Kawasaki

BRUTE FORCE 650 4×4

KVF 650 4×4



All Terrain Vehicle Service Manual

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- Refer to the sectional table of contents for the exact pages to locate the specific topic required.

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Periodic Maintenance Chart

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

FREQUENCY / OPERATION	First Service	Regular Service				
	After 10 hrs. or 100 km (60 mi.) of use	Every 10 days or 200 km (120 mi.) of use	Every 30 days or 600 km (360 mi.) of use	Every 90 days, 1 700 km (1 100 mi.) of use or when belt indicator light turns on (100 hrs of use) whichever comes first	Every year of use	See page
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Torque and Locking Agent

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

Letters used in the "Remarks" column mean:

AL: Tighten the two clamp bolts alternately two times to ensure even tightening torque.
L: Apply a non-permanent locking agent.
LB: Apply a non-permanent locking agent (Three Bond TB2471, Blue).
Lh: Left-hand Threads
MO: Apply molybdenum disulfide oil (mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10 : 1).
R: Replacement Parts
S: Follow the specific tightening sequence.
SS: Apply silicone sealant (Kawasaki Bond: 56019-120).
St: Stake the fasteners to prevent loosening.

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Fuel System				
Throttle Limiter Screw	3.7	0.38	33 in·lb	
Throttle Limiter Locknut	3.7	0.38	33 in·lb	
Throttle Case Assembly Screws	3.7	0.38	33 in·lb	
Choke Lever Mounting Screw	3.5	0.36	31 in·lb	
Left Handlebar Switches Assembly Screws	3.5	0.36	31 in·lb	
Heat Guard Plate Mounting Bolts	8.8	0.90	78 in·lb	
Air Cleaner Housing Bolts (M5)	5.9	0.60	52 in·lb	L
Air Cleaner Housing Bolts (M6) 28.7 mm (1.13 in.)	8.8	0.90	78 in·lb	
Air Cleaner Housing Bolts (M6) 33 mm (1.30 in.)	8.8	0.90	78 in·lb	
Fuel Pump Mounting Nuts (On and after KVF650D6F/E6F)	8.0	0.80	71 in·lb	
Fuel Pump Bracket Bolts (On and after KVF650D6F/E6F)	8.0	0.80	71 in·lb	
Fuel Tap Plate Screws	0.8	0.08	7 in·lb	
Fuel Tap Plate Screws (On and after KVF650D6F/E6F)	5.0	0.50	44 in·lb	
Air Cleaner Element Bracket Screws	5.0	0.50	44 in·lb	
Cooling System				
Radiator Fan Switch	18	1.8	13	
Water Pump Cover Bolts	8.8	0.90	78 in·lb	
Coolant Drain Plug	8.8	0.90	78 in·lb	
Water Pump Fitting Bolt	9.8	1.0	87 in·lb	
Water Pump Impeller	7.9	0.80	69 in·lb	
Thermostat Housing Cover Bolts	8.8	0.90	78 in·lb	
Coolant Temperature Warning Light Switch	6.9	0.70	61 in·lb	SS
Radiator Fan Mounting Nut	2.7	0.28	24 in·lb	L
Radiator Fan Assembly Bolts	8.8	0.90	78 in·lb	
Radiator Mounting Bolts	8.8	0.90	78 in·lb	
Engine Top End				
Water Pipe Bolts	9.8	1.0	87 in·lb	
Rocker Case Bolts 55 mm (2.2 in.)	8.8	0.90	78 in·lb	S
Rocker Case Bolts 130 mm (5.1 in.)	9.8	1.0	87 in·lb	S

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General Specifications

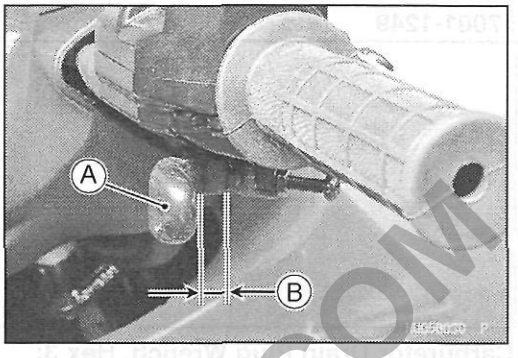
Items	KVF650-D1, E1	KVF650D6F ~, E6F ~
Dimensions		
Overall Length	2 185 mm (86.02 in.)	
Overall Width	1 209 mm (47.60 in.)	1 212 mm (47.72 in.)
Overall Height	1 166 mm (45.91 in.)	1 164 mm (45.83 in.)
Wheelbase	1 294 mm (50.94 in.)	
Ground Clearance:	192 mm (7.56 in.)	185 mm (7.28 in.)
Seat Height	864 mm (34.02 in.)	862 mm (33.94 in.)
Dry Mass	(KVF650-D1/D6F ~ D8F (US, CA, AU)/E1 ~ E8F) 273 kg (602 lb) (KVF650D6F ~ D8F (EUR)) 273.5 kg (603 lb)	
Curb Mass:	(KVF650D9F (US, CA, AU)/E9F) 293 kg (646 lb) (KVF650D9F (EUR)) 294 kg (648 lb)	
Front	152 kg (335 lb)	154 kg (339.6 lb) (KVF650D6F ~ D8F (EUR)) 154.2 kg (340 lb) (KVF650D9F (EUR)) 155 kg (342 lb)
Rear	141 kg (311 lb)	139 kg (306 lb) (KVF650D6F ~ D8F (EUR)) 139.3 kg (307 lb)
Fuel Tank Capacity	17 L (4.5 US gal)	18 L (4.8 US gal)
Performance		
Minimum Turning Radius	3.1 m (10.17 ft)	
Engine		
Type	4-stroke, SOHC, V-twin	
Cooling System	Liquid-cooled	
Bore and Stroke	80 × 63 mm (3.15 × 2.48 in.)	
Displacement	633 cm³ (38.6 cu in.)	
Compression Ratio	9.9 : 1	
Maximum Horsepower	30.9 kW (42.0 PS) @6 500 r/min (rpm), (US) –	
Maximum Torque	52.1 N·m (5.3 kgf·m, 38.0 ft·lb) @4 000 r/min (rpm)	
Carburetion System	Carburetor, Keihin CVKR-D32	
Starting System	Electric Starter & Recoil Starter	
Ignition System	Digital DC-CDI	
Timing Advance	Electronically advanced	
Ignition Timing	From 5° BTDC @1 100 r/min (rpm) to 28° BTDC @5 000 r/min (rpm)	
Spark Plug	NGK CR7E	
Cylinder Numbering Method	Front to rear, 1-2	
Firing Order	1-2	
Valve Timing:		
Inlet:		
Open	30° BTDC	
Close	34° ABDC	
Duration	244°	
Exhaust:		
Open	54° BBDC	
Close	10° ATDC	
Duration	244°	

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Fuel System

Throttle Lever Free Play Inspection



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

★If the throttle lever does not return properly, check the throttle cable routing, lever free play, and cable damage. Then lubricate the throttle cable.

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

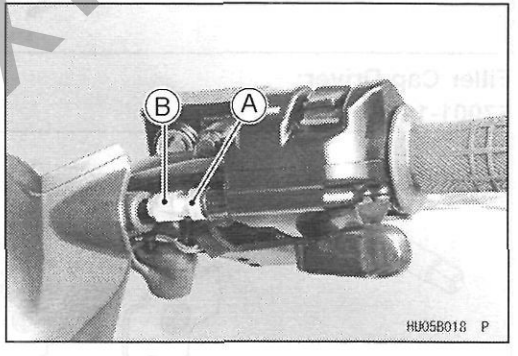
★If the idle speed increases, check the throttle lever free play and the cable routing.

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

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

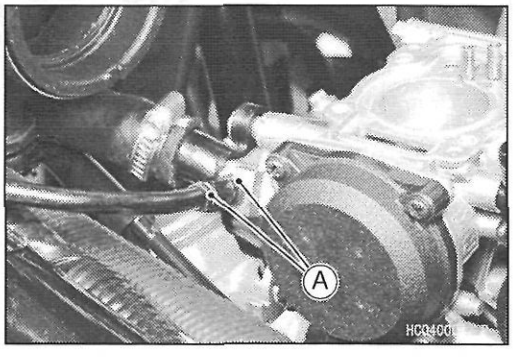
Throttle Lever Free Play
Standard: 2 ~ 3 mm (0.08 ~ 0.12 in.)

Throttle Lever Free Play Adjustment

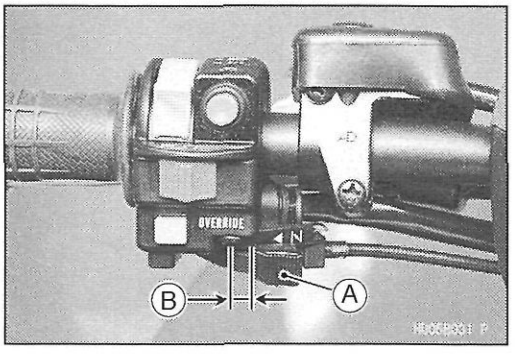


- Remove the handle cover (see Multifunction Meter Unit Removal in the Electrical System chapter).
- Slide the rubber cover off the adjuster at the throttle case.
- Loosen the locknut [A] and turn the throttle cable upper adjuster [B] until the cable has proper amount of play.
- Tighten the locknut and reinstall the rubber cover.

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



Choke Lever Free Play Inspection



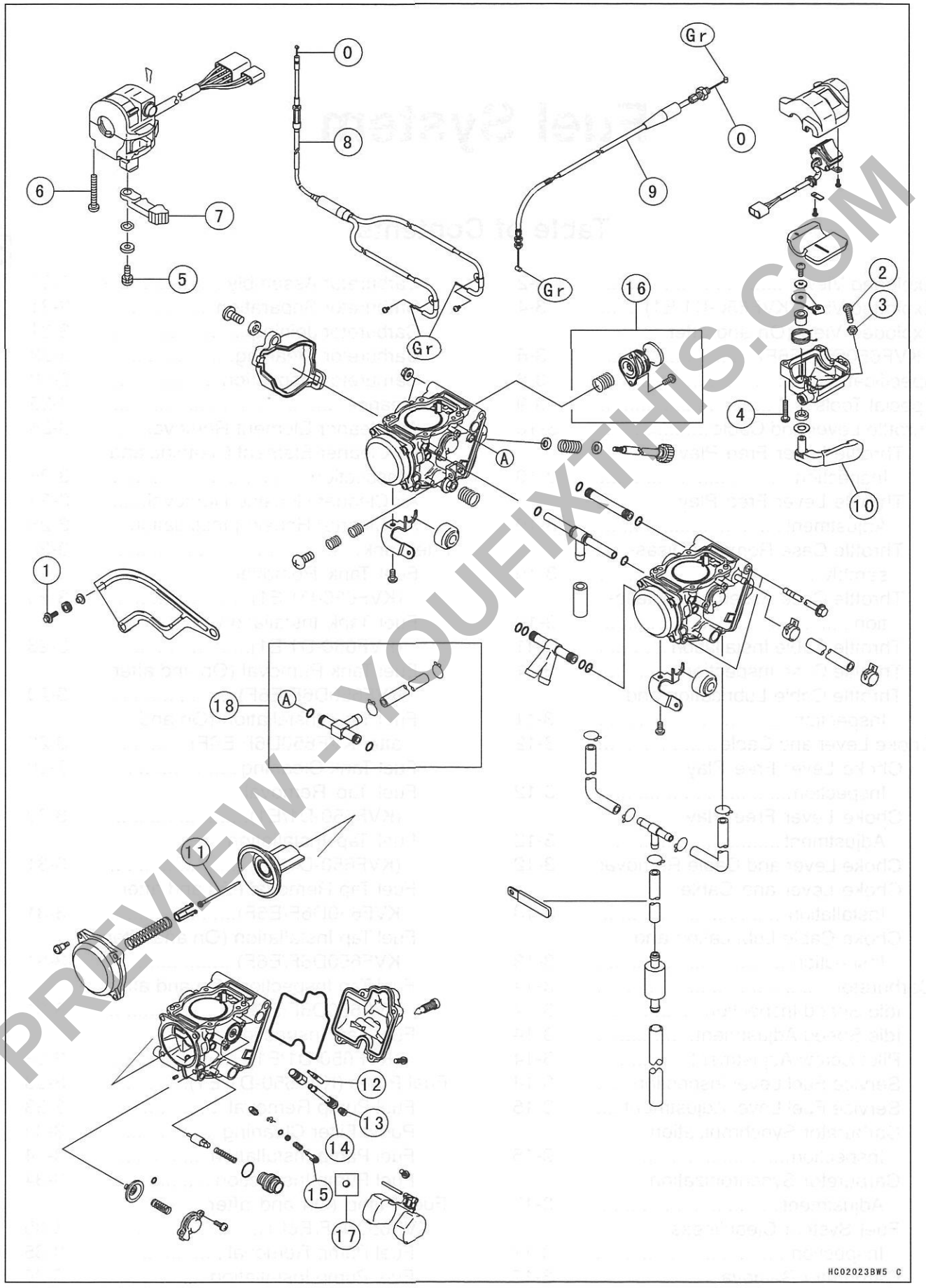
- Check if the choke lever [A] returns properly and if the inner cable slides smoothly.
- Make sure that the choke lever returns to its released position all the way.
- To determine the amount of choke cable play at the lever, pull the choke lever to the left until feeling the operation of the lever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

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

Choke Lever Free Play [B]
Standard: about 3 mm (0.12 in.)

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Exploded View

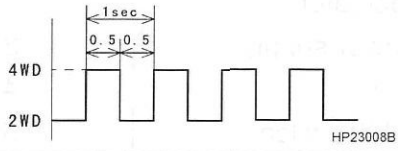
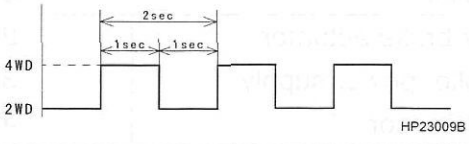
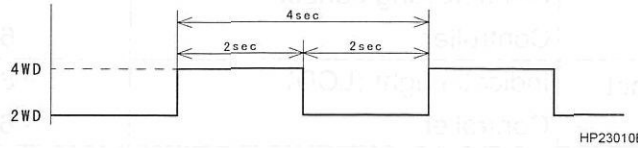


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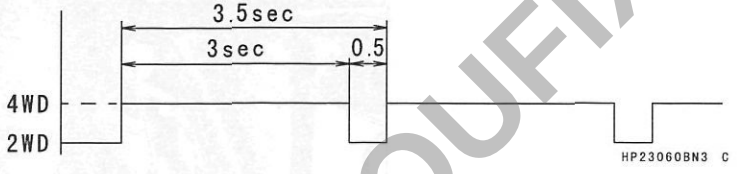
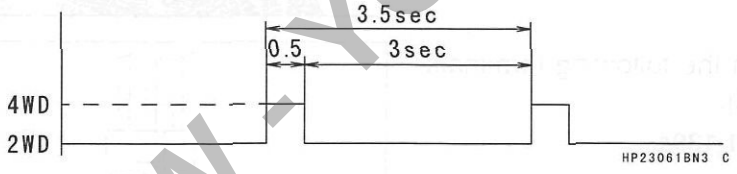
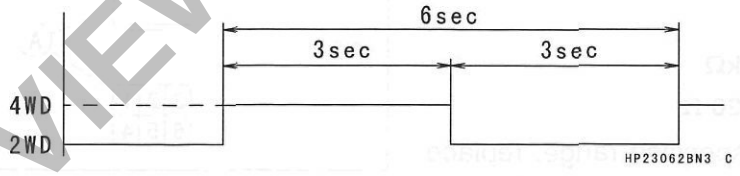
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Actuator Control System

Failure Indication Pattern and Failure Part (KVF650-D1 ~ D8F/E1 ~ E8F Models)

No.	Failure Indication Pattern	Failure Part
1		Selectable 2WD/4WD actuator
2		Engine brake actuator
3		Both the selectable 2WD/4WD actuator and the engine brake actuator

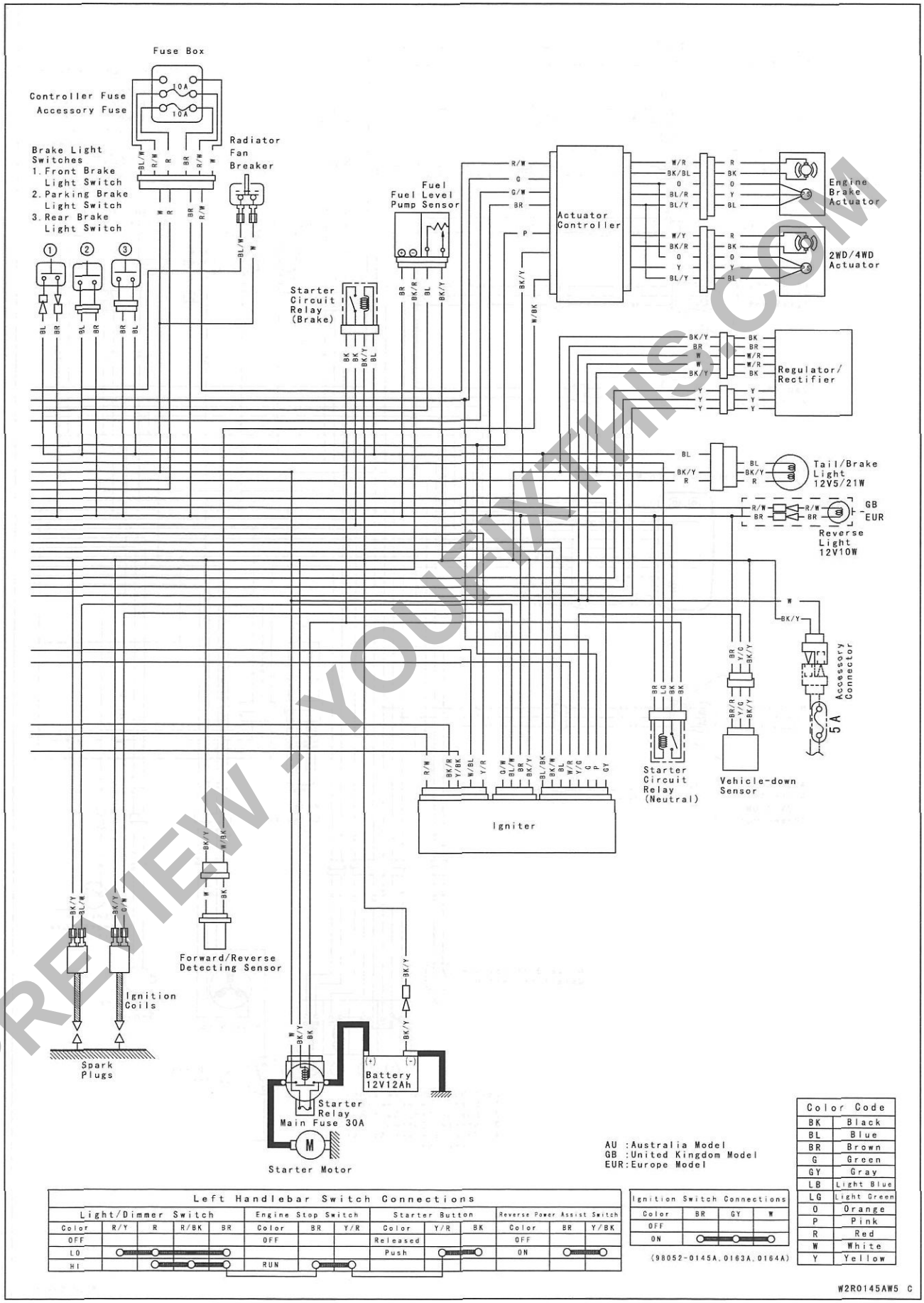
Failure Indication Pattern and Failure Part (KVF650D9F/E9F Models)

No.	Failure Indication Pattern	Failure Part
1		Selectable 2WD/4WD actuator
2		Engine brake actuator
3		Both the selectable 2WD/4WD actuator and the engine brake actuator

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Wiring Diagram (KVF650-D1/E1)



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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:
- Neutral switch trouble
- Starter motor trouble
- Battery voltage low
- Relays not contacting or operating
- Starter button not contacting
- Wiring open or shorted
- Ignition switch trouble
- Engine stop switch trouble
- Fuse blown

Starter motor rotating but engine doesn't turn over:
- Starter motor clutch trouble

Recoil starter not operating
- Recoil starter spring broken
- Recoil starter pawl not engaging

Engine won't turn over:
- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure

No fuel flow:
- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged
- Fuel pump damaged or circuit open/short

Engine flooded:
- Fuel level too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, crank the engine with the throttle
- fully opened to allow more air to reach the engine.)

Fuel/air mixture incorrect:
- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

No spark; spark weak:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or spark plug lead trouble
- Spark plug cap not in good contact
- Spark plug incorrect
- Crankshaft sensor trouble
- Igniter trouble
- Ignition coil trouble
- Battery voltage low
- Ignition or engine stop switch shorted
- Wiring shorted or open
- Fuse blown

Compression Low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive
- Cylinder head gasket damaged
- Cylinder head warped
- Valve spring broken or weak
- Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface)
- Compression release cam (K.A.C.R.) sticks open (Engine stalls when moving off)

Poor Running at Low Speed:

Spark weak:
- Spark plug dirty, broken, or maladjusted
- Spark plug cap or spark plug lead trouble
- Spark plug cap shorted or not in good contact
- Spark plug incorrect
- Igniter trouble
- Crankshaft sensor trouble
- Ignition coil trouble
- Battery voltage low

Fuel/air mixture incorrect:
- Pilot screw and/or idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Choke plunger stuck open
- Air cleaner clogged, poorly sealed, or missing
- Fuel level too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose

Compression low:
- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/groove clearance excessive

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LIST OF ABBREVIATIONS

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

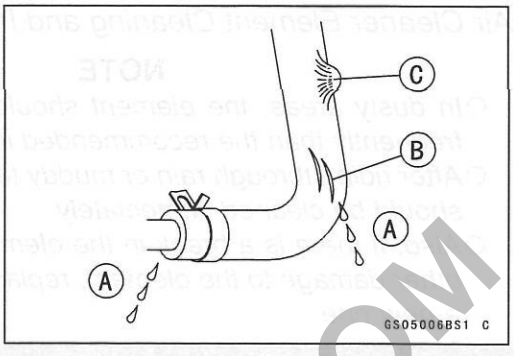
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Read OWNER'S MANUAL before operating.

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Periodic Maintenance Procedures

Fuel Hose and Connection Inspection



○The fuel hoses are designed to be used throughout the vehicle life without any maintenance, however, if the vehicle is not properly handled, the pressure inside the fuel line can cause fuel to leak [A] or the hose to burst. Check the fuel hose.

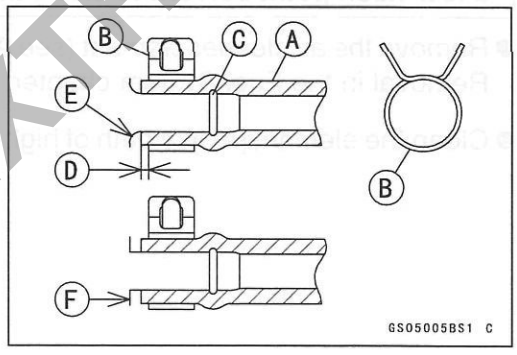
★Replace the fuel hose if any fraying, cracks [B] or bulges [C] are noticed.

● 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 Appendix chapter.

● When installing the fuel hoses, avoid sharp bending, kinking, flattening or twisting, and route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.

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



● 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]

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

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

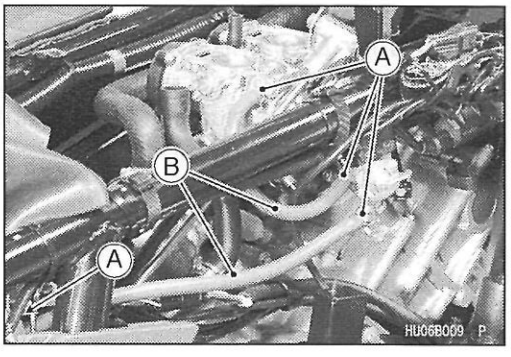
Fuel Hose Replacement

⚠ WARNING

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

● Remove the air cleaner cover (see Air Cleaner Cover Removal in Frame chapter).

● Turn the fuel tap to the OFF position.



● Remove:
Air Cleaner Housing (see Air Cleaner Housing Removal in Fuel System chapter)
Clamps [A]
Fuel Hoses [B]

● Replace the fuel hoses with new ones.

● When installing the fuel hose, route the hose according to Cable, Wire, and Hose Routing section in Appendix chapter.

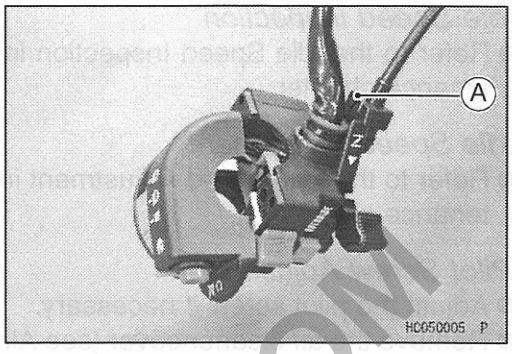
● When installing the fuel hose, avoid sharp bending, kinking, flattening or twisting, and route the fuel hose with a minimum of bending so that the fuel flow will not be obstructed.

● Fit the fuel hose onto the pipe fully and install the clamps beyond the raised rib (see Fuel Hose and Connection Inspection).

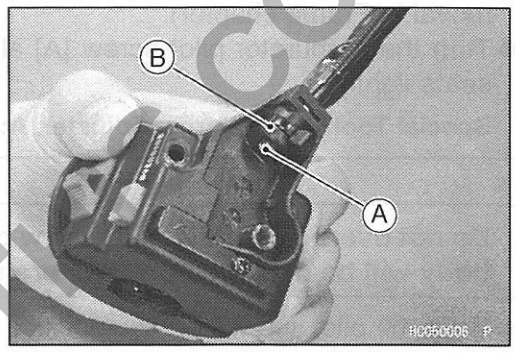
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Choke Lever and Cable

- Pull off the retaining clip [A].



- Fit the cable end [A] in the grommet [B], and free the cable from the switch case.
- Pull the cable out of the vehicle.



Choke Lever and Cable Installation

- Lubricate the choke cable before installation.
- Install the wave washer, plane washer and screw in that order.
- Route the choke cable according to the Appendix chapter.

⚠ WARNING

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

Choke Cable Lubrication and Inspection

- Whenever the choke cable is removed or in accordance with the Periodic Maintenance chart in the Periodic Maintenance chapter, lubricate the cable.
- Refer to the General Lubrication in the Periodic Maintenance chapter for the cable lubrication and inspection

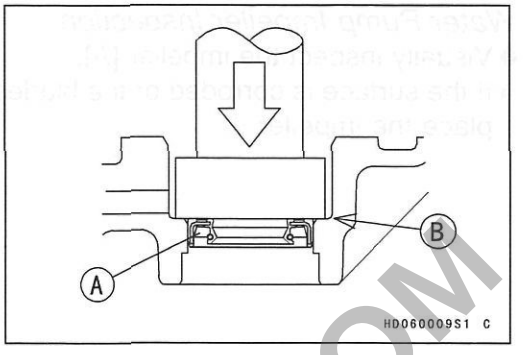
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Water Pump

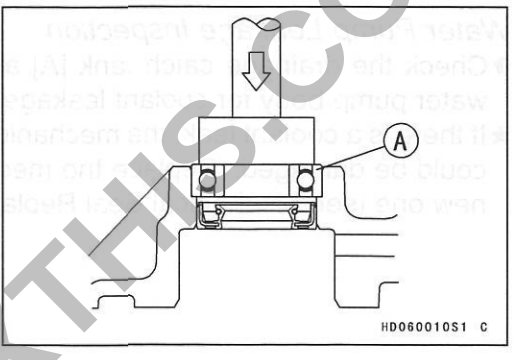
- Apply heat-resistance grease on the oil seal lip.
- From outside the alternator cover, press and insert the oil seal [A] flush [B] in the direction as shown.

Special Tool - Bearing Driver Set: 57001-1129



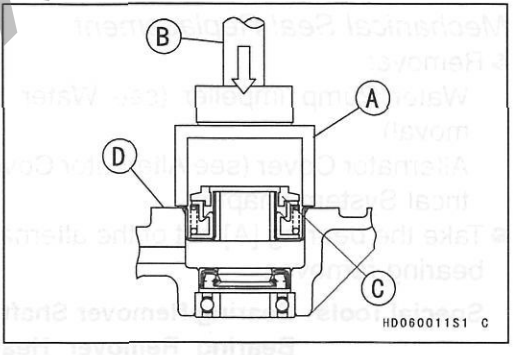
- From inside the alternator cover, press and insert the ball bearing [A] until it is bottomed.

Special Tool - Bearing Driver Set: 57001-1129



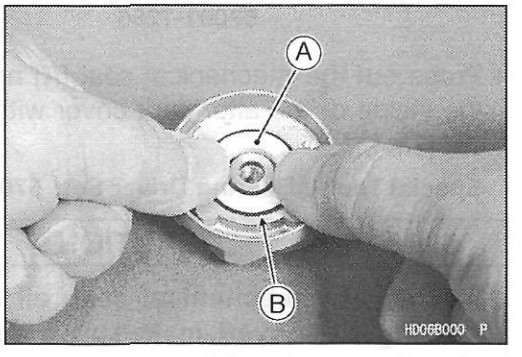
- Using a suitable socket [A] and the bearing driver [B], press and insert a new mechanical seal [C] until its flange stops at the step [D] of the hole.

Special Tool - Bearing Driver Set: 57001-1129



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

Torque - Water Pump Impeller: 7.9 N·m (0.80 kgf·m, 69 in·lb)



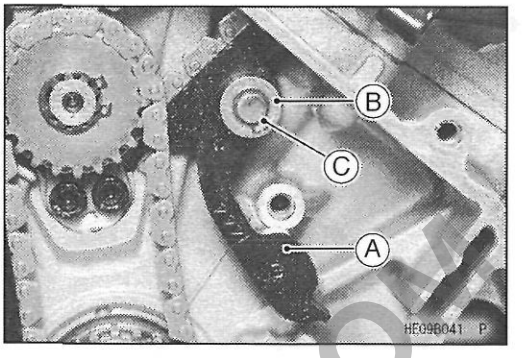
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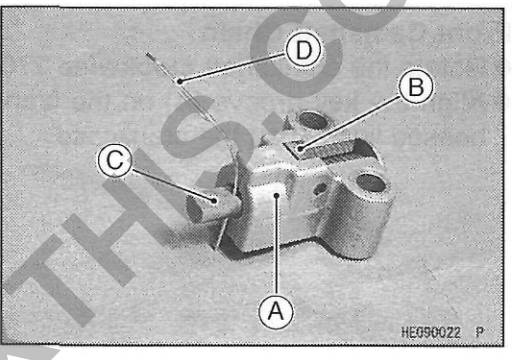
Camshaft

- Replace the circlip with a new one.
- Install:
  Intermediate Shaft Chain Guide [A] (Rear)
  Washer [B]
  Circlip [C]

Special Tool - Outside Circlip Pliers: 57001-144



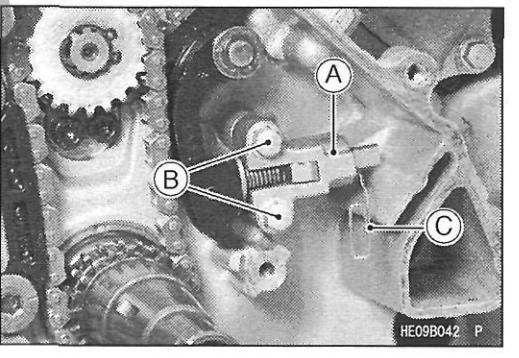
- Install the intermediate shaft chain tensioner [A] as follows:
- Release the stopper [B] and push the push rod [C] into the tensioner body.
- Insert a wire [D] into the rod hole to hold the rod in place.



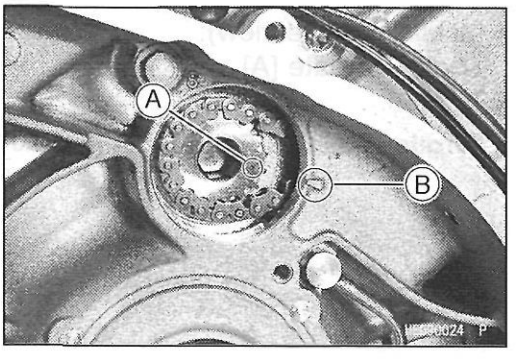
- Install:
  Intermediate Shaft Chain Tensioner [A]
- Tighten:

Torque - Intermediate Shaft Chain Tensioner Bolts [B]: 8.8 N·m (0.90 kgf·m, 78 in·lb)

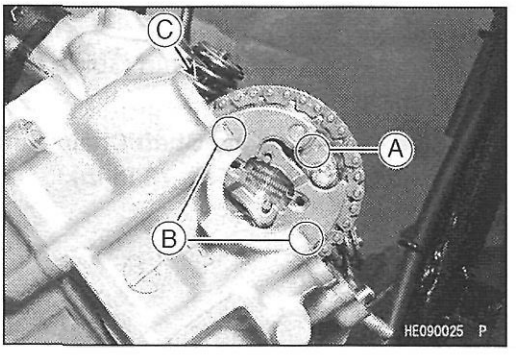
- Remove the wire [C] to free the push rod.



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



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

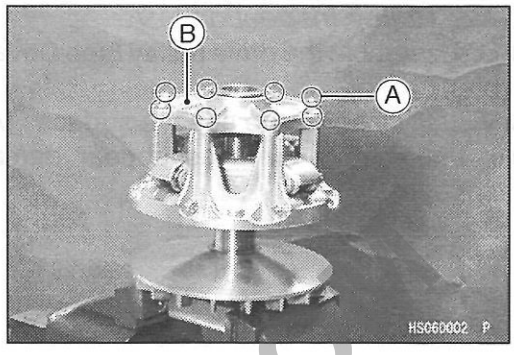


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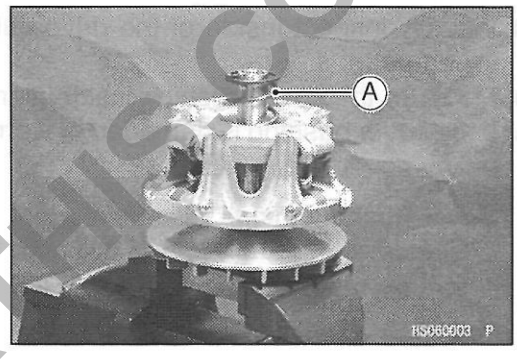
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Drive Pulley

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



- Remove:
  Spring [A]
  Spacer



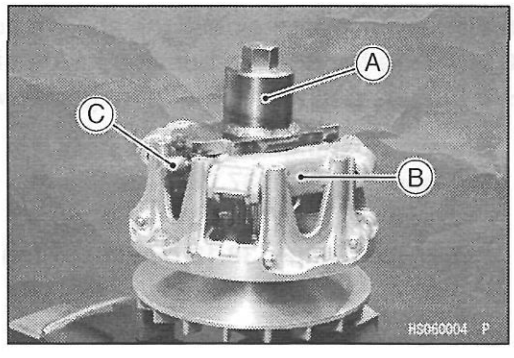
- Put the drive pulley wrench [A] on the spider [B] and tighten the bolt [C].

  Special Tool - Drive Pulley Wrench: 57001-1474

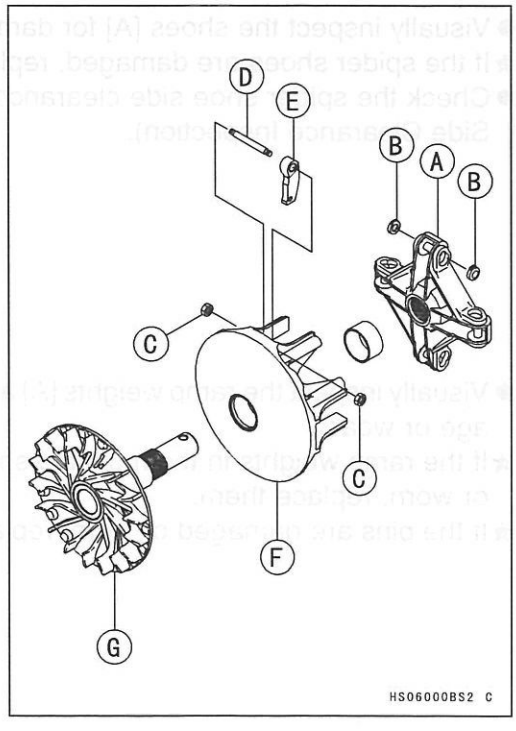
- Turn the wrench clockwise and remove the spider with the movable sheave.

NOTE

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



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



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Wheels (Rims)

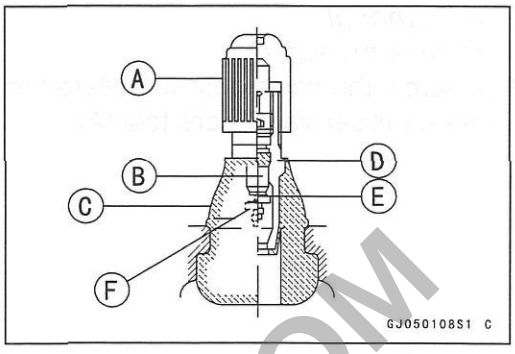
Wheel (Rim) Replacement

- Remove the wheel (see Wheel Removal).
- Disassemble the tire from the rim (see Tire Removal).

○Remove the air valve and discard it.

CAUTION

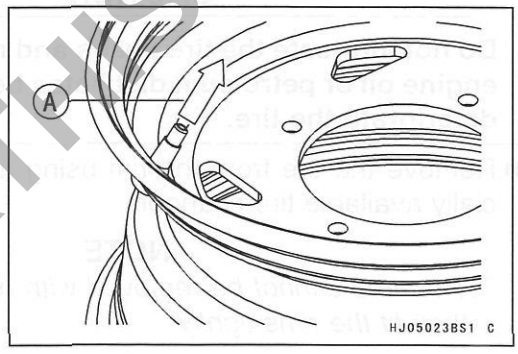
Replace the air valve whenever the tire is replaced. Do not reuse the air valve.



Plastic Cap [A]
Valve Core [B]
Stem Seal [C]
Valve Stem [D]
Valve Seat [E]
Valve Opened [F]

- Install a new air valve in the new rim.

○Remove the valve cap, lubricate the stem with a soap and water solution, and pull the stem [A] through the rim from the inside out until it snaps into place.



CAUTION

Do not use engine oil or petroleum distillates to lubricate the stem because they will deteriorate the rubber.

- Mount the tire on the new rim (see Tire Installation).
- Install the wheel (see Wheel Installation).
- Install the air valve cap.

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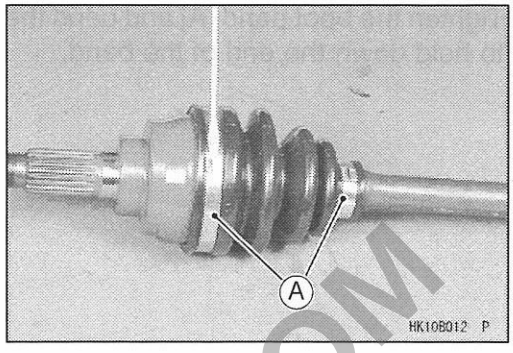
Front Axle

Outboard Joint Boot Replacement

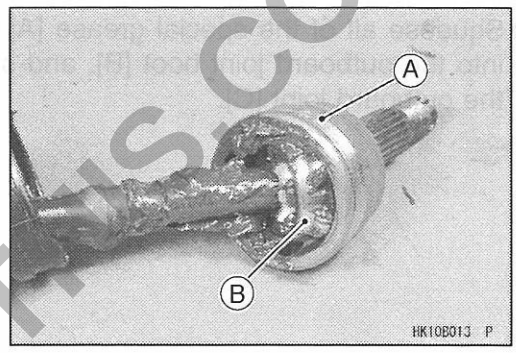
NOTE

○*If inspections of the outboard joint and boot reveal no problems, do not remove the outboard boot. Move on to Inboard Joint Boot Assembly.*

● Remove:
Inboard Joint Boot
Boot Bands [A]
○Scrap the removed boot bands.



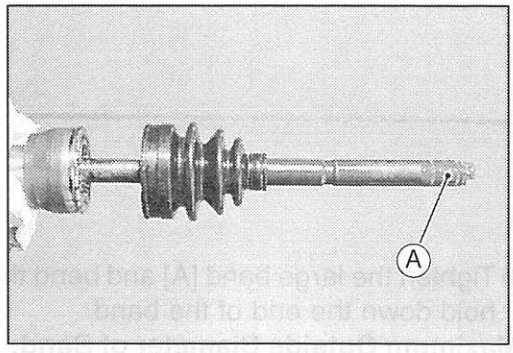
● The outboard joint [A] cannot be disassembled.
● Inspect the joint bearing [B].
★If the joint does not move smoothly due to wear or corrosion, replace the front axle because the joint bearing is damaged.
● Inspect whether the axle shaft spline is damaged or not.
★If there is clear damage or wear on the spline, replace the axle shaft.
● Clean the axle shaft by wiping off the used grease on it.



CAUTION

Do not clean the boot with the mineral oil or gasoline because they damage the boot.

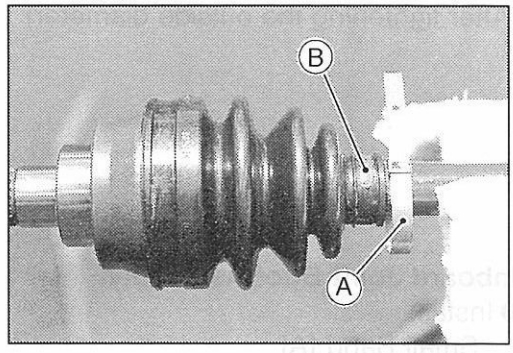
● Wind the tape [A] on the inside splines of the axle shaft in order to protect the joint boot.
● Apply the special grease slightly on the inside of the boot small diameter, and install the joint boot on the groove of the shaft.



CAUTION

Only the special grease which is included with the boot kit can be applied to the boots.

● Apply the special grease [B] slightly on the part of band installation in order to make easy to install the band [A].
● Tighten the small band first.



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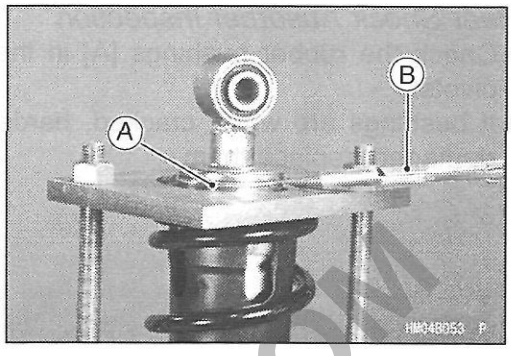
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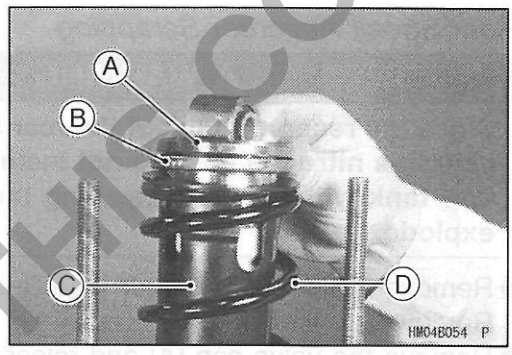
Shock Absorbers

- Remove:
  Circlip [A]

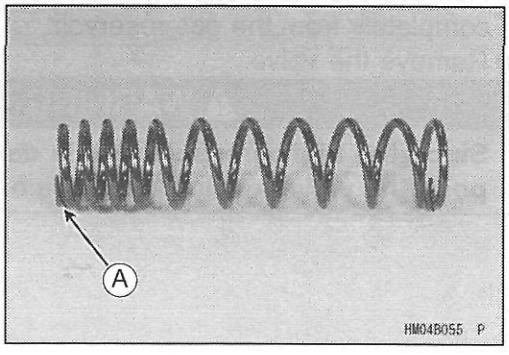
  Special Tool - Outside Circlip Pliers [B]: 57001-144



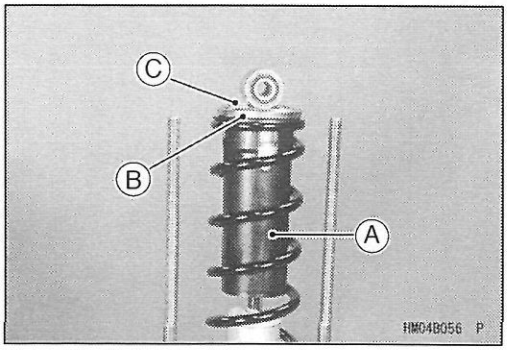
- Remove:
  Nuts and Holder
  Collar [A]
  Spring Seat [B]
  Cover [C]
  Spring [D] (Standard: Black Paint)



- Install the replaced spring (Option: Yellow Paint) with the smaller end [A] facing tank side.



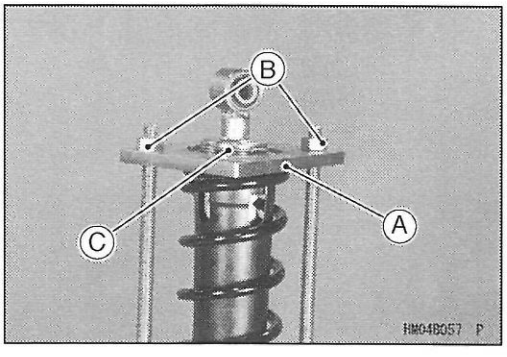
- Install:
  Cover [A]
  Spring Seat [B]
  Collar [C]



- Put the upper holder [A] (57001-1477) on upper end of the rear shock absorber and arbores.

  Special Tool - Holder & Spacer: 57001-1477

- Tighten the nuts [B] and compress the spring.
- Install the circlip [C].



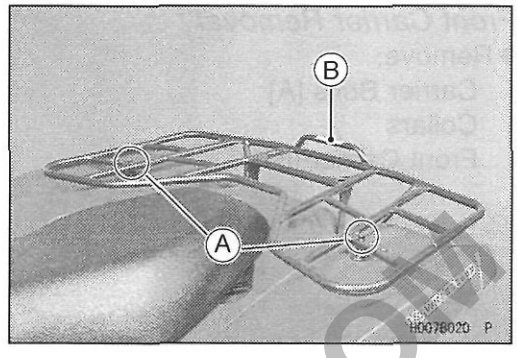
- Remove:
  Nuts and Holder

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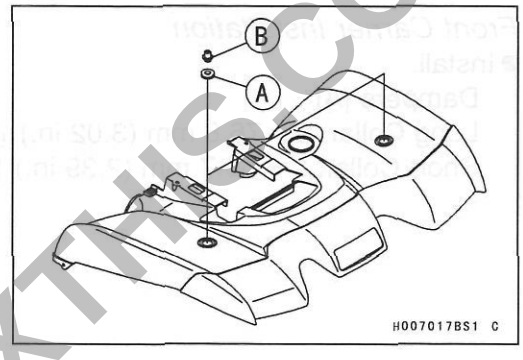
Carriers

● Remove:
Rear Carrier Upper Bolts [A]
Rear Carrier [B]



Rear Carrier Installation

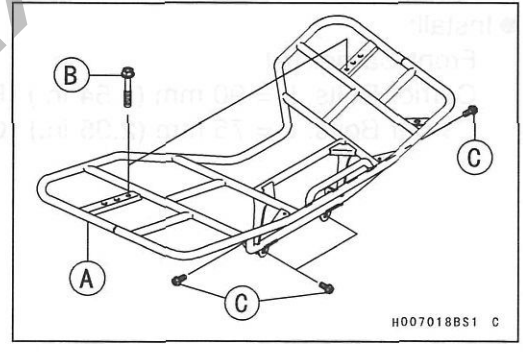
● Install:
Damper [A]
Collar [B]



● Install:
Rear Carrier [A]
● Tighten:

Torque - Rear Carrier Upper Bolts [B] and Nuts: 37 N·m (3.8 kgf·m, 27 ft·lb)
Rear Carrier Lower Bolts [C]: 54 N·m (5.5 kgf·m, 40 ft·lb)

● Install:
Snap Pins



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Battery

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. However, the battery's performance may be reduced noticeably if charged under conditions other than given above.
Never remove the seal caps during refresh charge.
If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

3) When you do not use the motorcycle for months
Give a refresh charge before you store the motorcycle and store it with the negative lead removed. Give a refresh charge once a month during storage.
4) Battery life
If the battery will not start the engine even after several refresh charges, the battery has exceeded its useful life. Replace it. (Provided, however, the vehicle's starting system has no problem.)

⚠ WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.
No fire should be drawn near the battery, or no terminals should have the tightening loosened.
The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

Interchange

A sealed battery can fully display its performance only when combined with a proper vehicle electrical system. Therefore, replace a sealed battery only on a vehicle which was originally equipped with a sealed battery.

Be careful, if a sealed battery is installed on a vehicle which had an ordinary battery as original equipment, the sealed battery's life will be shortened.

Charging Condition Inspection

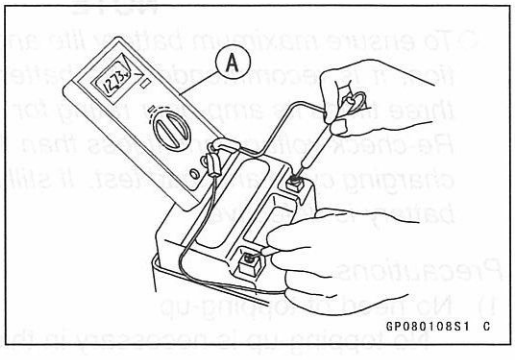
Battery charging condition can be checked by measuring battery terminal voltage.

● Remove the battery (see Battery Removal).

CAUTION

Be sure to disconnect the negative (–) lead first.

● Measure the battery terminal voltage.

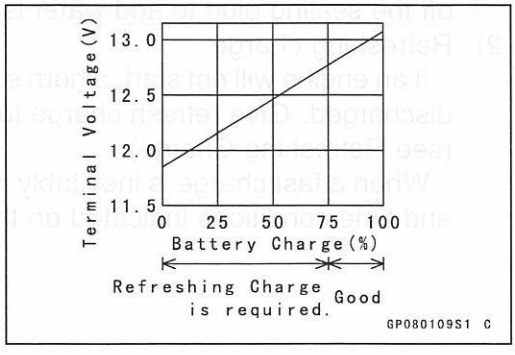


NOTE

○*Measure with a digital voltmeter [A] which can be read to one decimal place voltage.*

★If the reading is below the specified, refreshing charge is required.

Battery Terminal Voltage
Standard: 12.8 V or more



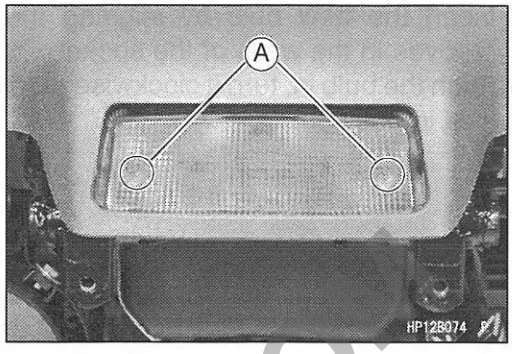
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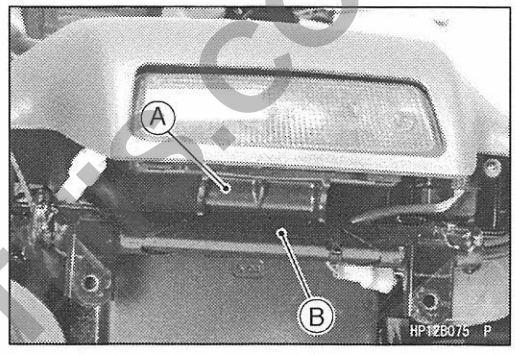
Lighting System

Taillight Bulb Replacement

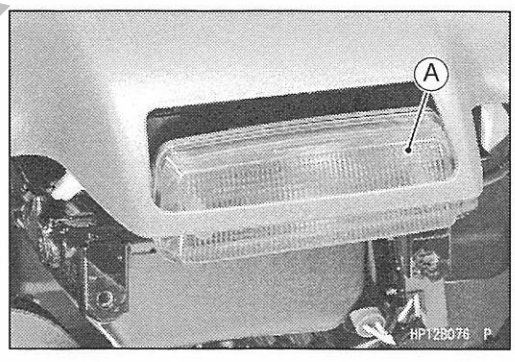
- Remove:
  Rear Carrier (see Rear Carrier Removal in Frame chapter)
  Taillight Lens Mounting Screws [A]



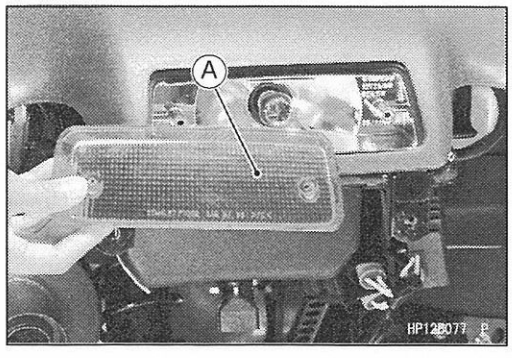
- Remove the taillight holder [A] assembly from the frame [B].



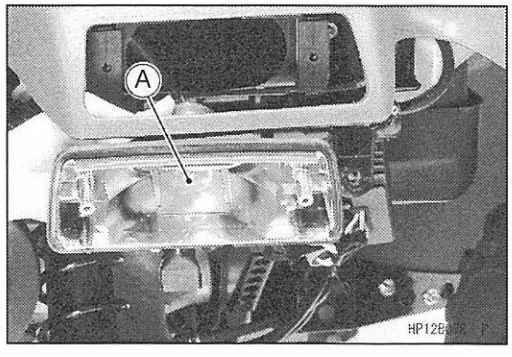
- Remove the taillight assembly [A] from the vehicle.



- Remove the taillight lens [A] from the taillight assembly.



- Push the bulb [A] in, turn it counterclockwise, and pull it out.
- Be sure the socket is clean.

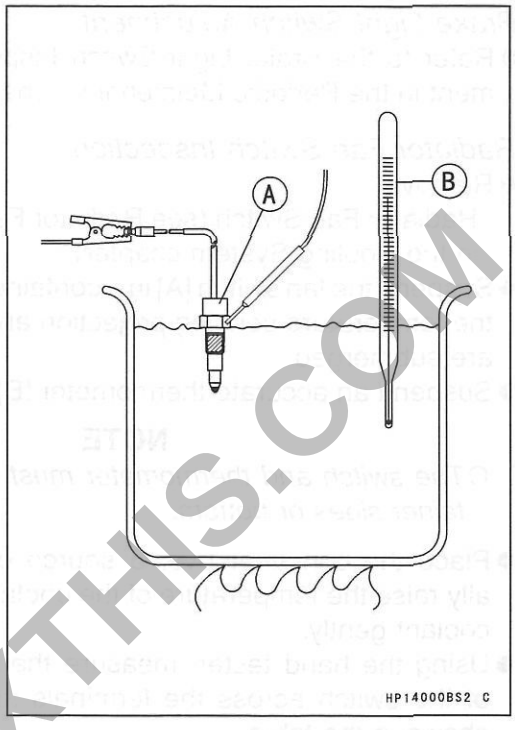


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Switches and Sensor

Water Temperature Switch Inspection



- Remove:
  Water Temperature 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.

NOTE

○*The switch and thermometer must not touch the container sides or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the connector and the body at the temperatures shown in the table.

★If the hand tester does not show the specified values, replace the switch.

Water Temperature Switch Resistance

○**Rising temperature:**

From OFF to ON at 112 ~ 118°C (234 ~ 244°F)

○**Falling temperature:**

From ON to OFF at 108 ~ 111°C (226 ~ 232°F)

ON: Less than 0.5 Ω

OFF: More than 1 MΩ

- Install:

Torque - Water Temperature Switch: 6.9 N·m (0.70 kgf·m, 61 in·lb)

Switch Inspection

- Using the hand tester, check to see that only the connections shown in the table have continuity (about zero ohms).

○For the handlebar switches, ignition switch, refer to tables in the Wiring Diagram.

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

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