Kawasaki

BRUTE FORCE 300

KVF300

All Terrain Vehicle Service Manual

Quick Reference Guide

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

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

Kawasaki

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All Terrain Vehicle Service Manual

First Edition (2) : Aug. 31, 2011

LIST OF ABBREVIATIONS

A	ampere(s)	L	liter(s)
ABDC	after bottom dead center	lb	pound(s)
AC	alternating current	LCD	liquid crystal display
Ah	ampere hour	LED	light emitting diode
ATDC	after top dead center	m	meter(s)
BBDC	before bottom dead center	min	minute(s)
BDC	bottom dead center	mmHg	millimeters of mercury
BTDC	before top dead center	mph	miles per hour
°C	degree(s) celsius	N	newton(s)
cmHg	centimeters of mercury	oz	ounce(s)
cu in	cubic inch(s)	Pa	pascal(s)
DC	direct current	PS	horsepower
F	farad(s)	psi	pound(s) per square inch
°F	degree(s) fahrenheit	qt	quart(s)
ft	foot, feet	r	revolution
g	gram(s)	rpm	revolution(s) per minute
gal	gallon(s)	s	second(s)
h	hour(s)	TDC	top dead center
HP	horsepower(s)	TIR	total indicator reading
IC	integrated circuit	V	volt(s)
in.	inch(s)	W	watt(s)
km/h	kilometers per hour	Ω	ohm(s)

COUNTRY AND AREA CODES

AU	Australia	US	United States
EUR	Europe		

EMISSION CONTROL INFORMATION
(US Model Only)

To protect the environment in which we all live, Kawasaki has incorporated crankcase emission (1), exhaust emission (2) and evaporative emission (3) 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
   This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this vehicle. The fuel, ignition and exhaust systems of this vehicle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

   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.

3. Evaporative Emission Control System
   The evaporative emission control system for this vehicle consists of low permeation fuel hoses and a fuel tank.

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

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

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

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

NOTE

○ *The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:*

1. *Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.*
2. *Tampering could include:*
   a. *Maladjustment of vehicle components such that the emission standards are exceeded.*
   b. *Use of replacement parts or accessories which adversely affect the performance or durability of the 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
- 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 or any internal portion of the muffler.
- Removal of the air cleaner housing or air cleaner housing cover.
- Modifications to the muffler or air intake system by cutting, drilling, or other means if such modifications result in increased noise levels.
- Modification to the air cleaner element.

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 symbols, heed their instructions! Always follow safe operating and maintenance practices.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

This manual contains four more symbols which will help you distinguish different types of information.

NOTE

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

- Indicates a procedural step or work to be done.

○ Indicates a procedural sub-step or how to do the work of the procedural step it follows. It also precedes the text of a NOTE.

★ Indicates a conditional step or what action to take based on the results of the test or inspection in the procedural step or sub-step it follows.

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

General Information

Table of Contents

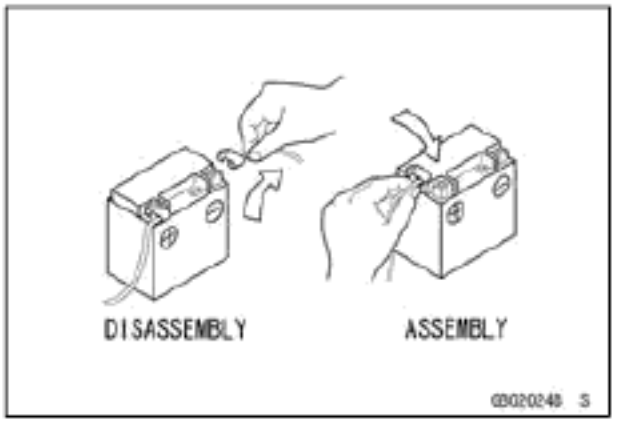
Before Servicing

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:

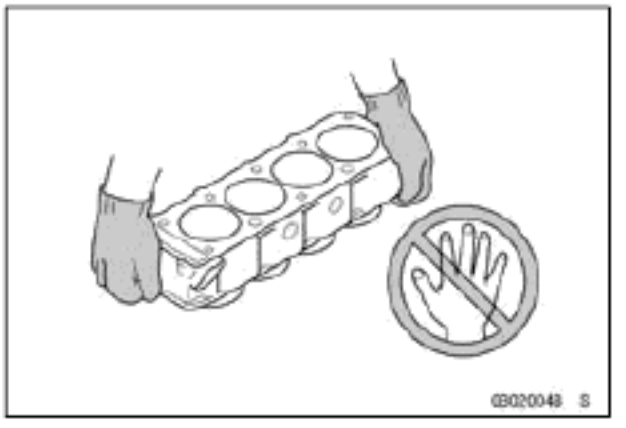
Battery Ground

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



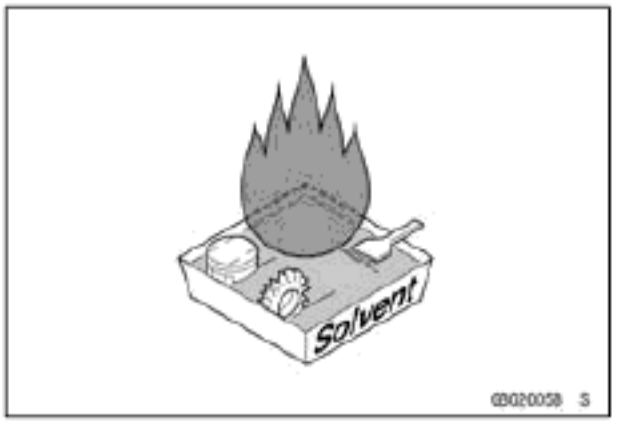
Edges of Parts

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



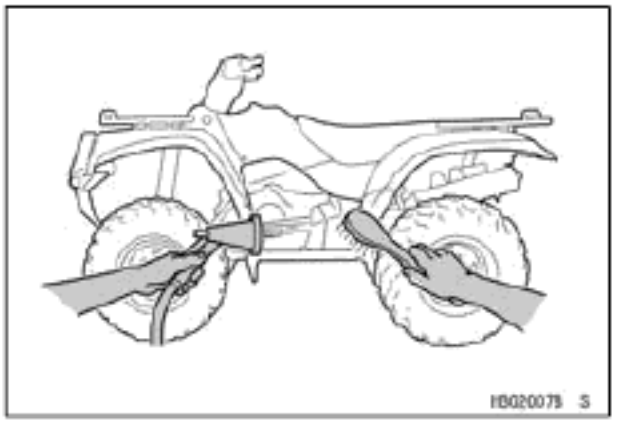
Solvent

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



Cleaning Vehicle before Disassembly

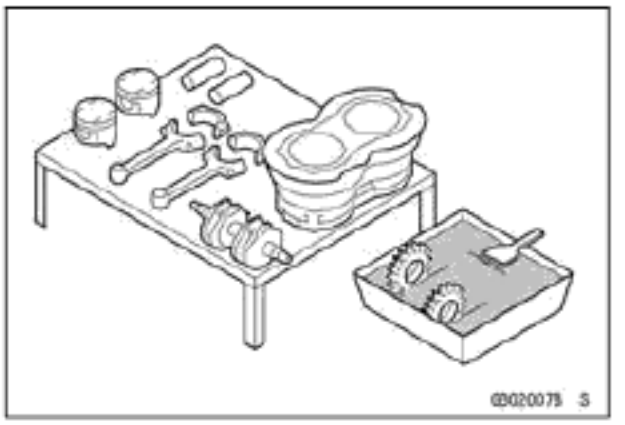
Clean the vehicle thoroughly before disassembly. Dirt or other foreign materials entering into sealed areas during vehicle disassembly can cause excessive wear and decrease performance of the vehicle.



Before Servicing

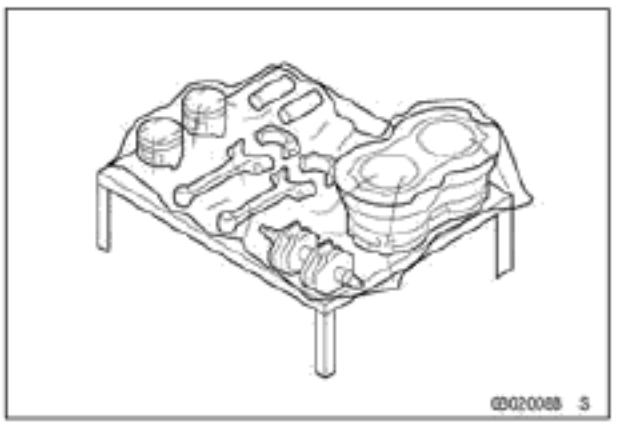
Arrangement and Cleaning of Removed Parts

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



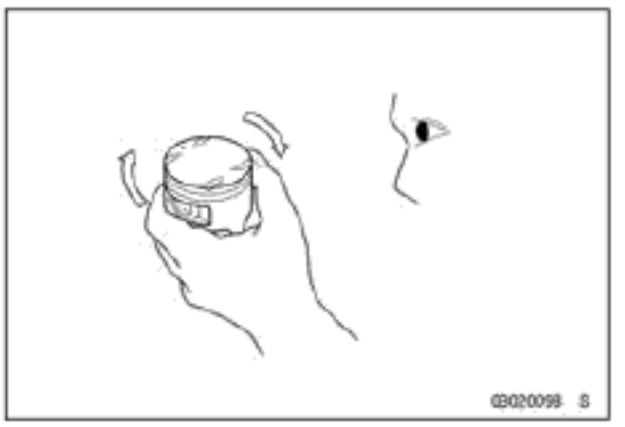
Storage of Removed Parts

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



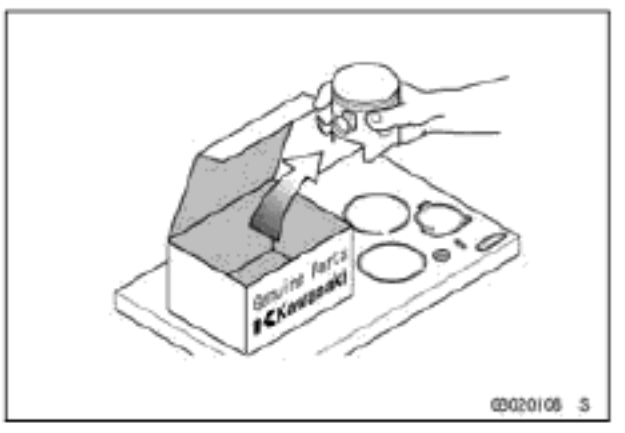
Inspection

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



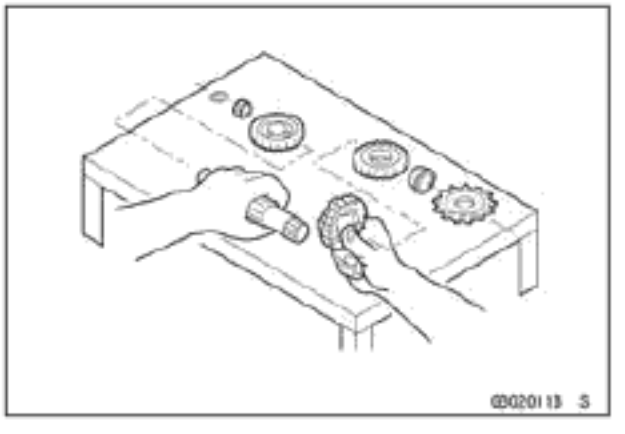
Replacement Parts

Replacement Parts must be KAWASAKI genuine or recommended by KAWASAKI. Gaskets, O-rings, Oil seals, Grease seals, circlips, cotter pins or self-locking nuts must be replaced with new ones whenever disassembled.



Assembly Order

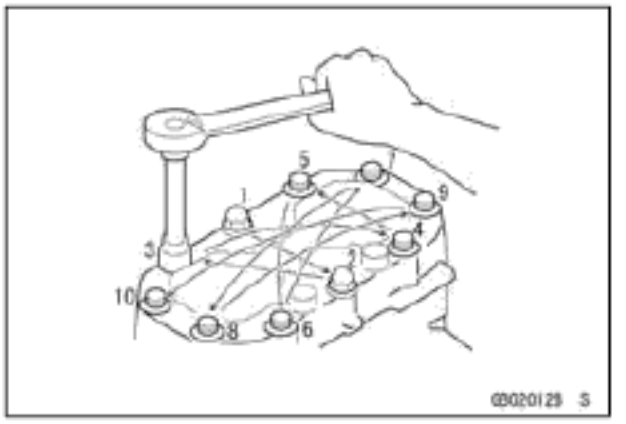
In most cases assembly order is the reverse of disassembly, however, if assembly order is provided in this Service Manual, follow the procedures given.



Before Servicing

Tightening Sequence

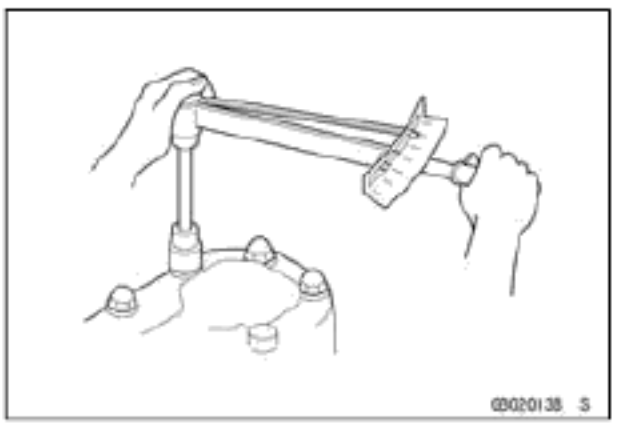
Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them according to the specified sequence to prevent case warpage or deformation which can lead to malfunction. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. If the specified tightening sequence is not indicated, tighten the fasteners alternating diagonally.



Tightening Torque

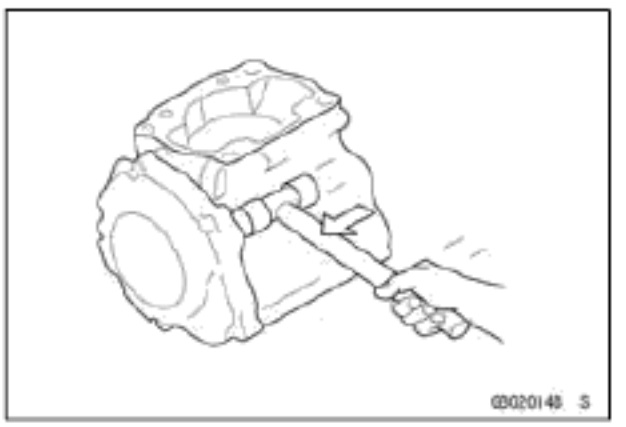
Incorrect torque applied to a bolt, nut, or screw may lead to serious damage. Tighten fasteners to the specified torque using a good quality torque wrench.

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



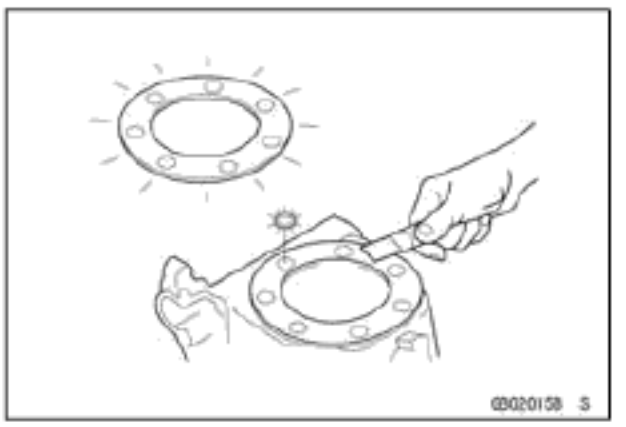
Force

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.



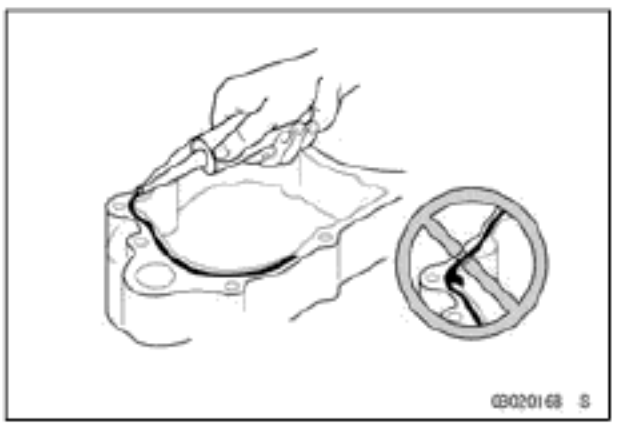
Gasket, O-ring

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

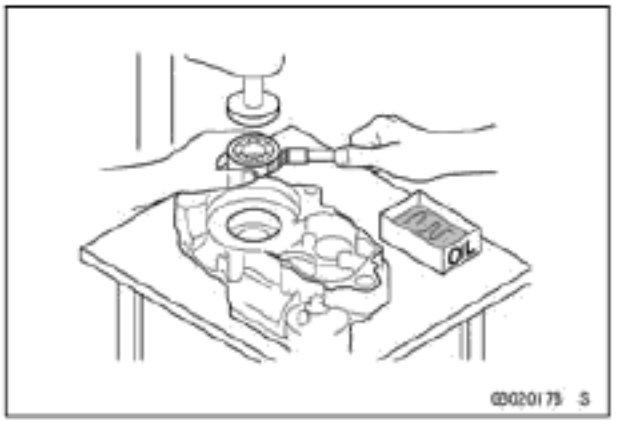
For applications that require Liquid Gasket or a Non-Permanent Locking Agent, clean the surfaces so that no oil residue remains before applying liquid gasket or locking agent. Do not apply them excessively. Excessive application can clog oil passages and cause serious damage.



Before Servicing

Press

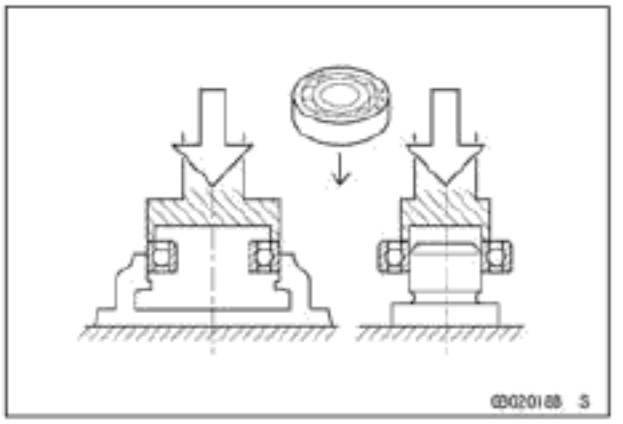
For items such as bearings or oil seals that must be pressed into place, apply small amount of oil to the contact area. Be sure to maintain proper alignment and use smooth movements when installing.



Ball Bearing and Needle Bearing

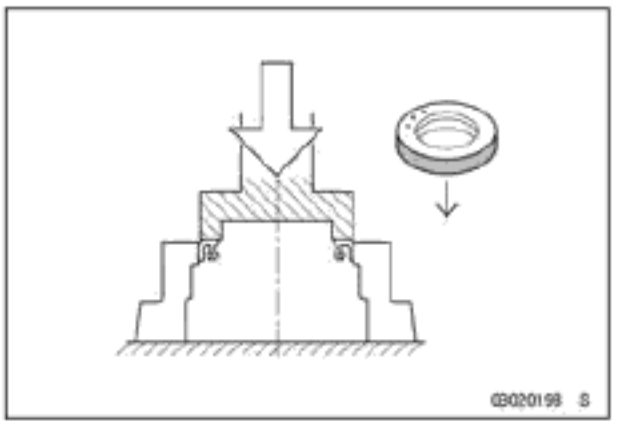
Do not remove pressed ball or needle unless removal is absolutely necessary. Replace with new ones whenever removed. Press bearings with the manufacturer and size marks facing out. Press the bearing into place by putting pressure on the correct bearing race as shown.

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

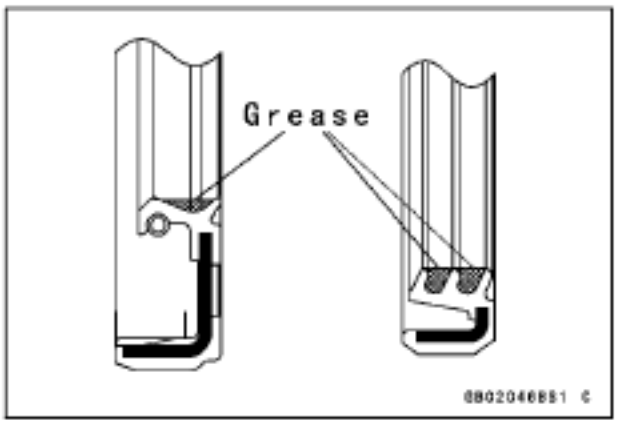


Oil Seal, Grease Seal

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.

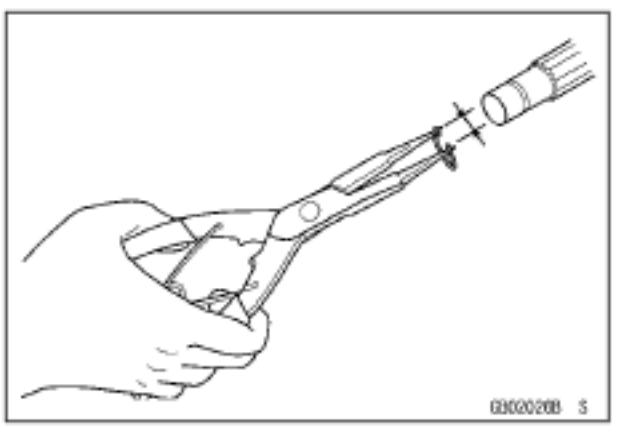


Apply specified grease to the lip of seal before installing the seal.



Circlips, Cotter Pins

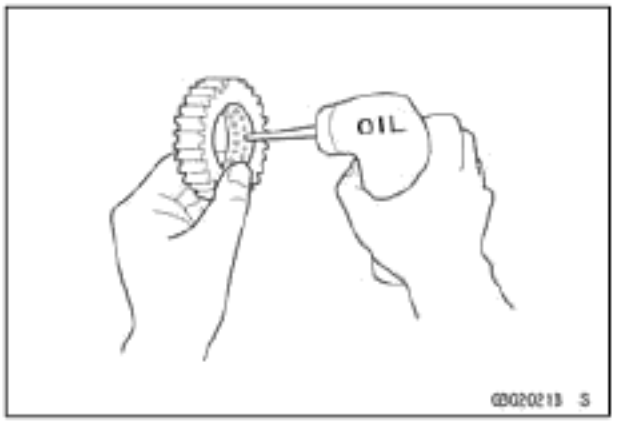
Replace circlips or cotter pins that were removed with new ones. Take care not to open the clip excessively when installing to prevent deformation.



Before Servicing

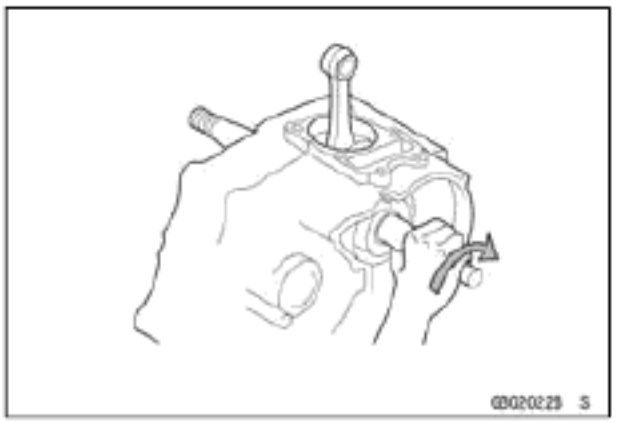
Lubrication

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



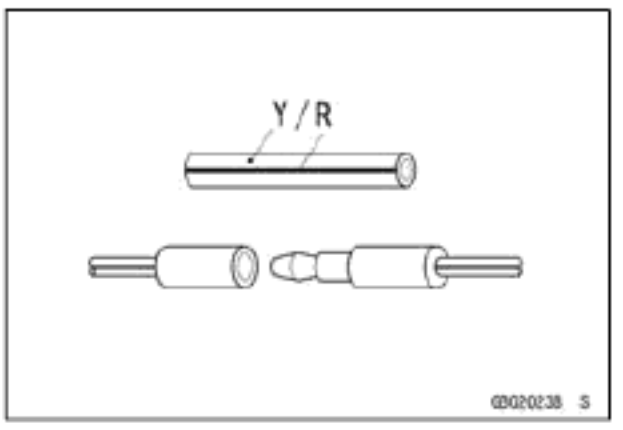
Direction of Engine Rotation

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



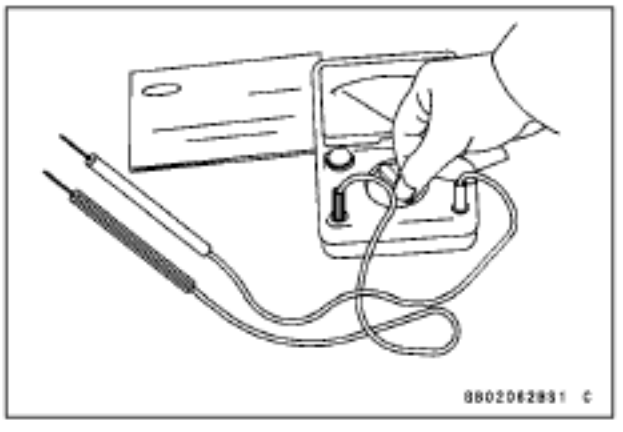
Electrical Wires

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



Instrument

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



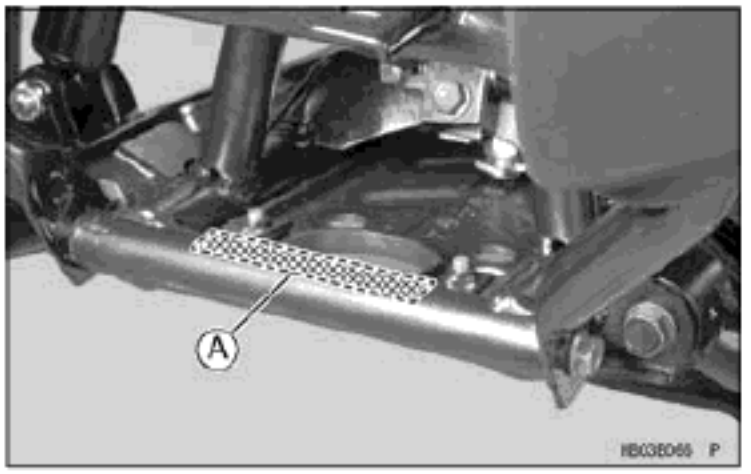
Model Identification

KVF300CC (United States) Left Side View

KVF300CC (United States) Right Side View

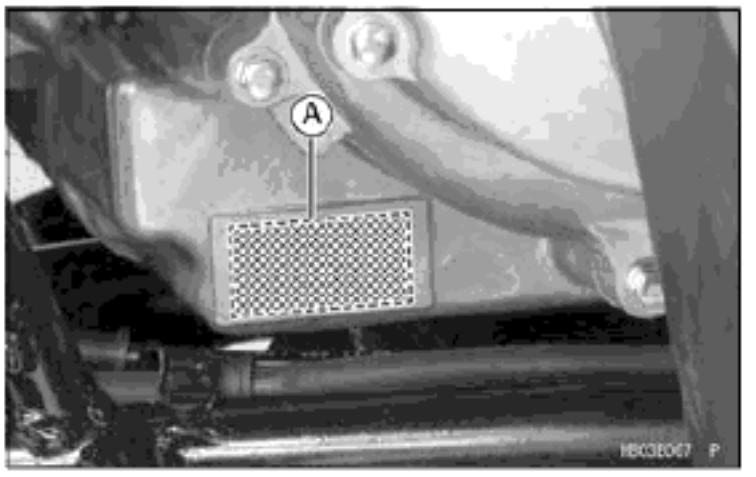
Model Identification

Frame Number



[A] Frame Number

Engine Number



[A] Engine Number

OIn this photo, the left side inner cover has been removed.

General Specifications

Items	KVF300CC
Dimensions	
Overall Length	1 915 mm (75.39 in.)
Overall Width	1 080 mm (42.52 in.)
Overall Height	1 170 mm (46.06 in.)
Wheelbase	1 165 mm (45.87 in.)
Ground Clearance	155 mm (6.10 in.)
Seat Height	845 mm (33.3 in.)
Curb Mass:	(US, AU) 243 kg (536 lb) (EUR) 242 kg (534 lb)
Front	(US, AU) 127 kg (280 lb) (EUR) 126 kg (278 lb)
Rear	116 kg (256 lb)
Fuel Tank Capacity	12 L (3.2 US gal)
Performance	
Minimum Turning Radius	2.8 m (9.2 ft)
Engine	
Type	4-stroke, SOHC, Single-cylinder
Cooling System	Liquid-cooled
Bore and Stroke	72.7 × 65.2 mm (2.86 × 2.57 in.)
Displacement	271 cm^3 (16.5 cu in.)
Compression Ratio	11.0 : 1
Maximum Horsepower	(AU, EUR) 16 kW (22 PS) @7 500 r/min (rpm) (US) – – –
Maximum Torque	(AU) 22 N·m (2.2 kgf·m, 16 ft·lb) @6 500 r/min (rpm) (EUR) 22.3 N·m (2.3 kgf·m, 16 ft·lb) @6 500 r/min (rpm) (US) – – –
Carburetion System	Carburetor, Keihin CVK32
Starting System	(US, AU) Electric starter & Recoil Starter (EUR) Electric Starter
Ignition System	Full transistor digital ignition
Timing Advance	Electronically advanced (digital)
Ignition Timing	10° BTDC @1 500 r/min (rpm)
Spark Plug	NGK DPR7EA-9
Valve Timing:	
Intake:	
Open	9° BTDC
Close	40° ABDC
Duration	229°
Exhaust:	
Open	42° BBDC
Close	7° ATDC
Duration	229°
Lubrication System	Forced lubrication (wet sump)

General Specifications

Items	KVF300CC
Engine Oil:	
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2
Viscosity	SAE 10W-40
Capacity	1.8 L (1.9 US qt)
Coolant Capacity	1.3 L (1.4 US qt)
Drive Train	
Primary Reduction System:	
Type	Belt drive torque converter (CVT)
Reduction Ratio	2.200 ~ 0.830
Clutch Type	Dry, Centrifugal
Transmission:	
Type	2-speed and reverse, Automatic
Gear Ratios:	
Forward:	
High	2.926
Low	4.147
Reverse	4.128
Final Drive System:	
Type	Shaft 2WD
Reduction Ratio	4.273
Overall Drive Ratio @ Top Gear	10.377
Transmission Gear Case Oil:	
Viscosity	SAE #90
Capacity	0.6 L (0.63 US qt)
Rear Final Gear Case Oil:	
Viscosity	SAE #80
Capacity	0.15 L (0.16 US qt)
Frame	
Type	Double tubelar
Caster (Rake Angle)	3.5°
Camber	1.0°
King Pin Angle	12°
Trail	16 mm (0.63 in.)
Tread:	
Front	850 mm (33.5 in.)
Rear	830 mm (32.7 in.)
Rim Size:	
Front	10 × 5.5AT
Rear	10 × 8.0AT
Front Tire:	
Type	Tubeless
Size	AT22 × 7-10

General Specifications

Items	KVF300CC
Rear Tire:	
Type	Tubeless
Size	AT22 × 10-10
Suspension:	
Front:	
Type	Double Wishbone
Wheel Travel	131 mm (5.16 in.)
Rear:	
Type	Swingarm
Wheel Travel	141 mm (5.55 in.)
Brake:	
Front	Disc × 2
Rear	Disc
Parking Brake	Disc (Mechanical)
Electrical Equipment	
Battery	12 V 10 Ah
Headlight:	
Type	Semi-sealed beam
Bulb	12 V 35/35 W × 2
Tail/Brake Light:	
Bulb	12 V 5/21 W × 2
Alternator:	
Type	Three-phase AC
Rated Output	14 A/14 V @5 000 r/min (rpm)

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

Unit Conversion Table

Prefixes for Units:

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

Units of Mass:

kg	×	2.205	=	lb
g	×	0.03527	=	oz

Units of Volume:

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

Units of Force:

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

Units of Length:

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

Units of Torque:

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

Units of Pressure:

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

Units of Speed:

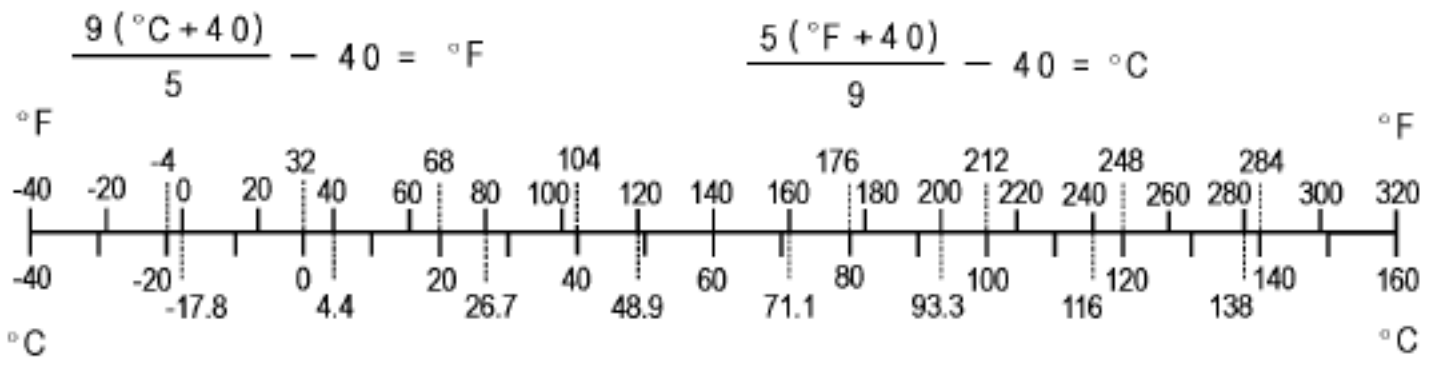
km/h	×	0.6214	=	mph

Units of Power:

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

Units of Temperature

$$\frac{9\,(°C + 40)}{5} - 40 = °F \qquad \frac{5\,(°F + 40)}{9} - 40 = °C$$



Periodic Maintenance

Table of Contents

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 / OPERATION	First Service	Regular Service		
	After 150 km (100 mi.) or 1 month of use	Every 1 000 km (600 mi.) or 6 months of use whichever comes first	Every 2 000 km (1 200 mi.) or year of use whichever comes first	See page
ENGINE				
Engine oil - change*	•	•	•	2-23
Oil screen - clean*	•	•	•	2-24
Transmission oil - inspect*	•		•	2-24
Transmission oil - change*	•		•	2-25
Air cleaner element - clean and inspect*	Every 20 ~ 40 hours (150 ~ 300 km, 100 ~ 200 mi.)			2-13
Idle speed - inspect	•	•	•	2-12
Throttle lever play - inspect	•	•	•	2-12
Breather hose and connections - inspect		•	•	2-14
Converter drive belt wear - inspect*			•	2-22
Spark plug - clean and gap	•	•	•	2-36
Fuel hose and connections - inspect		•	•	2-14
Valve clearance - inspect*	•	•	•	2-20
Spark arrester - clean		•	•	2-21
Coolant leak (water hose and pipe) - inspect	•	•	•	2-15
Coolant - change*	Every 2 years			2-16
Exhaust gas leak - inspect		•	•	2-22
Radiator - clean and inspect*	•	•	•	2-15
Radiator hose - replace	Every 3 years			2-19
Fuel hose - replace	Every 5 years			2-14
CHASSIS				
Final gear case oil - inspect	•		•	2-28
Final gear case oil - change	•		•	2-28
Brake operation - inspect	•	•	•	2-29
Brake fluid level - inspect	•	•	•	2-32
Brake pad wear - inspect*	•	•	•	2-30
Parking brake - inspect	•		•	2-35
Wheel/tire damage - inspect	•	•	•	2-26
Rim runout - inspect	•	•	•	2-27
Wheel bearings damage - inspect	•	•	•	2-26

2-4 PERIODIC MAINTENANCE

Periodic Maintenance Chart

OPERATION / FREQUENCY	First Service	Regular Service		
	After 150 km (100 mi.) or 1 month of use	Every 1 000 km (600 mi.) or 6 months of use whichever comes first	Every 2 000 km (1 200 mi.) or year of use whichever comes first	See page
Steering - inspect	●	●	●	2-35
Toe-in - inspect	●	●	●	2-27
General lubrication - perform*		●	●	2-37
Nut, bolt, and fastener tightness - inspect	●	●	●	2-39
Brake hose-replace	Every 4 years			2-30
Brake fluid - change	Every year			2-32
Joint boots - ispect	●	●		2-36

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

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

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:
EO: Apple engine oil.
L: Apply a non-permanent locking agent.
Lh: Left-hand Threads
R: Replacement Parts
S: Follow the specific tightening sequence.
SS: Apply silicone sealant (Liquid Gasket, TB1211: 56019-120).
St: Stake the fasteners to prevent loosening.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System				
Fuel Tank Bolts and Nuts	12	1.2	106 in·lb	
Cooling System				
Radiator Mounting Bolts	12	1.2	106 in·lb	
Radiator Fan Switch	22	2.2	16	SS
Thermostat Housing Mounting Bolt	9.8	1.0	87 in·lb	
Water Pump Cover Bolts	9.8	1.0	87 in·lb	
Water Pump Impeller	12	1.2	106 in·lb	Lh
Water Temperature Sensor	15	1.5	11	SS
Engine Top End				
Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb	
Camshaft Cap Nuts	25	2.5	18	EO
Camshaft Chain Tensioner Cap Bolt	4.2	0.43	37 in·lb	
Camshaft Chain Tensioner Mounting Bolts	12	1.2	106 in·lb	
Carburetor Holder Nuts	9.8	1.0	87 in·lb	
Clean Air System Pipe Mounting Bolt	9.8	1.0	87 in·lb	
Clean Air System Pipe Mounting Nuts	9.8	1.0	87 in·lb	
Cylinder Head Bolts	9.8	1.0	87 in·lb	
Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	
Cylinder Head Stud Bolts	9.0	0.92	80 in·lb	
Exhaust Pipe Cover Mounting Bolts	11	1.1	97 in·lb	
Muffler Body Mounting Bolt	20	2.0	15	
Muffler Body Mounting Nut	20	2.0	15	
Plug	21	2.1	15	
Rear Camshaft Chain Guide Bolt	9.8	1.0	87 in·lb	
Spark Arrester Mounting Bolt	11	1.1	97 in·lb	
Stud Bolts (for Cylinder/Cylinder Head)	9.0	0.92	80 in·lb	
Valve Adjusting Screw Locknuts	8.8	0.90	78 in·lb	EO
Converter System				
Clutch Driven Plate Nut	54	5.5	40	
Drive Pulley Nut	93	9.5	69	EO
Driven Pulley Nut	54	5.5	40	
Driven Shaft Bearing Retainer Bolt	9.8	1.0	87 in·lb	L
Torque Converter Cover Bolts	9.8	1.0	87 in·lb	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Torque Converter Outer Cover Bolts (EU Model)	9.8	1.0	87 in-lb	
Recoil Starter				
Recoil Starter Mounting Bolts (AU, US Models)	9.8	1.0	87 in-lb	
Engine Lubrication System				
Engine Oil Drain Plug	25	2.5	18	
Engine Oil Level Inspection Window Retainer Bolt	9.8	1.0	87 in-lb	
Engine Oil Screen Plug	15	1.5	11	
Oil Pump Chain Cover Bolts	9.8	1.0	87 in-lb	
Oil Pump Cover Screw	2.0	0.20	18 in-lb	
Oil Pump Mounting Bolts	9.8	1.0	87 in-lb	
Engine Removal/Installation				
Engine Bracket Mounting Bolts	26	2.7	19	
Front Engine Mounting Nut	39	4.0	29	R
Lower Engine Mounting Nut	39	4.0	29	R
Upper Engine Mounting Nut	39	4.0	29	R
Crankshaft/Transmission				
Crankcase Bolts	9.8	1.0	87 in-lb	L
Driven Pulley Bearing Retainer Bolt	9.8	1.0	87 in-lb	L
Output Drive Bevel Gear Cover Bolts	9.8	1.0	87 in-lb	
Output Drive Bevel Gear Nut	98	10	72	St
Output Driven Bevel Gear Nut	98	10	72	St
Output Driven Shaft Housing Bolts	9.8	1.0	87 in-lb	
Shift Bracket Nuts	20	2.0	15	
Shift Drum Stopper Plug	47	4.8	35	
Shift Lever Clamp Bolt	9.8	1.0	87 in-lb	
Speedometer Cable Holder	9.8	1.0	87 in-lb	
Tie-Rod End Nuts	26	2.7	19	
Transmission Case Cover Bolts	26	2.7	19	
Transmission Oil Drain Plug	9.8	1.0	87 in-lb	
Transmission Oil Filler Bolt	20	2.0	15	
Transmission Oil Level Inspection Bolt	9.8	1.0	87 in-lb	
Wheel/Tires				
Front Wheel Hub Nuts	69	7.0	51	
Front Wheel Nuts	54	5.5	40	S
Rear Wheel Hub Nuts	147	15.0	108	R, L
Rear Wheel Nuts	54	5.5	40	S
Final Drive				
Final Gear Case Cover Bolts (M10)	39	4.0	29	L
Final Gear Case Cover Bolts (M8)	26	2.7	19	
Final Gear Case Guard Bolts	31	3.2	23	
Final Gear Case Mounting Bolts	54	5.5	40	
Final Gear Case Oil Drain Bolt	20	2.0	15	
Final Gear Case Oil Filler Cap	15	1.5	11	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Final Gear Case Oil Level Inspection Bolt	20	2.0	15	
Pinion Gear Bearing Holder Nut	98	10	72	
Brakes				
Bleed Valves	6.0	0.61	53 in·lb	
Brake Caliper Mounting Bolts	26	2.7	19	
Brake Disc Mounting Bolts	34	3.5	25	
Brake Hose Banjo Bolts	34	3.5	25	
Front Brake Pad Pin Bolts	18	1.8	13	
Front Master Cylinder Clamp Bolts	12	1.2	106 in·lb	S
Parking Brake Adjusting Locknut	16	1.6	12	
Rear Brake Proportioning Valve Mounting Bolts	9.8	1.0	87 in·lb	
Rear Master Cylinder Mounting Bolts	12	1.2	106 in·lb	S
Rear Master Cylinder Clamp Bolts	12	1.2	106 in·lb	
Suspension				
Front Shock Absorber Mounting Nuts	39	4.0	29	R
Rear Shock Absorber Mounting Nuts	39	4.0	29	R
Steering Knuckle Pivot Nuts	30	3.1	22	
Suspension Arm Mounting Nuts	44	4.5	32	R
Swingarm Pivot Bolt Left Shaft	11	1.1	97 in·lb	
Swingarm Pivot Locknut	116	11.8	85.6	
Swingarm Pivot Right Shaft	116	11.8	85.6	
Steering				
Handle Holder Nuts	39	4.0	29	
Handlebar Holder Bolts	26	2.7	19	S
Steering Shaft Bottom End Nut	69	7.0	51	R
Steering Shaft Holder Bolts	26	2.7	19	
Suspension Arm Joint Nuts	34	3.5	25	
Tie-rod End Nuts	25	2.5	18	
Tie-rod Locknuts	25	2.5	18	Lh (2)
Frame				
Footboard Bracket Bolts	26	2.7	19	
Front Carrier Bolts (M8)	26	2.7	19	
Front Carrier Bracket Bolts	26	2.7	19	
Front Guard Bolts	26	2.7	19	
Rear Carrier Bolts (M8)	26	2.7	19	
Footboard Bolts	26	2.7	19	
Electrical System				
Alternator Cover Bolts	9.8	1.0	87 in·lb	
Alternator Rotor Nut	59	6.0	44	
Alternator Rotor Nut Cap Bolts	9.8	1.0	87 in·lb	
Alternator Stator Bolts	9.8	1.0	87 in·lb	
Crankshaft Sensor Mounting Screws	7.4	0.75	65 in·lb	
Gear Position Switch Mounting Bolt	9.8	1.0	87 in·lb	

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Spark Plug	18	1.8	13	
Starter Motor Clutch Bolts	20	2.0	15	L
Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	

Specifications

Item	Standard	Service Limit
Fuel System		
Throttle Lever Free Play	1 ~ 4 mm (0.04 ~ 0.16 in.)	– – –
Idle Speed	1 500 ±100 r/min (rpm)	– – –
Air Cleaner Element Oil	High-quality foam air filter oil	– – –
Cooling System		
Coolant:		
Type (Recommended)	Permanent type antifreeze	– – –
Color	Green	– – –
Mixed Ratio	Soft water 70%, Coolant 30%	– – –
Freezing Point	–15°C (5°F)	– – –
Total Amount	1.3 L (1.4 US qt)	– – –
Engine Top End		
Valve Clearance:		
Exhaust	0.08 ~ 0.12 mm (0.0032 ~ 0.0048 in.)	– – –
Intake	0.08 ~ 0.12 mm (0.0032 ~ 0.0048 in.)	– – –
Converter System		
Belt Width	23.6 ~ 24.4 mm (0.929 ~ 0.961 in.)	22 mm (0.87 in.)
Engine Lubrication System		
Engine Oil:		
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	– – –
Viscosity	SAE 10W-40	– – –
Capacity	1.6 L (1.7 US qt)	– – –
	1.8 L (1.9 US qt) (When engine is completely dry)	– – –
Crankshaft/Transmission		
Transmission Oil:		
Type	2-SP AUTOMATIC, REV	– – –
Viscosity	SAE#90	– – –
Oil Level	Inspection bolt opening bottom	– – –
Capacity	0.6 L (0.63 US qt)	– – –
Wheels/Tires		
Tire Tread Depth:		
Front	– – –	3 mm (0.12 in.)
Rear	– – –	3 mm (0.12 in.)
Standard tire:		
Front	AT 22 × 7-10	– – –
	MAXXIS, M937, Tubeless	– – –
Rear	AT 22 × 10-10	– – –
	MAXXIS, M938, Tubeless	– – –
Rim Runout (with tire installed):		
Axial	– – –	TIR 2 mm (0.08 in.)
Radial	– – –	TIR 2 mm (0.08 in.)
Toe-in	2.5 ~ 17.5 mm (0.098 ~ 0.689 in.) at 1 G*	– – –

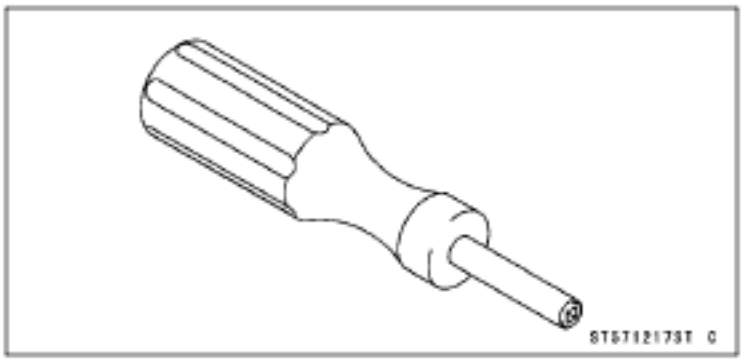
Specifications

Item	Standard	Service Limit
Final Drive		
Final Gear Case:		
Gear Case Oil:		
Viscosity	SAE#80	– – –
Oil Level	Inspection bolt opening bottom	– – –
Capacity	0.15 L (0.16 US qt)	– – –
Brakes		
Brake Fluid:		
Type	DOT4	– – –
Disc Brake:		
Pad Lining Thickness	5.5 mm (0.22 in.)	1 mm (0.04 in.)
Electrical System		
Spark Plug Type	NGK DPR7EA-9	– – –
Spark Plug Gap	0.8 ~ 0.9 mm (0.032 ~ 0.036 in.)	– – –

1 G*: The tires are grounded without the person and load.

Special Tool

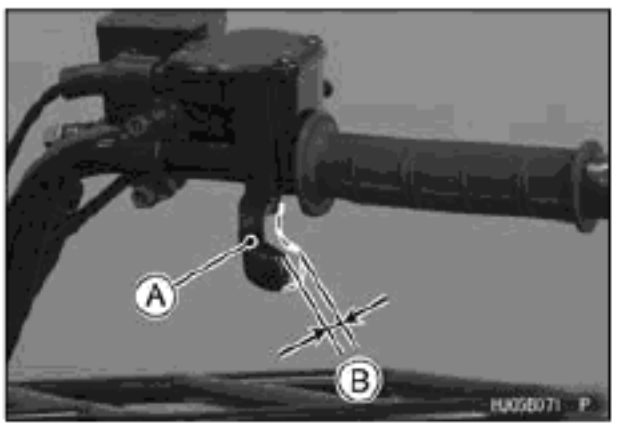
Valve Adjusting Screw Holder:
57001-1217



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 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.

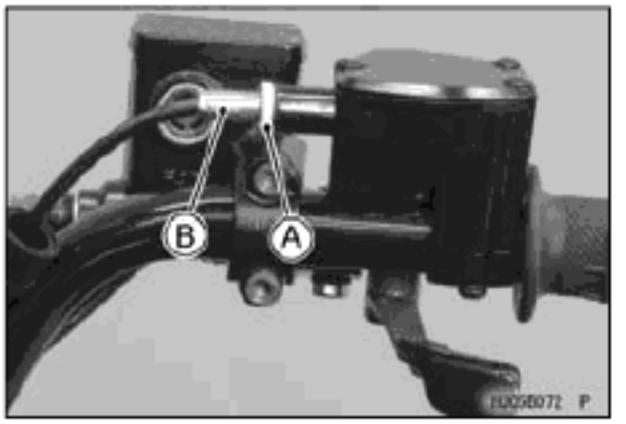
- Stop the engine and check the throttle lever free play [B].

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

Throttle Lever Free Play

Standard: 1 ~ 4 mm (0.04 ~ 0.16 in.)

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 adjuster [B] until the cable has proper amount of play.
- Tighten the locknut and reinstall the rubber cover.

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. Follow the service manual to make sure to correct any of these conditions.

- Check idle speed with a suitable tachometer.

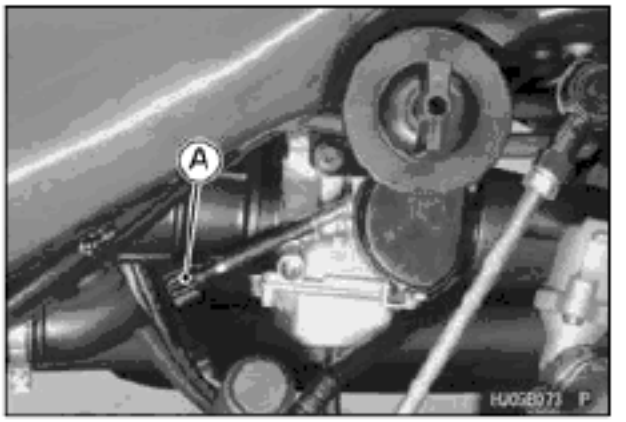
★If the idle speed is out of the specified range, adjust it.

Idle Speed

Standard: 1 500 ±100 r/min (rpm)

Periodic Maintenance Procedures

Idle Speed Adjustment



- Start the engine and warm it up thoroughly.
- Turn the adjusting screw [A] until the idle speed is correct.

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

Air Cleaner Element Cleaning and Inspection

NOTE

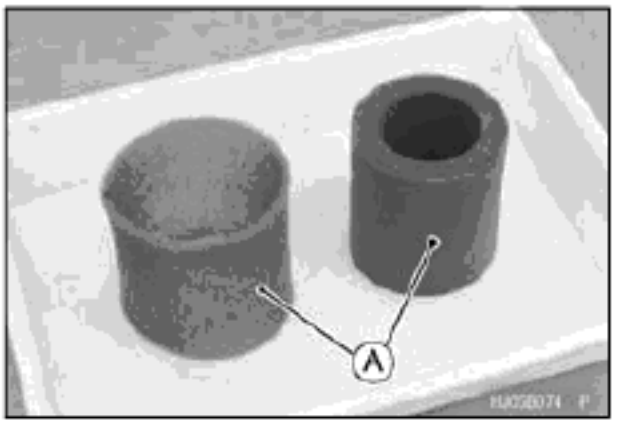
○*In dusty areas, the element should be cleaned more frequently than the recommended interval.*

○*After riding through rain or muddy terrains, the element should be cleaned immediately.*

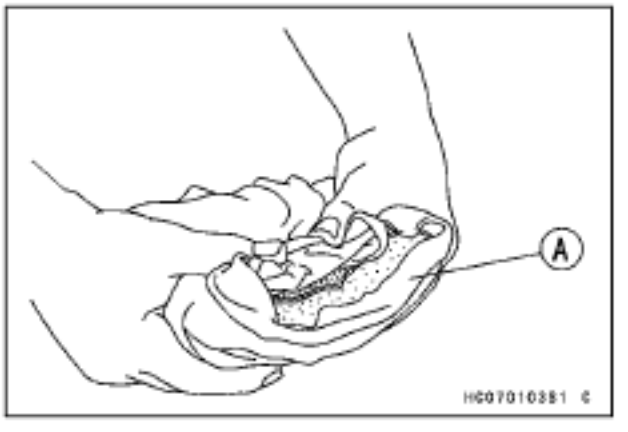
○*Also, if there is a break in the element material or any other damage to the element, replace the element with a new one.*

⚠ WARNING

Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. Clean the element in a well-ventilated area, and take care that there is no spark or flame anywhere near the working areas. Do not use gasoline or low flash-point solvents to clean the element.



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



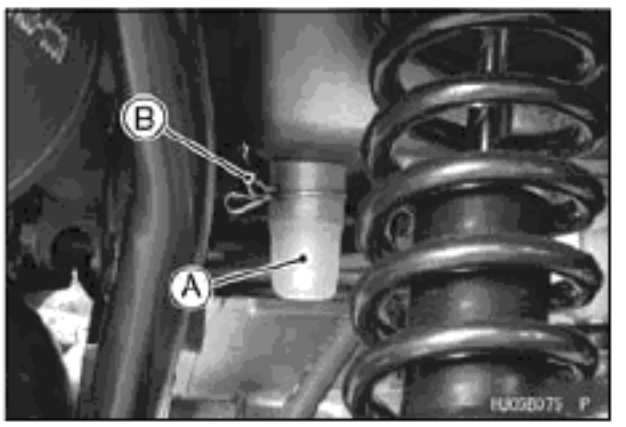
- Squeeze it dry in a clean towel [A]. Do not wring the element or blow it dry; the element can be damaged.
- Inspect the element for damage.

★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.

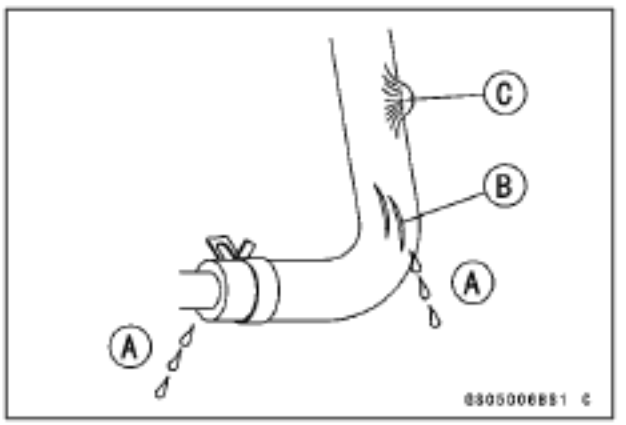
Periodic Maintenance Procedures

Air Cleaner Draining



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

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



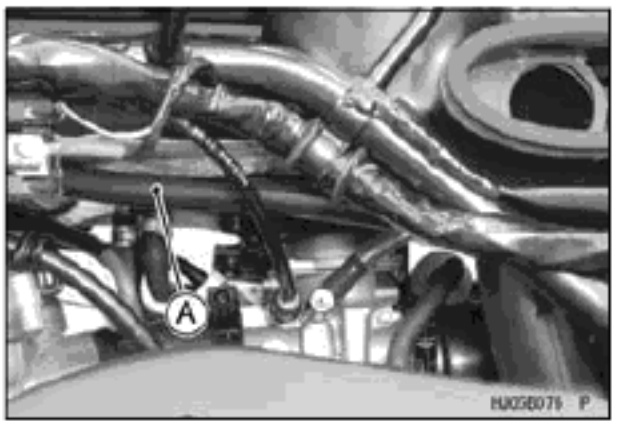
- Turn the fuel tap to the OFF position.
- Check the fuel hoses and fittings for deterioration, cracks and signs of leakage.

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

- Check that the hoses are securely connected and clamps are installed correctly.
- When installing, run the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
- When installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.

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

Engine Breather Hose Inspection



- Check the breather hose [A] for deterioration, craks and signs of leakage.

★Replace the breather hose if any fraying, leak, craks or bulges are noticed.

- Check that the hose is securely connected and clamps are installed correctly.

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

Fuel Hose Replacement

⚠WARNING

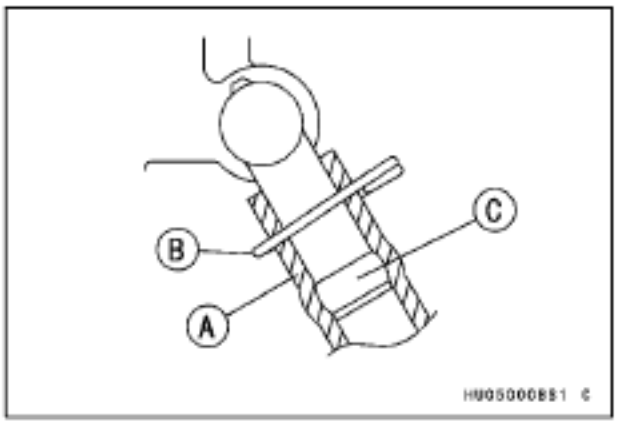
Gasoline is extremely flammable and can be explosive under certain conditions. Turn the ignition switch OFF. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

- Turn the fuel tap to the OFF position.
- Remove:

  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Clamps
  Fuel Hoses

Periodic Maintenance Procedures

- Fit the fuel hose [A] onto the pipe fully and install the clamps [B] beyond the raised rib [C].
- Run the fuel hose correctly (see Cable, Wire and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).
- Start the engine and check the fuel hose for leaks.



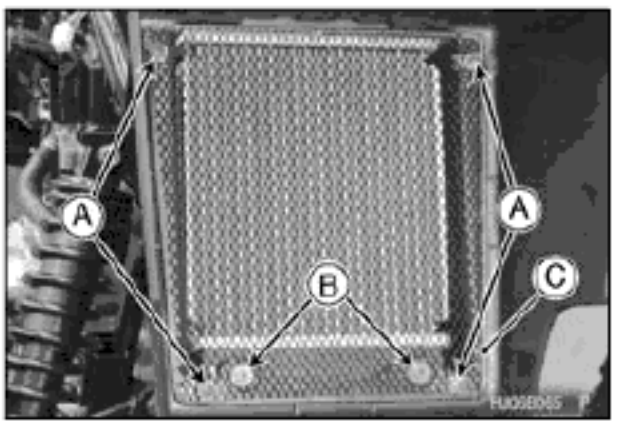
Cooling System

Radiator Cleaning

NOTICE

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.

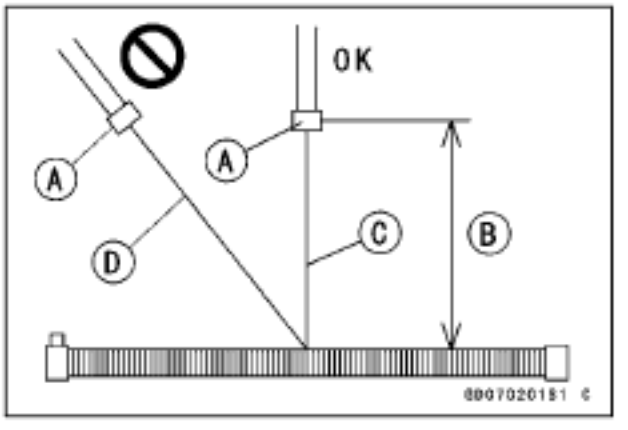
- Remove:
  Front Fender (see Front Fender Removal in the Frame chapter)
  Radiator Screen Mounting Screws [A]
  Radiator Screen Mounting Bolts [B]
  Radiator Screen [C]
- Clean the radiator screen in a bath of tap water, and then dry it with compressed air or by shaking it.



- Clean the radiator.

NOTICE

When cleaning the radiator with steam cleaner, be careful of the following to prevent radiator damage.
Keep the steam gun [A] away more than 0.5 m (20 in.) [B] from the radiator core.
Hold the steam gun perpendicular [C] (not oblique [D]) to the core surface.
Run the steam gun following the core fin direction.

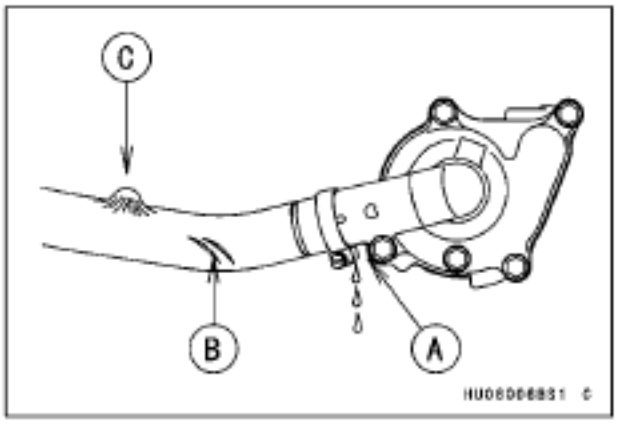


Water Hoses and Connections Inspection

○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.

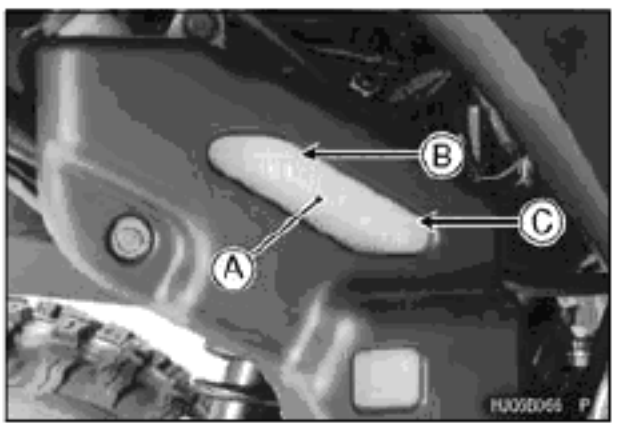


Periodic Maintenance Procedures

Coolant Level Inspection

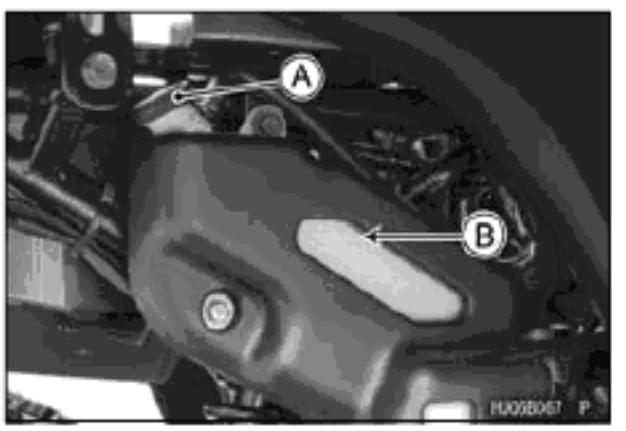
NOTE

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



- Check the coolant level in the reserve tank with the vehicle on the level ground.
  Reserve Tank [A]
  F (Full) Mark Line [B]
  L (Low) Mark Line [C]

★If the coolant level is lower than the L mark line, remove the seat (see Seat Removal in the Frame chapter) and reserve tank cap [A], then add coolant to the F mark line [B].



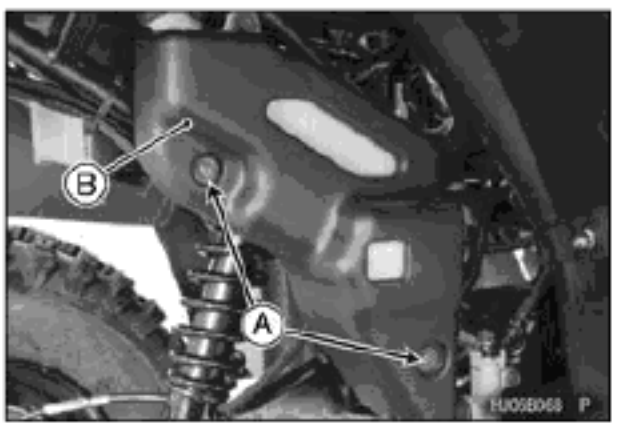
NOTICE

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

Coolant Change

⚠WARNING

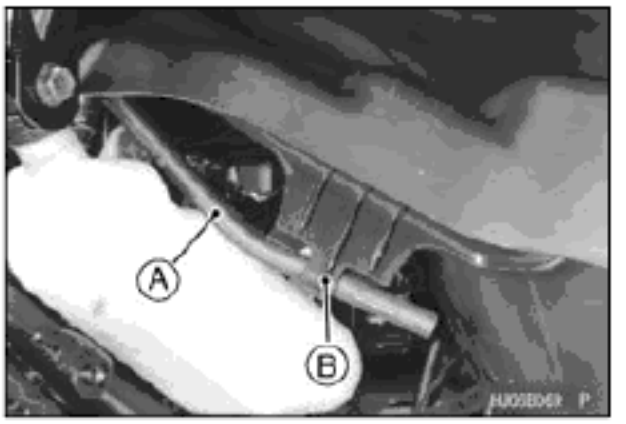
Coolant can be extremely hot and cause severe burns, is toxic and very slippery. Do not remove the radiator cap or attempt to change the coolant when the engine is hot; allow it cool completely. Immediately wipe any spilled coolant from tires, frame, engine or other painted parts. Do not ingest coolant.



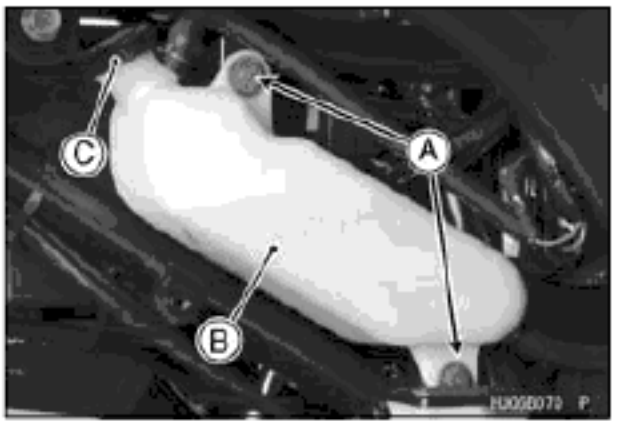
- Remove:
  Middle Cover (see Middle Cover Removal in the Frame chapter)
  Right Footboard (see Right Footboard Removal in the Frame chapter)
  Right Side Inner Cover (see Side Inner Cover Removal in the Frame chapter)
  Front Bottom Guard (see Front Bottom Guard Removal in the Frame chapter)
  Reserve Tank Cover Bolts [A]
  Reserve Tank Cover [B]

Periodic Maintenance Procedures

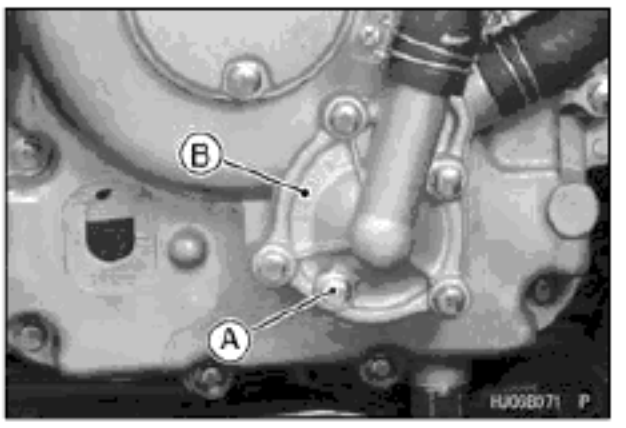
- Clear the over flow hose [A] from the holder [B] on the reserve tank cover.



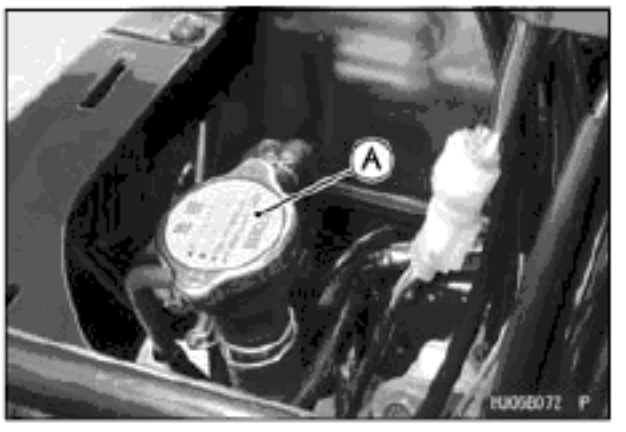
- Remove:
  Reserve Tank Bolts [A]
  Reserve Tank [B] with Hose
- Remove the reserve tank cap [C], and pour the coolant into a container.



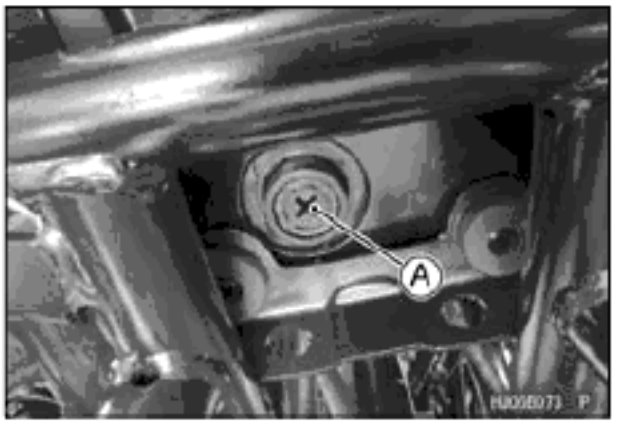
- Place a container under the drain bolt [A] at the bottom of the water pump cover [B], then remove the drain bolt.



- 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.

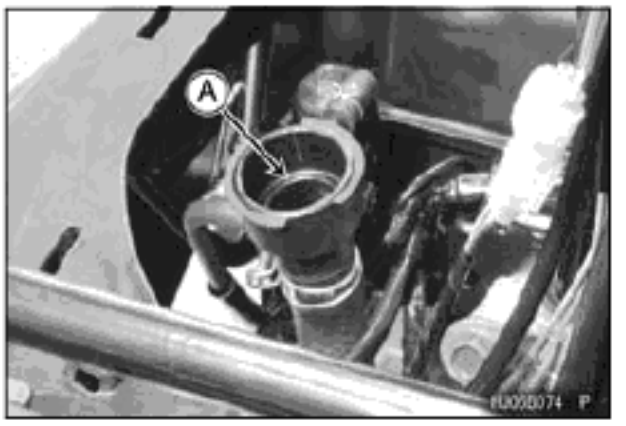


- Place a container under the drain screw [A] at the bottom of the radiator, then remove the drain bolt.
- The coolant will drain from the radiator and engine.



Periodic Maintenance Procedures

- Tighten the coolant drain bolts securely.
- 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 [A] with coolant.



NOTE

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

NOTICE

Soft or distilled water must be used with the antifreeze 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:	**70%**
Coolant:	**30%**
Freezing Point:	**−15°C (5°F)**
Total Amount:	**1.3 L (1.4 US qt)**

NOTE

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

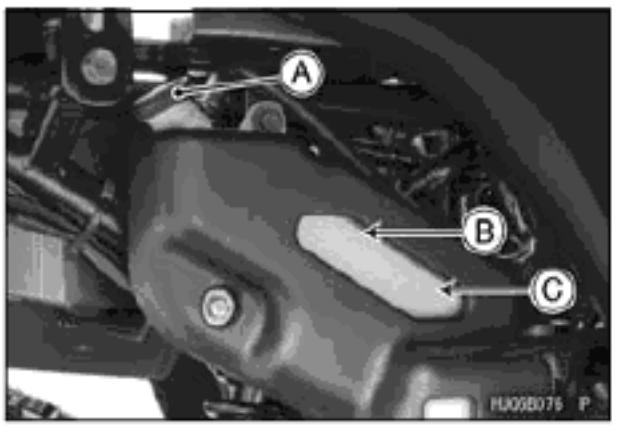
- Bleed the air from the cooling system as follows.

○Start the engine with the radiator cap removed and run it until no more air bubbles [A] can be seen in the coolant.
○Tap the radiator hoses to force any air bubbles caught inside.
○Stop the engine and add coolant up to the radiator filler neck.

- Install the radiator cap.

- Remove the reserve tank cap [A].
- Fill the reserve tank up to the F mark line [B] with coolant and install the 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 L mark line [C], add coolant to the F mark line.



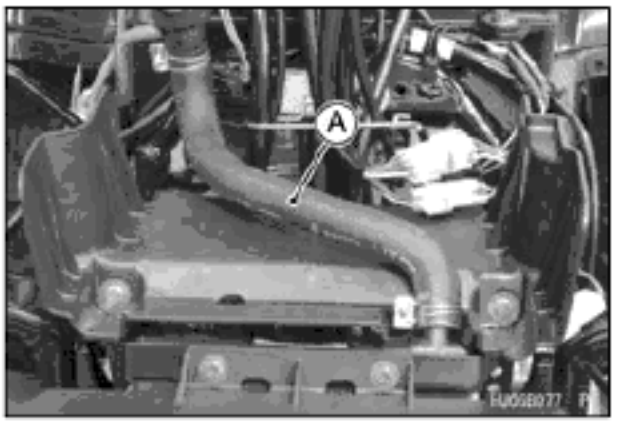
NOTICE

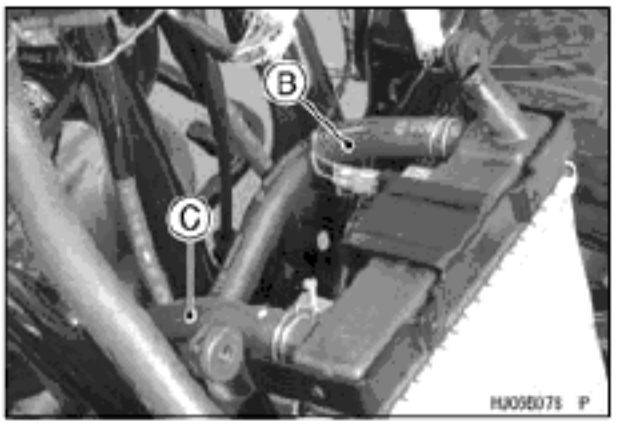
Do not add more coolant above the F mark line.

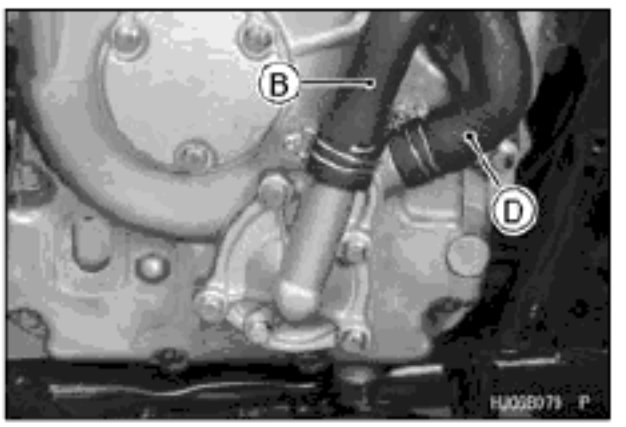
Periodic Maintenance Procedures

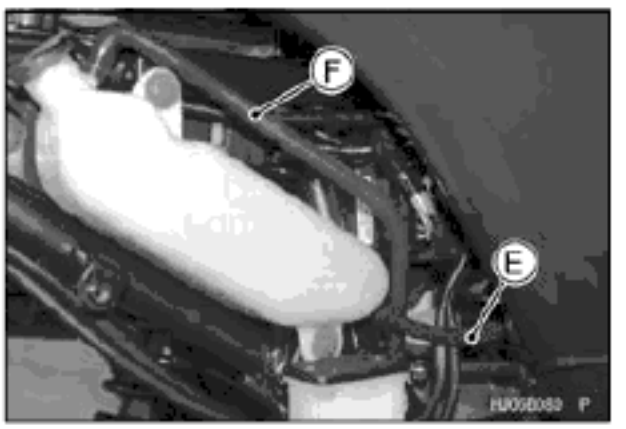
Radiator Hose and O-ring Replacement

- Drain the coolant (see Coolant Change).
- Remove:
  Front Fender (see Front Fender Removal in the Frame chapter)
- Replace the following hoses with new one.
  [A] Radiator Cap to Radiator
  [B] Radiator to Water Pump Cover
  [C] Radiator to Thermostat Housing
  [D] Alternator Cover to Cylinder
  [E] Radiator Cap to Reserve Tank
  [F] Overflow Hose

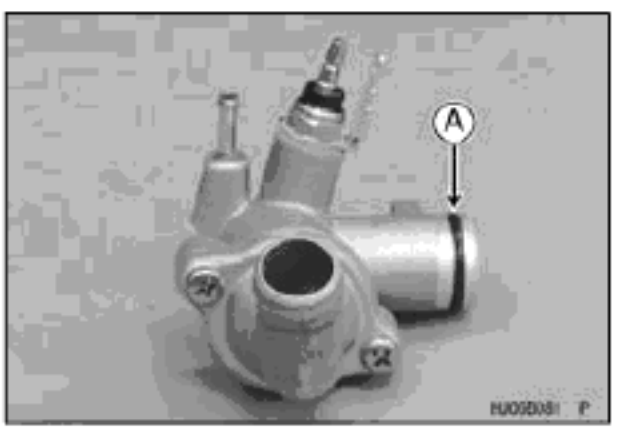








- Remove:
  Thermostat Housing (see Thermostat Removal in the Cooling System chapter)
- Replace the O-ring [A] with a new one.
- Apply grease to the O-rings and install it.
- Install the hoses and tighten the clamps securely.
- Fill the coolant (see Coolant Change).
- Check the cooling system for leaks.



Periodic Maintenance Procedures

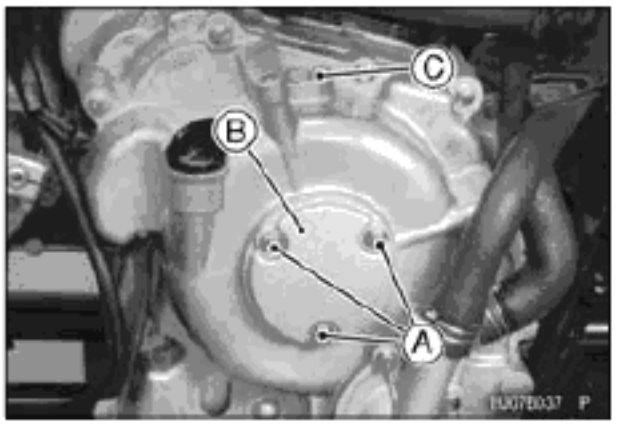
Engine Top End

Valve Clearance Inspection

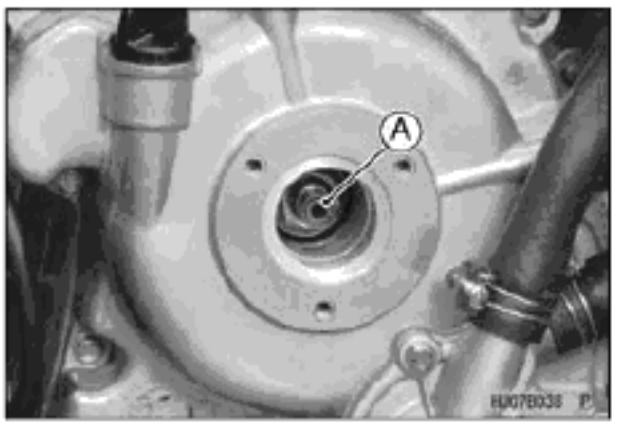
NOTE

○*Check the valve clearance only when the engine is cold (at room temperature).*

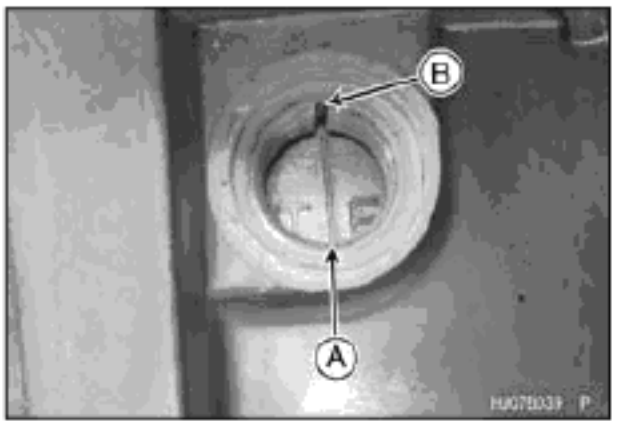
• Remove:
Cylinder Head Cover (see Cylinder Head Cover Removal in the Engine Top End chapter)
Alternator Rotor Nut Cap Bolts [A]
Alternator Rotor Nut Cap [B]
Timing Inspection Plug [C]



• Remove:
Oil Through Guide [A]
Spring



• Turn the crankshaft **clockwise** with a wrench on the alternator rotor bolt until "T-F" mark [A] on the alternator rotor aligns with the notch [B] as shown: the end of the compression stroke in the cylinder head.

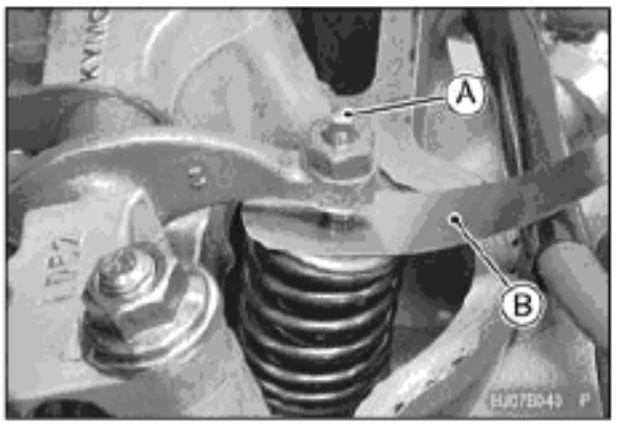


• Measure the clearance for valves, one at a time between the end of the valve stem and the adjusting screw [A] with the thickness gauge [B].

Valve Clearance (when cold)

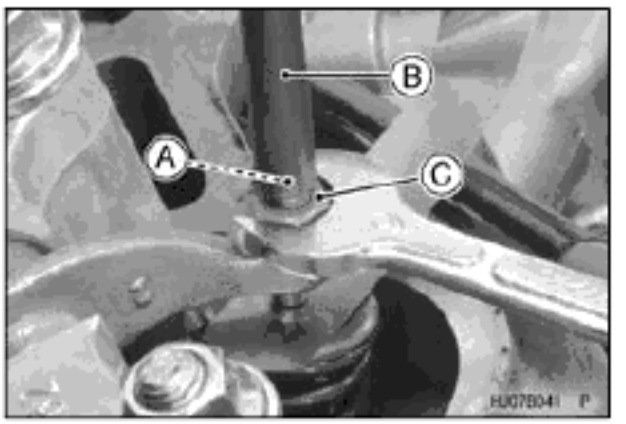
Exhaust	**0.08 ~ 0.12 mm (0.0032 ~ 0.0048 in.)**
Intake	**0.08 ~ 0.12 mm (0.0032 ~ 0.0048 in.)**

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



Periodic Maintenance Procedures

Valve Clearance Adjustment



- Loosen the locknut and turn the adjusting screw until the clearance is correct.
- Holding the adjusting screw [A] with the holder [B], tighten the locknut [C].

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

Special Tool - Valve Adjusting Screw Holder: 57001-1217

- Recheck the clearance.

★If the clearance is incorrect, repeat the adjustment procedure.

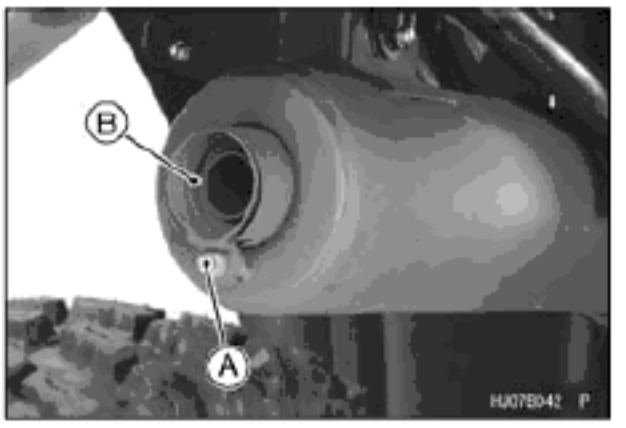
★If the clearance is correct, perform the adjustment procedure on the other valve.

Spark Arrester Cleaning

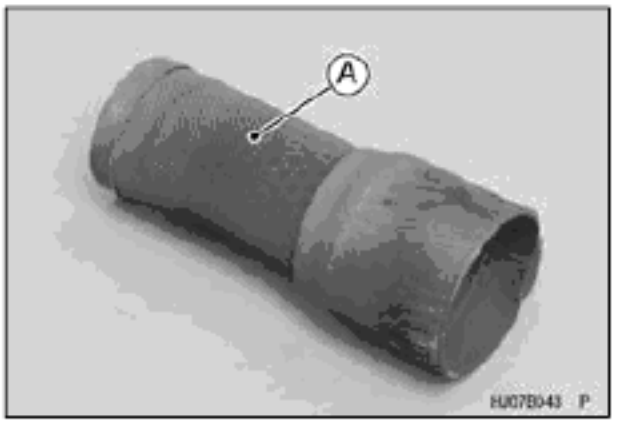
⚠ WARNING

The muffler can become extremely hot during normal operation and cause severe burns. Since the engine must be running during this procedure, wear heat-resistant gloves while cleaning the spark arrester.

- Remove:
  Spark Arrester Mounting Bolt [A]
  Spark Arrester [B]



- Clean the spark arrester [A] in a bath of high flash-point solvent and if necessary use a fine wire brush to gently remove any particles in the screen on the spark arrester.
- Inspect the screen for damage and replace the spark arrester if necessary.



- 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.

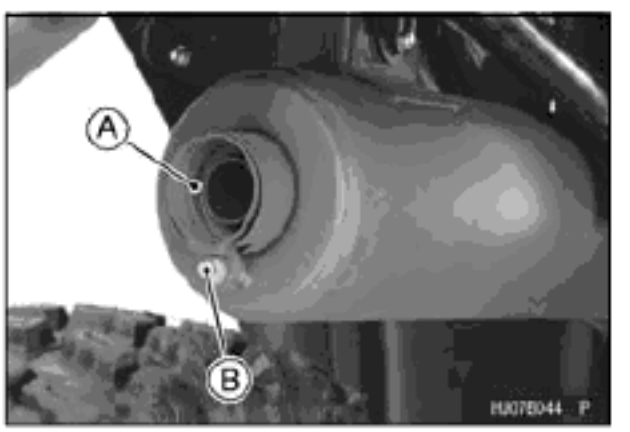
Periodic Maintenance Procedures

⚠ DANGER

Exhaust gas contains carbon monoxide, a colorless, odorless poisonous gas. Inhaling carbon monoxide can cause serious brain injury or death. DO NOT run the engine in enclosed areas. Operate only in a well-ventilated area.

- Stop the engine.
- Install the spark arrester [A].
- Tighten:

Torque - Spark Arrester Mounting Bolt [B]: 11 N·m (1.1 kgf·m, 97 in·lb)



Exhaust Pipe and Muffler Inspection

- Check for signs of leakage at the exhaust pipe gasket in the cylinder head.

★If there are signs of leakage around the exhaust pipe gasket, it should be replaced.

- Check the exhaust pipe and muffler for dents, cracks, rust and holes.

★If the exhaust pipe or muffler is damaged, it should be replaced for best performance and least noise.

Converter System

Converter Drive Belt Wear Inspection

⚠ 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. Maintain according to periodic maintenance chart.

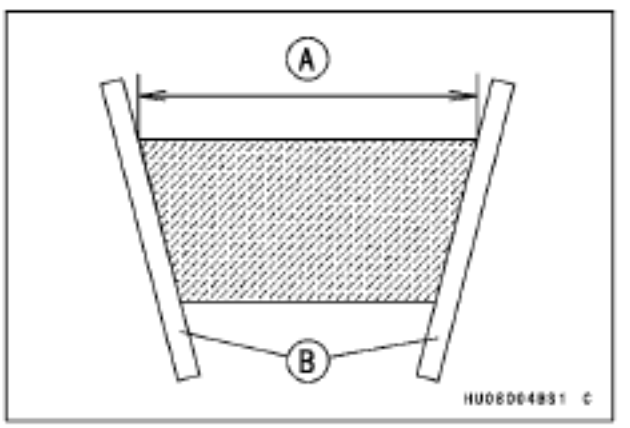
- Remove the torque converter cover (see Torque Converter Cover Removal in the Converter System chapter).
- Measure the width [A] of the belt at several locations with a pair of suitable straightedges [B] as shown.

★If any measurements exceed the service limit, replace the belt.

Belt Width

Standard: 23.6 ~ 24.4 mm (0.929 ~ 0.961 in.)

Service Limit: 22 mm (0.87 in.)

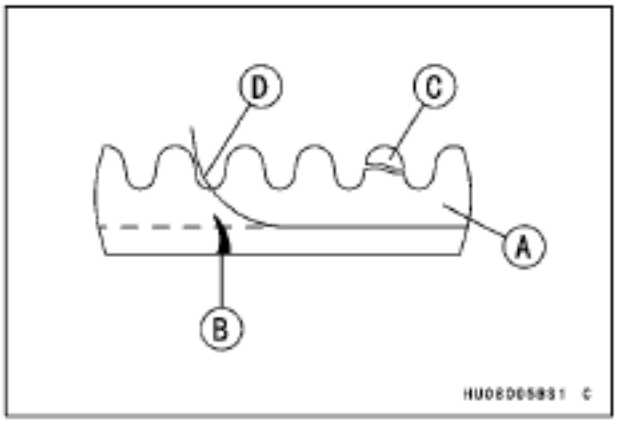


Periodic Maintenance Procedures

- 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

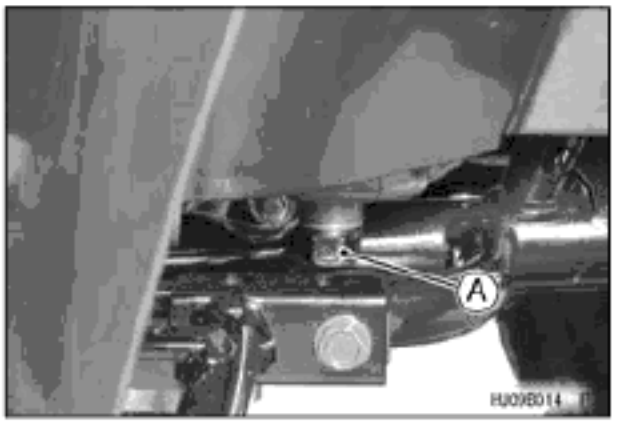
○*Whenever the belt is replaced, inspect the drive and the driven pulleys.*

Engine Lubrication System

Engine Oil Change

- Support the vehicle so that it is level, both side to side and front to rear after warming up the engine.
- Remove the engine oil drain plug [A] to drain the oil.
- Replace the oil drain plug gasket with a new one.
- Tighten:

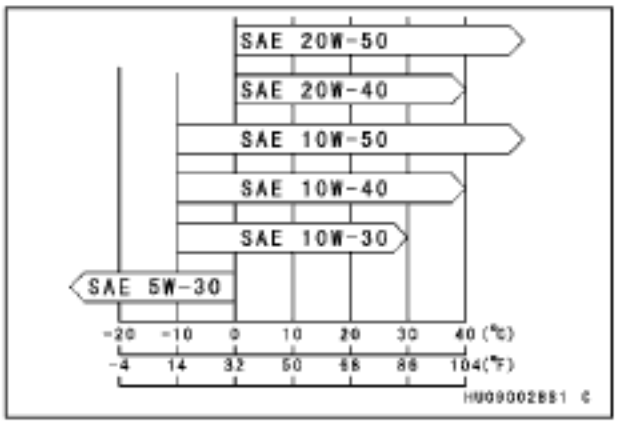
Torque - Engine Oil Drain Plug: 25 N·m (2.5 kgf·m, 18 ft·lb)



- Pour in the specified type and amount of oil.

Engine Oil

Type:	**API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2**
Viscosity:	**SAE 10W-40**
Amount:	**1.6 L (1.7 US qt)**
	1.8 L (1.9 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.*

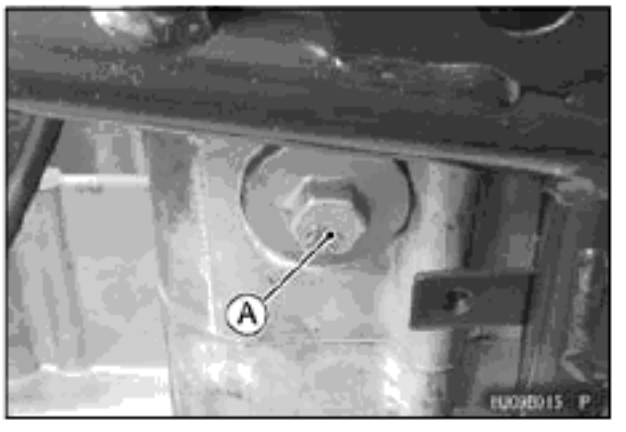
○*Although 10W-40 engine oil is the recommended oil for most conditions, the oil viscosity may need to be changed to accommodate atmospheric conditions in your riding area.*

- Check the engine oil level (see Oil Level Inspection in the Periodic Maintenance chapter).

Periodic Maintenance Procedures

Oil Screen Cleaning

- Drain the engine oil (see Engine Oil Change).
- Remove the oil screen plug [A] and spring.
- Clean the oil screen with a high flash-point solvent and remove any particles stuck.

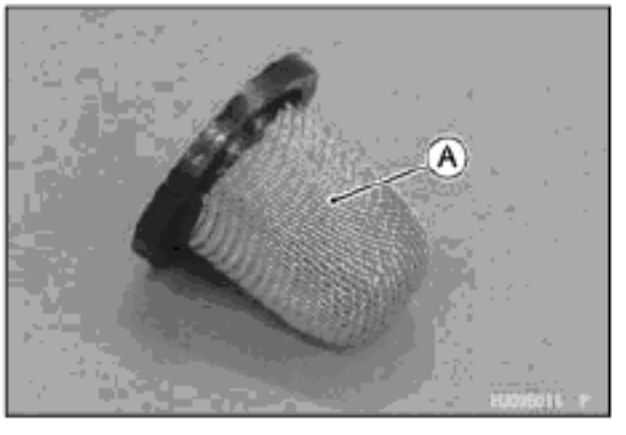


⚠WARNING

Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. Clean the screen 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 a low flash-point solvent to clean the screen.

- Check the screen [A] carefully for any damage, holes, broken wires gasket pulling off.

★If the screen is damaged, replace it.

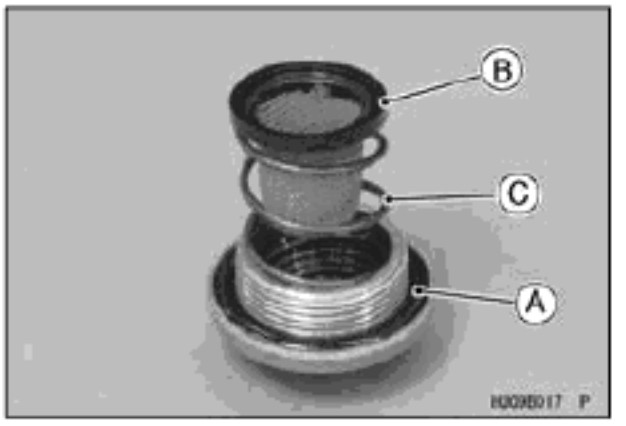


- Replace the O-ring [A] with a new one.
- Install the oil screen [B] together with the spring [C].

○The smaller diameter on the spring faces downward.

- Tighten:

Torque - Engine Oil Screen Plug: 15 N·m (1.5 kgf·m, 11 ft·lb)



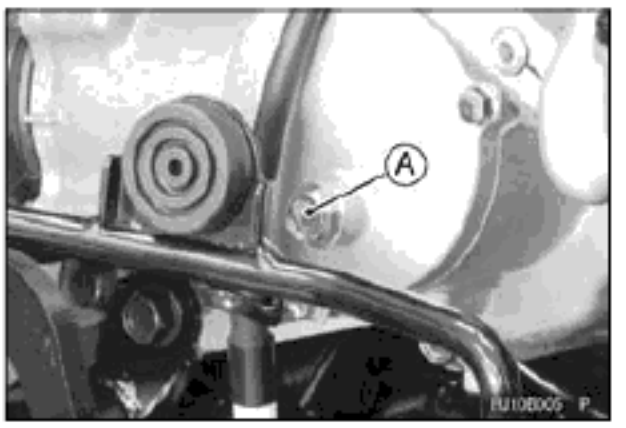
Crankshaft/Transmission

Transmission Oil Level Inspection

- Park the vehicle so that it is level, both side-to-side and front-to-rear.
- Remove:

  Right Footboard (see Right Footboard Removal in the Frame chapter)

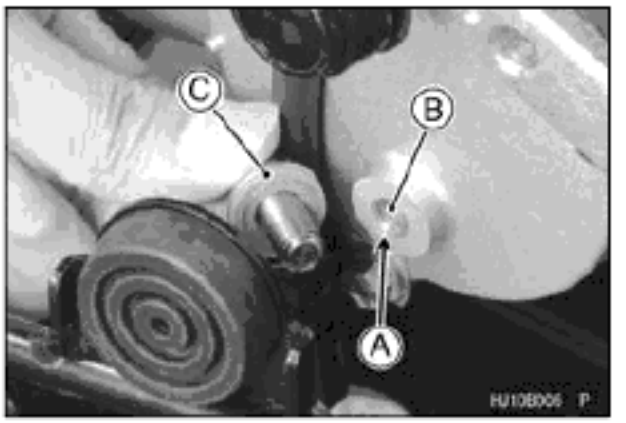
  Transmission Oil Level Inspection Bolt [A]



NOTICE

Be careful not to allow any dirt or foreign materials to enter the gear case.

Periodic Maintenance Procedures



- Check the oil level. The oil level should come to the bottom [A] of the inspection bolt opening [B].

★If it is insufficient, first check the transmission case for oil leakage, remedy it if necessary, and add oil through the inpection bolt opening. Use the same type and brand of oil that is already in the transmission case.

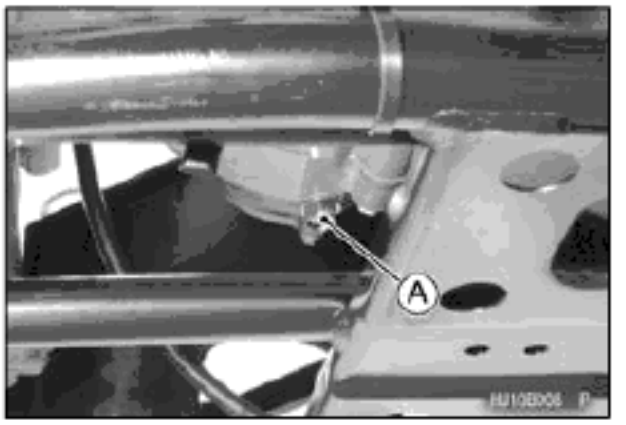
- Replace the gasket [C] with a new one, and tighten the inspection bolt.

Torque - Transmission Oil Level Inspection Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Transmission 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.

- Remove the transmission oil filler bolt [A].



- Place an oil pan beneath the transmission case.
- Remove the transmission oil drain plug [A], and let the oil drain completely.
- Replace the gasket with a new one.
- After the oil has completely drained out, install the drain plug with the gasket.

Torque - Transmission Oil Drain Plug: 20 N·m (2.0 kgf·m, 15 ft·lb)

- Fill the transmission case with a good quality oil as specified in the table.

Transmission Oil

Type:	**2-SP AUTOMATIC, REV**
Viscosity:	**SAE#90**
Capacity:	**0.6 L (0.63 US qt)**

- Check the oil level (see Transmission Oil Level Inspection).

- Replace the O-ring on the oil filler bolt with a new one, and apply grease to the O-ring.

Torque - Transmission Oil Filler Bolt: 20 N·m (2.0 kgf·m, 15 ft·lb)

Periodic Maintenance Procedures

Wheels/Tires

Tire Inspection

- Examine 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.

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

Tire Tread Depth

Service Limit:

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

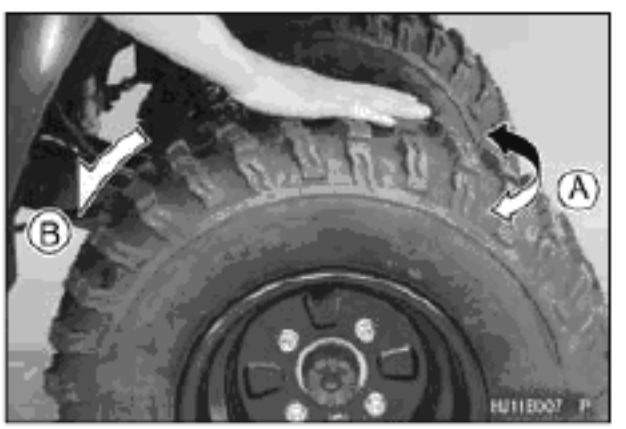
Standard Tire

Front:	**AT 22 × 7-10**
	MAXXIS, M937, Tubeless
Rear:	**AT 22 × 10-10**
	MAXXIS, M938, Tubeless

Wheel Bearing Damage Inspection

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

★If roughness, binding or noise is found, replace the wheel bearing (see Front Hub Disassembly/Assembly in the Wheels/Tires chapter).



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

★If roughness, binding or noise is found, replace the rear axle bearing (see Swinarm Disassembly/Assembly in the Suspension chapter).

Periodic Maintenance Procedures

Wheel Inspection

- Raise the front/rear wheel off the ground (see Wheel Removal in the Wheels/Tires chapter).
- Spin the wheel lightly, and check for roughness or binding.

★If roughness or binding is found, replace the hub bearings (see Hub Bearing Removal/Installation).

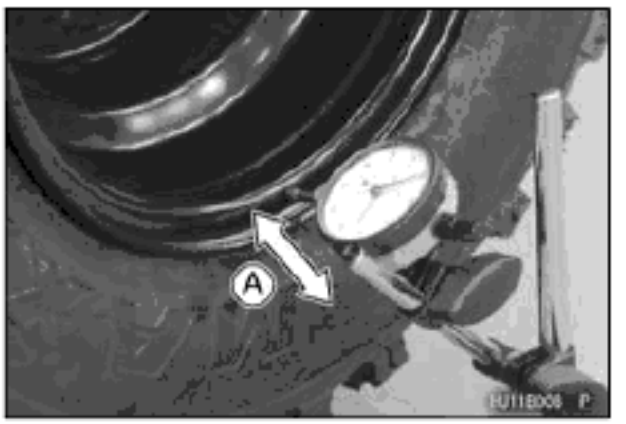
- Inspect the wheel for small cracks, dents, bending, or warp.

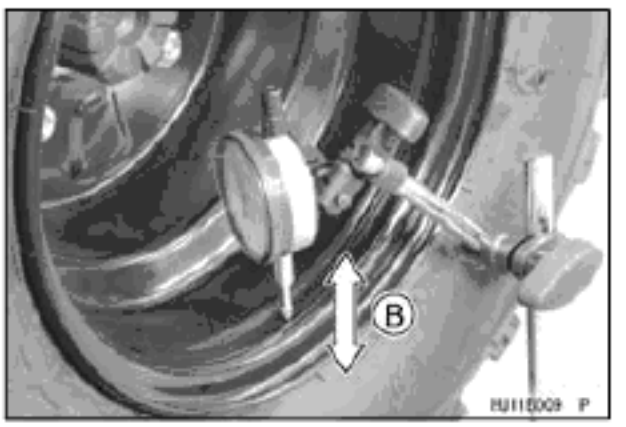
★If there is any damage to the wheel, replace the wheel.

- Remove the wheel, and support it with the tire by the axle.
- Measure the rim runout, axial [A] and radial [B], with a dial gauge.

★If rim runout exceeds the service limit, check the hub bearings (see Wheel Bearing Damage Inspection).

★If the problem is not due to the bearings, replace the wheel.





Rim Runout (with tire installed)

Service Limit:

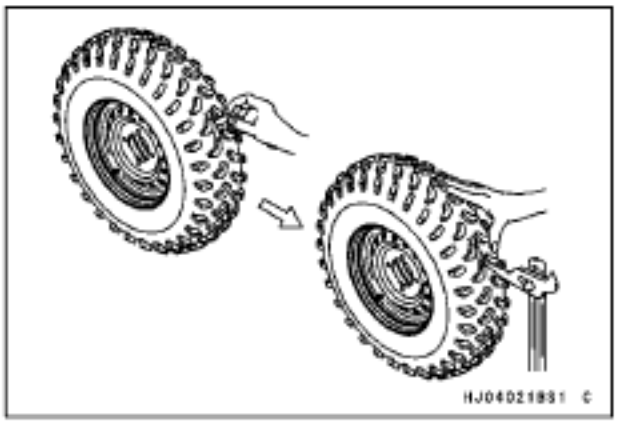
Axial	**TIR 2 mm (0.08 in.)**
Radial	**TIR 2 mm (0.08 in.)**

⚠ WARNING

Damaged wheel parts may fail and cause an accident resulting in serious injury or death. Never attempt to repair a damaged wheel part. If the wheel part is damaged, it must be replaced with a new one.

Toe-in Inspection

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

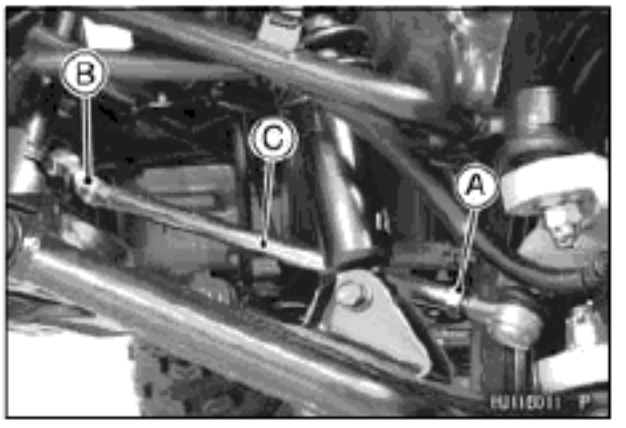
★If the toe-in is not in the specified range, adjust the toe-in (see Toe-in Adjustment).

Toe-in of Front Wheels

Standard: 2.5 ~ 17.5 mm (0.098 ~ 0.689 in.) at 1G

Periodic Maintenance Procedures

Toe-in Adjustment



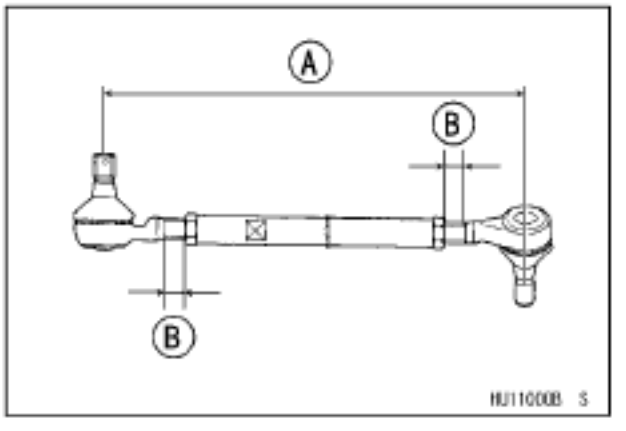
- Loosen the locknuts [A] [B] and turn the tie-rod [C] the same number of turns on both sides to achieve the specified toe-in.

NOTE

○*The locknut [B] near the steering shaft on the tie-rod has left-hand threads. Turn the locknut clockwise for loosening.*

NOTE

○*The toe-in will be near the specified value, if the tie-rod length [A] is 334.5 mm (13.17 in.) on each tie-rod.*



NOTICE

Adjust the tie-rod length so that the visible thread length [B] is even on both ends of the tie-rod. Uneven thread length could cause tie-rod damage.

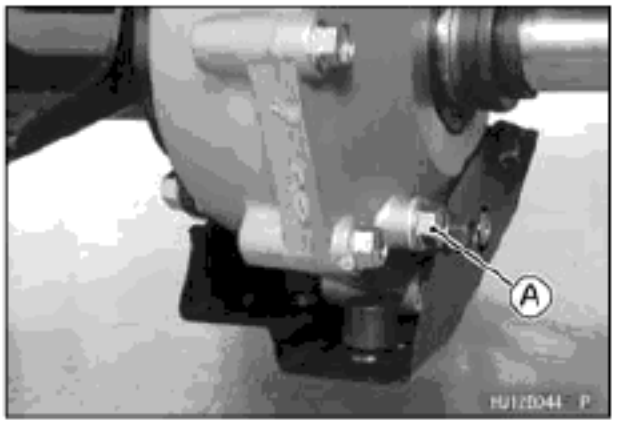
- Check the toe-in.
- Tighten:

Torque - Tie-rod Locknuts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Test ride the vehicle.

Final Drive

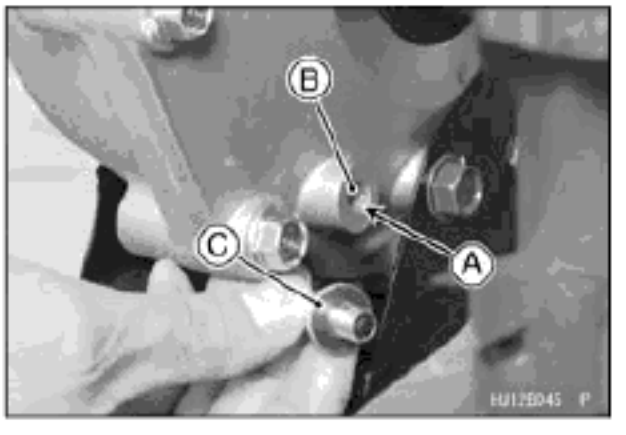
Final Gear Case Oil Level Inspection



- Park the vehicle so that it is level, both side-to-side and front-to-rear.
- Remove:
  Final Gear Case Oil Level Inspection Bolt [A]

NOTICE

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 [A] of the inspection bolt opening [B].

★If it is insufficient, first check the final gear case for oil leakage, remedy it if necessary, and add oil through the inspection bolt opening. Use the same type and brand of oil that is already in the final gear case.

- Replace the gasket [C] with a new one, and tighten the inspection bolt.

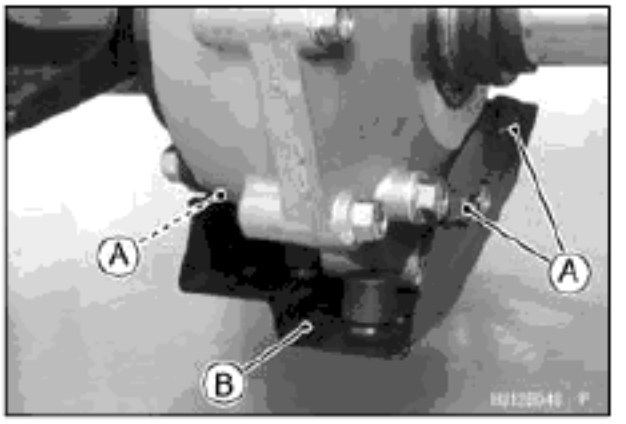
Torque - Final Gear Case Oil Level Inspection Bolt: 20 N·m (2.0 kgf·m, 15 ft·lb)

Final Gear Case Oil Change

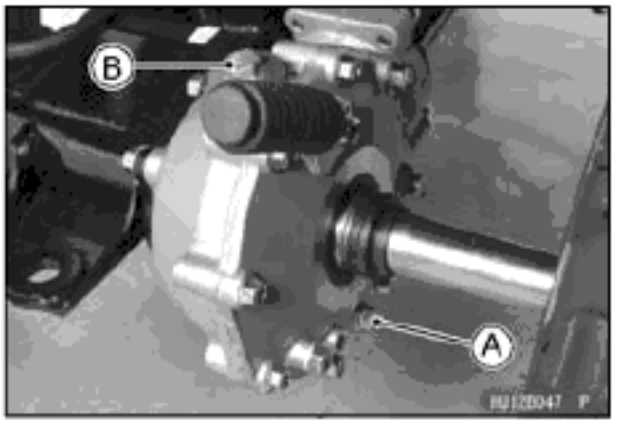
- Warm up the oil by running the vehicle so that the oil will pick up any sediment and drain easily. Then stop the vehicle.
- Park the vehicle so that it is level, both side-to-side and front-to-rear.

Periodic Maintenance Procedures

- Remove:
  Rear Guard Bolts [A]
  Rear Guard [B]



- Place an oil pan beneath the final gear case and remove the oil drain bolt [A].
- Remove:
  Final Gear Case Oil Drain Bolt
  Oil Filler Cap [B]



⚠ WARNING

Oil on tires can cause loss of traction and an accident resulting in serious injury or death. When draining or filling the final gear case, do not spill oil the tire or rim. Clean any oil that may spill with a high flash-point solvent.

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

Torque - Final Gear Case Oil Drain Bolt: 20 N·m (2.0 kgf·m, 15 ft·lb)

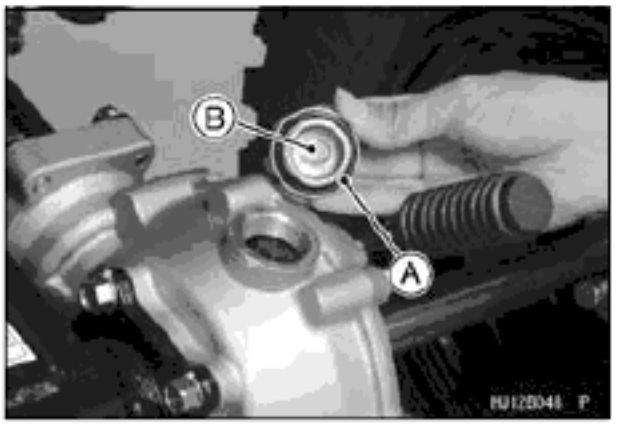
- Fill the gear case up to the bottom of inspection bolt opening with the oil specified below.

Final Gear Case Oil
Viscosity: SAE#80
Capacity: 0.15 L (0.16 US qt)

- Replace the O-ring [A] with a new one, and tighten the filler cap [B].

○Apply grease to the O-ring.

Torque - Final Gear Case Oil Filler Cap: 15 N·m (1.5 kgf·m, 11 ft·lb)



Brakes

Brake Operation Inspection

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

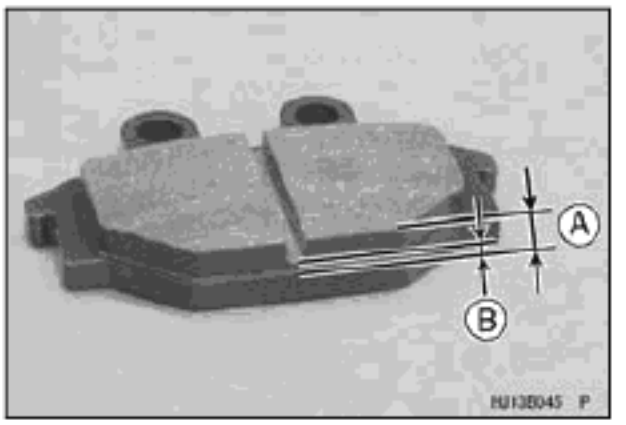
★If the brake operation is insufficiency, inspect the brake system.

⚠ WARNING

When test riding the vehicle, be aware of surrounding traffic for your safety.

Periodic Maintenance Procedures

Brake Pad Wear Inspection



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

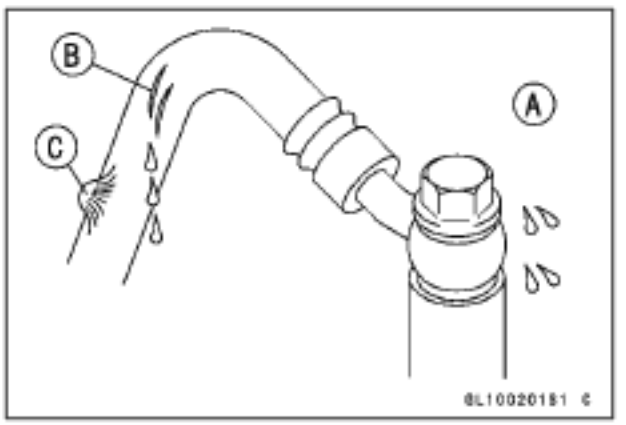
★If the lining thickness of either pad is less than the service limit [B], replace both pads in the caliper as a set. Then adjust the parking brake (see Parking Brake Cable Adjustment).

Pad Lining Thickness

Standard: 5.5 mm (0.22 in.)

Service Limit: 1 mm (0.04 in.)

Brake Hoses and Connections Inspection



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

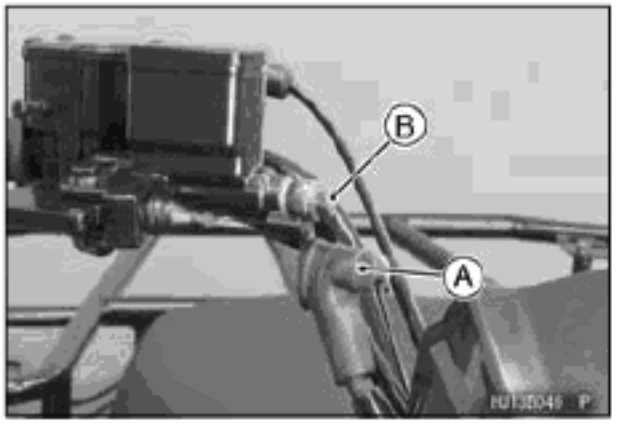
○The high pressure inside the brake line can cause fluid to leak [A] or the hose to burst if the line is not properly maintained. Bend and twist the rubber hose while examining it.

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

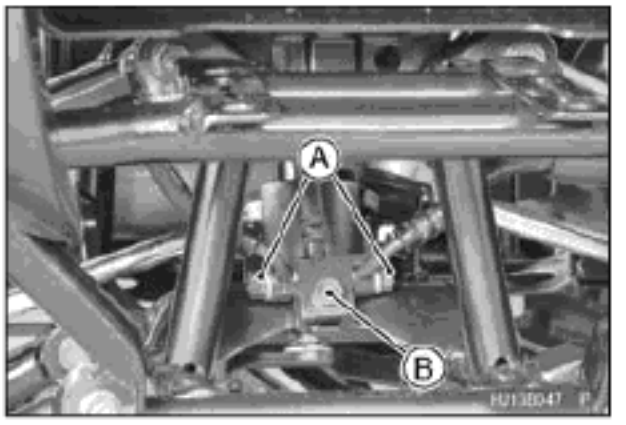
- Tighten any loose fittings.

Brake Hose Replacement

- Pump the brake fluid out of the line as explained in the Brake Fluid Change.
- Remove:
  Front Fender (see Front Fender Removal in the Frame chapter)
- Slide the rubber cover [A] and remove the brake hose banjo bolts [B] at the handlebars.

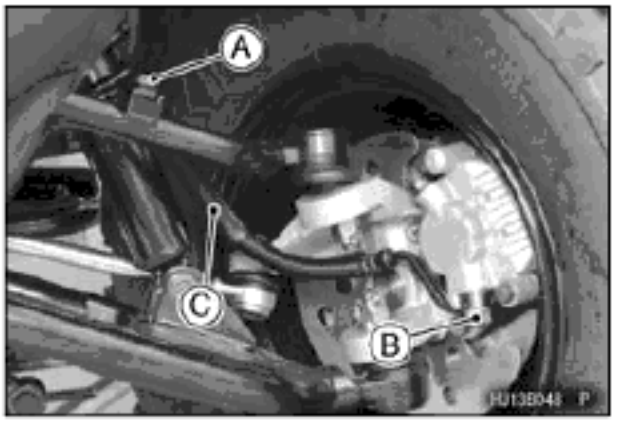


- Remove:
  Brake Hose Banjo Bolts [A]
  Brake Hose Fitting Bolt [B]

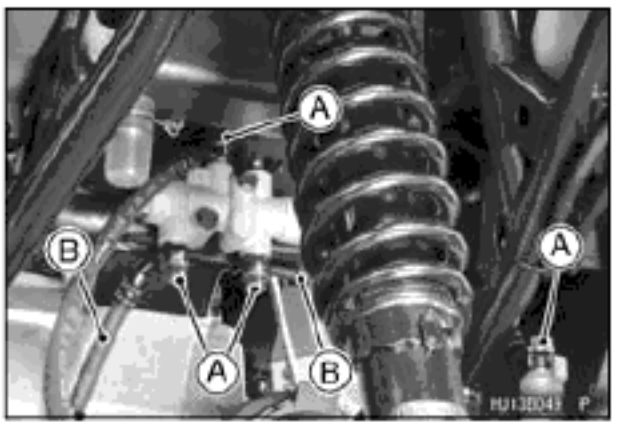


Periodic Maintenance Procedures

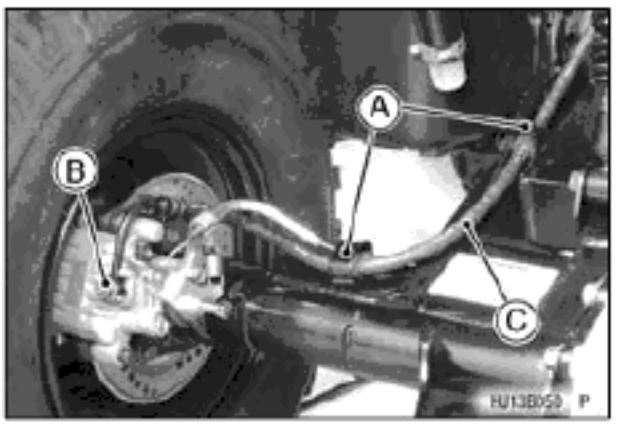
• Remove:
Brake Hose Clamp Bolt [A] (Both Sides)
Brake Hose Banjo Bolt [B] (Both Sides)
Brake Hose [C] (Both Sides)



• Remove:
Brake Hose Banjo Bolt [A]
Brake Hoses [B]



• Clear the brake hose from the clamps [A].
• Remove:
Brake Hose Banjo Bolt [B]
Brake Hose [C]



• Immediately wipe up any brake fluid that spills.

NOTICE

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

• Replace the new flat washers for each side of the hose fittings.
• Install the new brake hose in its place, and tighten the banjo bolts.
○Fit the projection of the brake hose end to the calipers and master cylinder, and tighten the brake hose banjo bolts.

Torque - Brake Hose Banjo Bolts: 35 N·m (3.6 kgf·m, 26 ft·lb)

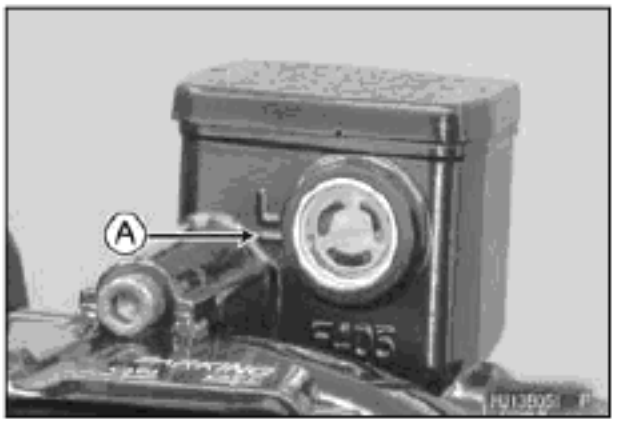
• When installing the hoses, avoid sharp bending, kinking, flatting or twisting, and route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
• Fill the brake line after installing the brake hose (see Brake Fluid Change).

Periodic Maintenance Procedures

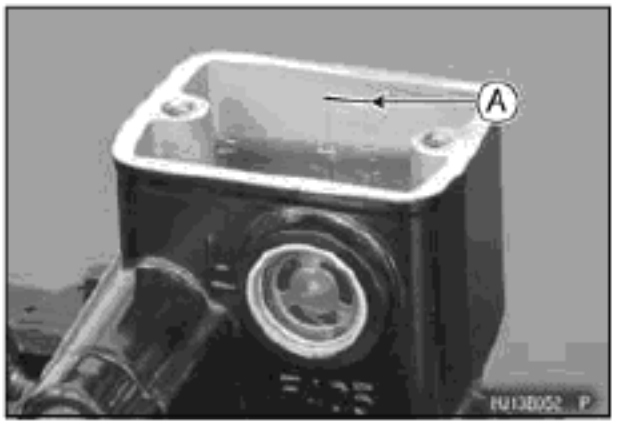
Brake Fluid Level Inspection

- 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.



Recommended Brake Fluid
Type: DOT4

⚠WARNING

Mixing brands and types of brake fluid can reduce the brake system's effectiveness and cause an accident resulting in injury or death. Do not mix two brands of brake fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified.

- Tighten the reservoir cap screws.

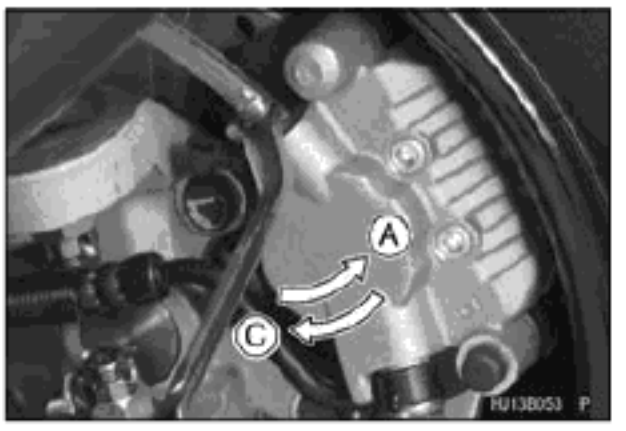
Brake Fluid Change

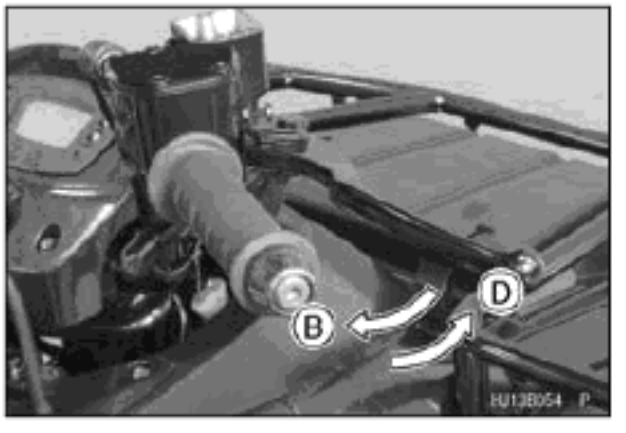
Front Brake

- Remove the reservoir cap and the rubber cap on the bleed valve.
- Attach a clear plastic hose to the bleed valve on the front 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 front 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.*

Periodic Maintenance Procedures

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

⚠ WARNING

Mixing brands and types of brake fluid can reduce the brake system's effectiveness and cause an accident resulting in injury or death. Do not mix two brands of brake fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified.

- Tighten:

Torque - Bleed Valves: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Apply the front 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 in the Brakes chapter).

⚠ WARNING

Air in the brake lines diminish braking performance and can cause an accident resulting in injury or death. If the brake lever has a soft or "spongy" feeling mushy when it is applied, there might be air in the brake lines or the brake may be defective. Do not operate the vehicle and service the brake system immediately.

Rear Brake

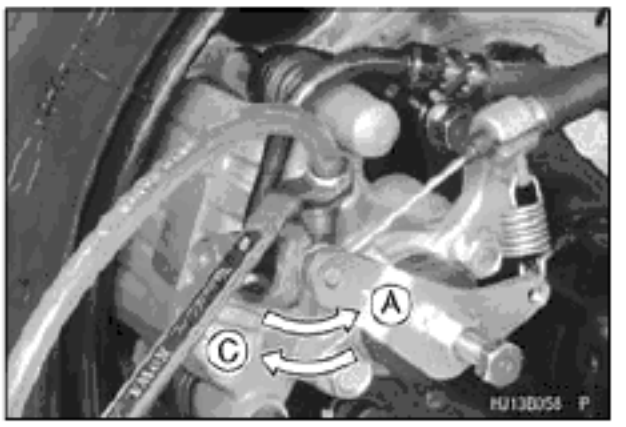
- Remove the reservoir cap and the rubber cap on the bleed valve.
- Attach a clear plastic hose to the bleed valve on the rear caliper, and run the other end of the hose into a container.
- Fill the reservoir with new brake fluid.
- Change the brake fluid as follows:

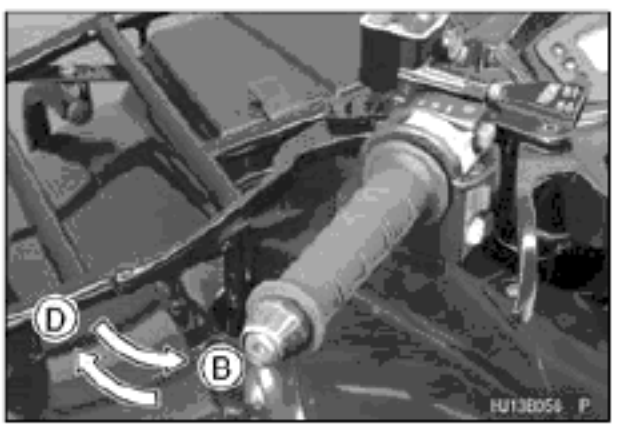
○Open the bleed valve [A].
○Apply the rear brake lever and hold it [B].
○Close the bleed valve [C].
○Release the brake lever [D].

- 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.*





Periodic Maintenance Procedures

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

⚠WARNING

Mixing brands and types of brake fluid can reduce the brake system's effectiveness and cause an accident resulting in injury or death. Do not mix two brands of brake fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified.

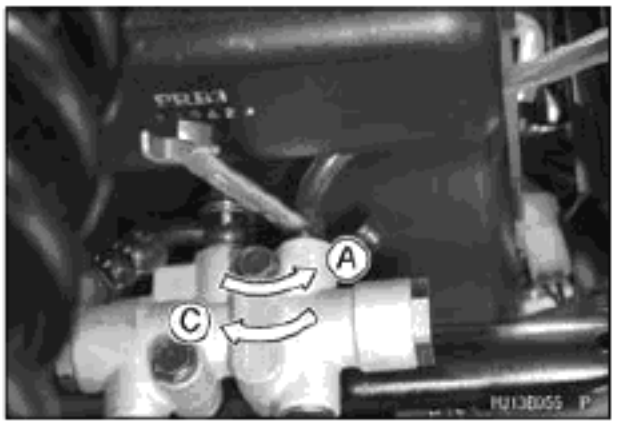
- Apply the rear brake lever forcefully for a few seconds, and check for fluid leakage around the fittings.

★If necessary, bleed the air from the brake line (see Brake Line Air Bleeding in the Brakes chapter).

- Remove the reserve tank cover (see Coolant Change).
- Fill the reservoir with new brake fluid.
- Change the brake fluid as follows:

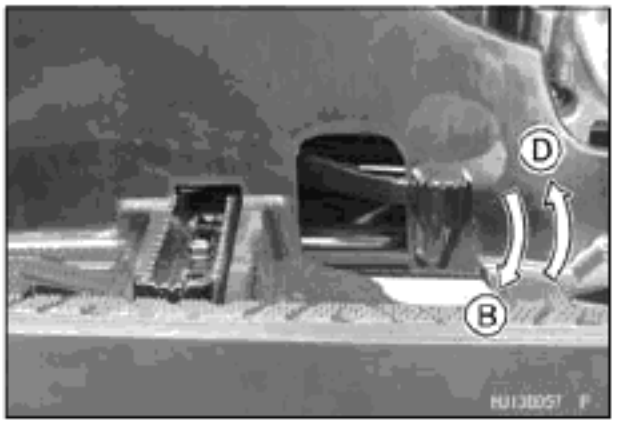
○Open the bleed valve [A].
○Apply the brake pedal and hold it [B].
○Close the bleed valve [C].
○Release the brake pedal [D].

- 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.
- Tighten:

Torque - Bleed Valve: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Apply the brake pedal 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 in the Brakes chapter).

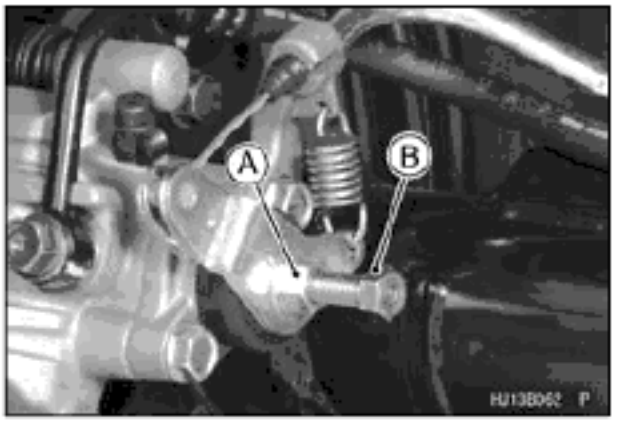
⚠WARNING

Air in the brake lines diminish braking performance and can cause an accident resulting in injury or death. If the brake lever or pedal has a soft or "spongy" feeling mushy when it is applied, there might be air in the brake lines or the brake may be defective. Do not operate the vehicle and service the brake system immediately.

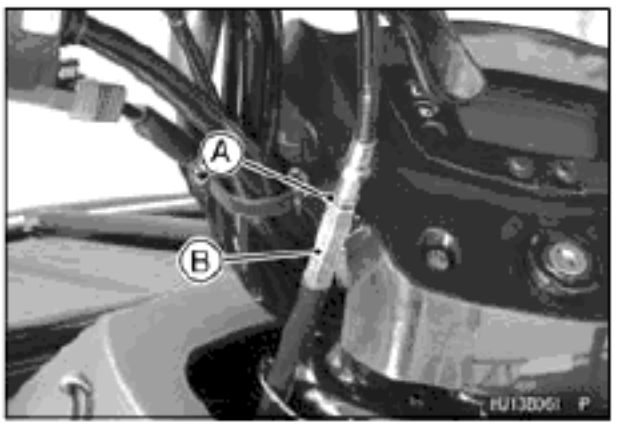
Periodic Maintenance Procedures

Parking Brake Cable Adjustment

- Release the parking brake lever.
- Loosen the adjusting locknut [A] on the rear brake caliper and turn out the adjusting bolt [B] a few turns.



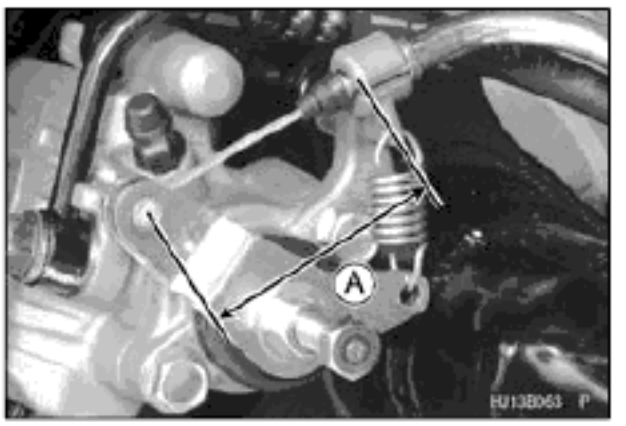
- Loosen the locknut [A] at the upper part of the parking brake cable.
  [B] Adjusting Nut



- Turn the adjusting nut on the parking brake cable until the specified length [A] (between center of the cable lower end and cable holder bracket) obtained.

Parking Brake Cable Lower End Length
Standard: 52 ~ 55 mm (2.0 ~ 2.2 in.)

- While holding the adjusting nut on the cable, tighten the locknut.

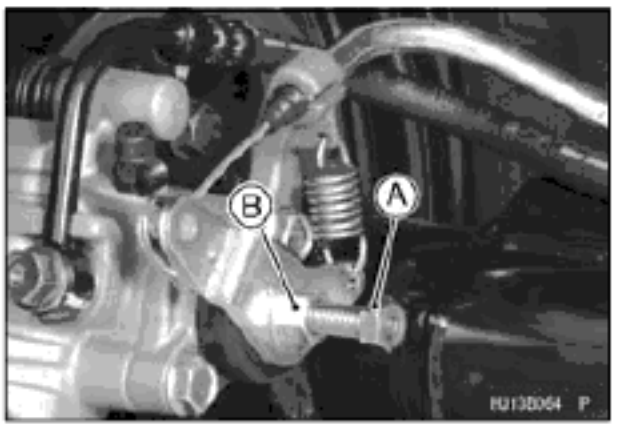


- Turn in the adjusting bolt [A] on the caliper until resistance is felt, then turn out the adjusting bolt by 1/8 turn.
- While holding the adjusting bolt, tighten the adjusting locknut [B].

Torque - Parking Brake Adjusting Locknut: 16 N·m (1.6 kgf·m, 12 ft·lb)

- Check the parking brake for good braking power and no brake drag.

★If parking brake power is weak or brake is drag, readjust the parking brake.



Steering

Steering Inspection

- Support the vehicle on a stand or a jack so that the front wheels are off the ground.
- Turn the handlebars 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, steering shaft grease seals, steering stem holders.

NOTE

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

Periodic Maintenance Procedures

- Check the steering action again.

★If the lubrication does not remedy the problem, inspect the steering shaft for straightness, steering stem holders, 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 bearings, tie-rod bearings, and steering knuckle joints.

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.

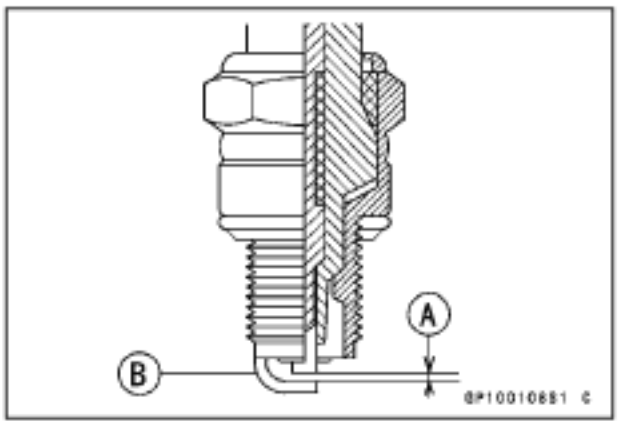
★If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.

Spark Plug Gap Inspection

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

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

Spark Plug Gap
0.8 ~ 0.9 mm (0.032 ~ 0.036 in.)

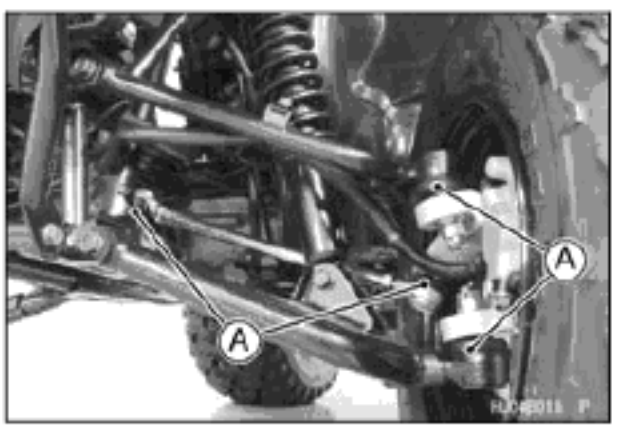


Joint Boots Inspection

Tie-rod End Boots Inspection

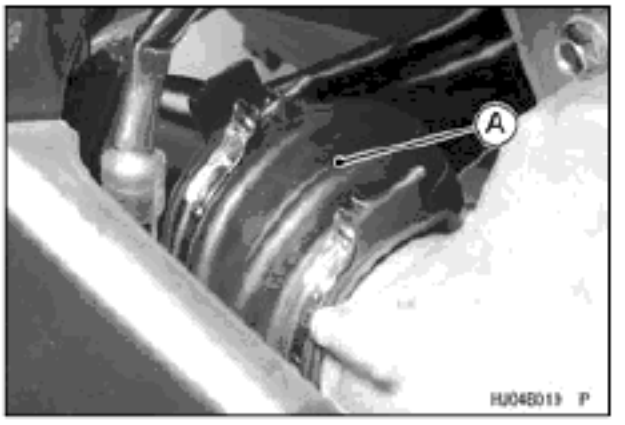
- Visually inspect the tie-rod end boots [A] of the tie-rods.

★If the boot is torn, worn, deteriorated, or leaks grease, replace the tie-rod end (see Tie-Rod End Removal in the Steering chapter).



Periodic Maintenance Procedures

Propeller Shaft Joint Boots Inspection



- Visually inspect the boots [A] of the propeller shaft.

★If the joint boot is torn, worn, or deteriorated, replace the joint boot and check the propeller shaft (see Propeller Shaft section in the Final Drive chapter).

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

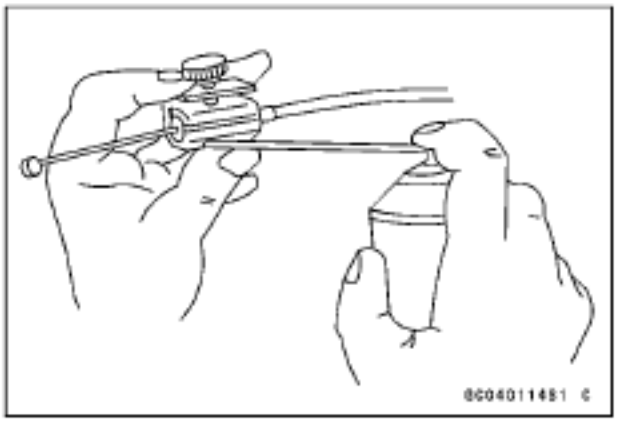
○*Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure spray water, perform the general lubrication.*

Cables: Lubricate with Cable Lubricant

Parking Brake Inner Cable
Throttle Inner Cable
Choke Inner Cable

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

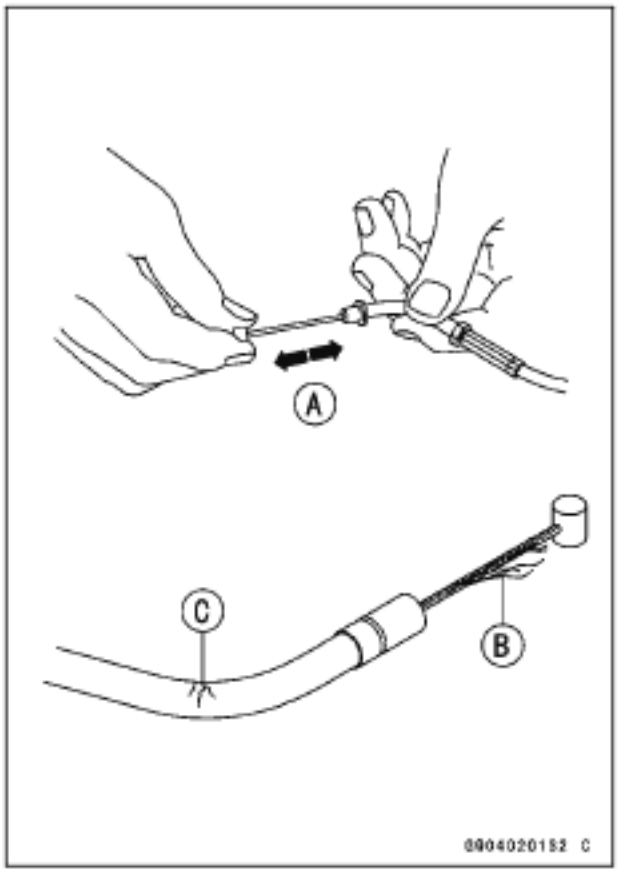
○The cable may be lubricated by using a pressure cable luber with an aerosol cable lubricant.



Periodic Maintenance Procedures

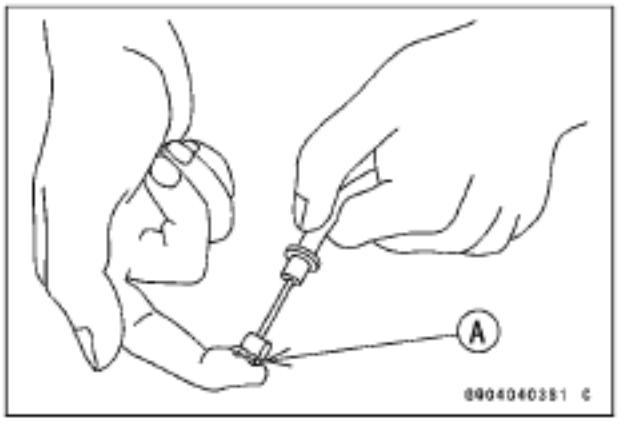
- With the cable disconnected at the both ends, the cable should move freely [A] within the cable housing.

★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 Lower End
Parking Brake Cable Ends



Slide Points: Lubricate with Grease.

Brake Lever
Brake Pedal Pivot Shaft
Throttle Lever Shaft
Steering Stem Bushings
Steering Stem Holders

Periodic Maintenance Procedures

Bolts and Nuts Tightening

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
Brake Lever Pivot Bolt
Brake Lever Pivot Bolt Locknut
Brake Caliper Mounting Bolts
Brake Pedal Cotter Pin

Steering/Suspension:
Handlebar Holder Bolts
Steering Shaft Holder Nuts
Swingarm Mounting Nut
Tie-rod End Nuts and Cotter Pins
Tie-rod Locknuts
Shock Absorber Mounting Nuts
Front Suspension Arm Pivot Nuts

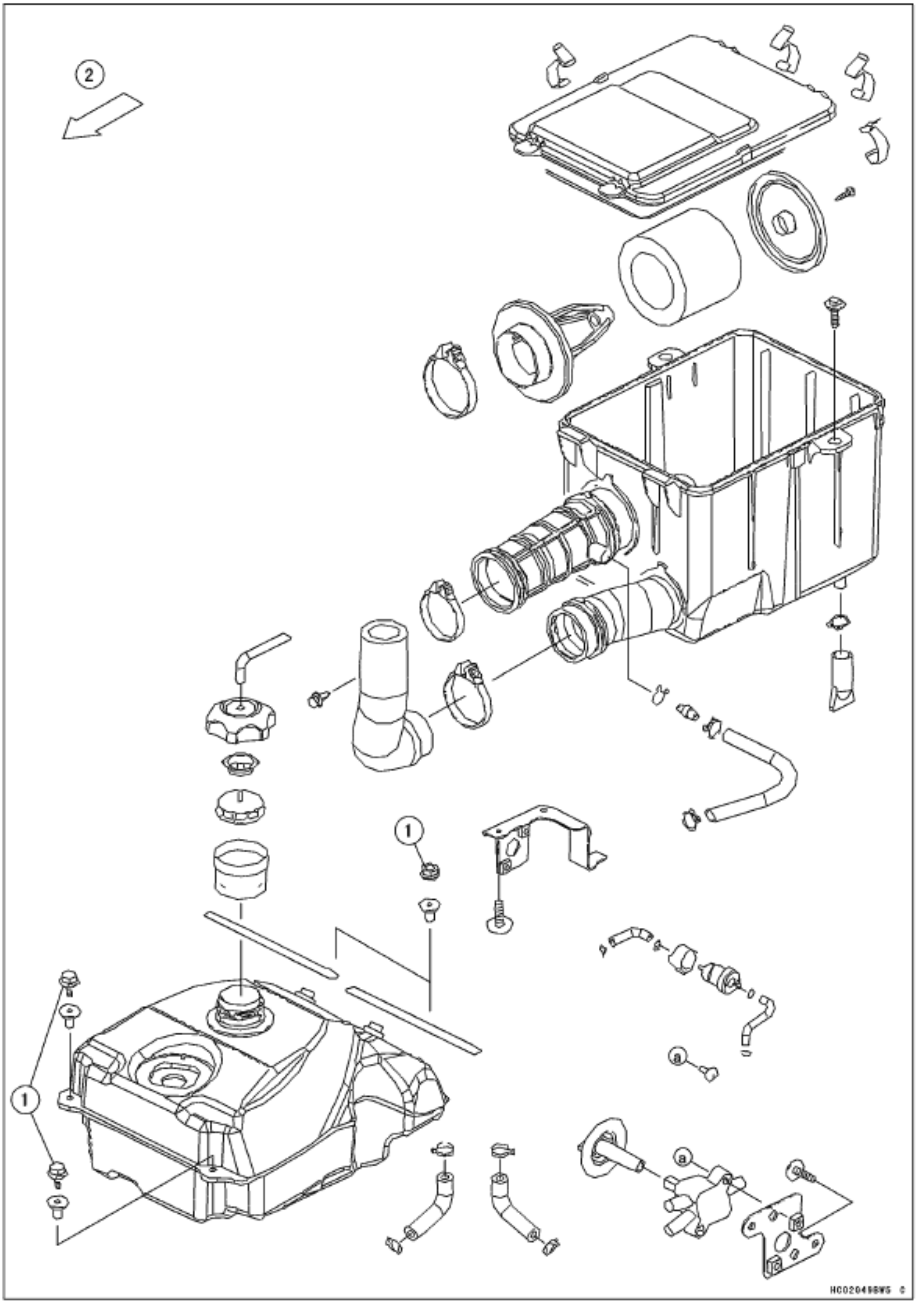
Engine:
Engine Mounting Bolts
Engine Mounting Bracket Bolts
Exhaust Pipe Holder Nuts
Muffler Mounting Nuts

Others:
Footboard Mounting Bolts
Throttle Case Screws
Carrier Bolts

Fuel System

Table of Contents

Exploded View

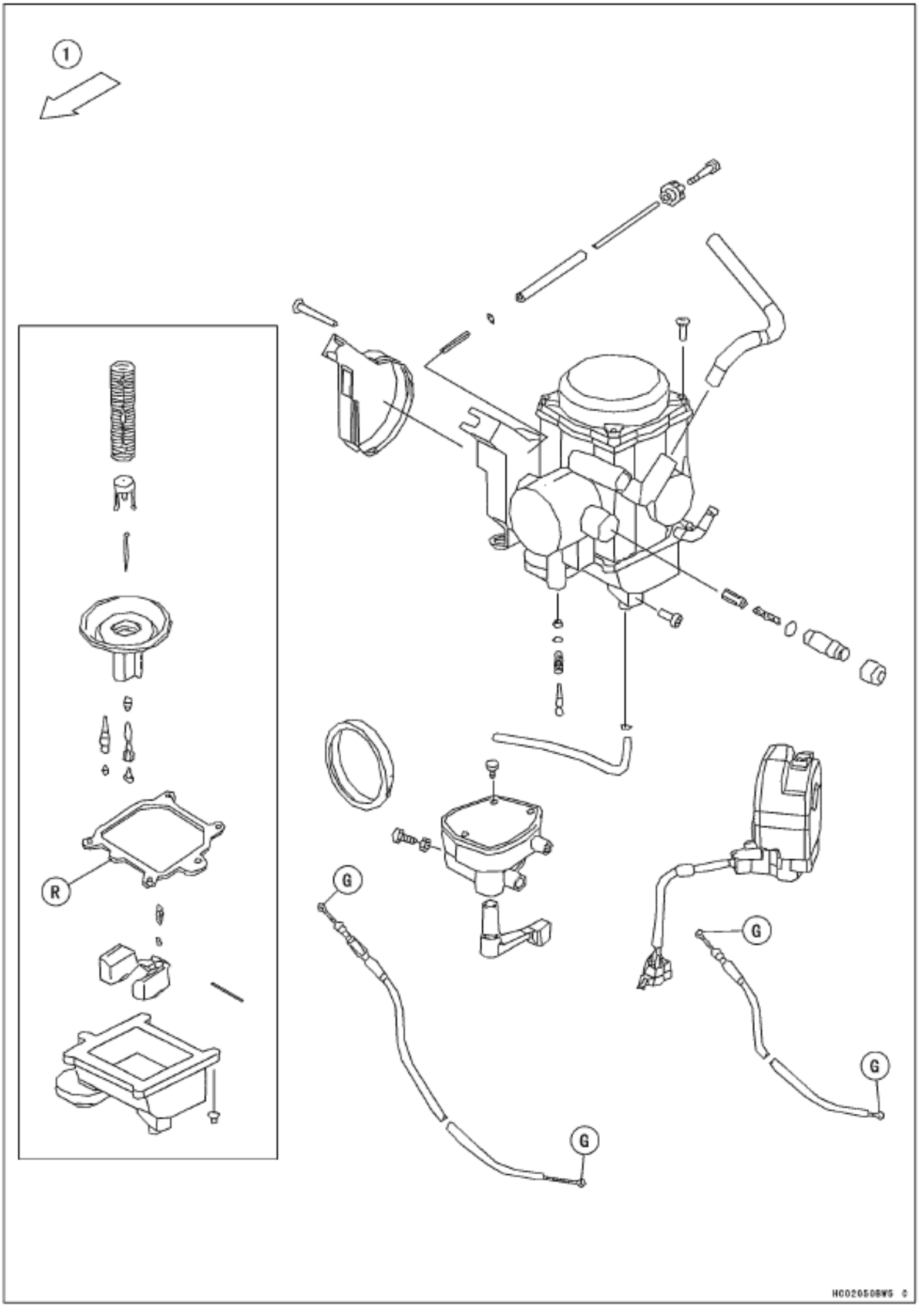


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Fuel Tank Bolts and Nuts	12	1.2	106 in·lb	

2. Front

Exploded View



Exploded View

1. Front
G: Apply grease.
R: Replacement Parts

3-6 FUEL SYSTEM

Specifications

Item	Standard
Throttle Lever and Cable	
Throttle Lever Free Play	1 ~ 4 mm (0.04 ~ 0.16 in.)
Carburetor	
Type	CVK32
Idle Speed	1 500 ±100 r/min (rpm)
Main Jet	#108
Float Height	17.0 ±2 mm (0.669 ±0.08 in.)
Air Cleaner	
Air Cleaner Element Oil	High-quality foam air filter oil

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

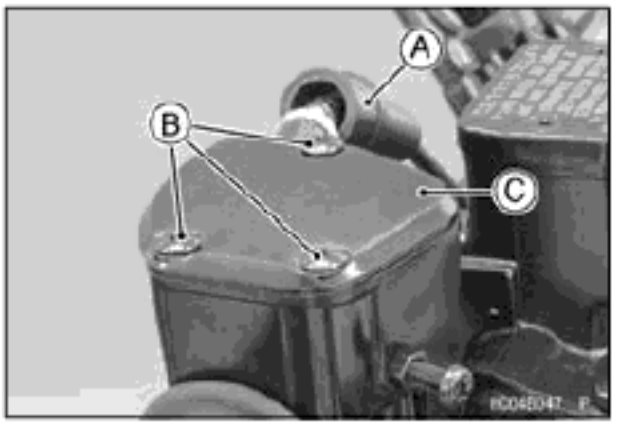
- Refer to the Throttle Lever Free Play Adjustment in the Periodic Maintenance chapter.

Throttle Cable Lubrication

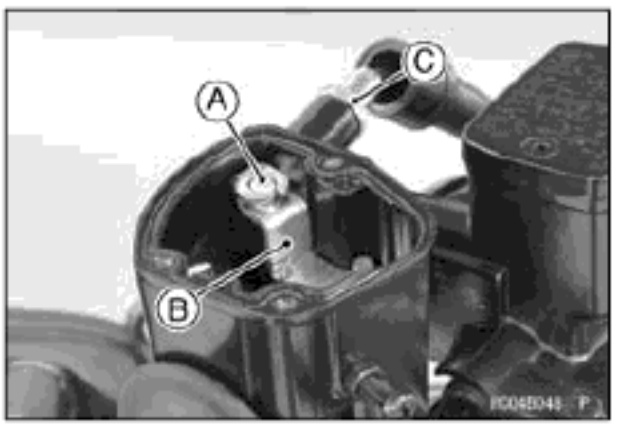
- Refer to the Lubrication in the Periodic Maintenance chapter.

Throttle Cable Removal

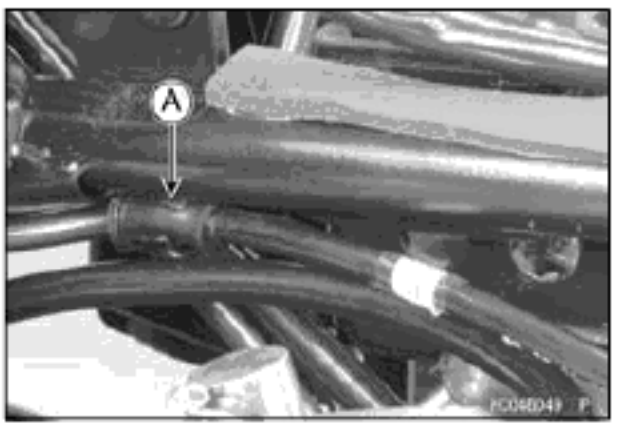
- Remove the throttle cable lower end from the carburetor (see Carburetor Removal).
- Slide the rubber cover [A] at the throttle case.
- Remove:
  Screws [B]
  Throttle Case Cover [C] and Gasket



- Clear the cable upper end [A] from the throttle lever [B].
- Loosen the locknut [C] and remove the throttle cable.



- Free the throttle cable from the clamp [A] and remove it out of the vehicle.



Throttle Cable Installation

- Install the throttle cable in accordance with Cable, Wire, and Hose Routing section in the Appendix chapter.
- Install the lower end of the throttle cable in the throttle pulley on the carburetor after installing the upper end of the throttle cable in the lever.
- After installation, adjust the cable properly.

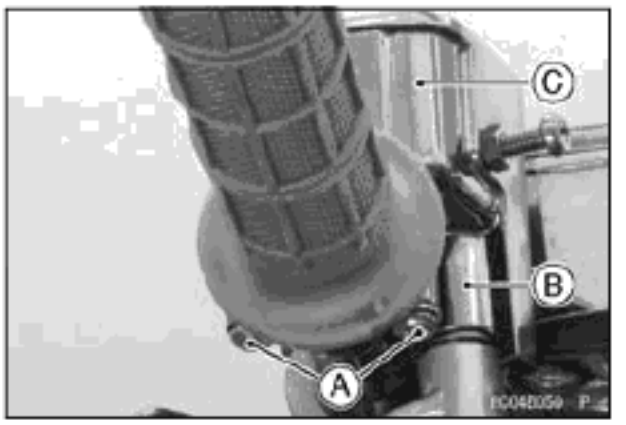
⚠ WARNING

Operation with incorrectly routed or improperly adjusted cable could result in an unsafe riding condition. Be sure the cable is routed correctly and properly adjusted.

Throttle Lever and Cable

Throttle Case Removal

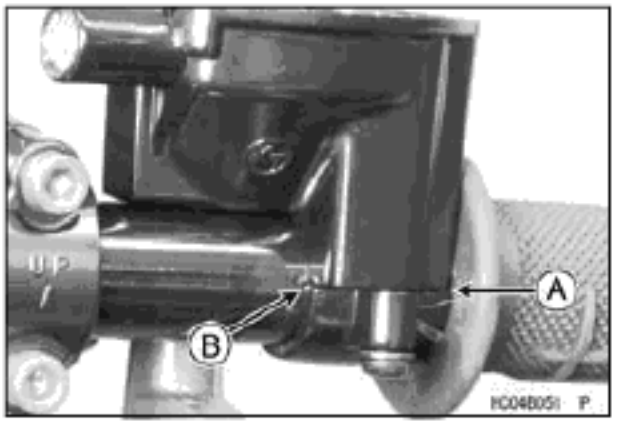
- Remove:
  Throttle Cable Upper End (see Throttle Cable Removal)
  Screws [A]
  Throttle Case Clamp [B]
  Throttle Case Assembly [C]



Throttle Case Installation

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

○Set the throttle case to match its mating surface [A] to the punch mark [B] of the handlebar.

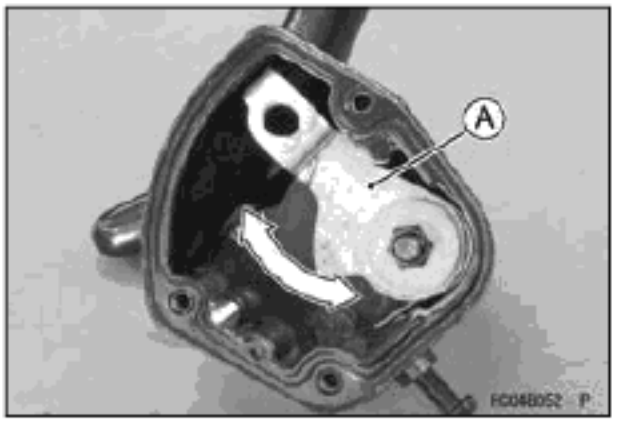


Throttle Case Inspection

- With the throttle cable disconnected from the throttle lever [A], the lever should move freely and return smoothly by spring.

★If the lever is heavy, clean and lubricate the throttle case.

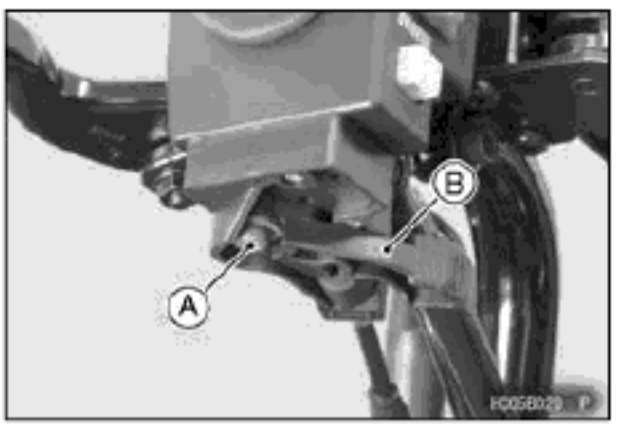
- Examine the lever and case for cracks. Replace the case assembly if it is cracked.



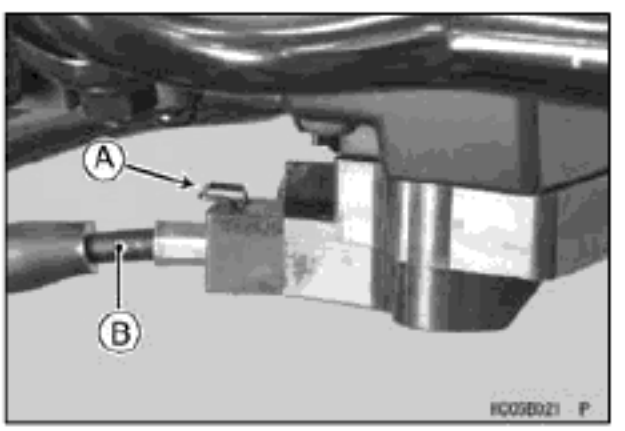
Choke Lever and Cable

Choke Lever Removal

- Remove the choke lever mounting screw [A] and take off the plane washer and the wave washer.
- Remove the choke lever [B] and free the choke cable upper end from the lever.



- Remove the retaining ring [A] and free the choke cable [B] from the switch case.



Choke Lever Installation

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

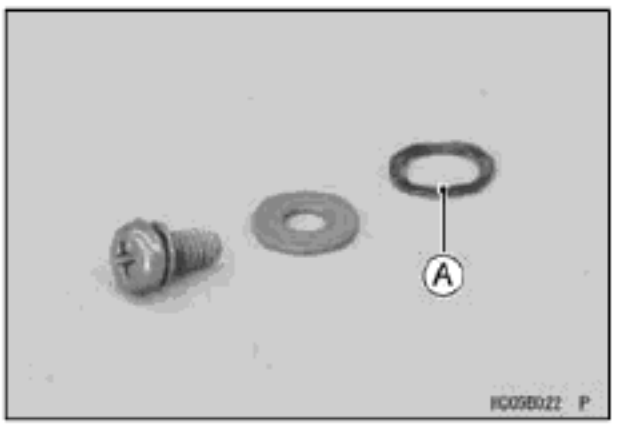
⚠ WARNING

Operation with an improperly adjusted, incorrectly routed or damaged cables could result in an unsafe riding condition. Follow the service manual to make sure to correct any of these conditions.

Choke Lever Lubrication

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

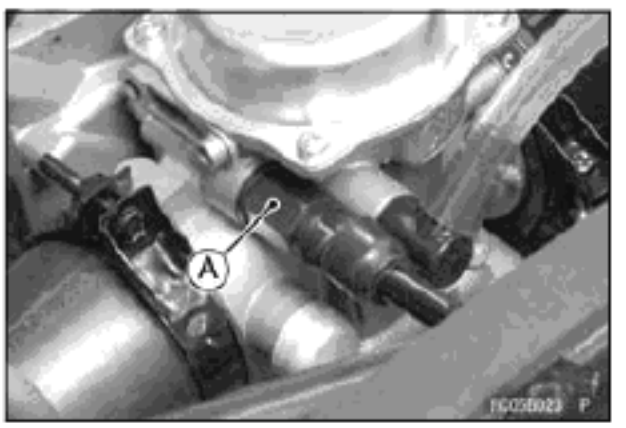
- Apply a thin coating of multi-purpose grease to the wave washer [A].



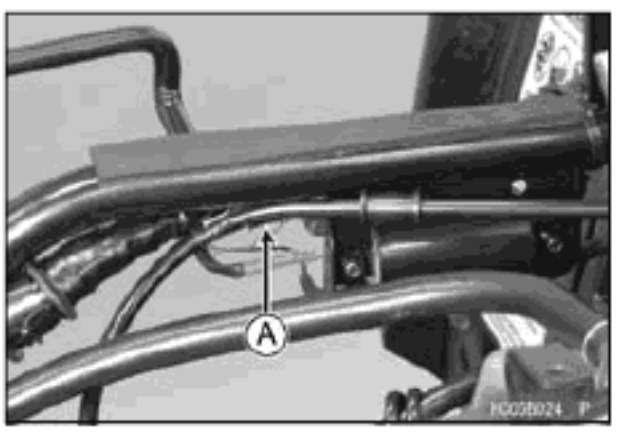
Choke Lever and Cable

Choke Cable Removal

- Remove:
  Choke Cable Upper End (see Choke Lever Removal)
  Fuel Tank (see Fuel Tank Removal)
- Loosen the locknut [A] and remove the choke cable lower end.



- Free the choke cable from the clamp [A] and remove it out of the vehicle.



Choke Cable Installation

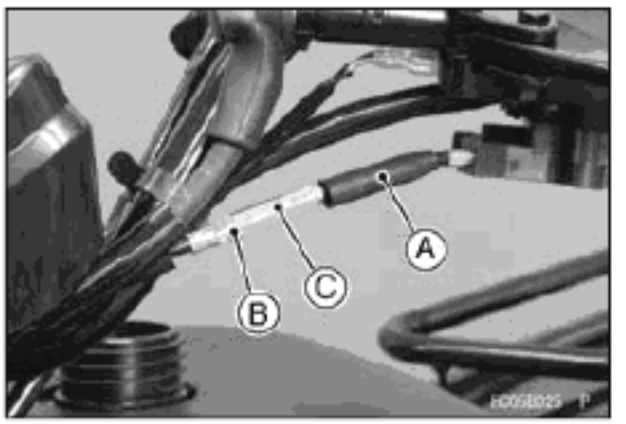
- Installation is the reverse of removal.
- Install the choke cable in accordance with the Cable, Wire, and Hose Routing section in the Appendix chapter.
- After installation, adjust the cable properly.

⚠WARNING

Operation with improperly adjusted, incorrectly routed or damaged cables could result in an unsafe riding condition. Follow the service manual to make sure to correct any of these conditions

- Adjust the choke lever operation as the following procedures.

○Slide the rubber cover [A].
○Loosen the locknut [B].
○Turn the adjuster [C] to adjust the hardness of the lever operation.



Choke Cable Lubrication

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

Carburetor

Idle Speed Inspection

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

Idle Speed Adjustment

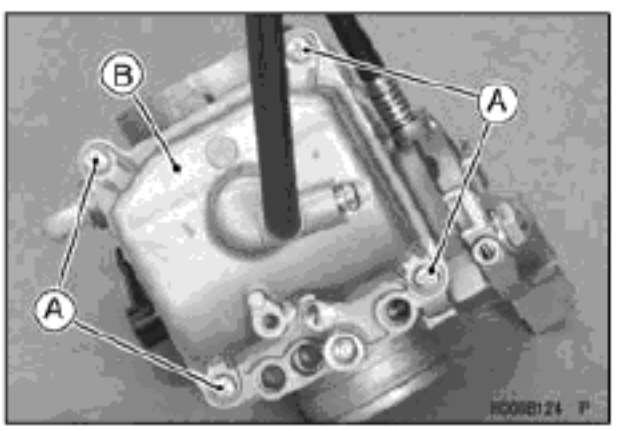
- Refer to the Idle Speed Adjustment in the Periodic Maintenance chapter.

Float Height Inspection

⚠ WARNING

Gasoline is extremely flammable and can be explosive under certain conditions. Always stop the engine and 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).
- Drain the fuel of the carburetor.
- Remove the screws [A], and take off the float bowl [B].



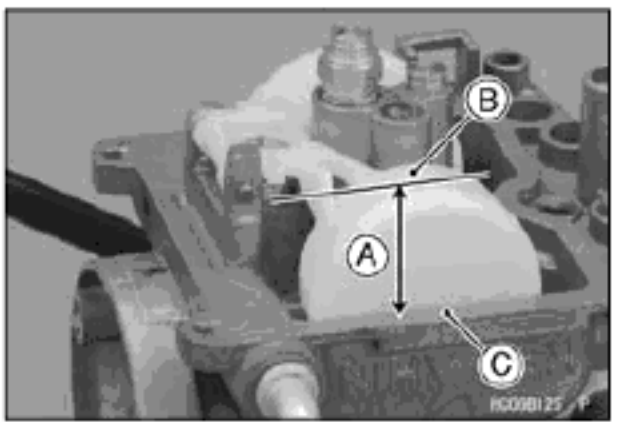
- Measure the height [A] between the float bowl mating surface [B] (with the gasket removed) and the float upper surface [C].

NOTE

○*Measure the height with the carburetor upside down.*
○*Do not push the needle rod in during the float height measurement.*

Float Height

Standard: 17.0 ±2 mm (0.669 ±0.08 in.)

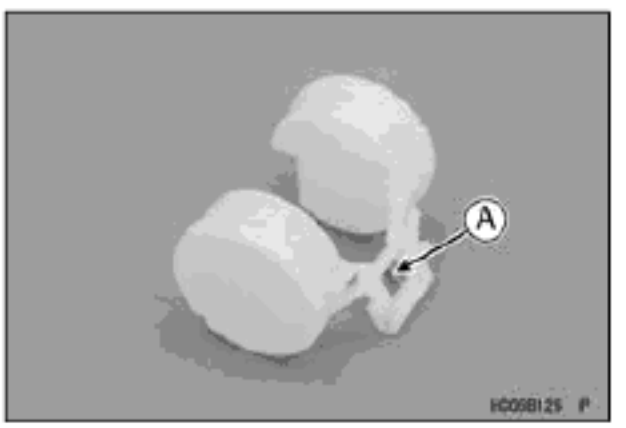


★If the float level is incorrect, adjust the float level as follows.

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

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

- Install the removed parts (see appropriate chapters).



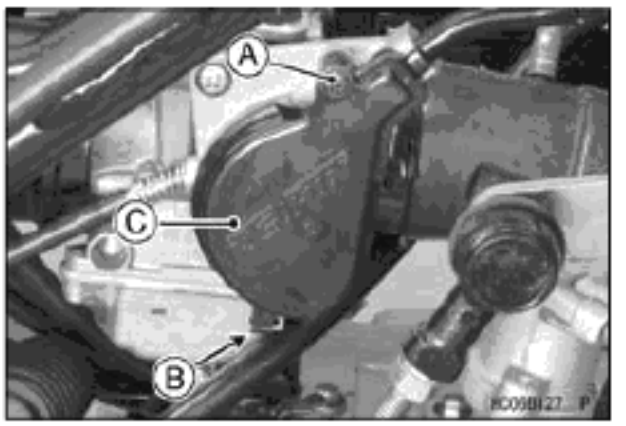
Carburetor

Carburetor Removal

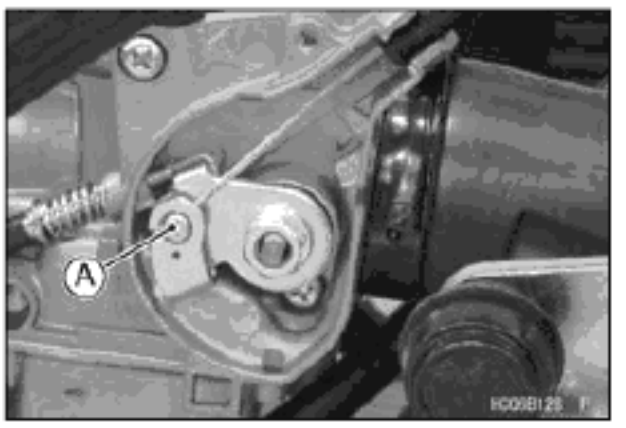
⚠WARNING

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

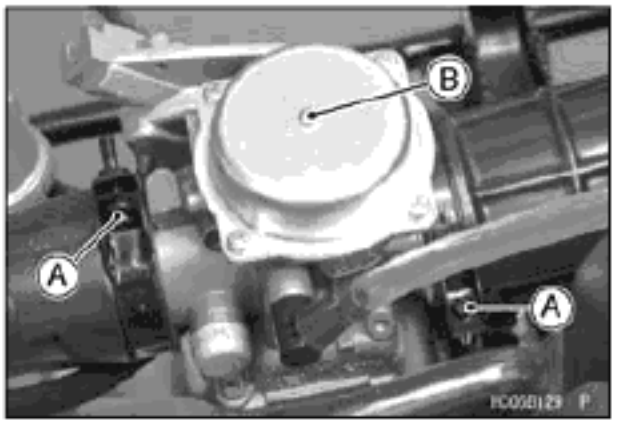
- Turn the fuel tap to the OFF position.
- Remove:
  Fuel Tank (see Fuel Tank Removal)
  Choke Cable (see Choke Cable Removal)
  Screw [A]
- Clear the hook [B] from the hole and remove the throttle pulley cover [C].



- Remove the throttle cable lower end [A] from the throttle pulley.



- Loosen the clamp screws [A].
- Pull off the carburetor [B].
- After removing the carburetor, stuff pieces of lint-free, clean cloths into the carburetor holder.



NOTICE

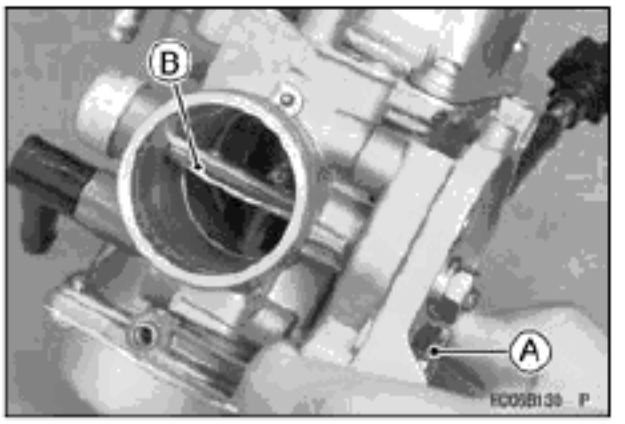
If dirt gets into the engine, excessive engine wear and possible engine damage will occur.

Carburetor

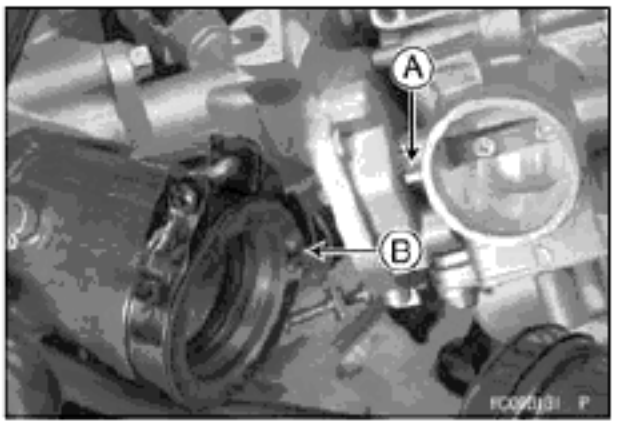
Carburetor Installation

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

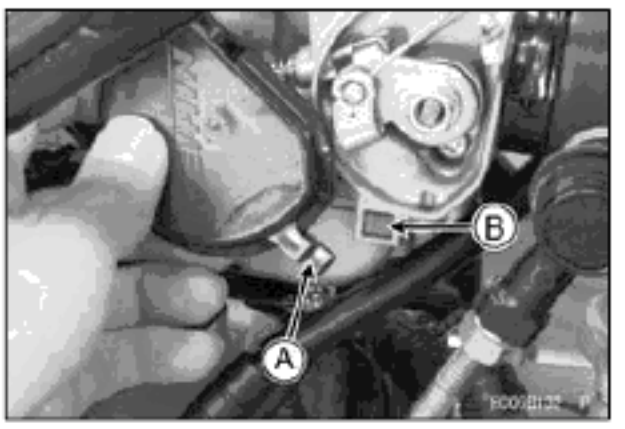
★If the throttle valve do not move smoothly, replace the carburetor.



- Run the leads, cables and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Fit the projection [A] of the carburetor into the slit [B] on the carburetor holder.
- Tighten the clamp screws securely.



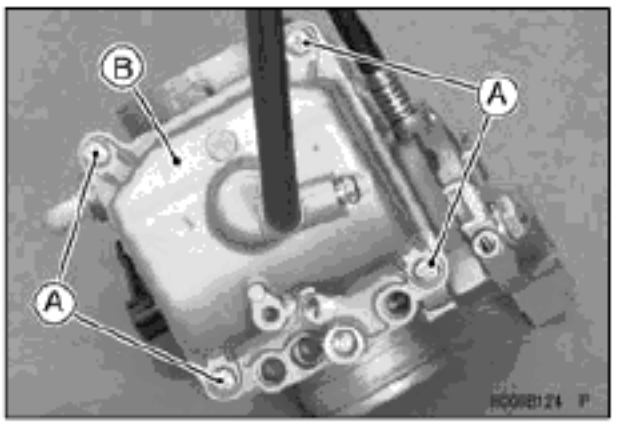
- Apply a thin coating of grease to the throttle cable lower end.
- Fit the throttle cable lower end into the throttle pulley.
- Insert the hook [A] of the throttle pulley cover to the hole [B] of the carburetor.
- Tighten the throttle pulley cover screw.
- Install the removed parts (see appropriate chapters).



- Adjust:
  Throttle Lever Free Play (see Throttle Lever Free Play Inspection in the Periodic Maintenance chapter)
  Idle Speed (see Idle Speed Adjustment in the Periodic Maintenance chapter)

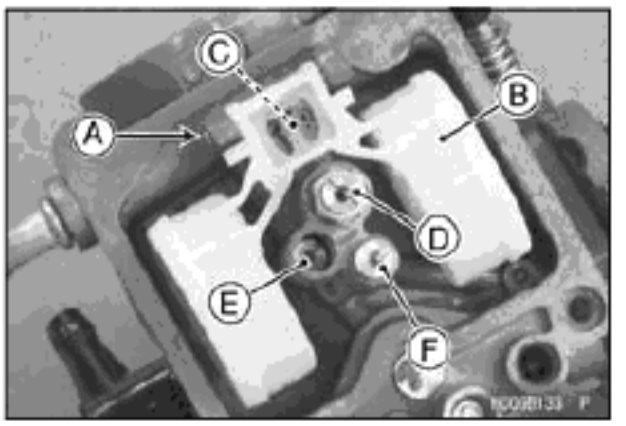
Carburetor Disassembly

- Remove:
  Carburetor (see Carburetor Removal)
  Float Bowl Screws [A]
  Float Bowl [B] and O-ring



Carburetor

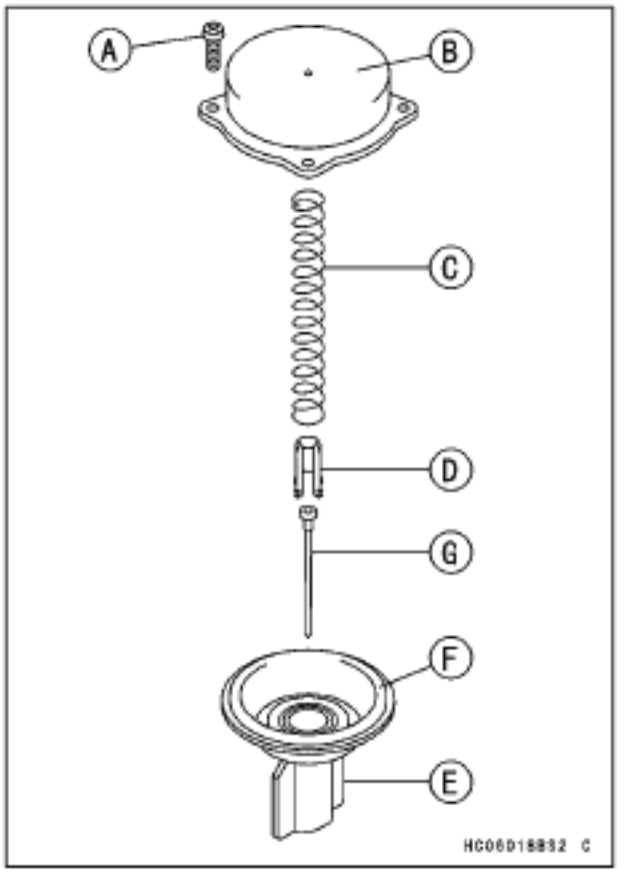
- Slide out the float pivot pin [A], remove the float [B], and drop out the float valve needle with its hanger.
- Remove:
  Float Valve Needle [C]
  Main Jet [D], Needle Jet Holder and Needle Jet
  Pilot Jet [E]
  Starter Jet [F]



- Remove:
  Screws [A]
  Chamber Cover [B]
  Spring [C] and Spring Seat [D]
  Vacuum Piston [E], Diaphragm [F] and Jet Needle [G]

NOTICE

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

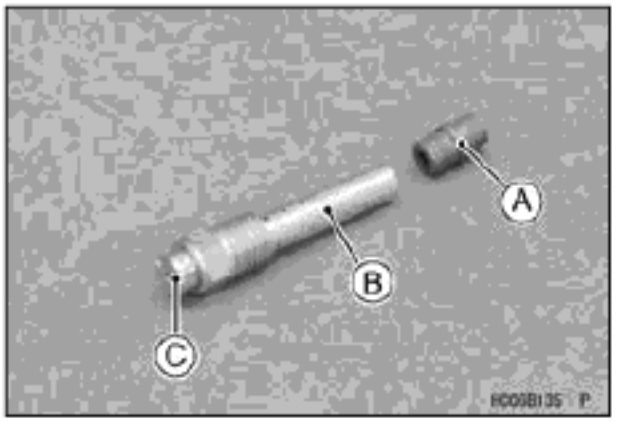


Carburetor Assembly

- Turn the carburetor body upside down, and install the needle jet [A] into the carburetor.

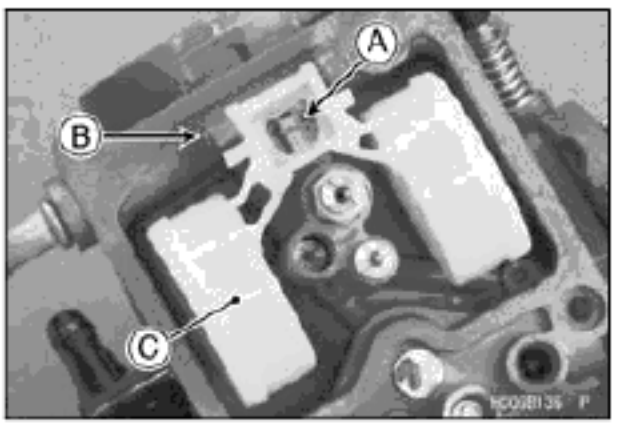
NOTICE

Do not force the needle jet holder [B] and main jet [C] or overtighten them. The needle jet or the carburetor body could be damaged requiring replacement.



Carburetor

- Drop the float valve needle into the valve seat and hold the float in place with the tang [A] hooked into the needle hanger.
- Slip the float pivot pin [B] through the pivot posts and the float [C] as shown in the figure.

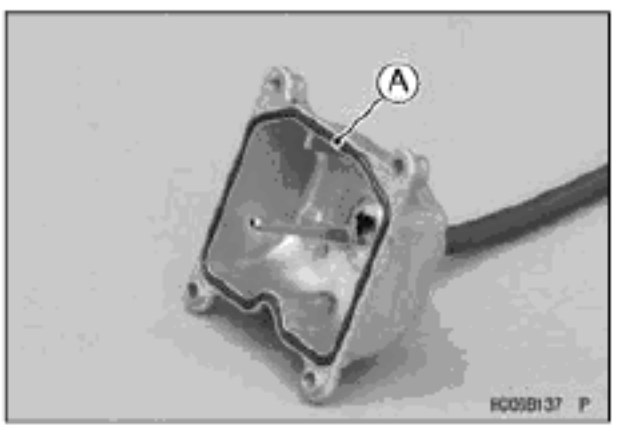


⚠ WARNING

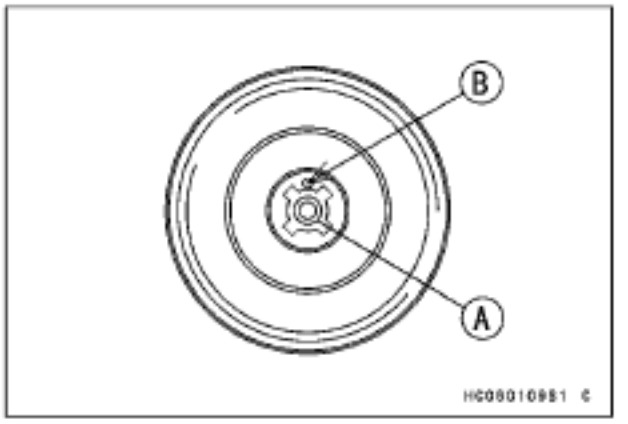
Fuel is flammable and can damage the environment. If the float is not properly installed, the specified fuel level cannot be maintained and fuel may spill from the carburetor. Be sure the float is properly installed and the float level set according to specifications.

- Set the float height as specified (see Float Height Inspection).

- Replace the float bowl O-ring [A] with a new one.
- Install the following parts.
  Pilot Jet
  Starter Jet
  New Float Bowl O-ring
  Float Bowl and Screws



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



Carburetor

Carburetor Cleaning

⚠WARNING

Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. 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. Do not use gasoline or a low flash-point solvent to clean the carburetor.

- Disassemble the carburetor (see Carburetor Disassembly).

NOTICE

Do not use compressed air on an assembled carburetor, the float may be deformed by the pressure. Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor with cleaning solution. This will prevent damage or deterioration of the parts. Do not use strong carburetor cleaning solution which could attack the plastic parts; instead, use 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.

- Immerse all the metal parts in carburetor cleaning solution.
- Rinse the parts in water.
- After the parts are cleaned, dry them with compressed air.
- Blow through the air and fuel passages with compressed air.
- Assemble the carburetor (see Carburetor Assembly).

Carburetor Inspection

⚠WARNING

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

- Disassemble the carburetor (see Carburetor Disassembly).
- Clean the carburetor (see Carburetor Cleaning).
- Check the carburetor holder, starter plunger, plunger cap, idle adjusting screw and vacuum piston diaphragm are in good condition.

★If any of the parts is not in good condition, replace it.

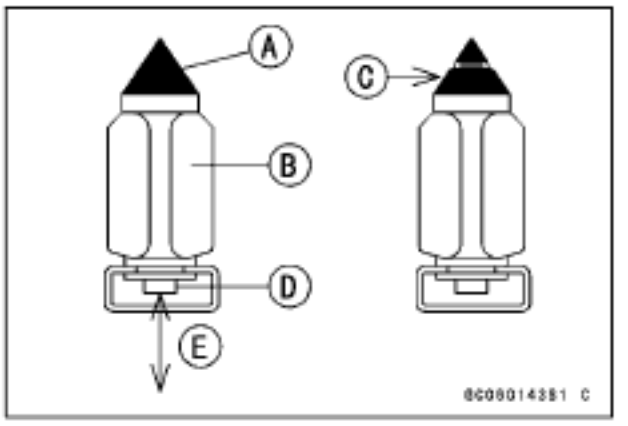
Carburetor

- Check the plastic tip [A] of the float valve needle [B]. It should be smooth, without any grooves, scratches, or tears.

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

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

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



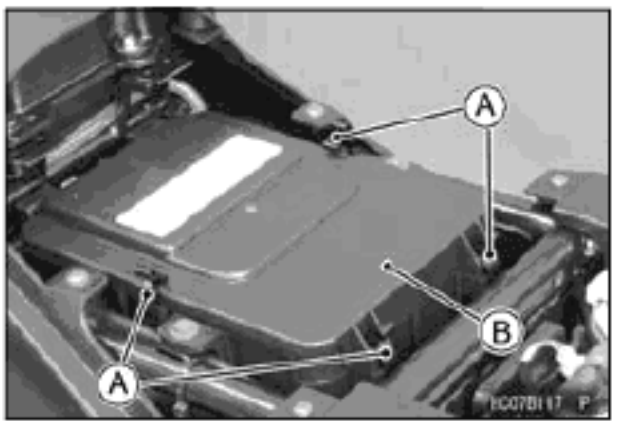
- Check that the vacuum piston moves smoothly in the carburetor body. The surface of the piston must not be excessively worn.

★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.

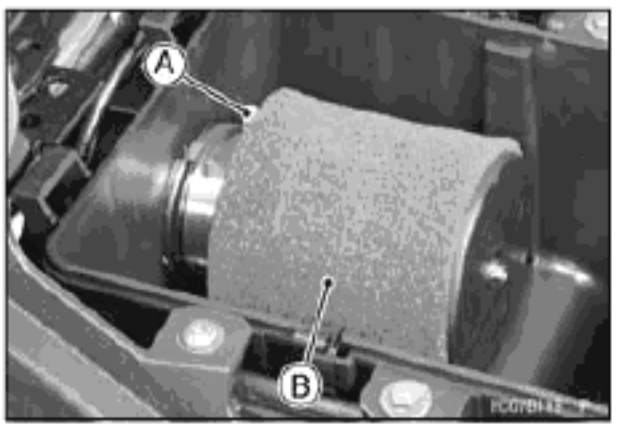
Air Cleaner

Air Cleaner Element Removal

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



- Remove:
  Element Clamp Screw [A]
  Element [B]
- After removing the element, stuff pieces of lint-free, clean cloth into the air cleaner duct to keep dirt out of the carburetor and engine.



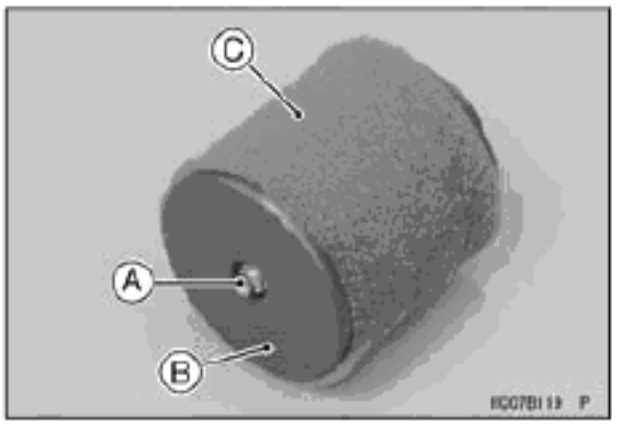
⚠WARNING

If dirt or dust is allowed to pass through into the carburetor, the throttle may become stuck, possibly causing accident. Replace the air cleaner element according to the maintenance chart.

NOTICE

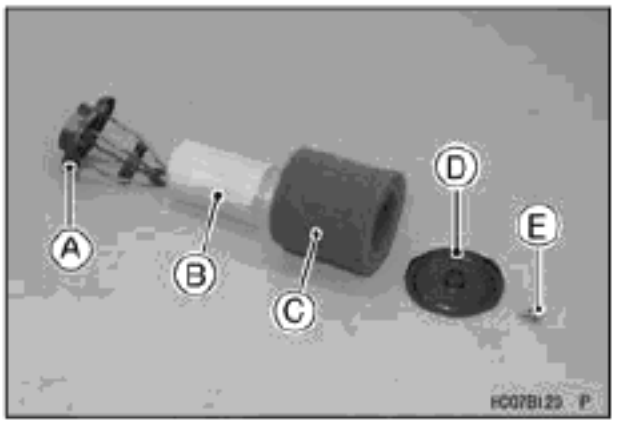
If dirt gets through into the engine, excessive engine wear and possibly engine damage will occur.

- Remove:
  Screw [A]
  Holder [B]
  Element [C]



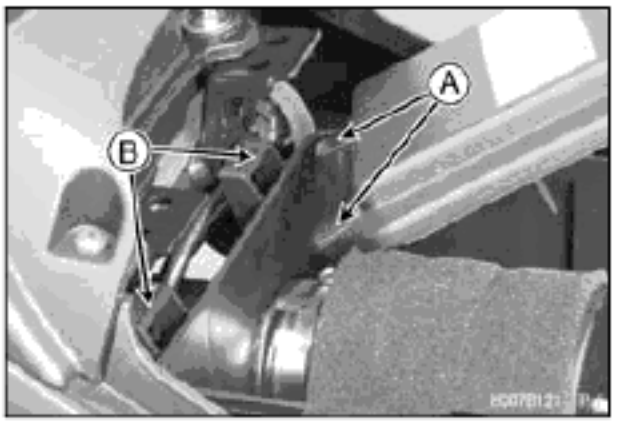
Air Cleaner Element Installation

- Install the following parts on the element frame [A].
  Metal Net [B]
  Element [C]
  Holder [D]
  Screw [E]



Air Cleaner

- Fit the tangs [A] of the housing cap into the holes [B] of the housing.
- Install the clips securely.



Air Cleaner Element Cleaning and Inspection

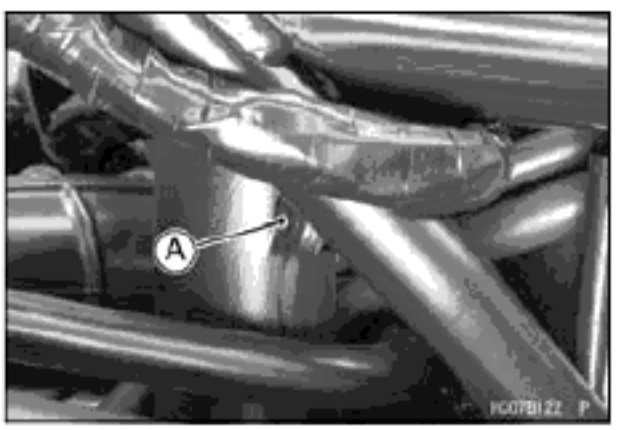
- Refer to the Air Cleaner Element Cleaning and Inspection in the Periodic Maintenance chapter.

Air Cleaner Draining

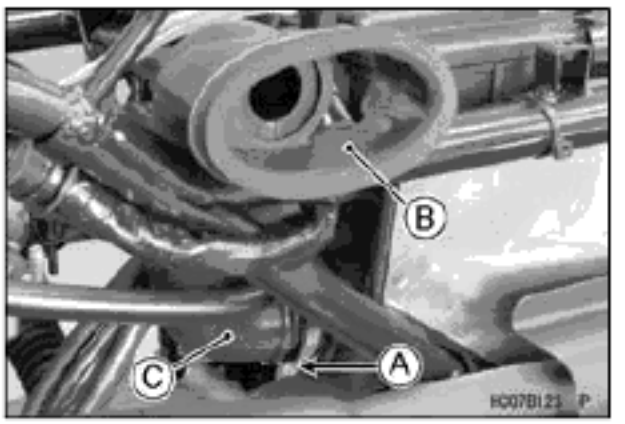
- Refer to the Air Cleaner Draining in the Periodic Maintenance chapter.

Air Cleaner Housing Removal

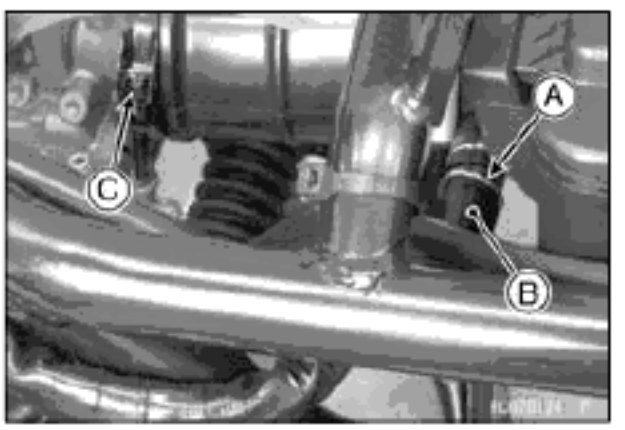
- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
- Loosen the screw [A] and remove the rivet.



- Loosen the clamp screw [A].
- Remove:
  Air Intake Duct (Outside) [B]
  Air Intake Duct (Inside) [C]

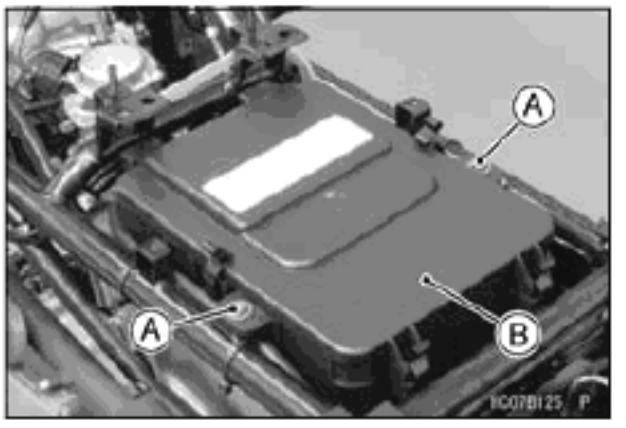


- Remove:
  Clamp [A] and Breather Hose [B]
- Loosen the clamp screw [C].



Air Cleaner

- Remove:
  Air Cleaner Housing Mounting Bolts [A]
  Air Cleaner Housing [B]

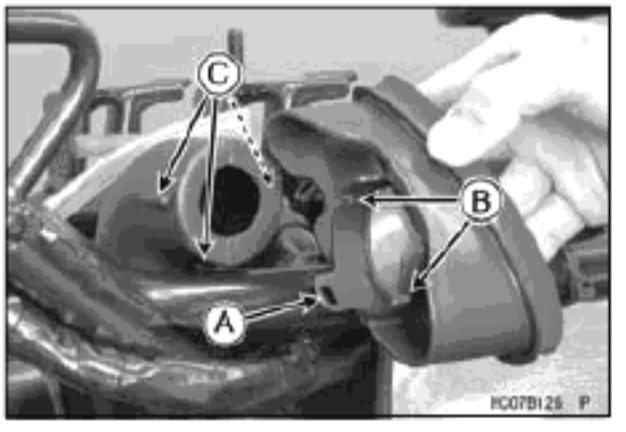


Air Cleaner Housing Installation

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

○Run the leads and hose correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

○Fit the hole [A] and slits [B] of the air intake duct (outside) to the projections [C] of the air intake duct (inside).



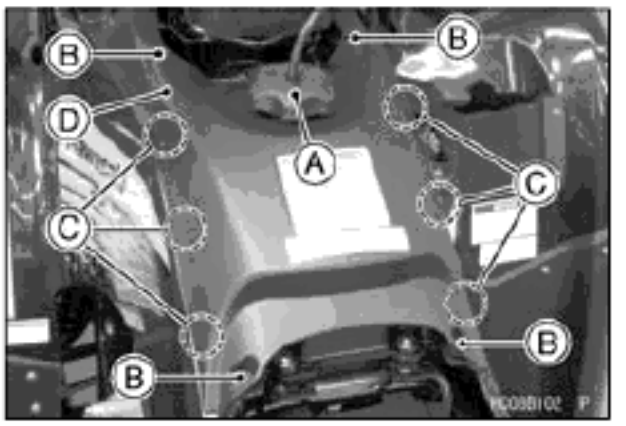
Fuel Tank

Fuel Tank Removal

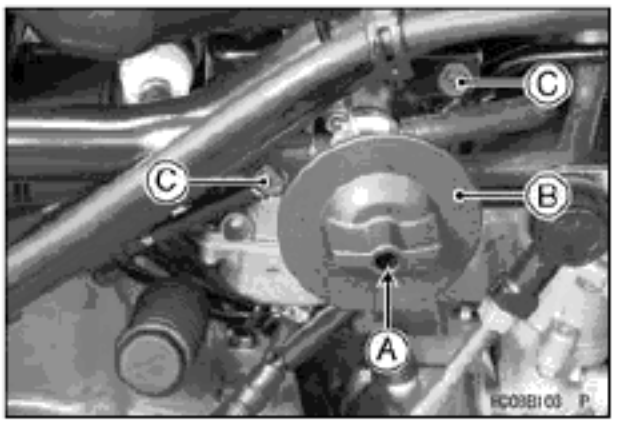
⚠ WARNING

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

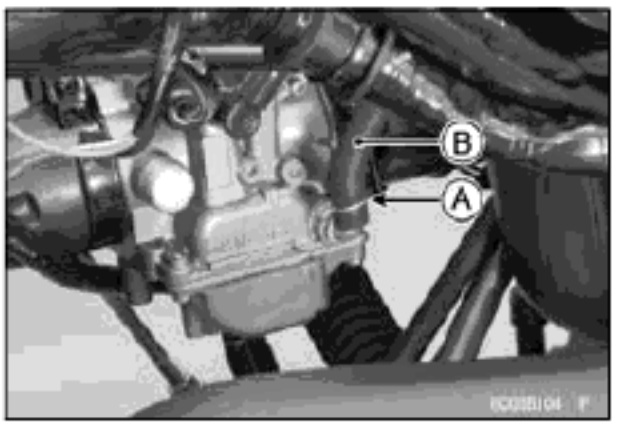
- Remove:
  Seat (see Seat Removal in the Frame chapter)
  Fuel Tank Cap [A]
  Screws [B]
- Clear the projections [C] from the holes and remove the fuel tank cover [D].



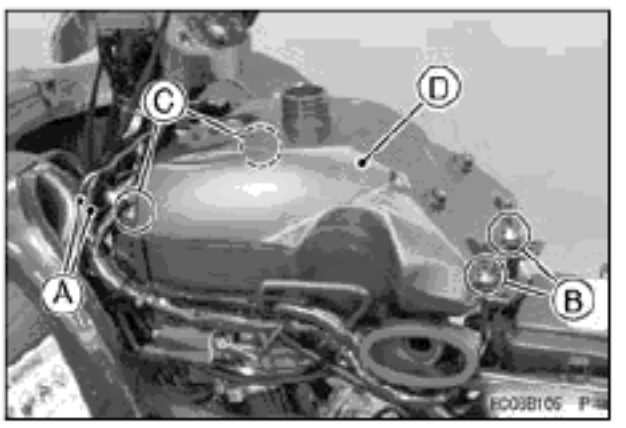
- Remove:
  Middle Cover (see Middle Cover Removal in the Frame chapter)
- Turn the fuel tap to the OFF position.
- Remove:
  Screw [A] and Knob [B]
  Bolts [C]



- Remove:
  Clamp [A]
  Fuel Hose [B]



- Remove:
  Connectors [A]
  Nuts [B] and Collars
  Bolts [C] and Collars
  Fuel Tank [D]



Fuel Tank

Fuel Tank Installation

⚠WARNING

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

- Check the rubber dampers [A] on the frame top-tubes as shown in the figure.

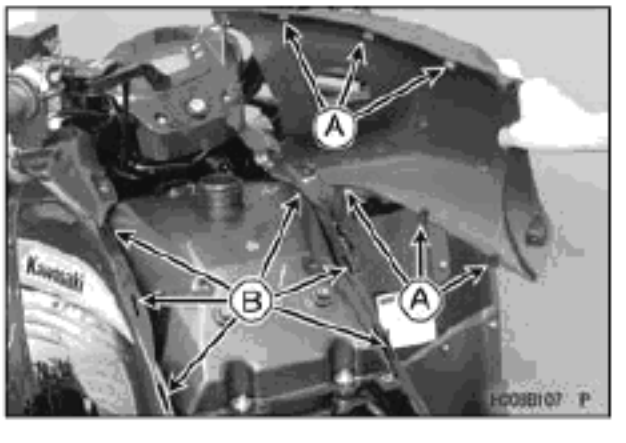
★If the dampers are damaged or deteriorated, replace them.

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

○Run the leads, cables and hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

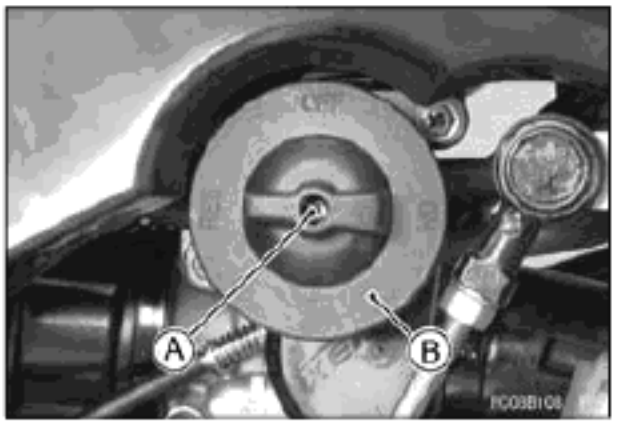
Torque - Fuel Tank Bolts and Nuts: 12 N·m (1.2 kgf·m, 106 in·lb)

○Insert the projections [A] into the holes [B].

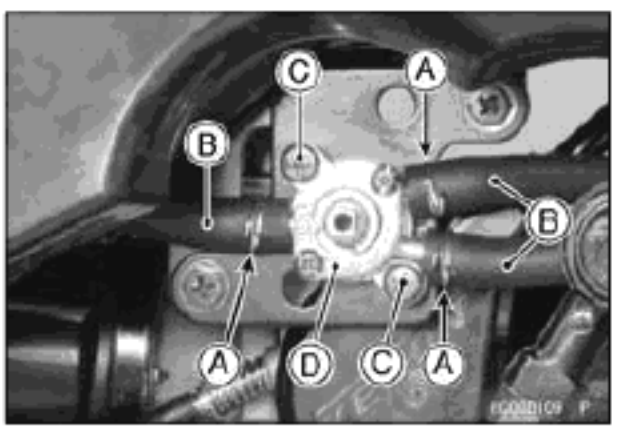


Fuel Tap Removal

- Drain the fuel from the tank.
- Remove:
  Screw [A]
  Knob [B]



- Remove:
  Clamps [A] and Hoses [B]
  Fuel Tap Mounting Screws [C]
  Fuel Tap [D]



Fuel Tank

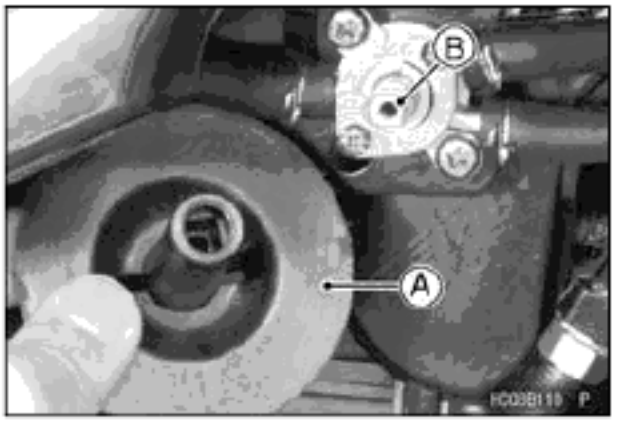
Fuel Tap Installation

- Be sure the fuel hoses are clamped to the fuel tap to prevent leakage.

⚠ WARNING

Fuel Spilled from the fuel tap is hazardous.

- Set the knob [A] on the shaft [B] securely.



Fuel Tank and Fuel Tap Cleaning

- Remove the fuel tank with fuel tap 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.

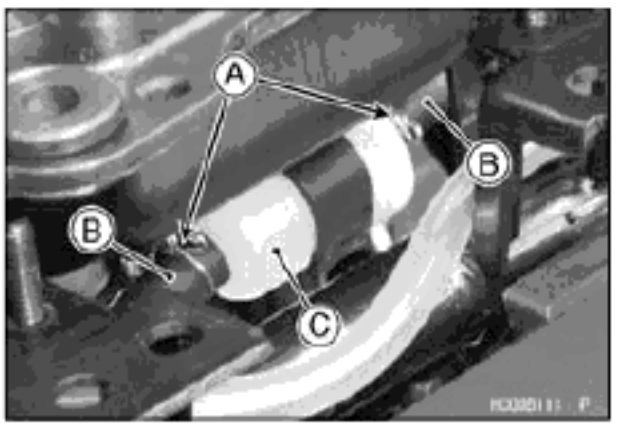
⚠ WARNING

Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. Clean the tank 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 a low flash-point solvent to clean the tank.

- Pour the solvent out the tank.
- Remove the fuel filter.
- Pour high flash-point solvent through the tap in both ON and RES positions.
- Dry the tank with compressed air.
- Install the fuel filter.
- Install the fuel tank (see Fuel Tank Installation).

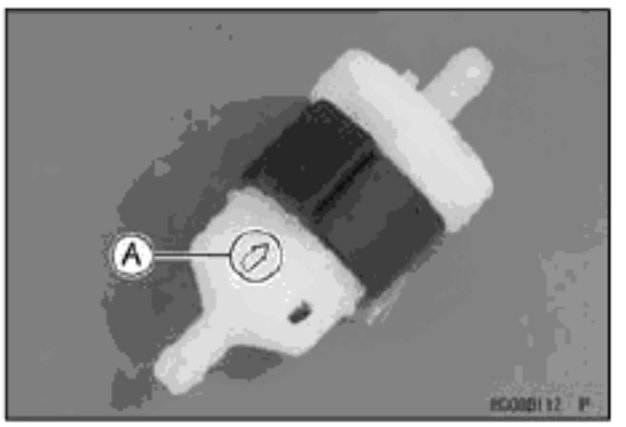
Fuel Filter Removal

- Remove the fuel tank bolts and nuts (see Fuel Tank Removal).
- Remove:
  Clamps [A] and Hoses [B]
  Fuel Filter [C]



Fuel Filter Installation

- Install the fuel filter so that the arrow mark [A] faces carburetor side.



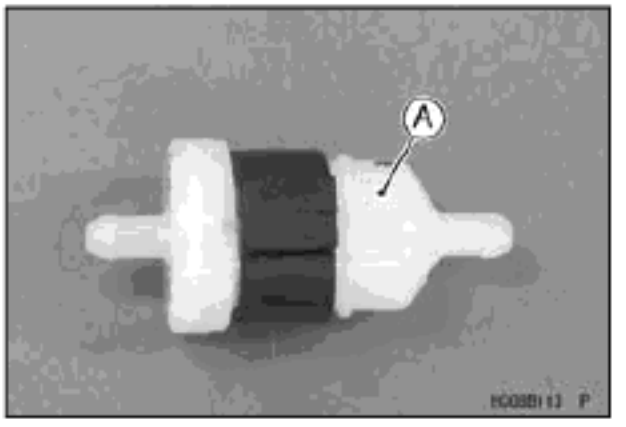
Fuel Tank

Fuel Filter Inspection

- Visually inspect the fuel filter [A].

★If the filter is clear with no signs of dirt or other contamination, it is OK and need not be replaced.

★If the filter is dark or looks dirty, replace it with a new one. Also check the rest of the fuel system for contamination.



Cooling System

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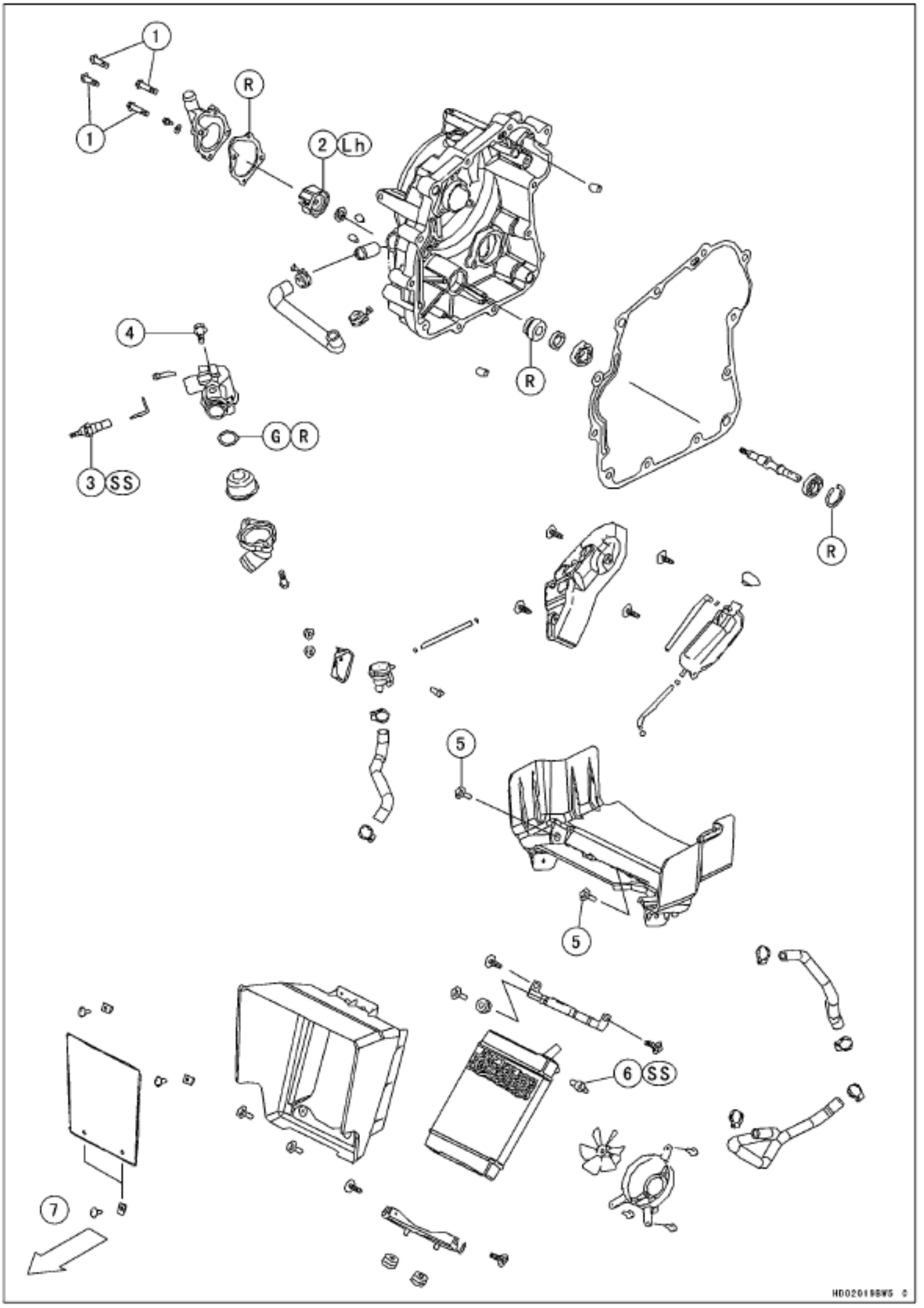
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Water Pump Cover Bolts	9.8	1.0	87 in·lb	
2	Water Pump Impeller	12	1.2	106 in·lb	Lh
3	Water Temperature Sensor	15	1.5	11	SS
4	Thermostat Housing Mounting Bolt	9.8	1.0	87 in·lb	
5	Radiator Mounting Bolts	12	1.2	106 in·lb	
6	Radiator Fan Switch	22	2.2	16	SS

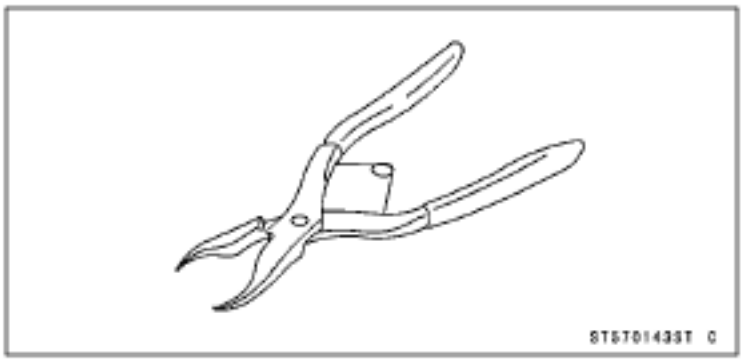
7. Front
G: Apply grease.
Lh Left-Hand Threads
R: Replacement Parts
SS: Apply silicone sealant.

Specifications

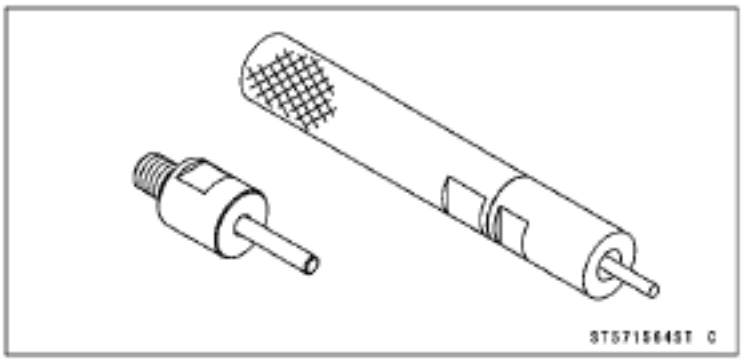
Item	Standard	Service Limit
Coolant Provided when Shipping		
Type	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiator)	– – –
Color	Green	– – –
Mixed Ratio	Soft water 70%, coolant 30%	– – –
Freezing Point	–15°C (5°F)	– – –
Total Amount	1.3 L (1.4 US qt) (reserve tank full level including radiator and engine)	– – –
Radiator Cap		
Relief Pressure	About 108 kPa (1.1 kgf/cm², 16 psi)	– – –
Thermostat		
Valve Opening Temperature	78 ~ 82°C (172 ~ 180°F)	– – –
Valve Full Opening Lift	3.5 ~ 4.5 mm (0.14 ~ 0.18 in.) or more @90°C (194°F)	– – –

Special Tools and Sealant

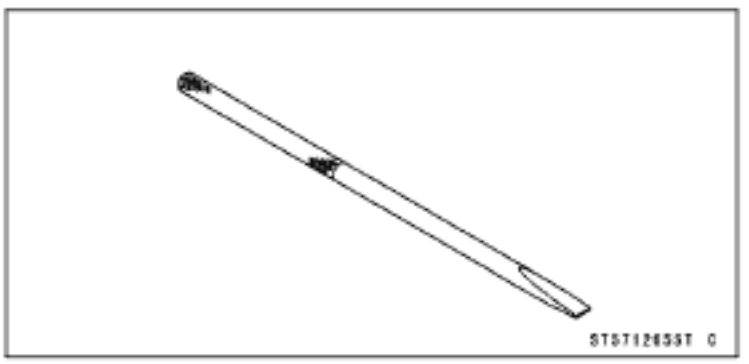
Inside Circlip Pliers:
57001-143



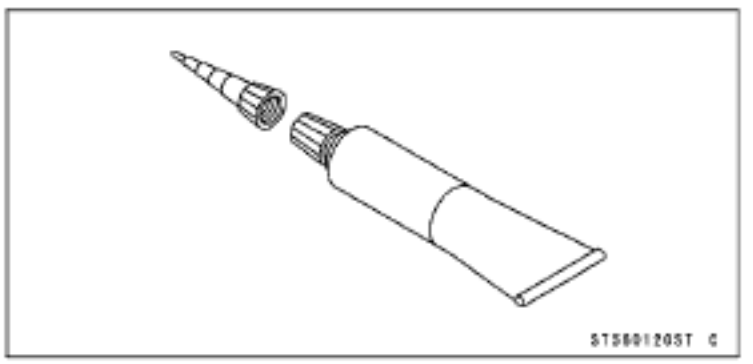
Valve Guide Driver:
57001-1564



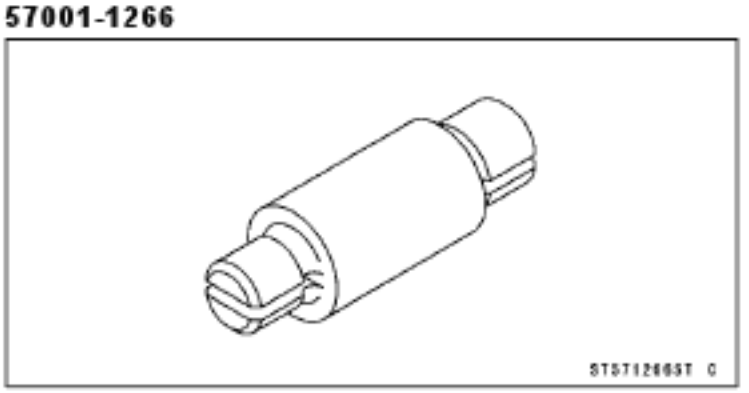
Bearing Remover Shaft, ϕ9:
57001-1265



Liquid Gasket, TB1211:
56019-120



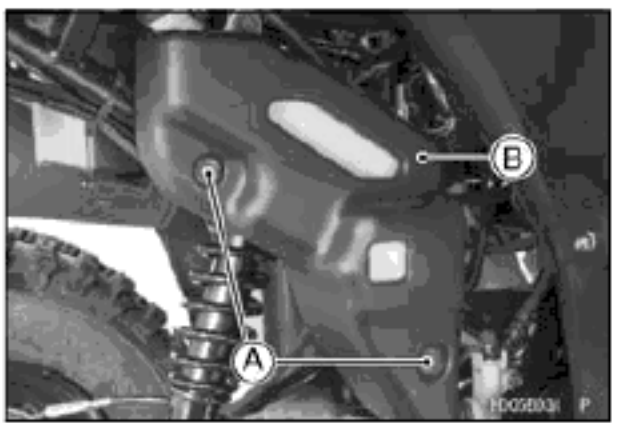
Bearing Remover Head, ϕ10 × ϕ12:
57001-1266



Coolant

Coolant Deterioration Inspection

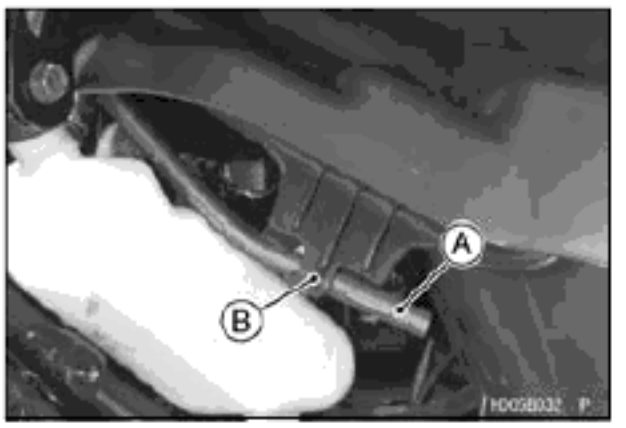
- Remove:
  Reserve Tank Cover Bolts [A]
  Reserve Tank Cover [B]



- Clear the over flow hose [A] from the holder [B] on the reserve tank cover.
- Visually inspect the coolant in the reserve tank.

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

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



Coolant Level Inspection

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

Coolant Draining

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

Coolant Filling

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

Pressure Testing

- Remove:
  Middle Cover (see Middle Cover Removal in the Frame chapter)
- Remove the radiator cap, and 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 105 kPa (1.07 kgf/cm², 15 psi).

NOTICE

During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure is 105 kPa (1.07 kgf/cm², 15 psi).

- Watch the gauge for at least 6 seconds.

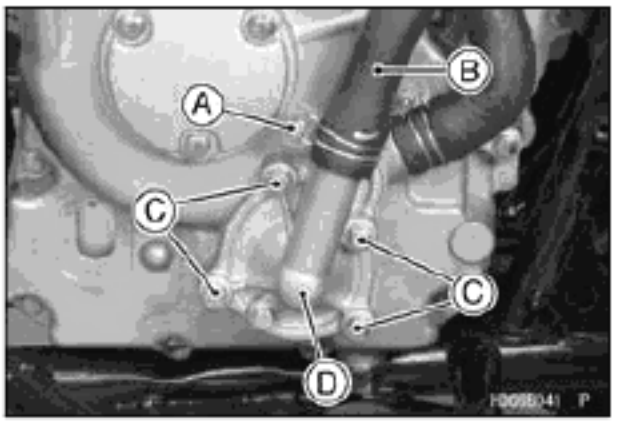
★If the pressure holds steady, the system is alright.

★If the pressure drops soon, check for leaks.

Water Pump

Water Pump Cover Removal

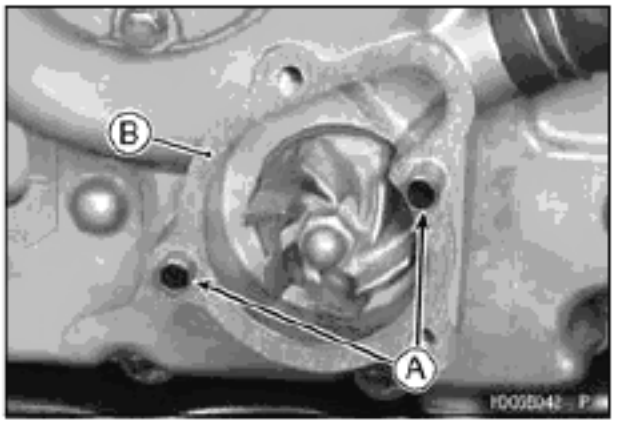
- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Loosen the clamp screw [A] fully.
- Remove:
  Radiator Hose [B]
  Water Pump Cover Bolts [C]
  Water Pump Cover [D]



Water Pump Cover Installation

- Install:
  Knock Pins [A]
  New Gasket [B]
- Tighten:

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

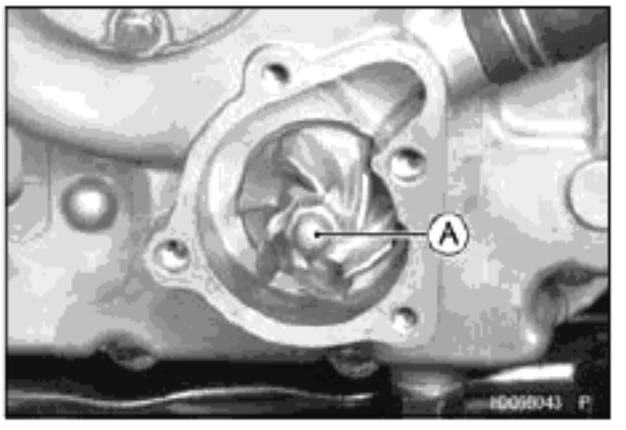


Water Pump Impeller Removal

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

NOTE

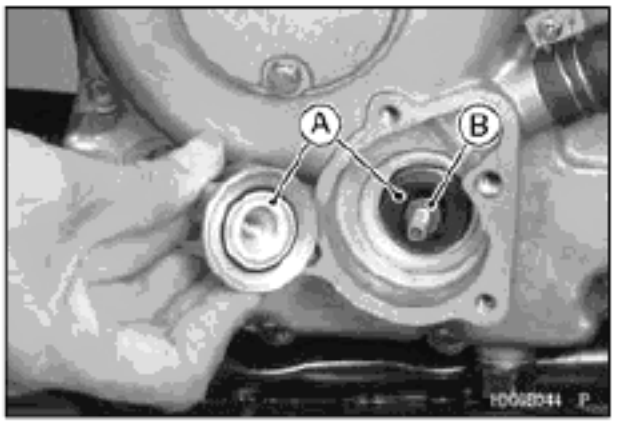
○*The water pump impeller has left-hand threads. Turn the impeller clockwise, and remove it.*



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 washer [B].
- Install the impeller on the water pump shaft and tighten the impeller counterclockwise.

Torque - Water Pump Impeller: 12 N·m (1.2 kgf·m, 106 in·lb)

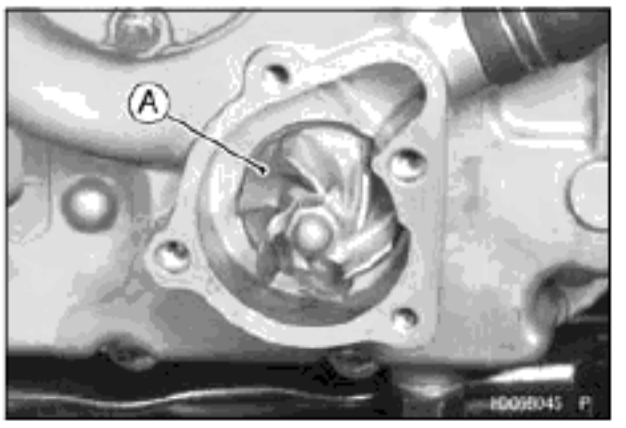


Water Pump

Water Pump Impeller Inspection

- Visually inspect the impeller [A].

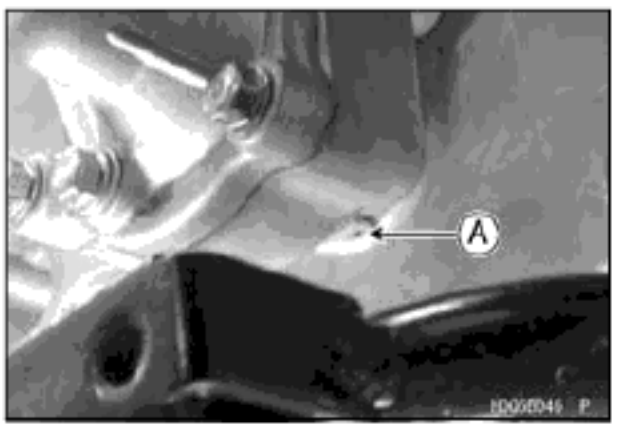
★If the surface is corroded or the blades are damaged, replace the impeller.



Water Pump Leakage Inspection

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

★If there is a coolant leak, the mechanical seal in the pump could be damaged. Replace the mechanical seal with a new one (see Mechanical Seal Replacement).

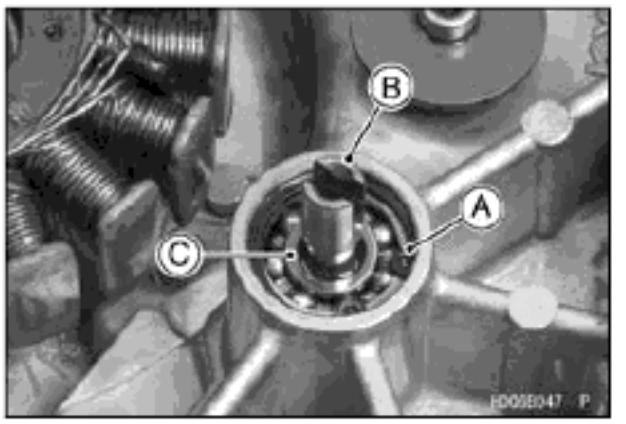


Mechanical Seal Replacement

- Remove:
  Water Pump Impeller (see Water Pump Impeller Removal)
  Alternator Cover (see Alternator Cover Removal in the Electrical System chapter)
  Circlip [A]

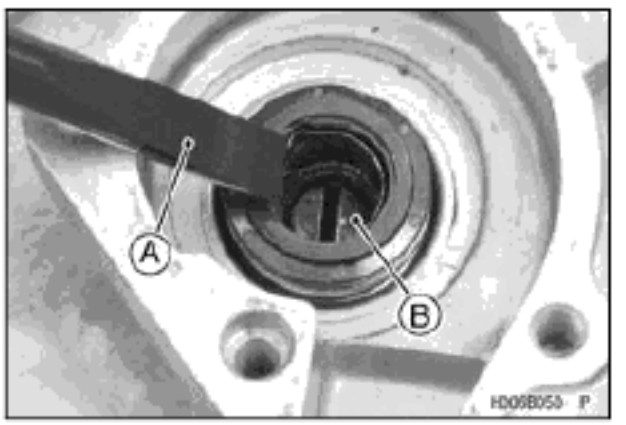
Special Tool - Inside Circrip Pliers: 57001-143

- Remove:
  Water Pump Shaft [B]
  Inner Bearing [C]



- Remove the outer bearing with the bearing remover.

Special Tools - Bearing Remover Shaft, ϕ9 [A]: 57001-1265
Bearing Remover Head, ϕ10 × ϕ12 [B]: 57001-1266



Water Pump

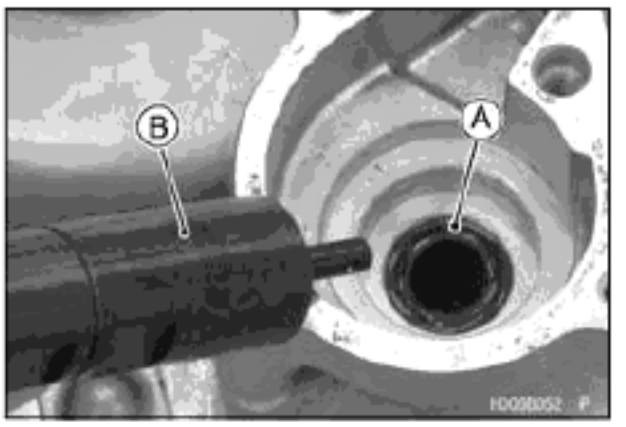
- Press out the mechanical seal and oil seal from the inside of the alternator cover.

  Special Tool - Bearing Remover Head, ϕ10 × ϕ12 [A]: 57001-1266

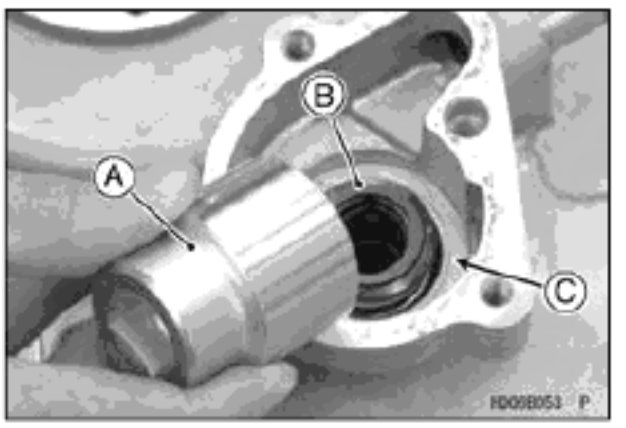
- Replace the mechanical seal and oil seal with a new one.

- Press in the oil seal [A] until it bottoms out.

  Special Tool - Valve Guide Driver [B]: 57001-1564



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

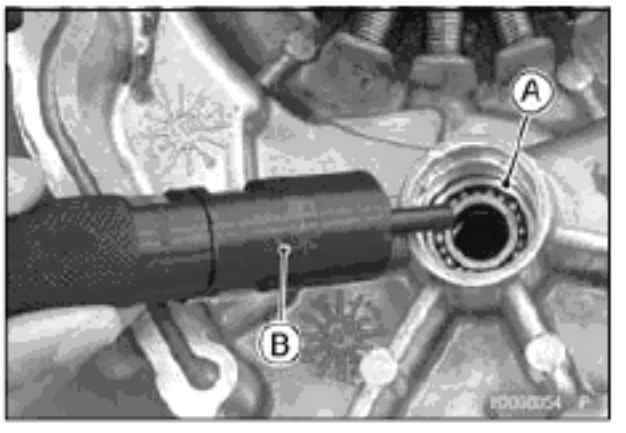


- From inside the alternator cover, press in the outer bearing [A] until it bottoms out.

  Special Tool - Valve Guide Driver [B]: 57001-1564

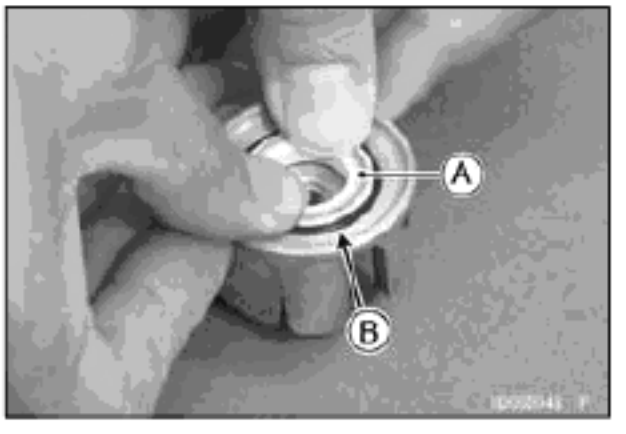
- Install:
  Inner Bearing
  Water Pump Shaft
  New Circlip

  Special Tool - Inside Circlip Pliers: 57001-143



- 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 it counterclockwise.

  Torque - Water Pump Impeller: 12 N·m (1.2 kgf·m, 106 in·lb)

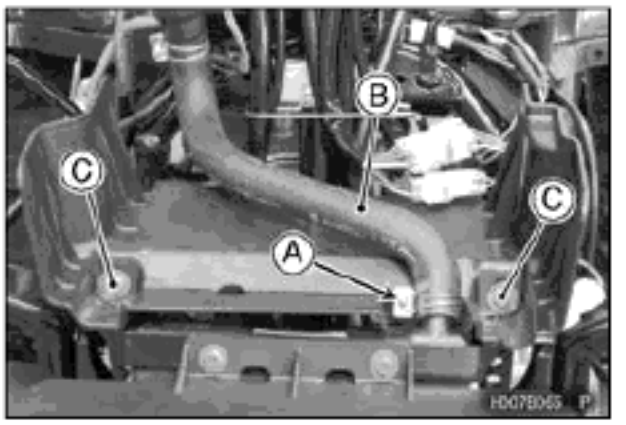


Radiator

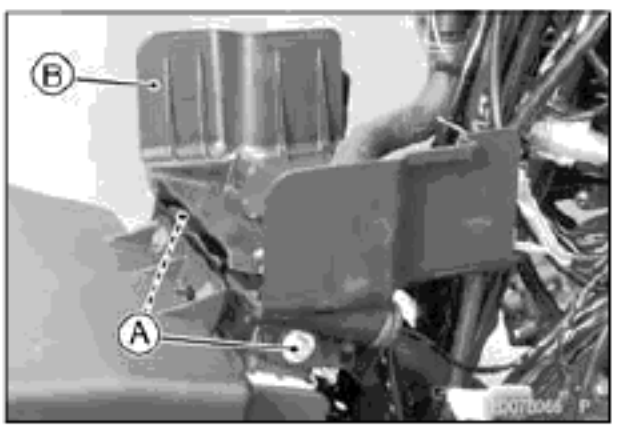
Radiator Removal

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

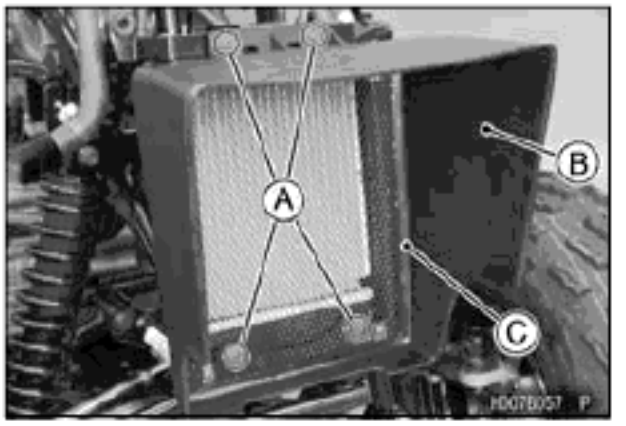
- Remove
  Front Fender (see Front Fender Removal in the Frame chapter)
- Loosen the hose clamp screw [A] fully.
- Remove:
  Radiator Hose [B]
  Radiator Mounting Bolts [C]



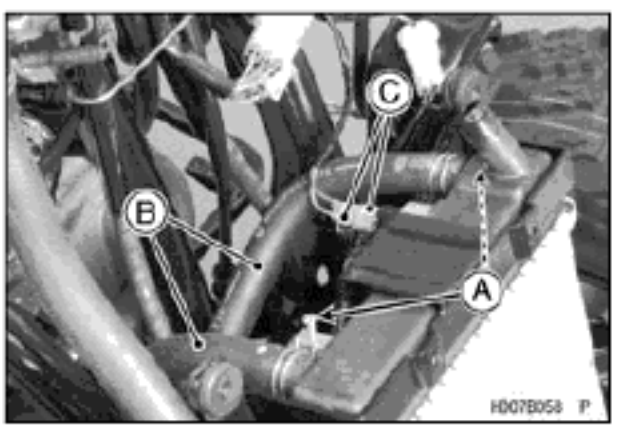
- Remove:
  Radiator Upper Cover Bolts [A]
  Radiator Upper Cover [B]



- Remove:
  Radiator Cover Bolts [A]
- Remove the radiator cover [B] together with the radiator screen [C].

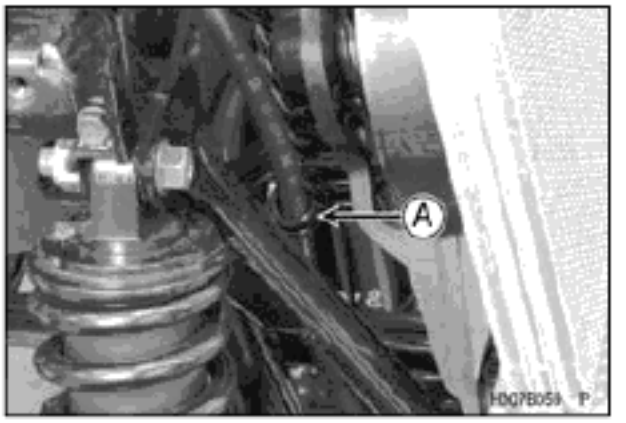


- Loosen the hose clamp screws [A] fully.
- Remove the radiator hoses [B].
- Disconnect the radiator fan motor lead connectors [C].



Radiator

- Open the brake hose clamp [A].



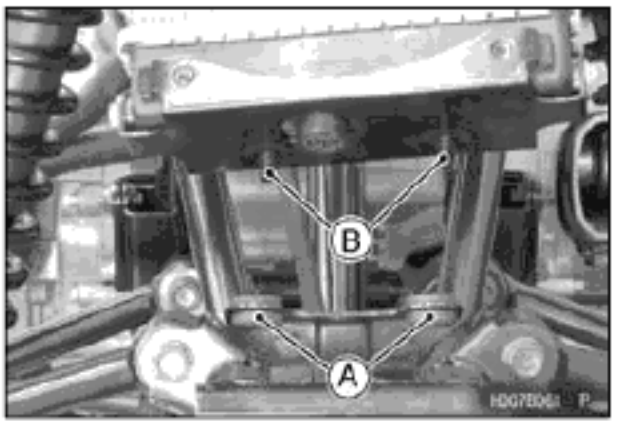
- Move the radiator forward.
- Pull up the radiator to remove it.

NOTICE

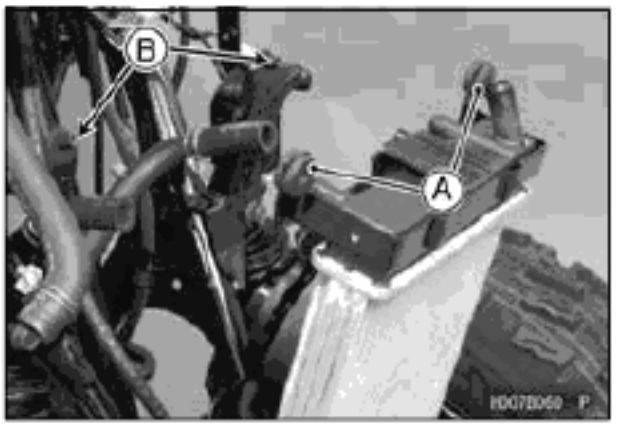
Do not touch the radiator core. This could damage the radiator fins, resulting in loss of cooling efficiency.

Radiator Installation

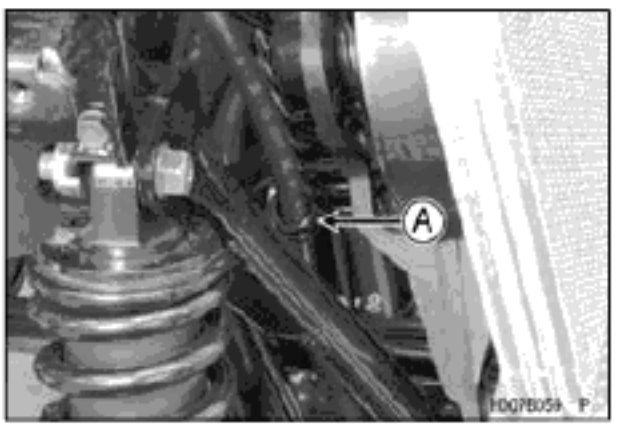
- Be sure to install the dampers [A].
- Insert the projections [B] of the radiator in the dampers.



- Fit the dampers [A] to the projections [B] of the frame.

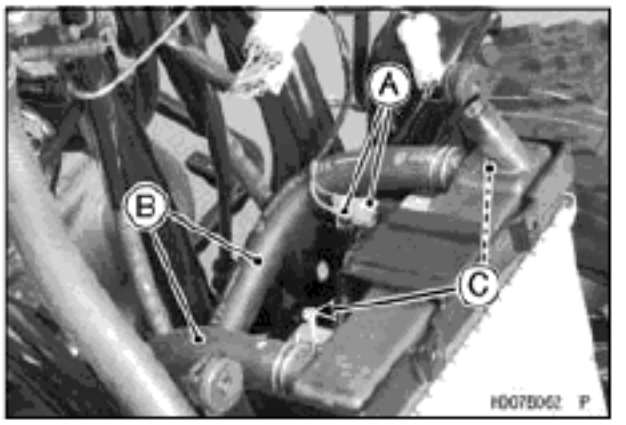


- Hold the brake hose with the clamp [A].

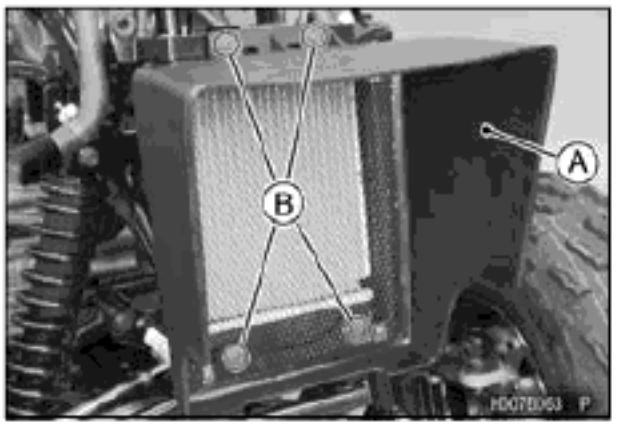


Radiator

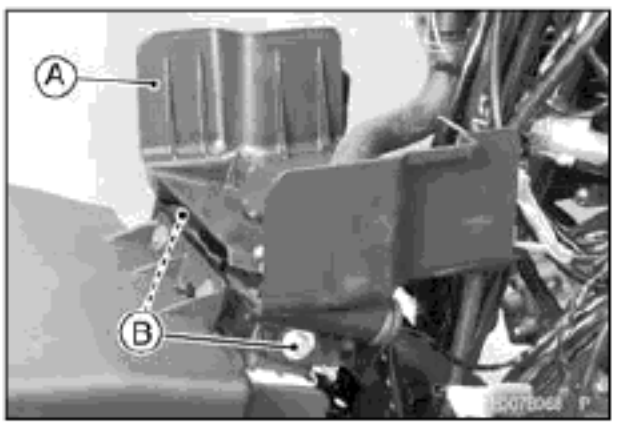
- Connect:
  Radiator Fan Motor Lead Connectors [A]
- Install the radiator hoses [B].
- Tighten the clamp screws [C] securely.



- Install the radiator cover [A].
- Tighten the radiator cover bolts [B] securely.

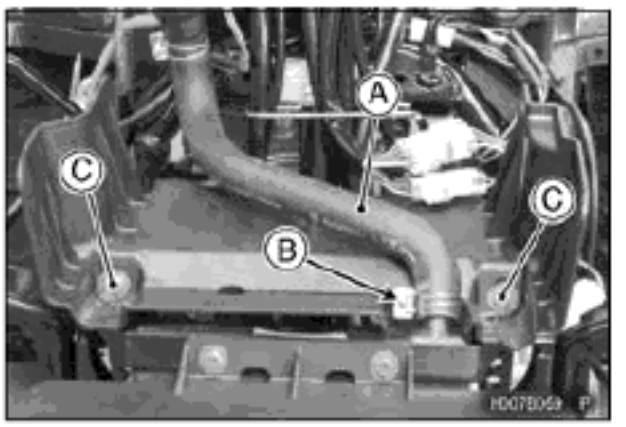


- Install the radiator upper cover [A].
- Tighten the radiator upper cover bolts [B] securely.



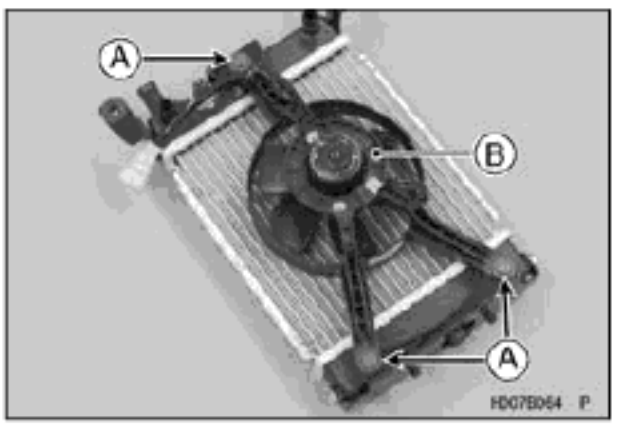
- Install the radiator hose [A].
- Tighten the clamp screw [B] securely.
- Tighten:

Torque - Radiator Mounting Bolts [C]: 12 N·m (1.2 kgf-m, 106 in·lb)



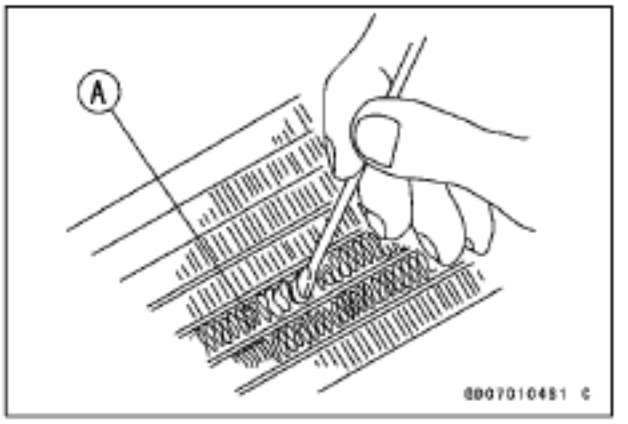
Radiator Fan Removal/Installation

- Remove:
  Radiator (see Radiator Removal)
  Radiator Fan Assembly Bolts [A]
  Fan Assembly [B]
- Install:
  Radiator Fan Assembly
- Tighten the radiator fan assembly bolts.



Radiator

Radiator Inspection



- Check the radiator core.

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

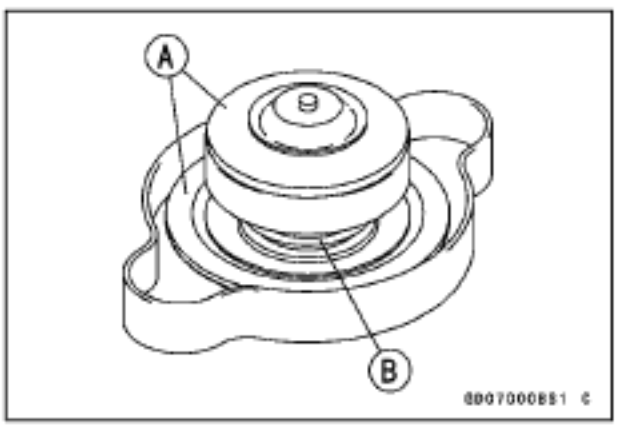
★If the corrugated fins [A] are deformed, carefully straighten them.

★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 Cap Inspection



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

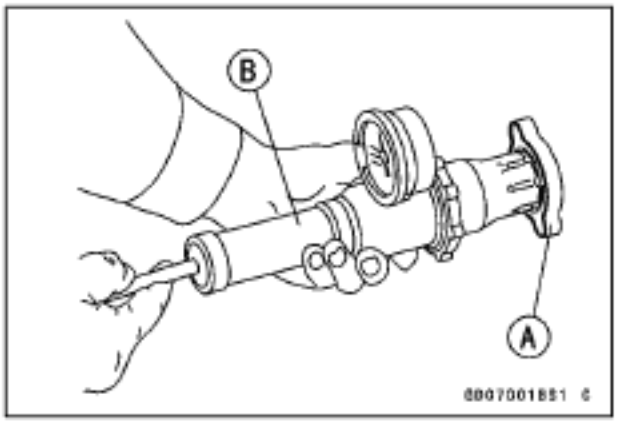
★If any one of them shows visible damage, replace the cap.

Top and Bottom Valve Seals [A]
Valve Spring [B]

- 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 seconds.

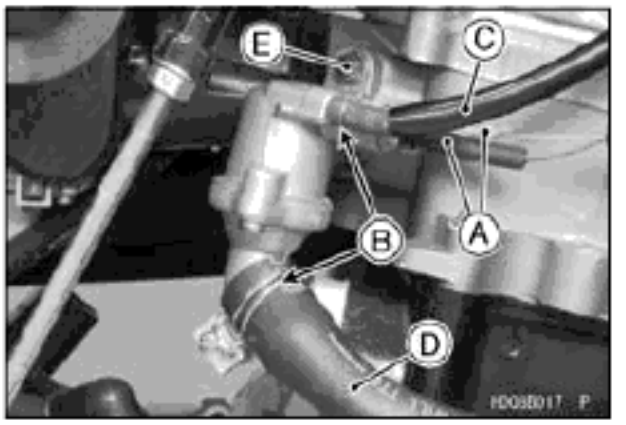
Radiator Cap Relief Pressure
Standard: About 108 kPa (1.1 kgf/cm², 16 psi)

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

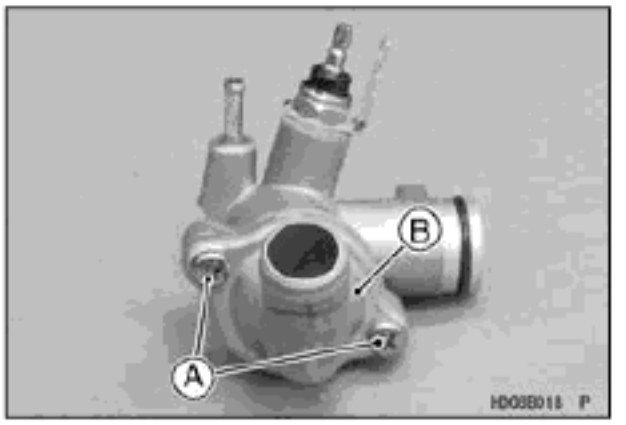
Thermostat

Thermostat Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Right Side Cover (see Right Side Cover Removal in the Frame chapter)
  Water Temperature Sensor Connectors [A]
  Hose Clamps [B]
  Air Vent Hose [C]
  Radiator Hose [D]
  Thermostat Housing Bolt [E]

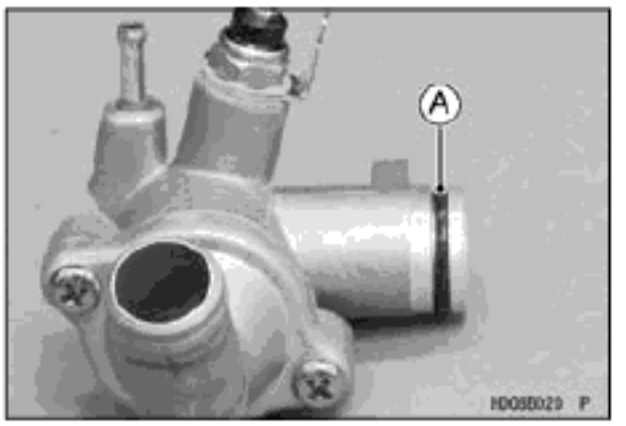


- Remove:
  Thermostat Housing Cover Screws [A]
  Thermostat Housing Cover [B]
  Thermostat



Thermostat Installation

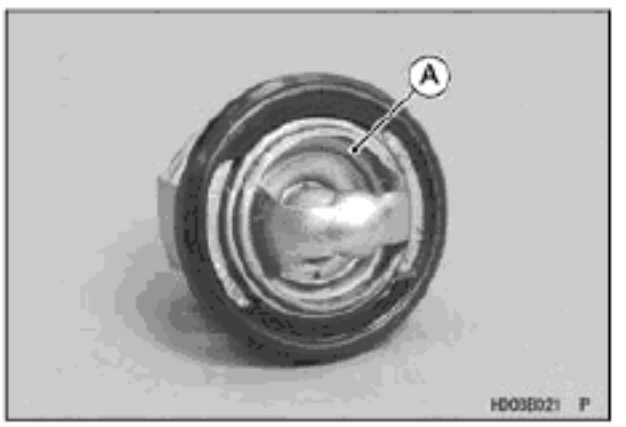
- Install the thermostat.
- Tighten the thermostat housing cover screws securely.
- Replace the O-ring [A] with a new one.
- Install the O-ring on the housing.
- Apply grease to the O-ring.
- Tighten the thermostat housing bolt.
- Fill the coolant (see Coolant Change in the Periodic Maintenance chapter).



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.

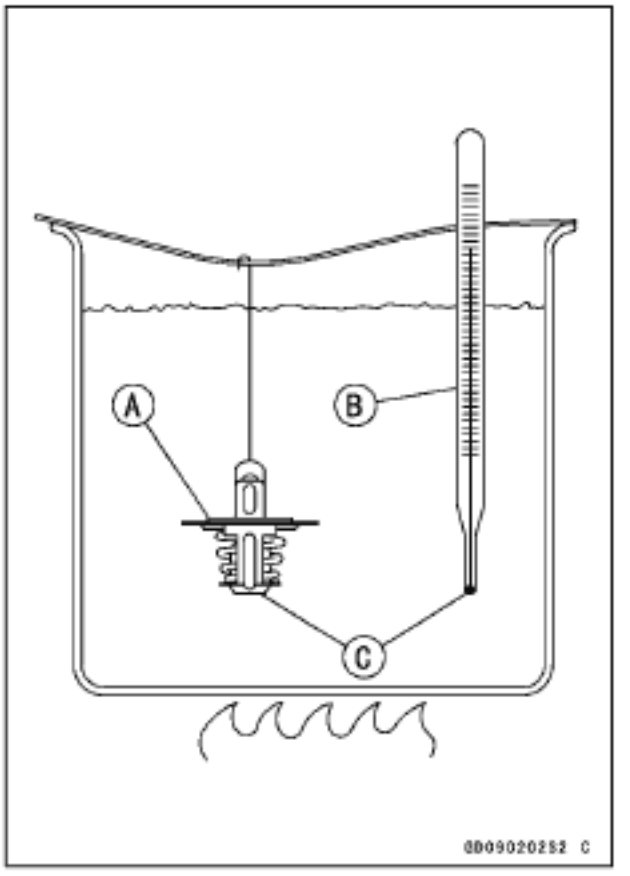
NOTE

○ *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 specified range, replace the thermostat.

Thermostat Valve Opening Temperature
78 ~ 82°C (172 ~ 180°F)



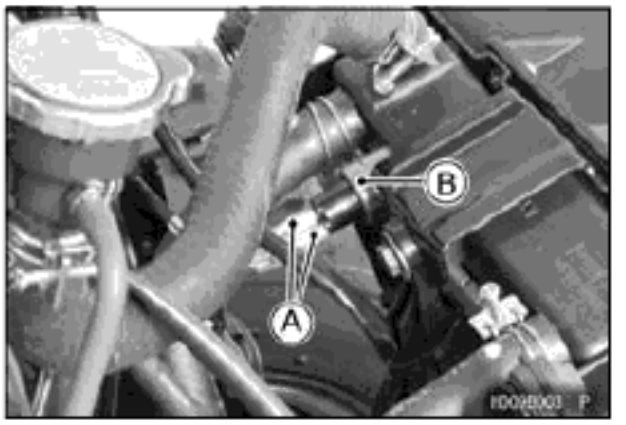
Radiator Fan Switch

Radiator Fan Switch Removal

NOTICE

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).
- Remove:
  Front Fender (see Front Fender Removal in the Frame chapter).
- Disconnect the fan switch lead connectors [A].
- Remove the radiator fan switch [B].



Radiator Fan Switch Installation

- Apply silicone sealant to the threads of the radiator fan switch.

  Sealant - Liquid Gasket, TB1211: 56019-120

- Tighten:

  Torque - Radiator Fan Switch: 22 N·m (2.2 kgf·m, 16 ft·lb)

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

Radiator Fan Switch Inspection

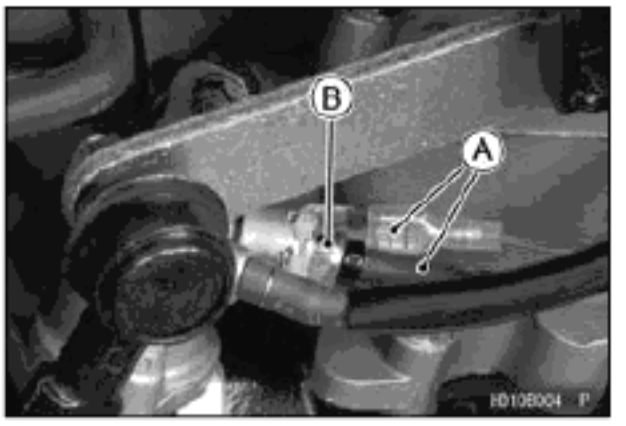
- Refer to the Radiator Fan Switch Inspection in the Electrical System chapter.

Water Temperature Sensor

Water Temperature Sensor Removal

NOTICE

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).
- Remove the right side cover (see Right Side Cover Removal in the Frame chapter).
- Disconnect the sensor lead connectors [A].
- Remove the water temperature sensor [B].

Water Temperature Sensor Installation

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

Sealant - Liquid Gasket, TB1211: 56019-120

- Tighten the water temperature sensor securely.
- 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.

Engine Top End

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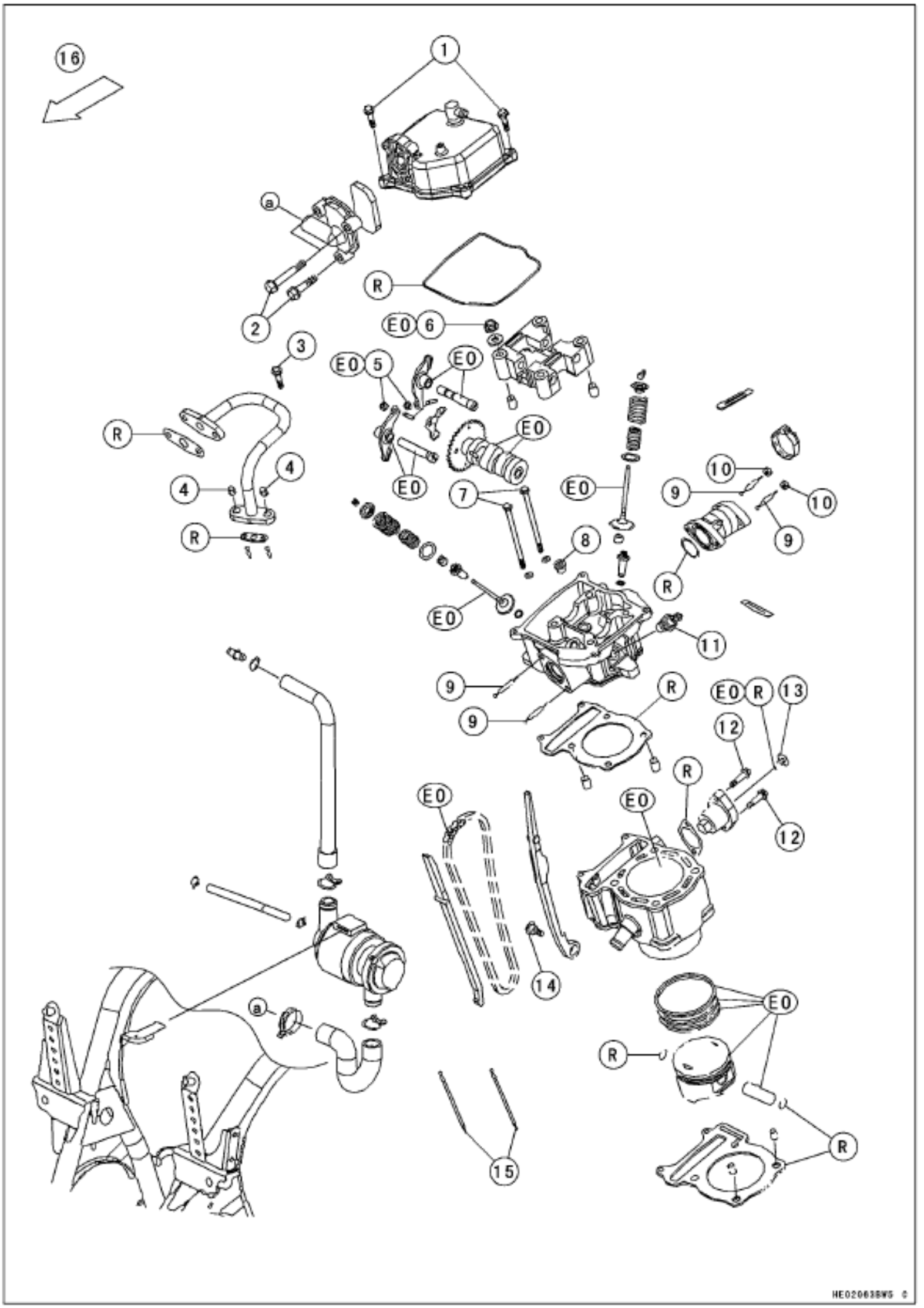
Exploded View

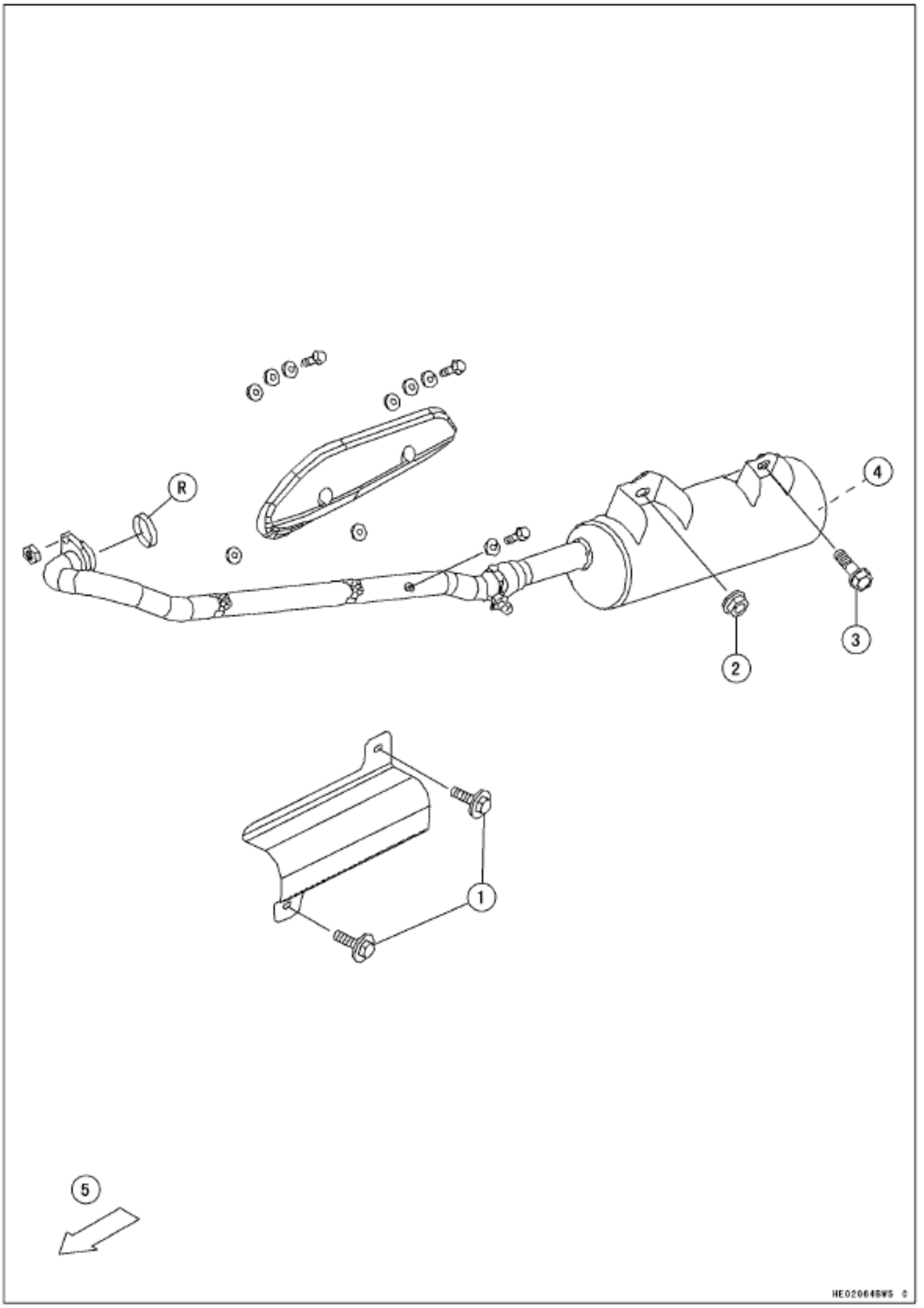


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Cylinder Head Cover Bolts	9.8	1.0	87 in·lb	
2	Air Suction Valve Cover Bolts	9.8	1.0	87 in·lb	
3	Clean Air System Pipe Mounting Bolt	9.8	1.0	87 in·lb	
4	Clean Air System Pipe Mounting Nuts	9.8	1.0	87 in·lb	
5	Valve Adjusting Screw Locknuts	8.8	0.90	78 in·lb	EO
6	Camshaft Cap Nuts	25	2.5	18	EO
7	Cylinder Head Bolts	9.8	1.0	87 in·lb	
8	Plug	21	2.1	15	
9	Cylinder Head Stud Bolts	9.0	0.92	80 in·lb	
10	Carburetor Holder Nuts	9.8	1.0	87 in·lb	
11	Spark Plug	18	1.8	13	
12	Camshaft Chain Tensioner Mounting Bolts	12	1.2	106 in·lb	
13	Camshaft Chain Tensioner Cap Bolt	4.2	0.43	37 in·lb	
14	Rear Camshaft Chain Guide Bolt	9.8	1.0	87 in·lb	
15	Stud Bolts (for Cylinder/Cylinder Head)	9.0	0.92	80 in·lb	

16. Front
EO: Apply engine oil.
R: Replacement Parts

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Exhaust Pipe Cover Mounting Bolts	11	1.1	97 in·lb	
2	Muffler Body Mounting Nut	20	2.0	15	
3	Muffler Body Mounting Bolt	20	2.0	15	
4	Spark Arrester Mounting Bolt	11	1.1	97 in·lb	

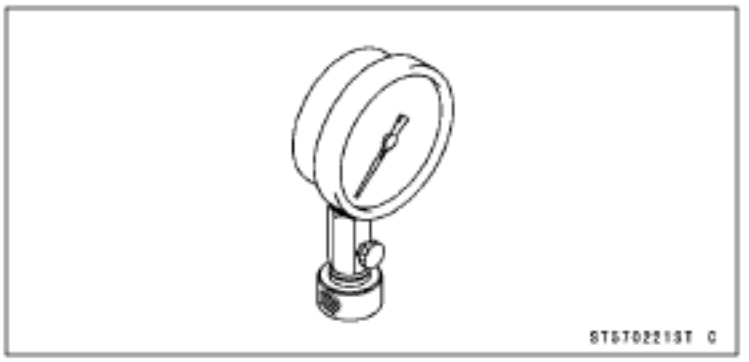
5. Front
R: Replacement Parts

Specifications

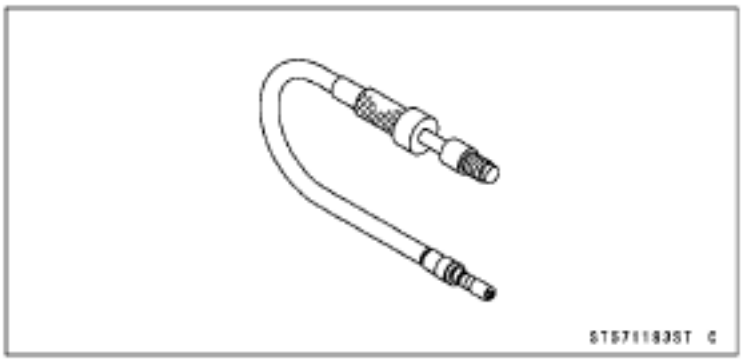
Item	Standard	Service Limit
Rocker Case		
Rocker Arm/Shaft Clearance	0.034 ~ 0.09 mm (0.0013 ~ 0.0035 in.)	0.1 mm (0.004 in.)
Camshafts		
Cam Height:		
Exhaust	34.172 mm (1.3454 in.)	34.05 mm (1.341 in.)
Intake	34.287 mm (1.3499 in.)	34.15 mm (1.344 in.)
Cylinder Head		
Cylinder Compression	(Usable Range) 1 190 ~ 1 900 kPa (12.1 ~ 19.4 kgf/cm², 173 ~ 276 psi) at 400 ~ 500 r/min (rpm)	– – –
Cylinder Head Warp	– – –	0.05 mm (0.002 in.)
Valve		
Valve Clearance:		
Exhaust	0.08 ~ 0.12 mm (0.0032 ~ 0.0048 in.)	– – –
Intake	0.08 ~ 0.12 mm (0.0032 ~ 0.0048 in.)	– – –
Valve/Valve Guide Clearance:		
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in.)	0.08 mm (0.0031 in.)
Intake	0.01 ~ 0.037 mm (0.0004 ~ 0.0015 in.)	0.06 mm (0.0024 in.)
Valve Spring Free Length:		
Outer	41 mm (1.614 in.)	39 mm (1.535 in.)
Inner	30.9 mm (1.217 in.)	29.4 mm (1.157 in.)
Cylinder, Piston		
Cylinder Inside Diameter	72.705 ~ 72.715 mm (2.8624 ~ 2.8628 in.)	72.8 mm (2.866 in.)
Piston Diameter	72.67 ~ 72.69 mm (2.8610 ~ 2.8618 in.)	72.6 mm (2.858 in.)
Piston/Cylinder Clearance	0.025 ~ 0.055 mm (0.0010 ~ 0.0022 in.)	– – –
Piston Ring/Groove Clearance:		
Top	0.015 ~ 0.055 mm (0.0006 ~ 0.0022 in.)	0.09 mm (0.0035 in.)
Second	0.015 ~ 0.055 mm (0.0006 ~ 0.0022 in.)	0.09 mm (0.0035 in.)
Piston Ring End Gap:		
Top	0.15 ~ 0.3 mm (0.0059 ~ 0.012 in.)	0.5 mm (0.020 in.)
Second	0.3 ~ 0.45 mm (0.012 ~ 0.0177 in.)	0.65 mm (0.0256 in.)
Oil	0.2 ~ 0.7 mm (0.008 ~ 0.028 in.)	0.9 mm (0.0354 in.)
Piston Pin Outside Diameter	16.994 ~ 17 mm (0.6691 ~ 0.67 in.)	16.96 mm (0.668 in.)
Piston Pin Hole Inside Diameter	17.002 ~ 17.008 mm (0.6694 ~ 0.6696 in.)	17.04 mm (0.671 in.)
Piston/Pin Clearance	0.002 ~ 0.014 mm (0.00008 ~ 0.00055 in.)	0.02 mm (0.0008 in.)
Connecting Rod Small End Inside Diameter	17.016 ~ 17.034 mm (0.6699 ~ 0.6706 in.)	17.06 mm (0.672 in.)
Connecting Rod/Piston Pin Clearance	– – –	0.06 mm (0.0024 in.)

Special Tools

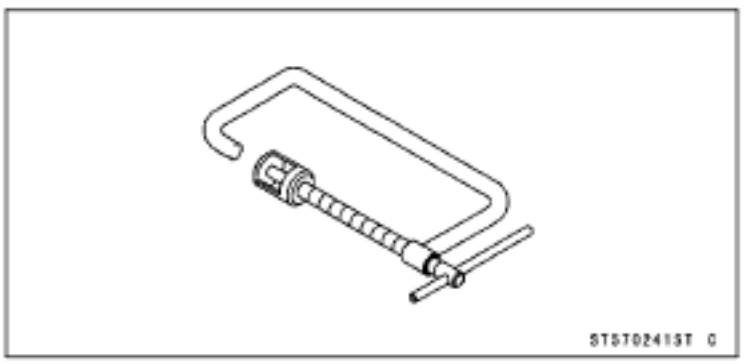
Compression Gauge, 20 kgf/cm²:
57001-221



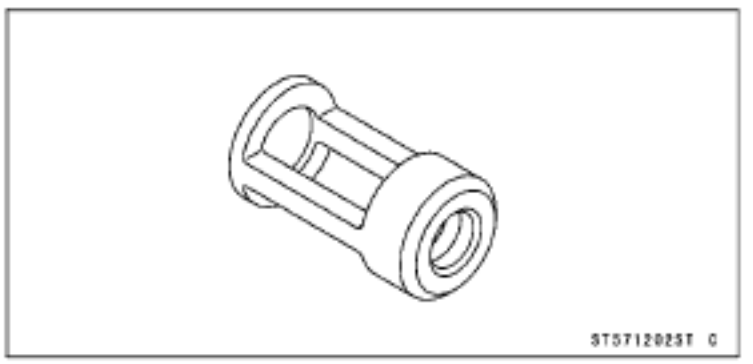
Compression Gauge Adapter, M12 × 1.25:
57001-1183



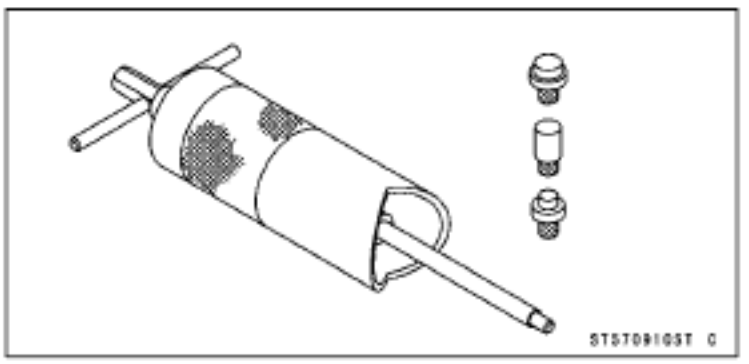
Valve Spring Compressor Assembly:
57001-241



Valve Spring Compressor Adapter, ϕ22:
57001-1202



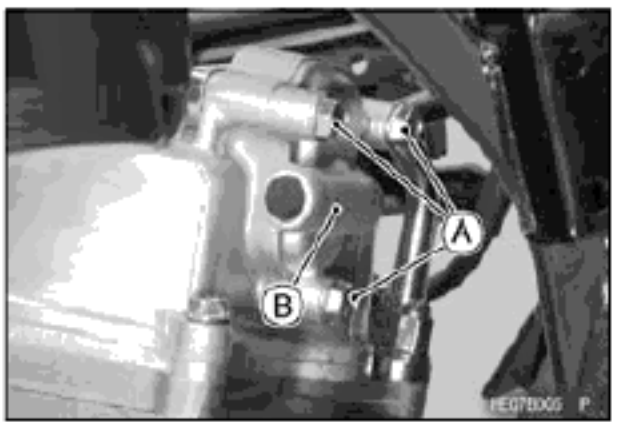
Piston Pin Puller Assembly:
57001-910



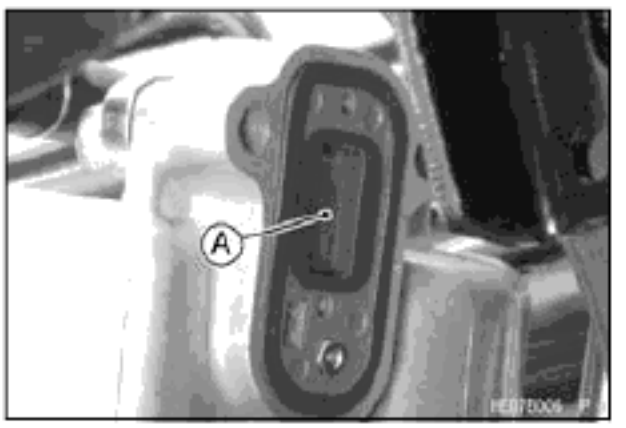
Clean Air System

Air Suction Valve Removal

- Remove:
  Vacuum Switch Valve (see Vacuum Switch Valve Removal)
  Air Suction Valve Cover Bolts [A]
  Air Suction Valve Cover [B]



- Remove the air suction valve [A].



Air Suction Valve Installation

- Installation is the reverse of removal.

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

Air Suction Valve Inspection

- Remove the air suction valve (see Air Suction Valve Removal).
- Visually inspect the reed [A] for cracks, folds, warps, heat damage or other damage.

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

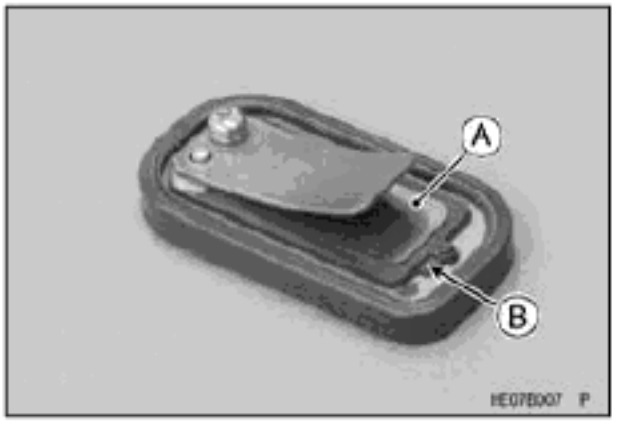
- Check the reed contact area [B] of the valve holder for grooves, scratches, any signs of separation from the holder or heat damage.

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

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

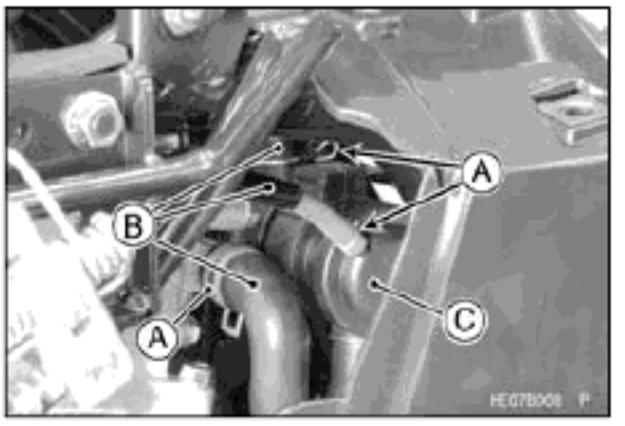
NOTICE

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



Clean Air System

Vacuum Switch Valve Removal



- Remove:
  Right Side Cover (see Right Side Cover Removal in the Frame chapter)
  Clamps [A] and Hoses [B]
  Vacuum Switch Valve [C]

Vacuum Switch Valve Installation

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

○Run the hoses correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

Clean Air System Hose Inspection

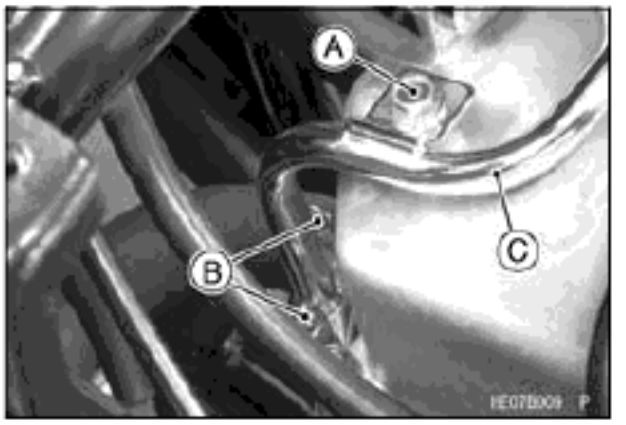
- Be certain that all the hoses are routed without being flattened or kinked, and are connected correctly to the torque converter intake duct, carburetor holder, vacuum switch valve and air suction valve cover.

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

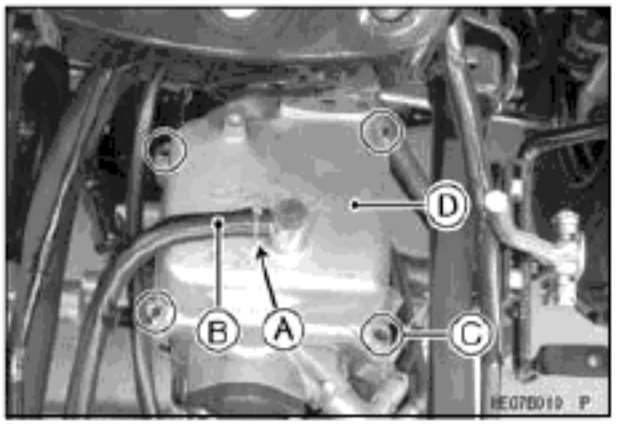
Cylinder Head Cover

Cylinder Head Cover Removal

- Remove:
  Fuel Tank (see Fuel Tank Removal in the Fuel System chapter)
  Air Suction Valve (see Air Suction Valve Removal)
  Clean Air System Pipe Mounting Bolt [A] and Nuts [B]
  Clean Air System Pipe [C]

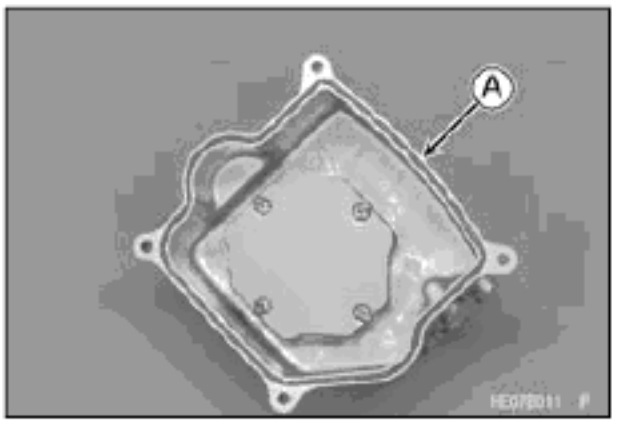


- Remove the clamp [A] and breather hose [B].
- Remove the cylinder head cover bolts [C] and the cylinder head cover [D].



Cylinder Head Cover Installation

- Replace the head cover O-ring [A] with a new one.



- Install the head cover.
- Tighten:

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

- Install the clean air system pipe.
- Tighten:

Torque - Clean Air System Pipe Mounting Nuts: 9.8 N·m (1.0 kgf·m, 87 in·lb)
Clean Air System Pipe Mounting Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the removed parts (see appropriate chapters).

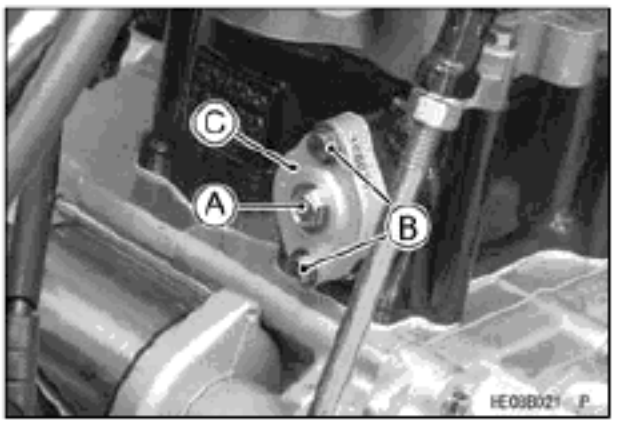
Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

NOTICE

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

- Remove:
  Thermostat Housing (see Thermostat Removal in the Cooling System chapter)
  Cap Bolt [A] and O-ring
  Mounting Bolts [B]
  Chain Tensioner [C]

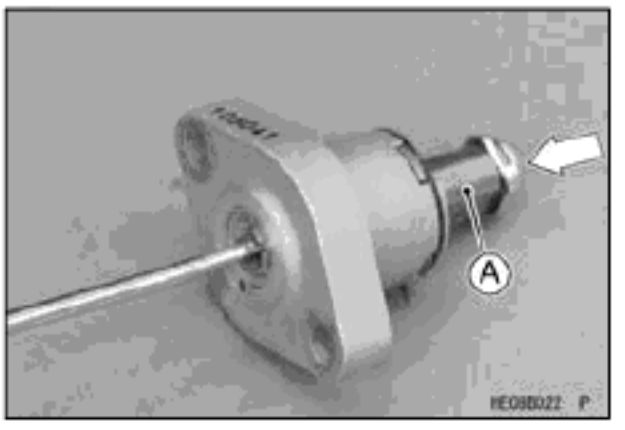


Camshaft Chain Tensioner Installation

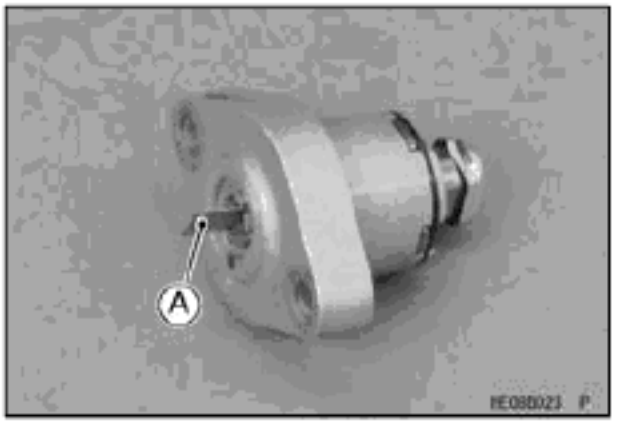
- Remove the tensioner cap bolt and O-ring.
- While compressing the push rod [A], turn it clockwise with a suitable screwdriver until the rod stopped.

NOTICE

Do not turn the rod counterclockwise before installing the tensioner. This could detach the rod and the tensioner cannot be reinstalled.



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



Camshaft Chain Tensioner

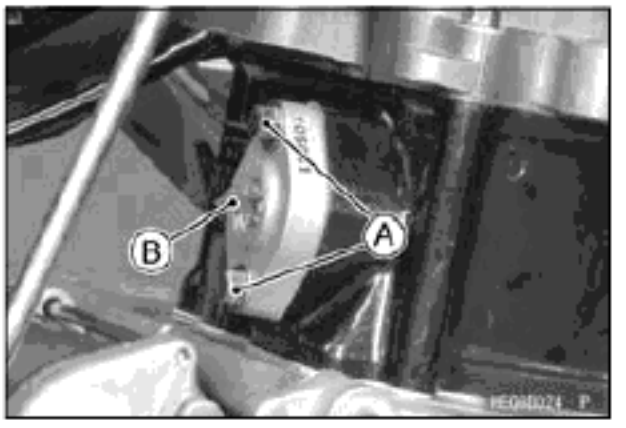
- Tighten:

Torque - Camshaft Chain Tensioner Mounting Bolts [A]: 12 N·m (1.2 kgf·m, 106 in·lb)

- Take out the holder plate [B].
- Replace the O-ring with a new one.
- Apply engine oil to a new O-ring.
- Install the O-ring and tighten the cap bolt.

Torque - Camshaft Chain Tensioner Cap Bolt: 4.2 N·m (0.43 kgf·m, 37 in·lb)

- Install the removed parts (see appropriate chapters).

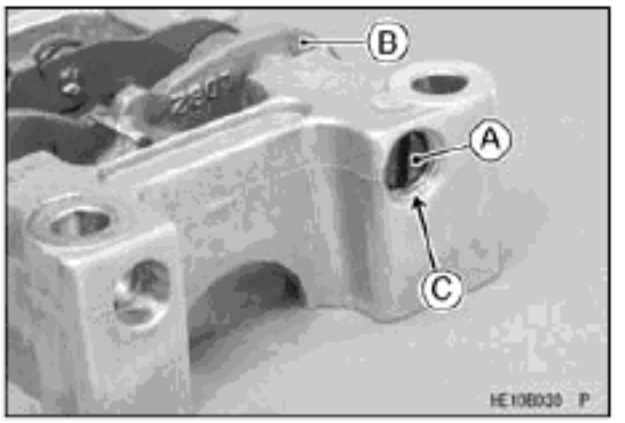


Rocker Arms and Shafts

Rocker Arm Removal

- Remove:
  Camshaft Cap (see Camshaft Removal)
  Rocker Shaft (Intake Side) [A]
  Rocker Arm [B]

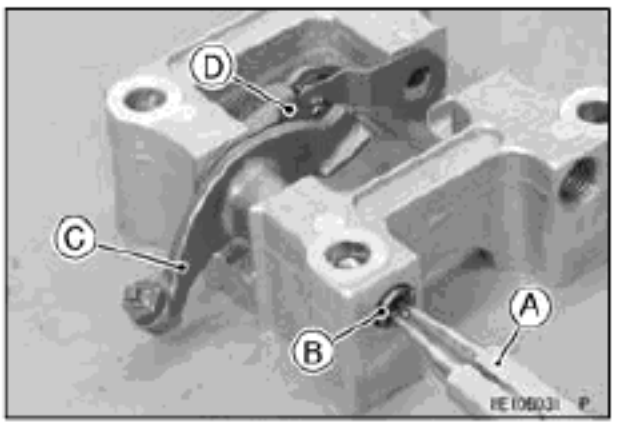
○The rocker shaft (intake side) has a threads [C].



- Using a suitable tool [A], remove the rocker shaft (exhaust side) [B].
- Remove:
  Rocker Arm [C]
  Stop Plate [D]

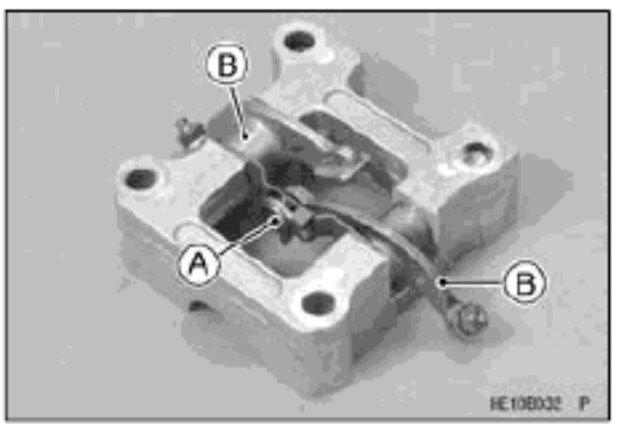
○Mark and record the rocker arm location so it can be installed in the original position.

○The rocker arms come off with the rocker shafts.



Rocker Arm Installation

- Apply engine oil to the following parts.
  Rocker Shafts
  Hole in Rocker Arms
- Install the following parts as shown in the figure.
  Stop Plate [A]
  Rocker Arms [B]
  Rocker Shafts



Rocker Arm and Shaft Inspection

- Inspect the area [A] on the rocker arm where the cam rubs.

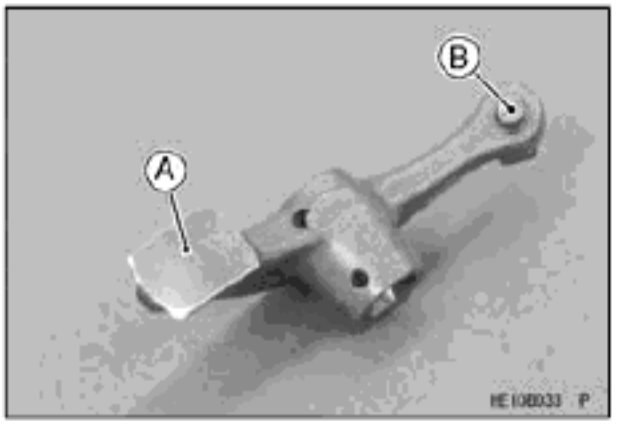
★If the rocker arm is scored, discolored or otherwise damaged, replace it. Also inspect the camshaft lobes.

- Inspect the end of the valve clearance adjusting screw [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.

- Insert the rocker shaft into the arm, measure the clearance.

★If the clearance exceeds the service limit, replace them as a set.



Rocker Arm/Shaft Clearance

Standard: **0.034 ~ 0.09 mm (0.0013 ~ 0.0035 in.)**

Service Limit: **0.1 mm (0.004 in.)**

Rocker Arms and Shafts

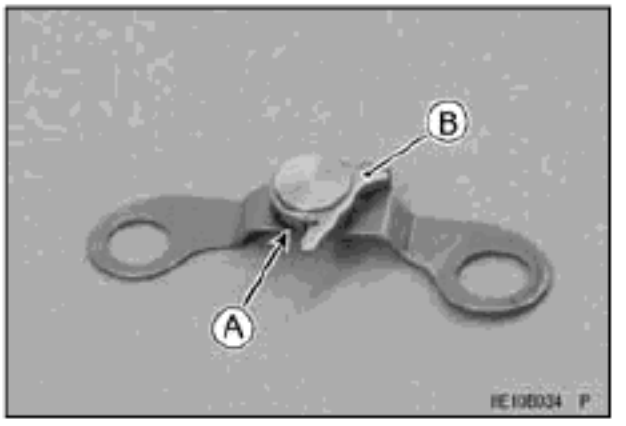
Stop Plate Inspection

- Inspect the stop plate spring [A] for damage.

★If the spring is damaged in any way, replace the stop plate assembly.

- Check that stop plate lever [B] moves smoothly and inspect it for damage.

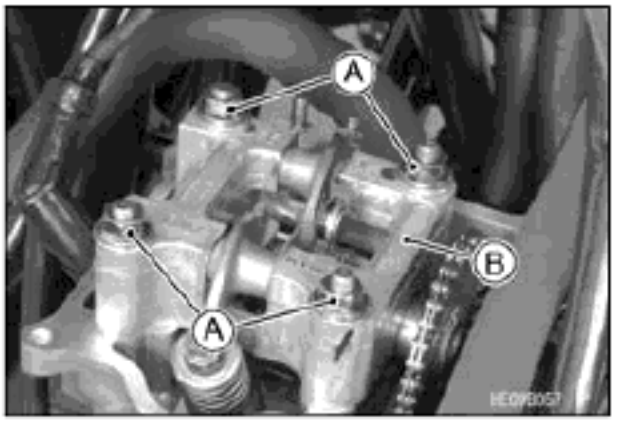
★If the lever is damaged in any way, replace the stop plate assembly.



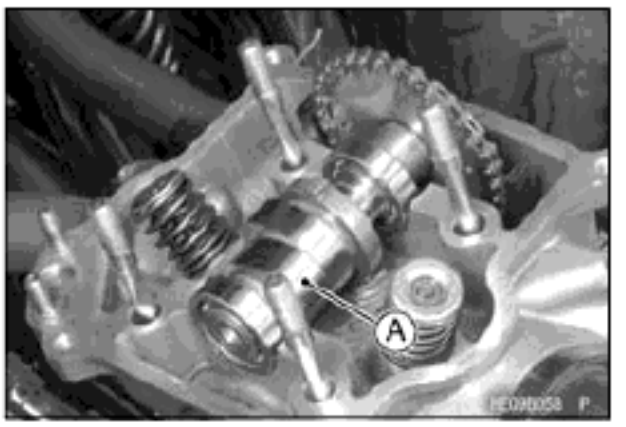
Camshaft

Camshaft Removal

- Position the piston TDC (see Valve Clearance Inspection in the Periodic Maintenance chapter).
- Remove:
  Cylinder Head Cover (see Cylinder Head Cover Removal)
  Camshaft Chain Tensioner (see Camshaft Chain Tensioner Removal)
  Camshaft Cap Nuts [A] and Washers
  Camshaft Cap [B]

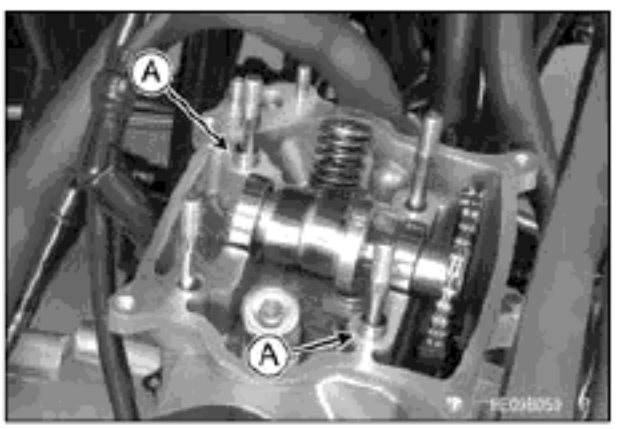


- Remove the camshaft [A].
- Support the chain using a suitable tool.



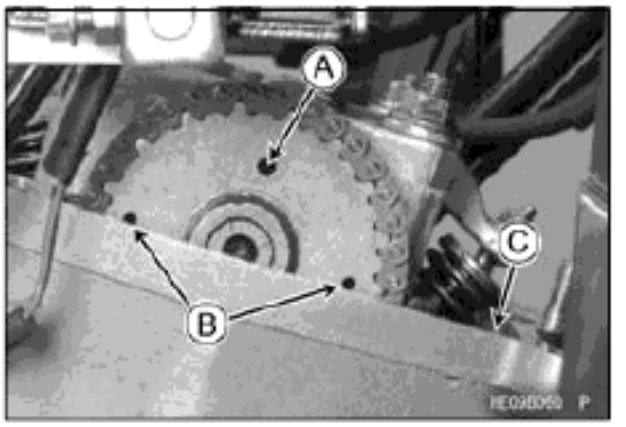
Camshaft Installation

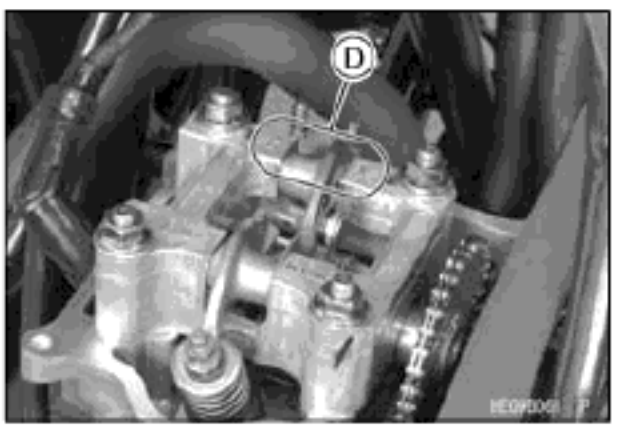
- Apply engine oil to all cam parts.
- Install the dowel pins [A].
- Engage the camshaft chain with the camshaft sprocket.



- Keep the round hole [A] on the camshaft sprocket facing up and align the holes [B] on the camshaft sprocket with the cylinder head upper surface [C] (The position of the intake and exhaust cam lobes is down.).
- Install the camshaft cap so that the EX mark [D] faces exhaust side.
- Apply engine oil to the threads of the camshaft cap nuts.
- Install the washers and camshaft cap nuts.
- Tighten:

Torque - Camshaft Cap Nuts: 25 N·m (2.5 kgf·m, 18 ft·lb)





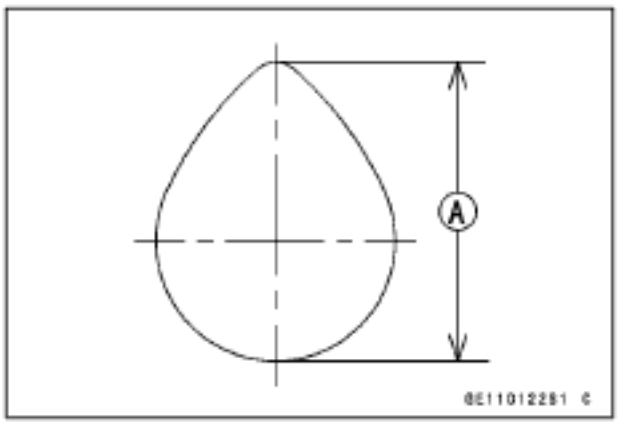
Camshaft

- Install:
  Camshaft Chain Tensioner (see Camshaft Chain Tensioner Installation)
- Turn the crankshaft 2 turns clockwise to allow the tensioner to expand and recheck the camshaft chain timing.
- Install the removed parts (see appropriate chapters).

Cam Wear Inspection

- Remove the camshaft (see Camshaft Removal).
- 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	**34.172 mm (1.3454 in.)**
Intake	**34.287 mm (1.3499 in.)**

Service Limit:

Exhaust	**34.05 mm (1.341 in.)**
Intake	**34.15 mm (1.344 in.)**

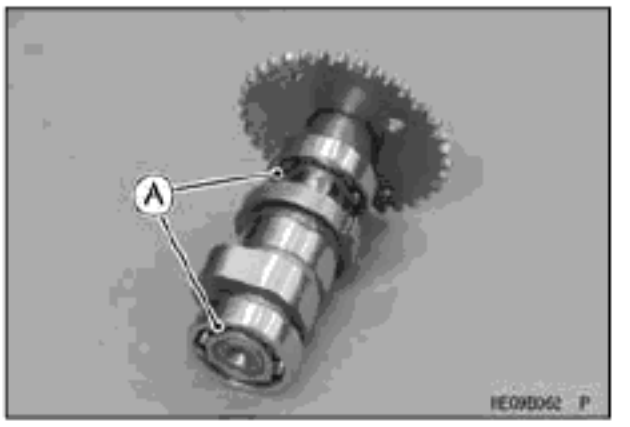
Camshaft Bearing Inspection

- Check each bearing [A] which is press-fitted on the camshaft.

○Since the ball bearing is made to extremely close tolerances, the wear must be judged by feel rather than measurement. Clean the bearing in a high flash-point solvent, dry it (do not spin the bearing while it is dry), and oil it with engine oil.

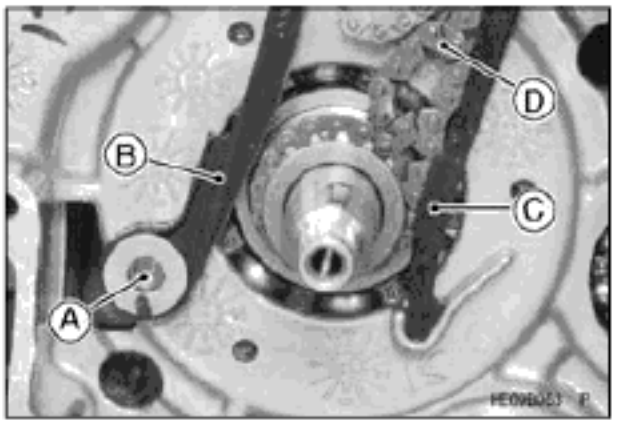
○Spin the bearing by hand to check its condition.

★If the bearing is noisy, does not spin smoothly, or has any rough stops, replace camshaft.



Camshaft Chain Removal

- Remove:
  Cylinder Head (see Cylinder Head Removal)
  Starter Clutch Gear (see Alternator Rotor Removal in the Electrical System chapter)
  Rear Camshaft Chain Guide Bolt [A]
  Rear Camshaft Chain Guide [B]
  Front Camshaft Chain Guide [C]
- Remove the camshaft chain [D] from the crankshaft sprocket.

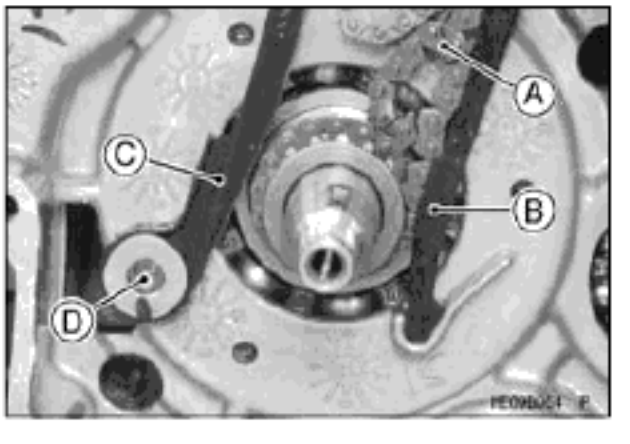


Camshaft Chain Installation

- Hang the camshaft chain [A] to the crankshaft sprocket.
- Install:
  Front Camshaft Chain Guide [B]
  Rear Camshaft Chain Guide [C]
- Tighten:

Torque - Rear Camshaft Chain Guide Bolt [D]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the removed parts (see appropriate chapters).



Camshaft

Camshaft Chain Guide Wear Inspection

- Visually inspect the rubber on the guides.

★If the rubber is damaged, cut, or is missing pieces, replace the guide.

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, M12 × 1.25: 57001-1183

- Using the starter motor, turn the engine over with the throttle fully open until the compression gauge stops rising; the compression is the highest reading obtainable.

Cylinder Compression
Usable Range: 1 190 ~ 1 900 kPa (12.1 ~ 19.4 kgf/cm², 173 ~ 276 psi) at 400 ~ 500 r/min (rpm)

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

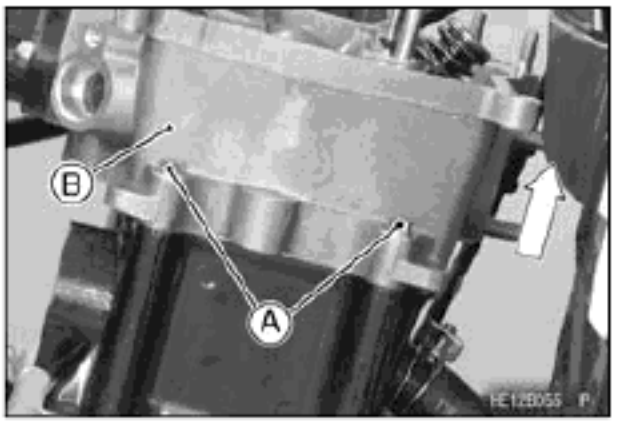
Problem	Diagnosis	Remedy (Action)
Cylinder compression is higher than usable range	Carbon accumulation on piston, cylinder head, and in combustion chamber possibly due to damaged valve stem oil seal and/or damaged piston oil rings (This may be indicated by white exhaust smoke).	Remove the carbon deposits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

Cylinder Head Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Carburetor (see Carburetor Removal in the Fuel System chapter)
  Exhaust Pipe (see Exhaust Pipe Removal)
  Spark Plug Cap
  Camshaft (see Camshaft Removal)

Cylinder Head

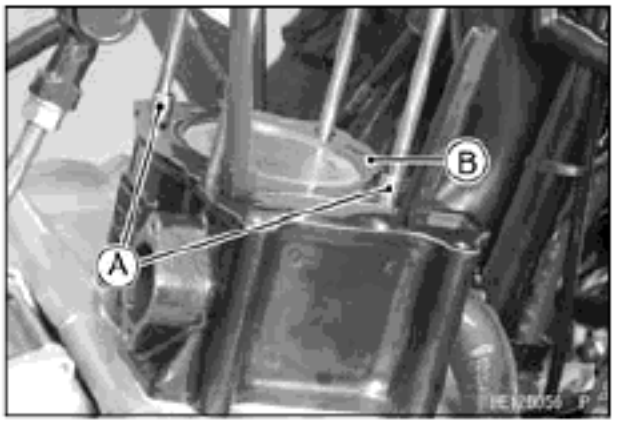
- Remove:
  Cylinder Head Bolts [A] and Washers
  Cylinder Head [B] and Gasket



Cylinder Head Installation

- Replace the cylinder head gasket with a new one.
- Install:
  Dowel Pins [A]
  New Cylinder Head Gasket [B]
  Cylinder Head
  Camshaft (see Camshaft Installation)
- Tighten the cylinder head bolts.

Torque - Cylinder Head Bolts: 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.

Cylinder Head Warp Inspection

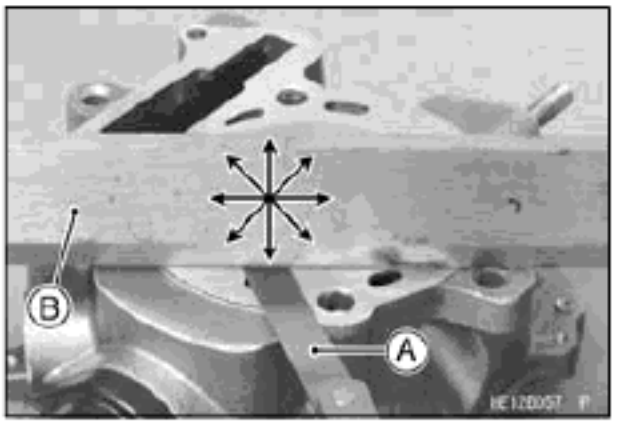
- Clean the cylinder head (see Cylinder Head Cleaning).
- Lay a straightedge across the lower surface of the cylinder head.
- Use a thickness gauge [A] to measure the space between the straightedge [B] and the head at several locations.

Cylinder Head Warp

Standard:	**– – –**
Service Limit:	**0.05 mm (0.002 in.)**

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

★If the cylinder head is warped less than the service limit, repair the head by 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.

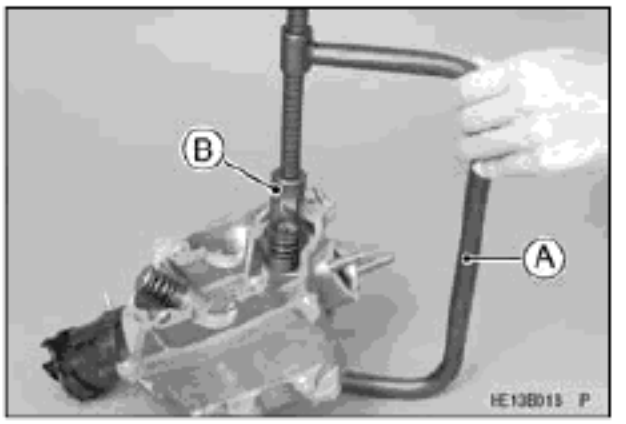
Valve Removal

- 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 [A] and adapter [B], remove the valve.

Special Tools - Valve Spring Compressor Assembly: 57001 -241
Valve Spring Compressor Adapter, ϕ22: 57001-1202



Valve Installation

- Replace the valve stem oil seal.

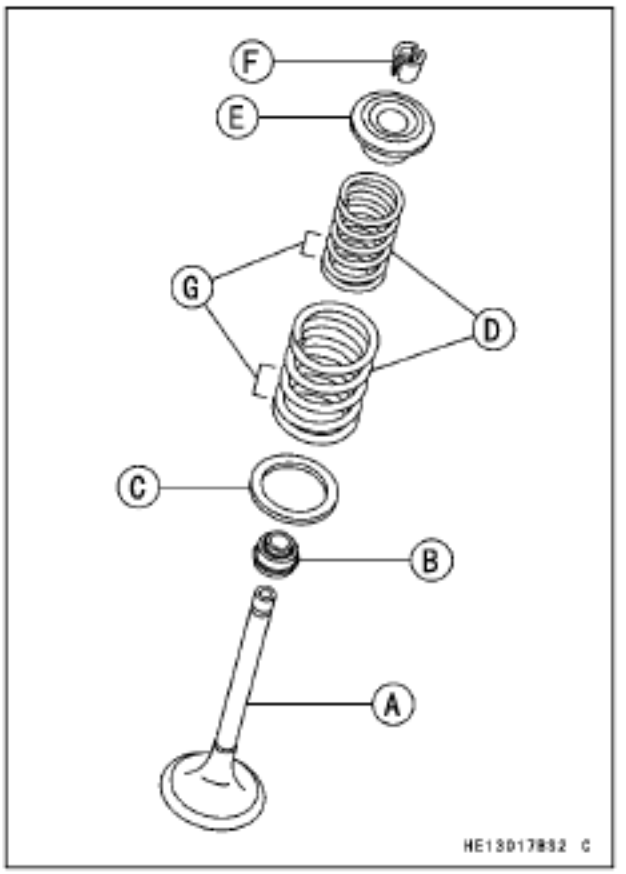
★If a new valve is to be used, check the valve-to-guide clearance (see Valve-to-Guide Clearance Measurement).

★If there is too little clearance, replace the cylinder head.

★If there is too much clearance, replace the cylinder head.

- Apply engine oil to the valve stem and install the valve and spring seat.
- Install the springs so that the closed coil end of each spring faces downwards.

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



Valve-to-Guide Clearance Measurement

- Measure each valve stem outside diameter and each valve guide inside diameter.
- Subtract each valve stem outside diameter from the corresponding guide inside diameter to obtain the valve-to-guide clearance.

★If the clearance exceeds service limit, replace the cylinder head.

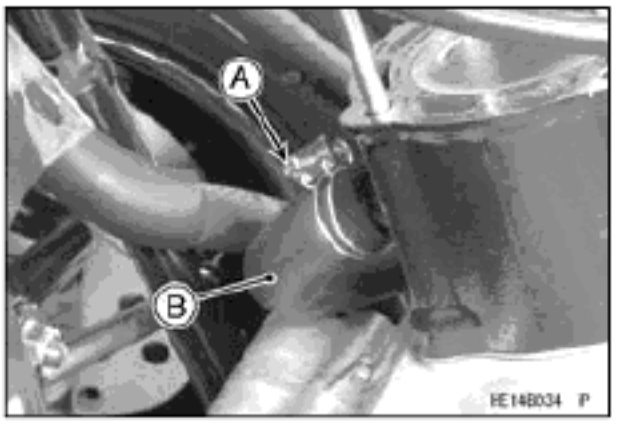
Valve/Valve Guide Clearance

Standard:	
Exhaust	**0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in.)**
Intake	**0.01 ~ 0.037 mm (0.0004 ~ 0.0015 in.)**
Service Limit:	
Exhaust	**0.08 mm (0.0031 in.)**
Intake	**0.06 mm (0.0024 in.)**

Cylinder and Piston

Cylinder Removal

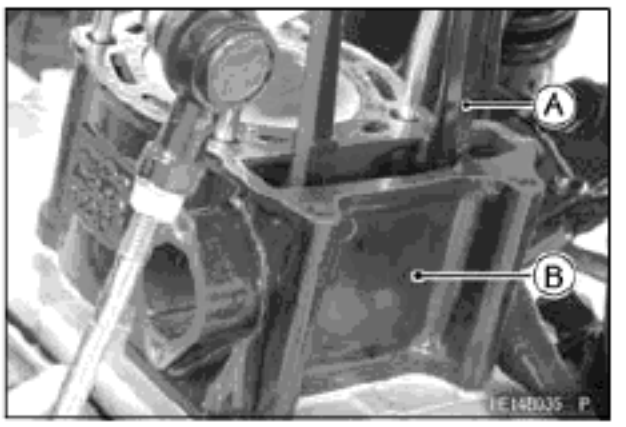
- Remove:
  Cylinder Head (see Cylinder Head Removal)
  Clamp Screw [A] (Loosen)
  Water Hose [B]



- Remove:
  Front Camshaft Chain Guide [A]
  Cylinder [B]

NOTE

○*While removing the front camshaft chain guide and cylinder, pull the camshaft chain upward and keep it taut after the removal. The camshaft chain will drop off from the crankshaft sprocket without the front camshaft chain guide.*

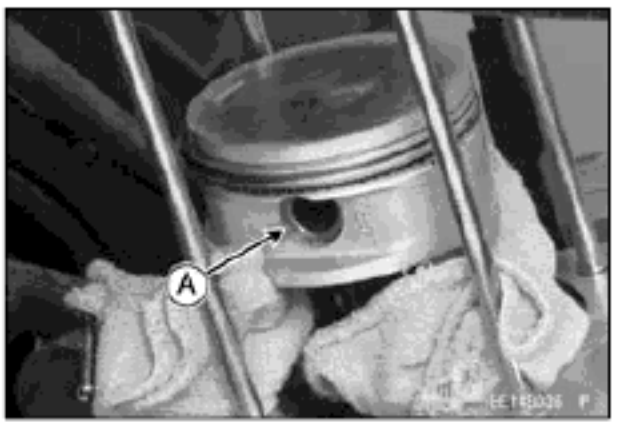


Piston Removal

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

NOTICE

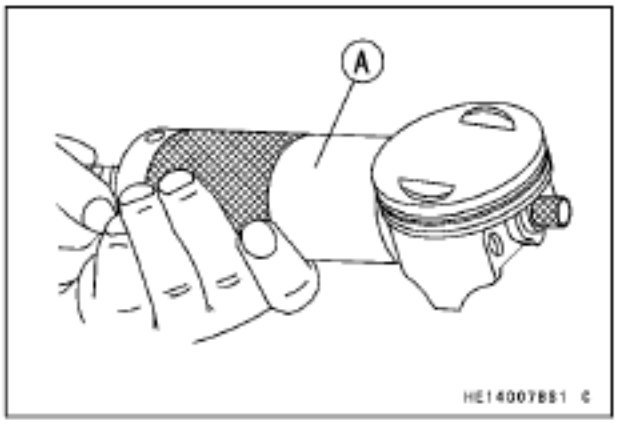
Do not reuse snap rings, as removal weakens and deforms them. They could fall out and score the cylinder wall.



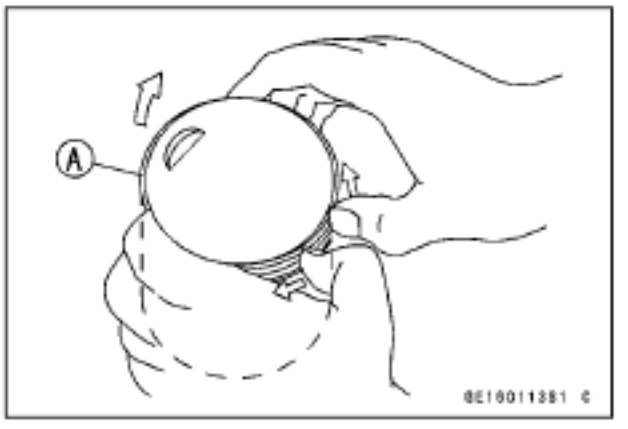
- Using the piston pin puller assembly [A] (special tool), remove the piston pin.

  Special Tool - Piston Pin Puller Assembly: 57001-910

- 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 and Piston

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.*

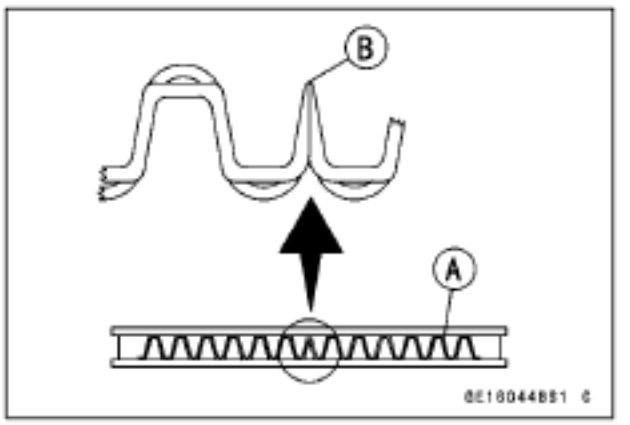
NOTE

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

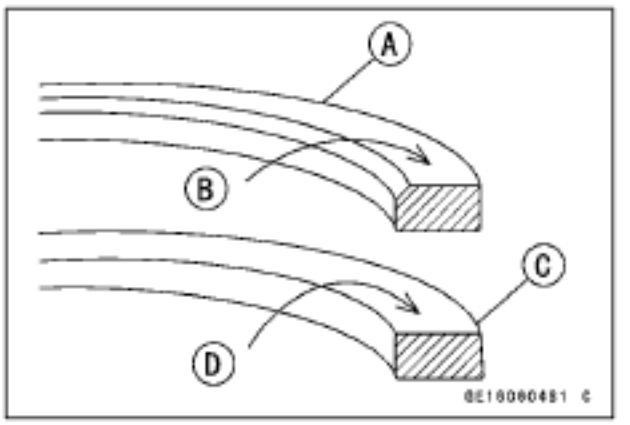
- Apply engine oil to the oil ring expander and oil ring steel rails.
- Install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
- Install the oil ring steel rails, one above the expander and one below it.

○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.



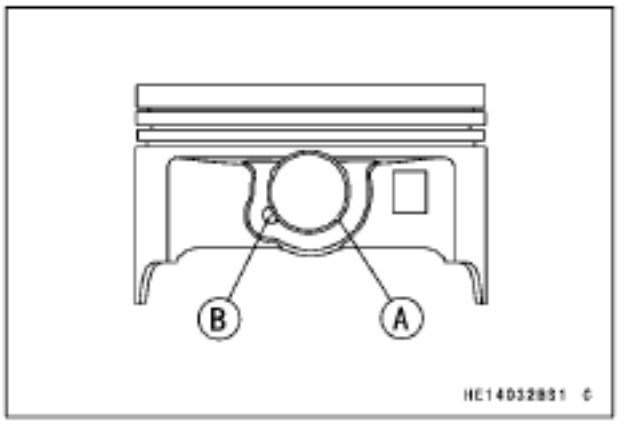
- Apply engine oil to the piston rings.
- Do not mix up the top ring and second ring.
- Install the top ring [A] so that the "**R**" mark [B] faces up.
- Install the second ring [C] so that the "**RN**" mark [D] faces up.



- Apply engine oil to the piston pin.
- Install the piston with its "IN" mark [A] facing intake side.
- Install the piston pin.

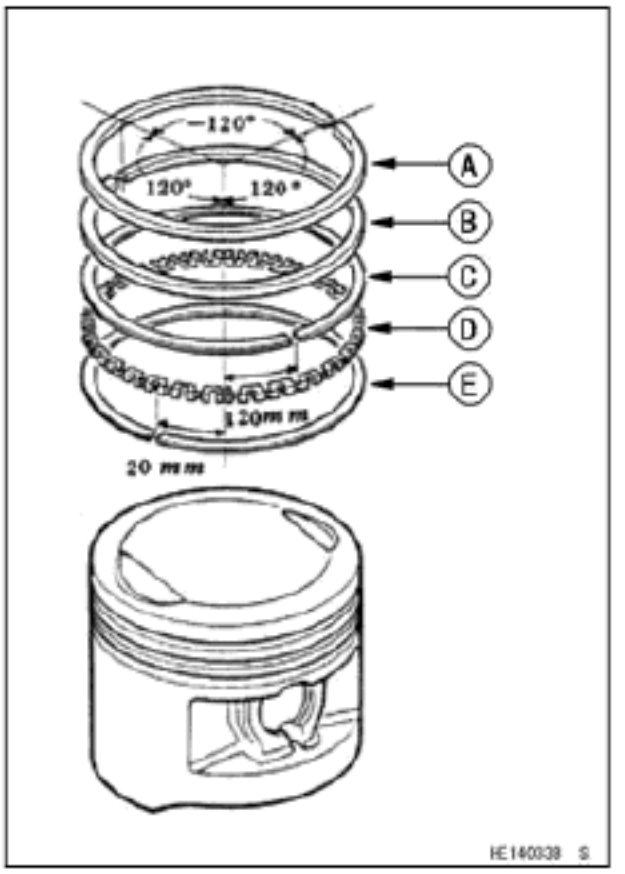
- Fit a new piston pin snap ring into the side of the piston so that the ring opening [A] does not coincide with the slit [B] of the piston pin hole.

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

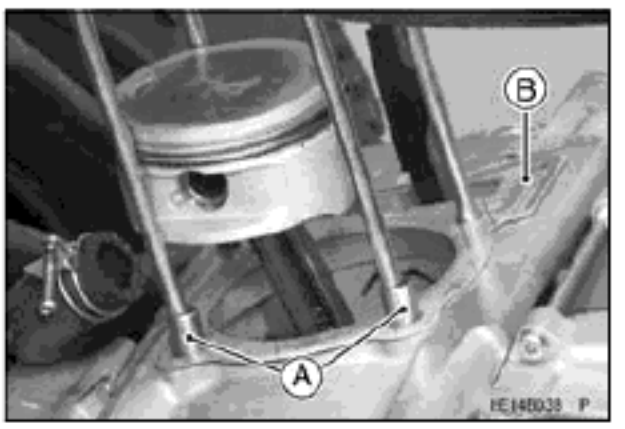


Cylinder and Piston

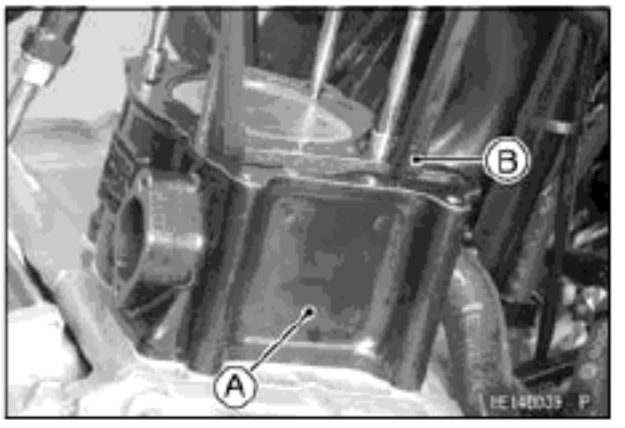
- Apply engine oil to the cylinder bore and piston skirt.
- The piston ring openings must be positioned as shown in the figure.
  Top Ring [A]
  Second Ring [B]
  Oil Ring Steel Rail (Upper) [C]
  Oil Ring Expander [D]
  Oil Ring Steel Rail (Lower) [E]



- Replace the cylinder base gasket with a new one.
- Install:
  Dowel Pins [A]
  New Cylinder Base Gasket [B]



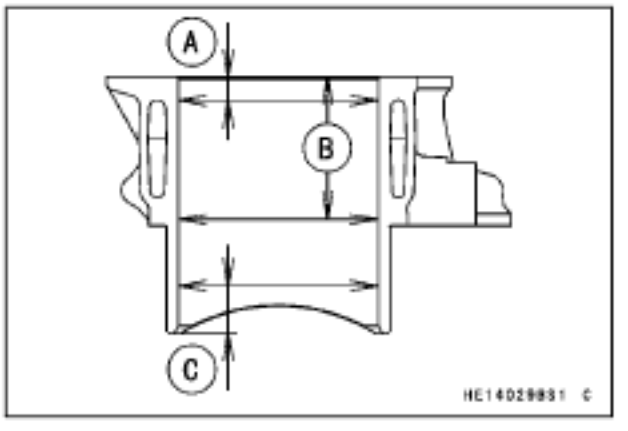
- Install:
  Cylinder [A]
  Front Camshaft Chain Guide [B]



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]



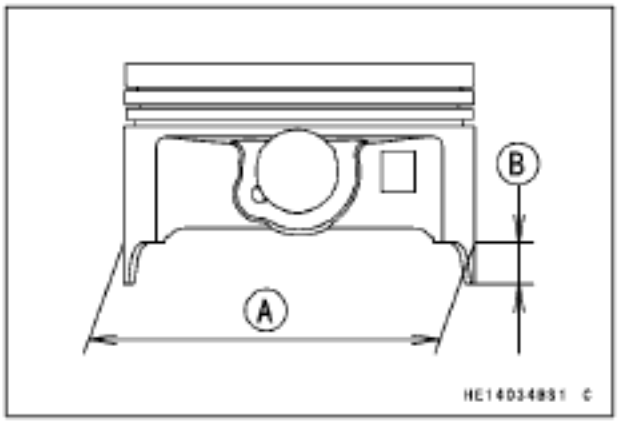
Cylinder Inside Diameter

Standard: **72.705 ~ 72.715 mm (2.8624 ~ 2.8628 in.)**

Service Limit: **72.8 mm (2.866 in.)**

Cylinder and Piston

Piston Wear Inspection



- Measure the outside diameter [A] of the piston 10 mm (0.4 in.) [B] up from the bottom of the piston at a right angle to the direction of the piston pin.

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

Piston Diameter

Standard: 72.67 ~ 72.69 mm (2.8610 ~ 2.8618 in.)

Service Limit: 72.6 mm (2.858 in.)

Piston/Cylinder Clearance Inspection

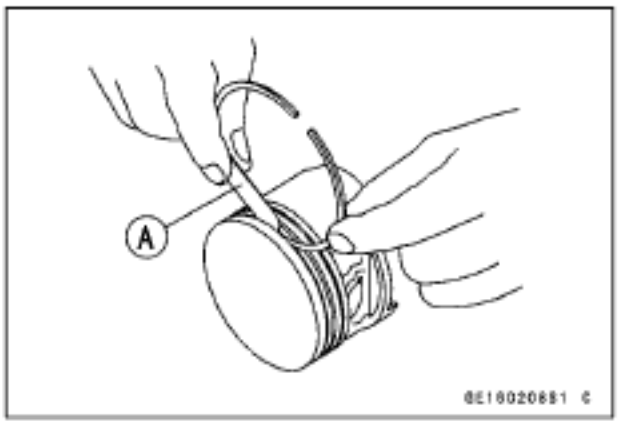
- Subtract the piston diameter from the cylinder inside diameter to get the piston/cylinder clearance.

Piston/Cylinder Clearance

Standard: 0.025 ~ 0.055 mm (0.0010 ~ 0.0022 in.)

★If the clearance exceeds service limit, inspect the piston and 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

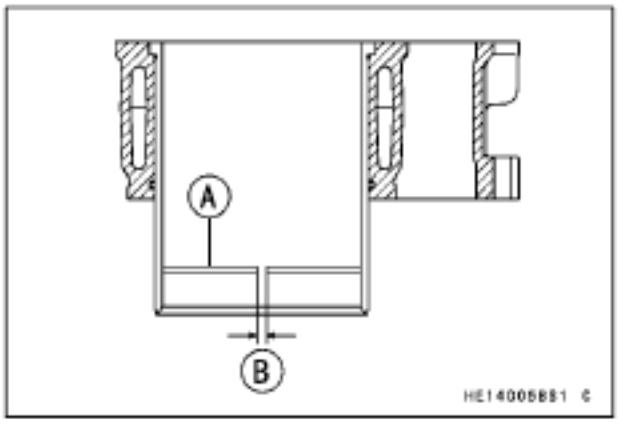
Standard:

Top	**0.015 ~ 0.055 mm (0.0006 ~ 0.0022 in.)**
Second	**0.015 ~ 0.055 mm (0.0006 ~ 0.0022 in.)**

Service Limit:

Top	**0.09 mm (0.0035 in.)**
Second	**0.09 mm (0.0035 in.)**

Piston Ring End Gap Inspection



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

Piston Ring End Gap

Standard:

Top	**0.15 ~ 0.3 mm (0.0059 ~ 0.012 in.)**
Second	**0.3 ~ 0.45 mm (0.012 ~ 0.0177 in.)**
Oil	**0.2 ~ 0.7 mm (0.008 ~ 0.028 in.)**

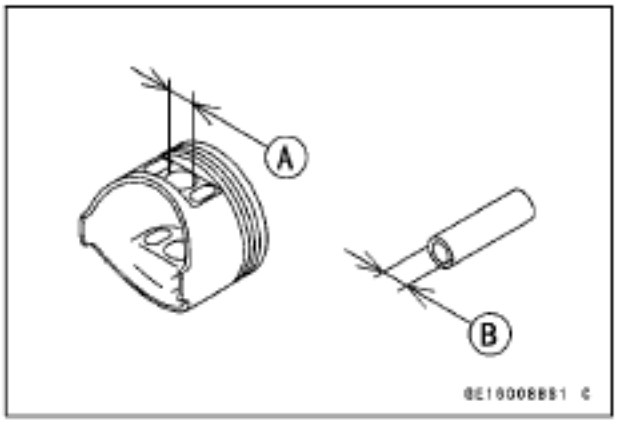
Service Limit:

Top	**0.5 mm (0.020 in.)**
Second	**0.65 mm (0.0256 in.)**
Oil	**0.9 mm (0.0354 in.)**

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

Cylinder and Piston

Piston, Piston Pin, Connecting Rod Inspection



- Measure the inside diameter [A] of both piston pin holes in the piston.

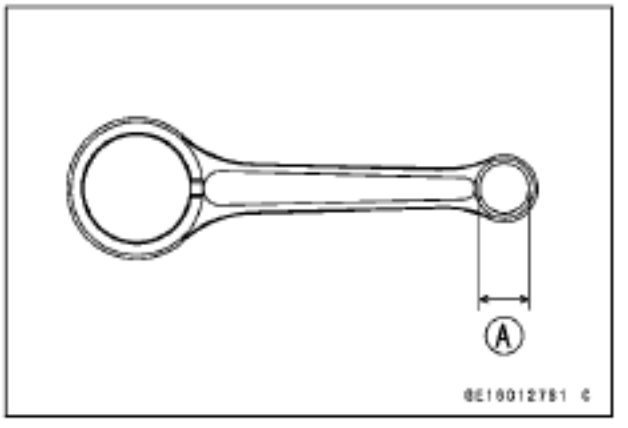
Piston Pin Hole Inside Diameter
Standard: 17.002 ~ 17.008 mm (0.6694 ~ 0.6696 in.)
Service Limit: 17.04 mm (0.671 in.)

★If either piston pin hole diameter exceeds the service limit, replace the piston.

- Measure the diameter [B] of the piston pin.

Piston Pin Outside Diameter
Standard: 16.994 ~ 17 mm (0.6691 ~ 0.67 in.)
Service Limit: 16.96 mm (0.668 in.)

★If the piston pin diameter is less than the service limit at any point, replace the piston pin.



- Measure the inside diameter [A] of the connecting rod small end.

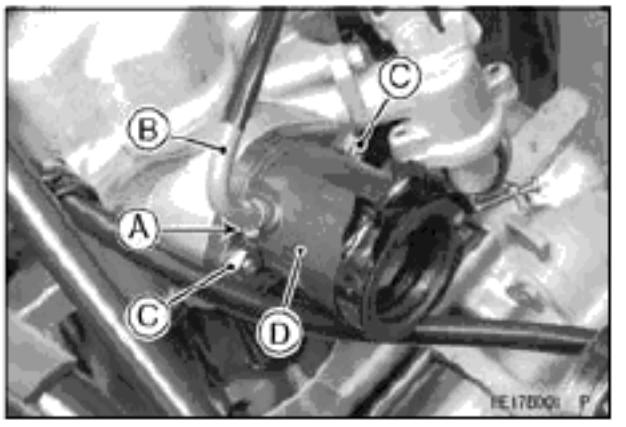
Connecting Rod Small End Inside Diameter
Standard: 17.016 ~ 17.034 mm (0.6699 ~ 0.6706 in.)
Service Limit: 17.06 mm (0.672 in.)

★If the diameter exceeds the service limit, replace the connecting rod.

Carburetor Holder

Carburetor Holder Removal

- Remove:
  Carburetor (see Carburetor Removal in the Fuel System chapter)
  Clamp [A] and Hose [B]
  Carburetor Holder Nuts [C]
  Carburetor Holder [D]



Carburetor Holder Installation

- Replace the O-ring with a new one.
- Apply engine oil to the new O-ring and install it.
- Install the carburetor holder and nuts.
- Tighten:

Torque - Carburetor Holder Nuts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Exhaust System

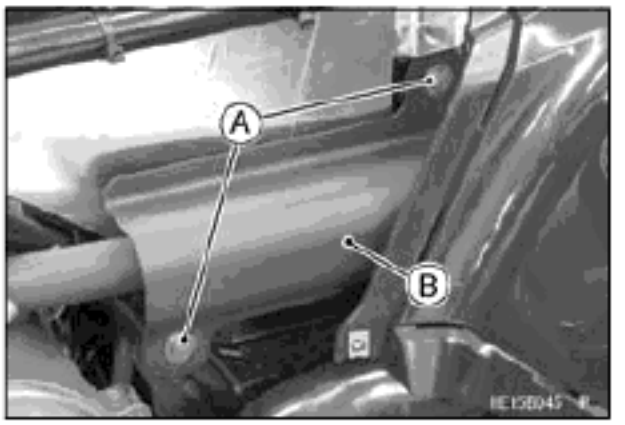
This vehicle is equipped with a spark arrester approved for off-road use by the United States Forest Service. It must be properly maintained to ensure its efficiency. In accordance with the Periodic Maintenance Chart, clean the spark arrester.

Spark Arrester Cleaning

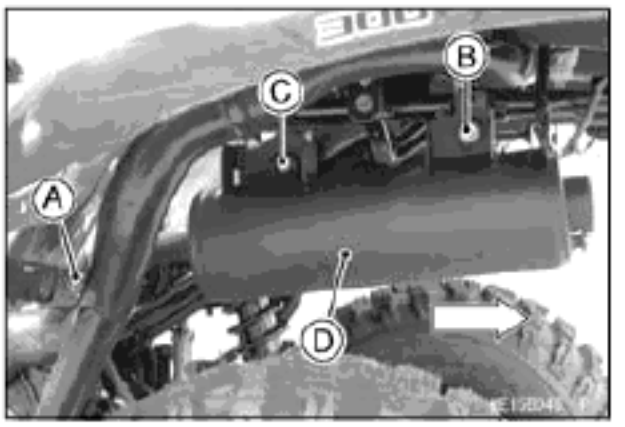
- Refer to the Spark Arrester Cleaning in the Periodic Maintenance chapter.

Muffler Removal

- Remove:
  Left Side Cover (see Left Side Cover Removal in the Frame chapter)
  Exhaust Pipe Cover Mounting Bolts [A]
  Exhaust Pipe Cover [B]



- Remove:
  Muffler Body Clamp Bolt [A] (Loosen)
  Muffler Body Mounting Bolt [B]
  Muffler Body Mounting Nut [C]
  Muffler Body [D]



Muffler Installation

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

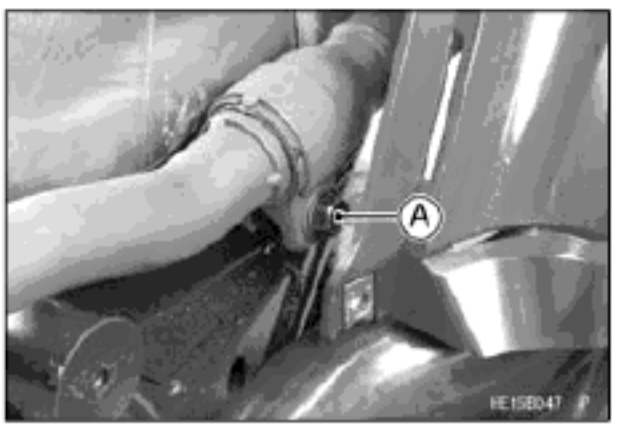
○Replace the muffler body gasket with a new one.

○Tighten:

Torque - Muffler Body Mounting Bolt: 20 N·m (2.0 kgf·m, 15 ft·lb)
Muffler Body Mounting Nut: 20 N·m (2.0 kgf·m, 15 ft·lb)
Exhaust Pipe Cover Mounting Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)

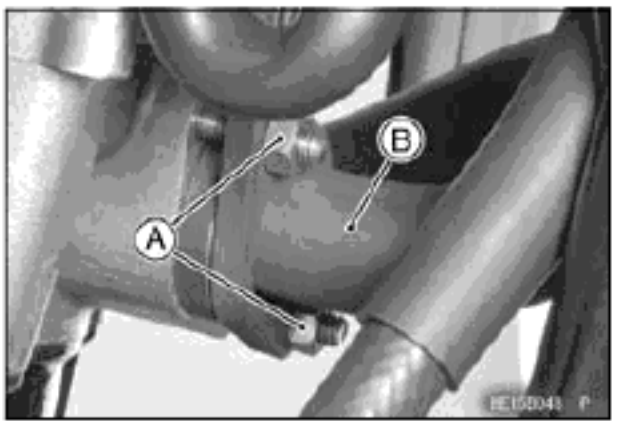
Exhaust Pipe Removal

- Remove:
  Right Side Cover (see Right Side Cover Removal in the Frame chapter)
  Exhaust Pipe Cover (see Muffler Removal)
  Muffler Body Clamp Bolt [A] (Loosen)



Exhaust System

- Remove:
  Exhaust Pipe Nuts [A]
  Exhaust Pipe [B]



Exhaust Pipe Installation

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

○Replace the exhaust pipe gasket and muffler body gasket with new ones.

Exhaust System Inspection

- Before removing the exhaust system, check for signs of leakage at the exhaust pipe gasket in the cylinder head and at the muffler clamp.

★If there are signs of leakage around the exhaust pipe gasket, it should be replaced. If the muffler-to-exhaust pipe joint leaks, tighten the clamp.

- Remove the exhaust pipe and muffler (see Muffler/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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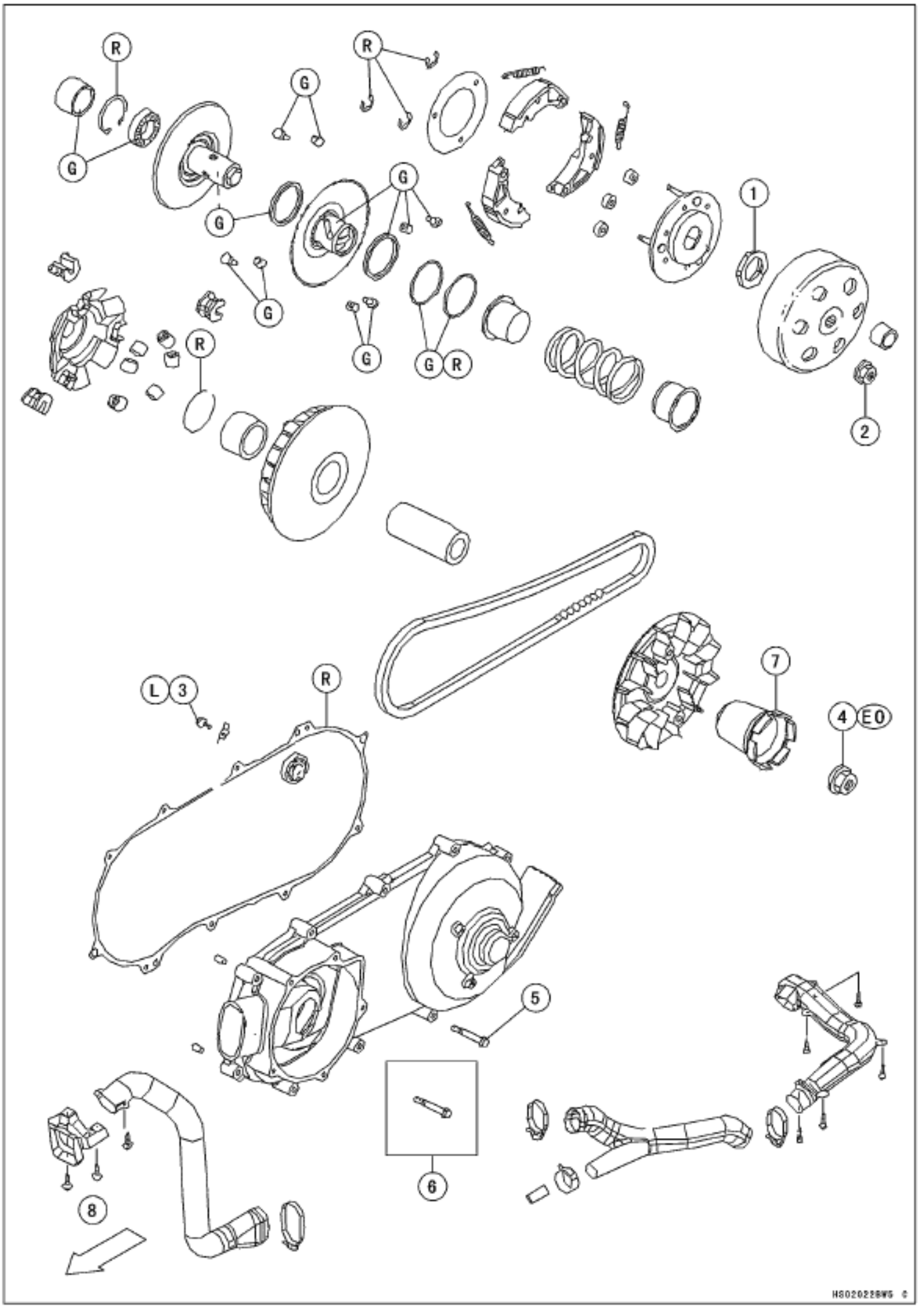
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Clutch Driven Plate Nut	54	5.5	40	
2	Driven Pulley Nut	54	5.5	40	
3	Driven Shaft Bearing Retainer Bolt	9.8	1.0	87 in·lb	L
4	Drive Pulley Nut	93	9.5	69	EO
5	Torque Converter Cover Bolts	9.8	1.0	87 in·lb	
6	Torque Converter Outer Cover Bolts (EUR Model only)	9.8	1.0	87 in·lb	

7. Ratchet (Other than EUR Model)
8. Front

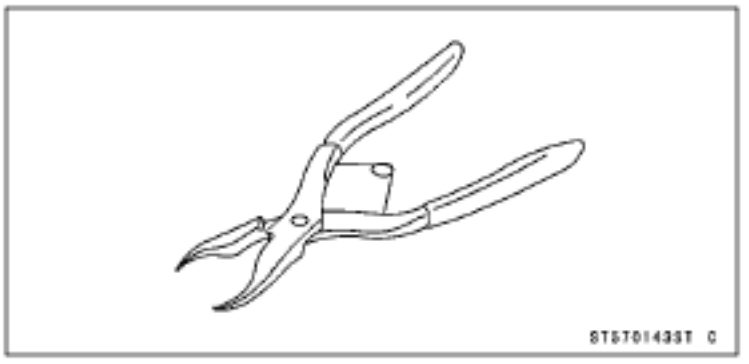
EO: Apply engine oil.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts

Specifications

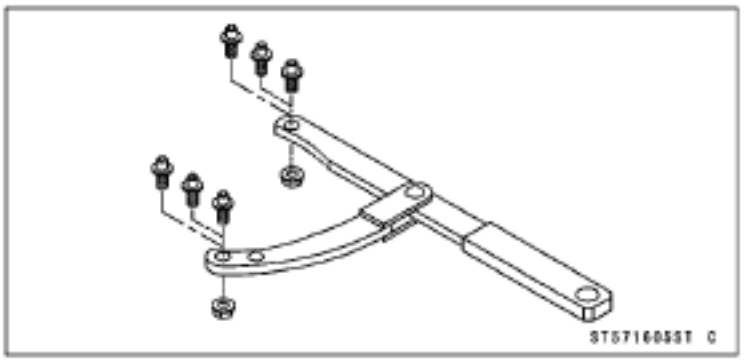
Item	Standard	Service Limit
Drive Belt		
Belt Width	23.6 ~ 24.4 mm (0.929 ~ 0.961 in.)	22 mm (0.87 in.)
Drive Pulley		
Movable Drive Sheave Bushing Inside Diameter	26.989 ~ 27.052 mm (1.0626 ~ 1.0650 in.)	27.06 mm (1.0654 in.)
Drive Pulley Collar Outside Diameter	26.96 ~ 26.974 mm (1.061 ~ 1.0620 in.)	26.94 mm (1.0606 in.)
Weight Roller Outside Diameter	22.92 ~ 23.08 mm (0.902 ~ 0.909 in.)	22.8 mm (0.90 in.)
Clutch/Driven Pulley		
Movable Driven Sheave Bushing Inside Diameter	40 ~ 40.025 mm (1.57 ~ 1.5758 in.)	40.06 mm (1.577 in.)
Fixed Driven Sheave Outside Diameter	39.965 ~ 39.985 mm (1.5734 ~ 1.5742 in.)	39.94 mm (1.572 in.)
Driven Pulley Spring Free Length	– – –	131 mm (5.16 in.)
Clutch Lining Thickness	0.8 ~ 1.0 mm (0.031 ~ 0.039 in.)	0.3 mm (0.012 in.)
Clutch Outer Inside Diameter	152.1 ~ 152.2 mm (5.988 ~ 5.992 in.)	152.6 mm (6.008 in.)

Special Tools

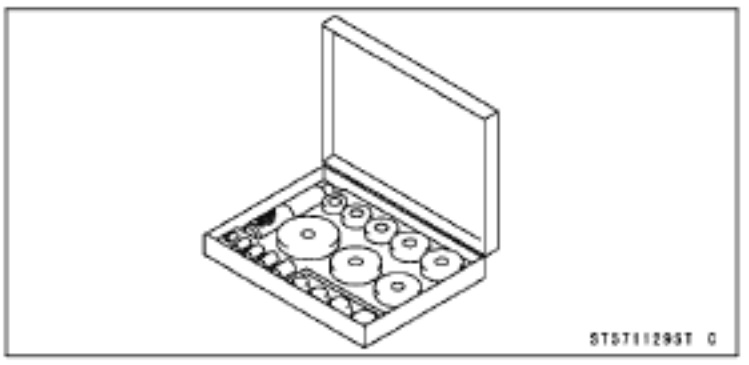
Inside Circlip Pliers:
57001-143



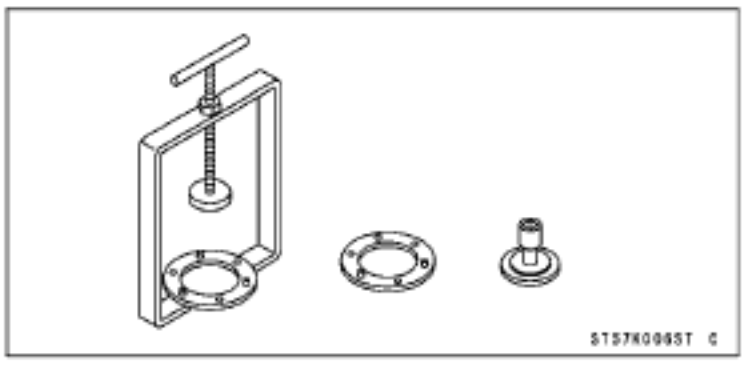
Flywheel & Pulley Holder:
57001-1605



Bearing Driver Set:
57001-1129



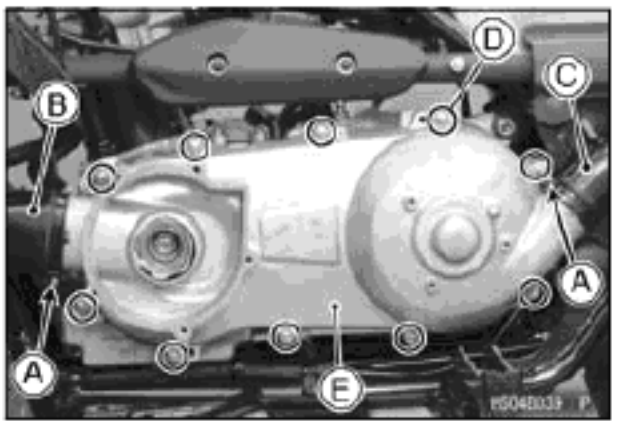
Clutch Spring Compressor:
57001-Y006



Torque Converter Cover

Torque Converter Cover Removal

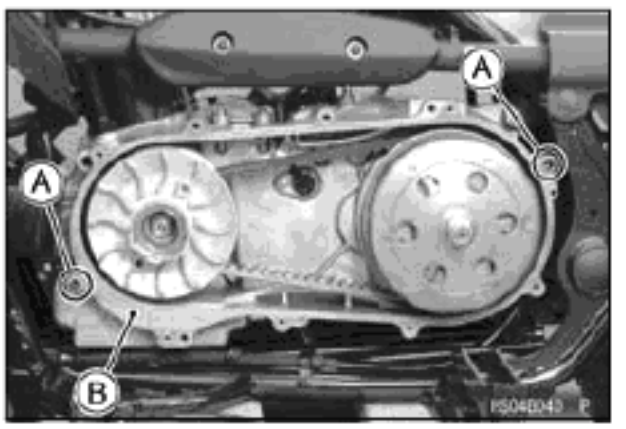
- Remove:
  Left Side Cover (see Left Side Cover Removal in the Frame chapter)
  Recoil Starter (Other than EUR Model) (see Recoil Starter Removal in the Recoil Starter chapter)
  Clamp Screws [A] (Loosen)
  Torque Converter Intake Duct [B] and Exhaust Duct [C]
  Torque Converter Cover Bolts [D]
  Torque Converter Cover [E] and Gasket



Torque Converter Cover Installation

- Replace the torque converter cover gasket with a new one.
- Install:
  Dowel Pins [A]
  New Torque Converter Cover Gasket [B]
  Torque Converter Cover
- Tighten:

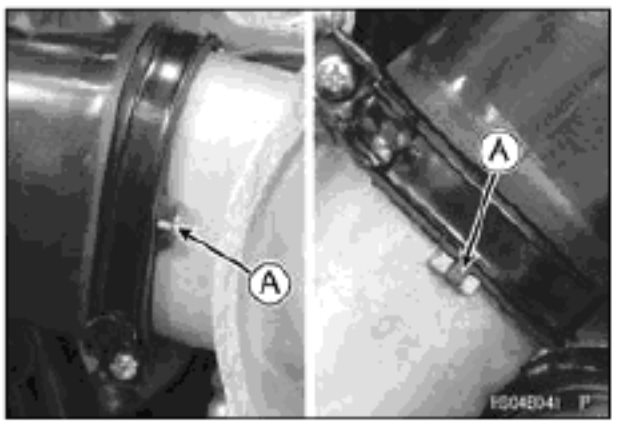
Torque - Torque Converter Cover Bolts: 9.8 N·m (1.0 kgf-m, 87 in-lb)



- Install the torque converter intake duct and exhaust duct.

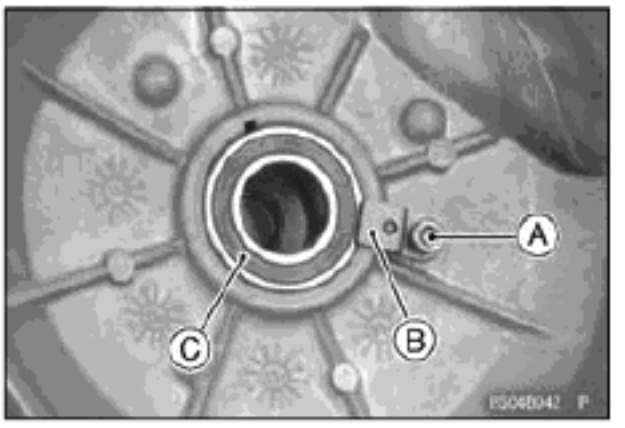
○Fit the projections [A] to the slits.

- Tighten the clamp screws securely.
- Install the removed parts (see appropriate chapters).



Torque Converter Cover Disassembly

- Remove:
  Torque Converter Cover (see Torque Converter Cover Removal)
  Bolt [A]
  Bearing Retainer [B]
- Remove the bearing [C] with a suitable tool.



Torque Converter Cover Assembly

- Press in the bearing with the bearing driver.

Special Tool - Bearing Driver Set: 57001-1129

- Install the bearing retainer as shown in the figure.
- Apply a non-permanent locking agent to the threads of the driven shaft bearing retainer bolt, and tighten it.

Torque - Driven Shaft Bearing Retainer Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Torque Converter Cover

Bearing Inspection

NOTE

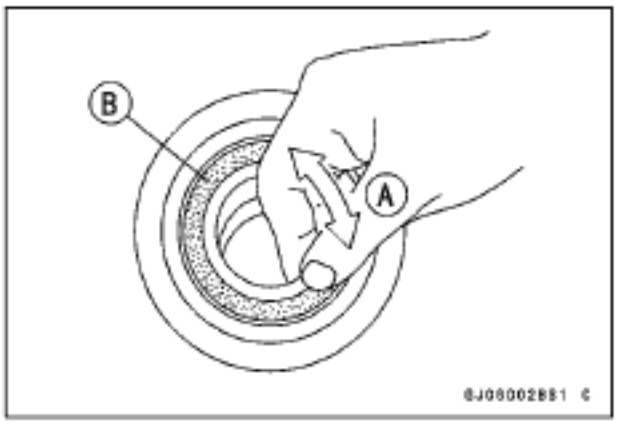
○*Do not remove the bearing for inspection. If the bearing is removed, it will need to be replaced with a new one.*

- Turn the bearing back and forth [A] while checking for plays, roughness, or binding.

★If bearing play, roughness or binding is found, replace the bearing.

- Examine the bearing seal [B] for tears or leakage.

★If the seal is torn or is leaking, replace the bearing.



Drive Belt

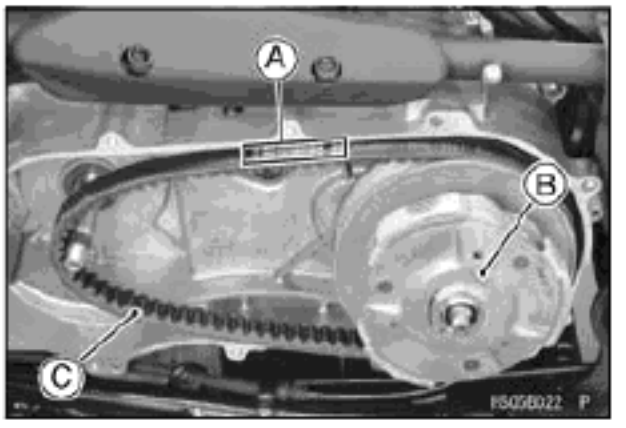
Drive Belt Removal

- Remove the drive pulley (see Drive Pulley Removal).
- Remove the clutch outer (see Clutch/Driven Pulley Removal).

NOTE

○*Before removing, observe the direction the belt's printed information [A] (such as manufacturer's name) is facing so that it may be reinstalled on the pulleys to rotate in the same direction as originally installed.*

- Remove the clutch/driven pulley [B] and drive belt [C].

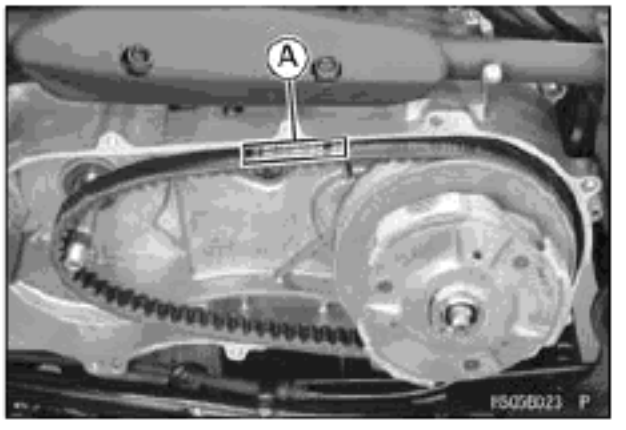


Drive Belt Installation

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 the reverse of removal.



Drive Belt Inspection

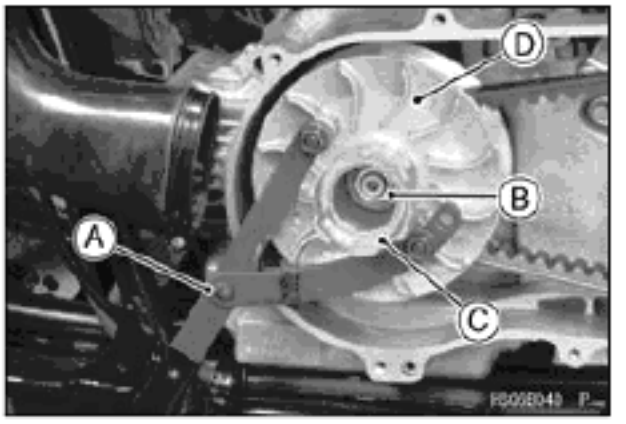
- Refer to the Converter Drive Belt Wear Inspection in the Periodic Maintenance chapter.

Drive Pulley

Drive Pulley Removal

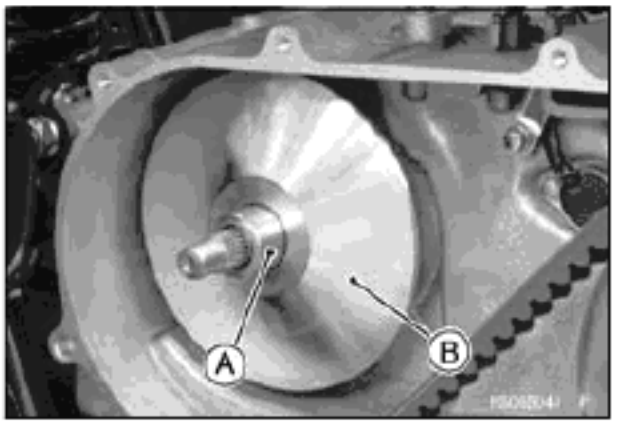
- Remove:
  Torque Converter Cover (see Torque Converter Cover Removal)
- Using the flywheel & pulley holder [A], remove the drive pulley nut [B].

Special Tool - Flywheel & Pulley Holder: 57001-1605

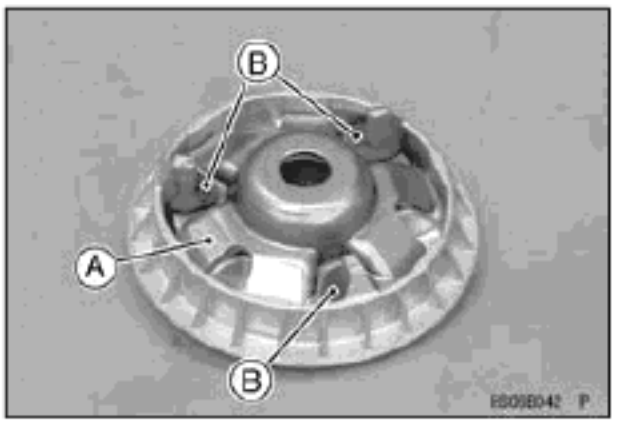


- Remove:
  Ratchet [C] (Other than EUR Model)
  Fixed Drive Sheave [D]

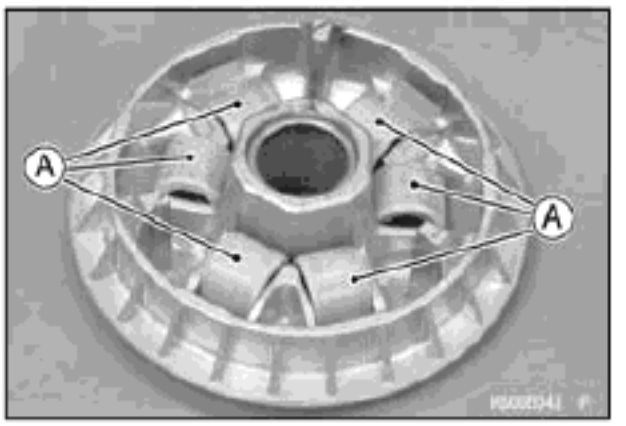
- Remove:
  Collar [A]
  Movable Drive Sheave Assembly [B]



- Remove:
  Ramp Plate [A] with Dampers [B]

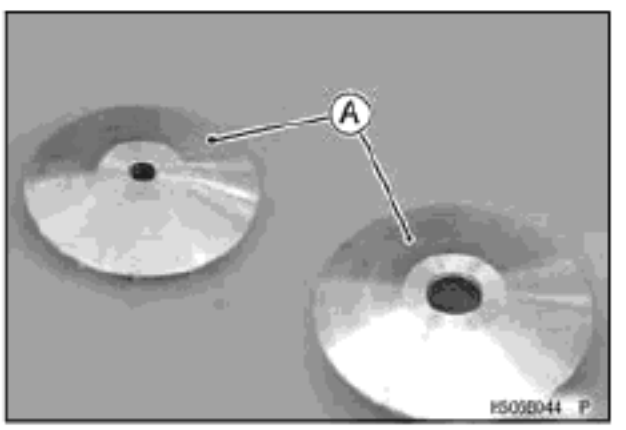


- Remove:
  Weight Rollers [A]



Drive Pulley Inspection

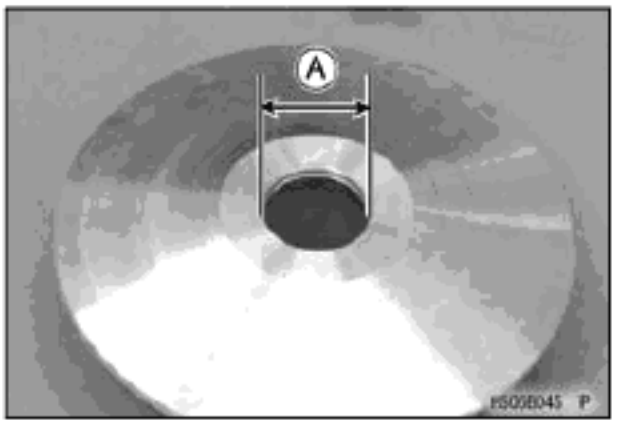
★If the sheave surfaces [A] appear damaged, replace the fixed drive sheave and/or movable drive sheave.



Drive Pulley

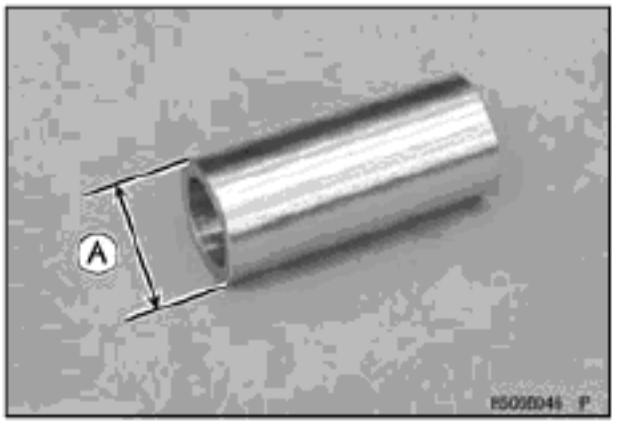
★If the movable drive sheave bushing is damaged or worn, replace it.

Movable Drive Sheave Bushing Inside Diameter [A]
Standard: 26.989 ~ 27.052 mm (1.0626 ~ 1.0650 in.)
Service Limit: 27.06 mm (1.0654 in.)



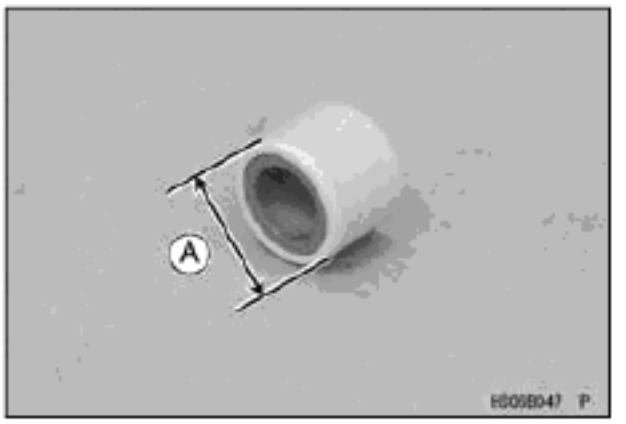
★If the drive pulley collar is damaged or worn, replace it.

Drive Pulley Collar Outside Diameter [A]
Standard: 26.96 ~ 26.974 mm (1.061 ~ 1.0620 in.)
Service Limit: 26.94 mm (1.0606 in.)



★If the weight rollers are damaged or worn, replace them.

Weight Roller Outside Diameter [A]
Standard: 22.92 ~ 23.08 mm (0.902 ~ 0.909 in.)
Service Limit: 22.8 mm (0.90 in.)



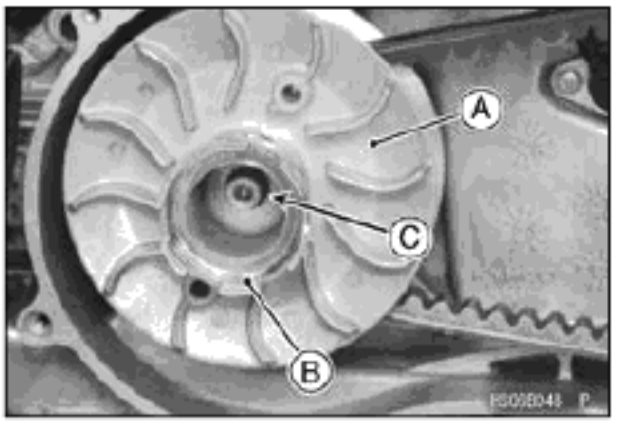
Drive Pulley Installation

• Installation is the reverse of removal. Note the following.
○Clean the following portions with an oil-less cleaning fluid, and dry them with a clean cloth.
Fixed Sheave Tapered Portion
Crankshaft
Drive Belt

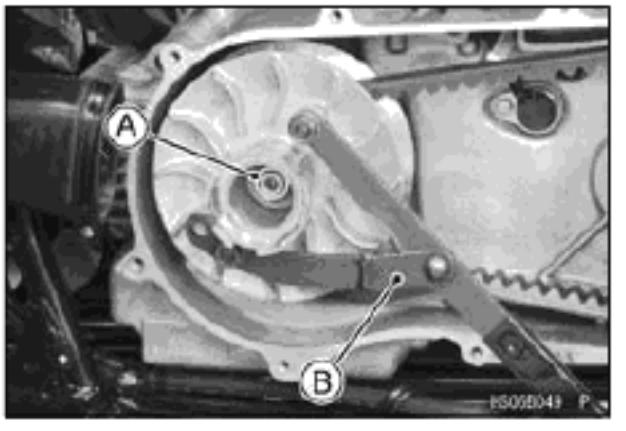
⚠WARNING

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

Drive Pulley



○When installing the fixed drive sheave [A], compress it to let the drive belt move downward to the lowest position so that the drive pulley can be tightened.
○Make sure the ratchet [B] into the splines [C] on the crankshaft when the ratchet is installed (Other than EUR model).



○Apply engine oil to the drive pulley nut [A].
○Using the flywheel & pulley holder [B], tighten the drive pulley nut.

Special Tool - Flywheel & Pulley Holder: 57001-1605

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

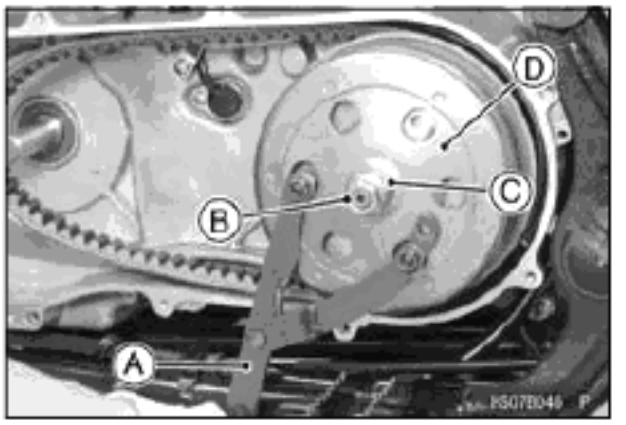
Clutch/Driven Pulley

Clutch/Driven Pulley Removal

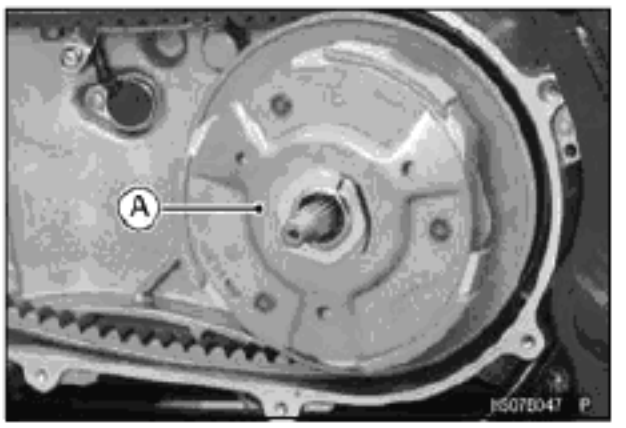
- Remove:
  Torque Converter Cover (see Torque Converter Cover Removal)
  Drive Pulley (see Drive Pulley Removal)
- Using the flywheel & pulley holder [A], remove the driven pulley nut [B].

Special Tool - Flywheel & Pulley Holder: 57001-1605

- Remove the collar [C] and clutch outer [D].



- Remove:
  Clutch/Driven Pulley [A]



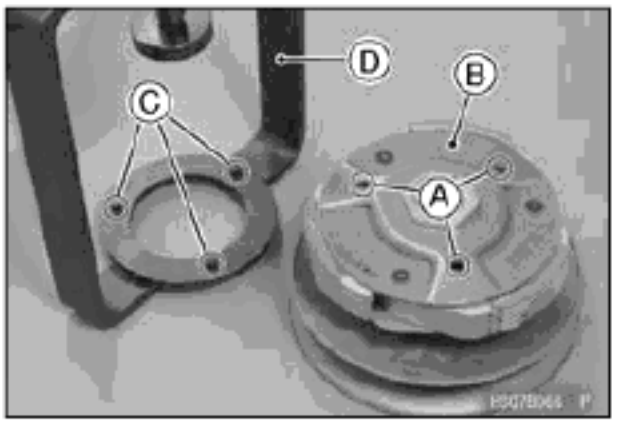
Clutch/Driven Pulley Disassembly

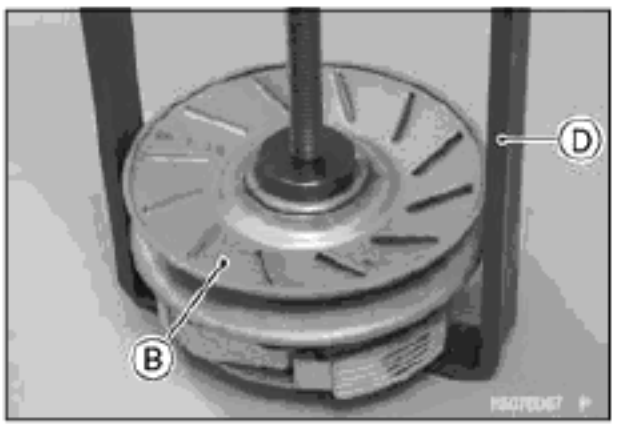
NOTE

○*Be sure to use a clutch spring compressor to avoid spring damage.*

- Set the holes [A] of the clutch/driven pulley assembly [B] to the pins [C] of the clutch spring compressor [D].
- Hold the clutch/driven pulley assembly with the clutch spring compressor securely.

Special Tool - Clutch Spring Compressor: 57001-Y006

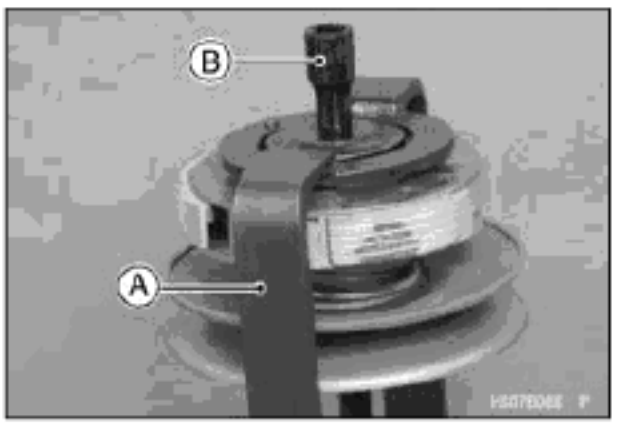




- Set the clutch spring compressor [A] in a vise.
- Using the hex nut wrench, 39 mm (57001-Y006) [B], remove the clutch driven plate nut.

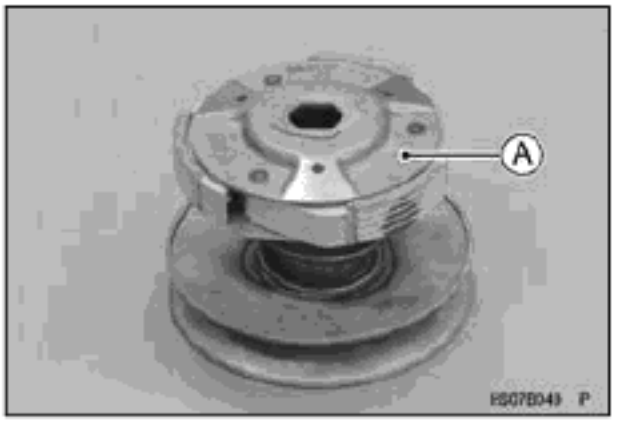
Special Tool - Clutch Spring Compressor: 57001-Y006

- Loosen the clutch spring compressor and remove the clutch/driven pulley assembly.

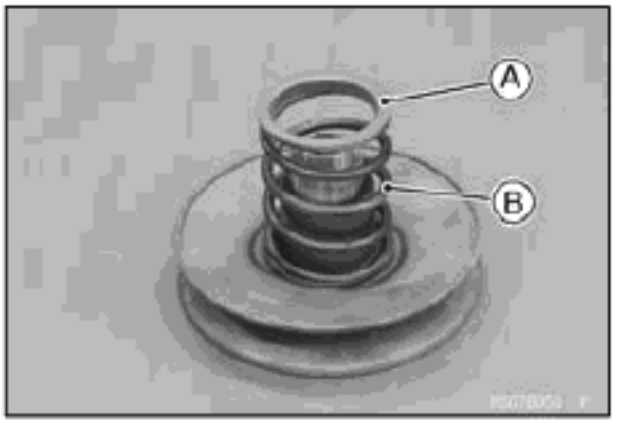


Clutch/Driven Pulley

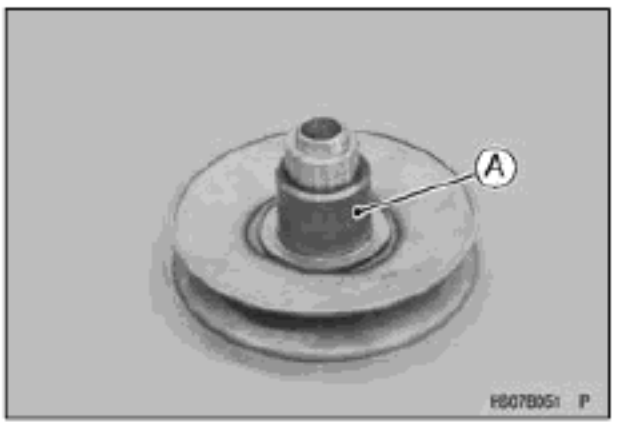
- Remove the clutch [A].



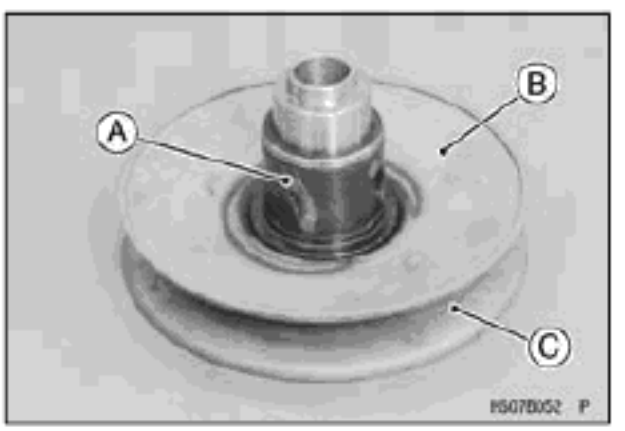
- Remove:
  Spring Seat [A]
  Spring [B]



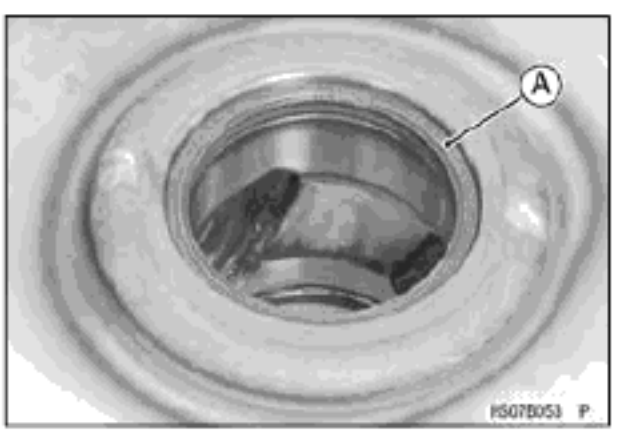
- Remove the seal collar [A].



- Wipe off the grease.
- Remove the guide roller pins [A] with guide rollers.
- Remove the movable driven sheave [B] from the fixed driven sheave [C].



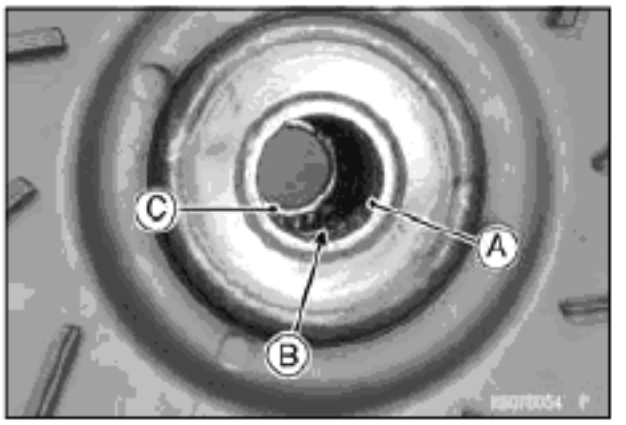
- Remove:
  Oil Seal [A]



Clutch/Driven Pulley

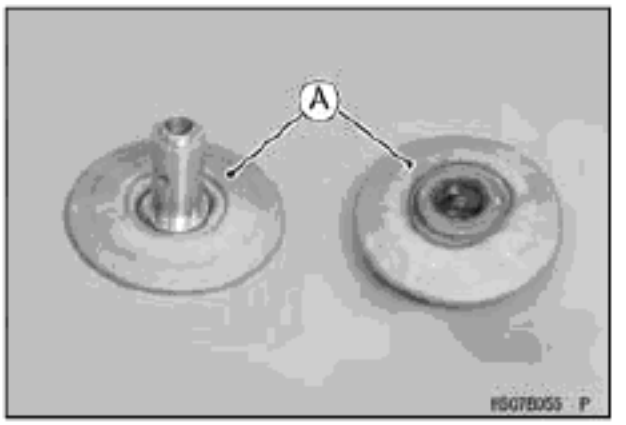
- Remove the inner needle bearing [A].
- Remove the snap ring [B] and outer bearing [C].

Special Tool - Inside Circlip Pliers: 57001-143



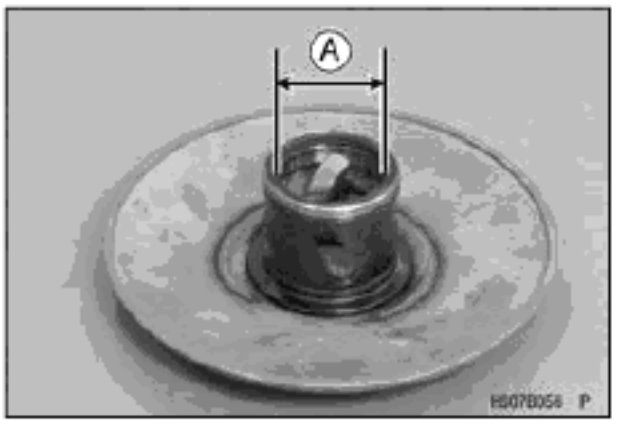
Driven Pulley Inspection

★If the sheave surfaces [A] appear damaged, replace the fixed driven sheave and/or movable driven sheave.



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

Movable Driven Sheave Bushing Inside Diameter [A]
Standard: 40 ~ 40.025 mm (1.57 ~ 1.5758 in.)
Service Limit: 40.06 mm (1.577 in.)



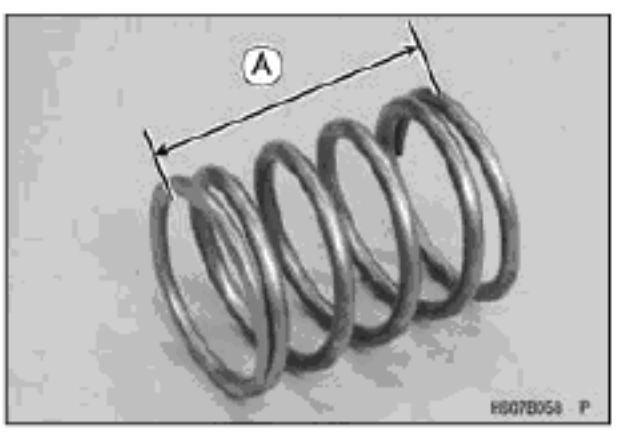
★If the fixed driven sheave is damaged or worn, replace the fixed driven sheave.

Fixed Driven Sheave Outside Diameter [A]
Standard: 39.965 ~ 39.985 mm (1.5734 ~ 1.5742 in.)
Service Limit: 39.94 mm (1.572 in.)

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

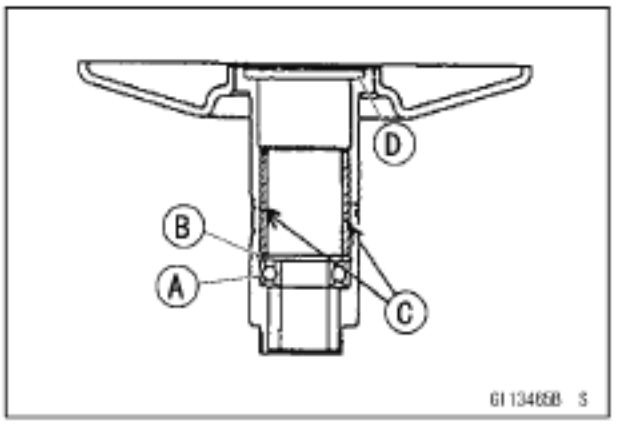
Spring Free Length [A]
Service Limit: 131 mm (5.16 in.)

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



Clutch/Driven Pulley

Clutch/Driven Pulley Assembly



- Apply grease to the outer bearing [A].
- Press a new outer bearing into the fixed driven sheave with the sealed end facing up.
- Replace the snap ring with a new one.
- Insert a new snap ring [B] in its groove.

Special Tool - Inside Circlip Pliers: 57001-143

- Apply grease to the fixed driven sheave bore areas [C].

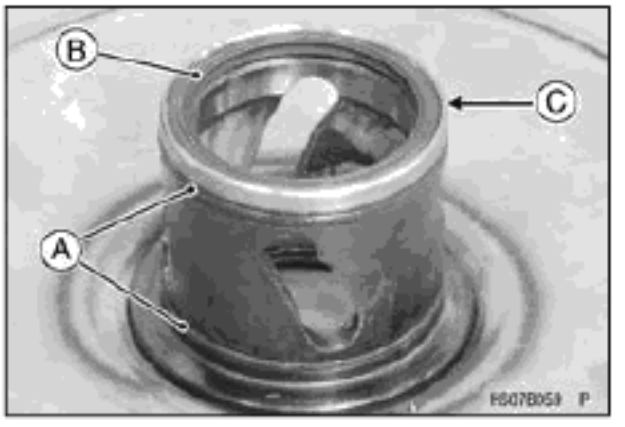
NOTE

○*Pack all bearing cavities with proper grease.*

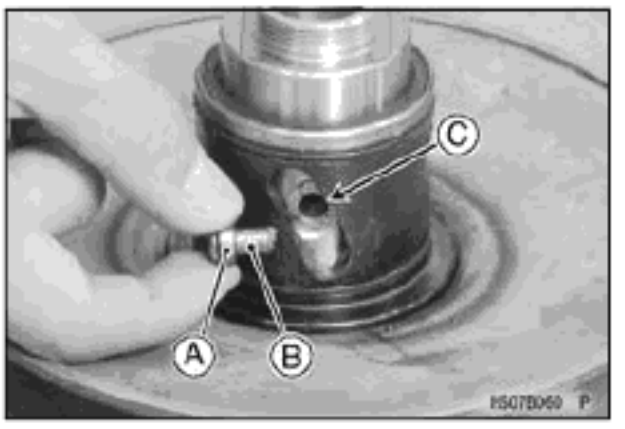
Specified Grease: Heat resistance 230°C (446°F)

- Press a new inner needle bearing [D] into the fixed driven sheave.

Special Tool - Bearing Driver Set: 57001-1129



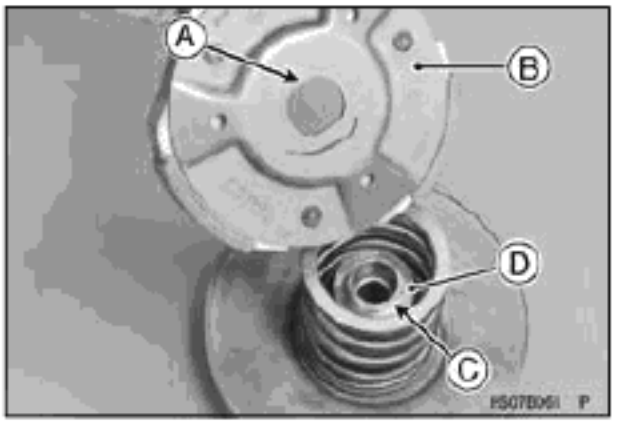
- Clean off any grease or dirt on the movable driven and fixed driven sheaves, and dry them with a clean cloth.
- Replace the O-rings [A] with new ones.
- Apply grease to a new O-rings, and install them.
- Apply grease to the oil seal lips.
- Press the oil seal [B] in the movable driven sheave so that the oil seal surface is flush [C] with the sleeve end.
- Install the movable driven sheave onto the fixed driven sheave.



- Apply grease to the guide rollers [A] and guide roller pins [B], and insert them into the holes [C] in the fixed driven sheave.
- Install the seal collar.
- Wipe off any excessive grease.

NOTE

○*Be sure to clean the fixed driven sheave off any grease.*

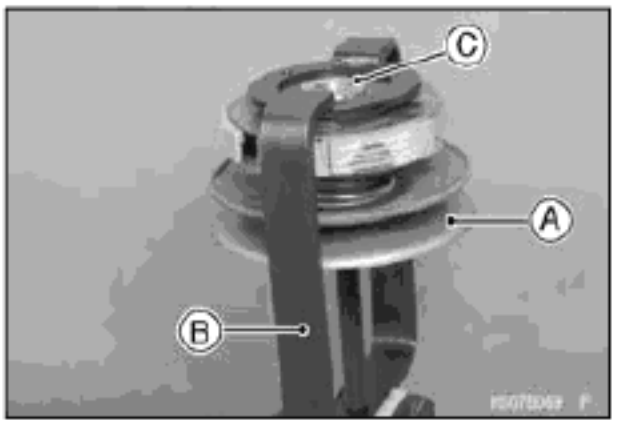


- Install the spring and spring seat.
- Align the flat surface [A] of the clutch drive plate [B] with the flat surface [C] of the fixed driven sheave [D].

Clutch/Driven Pulley

NOTE

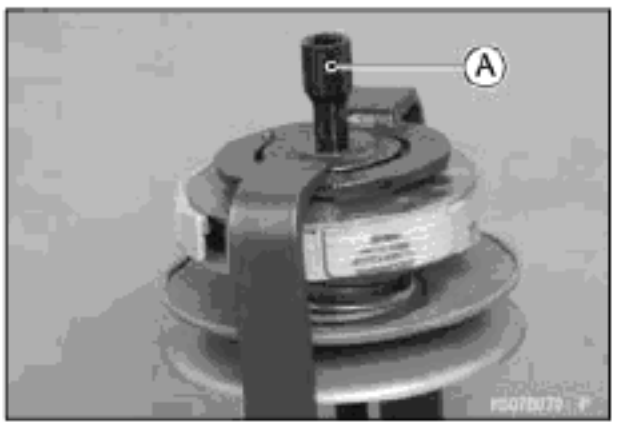
○*Be sure to use a clutch spring compressor to avoid spring damage.*



- Set the holes of the clutch/driven pulley assembly [A] to the pins of the clutch spring compressor [B].
- Hold the clutch/driven pulley assembly with the clutch spring compressor securely.

Special Tool - Clutch Spring Compressor: 57001-Y006

- Set the clutch spring compressor in a vise.
- Tighten the clutch driven plate nut [C] temporarily.



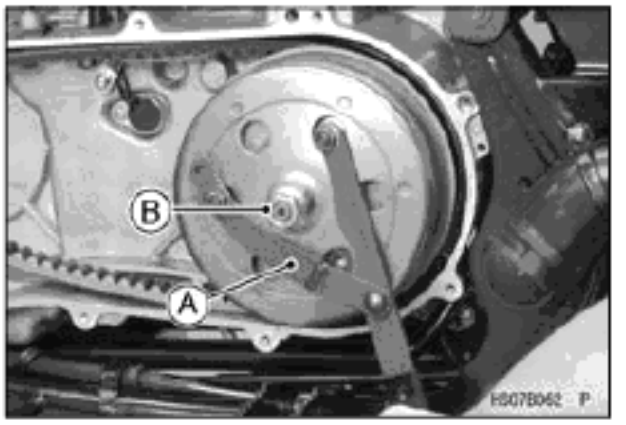
- Using the hex nut wrench, 39 mm (57001-Y006) [A], tighten the clutch driven plate nut to the specified torque.

Special Tool - Clutch Spring Compressor: 57001-Y006

Torque - Clutch Driven Plate Nut: 54 N·m (5.5 kgf·m, 40 ft·lb)

- Loosen the clutch spring compressor and remove the clutch/driven pulley assembly.

Clutch/Driven Pulley Installation

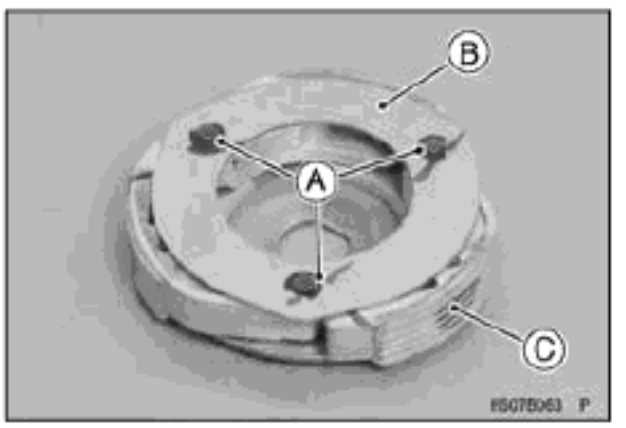


- Install the drive belt and clutch/driven pulley.
- Install the clutch outer and collar.
- Apply engine oil to the top of the driven shaft.
- Using the flywheel & pulley holder [A], tighten the driven pulley nut [B].

Special Tool - Flywheel & Pulley Holder: 57001-1605

Torque - Driven Pulley Nut: 54 N·m (5.5 kgf·m, 40 ft·lb)

Clutch Disassembly

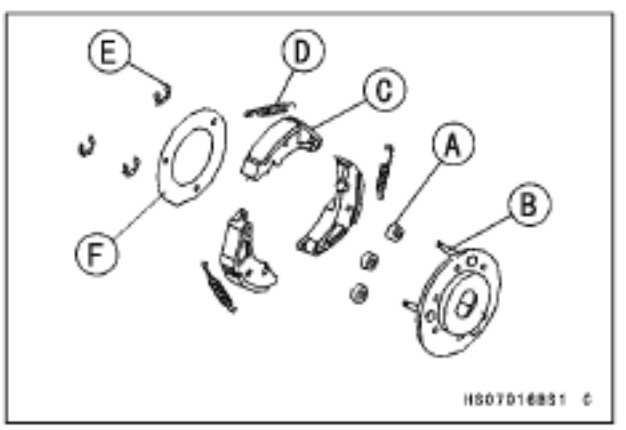


- Remove the clutch (see Clutch/Driven Pulley Disassembly).
- Remove the circlips [A] and retainer plate [B] to disassembly the clutch.

NOTE

○*Keep grease off the clutch linings [C].*

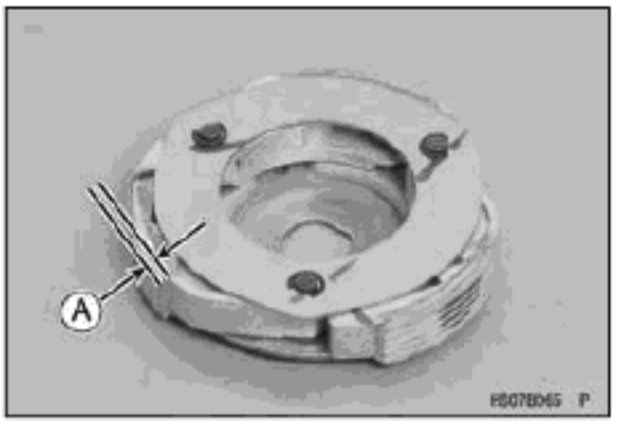
Clutch Assembly



- Install the damper rubbers [A] on the drive plate pins [B].
- Install the clutch weights/shoes [C] and clutch springs [D].
- Replace the circlips [E] with new ones.
- Install the retainer plate [F], and install the new circlips in the grooves of the drive plate pins.

Clutch/Driven Pulley

Clutch Inspection



- Check the clutch shoes for damage.

★If there is any damaged part, replace it.

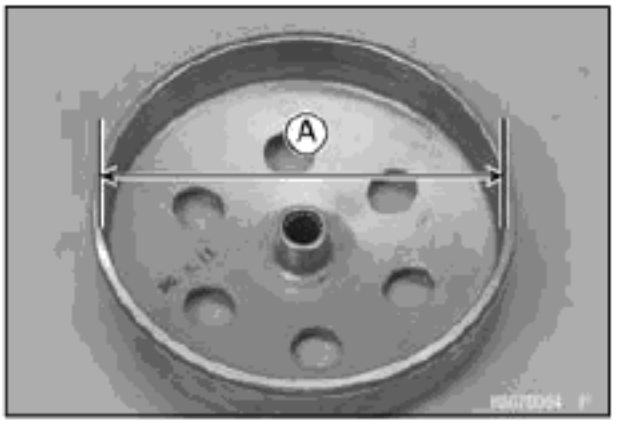
- Measure the clutch lining thickness [A].

★If the lining thickness is worn over the service limit, replace the clutch shoe.

Clutch Lining Thickness

Standard: 0.8 ~ 1.0 mm (0.031 ~ 0.039 in.)

Service Limit: 0.3 mm (0.012 in.)



- Inspect the clutch outer for damage.

★If there is any damaged part, replace it.

- Measure the clutch outer inside diameter [A].

★If the clutch outer is worn over the service limit, replace it.

Clutch Outer Inside Diameter

Standard: 152.1 ~ 152.2 mm (5.988 ~ 5.992 in.)

Service Limit: 152.6 mm (6.008 in.)

Recoil Starter

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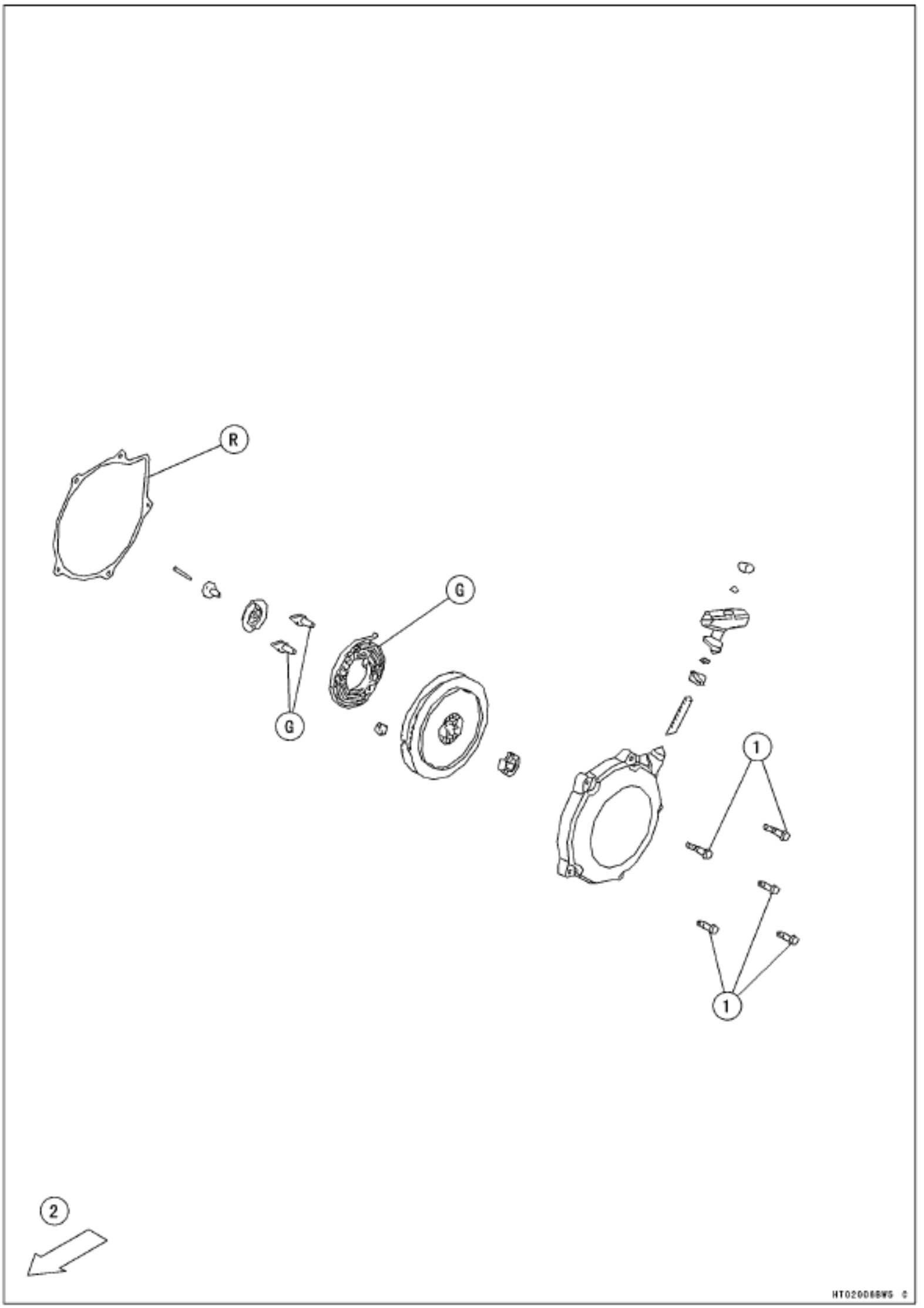
Exploded View (Other than EUR Model)



Exploded View (Other than EUR Model)

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Recoil Starter Mounting Bolts	9.8	1.0	87 in·lb	

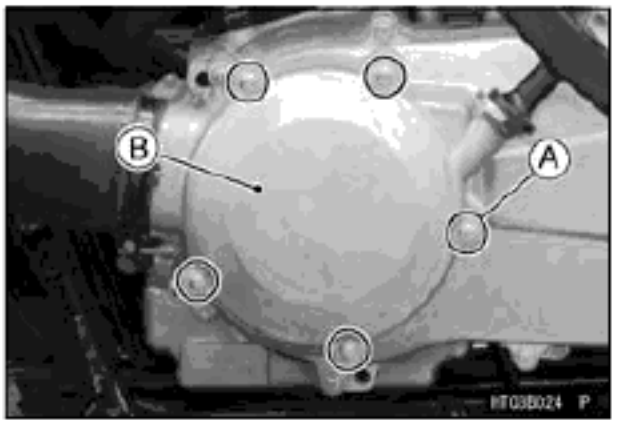
2. Front
G: Apply grease.
R: Replacement Parts

7-4 RECOIL STARTER

Recoil Starter (Other than EUR Model)

Recoil Starter Removal

- Remove:
  Left Footboard (see Left Footboard Removal in the Frame chapter)
  Recoil Starter Mounting Bolts [A]
  Recoil Starter [B]



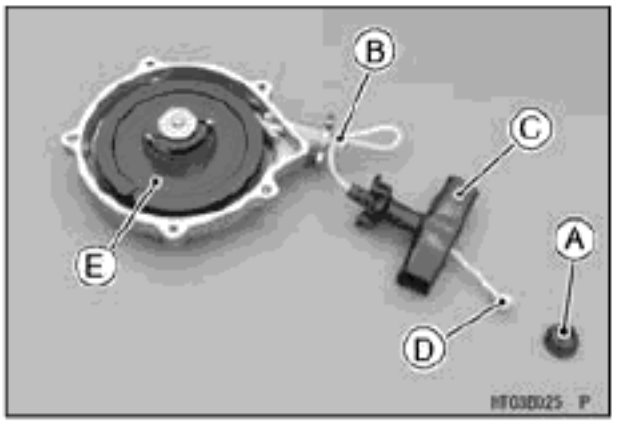
Recoil Starter Installation

- Tighten the recoil starter mounting bolts.

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

Recoil Starter Disassembly

- Remove the recoil starter (see Recoil Starter Removal).
- Remove the starter grip plug [A].
- Pull out the rope end about 100 ~ 200 mm (4.0 ~ 8.0 in.) and make a temporary knot [B] at that point.
- Pull out the rope end from the starter grip [C] and untie the knot [D] at the rope end to remove the starter grip.
- Holding the reel [E] with hand, untie the temporary knot.

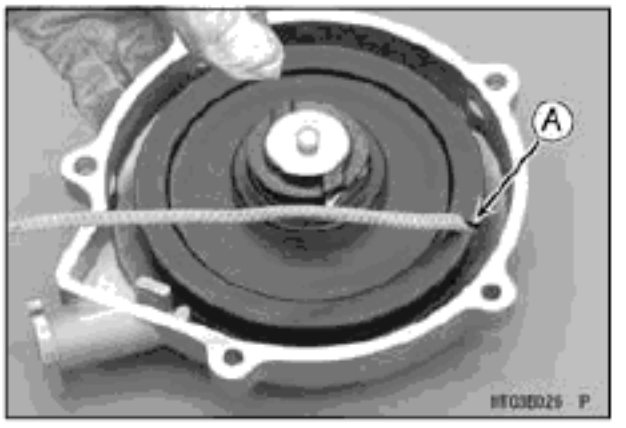


- Pull the rope in through the rope hole in the housing and hold it in the notch [A] in the reel.

NOTE

○*Do not let the rope wedge between the reel and the housing.*

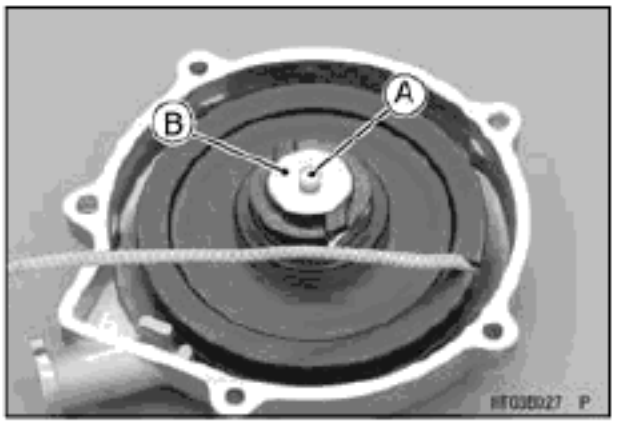
- Slowly allow recoil spring tension to unwind the reel.



- Remove:
  Bolt [A]
  Friction Plate [B]

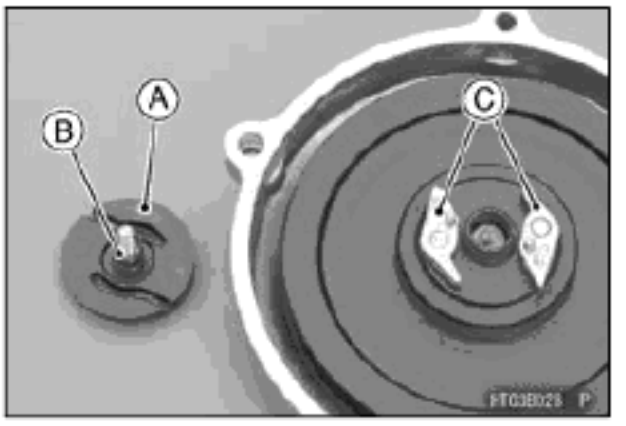
⚠WARNING

The recoil spring is under great tension and can travel at high speed if it comes loose and cause injury. To prevent the spring from coming loose during disassembly, turn the reel one-quarter turn counterclockwise past the rest position where no tension can be felt, then slowly lift the friction plate straight up out of the housing.



Recoil Starter (Other than EUR Model)

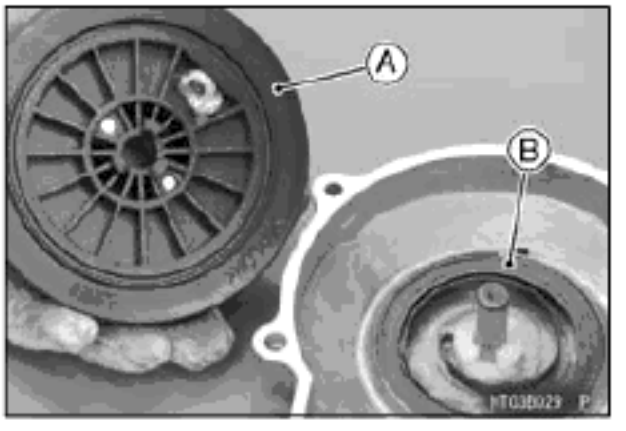
- Remove:
  Recoil Guide [A]
  Friction Plate Spring [B]
  Pawls [C]



- Remove the reel [A] noting the following.

⚠ WARNING

The recoil spring [B] is still under great tension and can travel at high speed if it comes loose and cause injury. To prevent the spring from coming loose during disassembly, turn the reel one-quarter turn counterclockwise past the rest position where no tension can be felt, then slowly lift the reel straight up out of the housing.



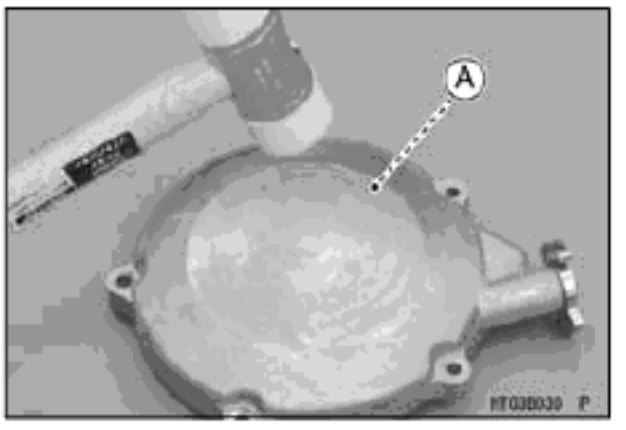
NOTE

○*There should be no spring tension on the reel when removing the reel. Lift the reel slightly. If tension is felt, push the reel back into place and gently "wiggle" it until the reel may be easily removed.*

- If necessary, remove the recoil spring [A] as follows:

○Place the starter housing facing down on a bench.

○Strike the starter housing with a rubber mallet so safely remove the spring.

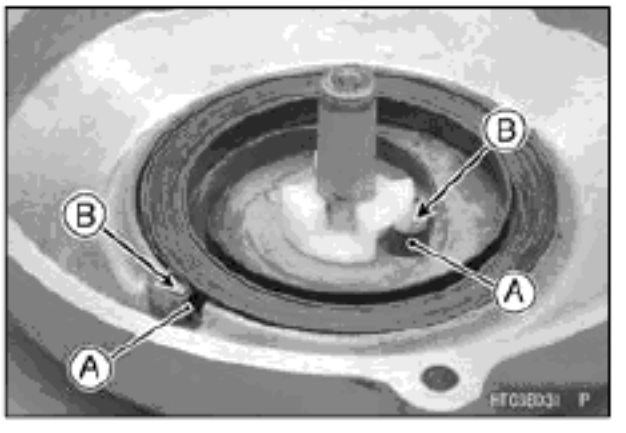


Recoil Starter Assembly

- If the recoil spring was removed, install it as shown. If it is not installed correctly, the starter will not operate properly.

⚠ WARNING

The recoil spring is under great tension and can travel at high speed if it comes loose and cause injury or pinch fingers. Wear gloves during reassembly to avoid injury.



- Hook the outer ends [A] of the recoil spring onto the dents [B].

Reel the recoil spring clockwise into the housing from outside to inside.

NOTE

○*Push the recoil spring against the housing securely to prevent the spring from slipping off during installation.*

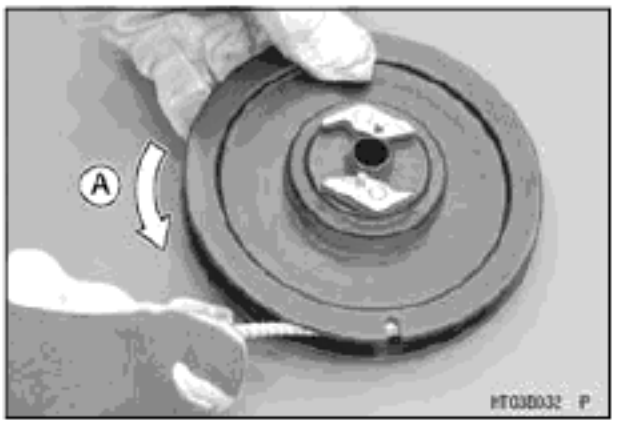
- Lightly grease the spring.

Recoil Starter (Other than EUR Model)

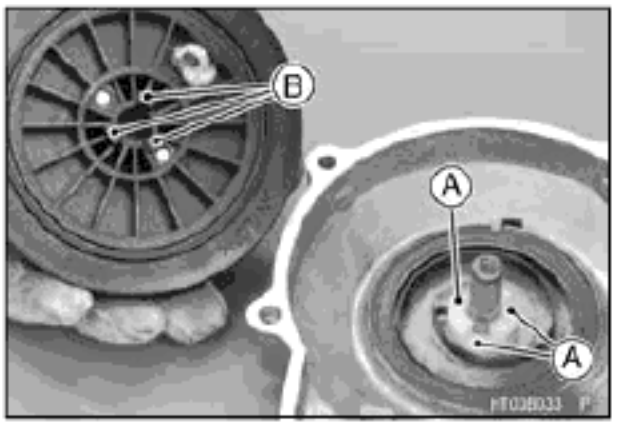
- If the rope was unwound from the reel, it must be wound clockwise for correct starter operation.
- Wind the rope around the smaller diameter of the reel.

NOTE

○*Turn the reel counterclockwise [A] to wind the rope clockwise. This prevents the rope from twisting.*

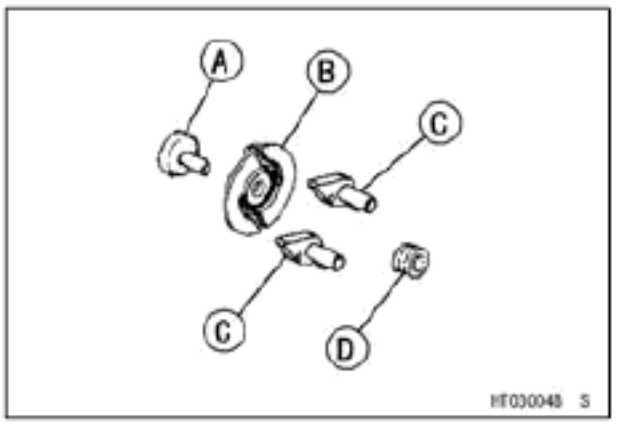


- Set the reel into the place so that the grooves [A] on the spring catch on the tabs [B] in the reel.

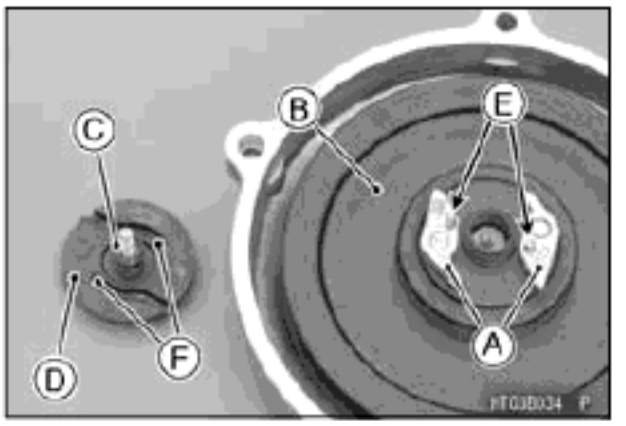


- Install:
  Friction Plate [A]
  Recoil Guide [B]
  Pawls [C]
  Friction Plate Spring [D]

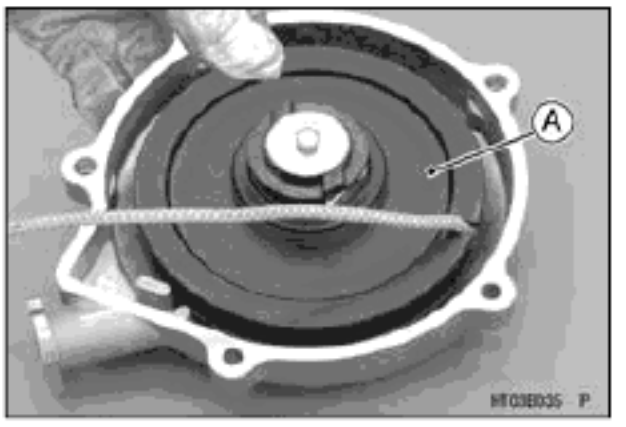
○Apply grease to the tabs of the pawls.



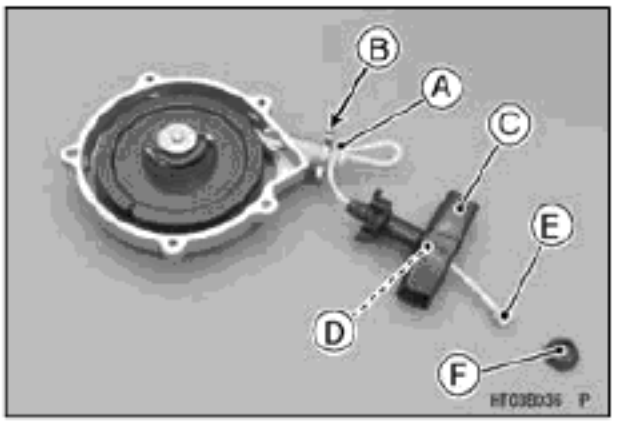
- Install the pawls [A] to the reel [B] as shown for proper starter operation.
- Install the spring [C] to the recoil guide [D]. Set the tabs [E] of the pawl to fit the grooves [F] of the recoil guide.
- Install:
  Friction Plate
  Bolt



- Turn the reel [A] **1 1/4 turns clockwise** to preload the spring.



Recoil Starter (Other than EUR Model)



- While holding the reel to keep it from unwinding, pull the end of the rope through the hole in the starter case.
- Pull out the rope about 100 ~ 200 mm (4.0 ~ 8.0 in.) and make a temporary knot [A] at that point.
- Wind back the reel slowly until the temporary knot returns to rope guide [B].
- Install the starter grip [C] and washer [D], and secure it with a knot [E].
- Install the starter grip plug [F].

- Holding the starter housing, untie the temporary knot.
- Check that the rope is wound smoothly by pulling the starter grip.
- Check that the real operates smoothly by pulling the starter grip.
- Install the recoil starter (see Recoil Starter Installation).

Recoil Starter Cleaning

- Disassemble the recoil starter.
- Immerse only the metal parts in a bath of high-flash point solvent.

⚠ WARNING

Gasoline and low-flash point solvents can be flammable and/or explosive and cause severe burns. Clean the starter in a well-ventilated area, and take care that there is no spark or flame anywhere near the working areas. Do not use gasoline or low-flash point solvents to clean the starter.

NOTICE

Do not clean any non-metallic parts in the solvent as they may be damaged.

○Use compressed air to dry the cleaned components.

Recoil Starter Inspection

- Clean the recoil starter.
- Examine the starter pawl for chips or excessive wear.
- Check the starter rope for excessive wear or fraying.
- Check the condition of the recoil spring, and friction plate spring.

○Inspect the springs for breaks, rust, distortion, or weakened condition.

Engine Lubrication System

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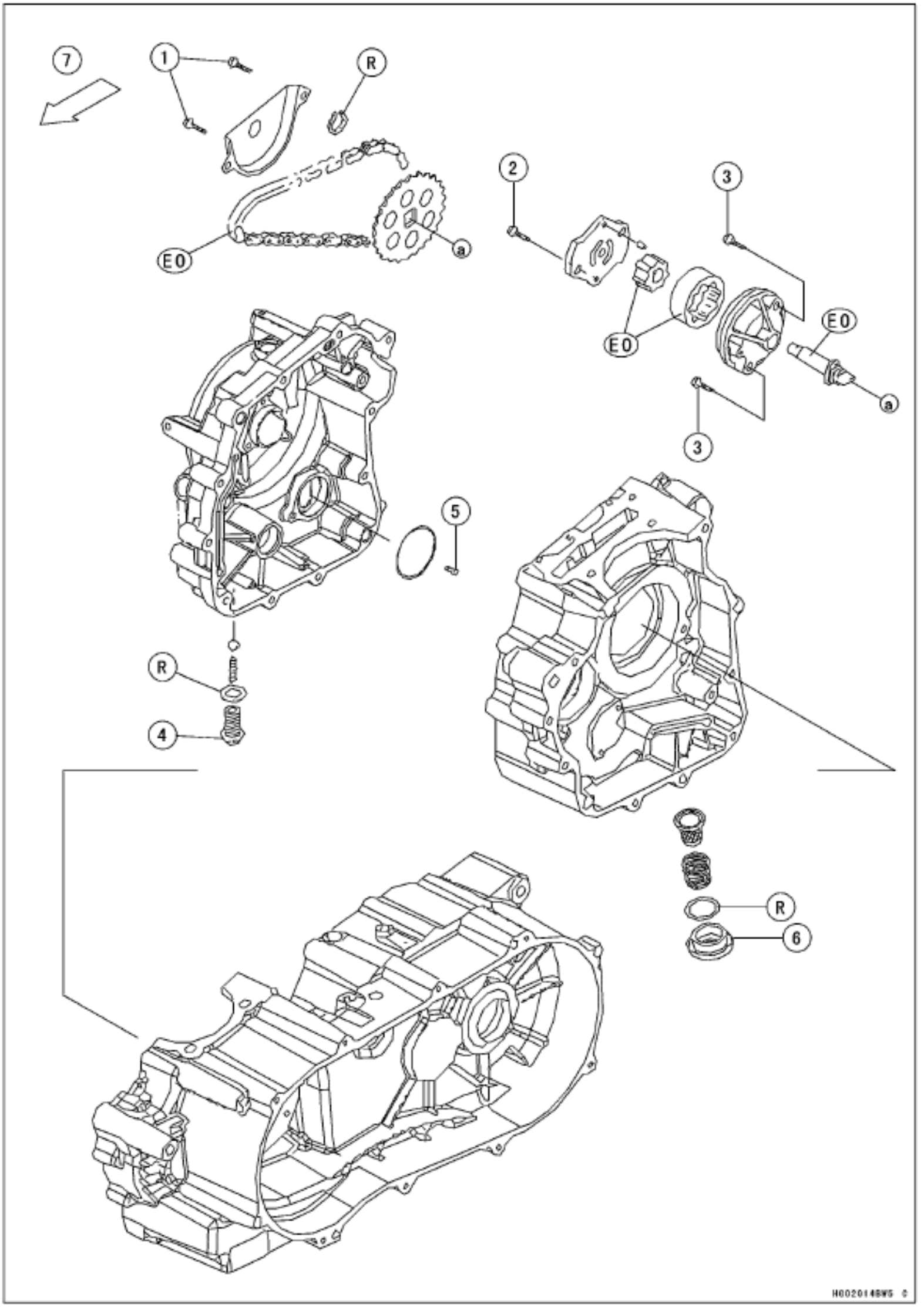
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Oil Pump Chain Cover Bolts	9.8	1.0	87 in·lb	
2	Oil Pump Cover Screw	2.0	0.20	18 in·lb	
3	Oil Pump Mounting Bolts	9.8	1.0	87 in·lb	
4	Engine Oil Drain Plug	25	2.5	18	
5	Engine Oil Level Inspection Window Retainer Bolt	9.8	1.0	87 in·lb	
6	Engine Oil Screen Plug	15	1.5	11	

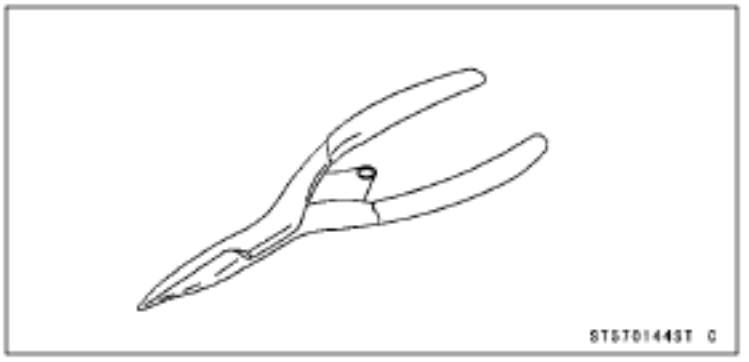
7. Front
EO: Apply engine oil.
R: Replacement Parts

Specifications

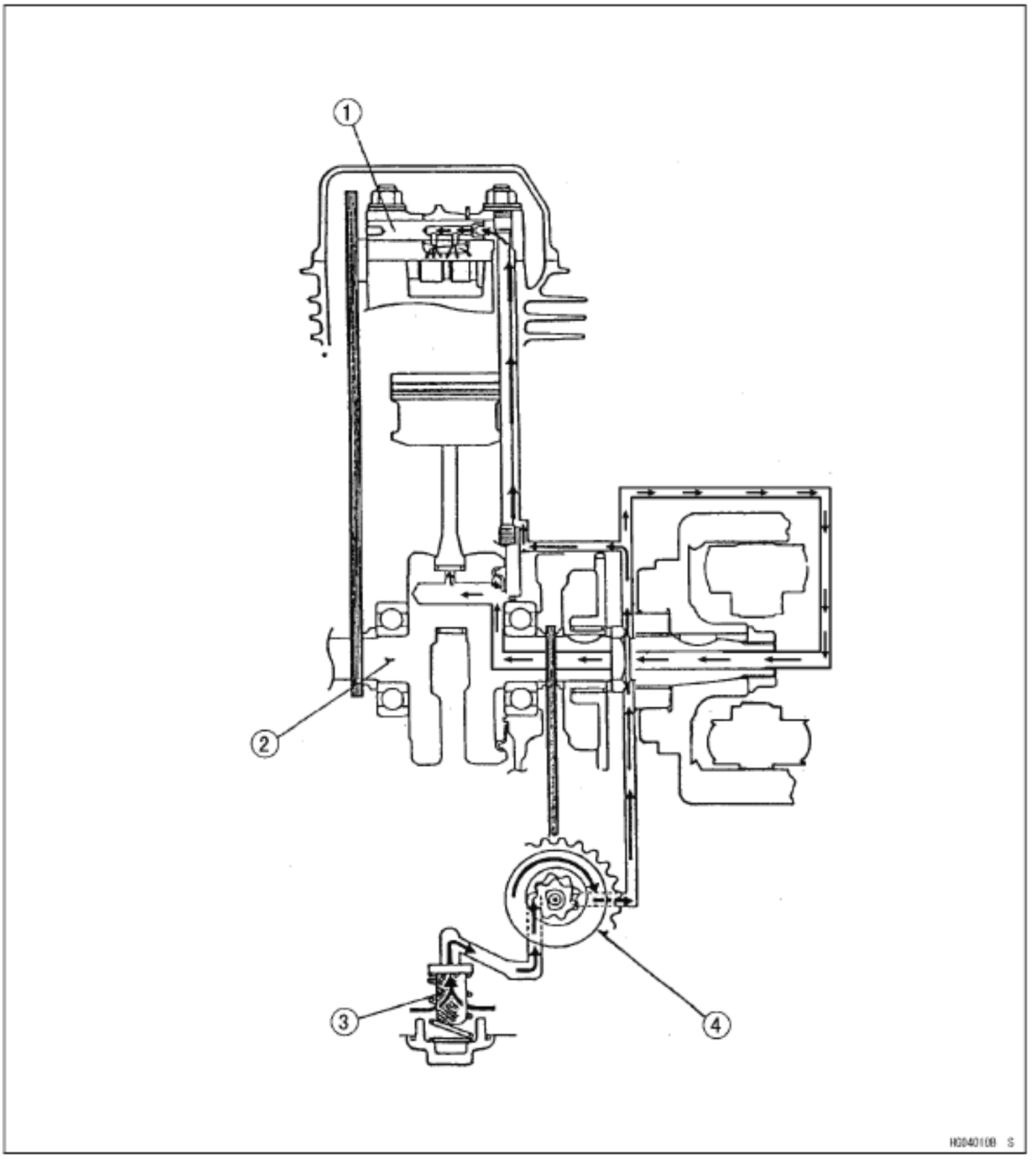
Item	Standard	Service Limit
Engine Oil		
Type	API SG, SH, SJ, SL or SM with JASO MA, MA1 or MA2	– – –
Viscosity	SAE 10W-40	– – –
Capacity	1.6 L (1.7 US qt)	– – –
	1.8 L (1.9 US qt) (when engine is completely dry)	– – –
Oil Level (after warm-up or driving)	Between upper and lower level lines	– – –
Oil Pump		
Inner Rotor/Outer Rotor Clearance	0.05 ~ 0.15 mm (0.002 ~ 0.006 in.)	0.15 mm (0.006 in.) or more
Outer Rotor/Pump Body Clearance	0.05 ~ 0.10 mm (0.002 ~ 0.004 in.)	0.10 mm (0.004 in.) or more
Rotor End/Pump Body Clearance	0.05 ~ 0.10 mm (0.002 ~ 0.004 in.)	0.10 mm (0.004 in.) or more

Special Tool

Outside Circlip Pliers:
57001-144



Engine Oil Flow Chart



1. Rocker Arm Shaft
2. Crankshaft
3. Oil Screen
4. Oil Pump

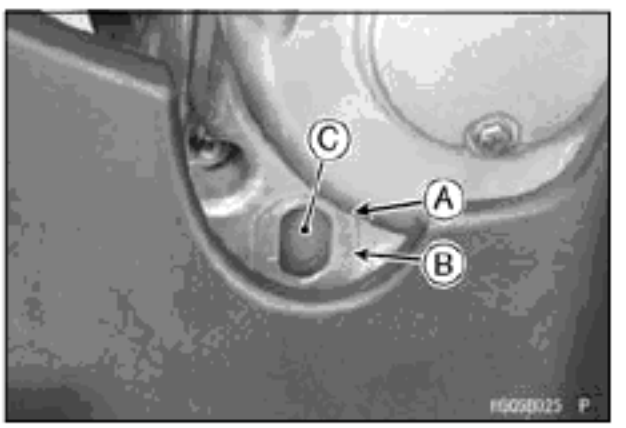
Engine Oil and Oil Filter

⚠ WARNING

Vehicle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated wear and may result in engine seizure, accident, and injury. Check the oil level before each use and change the oil and filter according to the periodic maintenance chart.

Oil Level Inspection

- Park the vehicle so that it is level, both side-to-side and front-to-rear.
- Check that the engine oil level is between the H mark line [A] and L mark line [B] lines in the oil level inspection window [C].



NOTE

○*If the oil has just been changed, start the engine and run it for several minutes at idle speed. Stop the engine, then wait several minutes until the oil settles.*

NOTICE

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

★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.

NOTE

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

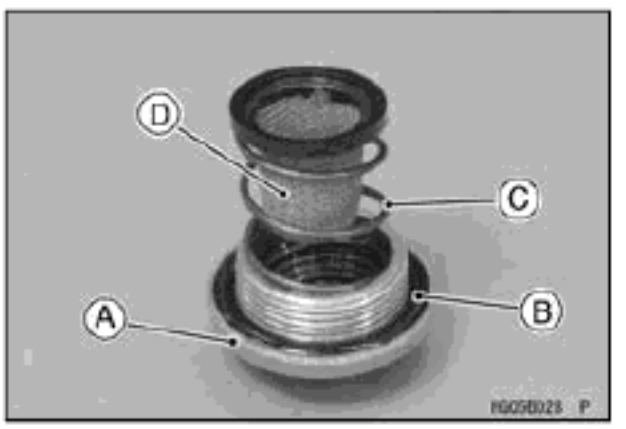
Engine Oil Change

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

Engine Oil and Oil Filter

Oil Screen Removal

- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove:
  Engine Oil Screen Plug [A] and O-ring [B]
  Spring [C]
  Oil Screen [D]



Oil Screen Installation

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

○Replace the O-ring with a new one.

Torque - Engine Oil Screen Plug: 15 N·m (1.5 kgf·m, 11 ft·lb)

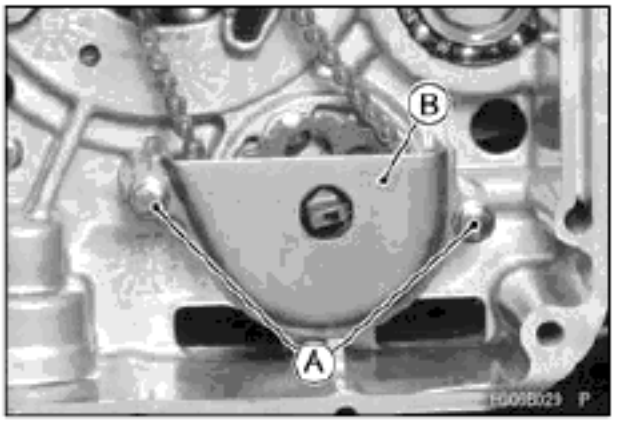
Oil Screen Cleaning

- Refer to the Oil Screen Cleaning in the Periodic Maintenance chapter.

Oil Pump

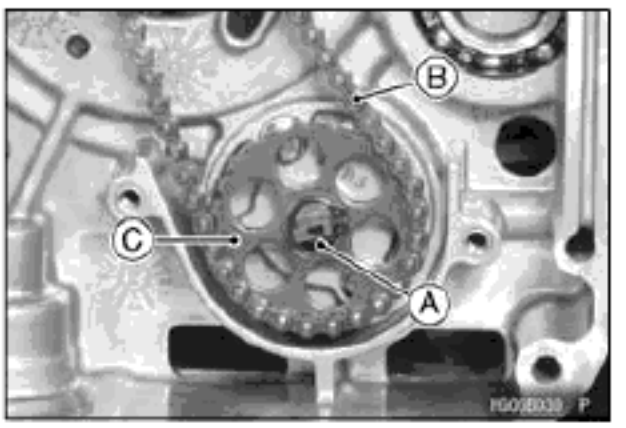
Oil Pump Removal

- Remove:
  Alternator Rotor (see Alternator Rotor Removal in the Electrical System chapter)
  Starter Motor Clutch Gear
  Oil Pump Chain Cover Bolts [A]
  Oil Pump Chain Cover [B]

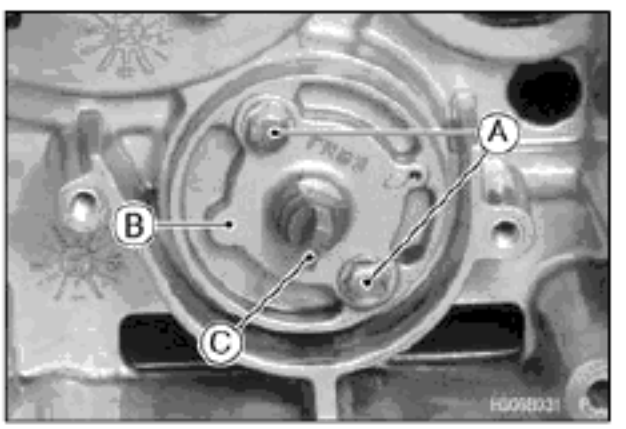


- Remove:
  Circlip [A]
  Oil Pump Chain [B] together with Oil Pump Gear [C]

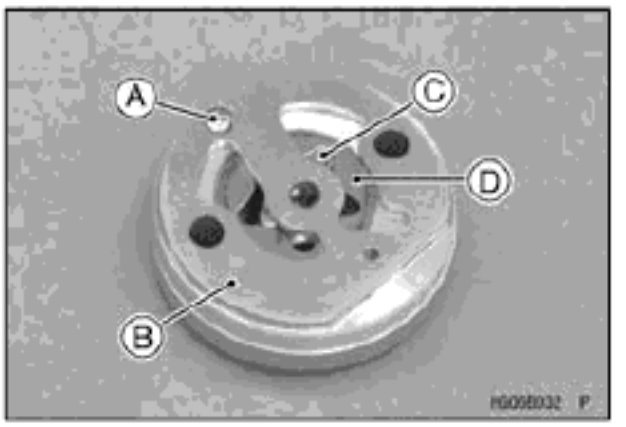
Special Tool - Outside Circlip Pliers: 57001-144



- Remove:
  Oil Pump Mounting Bolts [A]
  Oil Pump Assembly [B]
  Oil Pump Shaft [C]



- Remove:
  Oil Pump Cover Screw [A]
  Oil Pump Cover [B]
  Inner Rotor [C]
  Outer Rotor [D]

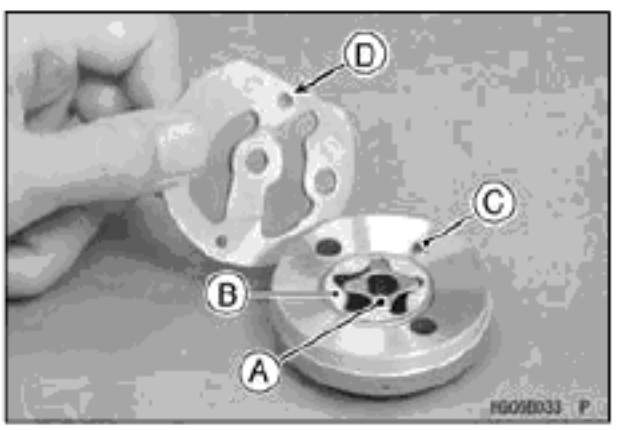


Oil Pump Installation

- Apply engine oil to the following parts.
  Oil Pump Shaft
  Inner [A] and Outer [B] Rotors
- Install:
  Inner Rotor
  Outer Rotor
- Check to see that the dowel pin [C] is in place.
- Install the pump cover by aligning the hole [D] in the cover with the dowel pin.
- Tighten the screw.

Torque - Oil Pump Cover Screw: 2.0 N·m (0.20 kgf·m, 18 in·lb)

- Install the oil pump shaft.

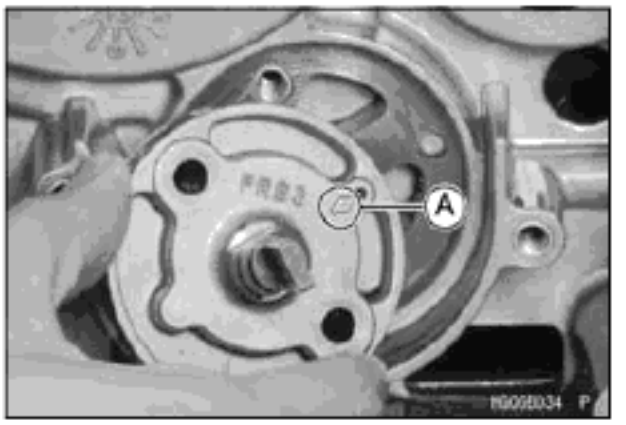


Oil Pump

- Fill the oil pump with engine oil.
- Install the oil pump assembly so that the arrow mark [A] faces upward.
- Tighten the mounting bolts.

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

- Check that the oil pump shaft turn freely.

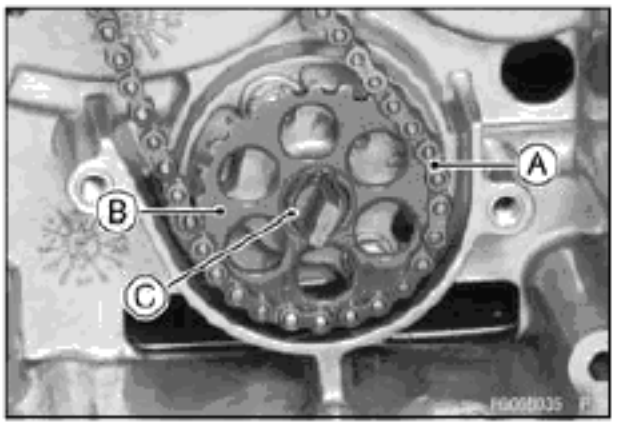


- Replace the circlip with a new one.
- Install:
  Oil Pump Chain [A] and Oil Pump Gear [B]
  New Circlip [C]

Special Tool - Outside Circlip Pliers: 57001-144

- Install the oil pump chain cover and tighten the cover bolts.

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



Oil Pump Inspection

- Remove the oil pump (see Oil Pump Removal).
- Visually inspect the pump gear, outer and inner rotor, and pump cover.

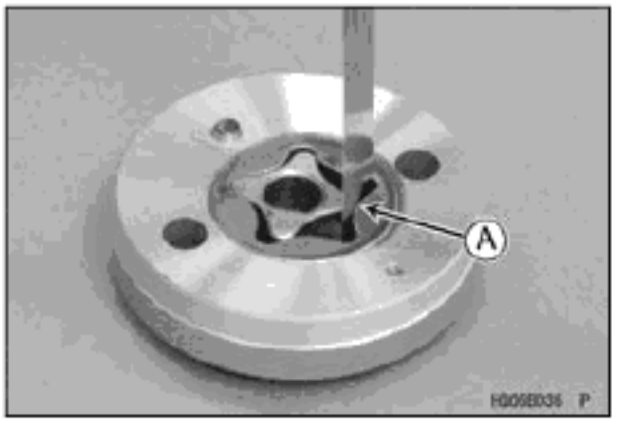
★If there is any damage or uneven wear, replace them.

○Check the clearance [A] between the inner and outer rotor with a thickness gauge. Measure the clearance between the high point of the inner rotor and the high point of the outer rotor.

★If the measurement exceed the service limit, replace the rotors as a set.

Inner Rotor/Outer Rotor Clearance

Standard:	**0.05 ~ 0.15 mm (0.002 ~ 0.006 in.)**
Service Limit:	**0.15 mm (0.006 in.) or more**

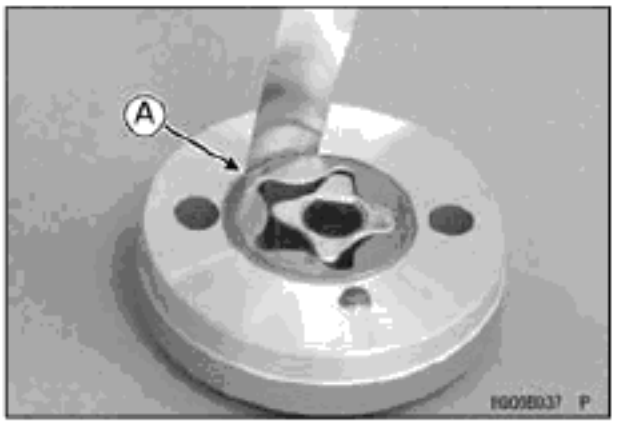


○Check the clearance [A] between the outer rotor and pump body with a thickness gauge.

★If the measurement exceed the service limit, replace the oil pump body and rotors as a set.

Outer Rotor/Pump Body Clearance

Standard:	**0.05 ~ 0.10 mm (0.002 ~ 0.004 in.)**
Service Limit:	**0.10 mm (0.004 in.) or more**



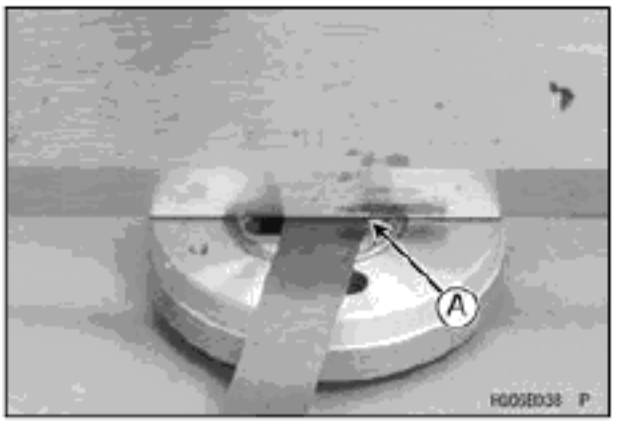
Oil Pump

○Check the clearance [A] between rotor end and pump body with a thickness gauge.

★If the measurement exceed the service limit, replace the oil pump body and rotors as a set.

Rotor End/Pump Body Clearance

Standard:	**0.05 ~ 0.10 mm (0.002 ~ 0.004 in.)**
Service Limit:	**0.10 mm (0.004 in.) or more**



Engine Removal/Installation

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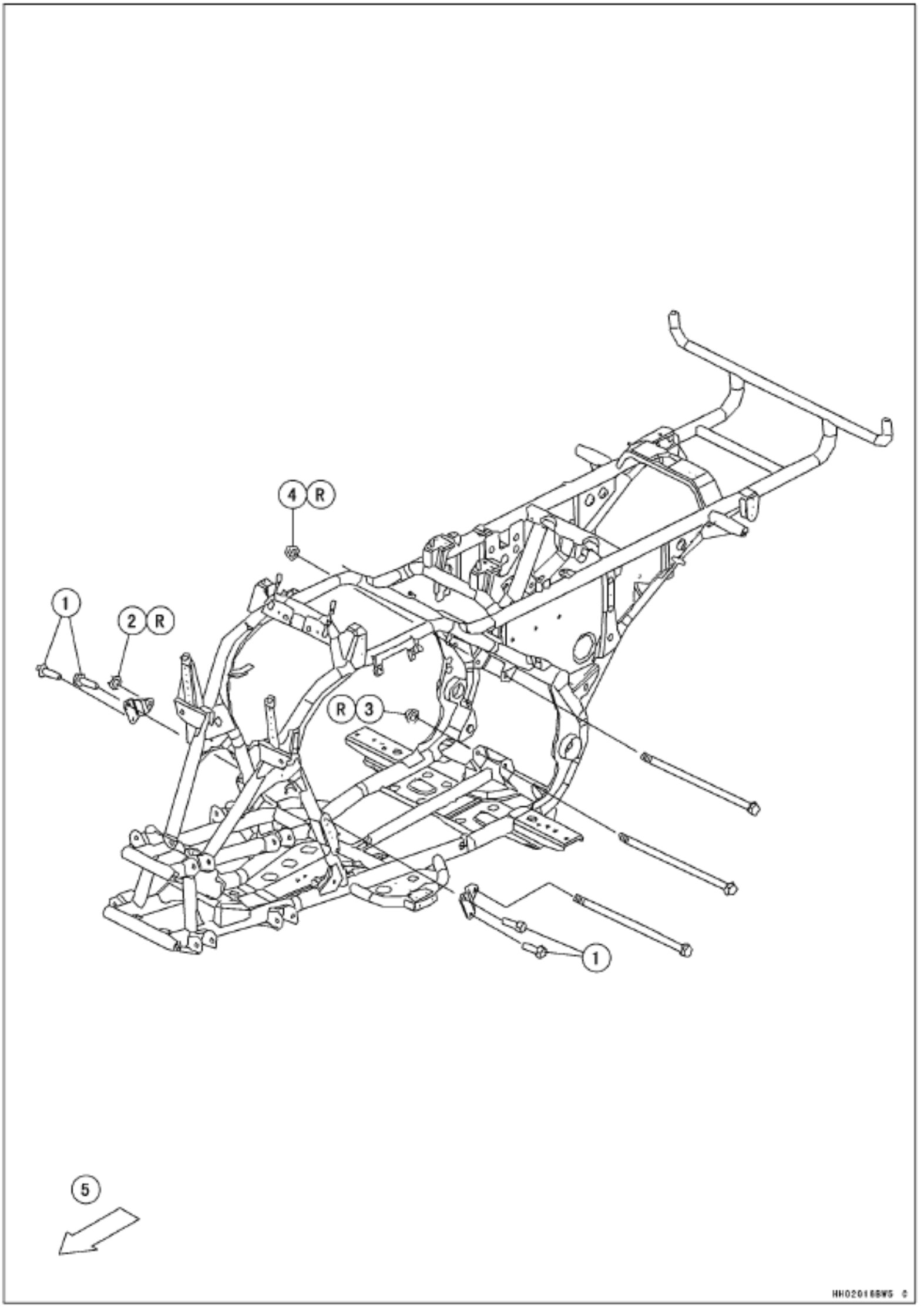
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine Bracket Mounting Bolts	26	2.7	19	
2	Front Engine Mounting Nut	39	4.0	29	R
3	Lower Engine Mounting Nut	39	4.0	29	R
4	Upper Engine Mounting Nut	39	4.0	29	R

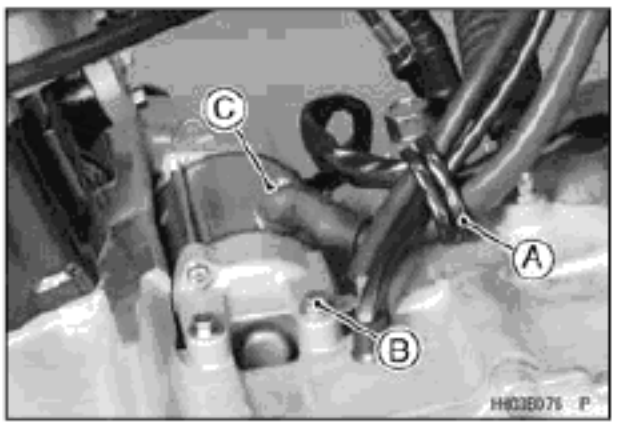
5. Front
R: Replacement Parts

Engine Removal/Installation

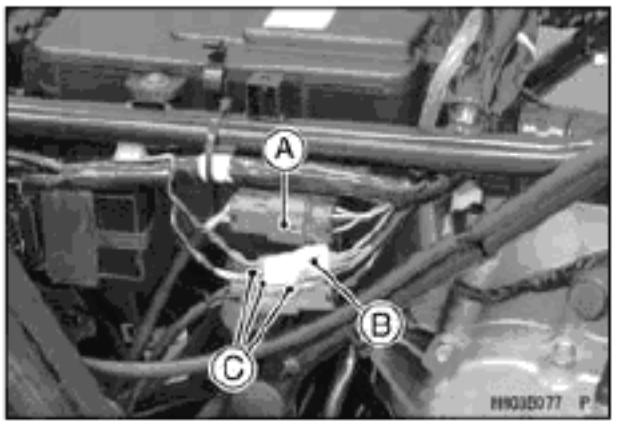
Engine Removal

- Remove:
  Engine Oil (Drain, see Engine Oil Change in the Periodic Maintenance chapter)
  Coolant (Drain, see Coolant Change in the Periodic Maintenance chapter)
  Footboards (see Left/Right Footboard Removal in the Frame chapter)
  Front Fender (see Front Fender Removal in the Frame chapter)
  Torque Converter Exhaust Duct (see Torque Converter Cover Removal in the Converter System chapter)
  Exhaust Pipe (see Exhaust Pipe Removal in the Engine Top End chapter)
  Ignition Coil (see Ignition Coil Removal in the Electrical System chapter)
  Carburetor (see Carburetor Removal in the Fuel System chapter)
  Vacuum Switch Valve (see Vacuum Switch Valve Removal in the Engine Top End chapter)
  Air Cleaner Intake Duct and Breather Hose (see Air Cleaner Housing Removal in the Fuel System chapter)

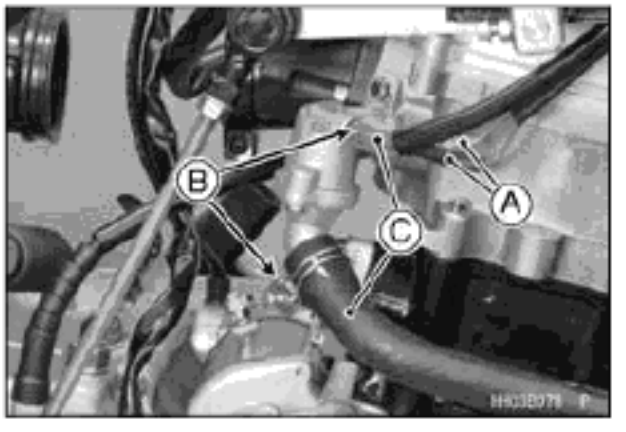
- Remove:
  Clamp [A]
  Engine Ground Terminal [B]
  Starter Motor Cable Nut [C]



- Disconnect:
  Alternator Lead Connector [A]
  Crankshaft Sensor Lead Connector [B]
  Gear Position Switch Lead Connectors [C]

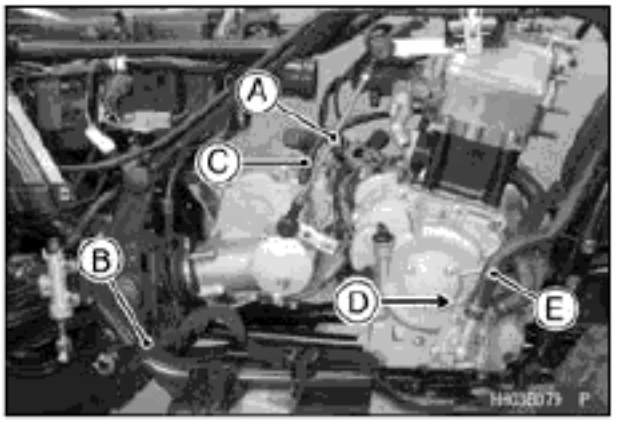


- Remove:
  Water Temperature Sensor Connectors [A]
  Clamps [B]
  Water Hoses [C]

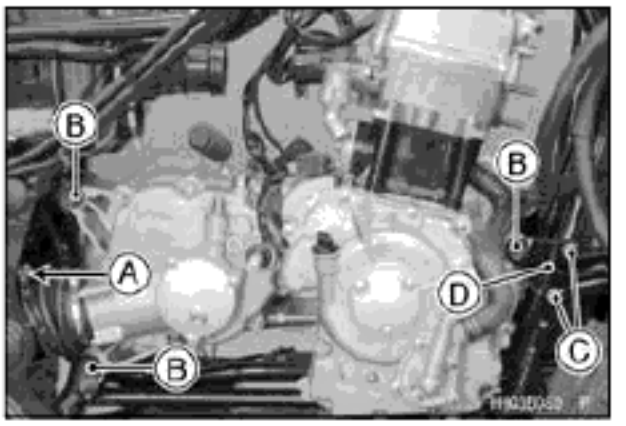


Engine Removal/Installation

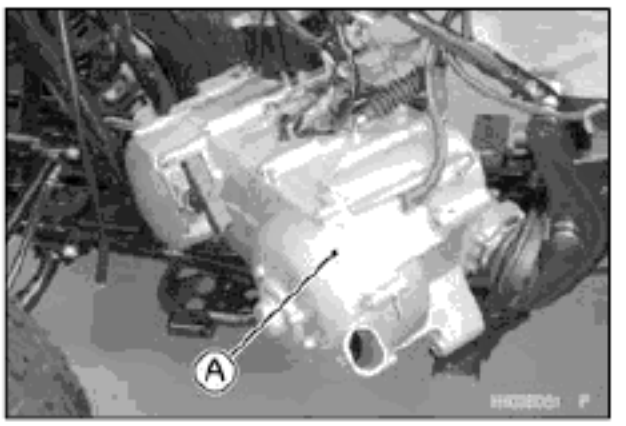
- Remove:
  Shift Shaft Lever [A] (see Shift Lever Removal in the Crankshaft/Transmission chapter)
  Brake Pedal [B] (see Brake Pedal Removal in the Brakes chapter)
  Speedometer Cable [C]
  Clamp [D] (Loosen)
  Water Hose [E]



- Remove:
  Clamp Screw [A] (Loosen)
  Engine Mounting Nuts and Bolts [B]
  Engine Mounting Bracket Bolts [C] (Both Sides)
  Engine Mounting Brackets [D] (Both Sides)



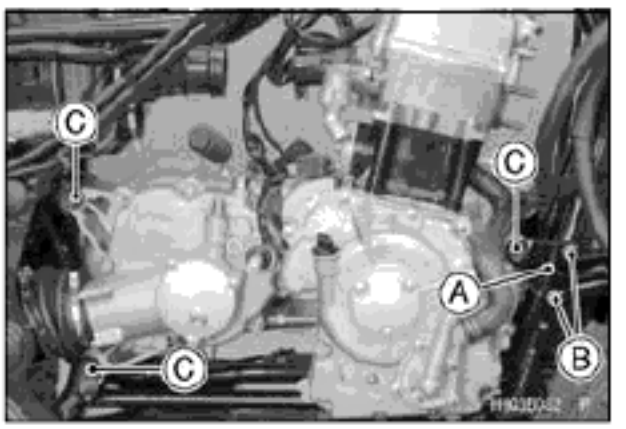
- Free the engine [A] from the propeller shaft and remove the engine as shown in the figure.



Engine Installation

- Apply molybdenum disulfide grease the splines at the driven gear shaft and front end of the propeller shaft.
- Support the vehicle so that the rear wheels are off the ground.
- Fit the driven gear shaft to the propeller shaft while rotating one rear wheel slowly.
- Replace the engine mounting nuts with new ones.
- Install:
  Engine Brackets [A] and Bolts [B] (Both Sides)
  Engine Mounting Bolts [C] and Nuts
- Tighten:

Torque - Engine Bracket Mounting Bolts: 26 N·m (2.7 kgf·m, 19 ft·lb)
Engine Mounting Nuts: 39 N·m (4.0 kgf·m, 29 ft·lb)



- Slide the boot on the swingarm securely and tighten the clamp screw.
- Run the hoses, cables and leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the removed parts (see appropriate chapters).

Crankshaft/Transmission

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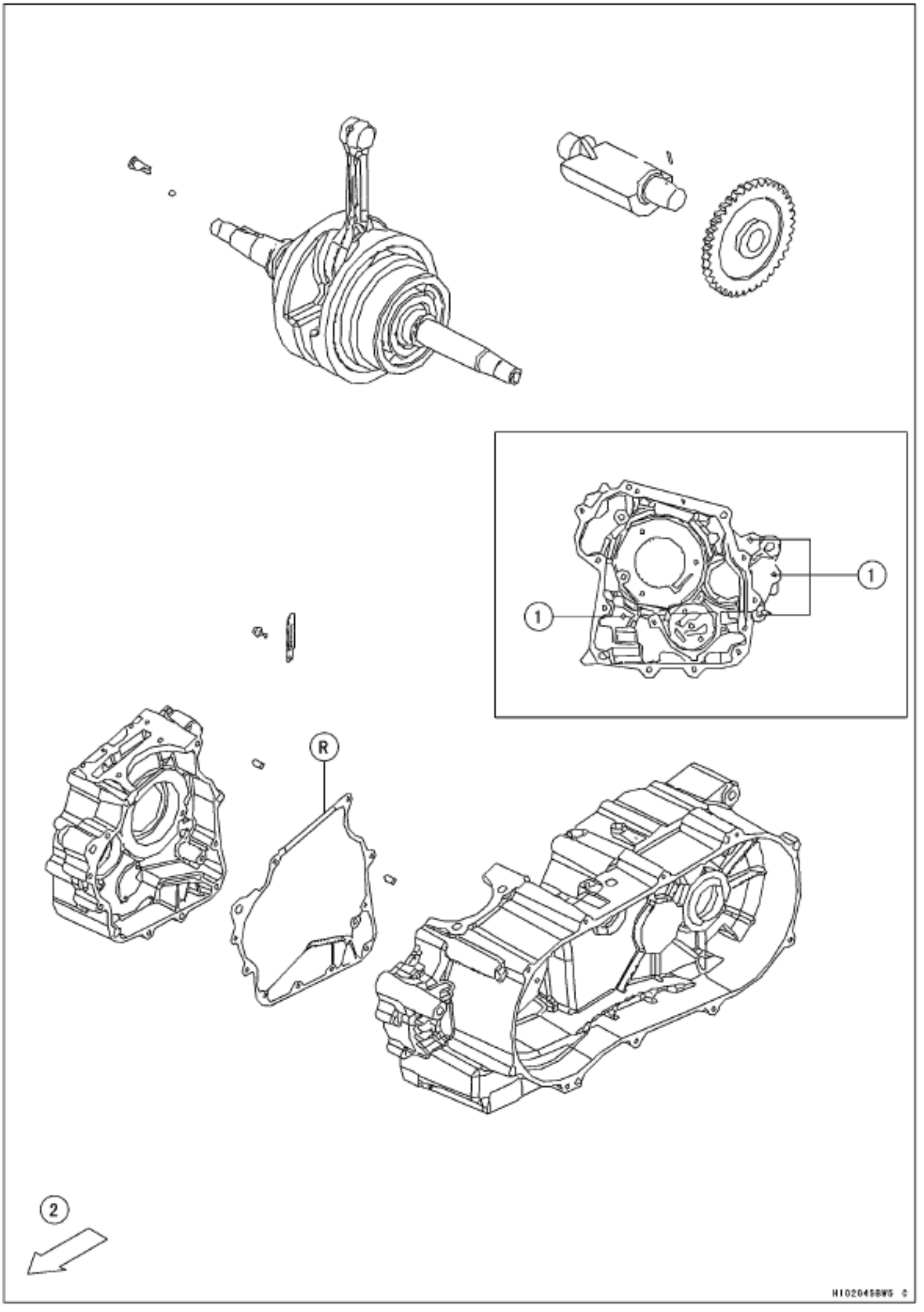
Exploded View

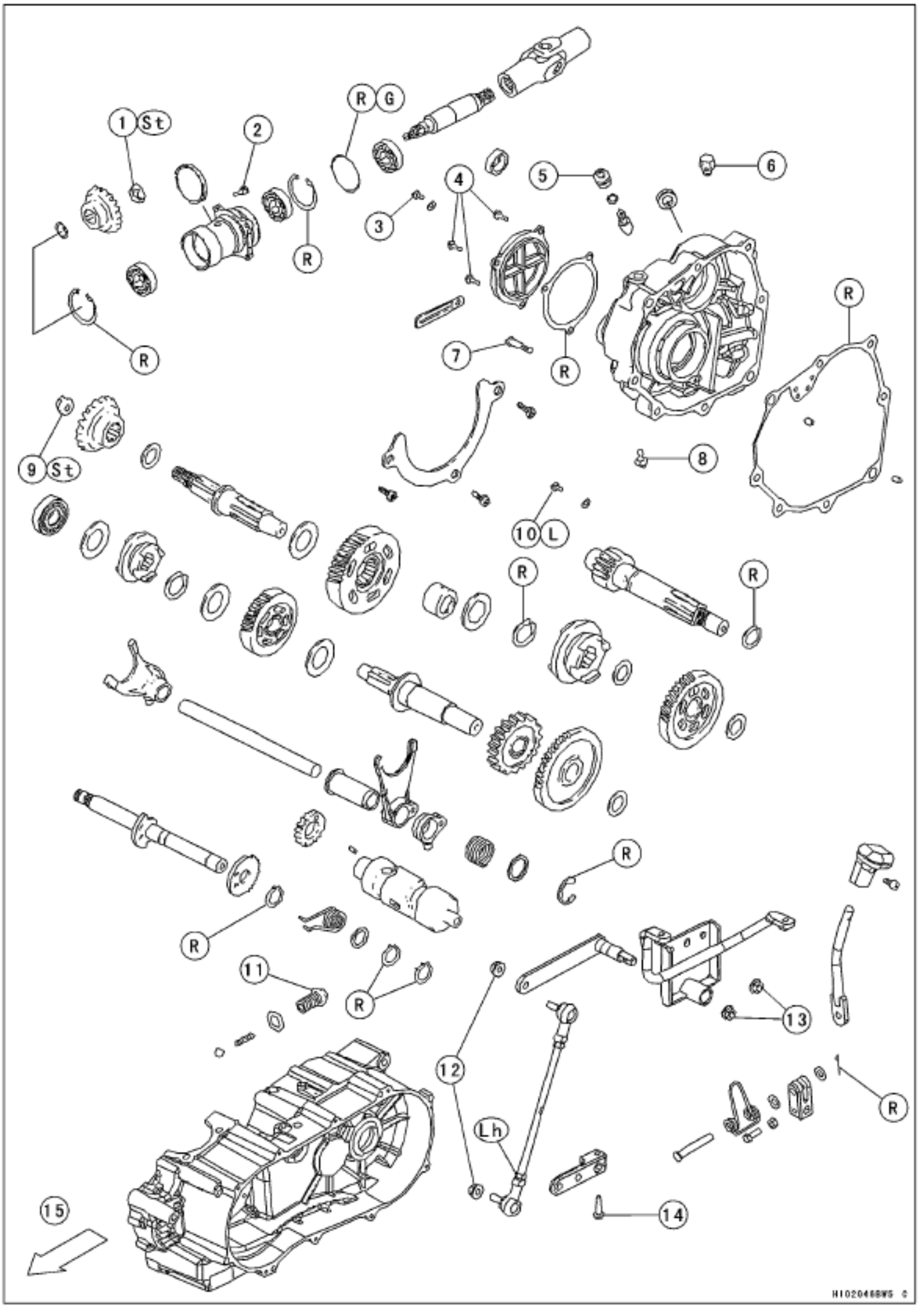


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Crankcase Bolts	9.8	1.0	87 in·lb	L

2. Front
R: Replacement Parts

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Output Driven Bevel Gear Nut	98	10	72	St
2	Output Driven Shaft Housing Bolts	9.8	1.0	87 in·lb	
3	Transmission Oil Level Inspection Bolt	9.8	1.0	87 in·lb	
4	Output Drive Bevel Gear Cover Bolts	9.8	1.0	87 in·lb	
5	Speedometer Cable Holder	9.8	1.0	87 in·lb	
6	Transmission Oil Filler Bolt	20	2.0	15	
7	Transmission Case Cover Bolts	26	2.7	19	
8	Transmission Oil Drain Plug	9.8	1.0	87 in·lb	
9	Output Drive Bevel Gear Nut	98	10	72	St
10	Driven Pulley Bearing Retainer Bolt	9.8	1.0	87 in·lb	L
11	Shift Drum Stopper Plug	47	4.8	35	
12	Tie-Rod End Nuts	26	2.7	19	
13	Shift Bracket Nuts	20	2.0	15	
14	Shift Lever Clamp Bolt	9.8	1.0	87 in·lb	

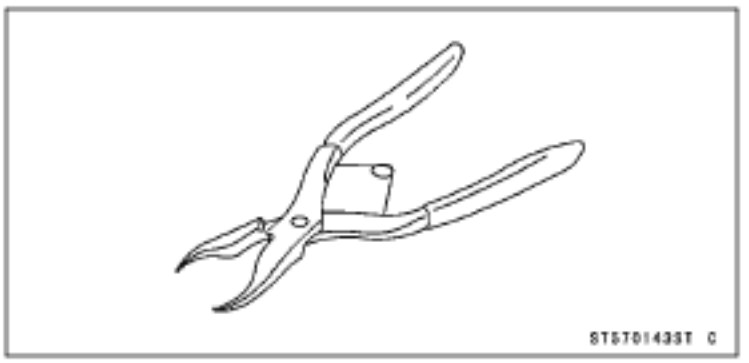
15. Front
G: Apply grease.
L: Apply a non-permanent locking agent.
Lh: Left-hand Threads
R: Replacement Part
St: Stake the fasteners to prevent loosening.

Specifications

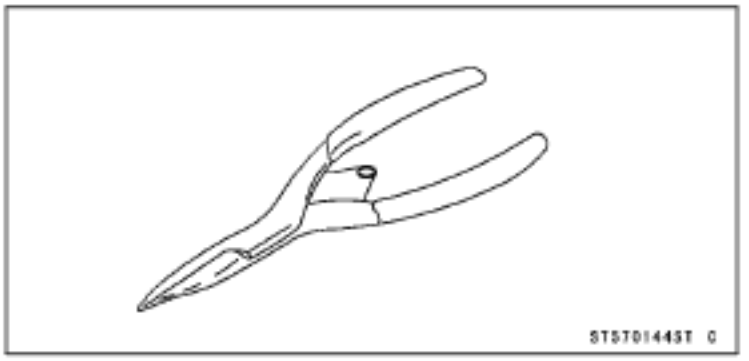
Item	Standard	Service Limit
Crankshaft		
Crankshaft Runout	– – –	0.1 mm (0.004 in.)
Connecting Rod Small End Diameter	– – –	17.06 mm (0.672 in.)
Connecting Rod Small End Free Play	0.8 ~ 1.0 mm (0.03 ~ 0.04 in.)	– – –
Connecting Rod Big End Side Clearance	– – –	0.6 mm (0.024 in.)
Crank Width	55.15 ~ 55.20 mm (2.171 ~ 2.173 in.)	– – –
Crankshaft Bearing Play:		
Axial	– – –	0.2 mm (0.008 in.)
Redial	– – –	0.05 mm (0.002 in.)
Transmission Oil		
Viscosity	SAE#90	– – –
Oil Level	Inspection Bolt Opening Bottom	– – –
Capacity	0.6 L (0.63 US qt)	– – –
Transmission		
Shift Fork Rod Runout	– – –	Less than 0.03 mm (0.0012 in.)
Driven Bevel Gear Backlash	0.03 ~ 0.15 mm (0.0012 ~ 0.059 in.)	– – –

Special Tools

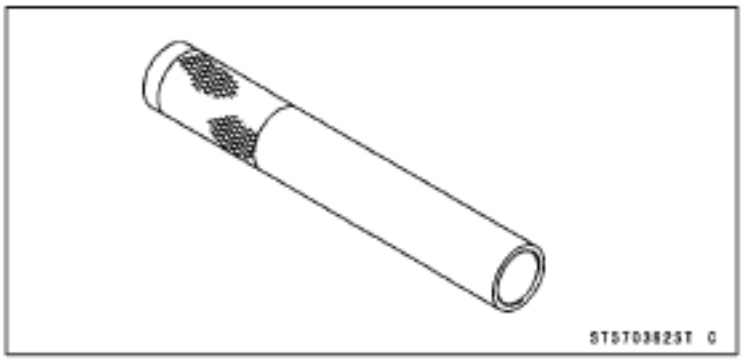
Inside Circlip Pliers:
57001-143



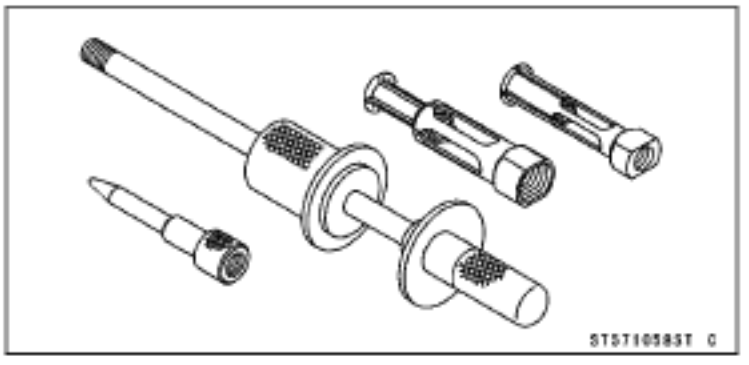
Outside Circlip Pliers:
57001-144



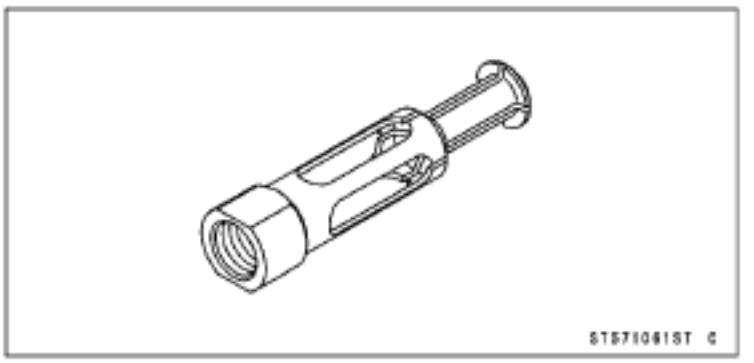
Bearing Driver, ϕ32:
57001-382



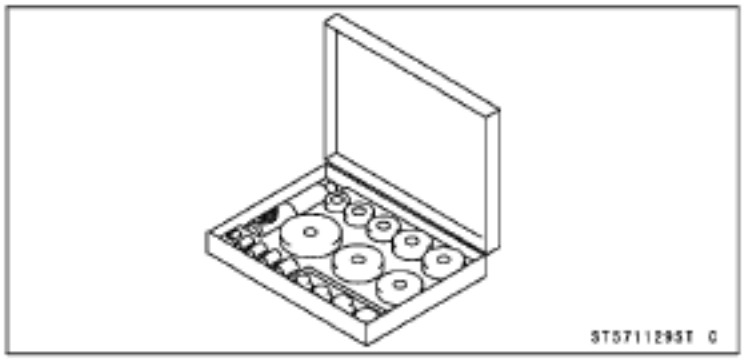
Oil Seal & Bearing Remover:
57001-1058



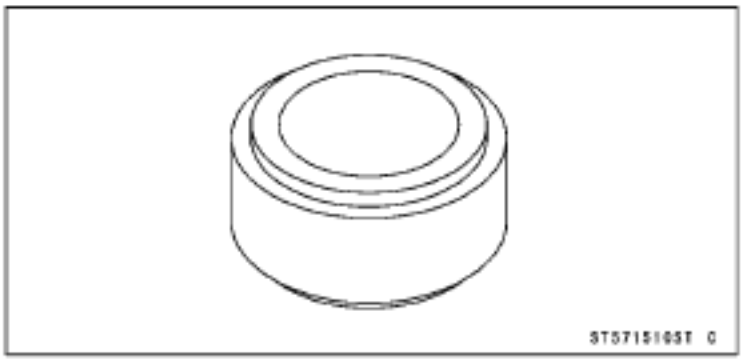
Oil Seal & Bearing Remover, Adapter A:
57001-1061



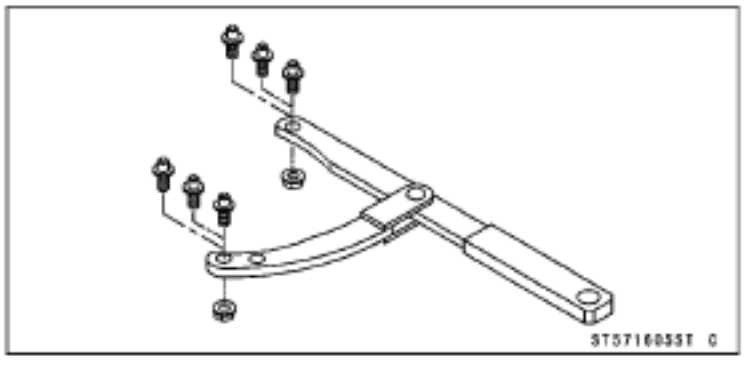
Bearing Driver Set:
57001-1129



Stem Bearing Driver Adapter, ϕ42:
57001-1510



Flywheel & Pulley Holder:
57001-1605

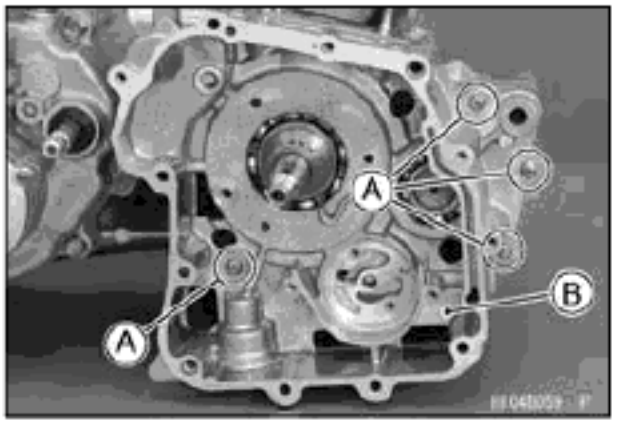


Crankcase

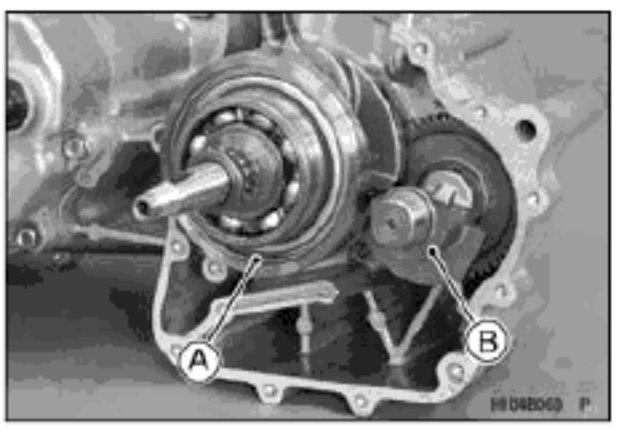
Crankcase Disassembly

- Remove:
  Engine (see Engine Removal in the Engine Removal/Installation chapter)
  Starter Motor (see Starter Motor Removal in the Electrical System chapter)
  Oil Screen (see Oil Screen Removal in the Engine Lubrication System chapter)
  Piston (see Piston Removal in the Engine Top End chapter)
  Drive Pulley (see Drive Pulley Removal in the Converter System chapter)
  Clutch/Driven Pulley (see Clutch/Driven Pulley Removal in the Converter System chapter)
  Oil Pump (see Oil Pump Removal in the Engine Lubrication System chapter)

- Remove:
  Crankcase Bolts [A]
  Right Crankcase Half [B]



- Remove:
  Dowel Pins
  Crankshaft [A]
  Balancer [B]



Crankcase

Crankcase Assembly

NOTICE

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

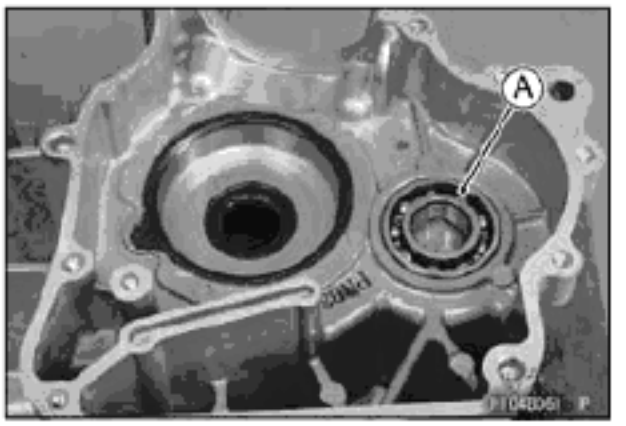
- *Be certain that all parts are cleaned thoroughly before assembly.*
- *Blow through all oil passages with compressed air to clear any blockage in the crankcase halves and crankshaft.*

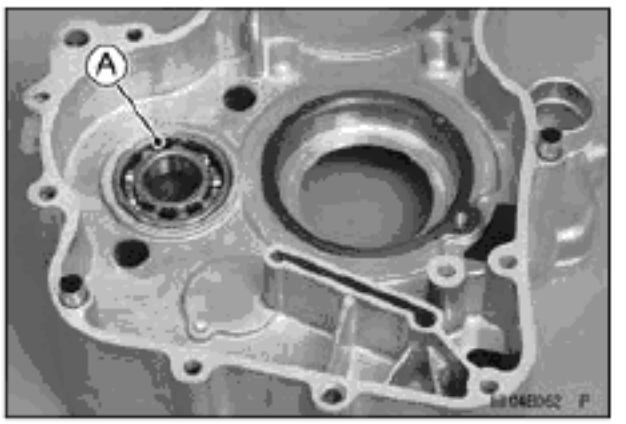
⚠ WARNING

Gasoline and low flash-point solvents can be flammable and/or explosive and cause severe burns. Clean the engine parts in a well-ventilated area, and take care that there is no spark or flame anywhere near the working areas. Do not use gasoline or low-flash point solvents to clean parts.

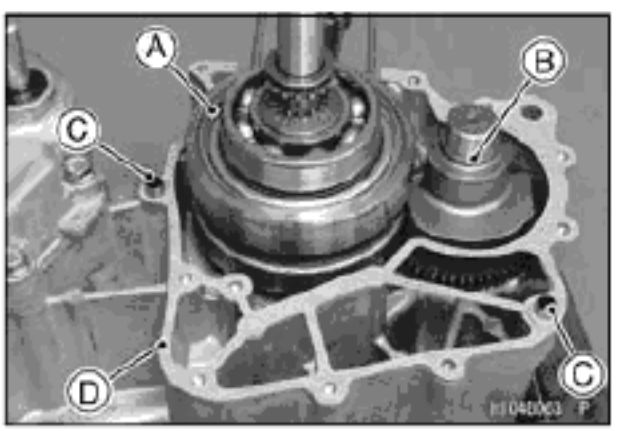
- Press and insert the new ball bearings [A] until they are bottomed.

  Special Tool - Bearing Driver Set: 57001-1129
- Apply engine oil to the bearings.





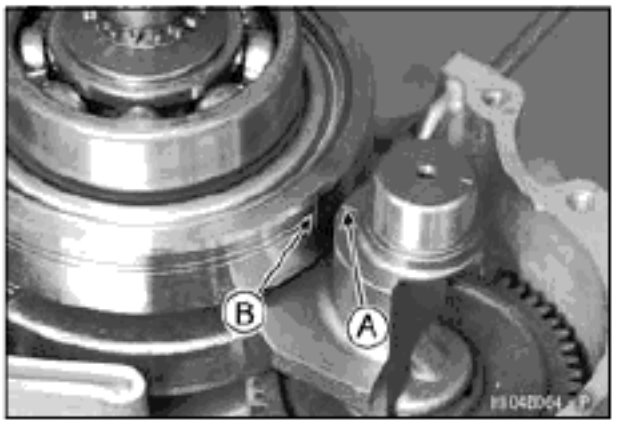
- Be sure the following parts are in place in the left crankcase half.
  Crankshaft [A]
  Balancer [B]
  Dowel Pins [C]
  New Gasket [D]



Crankcase

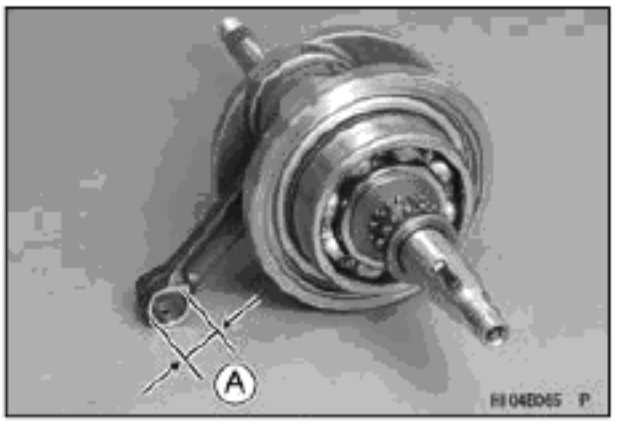
- Align the mark [A] on the balancer with the mark [B] on the crankshaft.
- Install the right crankcase half.
- Apply a non-permanent locking agent to the crankcase bolts.
- Tighten:

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



Crankshaft/Connection Rod

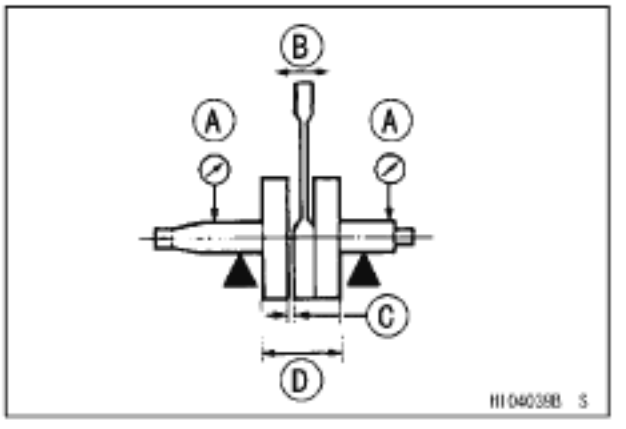
Crankshaft Inspection



- Remove the crankshaft (see Crankcase Disassembly).
- Measure the diameter [A] of connecting rod small end.

★If the measurement exceeds the service limit, replace the crankshaft with a new one.

Connecting Rod Small End Diameter [A]
Service Limit: 17.06 mm (0.672 in.)



- Measure the crankshaft runout [A].

★If the measurement exceeds the service limit, replace the crankshaft with a new one.

Crankshaft Runout [A]
Service Limit: TIR 0.1 mm (0.004 in.)

- Measure the connecting rod small end free play [B].

★If the measurement exceeds the standard, replace the crankshaft a new one.

Connecting Rod Small End Free Play [B]
Standard: 0.8 ~ 1.0 mm (0.03 ~ 0.04 in.)

- Measure the connecting rod big end side clearance [C].

★If the measurement exceeds the service limit, replace the crankshaft a new one.

Connecting Rod Big End Side Clearance [C]
Service Limit: 0.6 mm (0.024 in.)

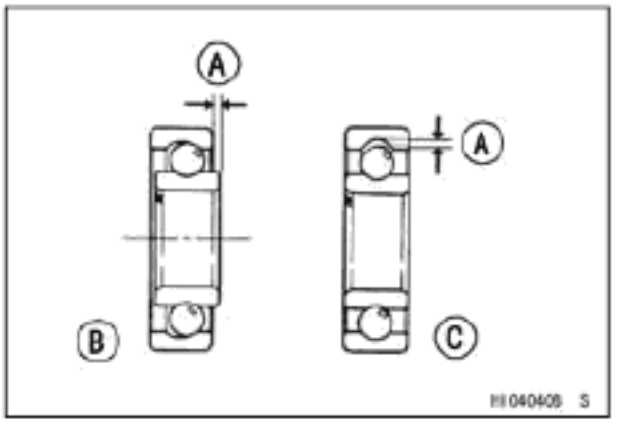
- Measure the crank width [D].

★If the measurement exceeds the service limit, replace the crankshaft a new one.

Crank Width [D]
Standard: 55.15 ~ 55.20 mm (2.171 ~ 2.173 in.)

- Install the crankshaft (see Crankcase Assembly).

Crankshaft Main Bearing Wear Inspection



- Turn the crankshaft bearings and check for excessive play.
- Measure the crankshaft bearing free play [A].

★If the measurement exceeds the service limit, replace the crankshaft with a new one.

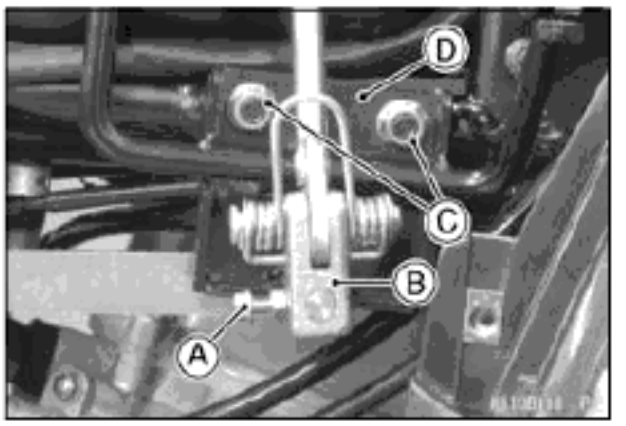
Crankshaft Bearing Free Play [A]

Service Limit:	**Axial [B]**	**0.2 mm (0.008 in.)**
	Radial [C]	**0.05 mm (0.0002 in.)**

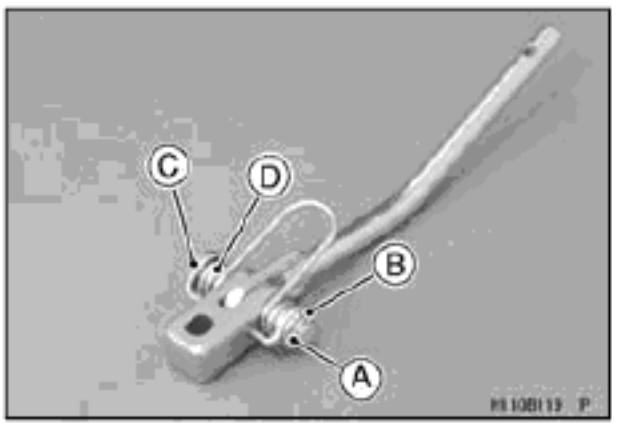
Transmission

Shift Lever Removal

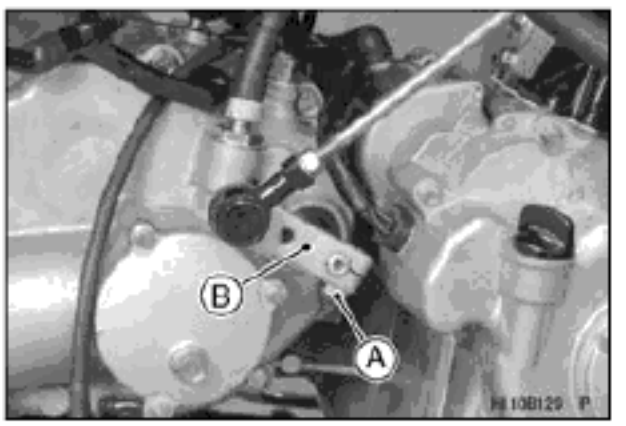
- Set the shift lever in the neutral position.
- Remove:
  Right Side Cover (see Right Side Cover Removal in the Frame chapter)
  Shift Lever Bolt [A] and Locknut
  Shift Lever [B]
  Shift Bracket Nut [C]
  Shift Bracket [D]



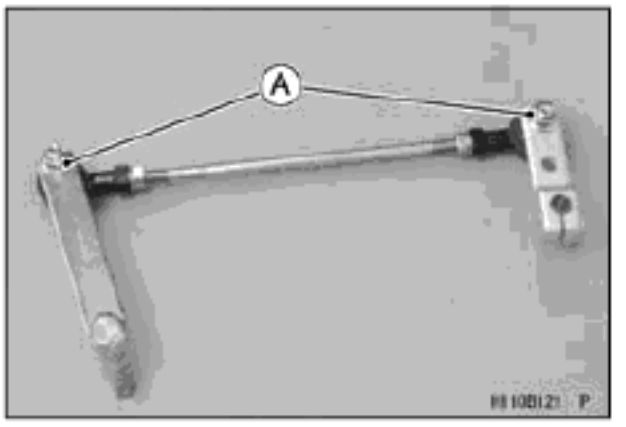
- Remove:
  Cotter Pin [A]
  Washer [B]
  Joint Pin [C]
  Spring [D]



- Remove:
  Shift Lever Clamp Bolt [A]
  Shift Shaft Lever [B]



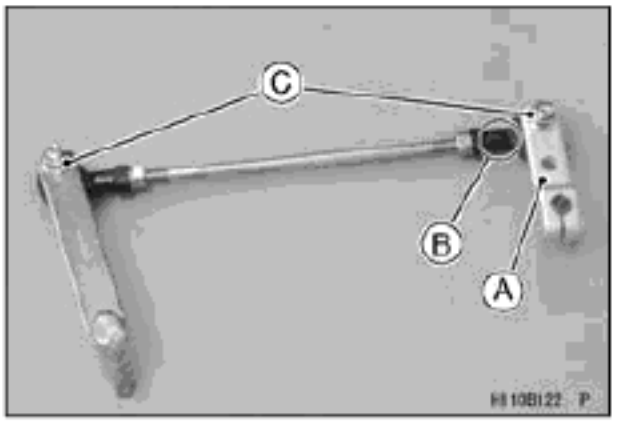
- Remove:
  Tie-Rod End Nuts [A]



Shift Lever Installation

- Install the shift shaft lever [A] to the L mark [B] side of tie-rod end.
- Tighten:

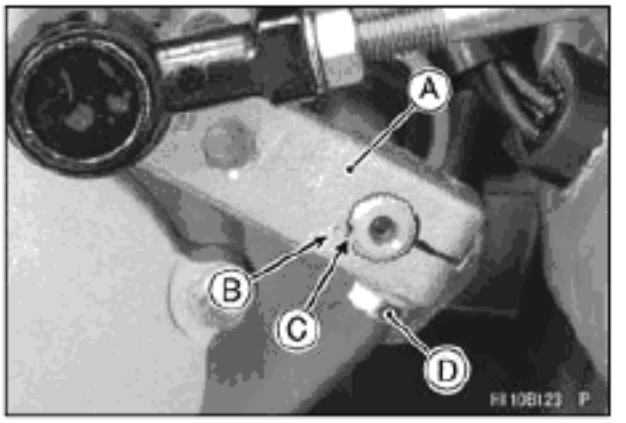
Torque - Tie-Rod End Nuts [C]: 26 N·m (2.7 kgf·m, 19 ft·lb)



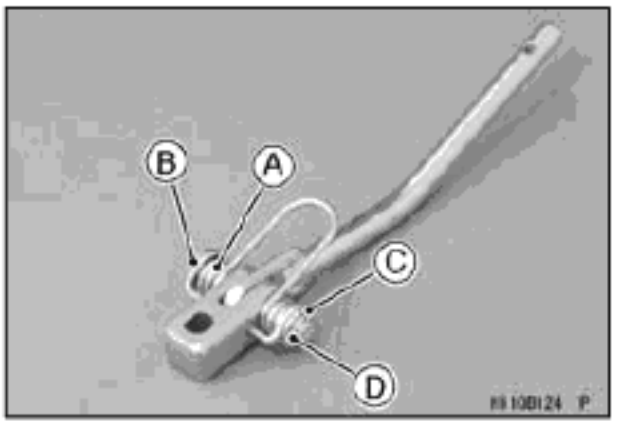
Transmission

- Install:
  Shift Shaft Lever [A]
- Align the punch mark [B] on the shift shaft lever with the mark [C] on the shift shaft.
- Tighten:

Torque - Shift Lever Clamp Bolt [D]: 9.8 N·m (1.0 kgf·m, 87 in·lb)



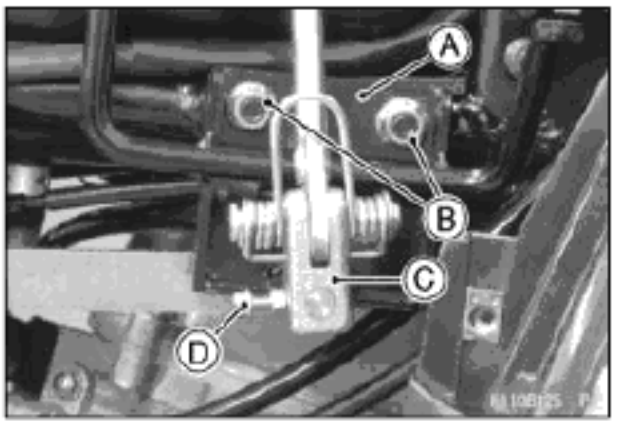
- Install:
  Spring [A]
  Joint Pin [B]
  Washer [C]
- Replace the cotter pin [D] with a new one.



- Install:
  Shift Bracket [A]
- Tighten:

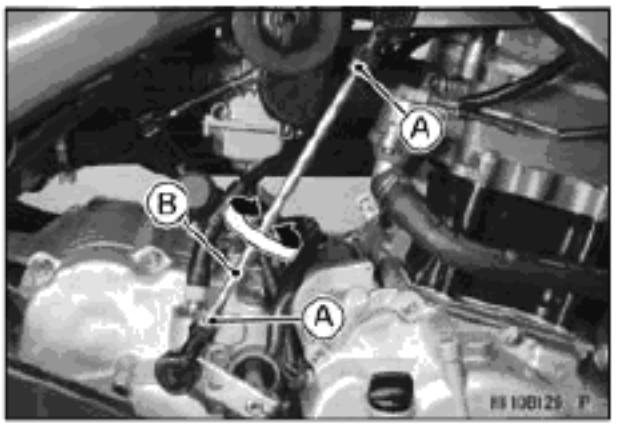
Torque - Shift Bracket Nuts [B]: 20 N·m (2.0 kgf·m, 15 ft·lb)

- Install:
  Shift Lever [C]
  Shift Lever Bolt [D] and Nut
- Install the removed parts (see appropriate chapters).

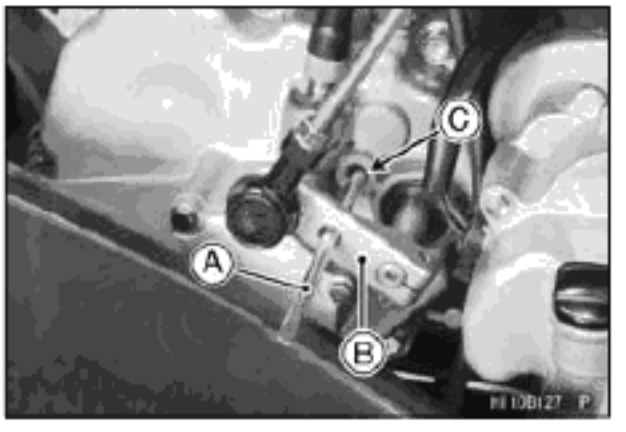


Shift Lever Adjustment

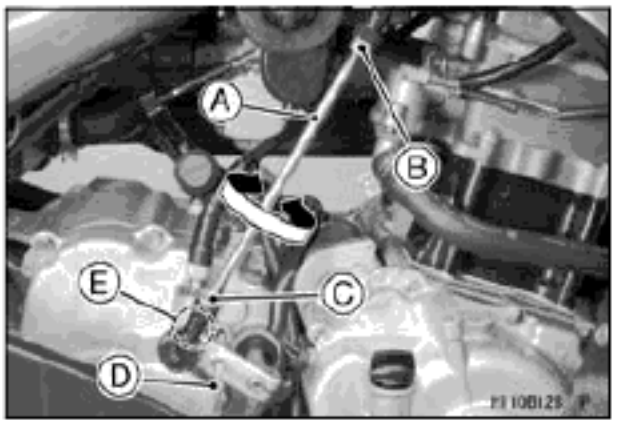
- Set the shift lever in the neutral position.
- Loosen the tie-rod locknuts [A].
- Shift the gear to neutral by moving the shift lever and/or turn the rod [B].



- Insert a screwdriver [A] through the shift shaft lever [B] into the index hole [C] at the transmission case.



Transmission



- Turn the rod [A] clockwise or counterclockwise and adjust the neutral position of shift lever.
- Tighten the locknuts [B] [C], and then pull out the screwdriver [D].

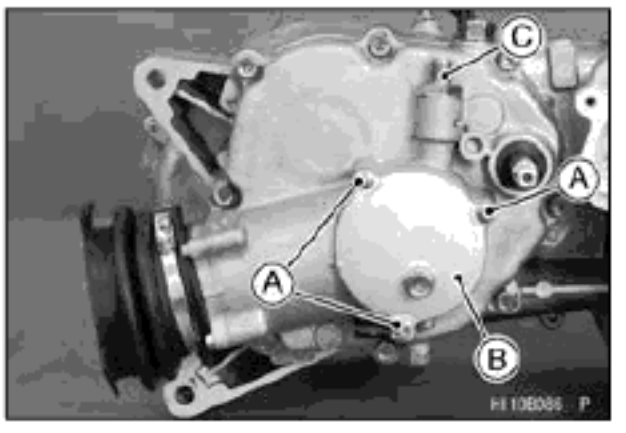
NOTE

○*The locknut [C] near the L mark [E] on the tie-rod left -hand threads. Turn the locknut clockwise for loosening.*

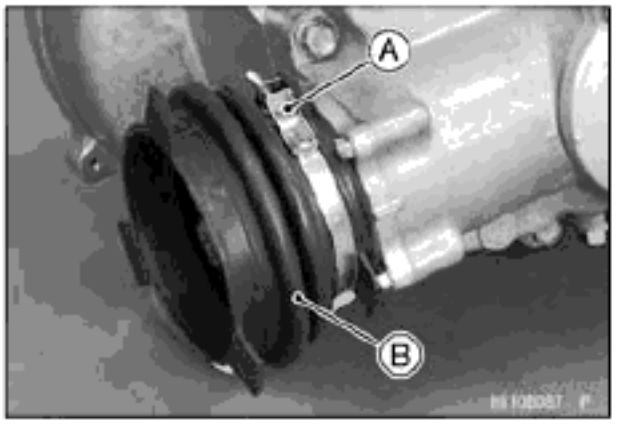
- After adjustment, start the engine and test to ride the ATV to be sure the shift lever is operating properly.

Transmission Case Removal

- Remove:
  Engine (see Engine Removal in the Engine Removal/Installation chapter)
  Starter Motor (see Starter Motor Removal in the Electrical System chapter)
  Oil Screen (see Oil Screen Removal in the Engine Lubrication System chapter)
  Piston (see Piston Removal in the Engine Top End chapter)
  Drive Pulley (see Drive Pulley Removal in the Converter System chapter)
  Clutch/Driven Pulley (see Clutch/Driven Pulley Removal in the Converter System chapter)
  Oil Pump (see Oil Pump Removal in the Engine Lubrication System chapter)



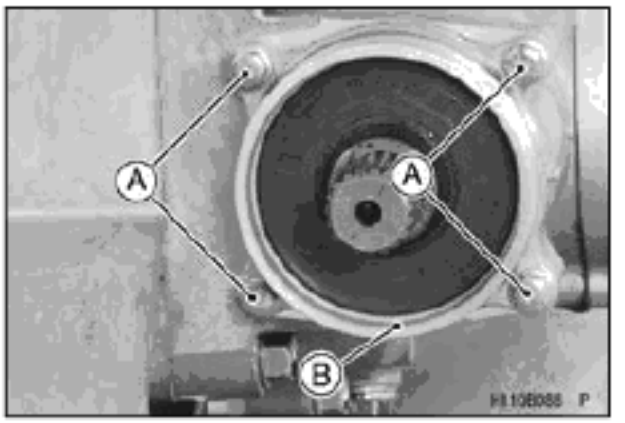
- Remove:
  Output Drive Bevel Gear Cover Bolts [A]
  Output Drive Bevel Gear Cover [B]
  Speedometer Cable Holder [C]



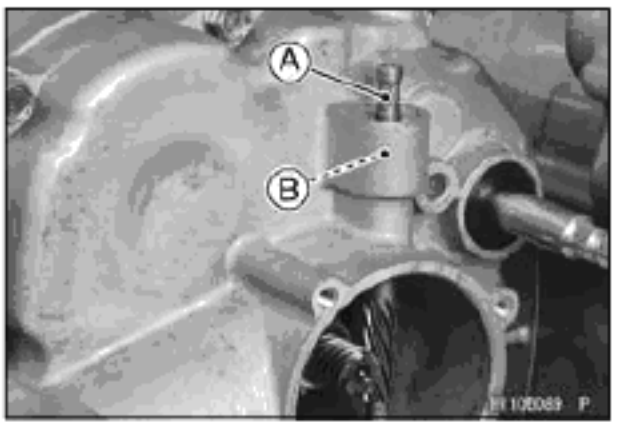
- Loosen the boot clamp screw [A].
- Remove the boot [B].

Transmission

- Remove:
  Output Drive Shaft Housing Bolts [A]
  Output Drive Shaft Housing [B]

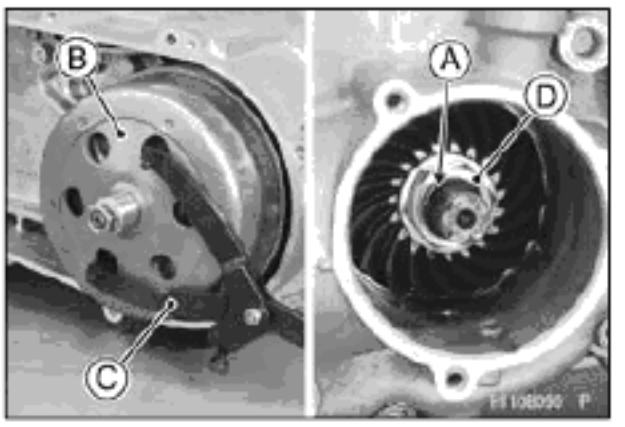


- Remove:
  Speedometer Gear Shaft [A]
  Washer [B]

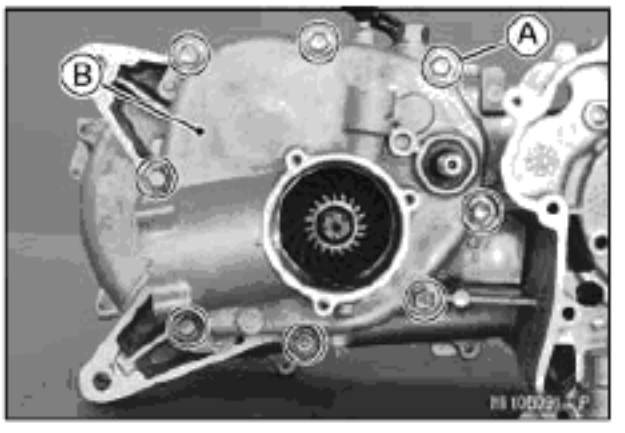


- Flatten out the bended threaded portion [A] of the nut.
- While holding the clutch outer [B] with the flywheel & pulley holder [C] and remove the output drive bevel gear nut [D].

Special Tool - Flywheel & Pulley Holder: 57001-1605



- Remove:
  Transmission Case Cover Bolts [A]
  Transmission Case Cover [B]



Transmission Case Installation

- Install:
  Transmission Case Cover
- Tighten:

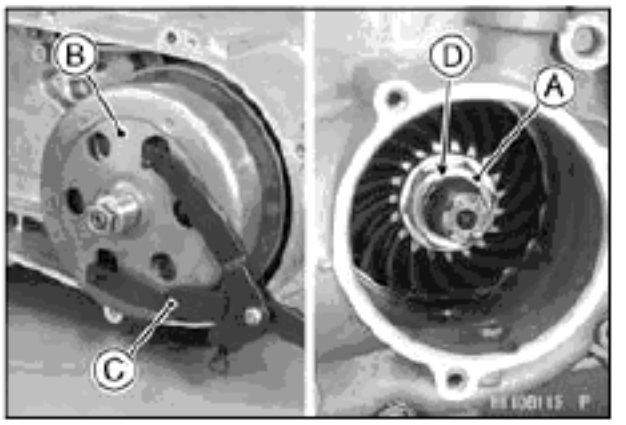
Torque - Transmission Case Cover Bolts: 26 N·m (2.7 kgf·m, 19 ft·lb)

Transmission

- Install the shim and output drive bevel gear.
- Tighten the output drive bevel gear nut [A] while holding the clutch outer [B] with the flywheel & pulley holder [C].

Torque - Output Drive Bevel Gear Nut: 98 N·m (10 kgf·m, 72 ft·lb)

- Bend a point [D] of the nut.
- Install:
  Washer
  Speedometer Gear Shaft



- Install the output driven shaft housing.
- Align the mark [A] on the output driven shaft housing [B] with the mark [C] on the transmission case [D].
- Tighten:

Torque - Output Driven Shaft Housing Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

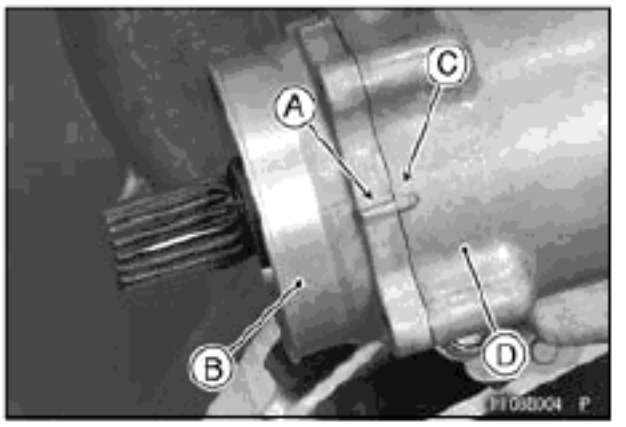
- Install the boot, and then tighten the boot clamp screw.
- Tighten:

Torque - Speedometer Cable Holder: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the output drive bevel gear cover.
- Tighten:

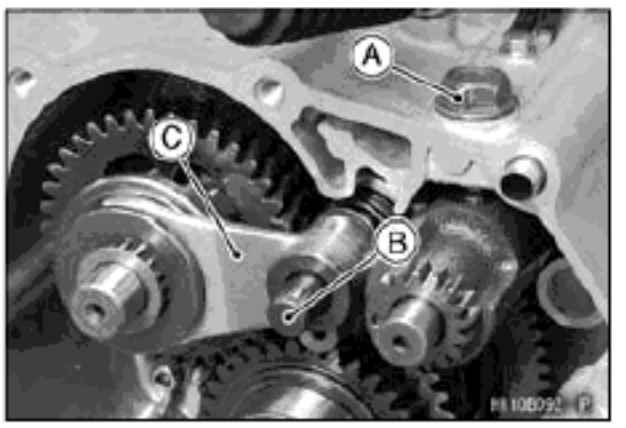
Torque - Output Drive Bevel Gear Cover Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install the removed parts (see appropriate chapters).

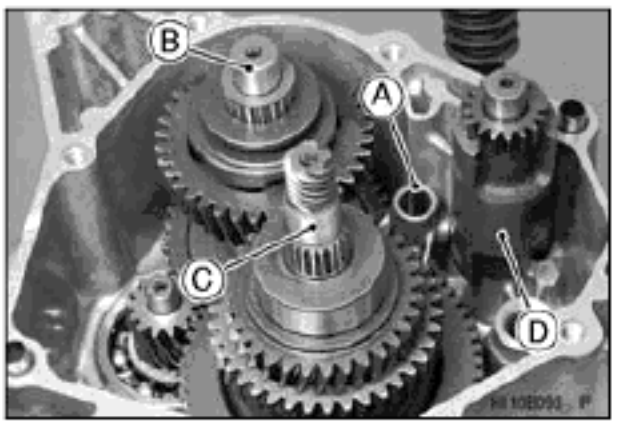


Transmission Case Disassembly

- Remove:
  Transmission Case Cover (see Transmission Case Removal)
  Shift Drum Stopper Plug [A], Washer, Spring and Ball
  Shift Fork Rod [B]
  Shift Fork [C]

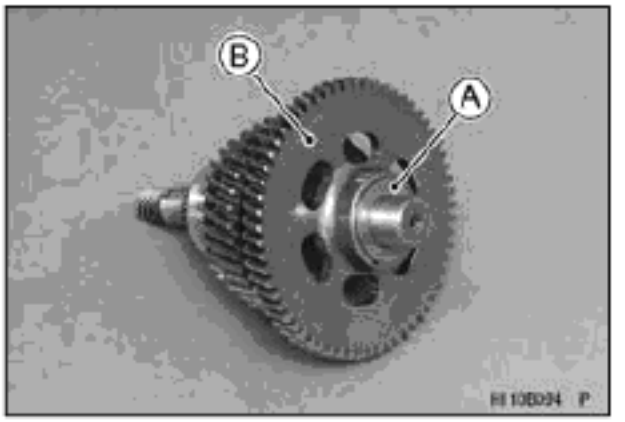


- Remove:
  Shift Fork [A]
  Drive Shaft [B]
  Driven Shaft [C]
  Shift Drum [D]

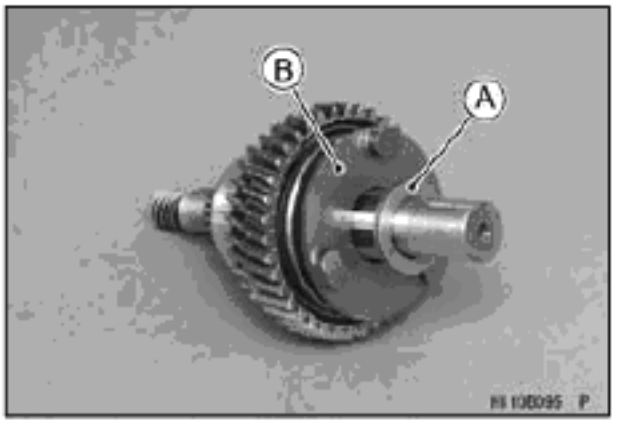


Transmission

- Remove:
  Washer (ϕ20 × ϕ33 × 1.0) [A]
  Reverse Gear [B]



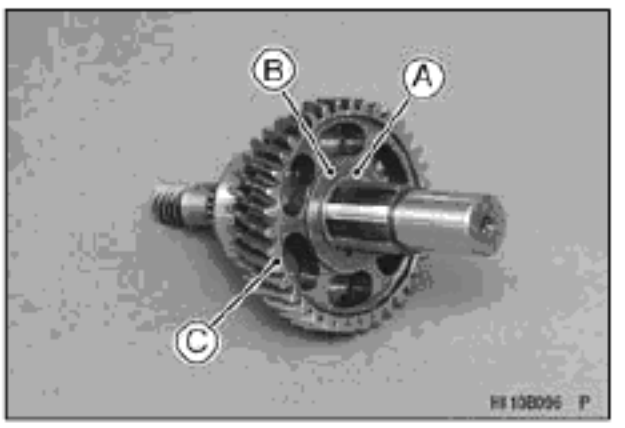
- Remove:
  Washer (ϕ20 × ϕ33 × 3.0) [A]
  Shifter [B]



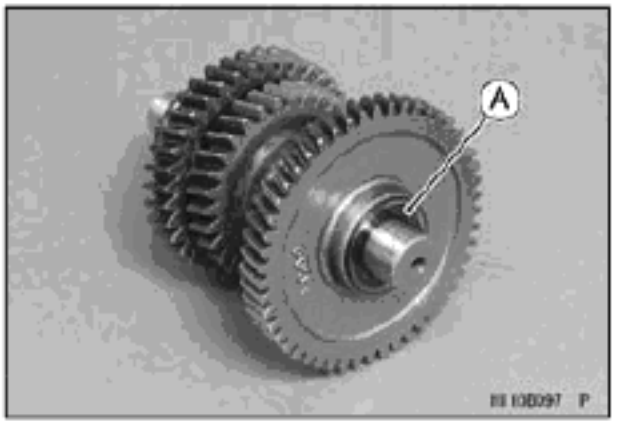
- Remove:
  Circlip [A]

Special Tool - Outside Circlip Pliers: 57001-144

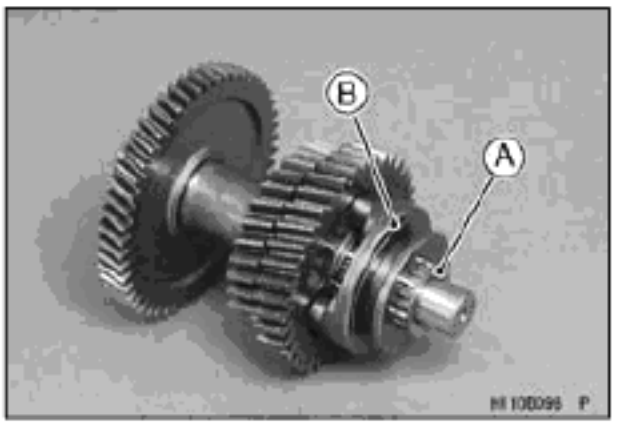
- Remove:
  Toothed Washer [B]
  Low Gear [C]



- Remove:
  Washer (ϕ22 × ϕ30 × 1.0) [A]



- Remove:
  Washer (ϕ17 × ϕ26 × 1.0) [A]
  Shifter [B]

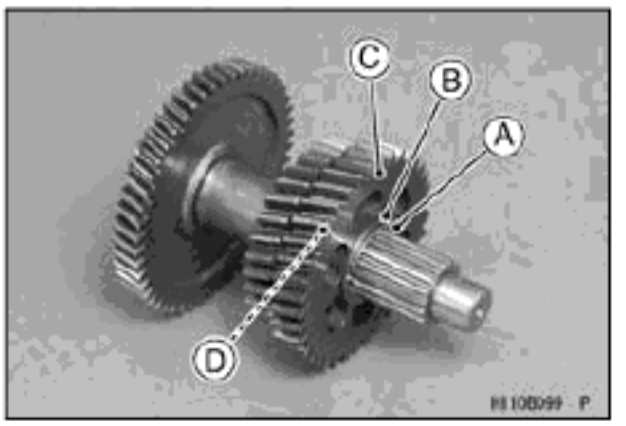


Transmission

- Remove:
  Circlip [A]

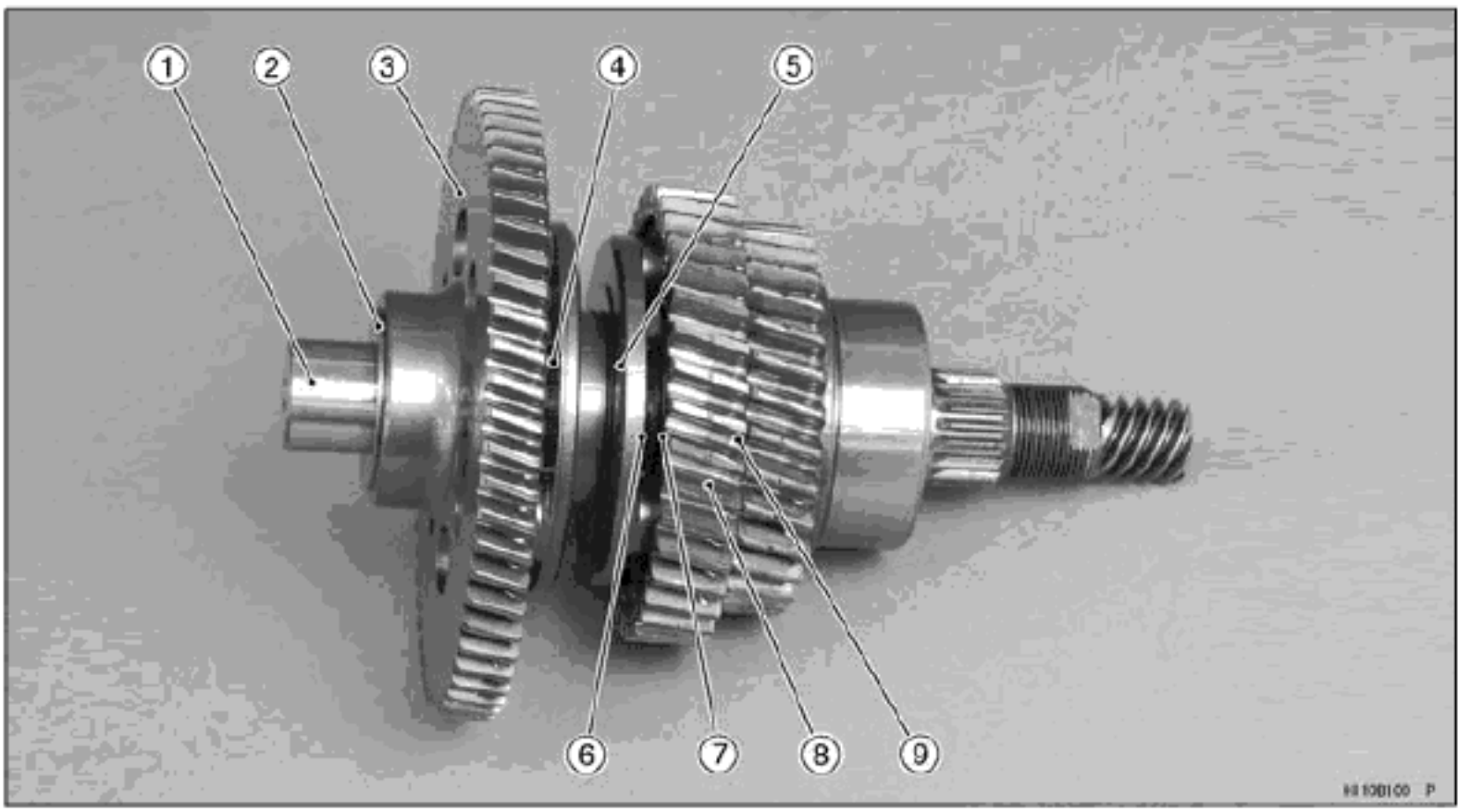
Special Tool - Outside Circlip Pliers: 57001-144

- Remove:
  Toothed Washer [B]
  High Gear [C]
  Washer (ϕ25 × ϕ37 × 3.0) [D]



Transmission Case Assembly

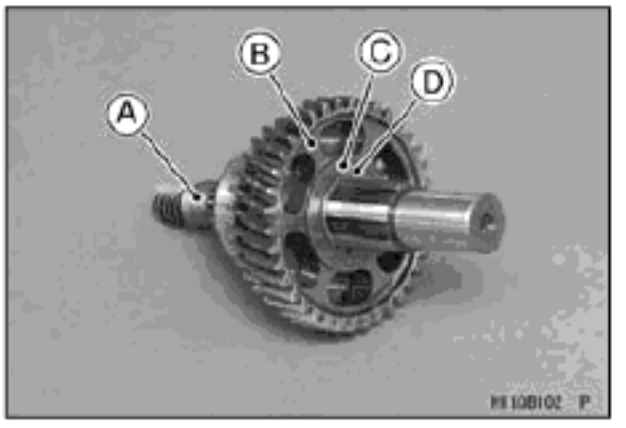
- Assemble the driven shaft as shown.



1. Driven Shaft
2. Washer (ϕ20 × ϕ33 × 1.0)
3. Reverse Gear
4. Washer (ϕ20 × ϕ33 × 3.0)
5. Shifter
6. Circlip
7. Toothed Washer
8. Low Gear
9. Washer (ϕ25 × ϕ40 × 1.0)

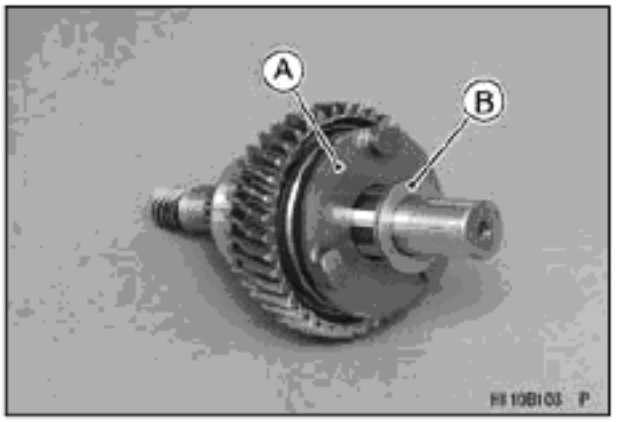
- Install the parts in the driven shaft [A] as follow.
- Install:
  Low Gear [B]
  Toothed Washer [C]
- Replace the circlip [D] with a new one.

Special Tool - Outside Circlip Pliers: 57001-144

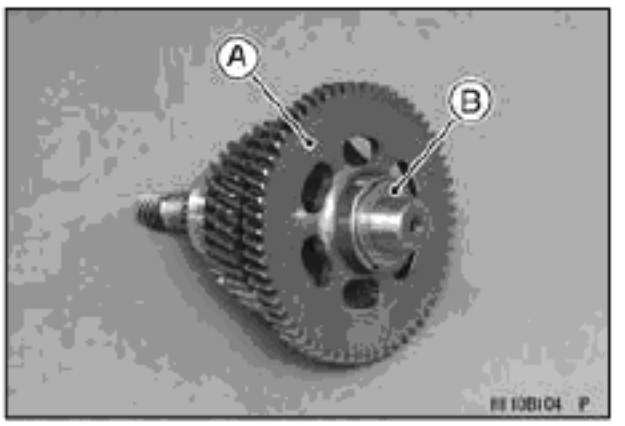


Transmission

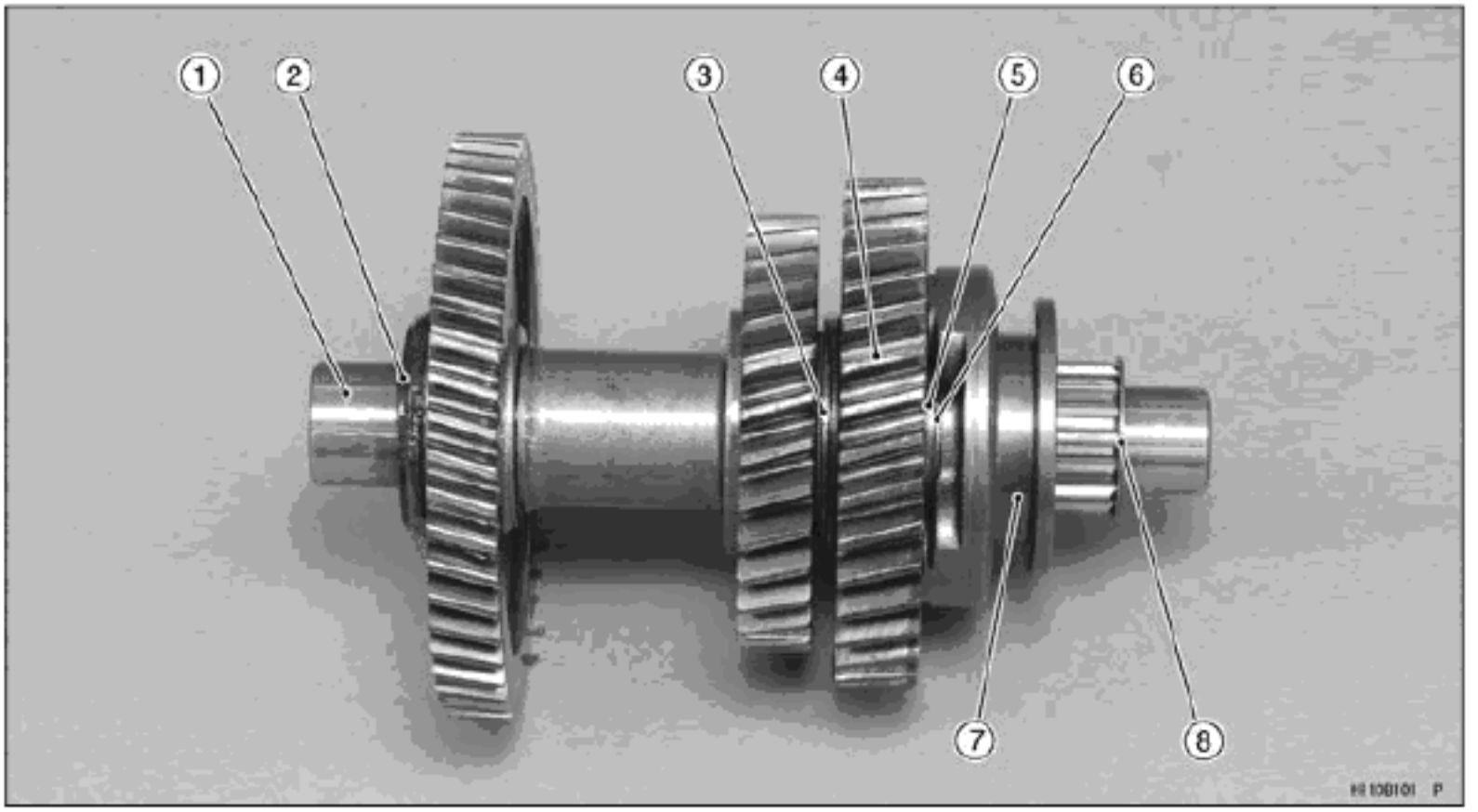
• Install:
Shifter [A]
Washer (ϕ20 × ϕ33 × 3.0) [B]



• Install:
Reverse Gear [A]
Washer (ϕ20 × ϕ33 × 1.0) [B]



• Assemble the drive shaft as shown.

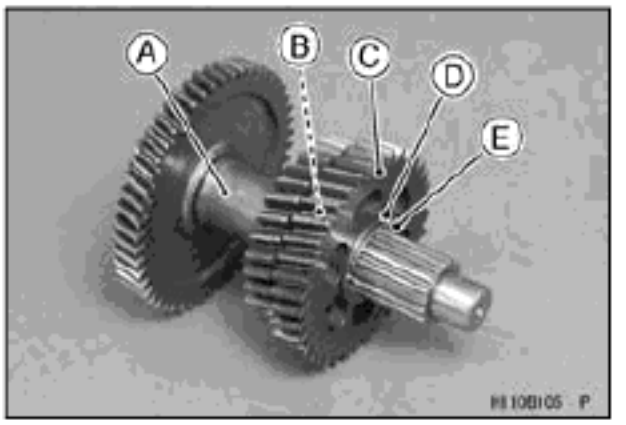


1. Drive Shaft
2. Washer (ϕ22 × ϕ33 × 1.0)
3. Washer (ϕ25 × ϕ37 × 3.0)
4. High Gear
5. Toothed Washer (t = 2.0)
6. Circlip
7. Shifter
8. Washer (ϕ17 × ϕ26 × 1.0)

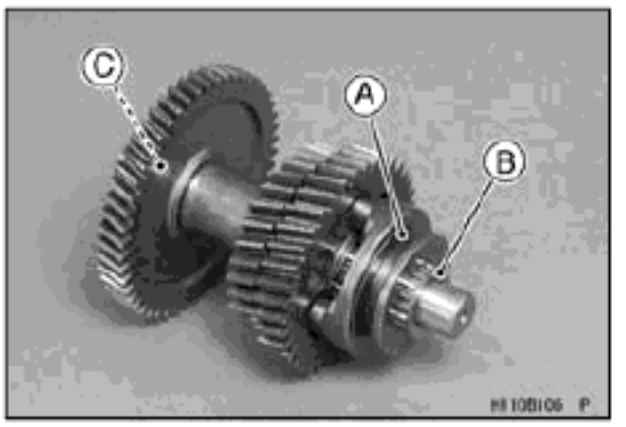
Transmission

- Install the parts in the drive shaft [A] as follow.
- Install:
  Washer (ϕ25 × ϕ37 × 3.0) [B]
  High Gear [C]
  Toothed Washer [D]
- Replace the circlip [E] with a new one.

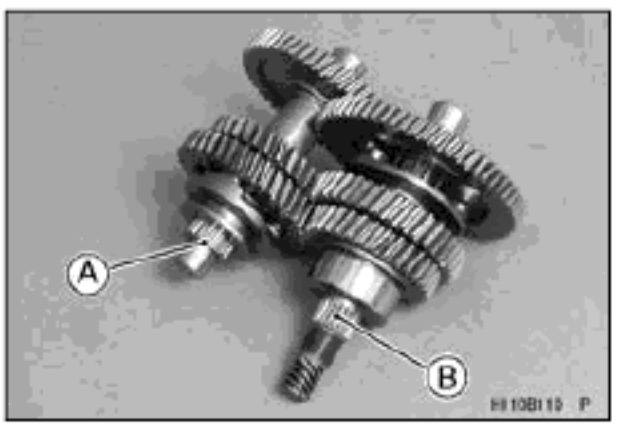
Special Tool - Outside Circlip Pliers: 57001-144



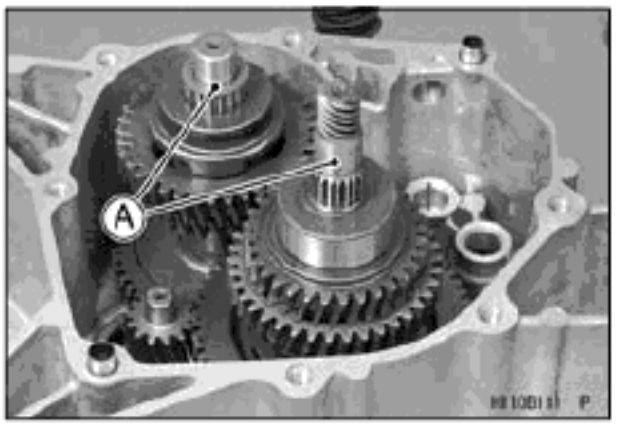
- Install:
  Shifter [A]
  Washer (ϕ17 × ϕ26 × 1.0) [B]
  Washer (ϕ22 × ϕ33 × 1.0) [C]



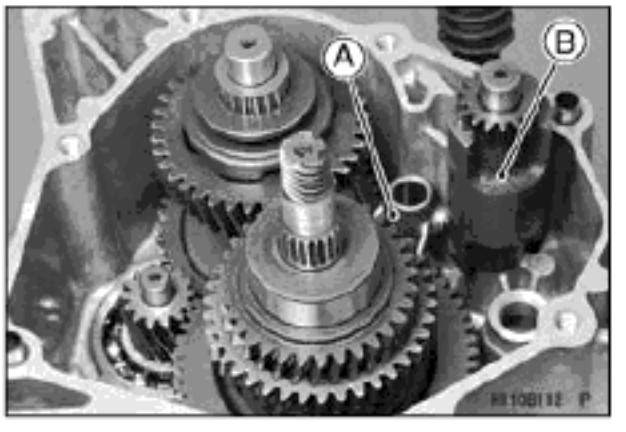
- Assemble the drive shaft [A] and driven shaft [B].



- Install the drive shaft and driven shaft assemblies [A] as a set into the transmission case.

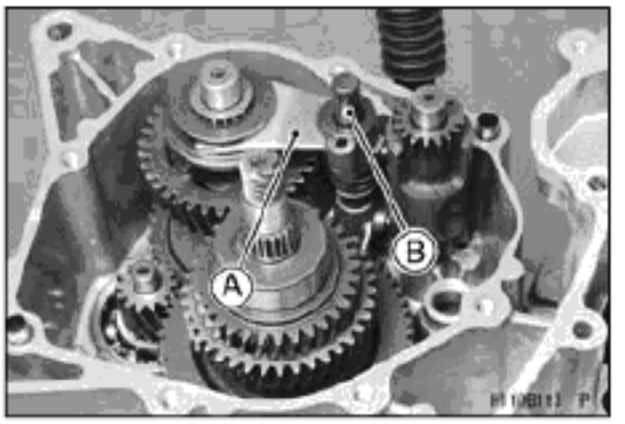


- Install the shift fork [A] and shift drum [B] as shown.

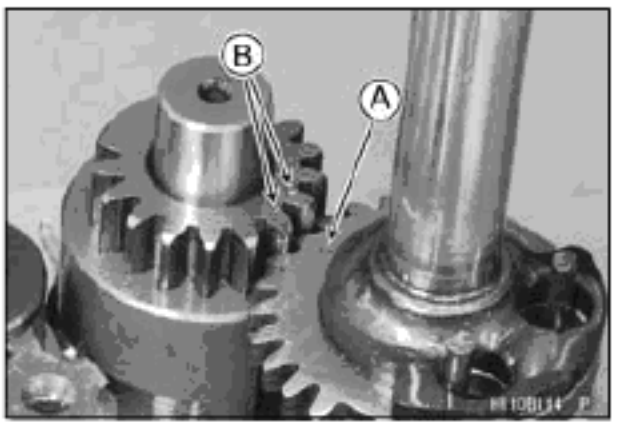


Transmission

- Install the shift fork [A] as shown, and then the shift fork rod [B].

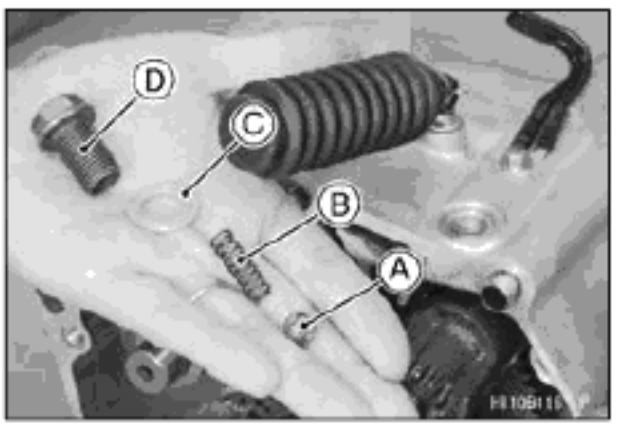


- Align the punch mark [A] of the shift shaft gear to between the punches [B] mark of the shift drum gear.



- Install:
  Ball [A]
  Spring [B]
  Washer [C]
- Tighten:

Torque - Shift Drum Stopper Plug [D]: 47 N·m (4.8 kgf·m, 35 in·lb)



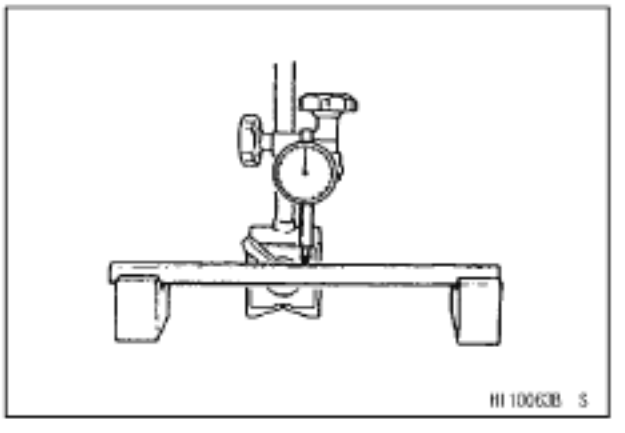
- Install the transmission case cover (see Transmission Case Installation).
- Install the removed parts (see appropriate chapters).

Shift Fork Rod Runout

- Measure the shift fork rod runout.

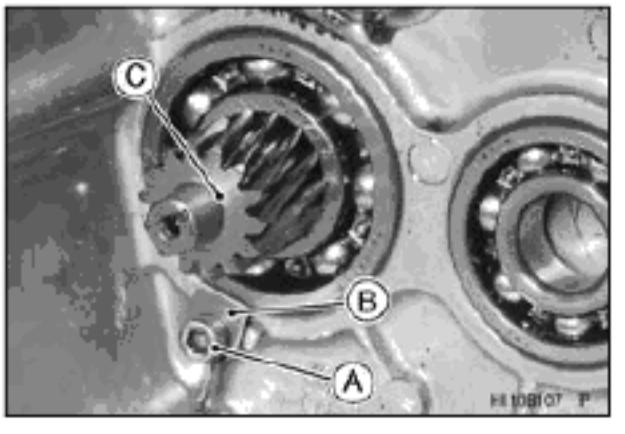
★If the measurement exceeds the service limit, replace the shift fork rod with a new one.

Shift Fork Rod Runout
Service Limit: Less than 0.03 mm (0.012 in.)



Clutch/Driven Pulley Shaft Disassembly

- Remove:
  Transmission (see Transmission Case Disassembly)
  Bolt [A]
  Driven Pulley Bearing Retainer [B]
  Clutch/Driven Pulley Shaft [C]

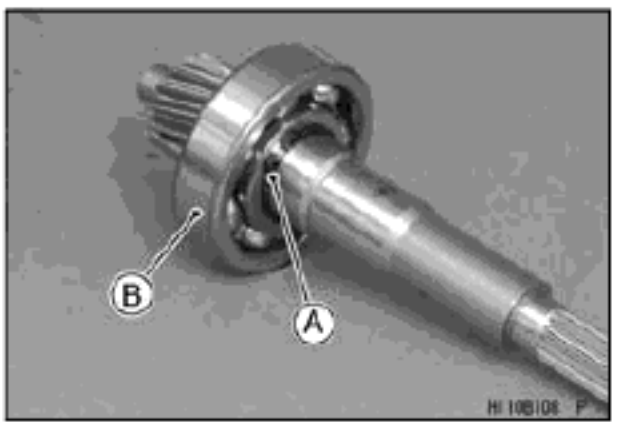


Transmission

- Remove:
  Circlip [A]

Special Tool - Outside Circlip Pliers: 57001-144

- Using a suitable puller, remove the ball bearing [B].



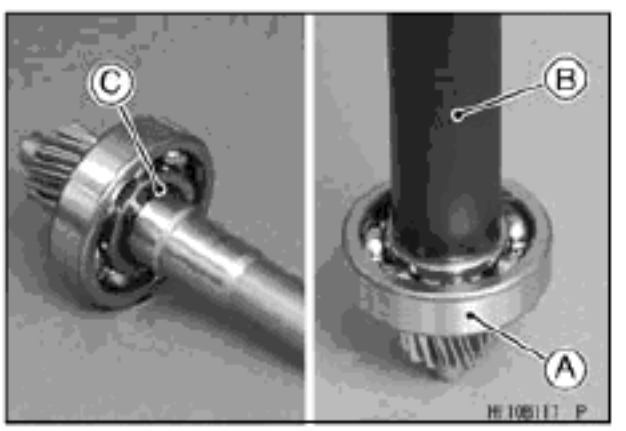
Clutch/Driven Pulley Shaft Assembly

- Install:
  Clutch/Driven Pulley Shaft Bearing [A]

Special Tool - Bearing Driver, ϕ32 [B]: 57001-382

- Replace the circlip [C] with a new one.

Special Tool - Outside Circlip Pliers: 57001-144



- Install:
  Clutch/Driven Pulley Shaft
  Driven Pulley Bearing Retainer
- Apply a non-permanent locking agent to the driven pulley bearing retainer bolt.
- Tighten:

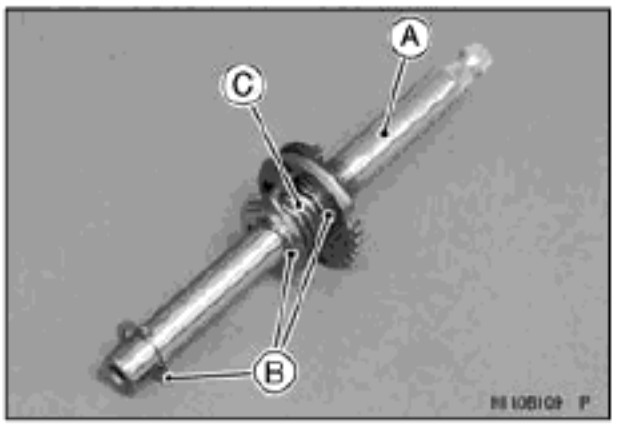
Torque - Driven Pulley Bearing Retainer Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

Shift Shaft Inspection

- Visually inspect the shift shaft [A], circlips [B], spring [C] for conditions.

★If the shift shaft is bent or damaged excessively, replace it with a new one.

★If the circlips, spring are damaged or worn excessively, replace them.



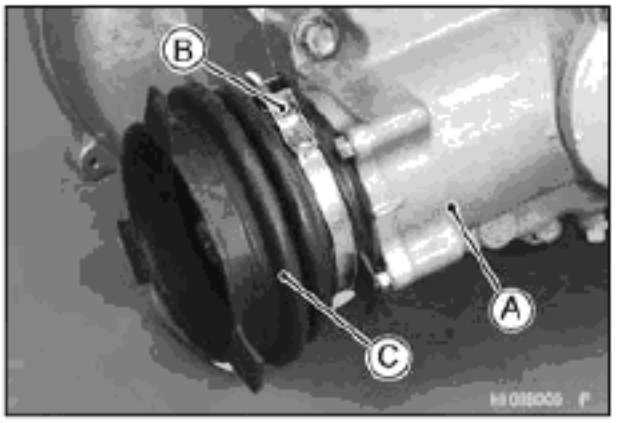
Shift Fork Rod Inspection

- Visually inspect the shift fork.

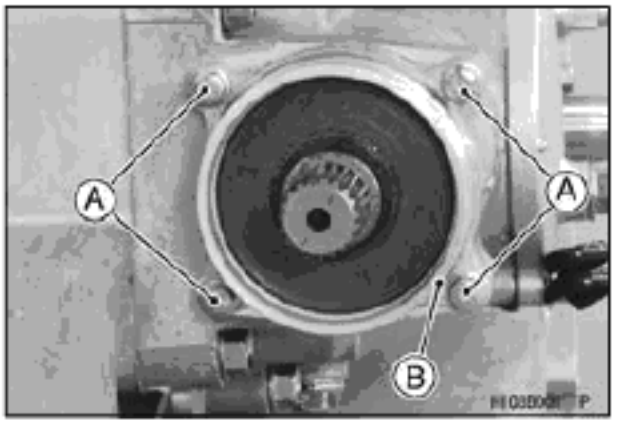
★If the shift fork rod is bent, replace the shift fork rod with a new one.

Transmission

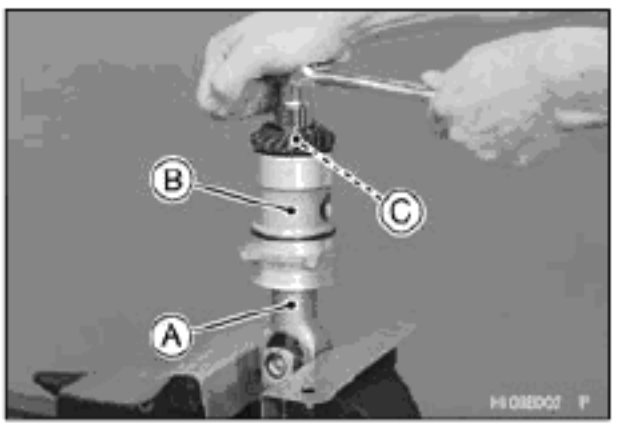
Output Driven Shaft Housing Disassembly



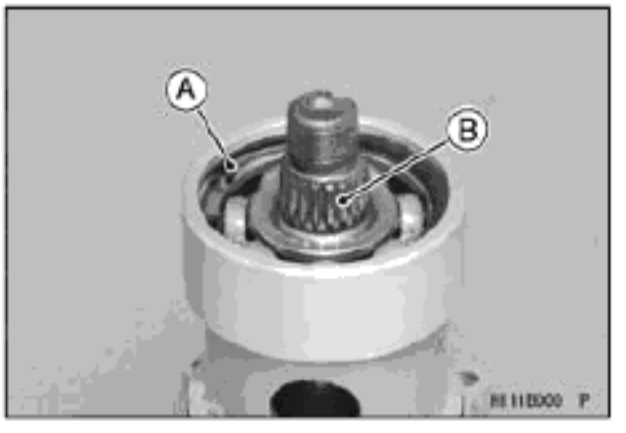
- Remove:
  Transmission Case [A] (see Transmission Case Removal)
- Loosen the screw [B] of the boot clamp.
- Remove the boot [C] with boot clamp.



- Remove:
  Bolts [A]
  Output Driven Shaft Housing [B]

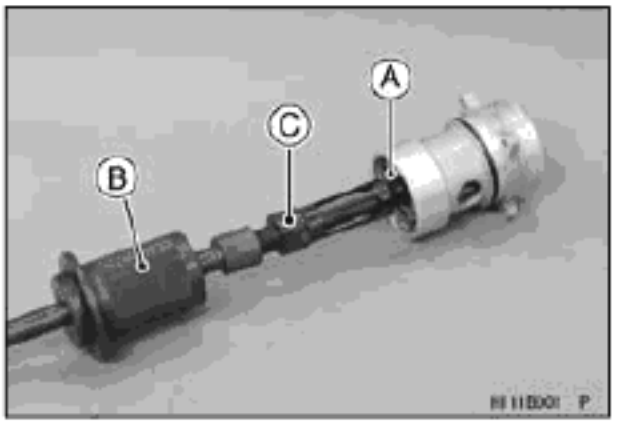


- Flatten out the bended threaded portion of the bevel gear nut.
- Install the universal joint [A] to the output driven shaft housing [B].
- Hold the universal joint in a vise.
- Loosen the bevel gear nut [C].



- Remove the circlip [A].

  Special Tool - Inside Circlip Pliers: 57001-143
- Remove the driven gear shaft [B].



- Remove the bearing [A].

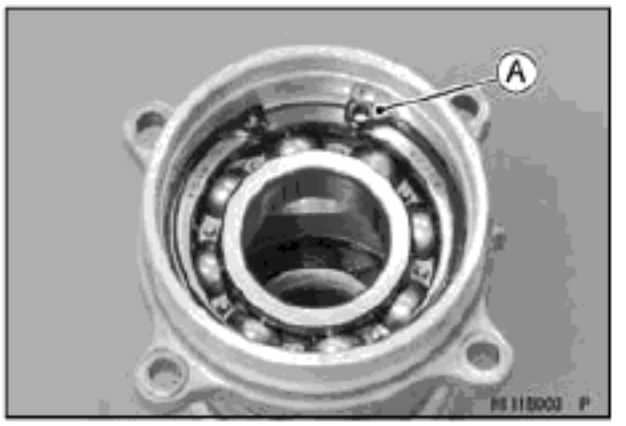
  Special Tools - Oil Seal & Bearing Remover [B]: 57001-1058
  Oil Seal & Bearing Remover, Adapter A [C]: 57001-1061

Transmission

- Remove the oil seal [A].

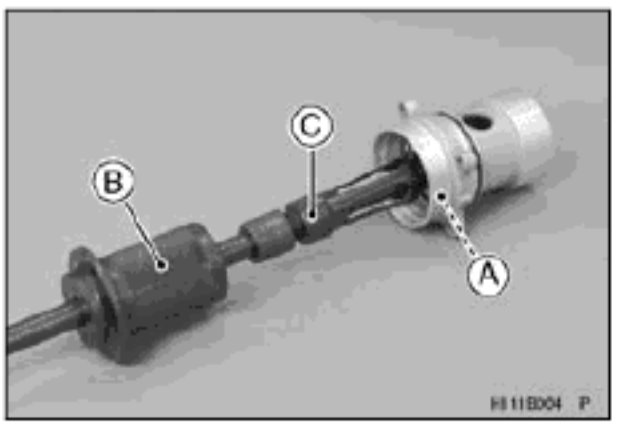
- Remove the circlip [A].

Special Tool - Inside Circlip Pliers: 57001-143



- Remove the bearing [A].

Special Tools - Oil Seal & Bearing Remover [B]: 57001-1058
Oil Seal & Bearing Remover, Adapter A [C]: 57001-1061



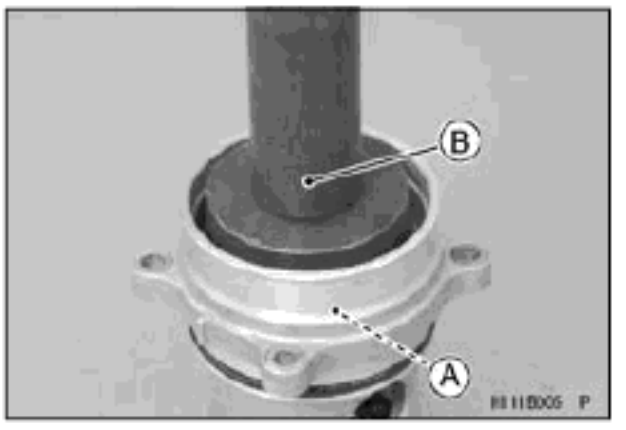
Output Driven Shaft Housing Assembly

- Replace the bearing [A] with a new one.
- Press in the bearing until it bottomed.

Special Tool - Bearing Driver Set [B]: 57001-1129

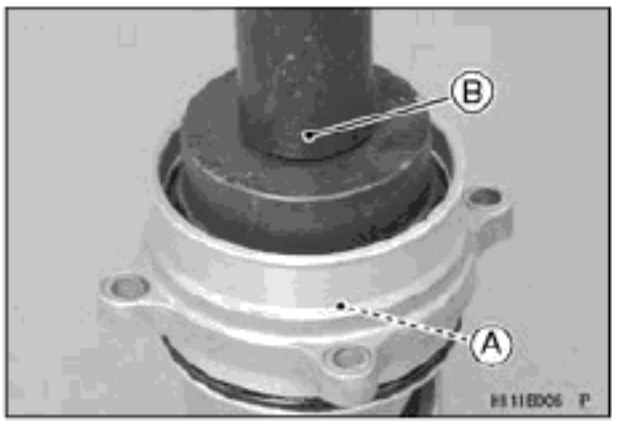
- Replace the circlip with a new one.
- Install the new circlip.

Special Tool - Inside Circlip Pliers: 57001-143



- Replace the oil seal [A] with a new one.
- Press in the oil seal until it bottomed.

Special Tool - Bearing Driver Set [B]: 57001-1129



Transmission

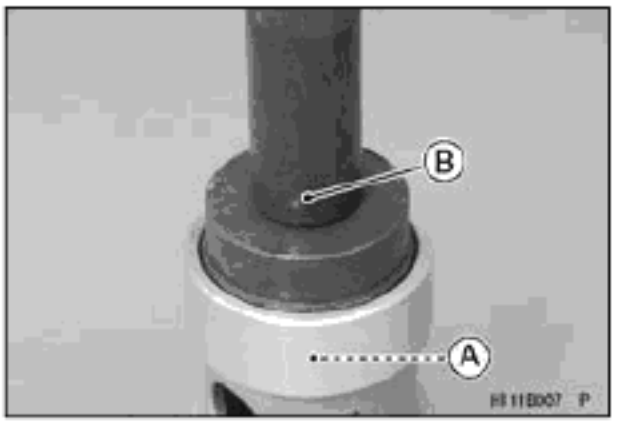
- Replace the bearing [A] with a new one.
- Press in the bearing until it bottomed.

Special Tool - Bearing Driver Set [B]: 57001-1129

- Replace the circlip with a new one.
- Install the circlip.

Special Tool - Inside Circlip Pliers: 57001-143

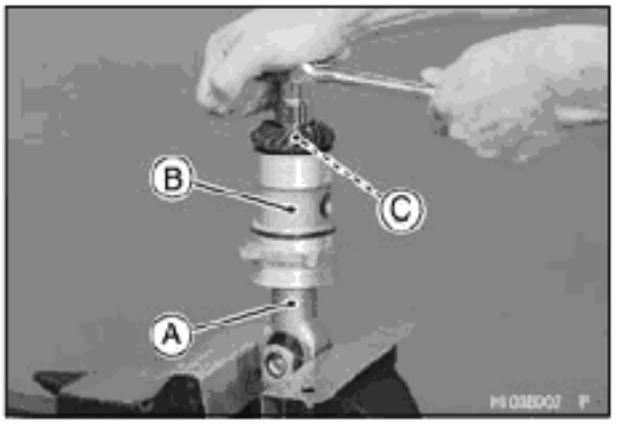
- Install the driven gear shaft.



- Install the universal joint [A] to the output driven shaft housing [B].
- Hold the universal joint in a vise.
- Tighten:

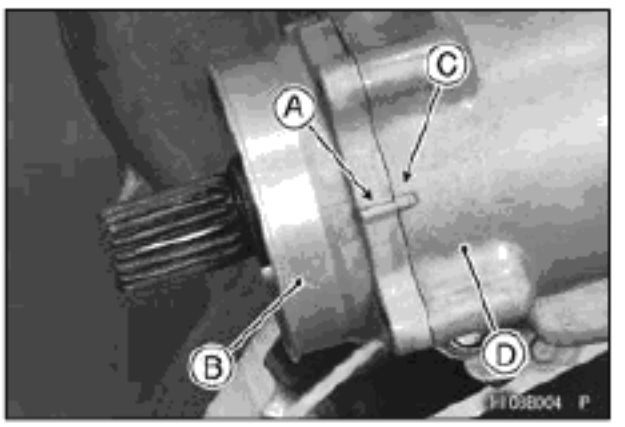
Torque - Output Driven Bevel Gear Nut [C]: 98 N·m (10 kgf·m, 72 ft·lb)

- Bend a point of the nut.



- Align the mark [A] on the output driven shaft housing [B] with the mark [C] on the transmission case [D].
- Tighten:

Torque - Output Driven Shaft Housing Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)



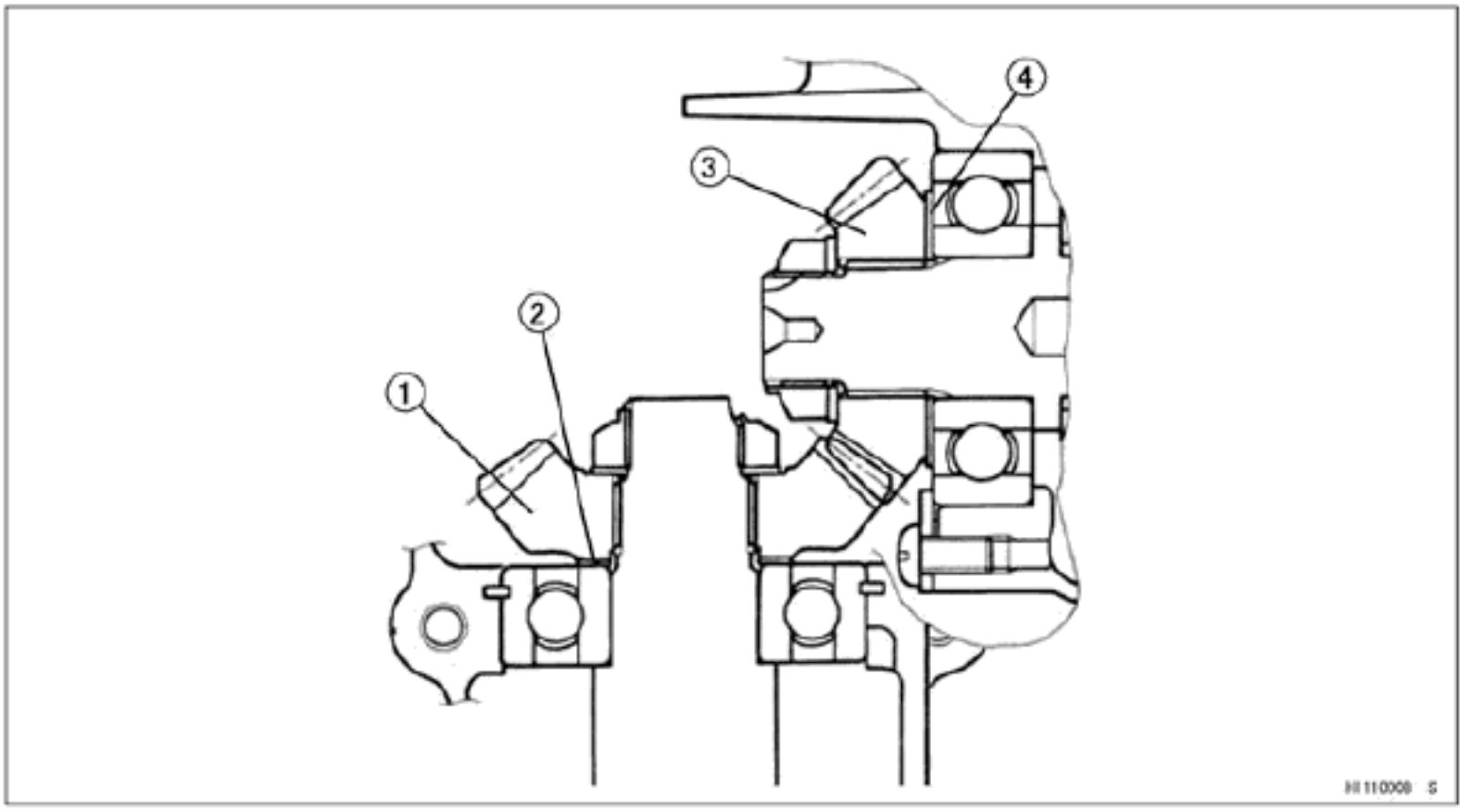
Output Drive Bevel Gears Adjustment

○The backlash and tooth contact pattern of the bevel gears must be correct to prevent the gears from making noise and being damaged.

- 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.

Transmission

Output Drive Bevel Case (Backlash-related Parts)



1. Driven Bevel Gear
2. Driven Bevel Gear Shim(s)
3. Drive Bevel Gear
4. Drive Bevel Gear Shim(s)

2. Driven Bevel Gear Shim(s)

Thickness	Part Number
0.60 mm (0.024 in.)	92180-Y013
0.65 mm (0.026 in.)	92180-Y014
0.70 mm (0.028 in.)	92180-Y015
0.75 mm (0.030 in.)	92180-Y016
0.80 mm (0.031 in.)	92180-Y017
0.85 mm (0.033 in.)	92180-Y018
0.90 mm (0.035 in.)	92180-Y019
0.95 mm (0.037 in.)	92180-Y020
1.00 mm (0.039 in.)	92180-Y021
1.05 mm (0.041 in.)	92180-Y022
1.10 mm (0.043 in.)	92180-Y023
1.15 mm (0.045 in.)	92180-Y024

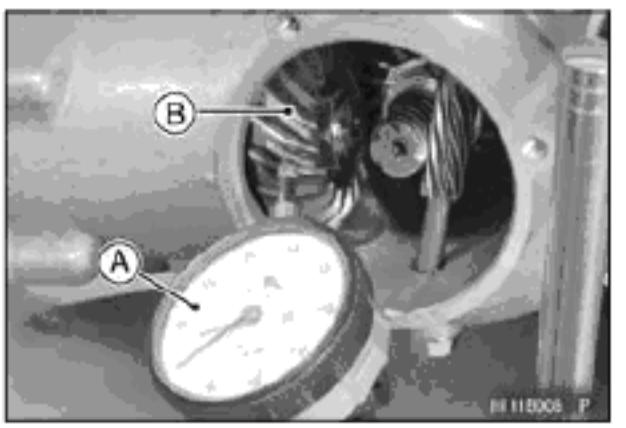
Transmission

4. Drive Bevel Gear Shim(s)

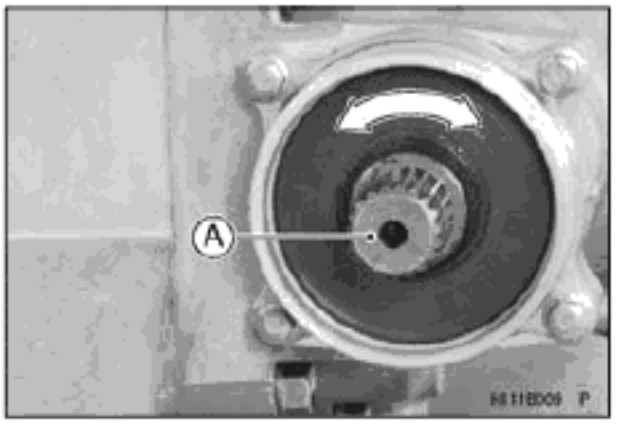
Thickness	Part Number
0.60 mm (0.024 in.)	92180-Y001
0.65 mm (0.026 in.)	92180-Y002
0.70 mm (0.028 in.)	92180-Y003
0.75 mm (0.030 in.)	92180-Y004
0.80 mm (0.031 in.)	92180-Y005
0.85 mm (0.033 in.)	92180-Y006
0.90 mm (0.035 in.)	92180-Y007
0.95 mm (0.037 in.)	92180-Y008
1.00 mm (0.039 in.)	92180-Y009
1.05 mm (0.041 in.)	92180-Y010
1.10 mm (0.043 in.)	92180-Y011
1.15 mm (0.045 in.)	92180-Y012

Backlash Adjustment

- Remove the output drive bevel gear cover (see Transmission Case Removal).
- Clean any dirt and oil off the output drive bevel gear teeth.
- Set a dial gauge [A] on the driven bevel gear [B] as shown.



- Measure the backlash by turning the driven bevel gear shaft [A] in each direction, reading the total backlash on the dial gauge.



Driven Bevel Gear Backlash
Standard: 0.03 ~ 0.15 mm (0.0012 ~ 0.0059 in.)

★If the backlash is not within specification, the shim must be changed and the backlash should be rechecked until correct (see Tooth Contact Adjustment).

★If the backlash is too small (under 0.03 mm, 0.001 in.), replace the driven bevel gear side spacer with a thinner shim.

★If the backlash is too great (over 0.15 mm, 0.006 in.), replace the driven bevel gear side spacer with a thicker shim.

Transmission

Tooth Contact Adjustment

After backlash adjustment is carried out, the tooth contact must be checked. Pay attention to the following procedures.

- Remove the driven bevel gear.
- Clean and degrease several teeth of the drive and driven bevel gears. Apply a coating of machinist's layout dye or paste to several teeth of the driven bevel gear.
- Install the driven bevel gear.
- Rotate the driven bevel gear several turns in both directions.
- Remove the driven bevel gear and inspect the coated teeth of the drive bevel gear. The tooth contact pattern should be as shown in [A], [B] and [C].

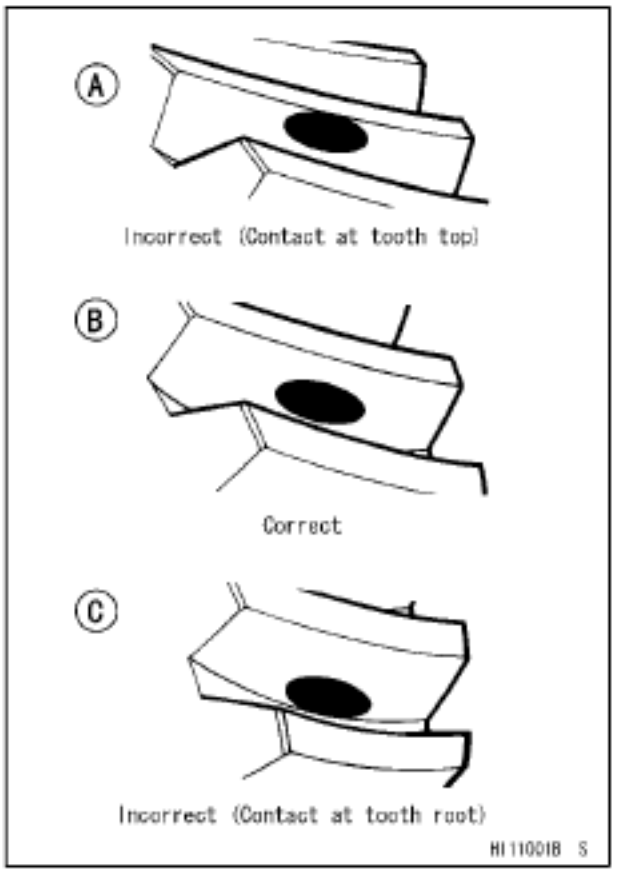
★If tooth contact is found to be correct (example [B]), then to complete installation.

★If tooth contact is found to be incorrect (examples [A] and [C]), the shim thickness between the drive bevel gear and driven bevel gear must be changed and the tooth contact rechecked until correct.

NOTE

○*backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the drive and driven bevel gears.*

Tooth Contact	Drive Bevel Gear Shim Adjustment	Driven Bevel Gear Shim Adjustment
Contact at tooth top [A]	Increase shim thickness	Increase shim thickness
Contact at tooth root [C]	Decrease shim thickness	Decrease shim thickness



Ball Bearing, Needle Bearing, and Oil Seal

Ball and Needle Bearing Replacement

NOTICE

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 the needle bearing.

NOTE

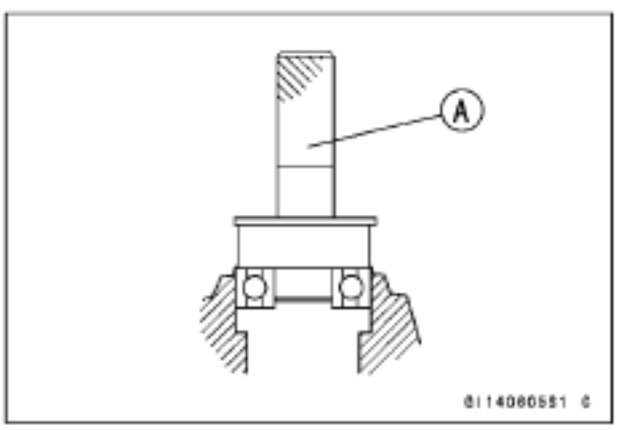
○*In the absence of the above mentioned tools, satisfactory results may be obtained by heating the case to approximately 93°C (200°F) max., and tapping the bearing in or out.*

NOTICE

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

NOTICE

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.

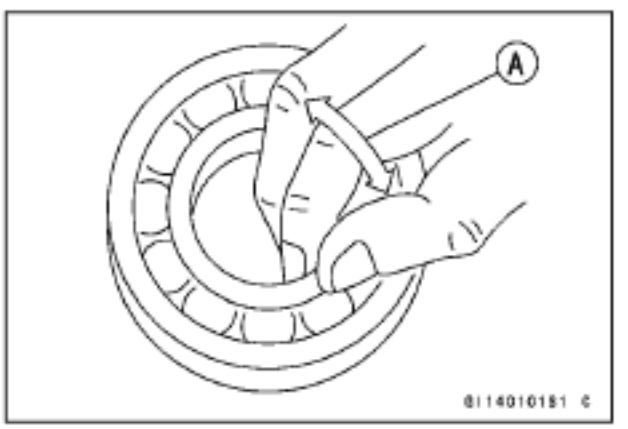
○Spin [A] the bearing by hand to check its condition.

★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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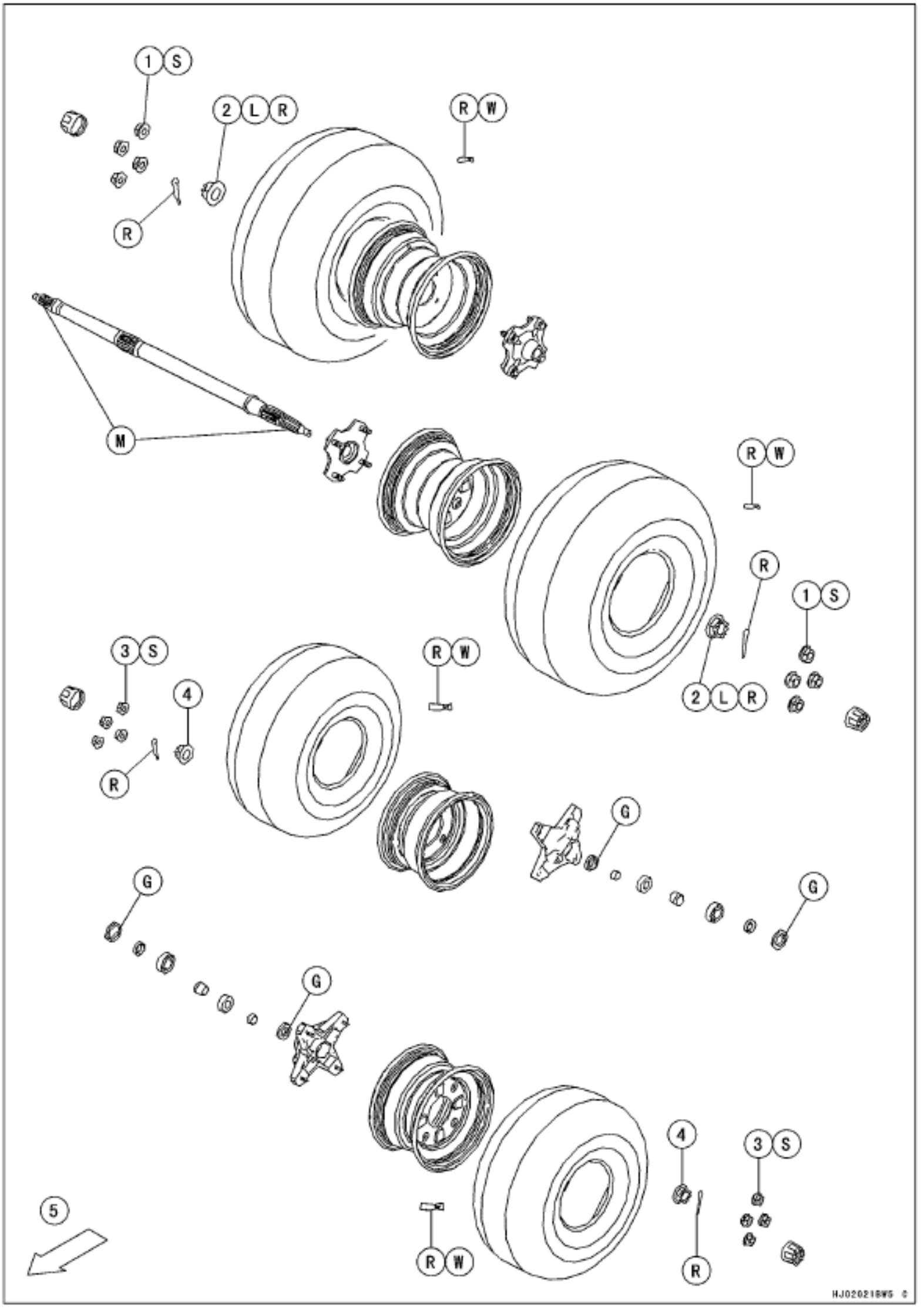
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear Wheel Nuts	54	5.5	40	S
2	Rear Wheel Hub Nuts	147	15.0	108	L, R
3	Front Wheel Nuts	54	5.5	40	S
4	Front Wheel Hub Nuts	69	7.0	51	

5. Front
G: Apply grease.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
R: Replacement Parts
S: Follow the specific tightening sequence.
W: Apply water or soap and water solution.

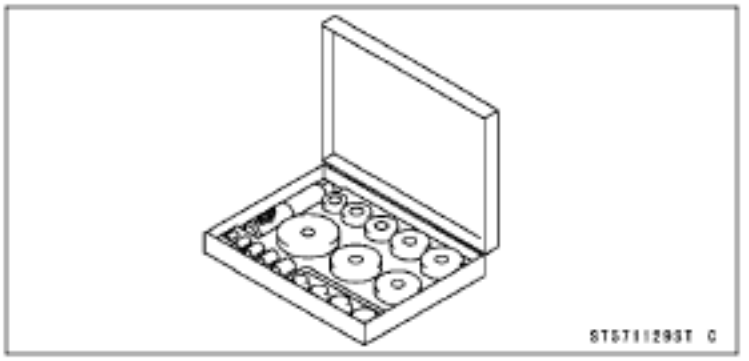
Specifications

Item	Standard	Service Limit
Wheel Alignment		
Toe-in of Front Wheels:	2.5 ~ 17.5 mm (0.098 ~ 0.689 in.) at 1G*	– – –
Wheels (Rims)		
Rim Size:		
Front	10 × 5.5 AT	– – –
Rear	10 × 8.0 AT	– – –
Tires		
Standard Tire:		
Front	AT 22 × 7-10 MAXXIS, M937, Tubeless	– – –
Rear	AT 22 × 10-10 MAXXIS, M938, Tubeless	– – –
Tire Air Pressure (when cold):		
Front	32 kPa (0.33 kgf/cm², 4.6 psi)	– – –
Rear	24 kPa (0.24 kgf/cm², 3.5 psi)	– – –
Maximum Tire Air Pressure (to seat beads, when cold)	250 kPa (2.5 kgf/cm², 36 psi)	– – –
Tire Tread Depth:		
Front	– – –	3 mm (0.12 in.)
Rear	– – –	3 mm (0.12 in.)

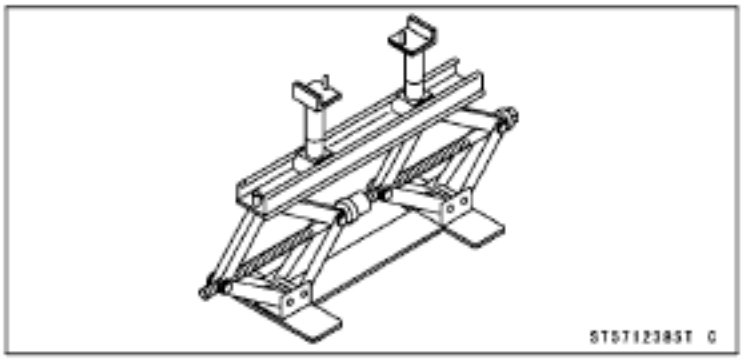
1G*: The tires are grounded without the person and load.

Special Tools

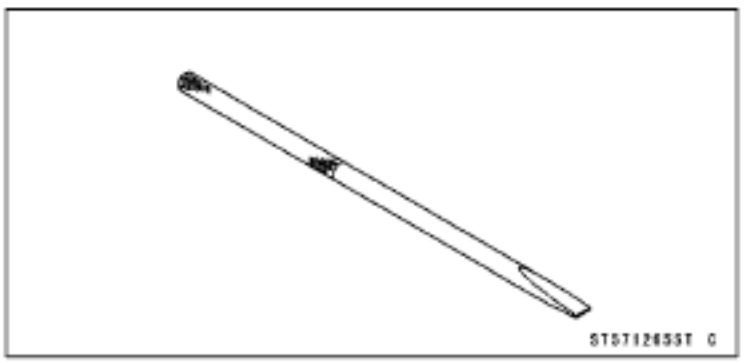
Bearing Driver Set:
57001-1129



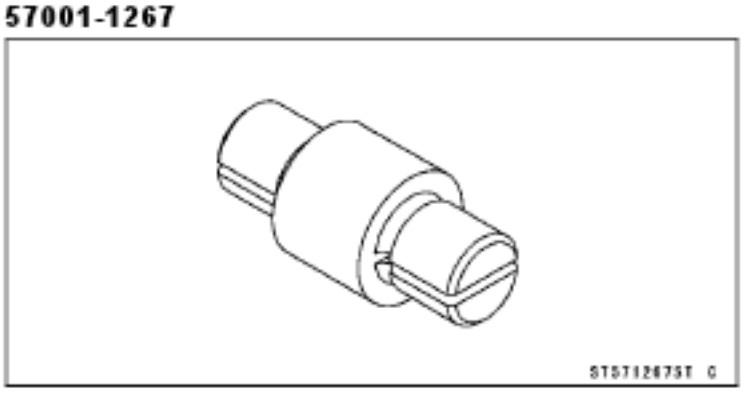
Jack:
57001-1238



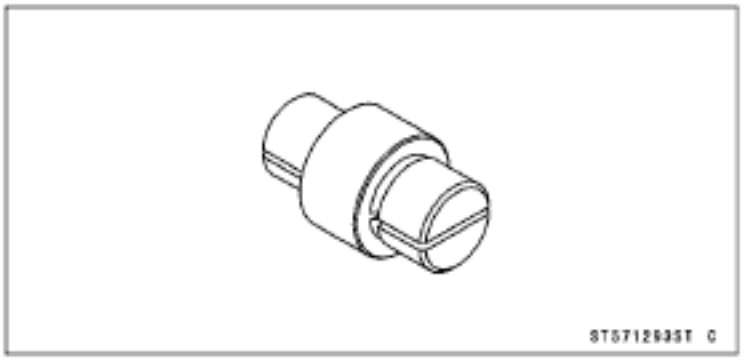
Bearing Remover Shaft, ϕ9:
57001-1265



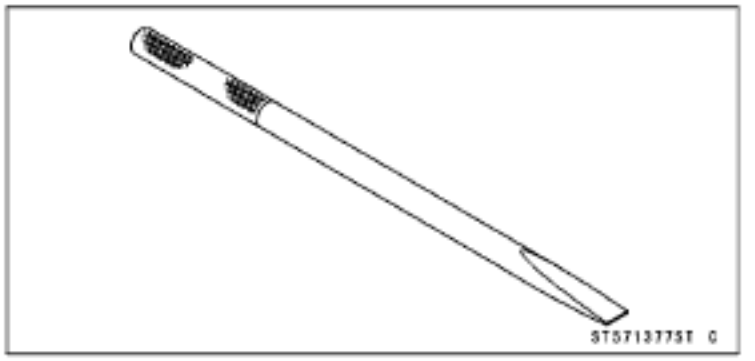
Bearing Remover Head, ϕ15 × ϕ17:
57001-1267



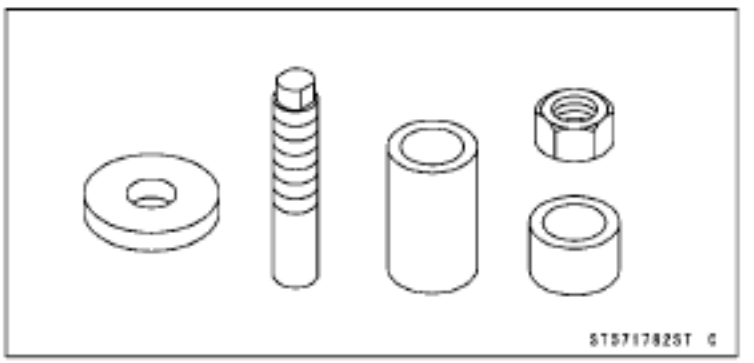
Bearing Remover Head, ϕ20 × ϕ22:
57001-1293



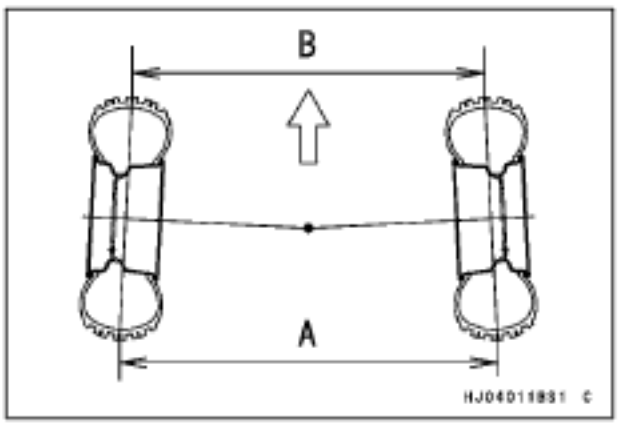
Bearing Remover Shaft, ϕ13:
57001-1377



Hub Driver Set:
57001-1782



Wheel Alignment



Toe-in is the difference between the distance of front and the one of rear at the axle height position in the front wheels. When there is toe-in, the distance A (Rear) is 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 (Rear) – B (Front) = Amount of Toe-in

(Distance A and B are measured at axle height with the vehicle sitting on the ground, or at 1G.)

Steering Centering Inspection

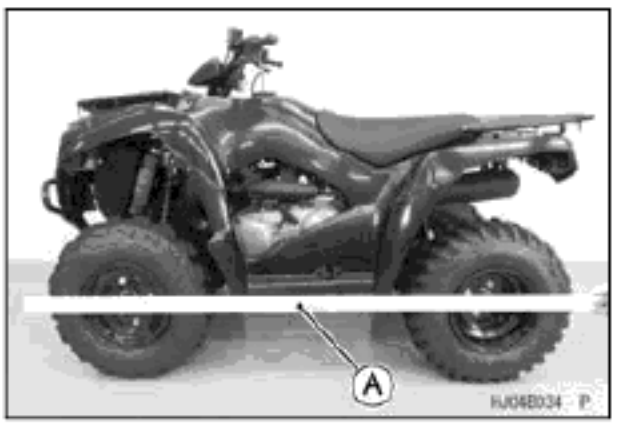
- Test ride the vehicle.

★If the handlebars is straight when the vehicle is traveling in a straight line, check the toe-in (see Toe-in Inspection in the Periodic Maintenance chapter).

★Otherwise, adjust the steering centering (see Steering Centering Adjustment).

Steering Centering Adjustment

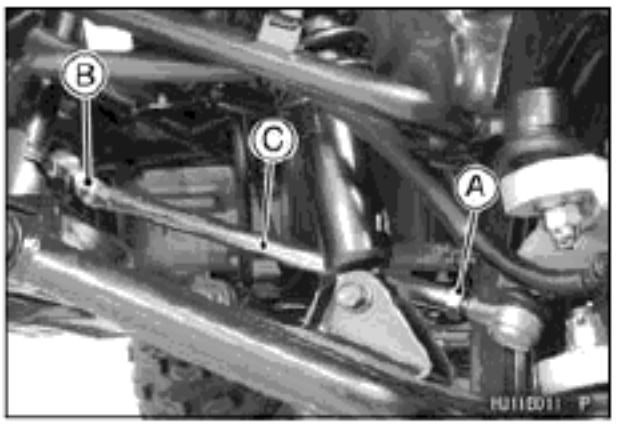
- Hold a straightedge [A] against the rear wheel rim on one side at axle height.



- With the handlebars straight ahead, loosen the locknuts [A] [B] and turn the tie-rod [C] until the front wheel on that side is parallel to the straightedge.

NOTE

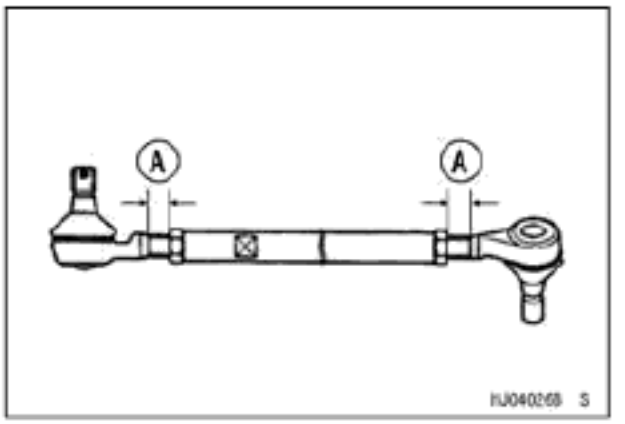
○*The locknut [B] near the steering shaft on the tie-rod has left-hand threads. Turn the locknut clockwise for loosening.*



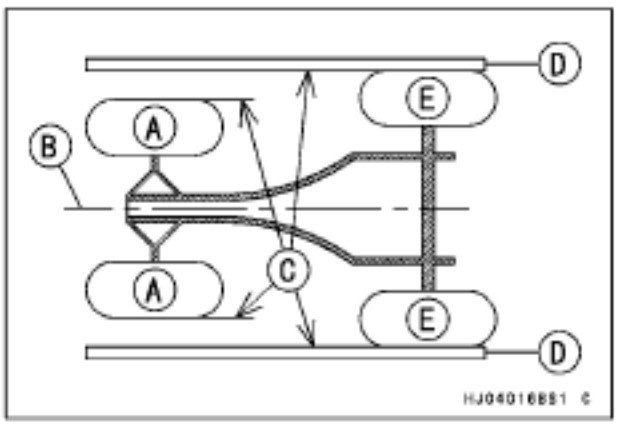
Wheel Alignment

NOTICE

Adjust the tie-rod so that the visible thread length [A] is even on both ends of the tie-rod, or the threads could be damaged.



- Repeat the straightedge procedure on the other side of the vehicle. Now the front wheels are parallel to each other and to the center line of the vehicle.
  Front Wheel [A]
  Vehicle Center Line [B]
  Parallel Each Other [C]
  Straightedges [D]
  Rear Wheels [E]
- Check the toe-in (see Toe-in Inspection in the Periodic Maintenance chapter).



Toe-in Inspection

- Refer to the Toe-in Inspection in the Periodic Maintenance chapter.

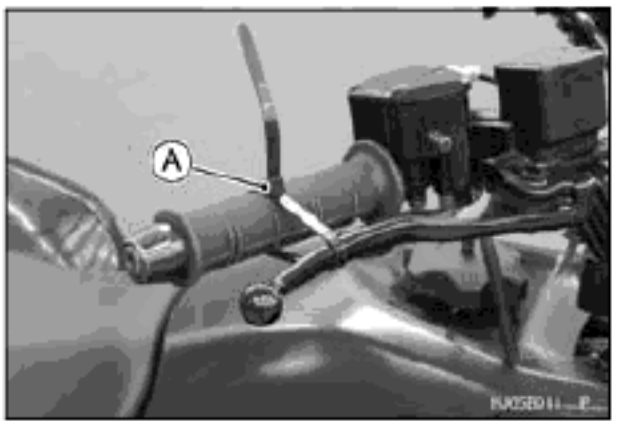
Toe-in Adjustment

- Refer to the Toe-in Adjustment in the Periodic Maintenance chapter.

Wheels (Rims)

Wheel Removal

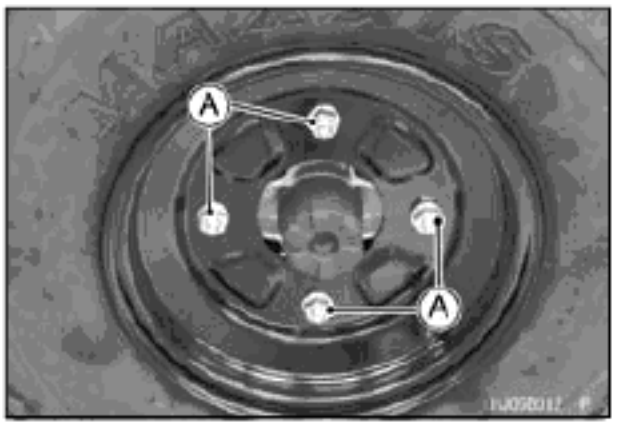
- Squeeze the brake lever securely and hold it with a band [A].



- Loosen the wheel nuts [A].
- Support the vehicle on a stand or a jack so that the wheels are off the ground.

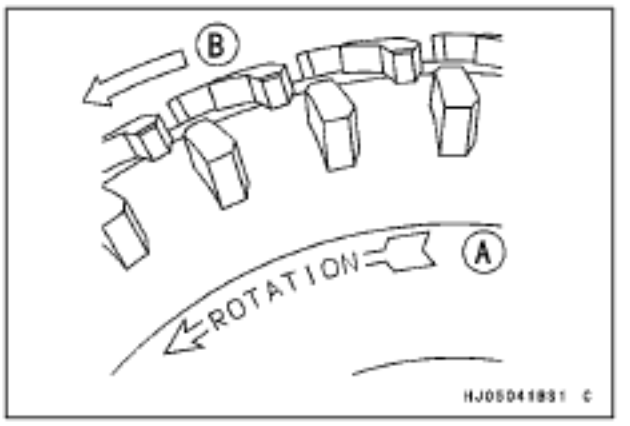
Special Tool - Jack: 57001-1238

- Remove:
  Wheel Nuts
  Wheel



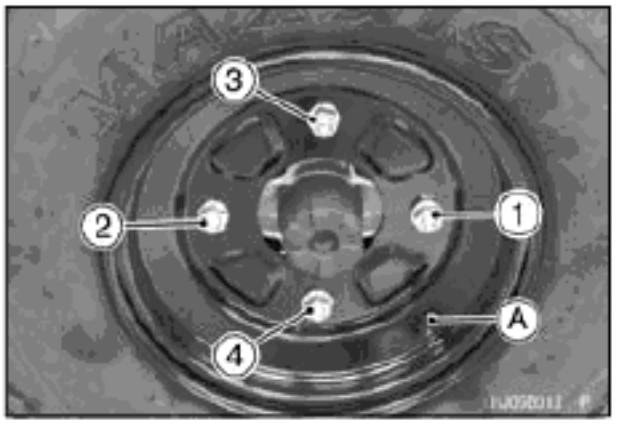
Wheel Installation

- Check the wheel runout (see Wheel Inspection in the Periodic Maintenance chapter).
- Check the tire rotation mark [A] on the tire, and install the wheel accordingly.
  [B] Tire Rotation Direction



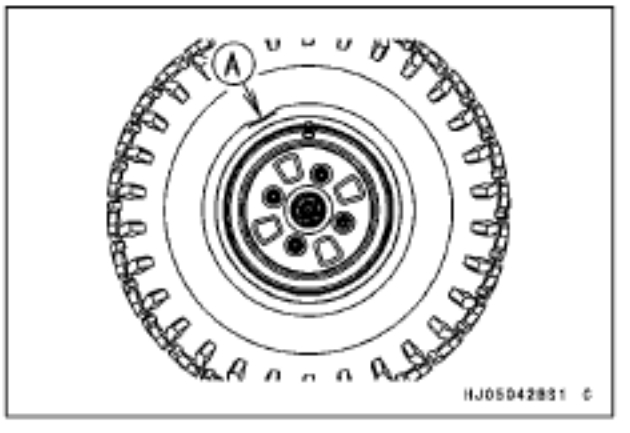
- Position the wheel so that the air valve [A] is toward the outside of the vehicle.
- Wipe dry the threads of the hub bolts and the seating surface of the rim.
- Wipe dry the nuts.
- Tighten:

Torque - Wheel Nuts: 54 N·m (5.5 kgf·m, 40 ft·lb)



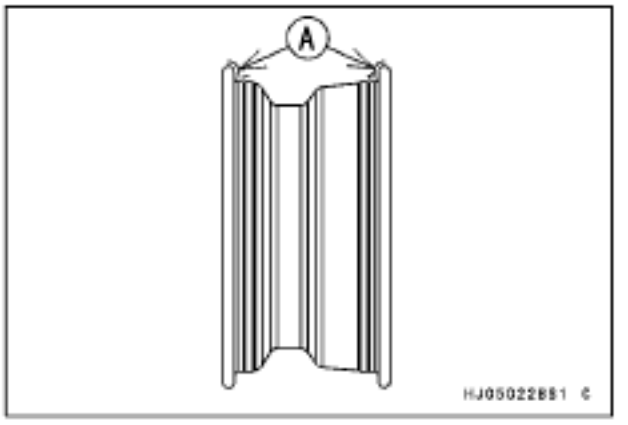
Wheel (Rim) Inspection

- Examine both sides of the rim for dents [A]. If the rim is dented, replace it.



Wheels (Rims)

★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).
- Remove the tire from the rim (see Tire Removal).

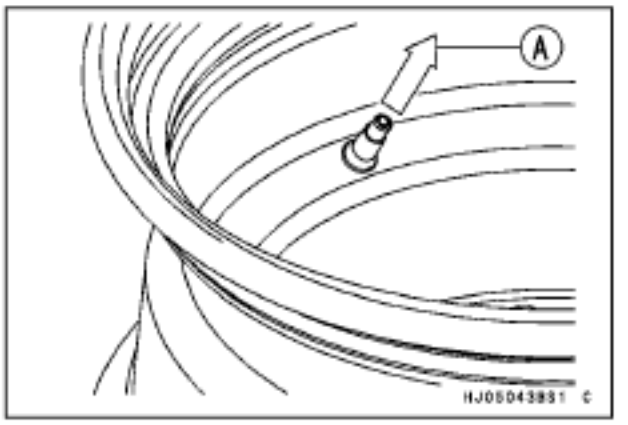
○Remove the air valve and discard it.

NOTICE

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

- Install a new air valve in the new rim.

○Remove the valve cap, lubricate the stem with a soap and water solution, and pull [A] the stem through the rim from the inside out until it snaps into place.



NOTICE

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

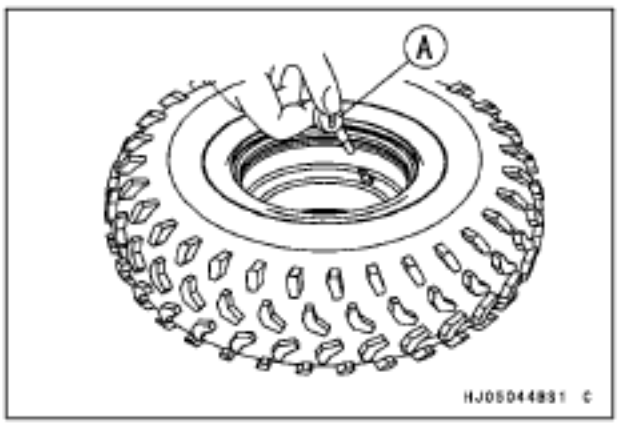
- Install the tire on the new rim (see Tire Installation).
- Install the wheel (see Wheel Installation).
- Install the air valve cap.

Tires

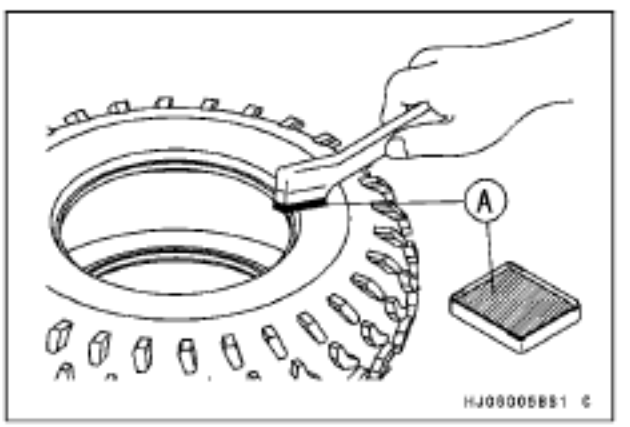
Tire Removal

- Remove the wheel.
- 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.



NOTICE

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.

NOTICE

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

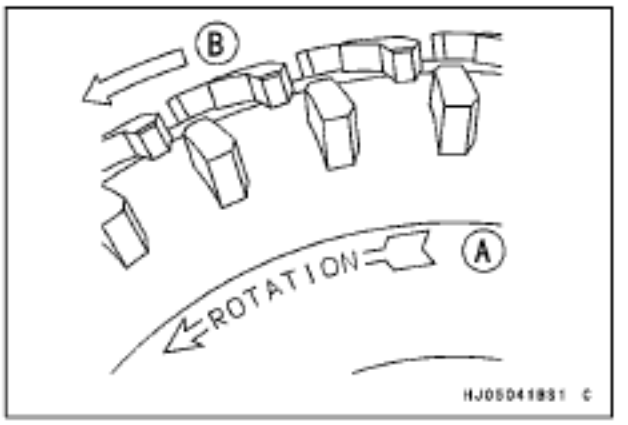
- Check the tire for wear and damage (see Tire Inspection in the Periodic Maintenance chapter).
- Lubricate the tire beads and rim flanges with a soap and water solution, or water.

⚠WARNING

Lubricants other than water or a water and soap solution can cause the bead to separate from the rim and cause an accident resulting in serious injury or death. Use only water or a water and soap solution to lubricate the bead when installing the tire.

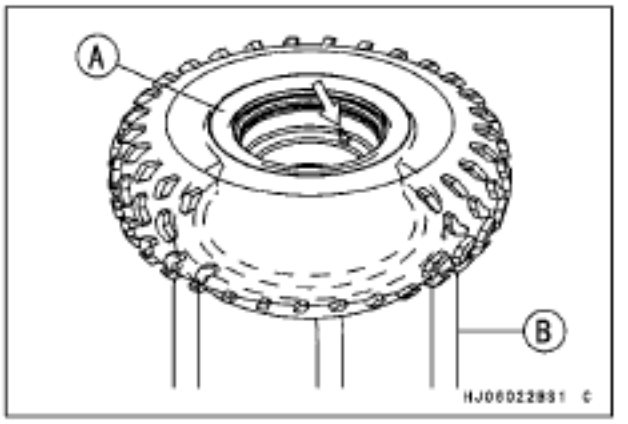
Tires

- Check the tire rotation mark [A] on the tire, and install the tire on the rim accordingly.
  [B] Tire Rotation Direction
- Install the tire on the rim using a suitable commercially available tire changer.
- Lubricate the tire beads again and center the tire on the rim.



- 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

Overinflating a tire can cause it to explode, causing serious injury or death. Be sure to install the valve core whenever inflating the tire, and do not inflate the tire to more than maximum pressure.

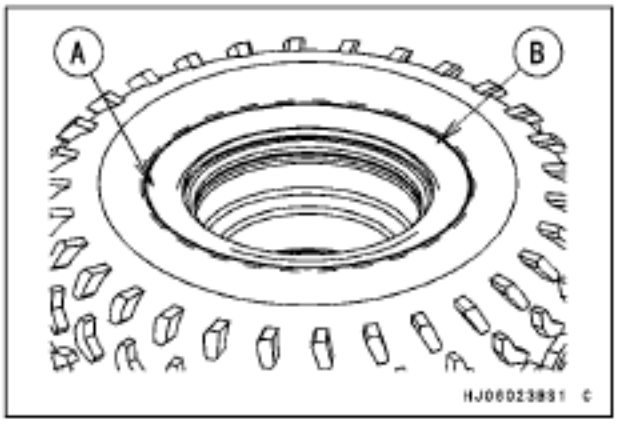
- Check to see that rim lines [A] on both sides of the tire are parallel with the rim flanges [B].

★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 with the owner's tool kit.*

Tire Air Pressure (when cold)
Front 32 kPa (0.33 kgf/cm², 4.6 psi)
Rear 24 kPa (0.24 kgf/cm², 3.5 psi)

- Install the air valve cap.
- Install the wheel (see Wheel Installation).
- Wipe off the soap and water solution on the tire and dry the tire before operation.

⚠ WARNING

Water or soap solution on the tire bead can cause tire separation and an accident resulting in serious injury or death. Do not operate the vehicle until any water or soap solution applied to the bead has completely dried.

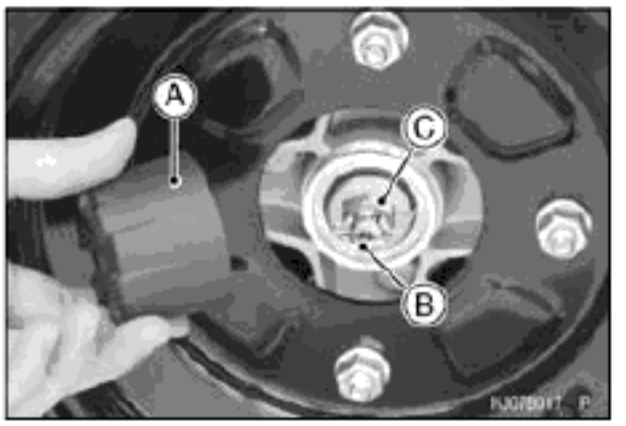
Tire Inspection

- Refer to the Tire Inspection in the Periodic Maintenance chapter.

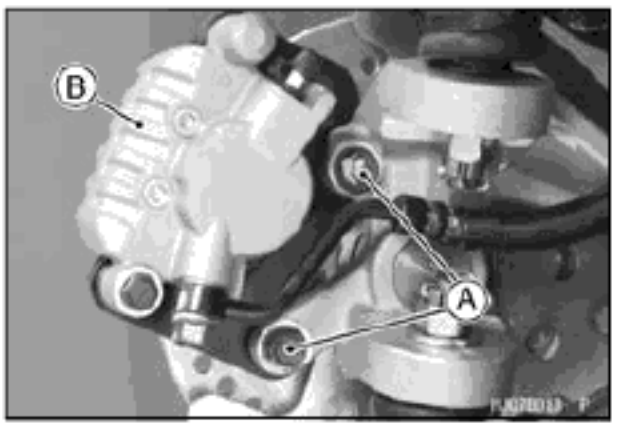
Front Hub

Front Hub Removal

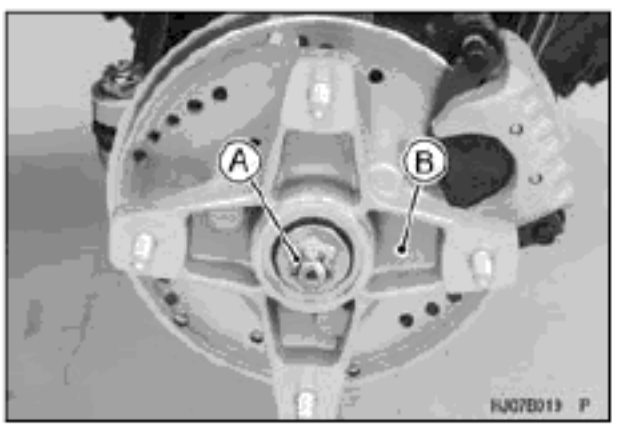
- Remove:
  Cap [A]
  Cotter Pin [B]
- Loosen the axle nut [C].



- Remove the front wheel (see Wheel Removal).
- Remove the caliper by taking off the mounting bolts [A], and let the caliper [B] hang free.



- Remove the axle nut [A], and pull off the front hub [B] together with the brake disc.
- Separate the brake disc from the front hub (see Front Brake Disc Removal in the Brakes chapter).



Front Hub Installation

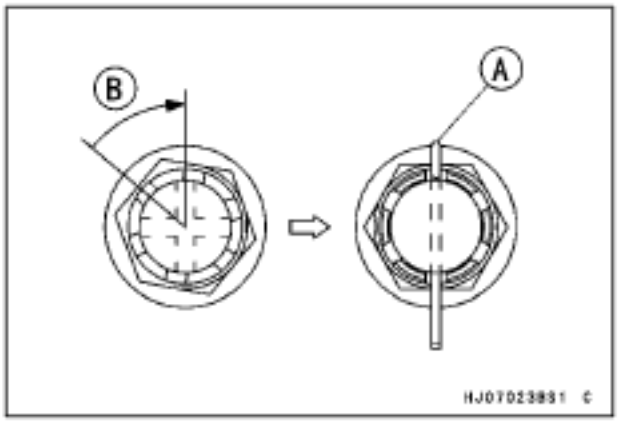
- Install the front brake disc (see Front Brake Disc Installation in the Brakes chapter).
- Wipe dry the surface of the hub and threads of the axle shaft.
- Wipe dry the threads and seating surface of the nuts.
- Tighten:

Torque - Front Wheel Hub Nuts: 69 N·m (7.0 kgf·m, 51 ft·lb)

- Insert a new cotter pin [A].

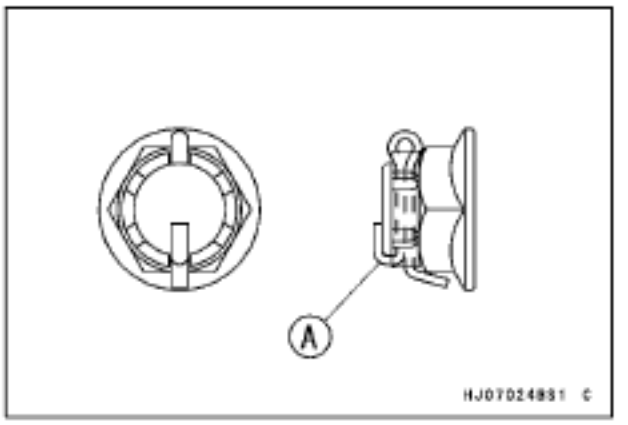
NOTE

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



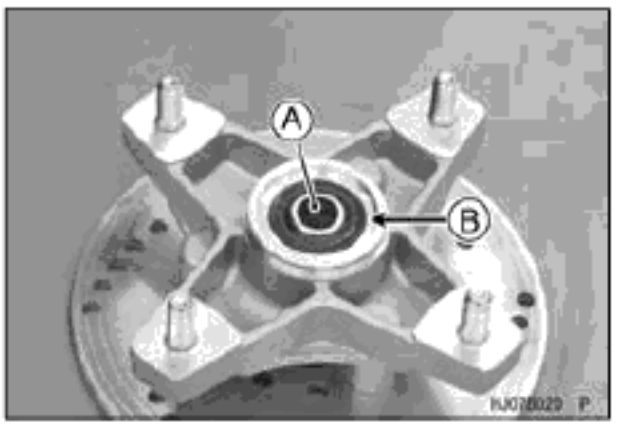
Front Hub

- Bend the cotter pin [A] over the nut.
- Install the cap.



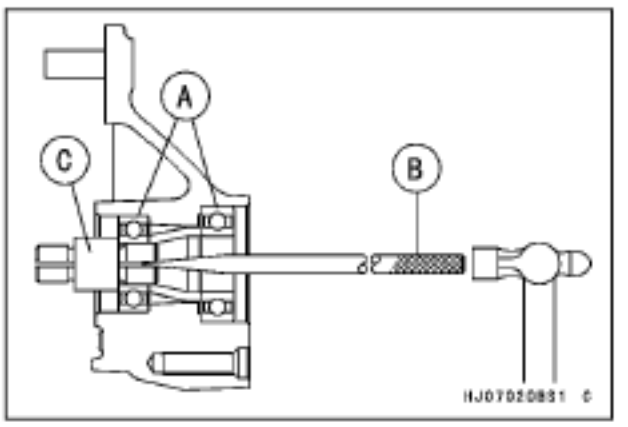
Front Hub Disassembly

- Remove:
  Collars [A]
  Dust Seals [B]
  Brake Disc (see Front Brake Disc Removal in the Brakes chapter)



- Take the bearings [A] out of the hub, using the bearing remover.

Special Tools - Bearing Remover Shaft, ϕ9: 57001-1265 [B]
Bearing Remover Head, ϕ15 × ϕ17: 57001 -1267 [C] (For Outside Bearing)
Bearing Remover Head, ϕ20 × ϕ22: 57001 -1293 (For Inside Bearing)



Front Hub Assembly

- Before installing the hub bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
- Replace the bearings with new ones.

NOTE

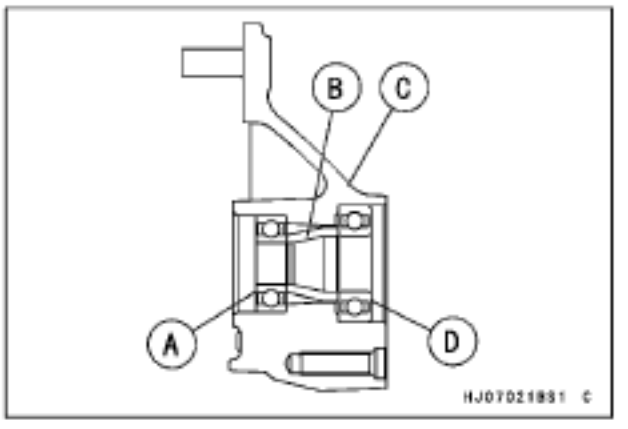
○*Install the bearings so that the marked side faces out.*

- Press in the one side bearing [A] until it is bottomed.

Special Tool - Bearing Driver Set: 57001-1129

- Insert the collar [B] in the hub [C] as shown.
- Press in the other side bearing [D] until it is bottomed.

Special Tool - Bearing Driver Set: 57001-1129

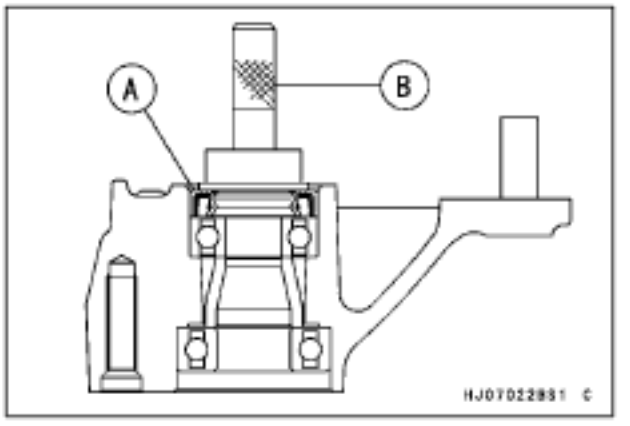


Front Hub

- Replace the dust seals with new ones.
- Press in the dust seal [A] until it is bottomed.
- Apply grease to the dust seal lips.

Special Tool - Bearing Driver Set: 57001-1129 [B]

- Press the hub bolts using a press, if removed.
- Install the brake disc (see Front Brake Disc Installation in the Brakes chapter).
- Install the removed parts (see appropriate chapters).



Hub Bearing Inspection

○Since the hub bearings are made to extremely close tolerances, the clearance can not normally be measured.

NOTE

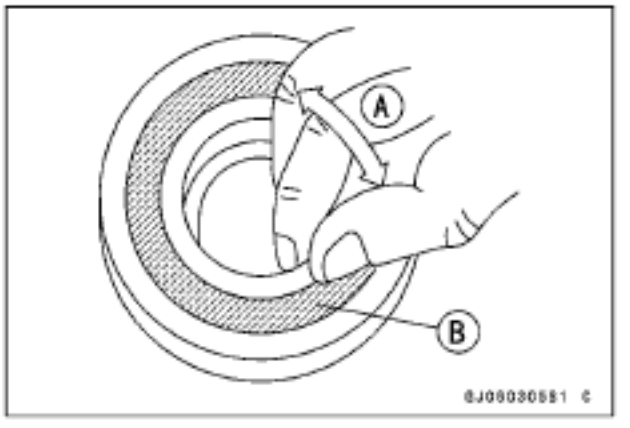
○*Do not remove any bearings for inspection. If any bearings are removed, they will need to be replaced with new ones.*

- Turn each bearing in the hub back and forth [A] while checking for plays, roughness, or binding.

★If bearing play, roughness, or binding is found, replace the bearing.

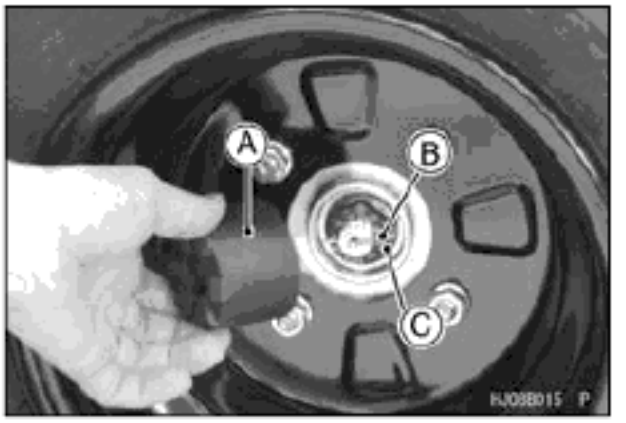
- Examine the bearing seal [B] for tears or leakage.

★If the seal is torn or is leaking, replace the bearing.

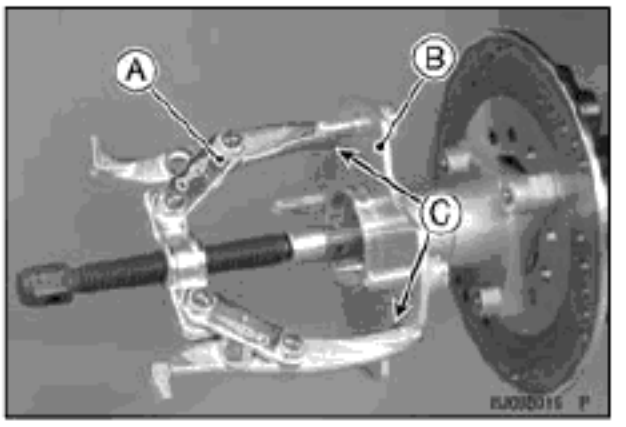


Rear Hub

Rear Hub Removal



- Remove:
  Cap [A]
  Cotter Pin [B]
- Loosen the axle nut [C], while applying the brake.
- Remove:
  Rear Wheel (see Wheel Removal)
  Axle Nut

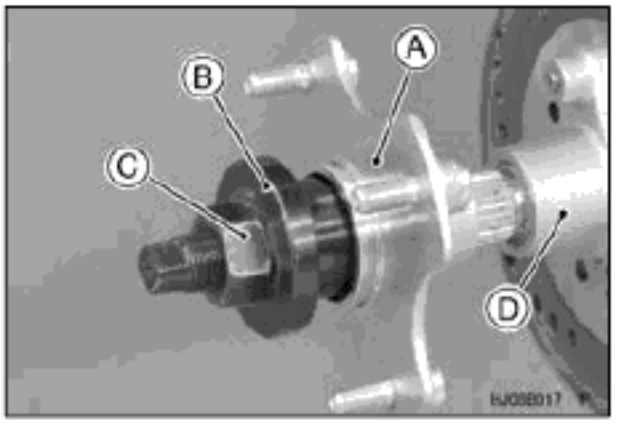


- Using a suitable puller [A], remove the rear hub [B] while holding it with the puller's hooks. Make sure that the hooks are positioned [C] on the rear hub as shown in the figure.

NOTE

○If the puller's hooks are not positioned correctly on the rear hub, the rear hub could be damaged and distorted.

Rear Hub Installation

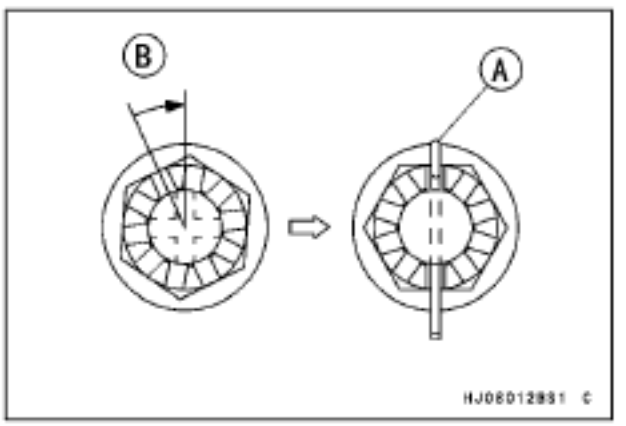


- Clean any dirt and molybdenum disulfide grease off the splines of rear hub and rear axle.
- Apply molybdenum disulfide grease to the splines of the axle, so the spline grove is filled with grease.
- Install the rear hub [A] onto the rear axle.

Special Tool - Hub Driver Set [B]: 57001-1782

- Tighten the nut [C] of the special tool, and install the rear hub until it is the disc hub [D].
- Install the rear wheel (see Wheel installation).
- Clean and wipe dry the threads of the rear axle.
- Replace the rear wheel hub nut with a new one.

Torque - Rear Wheel Hub Nut: 147 N·m (15.0 kgf·m, 108 ft·lb)



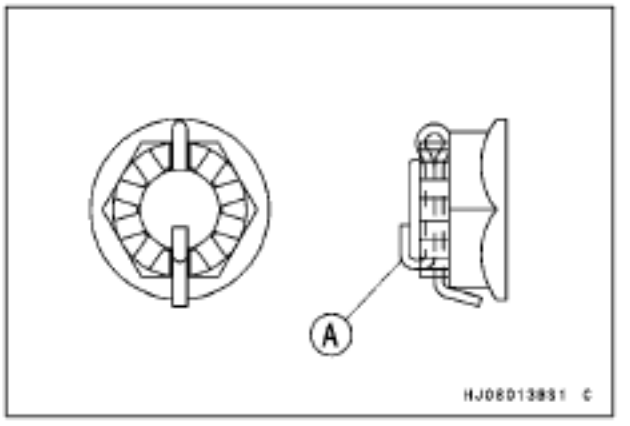
- Insert a new cotter pin [A].

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

Rear Hub

- Bend the cotter pin [A] over the nut.
- Install the cap.



Final Drive

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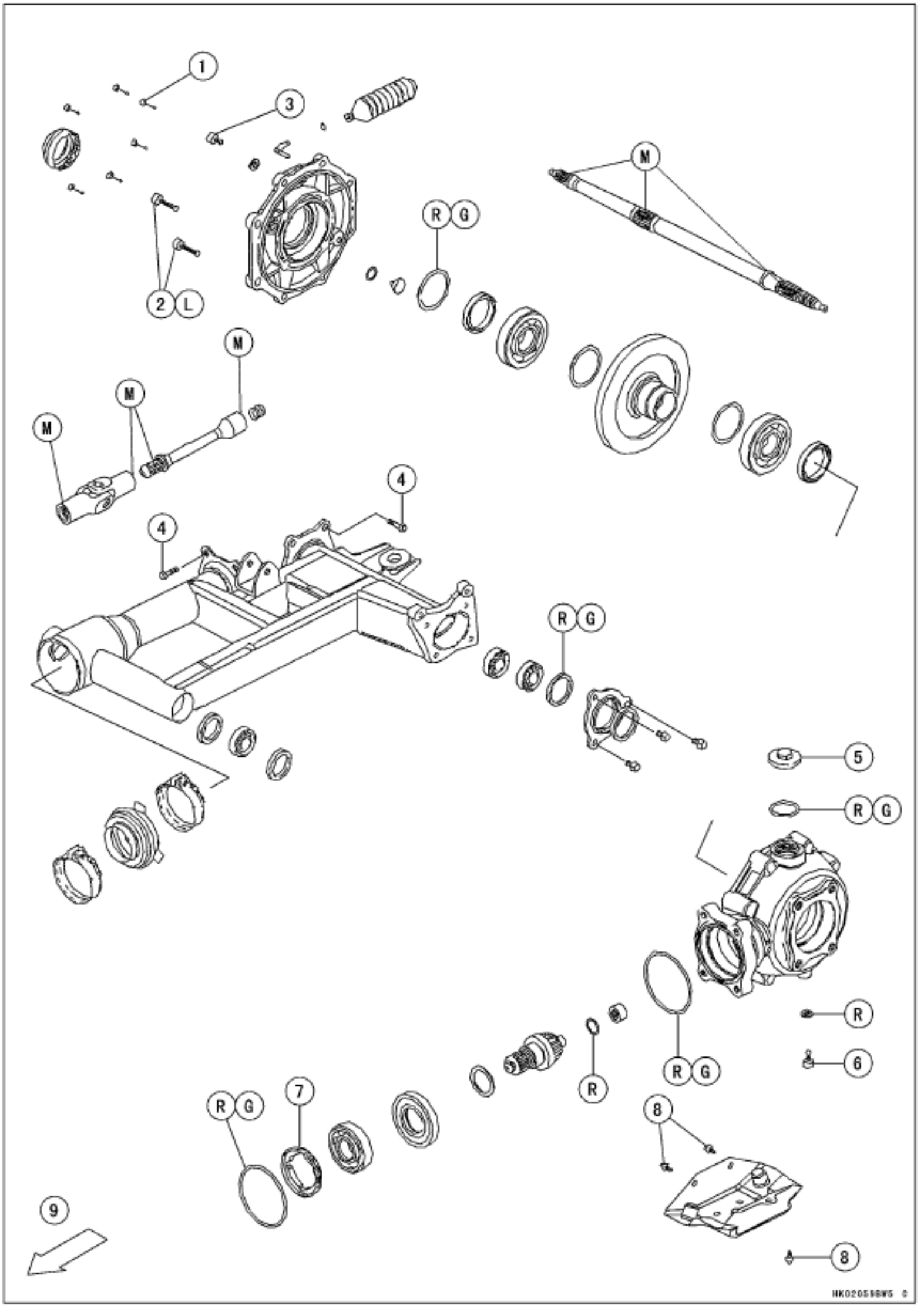
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Final Gear Case Cover Bolts (M8)	26	2.7	19	
2	Final Gear Case Cover Bolts (M10)	39	4.0	29	L
3	Final Gear Case Oil Level Inspection Bolt	20	2.0	15	
4	Final Gear Case Mounting Bolts	54	5.5	40	
5	Final Gear Case Oil Filler Cap	15	1.5	11	
6	Final Gear Case Oil Drain Bolt	20	2.0	15	
7	Pinion Gear Bearing Holder Nut	98	10	72	
8	Final Gear Case Guard Bolts	31	3.2	23	

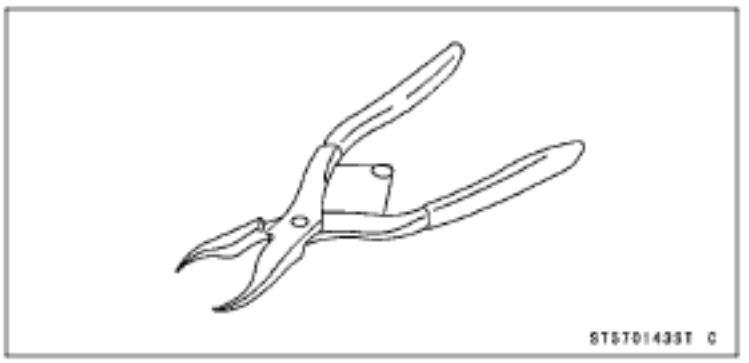
9. Front
G: Apply grease for oil seal and O-ring.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
R: Replacement Parts

Specifications

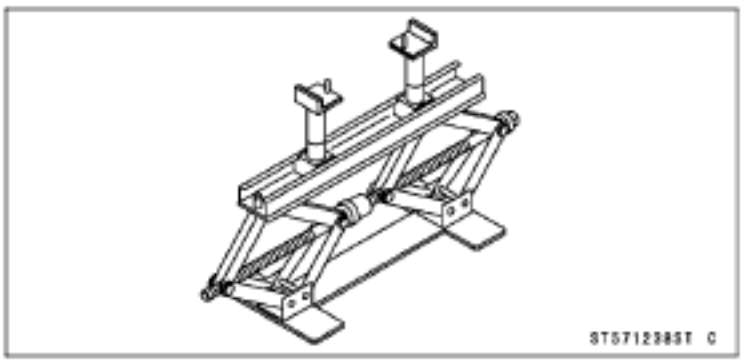
Item	Standard	Service Limit
Rear Axle Shaft		
Rear Axle Shaft Runout	– – –	TIR 3 mm (0.12 in.)
Bevel Gear Backlash		
Final	0.05 ~ 0.25 mm (0.0020 ~ 0.0098 in.) (at ring gear tooth)	0.4 mm (0.016 in.)
Final Gear Case Oil		
Viscosity	SAE#80	– – –
Capacity	0.15 L (0.16 US qt)	– – –

Special Tools

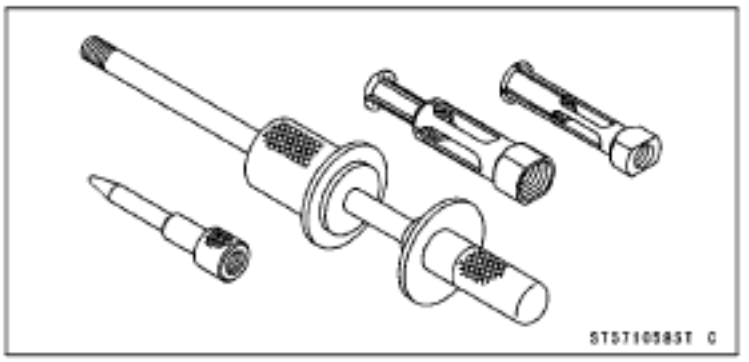
Inside Circlip Pliers:
57001-143



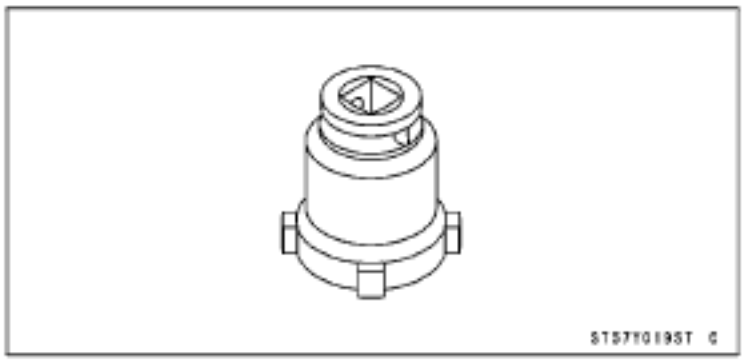
Jack:
57001-1238



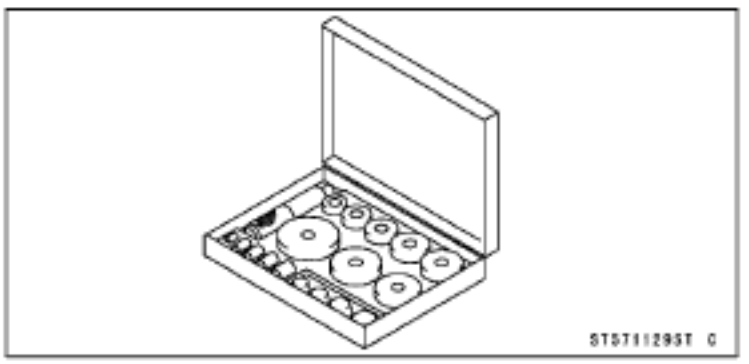
Oil Seal & Bearing Remover:
57001-1058



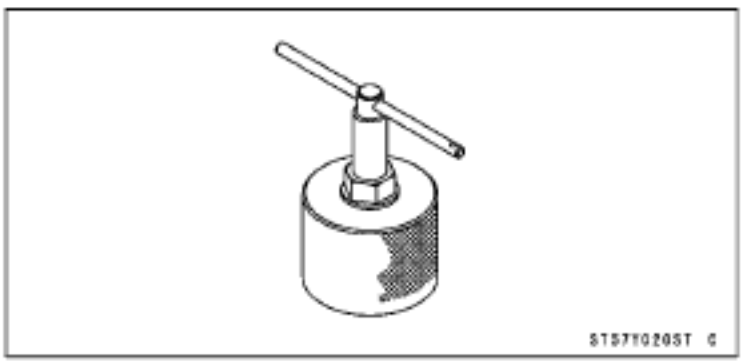
Pinion Bearing Lock Nut Wrench (52.5 mm):
57001-Y019



Bearing Driver Set:
57001-1129



Pinion Puller Set:
57001-Y020



Propeller Shaft

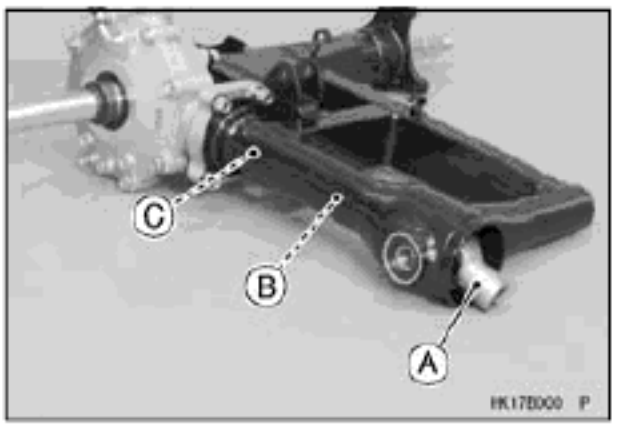
Propeller Shaft Removal

- Support the vehicle on a stand or the jack so that the rear wheels are off the ground.

Special Tool - Jack: 57001-1238

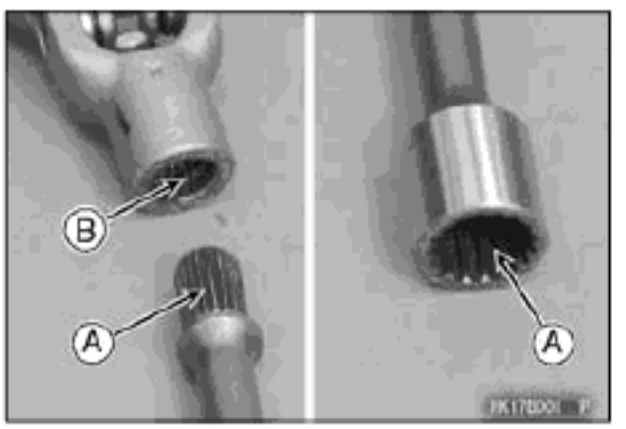
- Remove:
  Swingarm Assembly (see Swingarm Removal in the Suspension chapter)
- Support the final gear case on a stand or jack.

- Remove:
  Universal Joint [A]
  Propeller Shaft [B]
  Spring [C]

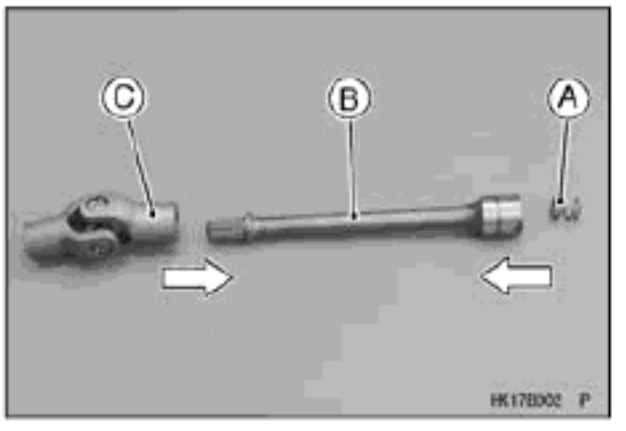


Propeller Shaft Installation

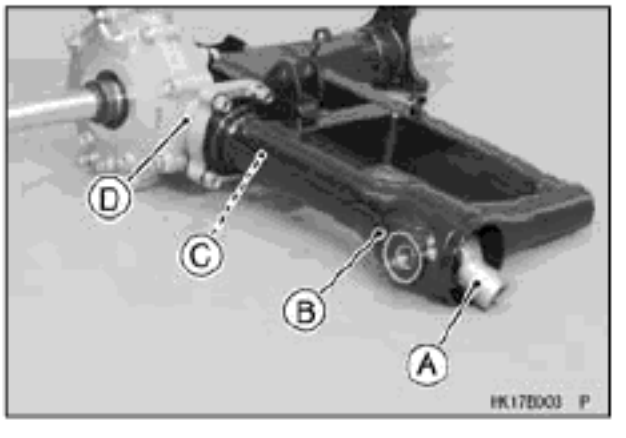
- Wipe the old grease off the end splines [A] of the propeller shaft and the universal joint [B].
- Apply molybdenum disulfide grease in those.



- Install the spring [A] to the rear end of propeller shaft [B].
- Install the universal joint [C] to the front end of propeller shaft.

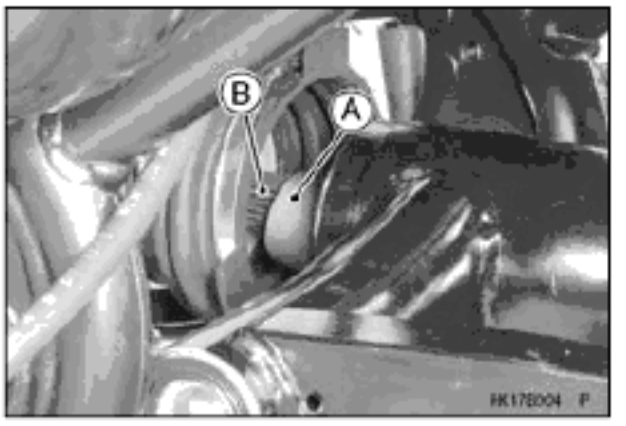


- Set the propeller shaft assembly [A] into the swingarm [B], and then secure propeller shaft spring [C] onto the pinion gear shaft in the final gear case [D].



Propeller Shaft

- Apply molybdenum disulfide grease:
  Splines at Front End [A] of Propeller Shaft
  Splines at Rear End [B] of Driven Gear Shaft
- Fit the propeller shaft to the driven gear shaft.
- Install the swingarm assembly.
- Install the removed parts (see appropriate chapters).



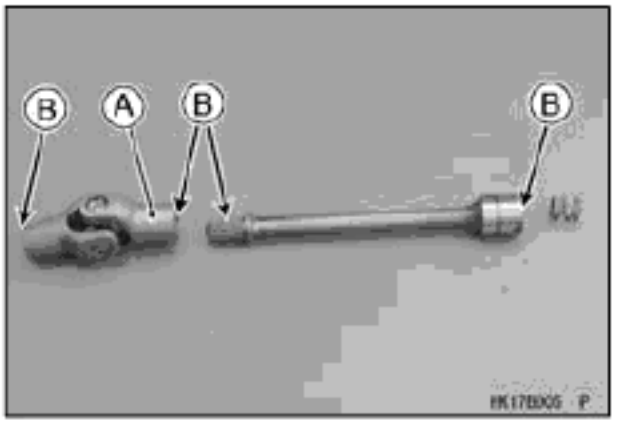
Propeller Shaft Inspection

- 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] the universal joint and propeller shaft is damaged.

★If they are badly worn, chipped, or loose, replace the propeller shaft and universal joint.



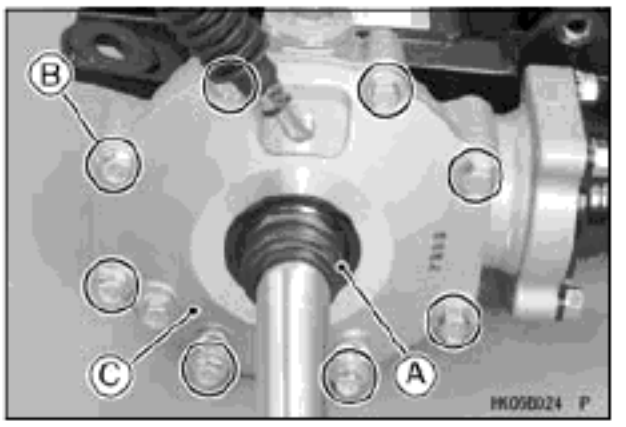
Propeller Shaft Joint Boot Inspection

- Refer to the Propeller Shaft Joint Boot Inspection in the Periodic Maintenance chapter.

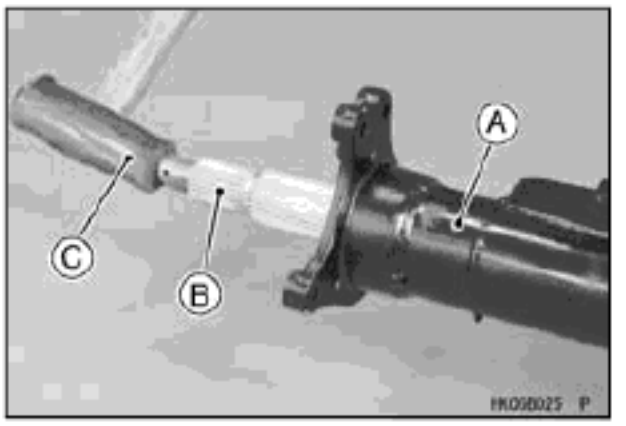
Rear Axle

Rear Axle Removal

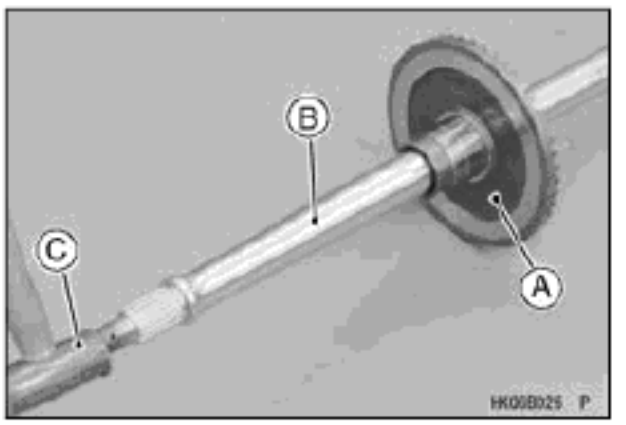
- Remove:
  Swingarm Assembly (see Swingarm Removal in the Suspension chapter)
  Boot [A]
  Final Gear Case Bolts [B]
  Final Gear Case Cover [C]



- Put the swingarm assembly [A] on the wooden blocks.
- Strike the rear axle [B] with a copper hammer [C], remove the rear axle and ring gear.

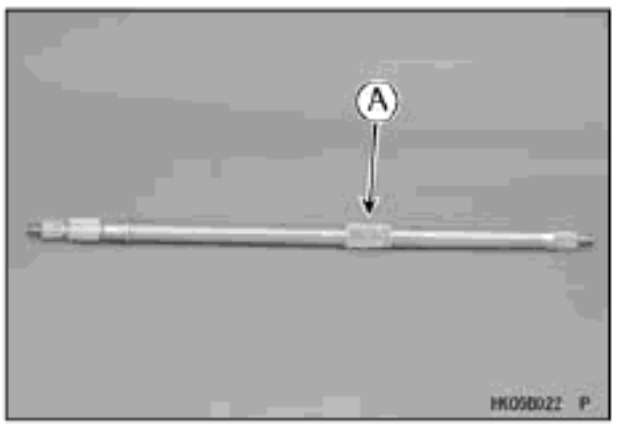


- Hold the ring gear [A], and then tap the rear axle [B] with a copper hammer [C], and then remove the ring gear.

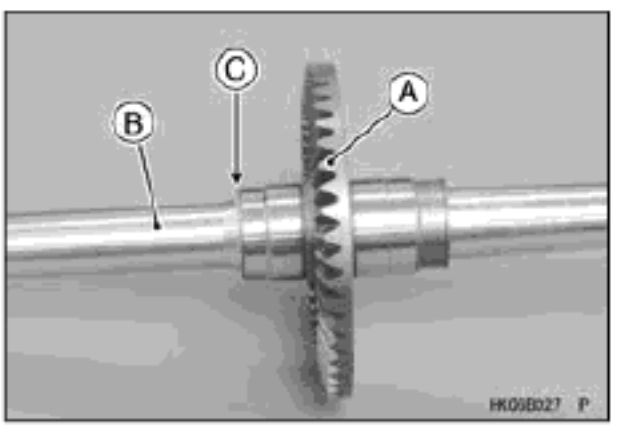


Rear Axle Installation

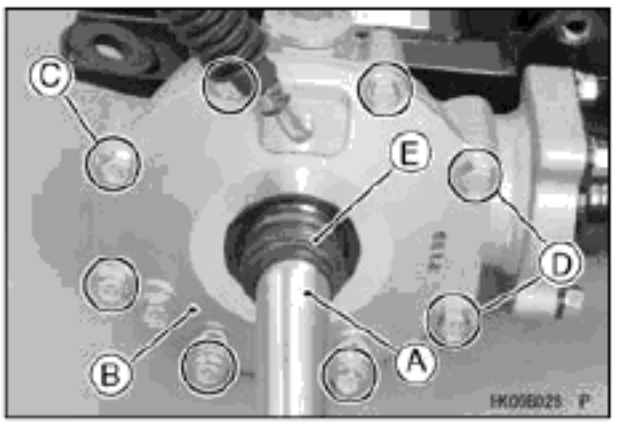
- Apply molybdenum disulfide grease to the center spline [A] of the rear axle.



- Press the ring gear [A] into the rear axle [B] so that its surface is flush with the end [C] of rear axle center spline.



Rear Axle



- Install the ring gear and rear axle [A] and shims to the final gear case.
- Install the final gear case cover [B].
- Tighten:

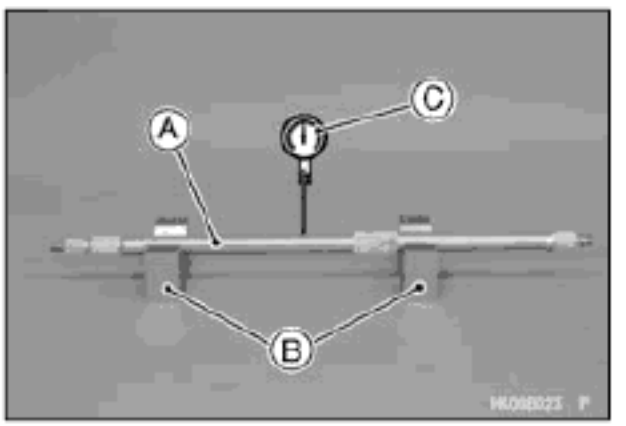
Torque - Final Gear Case Bolts (M8) [C]: 26 N·m (2.7 kgf·m, 19 ft·lb)

- Apply a non-permanent locking agent to the final gear case bolts (M10) [D].
- Tighten:

Torque - Final Gear Case Bolts (M10): 39 N·m (4.0 kgf·m, 29 ft·lb)

- Install the boot [E].
- Install the removed parts (see appropriate chapters).

Rear Axle Runout Inspection



- Remove the rear axle (see Rear Axle Removal).
- Visually inspect the rear axle [A] for damage.

★If the rear axle is damaged or bent, replace it.

- Set the rear axle in an alignment jig or on V blocks [B], and place a dial gauge [C] against the middle point.
- Turn the rear 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 rear axle.

Rear Axle Shaft Runout

Service Limit: TIR 3 mm (0.12 in.)

Final Gear Case

Final Gear Case Oil Level Inspection

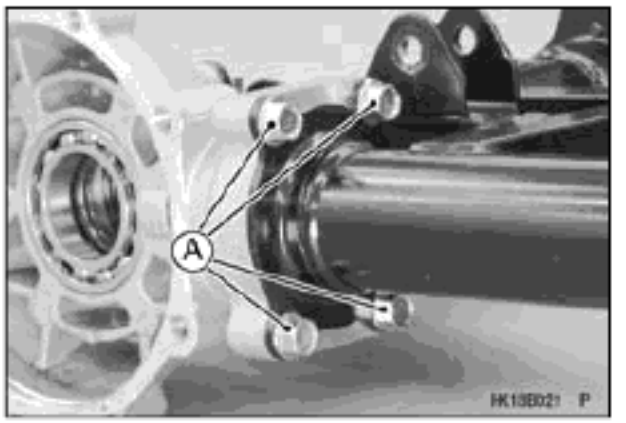
- Refer to the Final Gear Oil Level Inspection in the Periodic Maintenance chapter.

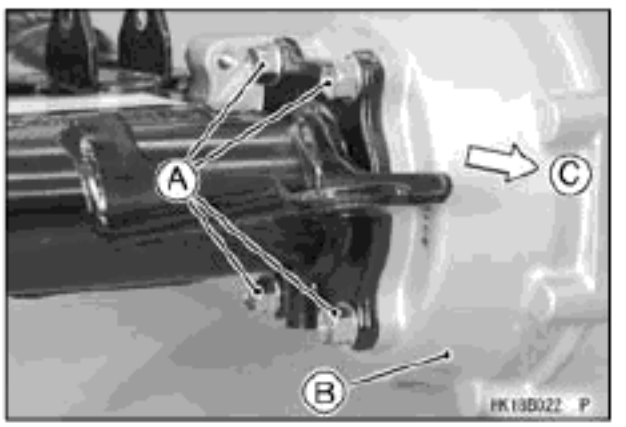
Final Gear Case Oil Change

- Refer to the Final Gear Oil Change in the Periodic Maintenance chapter.

Final Gear Case Removal

- Remove:
  Rear Axle (see Rear Axle Removal)
  Final Gear Case Mounting Bolts [A]
- Remove the final gear case [B] backward [C].



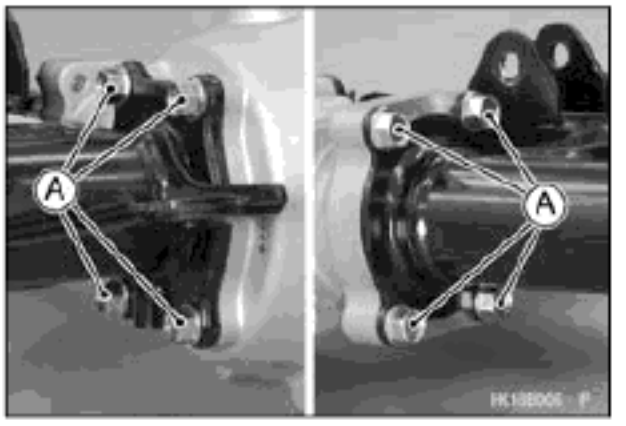


Final Gear Case Installation

- Installation is the reverse of removal, note the following.
- Install the final gear case.
- Tighten:

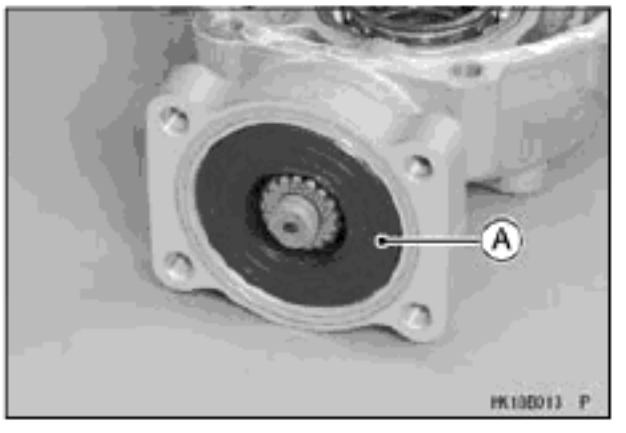
Torque - Final Gear Case Mounting Bolts [A]: 54 N·m (5.5 kgf·m, 40 ft·lb)

- Install the removed parts (see appropriate chapters).
- Fill the final gear case with the specified oil (see Final Gear Case Oil Change in the Periodic Maintenance chapter).



Final Gear Case Disassembly

- Remove:
  Final Gear Case (see Final Gear Case Removal)
  Oil Seal [A]

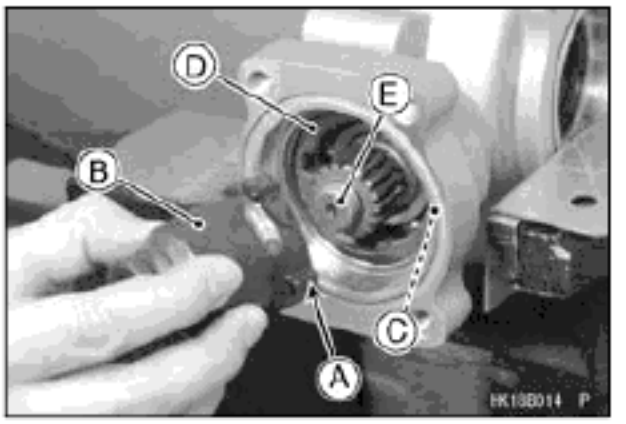


Final Gear Case

- Fit the projection [A] of the pinion bearing lock nut wrench [B] in grooves [C] of the pinion gear bearing lock nut wrench.

Special Tool - Pinion Bearing Lock Nut Wrench (52.5 mm) [B]: 57001-Y019

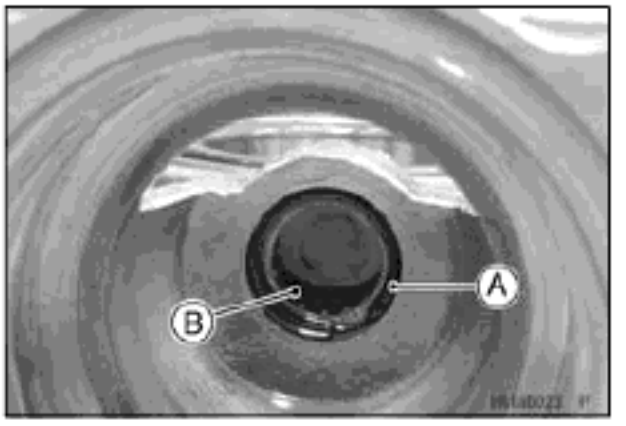
- Remove the pinion gear bearing holder locknut [D].
- Remove the pinion gear assembly [E].



- Remove the circlip [A].

Special Tool - Inside Circlip Pliers: 57001-143

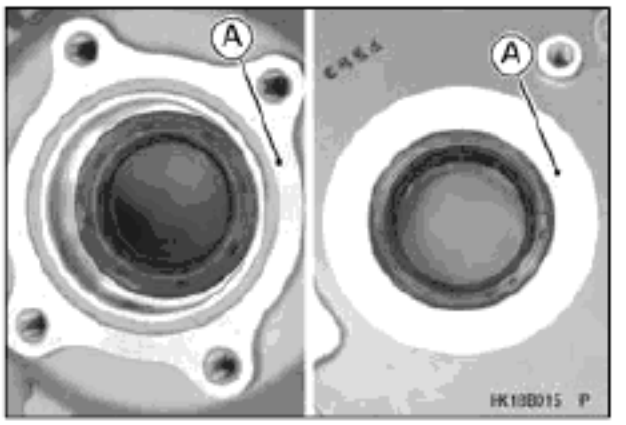
- Remove the needle bearing [B].



Final Gear Case Assembly

NOTICE

Be careful not to scratch the sealing surfaces [A] of the final gear case and case cover during the bearing removal and installation. A scratched sealing surface may allow oil to leak.



- Check:
  Oil Seal (see Oil Seal Inspection)
  Ball Bearings (see Ball or Needle Bearing Inspection)
- Visually check the bevel gears for scoring, chipping, or other damage.

★Replace the bevel gears as a set if either gear is damaged since they are lapped as a set in the factory to get the best tooth contact.

○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).

- Install the new needle bearing and new circlip.

Special Tool - Inside Circlip Pliers: 57001-143

- Install:
  Pinion Gear Assembly
  Pinion Gear Bearing Holder Locknut

Special Tool - Pinion Bearing Lock Nut Wrench (52.5 mm): 57001-Y019

Torque - Pinion Gear Bearing Holder Locknut: 98 N·m (10 kgf·m, 72 ft·lb)

New Oil Seal

Final Gear Case

Final Bevel Gear Adjustment

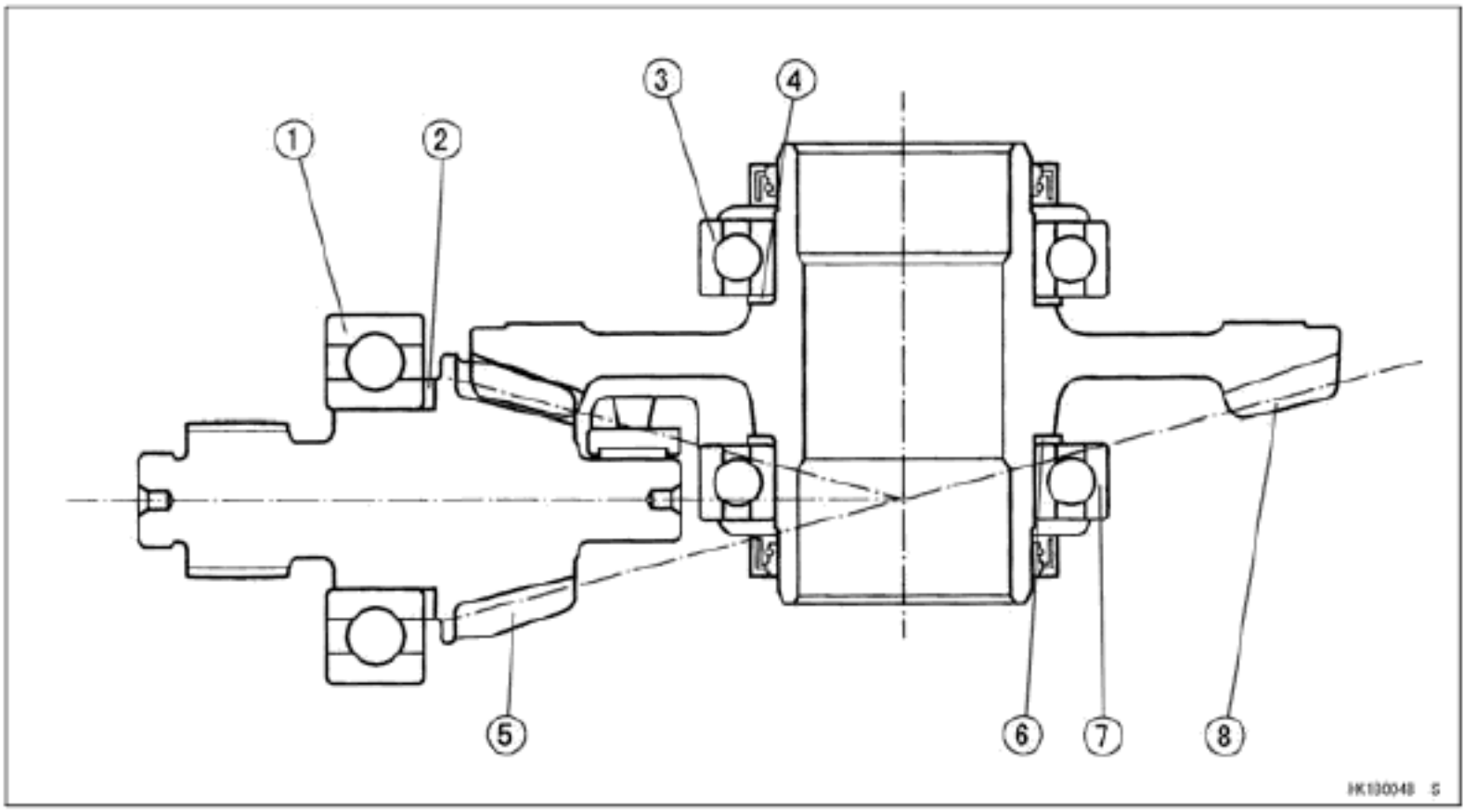
○The **backlash** and **tooth contact pattern** of the bevel gears must be correct to prevent the gears from making noise and being damaged.

● 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 location is influenced by pinion gear position more than by ring gear position.

Final Gear Case (Backlash-related Parts)



1. Pinion Gear Ball Bearing
2. Pinion Gear Shim(s)
3. Ring Gear Ball Bearing (Right)
4. Ring Gear Shim(s) (Right)
5. Pinion Gear
6. Ring Gear Shim(s) (Left)
7. Ring Gear Ball Bearing (Left)
8. Ring Gear

4. Ring Gear Shims (Right)

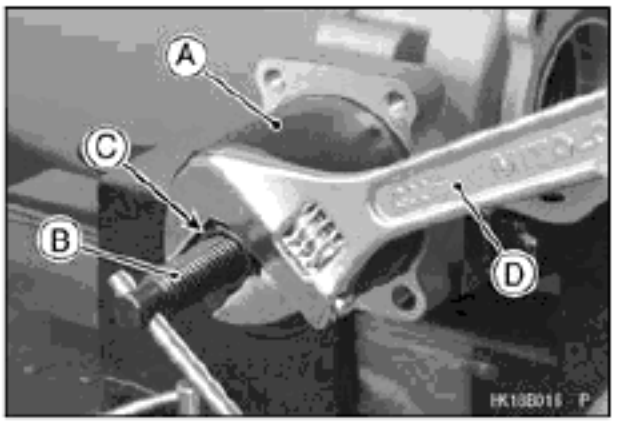
Thickness	Part Number
1.53 mm (0.060 in.)	92180-Y029
1.50 mm (0.059 in.)	92180-Y030
1.47 mm (0.058 in.)	92180-Y031

6. Ring Gear Shims (Left)

Thickness	Part Number
1.53 mm (0.060 in.)	92180-Y029
1.50 mm (0.059 in.)	92180-Y030
1.47 mm (0.058 in.)	92180-Y031

Final Gear Case

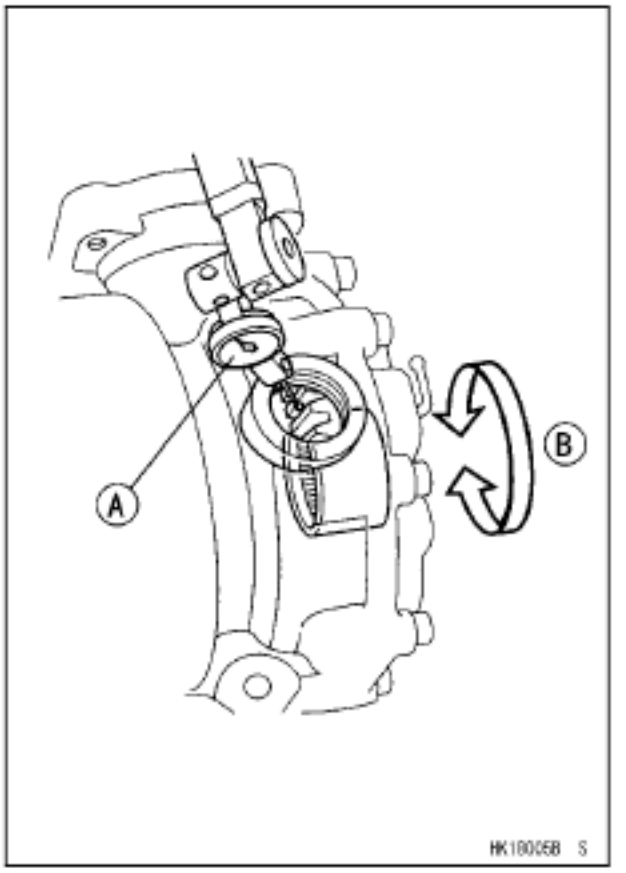
Backlash Adjustment



- Clean any dirt and oil off the bevel gear teeth.
- Install the pinion puller set [A], and screw the bolt [B] until it stops.
- Hold securely the nut [C] of the pinion puller set with a wrench [D].

Special Tool - Pinion Puller Set [A]: 57001-Y020

- Remove the oil filler cap.



- Set up a dial gauge [A] against a ring gear tooth to check gear backlash.
- To measure the backlash, move the ring gear back and forth [B] while holding the pinion gear steady with the pinion puller set.
- The difference between the highest and the lowest gauge reading is the amount of backlash.

Bevel Gear Backlash (Rear)

Standard:	**0.05 ~ 0.25 mm**
	(0.0020 ~ 0.0098 in.) (at ring gear tooth)
Service Limit:	**0.4 mm (0.016 in.)**

★If the backlash is too small, replace the ring gear shim (right) with a thicker one.

- Backlash is changed by about 0.03 mm (0.0012 in.) when thickness of the shim is changed by 0.06 mm (0.0024 in.).

NOTE

○*Three shims are available in thickness increments of 0.03 mm (0.0012 in.).*

Backlash Difference

- Remove the dial gauge. Turn the ring gear 120° and measure backlash.
- Repeat this procedure once more. Compare the difference of the three measurements.

Service Limit: 0.2 mm (0.008 in.)

★If the difference in measurements exceeds the service limit, it indicates that the bearing is not installed squarely, or the case is deformed.

- Inspect the bearings and case.

Tooth Contact Adjustment

- Remove the oil filler cap.
- Rotate ring gear several turns in each direction.

Final Gear Case

- Check the gear tooth contact pattern through the oil filler hole. This will provide a contact pattern on the coated teeth of the gear. Compare the coated teeth to the examples shown in [A], [B] and [C].
- Contact is normal if the machinist's layout dye to the approximate center of each tooth (example [B]).
- If tooth contact is found to be incorrect (example [A] and [C]), the shim between the pinion gear bearing and pinion gear must be changed and the tooth contact re-checked until correct.

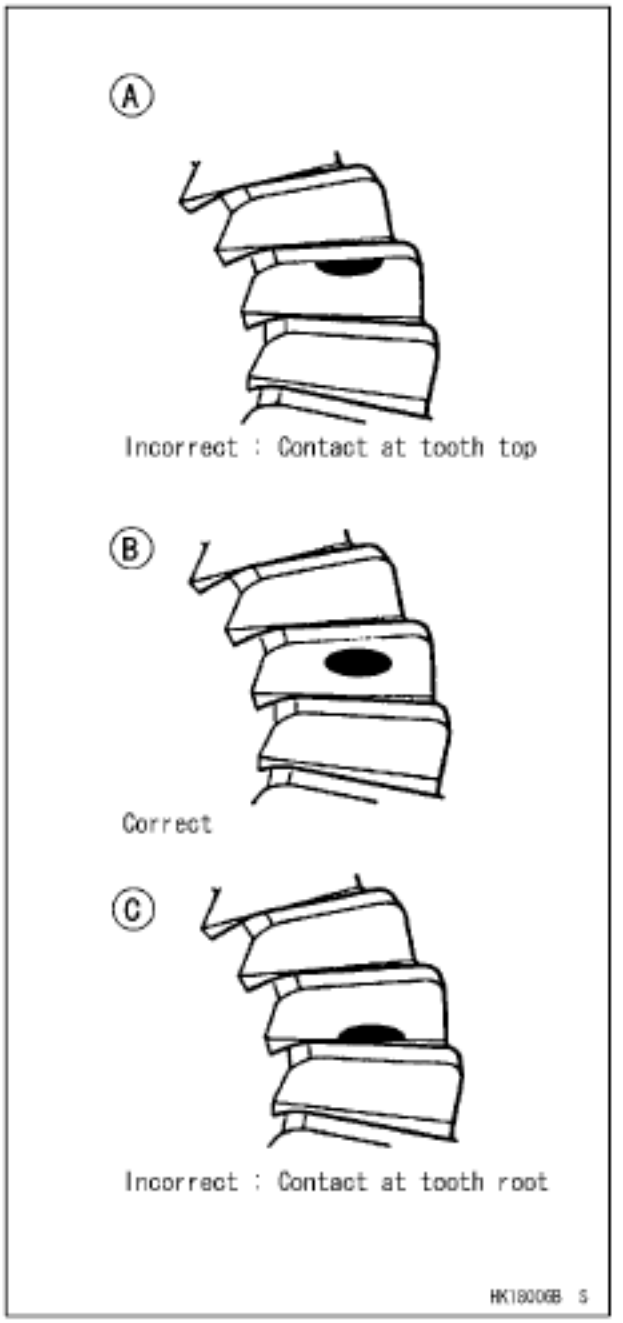
Tooth Contact	Shim Adjustment
Contact at tooth top [A]	Decrease shim thickness
Contact at tooth root [C]	Increase shim thickness

NOTE

○*Make sure to check the backlash and shim thickness after the tooth contact has been adjusted, since it may have changed. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the pinion gear and ring gear as a set.*

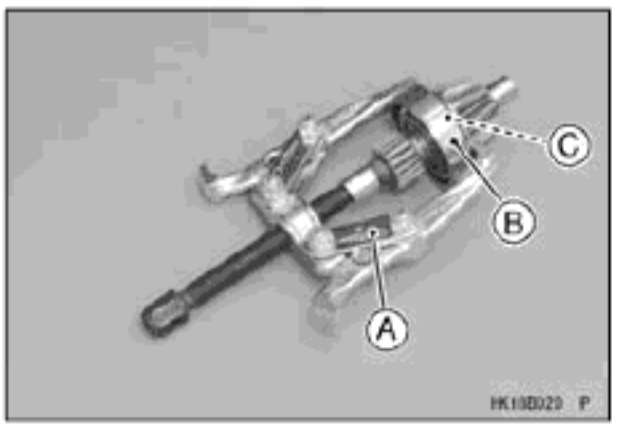
Pinion Gear Shims

Thickness	Part Number
2.03 mm (0.0799 in.)	92180-Y026
2.00 mm (0.0787 in.)	92180-Y027
1.97 mm (0.0776 in.)	92180-Y028



Pinion Gear Disassembly

- Remove the final gear case (see Final Gear Case Removal).
- Remove the pinion gear assembly (see Final Gear Case Disassembly).
- Using a suitable puller [A], remove the ball bearing [B] and shim(s) [C].

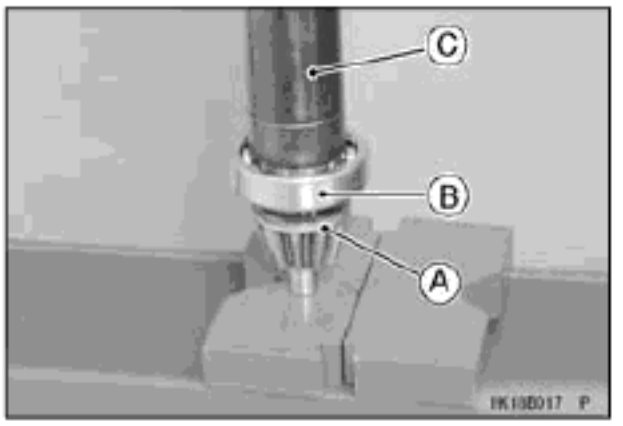


Pinion Gear Assembly

- The pinion gear and ring gear are lapped as a set by the factory to get the best tooth contact. They must be replaced as a set.
- Install the shim(s) [A] and ball bearing [B] using the bearing driver set.

Special Tool - Bearing Driver Set [C]: 57001-1129

- Install the pinion gear (see Final Gear Assembly).



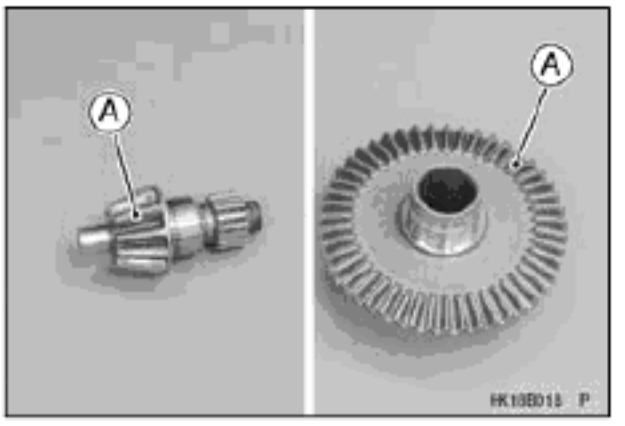
- Be sure to check and adjust the bevel gear backlash and tooth contact, when any of the parts which influence these items are replaced (see Final Bevel Gear Adjustment).

Final Gear Case

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.



Bearing and Oil Seal

Ball or Needle Bearing Inspection

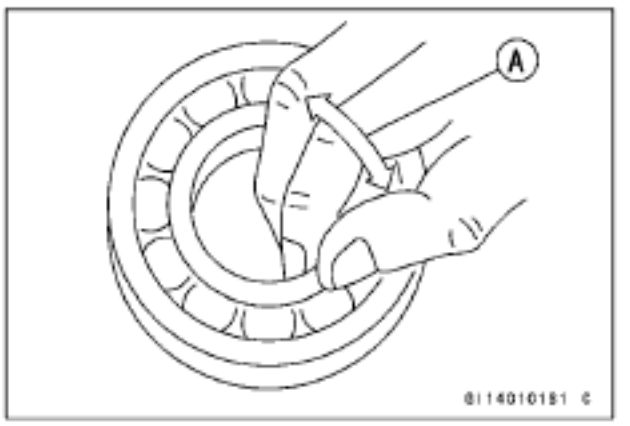
Since the bearings are made to extremely close tolerances, the clearance cannot normally be measured.

NOTICE

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.

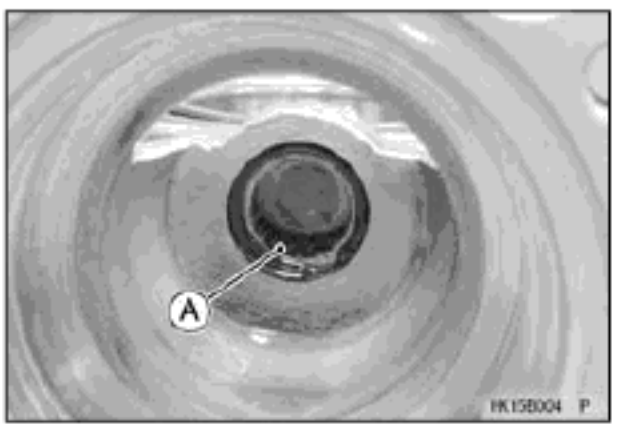
★If bearing play, roughness, or binding is found, replace the bearing.



- Check the needle bearing [A].

○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.

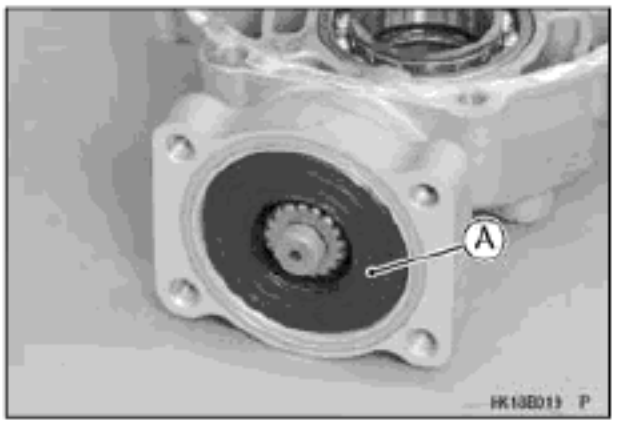
★If the bearing is damaged, replace the bearing.



Oil Seal Inspection

- Inspect the oil seal [A].

★Replace it if the lips are misshapen, discolored (indicating that the rubber had deteriorated), hardened, or been otherwise damaged.



Brakes

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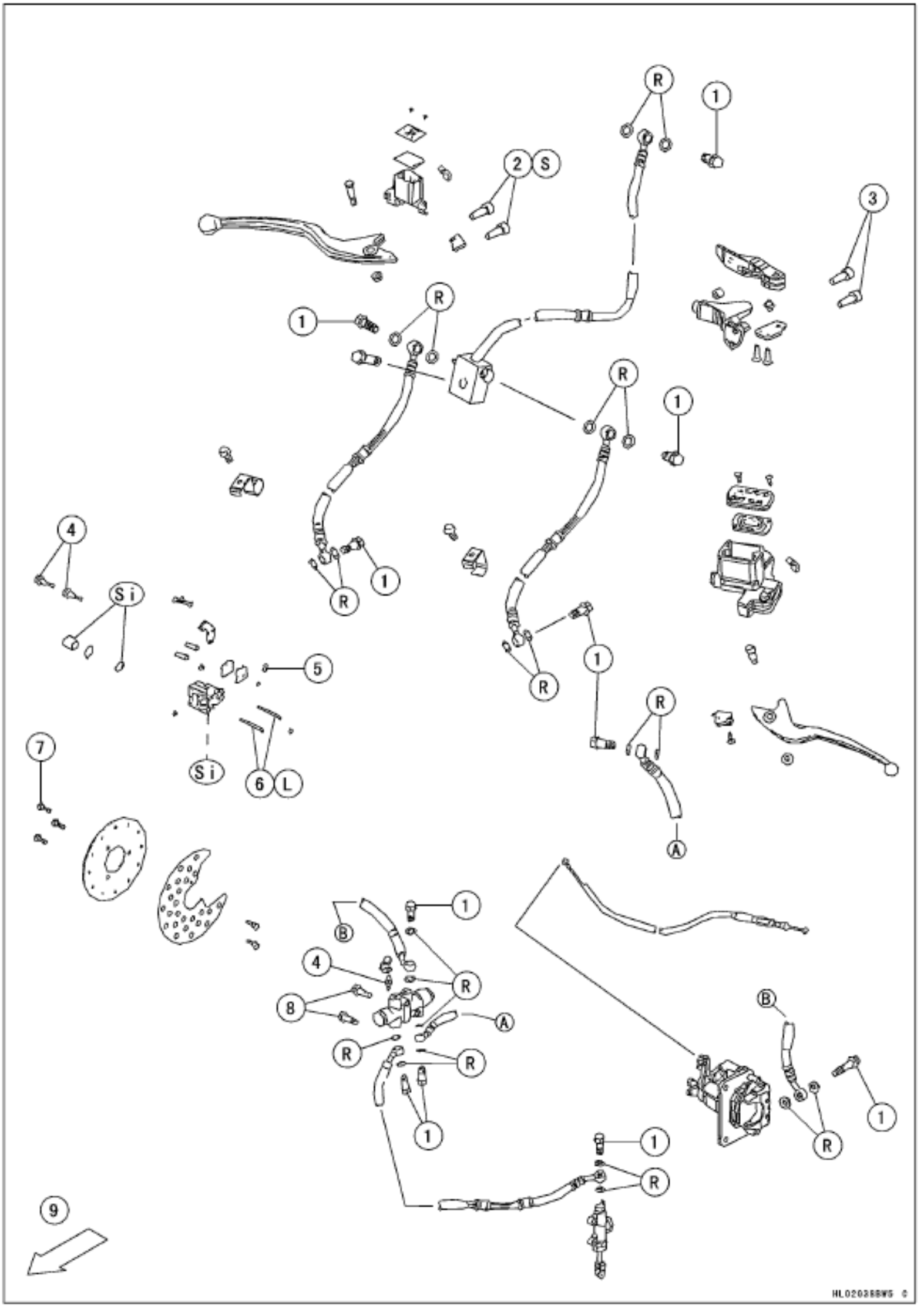
Exploded View

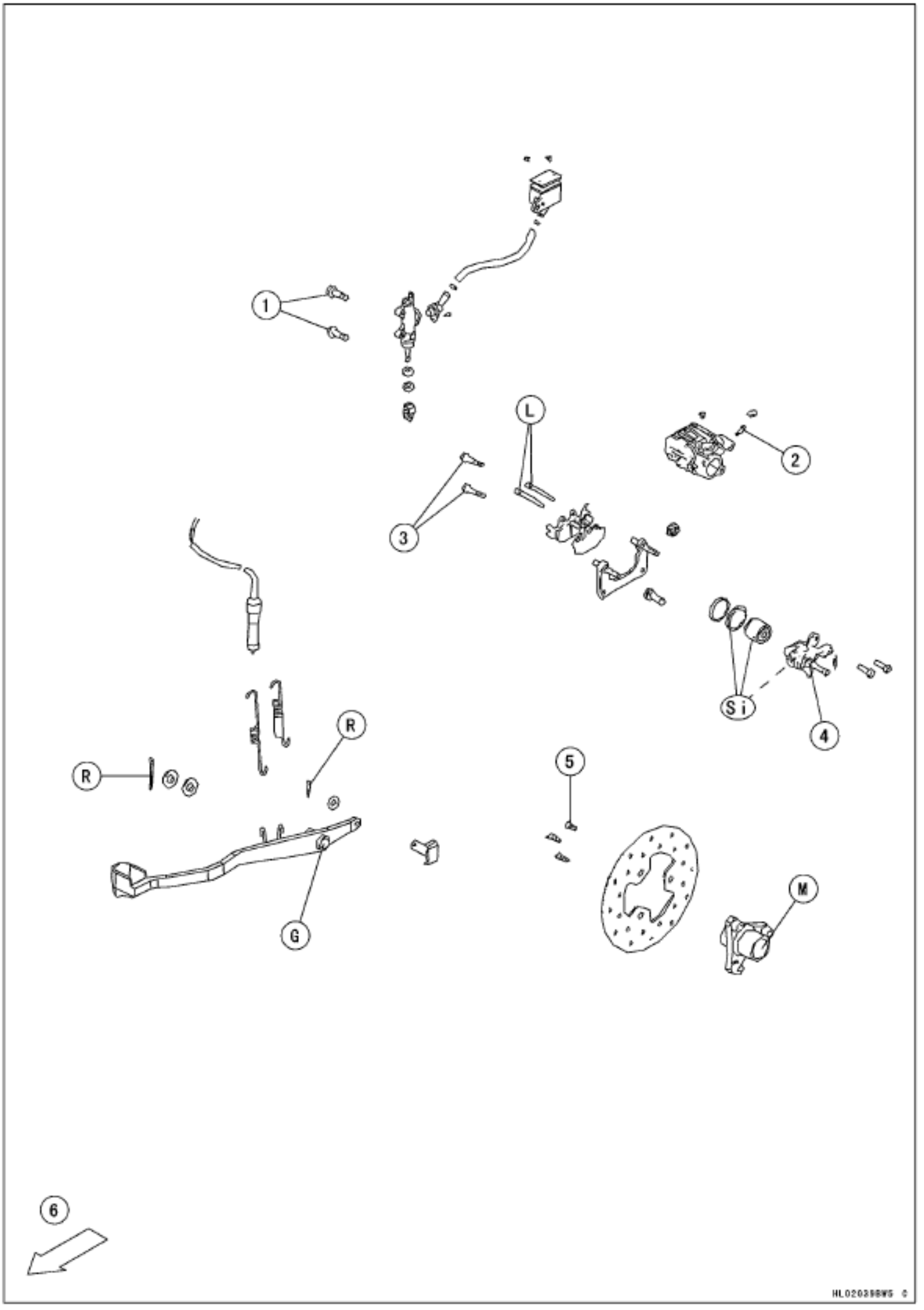


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Brake Hose Banjo Bolts	34	3.5	25	
2	Front Master Cylinder Clamp Bolts	12	1.2	106 in·lb	S
3	Rear Master Cylinder Clamp Bolts	12	1.2	106 in·lb	
4	Brake Caliper Mounting Bolts	26	2.7	19	
5	Bleed Valves	6.0	0.61	53 in·lb	
6	Front Brake Pad Pin Bolts	18	1.8	13	
7	Brake Disc Mounting Bolts	34	3.5	25	
8	Rear Brake Proportioning Valve Mounting Bolts	12	1.2	106 in·lb	

9. Front
L: Apply a non-permanent locking agent.
R: Replacement Parts
S: Follow the specified tightening sequence.
Si: Apply silicone grease.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear Master Cylinder Mounting Bolts	12	1.2	106 in·lb	
2	Bleed Valve	6.0	0.61	53 in·lb	
3	Brake Caliper Mounting Bolts	26	2.7	19	
4	Parking Brake Adjusting Locknut	16	1.6	12	
5	Brake Disc Mounting Bolts	34	3.5	25	

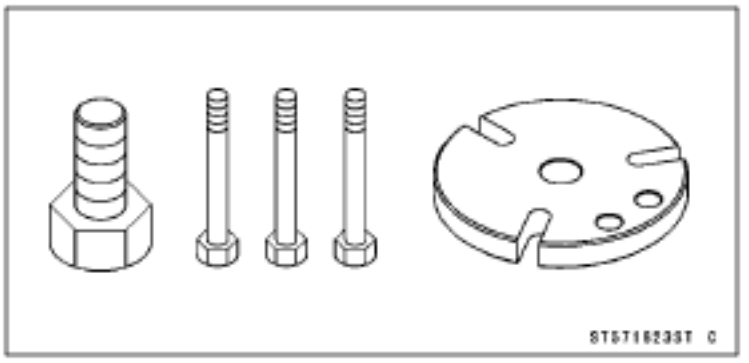
6. Front
G: Apply grease.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
R: Replacement Parts
Si: Apply silicone grease.

Specifications

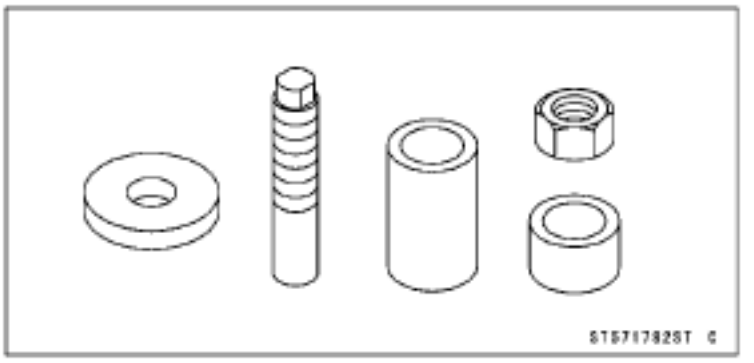
Item	Standard	Service Limit
Brake Fluid		
Grade	DOT 4	– – –
Disc Brake		
Pad Lining Thickness:		
Front	5.5 mm (0.22 in.)	1 mm (0.04 in.)
Rear	5.5 mm (0.22 in.)	1 mm (0.04 in.)
Disc Thickness	3.8 ~ 4.2 mm (0.15 ~ 0.17 in.)	3 mm (0.12 in.)
Disc Runout	– – –	TIR 0.3 mm (0.012 in.)
Brake Lever, Brake Pedal		
Brake Lever Position	Non-adjustable	– – –
Brake Lever Free Play	Non-adjustable	– – –
Brake Pedal Free Play	Non-adjustable	– – –

Special Tools

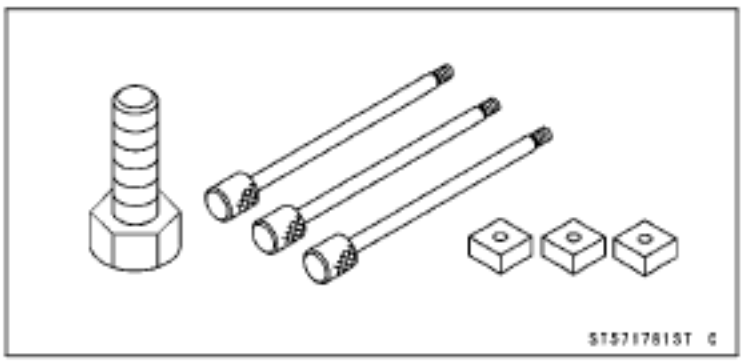
Rotor Puller:
57001-1623



Hub Driver Set:
57001-1782



Disc Hub Puller:
57001-1781



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 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 DOT4.

Recommended Disc Brake Fluid
Grade: 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 Fluid

Brake Line Air Bleeding

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

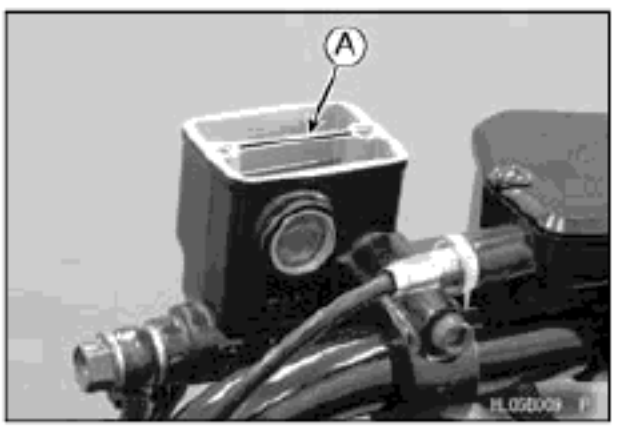
⚠ WARNING

Air in the brake lines diminish braking performance and can cause an accident resulting in injury or death. If the brake lever or pedal has a soft or "spongy" feeling mushy when it is applied, there might be air in the brake lines or the brake may be defective. Do not operate the vehicle and service the brake system immediately.

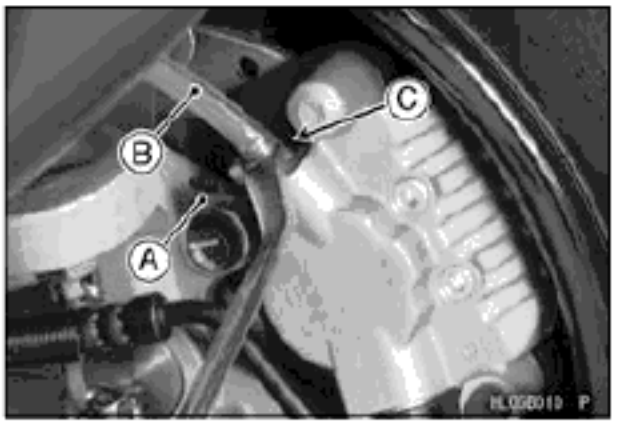
Front Brake

- Remove the front brake reservoir cap and diaphragm.
- Fill the reservoir with fresh brake fluid to the upper level line [A].
- Slowly pump the front brake lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.

○Bleed the air completely from the front master cylinder by this operation.



- Remove the rubber cap [A] on the front caliper.
- Attach a clear plastic hose [B] to the bleed valve [C], and run the other end of the hose into a container.

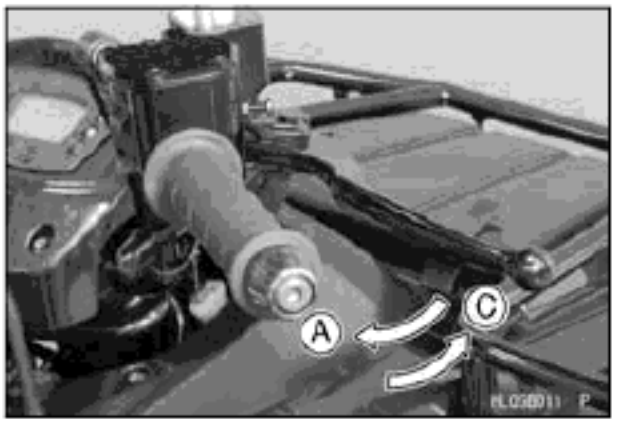


Brake Fluid

- Bleed the brake line and the front caliper.

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

1. Pump the front brake lever until it becomes hard, and apply the brake and hold it [A].
2. Quickly open and close [B] the bleed valve of front caliper while holding the brake applied.
3. Release the brake [C].

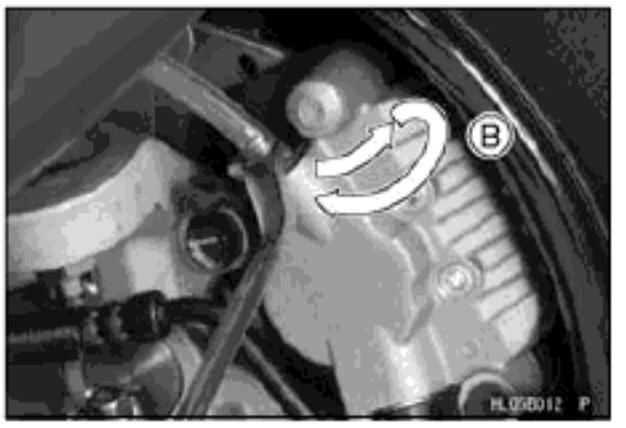


NOTE

○*The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○*Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*

○*First bleeding the right caliper then repeat the above steps for the left caliper.*



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

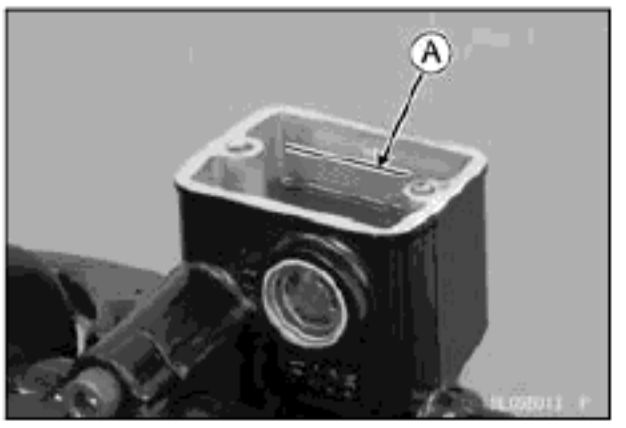
Torque - Caliper Bleed Valve: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Check the fluid level in the front brake reservoirs (see Brake Fluid Level Inspection in the Periodic Maintenance chapter).
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.

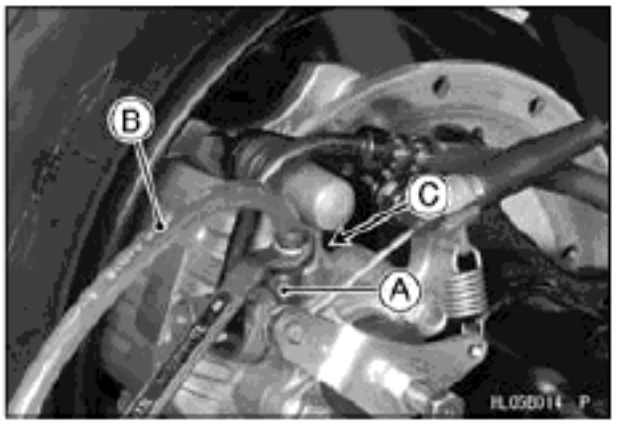
Rear Brake (Lever)

- Remove the rear brake (lever) reservoir cap and diaphragm.
- Fill the reservoir with fresh brake fluid to the upper level line [A].
- Slowly pump the rear brake lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.

○Bleed the air completely from the rear master cylinder (lever) by this operation.



- Remove the rubber cap [A] on the rear caliper.
- Attach a clear plastic hose [B] to the bleed valve [C], and run the other end of the hose into a container.

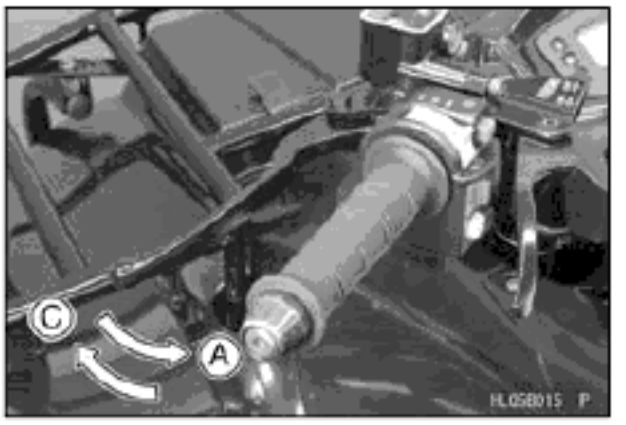


Brake Fluid

- Bleed the brake line and the rear caliper.

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

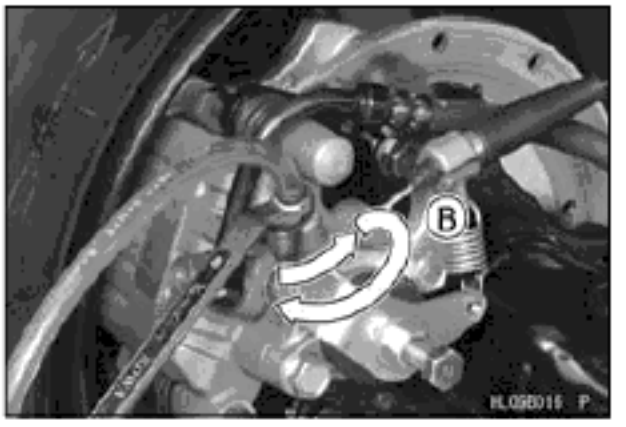
1. Pump the rear brake lever until it becomes hard, and apply the brake and hold it [A].
2. Quickly open and close [B] the bleed valve of rear caliper while holding the brake applied.
3. Release the brake [C].



NOTE

○*The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○*Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*



- Remove the clear plastic hose.
- Install the rear brake (lever) diaphragm and reservoir cap.
- Tighten the bleed valve, and install the rubber cap.

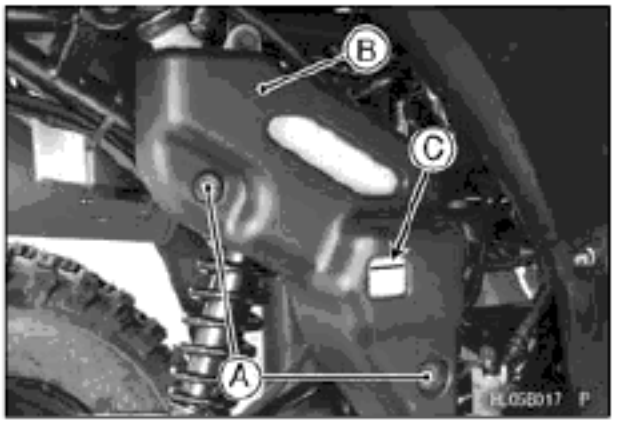
Torque - Caliper Bleed Valve: 6.0 N·m (0.61 kgf-m, 53 in-lb)

- Check the fluid level in the rear brake (lever) reservoirs (see Brake Fluid Level Inspection in the Periodic Maintenance chapter).
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.

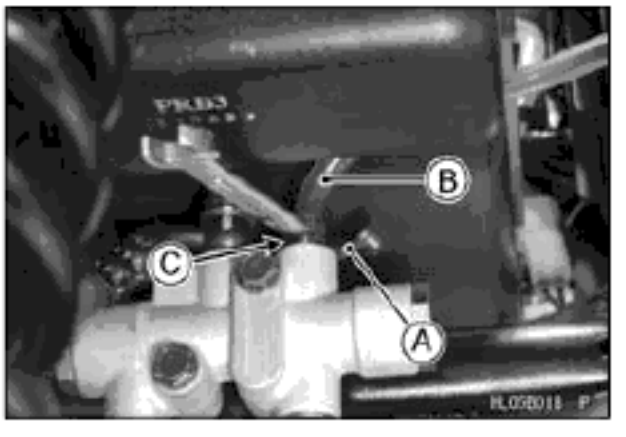
Rear Brake (Pedal)

- Remove the reserve tank cover bolt [A] and reserve tank cover [B].
- Remove the rear brake (pedal) reservoir cap and diaphragm.
- Fill the reservoir with fresh brake fluid to the upper level line [C].
- Slowly pump the rear brake pedal several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir.

○Bleed the air completely from the rear master cylinder (pedal) by this operation.



- Remove the rubber cap [A] on the proportioning valve.
- Attach a clear plastic hose [B] to the bleed valve [C], and run the other end of the hose into a container.



Brake Fluid

- Bleed the brake line and the proportioning valve.

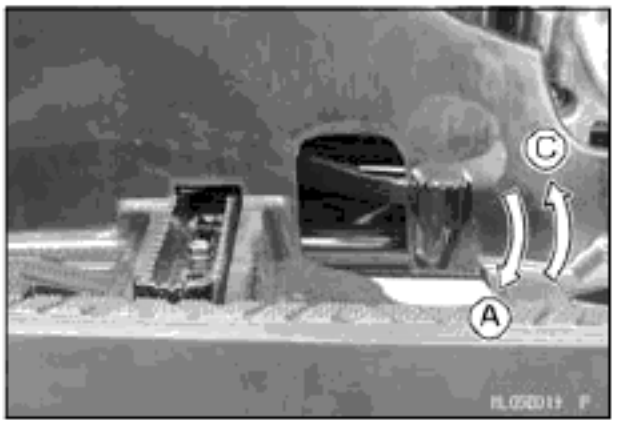
○Repeat this operation until no more air can be seen coming out into the plastic hose.

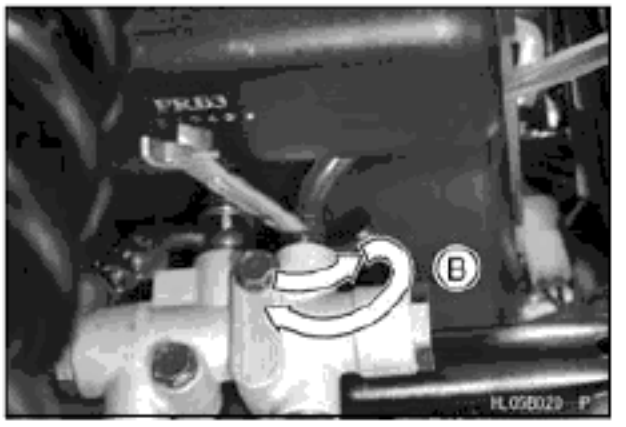
1. Pump the rear brake pedal until it becomes hard, and apply the brake and hold it [A].
2. Quickly open and close [B] the bleed valve of proportioning valve while holding the brake applied.
3. Release the brake [C].

NOTE

○*The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○*Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*





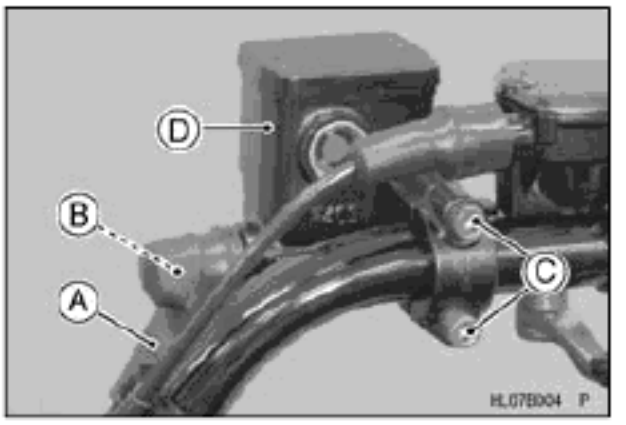
- Remove the clear plastic hose.
- Install the rear brake (pedal) diaphragm and reservoir cap.
- Install the reserve tank cover and bolts.
- Tighten the bleed valve, and install the rubber cap.

Torque - Caliper Bleed Valve: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Check the fluid level in the rear brake (pedal) reservoirs (see Brake Fluid Level Inspection in the Periodic Maintenance chapter).
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.

Master Cylinder

Front Master Cylinder Removal

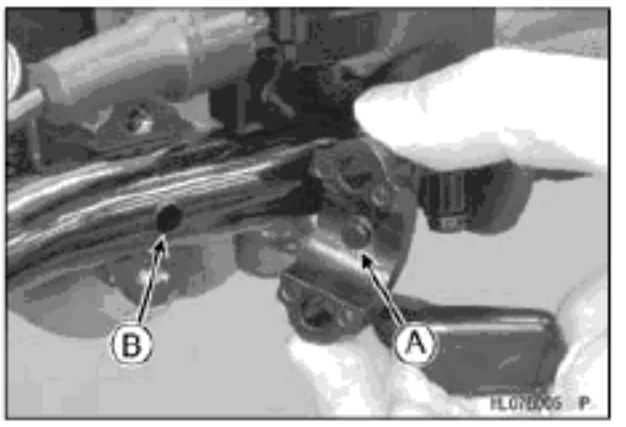


- Slide the rubber cap [A].
- Remove:
  Brake Hose Banjo Bolt [B]
  Master Cylinder Clamp Bolts [C]
  Front Master Cylinder [D]

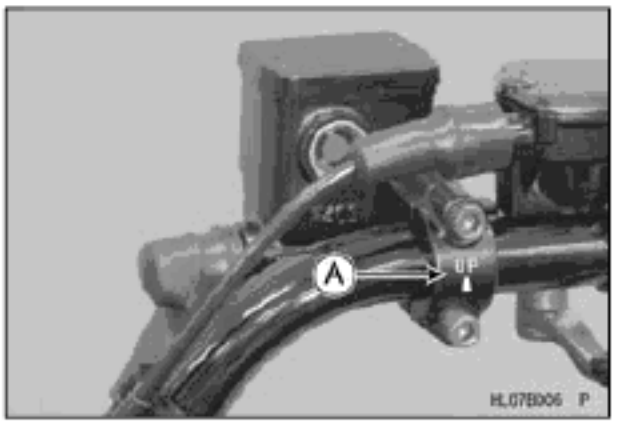
NOTICE

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

Front Master Cylinder Installation



- Fit the projection [A] of the master cylinder clamp into the hole [B] of the handlebar.



- 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 Master Cylinder Clamp Bolts: 12 N·m (1.2 kgf·m, 106 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: 34 N·m (3.5 kgf·m, 25 ft·lb)

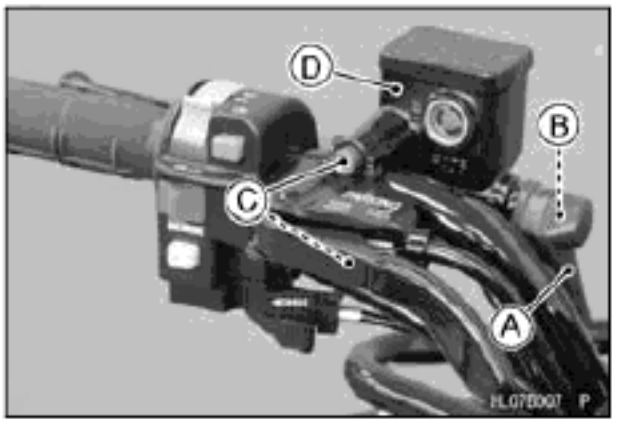
- Install the rubber cap.
- Bleed the brake line after master cylinder installation (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ WARNING

After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the vehicle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.

Master Cylinder

Rear Master Cylinder (Lever) Removal

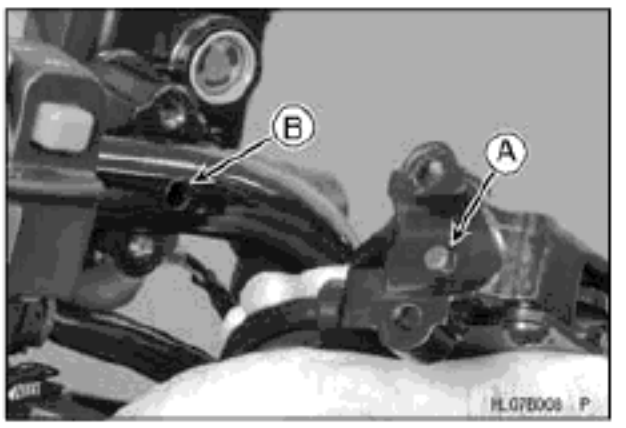


- Slide the rubber cap [A].
- Remove:
  Brake Hose Banjo Bolt [B]
  Rear Master Cylinder Clamp Bolts [C]
  Rear Master Cylinder [D]

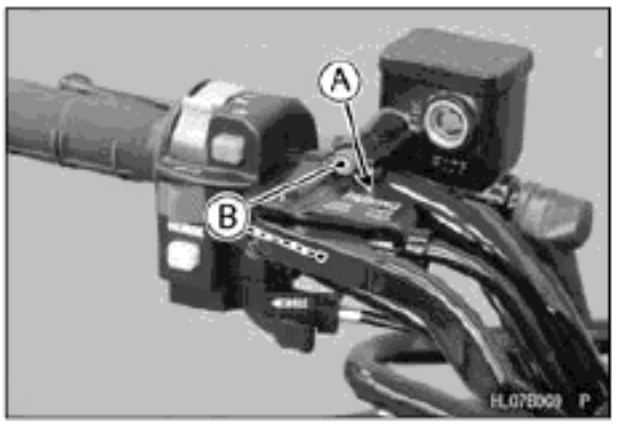
NOTICE

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

Rear Master Cylinder (Lever) Installation



- Fit the projection [A] of the master cylinder mounting into the hole [B] of the handlebar.



- The rear master cylinder clamp must be installed with the "PARKING" mark [A] upwards.
- Tighten:

  Torque - Rear Master Cylinder Clamp Bolts [B]: 12 N·m (1.2 kgf·m, 106 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: 34 N·m (3.5 kgf·m, 25 ft·lb)

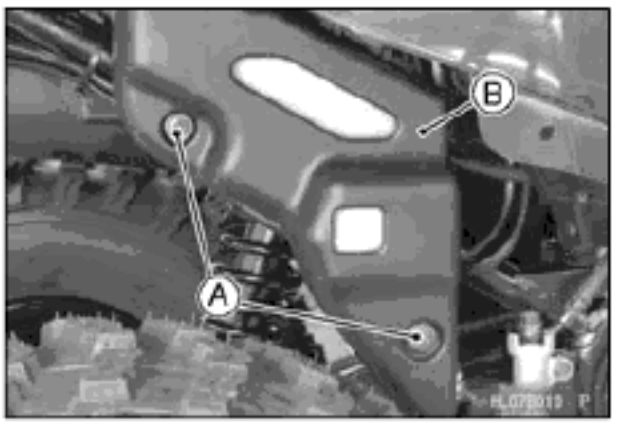
- Install the rubber cap.
- Bleed the brake line after master cylinder installation (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.
- Adjust the parking brake (see Parking Brake Cable Adjustment in the Periodic Maintenance chapter).

⚠ WARNING

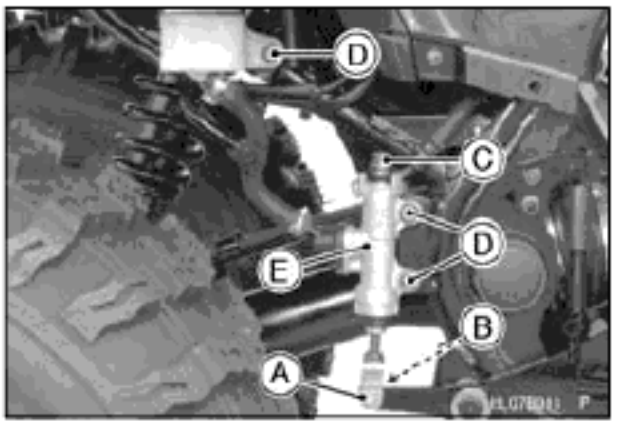
After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the vehicle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.

Master Cylinder

Rear Master Cylinder (Pedal) Removal



- Remove:
  Right Footboard (see Right Footboard Removal in the Frame chapter)
  Bolts [A]
  Reserve Tank Cover [B]



- Remove the cotter pin [A].
- Pull off the joint pin [B] with washer.

NOTE

○*Pull off the joint pin while pressing down the brake pedal.*

- Unscrew the brake hose banjo bolt [C].
- Unscrew the master cylinder mounting bolts [D], and remove the master cylinder [E].
- When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.

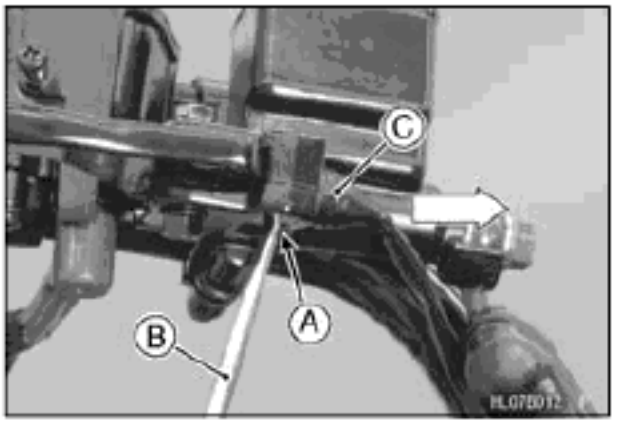
Rear Master Cylinder (Pedal) Installation

- Replace the cotter pin with a new one.
- Replace the washers are on each side of hose fitting with new ones.
- Tighten the following:

Torque - Brake Hose Banjo Bolt: 34 N·m (3.5 kgf·m, 25 ft·lb)
Rear Master Cylinder Mounting Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

- Bleed the brake line (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.
- Install the removed parts (see appropriate chapters).

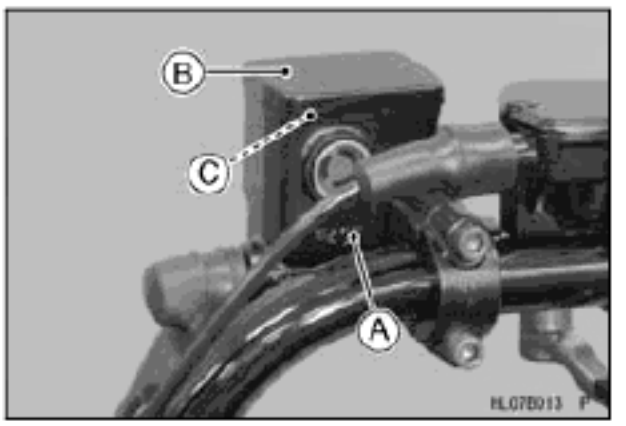
Front Master Cylinder Disassembly



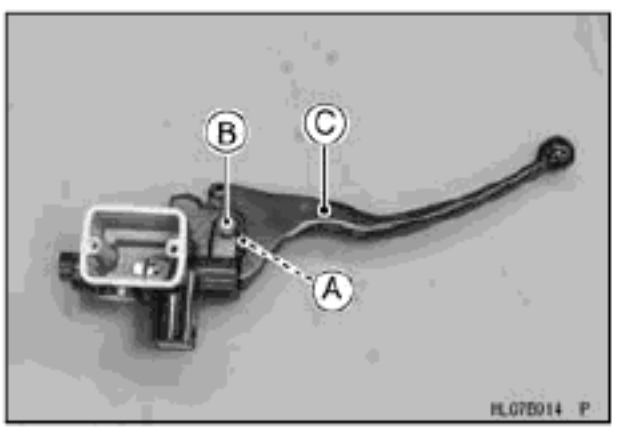
- Push the front brake light switch hook in the hole [A] by the screwdriver [B], and pull out the front brake light switch [C].

Master Cylinder

- Remove:
  Front Master Cylinder [A] (see Front Master Cylinder Removal)
- Remove the reservoir cap [B] and diaphragm [C], and pour the brake fluid into a container.



- Remove:
  Brake Lever Pivot Bolt Locknut [A]
  Brake Lever Pivot Bolt [B]
  Brake Lever [C]



Front Master Cylinder Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

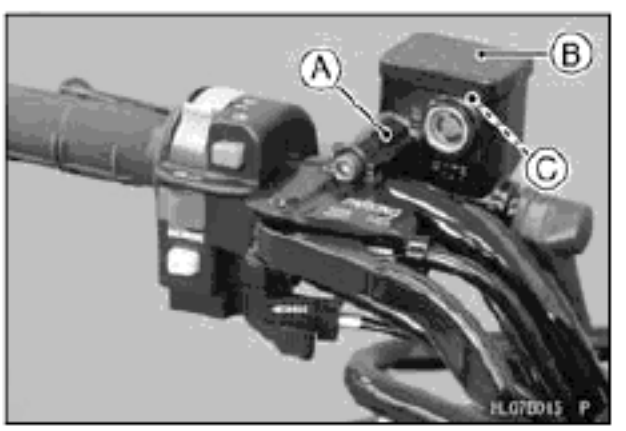
NOTICE

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

- Apply brake fluid to the removed parts and to the inner wall of the cylinder.
- Tighten the brake lever pivot bolt and locknut.

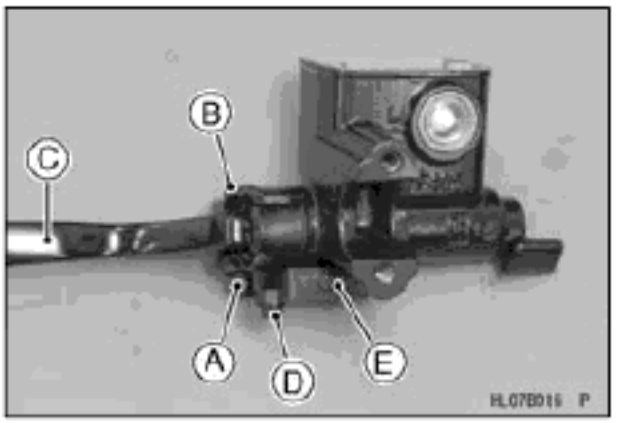
Rear Master Cylinder (Lever) Disassembly

- Remove:
  Rear Master Cylinder (Lever) [A] (see Rear Master Cylinder (Lever) Removal)
- Remove the reservoir cap [B] and diaphragm [C], and pour the brake fluid into a container.

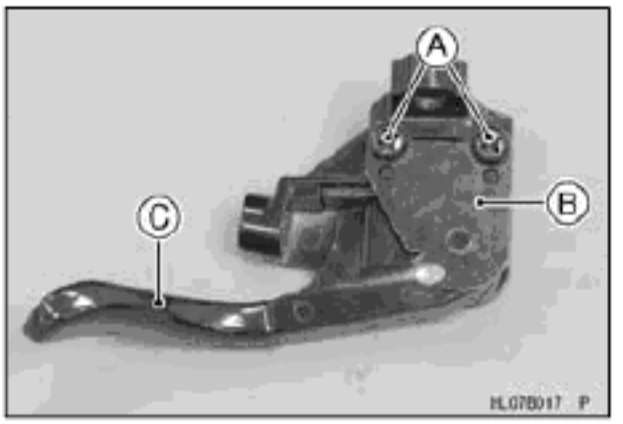


Master Cylinder

- Remove:
  Brake Lever Pivot Bolt Locknut [A]
  Brake Lever Pivot Bolt [B]
  Brake Lever [C]
  Screw [D]
  Rear Brake Light Switch [E]



- Remove:
  Screws [A]
  Plate [B]
  Parking Brake Lever [C]



Rear Master Cylinder (Lever) Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

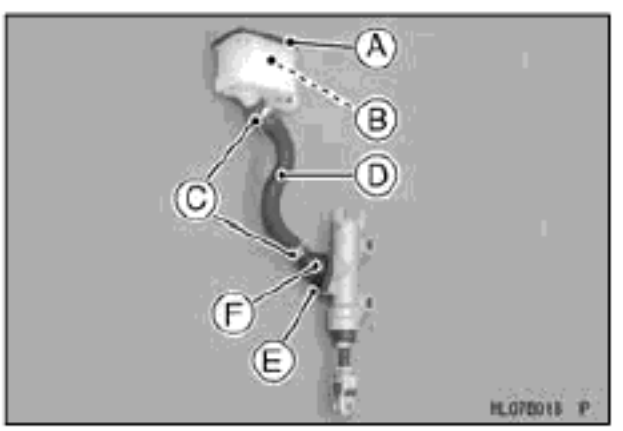
NOTICE

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

- Apply brake fluid to the removed parts and to the inner wall of the cylinder.
- Apply grease to the brake lever pivot bolt and dust cover.
- Tighten the brake lever pivot bolt and locknut.

Rear Master Cylinder (Pedal) Disassembly

- Remove the rear master cylinder (pedal) (see Rear Master Cylinder (Pedal) Removal).
- Remove the reservoir cap [A] and diaphragm [B], and pour the brake fluid into a container.
- Slide the clamps [C].
- Remove:
  Rear Master Cylinder Hose [D]
  Screw [E]
  Rear Master Cylinder Joint [F]



Master Cylinder

Rear Master Cylinder (Pedal) Assembly

- Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

NOTICE

Except for the disc pads and disc, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning of the brake parts. Do not use any other fluid for cleaning 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.

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

Master Cylinder Inspection (Visual Inspection)

- Disassemble the front and rear master cylinders.
- Check that there are no scratches, rust or pitting on the inner wall of each master cylinder and on the outside of each piston.

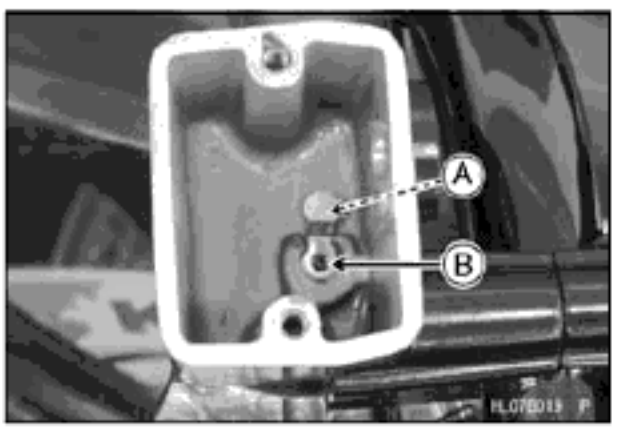
★If a master cylinder or piston shows any damage, replace them.

- Check the dust covers for damage.

★If they are damaged, replace the master cylinder.

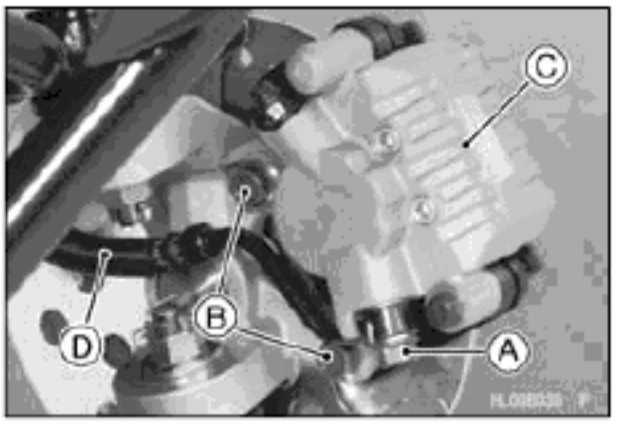
- Check that the relief [A] and supply [B] ports are not plugged.

★If the small relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.



Calipers

Front Caliper Removal



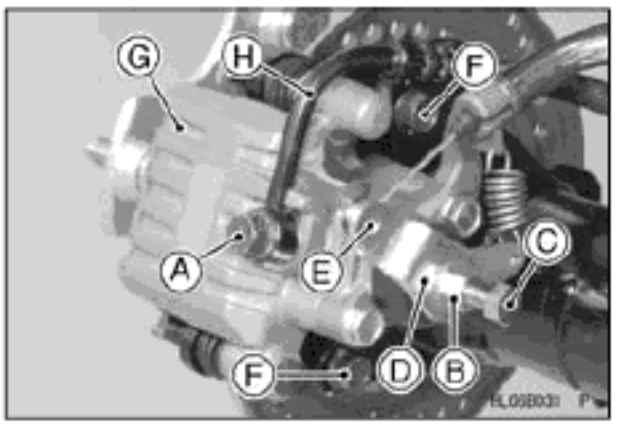
- Remove the front wheel (see Wheel Removal in the Wheels/Tires chapter).
- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.
- Unscrew the banjo bolt and remove the brake hose [D] from the caliper.

NOTICE
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 Front Caliper Disassembly).*

Rear Caliper Removal



- Remove the left rear wheel (see Wheel Removal in the Wheels/Tires chapter).
- Release the parking brake.
- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Loosen the parking brake adjusting locknut [B], and turn out the bolt [C] several turns.
- Clear the parking cable lower end [E] from the cable arm.
- Unscrew the caliper mounting bolts [F], and detach the caliper [G] from the disc.
- Unscrew the banjo bolt and remove the brake hose [H] from the caliper.

NOTICE
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 Rear Caliper Disassembly).*

Calipers

Front 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 - Brake Caliper Mounting Bolts: 26 N·m (2.7 kgf-m, 19 ft-lb)
Brake Hose Banjo Bolt: 34 N·m (3.5 kgf-m, 25 ft-lb)

- Replenish the fresh brake fluid.
- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠WARNING

After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the vehicle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.

Rear Caliper Installation

- Install the caliper and brake hose lower end.

○Replace the washers that are on each side of hose fitting with new ones.

- Apply a non-parmanent locking agent to the rear caliper mounting bolts.
- Tighten:

Torque - Brake Caliper Mounting Bolts: 26 N·m (2.7 kgf-m, 19 ft-lb)
Brake Hose Banjo Bolt: 34 N·m (3.5 kgf-m, 25 ft-lb)

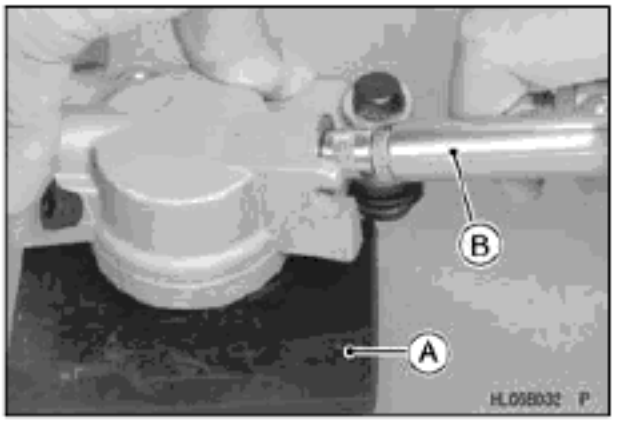
- Replenish the fresh brake fluid.
- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.
- Adjust the parking brake (see Parking Brake Cable Adjustment in the Periodic Maintenance chapter).

⚠WARNING

After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the vehicle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.

Calipers

Front Caliper Disassembly



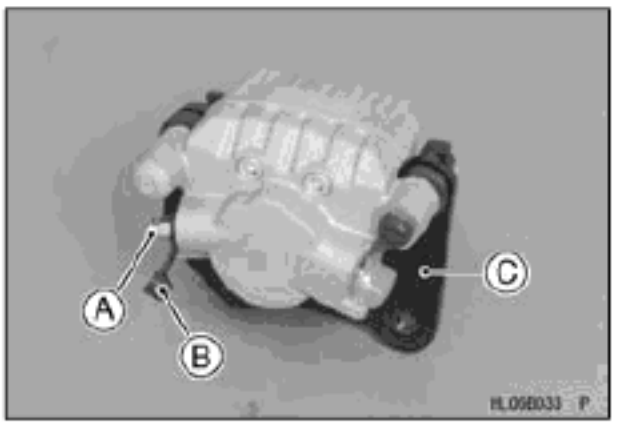
- Remove:
  Caliper (see Front Caliper Removal)
  Pads (see Front Brake Pad Removal)
  Anti-rattle Spring
- Using compressed air, remove the piston.
  ○Cover the caliper opening with a clean, rubber mat [A].
  ○Remove the piston by lightly applying compressed air [B] to where the brake line fits into the caliper.

⚠ WARNING

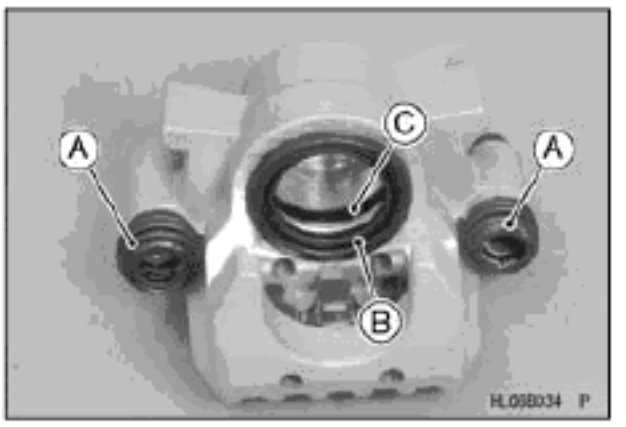
The piston in the brake caliper can crush hands and fingers. Never place your hand or fingers in front of the piston.

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 (see Front Brake Pad Removal) and anti-rattle spring.
○Pump the brake lever to remove the caliper piston.

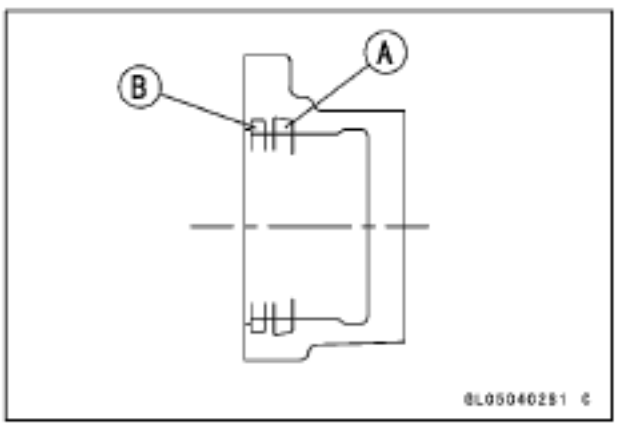


- Remove:
  Bleed Valve [A] and Rubber Cap [B]
  Caliper Holder [C]



- Remove:
  Boots [A]
  Dust Seal [B]
  Fluid Seal [C]

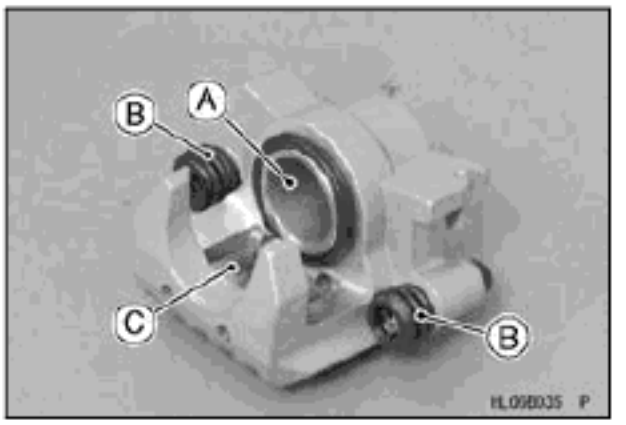
Front Caliper Assembly



- Replace the fluid seal [A] with a new one.
  ○Apply silicone grease 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.

Calipers

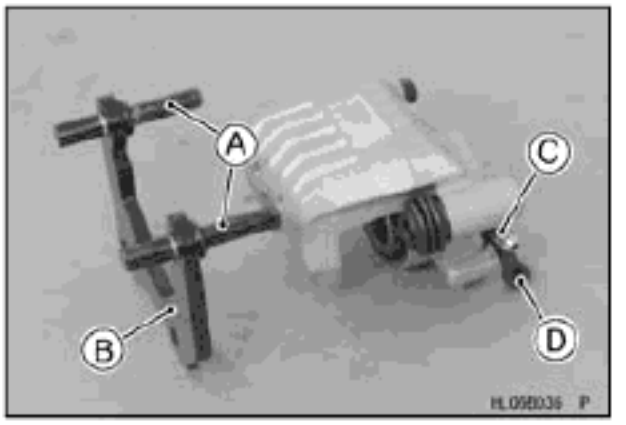
- Apply silicone grease to the outside of the pistons [A], and push them into the cylinder by hand. Take care that neither the cylinder nor the piston skirt gets scratched.
- Replace the rubber boots [B] if they are damaged.
- Install the ani-rattle spring [C] in the caliper as shown.



- Apply a grease to the caliper holder shafts [A].
- Install:
  Caliper Holder [B]
  Bleed Valve [C] and Rubber Cap [D]

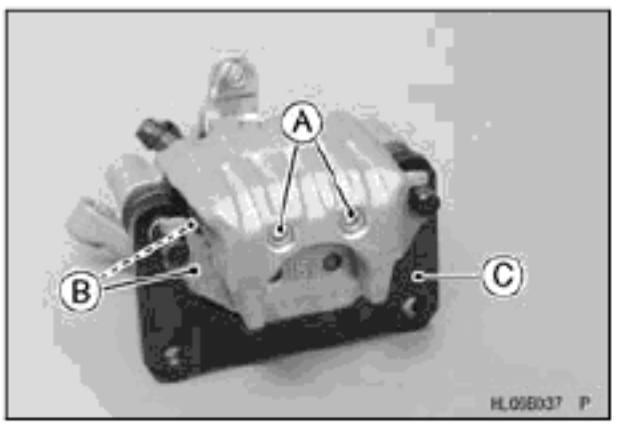
Torque - Bleed Valve: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Install the pads (see Front Brake Pad Installation).

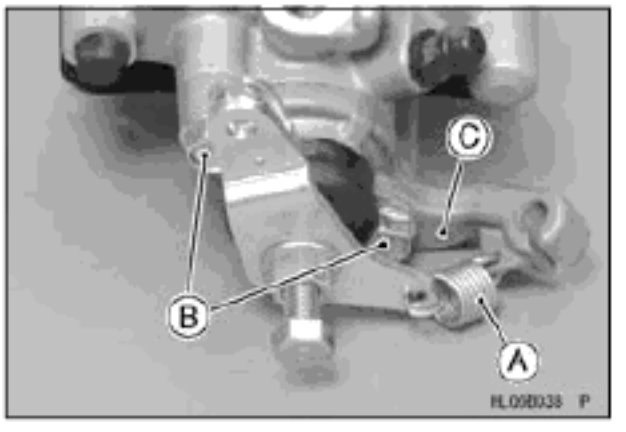


Rear Caliper Disassembly

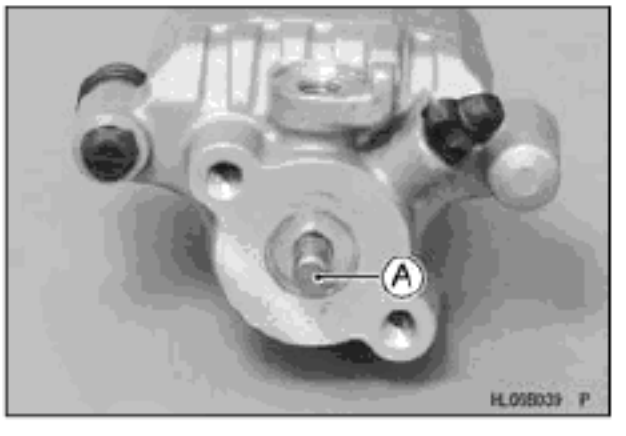
- Remove the rear caliper (see Rear Caliper Removal).
- Remove:
  Pad Bolts [A]
  Brake Pads [B]
- Pull out the caliper holder [C].



- Remove:
  Spring [A]
  Bolts [B]
  Parking Brake Bracket [C]

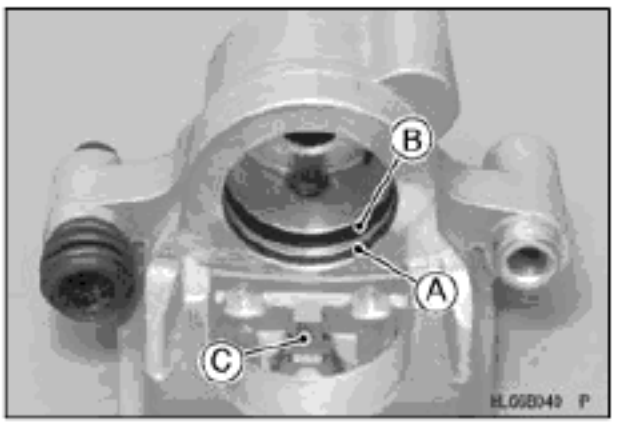


- Push out the piston [A].

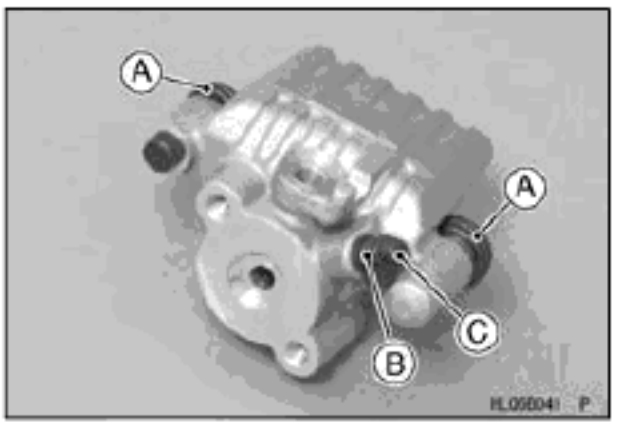


Calipers

- Remove:
  Dust Seal [A]
  Fluid Seal [B]
  Anti-rattle Spring [C]



- Remove:
  Boots [A]
  Bleed Valve [B] and Rubber Cap [C]



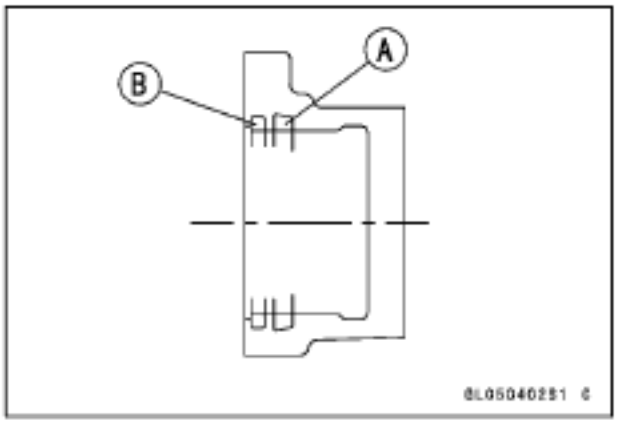
Rear Brake Caliper Assembly

- Replace the fluid seal [A] with a new one.

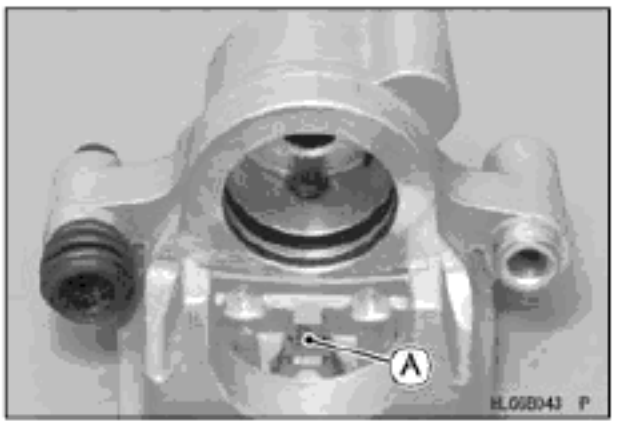
○Apply silicone grease to the fluid seal, and install it into the cylinder by hand.

- Replace the dust seal [B] with a new one.

○Apply brake fluid to the dust seal, and install it into the cylinder by hand.

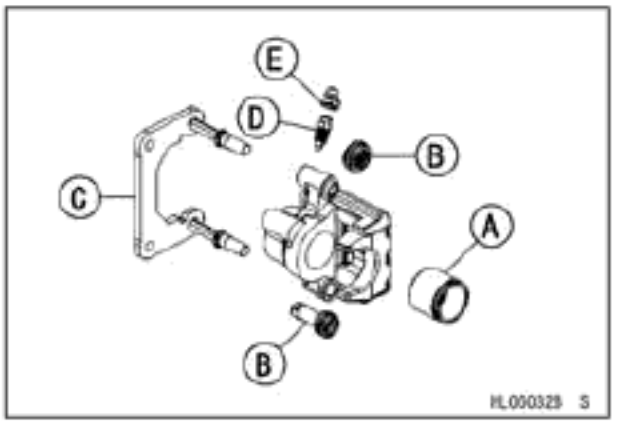


- Install the anti-rattle spring [A] in the caliper as shown.



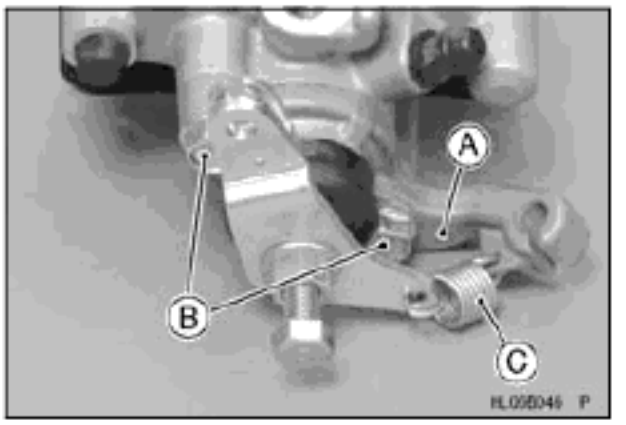
- Apply silicone grease to the outside of the piston [A], and push it into the cylinder by hand. Take care that neither the cylinder nor the piston skirt gets scratched.
- Replace the rubber boots [B] if they are damaged.
- Install:
  Caliper Holder [C]
  Bleed Valve [D] and Rubber Cap [E]

Torque - Rear Caliper Bleed Valve: 6.0 N·m (0.61 kgf·m, 53 in·lb)

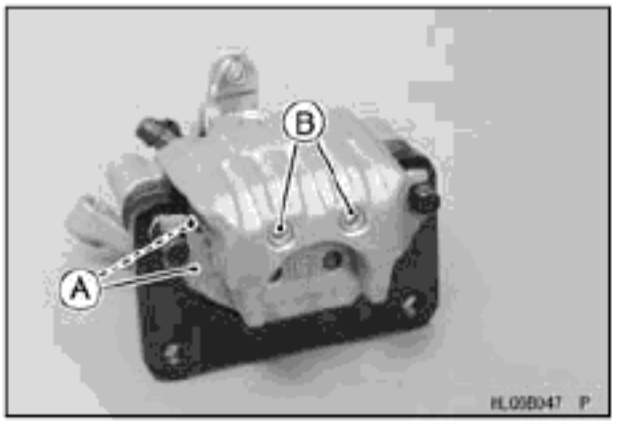


Calipers

- Install:
  Parking Brake Bracket [A]
  Bolts [B]
  Spring [C]



- Install the pads [A].
- Apply a non-permanent locking agent to the rear brake pad pin bolts [B].
- Tighten the rear brake pad pin bolts.

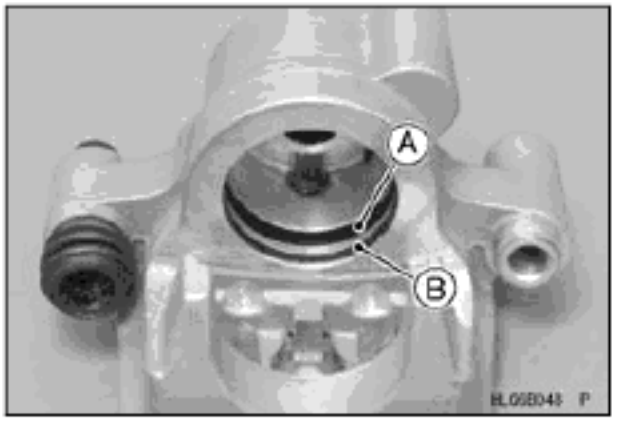


Fluid Seal Damage Inspection

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.

- Replace the fluid seals in accordance with the Periodic Maintenance Chart or under any of the following conditions: (a) fluid leakage around the pad; (b) brakes overheat; (c) there is a large difference in inner and outer pad wear; (d) the seal is stuck to the piston.

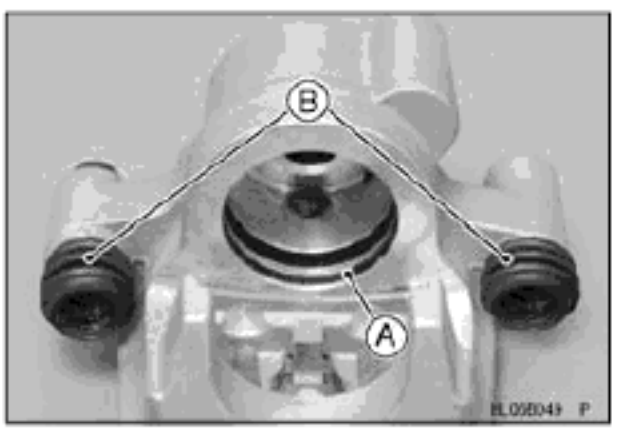
★If the fluid seal is replaced, replace the dust seal [B] as well. Also, replace all seals every other time the pads are changed.



Dust Seal and Friction Boot Damage Inspection

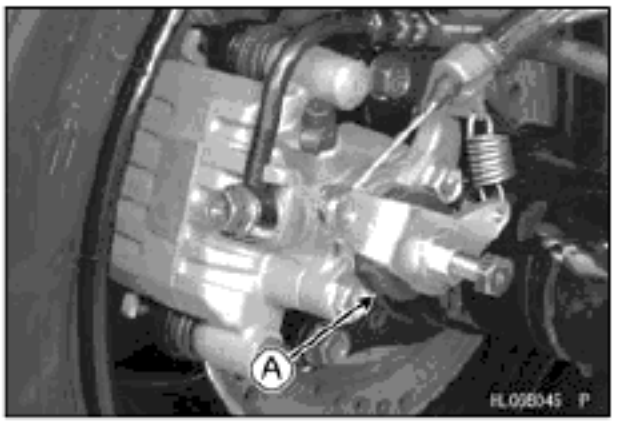
- Replace the dust seals [A] in accordance with the Periodic Maintenance Chart or check that the dust seals and friction boots [B] are not cracked, worn swollen, or otherwise damaged.

★If they show any damage, replace them.



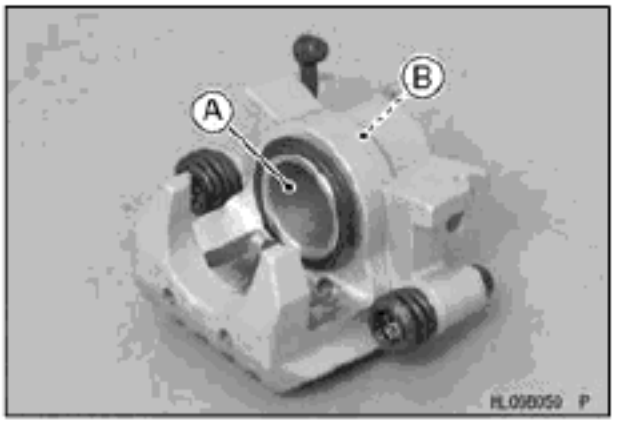
Calipers

Brake Fluid Leak Inspection



- Inspect the brake fluid leak [A] from the rear caliper.
- If the brake fluid is leaked, replace the rear caliper.

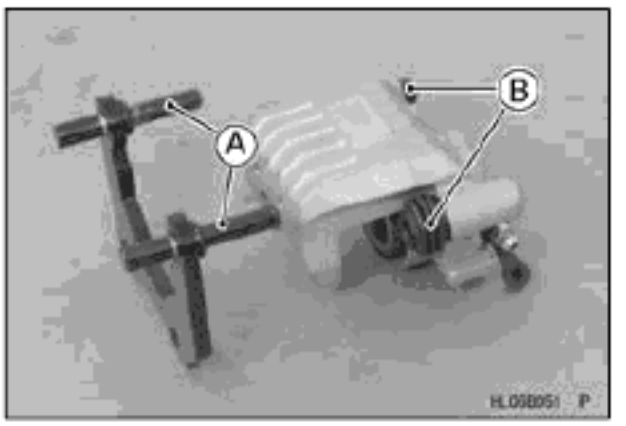
Piston and Cylinder Damage Inspection



- Visually inspect the pistons [A] and cylinder surfaces [B].

★Replace the caliper if the cylinder and piston are badly scored or rusty.

Caliper Holder Shaft Wear Inspection



The caliper body must slide smoothly on the caliper holder shafts [A]. 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.

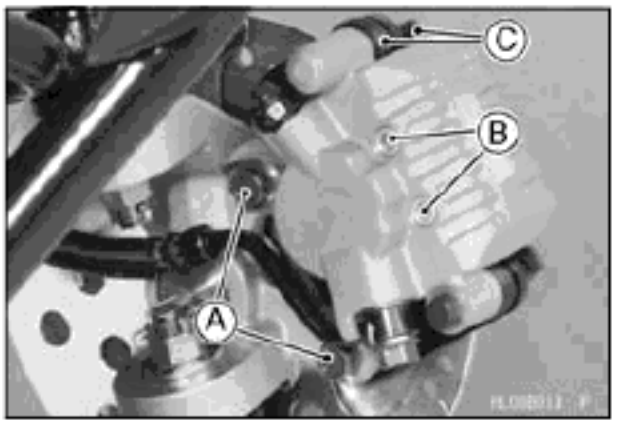
- Check to see that the caliper holder shafts are not badly worn or stepped, and that the rubber friction boots [B] are not damaged.

★If the rubber friction boot is damaged, replace the rubber friction boot.

★If caliper holder shaft is damaged, replace the caliper holder shaft and rubber friction boot as a unit.

Brake Pads

Front Brake Pad Removal



- Remove the front wheel (see Wheel Removal in the Wheels/Tires chapter).
- Remove the front caliper mounting bolts [A], and detach the caliper form the disc.
- Remove:
  Brake Pad Bolts [B]
  Brake Pads [C]

Front Brake Pad Installation

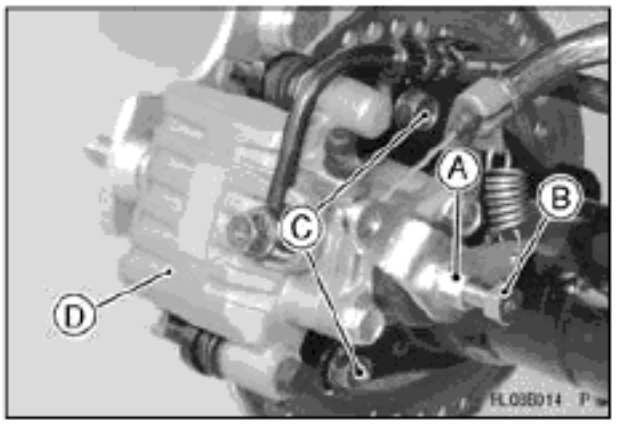
- Push the caliper piston in by hand as far as it will go.
- Be sure that the anti-rattle spring is in place.
- Install:
  Brake Pads
  Brake Pad Bolt
- Tighten the brake pad bolts securely.
- Install the front brake caliper (see Front Caliper Installation).

⚠WARNING

After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the vehicle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.

Rear Brake Pad Removal

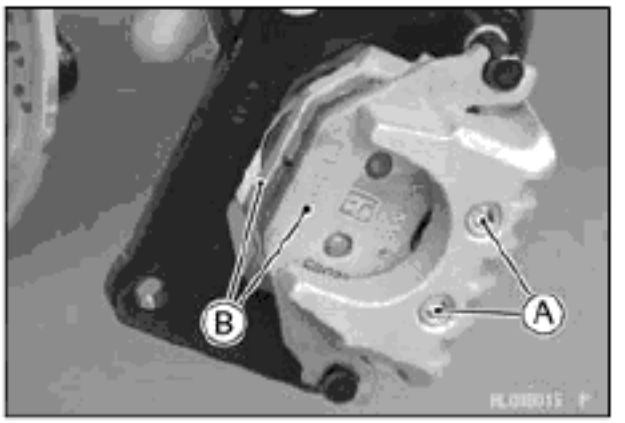
- Remove the left rear wheel (see Wheel Removal in the Wheels/Tires chapter).



- Release the parking brake.
- Loosen the adjusting locknut [A] and adjusting bolt [B] on the rear brake caliper.
- Remove the rear caliper mounting bolts [C], and detach the caliper [D] form the disc.

Brake Pads

- Remove:
  Brake Pad Bolts [A]
  Brake Pads [B]



Rear 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 the brake pads.
- Apply a non-permanent locking agent to the threads of the brake pad bolts.
- Tighten the brake pad bolts securely.
- Install the rear caliper (see Rear Caliper Installation).

⚠ WARNING

After servicing, it takes several applications of the brake lever or pedal before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the vehicle until a firm brake lever or pedal is obtained by pumping the lever or pedal until the pads are against the disc.

- Adjust the parking brake (see Parking Brake Adjustment in the Periodic Maintenance chapter).

Brake Pad Wear Inspection

- Refer to the Brake Pad Wear Inspection in the Periodic Maintenance chapter.

Brake Discs

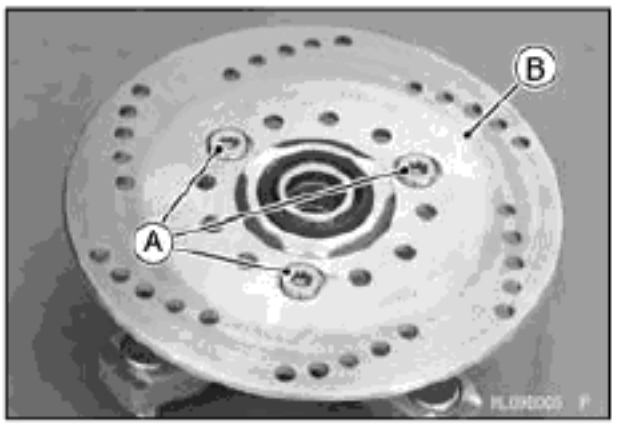
Brake Disc Cleaning

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

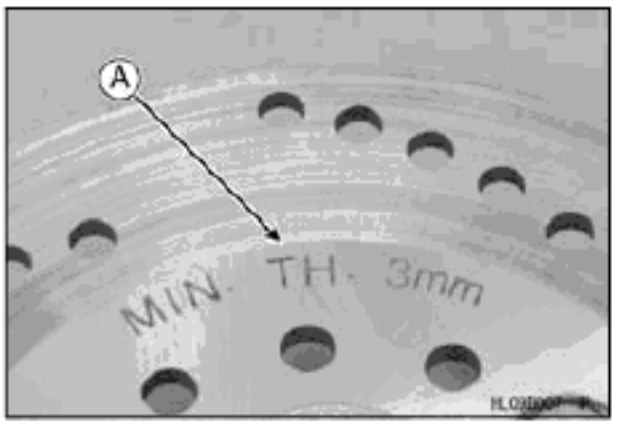
These cleaning fluids are usually highly flammable and harmful if breathed for prolonged periods. Be sure to heed the fluid manufacturer's warnings.

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

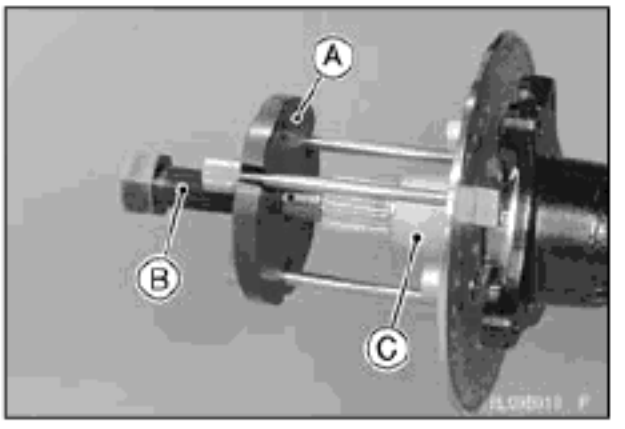


- The front brake disc must be installed with the marked side [A] facing toward inside.
- Tighten:

Torque - Brake Disc Mounting Bolts: 34 N·m (3.5 kgf·m, 25 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.

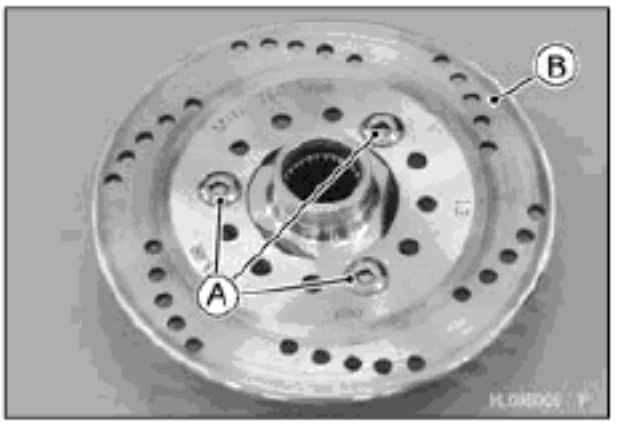
Rear Brake Disc Removal



- Remove:
  Rear Hub (see Rear Hub Removal in the Wheels/Tires chapter)
- Set the plate [A] of the rotor puller and disc hub puller [B].

Special Tools - Rotor Puller: 57001-1623
Disc Hub Puller: 57001-1781

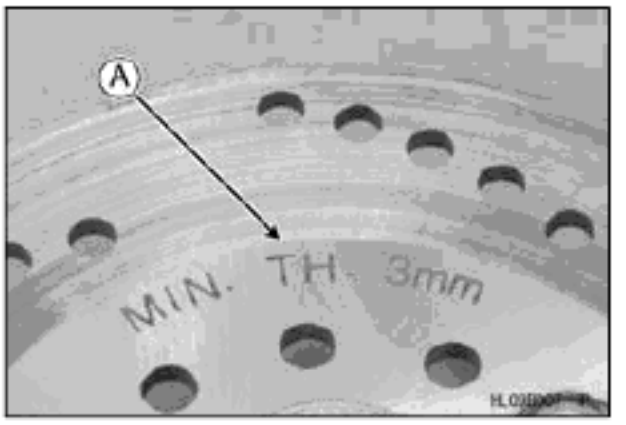
- Tighten the bolt of special tools, and remove the disc hub [C].



- Remove:
  Brake Disc Mounting Bolts [A]
  Brake Disc [B]

Brake Discs

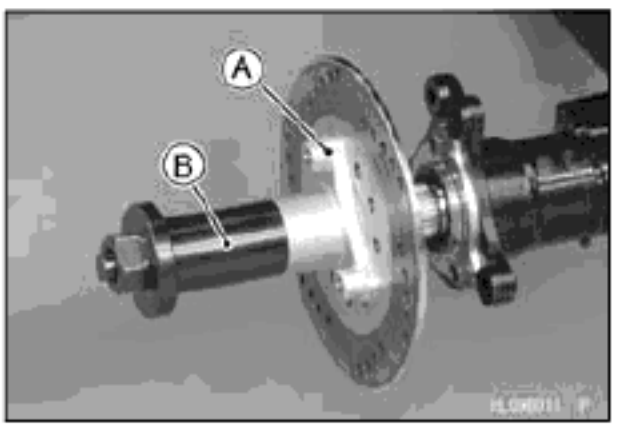
Rear Brake Disc Installation



- The rear brake disc must be installed with the marked side [A] facing toward inside.
- Tighten:

Torque - Brake Disc Mounting Bolts: 34 N·m (3.5 kgf·m, 25 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.



- Apply molybdenum disulfide grease to rear hub spline, so the spline grove is filled with grease.
- Install the rear disc hub assembly [A] onto the rear axle.

Special Tool - Hub Driver Set [B]: 57001-1782

- Tighten the nut of special tool, and install the disc hub assembly.
- Install the removed parts (see appropriate chapters).

Disc Wear

- Measure the thickness of each disc at the point [A] where it has worn the most.

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

Disc Thickness

Standard:	**3.8 ~ 4.2 mm (0.15 ~ 0.17 in.)**
Service Limit:	**3 mm (0.12 in.)**

Disc Runout

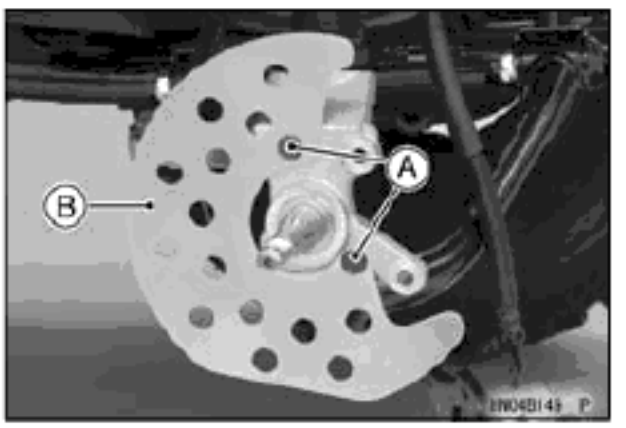
- Jack up the vehicle so that the wheels are off the ground.
- For front brake disc inspection, remove the front wheels and turn the handlebar fully to one side.
- Set up a dial gauge against the disc [A], and measure the disc runout.

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

Disc Runout

Service Limit:	**TIR 0.3 mm (0.012 in.)**

Front Brake Disc Guard Removal



- Remove:
  Front Brake Disc (see Front Brake Disc Removal)
  Bolts [A]
  Front Brake Disc Guard [B]

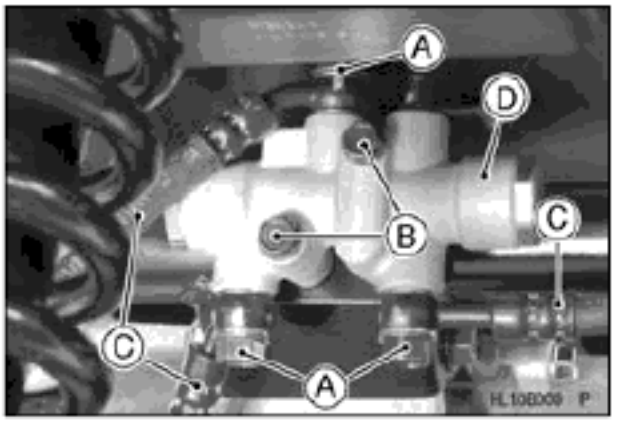
Brake Discs

Front Brake Disc Guard Installation

- Install:
  Front Brake Disc Guard
  Front Brake Disc Guard Bolts
- Install the removed parts (see appropriate chapters).

Proportioning Valve

Rear Brake Proportioning Valve Removal



- Drain the brake fluid (see Brake Fluid Change in the Periodic Maintenance chapter).
- Loosen the banjo bolts [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the rear brake proportioning valve mounting bolts [B].
- Unscrew the banjo bolts, and remove the brake hoses [C] from the rear brake proportioning valve [D].

Rear Brake Proportioning Valve Installation

- Install the rear brake proportioning valve and brake hoses lower end.

○Replace the washers that are on each side of hose fitting with new ones.

- Tighten:

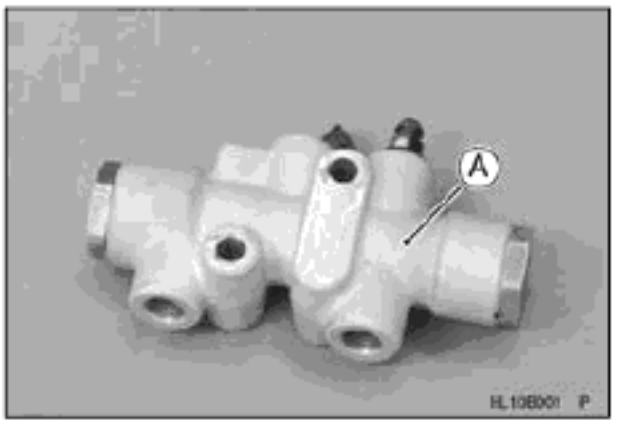
Torque - Rear Brake Proportioning Valve Mounting Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

- Check the fluid level in the brake reservoir.
- Bleed the brake line (see Brake Line Air Bleeding).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ WARNING

After servicing, it takes several applications of the brake lever before the brake pads contact the disc, which could result in increased stopping distance and cause an accident resulting in injury or death. Do not attempt to ride the vehicle until a firm brake lever is obtained by pumping the lever until the pads are against the disc.

Rear Brake Proportioning Valve Inspection



- Remove the rear brake proportioning valve [A] (see Rear Brake Proportioning Valve Removal).
- Visually inspect the rear brake proportioning valve.

★If the rear brake proportioning valve are cracked, leaked, or otherwise damaged, replace it.

Brake Hoses

Brake Hose Inspection

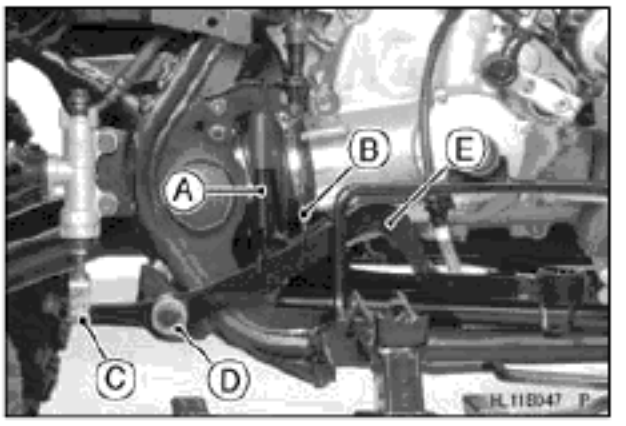
- Refer to the Brake Hose and Connections Inspection in the Periodic Maintenance chapter.

Brake Hose Replacement

- Refer to the Brake Hose Replacement in the Periodic Maintenance chapter.

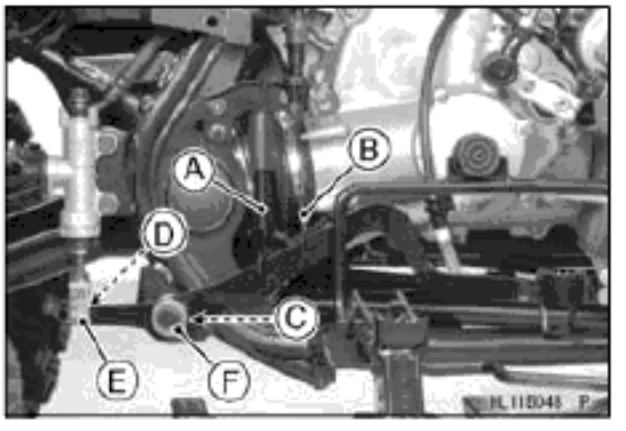
Brake Lever and Pedal

Brake Pedal Removal



- Remove:
  Right Footboard (see Right Footboard Removal in the Frame chapter)
  Brake Pedal Return Spring [A]
  Brake Light Switch Spring [B]
  Cotter Pin and Joint Pin [C]
  Brake Pedal Pivot Cotter Pin [D] and Washers
  Brake Pedal [E]

Brake Pedal Installation

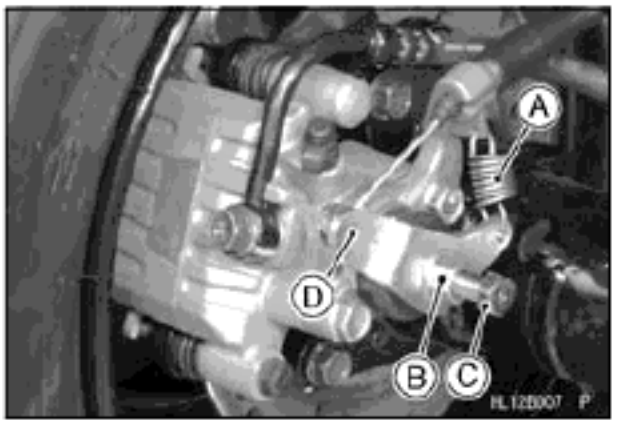


- Install:
  Brake Pedal Return Spring [A]
  Brake Light Switch Spring [B]
- Apply grease the brake pedal pivot [C].
- Replace the cotter pin with new a one.
- Install:
  Joint Pin [D]
  Cotter Pin [E]
  Brake Pedal Pivot Cotter Pin [F] and Washers
- Bend the cotter pin ends.

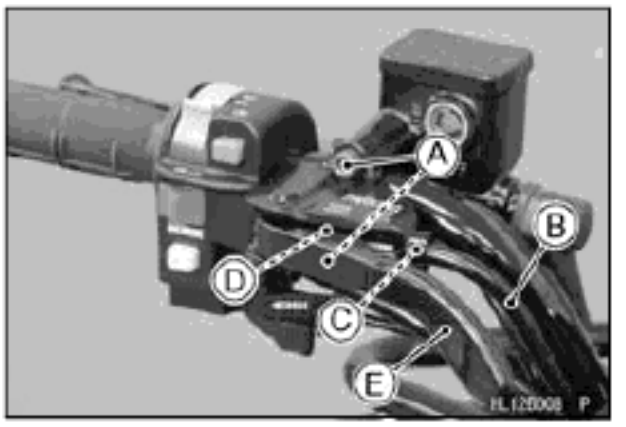
Parking Brake

Parking Brake Cable Removal

- Release the parking brake.
- Remove the parking brake spring [A].
- Loosen the parking brake adjusting bolt locknut [B] and turn out the bolt [C] several turns.
- Clear the parking cable lower end [D].

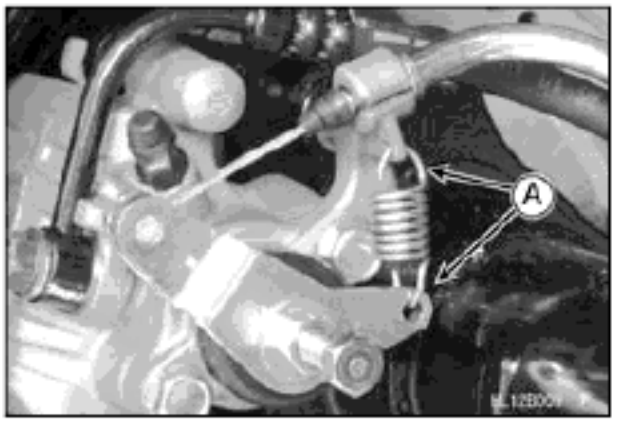


- Remove the master cylinder mounting bolts [A].
- Pull the parking cable [B] to clear the it from the holder [C].
- Clear the parking cable upper end [D] from the lever [E].



Parking Brake Cable Installation

- Lubricate the parking brake cable before installation (see General Lubrication in the Periodic Maintenance chapter).
- Install the parking brake cable in accordance with Cable, Wire and Hose Routing section in the Appendix chapter.
- Install the return spring so that the spring ends [A] faces inside.
- Adjust the parking brake (see Parking Brake Cable Adjustment in the Periodic Maintenance chapter).



Parking Brake Adjustment

- Refer to the Parking Brake Cable Adjustment in the Periodic Maintenance chapter.

Parking Brake Cable Lubrication

- Refer to the General Lubrication in the Periodic Maintenance chapter.

Suspension

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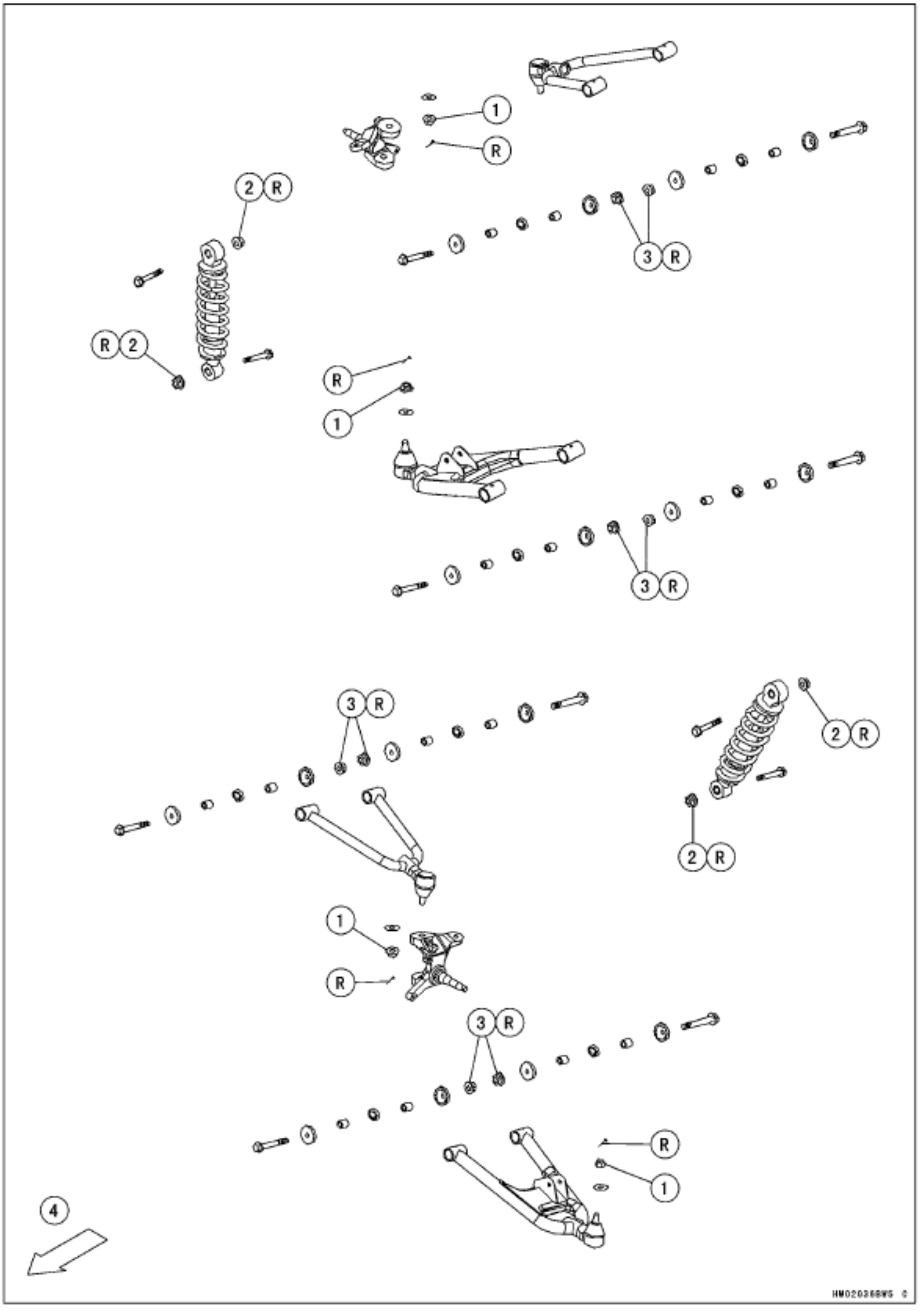
Exploded View

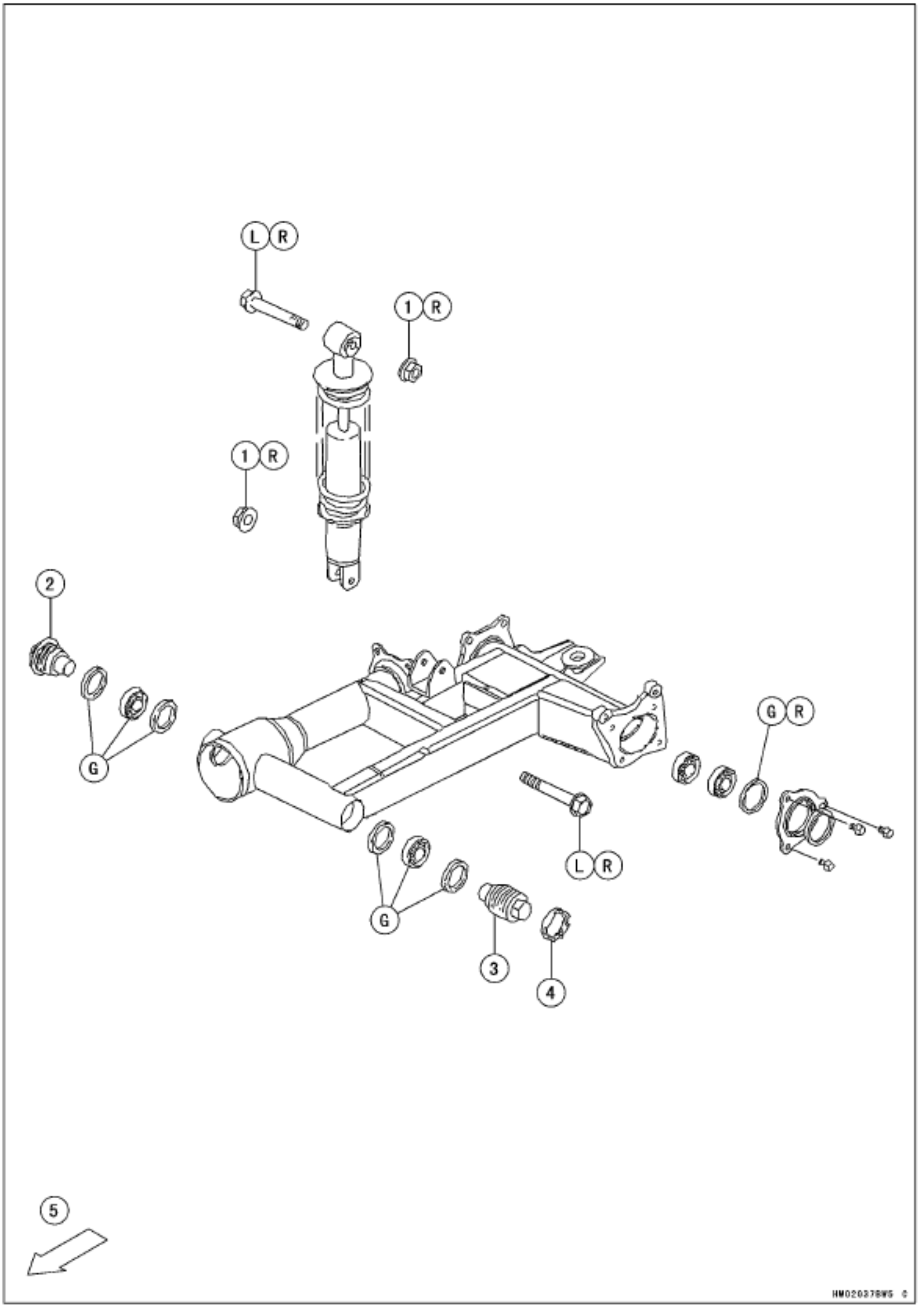


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Steering Knuckle Pivot Nuts	30	3.1	22	
2	Front Shock Absorber Mounting Nuts	39	4.0	29	R
3	Suspension Arm Mounting Nuts	44	4.5	32	R

4. Front
R: Replacement Parts

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear Shock Absorber Mounting Nuts	39	4.0	29	R
2	Swingarm Pivot Right Shaft	116	11.8	85.6	
3	Swingarm Pivot Bolt Left Shaft	11	1.1	97 in·lb	
4	Swingarm Pivot Locknut	116	11.8	85.6	

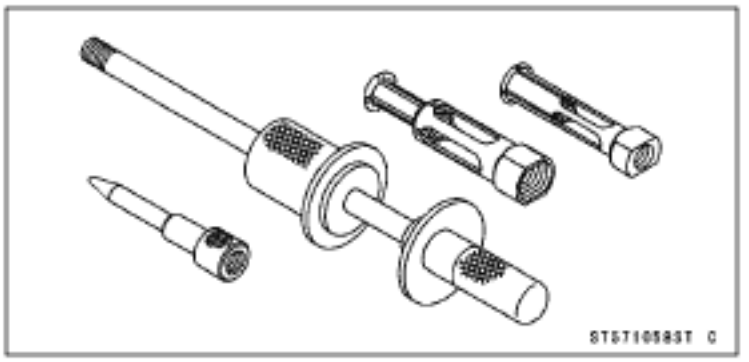
5. Front
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts

Specifications

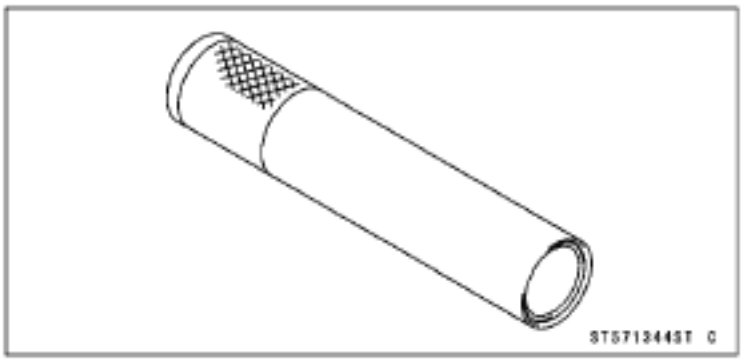
Item	Standard	Service Limit
Shock Absorbers		**(Usable Range)**
Spring Preload Setting Position:		
Front	2nd Step	1 ~ 5
Rear	2nd Step	1 ~ 5

Special Tools

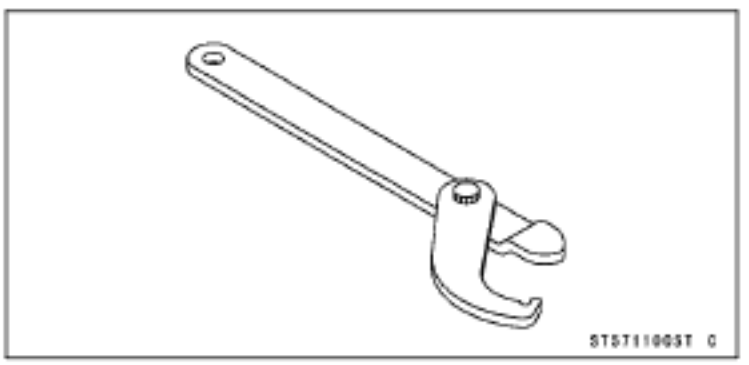
Oil Seal & Bearing Remover:
57001-1058



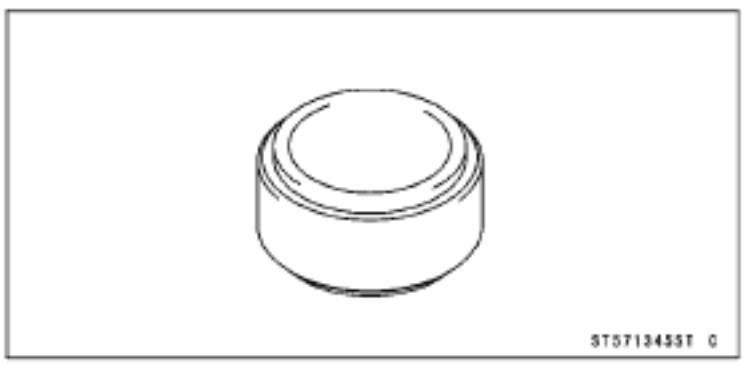
Steering Stem Bearing Driver, ϕ42.5:
57001-1344



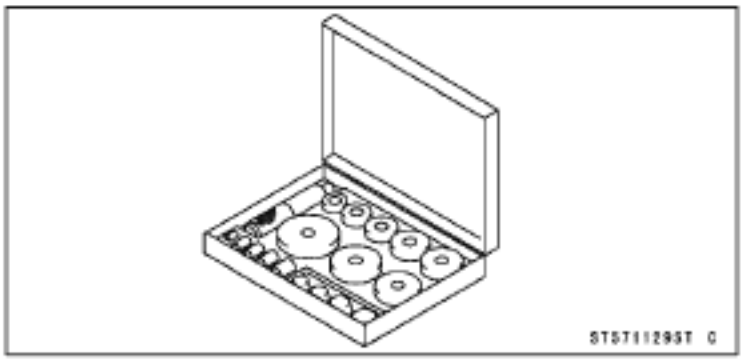
Steering Stem Nut Wrench:
57001-1100



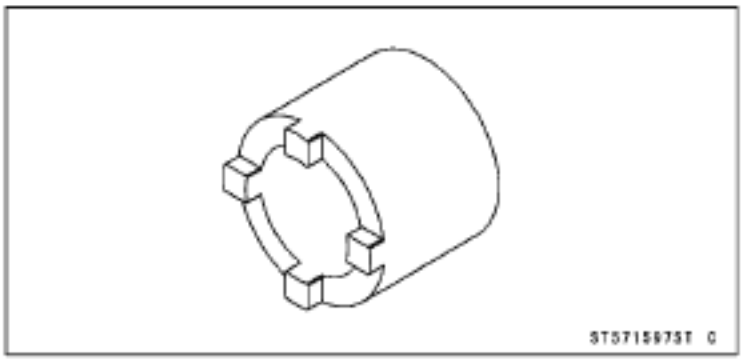
Steering Stem Bearing Driver Adapter, ϕ41.5:
57001-1345



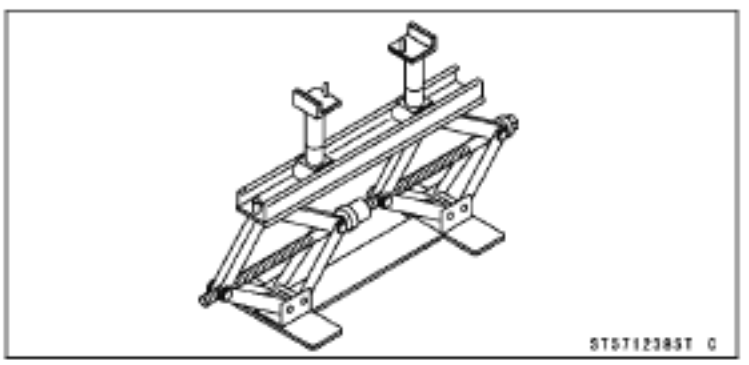
Bearing Driver Set:
57001-1129



Swingarm Pivot Nut Wrench:
57001-1597



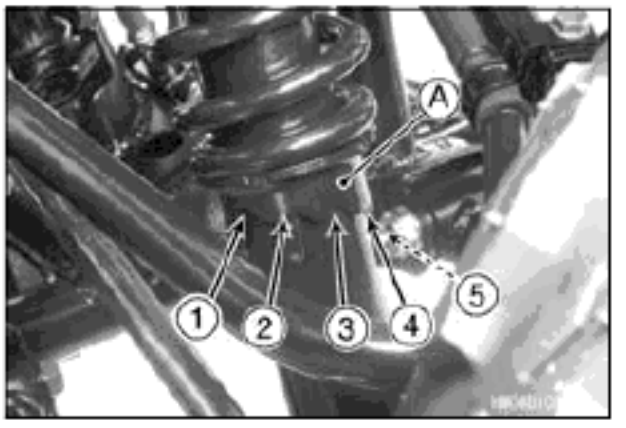
Jack:
57001-1238



Shock Absorbers

Front Shock Absorber Preload Adjustment

The spring adjusting sleeve [A] on 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	↓	↓	↓	↓	↓
5	Strong	Hard	Heavy	Rough	High

- Turn the adjusting sleeve on front shock absorber to the desired position with the wrench.

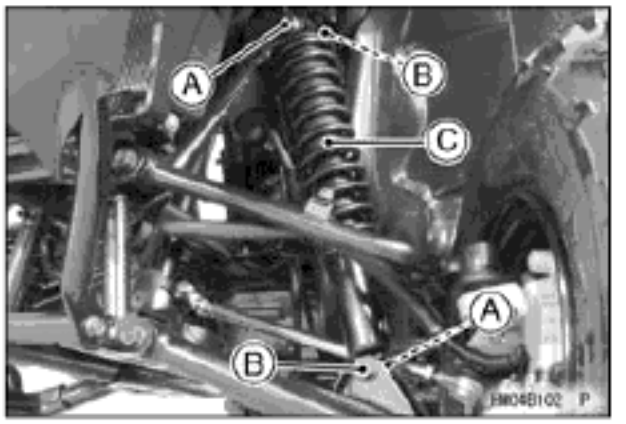
Special Tool - Steering Stem Nut Wrench: 57001-1100

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

- Remove:
  Bolts [A] and Nuts [B]
  Front Shock Absorber [C]



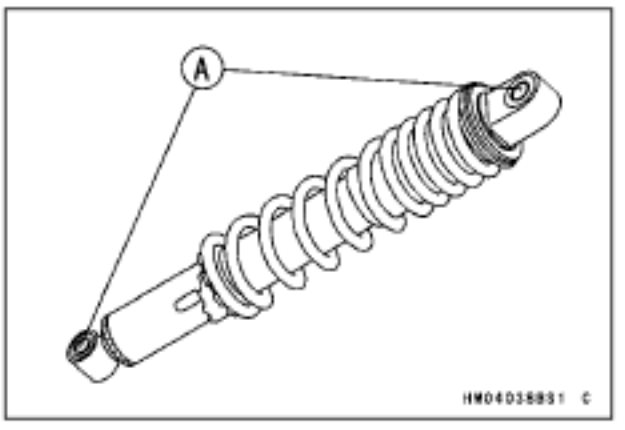
Front Shock Absorber Installation

- Replace the front shock absorber mounting nuts with new ones.
- Check the bushings [A] in the front shock absorber.

★If bushings are worm, crack, hardened or otherwise damage, replace the front shock absorber.

- Tighten:

Torque - Front Shock Absorber Mounting Nuts: 39 N·m (4.0 kgf·m, 29 ft·lb)



Front Shock Absorber Inspection

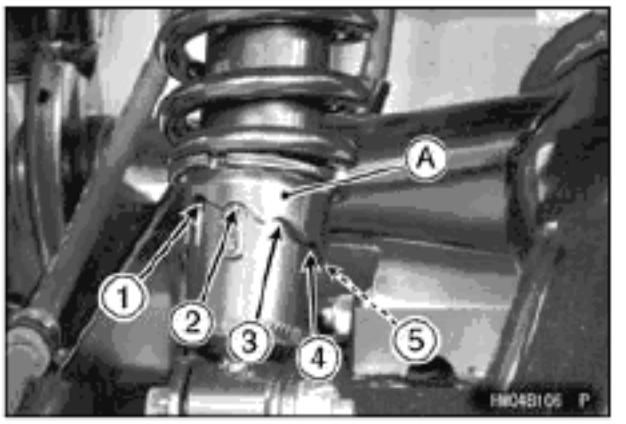
- Remove the front shock absorber (see Front Shock Absorber Removal).
- Visually inspect the following items.
  Smooth Stroke
  Oil Leakage
  Crake, Dent or Bend

★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.

Shock Absorbers

Rear Shock Absorber Preload Adjustment

The spring adjusting sleeve [A] on rear 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	↓	↓	↓	↓	↓
5	Strong	Hard	Heavy	Rough	High

- Turn the adjusting sleeve on rear shock absorber to the desired position with the wrench.

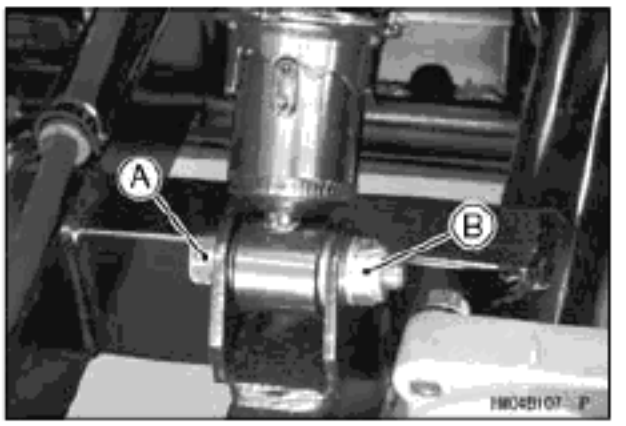
Special Tool - Steering Stem Nut Wrench: 57001-1100

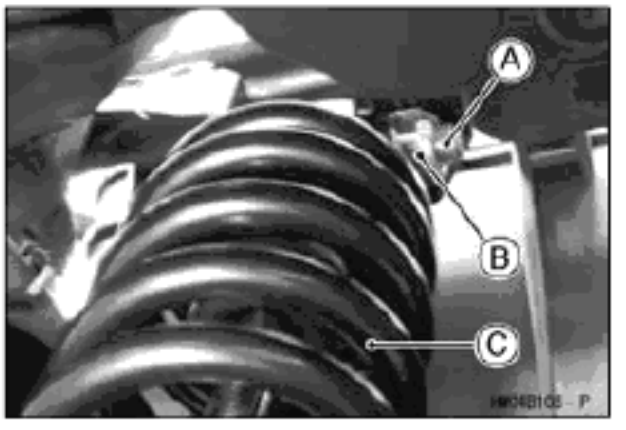
Rear Shock Absorber Removal

- 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] and nuts [B].
- Remove the rear shock absorber [C].

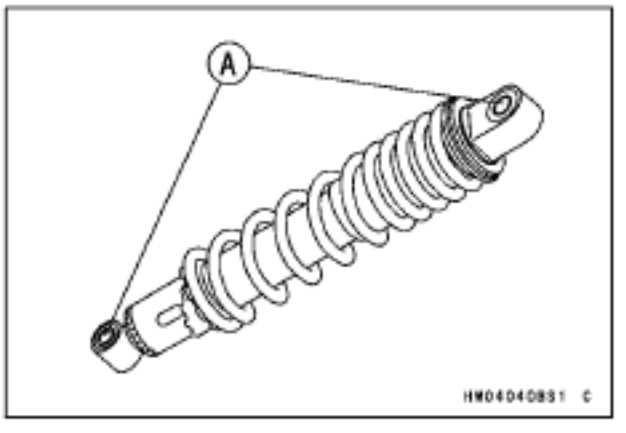




Rear Shock Absorber Installation

- Replace the rear shock absorber mounting bolts and nuts with new ones.
- Check the bush [A] in the rear shock absorber.
- ★If bushings are worm, crack, hardened or otherwise damage, replace the rear shock absorber.
- Apply a non-permanent locking agent on the thread of the rear shock absorber mounting bolts.
- Tighten:

Torque - Rear Shock Absorber Mounting Nuts: 39 N·m (4.0 kgf·m, 29 ft·lb)



Shock Absorbers

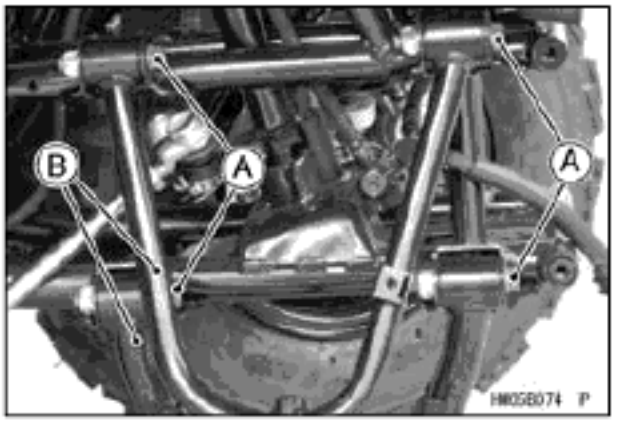
Rear Shock Absorber Inspection

- Remove the rear shock absorber (see Rear Shock Absorber Removal).
- Visually inspect the following items.
  Smooth Stroke
  Oil Leakage
  Crack, Dent or Bend

★If there is any damage to the rear shock absorber, replace it.

Suspension Arms

Suspension Arm Removal

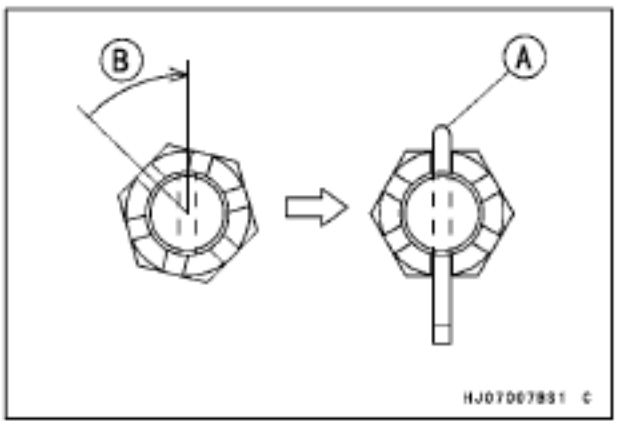


- Remove:
  Front Hub (see Front Hub Removal in the Wheels/Tires chapter)
  Steering Knuckle (see Steering Knuckle in the Steering chapter)
  Front Shock Absorber (see Front Shock Absorber Removal)
  Suspension Arm Mounting Bolts [A]
  Suspension Arms [B]

Suspension Arm Installation

- Replace the suspension arm mounting nuts with new ones.
- Tighten:

Torque - Suspension Arm Mounting Nuts: 44 N·m (4.5 kgf·m, 32 ft·lb)

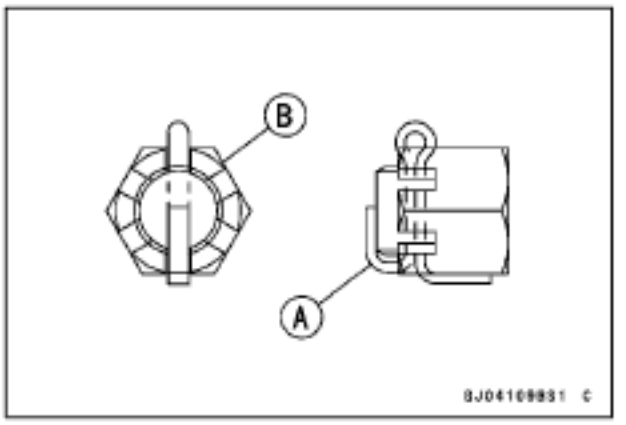


- Insert a new cotter pin [A].

NOTE

○When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axle, tighten the nut clockwise [B] up to next alignment.
○It should be within 30 degrees.
○Loosen once and tighten again when the slot goes past the nearest hole.

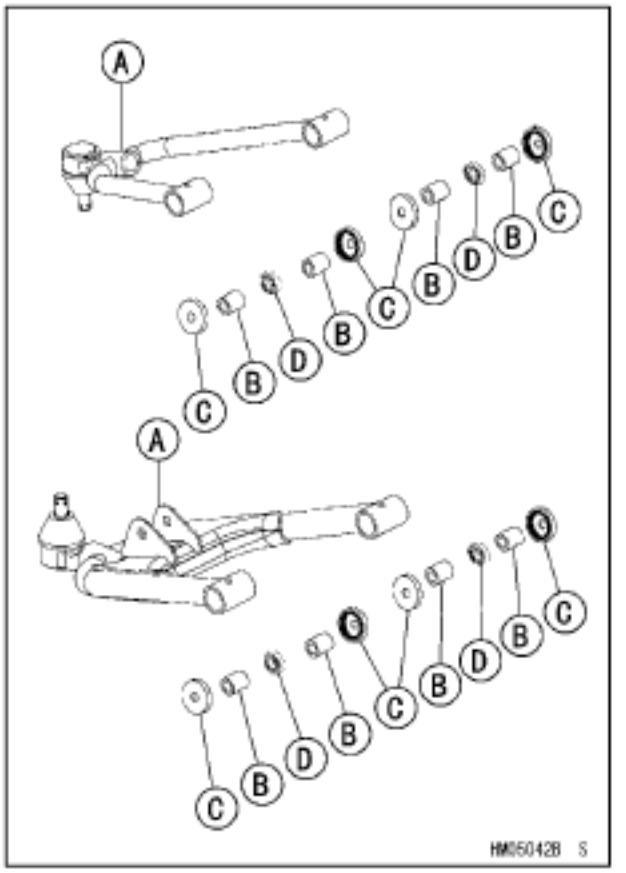
- Bend the cotter pin [A] over the nut [B].



Suspension Arms

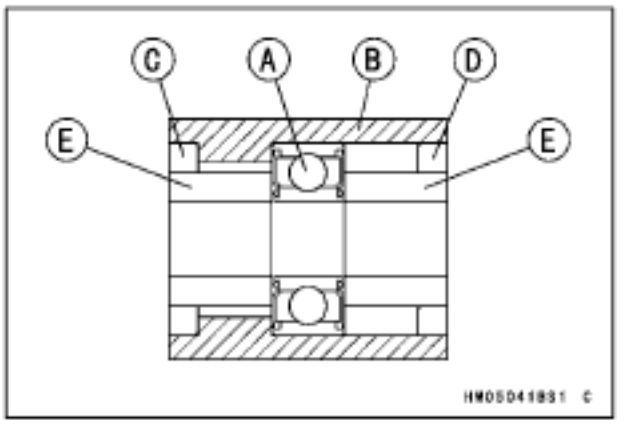
Suspension Arm Disassembly

- Remove:
  Suspension Arms [A] (see Suspension Arm Removal)
  Collars [B]
  Seals [C]
- Using a press, remove the bearings [D].



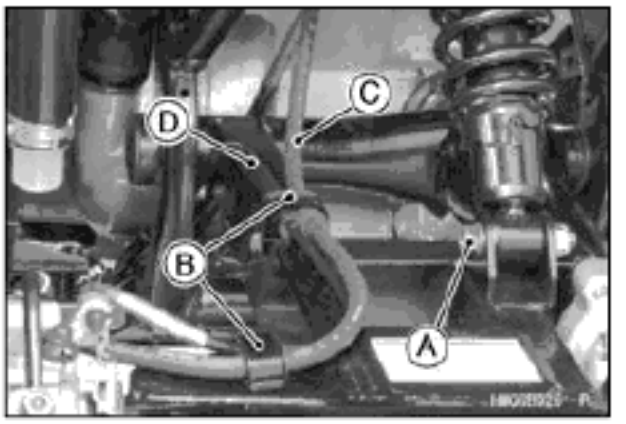
Suspension Arm Assembly

- Using a press, install the new bearing [A] until it stops at the bottom of suspension arm housing [B].
- Replace the seals with new ones.
- Install the seal [C] until it stops at the bottom of suspension arm housing, align the surface of the seal [D] with the outside of the suspension arm surface.
- Install the collars [E].



Swingarm

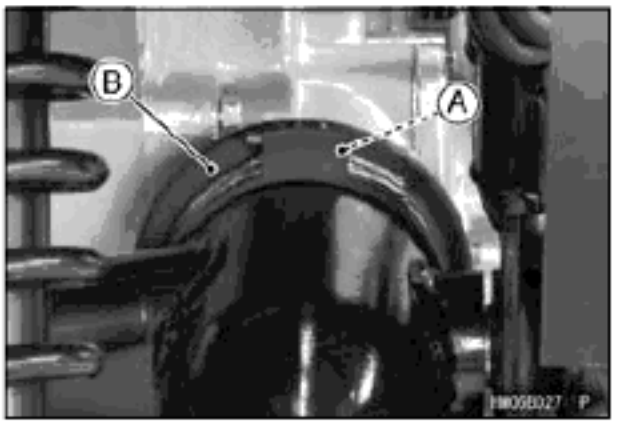
Swingarm Removal



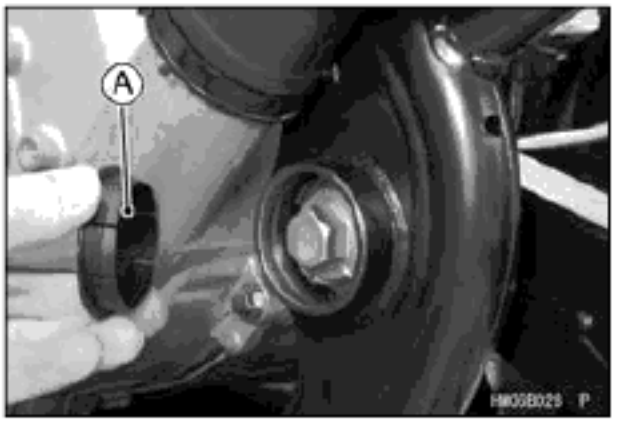
- Support the vehicle on a stand or a jack so that the rear wheels are off the ground.

Special Tool - Jack: 57001-1238

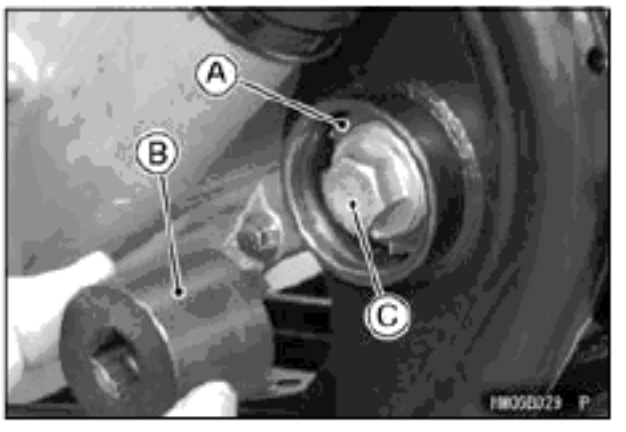
- Remove:
  Footboards (see Left and Right Footboard Removal in the Frame chapter)
  Rear Hubs (see Rear Hub Removal in the Wheels/Tires chapter)
  Rear Disc Hub (see Rear Disc Removal in the Brake chapter)
  Rear Shock Absorber Mounting Lower Bolt [A] and Nut
  Clamps [B] for Brake Hose [C] and Parking Brake Cable [D]



- Loosen:
  Boot Clamp Screw [A]
- Remove:
  Boot [B]



- Remove:
  Cap [A]



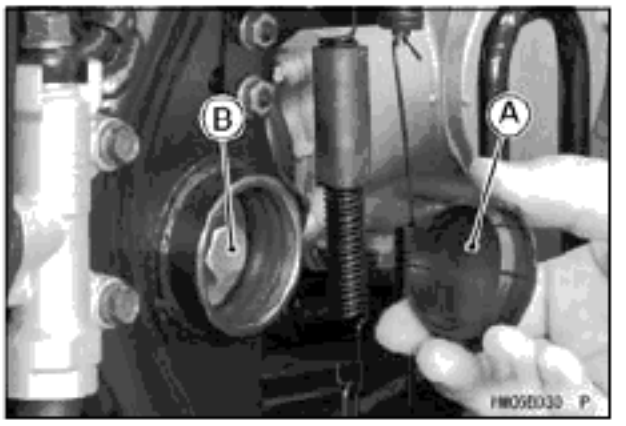
- Remove:
  Swingarm Adjusting Locknut [A]

Special Tool - Swingarm Pivot Nut Wrench [B]: 57001 -1597

- Remove:
  Swingarm Pivot Bolt Left Shaft [C]

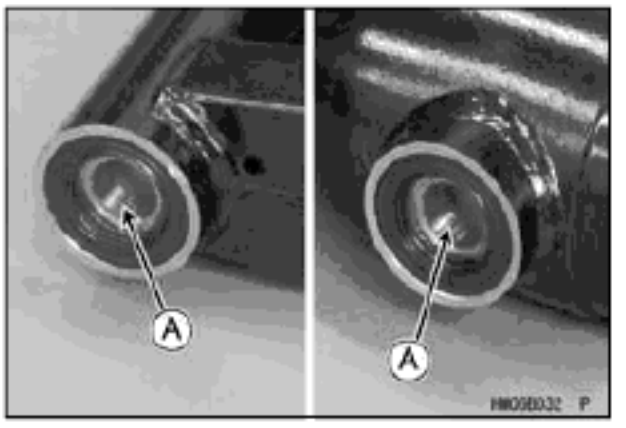
Swingarm

- Remove:
  Cap [A]
  Swingarm Pivot Right Shaft [B]
- Remove:
  Swingarm together with the Final Gear Case and Rear Axle
  Final Gear Case (see Final Gear Case Removal in the Final Drive chapter)

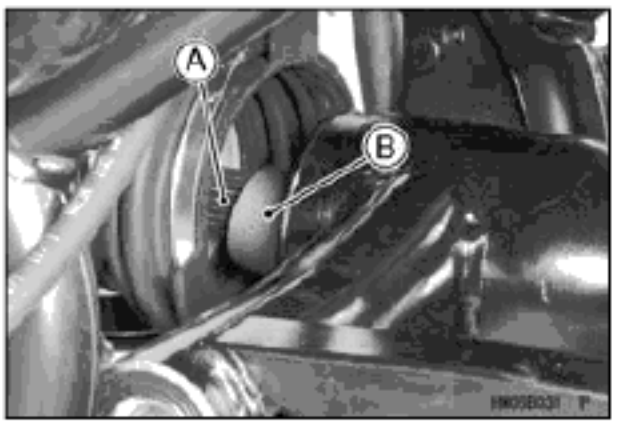


Swingarm Installation

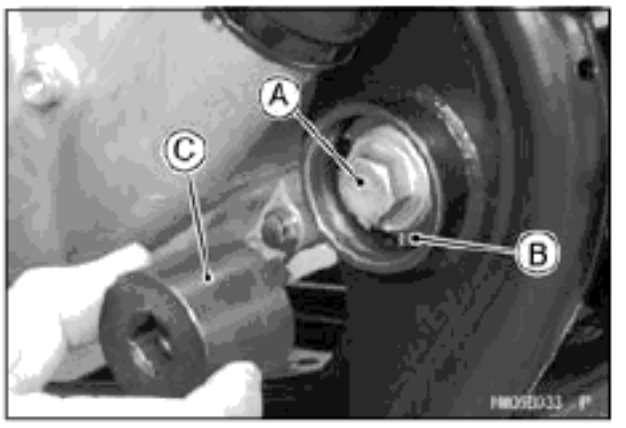
- Apply grease:
  Dust Seals [A]



- Install the final gear case (see Final Gear Case Installation in the Final Drive chapter).
- Apply molybdenum disulfide grease to the spline of the output shaft [A].
- Fit the propeller shaft [B] on the output shaft.



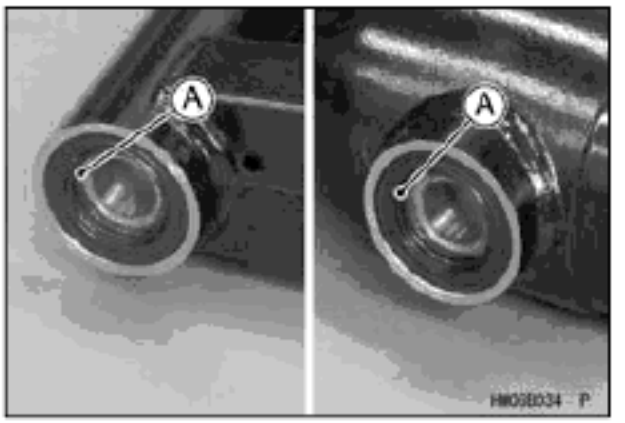
- Tighten:
  Torque - Swingarm Pivot Right Shaft: 116 N·m (11.8 kgf·m, 85.6 ft·lb)
- Tighten:
  Torque - Swingarm Pivot Bolt Left Shaft [A]: 11 N·m (1.1 kgf·m, 97 in·lb)
  Swingarm Pivot Locknut [B]: 116 N·m (11.8 kgf·m, 85.6 ft·lb)
  Special Tool - Swingarm Pivot Nut Wrench [C]: 57001 -1597
- Fit the boot on the swingarm, and tighten the clamp screw.
- Install the removed parts (see appropriate chapters).



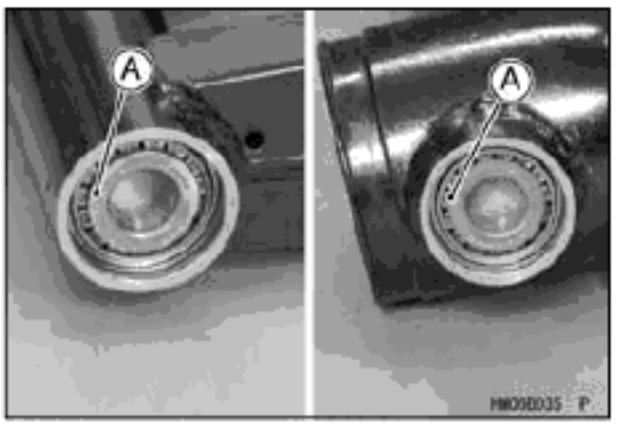
Swingarm

Swingarm Disassembly

- Remove:
  Dust Seals [A]

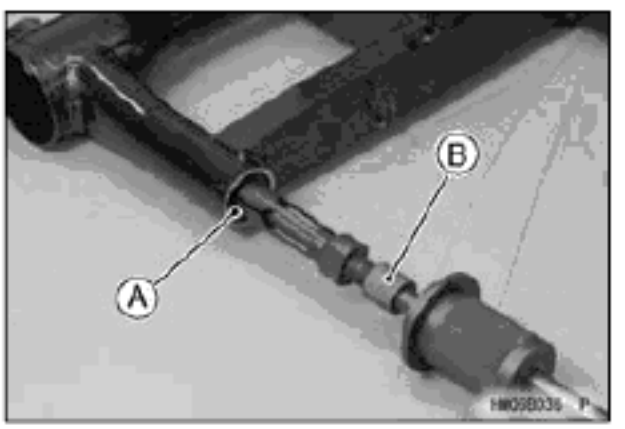


- Remove:
  Tapered Roller Bearings [A]

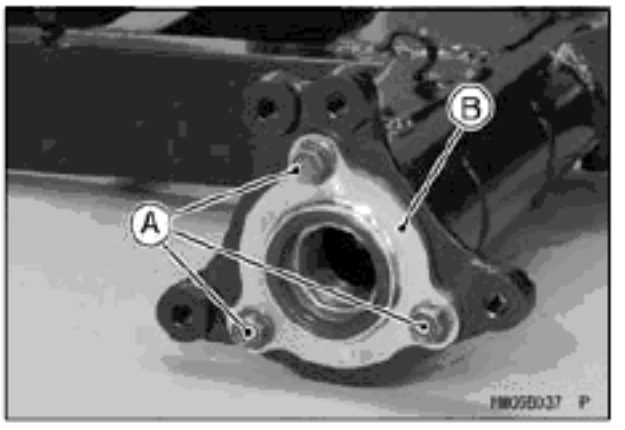


- Remove:
  Outer Races [A] (Both Sides)

Special Tool - Oil Seal & Bearing Remover [B]: 57001-1058



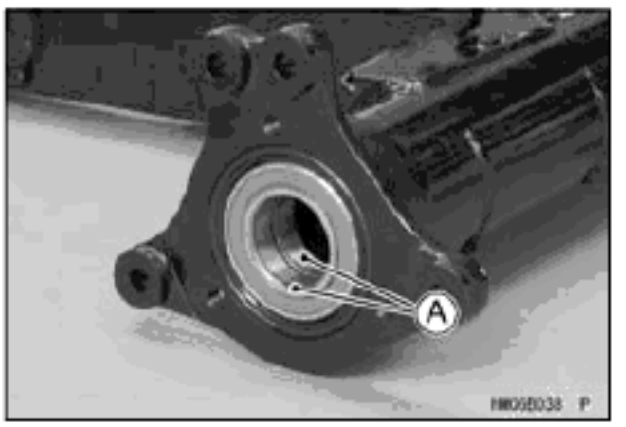
- Remove:
  Bolts [A]
  Bearing Stopper Plate [B]

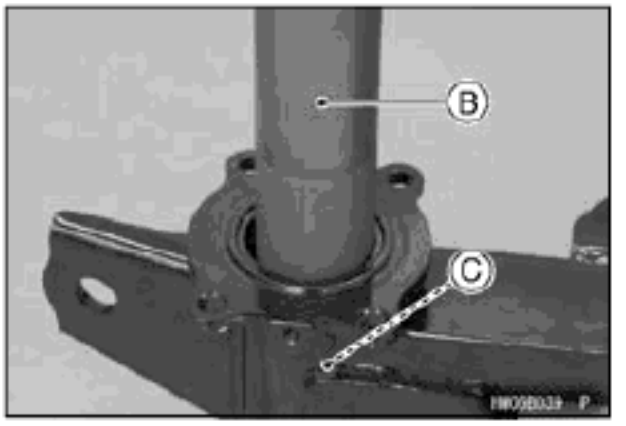


Swingarm

- Remove:
  Rear Axle Bearings [A]

Special Tools - Steering Stem Bearing Driver, ϕ42.5 [B]: 57001-1344
Steering Stem Bearing Driver Adapter, ϕ41.5 [C]: 57001-1345

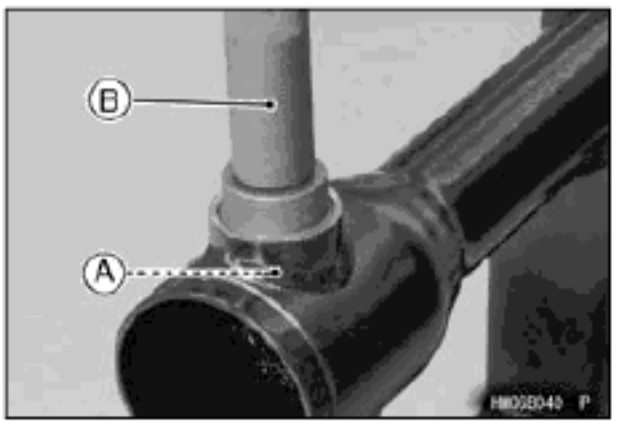




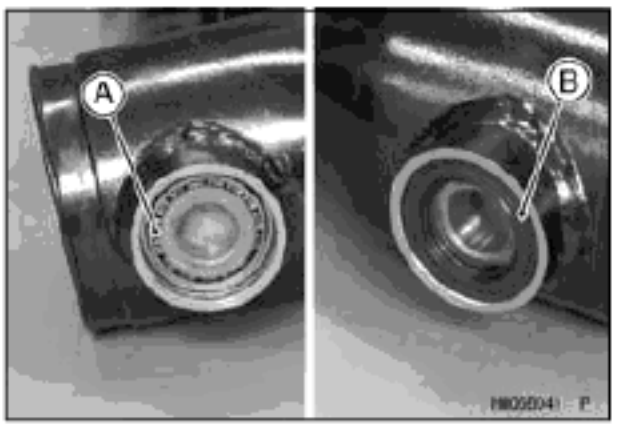
Swingarm Assembly

- Install the new outer race [A] by using special tool [B] (both sides).

Special Tool - Bearing Driver Set: 57001-1129

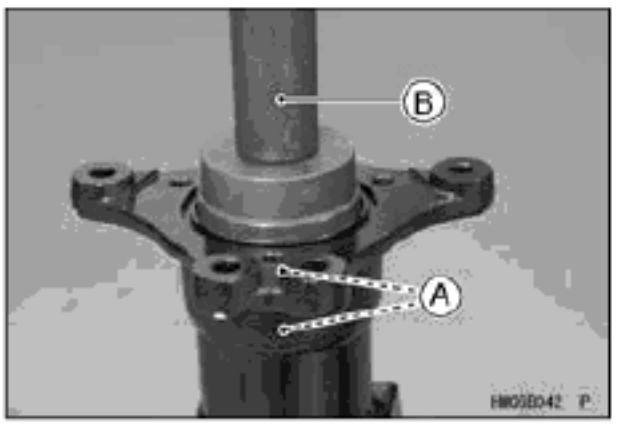


- Apply grease to the tapered roller bearing [A] and install it (both sides).
- Apply grease to the dust seal [B] and install it (both sides).



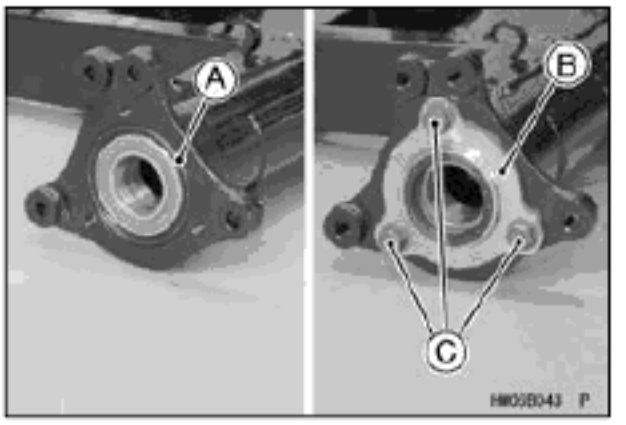
- Install the rear axle bearings [A] by using special tool [B].

Special Tool - Bearing Driver Set: 57001-1129



Swingarm

- Replace the O-ring [A] with a new one and apply grease.
- Install:
  O-ring [A]
  Bearing Stopper Plate [B]
  Bolts [C]



Swingarm Bearing Inspection

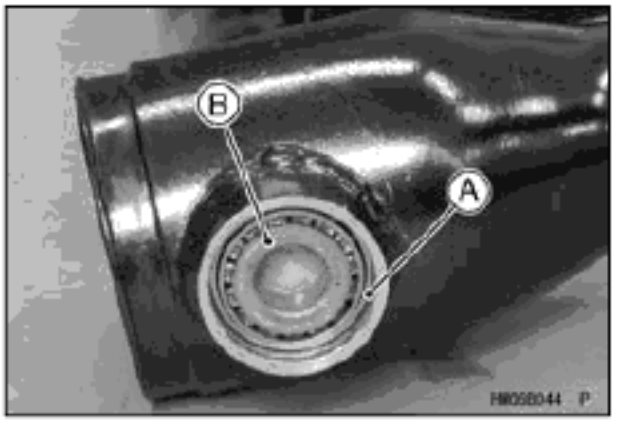
- Remove the rear final gear case (see Final Gear Case Removal in the Final Drive chapter).
- Move the swingarm up and down to check for abnormal friction, and push and pull it back and forth to check for bearing play.

★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.

Swingarm Bearing Lubrication

- Remove the swingarm (see Swingarm Removal).
- Using a high flash-point solvent, wash the bearings clean of grease, and dry them.
- Inspect the bearings and dust 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 grease to the inside of the oil seals.
- Install the swingarm (see Swingarm Installation).



Steering

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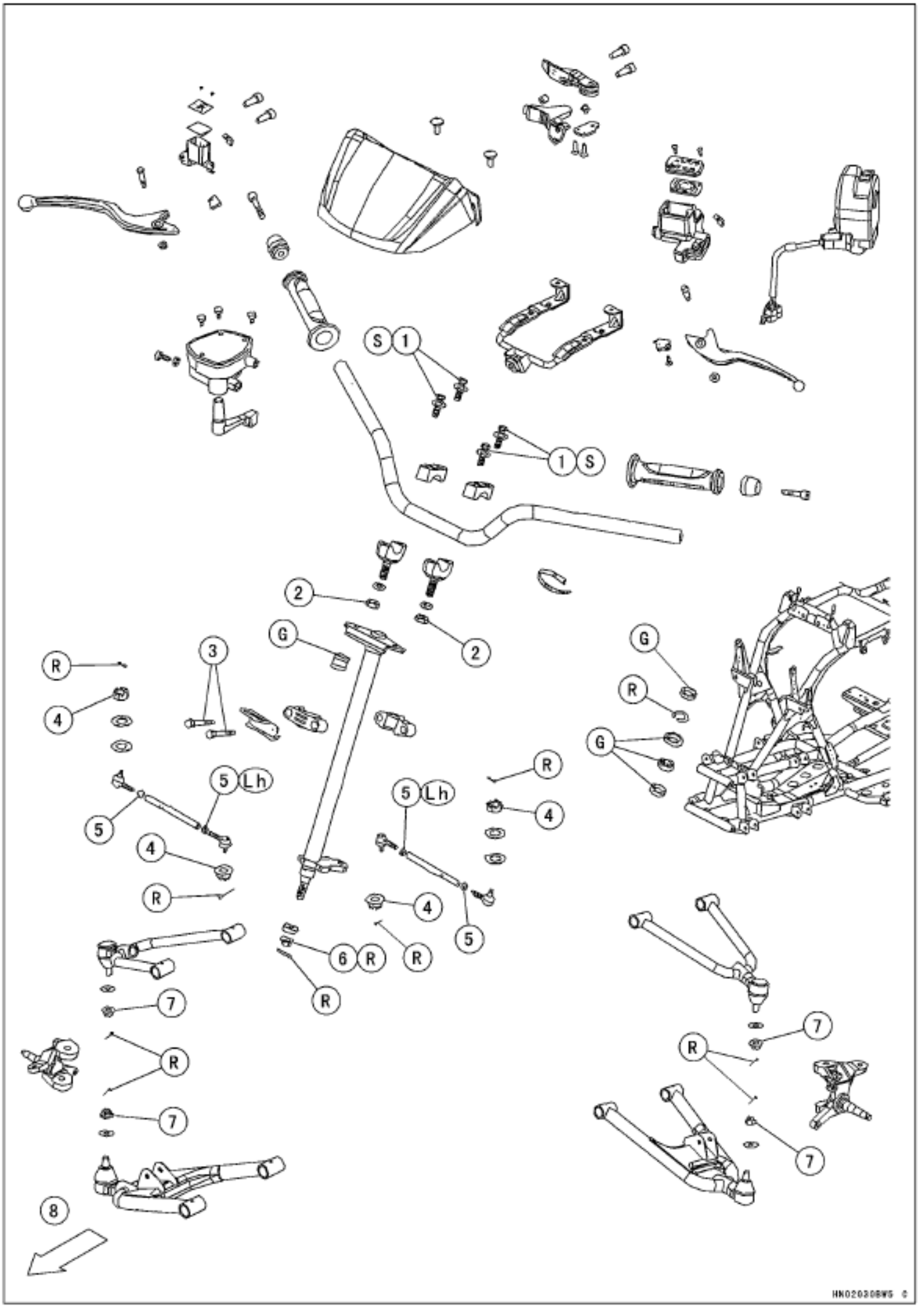
Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Handlebar Holder Bolts	26	2.7	19	S
2	Handlebar Holder Nuts	39	4.0	29	
3	Steering Shaft Holder Bolts	26	2.7	19	
4	Tie-rod End Nuts	25	2.5	18	
5	Tie-rod Locknuts	25	2.5	18	Lh (2)
6	Steering Shaft Bottom End Nut	69	7.0	51	R
7	Suspension Arm Joint Nuts	34	3.5	25	

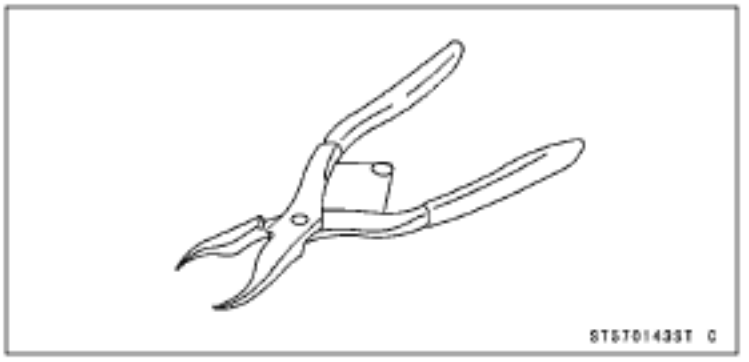
8. Front
G: Apply grease.
Lh: Left-hand Threads
R: Replacement Parts
S: Follow the specific tightening sequence.

Specifications

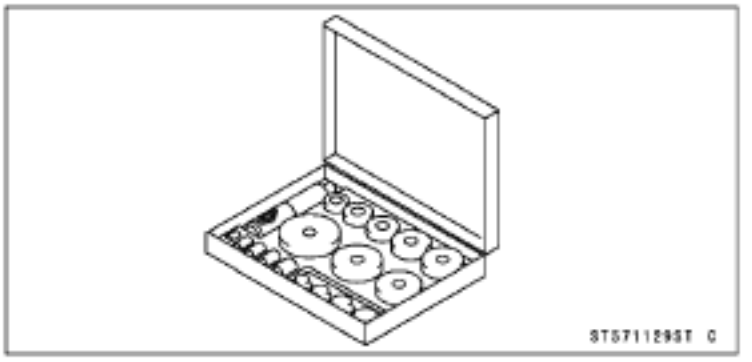
Item	Standard	Service Limit
Tie-rods		
Tie-rod Length	334.0 ~ 335.0 mm (13.15 ~ 13.19 in.)	– – –

Special Tools

Inside Circlip Pliers:
57001-143



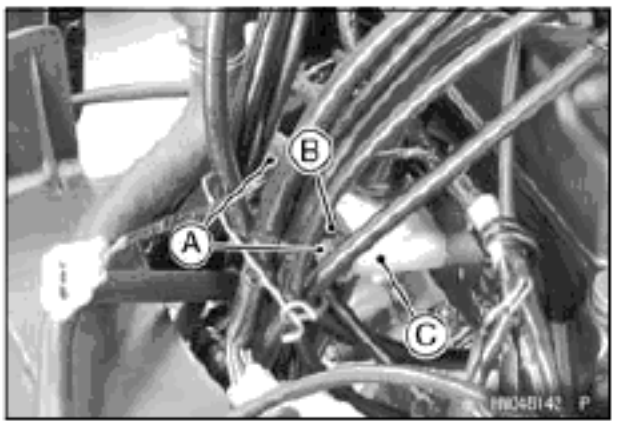
Bearing Driver Set:
57001-1129



Steering

Steering Shaft Removal

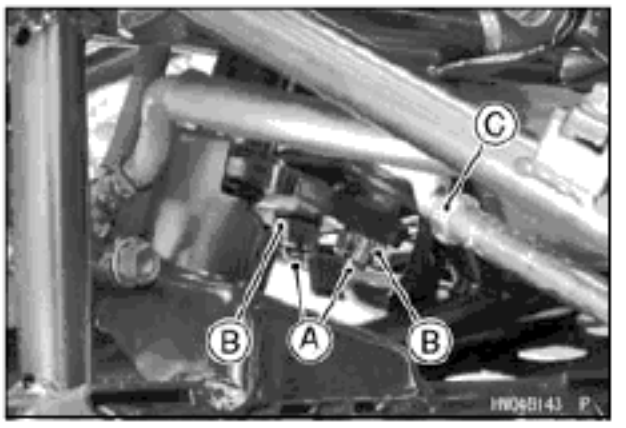
- Remove:
  Front Fender (see Front Fender Removal in the Frame chapter)
  Handlebar (see Handlebar Removal)
  Front Bottom Guard (see Front Bottom Guard Removal in the Frame chapter)
  Bolts [A]
  Cable Holder [B]
  Steering Shaft Holder [C]



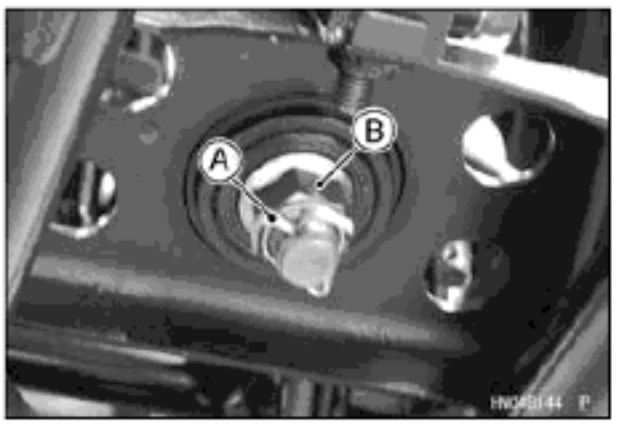
- Remove:
  Cotter Pins [A]
  Tie-rod End Nuts [B]

NOTICE

Do not loosen the locknuts [C] at the ends of the tie-rod adjusting sleeve, or the toe-in of the front wheels will be changed.

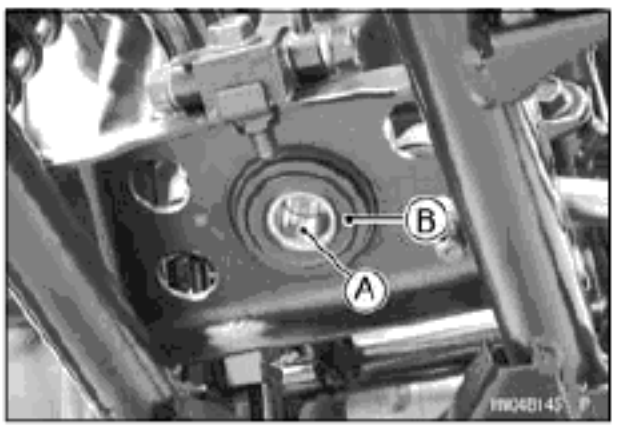


- Remove:
  Cotter Pin [A]
  Steering Shaft Bottom End Nut [B]
- Pull the steering shaft assembly upward to remove it from the frame.



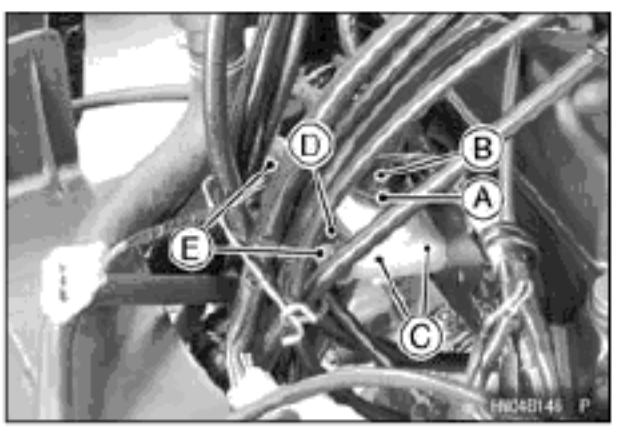
Steering Shaft Installation

- Assemble the steering shaft and bracket in reverse order of disassembly.
- Apply grease to the collar [A], dust seal [B] and bearing [C].



- Apply grease to the steering shaft bushing [A] on the steering shaft [B].
- Install:
  Steering Shaft Clamps [C]
  Cable Holder [D]
- Tighten:

Torque - Steering Shaft Holder Bolts [E]: 26 N·m (2.7 kgf·m, 19 ft·lb)

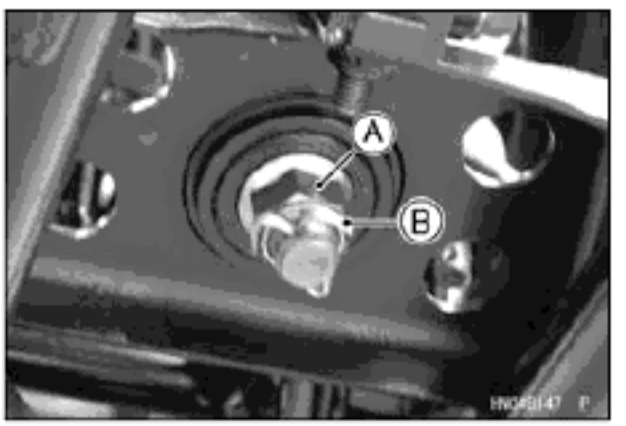


Steering

- Replace the steering shaft bottom end nut [A] with a new one.
- Tighten:

Torque - Steering Shaft Bottom End Nut: 69 N·m (7.0 kgf·m, 51 ft·lb)

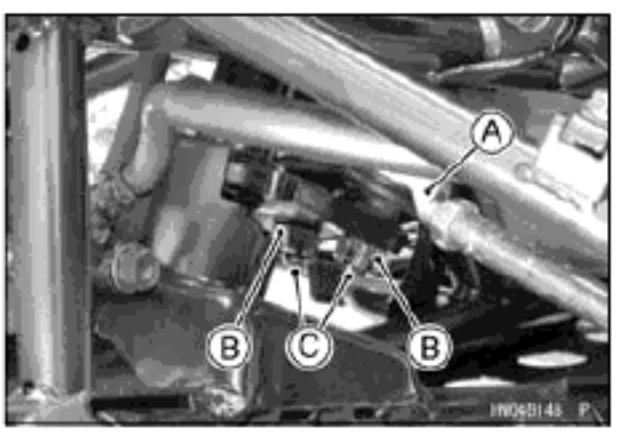
- Install a new cotter pin [B].



- Install:
  Tie-rod Ends [A]
- Tighten:

Torque - Tie-rod End Nuts [B]: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Install the new cotter pins [C].
- Install the removed parts.



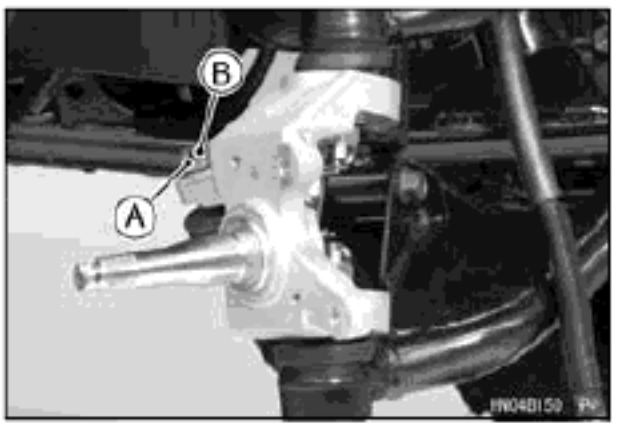
Steering Knuckle Removal

- Remove:
  Front Hub (see Front Hub Removal in the Wheels/Tires chapter)
  Front Brake Disc Guard (see Front Brake Disc Guard Removal in the Brakes chapter)

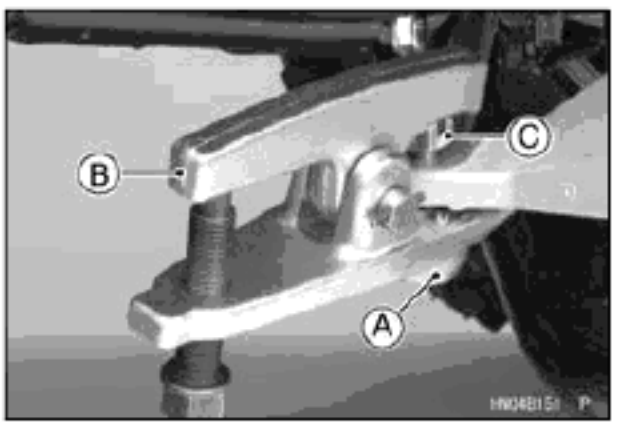
- Remove the cotter pin [A].
- Loosen the tie-rod end nut [B].

NOTICE

Do not loosen the locknuts at the ends of the tie-rod, or the toe-in of the front wheels will be changed.

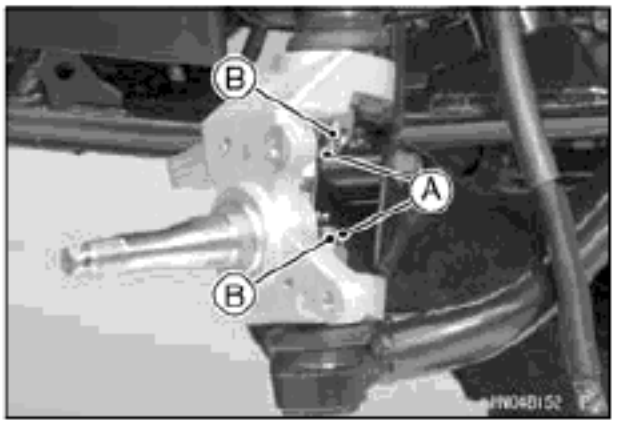


- Remove the tie-rod end joint [A] from the steering knuckle using a suitable joint remover [B].
- Remove the tie-rod end nut [C].

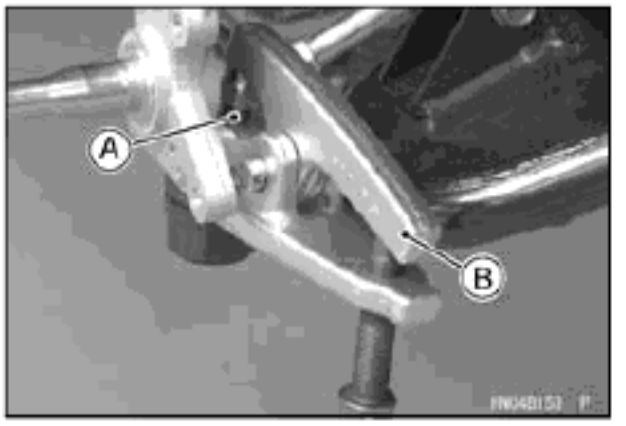


Steering

- Remove:
  Cotter Pins [A]
  Suspension Arm Joint Nuts [B]



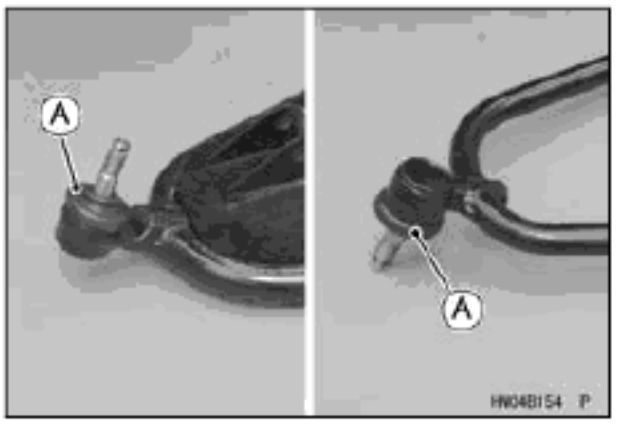
- Remove the suspension arm joint [A] from the steering knuckle using a suitable joint remover [B].



Steering Knuckle Installation

- Inspect the spherical bearings in the suspension arm joints [A].

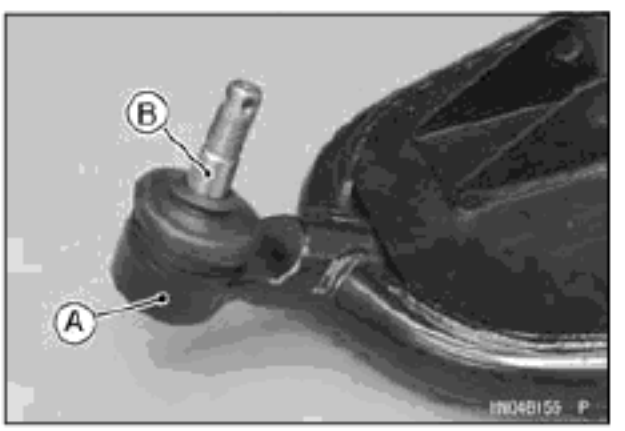
★If roughness, excessive play, or seizure is found, replace the suspension arm.



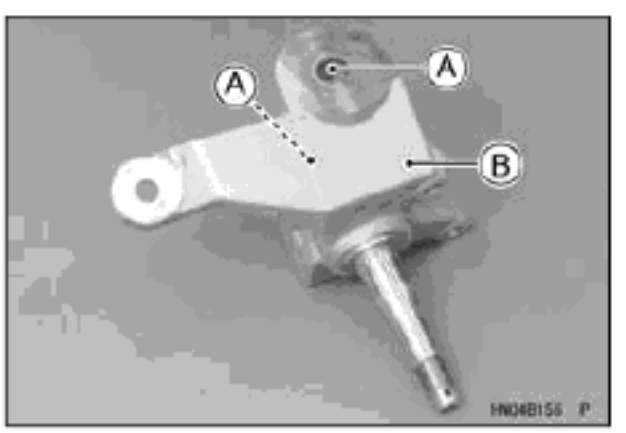
- Check the joint boot [A] is not torn, worn, deteriorated, or is leaking grease.

★If it is found, replace the suspension arm.

- Using a cleaning fluid, clean off any oil or dirt on the shanks [B] of the knuckle joint and dry it with a clean cloth.



- Using a cleaning fluid, clean off any oil or dirt on the taper surfaces [A] in the steering knuckle [B] and dry it with a clean cloth.

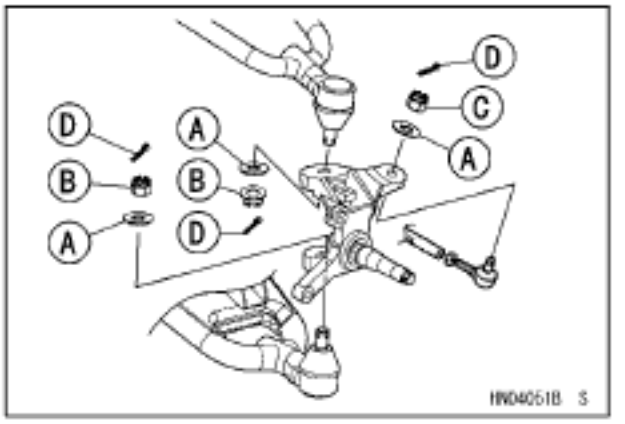


Steering

- Install:
  Washers [A] and Suspension Arm Joint Nuts [B]
  Washer [A] and Tie-rod End Nut [C]
- Tighten:

Torque - Suspension Arm Joint Nuts: 34 N·m (3.5 kgf·m, 25 ft·lb)
Tie-rod End Nuts: 35 N·m (3.6 kgf·m, 26 ft·lb)

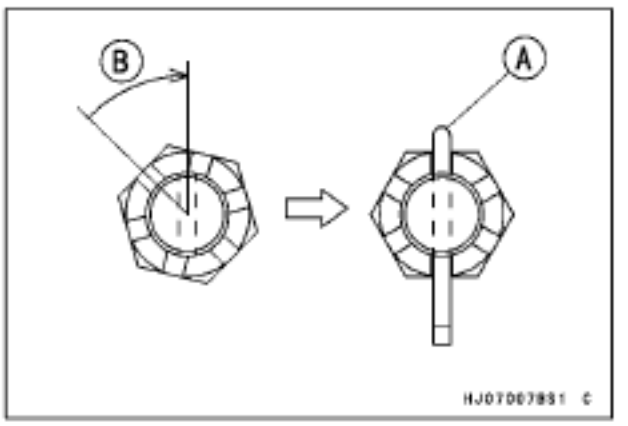
- Replace the cotter pins [D] with new ones.



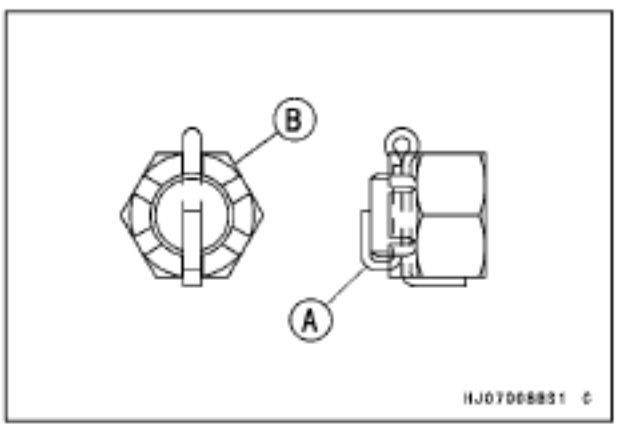
- Insert the cotter pin [A].

NOTE

○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the knuckle joint, tighten the nut clockwise [B] up to next alignment.*
○*It should be within 30 degrees.*
○*Loosen once and tighten again when the slot goes past the nearest hole.*



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

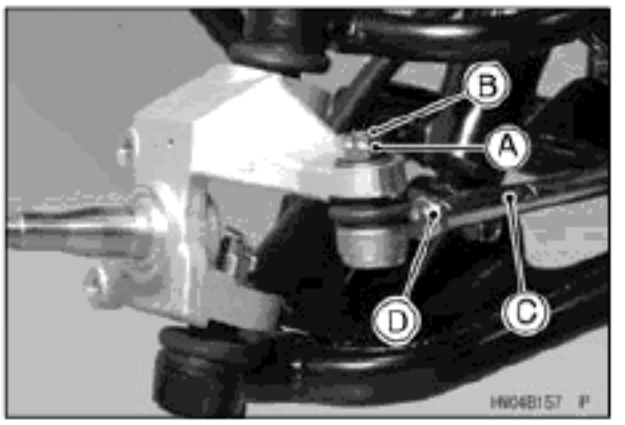


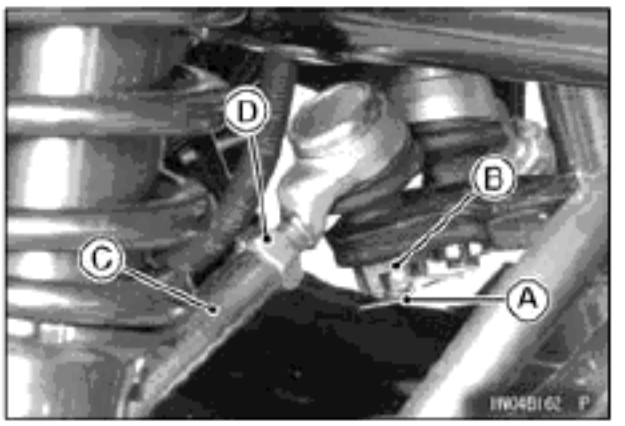
Tie-rod Removal

- Remove:
  Front Wheels (see Wheel Removal in the Wheels/Tires chapter)
  Front Brake Disc Guard (see Front Brake Disc Guard Removal in the Brakes chapter)
  Cotter Pins [A]
- Remove the tie-rod end joint, and remove the tie-rod nuts [B] and washers (see Steering Knuckle Removal).
- Remove:
  Tie-rod [C]

NOTICE

When removing the tie-rod, be careful not to bend it. Do not loosen the locknuts [D] at the end of the tie-rod adjusting sleeve, or the toe-in of the front wheels will be changed.





Steering

Tie-rod Installation

- The right and left tie-rods are identical.
- Tighten:

Torque - Tie-rod End Nuts: 35 N·m (3.6 kgf-m, 26 ft·lb)

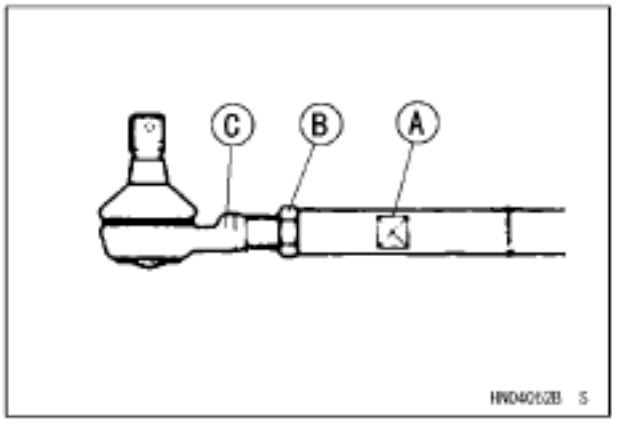
- Install the cotter pins.
- Inspect the toe-in (see Toe-in Inspection in the Periodic Maintenance chapter).

Tie-rod End Removal

- Remove the tie-rod (see Tie-rod Removal).
- Holding the tie-rod flattened area [A], loosen the locknut [B] and unscrew the tie-rod end [C].

NOTE

○*The locknut distant the tie-rod flattened area has left -hand threads. Turn the wrench clockwise for loosening.*

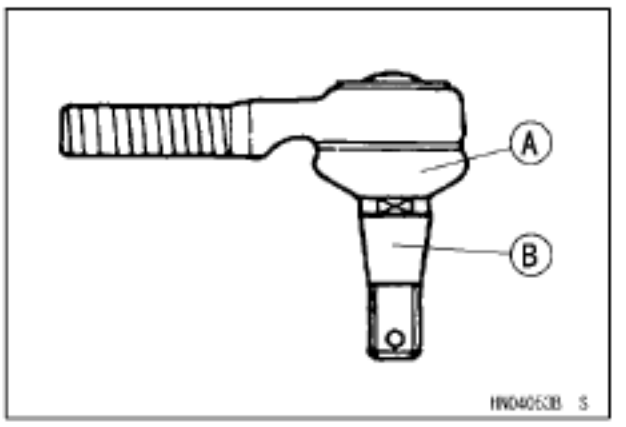


NOTICE

Do not remove the grease seal. It is packed with grease.

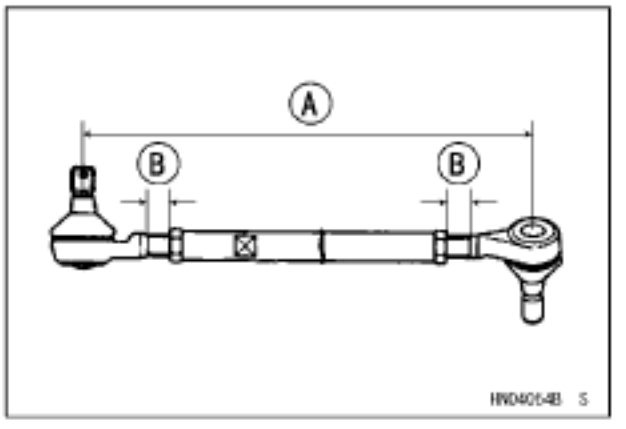
Tie-rod End Installation

- Check that the boot lip [A] is on the shank [B].

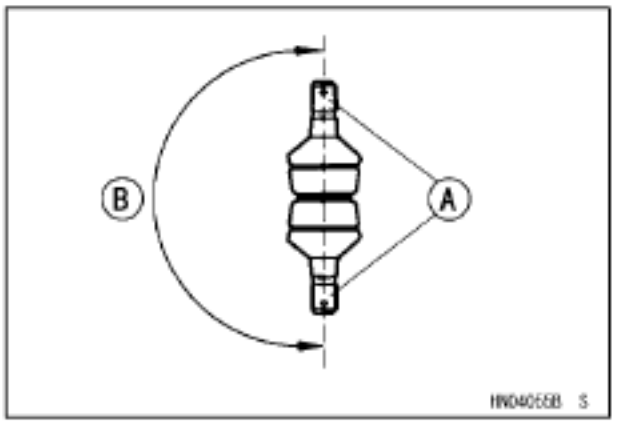


- Install the tie-rod ends so that the tie-rod has the correct length [A], and both visible thread lengths [B] are approximately equal.

Tie-rod Length
Standard: 334.0 ~ 335.0 mm (13.15 ~ 13.19 in.)



- Install the tie-rod ends so that the thread portions [A] of the tie-rod ends are opposite direction 180° [B] as shown.



Steering Maintenance

Steering Inspection

- Refer to the Steering Inspection in the Periodic Maintenance chapter.

Steering Shaft Straightness Inspection

- Remove the steering shaft (see Steering Shaft Removal).
- Check the steering shaft for straightness.

○Use a straightedge along the stem.

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

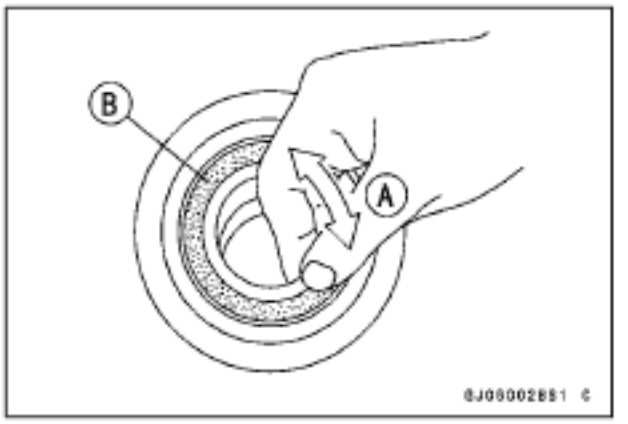
Steering Shaft Bearing Inspection

- Turn [A] the bearing back and forth while checking for roughness or binding.

★If roughness or binding is found, replace the bearing.

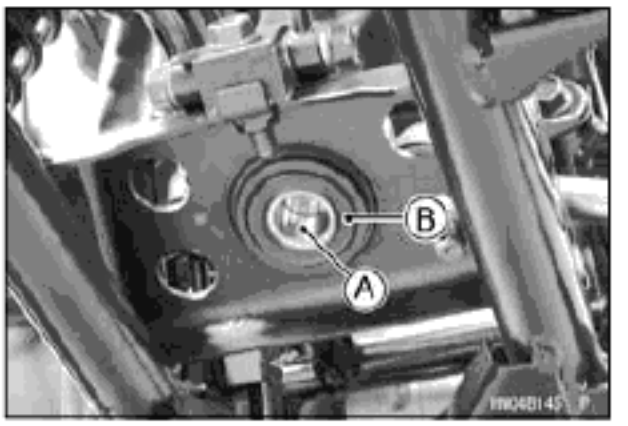
- Examine the bearing seal [B] for tears or leakage.

★If the seal is torn or is leaking, replace the bearing.

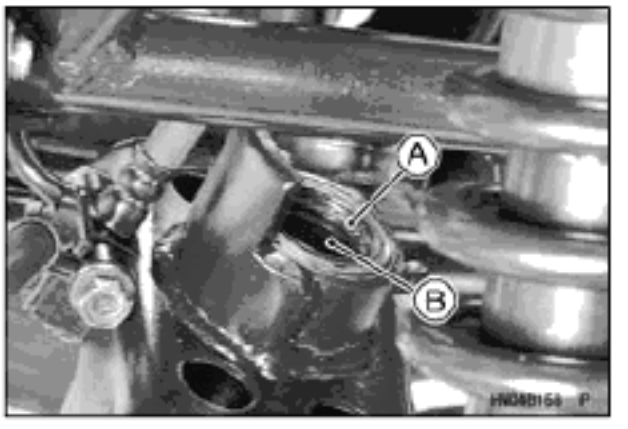


Steering Shaft Bearing Removal

- Remove:
  Steering Shaft (see Steering Shaft Removal)
  Collar [A]
  Dust Seal [B]



- Remove:
  Dust Seal [A]
  Collar [B]

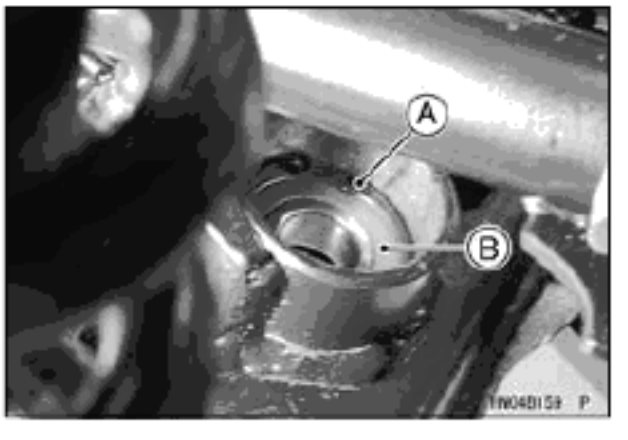


- Remove the circlip [A].

  Special Tool - Inside Circlip Pliers: 57001-143

- Remove the bearing [B].

  Special Tool - Bearing Driver Set: 57001-1129



Steering Maintenance

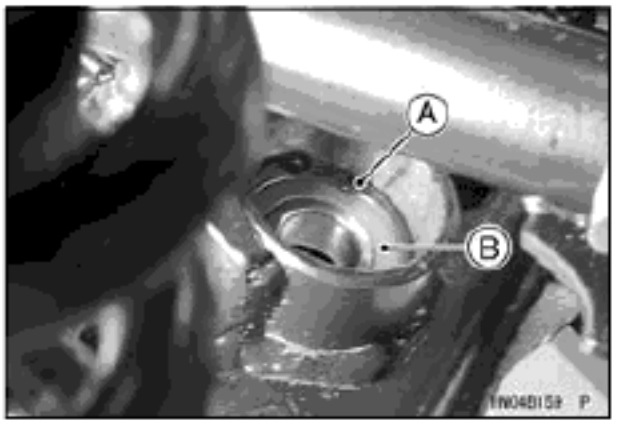
Steering Shaft Bearing Installation

- Replace the circlip [A] with a new one and install it.

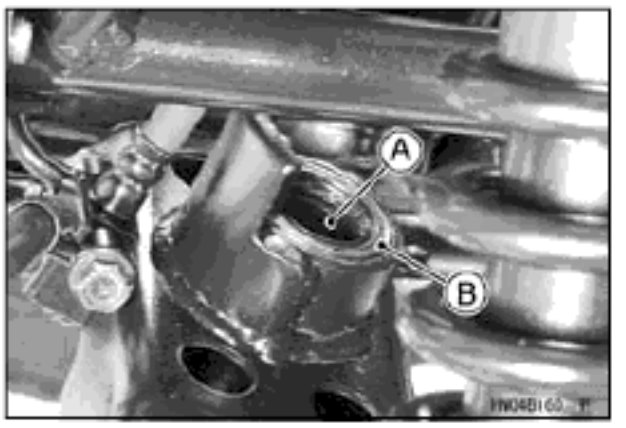
  Special Tool - Inside Circlip Pliers: 57001-143

- Replace the bearing [B] with a new one.
- Press in the bearing until the circlip.

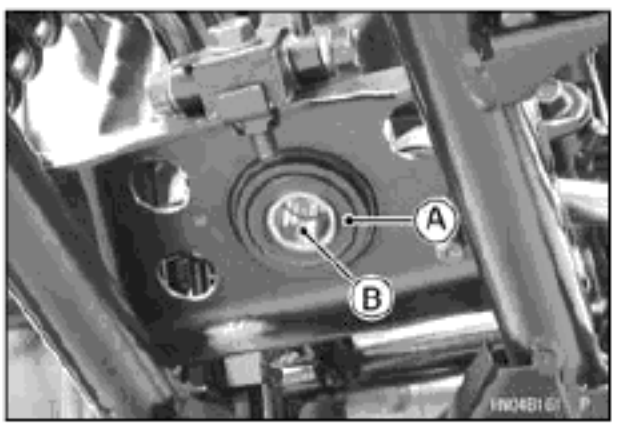
  Special Tool - Bearing Driver Set: 57001-1129



- Install:
  Collar [A]
  Dust Seal [B]



- Install:
  Dust Seal [A]
  Collar [B]



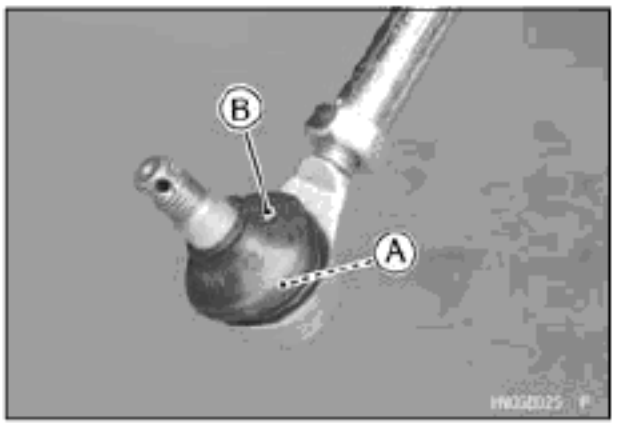
Tie-rod End Inspection

- Inspect each spherical bearing [A].

★If roughness, excessive play, or seizure is found, replace the tie-rod end.

- Inspect each boot [B].

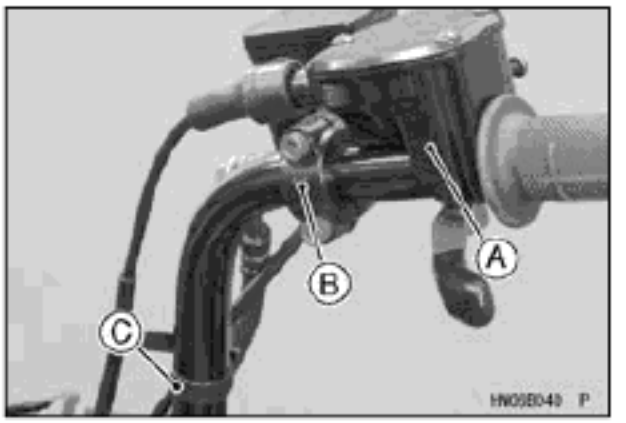
★If damage, wear or deterioration is found, replace the tie -rod end.

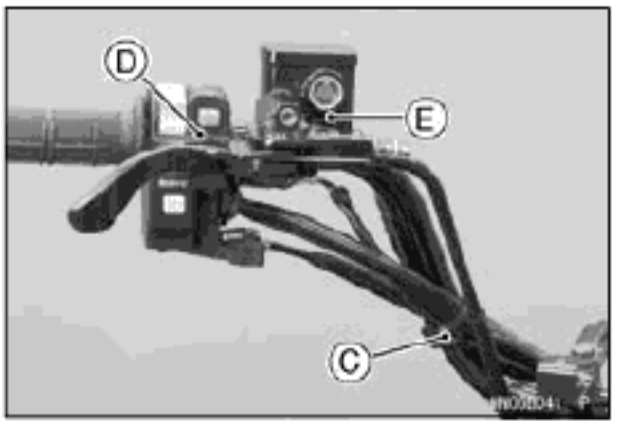


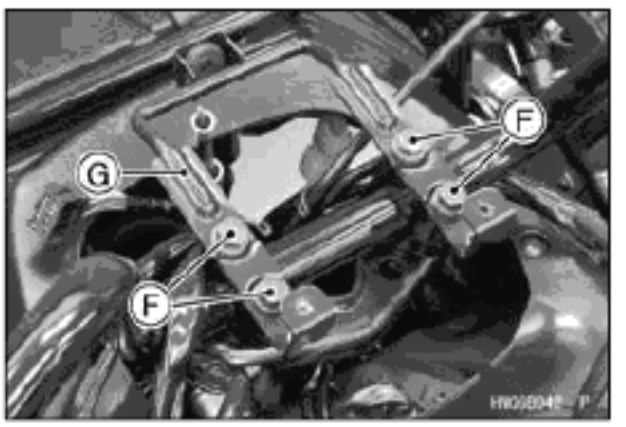
Handlebar

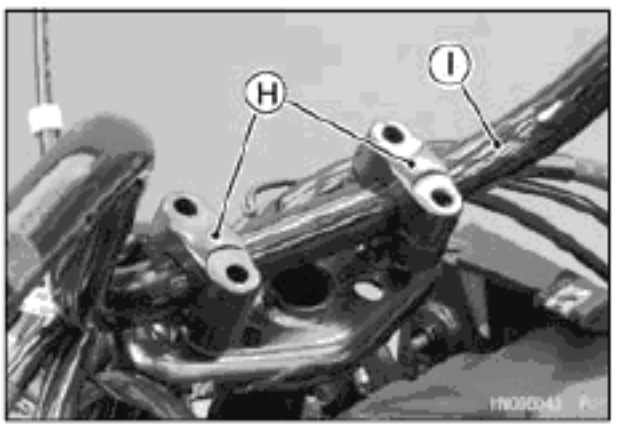
Handlebar Removal

- Remove:
  Multifunction Meter Unit (see Meter Unit Removal in the Electrical System chapter)
  Throttle Case [A]
  Front Master Cylinder [B] (see Front Master Cylinder Removal in the Brakes chapter)
  Bands [C]
  Left-hand Switch Housing [D]
  Rear Master Cylinder (Lever) [E] (see Rear Master Cylinder (Lever) Removal in the Brakes chapter)
  Handlebar Holder Bolts [F] and Bracket [G]
  Handlebar Holders [H]
  Handlebars [I]



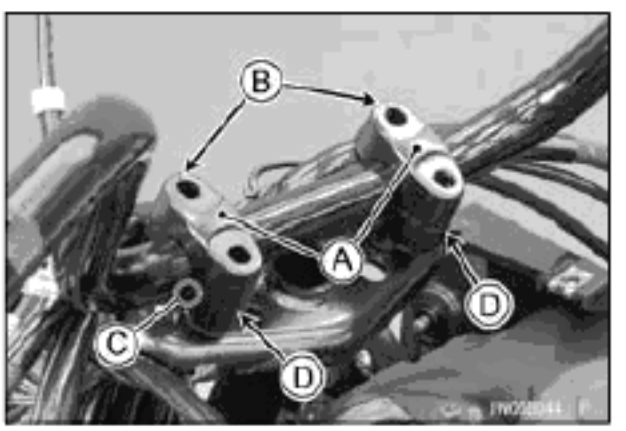






Handlebar Installation

- The handlebar holders [A] must be installed with the punch mark [B] forward.
- Align the punch mark [C] on the handlebar with the top of the mating surface [D] of the steering holder.

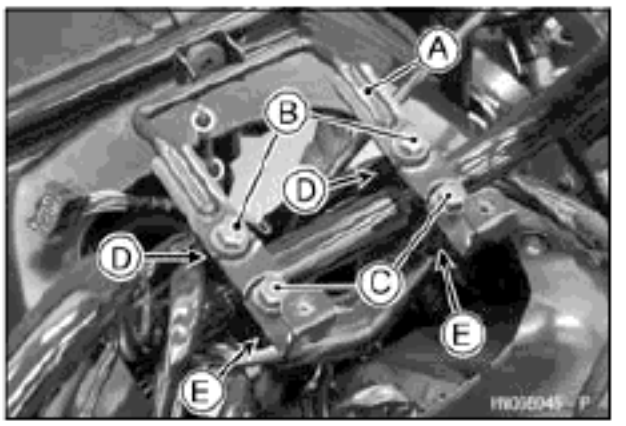


Handlebar

- Install the bracket [A].
- Tighten the holder front bolts [B] first and then the rear bolts [C].

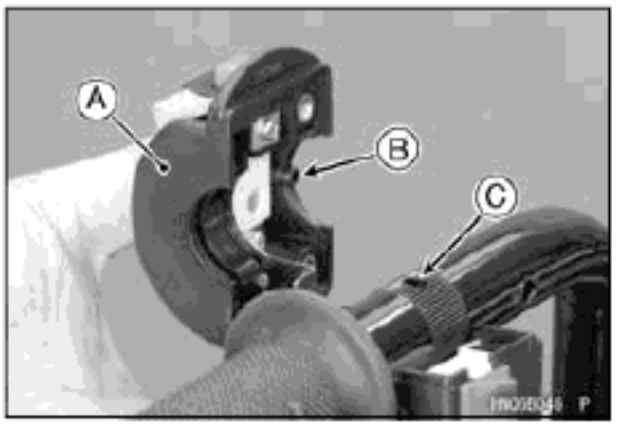
Torque - Handlebar Holder Bolts: 26 N·m (2.7 kgf·m, 19 ft·lb)

○If the holder is correctly installed, there will be no gap [D] at the front and an even gap [E] at the rear after tightening.

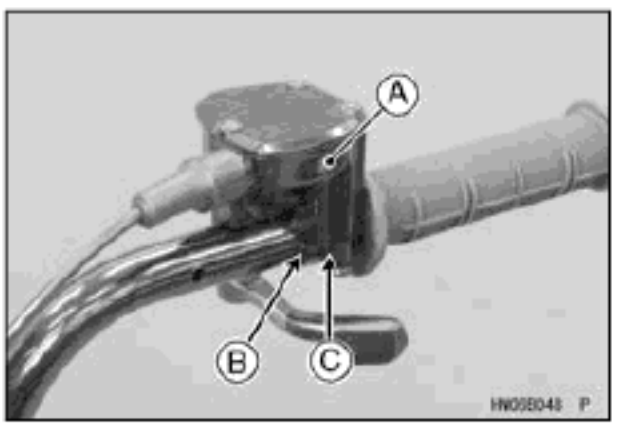


- Install the left switch housing [A].

○Fit the projection [B] into a hole [C] in the handlebars.



- Install the throttle case [A].
- Align the punch mark [B] on the handlebar with the surface [C] of throttle case.



- Install:

Front Master Cylinder (see Front Master Cylinder Installation in the Brakes chapter)
Rear Master Cylinder (Lever) (see Rear Master Cylinder (Lever) Installation in the Brakes chapter)

Frame

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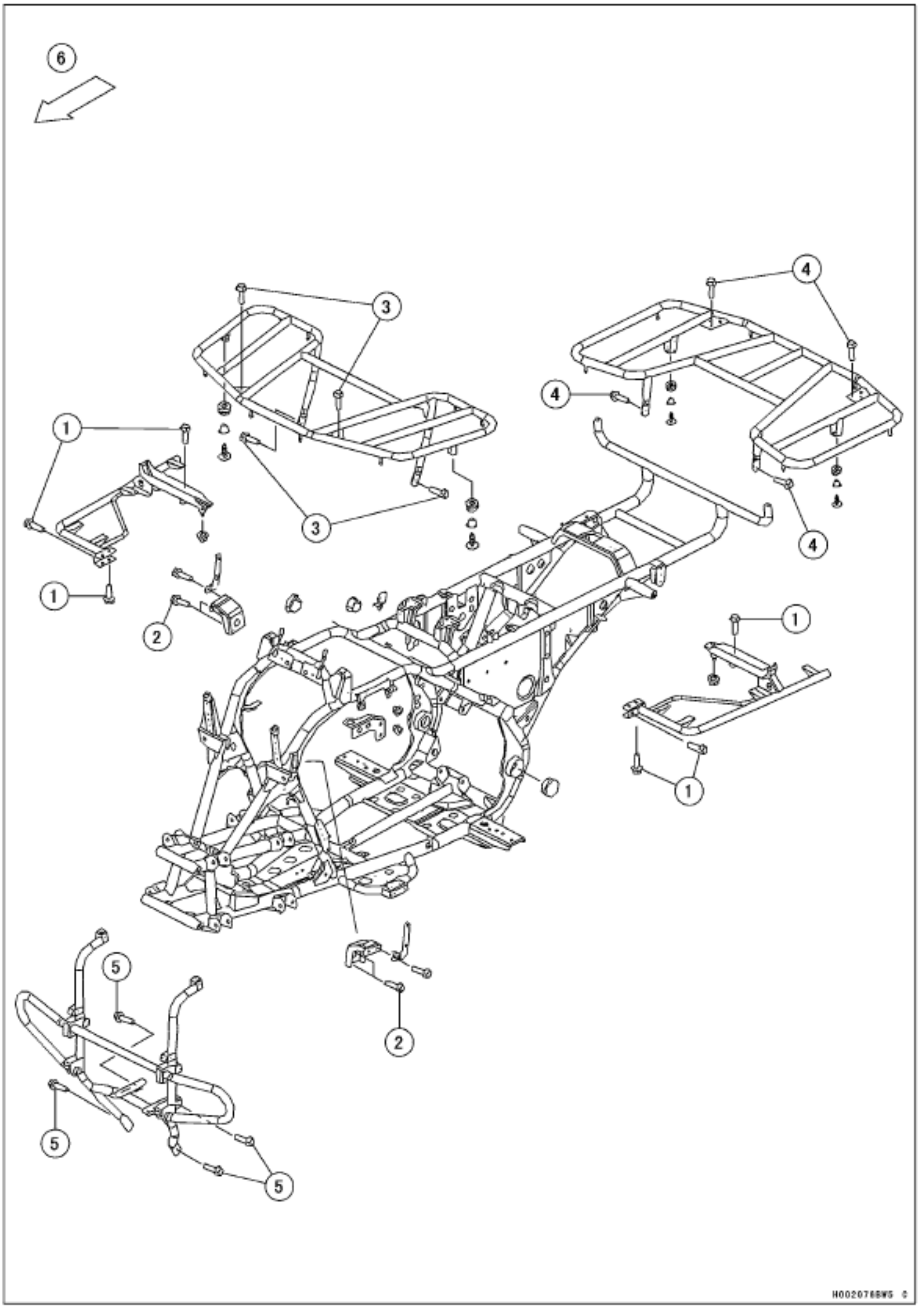
16-2 FRAME

Exploded View

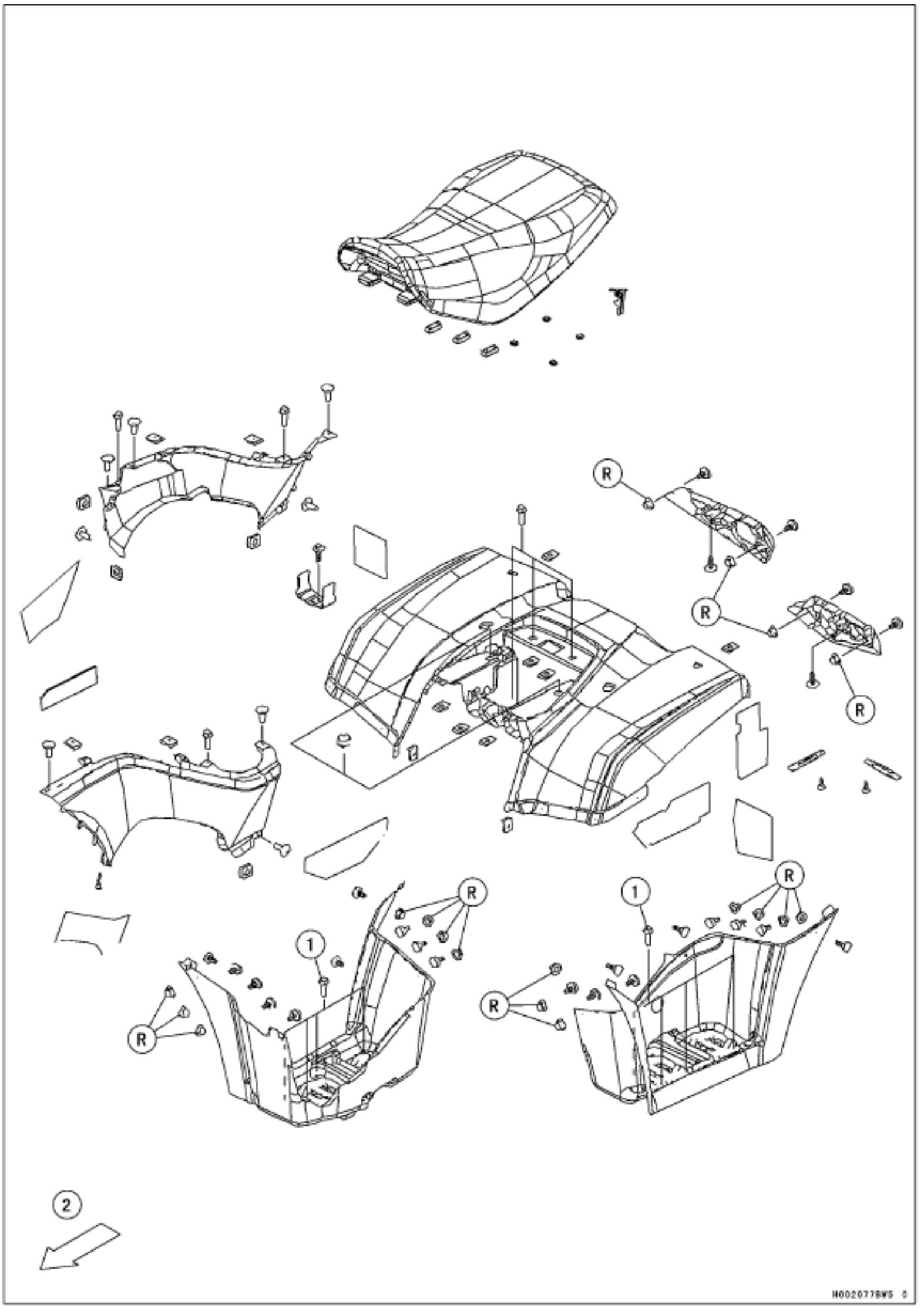


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Footboard Bracket Bolts	26	2.7	19	
2	Front Carrier Bracket Bolts	26	2.7	19	
3	Front Carrier Bolts (M8)	26	2.7	19	
4	Rear Carrier Bolts (M8)	26	2.7	19	
5	Front Guard Bolts	26	2.7	19	

6. Front

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Footboard Bolts	26	2.7	19	

2. Front
R: Replacement Parts

Exploded View

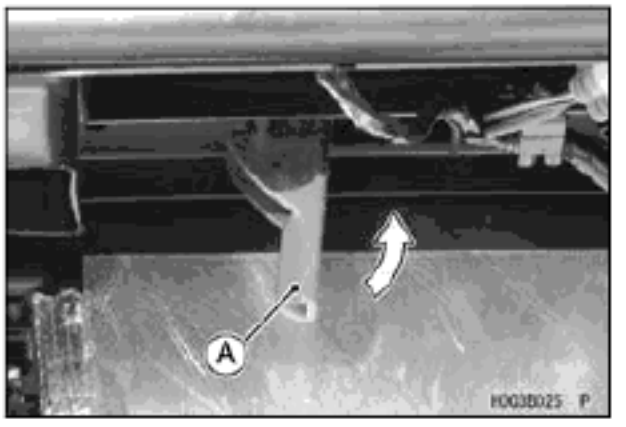
Exploded View

1. Front
R: Replacement Parts

Seat

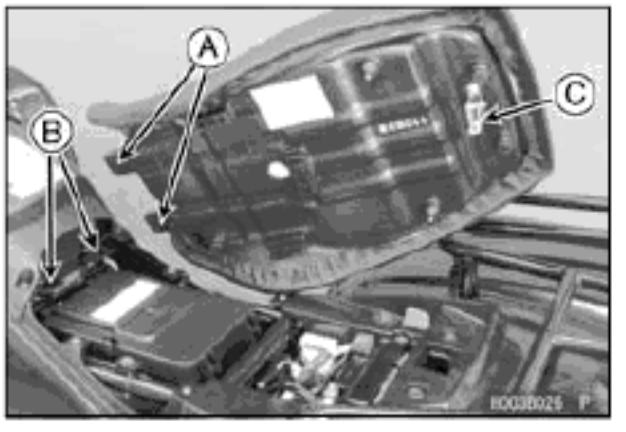
Seat Removal

- Remove the seat by lifting the latch lever [A] of the under rear end of the seat, and then pulling the seat up to the rear.



Seat Installation

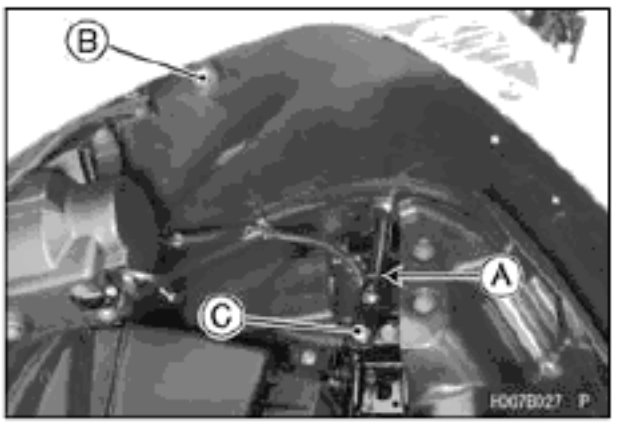
- Insert the front seat hooks [A] into the receivers [B] in the bracket.
- Push the rear part of the seat down to engage the latch [C].
- Pull up the rear end of the seat to make sure it is securely locked.

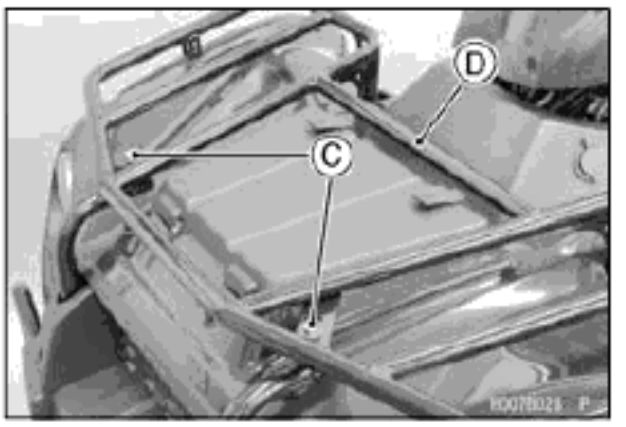


Carriers

Front Carrier Removal

- Remove:
  Bands [A] (Both Sides) (Cut)
  Front Carrier Bolts (M6) [B] (Both Sides)
  Collars (Both Sides)
  Front Carrier Bolts (M8) [C] (Both Sides)
  Front Carrier [D]





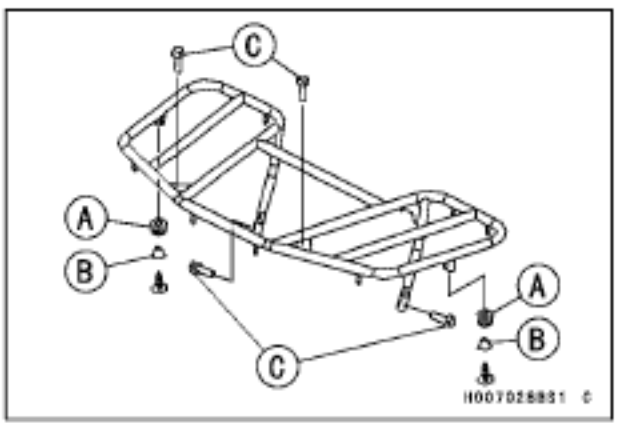
Front Carrier Installation

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

○Be sure to install the dampers [A] and collars [B].

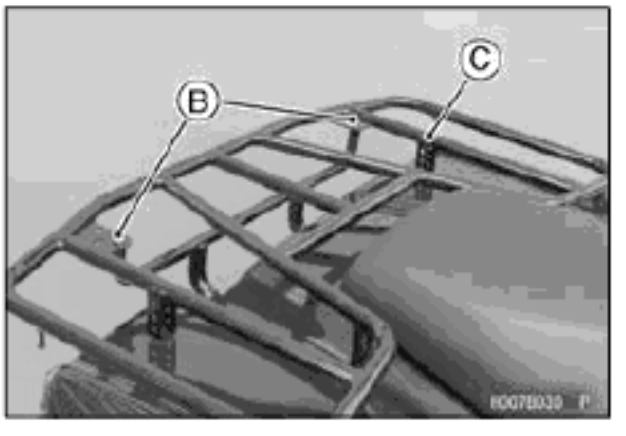
○Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

Torque - Front Carrier Bolts (M8) [C]: 26 N·m (2.7 kgf·m, 19 ft·lb)



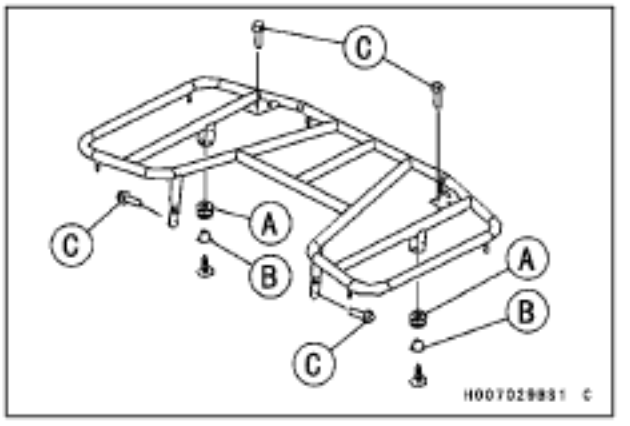
Rear Carrier Removal

- Remove:
  Rear Carrier Bolts (M6) [A] (Both Sides)
  Collars (Both Sides)
  Rear Carrier Bolts (M8) [B] (Both Sides)
  Rear Carrier [C]



Carriers

Rear Carrier Installation



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

○Be sure to install the dampers [A] and collars [B].

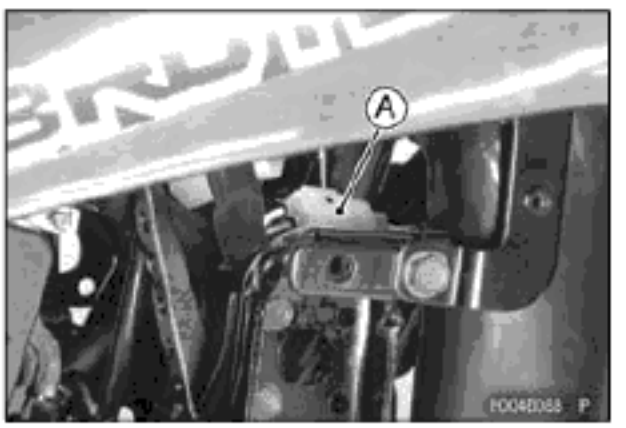
Torque - Rear Carrier Bolts (M8) [C]: 26 N·m (2.7 kgf·m, 19 ft·lb)

Fenders

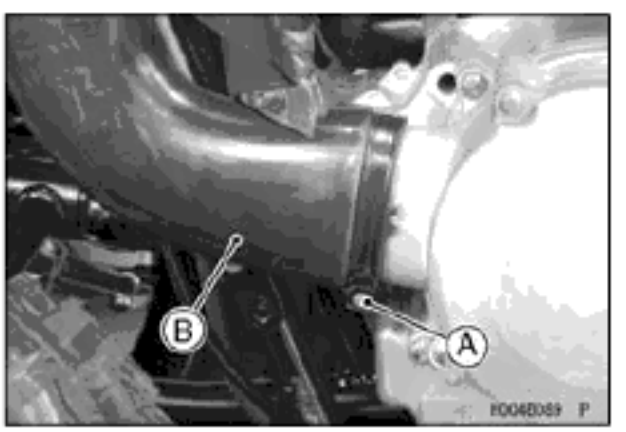
Front Fender Removal

- Remove:
  Front Carrier (see Front Carrier Removal)
  Front Guard (see Front Guard Removal)
  Side Covers (see Left/Right Side Cover Removal)

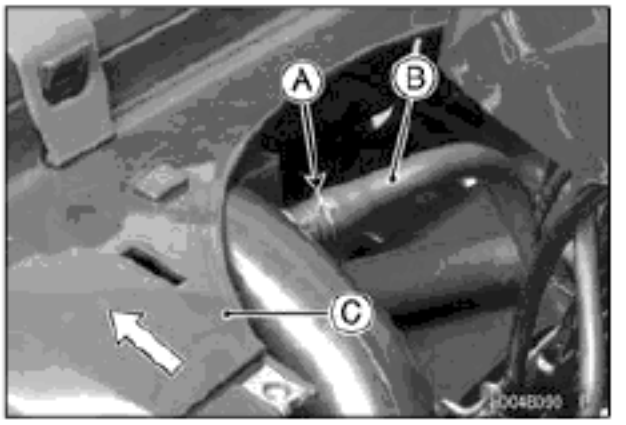
- Disconnect:
  Headlight Lead Connectors [A] (Both Sides)



- Loosen the clamp screw [A] and remove the torque converter intake duct [B].



- Remove:
  Clamp [A] and Hose [B]
  Front Fender [C]



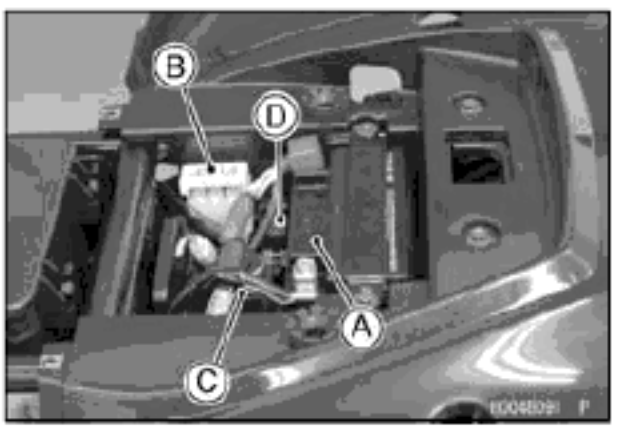
Front Fender Installation

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

○Run the leads and hose correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

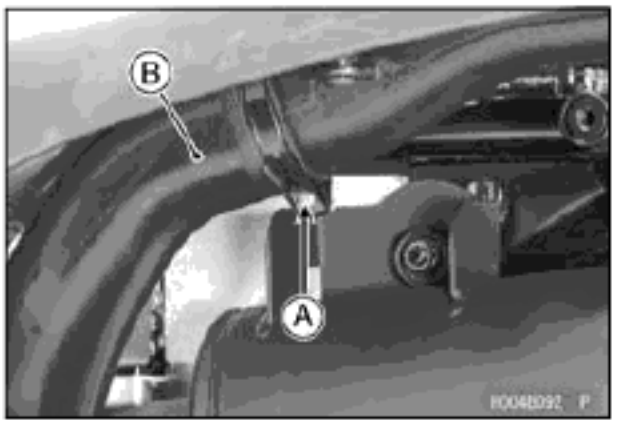
Rear Fender Removal

- Remove:
  Tail/Brake Light Cover (see Tail/Brake Light Cover Removal)
  Rear Carrier (see Rear Carrier Removal)
  Side Covers (see Left/Right Side Cover Removal)
  Battery [A] (see Battery Removal in the Electrical System chapter)
  Fuse Box [B]
  Starter Relay [C] (see Starter Relay Inspection in the Electrical System chapter)
  Starter Circuit Relay [D]



Fenders

- Loosen the clamp screw [A] and remove the torque converter exhaust duct [B].



- Remove:
  Bolts [A]
  Rear Fender [B]

Rear Fender Installation

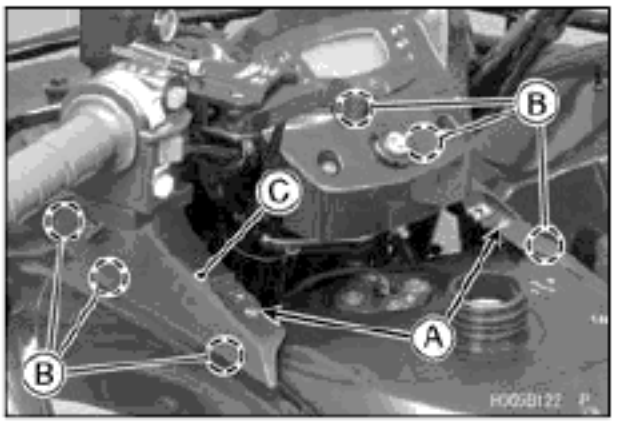
- Installation is the reverse of removal. Note the following.

○Run the leads and cables correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

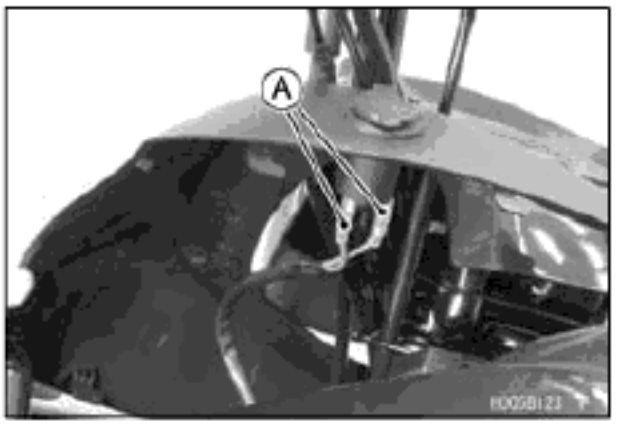
Covers

Middle Cover Removal

- Remove:
  Seat (see Seat Removal)
  Fuel Tank Cover (see Fuel Tank Removal in the Fuel System chapter)
  Middle Cover Screws [A]
- Clear the projections [B] from the holes and remove the middle cover [C].



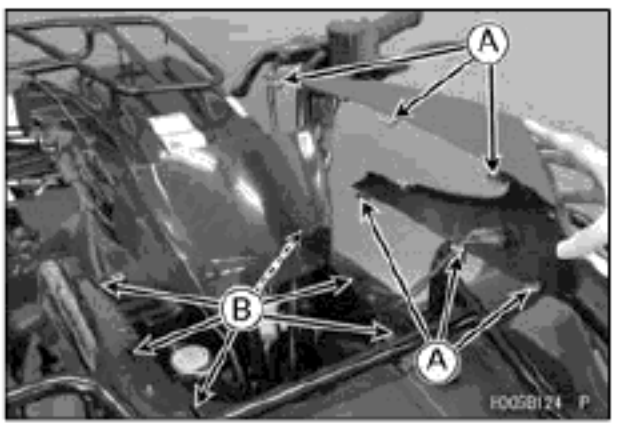
- Disconnect:
  Power Outlet Lead Connectors [A]



Middle Cover Installation

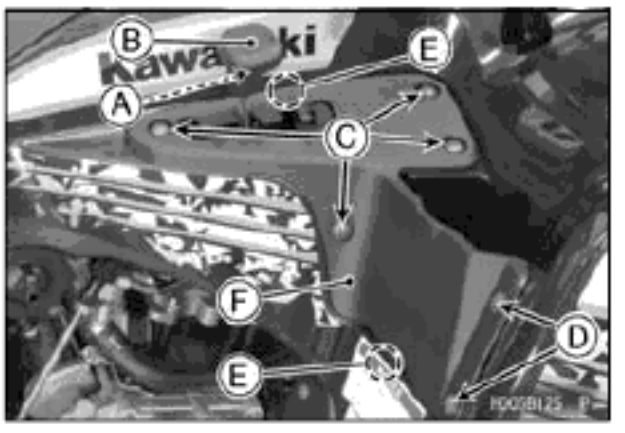
- Installation is the reverse of removal. Note the following.

○Insert the projections [A] into the holes [B].



Storage Case Removal

- Remove:
  Bolt [A] and Shift Knob [B]
  Screws [C]
  Screws [D] and Nuts
- Clear the projections [E] from the holes and remove the storage case [F].

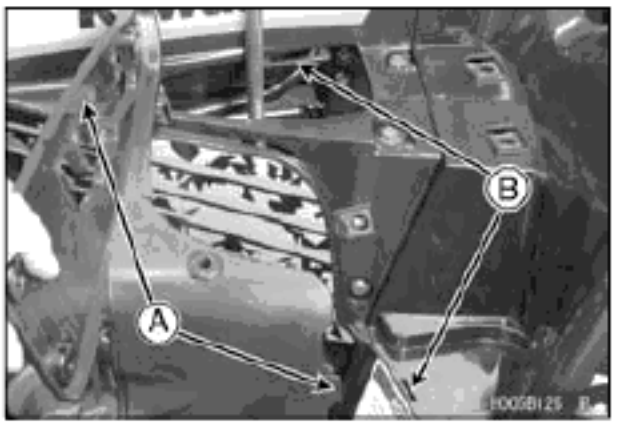


Storage Case Installation

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

○Insert the projections [A] into the holes [B].

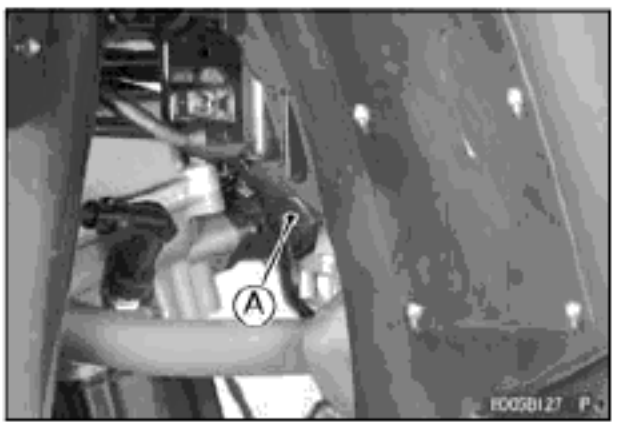
○Replace the nuts with new ones.



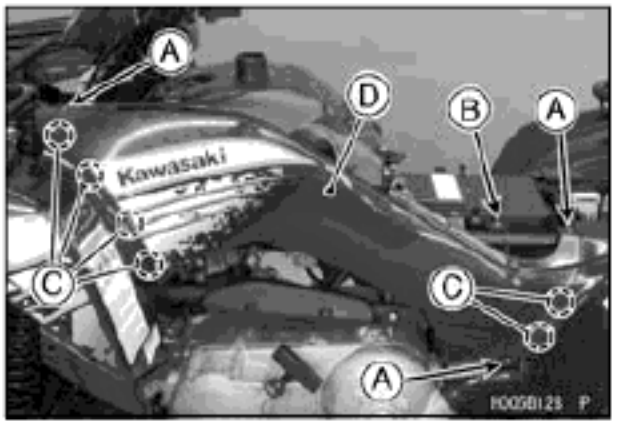
Covers

Left Side Cover Removal

- Remove:
  Middle Cover (see Middle Cover Removal)
  Left Side Inner Cover (see Side Inner Cover Removal)
  Left Footboard (see Left Footboard Removal)
  Quick Rivet [A]



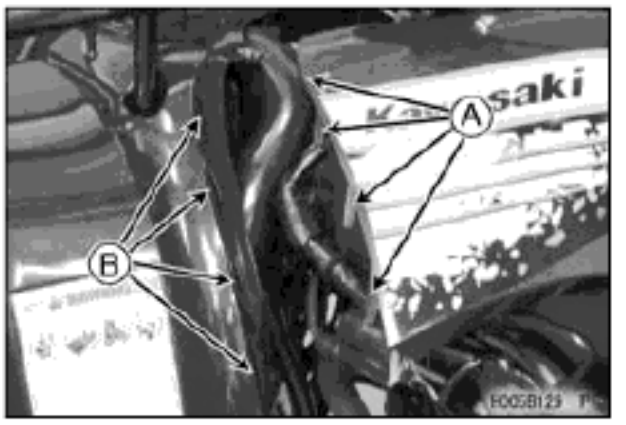
- Remove:
  Screws [A] and Bolt [B]
- Clear the projections [C] from the holes and remove the left side cover [D].

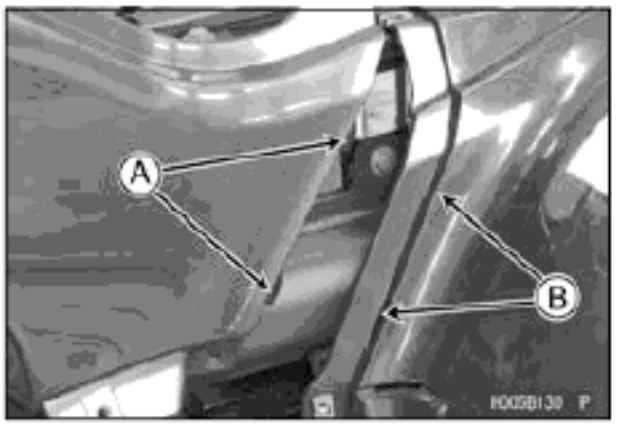


Left Side Cover Installation

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

○Insert the projections [A] into the holes [B].



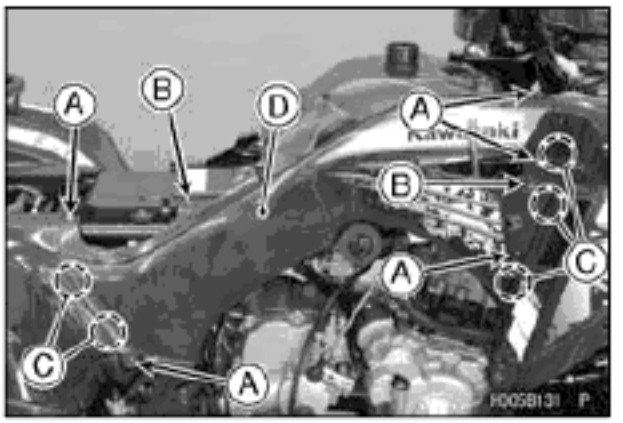


Right Side Cover Removal

- Remove:
  Middle Cover (see Middle Cover Removal)
  Right Side Inner Cover (see Side Inner Cover Removal)
  Right Footboard (see Right Footboard Removal)
  Storage Case (see Storage Case Removal)

Covers

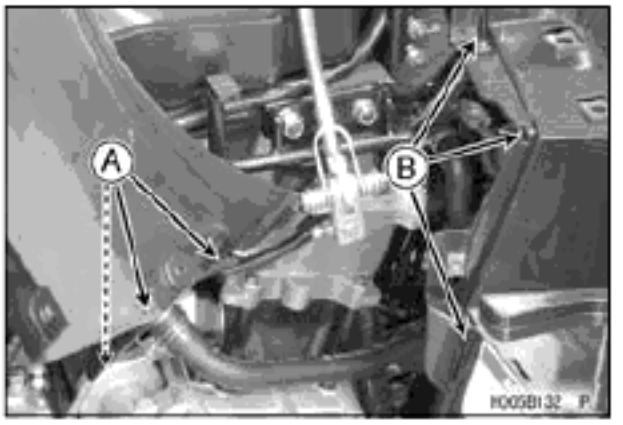
- Remove:
  Screws [A] and Bolts [B]
- Clear the projections [C] from the holes and remove the right side cover [D].

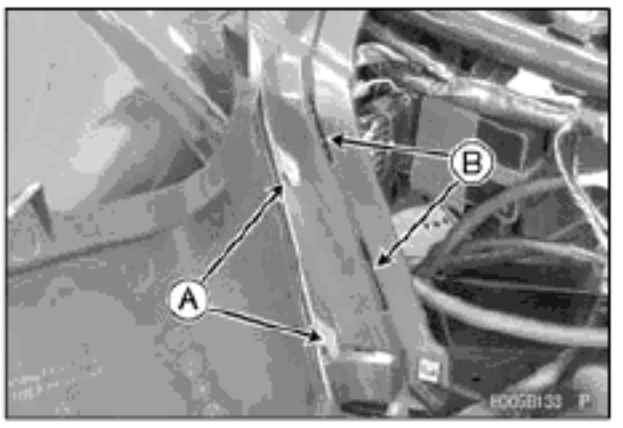


Right Side Cover Installation

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

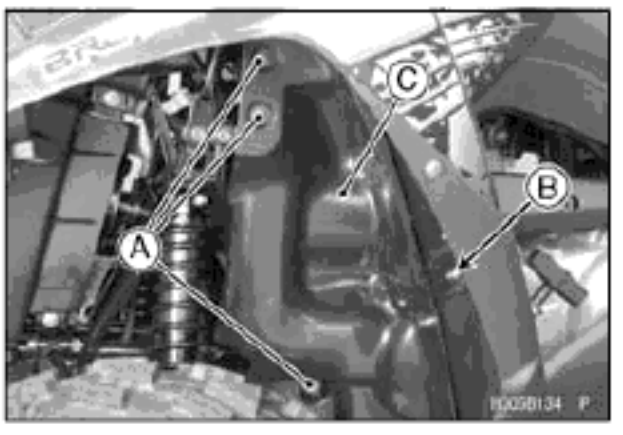
○Insert the projections [A] into the holes [B].





Side Inner Cover Removal

- Remove:
  Bolts [A]
  Nut [B] and Screw
  Side Inner Cover [C]



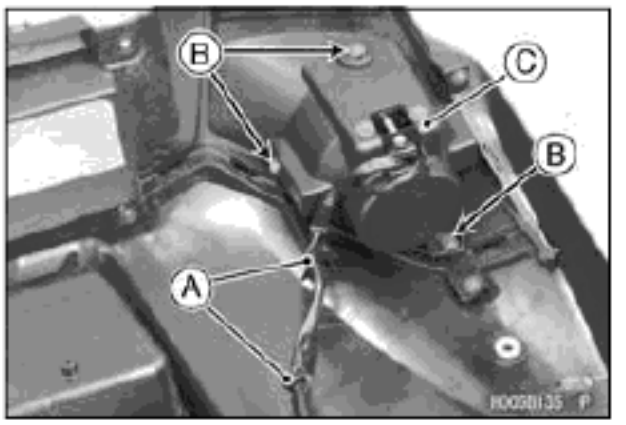
Side Inner Cover Installation

- Installation is the reverse of removal.

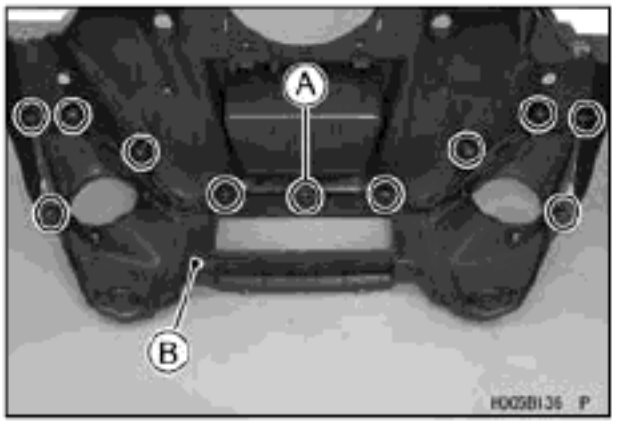
Covers

Headlight Cover Removal

- Remove:
  Front Fender (see Front Fender Removal)
  Clamps [A] (Both Sides)
  Bolts [B] (Both Sides)
  Headlights [C] (Both Sides)



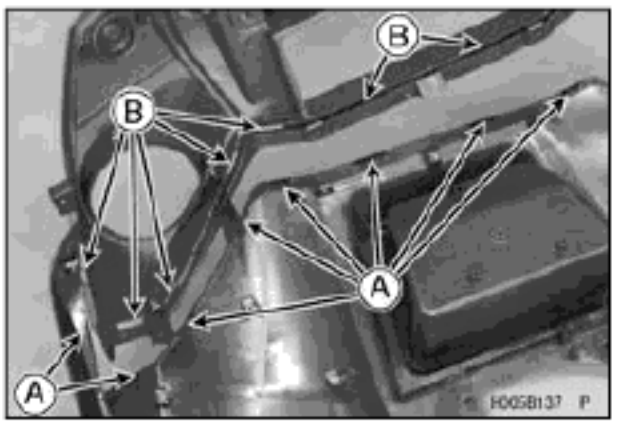
- Remove:
  Bolts [A]
- Clear the projections from the holes and remove the headlight cover [B].



Headlight Cover Installation

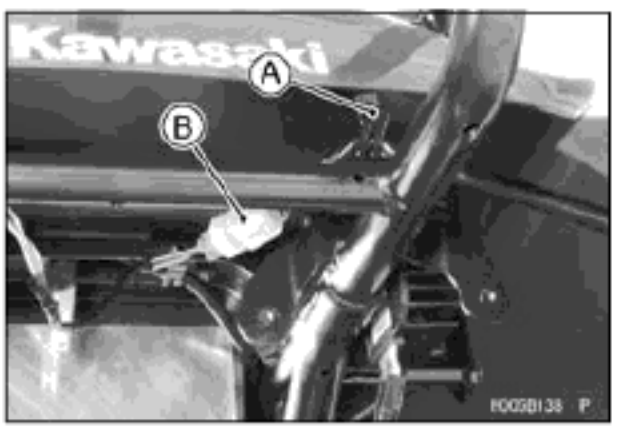
- Installation is the reverse of removal. Note the following.

○Insert the projections [A] into the holes [B] (both sides).
○Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).

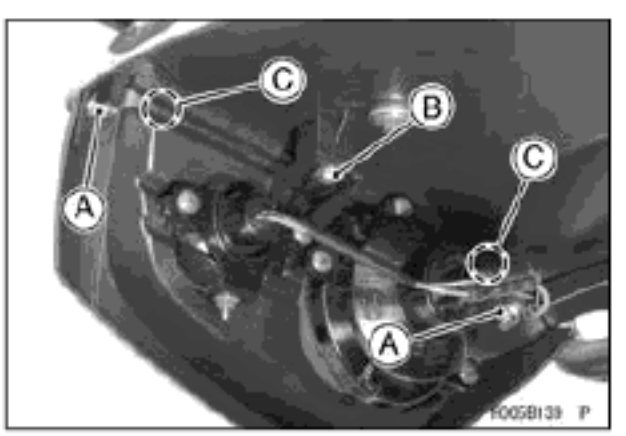


Tail/Brake Light Cover Removal

- Free the lead from the clamp [A].
- Disconnect the connector [B].

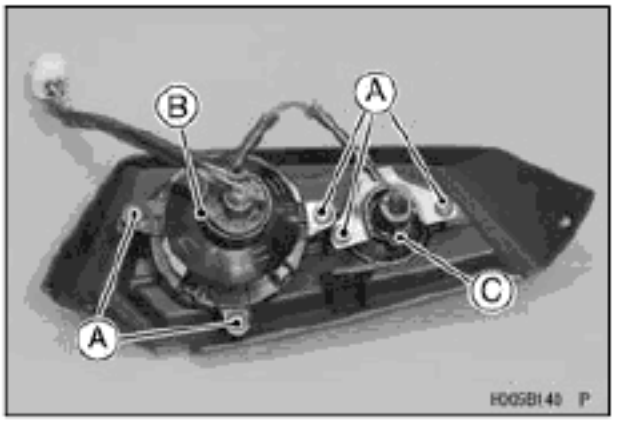


- Remove:
  Nuts [A] and Screws
  Bolt [B]
- Clear the projections [C] from the holes and remove the tail/brake light assy.



Covers

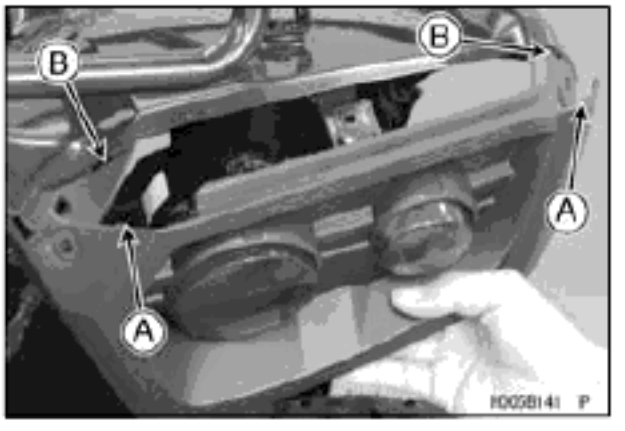
- Remove:
  Screws [A]
  Tail/Brake Light [B]
  Tail Light [C]



Tail/Brake Light Cover Installation

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

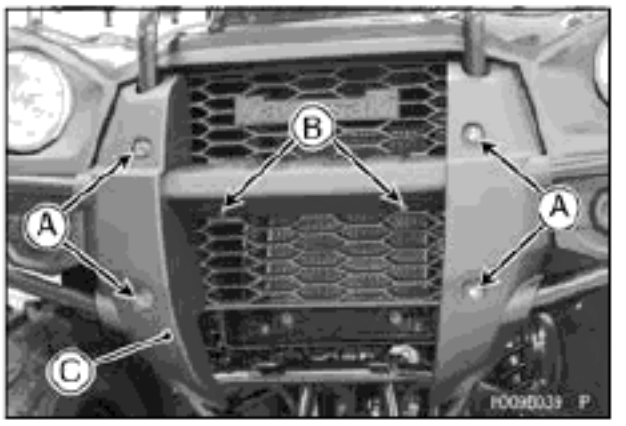
○Insert the projections [A] into the holes [B].
○Replace the nuts with new ones.
○Run the leads correctly (see Cable, Wire, and Hose Routing section in the Appendix chapter).



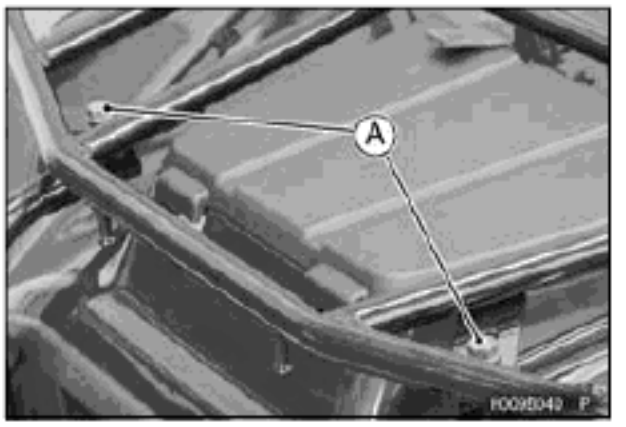
Guards

Front Guard Removal

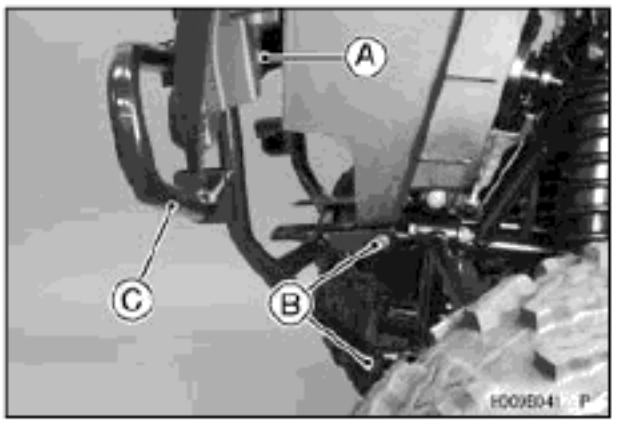
- Remove:
  Bolts [A] and Screws [B]
  Front Guard Cover [C]



- Remove:
  Front Carrier Bolts (M8) [A]



- Remove:
  Front Guard Bolts (M6) [A] (Both Sides)
  Front Guard Bolts (M8) [B] (Both Sides)
  Front Guard [C]

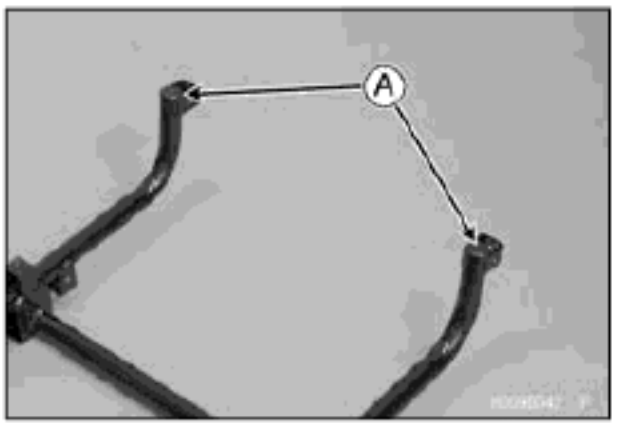


Front Guard Installation

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

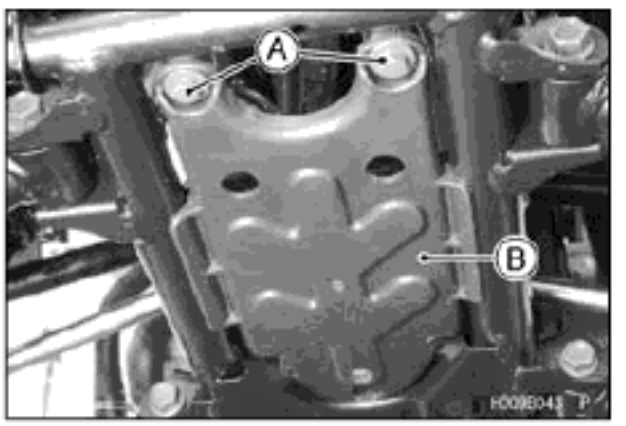
○Be sure to install the plugs [A].

Torque - Front Guard Bolts: 26 N·m (2.7 kgf·m, 19 ft·lb)



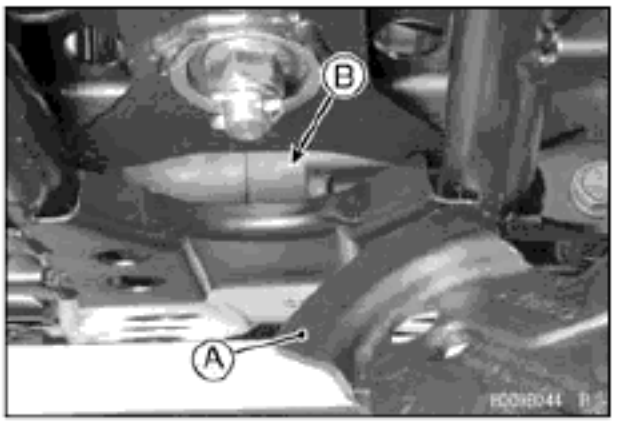
Front Bottom Guard Removal

- Remove:
  Bolts [A]
  Front Bottom Guard [B]



Guards

Front Bottom Guard Installation



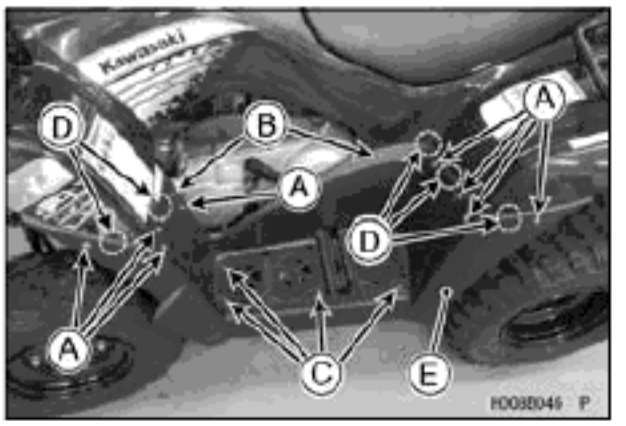
• Installation is the reverse of removal. Note the following.

○Insert the projection [A] into the space [B].

Footboards

Left Footboard Removal

- Remove:
  Screws [A] and Nuts
  Screws [B]
  Bolts [C]
- Clear the projections [D] from the holes and remove the left footboard [E].



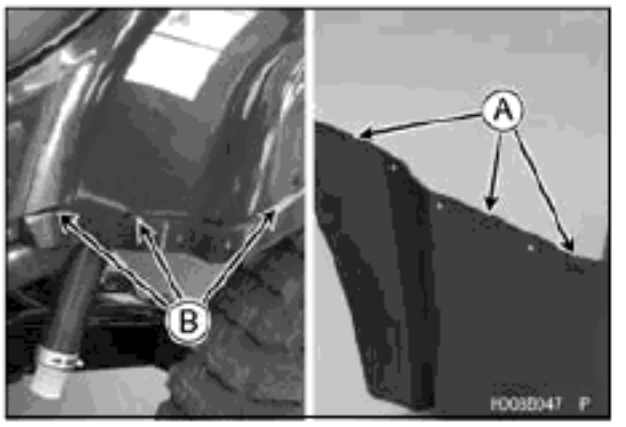
Left Footboard Installation

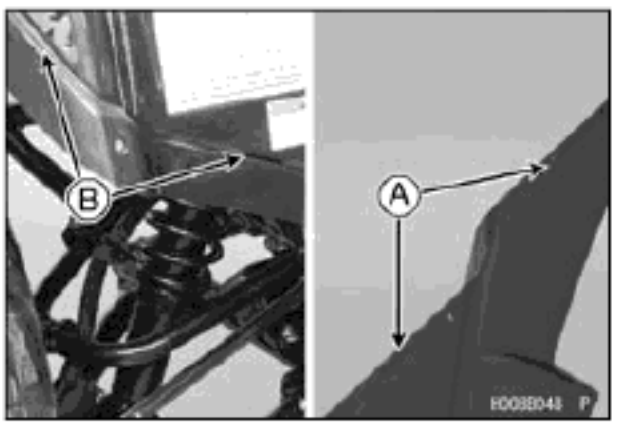
- Installation is the reverse of removal. Note the following.

○Insert the projections [A] into the holes [B].

○Replace the nuts with new ones.

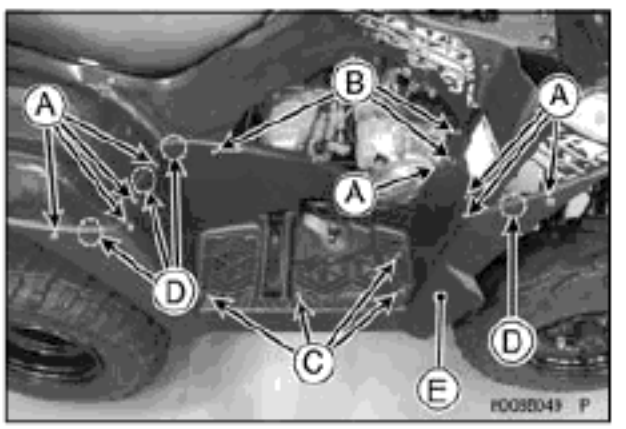
Torque - Footboard Bolts: 26 N·m (2.7 kgf·m, 19 ft·lb)





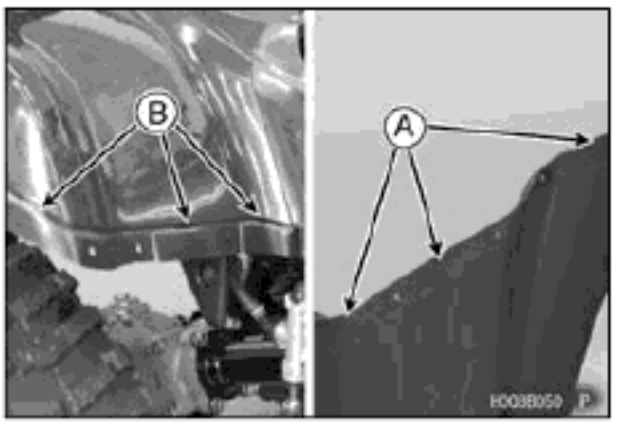
Right Footboard Removal

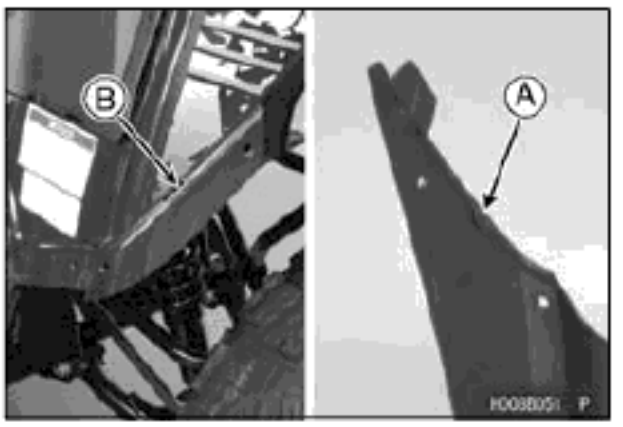
- Remove:
  Screws [A] and Nuts
  Screws [B]
  Bolts [C]
- Clear the projections [D] from the holes and remove the right footboard [E].



Footboards

Right Footboard Installation





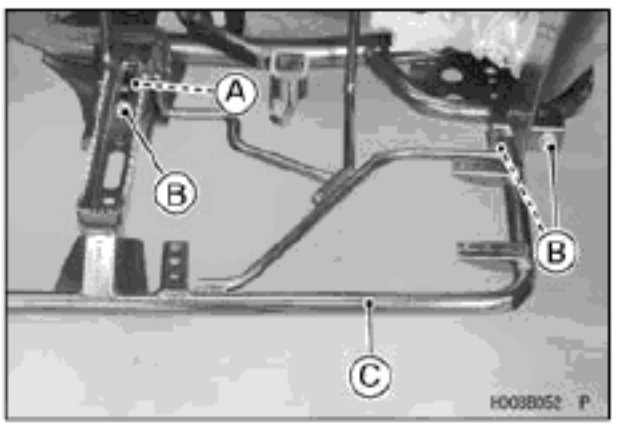
- Installation is the reverse of removal. Note the following.

○Insert the projections [A] into the holes [B].

○Replace the nuts with new ones.

Torque - Footboard Bolts: 26 N·m (2.7 kgf-m, 19 ft-lb)

Footboard Bracket Removal



- Remove:

Footboard (see Left/Right Footboard Removal)

Nut [A]

Footboard Bracket Bolts [B]

Footboard Bracket [C]

Footboard Bracket Installation

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

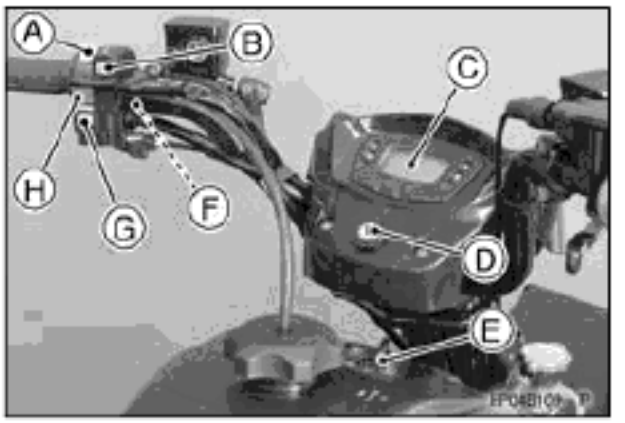
Torque - Footboard Bracket Bolts: 26 N·m (2.7 kgf-m, 19 ft-lb)

Electrical System

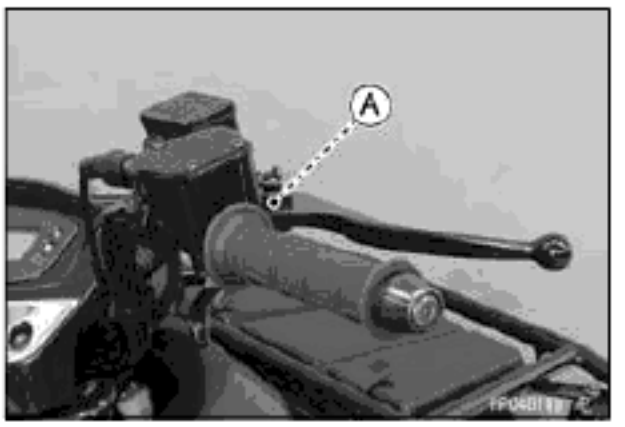
Table of Contents

Parts Location

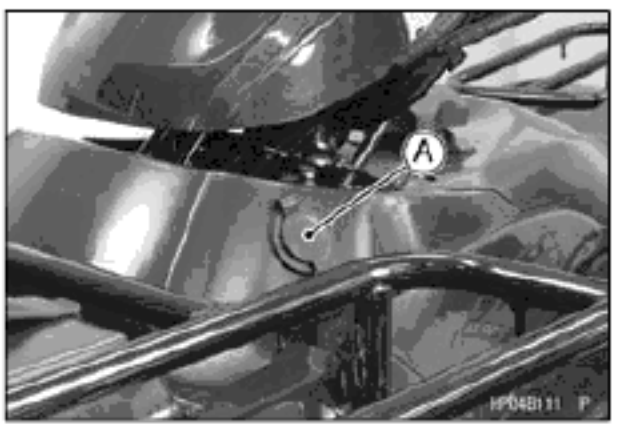
Light/Dimmer Switch [A]
Starter Button [B]
Meter Unit [C]
Ignition Switch [D]
Fuel Level Sensor [E]
Rear Brake (Lever) Light Switch [F]
Reverse Power Assist Switch (Override) [G]
Engine Stop Switch [H]



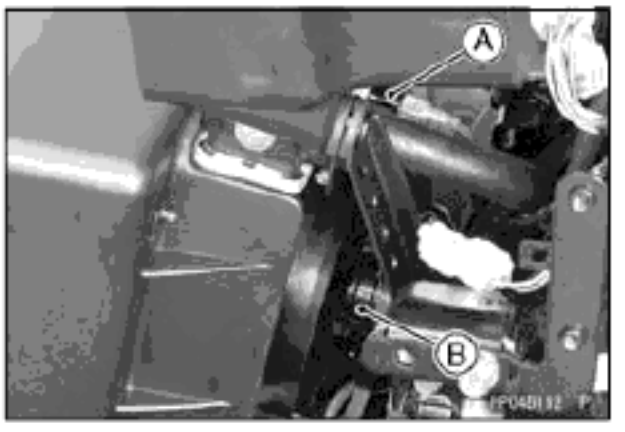
Front Brake Light Switch [A]



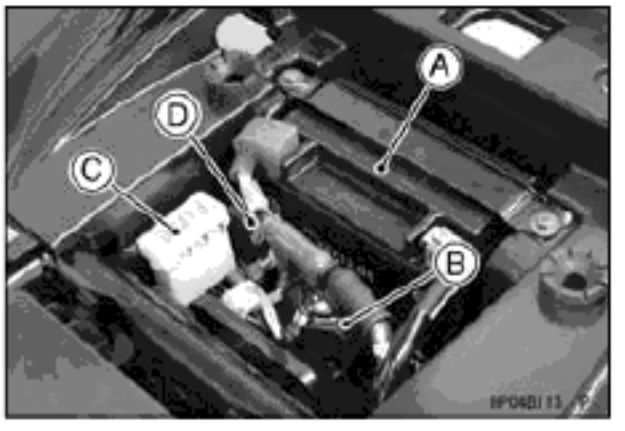
Power Outlet Connector [A]



Radiator Fan Switch [A]
Radiator Fan [B]

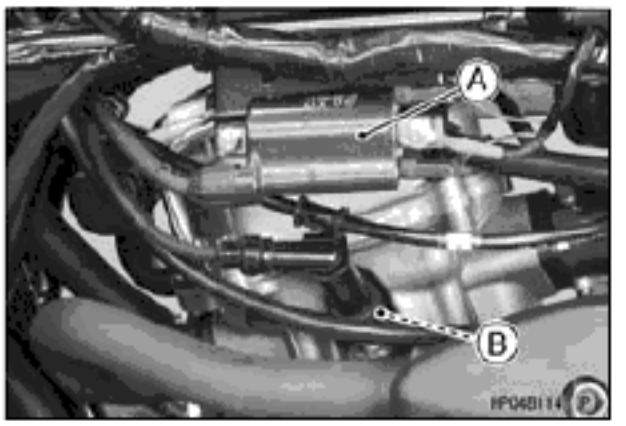


Battery [A]
Starter Relay [B]
Fuse Box [C]
Starter Circuit Relay [D]

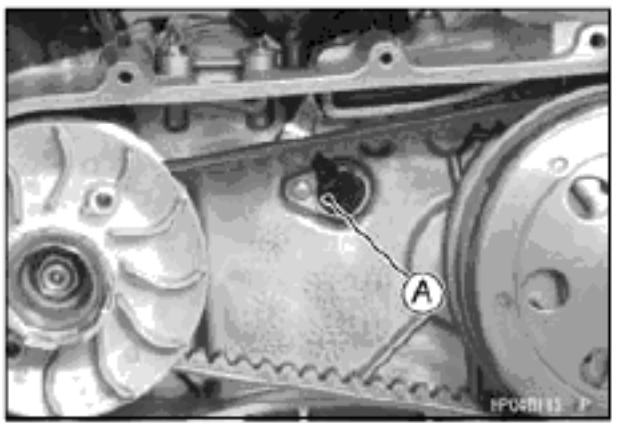


Parts Location

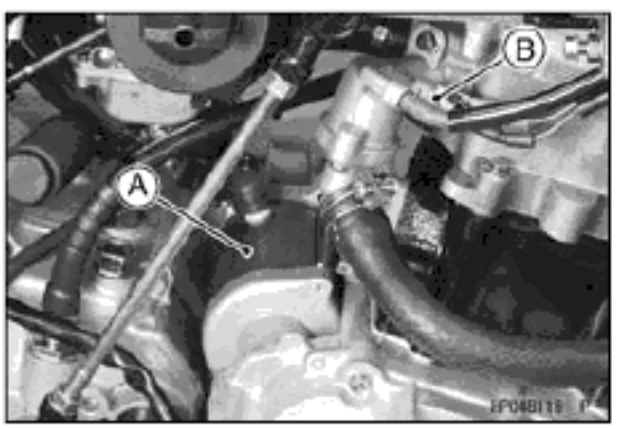
Ignition Coil [A]
Spark Plug [B]



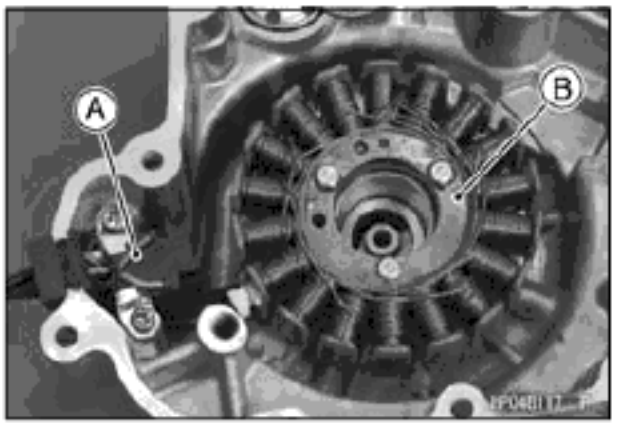
Gear Position Switch [A]
○In the photo, the torque converter cover has been removed.



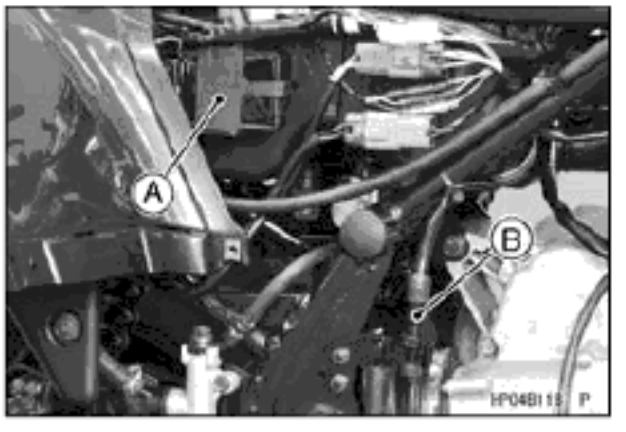
Starter Motor [A]
Water Temperature Sensor [B]



Crankshaft Sensor [A]
Alternator Stator Coil [B]
○In the photo, the alternator cover has been removed.

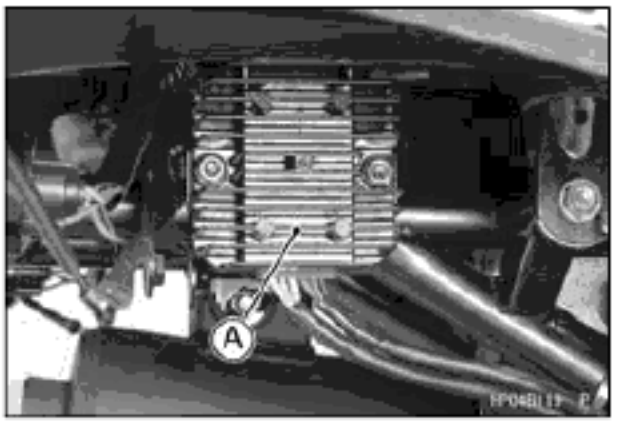


Igniter [A]
Rear Brake (Pedal) Light Switch [B]

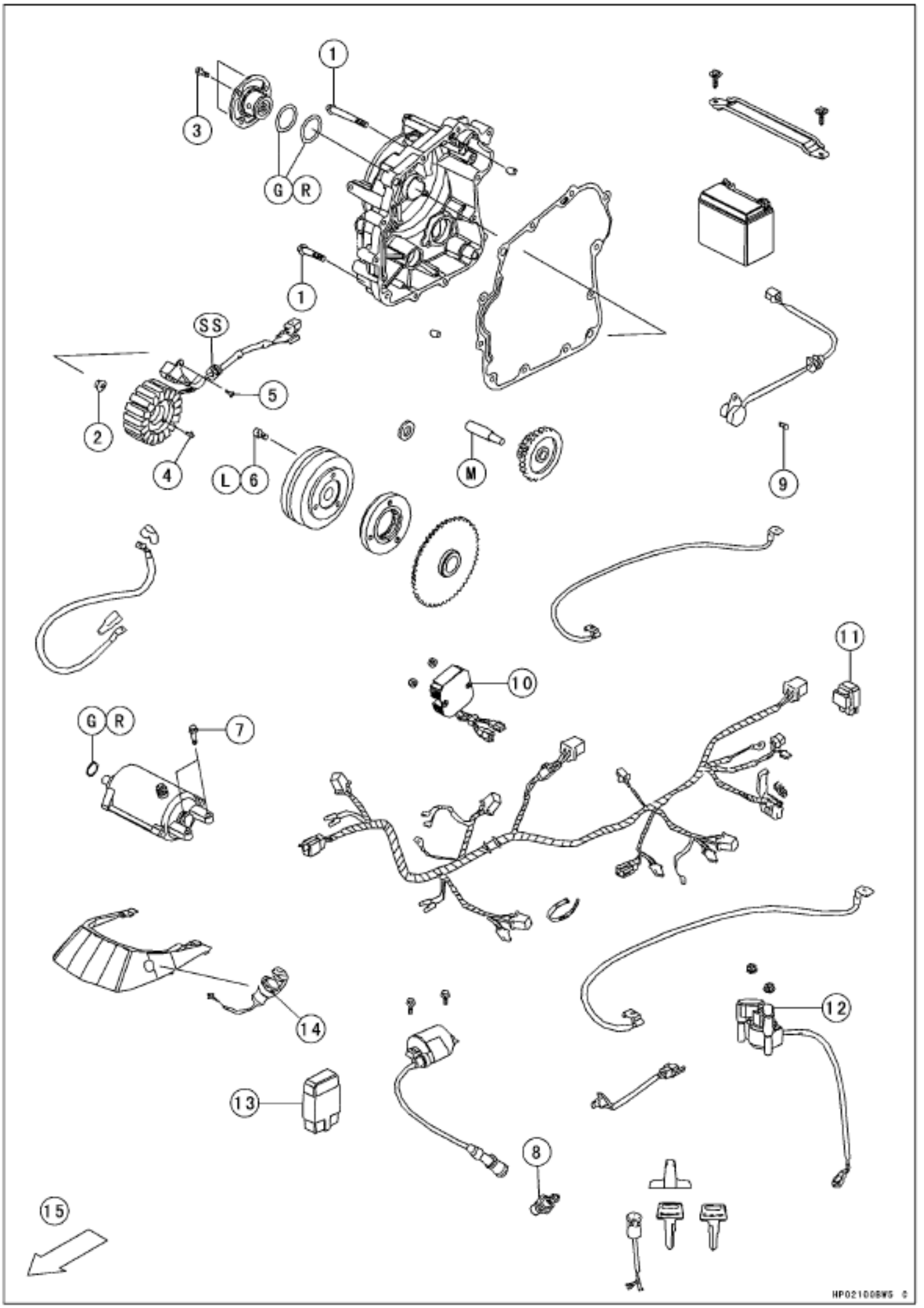


Parts Location

Regulator/Rectifier [A]



Exploded View



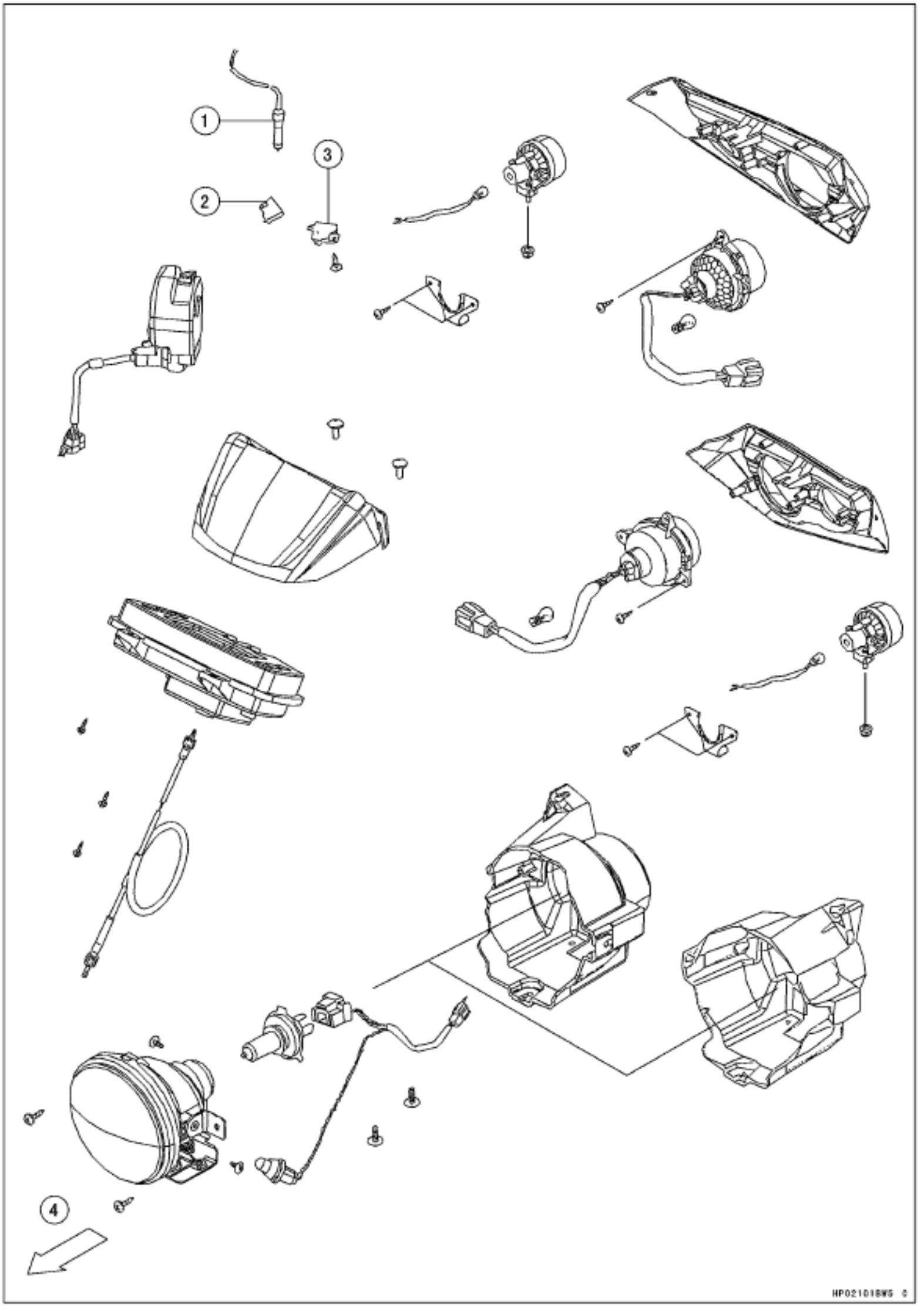
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Alternator Cover Bolts	9.8	1.0	87 in·lb	
2	Alternator Rotor Nut	59	6.0	44	
3	Alternator Rotor Nut Cap Bolts	9.8	1.0	87 in·lb	
4	Alternator Stator Bolts	9.8	1.0	87 in·lb	
5	Crankshaft Sensor Mounting Screws	7.4	0.75	65 in·lb	
6	Starter Motor Clutch Bolts	20	2.0	15	L
7	Starter Motor Mounting Bolts	9.8	1.0	87 in·lb	
8	Spark Plug	18	1.8	13	
9	Gear Position Switch Mounting Bolt	9.8	1.0	87 in·lb	

10. Regulator/Rectifier
11. Starter Circuit Relay
12. Starter Relay
13. Igniter
14. Power Outlet Connector
15. Front

G: Apply grease.
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
R: Replacement Parts
SS: Apply silicone sealant.

Exploded View



Exploded View

1. Rear Brake (Pedal) Light Switch
2. Front Brake Light Switch
3. Rear Brake (Lever) Light Switch
4. Front

Specifications

Item	Standard
Battery	
Type	Sealed Battery
Model Name	YTX12-BS
Capacity	12 V 10 Ah
Voltage	12.8 V or more
Charging System	
Alternator Type	Three-phase AC
Charging Voltage	13.5 ~ 15.5 V
(Regulator/Rectifier Output Voltage)	
Alternator Output Voltage	110 V at 4 000 r/min (rpm)
Stator Coil Resistance	0.1 ~ 1.5 Ω at 20°C (68°F)
Ignition System	
Spark Plug:	
Type	NGK DPR7EA-9
Spark Plug Gap	0.8 ~ 0.9 mm (0.032 ~ 0.036 in.)
Spark Plug Cap Resistance	4.2 ~ 5.2 kΩ at 20°C (68°F)
Ignition Coil:	
Primary Winding Resistance	3.4 ~ 4.1 Ω
Secondary Winding Resistance	18.9 kΩ (with plug cap) at 20°C (68°F) 14.45 kΩ (with out plug cap) at 20°C (68°F)
Crankshaft Sensor Resistance	105 ~ 110 Ω at 20°C (68°F)
Switches and Sensors	
Fuel Level Sensor Resistance:	
Full Level Position	Less than 60 Ω
Empty Level Position	Over than 820 Ω
Brake Light Switch Timing:	
Front	Pulled ON
Rear (Lever)	Pulled ON
Rear (Pedal)	ON after 10 mm (0.4 in.) of pedal travel
Water Temperature Sensor Resistance	in the text
Radiator Fan Switch Resistance:	
Rising Temperature	From OFF to ON at over than 85 ~ 90°C (185 ~ 194°F)
Falling Temperature	From ON to OFF at less than 85 ~ 90°C (185 ~ 194°F) ON: about 0 Ω OFF: ∞ Ω

Specifications

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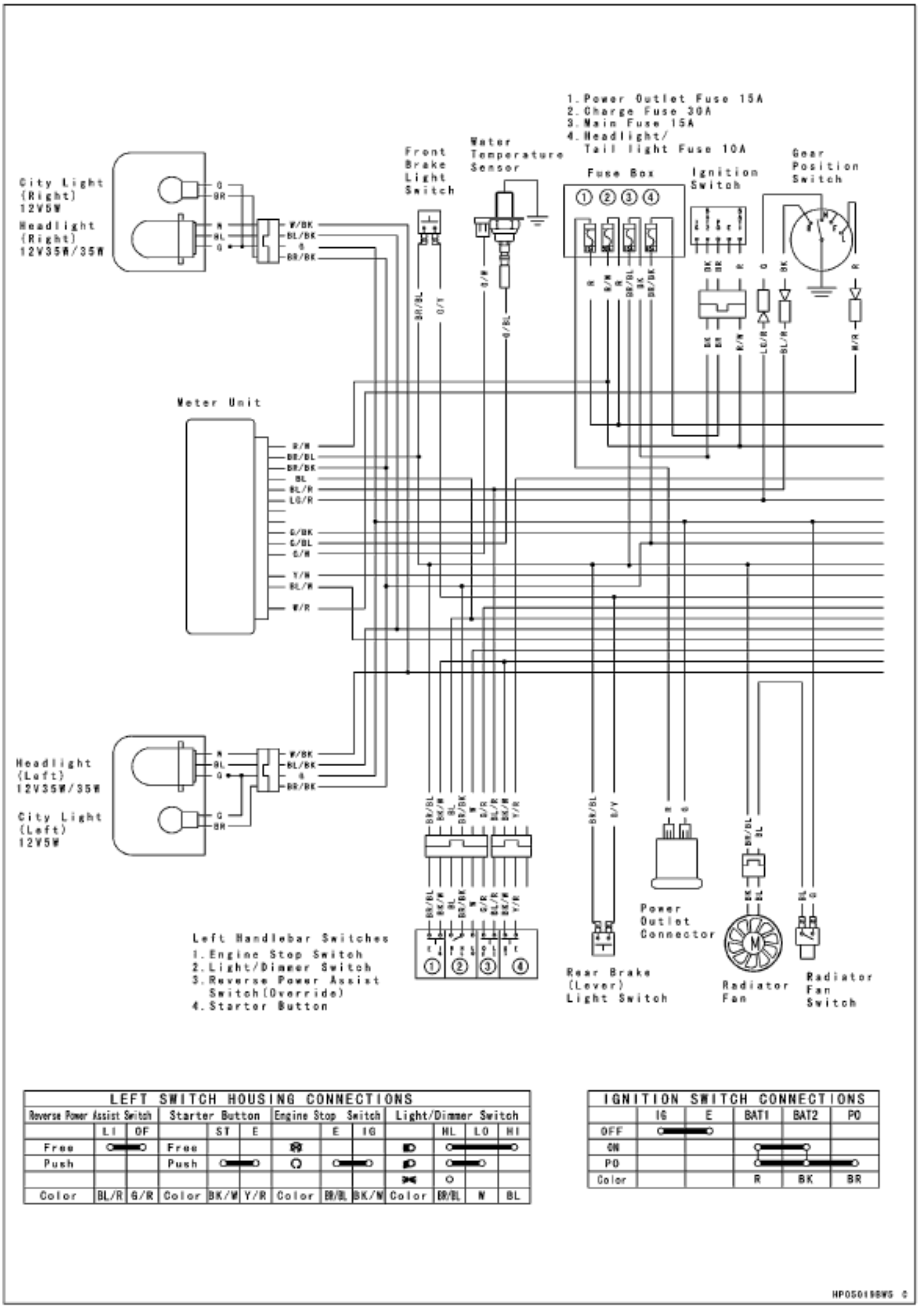
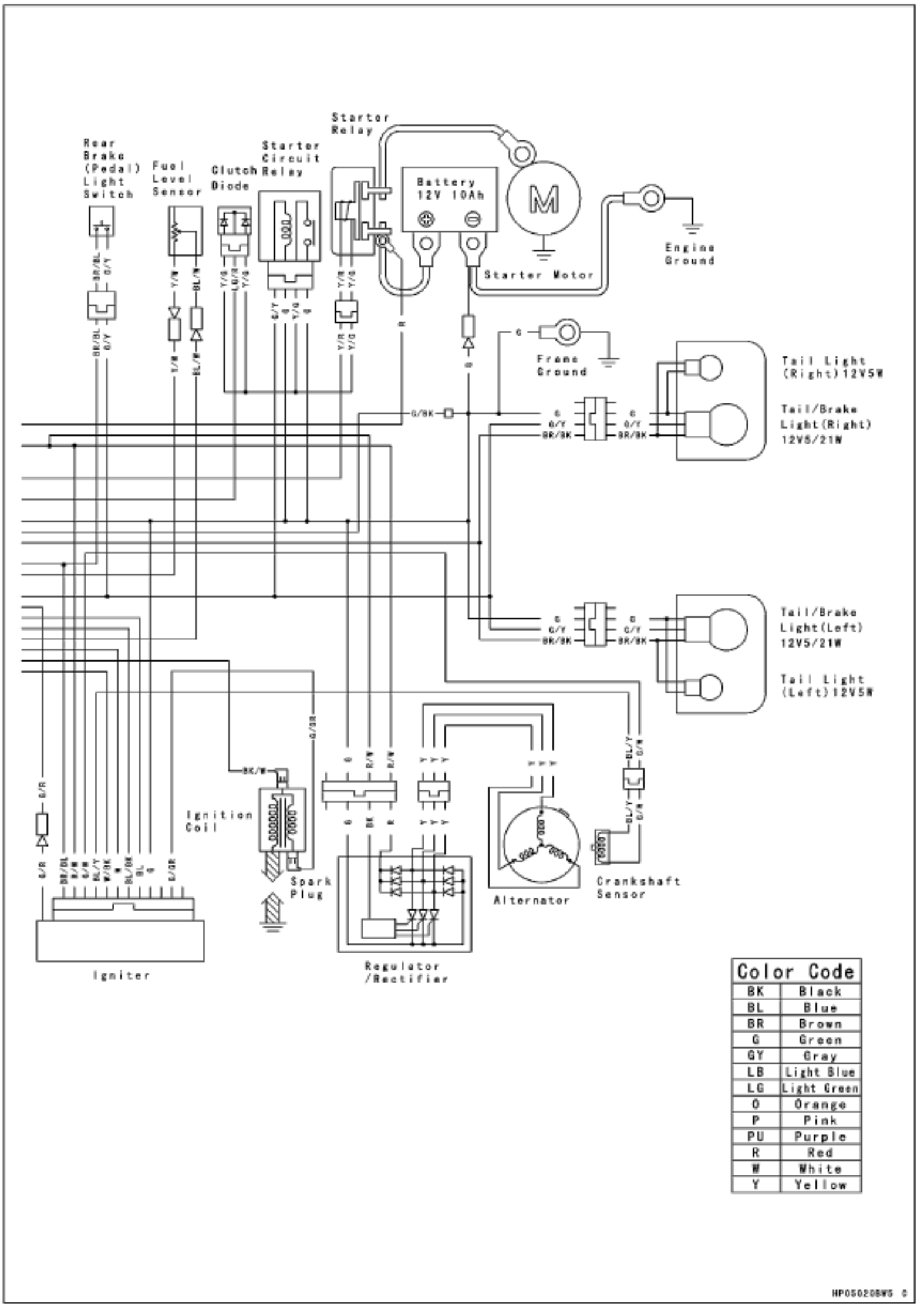
Wiring Diagram



LEFT SWITCH HOUSING CONNECTIONS												
Reverse Power Assist Switch			Starter Button			Engine Stop Switch			Light/Dimmer Switch			
	LI	OF		ST	E		E	IG		HL	LO	HI
Free	○—○		Free			⊛			◐	○—○		
Push			Push	○—○		○	○—○		◑	○—○		
									⋈	○		
Color	BL/R	G/R	Color	BK/W	Y/R	Color	BR/BL	BK/W	Color	BR/BL	W	BL

IGNITION SWITCH CONNECTIONS					
	IG	E	BAT1	BAT2	PO
OFF	○—○				
ON			○—○		
PO			○—○	○—○	
Color			R	BK	BR

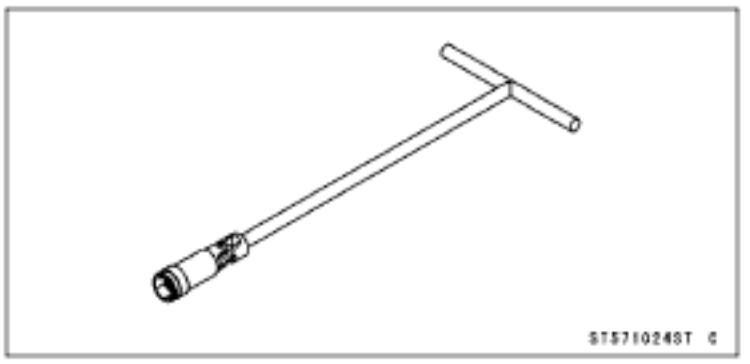
Wiring Diagram



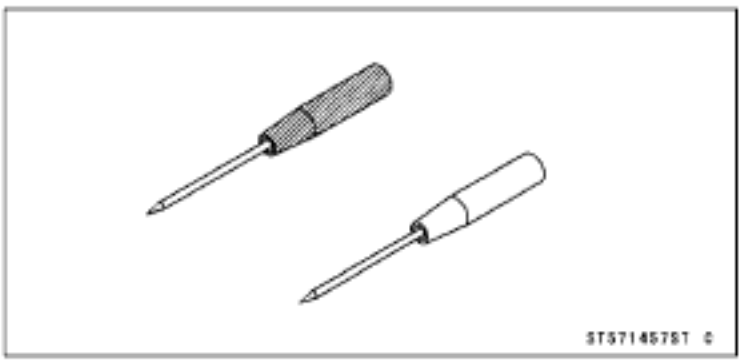
Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

Special Tools and Sealant

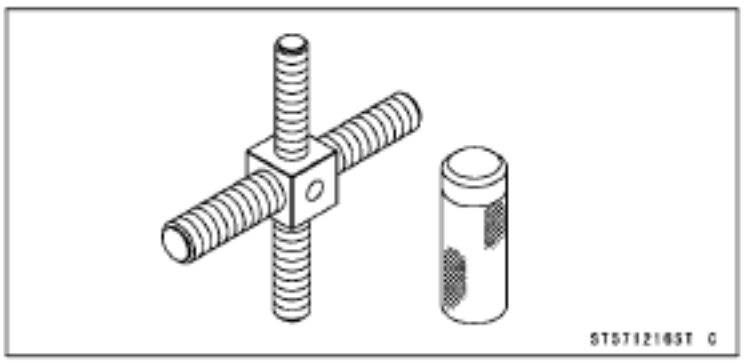
Spark Plug Wrench, Hex 18:
57001-1024



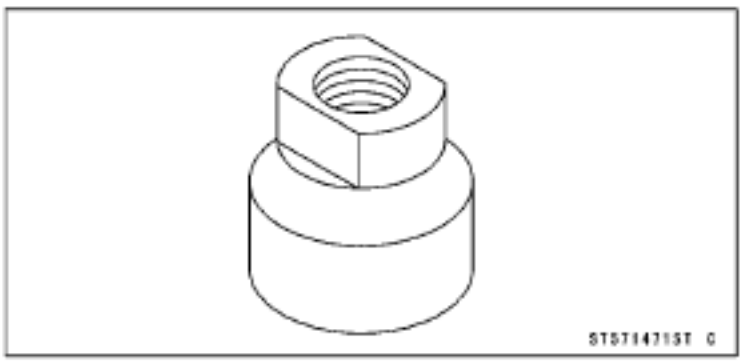
Needle Adapter Set:
57001-1457



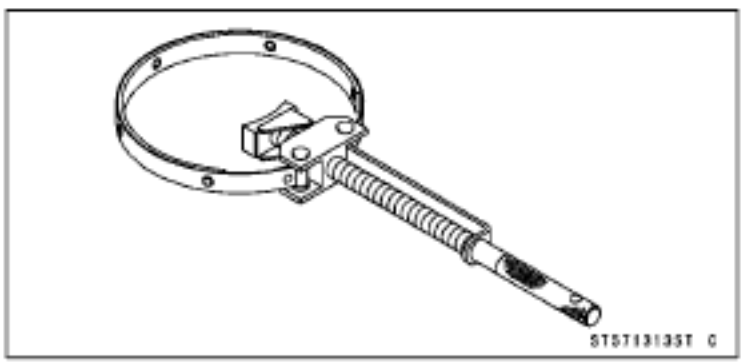
Rotor Puller, M16/M18/M20/M22 × 1.5:
57001-1216



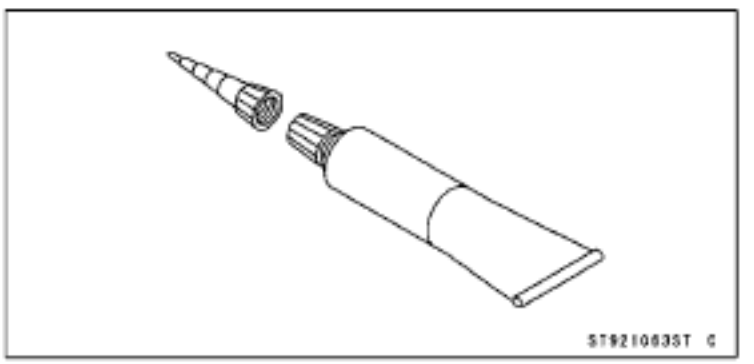
Flywheel Puller, M28 × 1.0:
57001-1471



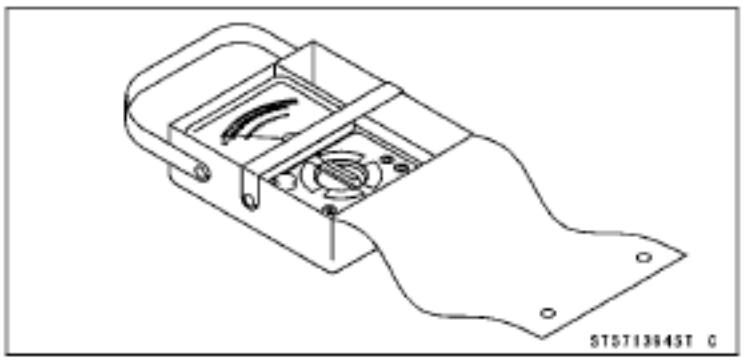
Flywheel Holder:
57001-1313



Liquid Gasket, TB1216:
92104-1063



Hand Tester:
57001-1394



Precautions

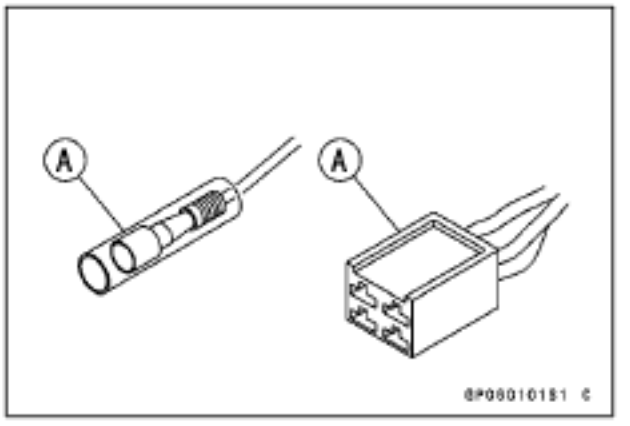
There are a number of important precautions that should be taken when servicing electrical systems. Learn and observe all the rules below.

- 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 cables 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:

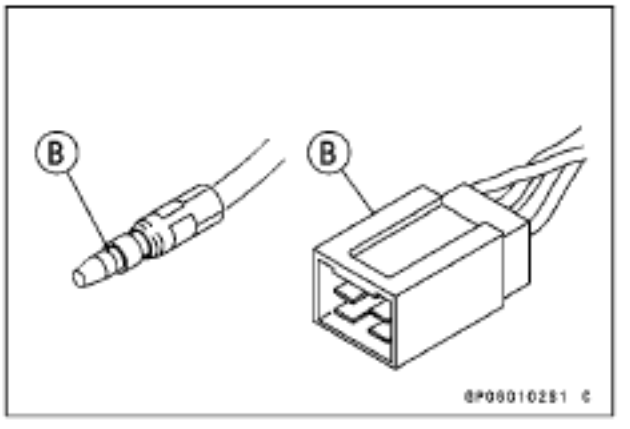
BK	Black	G	Green	P	Pink
BL	Blue	GY	Gray	PU	Purple
BR	Brown	LB	Light blue	R	Red
CH	Chocolate	LG	Light green	W	White
DG	Dark green	O	Orange	Y	Yellow

Precautions

○Electrical Connectors:
Connectors [A]

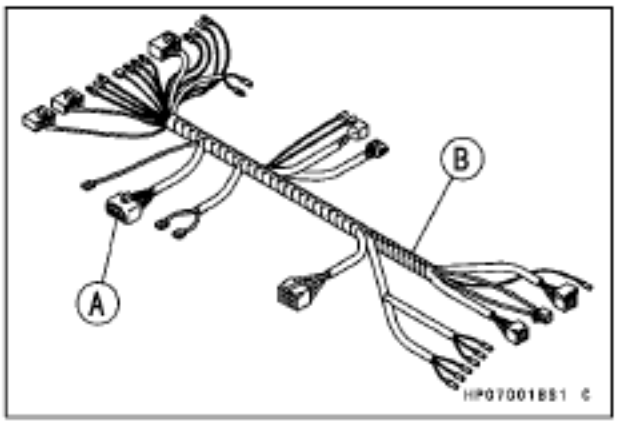


Connectors [B]



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

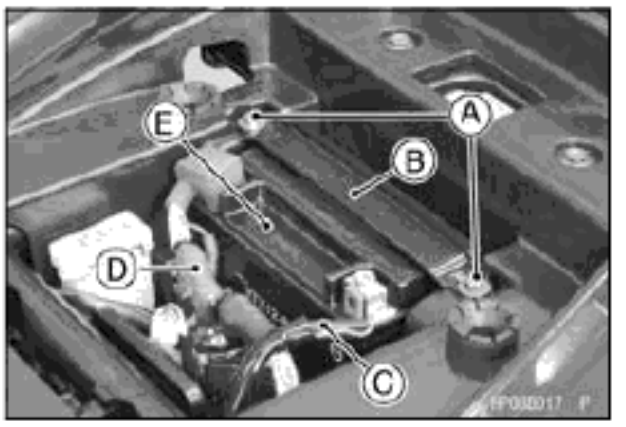
○Set the tester to the ×1 Ω range.

★If the tester does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness [B] if necessary.

Battery

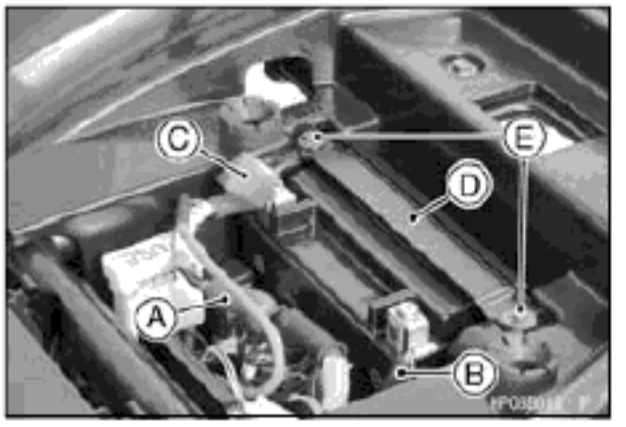
Battery Removal

- Turn the ignition switch to OFF.
- Remove:
  Seat (see Seat Removal in the Frame chapter)
  Battery Holder Bolts [A]
  Battery Holder [B]
- Disconnect the battery negative (–) cable [C] first, and then the positive (+) cable [D].
- Take out the battery [E].



Battery Installation

- Connect the positive (+) cable [A] with the red cap to the positive (+) terminal first, and then the negative (–) cable [B] to the negative (–) terminal.
- Cover the positive (+) terminal with the red cap [C].
- Install the battery holder [D].
- Tighten the battery holder bolts [E] securely.



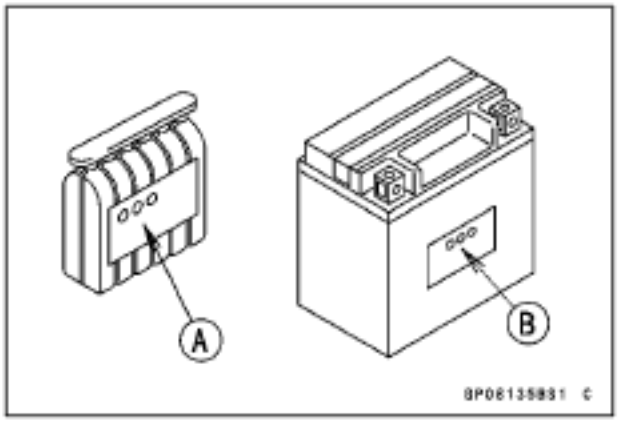
Battery Activation

Electrolyte Filling

- Make sure that the model name [A] of the electrolyte container matches the model name [B] of the battery. These names must be the same.

Battery Model Name

KVF300C: YTX12-BS



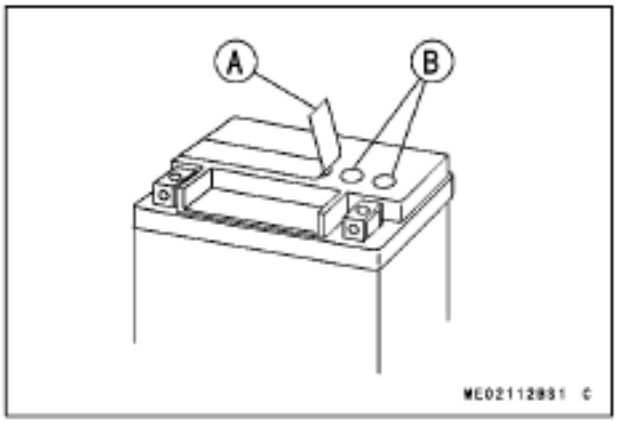
NOTICE

Each battery comes with its own specific electrolyte container; using the wrong container may overfill the battery with incorrect electrolyte, which can shorten battery life and deteriorate battery performance. 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.

Battery

NOTICE

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.



⚠ DANGER

Sulfuric acid in battery electrolyte can cause severe burns. To prevent burns, wear protective clothing and safety glasses when handling electrolyte. If the electrolyte comes in contact with your skin or eyes, wash the area with liberal amounts of water and seek medical attention for more severe burns.

- Place the battery on a level surface.
- Check to see that the sealing sheet has no peeling, tears, or holes in it.
- Remove the sealing sheet.

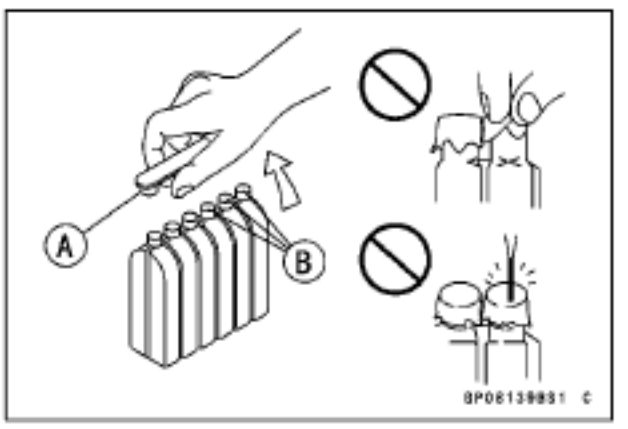
NOTE

○*The battery is vacuum sealed. If the sealing sheet has leaked air into the battery, it may require a longer initial charge.*

- Remove the electrolyte container from the vinyl bag.
- Detach the strip of caps [A] from the container and set aside, these will be used later to seal the battery.

NOTE

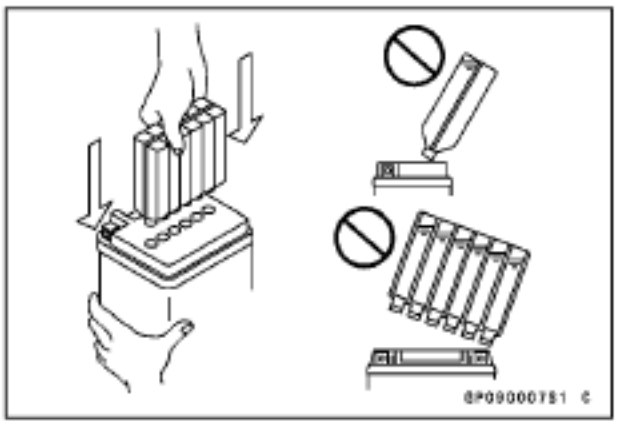
○*Do not pierce or otherwise open the sealed cells [B] of the electrolyte container. Do not attempt to separate individual cells.*



- Place the electrolyte container upside down with the six sealed cells into the filler ports of the battery. Hold the container level, push down to break the seals of all six cells. You will see air bubbles rising into each cell as the ports fill.

NOTE

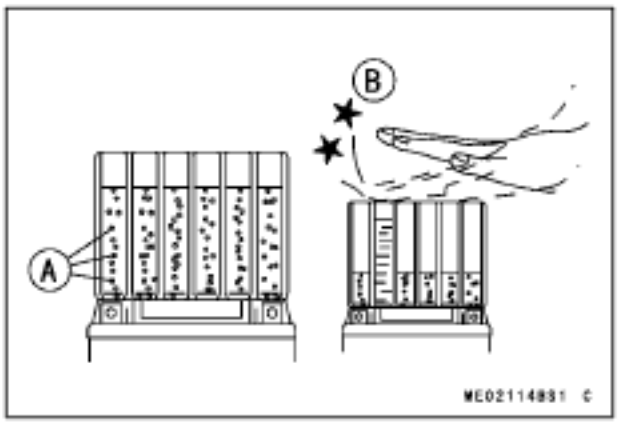
○*Do not tilt the electrolyte container.*



Battery

- 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.



NOTE

○*Be careful not to have the battery fall down.*

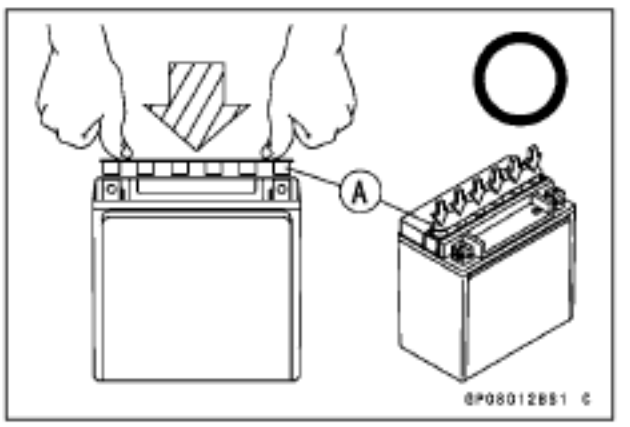
- Keep the container in place. Don't remove the container from the battery, the battery requires all the electrolyte from the container for proper operation.

NOTICE

Removal of the container before it is completely empty can shorten the service life of the battery. Do not remove the container until it is completely empty.

- After filling, let the battery sit for 20 ~ 60 minutes with the electrolyte container kept in place, which is required for the electrolyte to fully permeate into the plates.
- Make sure that the container cells have emptied completely, and remove the container from the battery.

- Place the strip of caps [A] loosely over the filler ports, press down firmly with both hands to seat the strip of caps into the battery (don't pound or hammer). When properly installed, the strip of caps will be level with the top of the battery.

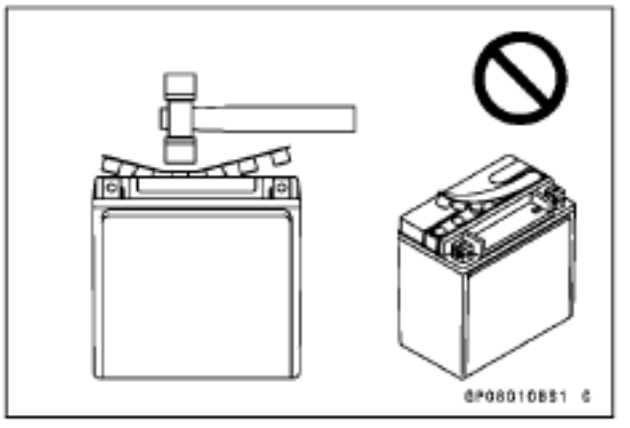


NOTICE

Once the strip of caps is installed onto the battery, never remove the caps, nor add water or electrolyte to the battery.

NOTE

○*Charging the battery immediately after filling can shorten service life.*



Battery

Initial Charge

• 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:
Battery Mate 150-9
OptiMate PRO 4-S/PRO S/PRO2
Yuasa MB-2040/2060
Christie C10122S

★If the above chargers are not available, use equivalent one.

• Let battery sit 30 minutes after initial charge, then check voltage using a voltmeter. (Voltage immediately after charging becomes temporarily high. For accurate measuring, let the battery sit for given time.)

NOTE

○*Charging rates will vary depending on how long the battery has been stored, temperature, and the type of charger used. If voltage is not at least 12.8 V, repeat charging cycle.*

○*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 V repeat the charging cycle and load test. If still below 12.8 V the battery is defective.*

Precautions

1) No need of topping-up
No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the 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.

NOTICE

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 vehicle for months
Give a refresh charge before you store the vehicle 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.)

Battery

⚠ DANGER

Batteries produce an explosive gas mixture of hydrogen and oxygen that can cause serious injury and burns if ignited. Keep the battery away from sparks and open flames during charging. 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. 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 and seek medial attention for more severe burns.

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.

Charging Condition Inspection

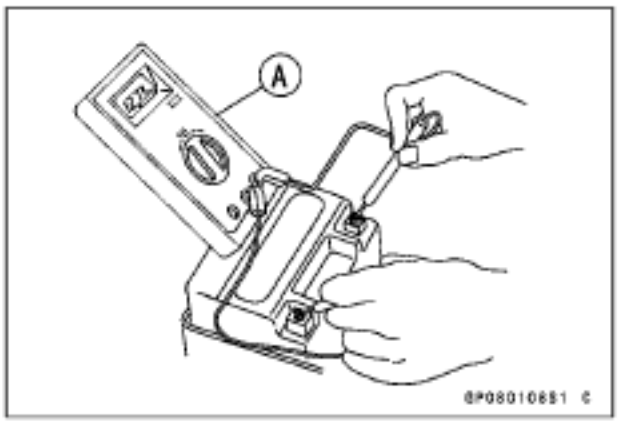
Battery charging condition can be checked by measuring battery terminal voltage.

- Remove the battery (see Battery Removal).

NOTICE

Be sure to disconnect the negative (–) cable first.

- Measure the battery terminal voltage.



NOTE

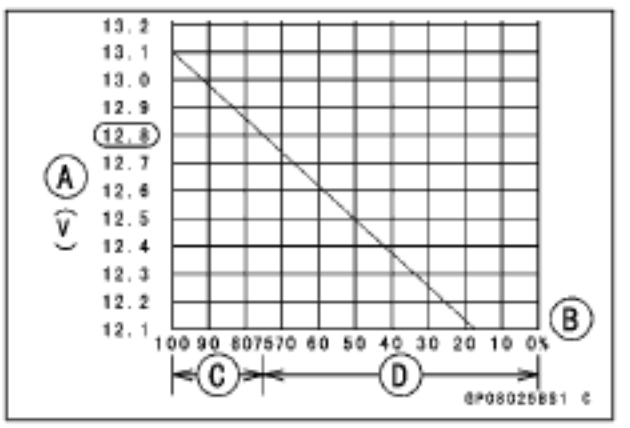
○*Measure with a digital voltmeter [A] which can be read to one decimal place voltage.*

★If the reading is below the specified, refreshing charge is required.

Battery Terminal Voltage

Standard: 12.8 V or more

Terminal Voltage (V) [A]
Battery Charge Rate (%) [B]
Good [C]
Refresh charge is required [D]

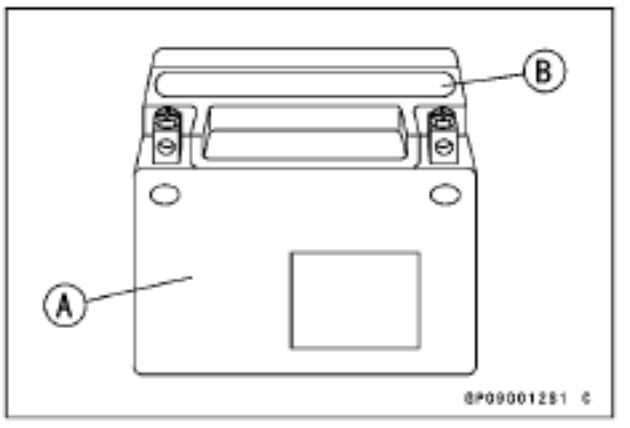


Refreshing Charge

- Remove the battery [A] (see Battery Removal).
- Refresh-charge by following method according to the battery terminal voltage.

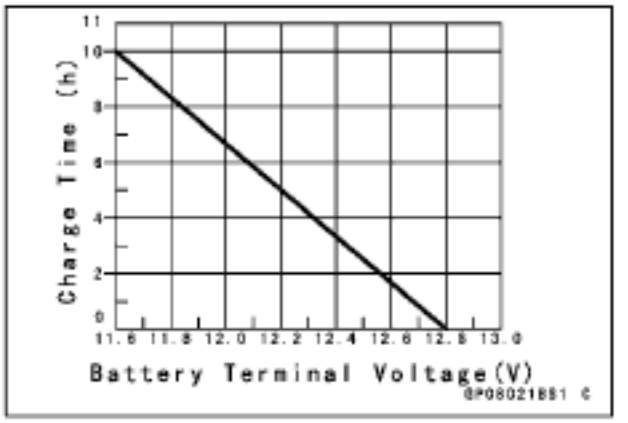
⚠ WARNING

This battery is sealed type. Never remove seal sheet [B] even at charging. Never add water. Charge with current and time as stated below.



Battery

Terminal Voltage: 11.5 ~ less than 12.8 V
Standard Charge
1.2 A × 5 ~ 10 h (see following chart)
Quick Charge
5.0 A × 1.0 h



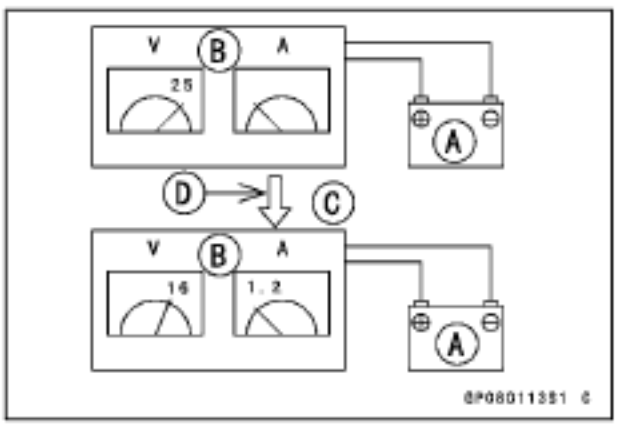
NOTICE

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

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.

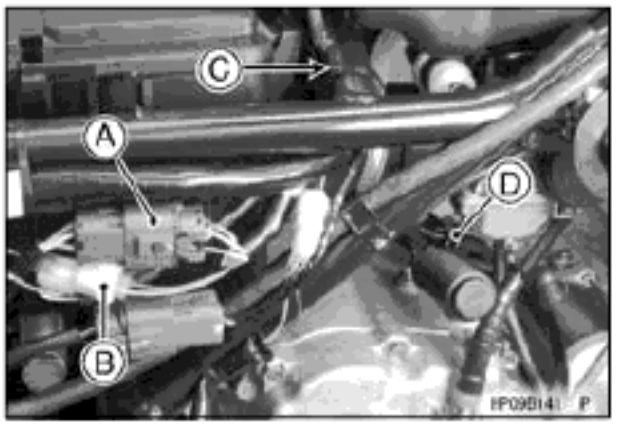
Criteria	Judgement
12.8 V or higher	Good
12.0 ~ 12.8 V or lower	Charge insufficient → Recharge
12.0 V or lower	Unserviceable → Replace

Charging System

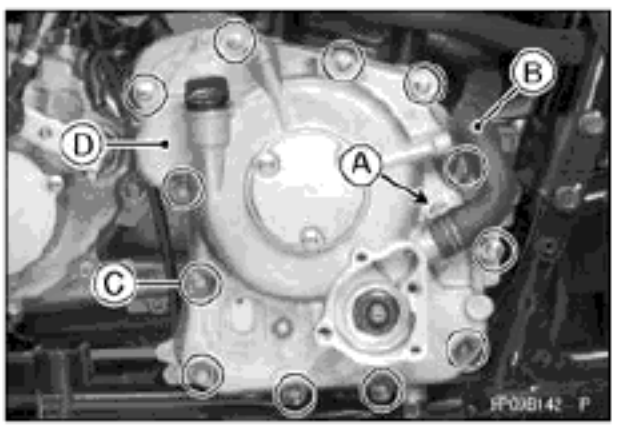
Alternator Cover Removal

- Drain:
  Coolant (see Coolant Change in the Periodic Maintenance chapter)
  Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
- Remove:
  Water Pump Impeller (see Water Pump Impeller Removal in the Cooling System chapter)
  Right Footboard (see Right Footboard Removal in the Frame chapter)
  Right Side Cover (see Right Side Cover Removal in the Frame chapter)

- Disconnect:
  Alternator Stator Connector [A]
  Crankshaft Sensor Connector [B]
- Cut the band [C].
- Open the clamp [D].



- Loosen the clamp screw [A] fully, and remove the coolant hose [B].
- Remove:
  Alternator Cover Bolts [C]
  Alternator Cover [D]



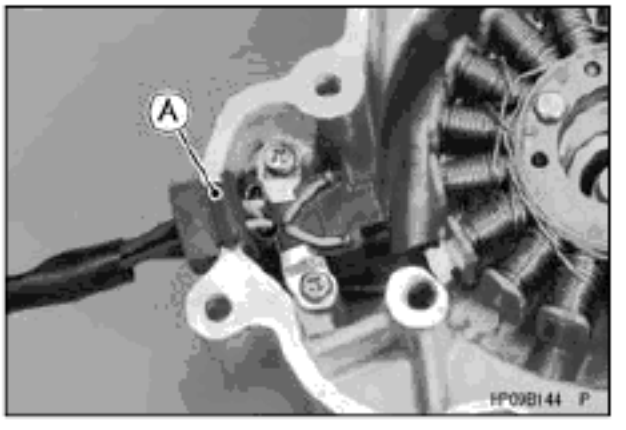
Alternator Cover Installation

- 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 [B] on the crankcase.

Charging System

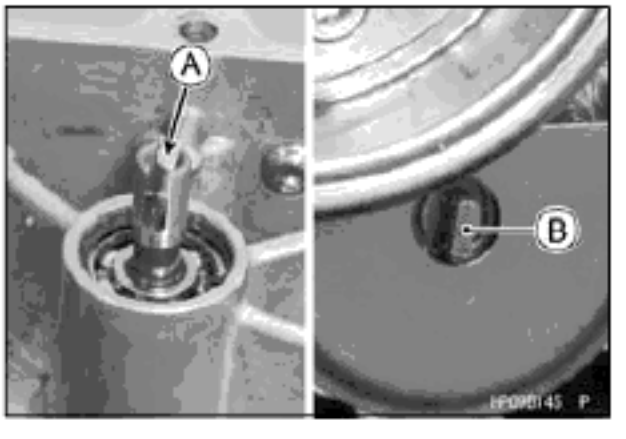
- Using a high flash-point solvent, clean off any oil or dirt that may be on the silicone sealant coating area. Dry them with a clean cloth.
- Apply silicone sealant to the circumference of the alternator lead grommet, and fit the grommet [A] into the notch of the alternator cover securely.

Sealant - Liquid Gasket, TB1216: 92104-1063



- Fit the slot [A] on the water pump shaft to the projection [B] on the oil pump shaft.
- Tighten:

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



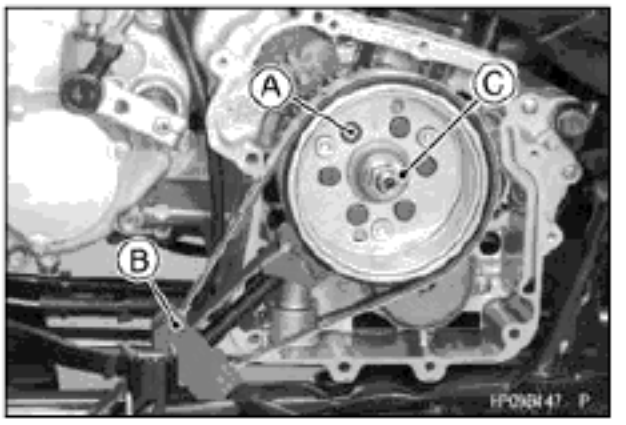
- Install the removed parts (see appropriate chapters).
- Pour:
  Coolant (see Coolant Change in the Periodic Maintenance chapter)
  Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)

Alternator Rotor Removal

- Remove:
  Alternator Cover (see Alternator Cover Removal)
- Remove the oil guide [A] and spring.

- Holding the alternator rotor [A] with the flywheel holder [B], loosen the alternator rotor nut [C].

Special Tool - Flywheel Holder: 57001-1313



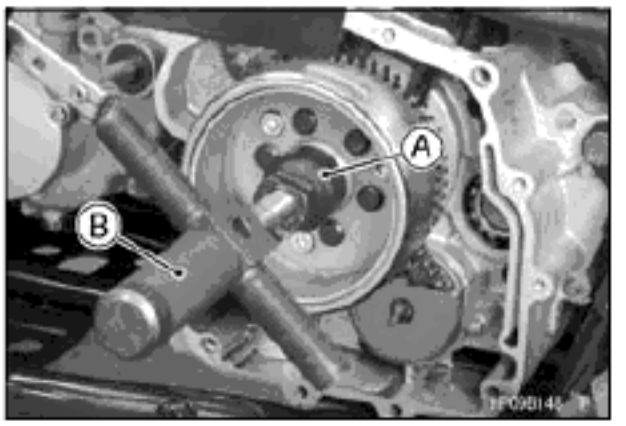
- Remove:
  Alternator Rotor Nut

Charging System

- Screw the flywheel puller [A] and rotor puller [B] onto the alternator rotor.

Special Tools - Rotor Puller, M16/M18/M20/M22 × 1.5: 57001 -1216

Flywheel Puller, M28 × 1.0: 57001-1471

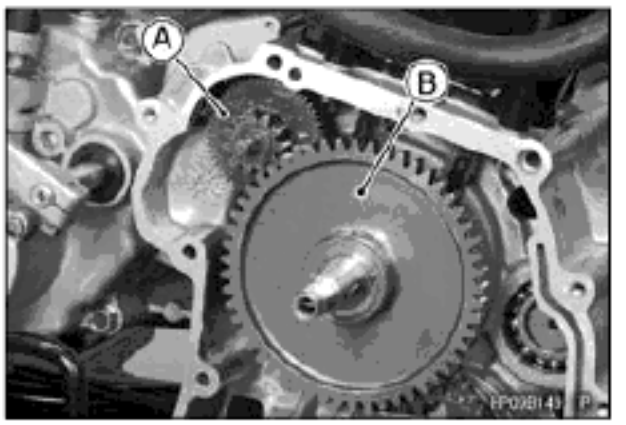


- Holding the flywheel puller, turn the rotor puller until the alternator rotor is forced off the end of the crankshaft.

NOTICE

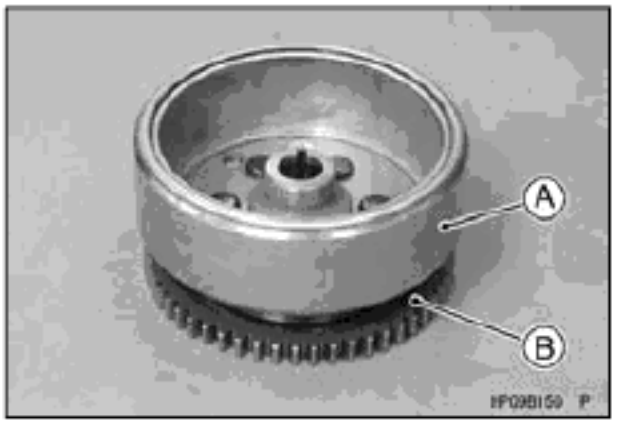
If the rotor is difficult to remove, turn the puller while tapping the end of the puller. Do not strike the alternator rotor. Striking the rotor can cause the magnets to lose magnetism.

- Remove:
  Reduction Gears [A]
  Starter Clutch Gear [B]



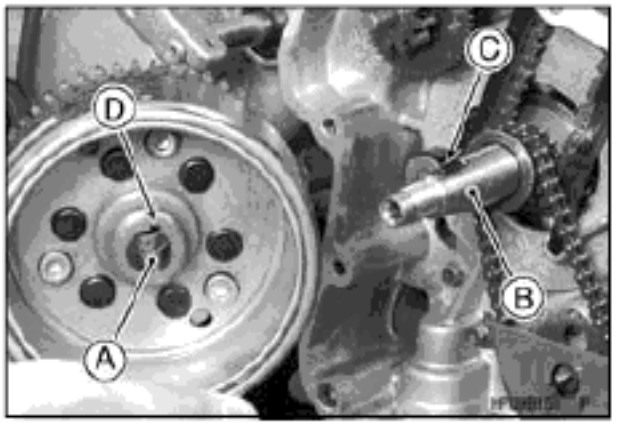
Alternator Rotor Installation

- Apply molybdenum disulfide grease to the shaft of the reduction gears.
- Install the reduction gears.
- Assemble the alternator rotor [A] and starter clutch gear [B].



- Clean the inside [A] of the rotor and the tapered portion [B] of the crankshaft.
- Fit the rotor onto the crankshaft so that woodruff key [C] fits in the groove [D] of the rotor.
- Install the alternator rotor.

○While assembling the alternator rotor and starter clutch gear, engage the reduction gears and starter clutch gear. When the rotor does not install easily, it installs while turning the rotor a little.



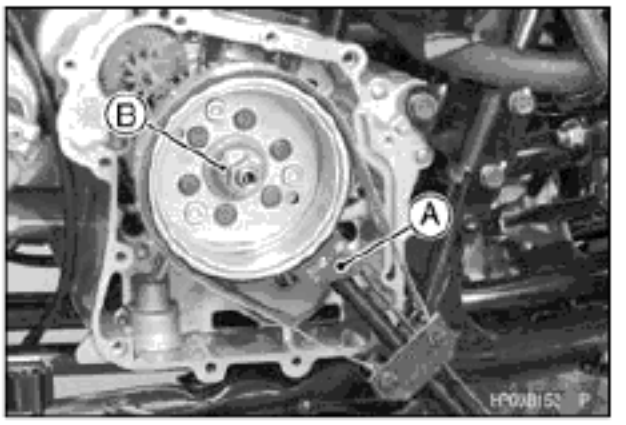
Charging System

- Hold the alternator rotor with the flywheel holder [A].

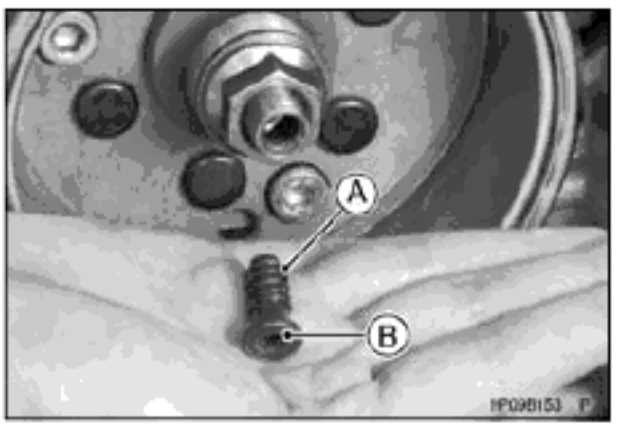
Special Tool - Flywheel Holder: 57001-1313

- Tighten:

Torque - Alternator Rotor Nut [B]: 59 N·m (6.0 kgf·m, 44 ft·lb)

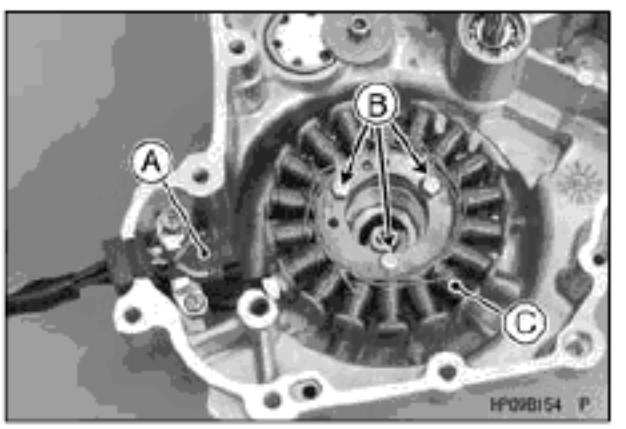


- Install the spring [A] and oil guide [B].



Alternator Stator Removal

- Remove:
  Alternator Cover (see Alternator Cover Removal)
  Crankshaft Sensor [A] (see Crankshaft Sensor Removal)
  Alternator Stator Bolts [B]
  Alternator Stator [C]



Alternator Stator Installation

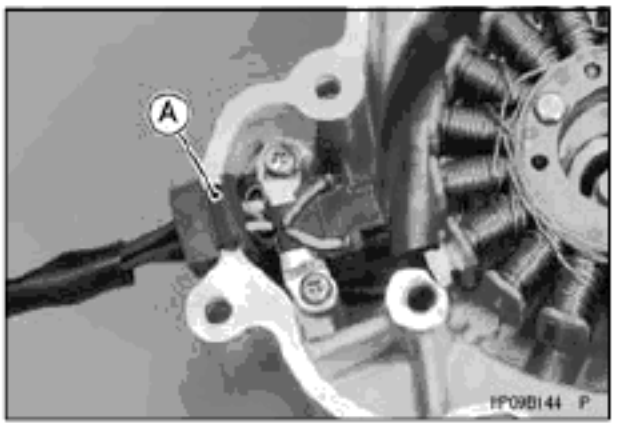
- Tighten:

Torque - Alternator Stator Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Install:
  Crankshaft Sensor (see Crankshaft Sensor Installation)
- Using a high flash-point solvent, clean off any oil or dirt that may be on the silicone sealant coating area. Dry them with a clean cloth.
- Apply silicone sealant to the circumference of the alternator lead grommet, and fit the lead grommet [A] into the notch of the alternator cover securely.

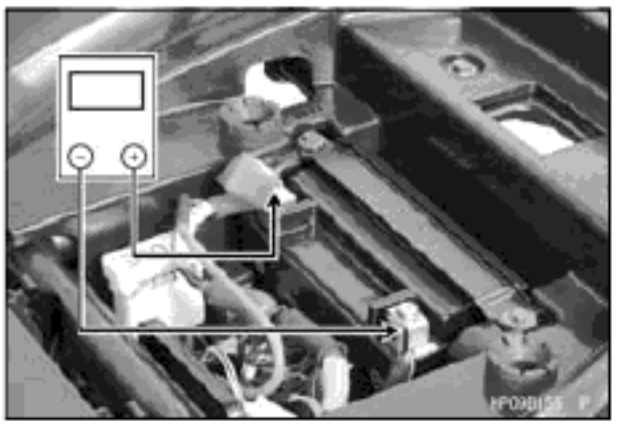
Sealant - Liquid Gasket, TB1216: 92104-1063

○Run the alternator leads under the crankshaft sensor leads.



Charging System

Regulator/Rectifier Output Voltage Inspection



- Remove:
  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 to 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 (–)	13.5 ~ 15.5 V

- Turn the ignition switch to OFF, and disconnect the hand tester.

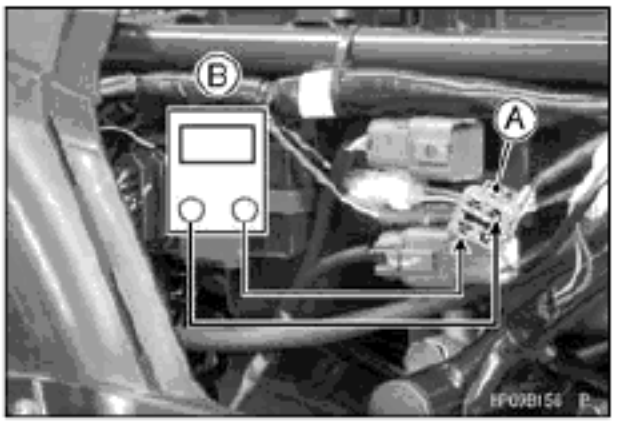
★If the regulator/rectifier output voltage is between the values given in the table, the charging system is working normally.

★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 right side cover (see Right Side Cover Removal in the Frame chapter).
○Disconnect the alternator connector [A].
○Connect a hand tester [B] as shown in the table.

Special Tools - Hand Tester: 57001-1394
Needle Adapter Set: 57001-1457

○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
	Tester (+) to	Tester (–) to	at 4 000 rpm
250 V AC	One yellow lead	Another yellow lead	110 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 **at 20°C (68°F)**

Tester Range	Connections		Reading
	Tester (+) to	Tester (–) to	
× 1 Ω	One yellow lead	Another yellow lead	0.1 ~ 1.5 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.

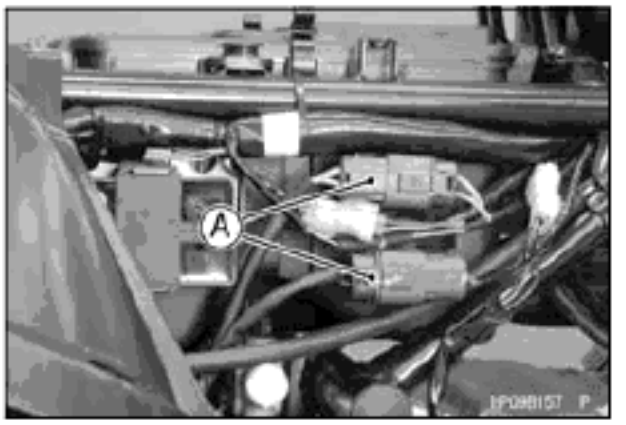
- Using the highest resistance range of the hand tester, measure the resistance between each of the yellow leads and chassis ground.

★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 rotor magnetism has probably weakened, and the rotor must be replaced.

Charging System

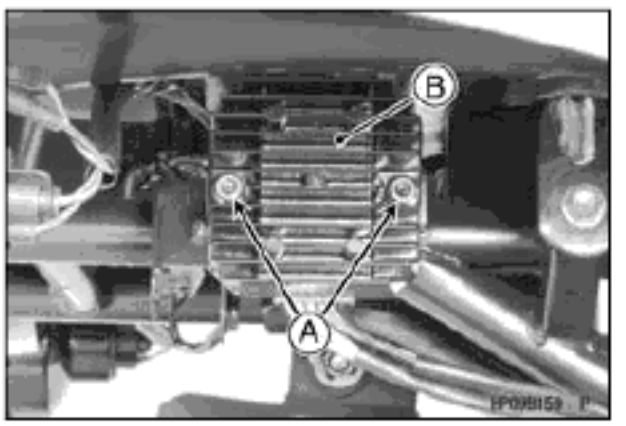
Regulator/Rectifier Removal

- Remove:
  Right Side Cover (see Right Side Cover Removal in the Frame chapter)
- Disconnect the connectors [A].



- Cut the bands [A].

- Remove:
  Regulator/Rectifier Mounting Nuts [A]
  Regulator/Rectifier [B]



Regulator/Rectifier Installation

- Installation is reverse of removal.

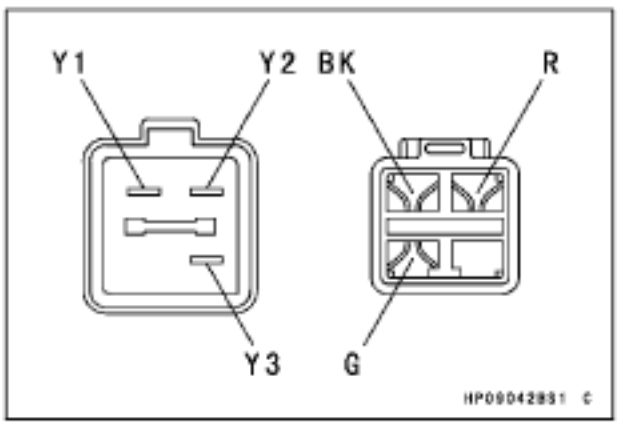
Regulator/Rectifier Inspection

- Remove:
  Regulator/Rectifier (see Regulator/Rectifier Removal)
- Set the hand tester to the × 1 kΩ range and make the measurements shown in the table.

Special Tool - Hand Tester: 57001-1394

- Connect the hand tester to the regulator/rectifier.

★If the tester readings are not as specified, replace the regulator/rectifier.



NOTICE

Use only Kawasaki Hand Tester 57001-1394 for this test. A tester other than the Kawasaki Hand Tester may show different readings.
If a megger or a meter with a large capacity battery is used, the regulator/rectifier will be damaged.

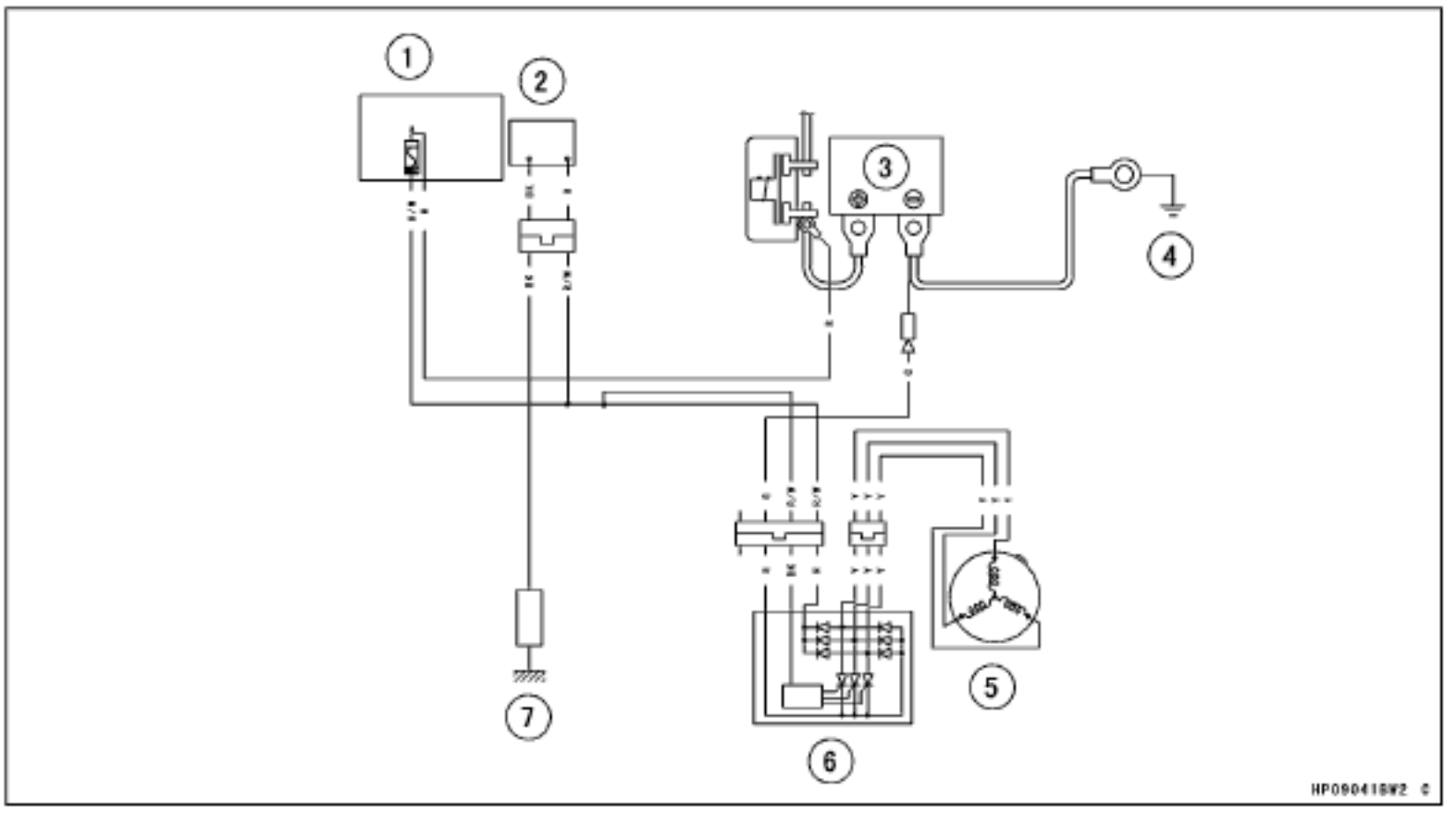
Charging System

Regulator/Rectifier Resistance **(Unit: kΩ)**

		Tester (+) Lead Connection					
	Terminal	G	R	BK	Y1	Y2	Y3
(–)*	G	–	8.25 ~ 24.75	5.5 ~ 16.5	4.25 ~ 12.75	4.25 ~ 12.75	4.25 ~ 12.75
	R	∞	–	∞	∞	∞	∞
	BK	15 ~ 45	27.5 ~ 82.5	–	20 ~ 60	20 ~ 60	20 ~ 60
	Y1	∞	3.5 ~ 10.5	∞	–	∞	∞
	Y2	∞	3.5 ~ 10.5	∞	∞	–	∞
	Y3	∞	3.5 ~ 10.5	∞	∞	∞	–

(–)*: Tester (–) Lead Connection

Charging System Circuit



1. Charge Fuse 30 A
2. Ignition Switch
3. Battery 12 V 10 Ah
4. Engine Ground
5. Alternator
6. Regulator/Rectifier
7. Load

Ignition System

⚠ WARNING

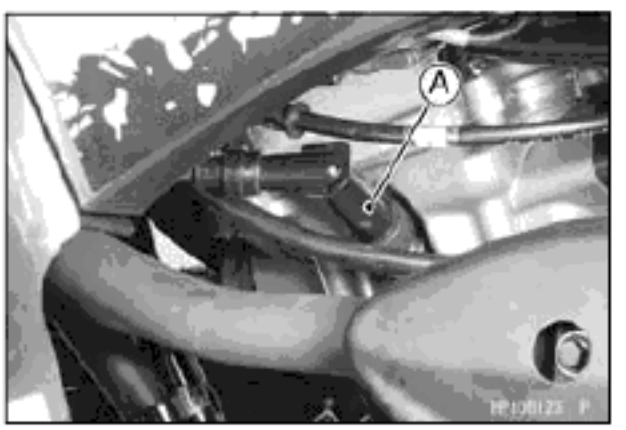
The ignition system produces extremely high voltage. Do not touch the spark plug, ignition coil or spark plug lead while the engine is running, or you could receive a severe electrical shock.

NOTICE

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

- Remove:
  Spark Plug Cap [A]



- Using a spark plug wrench, remove the spark plug [A].
  Special Tool - Spark Plug Wrench, Hex 18: 57001-1024

Spark Plug Installation

- Tighten:
  Torque - Spark Plug: 18 N·m (1.8 kgf·m, 13 ft·lb)
  Special Tool - Spark Plug Wrench, Hex 18: 57001-1024
- Fit the spark plug caps securely.
- Pull up the spark plug cap lightly to make sure of the installation of the spark plug cap.

Spark Plug Cleaning/Inspection

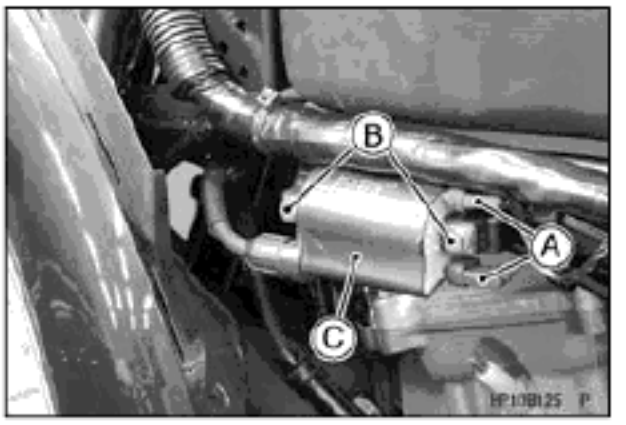
- Refer to the Spark Plug Cleaning/Inspection in the Periodic Maintenance chapter.

Spark Plug Gap Inspection

- Refer to the Spark Plug Gap Inspection in the Periodic Maintenance chapter.

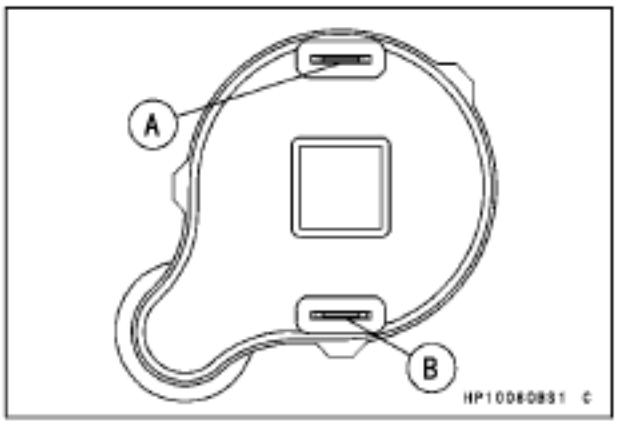
Ignition System

Ignition Coil Removal

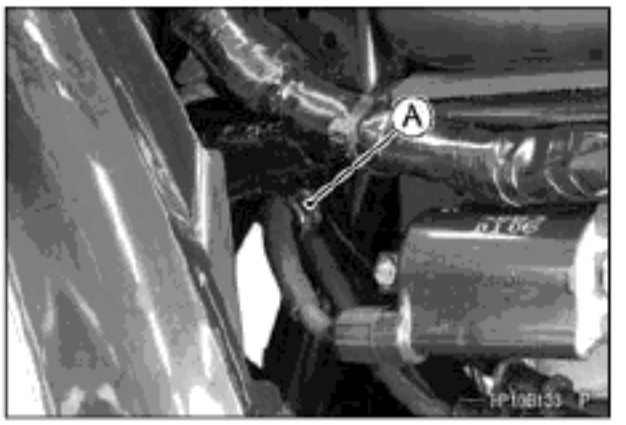


- Remove:
  Left Side Cover (see Left Side Cover Removal in the Frame chapter)
  Spark Plug Cap (see Spark Plug Removal)
  Primary Lead Connectors [A]
  Ignition Coil Mounting Bolts [B]
  Ignition Coil [C]

Ignition Coil Installation

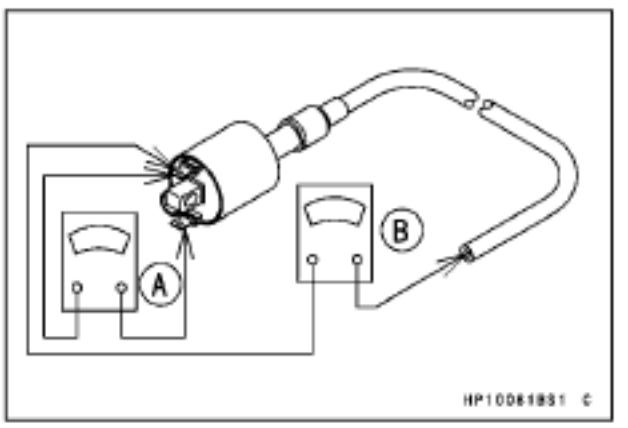


- Install:
  Ignition Coil
- Tighten the ignition coil mounting bolts securely.
- Connect the primary leads to the ignition coil terminals as shown.
  G/GY Lead → (Green) Terminal [A]
  BK/W Lead → (Black) Terminal [B]



- Hold the ignition coil lead with a clamp [A].

Ignition Coil Inspection



- Measure the primary winding resistance [A] as follows:
  ○Connect the tester between the coil terminals.
  ○Set the tester to the × 1 Ω range.
- Measure the secondary winding resistance [B] as follows:
  ○Connect the tester between the spark plug lead and terminal.
  ○Set the tester to the × 1 kΩ range.
  ○Remove the plug cap by turning it counterclockwise.
  ○Measure the secondary winding resistance with the plug cap removed.

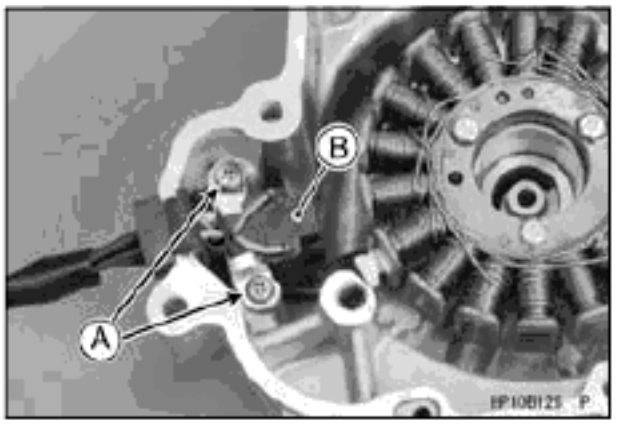
Ignition Coil Winding Resistance

Primary Windings:	**3.4 ~ 4.1 Ω at 20°C (68°F)**
Secondary Windings:	**18.9 kΩ (with plug cap) at 20°C (68°F)**
	14.45 kΩ (without plug cap) at 20°C (68°F)

★If the hand tester does not read as specified, replace the coil.
○To install the plug cap, turn it clockwise.

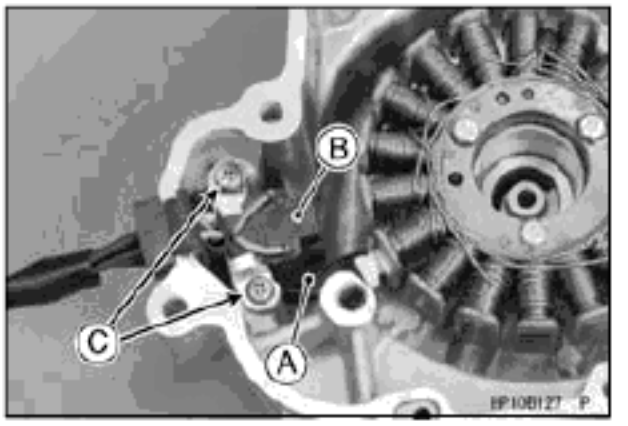
Ignition System

Crankshaft Sensor Removal



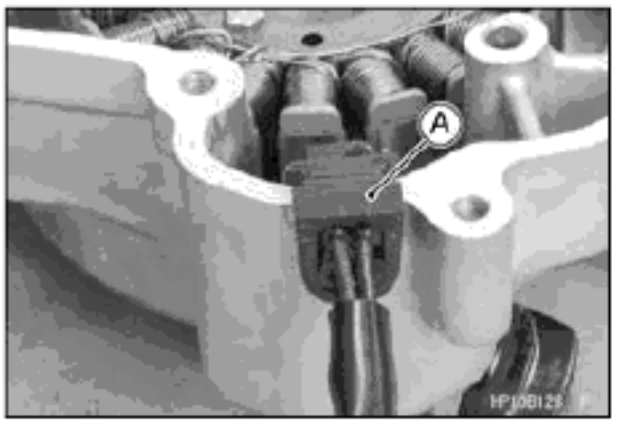
- Remove:
  Alternator Cover (see Alternator Cover Removal)
  Crankshaft Sensor Mounting Screws [A]
  Crankshaft Sensor [B]

Crankshaft Sensor Installation



- Install:
  Stator Coil Leads [A]
  Crankshaft Sensor [B]
- Tighten:

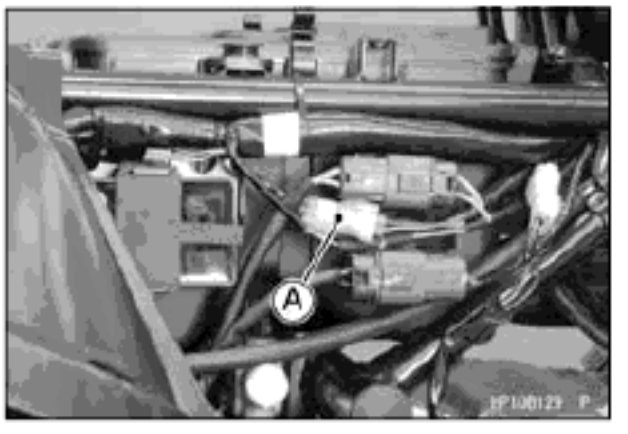
Torque - Crankshaft Sensor Mounting Screws [C]: 7.4 N·m (0.75 kgf-m, 65 in·lb)



- Using a high flash-point solvent, clean off any oil or dirt that may be on the silicone sealant coating area. Dry them with a clean cloth.
- Apply silicone sealant to the circumference of the alternator lead grommet, and fit the lead grommet [A] into the notch of the alternator cover securely.

Sealant - Liquid Gasket, TB1216: 92104-1063

Crankshaft Sensor Inspection



- Remove the right side cover (see Right Side Cover Removal in the Frame chapter).
- Disconnect the crankshaft sensor lead connector [A].
- Measure the crankshaft sensor resistance.

○Connect a hand tester between the BL/Y lead and the G/W lead.
○Set the tester to the × 10 Ω range.

Crankshaft Sensor Resistance
Standard: 105 ~ 110 Ω at 20°C (68°F)

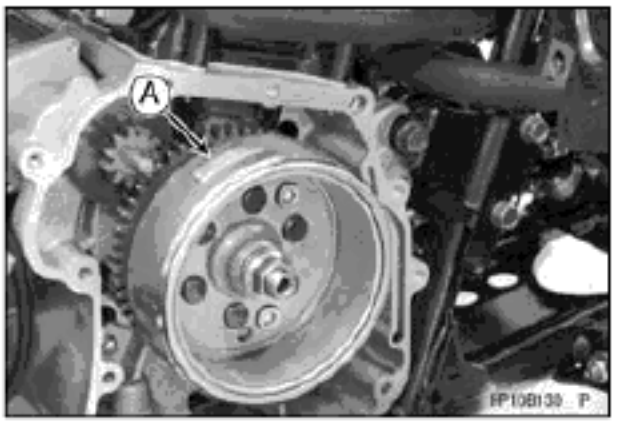
★If the tester does not read as specified, replace the crankshaft sensor.

Ignition System

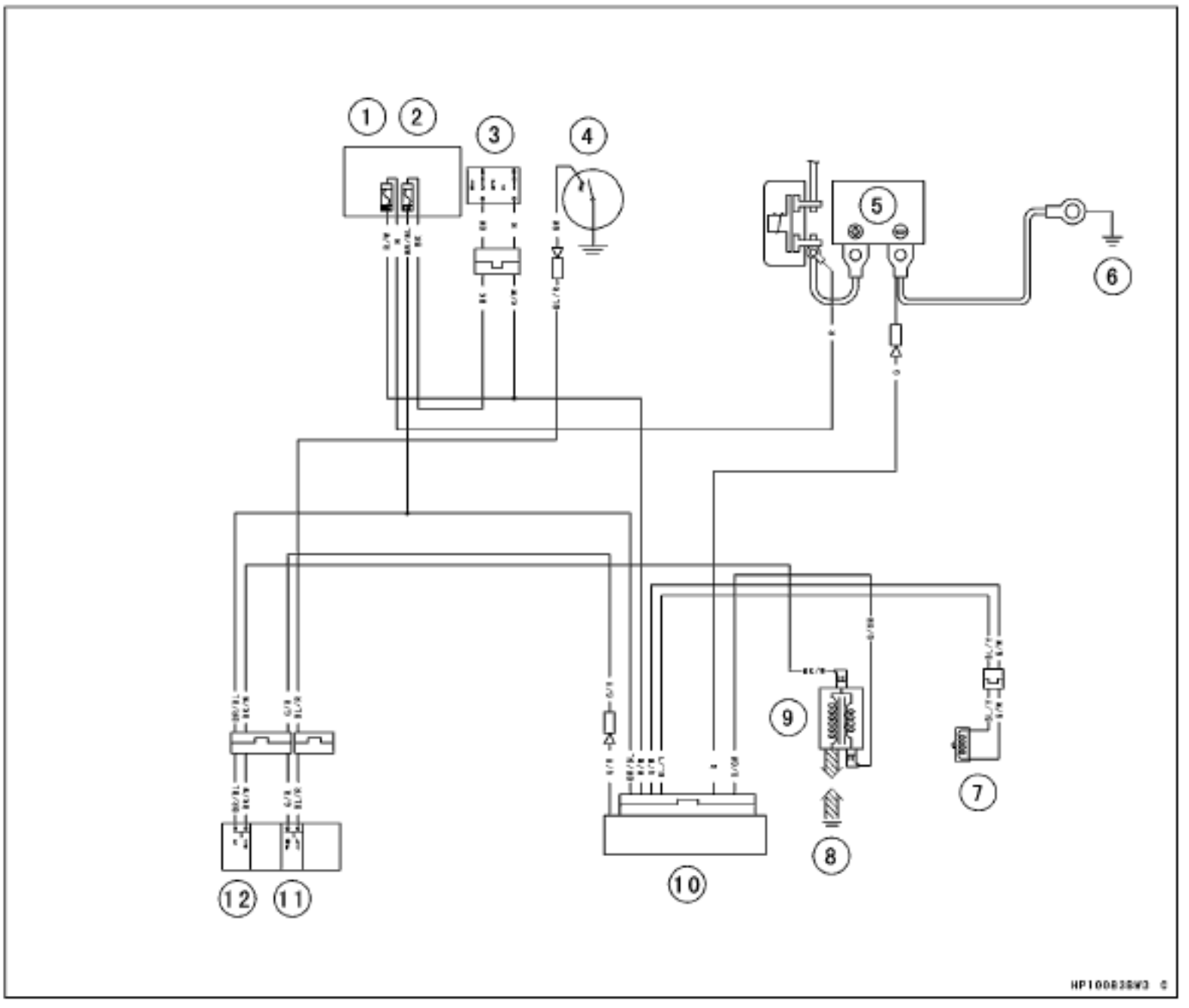
Alternator Rotor Inspection

- Check the timing projection [A] for damage such as chipping or grooving.

★If the timing projection on the rotor is visibly damaged, replace the alternator rotor.



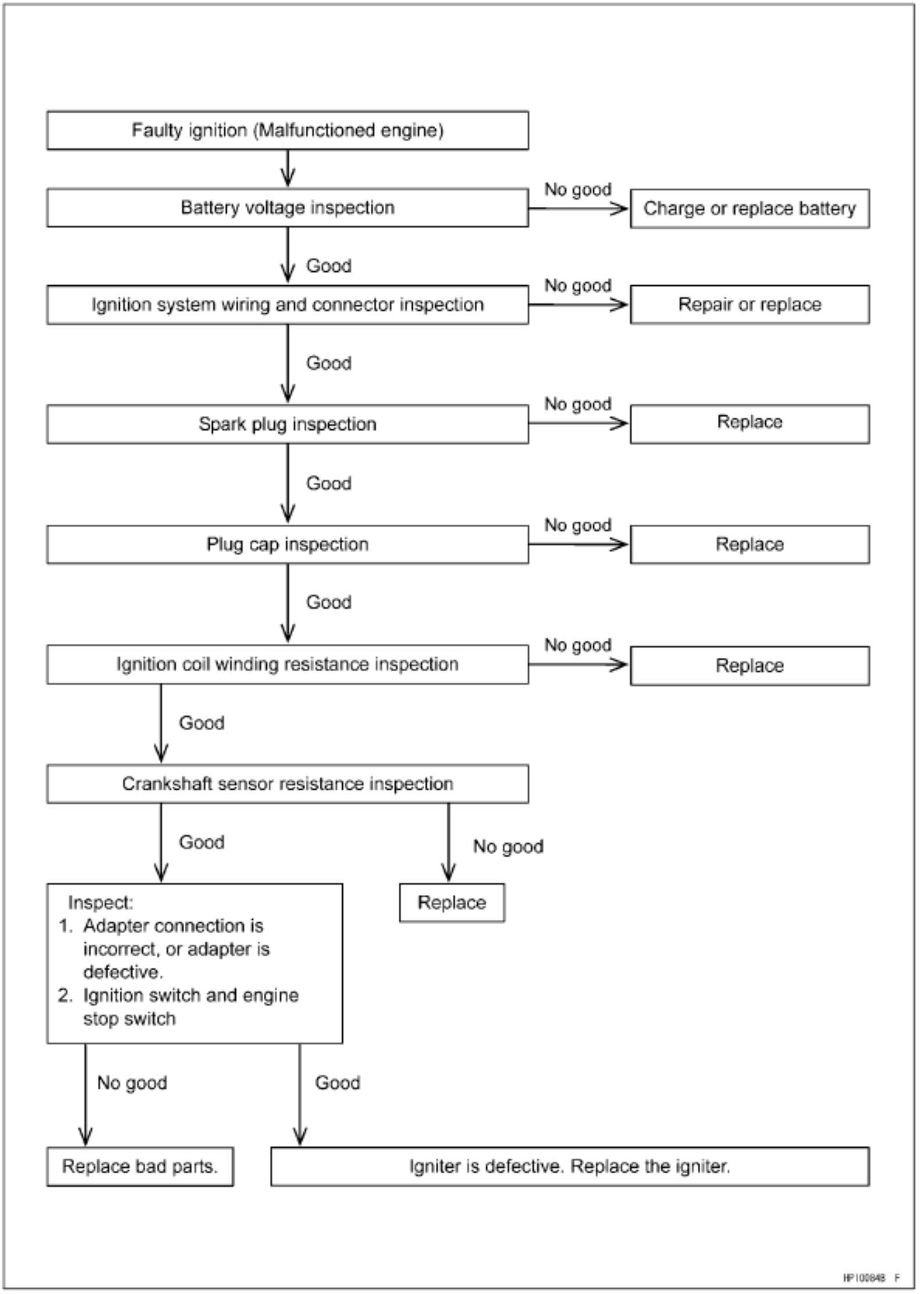
Ignition System Circuit



1. Charge Fuse 30 A
2. Main Fuse 15 A
3. Ignition Switch
4. Gear Position Switch
5. Battery 12 V 10 Ah
6. Engine Ground
7. Crankshaft Sensor
8. Spark Plug
9. Ignition Coil
10. Igniter
11. Reverse Power Assist Switch (Override)
12. Engine Stop Switch

Ignition System

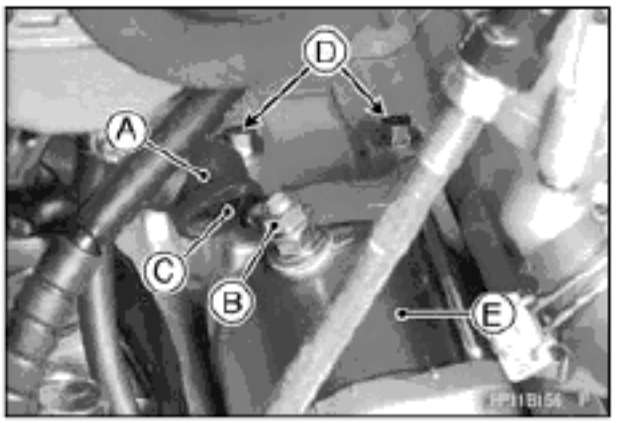
Ignition System Troubleshooting



Electric Starter System

Starter Motor Removal

- Slide the rubber boots [A].
- Remove:
  Starter Motor Cable Mounting Nut [B]
  Starter Motor Cable [C]
  Starter Motor Mounting Bolts [D]
  Starter Motor [E]

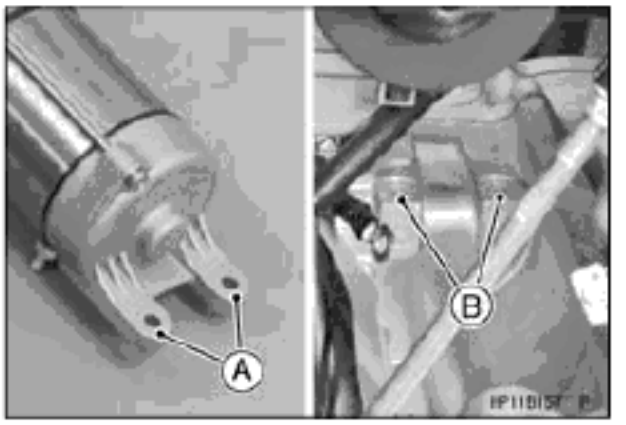


NOTICE

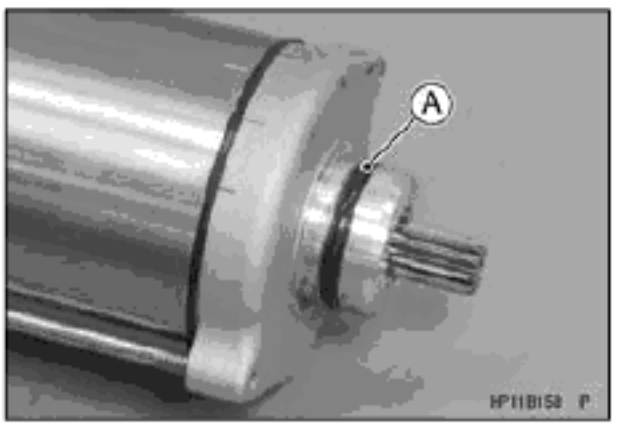
Do not tap the end of the starter motor shaft or the motor may be damaged.

Starter Motor Installation

- When installing the starter motor, clean the starter motor legs [A] and crankcase [B] where the starter motor is grounded.



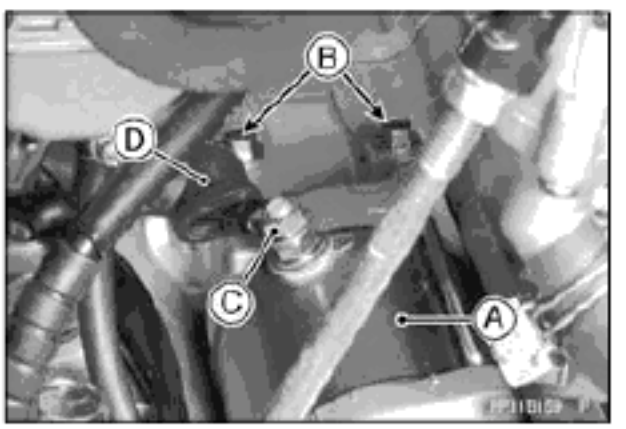
- Replace the O-ring [A] with a new one.
- Apply grease to the O-ring.



- Install:
  Starter Motor [A]
- Tighten:

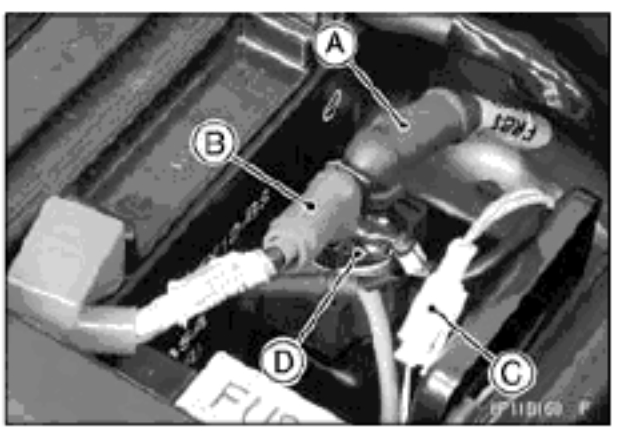
Torque - Starter Motor Mounting Bolts [B]: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Tighten the starter motor cable mounting nut [C] securely.
- Slide back the rubber cap [D] to the original position.



Starter Relay Inspection

- Remove:
  Seat (see Seat Removal in the Frame chapter)
- Disconnect:
  Starter Motor Cable [A]
  Battery Positive Cable [B]
  Connector [C]
- Remove:
  Starter Relay [D]



Electric Starter System

- Connect the hand tester [A] and a 12 V battery [B] to the starter relay as shown.

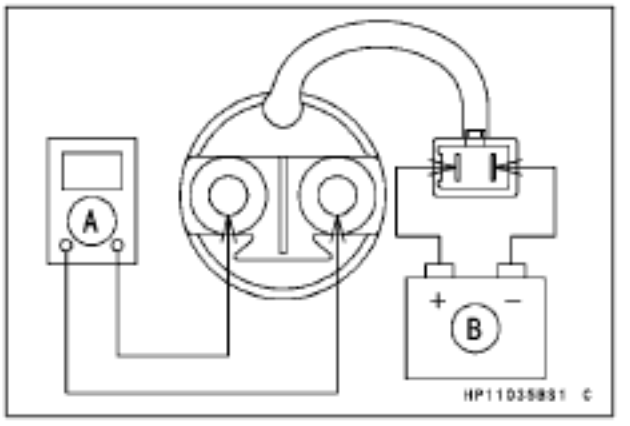
★If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Hand Tester Range: × 1 Ω range

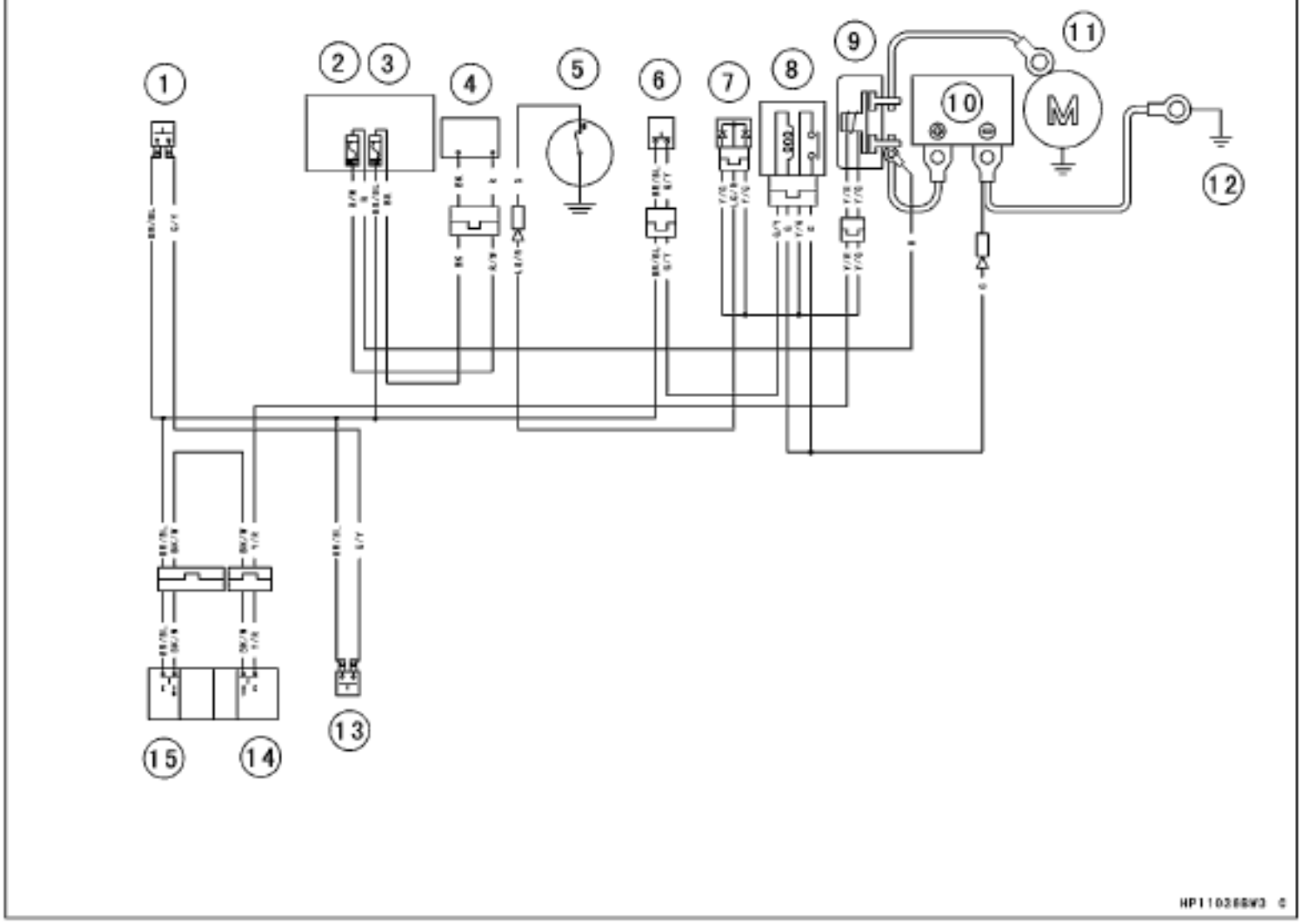
Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω



Electric Starter System

Electric Starter Circuit



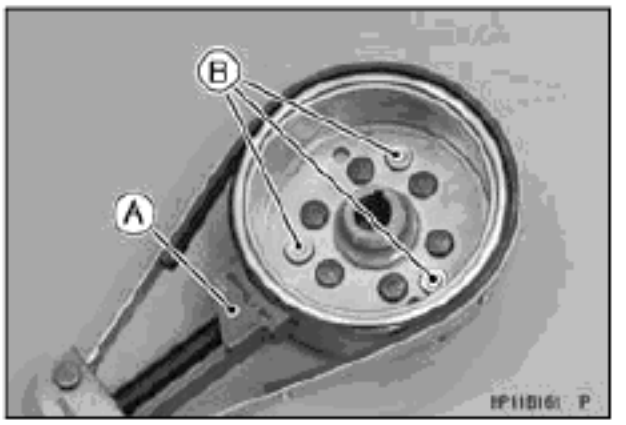
1. Front Brake Light Switch
2. Charge Fuse 30 A
3. Main Fuse 15 A
4. Ignition Switch
5. Gear Position Switch
6. Rear Brake (Pedal) Light Switch
7. Clutch Diode
8. Starter Circuit Relay
9. Starter Relay
10. Battery 12 V 10 Ah
11. Starter Motor
12. Engine Ground
13. Rear Brake (Lever) Light Switch
14. Starter Button
15. Engine Stop Switch

Electric Starter System

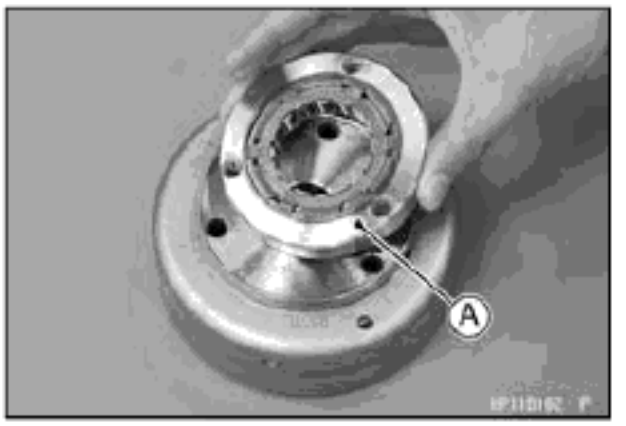
Starter Motor Clutch Removal

- Remove the alternator rotor (see Alternator Rotor Removal).
- Hold the rotor with the flywheel holder [A] and take out the starter motor clutch bolts [B].

Special Tool - Flywheel Holder: 57001-1313



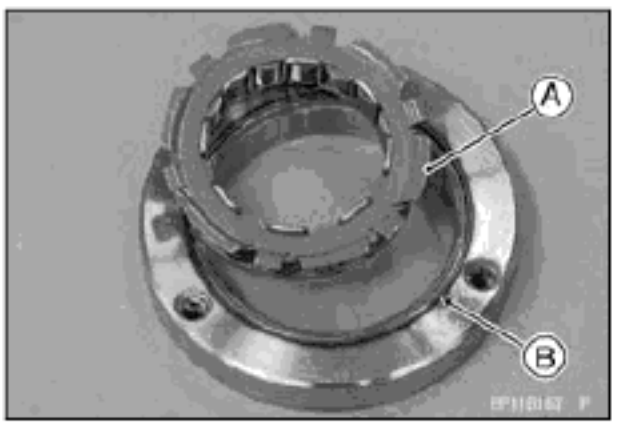
- Take out the one-way clutch [A].



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 to the starter motor clutch bolts.
- Tighten:

Torque - Starter Motor Clutch Bolts: 20 N·m (2.0 kgf·m, 15 ft·lb)

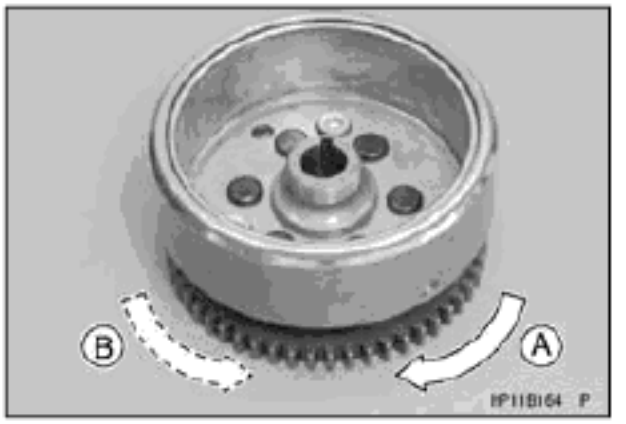


Starter Motor Clutch Inspection

- Remove:
  Alternator Rotor (see Alternator Rotor Removal)
- Fit the starter clutch gear into the starter motor clutch.

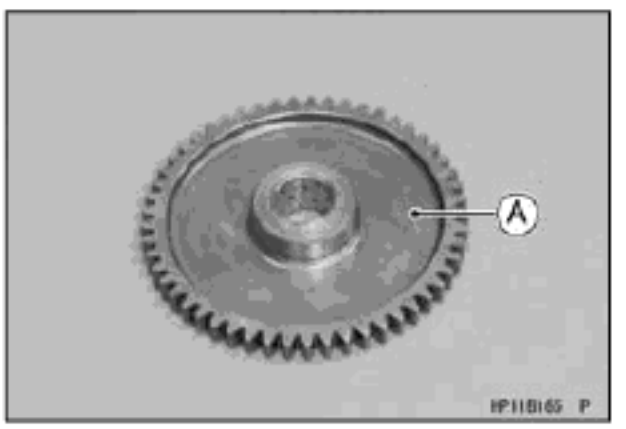
★If the alternator rotor turns clockwise [A] freely from the starter clutch gear, but not counterclockwise [B], the clutch is operating correctly.

★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

○*Examine the starter clutch gear [A]. Replace it if it is worn or damaged.*

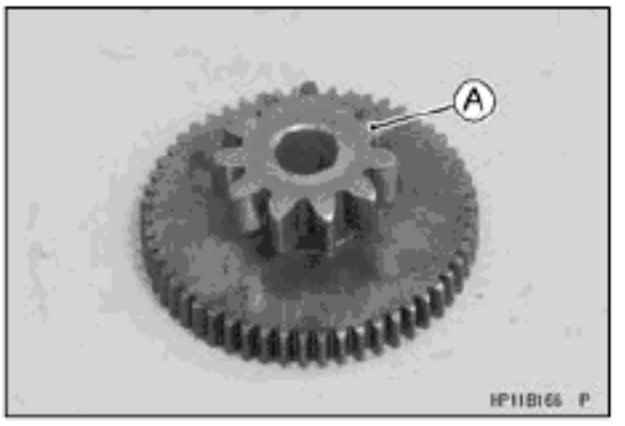


Electric Starter System

Reduction Gears Inspection

- Remove:
  Alternator Rotor (see Alternator Rotor Removal)
- Remove the reduction gears [A] and visually inspect it.

★If the limiter has wear, discoloration, or other damage, replace it as a unit.



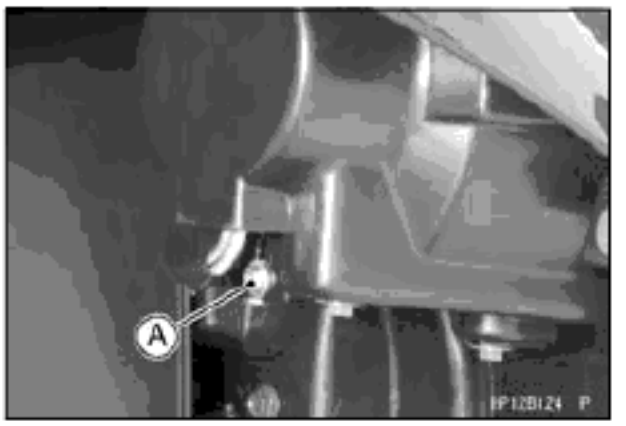
Lighting System

Headlight Beam Vertical Adjustment

- Turn the adjusting screw [A] on each headlight rim in or out to adjust the headlight vertically.

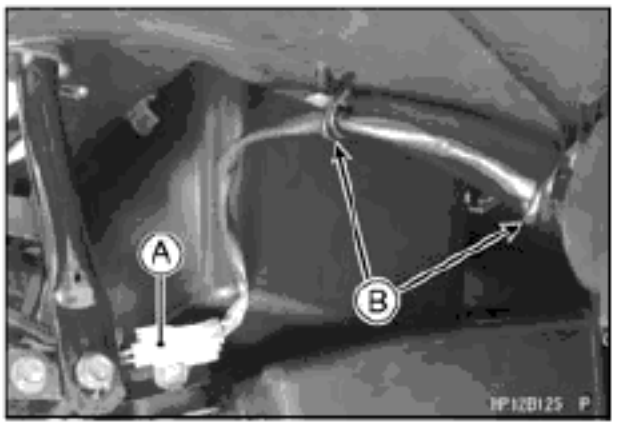
NOTE

○*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.*

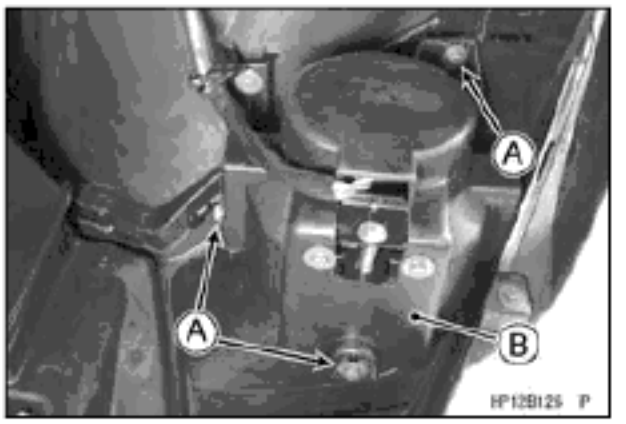


Headlight Removal

- Disconnect the headlight connector [A].
- Open the clamps [B].



- Remove:
  Headlight Mounting Bolts [A]
  Headlight Body [B]

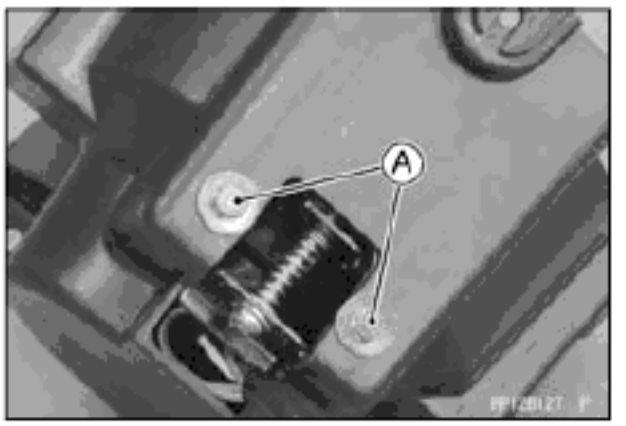


Headlight Installation

- Installation is the reverse of removal.

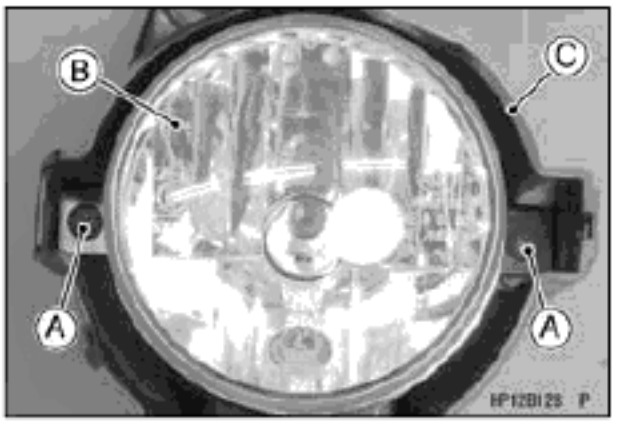
Headlight Bulb and City Light Bulb Replacement

- Remove:
  Headlight Body (see Headlight Removal)
  Bolts [A]

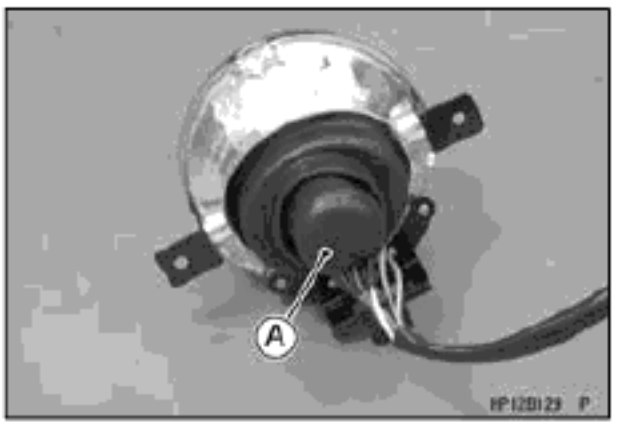


Lighting System

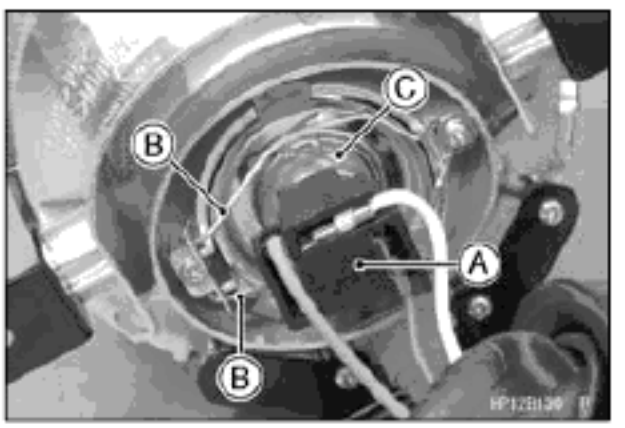
- Remove the screws [A] to separate the headlight [B] and headlight cover [C].



- Slide the dust cover [A].



- Disconnect the connector [A].
- Push the hooks [B] to unlock the headlight bulb.
- Remove the bulb [C].



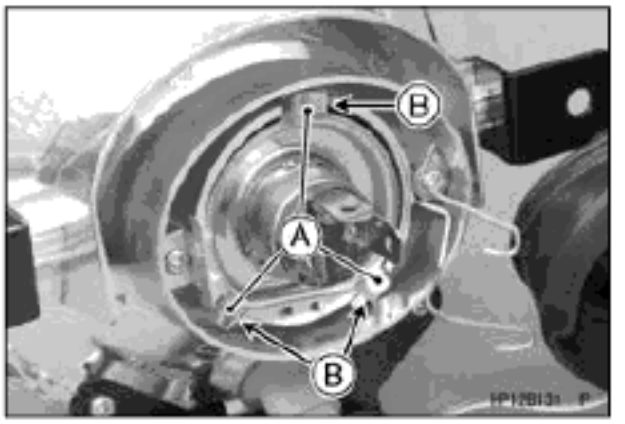
NOTICE

When handling the quartz-halogen bulb, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.

NOTE

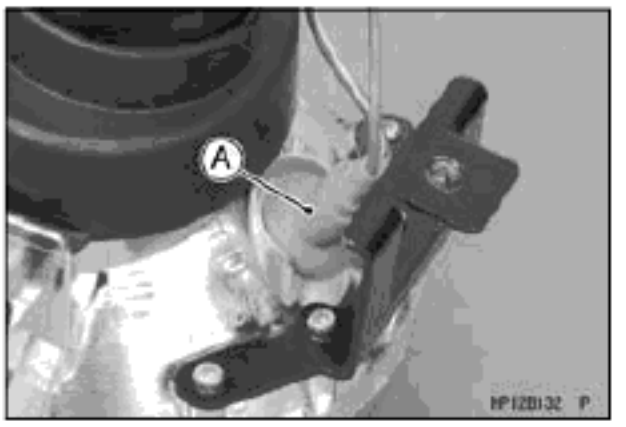
○*Clean off any contamination that inadvertently gets on the bulb with alcohol or soap and water solution.*

- Replace the headlight bulb.
- Fit the projections [A] of the bulb in the hollows [B] of the headlight.
- Install the hooks.
- Fit the dust cover onto the headlight body firmly.

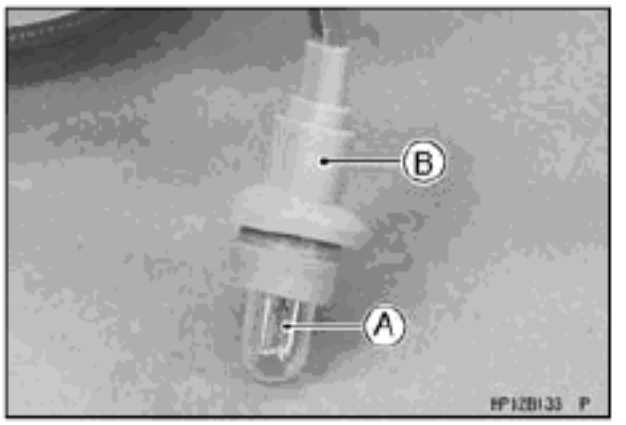


Lighting System

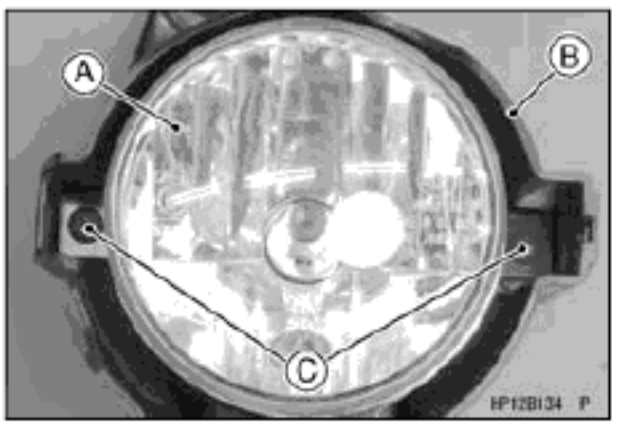
- Pull out the city light socket [A] with the bulb.



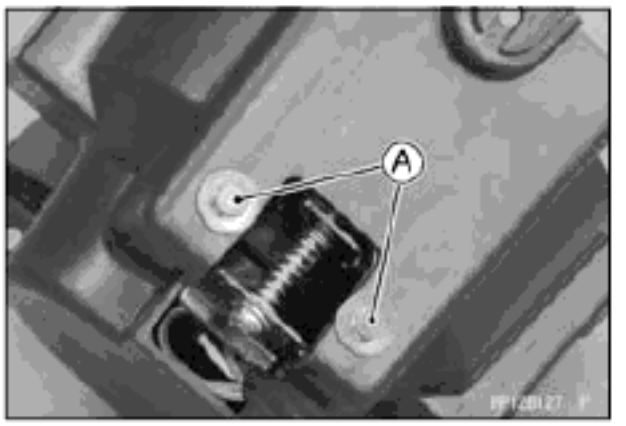
- Remove the city light bulb [A].
- Replace the city light bulb, and install it to the socket [B].
- Install the socket into the headlight body.



- Install the headlight body [A] into the headlight cover [B].
- Tighten the screws [C] securely.

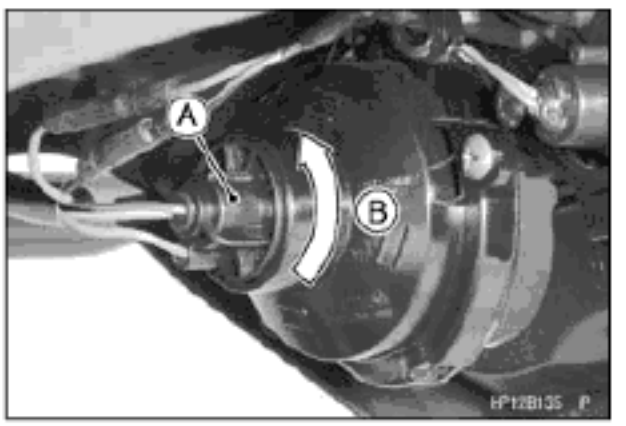


- Tighten the bolts [A] securely.
- Install the headlight (see Headlight Installation).
- After installation, adjust the headlight aim (see Headlight Beam Vertical Adjustment).



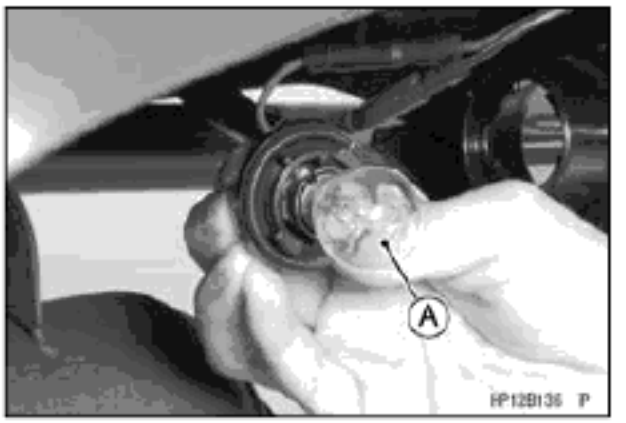
Tail/Brake Light Bulb Replacement

- Unscrew the socket [A] counterclockwise [B].

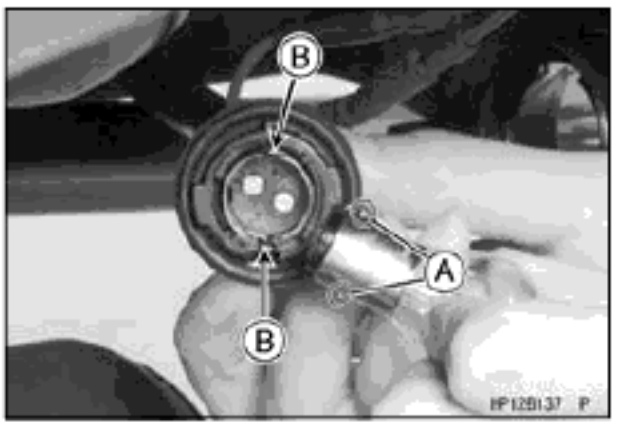


Lighting System

- Push the bulb [A] in, turn it counterclockwise, and pull it out.
- Be sure the socket is clean.

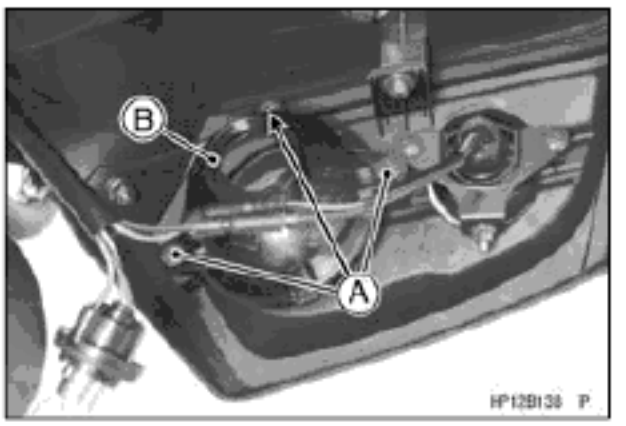


- Insert the new bulb by aligning the pins [A] with the grooves [B] in the walls of the socket.
- Push the bulb in, turn it clockwise, and release it. It should lock in position.



Tail/Brake Light Removal

- Remove the socket (see Tail/Brake Light Bulb Replacement).
- Remove the tail/brake light mounting screws [A].
- Remove the tail/brake light body [B].

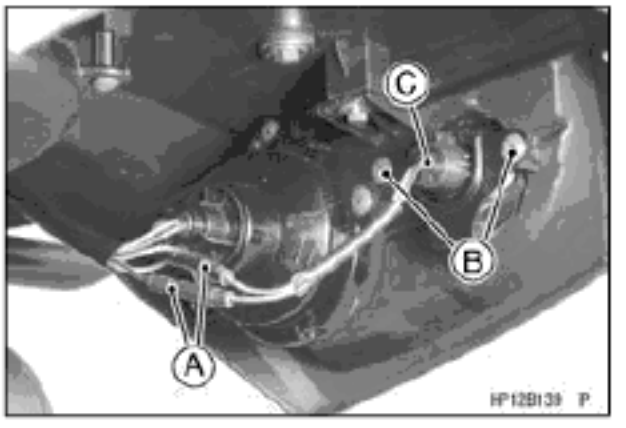


Tail/Brake Light Installation

- Installation is the reverse of removal.

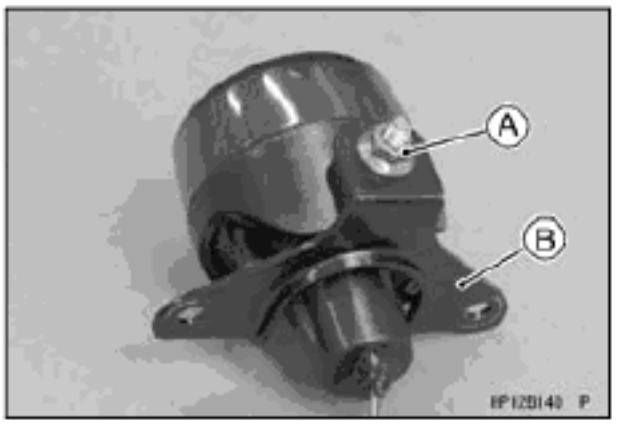
Tail Light Bulb Replacement

- Disconnect the connectors [A].
- Remove:
  Tail Light Mounting Screws [B]
  Tail Light Unit [C]

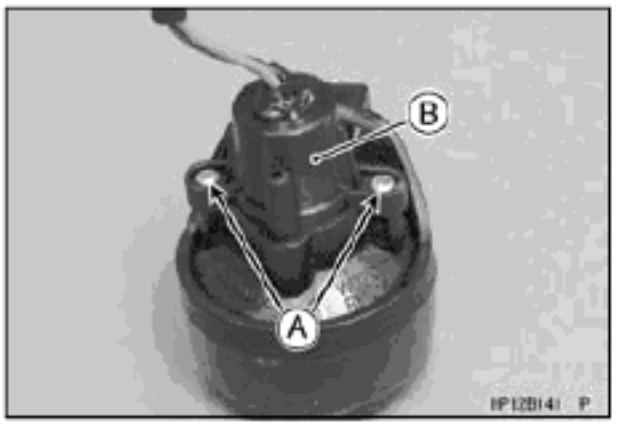


Lighting System

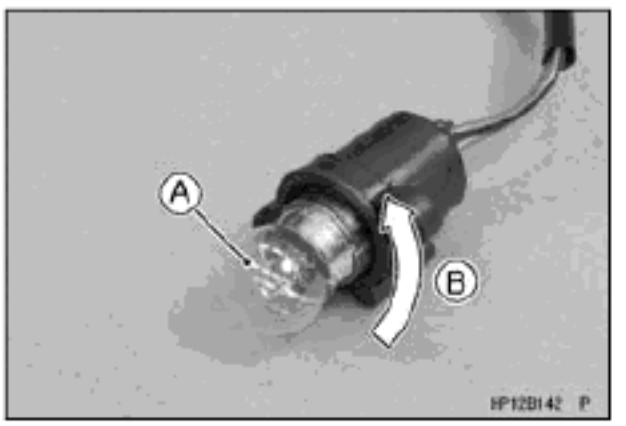
- Remove the bracket nut [A] and bracket [B].



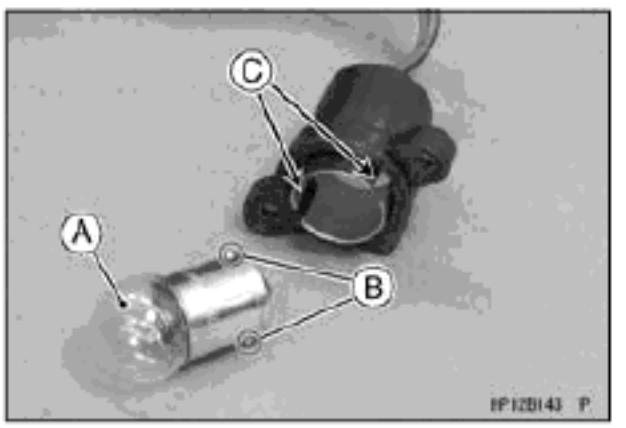
- Remove:
  Tail Light Socket Screws [A]
  Tail Light Socket [B]



- Push and turn the bulb [A] counterclockwise [B], and remove it.
- Replace the bulb with a new one.

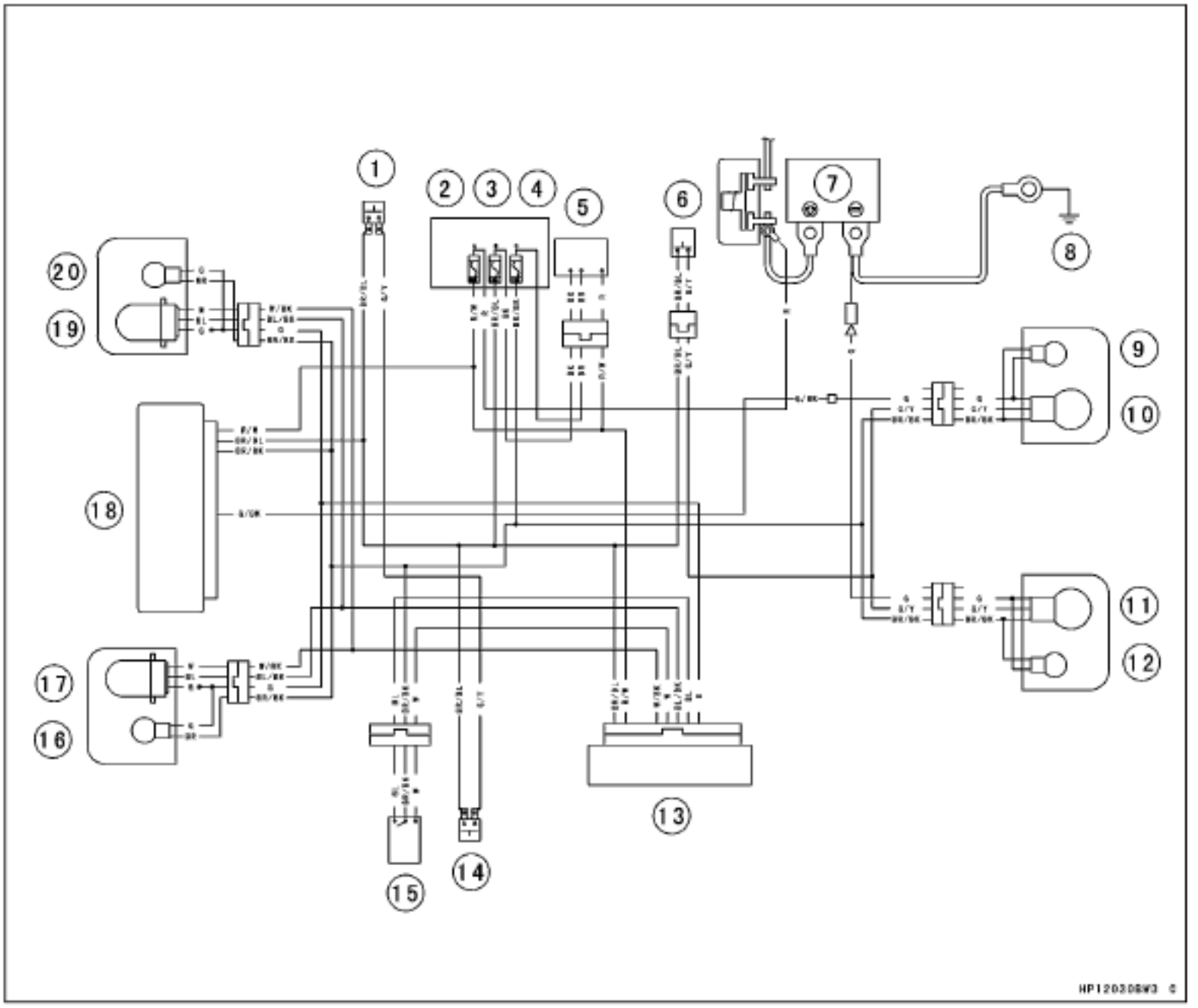


- Insert the new bulb [A] by aligning its pins [B] with the grooves [C] in the socket, and turn the bulb clockwise.
- Install the removed parts.



Lighting System

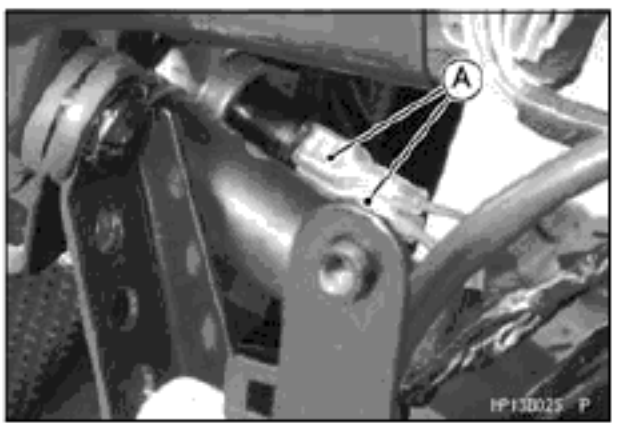
Lighting System Circuit



1. Front Brake Light Switch
2. Charge Fuse 30 A
3. Main Fuse 15 A
4. Headlight/Tail Light Fuse 10 A
5. Ignition Switch
6. Rear Brake (Pedal) Light Switch
7. Battery 12 V 10 Ah
8. Engine Ground
9. Tail Light (Right) 12 V 5 W
10. Tail/Brake Light (Right) 12 V 5/21 W
11. Tail/Brake Light (Left) 12 V 5/21 W
12. Tail Light (Left) 12 V 5 W
13. Igniter
14. Rear Brake (Lever) Light Switch
15. Light/Dimmer Switch
16. City Light (Left) 12 V 5 W
17. Headlight (Left) 12 V 35 W/35 W
18. Meter Unit
19. Headlight (Right) 12 V 35 W/35 W
20. City Light (Right) 12 V 5 W

Radiator Fan System

Radiator Fan Circuit Inspection



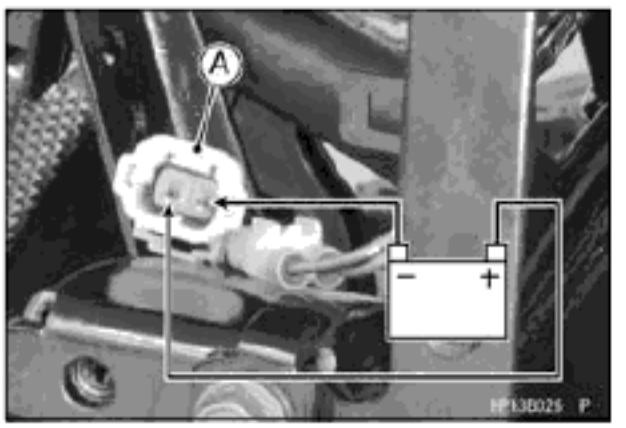
- Remove the front fender (see Front Fender Removal in the Frame chapter).
- Disconnect the connectors [A] from the radiator fan switch.
- Using an auxiliary wire, connect the radiator fan switch terminals of the main harness.
- Turn the ignition switch to ON.

★If the fan rotates, inspect the fan switch.

★If the fan does not rotate, inspect the following.

Leads and Connectors
Main Fuse
Fan Motor

Radiator Fan Motor Inspection



- Remove the front fender (see Front Fender Removal in the Frame chapter).
- Disconnect the connector [A] in the fan lead.
- Using two auxiliary wires, supply battery voltage to the fan motor.

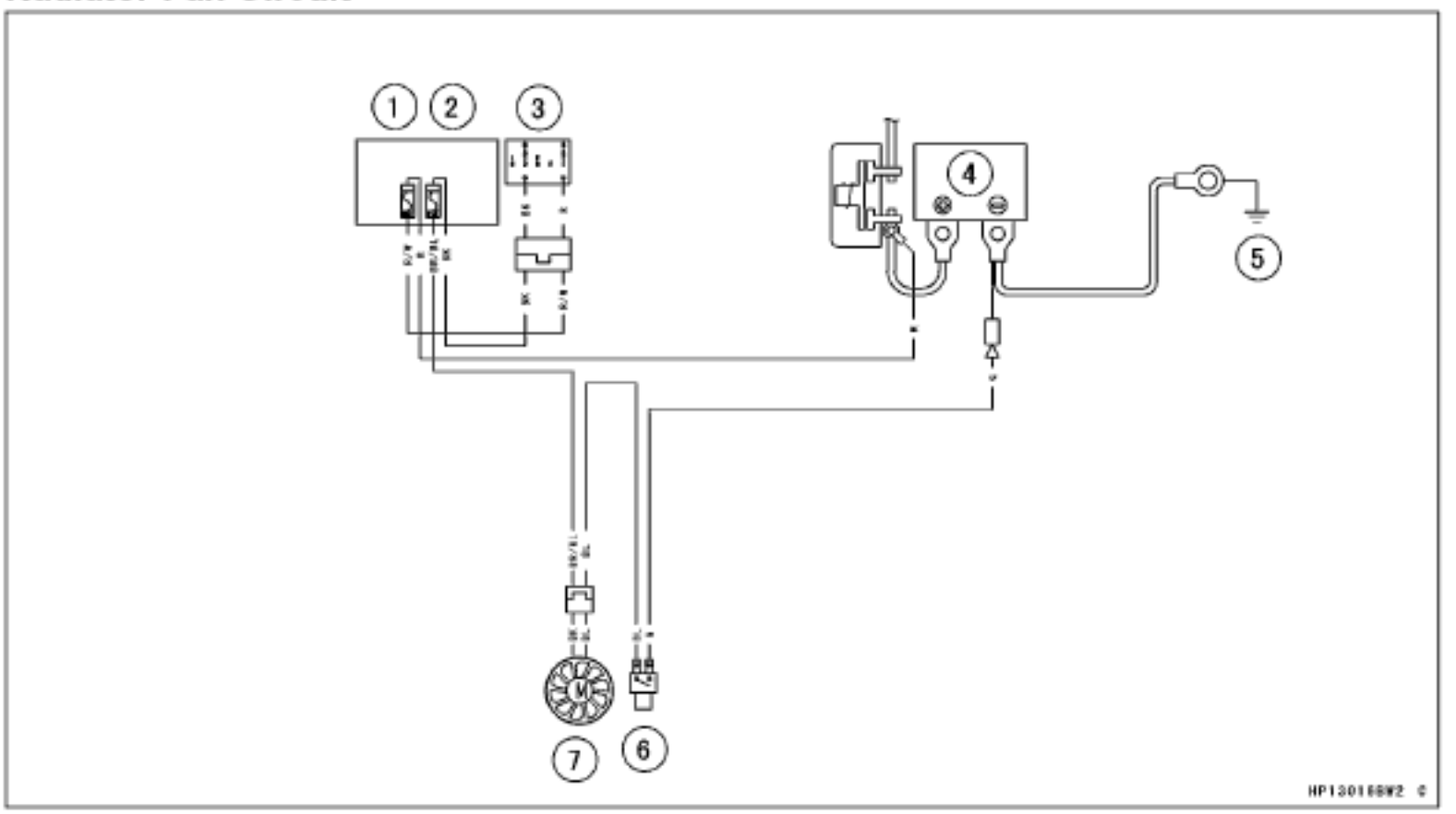
Radiator Fan Motor Lead Connections:

BK → Battery (+)

BL → Battery (–)

★If the fan does not rotate, the fan motor is defective and must be replaced.

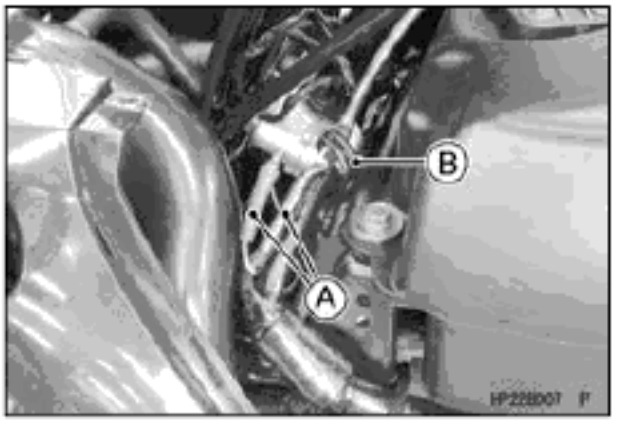
Radiator Fan Circuit



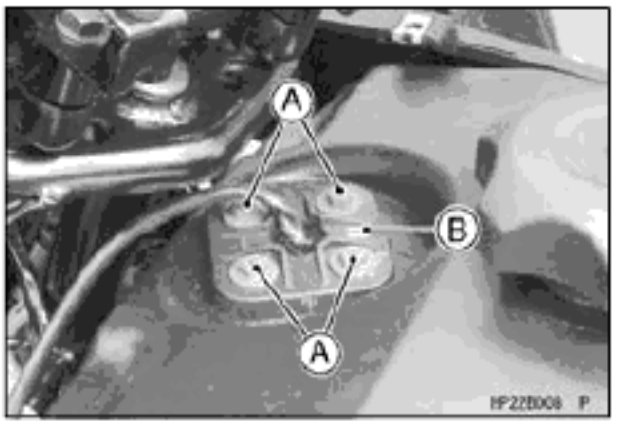
1. Charge Fuse 30 A
2. Main Fuse 15 A
3. Ignition Switch
4. Battery 12 V 10 Ah
5. Engine Ground
6. Radiator Fan Switch
7. Radiator Fan

Fuel Level Sensor

Fuel Level Sensor Removal



- Remove:
  Meter Cover (see Meter Unit Removal/Installation)
  Fuel Tank Cover (see Fuel Tank Removal in the Fuel System chapter)
  Fuel Level Sensor Connectors [A]
- Open the clamp [B].

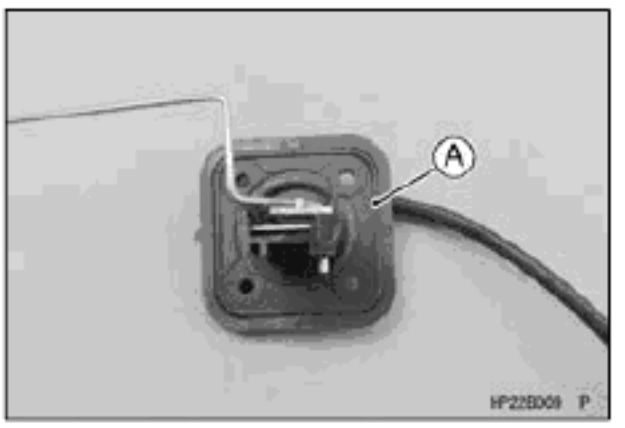


- Remove:
  Fuel Level Sensor Mounting Bolts [A]
  Fuel Level Sensor [B]

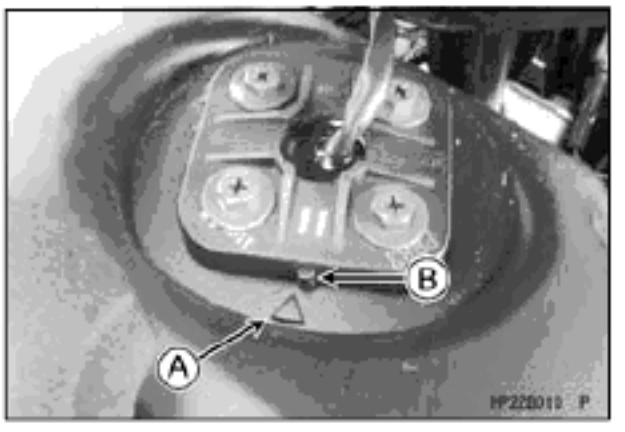
NOTE

○*Be careful not to bend or damage the fuel level sensor float arm.*

Fuel Level Sensor Installation



- Replace the fuel level sensor gasket [A] with a new one.



- Install:
  Fuel Level Sensor
- When installing the fuel level sensor, align the triangular mark [A] on the fuel tank with the projection [B] on the fuel level sensor.
- Tighten the fuel level sensor mounting bolts.

Fuel Level Sensor Inspection

- Remove:
  Fuel Level Sensor (see Fuel Level Sensor Removal)
- Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly, replace the fuel pump assembly.

Fuel Level Sensor

- Using a hand tester [A], measure the resistance across the terminals.

Special Tool - Hand Tester: 57001-1394

NOTE

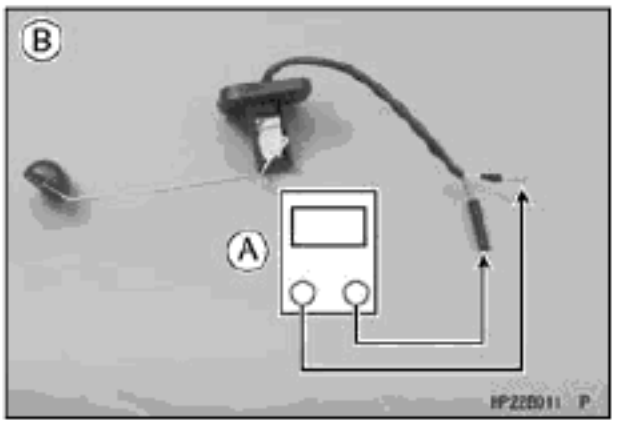
○*In contrast to the normal measuring method, the current that flows through the gauge when measuring it with a tester is very low, thus making the measurement easily affected by the oxidized film of the resistance plate, and resulting in excessive resistance. Therefore, make sure to wipe the resistance plate with alcohol before taking a measurement.*

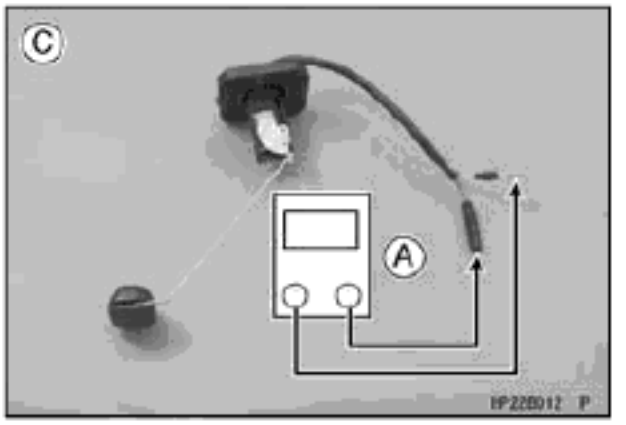
★If the readings are not as specified, replace the fuel pump assembly.

Fuel Level Sensor Resistance

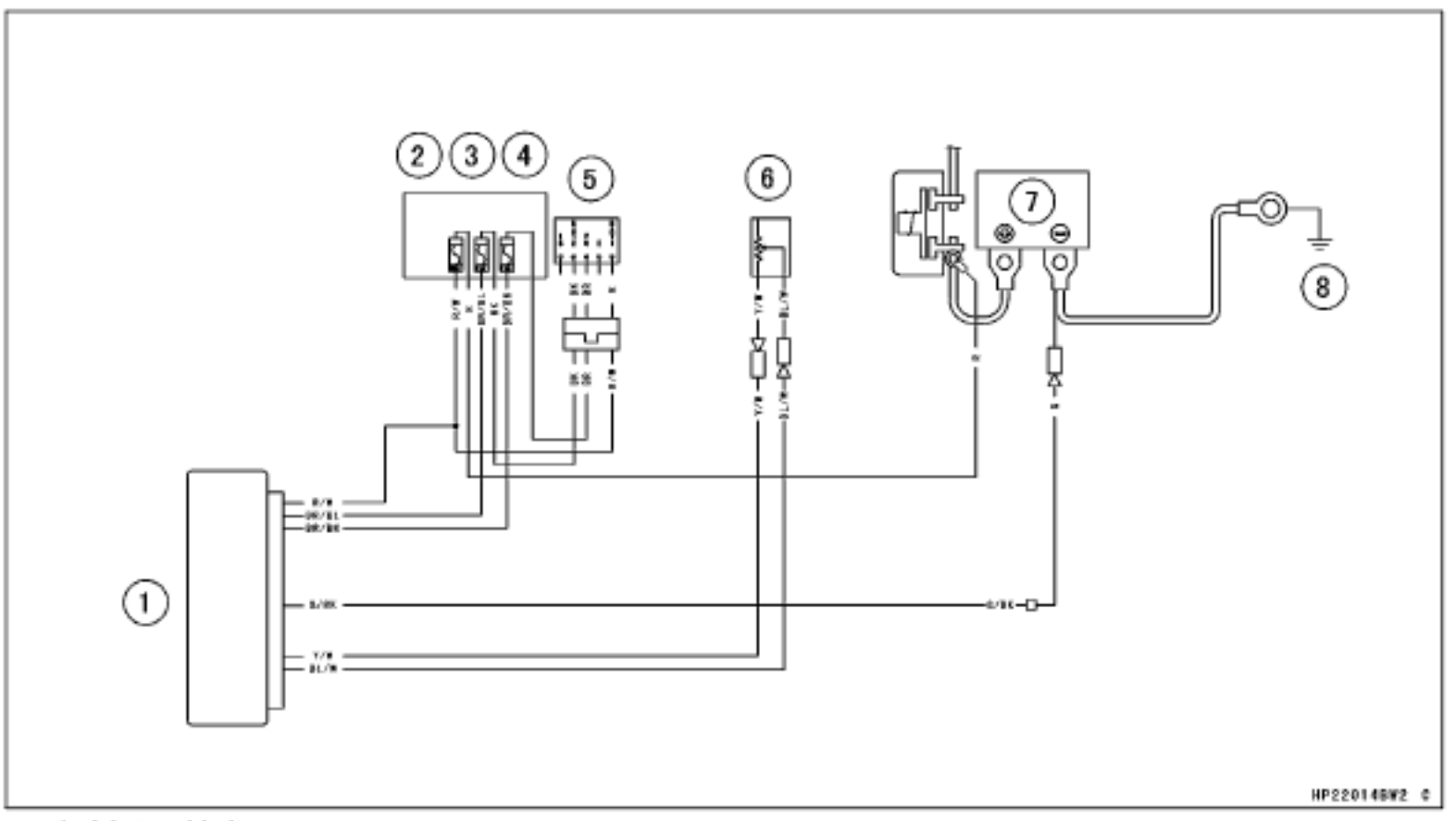
Standard: Full Level Position [B]: Less than 60 Ω

Empty Level Position [C]: Over than 820 Ω





Fuel Level Sensor Circuit

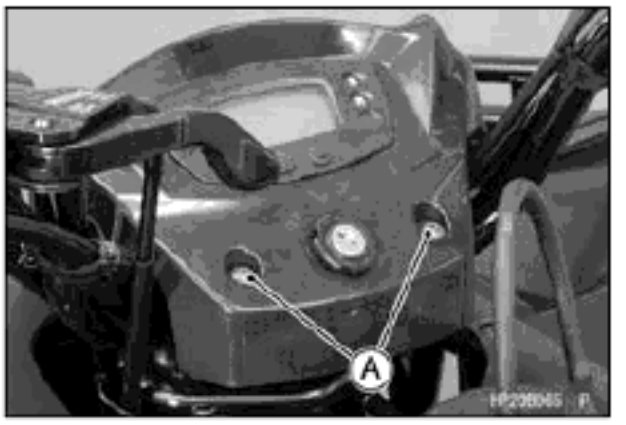


1. Meter Unit
2. Charge Fuse 30 A
3. Main Fuse 15 A
4. Headlight/Tail Light Fuse 10 A
5. Ignition Switch
6. Fuel Level Sensor
7. Battery 12 V 10 Ah
8. Engine Ground

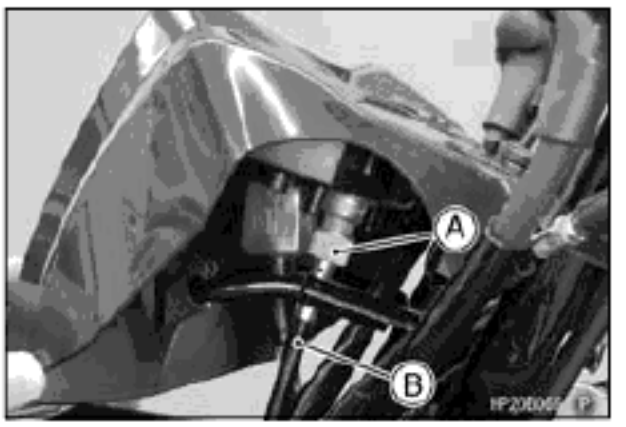
Meter

Meter Unit Removal/Installation

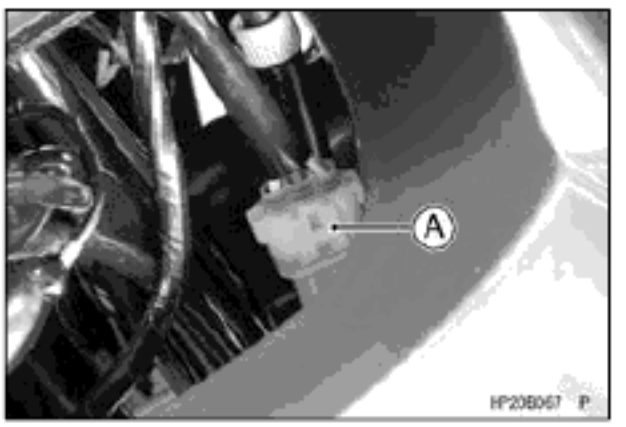
- Remove:
  Meter Cover Screws [A]



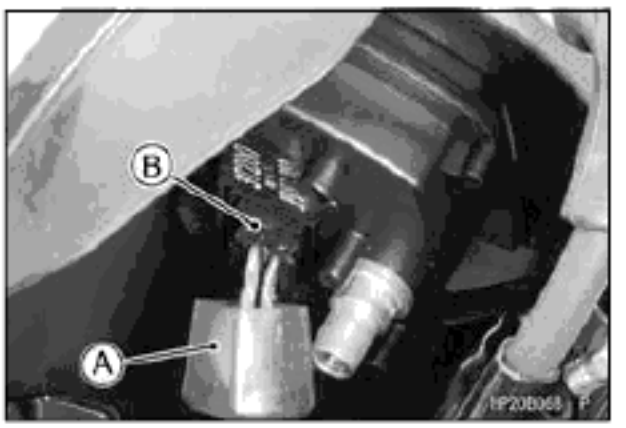
- While pulling up the meter cover, loosen the speedometer cable nut [A] fully.
- Remove the speedometer cable [B] from the meter unit.



- Disconnect the ignition switch connector [A].

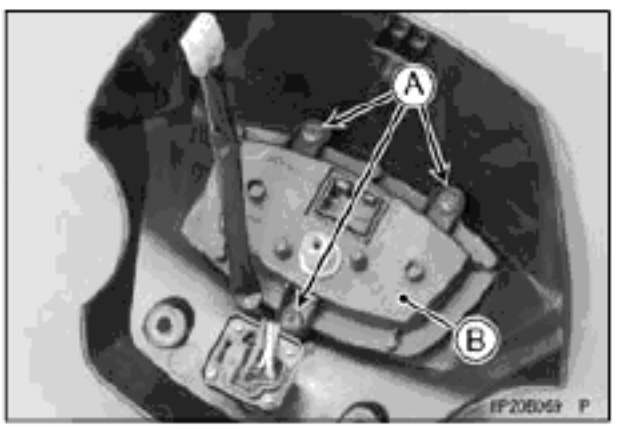


- Slide the dust cover [A] and disconnect the meter unit connector [B].



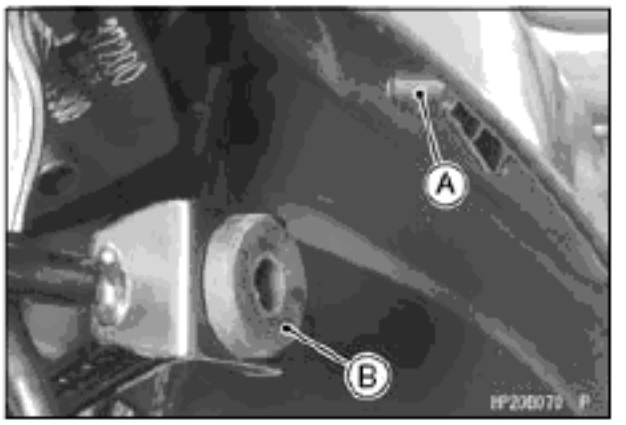
- Remove:
  Meter Unit Mounting Screws [A]
  Meter Unit [B]

NOTICE
Do not drop the meter unit.



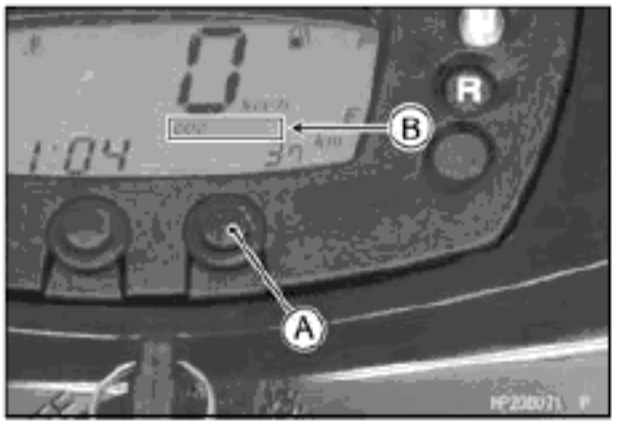
Meter

• Installation is the reverse of removal.
○Fit the projection [A] on the meter cover to the damper [B].



Meter Operation Inspection

• Turn the ignition switch to ON.
• Check that when the Right button [A] is pushed for more than two seconds and held continuously, the display [B] cycles through the two modes.
ODO → TRIP → ODO
★If this display function does not work, replace the meter unit.
• Cycle the meter to ODO mode.

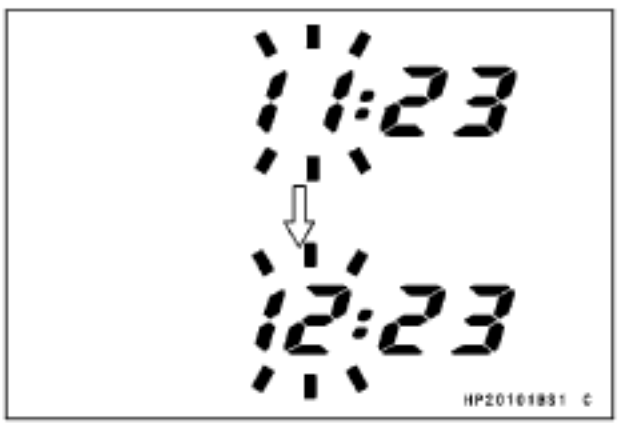


• Check that when the Left and Right buttons [A] are pushed for more than 2 seconds, the meter display turns to the clock set mode.
○The hour display start blinking.

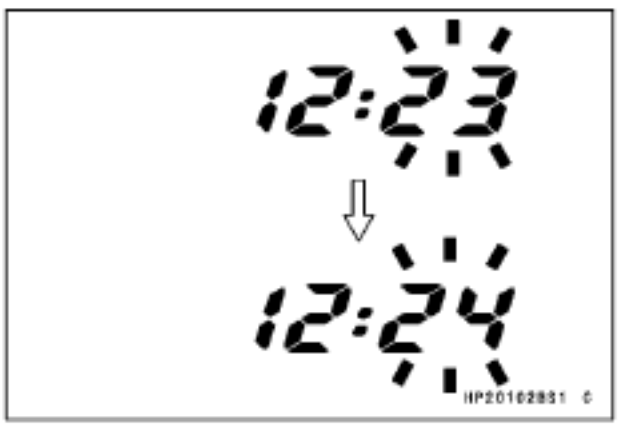
NOTE

○*The display will stop blinking automatically and the adjustment will be cancelled if the button is not pressed for about 10 seconds.*

• In the HOUR/MINUTE setting mode, press the Right button again to effect the HOUR setting mode.
○The hour display blinks on the display.
• Press the Right button to set the hour.

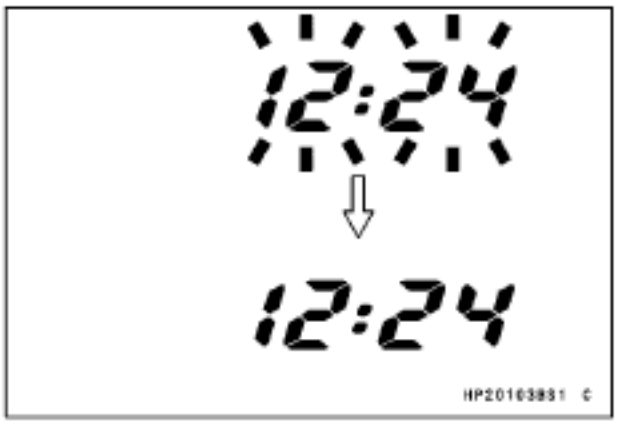


• In the HOUR setting mode, press the Left button to effect the MINUTE setting mode.
○The minute display blinks on the display.
• Press the Right button to set the minute.



Meter

- In the HOUR/MINUTE setting mode, press the Left and Right buttons for more than 2 seconds to return to complete the time setting process.

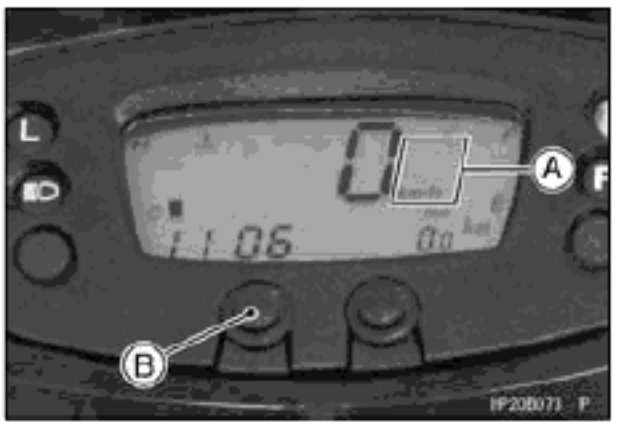


- Check that the display changes to the mile and km display [A] each time by pushing the Left button [B] is pushed for more than 2 seconds.

NOTE

○*Mile/km display can alternate between mile and km modes in the digital meter. Make sure that km or mile according to local regulations is correctly displayed before riding.*

★If the display function does not work and adjust, replace the meter unit.

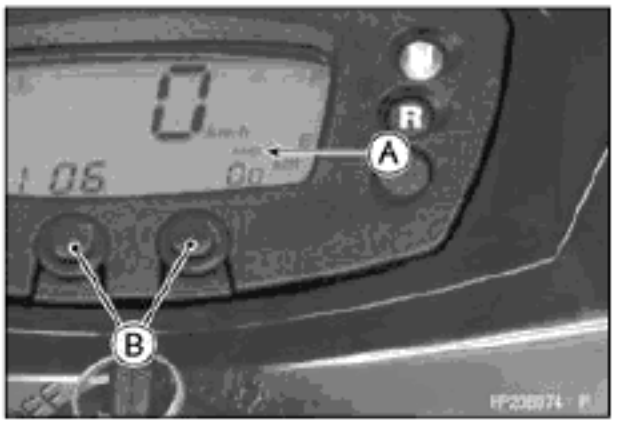


- Set the TRIP meter mode [A] in the display.
- Push the Left and Right buttons [B] for more than two seconds and check that each TRIP meter resets to 0.0.

★If the display function does not change, replace the meter unit.

NOTE

○*The integrated value of the odometer cannot be reset.*



Meter Indicator Light Inspection

Green Neutral Indicator Light (LED) Check

- Turn the ignition switch to ON.
- Set the shift lever in the neutral position.

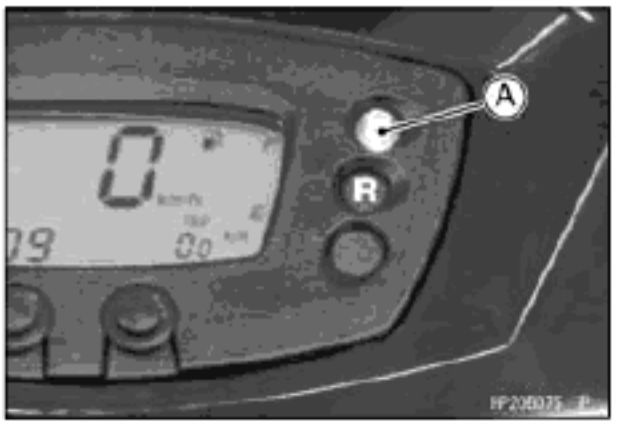
○The green neutral indicator light [A] goes on.

★If the display function does not work, check the gear position switch (see Switch Inspection).

★If the gear position switch is normal, check the wiring (see Meter Circuit).

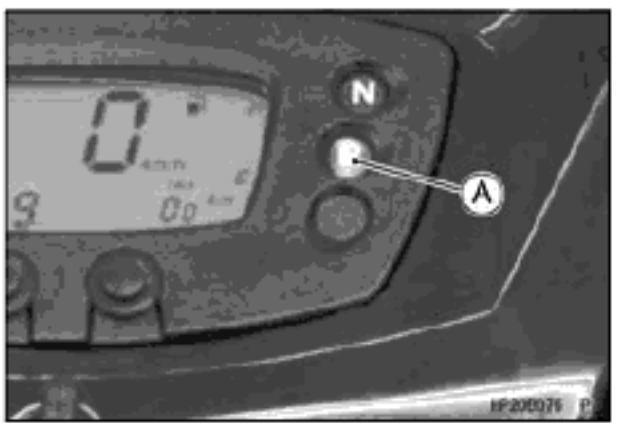
★If the wiring is good, check the shift lever condition (see Shift Lever Installation in the Crankshaft/Transmission chapter).

★If the shift lever condition is good, replace the meter unit.



Meter

Red Reverse Indicator Light (LED) Check



- Turn the ignition switch to ON.
- Set the shift lever in the reverse position.

○The red reverse indicator light [A] goes on.

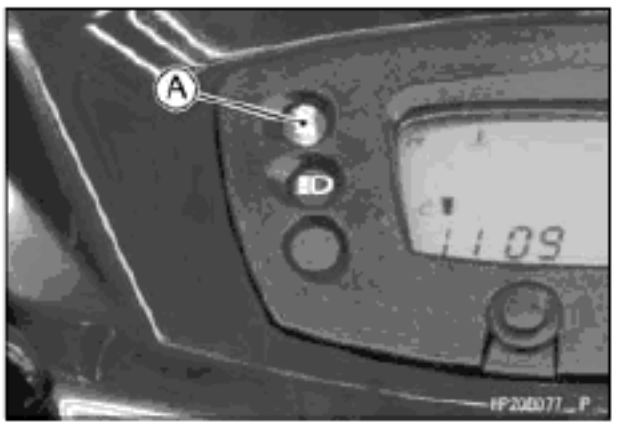
★If the display function does not work, check the gear position switch (see Switch Inspection).

★If the gear position switch is normal, check the wiring (see Meter Circuit).

★If the wiring is good, check the shift lever condition (see Shift Lever Installation in the Crankshaft/Transmission chapter).

★If the shift lever condition is good, replace the meter unit.

Yellow Low Gear Indicator Light (LED) Check



- Turn the ignition switch to ON.
- Set the shift lever in the low gear position.

○The yellow low gear indicator light [A] goes on.

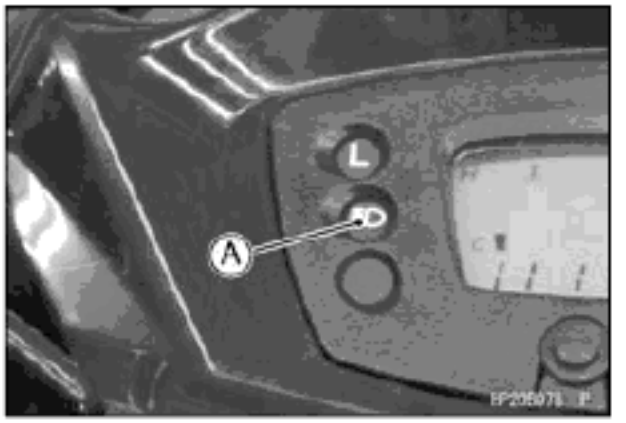
★If the display function does not work, check the gear position switch (see Switch Inspection).

★If the gear position switch is normal, check the wiring (see Meter Circuit).

★If the wiring is good, check the shift lever condition (see Shift Lever Installation in the Crankshaft/Transmission chapter).

★If the shift lever condition is good, replace the meter unit.

Blue High Beam Indicator Light (LED) Check



- Turn the ignition switch to ON.
- Set the dimmer switch to the high beam position.

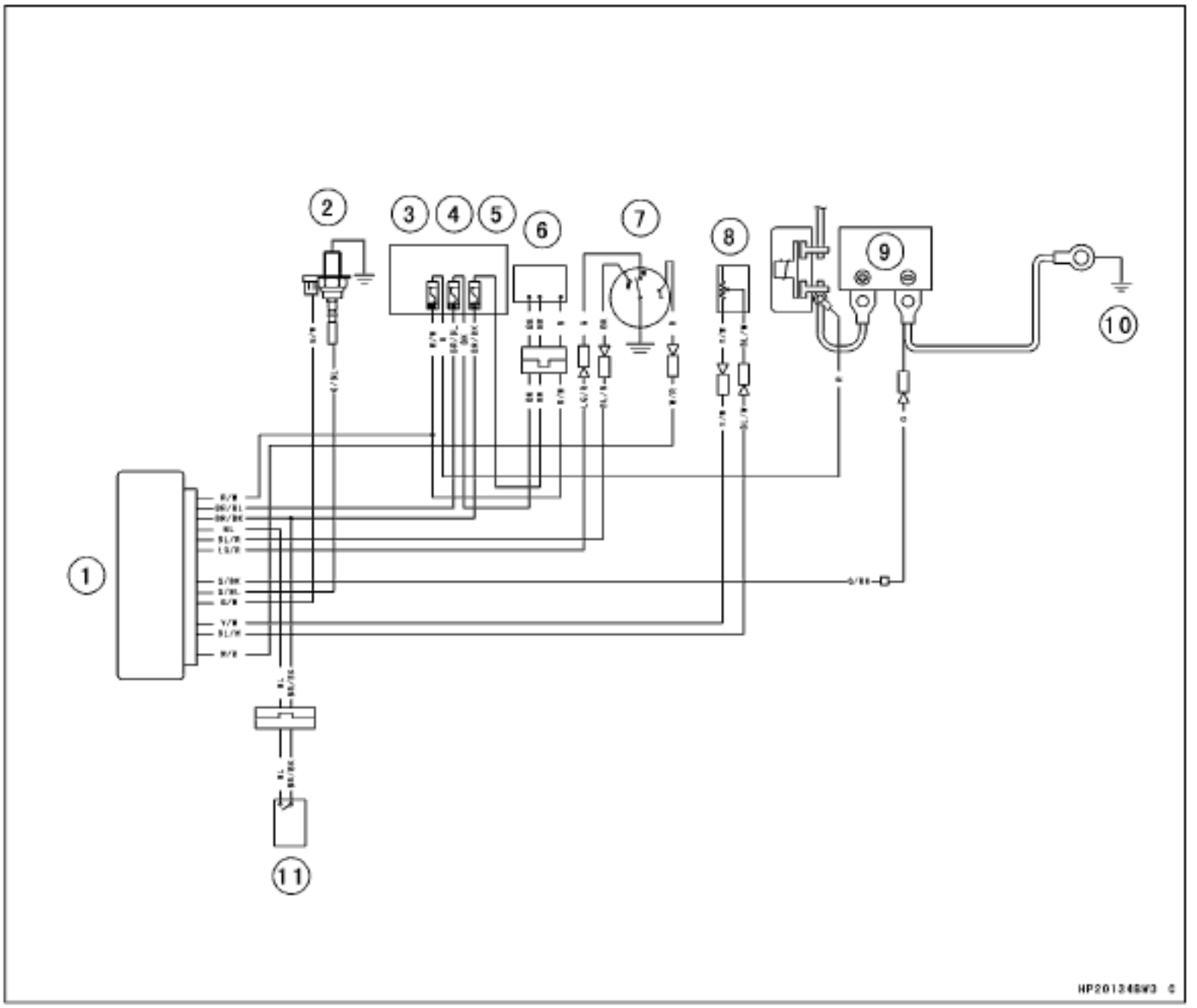
○The blue high beam indicator light [A] goes on.

★If the display function does not work, check the wiring (see Meter Circuit).

★If the wiring is good, replace the meter unit.

Meter

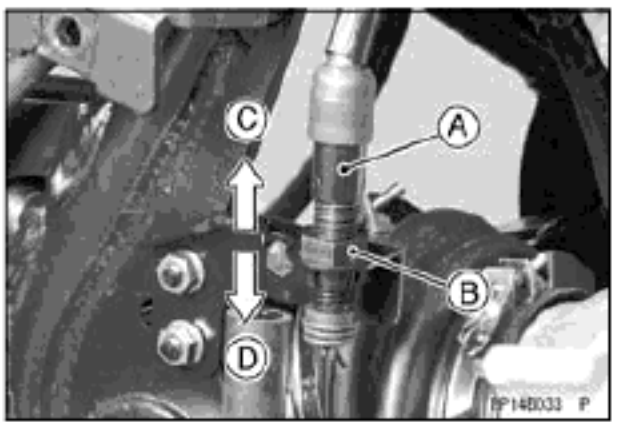
Meter Circuit



1. Meter Unit
2. Water Temperature Sensor
3. Charge Fuse 30 A
4. Main Fuse 15 A
5. Headlight/Tail Light Fuse 10 A
6. Ignition Switch
7. Gear Position Switch
8. Fuel Level Sensor
9. Battery 12 V 10 Ah
10. Engine Ground
11. Light/Dimmer Switch

Switches and Sensor

Rear Brake (Pedal) Light Timing Adjustment

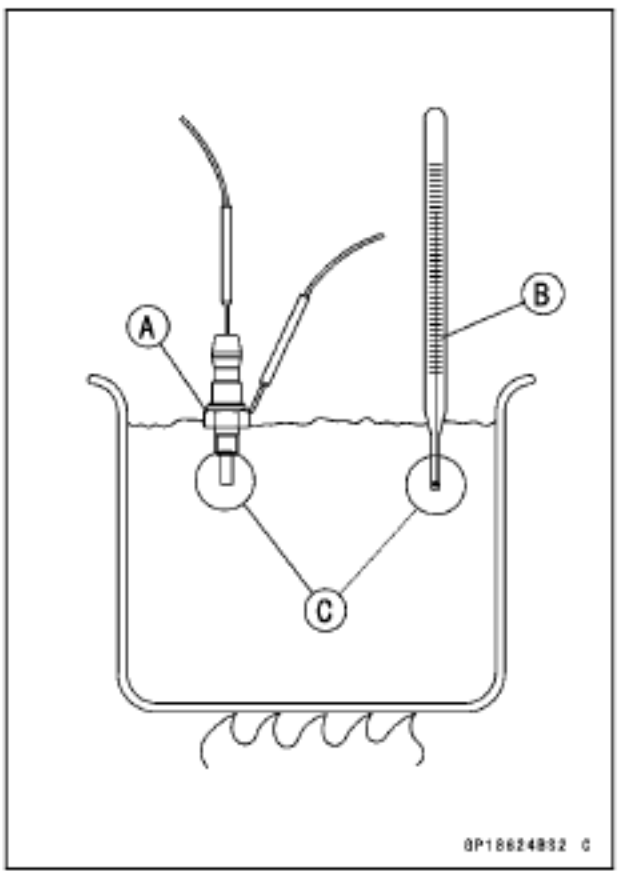


- Remove the right footboard (see Right Footboard Removal in the Frame chapter).
- Adjust the brake light switch [A] up or down. To change the switch position, turn the adjusting nut [B].
  Light sooner as the body rises [C]
  Light later as the body lowers [D]

NOTICE

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

Water Temperature Sensor Inspection



- Remove the water temperature sensor (see Water Temperature Sensor Removal in the Cooling System chapter).
- Suspend the sensor [A] in a container of machine oil so that the heat-sensitive portion and threaded portion are submerged.
- Suspend an accurate thermometer [B] with heat-sensitive portions [C] located in almost the same depth.

NOTE

○*The sensor and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the oil while stirring the oil gently for even temperature.
- Using the hand tester, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.

Special Tool - Hand Tester: 57001-1394

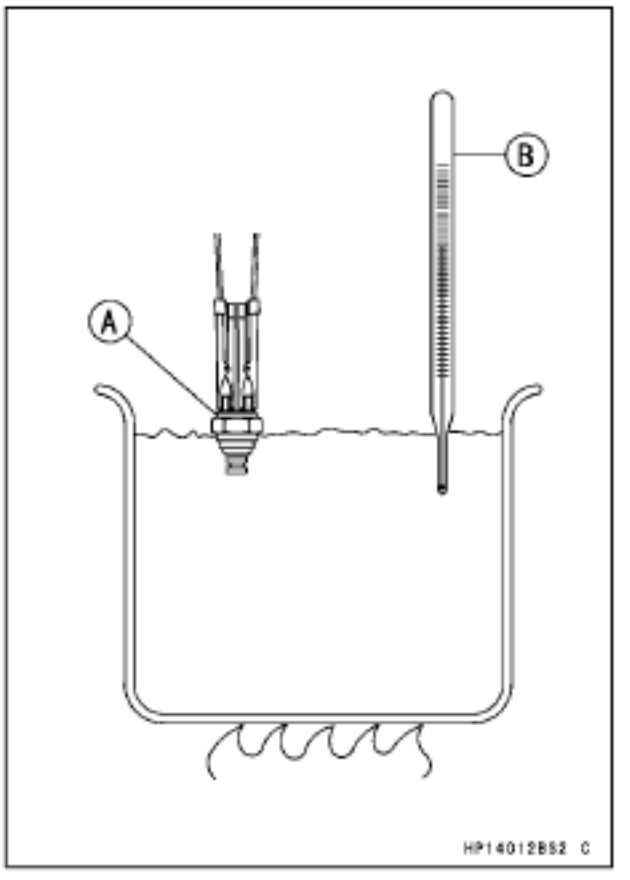
★If the measurement is out of the range, replace the sensor.

Water Temperature Sensor Resistance

Temperature	Resistance (Ω)
50°C (122°F)	154
80°C (176°F)	52
100°C (212°F)	27
120°C (248°F)	16

Switches and Sensor

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.

Special Tool - Hand Tester: 57001-1394

★If the hand tester does not show the specified values, replace the switch.

Radiator Fan Switch Resistance

○**Rising Temperature:**

From OFF to ON at over than 85 ~ 90°C (185 ~ 194°F)

○**Falling Temperature:**

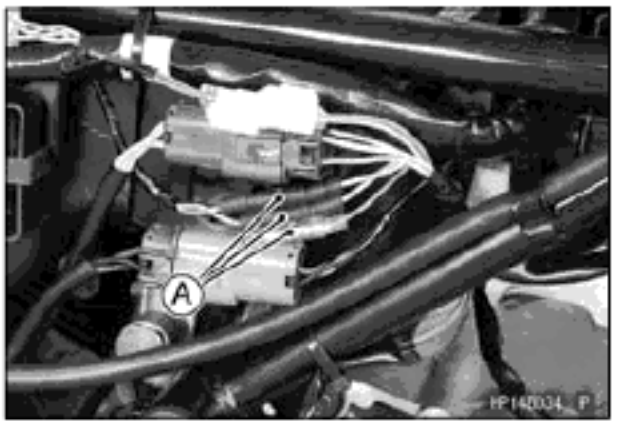
From ON to OFF at less than 85 ~ 90°C (185 ~ 194°F)

ON: about 0 Ω

OFF: ∞ Ω

- Install:
  Radiator Fan Switch (see Radiator Fan Switch Installation in the Cooling System chapter)

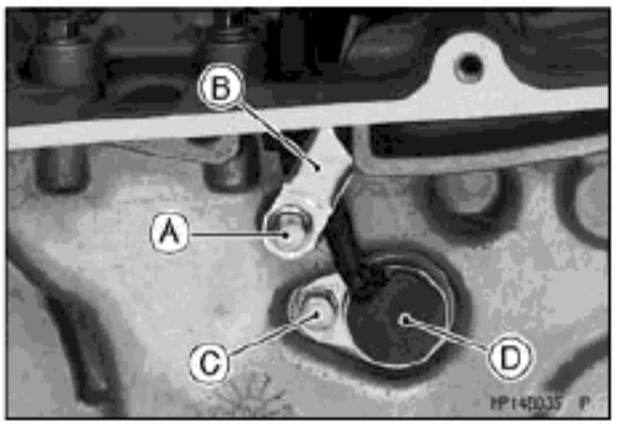
Gear Position Switch Removal



- Remove:
  Right Side Cover (see Right Side Cover Removal in the Frame chapter)
  Drive Belt (see Drive Belt Removal in the Converter System chapter)
- Disconnect the gear position switch lead connectors [A].

Switches and Sensor

- Remove:
  Lead Holder Mounting Bolt [A]
  Lead Holder [B]
  Gear Position Switch Bolt [C]
  Gear Position Switch [D]

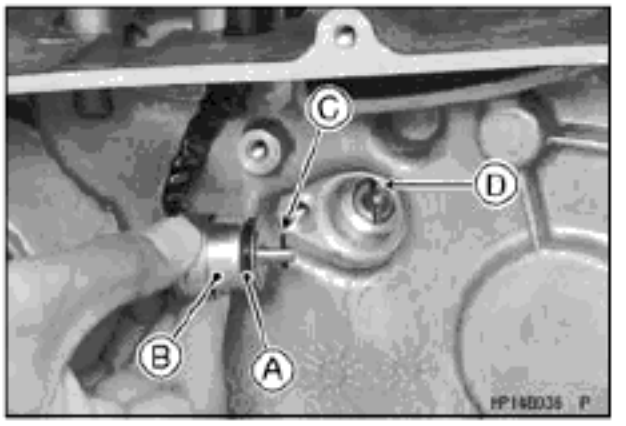


Gear Position Switch Installation

- Apply grease to the O-ring [A] on the gear position switch [B].
- Install the gear position switch so that the pin [C] fits the groove [D] on the shift drum.
- Tighten:

Torque - Gear Position Switch Mounting Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

- Tighten the lead holder mounting bolt securely.



Gear Position Switch Inspection

NOTE

○*Be sure the transmission mechanism is good condition.*

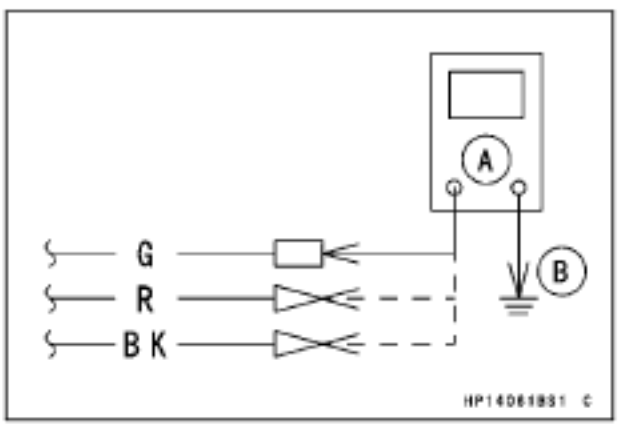
- Remove the right side cover (see Right Side Cover Removal in the Frame chapter).
- Disconnect the gear position switch connectors [A].

- Set the hand tester [A] and connect it to the each terminals in the gear position switch lead connector and ground [B].
  G Lead (Neutral)
  R Lead (Low)
  BK Lead (Reverse)

Special Tool - Hand Tester: 57001-1394

Gear Position Switch Resistance
Standard: about 0 Ω

★If the tester reading is not as specified, replace the gear position switch with a new one.



Switch Inspection

- Using the hand tester, check to see that only the connections shown in the table have continuity (about 0 Ω).

Special Tool - Hand Tester: 57001-1394

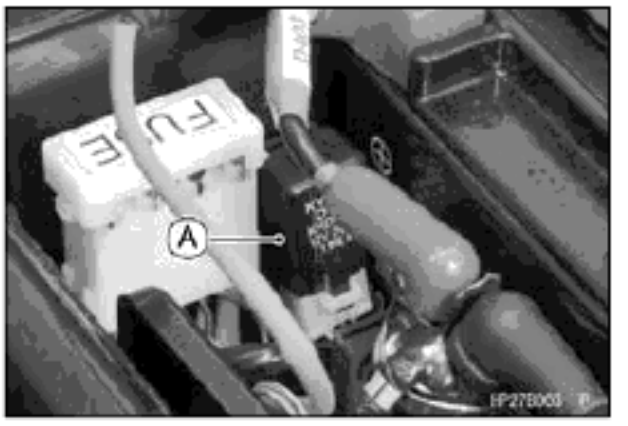
○For the handlebar switches, ignition switch, refer to tables in the Wiring Diagram.

★If the switch has an open or short, repair or replace it with a new one.

Relay

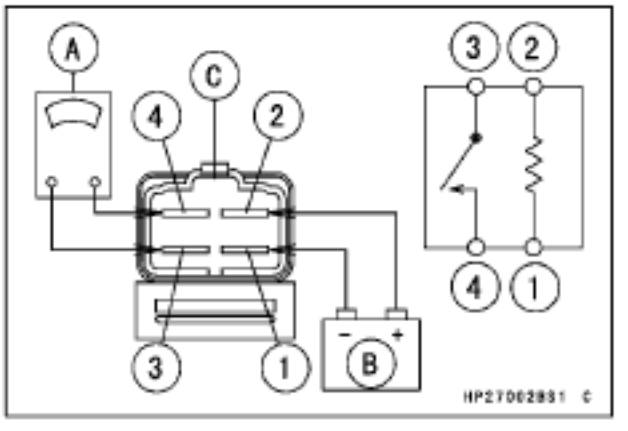
Relay Inspection

- Remove:
  Seat (see Seat Removal in the Frame chapter)
  Starter Circuit Relay [A]



- 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: × 1 Ω

Criteria: When battery is connected → 0 Ω

When battery is disconnected → ∞ Ω

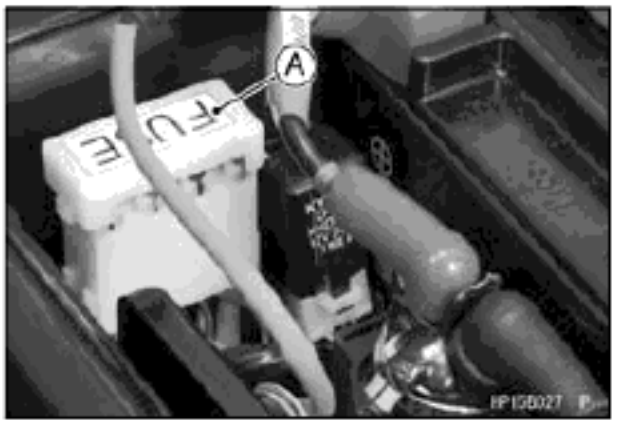
Relay Coil Terminals [1] and [2]

Relay Switch Terminals [3] and [4]

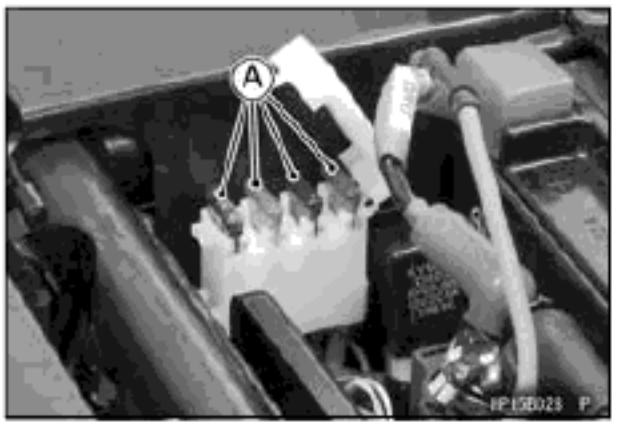
Fuses

Fuse Removal

- Remove:
  Seat (see Seat Removal in the Frame chapter)
  Fuse Box Lid [A]



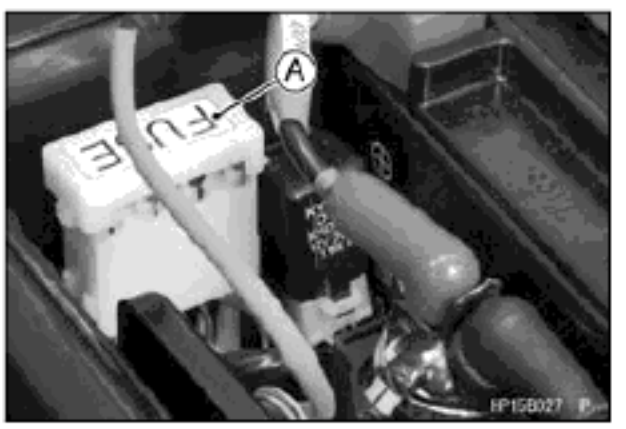
- Pull the fuses [A] straight out of the fuse box with needle nose pliers.



Fuse Installation

★If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.

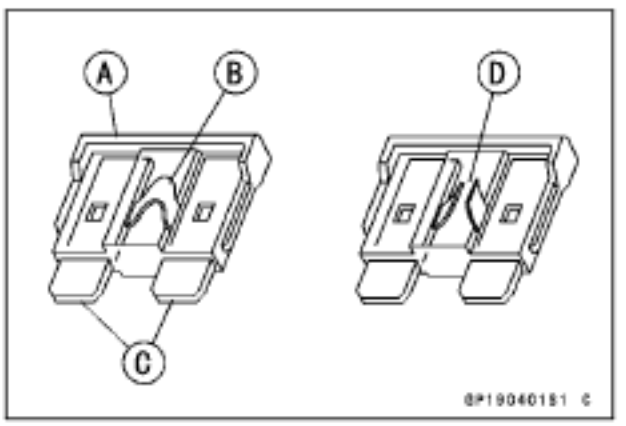
- Install the fuses on the original position as specified on the fuse box lids [A].



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]



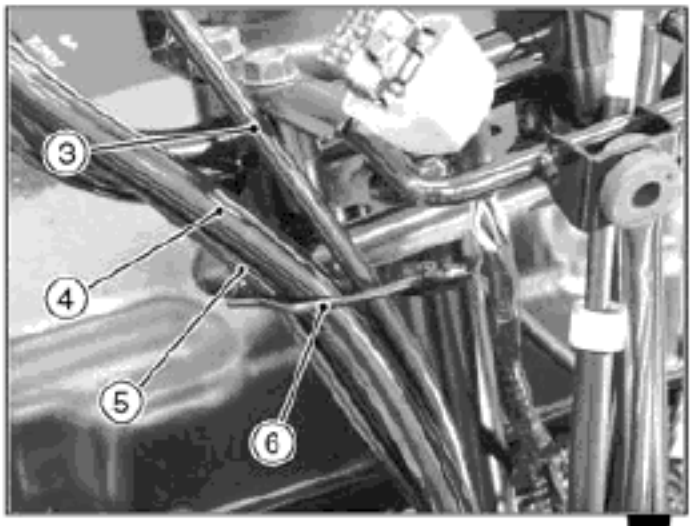
NOTICE

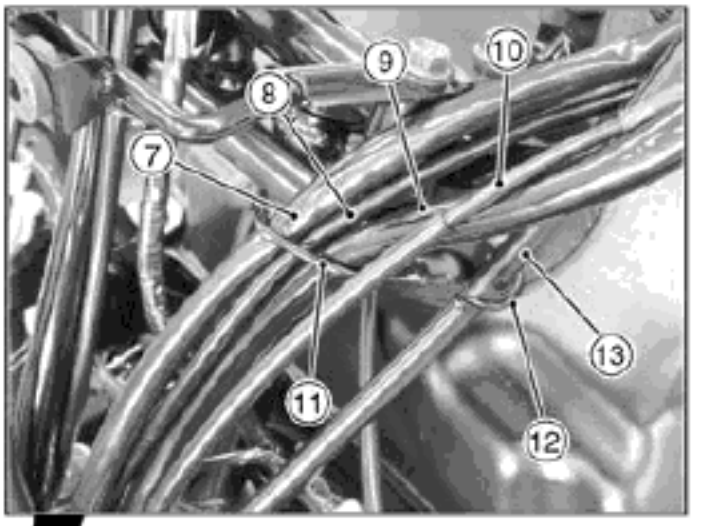
When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

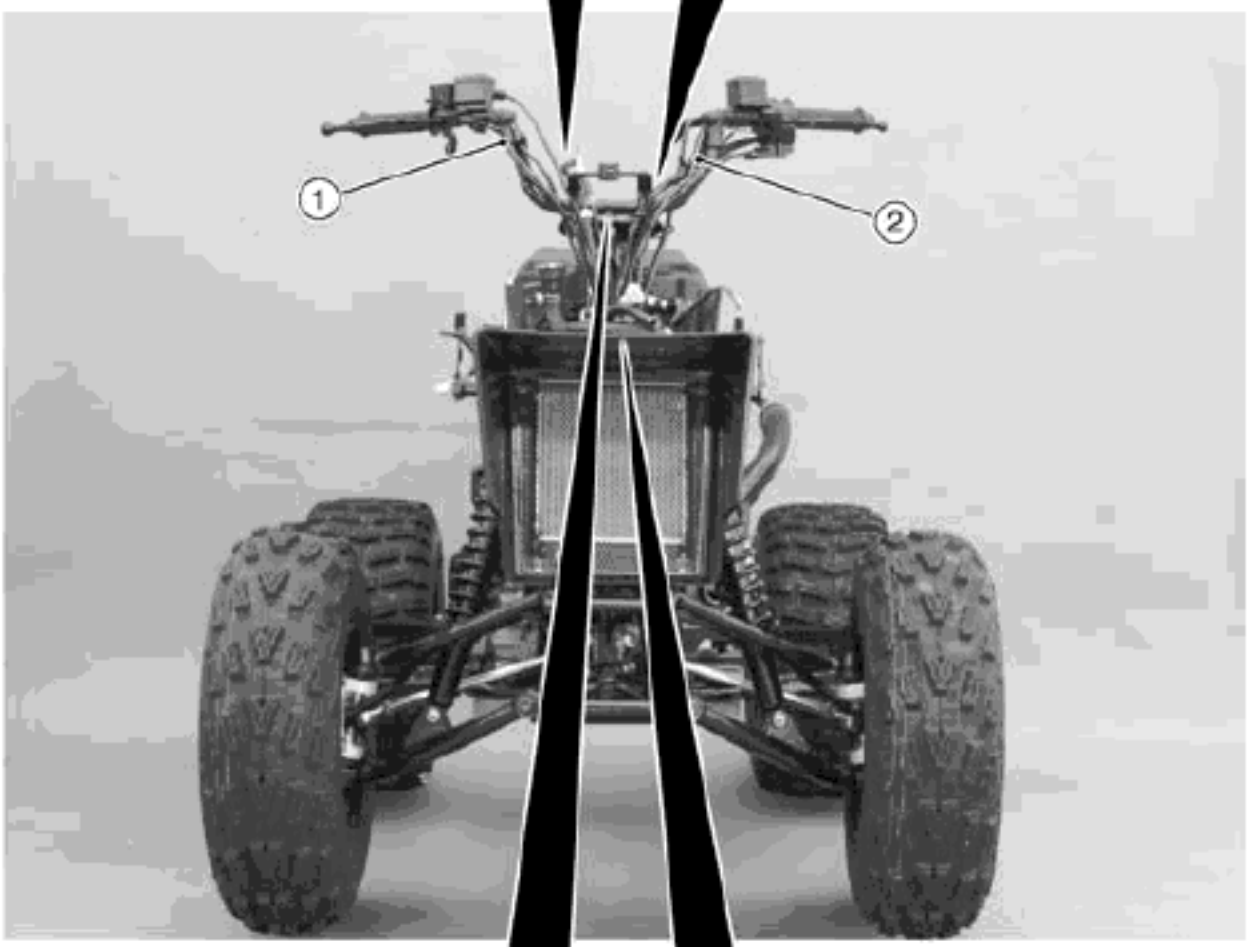
Appendix

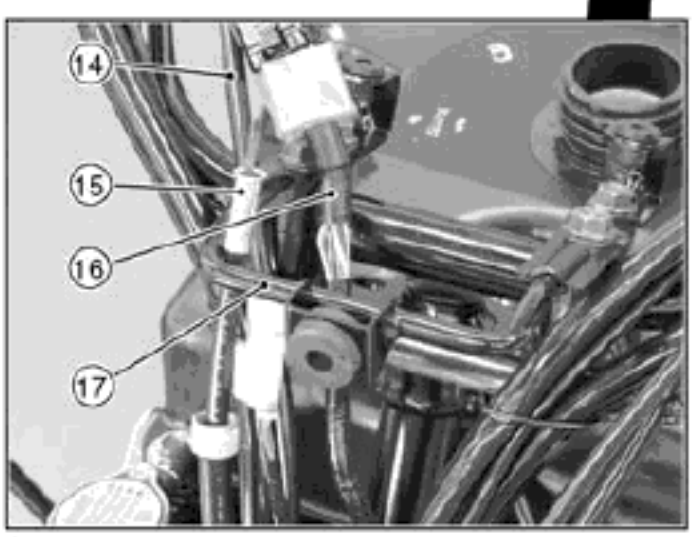
Table of Contents

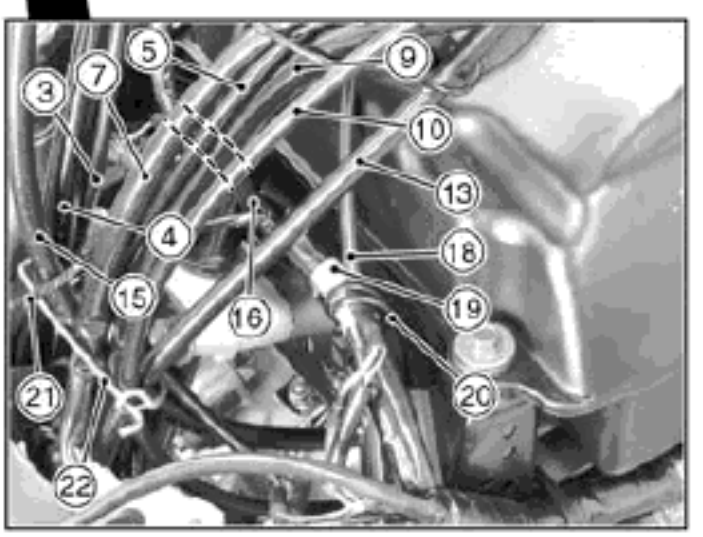
Cable, Wire, and Hose Routing









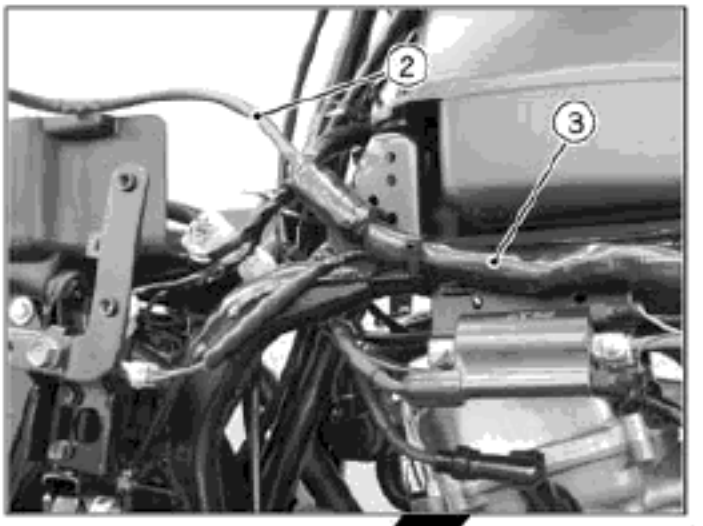


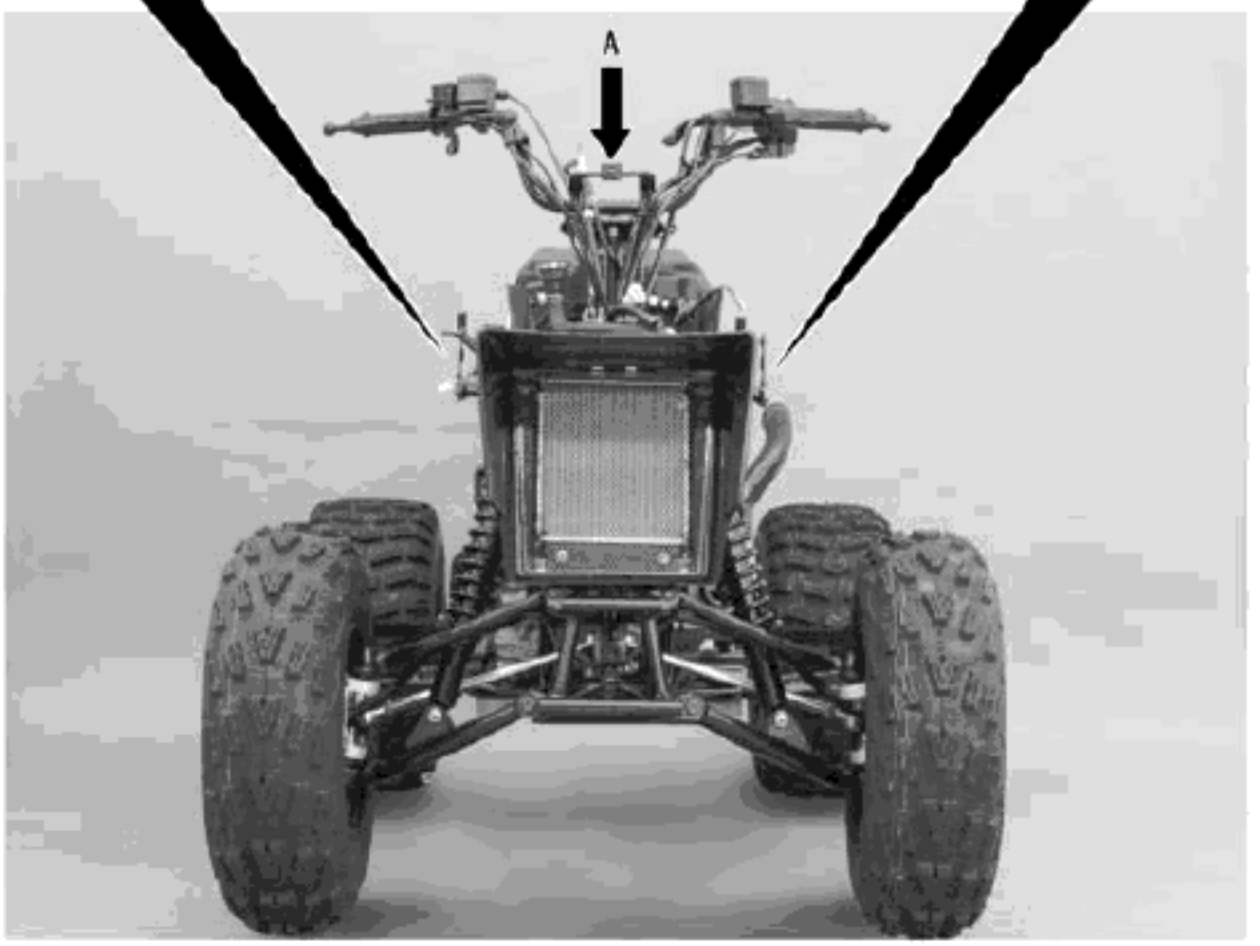
MB008060 C

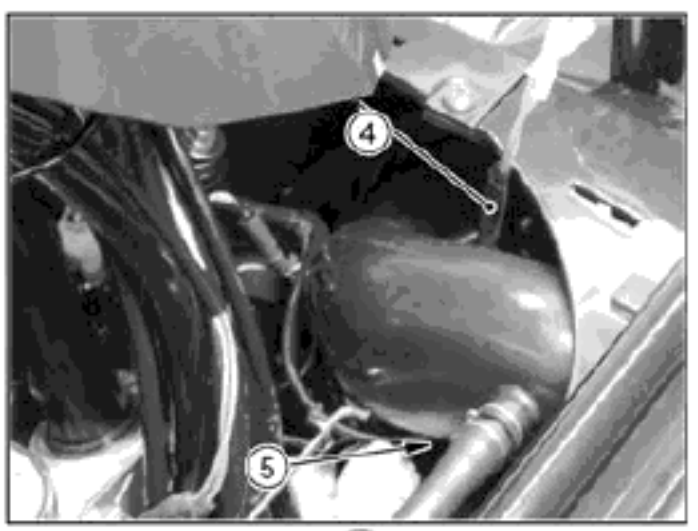
Cable, Wire, and Hose Routing

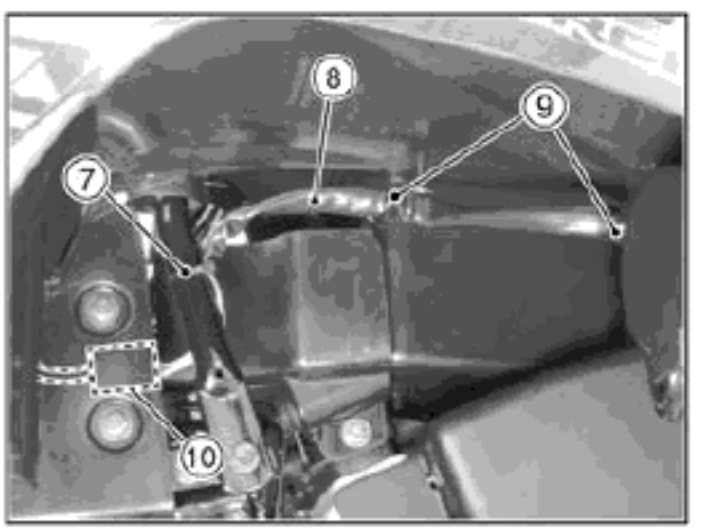
1. Band (Hold the front brake light switch lead.)
2. Band (Hold the left switch housing lead and rear brake light switch lead.)
3. Throttle Cable
4. Front Brake Hose
5. Front Brake Light Switch Lead
6. Steering Shaft Clamp (Right Side)
7. Left Switch Housing Lead
8. Rear Brake Light Switch Lead
9. Rear Brake Hose
10. Choke Cable
11. Steering Shaft Clamp (Front and Left Side)
12. Steering Shaft Clamp (Rear and Left Side)
13. Parking Brake Cable
14. Ignition Switch Lead
15. Speedometer Cable
16. Meter Unit Lead
17. Handlebar Holder Bracket (Run the ignition switch lead, speedometer cable and meter unit lead through inside the handlebar holder bracket.)
18. Fuel Level Sensor Lead
19. Main Harness
20. Clamp (Hold the fuel level sensor lead and main harness.)
21. To Ignition Switch
22. Handlebar Holder Center Guide

Cable, Wire, and Hose Routing









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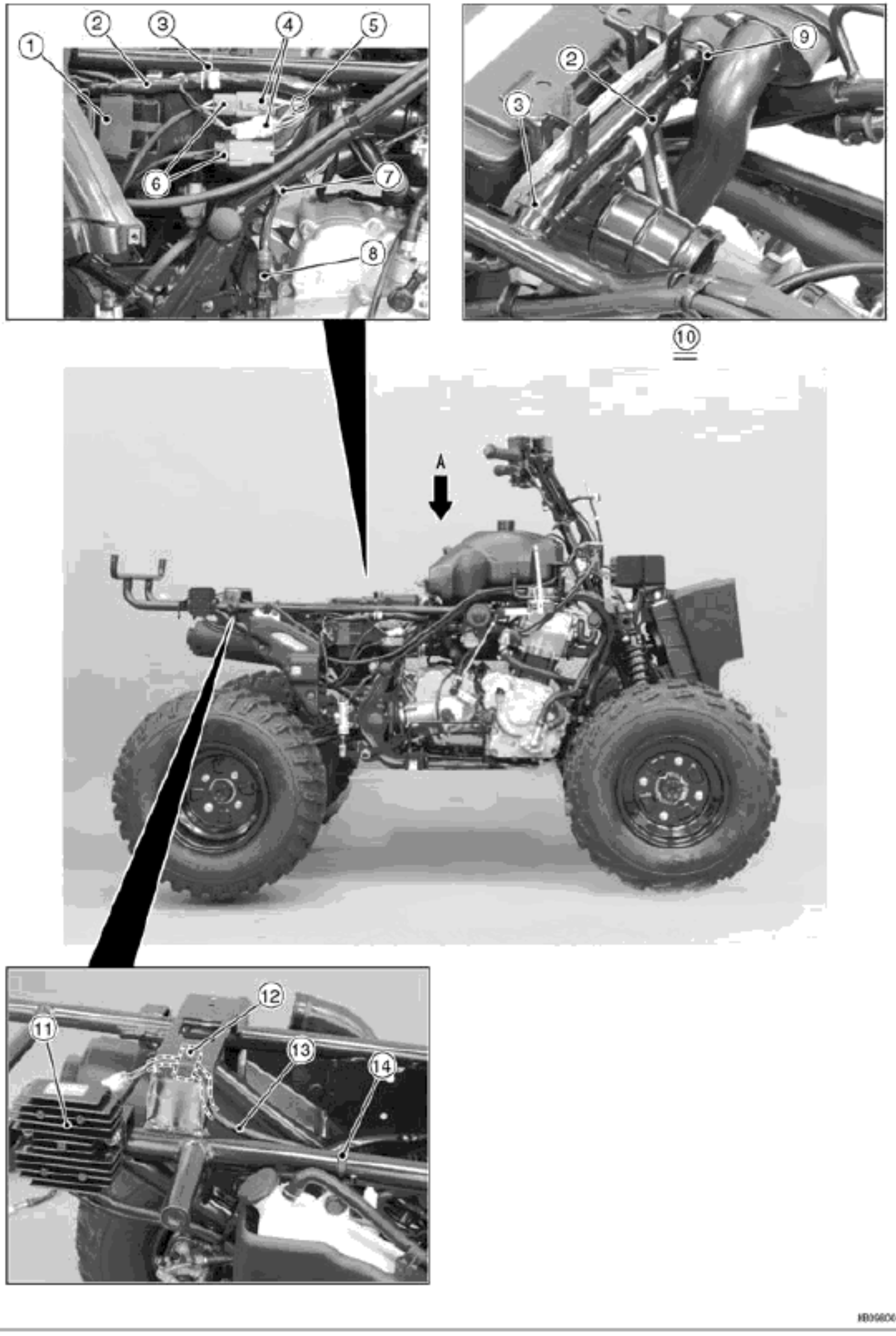
HB0G8001 G

Cable, Wire, and Hose Routing

1. Run the right headlight lead to outside the radiator guard.
2. Run the left headlight lead to outside the radiator guard.
3. Main Harness
4. Power Outlet Lead
5. Run the power outlet lead under the torque converter exhaust duct.
6. View form A
7. Band (Hold the headlight lead on both sides.)
8. Headlight Lead
9. Clamps (Hold the headlight leads on both sides.)
10. Hold the headlight connector on both sides. (Run the right headlight lead to torque converter exhaust duct.)

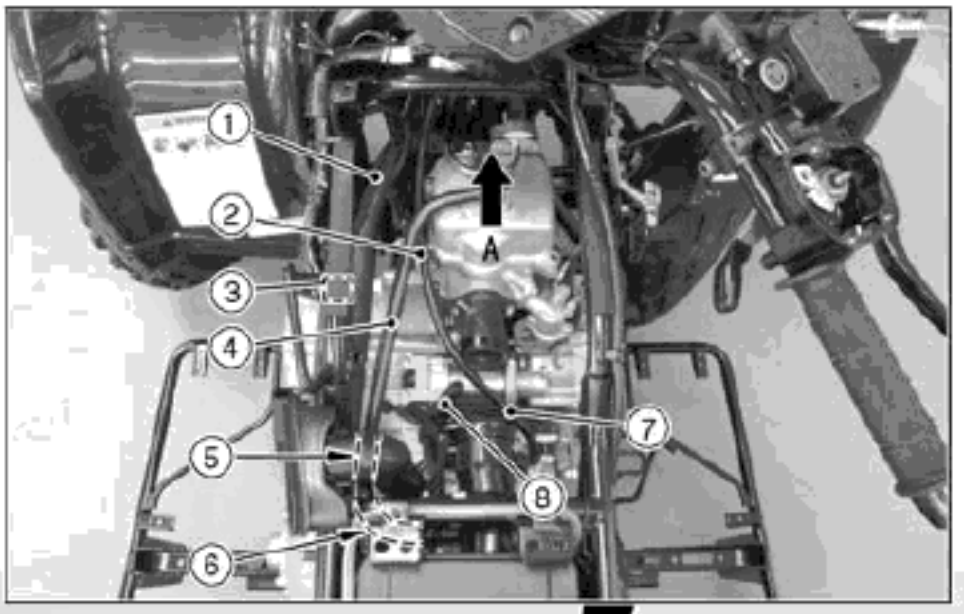
Cable, Wire, and Hose Routing

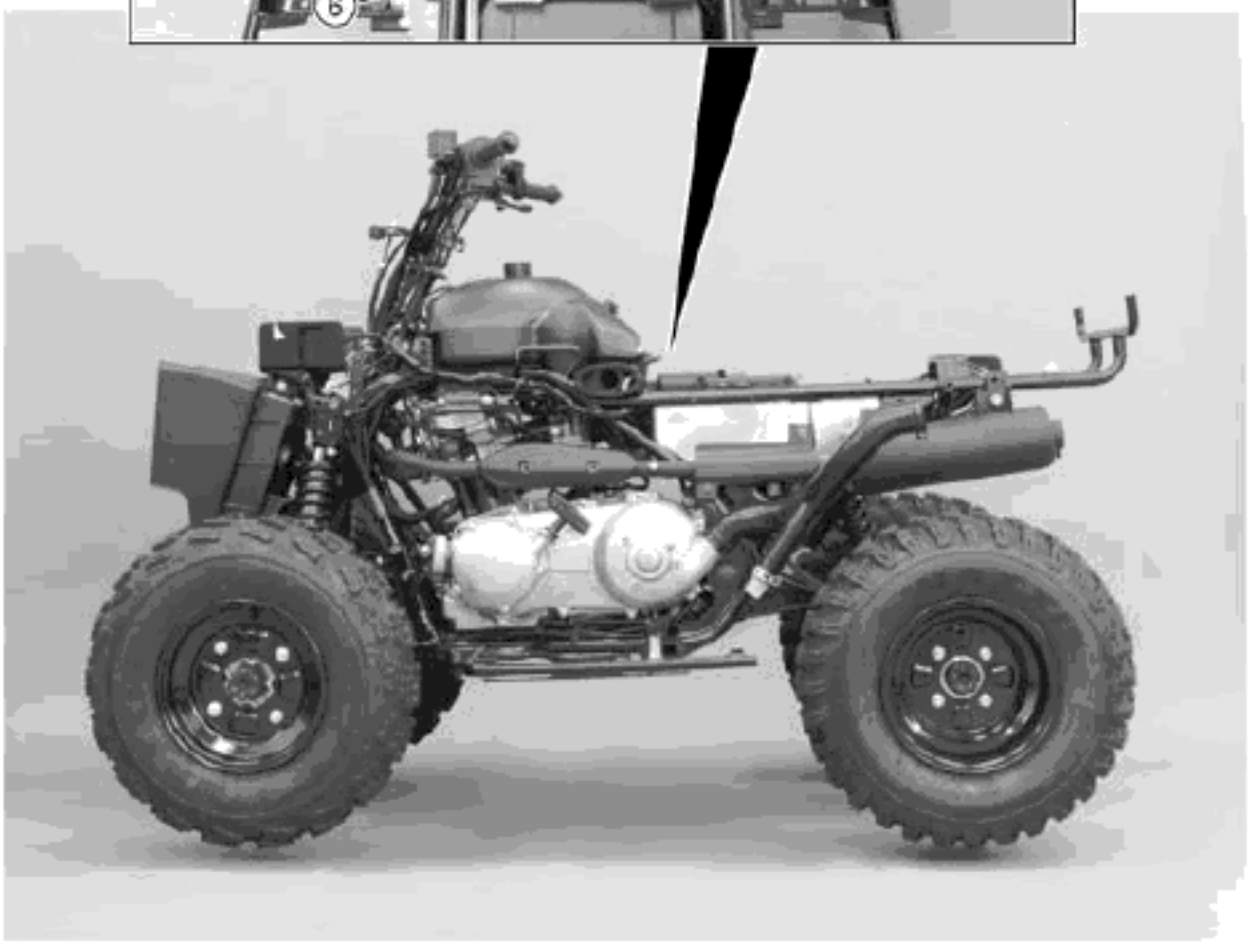


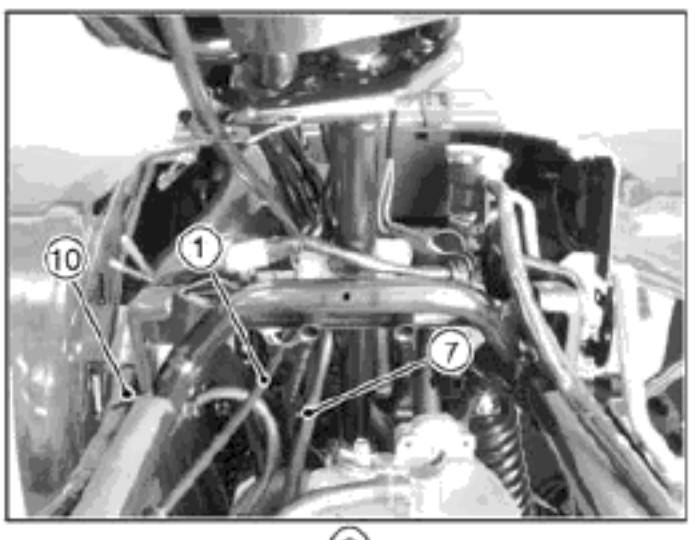
Cable, Wire, and Hose Routing

1. Igniter
2. Main Harness
3. Band (Hold the main harness to the frame pipe.)
4. Alternator/Crankshaft Sensor Lead Connectors
5. Gear Position Switch Lead
6. Regulator/Rectifier Lead Connectors
7. Band (Hold the brake light switch lead to the frame pipe.)
8. Brake Light Switch
9. Band (Hold the main harness and gear position switch lead to the frame pipe.)
10. View from A
11. Regulator/Rectifier
12. Clamp (Hold the tail/brake light switch lead.)
13. Tail/Brake Light Switch Lead
14. Band (Hold the tail/brake light switch lead to the frame pipe.)

Cable, Wire, and Hose Routing







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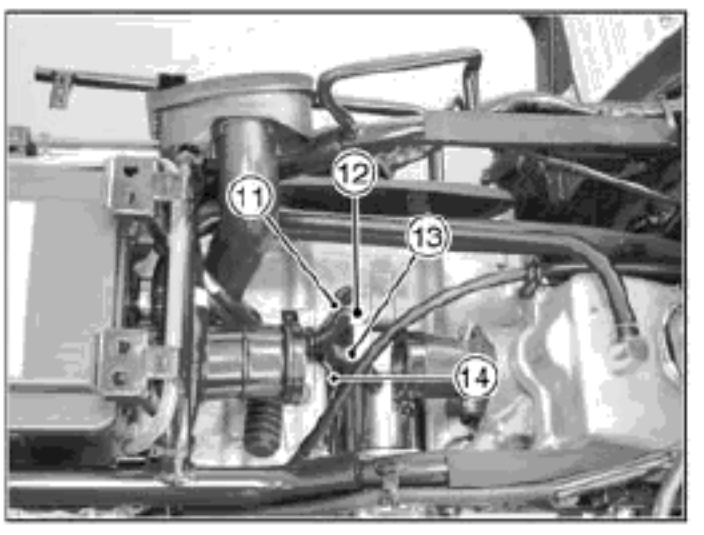
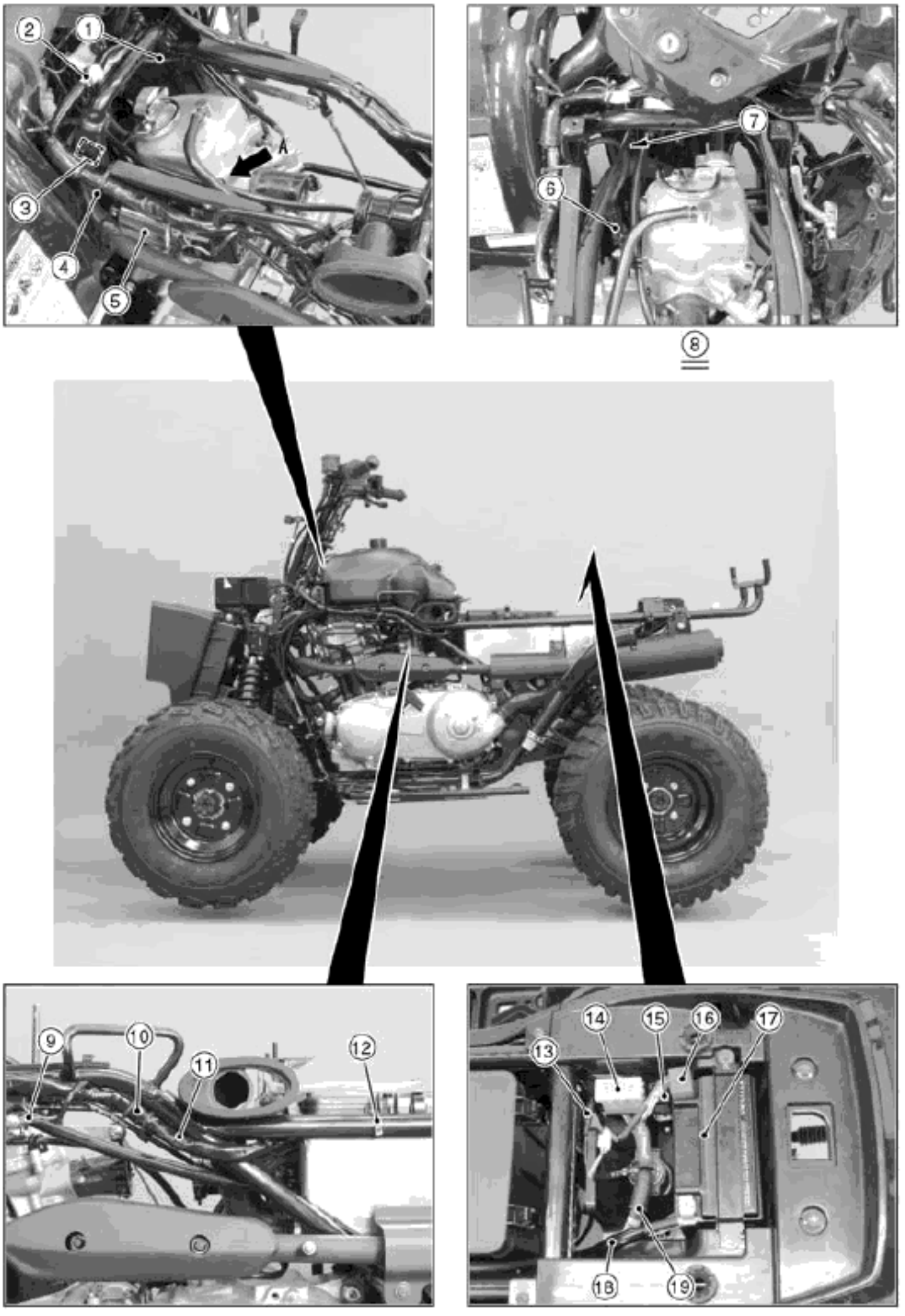


HB006003 C

Cable, Wire, and Hose Routing

1. Choke Cable
2. Clamp (Hold the speedometer cable.)
3. Clamp of Frame (Hold the choke cable.)
4. Breather Hose
5. Run the breather hose between the air duct and frame pipe.
6. Run the breather hose under the battery negative (–) cable, starter relay lead and gear position switch lead.
7. Run the speedometer cable under the carburetor.
8. Clamp (Hold the battery negative (–) cable, starter motor cable, gear position switch lead and alternator/crankshaft sensor lead.)
9. View from A
10. Band (Hold the main harness to the frame pipe.)
11. Gear Position Switch Lead
12. Engine Ground Terminal
13. Starter Motor Cable
14. Alternator/Crankshaft Sensor Lead

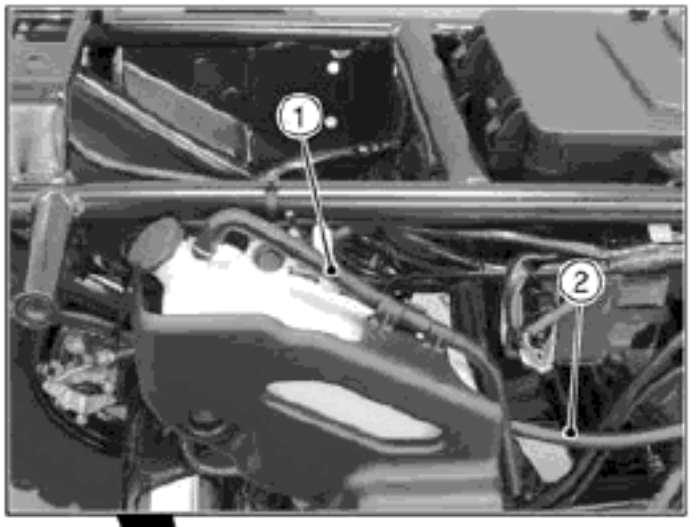
Cable, Wire, and Hose Routing

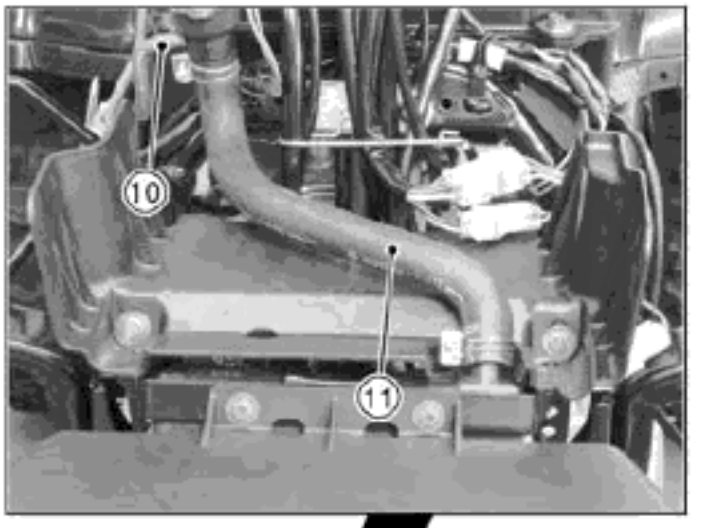


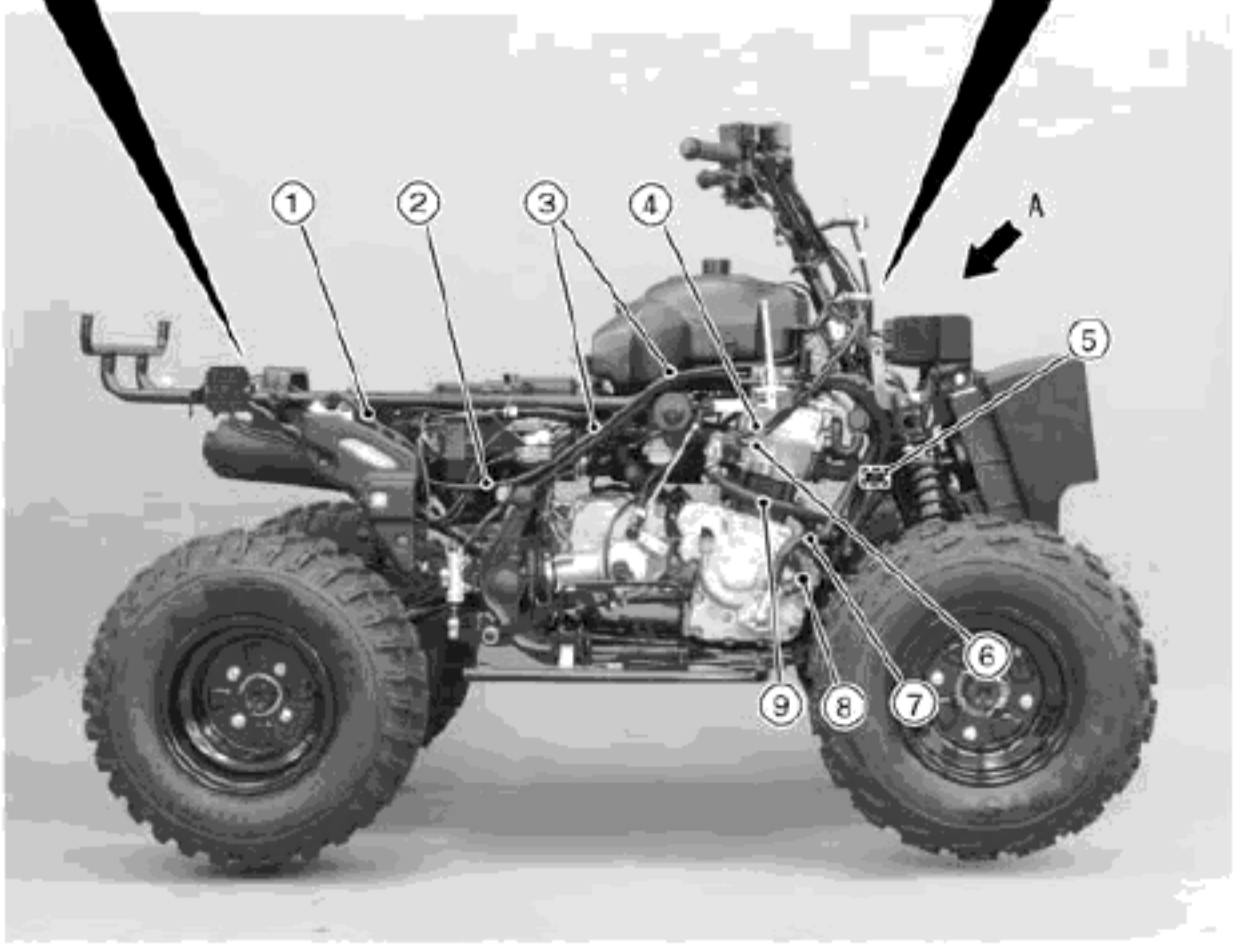
Cable, Wire, and Hose Routing

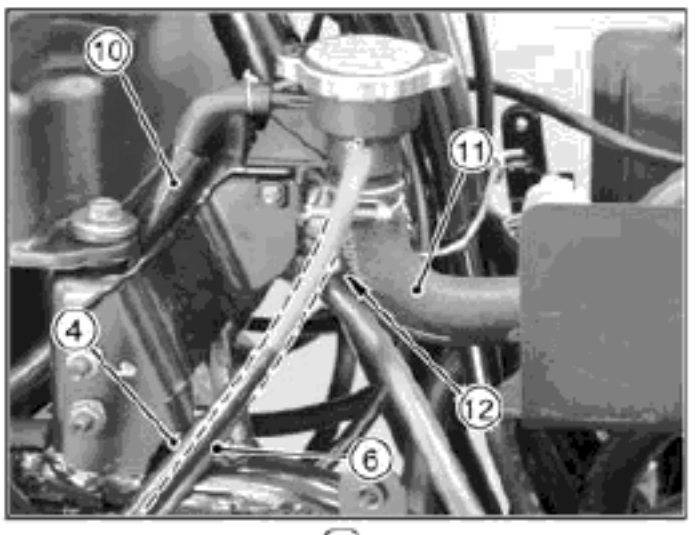
1. Clamp (Hold the throttle cable.)
2. Clamp (Hold the main harness.)
3. Clamp of Frame (Hold the ignition coil lead.)
4. Band (Hold the main harness to the frame pipe.)
5. Ignition Coil
6. Spark Plug Cap
7. Run the ignition coil lead under the choke cable.
8. View from A
9. Engine Ground Terminal (The ground terminal is tightened together with ignition coil mounting bolt.)
10. Clamp of Frame (Hold the main harness.)
11. Main Harness
12. Band (Hold the battery negative (–) cable and starter motor cable.)
13. Frame Ground Terminal
14. Fuse Box
15. Starter Circuit Relay
16. Battery Positive (+) Cable
17. Battery
18. Battery Negative (–) Cable
19. Starter Motor Cable

Cable, Wire, and Hose Routing









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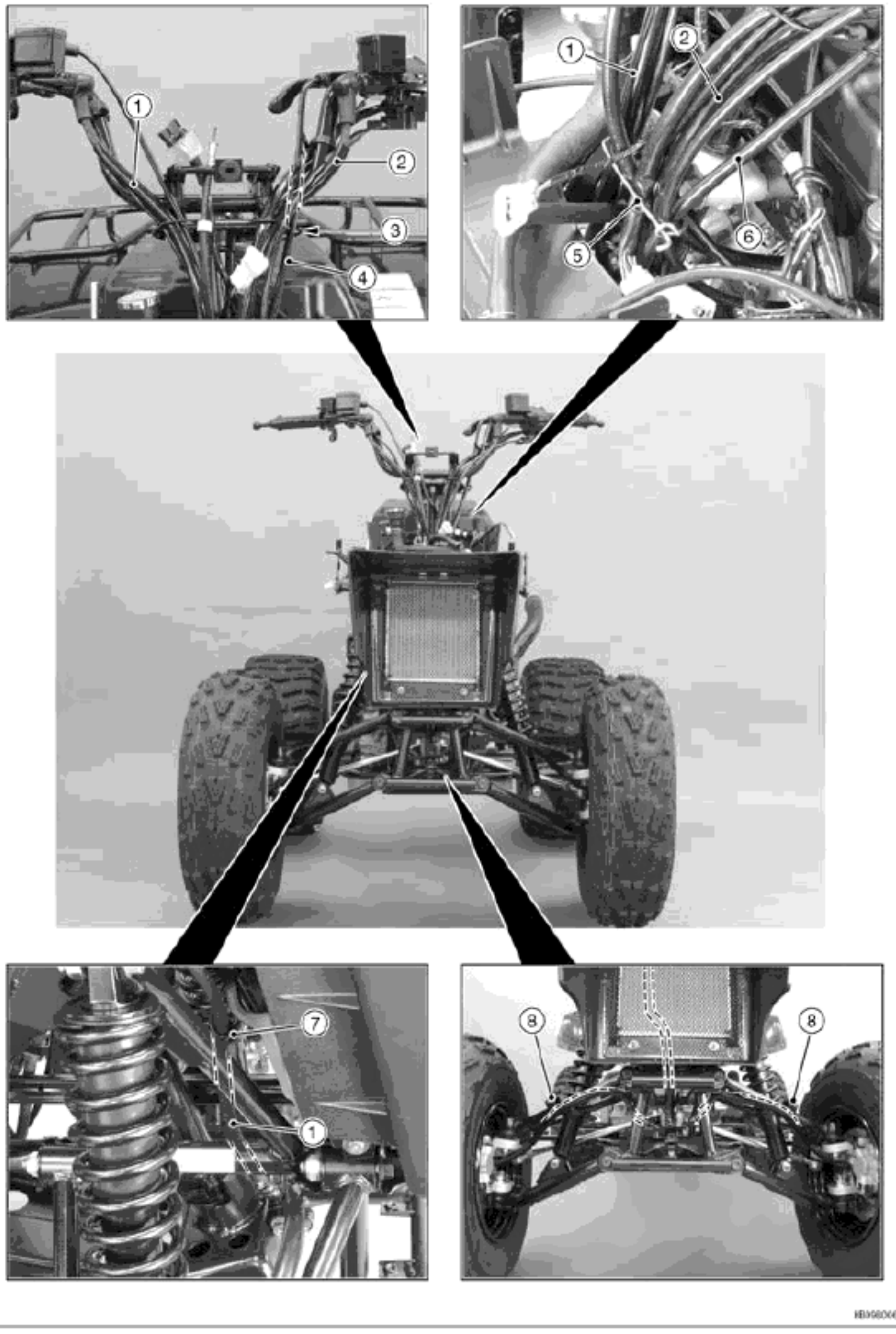
Cable, Wire, and Hose Routing

1. Reserve Tank Overflow Hose
2. Reserve Tank Hose
3. Clamps (Hold the reserve tank hose.)
4. Radiator Hose (Radiator Cap ~ Thermostat)
5. Clamp of Frame (Hold the radiator hose.)
6. Water Temperature Sensor Lead
7. Radiator Hose (Water Pump ~ Radiator)
8. Radiator Hose (Cylinder ~ Water Pump)
9. Radiator Hose (Thermostat ~ Radiator)
10. Run the reserve tank hose between the fuel tank and radiator cap bracket.
11. Radiator Hose (Radiator Cap ~ Radiator)
12. Run the water temperature sensor lead under the radiator cap bracket.
13. View from A

Cable, Wire, and Hose Routing

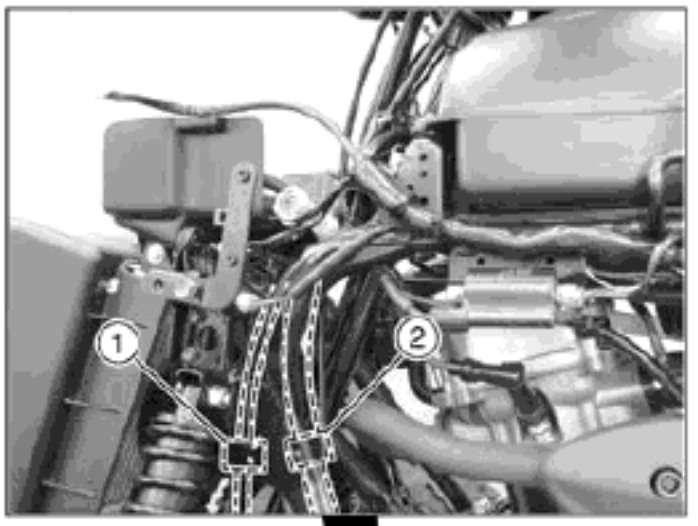


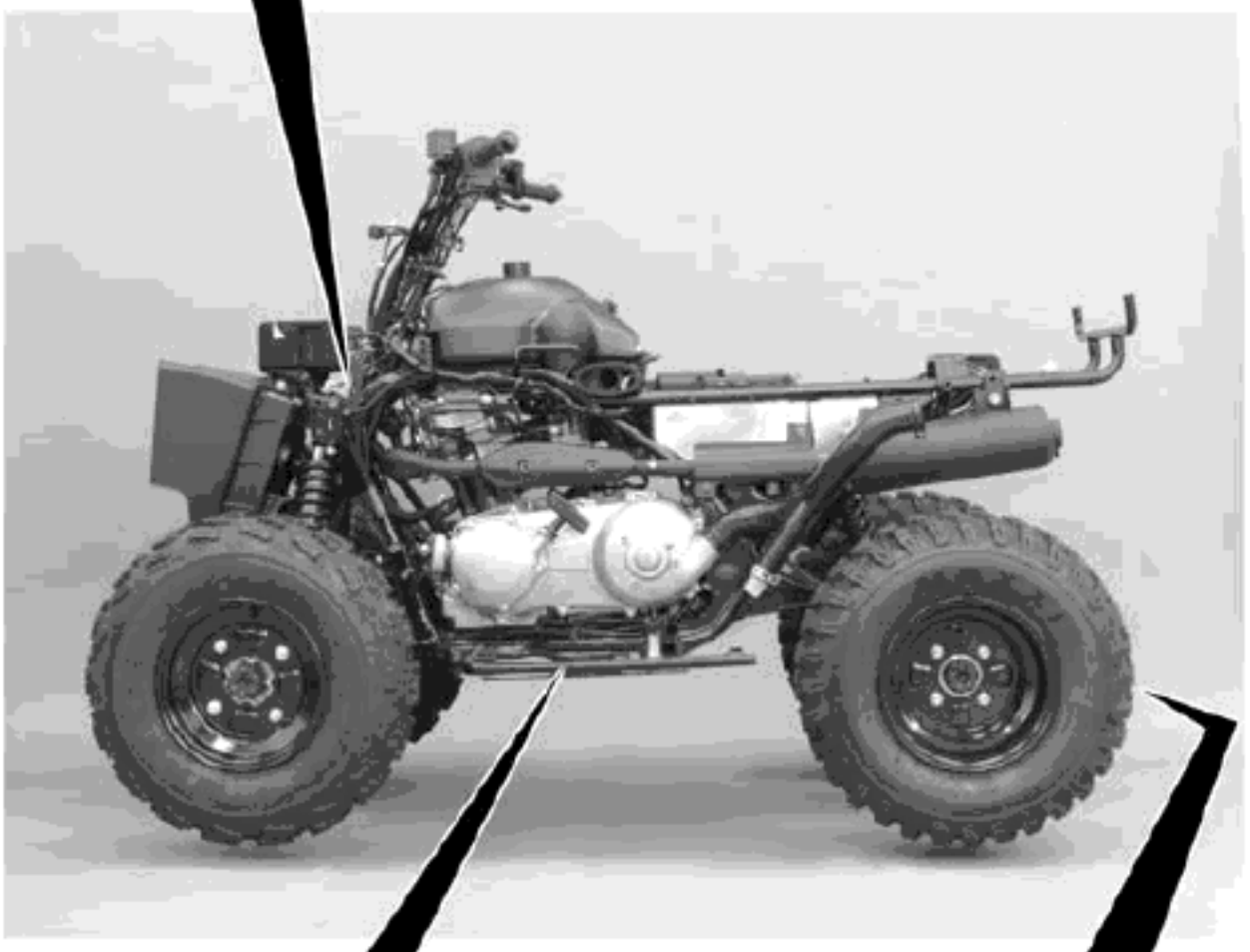
KBX60004 C

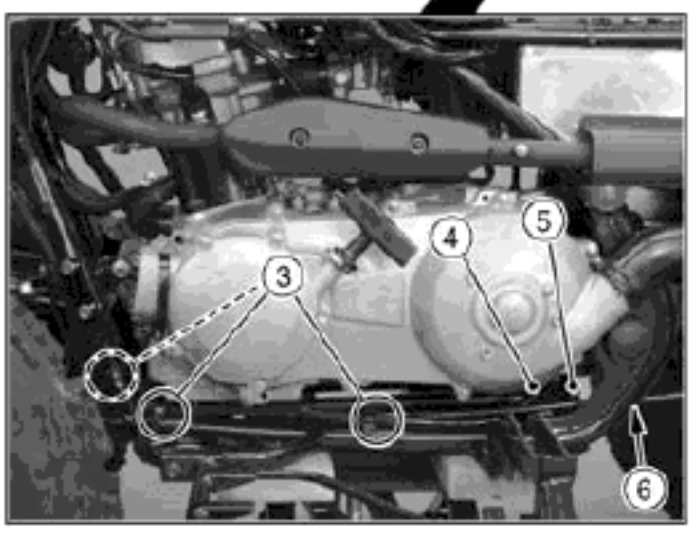
Cable, Wire, and Hose Routing

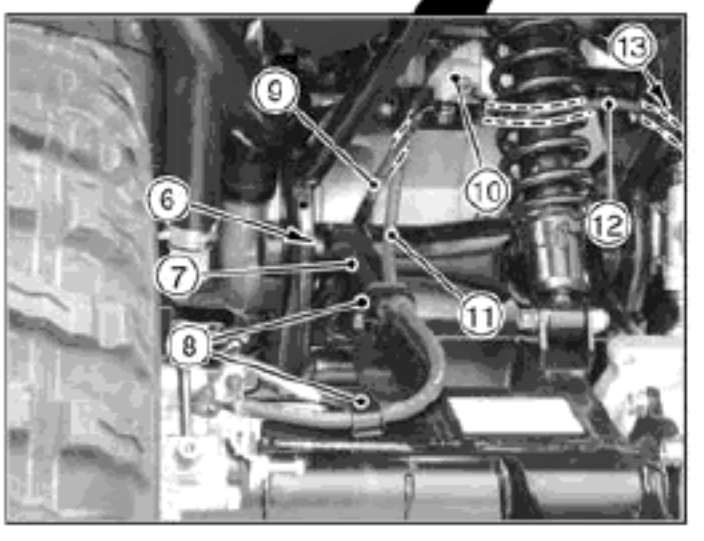
1. Front Brake Hose
2. Rear Brake Hose
3. Steering Shaft Clamp, Left and Rear Side (Run the parking brake cable.)
4. Parking Brake Cable (Run the parking brake cable backward of the handlebars.)
5. Handlebar Holder Center Guide (Run the front brake hose, rear brake hose and parking brake cable through handlebar holder center guide.)
6. Parking Brake Cable
7. Clamp (Radiator Fan Motor Lead)
8. Hold the front brake hoses on both sides.

Cable, Wire, and Hose Routing







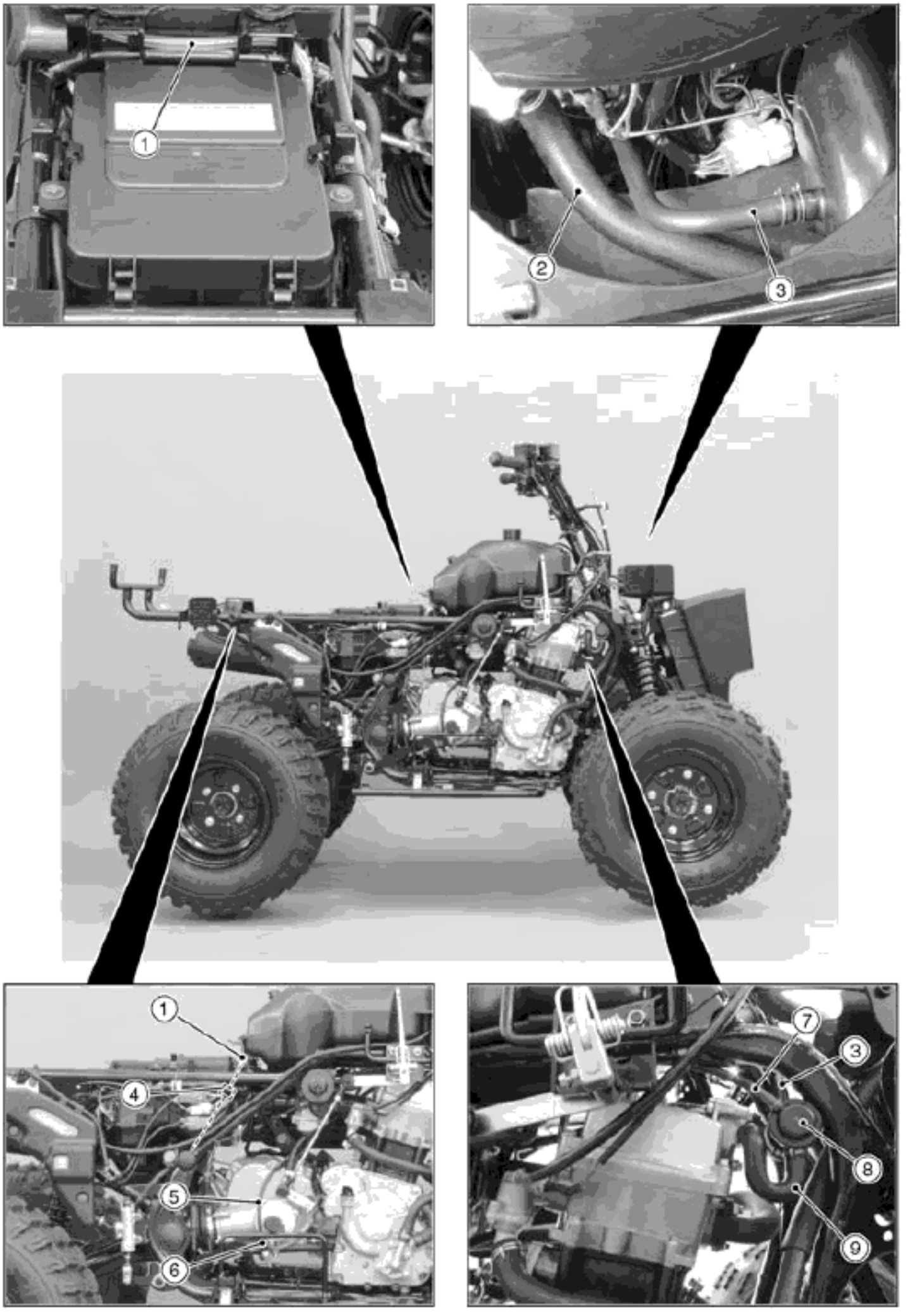


HB068067 C

Cable, Wire, and Hose Routing

1. Clamp of Frame (Hold the parking brake cable.)
2. Clamp of Frame (Hold the rear brake hose.)
3. Clamps of Frame (Hold the parking brake cable and rear brake hose.)
4. Rear Brake Hose (To Proportioning Valve)
5. Clamp of Frame (Unused)
6. Run the parking brake cable between the frame and swingarm.
7. Parking Brake Cable
8. Clamps (Hold the parking brake cable and rear brake hose.)
9. Rear Brake Hose (Rear Brake Master Cylinder [Lever] ~ Proportioning Valve)
10. Proportioning Valve
11. Rear Brake Hose (Proportioning Valve ~ Rear Brake Caliper)
12. Rear Brake Hose (Proportioning Valve ~ Rear Brake Master Cylinder [Pedal])
13. Run the rear brake hose (pedal) between the frame pipe and frame pipe.

Cable, Wire, and Hose Routing



NB068008 C

Cable, Wire, and Hose Routing

1. Carburetor Overflow Hose
2. Radiator Hose (Radiator Cap ~ Radiator)
3. To CVT Air Intake Duct
4. Clamp (Hold the carburetor overflow hose.)
5. Carburetor Fuel Drain Hose
6. Clamp (Hold the carburetor fuel drain hose.)
7. Run the hose of vacuum switch valve to the back side of cylinder head and connect the hose to the carburetor holder.
8. Vacuum Switch Valve
9. Vacuum Switch Valve Hose (To Air Suction Valve Cover)

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:
- Gear position 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

Recoil starter not operating
- Recoil starter spring broken
- Recoil starter pawl not engaging

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
- Balancer bearing 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:
- 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 spark plug 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)

Poor Running at Low Speed:

Spark weak:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or spark plug 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:
- Idle adjusting screw maladjusted
- Pilot jet, or air passage clogged
- Starter 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)

Other:
Carburetor throttle valve doesn't slide smoothly
Engine oil viscosity too high
Brake dragging
Igniter trouble
Final gear case oil level too high
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 spark plug 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
Needle jet clogged
Fuel level too high or too low
Air cleaner clogged, poorly sealed, or missing
Starter 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.)

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 throttle valve doesn't slide smoothly
Brake dragging
Clutch slipping
Overheating
Engine oil level too high
Engine oil viscosity too high
Balancer mechanism malfunctioning
Final gear case oil level 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

Engine load faulty:
Clutch slipping
Engine oil level too high
Engine oil viscosity too high
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
Wrong coolant mixed ratio

Cooling system component incorrect:
Radiator fin damaged
Radiator clogged
Thermostat trouble
Radiator cap trouble
Radiator fan switch trouble
Fan motor broken
Fan blade damaged
Water pump not turning
Water pump impeller damaged

Over Cooling:

Cooling system component incorrect:
Water temperature sensor trouble
Thermostat trouble
Radiator fan switch trouble

Troubleshooting Guide

Converter Operation Faulty:
- **Belt slipping:**
  - Belt dirty, worn, or wetted
  - Drive or driven pulley sheave dirty or worn
- **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 bushing worn
  - Drive pulley weight roller worn
- **Shifting too quickly:**
  - 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
  - Driven pulley movable sheave doesn't move smoothly

Clutch Operation Faulty:
- **Clutch slipping:**
  - Clutch housing or shoe linings overworn or worn unevenly
  - Clutch spring broken or weak
  - Clutch outer overworn or worn unevenly
- **Clutch not disengaging properly**
  - Clutch spring tension uneven
  - Clutch shoe spring broken or weak

Gear Shifting Faulty:
- **Doesn't go into gear:**
  - Clutch not disengaging
  - Shift fork(s) bent or seized
  - Gear(s) stuck on the shaft
  - Shift return spring weak or broken
  - Shift mechanism gear broken
  - Shift drum damaged
- **Jumps out of gear:**
  - Shift fork(s) worn
  - Gear groove(s) worn
  - Gear dogs, dog recesses, and/or dog holes worn
  - Shift drum groove(s) worn
  - Shift fork guide pin(s) worn
  - Drive shaft, output shaft, and/or gear splines worn
- **Overshifts:**
  - Shift mechanism gear broken

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
  - Balancer bearing worn
  - Balancer gear worn or shipped
  - Loose alternator rotor

Abnormal Drive Train Noise:
- **Converter noise:**
  - Belt worn
  - Drive or driven pulley sheave worn
  - Drive or driven pulley movable sheave bushing worn
  - Drive or driven pulley mount loose
  - Drive pulley weight roller worn
- **Transmission noise:**
  - Bearing worn
  - Transmission gears worn or chipped
  - Metal chips jammed in gear teeth
  - Engine oil insufficient or too thin
- **Drive train noise:**
  - Insufficient lubricant
  - Bevel gear bearings worn
  - Bevel gears worn or chipped
  - Bevel gears maladjusted
  - Propeller shaft bearing worn

Abnormal Frame Noise:
- **Shock absorber noise:**
  - Shock absorber damaged
- **Brake noise:**
  - Pad installed incorrectly
  - Pad surface glazed
  - Disc warped
  - Caliper trouble

Troubleshooting Guide

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 to high
Black Smoke:
Air cleaner clogged
Main jet too large or fallen off
Starter 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
Handlebars hard to turn:
Tire air pressure too low
Steering stem bearing damaged
Steering stem bearing lubrication inadequate
Steering stem bent
Damage tie-rod end
Handlebars shakes or excessively vibrates:
Tire worn
Wheel rim warped
Rear axle runout excessive
Wheel bearing worn
Handlebar clamp loose
Steering stem clamp bolt loose
Handlebars 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:
Air in the brake line
Brake fluid leakage
Brake fluid deteriorated
Primary or secondary cup trouble
Master cylinder scratched inside
Pad overworn or worn unevenly
Oil, grease on pads and disc
Disc worn or warped
Brake overheated
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

MODEL APPLICATION

Year	Model	Beginning Frame No.
2012	KVF300CC	RGSWM22A□CB100201 RGSWM22A□CB120101 RGSVF300CCB110101

□:This digit in the frame number changes from one machine to another.

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