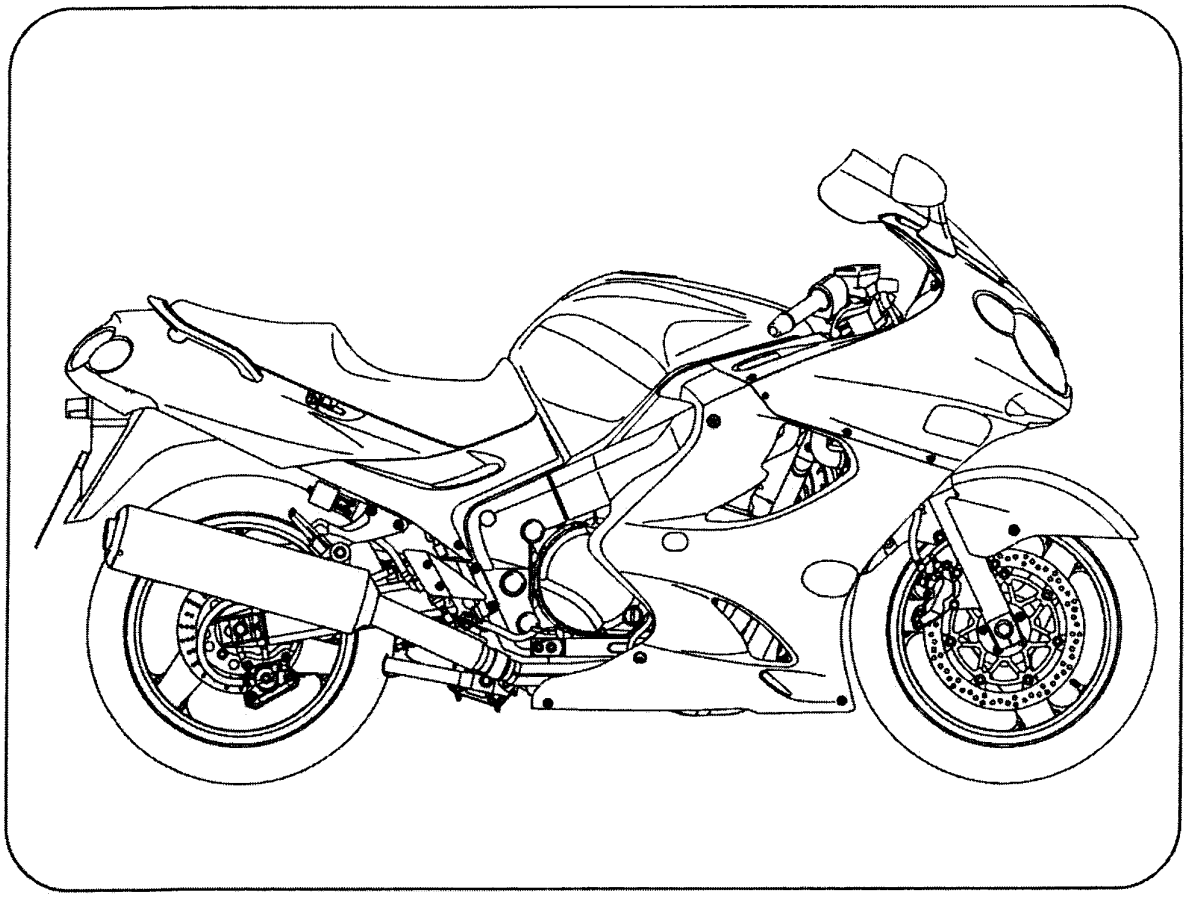
Kawasaki

ZZR1200



Motorcycle Service Manual

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EMISSION CONTROL INFORMATION

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

1. Crankcase Emission Control System

This system eliminates the release of crankcase vapors into the atmosphere. Instead, the vapors are routed through an oil separator to the intake side of the engine. While the engine is operating, the vapors are drawn into combustion chamber, where they are burned along with the fuel and air supplied by the carburetion system.

2. Exhaust Emission Control System

This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of this motorcycle. The fuel and ignition systems of this motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

3. Evaporative Emission Control System

Vapors caused by fuel evaporation in the fuel system are not vented into the atmosphere. Instead, fuel vapors are routed into the running engine to be burned, or stored in a canister when the engine is stopped. Liquid fuel is caught by a vapor separator and returned to the fuel tank.

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

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

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

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

NOTE

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

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

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

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TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

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

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

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

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★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.

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

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

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General Information

1

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1-2 GENERAL INFORMATION

Before Servicing

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

Especially note the following:

(1) Dirt

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

(2) Battery Leads

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

(3) Installation, Assembly

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

(4) Tightening Sequence

Generally, when installing a part with several bolts, nuts, or screws, start them all in their holes and tighten them to a snug fit. Then tighten them evenly in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter turn and then remove them. Where there is a tightening sequence indication in this Service Manual, the bolts, nuts, or screws must be tightened in the order and method indicated.

(5) Torque

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

(6) Force

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

(7) Edges

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

(8) High-Flash Point Solvent

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

(9) Gasket, O-ring

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

(10) Liquid Gasket, Non-Permanent Locking Agent

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

(11) Press

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

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Before Servicing

(12)Ball Bearing and Needle Bearing

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

(13)Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals. When pressing in a seal which has manufacturer's marks, press it in with the marks facing out. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of seal, until the face of the seal is even with the end of the hole. Before a shaft passes through a seal, apply a little high temperature grease on the lips to reduce rubber to metal friction.

(14)Circlip, Retaining Ring, and Cotter Pin

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

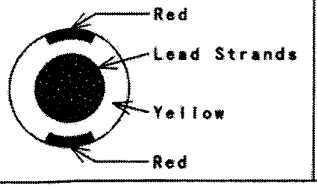
(15)Lubrication

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

Don't use just any oil or grease. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended. This manual makes reference to molybdenum disulfide grease (MoS_2) and molybdenum disulfide oil in the assembly of certain engine and chassis parts. The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1), which can be made in your work shop. Always check manufacturer recommendations before using such special lubricants.

(16)Electrical Wires

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

Lead (cross-section)	Color Indicated on the Lead	Color Indicated on the Wiring Diagram
	Yellow/Red	Y/R

GS02D01881 C

(17)Replacement Parts

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

(18)Inspection

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

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

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Before Servicing

(19) Specifications

Specification terms are defined as follows:

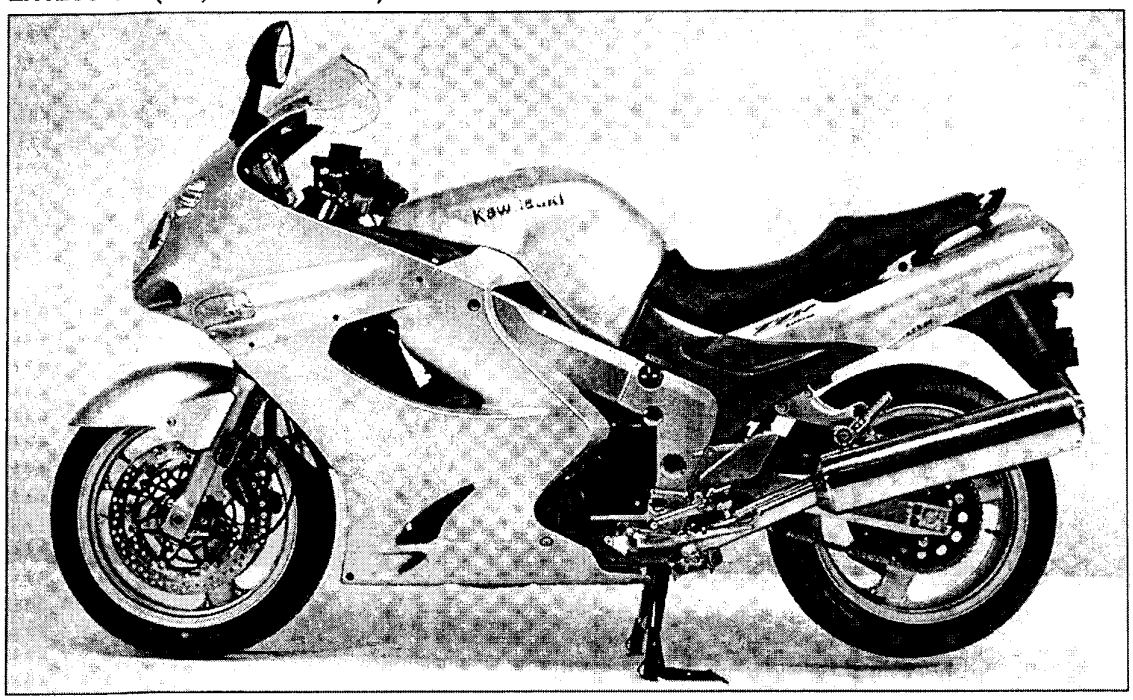
"Standards" show dimensions or performances which brand-new parts or systems have.

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

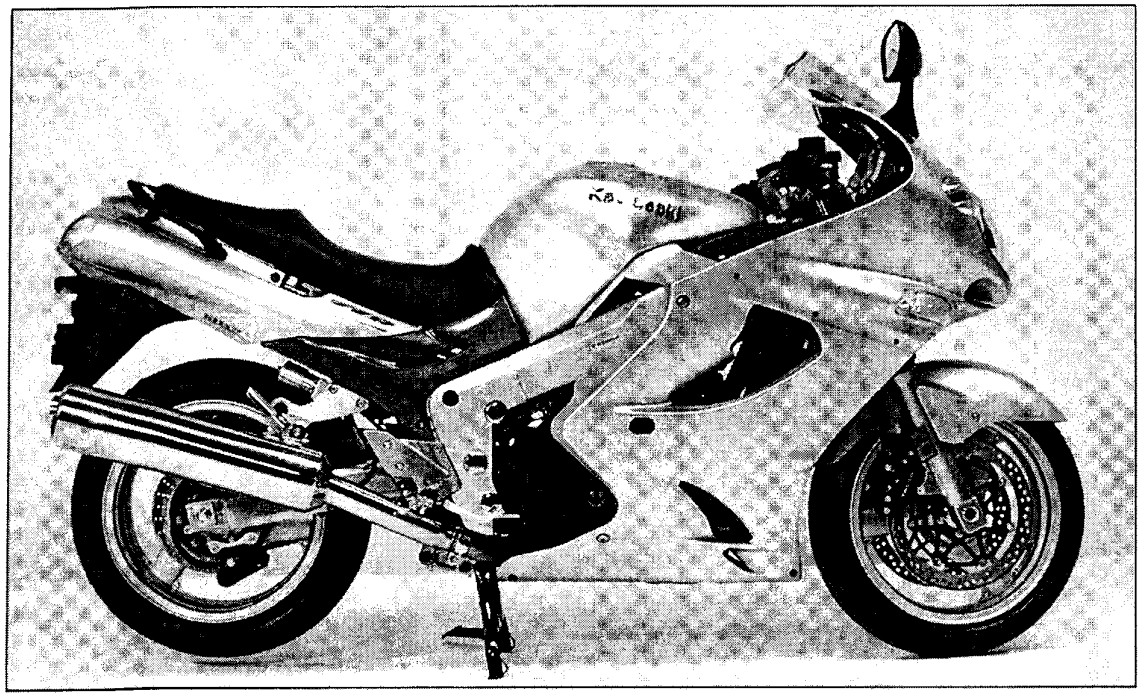
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Model Identification

ZX1200-C1 (US, and Canada) Left Side View:



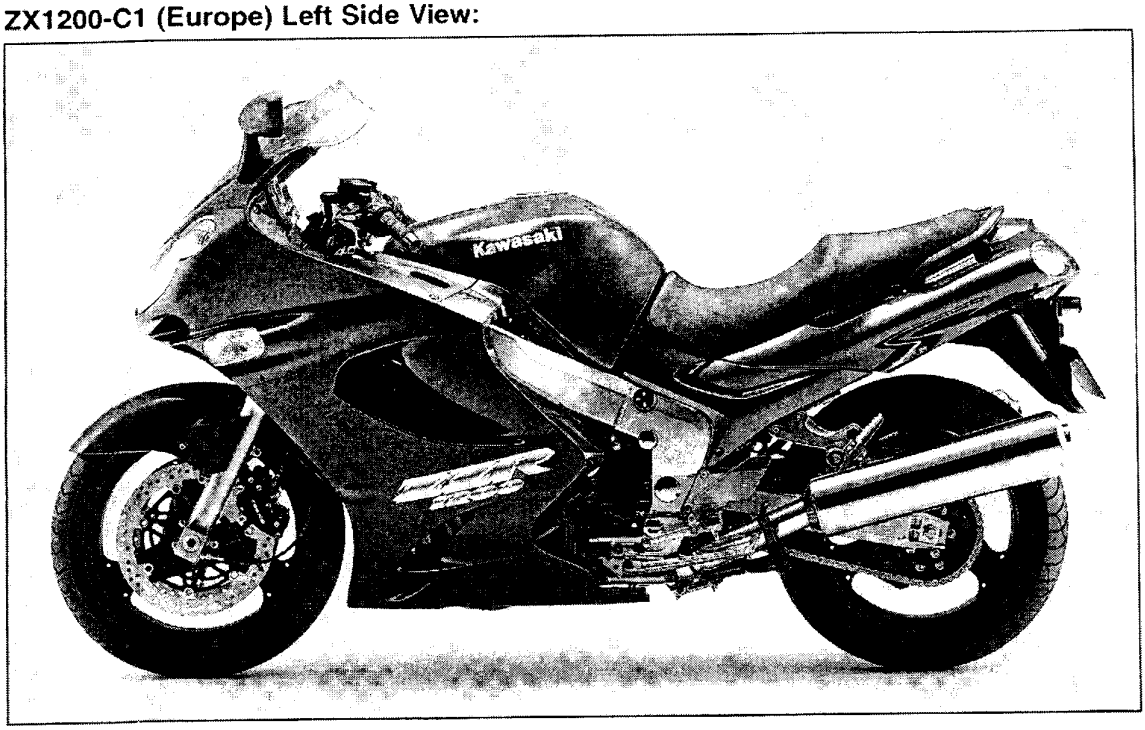
ZX1200-C1 (US, and Canada) Right Side View:



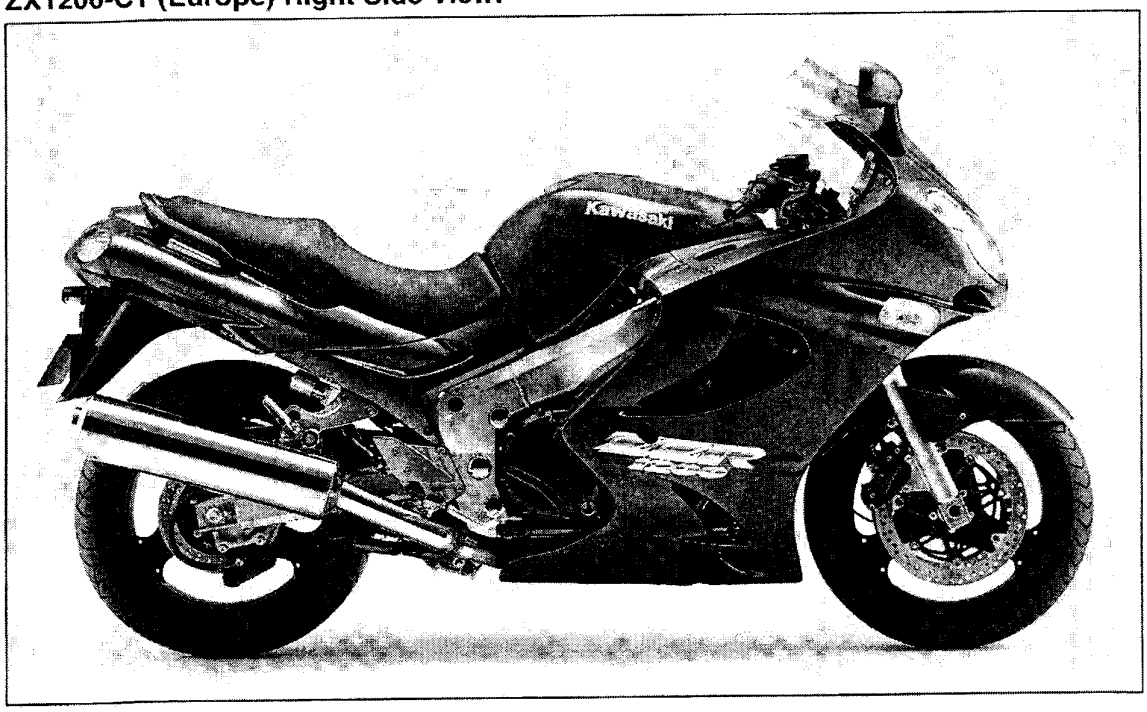
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Model Identification

ZX1200-C1 (Europe) Left Side View:



ZX1200-C1 (Europe) Right Side View:



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General Specifications

Items		ZX1200-C1 ~ C3/D1
Dimensions		
Overall length		2 160 mm (85.0 in.)
Overall width		755 mm (29.7 in.)
Overall height		1 245 mm (49.0 in.)
Wheelbase		1 505 mm (59.3 in.)
Road clearance		130 mm (5.12 in.)
Seat height		800 mm (31.5 in.)
Dry mass		236 kg (520 lb)
Curb mass:	Front	132 kg (291 lb)
	Rear	139 kg (306 lb)
Fuel tank capacity		23 L (6.1 US gal)
Performance		
Minimum turning radius		3.1 m (10.2 ft)
Engine		
Type		4-stroke, DOHC, 4-cylinder, 4 valves per cylinder
Cooling system		Liquid-cooled
Bore and stroke		79.0 x 59.4 mm (3.11 x 2.34 in.)
Displacement		1 164 mL (71.03 cu in.)
Compression ratio		10.6 : 1
Maximum horsepower		112 kW (152 PS) @9 800 r/min (rpm), (HR) 78.2 kW (106 PS) @9 000 r/min (rpm), (AU) (MY) (D1) 114 kW (155 PS) @9 800 r/min (rpm), (CA) (CAL) (US) - - -
Maximum torque		124 N·m (12.6 kgf·m, 91.1 ft·lb) @8 200 r/min (rpm), (HR) 108 N·m (11.0 kgf·m, 79.6 ft·lb) @4 700 r/min (rpm), (AU) (MY) (D1) 125 N·m (12.7 kgf·m, 91.9 ft·lb) @8 200 r/min (rpm), (CA) (CAL) (US) - - -
Carburetion system		Carburetors, Keihin CVKD 40 × 4
Starting system		Electric starter
Ignition system		Battery and coil (transistorized)
Timing advance		Electronically advanced (digital)
Ignition timing		From 10° BTDC @1 000 r/min (rpm) to 47.6° BTDC @7 000 r/min (rpm)
Spark plug		NGK CR9E or ND U27ESR-N
Cylinder numbering method		Left to right, 1-2-3-4
Firing order		1-2-4-3
Valve timing:		
Inlet	Open	40° BTDC
	Close	70° ABDC
	Duration	290°
Exhaust	Open	63° BBDC
	Close	43° ATDC
	Duration	286°

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General Specifications

Items		ZX1200-C1 ~ C3/D1
Lubrication system		Forced lubrication (wet sump)
Engine oil:		
Grade		API SE, SF or SG class API SH or SJ class with JASO MA
Viscosity		SAE10W-40
Capacity		4.2 L (4.4 US qt, when engine is completely disassembled and dry)
Drive Train		
Primary reduction system:		
Type		Gear
Reduction ratio		1.637 (95/58)
Clutch type		Wet multi disc
Transmission:		
Type		6-speed, constant mesh, return shift
Gear ratios:		
	1st	2.733 (41/15)
	2nd	1.947 (37/19)
	3rd	1.590 (35/22)
	4th	1.333 (32/24)
	5th	1.153 (30/26)
	6th	1.035 (29/28)
Final drive system:		
Type		Chain drive
Reduction ratio		2.588 (44/17)
Overall drive ratio		4.390 @Top gear
Frame		
Type		Tubular, double cradle
Caster (rake angle)		25°
Trail		104 mm (4.09 in.)
Front tire:	Type	Tubeless
	Size	120/70 ZR17 M/C (58W)
Rear tire:	Type	Tubeless
	Size	180/55 ZR17 M/C (73W)
Front suspension:		
	Type	Telescopic fork
	Wheel travel	120 mm (4.72 in.)
Rear suspension:		
	Type	Swingarm (uni-trak)
	Wheel travel	120 mm (4.72 in.)
Brake Type:	Front	Dual disc
	Rear	Single disc

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General Specifications

Items		ZX1200-C1 ~ C3/D1
Electrical Equipment		
Battery		12 V 14 Ah (sealed battery)
		12 V 12 Ah (sealed battery): ZX1200-C3 ~
Headlight:	Type	Semi-sealed beam
	Bulb	12 V 60/55 W (quartz-halogen) × 2
Tail/brake light		12 V 5/21 W × 2
Alternator:	Type	Three-phase AC
	Rated output	45 A/13.5 V @8 000 r/min (rpm)

Specifications are subject to change without notice, and may not apply to every country.
AU: Australia
CA: Canada
CAL: California
D1: ZX1200–D1 (H): WVTA Approval Model with honeycomb catalitic converter
HR: WVTA Approval Model with honeycomb catalitic converter (restricted model)
MY: Malaysia
US: United States

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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	=	kgf
N	×	0.2248	=	lb
kgf	×	9.807	=	N
kgf	×	2.205	=	lb

Units of Length:

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

Units of Torque:

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

Units of Pressure:

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

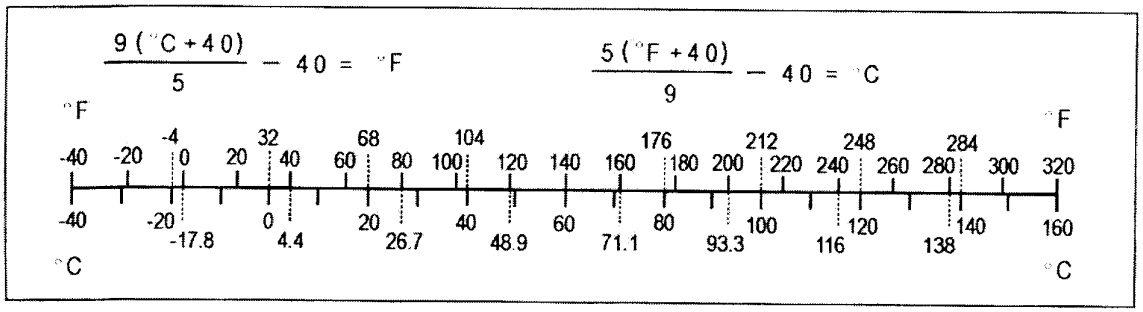
Units of Speed:

km/h	×	0.6214	=	mph

Units of Power:

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

Units of Temperature:



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Periodic Maintenance

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2-2 PERIODIC MAINTENANCE

Periodic Maintenance Chart

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

OPERATION	Whichever comes first ⬇ Every	➡ *Odometer Reading km × 1000 (mile × 1000) 1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)
Spark plug (e) - clean and gap †			●	●	●	●	●	●
Valve clearance (e) - inspect †				●		●		●
Air suction valve (e) - inspect †			●	●	●	●	●	●
Air cleaner element and air vent filter (e) - clean†#				●		●		●
Throttle grip play (e) - inspect †		●		●		●		●
Idle speed (e) - inspect †		●		●		●		●
Carburetor synchronization (e) - inspect †				●		●		●
Fuel hoses, connections - inspect †			●	●	●	●	●	●
Engine oil - change #	6 months	●	●	●	●	●	●	●
Oil filter - replace		●		●		●		●
Evaporative emission control system (e) (CAL) - inspect †		●	●	●	●	●	●	●
Drive chain wear - inspect † #			●	●	●	●	●	●
Brake pad wear - inspect † #			●	●	●	●	●	●
Brake light switch - inspect †		●	●	●	●	●	●	●
Steering - inspect †		●	●	●	●	●	●	●
Front fork oil - change	2 years					●		
Rear shock absorber oil leak - inspect †				●		●		●
Front fork oil leak - inspect †				●		●		●
Tire wear - inspect †			●	●	●	●	●	●
Swingarm pivot - lubricate				●		●		●
General lubrication - perform				●		●		●
Nut, bolt, and fastener tightness - inspect †		●		●		●		●
Drive chain - lubricate #	600 km							
Drive chain slack - inspect † #	1000 km							
Brake/clutch hoses, connections - inspect †			●	●	●	●	●	●
Brake/clutch fluid level - inspect † #	month	●	●	●	●	●	●	●
Radiator hoses, connections - inspect †		●						
Brake/clutch fluid - change	2 years					●		
Brake/clutch master cylinder cup and dust seal - replace	4 years							
Coolant - change	2 years					●		
Caliper piston seal and dust seal - replace	4 years							
Steering stem bearing - lubricate	2 years					●		
Clutch slave cylinder piston seal - replace	4 years							

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Periodic Maintenance Chart

OPERATION	Whichever comes first ⬇ Every	*Odometer Reading km × 1000 (mile × 1000) ➡ 1 (0.6)	6 (4)	12 (7.5)	18 (12)	24 (15)	30 (20)	36 (24)
Coolant filter (except for CA, CAL, US) - clean	year							

#: Service more frequently when operating in severe conditions; dusty, wet, muddy, high speed or frequent starting/stopping.
*: For higher odometer readings, repeat at the frequency interval established here.
†: Replace, add, adjust, clean, or torque if necessary.
CA: Canadian Model
CAL: California Model
US: United States Model
e: Emission Related Items

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Torque and Locking Agent

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

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

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

Basic Torque for General Fasteners

Threads dia. (mm)	Torque		
	N·m	kgf·m	ft·lb
5	3.4 ~ 4.9	0.35 ~ 0.50	30 ~ 43 in·lb
6	5.9 ~ 7.8	0.60 ~ 0.80	52 ~ 69 in·lb
8	14 ~ 19	1.4 ~ 1.9	10.0 ~ 13.5
10	25 ~ 34	2.6 ~ 3.5	19.0 ~ 25
12	44 ~ 61	4.5 ~ 6.2	33 ~ 45
14	73 ~ 98	7.4 ~ 10.0	54 ~ 72
16	115 ~ 155	11.5 ~ 16.0	83 ~ 115
18	165 ~ 225	17.0 ~ 23.0	125 ~ 165
20	225 ~ 325	23 ~ 33	165 ~ 240

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System:				
Fuel Tap Bolts	2.5	0.25	22 in·lb	
Fuel Tap Plate Screws	0.8	0.08	7 in·lb	
Fuel Tap Knob Screw	1.5	0.15	13 in·lb	
Fuel Level Sensor Bolts	6.9	0.70	61 in·lb	
Carburetor Holder Bolts	13	1.3	115 in·lb	L
Vacuum Valve Drain Screw	1.0	0.10	9 in·lb	CAL
Cooling System:				
Water Hose Clamp Screws	2.5	0.25	22 in·lb	
Water Pump Air Bleeder Bolt	10	1.0	89 in·lb	
Thermostat Housing Air Bleeder Bolt	7.8	0.80	69 in·lb	
Coolant Drain Plug (water pipe)	11	1.1	97 in·lb	
Radiator Fan Switch	18	1.8	13	
Water Temperature Sensor	7.8	0.80	69 in·lb	SS

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Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Water Pump Outlet Pipe Bolt	11	1.1	97 in·lb	
Water Pump Inlet Pipe Bolt	11	1.1	97 in·lb	L
Water Pump Mounting Bolts	11	1.1	97 in·lb	
Water Pump Cover Bolts	11	1.1	97 in·lb	
Engine Top End:				
Spark Plugs	14	1.4	10	
Air Suction Valve Cover Bolts	11	1.1	97 in·lb	
Cylinder Head Cover Bolts	10	1.0	89 in·lb	
Pickup Coil Cover Bolts	11	1.1	97 in·lb	L (2)
Chain Tensioner Mounting Bolts	11	1.1	97 in·lb	L
Chain Tensioner Cap	20	2.0	15	
Camshaft Cap Bolts	12	1.2	110 in·lb	S
Camshaft Bracket Bolts	12	1.2	110 in·lb	S
Camshaft Sprocket Bolts	15	1.5	11	L
Upper Chain Guide Bolts	12	1.2	110 in·lb	L
Cylinder Water Pipe Mounting Bolts (front)	11	1.1	97 in·lb	L
Cylinder Head Water Pipe Mounting Bolts (rear)	11	1.1	97 in·lb	
Water Hose Clamp Screws	2.5	0.25	22 in·lb	
Head Oil Hose Fitting	22	2.2	16	cylinder head
T-fitting Banjo Bolts	25	2.5	18	cylinder head
Cylinder Head Bolts:				
ϕ11 mm	62	6.3	46	S, MO (ws, se, th)
ϕ10 mm	46	4.7	34	S, MO (ws, se, th)
ϕ6 mm	9.8	1.0	87 in·lb	S
Cylinder Bolts: ϕ6 mm	15	1.5	11	S
Cylinder Coolant Drain Bolts	10	1.0	89 in·lb	
Rear Camshaft Chain Guide Bolt	20	2.0	15	L
Lower Chain Guide Bolts	11	1.1	97 in·lb	lower, L
Carburetor Holder Bolts	13	1.3	115 in·lb	L
Clutch:				
Clutch Lever Pivot Bolt	1.0	0.10	8.9 in·lb	
Clutch Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Clutch Slave Cylinder Bleed Valve	8.2	0.84	73 in·lb	
Clutch Slave Cylinder Bolts	–	–	–	L (2)
Clutch Hose Banjo Bolt	25	2.5	18	
Clutch Pipe Banjo Bolt	25	2.5	18	
Clutch Reservoir Cap Screws	1.5	0.15	13 in·lb	
Clutch Master Cylinder Clamp Bolts	11	1.1	97 in·lb	S
Starter Lockout Switch Screw	1.2	0.12	11 in·lb	
Clutch Cover Bolts	11	1.1	97 in·lb	L (4)
Clutch Cover Damper Bolts	10	1.0	89 in·lb	L
Clutch Cover Oil Pipe Banjo Bolt	12	1.2	110 in·lb	

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Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Clutch Cover Oil Pipe Mounting Bolt	6.0	0.60	53 in·lb	
Clutch Spring Bolts	11	1.1	97 in·lb	
Clutch Hub Nut	130	13.1	96	R
Engine Lubrication System:				
Oil Filler Cap	2.5	0.25	22 in·lb	
Engine Drain Plugs	20	2.0	15	
Oil Filter Bolt	20	2.0	15	
Oil Pan Bolts	15	1.5	11	L (6)
Oil Pressure Relief Valve	15	1.5	11	L
Oil Nozzle	3.5	0.36	31 in·lb	oil pan
Oil Pressure Switch Terminal Screw	1.6	0.16	14 in·lb	
Oil Pressure Switch	15	1.5	11	SS
Oil Pump Mounting Bolts	12	1.2	110 in·lb	three
Oil Pump Cover Bolts	9.8	1.0	87 in·lb	
Oil Pump Drive Gear Holder Screws	5.2	0.53	46 in·lb	L
Oil Pipe Banjo Bolts: ϕ12 mm	25	2.5	18	
Head Oil Hose Banjo Bolts:ϕ12 mm	25	2.5	18	on oil pan
Oil Cooler Left Hose Banjo Bolt: ϕ14 mm	34	3.5	25	on oil pan
Oil Cooler Right Hose Banjo Bolt: ϕ14 mm	34	3.5	25	Lh, on oil pan
Oil Pump Bracket Bolts	11	1.1	97 in·lb	
Oil Pump Bracket Plug	25	2.5	18	L
Main Oil Passage Plug	18	1.8	13	
Oil Pan Plug R 1/8	15	1.5	11	L, taper threads
Oil Screen Holder Screws	5.2	0.53	46 in·lb	
Oil Separator Screws	5.2	0.53	46 in·lb	
Crankcase Breather Cover Bolts	11	1.1	97 in·lb	
Oil Cooler Banjo Bolts	25	2.5	18	on oil cooler
Oil Cooler Screen Bolt	11	1.1	97 in·lb	lower right
Oil Cooler Screen Screw	4.5	0.46	40 in·lb	lower left
Engine Removal/Installation:				
Downtube Bolts	44	4.5	32	
Engine Mounting Bolts and Nuts	44	4.5	32	
Front Engine Bracket Bolts	44	4.5	32	
Engine Mounting Locknuts	49	5.0	36	
Oil Cooler Left Hose Banjo Bolt: ϕ14	34	3.5	25	on oil pan
Oil Cooler Right Hose Banjo Bolt: ϕ14	34	3.5	25	Lh, on oil pan
Engine Sprocket Nut	127	13.0	94	MO (th, se)
Crankshaft/Transmission:				
Lower Crankcase Plug: ϕ 25 mm	18	1.8	13	
Crankcase Bolts:				
ϕ9 mm	32	3.3	24	S

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Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
φ8 mm	30	3.1	22	S
φ7 mm	20	2.0	15	S
φ6 mm	20	2.0	15	S
Main Oil Passage Plug	18	1.8	13	
Connecting Rod Big End Nuts	in the text	←	←	MO (th, se)
Main Bearing Cap Bolts	32	3.3	24	
Balancer Lever Bolt	9.8	1.0	87 in·lb	L
Balancer Shaft Plate Bolt	11	1.1	97 in·lb	L
Balancer Shaft Clamp Bolt	11	1.1	97 in·lb	
Alternator Shaft Nut	59	6.0	44	right
Alternator Shaft Bearing Retainer Bolts	12	1.2	110 in·lb	L
Alternator Shaft Bolt	25	2.5	18	left
Alternator Chain Tensioner Bolts	11	1.1	97 in·lb	L
Alternator Chain Sprocket Bolt	25	2.5	18	crankshaft
Alternator Chain Guide Bolt	11	1.1	97 in·lb	L
Starter Motor Clutch Bolts	12	1.2	110 in·lb	L
Timing Rotor Bolt	25	2.5	18	L
External Shift Mechanism Cover Bolts	11	1.1	97 in·lb	L (4)
Shift Shaft Return Spring Pin (bolt)	30	3.1	22	L
Neutral Switch	15	1.5	11	
Shift Drum Bearing Holder Bolts	13	1.3	120 in·lb	L
Shift Drum Cam Screw	–	–	–	L
Bearing Holder Bolts	11	1.1	97 in·lb	
Transmission Oil Pipe Holder Bolt	11	1.1	97 in·lb	
Gear Set Lever Nut	11	1.1	97 in·lb	
Neutral Set Lever Nut	11	1.1	97 in·lb	
Crankcase Breather Cover Bolts	11	1.1	97 in·lb	
Oil Separator Screws	5.2	0.53	46 in·lb	
Wheels/Tires:				
Front Axle Clamp Bolts	20	2.0	15	
Front Axle Nut	127	13.0	94	
Rear Axle Nut	108	11.0	80	
Final Drive:				
Engine Sprocket Nut	125	12.8	92	MO (th, se)
Rear Sprocket Nuts	59	6.0	44	
Rear Sprocket Studs	–	–	–	L
Brakes:				
Brake Pedal Bolt	8.8	0.90	78 in·lb	
Caliper Bleed Valves	7.8	0.80	69 in·lb	
Brake Hose Banjo Bolts	25	2.5	18	
Brake Lever Pivot Bolt	1.0	0.10	9 in·lb	
Brake Lever Pivot Bolt Locknut	5.9	0.60	52 in·lb	
Front Brake Reservoir Cap Screws	1.5	0.15	13 in·lb	

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Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Front Brake Light Switch Screw	1.2	0.12	11 in·lb	
Front Master Cylinder Clamp Bolts	8.8	0.90	78 in·lb	S
Front Caliper Mounting Bolts	25	2.5	18	
Rear Caliper Mounting Bolts	25	2.5	18	
Front Caliper Assembly Bolts	21	2.1	15	
Rear Caliper Assembly Bolts	29	3.0	21	
Front Brake Pad Spring Bolts	2.9	0.30	26 in·lb	
Front Brake Pad Pin	16	1.6	12	
Brake Disc Mounting Bolts	27	2.8	20	L
Rear Master Cylinder Mounting Bolts	25	2.5	18	
Rear Master Cylinder Push Rod Locknut	18	1.8	13	
Suspension:				
Upper Front Fork Clamp Bolts	29	3.0	21	
Lower Front Fork Clamp Bolts	21	2.1	15	
Front Fork Top Plugs	23	2.3	17	
Fork Piston Rod Nut	15	1.5	11	
Front Fork Bottom Allen Bolts	40	4.0	29	L
Front Axle Clamp Bolts	20	2.0	15	S
Rear Shock Absorber Upper Mounting Nut	59	6.0	44	
Rear Shock Absorber Lower Mounting Nut	59	6.0	44	
Tie-rod Nuts	59	6.0	44	
Rocker-arm Nut	59	6.0	44	
Swingarm Pivot Shaft Nut	108	11.0	80	
Swingarm Pivot Shaft Lock Nut	98	10	72	
Steering:				
Steering Stem Head Nut	78	8.0	57	
Steering Stem Head Bolt (ZX1200-C3 ~)	108	11.0	80	
Steering Stem Nut	20	2.0	15	
Handlebar Bolts	25	2.5	18	
Handlebar Weight Screws	–	–	–	L
Handlebar Switch Housing Screws	3.4	0.35	30 in·lb	
Upper Front Fork Clamp Bolts	29	3.0	21	
Lower Front Fork Clamp Bolts	21	2.1	15	
Frame:				
Center Stand Bolts	29	3.0	21	
Rear Frame Bolts	44	4.5	32	L
Downtube Bolts	44	4.5	32	
Sidestand Bolt	44	4.5	32	
Sidestand Bracket Bolts	49	5.0	36	
Sidestand Switch Bolt	8.8	0.90	78 in·lb	L
Grub Rail Bolts	25	2.5	18	

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Specifications

Item	Standard	Service Limit
Fuel System		– – –
Throttle grip or choke lever	2 ~ 3 mm (0.08 ~ 0.12 in.)	
Free play Idle speed	1 000 ±50 r/min (rpm)	
Carburetor synchronization vacuum	2.7 kPa (2 cmHg, 0.39 psi) or less difference between any two carburetors	
Cooling System		– – –
Coolant:		
Type (recommended)	Permanent type antifreeze	
Color	Green	
Mixed ratio	Soft water 50% and coolant 50%	
Freezing point	–35°C (–31°F)	
Total amount	3.2 L (3.4 US qt)	
Engine Top End		– – –
Valve clearance:		
Exhaust	0.18 ~ 0.24 mm (0.0071 ~ 0.0095 in.)	
Inlet	0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in.)	
Clutch		– – –
Clutch fluid: Grade	DOT4	
Clutch lever free play	Non-adjustable	
Engine Lubrication System		– – –
Engine oil:		
Type	API SE, SF or SG API SH or SJ with JASO MA	
Viscosity	SAE 10W-40	
Capacity	3.3 L (3.5 US qt, when filter is not removed) 3.6 L (3.8 US qt, when filter is removed) 4.2 L (4.4 US qt, when engine is completely disassembled and dry)	
Level	Between upper and lower level lines (Wait 2 ~ 3 minutes after the engine stopped.)	
Tires		
Tread depth:		
Front		
BRIDGESTONE BT020E RADIAL AA 120/70 ZR17 M/C (58W)	4.3 mm (0.17 in.)	1 mm (0.04 in.) (DE, AT, CH) 1.6 mm (0.063 in.)
Rear		
BRIDGESTONE BT020R RADIAL AA 180/55 ZR17 M/C (73W)	6.2 mm (0.24 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.) Over 130 km/h (80 mph): 3 mm (0.12 in.)

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Specifications

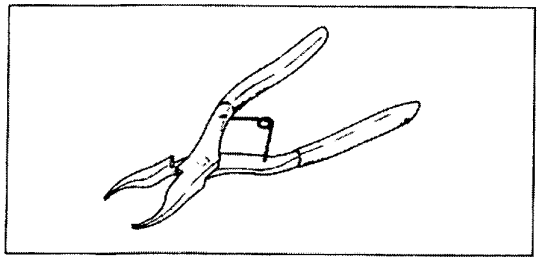
Item	Standard	Service Limit
Air pressure (when cold):		
Front	Up to 180 kg (397 lb) load: 290 kPa (2.9 kgf/cm², 42 psi)	– – –
Rear	Up to 180 kg (397 lb) load: 290 kPa (2.9 kgf/cm², 42 psi)	– – –
Final Drive		
Drive chain slack	25 ~ 35 mm (1 ~ 1.4 in.)	
Drive chain wear (20-link length)	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Brakes		
Brake fluid: Grade	DOT4	– – –
Brake pad lining thickness:		
Front	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Rear	4.0 mm (0.16 in.)	1 mm (0.04 in.)
Brake light timing:		
Front	Pulled ON	– – –
Rear	ON after about 10 mm (0.39 in.) of pedal travel	– – –
Suspension		
Fork Oil:		
Viscosity	SAE 5W	– – –
When changing oil amount	approx. 350 mL (11.8 US oz)	– – –
After disassembly and completely dry amount	409 ±4 mL (13.8 ±0.14 US oz)	– – –
Fork Oil Level: (fully compressed, without spring)	167 ±2 mm (6.57 ±0.08 in.)	
Electrical System		
Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	– – –

AT: Republic of Austria
CH: Swiss Confederation
DE: Federal Republic of Germany

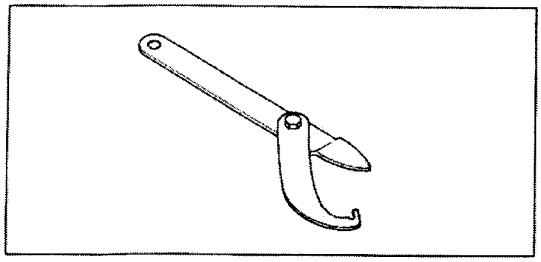
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Special Tools

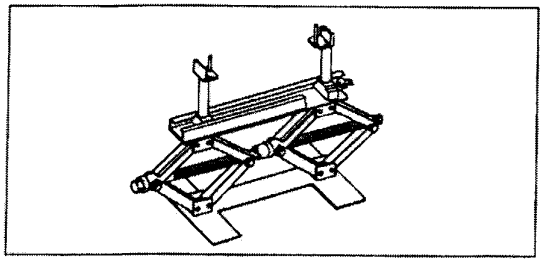
Inside Circlip Pliers:
57001–143



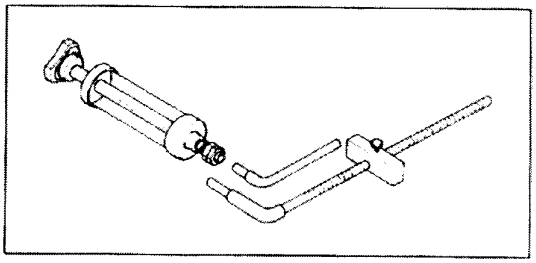
Steering Stem Nut Wrench:
57001–1100



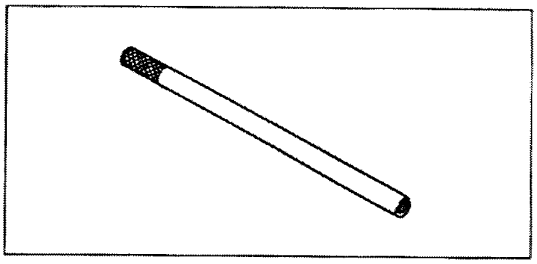
Jack:
57001–1238



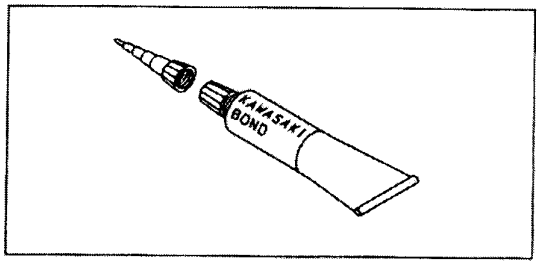
Fork Oil Level Gauge:
57001–1290



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



Kawasaki Bond (Silicone Sealant):
56019–120

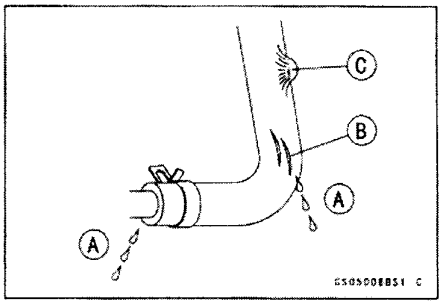


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Periodic Maintenance Procedures

Fuel System

Fuel Hose and Connection Inspection



OThe fuel hoses are designed to be used throughout the motorcycle's life without any maintenance, however, if the motorcycle is not properly handled, the pressure inside the fuel line can cause fuel to leak [A] or the hose to burst. Remove the fuel tank (see Fuel System chapter) and check the fuel hose.

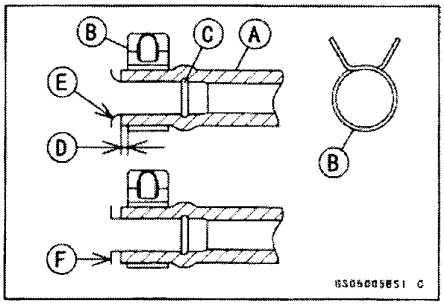
★Replace the fuel hose if any fraying, cracks [B] or bulges [C] are noticed.

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

● When installing, route the hoses according to Cable, Wire, and Hose Routing section in the General Information 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.

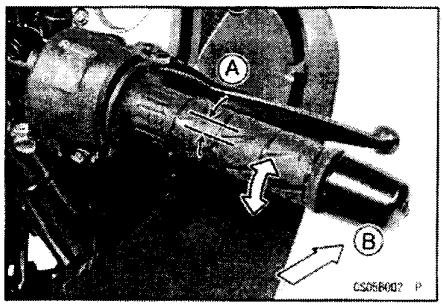


● Fit the fuel hose [A] onto the fitting fully and install the plate clamp [B] beyond the raised rib [C].
1 ~ 2 mm (0.0039 ~ 0.0078 in.) [D]

OThe hose end must reach the fillet [E] or be as near as possible to the step [F].

OFit the fuel pump inlet hoses onto the Y-joint fully until each end of the inlet hose touches the second raised rib.

Throttle Grip Play Inspection



● Check the throttle grip free play [A].
Front [B]

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

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

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

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

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

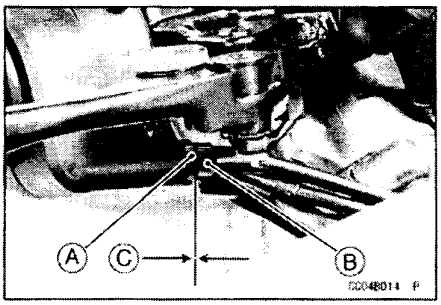
★If the idle speed increases, check the throttle grip free play and the cable routing.

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Periodic Maintenance Procedures

★If necessary, adjust the throttle cable as follows.
- Loosen the locknut [A] (right-front view).
- Turn the adjuster [B] until the proper amount of free play can be obtained.
- Tighten [C] the locknut against the adjuster securely.

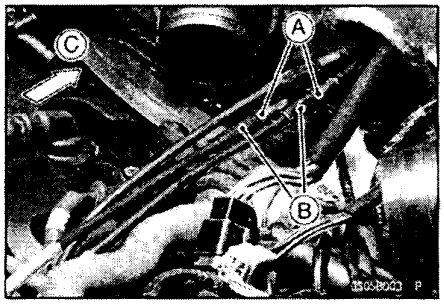
★If the throttle grip free play cannot be adjusted with the adjuster, use the adjusters in the middle of the throttle cables.
- Loosen the locknut, and screw the adjuster at the upper end of the accelerator cable all the way in.
- Tighten the locknut against the adjuster securely.



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

Front [C]

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



Idle Speed Inspection
- Start the engine and warm it up thoroughly.
- With the engine idling, turn the handlebar to both sides.

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

⚠ WARNING

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

- Check idle speed.

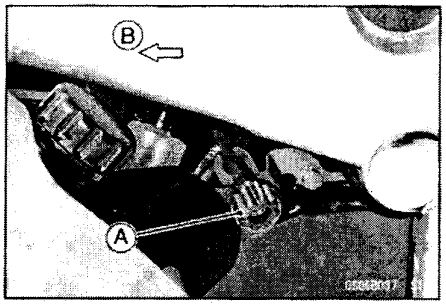
★If the idle speed is out of the specified range, adjust it.

Idle Speed
Standard: 1 000 ±50 r/min (rpm)

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

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

Front [B]



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Periodic Maintenance Procedures

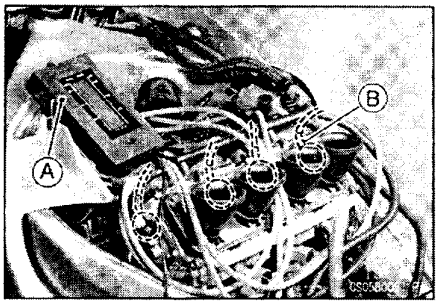
Carburetor Synchronization Inspection

- Situate the motorcycle so that it is vertical.
- Start the engine and warm it up thoroughly.
- Check idle speed, using an accurate commercially available tachometer.

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

- Remove the fuel tank and the air cleaner housing (see Fuel System chapter).
- Supply fuel to the carburetors with an auxiliary fuel tank.
- Pull the vacuum hoses off, and attach a commercially available vacuum gauge [A] to the fittings [B] on the carburetor holders (rear view).
- Start the engine and let it idle to measure each carburetor inlet vacuum.

★If the vacuum is incorrect, adjust the synchronization as follows:



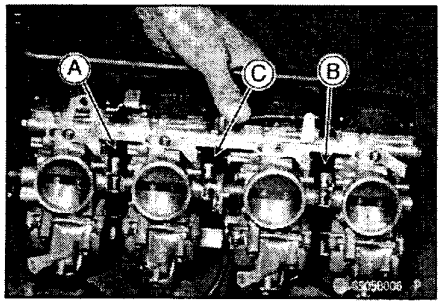
Carburetor Synchronization Vacuum

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

★If combustion varies from cylinder to cylinder, adjust the synchronization (in the photo, the carburetors have been removed for clarity).

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

○First synchronize the right two and then the left two carburetors by means of the adjusting screws [A] and [B] (front view). Then synchronize the right two carburetors and the left two carburetors using the center adjusting screw [C]. Adjust the idle speed as necessary.



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

CAUTION

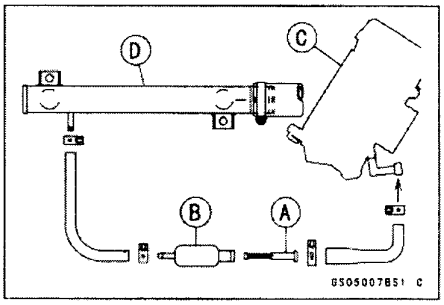
Do not turn the pilot screws carelessly during synchronization. You may cause poor running at low engine speed.

- Open and close the throttle a few times to make sure that the throttle valves are synchronized. Readjust if necessary.
- Install all parts previously removed, and adjust the idle speed.
- Connect the vacuum hoses to their original positions.

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Periodic Maintenance Procedures

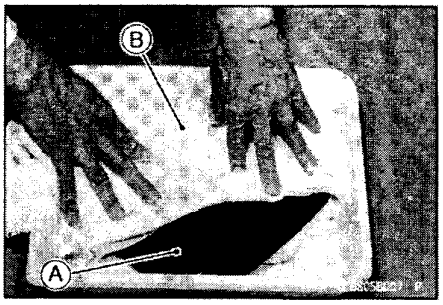
Coolant Filter Cleaning



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

- Remove the fuel tank (see Fuel System chapter).
- Remove the case [B] and take out the coolant filter. Carburetor [C] and Water Pipe [D]
- Plug the coolant hose immediately and wash away any coolant that spills on the engine.
- Blow dirt and sediment off the filter with compressed air.
- Install the coolant filter (see Fuel System chapter).

Air Cleaner Element/Air Vent Filter Cleaning



NOTE

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

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

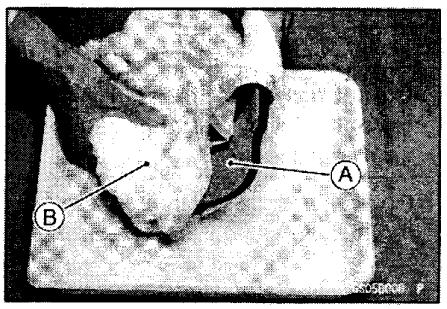
- Remove the air cleaner element (see Element Removal in the Fuel System chapter).
- Clean the element [A] in a bath of a high-flash point solvent.
- Squeeze the element dry in a clean towel [B].

⚠ WARNING

Clean the element in a well-ventilated area, and make sure that there are no sparks or flames anywhere near the working area; this includes any appliance with a pilot light. To avoid a fire or explosion, do not use gasoline or a low-flash point solvent to clean the element.

CAUTION

Do not twist, wring or blow the element dry to avoid damaging it.

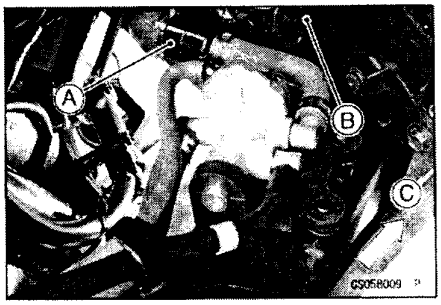


- After cleaning, saturate the element [A] with a high-quality foam-air-filter oil, squeeze out the excess oil, then wrap it in a clean towel [B] and squeeze it dry as much as possible. Be careful not to tear the element.
- Before installation, check the element for damage such as tears, hardening or shrinkage. If damaged, replace the element.

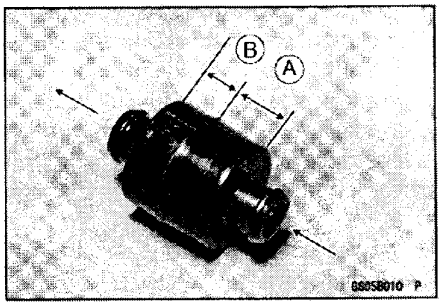
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Periodic Maintenance Procedures

● Remove the right inner cover (see Frame chapter).
● Remove the air vent filter [A] from under the headlight body [B].
Front [C]



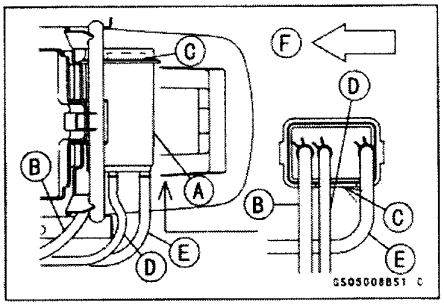
● Clean the filter by directing a stream of compressed air from the clean side [A] (rear: longer side) to the dirty side (front: shorter side) [B].



Evaporative Emission Control System Inspection
● Inspect the California canister as follows:
○Remove the seat and seat cover (see Frame chapter).
○Remove the canister and visually inspect it for cracks and other damage.
★If the canister has any cracks or bad damage, replace it with a new one.

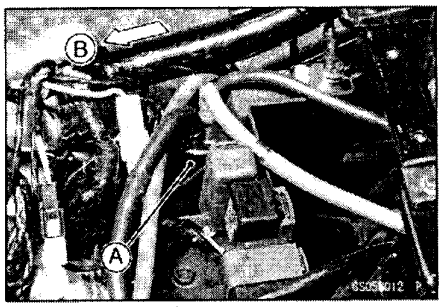
NOTE

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



○The canister [A] must be installed in the direction shown so the green hose [B] on the front and the inlet [C] down. Otherwise reinstall it.
Blue Hose [D]
Yellow Hose [E]
Front [F]

● Check the California liquid/vapor separator as follows:
● Remove the fuel tank (see Fuel System chapter).
○Disconnect the hoses from the separator, and remove the separator [A] from the motorcycle right side.
Front [B]
○Visually inspect the separator for cracks and other damage.
★If the separator has any cracks or damage, replace it with a new one.
○To prevent the gasoline from flowing into or out of the canister, hold the separator perpendicular to the ground.
● Check the hoses of the California evaporative emission control system as follows:



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Periodic Maintenance Procedures

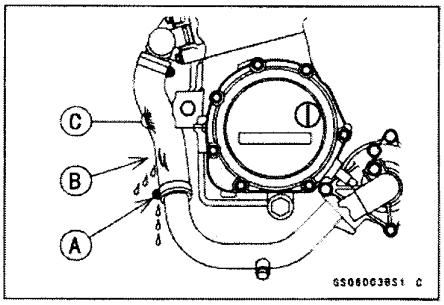
○Check that the hoses are securely connected and clips are in position.
○Replace any kinked, deteriorated or damaged hoses.
○Route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.
○When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses with a minimum of bending so that the emission flow will not be obstructed.

Cooling System

Radiator Hose and Connection Inspection

○The high pressure inside the radiator 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.

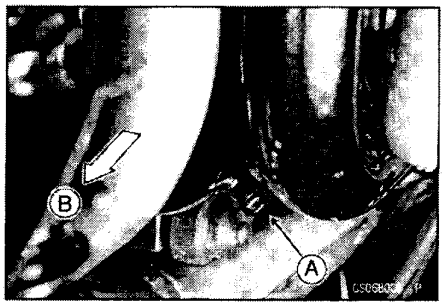
Torque - Radiator Hose Clamp Screws: 2.5 N·m (0.25 kgf·m, 22 in·lb)



Coolant Change

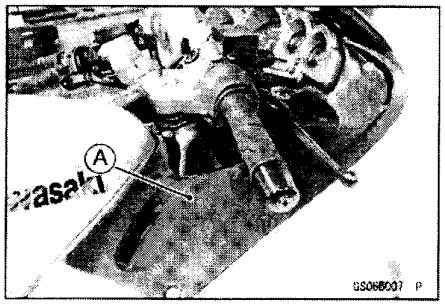
⚠ WARNING

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



● Put the motorcycle on its center stand.
● Remove the left lower fairing (see Frame chapter).
● Place a container under the drain plug [A], then remove the plug.
Front [B]

● Remove the right inner cover [A] (see Frame chapter).



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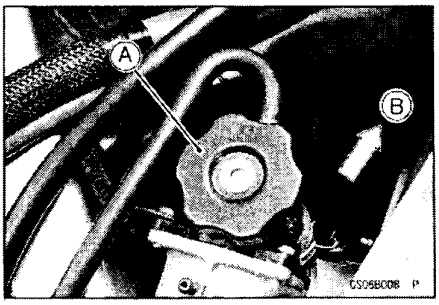
Periodic Maintenance Procedures

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

○The coolant will drain from the radiator and engine.

● Tighten the drain plug.

Torque - Drain Plug: 11 N·m (1.1 kgf·m, 97 in·lb)

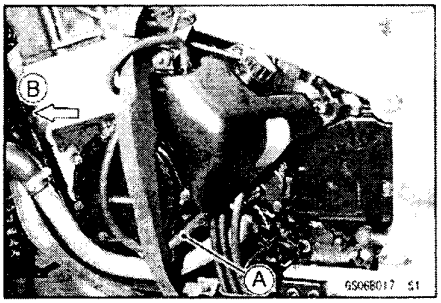


● Pull the hose [A] off the coolant reserve tank, and pour the coolant into a suitable container.
Front [B]

○When filling the coolant, choose a suitable mixture ratio by referring to the coolant manufacturer's directions.

CAUTION

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



● Fill the radiator up to the filler neck [A] with coolant.

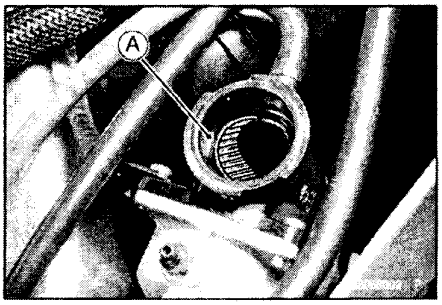
NOTE

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

● Fill the reserve tank up to the "F" (full) level line with coolant, and install the cap.

Water and Coolant Mixture Ratio

Soft water:	**50%**
Coolant:	**50%**
Freezing Point:	**– 35 °C (– 31 °F)**
Total Amount:	**3.2 L (3.4 US qt, reserve tank, engine, and radiator)**



NOTE

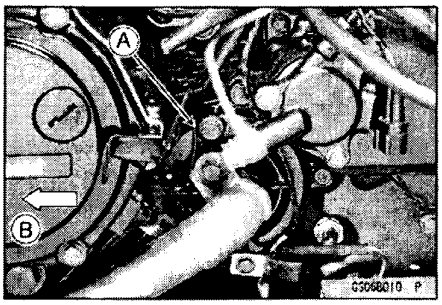
○*Choose a suitable mixture ratio by referring to the coolant manufacturer's directions.*

● Bleed the air from the cooling system using following two air bleeder bolts in the order listed.

○Loosen each air bleeder bolt [A] until the coolant begins to flow out the air bleeder bolt hole (that is, until all the remaining air has been forced out).
Front [B]

○Tighten each air bleeder bolt.

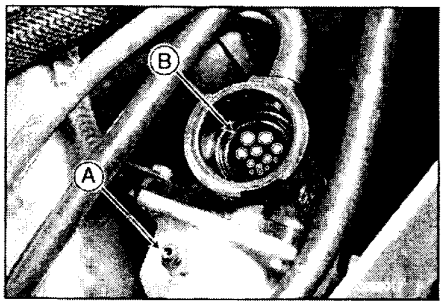
Torque - Water Pump Air Bleeder Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)



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Periodic Maintenance Procedures

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



- Start the engine with the radiator cap removed and run it until no more air bubbles [B] can be seen in the coolant.
- Tap the radiator hoses to force any air bubbles caught inside.
- Stop the engine and add coolant up to the radiator filler neck.
- Install the radiator cap.
- Check the coolant level in the reserve tank after the engine cools down (see Coolant Level Inspection in the Cooling System chapter).

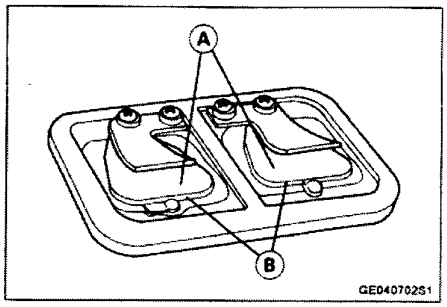
★If the coolant level is lower than the "L" level line, add coolant to the "F" level line.

- Install the right inner cover and left lower fairing (see Frame chapter).

CAUTION
Do not add more coolant above the "F" level line.

Engine Top End

Air Suction Valve Inspection



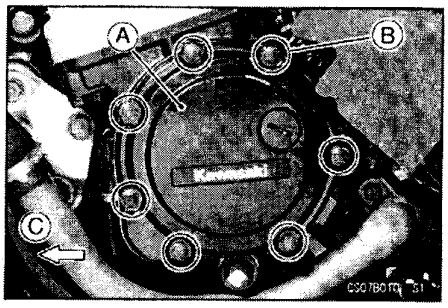
- Remove the fuel tank and air cleaner housing (see Fuel System chapter).
- Remove the air suction valve (see Air Suction Valve Removal in the Engine Top End chapter).
- Visually inspect the reeds for cracks, folds, warps, heat damage or other damage.

★If there is any doubt as to the condition of the reeds [A], replace the air suction valve as an assembly.

- Check the reed contact areas [B] of the valve holder for grooves, scratches, any signs of separation from the holder or heat damage.
- If there is any doubt as to the condition of the reed contact areas, replace the air suction valve as an assembly.
- If any carbon or other foreign particles have accumulated between the reed and the reed contact area, wash the valve assembly clean with a high-flash point solvent.

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

Valve Clearance Inspection



NOTE

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

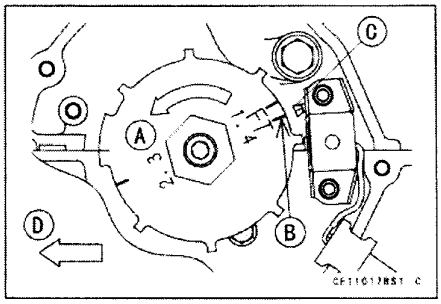
- Remove:

Fuel Tank and Air Cleaner Housing (see Fuel System chapter)
Left Lower Fairing (see Frame chapter)
Cylinder Head Cover (see Engine Top End chapter)
Pickup Coil Cover [A] and Bolts [B]
Front [C]

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Periodic Maintenance Procedures

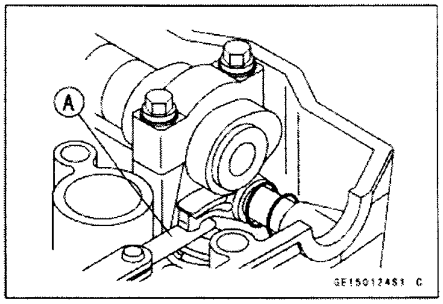
● Turn the crankshaft counterclockwise [A] and set the crankshaft at 1,4 piston TDC.
TDC Mark [B] #1, 4 Pistons
Crankcase Mark [C]
Front [D]



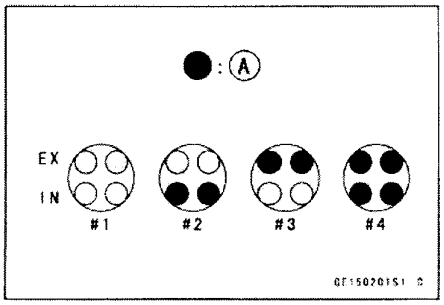
● Using a thickness gauge [A], measure the valve clearance between the rocker arm and the shim.

Valve Clearance
Standard:

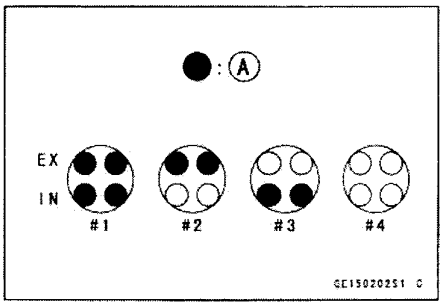
Exhaust	**0.18 ~ 0.24 mm (0.0071 ~ 0.0095 in.)**
Inlet	**0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in.)**



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



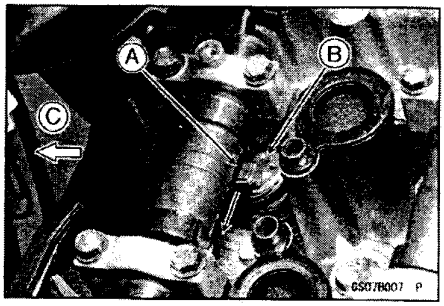
○When positioning #1 piston TDC at the end of the compression stroke, measure the following valves [A] at a time:
Exhaust valve clearance of #1 and #2 cylinders.
Inlet valve clearance of #1 and #3 cylinders
★If the valve clearance is not within the specified range, first record the clearance, and then adjust it.



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Periodic Maintenance Procedures

Valve Clearance Adjustment



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

NOTE

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

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

Additional Shims

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

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

CAUTION

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

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Periodic Maintenance Procedures

EXHAUST- VALVE CLEARANCE ADJUSTMENT CHART

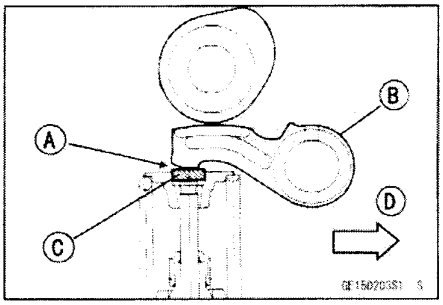
	Present Shim ← Example																				
Part No. (92025)	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
Mark	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	00
Thickness (mm)	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50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

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

Example

Install the shim of this thickness (mm)

1. Measure the clearance [A] (with engine cold) between the rocker arm [B] and shim [C].
   Front [D]
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. Install the shim specified where the lines intersect. This shim will give the proper clearance.
   Example:
   Present shim is **2.60 mm.**
   Measured clearance is **0.30 mm.**
   Replace **2.60 mm** shim with **2.70 mm** shim.
5. Remeasure the valve clearance and readjust if necessary.



CAUTION

Be sure to remeasure the clearance after selecting a shim according to the table. If the clearance is out of the specified range, use the additional shim.

NOTE

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

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Periodic Maintenance Procedures

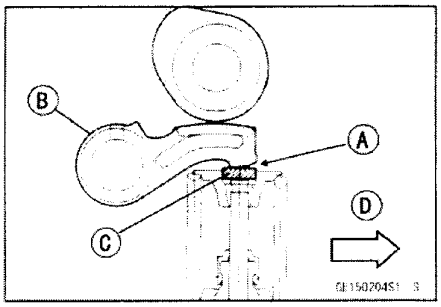
INLET- VALVE CLEARANCE ADJUSTMENT CHART

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

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

Install the shim of this thickness (mm).

1. Measure the clearance [A] (with engine cold) between the rocker arm [B] and shim [C].
   Front [D]
2. Check present shim size.
3. Match clearance in vertical column with present shim size in horizontal column.
4. Install the shim specified where the lines intersect. This shim will give the proper clearance.
   Example:
   Present shim is **2.55 mm.**
   Measured clearance is **0.35 mm.**
   Replace **2.55 mm** shim with **2.75 mm** shim.
5. Remeasure the valve clearance and readjust if necessary.



CAUTION

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

NOTE

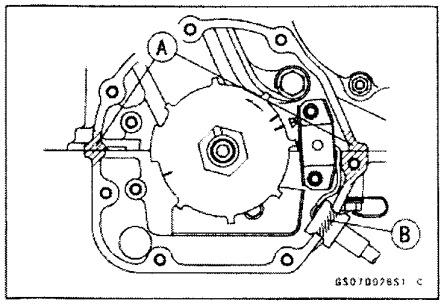
○*If the valve clearance is smaller (larger) than the standard, select a thinner (thicker) shim and then measure the clearance again.*

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Periodic Maintenance Procedures

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

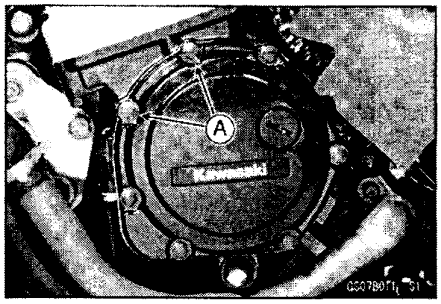
Sealant - Kawasaki Bond (Silicone Sealant): 56019–120



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

Torque - Pickup Coil Cover Bolts : 11 N·m (1.1 kgf·m, 97 in·lb)

- Install the removed parts.



Clutch

Clutch Hose and Connection Inspection

- The high pressure inside the clutch 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 (left-front view).

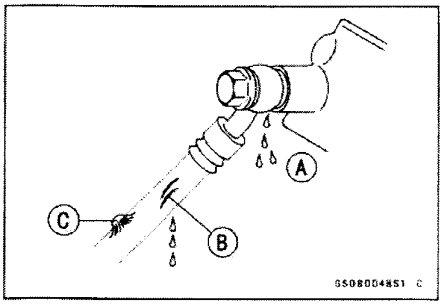
★Replace it if any fraying, cracks [B] or bulges [C] are noticed.

- Check that the hoses are securely connected and banjo bolts are tightened correctly.

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

- When installing the clutch hose, route the hoses according to Cable, Wire, and Hose Routing section in the Appendix chapter.

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



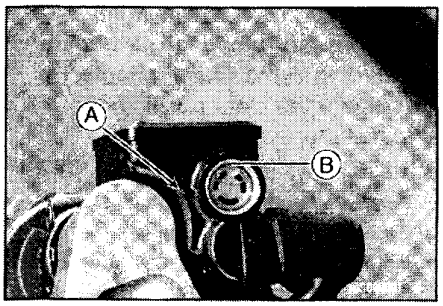
Clutch Fluid Level Inspection

- Hold the clutch fluid reservoir horizontal.
- Check that the clutch fluid level of the clutch reservoir is between the lower [A] and the upper [B] level lines.

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

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

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



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Periodic Maintenance Procedures

⚠ WARNING

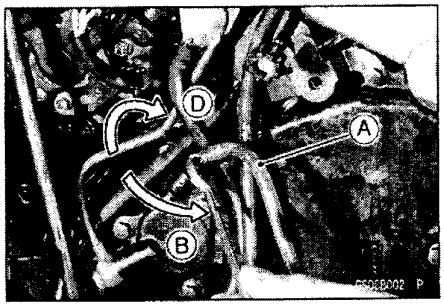
Change the fluid in the clutch line completely if the fluid must be refilled but the type and brand of the fluid that already is in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter. Mixing different types and brands of fluid lowers the fluid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

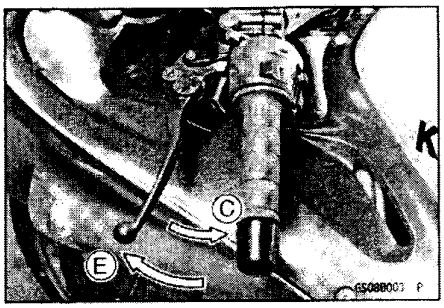
Clutch Fluid Change

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

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

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





NOTE

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

⚠ WARNING

Do not mix two brands of fluid.

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

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

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

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

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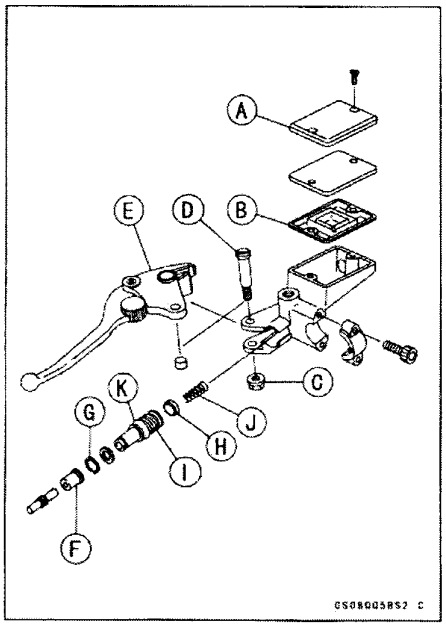
Periodic Maintenance Procedures

Clutch Master Cylinder Cup and Dust Seal Replacement

- Remove the clutch master cylinder (see Clutch Master Cylinder Removal in the Clutch chapter).
- Remove the reservoir cap [A] and diaphragm [B], and pour the clutch fluid into a container.
- Unscrew the locknut [C] and pivot bolt [D], and remove the clutch lever [E].
- Pull the dust cover [F] out of place, and remove the circlip [G].

Special Tool - Inside Circlip Pliers: 57001-143

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



CAUTION

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

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

CAUTION

Use only disc brake fluid, isopropyl alcohol or ethyl alcohol for cleaning parts. Do not use any other fluid for cleaning these parts. Gasoline, motor oil or any other petroleum distillate will cause deterioration of the rubber parts. Oil spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the cylinder.

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

○The push rod round end must be faced inwards.

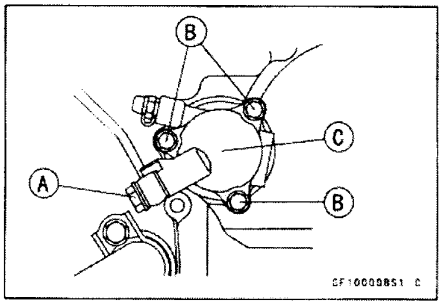
Torque - Clutch Lever Pivot Bolt: 1.0 N·m (0.10 kgf·m, 8.7 in·lb)
Clutch Lever Pivot Bolt Locknut: 5.9 N·m (0.60 kgf·m, 52 in·lb)

- Install the clutch master cylinder (see Clutch Master Cylinder Removal in the Clutch chapter).

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Periodic Maintenance Procedures

Clutch Slave Cylinder Piston Seal Replacement



- Remove the left lower fairing (see Frame chapter).
- Remove the plastic baffle and coolant reserve tank.
- Loosen the banjo bolt [A] at the clutch pipe lower end, and tighten it loosely.
- Unscrew the slave cylinder bolts [B] and detach the slave cylinder with the pipe installed from the engine.
- Pump the clutch lever until the piston comes out of the cylinder.
- Unscrew the banjo bolt and remove the slave cylinder [C].

CAUTION

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

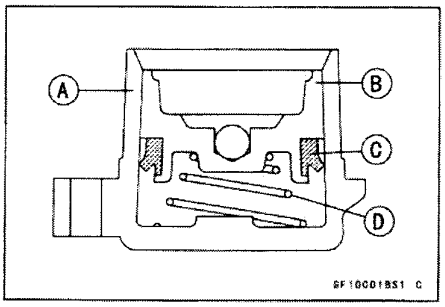
NOTE

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

- Remove the spring and piston seal.

CAUTION

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



- Before assembly, apply clutch fluid to the outside of the piston and the piston seal.
- Install the piston seal as shown.

  Cylinder [A]
  Piston [B]
  Piston Seal [C]
  Spring [D]

⚠ WARNING

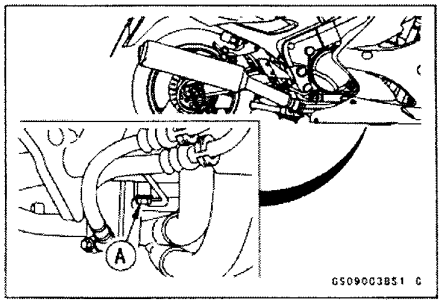
Motorcycle operation with insufficient, deteriorated or contaminated engine oil will cause accelerated wear and may result in engine or transmission seizure, accident, and injury.

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Periodic Maintenance Procedures

Engine Lubrication System

Engine Oil Change



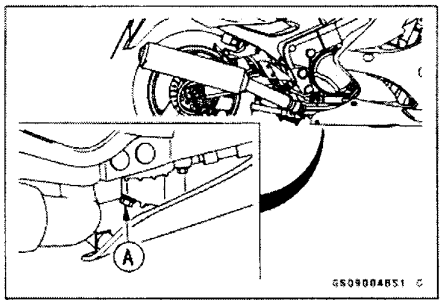
- Situate the motorcycle so that it is vertical after warming up the engine. Do not use the center stand or the sidestand.
- Remove two engine drain plugs [A] and drain the oil.

○The oil in the oil filter can be drained by removing the oil filter bolt and oil filter (see Oil Filter Change in this section).

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

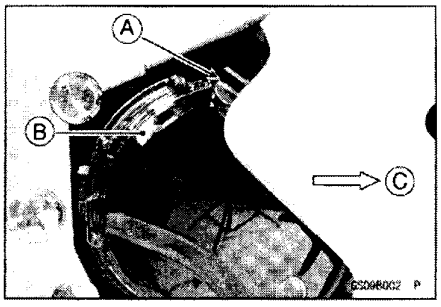
- Tighten:

Torque - Engine Drain Plugs: 20 N·m (2.0 kgf·m, 15 ft·lb)
Oil Filter Bolt: 20 N·m (2.0 kgf·m, 15 ft·lb)



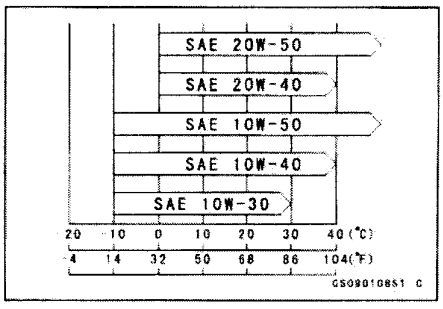
- Remove the oil filler cap [A] and pour in the specified type and amount of oil.
  Clutch Cover [B]
  Front [C]

Torque - Oil Filler Cap: 2.5 N·m (0.25 kgf·m, 22 in·lb)



Engine Oil

Type:	**API SE, SF or SG class**
	API SH or SJ class with JASO MA
Viscosity:	**SAE 10W-40**
Amount:	**3.3 L (3.5 US qt, when filter is not removed)**
	3.6 L (3.8 US qt, when filter is removed)
	4.2 L (4.4 US qt, when engine is completely disassembled and dry)



NOTE

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

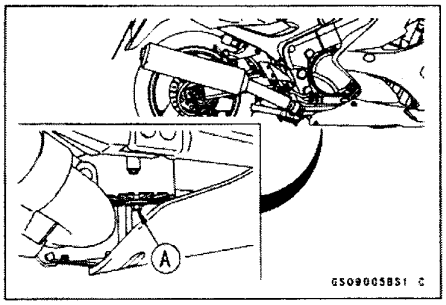
○Depending on the atmospheric temperature of your riding area, the engine oil viscosity should be changed according to the chart shown.

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Periodic Maintenance Procedures

Oil Filter Change

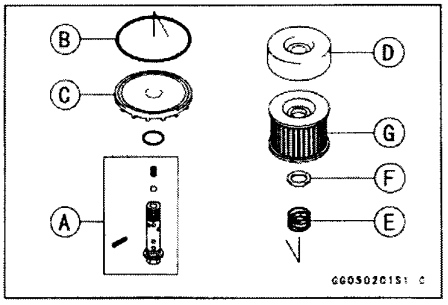
- Drain the engine oil (see Engine Oil Change in this section).
- Remove the oil filter bolt [A] and take off the filter assembly.



NOTE

○*The oil filter bypass valve is assembled in the filter bolt and cannot be removed.*

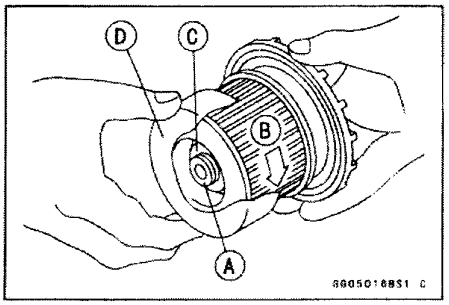
Filter Bolt [A]
O-ring [B]
Filter Cover [C]
Oil Fence [D]
Spring [E]
Washer [F]
Filter [G]



- Replace the filter with a new one.
- Apply engine oil to the body of the filter bolt [A] (excluding threads), and turn [B] the filter or the filter bolt to work the filter into place. Be careful that the filter grommets [C] do not slip out of place.
- Install the filter fence [D] over the filter.
- Apply grease to the O-rings of the filter bolt and filter cover, and tighten the filter bolt.

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

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

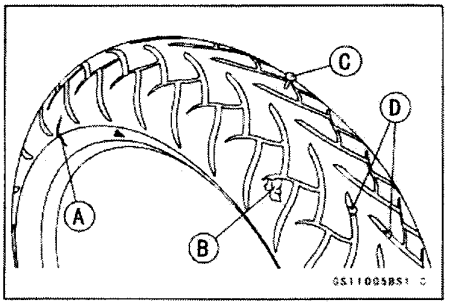


Wheel/Tires

Tire Inspection

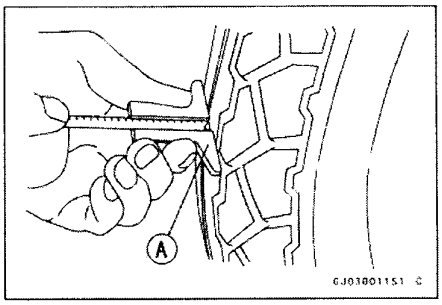
As the tire tread wears down, the tire becomes more susceptible to puncture and failure. An accepted estimate is that 90% of all tire failures occur during the last 10% of tread life (90% worn). So it is false economy and unsafe to use the tires until they are bald.

- Remove any imbedded stones [D] or other foreign particles from the tread.
- Visually inspect the tire for cracks [A], cuts [B], and a nail [C], replacing the tire in case of damage. Swelling or high spots indicate internal damage, requiring tire replacement.



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Periodic Maintenance Procedures



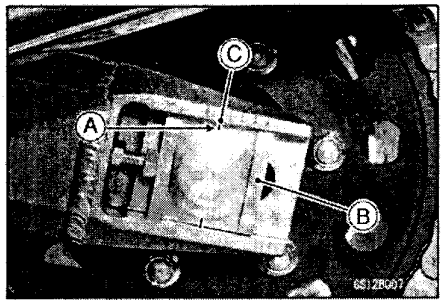
● Measure the tread depth at the center of the tread with a depth gauge [A]. Since the tire may wear unevenly, take measurement at several places.
★If any measurement is less than the service limit, replace the tire (see Wheels/Tires chapter).

Tread Depth

Standard:	
Front	**4.3 mm (0.17 in.)**
	4.0 mm (0.16 in.), ZX1200-C2 ~
Rear	**6.2 mm (0.24 in.)**
	5.9 mm (0.23 in.), ZX1200-C2 ~
Service Limit:	
Front	**1 mm (0.04 in.)**
	(AT, CH, DE) 1.6 mm (0.63 in.)
Rear	**2 mm (0.08 in.): up to 130 km/h (80 mph)**
	3 mm (0.12 in.): over to 130 km/h (80 mph)

Final Drive

Drive Chain Slack Inspection



NOTE

○*Check the slack with the motorcycle setting on it's center stand.*
○*Clean the chain if it is dirty, and lubricate it if it appears dry.*

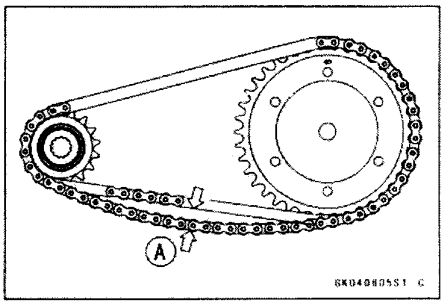
● Check that the notch [A] on the left alignment indicator [B] aligns with the same swingarm mark or position [C] that the right alignment indicator notch aligns with.
★If they are not, adjust the chain slack and align the wheel alignment (see Slack Adjustment).

NOTE

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

⚠ WARNING

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



● Rotate the rear wheel to find the position where the chain is tightest.
● Measure the vertical movement (chain slack) [A] midway between the sprockets.
★If the chain slack exceeds the standard, adjust it.

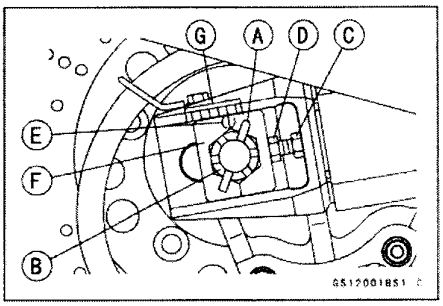
Chain Slack

Standard:	**25 ~ 35 mm (0.98 ~ 1.4 in.)**

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Periodic Maintenance Procedures

Drive Chain Slack Adjustment



- Straighten the cotter pin [A] and remove it.
- Loosen the axle nut [B].
- Loosen the both chain adjuster locknuts [C].
- Turn the chain adjusters [D] forward or rearward until the drive chain has the correct amount of chain slack.
- The right and left notches [E] on the alignment indicators [F] should point to the same marks or positions [G] on the swingarm.

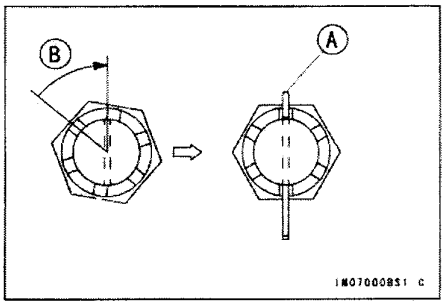
⚠ WARNING

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

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

Torque - Rear Axle Nut: 108 N·m (11.0 kgf-m, 80 ft-lb)

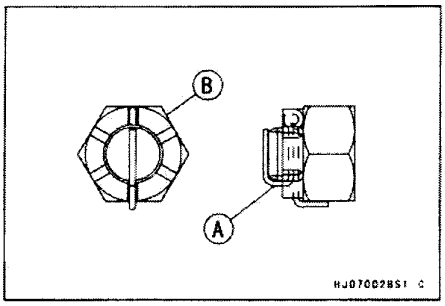
- Turn the wheel, measure the chain slack again at the tightest position, and readjust if necessary.
- Insert a new cotter pin [A].



NOTE

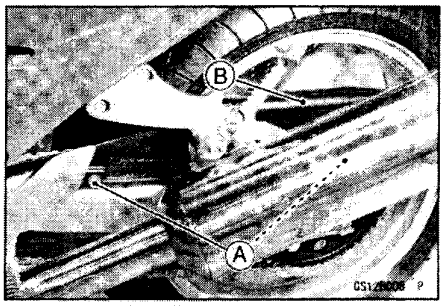
- *When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axel, tighten the nut clockwise [B] up to next alignment.*
- *It should be within 30 degree.*
- *Loosen once and tighten again when the slot goes past the nearest hole.*

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



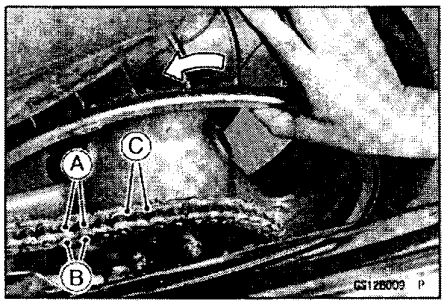
Drive Chain Wear Inspection

- Use the center stand to support the motorcycle upright.
- Remove:
  Mounting Bolts [A]
  Chain Cover [B]



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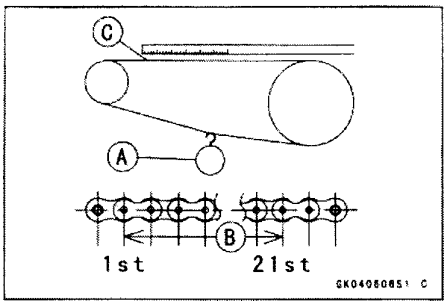
Periodic Maintenance Procedures



- Rotate the rear wheel to inspect the drive chain for cracked, worn or damaged rollers [A], pins [B] and links [C].

★If there is any irregularity, replace the drive chain.

★Lubricate the drive chain if it appears dry.



- Stretch the chain taut by hanging a 98 N (10 kg, 20 lb) weight [A] on the chain.
- Measure the length of 20 links [B] on the straight part [C] of the chain from the pin center of the 1st pin to the pin center of the 21st pin. Since the chain may wear unevenly, take measurements at several places.

★If any measurements exceed the service limit, replace the chain. Also, replace the front and rear sprockets when the drive chain is replaced.

Drive Chain 20-link Length

Standard:	**317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)**
Service Limit:	**323 mm (12.7 in.)**

⚠ WARNING

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

Drive Chain Lubrication

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

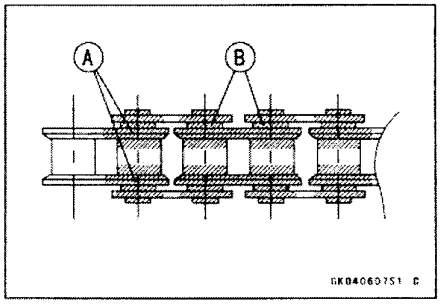
CAUTION

The O-rings between the side plates seal the lubricant between the pin and the bushing. To avoid damaging the O-rings and resultant loss of lubricant, observe the following rules.
Use only kerosene or diesel oil for cleaning an O -ring drive chain.
Any other cleaning solution such as gasoline or trichloroethylene will cause deterioration and swelling of the O-ring.
Immediately blow the chain dry with compressed air after cleaning.
Complete cleaning and drying the chain within 10 minutes.

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Periodic Maintenance Procedures

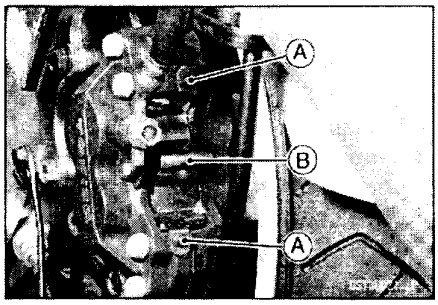
- Apply [A] oil to the sides of the rollers so that oil will penetrate to the rollers and bushings. Apply the oil to the O-rings [B] so that the O-rings will be coated with oil.
- Wipe off any excess oil.



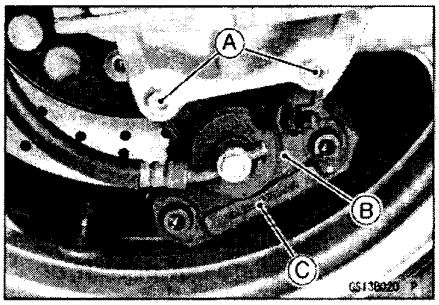
Brakes

Brake Pad Wear Inspection

- For the front brake caliper, unscrew the bolts [A] and remove the pad spring [B].



- For the rear brake caliper, unscrew the bolts [A] and remove the caliper [B] and pad cover [C].



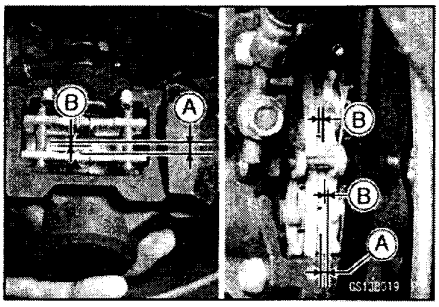
- Check the lining thickness [A] of the pads in each caliper.

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

Pad Lining Thickness

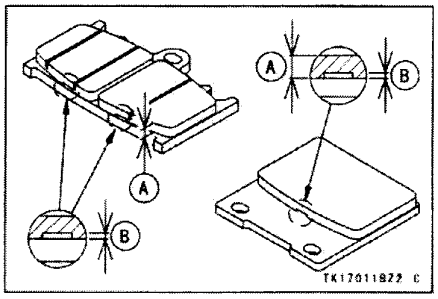
Standard:

Front:	**4.0 mm (0.16 in.)**
Rear:	**4.0 mm (0.16 in.)**
Service Limit:	**1 mm (0.04 in.)**



- Install the pad spring or caliper.
- Tighten the bolts.

Torque - Front Brake Pad Spring Bolts: 2.9 N·m (0.30 kgf·m, 26 in·lb)
Rear Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



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Periodic Maintenance Procedures

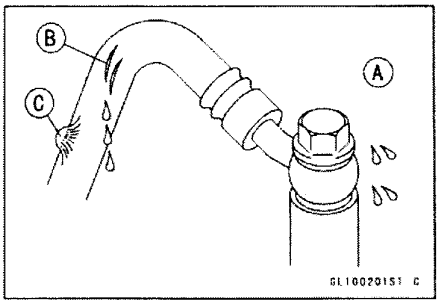
Brake Hose and Connection Check

● 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.

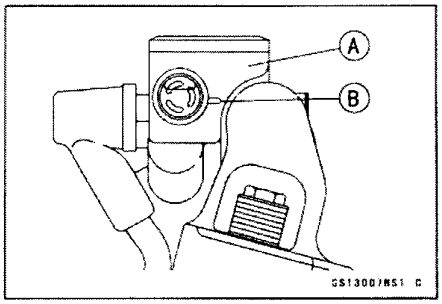


Brake Fluid Level Inspection

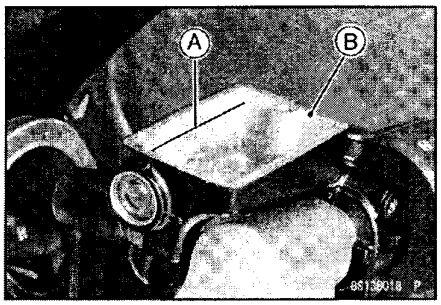
● Check that the brake fluid level in the front brake reservoir [A] is above the lower [B] level line.

NOTE

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



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



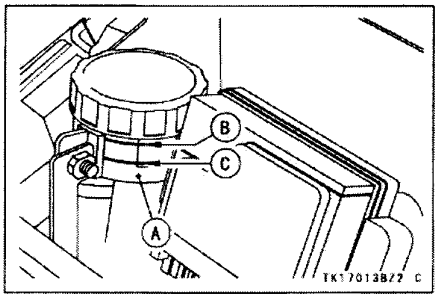
● Check that the brake fluid level in the rear brake reservoir [A] is between the upper [B] and the lower [C] level lines.

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

○Use extra heavy-duty brake fluid only from a container marked DOT4.

○Brake fluid of DOT4 is installed in the brake system when shipped.

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



⚠ WARNING

Do not mix two brands of fluid. Change the brake fluid in the brake line completely if the brake fluid must be refilled but the type and brand of the brake fluid that is already in the reservoir are unidentified. After changing the fluid, use only the same type and brand of fluid thereafter.

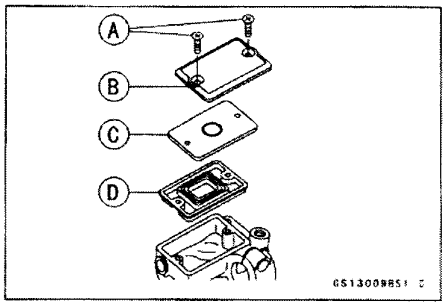
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Periodic Maintenance Procedures

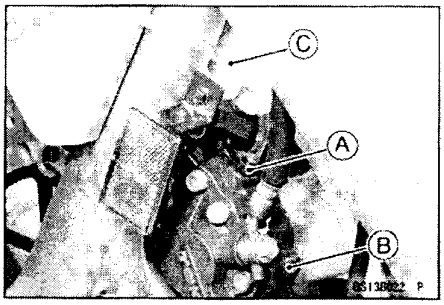
Brake Fluid Change

NOTE

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



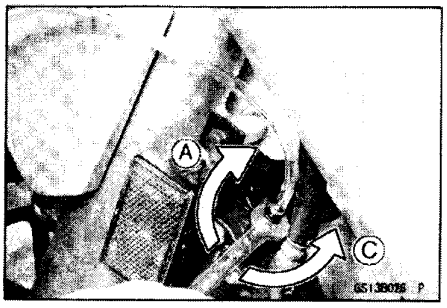
- Level the brake fluid reservoir.
- Remove the bolts [A] reservoir cap [B], plate [C] and diaphragm [D].



- Remove the rubber cap from the bleed valve [A] on the front caliper [B].
- Attach a clear plastic hose [C] to the bleed valve, and run the other end of the hose into a container.
- Fill the reservoir with new brake fluid.
- Temporarily install the reservoir cap.
- Change the brake fluid as follows:

NOTE

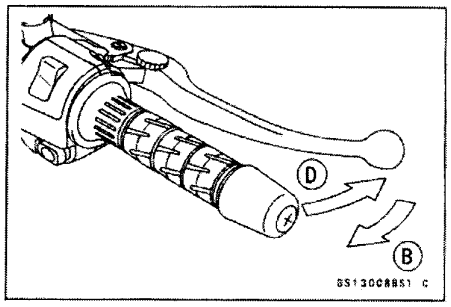
○*The fluid level must be checked often during the changing operation and replenished with fresh brake fluid. If the fluid in the reservoir runs out any time during the changing operation, the brakes will need to be bled since air will have entered the brake line.*



○Repeat this operation until fresh brake fluid comes out from the plastic hose or the color of the fluid changes.
Open the bleed valve [A].
Pump the brake lever and hold it [B].
Close the bleed valve [C].
Release the brake lever [D].
Front Brake : Repeat the above steps for other caliper.

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

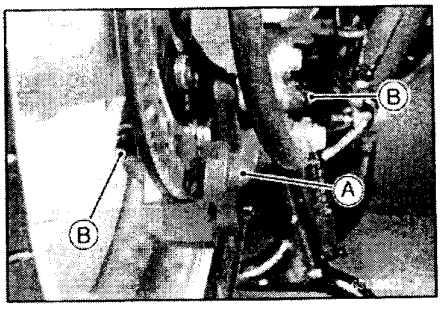
Torque - Caliper Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)
Front Brake Reservoir Cap Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)



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Periodic Maintenance Procedures

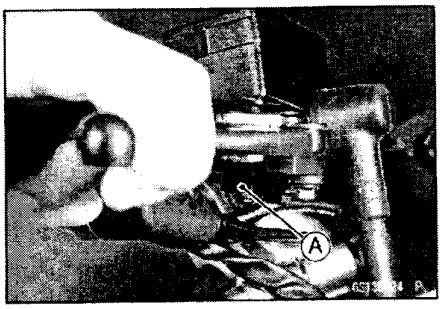
○For the rear brake caliper [A], change the brake fluid for two bleed valves [B].
● After changing the fluid, check the brake for good braking power, no brake drag, and no fluid leakage.
★If necessary, bleed the air from the lines (see Brakes chapter).



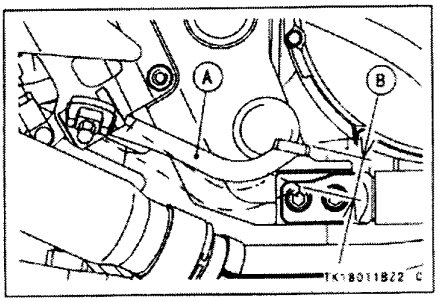
Brake Master Cylinder Cup and Dust Seal Replacement
● Refer to the Master Cylinder section in the Brakes chapter for Brake Master Cylinder Cup and Dust Seal Replacement.

Caliper Piston/Dust Seals Replacement
● Refer to the Calipers section in the Brakes chapter for Caliper Piston/Dust Seals Replacement.

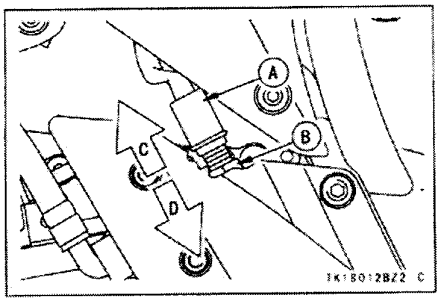
Front Brake Light Switch Inspection
● Turn on the ignition switch.
● The brake light should go on when the front brake lever is applied.
★If it does not, inspect the switch [A].
● Disconnect the connectors.
● Check continuity (about zero ohms) of the terminals with a hand tester.
○For the front brake light switch, refer to the table in the Wiring Diagram.
★If the switch has an open or short, replace it with new one.



Rear Brake Light Switch Inspection/Adjustment
● Turn on the ignition switch.
● Check the operation of the rear brake light switch by depressing the brake pedal [A]. The brake light should go on after about **10 mm (0.39 in.)** of the pedal travel [B].



★If it does not, adjust and inspect the brake light switch.
● While holding the switch body, turn the adjusting nut to adjust the switch.
Switch Body [A]
Adjusting Nut [B]
Light sooner as the body rises [C]
Light later as the body lowers [D]

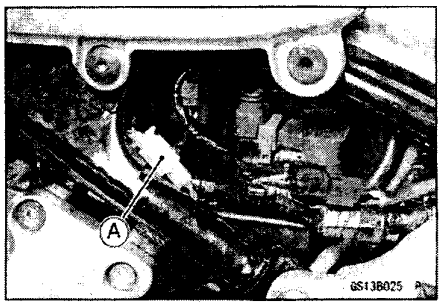


CAUTION

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

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Periodic Maintenance Procedures



- Remove the right side cover (see Frame chapter).
- Disconnect the connector [A].
- Using a hand tester, inspect to see that only the connection shown in the table have continuity (about zero ohms).

Special Tool - Hand Tester: 57001-1394

Rear Brake Light Switch Connections:

	BR	BL
When brake pedal is pushed down	○——	——○
When brake pedal is released		

★If the switch has an open or short, replace it with a new one.

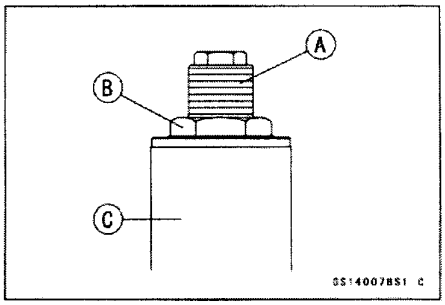
Suspension

Fork Oil Change

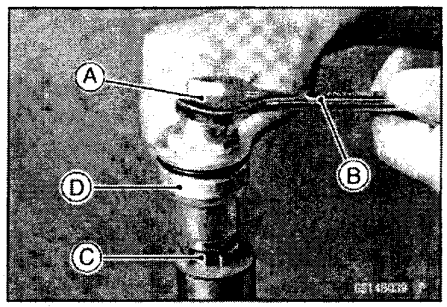
- Remove the front fork (see Front Fork Removal).

○Turn the spring preload adjuster [A] counterclockwise until the fully position.

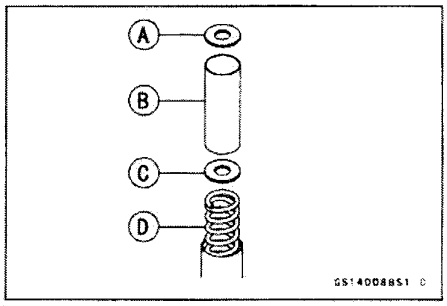
- Unscrew the top plug [B] from the inner tube [C].



- Holding the adjuster [A] with a wrench [B], loosen the piston rod nut [C].
- Remove the top plug [D] from the piston rod.



- Remove:
  Washer [A]
  Spacer [B]
  Washer [C]
  Fork Spring [D]

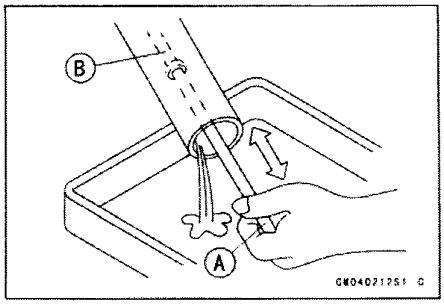


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Periodic Maintenance Procedures

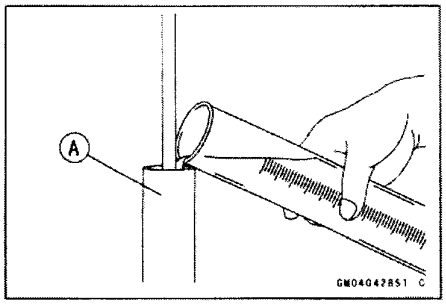
● Drain the fork oil into a suitable container.
○Using the piston rod puller [A], pump the piston rod [B] up and down at least ten times to expel the oil from the fork.

Special Tool - Fork Piston Rod Puller, M10 × 1.0: 57001–1298



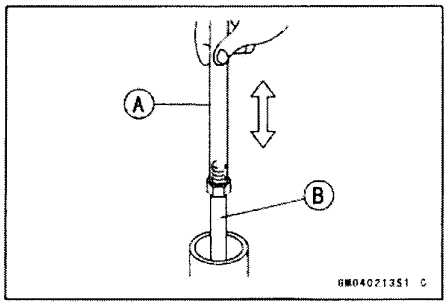
● Hold the fork tube upright, press the inner tube [A] all the way down.
● Pour in the type and amount of fork oil specified.

Fork Oil
Viscosity: **KAYABA 01 (SAE 5W)**
Amount (per side)
When chaining oil: **approx. 350 mL (11.8 US oz)**
approx. 347 mL (11.7 US oz), ZX1200-C3 ~
After disassembly and completely dry: **409 ±4 mL (13.8 ±0.14 US oz)**
406 ±4 mL (13.7 ±0.14 US oz), ZX1200-C3 ~



★If necessary, measure the oil level as follows.
○Hold the outer tube vertically in a vise.
○Pump the inner tube several times to expel air bubbles.
○Using the piston rod puller [A], move the piston rod [B] up and down more than ten times in order to expel all the air from the fork oil.

Special Tool - Fork Piston Rod Puller, M10 × 1.0: 57001–1298

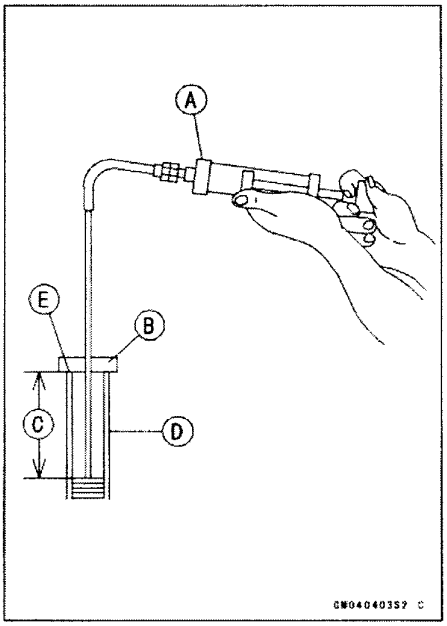


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Periodic Maintenance Procedures

○Remove the fork piston rod puller.
○Wait until the oil level settles.
○With the fork fully compressed and the piston rod fully pushed in, insert a tape measure or rod into the inner tube, and measure the distance from the top of the inner tube to the oil.

Oil Level (fully compressed, without spring)
Standard: 167 ±2 mm (6.57 ±0.08 in.)
(from the top of the inner tube)



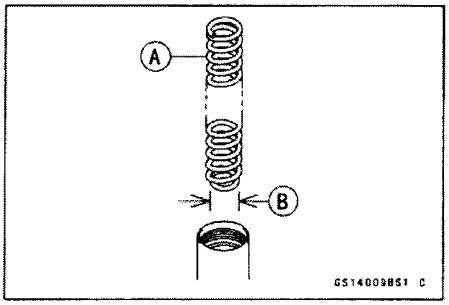
NOTE

○*Fork oil lever may also be measured using the fork oil level gauge.*

Special Tool - Fork Oil Level Gauge: 57001–1290 [A]

○With the fork fully compressed and without fork spring, insert the gauge tube into the inner tube [D] and position the stopper across the top end [E] of the inner tube.
○Set the gauge stopper [B] so that its lower side shows the oil level distance specified [C].
○Pull the handle slowly to pump out the excess oil until the oil no longer comes out.
★If no oil is pumped out, there is insufficient oil in the inner tube. Pour in enough oil, then pump out the excess oil as shown above.

● Install the fork spring [A] with the smaller end facing [B] downward [B].
● Install:
Washer
Spacer
Washer

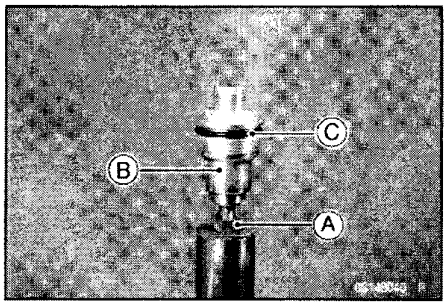


● Screw the fork piston rod puller onto the end of the rod.

Special Tool - Fork Piston Rod Puller, M10 × 1.0: 57001–1298

● Screw in the piston rod nut [A] fully.
○Screw the rod nut on to the piston rod with the chamfered side down.
● Screw in the top plug [B] fully.
○Check the O-ring [C] on the top plug and replace it with a new one if damaged.
● Tighten the piston rod nut to the top plug.

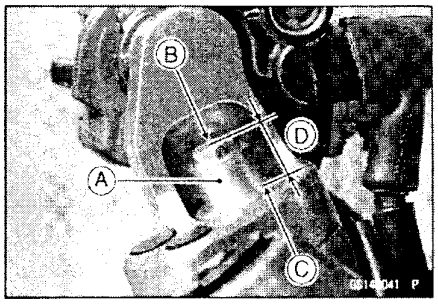
Torque - Fork Piston Rod Nut: 15 N·m (1.5 kgf·m, 11 ft·lb)



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Periodic Maintenance Procedures

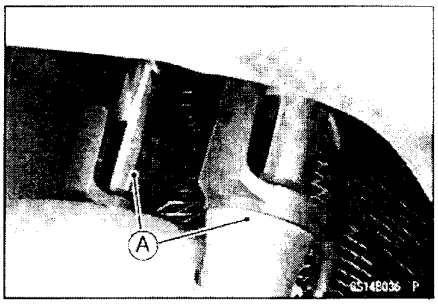
- Screw the top plug into inner tube.
- Repeat the same procedure for adjusting the other fork.
- Install the front fork (see Front Fork Installation).
- Screw in the spring preload adjuster [A] of the top plug so that the distance between the adjuster top [B] and the top plug nut surface [C] is 18 mm [D].



Front Fork Oil Leak Inspection

- Visually inspect the front forks [A] for oil leakage, scoring or scratches on the outer surface of the inner tubes.

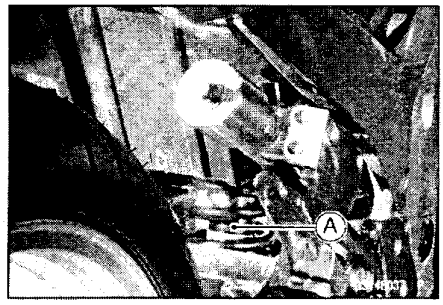
★Replace or repair any defective parts, if necessary.



Rear Shock Absorber Oil Leak Inspection

- Visually inspect the shock absorber [A] for oil leakage.

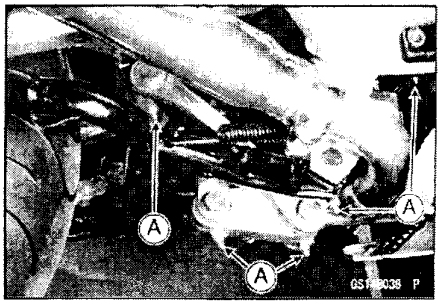
★If it is oil leaked, one unit feels weaker than the other, replace the shock absorber.



Swingarm Pivot, Uni-trak Linkage Lubrication

- Lubricate the swingarm, tie-rod, and rocker arm pivots with high-temperature grease through the grease nipples [A] using a grease gun according to the Periodic Maintenance Chart. They are normal for a small amount of grease to seep out around the grease seals.

○If the swingarm, tie-rod and rocker arm pivots are disassembled, wipe all the old grease off the bearings, sleeves, and grease seals, then grease them.



Steering

Steering Inspection

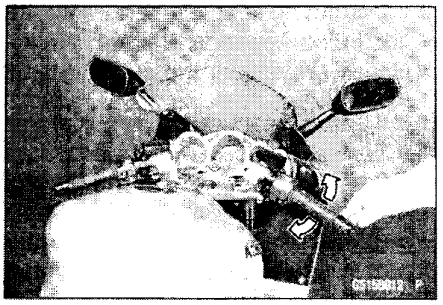
- Use the center stand to support the motorcycle upright.
- Lift the front wheel off the ground using the jack.

Special Tools - Jack: 57001–1238

- Check the steering.

○With the front wheel pointing straight ahead, alternately tap each end of the handlebar. The front wheel should swing fully left and right from the force of gravity until the fork hits the stop.

★If the wheel binds or catches before the stop, the steering is too tight.



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Periodic Maintenance Procedures

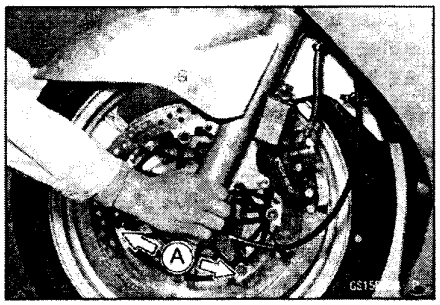
● Feel for steering looseness by pushing and pulling [A] the forks.

★If you feel looseness, the steering is too loose.

NOTE

○*The cables and wiring will have some effect on the motion of the fork which must be taken into account. Be sure the wires and cables are properly routed.*

○*The bearings must be in good condition and properly lubricated in order for any test to be valid.*



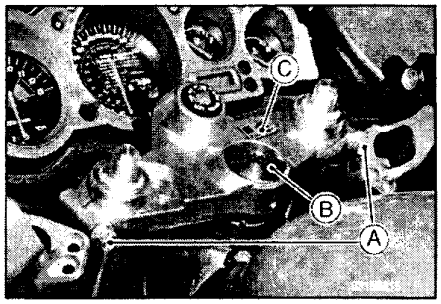
Steering Adjustment

★Adjust the steering, if necessary.

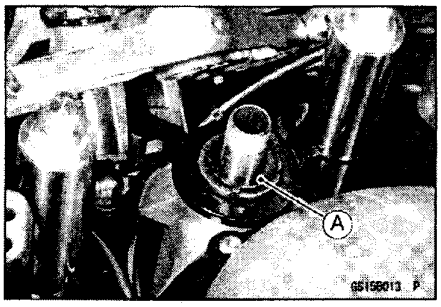
● Remove the handlebars (see Steering chapter).

● Loosen the upper front fork clamp bolts [A] on both side and unscrew the stem head nut [B].

● Remove the steering stem head [C].



● Remove the claw washer.



● Adjust the stem nut [A] with the stem nut wrench [B] by tightening to the specified torque.

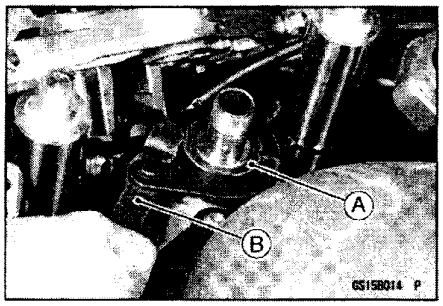
Special Tool - Steering Stem Nut Wrench: 57001-1100

Torque - Steering Stem Nut: 20 N·m (2.0 kgf·m, 15 ft·lb)

● Install the stem head.

● Tighten the following in the order listed.

Torque - Stem Head Nut: 78 N·m (8.0 kgf·m, 57 ft·lb)
Upper Front Fork Clamp Bolts: 29 N·m (3.0 kgf·m, 21 ft·lb)



○Run the throttle cables, brake hose, and clutch hose in accordance with the Cable, Wire, and Hose Routing section in the Appendix chapter.

● Check and adjust the steering and throttle cables after installation.

⚠ WARNING

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

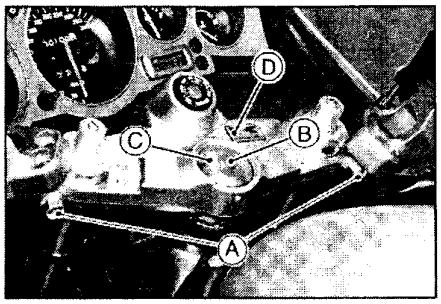
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Periodic Maintenance Procedures

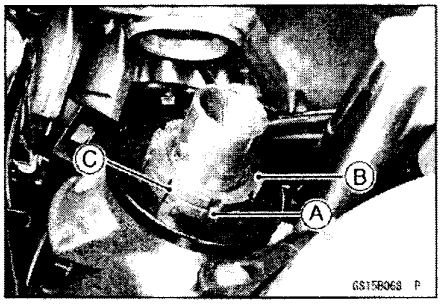
Steering Adjustment (ZX1200-C3 ~)

★Adjust the steering, if necessary.

- Remove the handlebars (see Steering chapter).
- Loosen the upper front fork clamp bolts [A] on both side.
- Remove the steering stem head bolt plug [B] and the stem head bolt [C].
- Remove the steering stem head [D].



- Bend the claw washer tabs [A].
- Remove the steering stem locknut [B] and claw washer [C].



- Adjust the steering.

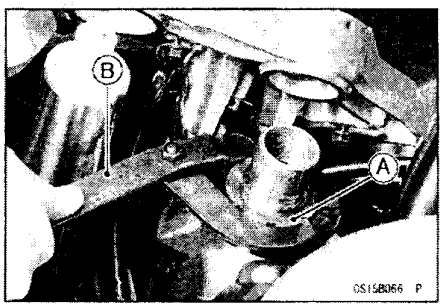
Special Tool - Steering Stem Nut Wrench: 57001–1100 [B]

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

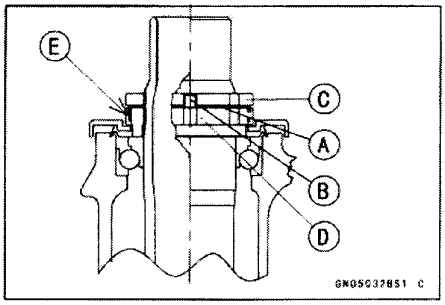
★If the steering is too loose, tighten the stem nut a fraction of a turn.

NOTE

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



- Install the claw washer [A] so that its bent side [B] faces upward, and engage the bent claws with the grooves of stem locknut [C].
- Hand tighten the stem locknut until it touches the claw washer.
- Tighten the stem locknut clockwise until the claws are aligned with the grooves (ranging from 2nd to 4th) of stem nut [D], and bend the 2 claws downward [E].



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● Tighten:

Torque - Steering Stem Head Bolt: 108 N·m (11 kgf·m, 80 ft·lb)
Upper Front Fork Clamp Bolts: 29 N·m (3.0 kgf·m, 21 ft·lb)

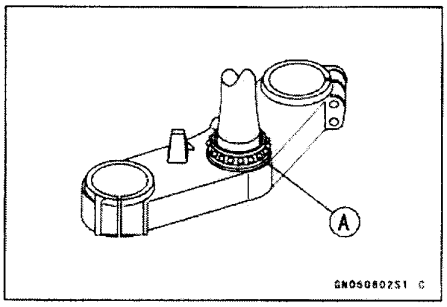
● Check the steering again.
★If the steering is still too tight or too loose, repeat the adjustment.
○Run the throttle cables, brake hose, and clutch hose in accordance with the Cable, Wire, and Hose Routing section in the Appendix chapter.
● Check and adjust the steering and throttle cables after installation.

⚠ WARNING

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

Steering Bearing Lubrication

● Remove the steering stem (see Steering chapter).
● Using a high flash-point solvent, wash the upper and lower ball bearings in the cages, and wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean off old grease and dirt.
● Visually check the outer races and the ball bearings.
★Replace the bearing assemblies if they show wear or damage.
● Pack the upper and lower ball bearings [A] in the cages with grease, and apply a light coat of grease to the upper and lower outer races.
● Install the steering stem, and adjust the steering.

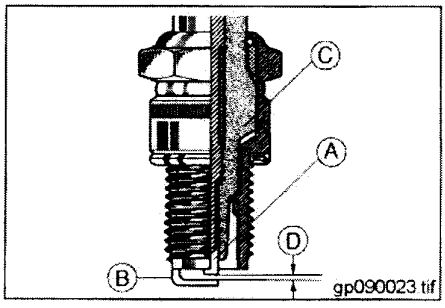


Electrical System

Spark Plug Cleaning/Inspection

● Clean the spark plug, preferably in a sandblasting device, and then clean off any abrasive particles. The plug may also be cleaned using a high-flash point solvent and a wire brush or other tool.
★If the spark plug center electrode [A] and/or side electrode [B] are corrected or damaged, or if the insulator [C] is cracked, replace the plug.
● Use the standard spark plug or its equivalent.
● Measure the gap [D] with a wire-type thickness gauge.
★If the gap is incorrect, carefully bend the side electrode with a tool to obtain the correct gap.

Spark Plug Gap: 0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)



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Periodic Maintenance Procedures

General Lubrication

Lubrication

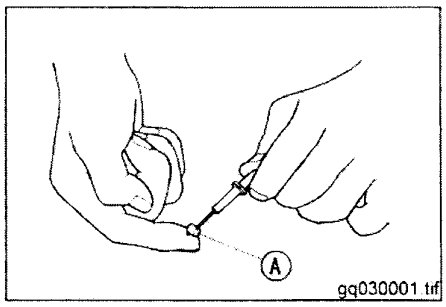
- Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.
- Lubricate the points listed below with indicated lubricant.

NOTE

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

Pivots: Lubricate with Motor Oil.
Rear Brake Rod Joint

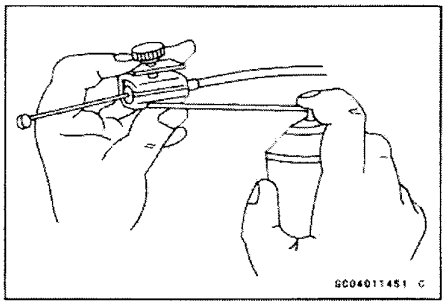
Points: Lubricate with Grease.
Throttle Inner Cable Upper and Lower Ends [A]
Choke Inner Cable Upper and Lower end
Clutch Lever Pivot (Apply silicone grease)
Brake Lever Pivot (Apply silicone grease)
Brake Pedal Pivot
Side Stand
Tie-Rod Pivots
Rocker Arm Pivots
Swingarm Pivot
Center Stand Pivot



Cable: Lubricate with Cable Lubricant.
Choke Cable
Throttle Cables

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

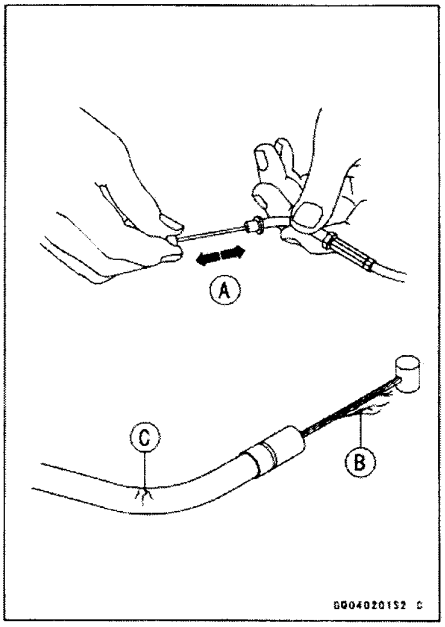
○The cable may be lubricated by using a commercially available pressure cable lubricator with an aerosol cable lubricant.



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Periodic Maintenance Procedures

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



Nut, Bolt, and Fastener Tightness

Tightness Inspection

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

NOTE

○ *For the engine fasteners, check the tightness of them when the engine is cold (at room temperature).*

★ If there are loose fasteners, retighten them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. For each faster, first loosen it by 1/2 turn, then tighten it.
★ If cotter pins are damaged, replace them with new ones.

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Periodic Maintenance Procedures

Nut, Bolt and Fastener to be checked

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

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

Suspension:
- Front Fork Clamp Bolts
- Front Fender Mounting Bolt
- Rear Shock Absorber Mounting Nuts
- Swingarm Pivot Shaft Nut
- Swingarm Pivot Shaft Lock Nut
- Uni-Trak Link Nuts

Steering:
- Stem Head Nut
- Handlebar Bolts

Engine:
- Engine Mounting Bolts and Nuts
- Downtube Bolts
- Muffler Mounting Bolts
- Exhaust Pipe Holder Nuts
- Muffler Connecting Clamp Bolt
- Clutch Lever Pivot Nut

Others:
- Sidestand Bolt
- Center Stand Bolts and Nuts
- Footpeg Stay Bolts
- Rear Frame Mounting Bolts

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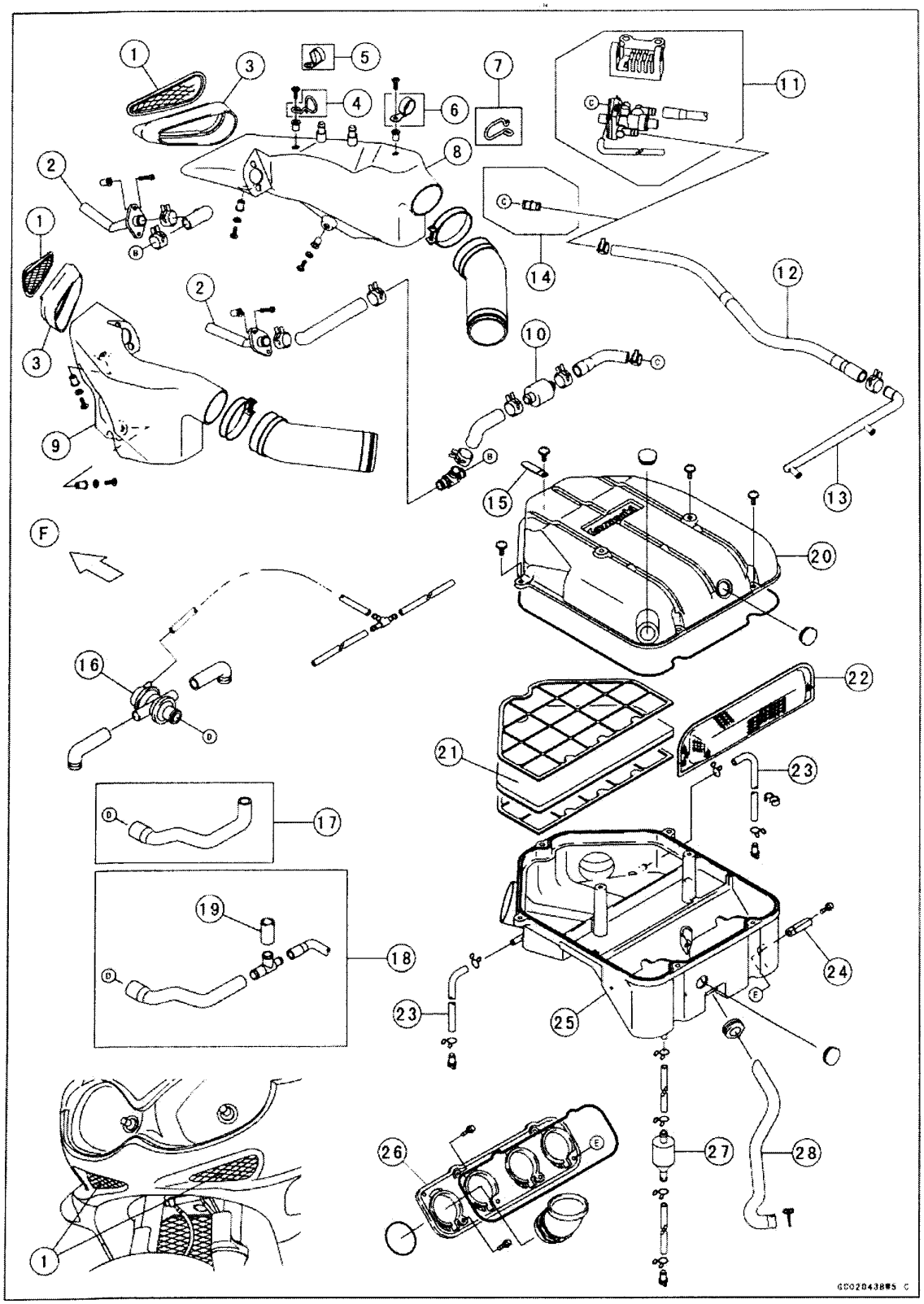
Fuel System

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Exploded View



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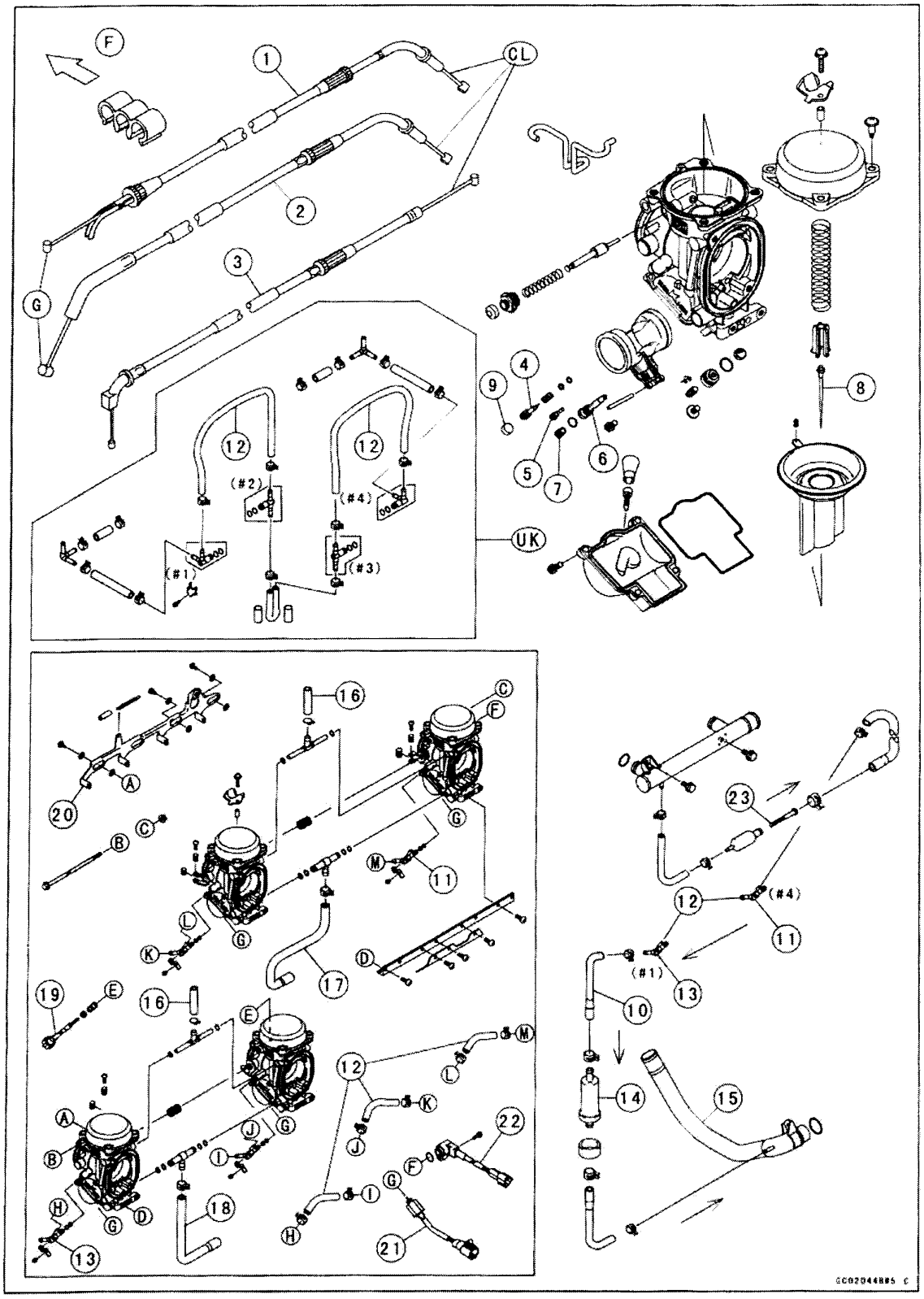
Exploded View

1. Right and left air duct screens
2. Air inlet pipes
3. Right and left air duct seals
4. Wire clamp
5. Plate clamp (CAL)
6. Plate clamp
7. Hose holder (CAL)
8. Right air duct
9. Left air duct
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19. Rubber joint
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25. Lower air cleaner housing
26. Air cleaner holder assembly
27. Breather catch tank
28. Crankcase breather hose

CAL: California
F: Front

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Exploded View



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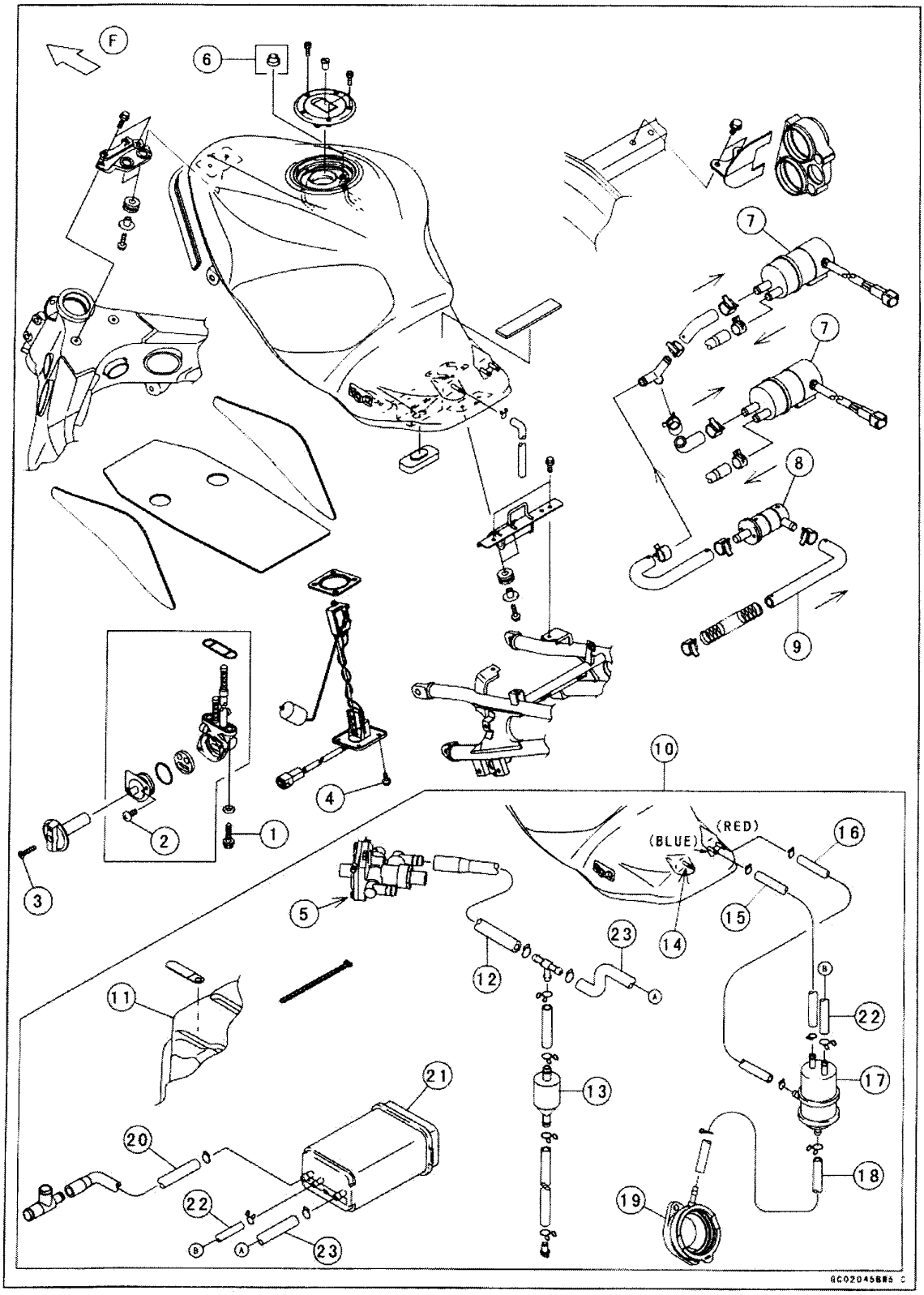
Exploded View

1. Throttle cable (accelerator)
2. Throttle cable (decelerator)
3. Choke cable
4. Pilot screw
5. Pilot (slow) jet
6. Needle jet holder
7. Main jet
8. Jet needle
9. Plug (CAL)
10. Carburetor coolant hoses (except for CA, CAL, US)
11. Fitting of the carburetor #4
12. Coolant hoses for the carburetors #4 ~ #1
13. Fitting of the carburetor #1
14. Coolant valve (except for CA, CAL, US)
15. Water pump inlet pipe
16. Carburetor vent hoses
17. Fuel supply hose for the carburetors #3 and #4
18. Fuel supply hose for carburetors #1 and #2
19. Idle adjusting screw
20. Starter lever
21. Fuel cut valves
22. Throttle sensor
23. Coolant filter

CA: Canada
CAL: California
CL: Apply cable lubricant.
F: Front
G: Apply grease.
UK: United Kingdom
US: United States of America

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Fuel tap bolts	25	0.25	22 in·lb	
2	Fuel tap plate screws	0.80	0.08	7 in·lb	
3	Fuel tap knob screw	1.5	0.15	13 in·lb	
4	Fuel level sensor bolts	6.9	0.70	61 in·lb	
5	Vacuum valve drain screw	1.0	0.10	9 in·lb	

6. Fuel tank cap seal (CAL)
7. Fuel pumps
8. Fuel filter
9. Fuel tap hose (Face the white marks upwards).
10. California evaporative emission control system
11. Front part of the air cleaner housing
12. Carburetor vent hose for the canister
13. Breather catch tank
14. Fuel tank filler drain fitting
15. Fuel tank breather hose (blue)
16. Fuel tank return hose (red)
17. Separator
18. Vacuum hose (white)
19. Carburetor holder #3
20. Canister purge hose (green)
21. Canister
22. Separator breather hose (blue)
23. Carburetor vent hose (yellow, canister side)

CAL: California

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3-8 FUEL SYSTEM

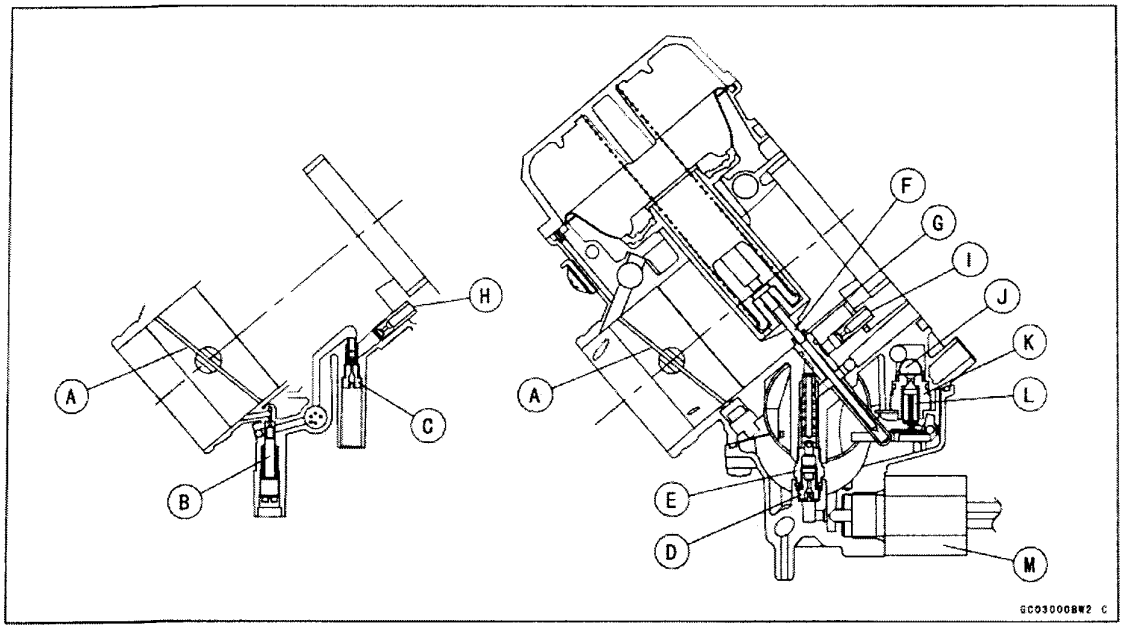
Specifications

Item	Standard
Throttle Grip and Cables	
Throttle grip or choke lever free play	2 ~ 3 mm (0.08 ~ 0.12 in.)
Carburetors	
Make, type	KEIHIN CVKD40
Idle speed	1 000 ±50 r/min (rpm)
Pilot screws [B] (turns out)	1 1/2 ±1/4, (CAL) (CA) (US) –
Synchronization vacuum	2.7 kPa (2 cmHg, 0.39 psi) or less difference between any two carburetors
Service fuel level	3.5 ~ 5.5 mm (0.138 ~ 0.217 in.) below the line mark
Float height	13 ±2 mm (0.512 ±0.078 in.)
Main jet [D]	#150 (#1,2,3,4),
Main air jet [I]	#70
Mark of jet needle [F]	N8CH (1, 4 cab), N3RV (2, 3 cab)
Pilot jet (slow jet) [C]	#40
Pilot air jet (slow air jet) [H]	#120
Starter jet	#62
Angle of throttle valve [A]	11°
High altitude carburetor adjustment	(US, CA, CAL only) Not required
Air Cleaner Element	
Type	Foam-air filter

CA: Canada
CAL: California
cab: carburetor, ex. 1,4 cab.: No.1 carburetor (leftmost) and No.4 carburetor (rightmost)
US: United States of America

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Specifications

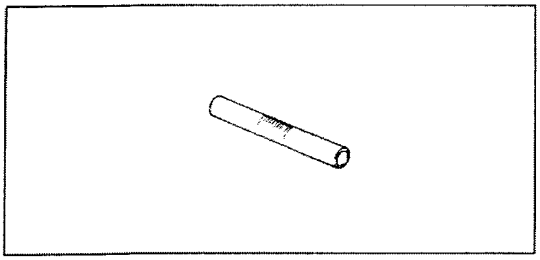


A ~ D, F, H, I: in the table
E: Air Bleed Pipe
G: Needle Jet
J: Fuel Strainer
K: Valve Seat
L: Float Valve
M: Fuel Cut Valve

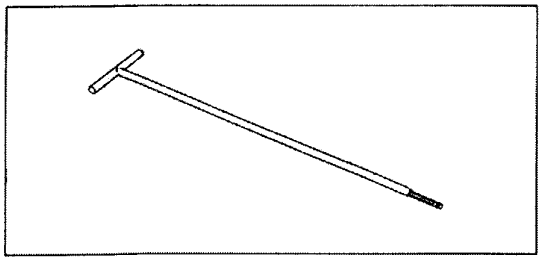
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Special Tools

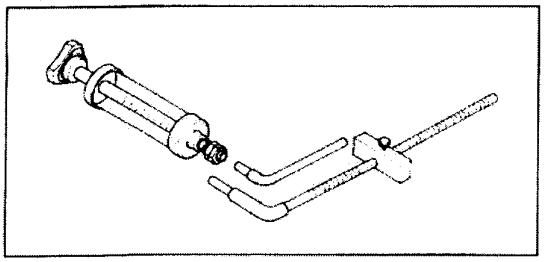
Fuel Level Gauge:
57001–1017



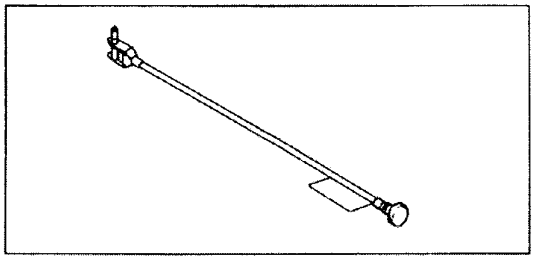
Carburetor Drain Plug Wrench, Hex 3:
57001–1269



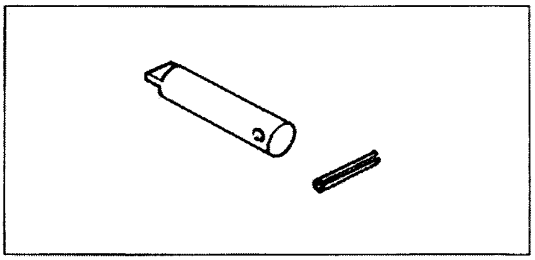
Fork Oil Level Gauge:
57001–1290



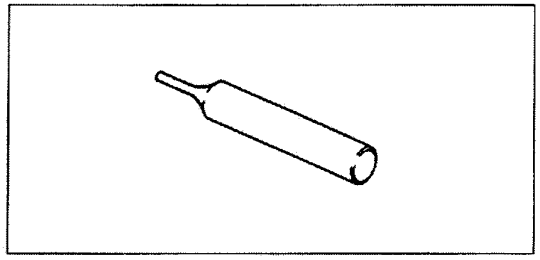
Pilot Screw Adjuster, C:
57001–1292



Pilot Screw Adjuster Adapter, ϕ5:
57001–1372



Pilot Screw Adjuster Driver:
57001–1373



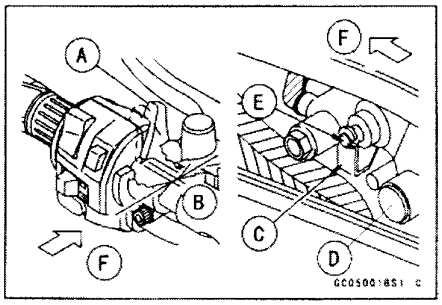
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Throttle Grip and Cables

Throttle Grip Play Inspection/Adjustment

○Refer to Throttle Grip Play Inspection in the Periodic Maintenance chapter.

Choke Lever Play Inspection



- Push the choke lever [A] on the handlebar forward (rest position).
- Measure the amount of choke cable play [B] at the root of the choke lever.
- Pull the choke lever until the starter plunger lever [C] at the carburetor #1 [D] touches the starter plunger [E]; the amount of choke lever travel is the amount of choke cable play.

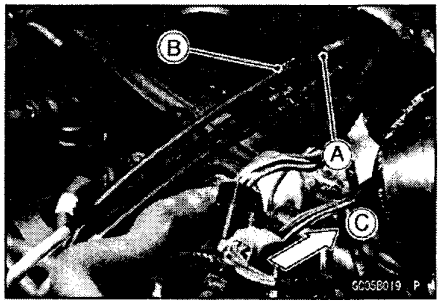
  Front [F]

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

Choke Lever Free Play

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

Choke Lever Play Adjustment



- Remove the fuel tank and the air cleaner housing (see this chapter).
- Loosen the locknut [A], and turn the adjuster [B] until the cable has the proper amount of free play.
- Tighten the locknut against the adjuster securely (left-rear view).

  Front [C]

Cable Removal/Installation

- For throttle cable removal/installation, refer to Carburetor Removal and Installation in this chapter.
- Install the cables in accordance with the Cable, Wire, and Hose Routing section in the Appendix chapter.
- After installation, adjust each cable properly.

⚠ WARNING

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

Cable Lubrication and Inspection

○Refer to General Lubrication in the Periodic Maintenance chapter.

Idle Speed Inspection

○Refer to Periodic Maintenance chapter.

Idle Speed Adjustment

○Refer to Periodic Maintenance chapter.

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Carburetors

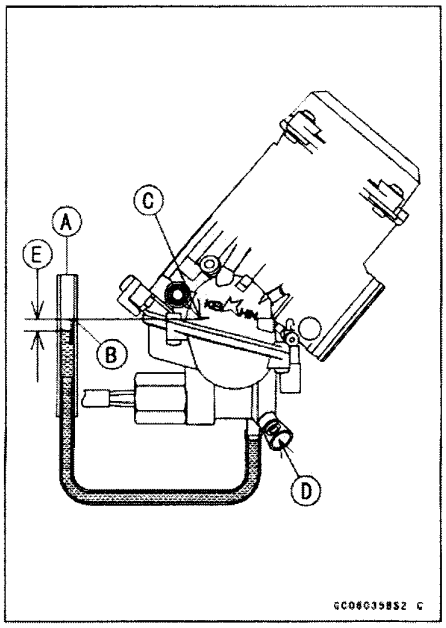
Carburetor Synchronization Inspection
○Refer to Periodic Maintenance chapter.

Synchronization Adjustment
○Refer to Periodic Maintenance chapter.

Service Fuel Level Inspection

⚠ WARNING

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



- Remove the fuel tank and air cleaner housing (see this chapter).
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetors.
- Prepare a fuel hose, inside diameter 6 mm (0.24 in.) × length about 300 mm (12 in.), and connect the fuel level gauge [A] to the carburetor float bowl with the fuel hose.

Special Tool - Fuel Level Gauge: 57001–1017

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

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

- Wait until the fuel level [E] in the gauge settles.
- Keeping the gauge vertical, slowly lower the gauge until the top line is even with the mark.

NOTE

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

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

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

Service Fuel Level
Standard: 3.5 mm (0.138 in.) – 5.5 mm (0.217 in.) below the mark

- Repeat the same procedure for the other carburetors.

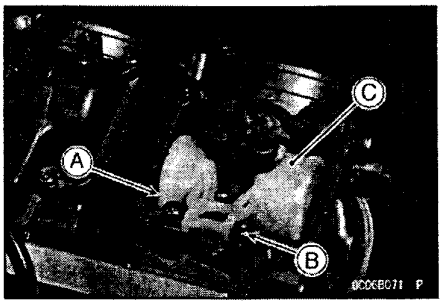
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Carburetors

Service Fuel Level Adjustment

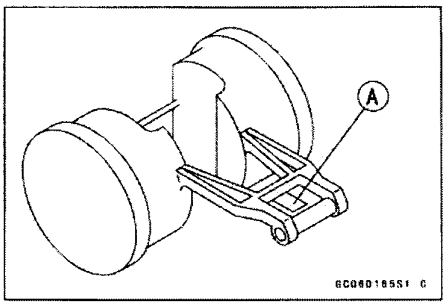
⚠ WARNING

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



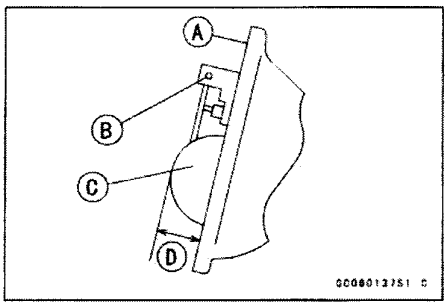
- Remove the carburetors, and drain the fuel into a suitable container.
- Turn the carburetor assembly upside down and remove the float bowl by taking out the screws.
- Remove the screw [A] and slide out the pivot pin [B] and remove the floats [C].

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



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

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



Float Height

Standard: 13 ±2 mm (0.512 ±0.078 in.)

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

NOTE

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

- Install the float bowl and the new O-ring, and recheck the fuel level.

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

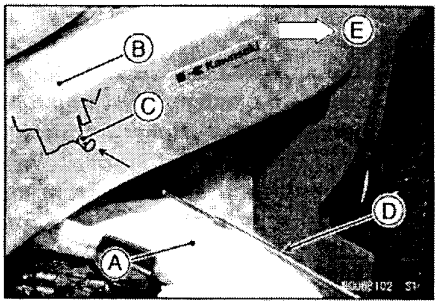
Fuel System Cleanliness Inspection

⚠ WARNING

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

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Carburetors



- Remove the right lower fairing (see Frame chapter).
- Stuff a clean shop towel [A] under the carburetors [B].
- Turn the fuel tap to the ON position.
- Turn out each drain plug [C] a few turns and drain the float bowl.

Special Tool - Carburetor Drain Plug Wrench, Hex 3 [D]: 57001–1269

Front [E]

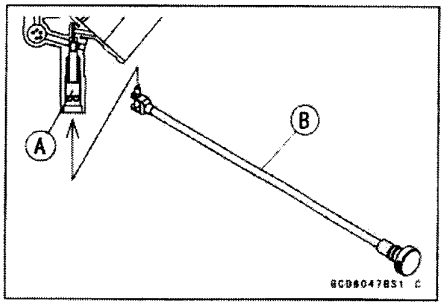
- Check to see if water or dirt comes out.
- Tighten the drain plug and turn the fuel tap to the OFF position.
- Repeat the same procedure for the other carburetors.

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

Pilot Screw Setting

CAUTION

Do not turn the pilot screws carelessly during carburetor synchronization. You may cause poor running at low engine speed. Do not force or overtighten the pilot screws. They could be damaged requiring replacement.



○The pilot screw [A] is set at the factory and should not be adjusted, But if necessary, set the pilot screw as follows:

- Remove the fuel tank (see this chapter) and lower fairings (see Frame chapter).
- Turn in the pilot screw and count the number of turns until it seats fully but not tightly.

○The pilot screw adjuster (special tool) [B] may be used with the carburetor assembly installed on the engine for other than California model.

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

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

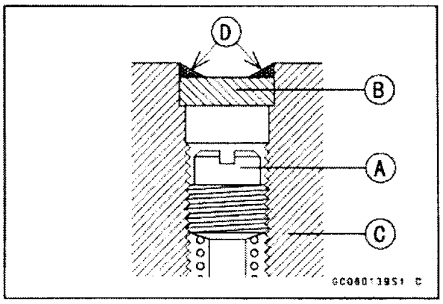
NOTE

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

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Carburetors

○For California model, set the pilot screw [A] as follows:
- Remove the carburetor assembly (see this chapter).
- With the carburetor assembly upside down, punch a hole in the plug [B] and pry it out with an awl or other suitable tool.
- Set the pilot screw, using a screwdriver in the same manner as described above.
- Install a new plug in the pilot screw hole of the carburetor body [C], and apply a little bonding agent [D] to the circumference of the plug to fix the plug.



CAUTION

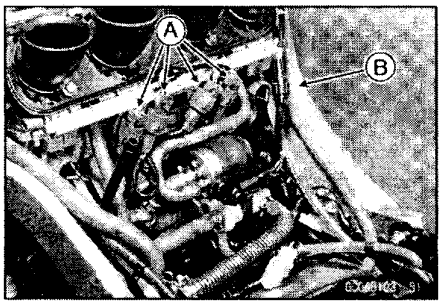
Do not apply too much bonding agent to the plug or the pilot screw itself may be fixed.

- Repeat the same procedure for the other carburetors.

Carburetor Removal

⚠ WARNING

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

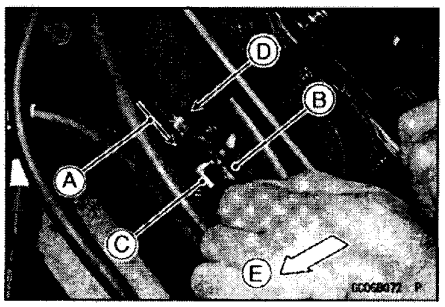


- Remove the fuel tank and air cleaner housing (see this chapter).

○Remove the coolant hoses and plug them immediately and wash away any coolant that spills on the engine (except for CA, CAL, and US models).

- Remove:
  Fuel Cut Valve Connectors [A]
  Throttle Sensor Connector [B]

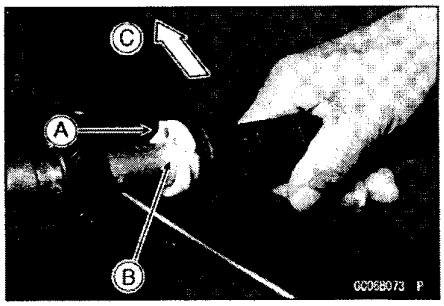
- Push the choke lever on the handlebar forward to give the choke cable plenty of play.
- Pull [A] the starter plunger lever and pull out the choke cable housing [B] from the holder [C] on the carburetor #4.
- Remove the choke cable lower end [D] from the starter plunger lever.
  Front [E]



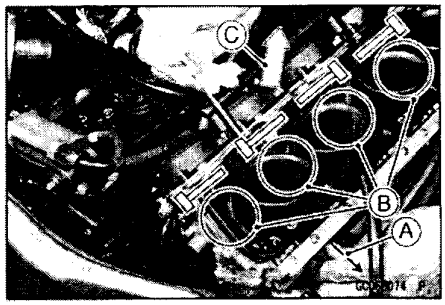
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Carburetors

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



- Pull the fuel supply hoses [A] out of the fittings.
- Loosen the carburetor holder clamps [B].
- Pull [C] the carburetor assembly out of the carburetor holders.
- Remove the throttle cable lower ends to complete carburetor assembly removal.
- Stuff pieces of lint-free clean cloth into the carburetor holders and to keep dirt out of the engine and air cleaner.



⚠ WARNING

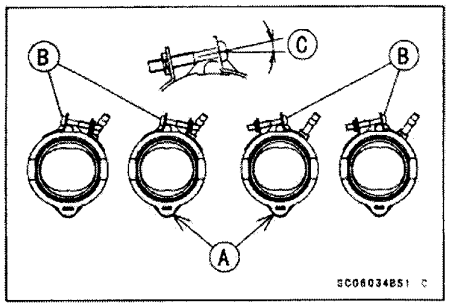
If dirt or dust is allowed to pass through into the carburetor, the throttle may become stuck, possibly causing an accident.

CAUTION

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

Carburetor Installation

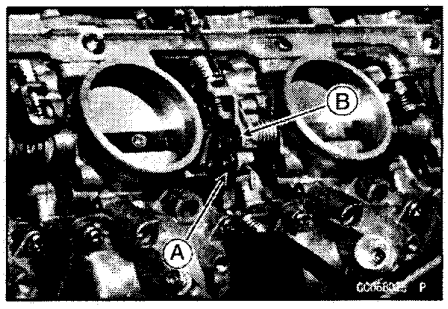
- Fit the clamp nails into the slits [A] of the carburetor holders with left two and right two screw heads [B] outside and inclined 5 ~ 10° [C] as shown.



⚠ WARNING

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

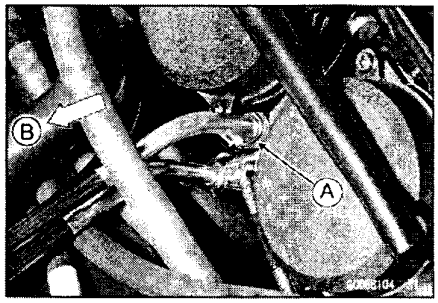
- Run the throttle cables and choke cable as shown in the Cable, Wire, and Hose Routing section of the Appendix chapter.
- Fit the accelerator cable end [A] and the decelerator cable [B] into the throttle pulley (front view of the carburetor).



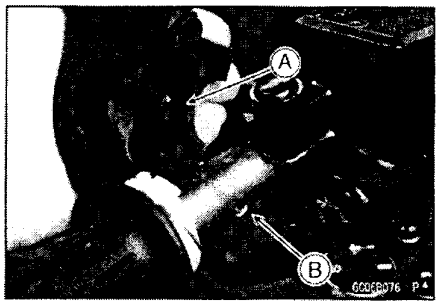
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Carburetors

OFit the clip [A] onto the throttle cable holder.
Front [B]



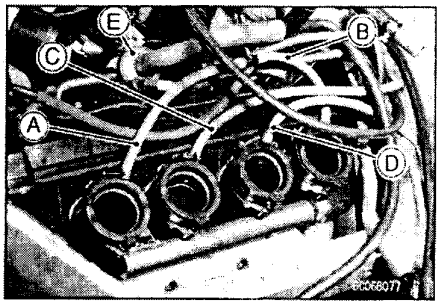
- Apply a thin coating of grease to the throttle cable upper ends.
- Install the upper ends of the throttle cables in the grip.
- Fit the projection [A] of the right switch housing into the hole [B] of the handlebar (front view).
- Turn the throttle grip and make sure that the throttle valves move smoothly and return by spring force.
- Check the throttle grip free play (see Throttle Grip Play Inspection in the Periodic Maintenance chapter).



⚠ WARNING

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

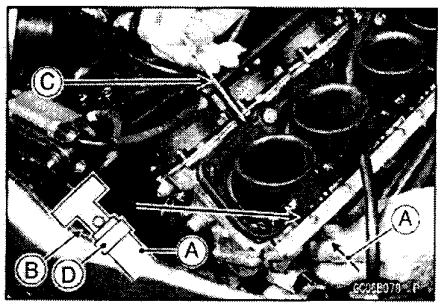
- Fit the vacuum hoses onto the fittings of the carburetor holders.
  Vacuum Hoses #1 [A] and #4 [B] for Vacuum Switch Valve [E]
  Vacuum Hose #2 [C] for Vacuum Valve (CAL)
  Vacuum Hose #3 [D] (with a clip) for Separator Bottom (CAL)
  CAL: California



- Connect two fuel supply hoses [A] to the carburetors as shown.

OFit the fuel supply hoses onto the fitting until the hose end contacts the round stopper [B] while holding the fitting with a screwdriver [C]. Be sure to clamp [D] these hoses.

- Check fuel leakage from the carburetors.
- Fit the carburetor assembly into the carburetor holders evenly.
- Tighten the carburetor clamps securely.

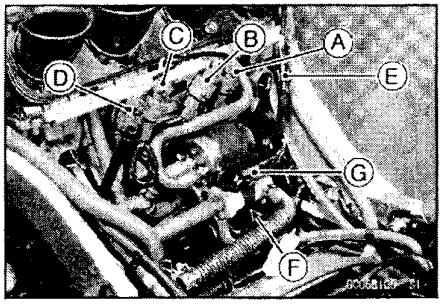


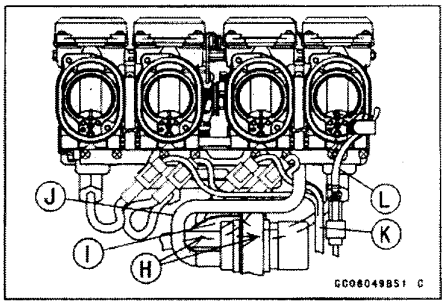
⚠ WARNING

Fuel spilled from the carburetors is hazardous.

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Carburetors





- Run the leads, carburetor vent hose and fuel hose as shown in the Cable, Wire, and Hose Routing section of the Appendix chapter.
- Run the fuel cut valve leads [H] inside the fuel pump bracket [I] and the fuel supply hose #3, 4 [J] and connect:
- Run the fuel cut valve leads [K] inside the fuel supply hose #3, 4 and on the right side of the fuel pump (not over the fuel pump).
- Run the throttle sensor lead [L] on the right side of the fuel pump (not over the fuel pump).

Carburetor Fuel Cut Valve Connectors

GY Connector #4 [A]: R-BR/BK, BK-R leads

BR Connector #3 [B]: R-BR/BK, BK-O/G leads

BR Connector #2 [C]: R-BR/BK, BK-O/BK leads

GY Connector #1 [D]: R-BR/BK, BK-LG/BK leads

Throttle Sensor Connector [E]:

BK/BL-BK, Y/W-Y, BL-BL leads

Connector [F] of Lower Fuel Pump:

R-R, BK/W-Y, BK-BK, BK/Y-BK/Y leads

Connector [G] of Upper Fuel Pump:

R-R, BK/W-Y, G-BK, BK/Y-BK/Y leads

- Check the following items and adjust them if necessary.
  Throttle Cable Play (see Fuel System section in the Periodic Maintenance chapter)
  Choke Cable Play (see this chapter)
  Idle Speed (see Fuel System section in the Periodic Maintenance chapter)
  Carburetor Synchronization (see Fuel System section in the Periodic Maintenance chapter)
- Install the air cleaner housing and the fuel tank (see this chapter).

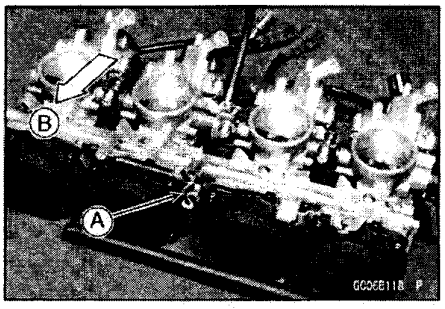
Carburetor Disassembly/Assembly

- Remove the carburetor assembly (see Carburetor Removal).

○Each carburetor unit can be disassembled and assembled in the joined state.

○Do not remove the throttle cable holder [A] for disassembling carburetors.

Front [B]



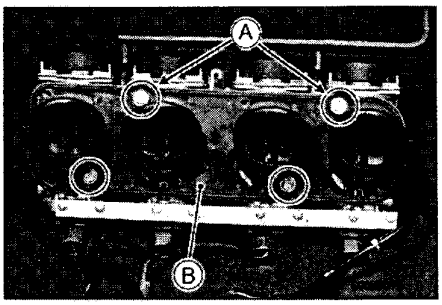
⚠ WARNING

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.

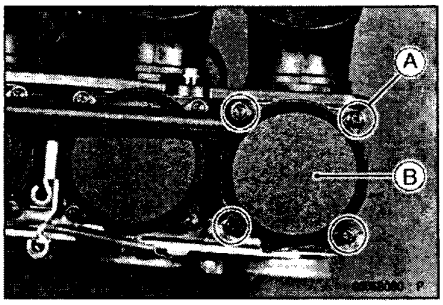
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Carburetors

● Unscrew four bolts [A] and remove the air cleaner holder [B].



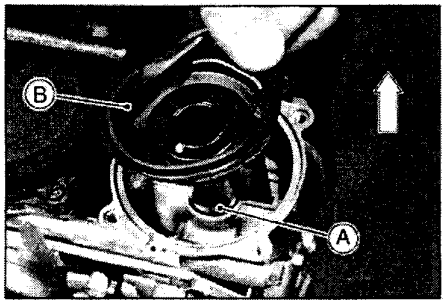
● Disassemble the upper end of the carburetor as follows:
○Unscrew the cover screws [A] and remove the upper chamber cover [B] slowly. Be careful not to pop the spring out.



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

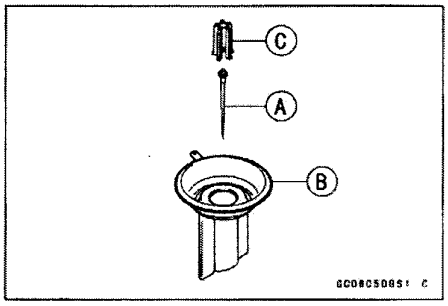
CAUTION

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

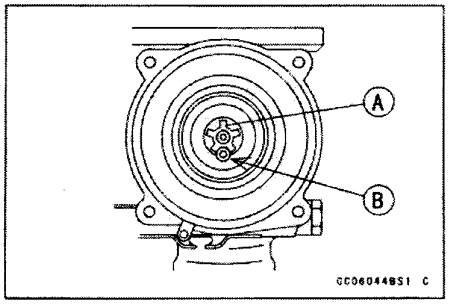


○Check the vacuum piston and diaphragm (see Carburetor Inspection).
○Clean the carburetor parts (see Carburetor Cleaning).

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



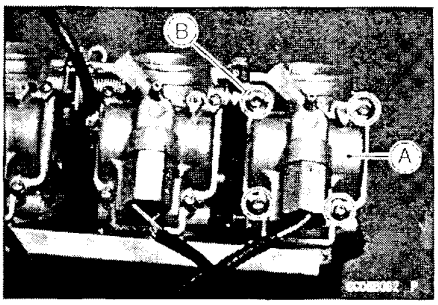
○Turn the spring seat [A] so that it does not block the hole [B] at the bottom of the vacuum piston.
○After installing the upper chamber cover, check that the vacuum piston slides up and down smoothly without binding in the carburetor bore.



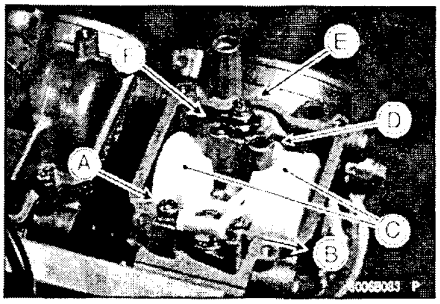
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Carburetors

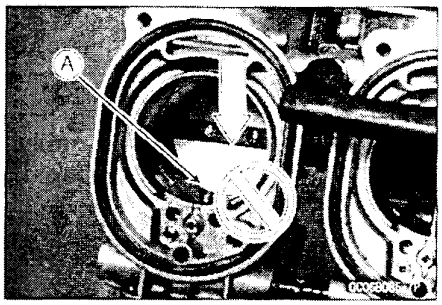
● Disassemble the lower end of the carburetor as follows:
○Remove the float bowl [A] and O-ring by taking out the screws [B].



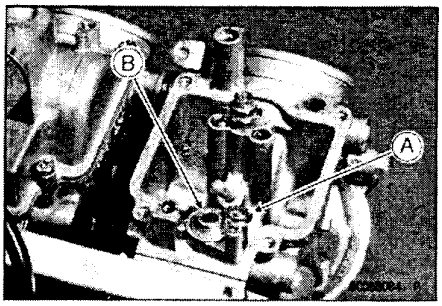
○Remove the screw [A] and slide out the float pivot pin [B] and remove the floats [C]. The float needle valve will come out together.
● Remove:
Pilot Jet [D]
Main Jet [E] and Needle Jet Holder
Starter Jet [F]



○The needle jet [A] cannot be removed.
● Check the following parts (see Carburetor Inspection):
Float Valve Needle
Pilot Screw



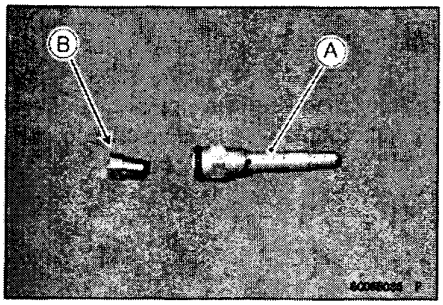
● Remove the screw [A] and take off the valve seat [B].
● Clean the carburetor parts (see Carburetor Cleaning in this chapter).



● Assemble the lower end of the carburetor as follows:
○Turn the carburetor body upside down.
○Carefully screw in the needle jet holder [A].
○Carefully screw in the main jet [B].

CAUTION

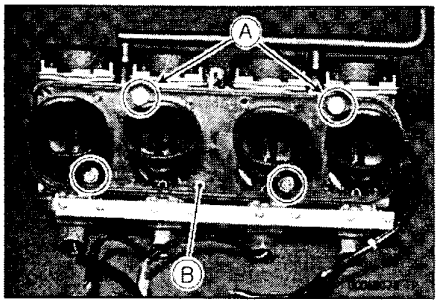
Do not force the needle jet holder and main jet or overtighten them. They could be damaged requiring replacement.



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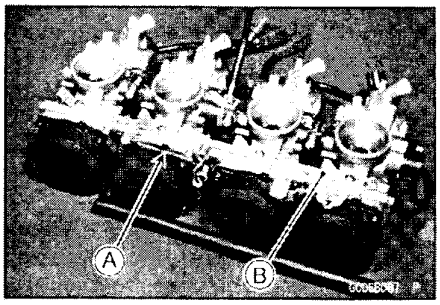
Carburetors

- Install the air cleaner holder [B], and be sure to install the bolts [A] on the positions shown. Otherwise, the air cleaner housing cannot be screwed on the carburetor.
- After assembling the carburetors, check:
  Fuel Level (see Fuel Level Inspection in this section)
  Starter Plunger Lever (see Carburetor Inspection in this section)

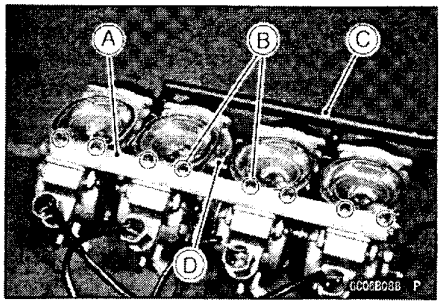


Carburetor Separation

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

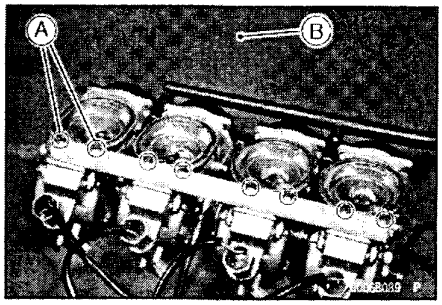


- Remove (rear view):
  Bracket [A] and Screws [B]
  Carburetor Vent Pipe [C]
- Separate the carburetors.
- Do not remove the throttle cable holder [D] which is sold with a carburetor body as a unit.
- Do not remove the throttle valves.



Carburetor Joining

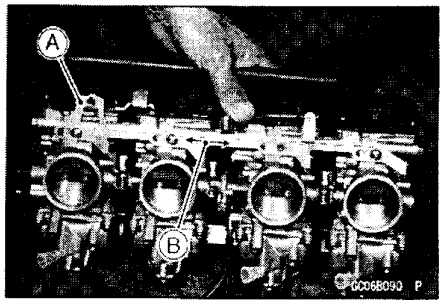
- The carburetor bores must be parallel both horizontally and vertically.
- Loosen the mounting screws [A] and align the carburetors with the outlet ends placed on a flat surface [B].
- Retighten the mounting screws.



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

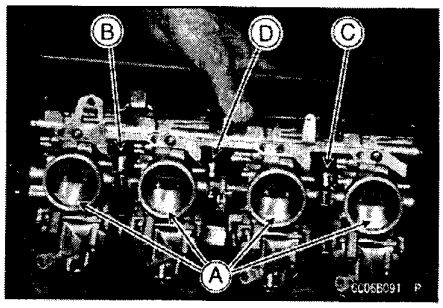
CAUTION

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



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Carburetors



● Visually synchronize the throttle (butterfly) valves.
○Check to see that all throttle valves open and close smoothly without binding when turning the pulleys.
○Visually check the clearances [A] between the throttle valve and the carburetor bore in each carburetor.
★If there is a difference between any two carburetors, turn the balance adjusting screws to obtain the same clearance.
○First synchronize the right two and then the left two carburetors by means of the right and left adjusting screws [B], [C]. Then synchronize the right two carburetors and the left two carburetors using the center balance adjusting screw [D].
● Install the carburetors (see Carburetor Installation).
● Adjust the synchronization (see Synchronization Adjustment in the Periodic Maintenance chapter).

Carburetor Cleaning

⚠ WARNING

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

CAUTION

Do not use compressed air on an assembled carburetor, or the floats may be crushed by the pressure, and the vacuum piston diaphragms may be damaged.
Remove as many rubber or plastic parts from the carburetor as possible before cleaning the carburetor. This will prevent damage to or deterioration of the parts.
The carburetor body has plastic parts that cannot be removed. Do not use a strong carburetor cleaning solution which could attack these parts; instead, use a mild high-flash point cleaning solution safe for plastic parts.
Do not use wire or any other hard instrument to clean carburetor parts, especially jets, as they may be damaged.

● Disassemble the carburetor (see this section).
● Immerse all the metal parts in a mild carburetor cleaning solution.
● Rinse the parts in water.
● When the parts are cleaned, dry them with compressed air.
● Blow through the air and fuel passages with compressed air.
● Assemble the carburetor (see this section).

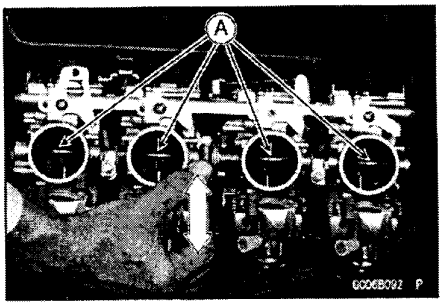
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Carburetors

Carburetor Inspection

⚠ WARNING

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



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

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

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

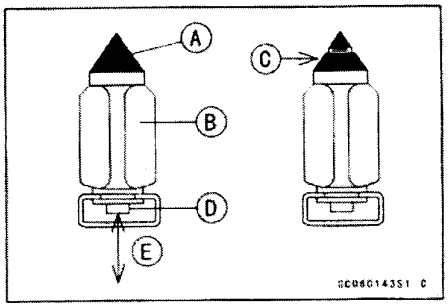
★If the throttle valves do not move smoothly, replace the carburetor assembly.

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

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

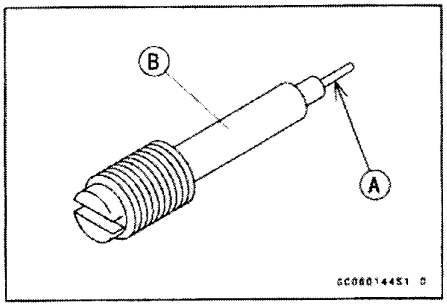
- Push the rod [D] in the other end of the float valve needle, and then release it [E].

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



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

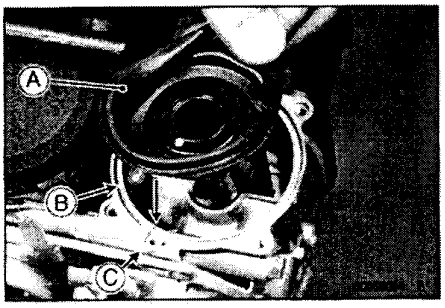
★If the pilot screw is worn or damaged on the tapered portion, it will prevent the engine from idling smoothly. Replace it.



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

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

- Fit the tab [B] into the recess [C] of the carburetor top.

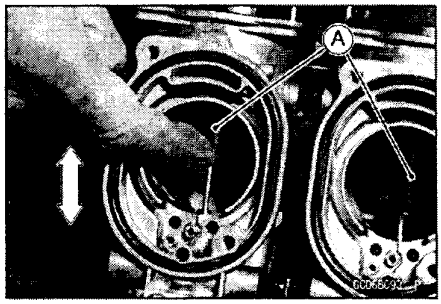


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Carburetors

● Check that the vacuum pistons [A] move smoothly in the carburetor body. The surface of the piston must not be excessively worn.

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

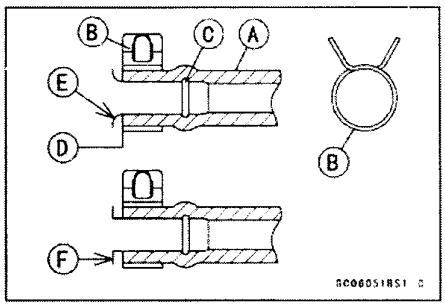


Coolant Filter Cleaning

○Refer to Periodic Maintenance chapter.

Coolant Filter/Coolant Valve Installation

● In the carburetor heating system (except for CAL, CA, US) from the water pipe behind the cylinder head to the water pump inlet, put each coolant hose [A] onto the fitting fully and install each plate clamp [B] onto the hose beyond the raised rib [C] so the clamp end aligns with the hose end [D]: the hose end should reach the fillet [E] of the coolant filter or valve and be as near as possible to the step [F] of the fitting of the water pipe or carburetors.



● Install the coolant hoses being careful to follow bending direction. Avoid sharp bending, kinking, flattening or twisting.

CA: Canada
CAL: California
US: United States

● Grease the O-ring [M] and fit the water pipe [J] into the cylinder head.

● Install the coolant filter [A] into the coolant filter case [L] in the direction shown and above the altenator mount [N] of the crankcase.

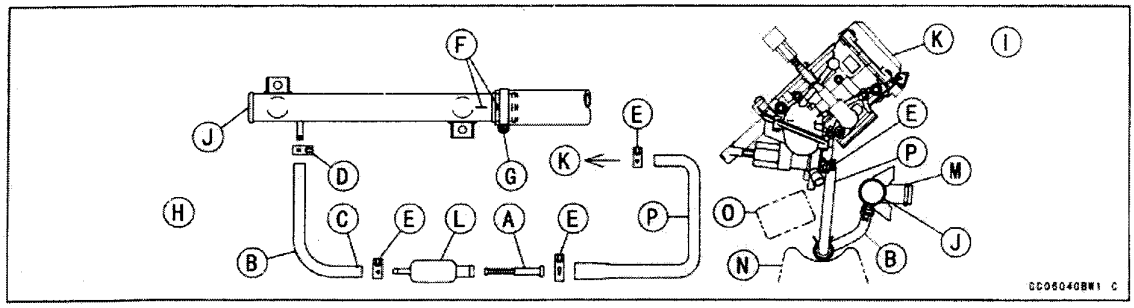
● Apply water to the inside of both ends of the coolant hoses. Insert the coolant hose [B] with the white mark [C] upwards, and run the hose [P] in front of the cross pipe [O] without touching the drain screw cap.

● Install the clamps [D] with the tabs inwards.

● Install the clamps [E] with the tabs upwards.

● Align [F] the white mark of the hose with the line mark of the pipe.

● Put the screw [G] on the lower side of the hose.



Rear View [H] Right Side View [I] Carburetor No.4 [K] (rightmost)

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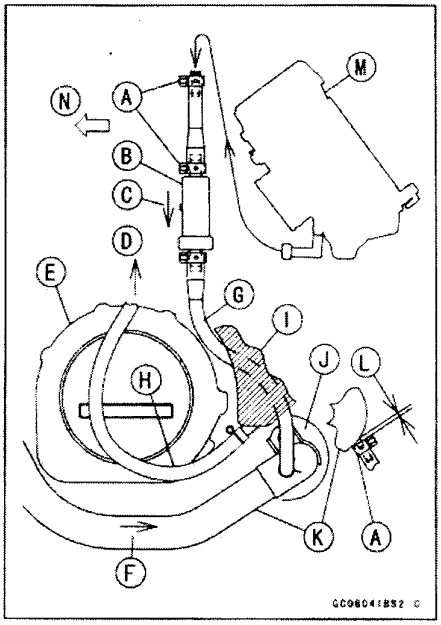
Carburetors

○Run the coolant hoses of the carburetor #4 for the United Kingdom, according to the Cable, Wire, and Hose Routing section in the Appendix chapter.

● Install the coolant valve in the direction shown.

● Face the tab of each coolant hose in the direction shown.

Plate Clamps [A]
Coolant Valve [B]
Return Coolant [C]
Radiator Cap [D]
Pickup Coil Cover [E]
Cold Coolant (from radiator) [F]
Carburetor Coolant Hose [G]
Reserve Tank Hose [H] (outside the hose [G])
Reserve Tank [I]
Water Pump [J]
Pump Inlet [K]
3 mm (0.12 in.) [L] (align the clamp end with the hose end)
Carburetor #1 [M]
Front [N]



Coolant Valve Inspection

● Remove the coolant valve on the engine left side (except for CAL, CA, and US).

● Inspect the coolant valve [A] at room temperature.

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

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

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

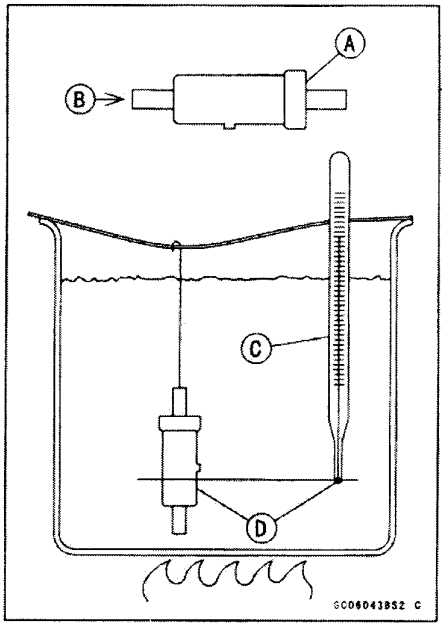
○The valve closes at about 70 °C (158 °F). This is to prevent vaper lock in the fuel hoses and percolation in the float bowls.

● To check valve closing temperature roughly, suspend the coolant valve [A] and a thermometer [C] in a container of water with the heat-sensitive portions [D] in almost the same depth.

● Gradually raise the temperature of the water and wait about 5 minutes while stirring the water gently for even temperature.

Valve Closing Temperature

Standard: **about 70° (158°F) or more**

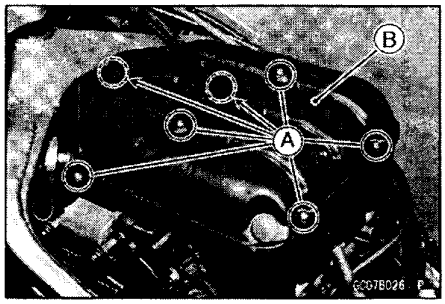


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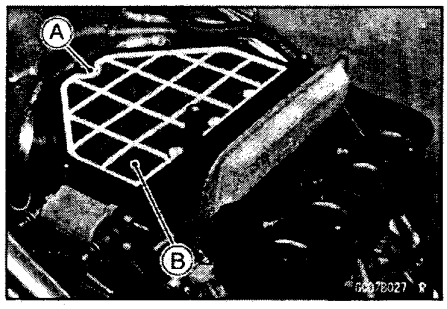
Air Cleaner

Element Removal

● Remove:
Fuel Tank (see Fuel Tank Removal in this chapter)
Seven Upper Housing Mounting Screws [A]
Upper Air Cleaner Housing [B]



● Remove the following parts as a unit.
Upper Plastic Holder [A]
Air Cleaner Element [B]
Lower Plastic Holder
● Put a clean lint-free towel over the lower air cleaner housing to keep dirt or other foreign material from entering.



⚠ WARNING

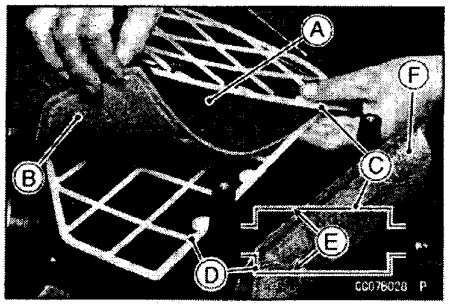
If dirt or dust is allowed to pass through into the carburetors, the butterfly valves may become stuck, possibly causing an accident.

CAUTION

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

Element Installation

● Install the element with the gray side [A] up and yellow side [B] down.
○The upper and lower plastic holders are the same.
● Install the upper holder [C] and the lower holder [D] as shown with each concave side [E] inwards.
○Be sure to install the screen (flame arrester) [F] into the groove of the lower air cleaner housing.



Air Cleaner Element/Air Vent Filter Cleaning

○Refer to the Periodic Maintenance chapter.

Air Cleaner Draining

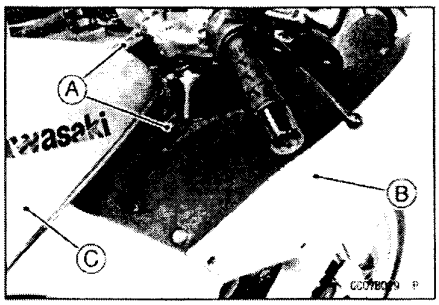
○Refer to the Breather Drain Cleaning in the Engine Lubrication System chapter.

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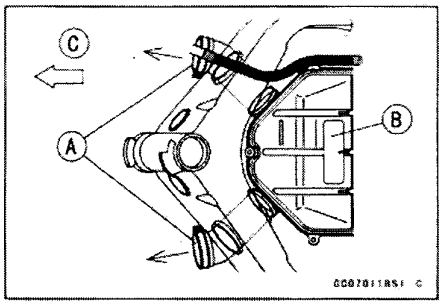
Air Cleaner

Air Cleaner Housing Removal

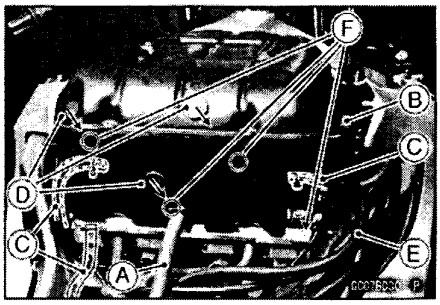
● Remove:
Inner Covers [A] (see Frame chapter)
Upper Fairing [B] (see Frame chapter)
Fuel Tank [C] (see this chapter)



● Pull out the right and left rubber air ducts [A] off the air cleaner housing [B] forwards.
Front [C]

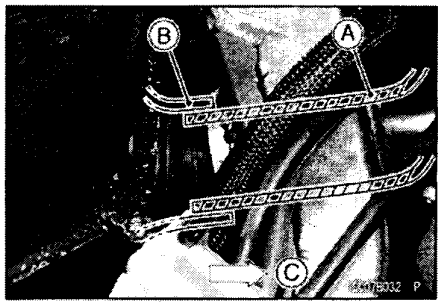


● Remove:
Crankcase Breather Hose [A]
Carburetor Vent Hose [B]
Three Air Cleaner Drain Hoses [C]
Three Rubber Plugs [D]
Purge Hose (green) [E] for Canister
● Unscrew three air cleaner housing mounting bolts [F] halfway as much as the housing can be removed. Do not remove these bolts completely from the air cleaner housing. Remove the outside mounting bolt completely.
● Remove the air cleaner housing.

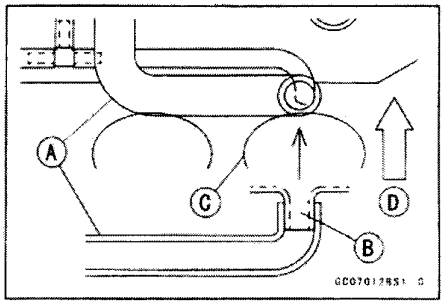


Air Cleaner Housing Installation

● Install:
Four Housing Mounting Bolts and Three Rubber Plugs
● Run the hoses correctly (see Cable, Wire, and Hose Routing in the Appendix chapter).
● Insert the right and left rubber air ducts [A] into the inlet [B] of the air cleaner housing, while installing the upper fairing (see Frame chapter). The line mark should almost align with the end of the air cleaner inlet.
● Tighten the air duct clamps securely.



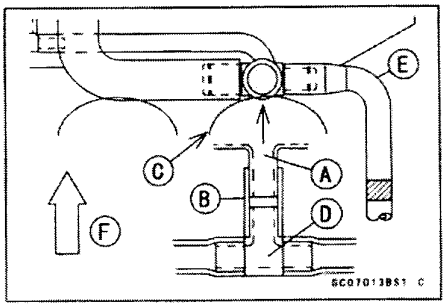
● Fit the vacuum valve switch hose [A] onto the fitting [B] of the air cleaner housing.
Carburetor Holder #4 [C]
Front [D]



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Air Cleaner

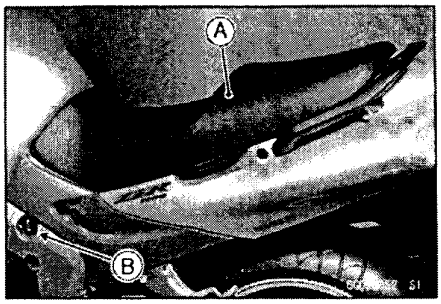
- For California, put the fitting [A] of the air cleaner housing into the rubber joint [B] on the T-joint [D].
  Carburetor Holder #4 [C]
  Purge Hose (green) [E]
  Front [F]
- Install:
  Fuel Tank (see this chapter)
  Inner Covers (see Frame chapter)



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Fuel Tank

Fuel Tank Removal



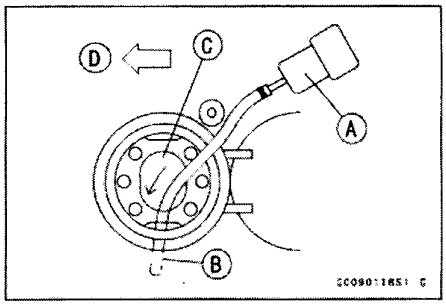
⚠ WARNING

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

CAUTION

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

- Turn both ignition switch and engine stop switch OFF.
- Remove the seat [A] (see Frame chapter).
- Disconnect the battery (–) terminal.
- Turn the fuel tap to the OFF position and remove the fuel tap knob screw [B] from the center hole.



- Open the fuel tank cap to lower the pressure in the tank.
- Draw the fuel out from the tank with a commercially available electric pump [A].

○Use a soft plastic hose [B] as a pump inlet hose in order to insert the hose smoothly.

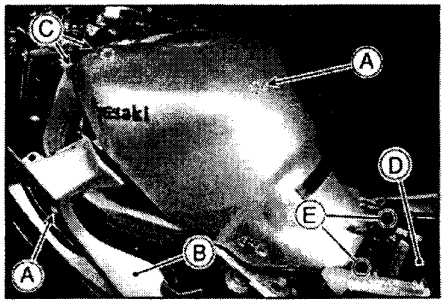
○Put the hose through the fill opening [C] into one side of the tank bottom and draw the fuel out.

Front [D]

○Draw the fuel from the other side of the tank bottom in the same way.

⚠ WARNING

The fuel could not be removed completely from the fuel tank.
Be careful for remained fuel spillage.



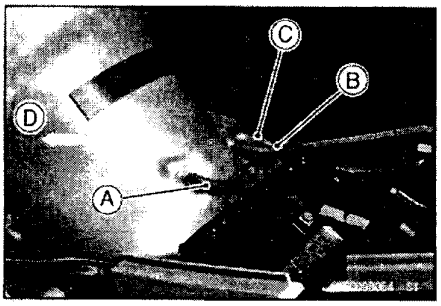
- Remove:

Inner Covers (see Frame chapter)
Upper Allen Bolts [A] of Right/Left Lower Fairings [B]
Front Bolts [C]
Tool Box [D] and Bolts
Rear Bolts [E]

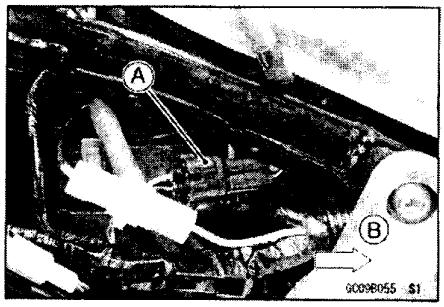
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Fuel Tank

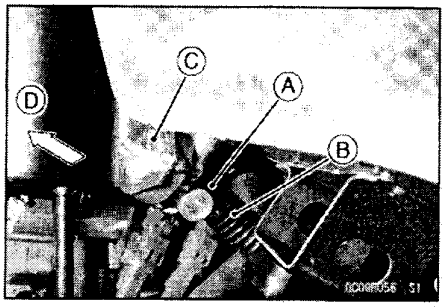
● Remove:
Fuel Tank Filler Drain Hose [A]
California Breather Hose [B] (blue, middle)
California Return Hose [C] (red, right side)
Front [D]
○Plug the fuel tank pipes immediately.



● Disconnect the fuel level sensor lead connector [A].
Front [B]
○Raise the lock of the fuel level sensor lead connector.
● Move the rear part of the fuel tank to the right side so the fuel tap clears the frame.

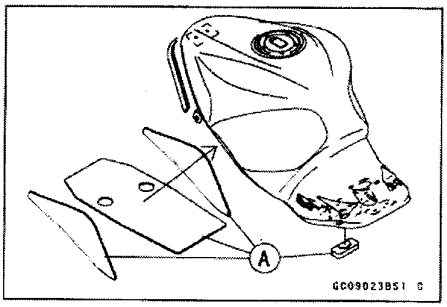


● While holding up the front of the fuel tank, remove the plate clamp [A] and pull off the fuel tap hose [B] from the fuel tap [C].
● Remove the fuel tank from the frame.
Front [D]



Fuel Tank Installation
● Read the above WARNING mentioned in Fuel Tank removal.
● Check the rubber dampers [A].
★If any damper is damaged or deteriorated, replace it.
● Connect and run the hoses correctly (see Appendix chapter).
Fuel Level Sensor Connector and Fuel Tap Hose
Fuel Tank Filler Drain Hose
California Breather and Return Hoses (see Fuel Tank Removal)
● Be sure the hoses are clamped securely to prevent leaks.

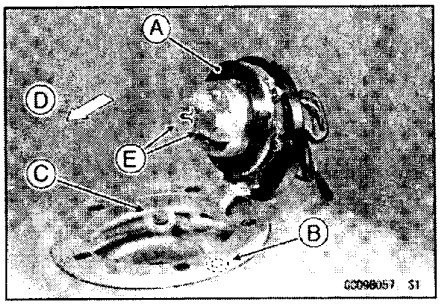
Torque - Fuel Tap Knob Screw: 1.5 N·m (0.15 kgf·m, 13 in·lb)



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Fuel Tank

Fuel Tank and Cap Inspection



- Open the tank cap (front view).
- Visually inspect the gasket [A] on the tank cap for any damage.
- Check to see if the filler drain pipe [B], and the California breather pipe [C] in the tank is not clogged.

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

Front [D]

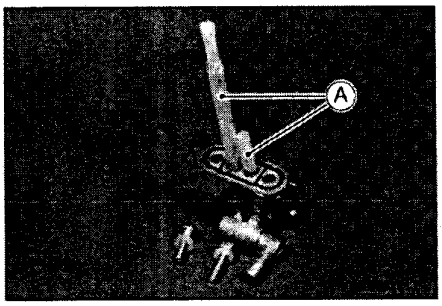
CAUTION

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

Fuel Tank Cleaning

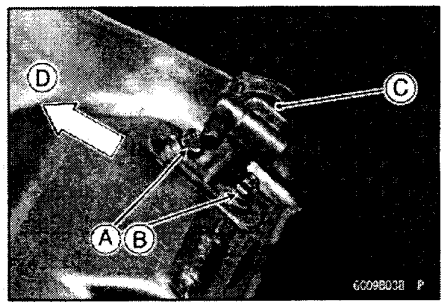
⚠ WARNING

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



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

Fuel Tap Removal



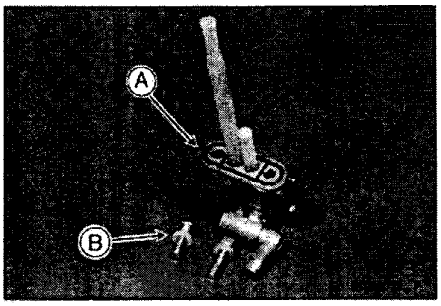
- Remove the fuel tank, drain it and plug the fuel tank fittings (see this chapter).
- Turn the fuel tank upside down.
- Remove:

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

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Fuel Tank

Fuel Tap Installation



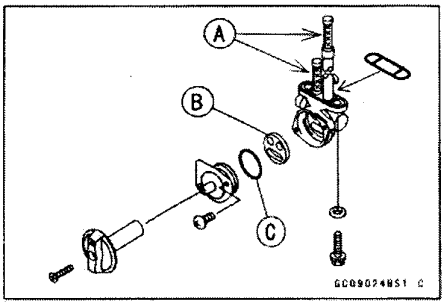
- Be sure the O-ring [A] is in good condition to prevent leaks.
- Be sure the nylon flat washers [B] are in good condition to prevent leaks.

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

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

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

Fuel Tap Inspection



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

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

★If the fuel tap leaks, or allows fuel to flow when it is at OFF position, replace the damaged gasket [B] or O-rings [C].

Torque - Fuel Tap Plate Screws: 0.80 N·m (0.08 kgf·m, 7 in·lb)

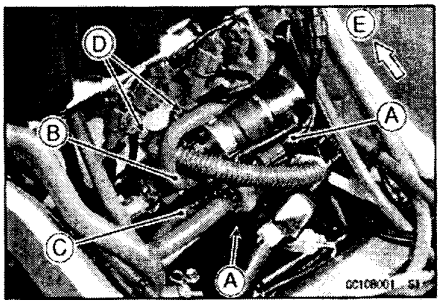
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Fuel Pump

Fuel Pump 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.

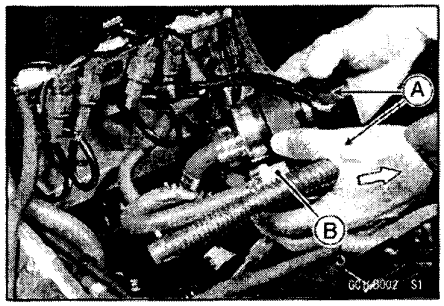


● Remove:

○Raise the lock of the fuel pump lead connectors.

Fuel Tank (see Fuel Tank Removal in this chapter)
Fuel Pump Lead Connectors [A]
Fuel Supply Hose [B] from upper pump
Fuel Supply Hose [C] from lower pump
Pump Bracket Bolts [D]
Front [E]

● Remove the upper and lower fuel pumps [A] and fuel filter [B] as a set.



Fuel Pump Installation

● Connect the fuel supply hoses to the fuel pumps as shown above.

○The upper fuel pump is connected to #3 and #4 carburetors and the lower fuel pump to #1 and #2 carburetors.

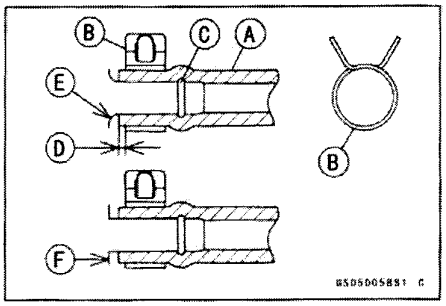
● Check fuel leakage from the fuel pumps.

● Fit the fuel hose [A] onto the fitting fully and install the hose clamp [B] beyond the raised rib [C].

1 ~ 2 mm (0.4 ~ 0.08 in.) [D]

○The hose end should reach the fillet [E] of the fuel filter and be as near as possible to the step [F] of the fuel pump.

○Fit the fuel pump inlet hoses onto the Y-joint until each end of the hoses touch the second raised rib of the joint.



Fuel Pump, Fuel Filter Assembly

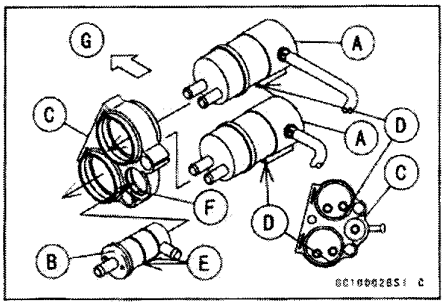
○The two fuel pumps [A] are the same.

● Install the fuel pumps and the fuel filter [B] into the holder [C] in the direction shown.

○Align [D] the projection of the holder with the air pipe of the pump.

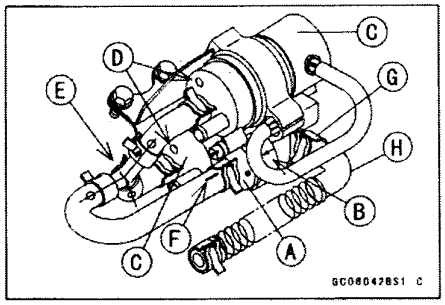
○Fit the rib [E] into the groove [F] of the holder.

Front [G]



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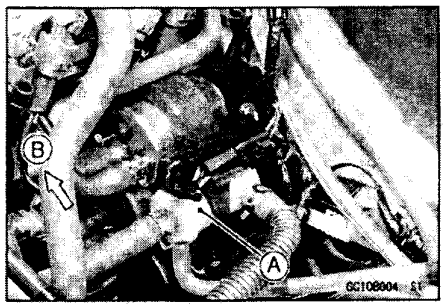
Fuel Pump



○The arrow [B] of the fuel filter [A] shows the fuel flow from the fuel tank to the fuel pumps [C].
○Fit the fuel pump inlet hoses onto the Y-joint fully. Each end of the hoses should touch the second raised rib of the joint.
● Connect the fuel hoses from the Y-joint to the pump fitting marked "INLET" [D].
● Align [E] the parting lines of the Y-joint with the white marks on the hoses.
● Connect the line marked end [F] of the fuel hose to the fuel filter.
● Face the tab of each fuel hose clamp in the direction shown.
○Face the tab of the clamp [G] inwards.
● Install the fuel tap hose [H] with the white mark at each end facing upwards.
● Be sure to route the hoses so that they will not be kinked or stretched.

Fuel Pump Inspection

● Refer to Electrical System chapter.



Fuel Filter Inspection

● Remove the fuel tank (see this chapter).
● Visually inspect the fuel filter [A].
Front [B]
★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. Also, check the rest of the fuel system for contamination.

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Evaporative Emission Control System (CAL)

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

Parts Removal/Installation

⚠ WARNING

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

CAUTION

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

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

⚠ WARNING

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

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

Carburetor Vent Hose Draining

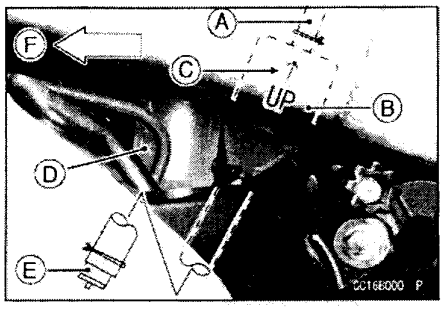
○A drain hose [A] and a catch tank [B] are connected to the bottom of the carburetor vent hose. The catch tank should be installed with the arrow mark [C] pointing upwards.

- Visually check the catch tank along with the breather catch tank [D]. To check the breather catch tank, see Breather Drain Cleaning in the Engine Lubrication System chapter.

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

Front [F]

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



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Evaporative Emission Control System (CAL)

Hose Inspection

○Refer to the Fuel System section in the Periodic Maintenance chapter.

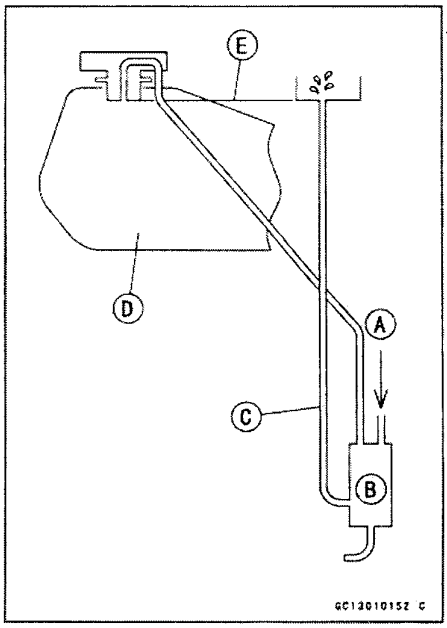
Separator Inspection

○Refer to the Fuel System section in the Periodic Maintenance chapter.

Separator Operation Test

⚠ WARNING

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



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

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

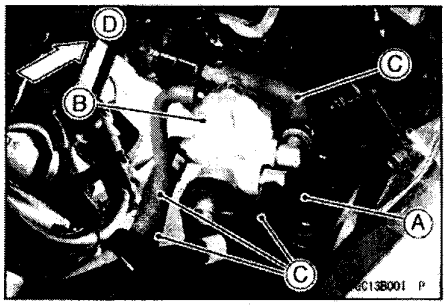
Canister Inspection

○Refer to Fuel System section in the Periodic Maintenance chapter.

Vacuum Valve Inspection

- Remove:

  Right Inner Cover (see Frame chapter)
  Rubber Holder [A] and Vacuum Valve [B]
  Vacuum Valve Hoses [C]
  Front [D]



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Evaporative Emission Control System (CAL)

● Remove the drain screw [A] from the side of the chamber.
★If any liquid accumulates in the chamber, drain it.

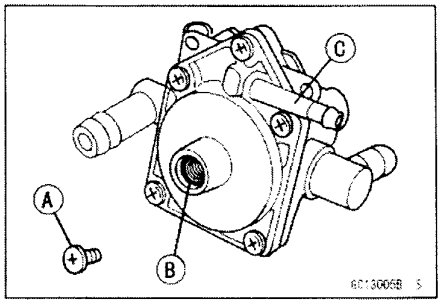
⚠ WARNING

The liquid may contain gasoline.

● Replace the O-ring [B] with a new one.
● After draining, install the drain screw with the O-ring.

Torque - Vacuum Valve Drain Screw: 1.0 N·m (0.10 kgf·m, 9 in·lb)

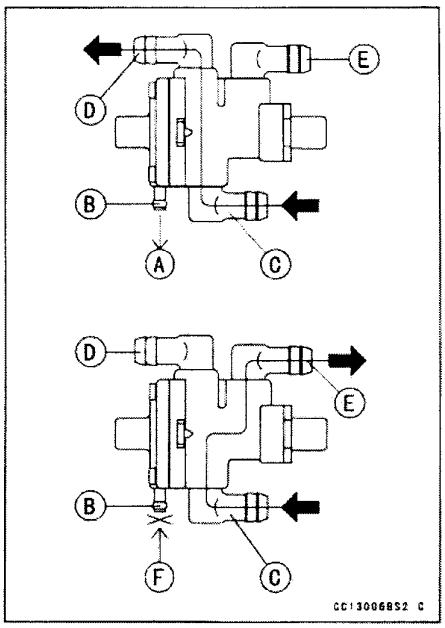
Vacuum Sensing Fitting [C]



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

Special Tool - Fork Oil Level Gauge: 57001–1290

○When applying vacuum [A] 2.0 kPa (1.5 cmHg, 0.29 psi) to the vacuum sensing fitting [B], air flows from the fitting [C] to the fitting [D], and vice versa.
○When applying no vacuum [F], air flows from the fitting [C] to the fitting [E], and vice versa.
★If the vacuum valve does not operate as described, replace it with a new one.



CAUTION

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

NOTE

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

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Cooling System

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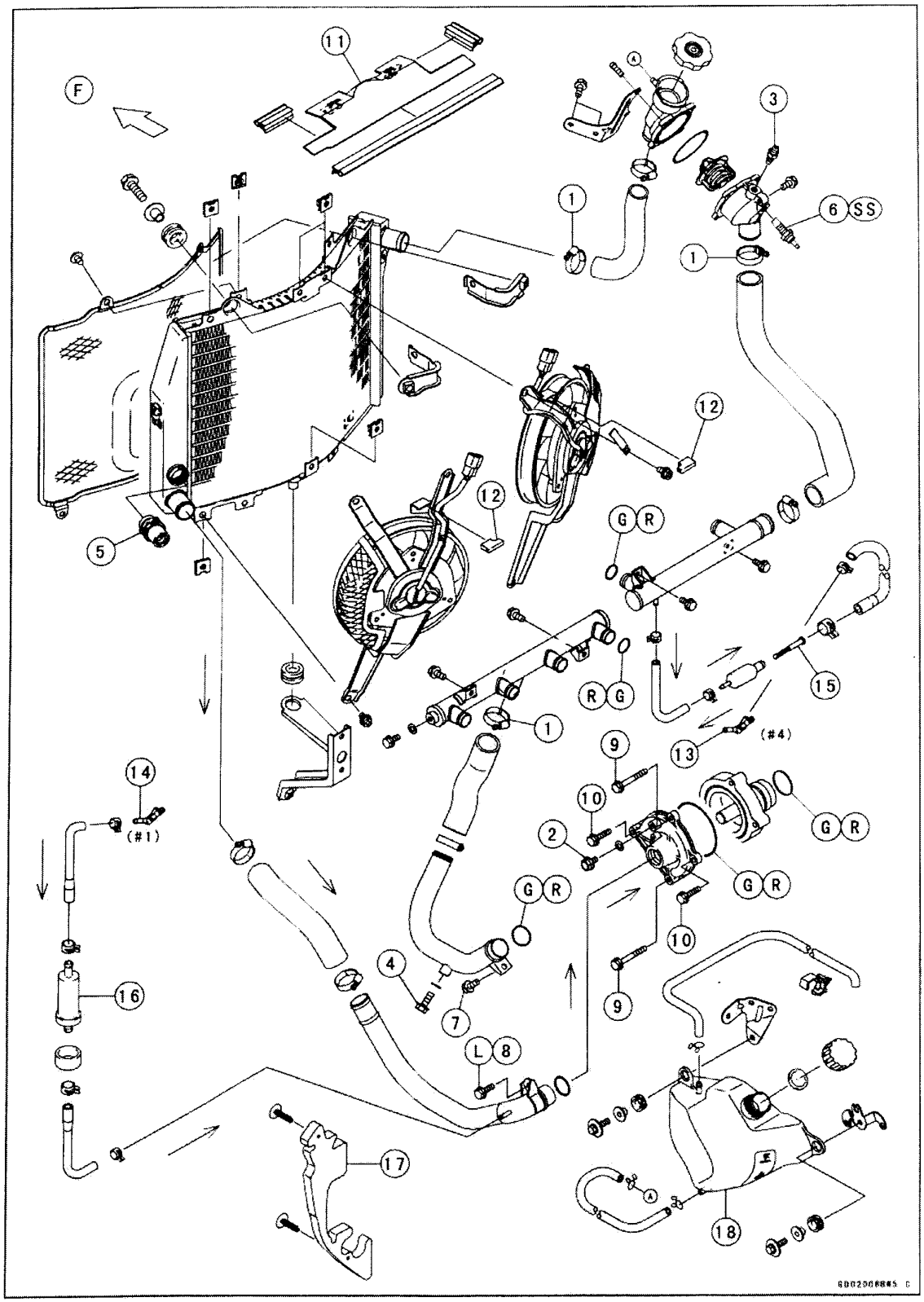
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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Water hose clamp screws	2.5	0.25	22 in·lb	
2	Water pump air bleeder bolt	10	1.0	89 in·lb	
3	Thermostat housing air bleeder bolt	7.8	0.80	69 in·lb	
4	Coolant drain plug (water pipe)	11	1.1	97 in·lb	
5	Radiator fan switch	18	1.8	13	
6	Water temperature sensor	7.8	0.80	69 in·lb	SS
7	Water pump outlet pipe bolt	11	1.1	97 in·lb	
8	Water pump inlet pipe bolt	11	1.1	97 in·lb	L
9	Water pump mounting bolts	11	1.1	97 in·lb	
10	Water pump cover bolts	11	1.1	97 in·lb	

11. Heat baffle (top)
12. Rubber dampers
13. Fitting of the carburetor #4 (through the carburetor coolant hoses to the fitting [14]).
14. Fitting of the carburetor #1
15. Coolant filter
16. Coolant valve
17. Heat baffle (left)
18. Coolant reserve tank

F: Front
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement parts.
SS: Apply silicone sealant.

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4-4 COOLING SYSTEM

Coolant Flow Chart

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

The thermostat is a wax pellet type which opens or closes with coolant temperature changes. The thermostat continuously changes its valve opening to keep the coolant temperature at the proper level. When coolant temperature is below about 75 °C, the thermostat closes so that the coolant flow is restricted through the air bleeder hole, causing the engine to warm up more quickly. When coolant temperature is more than 80 ~ 84 °C (176 ~ 183°F), the thermostat opens and the coolant flows.

When the coolant temperature goes up beyond 93 ~ 103 °C (199 ~ 217°F), the radiator fan switch conducts to operate the radiator fan. The radiator fan draws air through the radiator core when there is not sufficient air flow such as at low speeds. This increases up the cooling action of the radiator. When the temperature is below 90 ~ 96 °C (194 ~ 205°F), the fan switch opens and the radiator fan stops.

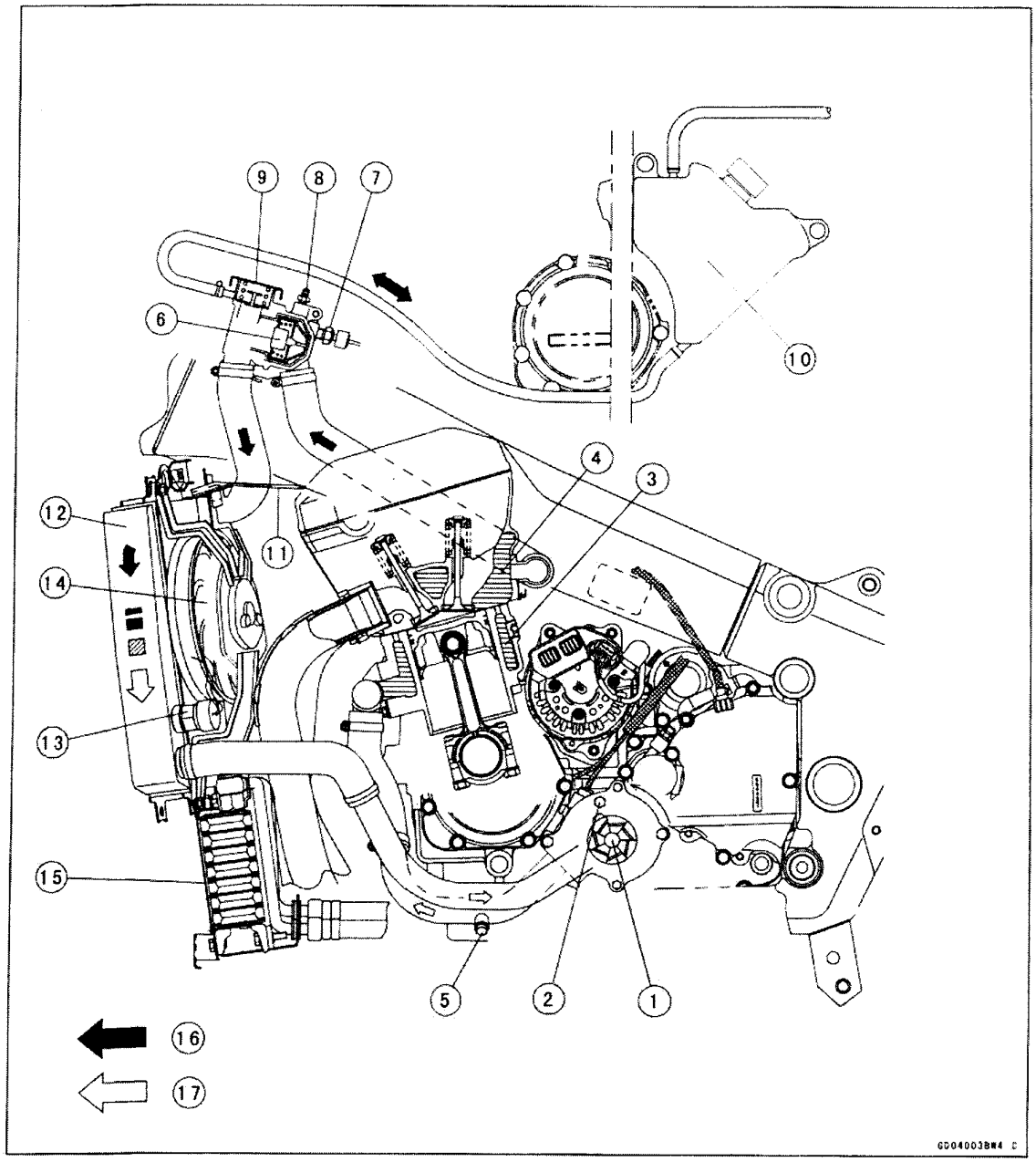
In this way, this system controls the engine temperature within narrow limits where the engine operates most efficiently even if the engine load varies.

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

The radiator cap has two valves. One is a pressure valve which holds the pressure in the system when the engine is running. When the pressure exceeds 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm^2, 14 ~ 17.8 psi), the pressure valve opens and releases the pressure to the reserve tank. As soon as pressure escapes, the valve closes, and keeps the pressure at 93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm^2, 14 ~ 17.8 psi). When the engine cools down, another small valve (vacuum valve) in the cap opens. As the coolant cools, the coolant contracts to form a vacuum in the system. The vacuum valve opens and allows the coolant from the reserve tank to enter the radiator.

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Coolant Flow Chart



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

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4-6 COOLING SYSTEM

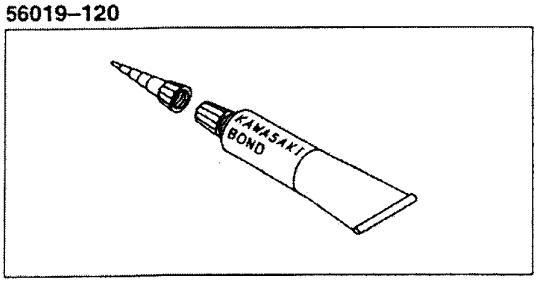
Specifications

Item	Standard
Coolant provided when shipping	
Type (recommended)	Permanent type of antifreeze (soft water and ethylene glycol plus corrosion and rust inhibitor chemicals for aluminum engines and radiators)
Color	Green
Mixed ratio	Soft water 50%, coolant 50%
Freezing point	– 35 °C (– 31 °F)
Total amount	3.2 L (3.4 US qt, reserve tank full level including radiator and engine)
Radiator Cap	
Radiator cap relief pressure	93 ~ 123 kPa (0.95 ~ 1.25 kgf/cm^2, 14 ~ 17.8 psi)
Thermostat	
Valve opening temperature	80 ~ 84 °C (176 ~ 183 °F)
Valve full opening lift	8 mm (0.315 in.) or more @95 °C (203 °F)

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Special Tool

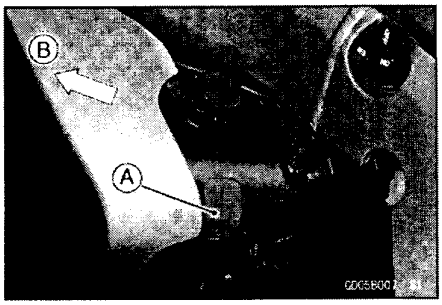
Kawasaki Bond (Silicone Sealant):
56019–120



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Coolant

Coolant Deterioration Inspection

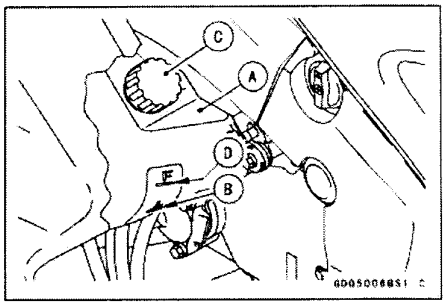


● Visually inspect the coolant [A] in the reserve tank.
Front [B]

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

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

Coolant Level Inspection



NOTE

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

● Check the coolant level in the reserve tank [A] with the motorcycle held upright (Do not use the center stand or sidestand).

★If the coolant level is lower than the "L" level line [B], unscrew the reserve tank cap [C] and add the coolant to the "F" level line [D].
"L": low
"F": full

CAUTION

For refilling, add the specified mixture of coolant and soft water. Adding water alone dilutes the coolant and degrades its anticorrosion properties. The diluted coolant can attack the aluminum engine parts. In an emergency, soft water can be added, but the diluted coolant must be returned to the correct mixture ratio within a few days.
If coolant must be added often or the reserve tank has run completely dry, there is probably leakage in the cooling system. Check the system for leaks.
Coolant ruins painted surfaces. Immediately wash away any coolant that spills on the frame, engine, wheels, or other painted parts.

Coolant Draining

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

Coolant Filling

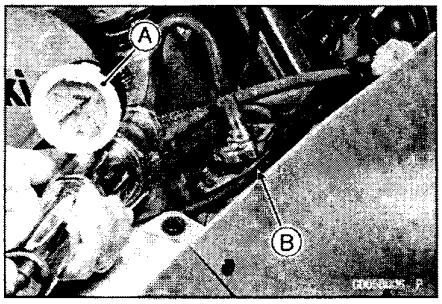
○Refer to the Coolant Change in the Periodic Maintenance chapter.

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Coolant

Pressure Testing

- Remove:
  Right Inner Cover (see Frame chapter).
- Remove the radiator cap, and install a cooling system pressure tester [A] on the filler neck [B].



NOTE

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

- Build up pressure in the system carefully until the pressure reaches 123 kPa (1.25 kgf/cm², 17.8 psi).

CAUTION

During pressure testing, do not exceed the pressure for which the system is designed. The maximum pressure is 123 kPa (1.25 kgf/cm², 17.8 psi).

- Watch the gauge for at least 6 seconds.
★If the pressure holds steady, the system is all right.
★If the pressure drops and no external source is found, check for internal leaks. Droplets in the engine oil indicate internal leakage. Check the cylinder head gasket, the cylinder base gasket and the water pump.
- Remove the pressure tester, replenish the coolant, and install the radiator cap.

Cooling System Flushing

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

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

CAUTION

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

- Warm up the engine, and run it at normal operating temperature for about ten minutes.
- Stop the engine, and drain the cooling system.
- Fill the system with fresh water.
- Warm up the engine and drain the system.
- Repeat the previous two steps once more.
- Fill the system with a permanent type coolant and bleed the air from the system (see Coolant Change in the Periodic Maintenance chapter).

Coolant Filter Cleaning

Refer to the Fuel System chapter for its cleaning procedures.

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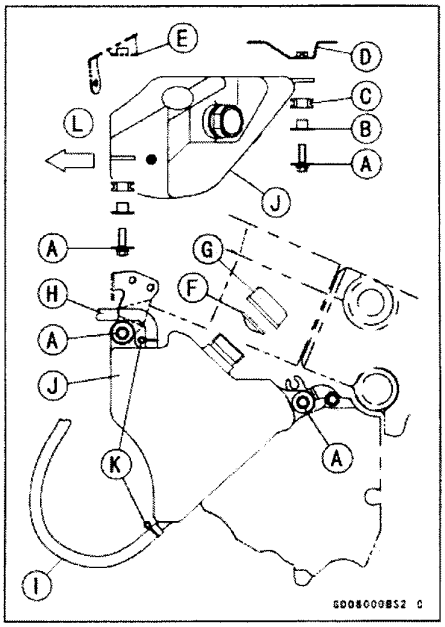
Coolant

Coolant Reserve Tank Removal

- Remove:
  Left Lower Fairing (see Frame chapter)
  Heat Baffle
- Drain the coolant from the reserve tank (see Cooling System section in the Periodic Maintenance chapter).
- Pull off the coolant hoses from the reserve tank.
- Remove the coolant reserve tank.

Coolant Reserve Tank Installation

- Install the mounting bolts and coolant hoses as shown.
  Mounting Bolts [A]
  Collars [B]
  Rubber Dampers [C]
  Idle Adjuster Bracket [D]
  Reserve Tank Bracket [E]
  Gasket [F]
  Reserve Tank Cap [G]
  Reserve Tank Vent Hose [H]
  Reserve Tank Hose [I] to radiator filler neck
  Coolant Reserve Tank [J]
  Clip [K]
  Front [L]



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Water Pump

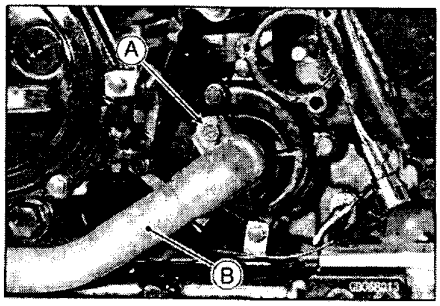
Water Pump Removal

- Drain the coolant (see Coolant Change in the Periodic Maintenance chapter).
- Remove:
  Left Lower Fairing (see Frame chapter)
  Small Coolant Hose (from pump inlet, except CA, CAL, US)
  Slave Cylinder (see Clutch chapter)

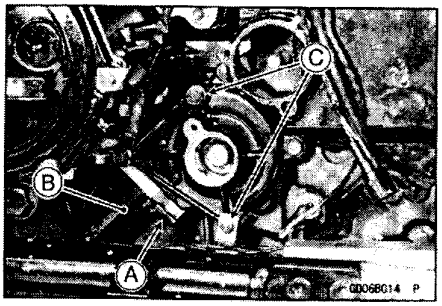
○Plug the coolant hose immediately and wash away any coolant that spills on the frame.

○Detach the clutch pipe from the frame. Push the piston into the cylinder and hold the clutch lever with a band.

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



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



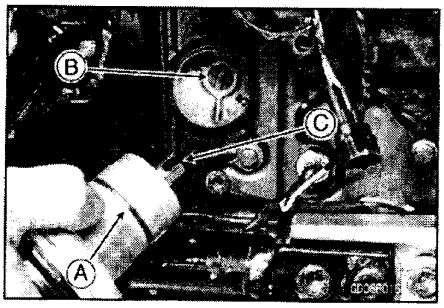
Water Pump Installation

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

Non-permanent Locking Agent -
Water Pump Inlet Pipe Bolt

- Apply grease to the O-ring of the pump inlet pipe.
- Tighten:

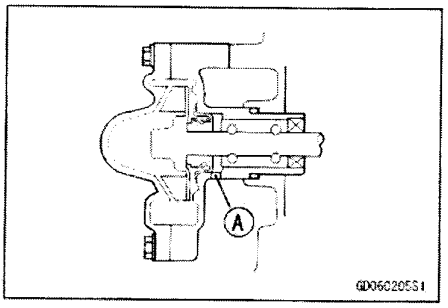
Torque - Water Pump Inlet Pipe Bolt, Outlet Pipe Bolt, and Water Pump Mounting Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)



Water Pump Inspection

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

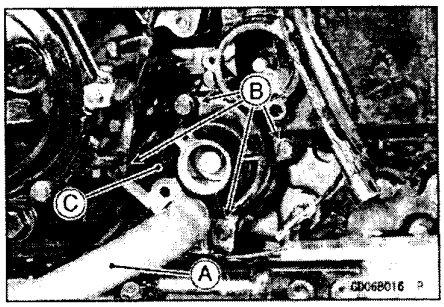
★If the mechanical seal is damaged, the coolant leaks through the seal and drains through the passage. Replace the water pump unit.



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Water Pump

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



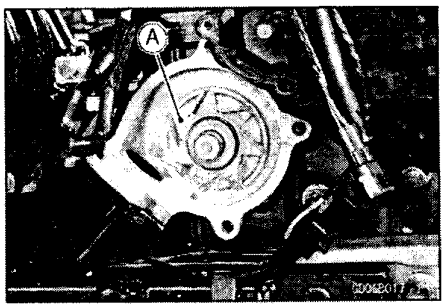
- Visually inspect the impeller [A].

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

- Replace the O-rings of the pump cover and the inlet pipe with new ones.

Non-permanent Locking Agent -
Water Pump Inlet Bolt

Torque - Water Pump Inlet Pipe Bolt, Outlet Pipe Bolt, Water Pump Mounting Bolts and Water Pump Cover Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)



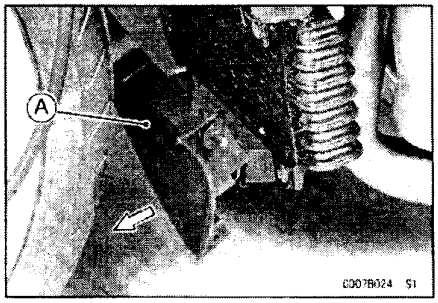
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Radiator

Radiator Removal

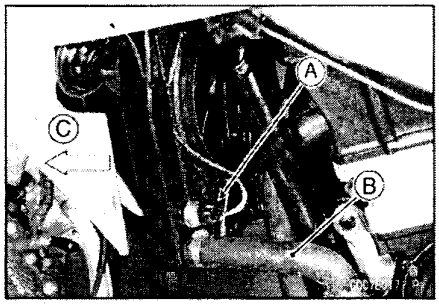
⚠ WARNING

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

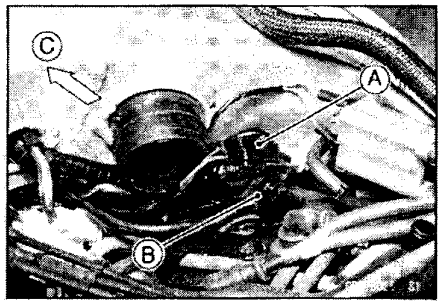


- Remove:
  Inner Covers and Lower Fairings (see Frame chapter)
  Inner Fairing [A] (pull it off forwards)

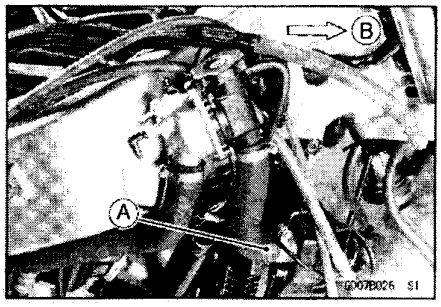
- Remove:
  Coolant (drain, see Periodic Maintenance chapter)
  Radiator Fan Switch Lead Connector [A]
  Left Radiator Hose [B]
  Front [C]



- Remove the fuel tank and air cleaner housing (see Fuel System chapter).
- Disconnect two radiator fan lead connectors.
  Right Radiator Fan Connector [A] (BL/W, BK/Y Leads)
  Left Radiator Fan Connector [B] (BL, BK Leads)
  Front [C]



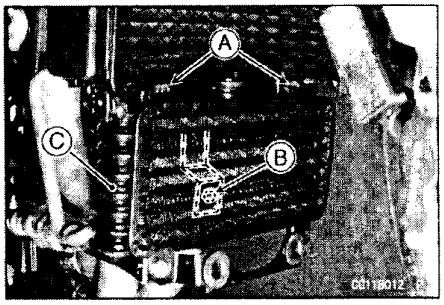
- Remove:
  Right Radiator Hose [A]
  Front [B]



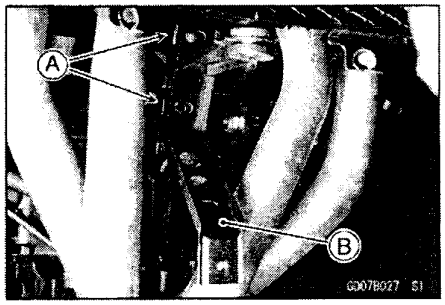
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Radiator

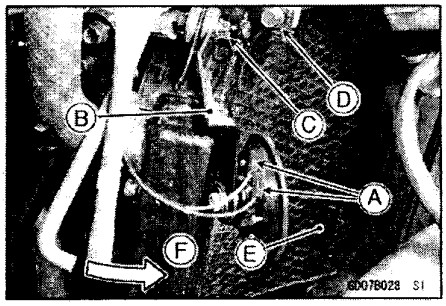
● Unscrew the two oil cooler upper bolts [A], the lower yellow bolt [B], and take off the oil cooler [C] with the oil hoses installed.



● Unscrew two bolts [A] and remove the radiator bracket [B].



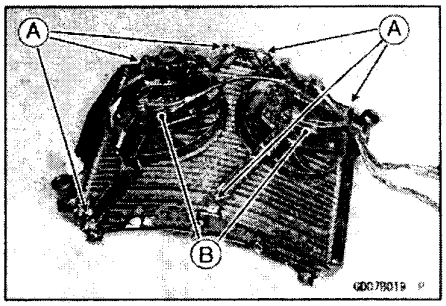
● Remove the following:
○In the photo, the upper fairing is removed for clarity.
Right and Left Horn Lead Connectors [A]
Right and Left Horns with Brackets [B] and Bolts [C]
Right and Left Radiator Mounting Bolts [D]
● Remove the radiator [E].
Front [F]



CAUTION

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

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

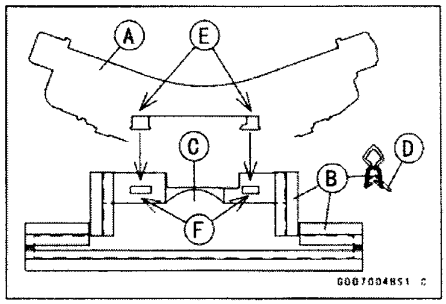


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Radiator

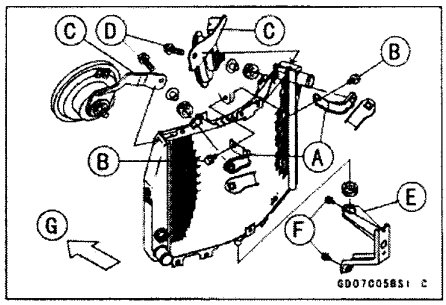
Radiator Installation

- Install the radiator [A].
- Fit the trims [B] onto the heat baffle [C] with the lips [D] downwards.
- Fit the rubber dampers onto the hooks.
- Fit the hooks [E] of the radiator fan into the grooves [F] of the baffle.



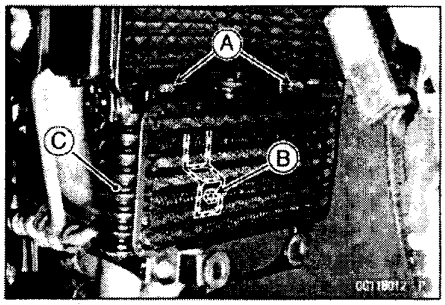
- Install each upper radiator bracket [A] on the bracket of the frame with the flat side upwards.
- Tighten the ϕ8 mounting bolts [B] (L 12 mm, 0.47 in.).
- Fit each horn bracket [C] onto the groove of the radiator sideways. The right horn bracket has an "R" mark and the left horn an "L" mark on it.
- Tighten the mounting bolts [D] (L 12 mm, 0.47 in.).
- Fit the grommet of the radiator bracket [E] onto the radiator pin and install the bracket bolts [F] (black, L 10 mm, 0.39 in.).

Front [G]



- Install the oil cooler [C] and tighten the lower yellow bolt [B] (L 20 mm, 0.79 in.).
- Tighten the two oil cooler upper bolts [A] (black, L 16 mm, 0.63 in.).
- Tighten the right oil cooler screen bolt and left oil cooler screen screw on the lower side of the cooler.

Torque - Oil Cooler Screen Bolt: 11 N·m (1.1 kgf·m, 97 in·lb)
Oil Cooler Screen Screw: 4.5 N·m (0.46 kgf·m, 40 in·lb)



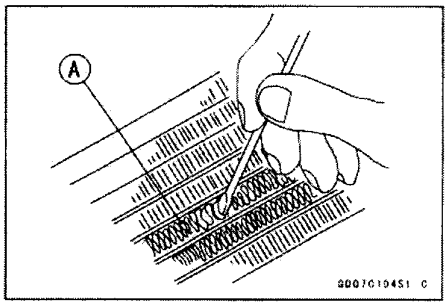
Radiator Inspection

- Check the radiator core.

★If there are obstructions to air flow, remove them.

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

★If the air passages of the radiator core are blocked more than **20%** by unremovable obstructions or irreparably deformed fins, replace the radiator with a new one.

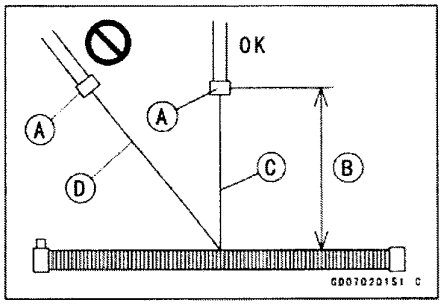


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Radiator

CAUTION

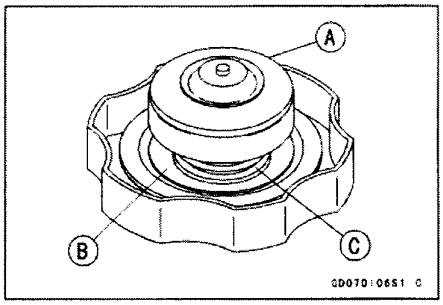
When cleaning the radiator with a steam cleaner, be careful of the following to prevent radiator damage:
Keep the steam gun [A] away more than 0.5 m (20 in.) [B] from the radiator core.
Hold the steam gun perpendicular [C] (not oblique [D]) to the core surface.
Run the steam gun following the core fin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



Radiator Cap Inspection

- Remove:
  Right Inner Cover (see Frame chapter)
  Radiator Cap
- Check the condition of the top and bottom valve seals of the radiator cap.

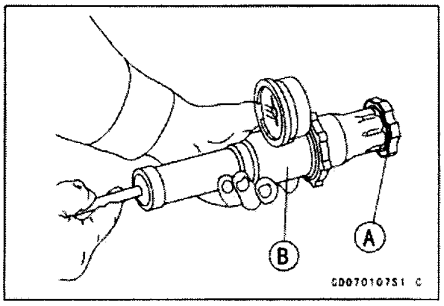
★If any one of them shows visible damage, replace the cap.
Bottom Valve Seal [A]
Top Valve Seal [B]
Valve Spring [C]



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

NOTE

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



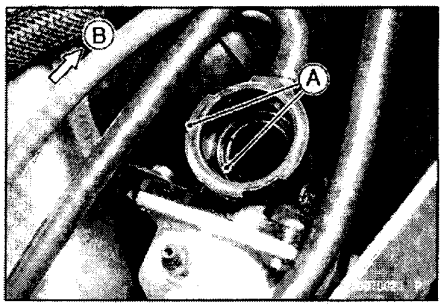
- Watching the pressure gauge, pump the pressure tester to build up the pressure until the relief valve opens: the gauge needle flicks downward. Stop pumping and measure leak time at once. The relief valve must open within the specified range in the table below and the gauge needle must remain within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

Radiator Cap Relief Pressure
Standard: 93 ~ 123 kPa
(0.95 ~ 1.25 kgf/cm², 14 ~ 17.8 psi)

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

Radiator Filler Neck Inspection

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

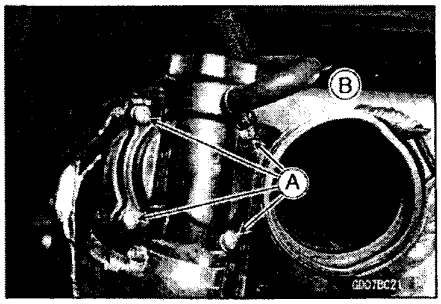


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Thermostat

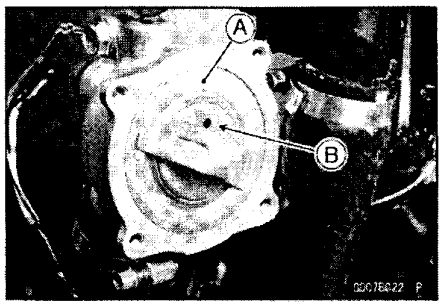
Thermostat Removal

- Remove:
  Right Inner Cover (see Frame chapter)
  Coolant (drain about 200 mL (6.76 US oz), see Periodic Maintenance chapter)
  Four Housing Screws [A]
- Remove the thermostat from the housing.
  Front View [B]



Thermostat Installation

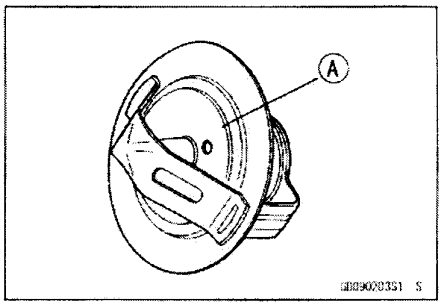
- Install the thermostat [A] in the housing so that the air bleeder hole [B] is on top.
- Install a new O-ring into the housing.
- Fill the radiator with coolant (see Coolant Change in the Periodic Maintenance chapter).



Thermostat Inspection

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

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



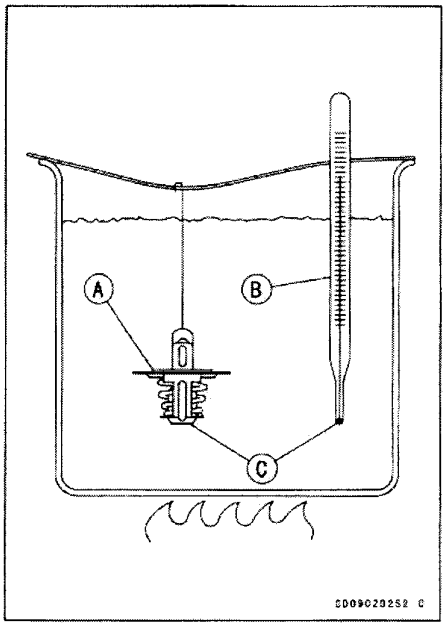
- To check valve opening temperature, suspend the thermostat [A] in a container of water and raise the temperature of the water.

○The thermostat must be completely submerged and must not touch the container sides or bottom. Suspend an accurate thermometer [B] in the water so that the heat sensitive portions [C] are located in almost the same depth. It must not touch the container, either.

- Gradually raise the temperature of the water while stirring the water gently for even temperature.

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

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



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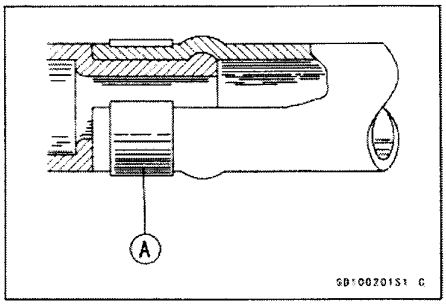
Hoses and Pipes

Hose Installation

- Install the hoses and pipes being careful to follow bending direction. Avoid sharp bending, kinking, flattening or twisting.
- Wet the internal diameter of both ends of the water hose with water or coolant and install the hose onto the pipe.
- Install the clamp [A] as near as possible to the hose end to clear the raised rib of the fitting. This will prevent the hoses from working loose.

○The clamp screws should be positioned correctly to prevent the clamps from contacting the other parts.

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



Hose Inspection

○Refer to the Periodic Maintenance chapter.

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Engine Top End

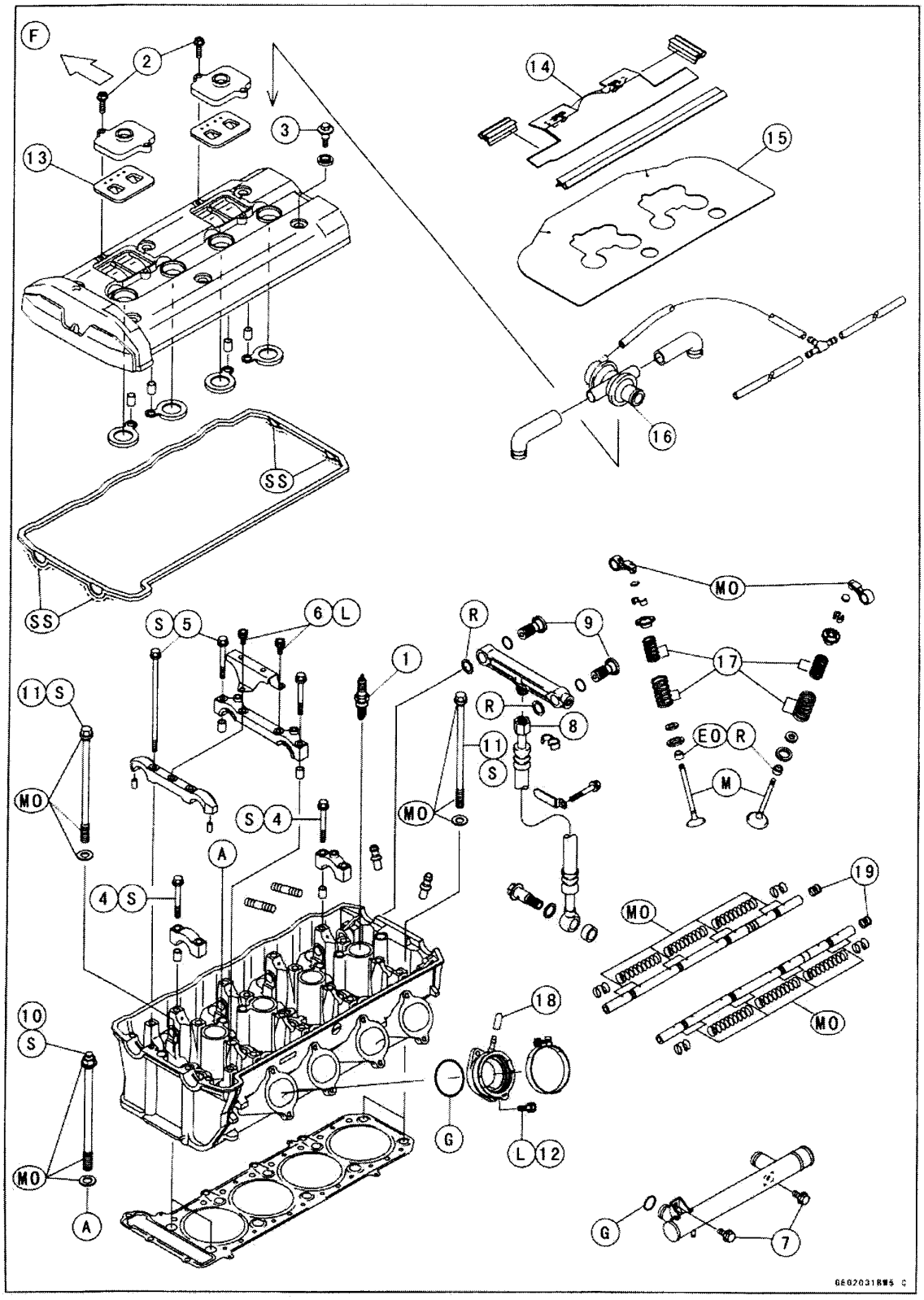
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5-2 ENGINE TOP END

Exploded View



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Exploded View

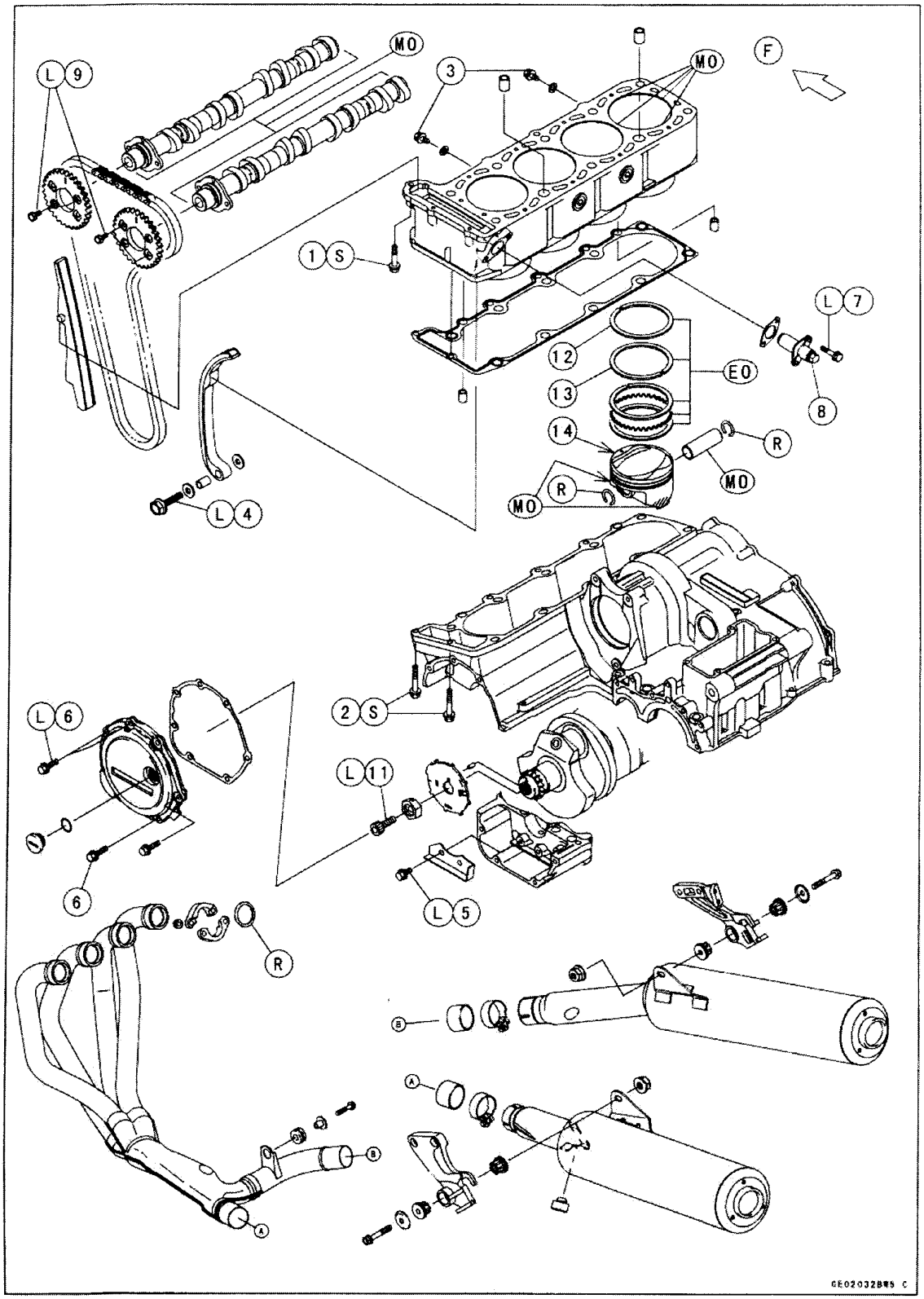
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Spark plugs	14	1.4	10	
2	Air suction valve cover bolts	11	1.1	97 in·lb	
3	Cylinder head cover bolts	10	1.0	89 in·lb	
4	Camshaft cap bolts	12	1.2	110 in·lb	S
5	Camshaft bracket bolts	12	1.2	110 in·lb	S
6	Upper chain guide bolts	12	1.2	110 in·lb	L
7	Cylinder head water pipe mounting bolts (rear)	11	1.1	97 in·lb	
8	Head oil hose fitting	22	2.2	16	
9	T-fitting banjo bolts	25	2.5	18	
10	Cylinder head bolts, ϕ11 mm	62	6.3	46	S, MO
11	Cylinder head bolts, ϕ10 mm	46	4.7	34	S, MO
12	Carburetor holder bolts	13	1.3	115 in·lb	L

13. Air suction valves
14. Heat baffle
15. Rubber cover
16. Vacuum switch valve
17. Closed coil end faces downwards (painted end upwards).
18. Rubber plugs for carburetor holders #2, #3 (except for California)
19. Springs (white)

EO: Apply engine oil.
F: Front
G: Apply grease.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil.
R: Replacement parts
S: Follow the specific tightening sequence.
SS: Apply silicone sealant (Kawasaki Bond : 56019–120).

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Cylinder head bolt, ϕ 6 × 30 mm (1.18 in.)	9.8	1.0	87 in·lb	S
2	Cylinder bolts, ϕ 6 × 38 mm (1.5 in.)	15	1.5	11	S
3	Cylinder coolant drain bolts	10	1.0	89 in·lb	
4	Rear camshaft chain guide bolt	20	2.0	15	L
5	Lower chain guide bolts	11	1.1	97 in·lb	L
6	Pickup coil cover bolts	11	1.1	97 in·lb	L (2)
7	Chain tensioner mounting bolts	11	1.1	97 in·lb	L
8	Chain tensioner cap	20	2.0	15	
9	Cylinder water pipe mounting bolts (front)	15	1.5	11	L
10	Cylinder head bolts	11	1.1	97 in·lb	L
11	Timing rotor bolt	25	2.5	18	L

12. "R" marked side faces up.
13. "RN" marked side faces up.
14. Round mark (○) is on the front side.

EO: Apply engine oil.
F: Front
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil.
R: Replacement parts
S: Follow the specific tightening sequence.

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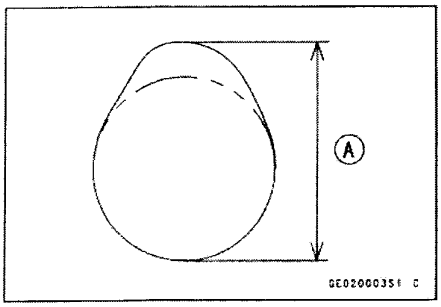
Specifications

Item	Standard	Service Limit
Clean Air system		
Vacuum switch valve closing pressure	Open → Close 57.3 ~ 65.3 kPa (430 ~ 490 mm Hg)	– – –
Camshafts		
Cam height:		
Exhaust	36.679 ~ 36.795 mm (1.4441 ~ 1.4486 in.)	36.57 mm (1.4398 in.)
Inlet	36.864 ~36.980 mm (1.4513 ~ 1.4560 in.)	36.76 mm (1.4472 in.)
Camshaft/camshaft cap clearance:		
#1, #2, #5	0.040 ~ 0.081 mm (0.00158 ~ 0.0032 in.)	0.17 mm (0.0067 in.)
#3, #4	0.070 ~ 0.111 mm (0.0028 ~ 0.0044 in.)	0.20 mm (0.0079 in.)
Camshaft journal diameter:		
#1, #2, #5	24.94 ~ 24.96 mm (0.9819 ~ 0.9827 in.)	24.91 mm (0.9807 in.)
#3, #4	24.91 ~ 24.93 mm (0.9807 ~ 0.9815 in.)	24.88 mm (0.9795 in.)
Camshaft bearing inside diameter	25.000 ~ 25.021 mm (0.9843 ~ 0.9851 in.)	25.08 mm (0.9874 in.)
Camshaft runout	TIR 0.02 mm (0.00079 in.) or less	TIR 0.1 mm (0.004 in.)
Rocker arm inside diameter	12.000 ~ 12.027 mm (0.4724 ~ 0.4735 in.)	12.06 mm (0.4748 in.)
Rocker shaft diameter	11.966 ~ 11.984 mm (0.4711 ~ 0.4718 in.)	11.94 mm (0.4701 in.)
Cylinder Head		
Cylinder compression	(Usable range) 879 ~ 1350 kPa (8.96 ~ 13.8 kgf/cm², 127 ~ 196 psi) @320 r/min (rpm) with electric starter	– – –
Cylinder head warp	– – –	0.05 mm (0.002 in.)
Valves		
Valve clearance:		
Exhaust	0.18 ~ 0.24 mm (0.0071 ~ 0.0095 in.)	– – –
Inlet	0.13 ~ 0.19 mm (0.0051 ~ 0.0075 in.)	– – –
Valve head thickness:		
Exhaust	0.7 ~ 0.9 mm (0.028 ~ 0.035 in.)	0.5 mm (0.020 in.)
Inlet	0.4 ~ 0.6 mm (0.0158 ~ 0.024 in.)	0.25 mm (0.0098 in.)
Valve stem bend	TIR 0.01 mm (0.0004 in.) or less	TIR 0.05 mm (0.0020 in.)
Valve stem diameter:		
Exhaust	4.955 ~ 4.970 mm (0.19508 ~ 0.19567 in.)	4.94 mm (0.1945 in.)
Inlet	4.975 ~ 4.990 mm (0.19587 ~ 019646 in.)	4.96 mm (0.1953 in.)
Valve guide inside diameter	5.000 ~ 5.012 mm (0.19685 ~ 0.19732 in.)	5.08 mm (0.200 in.)
Valve-to-guide clearance (wobble method):		
Exhaust	0.10 ~ 0.19 mm (0.0039 ~ 0.0075 in.)	0.41 mm (0.161 in.)
Inlet	0.03 ~ 0.12 mm (0.00118 ~ 0.0047 in.)	0.34 mm (0.0134 in.)

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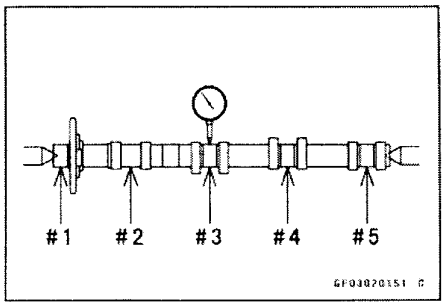
Specifications

Cam Height



Cam Height (maximum) [A]

Camshaft Journals and Runout



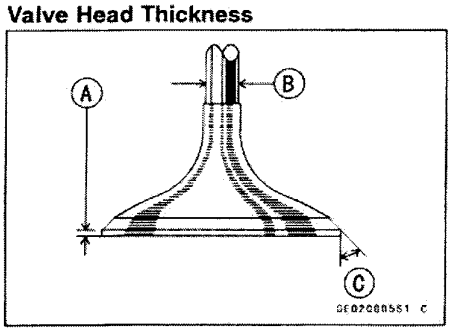
#1: left
#5: right

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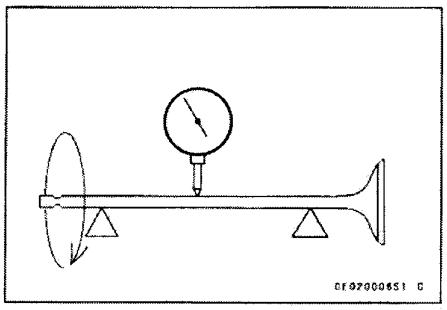
Specifications

Item	Standard	Service Limit
Valve seat surface		
Valve seat cutting angle	45°, 32°, 60°	– – –
Valve seat surface:		
Outside diameter:		
Exhaust	26.3 ~ 26.5 mm (1.035 ~ 1.043 in.)	– – –
Inlet	30.8 ~ 31.0 mm (1.213 ~ 1.220 in.)	– – –
Width:		
Exhaust	0.8 ~ 1.2 mm (0.032 ~ 0.047 in.)	– – –
Inlet	0.5 ~ 1.0 mm (0.0197 ~ 0.0394 in.)	– – –
Valve spring free length:		
Outer (ex, in.)	40.5 mm (light blue) (1.594 in.)	38.6 mm (1.520 in.)
Inner (ex, in.)	35.5 mm (light blue) (1.398 in.)	33.6 mm (1.323 in.)
Cylinders, Pistons		
Cylinder inside diameter	78.994 ~ 79.006 mm (3.1099 ~ 3.1105 in.)	79.10 mm (3.1142 in.)
Piston diameter	78.969 ~ 78.984 mm (3.1090 ~ 3.1096 in.)	78.82 mm (3.1031 in.)
Piston/cylinder clearance	0.010 ~ 0.037 mm (0.00039 ~ 0.00146 in.)	– – –
Piston ring/groove clearance:		
Top	0.03 ~ 0.07 mm (0.00118 ~ 0.00276 in.)	0.17 mm (0.0067 in.)
Second	0.02 ~ 0.06 mm (0.00079 ~ 0.0024 in.)	0.16 mm (0.0063 in.)
Piston ring groove width:		
Top	0.92 ~ 0.94 mm (0.0362 ~ 0.0370 in.)	1.02 mm (0.0402 in.)
Second	1.01 ~ 1.03 mm (0.0398 ~ 0.0406 in.)	1.11 mm (0.044 in.)
Piston ring thickness:		
Top	0.87 ~ 0.89 mm (0.034 ~ 0.035 in.)	0.80 mm (0.032 in.)
Second	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.90 mm (0.0354 in.)
Piston ring end gap:		
Top	0.25 ~ 0.40 mm (0.0098 ~ 0.0157 in.)	0.7 mm (0.0276 in.)
Second	0.40 ~ 0.55 mm (0.0158 ~ 0.0217 in.)	0.85 mm (0.0335 in.)
Oil	0.20 ~ 0.70 mm (0.0079 ~ 0.028 in.)	1.0 mm (0.0394 in.)

Valve Head Thickness



Valve Stem Bend



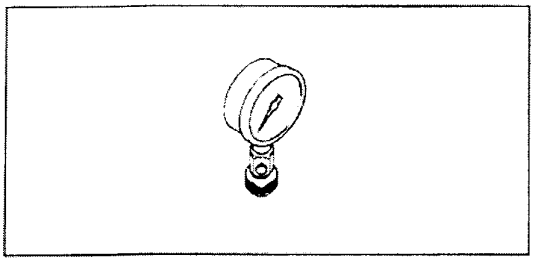
Valve Head Thickness [A]
Valve Stem Diameter [B]
45° [C]

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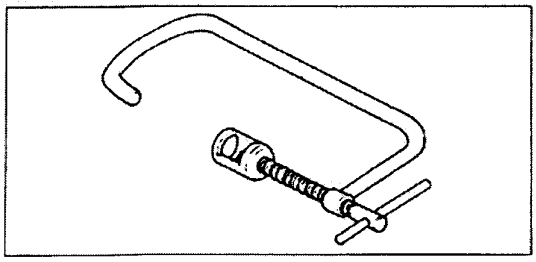
Special Tools

OThe following seat cutters can be used as alternative seat cutters instead of the specified cutters shown below.
Exhaust Valve Seat Cutter 57001–1119 (32°-ϕ28) → 57001–1120 (32°-ϕ30)
Inlet Valve Seat Cutter 57001–1115 (45°-ϕ32) → 57001–1116 (45°-ϕ35)

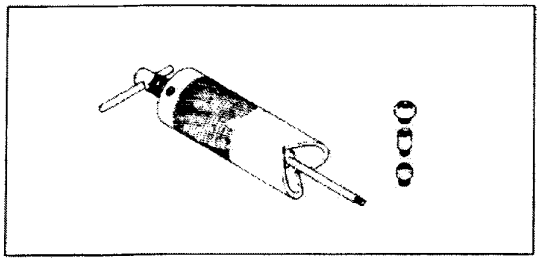
Compression Gauge, 20 kgf/cm²:
57001–221



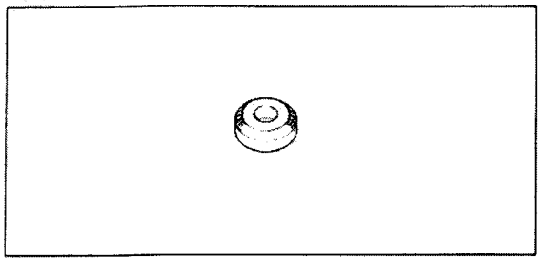
Valve Spring Compressor Assembly:
57001–241



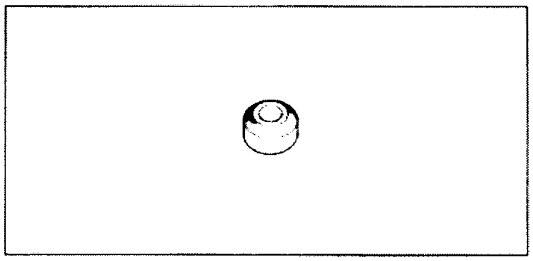
Piston Pin Puller Assembly:
57001–910



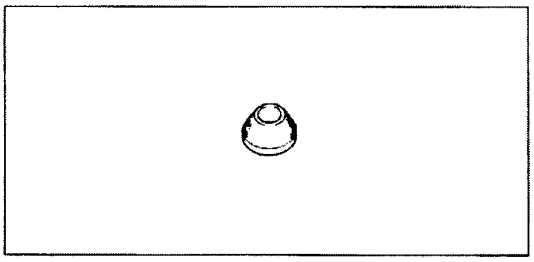
Valve Seat Cutter, 45° – ϕ32:
57001–1115



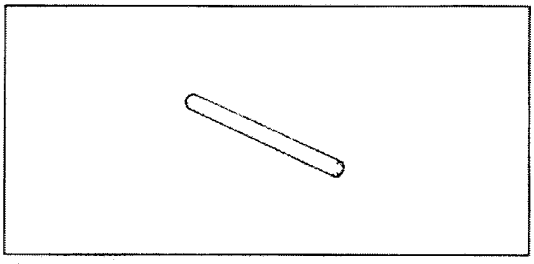
Valve Seat Cutter, 32° – ϕ28:
57001–1119



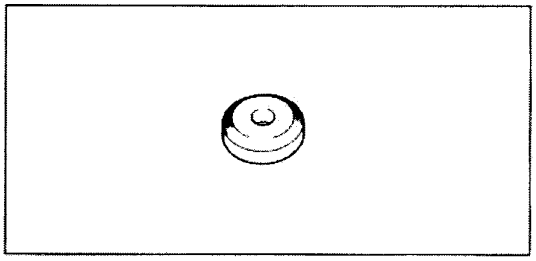
Valve Seat Cutter, 60° – ϕ30:
57001–1123



Valve Seat Cutter Holder Bar:
57001–1128



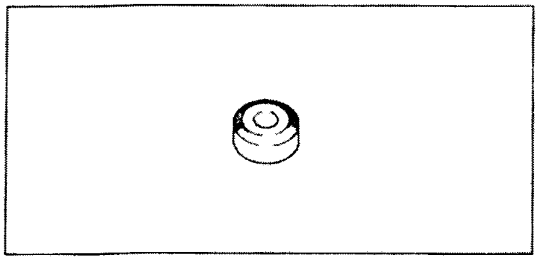
Valve Seat Cutter, 45° – ϕ30:
57001–1187



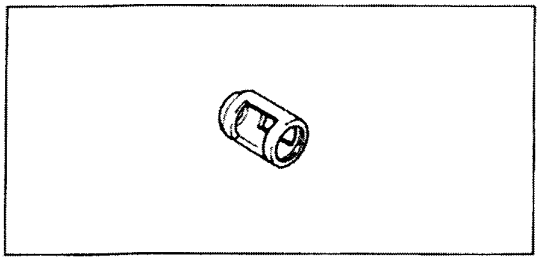
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Special Tools

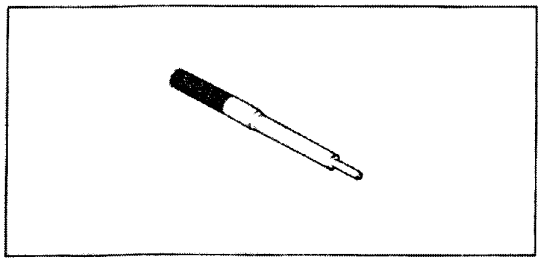
Valve Seat Cutter, 32° – φ33:
57001–1199



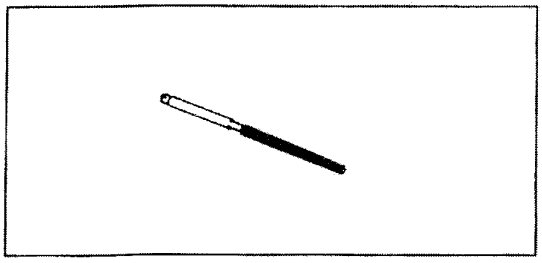
Valve Spring Compressor Adapter, φ22:
57001–1202



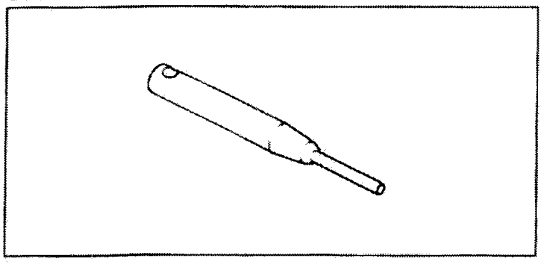
Valve Guide Arbor, φ5:
57001–1203



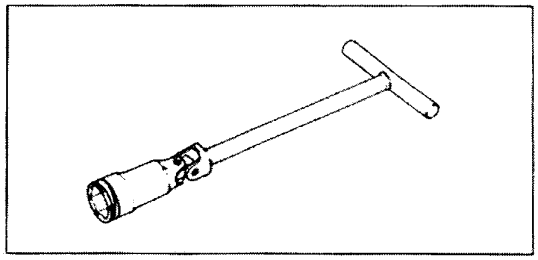
Valve Guide Reamer, φ5:
57001–1204



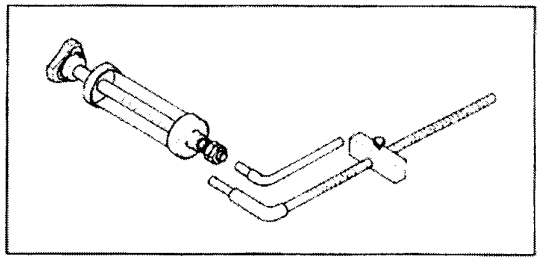
Valve Seat Cutter Holder, φ5:
57001–1208



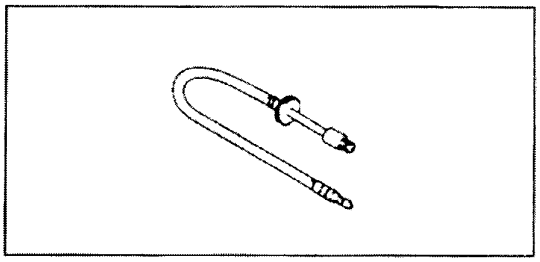
Spark Plug Wrench, Hex 16:
57001–1262



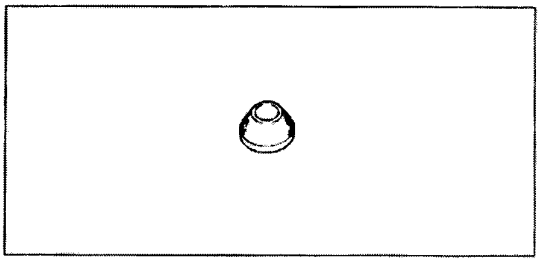
Fork Oil Level Gauge:
57001–1290



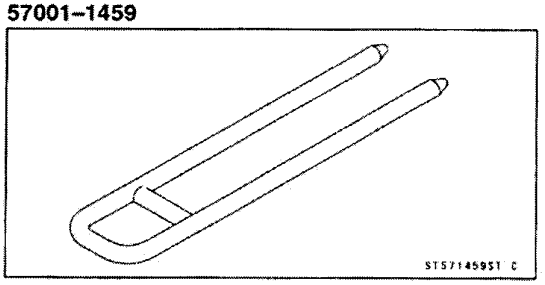
Compression Gauge Adapter, M10 x 1.0:
57001–1317



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



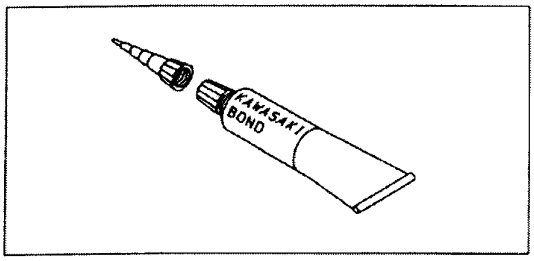
Piston Base, φ10:
57001–1459



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Special Tools

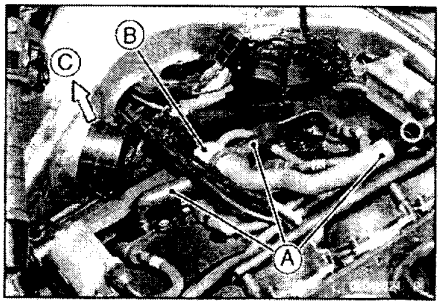
Kawasaki Bond (Silicone Sealant):
56019–120



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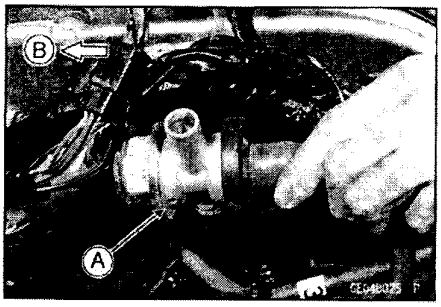
Clean Air System

Vacuum Switch Valve Removal



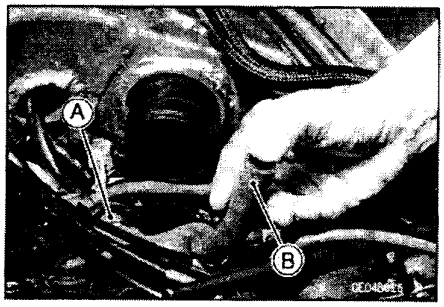
- Remove:
  Fuel Tank and Air Cleaner Housing (see Fuel System Chapter)
  Vacuum Switch Valve Hose Ends [A]
  Vacuum Switch Valve [B]
  Front [C]

Vacuum Switch Valve Installation



- Install the vacuum switch valve so that the air hole [A] faces downwards.
  Front [B]
- Apply water or rubber lubricant to the end of the vacuum switch hose and insert the hose onto the fitting of the air cleaner housing.

Vacuum Switch Valve Operation Test

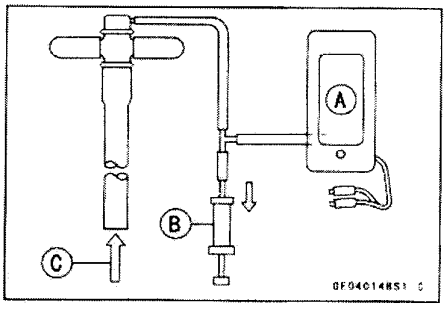


- Remove the fuel tank and air cleaner housing (see Fuel System chapter). Do not remove the vacuum switch valve [A].
- Supply fuel to the carburetors with an auxiliary fuel tank.
- Start the engine and run it at idle speed.
- Plug the vacuum switch hose end [B] with your finger and feel vacuum pulsing in the hose.

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

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

Vacuum Switch Valve Unit Test



- Remove the fuel tank and air cleaner housing (see Fuel System chapter).

○Do not remove the vacuum switch valve.

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

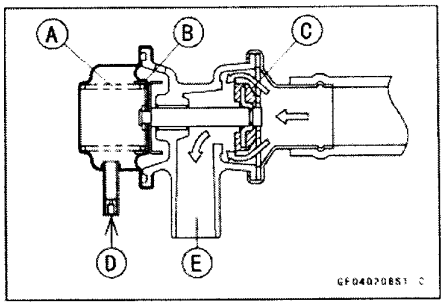
Special Tool - Fork Oil Level Gauge: 57001–1290

Air Flow [C]

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Clean Air System

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



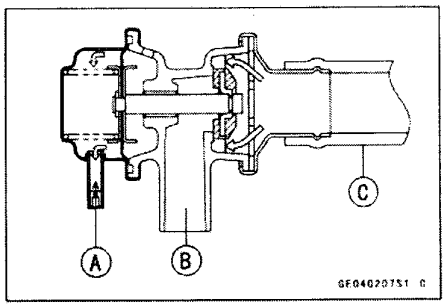
★If the vacuum switch valve does not operate as described, replace it with a new one.

NOTE

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

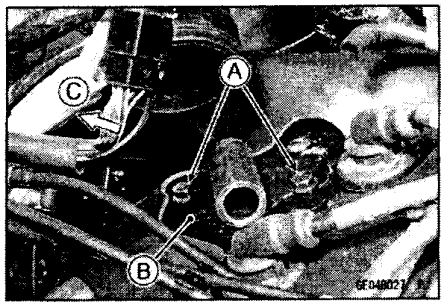
Vacuum Switch Valve Closing Pressure (Open → Close)
Standard: 57.3 – 65.3 kPa (430 – 490 mmHg)

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



Air Suction Valve Removal

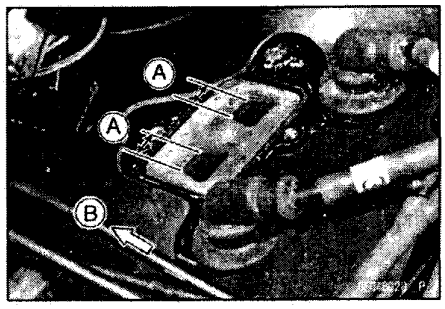
● Remove:
Fuel Tank and Air Cleaner Housing (see Fuel System Chapter)
Vacuum Switch Valve (see this section)
● Put the vacuum switch valve aside.
● Unscrew the bolts [A] and remove the air suction valve covers [B].
Front [C]



Air Suction Valve Installation

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

Torque - Air Suction Valve Cover Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)



Air Suction Valve Inspection

○Refer to Periodic Maintenance chapter.

Clean Air System Hose Inspection

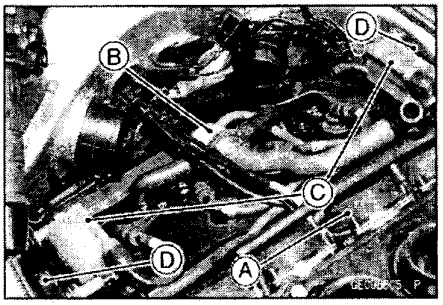
● Be certain that all the hoses are routed without being flattened or kinked, and are connected correctly to the air cleaner housing, carburetor assembly and cylinder head cover (see Cable, Wire, and Hose Routing section in the Appendix chapter).
★If they are not, correct them. Replace them if they are damaged.

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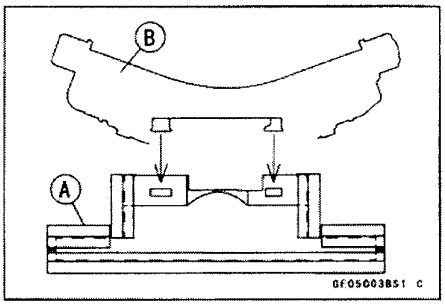
Cylinder Head Cover

Cylinder Head Cover Removal

- Remove the fuel tank and air cleaner housing (see Fuel System chapter).
- Loosen the carburetor holder clamp screws and pull the carburetor assembly [A] out of the holders with cables installed.
- Remove:
  Vacuum Switch Valve and Hoses [B] (see this section)
  Spark Plug Caps and Ignition Coils [C]
  Ignition Coil Brackets [D]

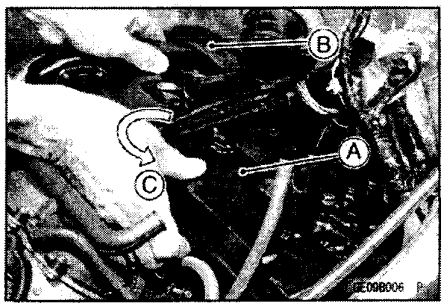


- Pull the heat baffle [A] off the radiator [B].
- Remove the rubber cover from the cylinder head cover.



- Unscrew the cover bolts and lift the cylinder head cover [A].

○Tilt up the left side of the cylinder head cover and clear the front-left side [B] of the frame, while twisting the cover counterclockwise [C].

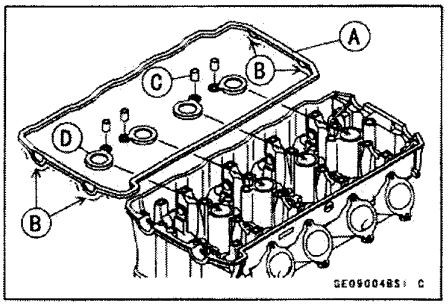


Cylinder Head Cover Installation

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

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

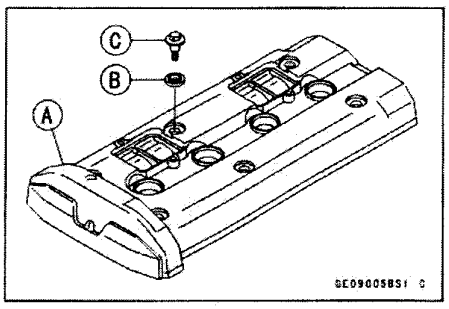
- Install:
  Dowel Pins [C]
  Spark Plug Hole Gaskets [D] (with the flat side up)



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

Torque - Cylinder Head Cover Bolts [C]: 10 N·m (1.0 kgf·m, 89 in·lb)

- Fit the plug caps securely. Pull up the spark plug caps lightly to make sure of installation of the spark plug caps (see Engine Removal/Installation chapter).
- Run the spark plug leads correctly (see Cable, Wire and Hose Routing section in the Appendix chapter).



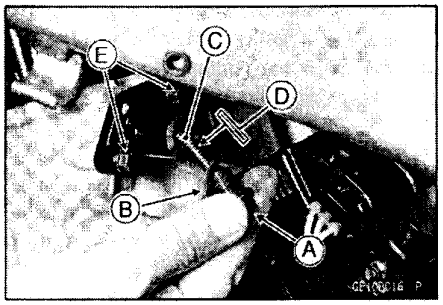
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Camshaft Chain Tensioner

Camshaft Chain Tensioner Removal

CAUTION

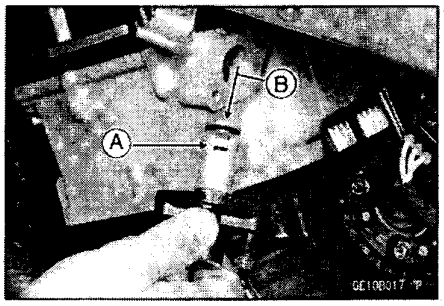
This is a non-return type cam chain tensioner. The push rod does not return to its original position once it moves out to take up camshaft chain slack. Observe all the rules listed below:
When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts from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



- Remove:
  Left Lower Fairing (see Frame chapter)
  Coolant Reserve Tank (see Cooling System chapter)
  Pickup Coil Cover (see Valve Clearance Inspection in the Periodic Maintenance chapter).
  Chain Tensioner Cap [A]
  Washer [B]
  Spring [C] and Pin [D]
  Tensioner Mounting Bolts [E]
- Take the camshaft chain tensioner off the cylinder.

Camshaft Chain Tensioner Installation

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

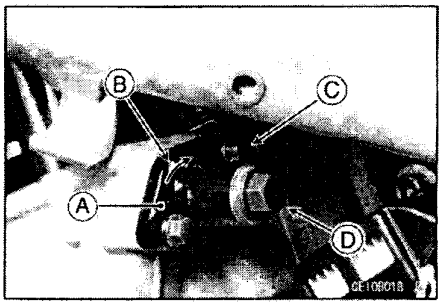


- Install the tensioner body [A] with the arrow mark [B] pointing upwards.

Non-permanent Locking Agent -
Chain Tensioner Mounting Bolts

- Tighten:

Torque - Chain Tensioner Mounting Bolts [C]: 11 N·m (1.1 kgf·m, 97 in·lb)



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

Torque - Chain Tensioner Cap [D]: 20 N·m (2.0 kgf·m, 15 ft·lb)

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

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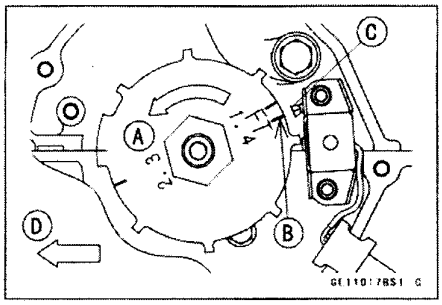
Camshafts

Camshaft Removal

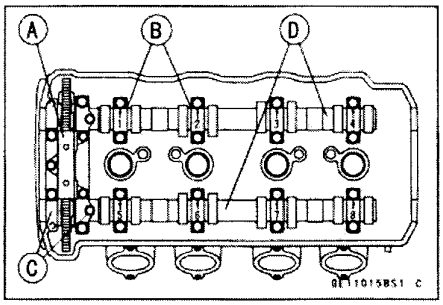
● Remove:
Cylinder Head Cover (see this chapter)
Pickup Coil Cover

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

● Remove the camshaft chain tensioner (see this chapter).



● Remove the following and stuff a clean cloth into the chain tunnel to keep any parts from dropping into the crankcase.
Upper Chain Guide [A], Camshaft Caps [B]
Camshaft Brackets [C], Camshafts [D]



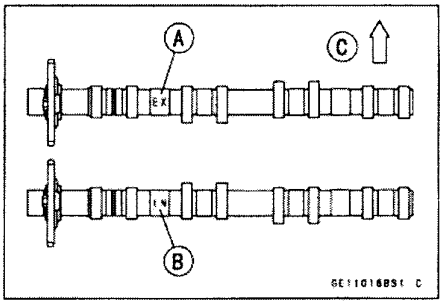
CAUTION

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

Camshaft Installation

● Apply molybdenum disulfide oil to all cam parts, left steps, and journals. The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10 : 1).

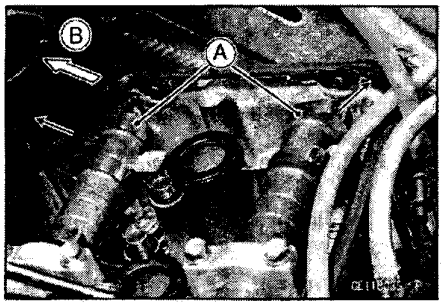
○The exhaust camshaft has an EX mark [A] and the inlet camshaft has an IN mark [B]. Be careful not to mix up these shafts.
Front [C]



● Position the crankshaft at #1, #4 piston TDC.

CAUTION

Always pull the chain taut while turning the crankshaft. This avoids kinking the chain on the lower sprocket. A kinked chain could damage both the chain and the sprocket.



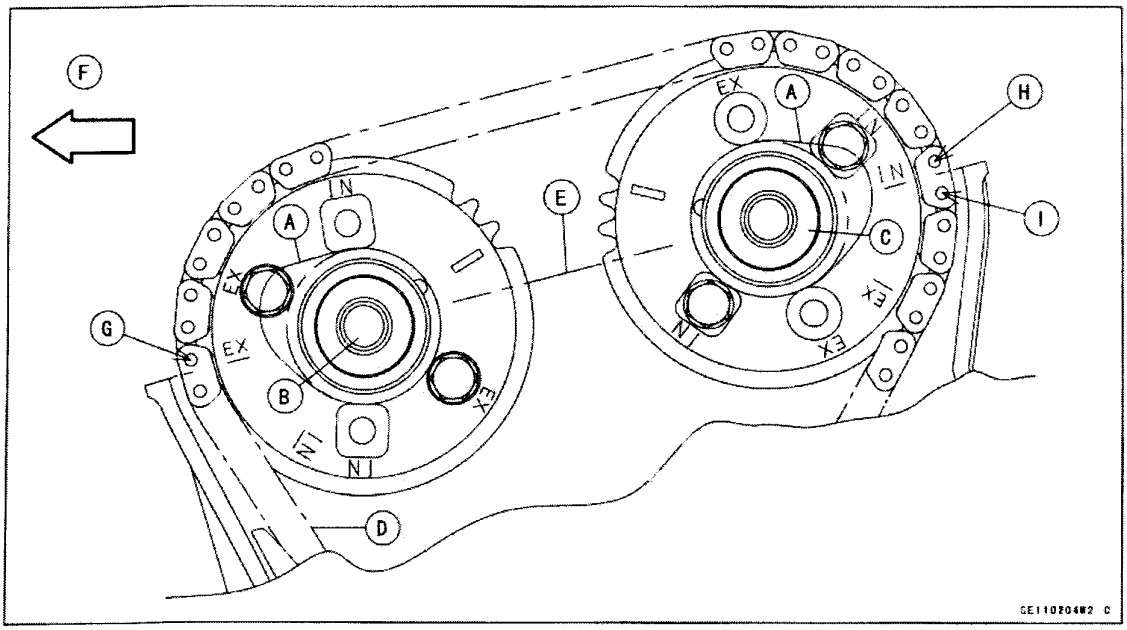
○Install these camshafts so the #4 cams [A] point away from the locker arm for easy timing.
Front [B]

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Camshafts

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

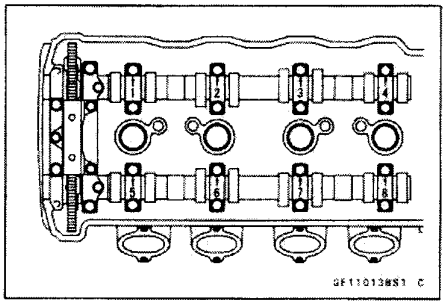
Front [F] 1 st Pin [G] 30 th Pin [H] 31 st Pin [I]



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

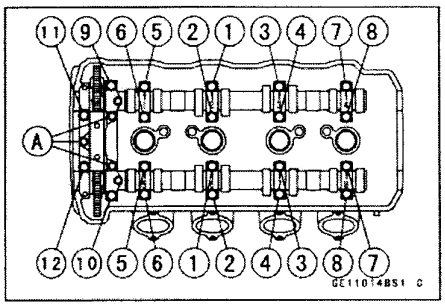
CAUTION

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



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Camshafts



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

Torque - Camshaft Cap and Bracket Bolts: 12 N·m (1.2 kgf·m, 110 in·lb)

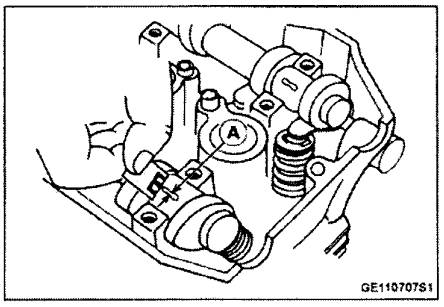
- Tighten the upper chain guide bolts [A].

Non-permanent Locking Agent - Upper Chain Guide Bolts

Torque - Upper Chain Guide Bolts: 12 N·m (1.2 kgf·m, 110 in·lb)

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

Camshaft/Camshaft Cap Wear



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

○Tighten:

Torque - Camshaft Cap Bolts: 12 N·m (1.2 kgf·m, 110 in·lb)

NOTE

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

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

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

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

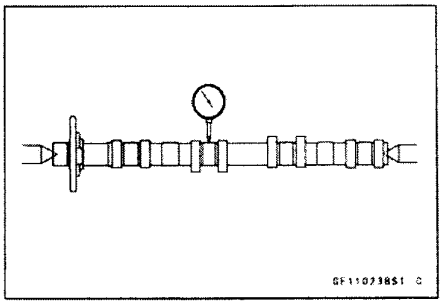
★If the camshaft journal diameter is less than the service limit, replace the camshaft with a new one and measure the clearance again.

★If the clearance still remains out of the limit, replace the cylinder head unit.

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Camshafts

Camshaft Runout



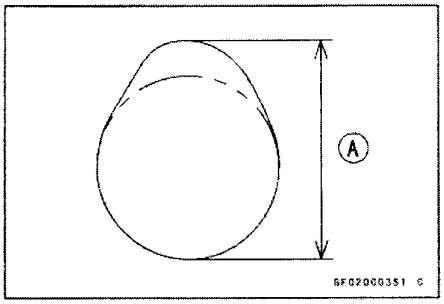
- Set the camshaft in a camshaft alignment jig or on V blocks.
- Measure runout with a dial gauge at the middle journal of the camshaft.

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

Camshaft Runout

Standard:	**TIR 0.02 mm (0.00079 in.) or less**
Service Limit:	**TIR 0.1 mm (0.004 in.)**

Cam Wear



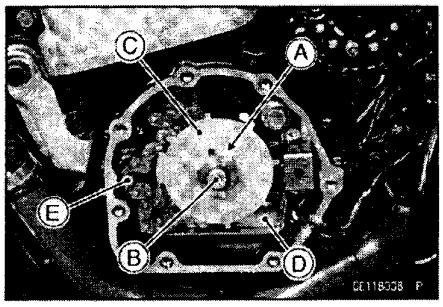
- Measure the maximum height [A] of each cam with a micrometer.

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

Cam Height

Standard:	
Exhaust	**36.679 ~ 36.795 mm (1.4441 ~ 1.4486 in.)**
Inlet	**36.864 ~ 36.980 mm (1.4513 ~ 1.4560 in.)**
Service Limit:	
Exhaust	**36.57 mm (1.4398 in.)**
Inlet	**36.76 mm (1.4472 in.)**

Camshaft Chain Removal/Installation



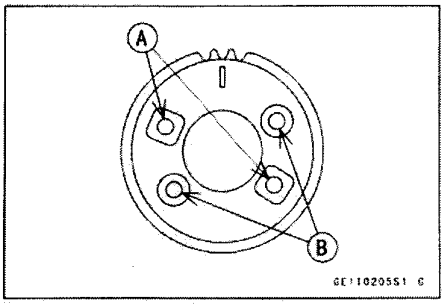
- Remove the pickup coil cover (see Valve Clearance Inspection in the Periodic Maintenance chapter).
- While holding the hexagon washer [A], unscrew the timing rotor bolt [B].
- Remove:
  Pickup Coil Cover Timing Rotor [C]
  Lower Chain Guide [D]
  Camshafts (see this chapter)
- Remove the camshaft chain [E] from the crankshaft sprocket.

Non-permanent Locking Agent -
Timing Rotor Bolt

Torque - Timing Rotor Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Install the camshafts (see Camshaft Installation in this chapter).

Camshaft and Sprocket Assembly



- Since the inlet and exhaust camshaft sprockets are the same, they have a set of bolt holes for the exhaust camshaft and another for the inlet.
  Bolt Holes for the Inlet Camshaft [A]
  Bolt Holes for the Exhaust Camshaft [B]
- Install the sprockets so that the marked side faces outwards.
- Apply a non-permanent locking agent to the camshaft sprocket bolts and tighten them.

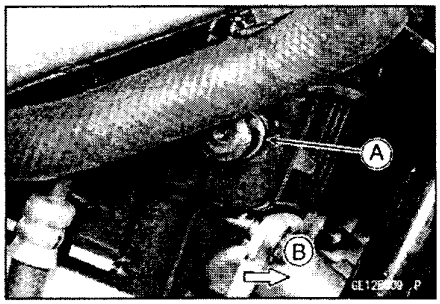
Torque - Camshaft Sprocket Bolts: 15 N·m (1.5 kgf·m, 11 ft·lb)

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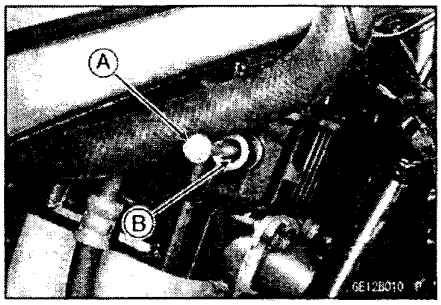
Camshafts

Rocker Shaft, Rocker Arm Removal

● Remove:
Camshafts (see this chapter)
Front Rocker Shaft End Bolt [A]
Front [B]



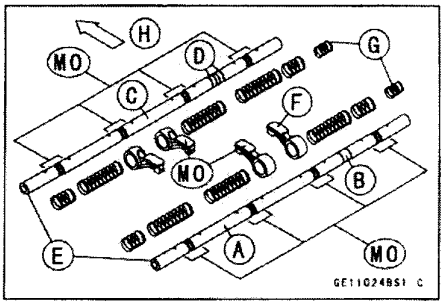
● Using a bolt [A] : M8 P1.25 × more than 45 mm (0.18 in.) long, pull the front rocker shaft [B] out.
○The rocker arms and springs come off with the rocker shaft.
○Mark and record the rocker arm locations so that the rocker arm can be reinstalled in their original positions.
○Remove the engine (see Engine Removal/Installation chapter) and remove the rear rocker shaft in the same way.



Rocker Shaft, Rocker Arm Installation

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

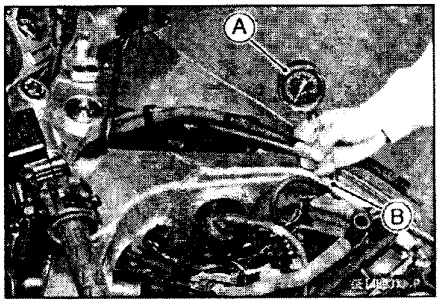
Torque - Rocker Shaft End Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



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Cylinder Head

Cylinder Compression Measurement



NOTE

○*Use the battery which is fully charged*

- Warm up the engine thoroughly and stop the engine.
- Remove:
  Fuel Tank and Air Cleaner Housing (see Fuel System chapter)
  Spark Plugs (see Electrical System chapter)

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

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

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

Cylinder Compression:
Usable Range 879 ~ 1350 kPa (8.96 ~ 13.8 kgf/cm², 127 ~ 196 psi) @ 320 r/min (rpm)

- Repeat the measurement for the other cylinders.
- Install the spark plugs and fit the spark plug caps securely onto the spark plugs and run the spark plug leads correctly (see Cylinder Head Cover Installation in this chapter).

Torque - Spark Plugs: 14 N·m (1.4 kgf·m, 10 ft·lb)

★Consult the next table if the reading is not within the usable range.

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

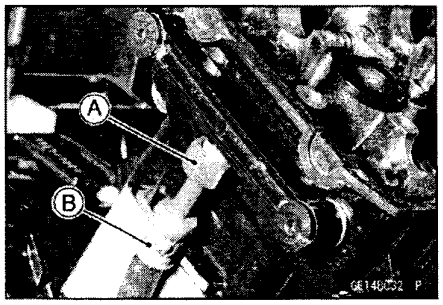
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Cylinder Head

Cylinder Head Removal

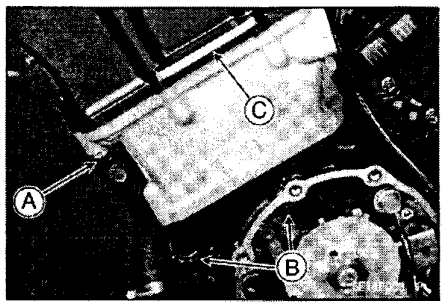
NOTE

○*Remove the engine for removal of the cylinder head.*



- Remove the engine (see Engine Removal/Installation chapter).
- Remove:
  Cylinder Head Cover (see this chapter)
  Camshaft Chain Tensioner and Camshafts (see this chapter)
  Oil Hose Fitting [A] and Oil Hose [B]

○The camshaft chain comes off.

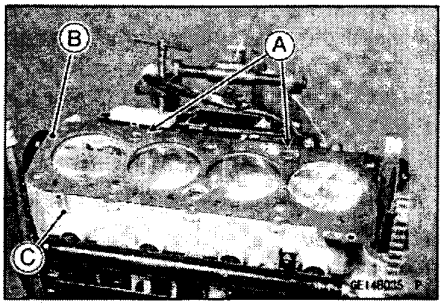


- Remove the 6 mm cylinder head bolt [A] first, loosen the 6 mm cylinder bolts [B], and then remove the 10 and 11 mm cylinder head bolts. This prevents excessive stress on the 6 mm bolts.
- Tap [C] lightly up the cylinder head with a plastic mallet to separate from the cylinder.
- Remove the cylinder head gasket.

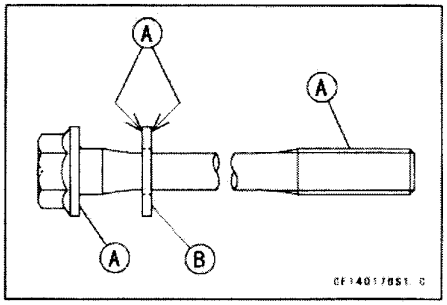
Cylinder Head Installation

NOTE

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



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

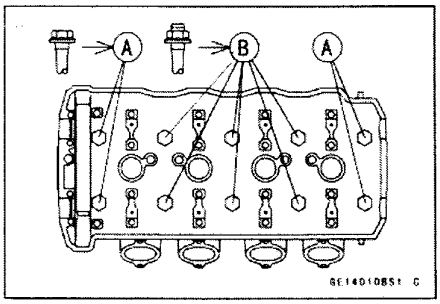


- Apply molybdenum disulfide oil [A] to the 10 mm and 11 mm cylinder head bolt threads, seating surfaces and both sides of steel washers [B].

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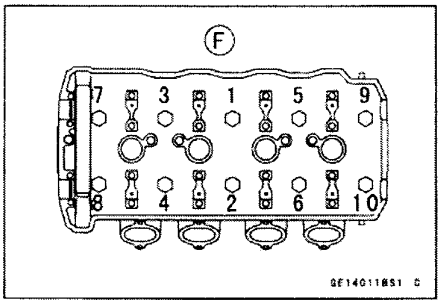
Cylinder Head

● Install the cylinder head bolts and steel washers as shown.
10 mm Bolts [A]
11 mm Bolts [B]



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

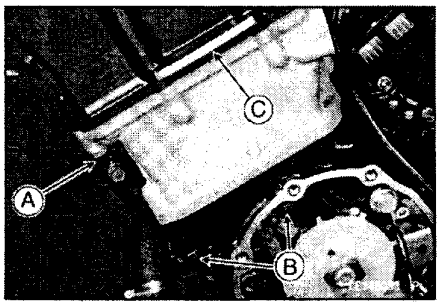
Torque - Cylinder Head Bolts:
First: 20 N·m (2.0 kgf·m, 15 ft·lb)
Final: 11 mm: 62 N·m (6.3 kgf·m, 46 ft·lb)
10 mm: 46 N·m (4.7 kgf·m, 34 ft·lb)



● Tighten:

Torque - Cylinder Head Bolt [A] (6 mm): 9.8 N·m (1.0 kgf·m, 87 in·lb)
Cylinder Bolts [B] (6 mm): 15 N·m (1.5 kgf·m, 11 ft·lb)

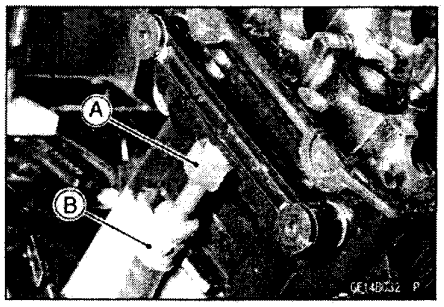
Cylinder Head [C]



● Tighten the oil hose fitting [A] to the specified torque.
Oil Hose [B]

Torque - Oil Hose Fitting: 22 N·m (2.2 kgf·m, 16 ft·lb)

○To tighten the fitting correctly, be careful that a torque wrench doesn't touch the cylinder head.



CAUTION

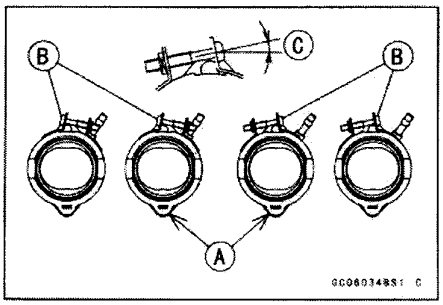
Insufficient tightening torque of the fitting can cause oil leak and may result in engine seizure.

Carburetor Holder Installation

● Fit the clamp nails into the slits [A] of the carburetor holder clamps with right two and left two screw heads [B] outside and inclined 5 ~ 10° [C] as shown.

Non-permanent Locking Agent -
Carburetor Holder Bolts

Torque - Carburetor Holder Bolts: 13 N·m (1.3 kgf·m, 115 in·lb)



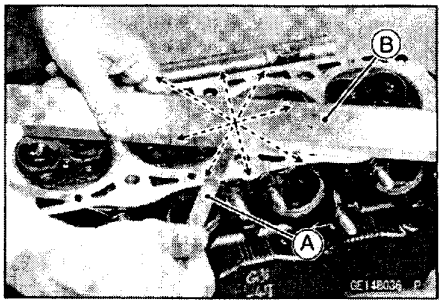
⚠ WARNING

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

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Cylinder Head

Cylinder Head Warp



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

Cylinder Head Warp

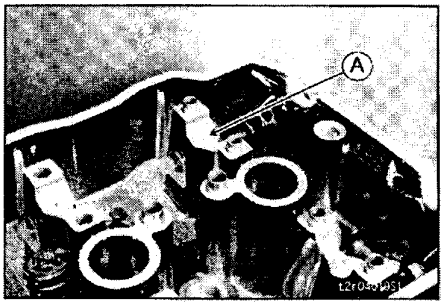
Standard: – – –

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

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

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

Cylinder Head Cleaning



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

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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.

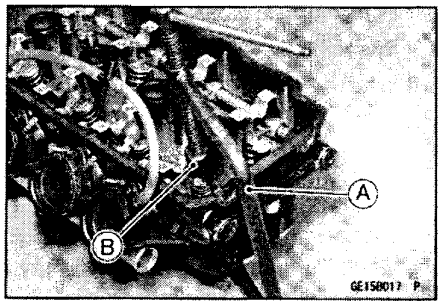
Valve Removal

- Remove the cylinder head (see Cylinder Head Removal in this chapter).
- Swing open the rocker arms, and then remove the shims.

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

- Using the valve spring compressor assembly, remove the valve.

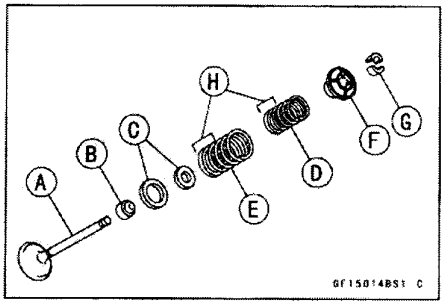
○Be sure to fit the adapter onto the retainer of the valve and put the arm end onto the concave of the valve head.



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

Valve Installation

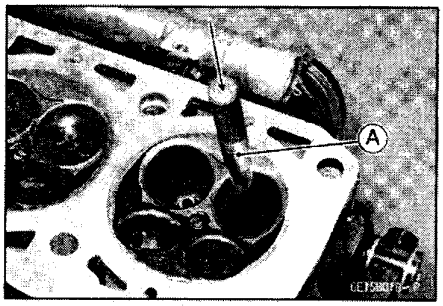
- Replace the stem oil seal with a new one.
- Apply a thin coat of molybdenum disulfide grease to the valve stem before valve installation.
- Install the springs so that the closed coil end faces downwards or painted side upwards.



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

Valve Guide Removal

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



CAUTION

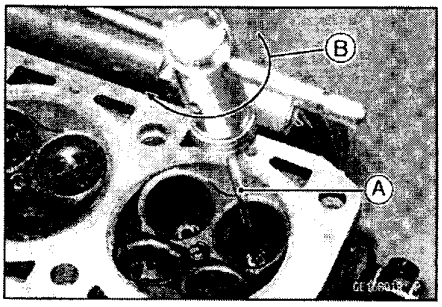
Do not heat the cylinder head with a blowtorch. This will warp the cylinder head. Soak the cylinder head in oil and heat the oil.

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

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Valves

Valve Guide Installation



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

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

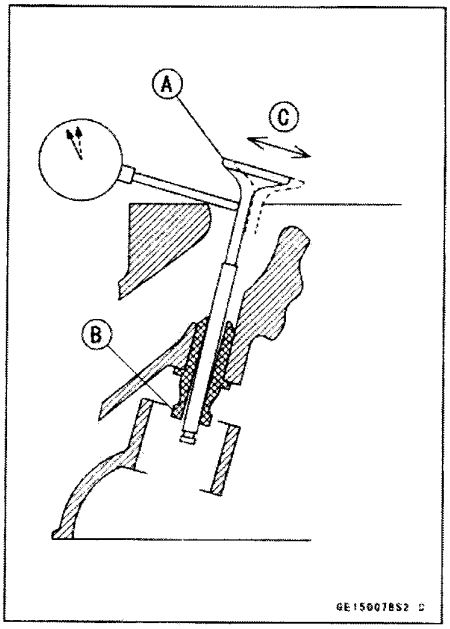
- Wait until the cylinder head cools down and then ream the valve guide with the valve guide reamer [A] even if the old guide is reused.

○Turn the reamer in a clockwise direction [B] until the reamer turns freely in the guide. Never turn the reamer counterclockwise or it will be dulled.

○Once the guides are reamed, they must be cleaned thoroughly.

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

Valve Guide Wear (Wobble Method)



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

- Insert a new valve [A] into the guide [B] and set a dial gauge against the stem perpendicular to it as close as possible to the cylinder head mating surface.
- Move the stem back and forth [C] to measure valve-to-valve guide clearance.
- Repeat the measurement in a direction at a right angle to the first.

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

Valve-to-Guide Clearance
(Measurements Expanded by Wobble Method)

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

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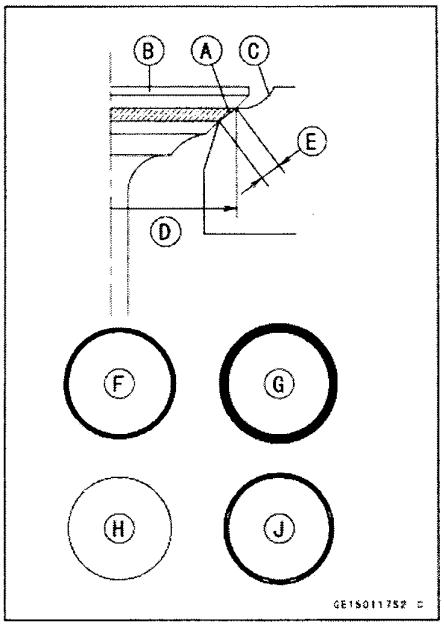
Valves

Valve Seat Inspection

- Remove the valves (see Valve Removal).
- Check the valve seat surface [A] between the valve [B] and valve seat [C].

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

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



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

Exhaust	**26.3 ~ 26.5 mm (1.035 ~ 1.043 in.)**
Inlet	**30.8 ~ 31.0 mm (1.213 ~ 1.220 in.)**

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

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

Valve Seat Surface Width (or Seat Width)
Standard:

Exhaust	**0.8 ~ 1.2 mm (0.032 ~ 0.047 in.)**
Inlet	**0.5 ~ 1.0 mm (0.0197~ 0.0394 in.)**

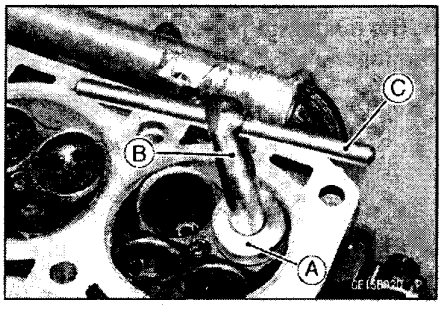
- Repeat the measurement for other valve seats.

Valve Seat Repair

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

OThe 45° cutter smoothes and widens the seat.

OThe 32° cutter reduces the seat outside diameter and the 60° cutter increases the seat inside diameter (both narrow the seat).



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

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

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

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

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Valves

Seat Cutter Operation Care:

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

CAUTION

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

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

NOTE

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

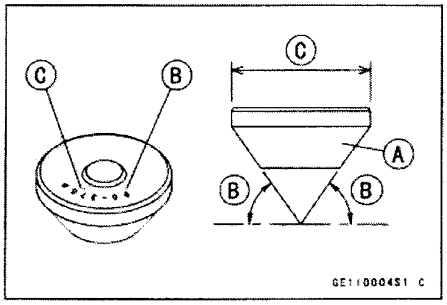
5. After use, wash it with washing oil and apply a thin layer of engine oil before storing.

Marks Stamped on the Cutter:

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

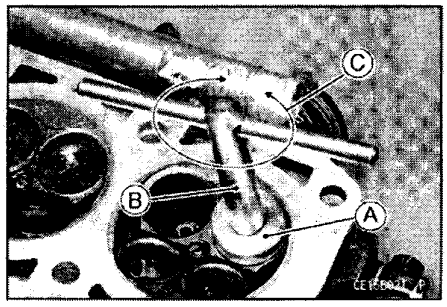
60° ..... Cutter Angle [B]

37.5 ϕ ..... Outer Diameter of Cutter [C]



Operating Procedures:

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



CAUTION

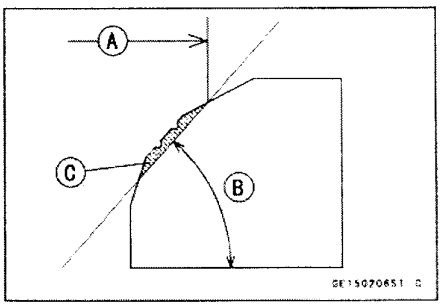
Do not grind the seat too much. Overgrinding will reduce valve clearance by sinking the valve into the head. If the valve sinks too far into the head, it will be impossible to adjust the clearance, and the cylinder head must be replaced.

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Valves

● Measure the outside diameter [A] of the seat surface (seat outer diameter) with vernier calipers.

★If the seat outer diameter is too small, repeat the 45° grind [B] until the diameter is within the specified range (Ground Volume [C]).



NOTE

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

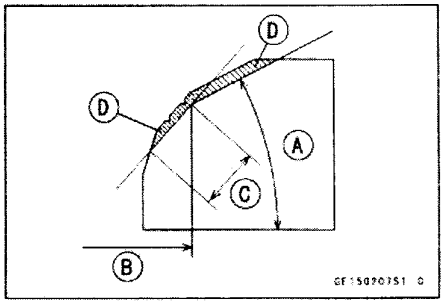
○*After grinding with 45° cutter, apply thin coat of machinist's dye to seat surface. This makes seat surface distinct and 32° and 60° grinding operation easier.*

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

★If the seat outer diameter is too large, make the 32° grind described below.

○To make the 32° grind, fit a 32° cutter into the holder, and slide it into the valve guide.

○Turn the holder one turn at a time while pressing down very lightly. Check the seat after each turn.



CAUTION

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

● Grind the seat at a 32° angle [A] until the seat outer diameter [B] is within the specified range (Ground Volume [D]).

★If the seat outer diameter is within the specified range, measure the seat width as described below.

● To measure the seat width, use vernier calipers to measure the width [C] of the 45° angle portion of the seat at several places around the seat.

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

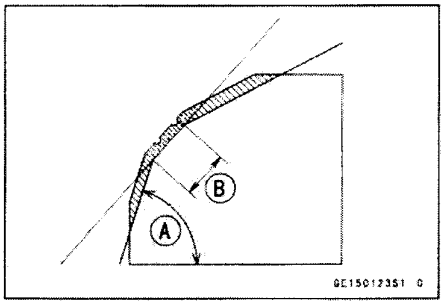
★If the seat width is too wide, make the 60° grind described below.

● To make the 60° grind, fit 60° cutter into the holder, and slide it into the valve guide.

● Turn the holder, while pressing down lightly.

● Grind the seat at a 60° angle [A] until the seat width [B] is within the specified range.

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



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Valves

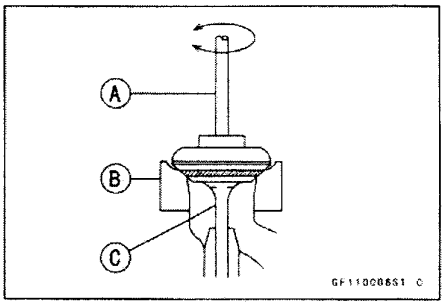
● Lap the valve to the seat, once the seat width and O.D. are within the ranges specified above.

○Put a little coarse grinding compound on the face of the valve in a number of places around the valve head.

○Spin the valve against the seat until the grinding compound produces a smooth, matched surface on both the seat and the valve.

○Repeat the process with a fine grinding compound.

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



● The seat area should be marked about in the middle of the valve face.

★If the seat area is not in the right place on the valve, check to be sure the valve is the correct part. If it is, it may have been refaced too much; replace it.

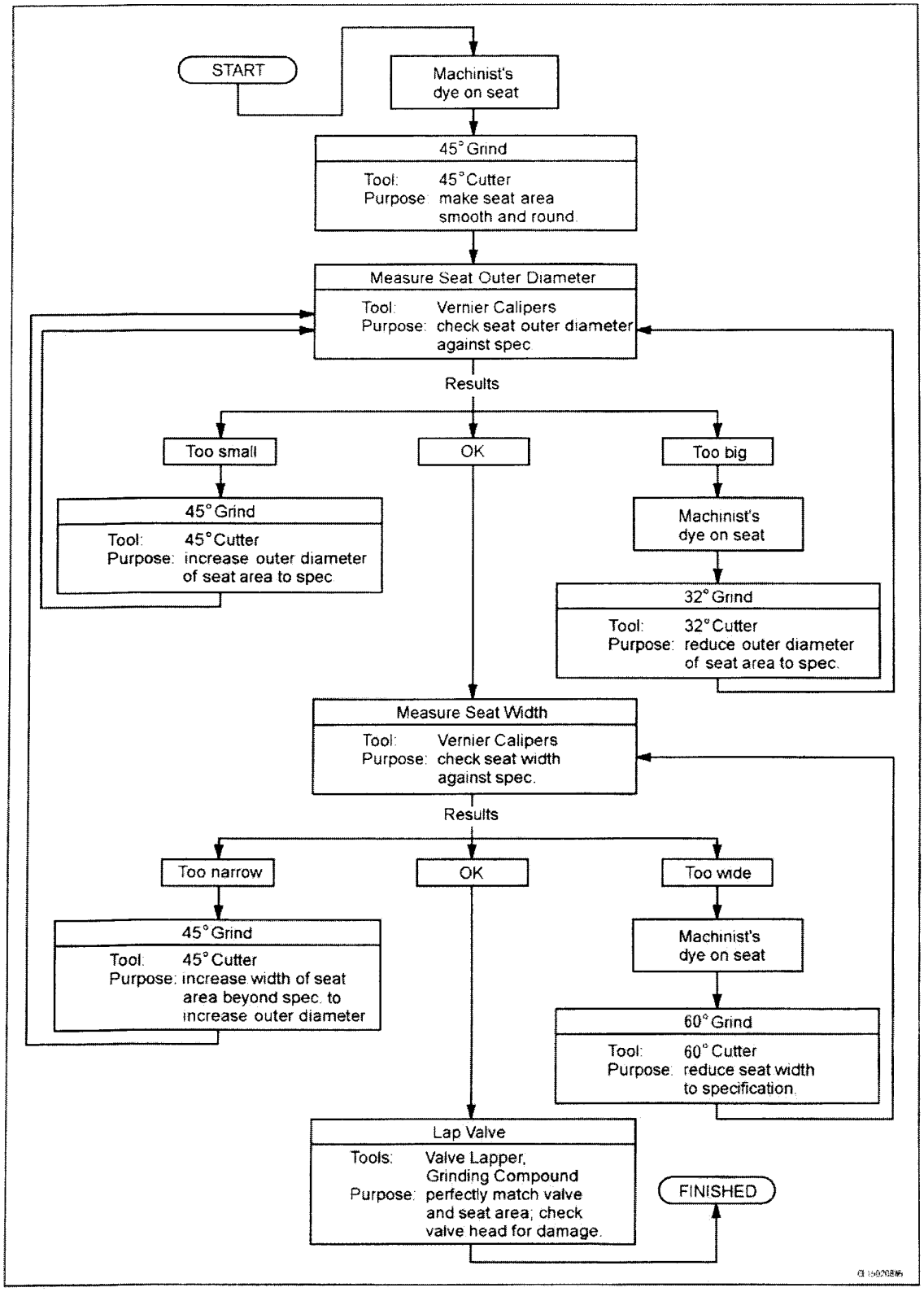
● Be sure to remove all grinding compound before assembly.

● When the cylinder head is installed, adjust the valve clearance (see Valve Clearance Adjustment in the Periodic Maintenance chapter).

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Valves

Valve Seat Repair



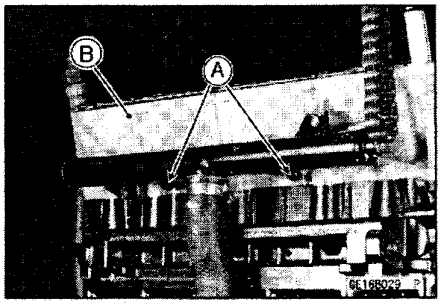
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Cylinder, Pistons

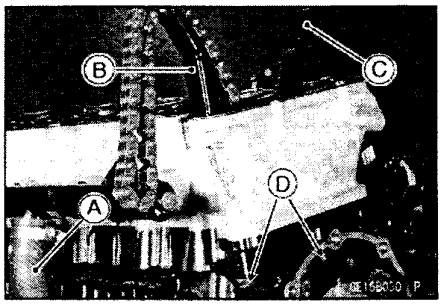
Cylinder Removal

- Remove the engine (see Engine Removal/Installation) and remove the cylinder head (see Cylinder Head Removal in this chapter).
- Remove the coolant drain bolts [A] and drain the coolant from the cylinder [B].
- Install the coolant drain bolts.

Torque - Cylinder Coolant Drain Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)



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

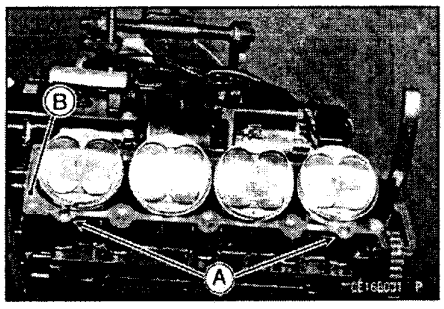


Cylinder Installation

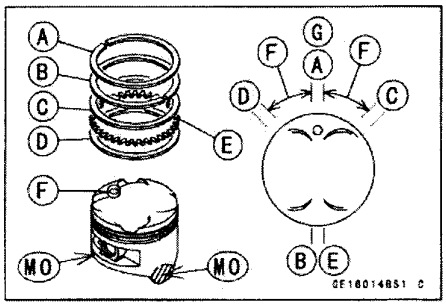
NOTE

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

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



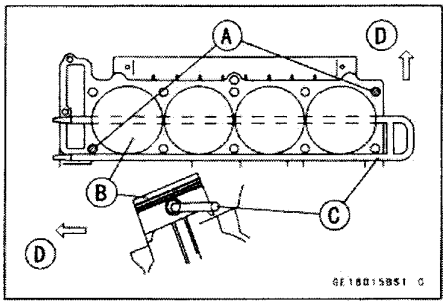
- The piston ring openings must be positioned as shown in the figure. The openings of the oil ring steel rails must be about 30 ~ 40° [F] of angle from the opening of the top ring.
  Top Ring (green) [A] and Second Ring (white) [B]
  Upper Oil Ring Steel Rail [C] and Lower Oil Ring Steel Rail [D]
  Oil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



- Apply molybdenum disulfide oil to the four points of the cylinder bore.
- Prepare two auxiliary head bolts with their head cut.
- Install the two bolts [A] diagonally in the crankcase.
- Position the crankshaft so that all the heads of the pistons [B] are almost level.
- Install the piston base [C] (special tool) as shown to hold the pistons in place.

Special Tool - Piston Base φ10: 57001–1459

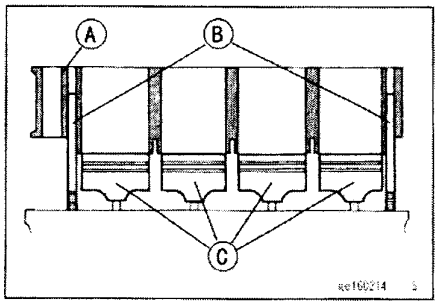
Front [D]



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Cylinder, Pistons

● Install the cylinder block [A] (rear view).
Auxiliary Head Bolts [B]
Pistons [C]
○Insert the piston rings with your thumbs.
● Remove the piston base, ϕ10

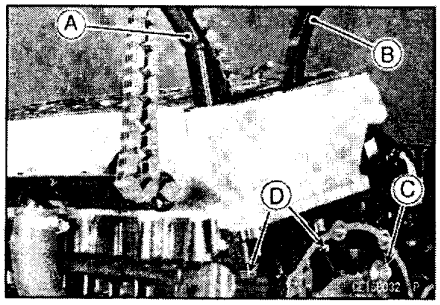


● Insert the front camshaft chain guide [A]. Push the guide all the way down.
★If the rear camshaft chain guide [B] is removed, install it.

Non-permanent Locking Agent -
Rear Camshaft Chain Guide Bolt [C]

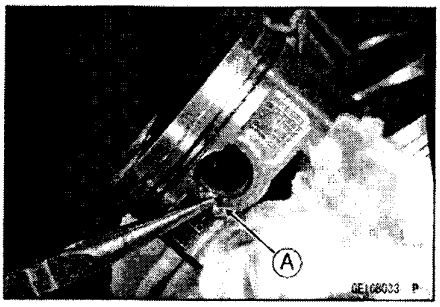
Torque - Rear Camshaft Chain Guide Bolt: 20 N·m (2.0 kgf·m, 15 ft·lb)

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



Piston Removal

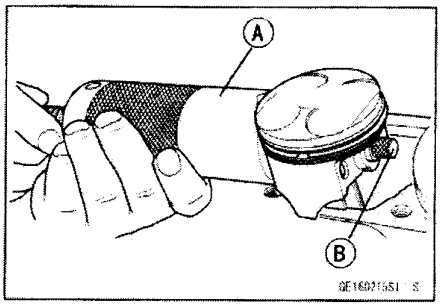
● Remove the cylinder (see Cylinder Removal).
● Place a clean cloth under the pistons and remove the piston pin snap ring [A] from the outside of each piston.



● Remove the piston pins.

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

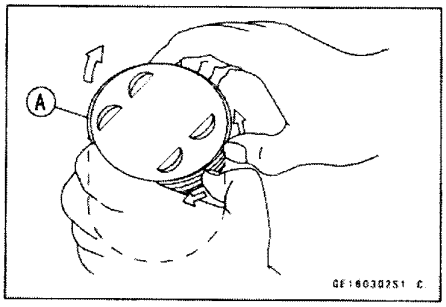
● Remove the piston.



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Cylinder, Pistons

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



Piston Installation

NOTE

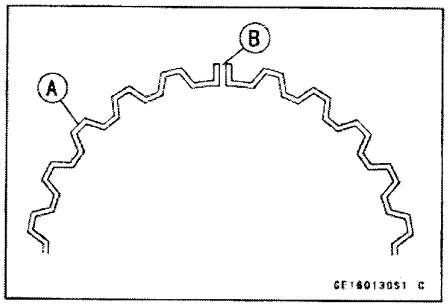
○*If a new piston or cylinder is used, check the piston to cylinder clearance (see Piston/Cylinder Clearance), and use new piston rings.*

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

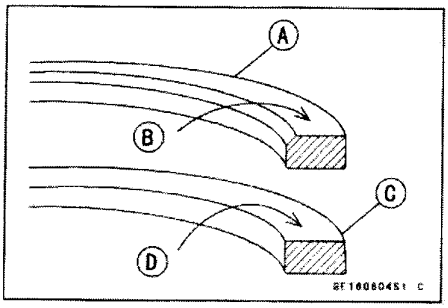
- Install the oil ring expander [A] in the bottom piston ring groove so the ends [B] butt together.
- Install the oil ring steel rails, one above the expander and one below it.

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

○Release the rail into the bottom piston ring groove.

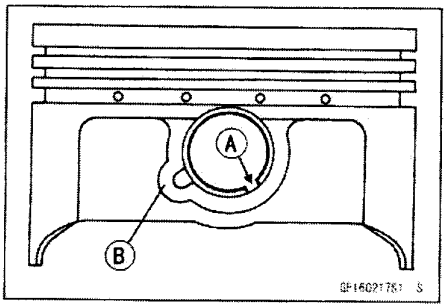


- Do not mix up the top ring and second ring.
- Install the top ring [A] so that the "R" mark [B] faces up.
- Install the second ring [C] so that the "RN" mark [D] faces up.



- The front mark (O) on the piston head must be on the front side of the engine.
- Apply molybdenum disulfide oil to the internal diameter of the con-rod small end and install the piston and piston pin onto the con-rod.
- Fit a new piston pin snap ring into the side of the piston so that the ring opening [A] does not coincide with the slit [B] of the piston pin hole.

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



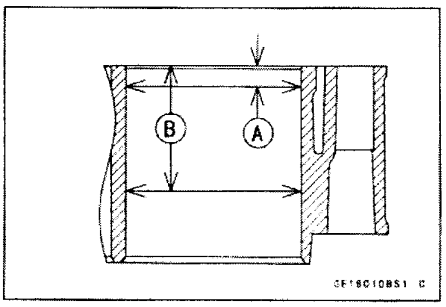
CAUTION

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

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Cylinder, Pistons

Cylinder Wear



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

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

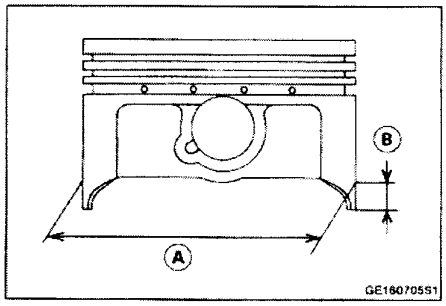
10 mm [A]
60 mm [B]

Cylinder Inside Diameter

Standard: **78.994 ~ 79.006 mm (3.1099 ~ 3.1105 in.) and less than 0.01 mm (0.00039 in.) difference between any two measurements.**

Service Limit: **79.10 mm (3.1142 in.) or 0.05 mm (0.00197 in.) difference between any two measurements.**

Piston Wear



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

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

Piston Diameter

Standard: **78.969 ~ 78.984 mm (3.1090 ~ 3.1696 in.)**

Service Limit: **78.82 mm (3.1031 in.)**

Piston/Cylinder Clearance

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

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

Piston/Cylinder Clearance

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

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

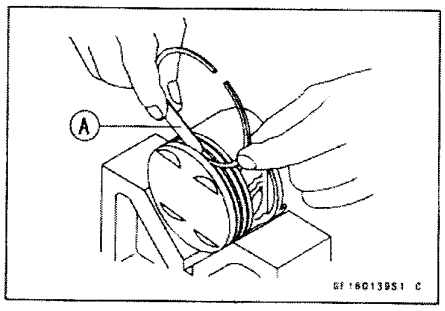
★If the piston/cylinder clearance is greater than the specified range, use a larger piston made within the standard diameter.

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

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Cylinder, Pistons

Piston Ring, Piston Ring Groove Wear



- Check for uneven groove wear by inspecting the ring seat.
- ★The rings should fit perfectly parallel to groove surfaces. If not, replace the piston and all the piston rings.
- With the piston rings in their grooves, make several measurements with a thickness gauge [A] to determine piston ring/groove clearance.

Piston Ring/Groove Clearance

Standard:

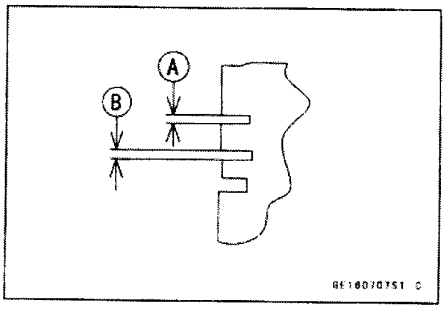
Top	**0.03 ~ 0.07 mm (0.00118 ~ 0.00276 in.)**
Second	**0.02 ~ 0.06 mm (0.00079 ~ 0.0024 in.)**

Service Limit:

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

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

Piston Ring Groove Width



- Measure the piston ring groove width.

○Use vernier calipers at several points around the piston.

Piston Ring Groove Width

Standard:

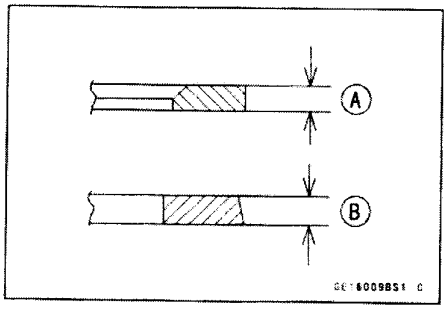
Top	**0.92 ~ 0.94 mm (0.0362 ~ 0.0370 in.) [A]**
Second	**1.01 ~ 1.03 mm (0.0398 ~ 0.0406 in.) [B]**

Service Limit:

Top	**1.02 mm (0.0402 in.)**
Second	**1.11 mm (0.044 in.)**

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

Piston Ring Thickness



- Measure the piston ring thickness.

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

Piston Ring Thickness

Standard:

Top	**0.87 ~ 0.89 mm (0.034 ~ 0.035 in.) [A]**
Second	**0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.) [B]**

Service Limit:

Top	**0.80 mm (0.032 in.)**
Second	**0.90 mm (0.0354 in.)**

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

NOTE

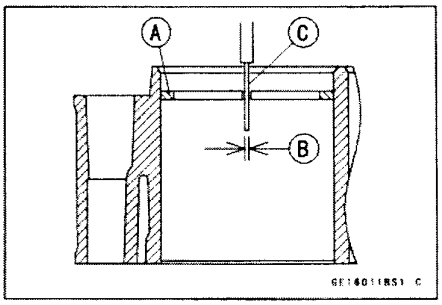
○*When using new rings in a used piston, check for uneven groove wear. The rings should fit perfectly parallel to the groove sides. If not, replace the piston.*

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Cylinder, Pistons

Piston Ring End Gap

- Place the cylinder upside down.
- 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 [C].



Piston Ring End Gap

Standard:

Top	**0.25 ~ 0.40 mm (0.00984 ~ 0.0157 in.)**
Second	**0.40 ~ 0.55 mm (0.0158 ~ 0.0217 in.)**
Oil	**0.20 ~ 0.70 mm (0.0079 ~ 0.028 in.)**

Service Limit:

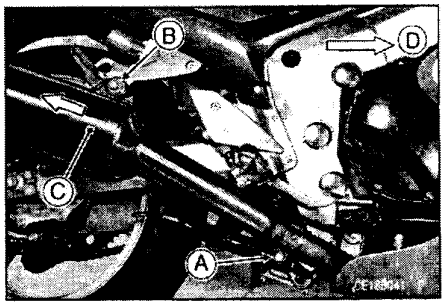
Top	**0.7 mm (0.0276 in.)**
Second	**0.85 mm (0.0335 in.)**
Oil	**1.0 mm (0.0394 in.)**

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

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Muffler

Muffler Body Removal

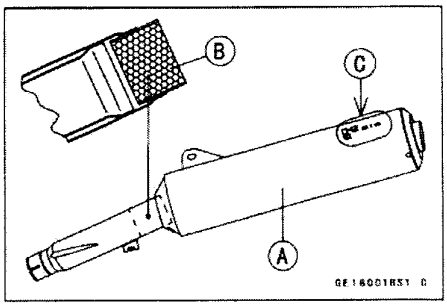


- Remove:
  Muffler Clamp Bolt [A]
  Muffler Body Clamp Bolt and Nut [B]
- Remove the muffler body [C] backwards.
  Front [D]
- Remove the other side of the muffler in the same manner.

Muffler Body Installation

- Install the exhaust manifold.
- Tighten the muffler body clamp bolt and nut.
- Thoroughly warm up the engine, wait until the engine cools down, and retighten all the bolts and nuts.

Muffler Body Identification

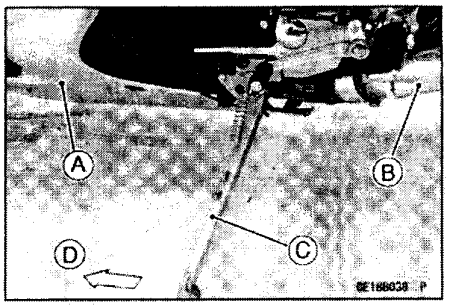


○Each muffler body [A] has a honeycomb catalytic converter [B] and both have the same identification Nos. [C] as follows:
  K448 for the ZX1200C (AU, CA, MY, and US) and ZX1200D (H)
  K442 for the ZX1200C (CAL, IL, H, HU, and HR)

○Do not mix up these muffler bodies with the other type muffler bodies. The motorcycle could not clear the emission regulation.
  AU: Australia
  CA: Canada
  CAL: California
  H: WVTA Approval Model
  HR: WVTA Approval Restricted Model
  HU: WVTA Approval UK Model
  IL: Israel
  MY: Malaysia

○Refer to the ZX900C/D or ZX600J Service Manual (Part No. 99924–1225 or 1254) for more information about the KLEEN (theory, maintenance, and handling precautions), including the secondary air injection system.

Exhaust Manifold Removal

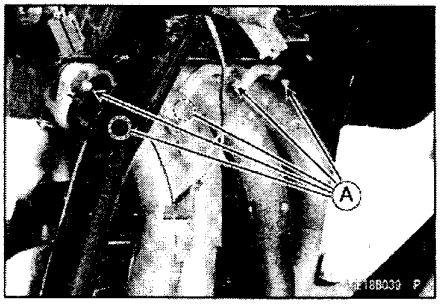


- Remove:
  Right and Left Lower Fairings [A] (see Frame chapter)
  Right and Left Muffler Bodies [B] (see this section)
  Oil Cooler and Radiator (see Cooling System chapter)
- Set the motorcycle on its sidestand [C].
  Front [D]

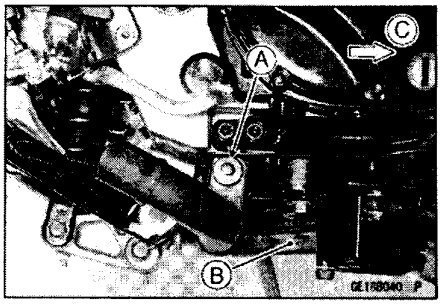
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Muffler

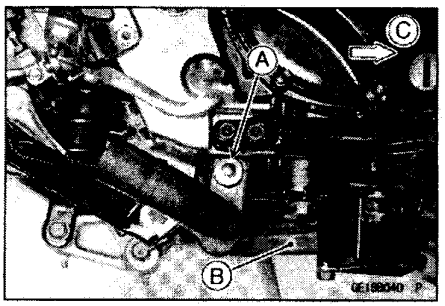
● Remove:
Exhaust Holder Nuts [A] (front view)



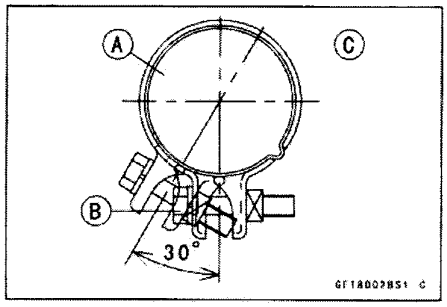
● Unscrew the manifold rear bolt [A] and remove the exhaust manifold [B].
Front [C]



Muffler Installation
● Replace the exhaust pipe gaskets with new ones.
● First insert the rear bracket [A] of the exhaust manifold [B] and then install the front exhaust holders.
Front [C]
● Tighten the exhaust holder nuts and then the manifold rear bolt.



● Install the right and left muffler bodies [A].
● Install the exhaust clamp bolts [B] from 30° to horizontally with each head outwards as shown.
Rear View [C]
● Install:
Oil Cooler and Radiator (see Cooling System chapter)
Lower Fairings (see Frame chapter).
● Fill the engine with coolant and bleed the air from the cooling system (see Cooling System chapter).
● Thoroughly warm up the engine, wait until the engine cools down, and retighten all the bolts and nuts.



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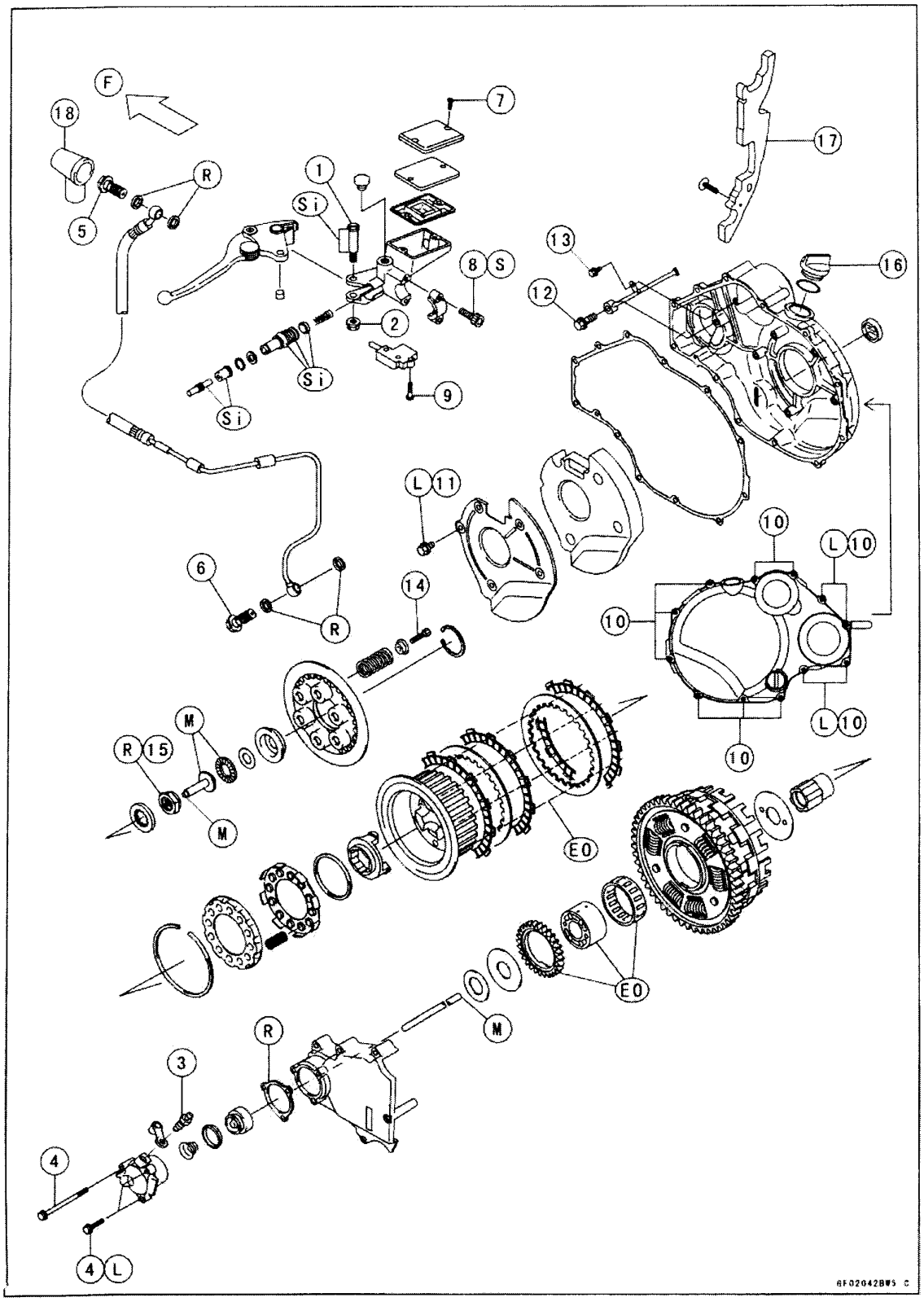
Clutch

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Clutch lever pivot bolt	1.0	0.10	8.9 in·lb	
2	Clutch lever pivot bolt locknut	5.9	0.60	52 in·lb	
3	Clutch slave cylinder bleed valve	8.2	0.84	73 in·lb	
4	Clutch slave cylinder bolts	–	–	–	L (2)
5	Clutch hose banjo bolt	25	2.5	18	
6	Clutch pipe banjo bolt	25	2.5	18	
7	Clutch reservoir cap screws	1.5	0.15	13 in·lb	
8	Clutch master cylinder clamp bolts	11	1.1	97 in·lb	S
9	Starter lockout switch screw	1.2	0.12	11 in·lb	
10	Clutch cover bolts	11	1.1	97 in·lb	L (4)
11	Clutch cover damper bolts	10	1.0	89 in·lb	L
12	Clutch cover oil pipe banjo bolt	12	1.2	110 in·lb	
13	Clutch cover oil pipe mounting bolt	6.0	0.60	53 in·lb	
14	Clutch spring bolts	11	1.1	97 in·lb	
15	Clutch hub nut	130	13.1	96	R
16	Oil filler cap	2.5	0.25	22 in·lb	

17. Heat baffle
18. Boot (ZX1200-C1 ~ C2)

EO: Apply engine oil.
F: Front
L: Apply a non-permanent locking agent.
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil.
R: Replacement parts
S: Follow the specific tightening sequence.
Si: Apply silicone grease.

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6-4 CLUTCH

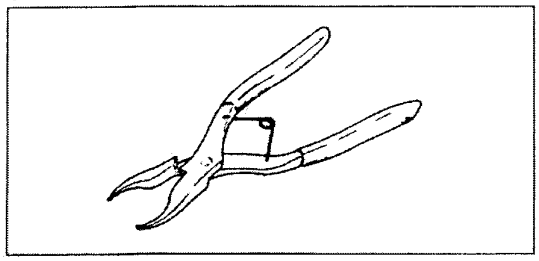
Specifications

Item	Standard	Service Limit
Clutch Fluid		
Grade	DOT4	– – –
Clutch Lever		
Clutch lever position	4-way adjustable (to suit rider)	– – –
Clutch lever free play	Non-adjustable	- - -
Clutch		
Friction plate thickness	2.92 ~ 3.08 mm (0.1150 ~ 0.1212 in.)	2.7 mm (0.106 in.)
Friction or steel plate warp	0.2 mm (0.008 in.) or less	0.3 mm (0.012 in.)
Clutch spring free length	46.27 mm (1.822 in.)	42.7 mm (1.681 in.)

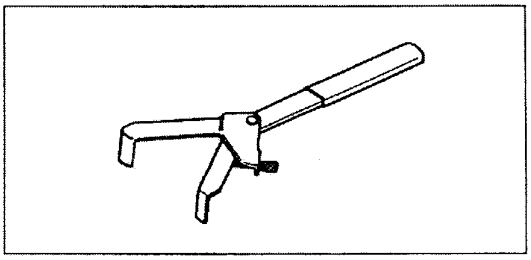
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Special Tools

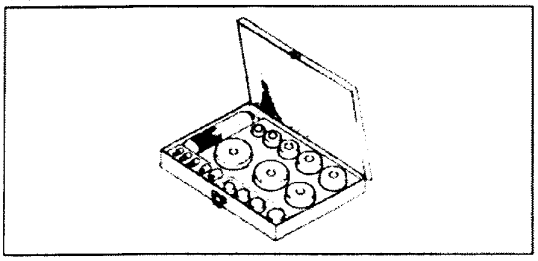
Inside Circlip Pliers:
57001–143



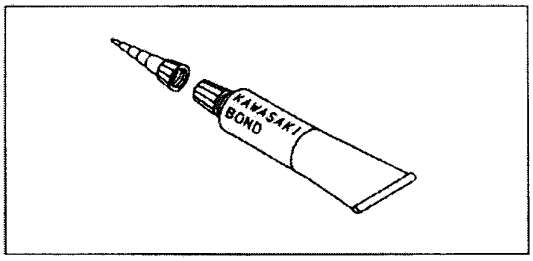
Clutch Holder:
57001–1243



Bearing Driver Set:
57001–1129



Kawasaki Bond (Silicone Sealant):
56019–120



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Clutch Fluid

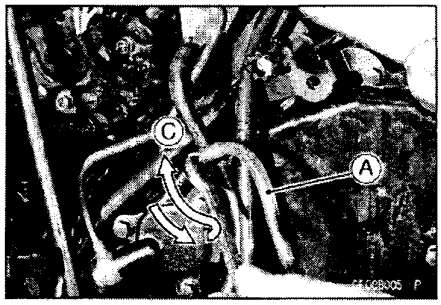
Clutch Fluid Level Check

○Refer to the Periodic Maintenance chapter.

Clutch Fluid Change

○Refer to the Periodic Maintenance chapter.

Bleeding the Clutch Line

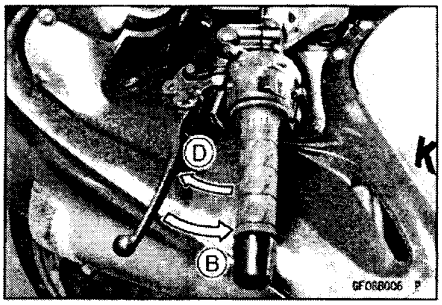


- Remove the left lower fairing (see Frame chapter).
- Remove the heat baffle and coolant reserve tank (see Cooling System chapter).
- With the reservoir cap off, slowly pump the clutch lever several times until no air bubbles can be seen rising up through the fluid from the holes at the bottom of the reservoir. This bleeds the air from the master cylinder end of the line.

NOTE

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

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



- Bleed the clutch line as follows:
  Pump the clutch lever a few times until it becomes hard and then hold it applied [B].
  Quickly open and close [C] the bleed valve.
  Release the clutch lever [D].
  Check the fluid level in the reservoir often, replenishing it as necessary.

NOTE

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

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

⚠ WARNING

Do not mix different grades and brands of fluid.

Torque - Clutch Reservoir Cap Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)
Clutch Slave Cylinder Bleed Valve: 8.2 N·m (0.84 kgf·m, 73 in·lb)

- Install the removed parts:
  Coolant Reserve Tank (see Cooling System chapter)

Clutch Hose Removal/Installation

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

Clutch Hose and Connection Check

○Refer to the Periodic Maintenance chapter.

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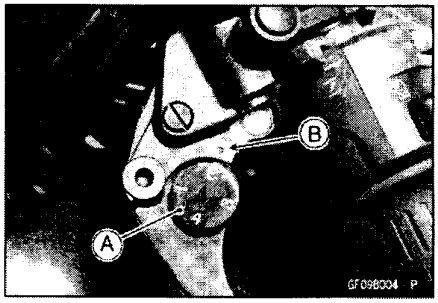
Clutch Master Cylinder

Clutch Lever Adjustment

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

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

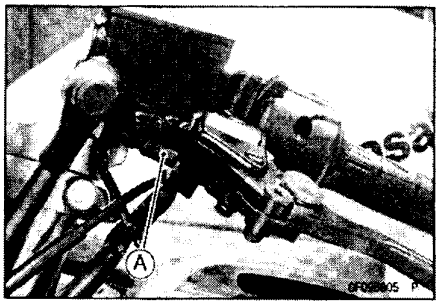
○The distance from the grip to the lever is minimum at Number 4 and maximum at Number 1.



Clutch Master Cylinder Removal

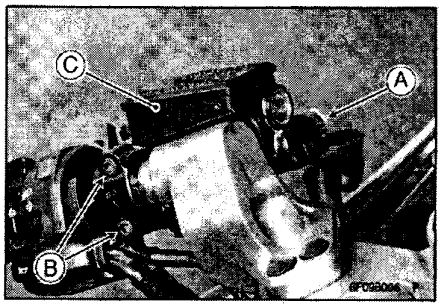
● Disconnect the starter lockout switch connector [A] (front view).

● Drain the clutch fluid from the reservoir (see Clutch Fluid Change in the Periodic Maintenance chapter).



● Remove the banjo bolt [A] to disconnect the clutch hose from the master cylinder (rear view).

● Unscrew the clamp bolts [B], and take off the master cylinder [C] as an assembly with the clutch reservoir, clutch lever, and starter lockout switch installed.



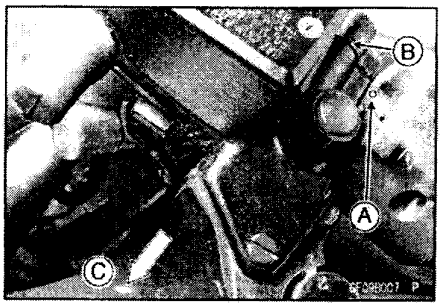
CAUTION

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

Clutch Master Cylinder Installation

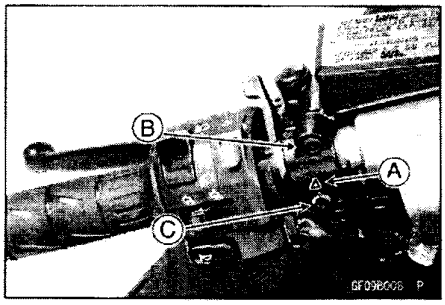
● Align the punch mark [A] on the handlebar with the mating surface [B] of the master cylinder clamp (left view).

Front [C]



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Clutch Master Cylinder



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

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

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

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

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

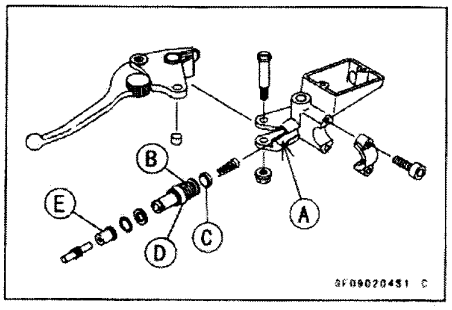
Clutch Master Cylinder Disassembly

○Refer to the Clutch Master Cylinder Cap and Dust Seal Replacement in the Periodic Maintenance chapter.

Clutch Master Cylinder Assembly

○Refer to the Clutch Master Cylinder Cap and Dust Seal Replacement in the Periodic Maintenance chapter.

Clutch Master Cylinder Inspection



- Disassemble the clutch master cylinder (see Clutch Master Cylinder Cap and Dust Seal Replacement in the Periodic Maintenance chapter).

Special Tool - Inside Circlip Pliers: 57001–143

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

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

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

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

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

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

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

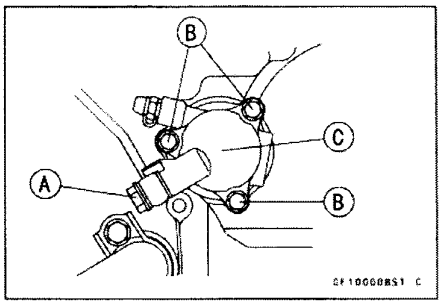
- Check the piston return spring for any damage.

★If the spring is damaged, replace it.

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Clutch Slave Cylinder

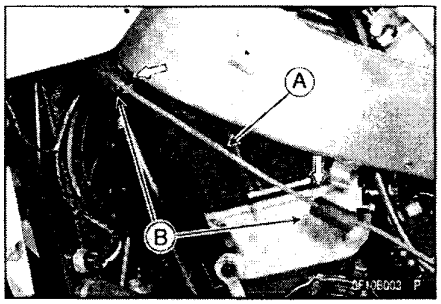
Clutch Slave Cylinder Removal



● Remove:
Left Lower Fairing (see Frame chapter)
Heat Baffle and Coolant Reserve Tank
Banjo Bolt [A]
Clutch Slave Cylinder Bolts [B]
Slave Cylinder [C]

CAUTION

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

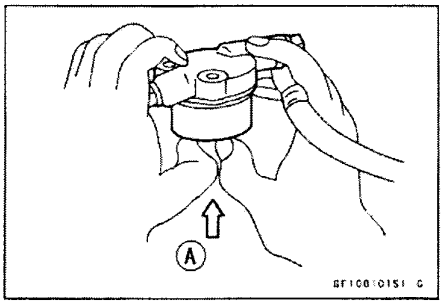


● Pull off the clutch pipe [A] by prying the dampers [B] out of the grooves of the frame. This prevents the pipe from distorting.

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

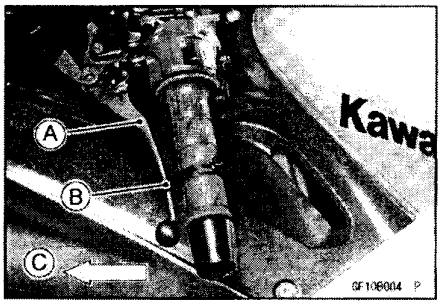
CAUTION

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



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

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



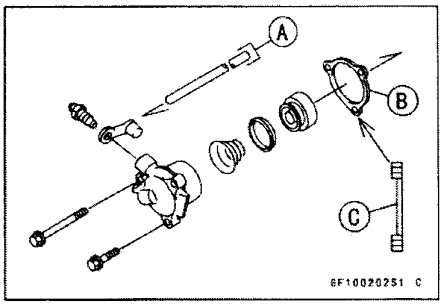
NOTE

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

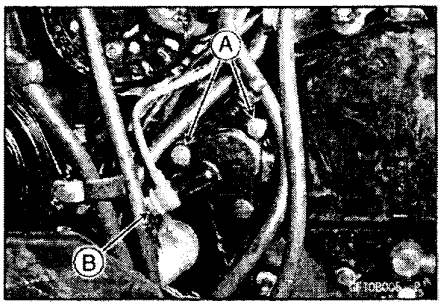
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Clutch Slave Cylinder

Clutch Slave Cylinder Installation



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



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

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

- Check the fluid level in the master cylinder reservoir, and bleed the air in the clutch line.
- Check the clutch operation.
- Install the removed parts.
  Coolant Reserve Tank (see Cooling System chapter)
  Left Lower Fairing (see Frame chapter)

Clutch Slave Cylinder Disassembly

○Refer to the Clutch Slave Cylinder Piston Replacement in the Periodic Maintenance chapter.

Clutch Slave Cylinder Assembly

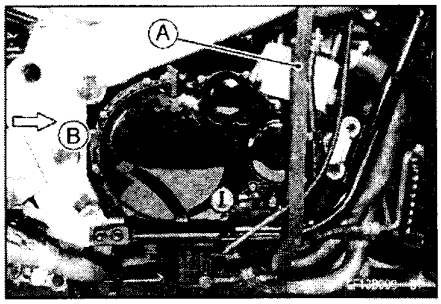
○Refer to the Clutch Slave Cylinder Piston Replacement in the Periodic Maintenance chapter.

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Clutch

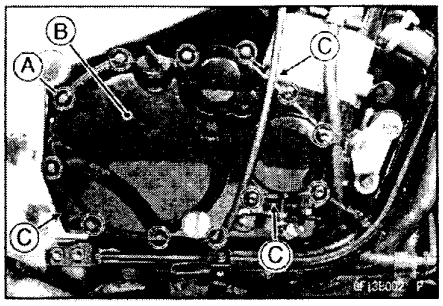
Clutch Removal

- Drain the engine oil (see Engine Lubrication System chapter).
- Remove:
  Right Lower Fairing (see Frame chapter)
  Heat Baffle [A]
  Front [B]

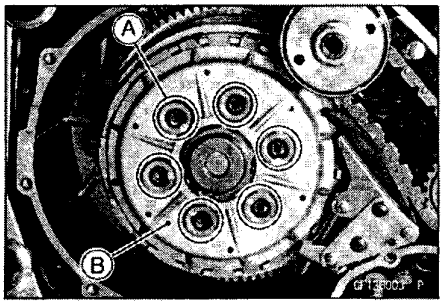


- Remove:
  Twelve Clutch Cover Bolts [A]
  Clutch Cover [B]

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



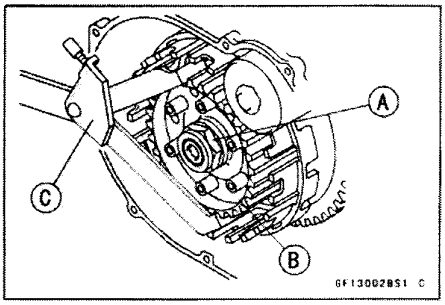
- Remove:
  Clutch Spring Bolts [A]
  Clutch Springs
  Clutch Spring Plate [B] (with thrust bearing and clutch pusher)



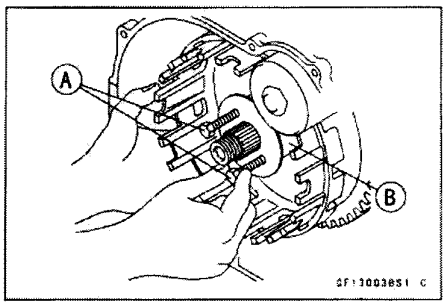
- Remove:
  Friction Plates, and Steel Plates
  Clutch Hub Nut [A]

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

Special Tool - Clutch Holder: 57001–1243



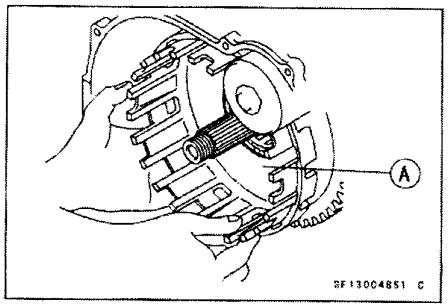
- Using the two 6 mm bolts [A], pull out the sleeve [B].
- Remove the needle bearing from the clutch housing.



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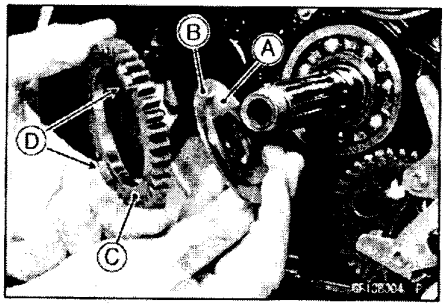
Clutch

● Remove the clutch housing [A].

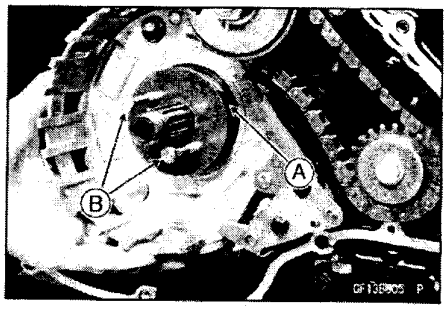


Clutch Installation

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



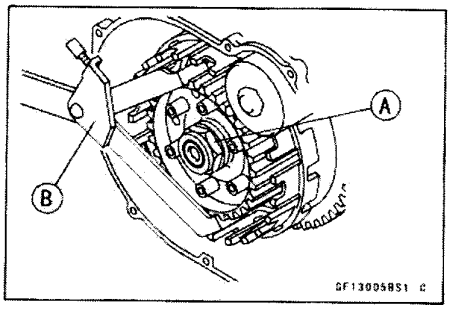
● Install the needle bearing [A] into the clutch housing.
● Install the sleeve with the tapped side [B] facing outward.



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

Special Tool - Clutch Holder: 57001–1243

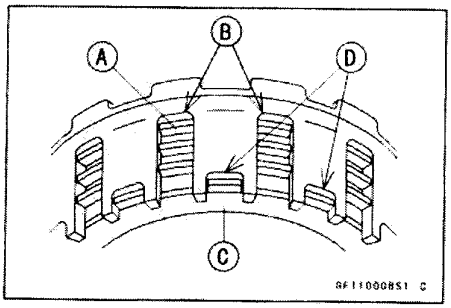
Torque - Clutch Hub Nut: 130 N·m (13.1 kgf·m, 96 ft·lb)



CAUTION

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

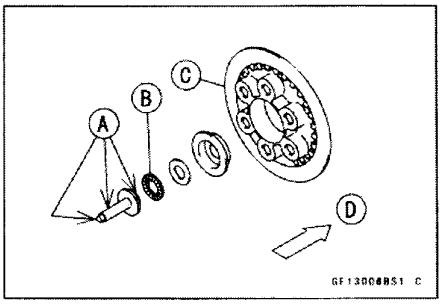
● First, install the friction plate [A], fitting the tangs in the deeper grooves [B].
● Secondly, install the steel plates, and then the friction plates alternately, fitting their tangs in the same grooves.
● Finally, install the friction plate [C], fitting the tangs in the shallower grooves [D].



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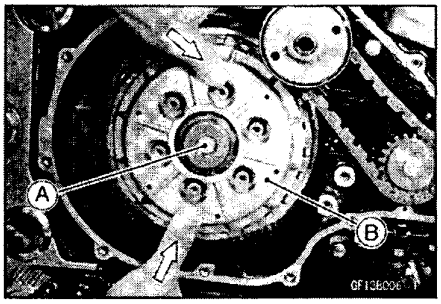
Clutch

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



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

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

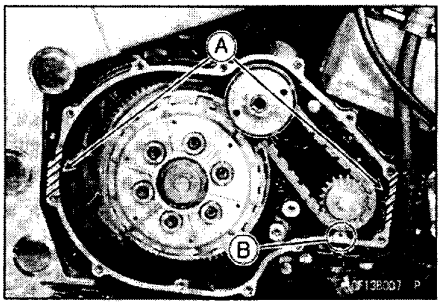


- Apply silicone sealant to the crankcase mating surfaces [A] on the front and rear cover mounts.

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

CAUTION

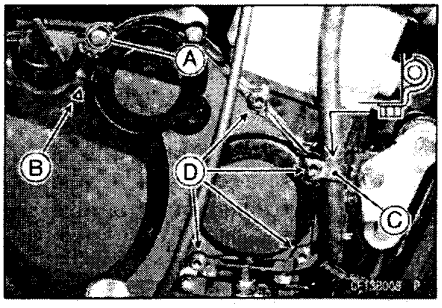
Do not apply silicone sealant to the area [B] around the oil passage.



- First install the clutch cover bolt [A] next to the triangular mark [B] to set the cover in place.
- Install the clamp [C] as shown, noting the direction.
- Apply a non-permanent locking agent to the four clutch cover bolts [D] shown.
- Tighten the cover bolts in a crisscross pattern.

Torque - Clutch Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

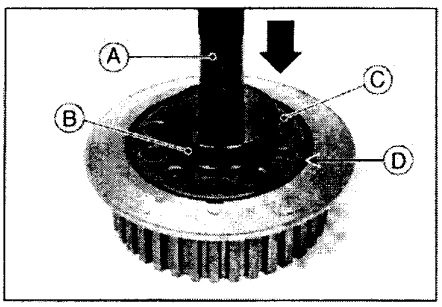
- Fill the engine with the engine oil to the specified amount.
- Install the heat baffle.
- Install the right lower fairing (see Frame chapter).



Clutch Hub Disassembly

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

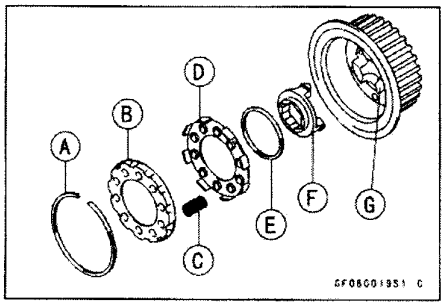
Special Tool - Bearing Driver Set: 57001–1129



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Clutch

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

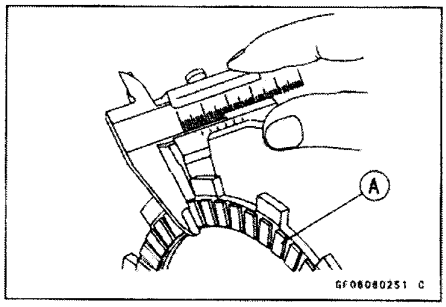


Friction or Steel Plate Damage, Wear Inspection

● Visually inspect the friction and steel plates for signs of seizure, overheating (discoloration) or uneven wear.
★If any plates show signs of damage, replace them with new ones.
● Measure the thickness of the friction plates [A] at several points.
★If they have worn past the service limit, replace them with new ones.

Friction Plate Thickness

Standard:	**2.92 ~ 3.08 mm (0.115 ~ 0.1212 in.)**
Service Limit:	**2.7 mm (0.106 in.)**

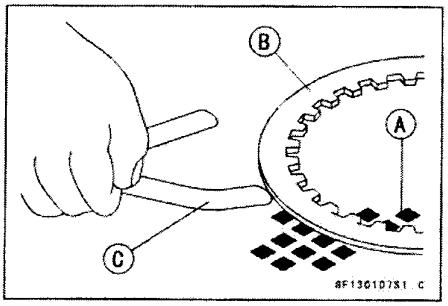


Friction or Steel Plate Warp Inspection

● Place each friction plate or steel plate on a surface plate, and measure the gap between the surface plate [A] and each friction plate or steel plate [B] with a thickness gauge [C]. The gap is the amount of friction or steel plate warp.
★If any plate is warped over the service limit, replace it with a new one.

Friction or Steel Plate Warp

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

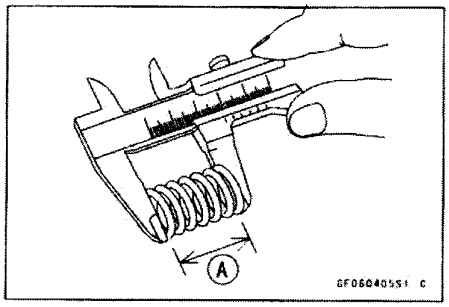


Clutch Spring Free Length Measurement

● Measure the free length [A] of the clutch springs.
★If any spring is shorter than the service limit, it must be replaced.

Clutch Spring Free Length

Standard:	**46.27 mm (1.882 in.)**
Service Limit:	**42.7 mm (1.681 in.)**



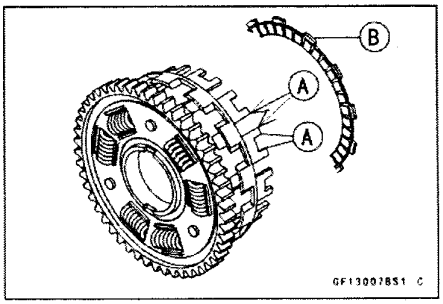
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Clutch

Clutch Housing Finger Inspection

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

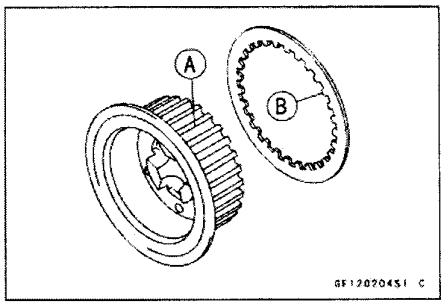
★If they are badly worn or if there are groove cuts where the tangs hit, replace the housing. Also, replace the friction plates if their tangs are damaged.



Clutch Hub Spline Inspection

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

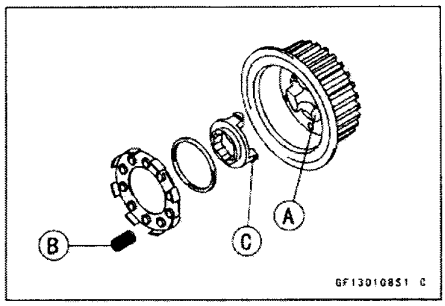
★If there are notches worn into the splines, replace the clutch hub. Also, replace the steel plates if their teeth are damaged.



Cam Damper Inspection

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

★Replace any part that appears damaged.



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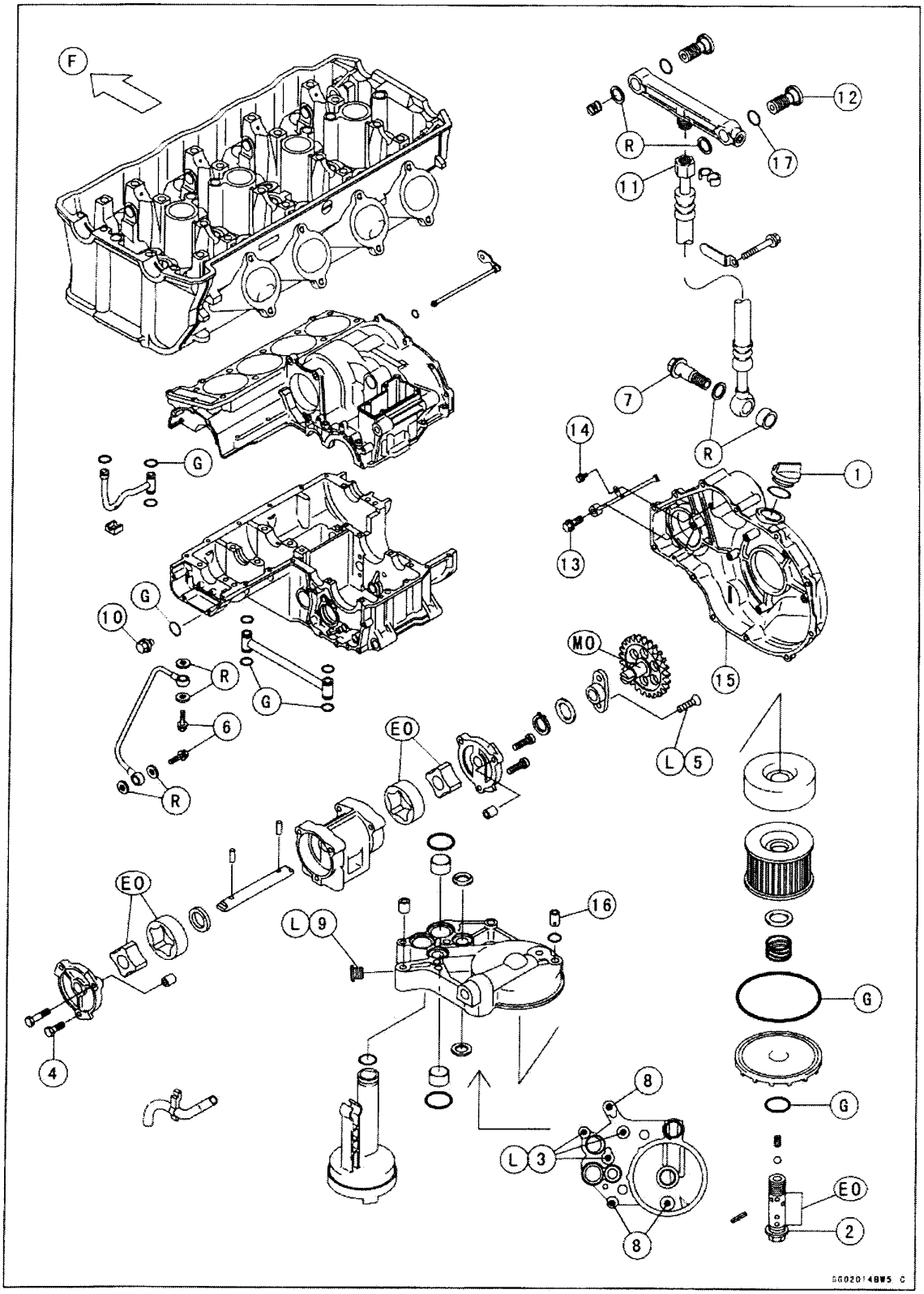
Engine Lubrication System

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Exploded View



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Exploded View

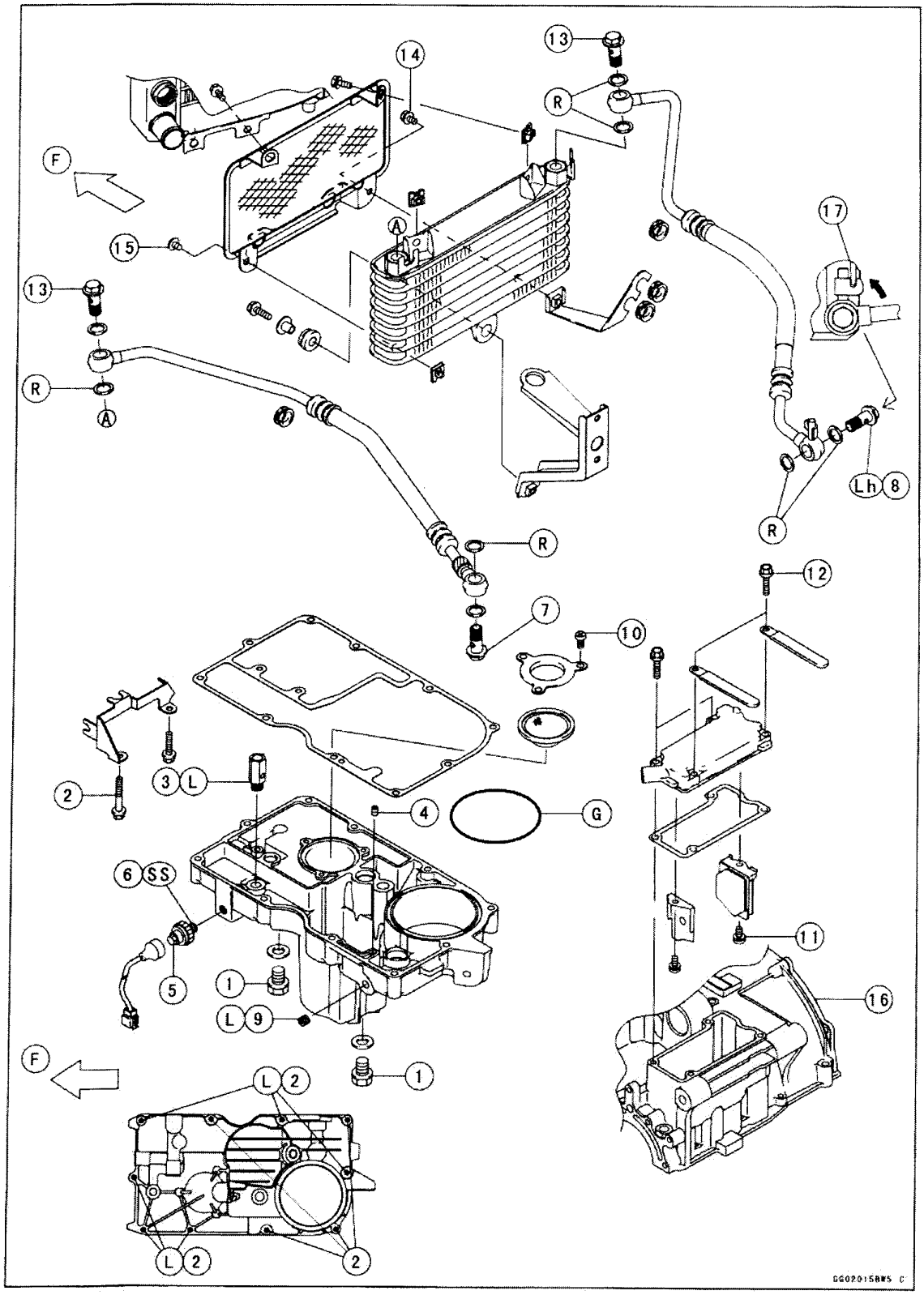
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Oil filler cap	2.5	0.25	22 in·lb	
2	Oil filler bolt	20	2.0	15	
3	Oil pump mounting bolts	12	1.2	110 in·lb	three
4	Oil pump cover bolts	9.8	1.0	87 in·lb	
5	Oil pump drive gear holder screws	5.2	0.53	46 in·lb	L
6	Oil pipe banjo bolts: ϕ12 mm	25	2.5	18	
7	Head oil hose banjo bolts: ϕ12 mm	25	2.5	18	on oil pan
8	Oil pump bracket bolts	11	1.1	97 in·lb	
9	Oil pump bracket plug	25	2.5	18	L
10	Main oil passage plug	18	1.8	13	
11	Head oil hose fitting	22	2.2	16	
12	T-fitting banjo bolt	25	2.5	18	
13	Clutch cover oil pipe banjo bolt	12	1.2	110 in·lb	
14	Clutch cover oil pipe mounting bolt	6.0	0.60	53 in·lb	

15. Clutch cover
16. Orifice (small hole faces down.)
17. O-rings
EO: Apply engine oil.
F: Front
G: Apply grease for oil seal and O-ring.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil.
R: Replacement parts

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7-4 ENGINE LUBRICATION SYSTEM

Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Engine drain plugs	20	2.0	15	
2	Oil pan bolts	15	1.5	11	L (6)
3	Oil pressure relief valve	15	1.5	11	L
4	Oil nozzle	3.5	0.36	31 in·lb	
5	Oil pressure switch terminal screw	1.6	0.16	14 in·lb	
6	Oil pressure switch	15	1.5	11	SS
7	Oil cooler left hose banjo bolt: ϕ14 mm	34	3.5	25	
8	Oil cooler right hose banjo bolt ϕ14 mm	34	3.5	25	Lh
9	Oil pan plug R 1/8	15	1.5	11	L
10	Oil screen holder screws	5.2	0.53	46 in·lb	
11	Oil separator screws	5.2	0.53	46 in·lb	
12	Crankcase breather cover bolts	11	1.1	97 in·lb	
13	Oil cooler banjo bolts	25	2.5	18	
14	Oil cooler screen bolt	11	1.1	97 in·lb	lower
15	Oil cooler screen screw	4.5	0.46	40 in·lb	lower

16. Upper crankcase
17. Fit the groove of the banjo bracket onto the rib of the oil pan and tighten the bolt [8] counter-clockwise.

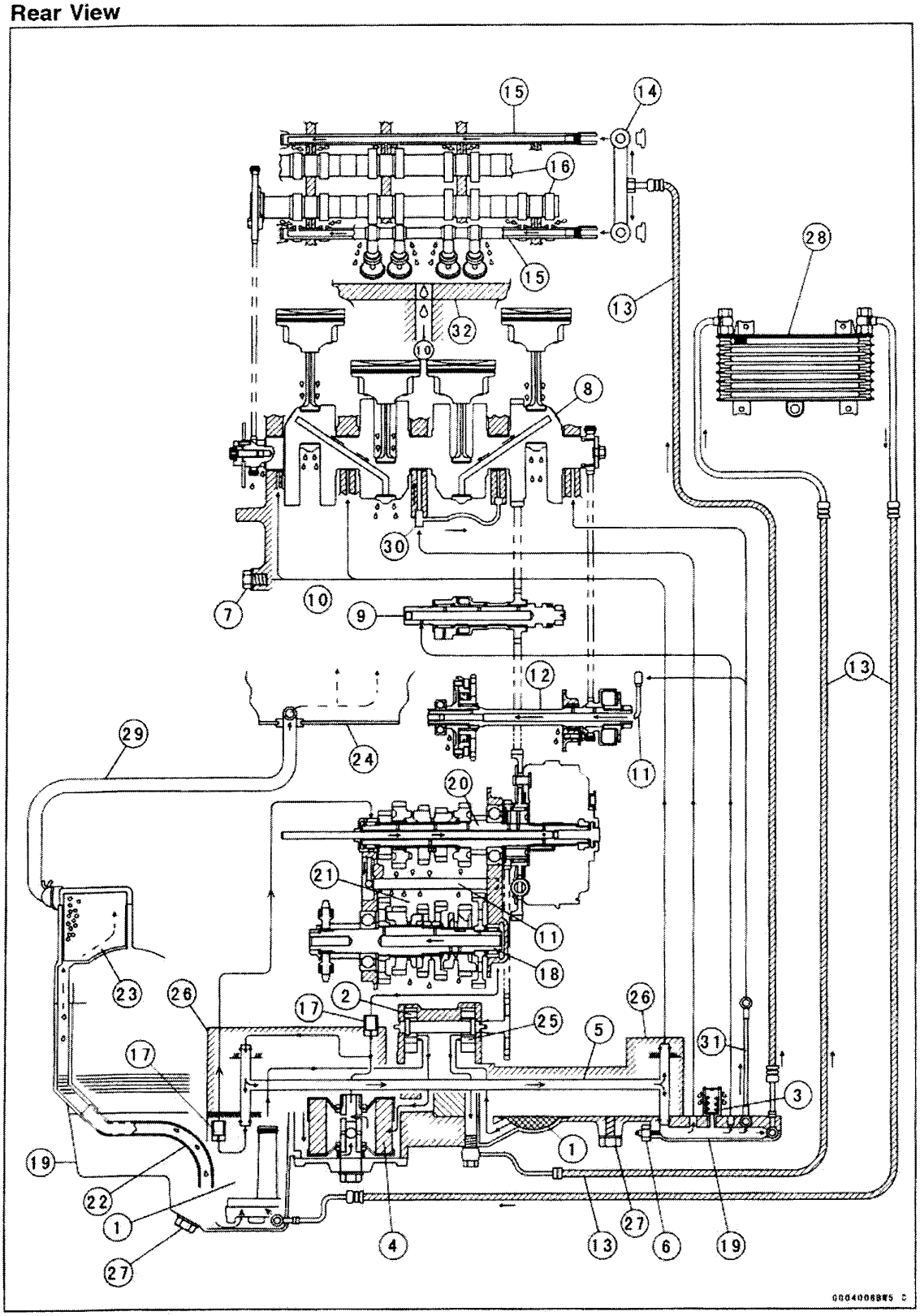
F: Front
G: Apply grease for oil seal and O-ring.
L: Apply a non-permanent locking agent.
R: Replacement parts
SS: Apply silicon sealant.

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7-6 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart

Rear View



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Engine Oil Flow Chart

<—: Oil Flow
<- -
-: Blowby Gas
1. Oil Screens
2. Left Side Oil Pump
3. Relief Valve
4. Oil Filter
5. Oil Pipes
6. Oil Pressure Switch
7. Main Oil Passage Plug
8. Crankshaft
9. Balancer Shaft
10. Crankcase and Balancer Chamber
11. Nozzles
12. Alternator Shaft
13. Oil Hoses
14. T-fitting
15. Rocker Shafts
16. Camshafts
17. Orifices
18. Output Shaft
19. Oil Pan
20. Drive Shaft
21. Transmission Chamber
22. Oil Return Pipe
23. Oil Separator
24. Air Cleaner Housing
25. Right Side Oil Pump
26. Oil Pump Bracket
27. Engine Drain Plugs
28. Oil Cooler
29. Crankcase Breather Hose
30. Crankshaft Bearing Oil Pipe
31. Outside Oil Pipe
32. Cylinder Head Bottom Wall

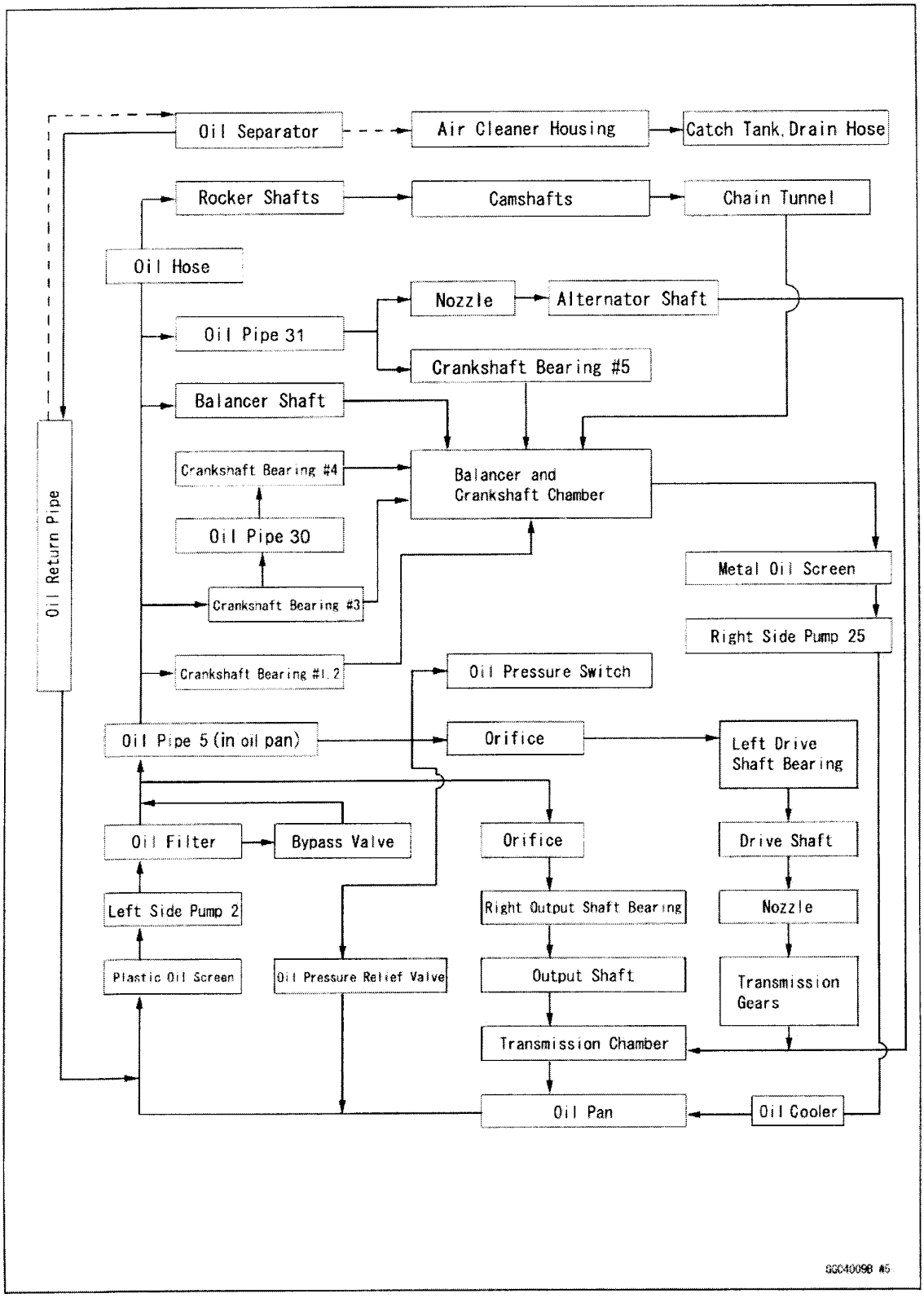
The engine lubrication system has a dual oil pump with the left side pump [2] feeding oil to the transmission, the top end, crank, and balancer. The right side pump [25] reduces oil stirring loss by keeping the oil from collecting in the crankshaft and balancer chamber below the crankshaft and balancer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

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

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7-8 ENGINE LUBRICATION SYSTEM

Engine Oil Flow Chart



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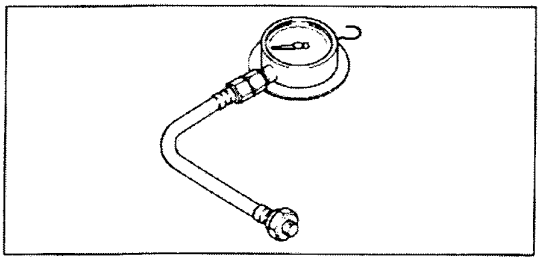
Specifications

Item	Standard
Engine Oil	
Type	API SE, SF or SG
	API SH or SJ with JASO MA
Viscosity	SAE 10W-40
Capacity	3.3 L (3.5 US qt, when filter is not removed)
	3.6 L (3.8 US qt, when filter is removed)
	4.2 L (4.4 US qt, when engine is completely dry)
Level	Between upper and lower level lines
(wait for 2 ~ 3 minutes after the engine stops)	
Oil Pressure Measurement	
Oil pressure @engine speed	
4 000 r/min (rpm), oil temp. 90°C (194°F)	200 ~ 290 kPa (2.0 ~ 3.0 kgf/cm^2, 28 ~ 43 psi)

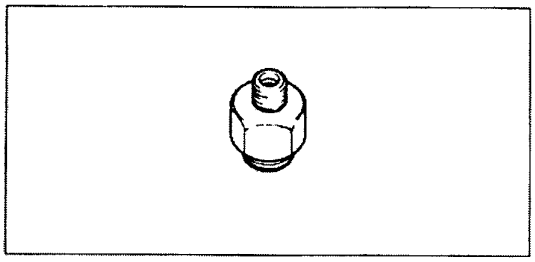
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Special Tools

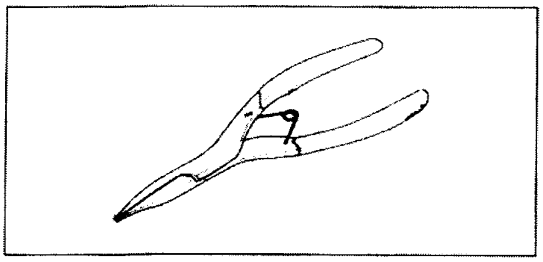
Oil Pressure Gauge, 5 kgf/cm²:
57001–125



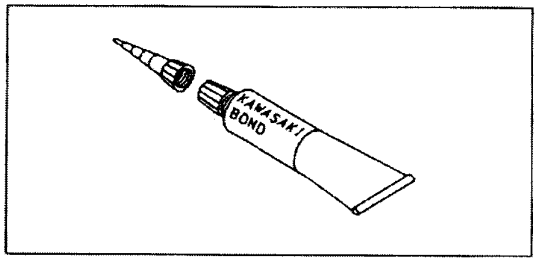
Oil Pressure Gauge Adapter, M18 × 1.5:
57001–1278



Outside Circlip Pliers:
57001–144



Kawasaki Bond (Silicone Sealant):
56019–120



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Engine Oil and Oil Filter

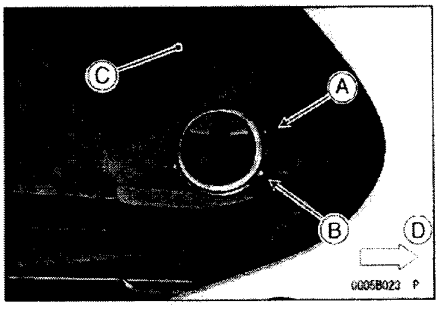
⚠ WARNING

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

Oil Level Inspection

- Situate the motorcycle so that it is vertical. Do not use the center stand or the sidestand.
- Check that the engine oil level is between the upper [A] and lower [B] levels in the gauge of the clutch cover [C].

Front [D]



NOTE

○*Situate the motorcycle so that it is perpendicular to the ground.*

○*If the motorcycle has just been used, wait 2 ~ 3 minutes for all the oil to drain down.*

○*If the oil has just been changed, start the engine and run it for several minutes at idle speed. This fills the oil filter with oil. Stop the engine, then wait 2 ~ 3 minutes until the oil settles.*

CAUTION

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

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

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

NOTE

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

Engine Oil Change

○Refer to the Periodic Maintenance chapter.

Oil Filter Change

○Refer to the Periodic Maintenance chapter.

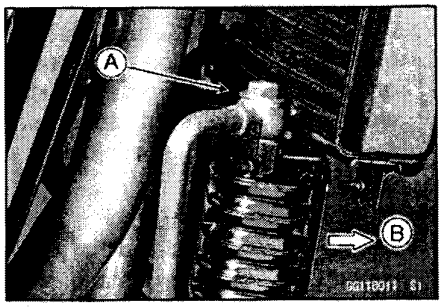
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Oil Cooler

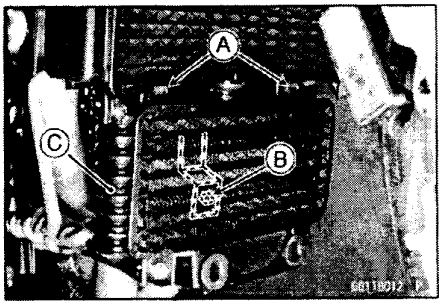
Removal

- Remove the right and left lower fairings (see Frame chapter).
- Pull off the inner fairing forwards.
- Drain the engine oil (see Engine Oil Change in the Periodic Maintenance chapter).
- Remove the right and left banjo bolts [A] from the oil cooler.

Front [B]



- Remove the oil cooler upper bolts [A] and the lower yellow bolt [B] and take off the oil cooler [C].



Installation

- Use a new flat washer on each side of the oil hose banjo bolt on the oil cooler.
- Tighten:

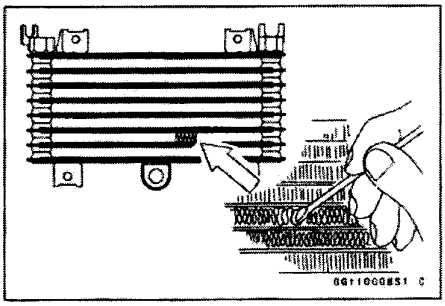
Torque - Oil Cooler Banjo Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

Inspection

- Check the oil cooler core.

★If there are obstructions to air flow, remove them.

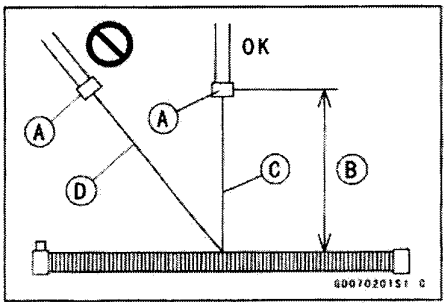
★If the corrugated fins are deformed, carefully straighten them.



CAUTION

Do not tear the cooler tubes while straightening the fins.

★If the air of the cooler core are blocked more than 20% by unremovable obstructions or irreparably deformed fins, replace the oil cooler with a new one.



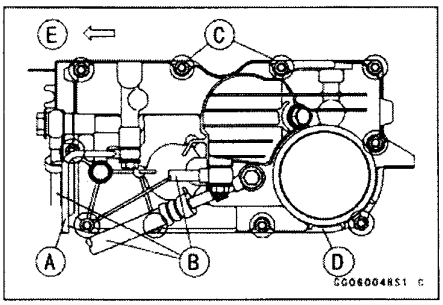
CAUTION

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

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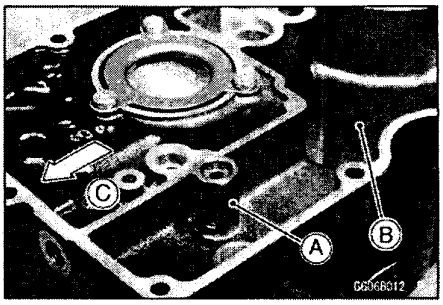
Oil Pan

Oil Pan Removal



- Remove the right and left lower fairings (see Frame chapter).
- Drain:
  Coolant (see Periodic Maintenance chapter)
  Engine Oil and Oil Filter (see Periodic Maintenance chapter)
- Remove:
  Oil Cooler and Radiator (see Engine Removal/Installation chapter)
  Muffler Assembly (see Engine Top End Chapter)
  Oil Pipe [A] and Oil Hoses [B]
  Oil Pressure Switch Lead Terminal and Screw
- Remove the oil pan bolts [C] and take off the oil pan [D].
  Front [E]

Oil Pan Installation

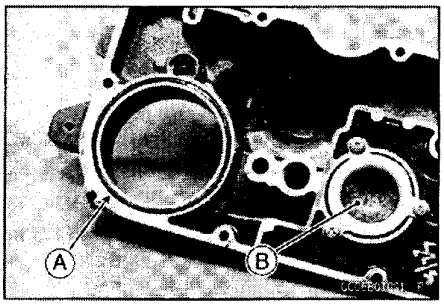


- Apply a non-permanent locking agent to the threads of the relief valve [A], and tighten it against the oil pan [B].
  Front [C]

⚠ WARNING

Do not apply too much non-permanent locking agent to the threads of the relief valve. This may block the oil passage.

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



- Replace the O-ring [A] in the oil pan.

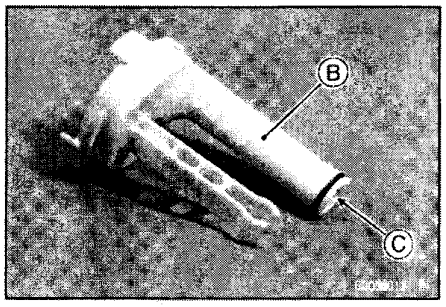
○You may apply grease to the O-ring so it doesn't fall off.

- Remove the oil screen units [B] and clean these oil screens with a high-flash point solvent and remove any particles stuck to them.

○Blow away the particles by applying compressed air [C] from the inside to the outside (from the clean side to the dirty side).

⚠ WARNING

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



NOTE

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

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

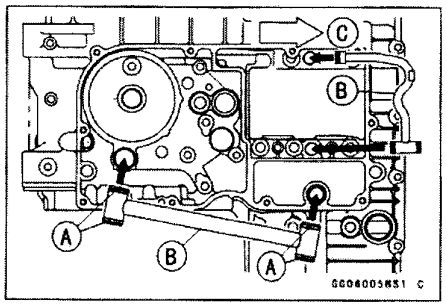
★If the screen is damaged, replace the unit.

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Oil Pan

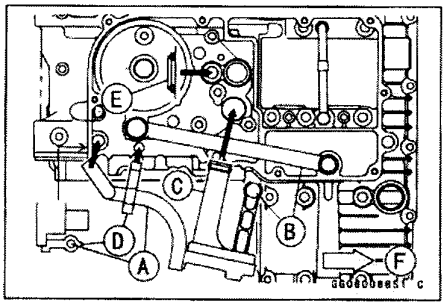
- Replace the oil pan gasket with a new one.
- Replace the O-rings [A] of the oil pipes [B] with new ones.
- Grease these O-rings and install the oil pipes.

Front [C]



- While inserting the oil return pipe [A] into the lower crankcase and the oil screen clamp onto the oil pipe [B], install the plastic oil screen unit [C]. Push the guide [D] of the oil return pipe onto the step of the pump bracket.
- Install the pump outlet O-ring [E] with the flat side facing to the pump bracket.

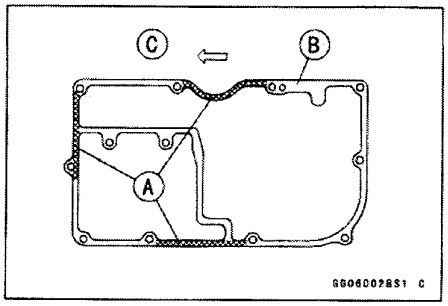
Front [F]



- Apply silicone sealant to both sides of areas [A] of the gasket [B] as shown.

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

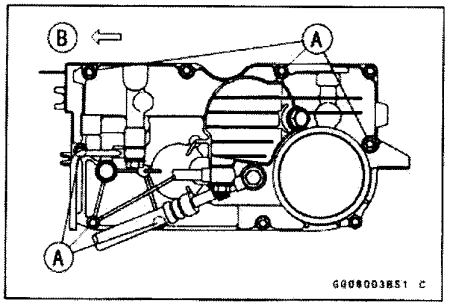
Front [C]



- Apply a non-permanent locking agent to the threads of the six oil pan bolts [A] on the oil pan.
- Tighten all the oil pan bolts (10).

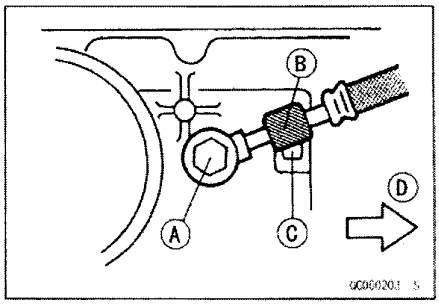
Torque - Oil Pan Bolts: 15 N·m (1.5 kgf·m, 11 ft·lb)

Front [B]



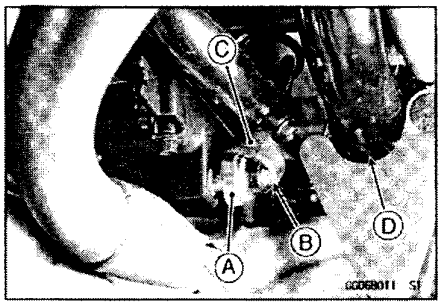
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Oil Pan



- Use a new flat washer on each side of the oil pipe or hose banjo bolt.
- Tighten the oil hose banjo bolt [A] so that the damper [B] contacts the stopper [C] on the bottom of the oil pan.
  Front [D]
- Install the oil cooler and radiator (see Cooling System chapter). The right oil cooler hose banjo bolt has **left -hand threads** on the oil pan (see Engine Removal/Installation chapter).
- Tighten:

Torque - Oil Pipe Banjo Bolts (12 mm): 25 N·m (2.5 kgf·m, 18 ft·lb)
Cylinder Head T–fitting Banjo Bolts (12 mm): 25 N·m (2.5 kgf·m, 18 ft·lb)
Oil Hose Banjo Bolts (14 mm): 34 N·m (3.5 kgf·m, 25 ft·lb)



- Install the muffler assembly (see Engine Top End chapter).
- If the oil pressure switch [A] has been removed, apply silicone sealant to threads and tighten it to the specified torque (left-front view).

Torque - Oil Pressure Switch: 15 N·m (1.5 kgf·m, 11 ft·lb)
Oil Pressure Switch Terminal Screw [B]: 1.6 N·m (0.16 kgf·m, 14 in·lb)

- Install the rubber cap [C].
- Secure the switch lead with the strap [D].

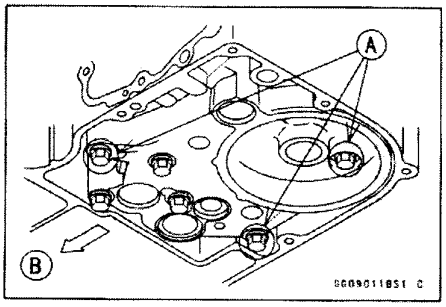
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Oil Pump

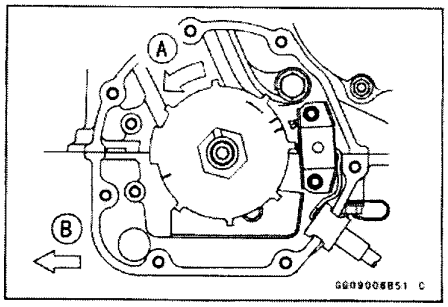
Oil Pump Removal

○The crankcase bottom is shown.

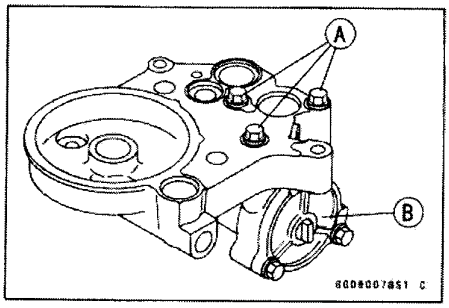
● Remove:
Oil Pan (see this chapter)
Plastic Oil Screen Unit
Oil Pipe
Three Oil Pump Bracket Bolts [A] (Do not remove the other bolts)
Pickup Coil Cover
Front [B]



● Turn [A] the crankshaft counterclockwise until the oil pump shaft tang and oil pump gear slot are vertical and the oil pump bracket can be removed.
● Pull out the oil pump bracket with the pump left installed.
Front [B]



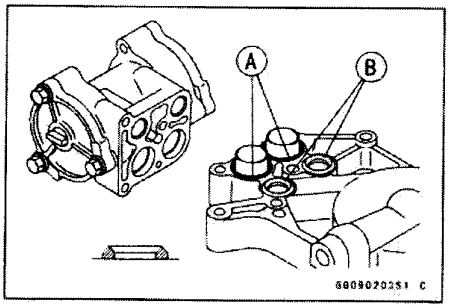
● Remove the oil pump mounting bolts [A] and separate the pump [B] from the oil pump bracket.



Oil Pump Installation

● Fill the pump with engine oil before installation.
● Check that the collars and O-rings [A] are in place.
○Install the pump outlet side O-rings [B] with the flat side facing the bracket and install the oil pump on the pump bracket.
○Check that the oil pump shaft turns freely.
● Apply a non-permanent locking agent to the threads of the oil pump mounting bolts, and tighten them.

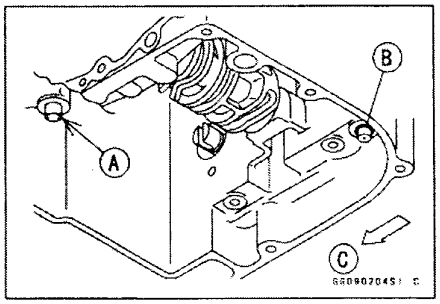
Torque - Oil Pump Mounting Bolts: 12 N·m (1.2 kgf·m, 110 in·lb)



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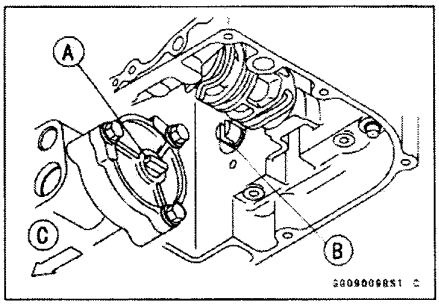
Oil Pump

● Check that the dowel pin [A], orifice and its O-ring [B] are in place. The small hole of the orifice must face the oil pump bracket (downwards).
Front [C]



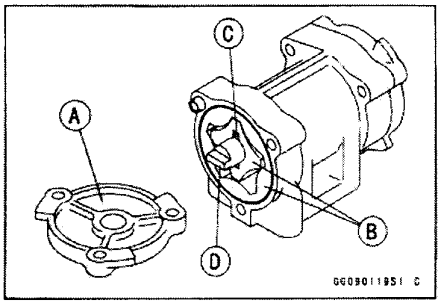
● Turn the oil pump shafts so that the tang [A] and slot [B] are both vertical.
● Install the oil pump bracket along with the pump and tighten the bracket bolts.

Torque - Oil Pump Bracket Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)



Oil Pump Disassembly

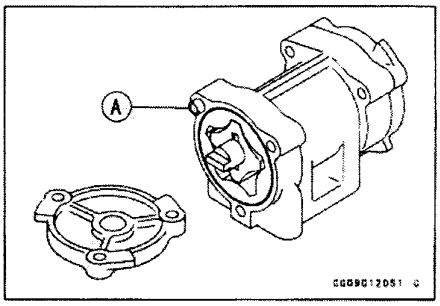
● Remove:
Oil Pump (see this chapter)
Oil Pump Cover Bolts
Oil Pump Cover [A]
● Take the rotors [B] out of the pump body.
● Pull the pin [C] off the pump shaft.
● Remove the rotors from the other side of the pump in the same manner.
● Pull the oil pump shaft [D] out of the body.



Oil Pump Assembly

● Be sure the dowel pin [A] is in place in the pump body.
● Apply engine oil to the rotors.
● Check that the pump shaft turns freely after assembling.

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



Oil Pump Inspection

● Disassemble the oil pump (see this section).
● Visually inspect the oil pump body, outer and inner rotors and covers.
★If there is any damage or uneven wear, replace the rotors or the oil pump assembly.

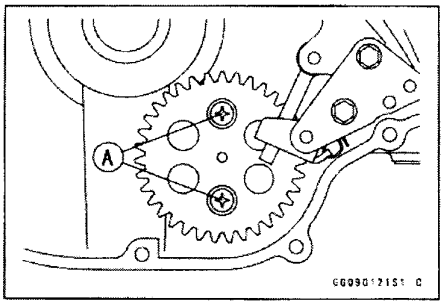
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Oil Pump

Oil Pump Drive Gear Removal

- Remove the clutch (see Clutch chapter).
- Turn the oil pump gear so that the gear holder screws [A] can be removed through the pump gear holes.
- Take out the screws and remove the oil pump gear with the holder.
- Remove the circlip and separate the gear from the holder.

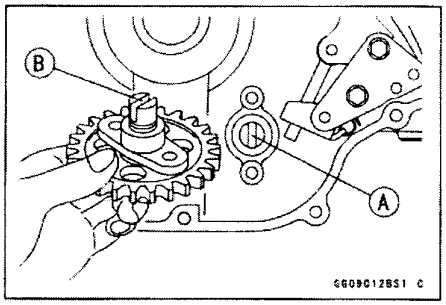
Special Tool - Outside Circlip Pliers: 57001–144



Oil Pump Drive Gear Installation

- When installing the oil pump gear, note the position of the oil pump shaft tang and turn the gear so that the tang [A] fits into the slot [B] of the shaft.
- Apply a non-permanent locking agent to the threads of the holder screws, and tighten them.

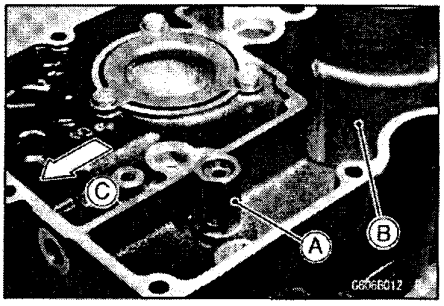
Torque - Oil Pump Drive Gear Holder Screws: 5.2 N·m (0.53 kgf·m, 46 in·lb)



Relief Valve Inspection

- Remove the oil pan [B] and then remove the oil pressure relief valve [A].

Front [C]

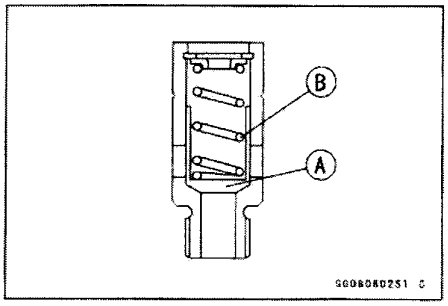


- Check to see if the valve [A] slides smoothly when pushing it in with a wooden or other soft rod, and see if it comes back to its seat by pressure of the spring [B].

NOTE

○*Inspect the valve in its assembled state. Disassembly and assembly may change the valve performance.*

★If any rough spots are found during above inspection, wash the valve clean with a high-flash point solvent and blow out any foreign particles that may be in the valve with compressed air.



⚠ WARNING

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

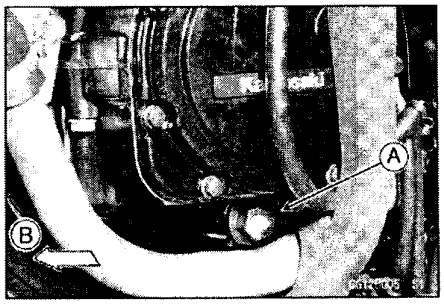
★If cleaning does not solve the problem, replace the relief valve as an assembly. The relief valve is precision made with no allowance for replacement of individual parts.

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Oil Pressure

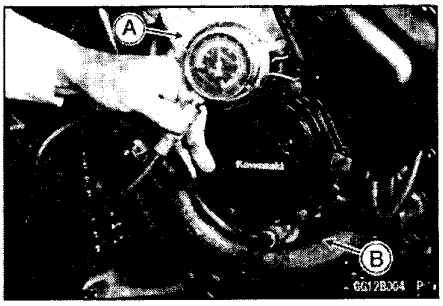
Oil Pressure Measurement

- Remove the left lower fairing (see Frame chapter).
- Remove the main oil passage plug [A].
  Front [B]



- Attach the gauge [A] and adapter [B] to the plug hole.

Special Tools - Oil Pressure Gauge, 5 kgf/cm²: 57001–125
Oil Pressure Gauge Adapter, M18 × 1.5: 57001–1278



- Start the engine and warm up the engine.
- Run the engine at the specified speed, and read the oil pressure gauge.

★If the oil pressure is much lower than the standard, check the oil pump, relief valve, crankshaft bearing insert wear, and con-rod big end bearing insert wear immediately.

★If the reading is much higher than the standard, check the oil screens first, and then the oil passages for dirt or clogging.

Oil Pressure
Standard: 200 ~ 290 kPa (2.0 ~ 3.0 kgf/cm², 28 ~ 43 psi) @4 000 r/min (rpm), oil temp. 90°C (194°F)

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

⚠ WARNING

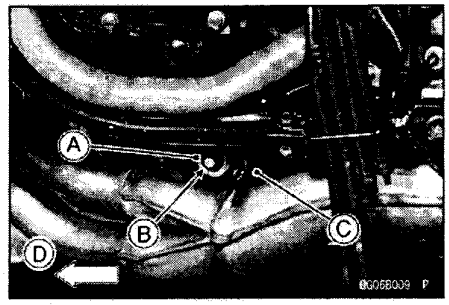
Take care against burns from hot engine oil that will drain through the oil passage when the plug is removed.

- Install the oil passage plug.

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

Oil Pressure Switch Removal

- Remove:
  Engine Oil (drain, see Engine Oil Change in the Periodic Maintenance chapter)
  Left Lower Fairing (see Frame chapter)
  Rubber Switch Cover [C]
  Switch Terminal Screw [B]
  Oil Pressure Switch [A]
  Front [D]



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Oil Pressure

Oil Pressure Switch Installation

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

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

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

- Tighten:

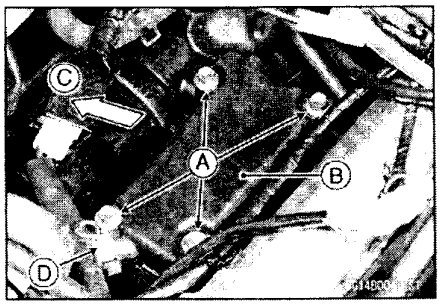
Torque - Oil Pressure Switch Terminal Screw: 1.6 N·m (0.16 kgf·m, 14 in·lb)

- Apply a little grease to the terminal for rust protection.
- Install the rubber cover.

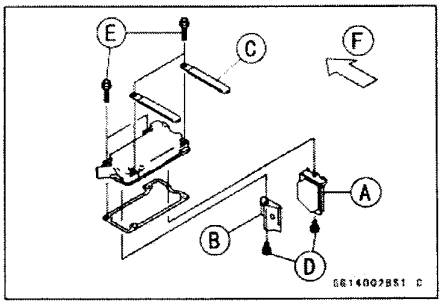
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Oil Hose and Pipes

Breather Removal/Installation



- Remove the fuel tank and fuel pumps (see Fuel System Chapter).
- Put the wiring aside.
- Pull off the breather hose.
- Unscrew the bolts [A] and take off the crankcase breather cover [B] along with the oil separator.
  Front [C]
  White Mark [D]

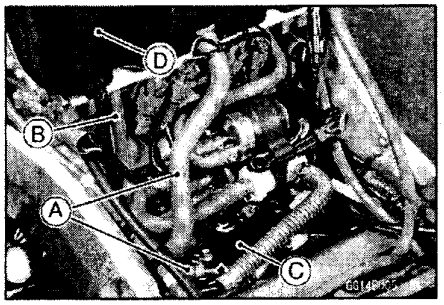


- Install:
  Oil Separator [A]
  Breather Plate [B]
  Plate Clamps [C]

  Torque - Oil Separator Screws [D]: 5.2 N·m (0.53 kgf·m, 46 in·lb)
  Crankcase Breather Cover Bolts [E]: 11 N·m (1.1 kgf·m, 97 in·lb)

  Front [F]
- Install the breather hose with the white mark upwards (see above).

Blow by Gas System Inspection



- Remove the fuel tank (see Fuel System chapter).
- Be certain that the breather hose [A] and air cleaner drain hose [B] are routed without being flattened or kinked, and are connected correctly to the crankcase breather cover [C] and air cleaner housing [D].

★If they are not, correct them.

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

★Replace any damaged hoses.

- Check that the hoses are securely connected.

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Oil Hose and Pipes

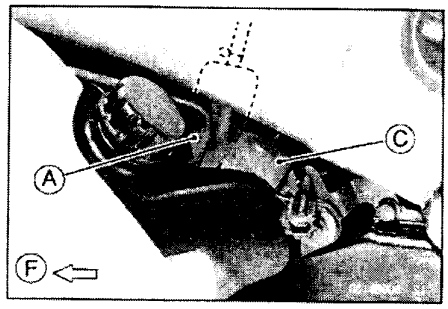
Breather Drain Cleaning

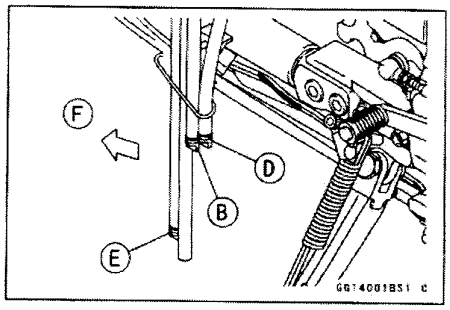
○A breather catch tank is provided beneath the air cleaner housing, and catches the water or oil from the crankcase breather hose. Usually water or oil does not collect at the bottom. In the event that rain water is drawn in through the air cleaner or if engine oil is blown back, drain the housing.

● Visually check the breather catch tank [A] sometimes (about every half a year) whether the water or oil accumulates in the tank. The catch tank is connected to the bottom of the air cleaner housing.

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

Front [F]





⚠ WARNING

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

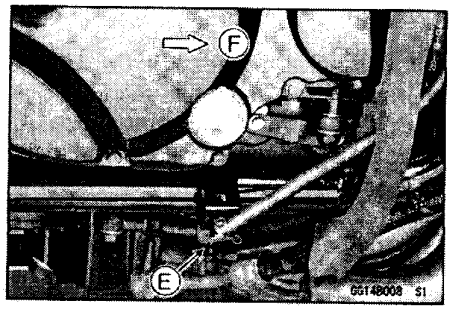
● At the same time, visually check the California carburetor vent catch tank [C] whether the fuel accumulates in the tank.

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

● After draining, be sure to install the plug firmly, otherwise the motorcycle could not clear the California emission regulation.

● At the same time, take off the right and left drain plugs [E] at the drain hoses of the air cleaner housing inlet. After draining, be sure to install these plugs firmly, or the air will be drawn in through, leading to deterioration of engine performance.

Front [F]



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Engine Removal/Installation

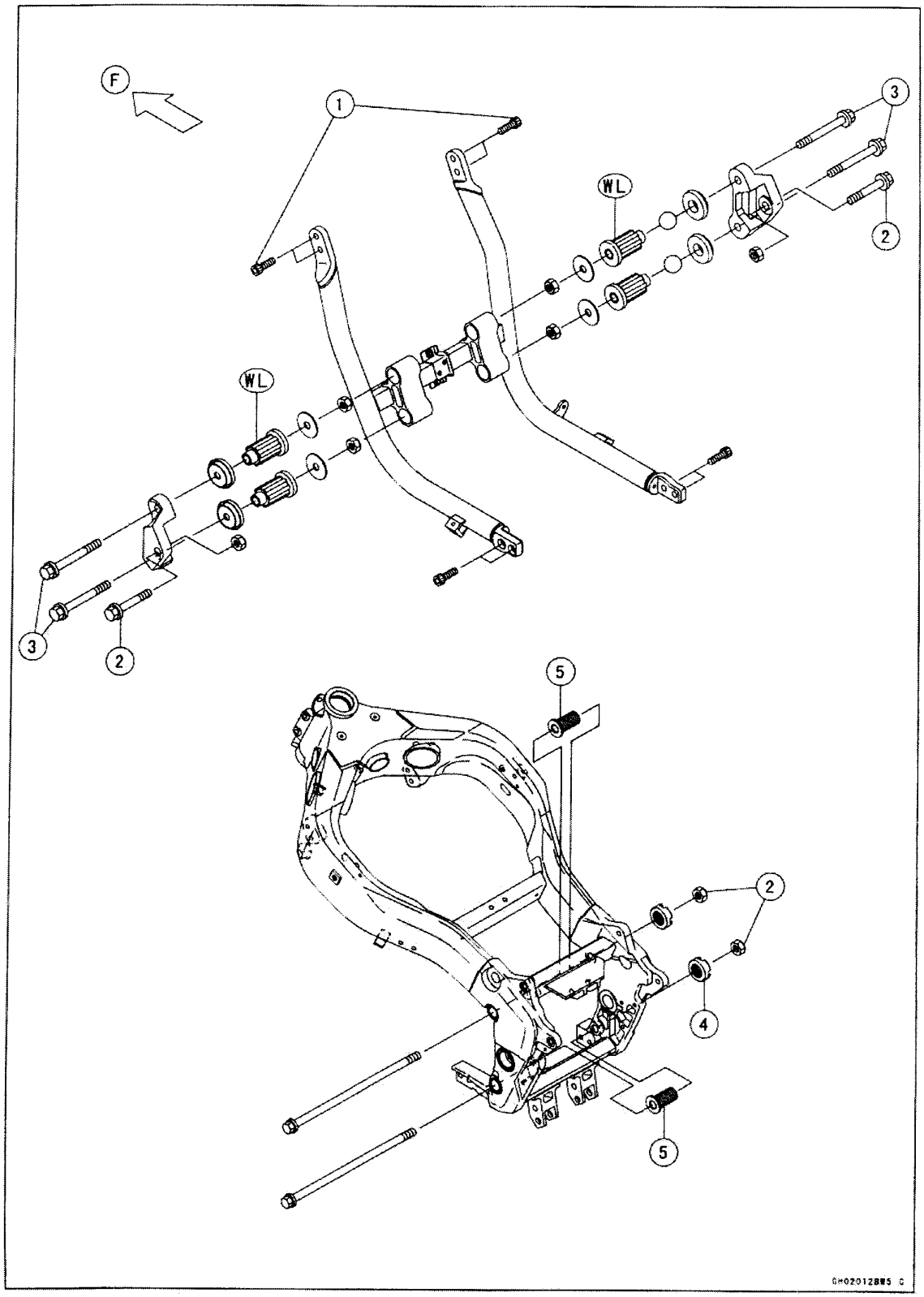
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Exploded View



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Exploded View

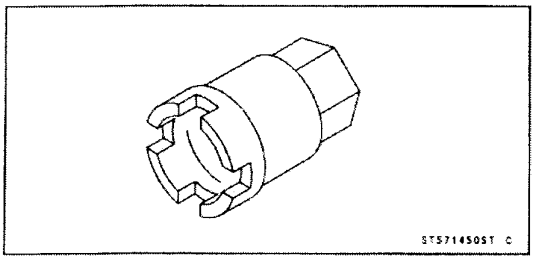
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Downtube bolts	44	4.5	32	
2	Engine mounting bolts and nuts	44	4.5	32	
3	Front engine bracket bolts	44	4.5	32	
4	Engine mounting locknuts	49	5.0	36	

5. Adjusting bolts
F: Front
WL: Apply a soap and water solution or rubber lubricant.

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Special Tool

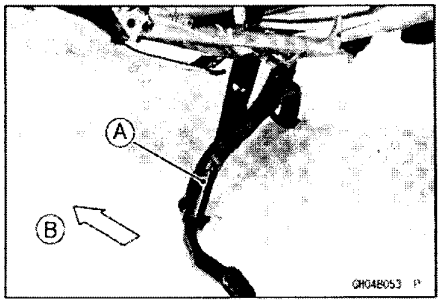
Engine Mount Nut Wrench:
57001–1450



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Engine Removal/Installation

Engine Removal

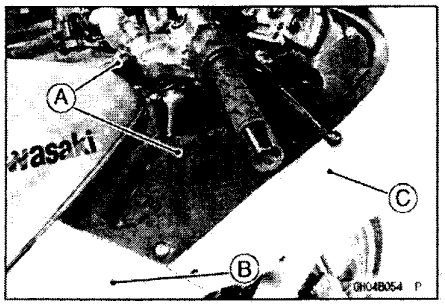


- Put the motorcycle on its center stand [A].
  Front [B]

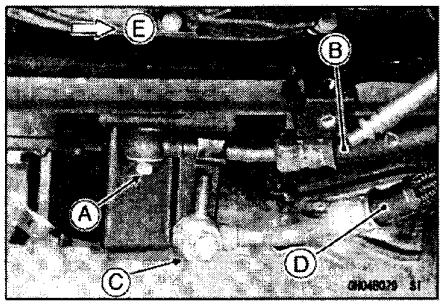
○The following parts may be removed with the engine in the frame.
  Cylinder Head Cover (see Engine Top End chapter)
  Clutch (see Clutch chapter)
  Electric Starter (see Electrical System chapter)
  Alternator (see Electrical System chapter)
  Alternator Coupling (see Crankshaft/Transmission chapter)
  Engine Oil Pump (see Engine Lubrication System chapter)

○When disconnecting the following connectors, raise the lock of the connectors.
  Fuel Level Sensor Lead Connector
  Oil Pressure Switch Lead Connector
  Fuel Pump Lead Connectors
  Battery (–) Lead Connectors

○Push the lock of the other connectors.



- Remove (see Frame chapter):
  Inner Covers [A]
  Lower Fairings [B]
  Upper Fairing [C]
- Drain:
  Coolant (see Periodic Maintenance chapter)
  Engine Oil (see Periodic Maintenance chapter)



- Unscrew the bottom banjo bolt [A] counterclockwise and take the oil cooler left hose [B] off the oil pan.
- Turn the side banjo bolt [C] **clockwise** and take the oil cooler right hose [D] off the oil pan. This banjo bolt has left-hand threads.
- Remove (see Radiator Removal in the Cooling System chapter):
  Oil Cooler (with the oil hoses attached)
  Radiator
  Front [E]

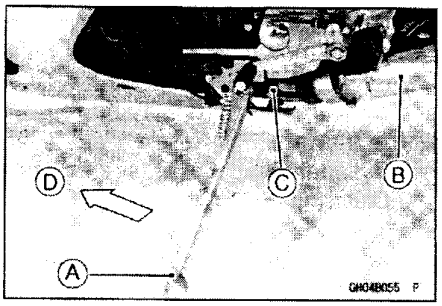
CAUTION

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

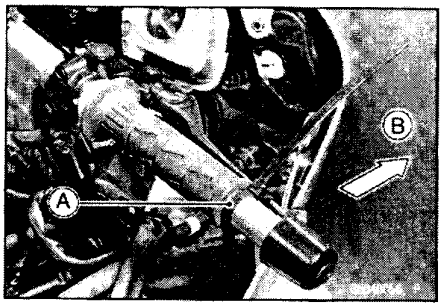
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Engine Removal/Installation

- Set the motorcycle on its sidestand [A].
- Remove the right and left mufflers [B] and the exhaust manifold [C] (see Engine Top End chapter).
  Front [D]



- Set the motorcycle on its center stand again.
- Squeeze the brake lever slowly and hold it with a band [A].
  Front [B]



⚠ WARNING

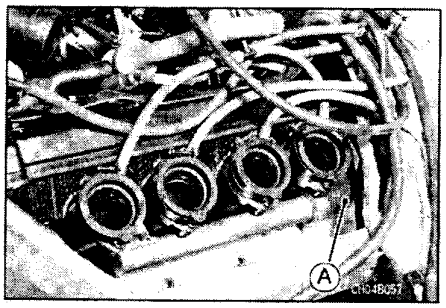
Be sure to hold the front brake when removing the engine or the motorcycle may fall over. It could cause an accident and injury.

CAUTION

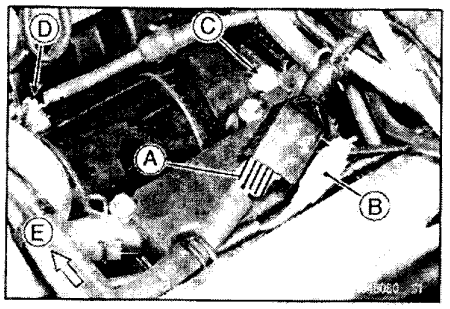
Be sure to hold the front brake when removing the engine or the motorcycle may fall over. The engine or the motorcycle could be damaged.

- Remove (see Fuel System chapter):
  Fuel Tank
  Air Cleaner Housing
  Carburetor Assembly
  Fuel Pump Assembly

- Remove:
  Coolant Hose [A] (from the cylinder head)
  Coolant Hose and Inlet Pipe (from the water pump)



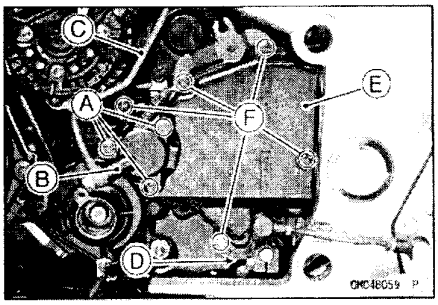
- Disconnect:
  Alternator Connector [A]
  Pickup Coil Connector [B]
  Engine Ground Lead Terminal [C]
  Starter Motor Lead Terminal [D]
  Front [E]
- Remove:
  Spark Plug Caps
  Vacuum Switch Valve and Hoses (see Engine Top End chapter)
  Heat Baffle on Cylinder Head Cover
  Rubber Cover on Cylinder Head Cover



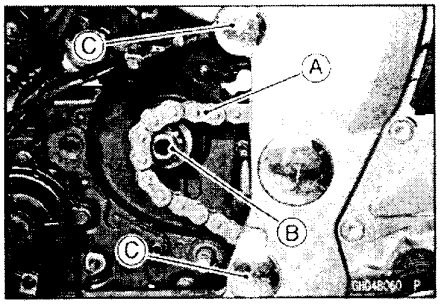
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Engine Removal/Installation

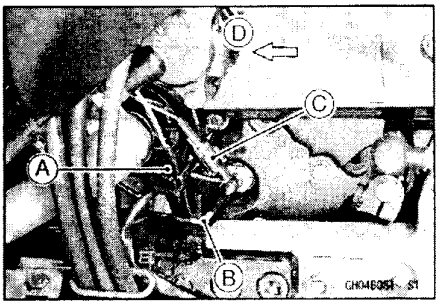
● Remove the coolant reserve tank.
● Remove three bolts [A] and clutch slave cylinder [B], noting the following (see Clutch chapter).
○Detach the clutch pipe [C] from the frame.
○Push the piston into the cylinder as far as it will go.
○Apply the clutch lever slowly and hold it with a band.
● Remove:
Shift Lever and Clamp Bolt [D]
Engine Sprocket Cover [E] and Five Bolts [F]



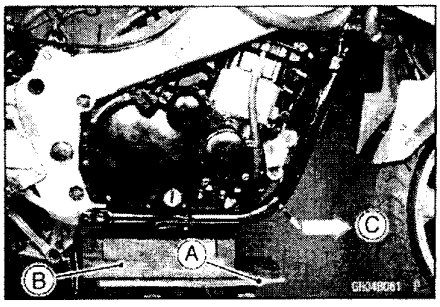
● While applying the rear brake pedal, remove the engine sprocket nut.
● Loosen the rear wheel nut (see Drive Chain Slack Adjustment in the Periodic Maintenance chapter).
● Move the rear wheel forwards and take off the engine sprocket from the output shaft (see Engine Sprocket Removal in the Final Drive chapter).
○The drive chain [A] is left on the output shaft [B].
● Remove the caps [C] for the upper/lower rear engine mount bolts.



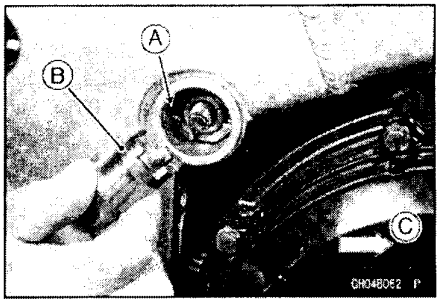
● Pull off the connectors and free the wiring from the frame.
Oil Pressure Switch Lead Connector [A]
Neutral Switch Lead Connector [B] (from the pin of the switch)
Sidestand Switch Lead Connector [C]
Front [D]
○Raise the lock to disconnect the oil pressure switch lead connector.



● Support the engine with a stand or jack [A] along with a wooden block [B].
● Remove the caps for the upper rear engine mount bolts.
Front [C]



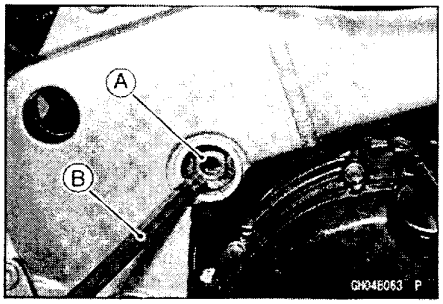
● Loosen the upper/lower mounting locknuts [A], using the engine mount nut wrench [B] (special tool).
Front [C]
Special Tool - Engine Mount Nut Wrench: 57001-1450



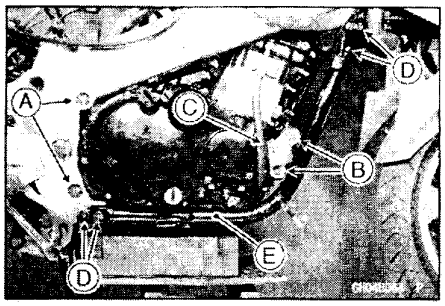
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Engine Removal/Installation

● Unscrew the rear upper/lower adjusting bolts [A] until they touch the frame inside with a 10 mm hexagon wrench [B] to remove the engine.



● Loosen the rear upper/lower engine mounting bolts [A].
● Remove the front engine bracket bolts [B] on both sides.
○Do not remove the front engine mounting bolts [C].
● Remove the downtube bolts [D] and take off both downtubes [E].

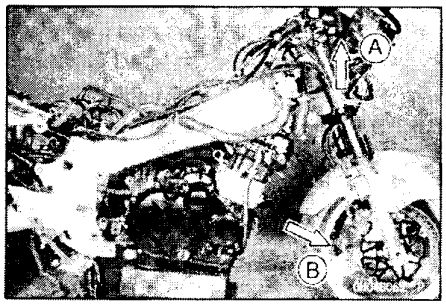


● Lift up [A] the front part of the frame and move the engine right [B] to free the output shaft from the drive chain.

NOTE

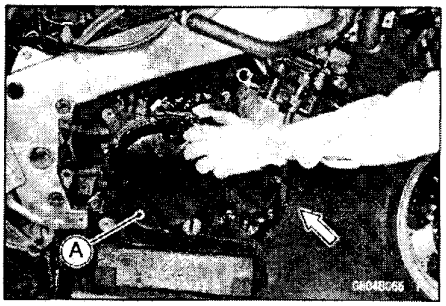
○*The drive chain will be removed from the output shaft when removing the engine.*

● Remove the engine from the vehicle right side. Clear the frame, while twisting the engine unit.
● Place the engine stable on a wooden block.



Engine Installation

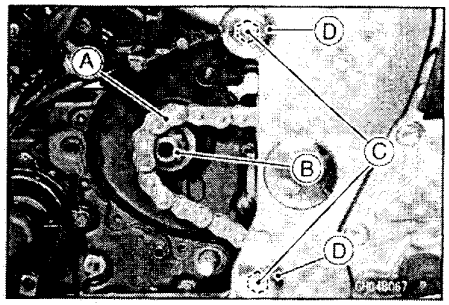
● Before engine installation, install the mounting adjusters and screw back the mounting adjusters until they touch the frame inside.
● While lifting up the front part of the frame, move the engine [A] into the frame from the left top end.



● Hang the drive chain [A] over the output shaft [B] just before moving the engine into its final position in the frame.
● Insert the rear mounting bolts [C] from the left side of the engine and install the caps [D].
○Install the engine sprocket and engine sprocket cover (see Final Drive chapter). The engine sprocket has no "face" or "back".

Molybdenum Disulfide Oil-
Threads and Seating Surface of the Engine Sprocket Nut

Torque - Engine Sprocket Nut: 127 N·m (13.0 kgf·m, 94 ft·lb)



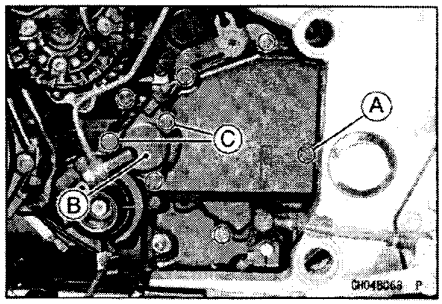
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Engine Removal/Installation

● Push the piston into the cylinder and install the slave cylinder [B] (see Clutch chapter).

Non-permanent Locking Agent -
Two Slave Cylinder Shorter Bolts [C]

● Tighten the engine sprocket cover bolts [A].



● First, tighten the front engine bracket bolts, next the rear engine mounting bolts and nuts.

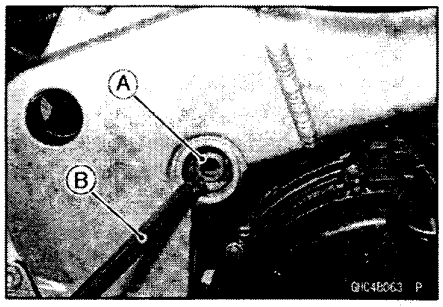
Torque - Downtube Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)
Engine Bracket Bolts: 44 N·m (4.5 kgf·m, 33 ft·lb)
Engine Mounting Bolts and Nuts: 44 N·m (4.5 kgf·m, 33 ft·lb)

● Tighten both adjusting bolts [A] until they press the engine mounts evenly, using a 10 mm hexagon wrench [B].

● Tighten the engine mounting locknuts to the specified torque.

Special Tool - Engine Mount Nut Wrench: 57001–1450

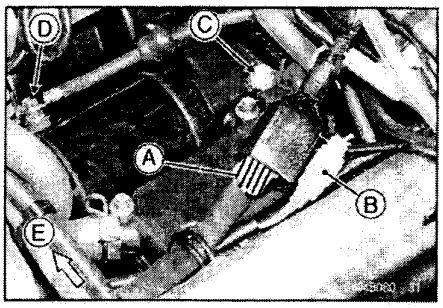
Torque - Engine Mounting Locknuts: 49 N·m (5.0 kgf·m, 36 ft·lb)



● Install the removed parts (see appropriate chapters).

Torque - Engine Ground Lead Terminal Bolt [C]: 20 N·m (2.0 kgf·m, 15 ft·lb)
Starter Motor Terminal Nut [D]: 4.9 N·m (0.50 kgf·m, 43 in·lb)

● Connect:
Alternator Connector [A]: W–BK, BR–BR leads
Pickup Coil Connector [B]: Y–Y, BK/W–BK/W leads
Front [E]



CAUTION

The alternator connector is black and has thick leads. Be careful not to mix up with the pickup coil white connector, otherwise the pickup coil will be damaged.

● Install:
Exhaust Manifold and Muffler (see Engine Top End chapter)

● Install the radiator, then the oil cooler, noting the following (see Radiator Installation in the Cooling System chapter).

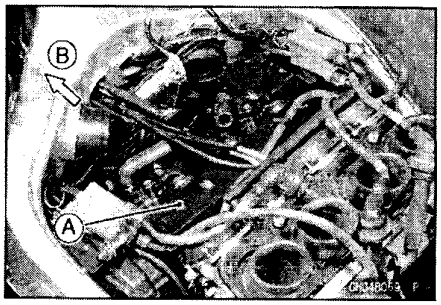
○Fit each upper radiator bracket onto the top of the radiator sideways.

○The right horn bracket has an "R" mark and the left horn bracket an "L" mark on it.

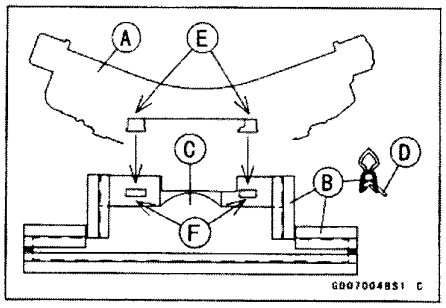
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Engine Removal/Installation

● Install the rubber cover [A] over the cylinder head cover. Front [B]

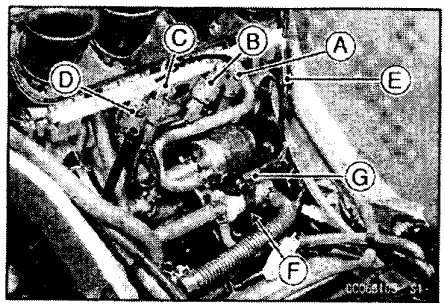


● Check that the rubber dampers are fitted onto the hooks on the radiator fan.
● Fit the trims [B] onto the baffle [C] with the lip [D] downwards.
● Install the baffle on the rubber cover and push it forward to fit the tabs [E] of the radiator [A] into the grooves [F] of the baffle.
● Install the carburetors (see Fuel System chapter).

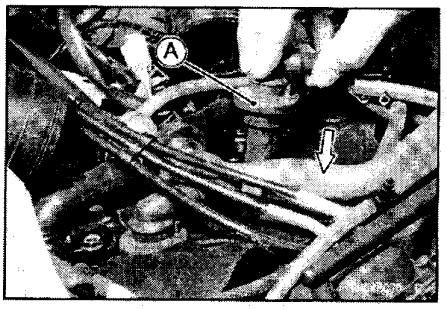


● Run the leads, cables and hoses correctly (see Cable, Wire and Hose Routing section in the Appendix chapter).
● Connect:

Carburetor Fuel Cut Valve Connectors
GY Connector #4 [A]: R-BR/BK, BK-R leads
BR Connector #3 [B]: R-BR/BK, BK-O/G leads
BR Connector #2 [C]: R-BR/BK, BK-O/BK leads
GY Connector #1 [D]: R-BR/BK, BK-LG/BK leads
Throttle Sensor Connector [E]: BK/BL-BK, Y/W-Y, BL-BL leads
Fuel Pump #1, 2 Connector [F] (lower):
R-R, BK/W-Y, BK-BK, BK/Y-BK/Y leads
Fuel Pump #3, 4 Connector [G] (upper):
R-R, BK/W-Y, G-BK, BK/Y-BK/Y leads

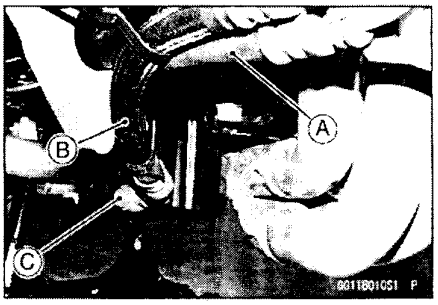


● Adjust:
Throttle Cables (see Periodic Maintenance chapter)
Choke Cable (see Fuel System chapter)
Drive Chain (see Periodic Maintenance chapter)
● Fit the plug caps [A] securely.
● Pull up the spark plug caps lightly to make sure of installation of the spark plug caps.
● Install the air cleaner housing and fuel tank (see Fuel System chapter).



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Engine Removal/Installation



- Fill the engine with engine oil (see Periodic Maintenance chapter).
- Fill the engine with coolant and bleed the air from the cooling system (see Periodic Maintenance chapter).
- Use a new flat washer on each side of the oil hose banjo bolt.
- Run the left oil cooler hose [A] to the banjo bolt (right -hand threads) on the crankcase bottom. Run the right oil cooler hose [B] to the banjo bolt **(left-hand threads)** [C] as shown.

○Fit the stopper of the right oil cooler hose banjo bolt onto the rib of the oil pan (see Exploded View in the Engine Lubrication System chapter).

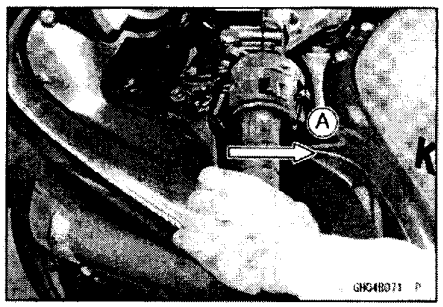
- Tighten:

Torque - Oil Cooler Right/Left Hose Banjo Bolts: 34 N·m (3.5 kgf·m, 25 ft·lb)

- Check the brake effectiveness.

⚠ WARNING

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



- Check the clutch operation.

○Check that the clutch line has proper fluid pressure and no fluid leakage.

○When the clutch lever is squeezed fully [A] with the engine idling, make sure that there is no abnormal noise, the lever is not too heavy and the gears can be shifted smoothly.

○When moving off, check that the clutch doesn't slip and is engaged smoothly.

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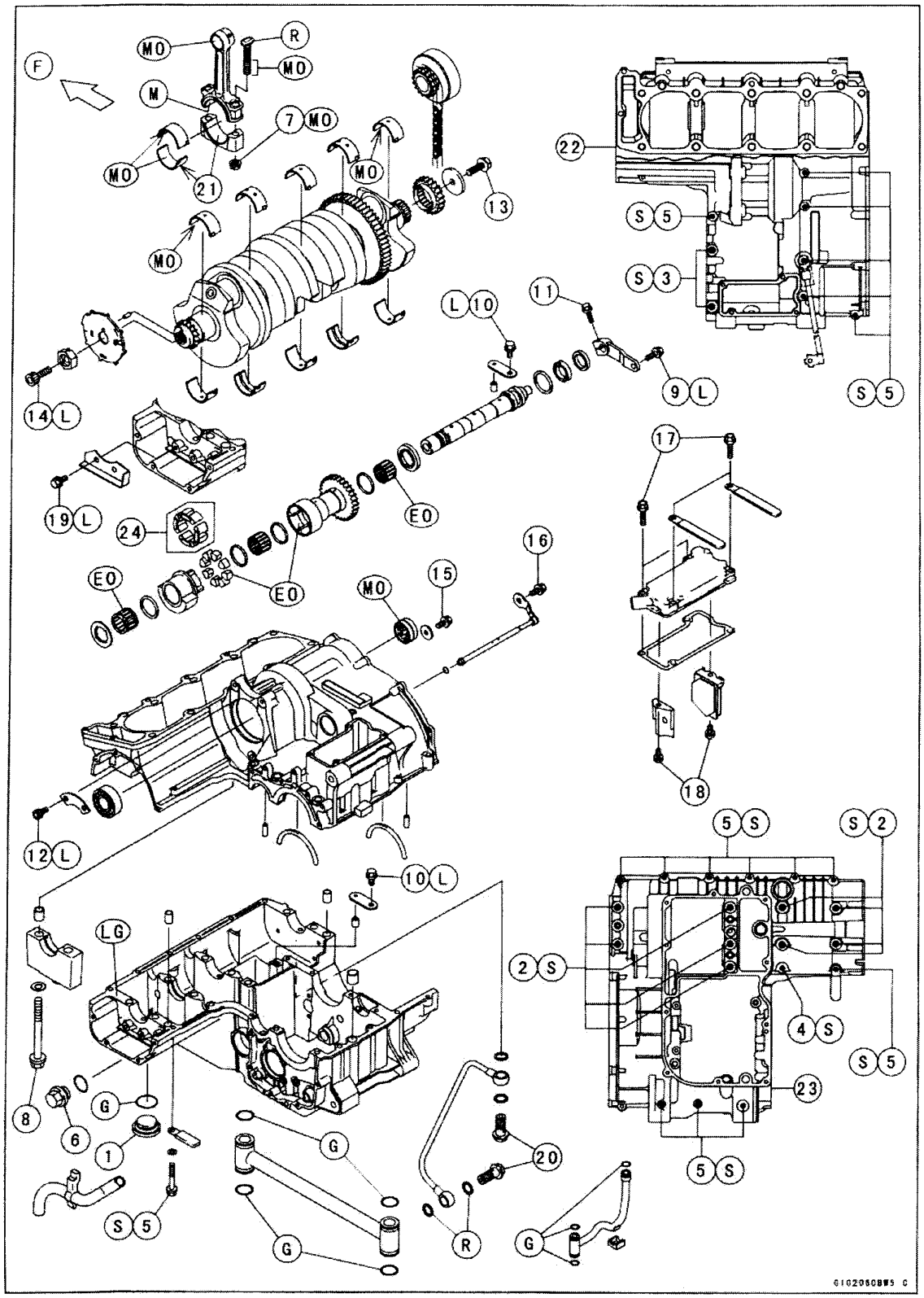
Crankshaft/Transmission

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Exploded View



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Exploded View

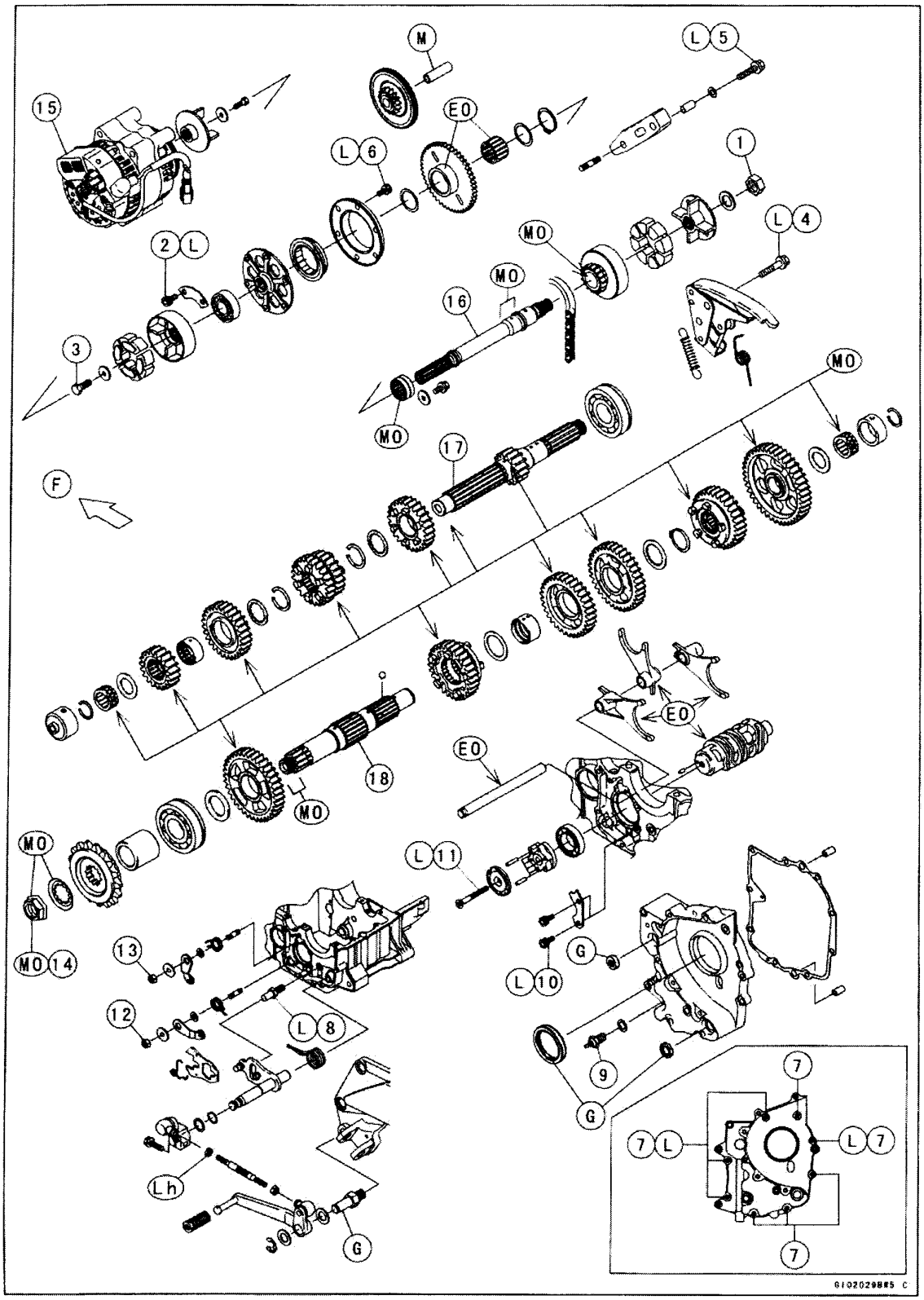
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Lower crankcase plug: ϕ25 mm	18	1.8	13	
2	Crankcase bolts: ϕ9 mm	32	3.3	24	S
3	ϕ8 mm	30	3.1	22	S
4	ϕ7 mm	20	2.0	15	S
5	ϕ6 mm	20	2.0	15	S
6	Main oil passage plug	18	1.8	13	
7	Connecting rod big end nuts	in the text	←	←	MO
8	Main bearing cap bolts	32	3.3	24	
9	Balancer lever bolt	9.8	1.0	87 in·lb	L
10	Balancer shaft plate bolt	11	1.1	97 in·lb	L
11	Balancer shaft clamp bolt	11	1.1	97 in·lb	
12	Alternator shaft bearing retainer bolts	12	1.2	110 in·lb	L
13	Alternator chain sprocket bolt	25	2.5	18	crankshaft
14	Timing rotor bolt	25	2.5	18	L
15	Bearing holder bolt	11	1.1	97 in·lb	
16	Transmission oil pipe holder bolt	11	1.1	97 in·lb	
17	Crankcase breather cover bolts	11	1.1	97 in·lb	
18	Oil separator screws	5.2	0.53	46 in·lb	
19	Lower chain guide bolts	11	1.1	97 in·lb	L
20	Oil pipe banjo bolts ϕ12	25	2.5	18	

21. Do not apply any grease or oil.
22. Upper crankcase
23. Lower crankcase
24. ZX1200-C2 ~ Model

EO: Apply engine oil.
F: Front
G: Apply grease.
L: Apply a non-permanent locking agent.
LG: Apply liquid gasket (Kawasaki Bond: 92104–1064).
MO: Apply molybdenum disulfide oil.
R: Replacement parts
S: Follow the specific tightening sequence.

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Alternator shaft nut	59	6.0	44	right
2	Alternator shaft bearing retainer bolts	12	1.2	110 in·lb	L
3	Alternator shaft bolt	25	2.5	18	left
4	Alternator chain tensioner bolts	11	1.1	97 in·lb	L
5	Alternator chain guide bolt	11	1.1	97 in·lb	L
6	Starter motor clutch bolts	12	1.2	110 in·lb	L
7	External shift mechanism cover bolts	11	1.1	97 in·lb	L (4)
8	Shift shaft return spring pin (bolt)	30	3.1	22	L
9	Neutral switch	15	1.5	11	
10	Shift drum bearing holder bolts	13	1.3	120 in·lb	L
11	Shift drum cam screw	–	–	–	L
12	Gear set lever nut	11	1.1	97 in·lb	
13	Neutral set lever nut	11	1.1	97 in·lb	
14	Engine sprocket nut	127	13.0	94	MO

15. Alternator (see Electrical System chapter)
16. Alternator shaft
17. Drive shaft
18. Output shaft

EO: Apply engine oil.
F: Front
G: Apply grease.
L: Apply a non-permanent locking agent.
Lh: Left-hand threads
M: Apply molybdenum disulfide grease.
MO: Apply molybdenum disulfide oil.

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Specifications

Item		Standard	Service Limit
Crankshaft, Connecting Rods			
Connecting rod bend		– – –	TIR 0.2/100 mm (0.008/3.94 in.)
Connecting rod twist		– – –	TIR 0.2/100 mm (0.08/3.94 in.)
Connecting rod big end side clearance		0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)	0.58 mm (0.023 in.)
Connecting rod big end bearing insert/crankpin clearance		0.042 ~ 0.070 mm (0.00165 ~ 0.00275 in.)	0.11 mm (0.0043 in.)
Crankpin diameter:		35.984 ~ 36.000 mm (1.41669 ~ 1.41732 in.)	35.97 mm (1.4161 in.)
Marking	None	35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)	– – –
	○	35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)	– – –
Connecting rod big end inside diameter:		39.000 ~ 39.016 mm (1.53543 ~ 1.53606 in.)	– – –
Marking	None	39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)	– – –
	○	39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)	– – –
Connecting rod big end bearing insert thickness:			
	Black	1.475 ~ 1.480 mm (0.05807 ~ 0.05827 in.)	– – –
	Blue	1.480 ~ 1.485 mm (0.05827 ~ 0.05846 in.)	– – –
	White	1.485 ~ 1.490 mm (0.05846 ~ 0.05866 in.)	– – –

Connecting rod big end bearing insert selection:

Con-rod Big End Inside Diameter Marking	Crankpin Diameter Marking	Bearing Inserts	
		Size Color	Part Number
None	○	Black	92028-1679
None	None	Blue	92028-1680
○	○		
○	None	White	92028-1681

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Specifications

Item		Standard	Service Limit
Crankshaft side clearance		0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in.)	0.40 mm (0.0158 in.)
Crankshaft runout		TIR 0.02 mm (0.0008 in.) or less	TIR 0.05 mm (0.0020 in.)
Crankshaft main bearing insert/journal clearance		0.020 ~ 0.044 mm (0.00079 ~ 0.00173 in.)	0.08 mm (0.0032 in.)
Crankshaft main journal diameter:		35.984 ~ 36.000 mm (1.41669 ~ 1.41732 in.)	35.96 mm (1.4158 in.)
Marking	None	35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)	– – –
	1	35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)	– – –
Crankcase main bearing bore diameter:		39.000 ~ 39.016 mm (1.53543 ~ 1.53606 in.)	– – –
Marking	○	39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)	– – –
	None	39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)	– – –
Crankshaft main bearing insert thickness:			
	Brown	1.490 ~ 1.494 mm (0.05866 ~ 0.05822 in.)	– – –
	Black	1.494 ~ 1.498 mm (0.05822 ~ 0.05898 in.)	– – –
	Blue	1.498 ~ 1.502 mm (0.05898 ~ 0.05913 in.)	– – –

Crankshaft main bearing insert selection:

Crankcase Main Bearing Bore Diameter	Crankshaft Main Journal Diameter	Bearing Inserts*		
Marking	Marking	Size Color	Part Number	Journal Nos.
○	1	Brown	92139-1070	1, 3, 5
			92139-1073	2, 4
None	1	Black	92139-1069	1, 3, 5
○	None		92139-1072	2, 4
None	None	Blue	92139-1068	1, 3, 5
			92139-1071	2, 4

*The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.

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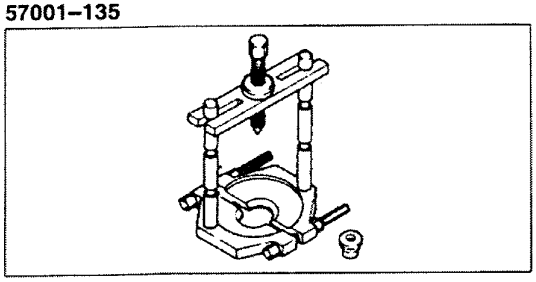
Specifications

Item	Standard	Service Limit
Transmission		
Shift fork ear thickness	4.9 ~ 5.0 mm	4.8 mm
	(0.193 ~ 0.197 in.)	(0.189 in.)
Gear groove width	5.05 ~ 5.15 mm	5.25 mm
	(0.1988 ~ 0.203 in.)	(0.207 in.)
Shift fork guide pin diameter	7.9 ~ 8.0 mm	7.8 mm
	(0.311 ~ 0.315 in.)	(0.307 in.)
Shift drum groove width	8.05 ~ 8.20 mm	8.3 mm
	(0.317 ~ 0.323 in.)	(0.327 in.)

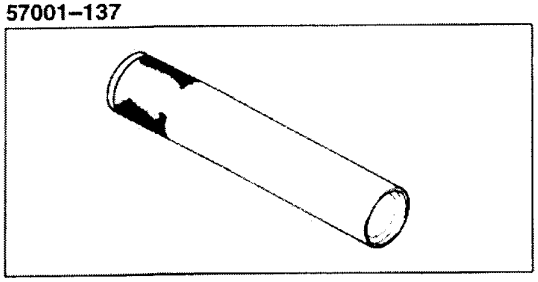
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Special Tools

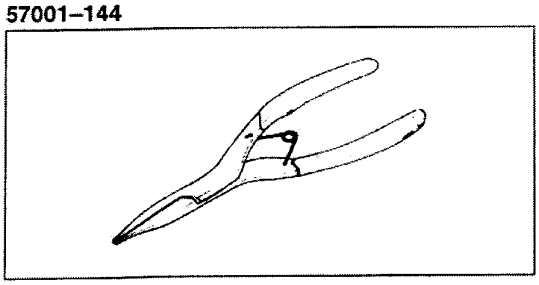
Bearing Puller:
57001–135



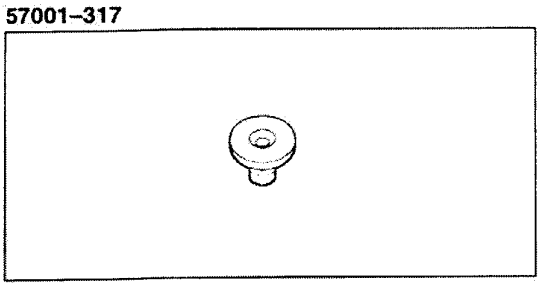
Steering Stem Bearing Driver:
57001–137



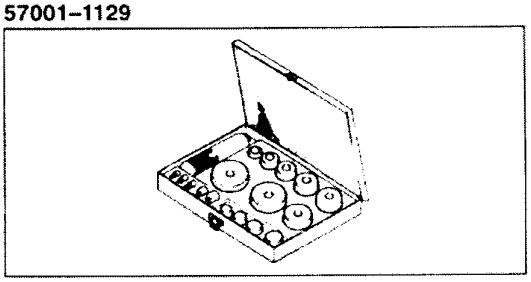
Outside Circlip Pliers:
57001–144



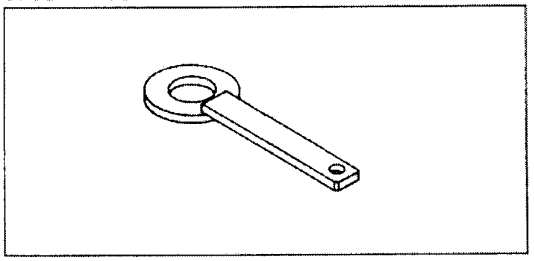
Bearing Puller Adapter:
57001–317



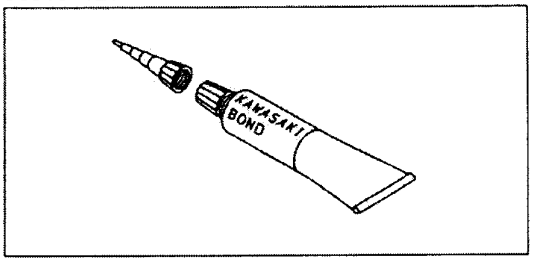
Bearing Driver Set:
57001–1129



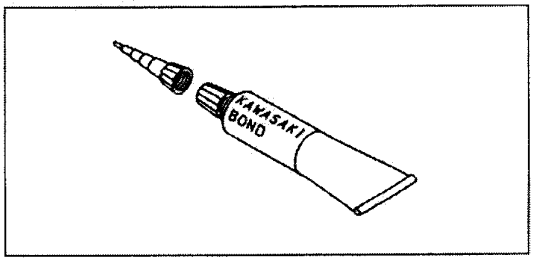
Coupling Holder:
57001–1189



Kawasaki Bond (Silicone Sealant):
56019–120



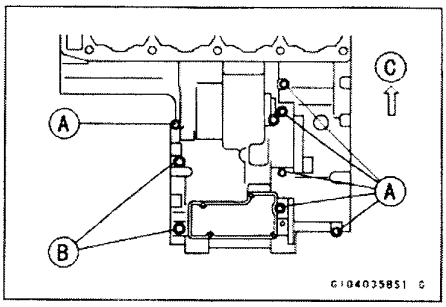
Kawasaki Bond (Liquid Gasket – Black):
92104–1062



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Crankcase

Crankcase Splitting

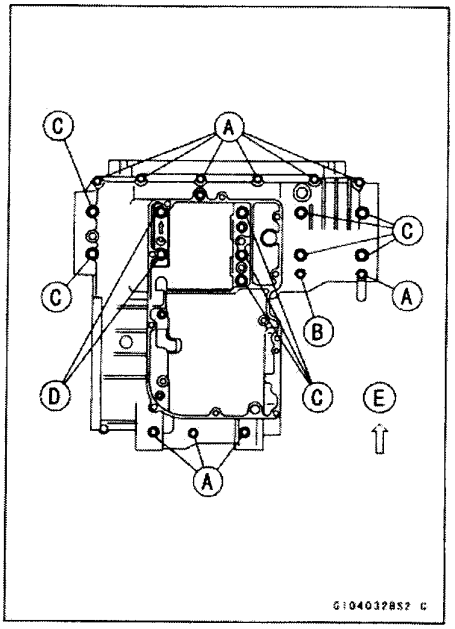


- Remove the engine (see Engine Removal/Installation chapter).
- Set the engine on a clean surface and hold the engine steady while parts are being removed.
- Remove the following parts from the engine.
  Starter Motor (see Electrical System chapter)
  Alternator (see Electrical System chapter)
  Clutch Cover (see Clutch chapter)
  External Shift Mechanism (see this chapter)

★If the crankshaft is to be removed, remove the following:
  Cylinder and Pistons (see Engine Top End chapter)
  Alternator Shaft Chain, Coupling and Sprocket (see this chapter)

★If the transmission drive shaft is to be removed, remove the clutch (see Clutch chapter).

- Remove the upper crankcase bolts in the order listed.
  6 mm Bolts [A]
  8 mm Bolts [B]
  Front [C]



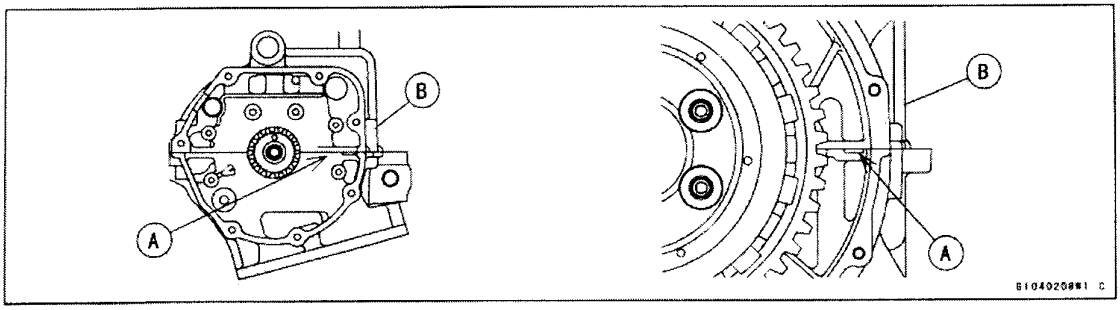
- Turn the engine upside down, and remove:
  Oil Pan (see Engine Lubrication System Chapter)
  Oil Pump along with Bracket
- Remove the lower crankcase bolts in the order listed.
  6 mm Bolts [A]
  7 mm Bolt [B]
  9 mm Bolts [C]

○Do not remove the main bearing cap bolts [D] if the crankshaft is not to be removed.
  Front [E]

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Crankcase

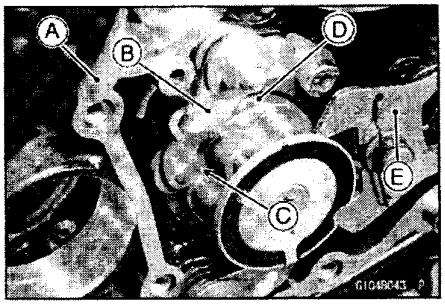
● Pry the points [A] shown to split the crankcase halves apart, and remove the lower crankcase half. [B]
○ Tap lightly around the crankcase joint with a plastic mallet, and split the crankcase. Take care not to damage the crankcase.



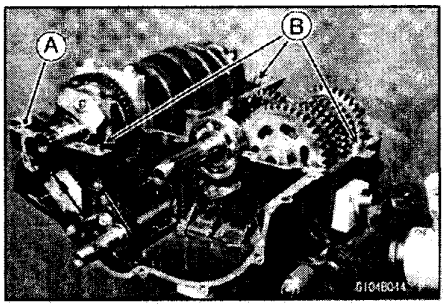
Crankcase Assembly

NOTE

○ *The upper crankcase half, the lower crankcase half, and the crankshaft main bearing cap are machined at the factory in the assembled state, so the crankcase halves and the main bearing cap must be replaced together as a set.*



● Install the shift drum and forks into the upper crankcase (see Transmission section in this chapter).
● In the upper crankcase [A], set the shift drum in the neutral position (the neutral set lover [B] fits into the detent [C] of the neutral cam [D]).
● Install the shift mechanism arm [E] (shift shaft).



● With a high-flash point solvent, clean off the mating surface of the upper crankcase half [A] and wipe dry.
● Check that the dowel pins [B] are in place.
● Install (see this chapter):
Alternator Shaft (upper crankcase)
Transmission (upper crankcase)
Crankshaft (upper crankcase)
Balancer Shaft (lower crankcase)

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Crankcase

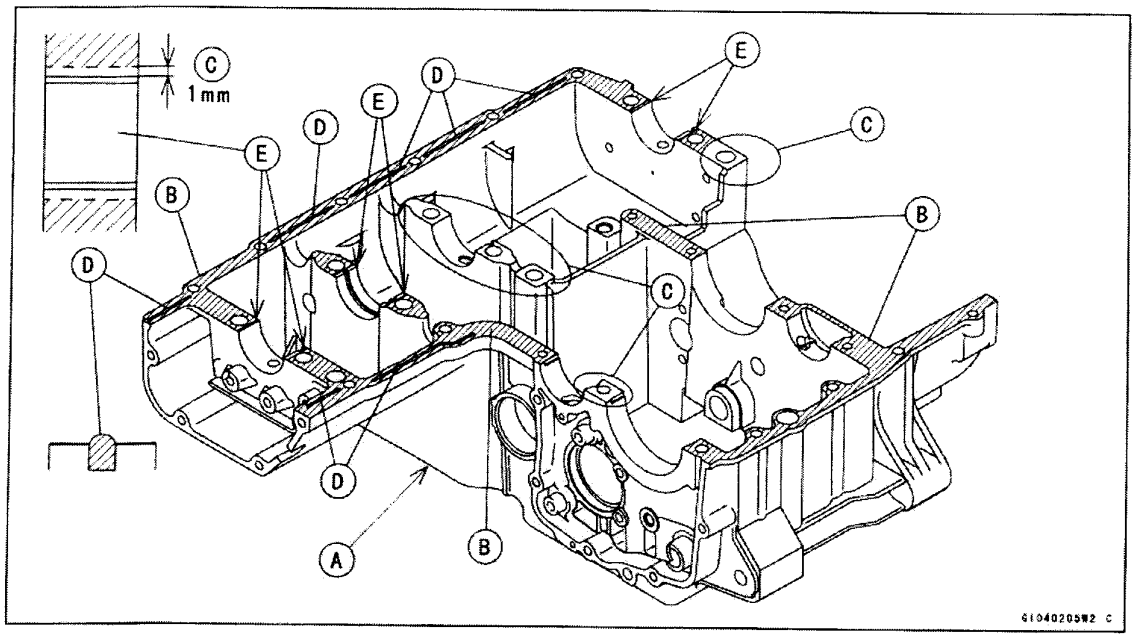
- With a high-flash point solvent, clean off the mating surface of the lower crankcase half [A] and wipe dry.
- Apply liquid gasket [B] to the mating surface of the lower crankcase half. Finish applying gasket in five minutes.

Sealant - Kawasaki Bond (Liquid Gasket- gray): 92104–1064

○Fill the grooves [D] with the gasket, so its surface swells a little to prevent leakage.

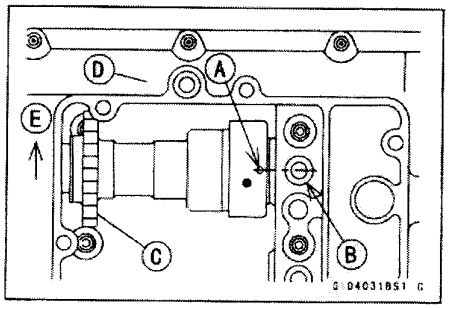
CAUTION

Do not apply the liquid gasket to the areas [C] around the bearing inserts [E], and oil passages.



- Temporarily, install the timing rotor and nut, and then position the crankshaft at #1, 4 piston TDC (timed by the timing rotor).
- Align the punch mark [A] on the balancer mass with the center of the oil passage hole [B] in the lower crankcase.
- While keeping the balancer at this position, mesh the balancer gear [C] with the crankshaft gear and install the lower crankcase [D] on the upper crankcase.

Front [E]



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Crankcase

● Tighten the lower crankcase bolts using the following steps.

○The three 9 mm bolts (No. 1 ~3) have a flat washer, respectively.

○First, tighten the 9 mm bolts.

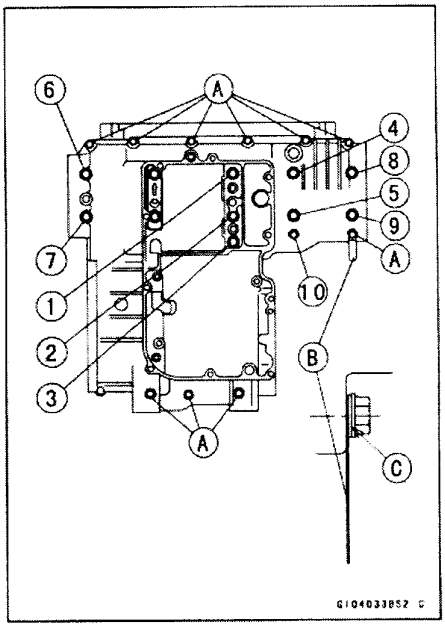
Torque - 9 mm Bolts (No. 1 ~ 9)
First: 9.8 N·m (1.0 kgf·m, 87 in·lb)
Final: 32 N·m (3.3 kgf·m, 24 ft·lb)

○Secondly, tighten the 7 mm bolt.

Torque - 7 mm Bolt (No. 10): 20 N·m (2.0 kgf·m, 15 ft·lb)

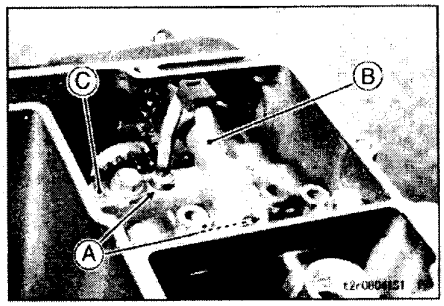
○Finally, install the clamp [B] and washer [C], then tighten the 6 mm bolts evenly along with the clamp.

Torque - 6 mm Bolts [A]: 20 N·m (2.0 kgf·m, 15 ft·lb)



● Apply grease to the O-rings [A] and install the oil pipe [B] into the main bearing cap [C] and lower crankcase bearing housing.

● Install (see Engine Lubrication System Chapter):
Oil Pump along with Pump Bracket
Oil Pan



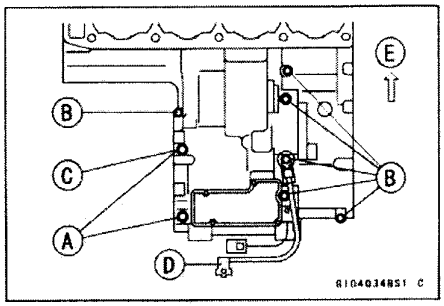
● Turn the crankcase assembly up.

● The 8 mm bolt shown [C] has a copper plated washer. Replace it with a new one

● Tighten the upper crankcase bolts in the order listed.

Torque - 8 mm Bolts: 30 N·m (3.1 kgf·m, 22 ft·lb) [A]
6 mm Bolts: 20 N·m (2.0 kgf·m, 15 ft·lb) [B]

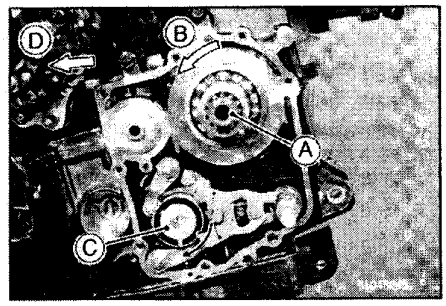
○After engine installation, the engine ground lead [D] will be installed with the bolt.
Front [E]



● After tightening all crankcase bolts, check the following items.

○Check that the drive shaft and output shaft [A] turn freely.

○Check that the positive neutral finder operates properly: while spinning [B] the output shaft fast using an air impact wrench, gears shift smoothly from the 1st, 2nd · · · 6th gear, and 6th, 5th · · · 1st. When the output shaft stays still, the gear can be shifted only to the 1st gear or neutral. It should not be shifted to the 2nd gear or other higher gear positions.
Shift Drum [C]
Front [D]

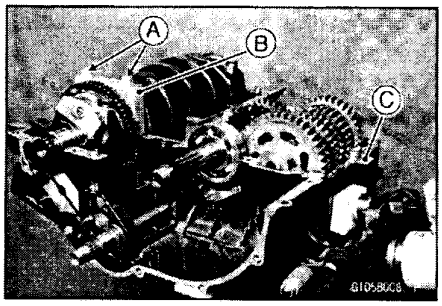


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Crankshaft and Connecting Rods

Crankshaft Removal

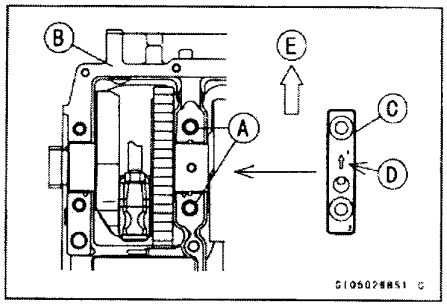
- Split the crankcase (see Crankcase Splitting in this chapter).
- Remove the main bearing cap bolts [A] with flat washers, and take off the cap [B] from the upper crankcase [C].
- Remove the crankshaft.



Crankshaft Installation

CAUTION

If the crankshaft, bearing inserts or crankcase halves are replaced with new ones, select the bearing inserts and check the clearance with a plastigage (press gauge) before assembling engine to be sure the correct bearing inserts are installed.



- Turn the upper crankcase upside down.
- Check that the dowel pins [A] are in the upper crankcase [B].
- Install the main bearing cap [C] with the arrow mark [D] on it pointing forward [E].

○Tighten the main bearing cap bolts along with flat washers.

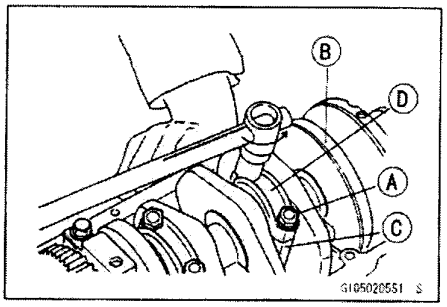
Torque - Main Bearing Cap Bolts: 32 N·m (3.3 kgf·m, 24 ft·lb)

Connecting Rod Removal

- Split the crankcase (see Crankcase Splitting in this chapter).
- Remove the connecting rod nuts [A].
- Remove the crankshaft [B].

NOTE

○*Mark and record the locations of the connecting rods [C] and their big end caps [D] so that they can be reassembled in their original positions.*



- Remove the connecting rods from the crankshaft.

CAUTION

Discard the connecting rod bolts.
To prevent damage to the crankpin surfaces, do not allow the connecting rod bolts bump against the crankpins.

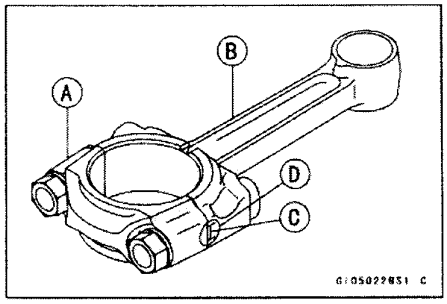
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Crankshaft and Connecting Rods

Connecting Rod Installation

CAUTION

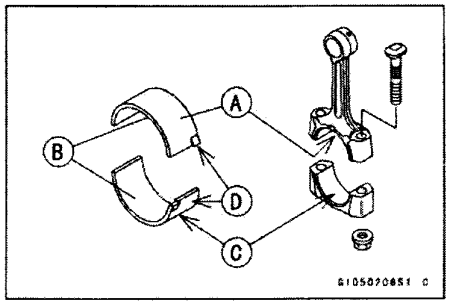
To minimize vibration, a pair of connecting rods (left two rods or right two) should have the same mass mark. The left two rods are a pair and the right two rods are a pair.



Big End Cap [A]
Connecting Rod [B]
Mass Mark (alphabet) [C]
Diameter Mark [D] (around weight mark) : "○" or no mark

CAUTION

If the connecting rods, bearing inserts or crankshaft are replaced with new ones, select the bearing insert and check clearance with a plastigage (press gauge) before assembling engine to be sure the correct bearing inserts are installed.

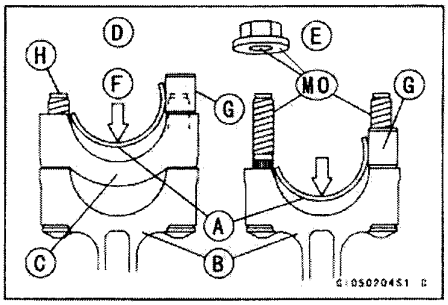


- Apply molybdenum disulfide grease [A] to the outer surface of the upper insert and the inner surface of the connecting rod big end.
- Apply molybdenum disulfide oil [B] to the inner surfaces of upper and lower bearing inserts.

○The molybdenum disulfide oil is a mixture of engine oil and molybdenum disulfide grease with a weight ratio (10:1).
○Do not apply any grease or oil [C] to the cap inside and cap insert outside.
○Install the inserts so that their nails [D] are on the same side and fit them into the recess of the connecting rod and cap.

CAUTION

Wrong application of oil and grease could cause bearing damage.



○When installing the inserts [A], be careful not to damage the insert surface with the edge of the connecting rod [B] or the cap [C]. One way to install inserts is as follows:
Installation [D] to Cap
Installation [E] to Connecting Rod
Push [F]
Spare Dowel Pin [G]
Connecting Rod Bolts [H]

- Install the cap on the connecting rod, aligning the mass and diameter marks.
- Remove debris and clean the surface of inserts.
- Apply molybdenum disulfide oil [MO] to the threads and seating surfaces of the big end nuts and bolts.

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Crankshaft and Connecting Rods

- Install the crankshaft (see this chapter).
- Install each connecting rod on its original crankpin.

○The connecting rod big end is bolted using the "plastic region fastening method".

○This method precisely achieves the needed clamping force without exceeding it unnecessarily, allowing the use of thinner, lighter bolts further decreasing connecting rod mass.

○There are two types of the plastic region fastening. One is a bolt length measurement method and other is a rotation angle method. Observe one of the following two, but the bolt length measurement method is preferable because this is a more reliable way to tighten the big end nuts.

CAUTION

The connecting rod bolts are designed to stretch when tightened. Never reuse the connecting rod bolts. See the table below for correct bolt and nut usage.

CAUTION

Be careful not to overtighten the nuts.
The bolts must be positioned on the seating surface correctly to prevent the bolt heads from hitting the crankcase.

(1) Bolt Length Measurement Method

- Be sure to clean the bolts, nuts, and connecting rods thoroughly with a high-flash point solvent, because the new connecting rods, bolts, and nuts are treated with an anti-rust solution.

⚠ WARNING

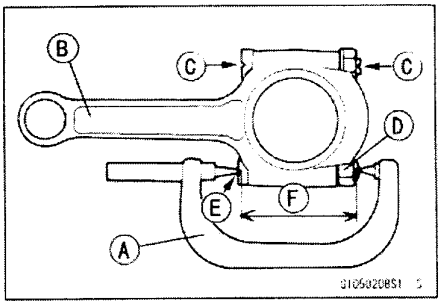
Clean the bolts, nuts, and connecting rods in a well -ventilated area, and take care that there is no spark or flame anywhere near the working area. This includes any appliance with a pilot light. Because of the danger of highly flammable liquids, do not use gasoline or low-flash point solvents to clean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

CAUTION

Immediately dry the bolts and nuts with compressed air after cleaning.
Clean and dry the bolts and nuts completely.

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Crankshaft and Connecting Rods



- Install new bolts in reused connecting rods.
- Dent both bolt head and bolt tip with a punch as shown.
- Before tightening, use a point micrometer [A] to measure the length of new connecting rod bolts and record the values to find the bolt stretch.
  Connecting Rod [B]
  Mark here with a punch [C].
  Nuts [D]
  Fit micrometer pins into punch marks [E].
- Apply a small amount of molybdenum disulfide oil to the following:
  Threads of Nuts and Bolts
  Seating Surfaces of Nuts and Con-rods
- Tighten the big end nuts until the bolt elongation reaches the length specified in the table.
- Check the length [F] of the connecting rod bolts.

★If the stretch is more than the usable range, the bolt has stretched too much. An overelongated bolt may break in use.

Bolt Length after tightening − Bolt Length before tightening = Bolt Stretch

Connecting Rod Assy	Bolt	Nut	Usable Range of Connecting Rod Bolt Stretch
New	Use the bolts attached to new con-rod	Attached to new con-rod	0.22 ~ 0.30 mm (0.0087 ~ 0.0118 in.)
		New	
Used	Replace the bolts with new ones.	Used	0.22 ~ 0.30 mm (0.0087 ~ 0.0118 in.)
		New	

(2) Rotation Angle Method

★If you don't have a point micrometer, you may tighten the nuts using the "Rotation Angle Method".

- Be sure to clean the bolts and nuts thoroughly with a high -flash point solvent, because the new bolts and nuts are treated with an anti-rust solution.

⚠ WARNING

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

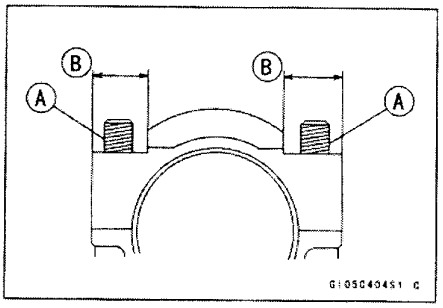
CAUTION

Immediately dry the bolts and nuts with compressed air after cleaning.
Clean and dry the bolts and nuts completely.

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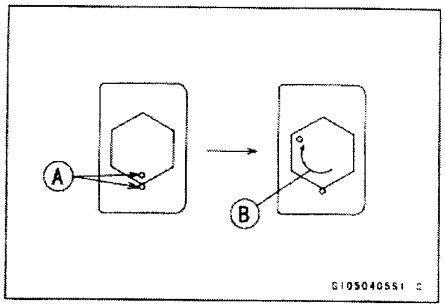
Crankshaft and Connecting Rods

- Install new bolts in reused connecting rods.
- Apply a small amount of molybdenum disulfide oil to the following:
  Threads [A] of Nuts and Bolts
  Seating Surfaces [B] of Nuts and Con-rods



- First, tighten the nuts to the specified torque. See the table below.
- Next, tighten the nuts **120° ±5°**.

○Mark [A] the connecting rod big end caps and nuts so that nuts can be turned 120° [B] properly.
○Tighten the hexagon nut by 2 corners.



Connecting Rod Assy	Bolt	Nut	Torque + Angle N·m (kgf·m, ft·lb)
New	Use the bolts attached to new con-rod	Attached to new con-rod	ALL 15 ±1 (1.5 ±0.1, 11 ±0.7) + 120° ±5°
		New	
Used	Replace the bolts with new ones.	Used	
		New	

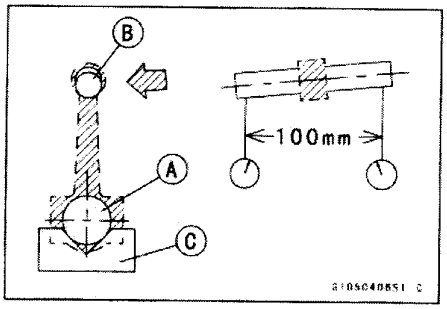
Crankshaft, Connecting Rod Cleaning

- After removing the connecting rods from the crankshaft, clean them with a high-flash point solvent.
- Blow the crankshaft oil passages with compressed air to remove any foreign particles or residue that may have accumulated in the passages.

Connecting Rod Bend

- Remove the connecting rod big end bearing inserts, and reinstall the connecting rod big end cap.
- Select an arbor [A] of the same diameter as the connecting rod big end, and insert the arbor through the connecting rod big end.
- Select an arbor of the same diameter as the piston pin and more than 105 mm (4.13 in.) long, and insert the arbor [B] through the connecting rod small end.
- On a surface plate, set the big-end arbor on V blocks [C].
- With the connecting rod held vertically, use a height gauge to measure the difference in the height of the arbor above the surface plate over a 100 mm (3.94 in.) length to determine the amount of connecting rod bend.

★If connecting rod bend exceeds the service limit, the connecting rod must be replaced.



Connecting Rod Bend
Service Limit: TIR 0.2/100 mm (0.08/3.94 in.)

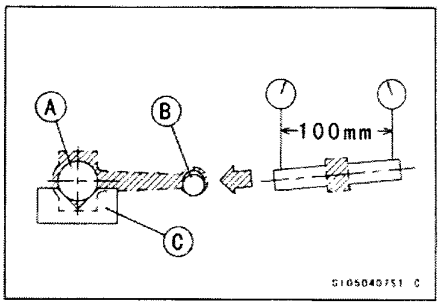
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Crankshaft and Connecting Rods

Connecting Rod Twist

● With the big-end arbor [A] still on V blocks [C], hold the connecting rod horizontally and measure the amount that the arbor [B] varies from being parallel with the surface plate over a 100 mm (3.94 in.) length of the arbor to determine the amount of connecting rod twist.

★If connecting rod twist exceeds the service limit, the connecting rod must be replaced.

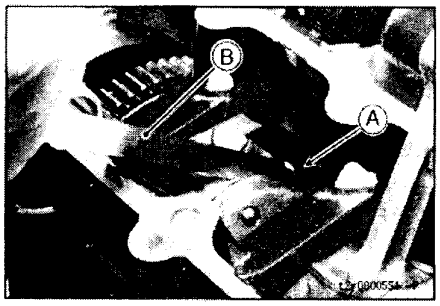


Connecting Rod Twist
Service Limit: TIR 0.2/100 mm (0.08/3.94 in.)

Connecting Rod Big End Side Clearance

● Measure connecting rod big end side clearance [A].

○Insert a thickness gauge [B] between the big end and either crank web to determine clearance.



Connecting Rod Big End Side Clearance
Standard: 0.13 ~ 0.38 mm (0.0051 ~ 0.0150 in.)
Service Limit: 0.58 mm (0.023 in.)

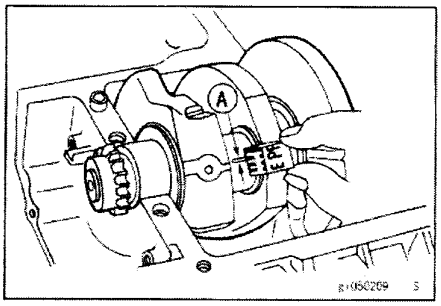
★If the clearance exceeds the service limit, replace the connecting rod with new one and then check the clearance again. If the clearance is too large after connecting rod replacement, the crankshaft also must be replaced.

Connecting Rod Big End Bearing Wear

● Measure the bearing insert/crankpin clearance with a plastigage [A].

○Tighten the big end nuts to the specified torque.

○Do not move the connecting rod and crankshaft during clearance measurement.

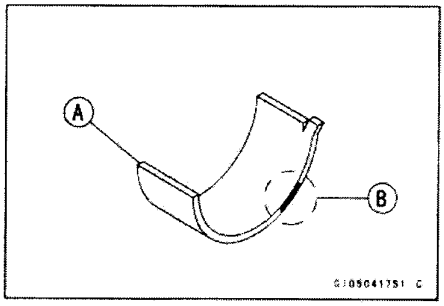


CAUTION
After measurement, replace the connecting rod bolts.

Connecting Rod Big End Bearing Insert/Crankpin Clearance
Standard: 0.042 ~ 0.070 mm (0.00165 ~ 0.00275 in.)
Service Limit: 0.11 mm (0.0043 in.)

★If the clearance is within the standard, no bearing replacement is required.

★If the clearance is between 0.071 mm (0.00279 in.) and the service limit (0.11 mm, 0.0043 in.), replace the bearing inserts [A] with inserts painted white [B]. Check insert/crankpin clearance with a plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.



★If the clearance exceeds the service limit, measure the diameter of the crankpins.

Crankpin Diameter
Standard: 35.984 ~ 36.000 mm (1.41669 ~ 1.41732 in.)
Service Limit: 35.97 mm (1.4161 in.)

★If any crankpin has worn past the service limit, replace the crankshaft with a new one.

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Crankshaft and Connecting Rods

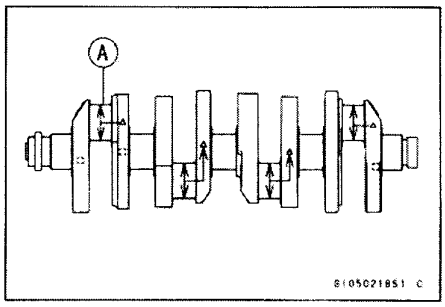
★If the measured crankpin diameters [A] are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

Crankpin Diameter Marks

None: 35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)

○: 35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)

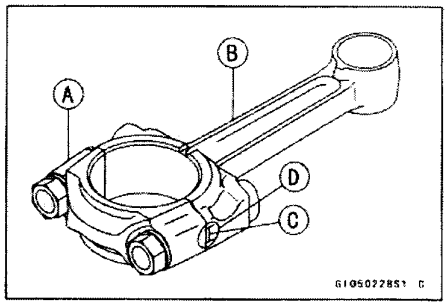
Δ: Crankpin Diameter Marks: "○" mark or no mark.



- Measure the connecting rod big end inside diameter, and mark each connecting rod big end in accordance with the inside diameter.
  Big End Cap [A]
  Connecting Rod [B]
  Mass Mark [C]: alphabet
  Diameter Mark (around mass mark) [D]:"○"or no mark

○Tighten the connecting rod big end nuts to the specified torque (see Connecting Rod Installation).

○The mark already on the big end should almost coincide with the measurement.

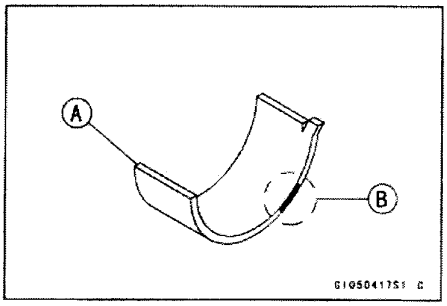


Connecting Rod Big End Inside Diameter

None: 39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)

○: 39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)

- Select the proper bearing insert [A] identified by the size color [B] in accordance with the combination of the connecting rod and crankshaft coding.
- Install the new inserts in the connecting rod and check insert/crankpin clearance with the plastigage.



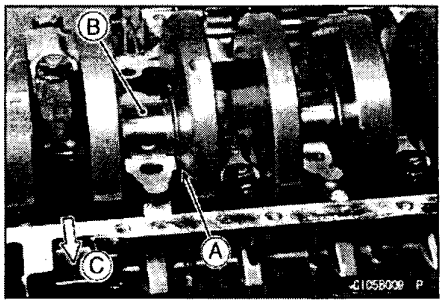
Big End Bearing Insert Selection

Con-rod Big End Inside Diameter Marking	Crankpin Diameter Marking	Bearing Inserts	
		Size Color	Part Number
None	○	Black	92028-1679
None	None	Blue	92028-1680
○	○		
○	None	White	92028-1681

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Crankshaft and Connecting Rods

Crankshaft Side Clearance



- Insert a thickness gauge [A] between the upper crankcase main bearing and the crank web at the No.2 journal [B] to determine clearance.
  Front [C]

★If the clearance exceeds the service limit, replace the crankcase halves and main bearing cap as a set.

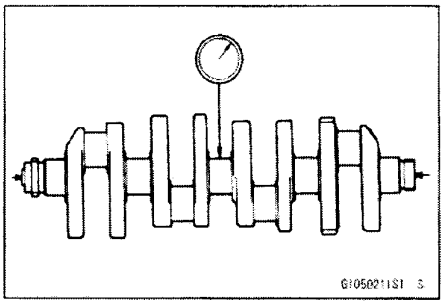
NOTE

○*The upper crankcase half, lower crankcase half, and main bearing cap are machined at the factory in the assembled state, so they must be replaced as a set.*

Crankshaft Side Clearance

Standard:	**0.05 – 0.20 mm (0.0020 – 0.0079 in.)**
Service Limit:	**0.40 mm (0.0158 in.)**

Crankshaft Runout



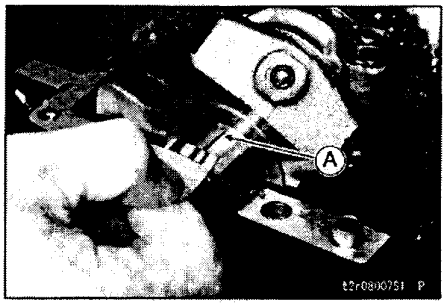
- Measure the crankshaft runout.

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

Crankshaft Runout

Standard:	**TIR 0.02 mm (0.0008 in.) or less**
Service Limit:	**TIR 0.05 mm (0.0020 in.)**

Crankshaft Main Bearing Wear



- Using a plastigage (press gauge) [A], measure the bearing insert/journal clearance.

NOTE

○*Tighten the crankcase bolts and main bearing cap bolts to the specified torque (see Crankcase Assembly in this chapter).*

○*Do not turn the crankshaft during clearance measurement.*

○*Journal clearance less than 0.025 mm (0.00098 in.) can not be measured by plastigage, however, using genuine parts maintain the minimum standard clearance.*

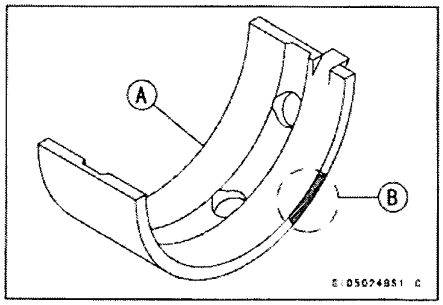
Crankshaft Main Bearing Insert/Journal Clearance

Standard:	**0.020 – 0.044 mm (0.00079 – 0.00173 in.)**
Service Limit:	**0.08 mm (0.0032 in.)**

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Crankshaft and Connecting Rods

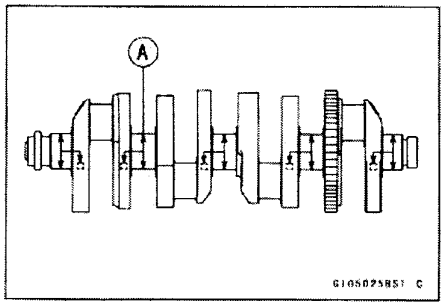
★If the clearance is within the standard, no bearing replacement is required.
★If the clearance is between 0.045 mm (0.00177 in.) and the service limit (0.08 mm, 0.0032 in.), replace the bearing inserts [A] with inserts painted blue [B]. Check the insert/journal clearance with the plastigage. The clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid bearing seizure.
★If the clearance exceeds the service limit, measure the diameter of the crankshaft main journal.



Crankshaft Main Journal Diameter

Standard:	**35.984 ~ 36.000 mm (1.4669 ~ 1.41732 in.)**
Service Limit:	**35.96 mm (1.4158 in.)**

★If any journal has worn past the service limit, replace the crankshaft with a new one.
★If the measured journal diameters [A] are not less than the service limit, but do not coincide with the original diameter markings on the crankshaft, make new marks on it.

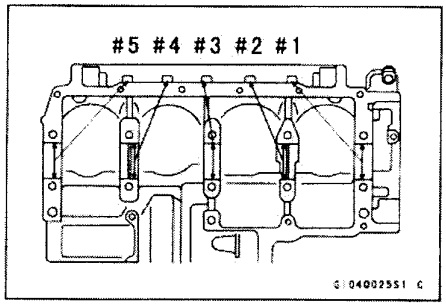


Crankshaft Main Journal Diameter Marks

None:	**35.984 ~ 35.992 mm (1.41669 ~ 1.41701 in.)**
1:	**35.993 ~ 36.000 mm (1.41704 ~ 1.41732 in.)**

□: Crankshaft Main Journal Diameter Marks, "1" mark or no mark

● Measure the main bearing bore diameter, and mark the upper crankcase half in accordance with the bore diameter.
Bore Diameter Mark: "○" or no mark



NOTE

○ *Tighten the crankcase bolts and main bearing cap bolts to the specified torque (see Crankcase Assembly in this chapter).*
○ *The mark already on the upper crankcase half should almost coincide with the measurement.*

Crankcase Main Bearing Bore Diameter

○:	**39.000 ~ 39.008 mm (1.53543 ~ 1.53574 in.)**
None:	**39.009 ~ 39.016 mm (1.53578 ~ 1.53606 in.)**

● Select the proper bearing insert in accordance with the combination of the crankcase and crankshaft coding.
● Install the new inserts in the crankcase halves and cap and check insert/journal clearance with a plastigage.

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Crankshaft and Connecting Rods

Crankcase Main Bearing Bore Diameter Marking	Crankshaft Main Journal Diameter Marking	Bearing Inserts*		
		Size Color	Part Number	Journal Nos.
○	1	Brown	92139-1070	1, 3, 5
			92139-1073	2, 4
None	1	Black	92139-1069	1, 3, 5
○	None		92139-1072	2, 4
None	None	Blue	92139-1068	1, 3, 5
			92139-1071	2, 4

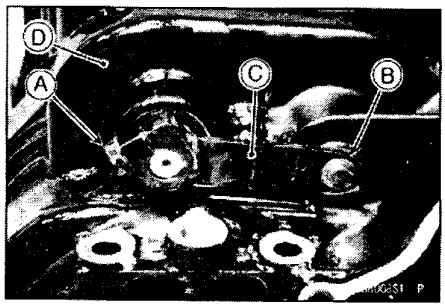
*The bearing inserts for Nos. 2 and 4 journals have an oil groove, respectively.

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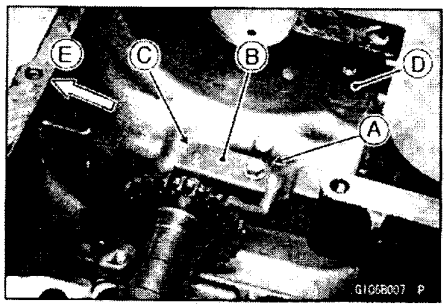
Balancer

Balancer Removal

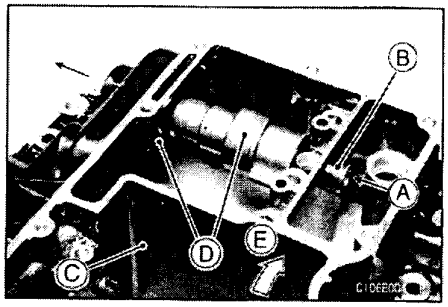
- Split the crankcase (see this chapter).
- Turn the lower crankcase upside down and remove the oil pan.
- Unscrew the balancer shaft clamp bolt [A], and balancer lever bolt [B], and pull off the balancer lever [C] from the lower crankcase half [D].



- Turn the lower crankcase up.
- Unscrew the balancer shaft plate bolt [A], and take off the plate [B] and guide pin [C] from the upper side of the lower crankcase [D].
  Front [E]



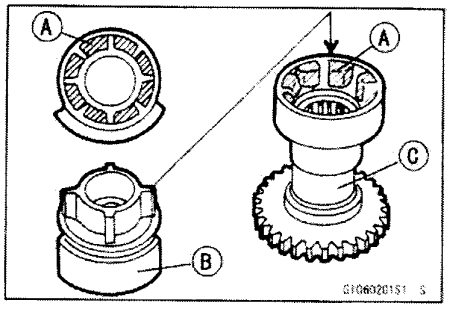
- Turn the lower crankcase upside down.
- Push [A] the balancer shaft [B] with the oil seal attached out of the lower crankcase [C]. The balancer mass and balancer gear [D] come off from the balancer shaft.
  Front [E]



Balancer Installation

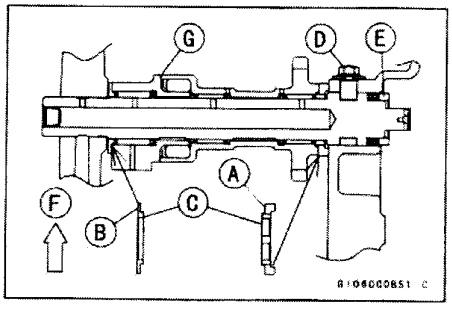
- Apply molybdenum disulfide oil to the needle bearings.
- Be sure to install all the needle bearings into the balancer gear and balancer mass.
- Check that the rubber dampers [A] are in place as shown.
- Install the balancer mass [B] into the balancer gear [C].

○Be sure to fit each vane between the dampers.



- Fit the steel washer [A] on the gear side and the copper washer [B] on the mass side. Each projected side [C] faces inward.
- Put [G] the balancer mass and gear assembly closely.
- Install the balancer shaft plate and guide pin on the lower crankcase.
- Apply a non-permanent locking agent to the threads of the plate bolt [D], and tighten it.
  Spacer [E]
  Front [F]

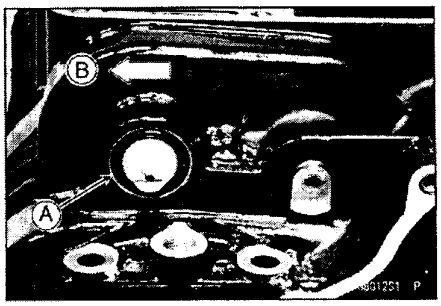
Torque - Balancer Shaft Plate Bolt: 11 N·m (1.1 kgf·m, 97 in·lb)



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Balancer

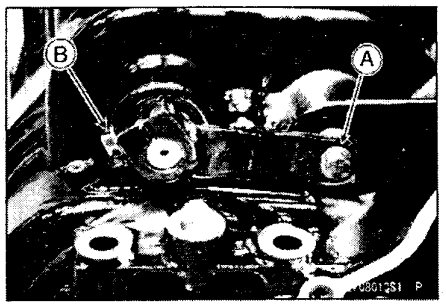
● Turn the balancer shaft, so the punch mark [A] is faced forwards [B].
● Install the spacer (see above figure.) and then install the balancer lever.



● Apply a non-permanent locking agent to the threads of the balancer lever bolt [A] and tighten it.

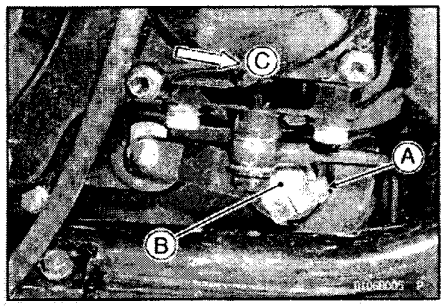
Torque - Balancer Lever Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)

● Tighten the balancer shaft clamp bolt [B] temporarily.



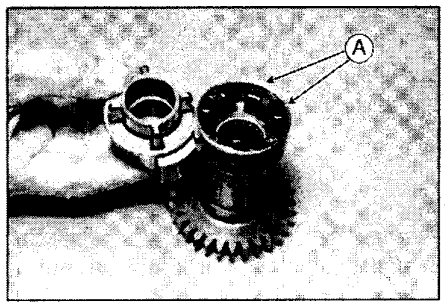
● Assemble the engine and install it in the frame (see Engine Removal/Installation).
● Adjust the balancer gear backlash with the engine idling. The backlash can be changed by turning the balancer shaft which has eccentric journals.
○Start the engine and let it idle.
○Loosen the clamp bolt [A] and turn the balancer shaft [B] counterclockwise until the balancer gear makes a noise.
○Turn the shaft clockwise until the balancer gear noise lowers the most, and tighten the clamp bolt.
Front [C]

Torque - Balancer Shaft Clamp Bolt: 11 N·m (1.1 kgf·m, 97 in·lb)



Balancer Damper Inspection

● Remove the balancer shaft and take out the balancer gear and mass.
● Visually inspect the rubber dampers [A].
★If they appear damaged or deteriorated, replace the dampers.



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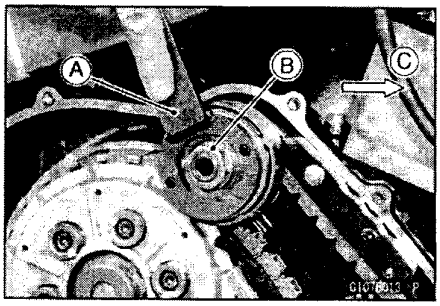
Alternator Shaft, Starter Motor Clutch

Alternator Chain and Tensioner Removal

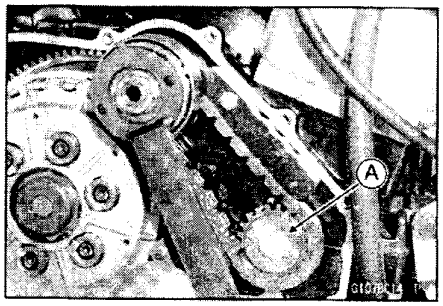
- Remove the clutch cover (see Clutch chapter).
- Holding the right alternator coupling with the coupling holder [A], loosen the alternator shaft nut [B] on the left side.

  Front [C]

  Special Tool - Coupling Holder: 57001-1189



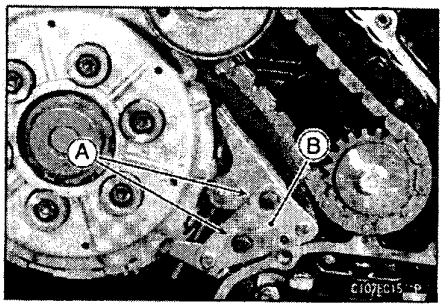
- While holding the right alternator coupling with the coupling holder, loosen the alternator sprocket bolt [A] of the crankshaft.



- Remove:

  Alternator Chain Tensioner Bolts [A]

  Alternator Chain Tensioner [B]



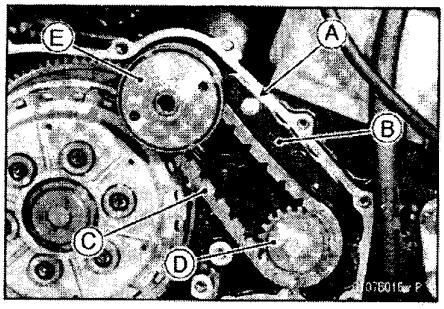
- Remove:

  Alternator Chain Guide Bolt [A]

  Alternator Chain Guide [B]

  Alternator Chain Sprocket Bolt

  Alternator Shaft Nut
- Pull off the alternator chain [C], sprocket [D], and right coupling [E] as a set.



Alternator Chain and Tensioner Installation

- Tighten the alternator shaft nut and alternator chain sprocket bolt.

  Special Tool - Coupling Holder: 57001-1189

  Non-permanent Locking Agent -
  Alternator Chain Guide Bolt

  Torque - Alternator Shaft Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)
  Alternator Chain Sprocket Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)
  Alternator Chain Guide Bolt: 11 N·m (1.1 kgf·m, 97 in·lb)

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Alternator Shaft, Starter Motor Clutch

● To install the alternator chain tensioner, lock the tensioner as follows:

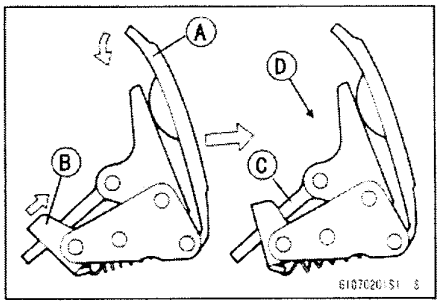
○Push the tensioner guide [A] and the rod stop lover [B] all the way down so that the stop lever keeps the rod [C] from returning.

Lock Position [D]

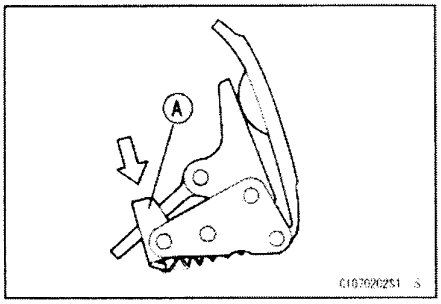
● Install the chain tensioner.

Non-permanent Locking Agent -
Alternator Chain Tensioner Bolts

Torque - Alternator Chain Tensioner Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)



● Free the tensioner by tapping the rod stop lever [A] lightly with a screwdriver.



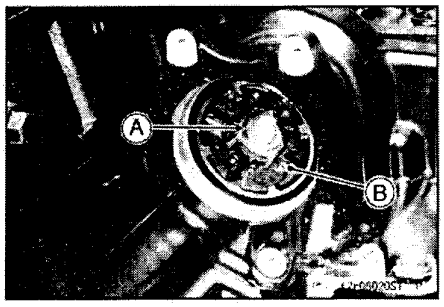
Alternator Shaft Removal

● Remove the alternator chain (see this section).

● Remove the alternator (see Electrical System chapter).

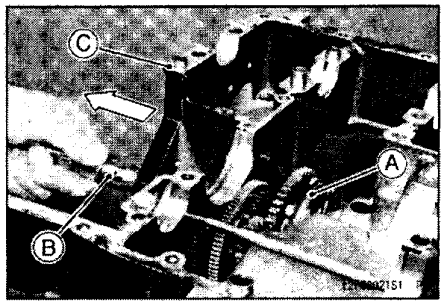
● Holding the right alternator coupling with the coupling holder (special tool), remove the alternator shaft bolt [A] and left coupling [B].

Special Tool - Coupling Holder: 57001–1189



● Split the crankcase (see this chapter) and remove the crankshaft from the upper crankcase.

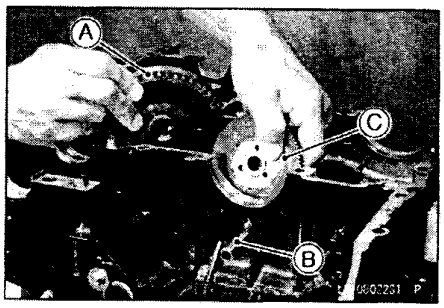
● Holding the starter motor clutch [A], pull the alternator shaft [B] off the upper crankcase [C].



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Alternator Shaft, Starter Motor Clutch

● Remove:
Starter Motor Clutch [A]
Idle Gear Shaft [B] and Starter Motor Idle Gear [C]



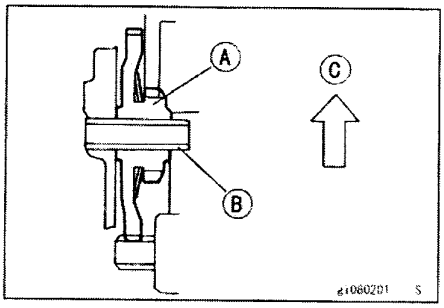
Alternator Shaft Installation

● Install the starter motor idle gear [A] as shown.

Molybdenum Disulfide Grease -
Idle Gear Shaft [B]

Front [C]

Molybdenum Disulfide Oil -
Right Needle Bearing of Alternator Shaft and Inside of Right Alternator Chain Sprocket



● Tighten the alternator shaft bolt.

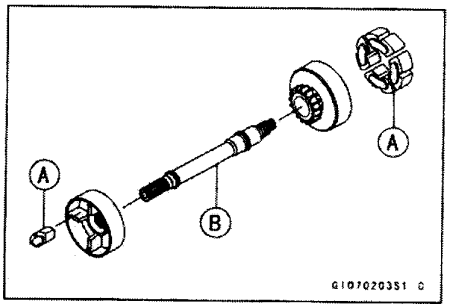
Special Tool - Coupling Holder: 57001–1189

Torque - Alternator Shaft Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

Coupling Damper Inspection

● Visually inspect the rubber dampers [A] in the couplings at both ends of the alternator shaft [B].

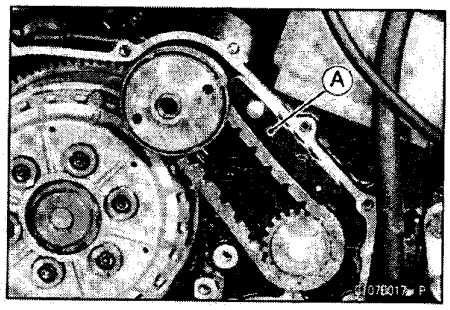
★If they appear damaged or deteriorated, replace the dampers.



Alternator Chain Guide Wear

● Visually inspect the rubber [A] on the guide.

★If the rubber is cut or damaged in any way, replace the guide.



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Alternator Shaft, Starter Motor Clutch

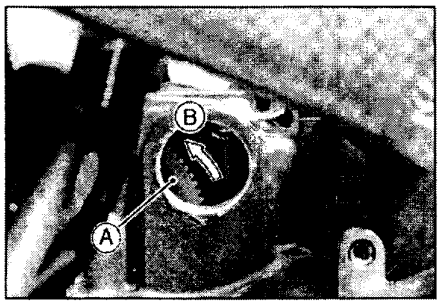
Starter Motor Clutch Inspection

- Remove the starter motor (see Electrical System chapter).
- Turn the starter motor idle gear [A] by hand. When viewed from the left side of the engine, the idle gear should turn counterclockwise freely [B], but should not turn clockwise (left side view).

★If the starter motor clutch does not operate as it should or if it makes noise, go to the next step.

- Remove and disassemble the starter motor clutch (see this section), and visually inspect the clutch parts.
- If there is any worn or damaged part, replace it.

○Examine the starter motor clutch gear as well. Replace the clutch gear if it is worn or damaged.

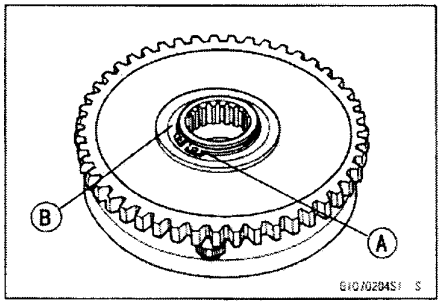


Starter Motor Clutch Disassembly

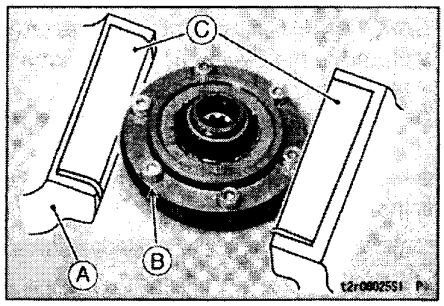
- Remove the starter motor clutch (see Alternator Shaft Removal in this section).
- Remove the circlip [A] and flat washer [B].

Special Tool - Outside Circlip Pliers: 57001-144

- Pull the starter motor clutch gear and take off the needle bearing and flat washer.



- Holding the starter motor clutch assembly in a vise [A], remove the starter motor clutch bolts [B] and take off the one-way clutch. Use rubber or aluminum plates [C] to prevent damage to the clutch assembly.

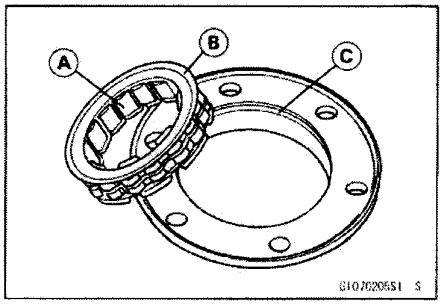


Starter Motor Clutch Assembly

- Be sure to install the one-way clutch [A] so that its flange [B] fits in the holder recess [C].
- Apply a non-permanent locking agent to the threads of the starter motor clutch bolts, and tighten them.

Torque - Starter Motor Clutch Bolts: 12 N·m (1.2 kgf-m, 106 in-lb)

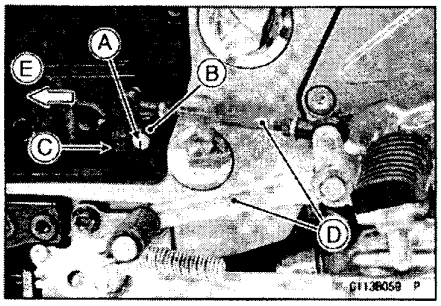
Special Tool - Outside Circlip Pliers: 57001-144



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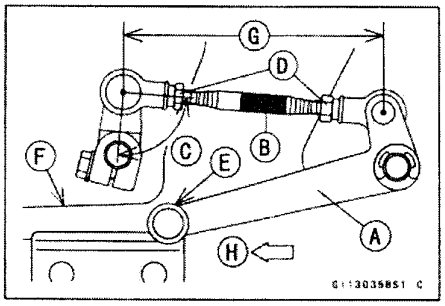
Transmission

Shift Pedal Removal



- Mark [A] the position of the shift lever [B] on the shift shaft so that it can be installed later in the same position
- Unscrew the bolt [C] and free the shift lever assembly [D].
  Front [E]

Shift Pedal Installation

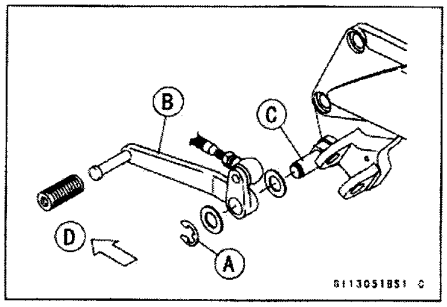


- Install the shift lever, aligning the mark (previously marked). The shift lever tilts up slightly.
- Install the shift pedal [A] so that the shift rod [B] is at a right angle (90°) [C] to the shift lever.
- Loosen the front locknut (left-hand threads) and rear rod locknut [D].
- Turn the rod to adjust the pedal position, so the top of the pedal pad [E] almost aligns with the extension of the upper line [F] of the frame.

○To get this position, adjust the pivot length [G] to about 114 mm (4.49 in.).

- Tighten the locknuts securely.
  Front [H]

Shift Lever Disassembly/Assembly

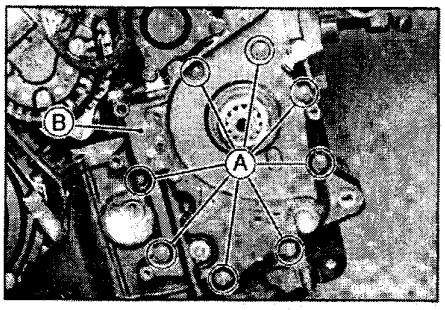


- Remove the circlip [A] and remove the shift lever assembly [B].
- Apply grease to the pin [C] of the frame.
  Front [D]
- Install the shift lever assembly onto the pin.
- Install the new circlip.

External Shift Mechanism Removal

NOTE

○*Remove the engine for removal of the external shift mechanism.*

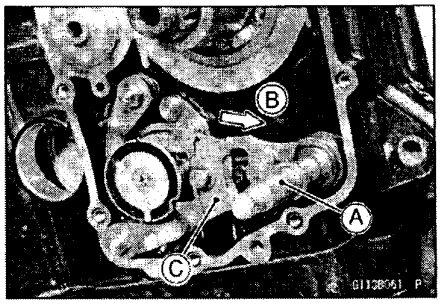


- Remove the engine (see Engine Removal/Installation chapter).
- Remove the water pump (see Cooling System chapter).
- Place an oil pan beneath the external shift mechanism cover.
- Remove the eight cover bolts [A].
- Remove the external shift mechanism cover [B].

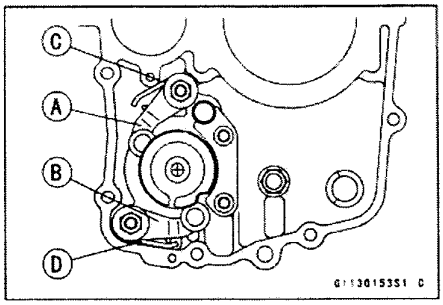
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Transmission

● Remove the shift shaft [A], while pushing [B] the shift mechanism arm [C] toward the shaft.



● Remove:
Neutral Set Lever [A]
Gear Set Lever [B]
Return Spring [C]
Return Spring [D]

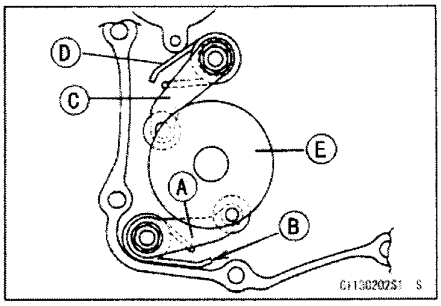


External Shift Mechanism Installation

○The gear set lever [A] has a white mark and its return spring [B] has a yellow mark.
○The neutral set lever [C] has no mark and its return spring [D] has a green mark.
○Be careful not to mix up these springs and levers.
Shift Drum [E]

● Turn these set levers clockwise and check that they move smoothly and return quickly by spring force.

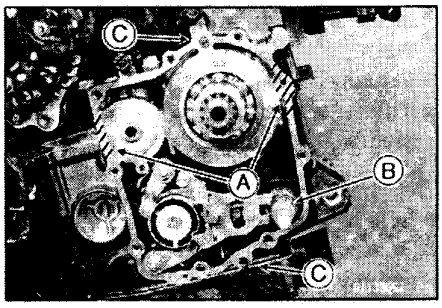
Torque - Gear Set Lever Nut, Neutral Set Lever Nut: 11 N·m (1.1 kgf·m, 97 in·lb)



● Apply silicone sealant [A] to the crankcase halves mating surface on the front and rear sides of the external shift mechanism cover mount.

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

● Be sure to install the washer [B].
● Make sure that dowel pins [C] are in place.

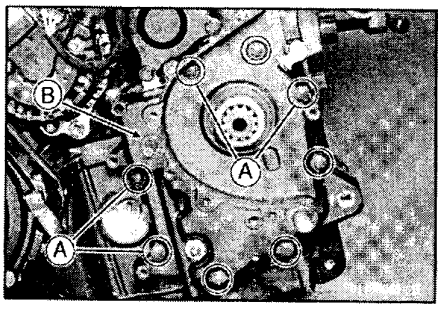


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Transmission

- Replace the cover gasket with a new one.
- Apply high temperature grease to the lips of three cover oil seals.
- Install the cover and tighten the cover bolts.
- Apply a non-permanent locking agent to the four cover bolts [A] shown.

Torque - External Shift Mechanism Cover Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)

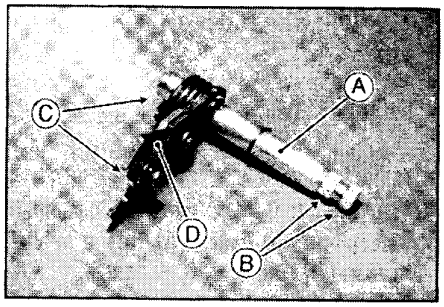


- Apply molybdenum disulfide grease to either end of the clutch push rod [B] and install it with the greased end going first.
- Install the water pump (see Cooling System chapter)
- Install the engine (see Engine Removal/Installation).
- Adjust the shift pedal position (see this chapter).

External Shift Mechanism Inspection

- Remove the external shift mechanism cover (see this chapter).
- Examine the shift shaft [A] for any damage.

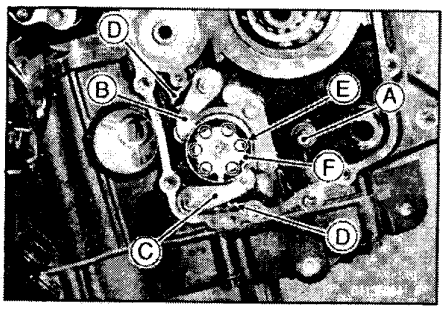
★If the shaft is bent, straighten or replace it.
★If the serrations [B] are damaged, replace the shaft.
★If the springs [C] are damaged in any way, replace them.
★If the shift mechanism arm [D] is damaged in any way, replace the arm.



- Check that the return spring pin [A] is not loose.

★If it is loose, unscrew it, apply a non-permanent locking agent to the threads, and tighten it.

Torque - Shift Shaft Return Spring Pin: 30 N·m (3.1 kgf·m, 22 ft·lb)



- Check the neutral set lever [B], the gear set lever [C], and their springs [D] for breaks or distortion.

★If the levers or springs are damaged in any way, replace them.

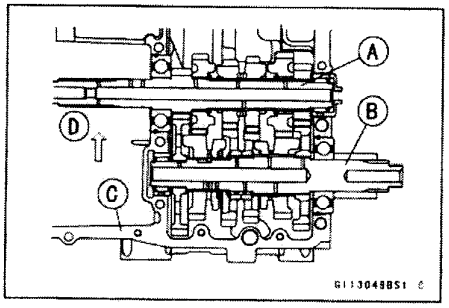
- Visually inspect the shift drum pins [E], and pin holder [F].

★If they are badly worn or if they show any damage, replace them.

Transmission Shaft Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the drive shaft assembly [A] and output shaft assembly [B] from the upper crankcase [C].

Front [D]

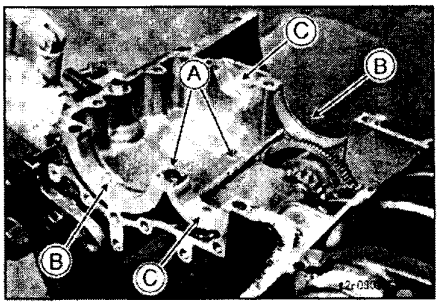


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Transmission

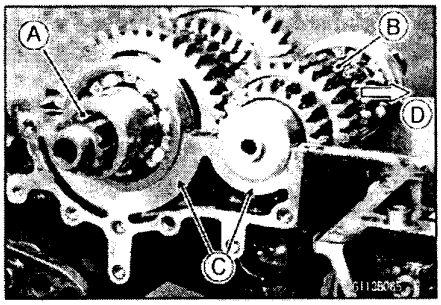
Transmission Shaft Installation

- Blow the oil passages [A] clean with compressed air.
- Check to see that the set rings [B] and set pins [C] are in place in the transmission bearing housings.



- Install the output shaft [A] and drive shaft [B] assemblies into the upper crankcase half.
- Apply molybdenum disulfide oil to the sliding surfaces of the gears and bearings.

○The bearing set pins and rings must match properly with the holes or grooves in the bearing outer races. When they are properly matched, there is no clearance between the crankcase and the bearing outer races [C].
Front [D]



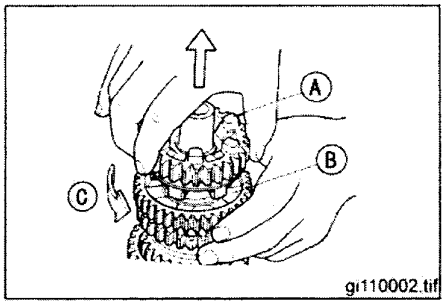
Transmission Shaft Disassembly

- Remove the transmission shafts.
- Remove the circlips and disassemble the transmission shafts.

Special Tool - Outside Circlip Pliers: 57001–144

- The 5th gear [A] on the output shaft has three steel balls assembled into it for the positive neutral finder mechanism.
- Remove the 5th gear as follows.

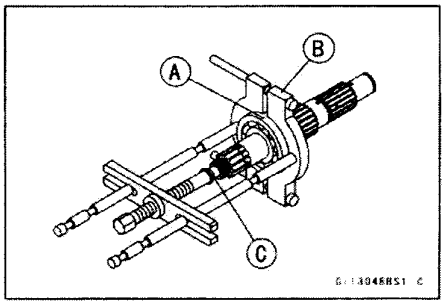
○Set the output shaft in a vertical position holding the 3rd gear [B].
○Spin [C] the 5th gear quickly and pull it off upward.



- Remove the ball bearing [A] from each shaft.

Special Tools - Bearing Puller: 57001–135 [B]
Bearing Puller Adapter: 57001–317 [C]

- Discard the bearing.



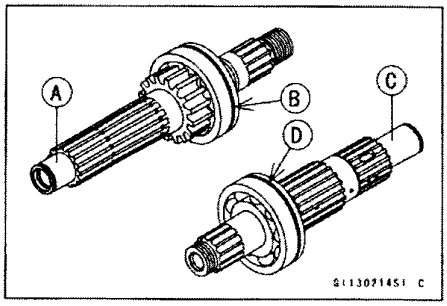
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Transmission

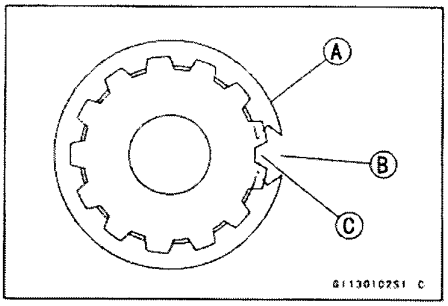
Transmission Shaft Assembly

- Install the ball bearing on the drive shaft [A] with the groove [B] toward the clutch side (right side) using the steering stem bearing driver (special tool).
- Install the ball bearing on the output shaft [C] with the groove [D] away from the engine sprocket side.

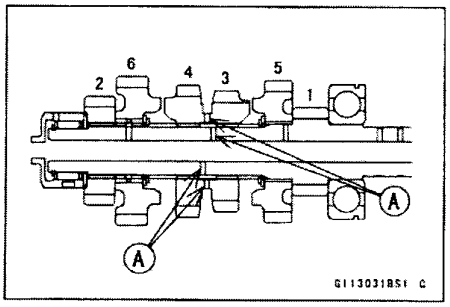
Special Tool - Steering Stem Bearing Driver: 57001–137



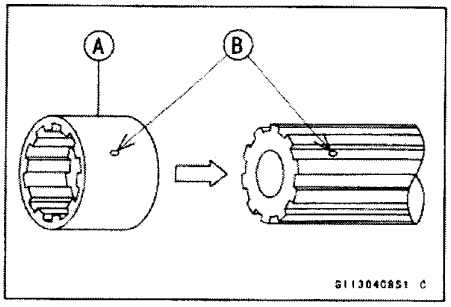
- Replace any circlips removed with new ones.
- Install the circlips [A] so that the opening [B] is aligned with a spline groove [C].



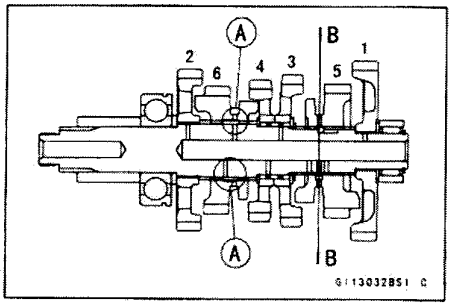
- The drive shaft gears can be recognized by size: the gear with the smallest diameter is 1st gear, and the largest one is 6th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- While aligning either pair of holes [A], install the 3rd/4th gear onto the drive shaft.



- Apply molybdenum disulfide oil to the gear-sliding surfaces on the shafts.
- Install the 6th gear bushing [A] onto the drive shaft with their holes [B] aligned.



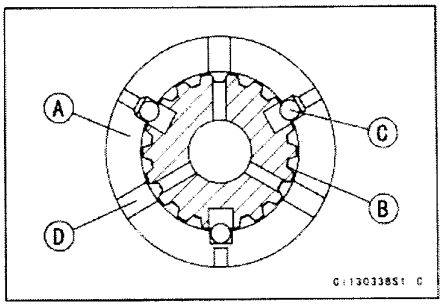
- The output shaft gears can be recognized by size: the gear with the largest diameter is 1st gear, and the smallest one is 6th gear. Be sure that all parts are put back in the correct sequence and all circlips and washers are properly in place.
- While aligning either pair of holes [A], install the 6th gear onto the output shaft.



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Transmission

● Fit the steel balls into the 5th gear holes in the output shaft, aligning three oil holes [D] (see Section BB in the output shaft illustration).
5th Gear [A], Output Shaft [B], and Steel Balls [C]



CAUTION

Do not apply grease to the balls to hold them in place. This will cause the positive neutral finder mechanism to malfunction.

○After assembling the 5th gear with steel balls in place on the output shaft, check the ball-locking effect that the 5th gear doesn't come out of the output shaft when moving it up and down by hand.

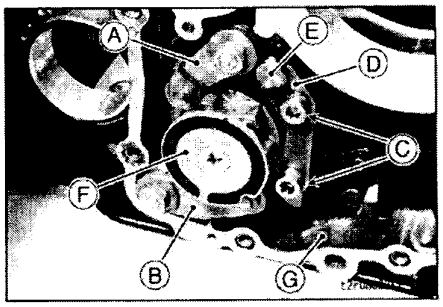
● Check that each gear spins or slides freely on the transmission shafts without binding after assembly.

Shift Drum and Fork Removal

● Remove:
Lower Crankcase Half (see Crankcase Splitting in this chapter)
Neutral Set Lever [A] and Gear Set Lever [B]
Bolts [C] and Shift Drum Bearing Holder [D]

● Pull out the shift rod [E], and take off the shift forks.

● Pull out the shift drum [F] from the upper crankcase [G].

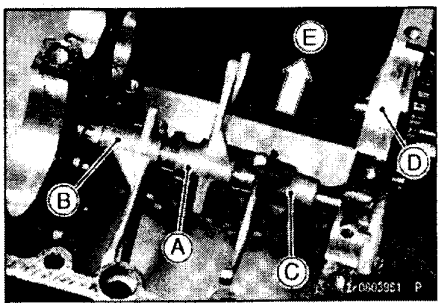


Shift Drum and Fork Installation

● Apply a non-permanent locking agent to the shift drum bearing holder bolts, and tighten them.

Torque - Shift Drum Bearing Holder Bolts: 13 N·m (1.3 kgf·m, 120 in·lb)

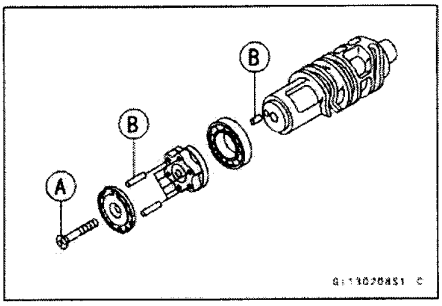
○The shift forks can be identified by their shape. Install them noting the direction shown.
Drive Shaft Fork marked with "96" [A]
Output Shaft Fork marked with "97" [B]
Output Shaft Fork marked with "98" [C]
Upper Crankcase [D]
Front [E]



Shift Drum Disassembly

● Remove the shift drum (see Shift Drum and Fork Removal).

● While holding the shift drum with aluminum plates and a vise, remove the shift drum cam screw.
Shift Drum Cam Screw [A]
Shift Drum Pins (Dowel Pins) [B]



Shift Drum Assembly

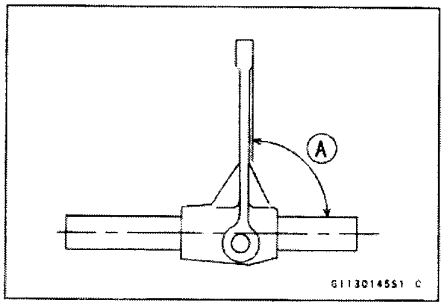
● Be sure to install the dowel pins.

● Apply a non-permanent locking agent to the threads of the shift drum cam screw, and tighten it.

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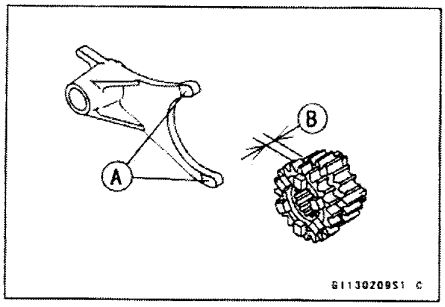
Transmission

Shift Fork Bending



- Visually inspect the shift forks, and replace any fork that is bent. A bent fork could cause difficulty in shifting or allow the transmission to jump out of gear under power.
  90° [A]

Shift Fork/Gear Groove Wear



- Measure the thickness of the shift fork ears [A], and measure the width [B] of the gear grooves.

★If the thickness of a shift fork ear is less than the service limit, the shift fork must be replaced.

Shift Fork Ear Thickness

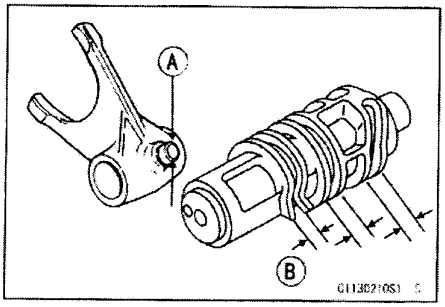
Standard:	**4.9 ~ 5.0 mm (0.193 ~ 0.197 in.)**
Service Limit:	**4.8 mm (0.189 in.)**

★If the gear groove is worn over the service limit, the gear must be replaced.

Gear Groove Width

Standard:	**5.05 ~ 5.15 mm (0.1988 ~ 0.203 in.)**
Service Limit:	**5.25 mm (0.207 in.)**

Shift Fork Guide Pin/Drum Groove Wear



- Measure the diameter of each shift fork guide pin [A], and measure the width [B] of each shift drum groove.

★If the guide pin on any shift fork is less than the service limit, the fork must be replaced.

Shift Fork Guide Pin Diameter

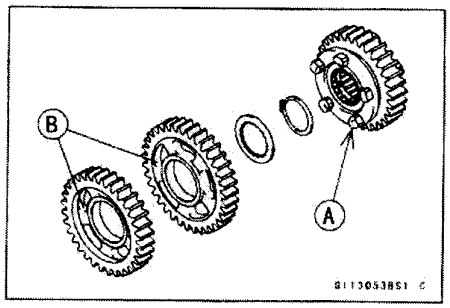
Standard:	**7.9 ~ 8.0 mm (0.311 ~ 0.315 in.)**
Service Limit:	**7.8 mm (0.307 in.)**

★If any shift drum groove is worn over the service limit, the drum must be replaced.

Shift Drum Groove Width

Standard:	**8.05 ~ 8.20 mm (0.317 ~ 0.323 in.)**
Service Limit:	**8.3 mm (0.327 in.)**

Gear Dog and Gear Dog Hole Damage

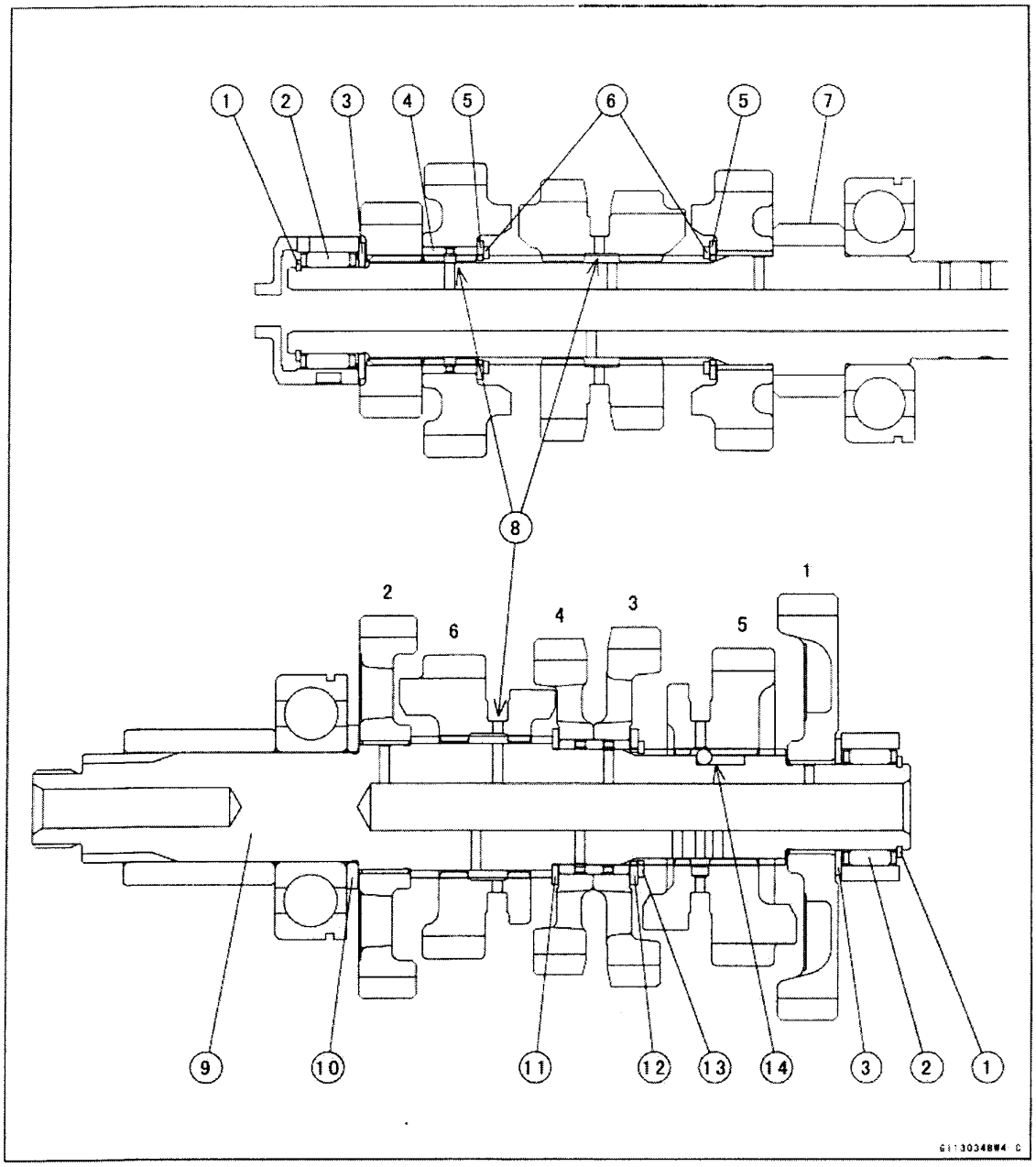


- Visually inspect the gear dogs [A] and gear dog holes [B].

★Replace any damaged gears or gears with their dogs or dog holes worn excessively.

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Transmission



1. Two Circlips, ϕ20 × 25.5 × t 1.2 mm (ϕ0.78 × 1.004 × t 0.047 in.)
2. Two Needle Bearings
3. Two Washers, ϕ22.3 × 35 × t 1.6 mm (ϕ0.878 × 1.38 × t 0.063 in.)
4. Bushing (6th gear)
5. Two Washers, ϕ 28.5 × 35.5 × t 1.5 mm (ϕ1.122 × 1.398 × t 0.059 in.)
6. Circlips, ϕ33 × 25.9 × t 1.5 mm (ϕ1.299 × 1.020 × 0.059 in.)
7. Low Gear (drive shaft)
8. Align the gear or bushing hole (s) with the shaft hole (s).
9. Output Shaft
10. Washer, ϕ28.3 × 42 × t 2.9 mm (ϕ1.114 × 1.65 × t 0.114 in.)
11. Washer, ϕ29.9 × 40 × t 1.5 mm (ϕ1.008 × 1.57 × t 0.059 in.)
12. Washer, ϕ30.3 × 40 × t 1.5 mm (ϕ1.193 × 1.57 × t 0.059 in.)
13. Circlip, ϕ29 (ϕ1.14 in.)
14. Steel Balls

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Ball Bearing, Needle Bearing, and Oil Seal

Ball Bearing Replacement

CAUTION

Do not remove the ball bearings unless it is necessary. Removal may damage them.

● Using a press or puller, remove the ball bearing.

NOTE

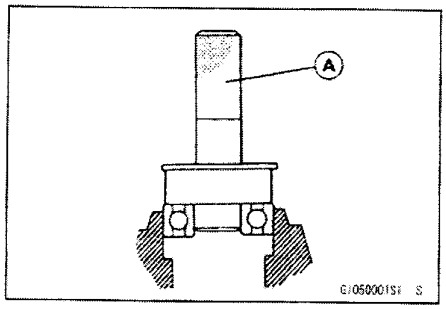
○*In the absence of the above mentioned tools, satisfactory results may be obtained by heating the case with engine oil to approximately 93°C (200°F) max., and tapping the bearing in or out.*

CAUTION

Do not heat the case with a blowtorch. This will warp the case. Soak the case in engine oil and heat the oil.

● Using a press and the bearing driver [A], install the new bearing until it stops at the bottom of its housing.

Special Tool - Bearing Driver Set: 57001–1129



Ball and Needle Bearing Wear

CAUTION

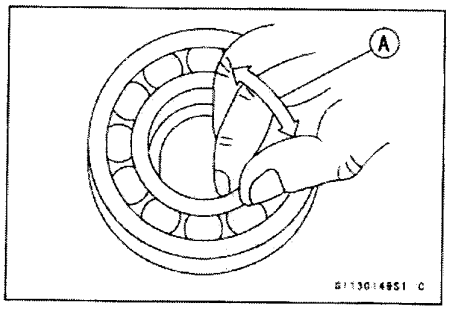
Do not remove the ball bearings for inspection. Removal may damage them.

● Check the ball bearings.

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

○Spin [A] the bearing by hand to check its condition.

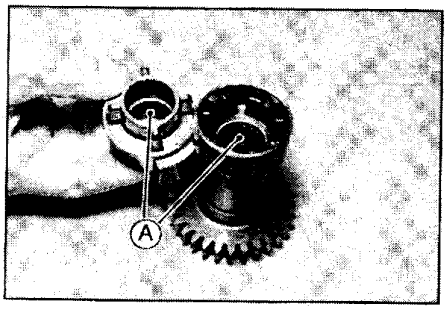
★If the bearing is noisy, does not spin smoothly, or has any rough spots, replace it.



● Check the needle bearings [A].

○The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, inspect the bearing for abrasion, color change, or other damage.

★If there is any doubt as to the condition of a needle bearing, replace it.



Oil Seal Inspection

● Inspect the oil seals.

★Replace it if the lips are misshapen, discolored (indicating that the rubber has deteriorated), hardened or otherwise damaged.

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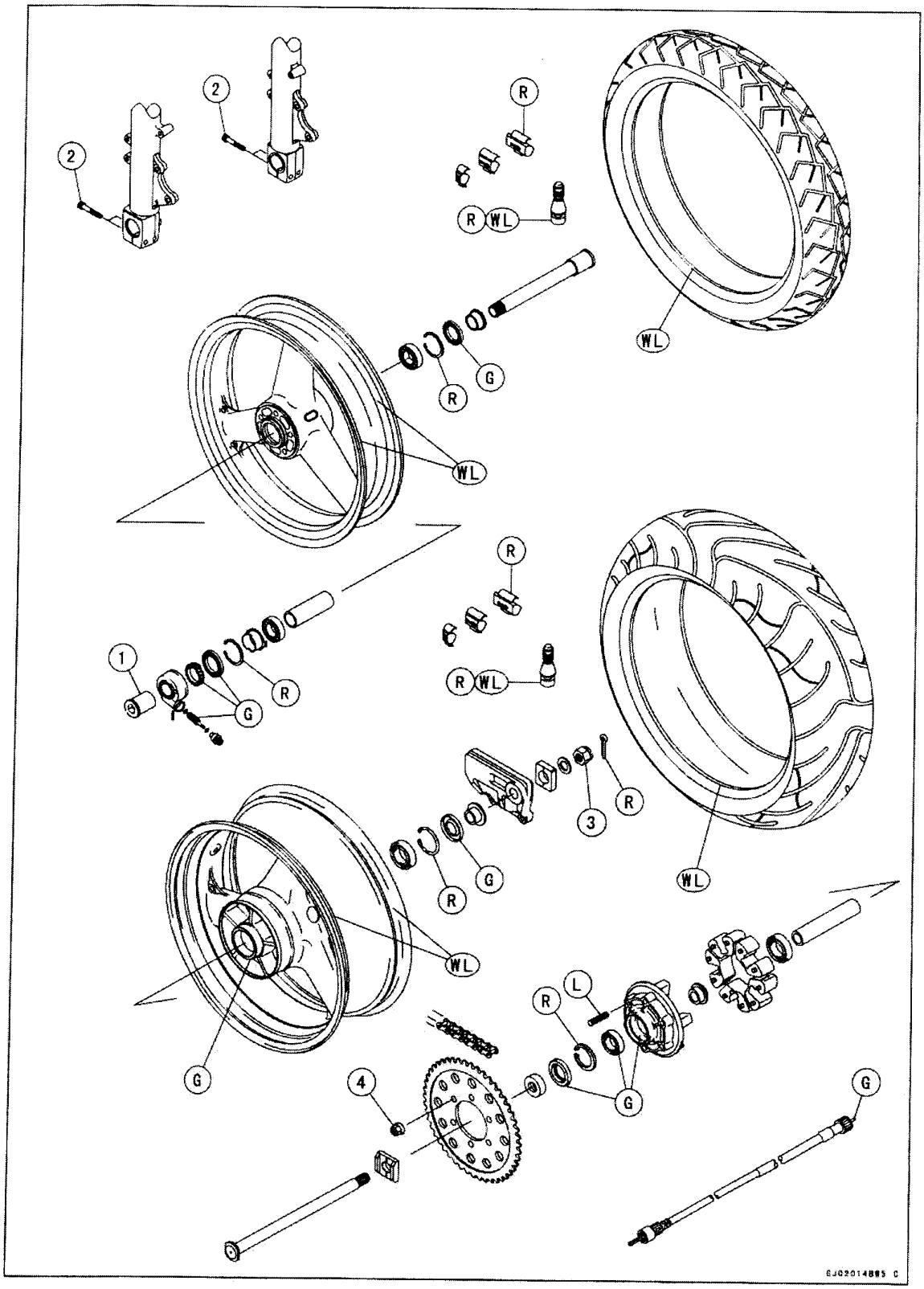
Wheels/Tires

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front axle nut	127	13.0	94	
2	Front axle clamp bolts	20	2.0	1.5	
3	Rear axle nut	108	11.0	80	
4.	Rear Sprocket nut	59	6.0	43	

G: Apply grease.
R: Replacement Parts.
WL: apply soap and water solution or rubber lubricant.

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Specifications

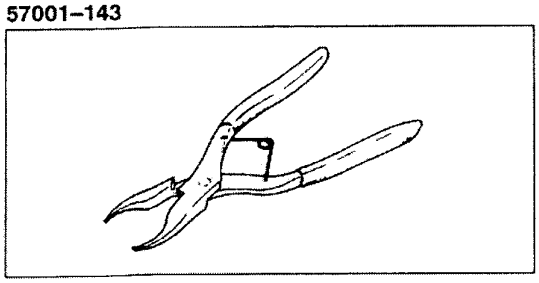
Item	Standard	Service Limit
Wheels (Rims)		
Rim runout:		
Axial	– – –	TIR 0.5 mm (0.02 in.)
Radial	– – –	TIR 0.8 mm (0.03 in.)
Axle runout/100 mm (3.9 in.)	0.03 mm (0.001 in.) or less	TIR 0.2 mm (0.008 in.)
Wheel balance	10 g or less	– – –
Balance weights	10 g, 20 g, 30 g	– – –
Tires		
Air pressure: (when cold)		
Front	Up to 180 kg (397 lb) load: 290 kPa (2.9 kgf/cm², 42 psi)	– – –
Rear	Up to 180 kg (397 lb) load: 290 kPa (2.9 kgf/cm², 42 psi)	– – –
Tread depth:		
Front:		
ZX1200-C1/D1	4.3 mm (0.17 in.)	1 mm (0.04 in.) (DE, AT, CH) 1.6 mm (0.063 in.)
ZX1200-C2 ~	4.0 mm (0.16 in.)	
Rear:		
ZX1200-C1/D1	6.2 mm (0.24 in.)	Up to 130 km/h (80 mph): 2 mm (0.08 in.) Over 130 km/h 80 mph): 3 mm (0.12 in.)
ZX1200-C2 ~	5.9 mm (0.23 in.)	
Standard tires	Make, Type	Size
Front:		
ZX1200-C1/D1	BRIDGESTONE BT020F RADIAL AA (tubeless)	120/70 ZR17 M/C (58 W)
ZX1200-C2 ~	DUNLOP SPORTMAX RADIAL D220FP	
Rear:		
ZX1200-C1/D1	BRIDGESTONE BT020R RADIAL AA (tubeless)	180/55 ZR17 M/C (73 W)
ZX1200-C2 ~	DUNLOPSPORTMAX RADIAL D220P	

AT: Republic of Austria
CH: Swiss Confederation
DE: Federal Republic of Germany

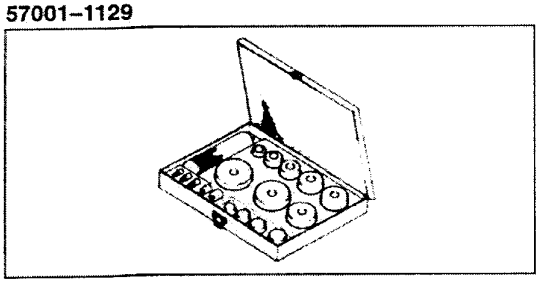
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Special Tools

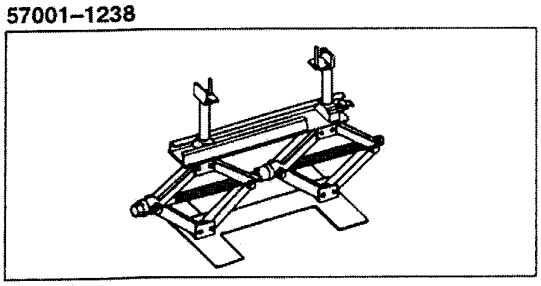
Inside Circlip Pliers:
57001–143



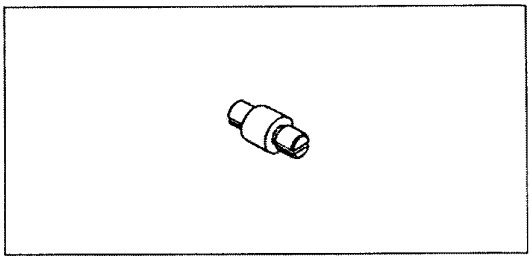
Bearing Driver Set:
57001–1129



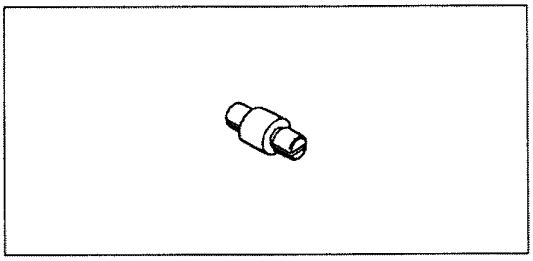
Jack:
57001–1238



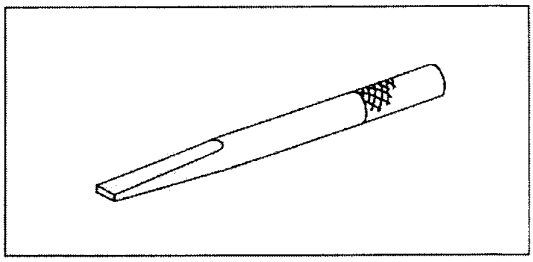
Bearing Remover Head, ϕ20 × ϕ22:
57001–1293



Bearing Remover Head, ϕ25 × ϕ28:
57001–1346



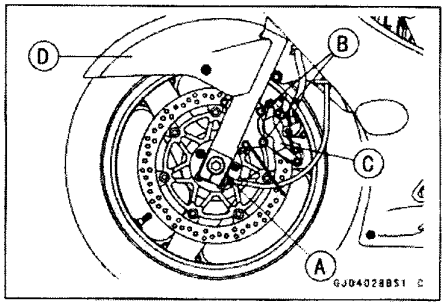
Bearing Remover Shaft, ϕ13:
57001–1377



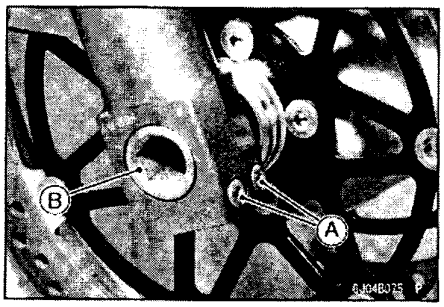
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Wheels (Rims)

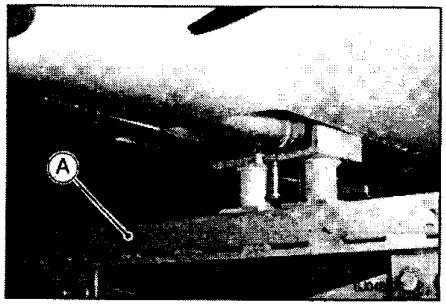
Front Wheel Removal



- Remove:
  Speedometer Cable Lower End [A]
  Reflector (For the U.S. and Canadian Models)
  Brake Caliper Mounting Bolts [B]
  Brake Calipers [C]
  Front Fender [D] (see Frame chapter)



- Loosen:
  Right Side Axle Clamp Bolts [A]
  Axle [B]



- Use the center stand to support the motorcycle upright.
- Use the jack [A], raise the front wheel off the ground until the rear wheel touches the ground.

  Special Tool - Jack: 57001-1238

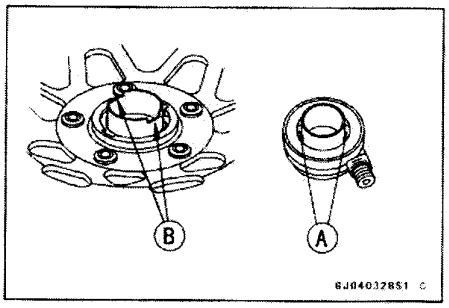
- Pull out the axle to the right and drop the front wheel out of the forks.

CAUTION

Do not lay the wheel down on one of the discs. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

Front Wheel Installation

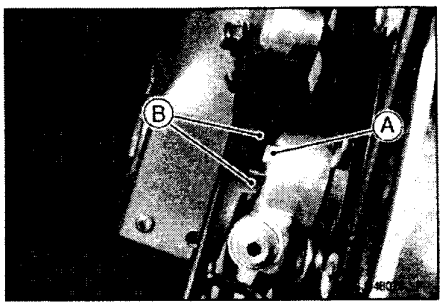
- If the speedometer gear housing is removed, engage the projections [A] inside the speedometer gear housing with the drive notches [B] in the gear drive of the wheel.



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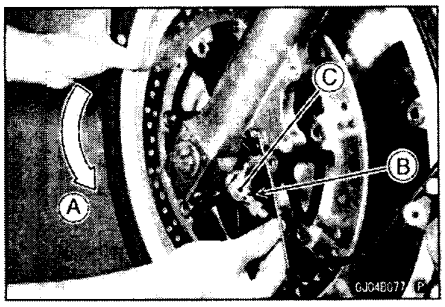
Wheels (Rims)

- Install the collar on the right side of the hub.
- Place the stop [A] of the speedometer gear housing between the stops [B] of the fork.



- Install the axle from the right side.
- Turning [A] the front wheel insert the lower end [B] of the speedometer cable to the gear housing [C].
- Tighten the axle.

Torque - Front Axle: 127 N·m (13.0 kgf·m, 94 ft·lb)
Front Axle Clamp Bolts: 20 N·m (2.0 kgf·m, 15 ft·lb)
Front Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



NOTE

○ *Tighten the two clamp bolts alternately two times to ensure even tightening torque.*

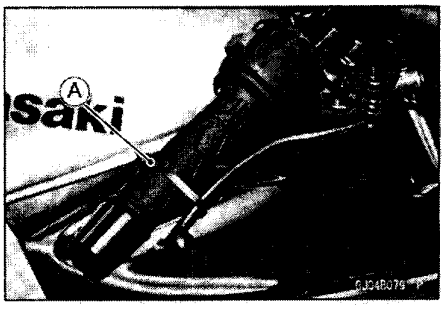
- Install the front brake caliper (see Brakes chapter).
- Check the front brake.

⚠ WARNING

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

Rear Wheel Removal

- Use the center stand to support the motorcycle upright.
- Squeeze the brake lever slowly and hold it with a band [A].



CAUTION

Be sure to hold the front brake when removing the rear wheel, or the motorcycle may fall over. The motorcycle could be damaged.

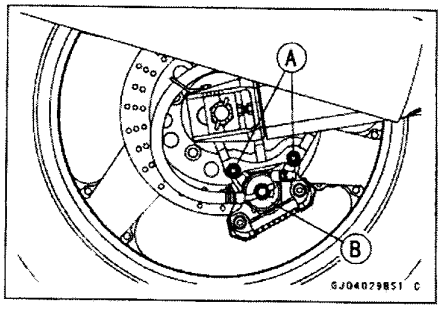
⚠ WARNING

Be sure to hold the front brake when removing the rear wheel, or the motorcycle may fall over. If could cause an accident and injury.

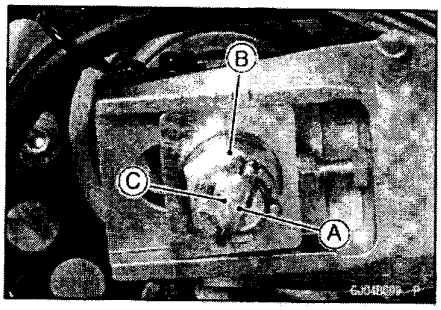
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Wheels (Rims)

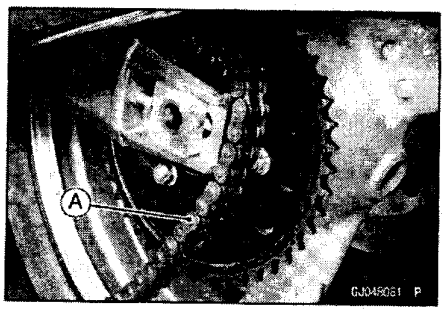
● Remove the rear caliper mounting bolts [A] and rear caliper [B].



● Remove:
Cotter Pin [A]
Axle Nut [B]
Axle [C]



● Remove the chain [A] from the rear sprocket toward the left.
● Move the rear caliper bracket back and remove the rear caliper bracket from the swingarm.
● Remove the rear wheel.

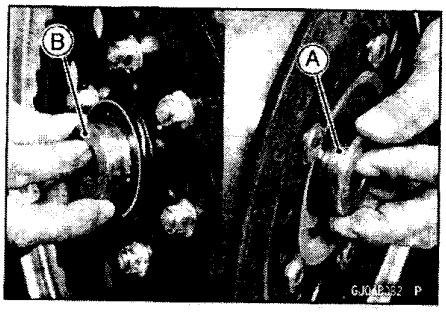


CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.

Rear Wheel Installation

● Fit the collers on the both sides of the hub.
Right Side Coller [A]
Left Side Coller [B]

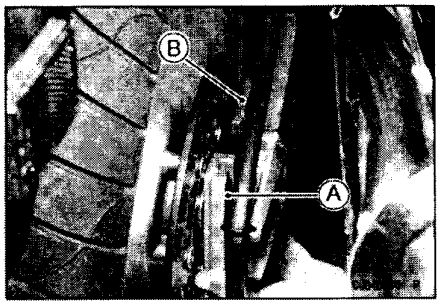


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Wheels (Rims)

● Engage the drive chain with the rear sprocket.
● Install the caliper bracket [A] onto the swingarm stop [B].
○Install the axle from the left side of the wheel, and tighten the axle nut.

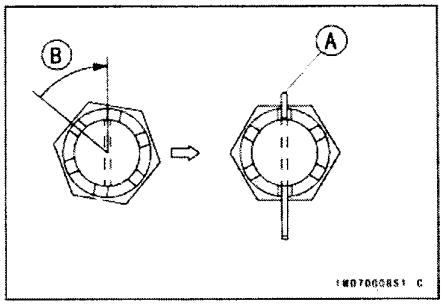
Torque - Rear Axle Nut: 108 N·m (11.0 kgf-m, 80 ft·lb)



● Insert a new cotter pin [A].

NOTE

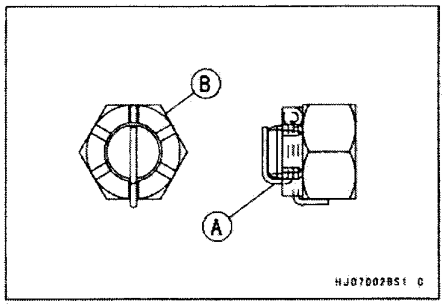
○*When inserting the cotter pin, if the slots in the nut do not align with the cotter pin hole in the axel, tighten the nut clockwise [B] up to next alignment.*
○*It should be within 30 degree.*
○*Loosen once and tighten again when the slot goes past the nearest hole.*



● Bend the cotter pin [A] over the nut [B].
● Check the rear brake.

⚠ WARNING

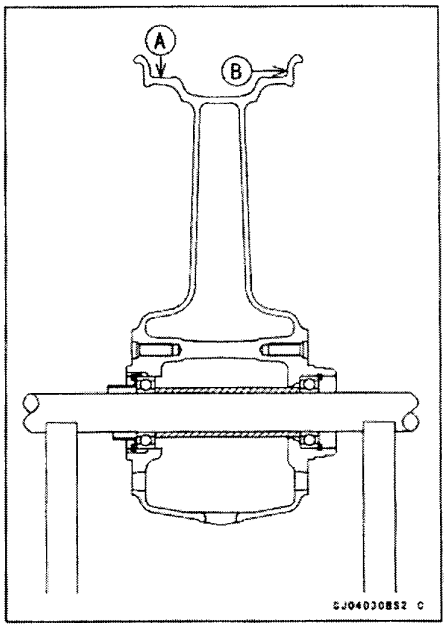
Do not attempt to drive the motorcycle until a full brake pedal is obtained by pumping the brake pedal until the pads are against the disc. The brake will not function on the first application of the pedal if this is not done.



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Wheels (Rims)

Wheel Inspection



- Raise the front/rear wheel off the ground.

Special Tool - Jack: 57001-1238

- Spin the wheel lightly, and check for roughness or binding.

★If roughness or binding is found, replace the hub bearings.

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

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

- Remove the wheel, and support it without the tire by the axle.
- Measure the rim runout, radial [A] and axial [B], with a dial gauge.

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

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

Rim Runout

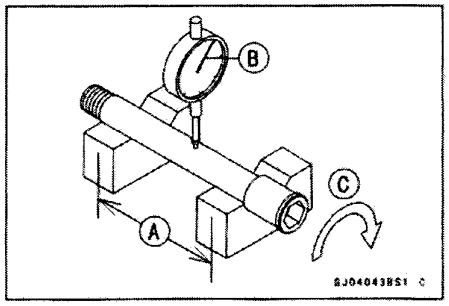
Service Limit:

Axial	**TIR 0.5 mm (0.02 in.)**
Radial	**TIR 0.8 mm (0.03 in.)**

⚠ WARNING

Never attempt to repair a damaged wheel. If there is any damage besides wheel bearings, the wheel must be replaced to insure safe operational condition.

Axle Inspection



- Visually inspect the front and rear axle for damages.

★If the axle is damaged or bent, replace it.

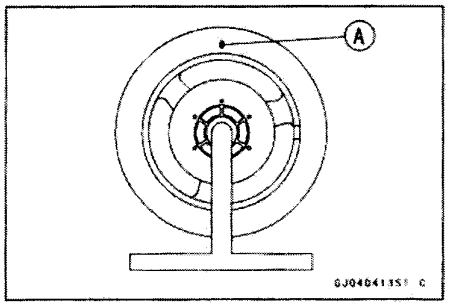
- Place the axle in V blocks that are 100 mm (3.94 in.) [A] apart, and set a dial gauge [B] on the axle at a point halfway between the blocks. Turn [C] the axle to measure the runout. The difference between the highest and lowest dial readings is the amount of runout.

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

Axle Runout/100 mm (3.94 in.)

Standard:	**0.03 mm (0.001 in.) or less**
Service Limit:	**0.2 mm (0.008 in.)**

Balance Inspection



- Remove the wheel (see this chapter).
- Support the wheel so that it can be spun freely.
- Spin the wheel lightly, and mark [A] the wheel at the top when the wheel stops.

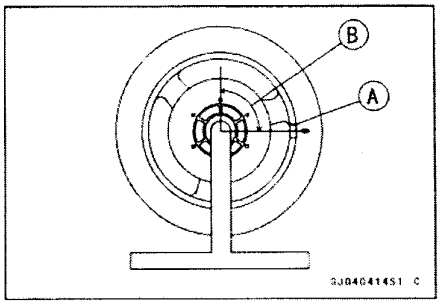
○Repeat this procedure several times. If the wheel stops of its own accord in various positions, it is well balanced.

★If the wheel always stops in one position, adjust the wheel balance.

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Wheels (Rims)

Balance Adjustment



- If the wheel always stops in one position, provisionally attach a balance weight [A] on the rim at the marking using adhesive tape.
- Rotate the wheel 1/4 turn [B], and see whether or not the wheel stops in this position. If it does, the correct balance weight is being used.

★If the wheel rotates and the weight goes up, replace the weight with the next heavier size. If the wheel rotates and the weight goes down, replace the weight with the next lighter size. Repeat these steps until the wheel remains at rest after being rotated 1/4 turn.

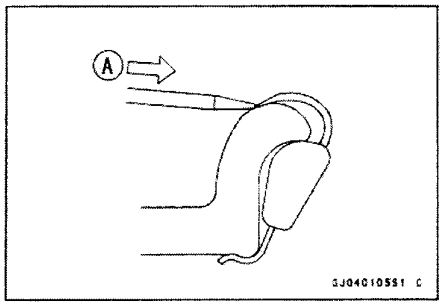
- Rotate the wheel another 1/4 turn and then another 1/4 turn to see if the wheel is correctly balanced.
- Repeat the entire procedure as many times as necessary to achieve correct wheel balance.
- Permanently install the balance weight.

Balance Weight

Part Number	Weight Unit: g (US oz)
41075-1014	10 (0.35)
41075-1015	20 (0.71)
41075-1016	30 (1.1)

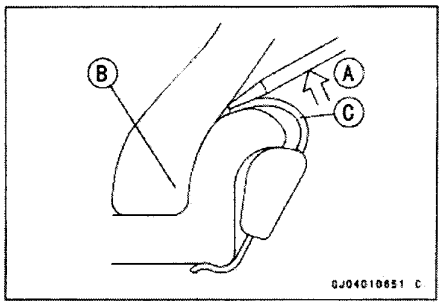
Balance Weight Removal

(a) When the tire is not on the rim.



- Push [A] the blade portion toward the outside with a regular tip screw driver, and slip the weight off the rim flange.
- Discard the used balance weight.

(b) When the tire is on the rim.



- Pry [A] the balance weight off the rim flange using a regular tip screw driver as shown in the figure.

○Insert a tip of the screw driver between the tire bead [B] and weight blade [C] until the end of the tip reaches the end of the weight blade.

○Push the driver grip toward the tire so that the balance weight slips off the rim flange.

- Discard the used balance weight.

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Wheels (Rims)

Balance Weight Installation

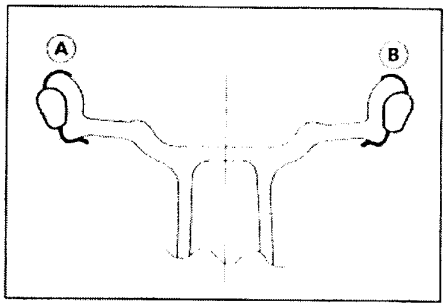
● Check if the weight portion has any play on the brade-and -clip plate.

★If it does, discard it.

⚠ WARNING

If the balance weight has any play on the rim flange, the blade and/or clip have been stretched. Replace the loose balance weight.
Do not reuse used balance weight.
Unbalanced wheels can create an unsafe riding condition.

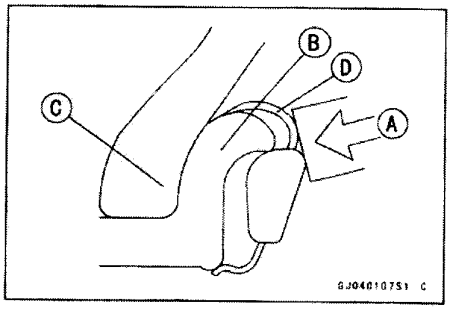
● When required total weight exceeds 20 g (0.71 US oz), install balance weight at both sides of rim flange as shown.



Required Total Weight: g (US oz)	Weight Selection: g (US oz)	
	One Side [A]	Other Side [B]
20 (0.71)	10 (0.35)	10 (0.35)
30 (1.06)	20 (0.71)	10 (0.35)
40 (1.41)	20 (0.71)	20 (0.71)
50 (1.76)	30 (1.06)	20 (0.71)
60 (2.12)	30 (1.06)	30 (1.06)
70 (2.47)	20 (0.71) + 20 (0.71)	30 (1.06)
80 (2.82)	20 (0.71) + 20 (0.71)	20 (0.71) + 20 (0.71)
90 (3.17)	20 (0.71) + 30 (1.06)	20 (0.71) + 20 (0.71)

○If the imbalance is less than 10 g (0.35 US oz), it will not affect the motorcycle's stability during driving. Do not use more than four balance weight or exceed 90 g (3.17 US oz). In such a case, inspect the wheel.

● Lubricate the balance weight blade [D], tire bead [C], and rim flange with a soap and water solution or rubber lubricant. This helps the balance weight slip onto the rim flange.



CAUTION

Do not lubricate the tire bead with engine oil or petroleum distillates because they will deteriorate the tire.

● Install the balance weight on the rim.

(a) Press or lightly hammer the weight in.

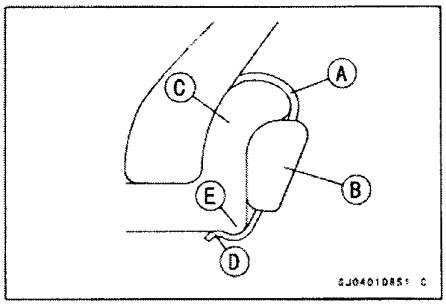
○Slip the weight on the rim flange [B] by pushing or lightly hammering [A] the weight in the direction shown in the figure.

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Wheels (Rims)

(b) Installation completed.

○Check that the blade [A] and weight [B] seat fully on the rim flange [C], and that the clip [D] is hooked over the rim ridge [E] and reaches rim flat portion.



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Tires

Tire Inspection

● Refer to the Tire Inspection in Periodic Maintenance chapter.

Air Pressure Inspection/Adjustment

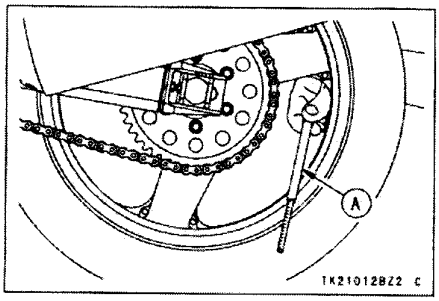
● Measure the tire air pressure with an air pressure gauge [A] when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).

★ Adjust the tire air pressure according to the specifications if necessary.

Air Pressure (when cold)

Front: Up to 180 kg (397 lb) 290 kPa (2.9 kgf/cm², 42 psi)

Rear: Up to 180 kg (397 lb) 290 kPa (2.9 kgf/cm², 42 psi)



Tire Removal

● Remove:

Wheel (see Front Wheel Removal, Rear Wheel Removal)

Disc(s) (see Brakes chapter)

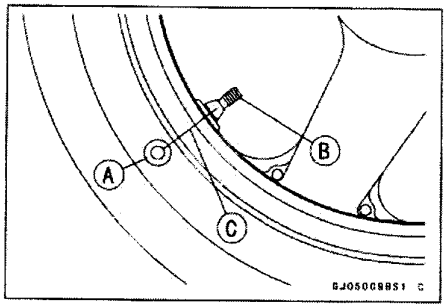
Valve Core (let out the air)

● To maintain wheel balance, mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position.

Chalk Mark or Yellow Mark [A]

Air Valve [B]

Align [C]



● Lubricate the tire beads and rim flanges on both sides with a soap and water solution or rubber lubricant. This helps the tire beads slip off the rim flanges.

CAUTION

Never lubricate with engine oil or petroleum distillates because they will deteriorate the tire.

● Remove the tire from the rim using a commercially available tire changer.

NOTE

○ *The tires cannot be removed with hand tools because they fit the rims too tightly.*

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Tires

Tire Installation

⚠ WARNING

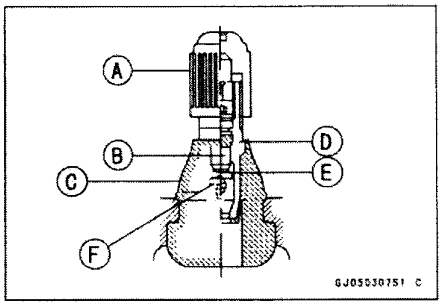
To ensure safe handling and stability, use only standard tires for replacement, inflated to the standard pressure.
Use the same manufacturer's tires on both front and rear wheels.

- Inspect the rim and tire, and replace them if necessary.
- Clean the sealing surfaces of the rim and tire, and smooth the sealing surfaces of the rim with a fine emery cloth if necessary.
- Remove the air valve and discard it.

CAUTION

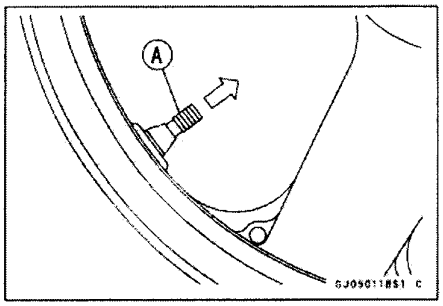
Replace the air valve whenever the tire is replaced.
Do not reuse the air valve.

- Install a new air valve in the rim.
  [A] Valve Cap
  [B] Valve Core
  [C] Valve Seal
  [D] Valve Stem
  [E] Valve Seat
  [F] Valve Opened



○Remove the valve cap, lubricate the stem seal with a soap and water solution or rubber lubricate, and pull the valve stem [A] through the rim from the inside out it snaps into place.

- Apply a soap and water solution, or rubber lubricant to the rim flange and tire beads.



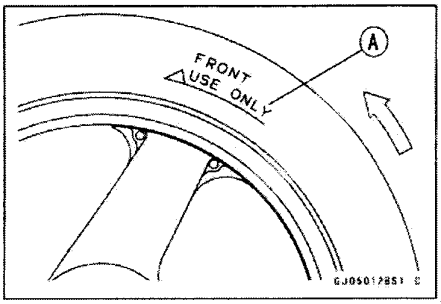
CAUTION

Never lubricate with mineral oil (engine oil) or gasoline because they will cause deterioration of the tire.

○Check the tire rotation mark on the front and rear tires and install them on the rim accordingly.

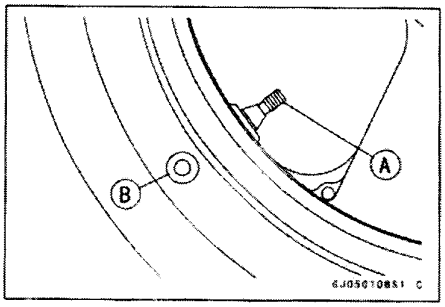
NOTE

○*The direction of the tire rotation [A] is shown by an arrow [B] on the tire sidewall.*



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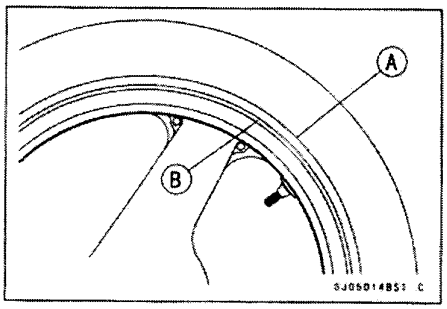
Tires



- Position the tire on the rim so that the valve [A] is at the tire balance mark [B] (the chalk mark made during removal, or the yellow paint mark on a new tire).
- Install the tire on the rim using a suitable commercially available tire changer.
- Lubricate the tire beads and rim flanges with a soap and water solution or rubber lubricant to help seat the tire beads in the sealing surfaces of the rim while inflating the tire.
- Center the rim in the tire beads, and inflate the tire with compressed air until the tire beads seat in the sealing surfaces.

⚠ WARNING

Be sure to install the valve core whenever inflating the tire, and do not inflate the tire to more than 400 kPa (4.0 kgf/cm², 57 psi). Overinflation can explode the tire with possibility of injury and loss of life.



- Check to see that the rim lines [A] on both sides of the tire sidewalls are parallel with the rim flanges [B].

★If the rim flanges and tire sidewall rim lines are not parallel, remove the valve core.

- Lubricate the rim flanges and tire beads.
- Install the valve core and inflate the tire again.
- After the tire beads seat in the rim flanges, check for air leaks.

○Inflate the tire slightly above standard inflation.

○Use a soap and water solution or submerge the tire, and check for bubbles that would indicate leakage.

- Adjust the air pressure to the specified pressure (see Periodic Maintenance chapter).
- Install the air valve cap.
- Install the brake disc(s) so that the marked side faces out (see Brake chapter).
- Adjust the wheel balance.

⚠ WARNING

Check and balance the wheel when a tire is replaced with a new one. New tires are slippery and may cause loss of control and injury. A break-in period of 160 km (100 mile) is necessary to establish normal tire traction. During break-in, avoid sudden and maximum braking and acceleration, and hard cornering.

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Tires

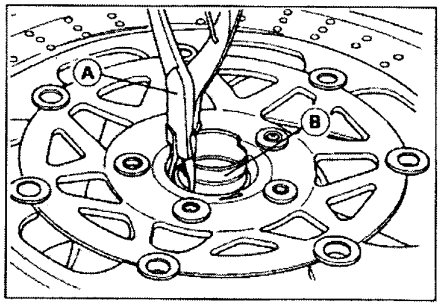
The Repair

Currently two types of repair for tubeless tires have come into wide use. One type is called a temporary (external) repair which can be carried out without removing the tire from the rim, and the other type is called permanent (internal) repair which requires tire removal. It is generally understood that higher running durability is obtained by permanent (internal) repairs than by temporary (external) ones. Also, permanent (internal) repairs have the advantage of permitting a thorough examination for secondary damage not visible from external inspection of the tire. For these reasons, Kawasaki does not recommend temporary (external) repair. Only appropriate permanent (internal) repairs are recommended. Repair methods may vary slightly from make to make. Follow the repair methods indicated by the manufacturer of the repair tools and materials so that safe results can be obtained.

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Hub Bearings

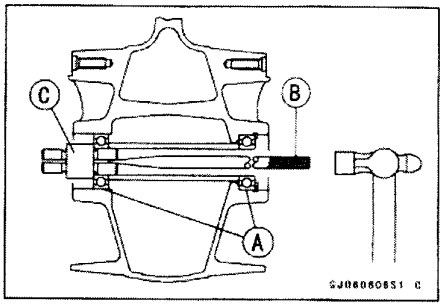
Hub Bearing Removal



● Remove the wheel, and take out the following.
Collars
Coupling (Out of rear hub)
Grease Seals
Circlip [A]
Speedometer Gear Drive (front hub) [B]

Special Tool - Inside Circlip Pliers: 57001-143

● Use the bearing remover to remove the hub bearings [A].



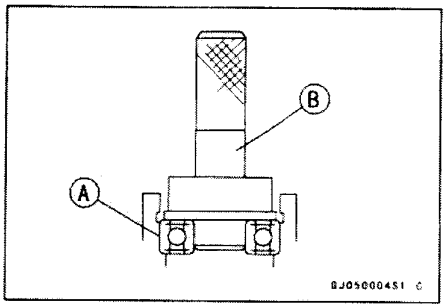
CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Please blocks under the wheel so that the disc does not touch the ground.

○Select a remover head that matches the bearing bore and insert it.
○Pass the remover shaft from the opposite end and engage its tip into the groove of the head.
○Tap the shaft with a hammer and remove the bearing.

Special Tools - Bearing Remover Shaft, ϕ13: 57001-1377 [B]
Bearing Remover Head, ϕ25 × ϕ28: 57001 -1346 [C]
Bearing Remover Head, ϕ20 × ϕ22: 57001–1293 [C]

Hub Bearing Installation



● Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
● Replace the bearings with new ones.
○Press in each right the bearing [A] until they are bottomed.

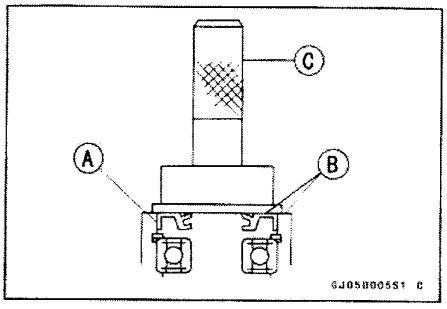
Special Tool - Bearing Driver Set: 57001-1129 [B]

NOTE

○*Install the bearings so that the marked side faces out.*

○Replace the circlips with new ones.

Special Tool - Inside Circlip Pliers: 57001-143



● Replace the grease seals with new ones.
● Press in the grease seals [A] so that the seal surface flush [B] with the end of the hole.
○Apply high-temperature grease to the grease seal lips.

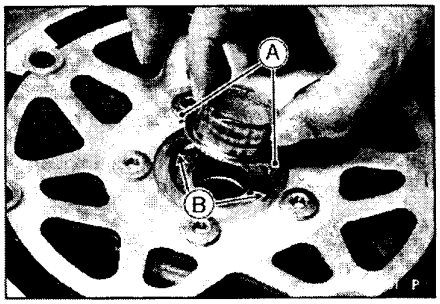
Special Tool - Bearing Driver Set: 57001-1129 [C]

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Hub Bearings

● Engage the speedometer gear drive [A] into the notch [B] of the front wheel hub and install the circlip.

Special Tool - Inside Circlip Pliers: 57001-143



Bearing Lubrication

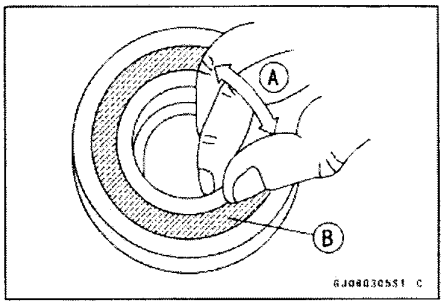
NOTE

○*Since the bearings are packed with grease and sealed on both sides, lubrication is not required.*

Hub Bearing Inspection

NOTE

○*It is not necessary to remove any bearings for inspection. If any bearings are removed, they will need to be replaced with new ones.*



● Spin [A] it by hand to check its condition.

★If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.

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

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

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Speedometer Gear Housing

Disassembly/Assembly

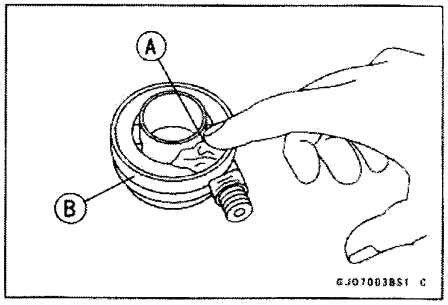
NOTE

○*It is recommended that the assembly be replaced rather than attempting to replace components.*

● Install the speedometer gear housing so that it fits in the speedometer gear drive notches (see Front Wheel Installation).

Lubrication

● Clean the speedometer gear housing [B] and grease the grease seal lips [A].



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Final Drive

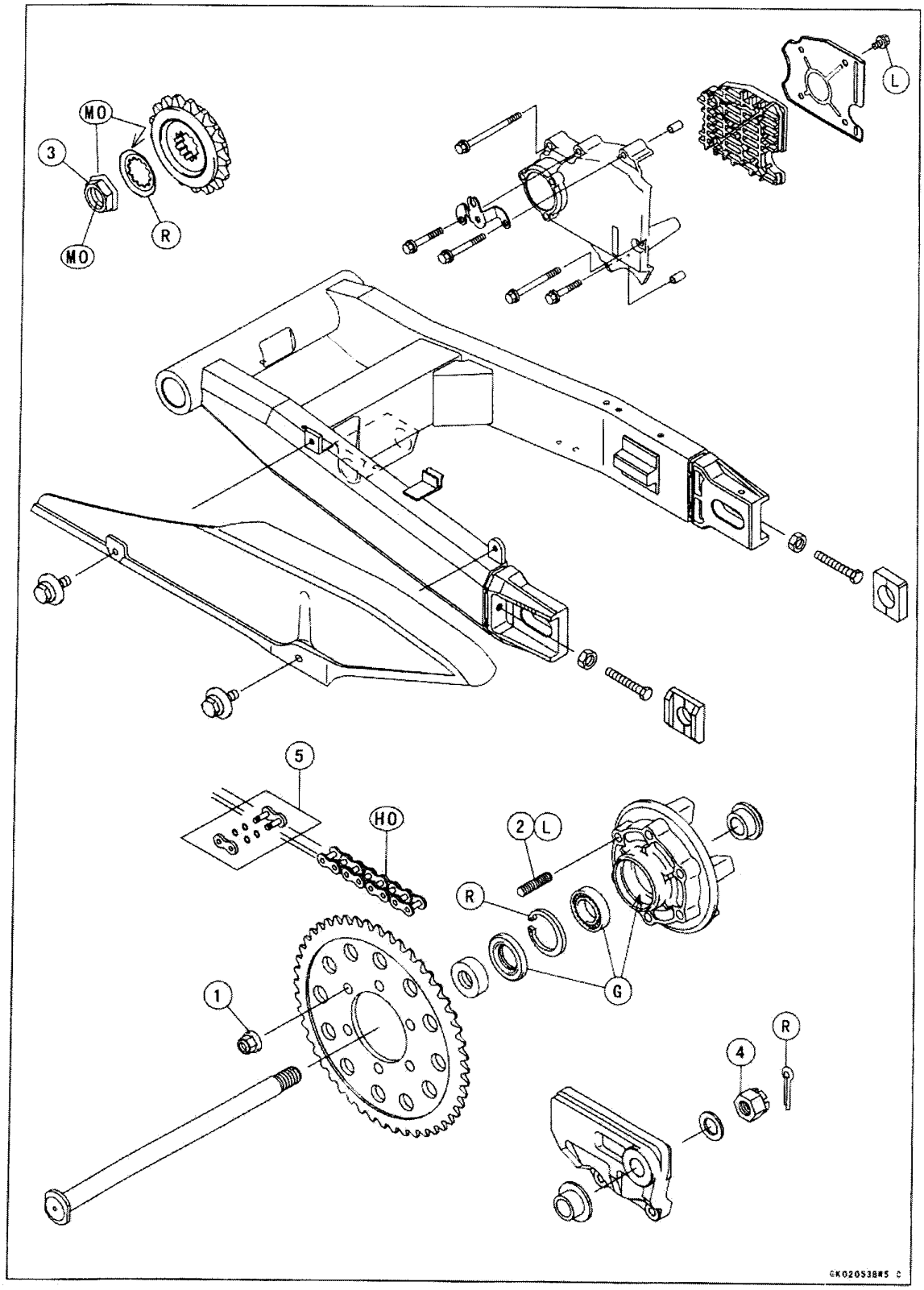
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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear sprocket nuts	59	6.0	43	
2	Rear sprocket studes	–	–	–	L
3	Engine sprocket nut	125	12.8	92	MO
4	Rear axle nut	108	11.0	80	

5: Drive chain joint
G: Apply grease.
HO: Apply heavy oil.
L: Apply a non-permanent locking agent.
MO: Apply molybdenum disulfide oil solution
(mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10 : 1)
R: Replacement Parts

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11-4 FINAL DRIVE

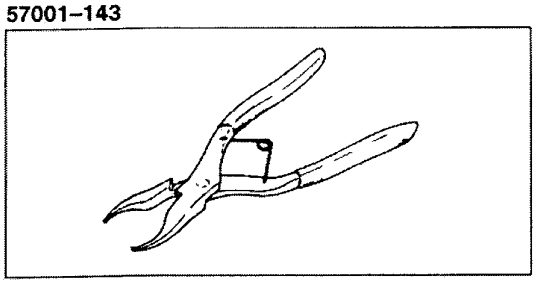
Specifications

Item	Standard	Service Limit
Drive Chain		
Chain slack	25 ~ 35 mm (0.98 ~ 1.4 in.)	– – –
20-link length	317.5 ~ 318.2 mm (12.50 ~ 12.53 in.)	323 mm (12.7 in.)
Standard chain:		
Make	ENUMA	– – –
Type	EK50ZVX2, Endless	– – –
Link	112 links	– – –
Sprockets		
Rear sprocket warp	0.4 mm (0.016 in.) or less	0.5 mm (0.02 in.)

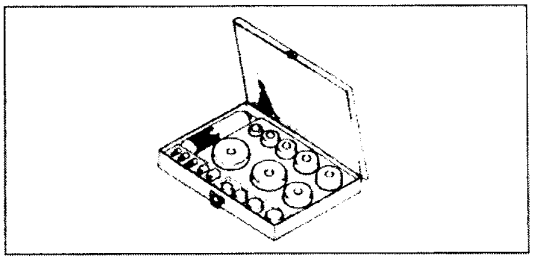
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Special Tools

Inside Circlip Pliers:
57001–143



Bearing Driver Set:
57001–1129



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Drive Chain

Drive Chain Slack Inspection

● Refer to the Drive Chain Slack Inspection in the Periodic Maintenance Chapter.

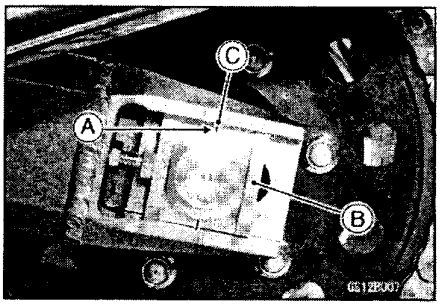
Drive Chain Slack Adjustment

● Refer to the Drive Chain Slack Adjustment in the Periodic Maintenance Chapter.

Wheel Alignment Inspection and Adjustment

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

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



NOTE

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

⚠ WARNING

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

Drive Chain Wear Inspection

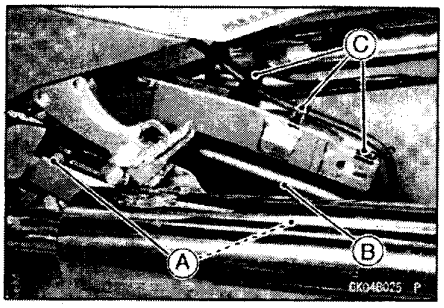
● Refer to the Drive Chain Wear Inspection in Periodic Maintenance Chapter.

Drive Chain Lubrication

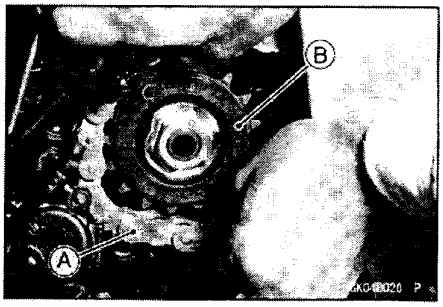
● Refer to the Drive Chain Lubrication in Periodic Maintenance Chapter.

Drive Chain Removal

● Remove:
Rear Wheel (see Wheels/Tires chapter)
Chain Cover Screws [A]
Chain Cover [B]
Brake Hose Clamps [C]
Swingarm (see Suspension chapter)
Engine Sprocket Cover (see this chapter)



● Disengage the drive chain [A] from the engine sprocket [B], and take it off the chassis.



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Drive Chain

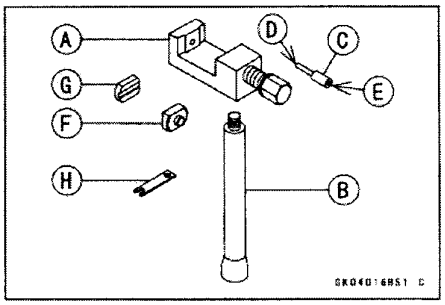
Drive Chain Installation

- Engage the drive chain to the engine sprocket.
- Install:
  Swingarm (see Suspension chapter)
  Rear Wheel (see Wheels/Tires chapter)
  Engine Sprocket Cover
  Chain Cover
- Adjust the chain slack after installing the chain (see Periodic Maintenance chapter).

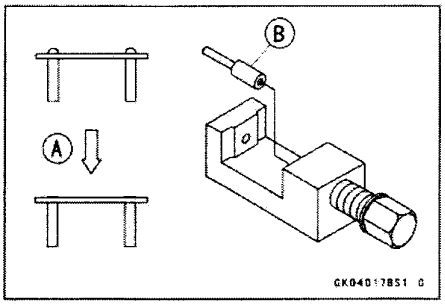
Drive Chain Replacement

- Remove:
  Chain Cover (see this chapter in the Drive Chain Removal)
  Engine Sprocket Cover (see this chapter in the Engine Sprocket Removal)

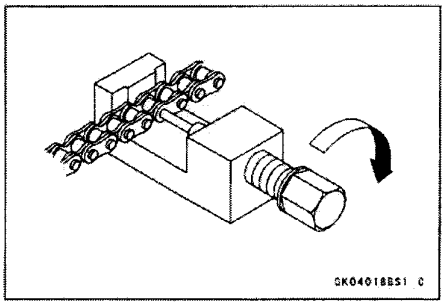
EK JOINT TOOL #50
Body [A]
Handlebar [B]
Cutting and Riveting Pin [C]
For Cutting [D]
For Riveting [E]
Plate Holder (A) [F]
Plate Holder (B) [G]
Gauge [H]



- Grind [A] pin head to make it flat.
- Set cutting and riveting pin [B] as shown.



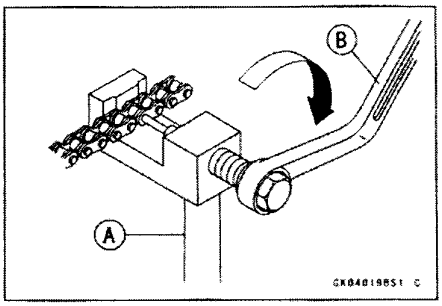
- Screw pin holder until it touches chain pin.
- Be sure that cutting pin hits center of chain pin.



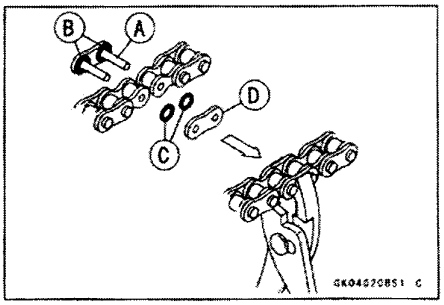
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Drive Chain

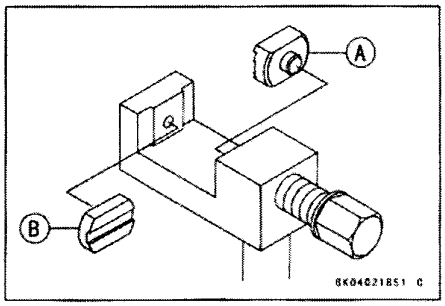
- Screw handlebar [A] into body.
- Turn pin holder with wrench [B] clockwise to extract chain pin.



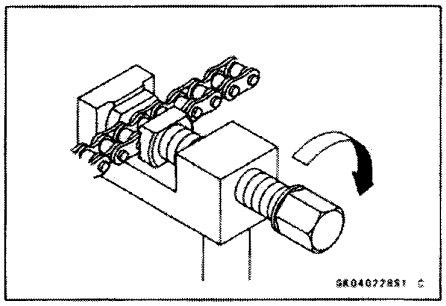
- Replace the link pin, link plate and grease seals.
- Apply grease to the link pins [A] and grease seals [B] [C].
- Engage the drive chain on the engine and rear sprocket.
- Insert the link pins in the drive chain ends.
- Install the grease seals [C].
- Install the link plate so that the mark [D] faces out.
- Push link plate by hand or plier to fix it.
- In case of grease seal chain, be sure to set grease seals correctly.



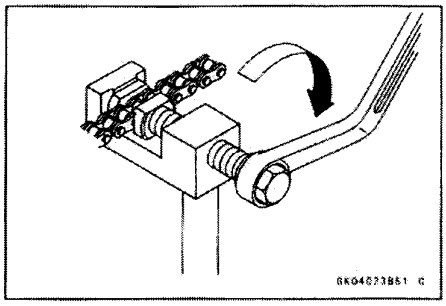
- Set plate holder (A) [A] and plate holder (B) [B] on the body.



- Fit plate holder (A) to link plate.
- Turn pin holder by hand until plate holder (B) touches the other link plate.



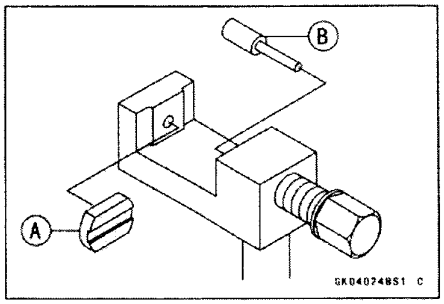
- Turn pin holder by wrench clockwise until two pins of link come into groove of plate holder (A).
- Take off plate holder.



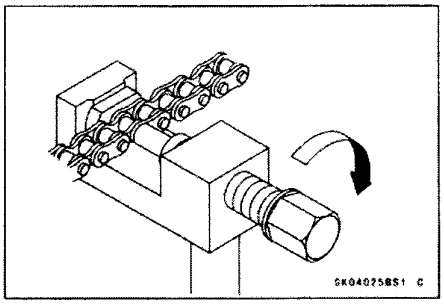
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Drive Chain

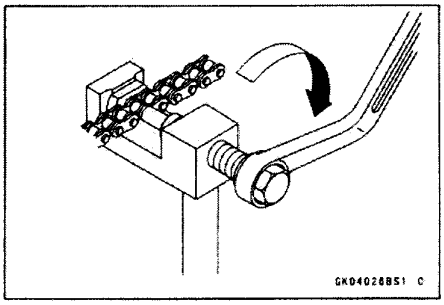
● Set plate holder (B) [A] and cutting and riveting pin [B] as shown.



● Turn pin holder until riveting pin touches link pin.



● Turn wrench clockwise until tip of riveting pin hits of link pin.
● Rivet it.
● Some work for the other link pin.

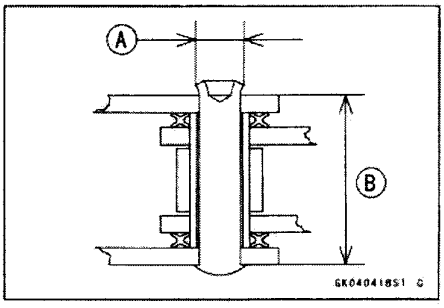


● After staling, check the staked area of the link pin for cracks.
● Measure the outside diameter [A] of the link pin and link plates width [B].

Link Pin Outside Diameter
Standard: 5.6 ~ 6.0 mm (0.22 ~ 0.24 in.)

Link Plates Outside Width
Standard: 22.65 ~ 22.80 mm (0.892 ~ 0.898 in.)

★If the reading exceeds the specified length, cut and rejoin the chain again.
● Check:
Movement of the Rollers
● Adjust the drive chain slack (Refer to the Periodic Maintenance chapter).

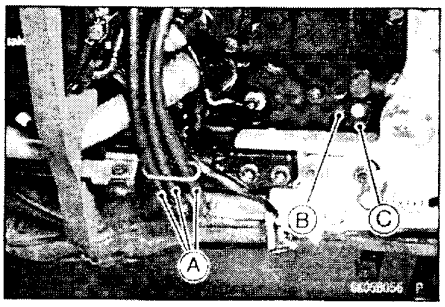


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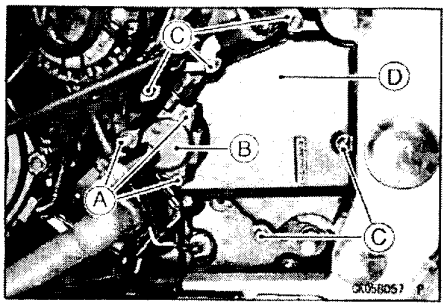
Sprocket, Coupling

Engine Sprocket Removal

- Using the center stand to support the motorcycle upright.
- Remove:
  Left Inner Cover (see Frame chapter)
  Left Lower Fairing (see Frame chapter)
  Reservoir Tank (see Cooling System chapter)
  Hoses [A]
  Shift Lever Bolt [B]
  Shift Lever [C]



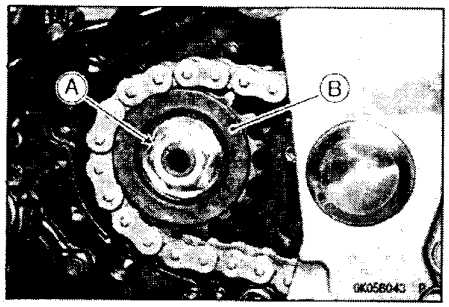
- Remove:
  Clutch Slave Bolts [A]
  Clutch Slave [B]
  Engine Sprocket Cover Bolts [C]
  Engine Sprocket Cover [D]



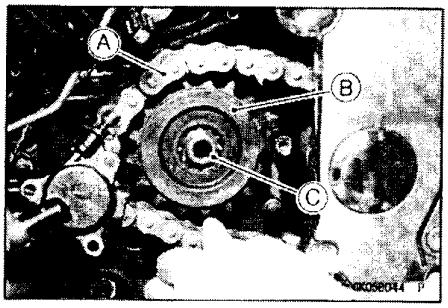
- Flatten out the bended washer [A].
- Remove the engine sprocket nut [B] and washer.

NOTE

○*When loosening the engine sprocket nut, hold the rear brake on.*

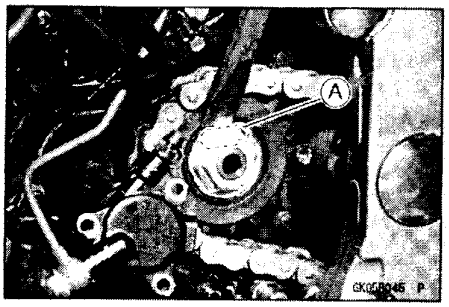


- Loosen the drive chain (see Slack Adjustment).
- Remove the drive chain from the rear sprocket toward the right.
- Pull the engine sprocket together with the drive chain little and disengage the drive chain [A] from the engine sprocket [B].
- Pull the engine sprocket off the output shaft [C].



Engine Sprocket Installation

- Replace the sprocket washer and axle cotter pin.
- Install the engine sprocket.
- Apply molybdenum disulfide oil solution to the threads of the output shaft.
- Apply molybdenum disulfide oil solution to the seating surface of the engine sprocket nut and washer.
- After torquing the engine sprocket nut, bend [A] the one side of the washer over the nut.



NOTE

○*Tighten the nut while applying the rear brake.*

Torque - Engine Sprocket Nut: 125 N·m (12.8 kgf·m, 92 ft·lb)

- Adjust the drive chain slack after installing the sprocket (see Periodic Maintenance chapter).

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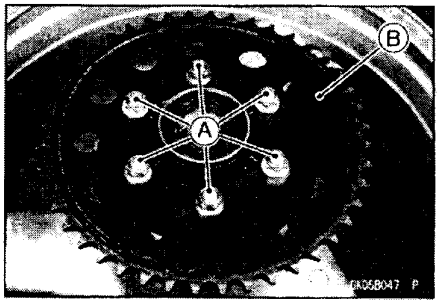
Sprocket, Coupling

Rear Sprocket Removal

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

CAUTION

Do not lay the wheel on the ground with the disc facing down. This can damage or warp the disc. Place blocks under the wheel so that the disc does not touch the ground.



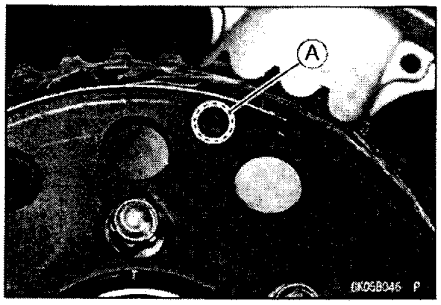
● Remove the rear sprocket nuts [A].
● Remove the rear sprocket [B].

Rear Sprocket Installation

● Install the sprocket facing the tooth number marking [A] outward.
● Tighten the rear sprocket nuts.

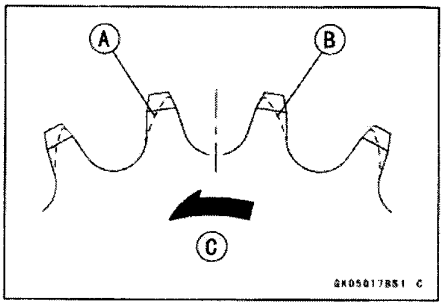
Torque - Rear Sprocket Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)

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



Sprocket Wear Inspection

● Visually inspect the engine and rear sprocket teeth for wear and damage.
★If the teeth are worn as illustrated, replace the sprocket, and inspect the drive chain wear (see Periodic Maintenance chapter).
[A] Worn Tooth (Engine Sprocket)
[B] Worn Tooth (Rear Sprocket)
[C] Direction of Rotation

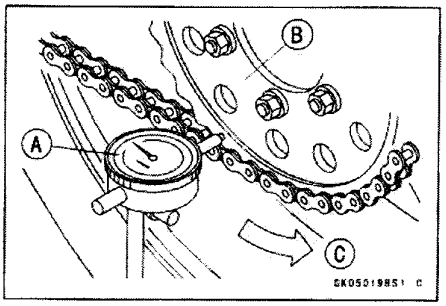


NOTE

○*If a sprocket requires replacement, the chain is probably worn also. When replacing a sprocket, inspect the chain.*

Rear Sprocket Warp Inspection

● Raise the rear wheel off the ground (see Wheels/Tires chapter) so that it will turn freely.
● Set a dial gauge [A] against the rear sprocket [B] near the teeth as shown, and rotate [C] the rear wheel to measure the sprocket runout (warp). The difference between the highest and lowest dial gauge readings is the amount of runout (warp).
★If the runout exceeds the service limit, replace the rear sprocket.



Rear Sprocket Warp

Standard:	**0.4 mm (0.016 in.) or less**
Service Limit:	**0.5 mm (0.02 in.)**

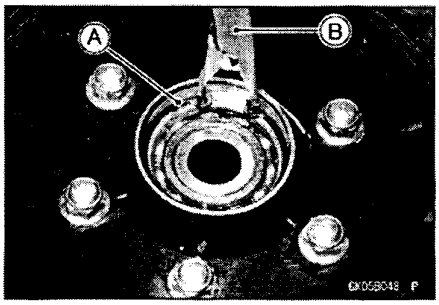
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Sprocket, Coupling

Coupling Bearing Removal

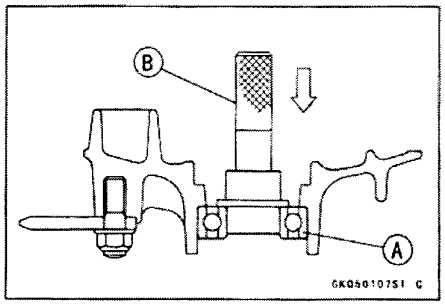
- Remove the rear wheel (see Wheels/Tires chapter).
- Remove:
  Coupling
  Grease Seal
  Circlip [A]

Special Tool - Inside Circlip Pliers: 57001-143 [B]



- Remove the bearing [A] by tapping from the wheel side.

Special Tool - Bearing Driver Set: 57001-1129 [B]



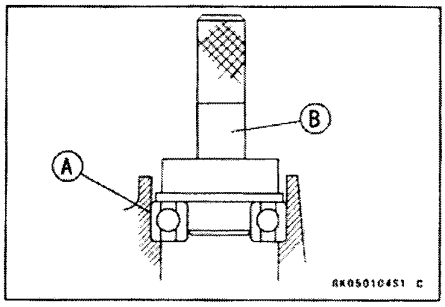
Coupling Bearing Installation

- Replace the bearing with a new one.
- Press in the bearing [A] until it is bottomed.

Special Tool - Bearing Driver Set: 57001-1129 [B]

- Pack the bearing with high temperature grease.
- Replace the circlip with a new one.

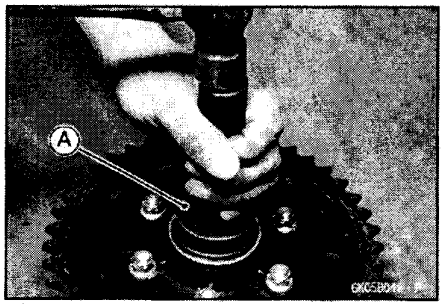
Special Tool - Inside Circlip Pliers: 57001-143



- Replace the grease seal with a new one.
- Press in the grease seal so that the seal surface is flush with the end of the hole.

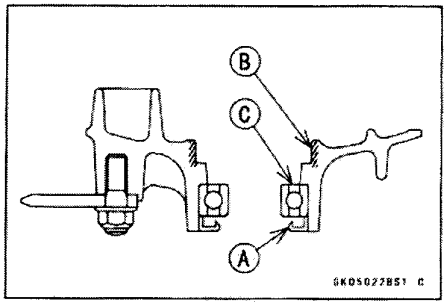
○Apply high-temperature grease to the grease seal lips.

Special Tool - Bearing Driver Set: 57001-1129 [A]



Coupling Installation

- Grease the following and install the coupling.
  Coupling Grease Seal Lip [A]
  Coupling Internal Surface [B]
  Ball Bearing [C]



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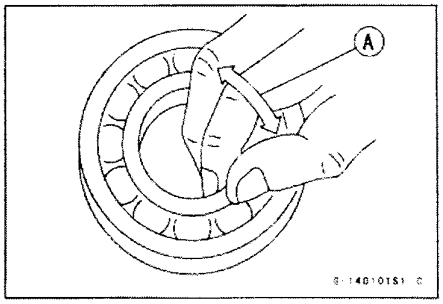
Sprocket, Coupling

Coupling Bearing Inspection and Lubrication

Since the coupling bearing is made to extremely close tolerances, the clearance can not normally be measured.

NOTE

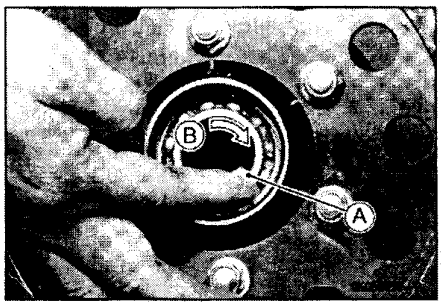
○*It is not necessary to remove the coupling bearing for inspection and lubrication. If the bearing is removed, it will need to be replaced with a new one.*



- Wash the bearing with a high flash-point solvent, dry it (do not spin it while it is dry), and oil it. Spin [A] it by hand to check its condition.

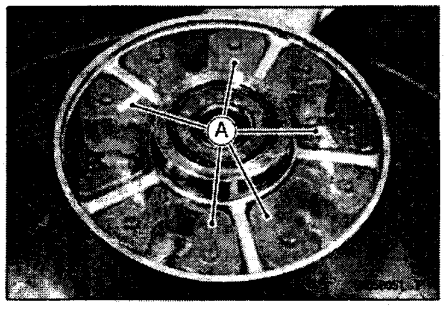
★If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.

- Pack the bearing with good quality bearing grease [A]. Turn [B] the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing.



Damper Inspection

- Remove the rear wheel coupling, and inspect the rubber dampers [A].
- Replace the damper if it appears damaged or deteriorated.



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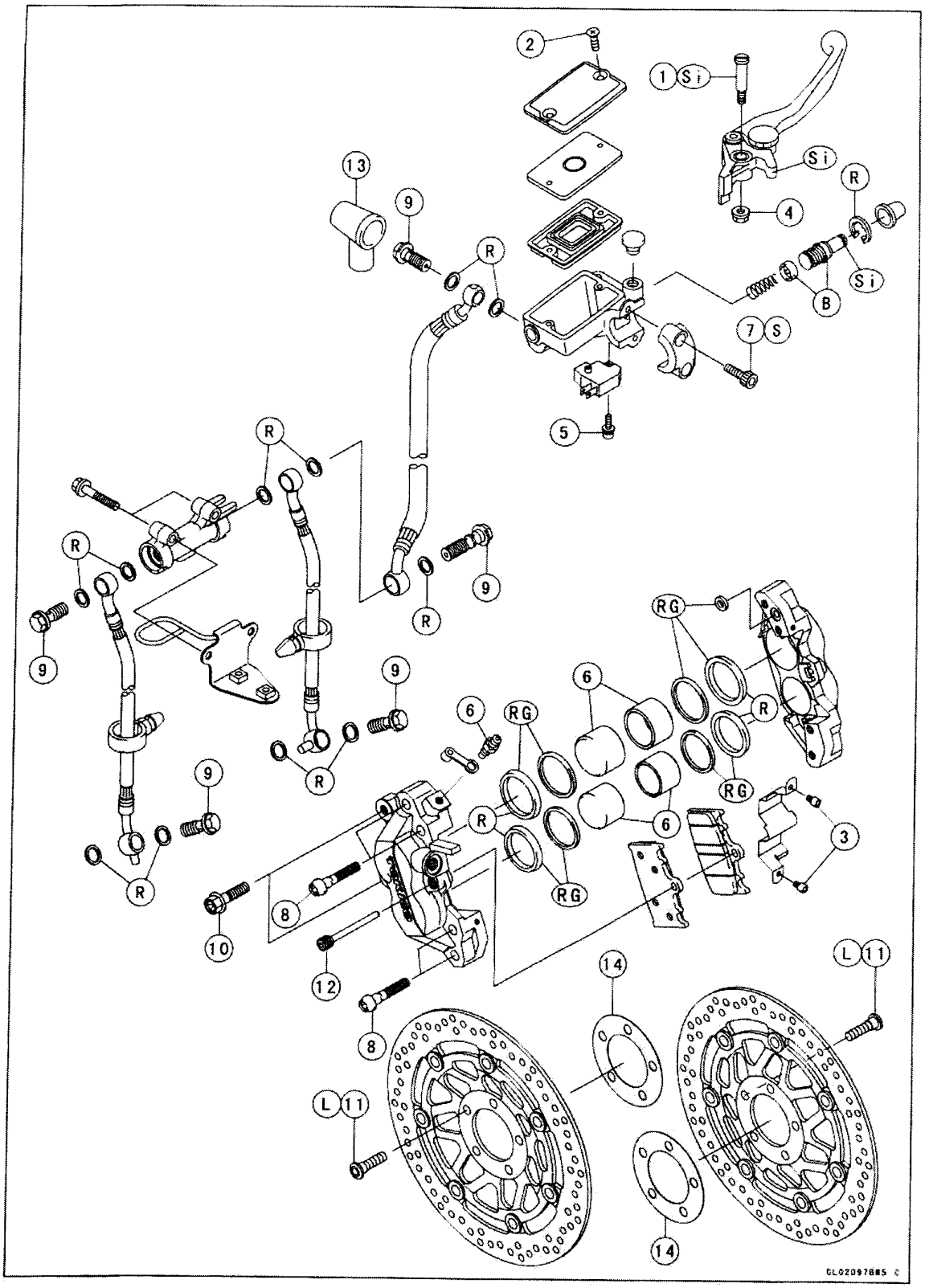
Brakes

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Exploded View



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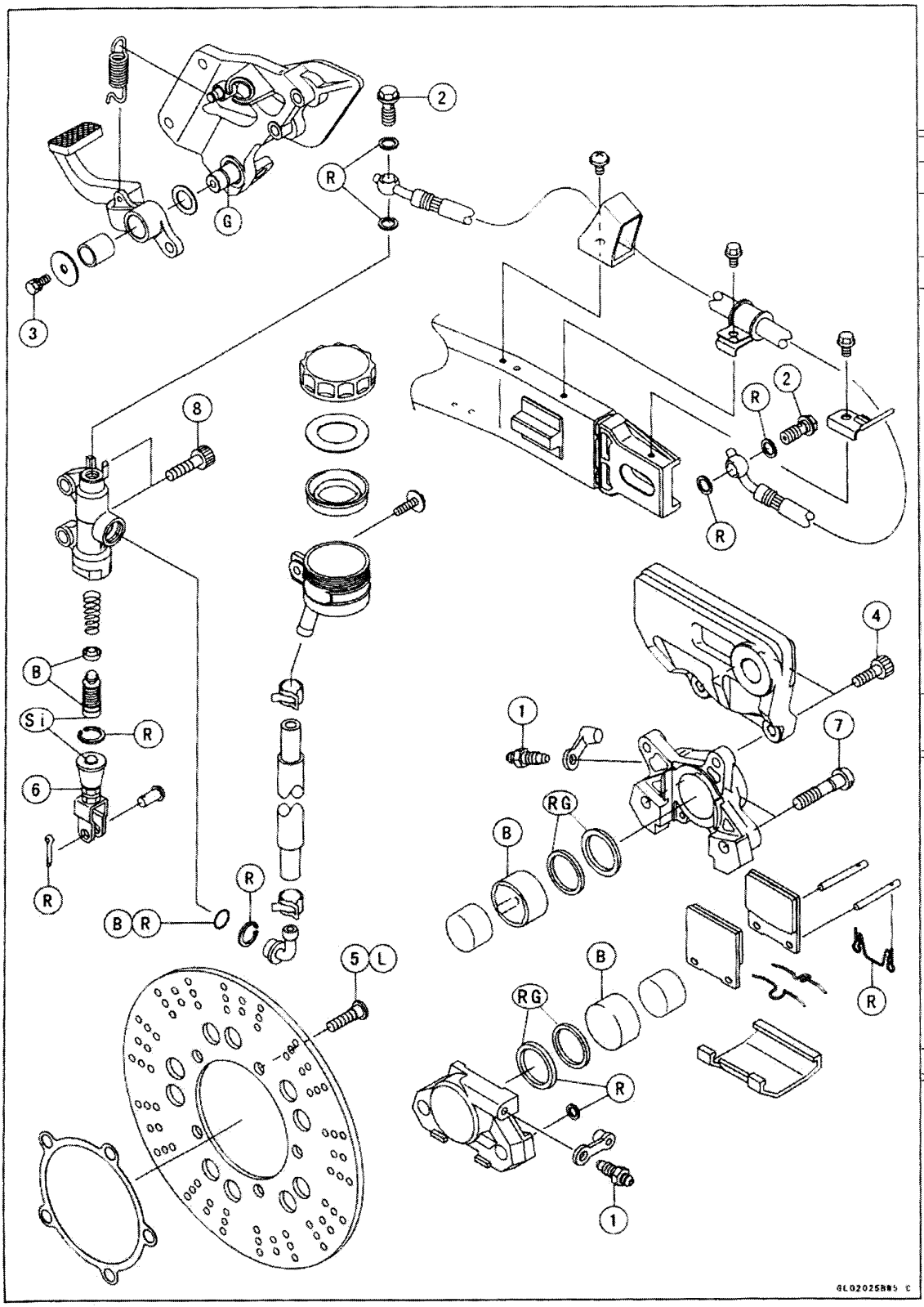
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Brake lever pivot bolt	1.0	0.1	9 in·lb	Si
2	Front brake reservoir cap screws	1.5	0.15	13 in·lb	
3	Front brake pad spring bolts	2.9	0.3	26 in·lb	
4	Brake lever pivot bolt locknut	5.9	0.60	52 in·lb	
5	Front brake light switch screw	1.2	0.12	11 in·lb	
6	Caliper bleed valve	7.8	0.8	69 in·lb	
7	Front master cylinder clamp bolts	8.8	0.9	78 in·lb	S
8	Front caliper assembly bolts	21	2.1	15	
9	Brake hose banjo bolts	25	2.5	18	
10	Front caliper mounting bolts	25	2.5	18	
11	Front brake disc bolts	27	2.8	20	L
12	Front brake pad pin	16	1.6	12	

13. Boot (ZX1200-C1 ~ C2)
14. Gaskets (ZX1200-C3 ~)
B: Apply brake fluid.
L: Apply a non-permanent locking agent.
RG: Apply rubber grease.
R: Replacement parts
S: Follow the specific tightening sequence.
Si: Apply silicone grease (ex. PBC grease).

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Caliper bleed valves	7.8	0.80	69 in·lb	
2	Brake hose banjo bolts	25	2.5	18	
3	Brake pedal bolt	8.8	0.90	78 in·lb	
4	Rear caliper mounting bolts	25	2.5	18	
5	Rear brake disc bolts	27	2.8	20	L
6	Rear master cylinder pushrod locknut	18	1.8	13	
7	Rear caliper assembly bolts	29	3.0	21	
8	Rear master cylinder mounting bolts	25	2.5	18	

B: Apply brake fluid.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement parts
RG: Apply rubber grease.
Si: Apply silicone grease (ex. PBC grease).

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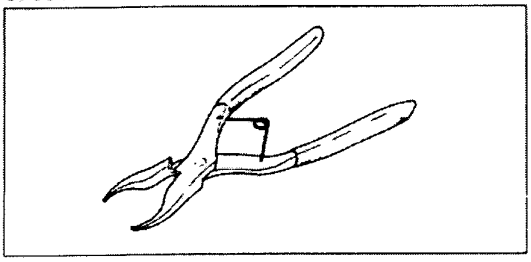
Specifications

Item	Standard	Service Limit
Brake Lever, Brake Pedal		
Brake lever position	4-way adjustable (to suit rider) 5-way adjustable (ZX1200-C3 ~)	– – –
Brake lever free play	Non-adjustable	– – –
Pedal free play	Non-adjustable	– – –
Pedal position	About 52 mm (2.0 in.) below footpeg top	– – –
Brake Fluid		
Grade	DOT4	– – –
Brake Pads		
Lining thickness:		
Front	4 mm (0.2 in.)	1 mm (0.04 in.)
Rear	4 mm (0.2 in.)	1 mm (0.04 in.)
Brake Discs		
Thickness:		
Front	4.8 ~ 5.1 mm (0.19 ~ 0.20 in.)	4.5 mm (0.18 in.)
Rear	5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)	5.5 mm (0.22 in.)
Runout	0.15 mm (0.0059 in.) or less	0.3 mm (0.01 in.)

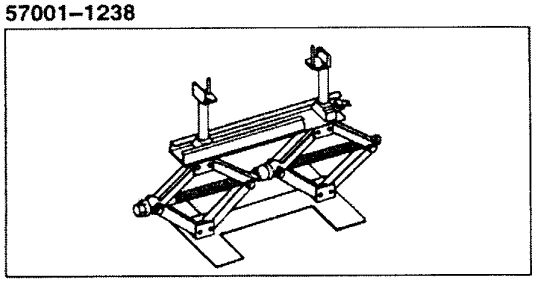
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Special Tools

Inside Circlip Pliers:
57001–143



Jack:
57001–1238



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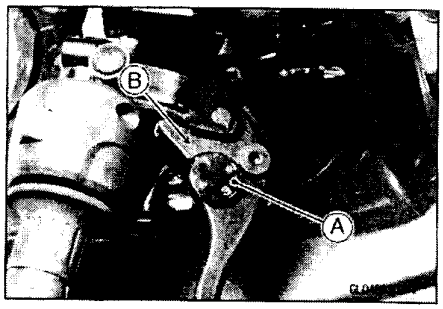
Brake Lever, Brake Pedal

Brake Lever Position Adjustment

The brake lever is adjustable to four positions to suit the rider.

- Push the lever forward and turn the adjuster [A] to align the number with the arrow mark [B].

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



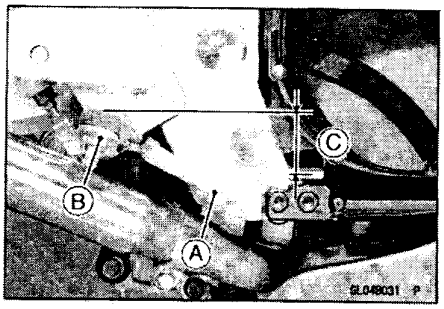
Brake Pedal Position Inspection

- Check that the brake pedal [A] is in the correct position. Footpeg [B]

Pedal Position [C]

Standard: **About 52 mm (2.0 in.) below top of footpeg**

★If it is incorrect, adjust the brake pedal position.



Brake Pedal Position Adjustment

NOTE

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

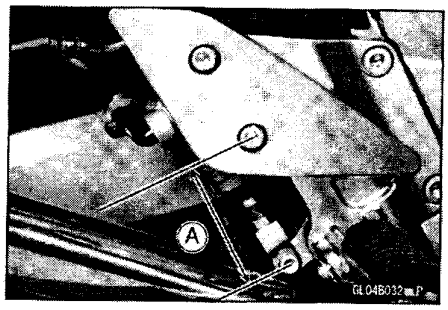
- Measure the length indicated in the figure.

Length [A]

Standard: **78.5 ±1 mm (3.09 ±0.04 in.)**

★If it is specified length, the brake pedal may be deformed or incorrectly installed.

★If it is not within the specified length, adjust the push rod in the master cylinder as following.



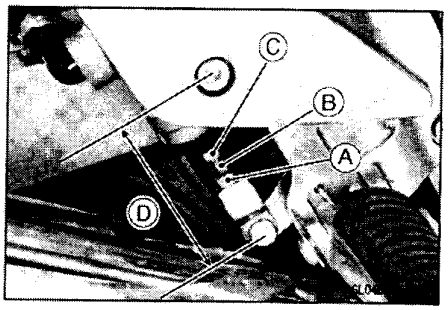
○Loosen the push rod locknut [A].

○Turn the hex head [C] of the push rod [B] to obtain the specified length [D].

○Tighten the locknut.

Torque - Rear Master Cylinder Push Rod Locknut: 18 N·m (1.8 kgf·m, 13 ft·lb)

- Check the brake light switch operation (see Electrical System chapter).

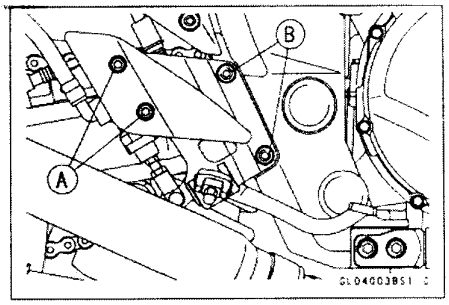


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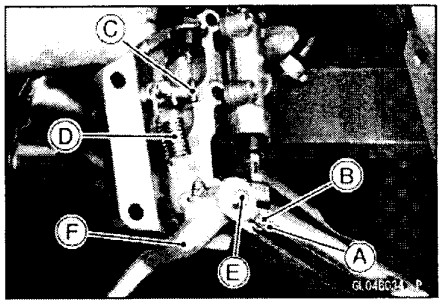
Brake Lever, Brake Pedal

Brake Pedal Removal

● Remove:
Rear Master Cylinder Mounting Bolts [A]
Right Footpeg Stay Bolts [B]

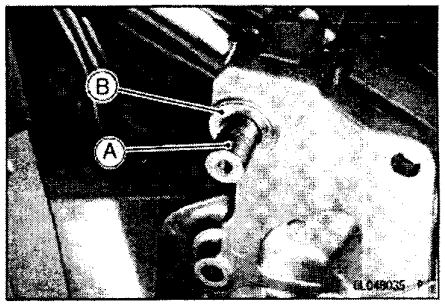


● Remove:
Cotter Pin [A]
Joint Pin [B] (see Rear Master Cylinder Removal)
● Remove the Rear Brake Light Switch Spring [C].
● Remove the return spring [D].
● Remove the mounting bolt [E] and take out the brake pedal [F].



Brake Pedal Installation

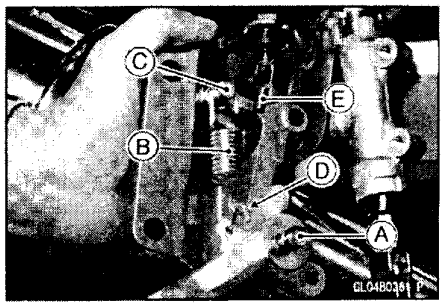
● Apply high-temperature grease to the pivot shaft [A] and install the washer [B].



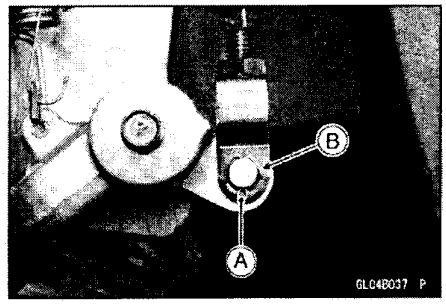
● Insert the return spring lower end to the pedal hole.
● Install the brake pedal with the return spring.
● Tighten the brake pedal bolt [A].

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

● Hook the upper end of the return spring [B] on the stay hook [C].
● Hook the lower end [D] of the rear brake light switch spring [E] on the return spring lower end.



● Replace the cotter pin with a new one.
○Insert the cotter pin [A] and bend the pin ends [B].



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Brake Lever, Brake Pedal

● Install the right footpeg stay.

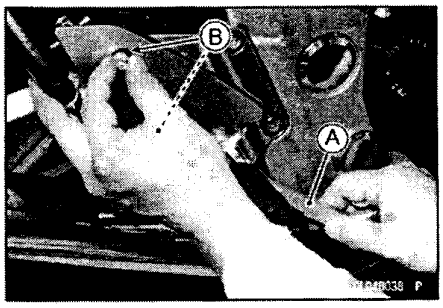
Torque - Front Footpeg Stay Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

● Install the rear master cylinder (see Rear Master Cylinder Installation).

○Depress the brake pedal [A] and then align the bolt holes of the master cylinder [B].

Torque - Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

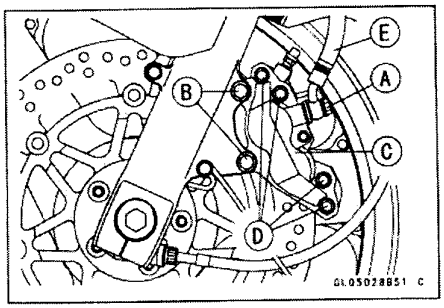
● Check the brake pedal position (see Brake Pedal Position Inspection).



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Calipers

Front Caliper Removal



- For U.S. and canadian models, remove the reflector.
- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.

CAUTION

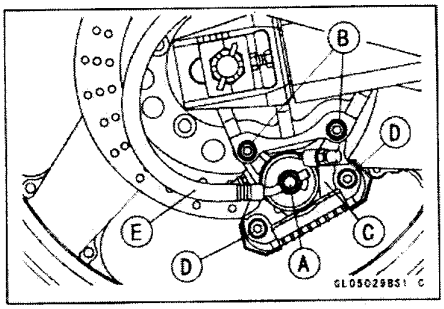
Do not loosen the caliper assembly bolts [D]. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper assembly bolts will cause brake fluid leakage.

- Unscrew the banjo bolt and remove the brake hose [E] from the caliper (see Brake Hose Removal/Installation).

CAUTION

Immediately wash away any brake fluid that spills.

Rear Caliper Removal



- Loosen the banjo bolt [A] at the brake hose lower end, and tighten it loosely.
- Unscrew the caliper mounting bolts [B], and detach the caliper [C] from the disc.

CAUTION

Do not loosen the caliper assembly bolts [D]. Take out only the caliper mounting bolts for caliper removal. Loosening the caliper assembly bolts will cause brake fluid leakage.

- Unscrew the banjo bolt and remove the brake hose [E] from the caliper (see Brake Hose Removal/Installation).

CAUTION

Immediately wash away any brake fluid that spills.

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Calipers

Caliper Installation

- Install the caliper and brake hose lower end.

○Replace the washers on each side of hose fitting with new ones.

- Tighten the caliper mounting bolts and banjo bolt.

Torque - Front Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Rear Caliper Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

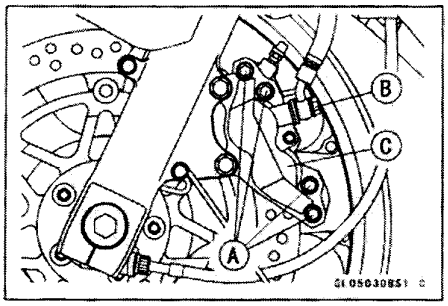
- Check the fluid level in the brake reservoirs.
- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

⚠ WARNING

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

Front Caliper Disassembly

- For U.S. and canadian models, remove the reflector.
- Remove the pad spring and brake pads (see this chapter).
- Loosen the front caliper assembly bolts [A] and front caliper banjo bolt [B] and tighten them loosely.
- Remove the front caliper [C] and banjo bolt.
- Remove the front caliper assembly bolts and split the front caliper.
- Remove the O-ring.

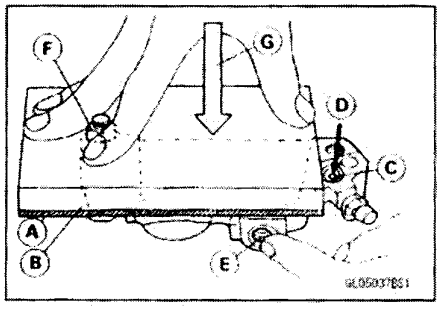


- Using compressed air, remove the pistons. One way to remove the pistons is as follows.

○Install a rubber gasket [A] and a wooden board [B] more than 10 mm thick on the caliper half, and fasten them together with a suitable bolt and nut as shown. Leave one of the oil passages [C] open.

○Lightly apply compressed air [D] to the oil passage until the pistons hit the rubber gasket. Block the hose joint opening [E] during this operation if the caliper half has the opening.

Bolt and Nut [F]
Push down [G]

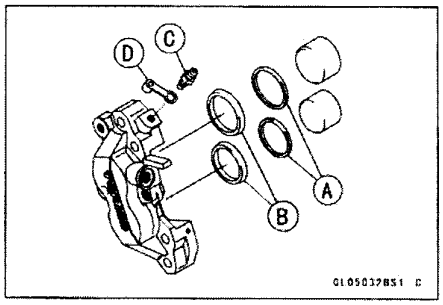


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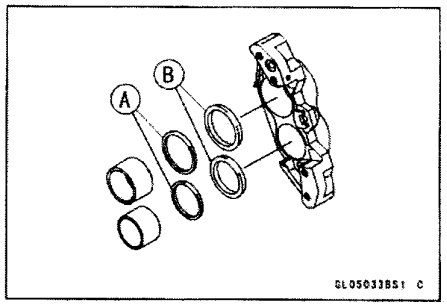
Calipers

⚠ WARNING

To avoid serious injury, never place your fingers or palm in front of the piston. If you apply compressed air into the caliper, the piston may crush your hand or fingers.



○Pull out the pistons by hand.
- Remove the dust seals [A] and fluid seals [B].
- Remove the bleed valve [C], and rubber cap [D].
- Repeat the previous step to remove the pistons from the other side of the caliper body.



Front Caliper Assembly

- Clean the caliper parts except for the pads.

CAUTION

For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valve and rubber cap.

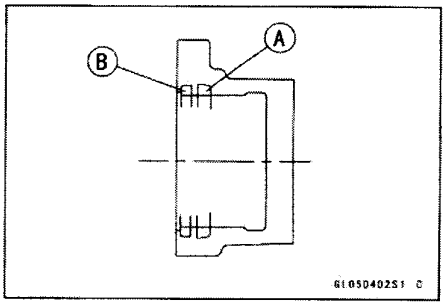
Torque - Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)

- Apply rubber grease to the cylinder bore.
- Replace the fluid seals [A] with new ones.

○Apply rubber grease to the fluid seals, and install them into the cylinders by hand.

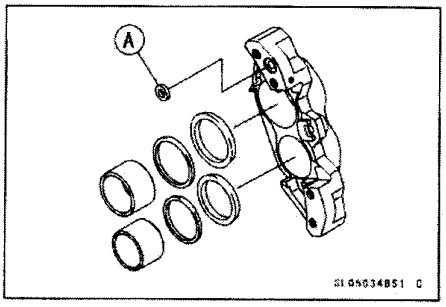
- Replace the dust seals [B] with new ones if they are damaged.

○Apply rubber grease to the dust seals, and install them into the cylinders by hand.



- Replace the O-ring [A] if they are damaged.
- Apply rubber grease to the O-ring.
- Apply brake fluid to the outside of the pistons, and push them into each cylinder by hand.
- Be sure to install the O-ring.
- Tighten the caliper assembly bolts.

Torque - Front Caliper Assembly Bolts: 21 N·m (2.1 kgf·m, 15 ft·lb)

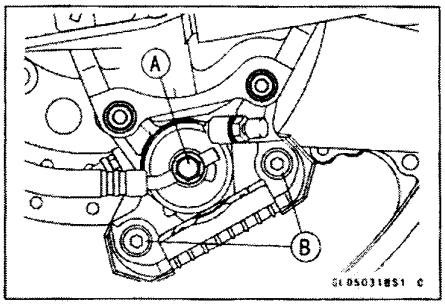


- Install the pads (see Front Brake Pad Installation).
- Wipe up any spilled brake fluid on the caliper with wet cloth.

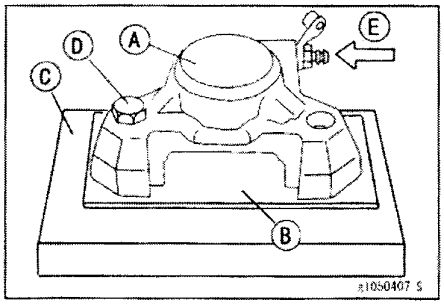
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Calipers

Rear Caliper Disassembly



- Loosen the banjo bolt [A] and rear caliper assembly bolts [B], and tighten them loosely.
- Remove:
  Rear Caliper (see Caliper Removal)
  Brake Pads (see Brake Pad Removal)
  Rear Caliper Assembly Bolts
  O-rings
  Insulators



- Remove the pistons as follows:

Left Side Piston

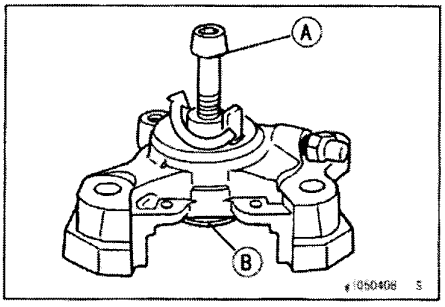
○Removal of the left side piston is the same as for the front caliper (see Front Caliper Disassembly).
[A] Left Side Caliper
[B] Rubber Gasket
[C] Wooden Board
[D] Bolt and Nut
[E] Apply compressed air

⚠ WARNING

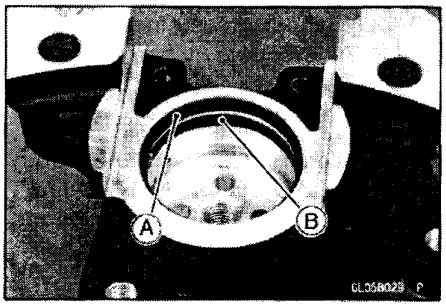
To avoid serious injury, never place your fingers or palm in rear of the piston. If you apply compressed air into the caliper, the piston may crush your hand of fingers.

Right Side Piston

○Using the rear caliper assembly bolt [A], remove the piston [B] as shown.



- Remove the dust seals [A] and fluid seals [B].
- Remove the bleed valves and rubber caps.



Rear Caliper Assembly

- Clean the caliper parts except for the pads.

CAUTION

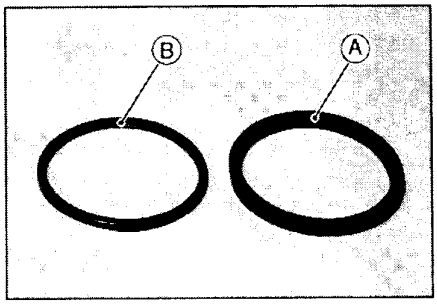
For cleaning the parts, use only disc brake fluid, isopropyl alcohol, or ethyl alcohol.

- Install the bleed valves and rubber caps.

Torque - Bleed Valve: 7.8 N·m (0.8 kgf·m, 69 in·lb)

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Calipers



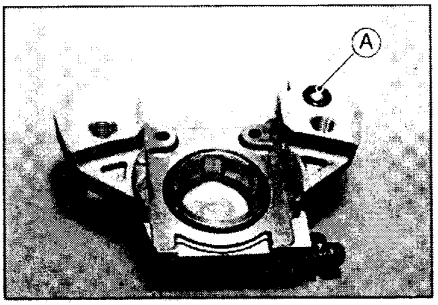
- Apply rubber grease to the cylinder bores.
- Replace the fluid seals [A] with a new ones.

○Apply rubber grease to the fluid seals, and install them into each cylinder by hand.

- Replace the dust seals [B] with a new ones if they are damaged.

○Apply rubber grease to the dust seals, and install them into each cylinder by hand.

- Install the fluid and dust seals (see Front Caliper Assembly).



- Replace the O-ring [A] if it is damaged.

○Apply rubber grease to the O-ring.

- Apply brake fluid to the outside of the pistons, and push them into the cylinder by hand.
- Install the piston insulators.

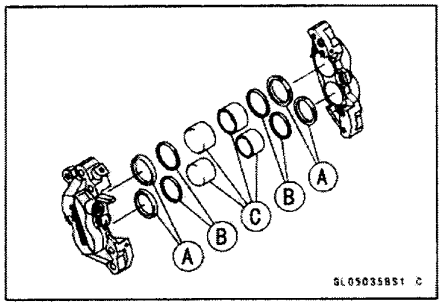
- Tighten the caliper assembly bolts.

Torque - Rear Caliper Assembly Bolts: 29 N·m (3.0 kgf·m, 21 ft·lb)

- Install the pads (see Rear Brake Pad Installation).
- Wipe up any spilled brake fluid on the caliper with wet cloth.
- Install the rear caliper (see Rear Caliper Installation).

Caliper Fluid Seal Damage

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

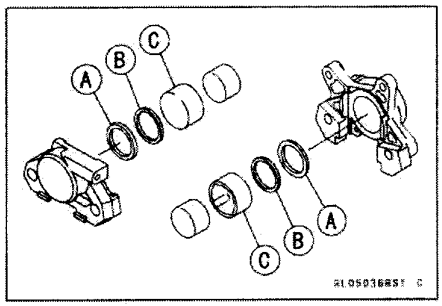


- Replace the fluid seals under any of the following conditions; (a) fluid leakage around the pad; (b) brakes overheat (c) there is a large difference in inner and outer pad wear; (d) the seal is stuck to the piston.

★If the fluid seal is replace, replace the dust seal as well. Also, replace all seals every other time the pads are changed.

Caliper Dust Seal Damage

- Check that the dust seals [B] is not cracked, worn, swollen, or otherwise damaged.
- If it show any damage, remove the caliper bracket and replace it.



Caliper Piston and Cylinder Damage

- Visually inspect the piston [C] and cylinder surfaces.

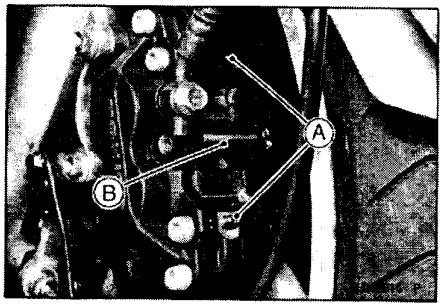
★Replace the caliper if the cylinder and piston are badly scores or rusty.

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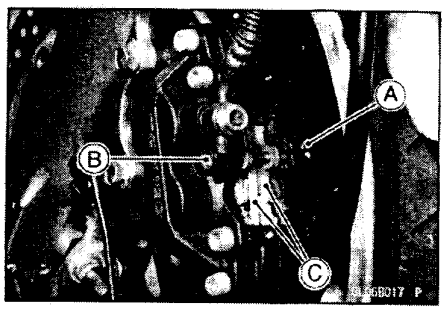
Brake Pads

Front Brake Pad Removal

- Unscrew the pad spring bolts [A], and remove the pad spring [B].



- Draw out the clip [A], and unscrew the pad pin [B].
- Remove the brake pads [C].



Front Brake Pad Installation

- Push the caliper pistons in by hand as far as they will go.
- Install the brake pads into the caliper.
- Tighten the pad pin and insert the clip into the pin end.

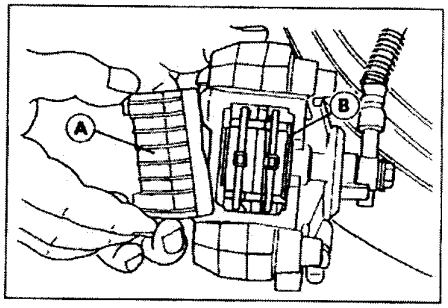
Torque - Front Brake Pad Pin: 16 N·m (1.6 kgf·m, 12 ft·lb)
Front Brake Pad Spring Bolts: 2.9 N·m (0.3 kgf·m, 26 in·lb)

⚠ WARNING

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

Rear Brake Pad Removal

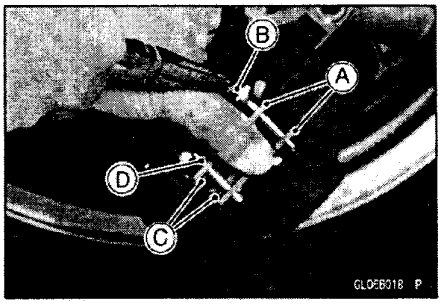
- Unscrew the caliper mounting bolts (see Rear Caliper Removal).
- Detach the caliper from the disc.
- Remove the pad cover [A].
- Draw out the clip [B] upward.



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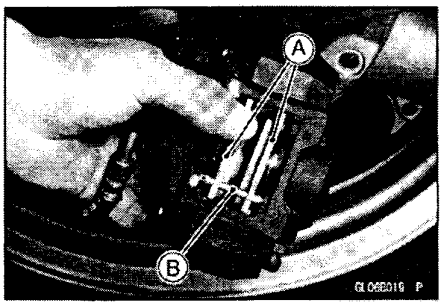
Brake Pads

- Pushing the middle part of the pads [A] lightly and then take off the pin [B].
- Remove the anti–rattle springs [C], pin [D] and brake pads.



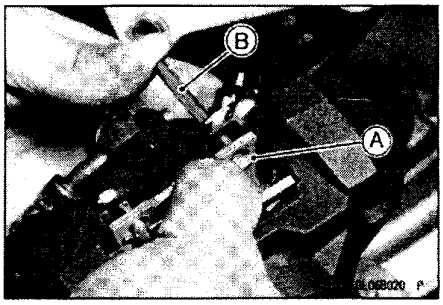
Rear Brake Pad Installation

- Push the caliper piston in by hand as far as it will go.
- Put the pads [A] in the caliper and insert the pin [B] one side .



- Install the anti-rattle springs in place.

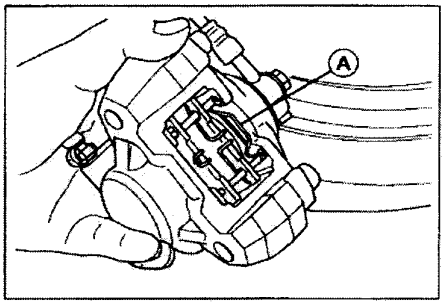
○Pushing the spring end [A] to under the hole of the pad, and insert the pin [B].



- Insert the clip [A]. The clip must be "outside" of the pads.
- Install the pad cap.
- Install the caliper (see Caliper Installation).

⚠ WARNING

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



Brake Pad Lining Wear

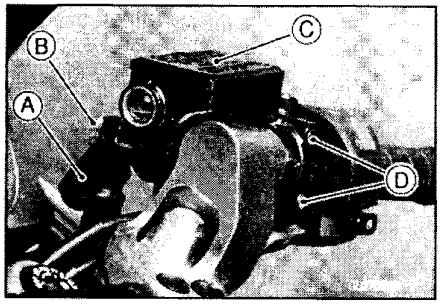
- Refer to the Brake Pad Wear Inspection in Periodic Maintenance Chapter.

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Master Cylinder

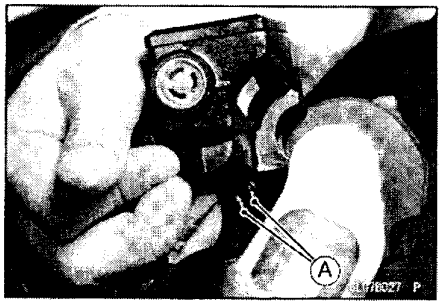
Front Master Cylinder Removal

- Slide out the dust cover [A] (ZX1200-C1 ~ C2).
- Remove the banjo bolt [B] to disconnect the brake hose from the master cylinder [C] (see Brake Hose Removal/Installation).



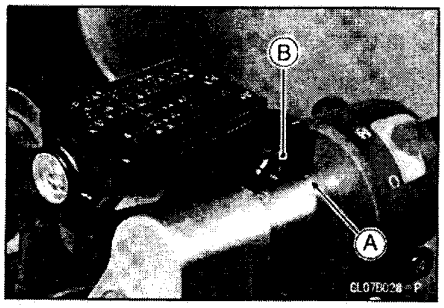
CAUTION
Immediately wash away any brake fluid that spills.

- Unscrew the clamp bolts [D], and take off the master cylinder as an assembly with the reservoir, brake lever, and brake switch installed.
- Disconnect the front brake light switch connectors [A].



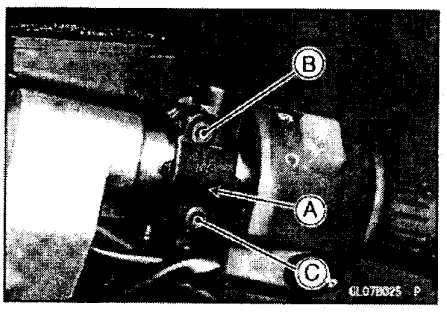
Front Master Cylinder Installation

- Connect the front brake light switch connectors.
- Install the front master cylinder so that the punch mark [A] of the handlebar is aligned with the mating surface [B] of the master cylinder clamp to level the reservoir.



- The master cylinder clamp must be installed with the arrow mark [A] upward.
- Tighten the upper clamp bolt [B] first, and then the lower clamp bolt [C]. There will be a gap at the lower part of the clamp after tightening.

  Torque - Front Master Cylinder Clamp Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)



- Replace the washers that are on each side of the hose fitting with new ones.
- Tighten the brake hose banjo bolt.

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

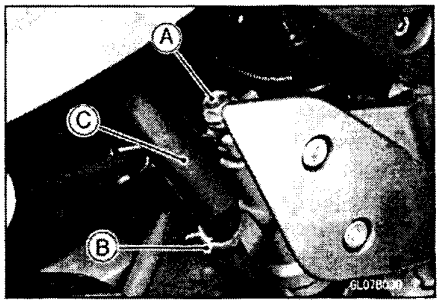
- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

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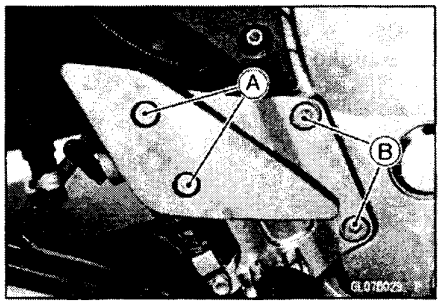
Master Cylinder

Rear Master Cylinder Removal

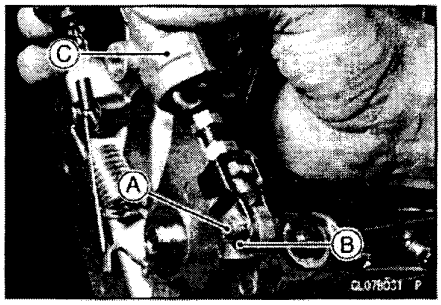
- Place a container under the rear master cylinder.
- Unscrew the brake hose banjo bolt [A] on the master cylinder (see Brake Hose Removal/Installation).
- Slide out the clamp [B].
- Pull out the reservoir hose [C], and drain the brake fluid into a container.



- Remove the master cylinder mounting bolts [A].
- Unscrew the footpeg stay bolts [B], and remove the footpeg assy.



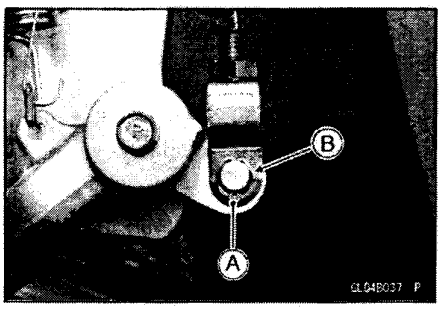
- Remove the cotter pin [B].
- Remove the joint pin [A].
- Remove the master cylinder [C].



Rear Master Cylinder Installation

- Replace the cotter pin with a new one.
- Insert the cotter pin [A] and bend the pin ends [B].
- Install the master cylinder (see Brake Pedal Installation).
- Replace the washers that are on each side of hose fitting with new ones.
- Tighten the following bolts.

Torque - Front Footpeg Stay Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Rear Master Cylinder Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Brake Hose Banjo Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)



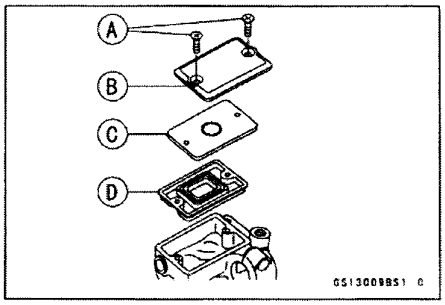
- Bleed the brake line (see Bleeding the Brake Line).
- Check the brake for good braking power, no brake drag, and no fluid leakage.

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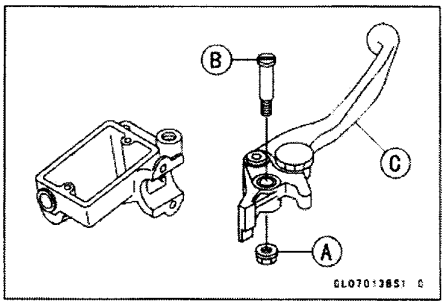
Master Cylinder

Front Master Cylinder Disassembly

- Remove the front master cylinder (see Front Master Cylinder Removal).
- Remove:
  Screws [A]
  Reservoir Cap [B]
  Plate [C]
  Diaphragm [D]
- Pour the brake fluid into a container.



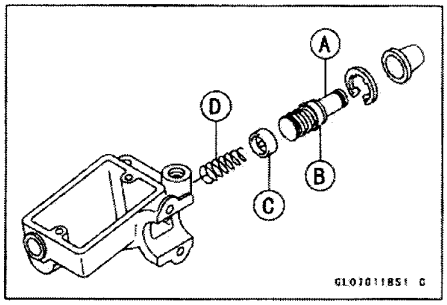
- Unscrew the locknut [A] and pivot bolt [B], and remove the brake lever [C].



- Pull the dust cover out of place, and remove the circlip.
  Special Tool - Inside Circlip Pliers: 57001-143
- Pull out the piston [A], secondary cup [B], primary cup [C], and return spring [D].

CAUTION

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



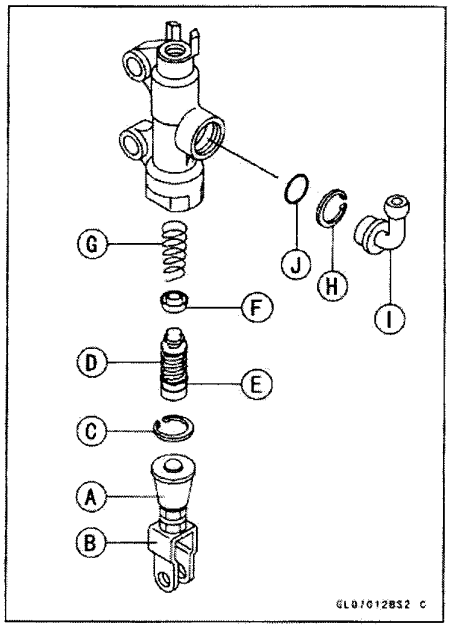
Rear Master Cylinder Disassembly

- Remove the rear master cylinder (see Rear Master Cylinder Removal).
- Slide the dust cover [A] on the push rod [B] out of place, and remove the circlip [C].
  Special Tool - Inside Circlip Pliers: 57001-143
- Pull out the push rod with the piston stop.
- Take off the piston [D], secondary cup [E], primary cup [F], and return spring [G].

CAUTION

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

- Remove the circlip [H] and pull out the fitting [I] with the O-ring [J].



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Master Cylinder

Master Cylinder Assembly

● Before assembly, clean all parts including the master cylinder with brake fluid or alcohol.

CAUTION

Use only disc brake fluid, isopropyl alcohol, or ethyl alcohol for cleaning master cylinder parts. Do not use any other fluid for cleaning these parts, Gasoline, engine oil, or any other petroleum distillate will cause deterioration of the rubber parts. Oil Spilled on any part will be difficult to wash off completely, and will eventually deteriorate the rubber used in the disc brake.

● Apply brake fluid to the removed parts and to the inner wall of the cylinder.

● Take care not to scratch the piston or the inner wall of the cylinder.

● Apply a silicone grease (ex. PBC grease) to the push rod contact and brake lever pivot bolt contact.

● Tighten the brake lever pivot bolt and the locknut.

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

Master Cylinder Inspection (Visual Inspection)

● Disassemble the front and rear master cylinders.

● Check that there are no scratches, rust or pitting on the inner wall [A] of each master cylinder and on the outside of each piston [B].

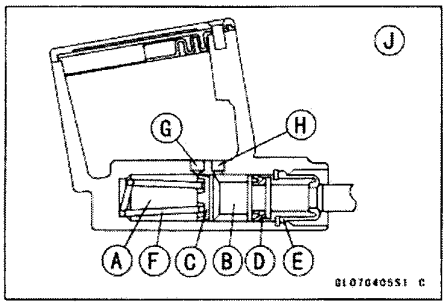
★If a master cylinder or piston shows any damage, replace them.

● Inspect the primary [C] and secondary [D] cups.

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

★If fluid leakage is noted at the brake lever, the piston assembly should be replaced to renew the cups.

Front Master Cylinder [J]

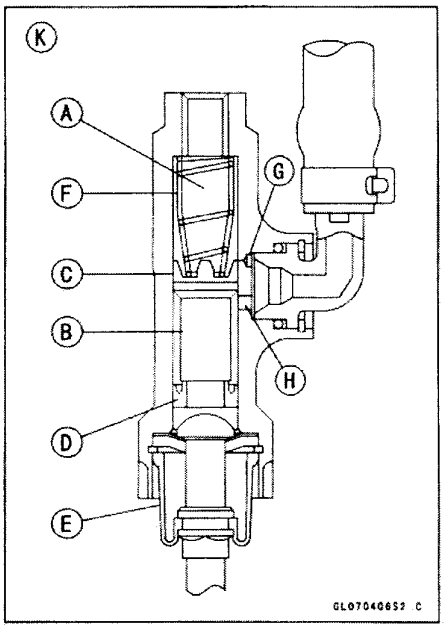


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Master Cylinder

● Check the dust covers [E] for damage.
★If they are damaged, replace them.
● Check the piston return springs [F] for any damage.
★If the springs are damaged, replace them.
● Check that relief [G] and supply [H] ports are not plugged.
★If the relief port becomes plugged, the brake pads will drag on the disc. Blow the ports clean with compressed air.

Rear Master Cylinder [K]

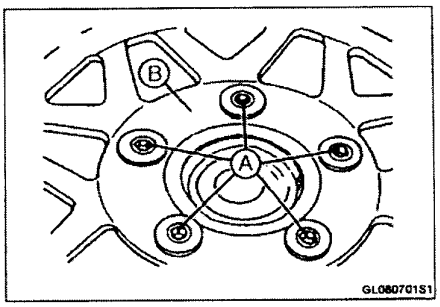


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Brake Discs

Brake Disc Removal

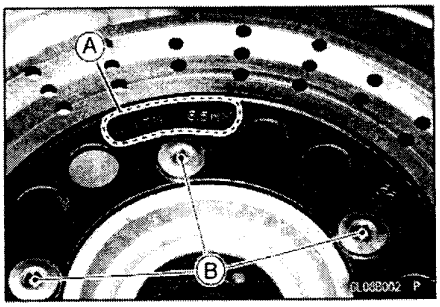
- Remove the wheel (see Wheels/Tires chapter).
- Unscrew the mounting bolts [A], and take off the disc [B].



Brake Disc Installation

- Install the brake disc on the wheel so that the marked side [A] faces out.
- Apply non-permanent locking agent to the threads of the rear brake disc mounting bolts.
- Tighten the mounting bolts [B].

Torque - Brake Disc Bolts: 27 N·m (2.8 kgf·m, 20 ft·lb)

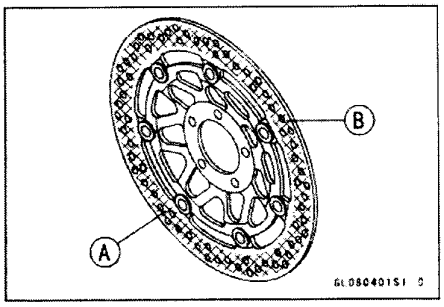


Brake Disc Wear

- Measure the thickness of each disc at the point where it has worn the most.

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

[B] Measuring Area



Front Disc Thickness

Standard:	**4.8 ~ 5.1 mm (0.19 ~ 0.20 in.)**
Service Limit:	**4.5 mm (0.18 in.)**

Rear Disk Thickness

Standard:	**5.8 ~ 6.2 mm (0.23 ~ 0.24 in.)**
Service Limit:	**5.5 mm (0.22 in.)**

Brake Disc Warp

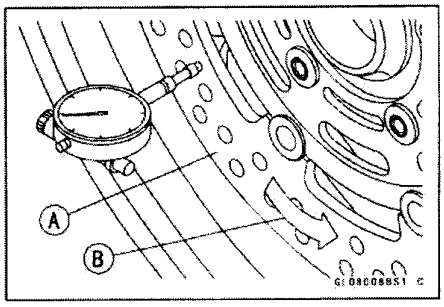
- Use the center stand to support the motorcycle upright.
- For front disc inspection, jack up the motorcycle so that the wheel is off the ground and turn the handlebar fully to one side.

Special Tool - Jack: 57001-1238

- Set up a dial gauge against the disc [A] as shown and measure disc runout.

[B] Turn the wheel by hand.

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



Disc Runout

Standard:	**0.15 mm (0.0059 in.) or less**
Service Limit:	**0.3 mm (0.01 in.)**

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Brake Fluid

Brake Fluid Level Inspection

- Refer to the Brake Fluid Level Inspection in Periodic Maintenance Chapter.

Brake Fluid Change

- Refer to the Brake Fluid Change in Periodic Maintenance Chapter.

Bleeding the Brake Line

The brake fluid has a very low compression coefficient so that almost all the movement of the brake lever or pedal is transmitted directly to the caliper for braking action. Air, however, is easily compressed. When air enters the brake lines, brake lever or pedal movement will be partially used in compressing the air. This will make the lever or pedal feel spongy, and there will be a loss in braking power.

⚠ WARNING

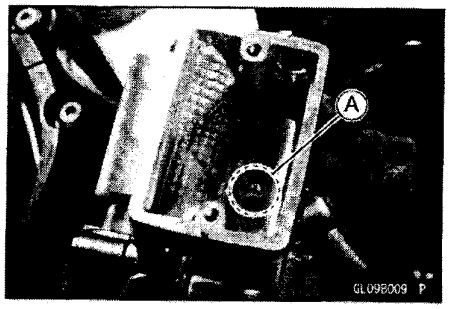
Be sure to bleed the air from the brake line whenever brake lever or pedal action feels soft or spongy after the brake fluid is changed, or whenever a brake line fitting has been loosened for any reason.

NOTE

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

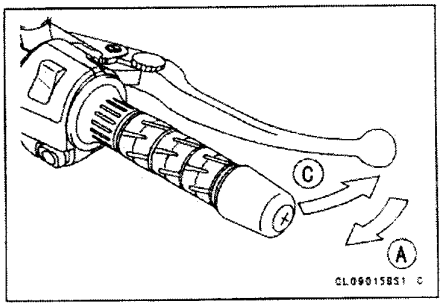
- Remove the reservoir cap plate, and diaphragm.
- Fill the reservoir with fresh brake fluid to the upper level line in the reservoir.
- With the reservoir cap off, slowly pump the brake lever several times until no air bubbles can be seen rising up through the fluid from the holes [A] at the bottom of the reservoir.

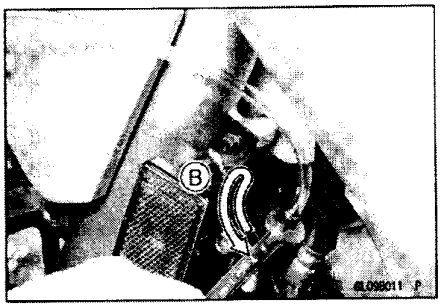
○ Bleed the air completely from the master cylinder by this operation.



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Brake Fluid





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

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

1. Pump the brake lever until it becomes hard, and apply the brake and hold it [A].
2. Quickly open and close [B] the bleed valve while holding the brake applied.
3. Release the brake [C].

NOTE

○*The fluid level must be checked often during the bleeding operation and replenished with fresh brake fluid as necessary. If the fluid in the reservoir runs completely out any time during bleeding, the bleeding operation must be done over again from the beginning since air will have entered the line.*

○*Tap the brake hose lightly from the caliper to the reservoir for more complete bleeding.*

○*Front Brake: Repeat the above steps for the other caliper.*

○*Rear Brake: Repeat the above steps for the other bleed valve.*

- Remove the clear plastic hose.
- Install the reservoir cap.
- Tighten the front reservoir cap screw.

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

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

Torque - Bleed Valve: 7.8 N·m (0.80 kgf·m, 69 in·lb)

- Check the fluid level.
- After bleeding is done, check the brake for good braking power, no brake drag, and no fluid leakage.

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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 handing the disc pads or disc, be careful that no disc brake fluid or any oil gets on them. Clean off any fluid or oil that inadvertently gets on the pads or disc with a high-flash point solvent. Do not use one which will leave an oily residue. Replace the pads with new ones if they cannot be cleaned satisfactorily.
8. Brake fluid quickly ruins painted surfaces; any spilled fluid should be completely wiped up immediately.
9. If any of the brake line fittings or the bleed valve is opened at any time, the **AIR MUST BE BLED FROM THE BRAKE LINE.**

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Brake Hoses

Brake Hose Removal/Installation

CAUTION

Brake fluid quickly ruins painted or plastic surfaces; any spilled fluid should be completely wiped up immediately with wet cloth.

- When removing the brake hose, take care not to spill the brake fluid on the painted or plastic parts.
- When removing the brake hose, temporarily secure the end of the brake hose to some high place to keep fluid loss to a minimum.
- There are washers on each side of the brake hose fitting. Replace them with new ones when installing.
- When installing the hoses, avoid sharp bending, kinking, flattening or twisting, and route the hoses according to Hose Routing section in Appendix chapter.
- Tighten the banjo bolts at the hose fittings.

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

- Bleed the brake line after installing the brake hose (see Bleeding the Brake Line).

Brake Hose Inspection

- Refer to the Brake Hose and Connection Check in Periodic Maintenance Chapter.

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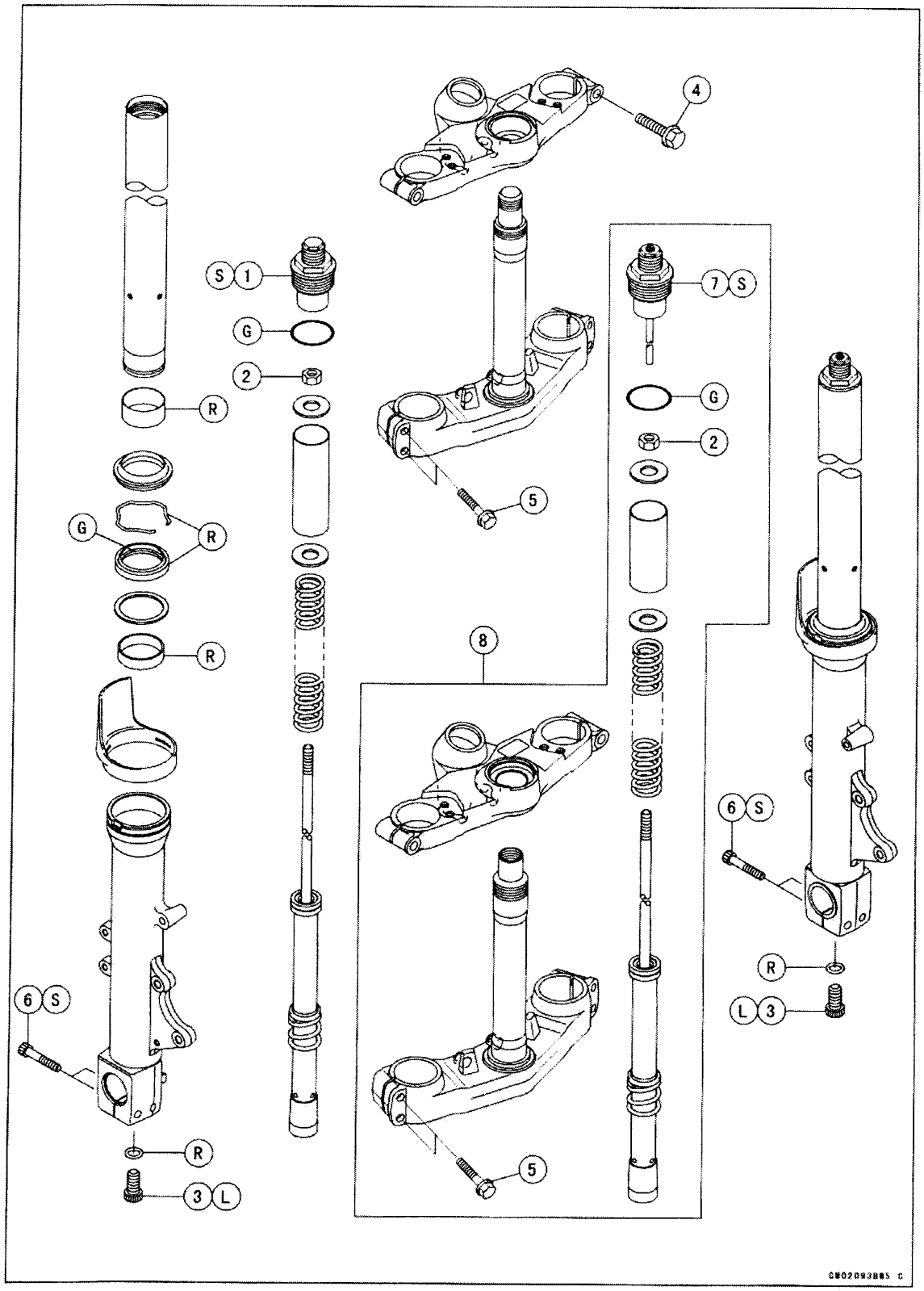
Suspension

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Exploded View



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Exploded View

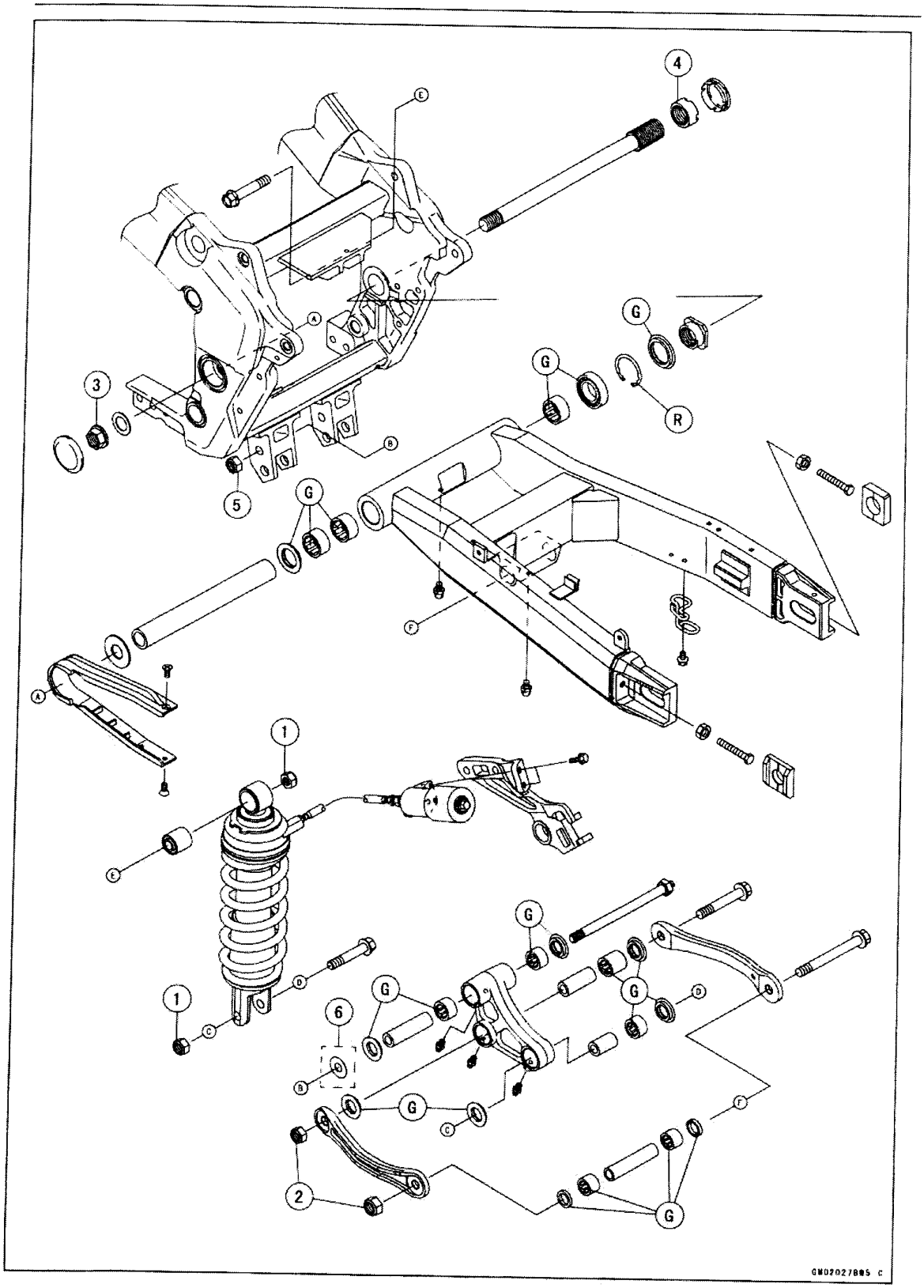
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front fork top plugs	23	2.3	17	
2	Piston rod nuts	15	1.5	11	
3	Front fork bottom bolts	40	4.0	29	L
4	Upper front fork clamp bolts	29	3.0	21	
5	Lower front fork clamp bolts	21	2.1	15	
6	Front axle clamp bolts	20	2.0	15	S
7	Front fork top plugs (ZX1200-C3 ~)	23	2.3	17	

8. Front fork (ZX1200-C3 ~)

G: Apply grease for oil seal and O-ring.
L: Apply a non-permanent locking agent.
R: Replacement Parts.

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear shock absorber nuts	59	6.0	44	
2	Tie-rod nuts	59	6.0	44	
3	Swingarm pivot shaft nut	110	11	81	
4	Swingarm pivot shaft locknut	98	10	72	
5	Rocker arm nut	59	6.0	44	

6. Shim (Be in need of shim adjustment from F/No 000001 to F/No 001025)
G: Apply grease.
R: Replacement Part

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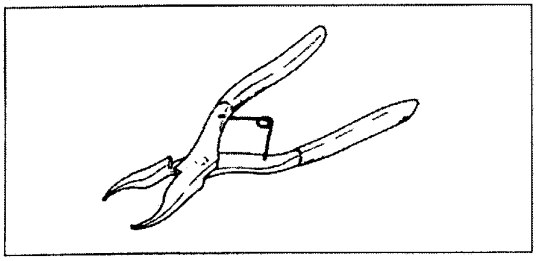
Specifications

Item	Standard
Front Fork (per one unit)	
Fork inner tube outside diameter	ϕ43 mm (1.7 in.)
Rebound damper setting:	1 turn out from the fully clockwise position
ZX1200-C3 ~	(Usable range: 0 ←→3 turns out)
Fork spring preload setting	Adjuster protrusion is 18 mm (0.7 in.)
	Usable Range: 5 ~ 20 mm (0.2 ~ 0.79 in.)
Fork oil viscosity	KAYABA 01 (SAE 5W)
Fork oil capacity	409 ±4 mL (13.8 ±0.14 US oz) completely dry
	406 ±4 mL (13.7 ±0.14 US oz) completely dry: ZX1200-C3 ~
	approx. 350 mL (11.8 US oz) when changing oil
	approx. 347 mL (11.7 US oz) when changing oil: ZX1200-C3 ~
Fork oil level	Fully compressed, without fork spring, below from inner tube top 167 ±2 mm (6.57 ±0.08 in.)
	163 ±2 mm (6.42 ±0.08 in.): ZX1200-C3 ~
Fork spring free length	269.3 mm (10.60 in.) Service limit 264 mm (10.4 in.)
Rear Shock Absorber	
Rebound damper setting	No. 2 of 4 positions
Spring setting position:	
damper setting	12th click from the first click of the fully clockwise position
	(Usable Range: 1 ←→ 45 clicks)
Standard	Spring length 194.2 mm (7.646 in.)
Usable range	Spring length 199.2 mm (7.842 in.) to 188.2 mm (7.409 in.) (weaker to stronger)
Spring free length	206.2 mm (8.118 in.) Service limit 202 mm (7.95 in.)
Gas pressure	980 kPa (10 kgf/cm^2, 142 psi, Non-adjustable)

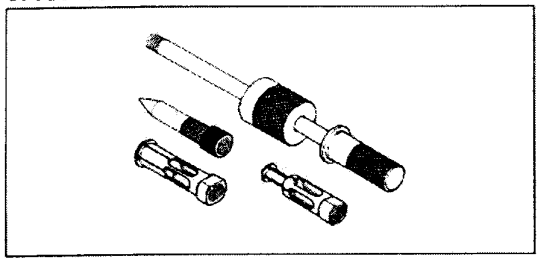
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Special Tools

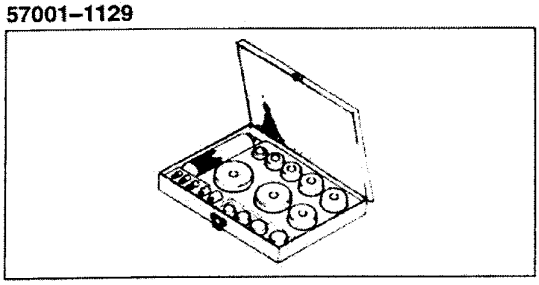
Inside Circlip Pliers:
57001–143



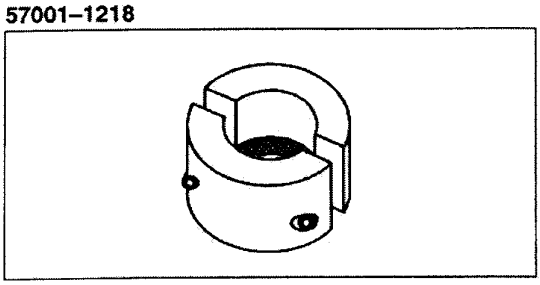
Oil Seal & Bearing Remover:
57001–1058



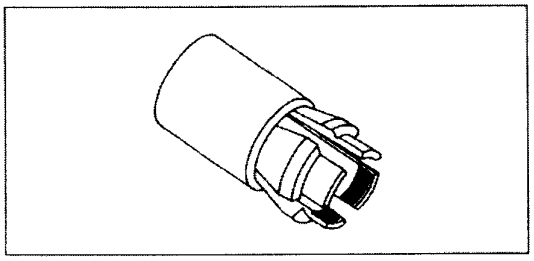
Bearing Driver Set:
57001–1129



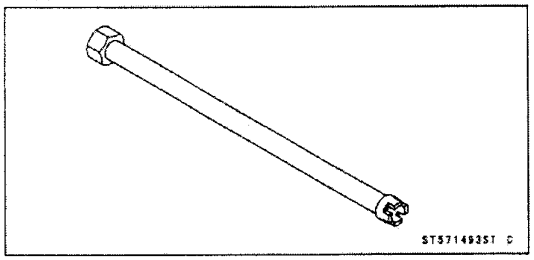
Fork Outer Tube Weight:
57001–1218



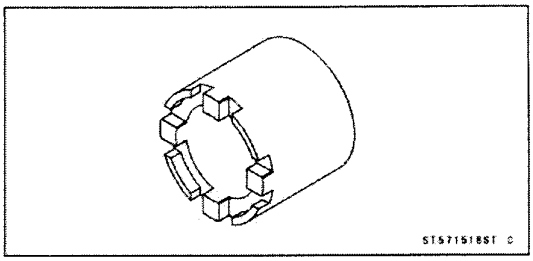
Front Fork Oil Seal Driver:
57001–1219



Fork Cylinder Holder, Hex 24:
57001–1493



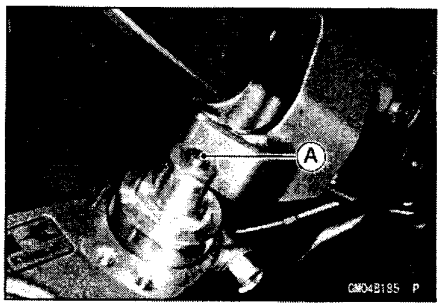
Swingarm Pivot Nut Wrench:
57001–1518



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Front Fork

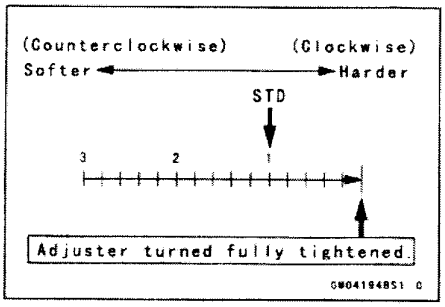
Rebound Damping Force Adjustment (ZX1200-C3 ~)



● To adjust the rebound damping force, turn the rebound damping adjuster [A] until you feel.

○The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is 1 turns out of the fully clockwise position.

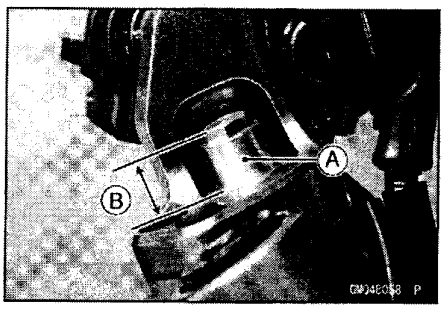
○The damping force can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the damping feels too soft or too stiff, adjust it in accordance with the following table.



Rebound Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
3	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
1					
↓	↓	↓	↓	↓	↓
0	Strong	Hard	Heavy	Bad	High

Spring Preload Adjustment



● Turn the spring preload adjuster [A] to change spring preload setting.

○The standard adjuster setting for the average-build rider of 68 kg (150 lb) with no passenger and no accessories is the 18 mm (0.7 in.) [B] from top as shown.

Adjuster Protrusion (from top)

Standard: **18 mm (0.7 in.)**

Usable Range: **5 ~ 20 mm (0.2 ~ 0.79 in.)**

⚠ WARNING

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

○The spring preload can be left soft for average riding. But it should be adjusted harder for high speed riding or riding with a passenger. If the spring action feels too soft or too stiff, adjust it in accordance with the following table.

Spring Action

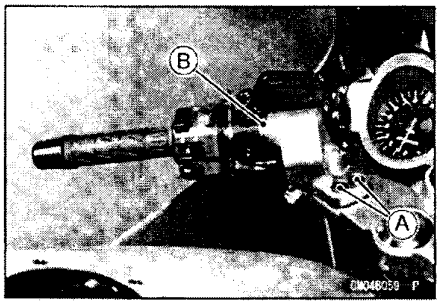
Adjuster Position	Damping Force	Setting	Load	Road	Speed
20 mm	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
5 mm	Strong	Hard	Heavy	Bad	High

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Front Fork

Front Fork Removal (each fork leg)

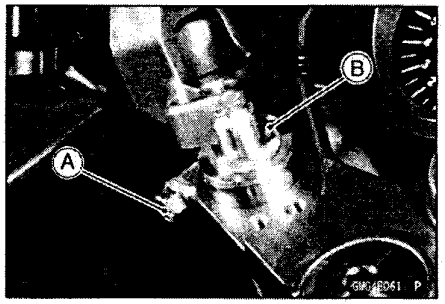
- Remove:
  Front Fender (see Frame chapter)
  Front Wheel (see Wheels/Tires chapter)
- Pull out the caps and unscrew the bolts [A].
- Remove the handlebar [B].



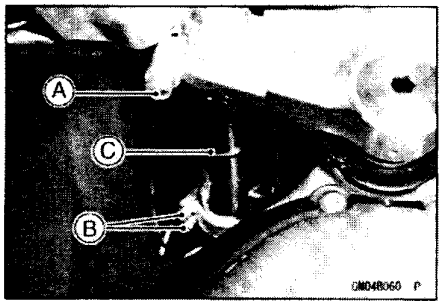
★Loosen the upper fork clamp bolt [A] and fork top plug [B] beforehand if the fork leg is to be disassembled.

NOTE

○*Loosen the top plug after loosening the upper fork clamp bolt.*



- Loosen the upper fork clamp bolt [A] and lower fork clamp bolts [B].
- Cut the strap [C].
- With a twisting motion, work the fork leg down and out.



Front Fork Installation

- Install the fork so that the top end [A] of the inner tube is 11.5 mm (0.45 in.) [B] high from with the upper surface [C] of the steering stem head bracket.
- Tighten the lower fork clamp bolts and fork top bolt.

Torque - Lower Front Fork Clamp Bolt: 21 N·m (2.1 kgf·m, 15 ft·lb)
Front Fork Top Plug: 23 N·m (2.3 kgf·m, 17 ft·lb)

NOTE

○*Tighten the two clamp bolts alternately two times to ensure even tightening torque.*

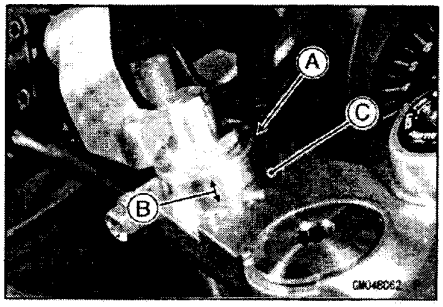
- Tighten the upper fork clamp bolt.

Torque - Upper Front Fork Clamp Bolt: 29 N·m (3.0 kgf·m, 21 ft·lb)

NOTE

○*Tighten the top plug before tightening the upper fork clamp bolt.*

- Install the removed parts (see appropriate chapters).
- Adjust the spring preload.



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Front Fork

Fork Oil Change

The fork oil should be changed in accordance with the Periodic Maintenance Chart.

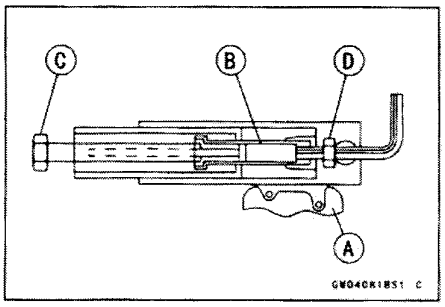
● Refer to the Fork Oil Change in Periodic Maintenance Chapter.

Front Fork Disassembly

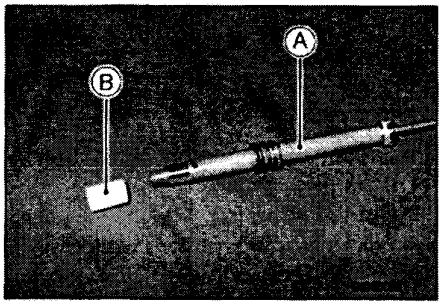
● Remove the front fork (see Front Fork Removal).
● Drain the fork oil (see Periodic Maintenance chapter).
● Remove the piston rod nut.
● Hold the front fork in a vise [A].
● Stop the cylinder [B] from turning by using the fork cylinder holder [C].

Special Tool - Fork Cylinder Holder: 57001-1493

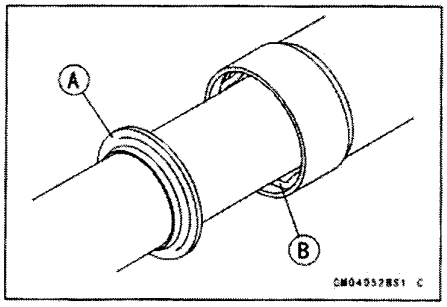
● Unscrew the Allen bolt [D], then take the bolt and gasket out of the bottom of the inner tube.



● Take the cylinder unit [A] and cylinder base [B].
○Do not disassemble the cylinder unit.

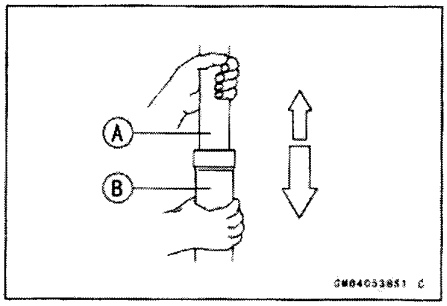


● Separate the inner tube from the outer tube as follows.
○Slide up the dust seal [A].
○Remove the retaining ring [B] from the outer tube.



○Grasp the inner tube [A] and stroke the outer tube up and down several times. The shock to the fork seal separates the inner tube from the outer tube [B].
★If the tubes are tight, use a fork outer tube weight.

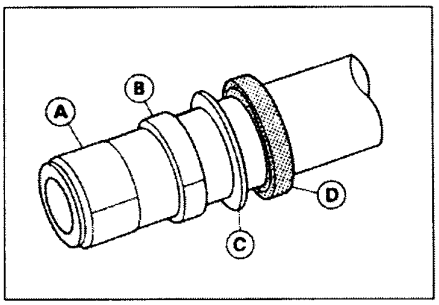
Special Tool - Fork Outer Tube Weight: 57001–1218



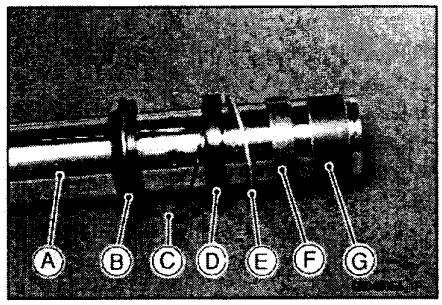
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Front Fork

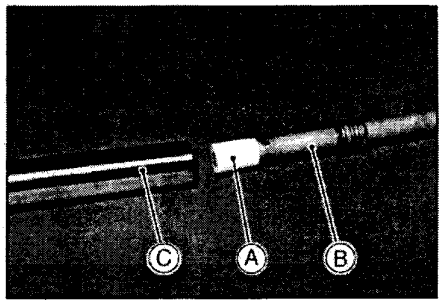
● Remove the inner tube guide bushing [A], outer tube guide bushing [B], washer [C] and oil seal [D] from the inner tube.
● Remove the cylinder base from the bottom of the outer tube.



Front Fork Assembly
● Replace the following part with new one.
Oil Seal
Guide Bushings
Bottom Allen Bolt Gasket
● Install the following parts into the inner tube [A].
Dust Seal [B]
Retaining Ring [C]
Oil Seal [D]
Washer [E]
Outer Tube Guide Bushing [F]
Inner Tube Guide Bushing [G]



● Install the cylinder base [A] on the cylinder unit [B].
● Insert the cylinder unit into the inner tube [C].

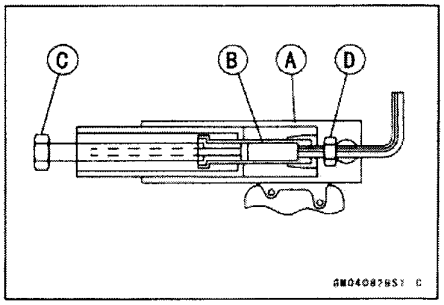


● Insert the inner tube, cylinder unit, and the cylinder base as a set into the outer tube [A].
● Replace the bottom Allen bolt gasket with a new one.
● Stop the cylinder [B] from turning by using the fork cylinder holder [C].

Special Tool - Fork Cylinder Holder: 57001-1493

● Apply non-permanent locking agent to the Allen bolt [D] and tighten it.

Torque - Front Fork Bottom Allen Bolt: 40 N·m (4.0 kgf·m, 29 ft·lb)

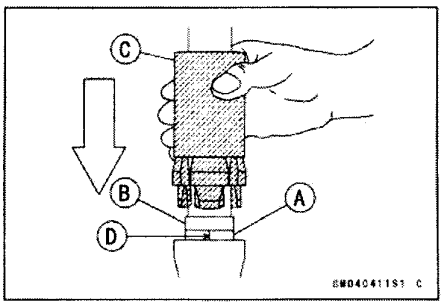


● Fit the new outer guide bushing [A] into the outer tube.

NOTE

○*When assembling the new outer tube guide bushing, hold the used guide bushing [B] against the new bushing and tap the used guide bushing with the fork oil seal driver [C] until it stops.*
○*The split [D] of the guide bushing should face the side of the vehicle.*

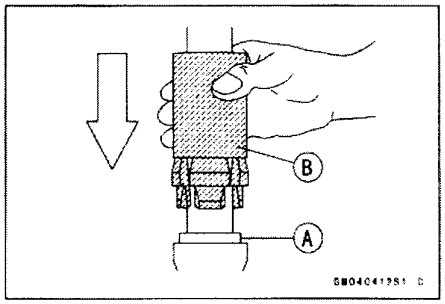
Special Tool - Front Fork Oil Seal Driver: 57001-1219



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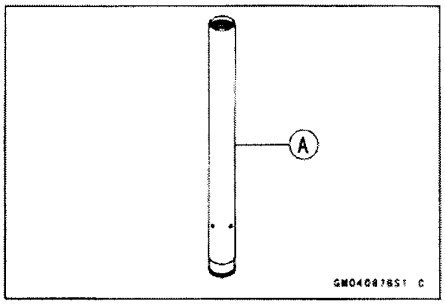
Front Fork

● After installing the washer, install the oil seal [A] by using the fork oil seal driver [B].
○Apply high-temperature grease to the oil seal lips.
● Install the retaining ring and dust seal by hand.
● Pour in the specified type of oil (see Periodic Maintenance chapter).



Inner Tube Inspection

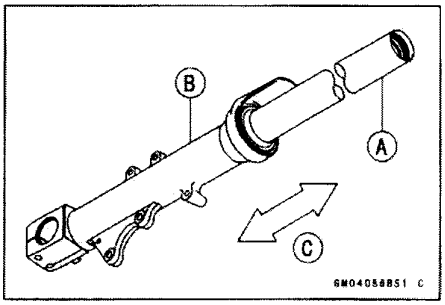
● Visually inspect the inner tube [A], and repair any damage.
● Nicks or rust damage can sometimes be repaired by using a wet-stone to remove sharp edges or raised areas which cause seal damage.
★If the damage is not repairable, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced.



CAUTION

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

● Temporarily assemble the inner [A] and outer tubes [B], and pump [C] them back and forth manually to check for smooth operation.
● If you feel binding or catching, the inner and outer tubes must be replaced.

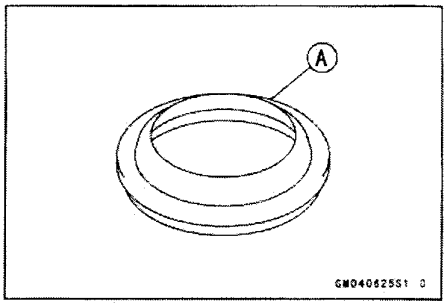


⚠ WARNING

A straightened inner or outer fork tube may fall in use, possibly causing an accident. Replace a badly bent or damaged inner or outer tube and inspect the other tube carefully before reusing it.

Dust Seal Inspection

● Inspect the dust seals [A] for any signs of deterioration or damage.
★Replace it if necessary.



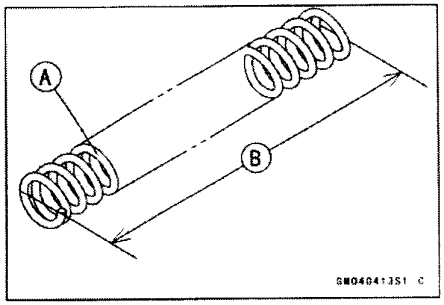
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Front Fork

Spring Tension

- Since a spring [A] becomes shorter as it weakens, check its free length [B] to determine its condition.

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



Fork Spring Free Length

Standard:	**269.3 mm (10.60 in.)**
Service Limit:	**264 mm (10.4 in.)**

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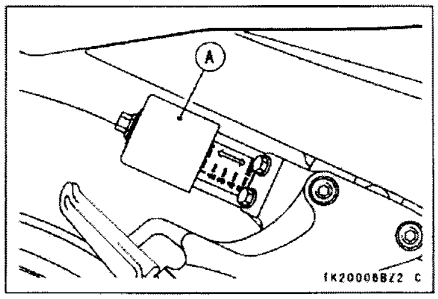
Rear Shock Absorber

Spring Preload Adjustment

- To adjust the spring preload, turn in the adjuster [A] until you feel a click.

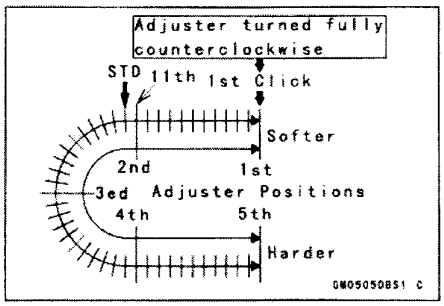
○The standard adjusting nut setting for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is the **12th** click from the 1st click of the fully clockwise position.

★If the spring action feels too soft or too stiff, adjust it.



Spring Adjustment

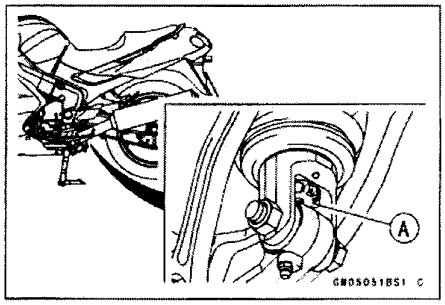
Adjuster Position	Damping Force	Setting	Load	Road	Speed
1	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
45	Strong	Hard	Heavy	Bad	High



Rebound Damping Force Adjustment

- To adjust the rebound damping force, turn the rebound damping adjuster [A] to the desired position.

○The standard adjuster setting for an average-build rider of 68 kg (150 lb) with no passenger and no accessories is **2nd** position.

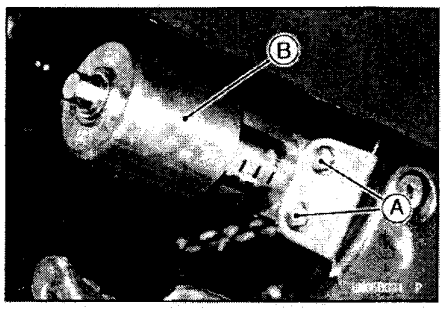


Rebound Damping Force Adjustment

Adjuster Position	Damping Force	Setting	Load	Road	Speed
1	Weak	Soft	Light	Good	Low
↑	↑	↑	↑	↑	↑
↓	↓	↓	↓	↓	↓
4	Strong	Hard	Heavy	Bad	High

Rear Shock Absorber Removal

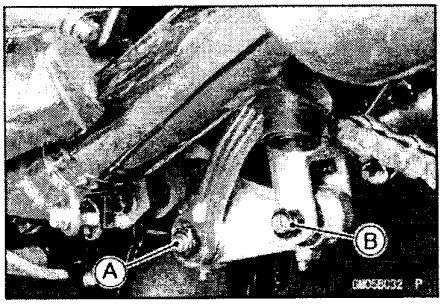
- Use the center stand to support the motorcycle upright.
- Unscrew the bolts [A] and hanging the adjuster [B].



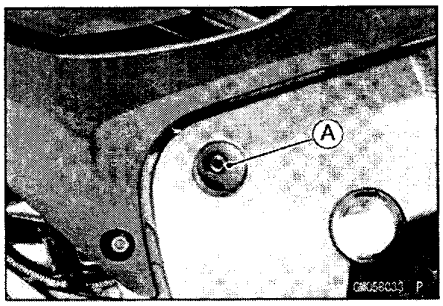
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Rear Shock Absorber

- Remove:
  Lower Tie-Rod Nut and Bolt [A]
  Lower Shock Absorber Nut and Bolt [B]



- Remove:
  Upper Shock Absorber Nut [A]
  Upper Shock Absorber Bolt
- Remove the shock absorber from under.



Rear Shock Absorber Installation

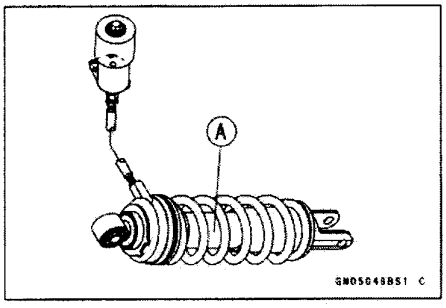
- Pack the rocker arm needle bearings with grease.
- Tighten the following nuts:

Torque - Rear Shock Absorber Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)
Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)

Rear Shock Absorber Scrapping

⚠ WARNING

Since the cylinder of the rear shock absorber contains nitrogen gas, do not incinerate the shock absorber without first releasing the gas or it may explode.



- Remove the shock absorber (see Rear Shock Absorber Removal).
- Drill the cylinder [A] of the shock absorber using about 2 mm (0.08 in.) drillbit.

⚠ WARNING

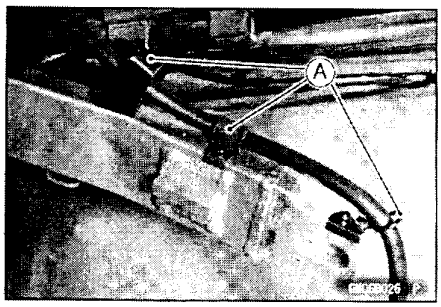
Since the high pressure gas is dangerous, do not point the drill hole toward your face or body.

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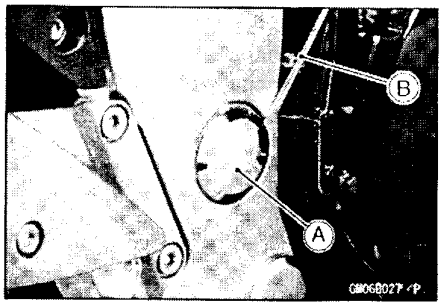
Swingarm

Swingarm Removal

- Use the center stand to support the motorcycle upright.
- Remove:
  Rear Wheel (see Wheels/Tires chapter)
  Chain Cover (see Final Drive chapter)
  Rear Shock Absorber (see this chapter)
  Brake Hose Clamps [A]

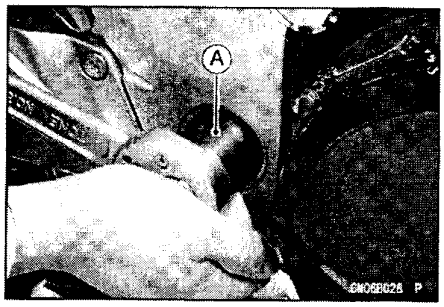


- Remove the pivot shaft caps [A] using the (–) type screw driver [B].

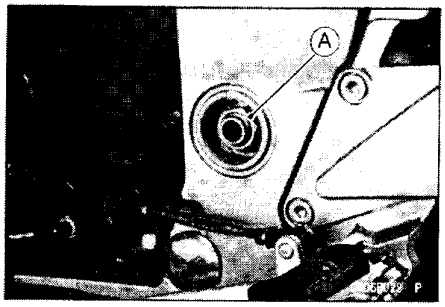


- Unscrew the swingarm pivot shaft locknut using socket wrench [A].

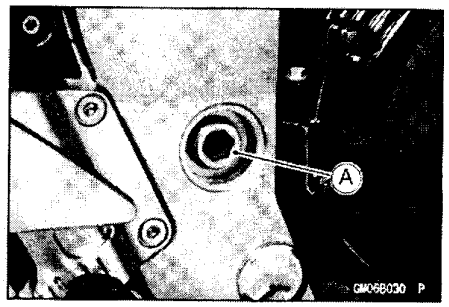
  Special Tool - Swingarm Pivot Nut Wrench: 57001–1518



- Unscrew the swingarm pivot shaft nut [A].



- Unscrew the swingarm pivot shaft [A].
- Pull out the pivot shaft right side of the motorcycle and remove the swingarm.

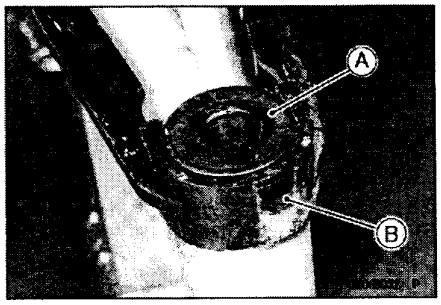


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Swingarm

Swingarm Installation

- Apply plenty of grease to the ball bearing, needle bearings and grease seals.
- Install the collar.
- Insert the washer [A] to the chain slider [B].



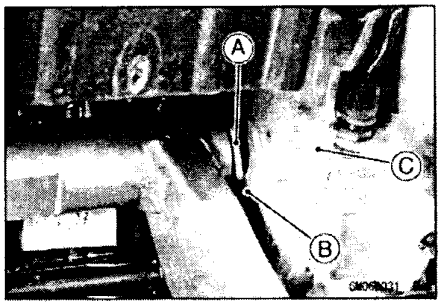
- Place the right collar [A] on the stopper [B] inside the frame [C].
- Insert the pivot shaft into the frame from the right side.
- Tighten the pivot shaft so that the clearance between the collar and the frame come to zero mm [D].
- Tighten the pivot nut.

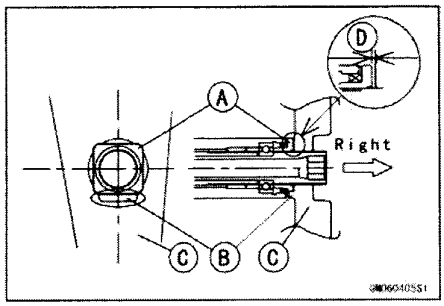
Torque - Swingarm Pivot Shaft Nut: 110 N·m (11 kgf·m, 81 ft·lb)

- Tighten the pivot locknut.

Torque - Swingarm Pivot Shaft Locknut: 98 N·m (10 kgf·m, 72 ft·lb)

- Install the removed parts (see appropriate chapters).



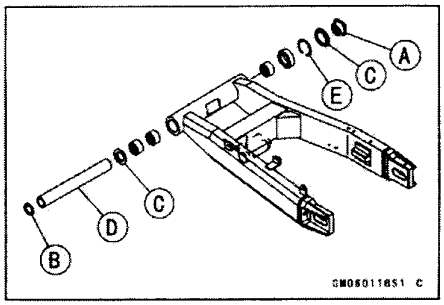


Swingarm Bearing Removal

- Remove:

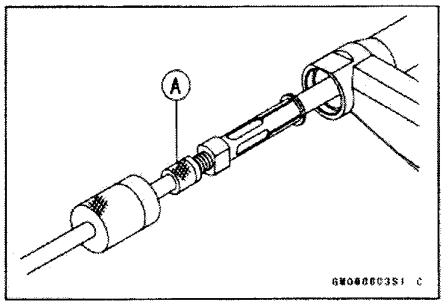
Swingarm (see Swingarm Removal)
Collar [A]
Washer [B]
Grease Seals [C]
Sleeve [D]
Circlip (right side) [E]

Special Tool - Inside Circlip Pliers: 57001-143



- Remove the ball bearing and needle bearings using the oil seal & bearing remover [A].

Special Tool - Oil Seal & Bearing Remover: 57001-1058



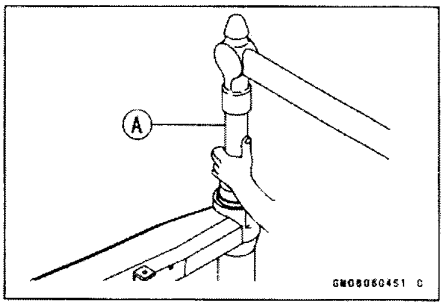
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Swingarm

Swingarm Bearing Installation

- Apply plenty of grease to the ball bearing and needle bearings.
- Install the needle bearings so that the manufacturer's marks face out.
- Install the ball bearing so that the manufacturer's marks faces out.

Special Tool - Bearing Driver Set: 57001-1129 [A]



Swingarm Bearing, Sleeve Inspection

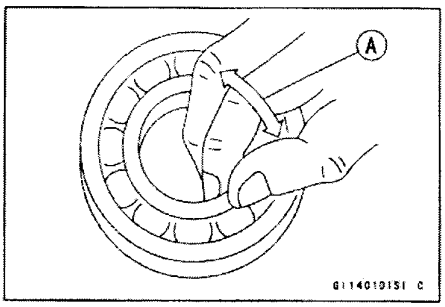
CAUTION

Do not remove the bearings for inspection. Removal may damage them.

- Check the ball bearing installed in the swingarm.

○Since the ball bearing is made to extremely close tolerances, the wear must be judged by feel rather than measurement.

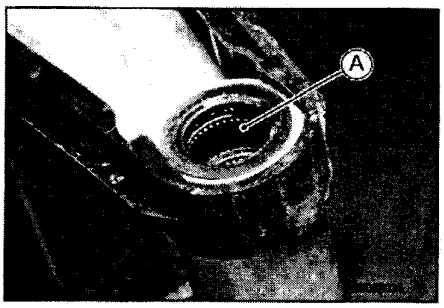
- Turn [A] the bearing in the swingarm back and forth while checking for plays, roughness, or binding. If bearing play, roughness, or binding is found, replace the bearing.



- Inspect the needle bearings [A] installed in the swingarm.

○The rollers in a needle bearing normally wear very little, and wear is difficult to measure. Instead of measuring, visually inspect the bearing for abrasion, discoloration, or other damage.

★If the needle bearing, ball bearing, and sleeve show any sings of abnormal wear, discoloration, or damage, replace them as a set.



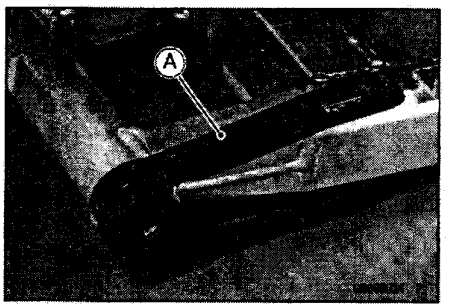
Swingarm Lubrication

- Refer to the Swingarm Pivot, Uni-trak Linkage Lubrication in Periodic Maintenance Chapter.

Chain Slider Inspection

- Visually inspect the chain slider [A].

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

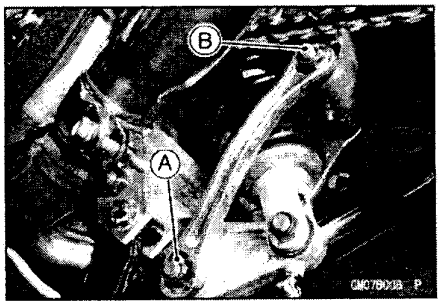


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Tie-Rod, Rocker Arm

Tie-Rod Removal

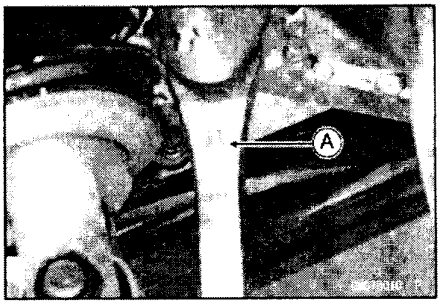
- Use the center stand to support the motorcycle upright.
- Remove:
  Lower Tie-Rod Bolts and Nut [A]
  Upper Tie-Rod Nut [B]
- Remove the upper tie-rod bolt so that the swingarm is pulling up.
- Pull out the lower tie-rod bolt from the rocker arm.



Tie-Rod Installation

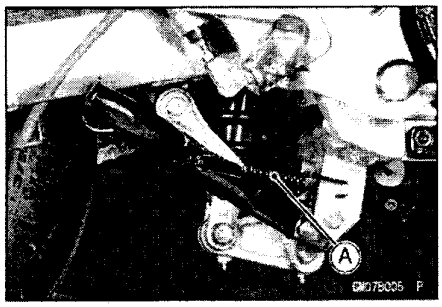
- Apply grease to the inside of the needle bearings and oil seal lipes.
- Install the tie-rods be facing the allow [A] on the inside of the tie-rod forward.
- Tighten each bolts.

Torque - Rocker Arm Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)
Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)
Lower Rear Shock Absorber Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)

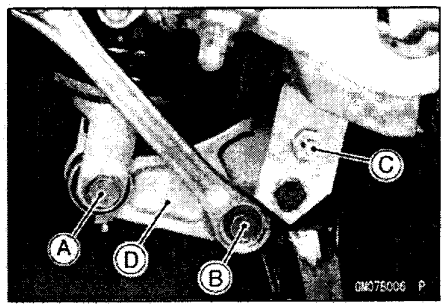


Rocker Arm Removal

- Remove the lower firings (see Frame chapter).
- Drain the coolant.
- Remove:
  Radiator (see Cooling System chapter)
  Muffler Assies (see Engine Top End chapter)
- Use the side stand to support the motorcycle.
- Remove the center stand springs [A].



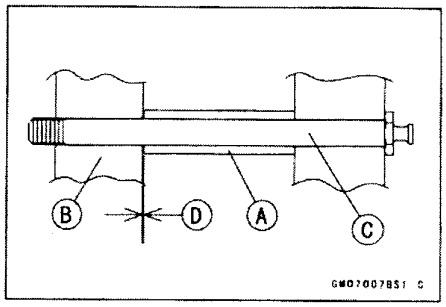
- Use the center stand to support the motorcycle upright.
  Lower Rear Shock Absorber Nut and Bolt [A]
  Lower Tie-Rod Nut and Bolt [B]
  Rocker Arm Bolt and Nut [C]
  Rocker Arm [D]



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Tie-Rod, Rocker Arm

Rocker Arm Installation



Shim Adjustment:

Be in need of the shim adjustment from F/No 000001 to F/No 001025

No need of shim adjustment from F/No 001026

- Temporary install the sleeve [A] between the frame brackets [B] using the rocker arm bolt [C].
- Measure the clearance [D] between the wall of the frame bracket and the end of the sleeve with a thickness gauge.
- To select the shim which brings the clearance within less than 0.3 mm (0.01 in.).

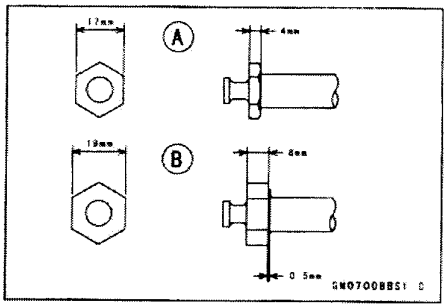
Shim:

92022-105 t 0.8 mm
92018-1445 t 0.7 mm
92018-1444 t 0.6 mm
92018-1443 t 0.5 mm
92018-1442 t 0.4 mm
92018-1441 t 0.3 mm

NOTE

○*However, for those models that need these shims, the shim adjustment is not necessary by changing the rocker arm bolt. In this case, however, change the springs together with the bolt.*

Bolts that need the shim adjustment [A]
Bolts that need no shim adjustment [B]

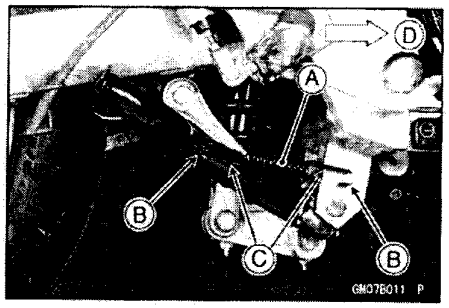


- Apply grease to the inside of the needle bearings and oil seal lips, and add grease to the grease nipple.
- Tighten the rocker arm nut, tie-rod nut and shock absorber lower nut.

Torque - Rocker Arm Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)
Tie-Rod Nuts: 59 N·m (6.0 kgf·m, 44 ft·lb)
Lower Rear Shock Absorber Nut: 59 N·m (6.0 kgf·m, 44 ft·lb)

- For need the shim adjustment, install the center stand spring [A], noting the direction of the hooks [B].

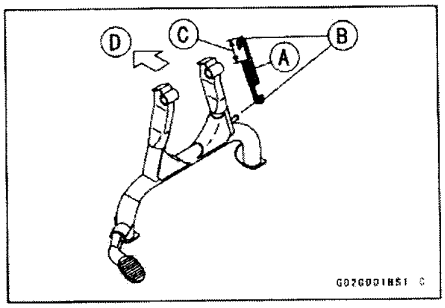
Same [C]
Front [D]



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Tie-Rod, Rocker Arm

● For need no shim adjustment, install the center stand spring [A], noting the direction of the hooks [B].
Long [C]
Front [D]

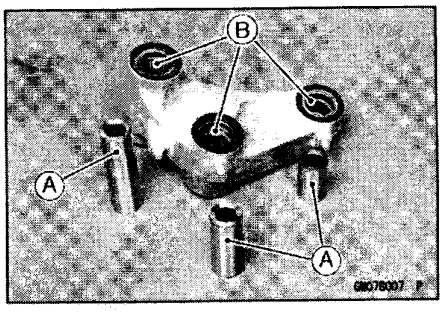


Needle Bearing Inspection

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

Tie-Rod, Rocker Arm Sleeve Inspection

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



Tie-Rod, Rocker Arm Needle Bearing Lubrication

● Refer to the Swingarm Pivot, Uni-trak Linkage Lubrication in Periodic Maintenance Chapter.

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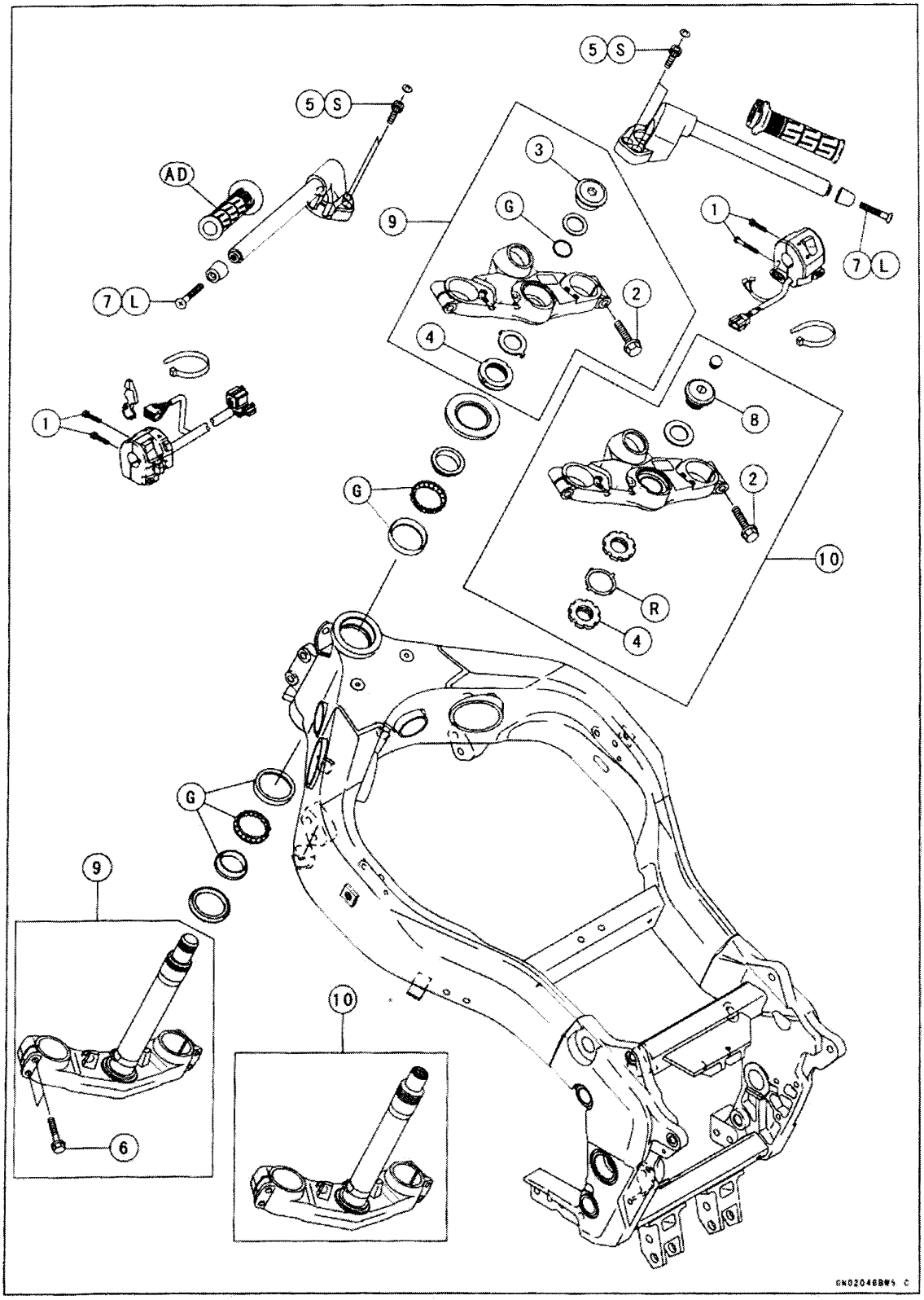
Steering

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Exploded View



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Exploded View

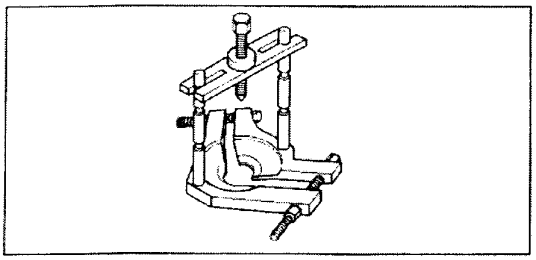
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Handlebar switch housing screws	3.4	0.35	30 in·lb	
2	Upper front fork clamp bolts	29	3.0	21	
3	Steering stem head nut	78	8.0	57	
4	Steering stem nut	20	2.0	15	
5	Handlebar bolts	25	2.5	18	S
6	Front fork lower clamp bolts	21	2.1	15	
7	Handlebar weight screws	–	–	–	L
8	Steering stem head bolt (ZX1200-C3 ~)	108	11.0	80	

9. ZX1200-C1~ C2
10. ZX1200-C3 ~
AD: Apply adhesive.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement part
S: Follow the specific tightening sequence.

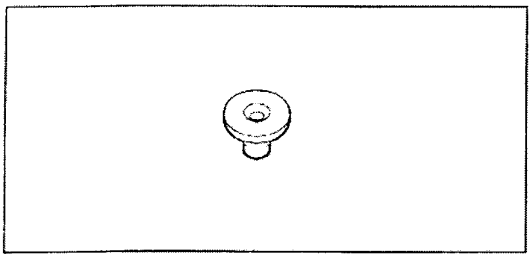
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Special Tools

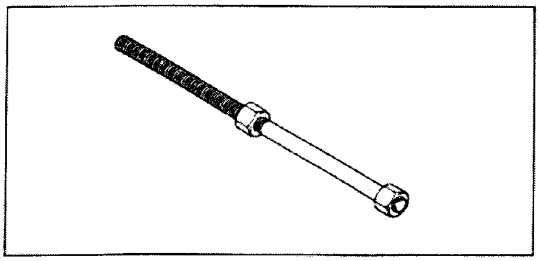
Bearing Puller:
57001–158



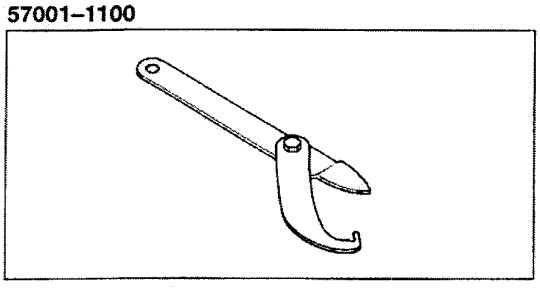
Bearing Puller Adapter
57001–166



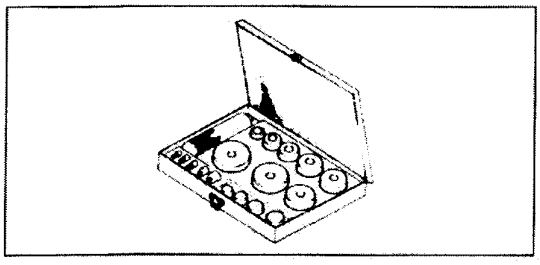
Head Pipe Outer Race Press Shaft:
57001–1075



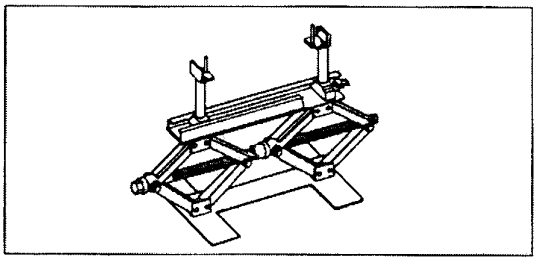
Steering Stem Nut Wrench:
57001–1100



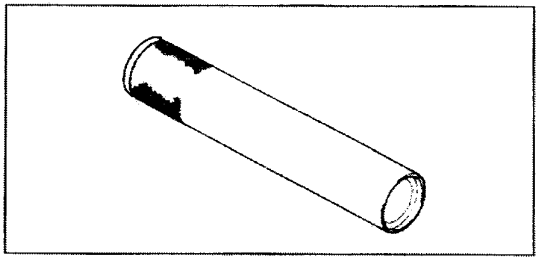
Bearing Driver Set:
57001–1129



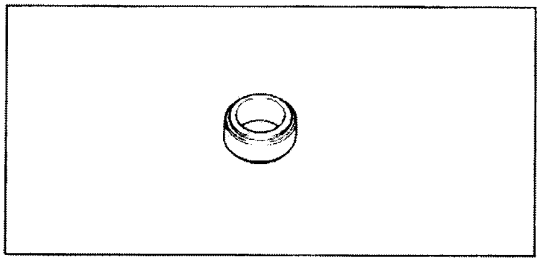
Jack:
57001–1238



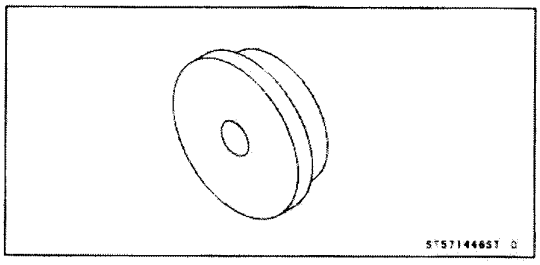
Steering Stem Bearing Driver, ϕ42.5:
57001–1344



Steering Stem Bearing Driver Adapter, ϕ41.5:
57001–1345



Head Pipe Outer Race Driver, ϕ55:
57001–1446



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Steering

Steering Inspection

- Refer to the Steering Inspection in the Periodic Maintenance chapter.

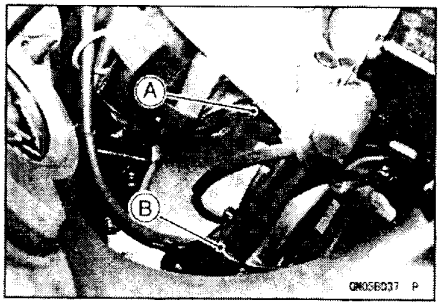
Steering Adjustment

- Refer to the Steering Adjustment in the Periodic Maintenance chapter.

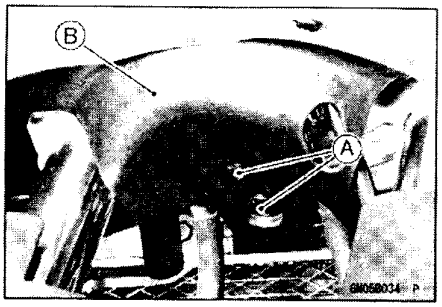
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Steering Stem

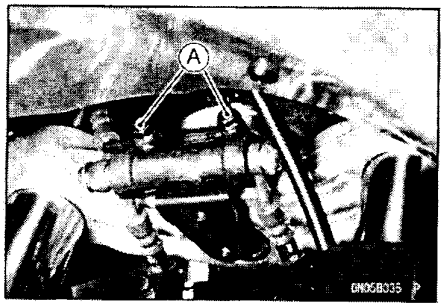
Stem, Stem Bearing Removal



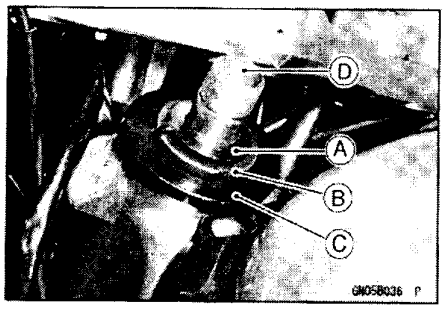
- Remove:
  Clamp (open) [A]
  Straps [B]
  Steering Stem Head Nut(s) or Bolt and Washer (see Steering Adjustment in the Periodic Maintenance chapter)
  Handlebars (see Handlebar Removal)
  Steering Stem Head (see Steering Adjustment in the Periodic Maintenance chapter)
  Steering Stem Head Bolt Plug (ZX1200-C3 ~)



- Remove:
  Cover Screws [A]
  Under Bracket Cover [B]

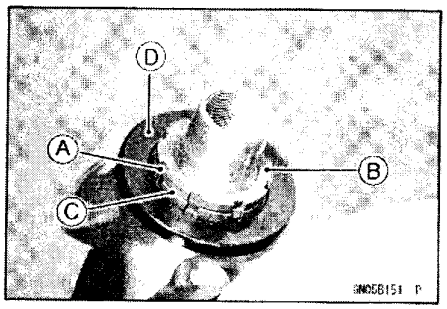


- Remove the brake hose joint bolts [A].



- Remove:
  Front Wheel (see Wheels/Tires chapter)
  Front Fork (see Suspension chapter)
- Pushing up the stem base, and remove the lock washer [A], steering stem nut [B], stem cap [C], then remove the steering stem [D].

  Special Tool - Steering Stem Nut Wrench: 57001-1100
- Remove the upper stem bearing inner race and ball bearing assy.

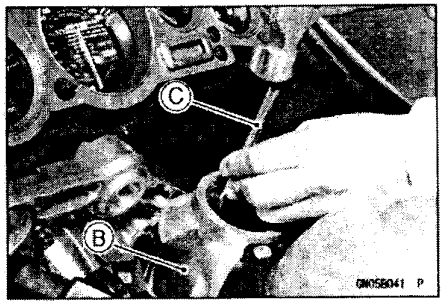


ZX1200-C3 ~
- Bend the claw washer tabs [A].
- Pushing up the stem base, and remove the steering stem locknut [B] and claw washer [C].
  Stem Cap [D]

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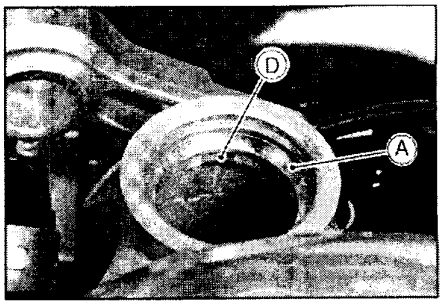
Steering Stem

● To remove the bearing outer races [A] pressed into the head pipe [B], insert a bar [C] into the recess [D] of head pipe, and hammer applying it to opposite recess alternately to drive the race out.



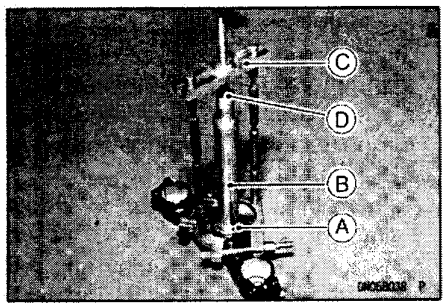
NOTE

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



● Remove the lower stem bearing (with its grease seal) [A] which is pressed onto the steering stem [B] with the bearing puller [C] and adapter [D].

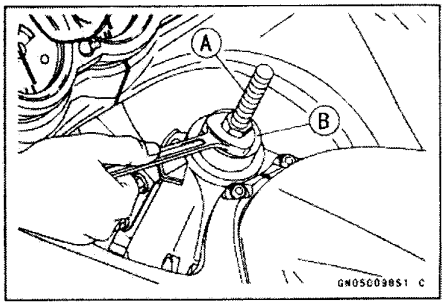
Special Tools - Bearing Puller: 57001–158
Bearing Puller Adapter: 57001–166



Stem, Stem Bearing Installation

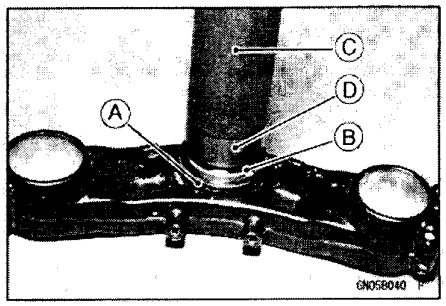
● Replace the outer races with new ones.
● Apply grease to the outer races, and drive them into the head pipe at the same time.

Special Tools - Head Pipe Outer Race Press Shaft: 57001–1075 [A]
Head Pipe Outer Race Driver φ55: 57001–1446 [B]
Bearing Driver Set: 57001–1129



● Replace the oil seal and lower inner race with new ones.
● Install the oil seal [A] on the steering stem, and drive the lower ball bearing inner race [B] applied the grease on to the stem.

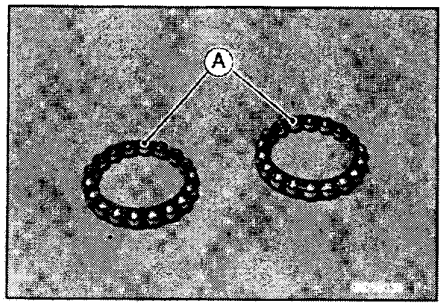
Special Tools - Steering Stem Bearing Driver: 57001–1334 [C]
Steering Stem Bearing Driver Adapter: 57001–1345 [D]



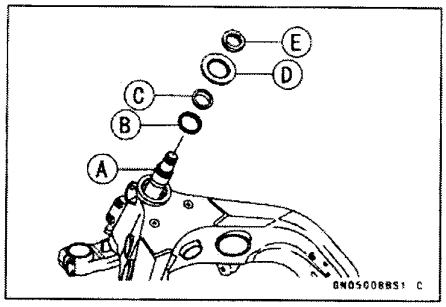
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Steering Stem

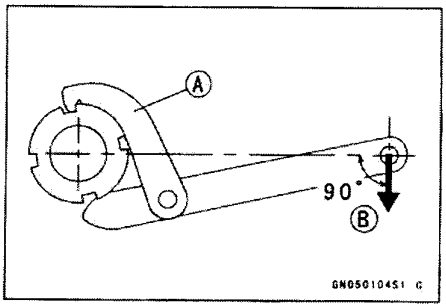
● Apply grease to the lower and upper ball bearings [A] and outer races.
● Install the lower ball bearing onto the stem.
○The lower and upper ball bearings are identical.



● Install the stem [A] through the head pipe and install the ball bearing [B] and inner race [C] on it.
● Install stem cap [D], steering stem nut [E].



● Settle the inner races in place as follows:
○Tighten the steering stem nut with 20 N·m (2.0 kgf·m, 15 ft·lb) of torque first, and loosen it a fraction of a turn until it turns lightly. Afterward tighten it again with specified torque using the stem nut wrench [A].
11.1 kg (24.5 lb) [B]
○Tighten the steering stem locknut with specified torque using a special tool.
○Check that there is no play and the steering stem turns smoothly without rattles. If not, the bearings on the inner races may be damaged.
○Again back out the stem locknut a fraction of turn until it turns lightly.
● Turn the stem nut lightly clockwise until it just becomes hard to turn. Do not overtighten, or the steering will be too tight.



Special Tool - Steering Stem Nut Wrench: 57001-1100

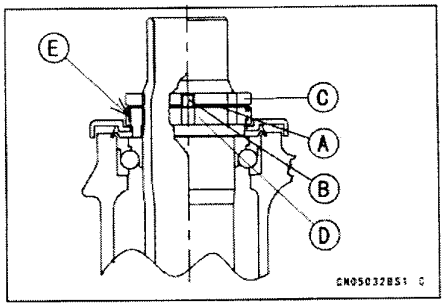
Torque - Steering Stem Nut: 20 N·m (2.0 kgf·m, 15 ft·lb)

ZX1200-C1 ~ C2

● Install:
Lock Washer
Steering Stem Head
O-ring
Washer
Steering Stem Head Nut
● Install the front fork (see Suspension chapter).

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Steering Stem



ZX1200-C3 ~

- Install the claw washer [A] so that its bent side [B] faces upward, and engage the bent claws with the grooves of stem locknut [C].
- Hand tighten the stem locknut until it touches the claw washer.
- Tighten the stem locknut clockwise until the claws are aligned with the grooves (ranging from 2nd to 4th) of stem nut [D], and bend the 2 claws downward [E].
- Install the stem head.
- Install the washer, and tighten the stem head bolt with specified torque.
- Install the steering stem head bolt plug.
- Install the front fork (see Suspension chapter).

NOTE

○*Tighten the fork upper clamp bolts first, next the stem head nut, last the fork lower clamp bolts.*

Torque - Steering Stem Head Nut: 78 N·m (8.0 kgf·m, 57 ft·lb)
Steering Stem Head Bolt: 108 N·m (11.0 kgf·m, 80 ft·lb) ZX1200-C3 ~
Upper Front Fork Clamp Bolts: 29 N·m (3.0 kgf·m, 21 ft·lb)
Lower Front Fork Clamp Bolts: 21 N·m (2.1 kgf·m, 15 ft·lb)

NOTE

○*Tighten the two clamp bolts alternately to times to ensure even tightening torque.*

- Install the removed parts (see appropriate chapters).

⚠ WARNING

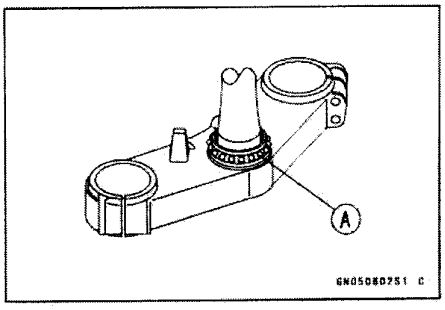
Do not impede the handlebar turning by routing the cables, harnesses and hoses improperly (see General Information chapter).

Steering Bearing Inspection

- Remove the steering stem.
- Using a high flash-point solvent, wash the upper and lower ball bearings in the cages, and wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean off old grease and dirt.
- Visually check the outer races and the ball bearings [A].

★Replace the bearing assemblies if they show wear or damage.

- Pack the upper and lower ball bearings in the cages with grease, and apply a light coat of grease to the upper and lower outer races.
- Install the steering stem, and adjust the steering.



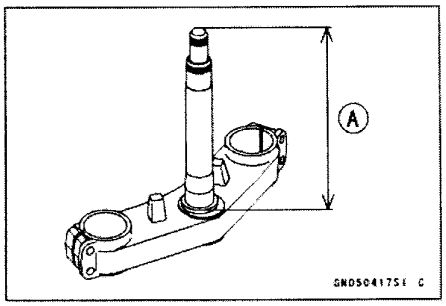
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Steering Stem

Steering Stem Warp

- Whenever the steering stem is removed, or if the steering cannot be adjusted for smooth action, check the steering stem for straightness [A].

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



Steering Bearing Lubrication

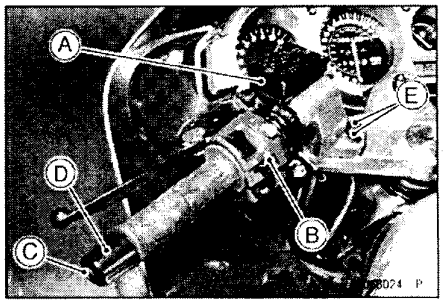
- Refer to the Steering Bearing Lubrication in the Periodic Maintenance Chapter.

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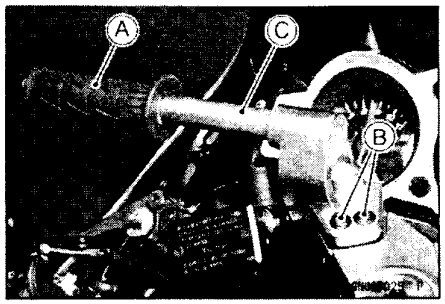
Handlebar

Handlebar Removal

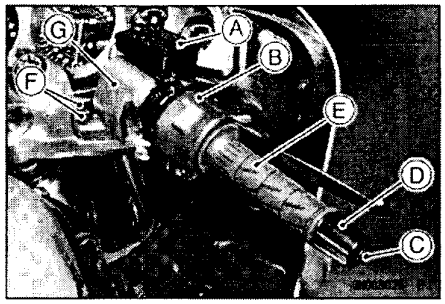
● Remove:
Clutch Muster Cylinder [A]
Left Handlebar Switch Housing [B]
Weight Screw [C]
Handlebar Weight [D]
Caps [E]



Left Handlebar Grip [A]
Handlebar Mounting Bolts [B]
Left Handlebar [C]



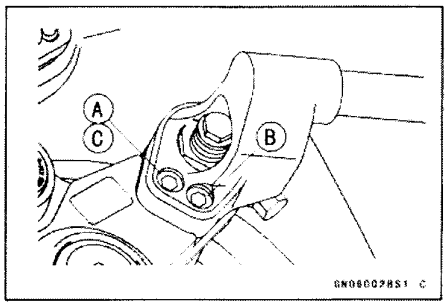
Front Brake Master Cylinder [A]
Right Handlebar Switch Housing [B]
Weight Screw [C]
Handlebar Weight [D]
Throttle Grip [E]
Caps [F]
Handlebar Bolts
Right Handlebar [G]



Handlebar Installation

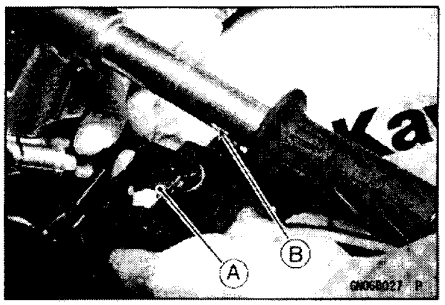
● Tighten the handlebar bolts using the following steps.
First [A] Secondly [B] Final [C]

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



● Apply a non-permanent locking agent to the threads of the weight bolts.
● Install the left and right handlebar switch housings.
○Fit the projection [A] into a small hole [B] in the handlebar.

Torque - Handlebar Switch Housing Screws: 3.4 N·m (0.35 kgf·m, 30 in·lb)



● Install the brake master cylinder (see Brakes chapter).
● Install the clutch lever (see Clutch chapter).
● Install the removed parts (see appropriate chapters).
● Check and adjust the following.
Throttle Free Play (see Periodic Maintenance chapter)
Front Brake (see Periodic Maintenance chapter)
Clutch (see Clutch chapter)

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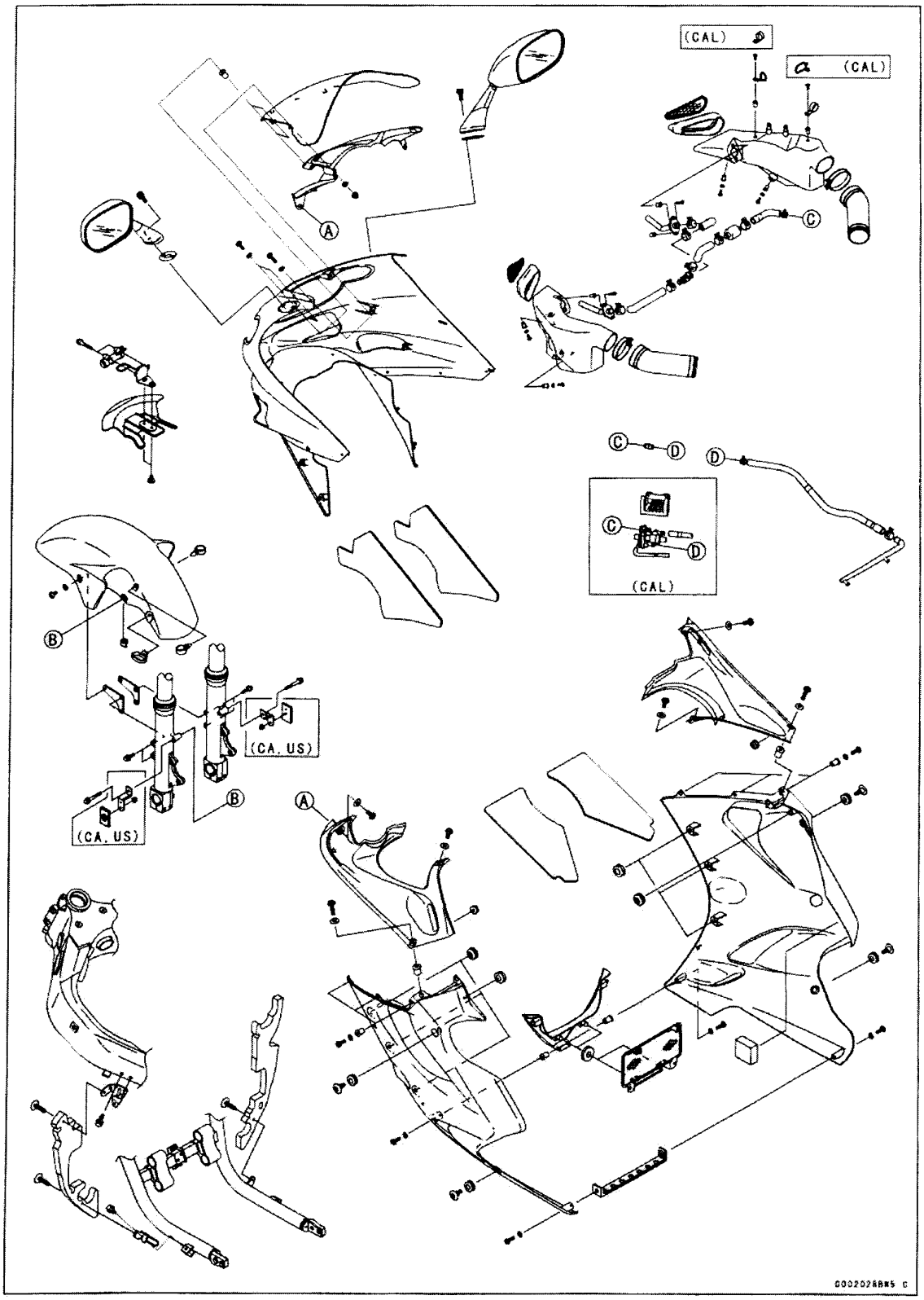
Frame

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Exploded View



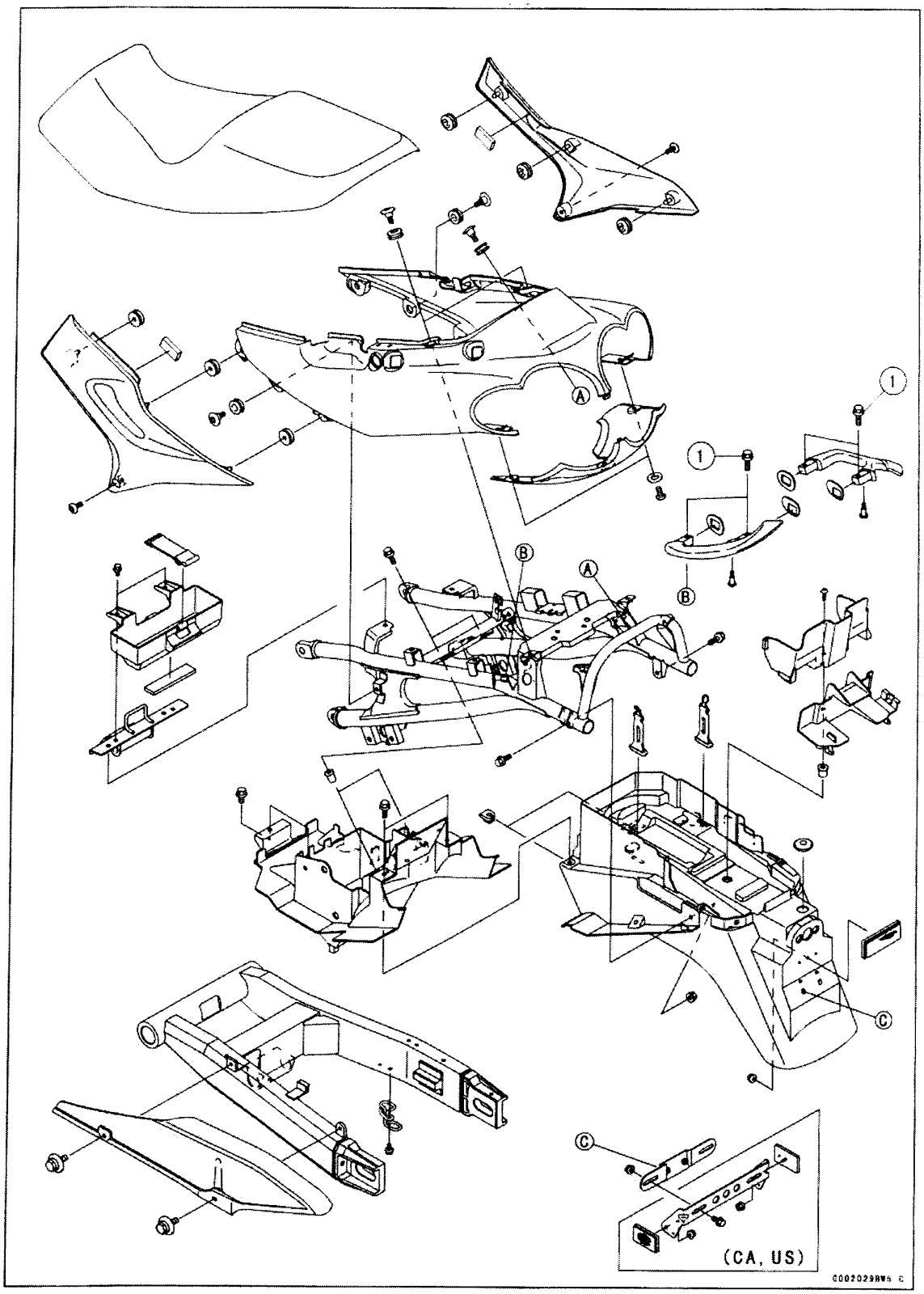
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Exploded View

CA: Canadian Model
CAL: California Model
US: U.S.A. Model

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Exploded View



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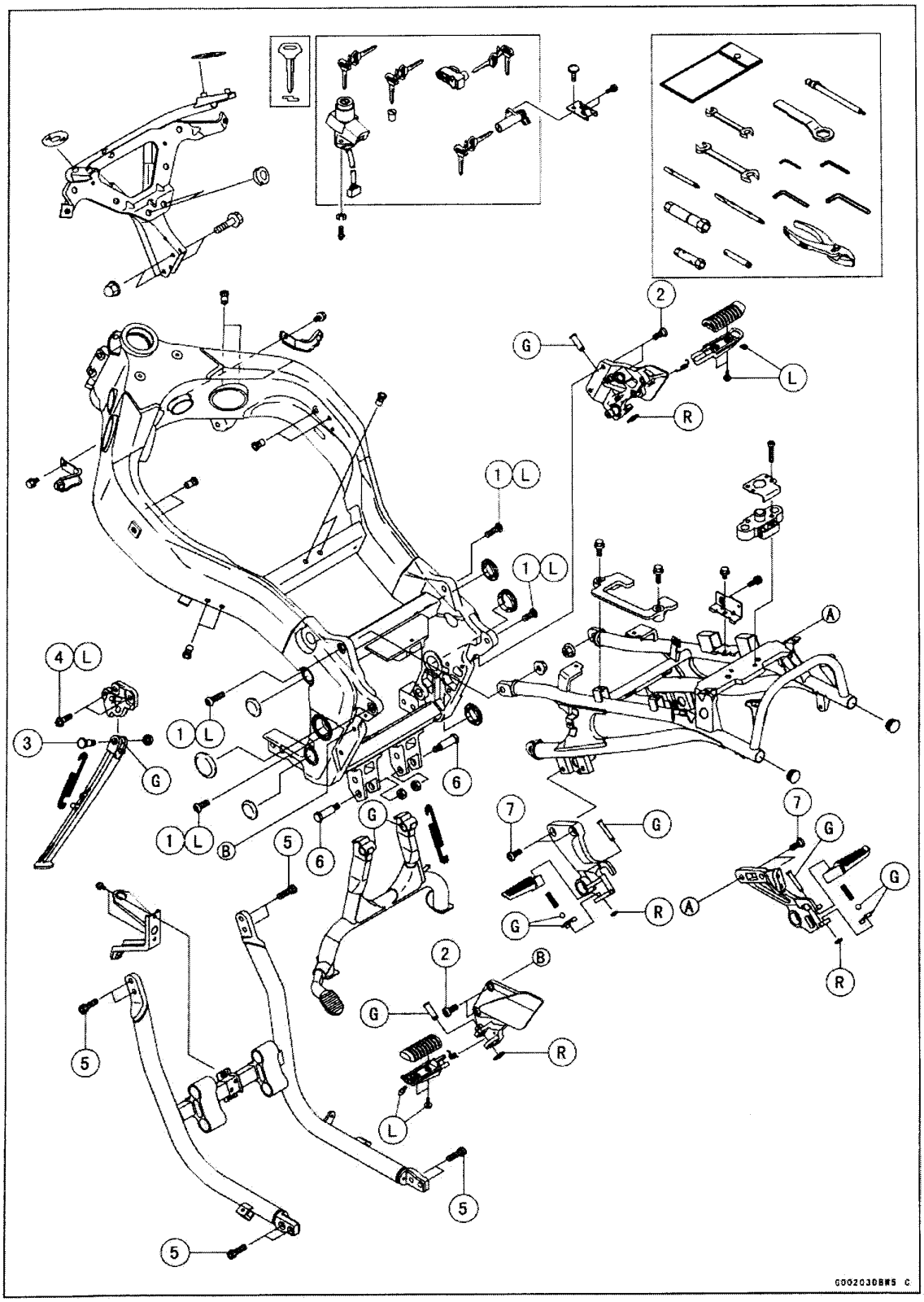
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Grab rail bolts	25	2.5	18	

CA: Canadian Model
US: U.S.A. Model

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Exploded View



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Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Rear frame mounting bolts	44	4.5	32	L
2	Front footpeg stay bolts	25	2.5	18	
3	Side stand bolt	44	4.5	32	
4	Side stand bracket bolts	49	5.0	36	L
5	Down tube bolts	44	4.5	32	
6	Center stand bolts	29	3.0	21	
7	Rear footpeg stay bolts	25	2.5	18	

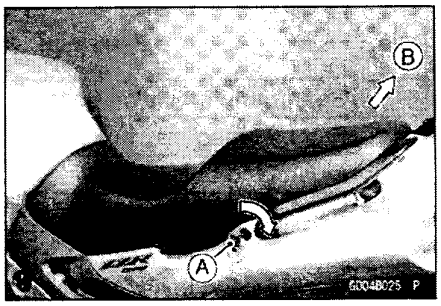
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts

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Seat

Seat Removal

● Insert the ignition switch key [A] into the seat lock, turning the key clockwise, pulling up on the rear of the seat, and pulling the seat backward [B].

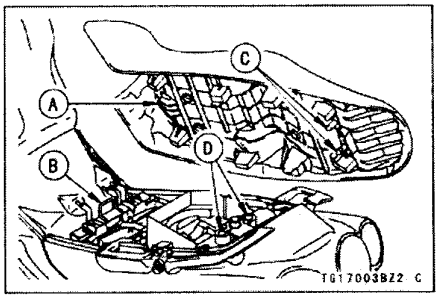


Seat Installation

● Insert the seat hook [A] in to the brace [B] of the fuel tank bracket.

● Insert the seat pins [C] into the latch holes [D].

○Push down the rear part of the seat until the lock clicks.

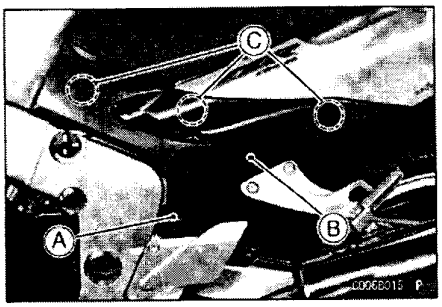


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Side Cover

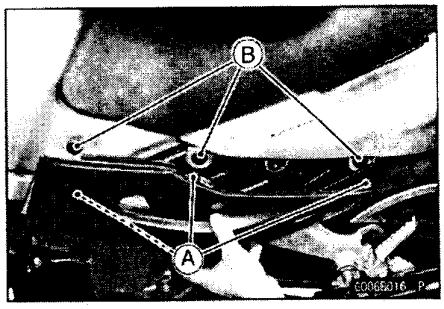
Side Cover Removal

- Unscrew the bolt [A].
- Pull the side cover [B] outside to clear the stopper portions [C].



Side Cover Installation

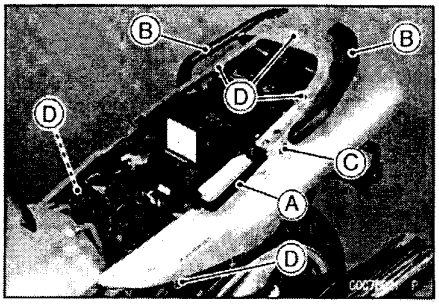
- Insert the projections [A] of the side cover into the grommet hole [B] of the frame.
- Tighten the bolt.



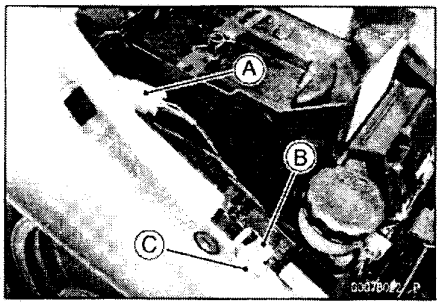
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Seat Cover

Seat Cover Removal

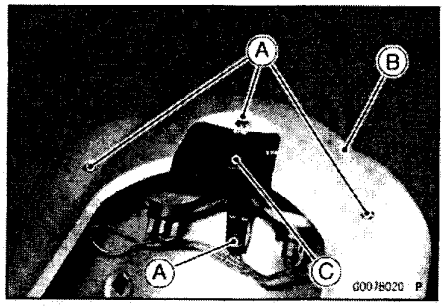


- Remove:
  - Seat (see Seat Removal)
  - Side Covers (see Side Cover Removal)
  - Grip Bolts
  - Grip [A]
  - Grab Rail Bolts
  - Grab Rails [B]
  - Seat Lock Screws
  - Seat Lock [C] (Hang)
  - Seat Cover Mounting Bolts [D]



- Disconnect the connector [A].
- When remove the seat cover, clear the tab [B] on the cover from the helmet lock hook [C].

○Pull the front portions of the seat cover outside, and then remove the seat cover backward.



- Remove:
  - Screws [A]
  - Seat Cover Under [B]
  - Tail/Turn Signal Light Assy [C]

Seat Cover Installation

- Installation is reverse of removal.
- Tighten:

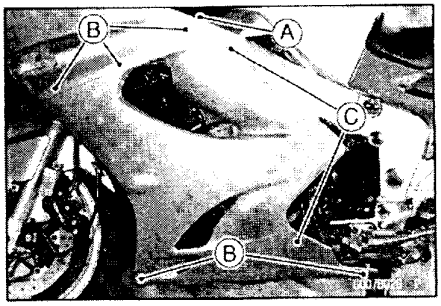
Torque - Grab Rail Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

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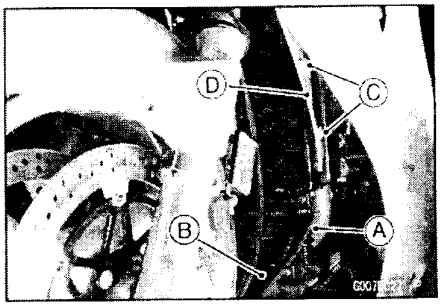
Fairings

Lower Fairing Removal

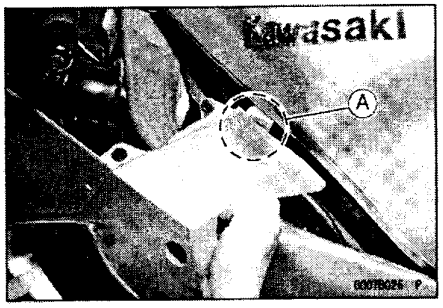
- Remove:
  Inner Cover [A] (see Inner Cover Removal)
  Screws [B]
  Allen Bolts [C]



- Pull out the lower stopper portion of the lower fairing from the projection [A] on the inner fairing [B].
- Pull out the midway stopper portions of the lower fairing from the projection [C] on the upper fairing [D].

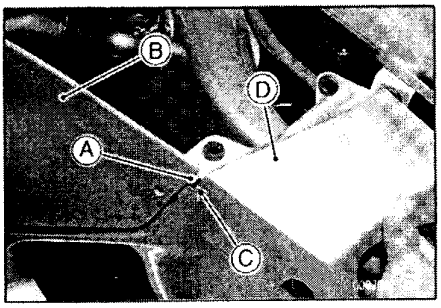


- Pull out the upper stopper portion [A] from the fuel tank.

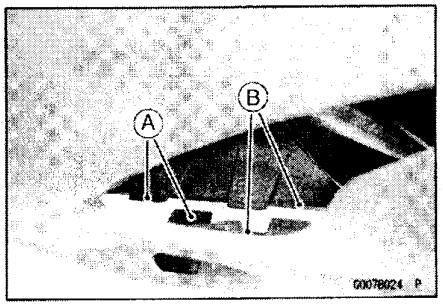


Lower Fairing Installation

- Be sure to in please the heat buffle.
- Insert the projection of the lower firing into the grommet hole of the fuel tank.
- Fit the tabu [A] on the upper fairing [B] into the hole [C] on the inner fairing [D].
- Insert the midway projections of the upper fairing into the grommet holes of the lower faring.
- Insert the projection of the inner fairing into the grommet hole of the inner fairing.



- Engage the engaging parts [A] of the firing lower portion and its counters [B].
- First tighten the Allen bolts temporarily, and tighten all screws lightly.
- Tighten the Allen bolts and screws.
- Install the inner cover (see Inner Cover Installation).

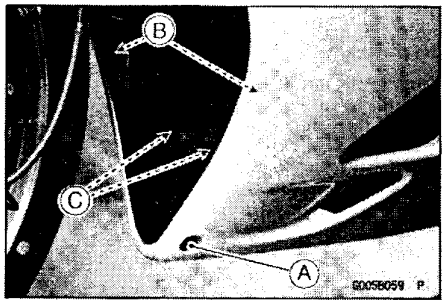


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Fairings

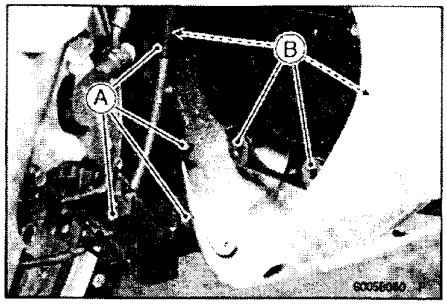
Inner Fairing Removal

● Remove:
Screw [A]
● Pull out the inner fairing from the lower fairing.
○Clear the projections to the grommet holes following the sequence.
1. Upper Portions [B]
2. Middle Portions [C]



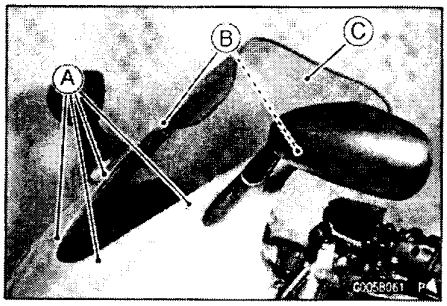
Inner Fairing Installation

● Fit the projections [A] onto the grommet holes [B].

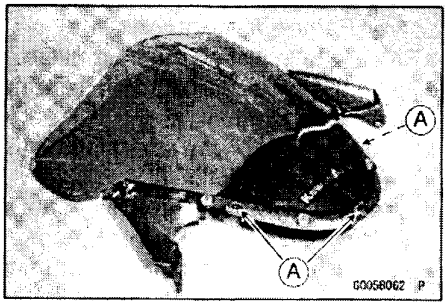


Wind Shield Removal

● Remove:
Inner Covers (see Inner Cover Removal)
Screws [A]
Screws and Nuts [B]
Window Shield [C] with front Inner Cover

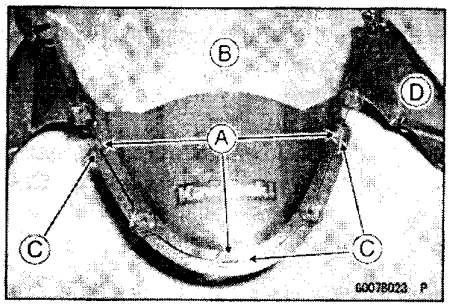


● Clear the tongues [A] of the window shield from the holes of the front inner cover.



Wind Shield Installation

● Insert the tongues [A] of the wind shield [B] in to the holes [C] of the front inner cover [D].

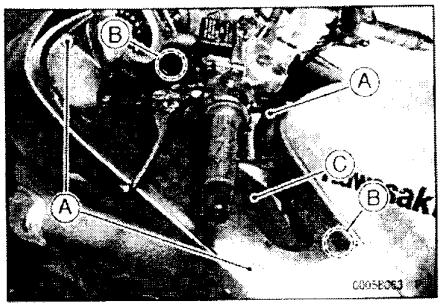


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Fairings

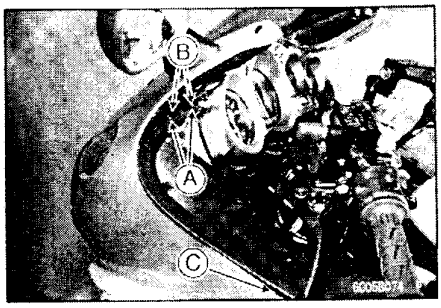
Inner Cover Removal

- Remove:
  Bolts [A]
- Pull out the projections [B] of the inner cover [C] outward from each rubber holes.



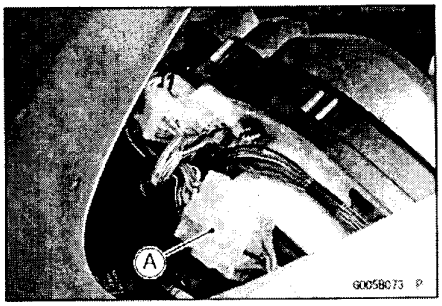
Inner Cover Installation

- Insert the tongues [A] of the inner cover into the holes [B] of the front inner cover.
- Fit the tongues [C] to the gusset.
- Insert the projection of the inner cover into the grommet hole of the fuel tank.
- Inset the projection of the inner cover into the grommet hole of the fairing bracket.

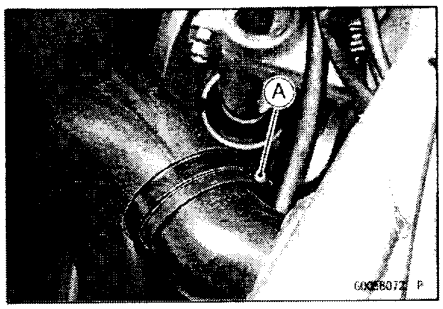


Upper Fairing Removal

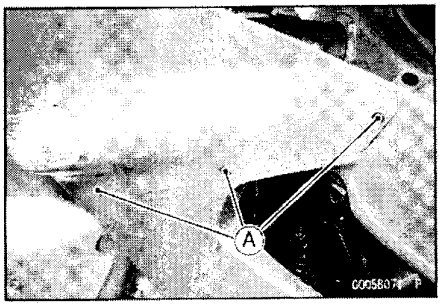
- Remove:
  Wind Shield (see Wind Shield Removal)
  Inner Covers (see Inner Cover Removal)
- Disconnect the sub harness connector [A].



- Loosen the front air duct clamp screws [A].



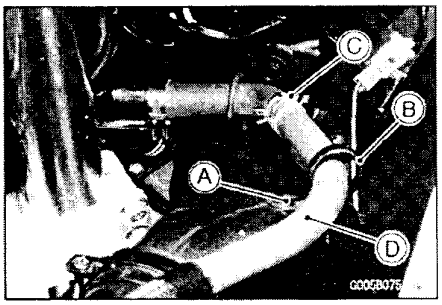
- Remove:
  Screws [A]



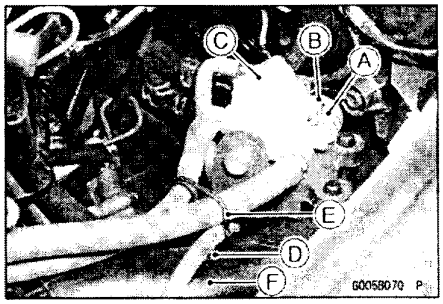
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Fairings

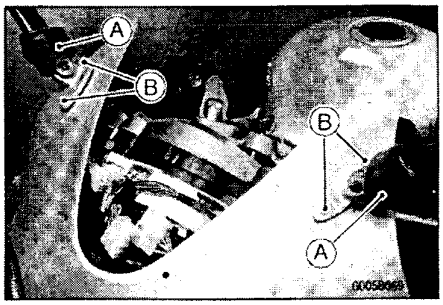
● Remove the screw [A] and clamp [B].
● Slide the clamp [C] and pull out the hose [D].



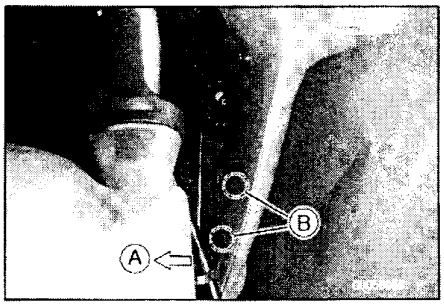
● For the California Model:
○Slide the clamp [A].
○Pull out the hose [B] from the vacuum valve [C].
○Remove the screw [D] and clamp [E].
○Remove the vacuum valve from the air duct [F].



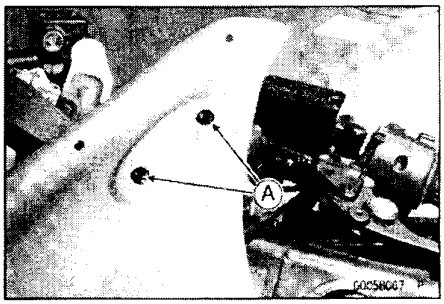
● Slide up the rubber covers [A].
● Remove the bolts [B] and take off the left and right rear view mirrors.



● Pull the lower portion [A] of the upper fairing.
○Clear the projections [B] from the grommet holes.



● Clear the holes [A] of the upper fairing from the fairing bracket.
● Pull the upper fairing assembly forward.

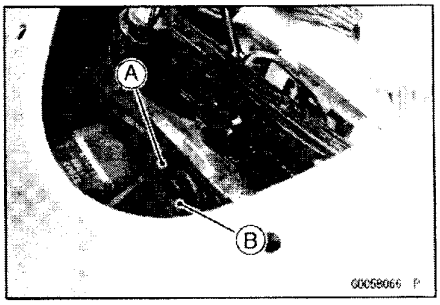


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Fairings

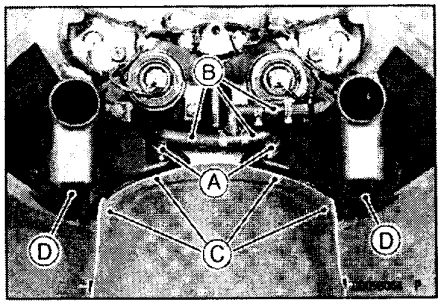
Upper Fairing Installation

- Upper fairing installation is the reverse of removal.
- Install the stopper portion [A] of the upper fairing onto the projection [B] of the fairing bracket.

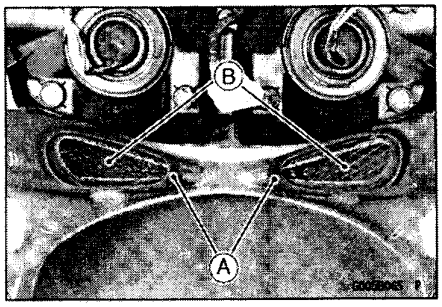


Air Duct Removal

- Remove the upper fairing (see Upper Fairing Removal).
- Slide the clamps [A] and remove the hoses [B].
- Remove the screws [C] and pull out the air ducts [D].



- Remove:
  Rubber Ducts [A]
  Screens [B]

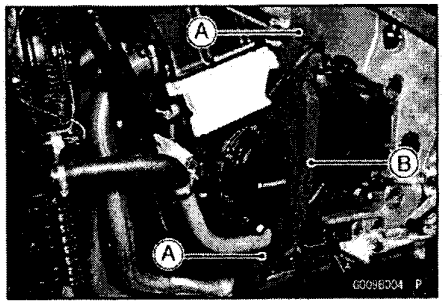


Air Duct Installation

- Air Duct Installation is reverse of removal.

Heat Baffle Removal/Installation

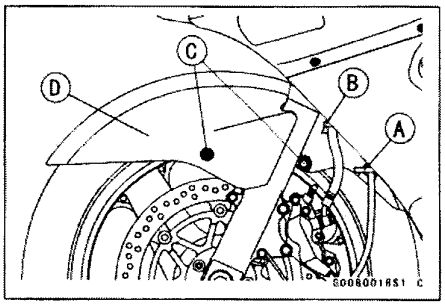
- Remove the lower firings (see Lower Firing Removal)
- Pull out the plastic clamps [A] and discard them.
- Remove the heat baffle [B].
- Insert the new plastic clamps fully.



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Fenders

Front Fender Removal

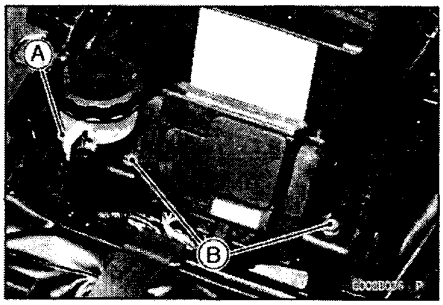


- Remove:
  Speedometer Cable Clamp [A]
  Brake Hose Clamps [B] (Left and Right)
  Bolts [C]
- Remove the front fender [D].

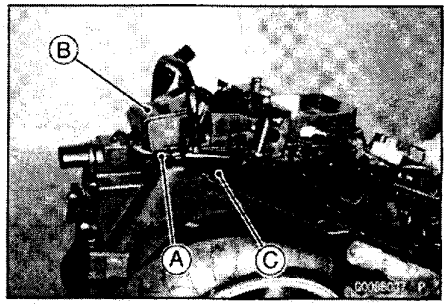
Front Fender Installation

- Install the front fender to the front fork.
- Tighten the bolts.
- Install the brake hose clamps and speedometer cable clamp to the front fender holes.

Rear Fender Rear Removal



- Remove:
  Seat (see Rear Seat Removal)
  Seat Cover (see Seat Cover Removal)
- Remove:
  Rear Brake Reservoir Bolt [A]
  Bolts [B]

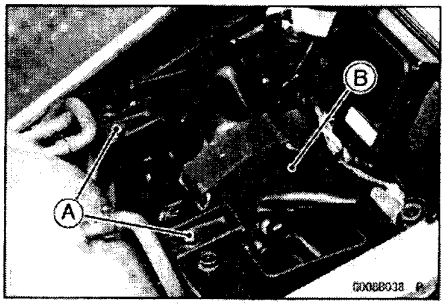


- Disconnect:
  License Plate Light Connector [A]
- Hang:
  Canister [B] (California Model Only)
- Remove:
  Bolts and Nuts [C]
- Pull out the rear fender rear down.

Rear Fender Rear Installation

- Install the front part of the rear fender rear under the rear fender front.

Rear Fender Front Removal

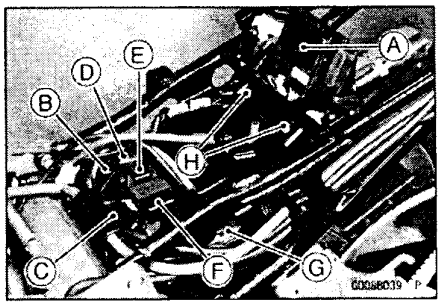


- Remove:
  Bolts [A]
  Tool Case [B]

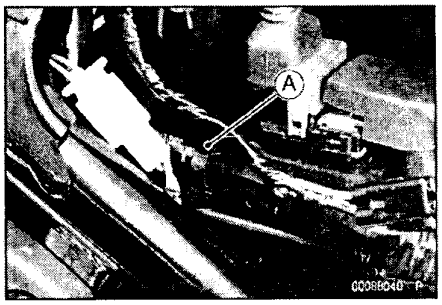
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Fenders

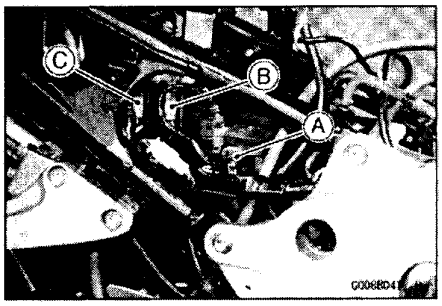
- Remove:
  Fuel Tank (see Fuel System chapter)
  Rear Fender Rear (see Rear Fender Rear Removal)
  Battery (see Electrical System chapter)
  Junction Box [A]
  Separator [B] (California Model only)
  Bolt [C]
  Turn Signal Relay [D]
  Radiator Fan Relay [E]
  Headlight Relay (Control) [F]
- Disconnect:
  IC Igniter Connector [G] (see Electrical System chapter)
- Remove the bolts [H].



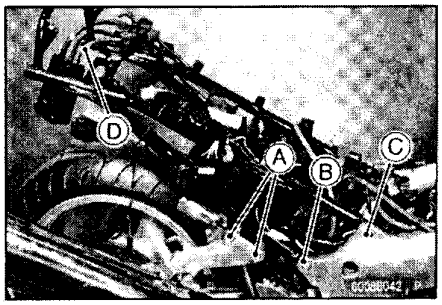
- Open the harness clamp [A].



- Remove:
  Starter Relay [A]
  Fan Fuse [B]
  Headlight Fuse [C]



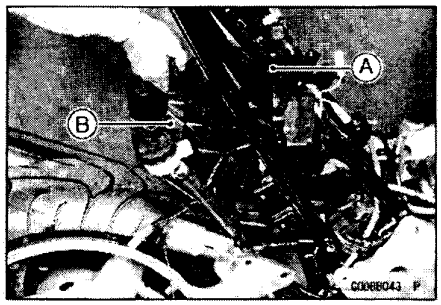
- Remove:
  Rear Footpeg Stay Bolts [A]
  Under Side Rear Frame Bolts [B]
- Loosen the upper side rear frame bolts [C].
- For the California model, pull out green hose [D] of the canister.



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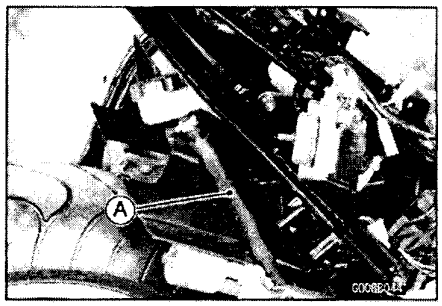
Fenders

- Turn the rear frame uplight [A].
- Remove the rear fender rear [B].



Rear Fender Front Installation

- Install the hose and harness clamps in accordance with Hose, Harness Routing section in Appendix chapter.
- Set the rear brake reservoir hose [A] as shown.

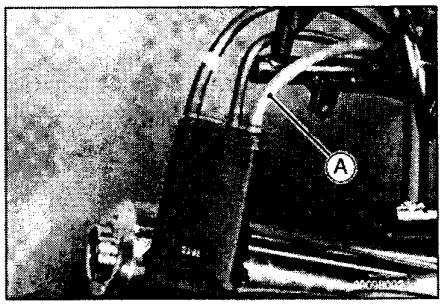


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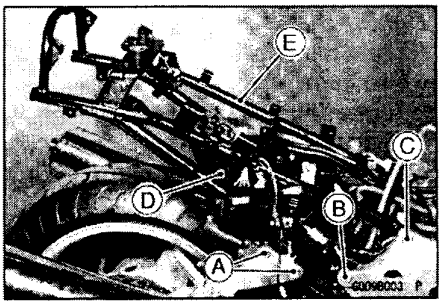
Frame

Rear Frame Removal

● Remove:
Seats (see this chapter)
Fuel Tank (see Fuel System chapter)
Seat Cover (see Seat Cover Removal)
Rear Fender Front (see Rear Fender Front Removal)
Green Hose [A] (California Model only)



Rear Footpeg Stay Bolts [A]
Frame Bolts [B]
Bolts and Nuts [C]
Rear Fender Rear [D] (see Rear Fender Rear Removal)
Rear Frame [E]



Rear Frame Installation

● Apply a non-permanent locking agent to the rear frame bolts.
● Tighten the rear frame bolts and nuts.

Torque - Rear Frame Bolts and Nuts: 44 N·m (4.5 kgf·m, 32 ft·lb)

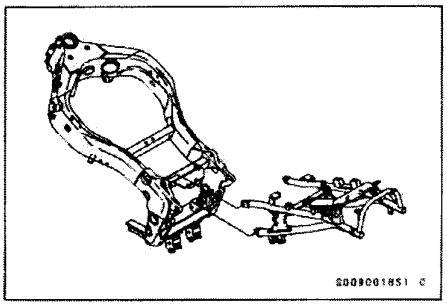
● Install the hose, harness and clamps in accordance with Hose, Harness Routing section in Appendix chapter.

Frame Inspection

● Visually inspect the frame for cracks, dents, bending, or warp.
★If there is any damage to the frame, replace it.

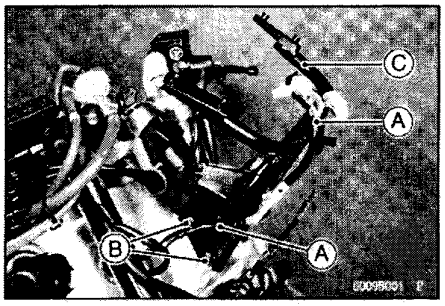
⚠ WARNING

A repaired frame may fail in use, possibly causing an accident. If the frame is bent, dented, cracked, or warped, replace it.



Fairing Bracket Removal

● Remove:
Upper Fairing (see Upper Fairing Removal)
Meter Unit (see Electrical System chapter)
Clamps [A]
Nuts and Bolts [B]
Fairing Bracket [C]



Down Tube Removal/Installation

● Refer to the Engine Removal and Installation in Engine Removal/Installation Chapter.

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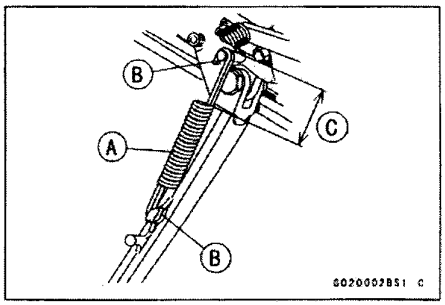
Center Stand, Side Stand

Side stand Installation

- Tighten:

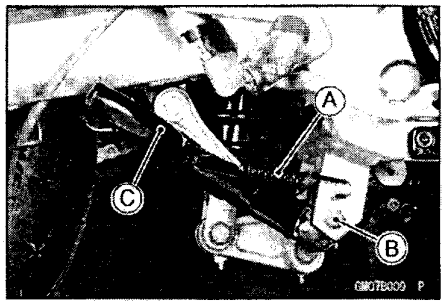
Torque - Side Stand Bolt: 44 N·m (4.5 kgf·m, 32 ft·lb)

- Install the spring [A] of the side stand, noting the direction of the hooks [B].
  Long [C]



Center Stand Removal

- Drain the coolant.
- Remove:
  Lower Firings (see Lower Firing Removal)
  Radiator (see Cooling System chapter)
  Muffler Assy (see Engine Top End chapter)
- Use the side stand to support the motorcycle.
- Remove the center stand springs [A].
- Unscrew the bolts [B] and remove the center stand [C].



Center Stand Installation

- Tighten the center stand bolts and nuts.

Torque - Center Stand Bolts: 29 N·m (3.0 kgf·m, 21 ft·lb)

- Install the center stand spring refer to the Rocker Arm Installation in Suspension Chapter.

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Electrical System

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Specifications

Item	Standard	Service Limit
Battery		
Type	Sealed Battery	– – –
Capacity	12 V 14 Ah 12 V 12 Ah (ZX1200-C3 ~)	– – –
Voltage	12.6 V or more	– – –
Alternator (Charging System)		
Type	Three-phase AC (built-in regulator/rectifier)	– – –
Charging voltage	14.2 ~ 14.8 V @4 000 r/min (rpm)	– – –
Stator coil resistance	1.0 Ω or less	– – –
Rotor coil resistance	2.3 ~ 3.5 Ω	– – –
Slip ring diameter	14.4 mm (0.57 in.)	14.0 mm (0.55 in.)
Carbon brush length	10.5 mm (0.41 in.)	4.5 mm (0.18 in.)
Ignition System		
Pickup coil resistance	380 ~ 570 Ω	– – –
Ignition coil:		
3 needle arcing distance	6 mm (0.24 in.) or more	– – –
Primary winding resistance	2.3 ~ 3.5 Ω	– – –
Secondary winding resistance	12 ~ 18 kΩ	– – –
Spark plug:		
Type	NGK CR9E or ND U27ESR-N	– – –
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	– – –
IC igniter inspection	in the text	– – –
Electric Starter System		
Starter motor:		
Brush length	12 ~ 12.5 mm (0.47 ~ 0.49 in.)	7 mm (0.3 in.)
Commutator diameter	28 mm (1.1 in.)	27 mm (1.06 in.)
Switch and Sensor		
Rear break light switch timing	ON after about 10 mm (0.39 in.) pedal travel	– – –
Engine oil pressure switch connections	When engine is stopped: ON When engine is running: OFF	– – – – – –
Fan switch resistance:		
Rising temperature	From OFF to ON @93 ~ 103°C (199 ~ 217°F)	– – –
Falling temperature	Fan stops with the temperature 3 ~ 8°C (38 ~ 46°F) lower than the operation temperature range. ON: Less than 0.5 Ω OFF: More than 10 MΩ	– – –
Water temperature sensor internal resistance	80°C (176°F): About 52 Ω 100°C (212°F): About 27 Ω	– – –
Fuel level sensor resistance:		
Full position	1 ~ 5 Ω	– – –
Empty position	103 ~ 117 Ω	– – –

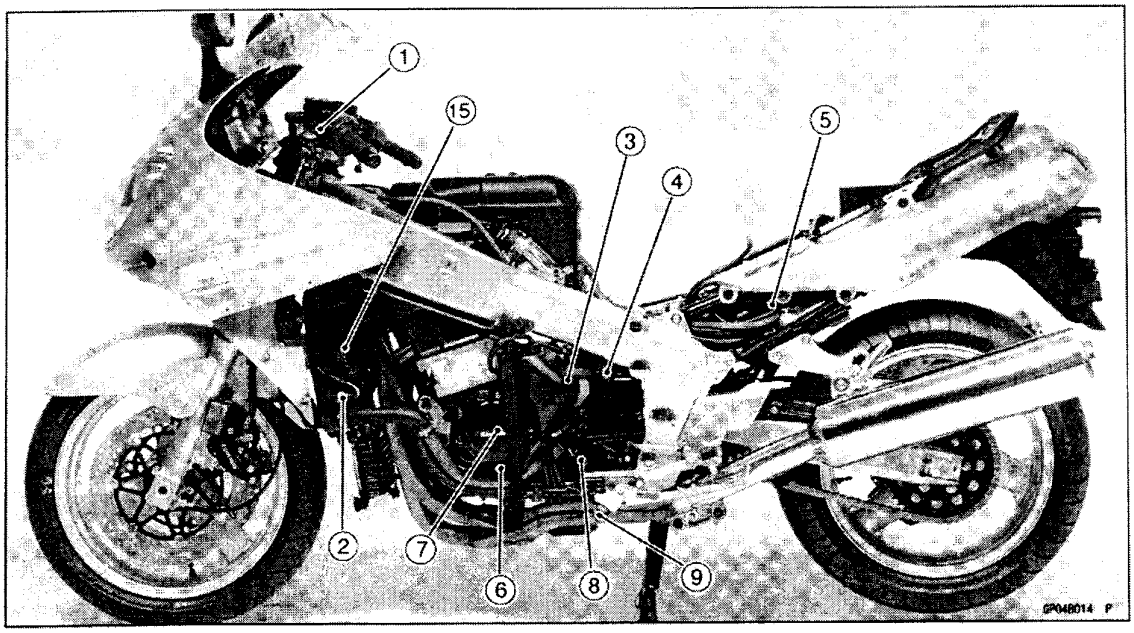
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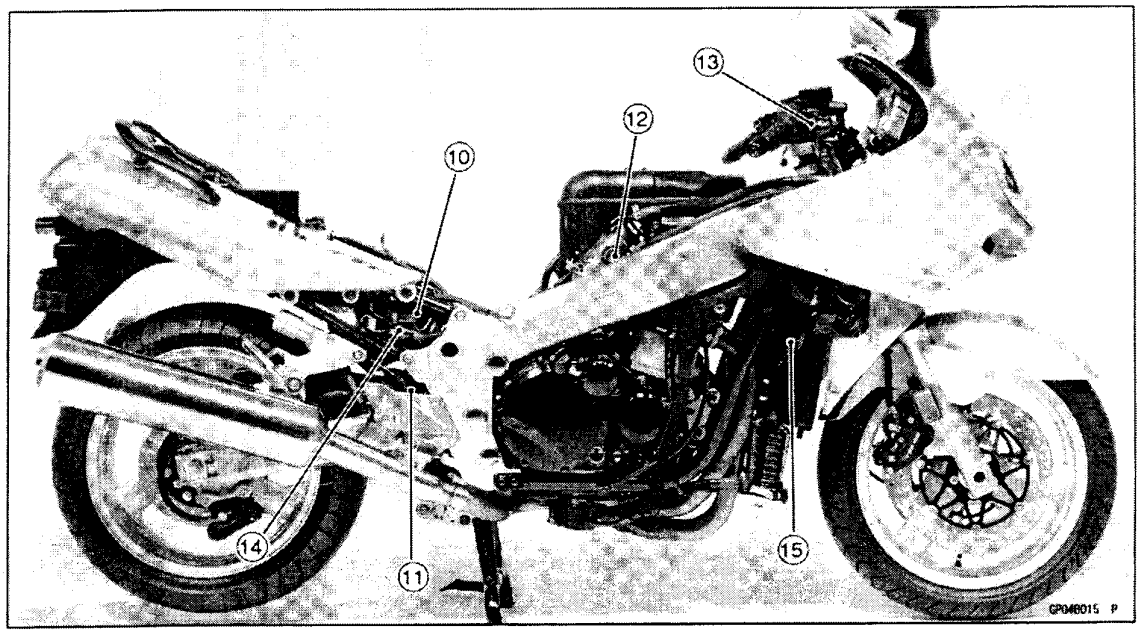
Specifications

Item	Standard	Service Limit
Throttle sensor output voltage	When engine is idling: 0.9 ~ 1.1 V	– – –
	When grip is fully opened: 4.06 ~ 4.26 V	– – –

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Parts Location

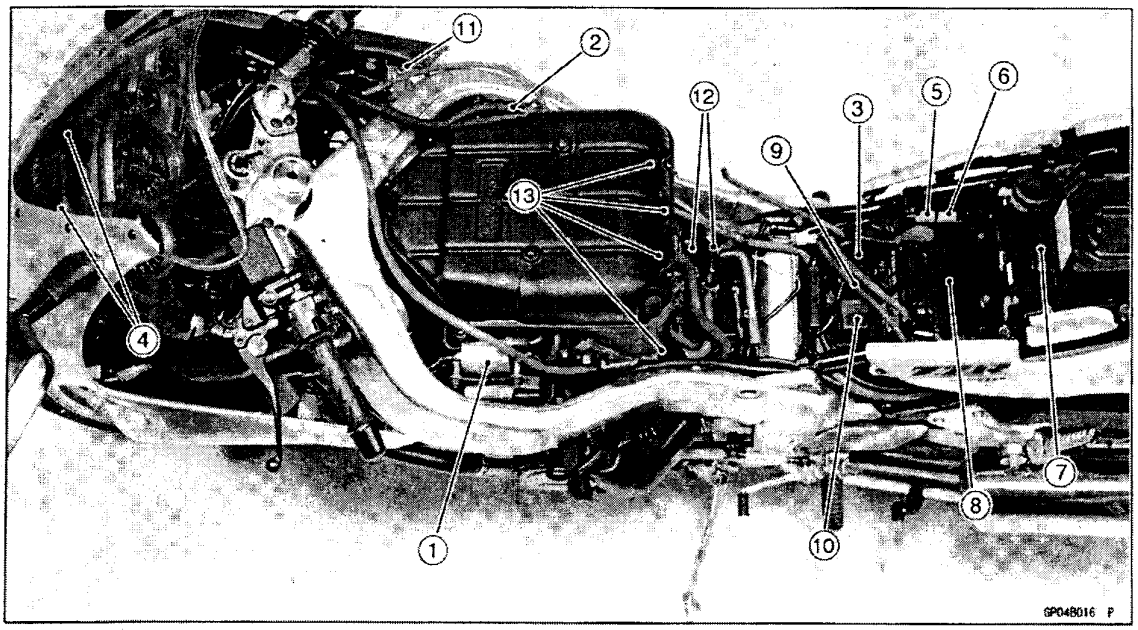




1. Starter Lockout Switch
2. Radiator Fan Switch
3. Alternator, Regulator and Rectifier
4. Starter Motor
5. IC Igniter
6. Oil Pressure Switch
7. Pickup Coil
8. Neutral Switch
9. Side Stand Switch
10. Starter Relay and Main Fuse
11. Rear Brake Light Switch
12. Throttle Position Sensor
13. Front Brake Light Switch
14. Diode
15. Radiator Fans

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Parts Location



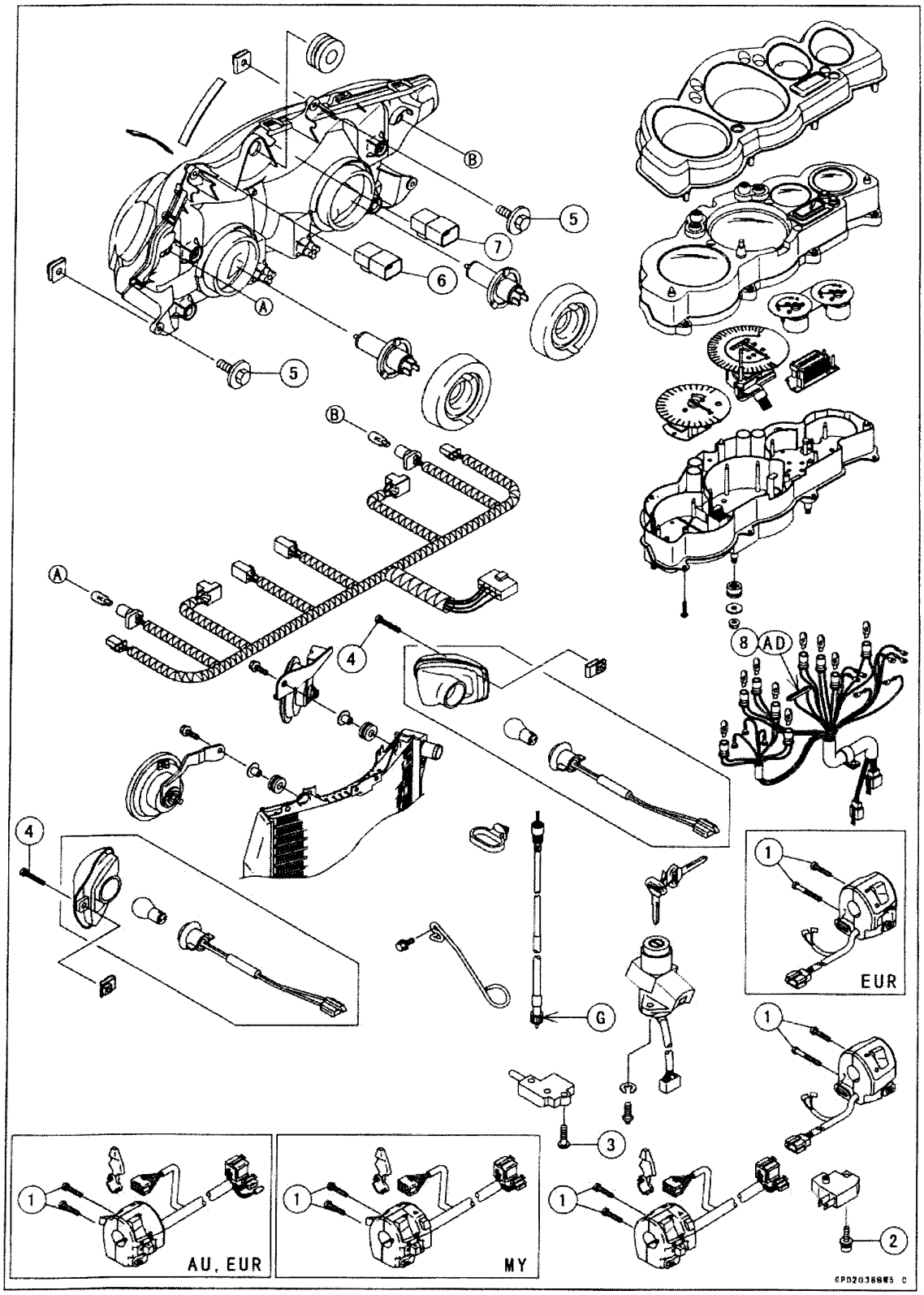
1. Ignition Coil #1, 4
2. Ignition Coil #2, 3
3. Turn Signal Relay
4. Headlight Relays (Hi and Low)
5. Headlight Fuse 30 A
6. Acc Fuse 10 A
7. Junction Box
8. Battery
9. Radiator Fan Relay
10. Headlight Relay (control)
11. Water Temperature Sensor
12. Fuel Pumps
13. Fuel Cut Valves

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Exploded View



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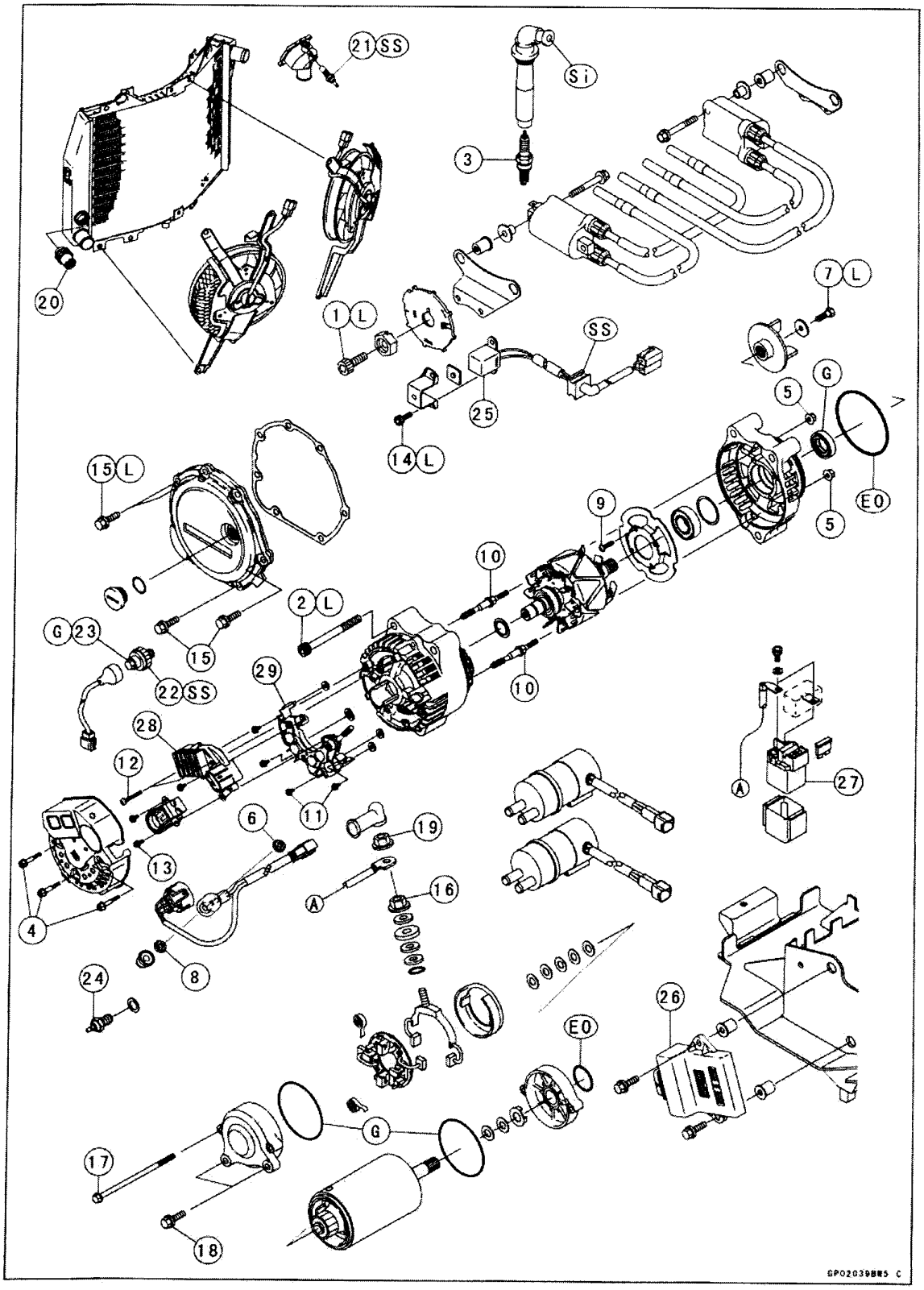
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Switch housing mounting screws	3.4	0.35	30 in·lb	
2	Front brake light switch screw	1.2	0.12	11 in·lb	
3	Starter lockout switch screw	1.2	0.12	11 in·lb	
4	Front turn signal light mounting screws	0.90	0.09	8 in·lb	
5	Headlight bolts	5.9	0.60	52 in·lb	

6. Headlight Relay (Hi)
7. Headlight Relay (Low)
8. Read Switch

AU: Australian Model
CA: Canadian Model
EUR: European Model
MY: Malaysian Model
AD: Apply adhesive.
G: Apply grease.

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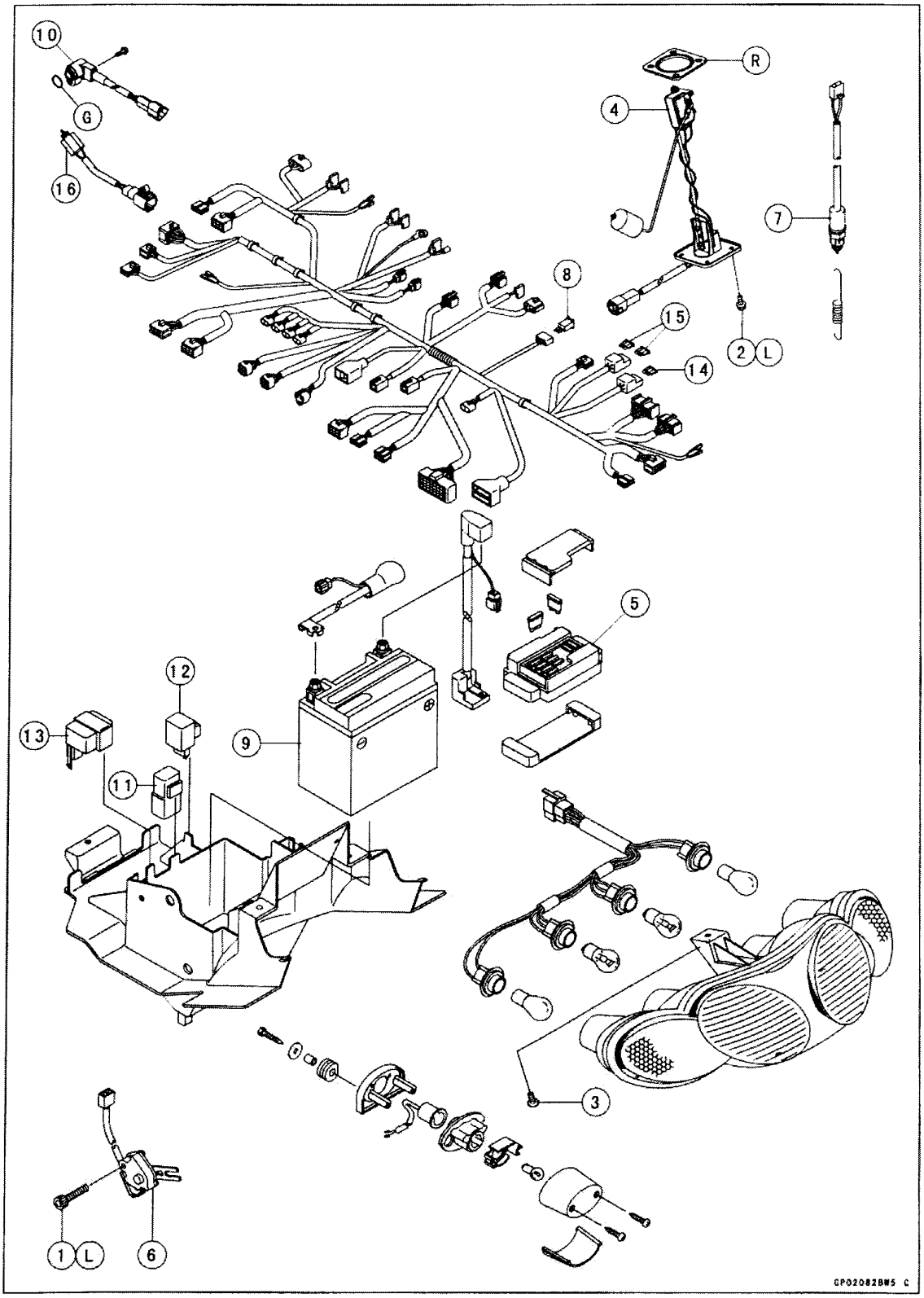
No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Timing rotor bolt	25	2.5	18	L
2	Alternator mounting bolts	25	2.5	18	L
3	Spark plug	14	1.4	10	
4	Alternator end cover bolts	3.7	0.37	32 in·lb	
5	Alternator housing nuts	4.5	0.46	40 in·lb	
6	Alternator terminal nut	7.8	0.80	69 in·lb	
7	Alternator coupling bolt	12	1.2	106 in·lb	L
8	Alternator terminal locknut	3.6	0.36	31 in·lb	
9	Alternator bearing retainer screws	2.6	0.27	23 in·lb	
10	Alternator studs	8.8	0.90	78 in·lb	
11	Rectifire screws	2.0	0.20	17 in·lb	
12	Regulator screws	2.0	0.20	17 in·lb	
13	Brush holder screws	2.0	0.20	17 in·lb	
14	Pickup coil bolts	5.9	0.60	52 in·lb	L
15	Pickup coil cover bolts	11	1.1	95 in·lb	L (2)
16	Starter motor terminal nut	4.9	0.50	43 in·lb	
17	Starter motor assembly bolts	4.9	0.50	43 in·lb	
18	Starter motor mounting bolts	11	1.1	95 in·lb	
19	Starter motor cable mounting nut	4.9	0.50	43 in·lb	
20	Radiator fan switch	18	1.8	13	
21	Water temperature sensor	7.8	0.80	6.9 in·lb	SS
22	Oil pressure switch	15	1.5	11	SS
23	Oil pressure switch terminal screw	1.5	0.15	13 in·lb	G
24	Neutral switch	15	1.5	11	

25. Pickup Coil
26. IC Igniter
27. Starter Relay
28. Regulator
29. Rectifier

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

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No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Sidestand switch bolt	8.8	0.90	78 in·lb	L
2	Fuel level sensor mounting bolts	6.9	0.70	61 in·lb	L
3	Taillight screws	5.9	0.60	52 in·lb	

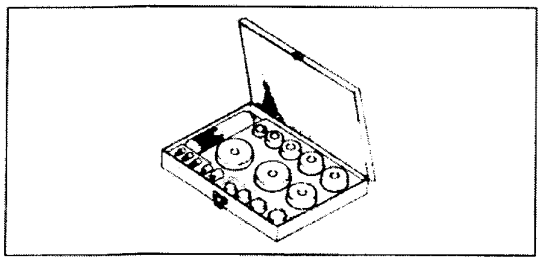
4. Fuel Level Sensor
5. Junction Box
6. Side Stand Switch
7. Rear Brake Light Switch
8. Diode
9. Battery
10. Throttle Position Sensor
11. Turn Signal Relay
12. Radiator Fan Relay
13. Headlight Relay
    (ZX1200-C1/D1: AU, CA, MY, US)
    (ZX1200-C2: H, HU, HR)
14. Accessory Fuse 10 A
15. Headlight Relay Fuse 30 A
16. Fuel Cut Valve

AU: Australian Model
CA: Canadian Model
MY: Malaysian Model
US: U.S.A. Model
H. with Honeycomb Catarytic Converter
HU. with Honeycomb Catarytic Converter (UK model)
HR. with Honeycomb Catarytic Converter (Restricted model)
L: Apply a non-permanent locking agent.
R: Replacement Part
G: Apply grease.

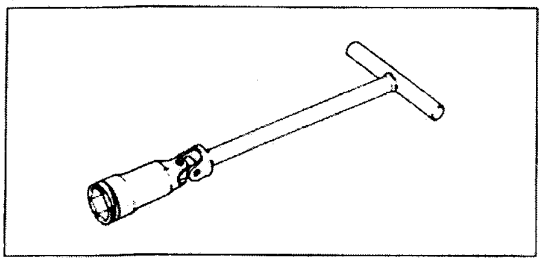
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Special Tools and Sealant

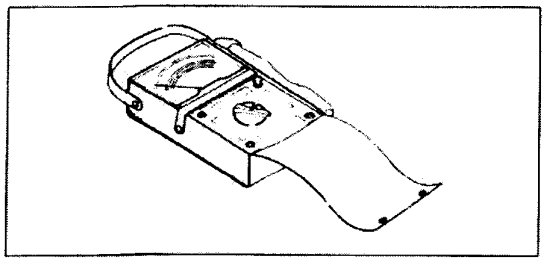
Bearing Driver Set:
57001–1129



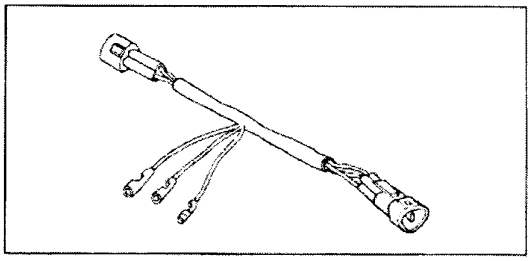
Spark Plug Wrench, Hex 16:
57001–1262



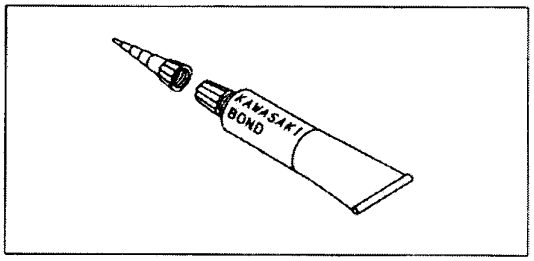
Hand Tester:
57001–1394



Throttle Sensor Setting Adapter #1:
57001–1400



Kawasaki Bond (Silicone Sealant):
56019–120



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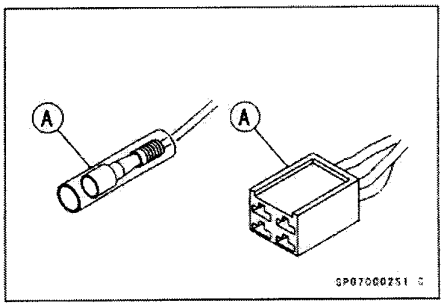
Precautions

There are a number of important precautions that are musts when servicing electrical systems. Learn and observe all the rules below.

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

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

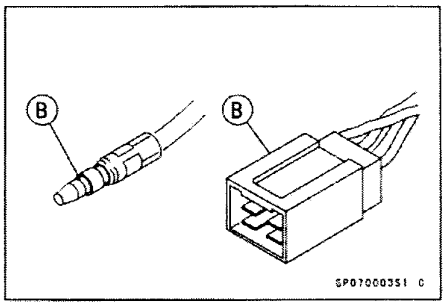
- ○Electrical Connectors
  Female Connectors [A]



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Precautions

Male Connectors [B]



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Electrical Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.

★If any wiring is poor, replace the damaged wiring.

- Pull each connector [A] apart and inspect it for corrosion, dirt, and damage.

★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.

- Check the wiring for continuity.

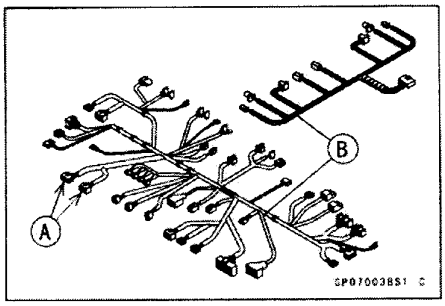
○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.

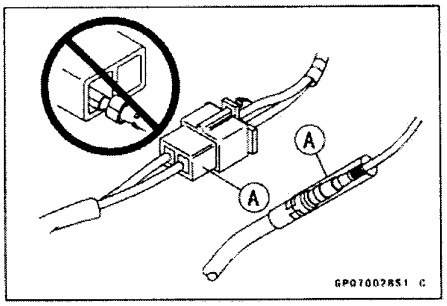
○Connect the hand tester between the ends of the leads.

Special Tool - Hand Tester: 57001–1394

○Set the tester to the × 1 Ω range, and read the tester.

★If the tester does not read 0 Ω, the lead is defective. Replace the lead or the wiring harness [B] if necessary.



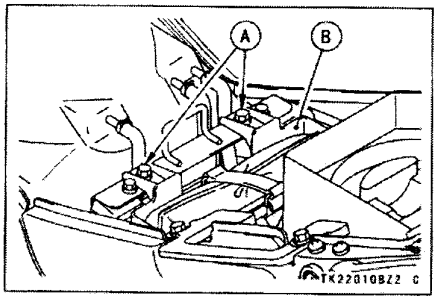


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Battery

Battery Removal

● Remove:
Seat (see Frame Chapter)
Bolts [A]
Tool Kit Case with Tool Kit [B]

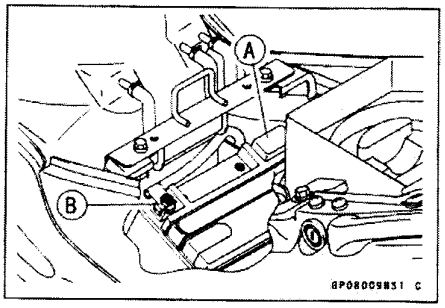


● Disconnect the negative (–) cable [B].
● Slide out the positive (+) terminal cap [A] and disconnect positive (+) cable.

CAUTION

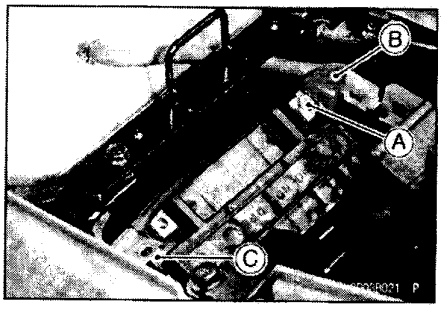
Be sure to disconnect the negative (–) lead first.

● Remove the battery.



Battery Installation

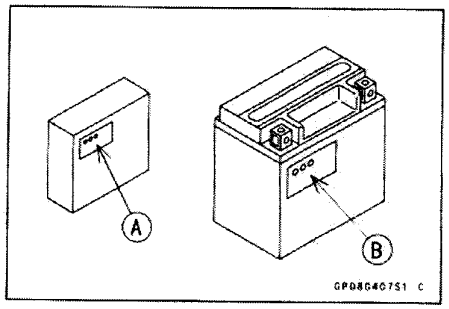
● Apply a light coat of grease on the terminals to prevent corrosion.
● Install the positive (+) cable [A] first.
● Cover the (+) terminal with the cap [B].
● Install the negative (–) cable [C].



Electrolyte Filling

● Make sure that the model name [A] of the electrolyte container matches the model name [B] of the battery. These names must be the same.

Battery Model Name for
ZX1200-C1 ~ 2: FTZ14-BS
ZX1200-C3 ~: YTX14-BS



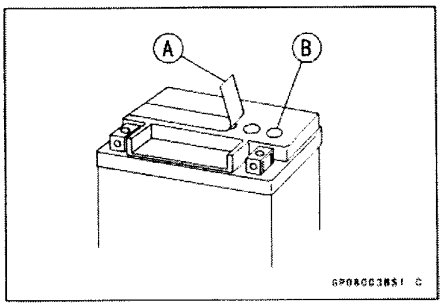
CAUTION

Be sure to use the electrolyte container with the same model name as the battery since the electrolyte volume and specific gravity vary with the battery type. This is to prevent overfilling of the electrolyte, shorting the battery life, and deterioration of the battery performance.

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Battery

- Check to see that there is no peeling, tears or holes in the seal sheet on the top of the battery.
- Place the battery on a level surface.
- Remove the seal sheet [A].



CAUTION

Do not remove the aluminum seal sheet [A] sealing the filler ports [B] until just before use.

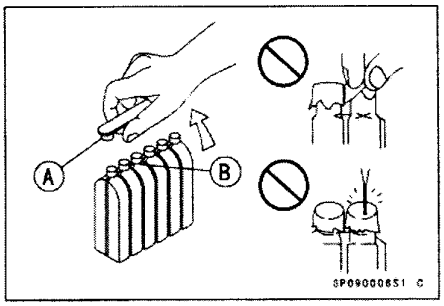
NOTE

○A battery whose seal sheet has any peeling, tears, holes, or from which the air-sucking sound was not heard requires a refreshing charge (initial charge).

- Take the electrolyte container out of the vinyl bag.
- Detach the seal caps [A] from the container.

NOTE

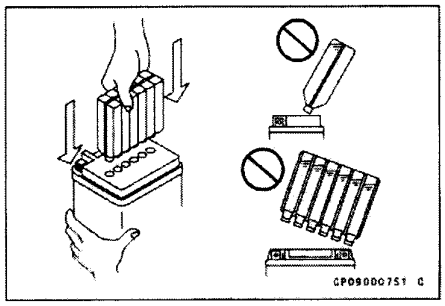
○Do not discard the seal caps because it is used as the battery plugs later.
○Do not peel back or pierce the seals [B] on the container.



- Place the electrolyte container upside down aligning the six seals with the six battery filler parts.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

○Do not tilt the container as the electrolyte flow may be interrupted.

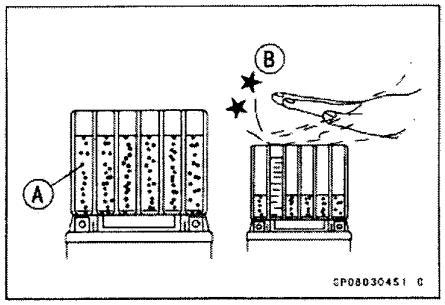


- Make sure air bubbles [A] are coming up from all six filler ports.

○Leave the container this way for 5 minutes or longer.

NOTE

○If no air bubbles are coming up from a filler port, tap [B] the bottom of the bottle two or three times. Never remove the container from the battery.



CAUTION

Fill the electrolyte into the battery until the container is completely emptied.

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Battery

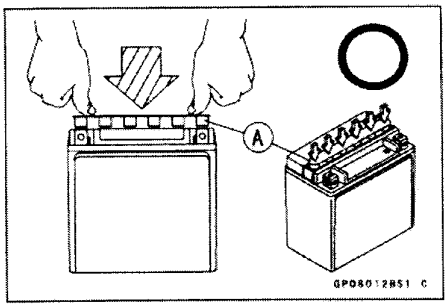
- Be certain that all the electrolyte has flowed out.
- Tap the bottom the same way as above if there is any electrolyte left in the container.
- Now pull the container gently out of the battery.
- Let the battery sit for **20** minutes. During this time, the electrolyte permeates the special separators and the gas generated by chemical reaction is released.
- Fit the seal caps [A] tightly into the filler ports until the seal caps are at the same level as the top of the battery.

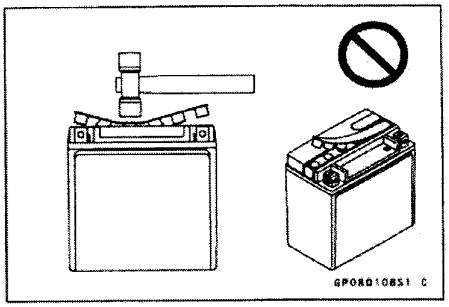
NOTE

○*Do not hammer. Press down evenly with both hands.*

CAUTION

Once you installed the seal caps after filling the battery, never remove it, nor add any water or electrolyte.





Initial Charge

While an sealed battery can be used after only filling with electrolyte, a battery may not be able to sufficiently move a starter motor to start an engine in the cases shown in the table below, where an initial charge is required before use. However, if a battery shows a terminal voltage of higher than 12.6 V after 10 minutes of filling (Note 1), no initial charge is necessary.

Condition Requiring Initial Charge	Charging Method
At low temperatures (lower than 0°C)	1.4 A × 2 ~ 3 hours
Battery has been stored in high temperature and humidity.	1.4 A ×15 ~ 20 hours
Seal has been removed, or broken - peeling, tear or hole. (If you did not hear the air-sucking sound "Shoosh" as you removed the seal.)	
Battery as old as 2 years or more after manufacture. Battery manufacturing date is printed on battery top. Example) 12 (Day) 10 (Month) 99 (Year) T1 (Mfg. location)	

Note 1 : Terminal voltage — To measure battery terminal voltage, use a digital voltmeter.

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Battery

Precautions

1) No need of topping-up
   No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the sealing plug to add water is very dangerous. Never do that.
2) Refreshing charge
   If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see the Electrical System chapter).
   When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. However, the battery's performance may be reduced noticeably if charged under conditions other than given above.
Never remove the seal caps during refresh charge.
If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

3) When you do not use the motorcycle for months
   Give a refresh charge before you store the motorcycle and store it with the negative lead removed.
   Give a refresh charge once a month during storage.
4) Battery life
   If the battery will not start the engine even after several refresh charges, the battery has exceeded its useful life. Replace it. (Provided, however, the vehicle's starting system has no problem.)

⚠ WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.
No fire should be drawn near the battery, or no terminals should have the tightening loosened.
The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

Interchange

The sealed battery can fully display its performance only when combined with a proper vehicle electrical system. Therefore, replace the sealed battery only on a motorcycle which was originally equipped with the sealed battery.

Be careful, if an sealed battery is installed on a motorcycle which had an ordinary battery as original equipment, the sealed battery's life will be shortened.

Charging Condition Inspection

Battery charging condition can be checked by measuring battery terminal voltage.

● Remove the battery (see Battery Removal).

CAUTION

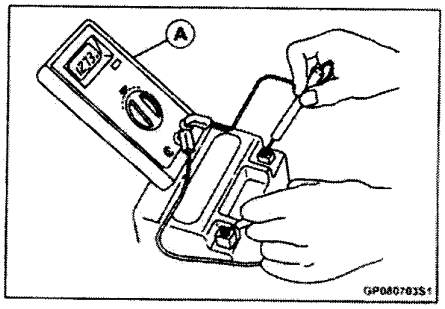
Be sure to disconnect the negative (–) lead first.

● Measure the battery terminal voltage.

NOTE

○*Measure with a digital voltmeter [A] which can be read to one decimal place voltage.*

★If the reading is below the specified, refreshing charge is required.

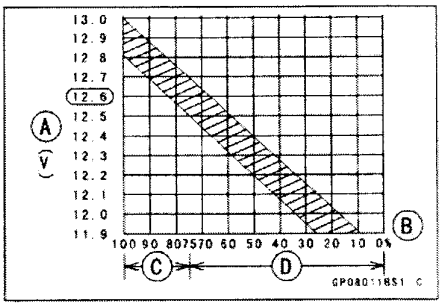


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Battery

Battery Terminal Voltage
Standard: 12.6 V or more

Terminal Voltage (V) [A]
Battery Charge Rate (%) [B]
Refresh charge is required [C]
Good [D]

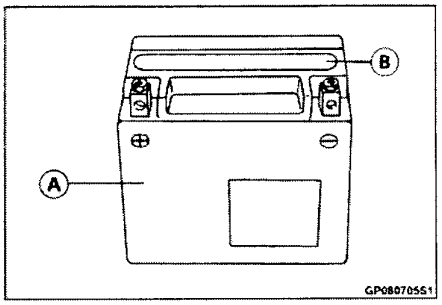


Refreshing Charge

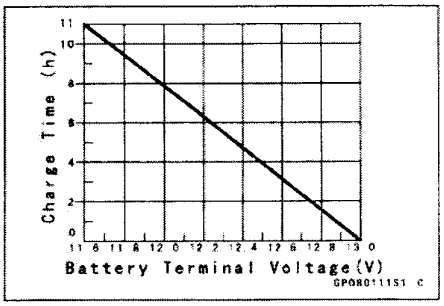
- Remove the battery [A] (see Battery Removal).
- Refresh-charge by following method according to the battery terminal voltage.

⚠ WARNING

This battery is sealed type. Never remove seal sheet [B] even at charging. Never add water. Charge with current and time as stated below.



Terminal Voltage: 11.5 – less than 12.6 V
Standard Charge:
1.4 A × 5 – 10 h (see following chart)
Quick Charge:
7.0 A × 1 h
6.0 A × 1 h (ZX1200-C3 –)



CAUTION

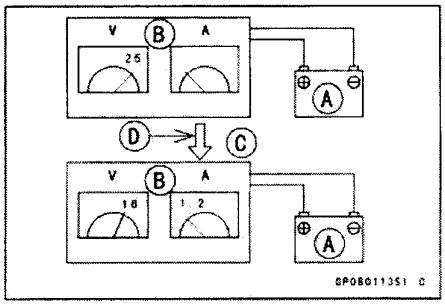
If possible, do not quick charge. If the quick charge is done due to unavoidable circumstances, do standard charge later on.

Terminal Voltage: less than 11.5 V
Charging Method: 1.4 A × 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 [D]. If the battery will accept current, decrease the voltage and charge by the standard charging method described on the battery case. If the battery will not accept current after 5 minutes, replace the battery.*

Battery [A]
Battery Charger [B]
Standard Value [C]



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Battery

● Determine battery condition after refreshing charge.
○Determine the condition of the battery 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.6 V or higher	Good
12.0 ~ 12.6 V or lower	Charge insufficient → Recharge.
12.0 V or lower	Unserviceable → Replace

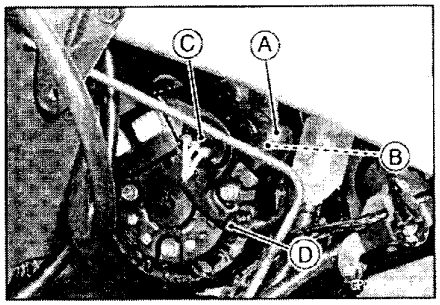
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Charging System

Alternator Removal

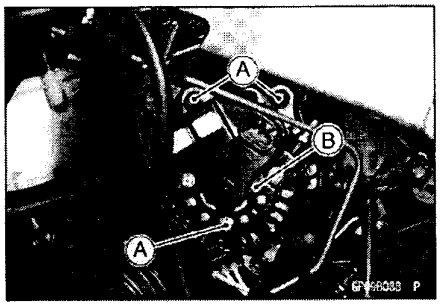
CAUTION

The Alternator positive (+) cable is connected directly to the battery positive (+) terminal even when the ignition switch off, so take care not to short the removed cable to chassis ground.



- Remove:
  Battery Negative Cables (see Battery Removal)
  Lower Fairing (see Frame chapter)
  Coolant Reservoir Tank (see Cooling System chapter)
  Rubber Cap [A] (Slide out)
  Nut [B]
  Positive Cable
  Alternator Lead Connector [C]
  Strap [D]

- Remove the alternator mounting bolts [A]
- Remove the alternator [B].



Alternator Installation

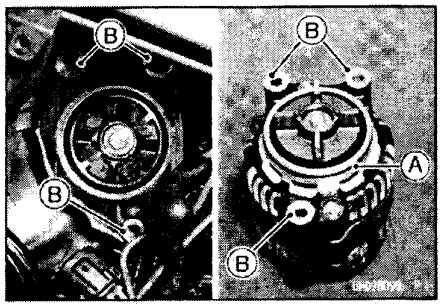
- Replace the O-ring [A] with the new one and apply a small amount of engine oil to the O-ring.
- Clean the alternator legs and crankcase where the alternator is grounded [B].
- Apply a non-permanent locking agent to the threads of the alternator mounting bolts.
- Tighten:

Torque - Alternator Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)

- Connect the alternator lead connector and cable.

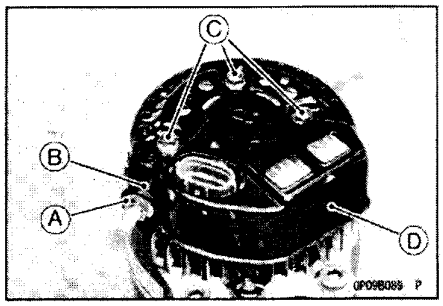
Torque - Alternator Terminal Nut: 7.8 N·m (0.80 kgf·m, 69 in·lb)

- Install the strap.



Alternator Disassembly

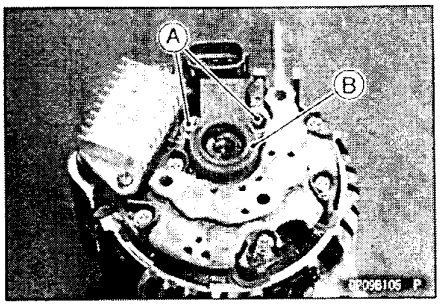
- Remove the alternator (see Alternator Removal).
- Remove:
  Alternator Terminal Nut [A]
  Insulator [B]
  End Cover Bolts [C]
  End Cover [D]



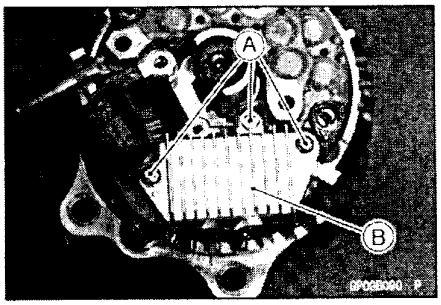
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Charging System

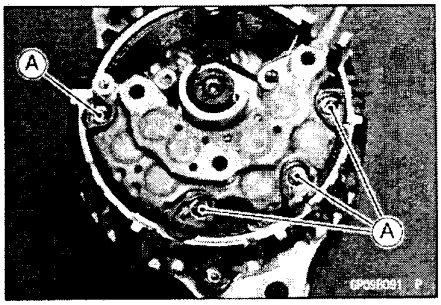
● Remove:
Brush Holder Screws [A]
Brush Holder [B]



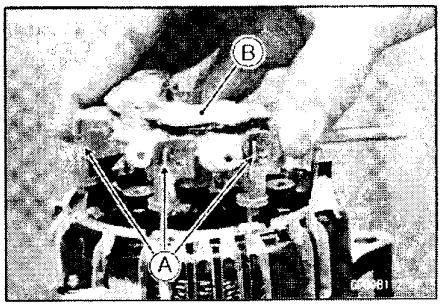
Screws [A]
Regulator [B]



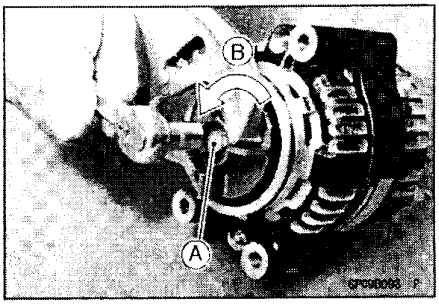
Screws [A]



● Straighten the leads [A] on the rectifier.
● Remove the rectifier [B].



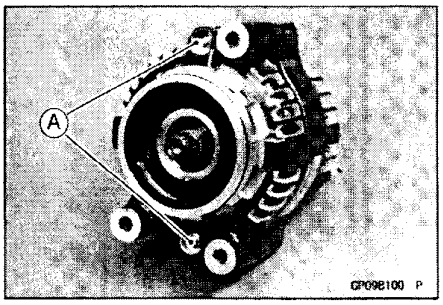
● Remove the alternator coupling to disassemble the rest of the parts as follows.
○Hold the alternator coupling with a vise and unscrew the coupling bolt [A].
○The coupling bolt has right-hand threads and turn the bolt counterclockwise [B].
○Remove the coupling bolt and coupling.



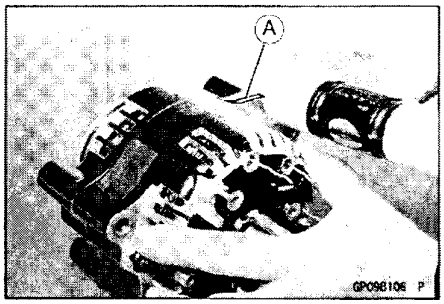
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Charging System

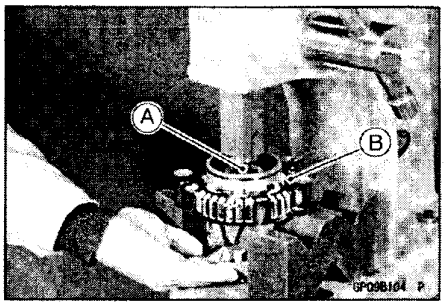
● Unscrew the housing nuts [A].



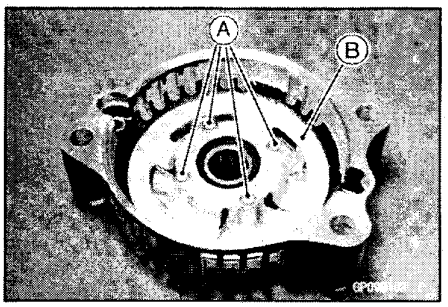
● Split the alternator housings apart.
○Using the plastic hammer, tap the edge [A] of the alternator housing.



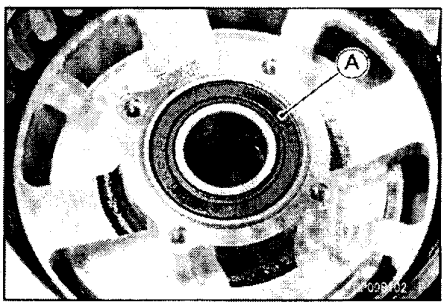
● Press out the alternator rotor [A] from the alternator housing [B].



● Remove the alternator bearing retainer screws [A] and the bearing retainer [B].



● Remove the alternator housing bearing [A].



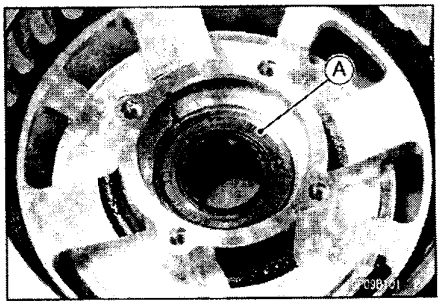
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Charging System

● Remove the oil seal [A], using the bearing driver set.

Special Tool - Bearing Driver Set: 57001–1129

● Discard the bearing and the oil seal.

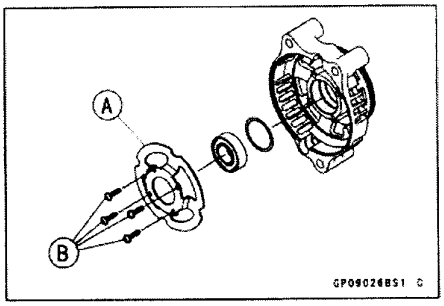


Alternator Assembly

● Install the new housing ball bearing into the alternator housing.

● Install the bearing retainer [A] with its screws [B].

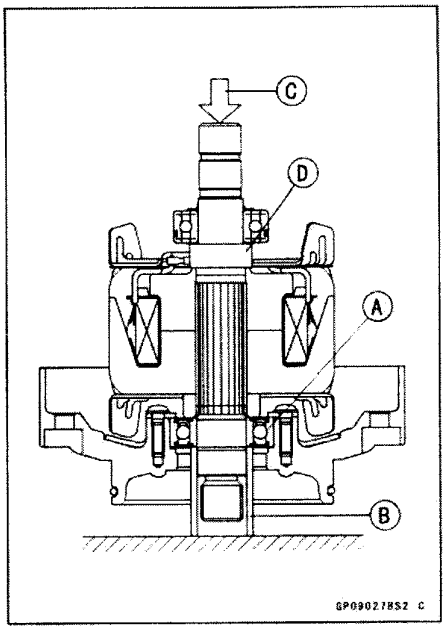
Torque - Alternator Bearing Retainer Screws: 2.6 N·m (0.27 kgf·m, 23 in·lb)



● Position the housing ball bearing [A] so that the inner race is seated on a suitable press fixture [B].

● Press [C] the alternator rotor [D] into the housing ball bearing.

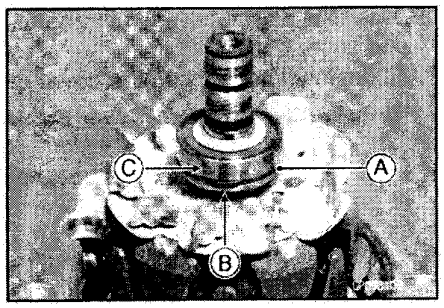
CAUTION
Do not damage the insulator on the alternator rotor end.



● Position the ball bearing ring [A] so that the ring projection [B] almost aligns with the side face of the outer coller [C]. This eases alternator housings installation.

○Tighten the nuts.

Torque - Alternator Housing Nuts: 4.5 N·m (0.46 kgf·m, 40 in·lb)

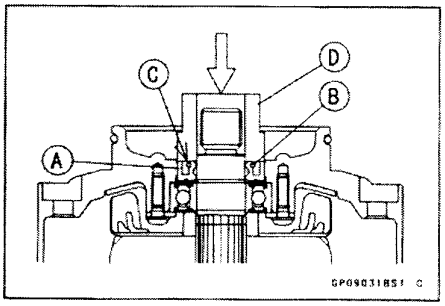


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Charging System

- Apply high temperature grease to the oil seal lips.
- Press in the oil seal [A] so that the spring band [B] faces out and the seal end is flush [C] with the end of the hole.

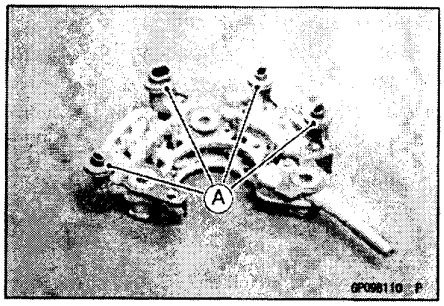
Special Tool - Bearing Driver Set: 57001–1129 [D]



- Apply a non-permanent locking agent to the coupling bolt.
- Install the alternator coupling.

Torque - Alternator Coupling Bolt: 12 N·m (1.2 kgf·m, 106 in·lb)

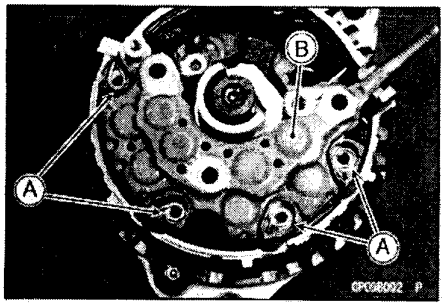
- Check that the rubber insulators [A] are on the rectifier.



- Run the stator leads [A] into the holes of the rectifier [B] and bend them as shown.

CAUTION

If stator leads are bended for more than a few times, the starter leads may be damaged.



- Tighten the screws.

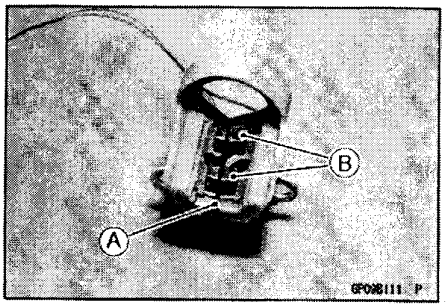
Torque - Rectifier Screws: 2.0 N·m (0.20 kgf·m, 17 in·lb)

- Install the regulator.

Torque - Regulator Screws: 2.0 N·m (0.20 kgf·m, 17 in·lb)

- Using a suitable string [A], fasten the brushes [B] as shown.
- Install the brush holder.

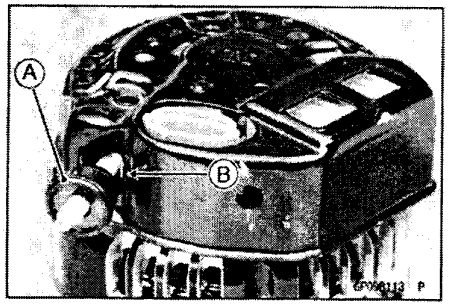
Torque - Brush Holder Screws: 2.0 N·m (0.20 kgf·m, 17 in·lb)



- Install the alternator end cover and tighten the alternator end cover bolts.

OFit the insulator [A] into the cover groove [B] first.

Torque - Alternator End Cover Bolts: 3.7 N·m (0.37 kgf·m, 32 in·lb)
Alternator Terminal Locknut: 3.6 N·m (0.36 kgf·m, 31 in·lb)



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Charging System

Operational Inspection

For any charging system problems, always check the charging system wiring first (see Wiring Inspection), and then check the system with the following tests shown in the troubleshooting guide.

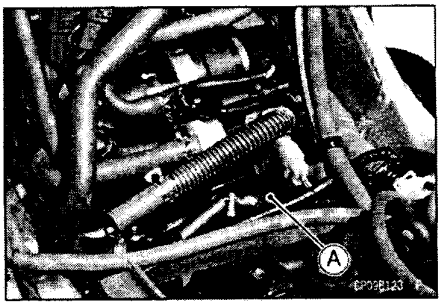
Troubleshooting Guide

Test No.	Trouble	Symptoms
1	Battery discharged	Starter not rotating
2	Battery overcharged	Battery temperature rises
3	Noise	Alternator or alternator chain noise

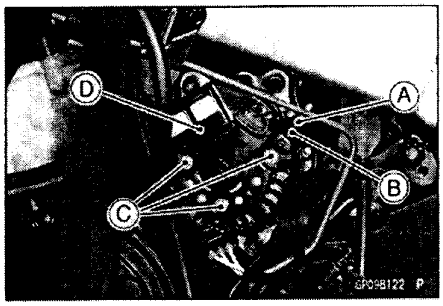
Test No.1 Battery Discharged

CAUTION

The Alternator positive (+) cable is connected directly to the battery (+) terminal even when the ignition switch off, so take care not to shout the removed cable to chassis ground.



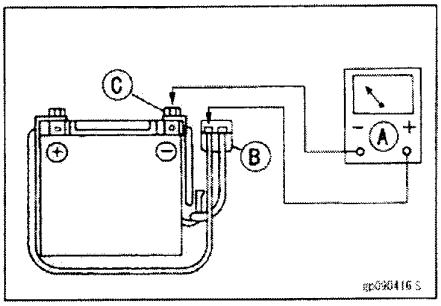
- Remove the fuel tank (see Fuel System chapter).
- Disconnect the alternator lead connector (Main Harness Side) [A].
- Disconnect the alternator lead connector and positive cable (see Alternator Removal).
- Cut out the strap (see Alternator Removal).



- Remove the terminal locknut [A] and pull the insulator [B].
- Remove the alternator end cover bolts [C], and take off the cover [D].
- Check that the alternator leads, cable, contact points and connectors are in good condition.

★If not, repair or replace the damaged parts.

- Replace the discharged battery with a good battery.



- Connect:
  Positive Cable
  Alternator Lead Connectors
- Install:
  Alternator End Cover

Torque - Alternator End Cover Screws: 3.7 N·m (0.37 kgf·m, 32 in·lb)

- Connect the hand tester [A] to the battery leads as shown.
  Starter Relay [B]
  Battery Negative Terminal [C]

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Charging System

● Check charging voltage with the engine running.
★If the charging voltage is higher than 13.5 V, the charging system is in good condition.

Charging Voltage 14.2 ~ 14.8 V @4 000 r/min (rpm)

★If the charging voltage is lower than 13.5 V, check the following.
Stator Coil
Rotor Coil
Slip Rings
Carbon Brushes
Rectifier
Regulator

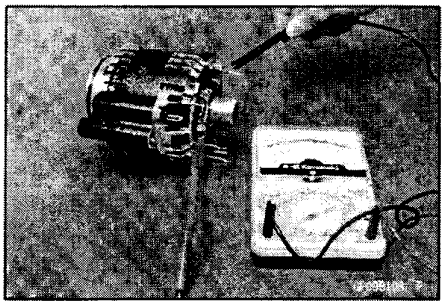
Test No.2 Battery Overcharged
● Check the regulator and/or rotor.
★Repair or replace the damaged parts.

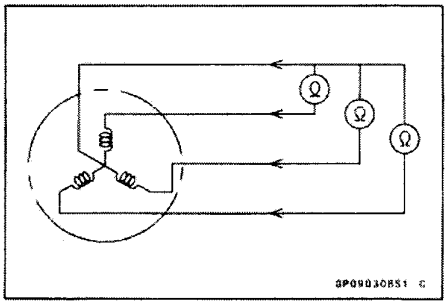
Test No.3 Noise
● Check the alternator chain slack and replace the chain if necessary (see Crankshaft/Transmission chapter).
● Check the alternator shaft ball bearings if they make a noise.
● Check the alternator ball bearings, stator coil, and/or rectifier if the alternator makes a noise.
★Repair or replace the damaged parts.

Stator Coil Inspection
● Connect the hand tester (× 1 Ω range) between the coil leads and read the tester.
★If the tester does not read as specified, replace the alternator frame.

Starter Coil Resistance: 1.0 Ω or less

● Using the highest hand tester range, measure the resistance between the stator coil core and each of the coil windings.
★If there is any reading at all, the stator coil winding has a short and the alternator frame must be replaced.

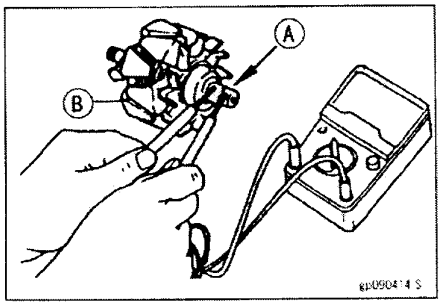




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Charging System

Rotor Coil Inspection



- Connect the hand tester (× 1 Ω range) between the slip rings [A] and read the tester.

★If the tester does not read as specified, replace the rotor [B].

Rotor Coil Resistance: 2.3 ~ 3.5 Ω

- Using the highest tester range, measure the resistance between the rotor shaft and each of the slip rings.

★If there is any reading at all, the rotor coil has a short and must be replaced.

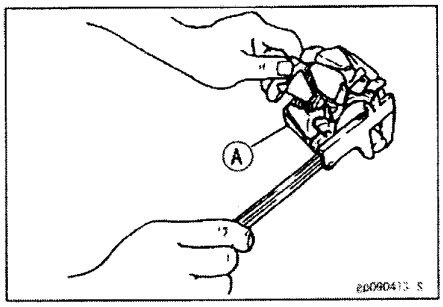
Slip Ring Cleaning

- Visually inspect the slip ring for dirt or pitting.

★If necessary, smooth the slip ring with No.300 ~ No.500 emery cloth.

Slip Ring Diameter

★If the measurement is less than the service limit, replace the rotor [A]



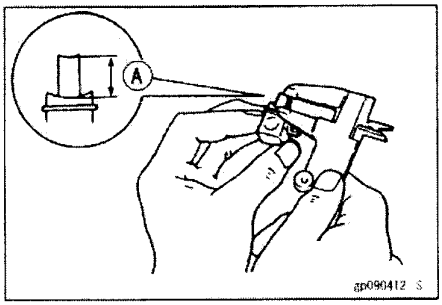
Slip Ring Diameter

Standard:	**14.4 mm (0.57 in.)**
Service Limit:	**14.0 mm (0.55 in.)**

Carbon Brush Length

- Measure the length [A] both carbon brushes that stick out of the holder.

★If either one is worn down to less than the service limit, replace it.



Carbon Brush Length (projected portion)

Standard:	**10.5 mm (0.413 in.)**
Service Limit:	**4.5 mm (0.18 in.)**

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Charging System

Rectifier Inspection

- Set the hand tester to the 1 Ω range.
- Zero the hand tester, and connect it to each terminal to check the resistance in both directions.

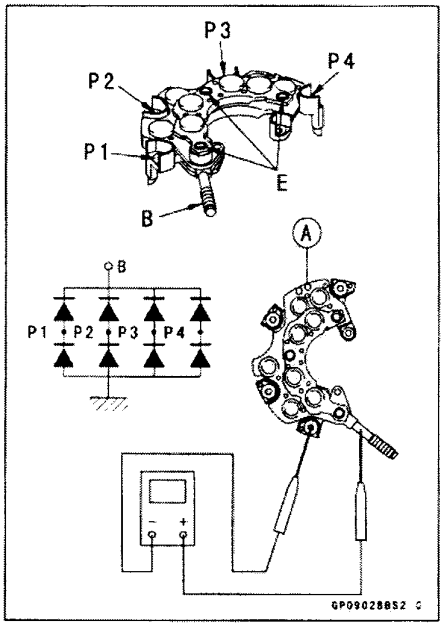
○The resistance should be low in one direction and more than ten times as much in the other direction. If the rectifier [A] shows low or high in both directions, the rectifier is defective and the rectifier must be replaced.

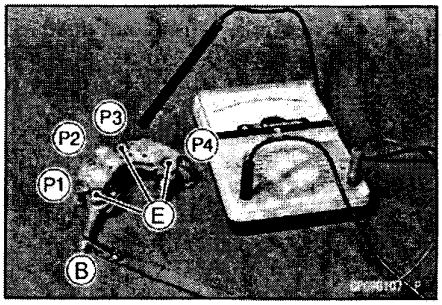
NOTE

○*The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking, the lower reading should be from zero to one half the scale.*

CAUTION

If a megger or a meter with a large-capacity battery is used, the rectifier will be damaged.

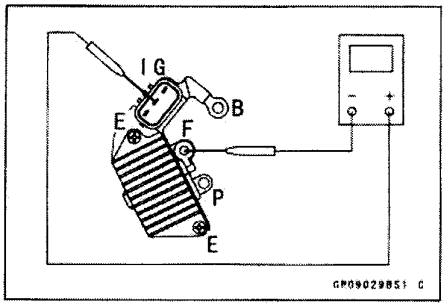




Regulator Inspection

- Set the hand tester to the 1 kΩ range.
- Check the resistance between B and F terminals in both directions.

★If the reading shows zero or infinity (no reading) in both directions, the regulator is defective and must be replaced.



Alternator Ball Bearing Inspection

CAUTION

Do not disassemble the alternator for bearing inspection since disassembling the alternator damages the bearings.

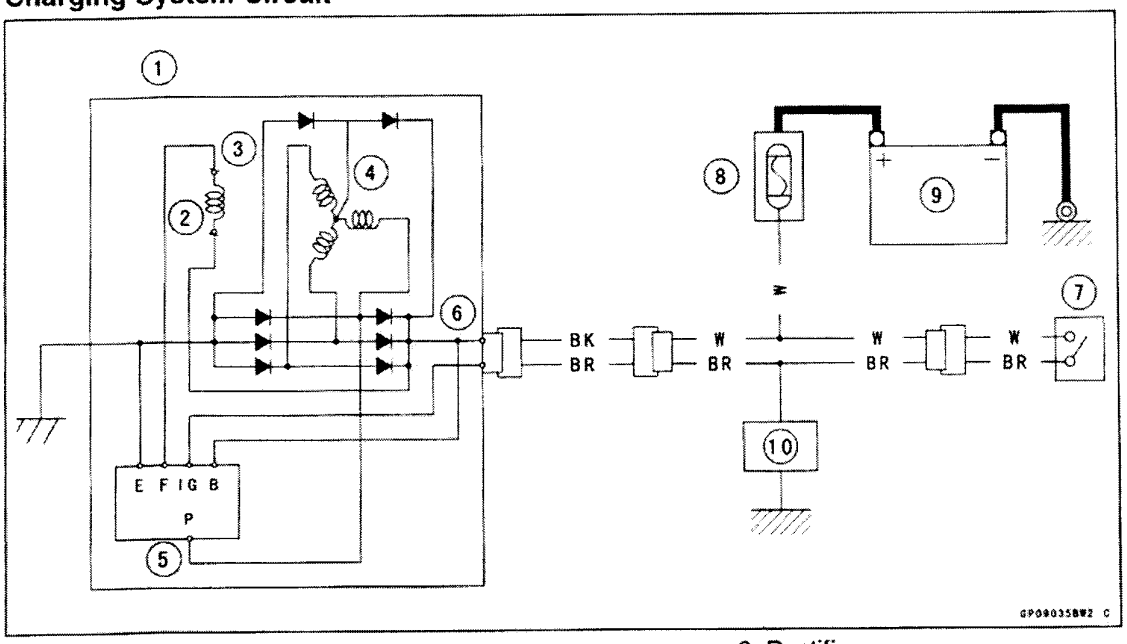
- Turn the alternator rotor shaft back and forth while checking for plays, roughness or binding of bearing or rotor.

★If bearing play, roughness, or binding is found, disassemble the alternator and replace the bearing or rotor.

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Charging System

Charging System Circuit

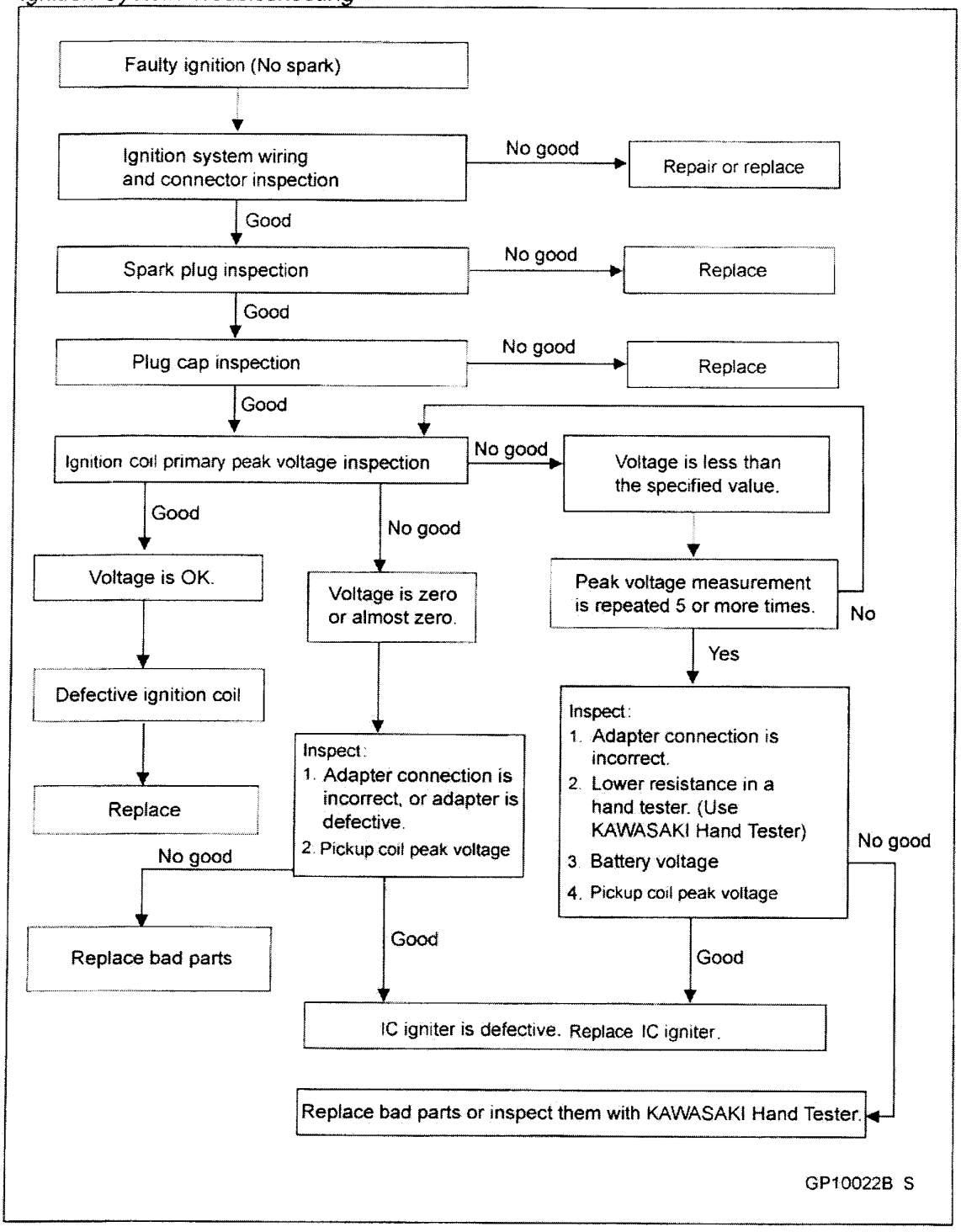


1. Alternator
2. Rotor
3. Carbon Brush
4. Stator Coil
5. Regulator
6. Rectifier
7. Ignition Switch
8. Main Fuse 30 A
9. Battery 12 V
10. Load

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Ignition System

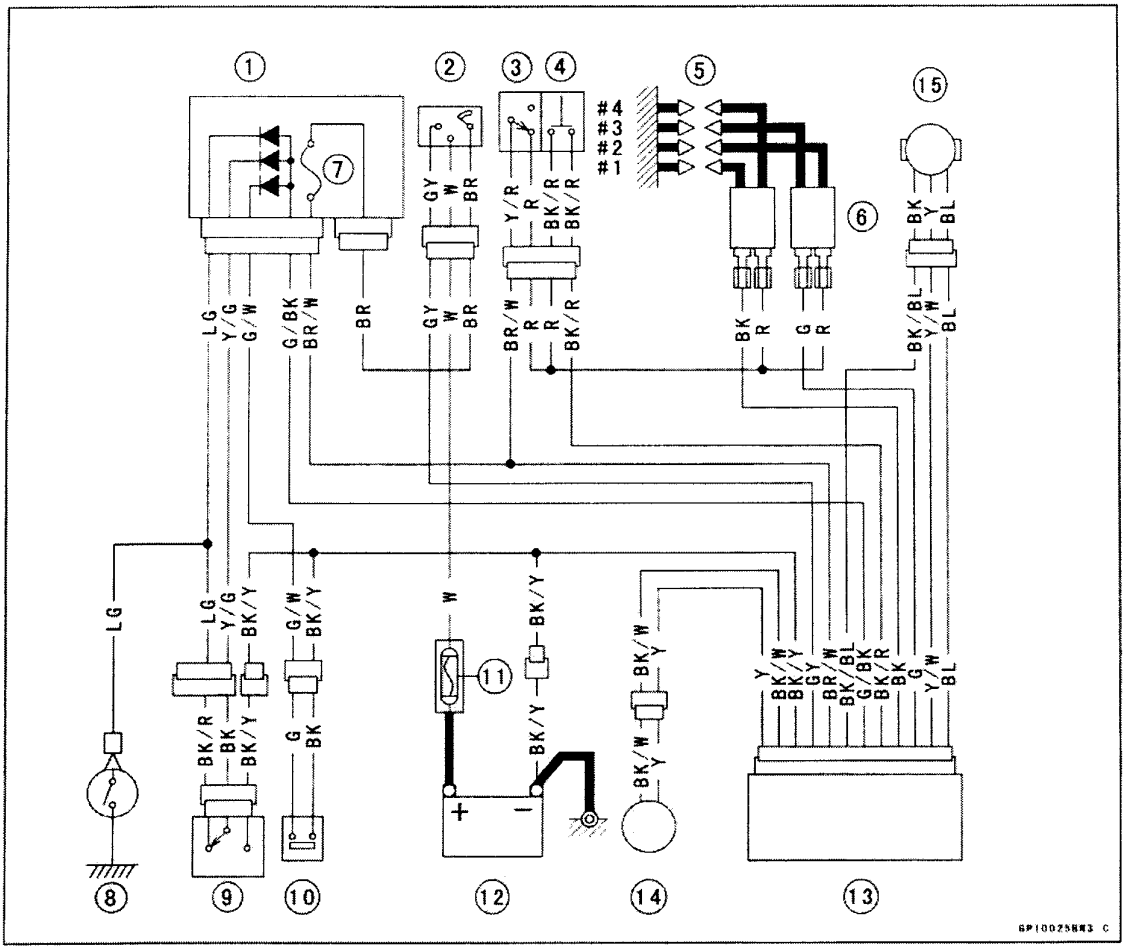
Ignition System Troubleshooting



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Ignition System

Ignition System Circuit



1. Junction Box
2. Ignition Switch
3. Engine Stop Switch
4. Starter Button
5. Spark Plugs
6. Ignition Coils
7. Ignition Fuse 10 A
8. Neutral Switch
9. Starter Lockout Switch
10. Side Stand Switch
11. Main Fuse 30 A
12. Battery 12 V
13. IC Igniter
14. Pickup Coil
15. Throttle Position Sensor

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Ignition System

⚠ WARNING

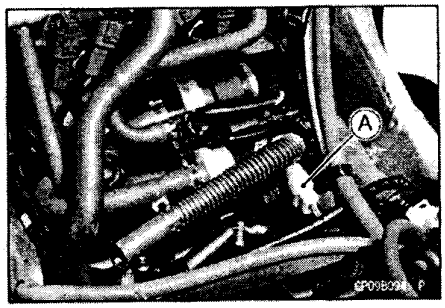
The ignition system produces extremely high voltage. Do not touch the spark plugs, ignition coils, or spark plug leads while the engine is running, or you could receive a severe electrical shock.

CAUTION

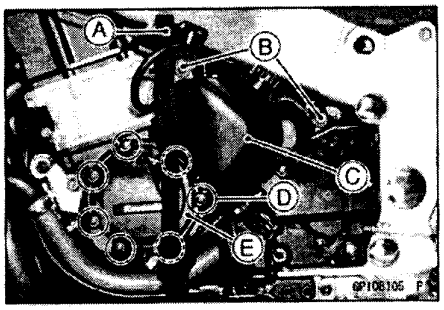
Do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent IC igniter damage.
Do not install the battery backwards. The negative side is grounded.
This is to prevent damage to the diodes and IC igniter.

Pickup Coil Removal

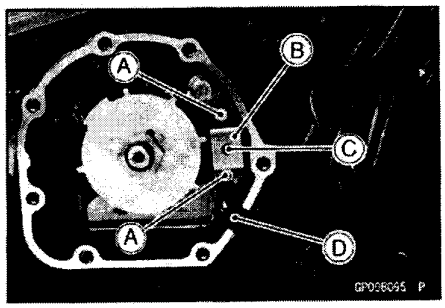
● Remove:
Fuel Tank (see Fuel System chapter)
Pickup Coil Lead Connector [A]



● Remove:
Left Lower Fairing (see Frame chapter)
Heat Baffle [A]
Coolant Reservoir Tank Bolts [B]
Reservoir Tank [C]
Bolts [D]
Pickup Coil Cover [E]



● Remove:
Pickup Coil Bolts [A]
Holder [B]
Damper [C]
Grommet [D]
Pickup Coil



Pickup Coil Installation

● Route the pickup coil lead correctly (see Cable, Wire, and Hose Routing in the Appendix chapter).
● Apply non-permanent locking agent to the threads of the pick up coil bolts.
● Install the pickup coil and tighten the pickup coil bolts.

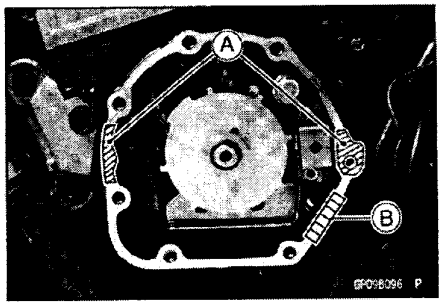
Torque - Pickup Coil Bolts: 5.9 N·m (0.60 kgf·m, 52 in·lb)

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Ignition System

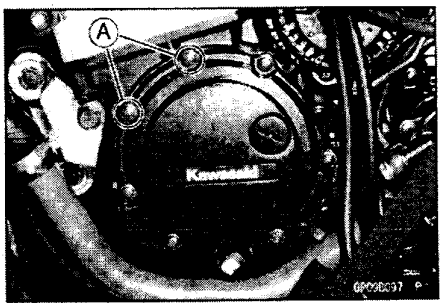
- Apply silicone sealant to the crankcase halves mating surface [A] on the front and rear sides of the pickup coil cover mount.
- Apply silicone sealant to the pick up coil lead grommet [B] and set the grommet securely in the notch of the crankcase.

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



- Apply a non-permanent locking agent to the threads of two pickup coil cover bolts [A] shown and tighten them.

Torque - Pickup Coil Cover Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)



Pickup Coil Inspection

- Remove:
  Fuel Tank (see Fuel System chapter)
  Pickup Coil Lead Connector [A]
- Set the hand tester to the x 100 Ω range and connect it to the pickup coil lead connector.

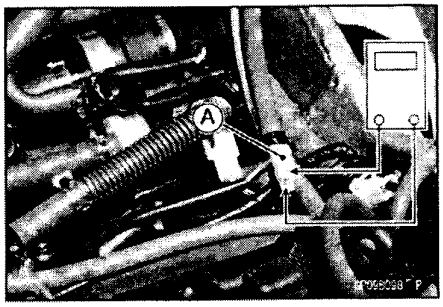
Special Tool - Hand Tester: 57001–1394

★If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

Pickup Coil Resistance: 380 ~ 570 Ω

★Using the highest resistance range of the tester, measure the resistance between the pickup coil leads and chassis ground.

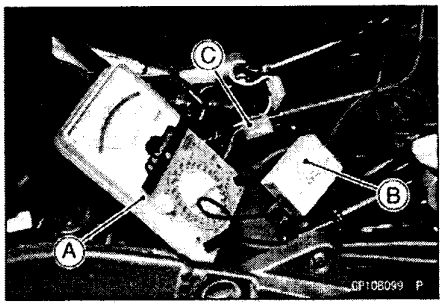
★Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.



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Ignition System

Pickup Coil Peak Voltage



NOTE

○*Be sure the battery is fully charged.*
○*Using the peak voltage adapter is a more reliable way to determine the condition of the pickup coil than pickup coil internal resistance measurements.*

- Remove:
  Fuel Tank (see Fuel System chapter)
  Pickup Coil Lead Connector
- Set the Hand Tester [A] to the × 10 V DC range, and connect it a commercially available Peak Voltage Adapter [B] as shown in the diagram.
- Connect the black lead of the Adapter to black/white and red lead to yellow lead in the Pickup Coil connector [C].
- Turn the ignition switch and engine stop switch ON.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission gear in neutral to measure the pickup coil peak voltage.
- Repeat the measurement 5 or more times.

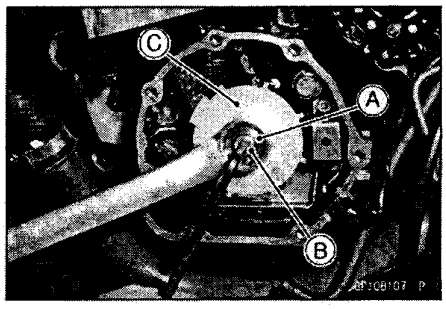
Pickup Coil Peak Voltage
Standard: 2 V or more

Special Tool - Hand Tester: 57001–1394

Recommended Tool - Peak Voltage Adapter
Type: KEK-54-9-B
Brand: KOWA SEIKI

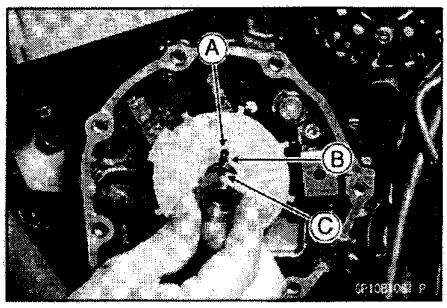
★If the tester reading is not specified one, check the pickup coil.

Timing Rotor Removal



- Remove the pickup coil cover (see Pickup Coil Cover Removal)
- Holding the rotor washer [A], and unscrew the rotor bolt [B].
- Remove the timing rotor [C].

Timing Rotor Installation



- Fit the slot [A] of the rotor to the pin [B] of the crankshaft.
- Fit the groove of the washer to the pin of the crankshaft.
- Apply a non-permanent locking agent to the threads of the rotor bolt.
- Heading the washer and tighten the rotor bolt.

Torque - Timing Rotor Bolt: 25 N·m (2.5 kgf·m, 18 ft·lb)

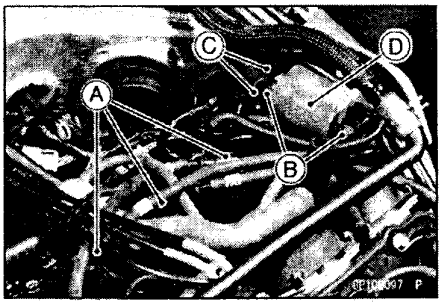
- Install the pickup coil cover (see Pickup Coil Cover Installation).

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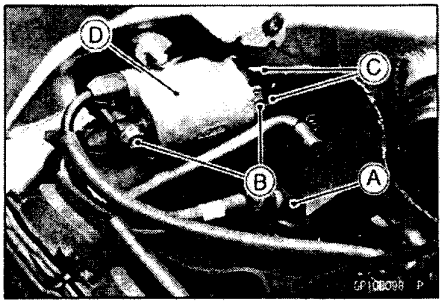
Ignition System

Ignition Coil Removal

● Remove:
Fuel Tank (see Fuel System chapter)
Air Cleaner Housing (see Fuel System chapter)
Spark Plug Caps [A]
Mounting Bolts [B]
Primary Lead Connectors [C]
Ignition Coil #2, 3 [D]

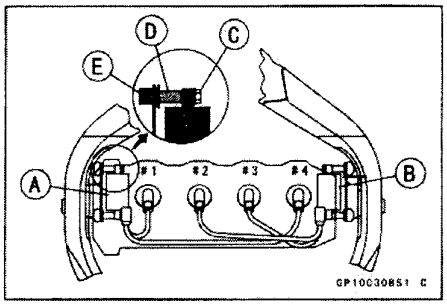


Spark Plug Cap [A]
Mounting Bolts [B]
Primary Lead Connectors [C]
Ignition Coil #1, 4 [D]



Ignition Coil Installation

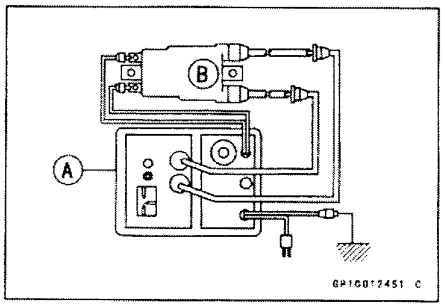
● Install the ignition coils.
○Connect the primary winding leads to the ignition coil terminals.
Black Lead → to #1, #4 Coil [A]
Green Lead → to #2, #3 Coil [B]
Red Leads → to both Coils
Bolts [C]
Collar [D]
Well Nut [E]



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Ignition System

Ignition Coil Inspection



- Remove the ignition coils (see this chapter).
- Measure the arcing distance with the suitable commercially available coil tester [A] to check the condition of the ignition coil [B].
- Connect the ignition coil (with the spark plug cap left attached at the end of the spark plug lead) to the tester in the manner prescribed by the manufacturer and measure the arcing distance.

Ignition Coil Arcing Distance: 6 mm or more

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the coil body or high-tension cable.

★If the distance reading is less than the specified value, the ignition coil or spark plug caps are defective.

- To determine which part is defective, measure the arcing distance again with the spark plug caps removed from the ignition coil. Remove the caps by turning them counterclockwise.

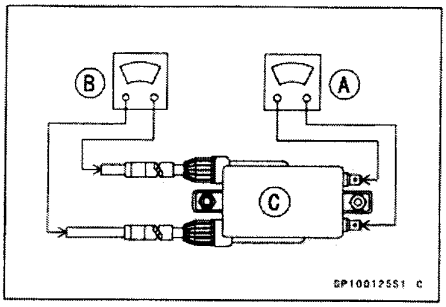
★If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug cap.

★If the coil tester is not available, the coil can be checked for a broken or badly shorted winding with the hand tester.

Special Tool - Hand Tester: 57001-1394

NOTE

○*The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.*



- Measure the primary winding resistance as follows.

○Connect the hand tester between the coil terminals.
○Set the tester to the x 1 Ω range, and read the tester.

- Measure the secondary winding resistance as follows.

○Remove the plug caps by turning them counterclockwise.
○Connect the tester between the spark plug leads.
○Set the tester to the x 1 kΩ range and read the tester.

Measure primary winding resistance [A]
Measure secondary winding resistance [B]
Ignition Coil [C]

Ignition Coil Winding Resistance

Primary Windings:	**2.3 ~ 3.5 Ω**
Secondary Windings:	**12 ~ 18 kΩ**

★If the tester does not read as specified, replace the coil.

- Apply a silicone grease into the lipe of the plug cap.

○To install the plug cap, turn it clockwise.

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Ignition System

Ignition Coil Primary Peak Voltage

⚠ WARNING

Disconnect the connectors of the fuel pumps. The fuel and/or the mixture air may be emitted from the carburetor air jet entrance openings if the fuel pumps operates during engine cranking. Gasoline is extremely flammable and can be explosive under certain conditions. Do not smoke. Make sure the area is well-ventilated and free from any source of flame or sparks; this includes any appliance with a pilot light.

CAUTION

Initially drain the fuel in the carburetor float bowls before inspecting. Remaining fuel in the carburetors will reach the catalytic converter in the muffler through combustion chambers. Fuel in the catalytic converter will burn when the engine starts later, and could damage the catalyst by high temperature.

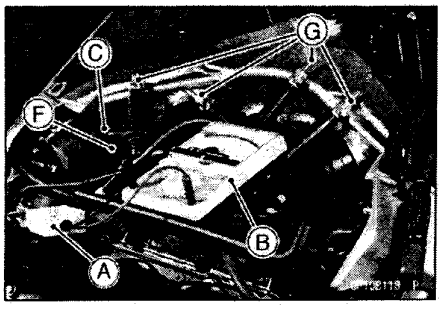
- Drain the fuel from the carburetor float bowls (see Fuel System chapter).
- Remove:
  Fuel Tank (see Fuel System chapter)
  Air Cleaner Housing (see Fuel System chapter)
- Disconnect:
  Fuel Pump Connectors (see Fuel Pump Removal/Installation)

NOTE

○*Be sure the battery is fully charged.*

- Remove all spark plug caps from the spark plugs, but do not remove the spark plugs.
- Measure the primary peak voltage as follows.

○Install the new spark plugs into each spark plug caps, and ground them onto the engine.
○Connect a commercially peak voltage adapter [A] into the hand tester [B] which is set to the x 250 V DC range.
○Connect the adapter between the ignition coil primary lead terminal [C] and the engine ground with the primary lead left connected.
IC igniter [D]
Battery [E]
Ignition coil [F]
Spark Plugs [G]

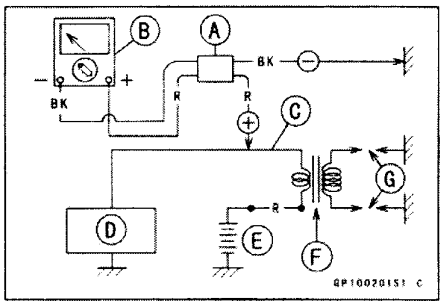


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Ignition System

Recommended Tool - Peak Voltage Adapter
Type: KEK-54-9-B
Brand: KOWA SEIKI

Special Tool - Hand Tester: 57001–1394



Primary Lead Connection

	Adapter (R, +)	Adapter (BK, –)
Ignition Coil #1, 4	BK	R or Ground
Ignition Coil #2, 3	G	R or Ground

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the spark plugs or tester connections.

- Turn the ignition switch and the engine stop switch ON.
- Pushing the starter button, turn the engine 4 ~ 5 seconds with the transmission in neutral to measure the primary peak voltage
- Repeat the measurements 5 times for one ignition coil.

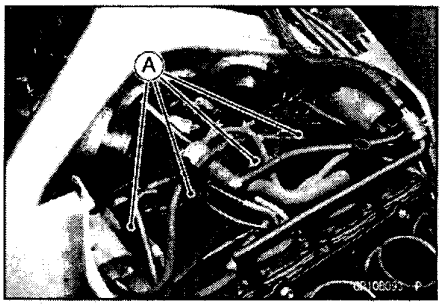
Ignition Coil Primary Peak Voltage
Standard: 100 V or more

- Repeat the test for the other ignition coil.

★If the reading is less than the specified value, check the following.
Ignition Coils (see Ignition Coil Inspection)
Pickup Coil (see Pickup Coil Inspection)
IC Igniter (see IC Igniter Inspection)
Ignition Coil Wiring

Spark Plug Removal

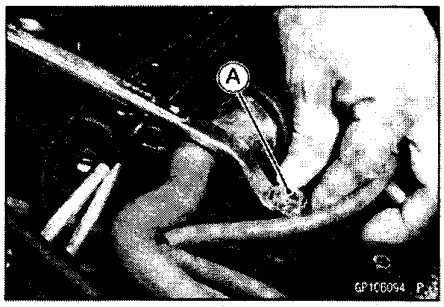
- Remove:
  Fuel Tank (see Fuel System chapter)
  Air Cleaner Housing (see Fuel System chapter)
- Take out the spark plug caps [A].



- Using the spark Plug Wrench, remove the spark plug.

Owner's Tool - Spark Plug Wrench: 92110–1132 [A]

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



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Ignition System

Spark Plug Installation

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

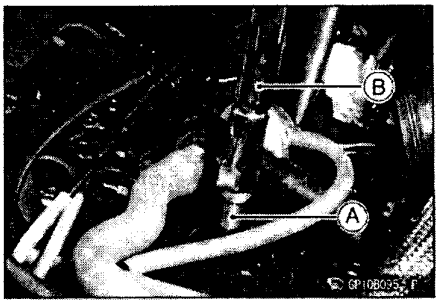
Owner's Tool - Spark Plug Wrench: 92110–1132 [B]

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

- Tighten the plug.

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

- Fit the plug caps securely.
- Pull up the spark plug caps lightly to make sure of the installation of the spark plug caps.



Spark Plug Cleaning and Inspection

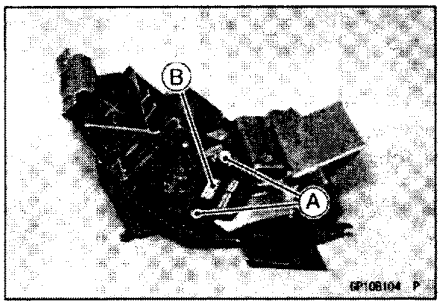
- Refer to the Spark Plug Cleaning and Inspection in the Periodic Maintenance Chapter.

Spark Plug Gap Inspection

- Refer to the Spark Plug Cleaning and Inspection in the Periodic Maintenance Chapter.

IC Igniter Removal

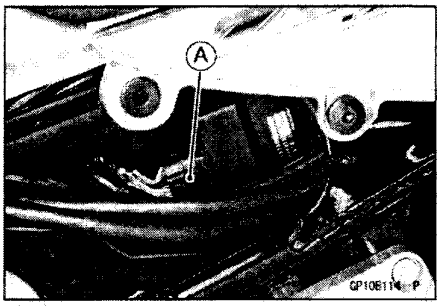
- Remove:
  Seat (Frame chapter)
  Seat Cover (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Rear Fender Front (see Frame chapter)
  Bolts [A]
  IC Igniter [B]



IC Igniter Inspection

1st Check: Power Supply Voltage

- Remove the left side cover (see Frame chapter).
- Disconnect the IC igniter connector [A].

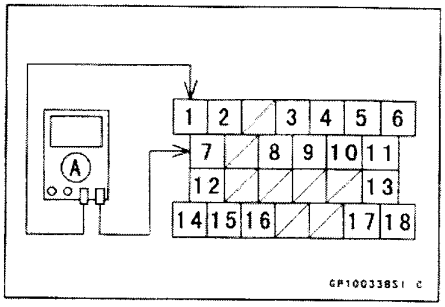


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Ignition System

● Check the IC igniter power source voltage with a digital voltmeter.

○Set the digital voltmeter [A] to the × 25 V DC range, and connect it to the connector come from main harness side as follows.



IC Igniter Power Source Inspection

Tester Connections:

7 (BR/W) Terminal ⟷ Tester (+) Terminal

1 (B/Y) Terminal ⟷ Tester (–) Terminal

Ignition Switch OFF: 0 V

Ignition Switch ON: Battery Voltage (12.6 V or more)

★If the voltmeter does not read as specified, check the following:

Ignition Fuse 10 A

Ignition Switch

Battery Voltage

Power Source Wiring (see wiring diagram)

2nd Check: Pickup Coil Primary Peak Voltage

● Refer to the Pickup Coil Peak Voltage in this chapter.

3rd Check: Ignition Coil Peak Voltage

● Refer to the Ignition Coil Primary Peak Voltage in this chapter.

4th Check: Throttle Sensor Input Voltage

● Refer to the Throttle Position Sensor Inspection in this chapter.

★If the voltage is out of specified one extremely, check the wiring/or igniter power supply voltage. If the wiring/or igniter power supply voltage are correct, replace the IC igniter.

5th Check: Speed Signal

● Remove the wind shield (see Frame chapter).

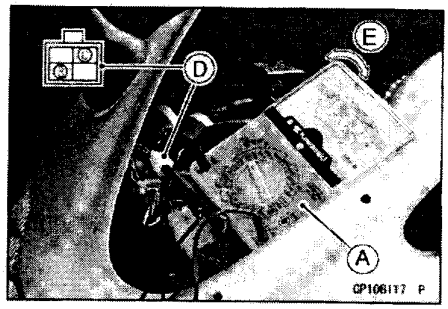
● Use the jack to lift the front wheel.

Special Tool - Jack: 57001–1238

● Connect the igniter connector.

● Set the hand tester [A] to the DC 10 V range, check the voltage between the LB lead [B] and the BK/Y lead [C].

4P Connector [D]



Special Tool - Kawasaki Hand Tester: 57001–1394

● Turn the ignition switch ON, and slowly rotating the front wheel. At this time, the tester's pointer should swing 0 V and 5 V [E].

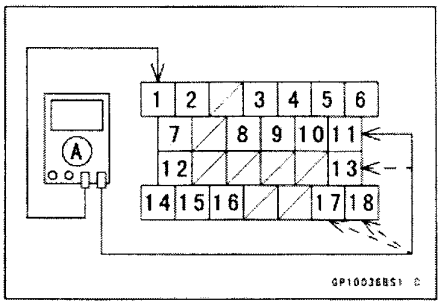
★If the tester's pointer does not swing, inspect the speed signal wiring and the read switch.

★If they are normal, replace the igniter.

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Ignition System

6th Check: Fuel Cut Valve Operation Voltage Inspection



- Turn the ignition switch OFF.
- Disconnect the igniter connector.
- Check the fuel cut valve operation voltage with a digital voltmeter.

○Set the digital voltmeter [A] to the × 25 V DC range, and connect it to the connector come from main harness side as follows.

Fuel Cut Valve Power Source Voltage Inspection

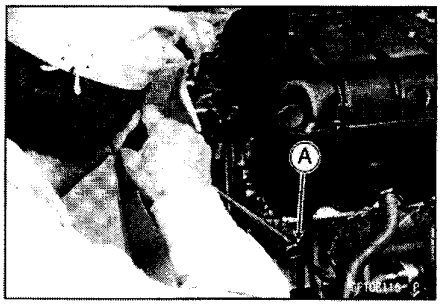
Tester Connections:

11 (LG/BK) Terminal ←→Tester (+) Terminal
13 (O/BK) Terminal ←→Tester (+) Terminal
18 (O/G) Terminal ←→Tester (+) Terminal
17 (R) Terminal ←→Tester (+) Terminal
1 (B/K) Terminal ←→Tester (–) Terminal

Ignition Switch OFF: 0 V

Ignition Switch ON: Battery Voltage (12.6 V or more)

★If the voltmeter does not read as specified, check the flowing.
Horn Fuse 10 A
Ignition Switch
Battery Voltage
Fuel Cut Valves Wiring



- To check the fuel cut valve operation.
- Connect the IC igniter connector.
- Remove the fuel tank (see Fuel System chapter).
- Turn the ignition switch ON and start the engine.

Fuel Cut Valve Operation Test

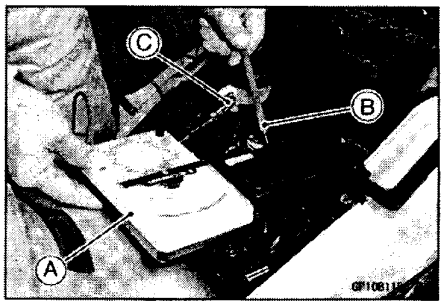
Disconnect the #1, 4 Red Terminal connect of the Ignition Coil:	**#1, 4 Fuel cut valves operate clack [A].**
Disconnect the #2, 3 Red Terminal Connecto of the Ignition Coil:	**#2, 3 Fuel cut valves operate clack.**

★If the fuel cut valve does not operated, replace the IC igniter.

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Ignition System

7th Check: Interlock Operation Inspection



- Connect the IC igniter connector.
- Remove:
  Seat (see Frame chapter)
  Junction Box with connector
- Measure the terminal voltage of the G/BK terminal [A] in accordance with the following procedure.

○Set the hand tester [B] to the 10 V DC range, connect it to the G/BK lead terminal of the junction box and frame ground [C].

Tester Connections:
G/BK Terminal → Tester (+) Terminal
Frame Ground → Tester (–) Terminal

Conditions:
Transmission Gear → 1st Position
Clutch Lever → Release
Side Stand → Down

○Turn the ignition switch ON.
○Read the voltage.

Interlock Operation Voltage
Standard: 4 V or more

★If the voltage is lower than the standard, inspect the side stand switch, starter lockout switch, neutral switch and junction box.
★If their parts are normality, replace the IC igniter .
★If the voltage is standard, push the starter button.
○Then the starter motor should not turn when the starter system circuit is normality.
★If the starter motor turned, IC igniter is defective. Replace the IC igniter.

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Ignition System

- Using the center stand, raise the rear wheel off the ground.
- Inspect the engine for its secure stop after the following operations are completed.
- Run the engine to the following conditions.

Condition:
Transmission Gear → 1st Position
Clutch Lever → Pull in
Side Stand → Up or Down

- Gradually release the clutch lever, then the engine will stop.
- Run the engine to the following conditions.

Condition:
Transmission Gear → 1st Position
Clutch Lever → Release
Side Stand → Up

- Set the side stand on the ground, then the engine will stop.

★If whichever may not be stopped, inspect the neutral switch, starter lockout switch, side stand switch and junction box.

★If their parts are normality, replace the IC igniter.

8th Check: Tachometer Input Voltage

- Refer to the Tachometer Inspection in this chapter.

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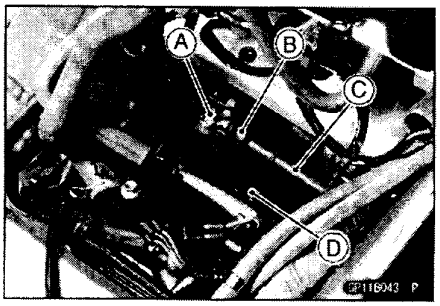
Electrical Starter System

Starter Motor Removal

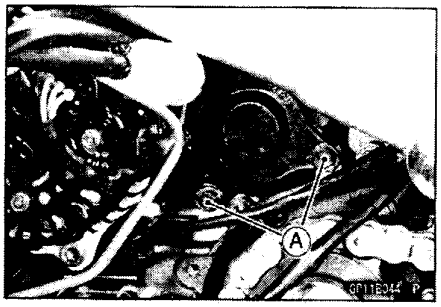
- Remove:
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Battery Negative (–) Cable (see Fuel System chapter)
  Fuel Pumps (see Fuel System chapter)
  Starter Cable Mounting Nut [A]

○Slide out the cap [B].

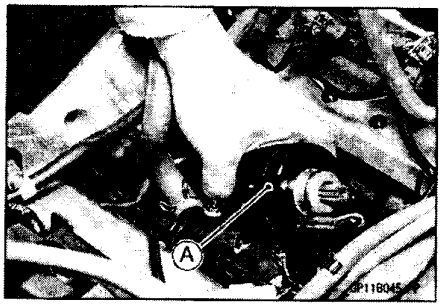
- Remove the starter motor cable [C] from the starter motor [D].



- Remove:
  Engine Sprocket Cover (see Final Drive chapter)
  Starter Motor Mounting Bolts [A]



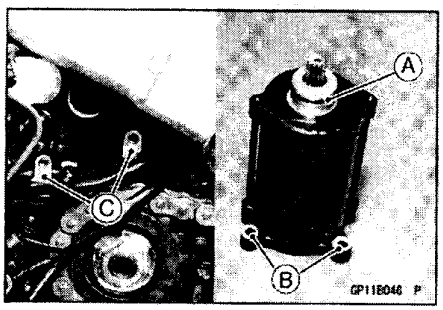
- Pull out the starter motor from the crankcase.
- Remove the starter motor [A] as shown.



Starter Motor Installation

CAUTION

Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.



- Replace the O-ring [A] with a new one if it is damaged.
- Apply a small amount of engine oil to the O-ring.
- When installing the starter motor, clean the starter motor legs [B] and crankcase [C] where the starter motor is grounded.
- Tighten:

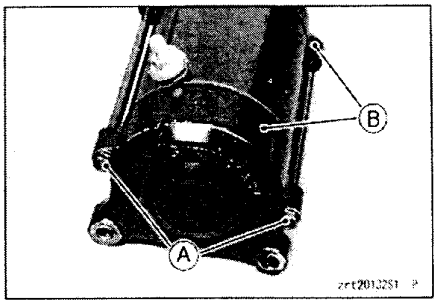
Torque - Starter Motor Terminal Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb)
Starter Motor Mounting Bolts: 11 N·m (1.1 kgf·m, 97 in·lb)

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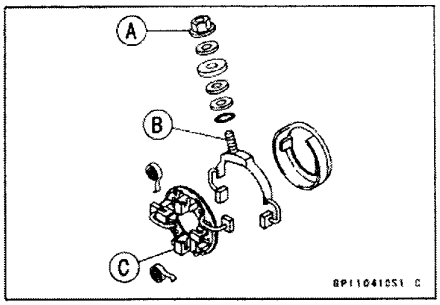
Electrical Starter System

Starter Motor Disassembly

- Remove the starter motor (see this section).
- Take off the starter motor assembly bolts [A] and remove both end covers [B] and pull the armature out of the yoke.

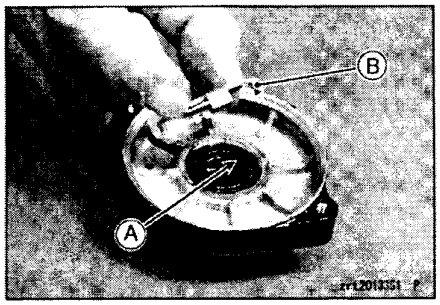


- Remove the terminal locknut [A] and terminal bolt [B] , and then remove the brush with the brush plate [C] from the yoke.

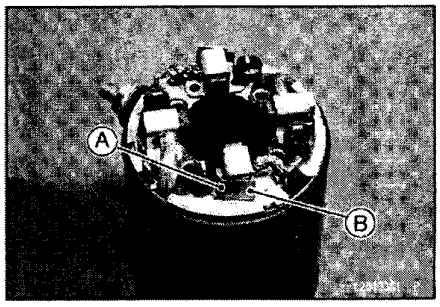


Starter Motor Assembly

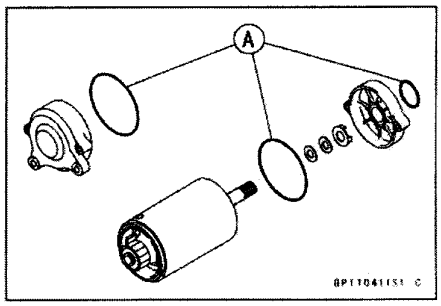
- Apply a thin coat of grease to the oil seal [A].
- Fit the toothed washer [B] into the end cover.



- Holding the spring ends [A] with suitable washers [B], put the armature among the brushes.



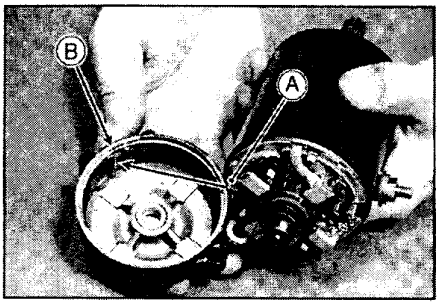
- Install the new O-rings [A] as shown.



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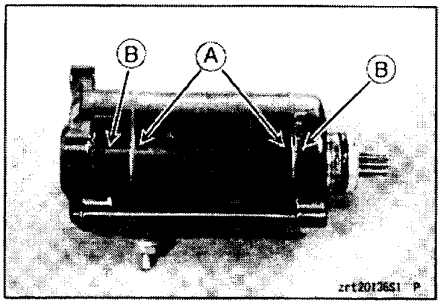
Electrical Starter System

● Fit the tongue [A] on the brush plate into the end cover groove [B].



● Align the lines [A] on the yoke with the lines [B] on the both end cover.
● Tighten:

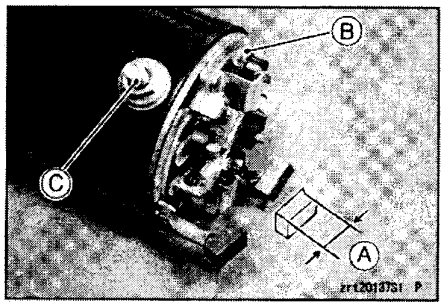
Torque - Starter Motor Assembly Bolts: 4.9 N·m (0.50 kgf·m, 43 in·lb)



Brush Inspection

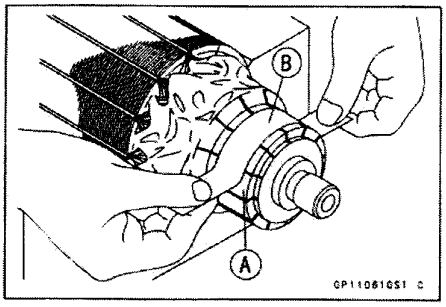
● Measure the length [A] of each brush.
★If any is worn down to the service limit, replace the carbon brush holder assembly [B] and the terminal bolt assembly [C].

Starter Motor Brush Length
Standard: 12 ~ 12.5 mm (0.47 ~ 0.49 in.)
Service Limit: 7 mm (0.3 in.)



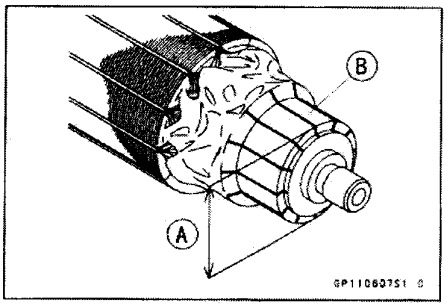
Commutator Cleaning and Inspection

● Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.



● Measure the diameter [A] of the commutator [B].
★Replace the starter motor with a new one if the commutator diameter is less than the service limit.

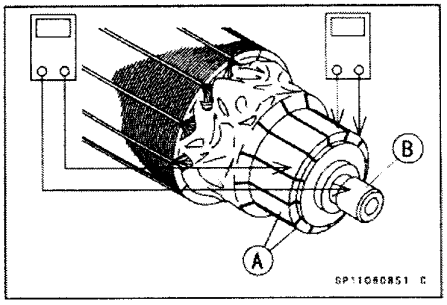
Commutator Diameter
Standard: 28 mm (1.1 in.)
Service Limit: 27 mm (1.06 in.)



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Electrical Starter System

Armature Inspection



- Using the x 1 Ω hand tester range, measure the resistance between any two commutator segments [A].

Special Tool - Hand Tester: 57001–1394

★If there is a high resistance or no reading (∞) between any two segments, a winding is open and the starter motor must be replaced.

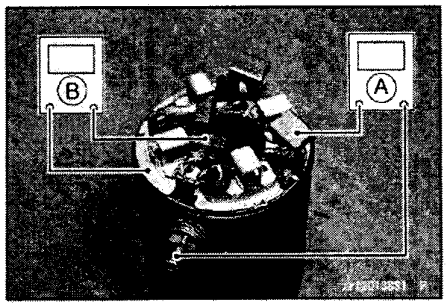
- Using the highest hand tester range, measure the resistance between the segments and the shaft [B].

★If there is any reading at all, the armature has a short and the starter motor must be replaced.

NOTE

○*Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the hand tester. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.*

Brush Lead Inspection

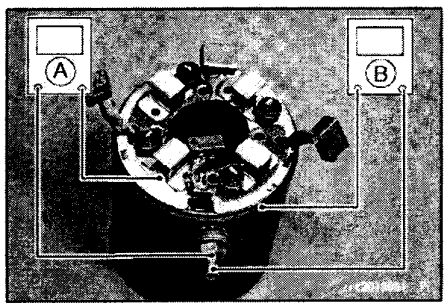


- Using the × 1 Ω hand tester range, measure the resistance as shown.
  [A] Terminal Bolt and Positive Brush
  [B] Brush Plate and Negative Brush

Special Tool - Hand Tester: 57001–1394

★If there is not close to zero ohms, the brush lead has an open. Replace the terminal bolt assembly and/or the brush holder assembly.

Brush Plate and Terminal Bolt Inspection

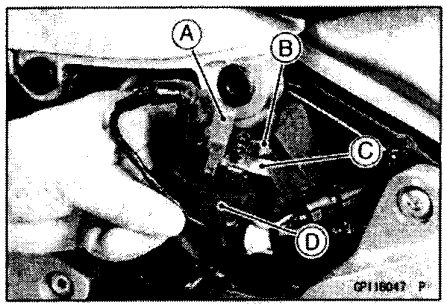


- Using the highest hand tester range, measure the resistance as shown.
  [A] Terminal Bolt and Brush Plate
  [B] Terminal Bolt and Yoke

Special Tool - Hand Tester: 57001–1394

★If there is any reading, the brush holder assembly and/or terminal bolt assembly have a short. Replace the brush holder assembly and the terminal bolt assembly.

Starter Relay Inspection



- Remove the right side cover (see Frame chapter).
- Pull out the starter relay.
- Disconnect the connector [A].
- Disconnect the starter motor cable [B] and battery positive (+) cable [C] from the starter relay [D].

CAUTION

The battery positive (+) cable with the rubber cap is connected directly to the battery positive (+) terminal even when the ignition switch off, so take care not to short the removed cable to chassis ground.

- Remove the starter relay.

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Electrical Starter System

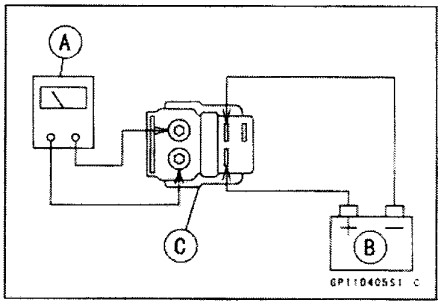
● Connect the hand tester [A] and 12 V battery [B] to the starter relay [C] as shown.

Special Tool - Hand Tester: 57001–1394

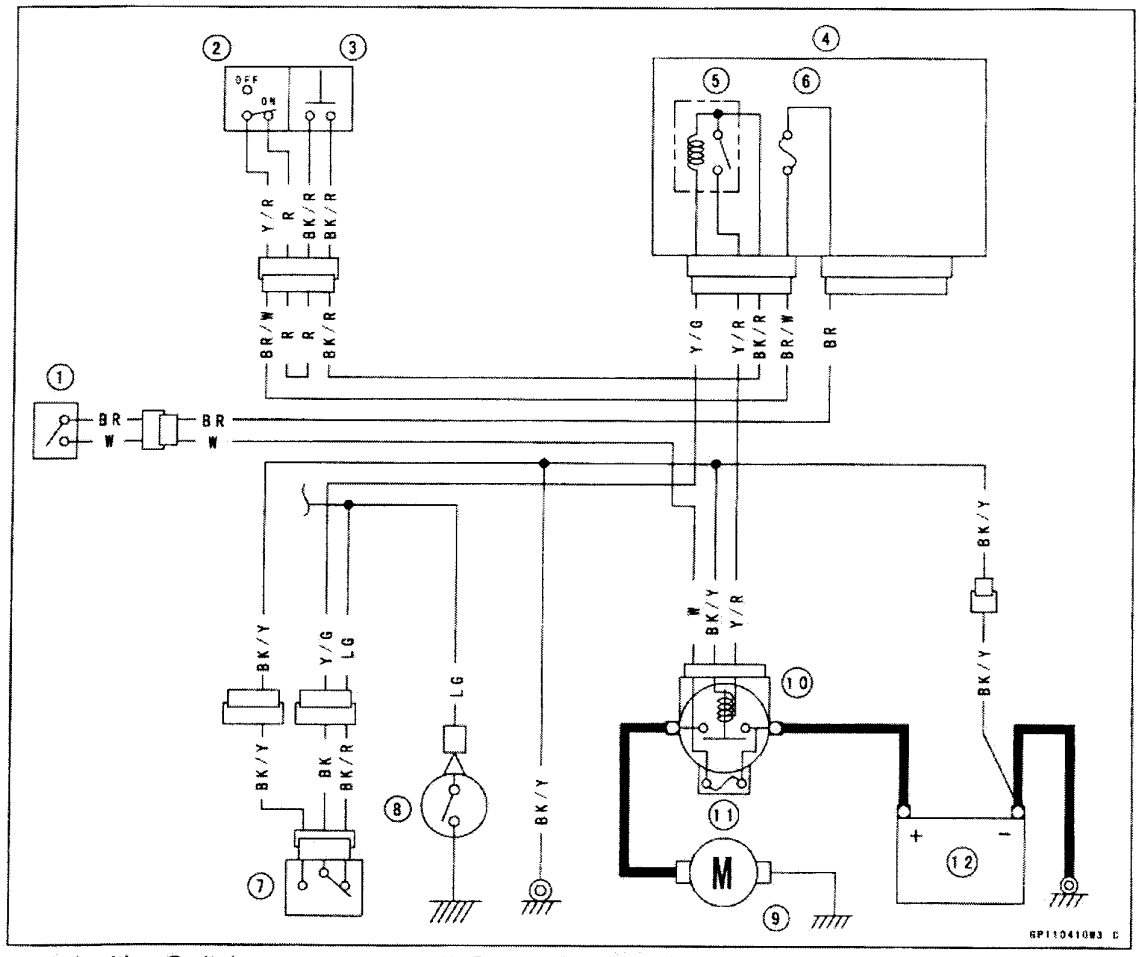
★If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Tester Range:	**× 1 Ω range**
Criteria:	**When battery is connected → 0 Ω**
	When battery is disconnected → ∞ Ω



Electrical Starter Circuit



1. Ignition Switch
2. Engine Stop Switch
3. Starter Button
4. Junction Box
5. Starter Circuit Relay
6. Ignition Fuse 10 A
7. Starter Lockout Switch
8. Neutral Switch
9. Starter Motor
10. Starter Relay
11. Main Fuse 30 A
12. Battery 12 V

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Lighting System

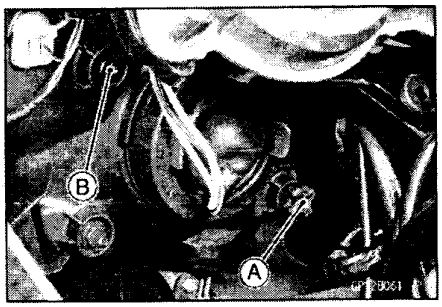
The US, Canada, Malaysia and Australia models adapt the daylight system and have a headlight relay and a headlight relay unit. In these models, the headlight does not go on when the ignition switch and the engine stop switch are first turned on. The headlight comes on after the starter button is released and stays on until the ignition switch is turned off. The headlight will go out momentarily whenever the starter button is pressed and come back on when the button is released.

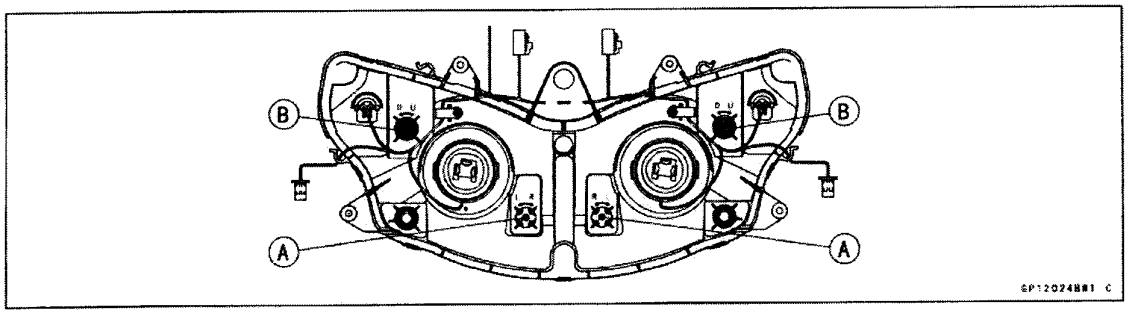
Headlight Beam Horizontal Adjustment

- Remove the inner covers (see Frame chapter).
- Turn the horizontal adjusters [A] on the headlight with a hand in or out until the beam points straight ahead.

Headlight Beam Vertical Adjustment

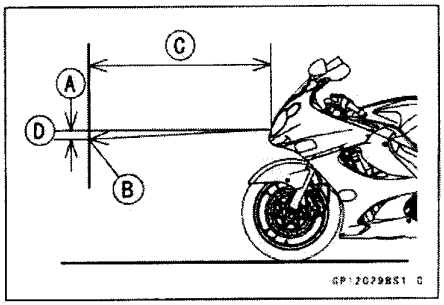
- Remove the inner covers (see Frame chapter).
- Turn the vertical adjusters [B] on the headlight with a screwdriver in or out to adjust the headlight vertically.





NOTE

- *On high beam, the brightest points should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight to the proper angle according to local regulations.*
- *For US model, the proper angle is 0.4 degrees below horizontal. This is 50 mm (2 in.) drop at 7.6 m (25 ft) measured from the center of the headlight with the motorcycle on its wheels and the rider seated.*



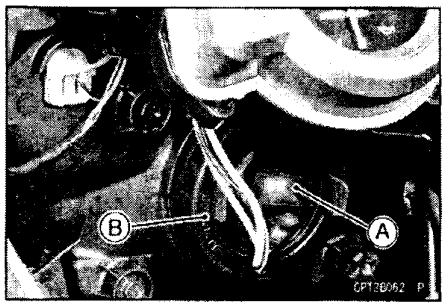
50 mm (2 in.) [A]
Center of Brightest Spot [B]
7.6 m (25 ft) [C]
Height of Headlight Center from Ground [D]

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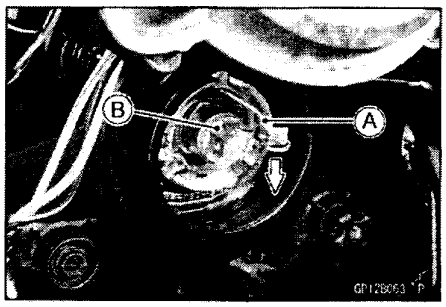
Lighting System

Headlight Bulb Replacement

- Remove:
  Inner Cover (see Frame chapter)
  Headlight Connector [A]
  Headlight Bulb Dust Cover [B]



- Remove the hook [A].



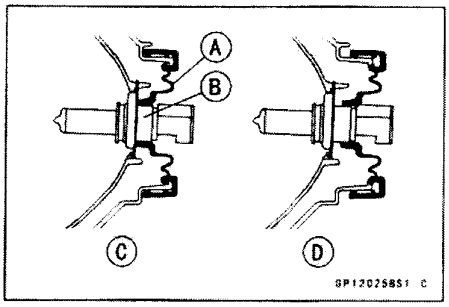
CAUTION

When handling the quartz-halogen bulb, never touch the glass portion with bare hands. Always use a clean cloth. Oil contamination from hands or dirty rags can reduce bulb life or cause the bulb to explode.

NOTE

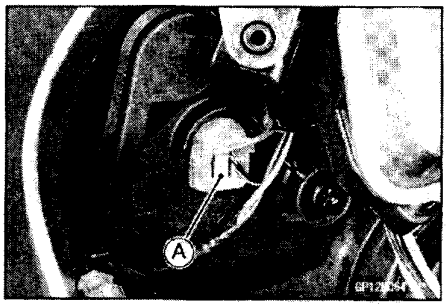
○*Clean off any contamination that inadvertently gets on the bulb with alcohol or soap and water solution.*

- Replace the headlight bulb [B].
- Fit the dust cover [A] onto the bulb [B] firmly as shown.
  Good [C]
  Bad [D]
- After installation, adjust the headlight aim (see this chapter).



Running Position Light Bulb Replacement

- Remove:
  Inner Covers
- Pull out the socket [A] together with the bulb.



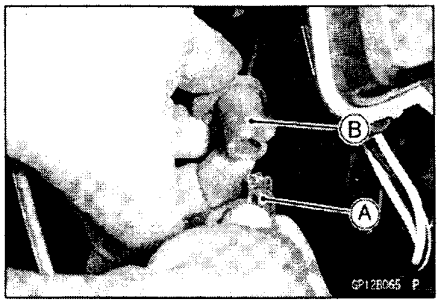
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Lighting System

● Pull the bulb [A] out of the socket [B].

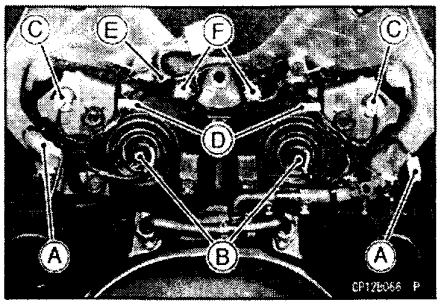
CAUTION

Do not turn the bulb. Pull the bulb out to prevent damage to the bulb. Do not use bulb rated for greater wattage than the specified value.

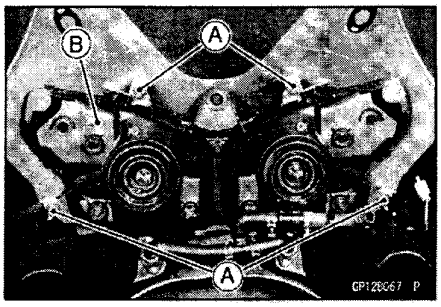


Headlight Removal/Installation

● Remove:
Upper Fairing (see Frame chapter)
● Disconnect:
Front Right & Left Turn Signal Connectors [A]
Headlight Connectors [B]
Running Position Light Connectors [C]
Clamp Screws [D]
● Remove the sub harness [E] with the clamp and headlight relays [F].



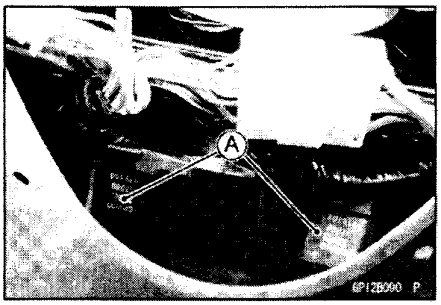
● Unscrew the bolts [A] and remove the headlight housing [B].
● Run the sub harness correctly (see Cable, Wire and Hose Routing section in the Appendix chapter).



Headlight Relay Unit Inspection

For the Headlight Relay (High Beam and Low Beam):

● Remove the windshield with upper inner cover (see Frame chapter).
● Take off the headlight relay units (high beam and low beam) [A].



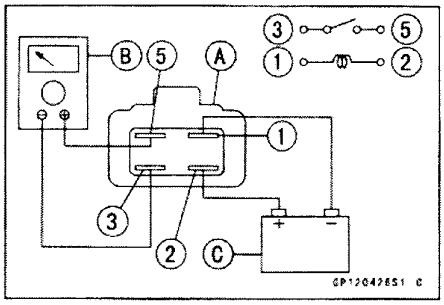
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Lighting System

● Set the hand tester to the × 1Ω range and make the measurements shown in the figure.
12 V Battery [C]

Special Tool - Hand Tester: 57001–1394 [B]

Testing Relay
Criteria: **When battery is connected → 0Ω**
When battery is disconnected → ∞Ω



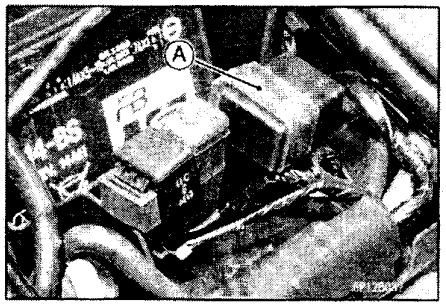
★If the tester readings are not as specified, replace the headlight relay unit.

CAUTION

Use only Hand Tester 57001–1394 for this test. An ohmmeter other than the Kawasaki Hand Tester may show different readings. If a megger or a meter with a large-capacity battery is used, the headlight relay will be damaged.

For the Headlight Relay (Control):

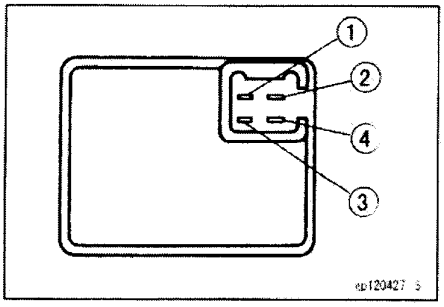
● Remove:
Seat (see Frame chapter)
Fuel Tank (see Fuel System chapter)
● Take off the headlight relay (control) [A].



● Take off the headlight relay [A].
● Set the hand tester to the × 1 kΩ range and make the measurements shown in the table.

Special Tool - Hand Tester: 57001–1394

★If the tester readings are not as specified, replace the headlight relay.



CAUTION

Use only Hand Tester 57001–1394 for this test. An ohmmeter other than the Kawasaki Hand Tester may show different readings.
If a megger or a meter with a large-capacity batter is used, the headlight relay will be damaged.

Headlight Relay (Control)

Range × 1 kΩ		Tester (+) Lead Connection			
		1	2	3	4
(−)*	1	–	∞	∞	∞
	2	∞	–	∞	∞
	3	∞	10 – 100	–	∞
	4	∞	20 – 200	1 – 5	–

(−)*: Tester (−) Lead Connection

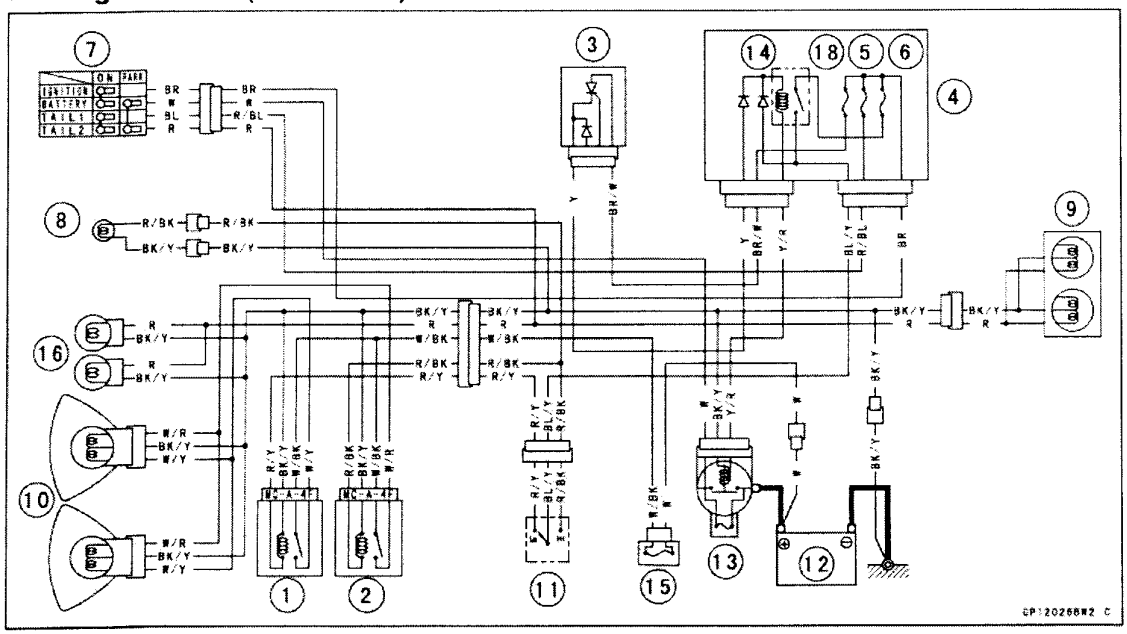
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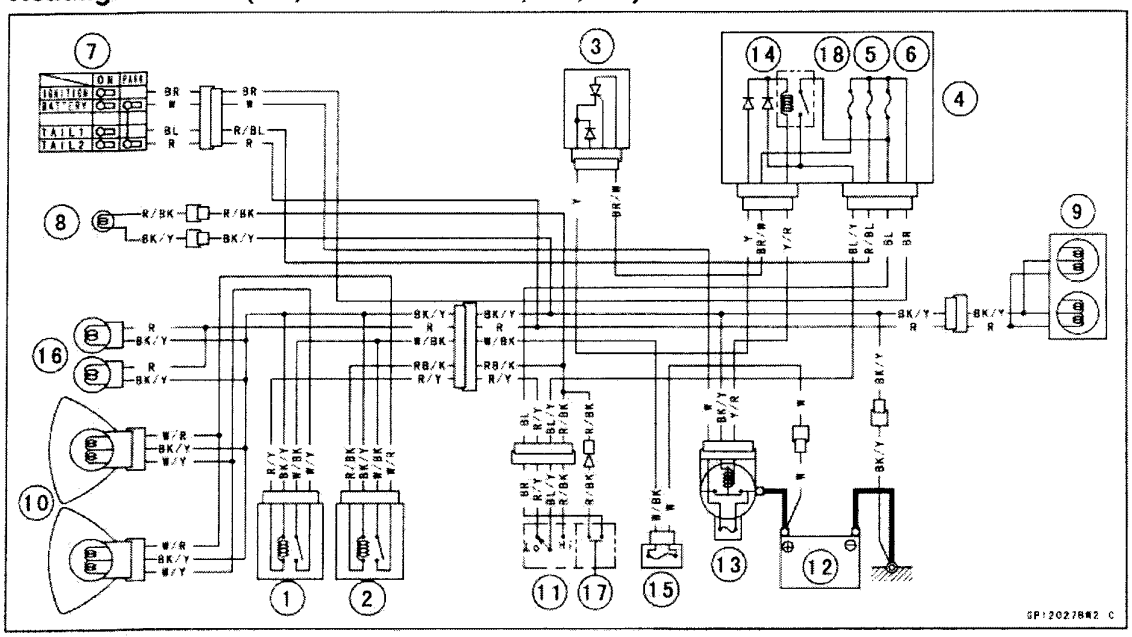
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Lighting System

Headlight Circuit (CA and US)



Headlight Circuit (AU, ZX1200-C2 ~: H, HU, HR)



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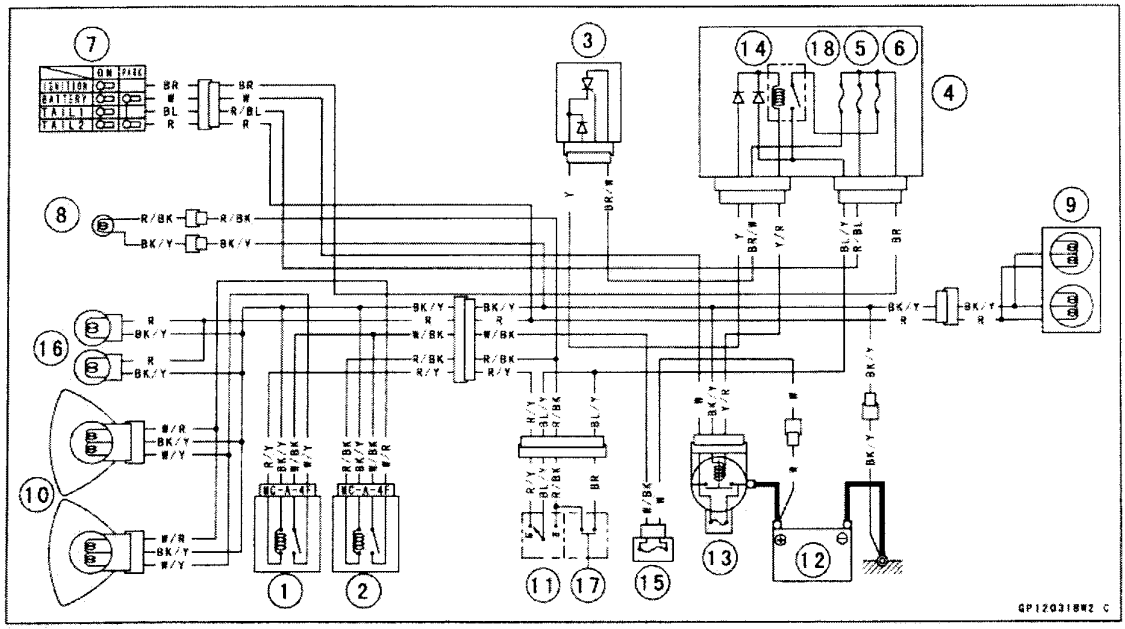
Lighting System

AU: Australia
CA: Canada
US: United States of America
H: with Honeycomb Catarytic Converter
HU: with Honeycomb Catarytic Converter (UK model)
HR: with Honeycomb Catarytic Converter (Restricted model)
1. Headlight Relay (Low Beam)
2. Headlight Relay (High Beam)
3. Headlight Relay (Control)
4. Junction Box
5. Taillight Fuse 10 A
6. Headlight Fuse 10 A
7. Ignition Switch
8. High Beam Indicator Light
9. Tail/Brake Lights
10. Headlights
11. Dimmer Switch
12. Battery 12 V
13. Main Fuse 30 A
14. Headlight Diodes
15. Headlight Fuse 10 A
16. Running Position Lights
17. Passing Button
18. Ignition Fuse 10 A

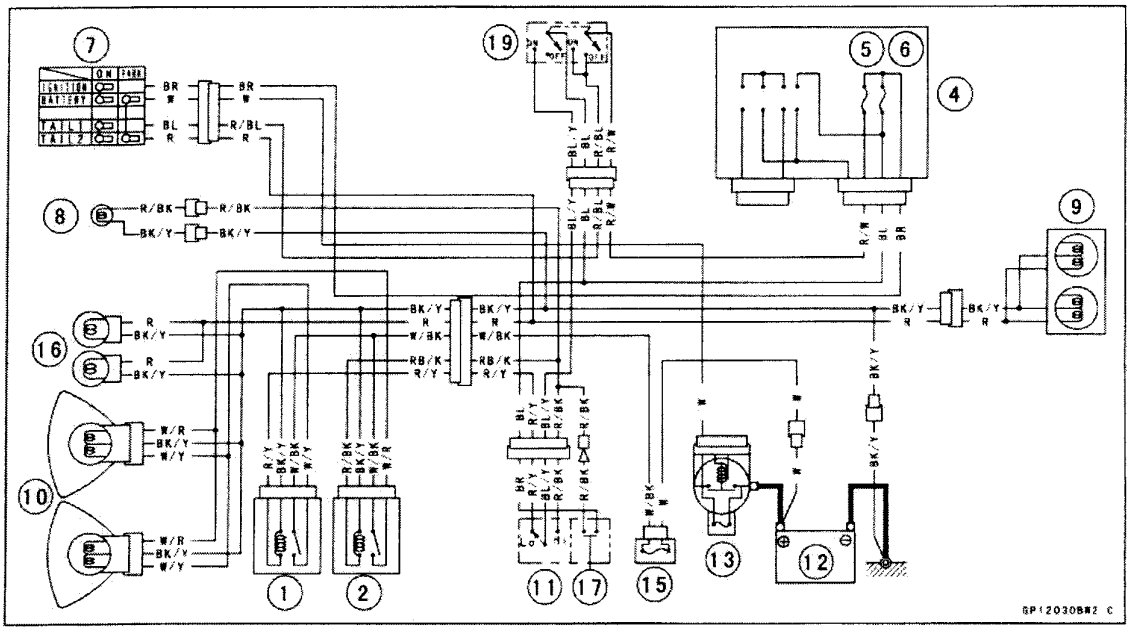
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Lighting System

Headlight Circuit (MY)



Headlight Circuit (other than AU, CA, MY and US)



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Lighting System

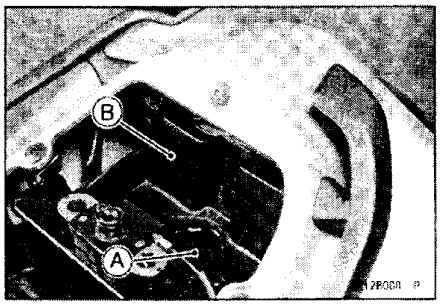
AU: Australia
CA: Canada
MY: Malaysia
US: United States of America
1. Headlight Relay (Low Beam)
2. Headlight Relay (High Beam)
3. Headlight Relay (Control)
4. Junction Box
5. Taillight Fuse 10 A
6. Headlight Fuse 10 A
7. Ignition Switch
8. High Beam Indicator Light
9. Tail/Brake Lights
10. Headlights
11. Dimmer Switch
12. Battery 12 V
13. Main Fuse 30 A
14. Headlight Diodes
15. Headlight Fuse 10 A
16. Running Position Lights
17. Passing Button
18. Ignition Fuse 10 A
19. Headlight Switch

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Lighting System

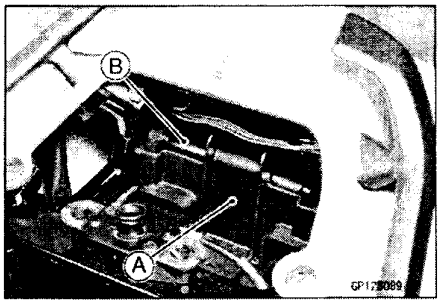
Tail/Brake Light Bulb Replacement

- Remove:
  Seat (see Frame chapter)
  Screw [A]
  Front Partition Plate [B]

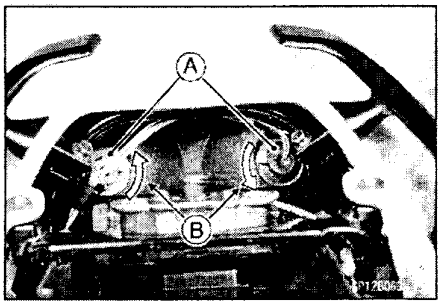


Rear Partition Plate [A]

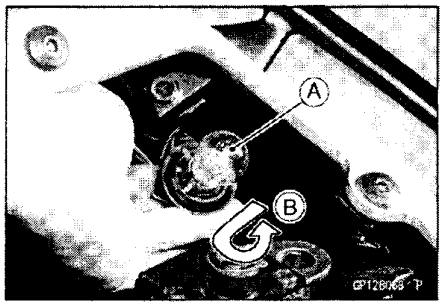
- For the California model, remove the canister [B].



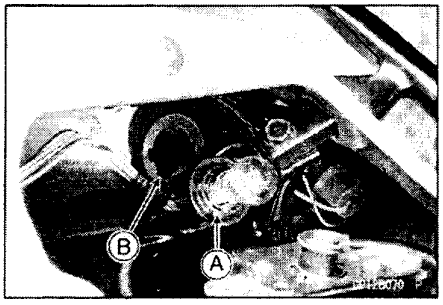
- Turn the socket counterclockwise [A] and remove the socket [B] with the bulb.



- Pushing down the bulb [A] in the socket turn the bulb counterclockwise [B].



- Insert the new bulb in the socket and turn the bulb clockwise.
- Insert the socket by aligning the projection [A] on the triangular mark with the notch [B] and turn the socket clockwise.

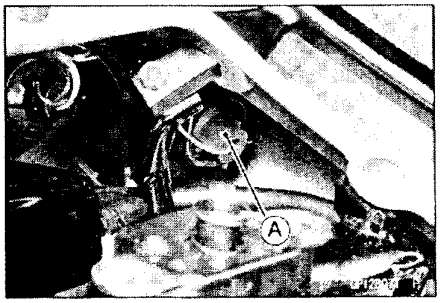


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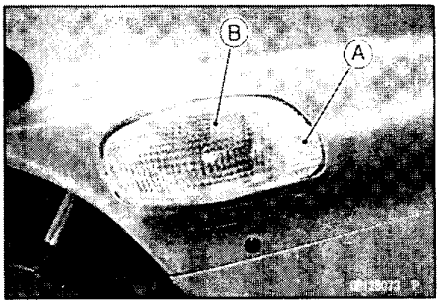
Lighting System

Turn Signal Light Bulb Replacement

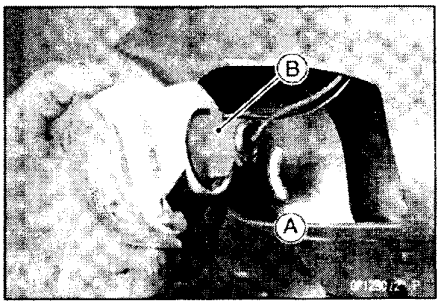
- Replace the bulb of the rear turn signal light [A] in the same way as in the Tail/Brake Light Bulb Replacement.



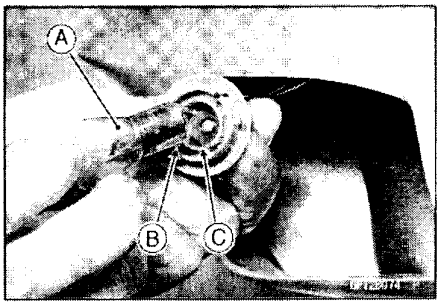
- Unscrew the screw [A].
- Remove the front turn signal [B].



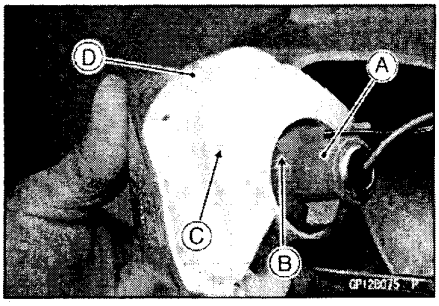
- Turn the socket counterclockwise [A] and remove the socket [B] with the bulb.



- Push and turn the bulb counterclockwise and remove it (see Tail/Brake Light Bulb Replacement).
- Insert the new bulb [A] by aligning its upper pin [B] with the upper groove [C] in the socket, and turn the bulb clockwise.



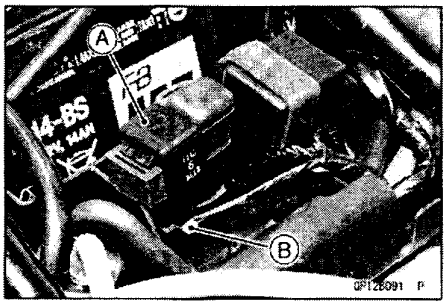
- Insert the socket [A] by aligning the triangular mark [B] on the socket with the triangular mark [C] on the lens housing [D].



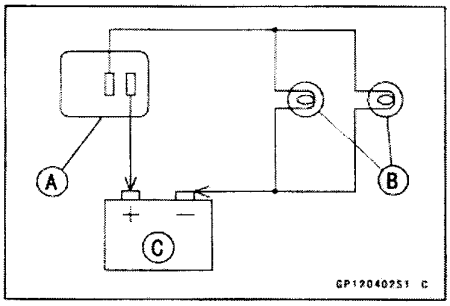
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Lighting System

Turn Signal Relay Inspection



- Remove:
  Seat (see Frame chapter)
  Fuel Tank (see Fuel System chapter)
  Turn Signal Relay [A]
- Disconnect:
  Turn Signal Relay Connector [B]



- Connect one 12 V battery and turn signal lights as indicated in the figure, and count how many times the lights flash for one minute.
  Turn Signal Relay [A]
  Turn Signal Lights [B]
  12 V Battery [C]

★If the lights do not flash as specified, replace the turn signal relay.

Testing Turn Signal Relay

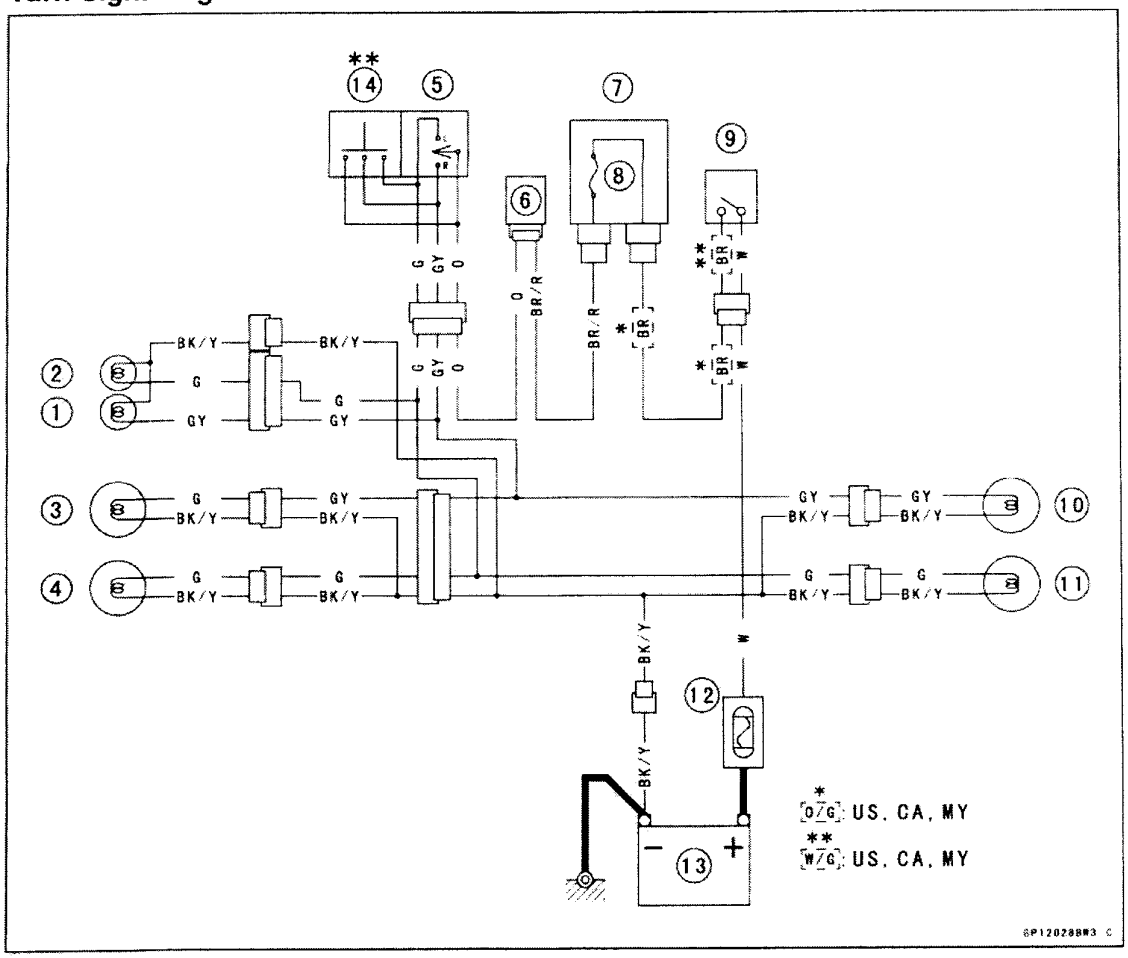
Load		Flashing times (c/m*)
The Number of Turn Signal Lights	Wattage (W)	
1**	21 - 23	Light stays on
2	42 - 46	75 - 95

*: Cycle(s) per minute
**: Corresponds to "One light burned out"

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Lighting System

Turn Signal Light Circuit



CA: Canadian Model
US: U.S.A. Model
MY: Malaysian Model

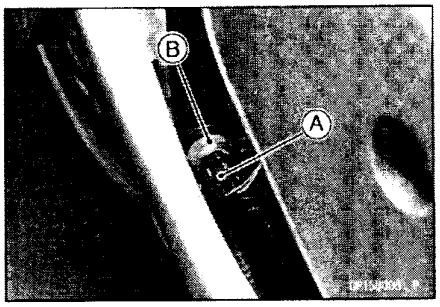
1. Right Turn Signal Indicator Light
2. Left Turn Signal Indicator Light
3. Front Right Turn Signal Light
4. Front Left Turn Signal Light
5. Turn Signal Switch
6. Turn Signal Relay
7. Junction Box
8. Turn Signal Fuse 10 A
9. Ignition Switch
10. Rear Right Turn Signal Light
11. Rear Left Turn Signal Light
12. Main Fuse 30 A
13. Battery 12 V
14. Hazard Button

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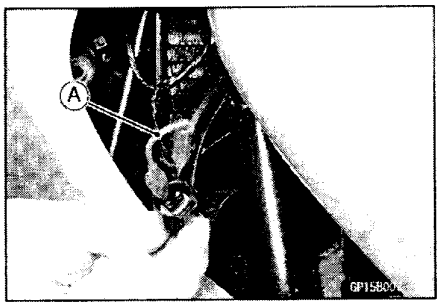
Radiator Fan System

Fan System Circuit Inspection

● Disconnect the 2 pin connector [A] from the radiator fan switch [B].



● Using an auxiliary wire [A], connect the radiator fan switch leads of the main harness side.
● Turn the ignition switch ON.
★If the fan rotates, inspect the fan switch.
★If the fan does not rotate, inspect the following.
Leads and Connectors
Main Fuse and Fan Fuse
Headlight Fuse 30 A
Fan Relay
Fan Motors



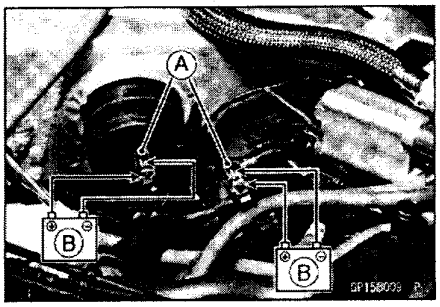
Fan Motor Inspection

● Remove:
Fuel Tank (see Fuel System chapter)
Air Cleaner Housing (see Fuel System chapter)

● Disconnect the 2-pin connector [A] in the fan motor leads.
● Using two auxiliary wires, supply battery [B] power to each fan motor.

Connections
Battery (+) → Blue Lead
Battery (–) → Black Lead

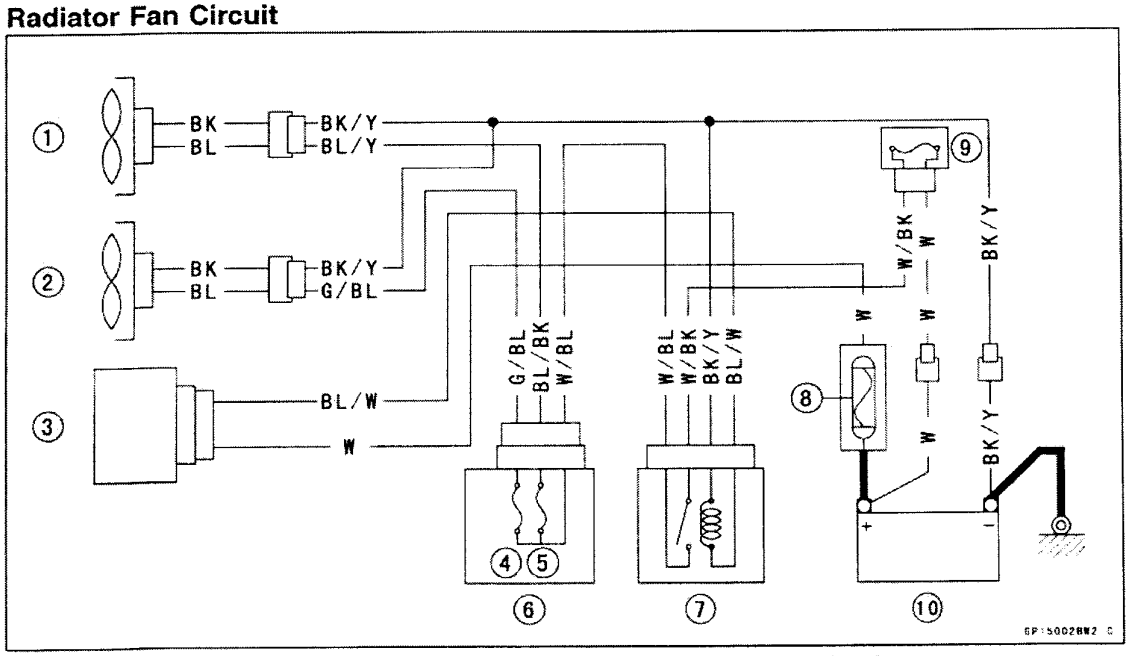
★If the fan does not rotate, the fan motor is defective and must be replaced.



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Radiator Fan System

Radiator Fan Circuit



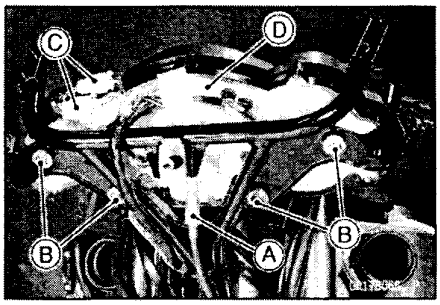
1. Radiator Fan (Right)
2. Radiator Fan (Left)
3. Radiator Fan Switch
4. Radiator Fan Fuse 10 A (Left)
5. Radiator Fan Fuse 10 A (Right)
6. Junction Box
7. Fan Relay
8. Main Fuse 30 A
9. Headlight Fuse 30 A
10. Battery 12 V

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Meters, Gauges, Indicator Unit

Meter Unit Removal

- Remove:
  Wind Shield with front Inner Cover (see Frame chapter)
  Upper Fairing (see Frame chapter)
  Speedometer Cable Upper End [A]
  Nuts [B] and Washers
  Meter Connectors [C]
- Remove the meter unit [D].

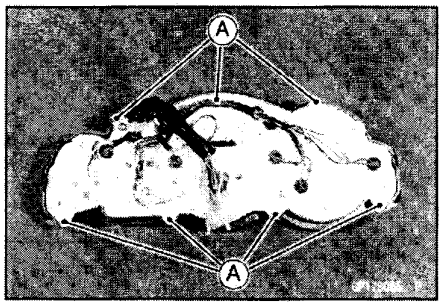


CAUTION

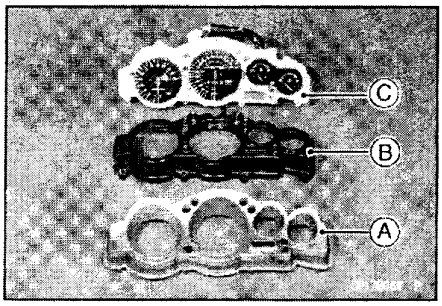
Place the meter or gauge so that the face is up. If a meter or gauge is left upside down or sideways for any length of time, it will malfunction.

Meter, Gauge Disassembly

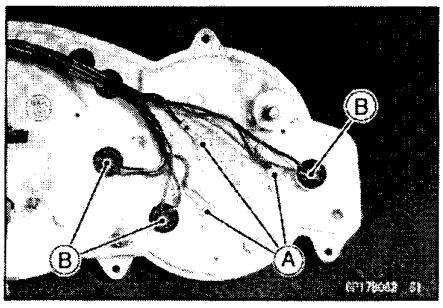
- Unscrew the screws [A].



- Separate the meter cover [A], upper meter case [B] and lower meter case [A].



- Unscrew the screws [A] and remove the tachometer.
- Pull the sockets [B] out from the lower meter case.

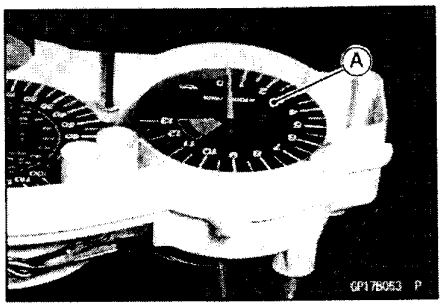


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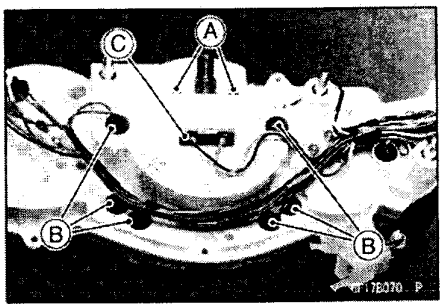
Meters, Gauges, Indicator Unit

CAUTION

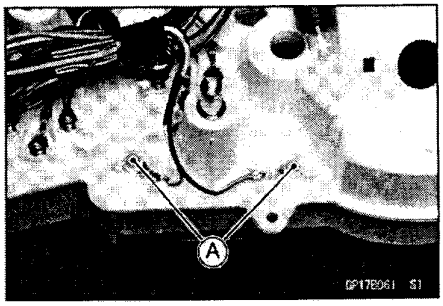
Do not fail to remove the screws while the meter faced up [A] when removing each meters. If the screws are removed while the meter faced down, the meter may come down, and the meter may be damage.



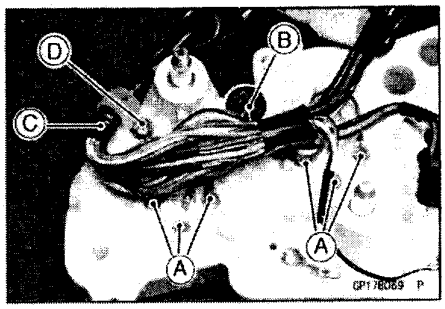
- Unscrew the screws [A] and remove the speedometer.
- Pull the sockets [B] out from the lower meter case.
- Pull out the read switch [C].



- Unscrew the screws [A] and remove the clock.



- Unscrew the screws [A] and remove the fuel/water temperature gauge.
- Pull the meter socket [B] out from the lower meter case.
- Unscrew the screw [C] and take the meter harness [D].



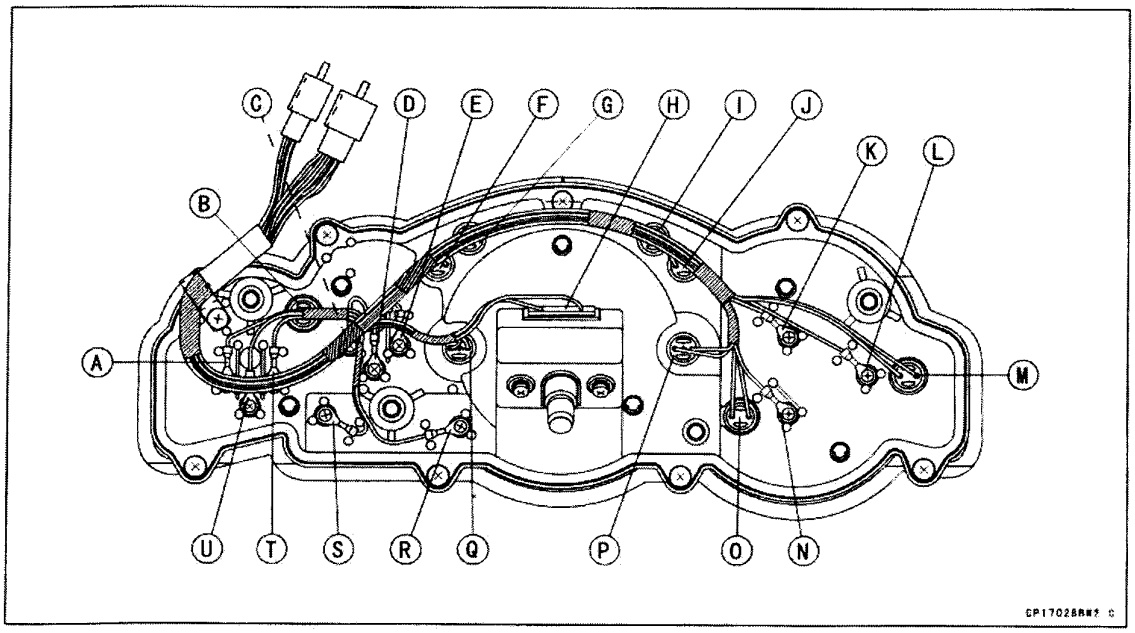
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Meters, Gauges, Indicator Unit

Meter Unit Assembly

● Install the bulbs and wire terminals in the original positions.

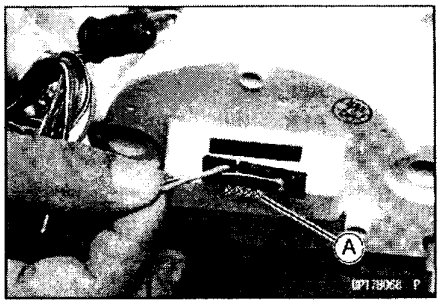
Y/W [A]
R/BL and BK/Y [B]
W/Y [C]
BK/Y [D]
BR [E]
GY and BK/Y [F]
BR and LG [G]
BL and BK/Y [H]
R/BK and BK/Y [I]
G and BK/Y [J]
BK [K]
BK/Y [L]
R/BL and BK/Y [M]
BR [N]
BL/R and BR [O]
R/BL and BK/Y [P]
R/BL and BK/Y [Q]
BK/Y [R]
W/BK [S]
BR [T]
BK/Y [U]



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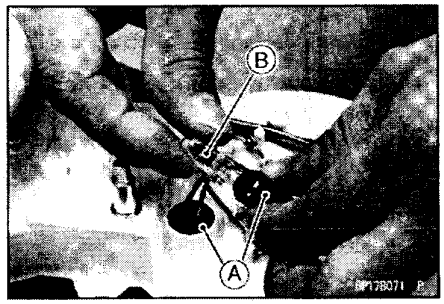
Meters, Gauges, Indicator Unit

● Apply a thin adhesive [A] to the side faces of the read switch.



Meter Bulb Replacement

● Remove the meter Unit (see Meter Unit Removal).
● Pull the meter socket [A] out from the meter unit.
● To remove the wedge-base type bulb [B], pull the bulb out of the socket.

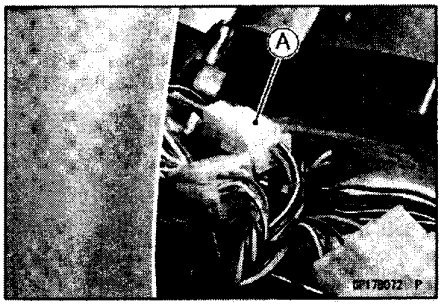


CAUTION

Do not turn the bulb. Pull the bulb out to prevent damage to the bulb.
Do not use bulb rated for greater wattage than the specified value.

Tachometer Inspection

● Remove:
  Wind Shield (see Frame chapter)
  Left Side Cover (see Frame chapter)
● Disconnect:
  IC Igniter Connector (see IC Igniter Inspection)
  4 Pin Meter Connector [A]
● Check the tachometer circuit wiring (see Wiring Inspection).
★If all wiring and components other than the tachometer unit check out good, the unit is suspect. Check the unit.



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Meters, Gauges, Indicator Unit

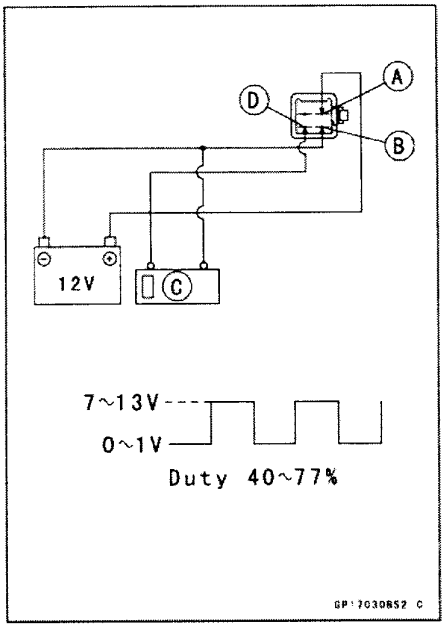
● Using the auxiliary wires, connect a 12 V battery to the meter unit connector terminals.

Connections:
Battery Positive Terminal (+) → Terminal [A]
Battery Negative Terminal (–) → Terminal [B]

● Connect the oscillator [C] to the terminal [D]. The rpm that corresponds to the input frequency will be displayed when a short wave from such as the one show in the diagram is input.

Example:
An input frequency of 100 Hz will display 3 000 rpm.

★If the meter does not function correctly, replace the tachometer unit.
★If the meter does function correctly, replace the IC ignitor.

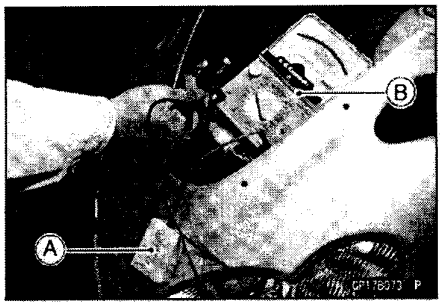


● Connect:
IC Igniter Connector
4 Pin Meter Connector
● If an oscillator is unavailable, check the tachometer as follows.

NOTE

○*Be sure the battery is fully charged.*

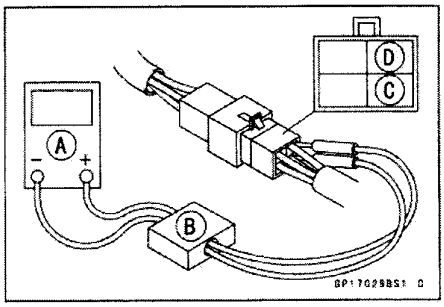
○Connect a commercially peak voltage adapter [A] into the hand tester [B] which is set to the × 25 V DC range.



Connections:
Adapter Red Lead → BK/O Lead Terminal [C]
Adapter Black Lead → BK/Y Lead Terminal [D]

Recommended Tool - Peak Voltage Adapter
Type: KEK-54-9-B
Brand: KOWA SEIKI

Special Tool - Hand Tester : 57001–1394



○Turn the ignition switch ON and start the engine.

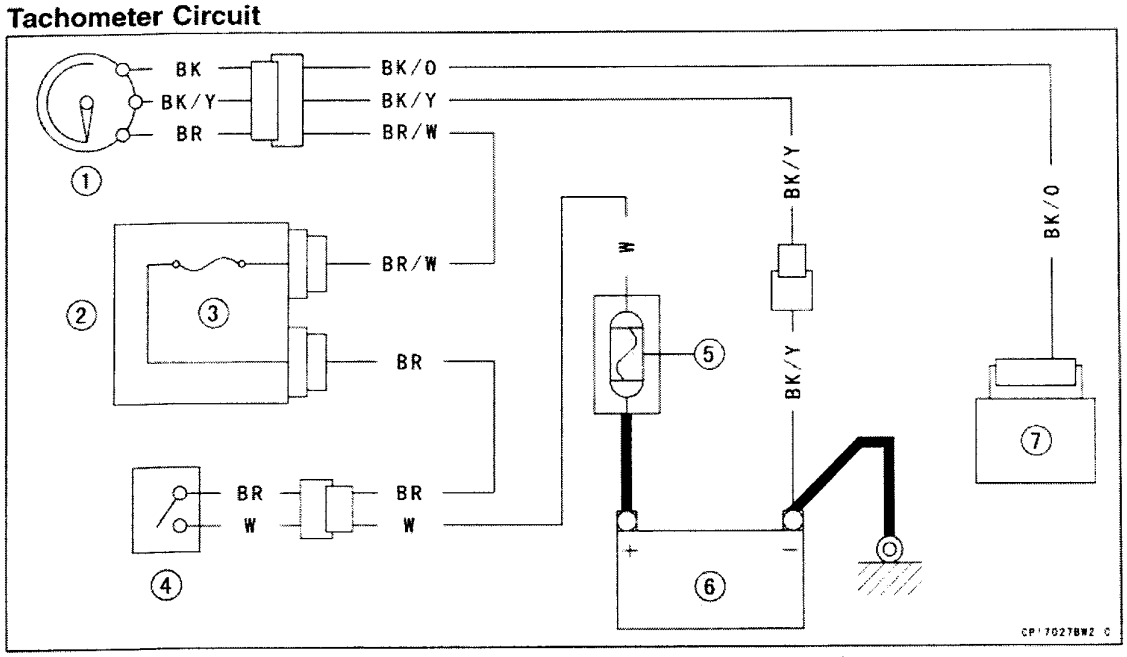
Tachometer Input Peak Voltage
Standard : 11 V or more

★If the reading is normal, replace the tachometer.
★If the reading is less than the specified value, replace the IC igniter.

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Meters, Gauges, Indicator Unit

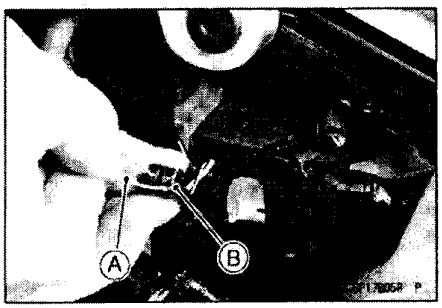
Tachometer Circuit



1. Tachometer
2. Junction Box
3. Ignition Fuse 10 A
4. Ignition Switch
5. Main Fuse 30 A
6. Battery 12 V
7. IC Igniter

Fuel Level Gauge Inspection

- Remove the Right Side Cover (see Frame chapter).
- Using auxiliary wire [A], short the terminals of the connect [B] on the main harness. At this time, check the movement of the fuel level gauge needle.



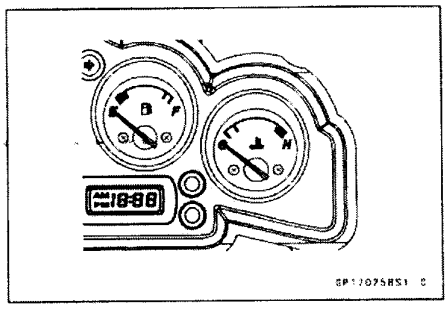
Fuel Level Gauge Operation Check
Ignition Switch Position: ON
Wire Location:
Female 2-pin sensor connector (disconnected)
Results:
Gauge should read E when connector wires are opened.
Gauge should read Fwhen connector wires are shorted.

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Meters, Gauges, Indicator Unit

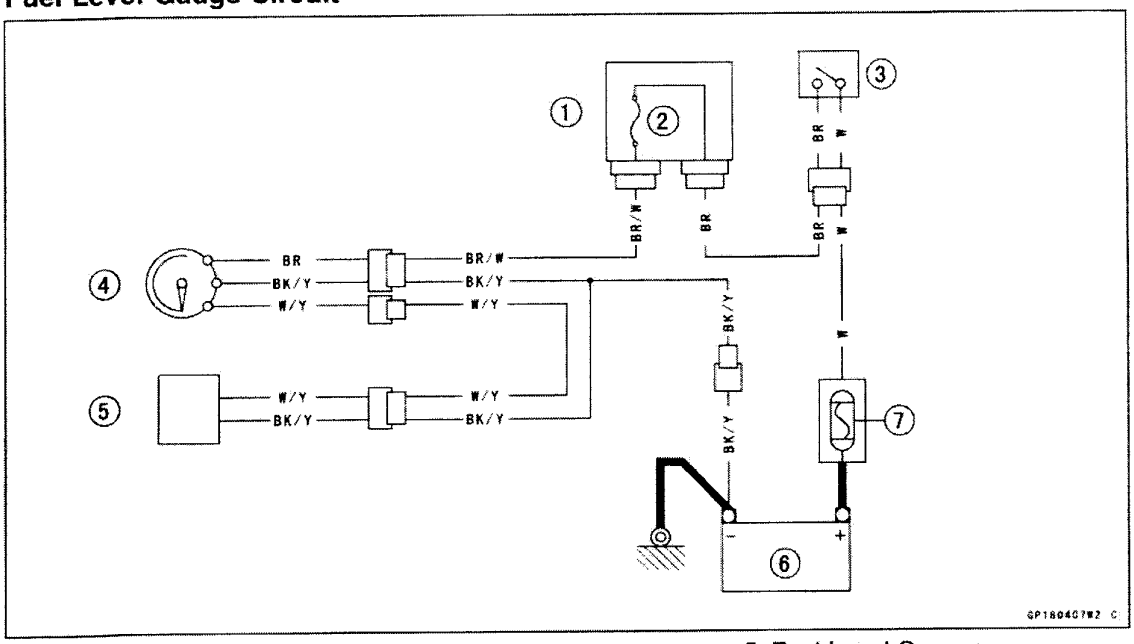
CAUTION

Do not short circuit the leads longer than necessary.
When the hand swings to the "F" position, stop short-circuiting.
Otherwise a good gauge could be damaged.



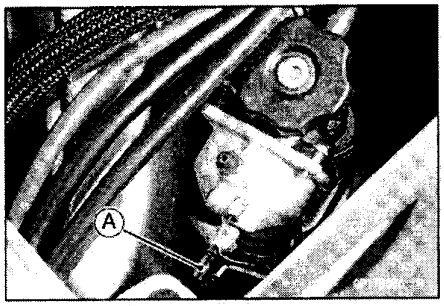
★If the gauge readings are correct, the fuel level sensor is bad.
★If these readings are not obtained, the trouble is with the gauge and/or wiring.
● Check the fuel level gauge circuit wiring (see Wiring Inspection).
★If all wiring and components other than the fuel level gauge check out good, the gauge is defective.

Fuel Level Gauge Circuit



1. Junction Box
2. Ignition Fuse 10 A
3. Ignition Switch
4. Fuel Level Gauge
5. Fuel Level Sensor
6. Battery 12 V
7. Main Fuse 30 A

Water Temperature Gauge Inspection
● Remove the right inner cover (see Frame chapter).
● Pull off the water temperature sensor connector [A].

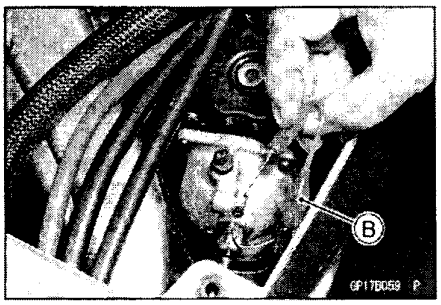


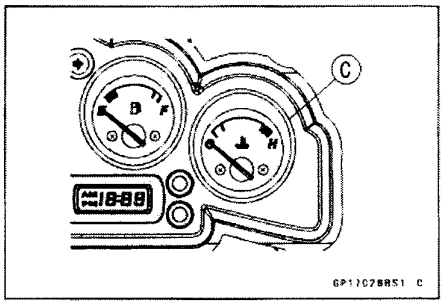
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Meters, Gauges, Indicator Unit

● Prepare auxiliary wire [B], and check the operation of the gauge [C].

Water Temperature Gauge Operation check
Ignition Switch Position: ON
Wire Location:
Female, Sensor Connector (disconnected)
Results:
Gauge should read C when connector wire is opened.
Gauge should read H when connector wire is grounded to engine.





CAUTION

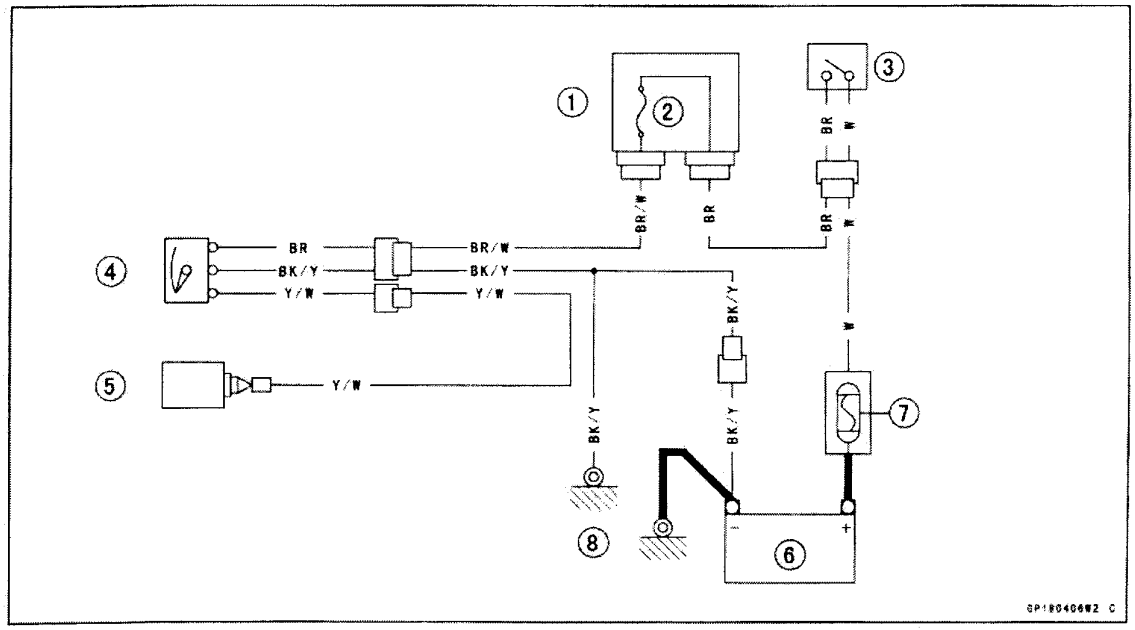
Do not ground the wiring longer than necessary. After the needle swings to the H position, stop the test. Otherwise the gauge could be damaged.

★If the gauge readings are correct, the water temperature sensor is bad. If these readings are not obtained, the trouble is with the gauge/or wiring.

● Check the water temperature gauge circuit wiring (see Wiring Inspection).

★If all wiring and components other than the water temperature gauge unit check out good, the unit is defective.

Water Temperature Gauge Circuit



1. Junction Box
2. Ignition Fuse 10 A
3. Ignition Switch
4. Water Temperature Gauge
5. Water Temperature Sensor
6. Battery 12 V
7. Main Fuse 30 A
8. Water Temperature Sensor Ground

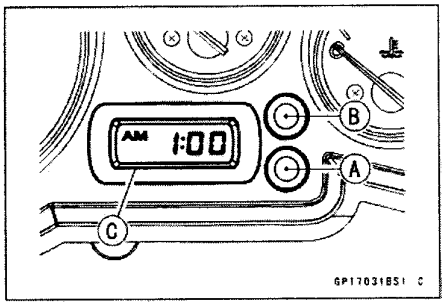
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Meters, Gauges, Indicator Unit

Clock Inspection

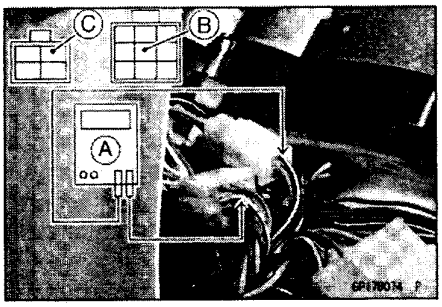
- Push the minute button [A] to adjust the minute and the hour button [B] to adjust the hour.
- Pushing the button momentarily advances the hour or minutes step by step.
- Pushing and holding the button advances the hour or minute continuously.
- Pushing the minute button and hour button simultaneously displays all LCD segments in digital clock [C], then resets the clock to AM. 1:00.

★If the display function does not work and adjust, replace the digital clock.



- Remove the wind shield (see Frame chapter).
- Check the digital clock power source voltage with a digital voltmeter.

○Set the digital voltmeter [A] to the × 25 V DC range, and connect it to the connector.



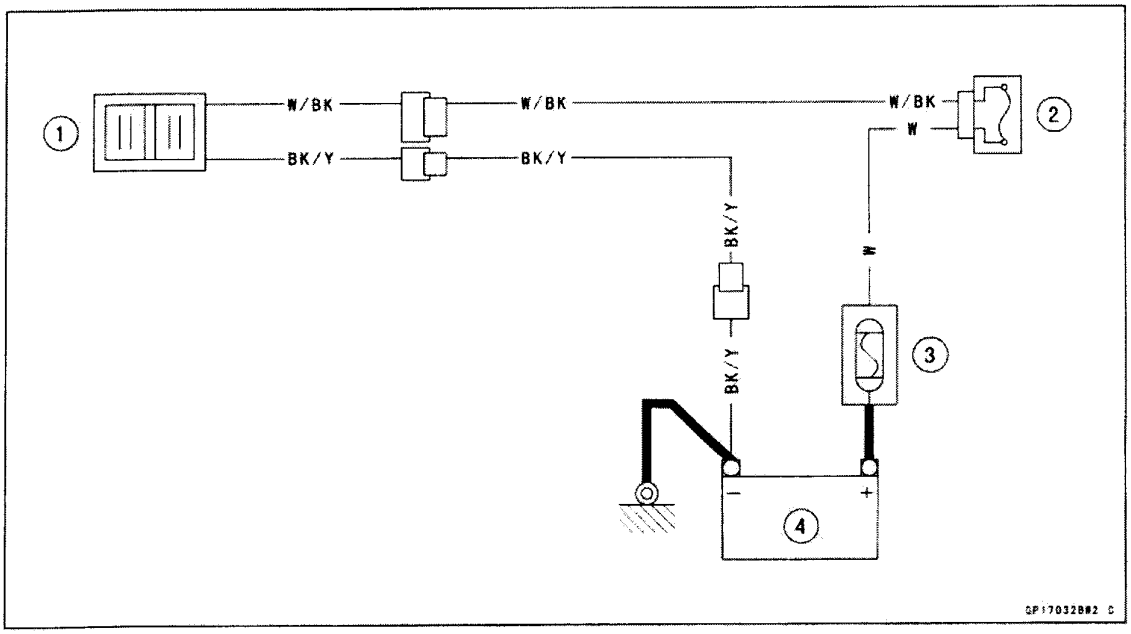
Tester Connections:
W/BK Lead Terminal (9P) ← Tester (+) Terminal [B]
BK/Y Lead Terminal (4P) ← Tester (–) Terminal [C]

Digital Clock Power Source Voltage.
Standard: Battery Voltage (12.6 V or more)

★If the reading is less than the specified value, check the following.
Battery Voltage
Main Harness Side Wiring

★If the reading is standard, check the following.
Meter Harness Wiring

★If the meter harness wiring is normal, replace the digital clock.



1. Digital Clock
2. Accessory Fuse 10 A
3. Main Fuse 30 A
4. Battery 12 V

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Meters, Gauges, Indicator Unit

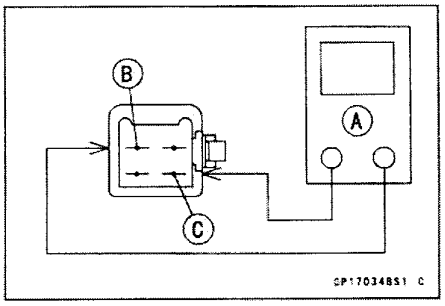
Read Switch Inspection

- Remove the wind shield (see Frame chapter).
- Use the jack to lift the front wheel.

Special Tool - Jack: 57001–1238

- Disconnect the 4P connector (see IC Igniter Inspection).
- Set the hand tester [A] to the × 1 Ω range, check the continuity between the LB lead terminal [B] and the BK/Y lead terminal [C].
- Slowly rotating the front wheel the tester's pointer should swing 0 Ω and ∞.

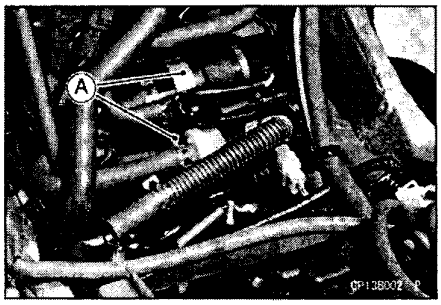
★If the tester's pointer does not swing, replace the meter harness.



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Fuel Pumps

The fuel pumps [A] operates when the starter button is pushed on or the engine is running. When the fuel level in the float chamber is low, the fuel pump operates to supply the furl into the float chamber. when the fuel reaches a certain level, the fuel pressure rises, and the fuel pump stops.



⚠ WARNING

Remove or install the fuel pumps only in an area that is well-ventilated and free from any source of flame or sparks.
Turn the ignition switch OFF.
Do not remove or install the fuel pumps when the engine is warm.
Wipe any spilled fuel before starting the engine.

Fuel Pumps Removal/Installation

- Refer to the Fuel System chapter.

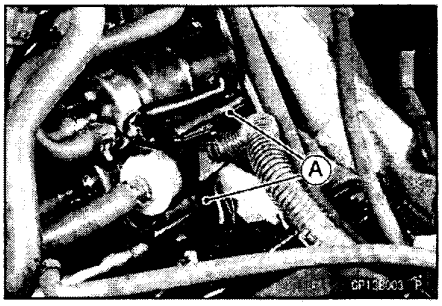
Fuel Pump Internal Resistance Inspection

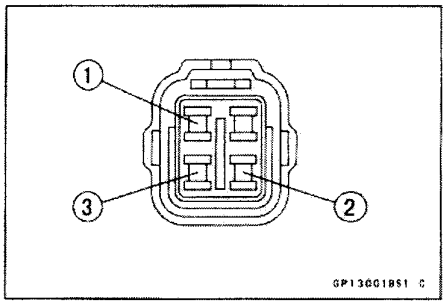
- Remove the seat (see Frame chapter).
- Remove the fuel tank (see Fuel System chapter).
- Remove the fuel pump connectors [A].
- Set the hand tester to the × 1 kΩ range and make the measurements shown in the table.

Special Tool - Hand Tester: 57001–1394

★If the tester readings are not as specified, replace the fuel pump.

★If the tester readings are normal, check the fuel pump operation.





CAUTION

Use only Hand Tester 57001–1394 for this test. An ohmmeter other than the Kawasaki Hand Tester may show different readings.
If a megger or a meter with a large-capacity battery is used, the fuel pump will be damaged.

Fuel Pump Internal Resistance **Unite: kΩ**

Range		Tester (+) Lead Connection		
× 1 kΩ		1	2	3
(–)*	1	–	∞	∞
	2	∞	–	∞
	3	∞	20 or above	–

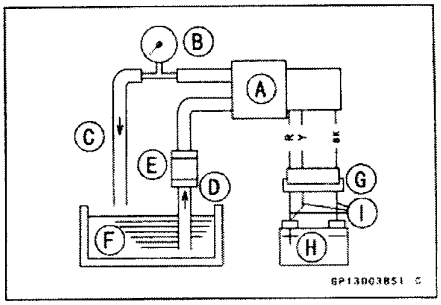
*: Tester (–) Lead Connection

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Fuel Pumps

Fuel Pump Operational Inspection

- Remove the fuel pump with the fuel filter (see Fuel System chapter).
- Prepare a container filled with kerosene.
- Prepare the rubber hoses, and connect them to the pump fittings.
- Connect a suitable pressure gauge to the outlet hose as shown.



Fuel Pump [A]
Pressure Gauge [B]
Outlet Hose [C]
Inlet Hose [D]
Fuel Filter [E]
Kerosene [F]
4-Pin Connector [G]
Battery [H]
Auxiliary Leads [I]

- Connect the pump leads to the battery using auxiliary wires as shown.

★If the pump operates, check the pump relay.
★If the pump does not operate, the pump is defective.
★I the pump operates and the pump relay in normal, close the outlet hose while operating the fuel pump.

- When the pump stops, read the pressure gauge.

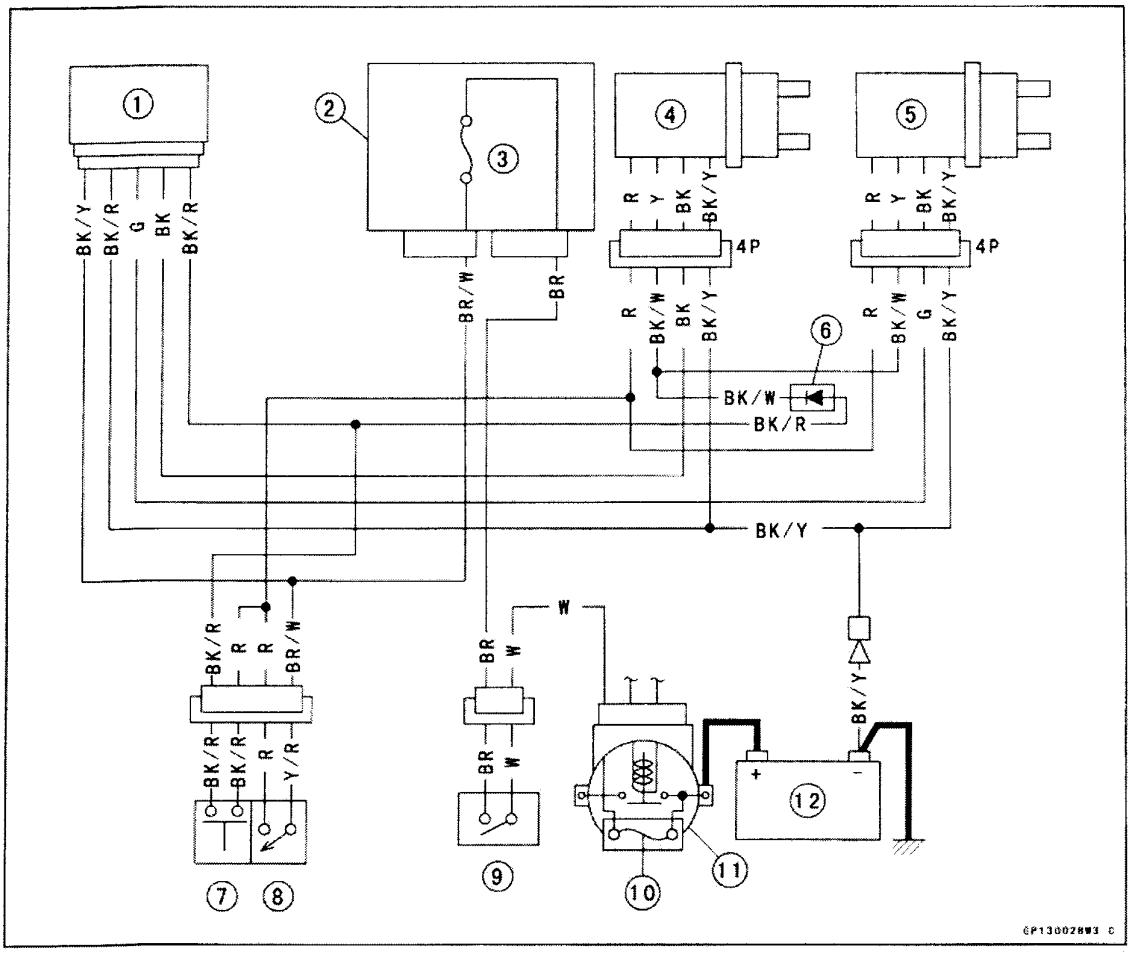
★If the pressure gauge reading is out of the specified pressure, the pump is defective.

Fuel Pump Pressure
Standard: 14 ~ 19 kPa (0.14 ~ 0.19 kgf/cm², 2.03 ~ 2.76 psi)

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Fuel Pumps

Fuel Pump Circuit



1. IC Igniter
2. Junction Box
3. Ignition Fuse 10 A
4. Fuel Pump #1, 4
5. Fuel Pump #2, 3
6. Diode (Rectifier)
7. Starter Button
8. Engine Stop Switch
9. Ignition Switch
10. Main Fuse 30 A
11. Starter Relay
12. Battery 12 V

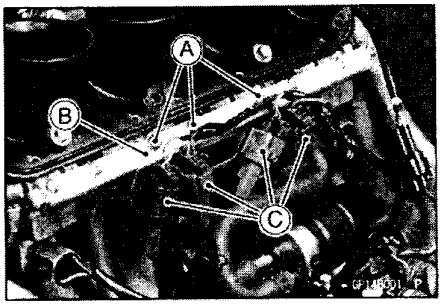
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Fuel Cut Valve

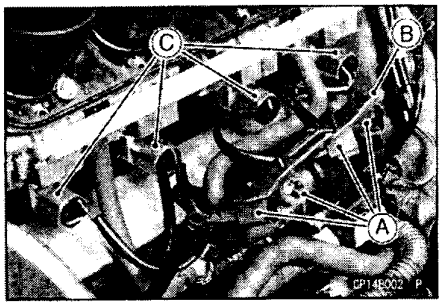
Fuel Cut Valve Removal

⚠ WARNING

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



- Remove the fuel tank and air cleaner housing (see Fuel System chapter).
- Unscrew the screws [A] and remove the connector bracket [B] together with fuel cut valve connectors [C].

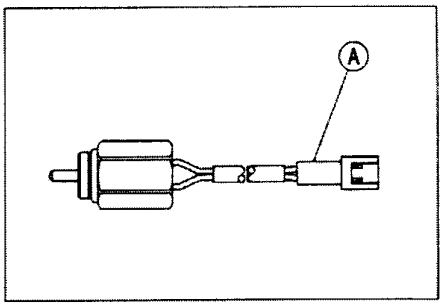


- Connect a suitable hose to the fitting at the bottom of each carburetor float bowl.
- Run the lower ends of the hoses into a suitable container.
- Turn out each drain plug a few turns and drain the float bowls.

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

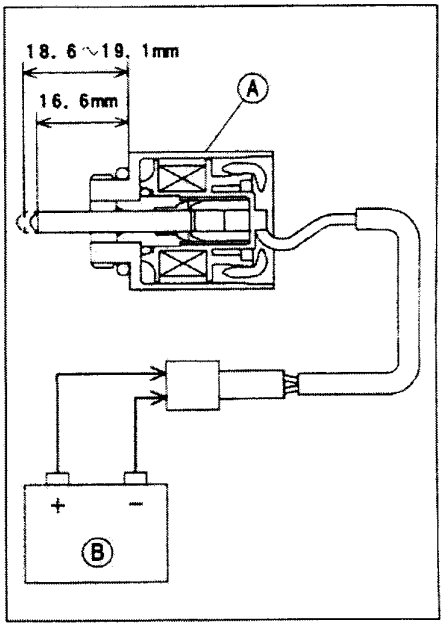
- Disconnect the connectors of the fuel cut valves.
- Remove the connectors [A] from the bracket [B].
- Loosen the fuel cut valves [C] and remove them.

Fuel Cut Valve Installation



- Install the fuel cut valves with a gray color connector [A] on the #1, #4 carburetors.
- Install the fuel cut valves with a brown color connector [A] on the #2, #3 carburetors.
- Do not install the fuel cut valves on the wrong carburetors. The fuel cut valves will not work well.

Fuel Cut Valve Inspection



- Remove the fuel cut valve [A].
- Connect and disconnect one 12 V battery [B] to the fuel cut valve connector as shown. The valve rod moves.

★If the protrusion exceeds the standard (too long or too short), the valve is defective and must be replaced.

Testing Fuel Cut Valve

Standard Protrusion:

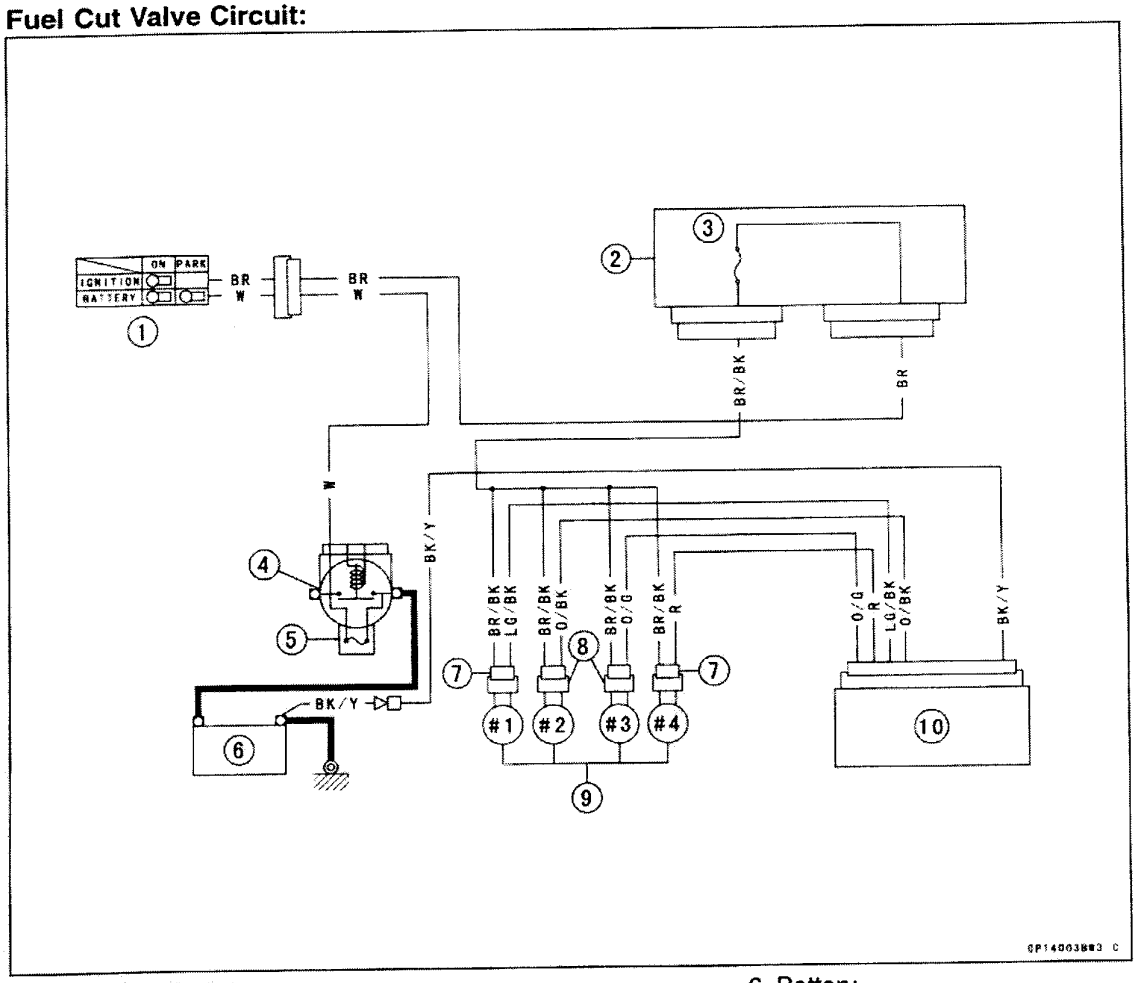
When battery is disconnected → 16.6 mm (0.65 in.)

When battery is connected → 18.6 ~ 19.1 mm (0.73 ~ 0.75 in.)

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Fuel Cut Valve

Fuel Cut Valve Circuit:



1. Ignition Switch
2. Junction Box
3. Horn Fuse 10 A
4. Starter Relay
5. Main Fuse 30 A
6. Battery
7. Gray Connector
8. Brown Connector
9. Fuel Cut Valve
10. IC Igniter

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Switch and Sensors

Rear Brake Light Timing Inspection

● Refer to the Rear Brake Light Switch Check/Adjustment in the Periodic Maintenance Chapter.

Rear Brake Light Timing Adjustment

● Refer to the Rear Brake Light Switch Check/Adjustment in the Periodic Maintenance Chapter.

Switch Inspection

● Using a hand tester, check to see that only the connections shown in the table have continuity (about zero ohms).

○For the handlebar switches and the ignition switch, refer to the tables in the Wiring Diagram.

★If the switch has an open or short, repair it or replace it with a new one.

Special Tool - Hand Tester: 57001–1394

Side Stand Switch Connections

	G	BK
When side stand is up	○———	———○
When side stand is down		

Neutral Switch Connections

	SW.Terminal	
When transmission is in neutral	○———	———○
When transmission is not in neutral		

Engine Oil Pressure Switch Connections*

	SW. Terminal	
When engine is stopped	○———	———○
When engine is running		

*: Engine lubrication system is in good condition

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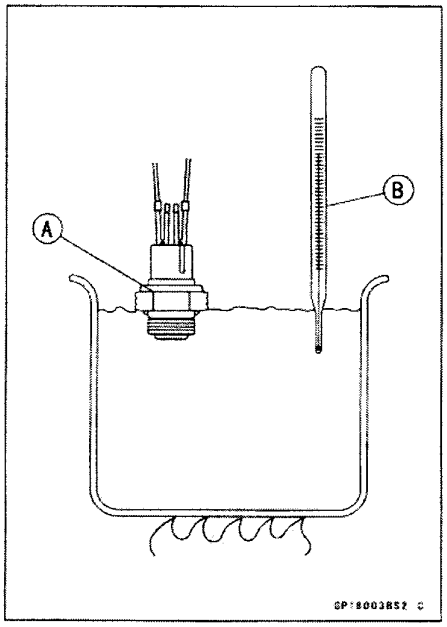
Switch and Sensors

Radiator Fan Switch Inspection

- Remove the fan switch (see Cooling System chapter).
- Suspend the switch [A] in a container of coolant so that the temperature-sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant so that the sensitive portions are located in almost the same depth.

NOTE

○*The switch and thermometer must not touch the container sides or bottom.*



- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the terminals in the connector at the temperatures shown in the table.

Special Tool - Hand Tester: 57001-1394

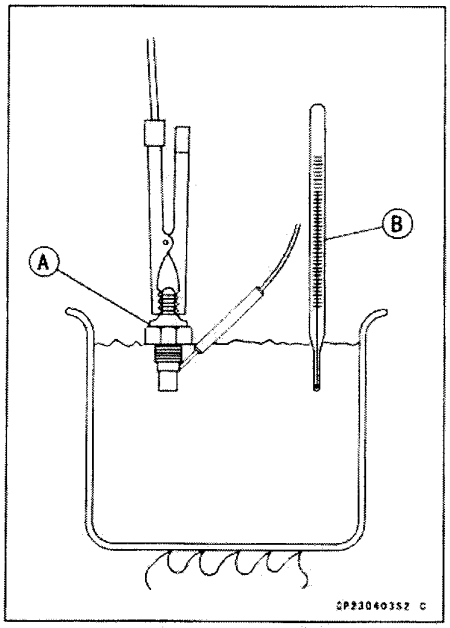
★If the hand tester does not show the specified values, replace the switch.

Fan Switch Resistance
Rising temperature:
From OFF to ON @ 93 ~ 103°C (199 ~ 217°F)
Falling temperature:
Fan stops with the temperature 3 ~ 8°C (38 ~ 46°F) lower than the operation temperature range.
ON: Less than 0.5 Ω
OFF: More than 10 MΩ

Water Temperature Sensor Inspection

- Remove the water temperature sensor.
- Suspend the sensor [A] in a container of coolant so that the temperature sensing projection and threaded portion are submerged. The sensor must not touch the container sides or bottom.
- Suspend an accurate thermometer [B] in the coolant. It must not touch the container, either.
- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using an ohmmeter, measure the internal resistance of the sensor across the terminal and the body at the temperatures shown in the table.

★If the ohmmeter does not show the specified values, replace the sensor.



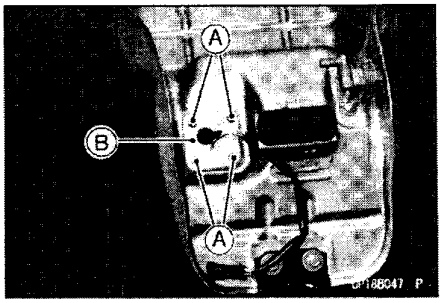
Internal Resistance of Water Temperature Sensor
80°C (176 °F): About 52 Ω
100°C (212 °F): About 27 Ω

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Switch and Sensors

Fuel Level Sensor Inspection

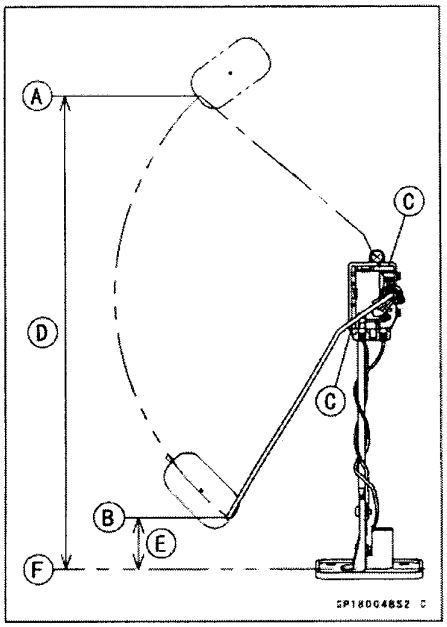
- Remove the fuel tank (see Fuel System chapter).
- Unscrew the bolts [A].
- Remove the fuel level sensor [B] from the fuel tank.



- Check that the float moves up and down smoothly without binding. It should go down under its own weight.

★If the float does not move smoothly, replace the sensor.

Float in Full Position [A]
Float in Empty Position [B]
Float Arm Stoppers [C]
284.5 ~ 294.5 mm (11.20 ~ 11.59 in.) from Sensor Base Line [D]
26.9 ~ 36.9 mm (1.06 ~ 1.45 in.) from Sensor Base Line [E]
Sensor Base Line [F]

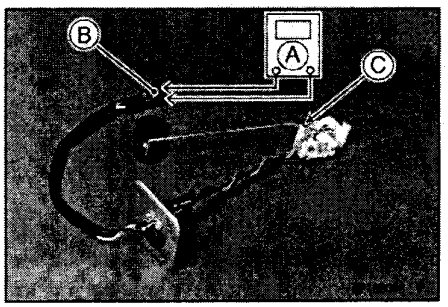


- Using the hand tester [A], measure the resistance across the terminals in the fuel level sensor lead connector [B].

Special Tool - Hand Tester: 57001-1394

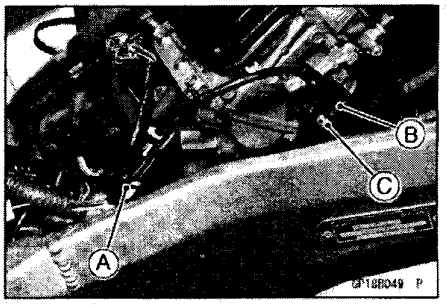
★If the tester readings are not as specified, or do not change smoothly according as the float moves up and down, replace the sensor.

Fuel Level Sensor Resistance
Standard: Full position: 1 ~ 5 Ω
Empty position [C]: 103 ~ 117 Ω



Throttle Position Sensor Removal/Installation

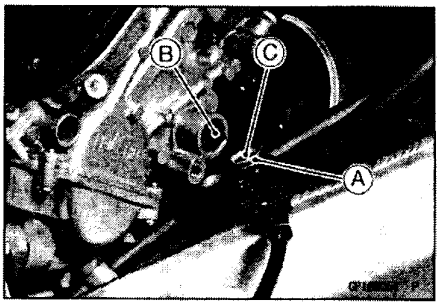
- Remove the carburetors (see Fuel System chapter).
- Disconnect the throttle sensor connector [A].
- Remove the throttle position sensor [B] by unscrewing the mounting screw [C].



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Switch and Sensors

- Replace the O-ring [A] with a new one.
- Fit the tongue [B] of the throttle valve shaft into the sensor groove [C].
- Be sure to adjust the throttle position sensor when installing (See throttle Position Sensor Adjustment).



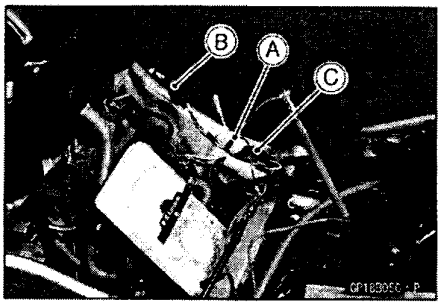
Throttle Position Sensor Inspection

NOTE

○*Be sure the battery is fully charged.*

- Remove the fuel tank (see Fuel System chapter).
- Prepare an auxiliary fuel tank and connect the fuel hose to the carburetor.
- Start the engine and warm it up thoroughly.
- Check idle speed and stop the engine.

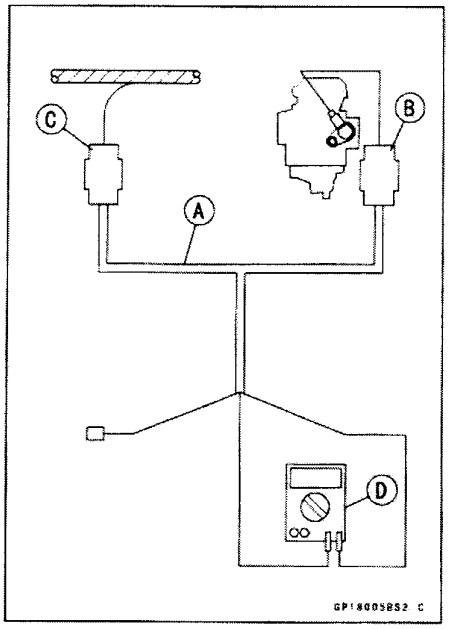
★If the idle speed is out of the specified range, adjust it (see Fuel System chapter).



- Disconnect the throttle position sensor connector and connect the setting adapter [A] between the sensor connector [B] and main harness connector [C].
- Set the digital volt meter to the DC 25 V range and connect the digital voltmeter [D] to the adapter.

  Hand Tester (+) → BL Lead (color of lead on the sensor)
  Hand Tester (–) → BK Lead (color of lead on the sensor)

Special Tool - Throttle Sensor Setting Adapter: 57001-1400



- Measure the sensor input voltage with the engine stopped, and with the connector joined.
- Turn the ignition switch ON.

Throttle Position Sensor Input Voltage
Standard: 4.75 ~ 5.25 V

★If the reading is not within the specified range, check the wiring/or IC igniter.

★If the reading is within the specified range, check the sensor output voltage.

- Connect the digital voltmeter to the adapter.

  Hand Tester (+) → Y Lead (color of lead on the sensor)
  Hand Tester (–) → BK Lead (color of lead on the sensor

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Switch and Sensors

- Turn the ignition switch ON.
- Measure the sensor output voltage with the engine stopped and with the idle throttle opening.

Throttle Position Sensor Output Voltage
Standard: 0.9 ~ 1.1 V (at idle throttle opening)

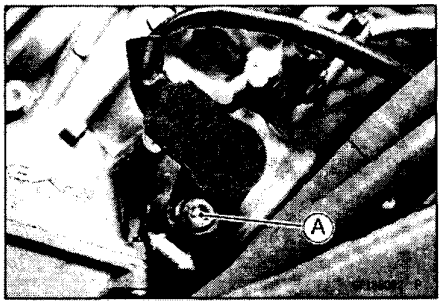
★If the reading is not within the specified range, adjust the throttle sensor position (see Throttle Sensor Position Adjustment).
★If the reading is within the specified range, check the sensor output voltage at full throttle opening.

Throttle Position Sensor Output Voltage
Standard: 4.06 ~ 4.26 V (at full throttle opening)

★If the reading is not within the specified range, readjust the sensor.
★If the throttle sensor cannot be adjusted, replace the sensor.

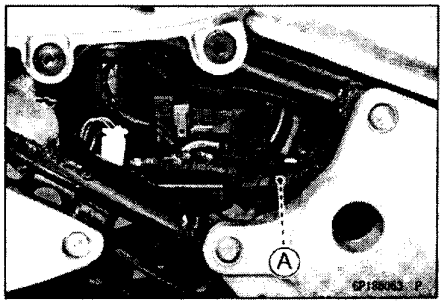
Throttle Position Sensor Position Adjustment

- Check the throttle sensor output voltage (see Throttle Sensor Inspection).
- If the output voltage is out of the range, adjust it as follows.
- Remove:
  Fuel Tank (see Fuel System chapter)
  Air Cleaner Housing (see Fuel System chapter)
  Carburetors (see Fuel System chapter)
- Loosen the throttle sensor mounting screw [A].
- Adjust the position of the sensor until the output voltage is within the specified range (see Throttle Sensor Inspection).



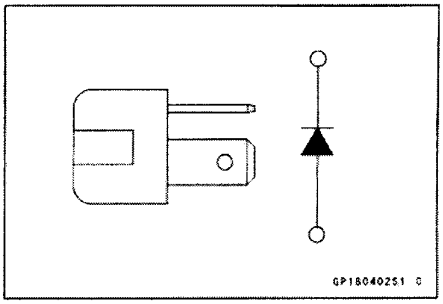
Diode (Rectifier) Inspection

- Remove the left side cover (see Frame chapter).
- Cut the vinyl tape.
- Disconnect the diode [A].



- Set the hand tester to the × 100Ω range.

Special Tool - Hand Tester: 57001-1394



- Check the continuity between the diode terminals in both directions.

★If there is continuity in one direction (forward direction) but no continuity (infinity) in the reverse direction, the diode is normal.
★The diode is defective if there is continuity after changing the direction, or if it remains with no continuity.

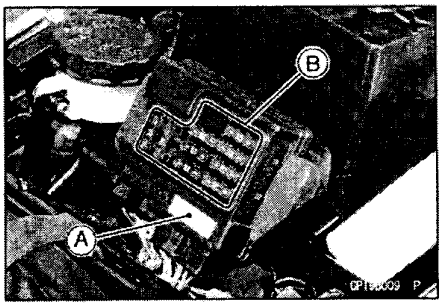
NOTE

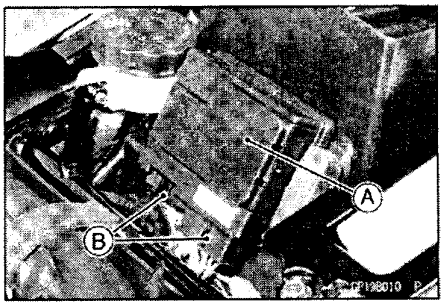
○*The actual resistance measurement in the forward direction varies with the tester used and the individual diodes. Generally speaking, it is acceptable if the tester's indicator swings approximately halfway.*

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Junction Box

The junction box [A] has fuses [B], relays, and diodes. The relays and diodes can not be removed.





Junction Box Fuse Circuit Inspection

- Remove the seat (see Frame chapter).
- Remove the junction box [A].
- Pull off the connectors [B] from the junction box.
- Make sure all connector terminals are clean and tight, and none of them have been bent.

★Clean the dirty terminals, and straighten slightly-bent terminals.

- Check conductivity of the numbered terminals with the hand tester.

○See the Junction Box Internal Circuit Diagram.

★If the tester does not read as specified, replace the junction box.

Special Tool - Hand Tester: 57001-1394

Fuse Circuit Inspection

Tester Connection	Tester Reading (Ω)
1 - 1A	0
1 - 2	0
3A - 4	0
6 - 5	0
6 - 10	0
6 - 7	0
6 - 17	0

Tester Connection	Tester Reading (Ω)
1A - 8	∞
2 - 8	∞
3A - 8	∞
6 - 2	∞
6 - 3A	∞
17 - 3A	∞

Starter Circuit/Headlight Relay Inspection

- Remove the junction box.
- Check conductivity of the following numbered terminals by connecting the hand tester and one 12 V battery to the junction box as shown.

★If the tester does not read as specified, replace the junction box.

Special Tool - Hand Tester: 57001-1394

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Junction Box

Relay Circuit Inspection (with the battery disconnected)

	Tester Connection	Tester Reading (Ω)
Headlight Relay	*7 - 8	∞
	*7 - 13	∞
	(+) (–) *13 - 9	Not ∞ **

	Tester Connection	Tester Reading (Ω)
Starter Circuit Relay	9 - 11	∞
	12 - 13	∞
	(+) (–) 13 - 11	∞
	(+) (–) 12 - 11	Not ∞ **

*: U.S.A., Canadian, Australian, and Malaysian Models only
**: The actual reading varies with the hand tester used.
(+): Apply tester positive wire.
(–): Apply tester negative wire.

Relay Circuit Inspection (with the battery connected)

	Battery Connection (+) (–)	Tester Connection	Tester Reading (Ω)
Headlight Relay	*9 - 13	*7 - 8	0
Starter Circuit Relay	11 - 12	(+) (–) 13 - 11	Not ∞ **

*: U.S.A., Canadian, Malaysian, and Australian Models only
**: The actual reading varies with the hand tester used.
(+): Apply tester positive lead.
(–): Apply tester negative lead.

Diode Circuit Inspection

- Remove the junction box.
- Check conductivity of the following pairs of terminals.

Diode Circuit Inspection

Tester Connection	*13-8, *13-9, 12-11, 12-14, 15-14, 16-14

*: U.S.A., Canadian, Malaysian, and Australian Models only

★The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the junction box must be replaced.

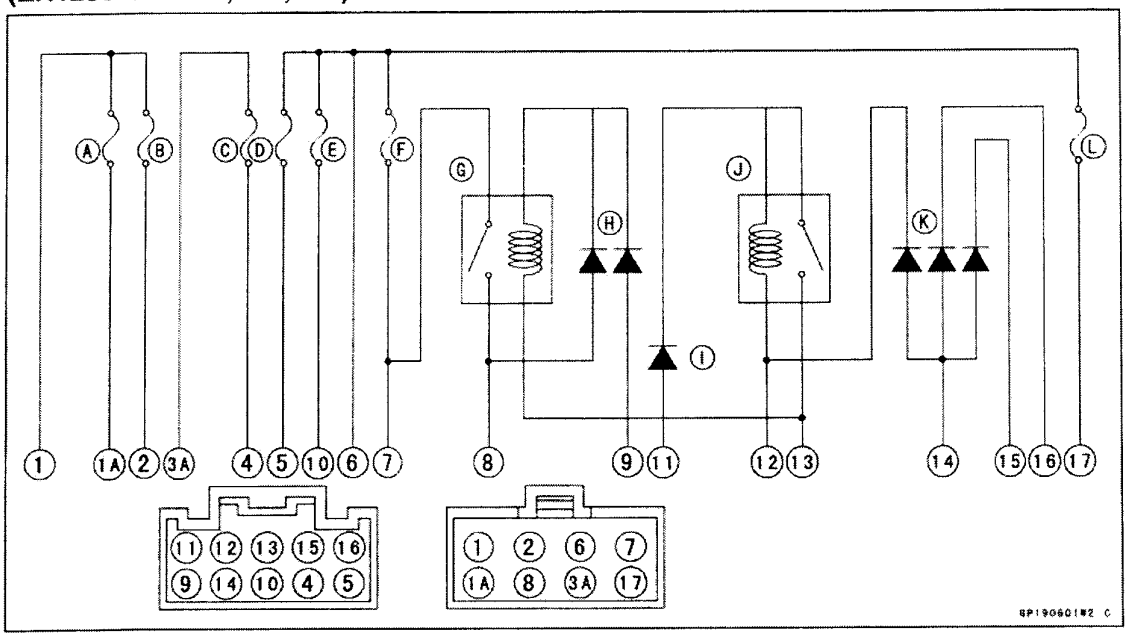
NOTE

○*The actual meter reading varies with the meter used and the individual diodes, but generally speaking, the lower reading should be from zero to one half the scale.*

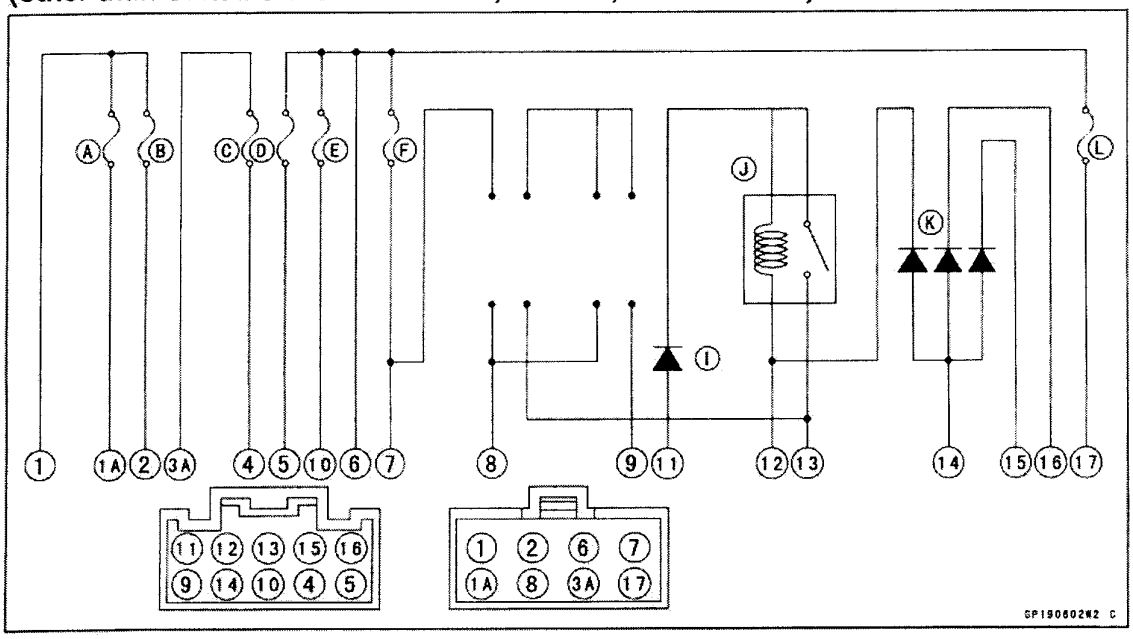
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Junction Box

Junction Box Internal Circuit
(United States of America, Canada, Malaysia, and Australia)
(ZX1200-C2 –: H, HU, HR)



Junction Box Internal Circuit: ZX1200-C1
(other than United States of America, Canada, and Australia)



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Junction Box

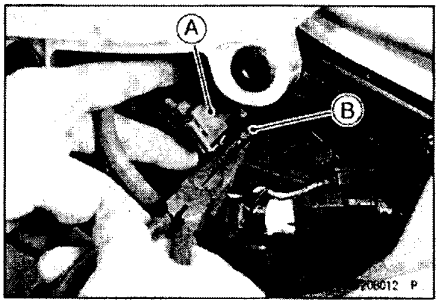
H. with Honeycomb Catarytic Converter
HU. with Honeycomb Catarytic Converter (UK model)
HR. with Honeycomb Catarytic Converter (Restricted model)
A. Radiator Fan Fuse (Left) 15 A
B. Radiator Fan Fuse (Right) 15 A
C. Turn Signal Fuse 10 A
D. Horn Fuse 10 A
E. Ignition Fuse 10 A
F. Headlight Fuse 10 A
G. Headlight Relay
H. Headlight Diodes
I. Starter Diode
J. Starter Circuit Relay
K. Interlock Diodes
L. Taillight Fuse 10 A

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Fuse

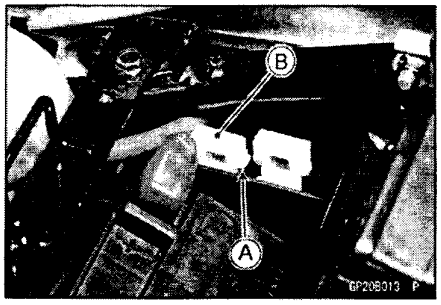
30 A Main Fuse Removal

- Remove:
  Left Side Cover (see Frame chapter)
  Starter Relay and 30 A Main Fuse Connector [A]
- Pull out the main fuse [B] from the starter relay with needle nose pliers.



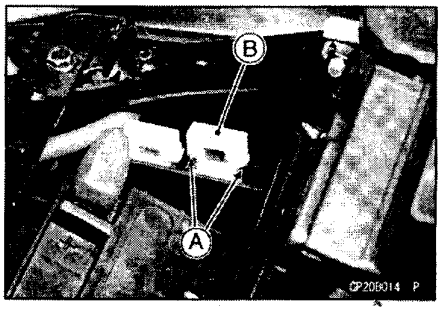
10 A Headlight Fuse Removal

- Remove:
  Seat (see Frame chapter)
  Tool Case (see Battery Removal)
- Unlock the hook [A] to pull the lid [B].
- Pull out the headlight fuse from the fuse box.



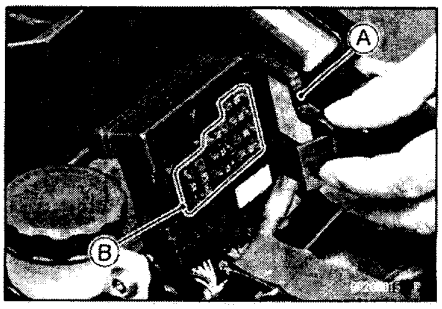
10 A Accessories Fuse Removal

- Remove:
  Seat (see Frame chapter)
  Tool Case (see Battery Removal)
- Unlock the hooks [A] to lift up the lid [B].
- Pull out the accessories fuse from the fuse box.



Junction Box Fuse Removal

- Remove the seat (see Frame chapter).
- Unlock the hook to remove the lid [A].
- Pull the fuses [B] straight out of the junction box with needle nose pliers.



Fuse Installation

- If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.
- Install the junction box fuses on the original position as specified on the lid.

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Fuse

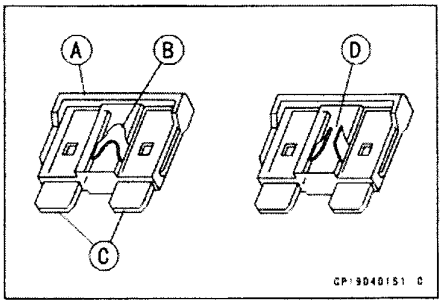
Fuse Inspection

● Remove the fuse (see Fuse Removal).

● Inspect the fuse element.

★If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

Housing [A]
Fuse Element [B]
Terminals [C]
Blown Element [D]



NOTE

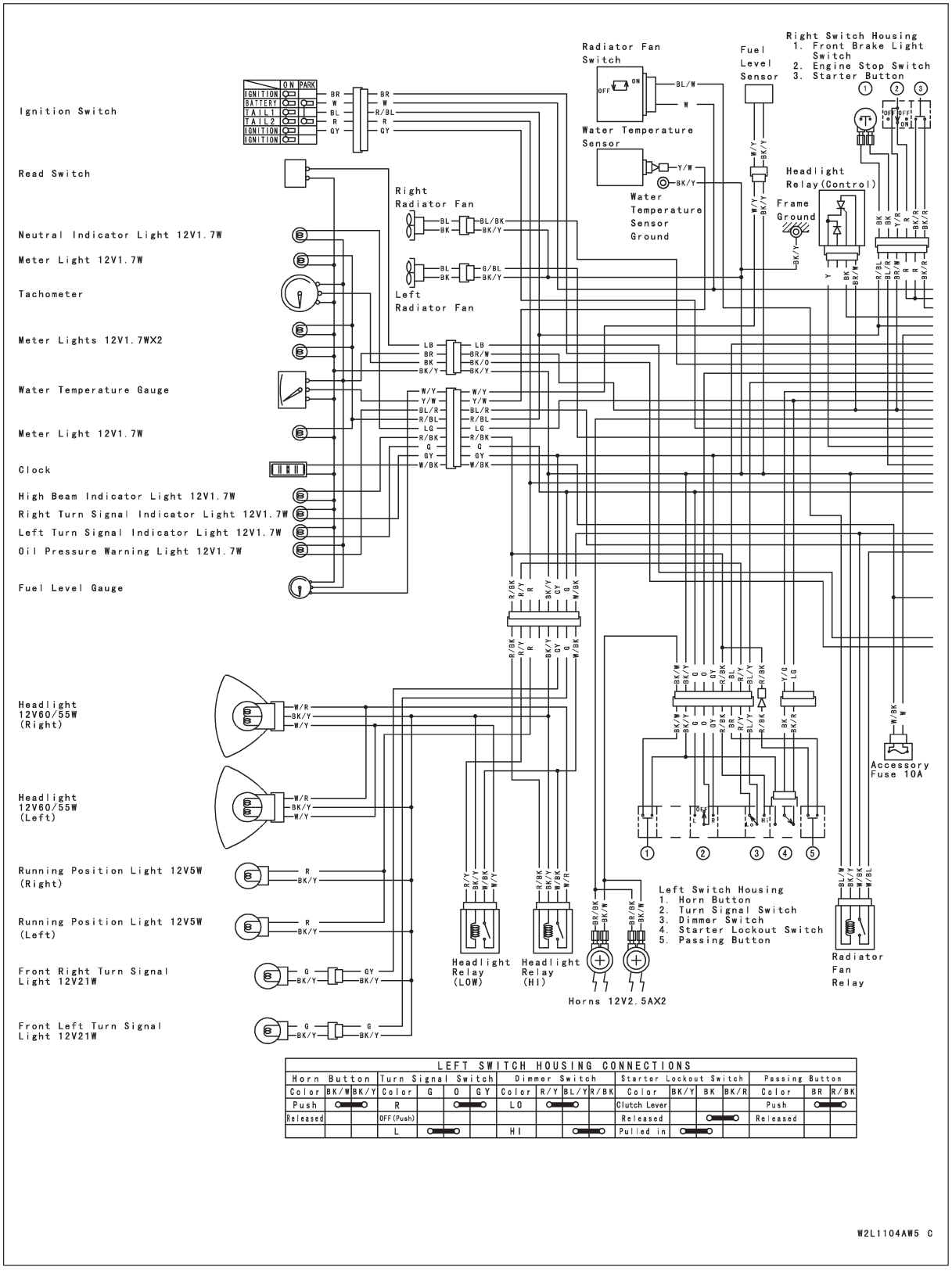
○*A mass current flows to the battery according to the state of the battery which needs refreshing charge when the engine is turned causing main fuse blown out.*

CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

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ZX-1200-C1 Schaltplan (Australien)

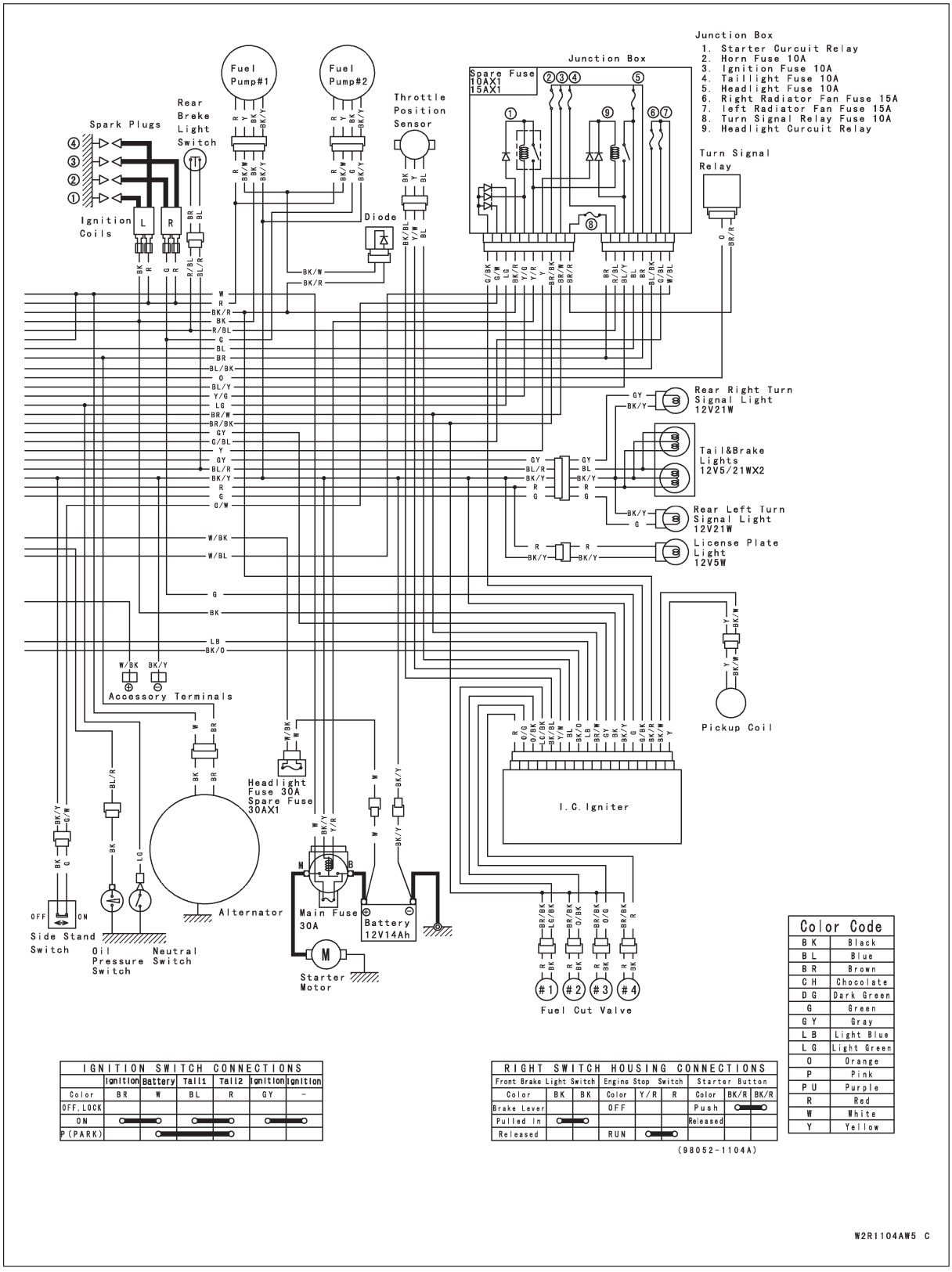


LEFT SWITCH HOUSING CONNECTIONS

Horn Button			Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button		
Color	BK/W	BK/Y	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	BR	R/BK
Push	○	●	R		●	○	LO		●		Clutch Lever				Push	●	●
Released			OFF(Push)								Released		●	○	Released		
			L	●	○		HI		●		Pulled in	●	○				

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ZX-1200-C1 Schaltplan (Australien)



IGNITION SWITCH CONNECTIONS						
	Ignition	Battery	Tail1	Tail2	Ignition	Ignition
Color	BR	W	BL	R	GY	–
OFF, LOCK						
ON	●		●		●	
P (PARK)		●		●		

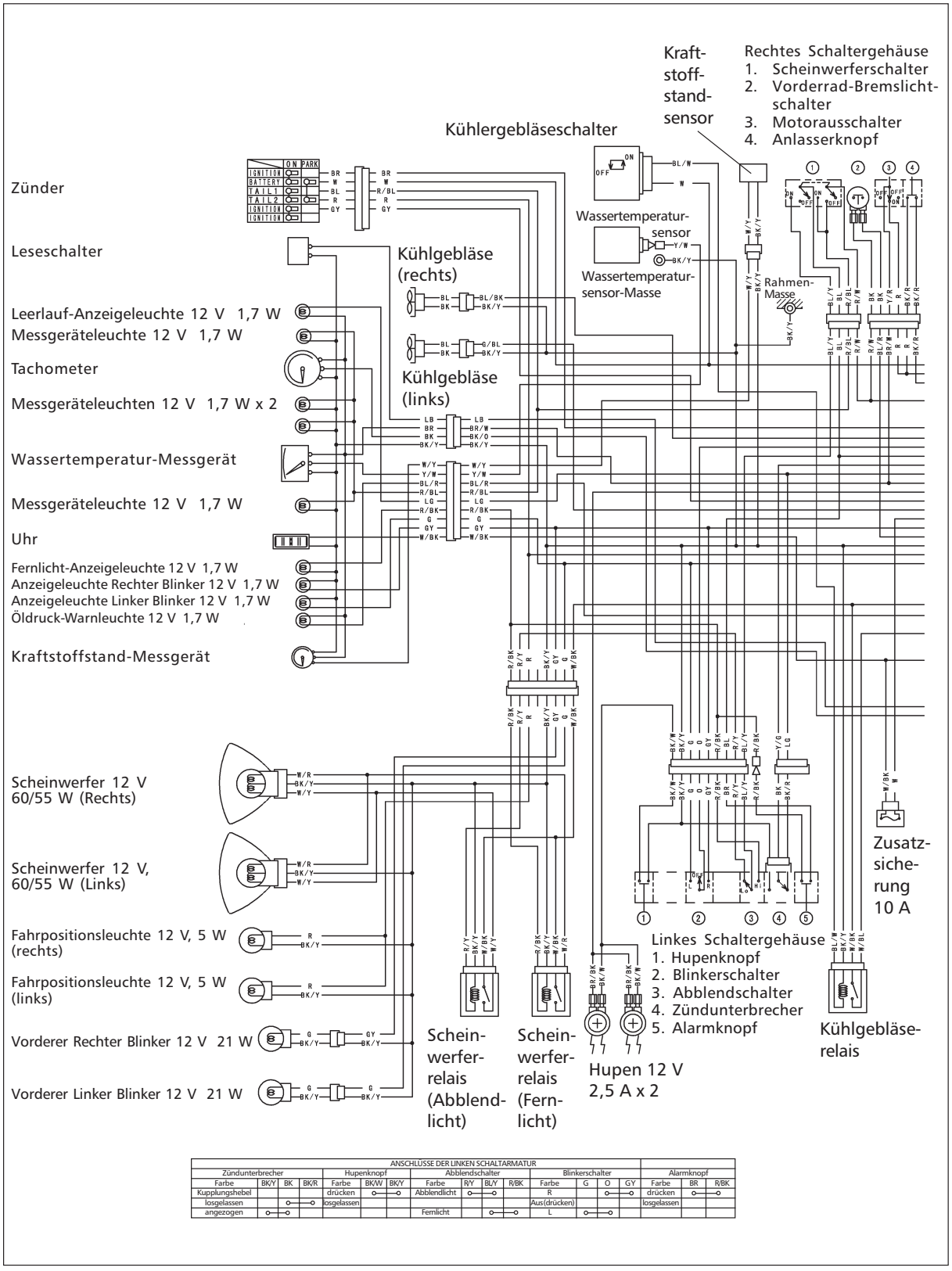
RIGHT SWITCH HOUSING CONNECTIONS								
Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	BK/R	BK/R
Brake Lever			OFF			Push	●	
Pulled In	●					Released		
Released			RUN	●				

(98052-1104A)

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

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ZX-1200-C1 Schaltplan (Alle Modelle außer Australien, Kanada, Malaysia und USA)

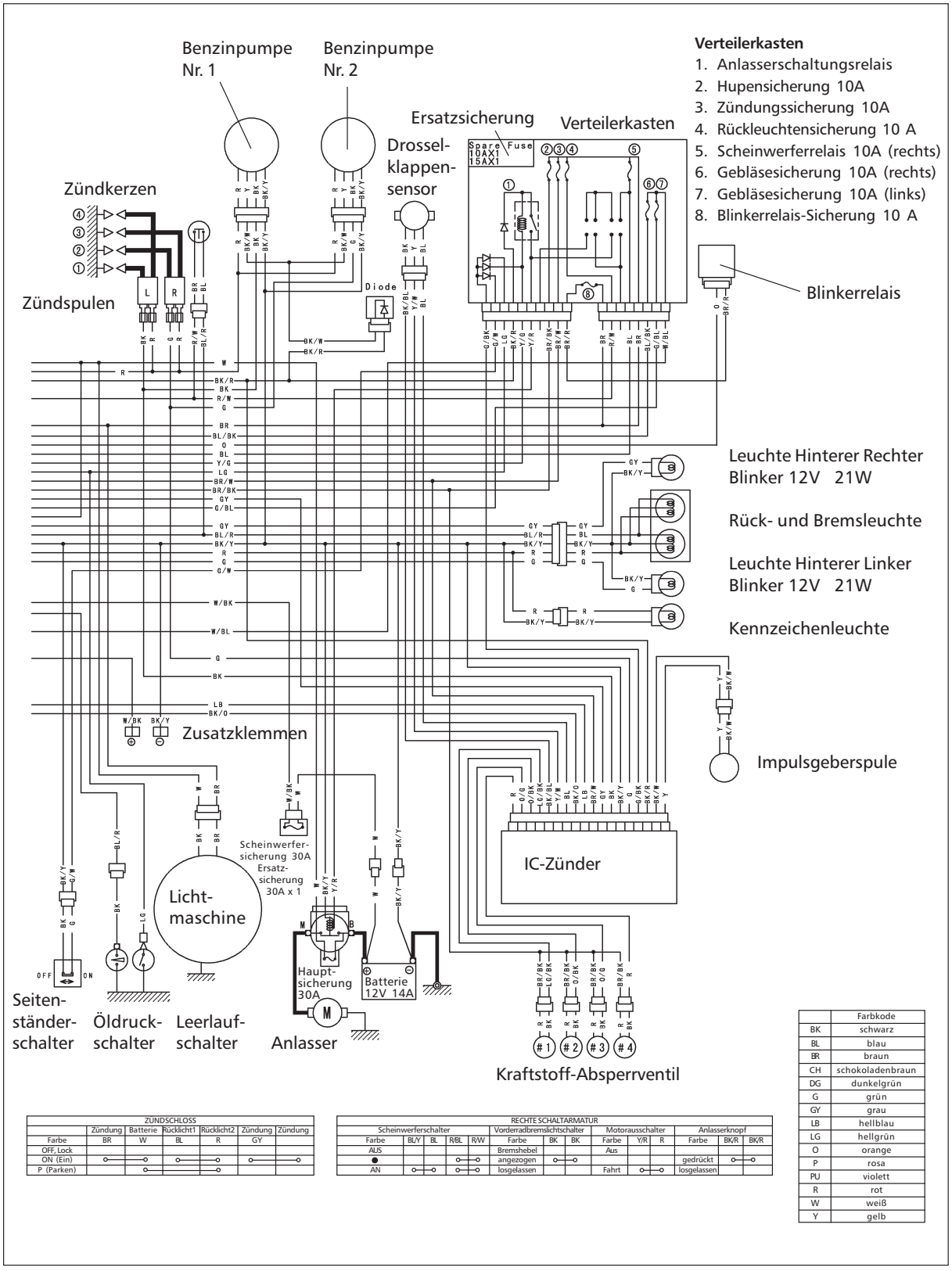


ANSCHLÜSSE DER LINKEN SCHALTARMATUR

Zündunterbrecher				Hupenknopf			Abblendschalter				Blinkerschalter				Alarmknopf		
Farbe	BK/Y	BK	BK/R	Farbe	BK/W	BK/Y	Farbe	R/Y	BL/Y	R/BK	Farbe	G	O	GY	Farbe	BR	R/BK
Kupplungshebel				drücken	o	o	Abblendlicht	o	o		R		o	o	drücken	o	o
losgelassen		o	o	losgelassen							Aus(drücken)				losgelassen		
angezogen	o	o					Fernlicht		o	o	L	o	o				

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ZX-1200-C1 Schaltplan (Alle Modelle außer Australien, Kanada, Malaysia und USA)



ZÜNDSCHLOSS						
	Zündung	Batterie	Rücklicht1	Rücklicht2	Zündung	Zündung
Farbe	BR	W	BL	R	GY	
OFF, Lock						
ON (Ein)	o	o	o	o	o	o
P (Parken)		o	o	o		

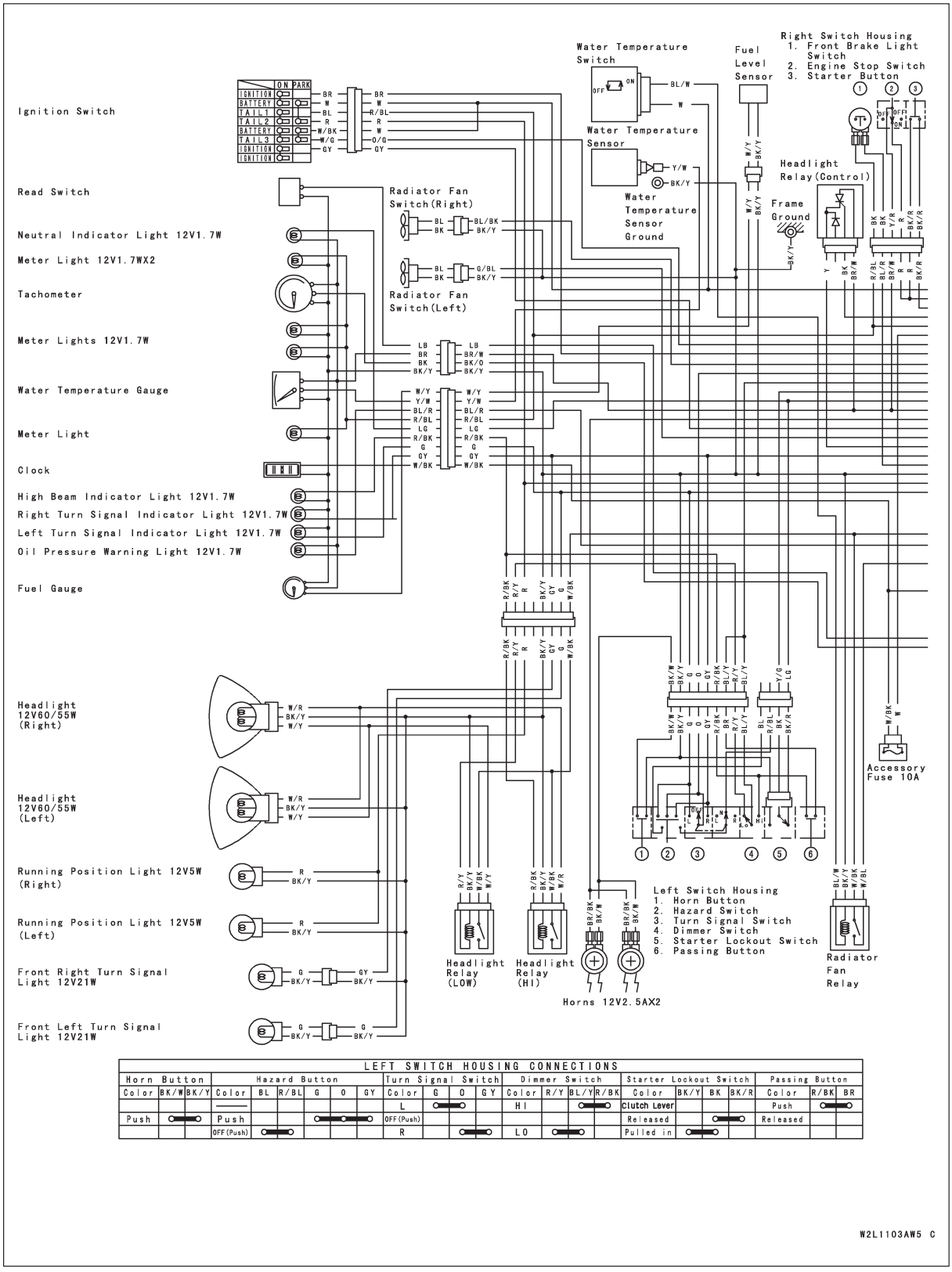
RECHTE SCHALTARMATUR												
Scheinwerferschalter					Vorderradbremslichtschalter			Motorausschalter			Anlasserknopf		
Farbe	BL/Y	BL	R/BL	R/W	Farbe	BK	BK	Farbe	Y/R	R	Farbe	BK/R	BK/R
AUS					Bremshebel			Aus					
●			o	o	angezogen	o	o				gedrückt	o	o
AN	o	o	o		losgelassen			Fahrt	o	o	losgelassen		

	Farbkode
BK	schwarz
BL	blau
BR	braun
CH	schokoladenbraun
DG	dunkelgrün
G	grün
GY	grau
LB	hellblau
LG	hellgrün
O	orange
P	rosa
PU	violett
R	rot
W	weiß
Y	gelb

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ZX-1200-C1 Schaltplan (Malaysia)

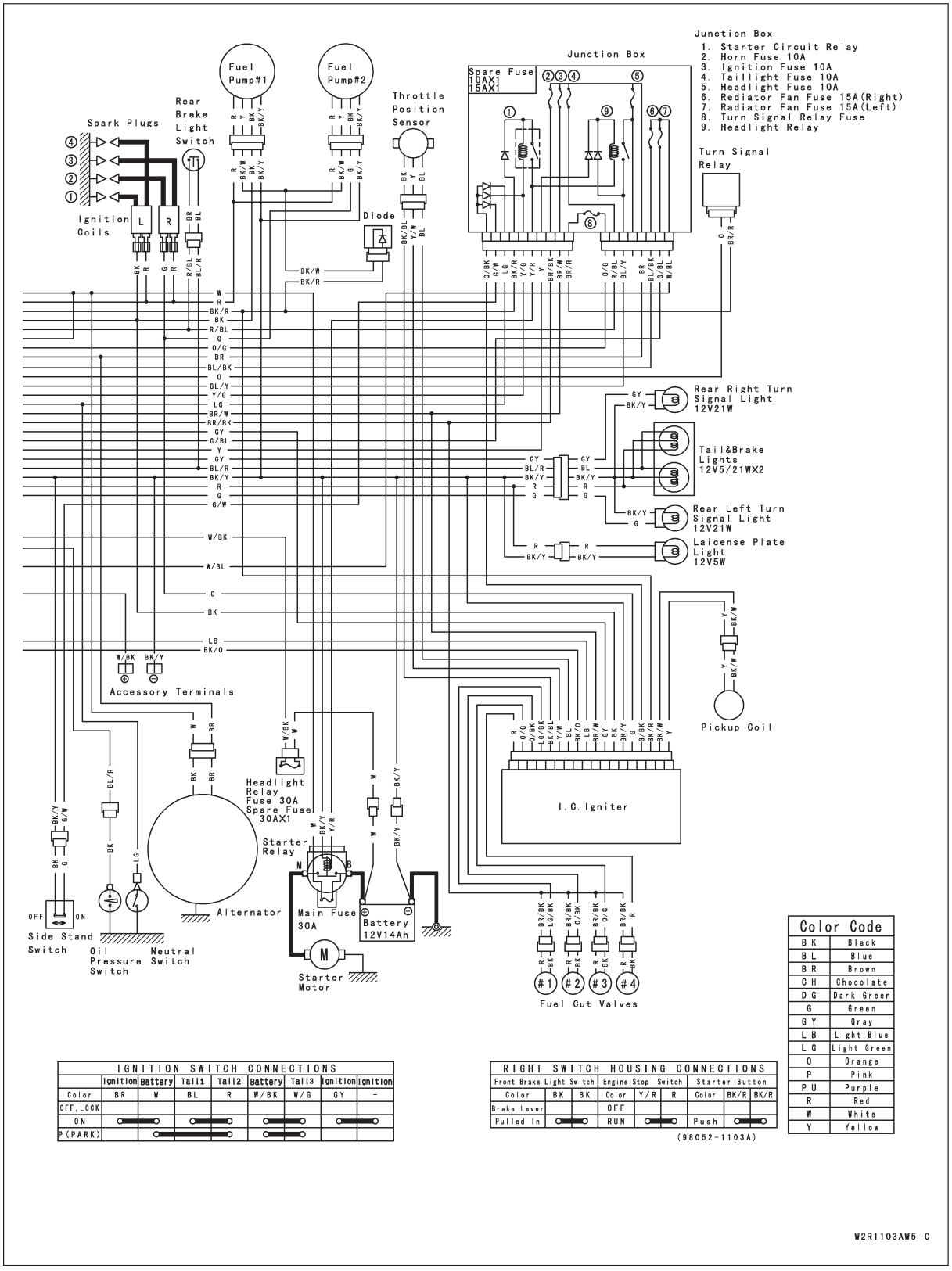


LEFT SWITCH HOUSING CONNECTIONS

Horn Button			Hazard Button						Turn Signal Switch				Dimmer Switch				Starter Lockout Switch				Passing Button		
Color	BK/W	BK/Y	Color	BL	R/BL	G	O	GY	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R	Color	R/BK	BR
			—						L				HI				Clutch Lever				Push		
Push			Push						OFF(Push)								Released				Released		
			OFF(Push)						R				LO				Pulled in						

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ZX-1200-C1 Schaltplan (Malaysia)



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

IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Tail1	Tail2	Battery	Tail3	Ignition	Ignition
Color	BR	W	BL	R	W/BK	W/G	GY	-
OFF, LOCK								
ON	●		●		●		●	
P (PARK)		●		●	●			

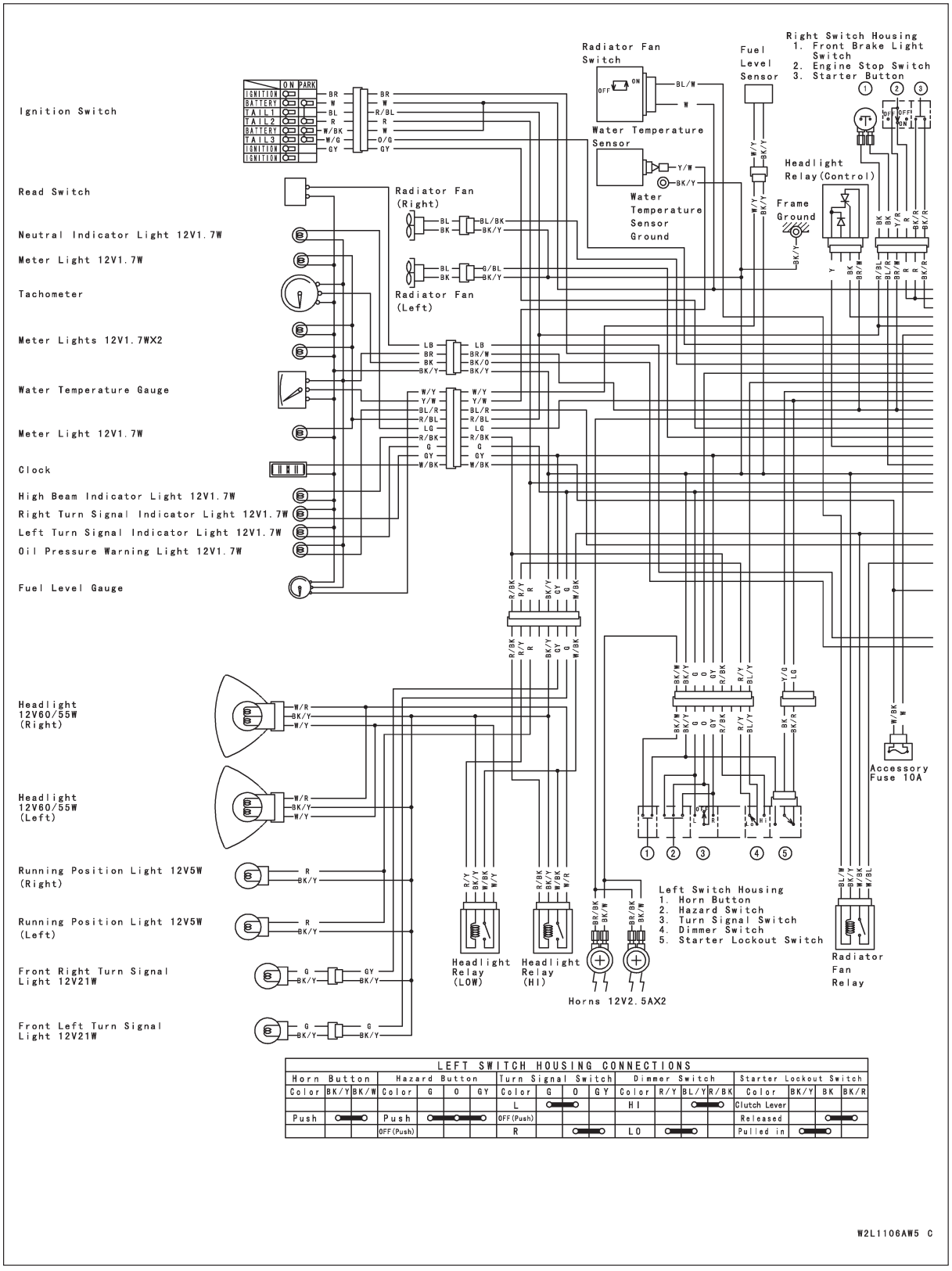
RIGHT SWITCH HOUSING CONNECTIONS

Front Brake Light Switch		Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	BK/R	BK/R
Brake Lever			OFF					
Pulled In	●		RUN	●		Push	●	

(98052-1103A)

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ZX-1200-C1 Schaltplan (USA und Kanada)

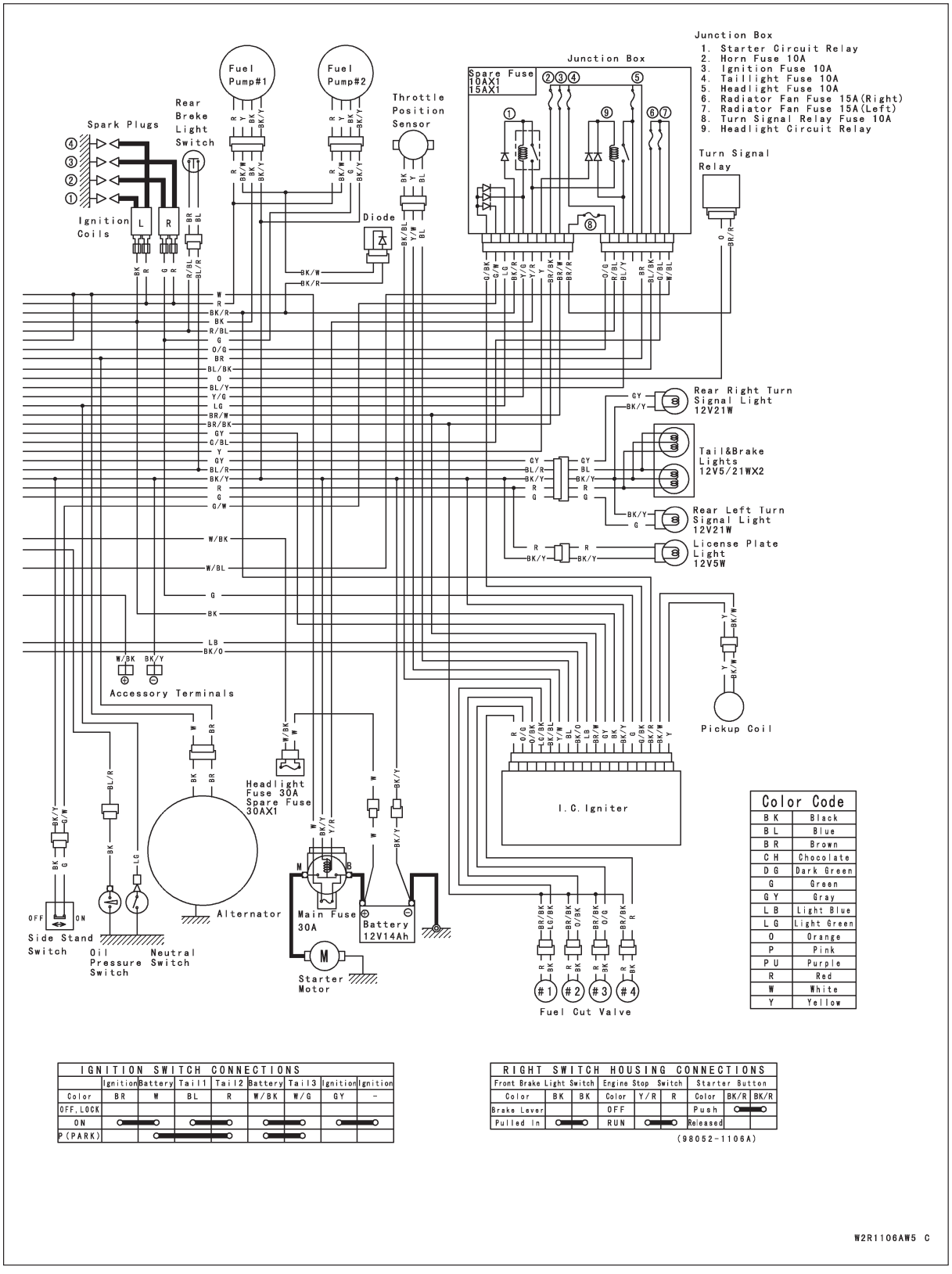


LEFT SWITCH HOUSING CONNECTIONS

Horn Button			Hazard Button				Turn Signal Switch				Dimmer Switch				Starter Lockout Switch			
Color	BK/Y	BK/W	Color	G	O	GY	Color	G	O	GY	Color	R/Y	BL/Y	R/BK	Color	BK/Y	BK	BK/R
							L	●		●	HI		●		Clutch Lever			
Push	●		Push	●	●	●	OFF(Push)								Released		●	
			OFF(Push)				R		●	●	LO	●			Pulled in	●		

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ZX-1200-C1 Schaltplan (USA und Kanada)



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

IGNITION SWITCH CONNECTIONS

	Ignition	Battery	Tail1	Tail2	Battery	Tail3	Ignition	Ignition
Color	BR	W	BL	R	W/BK	W/G	GY	-
OFF, LOCK								
ON	●		●		●		●	
P(PARK)		●	●		●			

RIGHT SWITCH HOUSING CONNECTIONS

Front Brake Light Switch			Engine Stop Switch			Starter Button		
Color	BK	BK	Color	Y/R	R	Color	BK/R	BK/R
Brake Lever			OFF			Push	●	
Pulled In	●		RUN	●		Released		

(98052-1106A)

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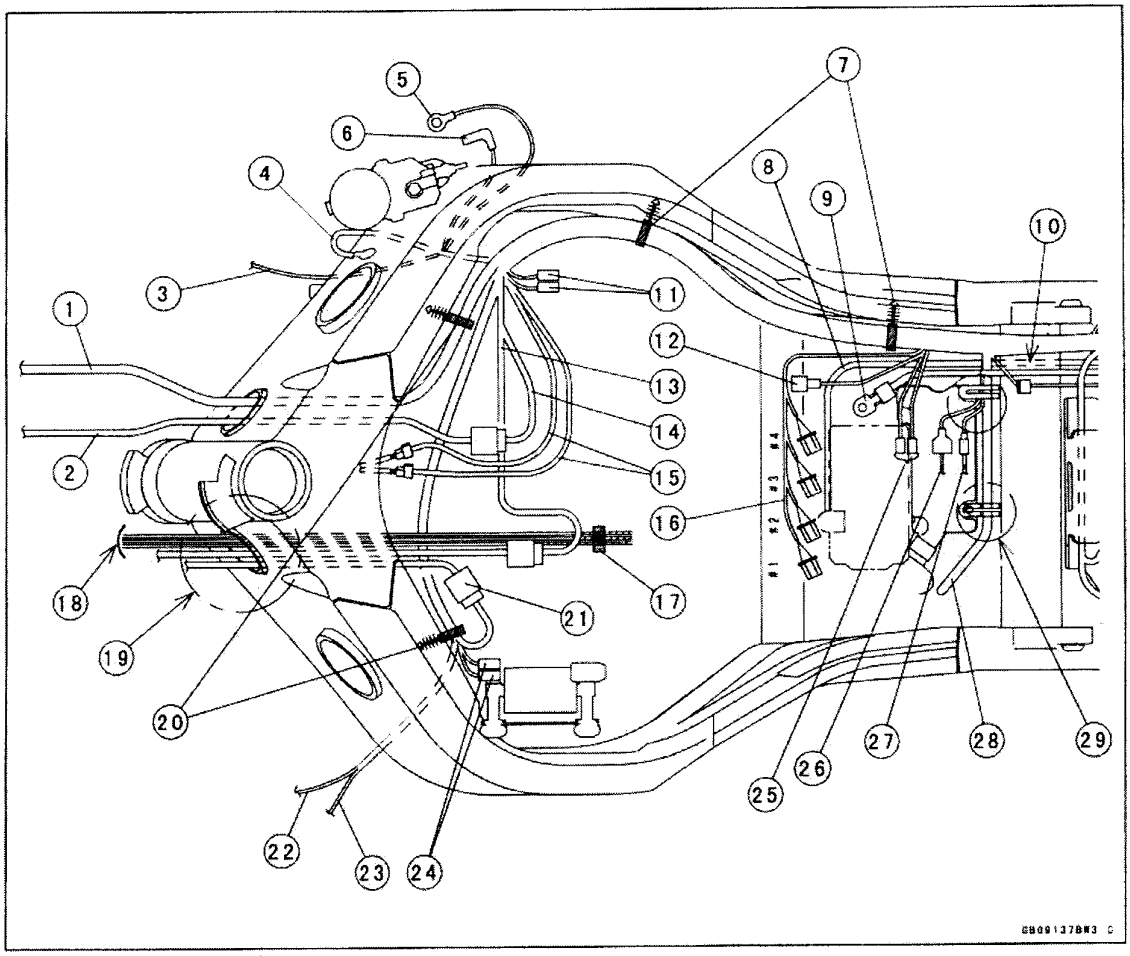
Appendix

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Cable, Wire, and Hose Routing 17-2
Troubleshooting Guide 17-38

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Cable, Wire, and Hose Routing



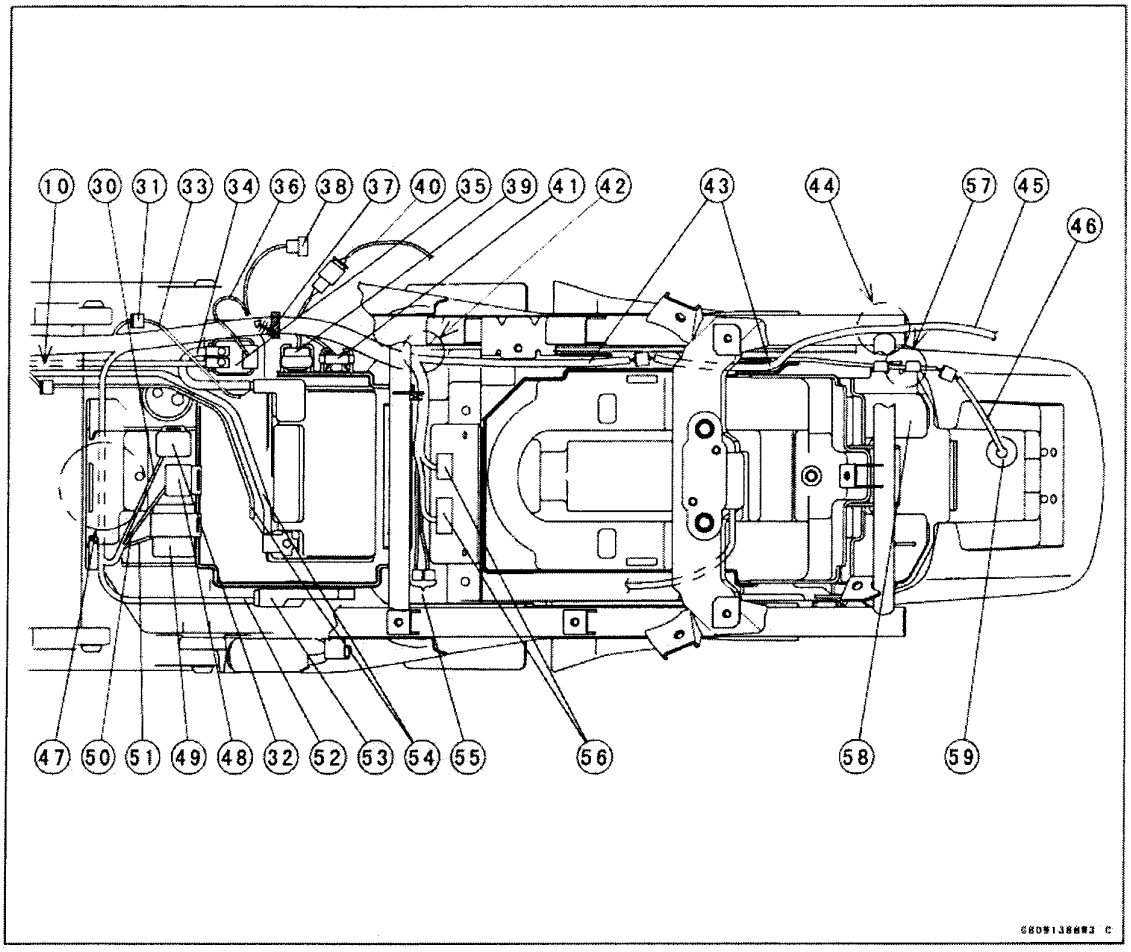
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Cable, Wire, and Hose Routing

1. Main Harness (To the Meter and headlight)
2. Ignition Switch Lead
3. Horn Lead
4. Frame Ground
5. Water Temperature Sensor Ground
6. Water Temperature Sensor Lead
7. Insert the location clamps into the frame (The clamps attached on the main harness).
8. Starter Motor Cable
9. Ground Cable
10. Run the starter motor cable under the cross frame.
11. Ignition Coil Connectors
12. Throttle Position Sensor Connector
13. Ignition Switch Lead
14. Right Switch Housing Lead
15. Radiator Fan Leads
16. Fuel Cut Valve Lead
17. Clamp (Throttle Cables and Choke Cable)
18. Throttle Cables and Choke Cable
19. Run the cables under the Leads.
20. Insert the location clamps into the frame (The clamps attached on the main harness).
21. Left Switch Housing Connector
22. Horn Lead
23. Radiator Fan Switch Lead
24. Ignition Coil Leads
25. Fuel Pump Connectors
26. Alternator Lead
27. Pickup Coil Lead
28. Oil Pressure Switch, Neutral Switch and Side Stand Switch Leads
29. Hold the Leads with the clamp (The clamps attached on the engine).

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Cable, Wire, and Hose Routing



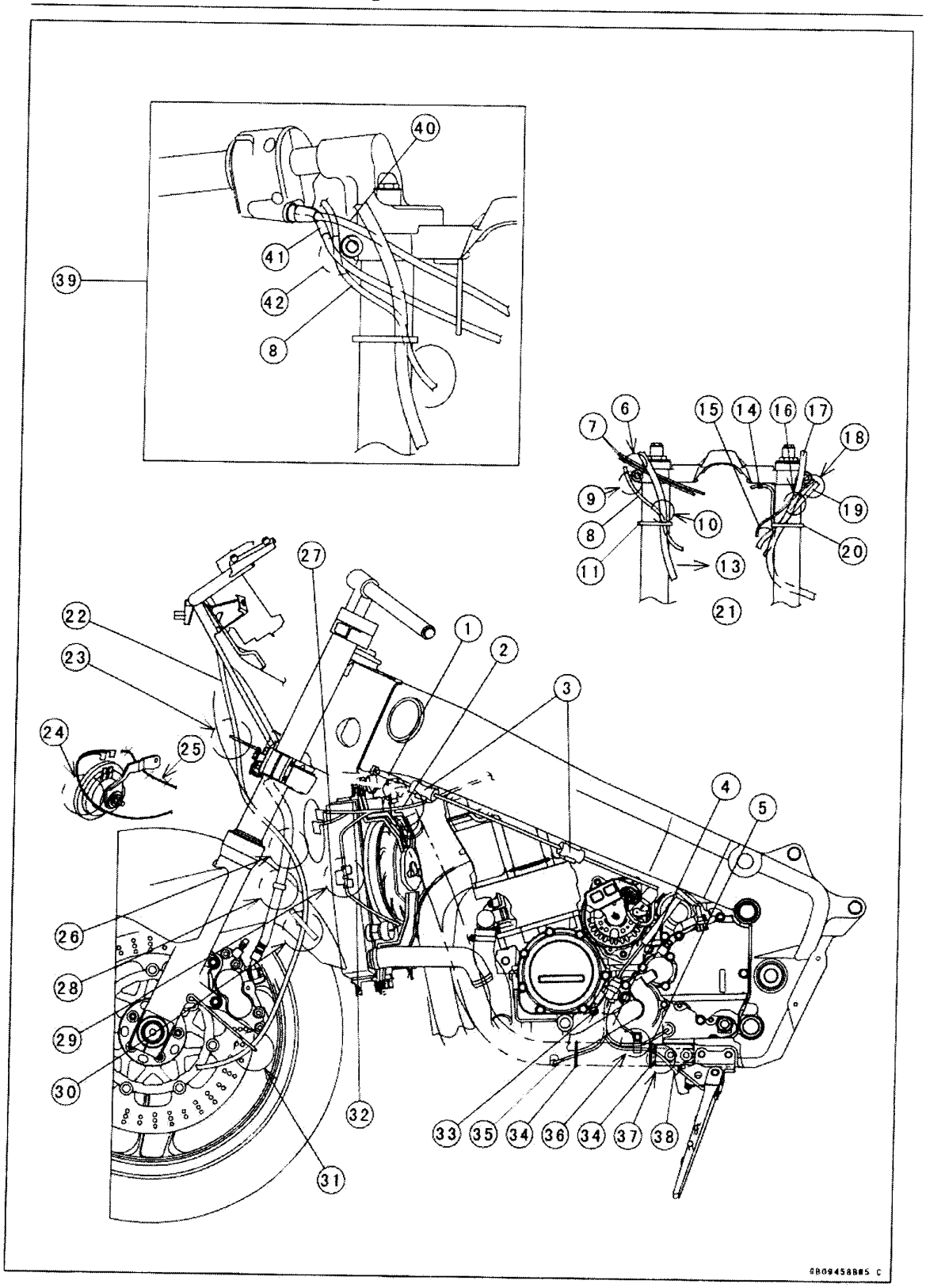
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Cable, Wire, and Hose Routing

10. Run the starter motor cable under-the cross frame.
30. Turn Signal Relay Lead
31. Located the battery lead connector front and under of the I.C. igniter lead after connecting the connector.
32. Turn Signal Relay
33. Battery Positive Lead
34. Battery Positive Cable
35. Starter Relay and Main Fuse 30 A
36. Starter Relay Lead
37. Insert the location clamp to the rear fender front (The clamp attached on the main harness).
38. Fuel Sensor Lead Connector
39. Headlight Fuse 30 A
40. Rear Brake Light Switch Lead
41. Accessory Fuse 10 A
42. Run the main harness inside the rear brake reservoir.
43. Runt the harnesses into the grooves on the rear fender rear.
44. Run the tail & brake lights lead outside of the cross pipe.
45. Tail & Brake Light Lead
46. License Plate Light Lead
47. Clamp the I.C. igniter lead with the flap of the rear fender front.
48. Radiator Fan Relay
49. Headlight Relay (control)
50. Radiator Fan Relay Lead
51. Headlight Relay Lead
52. I.C. Igniter Lead
53. I.C. Igniter
54. Battery negative Lead and Cable
55. Accessory Lead Connectors
56. Junction Box Connectors
57. Run the lead into the holders of the rear partition plate.
58. Rear Partition Plate
59. Rubber Grommet

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Cable, Wire, and Hose Routing



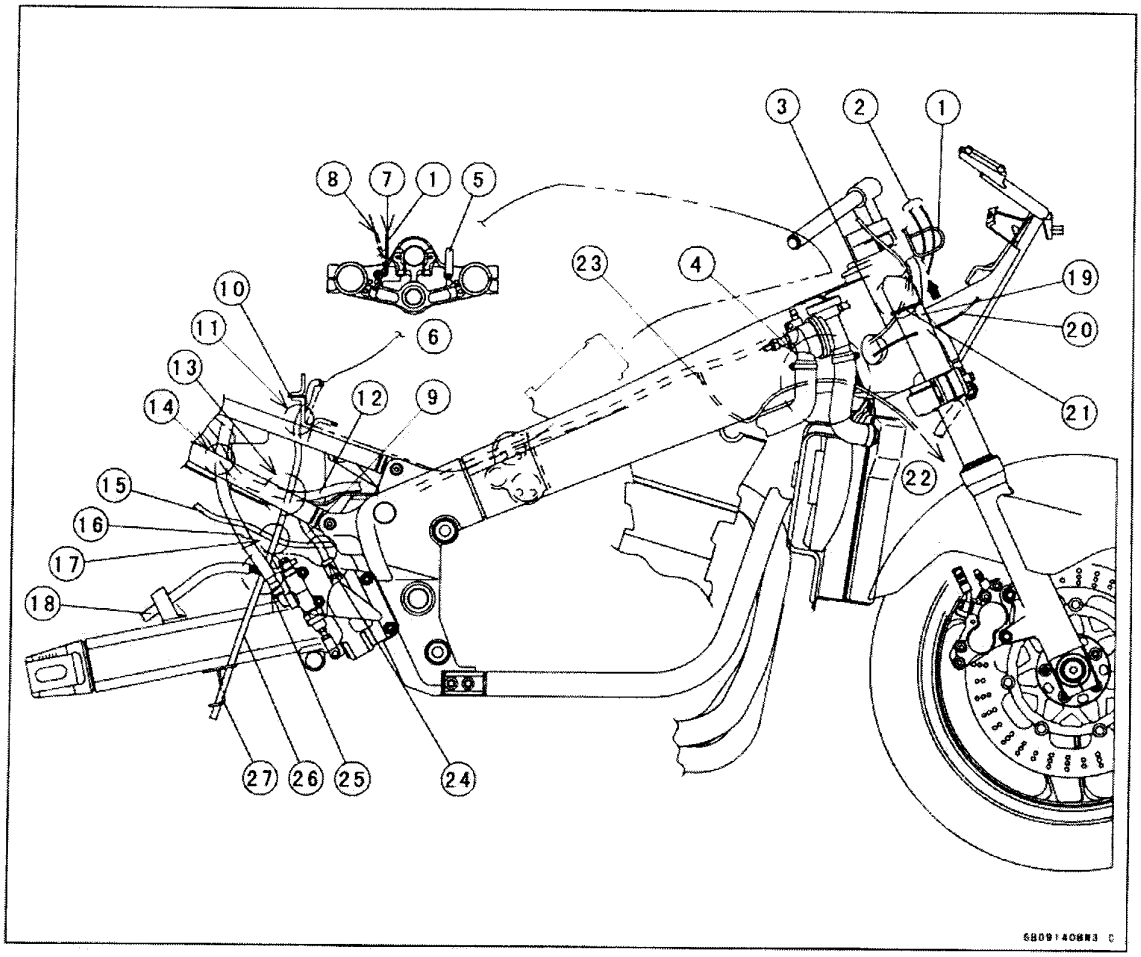
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Cable, Wire, and Hose Routing

1. Clutch Pipe
2. Run the lead outside the down tube.
3. Hold the clutch pipe.
4. Water Pipe
5. Neutral Switch Lead
6. Run the throttle cables over the bolt portion.
7. Throttle Cables
8. Right Switch Housing Lead
9. Run the right switch housing lead under the bolt portion.
10. Run the front brake hose over the right switch housing lead.
11. Band (The cut end of the band direction center of the motorcycle.)
12. Front Brake Hose
13. Draw up the center of the motorcycle.
14. Clamp (Hold the ignition switch lead.)
15. Choke Cable
16. Run the clutch hose over the choke cable and left switch housing lead.
17. Clutch Hose
18. Run the choke cable and left switch housing lead under the bolt portion.
19. Left Switch Housing Lead
20. Band (The cut end of the band direction center of the motorcycle and do not hold the choke cable.)
21. Viewed Front
22. Speedometer Cable
23. Run the speedometer cable through the clamp.
24. Run the horn lead outside of the horn (same the left and right horn).
25. N.G. Routing
26. Run the speedometer cable outside the front brake hose.
27. Horn Leads
28. Run the front brake hose through the clamp.
29. Hold the radiator fan switch lead with the clamp on the radiator.
30. Run the speedometer cable through the clamp.
31. Run the speedometer cable through the clamp.
32. Radiator Fan Switch Lead
33. Run the oil pressure switch lead front the water pipe.
34. Band
35. Oil Pressure Switch Lead
36. Hold the side stand switch lead and neutral switch lead with the clamp on the engine (Bend the clamp inside).
37. Run the side stand lead outside the down tube.
38. Side Stand Switch Lead
39. ZX1200-C3 ~
40. Run the throttle cable (accelerator) over the bolt portion.
41. Run the throttle cable (decelerator) under the throttle cable (accelerator).
42. Run the throttle cable (decelerator) and right switch housing lead under the bolt portion.

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Cable, Wire, and Hose Routing



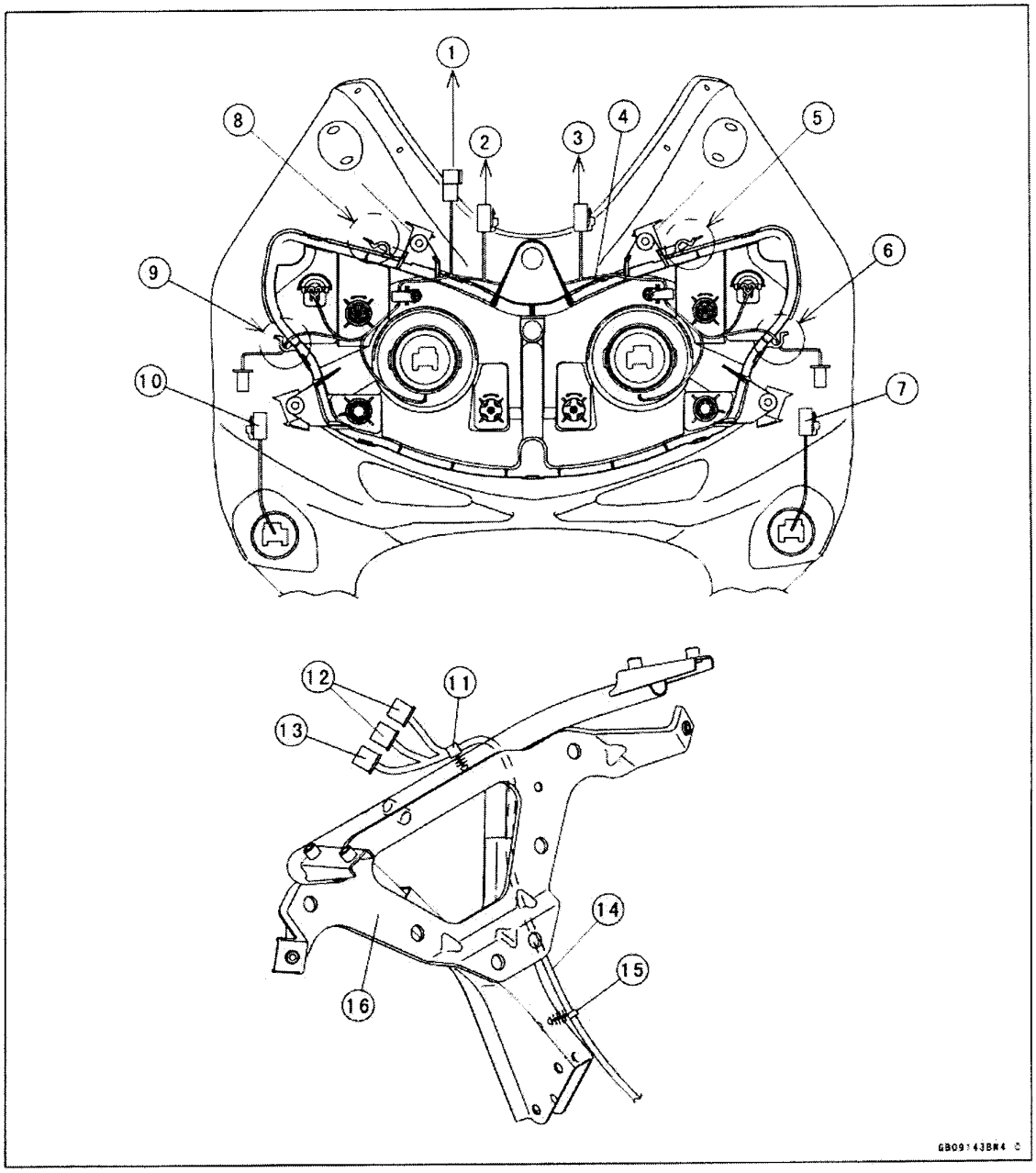
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Cable, Wire, and Hose Routing

1. Throttle Cable Clamp
2. Throttle Cables
3. Right Switch Housing Lead
4. Run the horn lead inside the water hose.
5. Ignition Switch lead Clamp
6. Viewed Arrow
7. Regular Position
8. N.G. Position
9. Rear Brake Light Switch
10. Fuel Tank Bracket
11. Run the drain tube between the fuel tank and tank bracket.
12. Main Harness
13. Run the drain tube outside the main harness.
14. Run the main harness inside the rear brake reservoir hose.
15. Rear Shock Absorber Spring Preload Adjuster Hose
16. Rear Brake Reservoir Hose
17. Run the drain hose outside the adjuster hose.
18. Rear Brake Hose
19. Front Brake Hose
20. Headlight & Meter Lead (Main Harness Side)
21. Band
22. To the horn.
23. Horn Lead
24. Run the rear brake light switch lead outside the adjuster hose.
25. Run the drain hose inside the rear brake hose.
26. Drain Tube
27. Clamp (Drain Tube)

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Cable, Wire, and Hose Routing



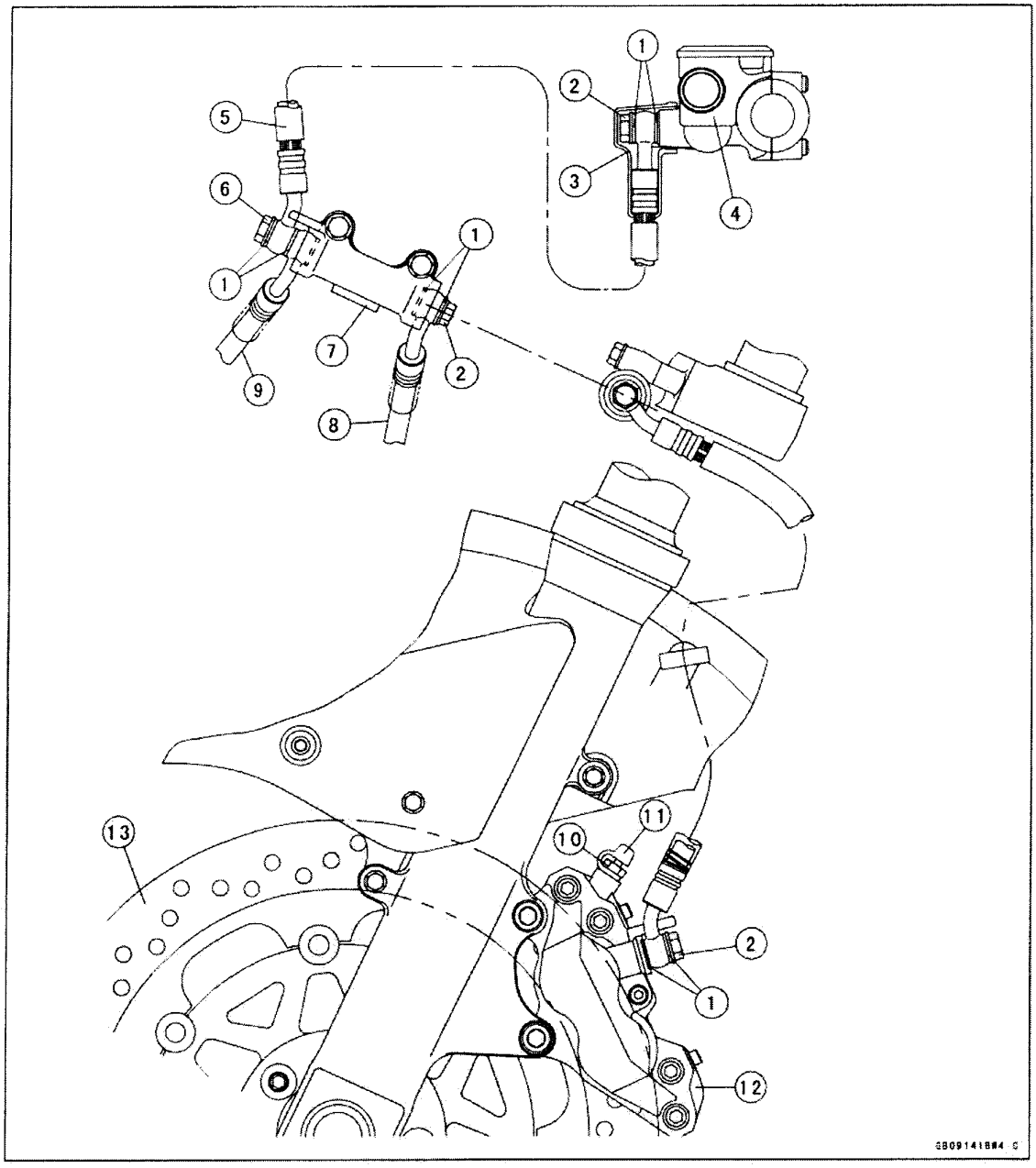
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Cable, Wire, and Hose Routing

1. To the main harness connector.
2. To the Headlight Relay.
3. To the Headlight Relay.
4. Front Sub Harness
5. Unused Clamp
6. Run the front right turn signal light lead through the attached clamp.
7. Front Right Turn Signal Light Connector
8. Unused Clamp
9. Run the front left turn signal light lead through the attached clamp.
10. Front Left Turn Signal Light Connector
11. Inserted the location clamp on the fairing bracket (The attached clamp on the main harness).
12. Meter Connector (Main Harness Side)
13. Front Sub Harness Connector (Main Harness Side)
14. Main Harness
15. Inserted the location clamp on the fairing bracket (The attached clamp on the main harness).
16. Fairing Bracket

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Cable, Wire, and Hose Routing



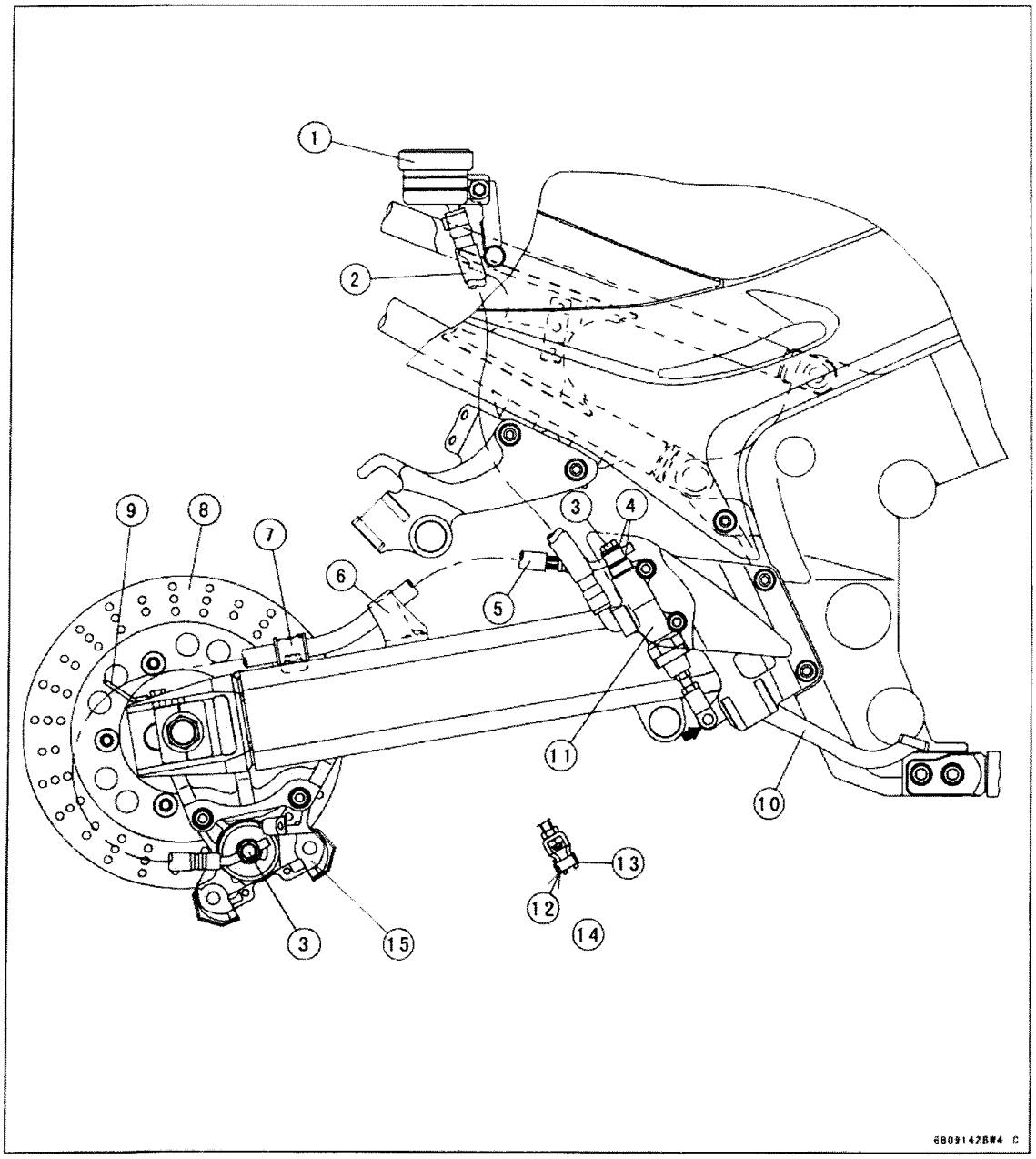
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Cable, Wire, and Hose Routing

1. Washers
2. Banjo Bolts
3. Rubber Cap (ZX1200-C1 ~ C2)
4. Front Brake Master Cylinder
5. Upper Front Brake Hose
6. Banjo Bolt
7. Joint
8. Left Lower Front Brake Hose
9. Right Lower Front Brake Hose
10. Bleed Valve
11. Bleed Valve Cap
12. Caliper
13. Front Brake Disc

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Cable, Wire, and Hose Routing



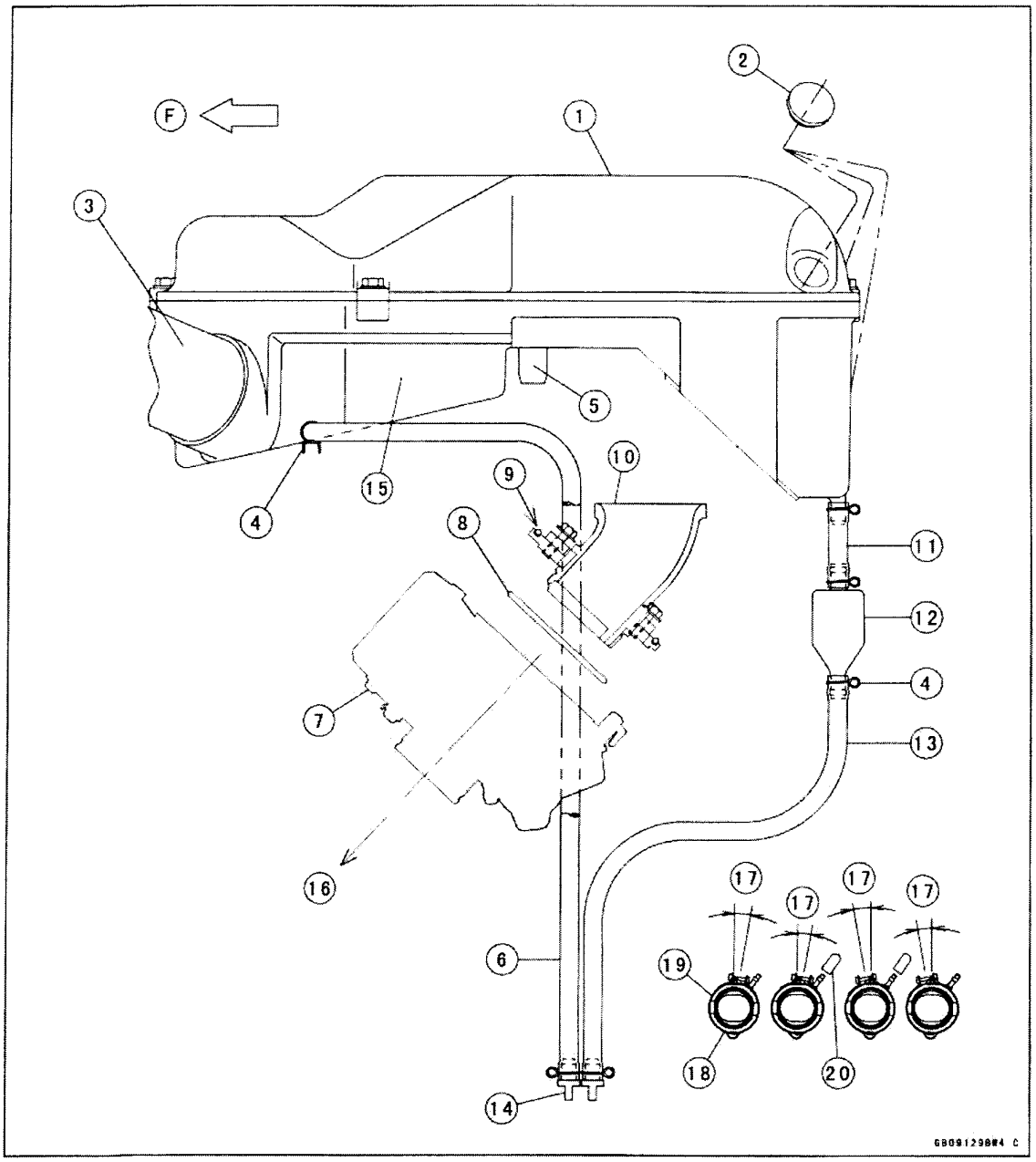
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Cable, Wire, and Hose Routing

1. Rear Brake Reservoir
2. Rear Brake Reservoir Hose
3. Banjo Bolts
4. Washers
5. Rear Brake Hose
6. Clamp
7. Clamp
8. Rear Brake Disc
9. Clamp
10. Rear Brake Pedal
11. Rear Brake Master Cylinder
12. Cotter Pin (Bent the ends of the cotter pin)
13. Pin
14. Viewed Arrow
15. Rear Brake Caliper

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Cable, Wire, and Hose Routing



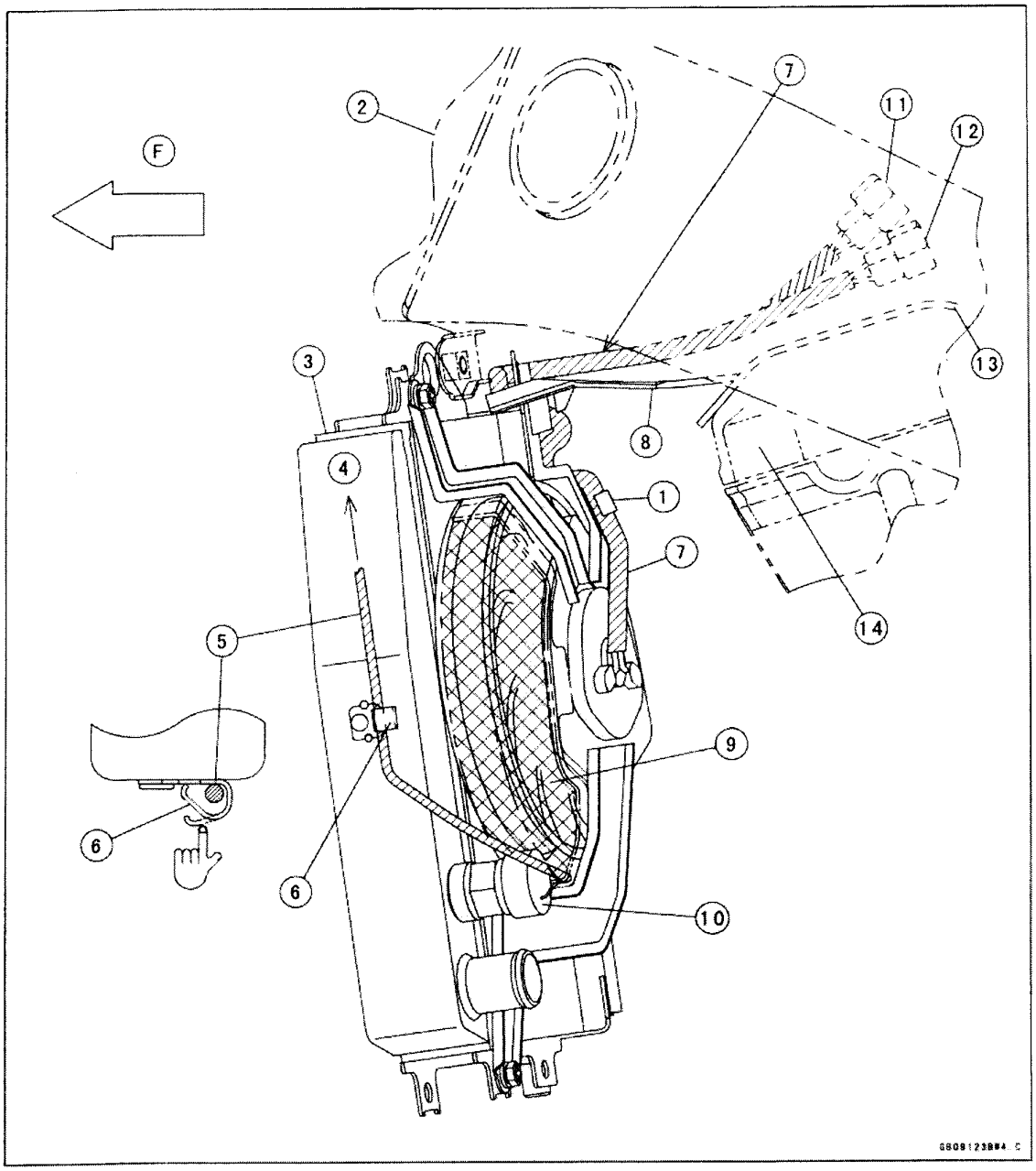
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Cable, Wire, and Hose Routing

F: Front
1. Air Cleaner Housing
2. Three Rubber Plugs
3. Rubber Air Ducts
4. Clips
5. Fitting
6. Drain Hoses of the inlet [15]
7. Carburetor Assembly
8. O-rings
9. Air Cleaner Holder Assembly
10. Air Filter Ducts
11. Breather Drain Hose
12. Breather Catch Tank
13. Breather Catch Tank Drain Hose
14. Drain Plugs
15. Air Cleaner Housing Inlet
16. Cylinder Head
17. 5 ~ 10°
18. Carburetor Holders
19. Holder Clamps
20. Rubber Plugs (other than California)

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Cable, Wire, and Hose Routing



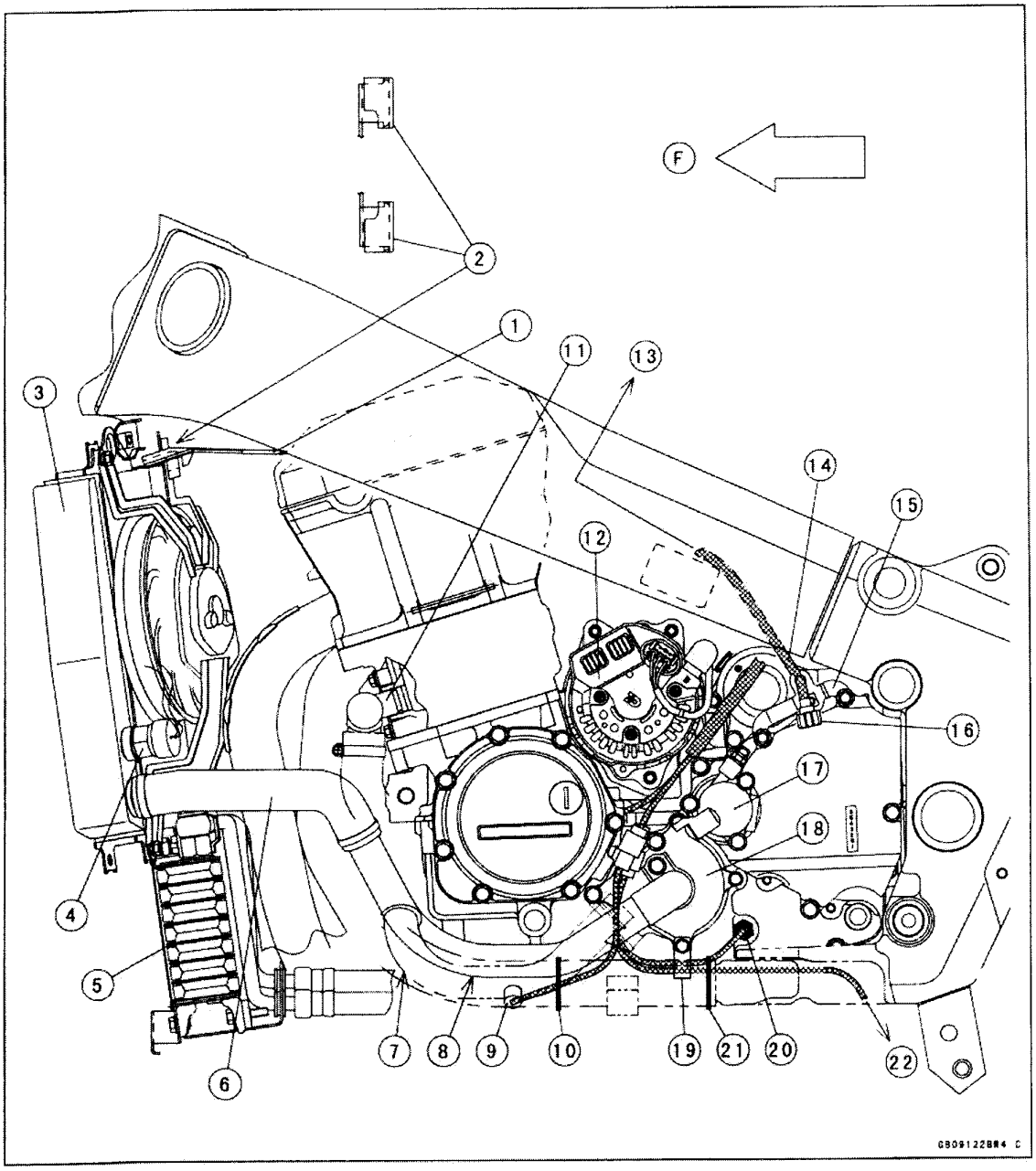
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Cable, Wire, and Hose Routing

F: Front
1. Clamp
2. Frame
3. Radiator
4. To the main harness under the air cleaner housing.
5. Radiator Fan Switch Leads
6. Clamp: Hold the lead with the clamp and press the clamp with your finger so the lead doesn't get pinched.
7. Radiator Fan Leads: Between the baffle [8] and the frame [2] to the main harness under the air cleaner housing.
8. Heat Baffle
9. Right and Left Radiator Fans
10. Radiator Fan Switch
11. Right Radiator Fan Lead Connector
12. Left Radiator Fan Lead Connector
13. Rubber Cover
14. Cylinder Head Cover

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Cable, Wire, and Hose Routing



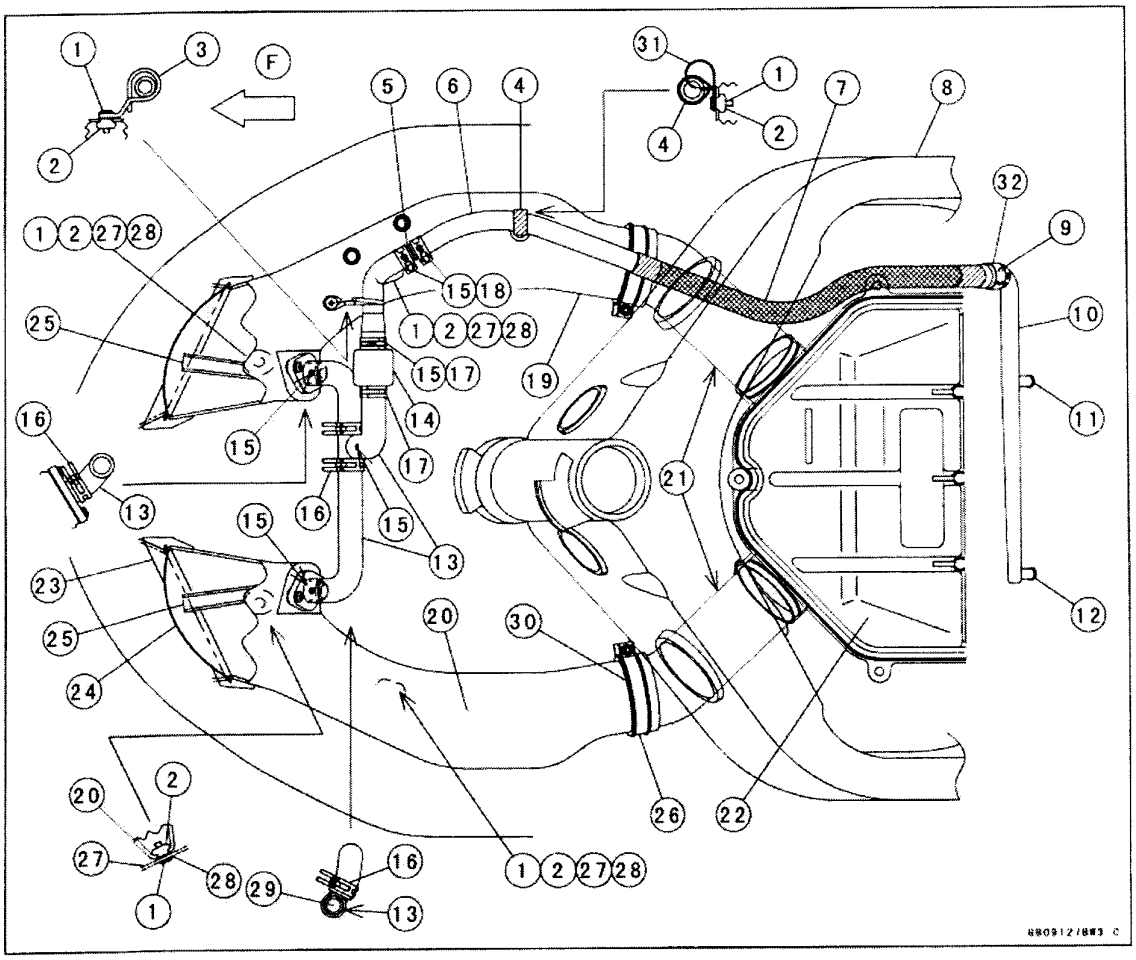
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Cable, Wire, and Hose Routing

F: Front
1. Heat Baffle
2. Dampers for the baffle [1]: They are inserted onto the hooks of the radiator.
3. Radiator
4. Radiator Fan Switch
5. Oil Cooler
6. Radiator Outlet Hose
7. Pump Outlet Pipe
8. Pump Inlet Pipe
9. Oil Pressure Switch
10. Strap (lead of the switch [9])
11. Cylinder Water Pipe
12. Alternator
13. Carburetor Link Lever
14. Idle Adjuster Cable: over the cross pipe–front of the breather drain hose–holder [15]
15. Holder
16. Idle Adjusting Screw
17. Clutch Slave Cylinder
18. Water Pump
19. Clamp: Bend it inside.
20. Neutral Switch
21. Strap
22. Sidestand Switch

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Cable, Wire, and Hose Routing



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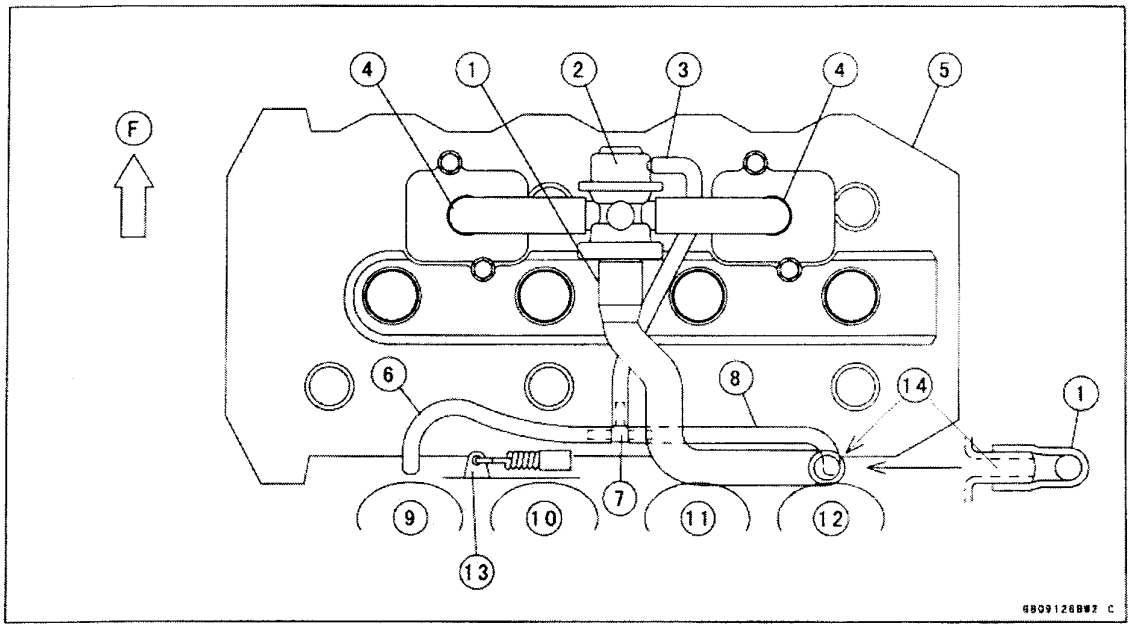
Cable, Wire, and Hose Routing

F: Front
1. Screws
2. Well Nuts
3. Wire Clamp
4. Plate Clamp: Bend the clamp so the hose is almost above the screw.
5. Fitting: Align the parting line with each white mark: Face the parting line upwards.
6. Carburetor Vent Hose: Face each white mark upwards and run this hose between the frame [8] and the inner cover.
7. Netted Part of the hose [6]
8. Frame
9. Align the clamp tab with the white mark of the hose [6]: Face the tab upwards.
10. Carburetor Vent Pipe
11. To the vent hose between carburetors #3 and #4
12. To the vent hose between carburetors #1 and #2
13. Air Inlet Hoses
14. Air Vent Cleaner
15. White Marks: Face them upwards.
16. Plate Clamps: Face the tabs forwards.
17. Plate Clamps: Face the tabs downwards.
18. Plate Clamps: Face the tabs inwards.
19. Right Air Duct: Fit the duct in until the line mark is almost on the end of the duct [21].
20. Left Air Duct: Fit the duct in until the line mark is almost on the end of the duct [21].
21. Rubber Air Ducts: Fit the ducts in until the line mark is almost on the inlet end of the housing [22].
22. Air Cleaner Housing
23. Air Duct Seals
24. Air Duct Screens
25. Air Inlet Pipes
26. Air Duct Clamps: Install them with the screws inside and with the front end on the line mark [30] of the ducts.
27. Upper Fairing
28. Plastic Washers
29. T-joint
30. Raised Line Mark of the air ducts
31. Original Position of the clamp [4]
32. Plate Clamp: Face the tab upwards.

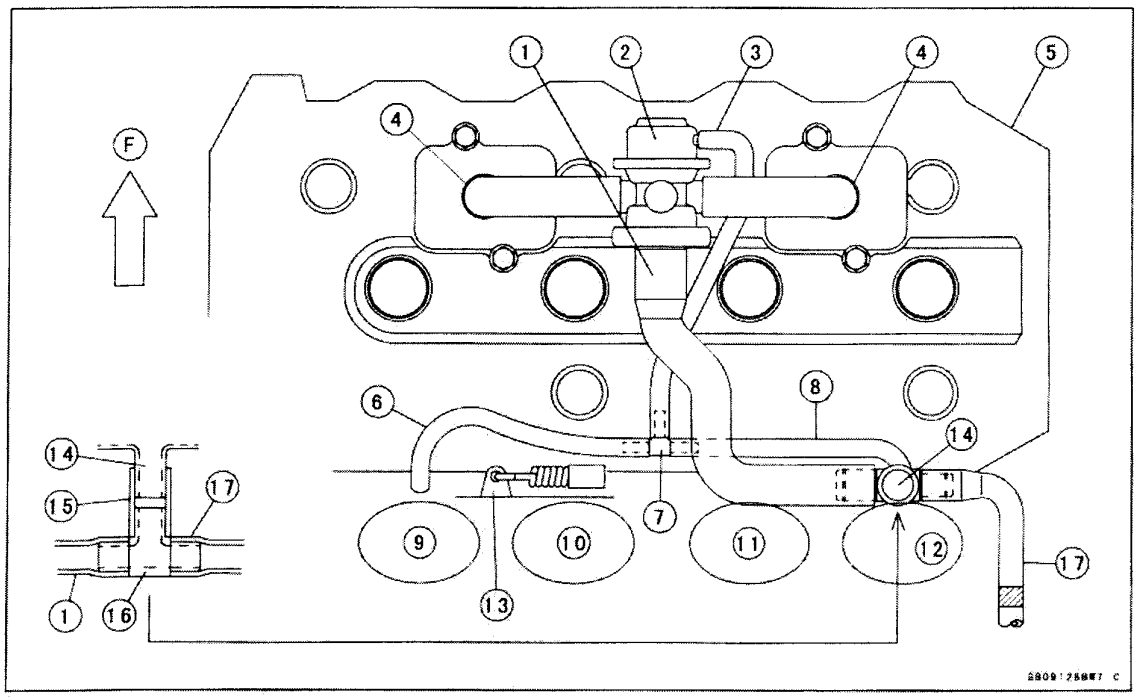
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Cable, Wire, and Hose Routing

Vacuum Switch Valve (other than California)



Vacuum Switch Valve (California)



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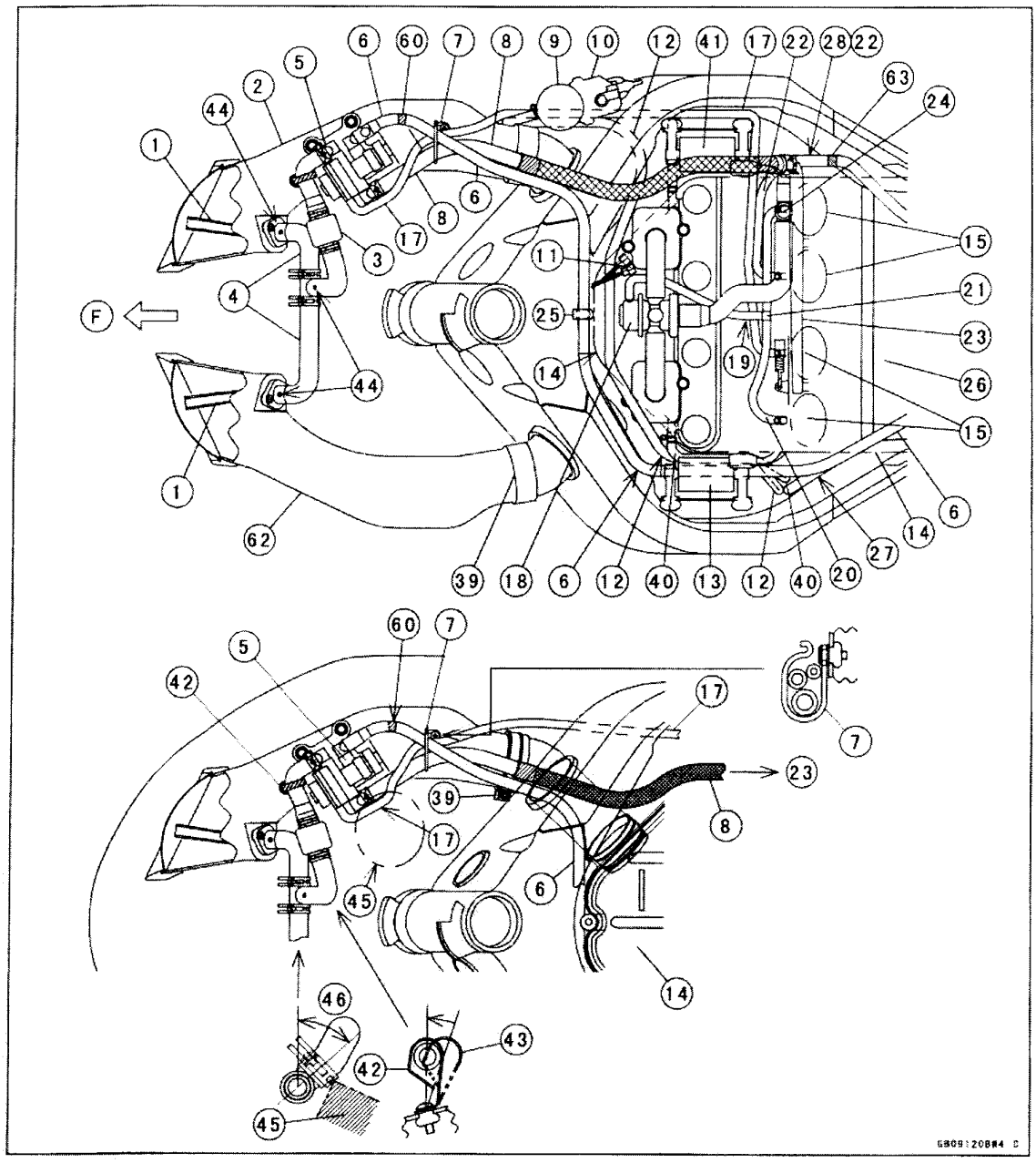
Cable, Wire, and Hose Routing

F: Front
1. Vacuum Switch Valve Hose
2. Vacuum Switch Valve
3. Vacuum Hose of Vacuum Switch Valve: Run it under the hoses [1] and [4].
4. Air Suction Valve Hoses
5. Cylinder Head Cover
6. Vacuum Hose to the holder #1 [9]: Run the hose with a little slack on the left side so it doesn't touch the lever [13].
7. Small T-joint
8. Vacuum Hose to the holder #4 [12]
9. Carburetor Holder #1
10. Carburetor Holder #2
11. Carburetor Holder #3
12. Carburetor Holder #4
13. Starter Lever on the carburetor assembly
14. Air Cleaner Fitting
15. Rubber Joint: First, fit this joint onto the T-joint [16] and put the fitting [14] into this joint.
16. T-joint
17. Purge Hose (green) for the canister

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Cable, Wire, and Hose Routing

California Evaporative Emission Control System



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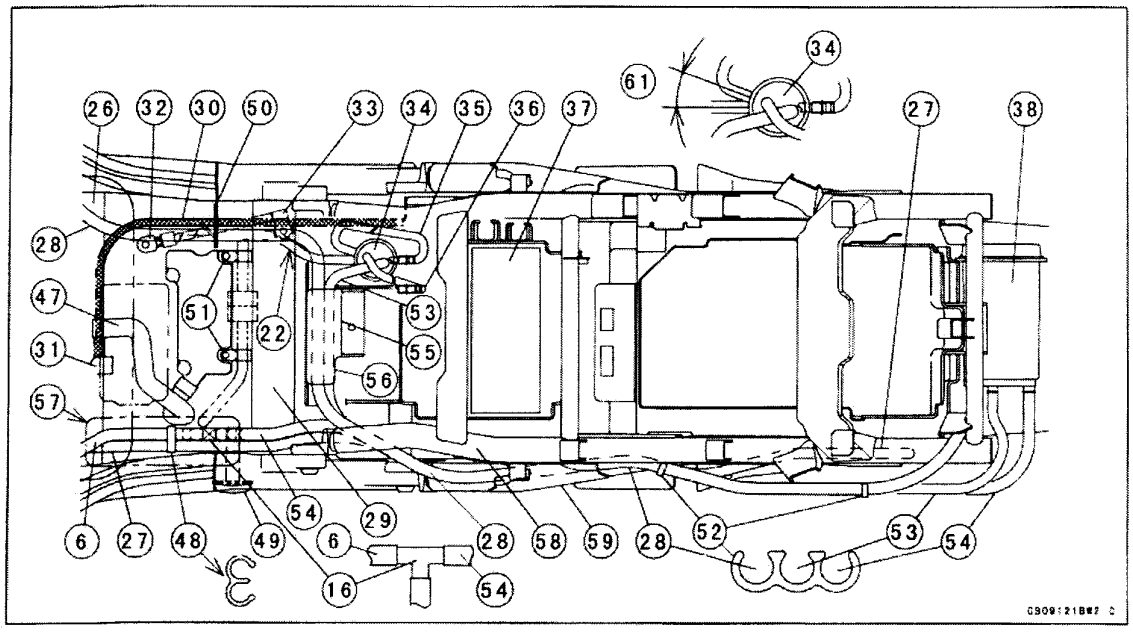
Cable, Wire, and Hose Routing

F: Front
1. Air Vent Pipes
2. Right Air Duct (R mark)
3. Air Vent Filter
4. Air Vent Hoses
5. Vacuum Valve
6. Carburetor Vent Hose (yellow): valve [5]–holder [7]–left of the hose [8]–clamp [25]–under the left ignition coil [13]–between the air cleaner hosing [14] and holders [15]–over the cross pipe [26]–two way holder [48]–T joint [16]–the hose [54]
7. Holder (hoses [6] [8] [17])
8. Carburetor Vent Hose
9. Radiator Cap
10. Thermostat Housing
11. Right and Left Radiator Fan Connectors
12. Reserve Tank Hose: front fitting of the cap [9]–between the front frame and the heat baffle–front of the valve [18]–under the ignition coil [13]–down to the lower fitting of the reserve tank
13. Left Ignition Coil
14. Air Cleaner Housing
15. Carburetor Holders
17. Vacuum Hose for the valve [5]: carburetor holder #2–under the right ignition coil [41] and the main frame–right side of the hose [12]–holder [7]–valve [5]
18. Vacuum Switch Valve
20. Vacuum Hose for the valve [18]
21. T-joint (small)
22. White Vacuum Hose for the separator [34]: carburetor holder #3 (wire clamp)–front and right of carburetors–under the hose [28]–over the corss pipe [26]–strap [50]–under the cross pipe [29]–bottom of the separator [34]
23. Carburetor Vent Pipe
24. T-joint and Rubber Joint (under [14])
25. Plate Clamp for California
26. Cross Pipe
27. Reserve Tank Vent Hose (over the cross pipes [26] and [29])
28. Canister Purge Hose (green): T-joint [24]–carburetor right side–over the cross pipes [26], [29]–front of the separator [34]–front of the hose guide [55]–under the rear frame pipe [58]–inside the rear frame pipe [59]–three way holders [52]–canister [38]
39. Air Duct Clamps
40. Right/Left Drain Hoses of the air cleaner inlet
41. Right Ignition Coil
42. Clamp: Bend the clamp about 20° forwards to prevent its contact with the valve [5].
43. Original Position of clamp [42]
44. White Marks: Face them upwards.
45. Front Fork Cover
46. Tilt the T-joint about 47° backwards to prevent its contact with the cover [45].
60. Yellow Tape
62. Left Air Duct (L mark)
63. Green Tape

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Cable, Wire, and Hose Routing

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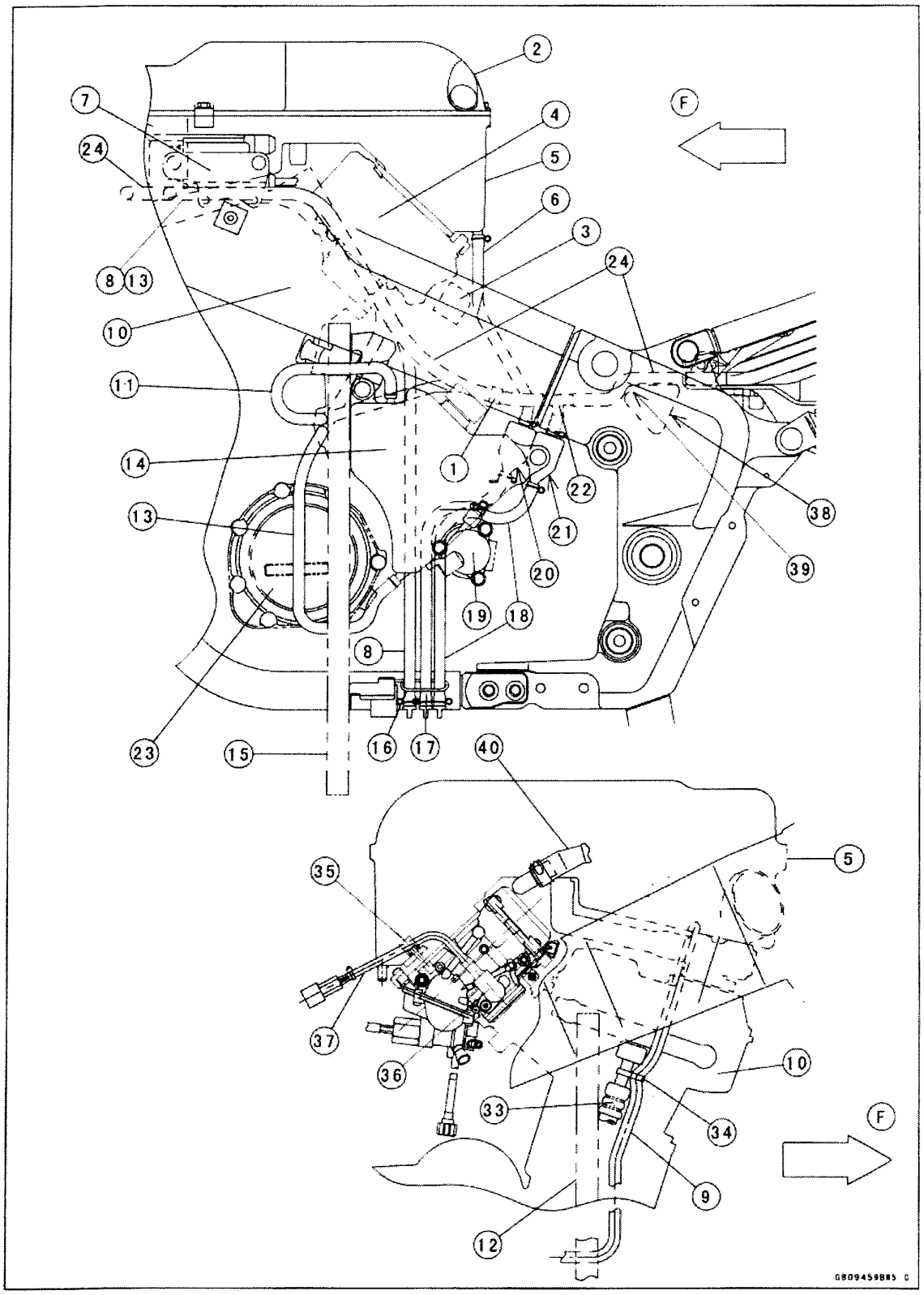
Cable, Wire, and Hose Routing

6. Carburetor Vent Hose (yellow): valve [5]–holder [7]–left of the hose [8]–clamp [25]–under the left ignition coil [13]–between the air cleaner hosing [14] and holders [15]–over the cross pipe [26]–two way holder [48]–T joint [16]–the hose [54]
16. T-joint
22. White Vacuum Hose for the separator [34]: carburetor holder #3 (wire clamp)–front and right of carburetors–under the hose [28]–over the corss pipe [26]–strap [50]–under the cross pipe [29]–bottom of the separator [34]
26. Cross Pipe
27. Reserve Tank Vent Hose (over the cross pipes [26] and [29])
28. Canister Purge Hose (green): T-joint [24]–carburetor right side–over the cross pipes [26], [29]–front of the separator [34]–front of the hose guide [55]–under the rear frame pipe [58]–inside the rear frame pipe [59]–three way holders [52]–canister [38]
30. Electric Starter Lead: front of the starter motor–right side of the lead [33]–under the cross pipe [29]–the starter relay
31. Electric Starter Lead Terminal
32. Engine Ground Terminal
33. Battery Ground Lead
34. Separator
35. Fuel Tank Return Hose (red, right) to the fuel tank pipe
36. Fuel Tank Breather Hose (blue, middle) to the fuel tank pipe
37. Battery
38. Canister
47. Crankcase Breather Hose
48. Two Way Holder
49. Fuel Tap
50. Strap (hose [22], [28] and the main harness): Do not flatten these hoses.
51. Clamps (alternator, pickup coil, neutral switch, sidestand switch and oil pressure switch leads)
52. Three Way Holders
53. Separator Breather Hose (blue, canister side)
54. Carburetor Vent Hose (yellow, canister side, over the cross pipe [29])
55. Hose Guide of the rear fender
56. Run the hose [53] over the harness.
57. These hose [6] and the hose [27] may be routed side by side around here.
58. Upper Rear Frame Pipe
59. Lower Rear Fame Pipe
61. About 20°

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Cable, Wire, and Hose Routing

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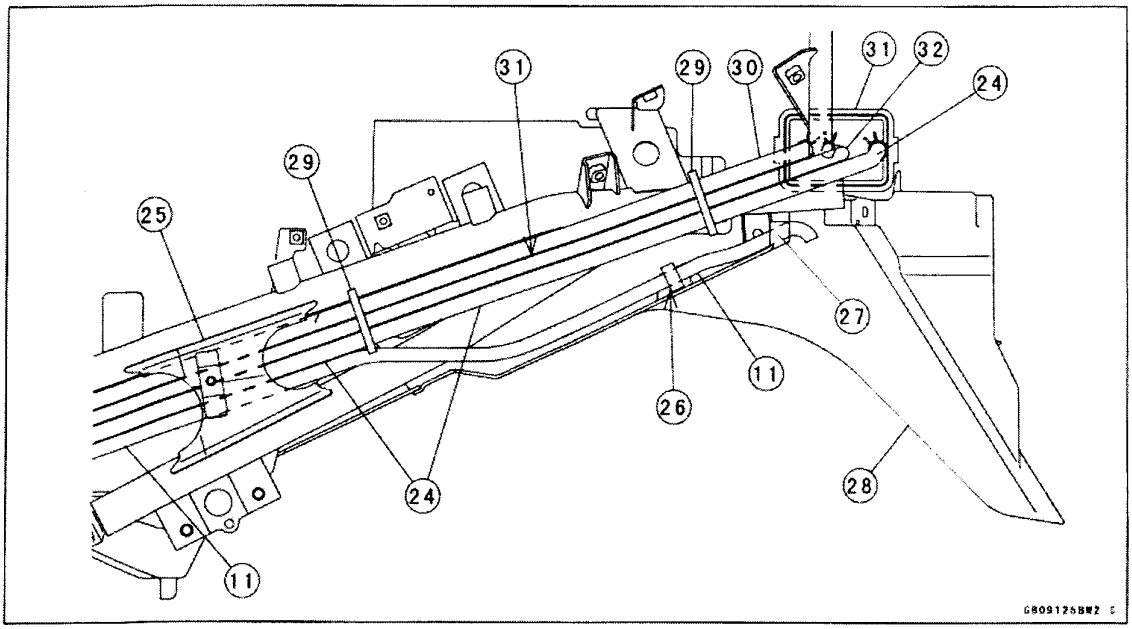
Cable, Wire, and Hose Routing

F: Front
1. Clamp
2. Upper Air Cleaner Housing
3. Cross Pipe
4. Carburetor Assembly
5. Lower Air Cleaner Housing
6. Breather Drain Hose (air cleaner drain hose): behind the cross pipe [3]–left side of the slave cylinder [19]–holder [16]
7. Right and Left Ignition Coils
8. Left Air Cleaner Inlet Drain Hose: left fitting of the housing [5]–left side of the cylinder head [10]–downwards–holder [16]
9. Right Air Cleaner Inlet Drain Hose: right fitting of the housing [5]–between right side of the cylinder head [10] and main frame–holder [34]–through the baffle [12] on the clutch cover
10. Cylinder Head
11. Reserve Tank Vent Hose: top fitting of the tank [14]–through the baffle [15]–along the hose [24]–inside the gusset [25]–clamp [26]–hook [27]
12. Right Heat Baffle
13. Reserve Tank Hose: the lower fitting of the tank [14]–between the baffle [15] and the cover [23]–along the hose [8]–front of the housing [5]–front of the radiator cap
14. Coolant Reserve Tank
15. Left Heat Baffle
16. Holder
17. Breather Catch Tank Drain Hose
18. Vent Catch Tank Drain Hose: T-joint [22]–left side of the slave cylinder [19]–holder [16]
19. Clutch Slave Cylinder
20. Breather Catch Tank
21. Carburetor Vent Catch Tank
22. T-joint: Put this joint the lowest in the carburetor vent line.
23. Pickup Coil Cover
24. Carburetor Vent Hoses (yellow)
33. Cylinder Head Oil Hose
34. Two Way Holder
35. Clamp: Bend it from outside to inside
36. Throttle Sensor
37. Throttle Sensor Lead (Be careful not to catch on the fuel tank.): right side of the housing [5]–clamp [35]–main harness under the fuel tank
38. Cross Pipe
39. Fit the bending of the hose [24] onto the cross pipe [38].
40. Carburetor Air Vent Tube

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Cable, Wire, and Hose Routing

California Evaporative Emission Control System



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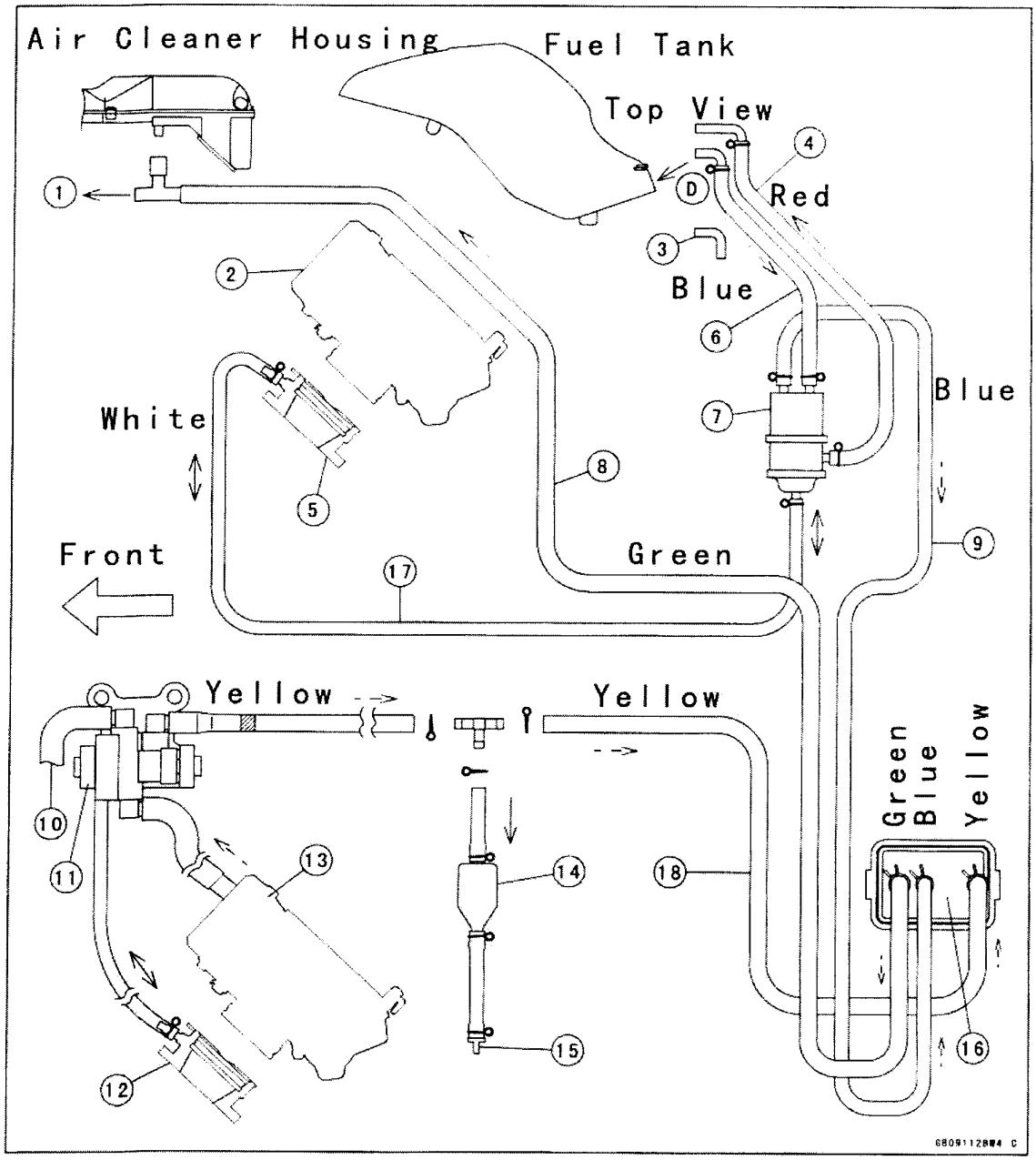
Cable, Wire, and Hose Routing

11. Reserve Tank Vent Hose: top fitting of the tank [14]–through the baffle [15]–along the hose [24]–inside the gusset [25]–clamp [26]–hook [27]
24. Carburetor Vent Hoses (yellow)
25. Gusset
26. Clamp (hose [11])
27. Hook of the rear fender [28]
28. Rear Fender
29. Three Way Holders
30. Canister Purge Hose (green)
31. Canister
32. Sparator Breather Hose (blue)

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Cable, Wire, and Hose Routing

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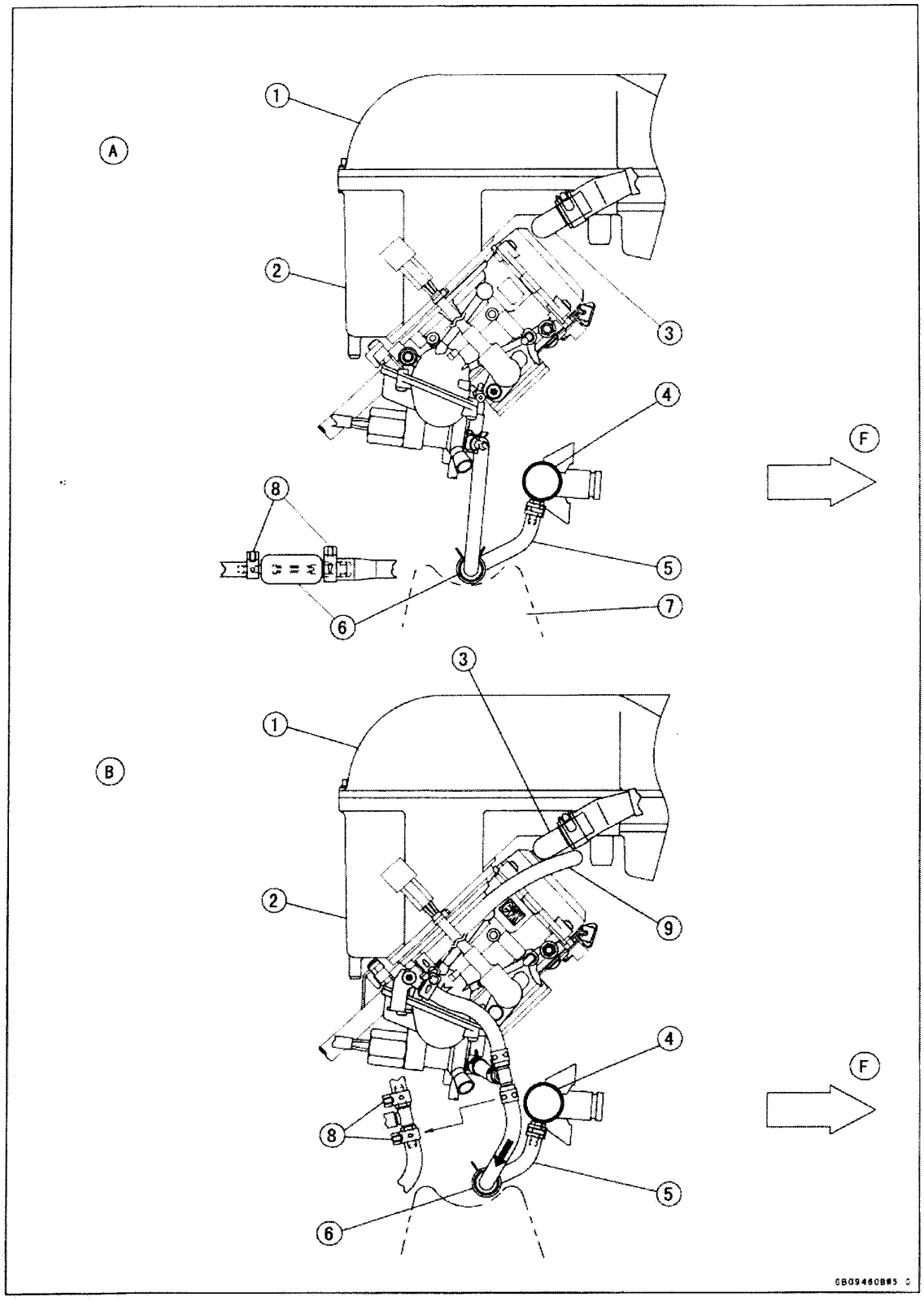
Cable, Wire, and Hose Routing

-→: Vapor Flow
→: Fuel Flow
←→: Vacuum Pulsation

1. Vacuum Switch Valve
2. Carburetor #3
3. Fuel Tank Filler Drain Hose
4. Fuel Tank Return Hose
5. Carburetor Holder #3
6. Fuel Tank Breather Hose
7. Separator
8. Purge Hose
9. Separator Breather Hose
10. Air Vent Hose: air inlet pipes (upper fairing)–air vent filter–this hose
11. Vacuum Valve
12. Carburetor Holder #2
13. Carburetor #2
14. Carburetor Vent Catch Tank
15. Drain Plug
16. Canister
17. Vacuum Hose (white)
18. Carburetor Vent Hose

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Cable, Wire, and Hose Routing



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Cable, Wire, and Hose Routing

A: Carburetor (other than United State and Canada Models)
B: Carburetor (United Kingdom Model)
F: Front
1. Upper Air Cleaner Housing
2. Lower Air Cleaner Housing
3. Carburetor Air Vent Tube
4. Cylinder Head Water Pipe
5. Coolant Hoses for the Carburetor: Run the hoses from the pipe [4] down to the top of the alternator, behind (not above) the pipe [4] to the fitting of the carburetor.
6. Coolant Filter Case: Above the alternator mount [C] of the crankcase.
7. Crankcase of the alternator mount portion.
8. Plate Clamp: Face the tab inwards.
9. Coolant Hose: Run the hose under the tube [3] for United Kingdom Model.

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Troubleshooting Guide

NOTE

○This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine Doesn't Start, Starting Difficulty:

Starter motor not rotating:
- Starter lockout switch or neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Starter relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter clutch trouble

Engine won't turn over:
- Valve seizure
- Valve lifter seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure
- Starter idle gear seizure

No fuel flow:
- No fuel in tank
- Fuel pump trouble
- Fuel tank air vent obstructed
- Fuel filter clogged
- Fuel line clogged

Engine flooded:
- Starting technique faulty

No spark; spark weak:
- Ignition switch not ON
- Engine stop switch turned OFF
- Clutch lever not pulled in or gear not in neutral
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Ignition coil shorted or not in good contact
- Spark plug incorrect
- IC igniter trouble
- Neutral, starter lockout, or sidestand switch trouble
- Pickup coil trouble
- Ignition coil trouble
- Ignition switch or engine stop switch shorted
- Wiring shorted or open
- Fuse blown

Fuel/air mixture incorrect:
- Bypass screw and/or idle adjusting screw maladjusted
- Air passage clogged
- Air cleaner clogged, poorly sealed, or missing

Compression Low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Poor Running at Low Speed:

Spark weak:
- Battery voltage low
- Spark plug dirty, broken, or maladjusted
- Ignition coil wiring trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- IC igniter trouble
- Pickup coil trouble
- Ignition coil trouble

Fuel/air mixture incorrect:
- Bypass screw maladjusted
- Air passage clogged
- Air bleed pipe bleed holes clogged
- Pilot passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Fuel pump trouble
- Throttle body assy holder loose
- Air cleaner duct loose

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head warped
- Cylinder head gasket damaged
- Valve spring broken or weak

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Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)

Other:
IC igniter trouble
Carburetor assy not synchronizing
Engine oil viscosity too high
Drive train trouble
Brake dragging
Air suction valve trouble
Vacuum switch valve trouble

Poor Running or No Power at High Speed:

Firing incorrect:
Spark plug dirty, broken, or maladjusted
Ignition coil wiring trouble
Spark plug pap not in good contact
Spark plug incorrect
IC igniter trouble
Pickup coil trouble
Ignition coil trouble

Fuel/air mixture incorrect:
Air cleaner clogged, poorly sealed, or missing
Air cleaner duct loose
Water or foreign matter in fuel
Carburetor assy holder loose
Fuel to carburetor insufficient
Fuel tank air vent obstructed
Fuel line clogged
Fuel pump trouble

Compression low:
Spark plug loose
Cylinder head not sufficiently tightened down
No valve clearance
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/groove clearance excessive
Cylinder head gasket damaged
Cylinder head warped
Valve spring broken or weak
Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface.)

Knocking:
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
IC igniter trouble
Pickup coil trouble

Miscellaneous:
Throttle valve won't fully open
Brake dragging
Clutch slipping
Overheating
Engine oil level too high
Engine oil viscosity too high
Drive train trouble
Air suction valve trouble
Vacuum switch valve trouble
Catalytic converters melt down due to muffler overheating (KLEEN)

Overheating:

Firing incorrect:
Spark plug dirty, broken, or maladjusted
Spark plug incorrect
IC igniter trouble

Muffler overheating:
For KLEEN, do not run the engine even if with only one cylinder misfiring or poor running (Request the nearest service facility to correct it)
For KLEEN, do not push-start with a dead battery (Connect another full-charged battery with jumper cables, and start the engine using the electric starter)
For KLEEN, do not start the engine under misfire due to spark plug fouling or poor connection of the ignition coil
For KLEEN, do not coast the motorcycle with the ignition switch off (Turn the ignition switch ON and run the engine)
IC igniter in ECU trouble

Fuel/air mixture incorrect:
Carburetor assy holder loose
Air cleaner duct loose
Air cleaner poorly sealed, or missing
Air cleaner clogged

Compression high:
Carbon built up in combustion chamber

Engine load faulty:
Clutch slipping
Engine oil level too high
Engine oil viscosity too high
Drive train trouble
Brake dragging

Lubrication inadequate:
Engine oil level too low
Engine oil poor quality or incorrect

Gauge incorrect:
Water temperature gauge broken
Water temperature sensor broken

Coolant incorrect:
Coolant level too low
Coolant deteriorated
Wrong coolant mixed ratio

Cooling system component incorrect:
Radiator fin damaged
Radiator clogged
Thermostat trouble

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Radiator cap trouble
Radiator fan switch trouble
Fan motor broken
Fan blade damaged
Water pump not turning
Water pump impeller damaged

Over Cooling:

Gauge incorrect:
Water temperature gauge broken
Water temperature sensor broken
Cooling system component incorrect:
Radiator fan switch trouble
Thermostat trouble

Clutch Operation Faulty:

Clutch slipping:
Friction plate worn or warped
Steel plate worn or warped
Clutch spring broken or weak
Clutch hub or housing unevenly worn
Clutch master cylinder trouble
Clutch slave cylinder trouble
Clutch not disengaging properly:
Clutch plate warped or too rough
Clutch spring compression uneven
Engine oil deteriorated
Engine oil viscosity too high
Engine oil level too high
Clutch housing frozen on drive shaft
Clutch hub nut loose
Clutch hub spline damaged
Clutch friction plate installed wrong
Clutch fluid leakage
Clutch slave cylinder trouble
Clutch fluid deteriorated
Air in clutch fluid line
Clutch master cylinder primary or secondary cup damaged
Clutch master cylinder scratched inside

Gear Shifting Faulty:

Doesn't go into gear; shift pedal doesn't return:
Clutch not disengaging
Shift fork bent or seized
Gear stuck on the shaft
Gear positioning lever binding
Shift return spring weak or broken
Shift return spring pin loose
Shift mechanism arm spring broken
Shift mechanism arm broken
Shift pawl broken
Jumps out of gear:
Shift fork ear worn, bent
Gear groove worn
Gear dogs and/or dog holes worn
Shift drum groove worn
Gear positioning lever spring weak or broken
Shift fork guide pin worn
Drive shaft, output shaft, and/or gear splines worn
Overshifts:
Gear positioning lever spring weak or broken
Shift mechanism arm spring broken

Abnormal Engine Noise:

Knocking:
IC igniter trouble
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
Overheating
Piston slap:
Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston pin hole worn
Valve noise:
Valve clearance incorrect
Valve spring broken or weak
Camshaft bearing worn
Valve lifter worn
Other noise:
Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken, or stuck
Piston seizure, damage
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder head connection
Crankshaft runout excessive
Engine mounts loose
Crankshaft bearing worn
Primary gear worn or chipped
Camshaft chain tensioner trouble
Camshaft chain, sprocket, guide worn
Air suction valve damaged
Vacuum switch valve damaged
Alternator coupling rubber damper damage
Alternator chain tensioner trouble
Alternator chain, sprocket, guide worn
Catalytic converters melt down due to muffler overheating (KLEEN)
Balancer gear worn or chipped
Balancer shaft position maladjusted
Balancer bearing worn
Balancer shaft coupling rubber damper damaged

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Troubleshooting Guide

Abnormal Drive Train Noise:

Clutch noise:
- Clutch damper weak or damaged
- Clutch housing/friction plate clearance excessive
- Clutch housing gear worn

Transmission noise:
- Bearings worn
- Transmission gears worn or chipped
- Metal chips jammed in gear teeth
- Engine oil insufficient

Drive line noise:
- Drive chain adjusted improperly
- Drive chain worn
- Rear and/or engine sprocket worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise:

Front fork noise:
- Oil insufficient or too thin
- Spring weak or broken

Rear shock absorber noise:
- Shock absorber damaged

Disc brake noise:
- Pad installed incorrectly
- Pad surface glazed
- Disc warped
- Caliper trouble

Other noise:
- Bracket, nut, bolt, etc. not properly mounted or tightened

Oil Pressure Warning Light Goes On:

- Engine oil pump damaged
- Engine oil screen clogged
- Engine oil level too low
- Engine oil viscosity too low
- Camshaft bearing worn
- Crankshaft bearings worn
- Oil pressure switch damaged
- Wiring faulty
- Relief valve stuck open
- O-ring at the oil passage in the crankcase damaged

Exhaust Smokes Excessively:

White smoke:
- Piston oil ring worn
- Cylinder worn
- Valve oil seal damaged
- Valve guide worn
- Engine oil level too high

Black smoke:
- Air cleaner clogged

Brown smoke:
- Air cleaner duct loose
- Air cleaner poorly sealed or missing

Handling and/or Stability Unsatisfactory:

Handlebar hard to turn:
- Cable routing incorrect
- Hose routing incorrect
- Wiring routing incorrect
- Steering stem locknut too tight
- Steering stem bearing damaged
- Steering stem bearing lubrication inadequate
- Steering stem bent
- Tire air pressure too low

Handlebar shakes or excessively vibrates:
- Tire worn
- Swingarm pivot bearings worn
- Rim warped, or not balanced
- Wheel bearing worn
- Handlebar clamp bolts loose
- Steering stem head nut loose

Handlebar pulls to one side:
- Frame bent
- Wheel misalignment
- Swingarm bent or twisted
- Steering maladjusted
- Front fork bent
- Right and left front fork oil level uneven

Shock absorption unsatisfactory:
- (Too hard)
- Front fork oil excessive
- Front fork oil viscosity too high
- Rear shock absorber adjustment too hard
- Tire air pressure too high
- Front fork bent
- (Too soft)
- Tire air pressure too low
- Front fork oil insufficient and/or leaking
- Front fork oil viscosity too low
- Rear shock adjustment too soft
- Front fork, rear shock absorber spring weak
- Rear shock absorber oil leaking

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Troubleshooting Guide

Brake Doesn't Hold:

Air in the brake line
Pad or disc worn
Brake fluid leakage
Disc warped
Contaminated pad
Brake fluid deteriorated
Primary or secondary cup damaged in master cylinder
Master cylinder scratched inside

Battery Trouble:

Battery discharged:
Battery faulty (too low terminal voltage)
Battery leads making poor contact
Load excessive (e.g., bulb of excessive wattage)
Ignition switch trouble
Alternator trouble
Wiring faulty
Regulator/rectifier trouble

Battery overcharged:
Regulator/rectifier trouble
Battery faulty

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