inlet	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in.)	5.08 mm (0.20 in.)
Valve/valve Guide Clearance (wobble method):		
Exhaust	0.09 ~ 0.17 mm (0.0035 ~ 0.0067 in.)	0.34 mm (0.0133 in.)
Inlet	0.03 ~ 0.11 mm (0.0012 ~ 0.0043 in.)	0.28 mm (0.0110 in.)
Valve Seat Cutting Angle	45°, 32°, 60°	— — —
Valve Seating Surface:		
Outside Diameter:		
Exhaust	25.2 ~ 25.4 mm (0.992 ~ 1.000 in.)	— — —
Inlet	29.4 ~ 29.6 mm (1.157 ~ 1.165 in.)	— — —
Width:		
Exhaust	0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)	— — —
Inlet	0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)	— — —
Valve Spring Free Length:		
Exhaust	41.3 mm (1.626 in.)	39.5 mm (1.555 in.)
Inlet	41.3 mm (1.626 in.)	39.5 mm (1.555 in.)
Cylinder, Piston		
Cylinder Inside Diameter	81.994 ~ 82.006 mm (3.2281 ~ 3.2286 in.)	82.09 mm (3.232 in.)
Piston Diameter	81.949 ~ 81.964 mm (3.2263 ~ 3.2269 in.)	81.80 mm (3.220 in.)
Piston/Cylinder Clearance	0.030 ~ 0.057 mm (0.0012 ~ 0.0022 in.)	— — —
Oversize Piston and Rings	+ 0.5 mm (0.020 in.)	— — —
Piston Ring/Groove Clearance:		
Top	0.040 ~ 0.080 mm (0.0016 ~ 0.0032 in.)	0.18 mm (0.0071 in.)
Second	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in.)	0.17 mm (0.0067 in.)
Piston Ring Groove Width:		
Top	1.030 ~ 1.050 mm (0.0405 ~ 0.0413 in.)	1.13 mm (0.0445 in.)
Second	1.020 ~ 1.040 mm (0.0402 ~ 0.0409 in.)	1.12 mm (0.0441 in.)
Piston Ring Thickness:		
Top	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.9 mm (0.035 in.)
Second	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.9 mm (0.035 in.)
Piston Ring End Gap:		
Top	0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in.)	0.60 mm (0.0236 in.)
Second	0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in.)	0.75 mm (0.0295 in.)
Oil	0.20 ~ 0.70 mm (0.0079 ~ 0.0276 in.)	1.00 mm (0.0394 in.)

5-10 ENGINE TOP END

Special Tools and Sealant

Outside Circlip Pliers:

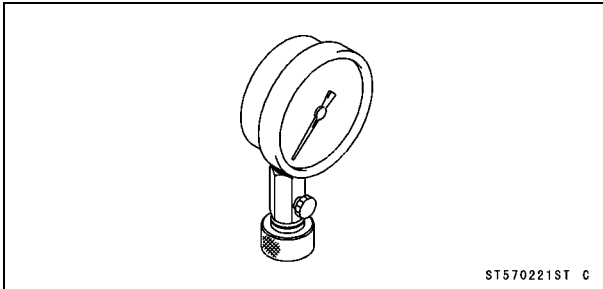
57001-144



ST570144ST C

Compression Gauge, 20 kgf/cm²:

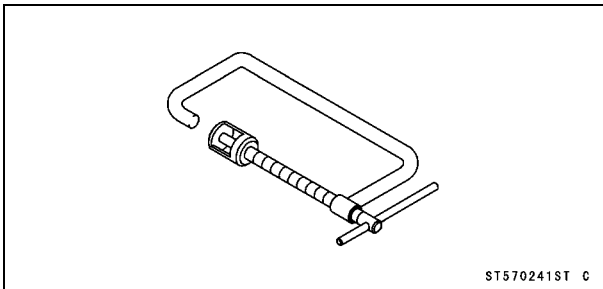
57001-221



ST570221ST C

Valve Spring Compressor Assembly:

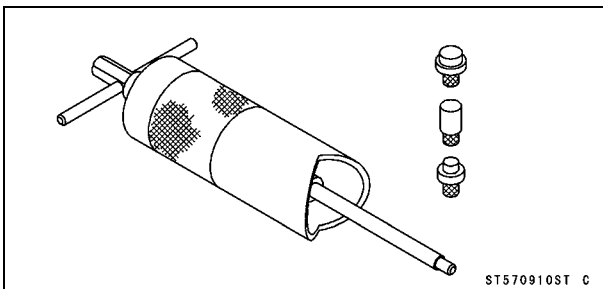
57001-241



ST570241ST C

Piston Pin Puller Assembly:

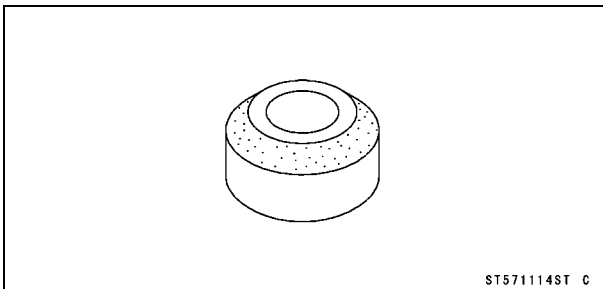
57001-910



ST570910ST C

Valve Seat Cutter, 45° - $\phi 27.5$:

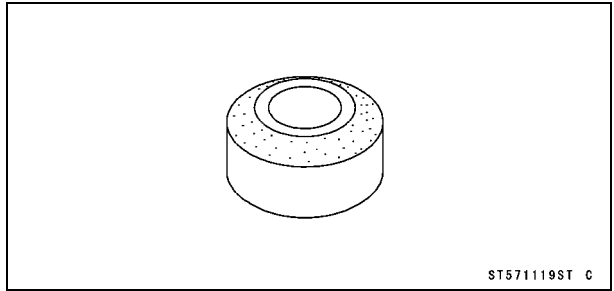
57001-1114



ST571114ST C

Valve Seat Cutter, 32° - $\phi 28$:

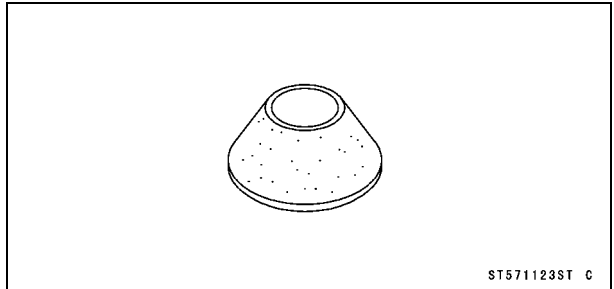
57001-1119



ST571119ST C

Valve Seat Cutter, 60° - $\phi 30$:

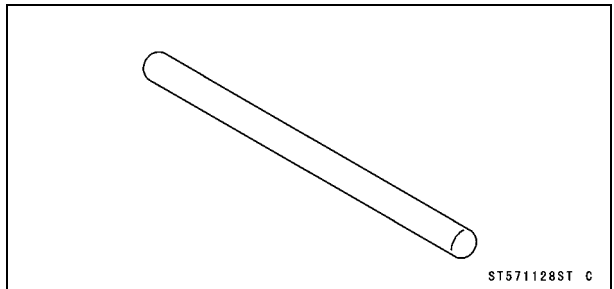
57001-1123



ST571123ST C

Valve Seat Cutter Holder Bar:

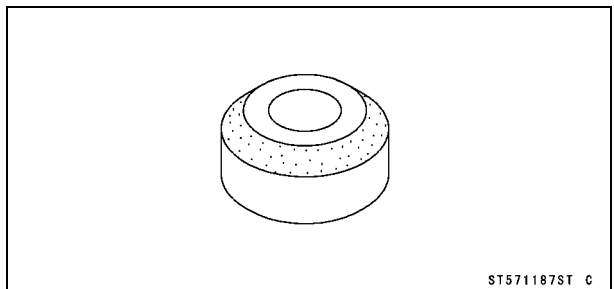
57001-1128



ST571128ST C

Valve Seat Cutter, 45° - $\phi 30$:

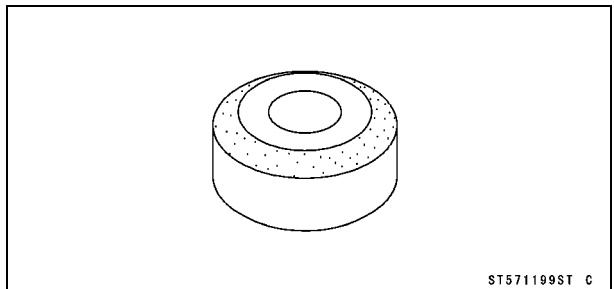
57001-1187



ST571187ST C

Valve Seat Cutter, 32° - $\phi 33$:

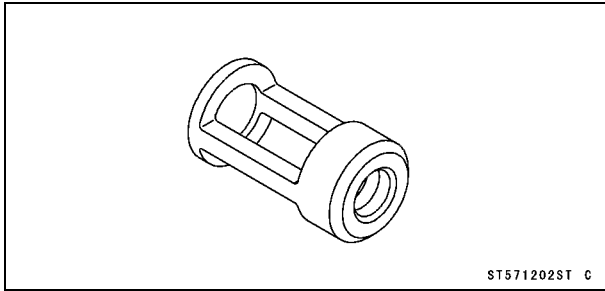
57001-1199



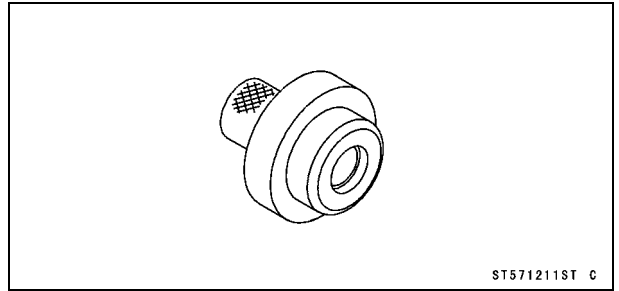
ST571199ST C

Special Tools and Sealant

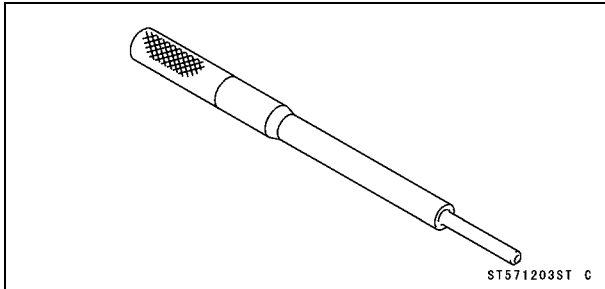
Valve Spring Compressor Adapter, $\phi 22$:
57001-1202



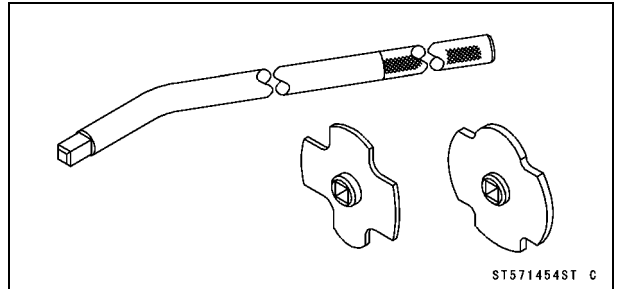
Piston Pin Puller Adapter, $\phi 14$:
57001-1211



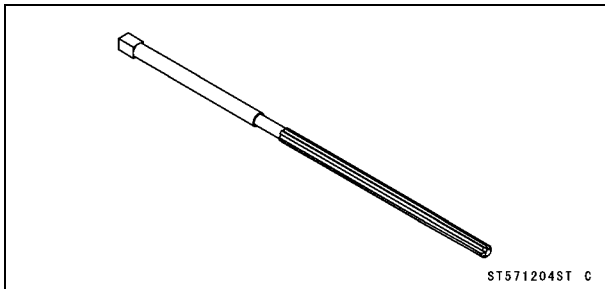
Valve Guide Arbor, $\phi 5$:
57001-1203



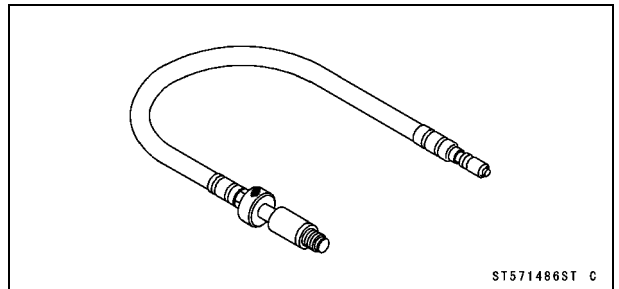
Filler Cap Driver:
57001-1454



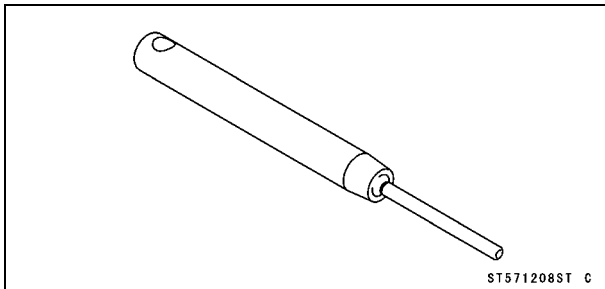
Valve Guide Reamer, $\phi 5$:
57001-1204



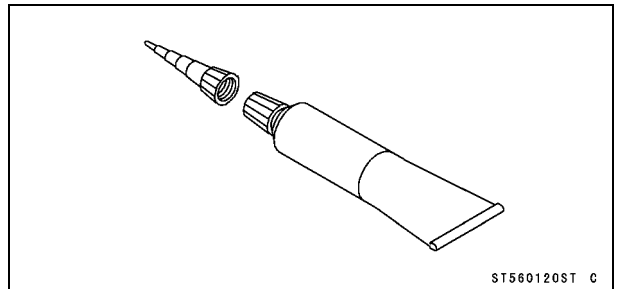
Compression Gauge Adapter, M10 x 1.0:
57001-1486



Valve Seat Cutter Holder, $\phi 5$:
57001-1208



Kawasaki Bond (Silicone Sealant):
56019-120



5-12 ENGINE TOP END

Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

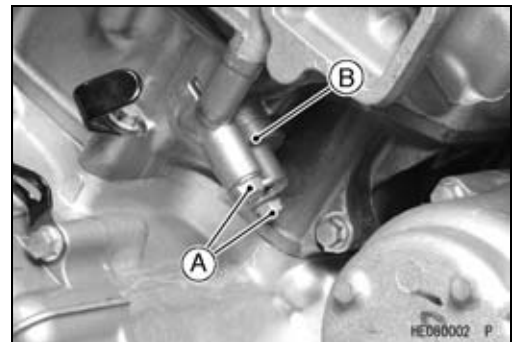
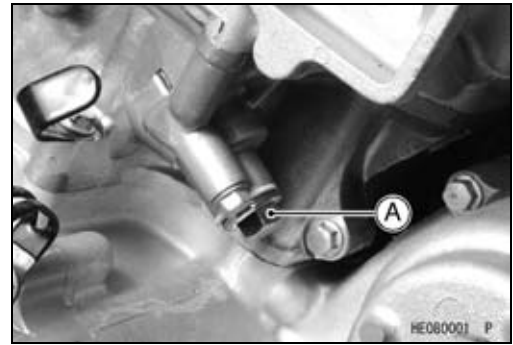
CAUTION

This is a non-return type cam chain tensioner. The push rod does not return to its original position once it moves out to take up cam chain slack. Observe all the rules listed below:

When removing the tensioner, do not take out the mounting bolts only partway. Retightening the mounting bolts from this position could damage the tensioner and the camshaft chain. Once the bolts are loosened, the tensioner must be removed and reset as described in "Camshaft Chain Tensioner Installation".

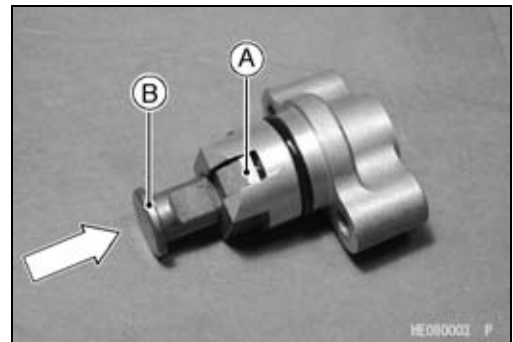
Do not turn over the crankshaft while the tensioner is removed. This could upset the cam chain timing, and damage the valves.

- Remove:
Cap Bolt [A] and Washer
Pin and Spring
- Remove:
Tensioner Mounting Bolts [A]
Camshaft Chain Tensioner [B]

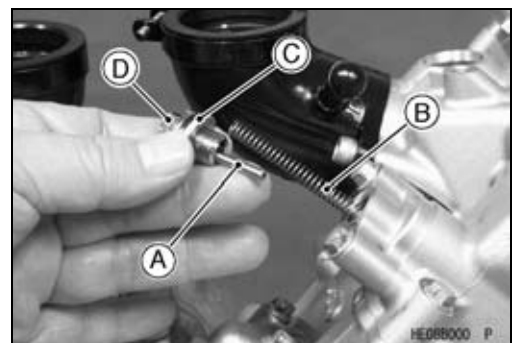


Camshaft Chain Tensioner Installation

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



- Tighten:
Torque - Chain Tensioner Mounting Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)
- Install:
Pin [A] and Spring [B]
Washer [C] and Chain Tensioner Cap Bolt [D]
- Tighten:
Torque - Chain Tensioner Cap Bolt: 22 N·m (2.2 kgf·m, 16 ft·lb)

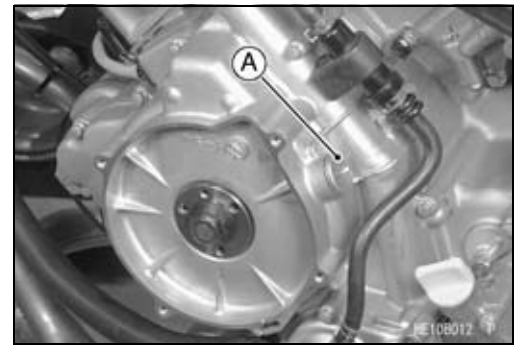


Rocker Case

Rocker Case Removal

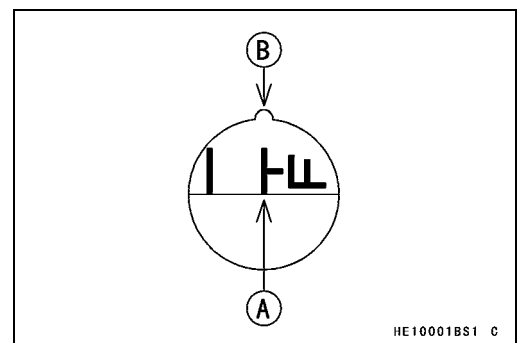
Front Rocker Case

- Remove:
 - Air Cleaner Cover (see Air Cleaner Cover Removal in the Frame chapter)
 - Front Fender (see Front Fender Removal in the Frame chapter)
 - Side Inner Cover (see Side Inner Cover Removal in the Frame chapter)
 - Timing Inspection Plug [A]
 - Valve Adjusting Caps
 - Converter Inlet Duct, Exhaust Duct (see Converter Inlet Duct, Exhaust Duct Removal in the Converter System chapter)



Special Tool - Filler Cap Driver: 57001-1454

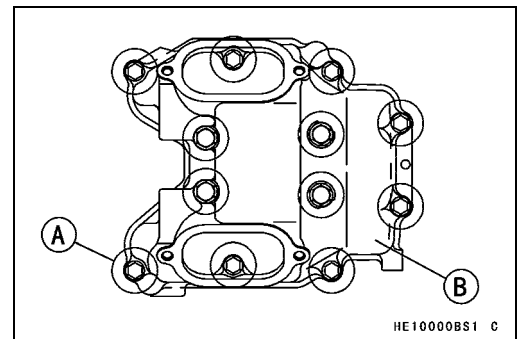
- Using a wrench on the alternator bolt, turn the crankshaft counterclockwise until “T-F” mark [A] is aligned with the notch [B] in the inspection window, and the cam lobes are pointing away from the rocker arms: the end of the compression stroke.



CAUTION

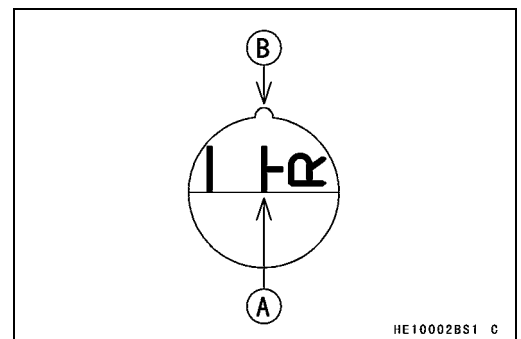
Be sure to position the crankshaft at TDC of the end of the compression stroke when removing or installing the rocker case. The rocker arms could bend the valves.

- Remove:
 - Front Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal)
 - Rocker Case Bolts [A]
 - Front Rocker Case [B]
- Lift the rocker case clear of the dowel pins in the cylinder head and slide the rocker case out of the frame.



Rear Rocker Case

- Remove:
 - Front Rocker Case
 - Converter Exhaust Joint Duct
- Using a wrench on the alternator bolt, turn the crankshaft **counterclockwise** (270°) until “T-R” mark [A] is aligned with the notch [B] in the inspection window, and the cam lobes are pointing away from the rocker arms: the end of the compression stroke.



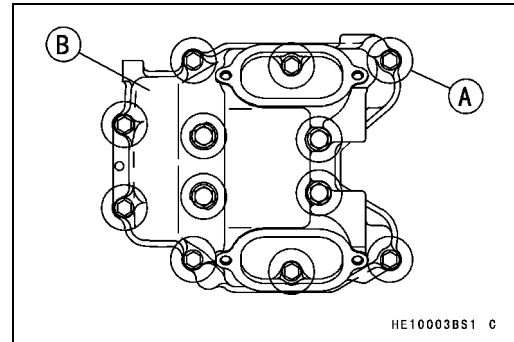
CAUTION

Be sure to position the crankshaft at TDC of the end of the compression stroke when removing or installing the rocker case. The rocker arms could bend the valves.

5-14 ENGINE TOP END

Rocker Case

- Remove:
 - Rear Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal)
 - Rocker Case Bolts [A]
 - Rear Rocker Case [B]
- Lift the rocker case clear of the dowel pins in the cylinder head and slide the rocker case out of the frame.



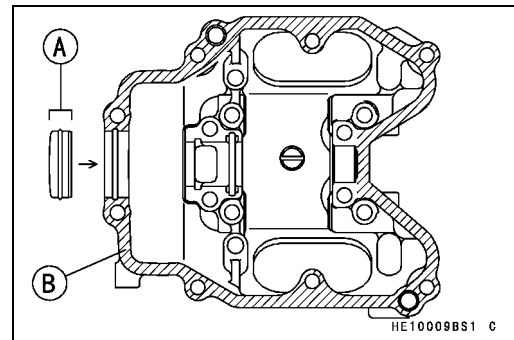
Rocker Case Installation

- Install the rear camshaft and then the front camshaft (see Camshaft Installation).
- Check that the crankshaft is positioned at TDC and at the end of the compression stroke.

CAUTION

Be sure to position the crankshaft is at TDC of the end of the compression stroke. The rocker arms could bend the valves.

- Apply silicone sealant to the outer surface of the cap [A] and the cylinder head upper surface [B] as shown.
Sealant - Kawasaki Bond (Silicone Sealant): 56019-120



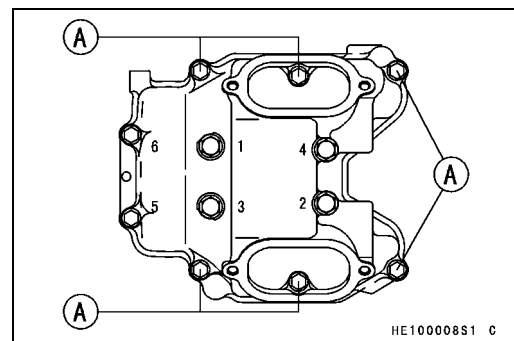
- Tighten the rocker case bolts following the tightening sequence shown.

Torque - Rocker Case Bolts [1 ~ 4, L = 55 mm (2.2 in.) with washers]: 8.8 N-m (0.90 kgf-m, 78 in-lb)

Rocker Case Bolts [5 ~ 6, L = 130 mm (5.1 in.)]: 9.8 N-m (1.0 kgf-m, 87 in-lb)

Rocker Case Bolts [A] [L = 30 mm (1.2 in.), L = 25 mm (1.0 in.)]: 9.8 N-m (1.0 kgf-m, 87 in-lb)

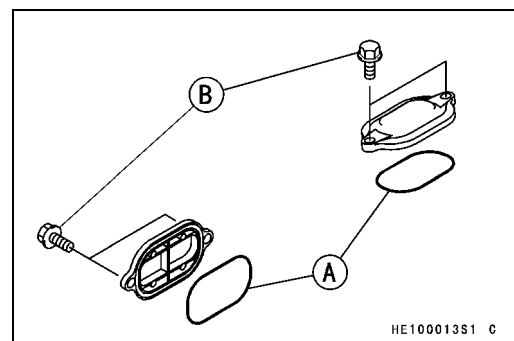
- Check the valve clearance and adjust it if necessary.



- Apply grease to the O-ring [A].

- Tighten:

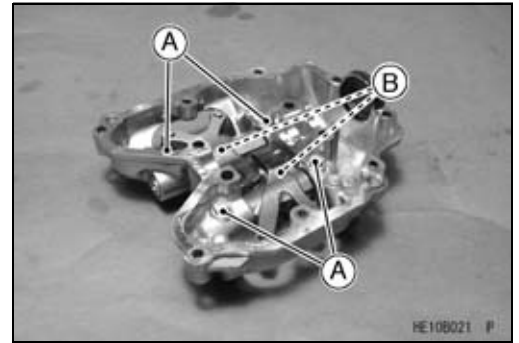
Torque - Valve Adjusting Cap Bolts [B]: 8.8 N-m (0.90 kgf-m, 78 in-lb)



Rocker Case

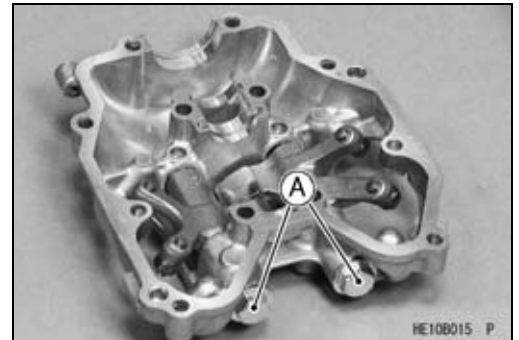
Rocker Arm Removal (KSV700-A1/B1)

- Remove:
 - Rocker Case (see Rocker Case Removal)
 - Rocker Shaft Bolts [A]
 - Rocker Shaft [B]
 - Washers
- Mark and record the rocker arm location so it can be installed in the original position.
- The rocker arms come off with the rocker shafts.

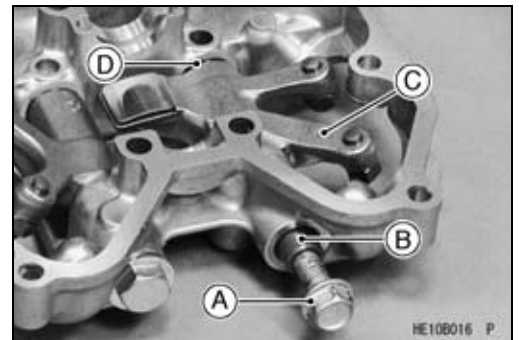


Rocker Arm Removal (KSV700-A2, A6F ~/B2, B6F ~/C6F)

- Remove:
 - Rocker Case (see Rocker Case Removal)
 - Rocker Shaft Bolts [A]

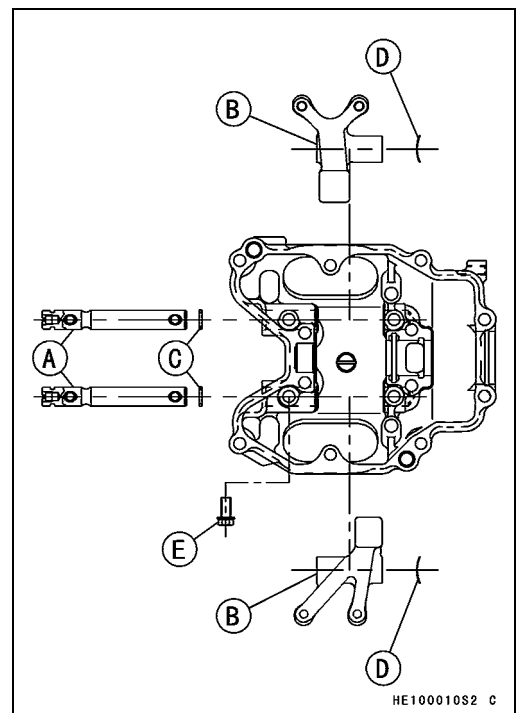


- Using a M8 bolt [A], remove the rocker shaft [B].
- Remove:
 - Rocker Arm [C]
 - Washers [D]
- Mark and record the rocker arm location so it can be installed in the original position.
- The rocker arms come off with the rocker shafts.



Rocker Arm Installation (KSV700-A1/B1)

- Apply molybdenum disulfide oil:
 - Rocker Shaft [A]
 - Hole in Rocker Arm [B]
- Apply grease to the O-rings [C].
- Install:
 - Wave Washers [D] (as shown)
 - Rocker Arms (as shown)
 - Rocker Shafts and O-rings
- Tighten:
 - Torque - Rocker Shaft Bolts [E]: 8.8 N·m (0.90 kgf·m, 78 in·lb)**

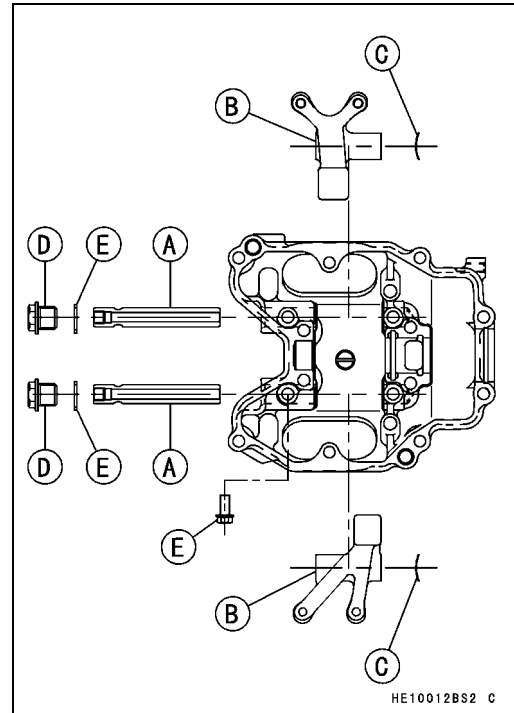


5-16 ENGINE TOP END

Rocker Case

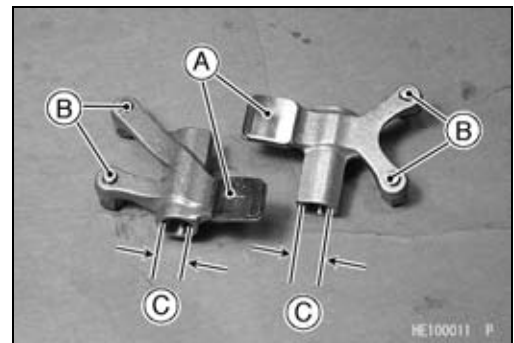
Rocker Arm Installation (KSV700-A2, A6F ~/B2, B6F ~/C6F)

- Apply engine oil:
 - Rocker Shaft [A]
 - Hole in Rocker Arm [B]
 - Install:
 - Wave Washers [C] (as shown)
 - Rocker Arms (as shown)
 - Rocker Shafts
 - Tighten the rocker shaft bolts [D] with copper washers [E].
- Torque - Rocker Shaft Bolts: 22 N·m (2.2 kgf·m, 16 ft·lb)**



Rocker Arm Inspection

- Inspect the area [A] on the rocker arm where the cam rubs.
- ★ If the rocker arm is scored, discolored or otherwise damaged, replace it. Also inspect the camshaft lobes.
- Inspect the end of the valve clearance adjusting screws [B] where it contacts the valve stem.
- ★ If the end of the adjusting screw is mushroomed or damaged in any way, or if the screw will not turn smoothly, replace it. Also inspect the end of the valve stem.
- Measure the inside diameter [C] of the rocker arm with a dial bore gauge.
- ★ If the rocker arm inside diameter is larger than the service limit, replace it. Also check the rocker shaft diameter (see Rocker Shaft Diameter Measurement).



Rocker Arm Inside Diameter

Standard: 12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in.)

Service Limit: 12.05 mm (0.474 in.)

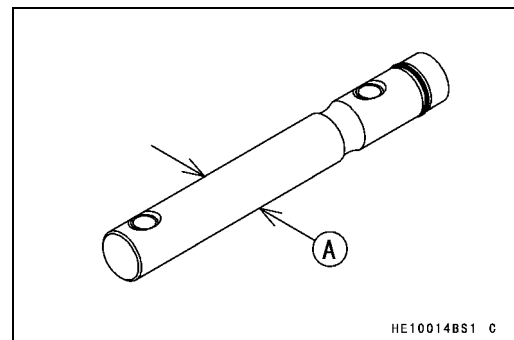
Rocker Shaft Diameter Measurement

- Measure the diameter [A] of the rocker shaft where the rocker arm pivots on it with a micrometer.
- ★ If the rocker shaft diameter is smaller than the service limit, replace it. Also check the rocker arm inside diameter (see Rocker Arm Inspection).

Rocker Shaft Diameter

Standard: 11.973 ~ 11.984 mm (0.4714 ~ 0.4718 in.)

Service Limit: 11.95 mm (0.470 in.)



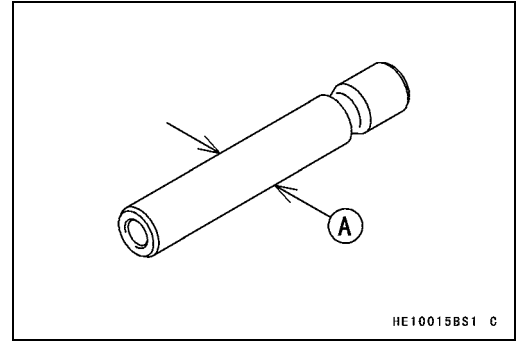
Rocker Case

- For KSV700-A2, A6F ~/B2, B6F ~/C6F models, note the following.

Rocker Shaft Diameter

Standard: 11.983 ~ 11.994 mm (0.4718 ~ 0.4722 in.)

Service Limit: 11.96 mm (0.471 in.)

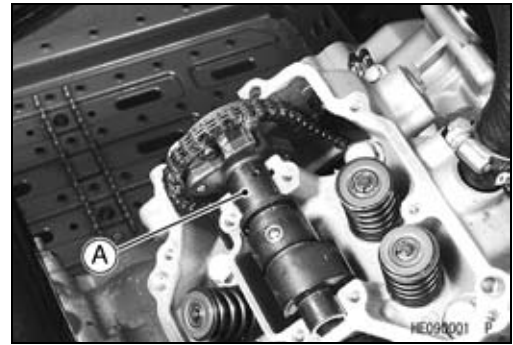


5-18 ENGINE TOP END

Camshaft

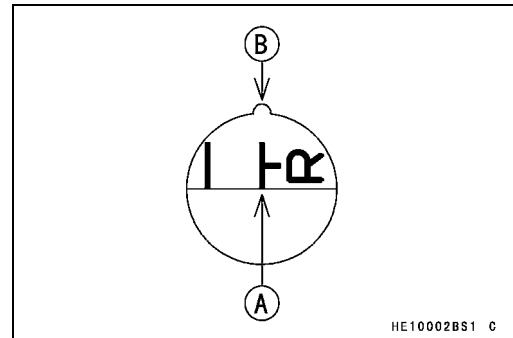
Camshaft Removal

- Remove:
 - Both Camshaft Chain Tensioners (see Camshaft Chain Tensioner Removal)
 - Both Rocker Cases (see Rocker Case Removal)
 - Both Camshafts [A]
- Support the chain using a suitable tool.

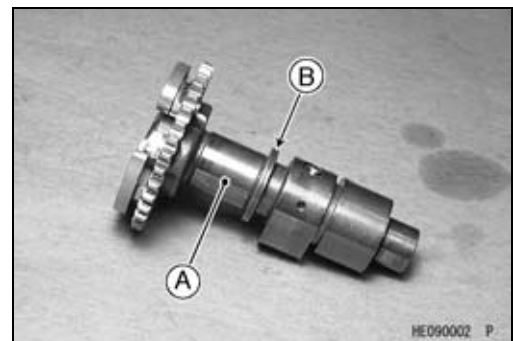


Camshaft Installation

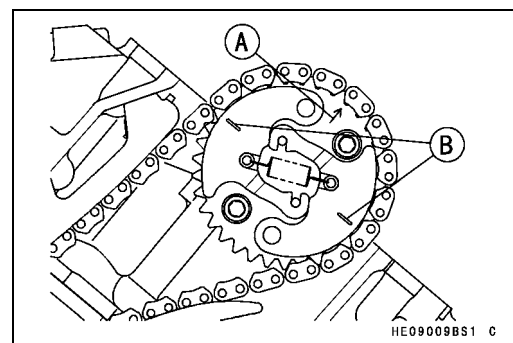
- Using a wrench on the alternator bolt, turn the crankshaft **clockwise** until "T-R" mark [A] is aligned with the notch [B] in the inspection window.



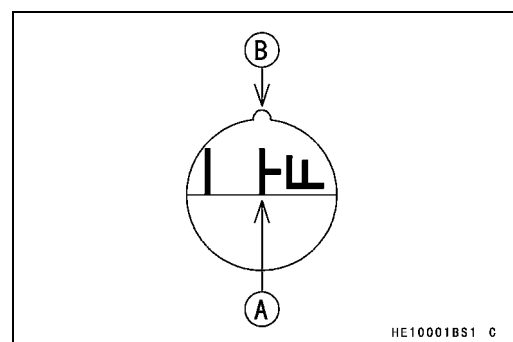
- The rear camshaft [A] has a groove [B].
- First, install the rear camshaft.



- Face the arrow mark [A] of the rear camshaft sprocket upward (left side view).
- Engage the rear camshaft chain with the rear camshaft sprocket.
- Align the marks [B] on the weights with the rear cylinder head upper surface.

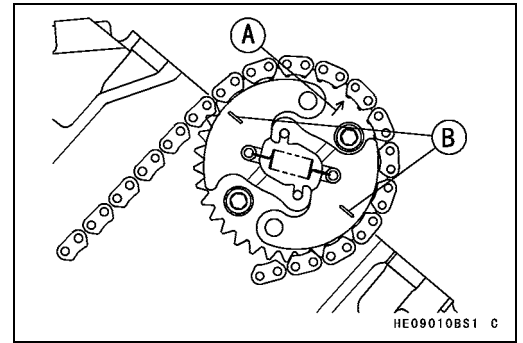


- Using a wrench on the alternator bolt, turn the crankshaft **clockwise** 270°.
- Align the "T-F" mark [A] with the notch [B] in the inspection window.



Camshaft

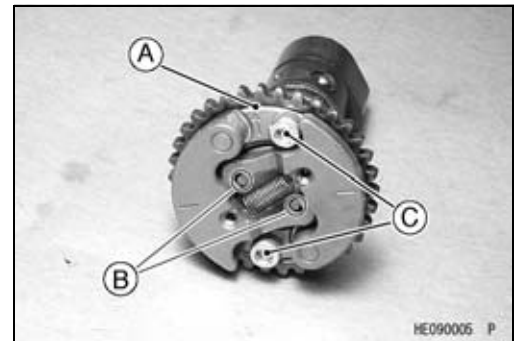
- Face the arrow mark [A] of the front camshaft sprocket upward (right side view).
- Engage the front camshaft chain with the front camshaft sprocket.
- Align the marks [B] on the weights with the front cylinder head upper surface.



- Install:
 - Rocker Cases (see Rocker Case Installation)
 - Camshaft Chain Tensioners (see Camshaft Chain Tensioner Installation)
- Check the valve clearance (see Valve Clearance Inspection).

Camshaft Assembly

- Install the KACR unit [A] (sprocket) on the camshaft so that the unit fits onto the camshaft pins [B].
- Apply a non-permanent locking agent to the camshaft sprocket bolts [C].
- Tighten:
 - Torque - Camshaft Sprocket Bolts: 12 N·m (1.2 kgf·m, 104 in·lb)**



Cam Wear Inspection

- Remove the camshaft.
- Measure the height [A] of the cam with a micrometer.
- ★ If the cams are worn past the service limit, replace the camshaft.

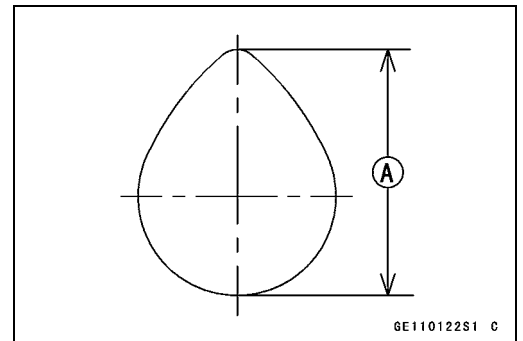
Cam Height

Standard:

Exhaust	35.363 ~ 35.477 mm (1.3932 ~ 1.3967 in.)
Inlet	35.622 ~ 35.736 mm (1.4024 ~ 1.4069 in.)

Service Limit:

Exhaust	35.26 mm (1.388 in.)
Inlet	35.52 mm (1.398 in.)



5-20 ENGINE TOP END

Camshaft

Camshaft Bearing Wear Inspection

- The journal wear is measured using plastigage (press gauge), which is inserted into the clearance to be measured. The plastigage indicates the clearance by the amount it is compressed and widened when the parts are assembled.
- Cut strips of plastigage to journal width. Place a strip on each journal parallel to the camshaft with the camshaft installed in the correct position so that the plastigage will be compressed between the journal and rocker case.
- Install the rocker case, tightening the bolts in the correct sequence to the specified torque (see Rocker Case Installation).

NOTE

○ Do not turn the camshaft when the plastigage is between the journal and rocker case.

- Remove the rocker case and measure the plastigage width [A] to determine the clearance between the journal and the rocker case. Measure the widest portion of the plastigage.

Camshaft Bearing Clearance ($\phi 18$)

Standard: 0.016 ~ 0.052 mm (0.0006 ~ 0.0020 in.)

Service Limit: 0.14 mm (0.0055 in.)

Camshaft Bearing Clearance ($\phi 22$)

Standard: 0.020 ~ 0.062 mm (0.0008 ~ 0.0024 in.)

Service Limit: 0.15 mm (0.0059 in.)

- ★ If any clearance exceeds the service limit, measure the diameter of the camshaft journal.

Camshaft Journal Diameter ($\phi 18$)

Standard: 17.966 ~ 17.984 mm (0.7073 ~ 0.7080 in.)

Service Limit: 17.94 mm (0.706 in.)

Camshaft Journal Diameter ($\phi 22$)

Standard: 21.959 ~ 21.980 mm (0.8645 ~ 0.8653 in.)

Service Limit: 21.93 mm (0.863 in.)

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



CAUTION

The cylinder head and rocker case are machined as a set, and must be replaced as a set.

Camshaft

KACR Inspection

The Kawasaki Automatic Compression Release (KACR) momentarily opens the exhaust valves on the compression stroke at very low speeds. This allows some of the compression pressure to escape, making it easy to turn over the engine during starting.

Due to the simplicity of the mechanism, no periodic maintenance is needed. There are only two symptoms of problems with the KACR mechanism [A]: compression is not released during starting, and compression is released during running.

(1) If compression is not released during starting, the weights are not returning to their rest position.

- Remove the camshaft (see Camshaft Removal).
- Remove the KACR unit.
- Visually inspect the spring.
- ★ If damaged, deformed, or missing, replace the spring.
- Remove the spring and move the weights back and forth.
- ★ If the weights do not move smoothly, replace the KACR unit. Also inspect the exhaust rocker arm for any damage, and replace the rocker arm if necessary.

[A] Rest Position (compression is released)

[B] Weights

[C] Spring

(2) If compression is released while the engine is running, the weights are not swinging out.

- Remove the spring and move the weights back and forth.
- ★ If the weights do not move easily from the retracted position, replace the KACR unit. Also inspect the exhaust rocker arm for any damage, and replace the rocker arm if necessary.

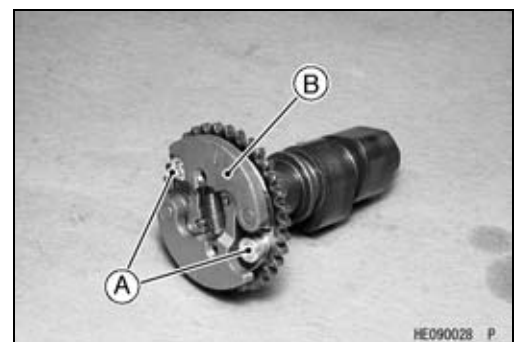
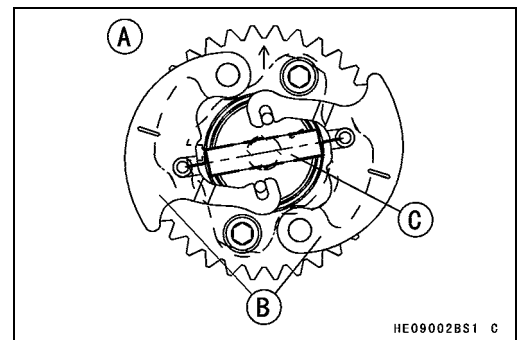
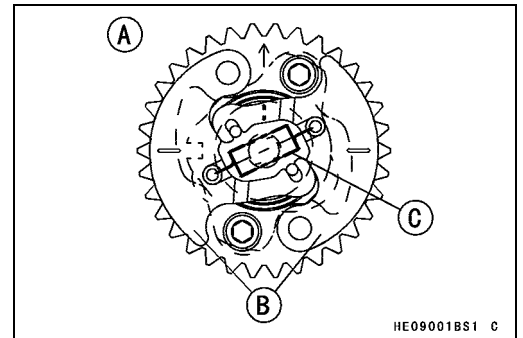
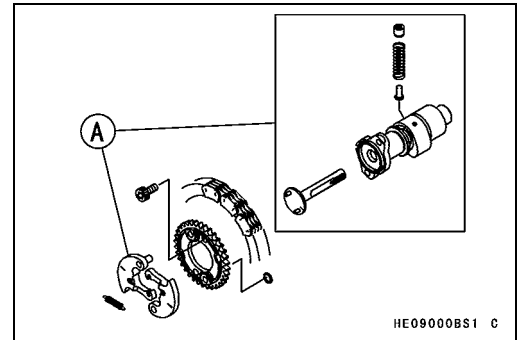
[A] Running Position (compression is not released)

[B] Weights

[C] Spring

KACR Removal

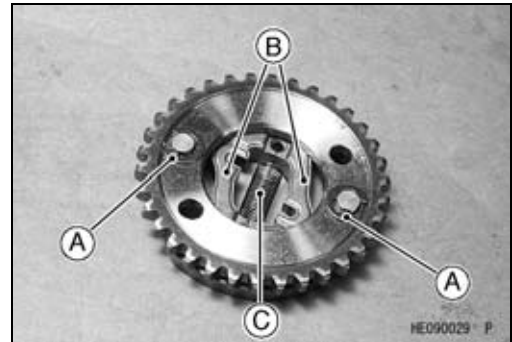
- Remove:
 - Camshaft (see Camshaft Removal)
 - Camshaft Sprocket Bolts [A]
 - KACR Unit [B]



5-22 ENGINE TOP END

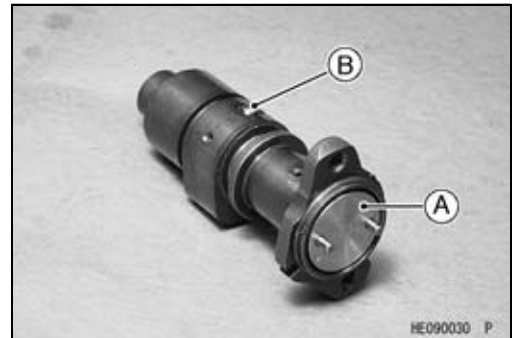
Camshaft

- Remove:
 - Circlips [A]
 - Weights [B]
 - Spring [C]



NOTE

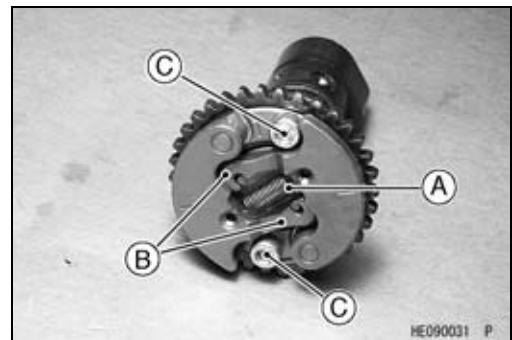
- Do not remove the shaft [A] and pin [B].
- If the parts are removed, they cannot be reinstalled.



KACR Installation

- Install:
 - Weights
 - Circlips
 - Spring [A]
- Hook the spring from the outside with the open side of the hook inwards.
- Install:
 - KACR Unit
- Hook the arms [B] on the pins.
- Apply a non-permanent locking agent to the camshaft sprocket bolts [C] and tighten them.

Torque - Camshaft Sprocket Bolts: 12 N·m (1.2 kgf-m, 104 in-lb)

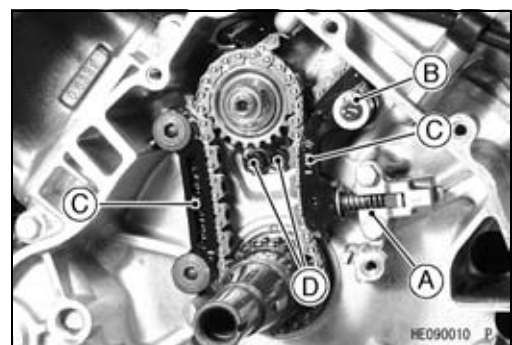


Camshaft Chain Removal

- Remove (left side view):
 - Rear and Front Camshafts (see Camshaft Removal)
 - Alternator Flywheel (see Alternator Flywheel Removal in the Electrical System chapter)
 - Oil Pump (see Oil Pump Removal in the Engine Lubrication System chapter)
 - Intermediate Shaft Chain Tensioner [A]
 - Circlip [B] and Washer

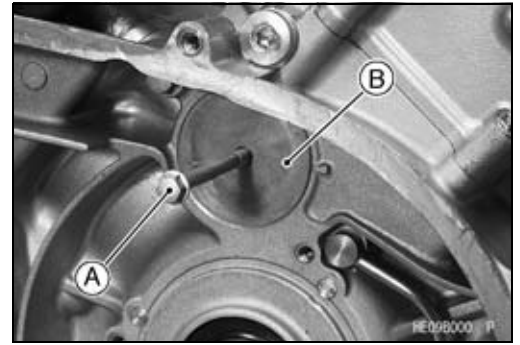
Special Tool - Outside Circlip Pliers: 57001-144

- Remove:
 - Intermediate Shaft Chain Guides [C]
 - Position Plate Bolts [D] and Position Plate



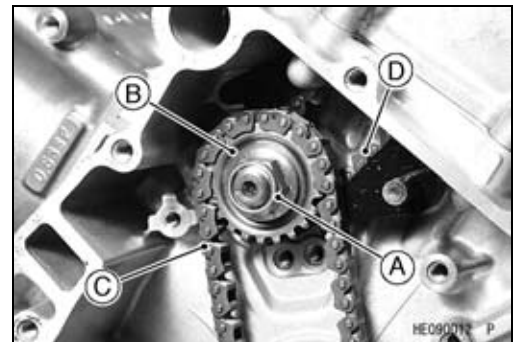
Camshaft

- Remove (right side view):
 - Torque Converter Cover (see Torque Converter Cover Removal in the Converter System chapter)
 - Drive Pulley (see Drive Pulley Removal in the Converter System chapter)
 - Driven Pulley (see Driven Pulley Removal in the Converter System chapter)
- Using a M6 bolt [A], pull out the cover [B].
- For KSV700-A1/B1 models, Using an Allen wrench, hold the intermediate shaft [A].



KSV700-A1/B1

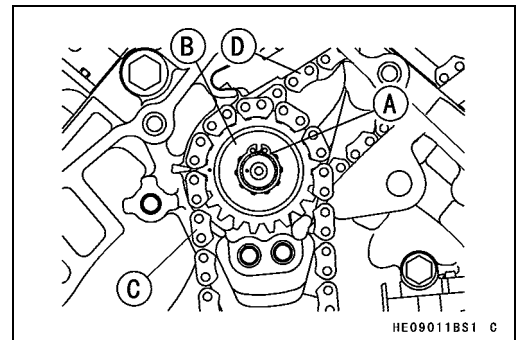
- Remove (left side view):
 - Intermediate Shaft Sprocket Nut [A]
 - Intermediate Shaft Sprocket [B]
 - Intermediate Shaft Drive Chain [C]
 - Rear Camshaft Chain [D]
 - Front Camshaft Chain



KSV700-A2 ~/B2 ~/C6F

- Remove (left side view):
 - Circlip [A]
 - Intermediate Shaft Sprocket [B]
 - Intermediate Shaft Drive Chain [C]
 - Rear Camshaft Chain [D]
 - Front Camshaft Chain

Special Tool - Outside Circlip Pliers: 57001-144



Camshaft Chain Installation

Rear Camshaft Chain

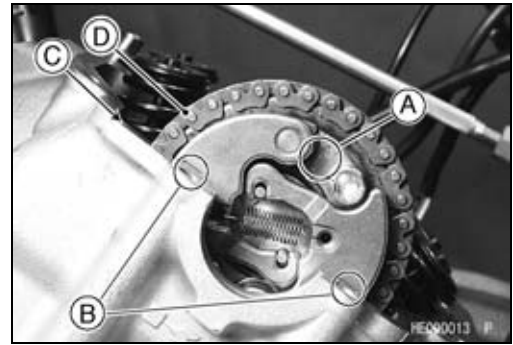
- Align the key groove [A] on the crankshaft with the embossed line [B] on the crankcase (left side view).



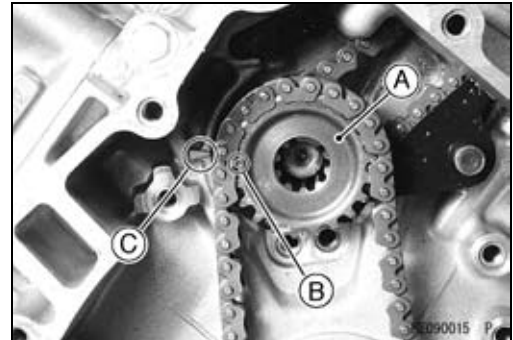
5-24 ENGINE TOP END

Camshaft

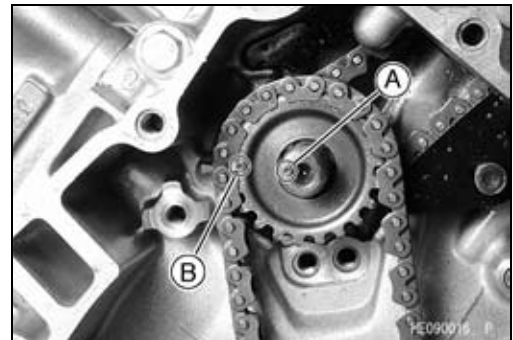
- Face the arrow mark [A] of the rear camshaft sprocket upward.
- Align the marks [B] on the weights with the rear cylinder head upper surface [C].
- Place the rear camshaft chain [D] onto the rear camshaft sprocket.



- Engage the camshaft and intermediate shaft chains on the intermediate shaft sprocket [A] (left side view).
- Align the punch mark [B] on the intermediate shaft sprocket with the embossed mark [C] on the crankcase.

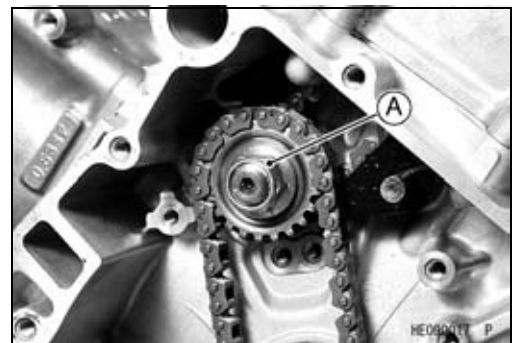


- Install the intermediate shaft and align the punch mark [A] on the intermediate shaft with the punch mark [B] on the intermediate sprocket nut.



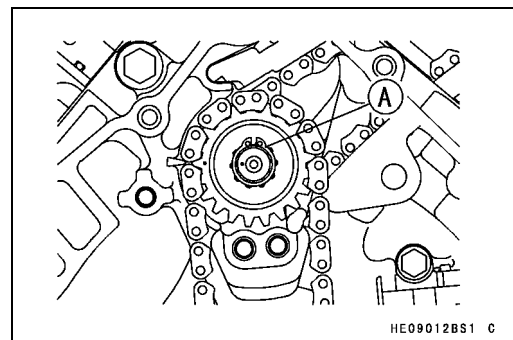
KSV700-A1/B1

- Using an Allen wrench, hold the intermediate shaft.
- Tighten:
Torque - Intermediate Shaft Sprocket Nut [A]: 44 N·m (4.5 kgf·m, 33 ft·lb)



KSV700-A2 ~/B2 ~/C6F

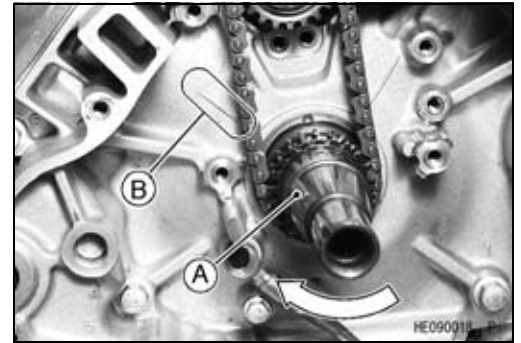
- Install the circlip [A].
Special Tool - Outside Circlip Pliers: 57001-144



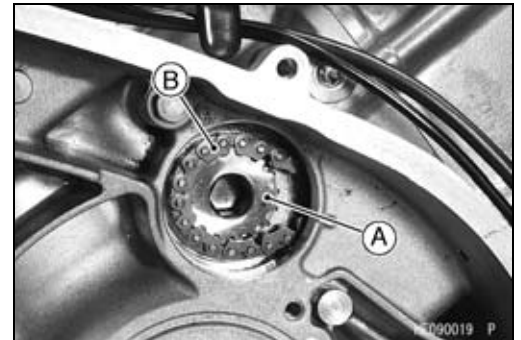
Camshaft

Front Camshaft Chain

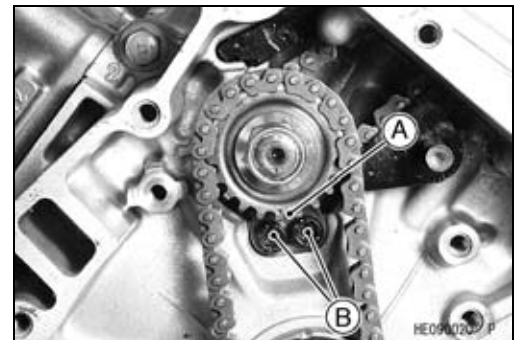
- Rotate the crankshaft **clockwise** 270°.
- Align the key groove [A] on the crankshaft with the embossed line [B] on the crankcase.



- Move the intermediate shaft [A] to the right side of the engine.
- Engage the front camshaft chain [B] with the sprocket on the intermediate shaft.



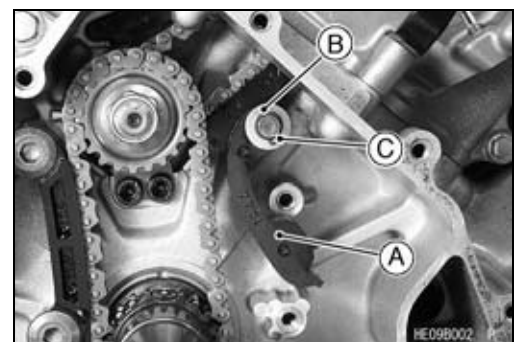
- Install (left side view):
Position Plate [A]
- Tighten:
Torque - Position Plate Bolts [B]: 8.8 N·m (0.90 kgf·m, 78 in·lb)



- Install:
Intermediate Shaft Chain Guide [A] (front)
- Tighten:
Torque - Intermediate Shaft Chain Guide Bolts [B]: 8.8 N·m (0.90 kgf·m, 78 in·lb)



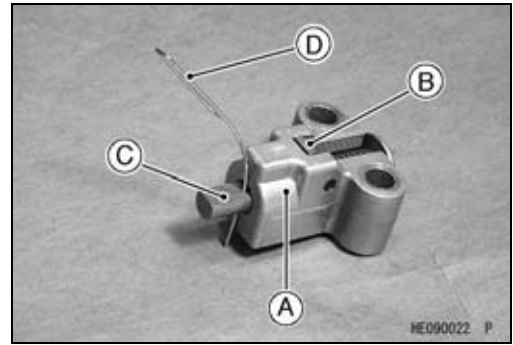
- Install:
Intermediate Shaft Chain Guide [A] (rear)
Washer [B]
Circlip [C]
- Special Tool - Outside Circlip Pliers: 57001-144**



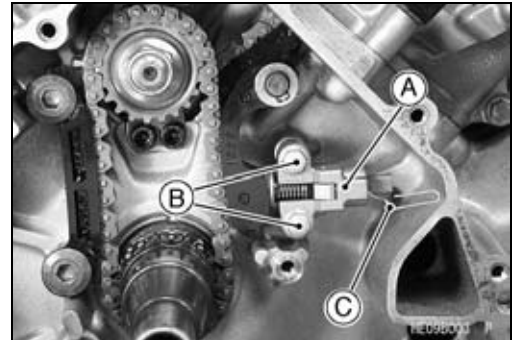
5-26 ENGINE TOP END

Camshaft

- Install the intermediate shaft chain tensioner [A] as follows:
- Release the stopper [B] and push the push rod [C] into the tensioner body.
- Insert a wire [D] into the rod hole to hold the rod in place.



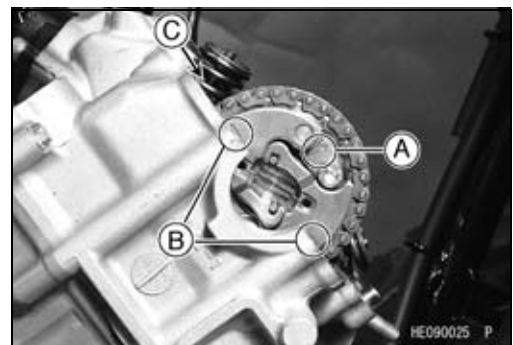
- Install:
Intermediate Shaft Chain Tensioner [A]
- Tighten:
Torque - Intermediate Shaft Chain Tensioner Bolts [B]: 8.8 N-m (0.90 kgf-m, 78 in-lb)
- Remove the wire [C] to free the push rod.



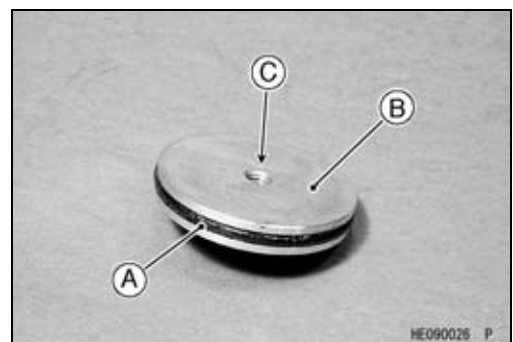
- Confirm that the punch mark [A] on the intermediate shaft sprocket (right side) is aligned with the embossed mark [B] on the crankcase.



- Face the arrow mark [A] upward.
- Align the marks [B] on the weights with the front cylinder head upper surface [C].
- Place the front camshaft chain on the front camshaft sprocket.



- Apply grease to the O-ring [A] and install the cover [B] into the right side of the crankcase so that the tapped hole [C] faces outward.



Camshaft

- Install:
 - Both Rocker Cases (see Rocker Case Installation)
 - Both Camshaft Chain Tensioners (see Camshaft Chain Tensioner Installation)
- Check the valve clearances (see Valve Clearance Inspection in the Periodic Maintenance chapter).

5-28 ENGINE TOP END

Cylinder Head

Cylinder Compression Measurement

NOTE

○ Use the battery which is fully charged.

- Warm up the engine thoroughly, and stop the engine.
- Remove the spark plug (see Spark Plug Removal in the Electrical System chapter).
- Attach the compression gauge [A] and adapter [B] firmly into the spark plug hole.

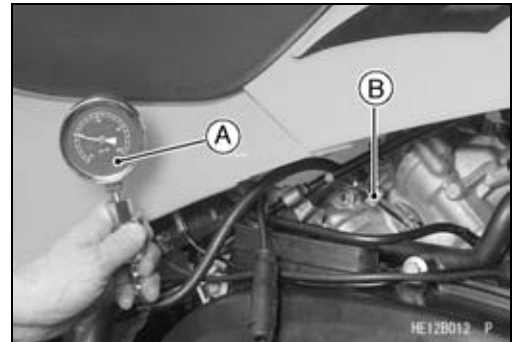
Special Tools - Compression Gauge, 20 kgf/cm²: 57001-221
Compression Gauge Adapter, M10 × 1.0: 57001-1486

- Hold the throttle wide open and crank the engine with the electric starter or the recoil starter several times.

When the gauge stops rising, stop cranking and read the gauge.

Cylinder Compression (Usable Range)

Electric Starter: 290 ~ 520 kPa (3.0 ~ 5.3 kgf/cm², 43 ~ 75 psi) @290 r/min (rpm)



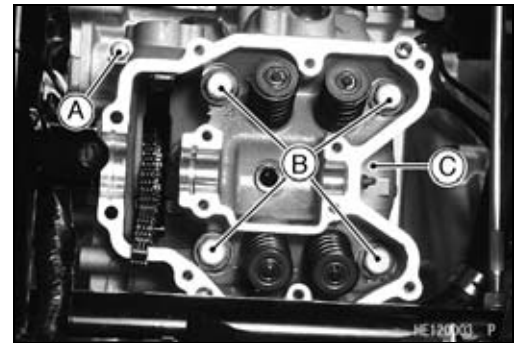
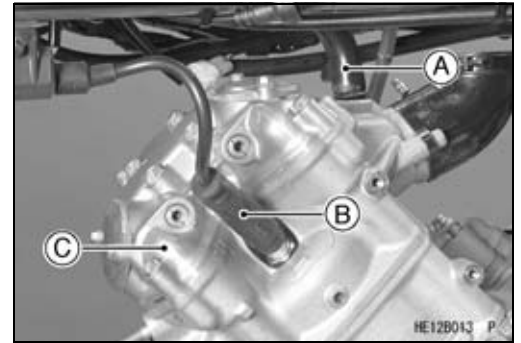
The following table should be consulted if the obtainable compression reading is not within the usable range.

Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon accumulation on piston, cylinder head, 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.
	Damaged or missing compression release cam spring	Replace the spring.
	Compression release weights do not move smoothly.	Replace the compression release unit.
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, piston seizure.	Replace the piston and/or cylinder
		Inspect the cylinder and liner 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.
Compression release weights do not move smoothly	Replace the compression release unit	

Cylinder Head

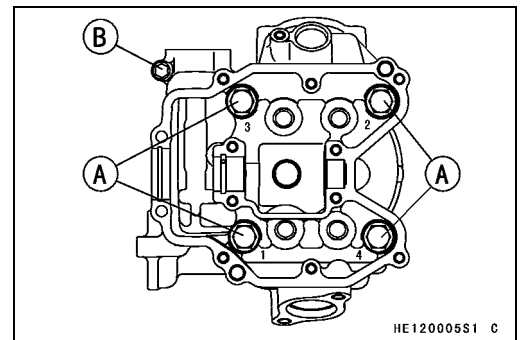
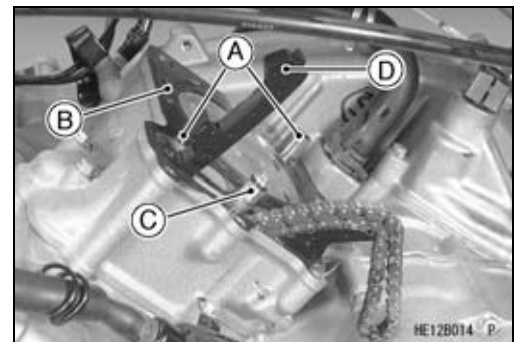
Cylinder Head Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
 - Carburetor (see Carburetor Removal in the Fuel System chapter)
 - Water Pipe [A]
 - Spark Plug Cap [B]
 - Rocker Case [C]
 - Camshaft (see Camshaft Removal)
 - Exhaust Pipe (see Muffler and Exhaust Pipe Removal)
- Remove:
 - Cylinder Head Bolt (M6) [A]
 - Cylinder Head Bolts (M10) [B] and Washers
 - Cylinder Head [C] and Gasket
- Lift the cylinder head to clear the dowel pins in the cylinder, and slide the cylinder head out of the frame.



Cylinder Head Installation

- Install:
 - Dowel Pins [A]
 - New Cylinder Head Gasket [B]
 - Oil Pipe [C]
 - Camshaft Chain Guides [D]
- Tighten:
 - Torque - Front Cylinder Camshaft Chain Guide Bolt: 20 N·m (2.0 kgf·m, 14 ft·lb)**
- Apply molybdenum disulfide oil to the threads and seating surface of the cylinder head bolts and both sides of the washers.
- Tighten the cylinder head bolts following the tightening sequence as shown.
 - First Torque - Cylinder Head Bolts (M10) [A]: 25 N·m (2.5 kgf·m, 18 ft·lb)**
 - Final Torque - Cylinder Head Bolts (M10) [A]: 49 N·m (5.0 kgf·m, 36 ft·lb)**
- Tighten the cylinder head bolts (M6).
 - Torque - Cylinder Head Bolts (M6) [B]: 9.8 N·m (1.0 kgf·m, 87 in·lb)**



Cylinder Head Cleaning

- Remove the cylinder head (see Cylinder Head Removal).
- Scrape the carbon out of the combustion chamber and exhaust port with a suitable tool.
- Wash the head with a high flash-point solvent.
- Blow out any particles which may obstruct the oil passage in the cylinder head using compressed air.

5-30 ENGINE TOP END

Cylinder Head

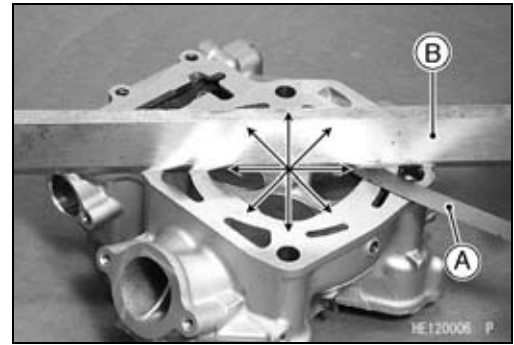
Cylinder Head Warp Inspection

- Clean the cylinder head (see Cylinder Head Cleaning).
- Lay a straightedge across the lower surface of the cylinder head.
- Use a thickness gauge [A] to measure the space between the straightedge [B] and the head at several locations.

Cylinder Head Warp

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 lapping the lower surface with emery paper secured to a surface plate (first No. 200, then No. 400).



Valves

Valve Clearance Inspection

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

Valve Clearance Adjustment

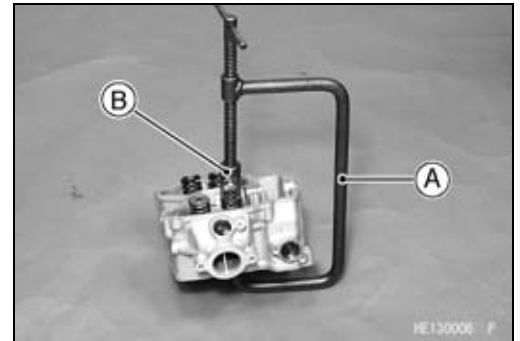
- Refer to the Valve Clearance Adjustment in the Periodic Maintenance chapter.

Valve Removal

- Remove the cylinder head (see Cylinder Head Removal).
- Mark and record the valve location so it can be installed in the original position.
- Using the valve spring compressor assembly, remove the valve.

Special Tools - Valve Spring Compressor Assembly: 57001-241 [A]

Valve Spring Compressor Adapter, $\phi 22$: 57001-1202 [B]



Valve Installation

- Replace the valve stem oil seal.
- ★ If a new valve is to be used, check the valve-to-guide clearance (see Valve to Guide Clearance Measurement).
- ★ If there is too little clearance, ream the valve guide (see Valve Guide Installation).
- ★ If there is too much clearance, install a new valve guide (see Valve Guide Removal and Valve Guide Installation).
- Check the valve seat (see Valve Seat Inspection).
- Apply a thin coat of molybdenum disulfide grease to the valve stem.
- Install each spring so that the closed coil end faces downwards.
- The green paint on the spring faces upwards.
- For KSV700-A2 ~/B2 ~/C6F models; the white paint on the spring faces upwards.

Valve Stem [A]

Oil Seal [B]

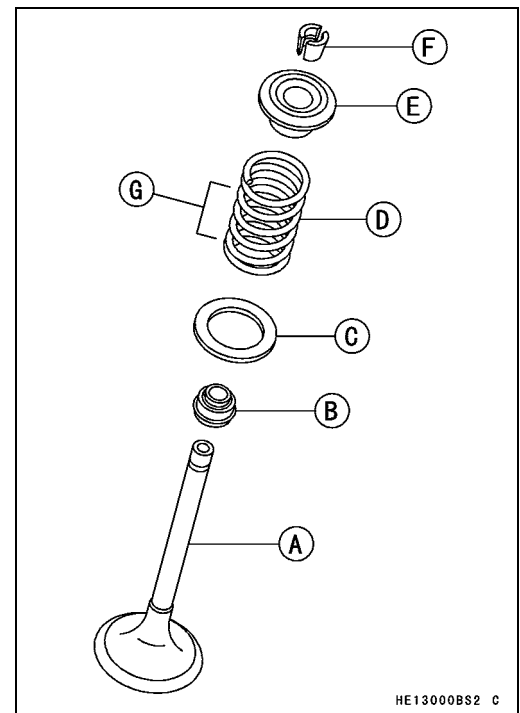
Spring Seat [C]

Spring [D]

Retainer [E]

Split Keepers [F]

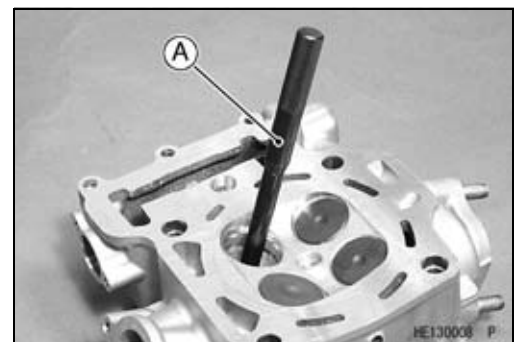
Closed Coil End [G]



Valve Guide Removal

- Remove:
 - Valve (see Valve Removal)
 - Valve Stem Oil Seal
- Hammer lightly on the valve guide arbor [A] to remove the guide from the top of the head.

Special Tool - Valve Guide Arbor, $\phi 5$: 57001-1203



5-32 ENGINE TOP END

Valves

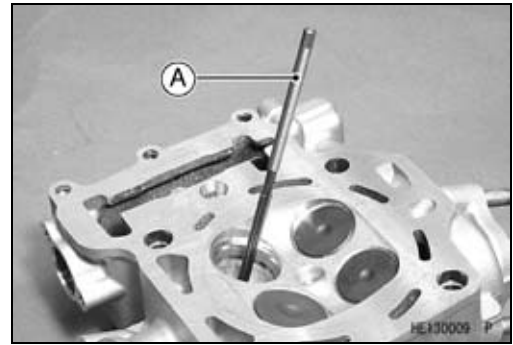
Valve Guide Installation

- Lightly oil the valve guide outer surface.
- Using the valve guide arbor, drive the valve guide until its flange touches the cylinder head.

Special Tool - Valve Guide Arbor, ϕ 5: 57001-1203

- Ream the valve guide with the valve guide reamer [A] even if the old guide is reused.

Special Tool - Valve Guide Reamer, ϕ 5: 57001-1204

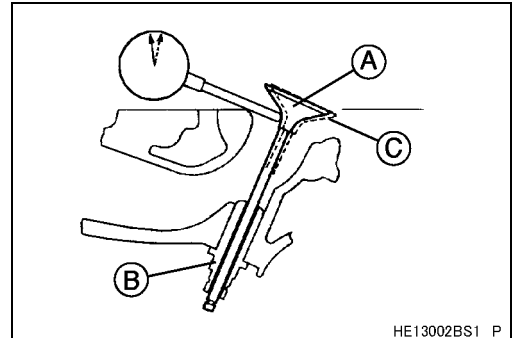


Valve-to-Guide Clearance Measurement

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 [C] the stem back and forth 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:

Exhaust: 0.09 ~ 0.17 mm (0.0035 ~ 0.0067 in.)

Inlet: 0.03 ~ 0.11 mm (0.0012 ~ 0.0043 in.)

Service Limit:

Exhaust: 0.34 mm (0.0133 in.)

Inlet: 0.28 mm (0.0110 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].
- Coat the valve seat with machinist's dye.
- Push the valve into the guide.
- Rotate the valve against the seat with a lapping tool.
- Pull the valve out, and check the seating pattern on the valve head. It must be the correct width and even all the way around.
- Measure the outside diameter [D] of the seating pattern on the valve seat.
- ★ If the outside diameter of the valve seating pattern is too large or too small, repair the seat (see Valve Seat Repair).

Valve Seating Surface Outside Diameter

Exhaust: 25.2 ~ 25.4 mm (0.992 ~ 1.000 in.)

Inlet: 29.4 ~ 29.5 mm (1.157 ~ 1.165 in.)

NOTE

○ The valve stem and guide must be in good condition, or this check will not be valid.

- ★ If the valve seating pattern is not correct, repair the seat (see Valve Seat Repair).
- Measure the seat width [E] of the portion where there is no build-up carbon (white portion) of the valve seat with vernier calipers.
- ★ If the width is too wide, too narrow or uneven, repair the seat (see Valve Seat Repair).

[F] Good
 [G] Too Wide
 [H] Too Narrow
 [J] Uneven

Valve Seating Surface Width

Exhaust: 0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)

Inlet: 0.5 ~ 1.0 mm (0.02 ~ 0.04 in.)

Valve Seat Repair (Valve Lapping)

- Using the valve seat cutters [A], repair the valve seat.

Special Tools - Valve Seat Cutters:

Exhaust Valves:

Valve Seat Cutter, 45° - ϕ 27.5: 57001-1114

Valve Seat Cutter, 32° - ϕ 28: 57001-1119

Valve Seat Cutter, 60° - ϕ 30: 57001-1123

Inlet Valves:

Valve Seat Cutter, 45° - ϕ 30: 57001-1187

Valve Seat Cutter, 32° - ϕ 33: 57001-1199

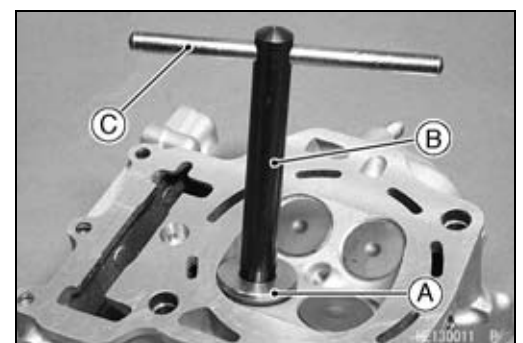
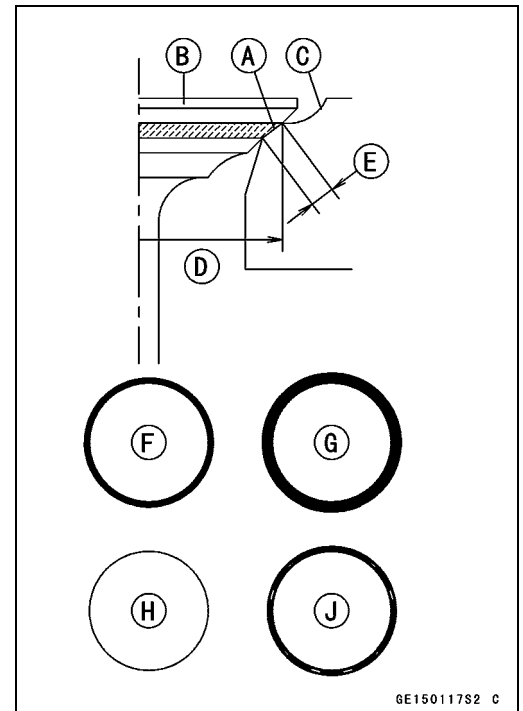
Valve Seat Cutter, 60° - ϕ 30: 57001-1123

Holder & Bar:

Valve Seat Cutter Holder, ϕ 5: 57001-1208 [B]

Valve Seat Cutter Holder Bar: 57001-1128 [C]

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



5-34 ENGINE TOP END

Valves

Seat Cutter Operation Care:

1. This valve seat cutter is developed to grind the valve seat 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.

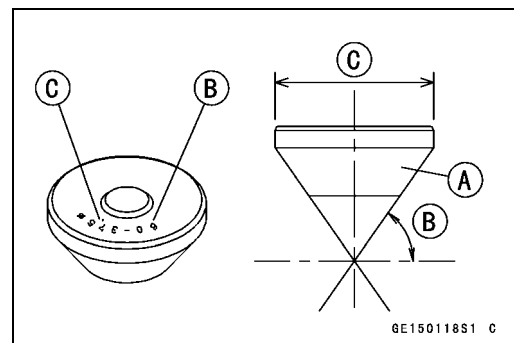
5. After use, wash it with washing oil and apply thin layer of engine oil before storing.

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

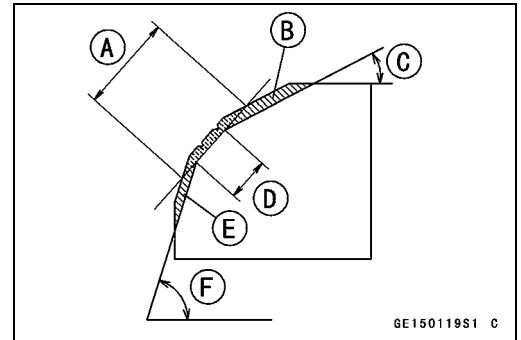
- Clean the seat area carefully.
- Coat the seat with machinist's dye.
- Fit a 45° cutter into the holder and slide it into the valve guide.
- Press down lightly on the handle and turn it right or left. Grind the seating surface only until it is smooth.

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.

Valves

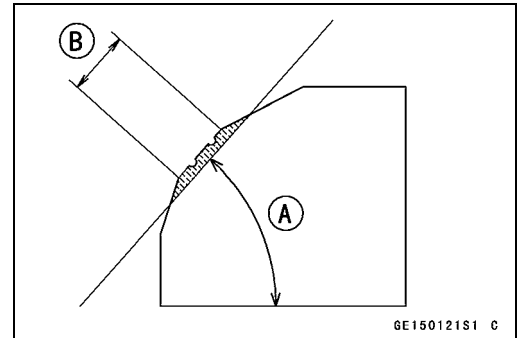
Widened Width [A] of engagement by machining with 45° cutter
 Ground Volume [B] by 32° cutter
 32° [C]
 Correct Width [D]
 Ground Volume [E] by 60° cutter
 60° [F]



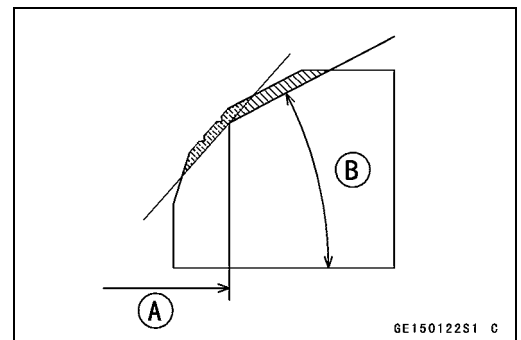
- Measure the outside diameter of the seating surface with vernier calipers.
 - ★ If the outside diameter of the seating surface is too small, repeat the 45° grind [A] until the diameter is within the specified range.
- Original Seating Surface [B]

NOTE

- Remove all pittings or 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 60° 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 (O.D.) [A] of the seating surface is too large, make the 32° grind described below.
 - ★ If the outside diameter 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

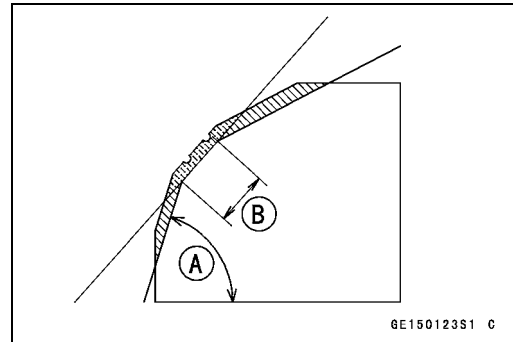
The 32° cutter removes material very quickly. Check the seat outside diameter frequently to prevent overgrinding.

- After making the 32° grind, return to the seat O.D. measurement step above.
- To measure the seat width, use vernier calipers 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.

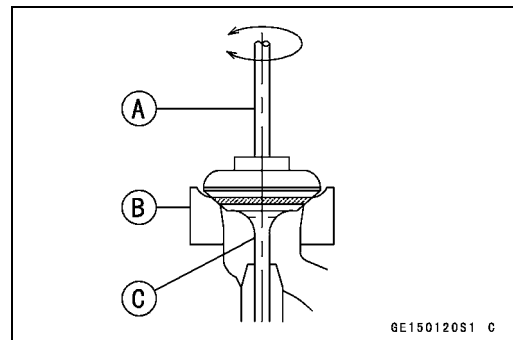
5-36 ENGINE TOP END

Valves

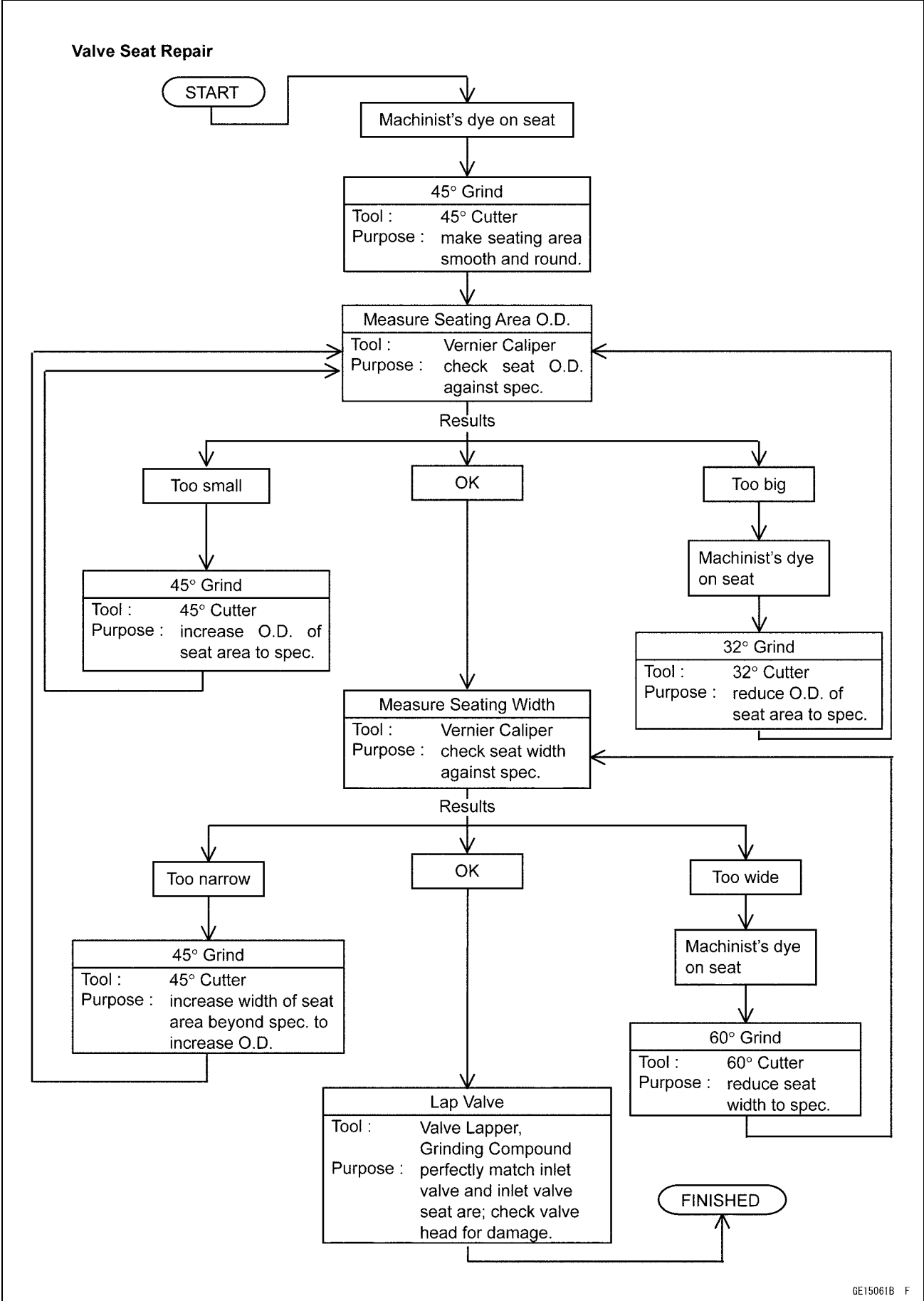
- ★ If the seat width is too wide, make the 60° [A] grind described below.
- ★ If the seat width is within the specified range, lap the valve to the seat as described below.
- Grind the seat at a 60° angle until the seat width is within the specified range.
- To make the 60° grind, fit 60° cutter into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



- 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 Valve Clearance Adjustment).



Valves

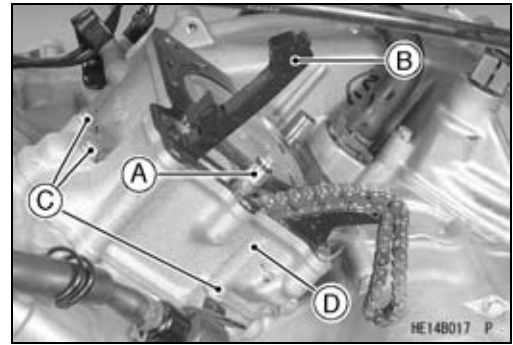


5-38 ENGINE TOP END

Cylinder and Piston

Cylinder Removal

- Remove:
 - Cylinder Head (see Cylinder Head Removal)
 - Oil Pipe [A]
 - Chain Guide [B]
 - Cylinder Bolts [C]
 - Cylinder [D]
 - Cylinder Base Gasket



Piston Removal

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

CAUTION

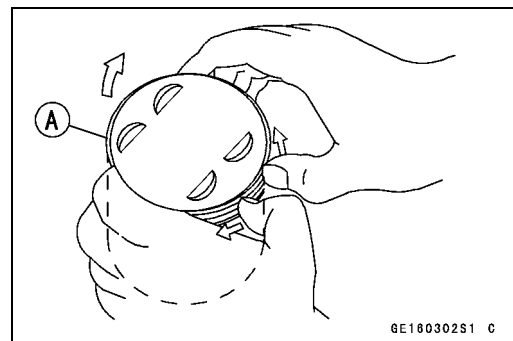
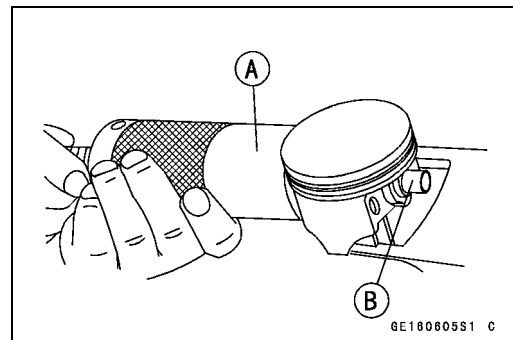
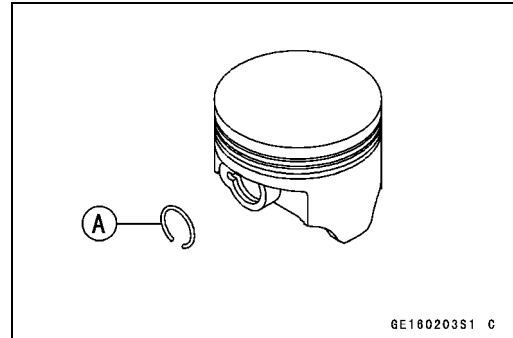
Do not reuse snap rings, as removal weakens and deforms them. They could fall out and score the cylinder wall.

- Using the piston pin puller assembly (special tool), remove the piston pins.

**Special Tools - Piston Pin Puller Assembly [A]: 57001-910
Piston Pin Puller Adapter, $\phi 14$ [B]: 57001-1211**

- Remove the piston.

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



Cylinder, Piston Installation

NOTE

- If a new piston or cylinder is used, check piston to cylinder clearance (see Piston/Cylinder Clearance Inspection), and use new piston rings.

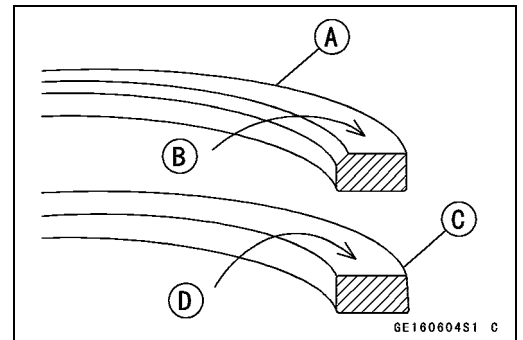
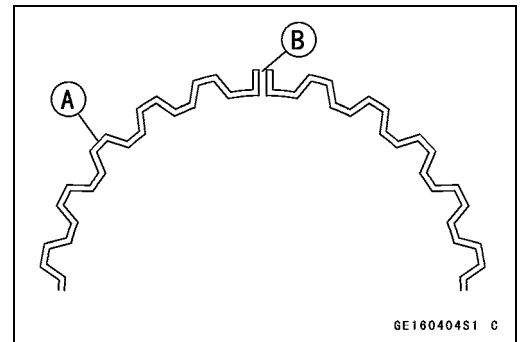
Cylinder and Piston

NOTE

○The oil ring rails have no “top” or “bottom”.

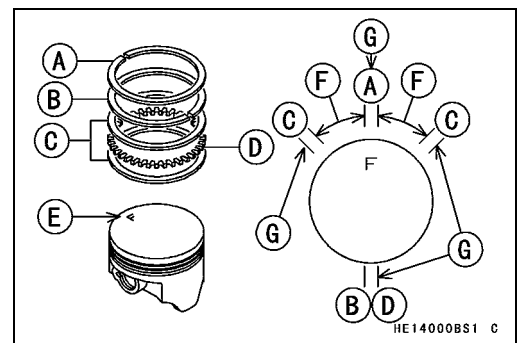
- Install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
- Install the oil ring steel rails, one above the expander and one below it.
- Spread the rail with your thumbs, but only enough to fit the rail over the piston.
- Release the rail into the bottom piston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

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

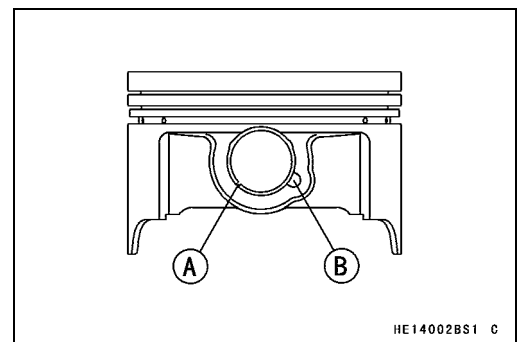


- The piston ring openings must be positioned as shown in the figure. The openings of the oil ring steel rails must be about 30 ~ 40° [F] of angle from the opening of the top ring.

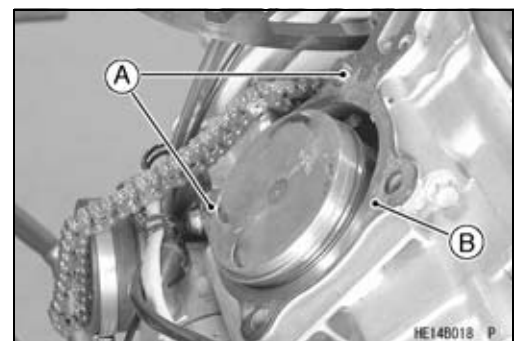
- Top Ring [A]
- Second Ring [B]
- Oil Ring Steel Rails [C]
- Oil Ring Expander [D]
- F mark [E] must be faced toward Front Side for front and rear pistons
- Opening Positions [G]



- 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.
- Apply engine oil to the cylinder bore and, piston skirt.



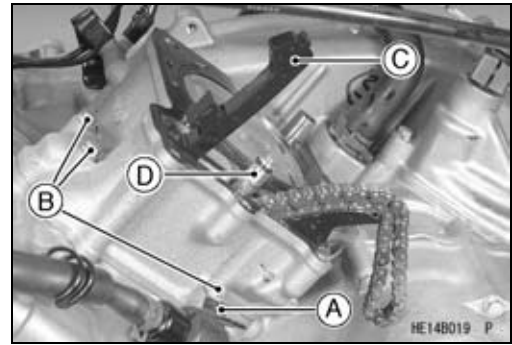
- Install:
 - Dowel Pins [A]
 - New Cylinder Base Gasket [B]



5-40 ENGINE TOP END

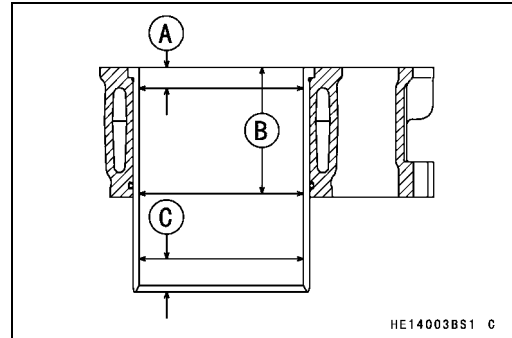
Cylinder and Piston

- Install:
 - Cylinder
 - Clamp [A] (rear only)
- Tighten:
 - Torque - Cylinder Bolts [B]: 9.8 N·m (1.0 kgf·m, 87 in·lb)**
- Install:
 - Chain Guide [C]
 - Oil Pipe [D]



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 three locations (total of six measurements) shown in the figure.
- ★ If any of the cylinder inside diameter measurements exceeds the service limit, replace the cylinder.
 - 10 mm (0.4 in.) [A]
 - 60 mm (2.4 in.) [B]
 - 20 mm (0.8 in.) [C]



Standard: 81.994 ~ 82.006 mm (3.2281 ~ 3.2286 in.), and less than 0.01 mm (0.0004 in.) difference between any two measurements.

Service Limit: 82.09 mm (3.232 in.), or more than 0.05 mm (0.0020 in.) difference between any two measurements.

Piston Wear Inspection

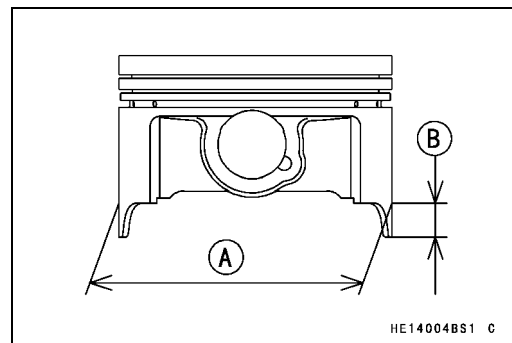
- Measure the outside diameter [A] of each piston 5 mm (0.20 in.) [B] up from the bottom of the piston at a right angle to the direction of the piston pin.

Piston Diameter

Standard: 81.949 ~ 81.964 mm (3.2263 ~ 3.2269 in.)

Service Limit: 81.80 mm (3.220 in.)

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



Piston/Cylinder Clearance Inspection

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

Piston/Cylinder Clearance

Standard: 0.030 ~ 0.057 mm (0.0012 ~ 0.0022 in.)

- ★ If the piston/cylinder clearance is less than the specified range, use a smaller piston made within the standard diameter or increase the cylinder inside diameter within the standard diameter by honing.
- ★ If the piston/cylinder clearance is greater than specified range, use a larger piston made within the standard diameter.
- ★ If only a piston is replaced, the clearance may exceed the standard slightly. But it must not be less than the minimum of the clearance in order to avoid piston seizure.

Cylinder and Piston

Cylinder Boring and Honing

○ There is an oversize piston available. The oversize piston requires oversize rings.

Oversize Piston and Rings: 0.5 mm (0.02 in.) oversize

- Before boring a cylinder [A], first measure the exact diameter of the oversize piston, and then, according to the standard clearance in the Specifications, determine the rebore diameter. However, if the amount of boring necessary would make the inside diameter greater than **0.5 mm (0.02 in.)**, 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 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 (0.0059 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.

Piston Ring, Piston Ring Groove Wear Inspection

- 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 0.040 ~ 0.080 mm (0.0016 ~ 0.0032 in.)

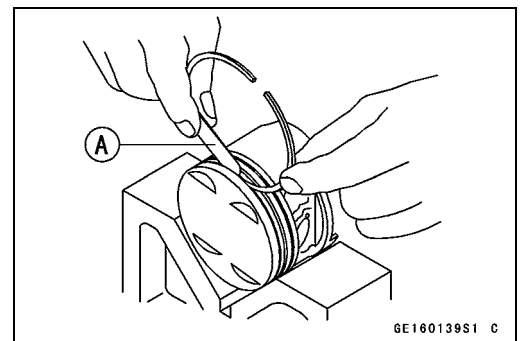
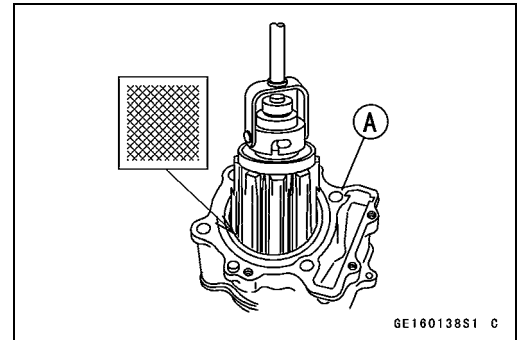
Second 0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in.)

Service Limit:

Top 0.18 mm (0.0071 in.)

Second 0.17 mm (0.0067 in.)

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



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Cylinder and Piston

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: 1.030 ~ 1.050 mm (0.0405 ~ 0.0413 in.)

Second: 1.020 ~ 1.040 mm (0.0402 ~ 0.0409 in.)

Service Limit

Top: 1.13 mm (0.0445 in.)

Second: 1.12 mm (0.0441 in.)

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

Piston Ring Thickness Inspection

- Measure the piston ring thickness.
- Use a micrometer to measure at several points around the ring.

Piston Ring Thickness

Standard:

Top 0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)

Second 0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)

Service Limit:

Top 0.9 mm (0.035 in.)

Second 0.9 mm (0.035 in.)

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

NOTE

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

Piston Ring End Gap 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: 0.20 ~ 0.30 mm (0.0079 ~ 0.0118 in.)

Second: 0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in.)

Oil: 0.20 ~ 0.70 mm (0.0079 ~ 0.0276 in.)

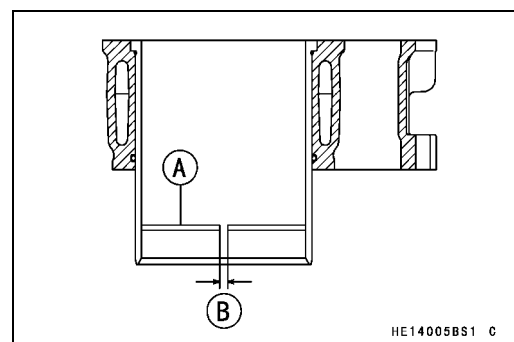
Service Limit

Top: 0.60 mm (0.0236 in.)

Second: 0.75 mm (0.0295 in.)

Oil: 1.00 mm (0.0394 in.)

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



Exhaust System

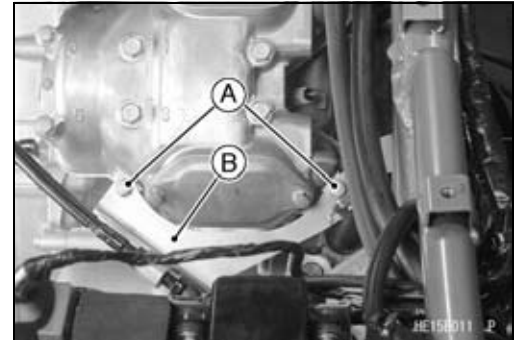
This vehicle is equipped with a spark arrester approved for off-road use by the US Forest Service. It must be properly maintained to ensure its efficiency. In accordance with the Periodic Maintenance Chart, clean the spark arrester.

Spark Arrester Cleaning

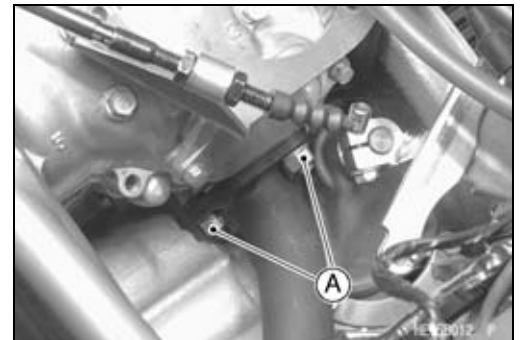
- Refer to the Spark Arrester Cleaning in the Periodic Maintenance chapter.

Muffler and Exhaust Pipe Removal

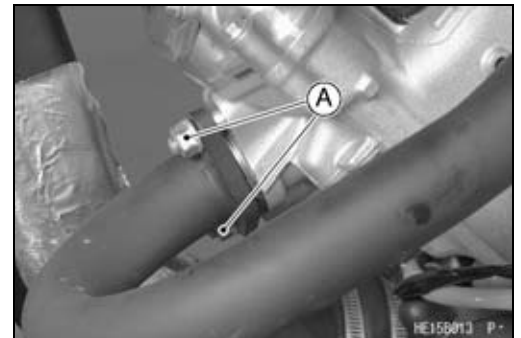
- Remove:
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
 - Battery and Battery Case (see Battery Removal in the Electrical System chapter)
 - Left Side Inner Cover
 - Rocker Case Bolts [A]
 - Cable Holder [B]



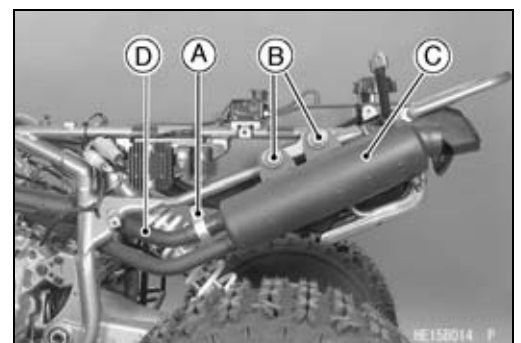
Rear Exhaust Pipe Holder Nuts [A]



- Remove:
 - Front Exhaust Pipe Holder Nuts [A]



- Remove:
 - Exhaust Pipe Clamp Bolt [A]
 - Muffler Mounting Bolts [B]
 - Muffler [C] and Rear Exhaust Pipe
 - Front Exhaust Pipe [D]



5-44 ENGINE TOP END

Exhaust System

Muffler and Exhaust Pipe Installation

- If the exhaust pipe cover [A] or muffler cover [B] were removed, tighten them.

Torque - Exhaust Pipe Cover Bolts [C]: 8.8 N·m (0.90 kgf·m, 78 in·lb)

Muffler Cover Bolts [D]: 8.8 N·m (0.90 kgf·m, 78 in·lb)

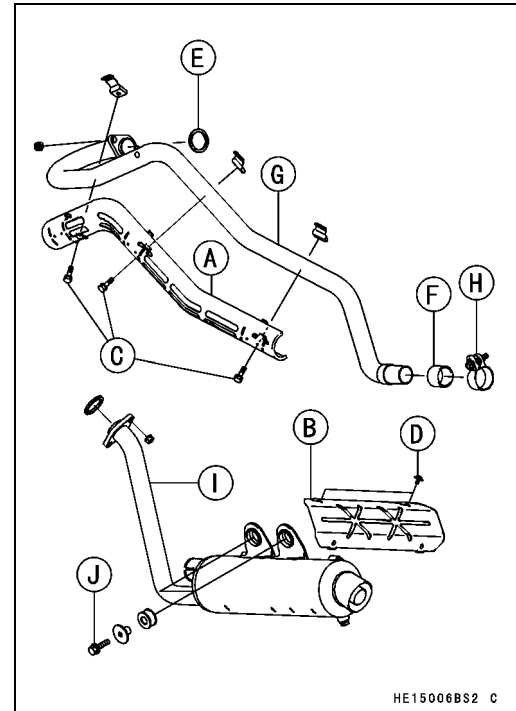
- Replace the exhaust pipe holder gaskets [E] and clamp gasket [F] with new ones.
- Install (But do not tighten the following nuts and bolts.):
Front Exhaust Pipe [G], and Clamp [H]
Rear Exhaust Pipe [I] and Muffler and Nuts
Muffler Mounting Bolts [J]
- Tighten:
Exhaust Pipe Holder Nuts evenly

Torque - Muffler Mounting Bolts: 20 N·m (2.0 kgf·m, 14 ft·lb)

Exhaust Pipe Clamp Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb)

Rocker Case (with Cable Holder) Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Exhaust Pipe Holder Nuts: 17 N·m (1.7 kgf·m, 12 ft·lb)



Exhaust System Inspection

- Before removing the exhaust system, check for signs of leakage at the exhaust pipe holder gasket in the cylinder head and at the exhaust pipe clamp.
- ★ If there are signs of leakage around the exhaust pipe clamp gasket, it should be replaced. If the muffler-to-exhaust pipe joint leaks, tighten the clamp.
- Remove the exhaust pipe and muffler (see Muffler and Exhaust Pipe 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 has holes, it should be replaced for best performance and least noise.

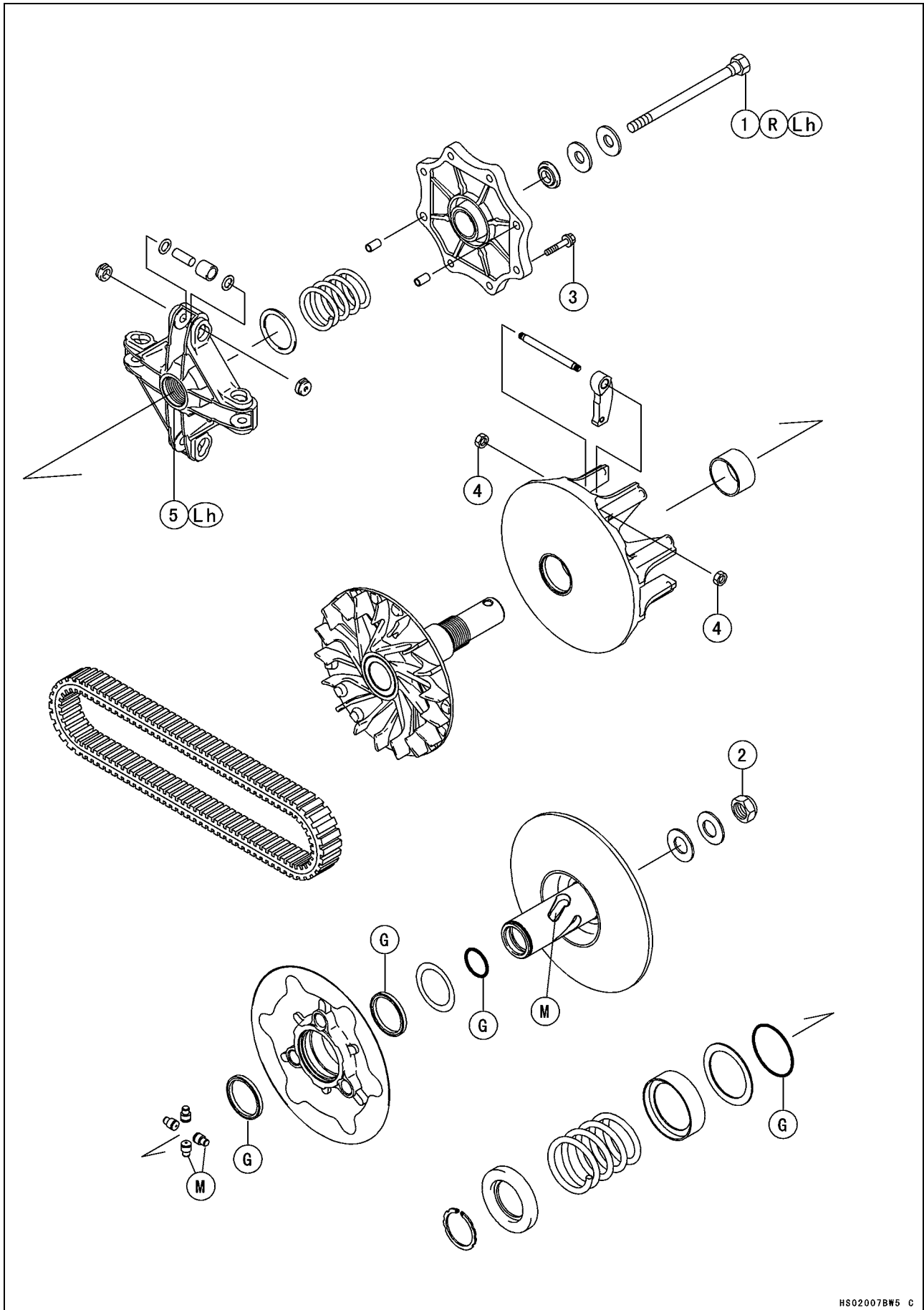
Converter System

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6-2 CONVERTER SYSTEM

Exploded View



CONVERTER SYSTEM 6-3

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Drive Pulley Bolt	93	9.5	69	Lh, R
2	Driven Pulley Nut	93	9.5	69	
3	Drive Pulley Cover Bolts	13	1.3	113 in·lb	
4	Ramp Weight Nuts	6.9	0.70	61 in·lb	
5	Spider	275	28	203	Lh

G: Apply grease for oil seal and O-ring.

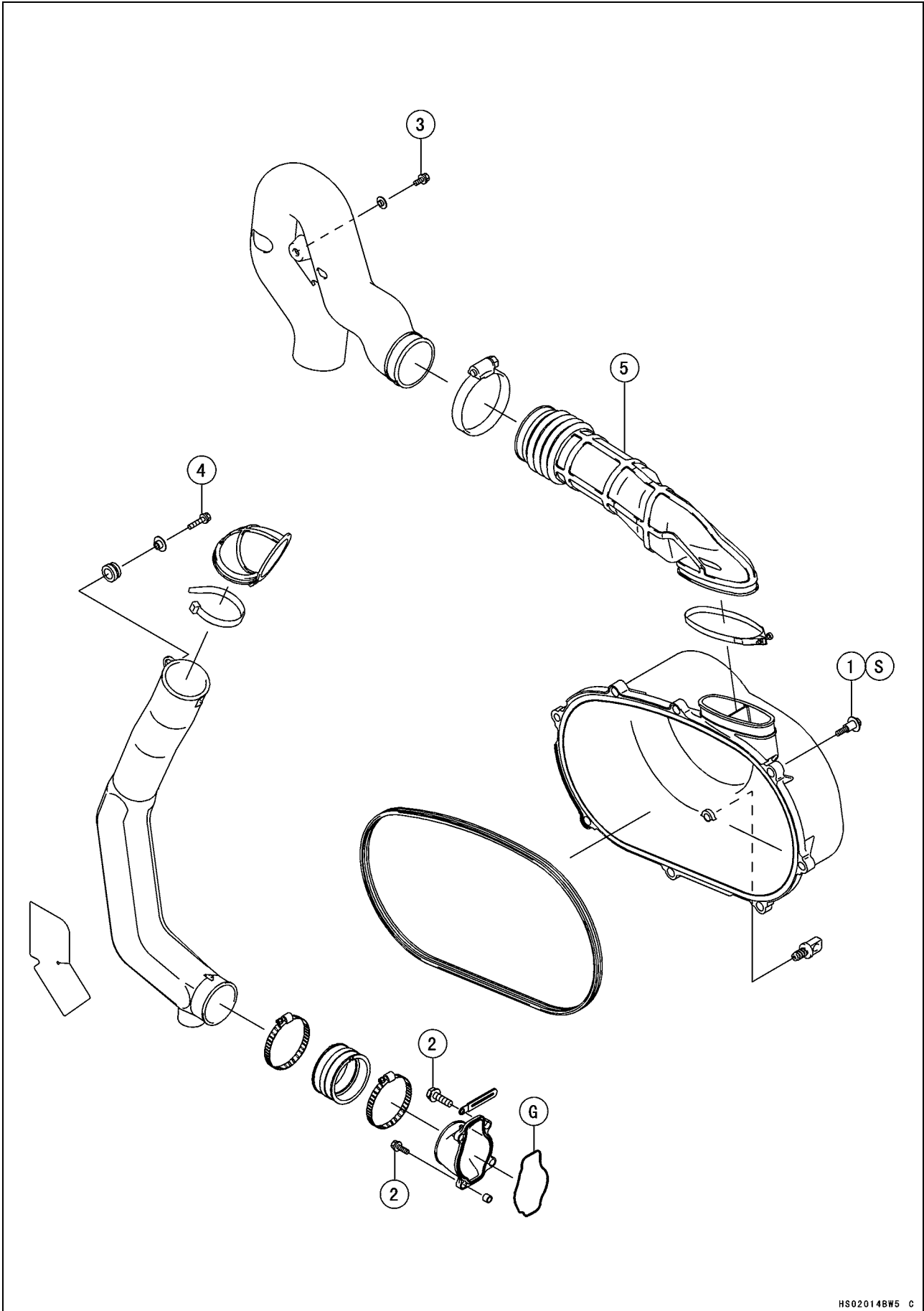
Lh: Left-hand Threads

M: Apply molybdenum disulfide grease.

R: Replacement Parts

6-4 CONVERTER SYSTEM

Exploded View



CONVERTER SYSTEM 6-5

Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Converter Cover Bolts	8.8	0.90	78 in-lb	S
2	Joint Duct Bolts	8.8	0.90	78 in-lb	
3	Exhaust Duct Bolt	8.8	0.90	78 in-lb	
4	Converter Inlet Duct Bolt	8.8	0.90	78 in-lb	

5. Exhaust Joint Duct

G: Apply grease for oil seal and O-ring.

S: Follow the specific tightening sequence.

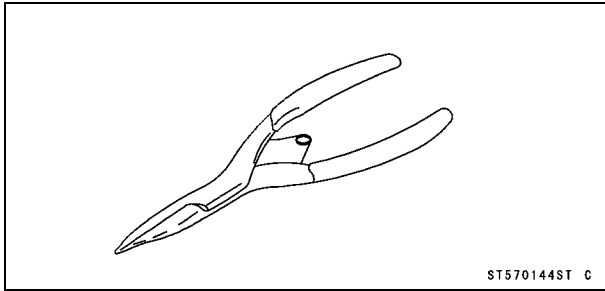
6-6 CONVERTER SYSTEM

Specifications

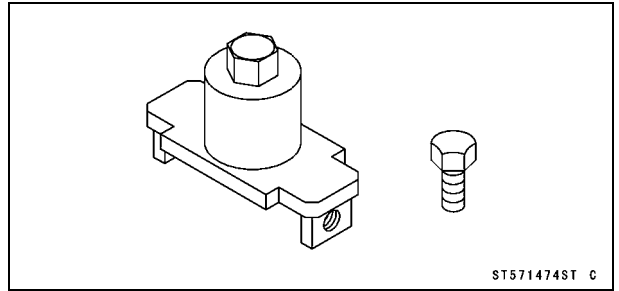
Item	Standard	Service Limit
Drive Belt		
Belt Deflection	22 ~ 27 mm (0.87 ~ 1.06 in.)	---
Belt Width	29.7 ~ 30.3 mm (1.169 ~ 1.193 in.)	28.0 mm (1.102 in.)
Drive Pulley		
Cover Bushing Inside Diameter	27.985 ~ 28.085 mm (1.1018 ~ 1.1057 in.)	28.12 mm (1.107 in.)
Sheave Bushing Inside Diameter	37.985 ~ 38.085 mm (1.4955 ~ 1.4994 in.)	38.12 mm (1.501 in.)
Shoe Side Clearance	0.15 ~ 0.30 mm (0.0059 ~ 0.0118 in.)	---
Spring Free Length	60.4 mm (2.38 in.)	---
Driven Pulley		
Sheave Bushing Inside Diameter	40.000 ~ 40.039 mm (1.5748 ~ 1.5763 in.)	40.079 mm (1.5779 in.)
Spring Free Length	99.5 mm (3.92 in.)	---

Special Tools

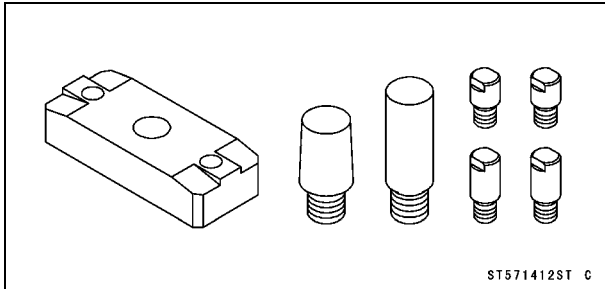
Outside Circlip Pliers:
57001-144



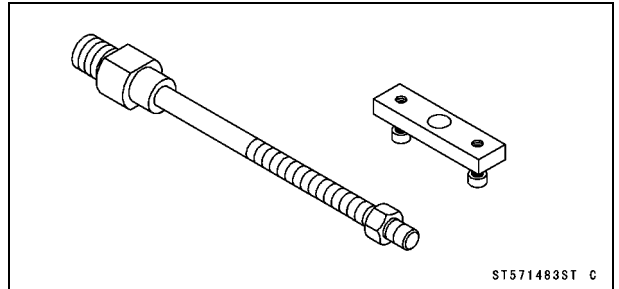
Drive Pulley Wrench:
57001-1474



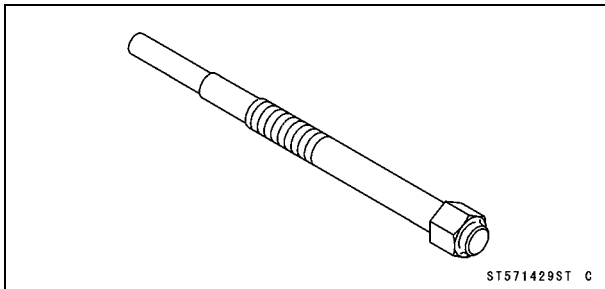
Drive & Driven Pulley Holder:
57001-1412



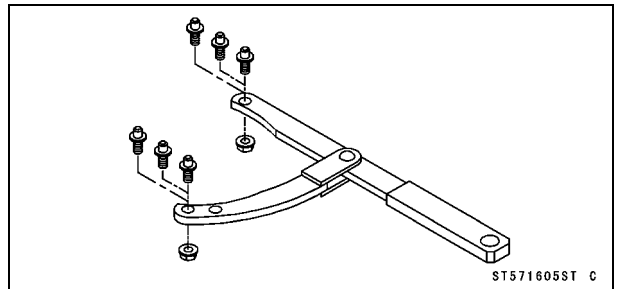
Spring Holder Set:
57001-1483



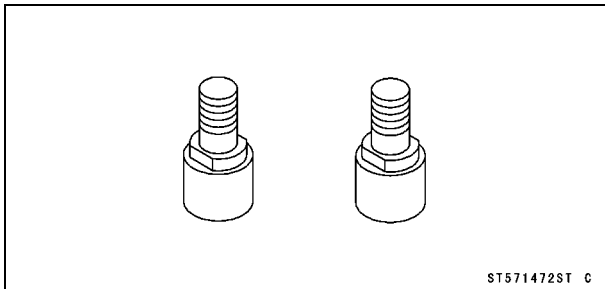
Drive Pulley Puller Bolt:
57001-1429



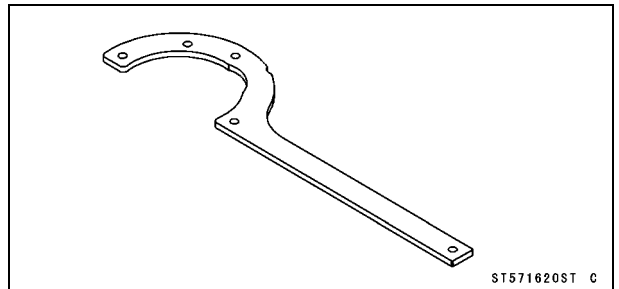
Flywheel & Pulley Holder:
57001-1605



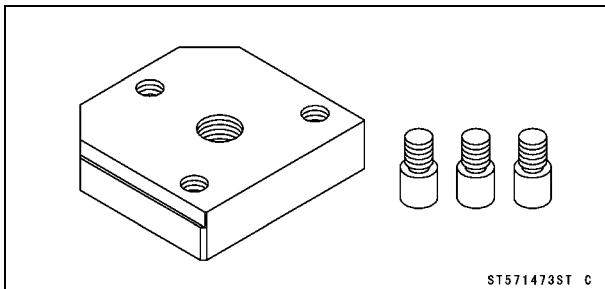
Pulley Holder Attachment:
57001-1472



Drive Pulley Holder:
57001-1620



Drive & Driven Pulley Holder:
57001-1473



6-8 CONVERTER SYSTEM

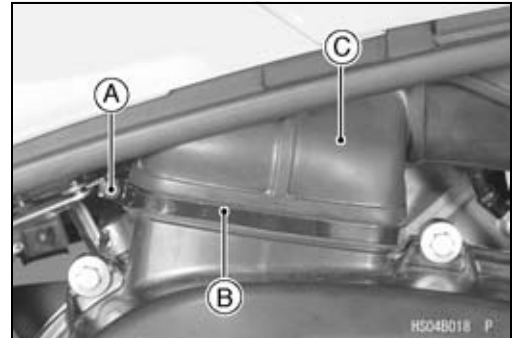
Torque Converter

⚠ WARNING

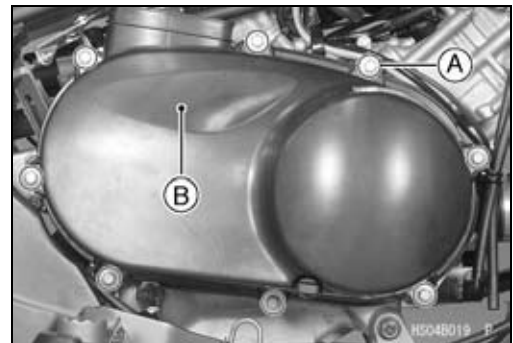
Excessive imbalance or operating rpm could cause torque converter pulley failure resulting in severe injury or death. The pulleys of the belt drive torque converter are precision balanced components designed to operate within certain rpm limits. Disassembly/assembly and servicing procedures of the pulley assemblies must be followed closely. Modifications to the engine or pulleys that increase rpm may cause failure.

Torque Converter Cover Removal

- Turn the ignition switch OFF.
- Remove:
 - Clamp Screw [A] and Clamp [B]
 - Joint Duct [C]

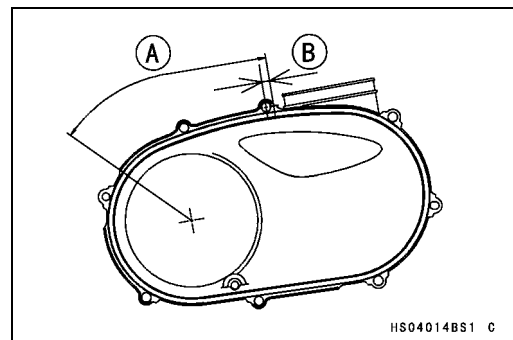


- Remove:
 - Torque Converter Cover Bolts [A]
 - Torque Converter Cover [B]



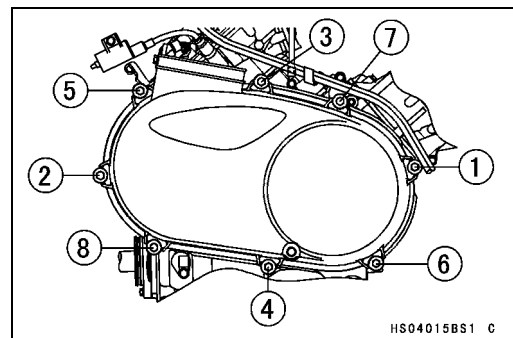
Torque Converter Cover Installation

- Fit the trim seal into the converter cover.
- Set trim seal juncture in area [A] when insert trim seal in the cover.
 - 10 mm (0.39 in.) [B]



- Tighten the cover bolts following the tightening sequence as shown.

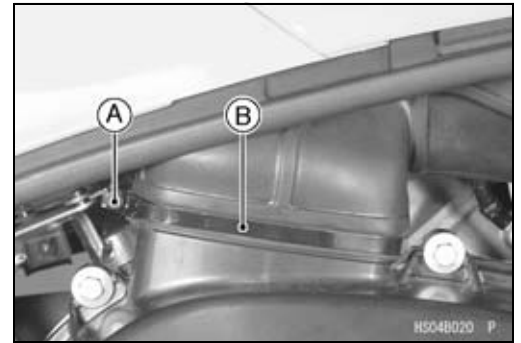
Torque - Converter Cover Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)



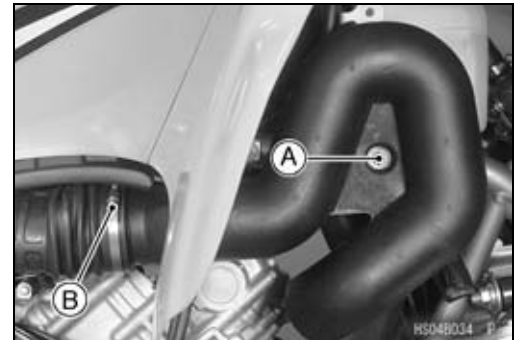
Torque Converter

Converter Exhaust Duct Removal

- Remove:
 - Clamp Screw [A]
 - Clamp [B]
- Remove the idle adjusting screw from the converter exhaust duct.



- Remove the duct mounting bolt [A] and collar.
- Loosen the clamp screw [B].
- Remove the converter exhaust duct and joint duct.



Converter Exhaust Duct Installation

- Install the converter exhaust duct, collar and tighten the duct mounting bolt.

Torque - Exhaust Duct Bolt: 8.8 N-m (0.90 kgf-m, 78 in-lb)

- Connect the converter exhaust duct [A] to the joint duct [B] as shown.

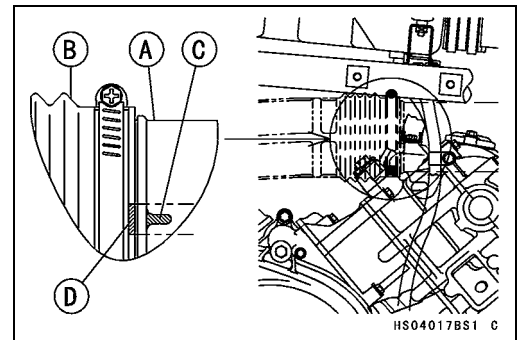
- When connecting the converter exhaust duct to the joint duct, fit to aligning mark.

Converter Exhaust Duct Aligning Mark [C]

Joint Duct Aligning Mark [D]

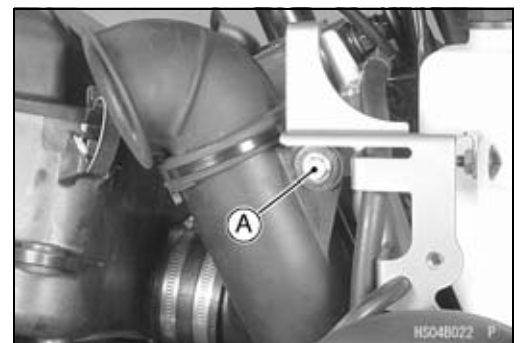
- When installing joint duct, do not twist and deform it.

- Install the joint duct to the converter cover.
- Install the clamp and tighten the clamp screw.
- Install the idle adjusting screw to the converter exhaust duct.
- Adjust the idle speed (see Idle Speed Adjustment in Periodic Maintenance chapter).



Converter Inlet Duct Removal

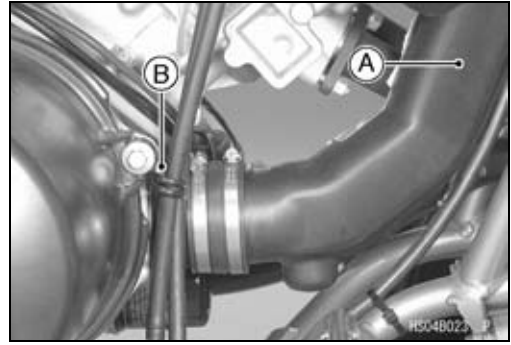
- Remove:
 - Seat and Air Cleaner Cover (see Seat, Air Cleaner Cover Removal in the Frame chapter)
 - Front Fender (see Front Fender Removal in the Frame chapter)
- Remove the duct mounting bolt [A], collar and damper.



6-10 CONVERTER SYSTEM

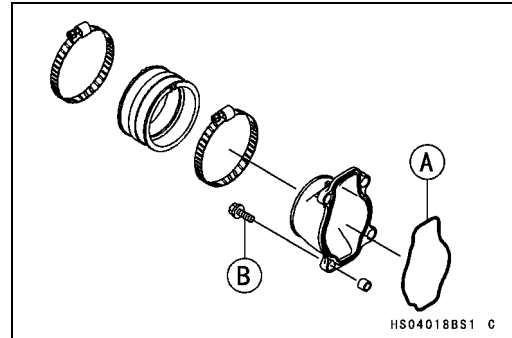
Torque Converter

- Remove the converter inlet duct [A] from the joint duct [B].
- Remove the converter inlet duct.



Converter Inlet Duct Installation

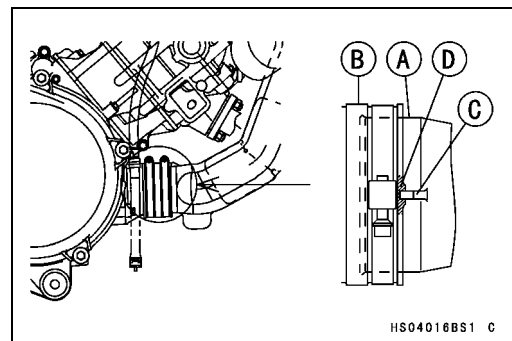
- Apply grease to the O-ring [A].
- Install the joint duct and tighten the joint duct bolts [B].
Torque - Joint Duct Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)



- Install the converter inlet duct [A] in the joint duct [B] as shown.

Torque - Converter Inlet Duct Bolt: 8.8 N-m (0.90 kgf-m, 78 in-lb)

- When installing converter inlet duct, fit to aligning mark.
Converter Inlet Duct Aligning Mark [C]
Joint duct Aligning Mark [D]
- Install the damper and collar.
- Tighten the duct mounting bolt.



Drive Belt

Drive Belt Removal

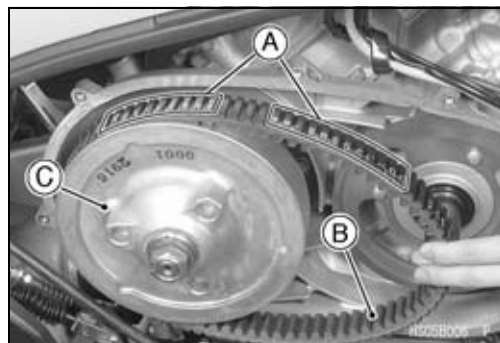
- Remove the drive pulley [A] (see Drive Pulley Removal).



NOTE

○ Before removing the drive belt, observe the direction of the information [A] (Such as manufacturer's name and arrow marks) printed on the belt so that it may be reinstalled on the pulleys as originally.

- Lift the drive belt [B] off the driven pulley [C].

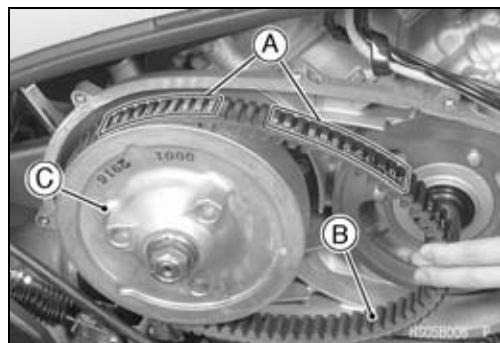


Drive Belt Installation

NOTE

○ Be sure the printed information faces the same direction so the belt rotates in the same direction as originally installed. When installing a new belt, install it so the printed information [A] can be read from beside the vehicle.

- Installation is basically the reverse of removal.
- Loop the belt [B] over the driven pulley [C].
- Install the drive pulley (see Drive Pulley Installation).
- Put the transmission in neutral, and rotate the driven pulley to allow the belt to return to the top [A] of the sheaves, before measuring belt deflection.



Drive Belt Inspection

- Refer to the Drive Belt Inspection in the Periodic Maintenance chapter.

Drive Belt Deflection Inspection

- Refer to the Drive Belt Deflection Inspection in the Periodic Maintenance chapter.

Drive Belt Deflection Adjustment

- Refer to the Drive Belt Deflection Adjustment in the Periodic Maintenance chapter.

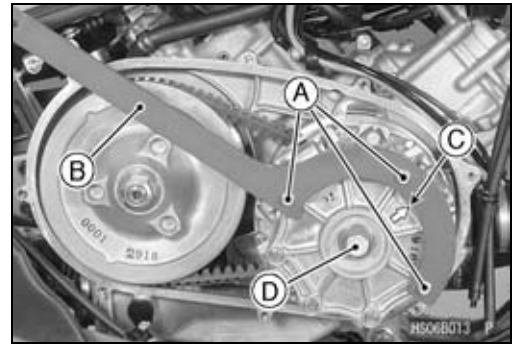
6-12 CONVERTER SYSTEM

Drive Pulley

Drive Pulley Removal

- Remove:
 - Torque Converter Cover (see Torque Converter Cover Removal)
- Be sure to remove the three cover bolts [A] in the positions shown and install the drive pulley holder [B] in the position shown. Note the holder's relative position to the arrow mark [C].
- Tighten the three bolts.

Special Tool - Drive Pulley Holder: 57001-1620



CAUTION

Be sure to install three bolts in the specified positions shown. Otherwise, the tapped holes will be damaged.

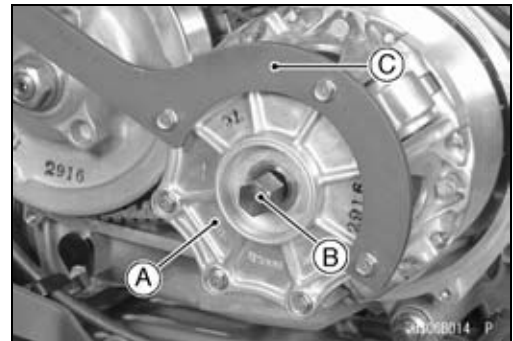
- Loosen the drive pulley bolt [D] (left-hand threads), holding the drive pulley with the drive pulley holder.
- Remove the drive pulley bolt, two washers and the stepped washer, but do not remove the drive pulley holder yet.

NOTE

○The drive pulley bolt has left-hand threads. Turn the wrench clockwise for loosening.

- Remove the drive pulley [A] from the crankshaft by screwing the drive pulley puller bolt [B] clockwise, while holding the drive pulley with the drive pulley holder [C].

Special Tool - Drive Pulley Puller Bolt: 57001-1429

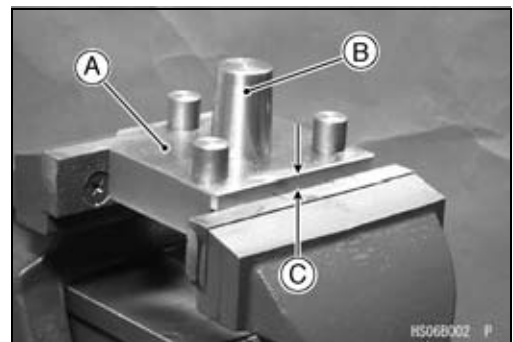


Drive Pulley Disassembly

- Hold the drive & driven pulley holder [A], [B] in a vise so that the upper surface on the holder is 7 mm (0.28 in.) [C] above the vise.

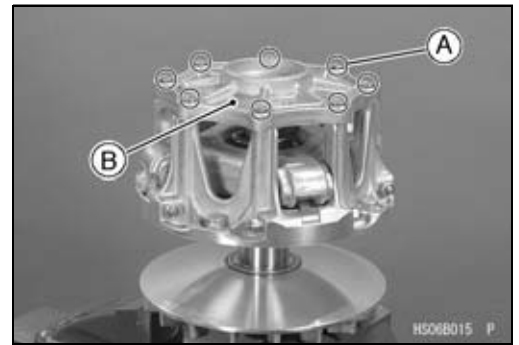
Special Tools - Drive & Driven Pulley Holder: 57001-1412 [B]

Drive & Driven Pulley Holder: 57001-1473 [A]

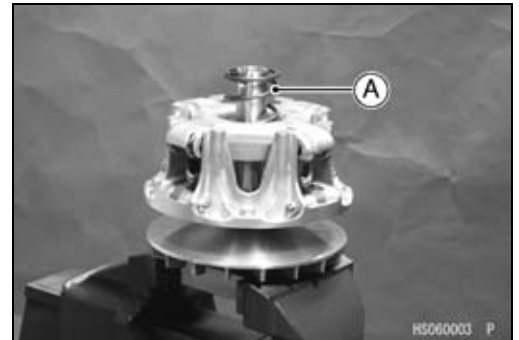


Drive Pulley

- Set the drive pulley onto the pulley holder.
- Remove:
 - Drive Pulley Cover Bolts [A]
 - Drive Pulley Cover [B]



- Remove:
 - Spring [A]
 - Spacer



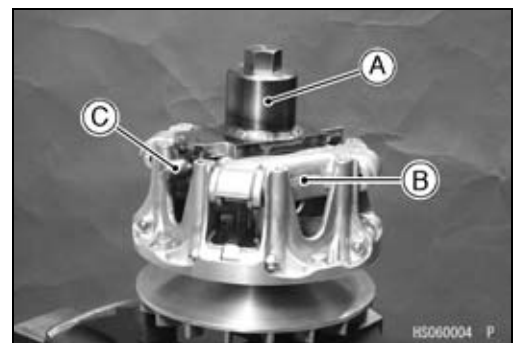
- Put the drive pulley wrench [A] on the spider [B] and tighten the bolt [C].

Special Tool - Drive Pulley Wrench: 57001-1474

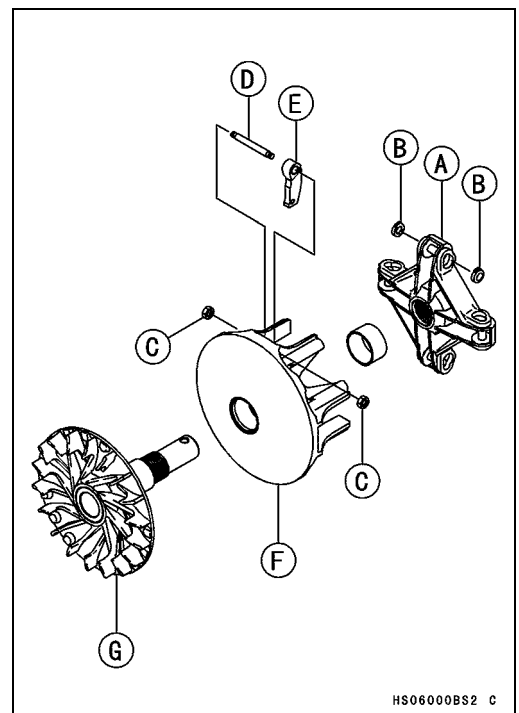
- Turn the wrench clockwise and remove the spider with the movable sheave.

NOTE

○ *The spider has left-hand threads. Turn the wrench clockwise for loosening.*



- Remove:
 - Spider [A]
 - Shoes [B]
 - Nuts [C]
 - Ramp Weight Pin [D]
 - Ramp Weight [E]
 - Movable Sheave [F]
 - Fixed Sheave [G]

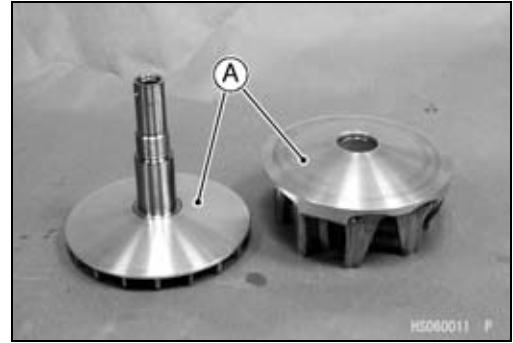


6-14 CONVERTER SYSTEM

Drive Pulley

Drive Pulley Inspection

★ If the sheave surfaces [A] appear damaged, replace the sheaves.

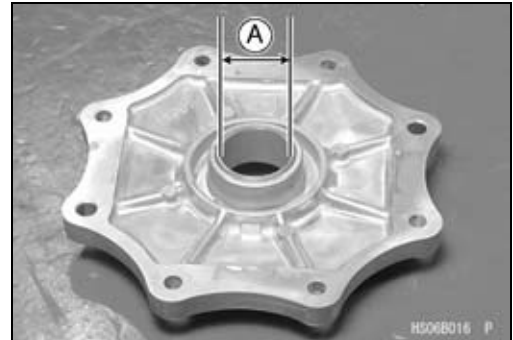


★ If the cover bushing is damaged or worn, replace the drive pulley cover.

Cover Bushing Inside Diameter [A]

Standard: 27.985 ~ 28.085 mm (1.1018 ~ 1.1057 in.)

Service Limit: 28.12 mm (1.107 in.)

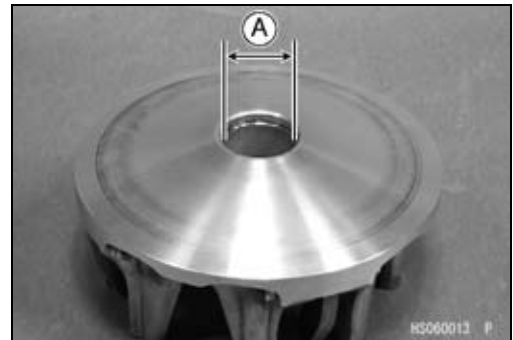


★ If the sheave bushing is damaged or worn, replace it.

Sheave Bushing Inside Diameter [A]

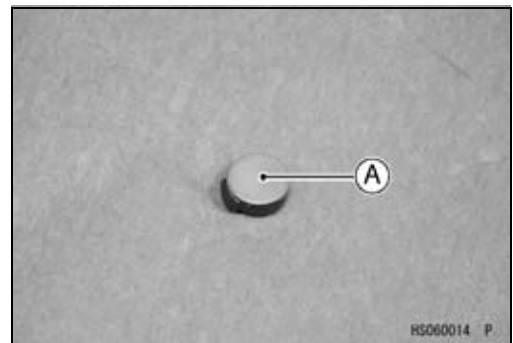
Standard: 37.985 ~ 38.085 mm (1.4955 ~ 1.4994 in.)

Service Limit: 38.12 mm (1.501 in.)



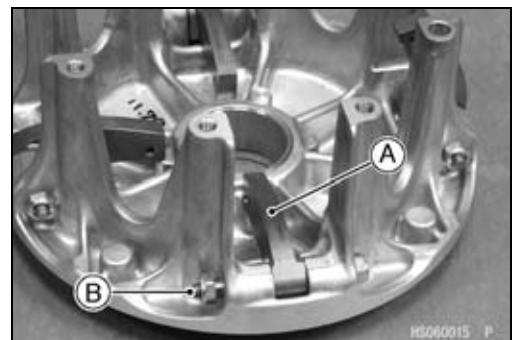
★ If the spider shoes [A] are damaged, replace them.

● Check the spider shoe side clearance (see Spider Shoe Side Clearance Inspection).



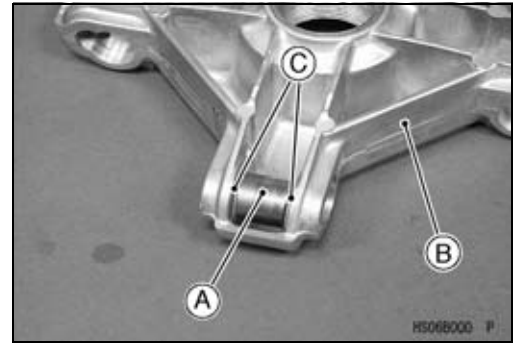
★ If the ramp weights [A] in the movable sheave are damaged or worn, replace them.

★ If the pins [B] are damaged or worn, replace them.



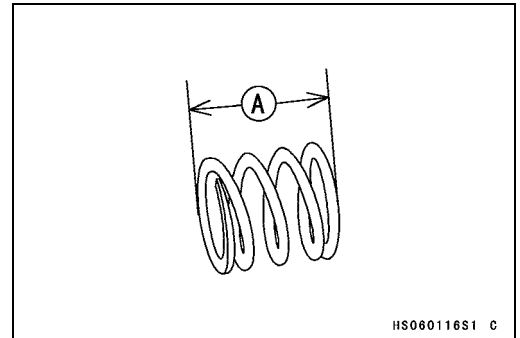
Drive Pulley

- ★ If the rollers [A] are damaged or worn, replace the spider [B].
- ★ If the washers [C] are damaged or worn, replace the spider.



- ★ If the spring is worn or damaged, replace the spring.

Spring Free Length [A]
Standard: 60.4 mm (2.38 in.)

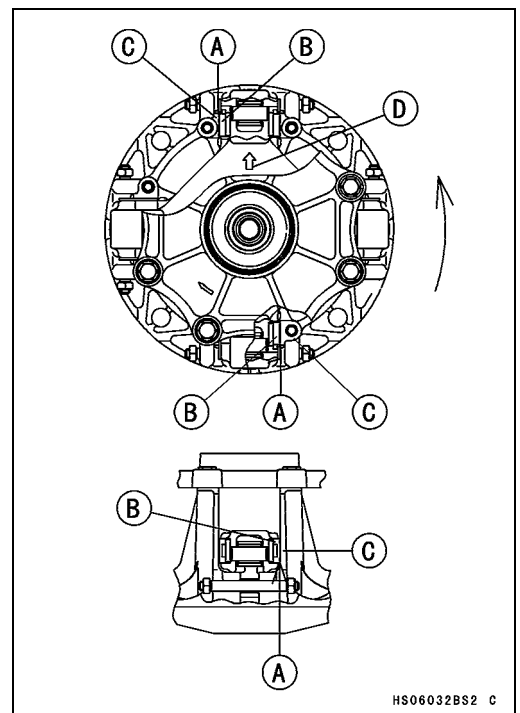


Spider Shoe Side Clearance Inspection

- Remove:
 - Drive Pulley (see Drive Pulley Removal)
 - Drive Pulley Cover and Spring (see Drive Pulley Disassembly)
- Temporarily install:
 - Dowel Pins (2)
 - Drive Pulley Cover
 - Two Bolts (at dowel pins)
- Turn the movable sheave counterclockwise.
- Measure the clearance [A] between the shoe [B] and the post [C] on the movable sheave at two positions as shown.
 - [D] Arrow Mark

Shoe Side Clearance
Standard: Up to 0.20 mm (0.008 in.), and there must be kept a clearance which the movable sheave [E] moves smoothly until it touches the fixed sheave [F] with its own weight.

- ★ If the clearance is not the specified range, adjust it using the following shoes.



6-16 CONVERTER SYSTEM

Drive Pulley

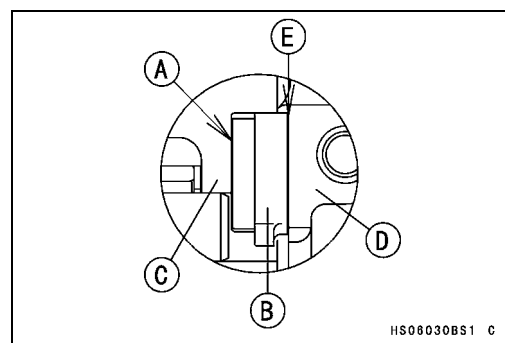
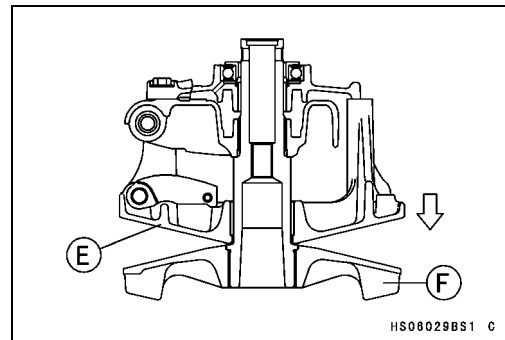
(KSV700-A1/B1 Model)

	Part No.	Thickness
Standard Shoe	(1) 49048-1089	7.4 mm (0.291 in.)
	(2) 49048-1090	7.5 mm (0.295 in.)
Adjustment Shoes	49048-1087	7.2 mm (0.283 in.)
	49048-1088	7.3 mm (0.287 in.)
	(3) 49048-1089	7.4 mm (0.291 in.)
	(4) 49048-1090	7.5 mm (0.295 in.)
	49048-1091	7.6 mm (0.299 in.)
	49048-1092	7.7 mm (0.303 in.)
	49048-1093	7.8 mm (0.308 in.)
	49048-1094	7.9 mm (0.311 in.)
49048-1095	8.0 mm (0.315 in.)	

- (1) KSV700-A1/B1
- (2) KSV700-A2 ~/B2 ~/C6F
- (3) Except KSV700-A1/B1
- (4) Except KSV700-A2 ~/B2 ~/C6F

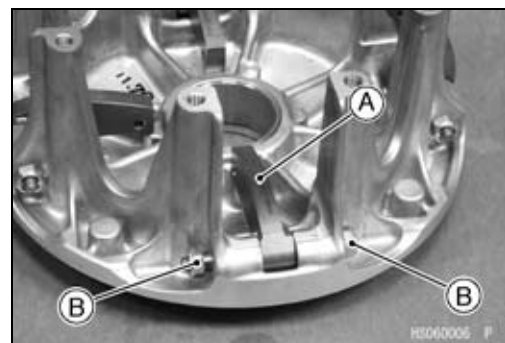
★If the clearance is not the specified range after the above shoes are replaced, use the spacer [A] (92026-0038) of the option part.

- [B] Shoe
- [C] Spider
- [D] Post
- [E] Clearance



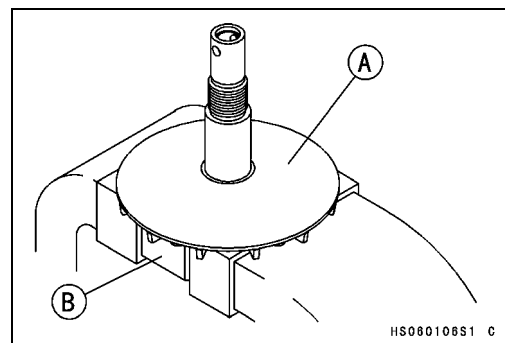
Drive Pulley Assembly

- Install the ramp weight [A] as shown.
- Tighten:
 - Torque - Ramp Weight Nuts [B]: 6.9 N·m (0.70 kgf·m, 61 in·lb)
- Check that the ramp weights swing smoothly.



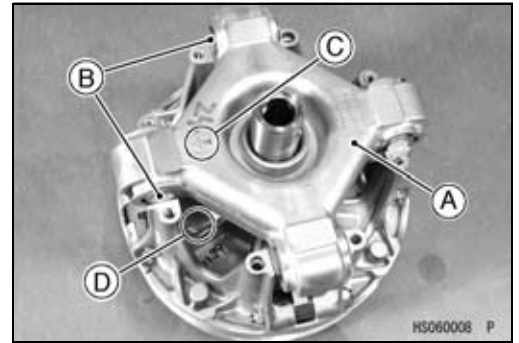
- Hold the fixed sheave [A] with the drive & driven pulley holder [B] in a vise.

Special Tool - Drive & Driven Pulley Holder: 57001-1473

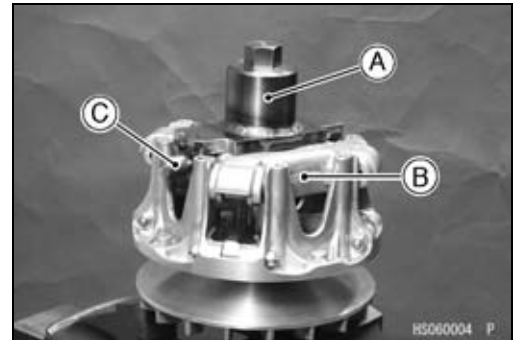


Drive Pulley

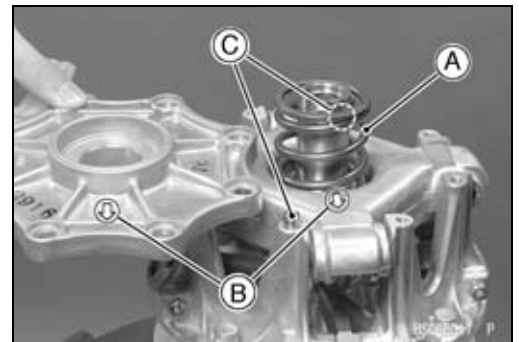
- Clean the threads of the fixed sheave and spider.
- Install:
 - Movable Sheave
 - Spider [A] and Shoes [B]
- Align the arrow mark [C] on the spider with the arrow mark [D] on the movable sheave.
- Insert the shoes so that the rubber side (small diameter) faces inward.



- Put the drive pulley wrench [A] on the spider [B] and tighten the bolt [C].
- **Special Tool - Drive Pulley Wrench: 57001-1474**
- Turn the wrench counterclockwise for tightening.
- **Torque - Spider: 275 N·m (28 kgf·m, 203 ft·lb)**
- Remove the drive pulley wrench.



- Install the spacer.
- Put the spring [A] in the groove of the spider.
- Align the arrow marks [B] on the drive pulley cover and spider.
- Install:
 - Dowel Pins [C]
 - Drive Pulley Cover
- Tighten:
 - **Torque - Drive Pulley Cover Bolts: 13 N·m (1.3 kgf·m, 113 in·lb)**



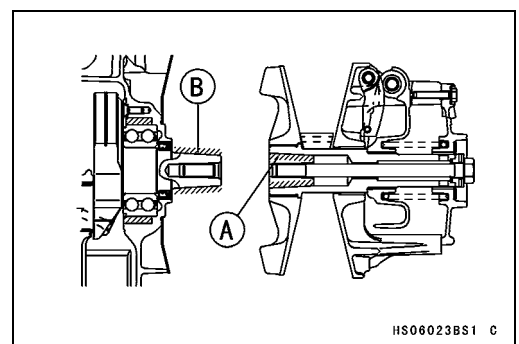
- Clean the surface of the sheaves with an oil-less cleaning fluid.

Drive Pulley Installation

- Clean the following portions with an oil-less cleaning fluid such as trichloroethylene or acetone.
 - Fixed Sheave Tapered Portion [A]
 - Crankshaft Tapered Portion [B]

⚠ WARNING

These cleaning fluids are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturer's warnings.

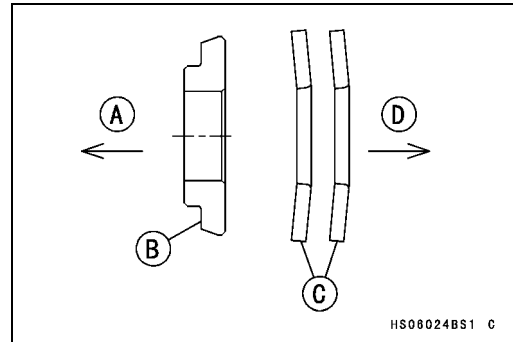


6-18 CONVERTER SYSTEM

Drive Pulley

- Install the drive pulley, stepped washer and two washers on the drive pulley bolt as shown.

Crankcase Side [A]
Stepped Washer [B]
Two Washer [C]
Bolt Head [D]



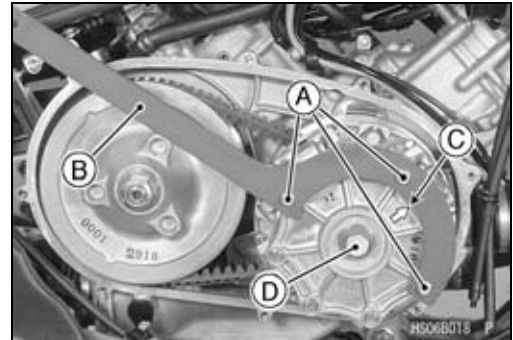
- Be sure to remove the three cover bolts [A] in the positions shown and install the drive pulley holder [B] in the position shown. Note the holder's relative position to the arrow mark [C].

Special Tool - Drive Pulley Holder: 57001-1620

- Tighten:

Torque - Drive Pulley Bolt [D] (New, left-hand threads): 93 N·m (9.5 kgf·m, 69 ft·lb)

Drive Pulley Cover Bolts: 13 N·m (1.3 kgf·m, 113 in·lb)



Driven Pulley

Driven Pulley Removal

- Remove:
 - Torque Converter Cover (see Torque Converter Cover Removal)
 - Drive Pulley (see Drive Pulley Removal)
 - Drive Belt (see Drive Belt Removal)
- Using a flywheel & pulley holder [A] and pulley holder attachments [B], remove the driven pulley nut [C] and washers. (Nut has R/H threads.)

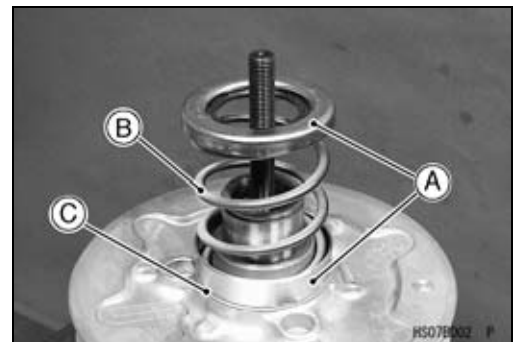
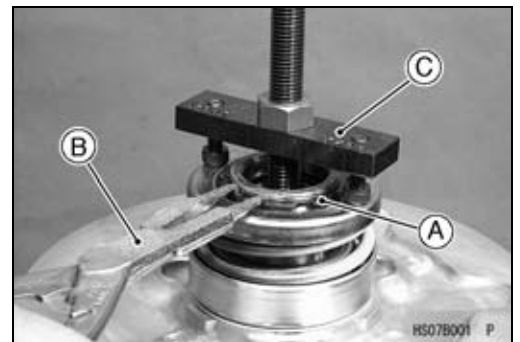
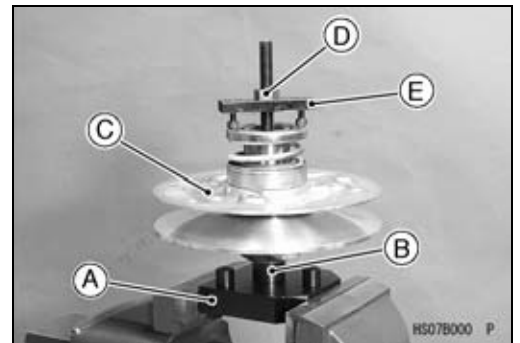
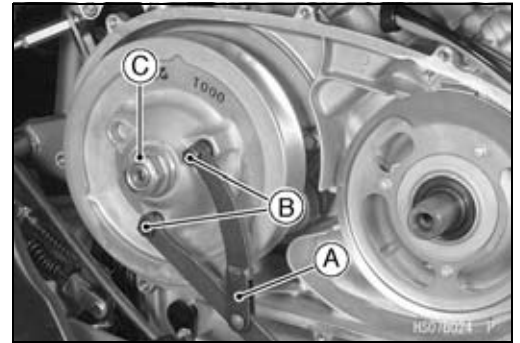
Special Tools - Flywheel & Pulley Holder: 57001-1605
Pulley Holder Attachment: 57001-1472

- Remove:
 - Driven Pulley

Driven Pulley Disassembly

- Hold the drive & driven pulley holder [A] in a vise.
 - Special Tool - Drive & Driven Pulley Holder: 57001-1473**
- Screw the guide bar [B] of the spring holder set into the holder.
 - Special Tool - Spring Holder Set: 57001-1483**
- Put the driven pulley [C] on the guide bar.
- Tighten the nut [D], and compress the spring with the spring holder [E] of the spring holder set.
 - Special Tool - Spring Holder Set: 57001-1483**
- Remove the circlip [A] with circlip pliers [B].
 - Special Tool - Outside Circlip Pliers: 57001-144**
- Remove the nut and spring holder [C].

- Remove:
 - Spring Seats [A]
 - Spring [B]
 - Thrust Plate [C]



6-20 CONVERTER SYSTEM

Driven Pulley

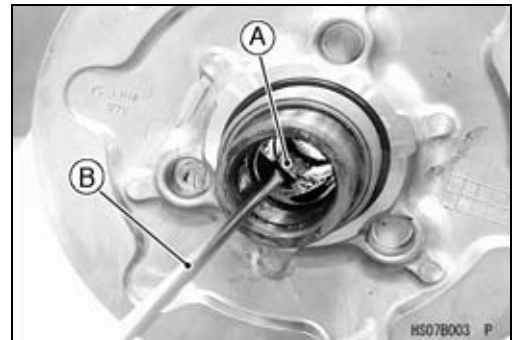
- Make alignment-marks [A] and [B] on the sheaves so that it can be installed later in the same position.

Movable Sheave [C]

Fixed Sheave [D]



- Wipe off the molybdenum disulfide grease.
- Remove the four pins [A] with a thin standard tip screwdriver [B].
- Remove the movable sheave from the fixed sheave.



- Remove:
Spacer(s) [A] (for Drive Belt Deflection Adjustment)



Driven Pulley Inspection

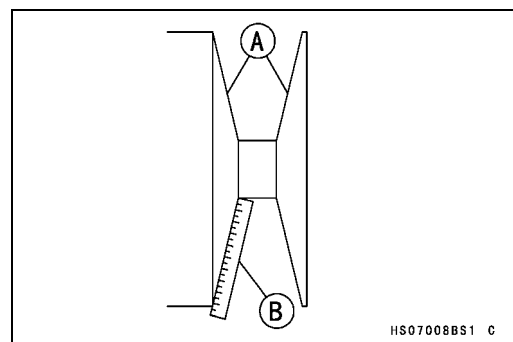
- ★ If the sheave surfaces [A] appear damaged, replace the sheaves.



- Replace the sheave with uneven wear on the belt contacting surfaces.

Sheave Surface [A]

Straight Edge [B]



Driven Pulley

★ If the sheave bushings [A] are damaged or worn, replace the movable sheave.

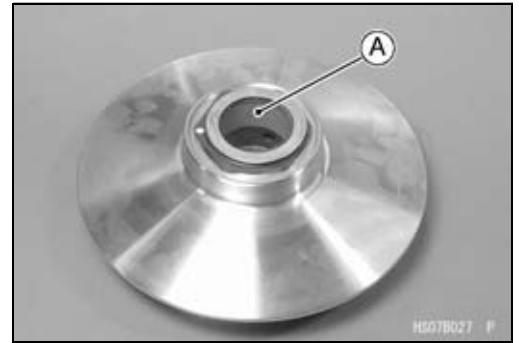
Sheave Bushing Inside Diameter

Standard: 40.000 ~ 40.039 mm (1.5748 ~ 1.5763 in.)

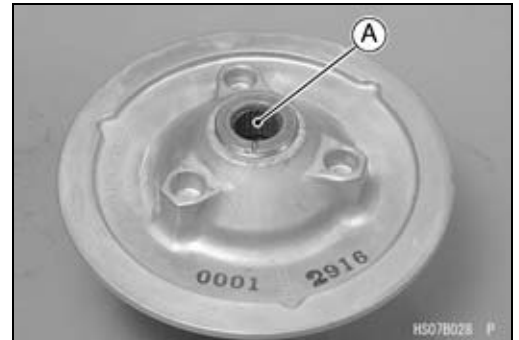
Service Limit: 40.079 mm (1.5779 in.)

● Inspect seals for damage.

★ If seals are damaged, replace the movable sheave.



★ If the splines [A] are damaged or worn, replace the fixed sheave.

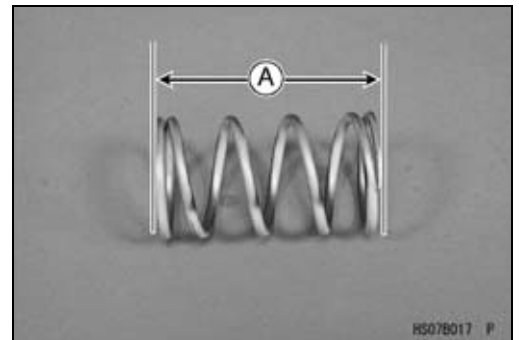


★ If the spring is damaged or worn, replace the spring.

Spring Free Length [A]

Standard: 99.5 mm (3.92 in.)

★ If the spring coils are distorted, replace the spring.

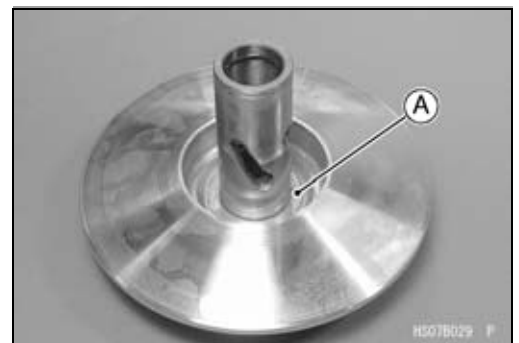


Driven Pulley Assembly

● Clean off any grease or dirt on the movable and fixed sheaves, and dry them with a clean cloth.

● Install:

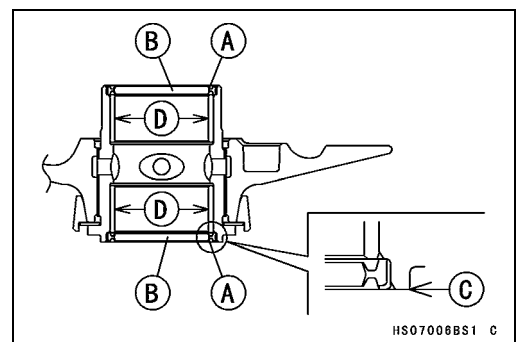
Spacers [A] (for Drive Belt Deflection Adjustment)



● Apply grease to the oil seal lips [A].

● Press the oil seals [B] in the movable sheave assembly so that the oil seal surface is flush [C] with the sleeve end.

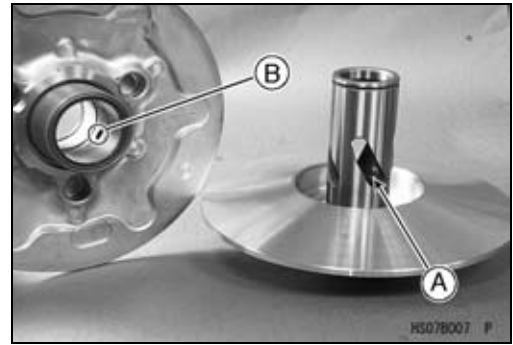
● Apply molybdenum disulfide grease to the inner surfaces [D] of the bushings.



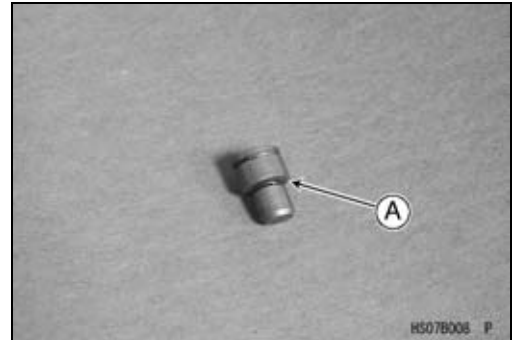
6-22 CONVERTER SYSTEM

Driven Pulley

- Align the alignment-marks on the sheaves, made when disassembled, and the opening [A] and hole [B] will be matched easily.



- Apply molybdenum disulfide grease to the seating surface [A] of the pins, and insert them into the holes in the movable sheave.



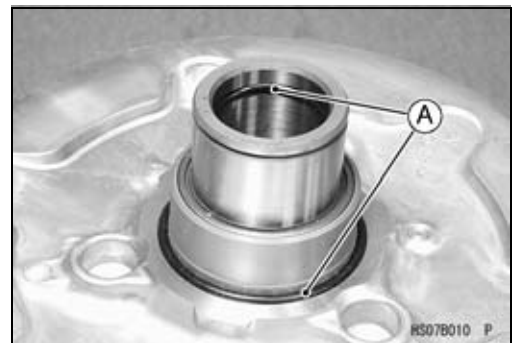
- Draw the movable sheave onto the fixed sheave, and apply molybdenum disulfide grease of 1 g (0.035 oz) to all openings [A].

NOTE

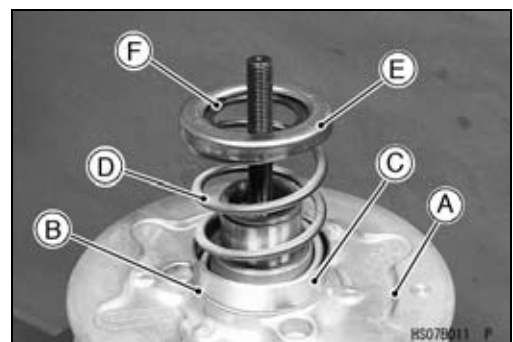
○Do not heap up the grease out of the openings.



- Check that the O-rings [A] are in good condition.
- ★If any of the O-rings are damaged, replace them.
- Apply grease to the O-rings.



- Hold the drive & driven pulley holder in a vise.
Special Tool - Drive & Driven Pulley Holder: 57001- 1473
- Screw the guide bar of the spring holder set into the holder.
Special Tool - Spring Holder Set: 57001-1483
- Put the driven pulley [A] onto the guide bar.
- Put the thrust plate [B] so that the alloy side (gray) faces the movable sheave.
- Install:
 - Spring Seat [C]: 18.5 mm (0.728 in.)
 - Spring [D]
 - Spring Seat [E]: 9.3 mm (0.366 in.)
 - Circlip [F]



Driven Pulley

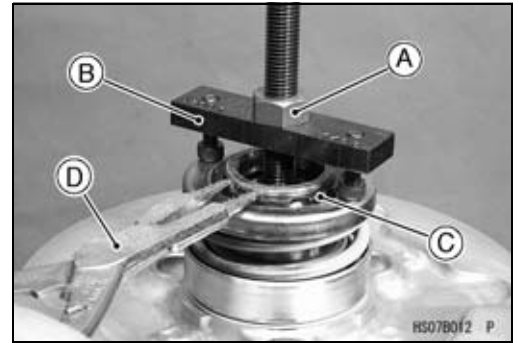
- Tighten the nut [A], and compress the spring with the spring holder [B].

Special Tool - Spring Holder Set: 57001-1483

- Install the circlip [C] with the circlip pliers [D].

Special Tool - Outside Circlip Pliers 57001-144

- Remove the driven pulley from the spring holder set.
- Clean the surface of the sheaves with an oil-less cleaning fluid.



Driven Pulley Installation

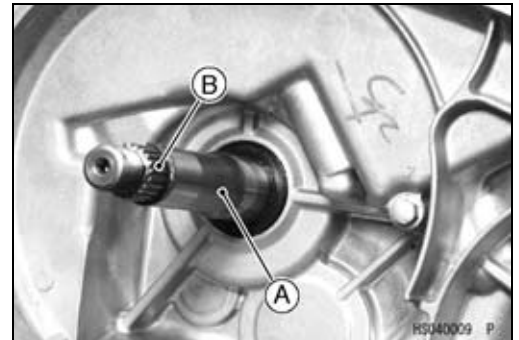
- Clean the transmission driven shaft [A].

- Install:

Driven Pulley

NOTE

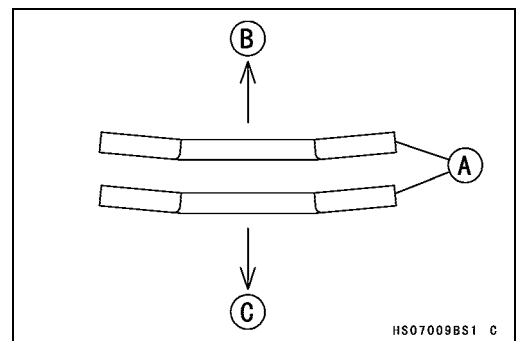
○ When engaging the spline on the driven pulley with the spline [B] on the shaft, do not damage the pulley's spline. If any damage occurs, remove it with a file.



- Clean the driven shaft and driven pulley ends to open the air vent passage. Wipe off any extra grease.
- Wipe off any protruding grease [A].



- Install the washers [A] on the shaft as shown.
Crankcase Side [B]
Bolt Head [C]

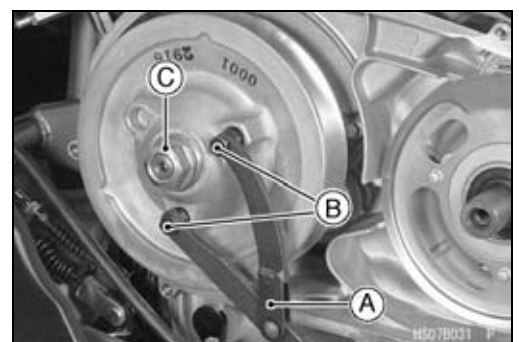


- Using a flywheel & pulley holder [A] and pulley holder attachments [B], tighten the driven pulley nut [C].

Special Tools - Flywheel & Pulley Holder: 57001-1605

Pulley Holder Attachment: 57001-1472

Torque - Driven Pulley Nut: 93 N·m (9.5 kgf·m, 69 ft·lb)



6-24 CONVERTER SYSTEM

High Altitude Setting Information

Specifications

Altitude m (ft)	Drive Pulley		Driven Pulley	Carburetor
	Ramp Weight	Spring Spacer		Main Jet
0 ~ 500 m (0 ~ 1 600 ft)	P/No. 39152-1088 (STD, Type C1)	P/No. 92026-1603 t = 1 mm (0.04 in.)	STD	Front: #135 P/No. (92063-1014) (STD) Rear: #140 P/No. (92063-1013) (STD)
500 ~ 1 600 m (1 600 ~ 4 900 ft)	P/No. 39152-1088 (STD, Type C1)	↑	↑	Front: #132 P/No. (92063-1076) Rear: #138 P/No. (92063-1015)
1 600 ~ 2 500 m (4 900 ~ 8 200 ft)	P/No. 39152-1088 (STD, Type C1)	↑	↑	Front: #130 P/No. (92063-1075) Rear: #135 P/No. (92063-1014)
2 500 ~ 3 500 m (8 200 ~ 11 500 ft)	P/No. 39152-0004 (Type EC-H3)	↑	↑	Front: #128 P/No. (92063-1074) Rear: #130 P/No. (92063-1075)
3 500 ~ 4 500 m (11 500 ~ 14 800 ft)	P/No. 39152-0004 (Type EC-H3)	↑	↑	Front: #120 P/No. (92063-1073) Rear: #125 P/No. (92063-1069)

C1, EC-H3: Identification marks

○Refer to the Drive Pulley section in this chapter and Carburetor section in the Fuel System chapter for parts replacement.

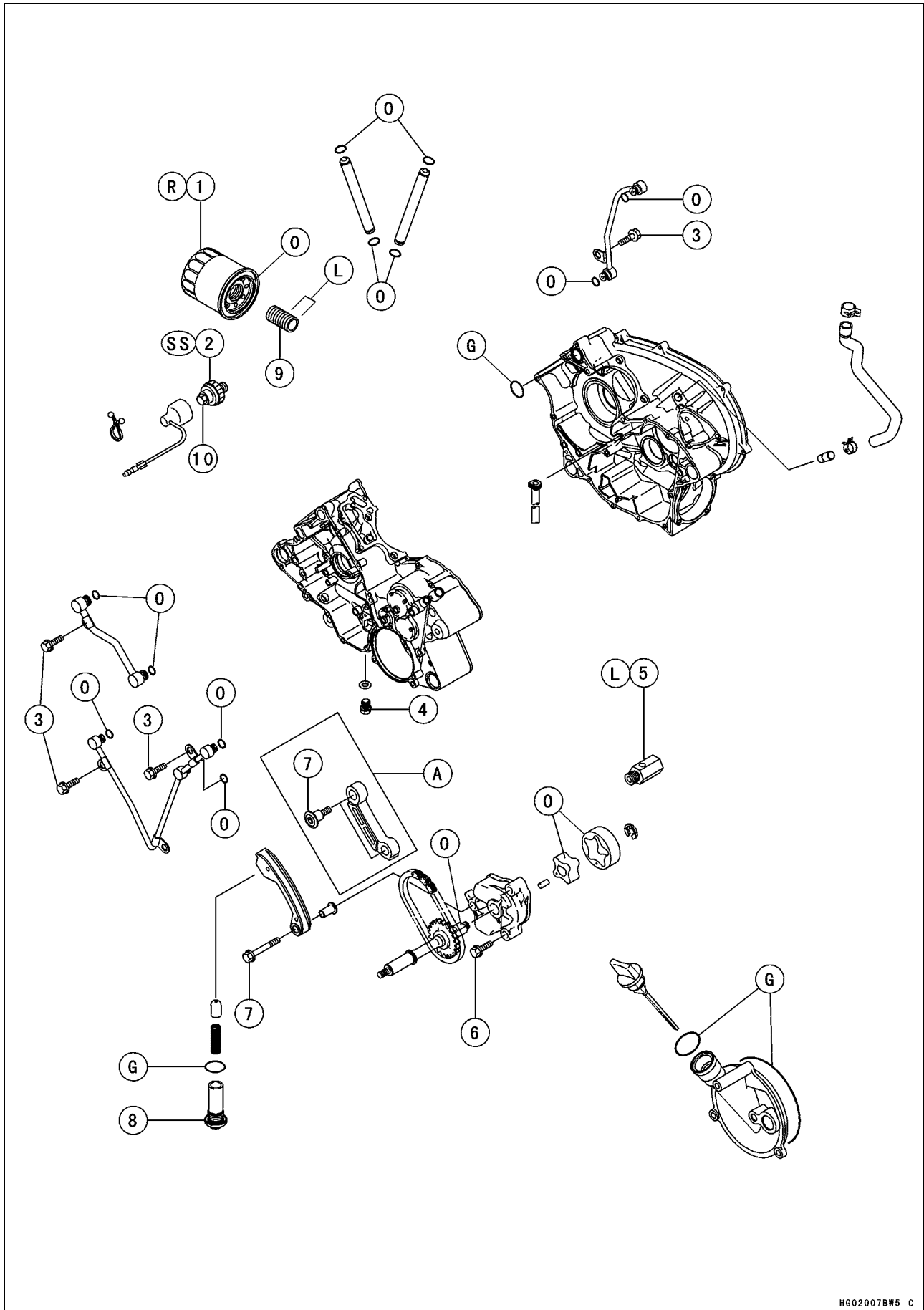
Engine Lubrication System

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7-2 ENGINE LUBRICATION SYSTEM

Exploded View



ENGINE LUBRICATION SYSTEM 7-3

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Oil Filter	18	1.8	13	R
2	Oil Pressure Switch	15	1.5	11	SS
3	Oil Pipe Bolts	8.8	0.90	78 in·lb	
4	Engine Drain Bolt	20	2.0	14	
5	Oil Pressure Relief Valve	15	1.5	11	L
6	Oil Pump Bolts	8.8	0.90	78 in·lb	
7	Chain Guide Bolts	8.8	0.90	78 in·lb	
8	Oil Pump Drive Chain Tensioner Bolt	25	2.5	18	
9	Oil Filter Mounting Bolt	25	2.5	18	L (15 mm)
10	Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

O: Apply engine oil.

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

R: Replacement Parts

A: KSV700-A1/B1 Models

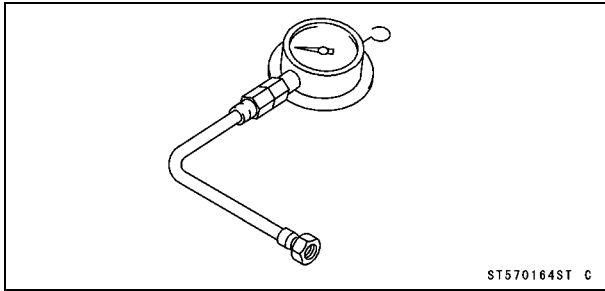
7-4 ENGINE LUBRICATION SYSTEM

Specifications

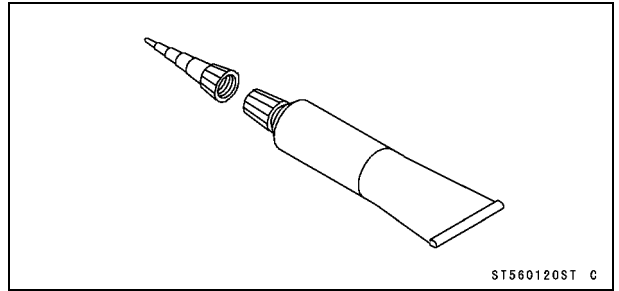
Item	Standard
Engine Oil Grade Viscosity Capacity	API SF or SG API SH or SJ with JASO MA, MA1 or MA2 (KSV700-A1 ~ A6F/B1 ~B6F/C6F) API SH, SJ or SL with JASO MA, MA1 or MA2 SAE 10W-40 1.7 L (1.80 US qt) (when filter is not removed) 1.9 L (2.01 US qt) (when filter is removed) 2.2 L (2.33 US qt) (when engine is completely dry)
Oil Pressure Measurement Oil Pressure @4 500 r/min (rpm), oil temperature 110°C (230°F)	480 kPa (4.9 kgf/cm ² , 69.7 psi)

Special Tools and Sealant

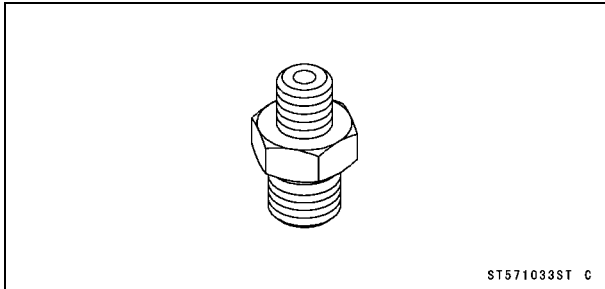
**Oil Pressure Gauge, 10 kgf/cm²:
57001-164**



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

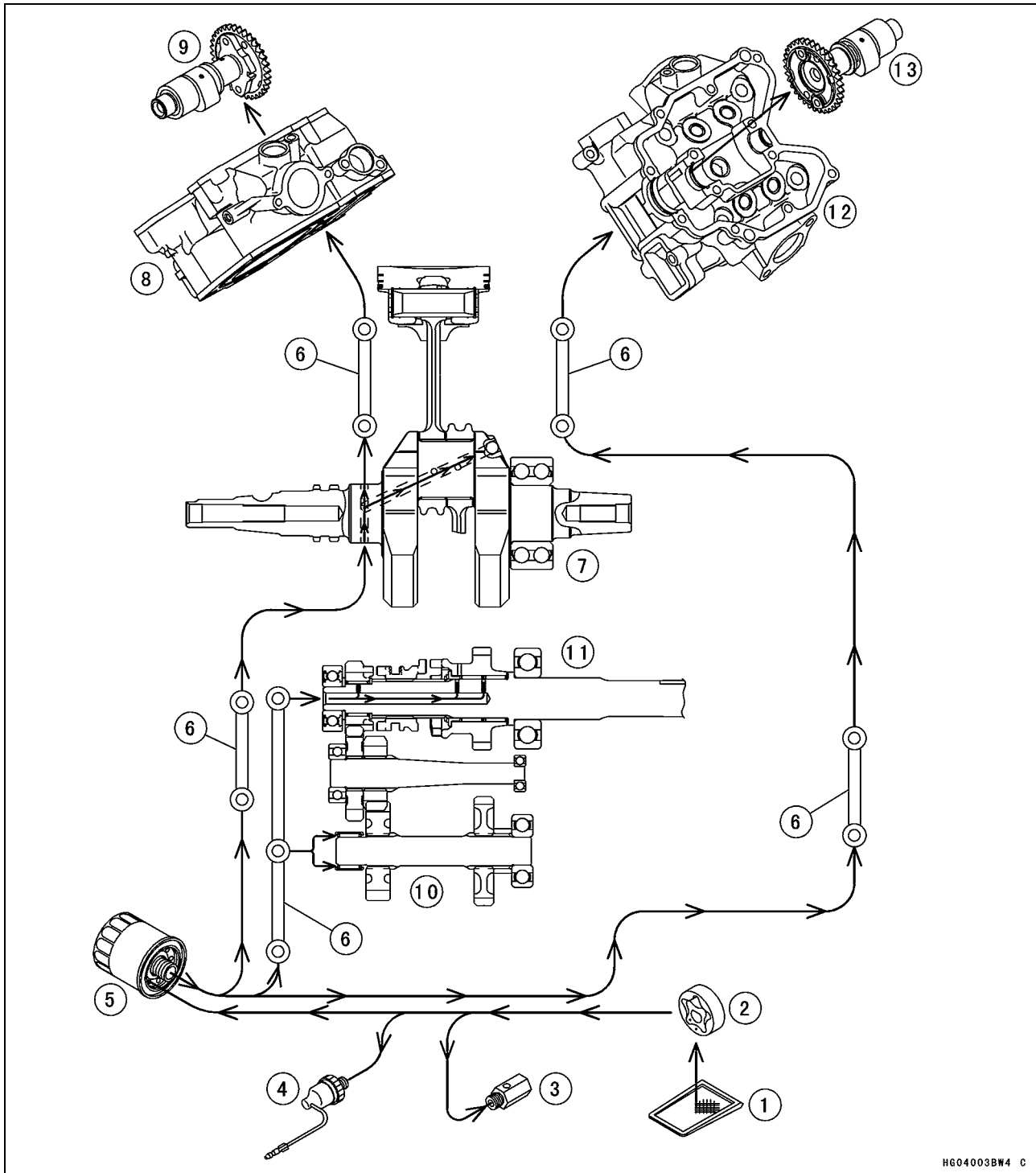


**Oil Pressure Gauge Adapter, PT 1/8:
57001-1033**



7-6 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart



- 1. Oil Screen
- 2. Oil Pump
- 3. Relief Valve
- 4. Oil Pressure Switch
- 5. Oil Filter

- 6. Oil Pipe
- 7. Crankshaft
- 8. Rear Cylinder Head
- 9. Rear Camshaft
- 10. Transmission Idle Shaft

- 11. Transmission Drive Shaft
- 12. Front Cylinder Head
- 13. Front Camshaft

Engine Oil and Oil Filter

⚠ WARNING

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

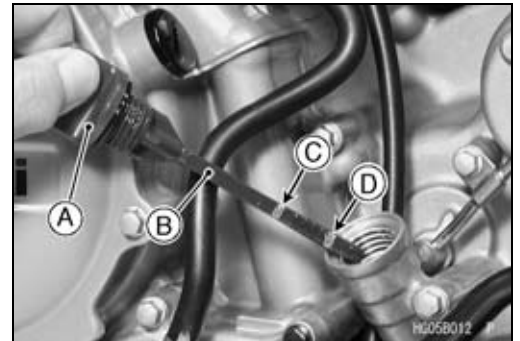
Oil Level Inspection

- Park the vehicle so that it is level, both side-to-side and front-to-rear.
- If the oil has just been changed, start the engine, and run it for several minutes to fill the oil filter.

CAUTION

Allow the engine to idle for several minutes so that oil may reach all parts of the engine. Racing a "dry" engine may cause severe damage.

- Stop the engine and wait several minutes for all the oil to drain back to the sump.
- Unscrew the oil filler cap [A], wipe its dipstick [B] dry, and tighten it into the filler opening.
- Unscrew the oil filler cap and check the oil level. The oil level should be between the upper (H) level line [C] and lower (L) level line [D].
- ★ If the level is too high, suck the excess oil out the filler hole with a syringe or other suitable device.
- ★ If the level is too low, add oil through the filler hole. Use the same type and make of oil that is already in the engine.



Engine Oil Change

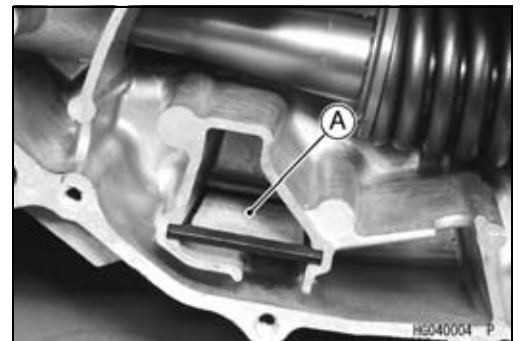
- Refer to the Engine Oil Change in the Periodic Maintenance chapter.

Oil Filter Replacement

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

Oil Screen Removal

- Split the crankcase (see Crankcase Disassembly in the Crankshaft/Transmission chapter).
- Pull the oil screen [A] out of the crankcase.



7-8 ENGINE LUBRICATION SYSTEM

Engine Oil and Oil Filter

Oil Screen Cleaning

- Clean the oil screen [A] thoroughly whenever it is removed for any reason.
- Clean the oil screen with a 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, broken wires, or gasket pulling off.
- ★ If the screen is damaged, replace it.

Oil Pressure Measurement

NOTE

- Measure the oil pressure after the engine is warmed up.
- Remove the oil pressure switch, and attach the oil pressure gauge [A] and adapter [B].

**Special Tools - Oil Pressure Gauge, 10 kgf/cm²: 57001-164
Oil Pressure Gauge Adapter: 57001-1033**

Oil Pressure

Standard: 480 kPa (4.9 kgf/cm², 69.7 psi) @ 4 500 r/min (rpm), 110°C (230°F) of oil temp.

- ★ If the oil pressure is much lower than the standard, inspect the relief valve, oil pump, and/or crankshaft bearing insert wear.
- ★ If the oil pressure is much higher than the standard, inspect the oil filter, oil screen, and other areas of the lubrication system for clogging.
- Stop the engine.
- Remove the oil pressure gauge and adapter.

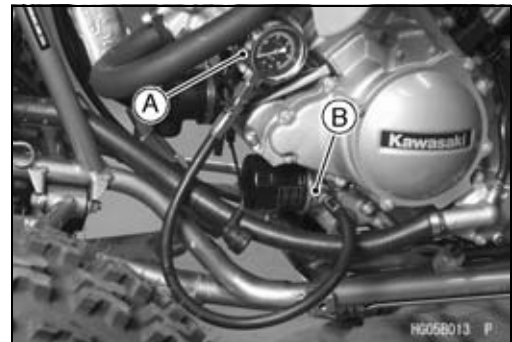
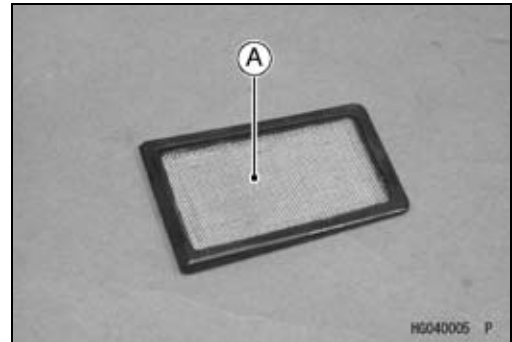
⚠ WARNING

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

- Apply silicone sealant to the oil pressure switch, and tighten it.

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

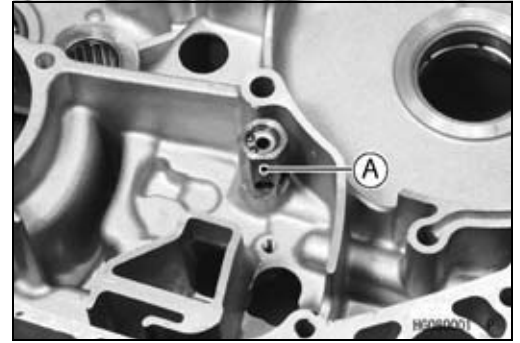
**Torque - Oil Pressure Switch: 15 N·m (1.5 kgf·m, 11 ft·lb)
Oil Pressure Switch Terminal Bolt: 1.5 N·m (0.15 kgf·m, 13 in·lb)**



Oil Pressure Relief Valve

Oil Pressure Relief Valve Removal

- Split the crankcase (see Crankcase Disassembly in the Crankshaft/Transmission chapter).
- Remove the oil pressure relief valve [A].



Oil Pressure Relief Valve Installation

- See crankcase assembly (See Crankcase Assembly in the Crankshaft/Transmission chapter).
- Apply a non-permanent locking agent to the threads of oil pressure relief valve, and tighten it.

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

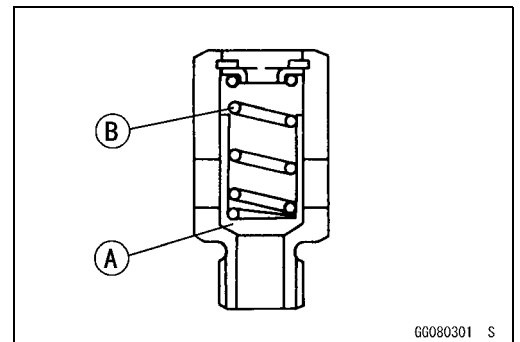
Oil Pressure Relief Valve Inspection

- Remove the relief valve.
- Using a wooden stick, push the inner valve to make sure that the valve [A] moves smoothly and that it returns to its original position by the force of the spring [B].

NOTE

○ *The relief valve cannot be disassembled and it must be inspected in the assembled state.*

- ★ If the valve movement is not smooth, wash the relief valve with high flash-point solvent, and use compressed air to remove any foreign particles from it.



⚠ 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 solvents.

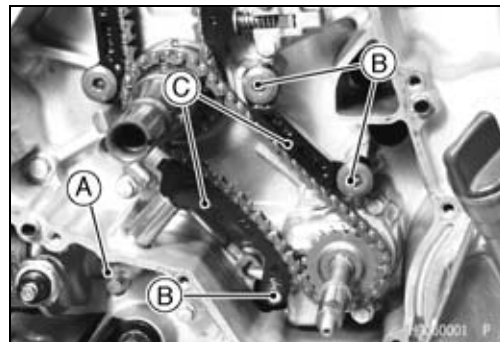
- ★ If the valve does not move smoothly even after washing it, replace the relief valve. The oil pressure relief valve is precision made with no allowance for replacement of individual parts.

7-10 ENGINE LUBRICATION SYSTEM

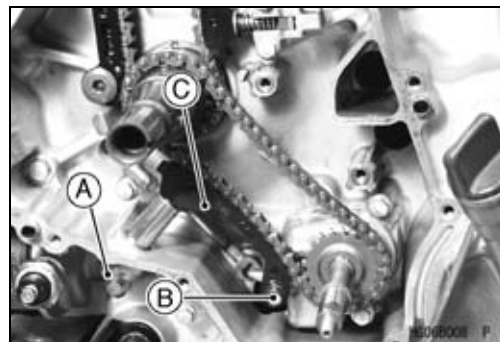
Oil Pump

Oil Pump Removal

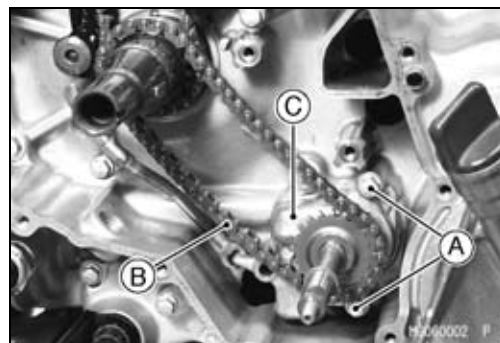
- Remove:
 - Alternator Rotor and Starter Clutch Gear (see Alternator Rotor, Starter Motor Clutch Removal in the Electrical System chapter)
 - Oil Pump Drive Chain Tensioner Bolt [A]
 - Chain Guide Bolts [B] and Collar
 - Chain Guides [C]



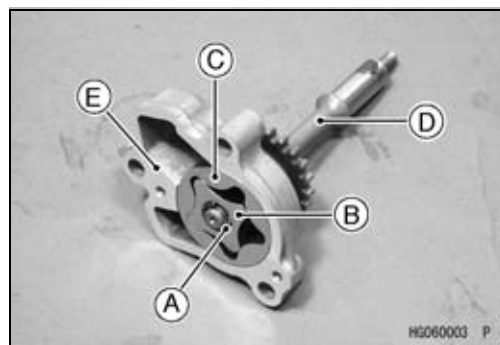
- For KSV700-A2 ~/B2 ~/C6F models; as shown in the figure.



- Remove:
 - Oil Pump Bolts [A]
 - Oil Pump Drive Chain [B] and Oil Pump Assembly [C]



- Remove:
 - Circlip [A]
 - Inner Rotor [B]
 - Outer Rotor [C]
 - Oil Pump Drive Shaft [D]
 - Oil Pump Cover [E]

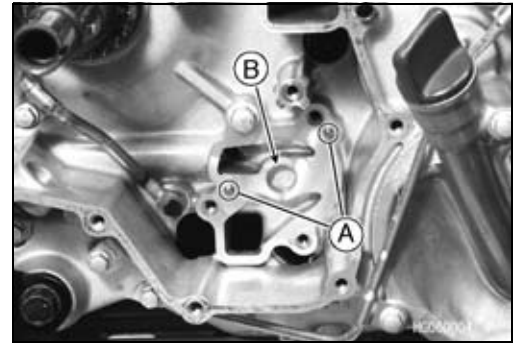


Oil Pump Installation

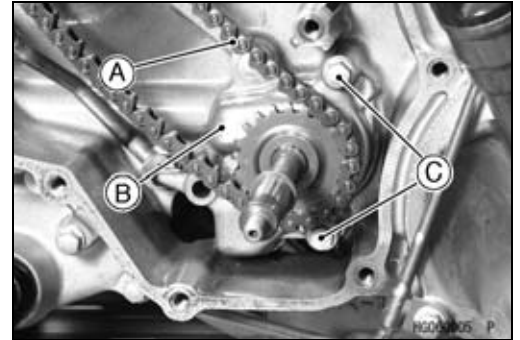
- Apply engine oil:
 - Oil Pump Shaft
 - Inner and Outer Rotors
- Install:
 - Oil Pump Drive Shaft
 - Oil Pump Cover
 - Inner Rotor
 - Outer Rotor
 - New Circlip

Oil Pump

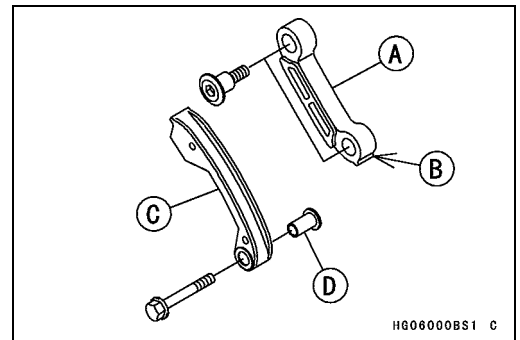
- Check to see that the dowel pins [A] are in place.
- Apply engine oil to the oil pump hole [B].



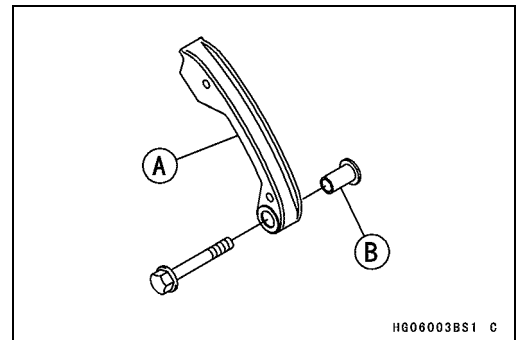
- Install the oil pump drive chain [A] with the oil pump assembly [B].
- Tighten:
 - Torque - Oil Pump Bolts [C]: 8.8 N-m (0.90 kgf-m, 78 in-lb)**



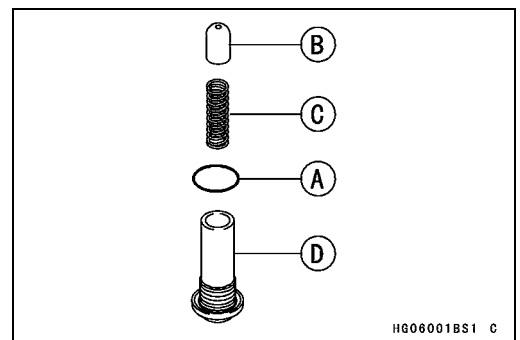
- Install:
 - Upper Chain Guide [A] (Face the tab [B] downward.)
 - Lower Chain Guide [C] and Collar [D]
- Tighten:
 - Torque - Chain Guide Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)**



- For KSV700-A2 ~/B2~/C6F models; note the following.
 - Install the chain guide [A] and collar [B].
 - Tighten:
 - Torque - Chain Guide Bolt: 8.8 N-m (0.90 kgf-m, 78 in-lb)**



- Apply grease to the O-ring [A].
- Install:
 - Pin [B]
 - Spring [C]
 - O-ring
 - Oil Pump Drive Chain Tensioner Bolt [D]
- Tighten:
 - Torque - Oil Pump Drive Chain Tensioner Bolt: 25 N-m (2.5 kgf-m, 18 ft-lb)**



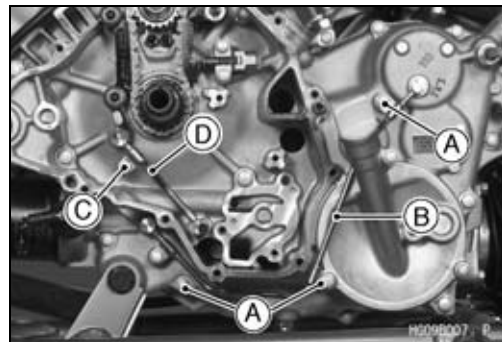
7-12 ENGINE LUBRICATION SYSTEM

Oil Pipe

Oil Pipe Removal

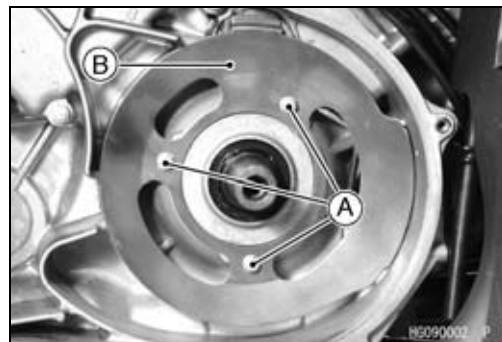
Engine Left Side Oil Pipe

- Remove:
 - Alternator Cover (see Alternator Cover Removal in the Electrical System chapter)
 - Oil Pipe Bolts [A]
 - Oil Pipe [B]
 - Oil Pump (see Oil Pump Removal)
 - Oil Pipe Bolts [C]
 - Oil Pipe [D]

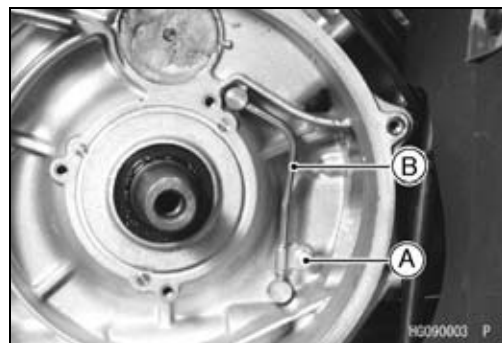


Engine Right Side Oil Pipe

- Remove:
 - Drive Pulley (see Drive Pulley Removal in the Torque Converter chapter)
 - Plate Bolts [A]
 - Plate [B]



- Remove:
 - Oil Pipe Bolt [A]
 - Oil Pipe [B]



Engine Inside Oil Pipe

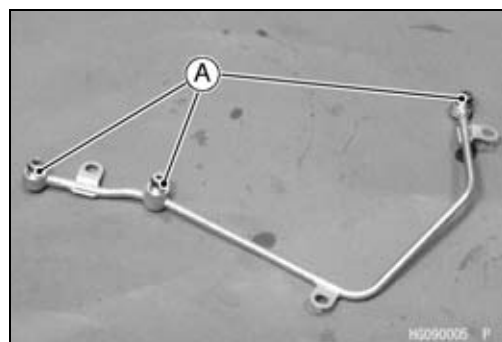
- Remove:
 - Cylinder Head (see Cylinder Head Removal in the Engine Top End chapter)
 - Oil Pipe [A]



Oil Pipe Installation

- Replace the O-ring [A] with new ones.
- Apply engine oil to the O-rings before installation.
- Tighten:

Torque - Oil Pipe Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)



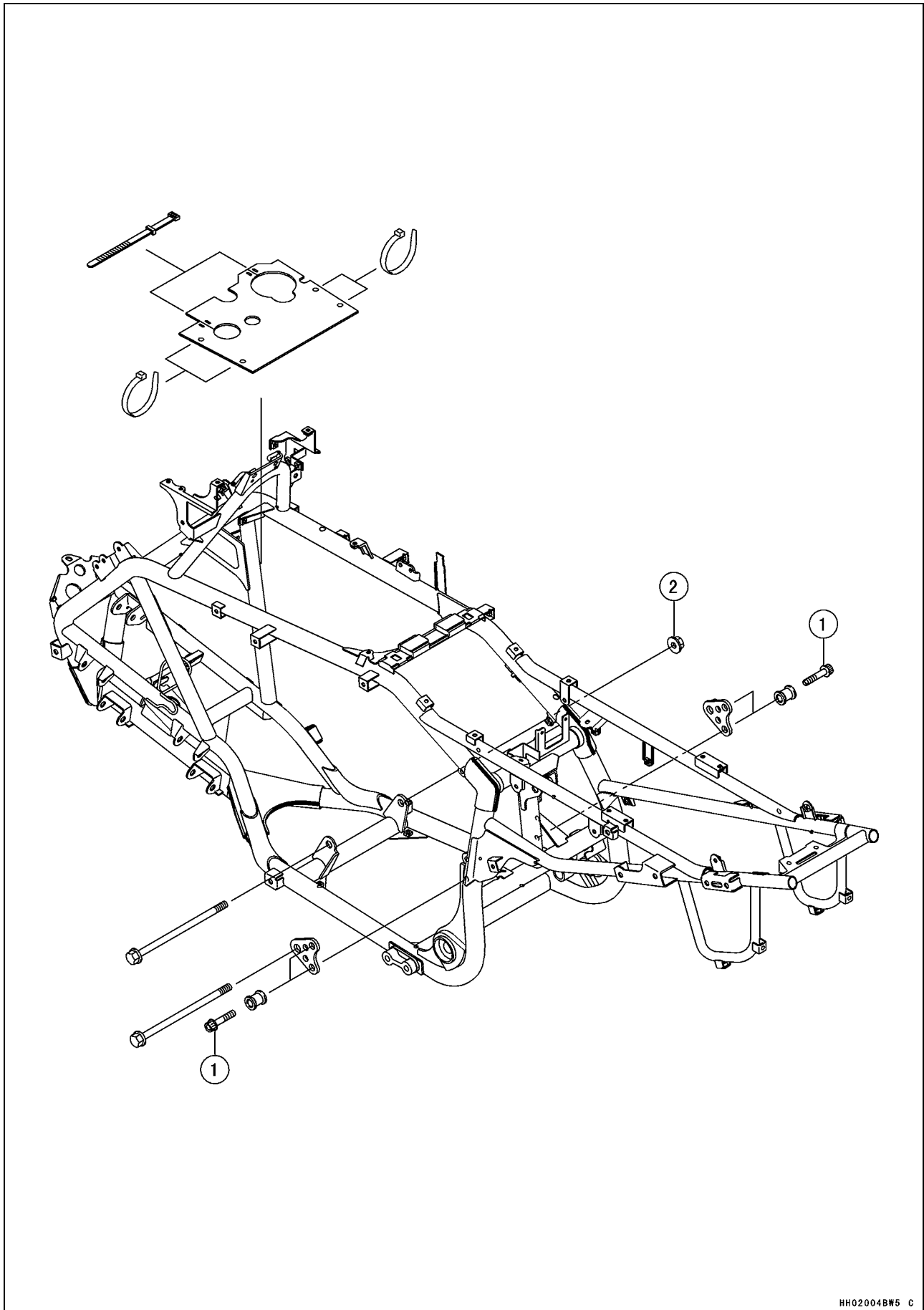
Engine Removal/Installation

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8-2 ENGINE REMOVAL/INSTALLATION

Exploded View



ENGINE REMOVAL/INSTALLATION 8-3

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Mounting Bracket Bolts	52	5.3	38	
2	Engine Mounting Nut	62	6.3	46	

8-4 ENGINE REMOVAL/INSTALLATION

Engine Removal/Installation

Engine Removal

● Remove:

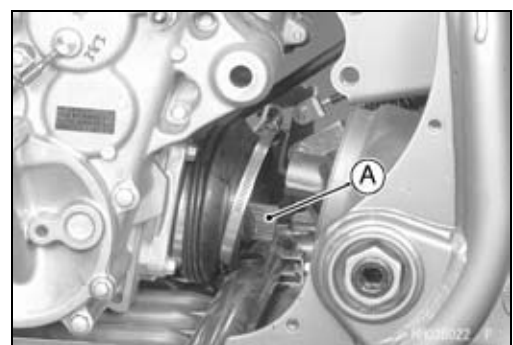
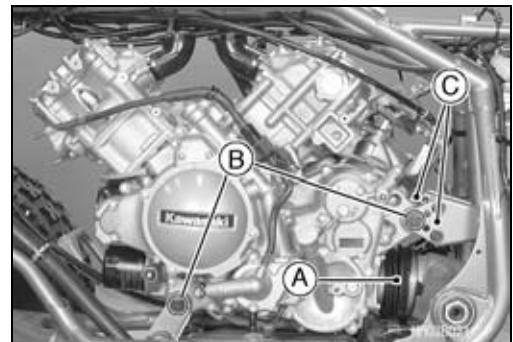
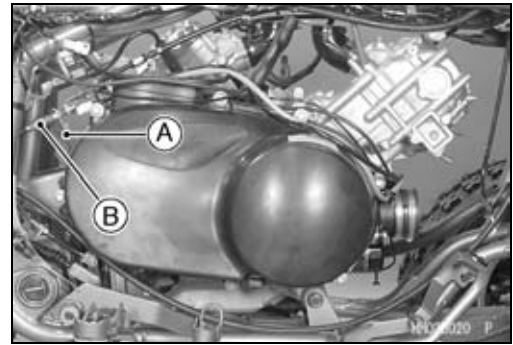
- Engine Oil (drain)
- Coolant (drain) and Water Hose
- Front Fender and Rear Fender (see Front Fender, Rear Fender Removal in the Frame chapter)
- Side Inner Covers (see Side Inner Cover Removal in the Frame chapter)
- Muffler and Exhaust Pipe (see Muffler and Exhaust Pipe Removal in the Engine Top End chapter)
- Carburetor (see Carburetor Removal in the Fuel System chapter)
- Inlet and Exhaust Converter Duct
- Alternator Lead Connector
- Crankshaft Sensor Lead Connector
- Foot Guards and Guard (see Front Guard, Engine Bottom guard, Rear Bottom Guard, Foot guard and stay Removal in the Frame chapter)
- Cable Holder [A] and Reverse Lock Cable [B] (see Reverse Lock Cable Removal in the Crankshaft/Transmission chapter)
- Oil Pressure Switch Lead Connector
- Spark Plug Caps

● Remove:

- Starter Motor Cable
- Battery Negative Cable
- Neutral Switch Lead Connector
- Reverse Switch Lead Connector
- Boot (roll up forward) [A]
- Engine Mounting Bolts [B]
- Engine Mounting Bracket [C]

- Put a tape to protect the frame.

- Move the engine forward to remove the drive shaft [A].



Engine Removal/Installation

- Remove the engine as shown.



Engine Installation

- Roll up the boot [A] toward the engine.



- Insert the drive shaft in the rear propeller shaft joint [A].
- Tighten:
 - Torque - Engine Mounting Bracket Bolts: 52 N·m (5.3 kgf·m, 38 ft·lb)**
 - Engine Mounting Nut: 62 N·m (6.3 kgf·m, 46 ft·lb)**



- Installation is the reverse of removal.
- Fill the Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Fill the Coolant (see Coolant Change in the Periodic Maintenance chapter).

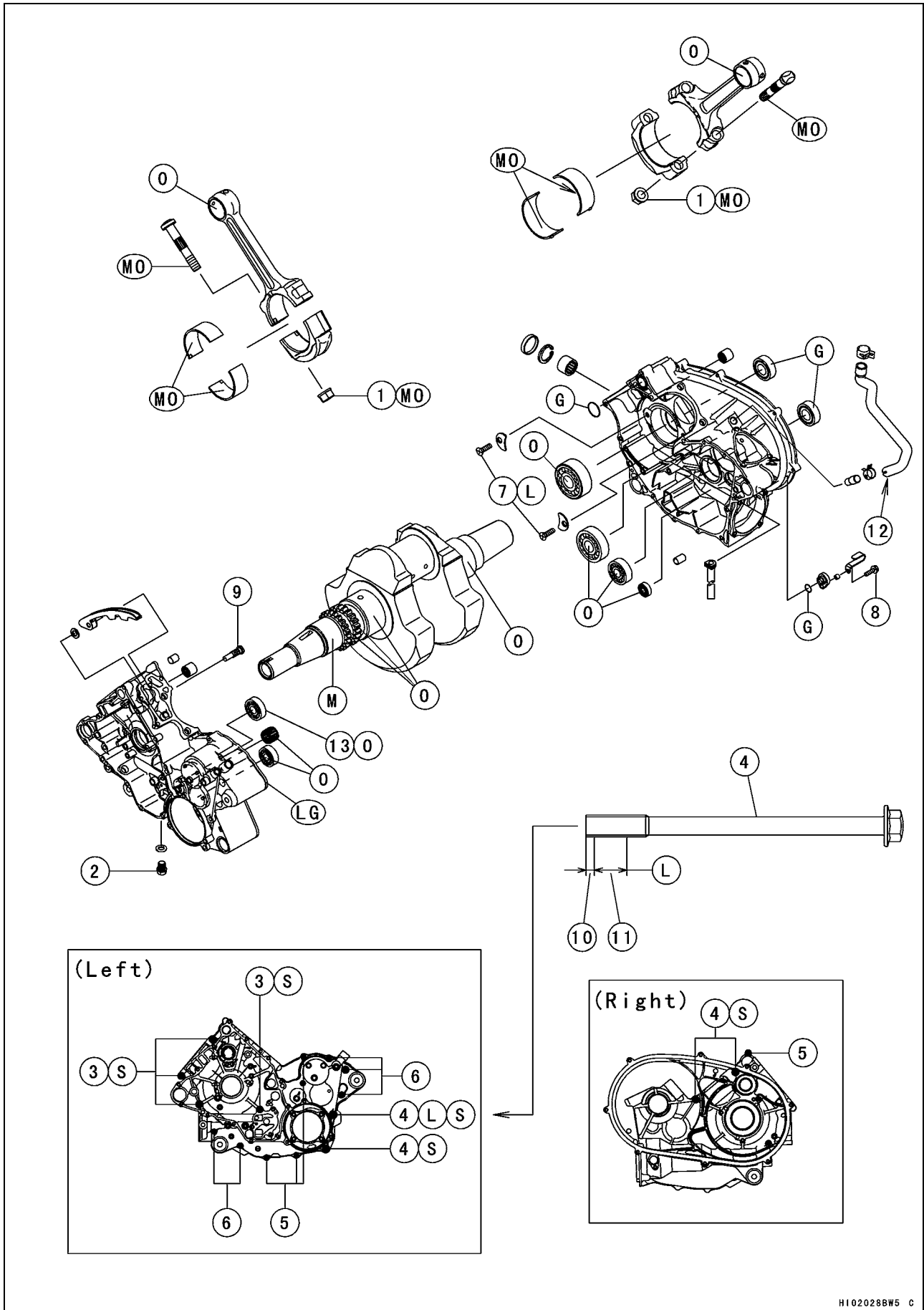
Crankshaft/Transmission

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9-2 CRANKSHAFT/TRANSMISSION

Exploded View



CRANKSHAFT/TRANSMISSION 9-3

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Connecting Rod Big End Cap Nuts	34	3.5	25	MO
2	Engine Drain Bolt	20	2.0	14	
3	Crankcase Bolts (M8) 75 mm (2.95 in.)	20	2.0	14	S
4	Crankcase Bolts (M8) 110 mm (4.33 in.)	20	2.0	14	L(1), S
5	Crankcase Bolts (M6) 40 mm (1.57 in.)	9.8	1.0	87 in·lb	
6	Crankcase Bolts (M6) 65 mm (2.56 in.)	9.8	1.0	87 in·lb	
7	Position Plate Mounting Screws	4.9	0.50	43 in·lb	L
8	Output Driven Bevel Gear Housing Cap Bolt	8.8	0.90	78 in·lb	
9	Rear Cylinder Camshaft Chain Guide Bolt	20	2.0	14	

10. Do not apply a non-permanent locking agent to this area (2 ~ 3 mm, 0.08 ~ 0.12 in.).

11. About 12 mm (0.47 in.)

12. White Mark: Face the mark backwards and align it with the crankcase mark.

13. Face the seal of the bearing to the left side (outward).

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

LG: Apply liquid gasket (Three Bond 1215, Gray).

M: Apply molybdenum disulfide grease.

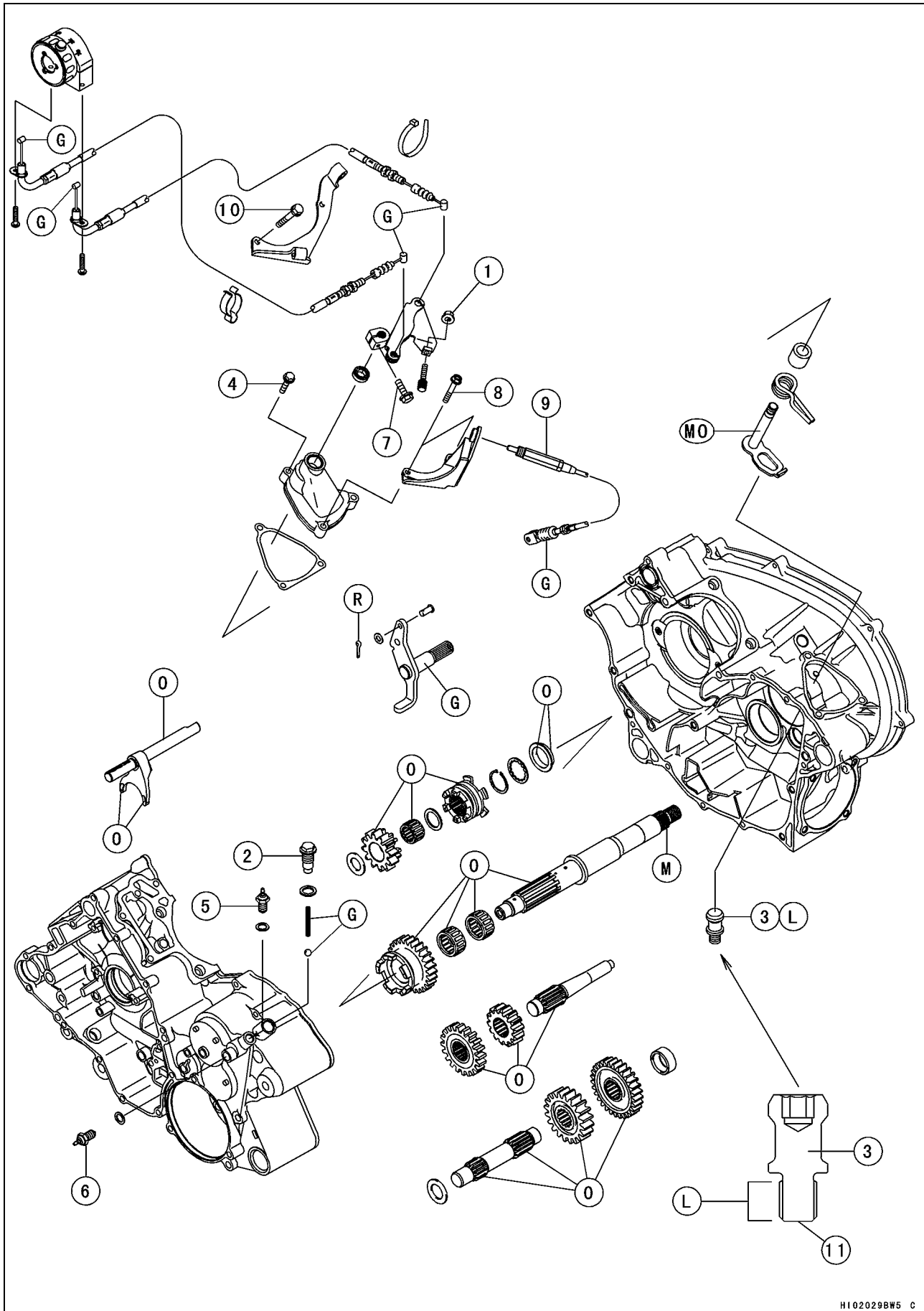
MO: Apply molybdenum disulfide oil.

O: Apply engine oil.

S: Follow the specific tightening sequence.

9-4 CRANKSHAFT/TRANSMISSION

Exploded View



CRANKSHAFT/TRANSMISSION 9-5

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Shift Shaft Lever Nut	8.8	0.90	78 in·lb	
2	Shift Shaft Positioning Bolt	25	2.5	18	
3	Shift Shaft Spring Bolt	25	2.5	18	L
4	Shift Shaft Cover Bolt	8.8	0.90	78 in·lb	
5	Neutral Position Switch	15	1.5	11	
6	Reverse Position Switch	15	1.5	11	
7	Shift Shaft Lever Bolt	14	1.4	10	
8	Reverse Cable Bracket Mounting Bolts	8.8	0.90	78 in·lb	
9	Reverse Cable Locknut	12	1.2	104 in·lb	
10	Cable Holder Mounting Bolts	9.8	1.0	87 in·lb	

11. Do not apply a non-permanent locking agent to this end.

G: Apply grease.

L: Apply a non-permanent locking agent.

M: Apply molybdenum disulfide grease.

MO: Apply molybdenum disulfide oil.

O: Apply engine oil.

R: Replacement Parts

9-6 CRANKSHAFT/TRANSMISSION

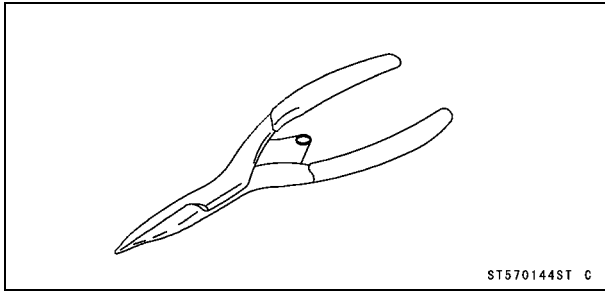
Specifications

Item	Standard	Service Limit																					
Crankshaft, Connecting Rods																							
Connecting Rod Bend	— — —	TIR 0.2/100 mm (0.008/3.94 in.)																					
Connecting Rod Twist	— — —	TIR 0.2/100 mm (0.008/3.94 in.)																					
Connecting Rod Big End Side Clearance	0.16 ~ 0.46 mm (0.0063 ~ 0.0181 in.)	0.7 mm (0.028 in.)																					
Connecting Rod Big End Bearing, Insert/Crankpin Clearance	0.028 ~ 0.052 mm (0.0011 ~ 0.0020 in.)	0.09 mm (0.0035 in.)																					
Crankpin Diameter:	39.984 ~ 40.000 mm (1.5742 ~ 1.5748 in.)	39.97 mm (1.5736 in.)																					
Marking: None	39.984 ~ 39.992 mm (1.5742 ~ 1.57449 in.)	— — —																					
○	39.993 ~ 40.000 mm (1.57452 ~ 1.5748 in.)	— — —																					
Connecting Rod Big End Inside Diameter:	43.000 ~ 43.016 mm (1.6929 ~ 1.6939 in.)	— — —																					
Marking: None	43.000 ~ 43.008 mm (1.6929 ~ 1.69323 in.)	— — —																					
○	43.009 ~ 43.016 mm (1.69326 ~ 1.6935 in.)	— — —																					
Connecting Rod Big End Bearing Insert Thickness:																							
Brown	1.482 ~ 1.486 mm (0.05835 ~ 0.05850 in.)	— — —																					
Yellow	1.486 ~ 1.490 mm (0.05850 ~ 0.05866 in.)	— — —																					
Green	1.490 ~ 1.494 mm (0.05866 ~ 0.05882 in.)	— — —																					
Connecting Rod Big End Bearing Insert Selection:																							
<table border="1"> <thead> <tr> <th rowspan="2">Con-rod Big End Bore Diameter Marking</th> <th rowspan="2">Crankpin Diameter Marking</th> <th colspan="2">Bearing Insert</th> </tr> <tr> <th>Size Color</th> <th>Part Number</th> </tr> </thead> <tbody> <tr> <td>None</td> <td>○</td> <td>Brown</td> <td>92028-1963</td> </tr> <tr> <td>None</td> <td>None</td> <td rowspan="2">Yellow</td> <td rowspan="2">92028-1962</td> </tr> <tr> <td>○</td> <td>○</td> </tr> <tr> <td>○</td> <td>None</td> <td>Green</td> <td>92028-1961</td> </tr> </tbody> </table>				Con-rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert		Size Color	Part Number	None	○	Brown	92028-1963	None	None	Yellow	92028-1962	○	○	○	None	Green	92028-1961
Con-rod Big End Bore Diameter Marking	Crankpin Diameter Marking	Bearing Insert																					
		Size Color	Part Number																				
None	○	Brown	92028-1963																				
None	None	Yellow	92028-1962																				
○	○																						
○	None	Green	92028-1961																				
Crankshaft Runout	TIR 0.04 mm (0.0016 in.) or less	TIR 0.10 mm (0.0039 in.)																					
Crankshaft Main Journal Diameter:																							
ϕ 42 Side	41.984 ~ 42.000 mm (1.6529 ~ 1.6535 in.)	41.96 mm (1.652 in.)																					
Crankshaft Main Bearing Bore Diameter:																							
ϕ 42 Side	42.025 ~ 42.041 mm (1.6545 ~ 1.6552 in.)	42.08 mm (1.6567 in.)																					
Transmission																							
Shift Fork Ear Thickness	5.9 ~ 6.0 mm (0.2322 ~ 0.2362 in.)	5.8 mm (0.228 in.)																					
Shifter Groove Width	6.05 ~ 6.15 mm (0.2382 ~ 0.2421 in.)	6.25 mm (0.246 in.)																					

Special Tools and Sealant

Outside Circlip Pliers:

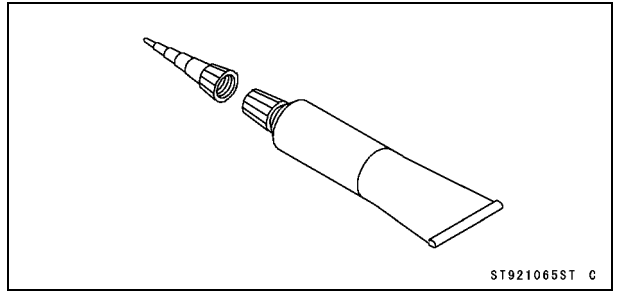
57001-144



ST570144ST C

Kawasaki Bond (Liquid Gasket)

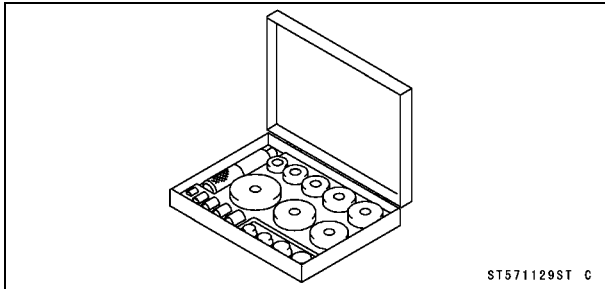
92104-1065



ST921065ST C

Bearing Driver Set:

57001-1129



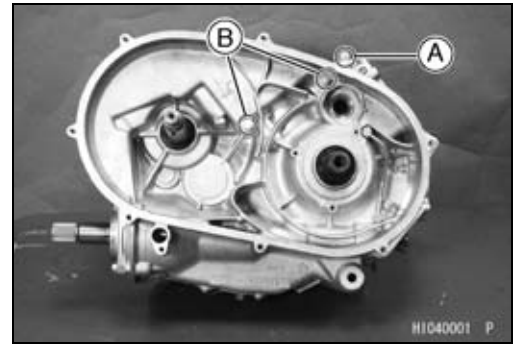
ST571129ST C

9-8 CRANKSHAFT/TRANSMISSION

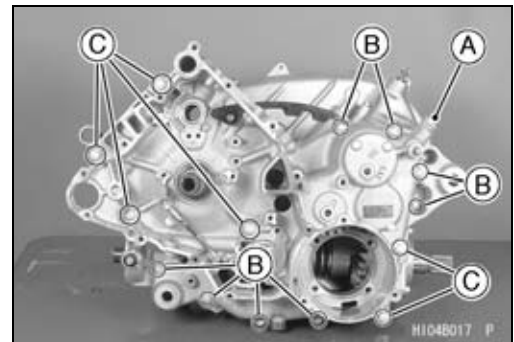
Crankcase

Crankcase Disassembly

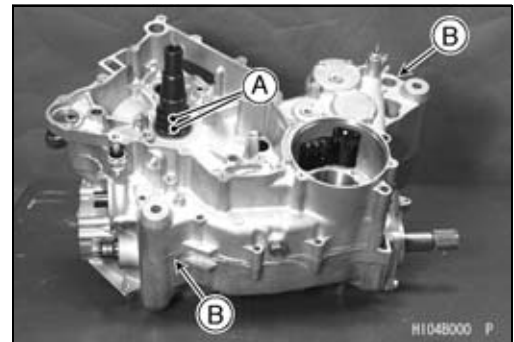
- Remove:
 - Engine (see Engine Removal in the Engine Removal/Installation chapter)
 - Starter Motor (see Starter Motor Removal in the Electrical System chapter)
 - Oil Filter (see Oil Filter Removal in the Engine Lubrication System chapter)
 - Cylinder Blocks and Pistons (see Cylinder, Piston Removal in the Engine Top End chapter)
 - Intermediate Shaft and Chain (see Camshaft Chain Removal in the Engine Top End chapter)
 - Output Driven Bevel Gear Housing Cap Bolt
 - Right Crankcase Bolts (M6) [A]
 - Right Crankcase Bolts (M8) [B]



- Remove:
 - Shift Shaft Positioning Bolt [A], Washer, Spring, and Steel Ball
 - Left Crankcase Bolts (M6) [B]
 - Left Crankcase Bolts (M8) [C]



- Wrap the teeth on the sprockets [A] by taping for protecting the bushing in the crankcase.
- Using the pry points [B], split the crankcase halves.
- Lift off the left crankcase half.



- Remove:
 - Output Drive Bevel Gear (see Output Drive Bevel Gear Removal in the Final Drive chapter)
 - Output Driven Bevel Gear (see Output Driven Bevel Gear Removal in the Final Drive chapter)
 - Transmission (see Transmission Removal in the Crankshaft/Transmission chapter)
 - Crankshaft/Connecting Rod (see Crankshaft, Connecting Rod Removal in the Crankshaft/Transmission chapter)

Crankcase

Crankcase Assembly

CAUTION

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

NOTE

- Be certain that all parts are cleaned thoroughly before assembly.
- Blow through all oil passages with compressed air to clear any blockage in the crankcase halves and crankshaft.

⚠ WARNING

Clean the engine parts in a well-ventilated area, and take care that there are no sparks or flame anywhere near the working area; this includes any appliance with a pilot light. Do not use gasoline or low flash-point solvents to clean parts. A fire or explosion could result.

- Apply a small amount of engine oil to the transmission gears, bearings and shift fork.
- Be sure the mating surfaces of the crankcase halves are clean and dry.
- Press and insert the new ball bearings until they are bottomed.

Special Tool - Bearing Driver Set: 57001-1129

[A] Ball Bearing

[B] Ball Bearing (sealed side towards crankcase)

- Press and insert the new needle bearings so that the bearing surfaces are flush with the end of the hole.

[C] Needle Bearing

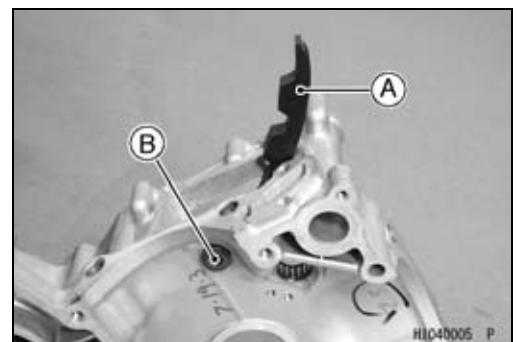
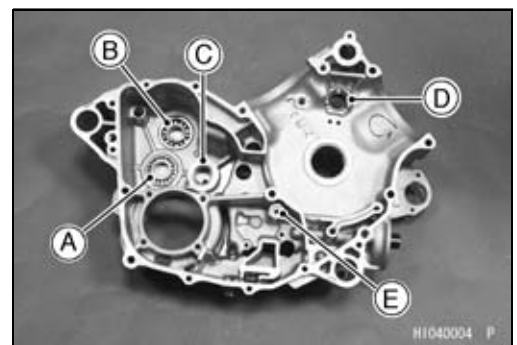
[D] Needle Bearing (Insert it from outside.)

- Apply engine oil to the bearings.
- Install:
Oil Pressure Relief Valve [E] (see Oil Pressure Relief Valve Installation in the Engine Lubrication System chapter)

- Install:
Rear Cylinder Camshaft Chain Guide [A]

- Tighten:

Torque - Rear Cylinder Camshaft Chain Guide Bolt [B]: 20 N·m (2.0 kgf·m, 14 ft·lb)



9-10 CRANKSHAFT/TRANSMISSION

Crankcase

- Press and insert the new ball bearings [A] until they are bottomed.

Special Tool - Bearing Driver Set: 57001-1129

- Press and insert the new needle bearings so that the bearing surfaces are flush with the end of the hole.

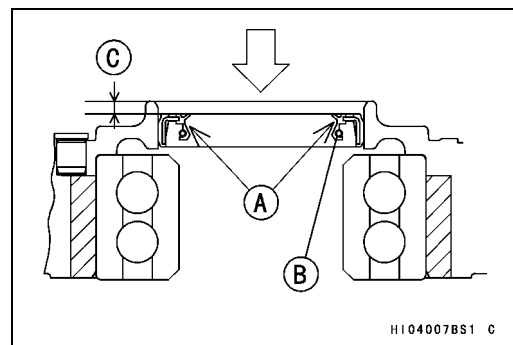
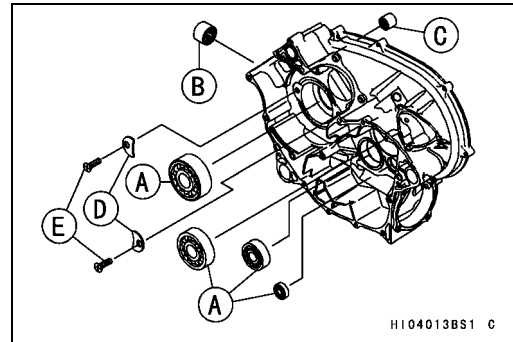
[B] Needle Bearing

[C] Needle Bearing (Insert it from outside.)

- Apply engine oil to the bearings.
- Install the position plates [D].
- Apply a non-permanent locking agent to the position plate mounting screws [E].
- Tighten:

Torque - Position Plate Mounting Screws: 4.9 N·m (0.50 kgf·m, 43 in·lb)

- Grease the lip [A] of the oil seal [B] and press the seal 3 mm (0.12 in.) [C] inwards from the end of the boss.



- Be sure the following parts are in place in the right crankcase half.

Crankshaft

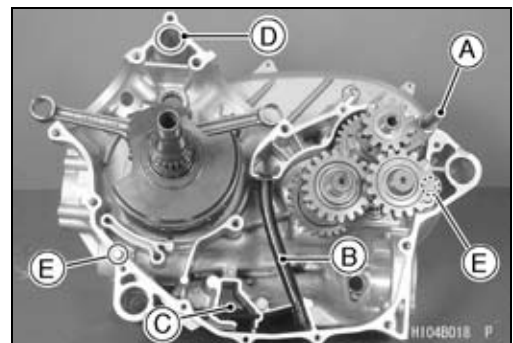
Transmission Shafts and Shift Rod [A]

Oil Tube [B]

Oil Screen [C]

O-ring (Apply Grease) [D]

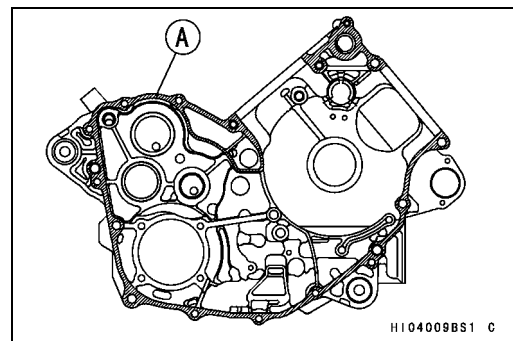
Dowel Pins [E]



- Apply liquid gasket [A] to mating surface of the left crankcase half.

Sealant - Kawasaki Bond (Liquid Gasket): 92104-1065

- After applying liquid gasket, the crankcase must be assembled within 20 minutes.



Crankcase

- Apply a non-permanent locking agent to the area [C] (12 mm, 0.47 in.) except for the tip [D] (2 ~ 3 mm, 0.08 ~ 0.12 in.).

Left Crankcase Bolt (M8) [3]

- Tighten the right and left crankcase bolts (M8) following the tightening sequence [1 ~ 8].

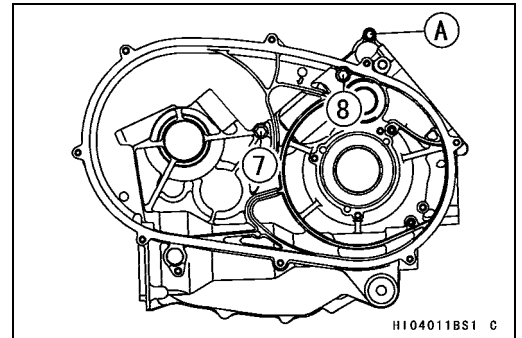
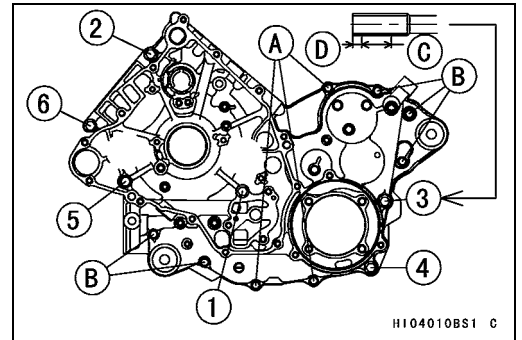
Torque - Crankcase Bolts (M8): 20 N·m (2.0 kgf·m, 14 ft·lb)

[1, 2, 5, 6] L = 75 mm (2.95 in.)
 [3, 4, 7, 8] L = 110 mm (4.33 in.)

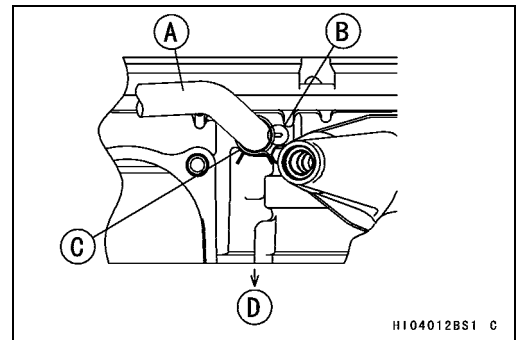
- Tighten:

Torque - Crankcase Bolts (M6): 9.8 N·m (1.0 kgf·m, 87 in·lb)

[A] L = 40 mm (1.57 in.)
 [B] L = 65 mm (2.56 in.)



- Install the breather tube [A] on the crankcase fitting.
- Align the white line on the tube with the mark [B] on the crankcase.
- Face the open end of the clamp [C] towards the left side [D] as shown.



- Apply grease to the steel ball [A] and spring [B].

- Install:

Steel Ball
 Spring
 Gasket [C]
 Shift Shaft Positioning Bolt [D]

- Tighten:

Torque - Shift Shaft Positioning Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Check:

Crankshaft and driven shaft turn freely.

- ★ If any of the shafts do not turn freely, split the crankcase to locate the problem.

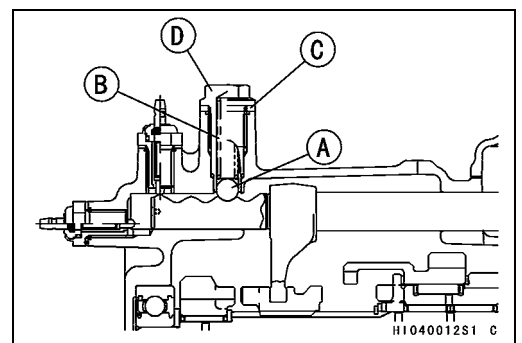
- Install the Oil Cover Cap.

Torque - Output Driven Bevel Gear Housing Cap Bolt: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Install

Output Drive Bevel Gear (see Output Drive Bevel Gear Installation in the Final Drive chapter)

Output Driven Bevel Gear (see Output Driven Bevel Gear Installation in the Final Drive chapter)

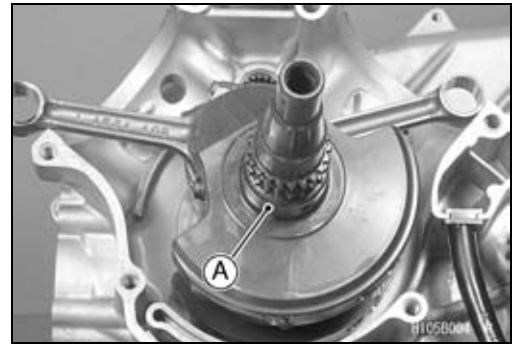


9-12 CRANKSHAFT/TRANSMISSION

Crankshaft/Connecting Rod

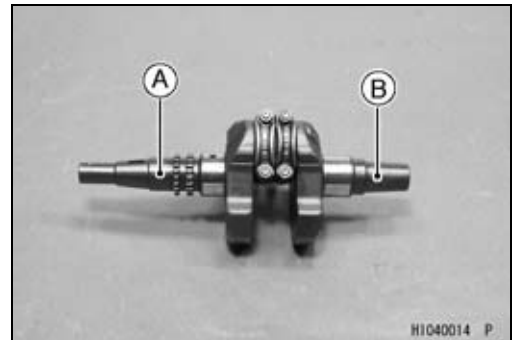
Crankshaft Removal

- Split the crankcase (see Crankcase Disassembly).
- Remove the crankshaft [A] from the crankcase using a press.



Crankshaft Installation

- The left shaft [A] of the crankshaft is longer than the right shaft [B].
- Apply engine oil to the both main journals.
- Insert the right crankshaft tapered end (the shorter end) into the right crankcase using a press.



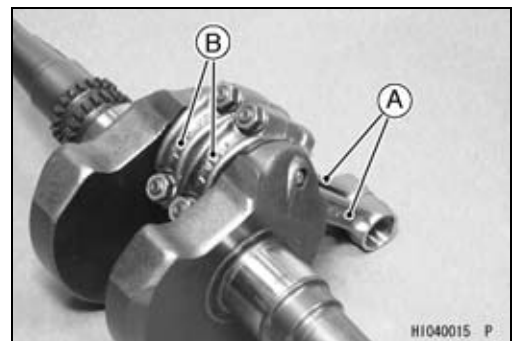
Connecting Rod Removal

- Remove the crankshaft (see Crankshaft Removal).
- Remove the connecting rods [A] from the crankshaft.

NOTE

○ Mark and record the locations of the connecting rods and their big end caps [B] so that they can be installed in their original positions.

- Remove the connecting rod big end nuts, and take off the rod and cap with the bearing inserts.

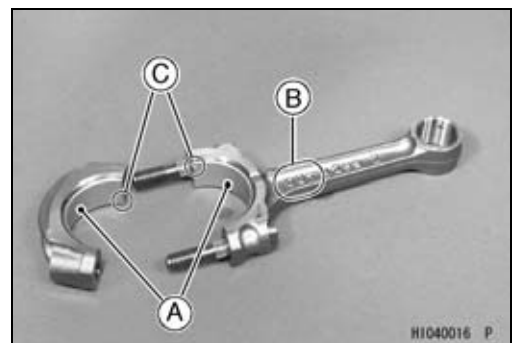


Connecting Rod Installation

CAUTION

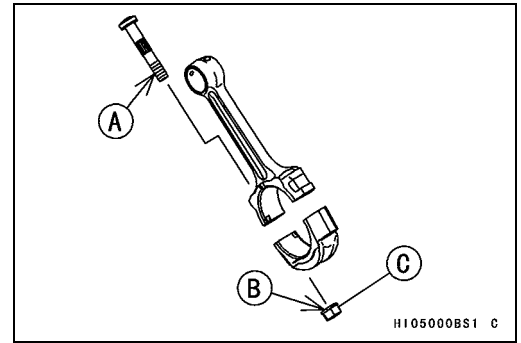
If the connecting rods, bearing inserts, or crankshaft are replaced with new ones, select the bearing insert and check clearance with a plastigage before assembling the engine to be sure the correct bearing inserts are installed.

- Apply molybdenum disulfide oil:
Inner Surface [A] of Bearing Inserts
- Face the "OUT" marks [B] of both connecting rods towards the outsides of the crankshaft.
- Fit the connecting rod cap so that the grooves [C] of the cap and connecting rod are on the same side.



Crankshaft/Connecting Rod

- Apply molybdenum disulfide oil:
 - Threads [A] of Connecting Rod Big End Cap Bolts
 - Seating Surface [B] of Connecting Rod Big End Cap Nuts [C]
- Tighten:
 - Torque - Connecting Rod Big End Cap Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)**

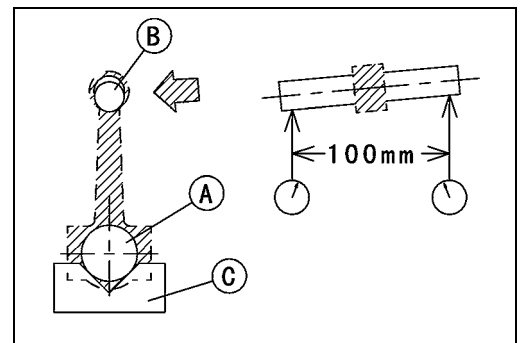


Crankshaft/Connecting Rod Cleaning

- 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 a 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 connecting rod bend exceeds the service limit, the connecting rod must be replaced.



Connecting Rod Bend

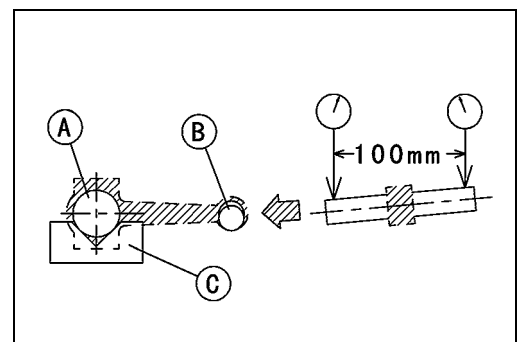
Service Limit: TIR 0.2/100 mm (0.008/3.94 in.)

Connecting Rod Twist Inspection

- With the big-end arbor [A] still on the V block [C], hold the connecting rod horizontally and measure the amount that the arbor [B] varies from being parallel with the surface plate over a 100 mm (3.94 in.) length of the arbor to determine the amount of connecting rod twist.
- ★ If connecting rod twist exceeds the service limit, the connecting rod must be replaced.

Connecting Rod Twist

Service Limit: TIR 0.2/100 mm (0.008/3.94 in.)



9-14 CRANKSHAFT/TRANSMISSION

Crankshaft/Connecting Rod

Connecting Rod Big End Side Clearance Inspection

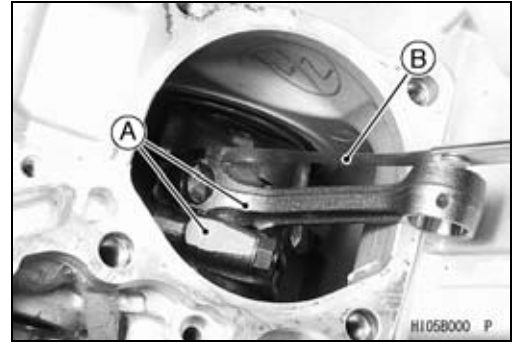
- Measure the side clearance of the connecting rod big end [A].
- Insert a thickness gauge [B] between the big end and either crank web to determine clearance.

Connecting Rod Big End Side Clearance

Standard: 0.16 ~ 0.46 mm (0.0063 ~ 0.0181 in.)

Service Limit: 0.7 mm (0.028 in.)

- ★ If the clearance exceeds the service limit, replace the connecting rod with new one and then check clearance again. If clearance is too large after connecting rod replacement, the crankshaft also must be replaced.



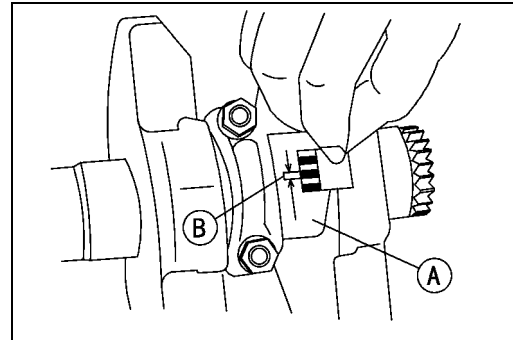
Connecting Rod Big End Bearing/Crankpin Wear Inspection

- Measure the bearing insert/crankpin [A] clearance with plastigage [B].
- Tighten the big end nuts to the specified torque.

Torque - Connecting Rod Big End Cap Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)

NOTE

- Do not move the connecting rod and crankshaft during clearance measurement.



Connecting Rod Big End Bearing, Insert/Crankpin Clearance

Standard: 0.028 ~ 0.052 mm (0.0011 ~ 0.0020 in.)

Service Limit: 0.09 mm (0.0035 in.)

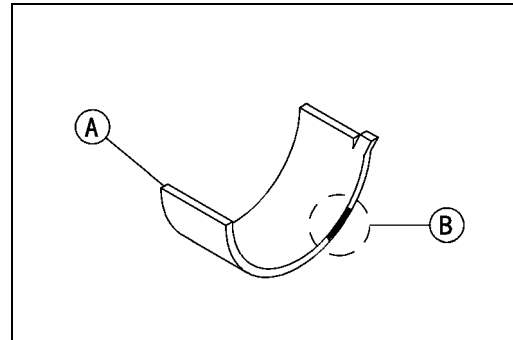
- ★ If the clearance is within the standard, no bearing insert replacement is required.
- ★ If the clearance is between 0.052 mm (0.0020 in.) and the service limit 0.09 mm (0.0035 in.), replace the bearing inserts [A] with inserts painted green [B]. Check insert/crankpin clearance with plastigage. The 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 crankpin.

Crankpin Diameter

Standard: 39.984 ~ 40.000 mm (1.5742 ~ 1.5748 in.)

Service Limit: 39.97 mm (1.5736 in.)

- ★ If the crankpin has worn past the service limit, replace the crankshaft with a new one.



Crankshaft/Connecting Rod

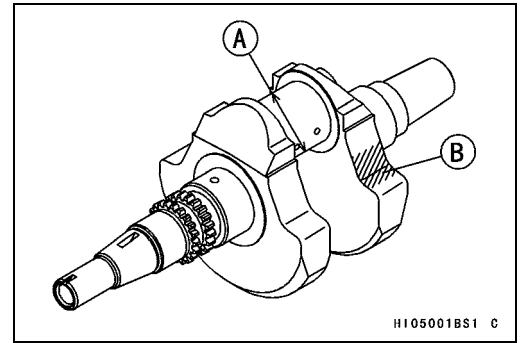
★If the measured crankpin diameter [A] is not less than the service limit, but does not coincide with the original diameter marking on the crankshaft, make a new mark on it.

Crankpin Diameter Marks

None: 39.984 ~ 39.992 mm (1.5742 ~ 1.57449 in.)

○: 39.993 ~ 40.000 mm (1.57452 ~ 1.5748 in.)

Crankpin Diameter Mark [B]: “○” mark or no mark



- Measure the connecting rod big end inside diameter, and mark each connecting rod big end in accordance with the inside diameter.
- Tighten the big end nuts to the specified torque.

Torque - Connecting Rod Big End Cap Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)

NOTE

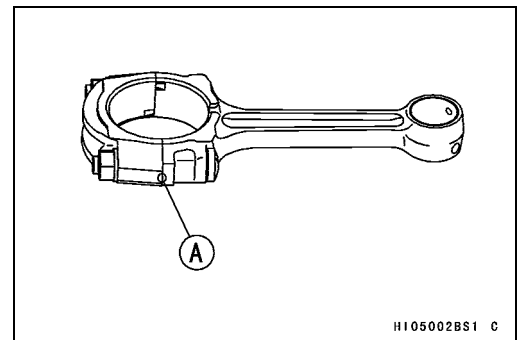
○The mark already on the big end should almost coincide with the measurement because of little wear.

Connecting Rod Big End Inside Diameter Marks

None: 43.000 ~ 43.008 mm (1.6929 ~ 1.69323 in.)

○: 43.009 ~ 43.016 mm (1.69326 ~ 1.6935 in.)

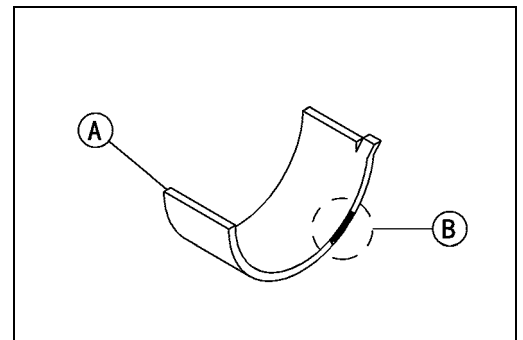
Diameter Mark [A]: “○” mark or no mark



- Select the proper bearing insert [A] in accordance with the combination of the connecting rod and crankshaft coding. Size Color [B]

Big End Bearing Insert Selection

Con-rod Big End Bore Diameter Marking	Crankpin Diameter Mark	Bearing Insert	
		Size Color	Part Number
None	○	Brown	92028-1963
None	None	Yellow	92028-1962
○	○		
○	None	Green	92028-1961



- Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.

9-16 CRANKSHAFT/TRANSMISSION

Crankshaft/Connecting Rod

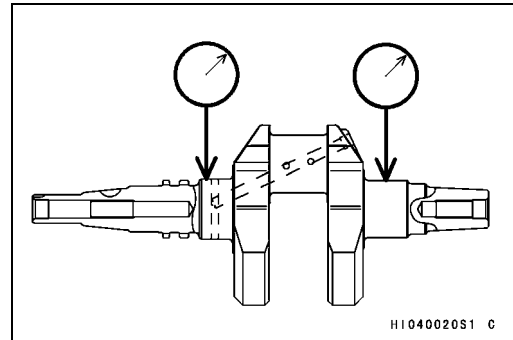
Crankshaft Runout Inspection

- Measure the crankshaft runout.
- ★ If the measurement exceeds the service limit, replace the crankshaft.

Crankshaft Runout

Standard: TIR 0.04 mm (0.0016 in.) or less

Service Limit: TIR 0.10 mm (0.0039 in.)



Crankshaft Main Bearing/Journal Wear Inspection

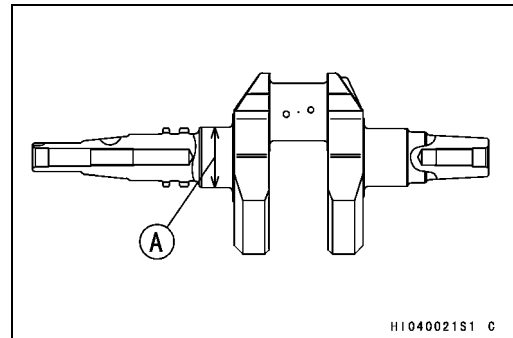
- Measure the diameter [A] of the crankshaft main journal.

Crankshaft Main Journal Diameter

Standard: 41.984 ~ 42.000 mm (1.6529 ~ 1.6535 in.)

Service Limit: 41.96 mm (1.652 in.)

- ★ If any journal has worn past the service limit, replace the crankshaft with a new one.



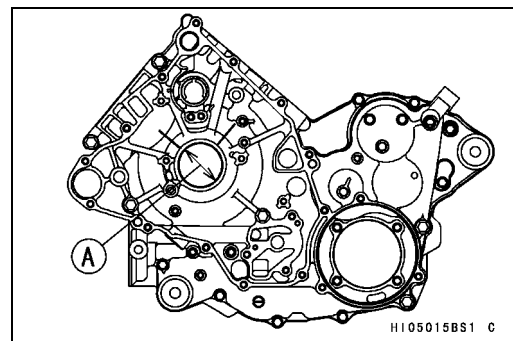
- Measure the main bearing bore diameter [A] in the crankcase halves.

Crankcase Main Bearing Bore Diameter

Standard: 42.025 ~ 42.041 mm (1.6545 ~ 1.6552 in.)

Service Limit: 42.08 mm (1.6567 in.)

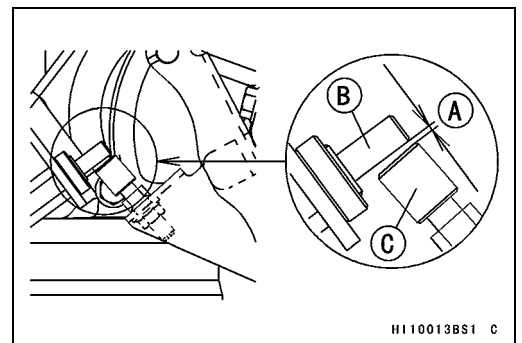
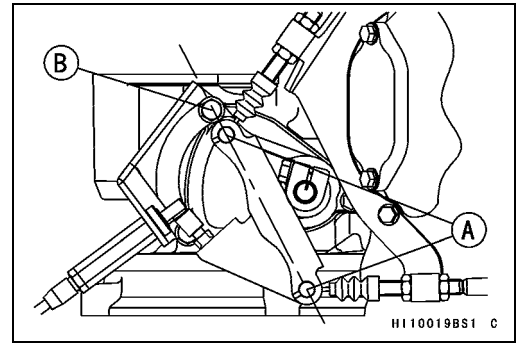
- ★ If there is any signs of seizure, damage, or excessive wear, replace the crankcase halves as a set.



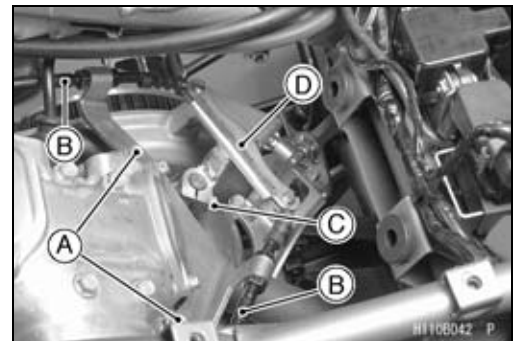
Transmission

Shift Lever Removal

- Remove:
 - Seat and Rear Fender (see Seat, Rear Fender Removal in the Frame chapter)
 - Air Cleaner Cover and Right Side Inner Cover (see Air Cleaner Cover, Side Inner Cover Removal in the Frame chapter)
 - Battery and Rear Ignition Coil (see Battery, Ignition Coil Removal in the Electrical System chapter)
- Make sure that the shift control grip is in neutral position.
- Make sure that the shift lever is in neutral position.
- Neutral position is the place that the shift control cable lower ends [A] aligned with the reverse cable bracket mounting bolt [B].
- At neutral position.
 - 1 mm (0.04 in.) [A]
 - Reverse Cable End [B]
 - Screw [C]

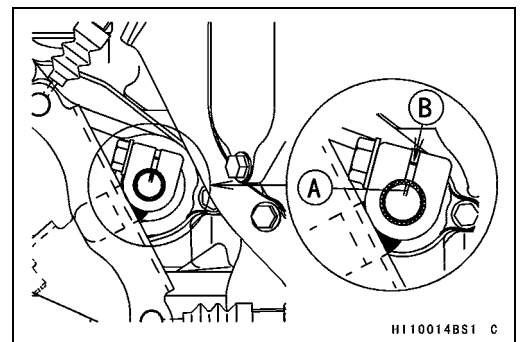


- Remove the cable holder mounting bolts [A].
- Remove the shift control cables [B] from the shift shaft lever.
- Remove the shift shaft lever bolt [C].
- Remove the shift shaft lever [D] from the shift shaft.



Shift Lever Installation

- Install the shift shaft lever to the shift shaft.
- When installing shift shaft lever, align the mark [A] on the shaft end with the slit [B] of the shift shaft lever.
- Tighten the shift shaft lever bolt.
 - Torque - Shift Shaft Lever Bolt: 14 N·m (1.4 kgf·m, 10 ft·lb)**
- Install the shift control cables to the shift shaft lever.
- Install the cable holder and tighten the cable holder mounting bolts.
 - Torque - Cable Holder Mounting Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)**
- Adjust the shift control cables free play (see Shift Control Grip Free Play Adjustment in the Periodic Maintenance chapter).

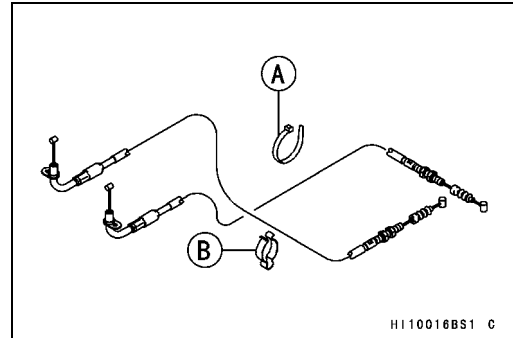
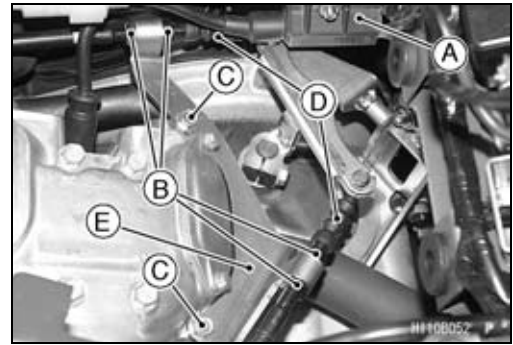


9-18 CRANKSHAFT/TRANSMISSION

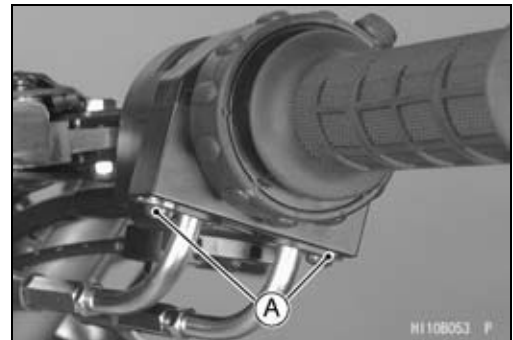
Transmission

Shift Control Cables Removal

- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Battery and Rear Ignition Coil [A] (see Battery, Ignition Coil Removal in the Electrical System chapter)
- Loosen the adjusting nuts [B].
- Remove the cable holder mounting bolts [C].
- Remove the shift control cables [D] from the shift shaft lever.
- Remove the shift control cables from the cable holder [E].
- Remove the band [A] and clamp [B].



- Remove the shift control grip screws [A].
- Remove the shift control cables from the shift control grip.



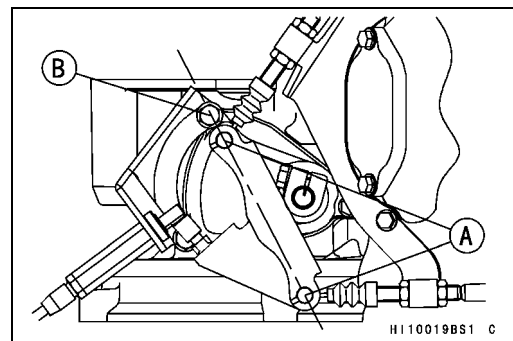
Shift Control Cables Installation

- Make sure that the shift lever is in neutral position.
- Neutral position is the place that the shift control cable lower ends [A] aligned with the reverse cable bracket mounting bolt [B].
- Lubricate the shift control cables before installation.
- Route the shift control cables correctly according to the Appendix chapter.

⚠ WARNING

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

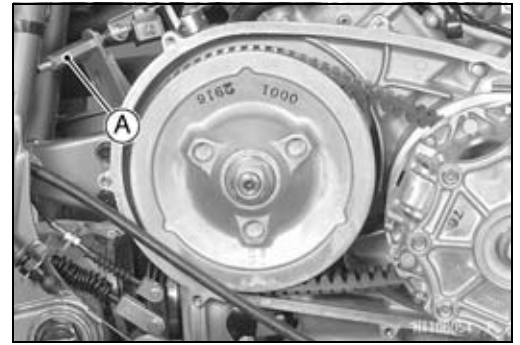
- Adjust the shift control cables free play (see Shift Control Grip Free Play Adjustment in the Periodic Maintenance chapter).



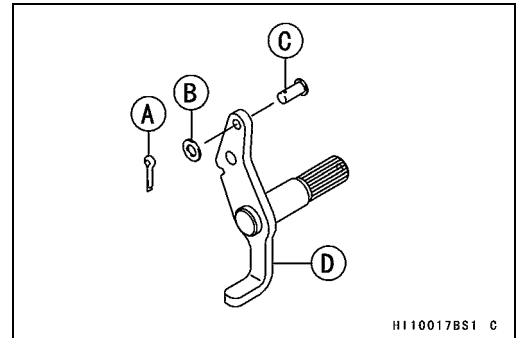
Transmission

Reverse Lock Cable Removal

- Remove:
 - Right Foot Guard (see Foot Guard and Stay Removal in the Frame chapter)
 - Torque Converter Cover (see Torque Converter Cover Removal in the Converter System chapter)
- Remove the reverse lock cable locknut [A].

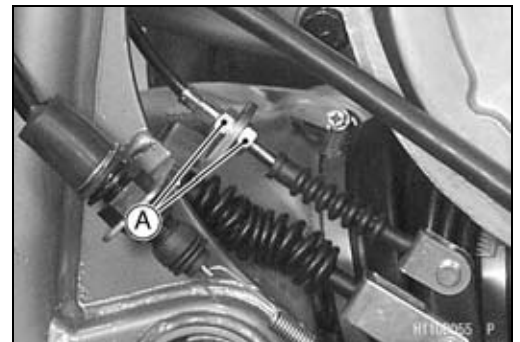


- Remove the cotter pin [A], washer [B] and pin [C].
- Remove the reverse lock cable from the lever [D].



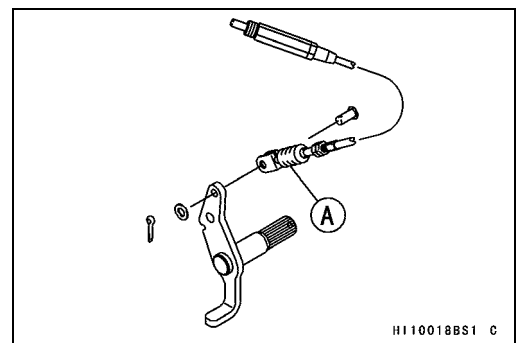
HI10017BS1 C

- Loosen the locknuts [A] and remove the reverse lock cable from the frame.



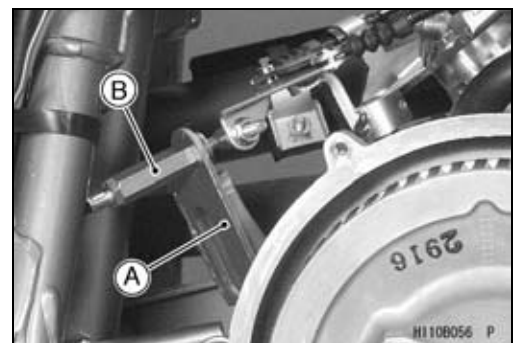
Reverse Lock Cable Installation

- Lubricate the reverse lock cable before installation.
- Install the reverse lock cable to the frame.
- Tighten the locknuts temporarily.
- Install the reverse lock cable [A] to the lever.
- Replace the cotter pin with a new one.
- Install the pin, washer and cotter pin.
- Bend the end of cotter pin surely.



HI10018BS1 C

- Install the reverse lock cable in the reverse lock cable bracket [A].
- Tighten the reverse lock cable locknut [B].
 - Torque - Reverse Cable Locknut: 12 N·m (1.2 kgf·m, 104 in·lb)**
- Tighten the locknuts securely.



9-20 CRANKSHAFT/TRANSMISSION

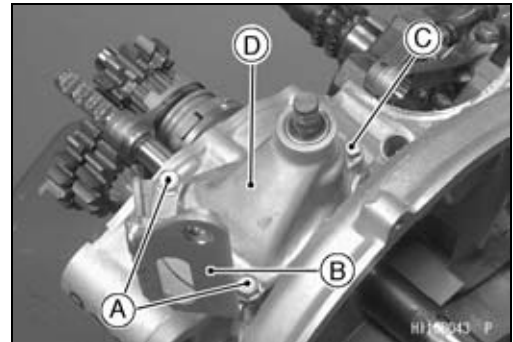
Transmission

Transmission Removal

- Remove the shift lever (see Shift Lever Removal).
- Split the crankcase (see Crankcase Disassembly).

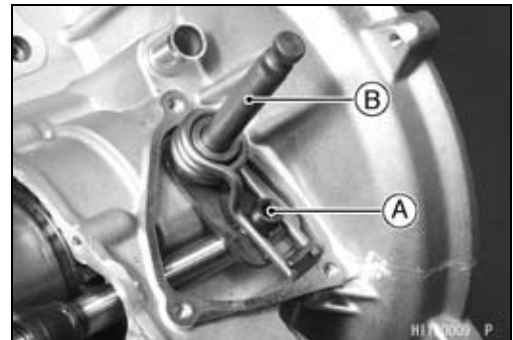
- Remove:

- Reverse Lock Cable Bracket Mounting Bolts [A]
- Reverse Lock Cable Bracket [B]
- Shift Shaft Cover Bolt [C]
- Shift Shaft Cover [D]



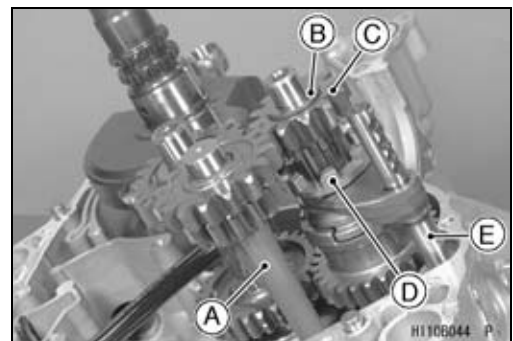
- Remove:

- Shift Shaft Spring Bolt [A]
- Shift Shaft [B]



- Remove:

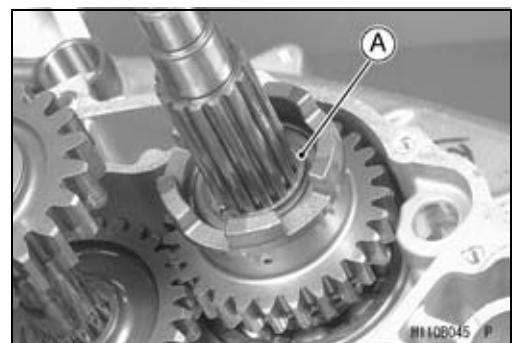
- Reverse Idle Shaft [A]
- Spacer [B]
- Reverse Drive Gear [C], Needle Bearing and Spacer Shifter [D]
- Shift Rod [E]



- Remove:

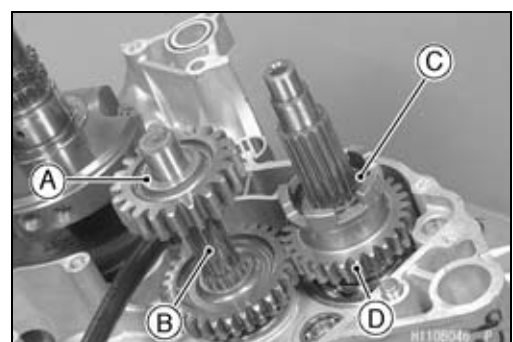
- Circlip [A]

Special Tool - Outside Circlip Pliers: 57001-144



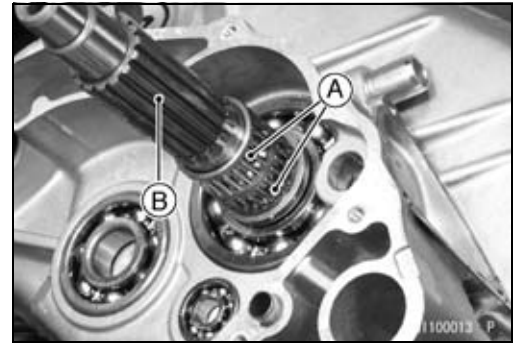
- Remove:

- Spacer [A]
- Idle Gear Assembly [B] and Spacer
- Toothed Washer and Spacer [C]
- High Gear [D]



Transmission

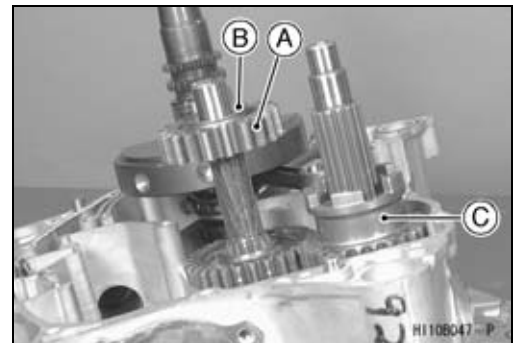
- Remove:
Needle Bearings [A]
- Remove the driven shaft [B] from the crankcase using a press.



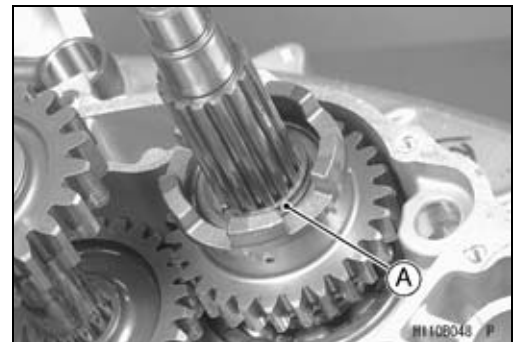
Transmission Installation

- Insert the driven shaft in the crankcase until it is bottomed using a press.
- Apply engine oil to the needle bearings and install them.

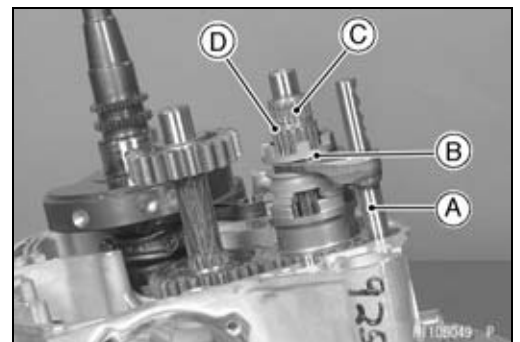
- Install:
Spacer and Idle Gear Assembly [A]
Spacer [B]
High Gear [C]



- Install:
Spacer
Toothed Washer [A]
Circlip
- Special Tool - Outside Circlip Pliers: 57001-144**



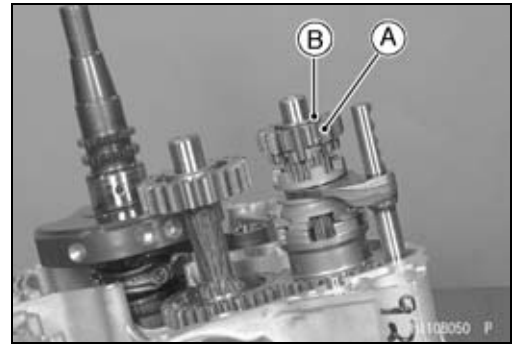
- Apply engine oil:
Shift Rod [A] and Shift Fork Ear [B]
Needle Bearing [C]
- Install:
Shift Rod with Shifter
Spacer [D]
Needle Bearing



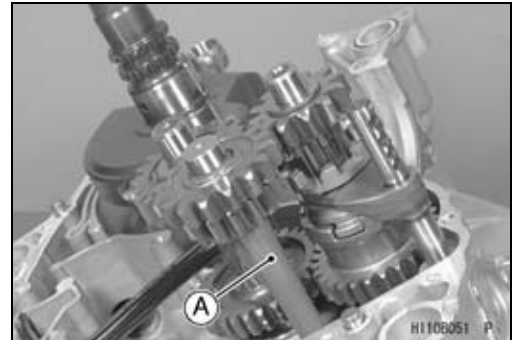
9-22 CRANKSHAFT/TRANSMISSION

Transmission

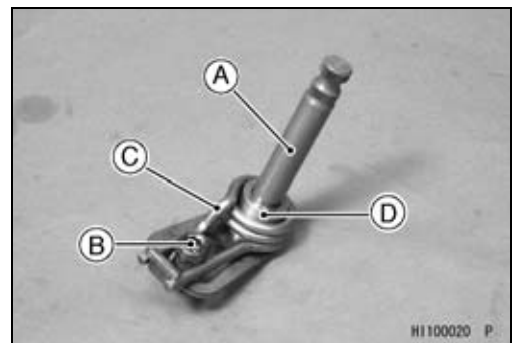
- Install:
 - Reverse Drive Gear [A]
 - Spacer [B]



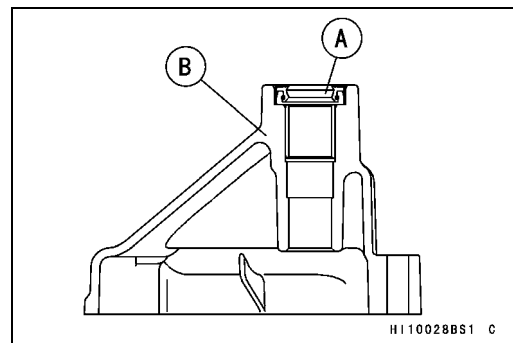
- Install:
 - Reverse Idle Shaft [A]



- Apply molybdenum disulfide oil to the shift shaft [A].
- Install:
 - Shift Shaft Spring Bolt [B]
 - Spring [C]
 - Guide [D]
- Apply a non-permanent locking agent:
 - Shift Shaft Spring Bolt
- Tighten:
 - Torque - Shift Shaft Spring Bolt: 25 N-m (2.5 kgf-m, 18 ft-lb)**



- When an oil seal [A] is installed in the shift shaft cover [B], press and insert the new oil seal so that its surface is flush with the end of the hole.

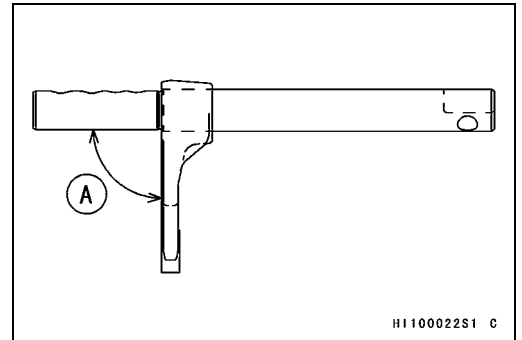


- Install:
 - Shift Shaft Cover
- Tighten:
 - Torque - Shift Shaft Cover Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)**

Transmission

Shift Fork Bending Inspection

- Visually inspect the shift fork.
- ★ If the fork is bent, replace the shift rod with a new one. A bent fork could cause difficulty in shifting, or allow the transmission to jump out of gear when under power. [A] 90°



Shift Fork/Gear and Shifter Groove Wear Inspection

- Measure the thickness of the shift fork ears [A], and measure the width [B] of the gear groove and shifter.
- ★ If the thickness of a shift fork ear is less than the service limit, the shift rod must be replaced.

Shift Fork Ear Thickness

Standard: 5.9 ~ 6.0 mm (0.2322 ~ 0.2362 in.)

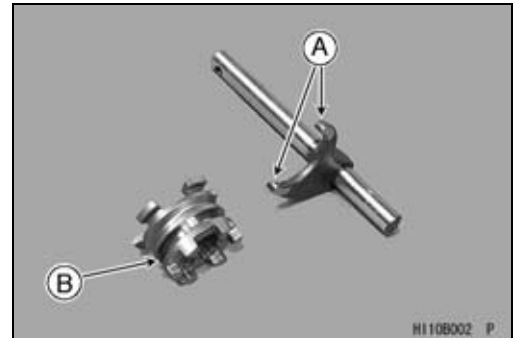
Service Limit: 5.8 mm (0.228 in.)

- ★ If the groove is worn over the service limit, the shifter must be replaced.

Shifter Groove Width

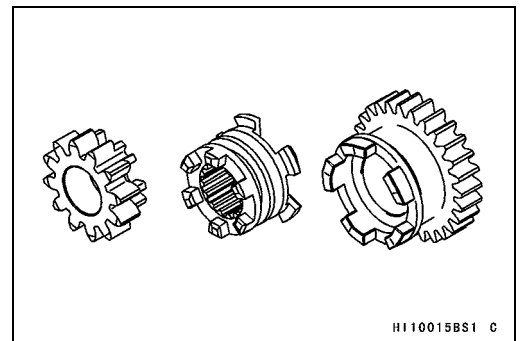
Standard: 6.05 ~ 6.15 mm (0.2382 ~ 0.2421 in.)

Service Limit: 6.25 mm (0.2460 in.)



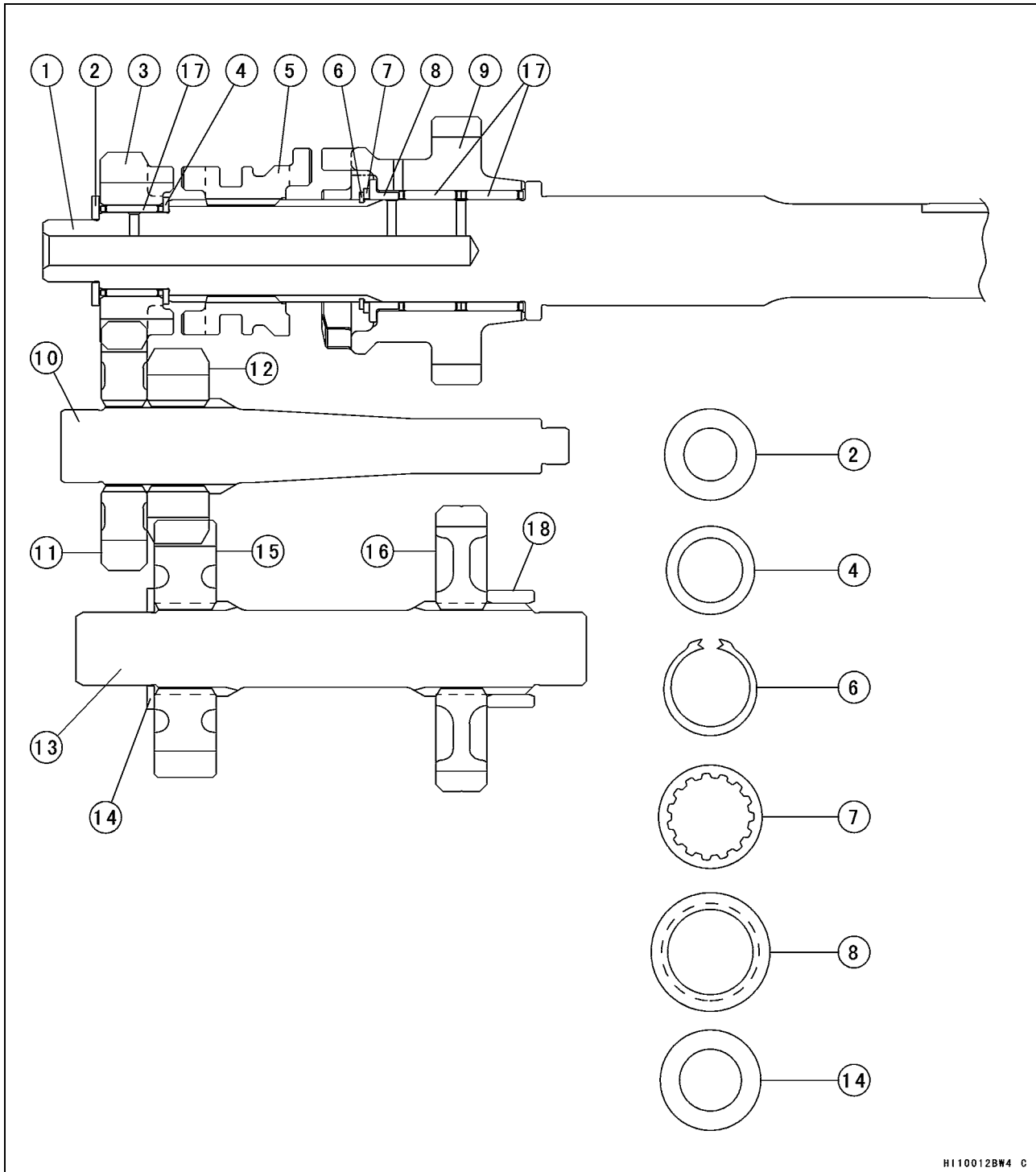
Transmission and Shift Mechanism Inspection

- Visually inspect:
 - Gears
 - Dogs of Gear and Shifter
- ★ If they are damaged or worn excessively, replace them.



9-24 CRANKSHAFT/TRANSMISSION

Transmission



HI10012BW4 C

- | | |
|-----------------------------|--------------------------------------|
| 1. Driven Shaft | 10. Reverse Idle Shaft |
| 2. Spacer (17.3 × 30 × 2.0) | 11. Reverse Driven Gear (16T) |
| 3. Reverse Gear (12T) | 12. Reverse Driven Output Gear (14T) |
| 4. Spacer (21.2 × 29 × 1.6) | 13. Idle Shaft |
| 5. Shifter | 14. Spacer (20.3 × 33 × 2.0) |
| 6. Snap Ring | 15. Driven Output Gear (20T) |
| 7. Washer T = 1.5 | 16. Driven Hi Gear (29T) |
| 8. Spacer (28 × 39 × 8) | 17. Needle Bearing |
| 9. Drive Hi Gear (27T) | 18. Spacer (25 × 32 × 13) |

Ball Bearing, Needle Bearing, and Oil Seal

Ball and Needle Bearing Replacement

CAUTION

Do not remove the ball or needle bearings unless it is necessary. Removal may damage them.

- Using a press or puller, remove the ball bearing and/or three needle bearings.

NOTE

○ In the absence of the above mentioned tools, satisfactory results may be obtained by heating the case to approximately 93°C (200°F) max., and tapping the bearing in or out.

CAUTION

Do not heat the case with a torch. This will warp the case. Soak the case in oil and heat the oil.

- Using a press and the bearing driver set [A], install the new ball bearing until it stops at the bottom of its housing.
- Three new needle bearings must be pressed into the crankcase so that the end is flush with the end of the hole.

Special Tool - Bearing Driver Set: 57001-1129

Ball and Needle Bearing Wear Inspection

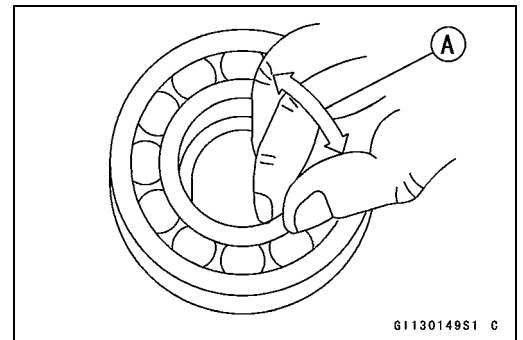
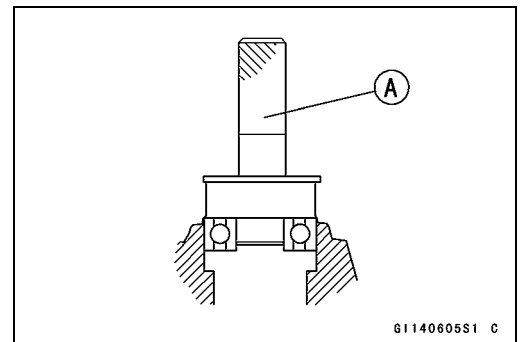
CAUTION

Do not remove the bearings for inspection. Removal may damage them.

- Check the ball bearings.
 - Since the ball bearings are made to extremely close tolerances, the wear must be judged by feel rather than measurement. Clean each bearing in a high flash-point solvent, dry it (do not spin the bearing while it is dry), and oil it with engine oil.
 - Spin [A] the bearing by hand to check its condition.
 - ★ If the bearing is noisy, does not spin smoothly, or has any rough spots, replace it.
- Check the needle bearings.
 - The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.
 - ★ If there is any doubt as to the condition of a needle bearing, replace it.

Oil Seal Inspection

- Inspect the oil seals.
 - ★ Replace it if the lips are misshapen, discolored (indicating that the rubber has deteriorated), hardened or otherwise damaged.



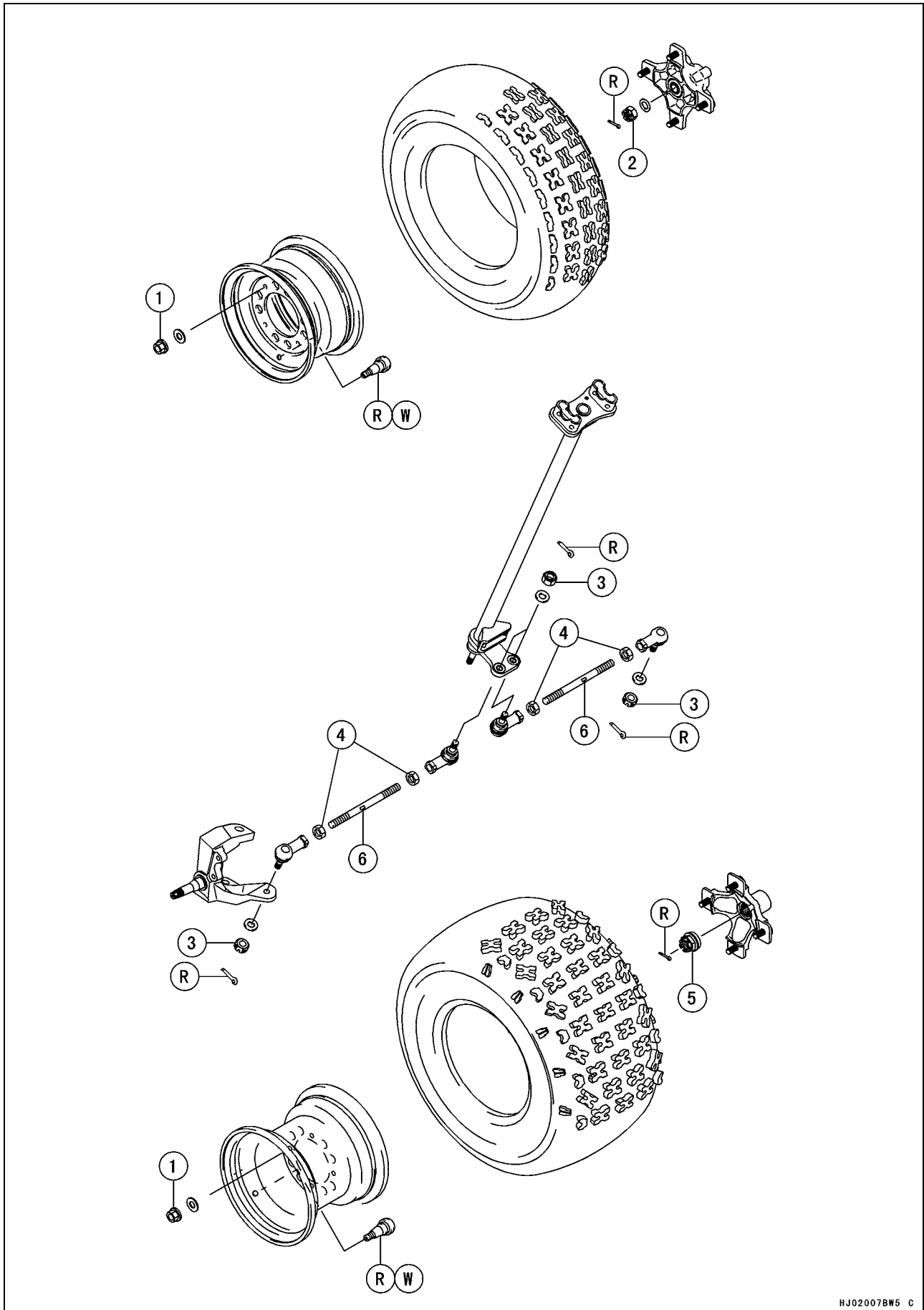
Wheels/Tires

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10-2 WHEELS/TIRES

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Wheel Nuts	78	8.0	58	
2	Front Axle Nuts	52	5.3	38	
3	Tie-Rod End Nuts	42	4.3	31	
4	Tie-Rod Adjusting Locknuts	22	2.2	16	
5	Rear Axle Nuts	265	27	195	

6. Tie-rod: Install the width across flats side to the knuckle arm.

R: Replacement parts

W: Apply water or soap and water solution.

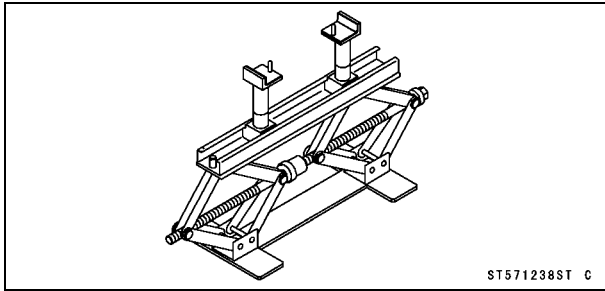
10-4 WHEELS/TIRES

Specifications

Item	Standard	Service Limit
Wheels (Rims)		
Rim Size:		
Front	10 x 5.5	---
Rear	10 x 8.5	---
Wheel Alignment		
Toe-in of Front Wheels	10 ±10 mm (0.39 ±0.39 in.) at 1G	---
Tires		
Standard Tire:		
Front	AT 22 X 7-10 HOLESHOT XC, Tubeless	---
Rear	AT 22 X 11-10 HOLESHOT XCT, Tubeless	---
Tire air pressure (when cold):		
Front	28 kPa (0.28 kgf/cm ² , 4.0 psi)	---
Rear	35 kPa (0.35 kgf/cm ² , 5.0 psi)	---
Maximum Tire Air Pressure (to seat beads, when cold)	250 kPa (2.5 kgf/cm ² , 36 psi)	---
Tire Tread Depth:		
Front	12.7 mm (0.5 in.)	3 mm (0.12 in.)
Rear	15.2 mm (0.6 in.)	3 mm (0.12 in.)

Special Tool

Jack:
57001-1238



10-6 WHEELS/TIRES

Wheel Alignment

Toe-in is the amount that the front wheels are closer together in front than at the rear at the axle height. When there is toe-in, the distance A (Rear) is the greater than B (Front) as shown.

The purpose of toe-in is to prevent the front wheels from getting out of parallel at any time, and to prevent any slipping or scuffing action between the tires and the ground. If toe-in is incorrect, the front wheels will be dragged along the ground, scuffing and wearing the tread knobs.

Caster and camber are build-in and require no adjustment.

$A \text{ (Rear) } - B \text{ (Front) } = \text{Amount of Toe-in}$
(Distance A and B are measured at axle height with the vehicle sitting on the ground, or at 1G.)

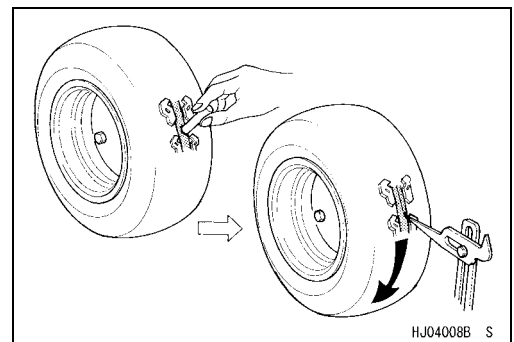
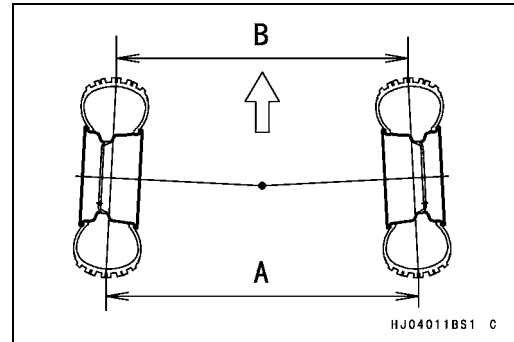
Toe-in Inspection

- Apply a heavy coat of chalk or a paint line near the center of the front tires.
- Using a needle nose scriber, make a thin mark near the center of the chalk coating while turning the wheel.

- With the front wheels on the ground, set the handlebar straight ahead.
- At the level of the axle height, measure the distance between the scribed or painted lines for both front and rear of the front tires.
- Subtract the measurement of the front from the measurement of the rear to get the toe-in.
- ★ If the toe-in is not in the specified range, go on to the Toe-in Adjustment procedure.

Toe-in of Front Wheels

Standard: $10 \pm 10 \text{ mm (} 0.39 \pm 0.39 \text{ in.) at 1G}$



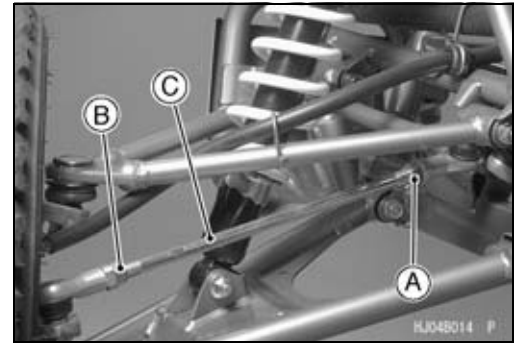
Wheel Alignment

Toe-in Adjustment

- Loosen the locknuts [A] [B] and turn the adjusting tie-rods [C] the same number of turns on both sides to achieve the specified toe-in.

NOTE

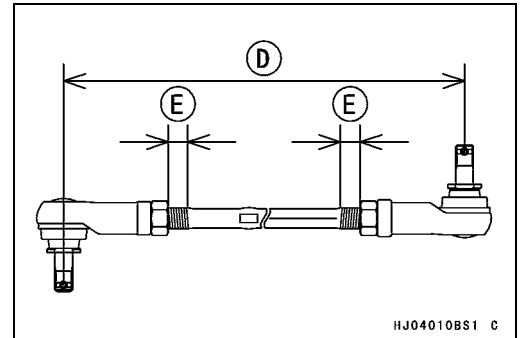
- The locknut [A] on the tie-rod has left-hand threads. Turn the locknut clockwise for loosening.
- The toe-in will be near the specified value, if the tie-rod length [D] is 386 ~ 389 mm (15.2 ~ 15.3 in.) on each tie-rod.



CAUTION

Adjust the tie-rod length so that the visible thread length [E] is even on both ends of the tie-rod. Uneven thread length could cause tie-rod end damage.

- Check the toe-in.
- Tighten:
 - Torque - Tie-Rod Adjusting Locknuts: 22 N·m (2.2 kgf·m, 16 ft·lb)
- Test ride the vehicle.



10-8 WHEELS/TIRES

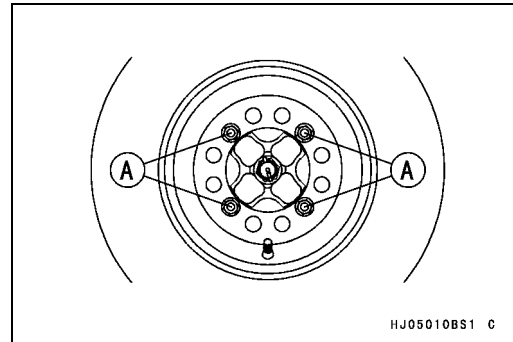
Wheels (Rims)

Wheel Removal

- Loosen the wheel nuts [A].
- Support the vehicle on a stand or a jack so that the wheels are off the ground.

Special Tool - Jack: 57001-1238

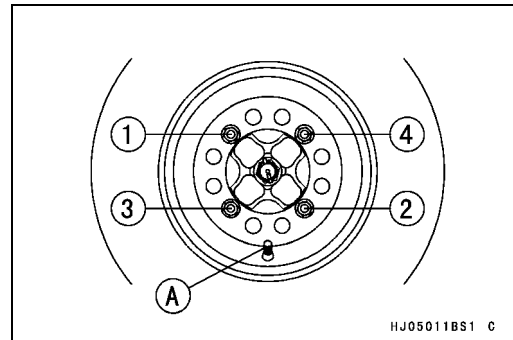
- Remove:
 - Wheel Nuts
 - Wheel



Wheel Installation

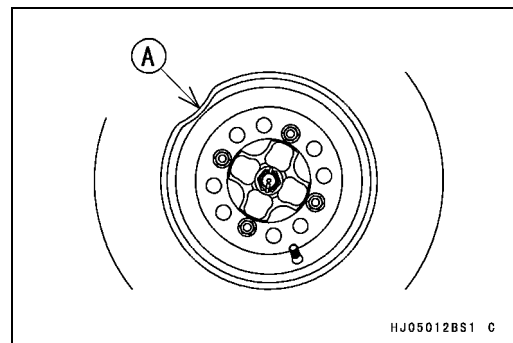
- Position the wheel so that the air valve [A] is toward the outside of the vehicle.
- Tighten the wheel nuts in a criss-cross pattern.

Torque - Wheel Nuts: 78 N·m (8.0 kgf·m, 58 ft·lb)

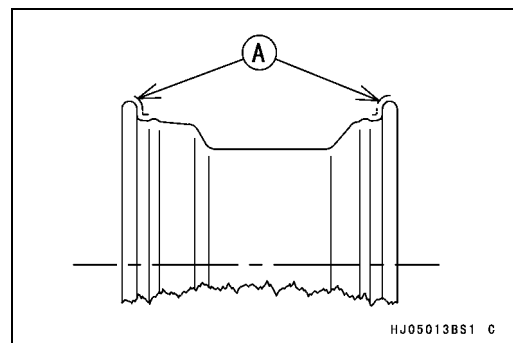


Wheel (Rim) Inspection

- Inspect both sides of the rim for dents [A]. If the rim is dented, replace it.



- ★ If the tire is removed, inspect the air sealing surfaces [A] of the rim for scratches or nicks. Smooth the sealing surfaces with fine emery cloth if necessary.



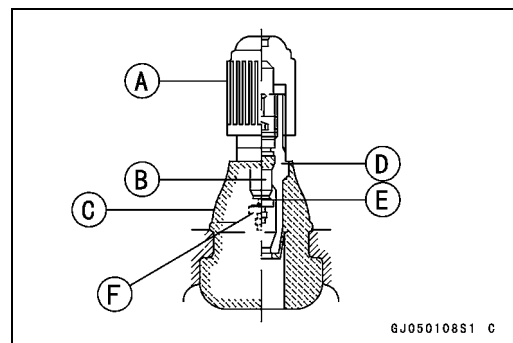
Wheel (Rim) Replacement

- Remove the wheel (see Wheel Removal).
- Disassemble the tire from the rim (see Tire Removal).
- Remove the air valve and discard it.

CAUTION

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

- Plastic Cap [A]
- Valve Core [B]
- Stem Seal [C]
- Valve Stem [D]
- Valve Seat [E]
- Valve Opened [F]



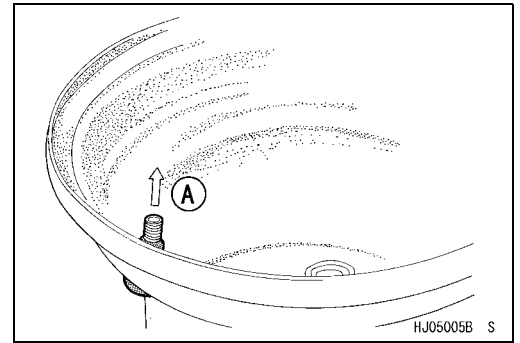
Wheels (Rims)

- Install a new air valve in the new rim.
- Remove the valve cap, lubricate the stem with a soap and water solution, and pull the stem [A] 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.

- Mount the tire on the new rim (see Tire Installation).
- Install the wheel (see Wheel Installation).

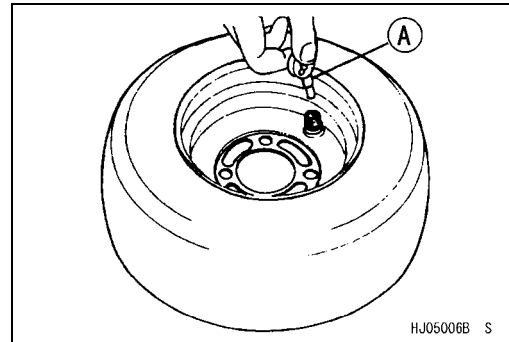


10-10 WHEELS/TIRES

Tires

Tire Removal

- Remove the wheel (see Wheel Removal).
- Unscrew the valve core to deflate the tire.
- Use a proper valve core tool [A].

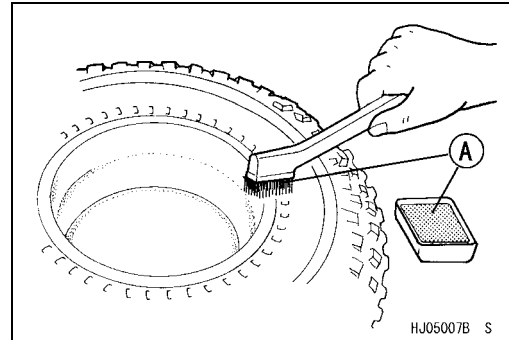


- Lubricate the tire beads and rim flanges on both sides of the wheel with a soap and water solution, or water [A]. This helps the tire beads slip off the rim flanges.

CAUTION

Do not lubricate the tire beads and rim flanges with engine oil or petroleum distillates because they will deteriorate the tire.

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



NOTE

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

Tire Installation

- Inspect the rim (see Wheel (Rim) Inspection).
- Replace the air valve with a new one.

CAUTION

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

- Check the tire for wear and damage (see Tire Inspection).
- Lubricate the tire beads and rim flanges with a soap and water solution, or water.

WARNING

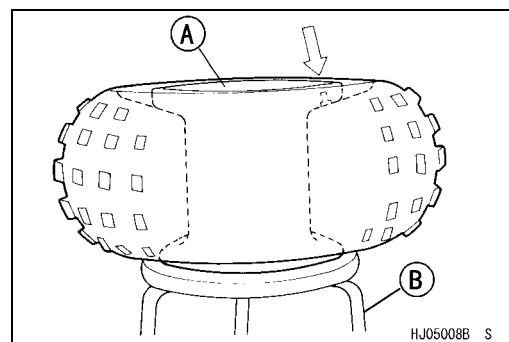
Do not use the lubricant other than a water and soap solution, or water to lubricate the tire beads and rim because it may cause tire separation.

- Support the wheel rim [A] on a suitable stand [B] to prevent the tire from slipping off.
- Inflate the tire until the tire beads seat on the rim.

Maximum Tire Air Pressure (to seat beads when cold)
Front and Rear: 250 kPa (2.5 kgf/cm², 36 psi)

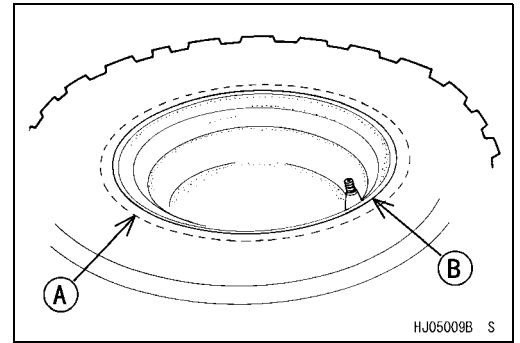
WARNING

Do not inflate the tire to more than the maximum tire air pressure. Overinflation can explode the tire with possibility of injury and loss of life.



Tires

- Check to see that rim lines [A] on both sides of the tire are parallel with the rim flanges [B].
- ★ If the rim lines and the rim flanges are not parallel, deflate the tire, lubricate the sealing surfaces again, and reinflate the tire.
- After the beads are properly seated, check for air leaks.
- Apply a soap and water solution around the tire bead and check for bubbles.
- Deflate the tire to the specified pressure.
- Check the tire pressure using an air pressure gauge.



NOTE

- *Kawasaki provides the air pressure gauge (P/N 52005-1082) with the owner's tool kit.*

Tire Air Pressure (when cold)

Front: 28 kPa (0.28 kgf/cm², 4.0 psi)

Rear: 35 kPa (0.35 kgf/cm², 5.0 psi)

- Install the wheel (see Wheel Installation).
- Wipe off the soap and water solution on the tire and dry the tire before operation.

▲ WARNING

Do not operate the vehicle with the water and soap still around the tire beads. They will cause tire separation, and a hazardous condition may result.

Tire Inspection

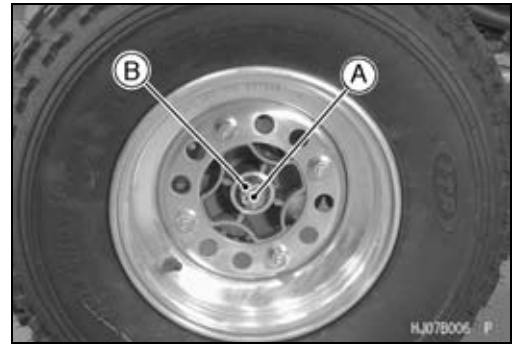
- Refer to the Tire Inspection in the Periodic Maintenance chapter.

10-12 WHEELS/TIRES

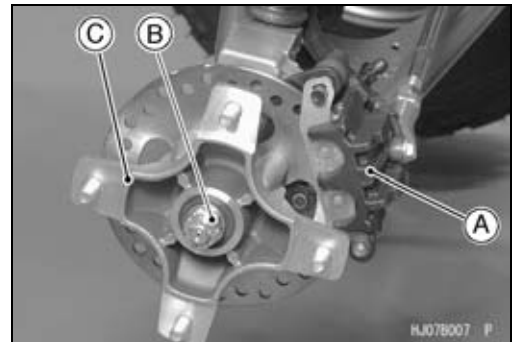
Front Hub

Front Hub Removal

- Remove:
 - Cotter Pin [A]
- Loosen the axle nut [B].



- Remove the wheel (see Wheel Removal).
- Remove the caliper [A] by taking off the mounting bolts, and let the caliper hang free.
- Remove the axle nut [B] and pull off the front hub [C] and brake disc.
- Separate the brake disc from the front hub.

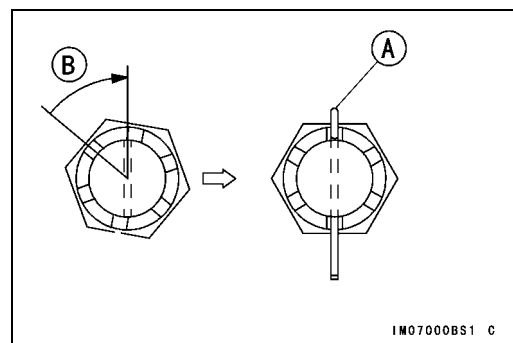


Front Hub Installation

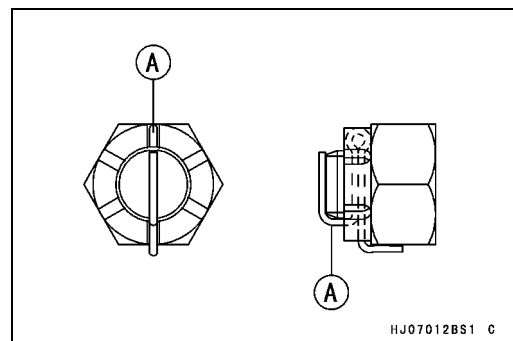
- Install the brake disc (see Front Brake Disc Installation in the Brakes chapter) to the front hub and install the front hub.
- Tighten:
 - Torque - Front Axle Nut: 52 N-m (5.3 kgf-m, 38 ft-lb)
- Insert a new cotter pin [A].

NOTE

- When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle shaft, 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.

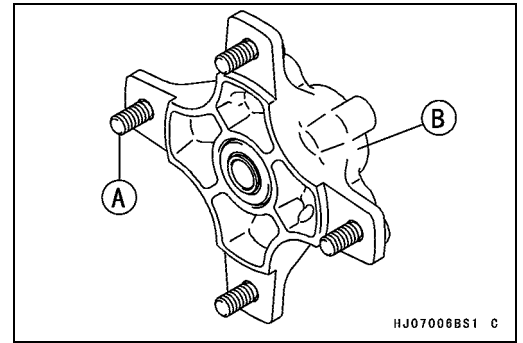


- Install:
 - Caliper (see Front Brake Caliper Installation)
 - Wheel (see Wheel Installation)

Front Hub

Front Hub Disassembly/Assembly

- Do not press the hub bolts [A] out.
- ★ If any hub bolt is damaged, replace the hub [B] and bolts as a unit.

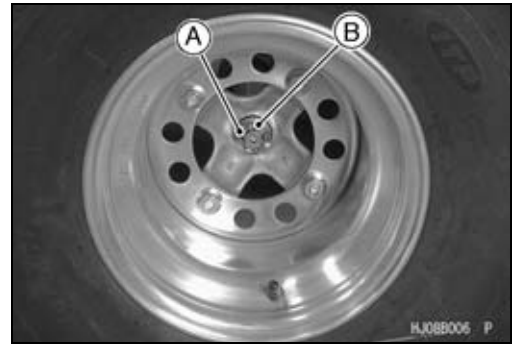


10-14 WHEELS/TIRES

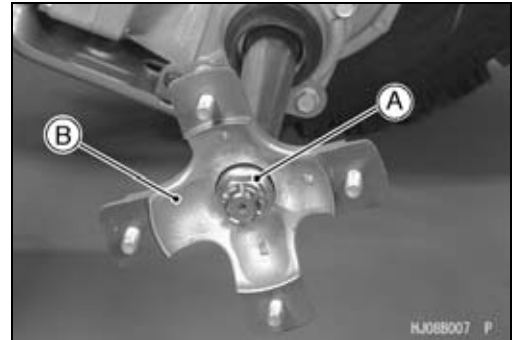
Rear Hub

Rear Hub Removal

- Remove:
 - Cotter Pin [A]
 - Loosen the axle nut [B].



- Remove:
 - Wheel (see Wheel Removal)
 - Axle Nut [A]
 - Rear Hub [B]

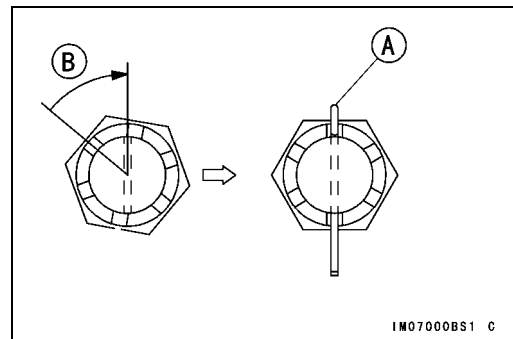


Rear Hub Installation

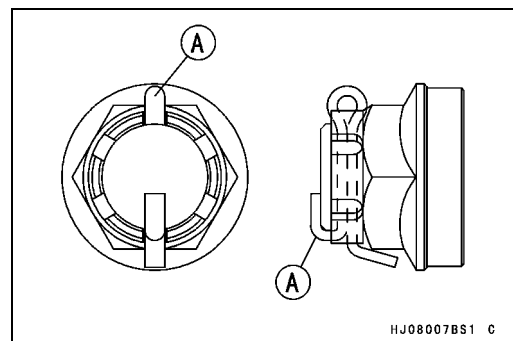
- Install:
 - Rear Hub
- Tighten:
 - Torque - Rear Axle Nuts: 265 N·m (27 kgf·m, 195 ft·lb)**
- Insert a new cotter pin [A].

NOTE

- When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle shaft, tighten the nut clockwise 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.

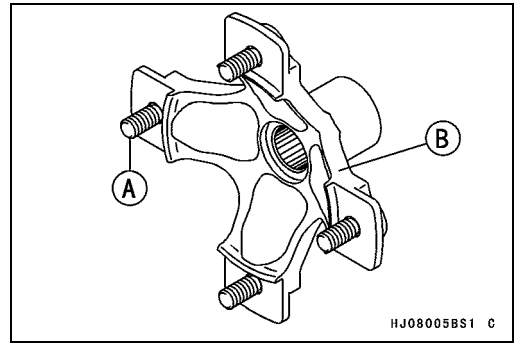


- Install:
 - Wheel (see Wheel Installation)

Rear Hub

Rear Hub Disassembly/Assembly

- Do not press the hub bolts [A] out.
- ★ If any hub bolt is damaged, replace the hub [B] and bolts as a unit.



Final Drive

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Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Output Driven Bevel Gear Housing Bolts	26	2.7	20	
2	Output Drive Bevel Gear Housing Bolts	26	2.7	20	
3	Output Driven Bevel Gear Bearing Holder	250	25.5	184	L
4	Bevel Gear Holder Nut	200	20.4	148	L
5	Output Drive Bevel Gear Bearing Holder	118	12	87	L
6	Output Shaft Holder Nut	200	20.4	148	L
7	Output Drive Bevel Gear Cover Bolts	8.8	0.90	78 in-lb	
8	Converter Fan Cover Bolts	8.8	0.90	78 in-lb	

G: Apply grease for oil seal and O-ring.

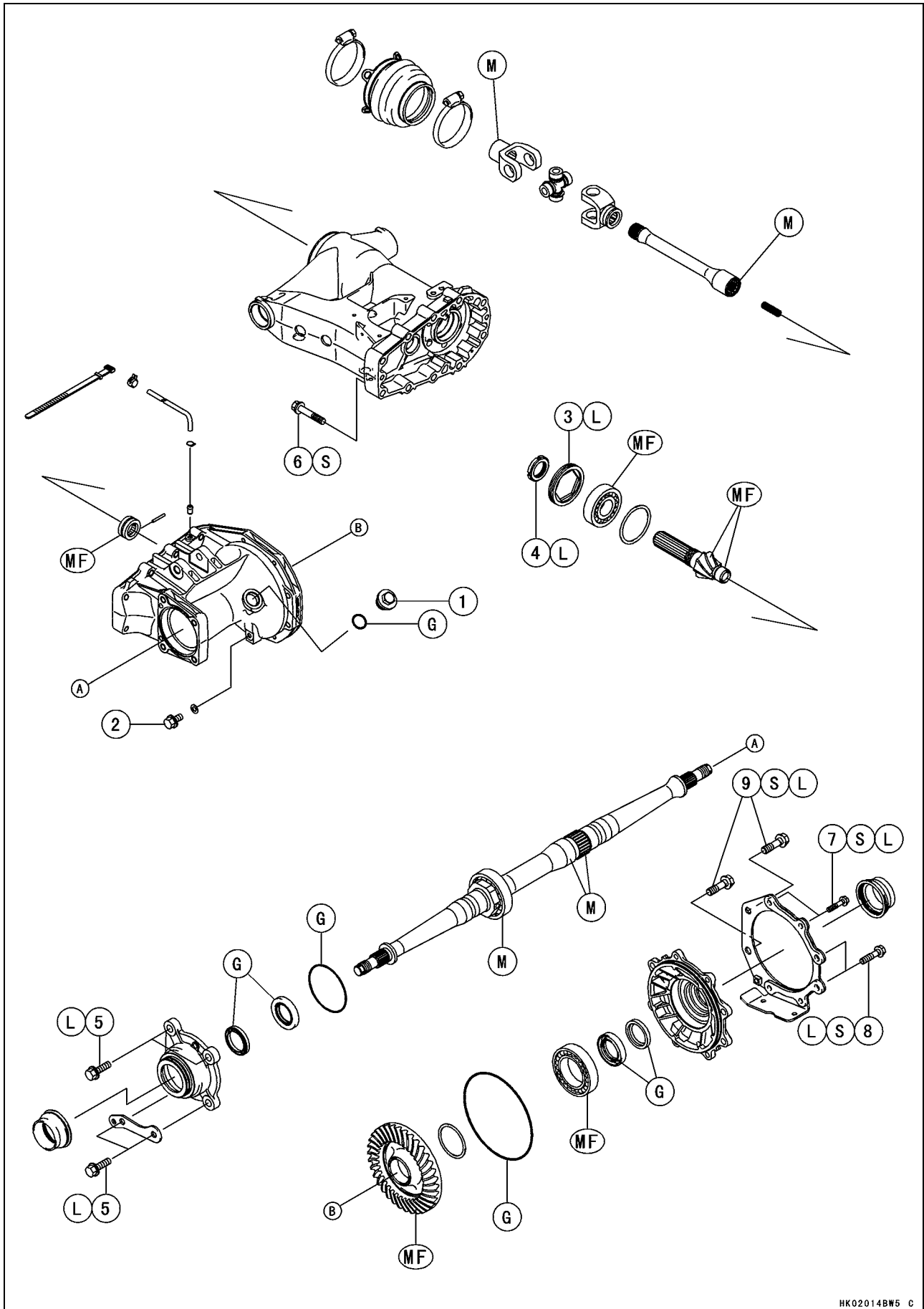
L: Apply a non-permanent locking agent.

M: Apply molybdenum disulfide grease.

MO: Apply molybdenum disulfide oil.

11-4 FINAL DRIVE

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Oil Filler Cap	29	3.0	22	
2	Oil Drain Bolt	20	2.0	14	
3	Pinion Gear Bearing Holder	137	14	101	L
4	Pinion Gear Bearing Holder Nut	157	16	116	L
5	Final Gear Case Left Cover Bolts	49	5.0	36	L
6	Final Gear Case Bolts	42	4.3	31	S
7	Final Gear Case Right Cover Bolts (M8)	24	2.4	17	L, S
8	Final Gear Case Right Cover Bolts (M10)	49	5.0	36	L, S
9	Final Gear Case Right Cover Bolts (M12)	94	9.6	69	L, S

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

M: Apply molybdenum disulfide grease.

MF: Apply MOBIL FLUID 424 or equivalent oil.

S: Follow the specific tightening sequence.

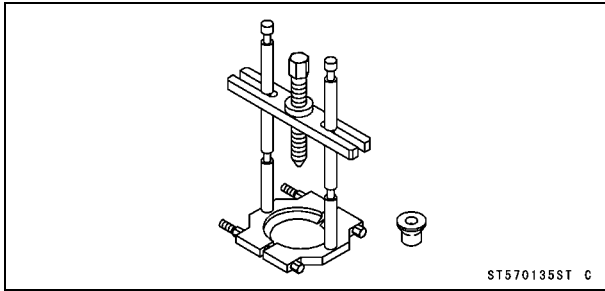
11-6 FINAL DRIVE

Specifications

Item	Standard	Service Limit
Output Bevel Gear Case Output Bevel Gear Backlash	0.05 ~ 0.11 mm (0.0020 ~ 0.0043 in.) (at output drive shaft spline)	— — —
Rear Axle Shaft Rear Axle Shaft Runout	TIR 1 mm (0.04 in.) or less	TIR 2 mm (0.08 in.)
Final Gear Case Gear Case Oil: Type	MOBIL Fluid 424 or CITGO TRANSGARD TRACTOR HYDRAULIC FLUID or EXXON HYDRAUL 560	— — —
Oil level	Filler opening bottom	— — —
Capacity	900 mL (0.95 US qt)	— — —
Final Bevel Gear Backlash	0.07 ~ 0.14 mm (0.003 ~ 0.006 in.) (at pinion gear spline)	— — —

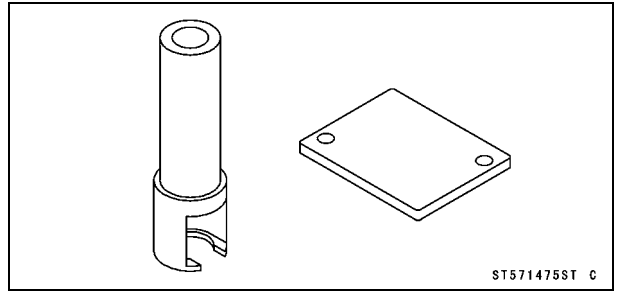
Special Tools

Bearing Puller:
57001-135



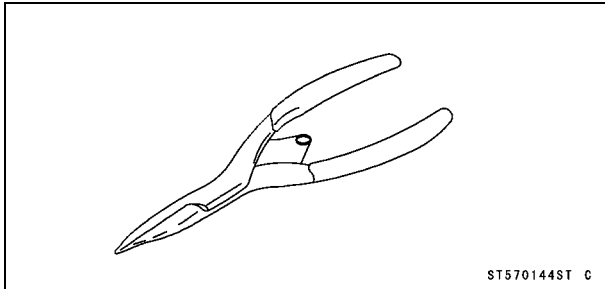
ST570135ST C

Damper Spring Compressor Set:
57001-1475



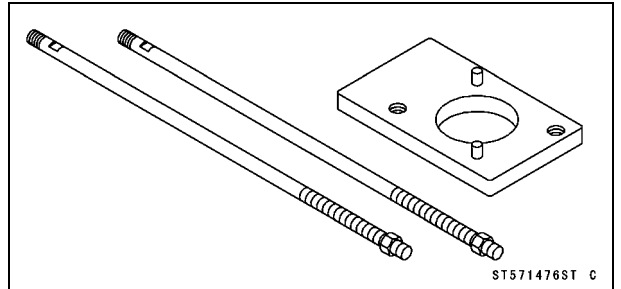
ST571475ST C

Outside Circlip Pliers:
57001-144



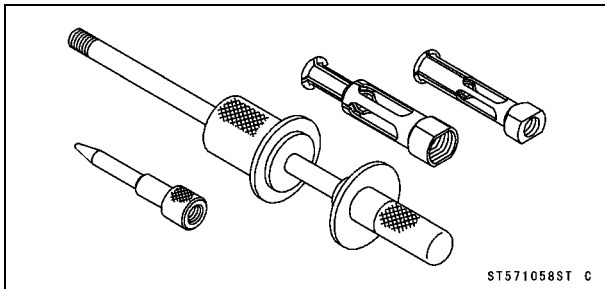
ST570144ST C

Holder & Guide Arbor:
57001-1476



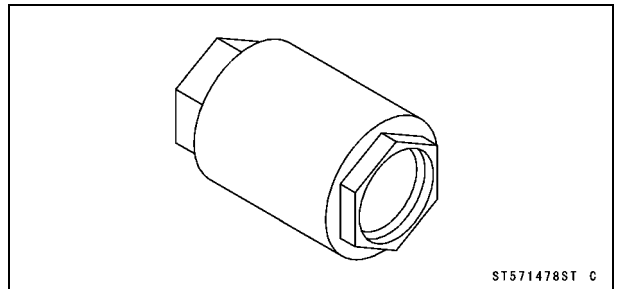
ST571476ST C

Oil Seal & Bearing Remover:
57001-1058



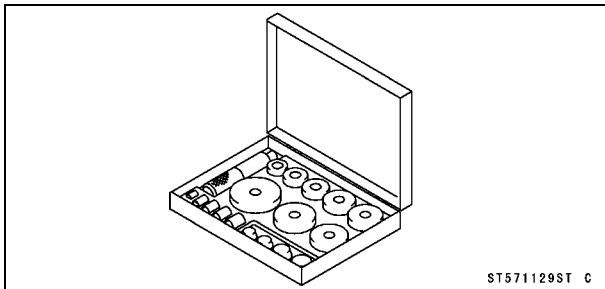
ST571058ST C

Socket Wrench, Hex 50:
57001-1478



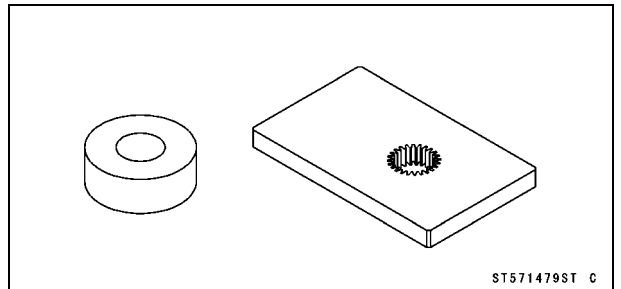
ST571478ST C

Bearing Driver Set:
57001-1129



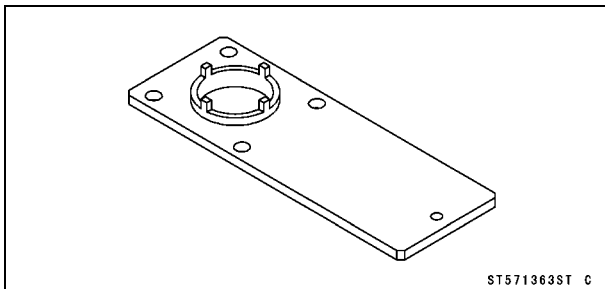
ST571129ST C

Output Shaft Holder & Spacer, m1.25:
57001-1479



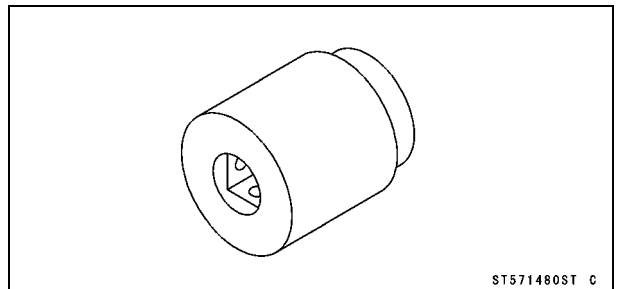
ST571479ST C

Socket Wrench:
57001-1363



ST571363ST C

Pinion Gear Holder, m1.667:
57001-1480



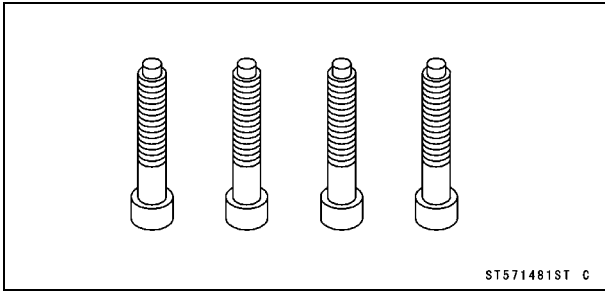
ST571480ST C

11-8 FINAL DRIVE

Special Tools

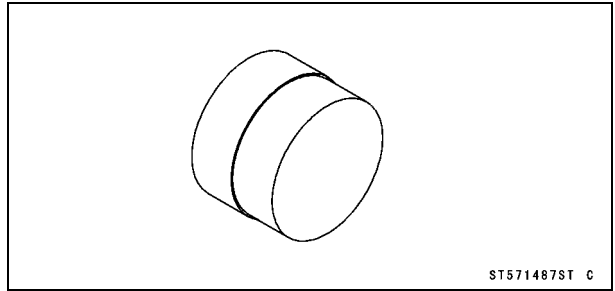
Nut Holding Bolts:

57001-1481



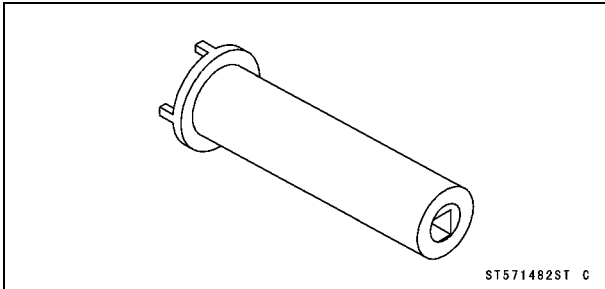
Oil Seal Driver, $\phi 47.5$:

57001-1487



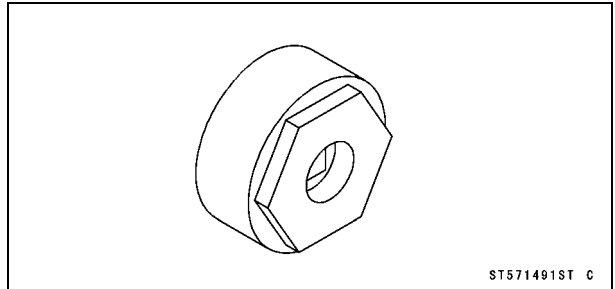
Socket Wrench:

57001-1482



Hexagon Wrench, Hex 41:

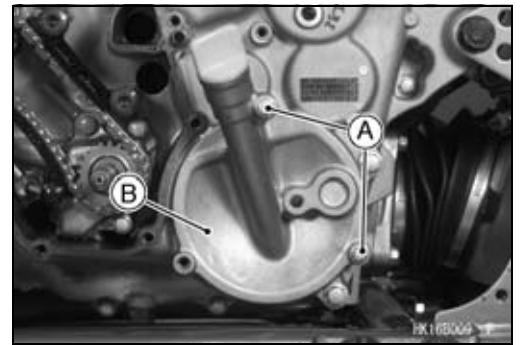
57001-1491



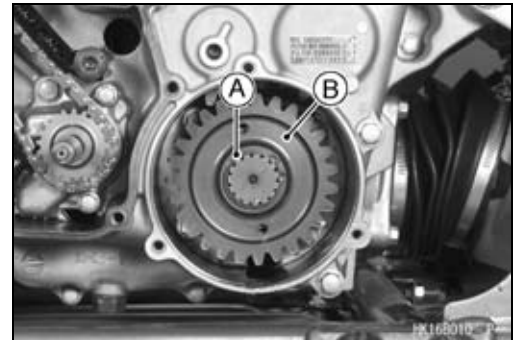
Output Bevel Gears

Output Drive Bevel Gear Removal

- Remove:
 - Oil Pipe (see Oil Pipe Removal in the Engine Lubrication System chapter)
 - Output Drive Bevel Gear Cover Bolts [A]
 - Output Drive Bevel Gear Cover [B]

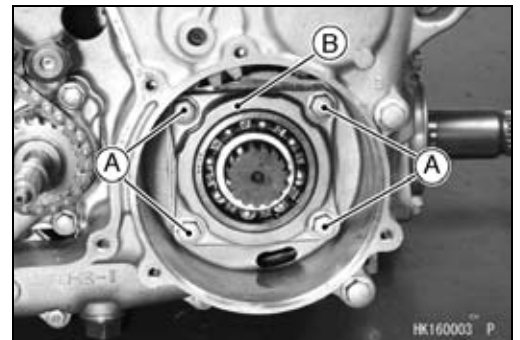


- Remove:
 - Circlip [A]**Special Tool - Outside Circlip Pliers: 57001-144**



- Remove:
 - Output Drive Idle Gear [B]

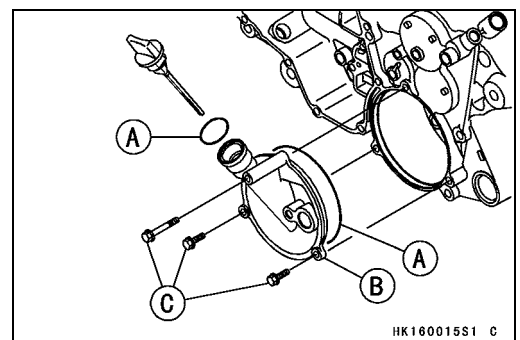
- Remove:
 - Output Drive Bevel Gear Housing Bolts [A]
 - Output Drive Bevel Gear Housing [B]



Output Drive Bevel Gear Installation

- Install the output drive bevel gear housing.
- Tighten:
 - Torque - Output Drive Bevel Gear Housing Bolts: 26 N-m (2.7 kgf-m, 20 ft-lb)**
- Install:
 - Output Drive Idle Gear
 - New Circlip**Special Tool - Outside Circlip Pliers: 57001-144**

- Apply grease:
 - O-rings [A]
- Install:
 - Output Drive Bevel Gear Cover [B]
- Tighten:
 - Torque - Output Drive Bevel Gear Cover Bolts [C]: 8.8 N-m (0.90 kgf-m, 78 in-lb)**

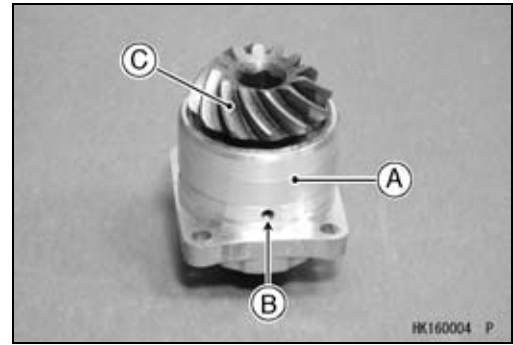


11-10 FINAL DRIVE

Output Bevel Gears

Output Drive Bevel Gear Disassembly

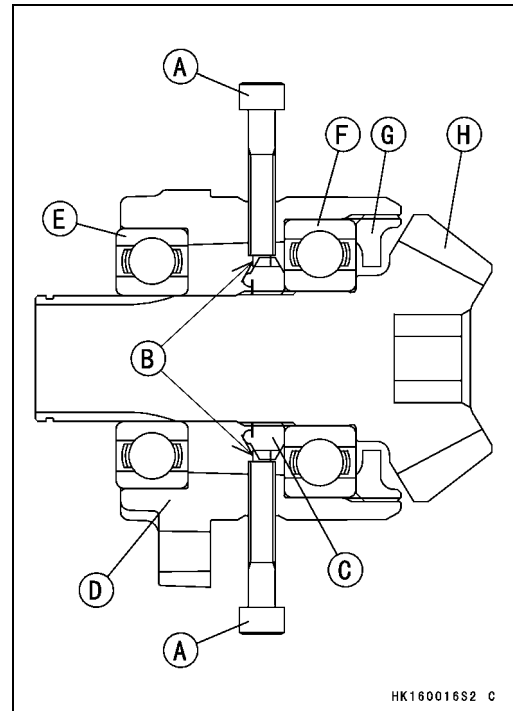
- Remove:
 - Output Drive Bevel Gear Housing [A] (see Output Drive Bevel Gear Removal)
- Look through the hole [B] in the housing.
- Turn the bevel gear [C] until the groove of the output drive bevel gear holder nut is seen.



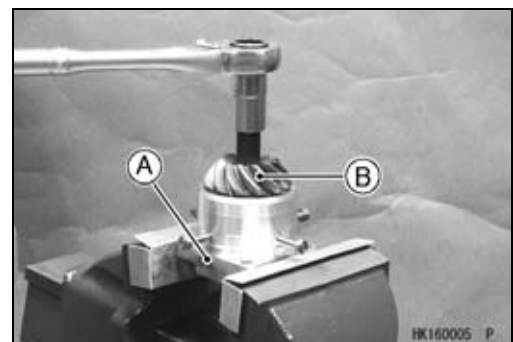
- Tighten the nut holding bolts [A] (4) securely into the grooves [B] of the bevel gear holder nut [C] in the output drive bevel gear housing.

Special Tool - Nut Holding Bolts: 57001-1481

- [D] Output Drive Bevel Gear Housing
- [E] Outer Ball Bearing
- [F] Inner Ball Bearing
- [G] Bearing Holder
- [H] Output Drive Bevel Gear



- Hold the output drive bevel gear housing [A] in a vise.
- Loosen the bevel gear [B] using an Allen wrench about four rotations.
- Remove one nut holding bolt, and look at through the hole.
- ★ If the groove of the bevel gear holder nut is not seen, loosen the other three bolts.



- Drive the gear shaft end using a copper mallet until the grooves of the bearing holder nut can be seen again.
- Retighten the nut holding bolts (4) securely into the groove of the bevel gear holder nut in the output drive bevel gear housing.

Special Tool - Nut Holding Bolts: 57001-1481

- Repeat the above procedure, and remove the bevel gear from the housing.

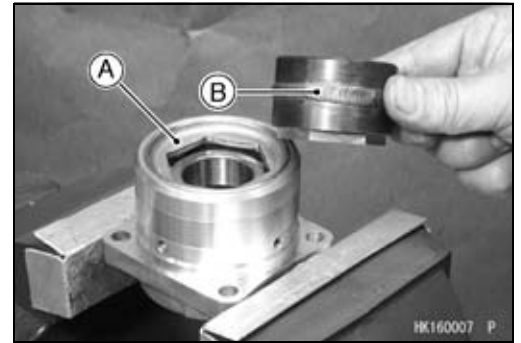


Output Bevel Gears

- Remove the bearing holder [A] using the hexagon wrench [B].

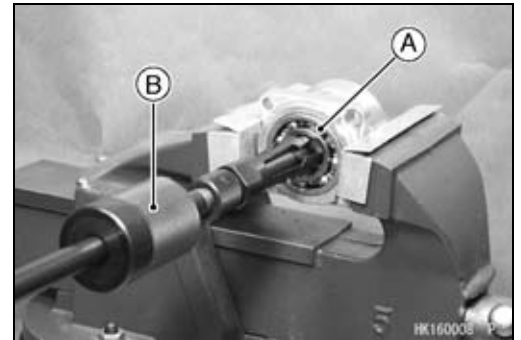
Special Tool - Hexagon Wrench, Hex 41: 57001-1491

- If the holder seems too difficult to break free, apply heat to soften the locking agent.



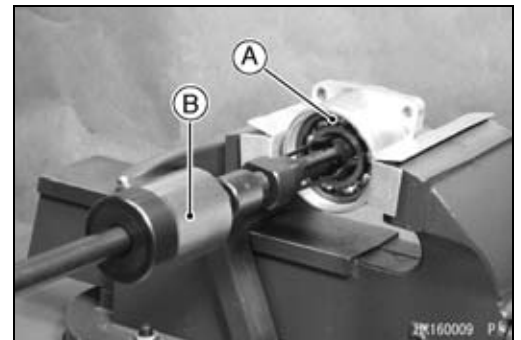
- Remove:
Outer Ball Bearing [A]

Special Tool - Oil Seal & Bearing Remover [B]: 57001-1058



- Remove:
Output Drive Bevel Gear Holder Nut
Inner Ball Bearing [A]

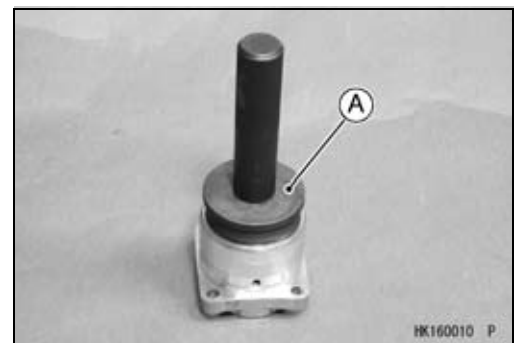
Special Tool - Oil Seal & Bearing Remover [B]: 57001-1058



Output Drive Bevel Gear Assembly

- Press the new inner ball bearing until it is bottomed.

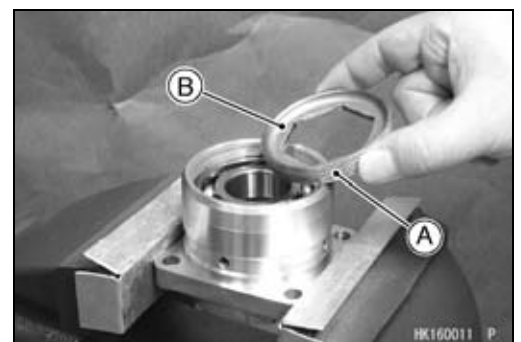
Special Tool - Bearing Driver Set [A]: 57001-1129



- Apply a non-permanent locking agent to the threads of the output drive bevel gear bearing holder [A] and tighten it so that the deep side [B] faces outward.

**Torque - Output Drive Bevel Gear Bearing Holder: 118 N·m
(12 kgf·m, 87 ft·lb)**

- Press the output drive bevel gear until it is bottomed.



11-12 FINAL DRIVE

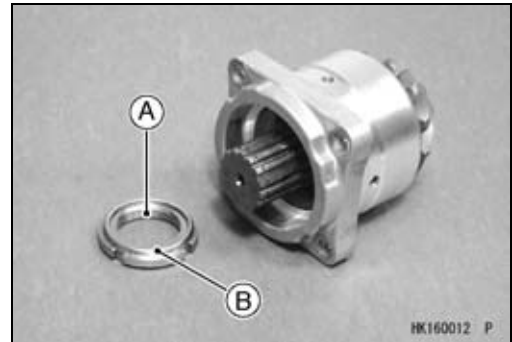
Output Bevel Gears

- Apply a non-permanent locking agent to the threads of the bevel gear holder nut [A] and tighten it so that the projection side [B] faces outward.

Special Tool - Socket Wrench: 57001-1482 [C]

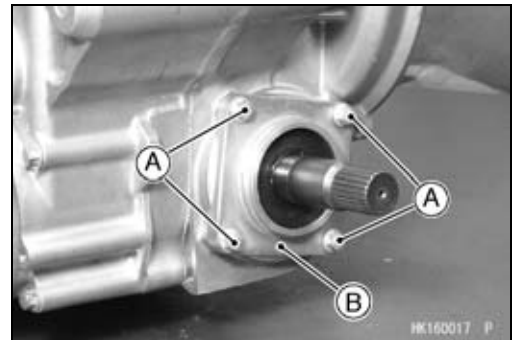
Torque - Bevel Gear Holder Nut: 200 N·m (20.4 kgf·m, 148 ft·lb)

- Press the new outer ball bearing until it is bottomed.

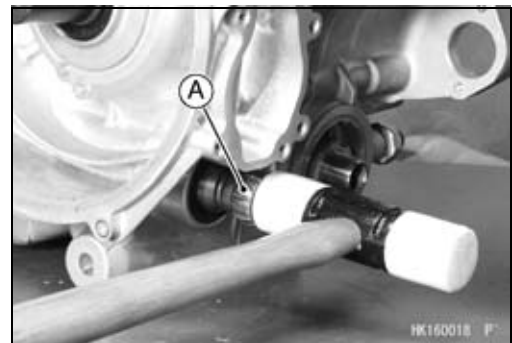


Output Driven Bevel Gear Removal

- Remove:
 - Swingarm (see Swingarm Removal in the suspension chapter) and Propeller Shaft (see Propeller Shaft Removal)
 - Engine (see Engine Removal in the Engine Removal/Installation chapter)
 - Output Driven Bevel Gear Housing Bolts [A]
 - Output Driven Bevel Gear Housing [B]



- Tap lightly the front end [A] of the output driven bevel gear shaft using a plastic mallet.
- The output driven bevel gear shaft assembly comes off with the housing.



Output Driven Bevel Gear Installation

- Apply grease:
 - O-ring [A]
- Install the output driven bevel gear shaft assembly.
- Tighten:
 - Torque - Output Driven Bevel Gear Housing Bolts: 26 N·m (2.7 kgf·m, 20 ft·lb)**



Output Bevel Gears

Output Driven Bevel Gear Disassembly

- Remove:
Output Driven Bevel Gear Housing Assembly (see Output Driven Bevel Gear Removal)
- Hold the holder in a vise, and set the housing assembly [A] on the holder.

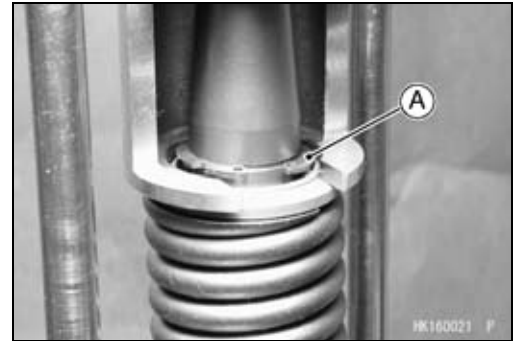
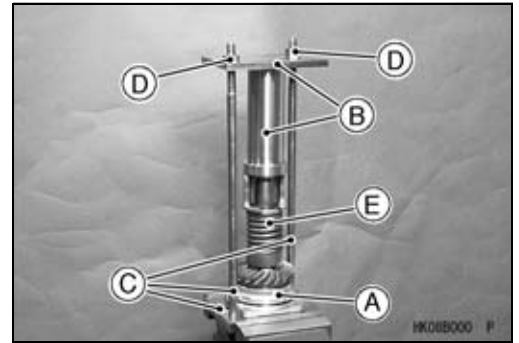
Special Tools - Damper Spring Compressor Set [B]: 57001-1475

Holder & Guide Arbor [C]: 57001-1476

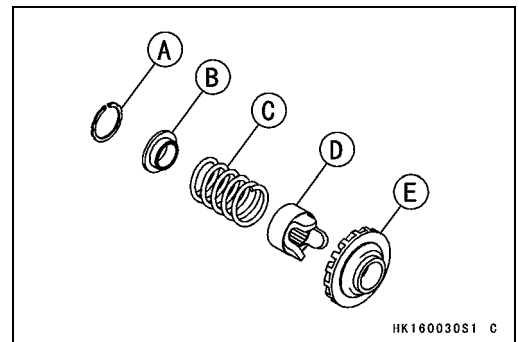
- Tighten the nuts [D] and compress the damper spring [E].

- Remove:
Circlip [A]

Special Tool - Outside Circlip Pliers: 57001-144



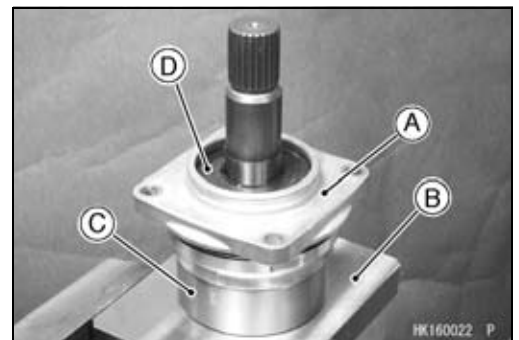
- Remove:
Circlip [A]
Spring Holder [B]
Spring [C]
Cam Damper [D]
Output Driven Bevel Gear [E]



- Hold the housing assembly [A] with the output shaft holder [B] & spacer [C] in a vise.

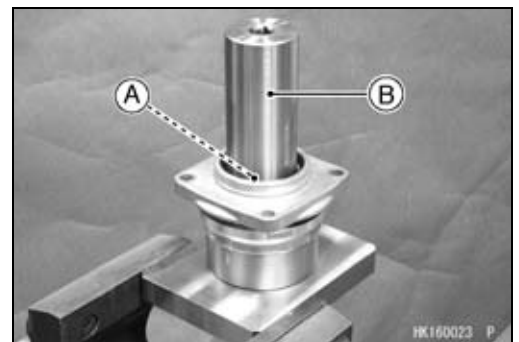
Special Tool - Output Shaft Holder & Spacer, m1.25: 57001-1479

- Remove:
Oil Seal [D]



- Remove:
Output Shaft Holder Nut [A]

Special Tool - Socket Wrench [B]: 57001-1482



11-14 FINAL DRIVE

Output Bevel Gears

- Hold the housing assembly [A] with the holder [B] in a vise.

Special Tool - Holder & Guide Arbor : 57001-1476

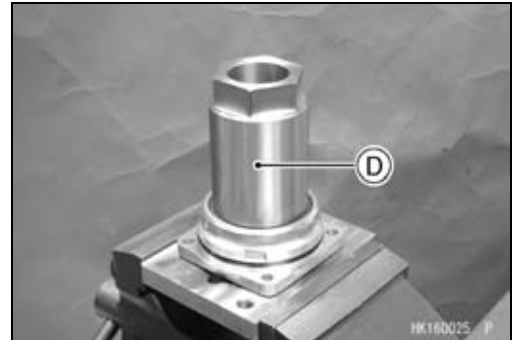
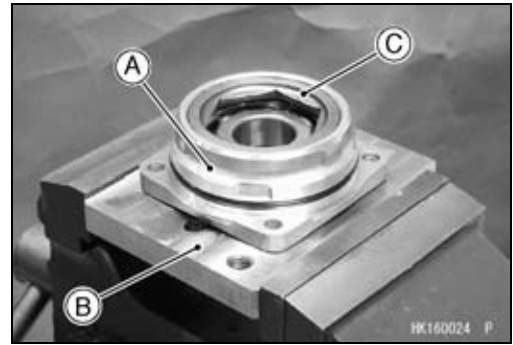
- Remove:
Bearing Holder [C]

Special Tool - Socket Wrench [D], Hex 50: 57001-1478

- If the holder seems too difficult to break free, apply heat to soften the locking agent.

- Remove:
Ball Bearing

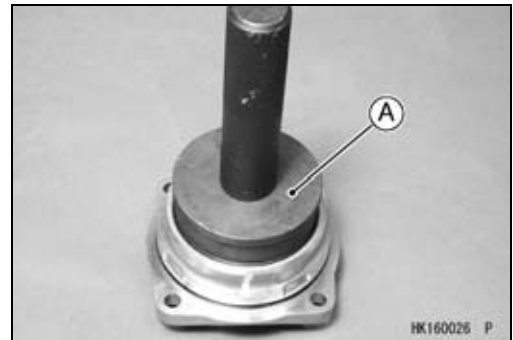
Special Tool - Oil Seal & Bearing Remover: 57001-1058



Output Driven Bevel Gear Assembly

- Press the new ball bearing until it is bottomed.

Special Tool - Bearing Driver Set [A]: 57001-1129



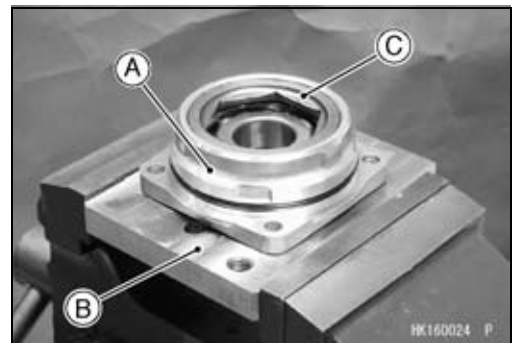
- Hold the housing assembly [A] with the holder [B] in a vise.

Special Tool - Holder & Guide Arbor: 57001-1476

- Apply a non-permanent locking agent to the threads of the output driven bevel gear bearing holder [C] and tighten it.

Special Tool - Socket Wrench, Hex 50: 57001-1478

Torque - Output Driven Bevel Gear Bearing Holder: 250 N-m (25.5 kgf-m, 184 ft-lb)



- Hold the housing assembly [A] with the output shaft holder [B] & spacer [C] in a vise.

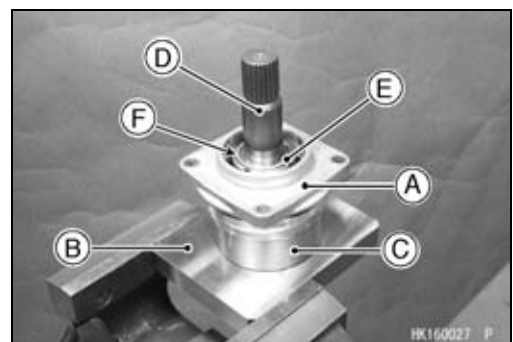
Special Tool - Output Shaft Holder & Spacer, m1.25: 57001-1479

- Insert the output shaft [D] in the housing.
- Apply a non-permanent locking agent to the threads of the output shaft holder nut [E] and tighten it so that the projection side [F] faces outward.

Special Tool - Socket Wrench: 57001-1482

Torque - Output Shaft Holder Nut: 200 N-m (20.4 kgf-m, 148 ft-lb)

- Apply grease to the oil seal and press it.

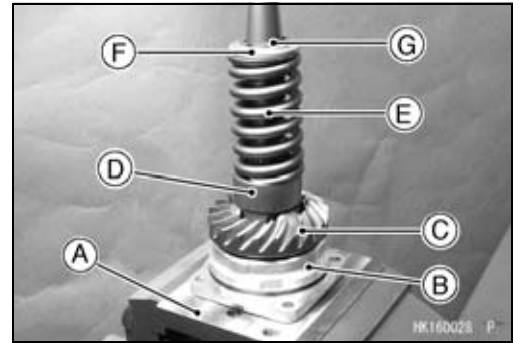


Output Bevel Gears

- Hold the holder [A] in a vise, and set the housing assembly [B] on the holder.

Special Tool - Holder & Guide Arbor: 57001-1476

- Install:
 - Output Driven Bevel Gear [C]
 - Cam Damper [D]
 - Spring [E]
 - Spring Holder [F]
 - Circlip [G]



- Install:
 - Guide Bars [A]
 - Damper Spring Compressor Set [B]

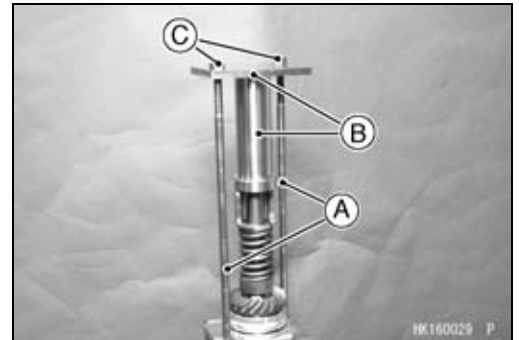
Special Tools - Holder & Guide Arbor: 57001-1476

Damper Spring Compressor Set: 57001-1475

- Tighten the nuts [C] and compress the damper spring.

- Install:
 - Circlip

Special Tool - Outside Circlip Pliers: 57001-144



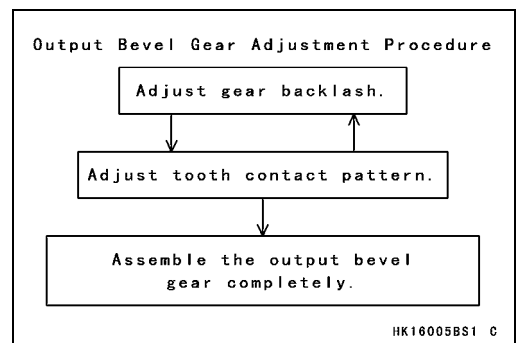
Output Bevel Gears Adjustment

The **backlash** and **tooth contact pattern** of the bevel gears must be correct to prevent the gears from making noise and being damaged.

When replacing any one of the backlash-related parts, be sure to check and adjust the backlash and tooth contact.

First adjust the backlash, and then tooth contact by replacing shims.

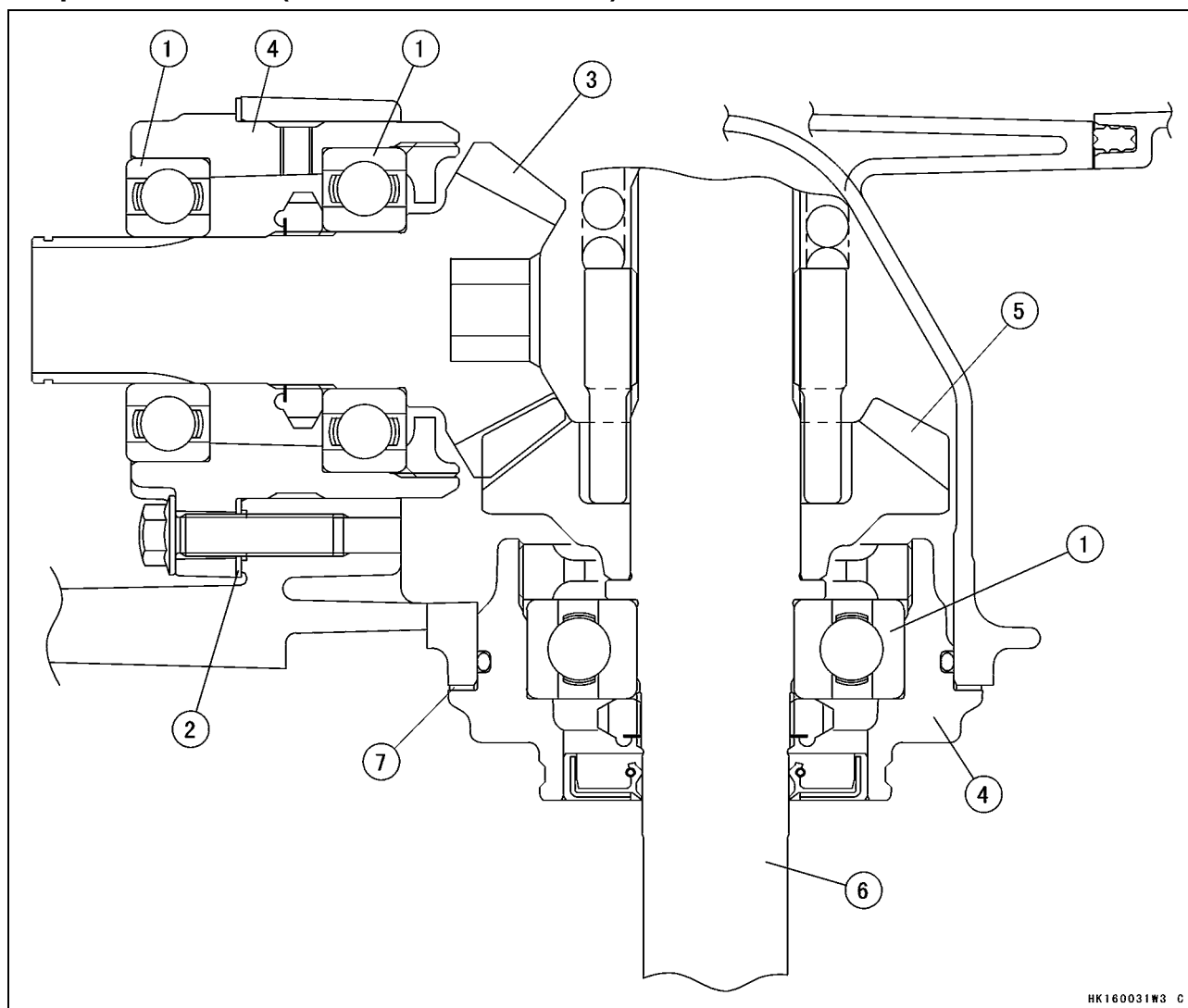
These two adjustments are of critical importance and must be carried out in the correct sequence, using the procedures shown.



11-16 FINAL DRIVE

Output Bevel Gears

Output Bevel Gear (Backlash-related Parts)



HK160031W3 C

- 1. Ball Bearings
- 2. Drive Bevel Gear Shims
- 3. Output Drive Bevel Gear
- 4. Bearing Housings

- 5. Output Driven Bevel Gear
- 6. Output Driven Shaft
- 7. Driven Bevel Gear Shims

Output Bevel Gears

Drive Bevel Gear Shims for Tooth Contact Adjustment

Thickness	Part Number
0.15 mm (0.006 in.)	92180-1311
0.2 mm (0.008 in.)	92180-1312
0.5 mm (0.020 in.)	92180-1313
0.8 mm (0.031 in.)	92180-1314
1.0 mm (0.039 in.)	92180-1351
1.2 mm (0.047 in.)	92180-1352

Driven Bevel Gear Shims for Backlash Adjustment

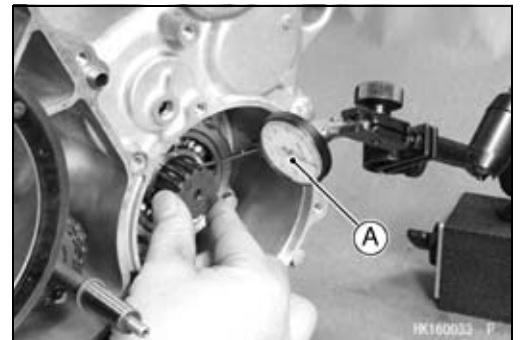
Thickness	Part Number
0.15 mm (0.006 in.)	92180-1307
0.2 mm (0.008 in.)	92180-1308
0.5 mm (0.020 in.)	92180-1309
0.8 mm (0.031 in.)	92180-1310
1.0 mm (0.039 in.)	92180-1349
1.2 mm (0.047 in.)	92180-1350

Bevel Gear Backlash Adjustment

- The amount of backlash is influenced by driven bevel gear position more than by drive bevel gear position.
- Remove the output drive idle gear (see Output Drive Bevel Gear Removal).
- Set up a dial gauge [A] against the output drive shaft spline groove to check gear backlash.
- To measure the backlash, turn the shaft clockwise and counterclockwise slightly so as not to move the mate gear. A rod can be inserted through the lower hole of the housing and into contact with driven gear. This may help to hold it still. The difference between the highest and lowest gauge reading is the amount of backlash.
- ★ If the backlash is not within the limit, replace the shim(s) at the driven bevel gear.
- ★ Change the thickness a little at a time.
- Recheck the backlash, and readjust as necessary.

Output Bevel Gear Backlash

Standard: 0.05 ~ 0.11 mm (0.0020 ~ 0.0043 in.) (at output drive shaft spline)



11-18 FINAL DRIVE

Output Bevel Gears

Tooth Contact Adjustment

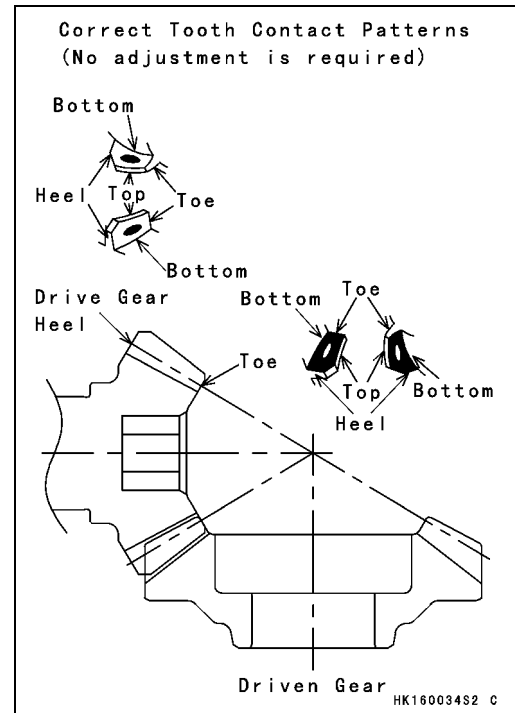
- Tooth contact location is influenced by drive gear position more than by driven gear position.
- Clean any dirt and oil off the bevel gear teeth.
- Apply checking compound to 4 or 5 teeth on the output driven bevel gear.

NOTE

- Apply checking compound to the teeth in a thin, even coat with a fairly stiff paint brush. If painted too thickly, the exact tooth pattern may not appear.
- The checking compound must be smooth and firm with the consistency of tooth paste.
- Special compounds are available from automotive supply stores for the purpose of checking differential gear tooth patterns and contact. Use this for checking the bevel gears.
- Turn the output driven shaft for 3 or 4 turns in the drive and reverse (coast) directions, while creating a drag on the drive bevel gear shaft.
- Check the drive pattern and coast pattern of the bevel gear teeth. The tooth contact patterns of both drive and coast sides should be centrally located between the top and bottom of the tooth, and a little closer to the toe of the tooth.
- ★ If the tooth contact pattern is incorrect, replace the shim(s) at the drive bevel gear and shim(s) at the driven bevel gear, following the examples shown. Then erase the tooth contact patterns, and check them again. Also check the backlash every time the shims are replaced. Repeat the shim change procedure as necessary.

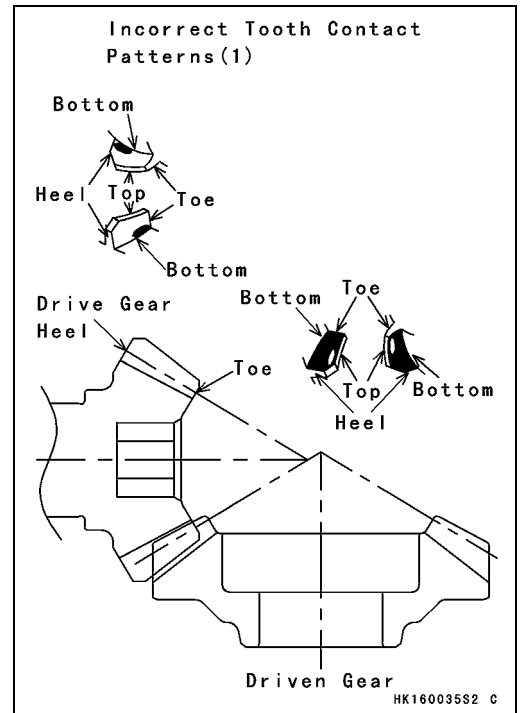
NOTE

- If the backlash is out of the standard range after changing shims, correct the backlash before checking the tooth contact pattern.

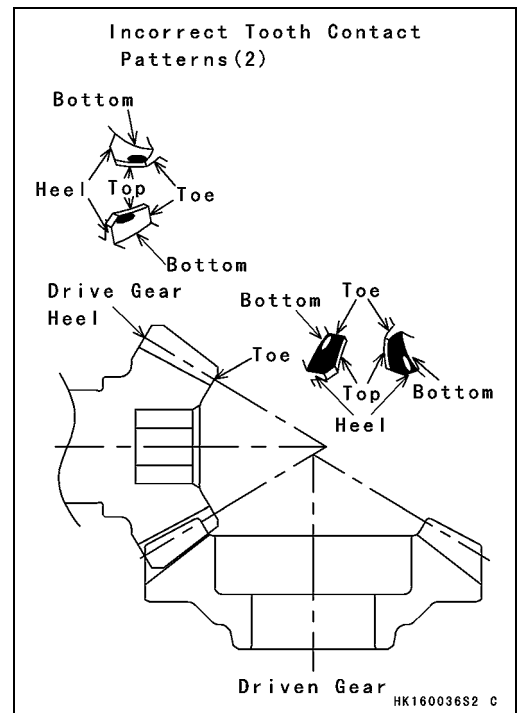


Output Bevel Gears

Example 1: Decrease the thickness of the drive bevel gear shim(s) by 0.1 mm (0.004 in.), and/or increase the thickness of the driven bevel gear shim(s) by 0.1 mm (0.004 in.) to correct the pattern shown below. Repeat in 0.1 mm (0.004 in.) steps if necessary.



Example 2: Increase the thickness of the drive bevel gear shim(s) by 0.1 mm (0.004 in.), and/or decrease the thickness of the driven bevel gear shim(s) by 0.1 mm (0.004 in.) to correct the pattern shown below. Repeat in 0.1 mm (0.004 in.) steps if necessary.

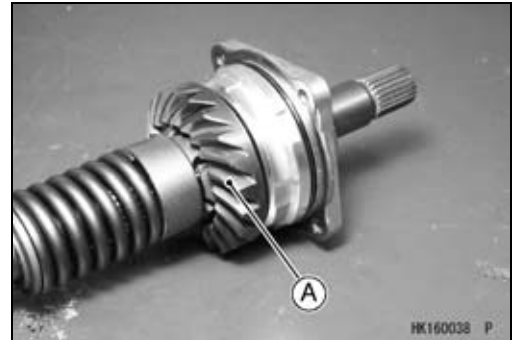
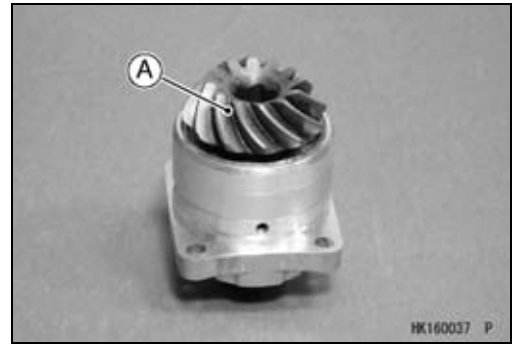


11-20 FINAL DRIVE

Output Bevel Gears

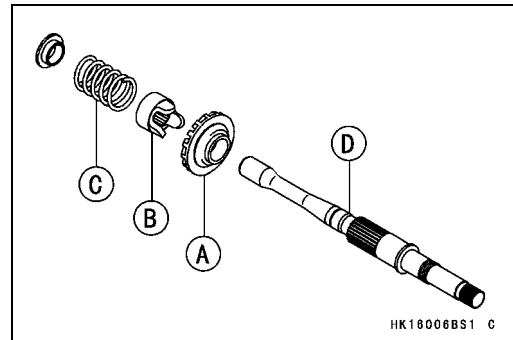
Bevel Gears Inspection

- Visually check the bevel gears [A] for scoring, chipping, or other damage.
- ★ Replace the bevel gears as a set if either gear is damaged.



Cam Damper Inspection

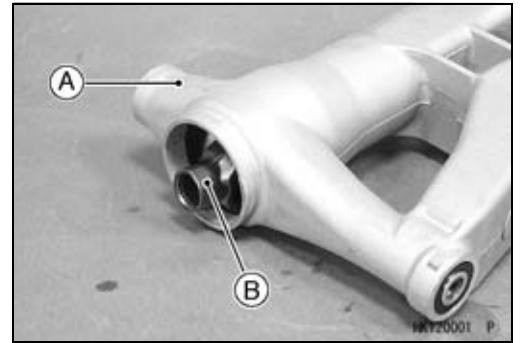
- Visually inspect:
 - Bevel Gear Cam [A]
 - Cam Follower [B]
 - Spring [C]
 - Shaft [D]
- ★ Replace any part if it appears damaged.



Propeller Shaft

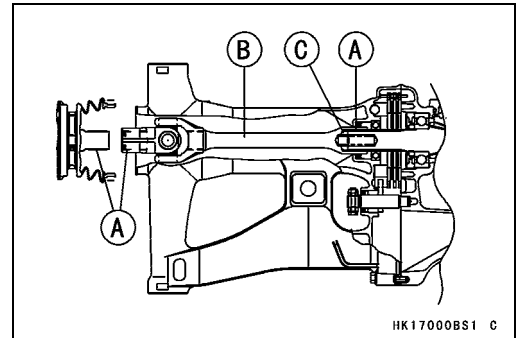
Propeller Shaft Removal

- Drain the final gear case oil (see Final Gear Case Oil Change in the Periodic Maintenance chapter).
- Remove:
 - Swingarm [A] (see Swingarm Removal in the Suspension chapter)
 - Propeller Shaft [B]



Propeller Shaft Installation

- Wipe the old grease off the front and rear end splines [A] of the propeller shaft [B] and apply new molybdenum disulfide grease in that places.
- Be sure to install the spring [C] on the pinion gear nut of the final gear case.
- Install the propeller shaft while aligning the splines.

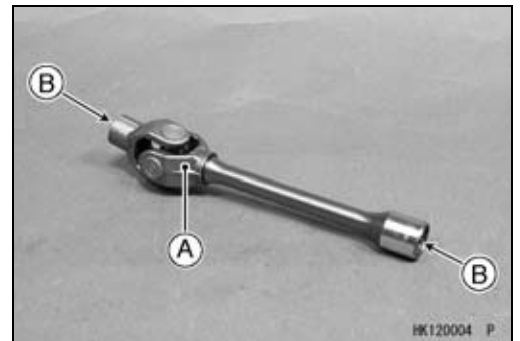


Propeller Shaft Joint Boot Inspection

- Refer to the Propeller Shaft Joint Boot Inspection in the Periodic Maintenance chapter.

Propeller Shaft Inspection

- Remove the propeller shaft (see Propeller Shaft Removal).
- Check that the universal joint [A] works smoothly without rattling or sticking.
 - ★ If it does rattle or stick, the universal joint is damaged. Replace the propeller shaft with a new one.
- Visually inspect the splines [B] on the propeller shaft.
 - ★ If they are badly worn, chipped, or loose, replace the propeller shaft.
- Also, inspect the splines on the rear end of the output shaft and the pinion gear joint in the final gear case.
 - ★ If splines are badly worn, chipped, or loose, replace the output shaft and the pinion gear joint.

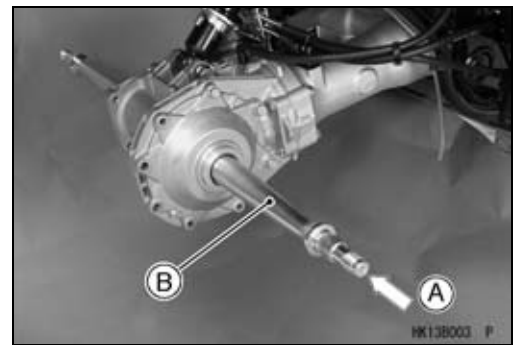
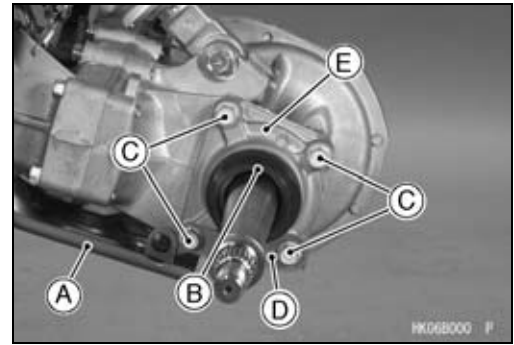


11-22 FINAL DRIVE

Rear Axle

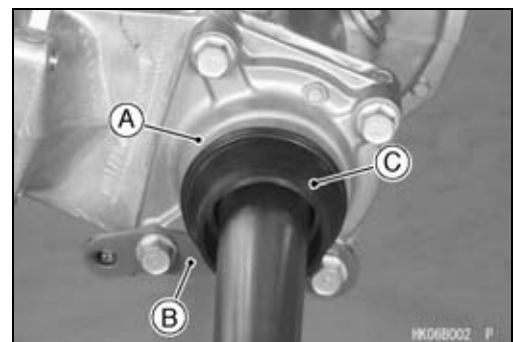
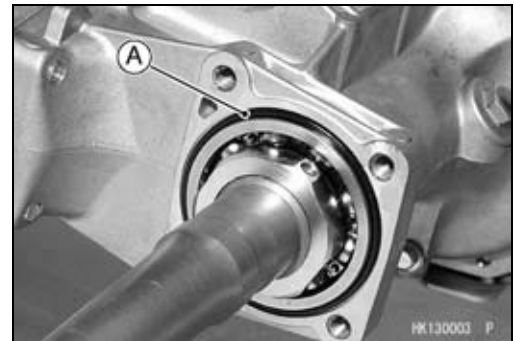
Rear Axle Removal

- Drain the final gear case oil (see Final Gear Case Oil Change in the Periodic Maintenance chapter).
- Remove:
 - Rear Wheels (see Wheel Removal in the Wheels/Tires chapter)
 - Rear Hub (see Rear Hub Removal in the Wheels/Tires chapter)
 - Rear Bottom Guard [A] (see Rear Bottom Guard Removal in the Frame chapter)
 - Cap [B]
 - Final Gear Case Left Cover Bolts [C]
 - Final Gear Case Left Cover Bracket [D]
 - Final Gear Case Left Cover [E]
- Tap [A] the right end of the rear axle [B] and pull it out from the left.
- The left axle bearing comes off with the axle.



Rear Axle Installation

- Install the rear axle from the left side with the left bearing installed, while aligning the splines.
- Apply grease:
 - O-ring [A]
 - Oil Seal Lips in Final Gear Case Left Cover
- Install:
 - Final Gear Case Left Cover [A]
 - Final Gear Case Left Cover Bracket [B]
- Apply a non-permanent locking agent to the cover bolts, and tighten them.
 - Torque - Final Gear Case Left Cover Bolts : 49 N·m (5.0 kgf·m, 36 ft·lb)**
- Install the cap [C].



Rear Axle

Ball Bearing Wear Inspection

CAUTION

Do not remove the bearing [A] for inspection. Removal may damage it.

- Check the ball bearing.
- Since the ball bearing is made to extremely close tolerances, the wear must be judged by feel rather than measurement.
- Spin the bearing by hand to check its condition.
- ★ If the bearing is noisy, does not spin smoothly, or has any rough spots, replace the rear axle shaft.

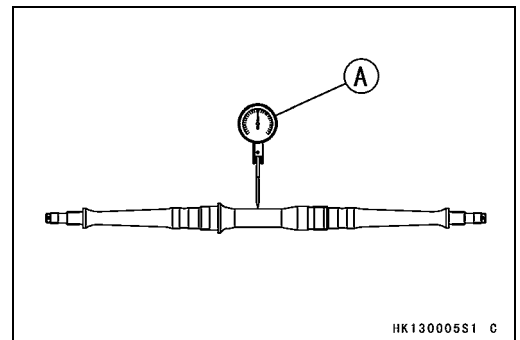
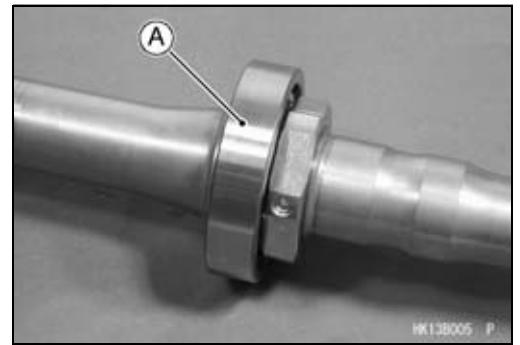
Rear Axle Runout Inspection

- Visually inspect the axle for damage.
- ★ If the axle is damaged or bent, replace it.
- Set the rear axle in an alignment jig or on V blocks, and place a dial gauge [A] against the middle point.
- Turn the axle slowly. The difference between the highest and lowest dial gauge readings is the axle runout (TIR).
- ★ If the runout exceeds the service limit, replace the axle.

Rear Axle Shaft Runout

Standard: TIR 1 mm (0.04 in.) or less

Service Limit: TIR 2 mm (0.08 in.)



11-24 FINAL DRIVE

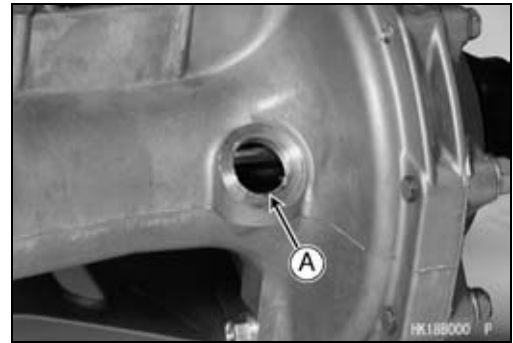
Final Gear Case

Final Gear Case Oil Level Inspection

- Park the vehicle so that it is level, both side-to-side and front-to-rear.
- Remove the filler cap.

CAUTION
Be careful not to allow any dirt or foreign materials to enter the gear case.

- Check the oil level. The oil level should come to the bottom of the filler opening [A].



★If it is insufficient, first check the final gear case for oil leakage, remedy it if necessary, and add oil through the filler opening. Use the same type and brand of oil that is already in the final gear case.

- Apply grease to the O-ring.
- Be sure the O-ring is in place.

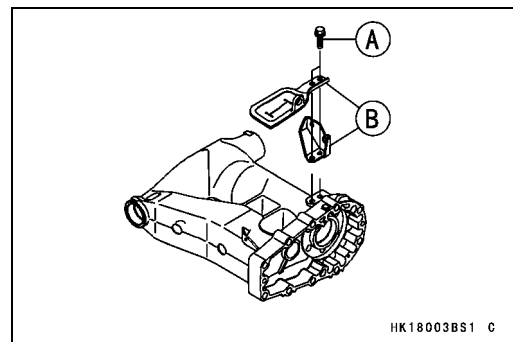
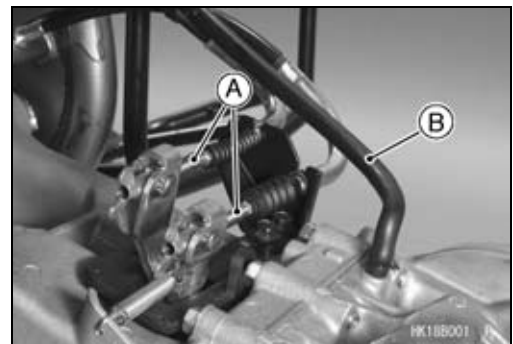
Torque - Oil Filler Cap: 29 N·m (3.0 kgf·m, 22 ft·lb)

Final Gear Case Oil Change

- Refer to the Final Gear Case Oil Change in the Periodic Maintenance chapter.

Final Gear Case Removal

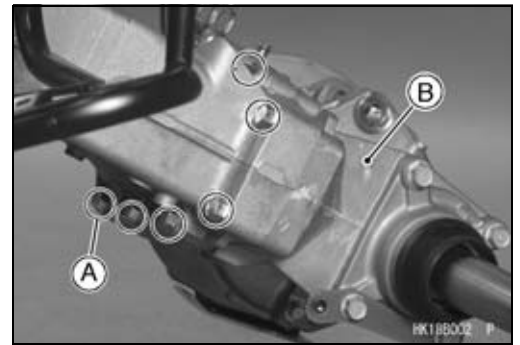
- Remove:
 - Lower Rear Shock Absorber Mounting Bolts, Nuts and Washers (see Rear Shock Absorber Removal in the Suspension chapter)
 - Rear Brake Cable Ends [A] (see Brake Cable Removal in the Brake chapter)
 - Final Gear Case Breather Hose [B]
 - Rear Bottom Guard (see Rear Bottom Guard Removal in the Frame chapter)
- Remove:
 - Brake Cable Mount Bolts [A]
 - Brake Cam Lever Cover and Cable Mount [B]



HK18003BS1 C

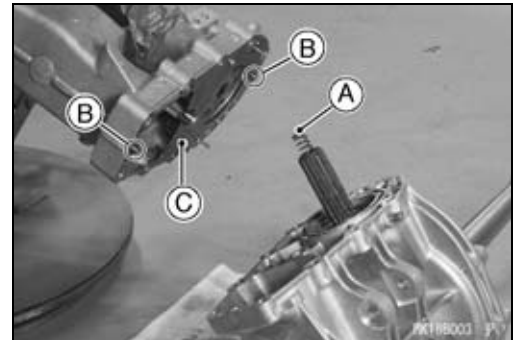
Final Gear Case

- Remove:
 - Final Gear Case Bolts [A] (10)
 - Final Gear Case [B]



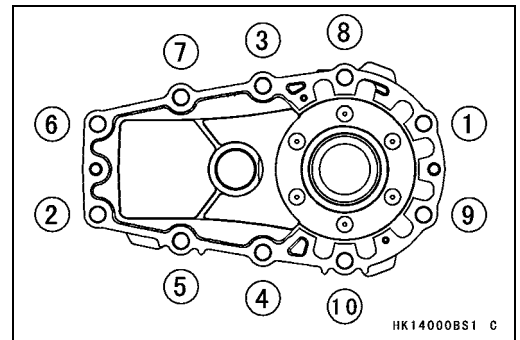
Final Gear Case Installation

- Install:
 - Spring [A]
 - Dowel Pins [B]
 - New Gasket [C] (see Internal Wet Brake Disassembly in the Brake chapter)
- Insert the pinion gear shaft of the final gear case in the plate assembly.
- Align the splines by rotating the axle shaft.



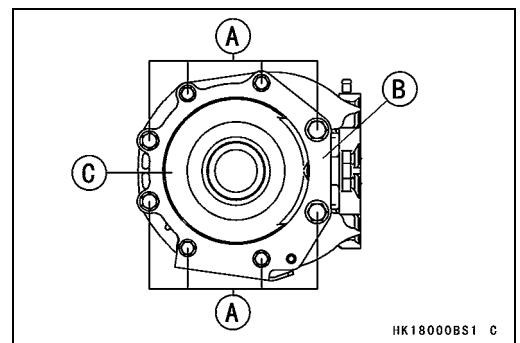
- Tighten the final gear case bolts following the tightening sequence [1 ~ 10].

Torque - Final Gear Case Bolts: 42 N·m (4.3 kgf·m, 31 ft·lb)

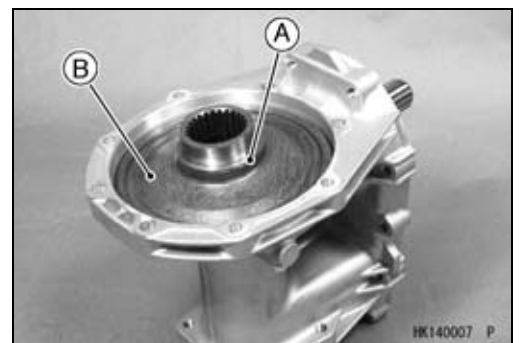


Final Gear Case Disassembly

- Remove:
 - Final Gear Case (see Final Gear Case Removal)
 - Final Gear Case Left Cover (see Rear Axle Removal)
 - Final Gear Case Right Cover Bolts [A]
 - Final Gear Case Right Cover Bracket [B]
 - Final Gear Case Right Cover [C]



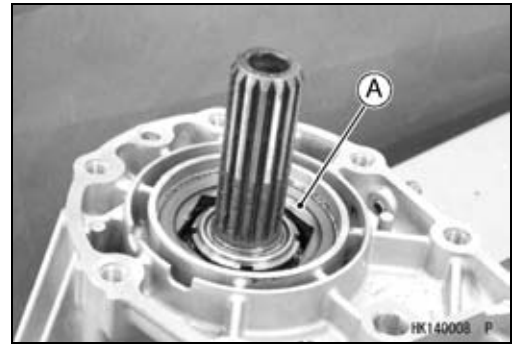
- Remove:
 - Shim(s) [A]
 - Ring Gear [B]



11-26 FINAL DRIVE

Final Gear Case

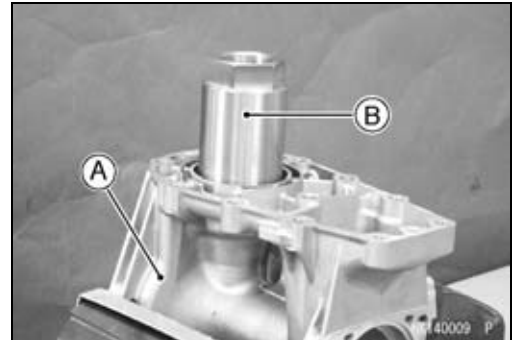
- Remove:
Pinion Gear Bearing Holder [A]



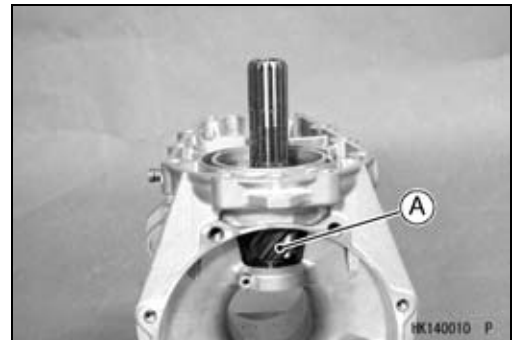
- Hold the final gear case [A] in a vise, and remove the bearing holder using the socket wrench [B].

Special Tool - Socket Wrench, Hex 50: 57001-1478

- If the holder seems too difficult to break free, apply heat to soften the locking agent.



- Remove:
Pinion Gear Unit [A]
Shim(s)



Final Gear Case Assembly

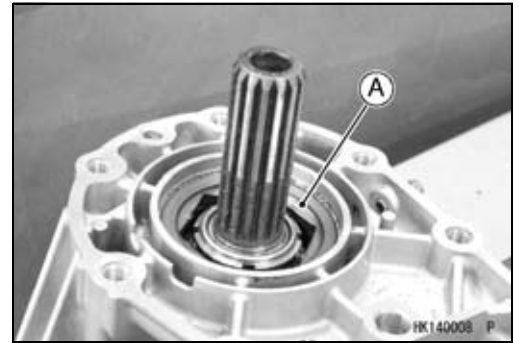
- Visually check the pinion gear and ring gear for scoring, chipping, or other damage.
- ★ Replace the bevel gear as a set if either gear is damaged since they are lapped as a set in the factory to get the best tooth contact.
- Install:
Shim(s)
Pinion Gear Unit
- Be sure to check and adjust the bevel gear backlash and tooth contact when any of the backlash-related parts are replaced (see Final Bevel Gear Adjustment).

Final Gear Case

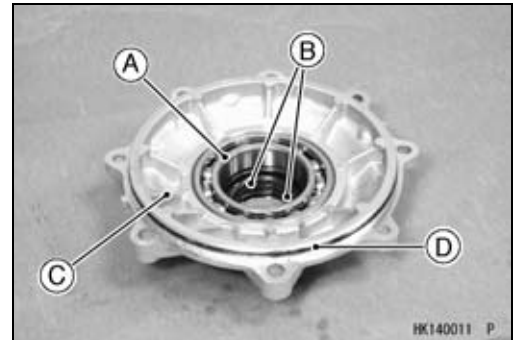
- Apply a non-permanent locking agent to the pinion gear bearing holder [A], and tighten it.

Special Tool - Socket Wrench, Hex 50: 57001-1478

Torque - Pinion Gear Bearing Holder: 137 N·m (14 kgf·m, 101 ft·lb)



- Inspect:
 - Ball Bearing [A] (see Ball or Needle Bearing Inspection)
 - Oil Seals [B] (see Oil Seal Inspection)
 - ★ If they are damaged, replace the final gear case right cover [C].
- Apply grease to the oil seal lips and O-ring [D].

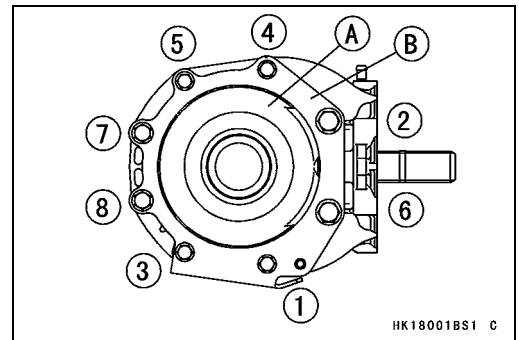


- Install:
 - Final Gear Case Right Cover [A]
 - Final Gear Case Right Cover Bracket [B]
- Apply a non-permanent locking agent to the cover bolts, and tighten them following the tightening sequence [1 ~ 8].

Torque - Final Gear Case Right Cover Bolts (M8): 24 N·m (2.4 kgf·m, 17 ft·lb)

Final Gear Case Right Cover Bolts (M10): 49 N·m (5.0 kgf·m, 36 ft·lb)

Final Gear Case Right Cover Bolts (M12): 94 N·m (9.6 kgf·m, 69 ft·lb)

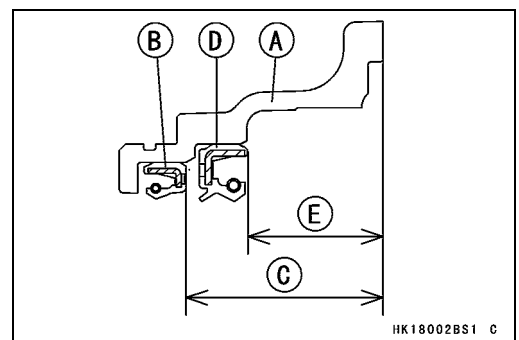


- Install:
 - Rear Axle (see Rear Axle Installation)
 - Final Gear Case Left Cover

Oil Seal Installation

- Press the oil seals in the right and left covers to the specified positions as shown.

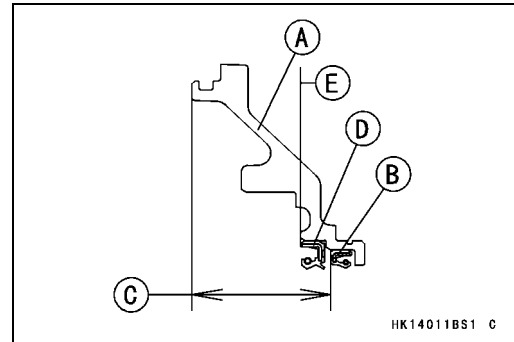
- [A] Left Cover
- [B] Outside Oil Seal
- [C] 31.5 ~ 32.5 mm (1.24 ~ 1.28 in.)
- [D] Inside Oil Seal
- [E] 21.3 ~ 22.3 mm (0.84 ~ 0.88 in.)



11-28 FINAL DRIVE

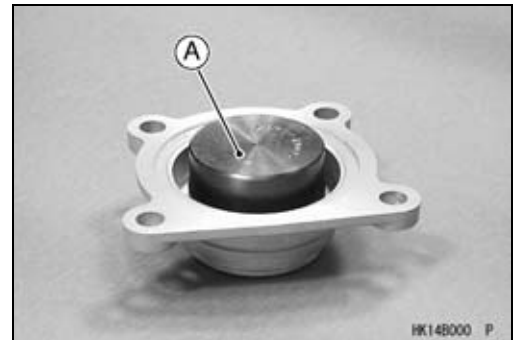
Final Gear Case

- [A] Right Cover
- [B] Outside Oil Seal
- [C] 44.8 ~ 45.8 mm (1.76 ~ 1.80 in.)
- [D] Inside Oil Seal
- [E] Flush with Cover End



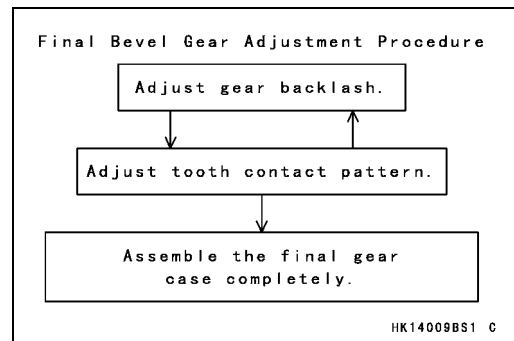
- Use the oil seal driver [A] for the outside oil seals of the right and left covers.

Special Tool - Oil Seal Driver, ϕ 47.5: 57001-1487



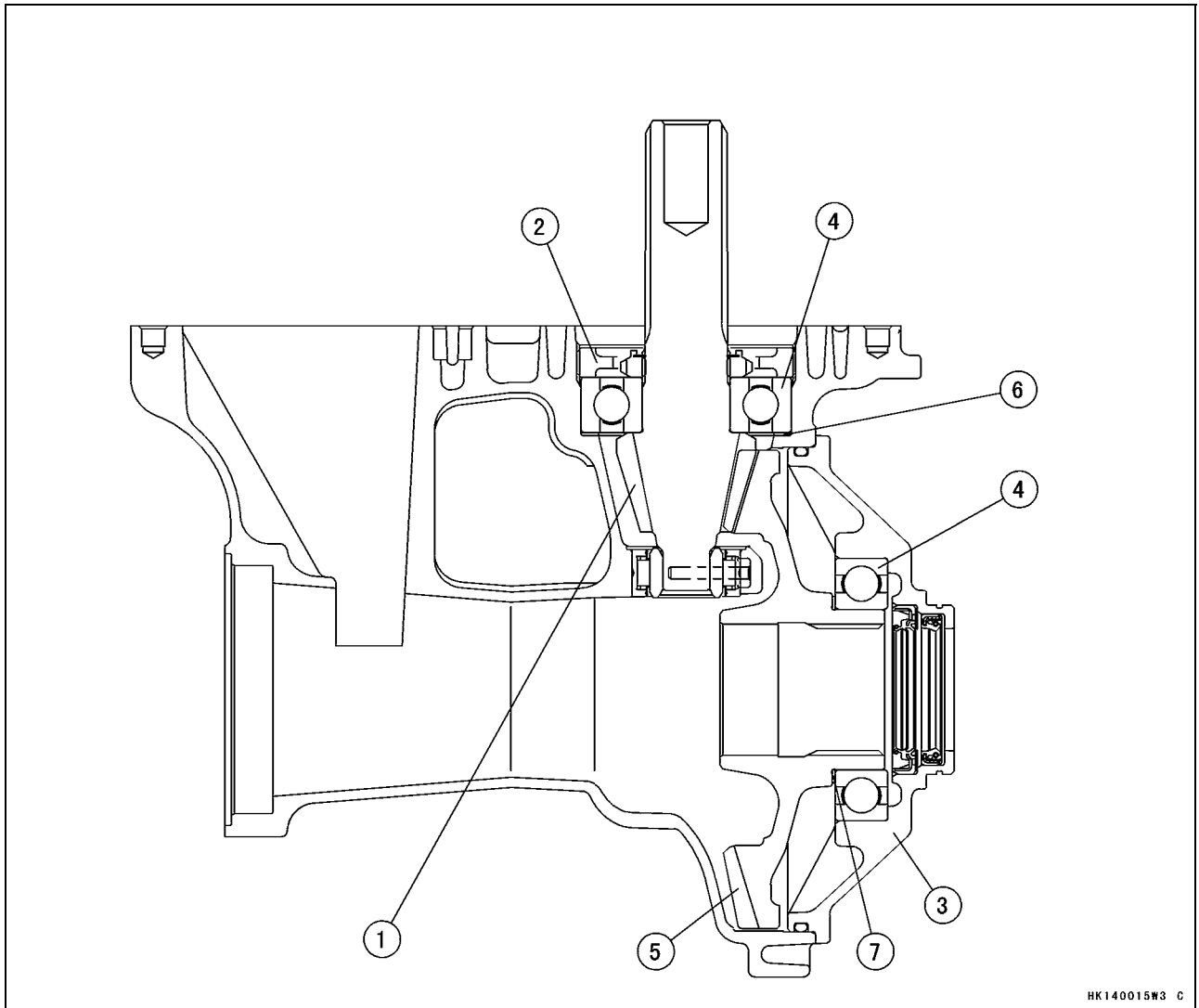
Final Bevel Gear Adjustment

- The **backlash** and **tooth contact pattern** of the bevel gears must be correct to prevent the gears from making noise and being damaged.
- After replacing any of the backlash-related parts, be sure to check and adjust the backlash and tooth contact of the bevel gears. First, adjust backlash, and then tooth contact by replacing shims.
- The amount of backlash is influenced by the ring gear position more than by the pinion gear position.
- Tooth contact locations is influenced by the pinion gear position more than by the ring gear position.



Final Gear Case

Final Gear Case (Backlash-related Parts)



HK140015W3 C

- | | |
|-------------------------------|------------------------|
| 1. Pinion Gear | 5. Ring Gear |
| 2. Pinion Gear Bearing Holder | 6. Pinion Gear Shim(s) |
| 3. Gear Case Right Cover | 7. Ring Gear Shim(s) |
| 4. Ball Bearings | |

11-30 FINAL DRIVE

Final Gear Case

6. Pinion Gear Shims for Tooth Contact Adjustment

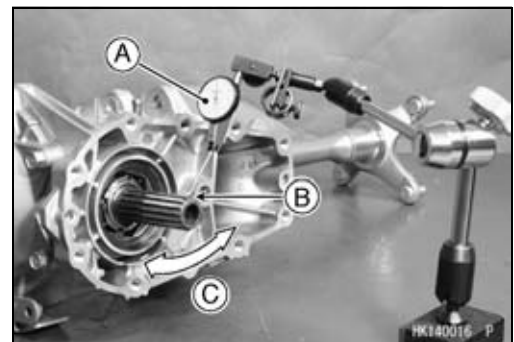
Thickness	Part Number
0.15 mm (0.006 in.)	92180-1423
0.2 mm (0.008 in.)	92180-1424
0.5 mm (0.020 in.)	92180-1425
0.8 mm (0.031 in.)	92180-1426
1.0 mm (0.039 in.)	92180-1427
1.2 mm (0.047 in.)	92180-1428

7. Ring Gear Shims for Backlash Adjustment

Thickness	Part Number
0.15 mm (0.006 in.)	92180-1417
0.2 mm (0.008 in.)	92180-1418
0.5 mm (0.020 in.)	92180-1419
0.8 mm (0.031 in.)	92180-1420
1.0 mm (0.039 in.)	92180-1421
1.2 mm (0.047 in.)	92180-1422

Backlash Adjustment

- Clean any dirt and oil off the bevel gear teeth.
- Install the pinion gear assembly with the primary shim **1.0 mm (0.039 in.) thickness**.
- Assemble the final gear case (see Final Gear Case Assembly).
- Install the ring gear with the primary shim **1.0 mm (0.039 in.) thickness**.
- Check the backlash during tightening the cover bolts, and stop to tighten them immediately if the backlash disappears. Then, change the ring gear shim to a thinner one.
- Temporarily, install the rear axle in the gear case and hold it with a vise so that the ring gear is lower than the pinion gear.
- Mount a dial gauge [A] so that the tip of the gauge is against the splined portion [B] of the pinion gear joint.
- To measure the backlash, turn the pinion gear shaft to both side [C] a little while holding the rear axle steady. The difference between the highest and the lowest gauge reading is the amount of backlash.
- Measure the backlash at three locations equally spaced on the splines.



Final Bevel Gear Backlash :

0.07 ~ 0.14 mm (0.003 ~ 0.006 in.) at pinion gear spline

- ★ If the backlash is not within the limit, replace the ring gear shim(s). To increase the backlash, decrease the thickness of the shim(s). To decrease the backlash, increase the thickness of the shim(s).
- ★ Change the thickness a little at a time.
- Recheck the backlash, and readjust as necessary.

Final Gear Case

Tooth Contact Adjustment

- Clean any dirt and oil off the bevel gear teeth.
- Apply checking compound to 4 or 5 teeth of the pinion gear.

NOTE

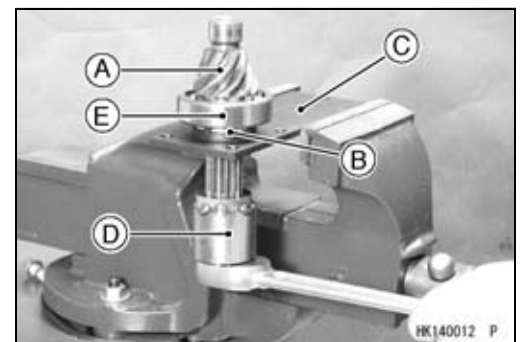
- Apply checking compound to the teeth in a thin, even coat with a fairly stiff paint brush. If painted too thickly, the exact tooth pattern may not appear.
 - The checking compound must be smooth and firm, with the consistency of tooth paste.
 - Special compounds are available at automotive supply stores for the purpose of checking differential gear tooth patterns and contact.
- Assemble the final gear case (see Final Gear Case Assembly).
 - Turn the pinion gear for one revolution in the drive and reverse (coast) direction, while creating drag on the ring gear.
 - Remove the ring gear and pinion gear unit to check the drive pattern and coast pattern of the bevel gear teeth.
 - The tooth contact patterns of both (drive and coast) sides should be centrally located between the top and bottom of the tooth. The drive pattern can be a little closer to the toe and the coast pattern can be a somewhat longer and closer to the toe.
- ★ If the tooth contact pattern is incorrect, replace the pinion gear shim(s), following the examples shown.
 - Then erase the tooth contact patterns, and check them again. Also check the backlash every time the shim(s) are replaced. Repeat the shim change procedure as necessary.

NOTE

- If the backlash is out of the standard range after changing the pinion gear shim(s), change the ring gear shim(s) to correct the backlash before checking the tooth contact pattern.

Pinion Gear Unit Disassembly

- Remove:
 - Pinion Gear Unit [A] (see Final Gear Case Disassembly)
 - Hold the pinion gear bearing holder nut [B] with the socket wrench [C] in a vise, and loosen the pinion gear shaft using the pinion gear holder [D].
- Special Tools - Socket Wrench: 57001-1363**
Pinion Gear Holder, m1.667: 57001-1480
- Remove the ball bearing [E] as necessary.
- Special Tool - Bearing Puller: 57001-135**



11-32 FINAL DRIVE

Final Gear Case

Pinion Gear Unit Assembly

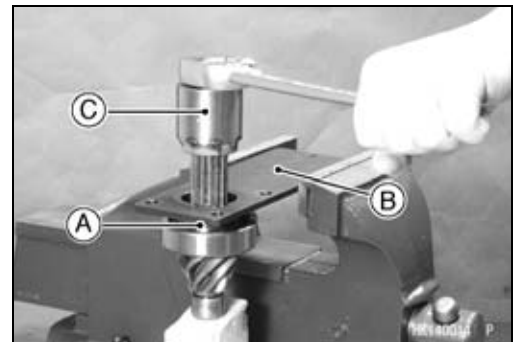
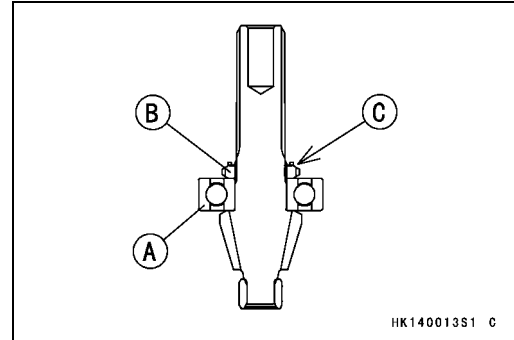
○The pinion gear and ring gear are lapped as a set in the factory to get the best tooth contact. They must be replaced as a set.

- Visually inspect the bearing for abrasion, color change, or other damage.
- ★ If there is any doubt as to the condition of a bearing, replace the bearing.
- Be sure to check and adjust the bevel gear backlash and tooth contact, when any of the backlash-related parts are replaced.
- Press the bearing [A] on the pinion gear until it is bottomed.
- Install the pinion gear bearing holder nut [B] so that the projection [C] faces outward.
- Apply a non-permanent locking agent to the pinion gear bearing holder nut [A], and tighten it.

Special Tools - Socket Wrench [B]: 57001-1363

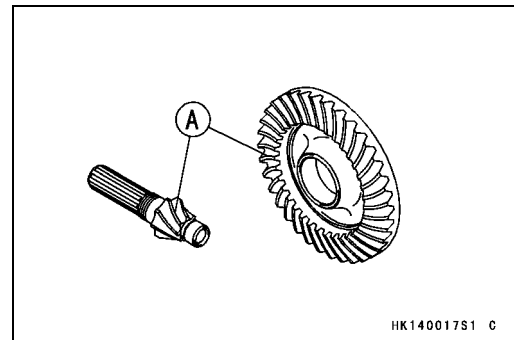
Pinion Gear Holder, m1.667 [C]: 57001-1480

Torque - Pinion Gear Bearing Holder Nut: 157 N·m (16 kgf·m, 116 ft·lb)



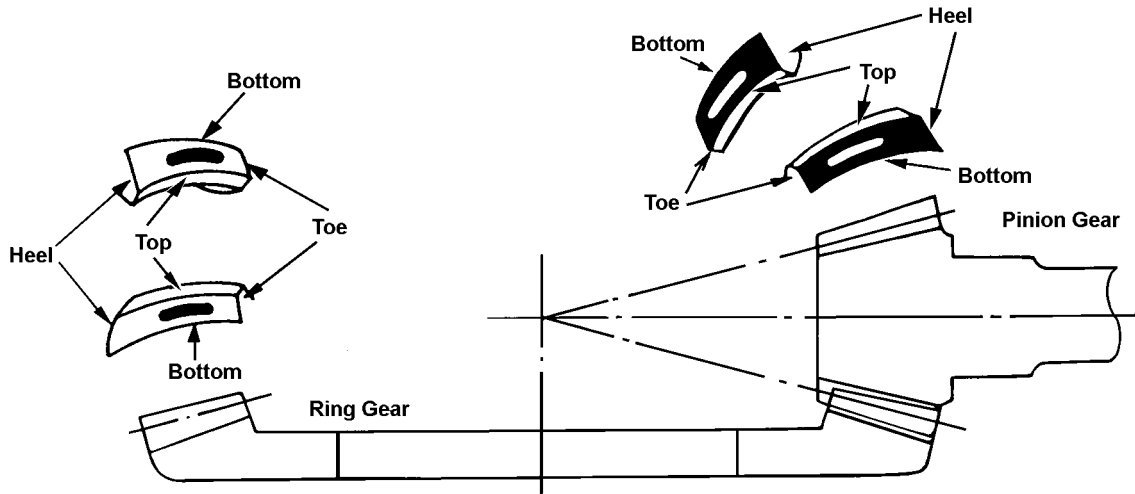
Bevel Gear Inspection

- Visually check the bevel gears [A] for scoring, chipping, or other damage.
- ★ Replace the bevel gears as a set if either gear is damaged.



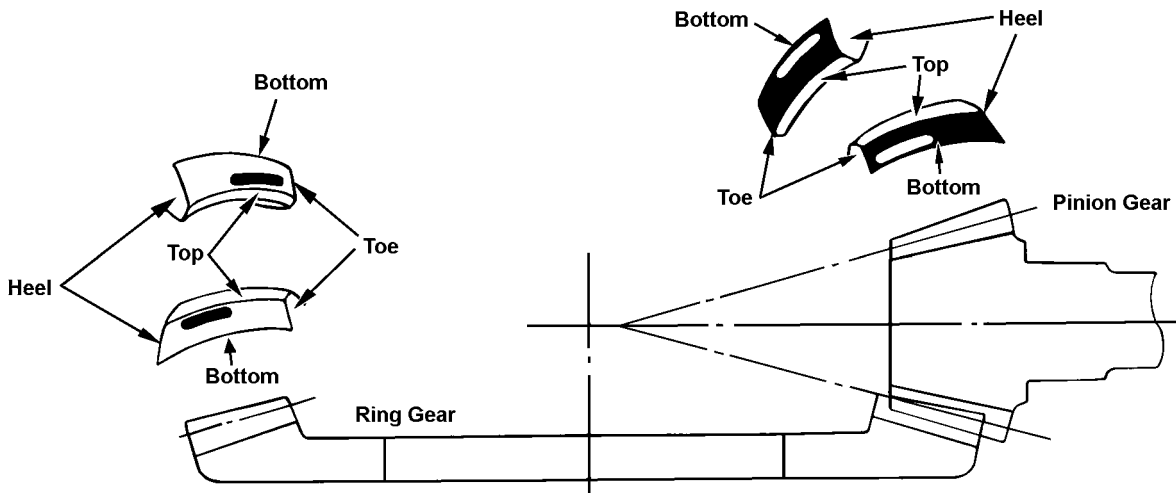
Final Gear Case

Correct Tooth Contact Pattern: No adjustment is required.

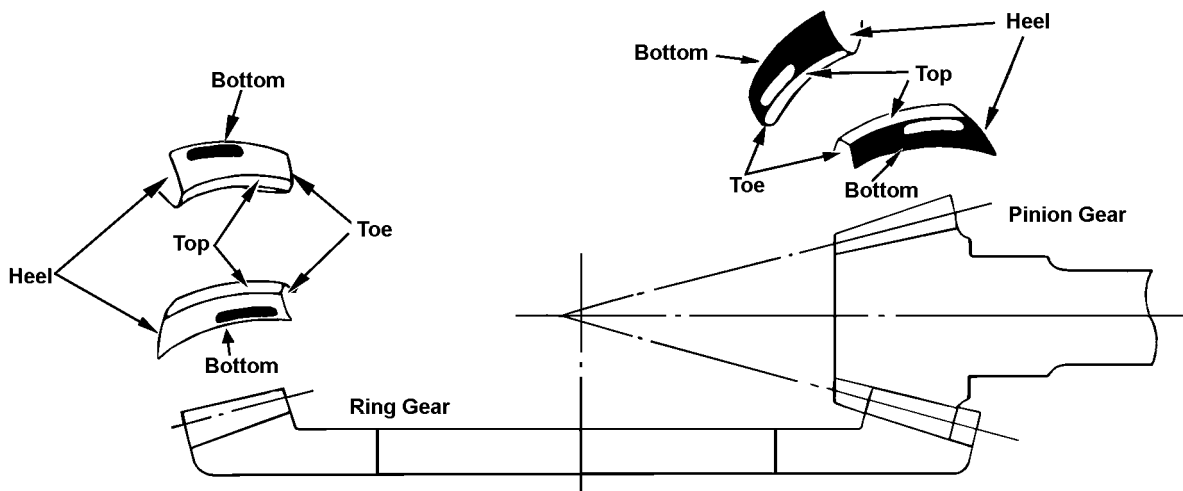


Incorrect Tooth Contact Patterns

Example 1 : Decrease the thickness of the ring gear shim(s) by 0.1 mm (0.004 in.) to correct the pattern shown below. Repeat in 0.1 mm (0.004 in.) steps if necessary.



Example 2 : Increase the thickness of the ring gear shim(s) by 0.1 mm (0.004 in.) to correct the pattern shown below. Repeat in 0.1 mm (0.004 in.) steps if necessary.



11-34 FINAL DRIVE

Bearing and Oil Seal

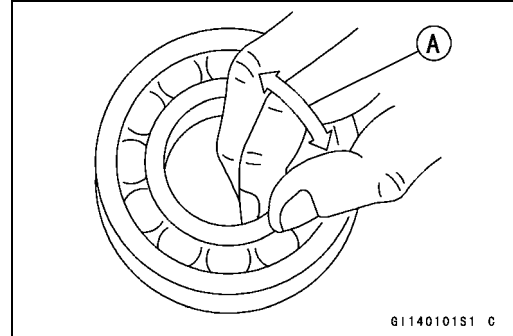
Ball or Needle Bearing Inspection

Since the bearings are made to extremely close tolerances, the clearance cannot normally be measured.

CAUTION

Do not remove any bearings for inspection except the right rear axle bearing.

- Turn each bearing in the case or hub back and forth [A] while checking for plays, roughness, or binding.
- ★ If bearing play, roughness, or binding is found, replace the bearing.

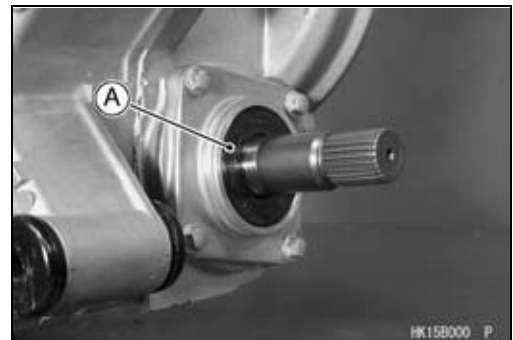


- Check the needle bearings [A] in the final gear case.
- The rollers in the needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.
- ★ If the bearing is damaged, replace the rear final gear case.



Oil Seal Inspection

- Inspect the oil seals [A].
- ★ Replace any if the lips are misshapen, discolored (indicating that the rubber has deteriorated), hardened, or been otherwise damaged.



Brakes

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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Brake Reservoir Cap Screws	1.5	0.15	13 in·lb	
2	Front Brake Lever Pivot Bolt	5.9	0.60	52 in·lb	
3	Front Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
4	Front Brake Master Cylinder Clamp Bolts	8.8	0.90	78 in·lb	
5	Brake Switch Mounting Bolt	1.2	0.12	10 in·lb	
6	Brake Hose Banjo Bolts	25	2.5	18	
7	Front Brake Caliper Mounting Bolts	25	2.5	18	
8	Bleed Valves	7.8	0.80	69 in·lb	
9	Disc Mounting Bolts	37	3.8	27	L

B: Apply brake fluid.

L: Apply a non-permanent locking agent.

R: Replacement Parts

Si: Apply silicone grease.

Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear (Parking) Brake Lever Screw	–	–	–	L
2	Gasket Screws	–	–	–	L
3	Brake Pedal Bolt	8.8	0.90	78 in·lb	

4. Brake Pedal Cotter Pin

G: Apply grease.

L: Apply a non-permanent locking agent.

MF: Apply MOBIL FLUID 424 or equivalent oil.

O: Apply engine oil.

R: Replacement Parts.

Si: Apply silicone grease.

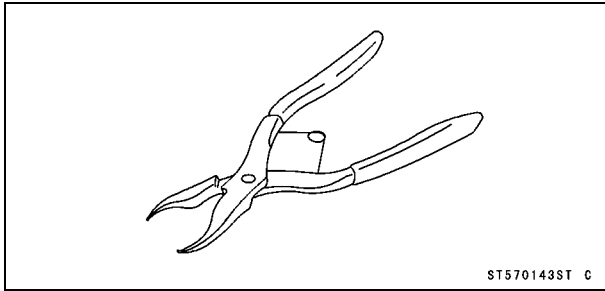
12-6 BRAKES

Specifications

Item	Standard	Service Limit
Brake Fluid Type	DOT 3 or DOT 4	— — —
Front Disc Brake Pad Lining Thickness	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Disc Thickness	3.3 ~ 3.7 mm (0.130 ~ 0.146 in.)	3 mm (0.12 in.)
Disc Runout	TIR 0.2 mm (0.008 in.) or less	TIR 0.3 mm (0.012 in.)
Rear Brake Lever, Pedal and Cables Rear Brake Pedal Position	35 ~ 40 mm (1.38 ~ 1.57 in.) above footboard	— — —
Rear Brake Lever Free Play	1 ~ 2 mm (0.04 ~ 0.08 in.)	— — —
Rear Brake Pedal Free Play	15 ~ 25 mm (0.6 ~ 1.0 in.)	— — —

Special Tool

**Inside Circlip Pliers:
57001-143**



12-8 BRAKES

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 brake parts. Do not use any other fluid for cleaning of 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 washed away 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 Fluid Recommendation

Use extra heavy-duty brake fluid only from a container marked DOT3 or DOT4.

Recommended Disc Brake Fluid

Type: DOT 3 or DOT 4

Brake Fluid Level Inspection

- Refer to the Brake Fluid Level Inspection in the Periodic Maintenance chapter.

Brake Fluid Change

- Refer to the Brake Fluid Change in the Periodic Maintenance chapter.

Brake Line Air Bleeding

- Refer to the Brake Line Air Bleeding in the Periodic Maintenance chapter.

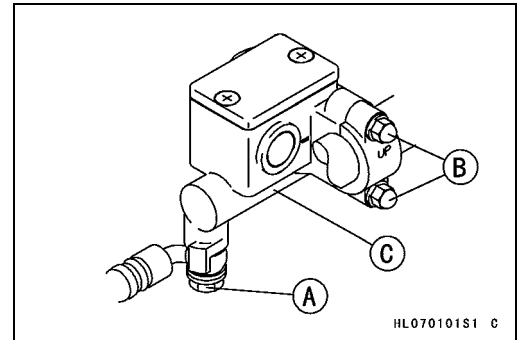
Master Cylinder

Front Brake Master Cylinder Removal

- Remove:
 - Brake Hose Banjo Bolt [A]
 - Master Cylinder Clamp Bolts [B]
 - Master Cylinder [C]

CAUTION

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



Front Brake Master Cylinder Installation

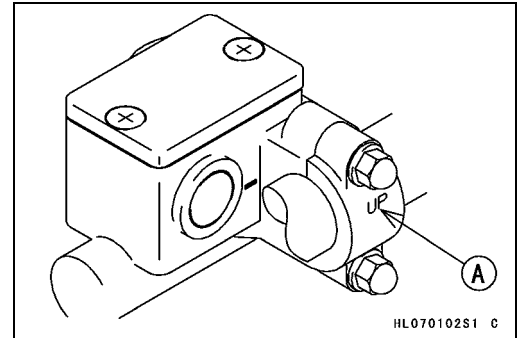
- The master cylinder clamp must be installed with the "UP" mark [A] upwards.
- Tighten the upper clamp bolt first, and then the lower clamp bolt. There will be a gap at the lower part of the clamp after tightening.

Torque - Front Brake Master Cylinder Clamp Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)

- Use a new flat washer on each side of the brake hose fitting, and tighten the banjo bolt.

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

- Bleed the brake line after master cylinder installation (see Brake Line Air Bleeding in the Periodic Maintenance chapter).
- Check the brake for good braking power, no braking brag, and no fluid leakage.



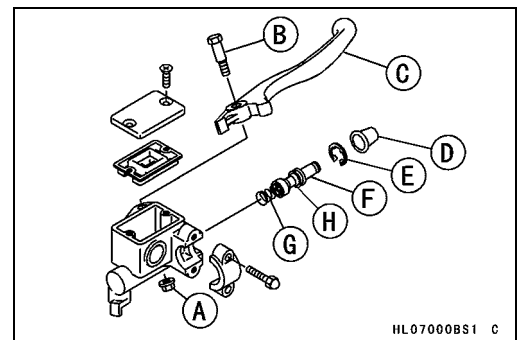
⚠ WARNING

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

Front Brake Master Cylinder Disassembly

- Remove:
 - Master Cylinder (see Front Brake Master Cylinder Removal)
 - Brake Lever Pivot Bolt Locknut [A]
 - Brake Lever Pivot Bolt [B]
 - Brake Lever [C]
 - Dust Cover [D]
 - Circlip [E]
 - Piston [F]
 - Spring [G]

Special Tool - Inside Circlip Pliers: 57001-143



CAUTION

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

12-10 BRAKES

Master Cylinder

Front Brake Master Cylinder Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

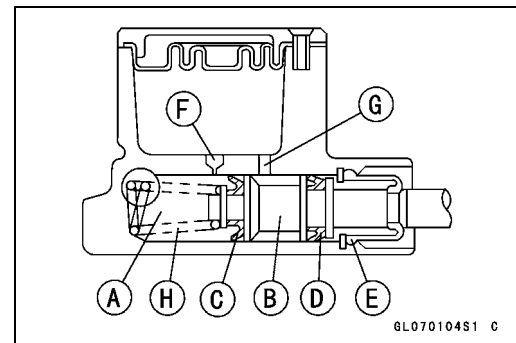
CAUTION

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.

- Take care not to scratch the piston or the inner wall of the cylinder.
- Apply brake fluid to the removed parts and to the inner wall of the cylinder.
- Tighten:
 - Torque - Front Brake Lever Pivot Bolt: 5.9 N·m (0.60 kgf·m, 52 in·lb)
 - Front Brake Lever Pivot Bolt Locknut: 5.9 N·m (0.60 kgf·m, 52 in·lb)

Front Brake Master Cylinder Inspection (Visual Inspection)

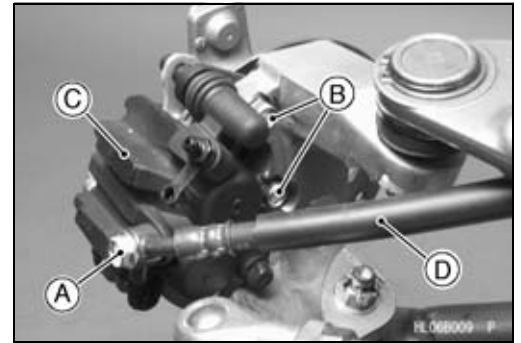
- Disassemble the master cylinder (see Front Brake Master Cylinder Disassembly).
- Check that there are no scratches, rust or pitting on the inner wall of the master cylinder [A] and on the outside of the piston [B].
- ★ If the master cylinder or piston shows any damage, replace them.
- Inspect the primary [C] and secondary [D] cups.
- ★ 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.
- Check the dust cover [E] for damage.
- ★ If it is damaged, replace it.
- Check that the relief [F] and supply [G] ports are not plugged.
- ★ If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.
- Check the piston return spring [H] for any damage.
- ★ If the spring is damaged, replace it.



Calipers

Front Brake Caliper Removal

- Remove the front wheel (see Wheel Removal in the Wheels/Tires chapter).
- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B].
- Detach the caliper [C] from the disc.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper.



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 Disassembly).

Front Brake Caliper Installation

- Install the caliper and brake hose lower end.
- Replace the washers that are on each side of hose fitting with new ones.
- Tighten:
 - Torque - Front Brake Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)**
 - Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)**
- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Brake Line Air Bleeding in the Periodic Maintenance chapter).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ WARNING

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

12-12 BRAKES

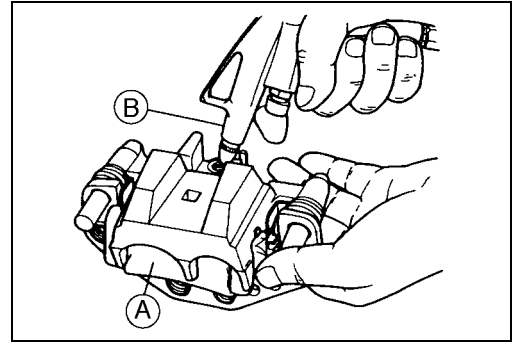
Calipers

Front Brake Caliper Disassembly

- Remove:
 - Caliper (see Front Brake Caliper Removal)
 - Pads (see Front Brake Pad Removal)
 - Anti-rattle Spring
- Using compressed air, remove the piston.
 - Cover the caliper opening with a clean, heavy cloth [A].
 - Remove the piston by lightly applying compressed air [B] to where the brake line fits into the caliper.

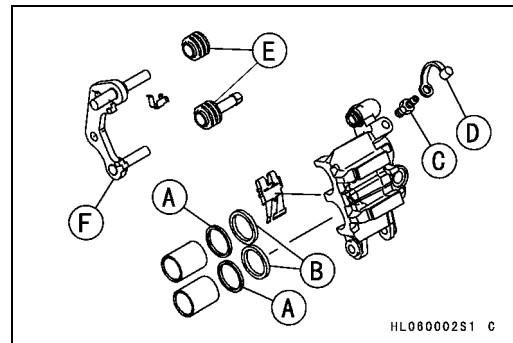
⚠ WARNING

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



NOTE

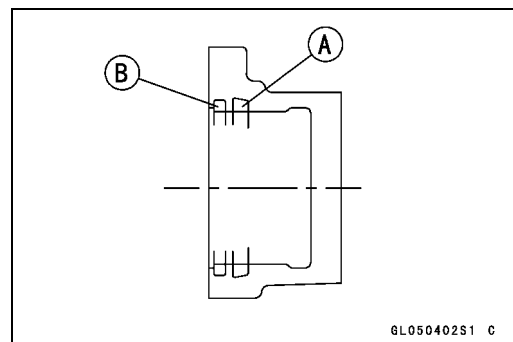
- If compressed air is not available, do as follows with the brake hose connected to the caliper.
 - Prepare a container for brake fluid.
 - Remove the pads and spring (see Front Brake Pad Removal).
 - Pump the brake lever to remove the caliper piston.
- Remove:
 - Dust Seal [A]
 - Fluid Seal [B]
 - Bleed Valve [C] and Rubber Cap [D]
 - Boots [E] and Caliper Holder [F]



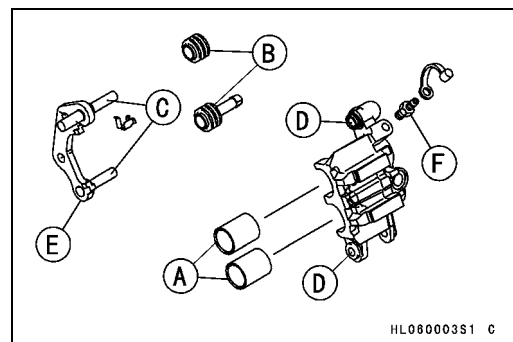
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Front Brake Caliper Assembly

- Replace the fluid seal [A] with a new one.
 - Apply brake fluid to the fluid seal, and install it into the cylinder by hand.
 - Replace the dust seal [B] with a new one if it is damaged.
 - Apply brake fluid to the dust seal, and install it into the cylinder by hand.
 - Apply brake fluid to the outside of the pistons [A], and push them into the cylinder by hand. Take care that neither the cylinder nor the piston skirt gets scratched.
 - Replace the rubber boots [B] if they are damaged.
 - Apply a thin coat of silicone grease to the caliper holder shafts [C] and holder holes [D] (Silicone grease is a special high temperature, water-resistant grease).
 - Install:
 - Caliper Holder [E]
 - Bleed Valve [F] and Rubber Cap
- Torque - Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)**



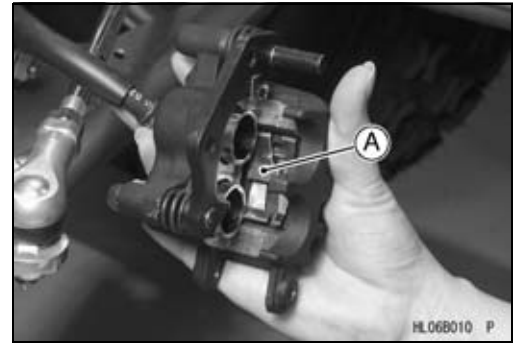
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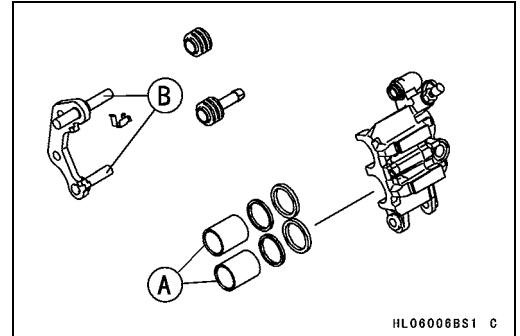
Calipers

- Install the anti-rattle spring [A] in the caliper as shown.
- Install the pads (see Front Brake Pad Installation).



Front Brake Piston and Cylinder Damage Inspection

- Visually inspect the pistons [A] and cylinder surfaces.
- ★ Replace the caliper if the cylinder and piston are badly scored or rusty.



Front Brake Caliper Holder Shaft Wear Inspection

The caliper body must slide smoothly on the caliper holder shafts [B]. 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.

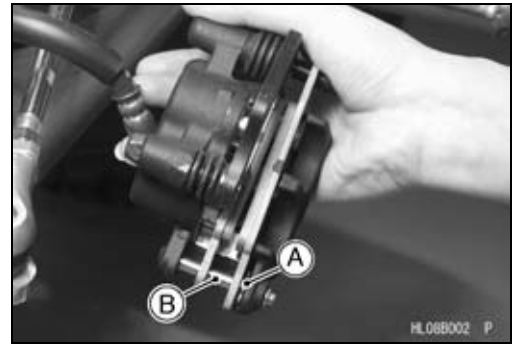
- Check to see that the caliper holder shafts are not badly worn or stepped, and that the rubber boots are not damaged.
- ★ If the rubber boot is damaged, replace the rubber boot.
- ★ If caliper holder shaft is damaged, replace the caliper holder shaft and rubber boot as a unit.

12-14 BRAKES

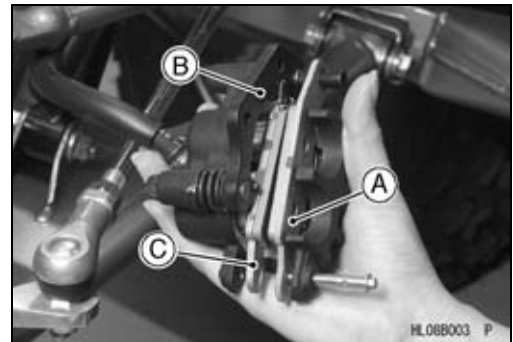
Brake Pads

Front Brake Pad Removal

- Remove the front wheel (see Wheel Removal in the Wheels/Tires chapter).
- Detach the caliper from the disc (see Front Brake Caliper Removal).
- Draw out the clip [A], and remove the pad holder pin [B].



- Remove the pad [A] on the outside.
- Push the holder [B] towards the piston, and remove the pad [C] on the piston side.



Front Brake Pad Installation

- Push the caliper piston in by hand as far as it will go.
- Be sure that the anti-rattle spring is in place.
- Install:
 - Brake Pads
 - Pad Holder Pin and Clip
- The clip must be “outside” of the pads.

⚠ WARNING

Do not attempt to drive the vehicle until a firm brake lever can be obtained by pumping the brake lever until the pads are against each disc. The brake will not function on the first application if this is not done.

Brake Pad Wear Inspection

- Refer to the Front Brake Pad Wear Inspection in the Periodic Maintenance chapter.

Brake Discs

Front Brake Disc Cleaning

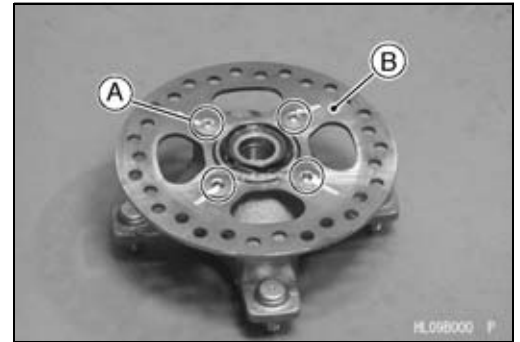
Poor braking can be caused by oil on a disc. Oil on a disc must be cleaned off with an oilless cleaning fluid such as trichloroethylene or acetone.

⚠ WARNING

These cleaning fluids are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturer's warnings.

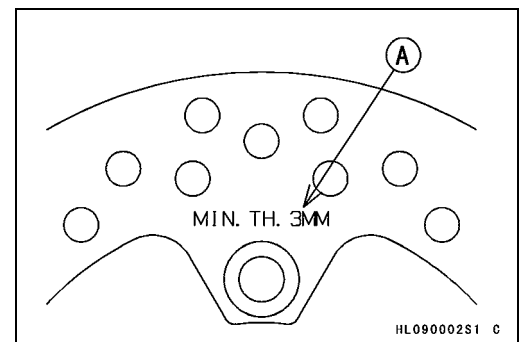
Front Brake Disc Removal

- Remove:
 - Front Hub (see Front Hub Removal in the Wheels/Tires chapter)
 - Brake Disc Mounting Bolts [A]
 - Brake Disc [B]



Front Brake Disc Installation

- The disc must be installed with the marked side [A] facing toward the steering knuckle.
- Apply a non-permanent locking agent to the disc mounting bolts.
- Tighten:
 - Torque - Disc Mounting Bolts: 37 N·m (3.8 kgf·m, 27 ft·lb)**
- After installing the discs, check the disc runout. Completely clean off any grease that has gotten on either side of the disc with a high flash-point solvent. Do not use one which will leave an oily residue.



Front Brake Disc Wear Inspection

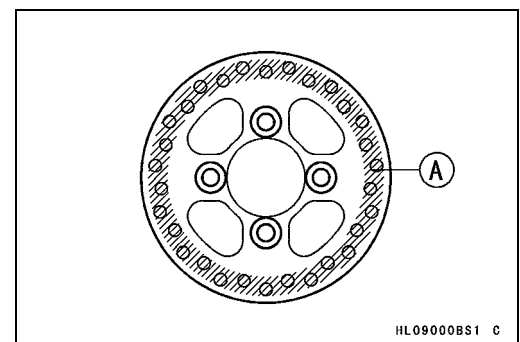
- Measure the thickness of each disc at the point [A] where it has worn the most.

Disc Thickness

Standard: 3.3 ~ 3.7 mm (0.130 ~ 0.146 in.)

Service Limit: 3 mm (0.12 in.)

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



Front Brake Disc Runout Inspection

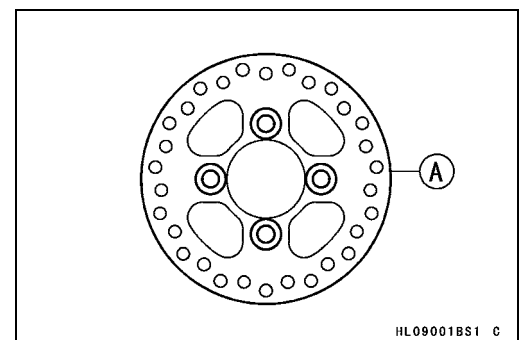
- Jack up the vehicle so that the wheels are off the ground.
- Remove the front wheels and turn the handlebar fully to one side.
- Set up a dial gauge against the disc [A], and measure the disc runout.

Disc Runout

Standard: TIR 0.2 mm (0.008 in.) or less

Service Limit: TIR 0.3 mm (0.012 in.)

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



12-16 BRAKES

Brake Hoses

Front Brake Hose Inspection

- Refer to the Front Brake Hoses and Connections Inspection in the Periodic Maintenance chapter.

Front Brake Hose Replacement

- Refer to the Front Brake Hose Replacement in the Periodic Maintenance chapter.

Rear Brake Lever, Pedal and Cables

Rear Brake Pedal Position Inspection

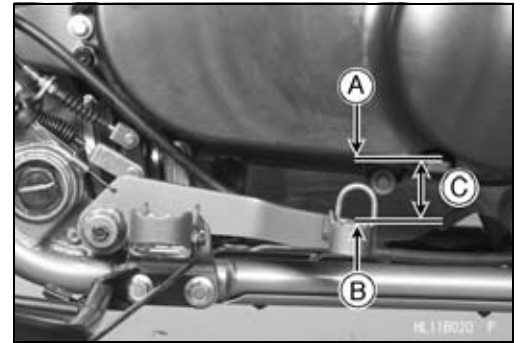
- Check that the brake pedal [B] is in the correct position as shown.

[A] Converter Cover

Pedal Position [C]

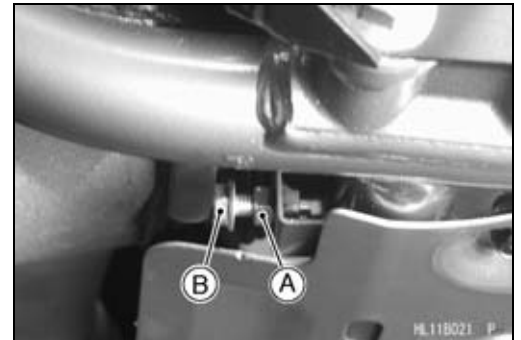
Standard: 35 ~ 40 mm (1.38 ~ 1.57 in.)

- ★ If it is incorrect, adjust the brake pedal position.



Rear Brake Pedal Position Adjustment

- Loosen the locknut [A], and turn the adjusting bolt [B] until the brake pedal is correctly positioned.
- Tighten the locknut.
- Check the brake pedal free play (see Rear Brake Pedal Free Play Inspection in the Periodic Maintenance chapter).



Rear (Parking) Brake Lever Free Play Inspection

- Refer to the Rear (Parking) Brake Lever Free Play Inspection in the Periodic Maintenance chapter.

Rear Brake Pedal Free Play Inspection

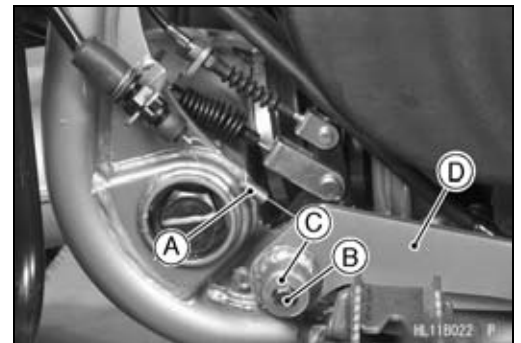
- Refer to the Rear Brake Pedal Free Play Inspection in the Periodic Maintenance chapter.

Rear (Parking) Brake Lever and Pedal Free Play Adjustment

- Refer to the Rear (Parking) Brake Lever and Pedal Free Play Adjustment in the Periodic Maintenance chapter.

Rear Brake Pedal Removal

- Remove:
 - Right Footpeg (see Foot Guard and Stay Removal in the Frame chapter)
- Loosen the locknut and the adjusting bolt.
- Remove the brake switch spring [A].
- Loosen the brake pedal bolt [B].
- Remove:
 - Washers [C]
 - Brake Pedal [D]

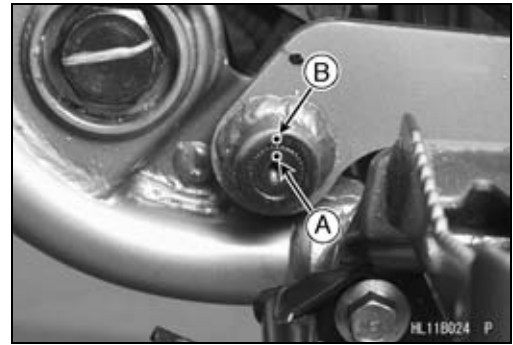


12-18 BRAKES

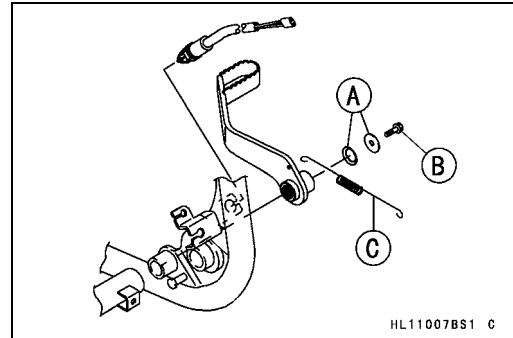
Rear Brake Lever, Pedal and Cables

Rear Brake Pedal Installation

- Apply grease to the tip of the brake pedal shaft.
- Install the brake pedal.
- Align the punch mark [A] on the brake pedal shaft with the punch mark [B] on the brake pedal.

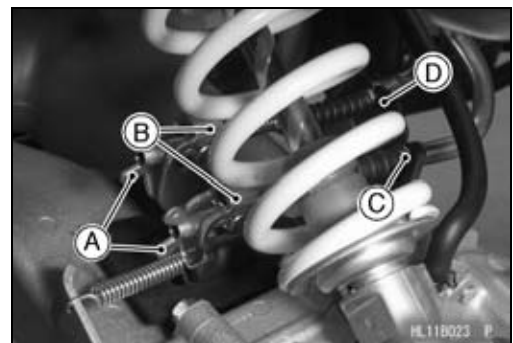


- Install the washers [A].
- Tighten:
Torque - Brake Pedal Bolt [B]: 8.8 N·m (0.90 kgf·m, 78 in·lb)
- Install the brake switch spring [C].
- Adjust the brake pedal position (see Rear Brake Pedal Position Adjustment).

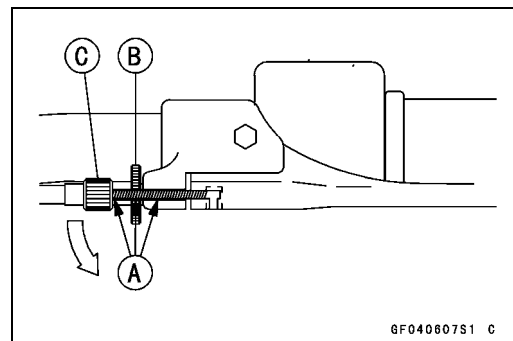


Rear (Parking) Brake Cable Removal

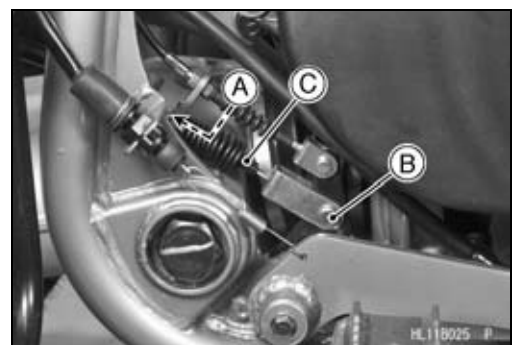
- Remove:
Right Foot Guard (see Foot Guard and Stay Removal in the Frame chapter)
- Unscrew the adjusters [A] at the rear ends of the cables, and pull the cables out of the joints [B].
- Remove the circlip [C] and pull the cables out of the cable mount [D].



- Loosen the knurled locknut [B] at the rear brake lever and screw in the adjuster [C].
- Line up the slots [A] in the brake lever, knurled locknut, and adjuster, and then free the cable from the lever.
- Remove the brake lever cable from the frame.



- Remove:
Swingarm (see Swingarm Removal in the Suspension chapter)
Circlip [A]
Cotter Pin, Washer and Pin [B]
Brake Pedal Cable [C]



Rear Brake Lever, Pedal and Cables

Rear (Parking) Brake Cable Installation

- Grease the brake cable front ends.
- Replace the cotter pin with a new one.
- Route the brake cables according to the Cable, Wire, and Hose Routing section in the Appendix chapter.
- Install the parts removed (see the appropriate chapter).
- Adjust the brake pedal and rear brake lever.

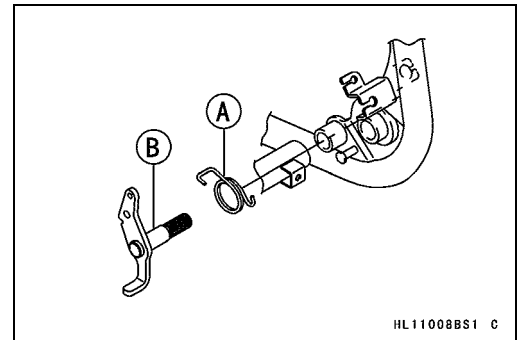
Rear (Parking) Brake Cable Lubrication

Whenever the brake cable is removed, lubricate the cable as follows:

- Lubricate the cable with a penetrating rust inhibitor.

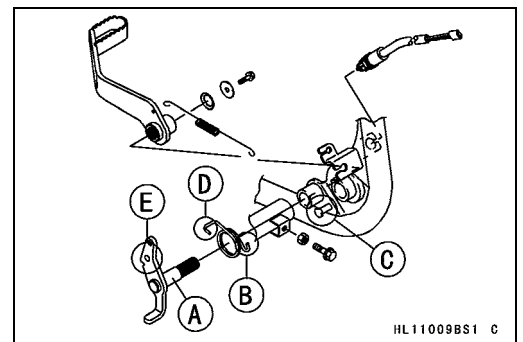
Rear Brake Pedal Shaft Removal

- Remove:
 - Swingarm (see Swingarm Removal in the Suspension chapter)
 - Brake Pedal (see Rear Brake Pedal Removal)
 - Brake Cable (see Rear Brake Cable Removal)
 - Reverse Lock Cable (see Reverse Lock Cable Removal in the Crankshaft/Transmission chapter)
- Remove the brake return spring [A] with pliers.
- Remove the brake pedal shaft [B].



Rear Brake Pedal Shaft Installation

- Apply grease to the tip of the brake pedal shaft [A].
- Install:
 - Brake Return Spring
 - Brake Pedal Shaft
- Hook the brake return spring end [B] to the projection [C], turn the spring clockwise and hook the other end of the spring [D] to the brake pedal shaft [E] with pliers.
- Install:
 - Brake Cable (see Rear Brake Cable Installation)
 - Reverse Lock Cable (see Rear Reverse Lock Cable Installation in the Crankshaft/Transmission chapter)
 - Brake Pedal (see Rear Brake Pedal Installation)
 - Swingarm (see Swingarm Installation in the Suspension chapter)

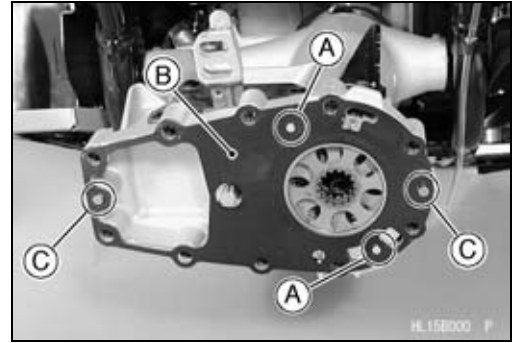


12-20 BRAKES

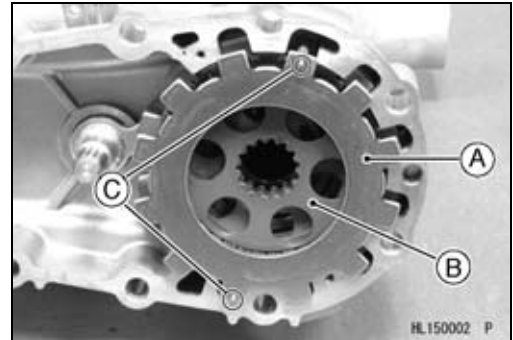
Internal Wet Brake

Internal Wet Brake Disassembly

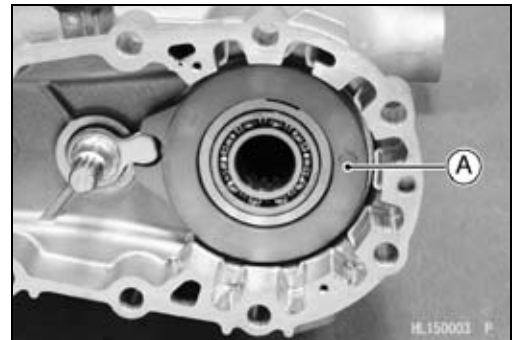
- Remove:
 - Rear Final Gear Case (see Final Gear Case Removal in the Final Drive chapter)
 - Gasket Screws [A]
 - Gasket [B]
 - Dowel Pins [C]



- Remove:
 - Steel Pressure Plates [A] and Steel Plates
 - Friction Plates [B]
 - Pins [C] and Springs



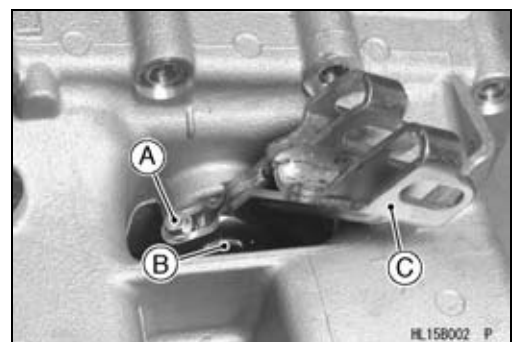
- Remove:
 - Brake Cam Plate [A]



- Remove:
 - Steel Balls [A]



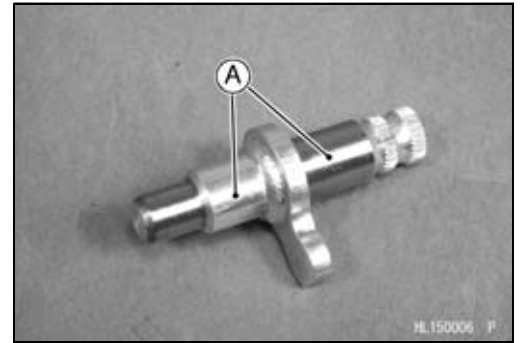
- Remove:
 - Brake Cam Lever Bolt and Nut [A]
 - Brake Camshaft [B]
 - Brake Cam Lever [C]



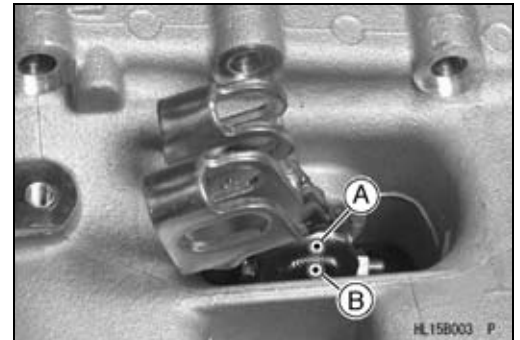
Internal Wet Brake

Internal Wet Brake Assembly

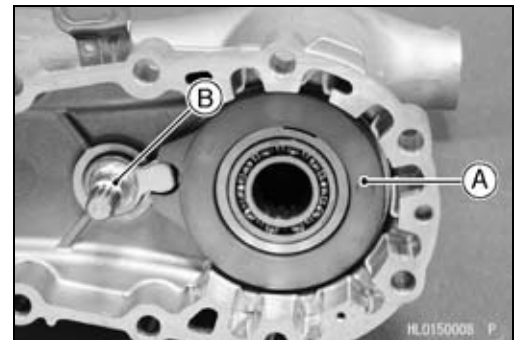
- Apply [A] MOBIL FLUID 424 or equivalent oil to the brake camshaft and the inside of the collar.
- Install the brake cam lever inserting the camshaft in the swingarm.



- Align the punch mark [A] on the brake cam lever with the punch mark [B] on the brake camshaft.
- Install the brake cam lever bolt and nut, and tighten them.



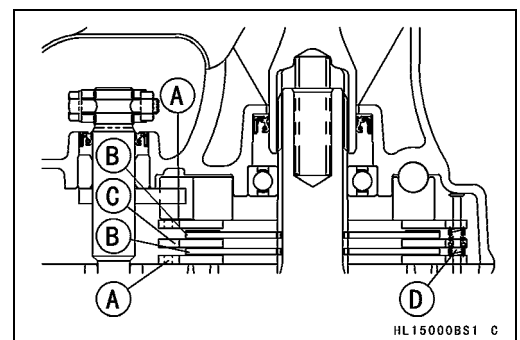
- Install:
 - Steel Balls
 - Brake Cam Plate [A]
- Fit the cam plate and brake camshaft [B] as shown.



- Install:
 - Steel Pressure Plate [A] and Pins [B] (as shown)



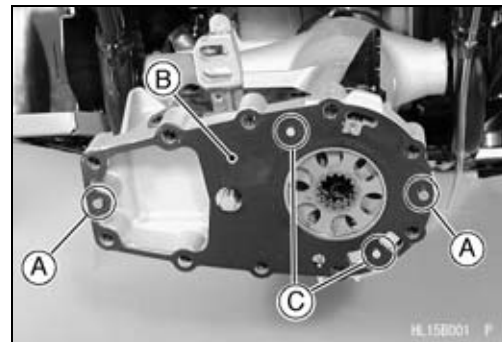
- Install:
 - Steel Pressure Plates [A]
 - Friction Plates [B]
 - Steel Plate [C]
 - Springs [D]



12-22 BRAKES

Internal Wet Brake

- Install:
 - Dowel Pins [A]
 - New Gasket [B]
- Apply a non-permanent locking agent to the gasket screws [C], and tighten them.
- Install:
 - Rear Final Gear Case (see Final Gear Case Installation in the Final Drive chapter)



Suspension

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Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Front Shock Absorber Mounting Nuts	42	4.3	31	
2	Rear Shock Absorber Mounting Nuts	62	6.3	46	
3	Suspension Arm Pivot Bolts	42	4.3	31	
4	Steering Knuckle Joint Nuts	29	3.0	21	
5	Swingarm Pivot Right Shaft	152	15.5	112	L
6	Swingarm Pivot Left Shaft	20	2.0	14	L
7	Swingarm Pivot Left Nut	152	15.5	112	

AG: Apply grease (Amoco rykon premium grease No. 2 EP Green).

G: Apply grease.

L: Apply a non-permanent locking agent.

MF: Apply MOBIL FLUID 424 or equivalent oil.

R: Replacement parts

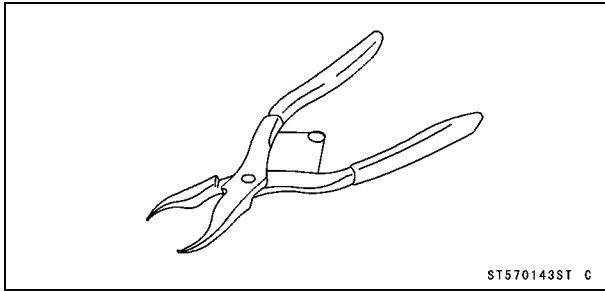
13-4 SUSPENSION

Specifications

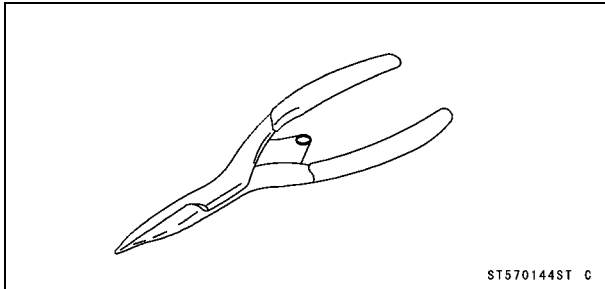
Item	Standard	Service Limit
Front Shock Absorbers Spring Preload Setting Position	No. 2	(Usable Range) 1 ~ 5
Rear Shock Absorber Spring Preload Adjustment (Adjusting nut position from the center of the mounting hole upper)	94.2 mm (3.71 in.)	(Adjustable Range) 93.2 ~ 104.3 mm (3.67 ~ 4.11 in.)
Gas Reservoir Compression Damping Adjustment (from the seated position adjuster tuned fully clockwise)	14 clicks counter-clockwise	(Adjustable Range) 1 ~ 19 clicks
Nitrogen Gas Pressure	980 kPa (10 kgf/cm ² , 142 psi)	— — —

Special Tools

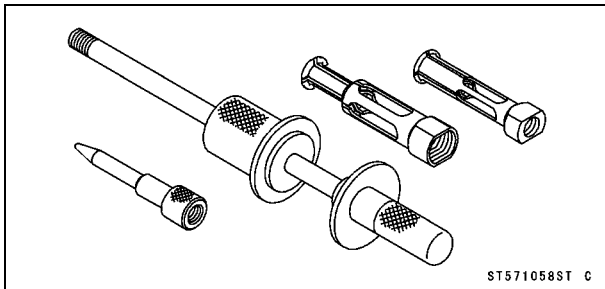
Inside Circlip Pliers:
57001-143



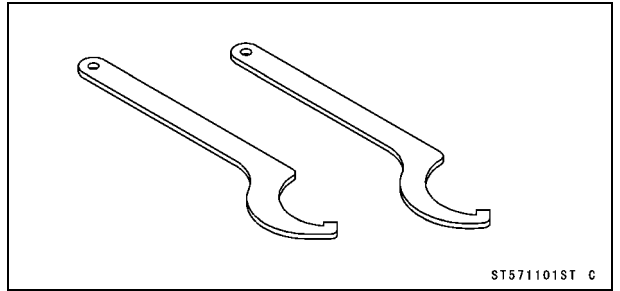
Outside Circlip Pliers:
57001-144



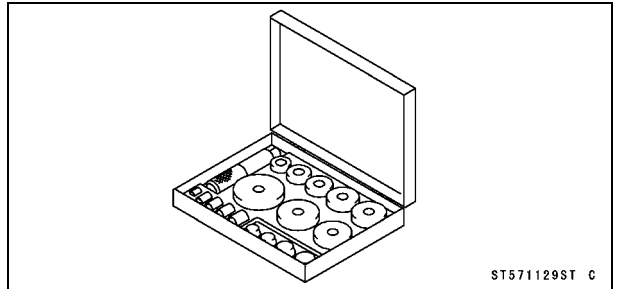
Oil Seal & Bearing Remover:
57001-1058



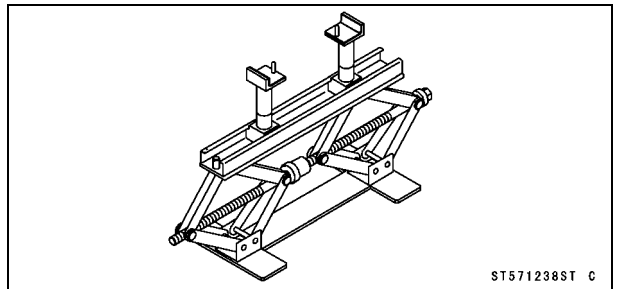
Hook Wrench R37.5, R42:
57001-1101



Bearing Driver Set:
57001-1129



Jack:
57001-1238



13-6 SUSPENSION

Shock Absorbers

Front Shock Absorber

Front Shock Absorber Inspection

Since the front shock absorbers are sealed units which cannot be disassembled, only external checks are necessary.

- ★ If one unit is damaged, replace both shock absorbers as a set. If only one unit is replaced and the two are not balanced, vehicle instability at high speed may result.

Front Shock Absorber Preload Adjustment

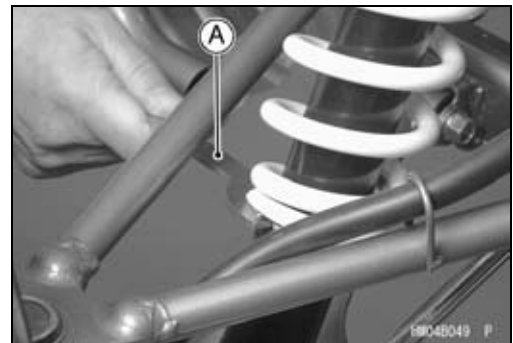
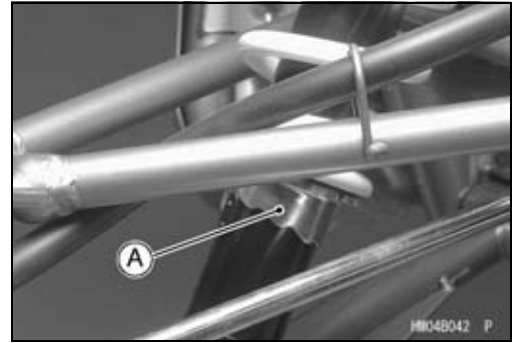
The spring adjusting sleeve [A] on the front shock absorber has 5 positions so that the spring can be adjusted for different terrain and loading conditions. If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Action

Position	Spring Force	Setting	Load	Terrain	Speed
1	Weak ↑	Soft ↑	Light ↑	Smooth ↑	Low ↑
2 (STD)					
3					
4	Strong ↓	Hard ↓	Heavy ↓	Rough ↓	High ↓
5					

- Turn the adjusting sleeve on shock absorber to the desired position with the hook wrench [A].

Owner's Tool - 92110-1129

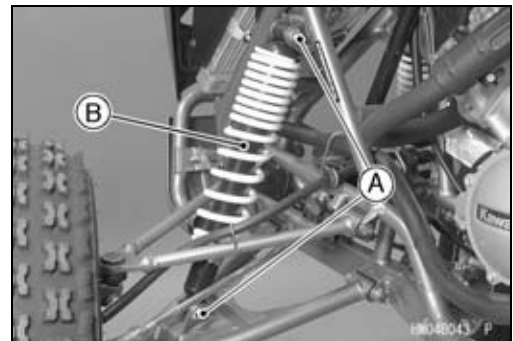


Front Shock Absorber Removal

- Support the vehicle on a stand or a jack so that the front wheels are off the ground.

Special Tool - Jack: 57001-1238

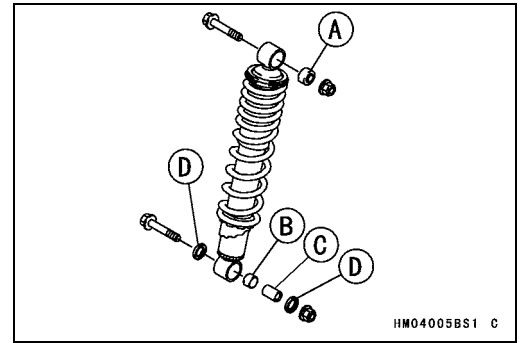
- While holding the front wheels, remove the lower and upper shock absorber mounting bolts [A], nuts, and washers.
- Remove the front shock absorber [B].



Shock Absorbers

Front Shock Absorber Installation

- Apply plenty of grease to the inside of the bushing, sleeve and oil seals.
- Install:
 - Rubber Bushing [A]
 - Bushing [B]
 - Sleeve [C]
 - Oil Seals [D]
- Tighten:
 - Torque - Front Shock Absorber Mounting Nuts: 42 N·m (4.3 kgf·m, 31 ft·lb)**



Rear Shock Absorber

To suit to various riding conditions, the spring preload of the shock absorber can be adjusted or the spring can be replaced. Also the damping force can be adjusted easily so changing oil viscosity unnecessary.

Compression Damping Adjustment

- Turn the compression damping adjuster [A] on the rear shock absorber gas reservoir with a flat-bead screwdriver.
- ★ If the damping feels too soft or too stiff, adjust it in accordance with the following table.

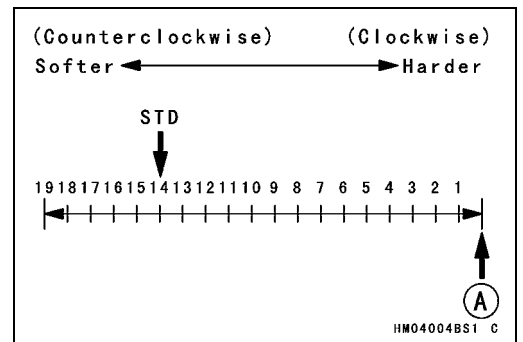


Seated position : adjuster turned fully clockwise [A].

Compression Damping
Standard: 14 clicks

NOTE

○ Always make any damping adjustments in small steps and test their effects before using them in competition.

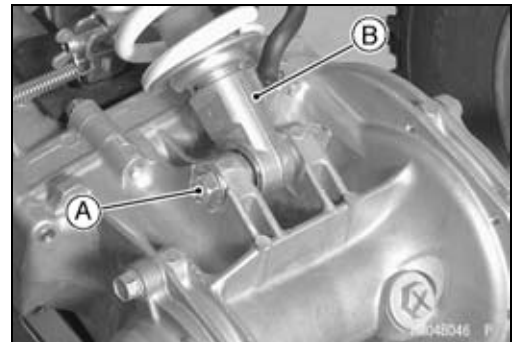
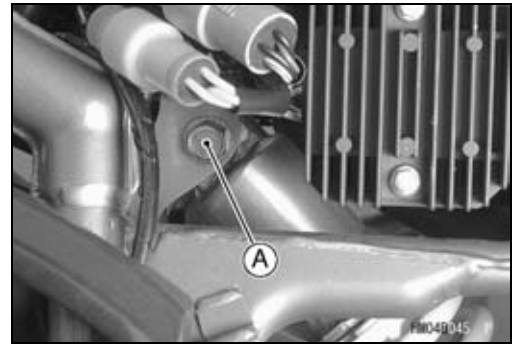


13-8 SUSPENSION

Shock Absorbers

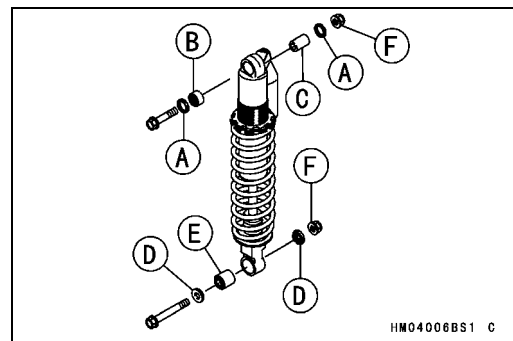
Rear Shock Absorber Removal

- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
- Support the vehicle on a stand or a jack so that the rear wheels are off the ground.
Special Tool - Jack: 57001-1238
- While holding the rear wheels, remove the lower and upper shock absorber mounting bolts [A], nuts, and washers.
- Remove the rear shock absorber [B].



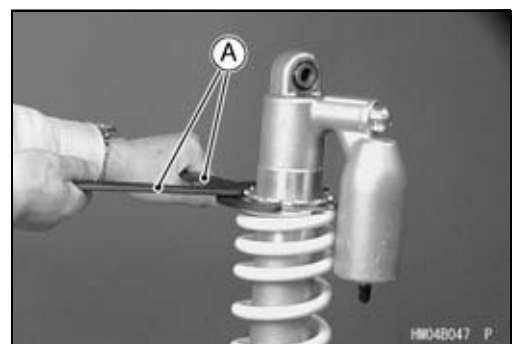
Rear Shock Absorber Installation

- Apply plenty of grease to the inside of the needle bearing, sleeve and oil seals.
- Install:
 - Oil seals [A]
 - Needle Bearing [B]
 - Sleeve [C]
 - Collars [D]
 - Rubber Bushing [E]
- Tighten:
Torque - Rear Shock Absorber Mounting Nuts [F]: 62 N·m (6.3 kgf·m, 46 ft·lb)



Rear Shock Absorber Preload Adjustment

- Remove:
 - Rear Shock Absorber (see Rear Shock Absorber Removal)
 - Loosen the locknut and turn out the adjusting nut to free the spring.
- Special Tools - Hook Wrench R37.5, R42: 57001-1101**



Shock Absorbers

- To adjust the spring preload, turn in the adjusting nut [A] to the desired position and tighten the locknut [B].
Adjusting nut position [C]

Spring Preload Setting Position

Standard: 94.2 mm (3.71 in.)

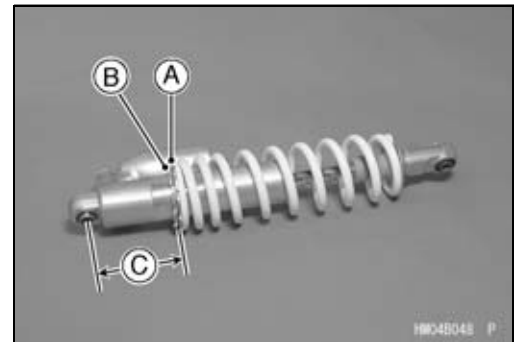
Usable Range: 93.2 mm (3.67 in.) to 104.3 mm (4.11 in.)

Torque - Rear Shock Absorber Spring Locknut: 30 N·m (3.1 kgf·m, 22 ft·lb)

- ★ If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

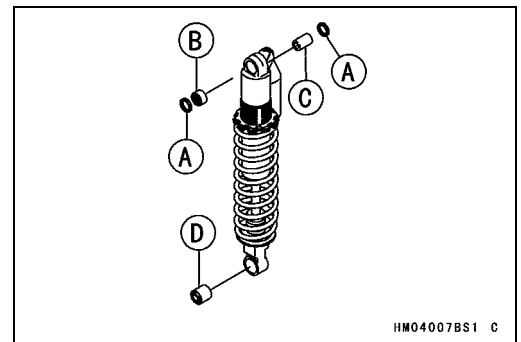
Spring Action

Position	Spring Force	Setting	Load	Terrain	Speed
94.2 mm (3.71 in.)	Weak	Soft	Light	Smooth	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
104.3 mm (4.11 in.)	Strong	Hard	Heavy	Rough	High



Rear Shock Absorber Inspection

- Check the upper pivot.
- ★ If the sleeve, needle bearing and oil seals is damaged, replace them.
Oil Seal [A]
Needle Bearing [B]
Sleeve [C]
Rubber Bushing [D]
- Check the lower pivot.
- ★ If the bushing are worn, cracked, hardened, or otherwise damaged, replace them.



Rear Shock Absorber Scrapping

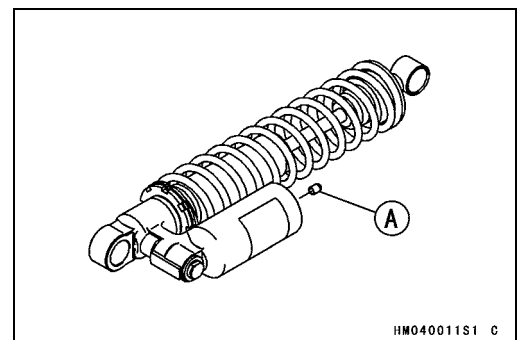
⚠ WARNING

Since the reservoir tank of the rear shock absorber contains nitrogen gas, do not incinerate the reservoir tank without first releasing the gas or it may explode.

- Remove the shock absorber (see Rear Shock Absorber Removal).
- Remove the valve cap [A] and release the nitrogen gas completely from the gas reservoir.
- Remove the valve.

⚠ WARNING

Since the high pressure gas is dangerous, do not point the valve toward your face or body.

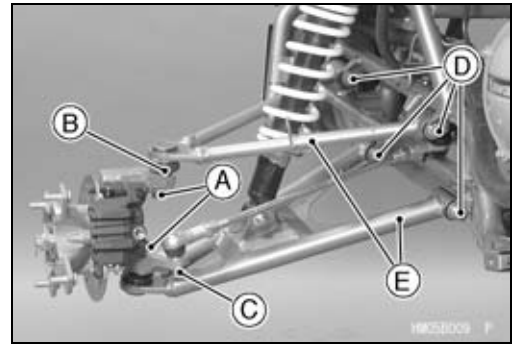


13-10 SUSPENSION

Suspension Arms

Suspension Arm Removal

- Remove:
 - Brake Hose Banjo Bolt (Caliper side)
 - Front Wheel (see Wheel Removal in the Wheels/Tires chapter)
 - Knuckle Joint Nuts and Cotter Pin [A]
 - Knuckle Joints [B] (from Knuckle)
 - Tie-Rod End Nut [C]
 - Suspension Arm Pivot Bolts [D]
 - Suspension Arms [E]



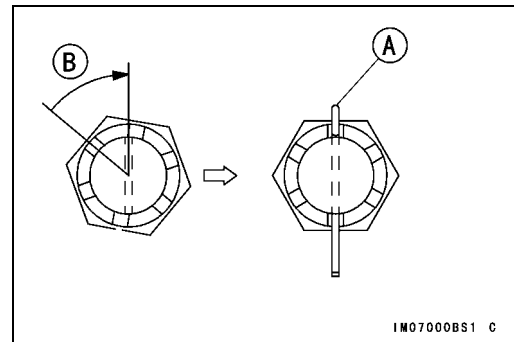
Suspension Arm Installation

- Tighten:
 - Torque - Suspension Arm Pivot Bolts: 42 N·m (4.3 kgf·m, 31 ft·lb)**
 - Steering Knuckle Joint Nuts: 29 N·m (3.0 kgf·m, 21 ft·lb)**
 - Tie-Rod End Nut: 42 N·m (4.3 kgf·m, 31 ft·lb)**

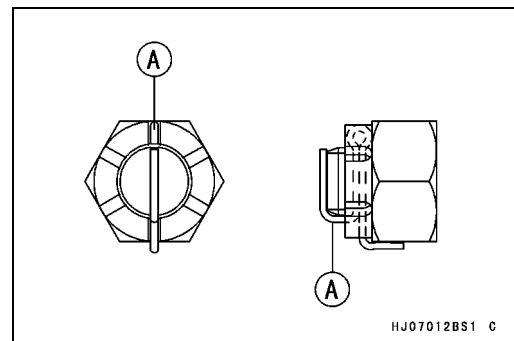
- Insert a new cotter pin [A].

NOTE

- When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle shaft, 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.



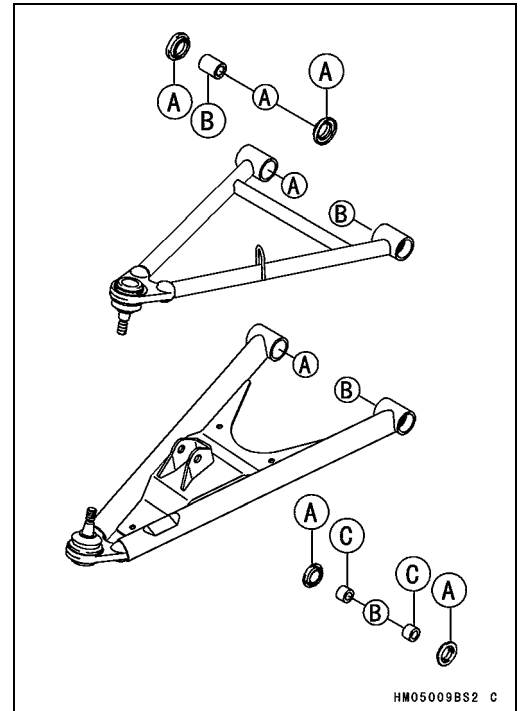
- Bend the cotter pin [A] over the nut.



Suspension Arms

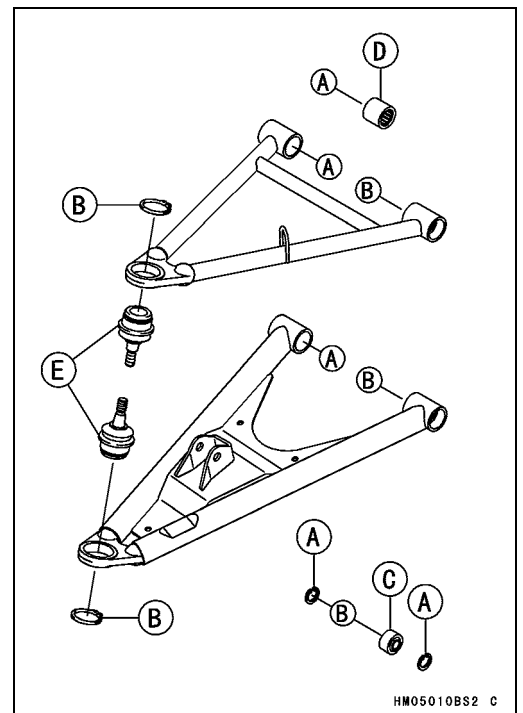
Suspension Arm Disassembly

- Remove:
 - Oil Seals [A]
 - Sleeve [B]
 - Collars [C]



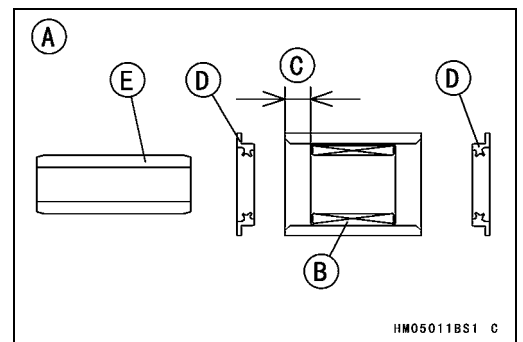
- Remove:
 - Circlip [A]
 - Snap Ring [B]
- Press out the ball joint bearing [C] and needle bearing [D].
Knuckle joint [E]

Special Tools - Inside Circlip Pliers: 57001-143
Outside Circlip Pliers: 57001-144



Suspension Arm Assembly

- Install the following parts as shown.
 - Front Side [A]
 - Needle Bearing [B]
 - [C] = 7.5 ±0.1 mm (0.295 ±0.004 in.)
 - Oil seals [D]
 - Sleeve [E]



13-12 SUSPENSION

Suspension Arms

Rear Side [F]

Ball Joint Bearing [G]

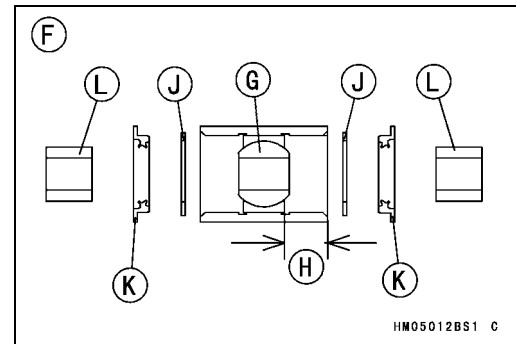
[H] = 13.5 ± 0.1 mm (0.531 ± 0.004 in.)

Circlips [J]

Oil seals [K]

- Apply grease to oil seals.

Collars [L]



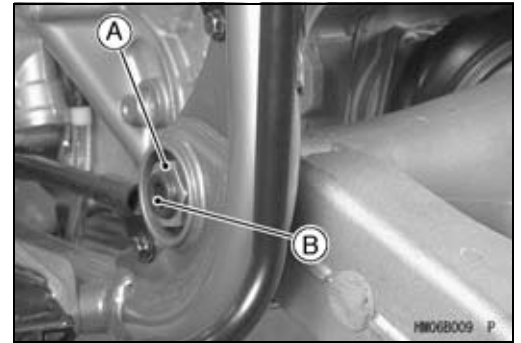
Swingarm

Swingarm Removal

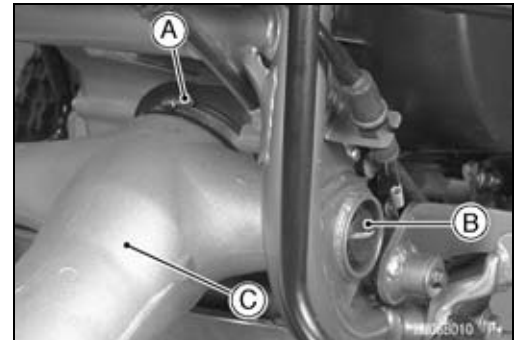
- Support the vehicle on a stand or a jack so that the rear wheels are off the ground.

Special Tool - Jack: 57001-1238

- Remove:
 - Rear Final Gear Case (see Final Gear Case Removal in the Final Drive chapter)
 - Swingarm Pivot Left Nut [A]
 - Swingarm Pivot Left Shaft [B]

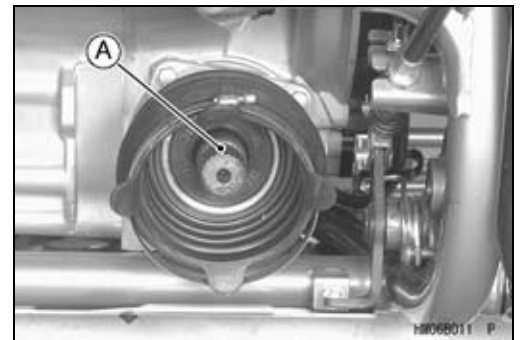


- Loosen:
 - Boot Clamp Screw [A]
- Remove:
 - Boot
 - Swingarm Pivot Right Shaft [B]
 - Swingarm [C]



Swingarm Installation

- Apply molybdenum disulfide grease to the spline of the output shaft [A].
- Fit the propeller shaft on the output shaft.

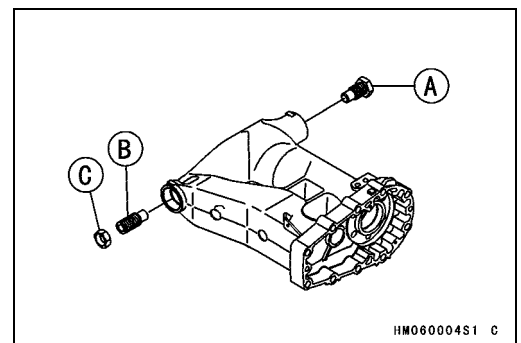


- Apply a non-permanent locking agent to the swingarm pivot right shaft [A] and left shaft [B].
- Tighten:

Torque - Swingarm Pivot Right Shaft: 152 N·m (15.5 kgf·m, 112 ft·lb)

Swingarm Pivot Left Shaft: 20 N·m (2.0 kgf·m, 14 ft·lb)

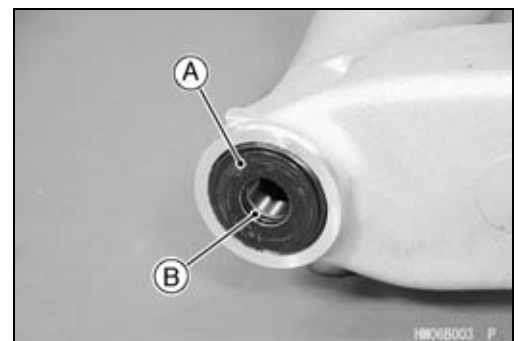
Swingarm Pivot Left Nut [C]: 152 N·m (15.5 kgf·m, 112 ft·lb)



- Fit the boot on the swingarm, and tighten the clamp screw.

Swingarm Disassembly

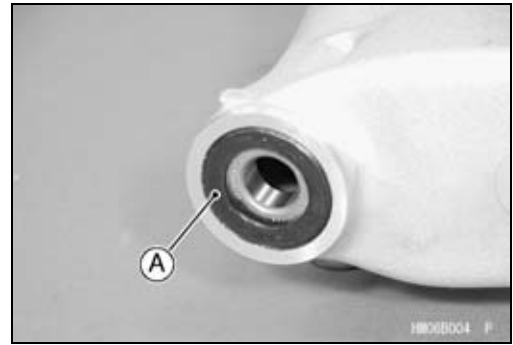
- Remove:
 - Collars [A]
 - O-ring [B]



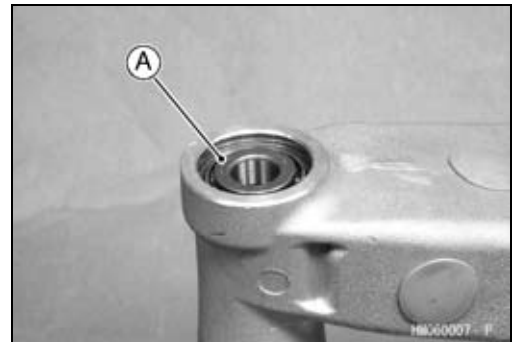
13-14 SUSPENSION

Swingarm

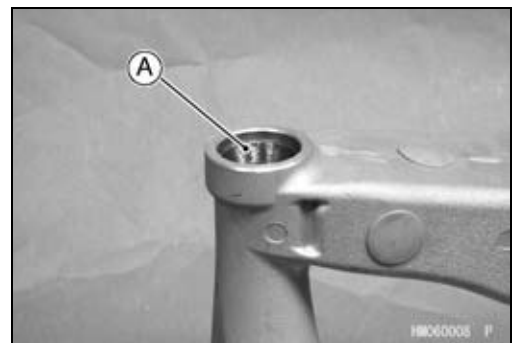
- Remove:
Oil Seal [A]



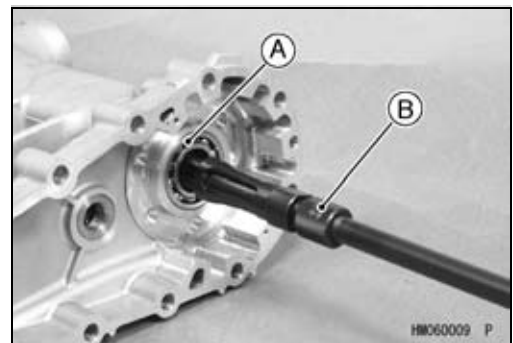
- Remove:
Tapered Roller Bearing [A]



- Remove:
Outer Race [A]



- Remove:
Ball Bearing [A]
Special Tool - Oil Seal & Bearing Remover [B]: 57001-1058

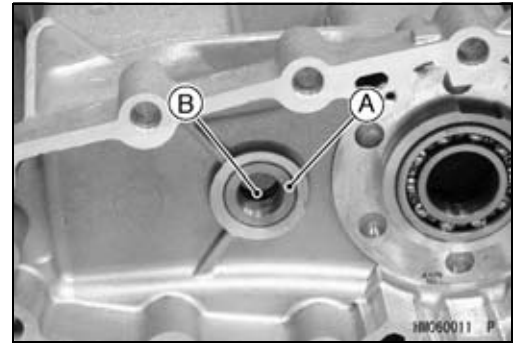


- Remove:
Oil Seal [A]



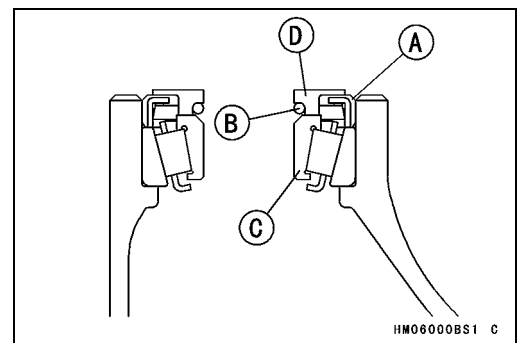
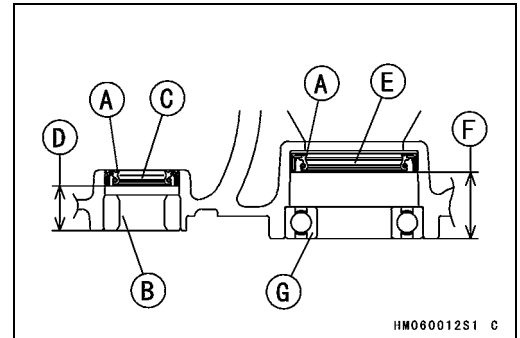
Swingarm

- Remove:
 - Collar [A]
 - Oil Seal [B]



Swingarm Assembly

- Apply grease:
 - Inside [A] of Oil Seals
- Apply MOBIL FLUID 424 or Equivalent:
 - Surface of Collar [B]
- Install the following parts as shown.
 - Brake Lever Oil Seal [C]
 - [D] = 14.5 ± 0.1 mm (0.571 ± 0.004 mm)
 - Collar (level with surface)
 - Propeller Shaft Oil Seal [E]
 - [F] = 25 ± 0.1 mm (0.984 ± 0.004 mm)
 - Ball Bearing [G] (level with surface)
- Apply Amoco Rykon Premium Grease No.2 EP Green:
 - Inside of Oil Seals [A]
 - O-rings [B]
- Install the following parts as shown.
 - Tapered Roller Bearing [C]
 - Oil Seal (level with surface)
 - O-ring
 - Collar [D]



Special Tool - Bearing Driver Set: 57001-1129

Swingarm Bearing Inspection

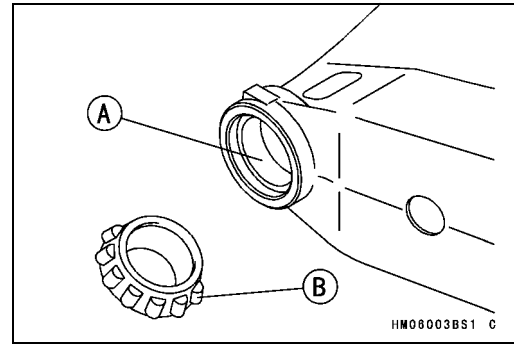
- Remove the final gear case (see Final Gear Case Removal in the Final Drive chapter).
- Move the swingarm up and down to check for abnormal friction, and push and pull it back and forth to check for bearing play.
- ★ If abnormal friction is felt, the bearings are damaged. Replace the oil seals and both left and right bearings.
- The play developed during use may indicate bearing damage. In this case, remove the swingarm and inspect the bearings. Replace both left and right bearings, if either of the bearings is damaged.

13-16 SUSPENSION

Swingarm

Swingarm Bearing Lubrication

- Remove the swingarm.
- Using a high flash-point solvent, wash the bearings clean of grease, and dry them.
- Inspect the bearings and oil seals for abrasion, color change, or other damage.
- Apply grease to the outer races [A], and pack the tapered roller bearings [B] with the same grease.
- Apply Amoco Rykon Premium Grease No. 2 EP (green) to the inside of the oil seals.
- Install the swingarm (see Swingarm Installation).



Steering

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Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Handlebar Holder Bolts	29	3.0	22	S
2	Tie-Rod Adjusting Locknuts	22	2.2	16	
3	Tie-Rod End Nuts	42	4.3	31	
4	Steering Stem Clamp Bolts	25	2.5	18	
5	Steering Stem Bearing Joint Bolts	21	2.1	15	L
6	Steering Stem Bottom End Nut	40	4.1	30	
7	Steering Knuckle Joint Nuts	29	3.0	22	
8	Master Cylinder Clamp Bolts	8.8	0.90	78 in-lb	

AD: Apply adhesive agent.

AG: Apply grease (Amoco rykon premium grease No. 2 EP Green).

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

R: Replacement Parts

S: Follow the specific tightening sequence.

14-4 STEERING

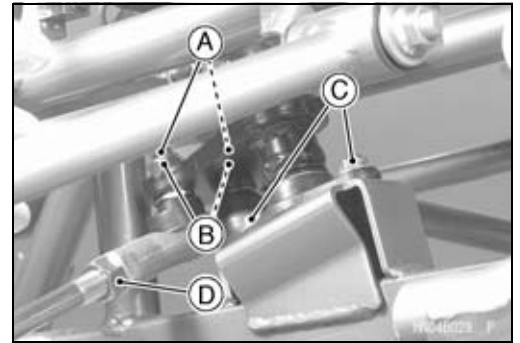
Specifications

Item	Standard	Service Limit
Tie-Rods Tie-Rod Length	387.4 ±1.5 mm (15.3 ±0.06 in.)	- - -

Steering

Steering Stem Removal

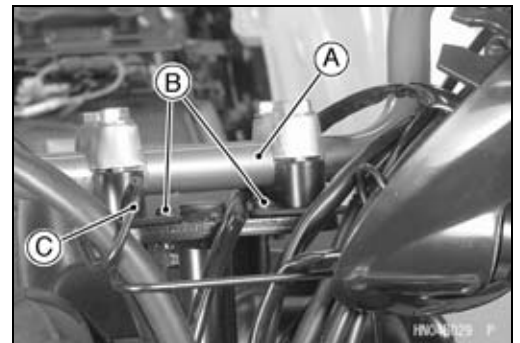
- Remove:
 - Front Fender (see Front Fender Removal in the Frame chapter)
 - Front Wheels (see Wheel Removal in the Wheels/Tires chapter)
 - Cotter Pins [A]
 - Tie-Rod End Nuts [B] and Tie-Rod End
 - Steering Stem Bearing Joint Bolts [C] (right and left)



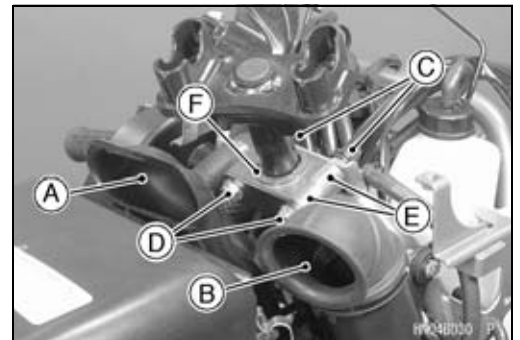
CAUTION

Do not loosen the tie-rod adjusting locknuts [D], or the toe-in of the front wheels will be changed.

- Handlebar Assembly [A] (see Handlebar Removal)
- Screws [B]
- Clamp [C]

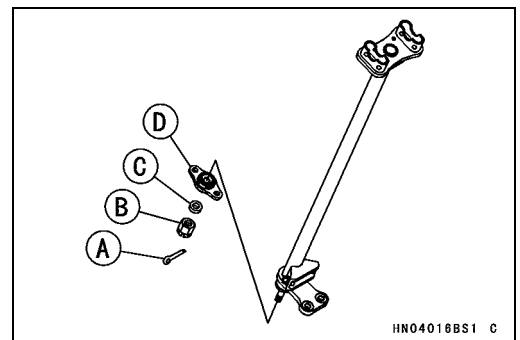


- Remove:
 - Air Cleaner Duct [A]
 - Converter Inlet Duct [B]
 - Nuts [C] and Clamp
 - Steering Clamp Bolts [D], and Plate
 - Steering Clamps [E] and Collars
 - Grease Seals [F] (upper and lower)



- Pull the steering stem out of the frame.

- Remove:
 - Cotter Pin [A]
 - Steering Stem Bottom End Nut [B]
 - Collar [C]
 - Steering Stem Bearing Joint [D]



HN04016BS1 C

14-6 STEERING

Steering

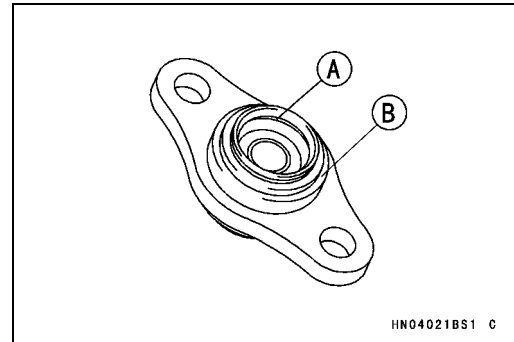
Steering Stem Installation

- Full grease up the seal grooves [A] in the steering stem bearing joint [B].

- Install:
Collar

- Tighten:

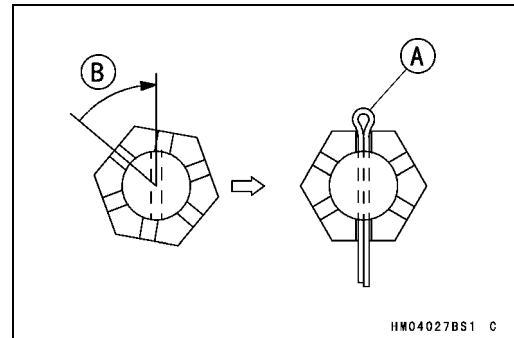
Torque - Steering Stem Bottom End Nut: 40 N·m (4.1 kgf·m, 30 ft·lb)



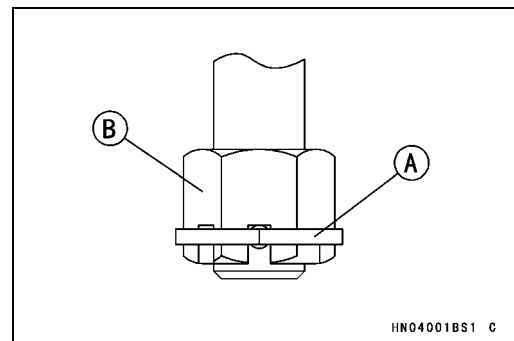
- Insert a new cotter pin [A].

NOTE

- When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the steering stem, 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.

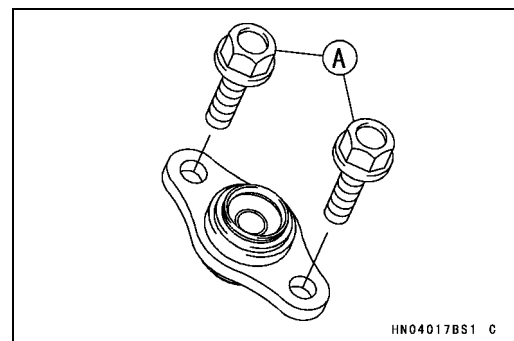


- Bend both ends of the cotter pin [A] as shown.
Steering Stem Bottom End Nut [B]



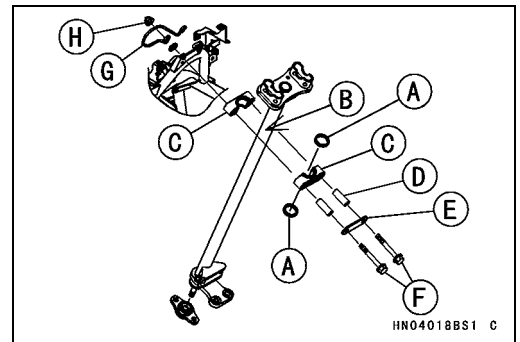
- Apply a non-permanent locking agent to the steering stem bearing joint bolts [A]

Torque - Steering Stem Bearing Joint Bolts: 21 N·m (2.1 kgf·m, 15 ft·lb)



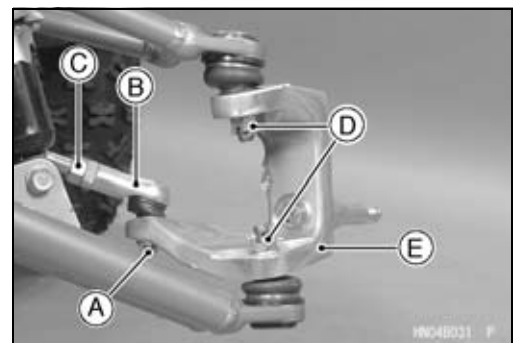
Steering

- Apply Amoco Rykon Premium Grease No.2 EP (Green):
 Inside of Grease Seals [A]
 Steering Stem [B]
- Install:
 Grease Seals
 Steering Clamps [C] and Collars [D]
 Plate [E], and Steering Stem Clamp Bolts [F]
 Clamp [G]
- Tighten:
 Nuts [H] and Washers
- Torque - **Steering Stem Clamp Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)**
Tie-Rod End Nuts: 42 N·m (4.3 kgf·m, 31 ft·lb)
- Inspect the toe-in (see Toe-in Inspection in the Wheels/Tires chapter).



Steering Knuckle Removal

- Remove:
 Front Wheel and Hub (see Wheel Removal and Front Hub Removal in the Wheels/Tires chapter)
 Brake Caliper (see Front Brake Caliper Removal in the Brakes chapter)
 Nut and Cotter Pin [A]
 Tie-Rod End [B]



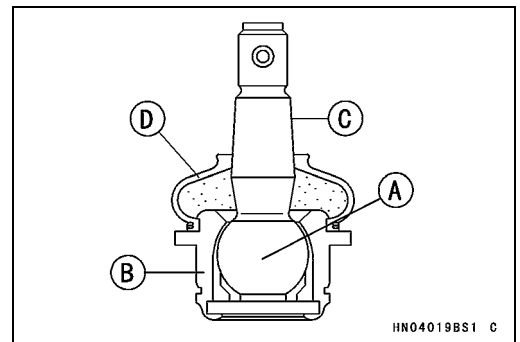
CAUTION

Do not loosen the tie-rod adjusting locknuts [C], or the toe-in of the front wheels will be changed.

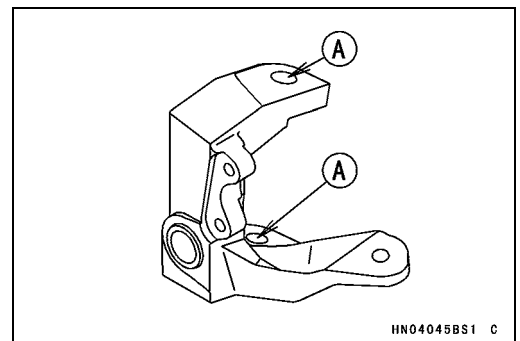
- Remove:
 Cotter Pins and Steering Knuckle Joint Nuts [D]
 Brake Hose Clamp (upper knuckle joint)
- Remove the knuckle [E] from the suspension arms.

Steering Knuckle Installation

- Inspect the spherical bearing [A].
- ★ If the roughness, excessive play, or seizure is found, replace the knuckle joint [B].
- Using a cleaning fluid, clean off any oil or dirt on the taper surface [C] of the knuckle joint and dry it with a clean cloth.
- Check that the joint boot [D] is not torn, worn, deteriorated, or is leaking grease.
- ★ If the defect is found, replace the knuckle joint.



- Using a cleaning fluid, clean off any oil or dirt on the taper surface [C] of the knuckle and dry it with a clean cloth.



14-8 STEERING

Steering

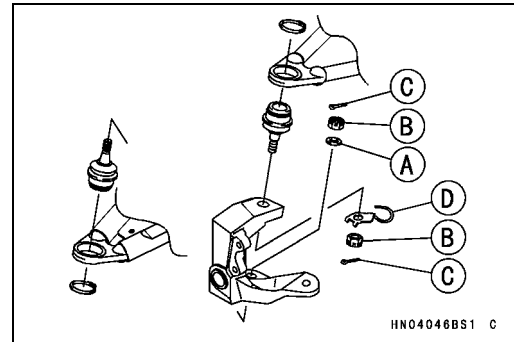
- Install:

- Washer [A]
- Steering Knuckle Joint Nuts [B]
- Clamp [D]

Torque - Steering Knuckle Joint Nut: 29 N·m (3.0 kgf·m, 22 ft·lb)

Tie-Rod End Nut: 42 N·m (4.3 kgf·m, 31 ft·lb)

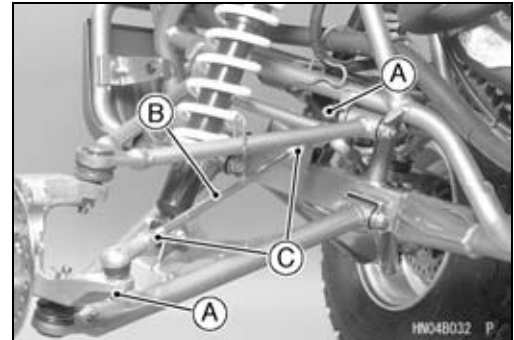
- Install the new cotter pins [C] and bend its both ends surely.



Tie-Rod Removal

- Remove:

- Front Wheel (see Wheel Removal in the Wheels/Tires chapter)
- Cotter Pins and Tie-Rod End Nuts [A]
- Tie-Rod [B]



CAUTION

When removing the tie-rod, be careful not to bend it. Do not loosen the tie-rod adjusting locknuts [C], or the toe-in of the front wheels will be changed.

Tie-Rod Installation

- The right and left tie-rods are identical.
- Tighten:

Torque - Tie-Rod End Nuts: 42 N·m (4.3 kgf·m, 31 ft·lb)
Wheel Nuts: 52 N·m (5.3 kgf·m, 38 ft·lb)

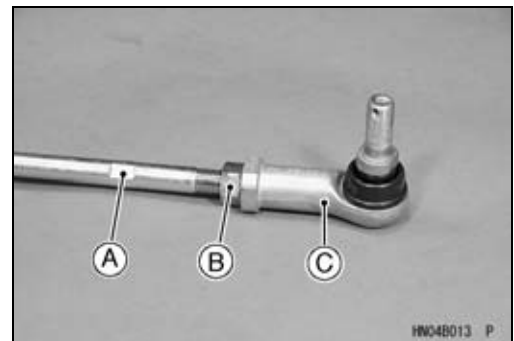
- Inspect the toe-in (see Toe-in Inspection in the Wheels/Tires chapter).

Tie-Rod End Removal

- Remove the tie-rod (see Tie-Rod Removal).
- Holding the width across flats [A] on the tie-rod, loosen the locknut [B] and unscrew the tie-rod end [C].

NOTE

○The locknut near the flattened area on the tie-rod has left-hand threads. Turn the wrench clockwise (as viewed from the joint end) for loosening.



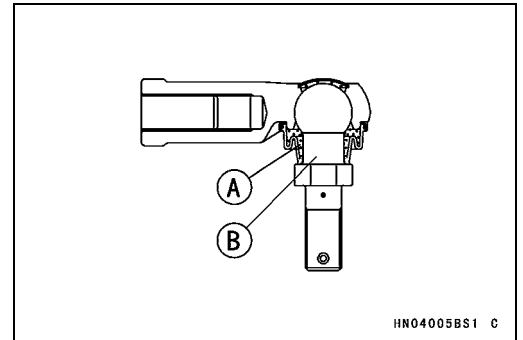
CAUTION

Do not remove the grease seal. It is packed with grease.

Steering

Tie-Rod End Installation

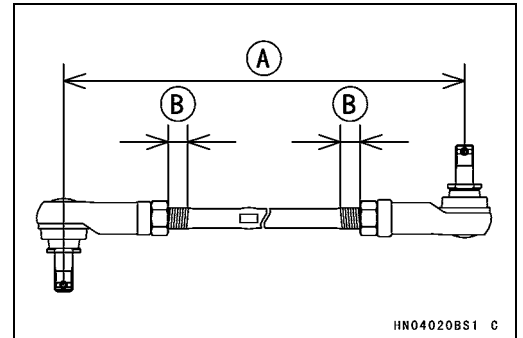
- Check that the seal lip [A] is on the shank [B].



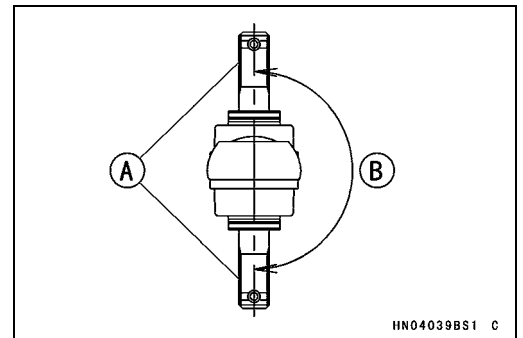
- Install the tie-rod ends so that width across flats on the tie-rod face to the knuckle arm, the tie-rod has the correct length [A], and both visible thread lengths [B] are approximately equal.

Tie-Rod Length

Standard: 387.4 ±1.5 mm (15.3 ±0.06 in.)

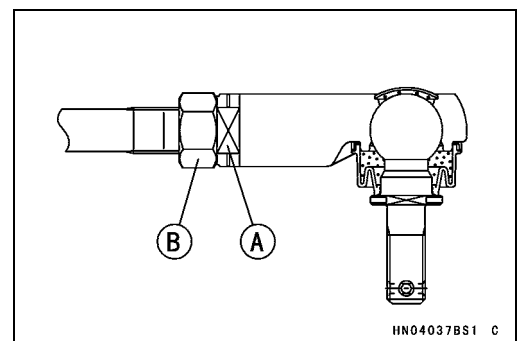


- Install the tie-rod ends so that the thread portions [A] of the tie-rod ends are opposite direction 180° [B] as shown.



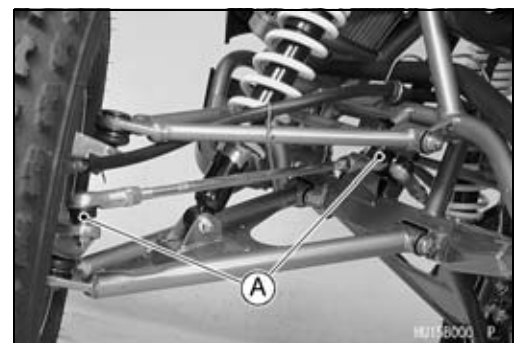
- Hold the flat surface [A] of the tie-rod end with a wrench, and tighten the locknut [B].

Torque - Tie-rod Adjusting Locknuts: 22 N·m (2.2 kgf·m, 16 ft·lb)



Tie Rod End Inspection

- Visually inspect the grease seal [A] of tie rod end.
- ★ If the damage, wear or deterioration is found, replace the tie rod end.



14-10 STEERING

Steering Maintenance

Steering Inspection

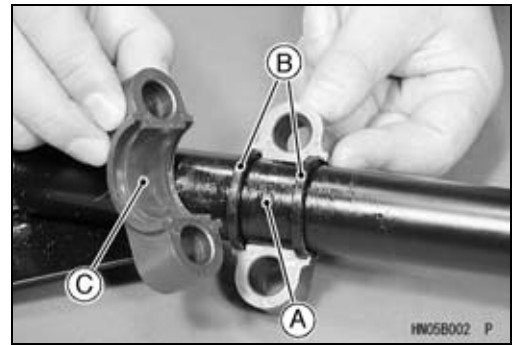
- Refer to the Steering Inspection in the Periodic Maintenance chapter.

Steering Stem Straightness Inspection

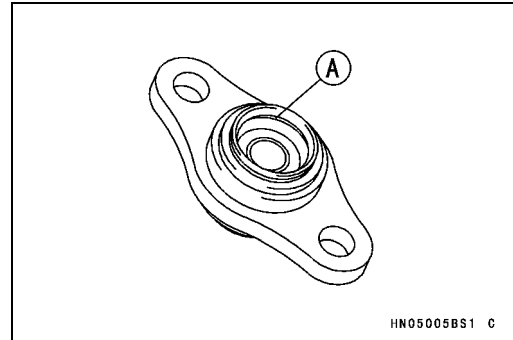
- Remove the steering stem (see Steering Stem Removal).
- Check the steering stem for straightness.
- Use a straightedge along the stem.
- ★ If the steering stem is bent, replace the steering stem.

Steering Lubrication

- Lubricate the steering stem clamps.
- Remove the steering stem (see Steering Stem Removal).
- Wipe all the old grease off the steering stem, bearing sleeves, and out of the grease seals.
- Apply Amoco Rykon Premium Grease No. 2 EP (Green) to the steering stem [A], grease seals [B], and mating surface [C] of the clamp.



- Lubricate the steering stem bearing [A].
- Remove the steering stem bearing.
- Pack the grease seal lips with grease.



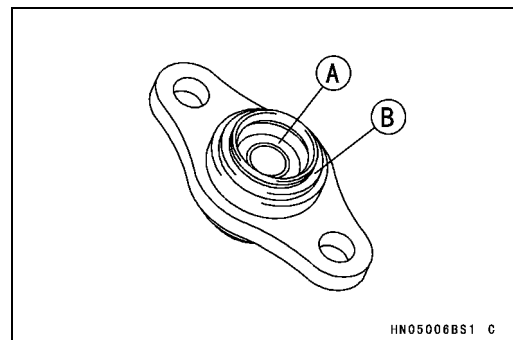
Steering Stem Clamp Inspection

- Inspect the steering stem clamps [A].
- ★ If the roughness, excessive play, or seizure is found, replace both clamps.



Steering Stem Bearing Inspection

- Inspect the spherical bearing [A].
- ★ If the roughness, excessive play, or seizure is found, replace the steering stem bearing.
- Inspect the upper and lower grease seals [B].
- ★ If the damage, wear or deterioration is found, replace the steering stem bearing.



Steering Maintenance

Steering Knuckle Bearing Inspection

CAUTION

Do not remove any bearings for inspection.

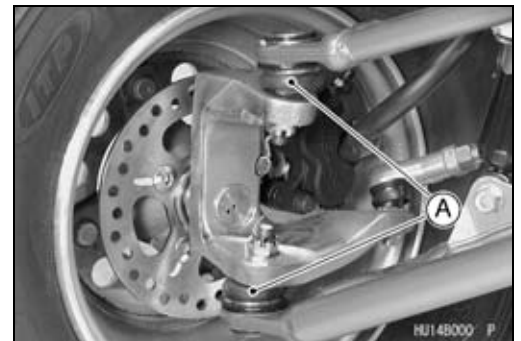
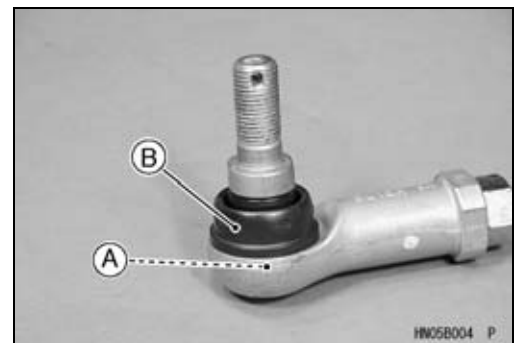
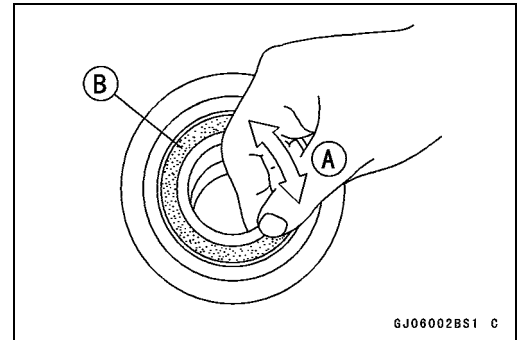
- Remove the steering knuckle (see Steering Knuckle Removal).
- Inspect the bearing seal [B] for tears or leakage.
- ★ If the seal is torn or is leaking, replace the bearing.
- Turn [A] the bearing back and forth while checking for roughness or binding.
- ★ If the roughness or binding is found, replace the bearing.

Tie-Rod End and Steering Knuckle Joint Inspection

- Inspect each spherical bearing [A].
- ★ If the roughness, excessive play, or seizure is found, replace the tie-rod end, or steering knuckle joint.
- Inspect each grease seal [B].
- ★ If the damage, wear or deterioration is found, replace the tie-rod end, or steering knuckle joint.

Knuckle Joint Inspection

- Visually inspect the boot [A] of knuckle joint.
- ★ If the damage, wear or deterioration is found, replace the knuckle joint.



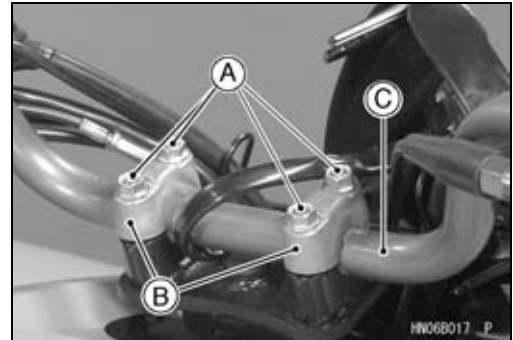
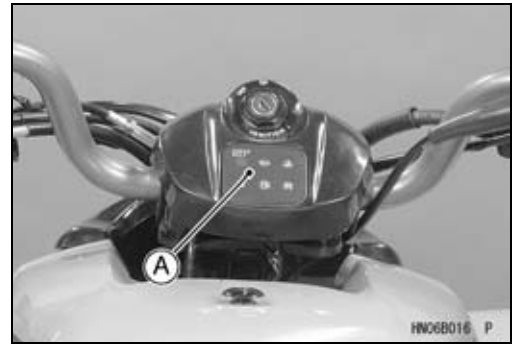
14-12 STEERING

Handlebar

Handlebar Removal

- Remove:
 - Throttle Case
 - Front Brake Master Cylinder
 - Left Handlebar Switch Housing
 - Rear Brake Lever Assembly
 - Handlebar Cover and Indicator Unit [A] as a set

Handlebar Holder Bolts [A]
Handlebar Holders [B]
Handlebar [C]



Handlebar Installation

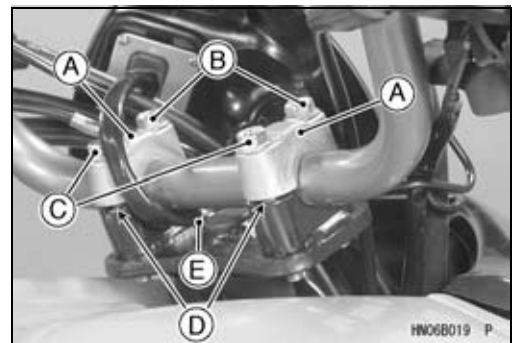
- Install the handlebar so that the angle of the handlebar matches the angle of the steering stem as shown.
[A] : Parallel



- Install the handlebar holder [A].
- Tighten the holder front bolts [B] first and then the rear bolts [C].

Torque - Handlebar Holder Bolts: 29 N·m (3.0 kgf·m, 22 ft·lb)

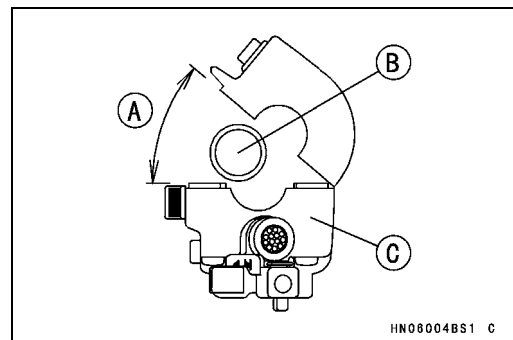
- If the holder is correctly installed, there will be no gap at the front and an even gaps [D] at the rear after tightening.
- Be sure the indicator unit lead place under the handlebar [E].



- Install the left handlebar switch housing [C] on the handlebar [B] so that the opening angle is 40° [A] or less.

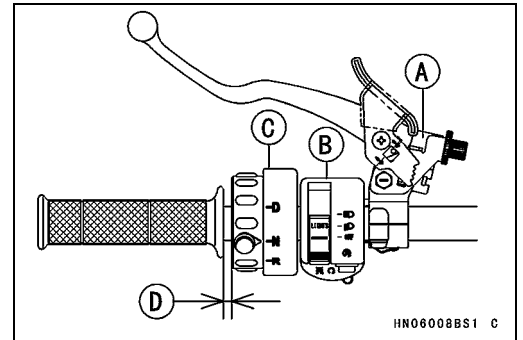
NOTE

- Do not open the housing more than 40°, the built-in parts in the housing may be damaged.



Handlebar

- Install:
 - Rear Brake Lever Assembly [A]
 - Left Handlebar Switch Housing [B]
 - Shift Grip [C]
 - [D] = 2 ~ 3 mm (0.08 ~ 0.12 in.)



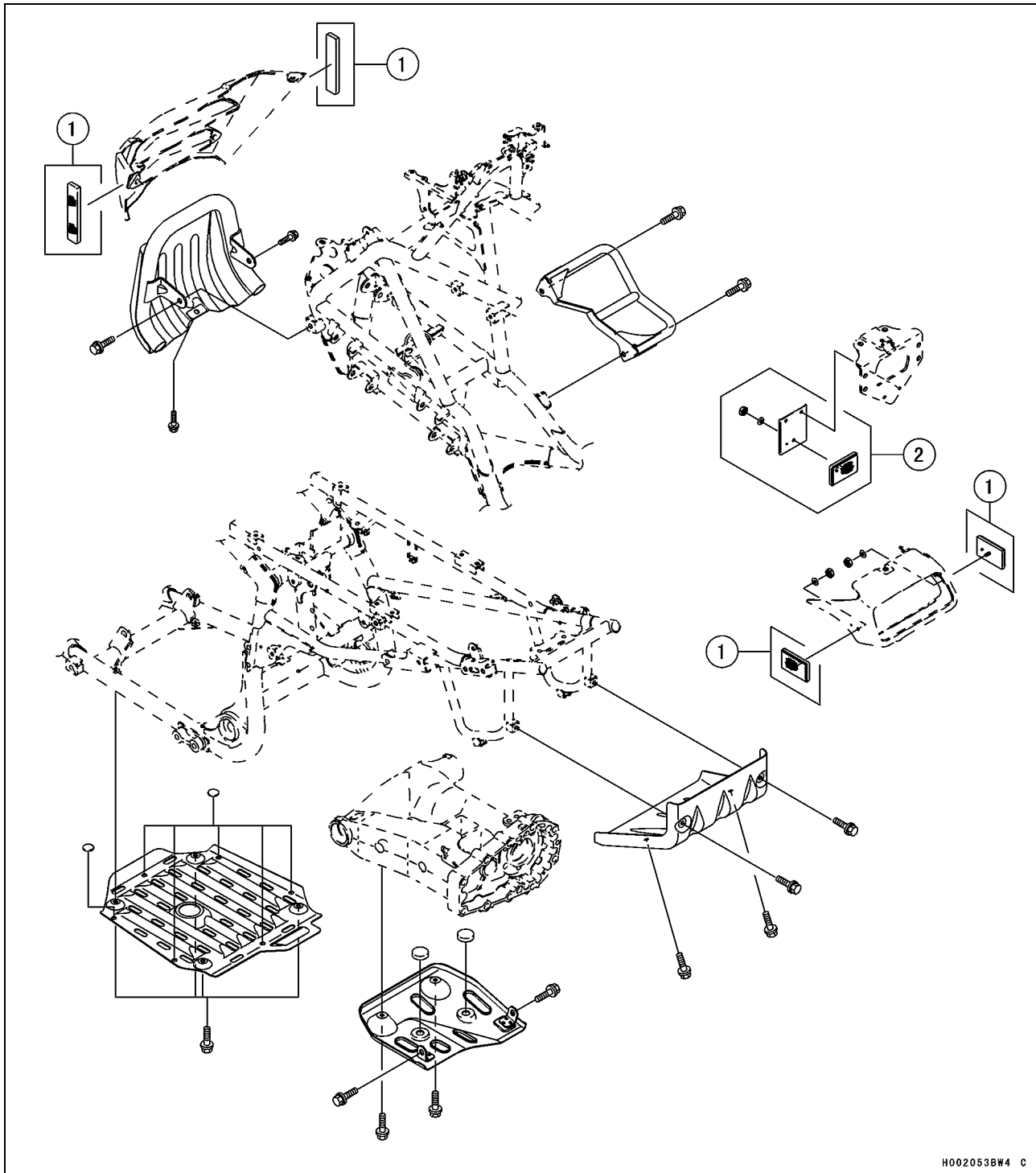
Frame

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15-2 FRAME

Exploded View

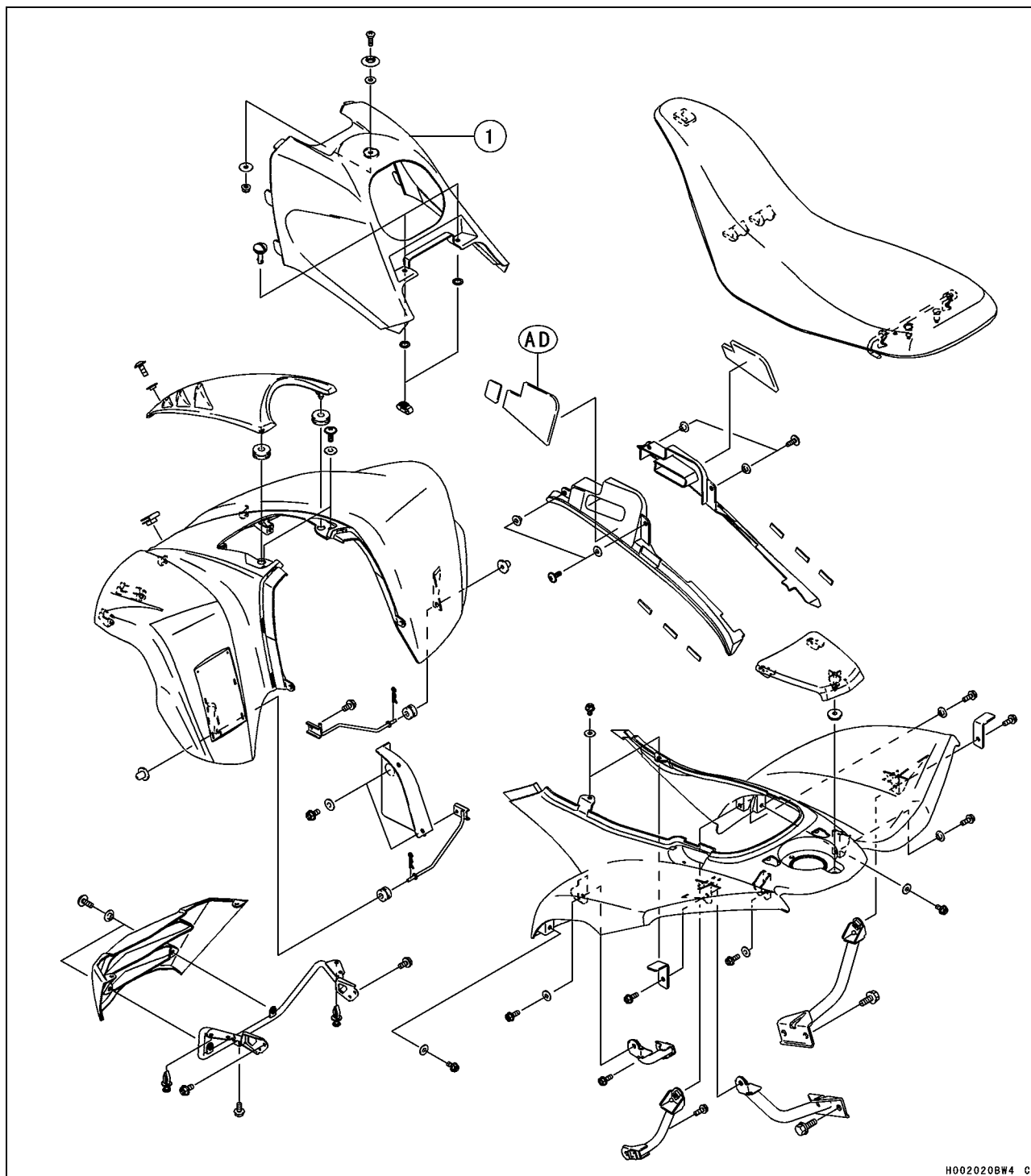


H002053BW4 C

1. Canada Model

2. Canada Model, KSV700A9F Europe Model

Exploded View

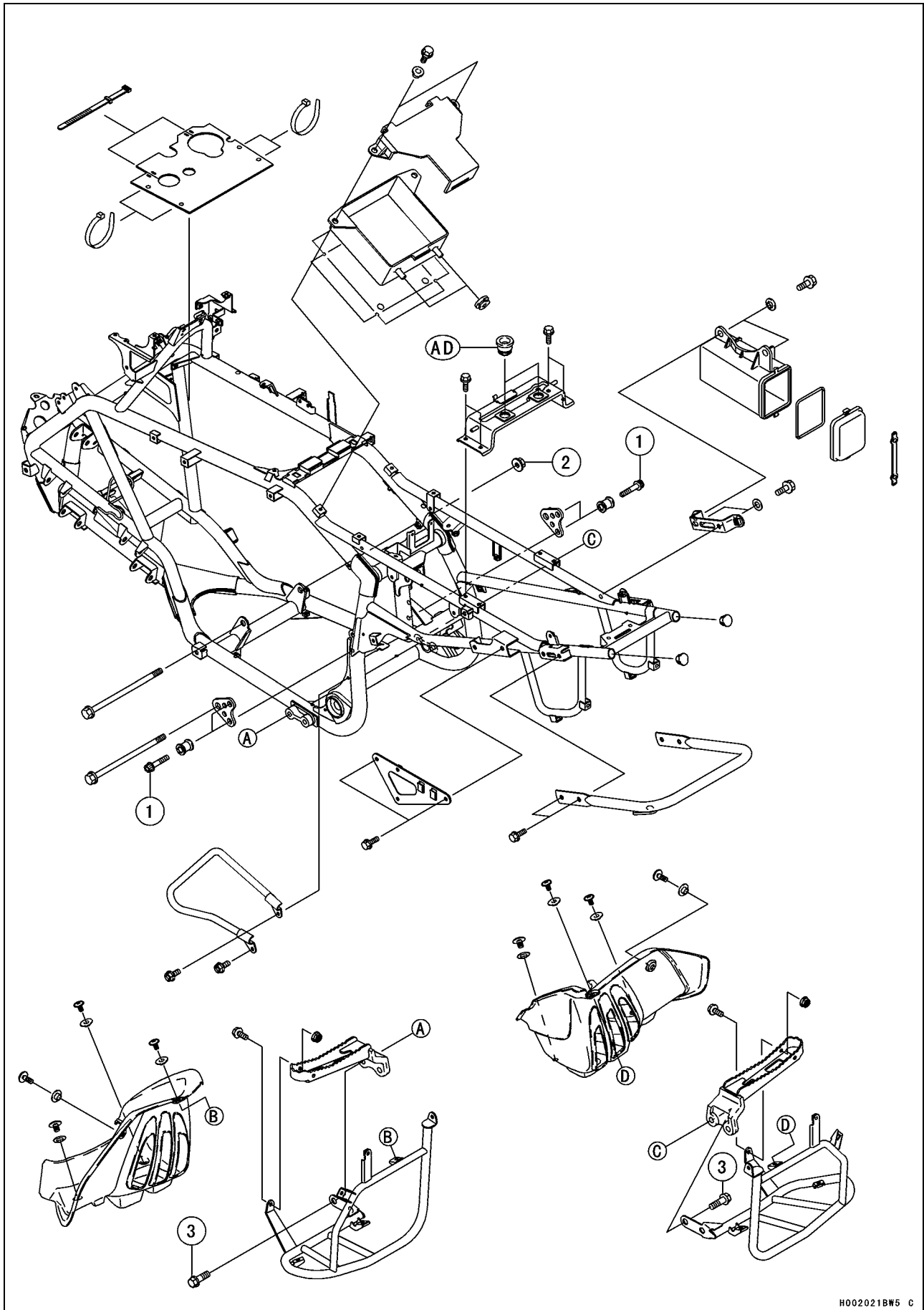


H002020BW4 C

1. Air Cleaner Cover
 AD: Apply adhesive agent to outside.

15-4 FRAME

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Engine Mounting Bracket Bolts	52	5.3	38	
2	Engine Mounting Nut	62	6.3	46	
3	Footpeg Mounting Bolts	44	4.5	33	

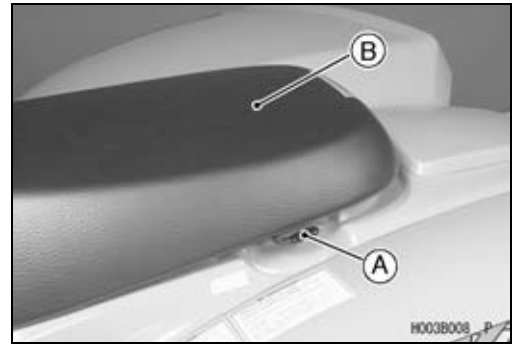
AD: Apply adhesive agent.

15-6 FRAME

Seat

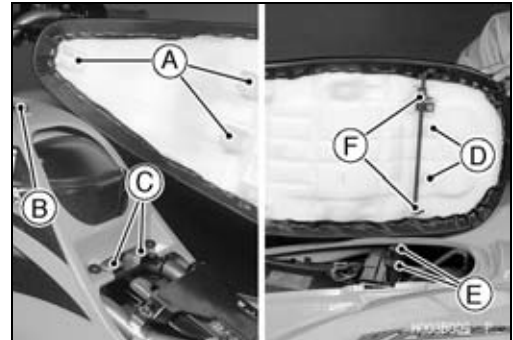
Seat Removal

- Push down the seat latch [A], and then remove the seat [B] by pulling it up to the rear.



Seat Installation

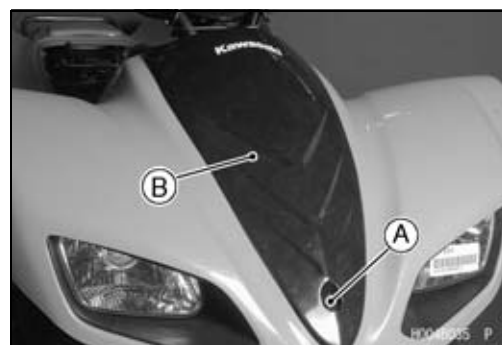
- Slip the front seat hooks [A] into the button [B] on the air cleaner cover and the brace [C] on the frame.
- Put the stoppers [D] into the holes [E] in the frame.
- Push down the rear part of the seat until the lock [F] clicks.



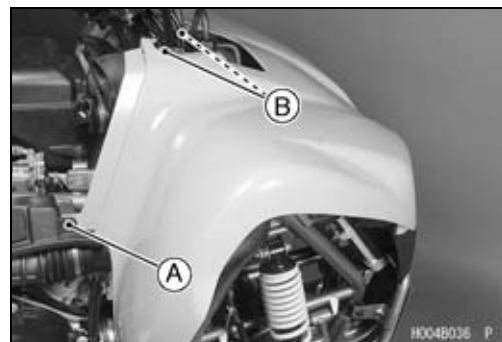
Fenders

Front Fender Removal

- Remove:
 - Seat (see Seat Removal)
 - Air Cleaner Cover (see Air Cleaner Cover Removal)
 - Screw and Collar [A]
 - Upper Front Cover [B]



- Remove:
 - Screws and Collars [A] (both side)
 - Screws and Collars [B]

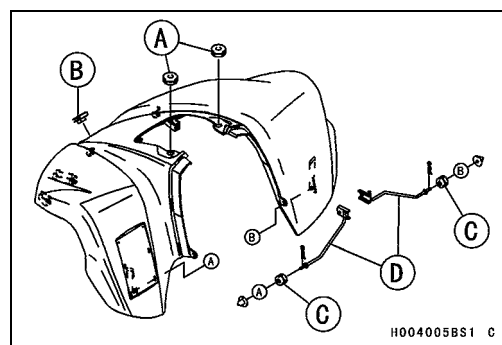


- Remove
 - Bolts [A] (both side)
 - Screws and Collar [B] (both side)
 - Headlight Connector [C] (both side)
 - Front Fender



Front Fender Installation

- Install:
 - Grommets [A]
 - Clamp Nut [B]
 - Damper [C]
 - Stay [D]
 - Front Fender
 - Upper Front Cover
 - Air Cleaner Cover (see Air Cleaner Cover Installation)
 - Seat (see Seat Installation)



Rear Fender Removal

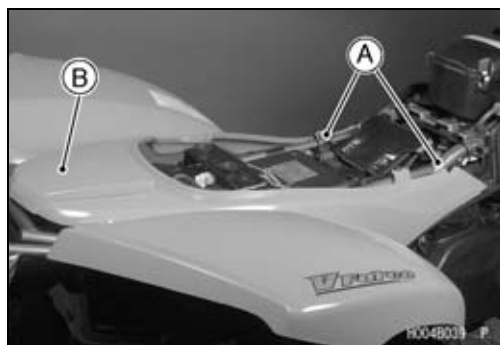
- Remove:
 - Seat (see Seat Removal)
 - Bolts and Collars [A] (both side)
 - Bolts and Plats [B] (both side)



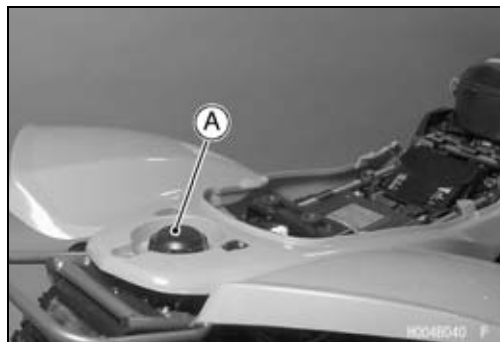
15-8 FRAME

Fenders

- Remove:
 - Bolts and Collars [A]
 - Tank Cap Cover [B]



- Remove:
 - Fuel Tank Cap [A]
 - Rear Fender
- Install the fuel tank cap at once.



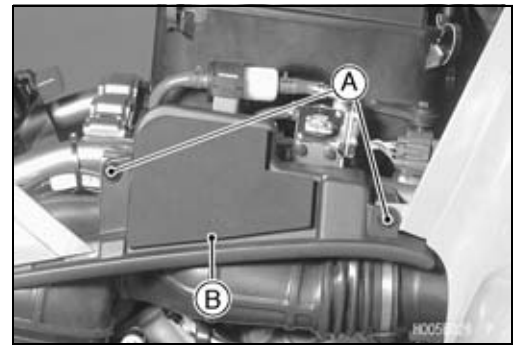
Rear Fender Installation

- Remove the fuel tank cap.
- Install:
 - Rear Fender
 - Fuel Tank Cap
- Install the removed parts.

Covers

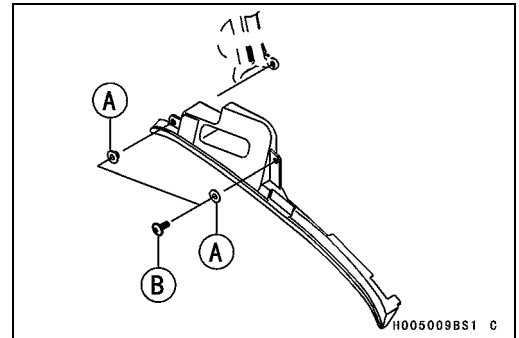
Side Inner Cover Removal

- Remove:
 - Air Cleaner Cover (see Air Cleaner Cover Removal)
 - Screws and Collars [A]
 - Side Inner Cover [B]



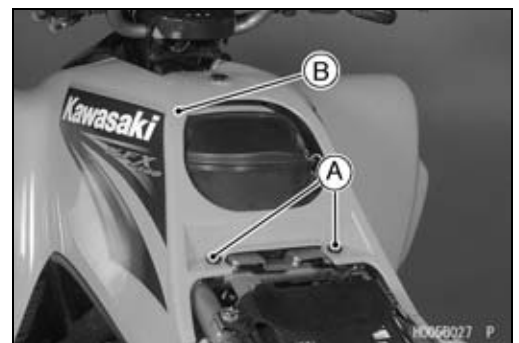
Side Inner Cover Installation

- Install:
 - Side Inner Cover
 - Collars [A]
 - Screws [B]
 - Air Cleaner Cover (see Air Cleaner Cover Installation)



Air Cleaner Cover Removal

- Remove:
 - Seat (see Seat Removal)
 - Knobs [A]
 - Air Cleaner Cover [B]



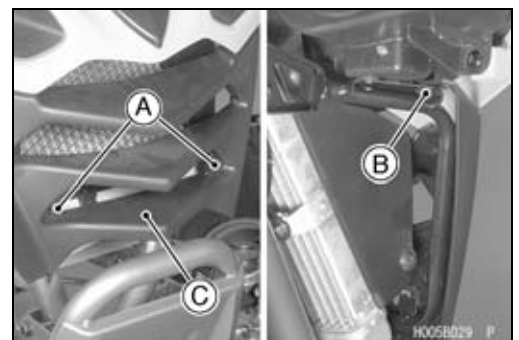
Air Cleaner Cover Installation

- Insert the tabs [A] of the cover into the recesses (both sides).
- Install the removed parts.



Radiator Cover Removal

- Remove:
 - Screws and Collars [A]
 - Quick Rivet [B]
 - Radiator Cover [C]

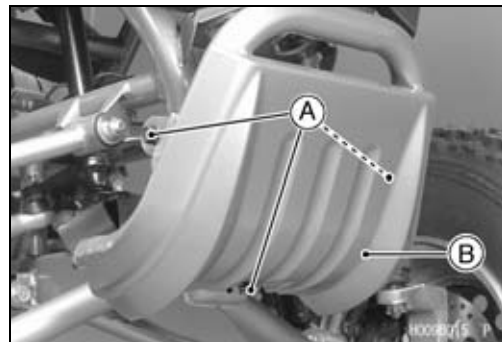


15-10 FRAME

Guards

Front Guard Removal

- Remove:
 - Front Guard Bolts [A]
 - Front Guard [B]

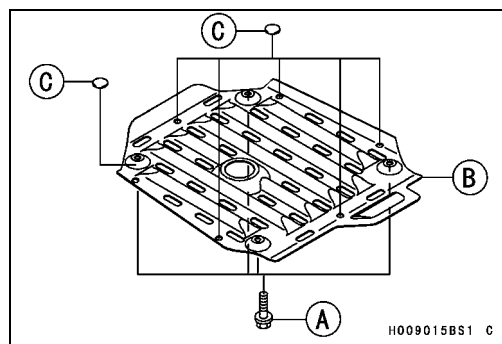


Front Guards Installation

- Install the front guard.
- Tighten the front guard bolts.

Engine Bottom Guard Removal

- Remove:
 - Bolts [A]
 - Engine Bottom Guard [B]

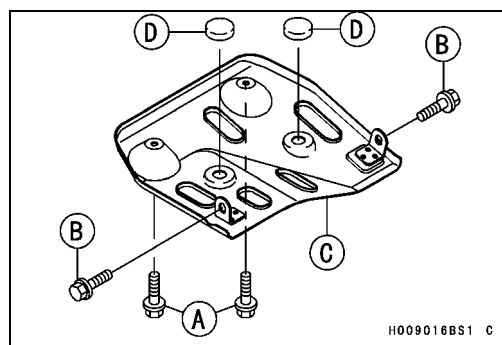


Engine Bottom Guard Installation

- Confirm:
 - Damper [C]
- Install:
 - Engine Bottom Guard
 - Bolts

Rear Bottom Guard Removal

- Remove:
 - Bolts (M6) [A]
 - Bolts (M8) [B]
 - Rear Bottom Guard [C]



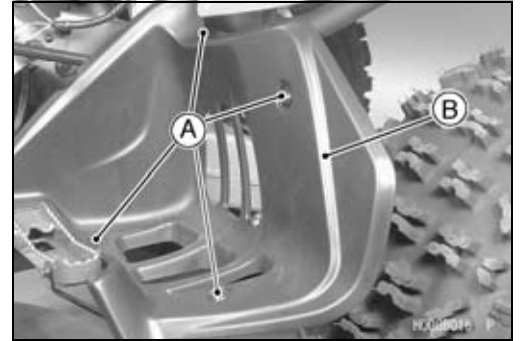
Rear Bottom Guard Installation

- Confirm:
 - Dampers [D]
- Install:
 - Rear Bottom Guard
 - Bolts (M8)
 - Bolts (M6)

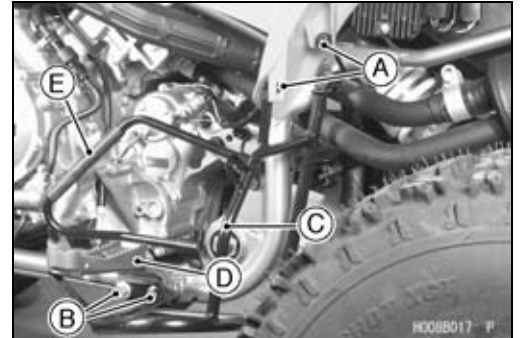
Foot Guard and Stay

Foot Guard and Stay Removal

- Remove:
 - Screws and Collars [A]
 - Foot Guards [B]

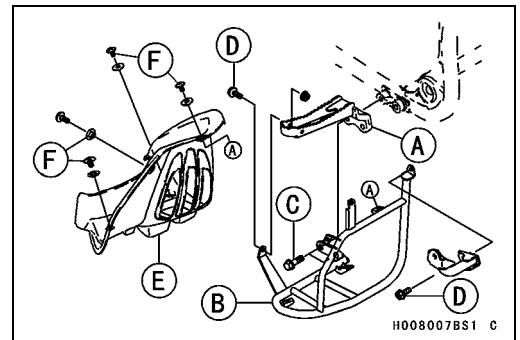


- Remove:
 - Bolt and Nut [A]
 - Bolts [B]
 - Guard Stays [C]
 - Footpeg [D]
- For left side, remove the guard [E].



Foot Guard and Stay Installation

- For left side, install the guard.
- Install the footpeg [A] and foot stay [B].
- Tighten the footpeg mounting bolt [C] and the bolts [D].
 - Torque - Footpeg Mounting Bolts : 44 N·m (4.5 kgf·m, 33 ft·lb)**
- Install the foot guard [E] and tighten the screws [F].



Electrical System

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16-2 ELECTRICAL SYSTEM

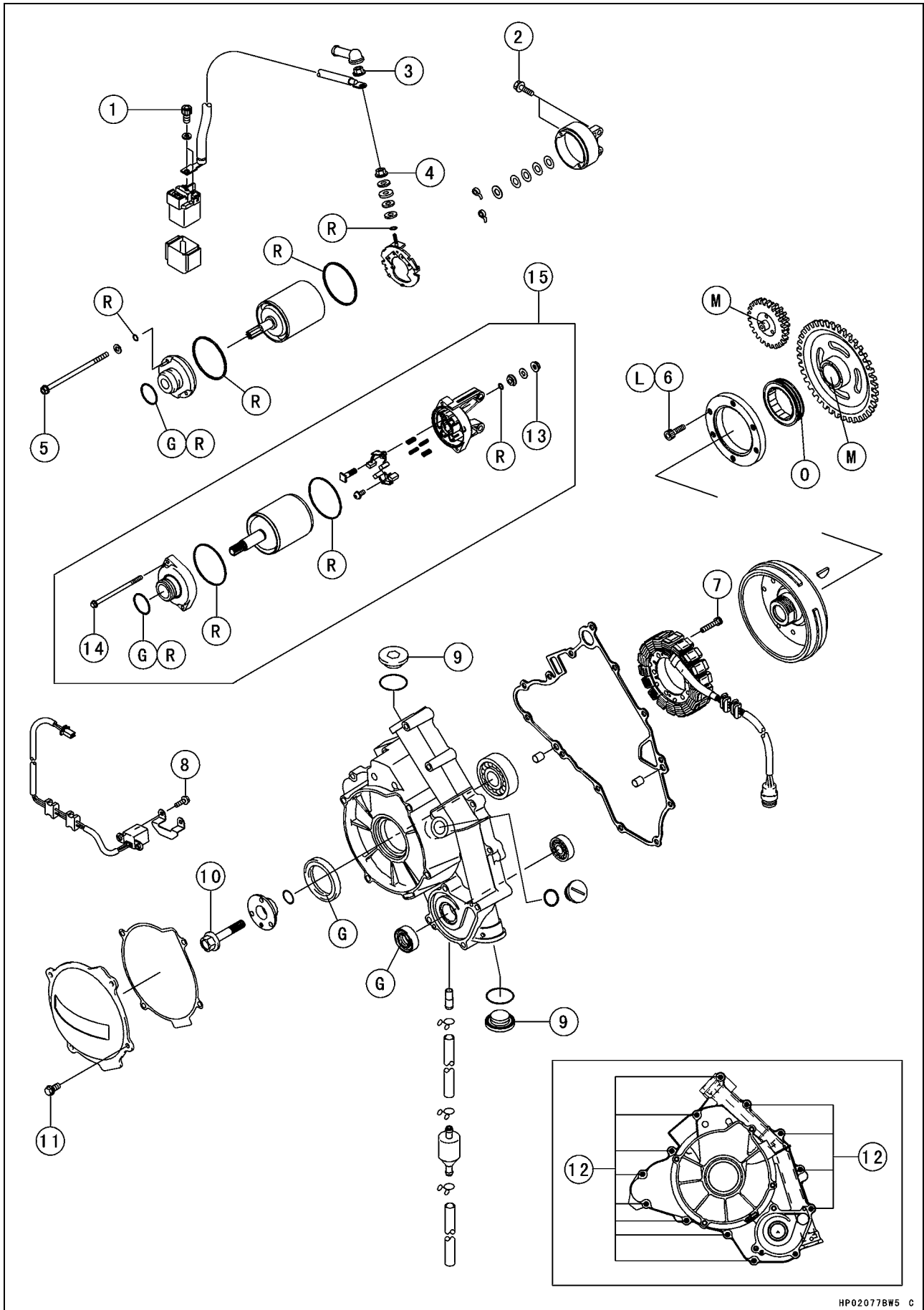
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Exploded View

Dummy Page

16-4 ELECTRICAL SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Battery Cable Bolts	5.9	0.60	52 in·lb	
2	Starter Motor Mounting Bolts	8.8	0.90	78 in·lb	
3	Starter Motor Terminal Nut	6.9	0.70	61 in·lb	
4	Starter Motor Terminal Locknut	6.9	0.70	61 in·lb	
5	Starter Motor Bolts	4.9	0.50	43 in·lb	
6	Starter Motor Clutch Bolts	34	3.5	25	L
7	Alternator Stator Bolts	13	1.3	113 in·lb	
8	Crankshaft Sensor Mounting Bolts	5.9	0.60	52 in·lb	
9	Alternator Cover Plugs	18	1.8	13	
10	Alternator Flywheel Bolt	127	13	94	
11	Alternator Flywheel Bolt Cover Bolts	8.8	0.90	78 in·lb	
12	Alternator Cover Bolts	8.8	0.90	78 in·lb	
13	Starter Motor Terminal Locknut	11	1.1	97 in·lb	
14	Starter Motor Through Bolts	5.0	0.51	44 in·lb	

15. KSV700A9F/B9F Models

G: Apply grease for oil seal and O-ring.

L: Apply a non-permanent locking agent.

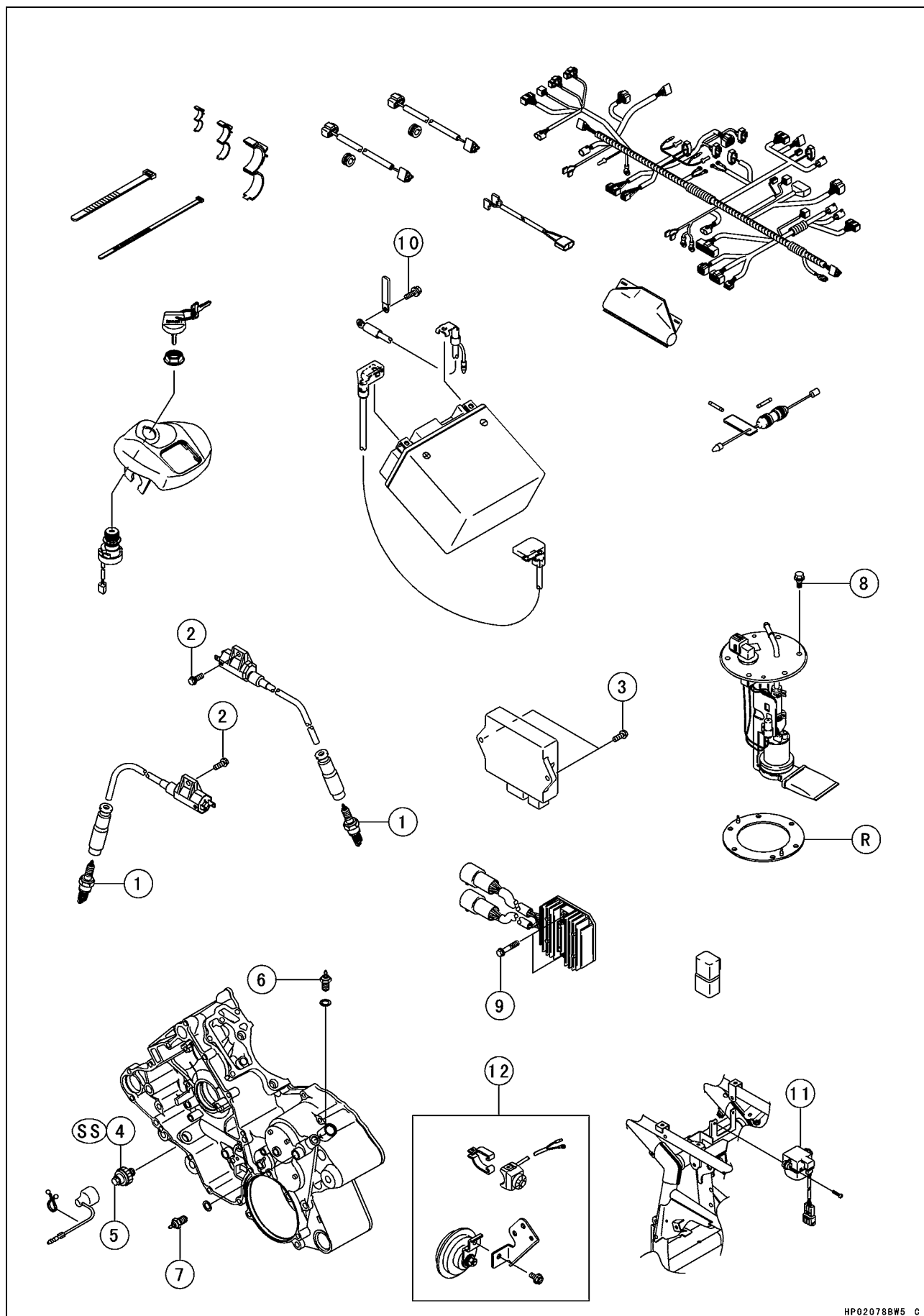
M: Apply molybdenum disulfide grease.

O: Apply engine oil.

R: Replacement Parts

16-6 ELECTRICAL SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N-m	kgf-m	ft-lb	
1	Spark Plugs	13	1.3	113 in-lb	
2	Ignition Coil Mounting Bolts	6.9	0.70	61 in-lb	
3	Igniter Mounting Bolts	2.3	0.23	20 in-lb	
4	Oil Pressure Switch	15	1.5	11	SS
5	Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in-lb	
6	Neutral Position Switch	15	1.5	11	
7	Reverse Position Switch	15	1.5	11	
8	Fuel Pump Mounting Bolts	2.0	0.20	17 in-lb	
9	Regulator/Rectifier Bolts	8.8	0.90	78 in-lb	
10	Harness Clamp Mounting Bolts	8.8	0.90	78 in-lb	

11. Vehicle Down Sensor

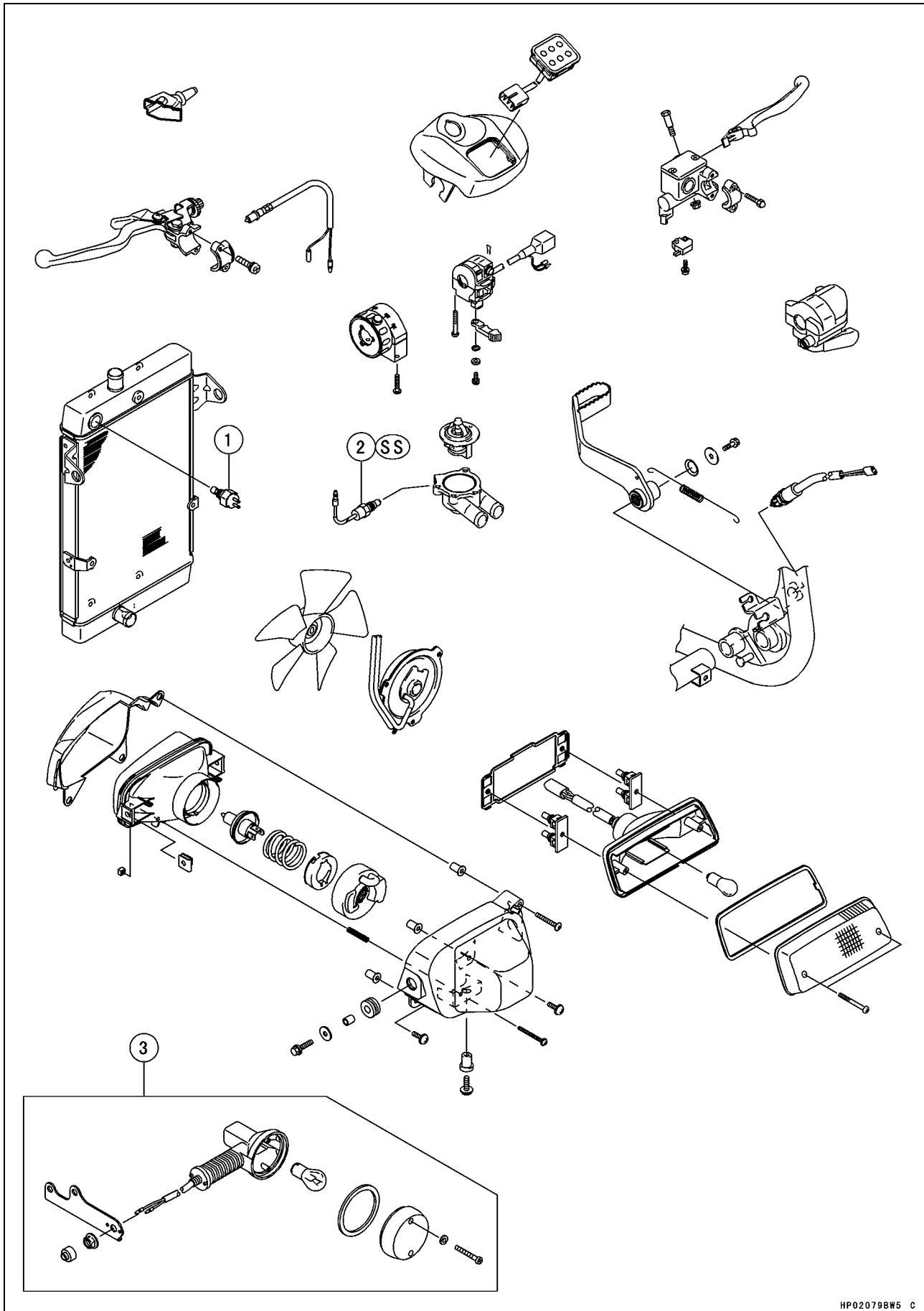
12. KSV700A9F Europe Model

R: Replacement Parts

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

16-8 ELECTRICAL SYSTEM

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Radiator Fan Switch	18	1.8	13	
2	Water Temperature Sensor	7.8	0.80	69 in·lb	SS

3. KSV700A9F Europe Model

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

16-10 ELECTRICAL SYSTEM

Specifications

Item	Standard	Service Limit
Battery		
Type	Sealed Battery	---
Capacity	12 V 12 Ah	---
Charging System		
Alternator Type	Three-phase AC	---
Charging Voltage (Regulator/rectifier output voltage)	14 ~ 15 V	---
Alternator Output Voltage	36 ~ 54 V 3 000 r/min (rpm)	---
Alternator Stator Coil Resistance	0.33 ~ 0.49 Ω	---
Ignition System		
Spark Plug:		
Spark Plug Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	---
Spark Plug Cap Resistance	3.75 ~ 6.25 k Ω	---
Ignition Coil:		
3 Needle Arcing Distance	7 mm (0.28 in.) or more	---
Primary Winding Resistance	0.09 ~ 0.13 Ω	---
Secondary Winding Resistance	3.8 ~ 5.8 k Ω	---
Primary Peak Voltage	50 V or more	---
Crankshaft Sensor Resistance	110 ~ 140 Ω	---
Crankshaft Sensor Peak Voltage	1.8 V or more	---
Vehicle-down Sensor		
Detection Method	Magnetic flux detection method	---
Detection Angle	More than 65° \pm 5° for each bank	---
Detection Time	Within 0.5 ~ 1.0 sec.	---
Output Voltage	in the text	---
Electric Starter System		
Starter Motor:		
Commutator Diameter	28 mm (1.10 in.)	27 mm (1.06 in.)
Brush Length	12 mm (0.47 in.)	4 mm (0.16 in.)
Fuel Pump		
Fuel Pump Shut-Off Pressure	17.7 ~ 22.6 kPa (0.18 ~ 0.23 kgf/cm ² , 2.6 ~ 3.3 psi)	---
Switches		
Brake Light Switch Timing	ON after 10 mm (0.4 in.) of pedal travel	---
Radiator Fan Switch Resistance:		
Rising Temperature	From OFF to ON at 96 ~ 100°C (205 ~ 212°F)	---
Falling Temperature	From ON to OFF at 91 ~ 95°C (196 ~ 203°F)	---
	ON: Less than 0.5 Ω	
	OFF: More than 10 M Ω	
Water Temperature Sensor Resistance:		
Rising Temperature	From OFF to ON at 112 ~ 118°C (234 ~ 244°F)	---

ELECTRICAL SYSTEM 16-11

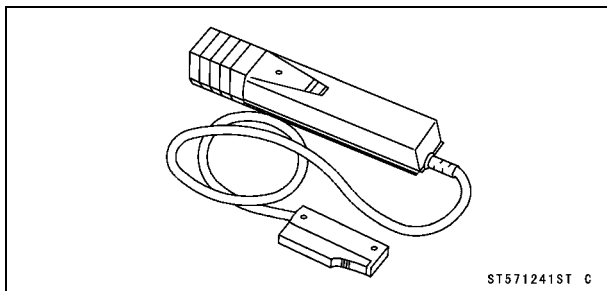
Specifications

Item	Standard	Service Limit
Falling Temperature	From ON to OFF at 108 ~ 111°C (226 ~ 232°F) ON: less than 0.5 Ω OFF: More than 1 MΩ	- - - -

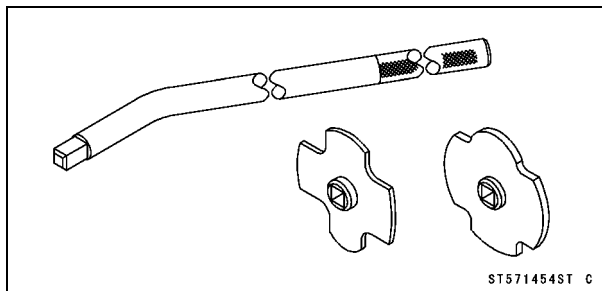
16-12 ELECTRICAL SYSTEM

Special Tools

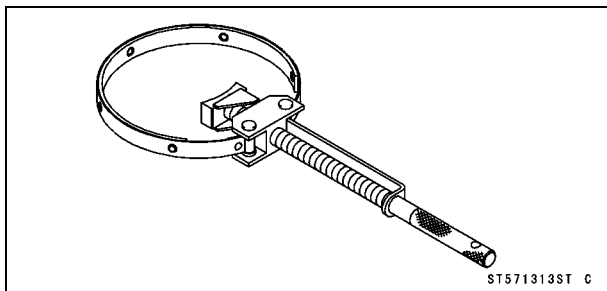
Timing Light:
57001-1241



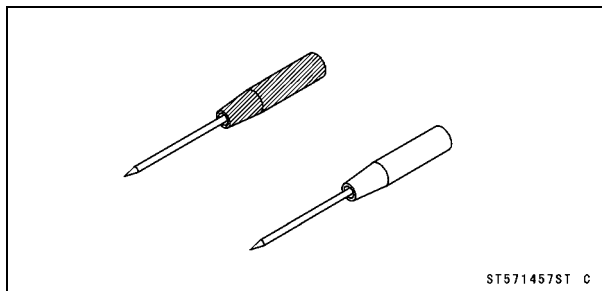
Filler Cap Driver:
57001-1454



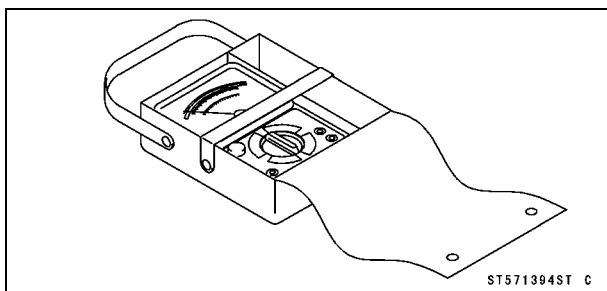
Flywheel Holder:
57001-1313



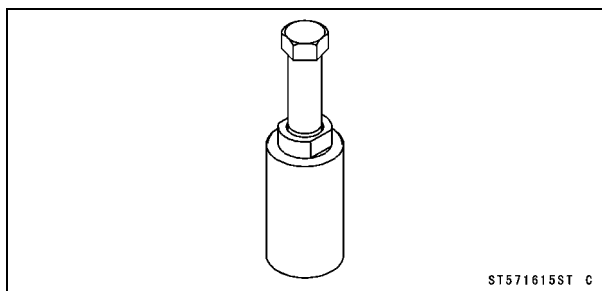
Needle Adapter Set:
57001-1457



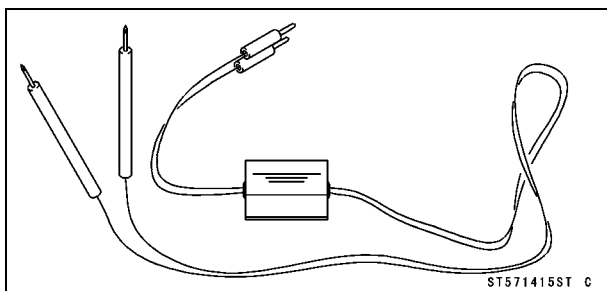
Hand Tester:
57001-1394



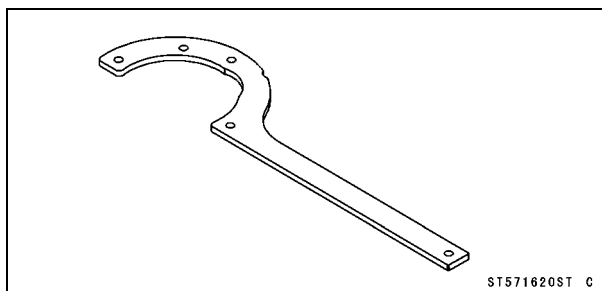
Flywheel Puller Assembly:
57001-1615



Peak Volt Adapter:
57001-1415

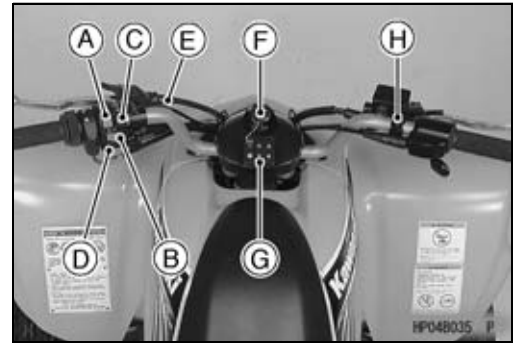


Drive Pulley Holder:
57001-1620

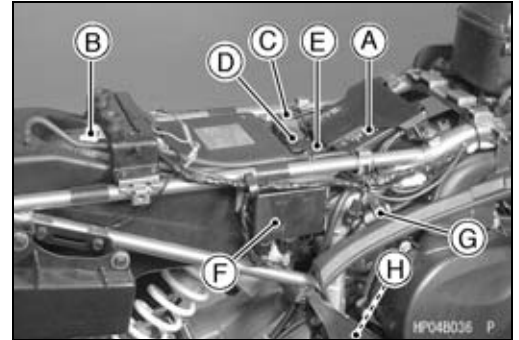


Parts Location

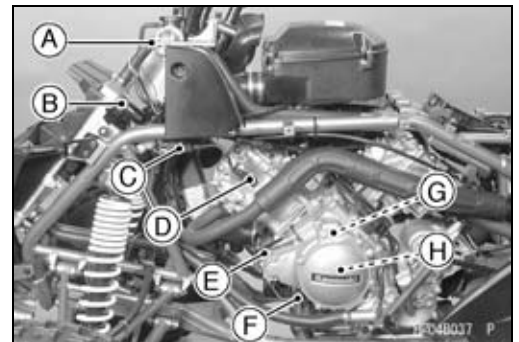
- Light/Dimmer Switch [A]
- Engine Stop Switch [B]
- Starter Button [C]
- Reverse Power Assist Switch (Override) [D]
- Rear Brake Light Switch [E]
- Ignition Switch [F]
- Indicator Unit [G]
- Front Brake Light Switch [H]



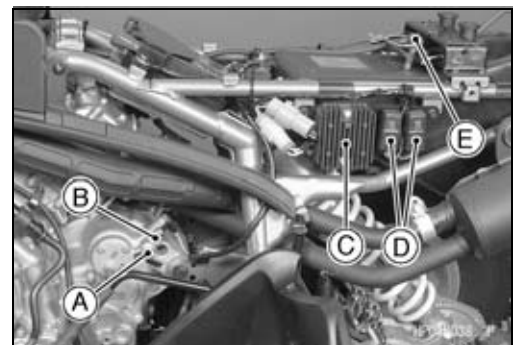
- Battery [A]
- Fuel Pump, Fuel Reserve Switch [B] (in fuel tank)
- Main Fuse 30 A [C]
- Starter Relay [D]
- Vehicle Down Sensor [E]
- Igniter [F]
- Ignition Coil (Rear) [G]
- Rear Brake Light Switch [H]



- Water Temperature Sensor [A]
- Radiator Fan Switch [B]
- Ignition Coil (Front) [C]
- Spark Plug [D]
- Starter Motor [E]
- Oil Pressure Warning Light Switch [F]
- Crankshaft Sensor [G]
- Alternator [H]



- Reverse Position Switch [A]
- Neutral Position Switch [B]
- Regulator/Rectifier [C]
- Starter Circuit Relays [D]
- Radiator Fan Fuse [E]



16-14 ELECTRICAL SYSTEM

Precautions

There are a number of important precautions that should be taken when servicing electrical systems. Learn and observe all the rules below.

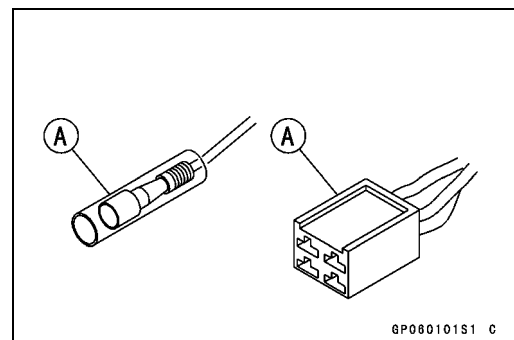
- Do not reverse the battery cable connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is required for conducting accurate electrical system tests.
- The electrical parts should 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 damaging electrical parts, do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the high current, never keep the starter button depressed when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Only use an illumination bulb rated for the voltage or wattage specified in the wiring diagram, or the handle cover 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 chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine leads for signs of burning, fraying, etc. Defective 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:

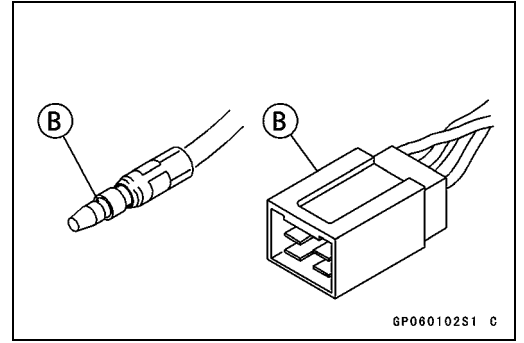
Connectors [A]



6P080101S1 C

Precautions

Connectors [B]



16-16 ELECTRICAL SYSTEM

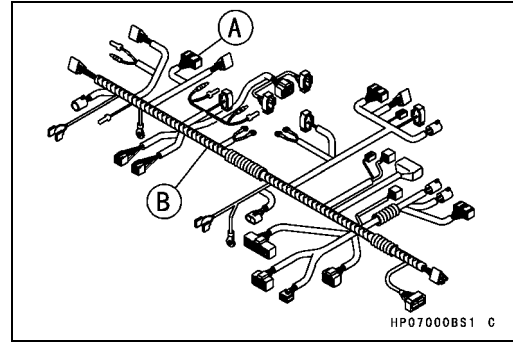
Electrical Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.
- ★ If any wiring is defective, replace the damaged wiring.
- Pull each connector [A] apart and inspect 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

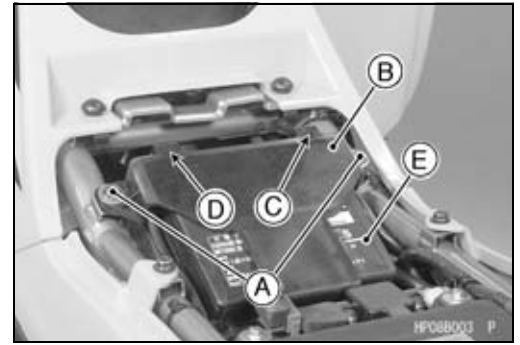
- Set the tester to the $\times 1 \Omega$ range.
- ★ If the tester does not read 0Ω , the lead is defective. Replace the lead or the wiring harness [B] if necessary.



Battery

Battery Removal

- Turn off the ignition switch.
- Remove the seat (see Seat Removal in the Frame chapter)
- Loosen the bolts [A] of the battery holder [B].
- Remove the battery with the holder and the case.
- Disconnect the battery negative (-) cable [C] first, and then the positive (+) cable [D].
- Take out the battery [E].



Battery Installation

- Turn off the ignition switch.
- Put the battery with the case and the holder in place.
- Connect the positive cable first and then the negative cable.
- Put a light coat of grease on the terminals to prevent corrosion.
- Tighten the battery holder bolts.

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: KMX 14-BS

CAUTION

Be sure to use the electrolyte container with the same model name as the battery since the electrolyte volume and specific gravity vary with the battery type. This is to prevent overfilling of the electrolyte, shorting the battery life, and deterioration of the battery performance.

- Check to see that there is no peeling, tears or holes in the seal sheet on the top of the battery.
- Place the battery on a level surface.
- Remove the seal sheet.

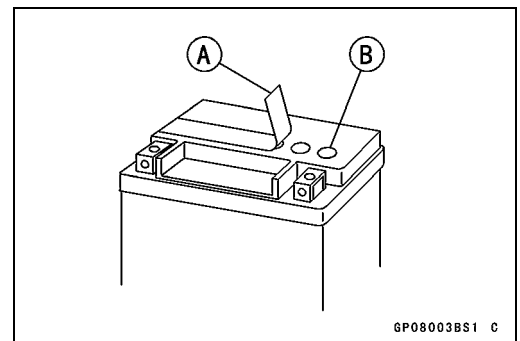
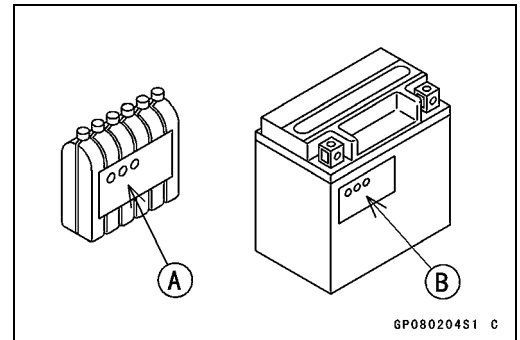
CAUTION

Do not remove the aluminum 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.*



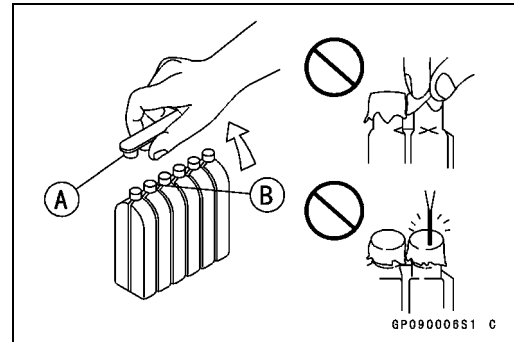
16-18 ELECTRICAL SYSTEM

Battery

- 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

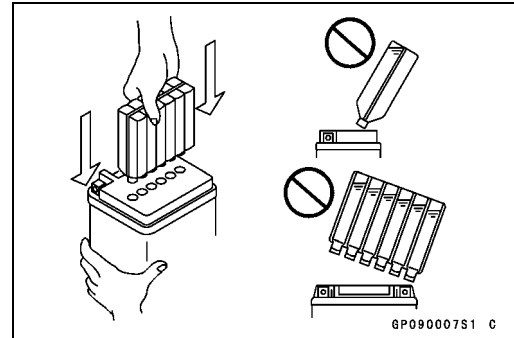
○ Do not pierce or otherwise open the sealed cells [B] of the electrolyte container. Do not attempt to separate individual cells.



- 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

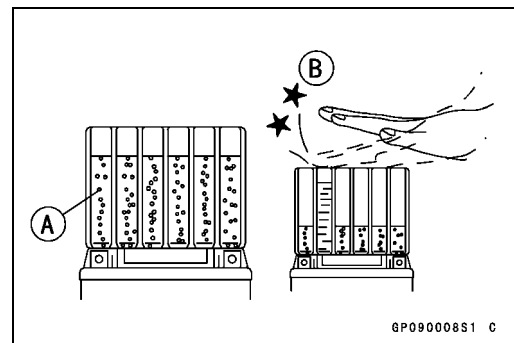
○ Do not tilt the electrolyte container



- 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.



- Gently remove the container from the battery.
- Let the battery sit for **60** 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.

Battery

Initial Charge

- Place the strip [A] of caps loosely over the filler ports.
- Newly activated sealed batteries require an initial charge.

Standard Charge **1.2 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.

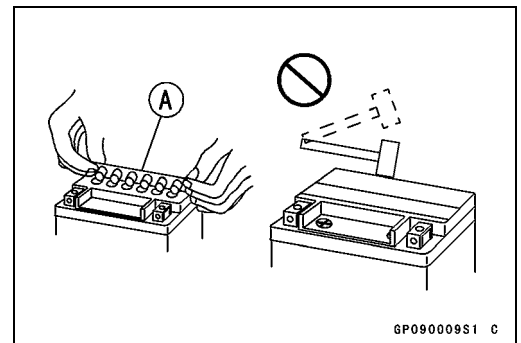
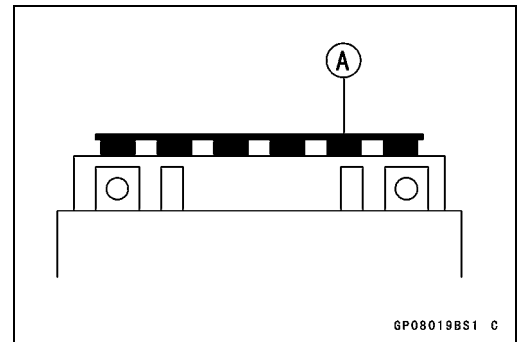
- After charging is completed, press down firmly with both hands to seat the strip of caps [A] into the battery (don't pound or hammer). When properly installed, the strip of the caps will be level with the top of the battery.

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.



16-20 ELECTRICAL SYSTEM

Battery

Precautions

- 1) No need of topping-up

No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the sealing plug to add water is very dangerous. Never do that.

- 2) Refreshing charge

If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see Refreshing Charge).

When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. However, the battery's performance may be reduced noticeably if charged under conditions other than given above.

Never remove the seal caps during refresh charge.

If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

- 3) When you do not use the motorcycle for months

Give a refresh charge before you store the motorcycle and store it with the negative lead removed. Give a refresh charge once a month during storage.

- 4) Battery life

If the battery will not start the engine even after several refresh charges, the battery has exceeded its useful life. Replace it. (Provided, however, the vehicle's starting system has no problem.)

⚠ WARNING

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

No fire should be drawn near the battery, or no terminals should have the tightening loosened.

The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

Interchange

A sealed battery can fully display its performance only when combined with a proper vehicle electrical system. Therefore, replace a sealed battery only on a vehicle which was originally equipped with a sealed battery.

Be careful, if a sealed battery is installed on a vehicle which had an ordinary battery as original equipment, the sealed battery's life will be shortened.

Battery

Charging Condition Inspection

Battery charging condition can be checked by measuring battery terminal voltage.

- Remove the battery (see Battery Removal).

CAUTION

Be sure to disconnect the negative (-) lead first.

- Measure the battery terminal voltage.

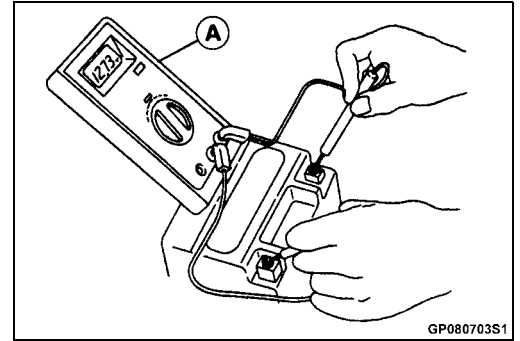
NOTE

○ Measure with a digital voltmeter [A] which can be read to one decimal place voltage.

- ★ If the reading is below the specified, refreshing charge is required.

Battery Terminal Voltage

Standard: 12.8 V or more

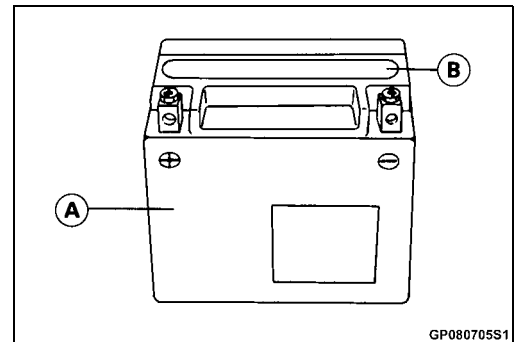


Refreshing Charge

- Remove the battery [A] (see Battery Removal).
- Refresh-charge by following method according to the battery terminal voltage.

⚠ WARNING

This battery is sealed type. Never remove seal sheet [B] even at charging. Never add water. Charge with current and time as stated below.



Terminal Voltage: 11.5 ~ less than 12.8 V

Standard Charge

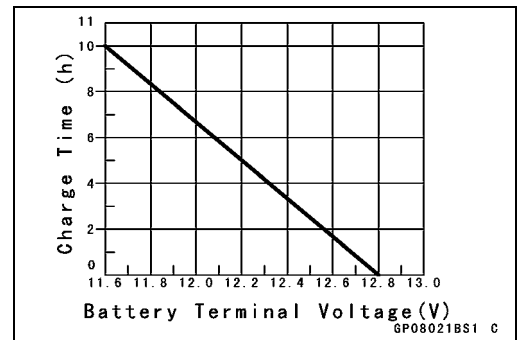
1.2 A × 5 ~ 10 h (refer to following chart)

Quick Charge

6.0 A × 1.0 h

CAUTION

If possible, do not quick charge. If the quick charge is done due to unavoidable circumstances, do the standard charge later on.



Terminal Voltage: less than 11.5 V

Charging Method: 1.2 A × 20 h

16-22 ELECTRICAL SYSTEM

Battery

NOTE

○ Increase the charging voltage to a maximum voltage of 25 V if the battery will not accept current initially. Charge for no more than 5 minutes at the increased voltage then check if the battery is drawing current. If the battery will accept current [D], decrease the voltage and charge by the standard charging method described on the battery case. If the battery will not accept current after 5 minutes, replace the battery.

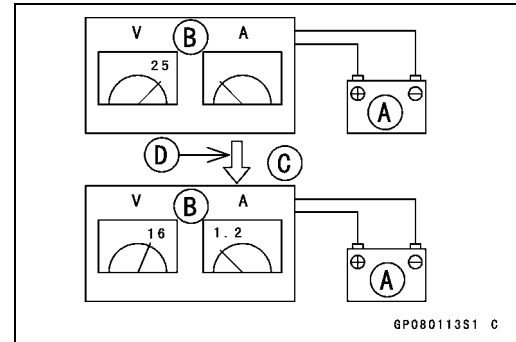
Battery [A]

Battery Charger [B]

Standard Value [C]

- Determine battery condition after refreshing charge.
- Determine the condition of the battery 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.8 V or higher	Good
12.0 ~ 12.7 V or lower	Charge insufficient → Recharge
12.0 V or lower	Unserviceable → Replace



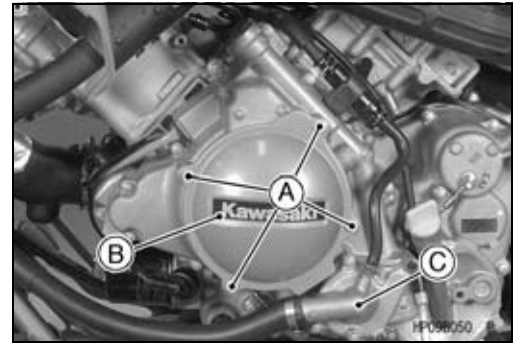
Charging System

Alternator Cover Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).

- Remove:

Bolts [A] and Alternator Flywheel Bolt Cover [B]
Water Pump Cover [C] and Impeller (see Water Pump Cover and Impeller Removal in the Cooling System chapter)

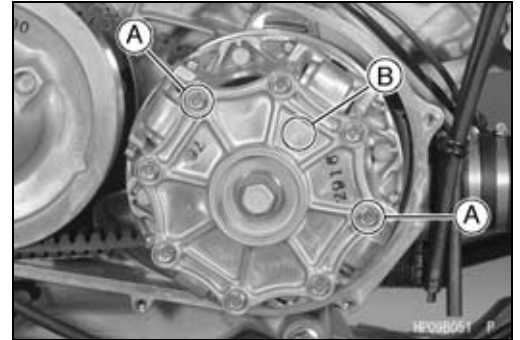


- Remove:

Torque Converter Cover (see Torque Converter Cover Removal in the Converter System chapter)

- Remove the three bolts of the drive pulley cover, except for at the dowel pin parts [A] as shown.

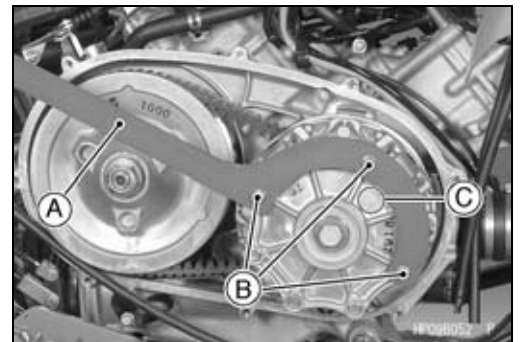
[B] Arrow Mark



- Install and tighten the drive pulley holder [A] and the three bolts [B].

Special Tool - Drive Pulley Holder: 57001-1620

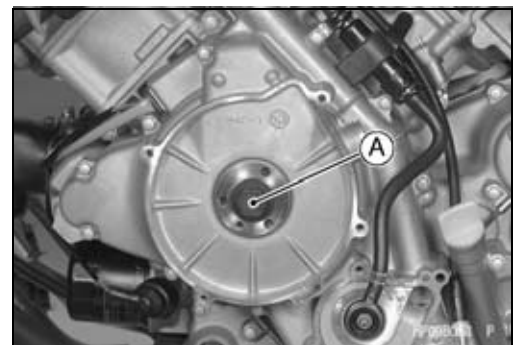
[C] Arrow Mark



- Holding the drive pulley with the drive pulley holder, loosen the alternator flywheel bolt [A].

- Remove:

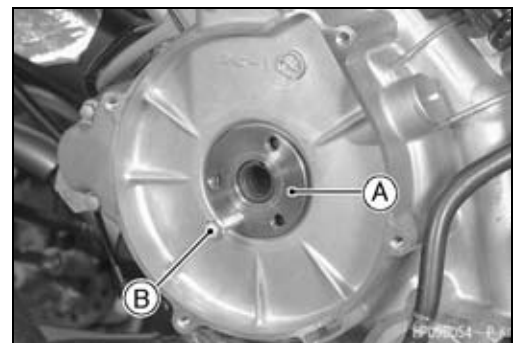
Alternator Flywheel Bolt



- Remove:

Collar [A]

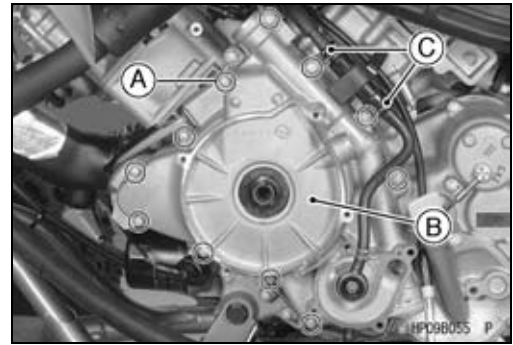
- Install the M6 bolt [B] to the collar, and remove it.



16-24 ELECTRICAL SYSTEM

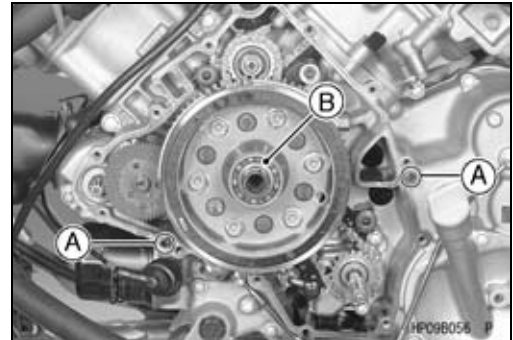
Charging System

- Place an oil pan under the engine left side.
- Remove:
 - Alternator and Crankshaft Sensor Lead Connectors (disconnect)
 - Alternator Cover Bolts [A]
 - Alternator Cover [B]
 - Clamp [C]

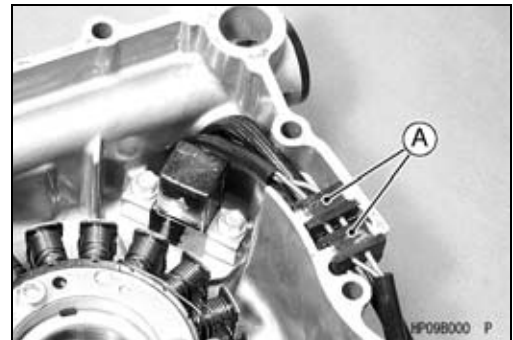


Alternator Cover Installation

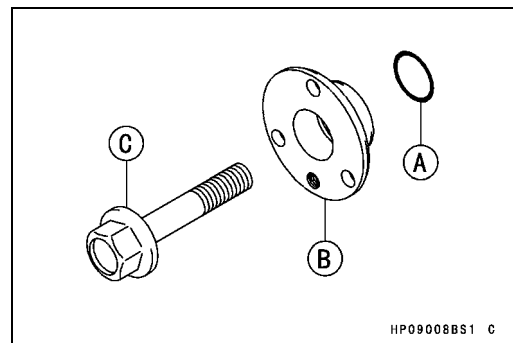
- Be sure all of the old gasket has been removed from the alternator cover and the left crankcase sealing surfaces.
- Check that the dowel pins [A] are in place, and fit a new gasket on the crankcase.
- Check that the bearing [B] is in place.



- Fit the grommets [A] into the notch in the cover.
- Grease the alternator cover oil seal.
- Tighten
 - Torque - Alternator Cover Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)**



- Check that the O-ring [A] in the collar [B] is in good condition.
- Apply grease to the O-ring.
- Install the collar on the alternator cover.
- Install the alternator flywheel bolt [C].



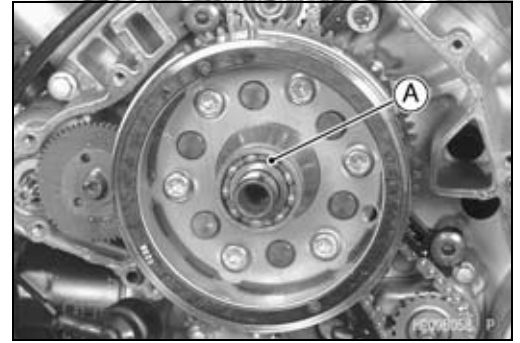
- Hold the drive pulley with the drive pulley holder [A].
 - Special Tool - Drive Pulley Holder: 57001-1620**
- Tighten:
 - Torque - Alternator Flywheel Bolt: 127 N-m (13 kgf-m, 94 ft-lb)**
 - Alternator Flywheel Bolt Cover Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)**
- Add engine oil.



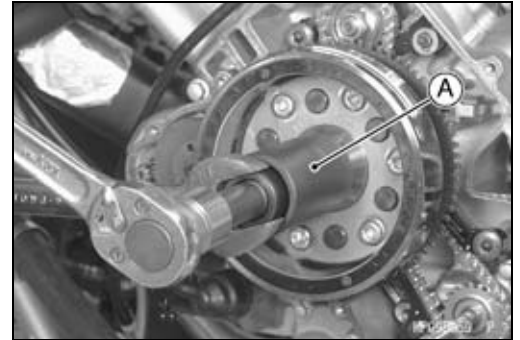
Charging System

Alternator Flywheel Removal

- Remove:
 - Alternator Cover (see Alternator Cover Removal)
 - Ball Bearing [A]



- Thread the flywheel puller [A] onto the alternator flywheel.
 - Special Tool - Flywheel Puller: 57001-1615**
- Holding the flywheel puller, turn the flywheel puller until the alternator flywheel is forced off the end of the crankshaft.

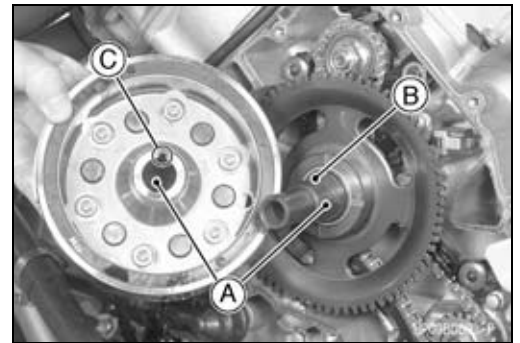


CAUTION

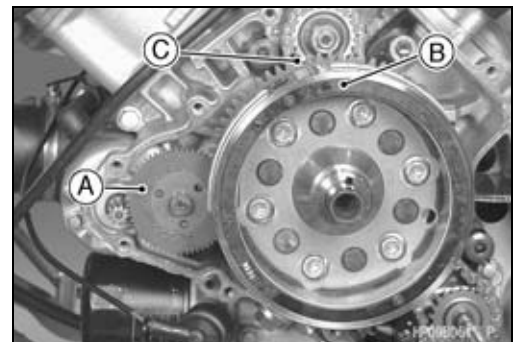
If the flywheel is difficult to remove, turn the puller while tapping the end of the puller. Do not strike the alternator flywheel. Striking the flywheel can cause the magnets to lose magnetism.

Alternator Flywheel Installation

- Clean [A] the inside of the rotor and the end of the crankshaft.
- Fit the flywheel onto the crankshaft so that woodruff key [B] fits in the groove [C] in the hub of the flywheel.



- Install the torque limiter [A].
- Install the alternator flywheel [B] while turning the starter clutch gear [C].

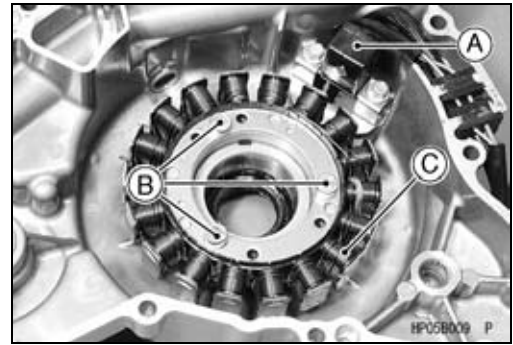


16-26 ELECTRICAL SYSTEM

Charging System

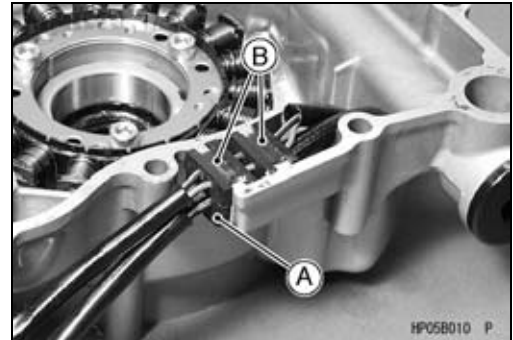
Alternator Stator Removal

- Remove:
 - Alternator Cover (see Alternator Cover Removal)
 - Crankshaft Sensor [A] (see Crankshaft Sensor Removal)
 - Bolts [B] and Alternator Stator [C]



Alternator Stator Installation

- Tighten:
 - Torque - Alternator Stator Bolts: 13 N·m (1.3 kgf·m, 113 in·lb)**
- Install:
 - Crankshaft Sensor (see Crankshaft Sensor Installation)
- Fit the lead grommets into the notch on the alternator cover.
 - Grommets [A] for Alternator Leads
 - Grommets [B] for Crankshaft Sensor Leads



Regulator/Rectifier Output Voltage Inspection

- Remove the seat (see Seat Removal in the Frame chapter).
- Check the battery condition (see Battery section).
- Warm up the engine to obtain actual alternator operating conditions.
- Check that the ignition switch is turned off, and connect a hand tester to the battery terminals.

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 off. The readings should show nearly battery voltage when the engine speed is low, and as the engine speed increases, the readings should also increase.



Regulator/Rectifier Output Voltage

Tester Range	Connections		Reading
	Tester (+) to	Tester (-) to	
25 V DC	Battery (+)	Battery (-)	14 ~ 15 V

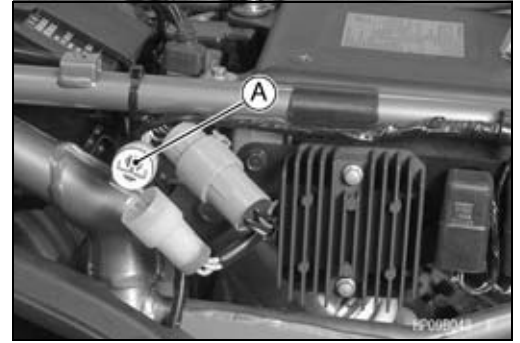
- Turn off the ignition switch, and disconnect the hand tester.
- ★ If the regulator/rectifier output voltage is between the values given in the table, the charging system is working normally.
- ★ If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.
- ★ If the battery voltage does not increase 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

Alternator Inspection

There are three types of alternator failures: short, open, 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, perform the following procedures.
 - Remove the rear fender (see Rear Fender Removal in the Frame chapter).
 - Disconnect the alternator connector [A].
 - Connect a hand tester as shown in the table.
 - Start the engine.
 - Run it at the rpm given in the table.
 - Note the voltage readings (total 3 measurements).



Alternator Output Voltage

Tester Range	Connections		Reading @3 000 rpm
	Tester (+) to	Tester (-) to	
250 V AC	One yellow lead	Another yellow lead	36 ~ 54 V

★ If the output voltage is within the values in the table, the alternator is operating correctly, and the regulator/rectifier is damaged. A much lower reading indicates that the alternator is defective.

- Check the stator coil resistance as follows:
 - Stop the engine.
 - Disconnect the alternator connector.
 - Connect a hand tester as shown in the table.
 - Note the readings (total 3 measurement).

Stator Coil Resistance

Tester Range	Connections		Reading
	Tester (+) to	Tester (-) to	
x 1 Ω	One yellow lead	Another yellow lead	0.33 ~ 0.49 Ω

★ If there is more resistance than shown in the table, or no reading (infinity) for any two leads, the stator has an open and must be replaced. Much less 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 reading less than infinity (∞) indicates a short, necessitating stator replacement.
- ★ If the stator coils have normal resistance, but the voltage check shows the alternator to be defective; then the fly-wheel magnetism has probably weakened, and the fly-wheel must be replaced.

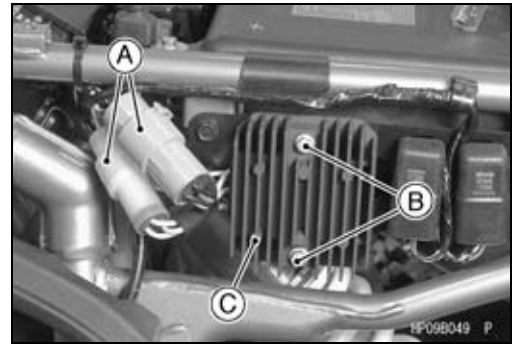
Special Tool - Hand Tester: 57001-1394

16-28 ELECTRICAL SYSTEM

Charging System

Regulator/Rectifier Inspection

- Remove:
 - Connectors [A] (disconnect)
 - Bolts [B] and Regulator/Rectifier [C]



Rectifier Circuit Check

- Check conductivity of the following pair of terminals.

Rectifier Circuit Inspection

Tester connection	W/R-Y1,	W/R-Y2,	W/R-Y3
	BK-Y1,	BK-Y2,	BK-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 must be replaced.

NOTE

○ The actual meter reading varies with the meter and the individual rectifier. Generally speaking the lower reading should be from zero to one half of 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).

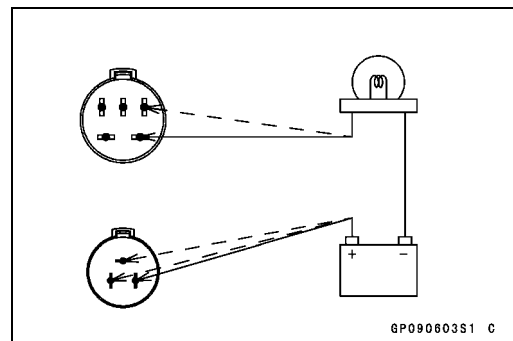
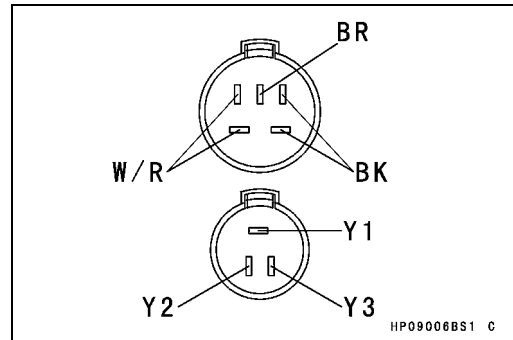
CAUTION

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 correct before continuing.

Regulator Circuit Test-1st Step

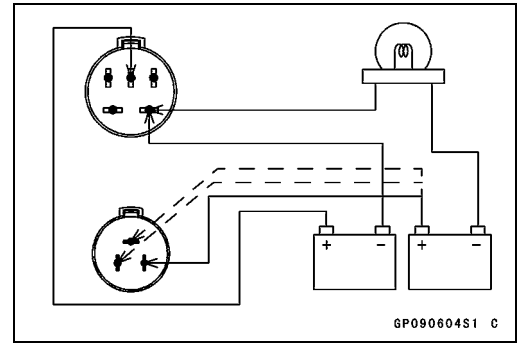
- Connect the test light and the 12 V battery to the regulator/rectifier as shown.
- Check Y1, Y2, and Y3 terminal respectively.
- ★ If the test light turns on, the regulator/rectifier is defective.
- ★ If the test light does not turn on, continue the test.



Charging System

Regulator Circuit Test-2nd Step

- Connect the test light and a 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
- Apply 12 V to the BR terminal.
- Check Y1, Y2, and Y3 terminals.
- ★ If the test light turns on, the regulator/rectifier is defective.
- ★ If the test light does not turn on, continue the test.



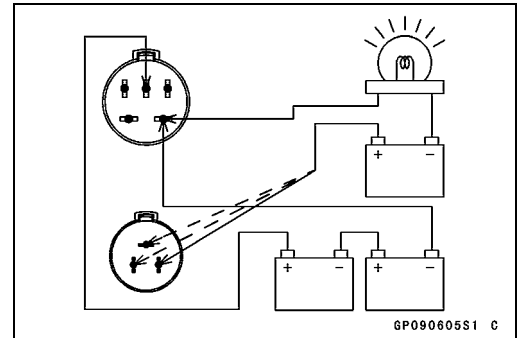
Regulator Circuit Test-3rd Step

- Connect the test light and a 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
- Momentarily apply 24 V to the BR terminal by adding a 12 V battery.
- Check Y1, Y2, and Y3 terminals.

CAUTION

Do not apply more than 24 V to the regulator/rectifier. Do not leave the 24 V applied for more than a few seconds, or the unit will be damaged.

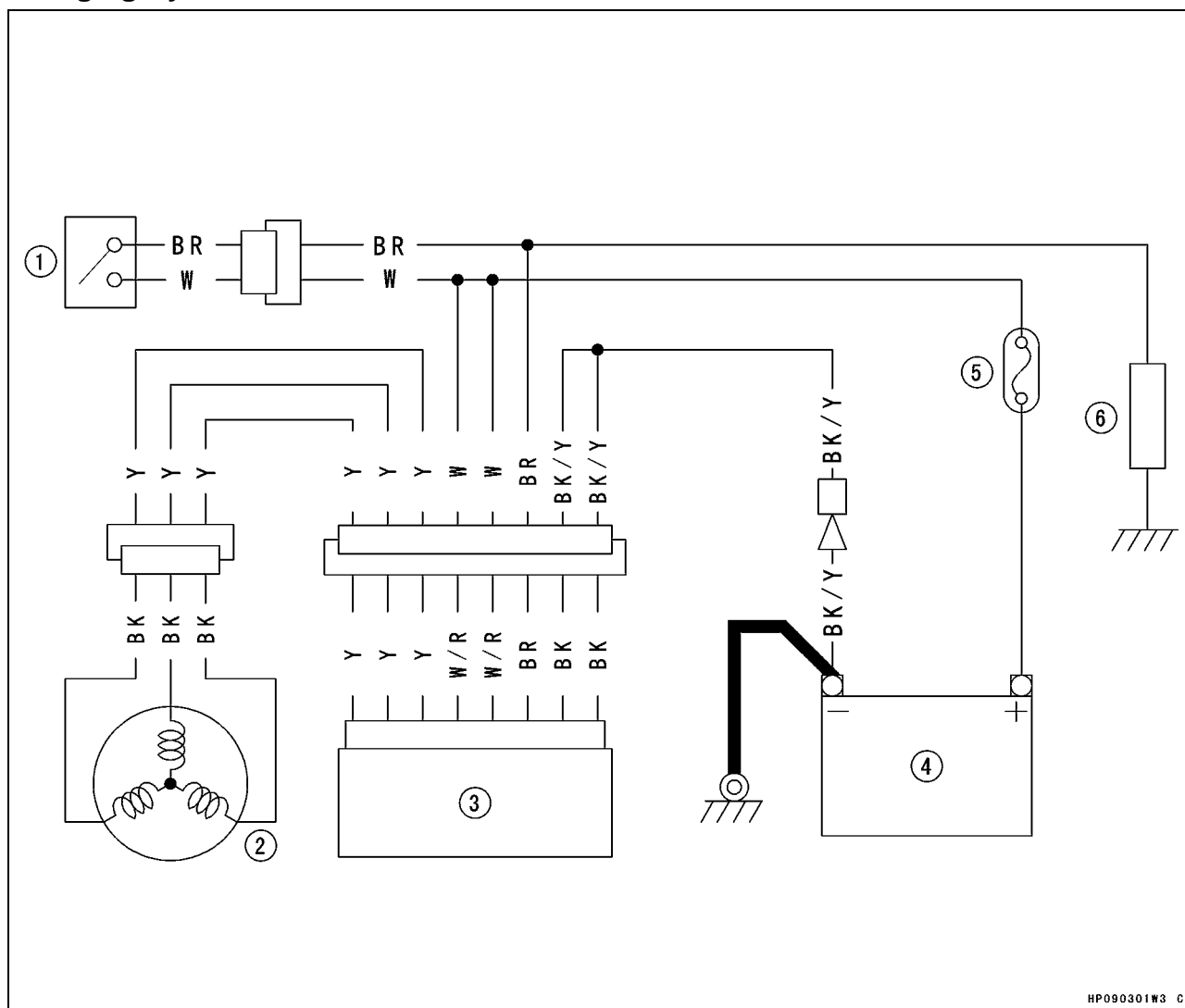
- ★ If the test light did not light when the 24 V was applied momentarily to the BR terminal, the regulator/rectifier is defective.
- ★ If the regulator/rectifier passes all of the tests described, it may still be defective. If the charging system still does not work properly after checking all of the components and the battery, test the regulator/rectifier by replacing it with a known good unit.



16-30 ELECTRICAL SYSTEM

Charging System

Charging System Circuit



HP090301W3 C

- 1. Ignition Switch
- 2. Alternator
- 3. Regulator/Rectifier

- 4. Battery
- 5. Main Fuse 30 A
- 6. Load

Ignition System

⚠ WARNING

The ignition system produces extremely high voltage.

Do not touch the spark plug, ignition coil, or high tension lead while the engine is running, or you could receive a severe electrical shock.

CAUTION

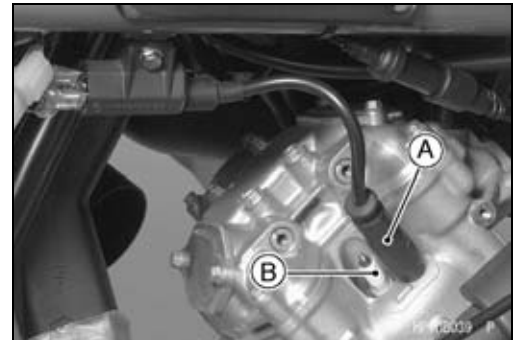
Do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent igniter damage.

Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and igniter.

Use the standard regulator/rectifier, or the igniter will be damaged.

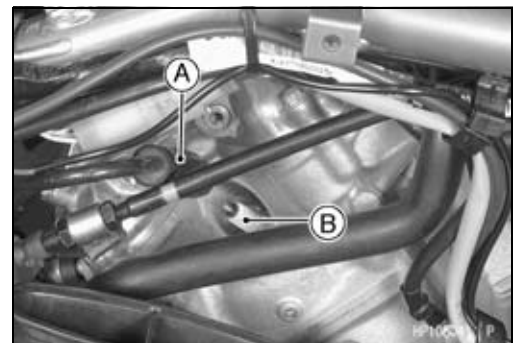
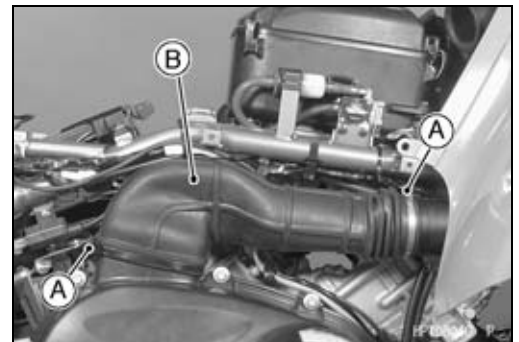
Spark Plug Removal **Front Side**

- Remove:
 - Spark Plug Cap [A]
 - Spark Plug [B]



Rear Side

- Remove:
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
 - Air Cleaner Cover (see Air Cleaner Cover Removal in the Frame chapter)
 - Side Inner Cover (see Side Inner Cover Removal in the Frame chapter)
 - Clamp Screws [A] and Clamps
 - Converter Exhaust Joint Duct [B]
- Remove:
 - Spark Plug Cap [A]
 - Spark Plug [B]



Spark Plug Installation

- Tighten:
 - Torque - Spark Plugs: 13 N·m (1.3 kgf·m, 113 in·lb)**
- Fit the spark plug caps securely.
- Pull up the spark plug caps lightly to make sure of the installation of the spark plug caps.

16-32 ELECTRICAL SYSTEM

Ignition System

Spark Plug Cleaning/Inspection

- Refer to the Spark Plug Inspection in the Periodic Maintenance chapter.

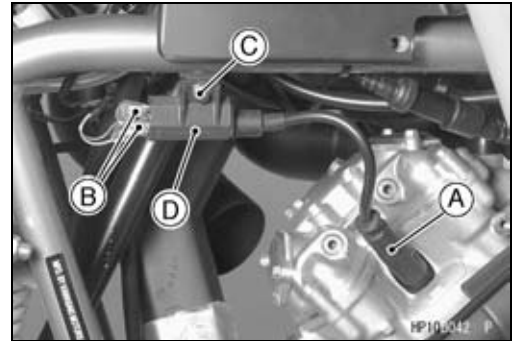
Spark Plug Gap Inspection

- Refer to the Spark Plug Inspection in the Periodic Maintenance chapter.

Ignition Coil Removal

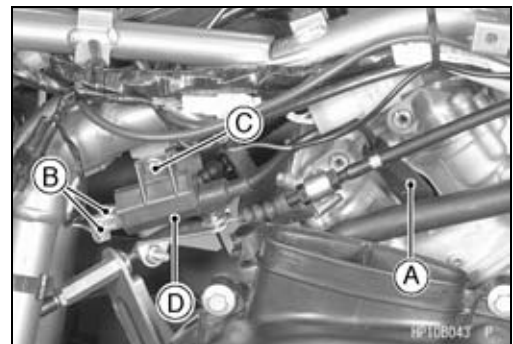
Front Side

- Remove:
 - Spark Plug Cap [A]
 - Primary Lead Connectors [B]
 - Bolt [C]
 - Ignition Coil [D]



Rear Side

- Remove:
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
 - Air Cleaner Cover (see Air Cleaner Cover Removal in the Frame chapter)
 - Side Inner Cover (see Side Inner Cover Removal in the Frame chapter)
 - Converter Exhaust Joint Duct (see Spark Plug Removal (Rear Side))
 - Spark Plug Cap [A]
 - Primary Lead Connectors [B]
 - Bolt [C]
 - Ignition Coil [D]



Ignition Coil Installation

- Connect the primary leads to the ignition coil terminals as shown.

Front Side

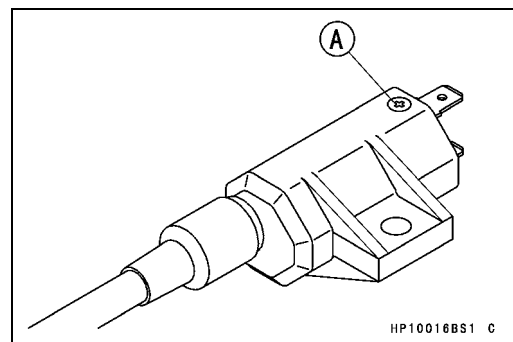
- G/W Lead → (+) Mark [A]
- BK/Y Lead → (-) Mark

Rear Side

- BL/W Lead → (+) Mark [A]
- BK/Y Lead → (-) Mark

- Tighten:

Torque - Ignition Coil Mounting Bolts: 6.9 N·m (0.70 kgf·m, 61 in·lb)



Ignition System

Ignition Coil Inspection

- Remove the ignition coil.
- Measure the arcing distance with a coil tester [A] to check the condition of the ignition coil [B].
- Connect the ignition coil (with the spark plug cap attached at the end of the high tension lead) to the tester in the manner prescribed by the manufacturer and measure the arcing distance.

Ignition Coil Arcing Distance
7 mm or more

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the ignition coil body or leads.

- ★ If the distance reading is less than the specified value, the ignition coil or spark plug cap is defective.
- 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 as before, the trouble is with the ignition coil. If the arcing distance is normal, the trouble is with the spark plug cap.
- ★ If a coil tester is not available, the coil can be checked for a broken or badly shorted winding with a hand tester.

Special Tool - Hand Tester: 57001-1394

NOTE

○ *The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.*

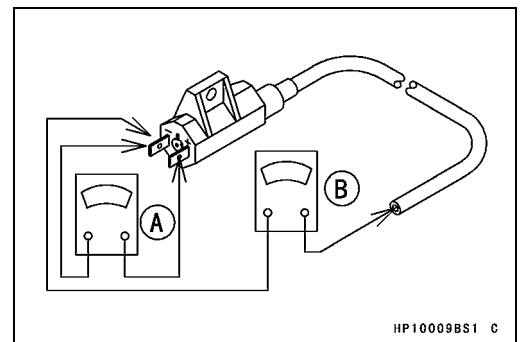
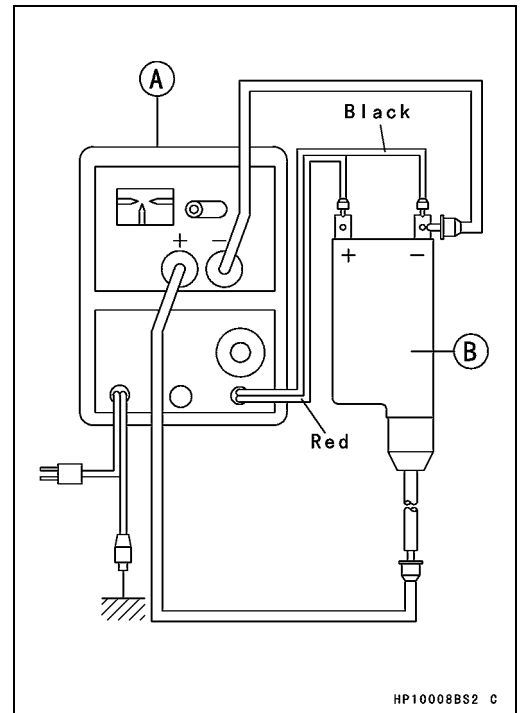
- Measure the primary winding resistance [A] as follows:
 - Connect the tester between the coil terminals.
 - Set the tester to the $\times 1 \Omega$ range.
- Measure the secondary winding resistance [B] as follows:
 - Remove the plug cap by turning it counterclockwise.
 - Connect the tester between the high tension lead and terminal.
 - Set the tester to the $\times 1 \text{ k}\Omega$ range.

Ignition Coil Winding Resistance

Primary windings: 0.09 ~ 0.13 Ω

Secondary windings: 3.8 ~ 5.8 $\text{k}\Omega$

- ★ If the hand tester does not read as specified, replace the coil.
- To install the plug cap, turn it clockwise.



16-34 ELECTRICAL SYSTEM

Ignition System

Ignition Coil Primary Peak Voltage Inspection

NOTE

○ Be sure the battery is fully charged.

- Remove the spark plug cap (see Spark Plug Removal), but do not remove the spark plug.
- Measure the primary peak voltage as follows.
- Connect the peak voltage adapter [A] to the hand tester [B] (250 V DC range). Install the needle adapters [C] on the peak voltage adapter leads.

Special Tools - Hand Tester: 57001-1394

Needle Adapter Set: 57001-1457

Peak Voltage Adapter: 57001-1415

Type: KEK-54-9-B

- Insert the needle adapter inside the seal of the G/W (front) or BL/W (rear) lead in the ignition coil [D] until the needle reaches the terminal in the ignition coil.
- Install a new spark plug [E] into the spark plug cap, and ground it to the engine.

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the spark plugs or tester connections.

- Turn the ignition switch ON, rotate the engine for 4 ~ 5 seconds with the transmission in neutral to measure the primary peak voltage.
- Repeat the measurements 5 times for one ignition coil.

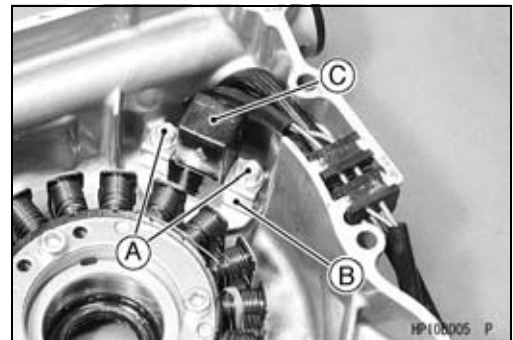
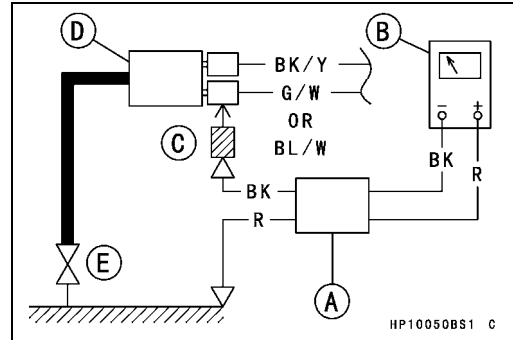
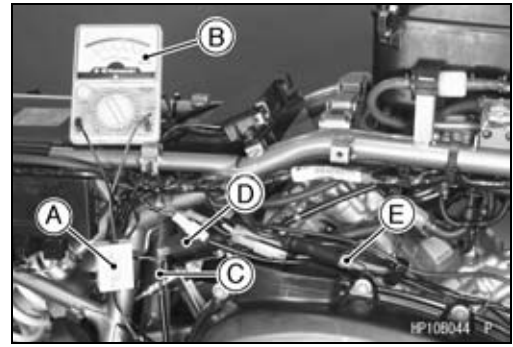
Ignition Coil Primary Peak Voltage

Standard: 50 V or more

- Repeat the test for the other ignition coil.
- ★ If the reading is less than the specified value, check the following.
 - Ignition Coils (see Ignition Coil Inspection)
 - Crankshaft Sensor (see Crankshaft Sensor Inspection)
- ★ If the ignition coils and crankshaft sensor are normal, see the Ignition System Troubleshooting chart.

Crankshaft Sensor Removal

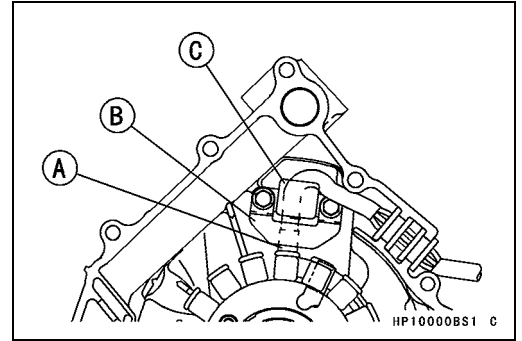
- Remove:
 - Alternator Cover (see Alternator Cover Removal)
 - Crankshaft Sensor Mounting Bolts [A]
 - Plate [B]
 - Crankshaft Sensor [C]



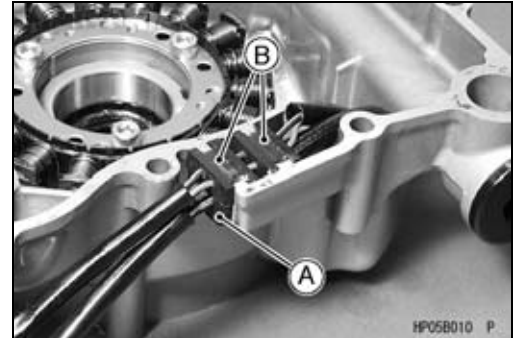
Ignition System

Crankshaft Sensor Installation

- Install:
 - Stator Coil Leads [A]
 - Plate [B]
 - Crankshaft Sensor [C]
- Tighten:
 - Torque - Crankshaft Sensor Mounting Bolts: 5.9 N·m (0.6 kgf·m, 52 in·lb)**



- Fit the lead grommets into the notch on the alternator cover.
 - Grommets [A] for Alternator Leads
 - Grommets [B] for Crankshaft Sensor Leads



Crankshaft Sensor Inspection

- Remove the rear fender (see Rear Fender Removal in the Frame chapter).
- Disconnect the crankshaft sensor lead connector [A].
- Measure the crankshaft sensor resistance.
 - Connect a hand tester between the BK/W lead and the BL lead.
 - Set the tester to the $\times 10 \Omega$ range.

Crankshaft Sensor Resistance
110 ~ 140 Ω

- ★ If the tester does not read as specified, replace the crankshaft sensor.



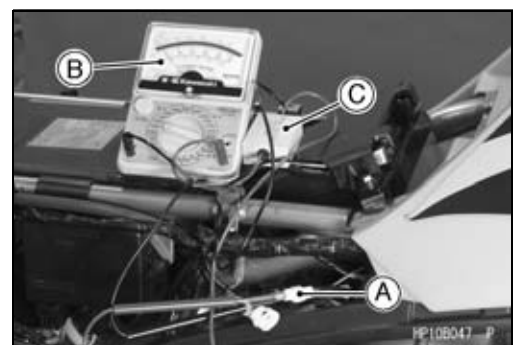
Crankshaft Sensor Peak Voltage Inspection

NOTE

○ Be sure the battery is fully charged.

- Remove the spark plug caps, but do not remove the spark plugs.
- Disconnect:
 - Crankshaft Sensor Lead Connector [A]
- Set the hand tester [B] to the 10 V DC range.
- Connect the peak voltage adapter [C] to the hand tester and crankshaft sensor leads in the connector.

Special Tools - Hand Tester: 57001-1394
Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B



Connections:

Crankshaft Sensor Lead	Adapter	Hand Tester
Blue	← Red	→ (+)
Black/White	← Black	→ (-)

- Turn the ignition switch on, and rotate the engine for 4 ~ 5 seconds with the transmission gear in neutral to measure the crankshaft sensor peak voltage.

16-36 ELECTRICAL SYSTEM

Ignition System

- Repeat the measurement 5 or more times.

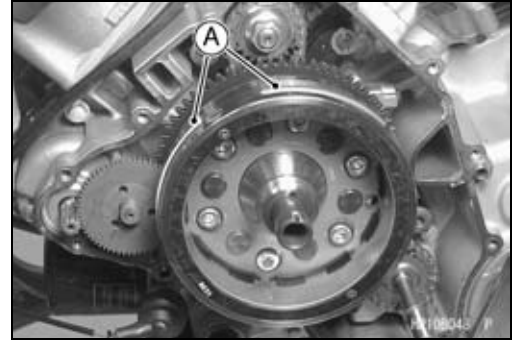
Crankshaft Sensor Peak Voltage

Standard: 1.8 V or more

- ★ If the peak voltage is lower than the standard, inspect the crankshaft sensor.

Alternator Flywheel Inspection

- Check the timing projection [A] for damage such as chipping or grooving.
- ★ If the timing projection on the flywheel is visibly damaged, replace the alternator flywheel.



Ignition Timing Test

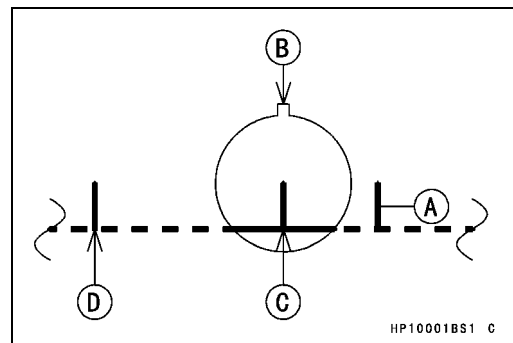
- Remove the ignition timing inspection plug.
- Special Tool - Filler Cap Driver: 57001-1454**
- Attach a timing light [A] and a tachometer in the manner prescribed by the manufacturer.
- Special Tool - Timing Light: 57001-1241**
- Start the engine and aim the timing light at the timing mark on the alternator rotor.
- Run the engine at the speeds specified and note the alignment of the timing marks.



[A] F or R mark

Ignition Timing

Engine speed r/min (rpm)	Slot [B] aligned with:
1 100 and below	Advanced mark [C] on alternator flywheel
5 000 and above	Advanced mark [D] on alternator flywheel



NOTE

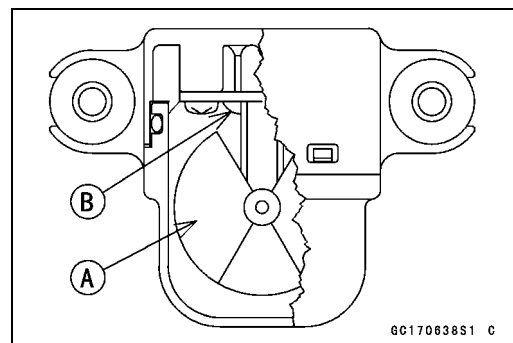
○ Do not mix up the timing marks with mark [A].

- ★ If the ignition timing is incorrect, replace the igniter and the crankshaft sensor.

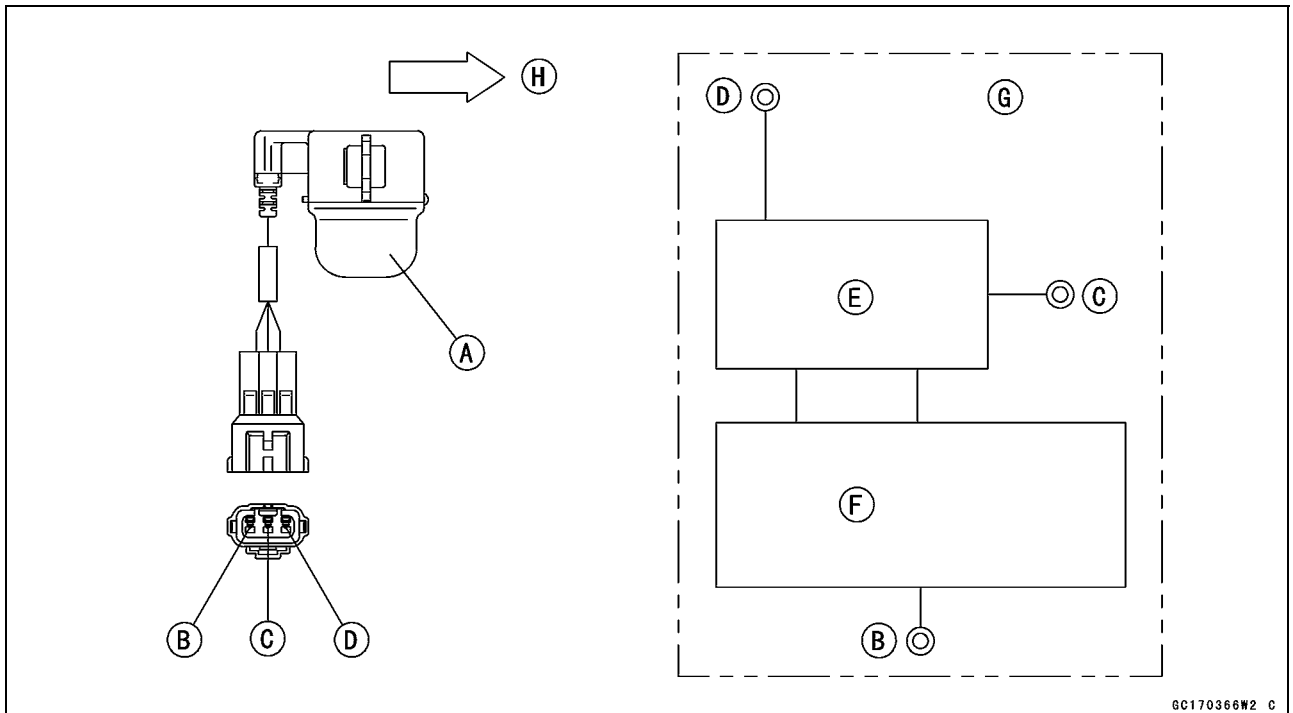
Vehicle-down Sensor Outline

This sensor has a weight [A] with two magnets inside, and sends a signal to the igniter. But when the vehicle banks 60 ~ 70° or more to either side (in fact falls down), the weight turns and shuts off the voltage in the vehicle-down sensor circuit. The igniter senses this change, and stops the fuel pump and the ignition system.

Hall IC [B]



Ignition System



Vehicle-down Sensor [A]
 Ground Terminal [B] BK/Y
 Output Terminal [C] Y/G
 Power Source Terminal [D] BR

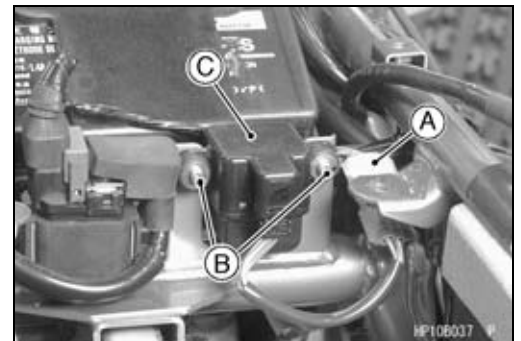
Constant Voltage Circuit [E]
 Hall IC (Integrated Circuit) [F]
 Vehicle-down Sensor Circuit [G]
 Front [H]

Vehicle-down Sensor Removal

CAUTION

Never drop the down-sensor, especially on a hard surface. Shock to the sensor can damage it.

- Remove:
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
 - Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
 - Vehicle-down Sensor Lead Connector [A]
 - Screws [B]
 - Vehicle-down Sensor [C]

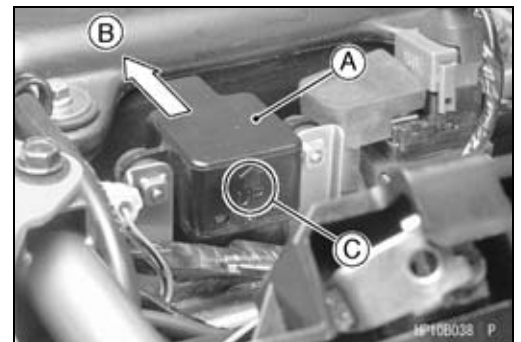


Vehicle-down Sensor Installation

- Install the vehicle-down sensor [A] so that the sensor lead faces backwards [B], and the arrow mark [C] on the sensor points upward.
- Tighten the screws securely.

⚠ WARNING

Incorrect installation of the vehicle-down sensor could cause sudden loss of engine power. The rider could lose balance during certain riding situations, like leaning over in a turn, with the potential for an accident resulting in injury or death. Ensure that the down sensor is held in place by the sensor brackets.



16-38 ELECTRICAL SYSTEM

Ignition System

Vehicle-down Sensor Inspection

NOTE

○Be sure the battery is fully charged.

Vehicle-down Sensor Power Source Voltage

- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Vehicle-down Sensor Lead Connector
- Connect:
 - Vehicle-down Sensor Lead Connector [A] (harness side)
 - Digital Volt Meter [B]
- I. **Connections to Connector (12 V circuit)**
 - Meter (+) → Connector BR Lead [C]
 - Meter (-) → Connector BK/Y Lead [D]
- Turn the ignition switch ON, and measure the power source voltage.

Vehicle-down Sensor Power Source Voltage

Standard: Battery Voltage

- Turn the ignition switch OFF.
- ★ If there is no battery voltage, check the following:
 - Main Fuse 30 A
 - Ignition Switch
 - Wiring for Vehicle-down Sensor Power Source

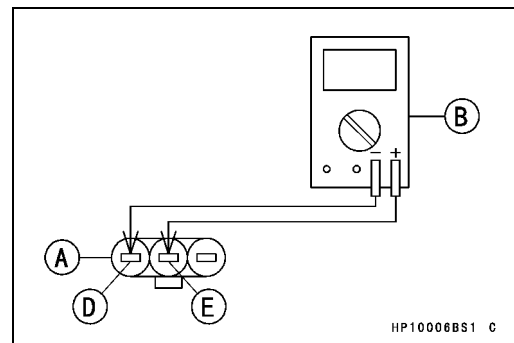
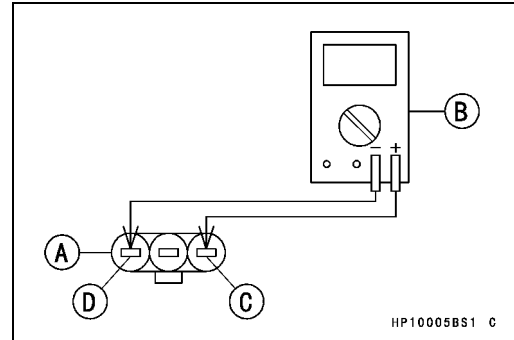
II. Connections to Connector (5 V circuit)

- Meter (+) → Connector Y/G Lead [E]
- Meter (-) → Connector BK/Y Lead [D]
- Turn the ignition switch ON, and measure the power source voltage.

Vehicle-down Sensor Power Source Voltage

Standard: about 5 V

- Turn the ignition switch OFF.
- ★ If there is no standard voltage, check the following:
 - Igniter
 - Wiring for Vehicle-down Sensor Power Source



Ignition System

Vehicle-down Sensor Output Voltage

- Remove the vehicle-down sensor (see Vehicle-down Sensor Removal).
- Connect the vehicle-down sensor [A] to the connector of the harness.
- Hold the sensor almost vertical [B] with the arrow mark pointed up.
- Connect:
 - Vehicle-down Sensor Lead Connector [C]
 - Digital Volt Meter [D]
 - Needle Adapters [E]

Special Tool - Needle Adapter Set: 57001-1457

Connection to Connector (5 V circuit)

- Meter (+) → Connector Y/G Lead [F]
- Meter (-) → Connector BK/Y Lead [G]

- Turn the ignition switch ON, and measure the output voltage with the connector joined.

Vehicle-down Sensor Power Output Voltage

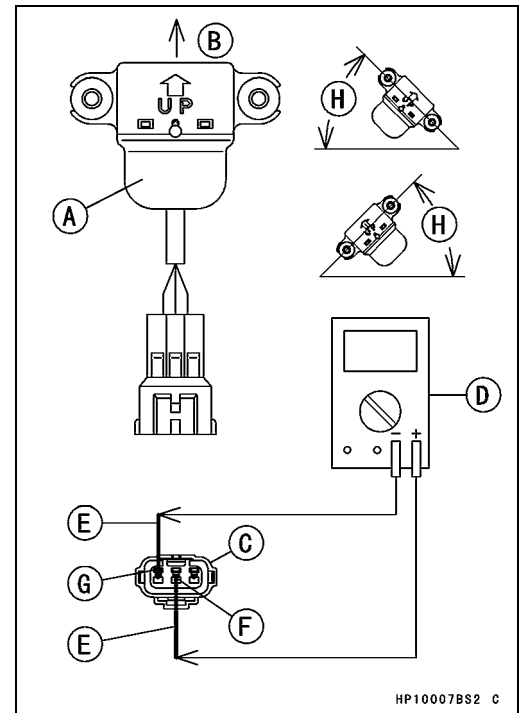
Standard: 0.4 ~ 1.4 V (with sensor arrow mark pointed up)

- Tilt the sensor 60 ~ 70° or more [H] right or left, and measure the output voltage.
- The time lag is from 0.5 to 1 second.

Vehicle-down Sensor Power Output Voltage

Standard: 3.7 ~ 4.4 V (with sensor tilted 60 ~ 70° or more, right or left)

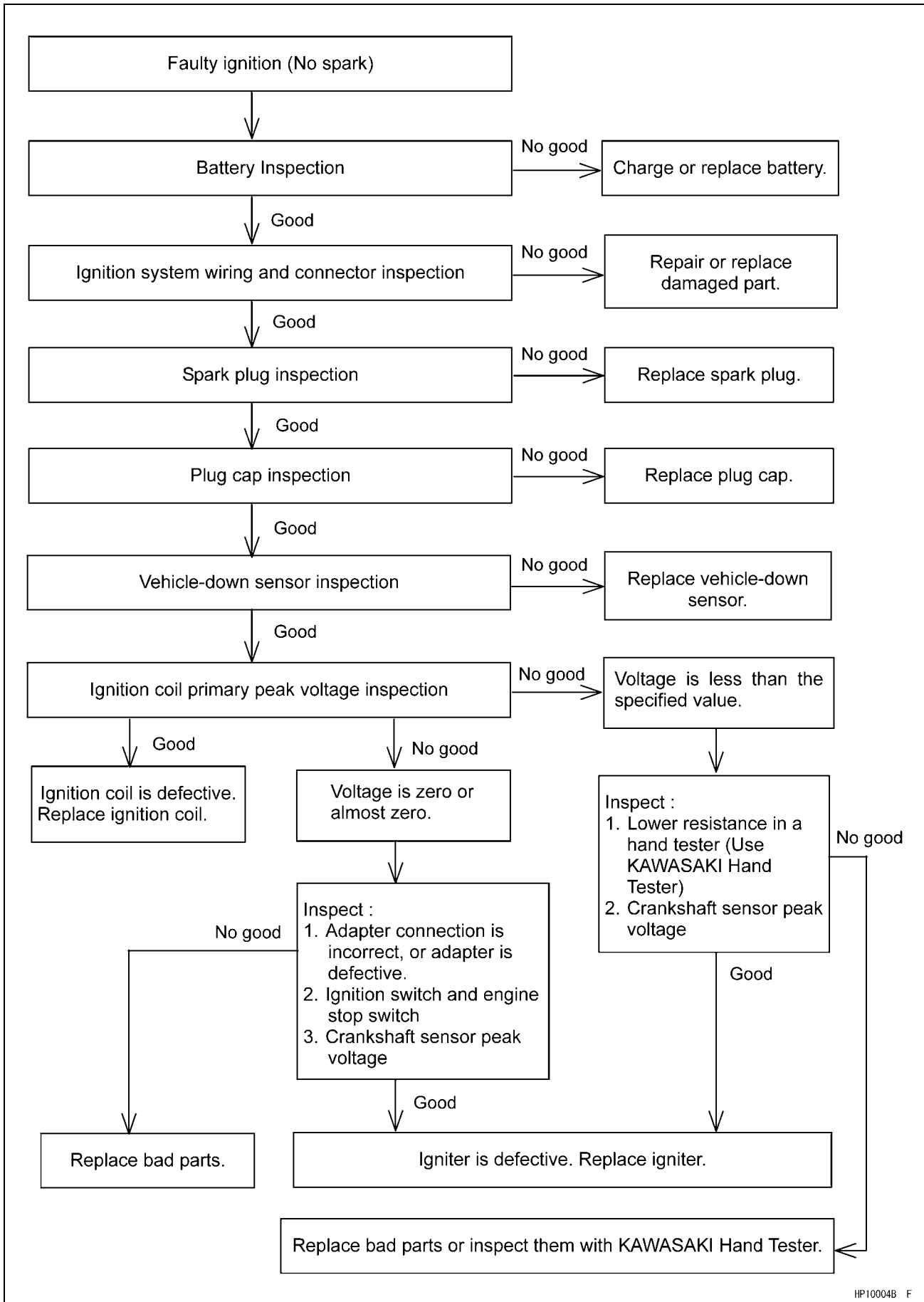
- ★ If the output voltage is out of the specified, replace the vehicle-down sensor.



16-40 ELECTRICAL SYSTEM

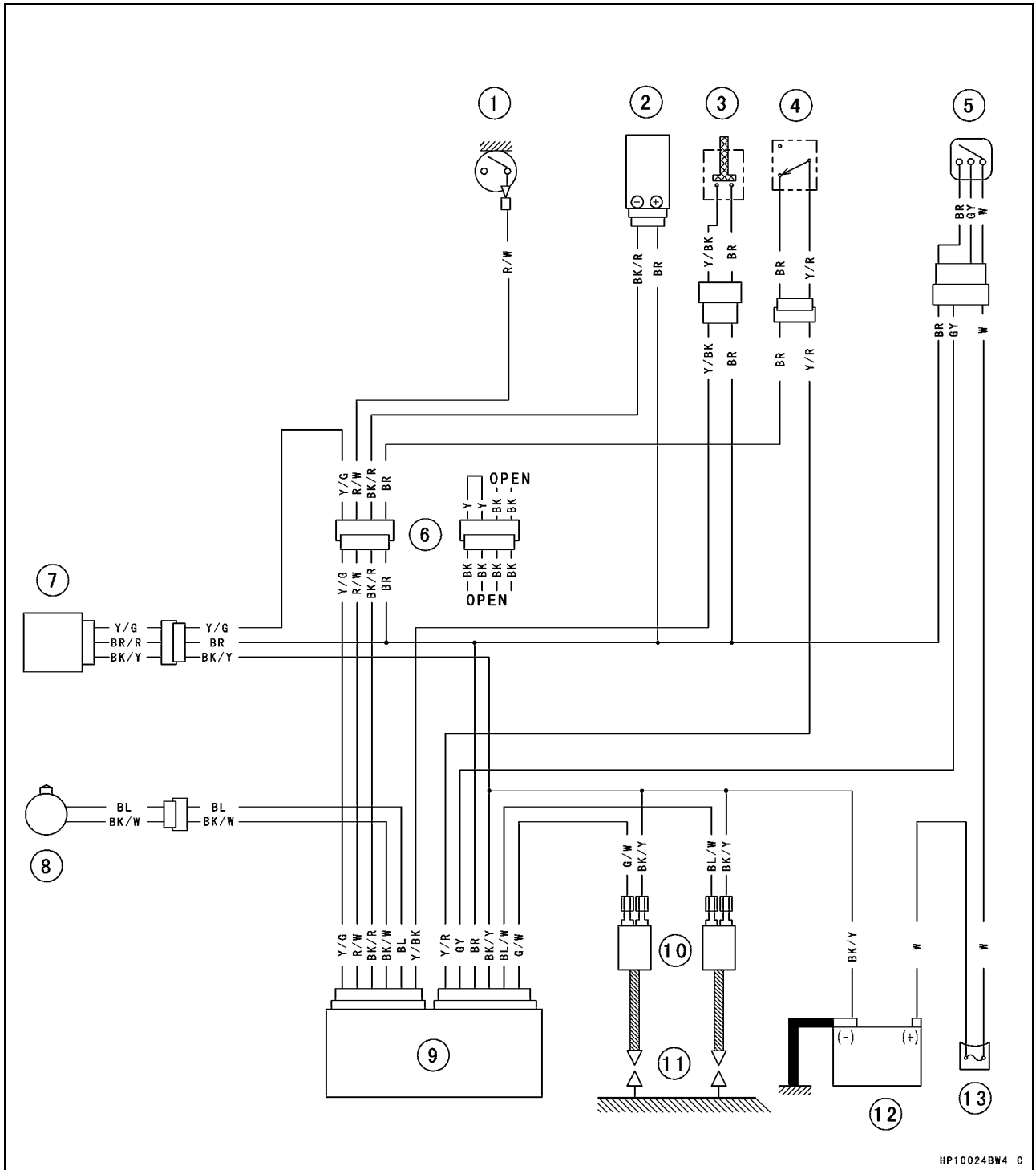
Ignition System

Ignition System Troubleshooting



Ignition System

Ignition System Circuit



HP10024BW4 C

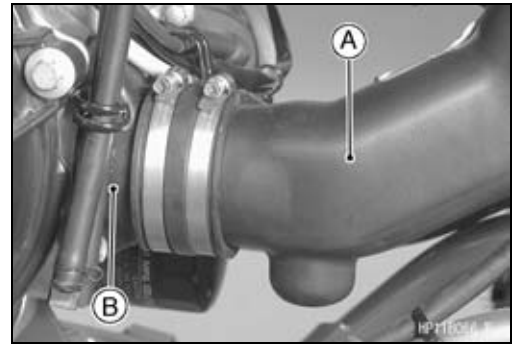
- | | |
|---|----------------------|
| 1. Reverse Switch | 8. Crankshaft Sensor |
| 2. Fuel Pump | 9. Igniter |
| 3. Reverse Power Assist Switch (Override) | 10. Ignition Coils |
| 4. Engine Stop Switch | 11. Spark Plugs |
| 5. Ignition Switch | 12. Battery |
| 6. Reset Connectors | 13. Main Fuse 30 A |
| 7. Vehicle-down Sensor | |

16-42 ELECTRICAL SYSTEM

Electric Starter System

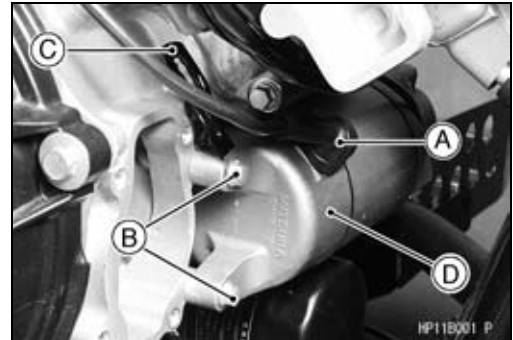
Starter Motor Removal

- Remove:
 - Converter Inlet Duct [A]
 - Joint Duct [B] and Collars



KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

- Remove:
 - Starter Motor Cable [A] and Nut
 - Starter Motor Mounting Bolts [B]
 - Clamp [C]
 - Starter Motor [D]

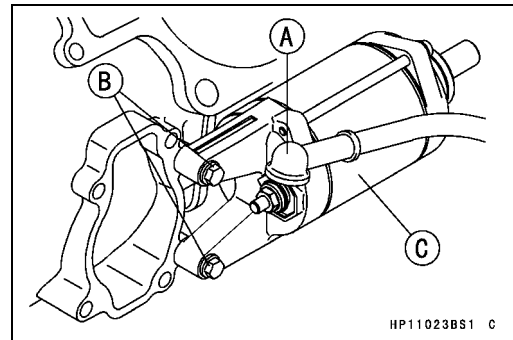


CAUTION

Do not tap the end of the starter motor shaft or the motor may be damaged.

KSV700A9F/B9F Models

- Remove:
 - Starter Motor Cable [A] and Nut
 - Starter Motor Mounting Bolts [B]
 - Clamp
 - Starter Motor [C]



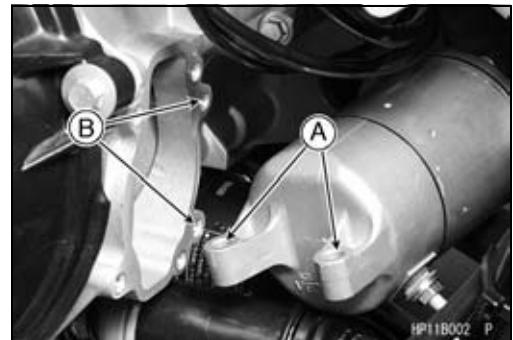
CAUTION

Do not tap the end of the starter motor shaft or the motor may be damaged.

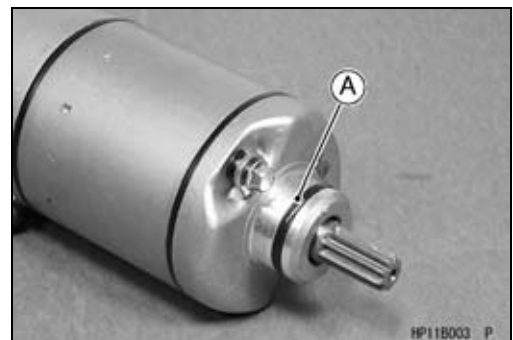
Starter Motor Installation

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

- When installing the starter motor, clean the starter motor lugs [A] and crankcase [B] where the starter motor is grounded.

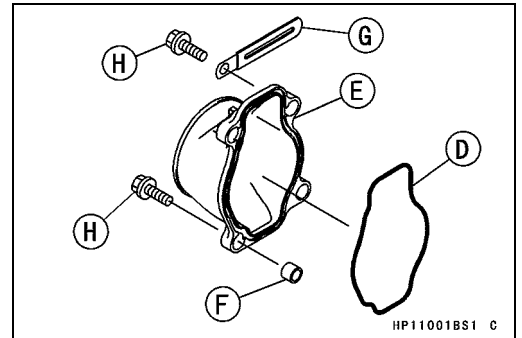
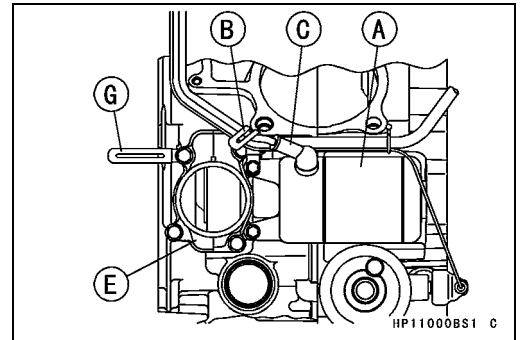


- Replace the O-ring [A] with a new one.
- Apply a small amount of engine oil to the O-ring.



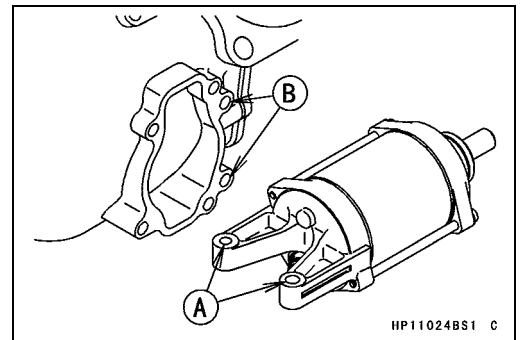
Electric Starter System

- Install:
 - Starter Motor [A]
 - Clamp [B] (as shown)
 - Starter Motor Cable [C]
- Tighten:
 - Torque - Starter Motor Mounting Bolts: 8.8 N-m (0.90 kgf-m, 78 in-lb)**
 - Starter Motor Terminal Nut: 6.9 N-m (0.70 kgf-m, 61 in-lb)**
- Apply grease to the O-ring [D] in the joint duct [E].
- Install:
 - Joint Duct and Collars [F]
 - Clamp [G] (as shown)
- Tighten:
 - Torque - Joint Duct Bolts [H]: 8.8 N-m (0.90 kgf-m, 78 in-lb)**

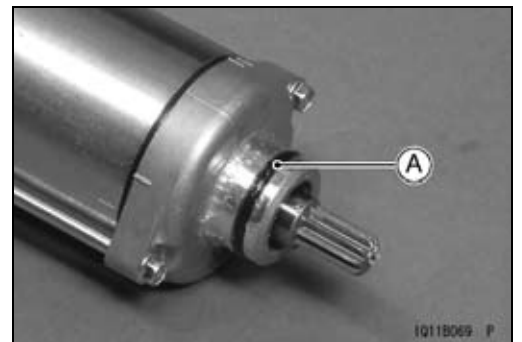


KSV700A9F/B9F Models

- When installing the starter motor, clean the starter motor lugs [A] and crankcase [B] where the starter motor is grounded.



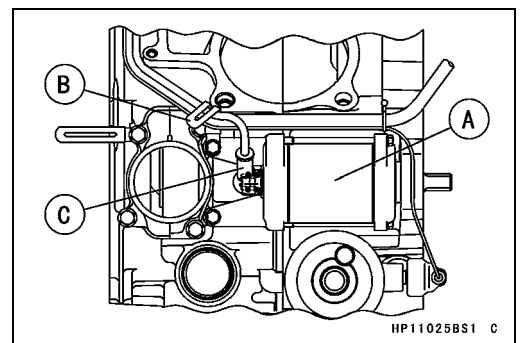
- Replace the O-ring [A] with a new one.
- Apply grease to the O-ring.



- Install:
 - Starter Motor [A]
 - Clamp [B] (as shown)
 - Starter Motor Cable [C]

CAUTION

Do not tap the end of the starter motor shaft or the motor may be damaged.



16-44 ELECTRICAL SYSTEM

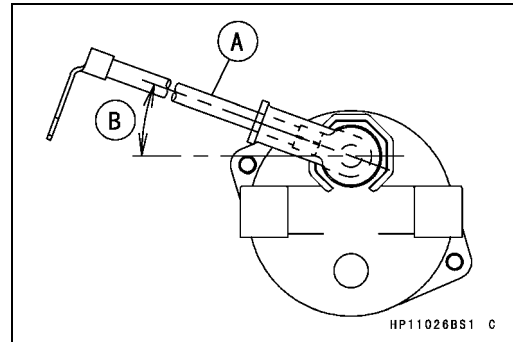
Electric Starter System

- Install the starter motor cable [A] at the angle as shown in the figure.
about 20° [B]

- Tighten:

Torque - Starter Motor Mounting Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)

Starter Motor Terminal Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb)



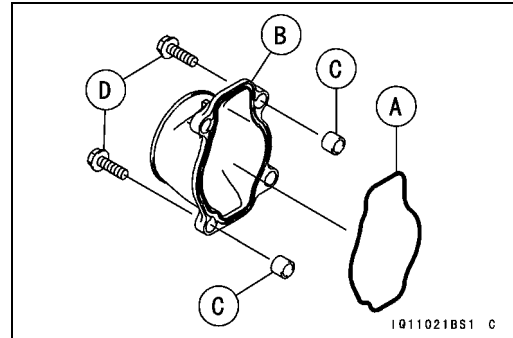
- Apply grease to the O-ring [A] in the joint duct [B].

- Install:

Joint Duct and Collars [C]

- Tighten:

Torque - Joint Duct Bolts [D]: 8.8 N·m (0.90 kgf·m, 78 in·lb)



Starter Motor Disassembly

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

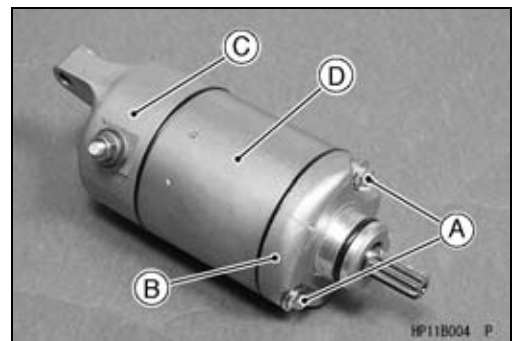
- Remove:

Starter Motor Bolts [A]

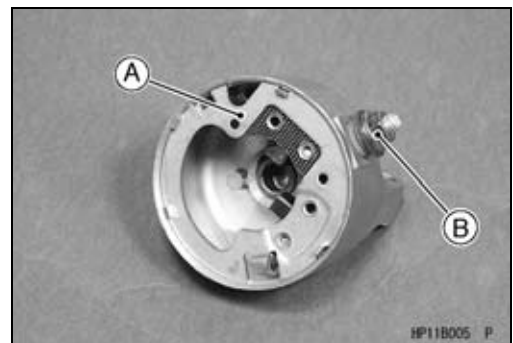
Left End Cover [B]

Right End Cover [C]

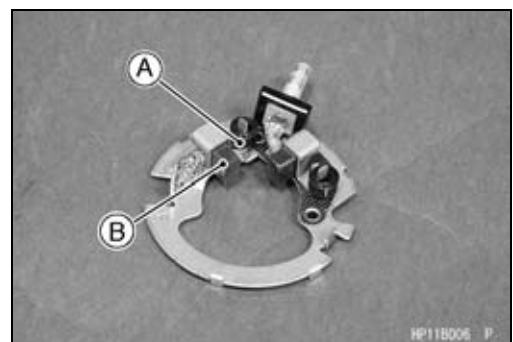
Yoke [D]



- To remove the brush plate assembly [A], remove the terminal locknut [B].



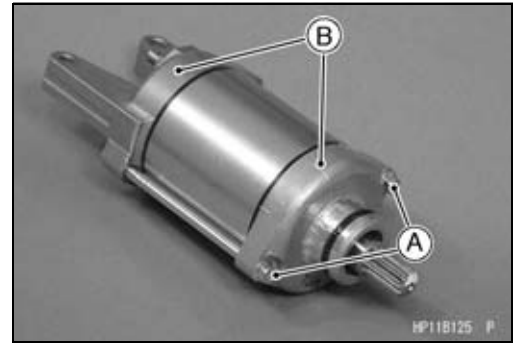
- Hold the brush spring [A] with needle nose pliers, and pull the brush [B] off the holder.



Electric Starter System

KSV700A9F/B9F Models

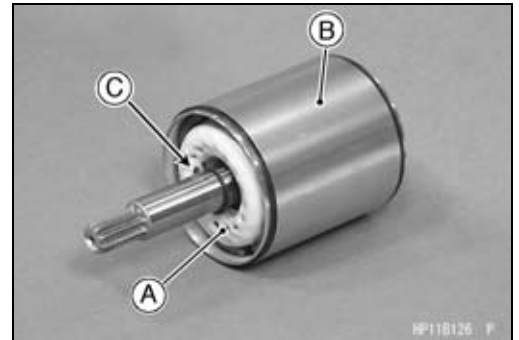
- Remove the starter motor (see Starter Motor Removal).
- Take off the starter motor through bolts [A] and remove the both end covers [B].



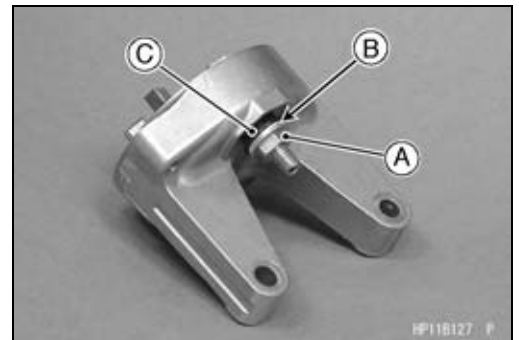
- Pull out the armature [A] out of the yoke [B].

NOTE

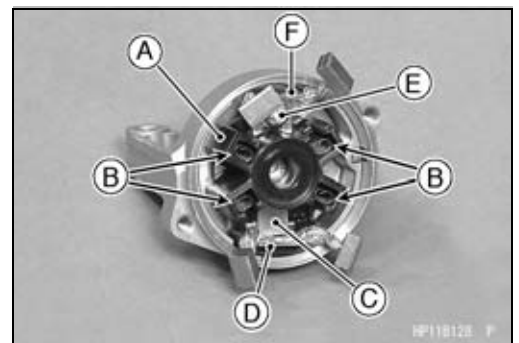
○ Do not remove the circlip [C] from the shaft.



- Remove:
 - Starter Motor Terminal Locknut [A]
 - Washer [B]
 - Collar [C]



- Pull out the brushes from the brush holder [A].
- Remove:
 - Brush Springs [B]
 - Starter Motor Terminal [C]
 - Positive Brush Assy [D] and O-ring
 - Screw [E]
 - Negative Brush Assy [F]
 - Brush Holder

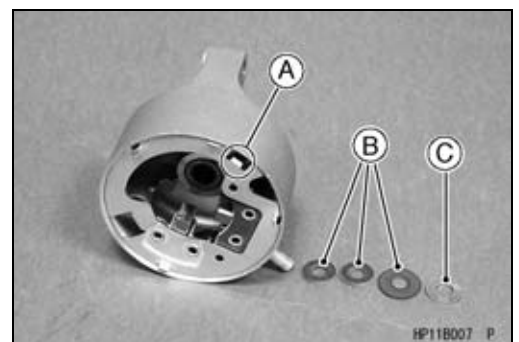


Starter Motor Assembly

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

- Replace the O-rings.
- Install the brush plate assembly to the right end cover so that the projection [A] on the brush plate fits into the groove on the right end cover.
- Install the O-ring, insulators [B], and washer [C] in that order on the terminal bolt.
- Tighten:

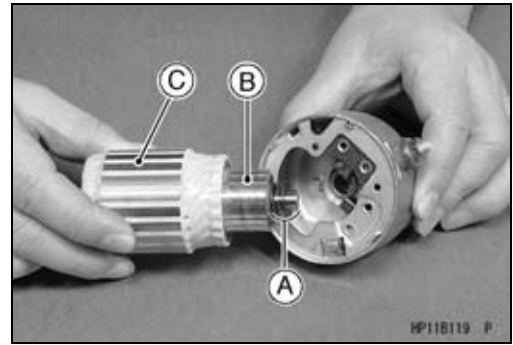
Torque - Starter Motor Terminal Locknut: 6.9 N·m (0.70 kgf·m, 61 in·lb)



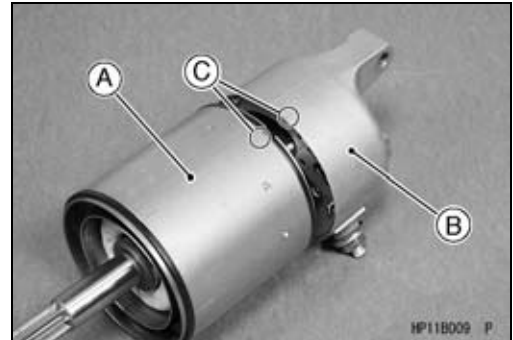
16-46 ELECTRICAL SYSTEM

Electric Starter System

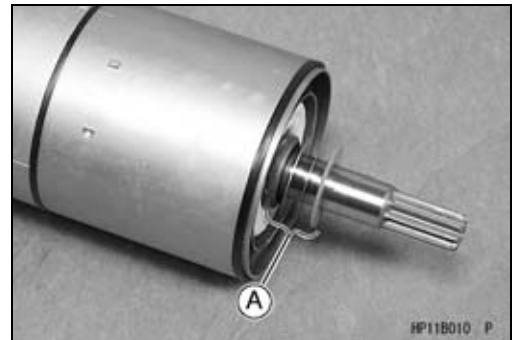
- Install the washers [A].
- Install the commutator [B] between the brushes.
Armature [C]



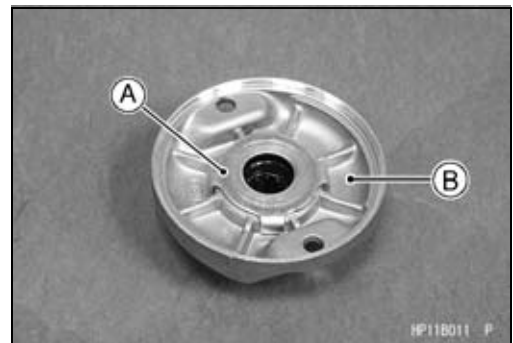
- Install the yoke [A] onto the right end cover [B] aligning the marks [C] on the yoke and right end cover.



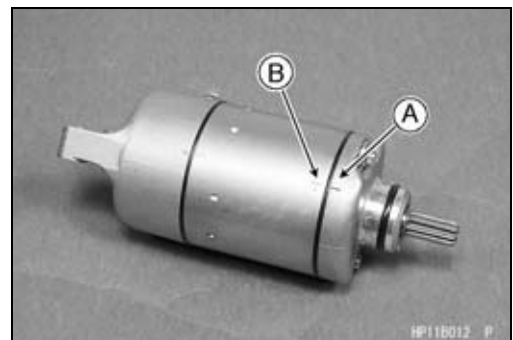
- Install the washers [A].



- Install the plate [A] on the left end cover [B].



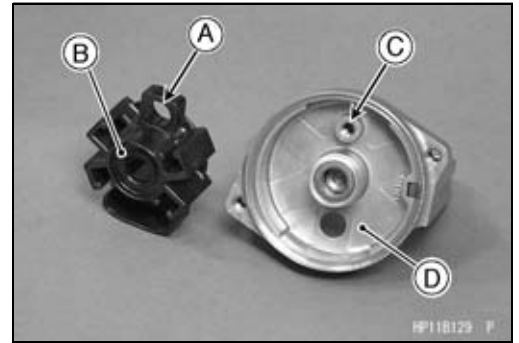
- Align the mark [A] on the left end cover with the mark [B] on the yoke.
- Tighten:
Torque - Starter Motor Bolts: 4.9 N-m (0.50 kgf-m, 43 in-lb)



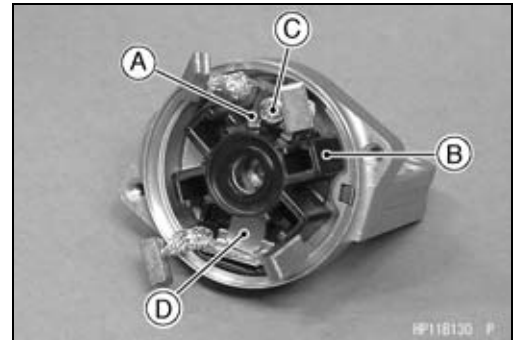
Electric Starter System

KSV700A9F/B9F Models

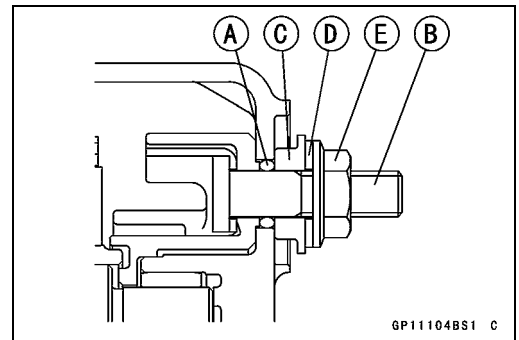
- Align the hole [A] of the brush holder [B] to the boss [C] of the end cover [D].



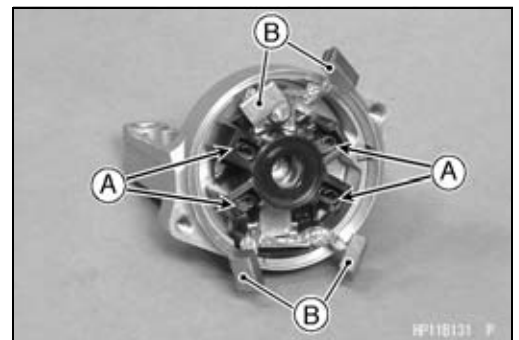
- Install the negative brush assy [A] to the brush holder [B].
- Tighten the screw [C] securely.
- Install the positive brush assy [D] to the brush holder.
- Install the starter motor terminal.



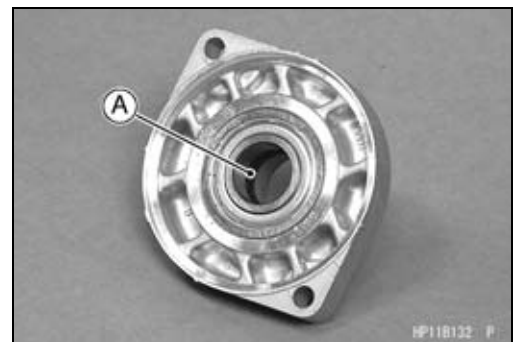
- Replace the O-ring [A] with a new one.
- Install the following parts to the starter motor terminal [B].
 - O-ring
 - Collar [C]
 - Washer [D]
 - Starter Motor Terminal Locknut [E]
- Install the collar so that stepped side faces outward.
- Tighten:
 - Torque - Starter Motor Terminal Locknut: 11 N·m (1.1 kgf·m, 97 in·lb)**



- Install the brush springs [A].
- Insert the brushes [B] to the brush holder.



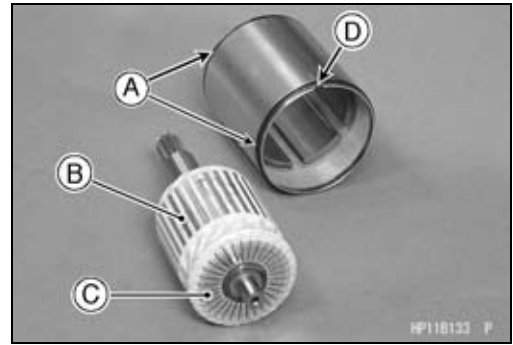
- Apply thin coat of grease to the oil seal [A].



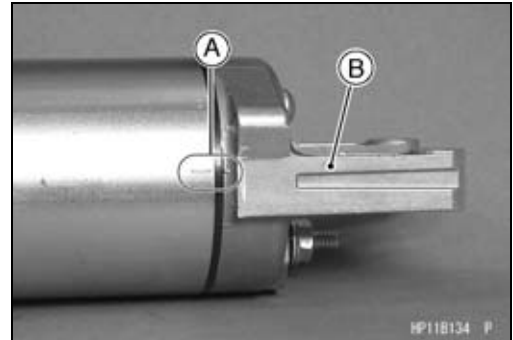
16-48 ELECTRICAL SYSTEM

Electric Starter System

- Replace the O-rings [A] with new ones.
- Insert the armature [B] so that commutator side [C] faces hollow side [D] of the yoke.



- Align the marks [A] to assembly the yoke and the end cover [B] as shown.



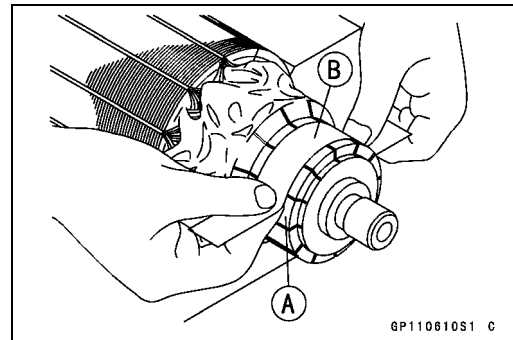
- Tighten:
Torque - Starter Motor Through Bolts [A]: 5.0 N·m (0.51 kgf·m, 44 in·lb)



Commutator Cleaning/Inspection

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.

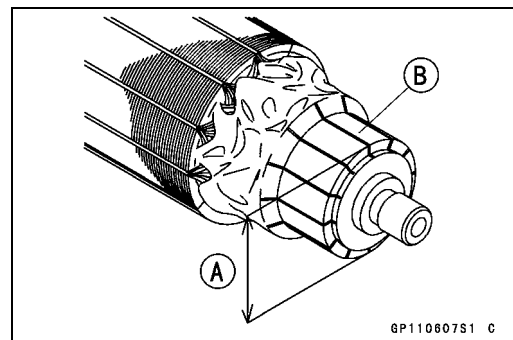


- Measure the diameter [A] of the commutator [B].
- ★ Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commutator Diameter

Standard: 28 mm (1.10 in.)

Service Limit: 27 mm (1.06 in.)



Electric Starter System

KSV700A9F/B9F Models

- Clean the metallic debris off the between commutator segments [A].

NOTE

○ Do not use emery or sand paper on the commutator.

- Check the commutator for damage or abnormal wear.
- ★ Replace the starter motor with a new one if there is any damage or wear.
- Visually inspect the commutator segments for discoloration.
- ★ Replace the starter motor with a new one if discoloration is noticed.

Armature Inspection

- Using the $\times 1 \Omega$ 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. Replace the starter motor.
- Using the highest range, measure the resistance between the segments and the shaft [B].
- If there is any reading at all, the armature has a short. Replace the starter motor.

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.

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models [C]

KSV700A9F/B9F Models [D]

Brush Length Inspection

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

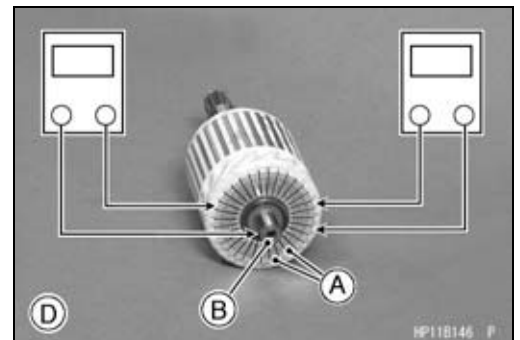
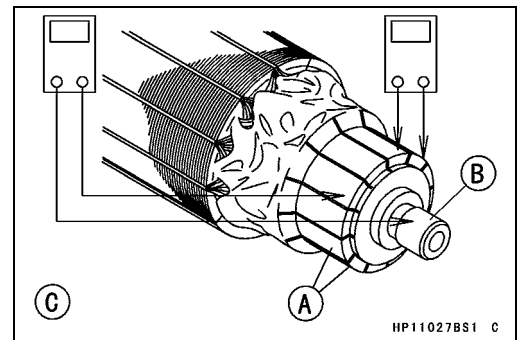
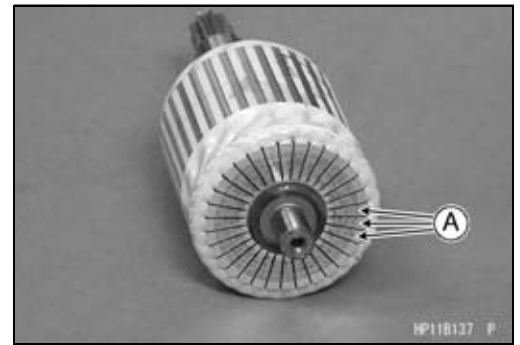
- Measure the overall length [A] of each brush.

Starter Motor Brush Length

Standard: 12 mm (0.47 in.)

Service Limit: 4 mm (0.16 in.)

- ★ If any is worn down to the service limit, replace the brush plate assembly.



16-50 ELECTRICAL SYSTEM

Electric Starter System

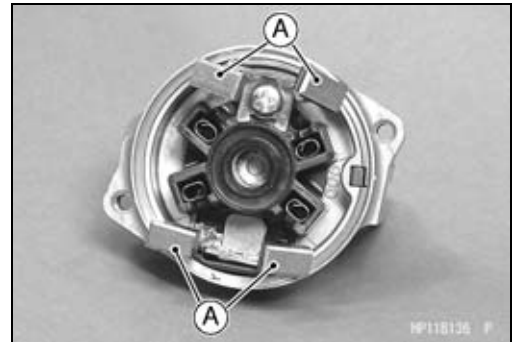
KSV700A9F/B9F Models

- Measure the length of each brush [A].
- ★ If any is worn down to the service limit, replace the brush assy.

Starter Motor Brush Length

Standard: 12 mm (0.47 in.)

Service Limit: 6.5 mm (0.26 in.)

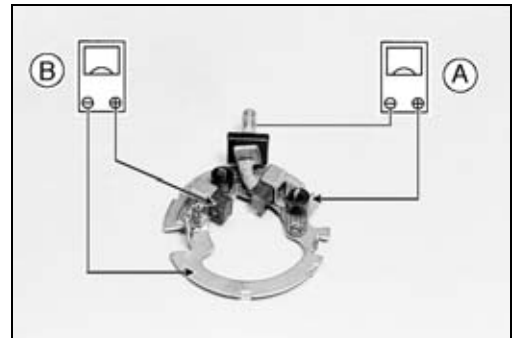


Brush Assembly Inspection

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

- Using the $\times 1 \Omega$ range, measure the resistance as shown.
 - 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 brush plate assembly.

Special Tool - Hand Tester: 57001-1394



KSV700A9F/B9F Models

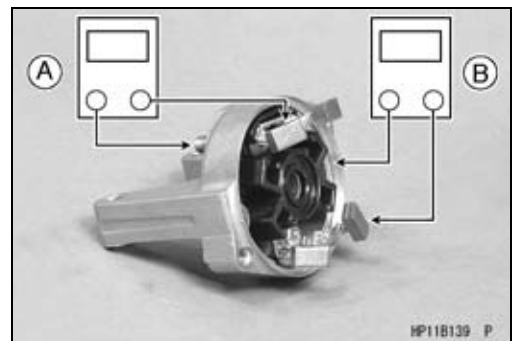
- Using the $\times 1 \Omega$ hand tester range, measure the resistance as shown.

Terminal Bolt and Positive Brushes [A]

Right-hand End Cover and Negative Brushes [B]

Special Tool - Hand Tester: 57001-1394

- ★ If there is not close to zero ohms, the brush lead has an open. Replace the brush plate assy.



Brush Plate and Terminal Bolt Inspection

KSV700-A1 ~ A8F/B1 ~ B8F/C6F Models

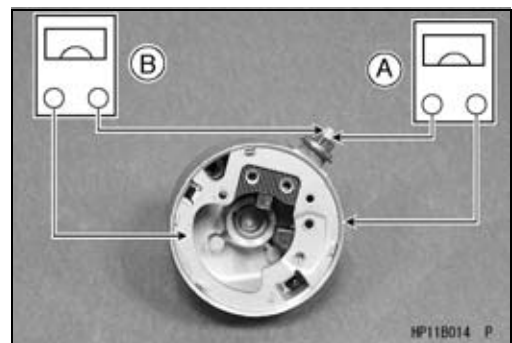
- Using the highest range, measure the resistance as follows:

Terminal Bolt and Right - Hand End Cover [A]

Terminal Bolt and Brush Plate [B]

- ★ If there is any reading, the brush holder assembly has a short. Replace the brush plate assembly.

Special Tool - Hand Tester: 57001-1394



KSV700A9F/B9F Models

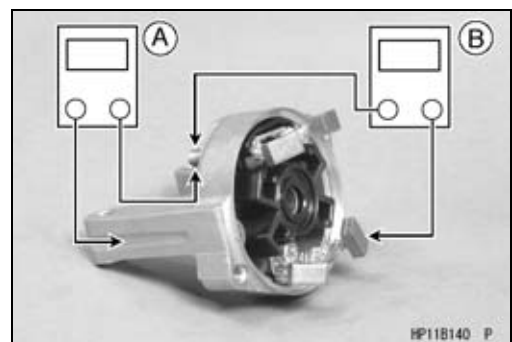
- Using the highest hand tester range, measure the resistance as shown.

Terminal Bolt and Right-hand End Cover [A]

Terminal Bolt and Negative Brushes [B]

Special Tool - Hand Tester: 57001-1394

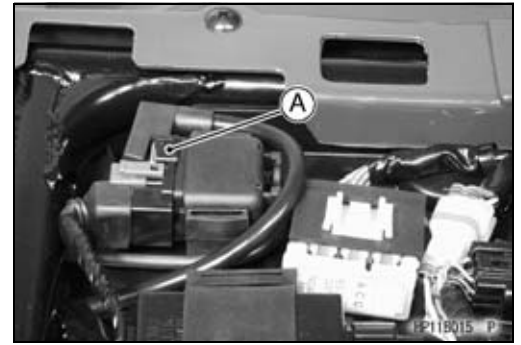
- ★ If there is any reading, the brush assy and/or terminal bolt assy have a short. Replace the starter motor.



Electric Starter System

Starter Relay Inspection

- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Starter Relay [A]



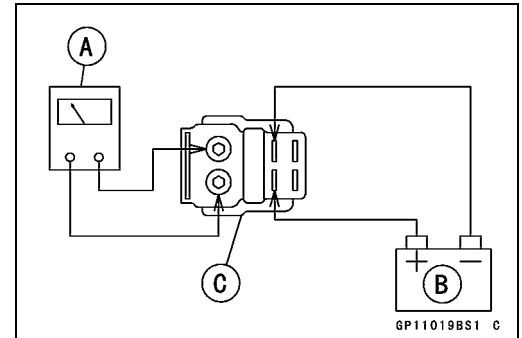
- Connect the hand tester [A] and a 12 V battery [B] to the starter relay [C] as shown.
- ★ If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Hand Tester Range: $\times 1\Omega$ range

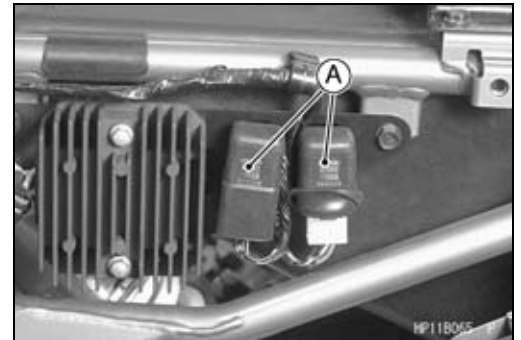
Criteria: When battery is connected $\Rightarrow 0\Omega$
 When battery is disconnected $\Rightarrow \infty\Omega$

Special Tool - Hand Tester: 57001-1394



Starter Circuit Relay Inspection

- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
 - Starter Circuit Relays [A] (Brake and Neutral Switch Circuit)
- The starter circuit relays for the brake and neutral switch circuits are identical.



- Connect the hand tester [A] and a 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.

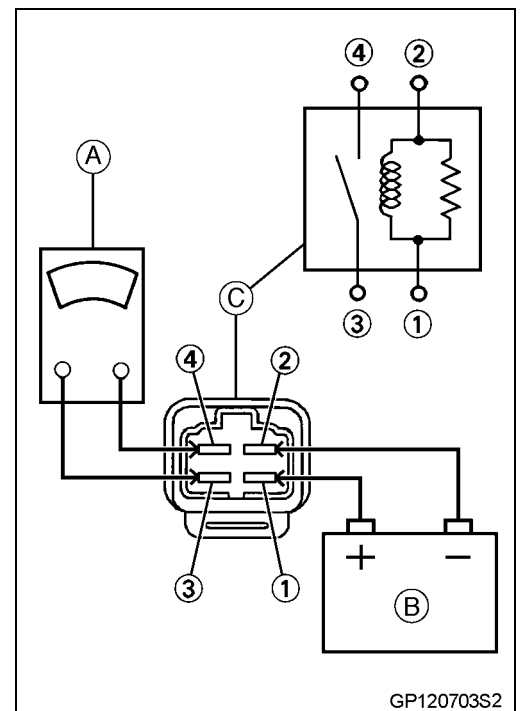
Testing Relay

Hand Tester Range: $\times 1\Omega$

Criteria: When battery is connected $\Rightarrow 0\Omega$
 When battery is disconnected $\Rightarrow \infty\Omega$

Relay Coil Terminals [1] and [2]

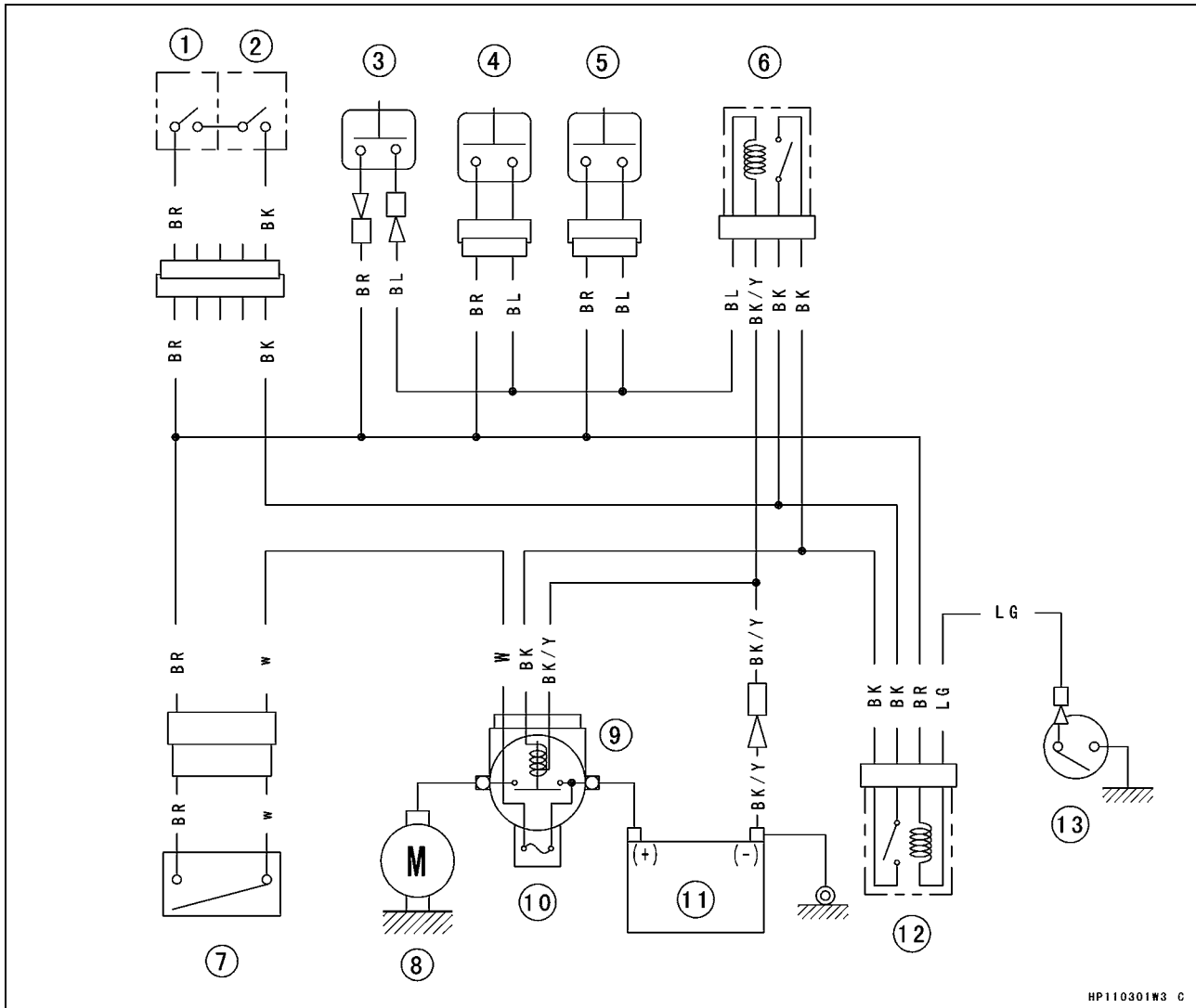
Relay Switch Terminals [3] and [4]



16-52 ELECTRICAL SYSTEM

Electric Starter System

Electric Starter Circuit



HP110301W3 C

- | | | |
|-------------------------------|--------------------------|-------------------------------------|
| 1. Engine Stop Switch | 6. Starter Circuit Relay | 11. Battery |
| 2. Starter Button | 7. Ignition Switch | 12. Starter Circuit Relay (Neutral) |
| 3. Front Brake Light Switch | 8. Starter Motor | 13. Neutral Switch |
| 4. Parking Brake Light Switch | 9. Starter Relay | |
| 5. Rear Brake Light Switch | 10. Main Fuse 30 A | |

Starter Motor Clutch Removal

- Remove the alternator flywheel (see Alternator Flywheel Removal).
- Hold the flywheel with the flywheel holder and take out the starter motor clutch bolts [A].

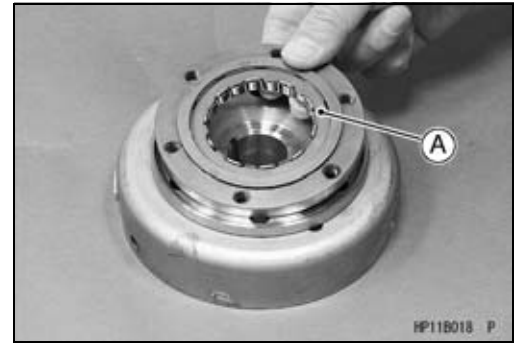
Special Tool - Flywheel Holder: 57001-1313



HP11B017 P

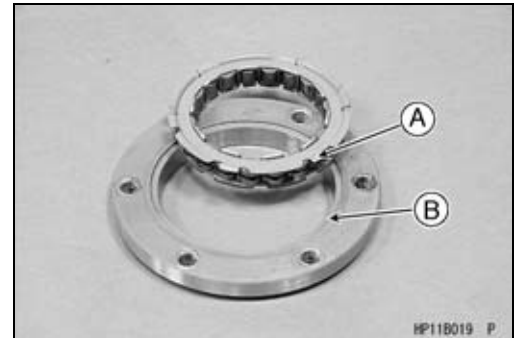
Electric Starter System

- Take out the one-way clutch [A].



Starter Motor Clutch Installation

- Install the one-way clutch so that the flange [A] fits on the recess [B] of the race.
- Apply a non-permanent locking agent: Starter Motor Clutch Bolts
- Tighten:
 - Torque - Starter Motor Clutch Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)**



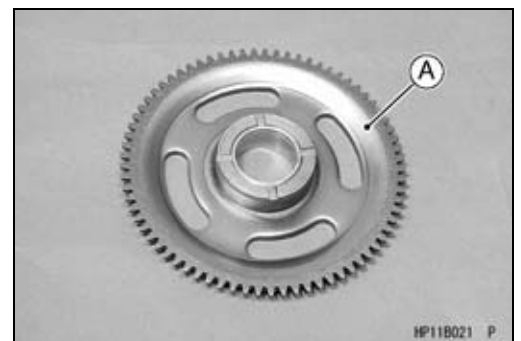
Starter Motor Clutch Inspection

- Remove: Alternator Flywheel (see Alternator Flywheel Removal)
- Fit the starter clutch gear into the starter motor clutch.
- ★ If the alternator flywheel turns counterclockwise [A] freely from the starter clutch gear, but not clockwise [B], the clutch is operating correctly.
- ★ If the clutch does not operate correctly, or if it makes noise, disassemble it and examine each part visually. Replace any worn or damaged parts.



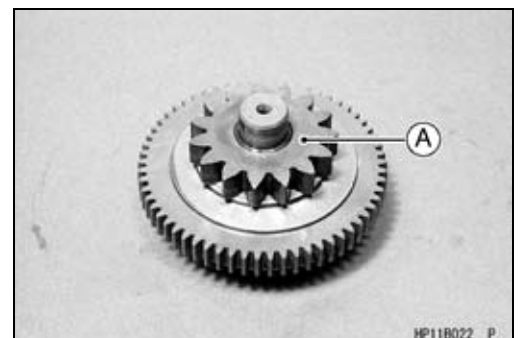
NOTE

○ Inspect the starter clutch gear [A]. Replace it if it is worn or damaged.



Torque Limiter Inspection

- Remove: Alternator Flywheel (see Alternator Flywheel Removal)
- Remove the torque limiter [A] and visually inspect it.
- ★ If the limiter has wear, discoloration, or other damage, replace it as a unit.



16-54 ELECTRICAL SYSTEM

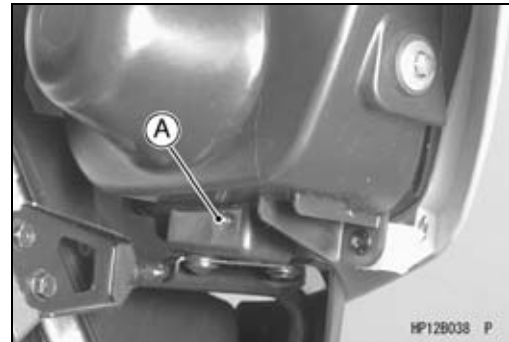
Lighting System

Headlight Beam Vertical Adjustment

- Turn the adjusting screw [A] on each headlight rim in or out to adjust the headlight vertically.

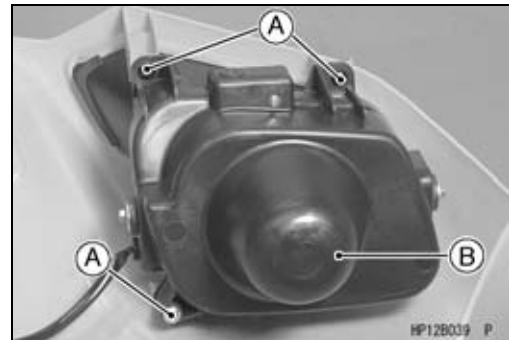
NOTE

- On high beam, the brightest point should be slightly below horizontal with the vehicle on its wheels and the rider seated. Adjust both headlights to the same angle.

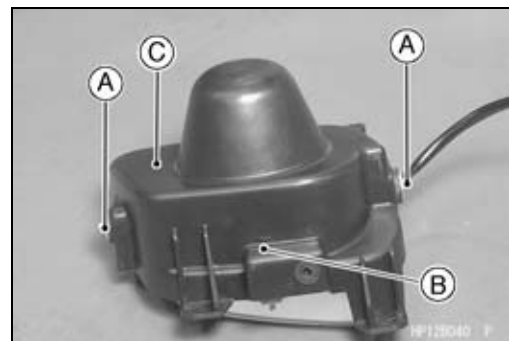


Headlight Bulb Replacement

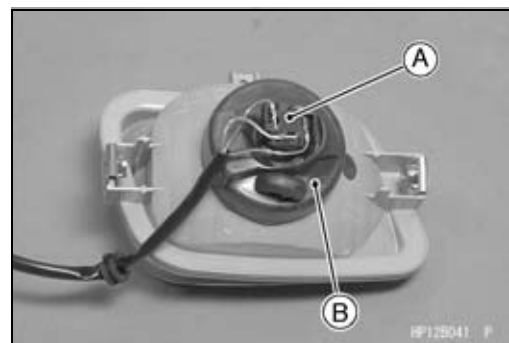
- Remove:
 - Front Fender (see Front Fender Removal in the Frame chapter)
 - Mounting Screws [A]
 - Headlight Unit [B]



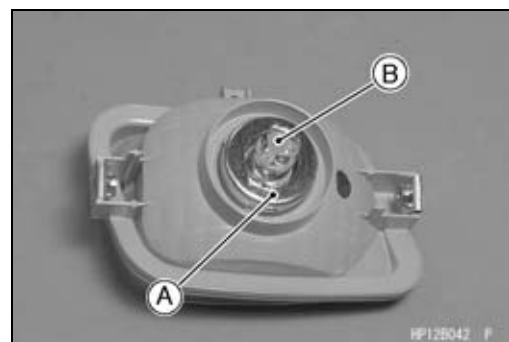
- Remove:
 - Headlight Bolts [A] and Washer
 - Vertical Adjustment Screw [B], Spring, and Nut
 - Headlight Body [C]



- Remove:
 - Headlight Connector [A]
 - Dust Cover [B]

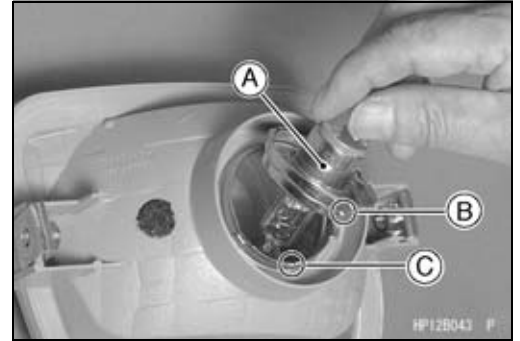


- Push the holder [A] and turn it counterclockwise.
- Remove:
 - Holder
 - Headlight Bulb [B]



Lighting System

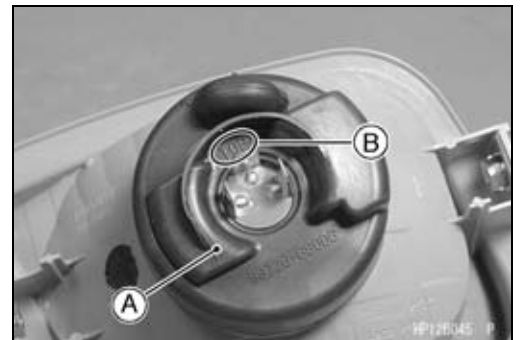
- Insert the new bulb [A] by aligning the projection [B] with the notch [C] in the headlight unit.



- Push the bulb holder [A] in, turn it clockwise, and release it. It should lock in position.



- Fit the dust cover [A].
- Face the TOP mark [B] upward.

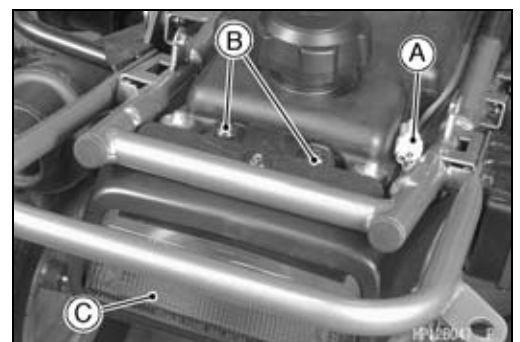


- Install:
 - Grommet [A]
 - Vertical Adjustment Screw, Spring and Nut [B]
 - Damper, Collar and Bolt [C]



Tail Light Bulb Replacement

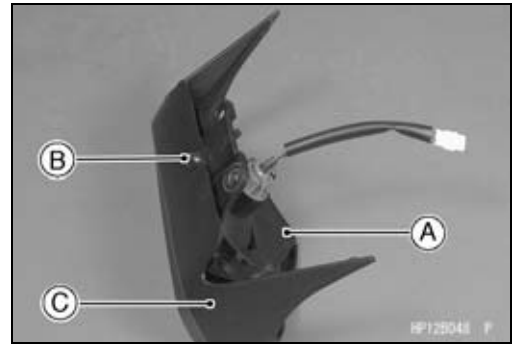
- Remove:
 - Rear Fender (see Rear Fender Removal in the Frame chapter)
 - Tail Light Connector [A]
 - Screws and Collars [B]
 - Tail Light Assembly [C] with Cover



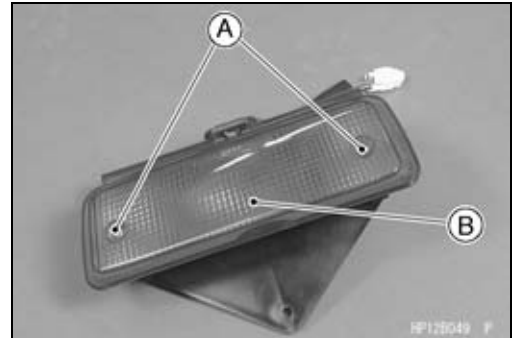
16-56 ELECTRICAL SYSTEM

Lighting System

- Remove
Screw [A]
Screw and Collar [B]
Tail Light Cover [C]



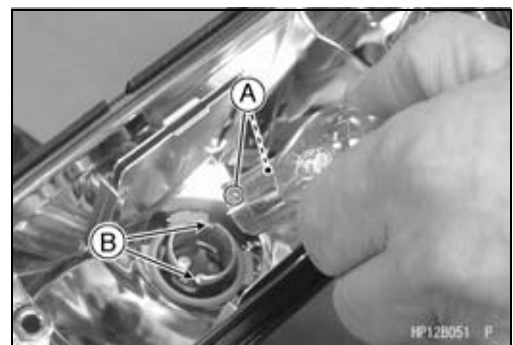
- Remove the screws [A].
- Remove the tail light lens [B] from the tail light assembly.



- Push the bulb [A] in, turn it counterclockwise, and pull it out.
- Be sure the socket is clean.

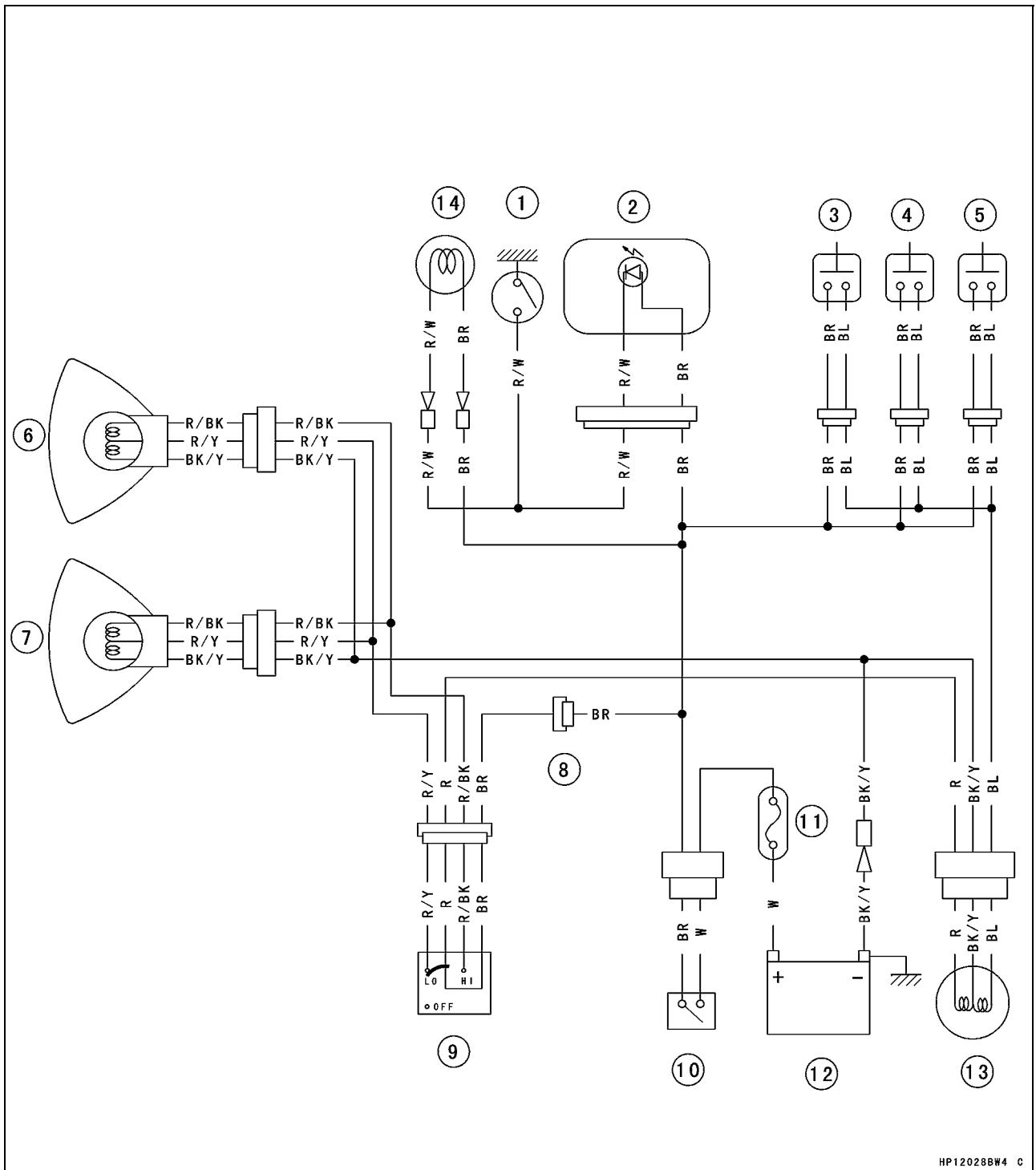


- Insert the new bulb by aligning the pins [A] with the grooves [B] in the walls of the socket.
- Push the bulb in, turn it clockwise, and release it. It should lock in position.



Lighting System

Lighting System Circuit



HP12028BW4 C

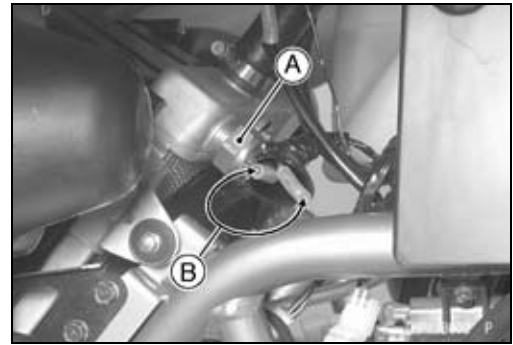
- | | |
|----------------------------------|--|
| 1. Reverse Switch | 8. Reset Connector |
| 2. Reverse Indicator Light (LED) | 9. Light/Dimmer Switch |
| 3. Front Brake Light Switch | 10. Ignition Switch |
| 4. Parking Brake Light Switch | 11. Main Fuse 30 A |
| 5. Rear Brake Light Switch | 12. Battery |
| 6. Headlight (Right) | 13. Tail/Brake Light |
| 7. Headlight (Left) | 14. Reverse Light (KSV700A9F Europe Model) |

16-58 ELECTRICAL SYSTEM

Radiator Fan System

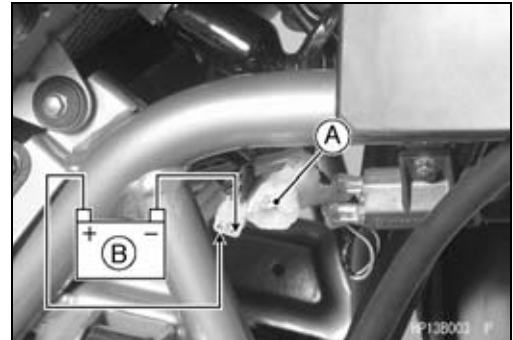
Radiator Fan Circuit Inspection

- Disconnect the leads from the radiator fan switch [A].
- 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



Radiator Fan Motor Inspection

- Disconnect the connector [A] in the fan motor lead.
- Using two auxiliary wires, supply battery [B] voltage to the fan motor.
- ★ If the fan does not rotate, the fan motor is defective and must be replaced.

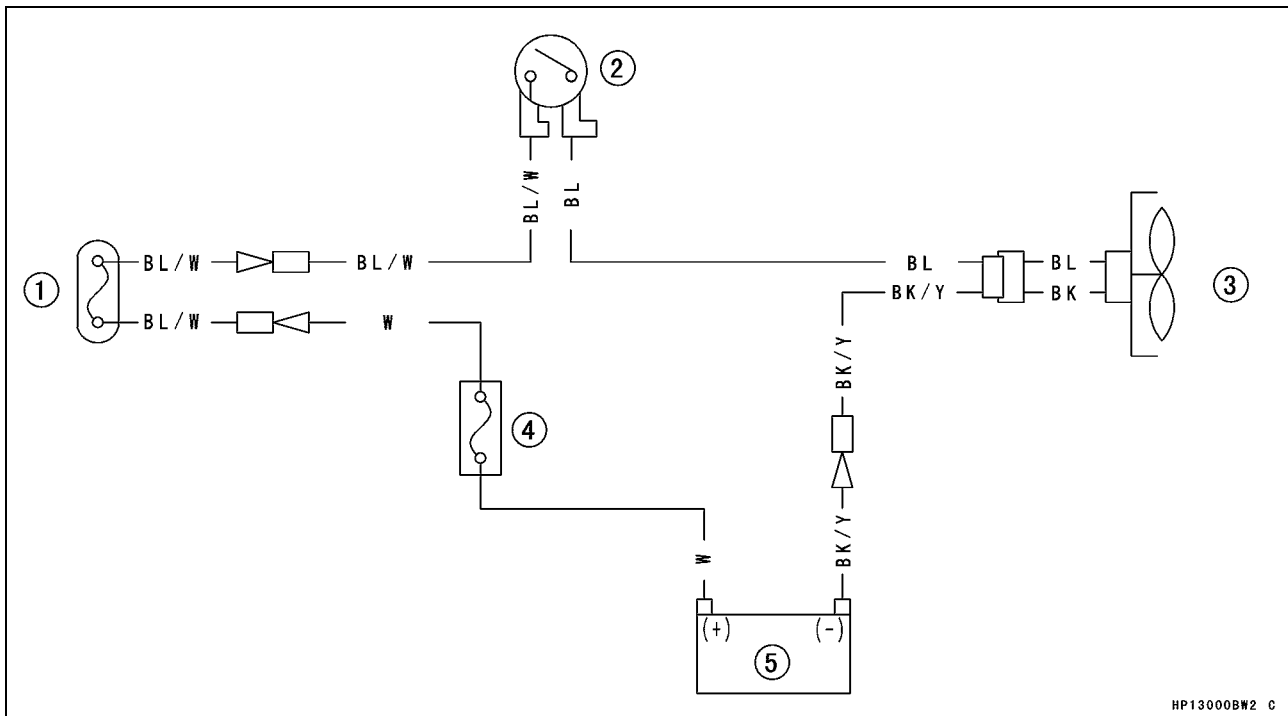


Radiator Fan Motor Leads

BL: Battery (+)

BK: Battery (-)

Radiator Fan Circuit



HP13000BW2 C

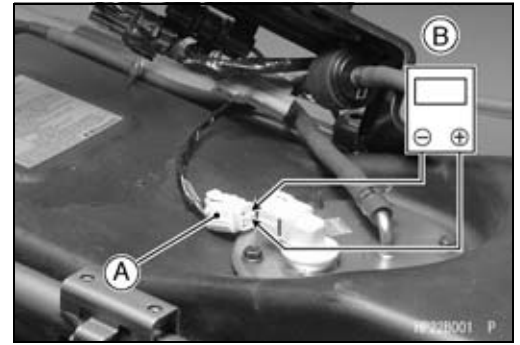
1. Radiator Fan Fuse 20A
2. Radiator Fan Switch
3. Radiator Fan
4. Main Fuse 30 A
5. Battery

Fuel Pump/Fuel Reserve Switch

Fuel Pump Inspection

Fuel Pump Supply Voltage Inspection

- Turn the ignition switch OFF.
- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Fuel Pump Lead Connector [A]
- Connect a hand tester [B] with suitable leads as shown.
 - Hand Tester (+) → Fuel Pump Connector (BR) Terminal
 - Hand Tester (-) → Fuel Pump Connector (BK/R) Terminal
- Turn the ignition switch ON, and run the engine with the transmission in neutral.
- Measure the fuel pump supply voltage.



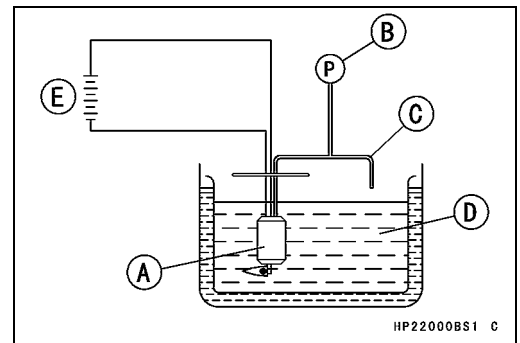
Fuel Pump Supply Voltage

Standard: Near the Battery Voltage

- ★ If the reading is not as specified, replace the igniter.
- ★ If the reading is as specified, check the fuel pump.

Fuel Pump Operational Inspection

- Remove:
 - Fuel Pump (see Fuel Pump Removal in the Fuel System chapter)
- Prepare a container filled with kerosene.
- Prepare the rubber hoses, and connect them to the pump fitting.
- Connect a suitable pressure gauge to the outlet hose as shown.
 - Fuel Pump [A]
 - Pressure Gauge [B]
 - Outlet Hose [C]
 - Kerosene [D]
 - Battery [E] (12V)
- Connect the pump leads to the battery using auxiliary wires as shown.
 - Battery (+) → Fuel Pump Connector (BR) Terminal
 - Battery (-) → Fuel Pump Connector (BK/R) Terminal
- ★ If the pump does not operate, the pump is defective. Replace the fuel pump.
- ★ If the pump operates is normal, close the outlet hose while operating the fuel pump.
- When the pump stops, read the pressure gauge.



Fuel Pump Shut-Off Pressure

Standard: 17.7 ~ 22.6 kPa (0.18 ~ 0.23 kgf/cm², 2.6 ~ 3.3 psi)

- ★ If the pressure gauge reading is out of the specified pressure, the pump is defective. Replace the fuel pump.
- Install the fuel pump and tighten it.

Torque - Fuel Pump Mounting Bolts: 2 N·m (0.2 kgf·m, 17 in·lb)

16-60 ELECTRICAL SYSTEM

Fuel Pump/Fuel Reserve Switch

Fuel Reserve Switch Inspection (1)

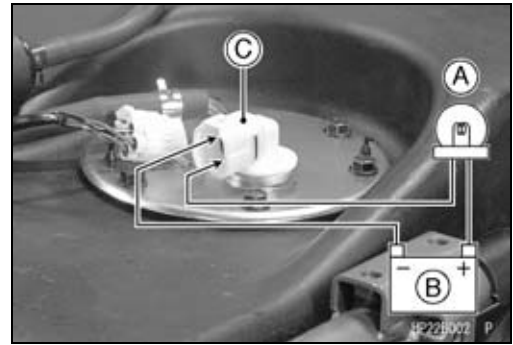
- Fill the fuel tank with fuel.
- Close the fuel tank cap surely.
- Remove the fuel tank (see Fuel Tank Removal in the Fuel System chapter).
- Connect the test light [A] (12 V 3.4 W bulb a socket with leads) and the 12 V battery [B] to the fuel pump connector [C].

Connections

- Battery (+) → 12 V 3.4 W Bulb (one side)
- 12 V 3.4 W Bulb (other side) → BL Lead Terminal
- Battery (-) → BK/Y Lead Terminal

Special Tool - Needle Adapter Set: 57001-1457

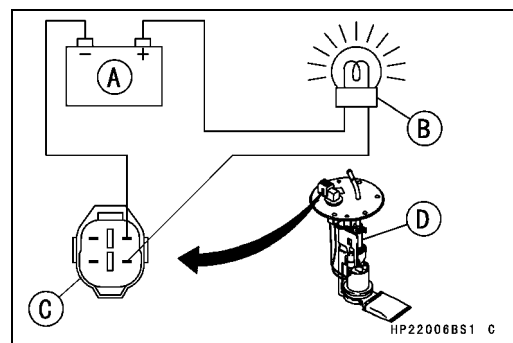
- ★ If the test light turn on, the reverse switch is defective. Replace the fuel pump.



Fuel Reserve Switch Inspection (2)

- Remove:
 - Fuel Pump (see Fuel Pump Removal in the Fuel System chapter)
- Connect the test light (12 V 3.4 W bulb in a socket with leads) and the 12 V battery to the fuel pump connector as shown.
 - 12 V Battery [A]
 - Test Light [B]
 - Fuel Pump Connector [C]
 - Fuel Reserve Switch [D]

- ★ If the test light doesn't light, replace the fuel pump.

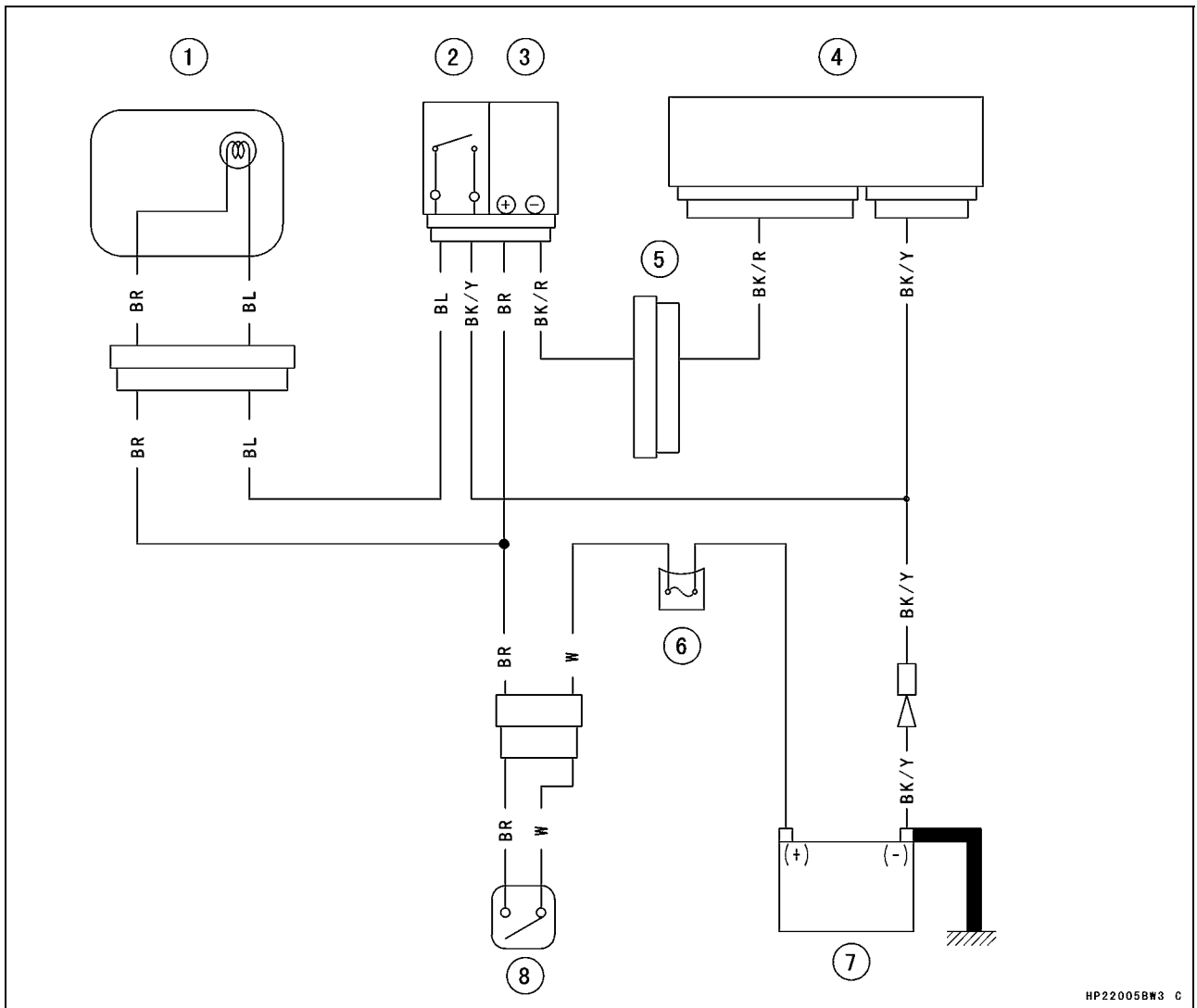


NOTE

- It may take a long time to turn on the test light in case that the fuel reserve switch is inspected just after the fuel pump is removed. Leave the fuel reserve switch with leads for inspection connected for 3 minute.

Fuel Pump/Fuel Reserve Switch

Fuel Pump/Fuel Reserve Switch Circuit



HP22005BW3 C

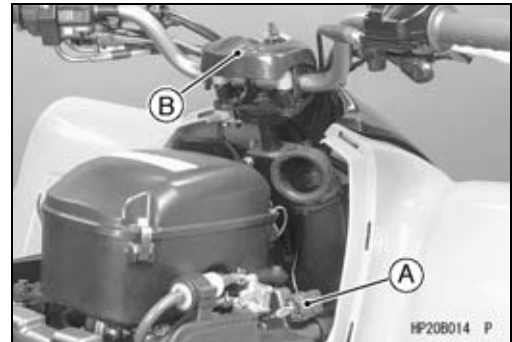
1. Indicator Unit
2. Fuel Reserve Switch
3. Fuel Pump
4. Igniter
5. Reset Connector
6. Main Fuse 30 A
7. Battery
8. Ignition Switch

16-62 ELECTRICAL SYSTEM

Indicator Unit

Indicator Unit Removal

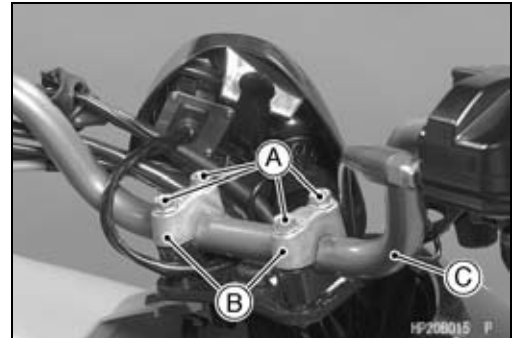
- Remove:
 - Air Cleaner Cover (see Air Cleaner Cover Removal in the Frame chapter)
 - Indicator Unit Lead Connector [A]
 - Handlebar Cover and Indicator Unit [B]



- Remove:
 - Bolts [A]
 - Handlebar Holders [B]
 - Handlebar Assembly [C]
- Remove the indicator unit from handlebar cover.

CAUTION

Do not drop the indicator unit.
--

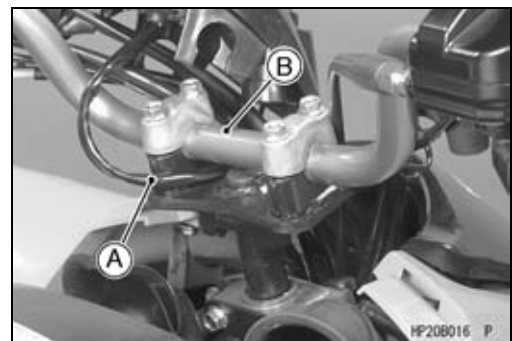


Indicator Unit Installation

- Install:
 - Indicator Unit Lead Connector
 - Handlebar Assembly
- Be sure the indicator unit lead [A] placed under the handlebar [B].
- Install the removed parts.

CAUTION

Do not drop the indicator unit.
--



Indicator Unit Inspection

- Remove:
 - Indicator Unit (see Indicator Unit Removal)

Indicator Unit

Check1. Indicator Light Inspection

- Using the auxiliary wires connect a 12 V battery to the indicator unit connector as follows:

Fuel Indicator Light [A]

- Battery Positive (+) Terminal to Terminal [1]
- Battery Negative (-) Terminal to Terminal [2]

- ★ If indicator light does not go on, replace the indicator unit.

Check2. LED (light Emitting Diode) Light Inspection

- Using the auxiliary wires, connect a 12 V battery to the indicator unit connector as follows:

Neutral Indicator Light (LED) [B]

- Battery Positive (+) Terminal to Terminal [1]
- Battery Negative (-) Terminal to Terminal [3]

Reverse Indicator Light (LED) [C]:

- Battery Positive (+) Terminal to Terminal [1]
- Battery Negative (-) Terminal to Terminal [4]

Water Temperature Warning Light (LED) [D]:

- Battery Positive (+) Terminal to Terminal [1]
- Battery Negative (-) Terminal to Terminal [5]

Oil Pressure Warning Light (LED) [E]:

- Battery Positive (+) Terminal to Terminal [1]
- Battery Negative (-) Terminal to Terminal [6]

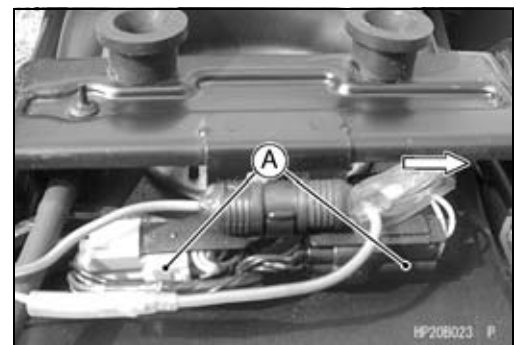
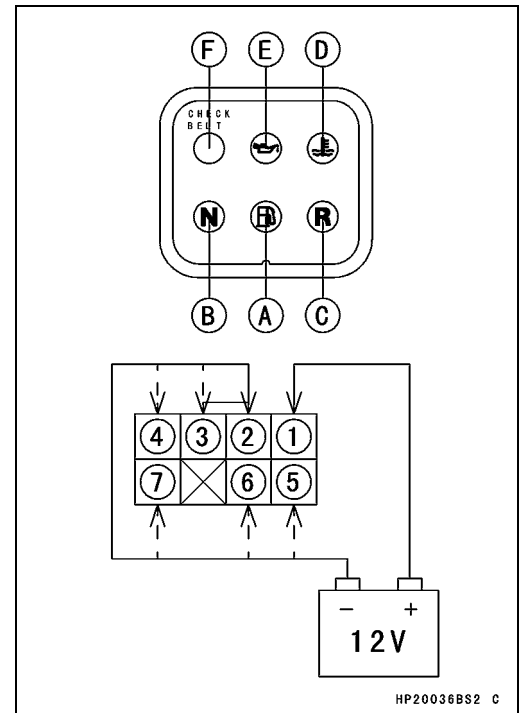
Belt Indicator Light (LED) [F]:

- Battery Positive (+) Terminal to Terminal [1]
- Battery Negative (-) Terminal to Terminal [7]

- ★ If each LED light does not go on, replace the indicator unit.

Drive Belt Failure Mode Memory Clearing Procedure

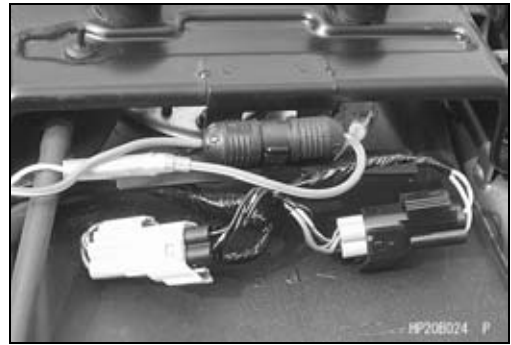
- Turn off the ignition switch.
- Remove the seat (see Seat Removal in the Frame chapter).
- Pull off the both sets of 4 pin connectors [A] from the seat bracket.
- Disconnect the 4 pin connectors.



16-64 ELECTRICAL SYSTEM

Indicator Unit

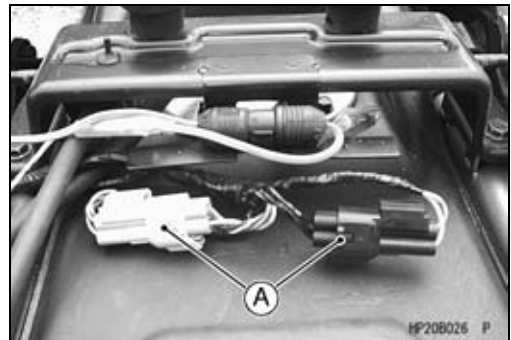
- Reconnect these 4 pin connectors to their opposite gray to black and black to gray.



- Turn on the ignition switch.
- When the key is turned on, the memory is cleared.
- Observe the belt warning light [A].
- It should be flashing.
- While observing the belt warning light, turn off the ignition switch.



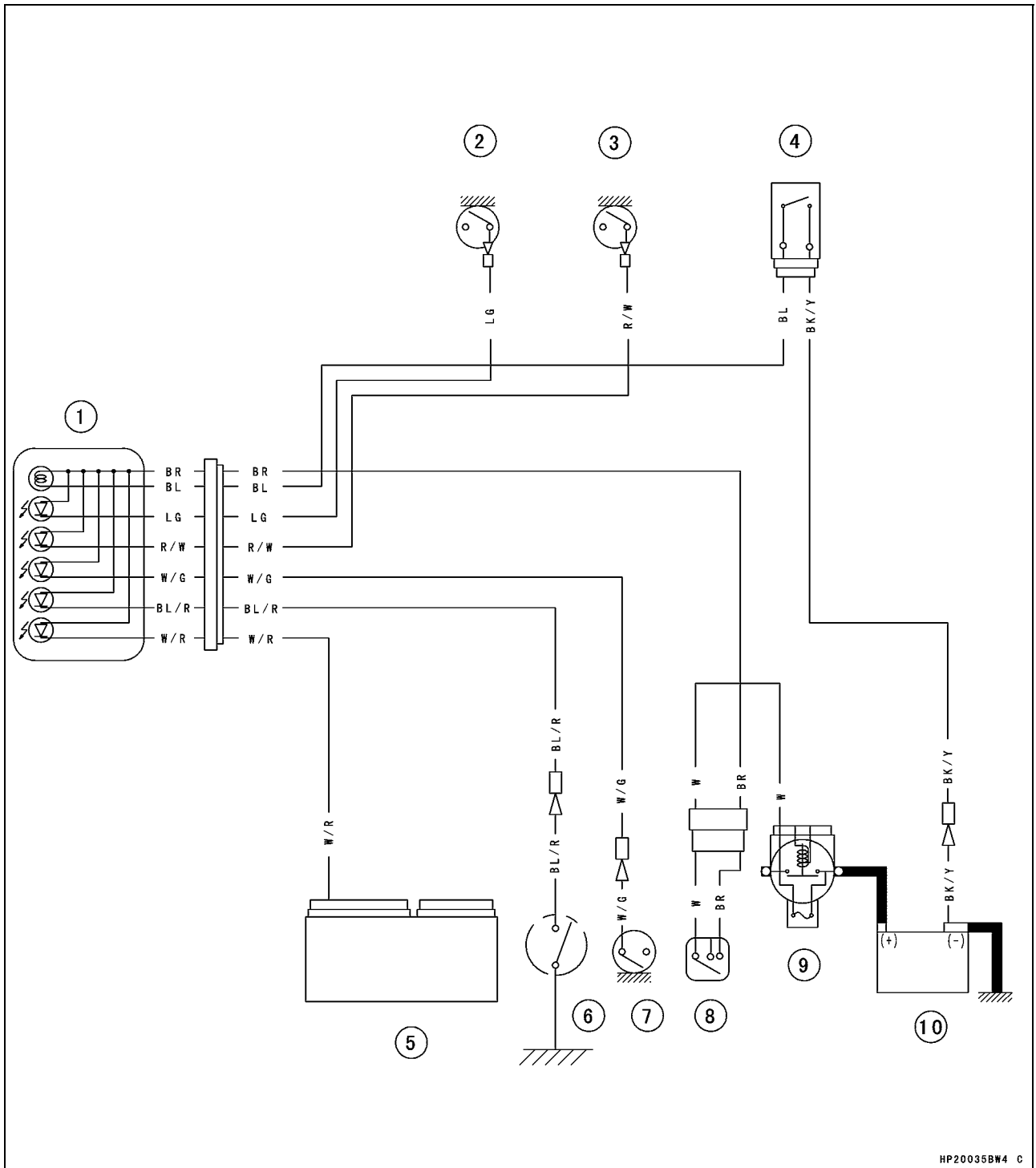
- Disconnect the mismatched 4 pin connector sets and re-connect them normally (black to black, gray to gray) [A].



- Turn on the ignition switch.
- Confirm that no warning light is flashing.
- Put back the 4 pin connectors to the original position.

Indicator Unit

Indicator Unit Circuit



HP20035BW4 C

- | | |
|------------------------|-----------------------------|
| 1. Indicator Unit | 6. Oil Pressure Switch |
| 2. Neutral Switch | 7. Water Temperature Sensor |
| 3. Reverse Switch | 8. Ignition Switch |
| 4. Fuel Reserve Switch | 9. Main Fuse 30 A |
| 5. Igniter | 10. Battery |

NOTE

○Refer to the ignition system circuit in Ignition System section for the reset connectors circuit.

16-66 ELECTRICAL SYSTEM

Switches

Brake Light Switch Adjustment

- Refer to the Brake Light Switch Inspection in the Periodic Maintenance chapter.

Radiator Fan Switch Inspection

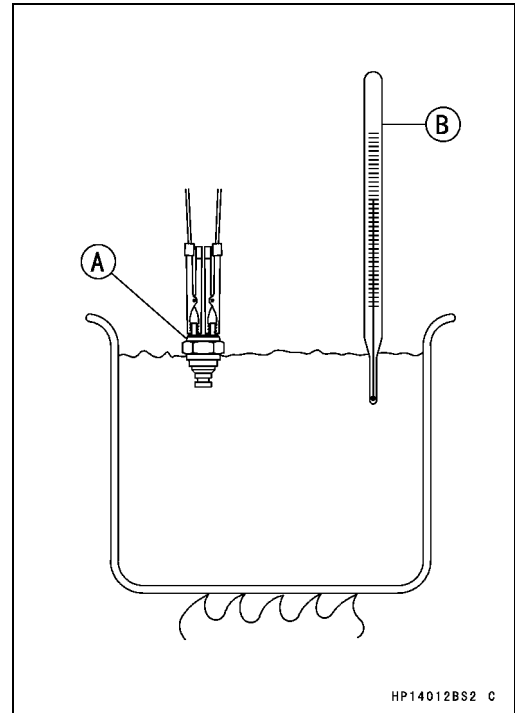
- Remove:
 - Radiator Fan Switch (see Radiator Fan Switch Removal in the Cooling System chapter)
- Suspend the fan switch [A] in a container of coolant so that the temperature sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant.

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.
- ★ If the hand tester does not show the specified values, replace the switch.

Radiator Fan Switch Resistance

- **Rising temperature:**
 - From OFF to ON at 96 ~ 100°C (205 ~ 212°F)
- **Falling temperature:**
 - From ON to OFF at 91 ~ 95°C (196 ~ 203°F)
 - ON: Less than 0.5 Ω**
 - OFF: More than 10 MΩ**



Switches

Water Temperature Sensor Inspection

- Remove:
 - Water Temperature Sensor (see Water Temperature Sensor Removal in the Cooling System chapter)
- Suspend the switch [A] in a container of coolant so that the temperature sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant.

NOTE

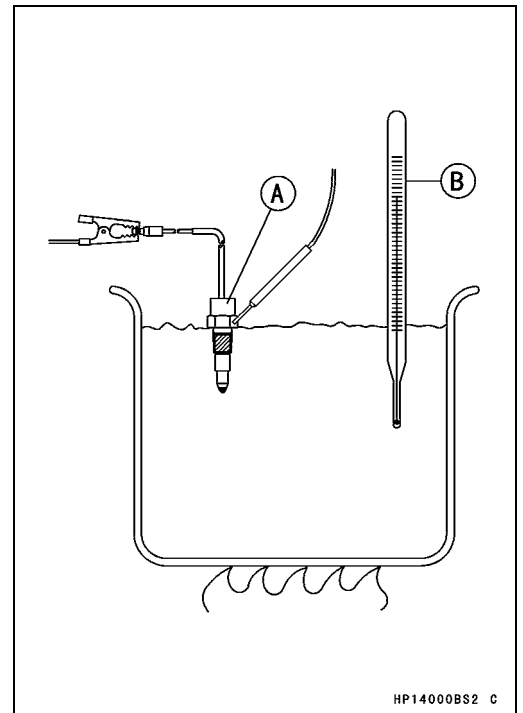
- *The switch and thermometer must not touch the container sides or bottom.*
- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the connector and the body at the temperatures shown in the table.
- ★ If the hand tester does not show the specified values, replace the switch.

Water Temperature Sensor Resistance

- **Rising temperature:**
 - From OFF to ON at 112 ~ 118°C (234 ~ 244°F)
- **Falling temperature:**
 - From ON to OFF at 108 ~ 111°C (226 ~ 232°F)
 - ON: Less than 0.5 Ω**
 - OFF: More than 1 MΩ**

Switch Inspection


- Using the hand tester, check to see that only the connections shown in the table have continuity (about zero ohms).
- For the handlebar switches, ignition switch, refer to tables in the Wiring Diagram.
- ★ If the switch has an open or short, repair or replace it with a new one.



16-68 ELECTRICAL SYSTEM


Switches

Neutral Switch Connection

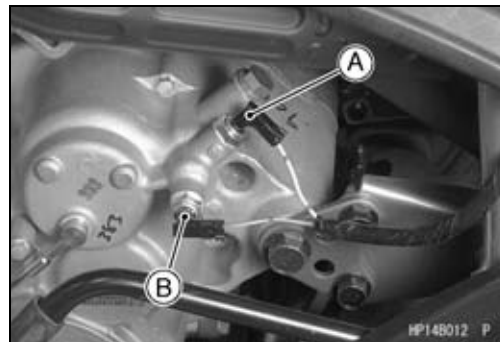
	SW. Terminal	$\overline{\text{TTT}}$
When transmission is in neutral		
When transmission is not in neutral		

[A] Neutral Switch


Reverse Switch Connections

	SW.Terminal	$\overline{\text{TTT}}$
When transmission is in reverse		
When transmission is not in reverse		

[B] Reverse Switch





Oil Pressure Switch Connections*

	SW. Terminal	$\overline{\text{TTT}}$
When engine is stopped		
When engine is running		

*: Engine lubrication system is in good condition.

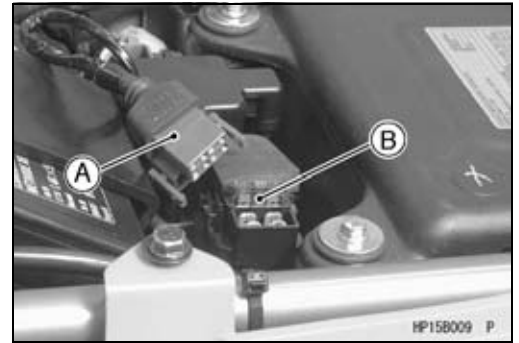
Horn Button Connections (KSV700A9F EUR)

	BK/W	BK/Y
Free		
Push (ON)		

Fuses

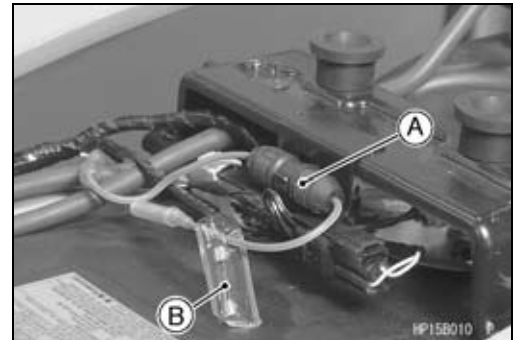
30 A Main Fuse Removal

- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Starter Relay and 30 A Main Fuse Connector [A]
- Pull out the main fuse [B] from the starter relay with a needle nose pliers.



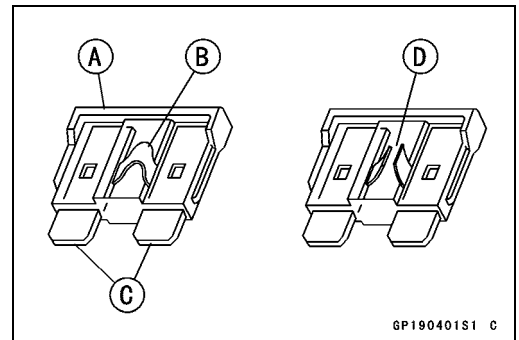
Radiator Fan Fuse Removal

- Remove:
 - Seat (see Seat Removal in the Frame chapter)
 - Fuse Case Cover [A]
- Pull out the fuse from the fuse case.
 - Spare Fuse [B]



Main Fuse Inspection

- Inspect the fuse element.
- ★ If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.
 - Housing [A]
 - Fuse Element [B]
 - Terminals [C]
 - Blown Element [D]

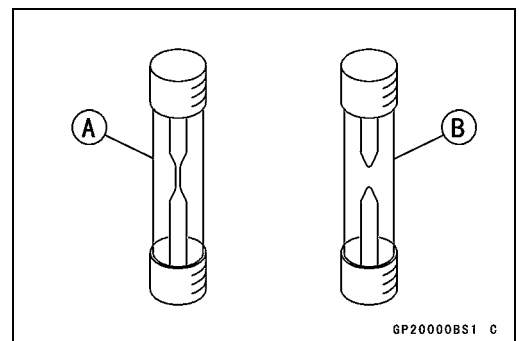


CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

Radiator Fan Fuse Inspection

- Remove the fuse (see Radiator Fan Fuse Removal).
- Inspect the fuse element.
- ★ If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.
 - Fuse Element [A]
 - Blown Element [B]

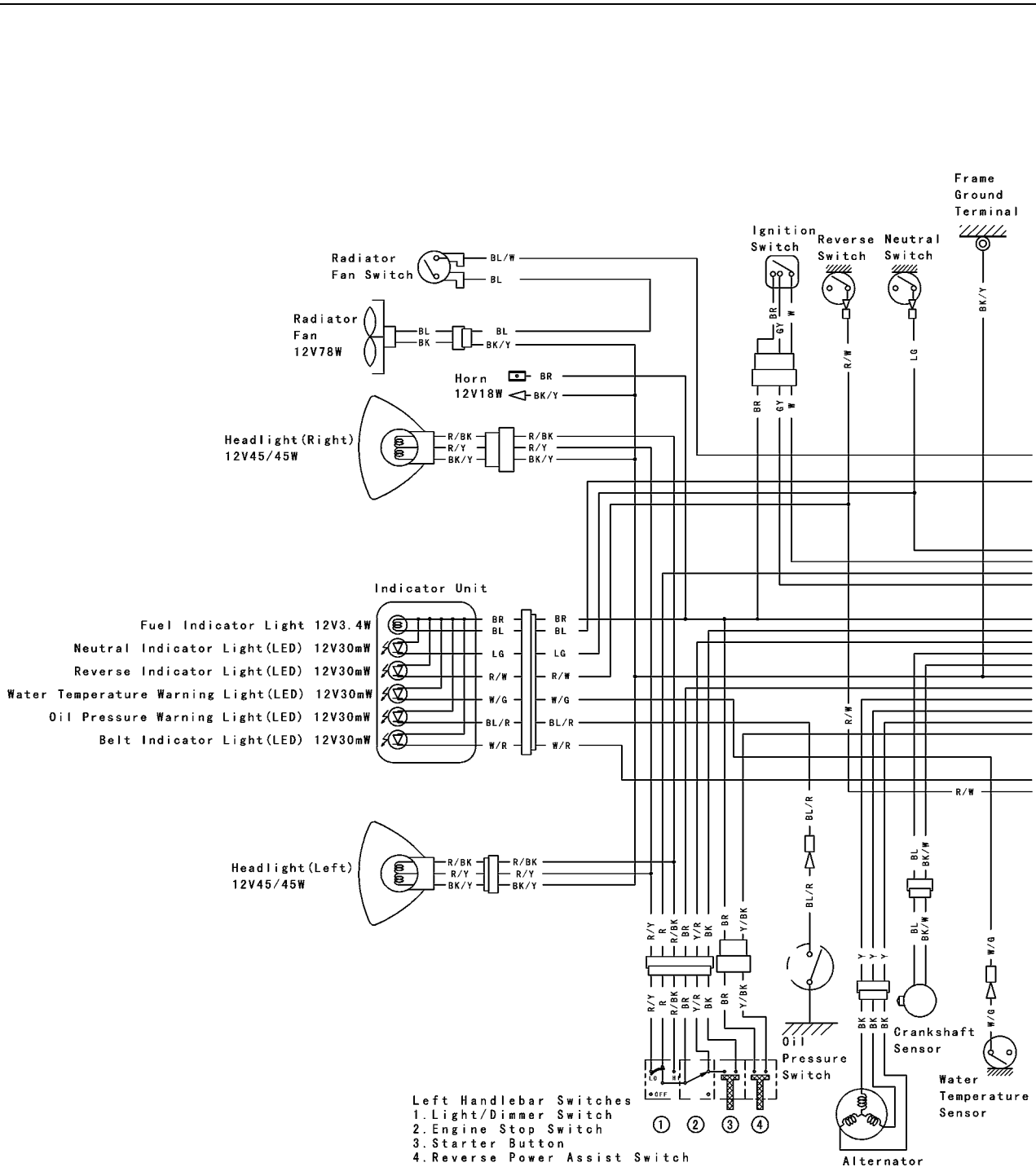


CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

16-70 ELECTRICAL SYSTEM

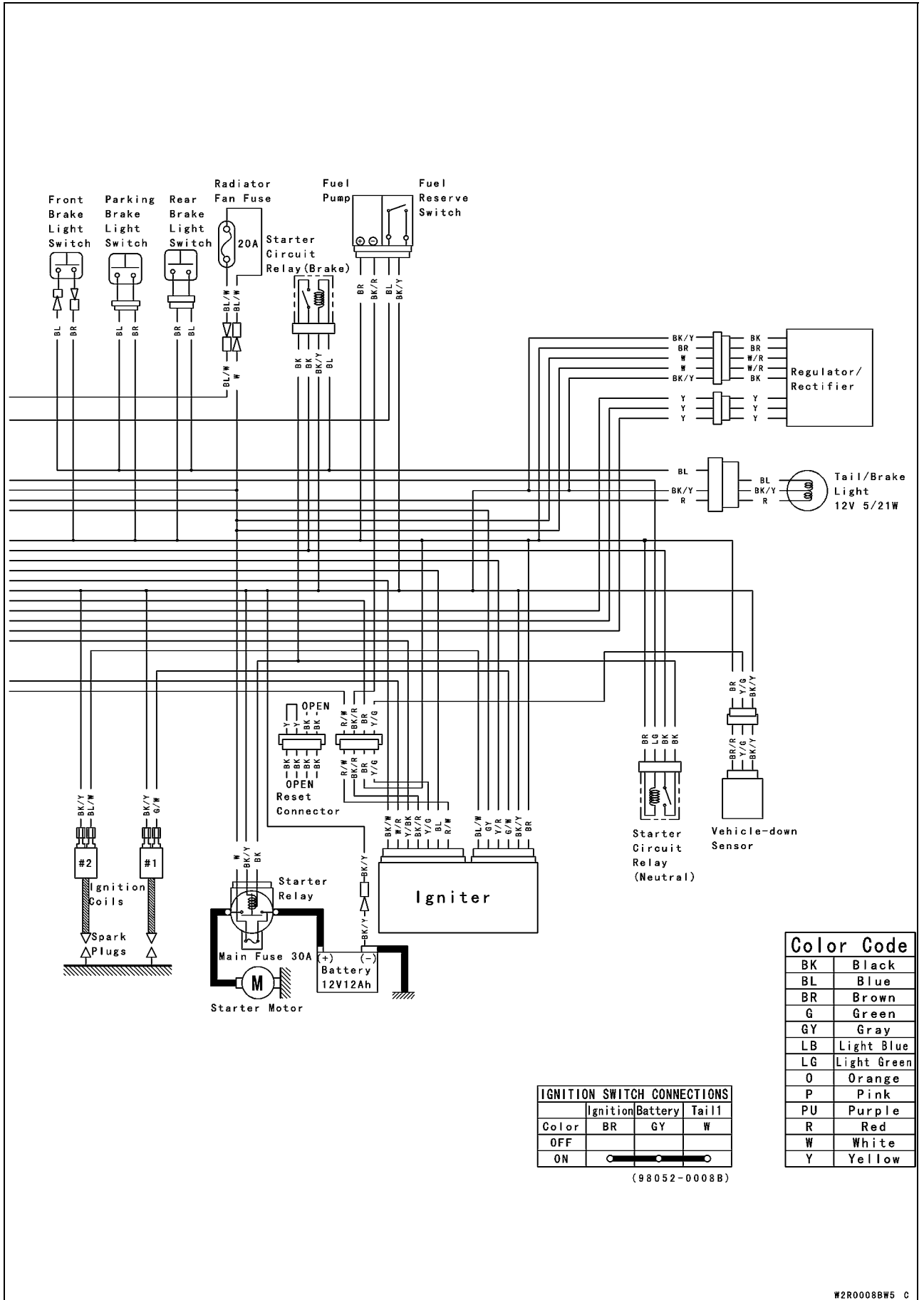
Wiring Diagram (KSV700-A1 ~ A8F/B1 ~ B8F/C6F)



- Left Handlebar Switches
1. Light/Dimmer Switch
 2. Engine Stop Switch
 3. Starter Button
 4. Reverse Power Assist Switch

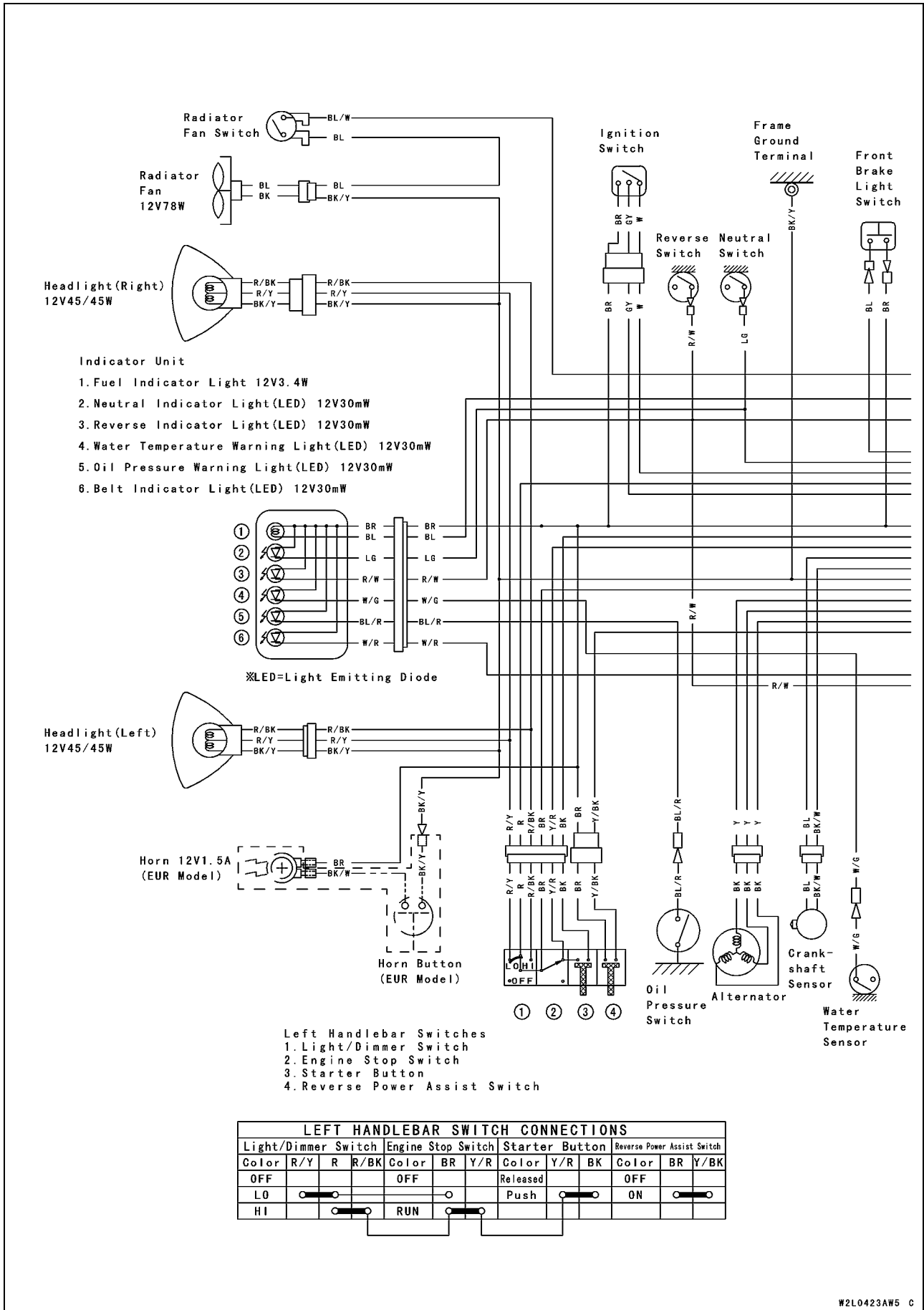
LEFT HANDLEBAR SWITCH CONNECTIONS									
Light/Dimmer Switch			Engine Stop Switch			Starter Button		Reverse Power Assist Switch	
Color	R/Y	R	R/BK	Color	BR	Y/R	Color	Y/R	BK
OFF				OFF			Released		OFF
LO	○	○			○			○	
HI	○	○			○		Push	○	○

Wiring Diagram (KSV700-A1 ~ A8F/B1 ~ B8F/C6F)

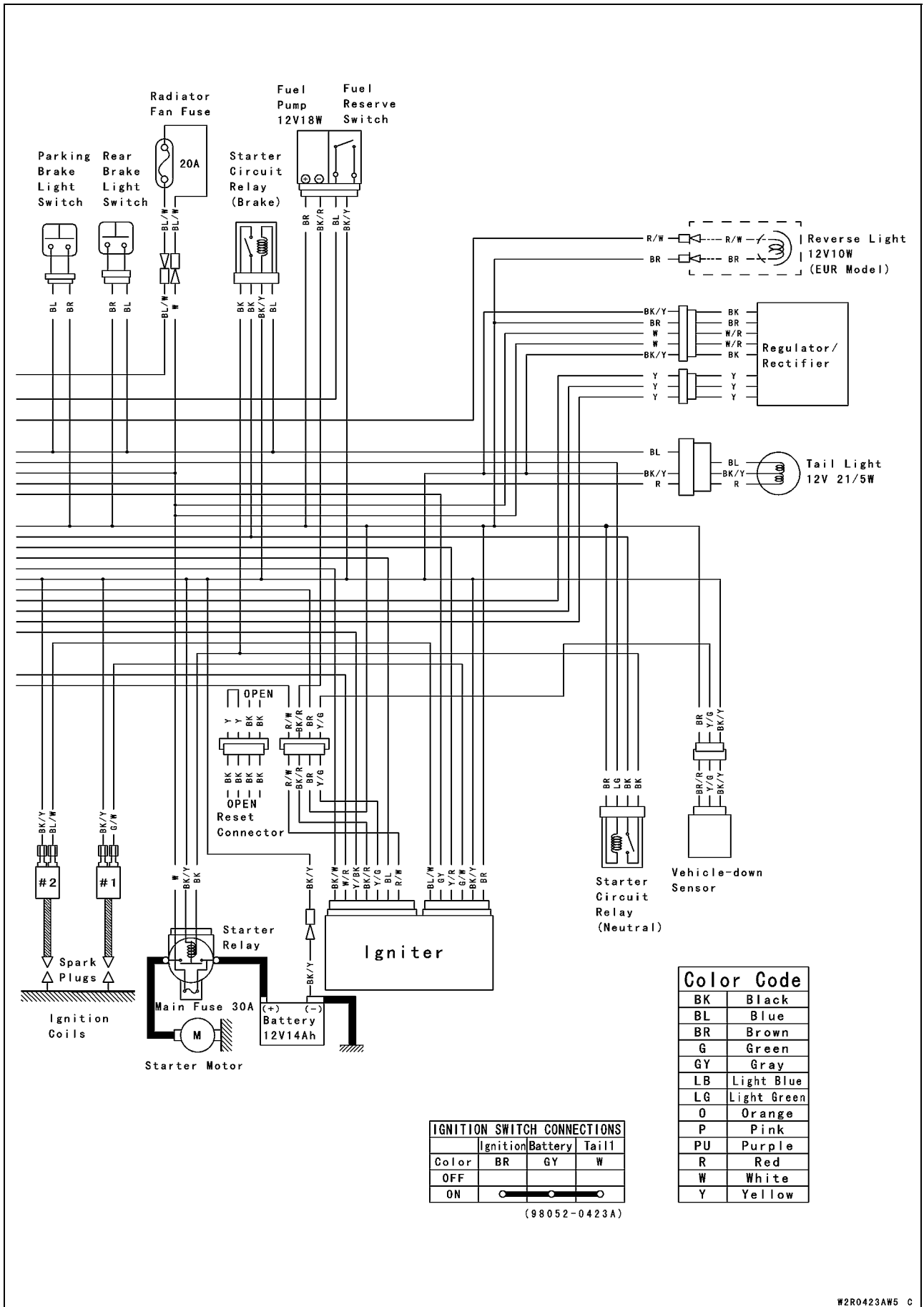


16-72 ELECTRICAL SYSTEM

Wiring Diagram (KSV700A9F/B9F)



Wiring Diagram (KSV700A9F/B9F)



Appendix

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Troubleshooting Guide	17-2
Cable, Wire, and Hose Routing	17-6

17-2 APPENDIX

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:

- Neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:

- Starter motor clutch trouble

Engine won't turn over:

- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure

No fuel flow:

- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:

- Fuel level 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.)

Fuel/air mixture incorrect:

- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

No spark; spark weak:

- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension lead trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- Crankshaft Sensor trouble
- Igniter trouble
- Ignition coil trouble

- Battery voltage low
- Ignition or engine stop switch shorted
- Wiring shorted or open
- 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)
- Compression release cam (K.A.C.R.) sticks open (Engine stalls when moving off)

Poor Running at Low Speed:

Spark weak:

- Spark plug dirty, broken, or maladjusted
- Spark plug cap or high tension lead trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- Igniter trouble
- Crankshaft Sensor trouble
- Ignition coil trouble
- Battery voltage low

Fuel/air mixture incorrect:

- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Choke plunger stuck open
- Air cleaner clogged, poorly sealed, or missing
- Fuel level 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 gasket damaged
- Cylinder head warped
- Valve spring broken or weak

Troubleshooting Guide

Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Compression release cam (K.A.C.R.) sticks open (Engine stalls when moving off)

Other:

Carburetor vacuum piston doesn't slide smoothly

Engine oil viscosity too high

Brake dragging

Igniter trouble

Final gear case oil viscosity too high

Poor Running or No Power at High Speed:

Firing incorrect:

Spark plug dirty, broken, or maladjusted

Spark plug cap or high tension lead trouble

Spark plug cap shorted or not in good contact

Spark plug incorrect

Crankshaft sensor trouble

Igniter trouble

Ignition coil trouble

Fuel/air mixture incorrect:

Main jet clogged or wrong size

Jet needle or needle jet worn

Main air jet clogged

Bleed holes of air bleed pipe or needle jet clogged

Fuel level too high or too low

Air cleaner clogged, poorly sealed, or missing

Choke plunger stuck open

Water or foreign matter in fuel

Carburetor holder loose

Air cleaner duct loose

Fuel tank air vent obstructed

Fuel tap clogged

Fuel line clogged

Compression low:

Spark plug loose

Cylinder head not sufficiently tightened down

No valve clearance

Cylinder, piston worn

Piston rings 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.)

Compression release cam (K.A.C.R.) sticks open (Engine stalls when moving off)

Knocking:

Carbon built up in combustion chamber

Fuel poor quality or incorrect

Spark plug incorrect

Igniter trouble

Miscellaneous:

Throttle valve won't fully open

Carburetor vacuum piston doesn't slide smoothly

Brake dragging

Overheating

Engine oil level too high

Engine oil viscosity too high

Final gear case oil viscosity too high

Overheating:

Firing incorrect:

Spark plug dirty, broken, or maladjusted

Spark plug incorrect

Igniter trouble

Fuel/air mixture incorrect:

Main jet clogged

Fuel level too low

Carburetor holder loose

Air cleaner poorly sealed, or missing

Air cleaner duct loose

Air cleaner clogged

Compression high:

Carbon built up in combustion chamber

Compression release cam (K.A.C.R.) sticks close

Engine load faulty:

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

Final gear case overheating:

Insufficient oil

Bevel gears maladjusted

Coolant incorrect:

Coolant level too low

Coolant deteriorated

Thick coolant

Cooling system component incorrect:

Radiator clogged

Thermostat trouble

Radiator cap trouble

Radiator fan switch trouble

Fan motor broken

Fan blade damaged

Water pump not turning

Water pump impeller damaged

Over Cooling:

Cooling system component incorrect:

Radiator fan switch trouble

Thermostat trouble

17-4 APPENDIX

Troubleshooting Guide

Converter Operation Faulty:

Belt slipping:

- Belt dirty, worn, or wetted
- Drive or driven pulley sheave dirty or worn
- Drive pulley spring broken or weak

Converter engagement speed too low:

- Drive pulley spring broken or weak

Converter engagement speed too high:

- Belt dirty or worn
- Drive or driven pulley sheave dirty or worn
- Drive pulley weight doesn't move smoothly
- Drive pulley movable sheave doesn't move smoothly
- Drive or driven pulley movable sheave bush worn
- Drive pulley weight or roller worn

Shifting too quickly:

- Drive pulley spring weak
- Driven pulley spring weak or incorrectly installed (too loose)

Shifting too slowly:

- Belt dirty or worn
- Drive or driven pulley sheave dirty or worn
- Drive pulley weight doesn't move smoothly
- Drive pulley movable sheave doesn't move smoothly
- Drive pulley spring incorrect installed (too tight)
- Driven pulley movable sheave doesn't move smoothly

Gear Shifting Faulty:

Doesn't go into gear:

- Shift shaft bent or seized
- Gear stuck on the shaft
- Shift control grip damaged
- Shift control cable maladjusted
- Reverse lock maladjusted

Jumps out of gear:

- Shifter groove worn
- Gear dogs worn
- Shift block worn
- Shift fork worn
- Shift shaft spring weak or broken
- Shift control cable maladjusted
- Drive shaft, output shaft, and/or gear splines worn

Overshifts:

- Shift shaft spring weak or broken
- Shift control cable maladjusted

Abnormal Engine Noise:

Knocking:

- 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 holes worn

Valve noise:

- Valve clearance incorrect
- Valve spring broken or weak
- Camshaft bearing worn
- Rocker arm worn

Other noise:

- Connecting rod small end clearance excessive
- Connecting rod big end clearance excessive
- Piston ring worn, broken, or stuck
- Piston seizure, damage
- Cylinder head gasket leaking
- Exhaust pipe leaking at cylinder head connection
- Crankshaft runout excessive
- Engine mounts loose
- Crankshaft bearing worn
- Camshaft chain tensioner trouble
- Camshaft chain, sprocket, guides worn
- Loose alternator rotor

Abnormal Drive Train Noise:

Converter noise:

- Belt worn
- Drive or driven pulley sheave worn
- Drive or driven pulley movable sheave bush worn
- Drive or driven pulley mount loose
- Driven pulley shoe worn
- Drive pulley weight or roller side washer worn
- Drive pulley weight or roller worn
- Wear guides worn

Transmission noise:

- Bearing worn
- Transmission gears worn or chipped
- Metal chips jammed in gear teeth
- Engine oil insufficient or too thin

Final gear case noise:

- Insufficient lubricant
- Bevel gear bearings worn
- Bevel gears worn or chipped
- Bevel gears maladjusted

Abnormal Frame Noise:

Shock absorber noise:

- Shock absorber damaged

Disc brake noise:

- Pad installed incorrectly
- Pad surface glazed
- Disc warped
- Caliper trouble

Troubleshooting Guide

Rear brake noise:

- Foreign matter in hub
- Brake not properly adjusted

Other noise:

- Bracket, nut, bolt, etc. not properly mounted or tightened

Exhaust Smokes Excessively:**White smoke:**

- Piston oil ring worn
- Cylinder worn
- Valve oil seal damaged
- Valve guide worn
- Cylinder head gasket damaged
- Engine oil level too high

Black Smoke:

- Air cleaner clogged
- Main jet too large or fallen off
- Chock plunger stuck open
- Fuel level too high

Brown smoke:

- Main jet too small
- Fuel level too low
- Air cleaner duct loose
- Air cleaner poorly sealed or missing

Handling and/or Stability Unsatisfactory**Handlebar hard to turn:**

- Tire air pressure too low
- Steering stem bearing damaged
- Steering stem bearing lubrication inadequate
- Steering stem bent
- Damage tie-rod end

Handlebar shakes or excessively vibrates:

- Tire worn
- Wheel rim warped
- Rear axle runout excessive
- Wheel bearing worn
- Handlebar clamp loose
- Steering stem clamp bolt loose

Handlebar pulls to one side:

- Frame bent
- Wheel maladjustment

- Suspension arm bent or twisted
- Steering stem bent
- Front or rear tire air pressure unbalanced
- Front shock absorber unbalanced

Shock absorption unsatisfactory:**Too hard:**

- Tire air pressure too high
- Shock absorber maladjusted

Too soft:

- Shock absorber oil leaking
- Shock absorber spring weak
- Tire air pressure too low
- Shock absorber maladjusted

Brake Doesn't Hold**Front brake:**

- Air in the brake line
- Brake fluid leakage
- Brake fluid deteriorated
- Primary or secondary cup trouble
- Master cylinder inside scratched
- Pad overworn or worn unevenly
- Oil, grease on pads and disc
- Disc worn or warped
- Brake overheated

Rear Brake:

- Brake not properly adjusted
- Plates worn
- Brake parts worn or damaged

Battery Discharged:

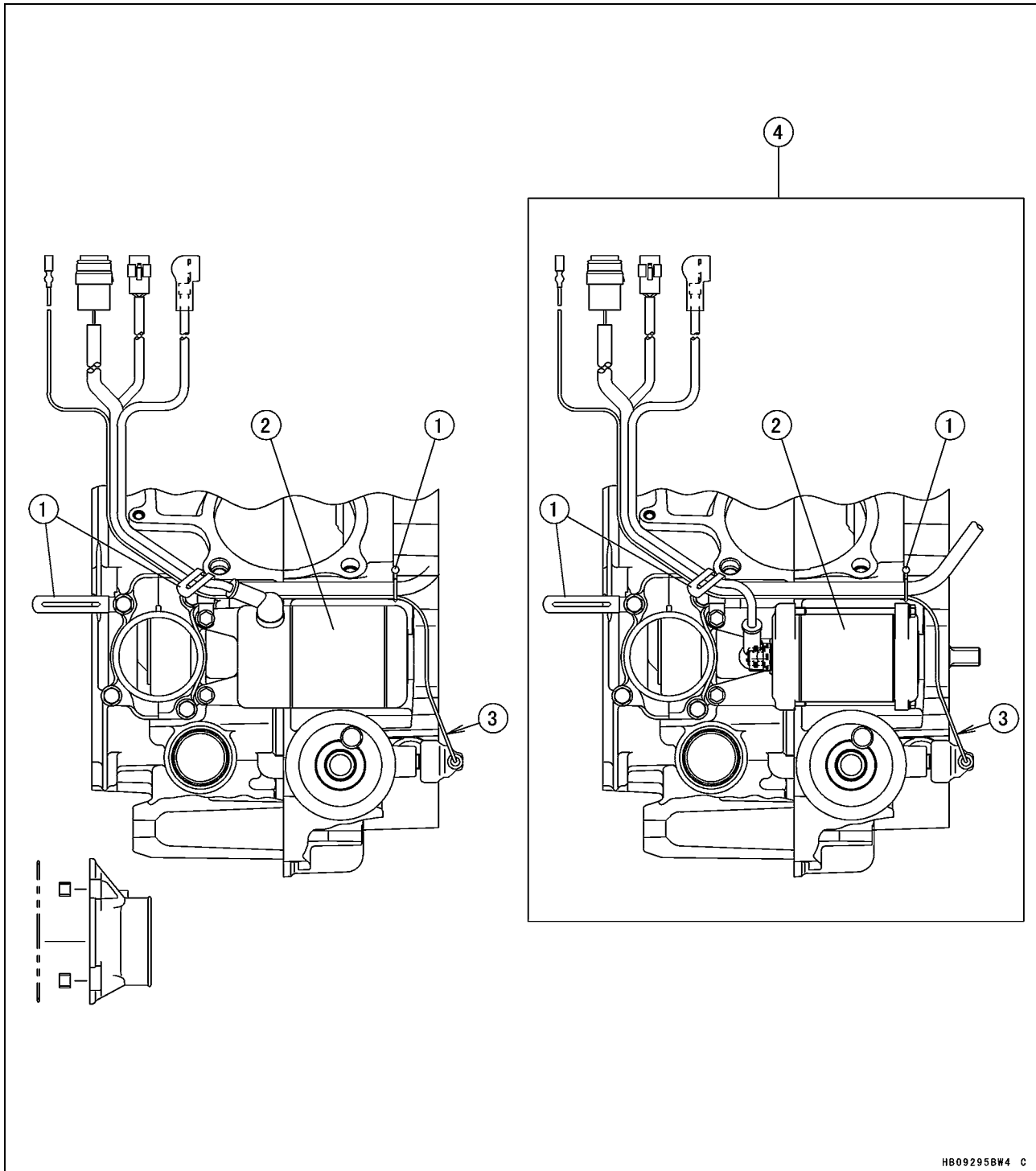
- Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
- Battery leads making poor contact
- Load excessive (e.g., bulb of excessive wattage)
- Ignition switch trouble
- Regulator/rectifier trouble
- Alternator trouble
- Wiring faulty

Battery Overcharged:

- Regulator/rectifier trouble
- Battery trouble

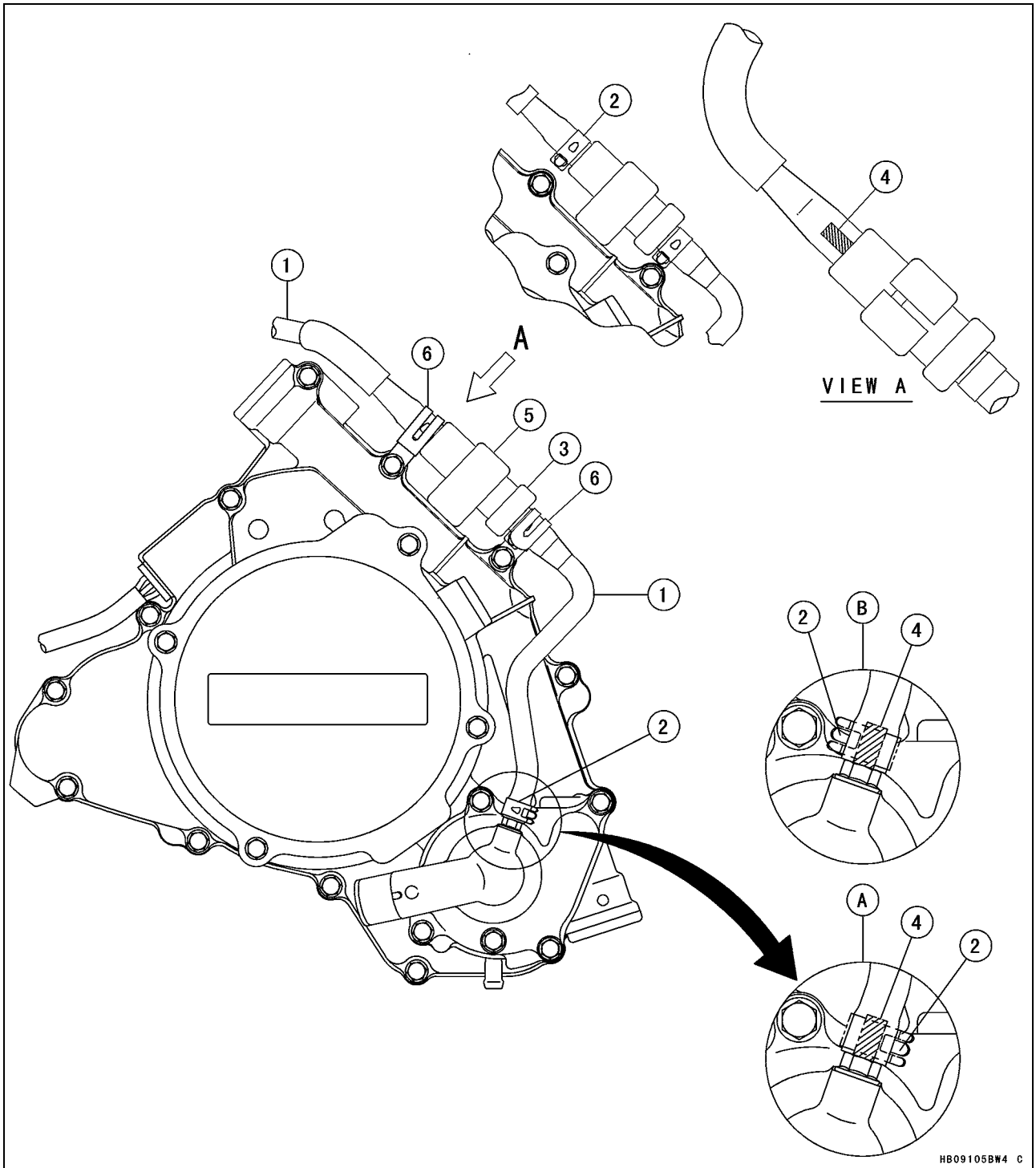
17-6 APPENDIX

Cable, Wire, and Hose Routing



1. Clamp
2. Electric Starter
3. Run the oil pressure lead so that it does not interfere with the electric starter motor.
4. KSV700A9F/B9F

Cable, Wire, and Hose Routing

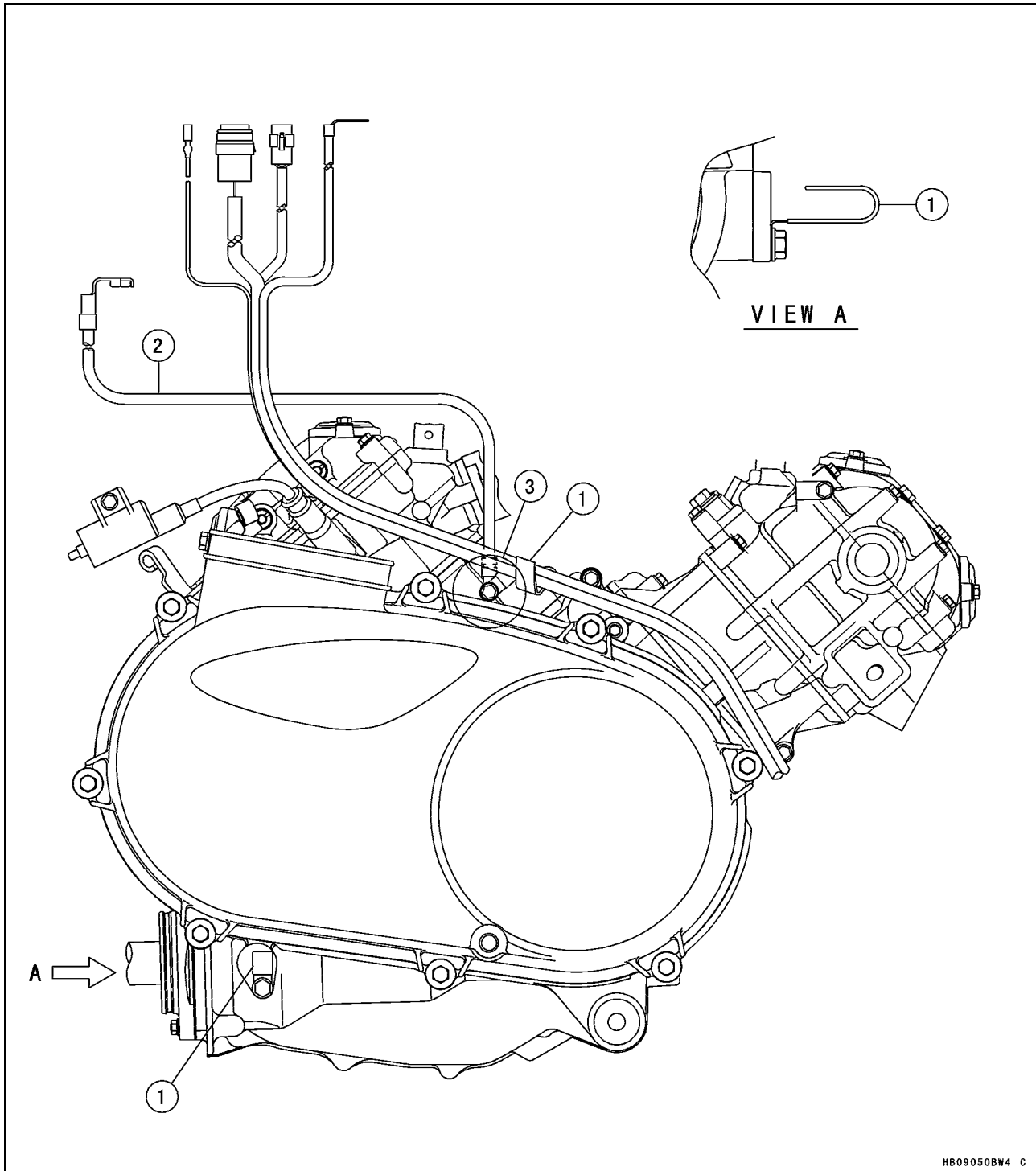


HB09105BW4 C

- 1. Water Hoses
- 2. Clamps (Install the clamps with the tabs direction as shown.)
- 3. Coolant Valve
- 4. Position the white marks on the tube as shown.
- 5. Damper
- 6. Clamps
- A: KSV700-A1/B1 Models
- B: KSV700-A2 ~/B2 ~/C6F Models

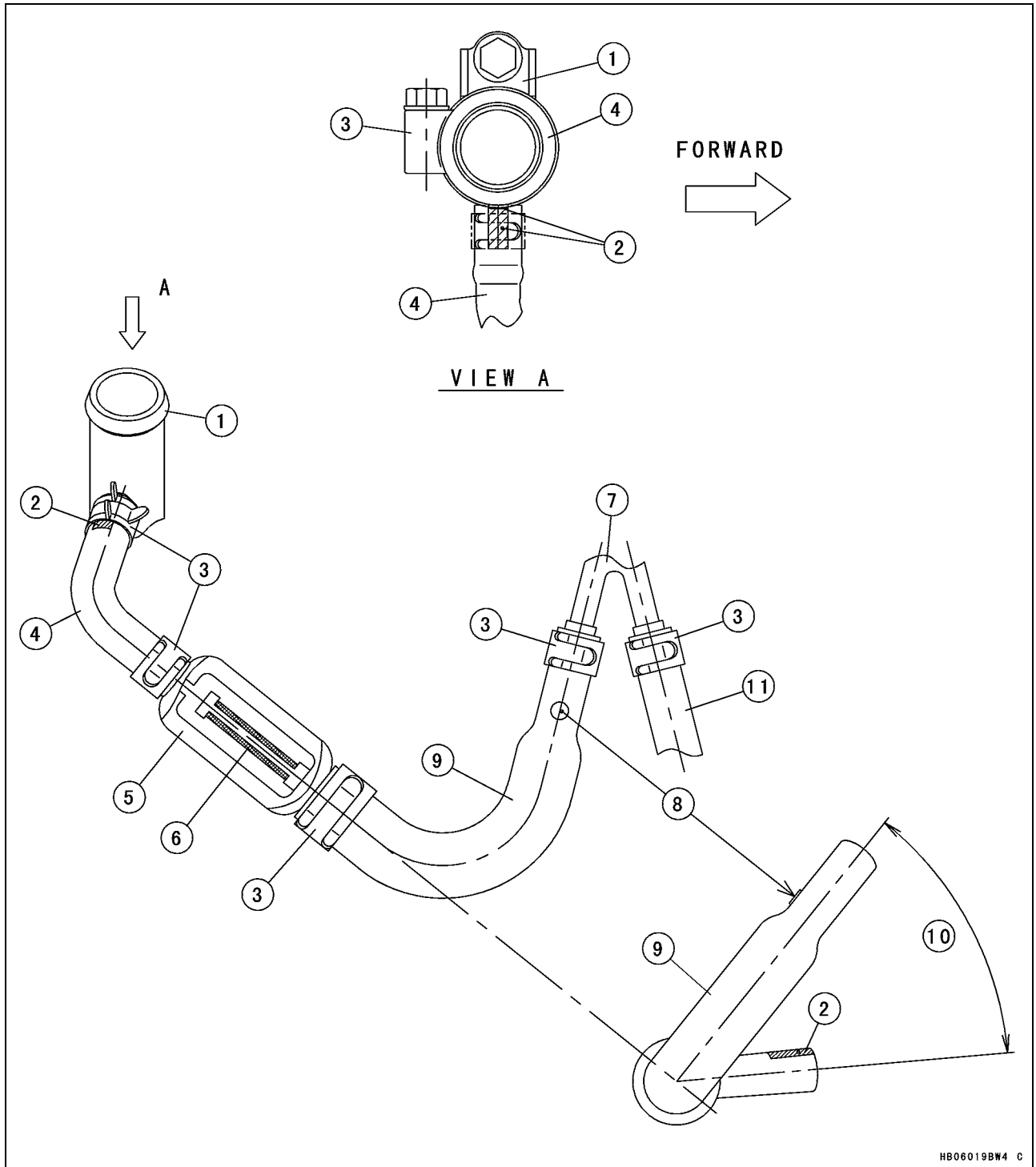
17-8 APPENDIX

Cable, Wire, and Hose Routing



1. Clamp
2. Engine Ground Cable
3. Install the clamp on the engine ground cable.

Cable, Wire, and Hose Routing

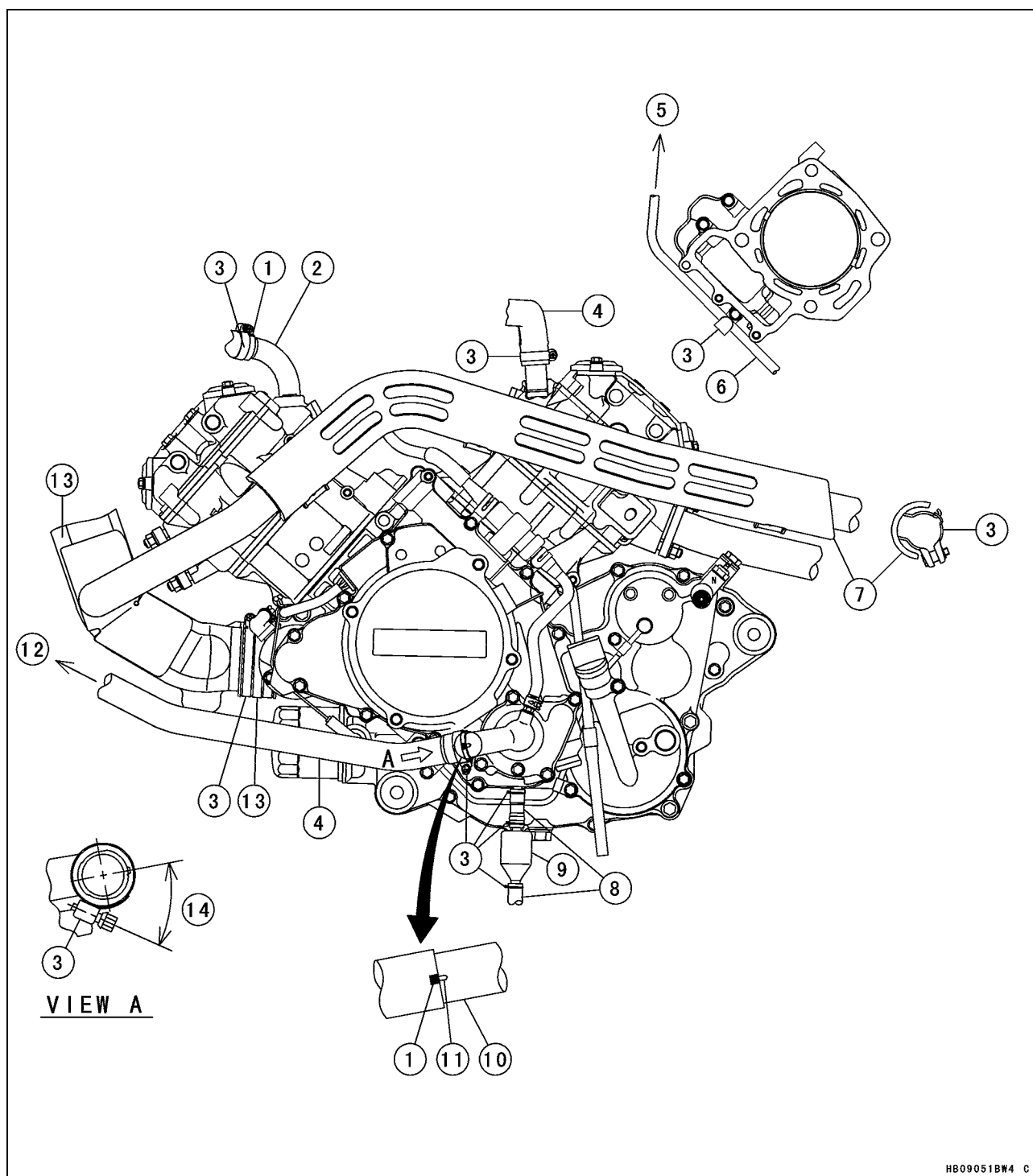


- 1. Water Pipe
- 2. White Paint
- 3. Clamps
- 4. Water Hoses
- 5. Coolant Filter Body
- 6. Coolant Filter

- 7. Carburetor
- 8. Mark
- 9. Water Hose
- 10. Assemble Angle (about 45°, [4] and [9] hoses)
- 11. Water Hose

17-10 APPENDIX

Cable, Wire, and Hose Routing



HB09051BW4 C

1. White Paint

2. Water Pipe

3. Clamp

4. Water Hose

5. To Carburetor

6. Carburetor Overflow Hose

7. Exhaust Pipe Cover

8. Hose

9. Breather

10. Pump Cover

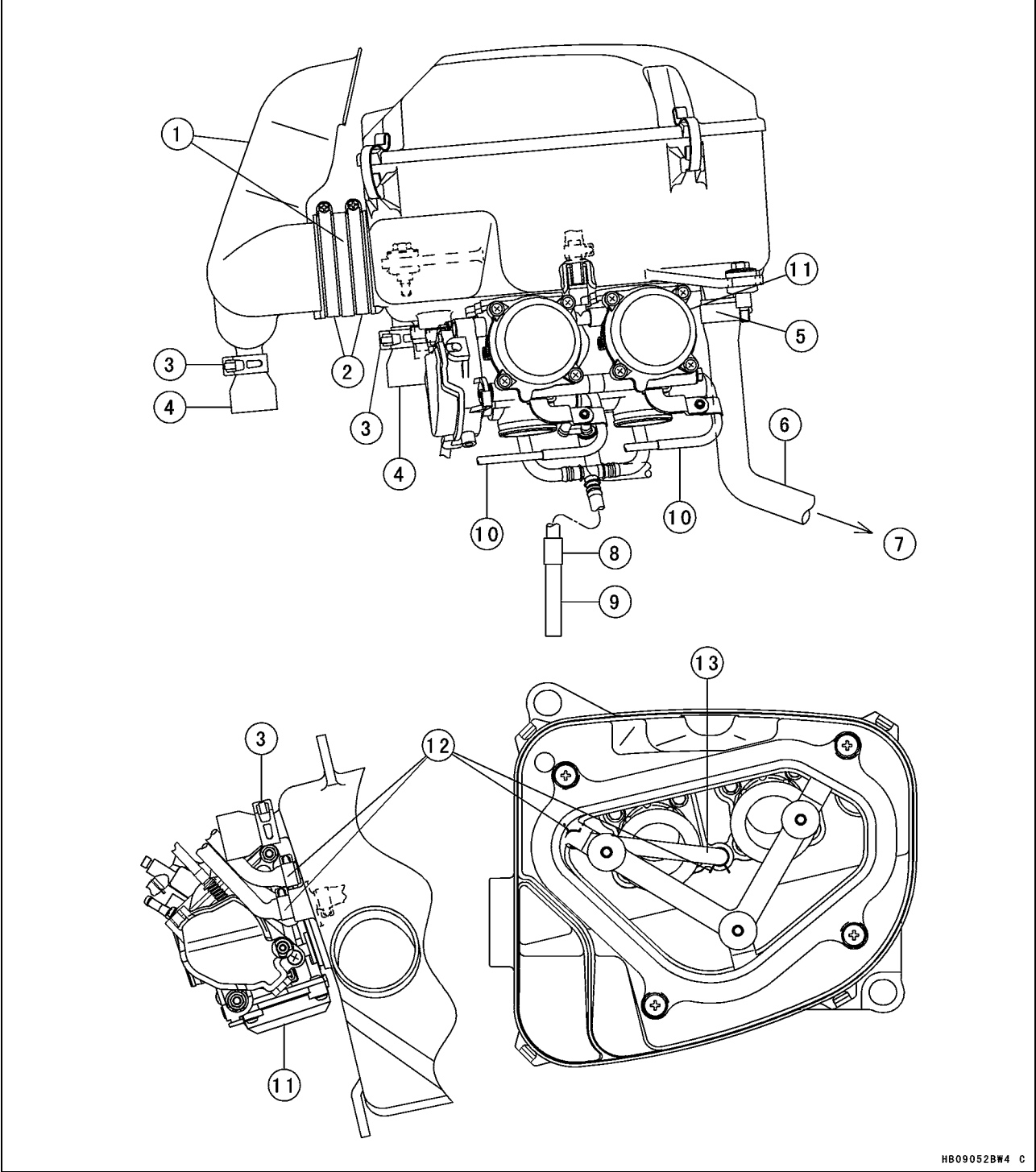
11. Mark

12. To Radiator

13. Duct

14. Face the clamp screw as shown.

Cable, Wire, and Hose Routing



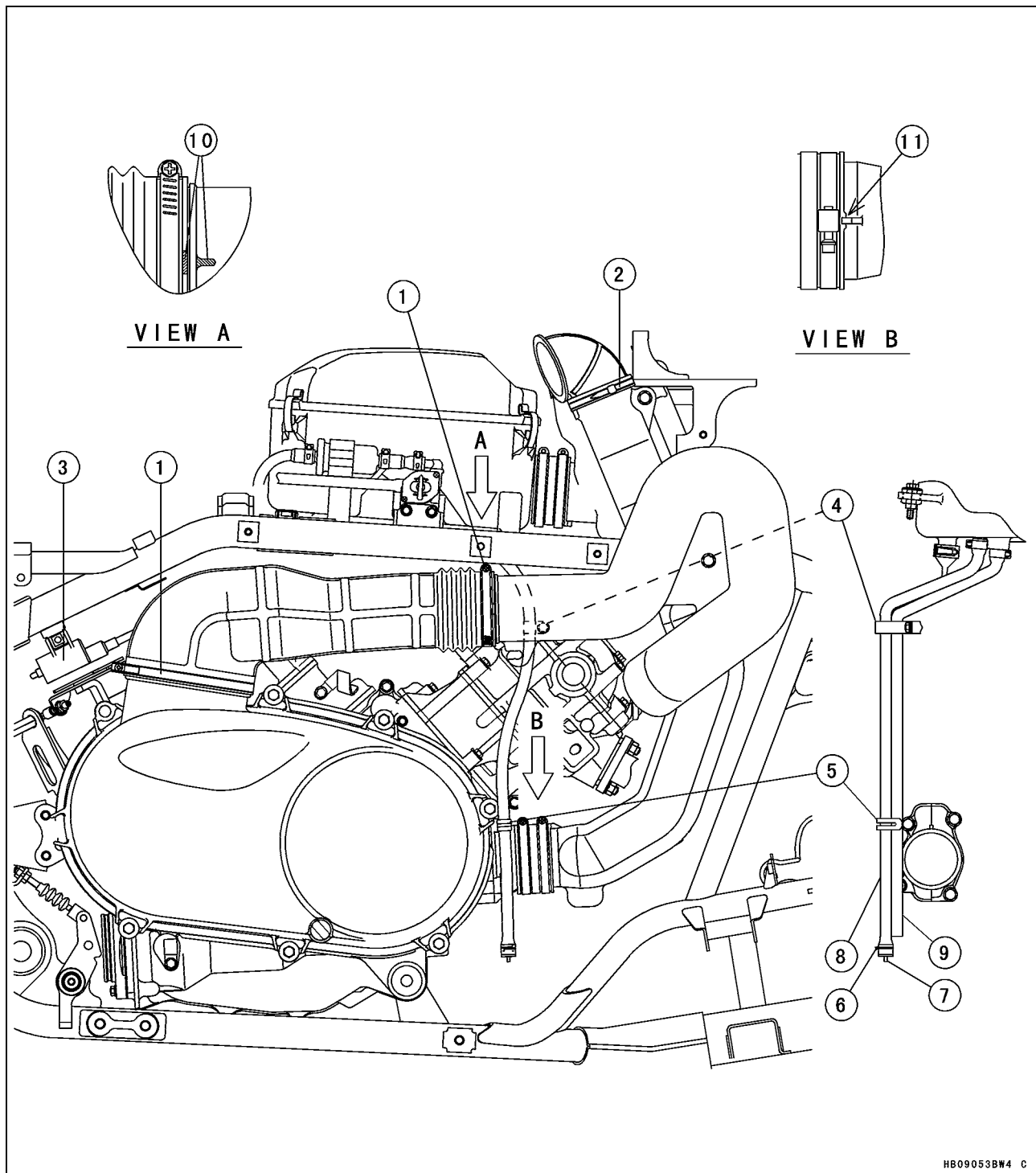
HB09052BW4 C

- 1. Air Cleaner Duct
- 2. Clamps
- 3. Clamps
- 4. Boots
- 5. Clamps
- 6. Vent Hose
- 7. To Crankcase

- 8. Coolant Valve
- 9. Water Hose
- 10. Choke Cable
- 11. Carburetor
- 12. Clamps
- 13. Air Vent Tube

17-12 APPENDIX

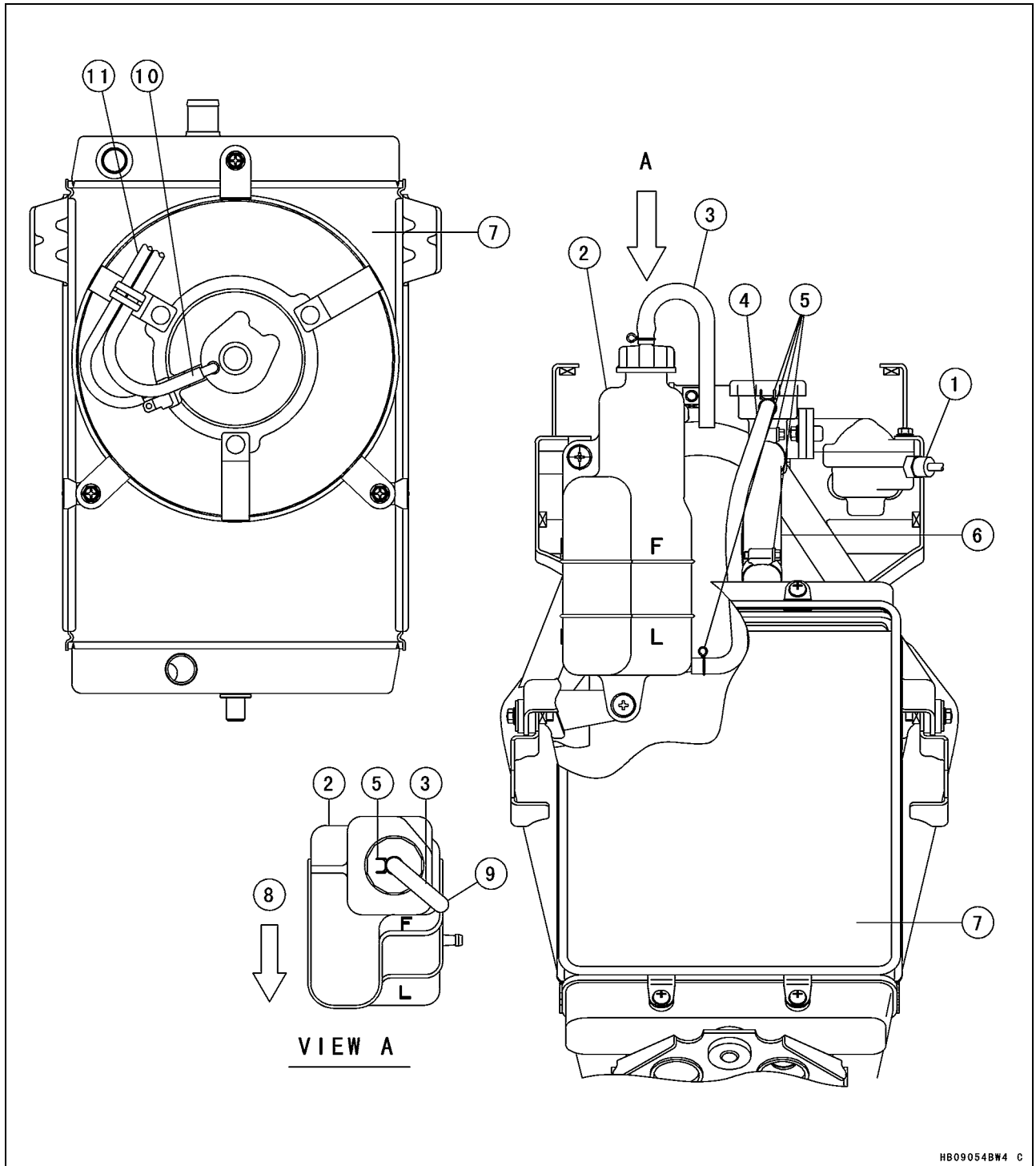
Cable, Wire, and Hose Routing



1. Clamps
2. Bands
3. Ignition Coil (Rear)
4. Clamp
5. Clamp
6. Clamp
7. Drain Plug
8. Drain Hose

9. Vent Hose
10. Align the mark. (when the exhaust duct shall be connected to the joint duct, align the projection of the exhaust duct with the mark of the joint duct.)
11. Fit the projection and groove of the each ducts.

Cable, Wire, and Hose Routing

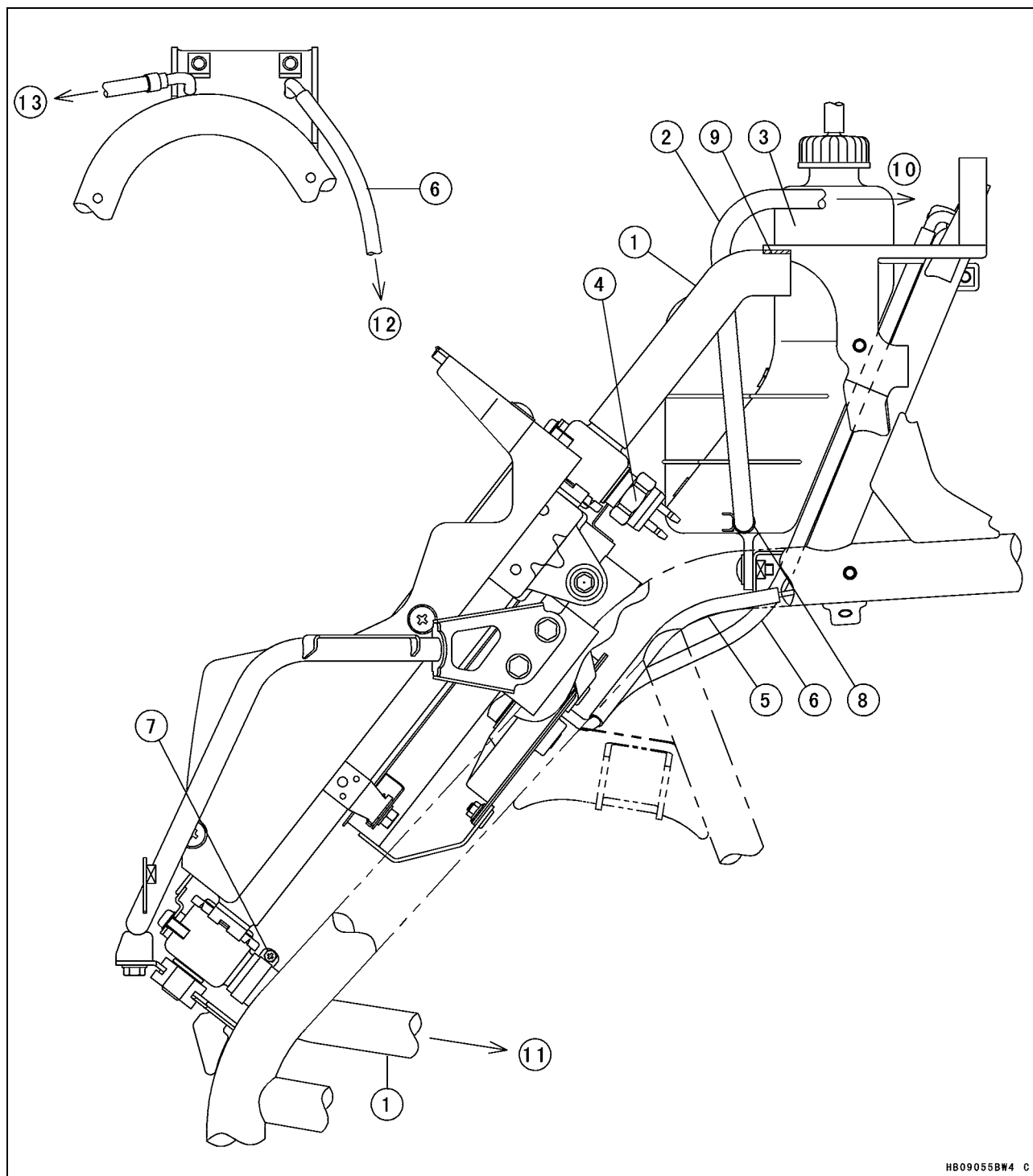


HB09054BW4 C

- | | |
|-------------------------------|--|
| 1. Water Temperature Sensor | 7. Radiator |
| 2. Reserve Tank | 8. Forward |
| 3. Reserve Tank Breather Hose | 9. Face the reserve tank breather hose as shown. |
| 4. Water Hose | 10. Fan Motor Breather Hose |
| 5. Clamps | 11. Fan Motor Lead |
| 6. Water Hose | |

17-14 APPENDIX

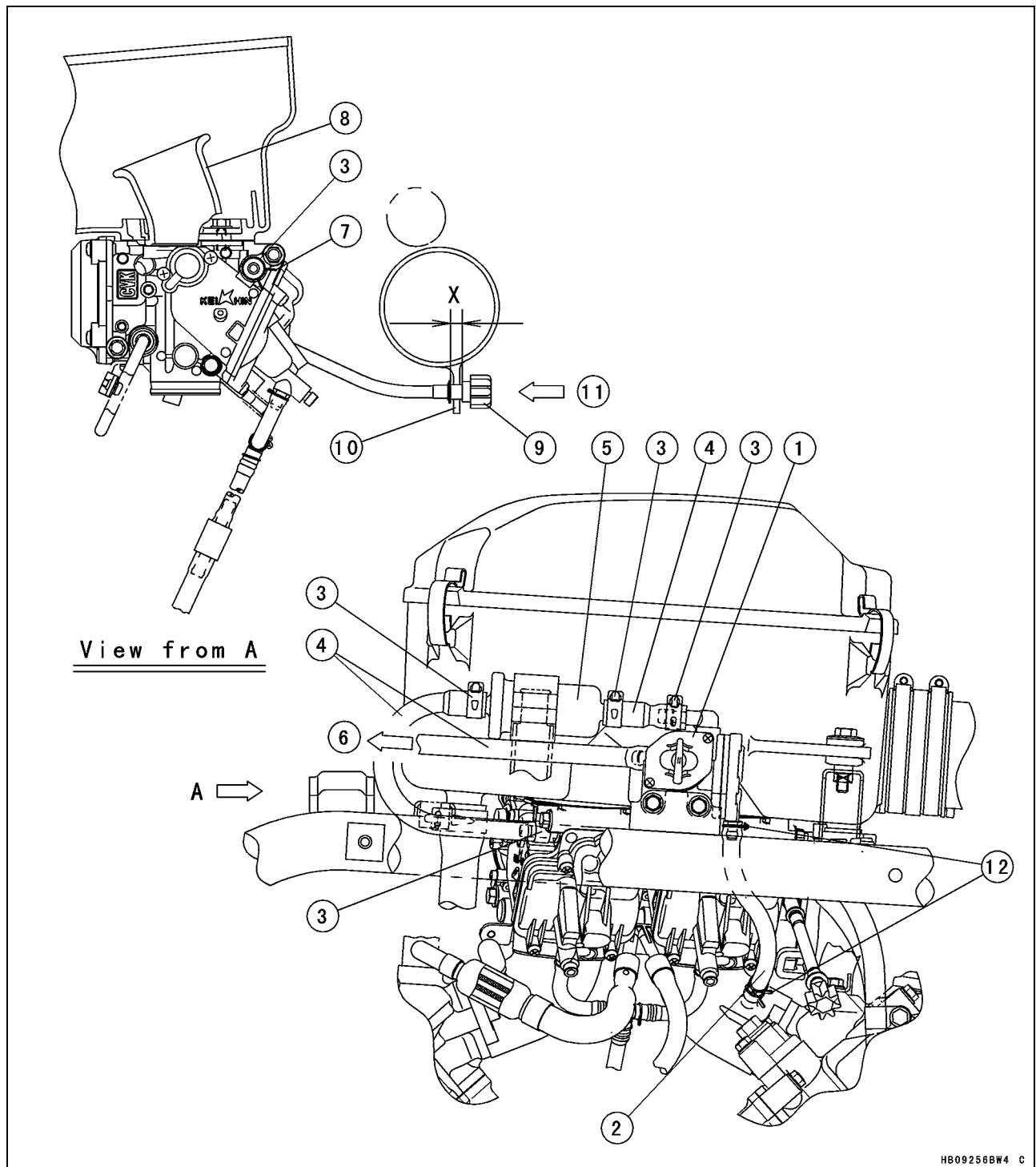
Cable, Wire, and Hose Routing



1. Water Hose
2. Water Hose
3. Reserve Tank
4. Radiator Fan Switch
5. Fan Motor Lead
6. Fan Motor Breather Hose
7. Clamp

8. Clamp
9. Face the white paint upward.
10. To Thermostat
11. To Water Pump
12. To Fan Motor
13. To Final Gear Case

Cable, Wire, and Hose Routing

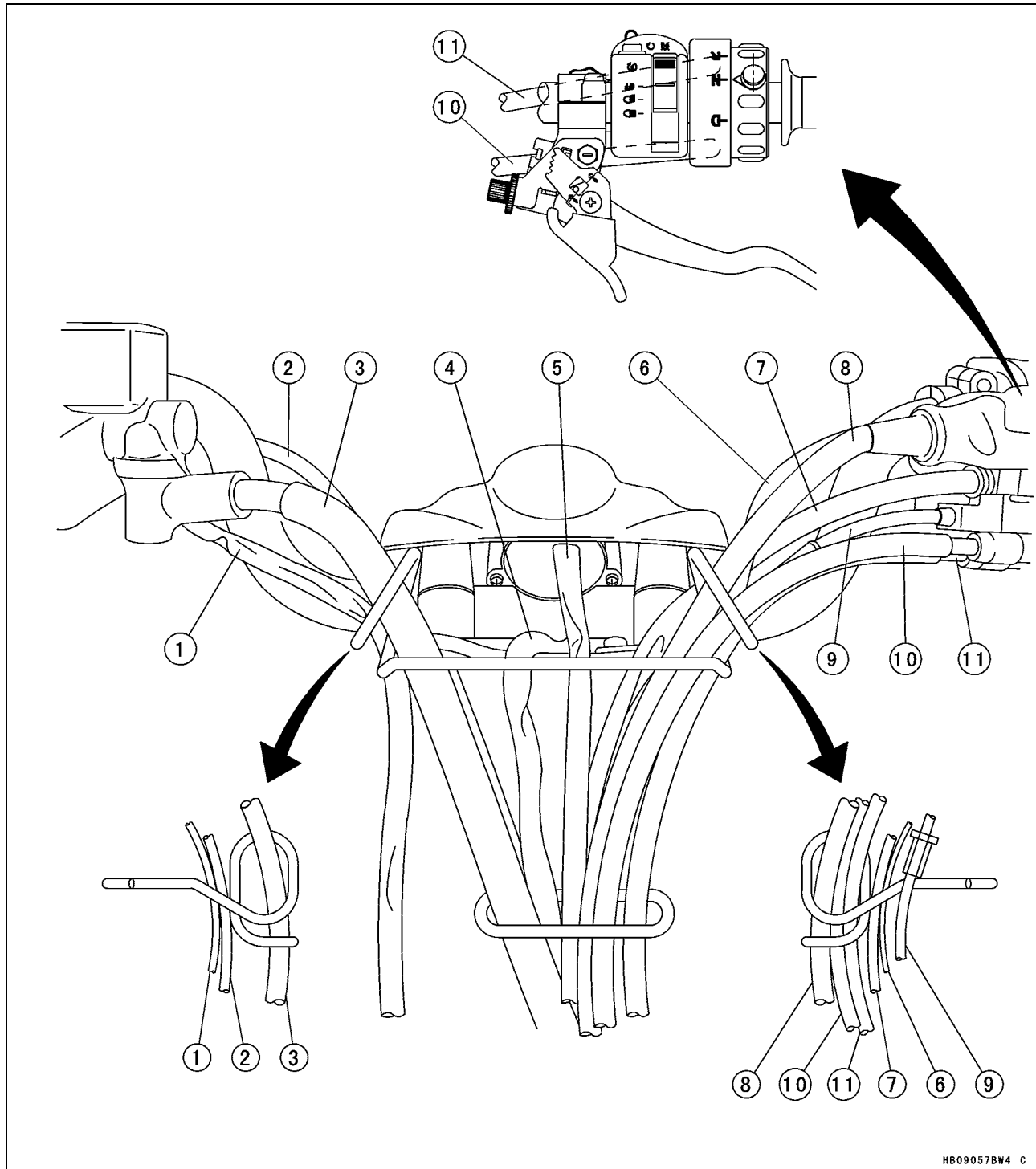


HB09256BW4 C

1. Fuel Tap
2. Fuel Tap Vacuum Hose
3. Clamp
4. Fuel Hose
5. Fuel Filter
6. To Fuel Tank
7. Face the clamp as shown.
8. Air Cleaner Duct
9. Idle Adjusting Screw (After installing the idle adjusting screw to the converter exhaust duct, push it lightly to decrease the gap "X".)
10. Converter Inlet Duct
11. Push
12. Clamps

17-16 APPENDIX

Cable, Wire, and Hose Routing

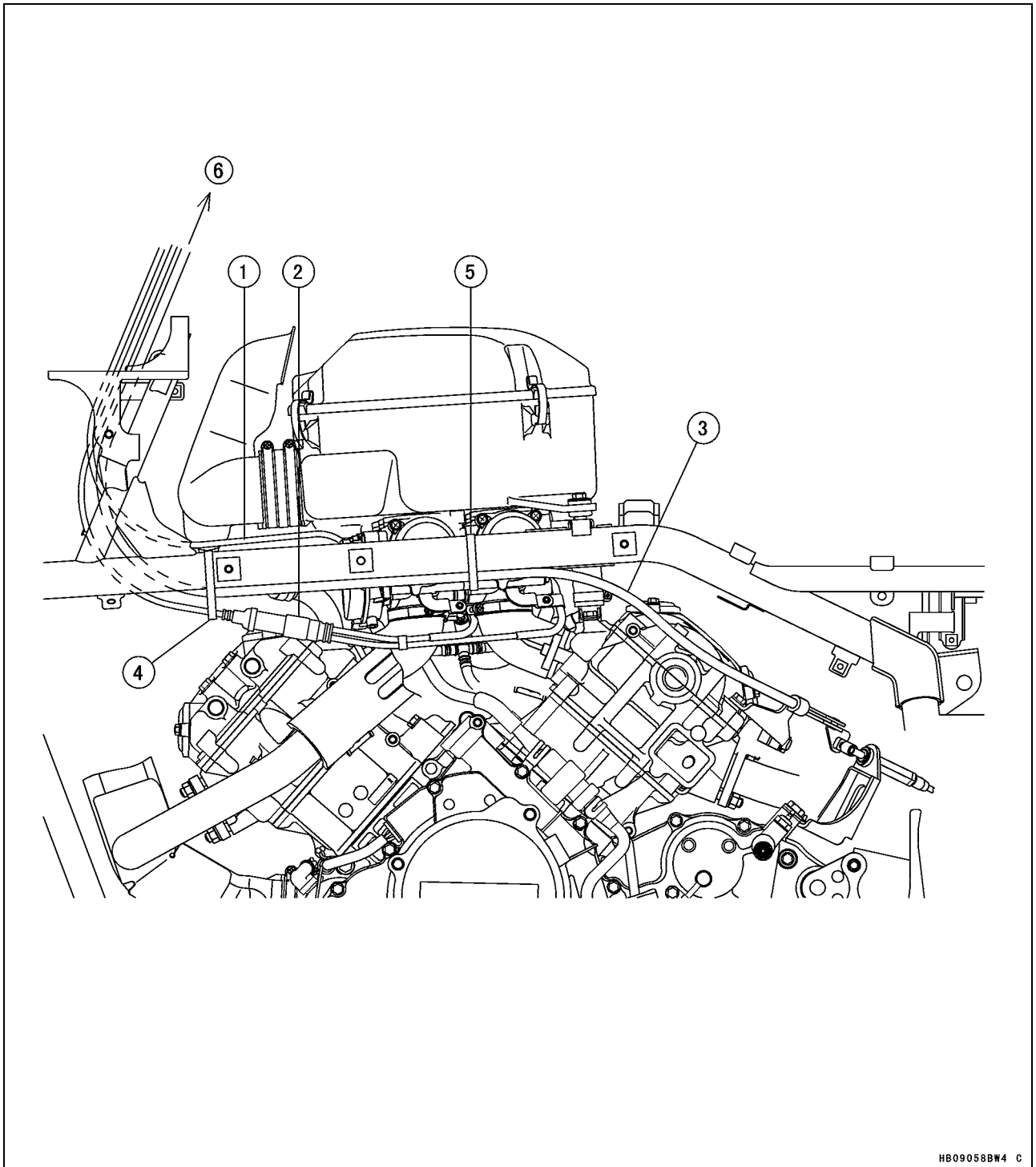


HB09057BW4 C

- 1. Front Brake Switch Lead
- 2. Throttle Cable
- 3. Front Brake Hose
- 4. Indicator Unit Lead
- 5. Ignition Switch Lead
- 6. Rear Brake Switch Lead

- 7. Left Handlebar Switch Lead
- 8. Parking Brake Cable
- 9. Choke Cable
- 10. Shift Control Cable
- 11. Shift Control Cable

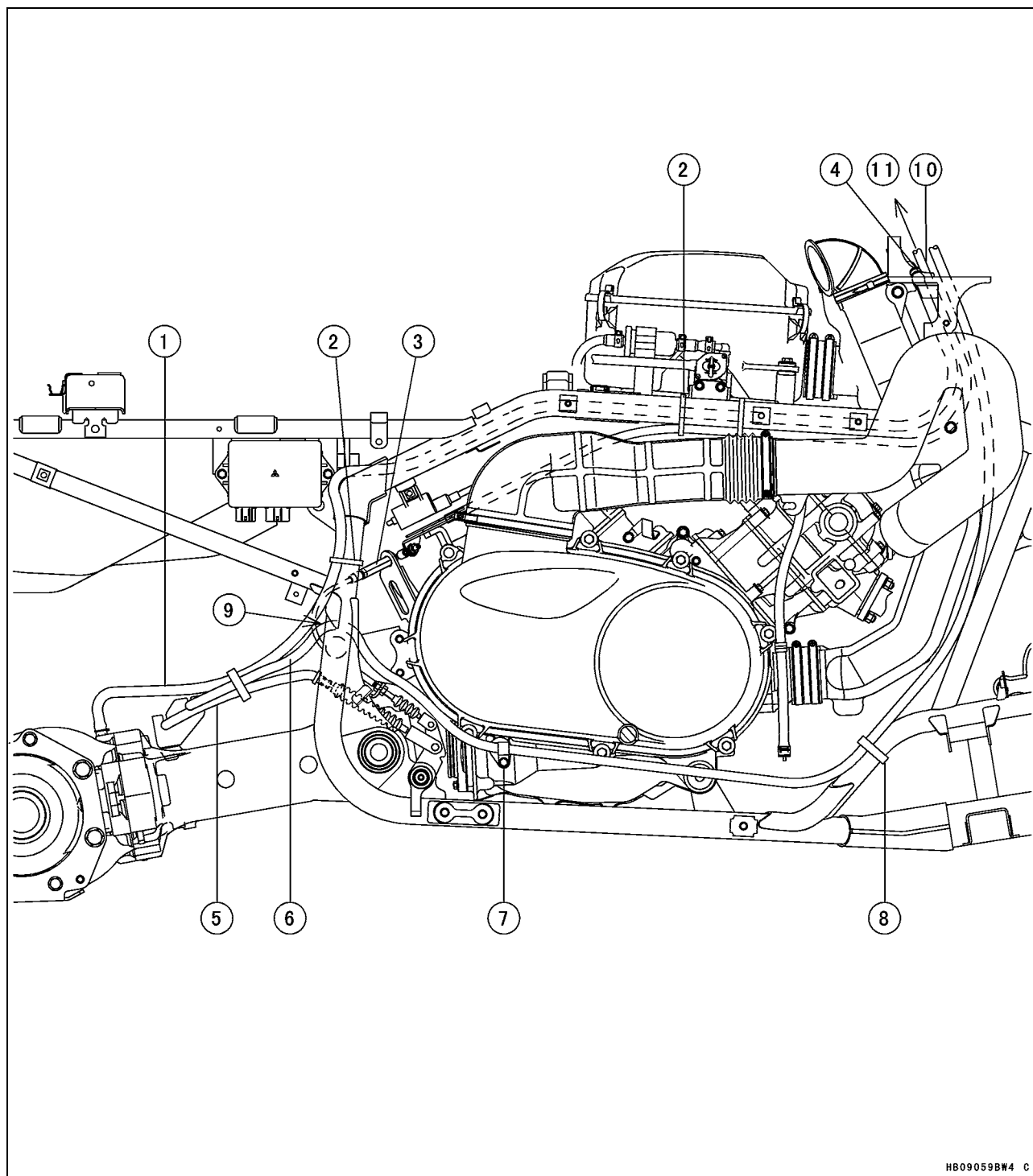
Cable, Wire, and Hose Routing



1. Throttle Cable
2. Choke Cable
3. Shift Control Cable
4. Clamp the choke cable only with the band.
5. Band
6. To Front Side of Shift Control Grip

17-18 APPENDIX

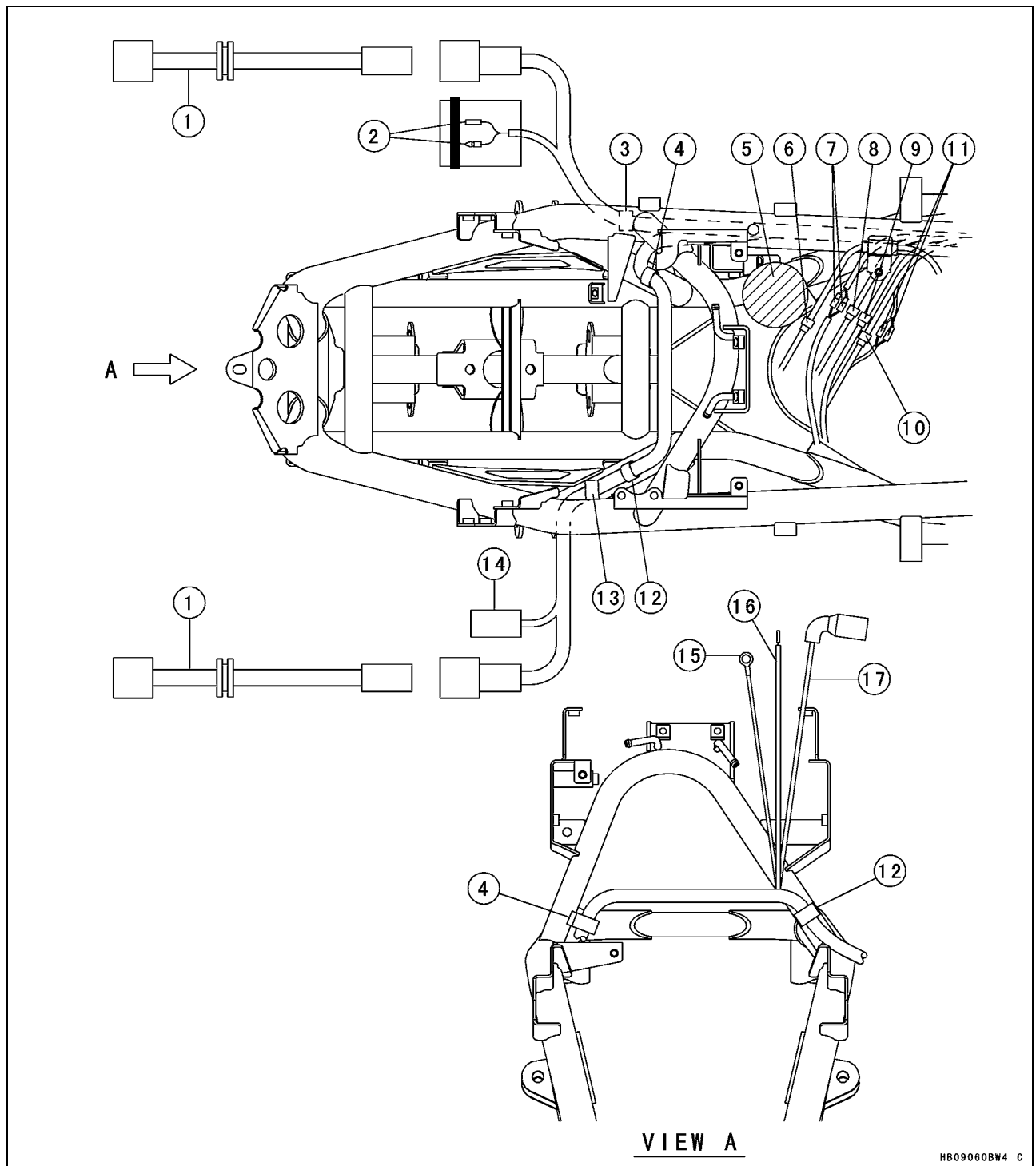
Cable, Wire, and Hose Routing



1. Final Gear Case Breather Hose
2. Band
3. Reverse Lock Cable
4. Clamp
5. Rear Brake Cable
6. Parking Brake Cable

7. Clamp
8. Band (With the Rear Brake Light Switch)
9. Run the parking brake cable through upper side on the cross pipe.
10. Shift Control Cable
11. To Rear Side of Shift Control Grip

Cable, Wire, and Hose Routing



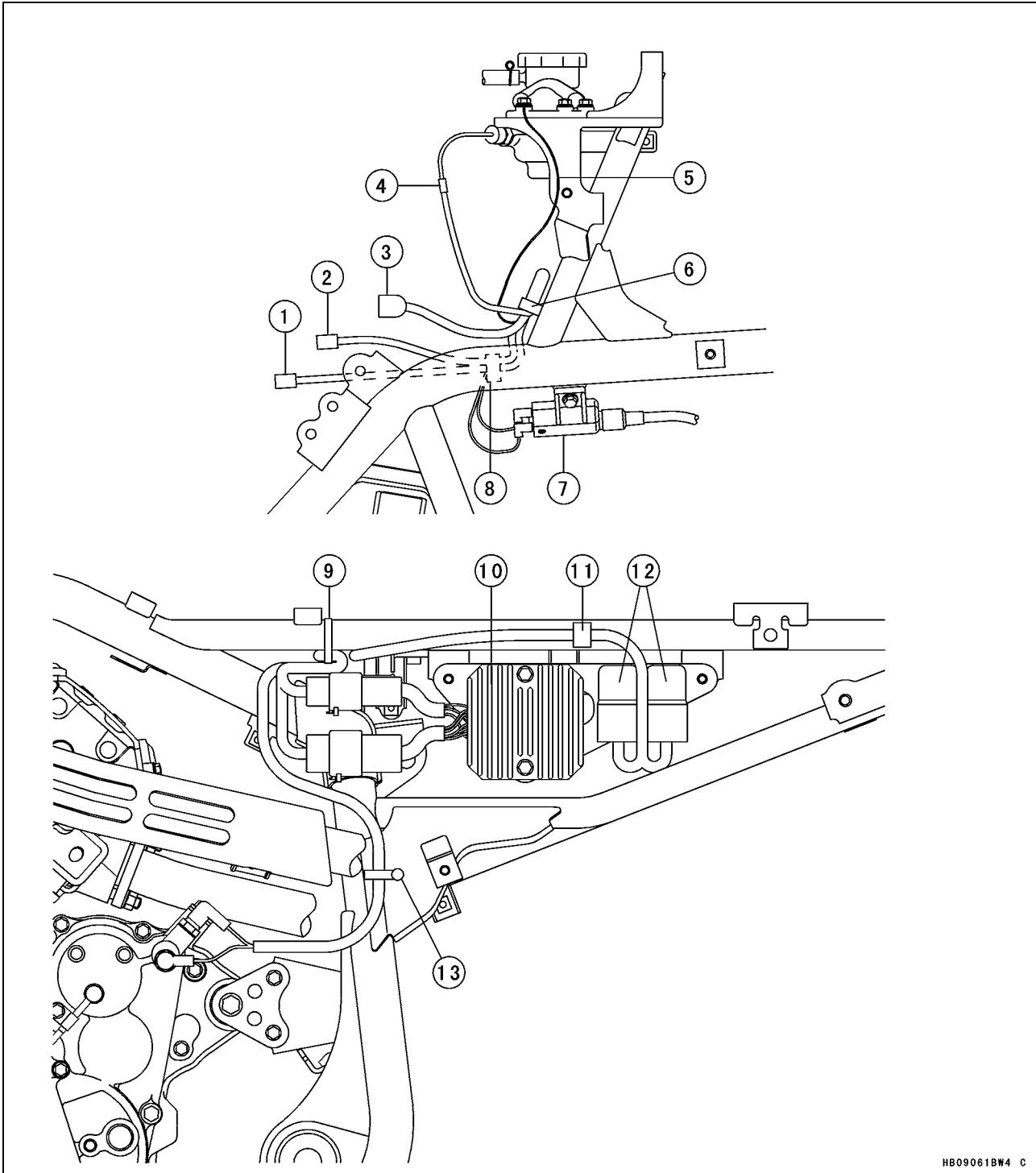
VIEW A

HB09060BW4 C

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Headlight Lead 2. Horn Connector 3. Clamp 4. Clamp 5. Converter Duct 6. Indicator Unit Lead Connector 7. Rear Brake Switch Lead Connector 8. Front Brake Switch Lead Connector 9. Ignition Switch Lead Connector 10. Left Handlebar Switch Lead Connector | <ul style="list-style-type: none"> 11. Reverse Power Assist Switch Lead Connector 12. Clamp 13. Clamp 14. Radiator Fan Connector 15. Ground (Tighten with the thermostat cover bolt.) 16. Water Temperature Sensor Lead 17. Radiator Fan Switch Lead |
|---|---|

17-20 APPENDIX

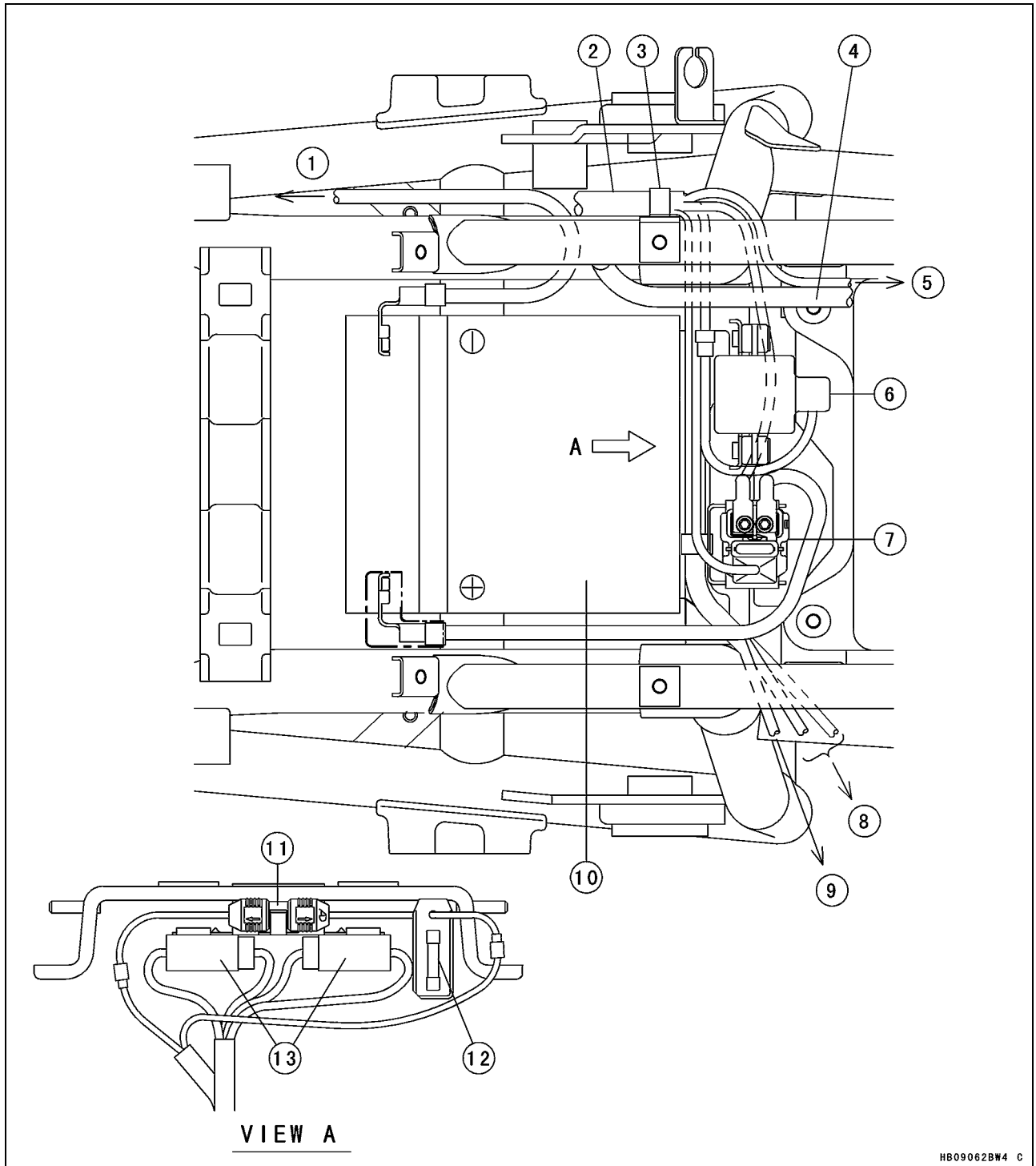
Cable, Wire, and Hose Routing



HB09061BW4 C

- | | |
|---|----------------------------|
| 1. Left Headlight Lead Connector | 7. Ignition Coil (Front) |
| 2. Radiator Fan Connector | 8. Clamp |
| 3. Radiator Fan Switch Connector | 9. Band |
| 4. Water Temperature Sensor Lead | 10. Regulator/Rectifier |
| 5. Ground (Tighten with the thermostat cover bolt.) | 11. Clamp |
| 6. Clamp | 12. Starter Circuit Relays |
| | 13. Clamp |

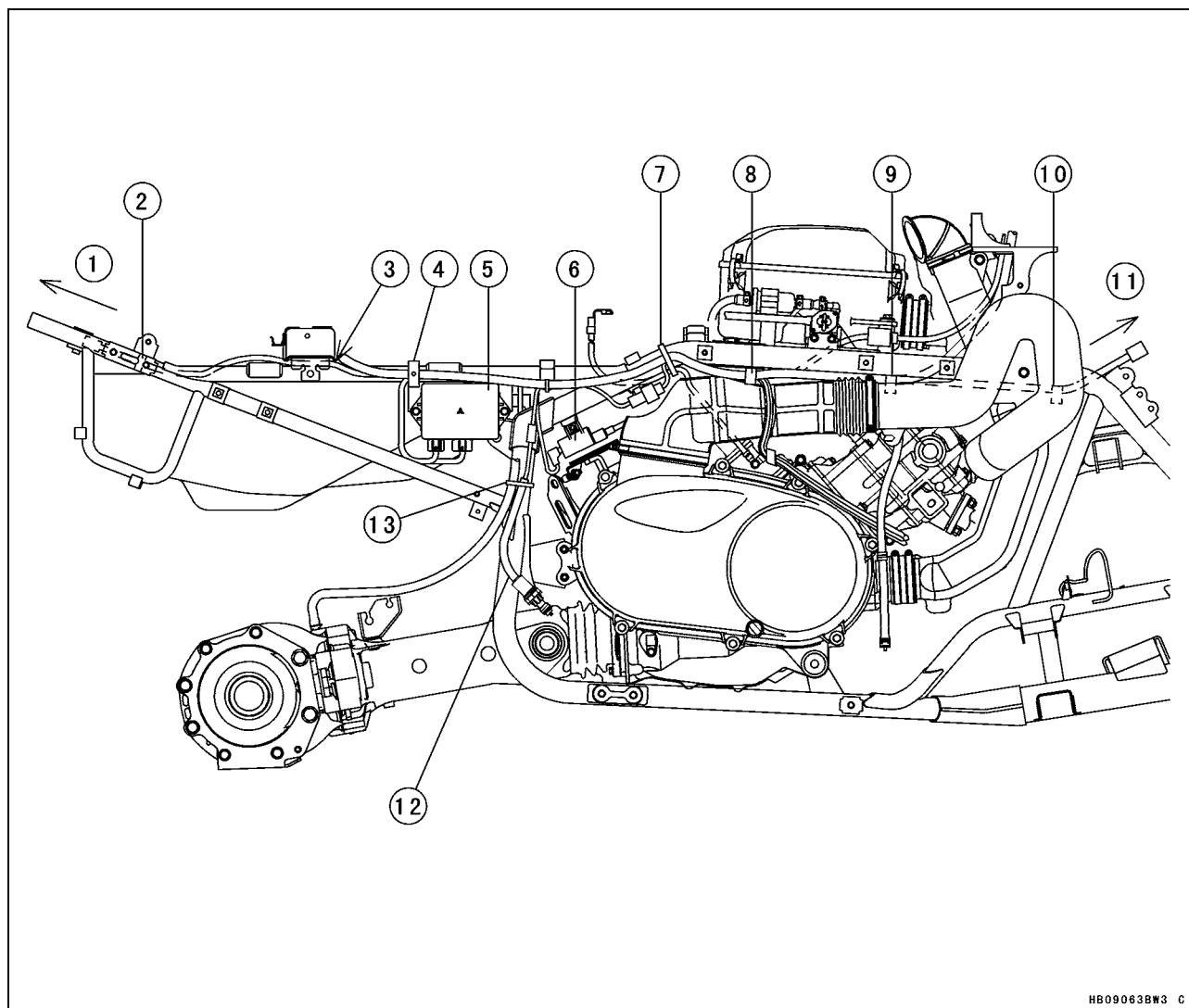
Cable, Wire, and Hose Routing



- | | |
|-----------------------------------|----------------------------------|
| 1. To Engine Ground | 8. To Regulator/Rectifier |
| 2. Main Harness | 9. To Reverse/Neutral Switch |
| 3. Clamp (Main Harness Accessory) | 10. Battery |
| 4. Fuel Tank Breather Hose | 11. Fuse Case (For Radiator Fan) |
| 5. To Tail/Brake Light | 12. Spare Fuse |
| 6. Vehicle-down Sensor | 13. Reset Connectors |
| 7. Starter Relay/Main Fuse | |

17-22 APPENDIX

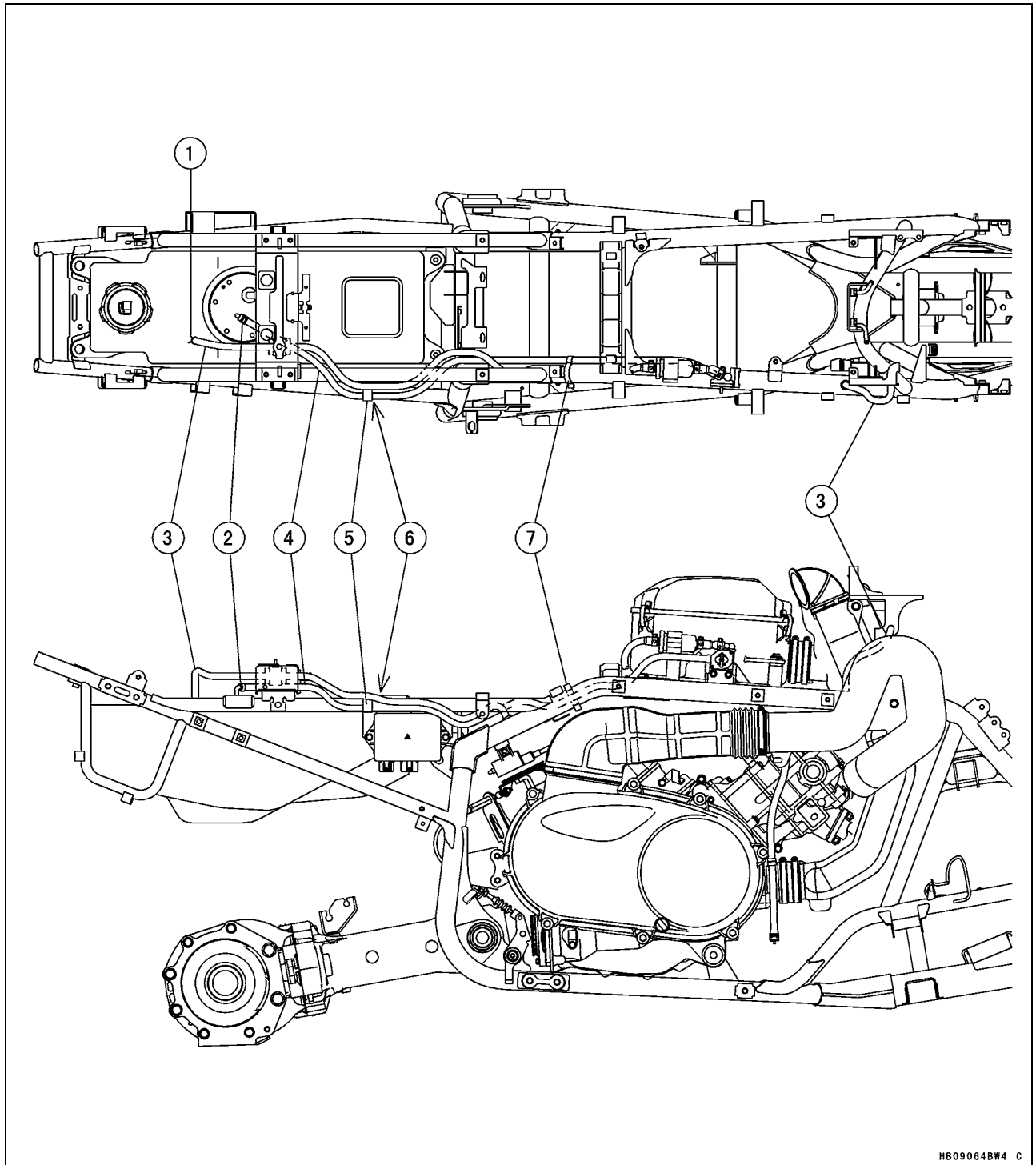
Cable, Wire, and Hose Routing



HB09063BW3 C

1. To Tail/Brake Light
2. Clamp
3. Run the main harness under the seat bracket.
4. Clamp (With the Fuel Hose)
5. Igniter
6. Ignition Coil (Rear)
7. Band (Face the end of the band upward.)
8. Clamp
9. Clamp
10. Clamp
11. To Right Headlight
12. Rear Brake Light Switch
13. Band (With the Final Gear Case Breather Hose)

Cable, Wire, and Hose Routing

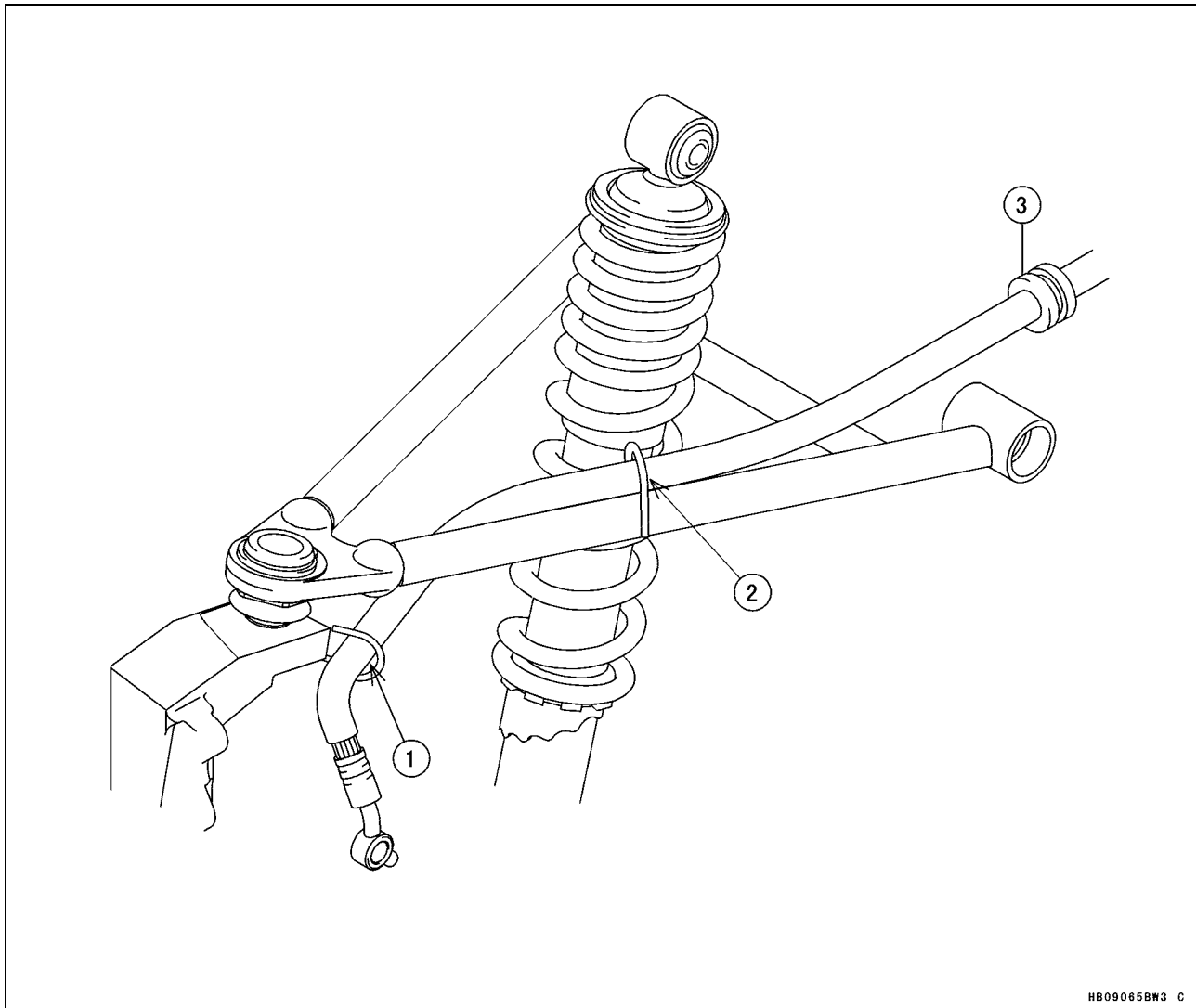


HB09064BW4 C

1. Clamp
2. Clamp
3. Fuel Tank Breather Hose
4. Fuel Hose
5. Clamp the fuel hose and main harness.
6. Run the hoses above the main harness.
7. Clamp

17-24 APPENDIX

Cable, Wire, and Hose Routing



1. Run the brake hose through the clamp. (Left Side Only)
2. Run the brake hose through the clamp on the left side suspension arm.
3. Fit the grommet to the frame clamp.

MODEL APPLICATION

Year	Model	Beginning Frame No.
2004	KSV700-A1	JKASV6A1□4B500001 or JKASV700AAB600001
2004	KSV700-B1	JKASV6B1□4B500001
2005	KSV700-A2	JKASV6A1□5B514801 or JKASV700AAB602001
2005	KSV700-B2	JKASV6B1□5B501801
2006	KSV700A6F	JKASV6A1□6B517601 or JKASV700AAB603201
2006	KSV700B6F	JKASV6B1□6B505201 or JKASV700BBB600001
2006	KSV700C6F	JKASV6C1□6B500001
2007	KSV700A7F	JKASV6A1□7B519001 or JKASV700AAB604201
2007	KSV700B7F	JKASV6B1□7B507301 or JKASV700BBB600501
2008	KSV700A8F	JKASV6A1□8B520000 or JKASV700AAB604700
2008	KSV700B8F	JKAS8V6B1□8B509800 or JKASV700BBB
2009	KSV700A9F	JKASV6A1□9B521001 or JKASV700AAB605201
2009	KSV700B9F	JKASV6B1□9B510901 or

□: This digit in the frame number changes from one machine to another.



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