

Electrical System

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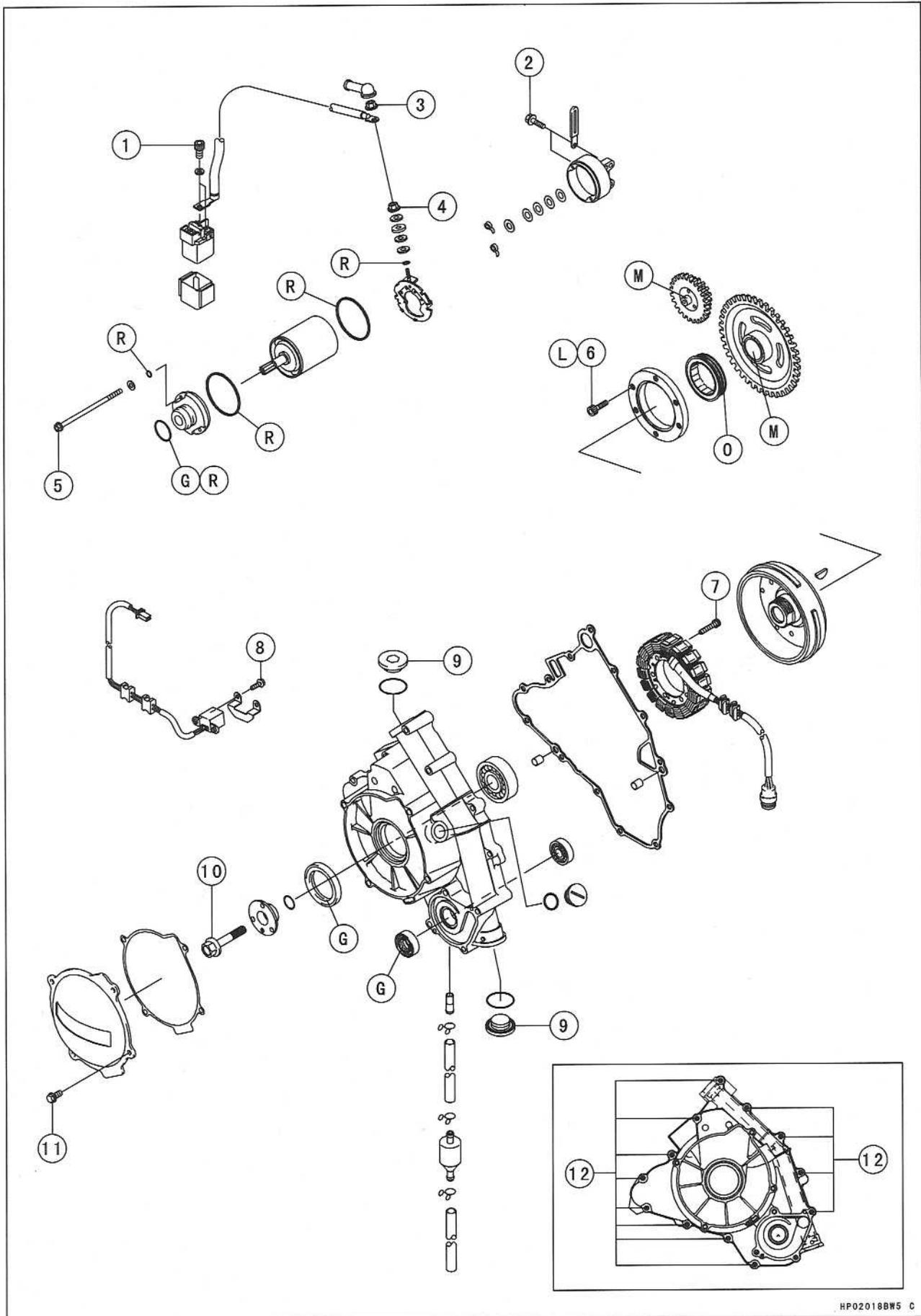
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Exploded View



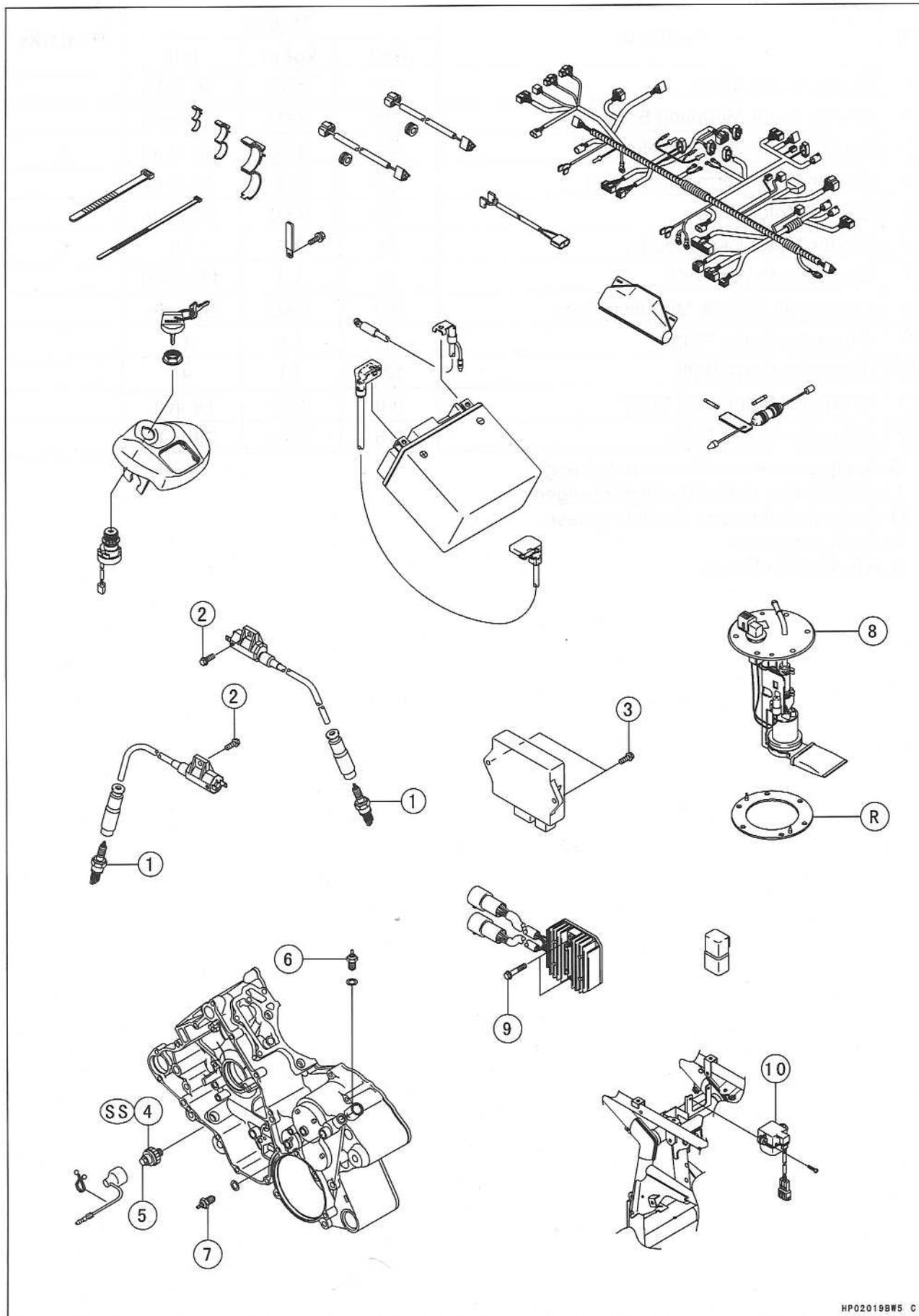
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Battery Cable Bolts	5.9	0.60	52 in·lb	
2	Starter Motor Mounting Bolts	8.8	0.90	78 in·lb	
3	Starter Motor Terminal Nut	4.9	0.50	43 in·lb	
4	Starter Motor Terminal Locknut	6.9	0.70	61 in·lb	
5	Starter Motor Bolts	4.9	0.50	43 in·lb	
6	Starter Motor Clutch Bolts	34	3.5	25	L
7	Alternator Stator Bolts	13	1.3	113 in·lb	
8	Crankshaft Sensor Mounting Bolts	5.9	0.60	52 in·lb	
9	Alternator Cover Plugs	18	1.8	13	
10	Alternator Rotor Bolt	127	13	94	
11	Alternator Bolt Cover Bolts	8.8	0.90	78 in·lb	
12	Alternator Cover Bolts	8.8	0.90	78 in·lb	

- G: Apply grease for oil seal and O-ring.
 L: Apply a non-permanent locking agent.
 M: Apply molybdenum disulfide grease.
 O: Apply engine oil.
 R: Replacement Parts

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Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Spark Plugs	13	1.3	113 in·lb	
2	Ignition Coil Mounting Bolts	5.5	0.55	48 in·lb	
3	Igniter Mounting Bolts	2.3	0.23	20 in·lb	
4	Oil Pressure Switch	15	1.5	11	SS
5	Oil Pressure Switch Terminal Bolt	1.5	0.15	13 in·lb	
6	Neutral Position Switch	15	1.5	11	
7	Reverse Position Switch	15	1.5	11	
8	Fuel Pump Mounting Bolts	2.0	0.20	17 in·lb	
9	Regulator/Rectifier Bolts	8.8	0.90	78 in·lb	

10. Vehicle Down Sensor

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

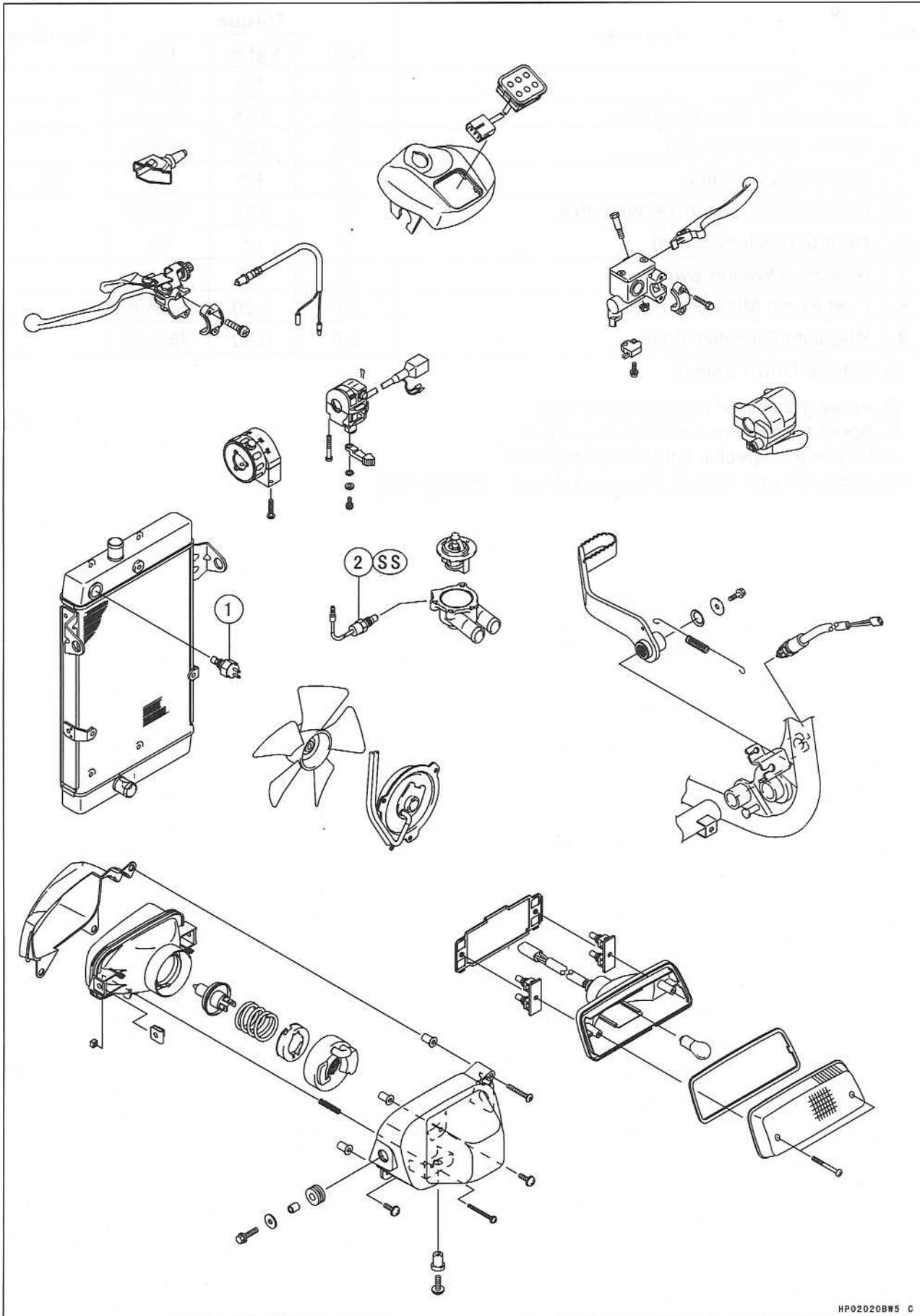
L: Apply a non-permanent locking agent.

S: Follow the specific tightening sequence.

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

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Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Radiator Fan Switch	18	1.8	13	
2	Coolant Temperature Warning Light Switch	6.9	0.70	61 in·lb	SS

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

16-10 ELECTRICAL SYSTEM

Specifications

Item	Standard	Service Limit
Battery:		
Type	Sealed Battery	---
Capacity	12 V 12 Ah	---
Charging System:		
Alternator type	Three-phase AC	---
Charging voltage (Regulator/rectifier output voltage)	14 ~ 15 V	---
Alternator output voltage	36 ~ 54 V 3 000 r/min (rpm)	---
Stator coil resistance	0.33 ~ 0.49 Ω	---
Ignition System:		
Spark plug:		
Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)	---
Spark plug cap resistance	3.75 ~ 6.25 k Ω	---
Ignition coil:		
3 needle arcing distance	7 mm (0.28 in.) or more	---
Primary winding resistance	0.09 ~ 0.13 Ω	---
Secondary winding resistance	3.8 ~ 5.8 k Ω	---
Primary peak voltage	50 V or more	---
Crankshaft sensor resistance	110 ~ 140 Ω	---
Crankshaft sensor peak voltage	1.8 V or more	---
Vehicle-down Sensor		
Detection method	Magnetic flux detection method	---
Detection angle	More than 65° \pm 5° for each bank	---
Detection time	Within 0.5 ~ 1.0 sec.	---
Output voltage	in the text	---
Electric Starter System:		
Starter motor:		
Commutator diameter	28 mm (1.10 in.)	27 mm (1.06 in.)
Brush length	12 mm (0.47 in.)	4 mm (0.16 in.)
Fuel Pump:		
Fuel pump pressure	17.7 ~ 22.6 kPa (0.18 ~ 0.23 kgf/cm ² , 2.6 ~ 3.3 psi)	---
Switches:		
Brake light switch timing	ON after 10 mm (0.4 in.) of pedal travel	---
Radiator fan switch resistance:		
Rising temperature	From OFF to ON at 96 ~ 100°C (205 ~ 212°F)	---

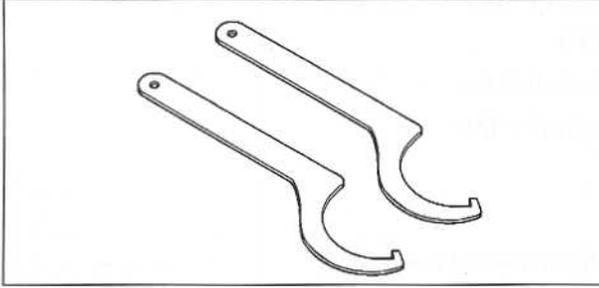
Specifications

Item	Standard	Service Limit
Falling temperature	From ON to OFF at 91 ~ 95°C (196 ~ 203°F) ON: Less than 0.5 Ω OFF: More than 1 MΩ	- - -
Coolant temperature warning light 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	- - -

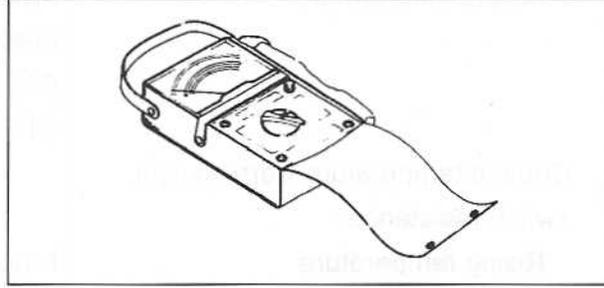
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Special Tools

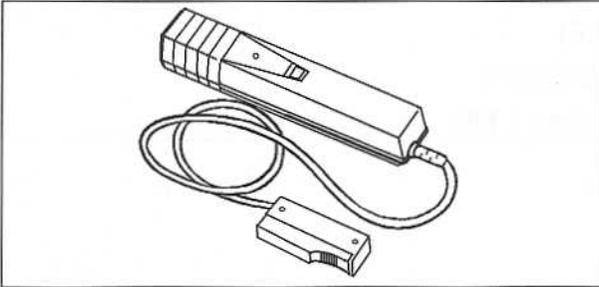
Hook Wrench :
57001-1101



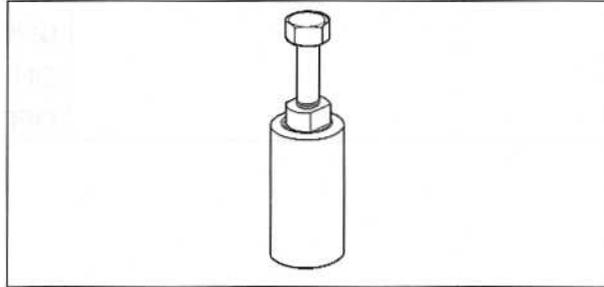
Hand Tester :
57001-1394



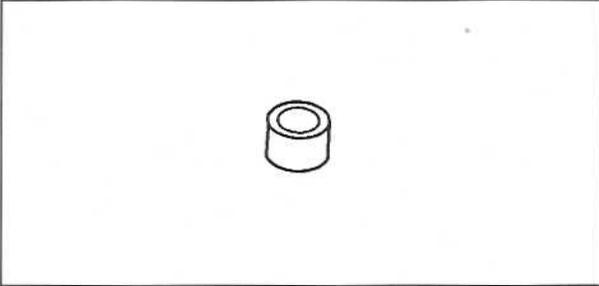
Timing Light :
57001-1241



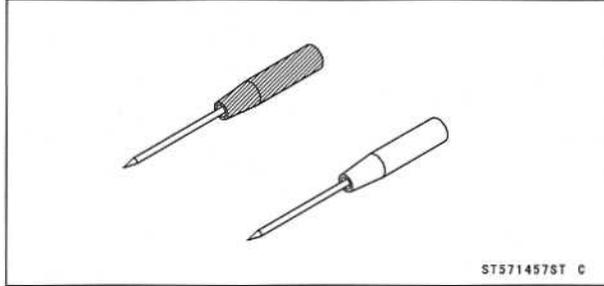
Flywheel Puller Assembly :
57001-1405



Compression Gauge Gasket :
57001-1314



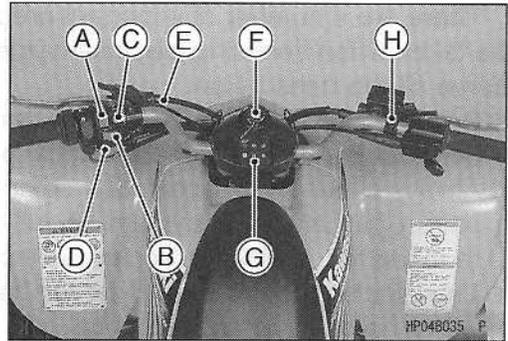
Needle Adapter Set :
57001-1457



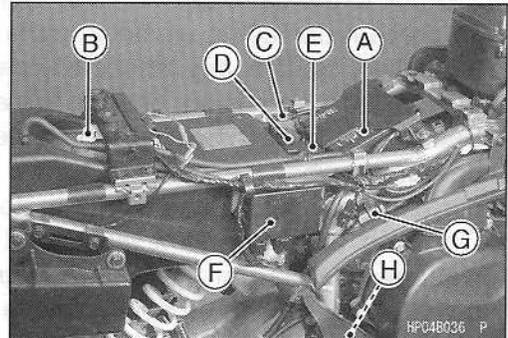
ST571457ST C

Parts Location

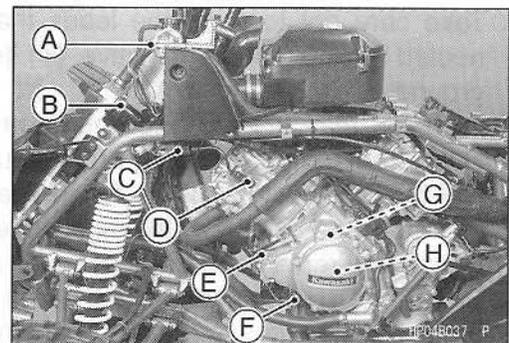
- Light/Dimmer Switch [A]
- Engine Stop Switch [B]
- Starter Button [C]
- Reverse Power Assist Switch (Override) [D]
- Rear Brake Light Switch [E]
- Ignition Switch [F]
- Indicator Unit [G]
- Front Brake Light Switch [H]



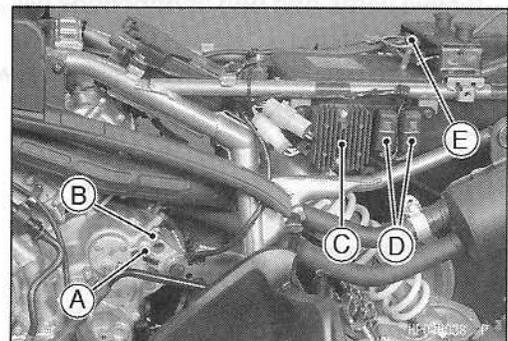
- Battery [A]
- Fuel Pump, Fuel Reserve Switch [B] (in fuel tank)
- Main Fuse 30 A [C]
- Starter Relay [D]
- Vehicle Down Sensor [E]
- Igniter [F]
- Ignition Coil (Rear) [G]
- Rear Brake Light Switch [H]



- Water Temperature Switch [A]
- Radiator Fan Switch [B]
- Ignition Coil (Front) [C]
- Spark Plug [D]
- Starter Motor [E]
- Oil Pressure Warning Light Switch [F]
- Crankshaft Sensor [G]
- Alternator [H]



- Reverse Position Switch [A]
- Neutral Position Switch [B]
- Regulator/Rectifier [C]
- Starter Circuit Relays [D]
- Radiator Fan Fuse [E]



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Precautions

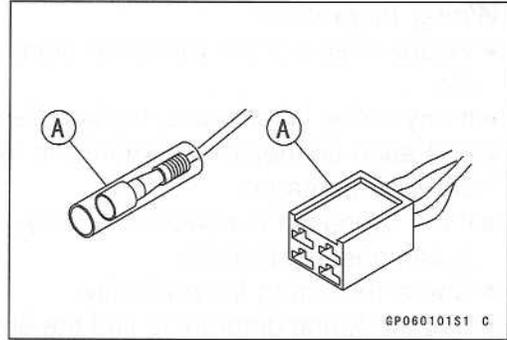
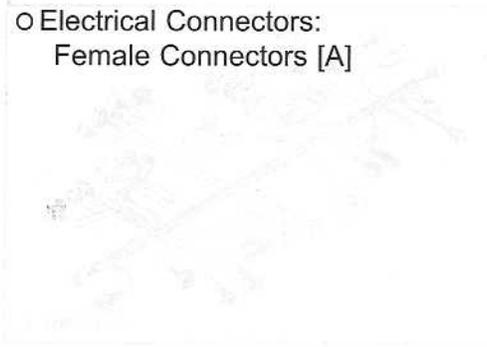
There are a number of important precautions that should be taken when servicing electrical systems. Learn and observe all the rules below.

- Do not reverse the battery lead connections. This will burn out the diodes in the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is required for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damaging electrical parts, do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the high current, never keep the starter button depressed when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Only use an illumination bulb rated for the voltage or wattage specified in the wiring diagram, or the handle cover could be warped by excessive heat radiated from the bulb.
- Take care not to short the leads that are directly connected to the battery positive (+) terminal to chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Defective wires and bad connections will affect electrical system operation.
- Measure coil and winding resistance when the part is cold (at room temperature).
- Color Codes:

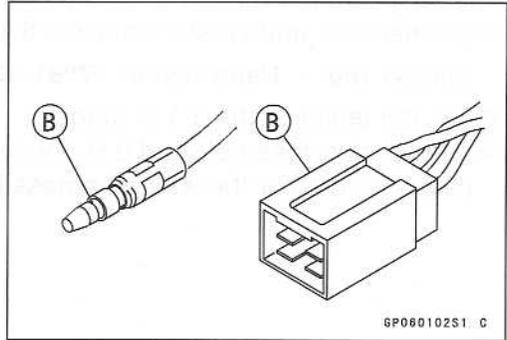
BK	Black	G	Green	P	Pink
BL	Blue	GY	Gray	PU	Purple
BR	Brown	LB	Light blue	R	Red
CH	Chocolate	LG	Light green	W	White
DG	Dark green	O	Orange	Y	Yellow

Precautions

○ Electrical Connectors:
Female Connectors [A]



Male Connectors [B]



16-16 ELECTRICAL SYSTEM

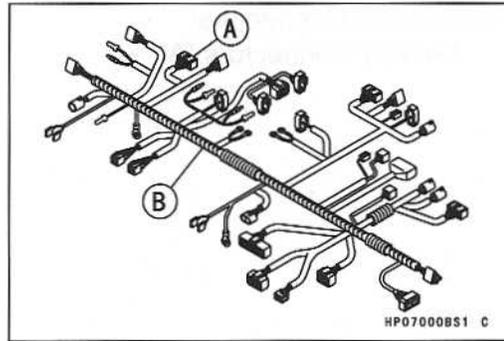
Electrical Wiring

Wiring Inspection

- Visually inspect the wiring for signs of burning, fraying, etc.
- ★ If any wiring is defective, replace the damaged wiring.
- Pull each connector [A] apart and inspect for corrosion, dirt, and damage.
- ★ If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.
- Check the wiring for continuity.
- Use the wiring diagram to find the ends of the lead which is suspected of being a problem.
- Connect the hand tester between the ends of the leads.

Special Tool - Hand Tester: 57001-1394

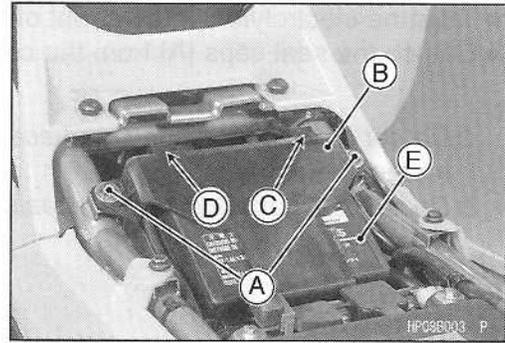
- Set the tester to the x 1 Ω range.
- ★ If the tester does not read 0 Ω , the lead is defective. Replace the lead or the wiring harness [B] if necessary.



Battery

Battery Removal

- Turn off the ignition switch.
- Remove the seat (see Frame chapter)
- Loosen the bolts [A] of the battery holder [B].
- Remove the battery with the holder and the case.
- Disconnect the battery negative (-) cable [C] first, and then the positive (+) cable [D].
- Take out the battery [E].



Battery Installation

- Turn off the ignition switch.
- Put the battery with the case and the holder in place.
- Connect the positive cable first and then the negative cable.
- Put a light coat of grease on the terminals to prevent corrosion.
- Tighten the battery holder bolts.

Electrolyte Filling

- Make sure that the model name [A] of the electrolyte container matches the model name [B] of the battery. These names must be the same.

Battery Model Name : KMX 14-BS

CAUTION

Be sure to use the electrolyte container with the same model name as the battery since the electrolyte volume and specific gravity vary with the battery type. This is to prevent overfilling of the electrolyte, shorting the battery life, and deterioration of the battery performance.

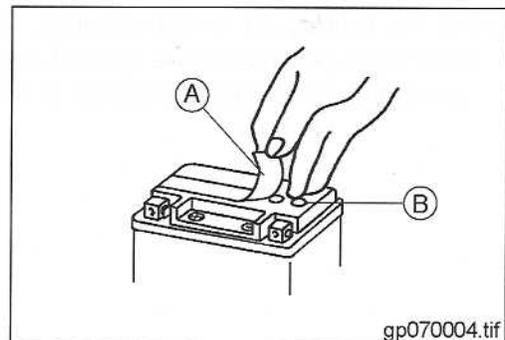
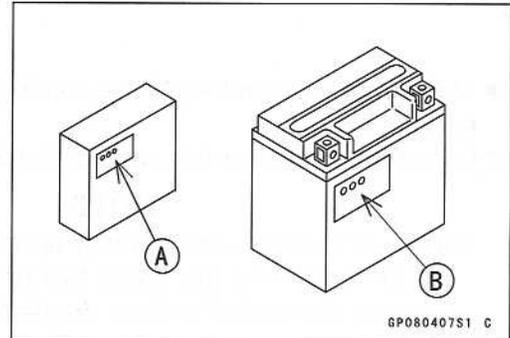
- Check to see that there is no peeling, tears or holes in the seal sheet on the top of the battery.
- Place the battery on a level surface.
- Remove the seal sheet.

CAUTION

Do not remove the aluminum 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).



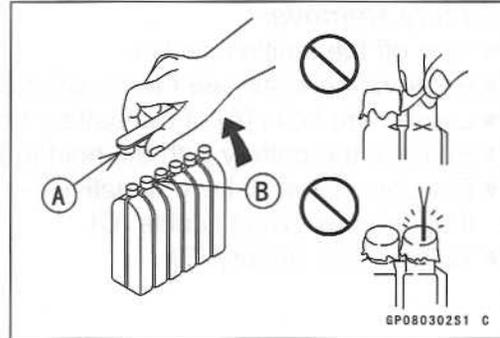
16-18 ELECTRICAL SYSTEM

Battery

- Take the electrolyte container out of the vinyl bag.
- Detach the seal caps [A] from the container.

NOTE

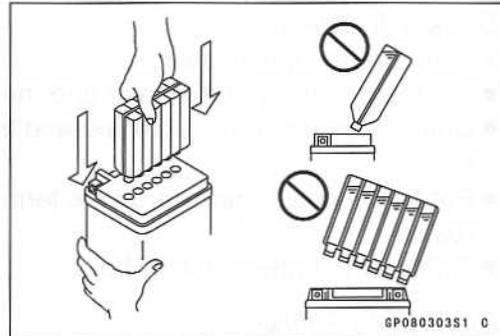
- Do not discard the seal caps because it is used as the battery plugs later.
- Do not peel back or pierce the seals [B] on the container.



- Place the electrolyte container upside down aligning the six seals with the six battery filler ports.
- Push the container down strongly enough to break the seals. Now the electrolyte should start to flow into the battery.

NOTE

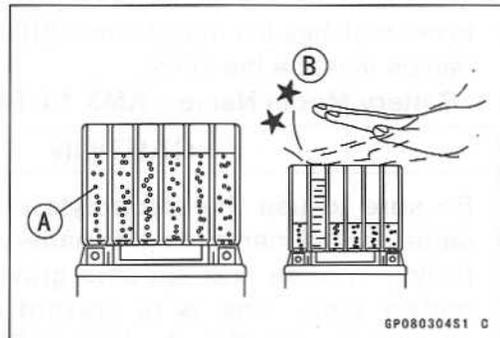
- Do not tilt the container as the electrolyte flow may be interrupted.



- 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.

- 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.

Battery

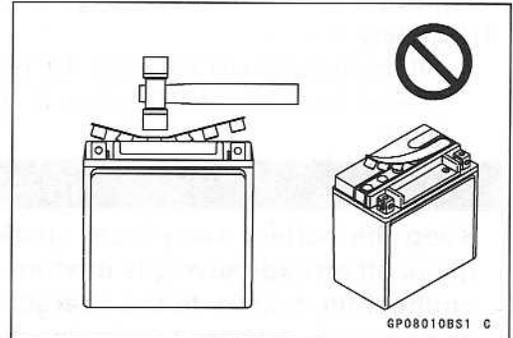
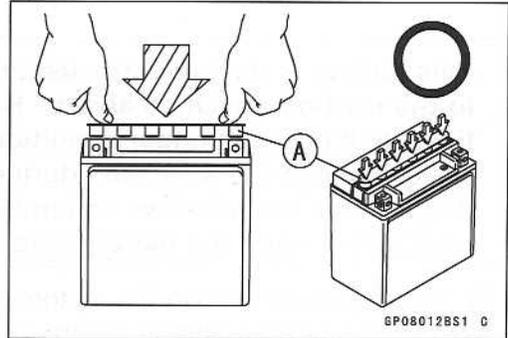
- Fit the seal caps [A] tightly into the filler ports until the seal caps are at the same level as the top of the battery.

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 x 2 ~ 3 hours
Battery has been stored in high temperature and humidity.	1.4 A x 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) <u>12</u> <u>10</u> <u>99</u> <u>T1</u> Day Month Year Mfg. location	

Note 1 : Terminal voltage — To measure battery terminal voltage, use a digital voltmeter.

Precautions

- 1) No need of topping-up
No topping-up is necessary in this battery until it ends its life under normal use. Forcibly prying off the sealing plug to add water is very dangerous. Never do that.
- 2) Refreshing charge
If an engine will not start, a horn sounds weak, or lamps are dim, it indicates the battery has been discharged. Give refresh charge for 5 to 10 hours with charge current shown in the specification (see Refreshing Charge).
When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

16-20 ELECTRICAL SYSTEM

Battery

CAUTION

This battery is designed to sustain no unusual deterioration if refresh-charged according to the method specified above. However, the battery's performance may be reduced noticeably if charged under conditions other than given above.

Never remove the seal caps during refresh charge.

If by chance an excessive amount of gas is generated due to overcharging, the safety valve operates to keep the battery safe.

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

⚠ WARNING

Keep the battery away from sparks and open flames during charging, since the battery gives off an explosive gas mixture of hydrogen and oxygen. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases.

No fire should be drawn near the battery, or no terminals should have the tightening loosened.

The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water. Get medical attention if severe.

Interchange

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

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

Battery

Charging Condition Inspection

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

- Remove the battery (see Battery Removal).

CAUTION

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

- Measure the battery terminal voltage.

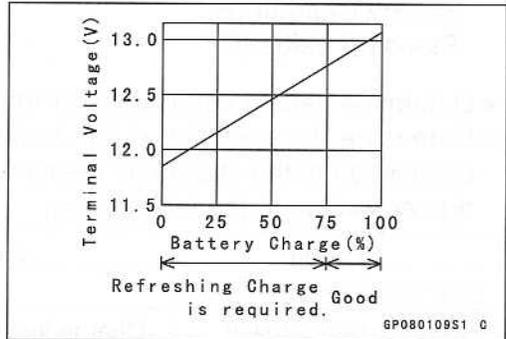
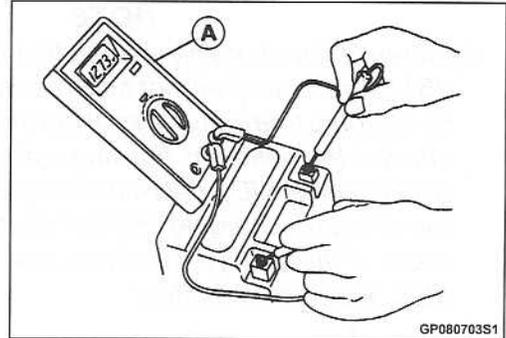
NOTE

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

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

Battery Terminal Voltage

Standard: 12.6 V or more

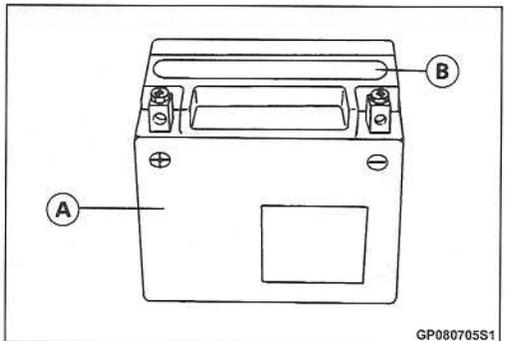


Refreshing Charge

- Remove the battery [A] (see Battery Removal).
- Refresh-charge by following method according to the battery terminal voltage.

⚠ WARNING

This battery is sealed type. Never remove seal sheet [B] even at charging. Never add water. Charge with current and time as stated below.



Terminal Voltage: 11.5 ~ less than 12.5 V

Standard Charge

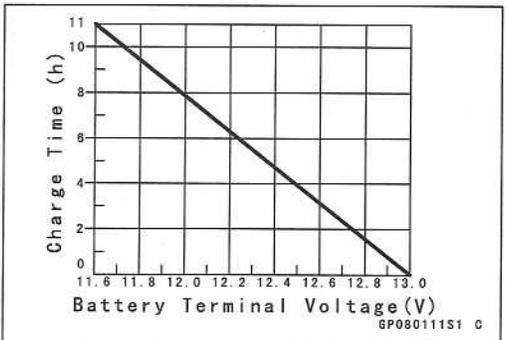
1.4 A x 5 ~ 10 h (see following chart)

Quick Charge

6.0 A x 1.0 h

CAUTION

If possible, do not quick charge. If the quick charge is done due to unavoidable circumstances, do the standard charge later on.



Terminal Voltage : less than 11.5 V

Charging Method: 1.4 A x 20 h

16-22 ELECTRICAL SYSTEM

Battery

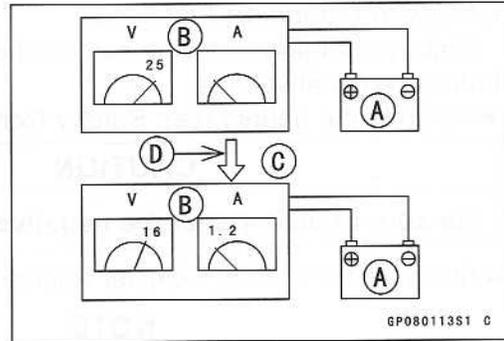
NOTE

○ Increase the charging voltage to a maximum voltage of 25 V if the battery will not accept current initially. Charge for no more than 5 minutes at the increased voltage then check if the battery is drawing current. If the battery will accept current [D], decrease the voltage and charge by the standard charging method described on the battery case. If the battery will not accept current after 5 minutes, replace the battery.

Battery [A]

Battery Charger [B]

Standard Value [C]



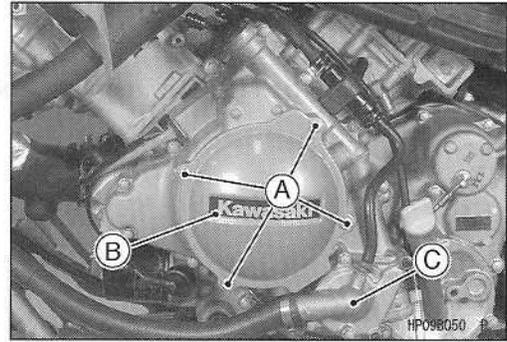
- Determine battery condition after refreshing charge.
- Determine the condition of the battery 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.6 V or higher	Good
12.0 ~ 12.5 V or lower	Charge insufficient → Recharge
12.0 V or lower	Unserviceable → Replace

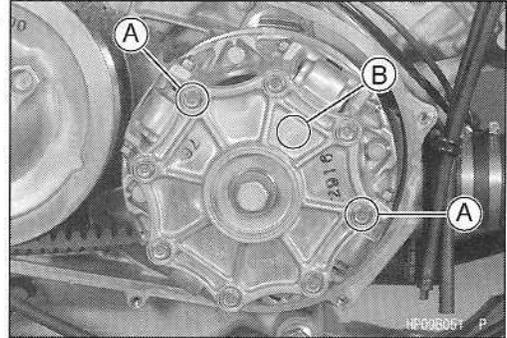
Charging System

Alternator Cover Removal

- Drain the coolant (see Cooling System chapter).
- Remove:
 - Bolts [A] and Alternator Bolt Cover [B]
 - Water Pump Cover [C] and Impeller (see Cooling System chapter)



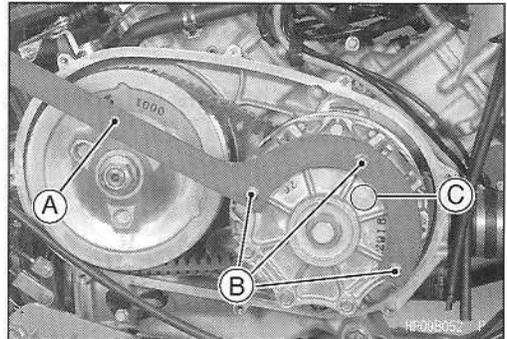
- Remove:
 - Torque Converter Cover (see Converter System chapter)
- Remove the three bolts of the drive pulley cover, except for at the dowel pin parts [A] as shown.
 - [B] Arrow



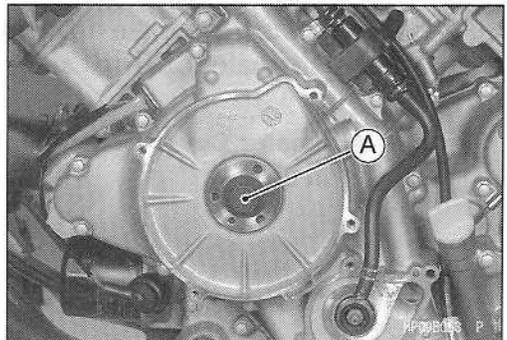
- Install and tighten the drive pulley holder [A] and the three bolts [B].

Special Tool - Drive Pulley Holder: 57001-1520

[C] Arrow



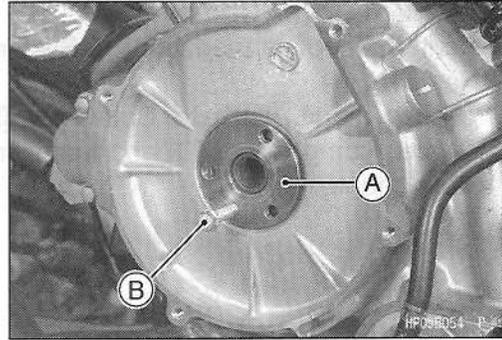
- Holding the drive pulley with the drive pulley holder, loosen the alternator rotor bolt [A].
- Remove:
 - Alternator Rotor Bolt



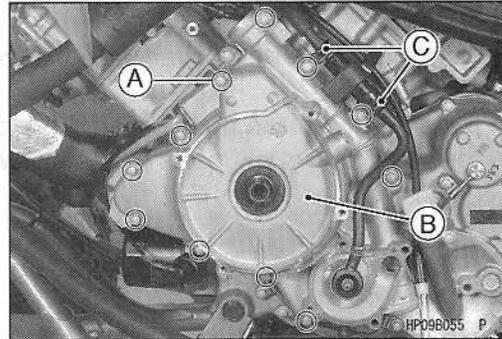
16-24 ELECTRICAL SYSTEM

Charging System

- Remove:
 - Collar [A]
- Install the M6 bolt [B] to the collar, and remove it.

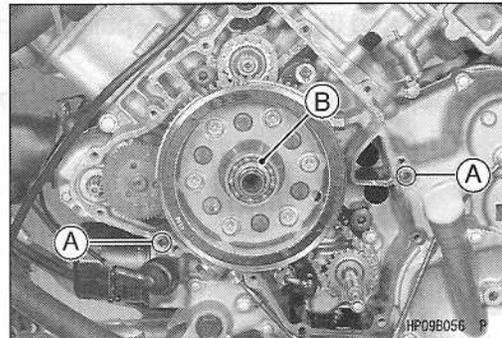


- Place an oil pan under the engine left side.
- Remove:
 - Alternator and Crankshaft Sensor Lead Connectors (disconnect)
 - Alternator Cover Bolts [A]
 - Alternator Cover [B]
 - Clamp [C]



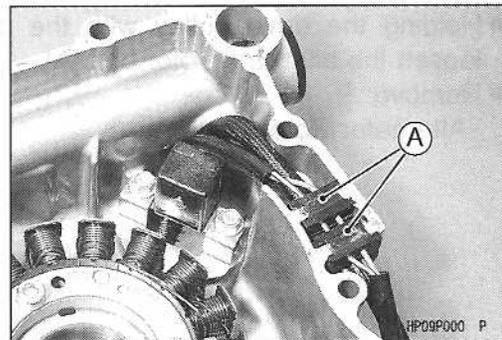
Alternator Cover Installation

- Be sure all of the old gasket has been removed from the alternator cover and the left crankcase sealing surfaces.
- Check that the dowel pins [A] are in place, and fit a new gasket on the crankcase.
- Check that the bearing [B] is in place.



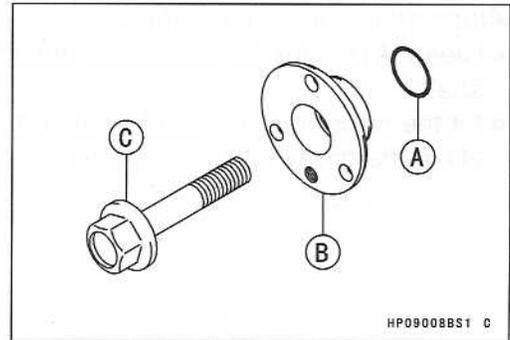
- Fit the grommets [A] into the notch in the cover.
- Grease the alternator cover oil seal.
- Tighten

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

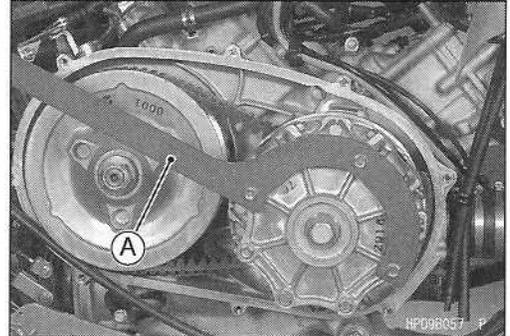


Charging System

- Check that the O-ring [A] in the collar [B] is in good condition.
- Apply grease to the O-ring.
- Install the collar on the alternator cover.
- Install the alternator rotor bolt [C].

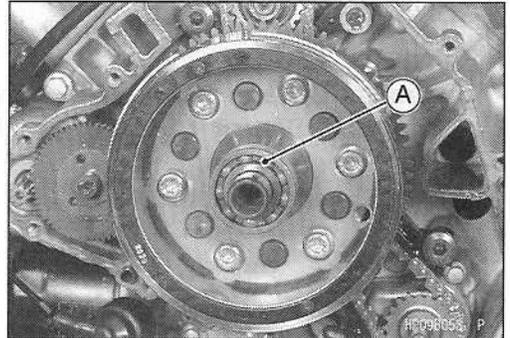


- Hold the drive pulley with the drive pulley holder [A].
Special Tool - Drive Pulley Holder: 57001-1520
- Tighten:
Torque - Alternator Rotor Bolt: 127 N·m (13 kgf·m, 94 ft·lb)
Alternator Bolt Cover Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)
- Add engine oil.

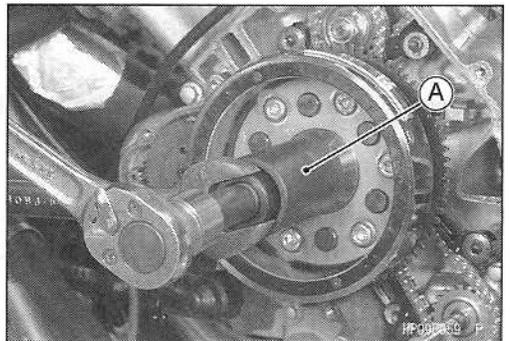


Alternator Rotor Removal

- Remove:
Alternator Cover (see Alternator Cover Removal)
Ball Bearing [A]



- Thread the flywheel puller [A] onto the alternator rotor.
Special Tool - Flywheel Puller: 57001-1405
- Holding the flywheel puller, turn the rotor puller until the alternator rotor is forced off the end of the crankshaft.



CAUTION

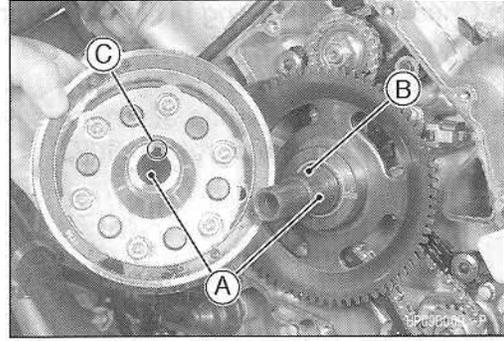
If the rotor is difficult to remove, turn the puller while tapping the end of the puller. Do not strike the alternator rotor. Striking the rotor can cause the magnets to lose magnetism.

16-26 ELECTRICAL SYSTEM

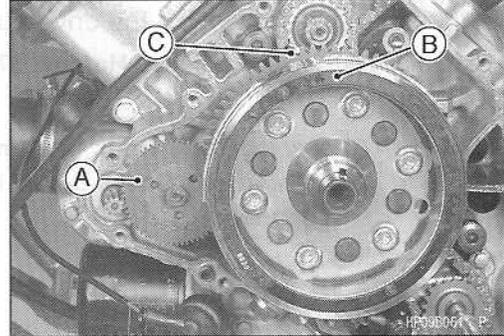
Charging System

Alternator Rotor Installation

- Clean [A] the inside of the rotor and the end of the crankshaft.
- Fit the rotor onto the crankshaft so that woodruff key [B] fits in the groove [C] in the hub of the rotor.

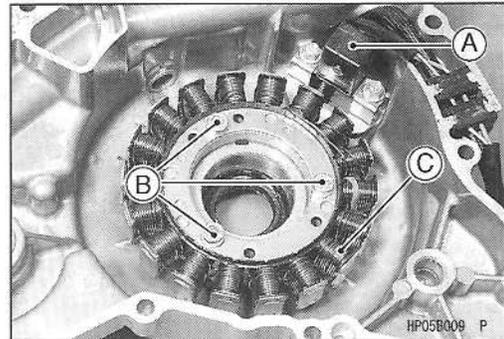


- Install the torque limiter [A].
- Install the alternator rotor [B] while turning the starter clutch gear [C].



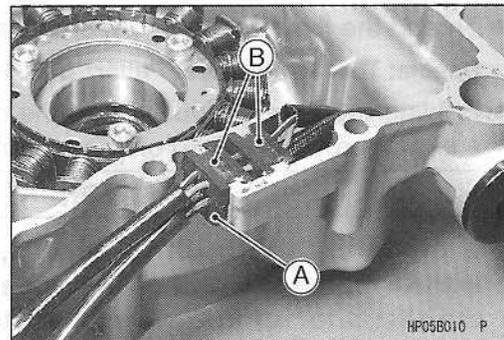
Alternator Stator Removal

- Remove:
 - Alternator Cover (see Alternator Cover Removal)
 - Crankshaft Sensor [A] (see Crankshaft Sensor Removal)
 - Bolts [B] and Alternator Stator [C]



Alternator Stator Installation

- Tighten:
 - Torque - Alternator Stator Bolts: 13 N·m (1.3 kgf·m, 113 in·lb)**
- Install:
 - Crankshaft Sensor (see Crankshaft Sensor Installation)
- Fit the lead grommets into the notch on the alternator cover.
 - Grommets [A] for Alternator Leads
 - Grommets [B] for Crankshaft Sensor Leads



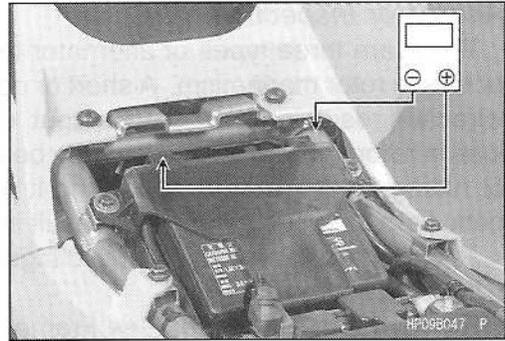
Charging System

Regulator/Rectifier Output Voltage Inspection

- Remove the seat (see Frame chapter).
- Check the battery condition (see Battery section).
- Warm up the engine to obtain actual alternator operating conditions.
- Check that the ignition switch is turned off, and connect a hand tester to the battery terminals.

Special Tool - Hand Tester : 57001-1394

- Start the engine and note the voltage readings at various engine speeds with the headlight turned on and then off. The readings should show nearly battery voltage when the engine speed is low, and as the engine speed increases, the readings should also increase.



Regulator/Rectifier Output Voltage

Tester Range	Connections		Reading
	Tester (+) to	Tester (-) to	
25 V DC	Battery (+)	Battery (-)	14 ~ 15 V

- Turn off the ignition switch, and disconnect the hand tester.
- ★ If the regulator/rectifier output voltage is between the values given in the table, the charging system is working normally.
- ★ If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.
- ★ If the battery voltage does not increase as the engine speed increases, then the regulator/rectifier is defective or the alternator output is insufficient for the loads. Check the alternator and regulator/rectifier to determine which part is defective.

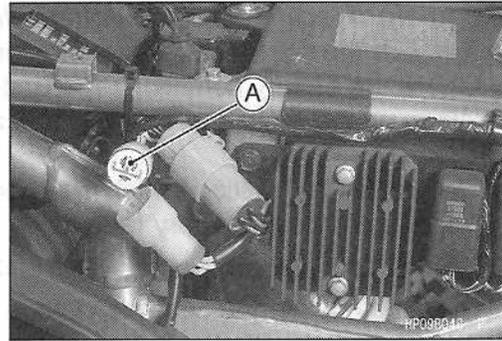
16-28 ELECTRICAL SYSTEM

Charging System

Alternator Inspection

There are three types of alternator failures: short, open, or loss in rotor magnetism. A short or open in one of the coil wires will result in either a low output, or no output at all. A loss in rotor magnetism, which may be caused by dropping or hitting the alternator, by leaving it near an electromagnetic field, or just by aging, will result in low output.

- To check the alternator output voltage, perform the following procedures.
 - Remove the rear fender (see Frame chapter).
 - Disconnect the alternator connector [A].
 - Connect a hand tester as shown in the table.
 - Start the engine.
 - Run it at the rpm given in the table.
 - Note the voltage readings (total 3 measurements).



Alternator Output Voltage

Tester Range	Connections		Reading @3 000rpm
	Tester (+) to	Tester (-) to	
250 V AC	One yellow lead	Another yellow lead	36 ~ 54 V

★ If the output voltage is within the values in the table, the alternator is operating correctly, and the regulator/rectifier is damaged. A much lower reading indicates that the alternator is defective.

- Check the stator coil resistance as follows:
 - Stop the engine.
 - Disconnect the alternator connector.
 - Connect a hand tester as shown in the table.
 - Note the readings (total 3 measurement).

Stator Coil Resistance

Tester Range	Connections		Reading
	Tester (+) to	Tester (-) to	
x 1 Ω	One yellow lead	Another yellow lead	0.33 ~ 0.49 Ω

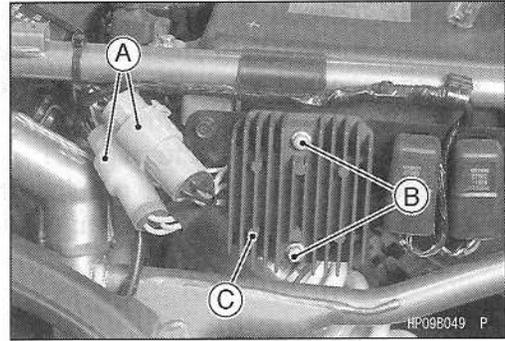
- ★ If there is more resistance than shown in the table, or no reading (infinity) for any two leads, the stator has an open and must be replaced. Much less resistance means the stator is shorted and must be replaced.
- Using the highest resistance range of the hand tester, measure the resistance between each of the black leads and chassis ground.
- ★ Any reading less than infinity (∞) indicates a short, necessitating stator replacement.
- ★ If the stator coils have normal resistance, but the voltage check shows the alternator to be defective; then the rotor magnetism has probably weakened, and the rotor must be replaced.

Special Tool - Hand Tester : 57001-1394

Charging System

Regulator/Rectifier Inspection

- Remove:
 - Connectors [A] (disconnect)
 - Bolts [B] and Regulator/Rectifier [C]



Rectifier Circuit Check:

- Check conductivity of the following pair of terminals.

Rectifier Circuit Inspection

Tester connection	W/R-Y1,	W/R-Y2,	W/R-Y3
	BK-Y1,	BK-Y2,	BK-Y3

- ★ The resistance should be low in one direction and more than ten times as much in the other direction. If any two leads are low or high in both directions, the rectifier is defective and must be replaced.

NOTE

- The actual meter reading varies with the meter and the individual rectifier. Generally speaking the lower reading should be from zero to one half of the scale.

Regulator Circuit Check:

To test the regulator out of circuit, use three 12 V batteries and a test light (12 V 3 ~ 6 W bulb in a socket with leads).

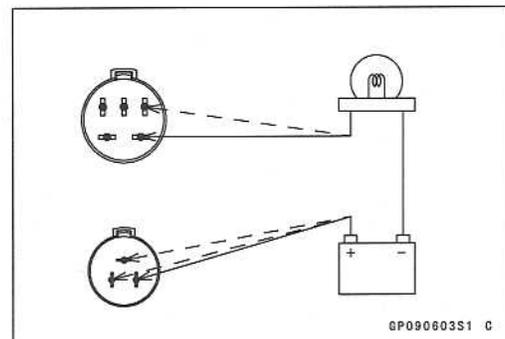
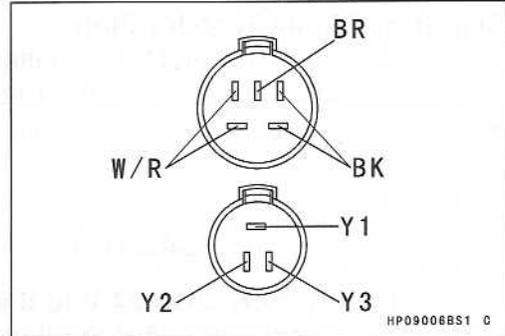
CAUTION

The test light works as an indicator and also a current limiter to protect the regulator/rectifier from excessive current. Do not use an ammeter instead of a test light.

- Check to be sure the rectifier circuit is correct before continuing.

Regulator Circuit Test-1st Step:

- Connect the test light and the 12 V battery to the regulator/rectifier as shown.
- Check Y1, Y2, and Y3 terminal respectively.
- ★ If the test light turns on, the regulator/rectifier is defective.
- ★ If the test light does not turn on, continue the test.

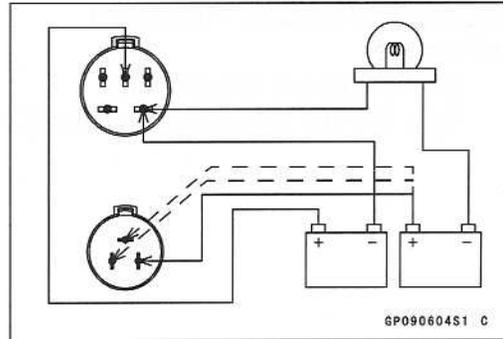


16-30 ELECTRICAL SYSTEM

Charging System

Regulator Circuit Test-2nd Step:

- Connect the test light and a 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
 - Apply 12 V to the BR terminal.
 - Check Y1, Y2, and Y3 terminals.
- ★ If the test light turns on, the regulator/rectifier is defective.
★ If the test light does not turn on, continue the test.



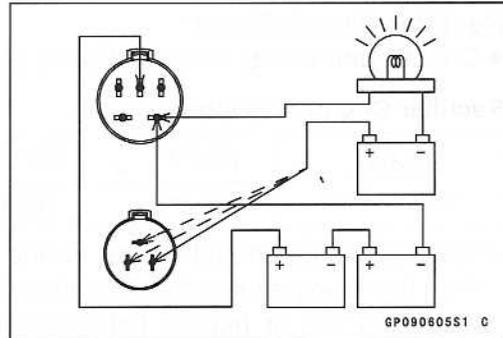
Regulator Circuit Test-3rd Step:

- Connect the test light and a 12 V battery in the same manner as specified in the "Regulator Circuit Test-1st Step".
- Momentarily apply 24 V to the BR terminal by adding a 12 V battery.
- Check Y1, Y2, and Y3 terminals.

CAUTION

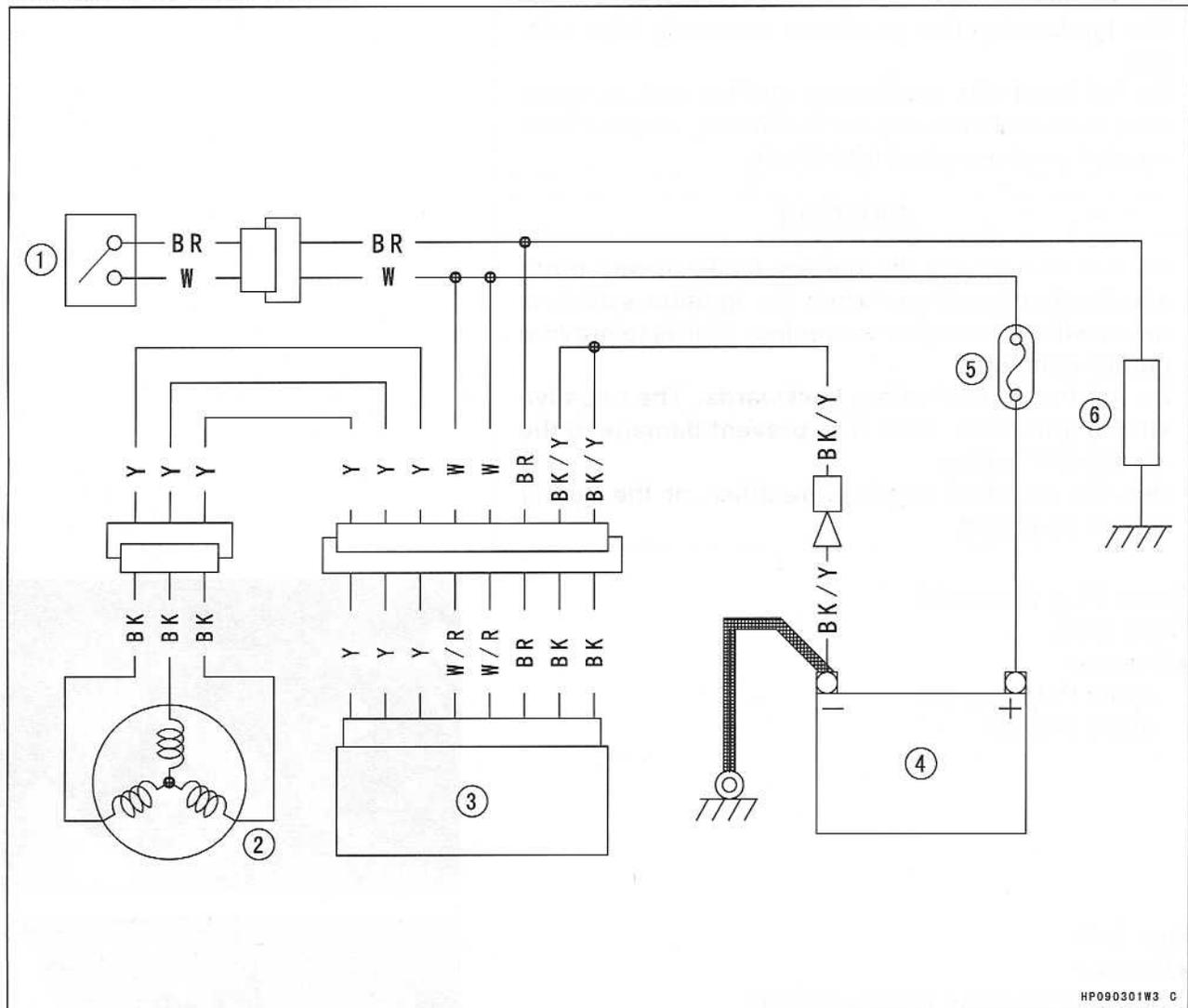
Do not apply more than 24 V to the regulator/rectifier. Do not leave the 24 V applied for more than a few seconds, or the unit will be damaged.

- ★ If the test light did not light when the 24 V was applied momentarily to the BR terminal, the regulator/rectifier is defective.
- ★ If the regulator/rectifier passes all of the tests described, it may still be defective. If the charging system still does not work properly after checking all of the components and the battery, test the regulator/rectifier by replacing it with a known good unit.



Charging System

Charging System Circuit



1. Ignition Switch
2. Alternator

3. Regulator/Rectifier
4. Battery

5. Main Fuse 30 A
6. Load

16-32 ELECTRICAL SYSTEM

Ignition System

⚠ WARNING

The ignition system produces extremely high voltage.

Do not touch the spark plug, ignition coil, or spark plug lead while the engine is running, or you could receive a severe electrical shock.

CAUTION

Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent igniter damage.

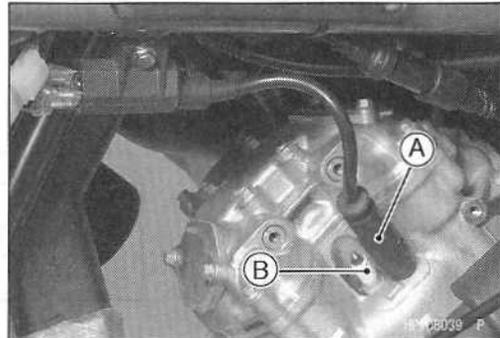
Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and igniter.

Use the standard regulator/rectifier, or the igniter will be damaged.

Spark Plug Removal

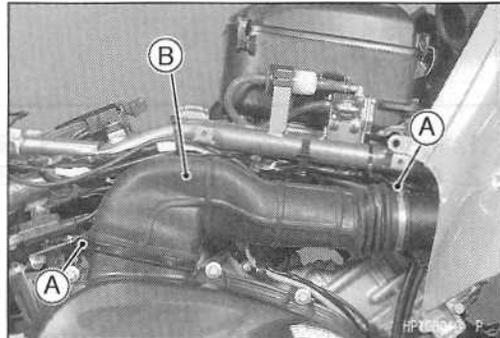
Front Side:

- Remove:
 - Spark Plug Cap [A]
 - Spark Plug [B]



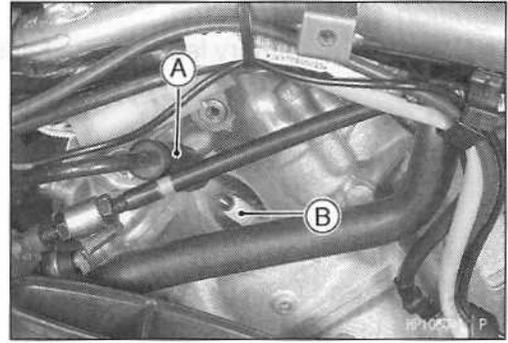
Rear Side:

- Remove:
 - Rear Fender (see Frame chapter)
 - Air Cleaner Cover (see Frame chapter)
 - Inner Side Cover (see Frame chapter)
 - Clamp Screws [A] and Clamps
 - Converter Exhaust Joint Duct [B]



Ignition System

- Remove:
 - Spark Plug Cap [A]
 - Spark Plug [B]



Spark Plug Installation

- Tighten:
 - Torque - Spark Plugs: 13 N·m (1.3 kgf·m, 113 in·lb)**
- Fit the spark plug caps securely.
- Pull up the spark plug caps lightly to make sure of the installation of the spark plug caps.

Spark Plug Cleaning/Inspection

- Refer to the Spark Plug Inspection in the Periodic Maintenance chapter.

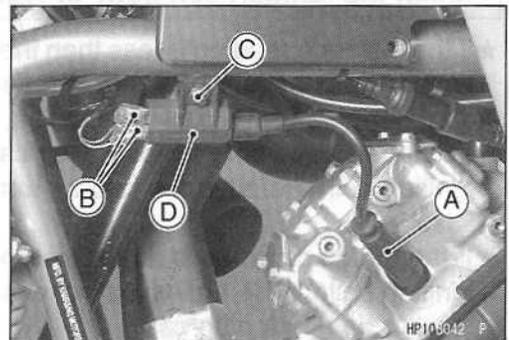
Spark Plug Gap Inspection

- Refer to the Spark Plug Inspection in the Periodic Maintenance chapter.

Ignition Coil Removal

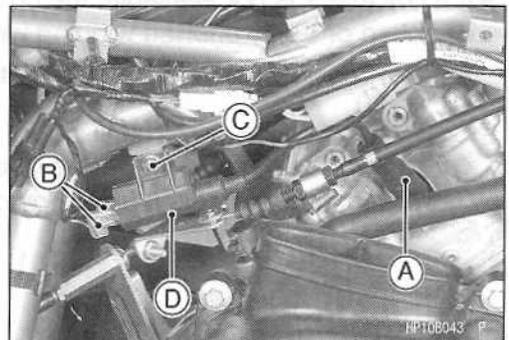
Front Side:

- Remove:
 - Spark Plug Cap [A]
 - Primary Lead Connectors [B]
 - Bolt [C]
 - Ignition Coil [D]



Rear Side:

- Remove:
 - Rear Fender (see Frame chapter)
 - Air Cleaner Cover (see Frame chapter)
 - Inner Side Cover (see Frame chapter)
 - Converter Exhaust Joint Duct (see Spark Plug Removal (Rear Side))
 - Spark Plug Cap [A]
 - Primary Lead Connectors [B]
 - Bolt [C]
 - Ignition Coil [D]



16-34 ELECTRICAL SYSTEM

Ignition System

Ignition Coil Installation

- Connect the primary leads to the ignition coil terminals as shown.

Front Side:

- G/W Lead → (+) Mark [A]
- BK/Y Lead → (-) Mark

Rear Side:

- BL/W Lead → (+) Mark [A]
- BK/Y Lead → (-) Mark

Ignition Coil Inspection

- Remove the ignition coil.
- Measure the arcing distance with a coil tester [A] to check the condition of the ignition coil [B].
- Connect the ignition coil (with the spark plug cap 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

7 mm or more

⚠ WARNING

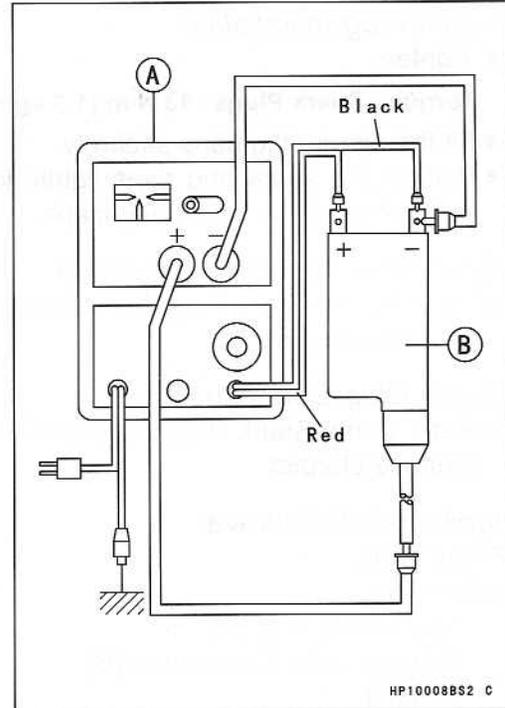
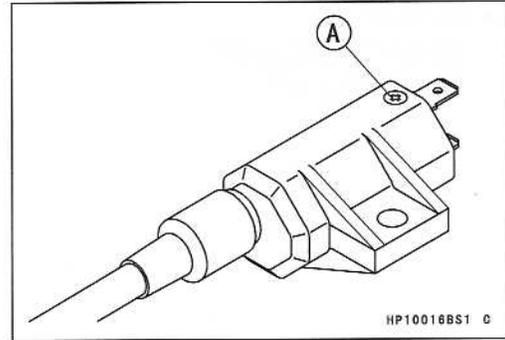
To avoid extremely high voltage shocks, do not touch the ignition coil body or leads.

- ★ If the distance reading is less than the specified value, the ignition coil or spark plug cap is defective.
- To determine which part is defective, measure the arcing distance again with the spark plug cap removed from the ignition coil. Remove the cap by turning it counterclockwise.
- ★ If the arcing distance is as before, the trouble is with the ignition coil. If the arcing distance is normal, the trouble is with the spark plug cap.
- ★ If a coil tester is not available, the coil can be checked for a broken or badly shorted winding with a hand tester.

Special Tool - Hand Tester : 57001-1394

NOTE

- The hand tester cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.



Ignition System

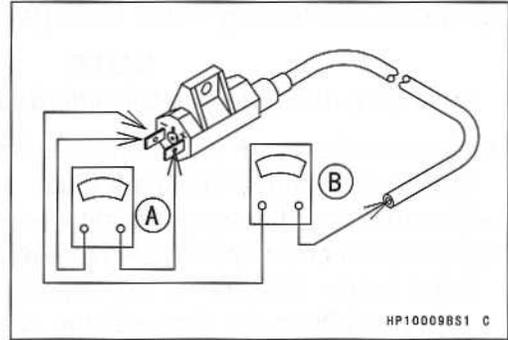
- Measure the primary winding resistance [A] as follows:
 - Connect the tester between the coil terminals.
 - Set the tester to the $\times 1 \Omega$ range.
- Measure the secondary winding resistance [B] as follows:
 - Remove the plug cap by turning it counterclockwise.
 - Connect the tester between the spark plug lead and terminal.
 - Set the tester to the $\times 1 \text{ k}\Omega$ range.

Ignition Coil Winding Resistance

Primary windings : $0.09 \sim 0.13 \Omega$

Secondary windings : $3.8 \sim 5.8 \text{ k}\Omega$

- ★ If the hand tester does not read as specified, replace the coil.
- To install the plug cap, turn it clockwise.



16-36 ELECTRICAL SYSTEM

Ignition System

Ignition Coil Primary Peak Voltage Inspection

NOTE

○ Be sure the battery is fully charged.

- Remove the spark plug cap (see Spark Plug Removal), but do not remove the spark plug.
- Measure the primary peak voltage as follows.
- Connect a commercially peak voltage adapter [A] to the hand tester [B] (250 V DC range). Install the needle adapters [C] on the peak voltage adapter leads.

Special Tools - Hand Tester: 57001-1394

Needle Adapter Set: 57001-1457

Recommended Tool - Peak Voltage Adapter

Type: KEK-54-9-B

Brand: KOWA SEIKI

- Insert the needle adapter inside the seal of the G/W (front) or BL/W (rear) lead in the ignition coil [D] until the needle reaches the terminal in the ignition coil.
- Install a new spark plug [E] into the spark plug cap, and ground it to the engine.

⚠ WARNING

To avoid extremely high voltage shocks, do not touch the spark plugs or tester connections.

- Turn the ignition switch ON, rotate the engine for 4 ~ 5 seconds with the transmission in neutral to measure the primary peak voltage.
- Repeat the measurements 5 times for one ignition coil.

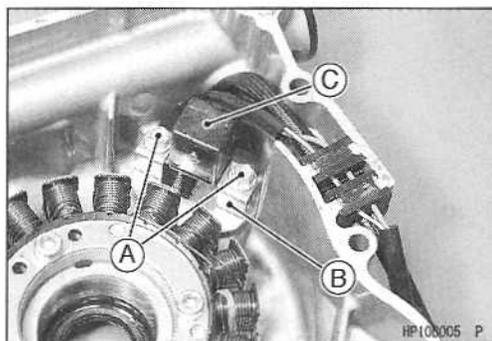
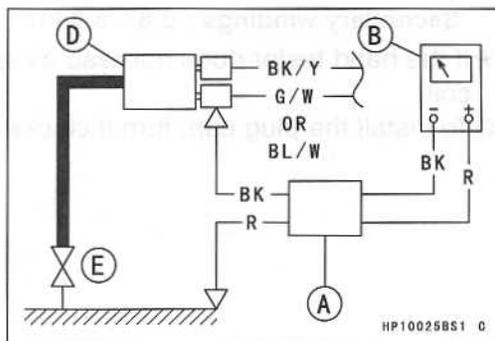
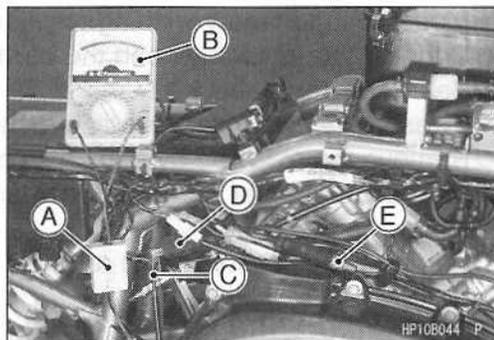
Ignition Coil Primary Peak Voltage

Standard: 50 V or more

- Repeat the test for the other ignition coil.
- ★ If the reading is less than the specified value, check the following.
 - Ignition Coils (see Ignition Coil Inspection)
 - Crankshaft Sensor (see Crankshaft Sensor Inspection)
- ★ If the ignition coils and crankshaft sensor are normal, see the Ignition System Troubleshooting chart.

Crankshaft Sensor Removal

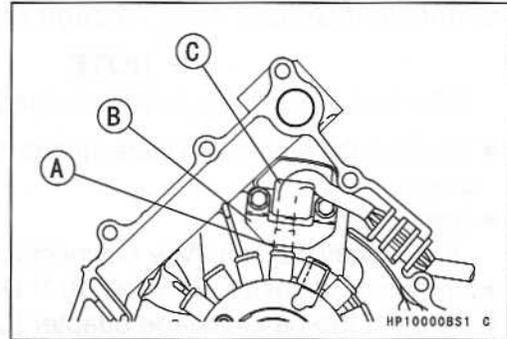
- Remove:
 - Alternator Cover (see Alternator Cover Removal)
 - Crankshaft Sensor Mounting Bolts [A]
 - Plate [B]
 - Crankshaft Sensor [C]



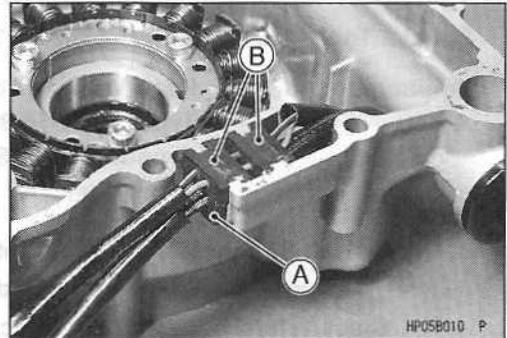
Ignition System

Crankshaft Sensor Installation

- Install:
 - Stator Coil Leads [A]
 - Plate [B]
 - Crankshaft Sensor [C]
- Tighten:
 - Torque - Crankshaft Sensor Mounting Bolts: 5.9 N·m (0.6 kgf·m, 52 in·lb)**



- Fit the lead grommets into the notch on the alternator cover.
 - Grommets [A] for Alternator Leads
 - Grommets [B] for Crankshaft Sensor Leads



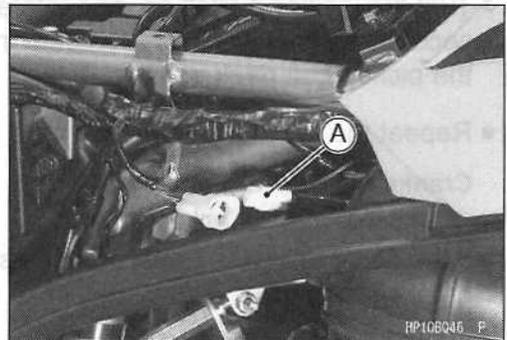
Crankshaft Sensor Inspection

- Remove the rear fender (see Frame chapter).
- Disconnect the crankshaft sensor lead connector [A].
- Measure the crankshaft sensor resistance.
- Connect a hand tester between the BK/W lead and the BL lead.
- Set the tester to the x 10 Ω range.

Crankshaft Sensor Resistance

110 ~ 140 Ω

- ★ If the tester does not read as specified, replace the crankshaft sensor.



16-38 ELECTRICAL SYSTEM

Ignition System

Crankshaft Sensor Peak Voltage Inspection

NOTE

○ Be sure the battery is fully charged.

- Remove the spark plug caps, but do not remove the spark plugs.
- Disconnect:
Crankshaft Sensor Wire Connector [A]
- Set the hand tester [B] to the 10 V DC range.
- Connect the peak voltage adapter [C] to the hand tester and crankshaft sensor leads in the connector.

Special Tool - Hand Tester: 57001-1394

Recommended Tool - Peak Voltage Adapter

Type: KEK-54-9-B

Brand: KOWA SEIKI

Connections:

Crankshaft Sensor Wire		Adapter		Hand Tester
Blue	←	Red	→	(+)
Black/White	←	Black	→	(-)

- Turn the ignition switch on, and rotate the engine for 4 ~ 5 seconds with the transmission gear in neutral to measure the pickup coil peak voltage.
- Repeat the measurement 5 or more times.

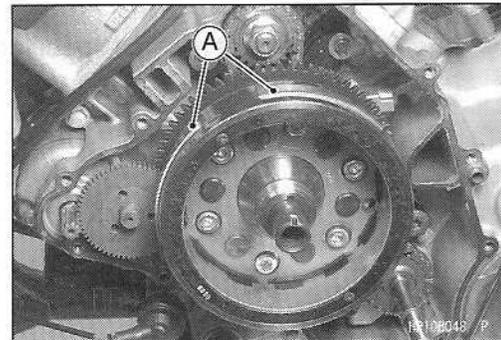
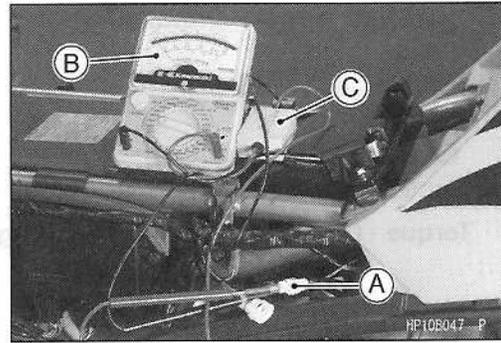
Crankshaft Sensor Peak Voltage

Standard: 1.8 V or more

- ★ If the peak voltage is lower than the standard, inspect the crankshaft sensor.

Alternator Rotor Inspection

- Check the timing projection [A] for damage such as chipping or grooving.
- ★ If the timing projection on the rotor is visibly damaged, replace the alternator rotor.



Ignition System

Ignition Timing Test

- Remove the ignition timing inspection plug.
- Attach a timing light [A] and a tachometer in the manner prescribed by the manufacturer.

Special Tool - Timing Light : 57001-1241

- Start the engine and aim the timing light at the timing mark on the alternator rotor.
- Run the engine at the speeds specified and note the alignment of the timing marks.

[A] F or R mark

Ignition Timing

Engine speed r/min (rpm)	Slot [B] aligned with:
1 100 and below	Advanced mark [C] on alternator rotor
5 000 and above	Advanced mark [D] on alternator rotor

NOTE

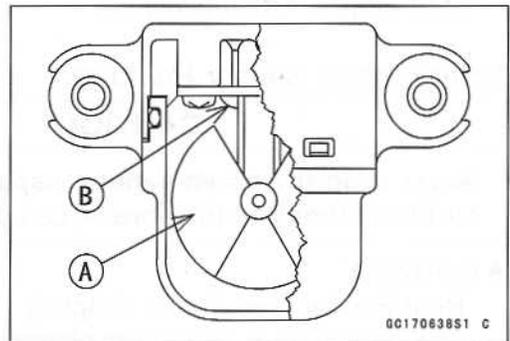
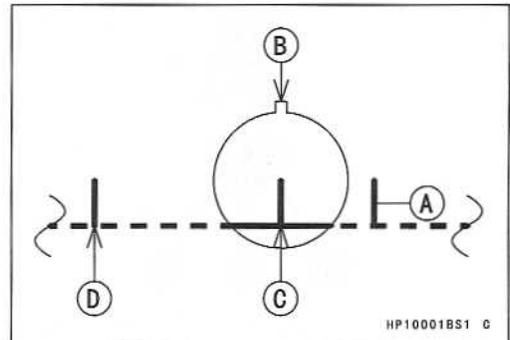
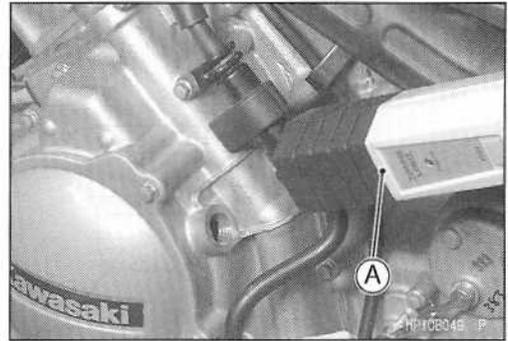
○ Do not mix up the timing marks with mark [A].

★ If the ignition timing is incorrect, replace the igniter and the crankshaft sensor.

Vehicle-down Sensor Outline

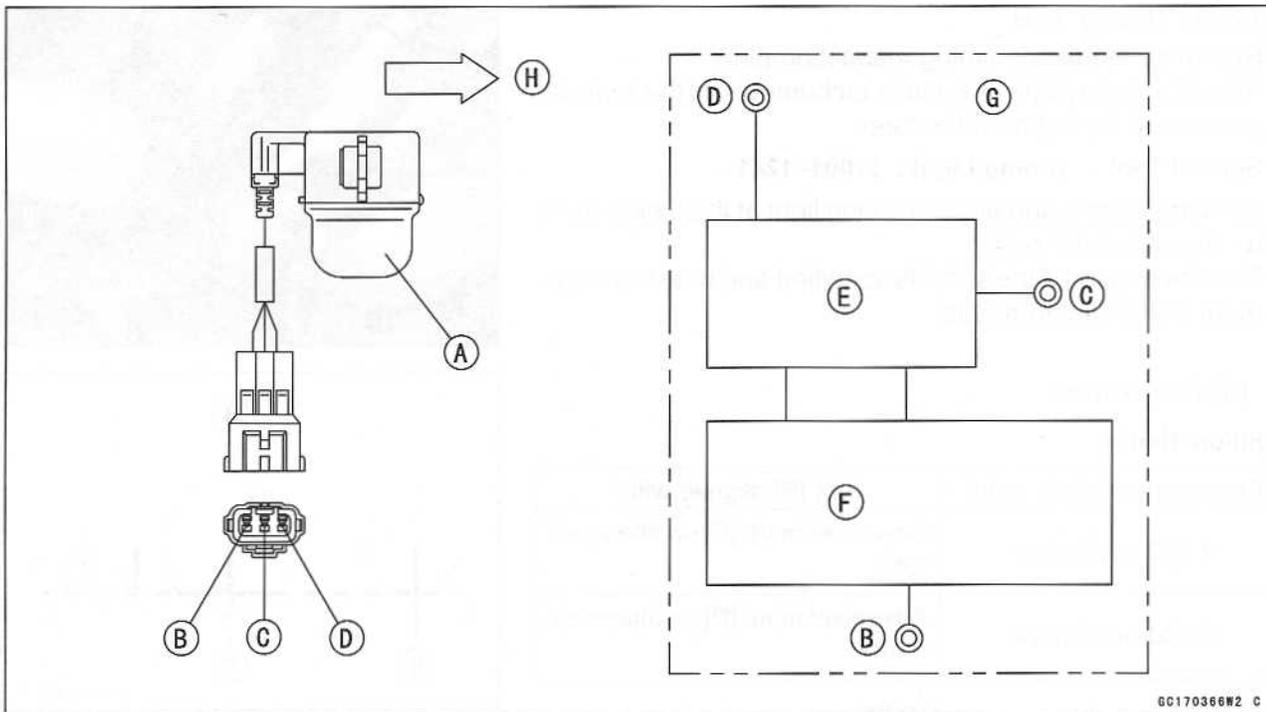
This sensor has a weight [A] with two magnets inside, and sends a signal to the igniter. But when the vehicle banks 60 ~ 70° or more to either side (in fact falls down), the weight turns and shuts off the voltage in the vehicle-down sensor circuit. The igniter senses this change, and stops the fuel pump and the ignition system.

Hall IC [B]



16-40 ELECTRICAL SYSTEM

Ignition System



Vehicle-down Sensor [A]
Ground Terminal [B] BK/Y
Output Terminal [C] Y/G
Power Source Terminal [D] BR

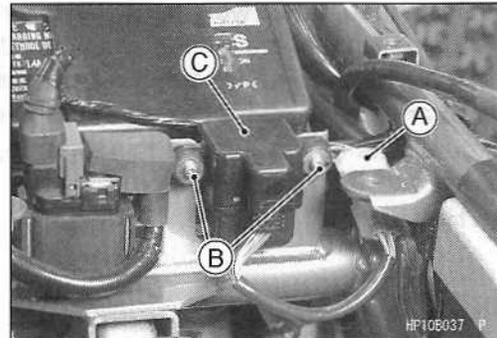
Constant Voltage Circuit [E]
Hall IC (Integrated Circuit) [F]
Vehicle-down Sensor Circuit [G]
Front [H]

Vehicle-down Sensor Removal

CAUTION

Never drop the down-sensor, especially on a hard surface. Shock to the sensor can damage it.

- Remove:
 - Rear Fender (see Frame chapter)
 - Fuel Tank (see Fuel System chapter)
 - Vehicle-down Sensor Lead Connector [A]
 - Screws [B]
 - Vehicle-down Sensor [C]

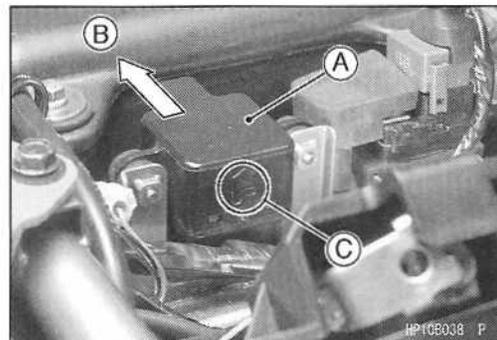


Vehicle-down Sensor Installation

- Install the vehicle-down sensor [A] so that the sensor lead faces backwards [B], and the arrow mark [C] on the sensor points upward.
- Tighten the screws securely.

⚠ WARNING

Incorrect installation of the vehicle-down sensor could cause sudden loss of engine power. The rider could lose balance during certain riding situations, like leaning over in a turn, with the potential for an accident resulting in injury or death. Ensure that the down sensor is held in place by the sensor brackets.



Ignition System

Vehicle-down Sensor Inspection

NOTE

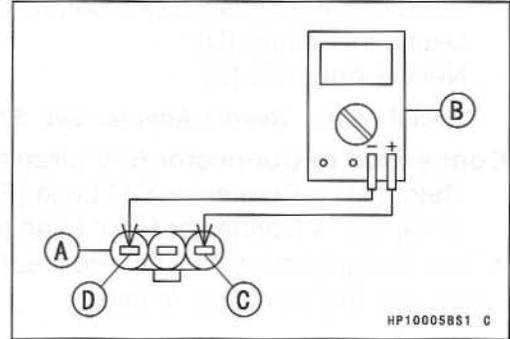
○ Be sure the battery is fully charged.

Vehicle-down Sensor Power Source Voltage:

- Remove:
 - Seat (see Frame chapter)
 - Vehicle-down Sensor Lead Connector
- Connect:
 - Vehicle-down Sensor Lead Connector [A] (harness side)
 - Digital Volt Meter [B]

I. Connections to Connector (12 V circuit)

- Meter (+) → Connector BR Lead [C]
- Meter (-) → Connector BK/Y Lead [D]
- Turn the ignition switch ON, and measure the power source voltage.



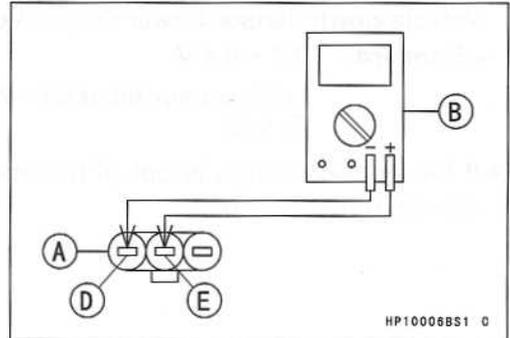
Vehicle-down Sensor Power Source Voltage

Standard: Battery Voltage (12.5 V or more)

- Turn the ignition switch OFF.
- ★ If there is no battery voltage, check the following:
 - Main Fuse 30A
 - Ignition Switch
 - Wiring for Vehicle-down Sensor Power Source

II. Connections to Connector (5 V circuit)

- Meter (+) → Connector Y/G Lead [E]
- Meter (-) → Connector BK/Y Lead [D]
- Turn the ignition switch ON, and measure the power source voltage.



Vehicle-down Sensor Power Source Voltage

Standard: about 5 V

- Turn the ignition switch OFF.
- ★ If there is no standard voltage, check the following:
 - Igniter
 - Wiring for Vehicle-down Sensor Power Source

16-42 ELECTRICAL SYSTEM

Ignition System

Vehicle-down Sensor Output Voltage:

- Remove the vehicle-down sensor (see Vehicle-down Sensor Removal).
- Connect the vehicle-down sensor [A] to the connector of the harness.
- Hold the sensor almost vertical [B] with the arrow mark pointed up.
- Connect:
 - Vehicle-down Sensor Lead Connector [C]
 - Digital Volt Meter [D]
 - Needle Adapters [E]

Special Tool - Needle Adapter Set: 57001-1457

Connection to Connector (5 V circuit)

- Meter (+) → Connector Y/G Lead [F]
- Meter (-) → Connector BK/Y Lead [G]

- Turn the ignition switch ON, and measure the output voltage with the connector joined.

Vehicle-down Sensor Power Output Voltage

Standard: 0.4 ~ 1.4 V

(with sensor arrow mark pointed up)

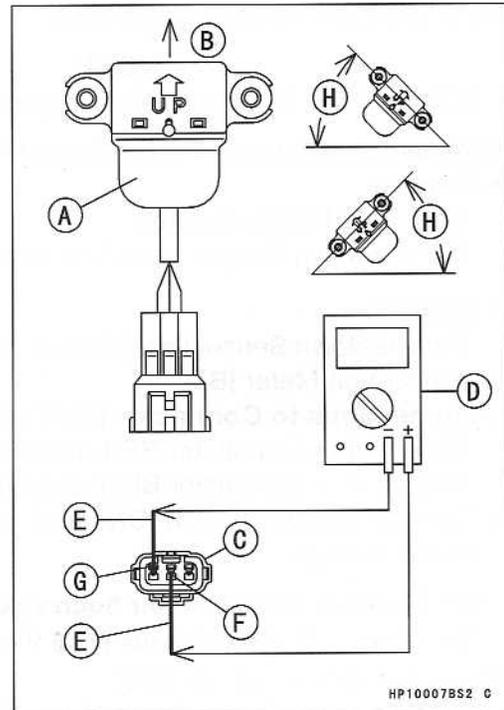
- Tilt the sensor 60 ~ 70° or more [H] right or left, and measure the output voltage.
- The time lag is from 0.5 to 1 second.

Vehicle-down Sensor Power Output Voltage

Standard: 3.7 ~ 4.4 V

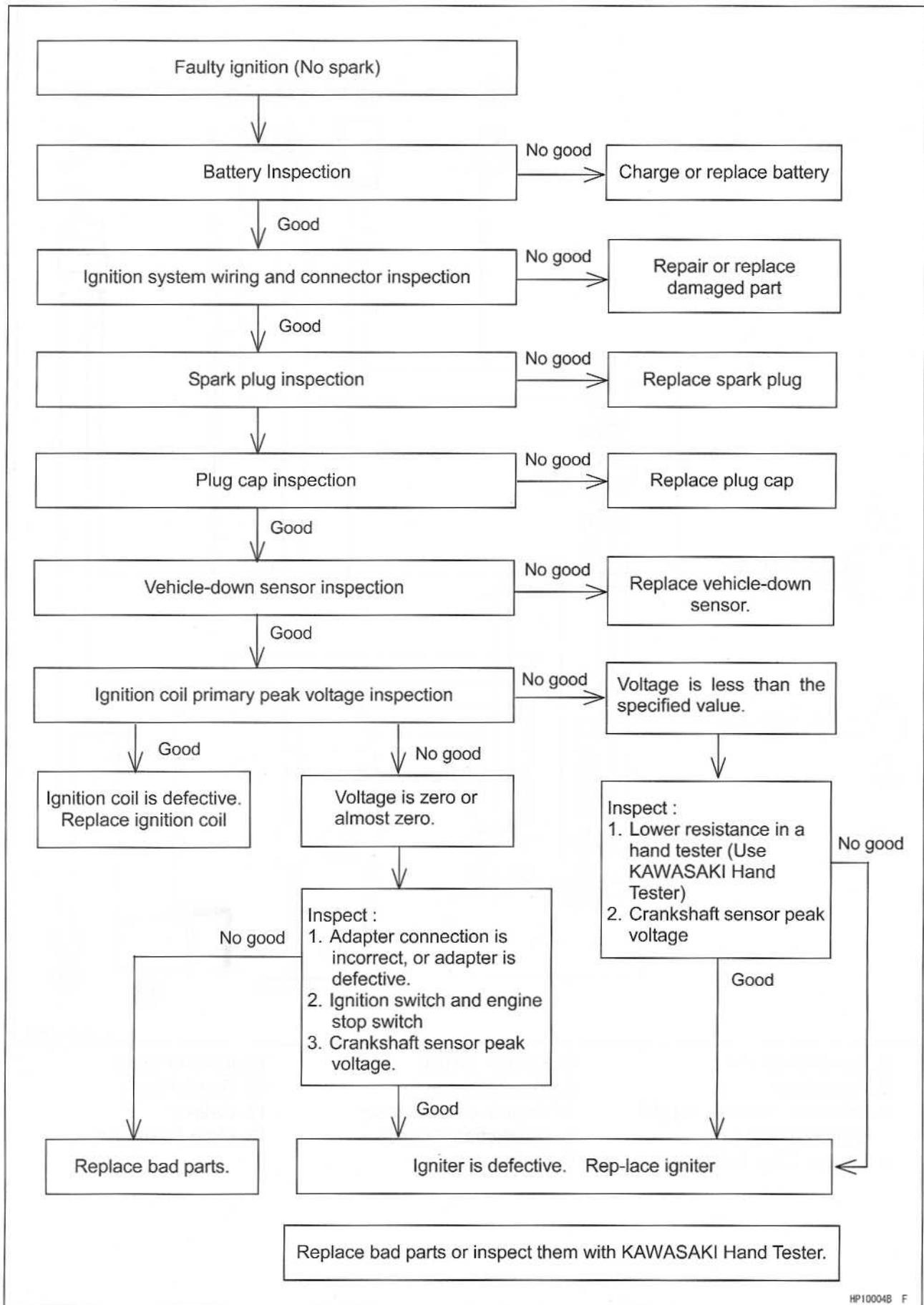
(with sensor tilted 60 ~ 70° or more, right or left)

- ★ If the output voltage is out of the specified, replace the vehicle-down sensor.



Ignition System

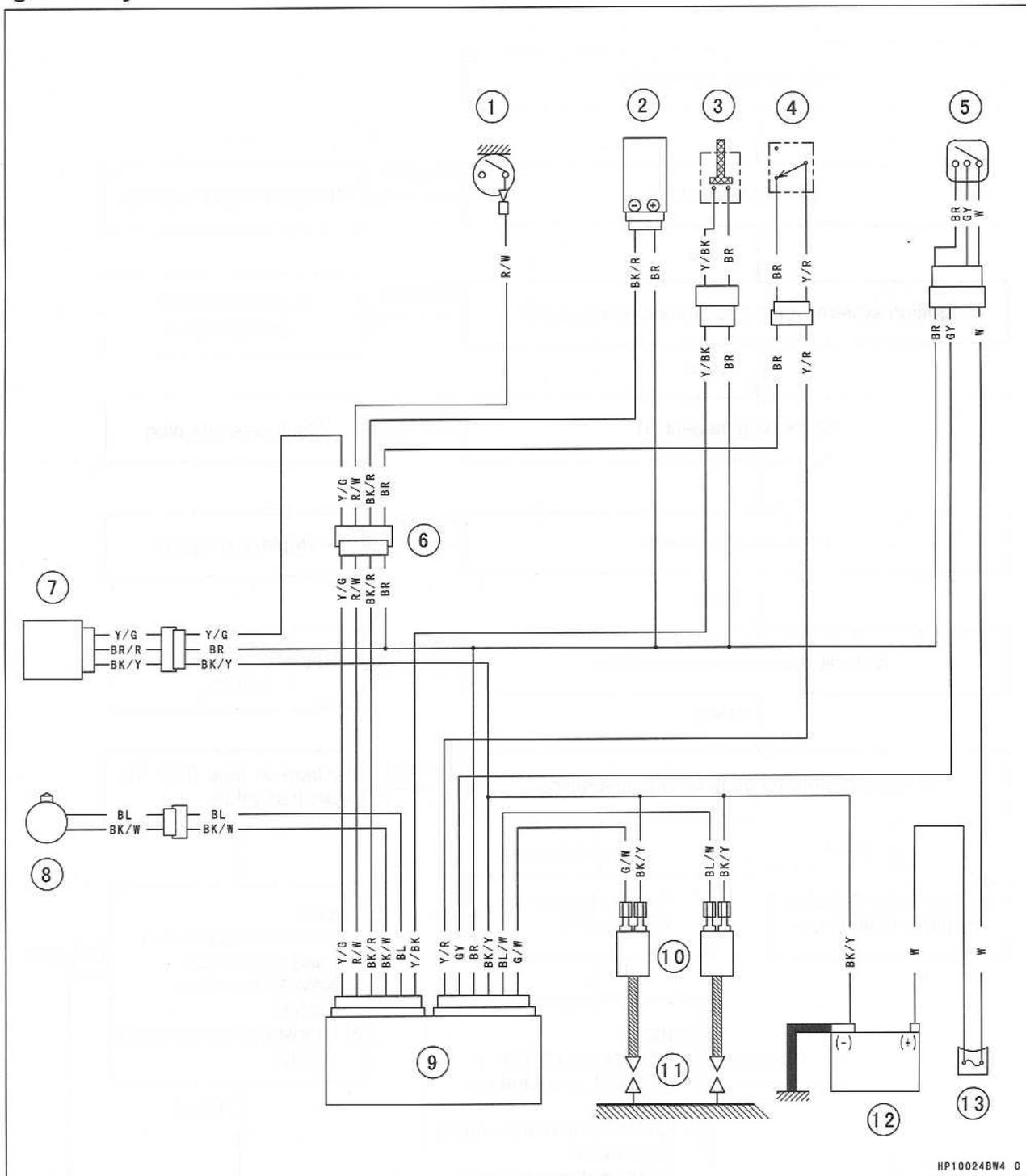
Ignition System Troubleshooting



16-44 ELECTRICAL SYSTEM

Ignition System

Ignition System Circuit



1. Reverse Switch
2. Fuel Pump
3. Reverse Power Assist Switch (Override)
4. Engine Stop Switch

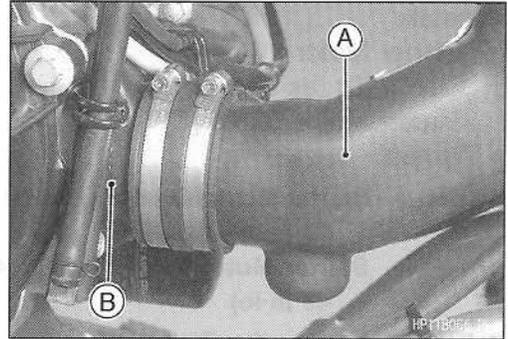
5. Ignition Switch
6. Reset Connector
7. Vehicle-down Sensor
8. Crankshaft Sensor
9. Igniter

10. Ignition Coils
11. Spark Plugs
12. Battery
13. Main Fuse 30A

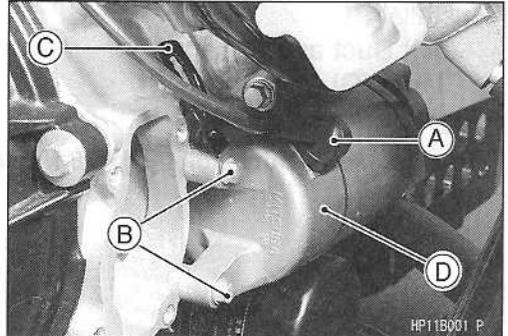
Electric Starter System

Starter Motor Removal

- Remove:
Converter Intake Duct [A]
Joint Duct [B] and Collars



- Remove:
Starter Motor Cable [A]
Starter Motor Mounting Bolts [B]
Clamp [C]
Starter Motor [D]

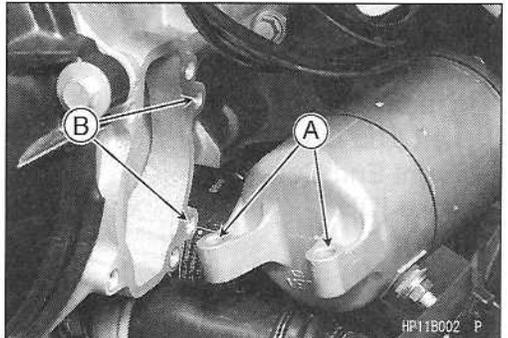


CAUTION

Do not tap the end of the starter motor shaft or the motor may be damaged.

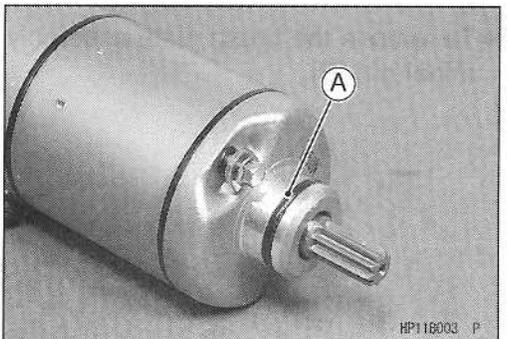
Starter Motor Installation

- When installing the starter motor, clean the starter motor lugs [A] and crankcase [B] where the starter motor is grounded.



★If the O-ring [A] shows wear or damage, or if it is hardened, replace it with a new one.

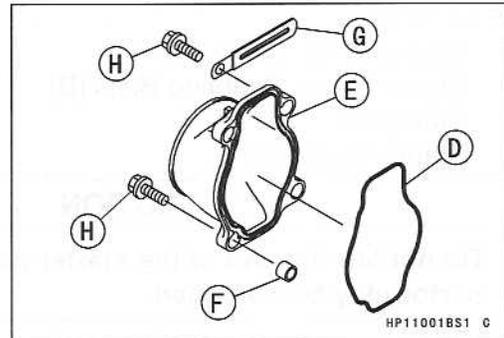
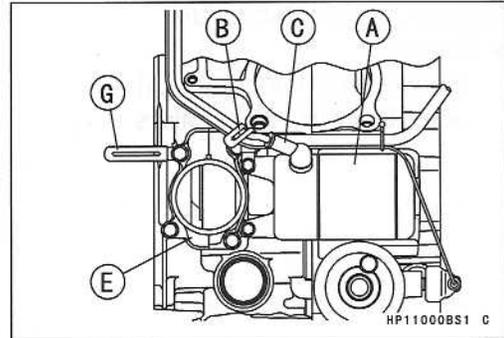
- Apply a small amount of engine oil to the O-ring.



16-46 ELECTRICAL SYSTEM

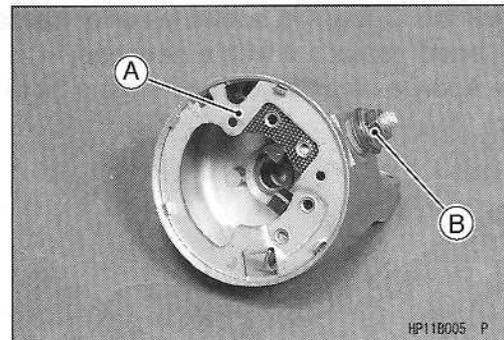
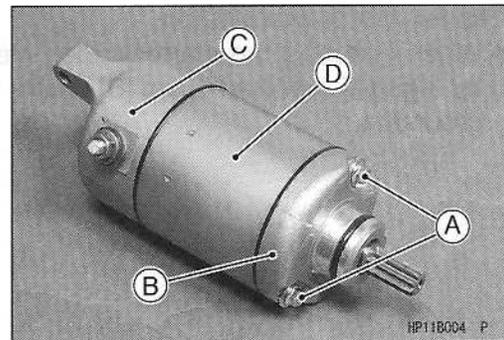
Electric Starter System

- Install:
 - Starter Motor [A]
 - Clamp [B] (as shown)
 - Starter Motor Cable [C]
- Tighten:
 - Torque - Starter Motor Mounting Bolts: 8.8 N·m (0.90 kgf·m, 78 in·lb)**
 - Starter Motor Terminal Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb)**
- Apply grease to the O-ring [D] in the joint duct [E].
- Install:
 - Joint Duct and Collars [F]
 - Clamp [G] (as shown)
- Tighten:
 - Torque - Joint Duct Bolts [H]: 8.8 N·m (0.90 kgf·m, 78 in·lb)**



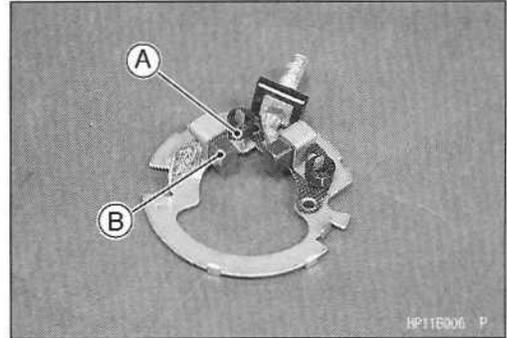
Starter Motor Disassembly

- Remove:
 - Starter Motor Bolts [A]
 - Left End Cover [B]
 - Right End Cover [C]
 - Yoke [D]
- To remove the brush plate assembly [A], remove the terminal nut [B].



Electric Starter System

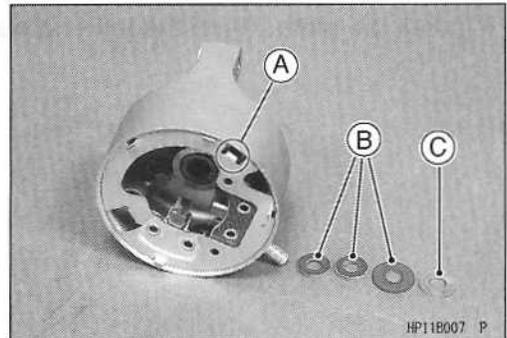
- Hold the brush spring [A] with needle nose pliers, and pull the brush [B] off the holder.



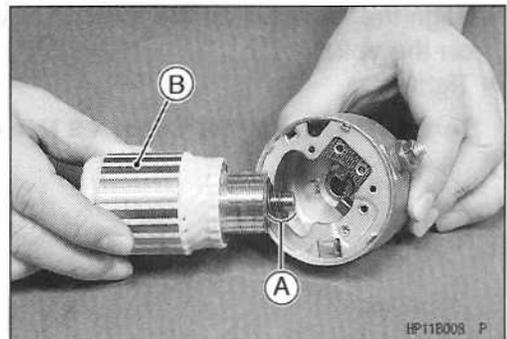
Starter Motor Assembly

- Replace the O-rings.
- Install the brush plate assembly to the right end cover so that the projection [A] on the brush plate fits into the groove on the right end cover.
- Install the O-ring, insulators [B], and washer [C] in that order on the terminal bolt.
- Tighten:

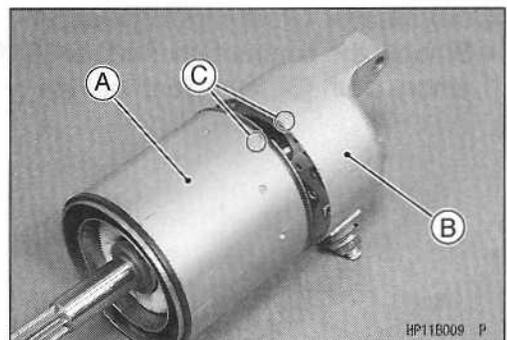
Torque - Starter Motor Terminal Locknut: 6.9 N·m (0.70 kgf·m, 61 in·lb)



- Install the washers [A].
- Install the armature [B] between the brushes.



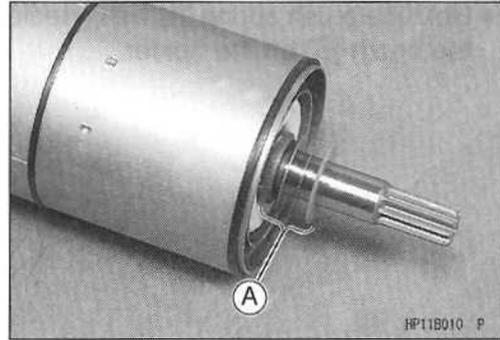
- Install the yoke [A] onto the right end cover [B] aligning the marks [C] on the yoke and right end cover.



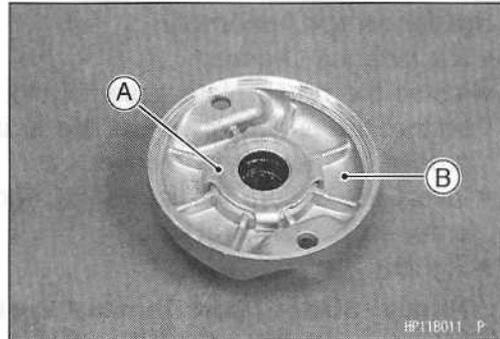
16-48 ELECTRICAL SYSTEM

Electric Starter System

- Install the washers [A].



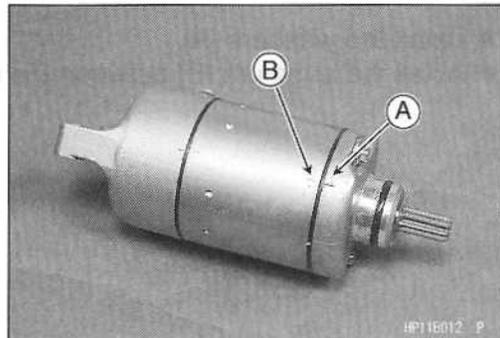
- Install the plate [A] on the left end cover [B].



- Align the mark [A] on the left end cover with the mark [B] on the yoke.

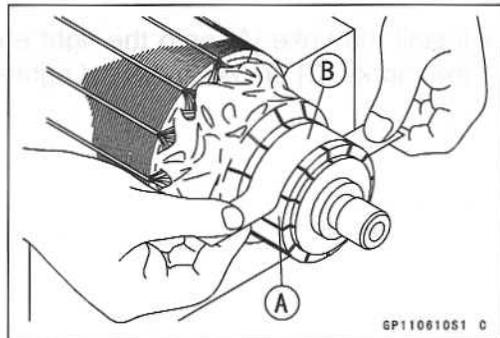
- Tighten:

Torque - Starter Motor Bolts: 4.9 N·m (0.50 kgf·m, 43 in·lb)



Commutator Cleaning/Inspection

- Smooth the commutator surface [A] if necessary with fine emery cloth [B], and clean out the grooves.



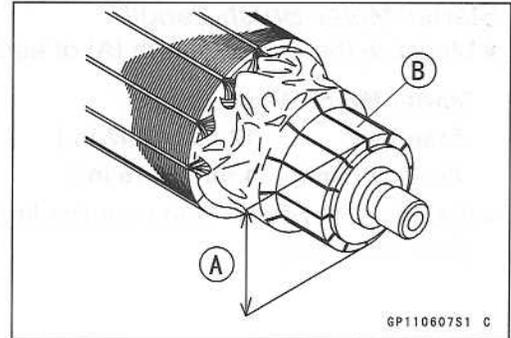
Electric Starter System

- Measure the diameter [A] of the commutator [B].
- ★ Replace the starter motor with a new one if the commutator diameter is less than the service limit.

Commutator Diameter

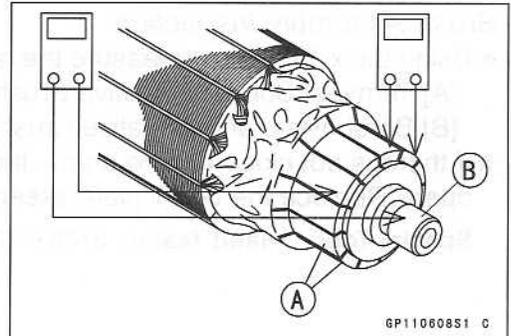
Standard: 28 mm (1.10 in.)

Service Limit: 27 mm (1.06 in.)



Armature Inspection

- Using the x 1 Ω range, measure the resistance between any two commutator segments [A].
- ★ If there is a high resistance or no reading (∞) between any two segments, a winding is open. Replace the starter motor.
- Using the highest range, measure the resistance between the segments and the shaft [B].
- If there is any reading at all, the armature has a short. Replace the starter motor.



Special Tool - Hand Tester: 57001-1394

NOTE

- Even if the foregoing checks show the armature to be good, it may be defective in some manner not readily detectable with the hand tester. If all other starter motor and starter motor circuit components check good, but the starter motor still does not turn over or only turns over weakly, replace the starter motor with a new one.

16-50 ELECTRICAL SYSTEM

Electric Starter System

Starter Motor Brush Length

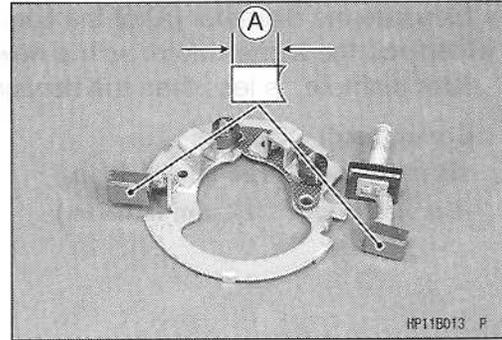
- Measure the overall length [A] of each brush.

Starter Motor Brush Length

Standard: 12 mm (0.47 in.)

Service Limit: 4 mm (0.16 in.)

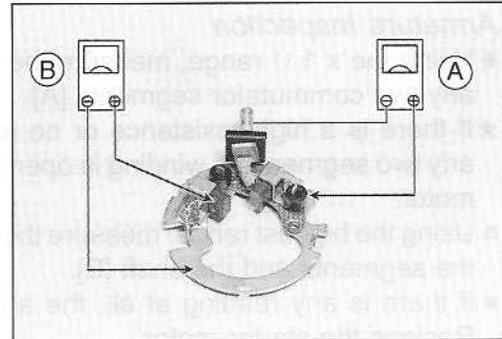
- ★ If any is worn down to the service limit, replace the brush plate assembly.



Brush Assembly Inspection

- Using the x 1 Ω range, measure the resistance as shown.
[A] Terminal Bolt and Positive Brush
[B] Brush Plate and Negative Brush
- ★ If there is not close to zero ohms, the brush lead has an open. Replace the brush plate assembly.

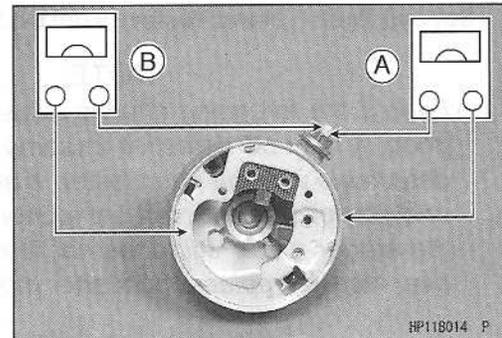
Special Tool - Hand Tester: 57001-1394



Brush Plate and Terminal Bolt Inspection

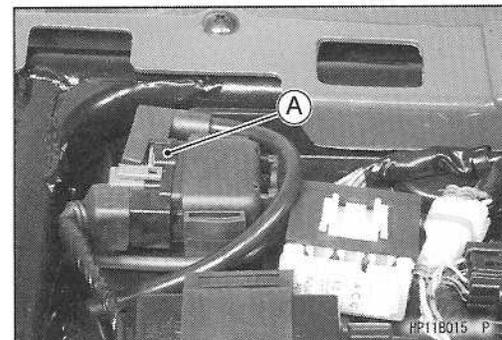
- Using the highest range, measure the resistance as follows:
[A] Terminal Bolt and Right - Hand End Cover
[B] Terminal Bolt and Brush Plate
- ★ If there is any reading, the brush holder assembly has a short. Replace the brush plate assembly.

Special Tool - Hand Tester: 57001-1394



Starter Relay Inspection

- Remove:
Seat (see Frame chapter)
Starter Relay [A]



Electric Starter System

- Connect the hand tester [A] and a 12 V battery [B] to the starter relay [C] as shown.
- ★ If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Hand Tester Range: $\times 1\Omega$ range

Criteria: When battery is connected $\Rightarrow 0\Omega$

When battery is disconnected $\Rightarrow \infty\Omega$

Special Tool - Hand Tester: 57001-1394

Starter Circuit Relay Inspection

- Remove:
 - Seat (see Frame chapter)
 - Rear Fender (see Frame chapter)
 - Starter Circuit Relays [A] (Brake and Neutral Switch Circuit)
- The starter circuit relays for the brake and neutral switch circuits are identical.

- Connect the hand tester [A] and a 12 V battery [B] to the starter circuit relay [C] as shown.
- ★ If the relay does not work as specified, the relay is defective. Replace the relay.

Testing Relay

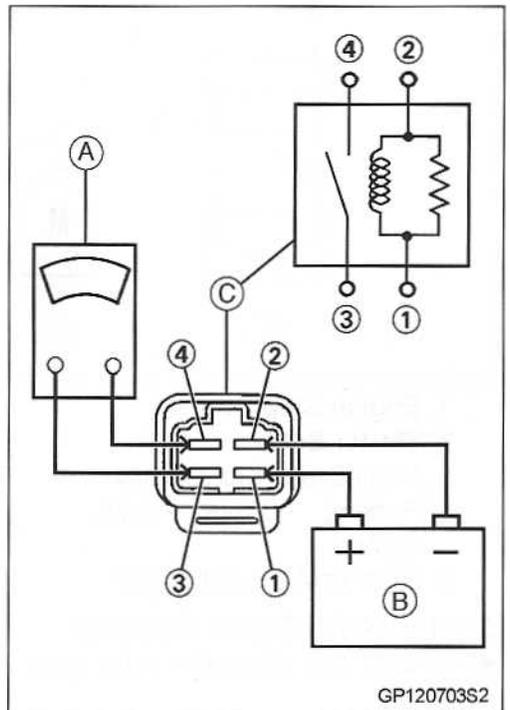
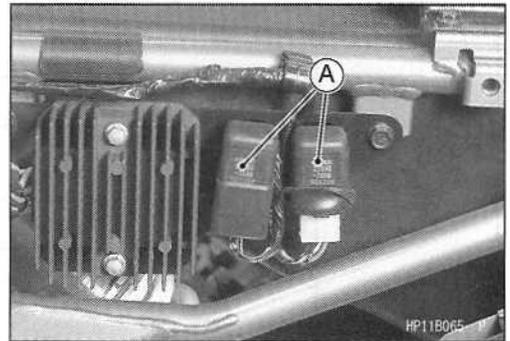
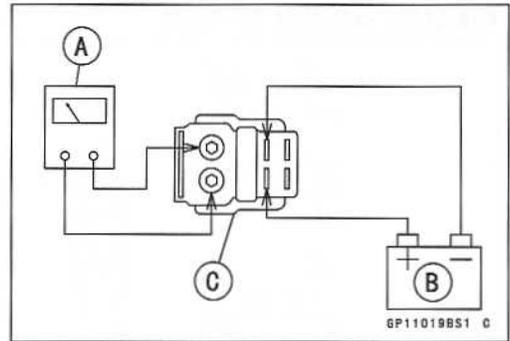
Hand Tester Range: $\times 1\Omega$

Criteria: When battery is connected $\Rightarrow 0\Omega$

When battery is disconnected $\Rightarrow \infty\Omega$

Relay Coil Terminals [1] and [2]

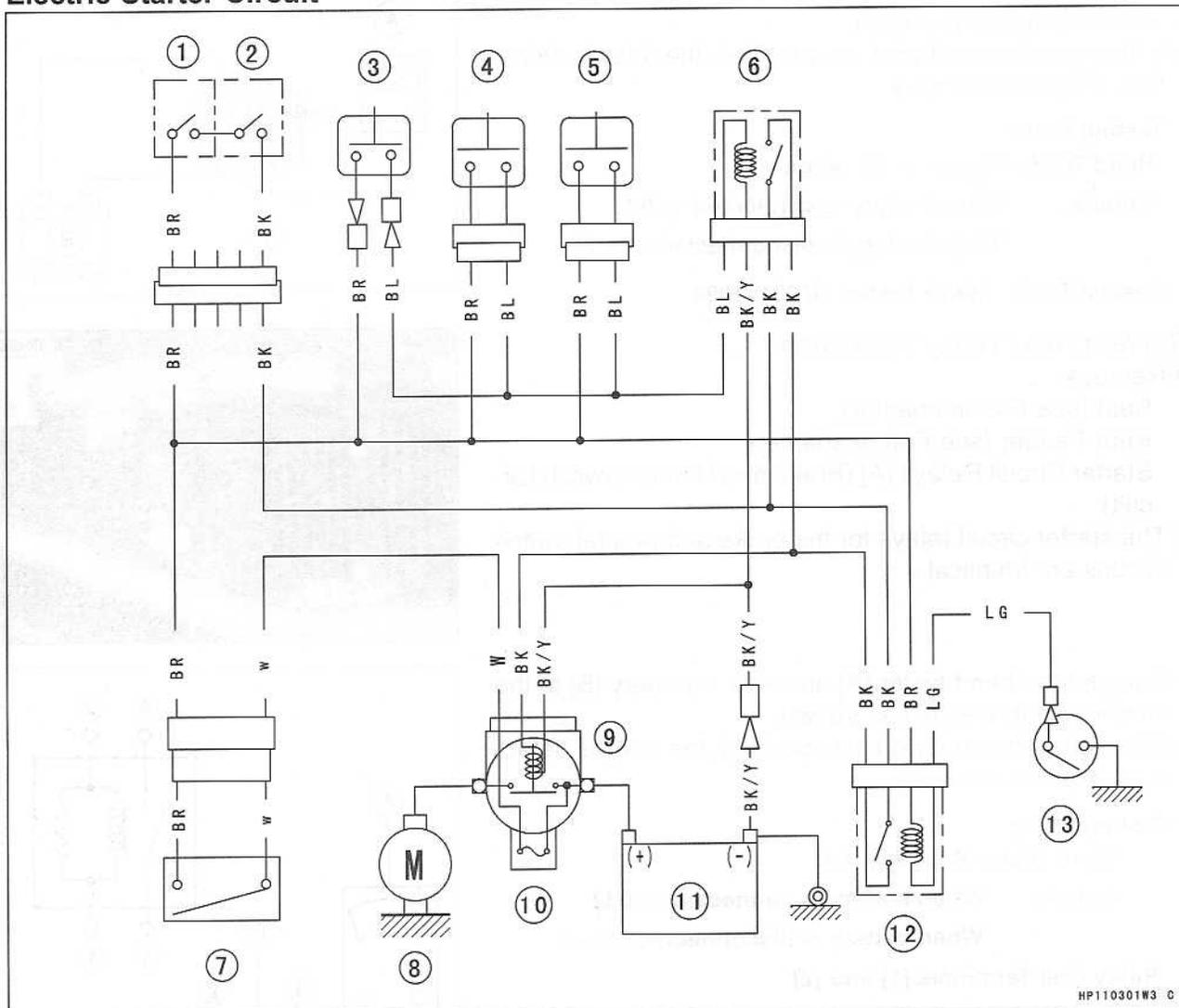
Relay Switch Terminals [3] and [4]



16-52 ELECTRICAL SYSTEM

Electric Starter System

Electric Starter Circuit



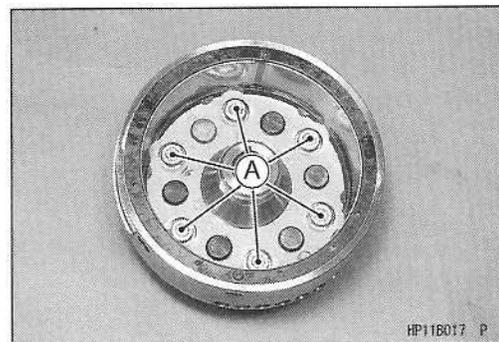
HP110301W3 C

- | | | |
|-------------------------------|----------------------------------|-------------------------------------|
| 1. Engine Stop Switch | 6. Starter Circuit Relay (Brake) | 11. Battery |
| 2. Starter Button | 7. Ignition Switch | 12. Starter Circuit Relay (Neutral) |
| 3. Front Brake Light Switch | 8. Starter Motor | 13. Neutral Switch |
| 4. Parking Brake Light Switch | 9. Starter Relay | |
| 5. Rear Brake Light Switch | 10. Main Fuse 30A | |

Starter Motor Clutch Removal

- Remove the alternator rotor (see Alternator Rotor Removal).
- Hold the rotor with the flywheel holder and take out the starter motor clutch bolts [A].

Special Tool - Flywheel Holder: 57001-1313



HP116017 P

Electric Starter System

- Take out the one-way clutch [A].



Starter Motor Clutch Installation

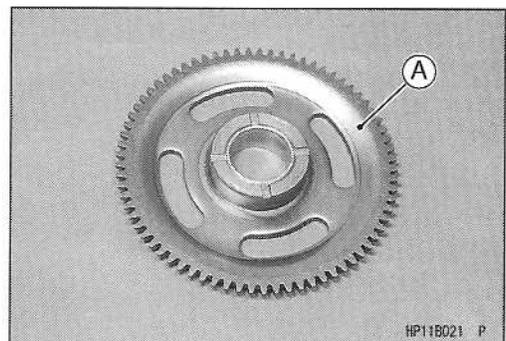
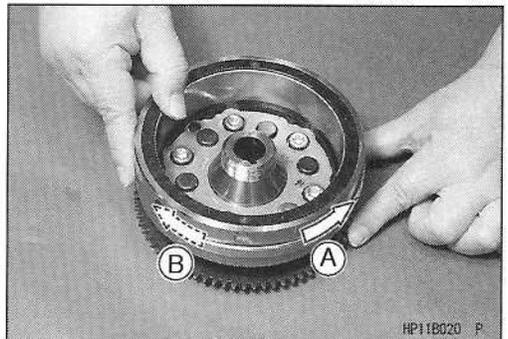
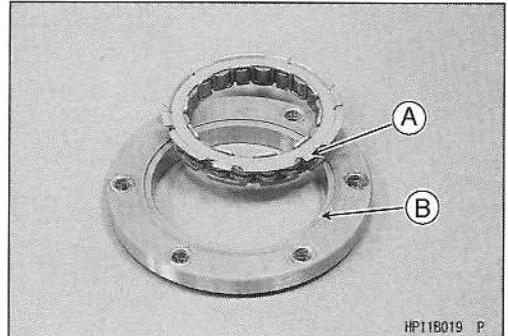
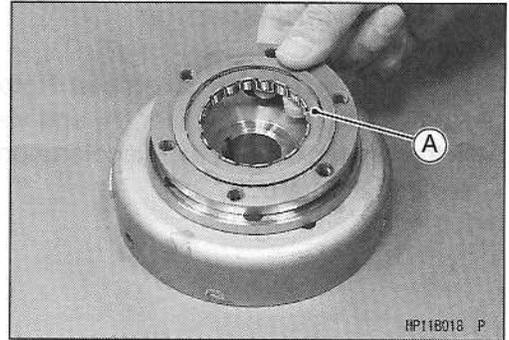
- Install the one-way clutch so that the flange [A] fits on the recess [B] of the race.
- Apply a non-permanent locking agent:
Starter Motor Clutch Bolts
- Tighten:
Torque - Starter Motor Clutch Bolts : 34 N·m (3.5 kgf·m, 25 ft·lb)

Starter Motor Clutch Inspection

- Remove:
Alternator Rotor (see Alternator Rotor Removal)
- Fit the starter clutch gear into the starter motor clutch.
- ★ If the alternator rotor turns counterclockwise [A] freely from the starter clutch gear, but not clockwise [B], the clutch is operating correctly.
- ★ If the clutch does not operate correctly, or if it makes noise, disassemble it and examine each part visually. Replace any worn or damaged parts.

NOTE

- Examine the starter clutch gear [A]. Replace it if it is worn or damaged.

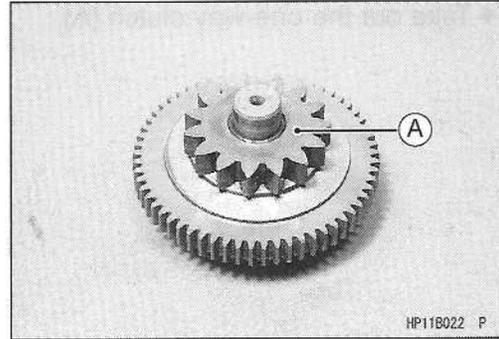


16-54 ELECTRICAL SYSTEM

Electric Starter System

Torque Limiter Inspection

- Remove:
 - Alternator Rotor (see Alternator Rotor Removal)
- Remove the torque limiter [A] and visually inspect it.
- ★ If the limiter has wear, discoloration, or other damage, replace it as a unit.



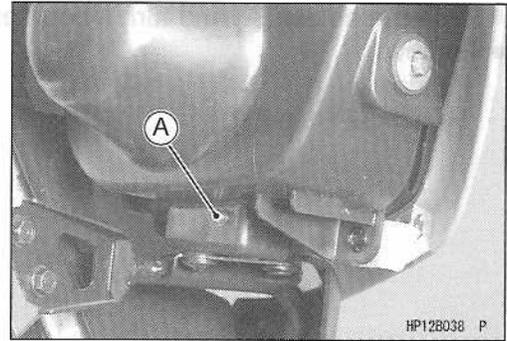
Lighting System

Headlight Beam Vertical Adjustment

- Turn the adjusting screw [A] on each headlight rim in or out to adjust the headlight vertically.

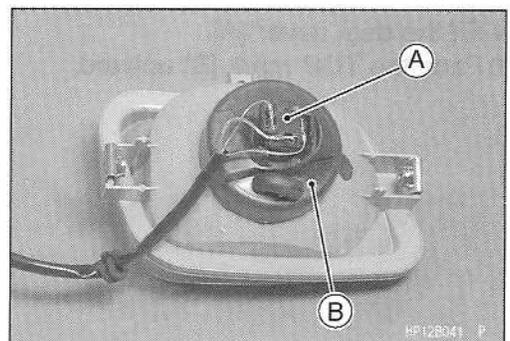
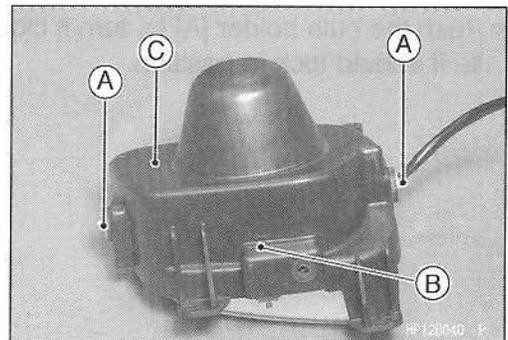
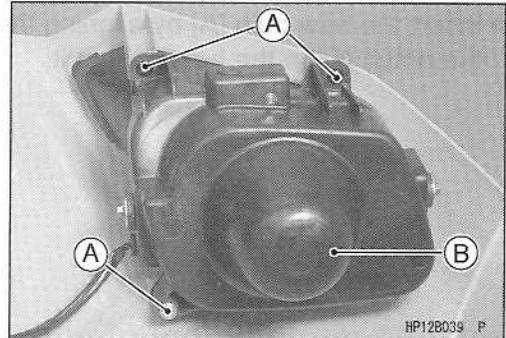
NOTE

- On high beam, the brightest point should be slightly below horizontal with the vehicle on its wheels and the rider seated. Adjust both headlights to the same angle.



Headlight Bulb Replacement

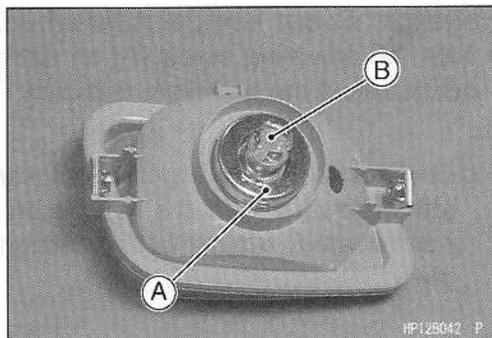
- Remove:
 - Front Fender (see Frame chapter)
 - Mounting Screws [A]
 - Headlight Unit [B]
- Remove:
 - Headlight Bolts [A] and Washer
 - Vertical Adjustment Screw [B], Spring, and Nut
 - Headlight Body [C]
- Remove:
 - Headlight Connector [A]
 - Dust Cover [B]



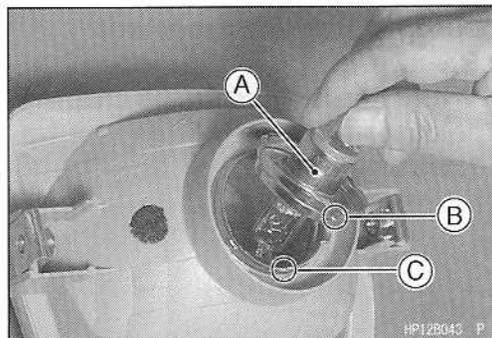
16-56 ELECTRICAL SYSTEM

Lighting System

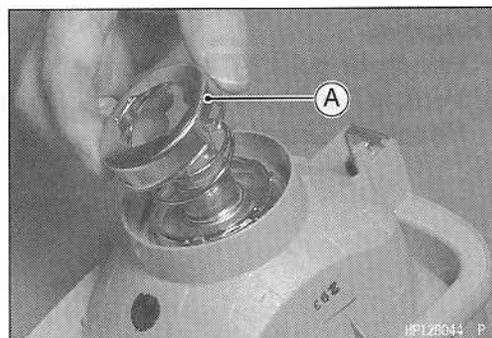
- Push the holder [A] and turn it counterclockwise.
- Remove:
 - Holder
 - Headlight Bulb [B]



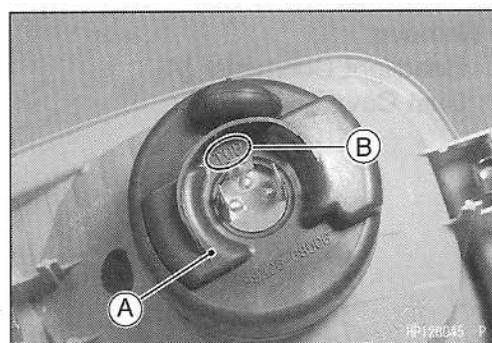
- Insert the new bulb [A] by aligning the projection [B] with the notch [C] in the headlight unit.



- Push the bulb holder [A] in, turn it clockwise, and release it. It should lock in position.

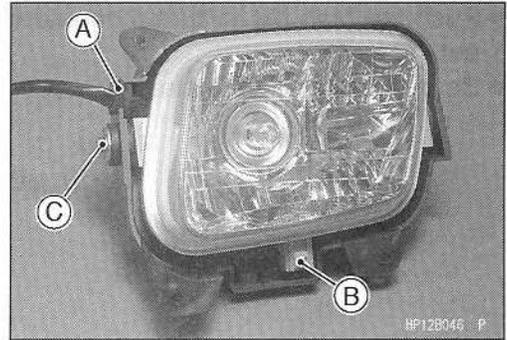


- Fit the dust cover [A].
- Face the TOP mark [B] upward.



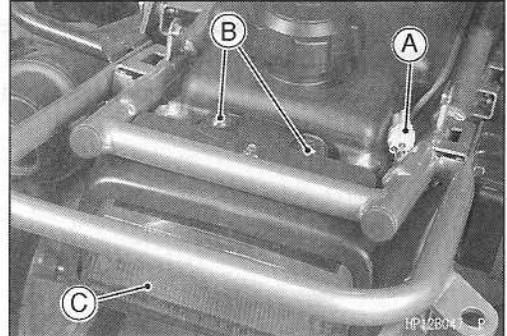
Lighting System

- Install:
 - Grommet [A]
 - Vertical Adjustment Screw, Spring and Nut [B]
 - Damper, Collar and Bolt [C]

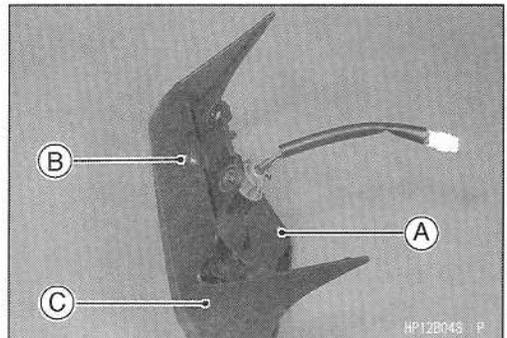


Taillight Bulb Replacement

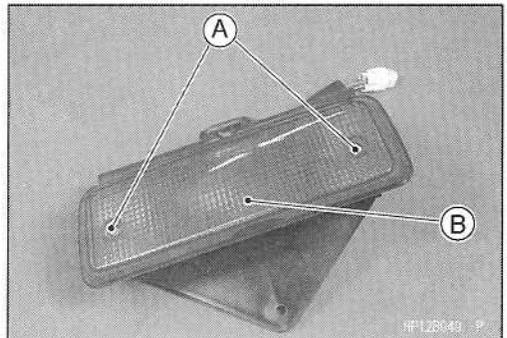
- Remove:
 - Rear Fender (see Frame chapter)
 - Tail Light Connector [A]
 - Screws and Collars [B]
 - Tail Light Assembly [C] with Cover



- Remove
 - Screw [A]
 - Screw and Collar [B]
 - Tail Light Cover [C]



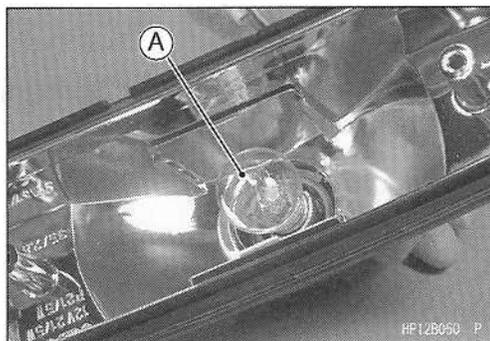
- Remove the screws [A].
- Remove the taillight lens [B] from the taillight assembly.



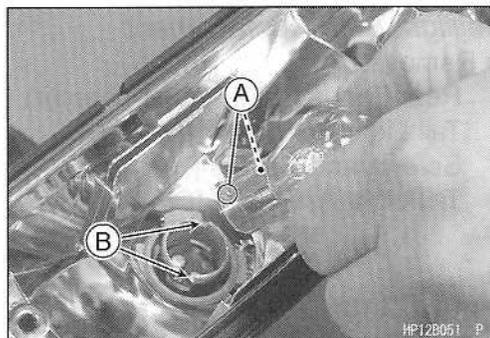
16-58 ELECTRICAL SYSTEM

Lighting System

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

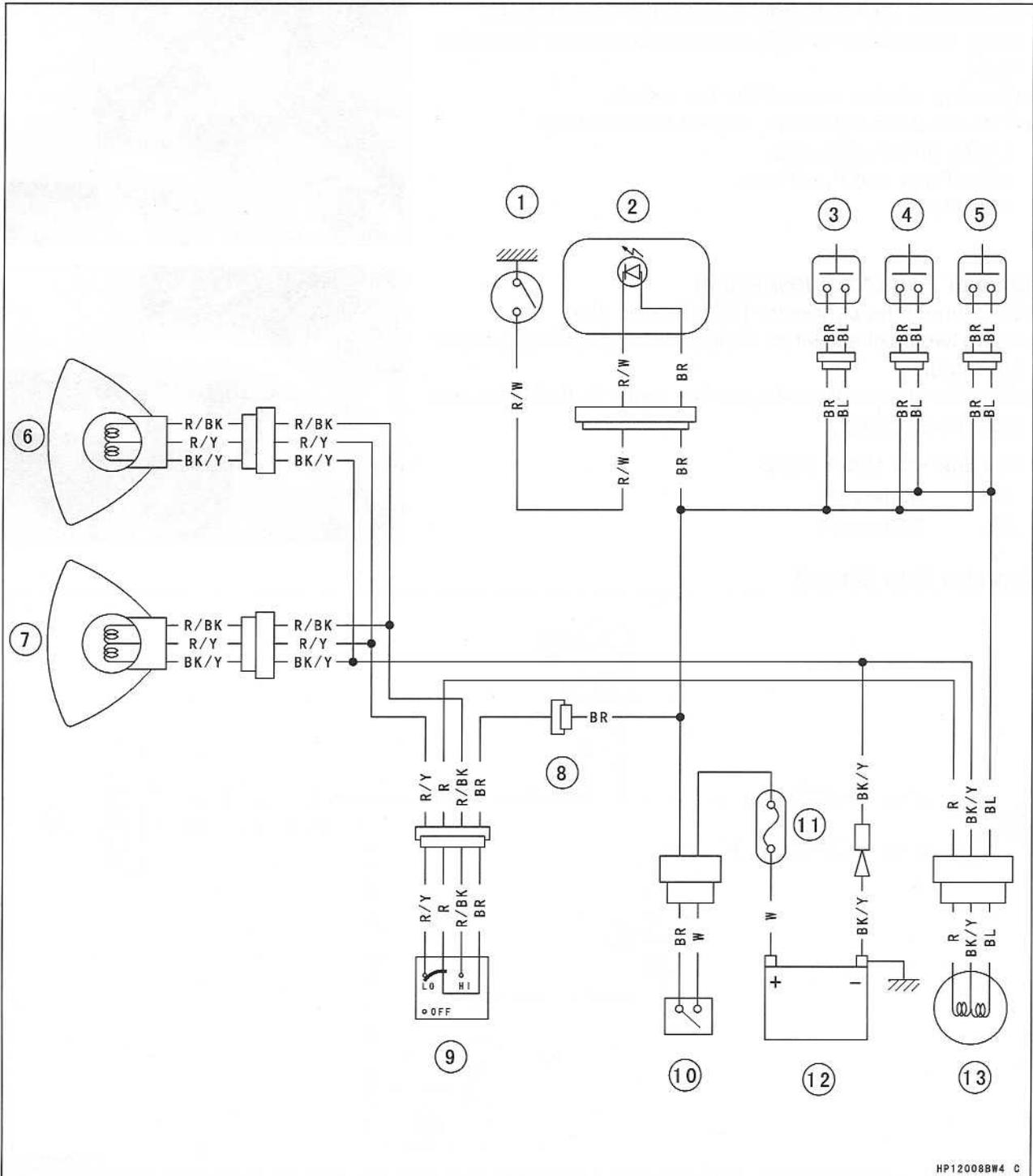


- Insert the new bulb by aligning the pins [A] with the grooves [B] in the walls of the socket.
- Push the bulb in, turn it clockwise, and release it. It should lock in position.



Lighting System

Lighting System Circuit



HP12008BW4 C

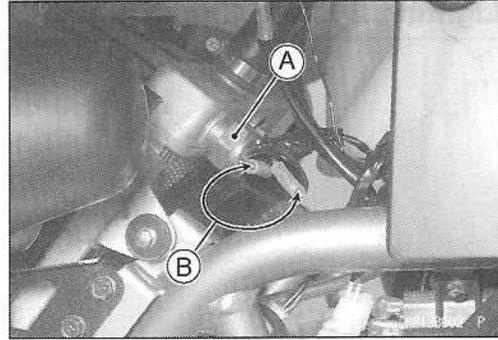
- | | | |
|----------------------------------|----------------------------|----------------------|
| 1. Reverse Switch | 5. Rear Brake Light Switch | 11. Main Fuse 30A |
| 2. Reverse Indicator Light (LED) | 6. Headlight (Right) | 12. Battery |
| 3. Front Brake Light Switch | 7. Headlight (Left) | 13. Tail/Brake Light |
| 4. Parking Brake Light Switch | 8. Reset Connector | |
| | 9. Light/Dimmer Switch | |
| | 10. Ignition Switch | |

16-60 ELECTRICAL SYSTEM

Radiator Fan System

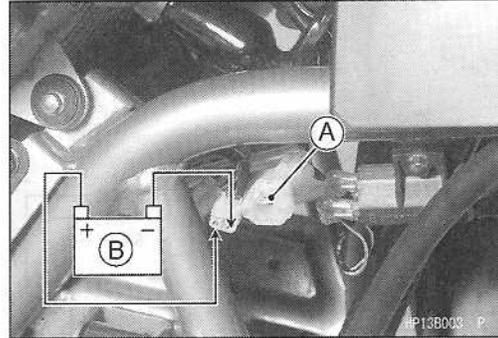
Radiator Fan Circuit Inspection

- Disconnect the leads from the radiator fan switch [A].
- Using an auxiliary wire [B], connect the radiator fan switch leads.
- ★ If the fan rotates, inspect the fan switch.
- ★ If the fan does not rotate, inspect the following.
 - Leads and Connectors
 - Main Fuse and Fan Fuse
 - Fan Motor



Radiator Fan Motor Inspection

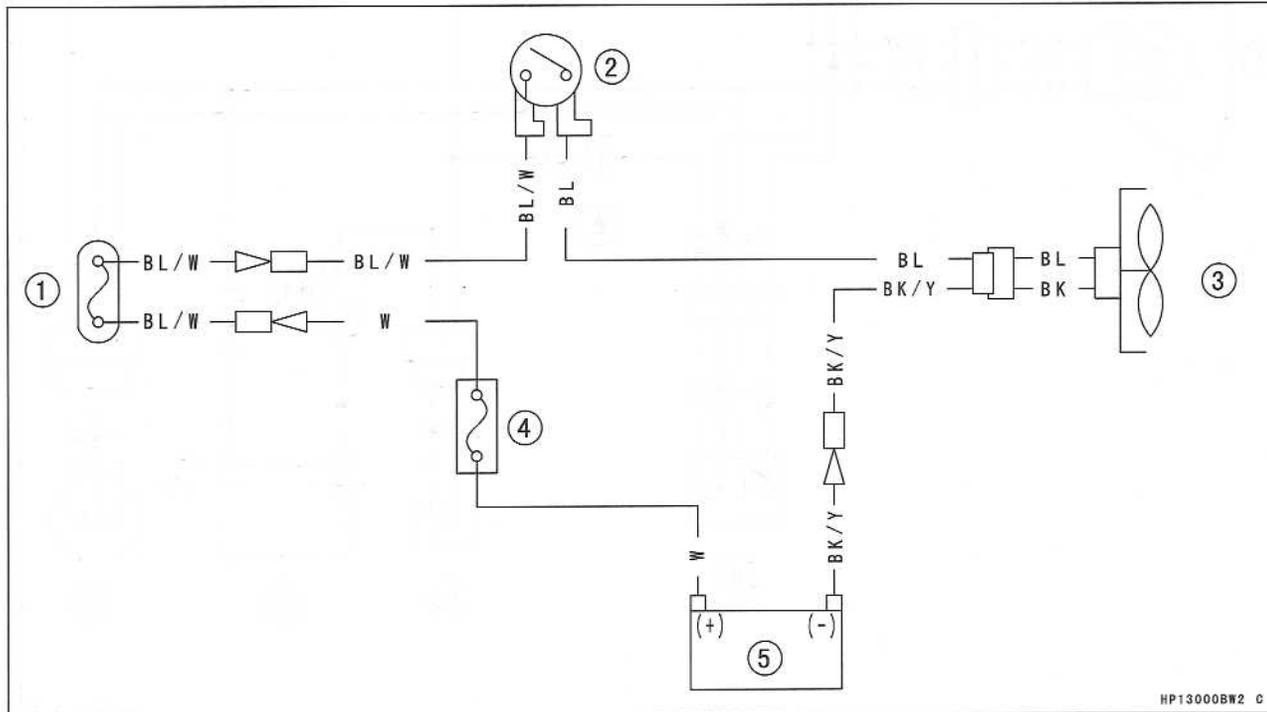
- Disconnect the connector [A] in the fan lead.
- Using two auxiliary wires, supply battery [B] voltage to the fan motor.
- ★ If the fan does not rotate, the fan motor is defective and must be replaced.



Radiator Fan Motor Leads

- BL: Battery (+)
- BK: Battery (-)

Radiator Fan Circuit



1. Radiator Fan Fuse 20A
2. Radiator Fan Switch
3. Radiator Fan

4. Main Fuse 30A
5. Battery

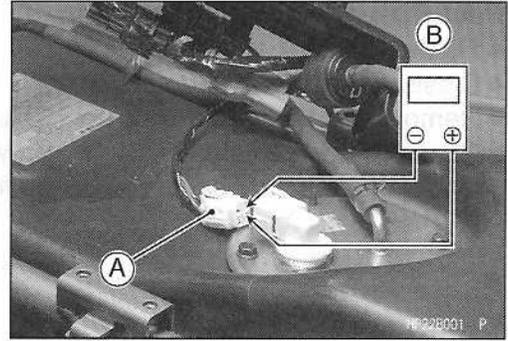
HP13000BW2 C

Fuel Pump/Fuel Reserve Switch

Fuel Pump Inspection

Fuel Pump Supply Voltage Inspection:

- Turn the ignition switch OFF.
- Remove:
 - Seat
 - Fuel Pump Lead Connector [A]
- Connect a hand tester [B] with suitable leads as shown.
 - Hand Tester (+) → Fuel Pump Connector (BR) Terminal
 - Hand Tester (-) → Fuel Pump Connector (BK/R) Terminal
- Turn the ignition switch ON, and run the engine with the transmission in neutral.
- Measure the fuel pump supply voltage.



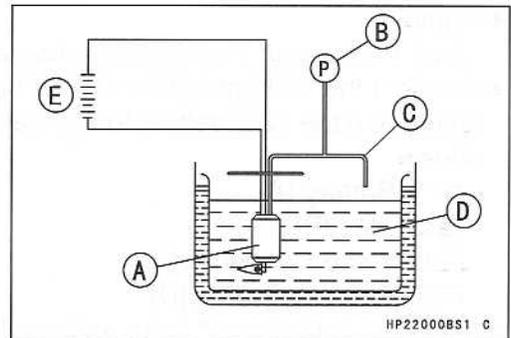
Fuel Pump Supply Voltage

Standard: near the Battery Voltage

- ★ If the reading is not as specified, replace the igniter.
- ★ If the reading is as specified, check the fuel pump.

Fuel Pump Operational Inspection:

- Remove:
 - Fuel Pump (see Fuel System chapter)
- Prepare a container filled with kerosene.
- Prepare the rubber hoses, and connect them to the pump fitting.
- Connect a suitable pressure gauge to the outlet hose as shown.
 - Fuel Pump [A]
 - Pressure Gauge [B]
 - Outlet Hose [C]
 - Kerosene [D]
 - Battery [E] (12V)
- Connect the pump leads to the battery using auxiliary wires as shown.
 - Battery (+) → Fuel Pump Connector (BR) Terminal
 - Battery (-) → Fuel Pump Connector (BK/R) Terminal
- ★ If the pump does not operate, the pump is defective. Replace the fuel pump.
- ★ If the pump operates is normal, close the outlet hose while operating the fuel pump.
- When the pump stops, read the pressure gauge.
- ★ If the pressure gauge reading is out of the specified pressure, the pump is defective. Replace the fuel pump.



Fuel Pump Pressure

Standard: 17.7 ~ 22.6 kPa

(0.18 ~ 0.23 kgf/cm², 2.6 ~ 3.3 psi)

- Install the fuel pump and tighten it.

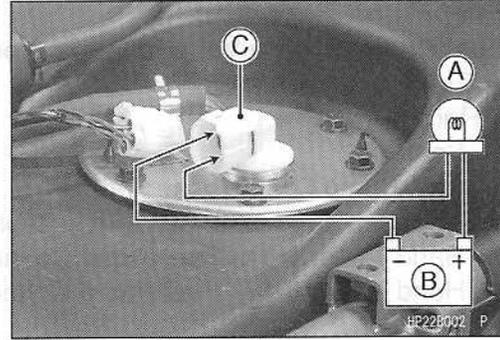
Torque - Fuel Pump Mounting Bolts : 2 N·m (0.2 kgf·m, 17 in·lb)

16-62 ELECTRICAL SYSTEM

Fuel Pump/Fuel Reserve Switch

Fuel Reserve Switch Inspection (1)

- Fill the fuel tank with fuel.
- Close the fuel tank cap surely.
- Remove the fuel tank (see Fuel System chapter).
- Connect the test light [A] (12 V 3.4 W bulb a socket with leads) and the 12 V battery [B] to the fuel pump connector [C].



Connections:

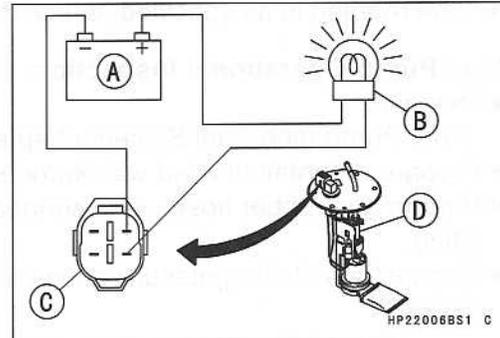
- Battery (+) → 12 V 3.4 W Bulb (one side)
- 12 V 3.4 W Bulb (other side) → BL Lead Terminal
- Battery (-) → BK/Y Lead Terminal

Special Tool - Needle Adapter Set: 57001-1457

- ★ If the test light turn on, the reverse switch is defective. Replace the fuel pump.

Fuel Reserve Switch Inspection (2)

- Remove:
 - Fuel Pump (see Fuel System chapter)
- Connect the test light (12 V 3.4 W bulb in a socket with leads) and the 12 V battery to the fuel pump connector as shown.
 - 12 V Battery [A]
 - Test Light [B]
 - Fuel Pump Connector [C]
 - Fuel Reserve Switch [D]



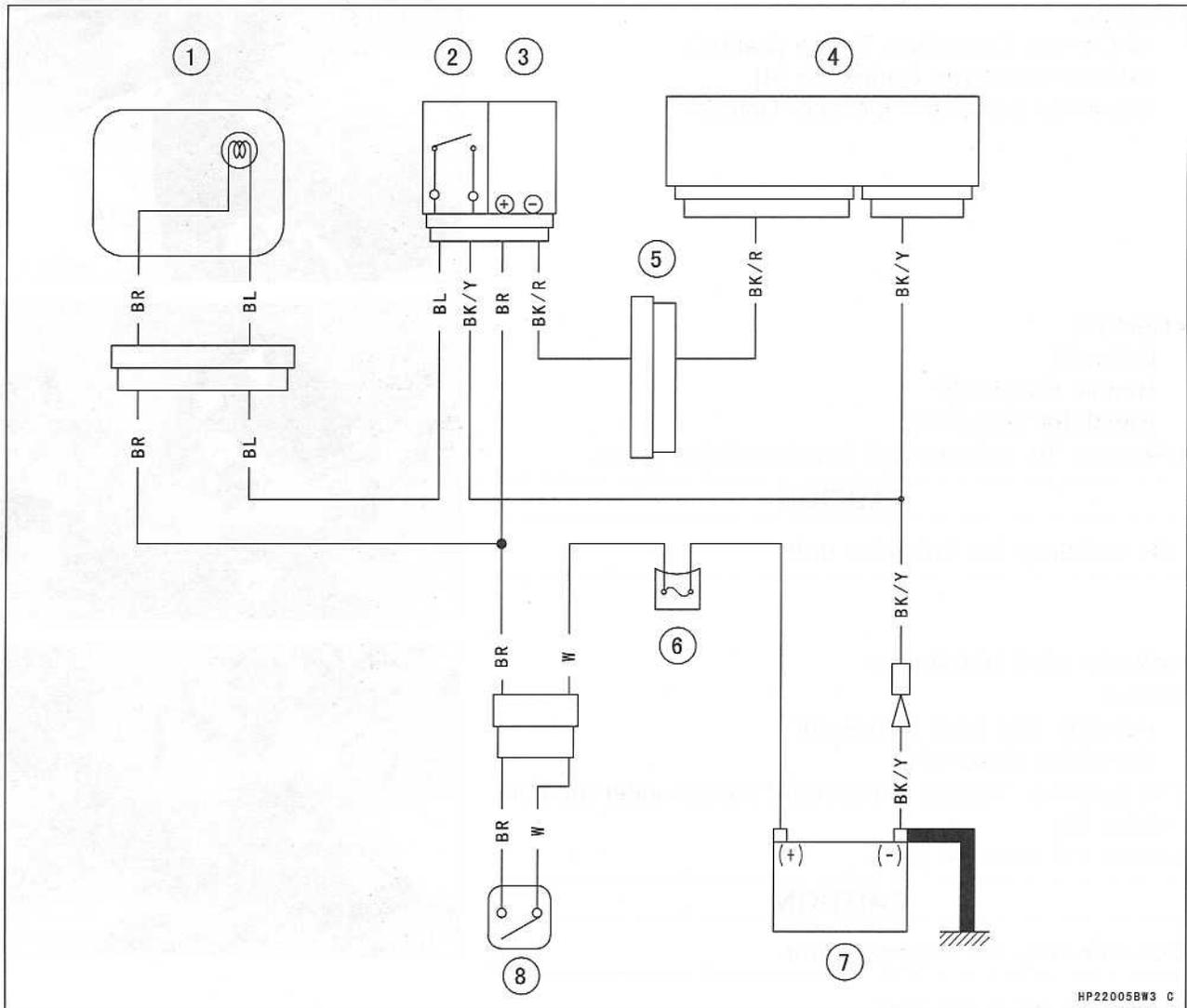
- ★ If the test light doesn't light, replace the fuel pump.

NOTE

- It may take a long time to turn on the test light in case that the fuel reserve switch is inspected just after the fuel pump is removed. Leave the fuel reserve switch with leads for inspection connected for 3 minute.

Fuel Pump/Fuel Reserve Switch

Fuel Pump/Fuel Reserve Switch Circuit



HP22005BW3 C

- 1. Indicator Unit
- 2. Fuel Level Sensor
- 3. Fuel Pump
- 4. Igniter

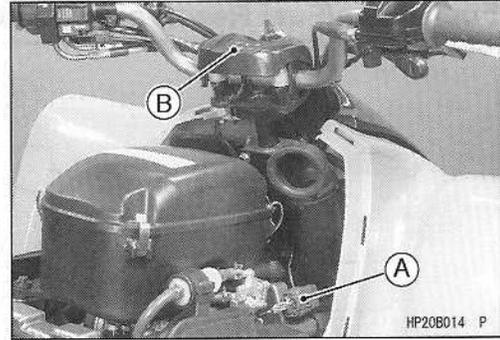
- 5. Reset Connector
- 6. Main Fuse 30 A
- 7. Battery
- 8. Ignition Switch

16-64 ELECTRICAL SYSTEM

Indicator Unit

Indicator Unit Removal

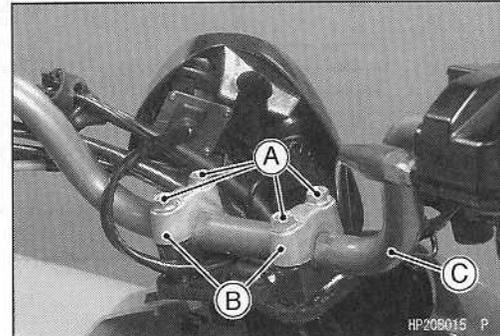
- Remove:
 - Air Cleaner Cover (see Frame chapter)
 - Indicator Unit Lead Connector [A]
 - Handlebar Cover and Indicator Unit [B]



- Remove:
 - Bolts [A]
 - Handle Holders [B]
 - Handlebar Assembly
- Remove the indicator unit from handlebar cover.

CAUTION

Do not drop the indicator unit.
--

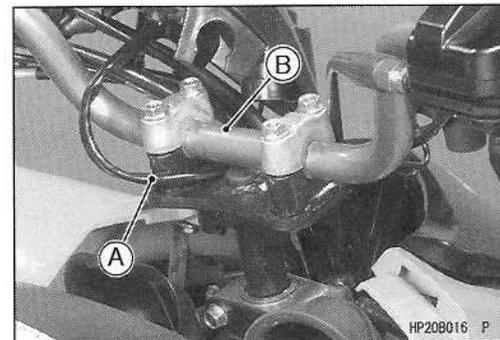


Indicator Unit Installation

- Install:
 - Indicator Unit Lead Connector
 - Handlebar Assembly
- Be sure the indicator unit lead [A] placed under the handlebar [B].
- Install the removed parts.

CAUTION

Do not drop the indicator unit.
--



Indicator Unit Inspection

- Remove:
 - Indicator Unit (see Indicator Unit Removal)

Indicator Unit

Check1. Indicator Light Inspection

- Using the auxiliary leads connect a 12 V battery to the indicator unit connector as follows:

Fuel Indicator Light [A]:

Battery Positive (+) Terminal to Terminal [1]

Battery Positive (-) Negative to Terminal [2]

- ★ If indicator light does not go on, replace the indicator unit.

Check2. LED (light Emitting Diode) Light Inspection

- Using the auxiliary leads, connect a 12 V battery to the indicator unit connector as follows:

Neutral Indicator Light (LED) [B]:

Battery Positive (+) Terminal to Terminal [1]

Battery Positive (-) Negative to Terminal [3]

Reverse Indicator Light (LED) [C]:

Battery Positive (+) Terminal to Terminal [1]

Battery Positive (-) Negative to Terminal [4]

Water Temperature Warning Light (LED) [D]:

Battery Positive (+) Terminal to Terminal [1]

Battery Positive (-) Negative to Terminal [5]

Oil Pressure Warning Light (LED) [E]:

Battery Positive (+) Terminal to Terminal [1]

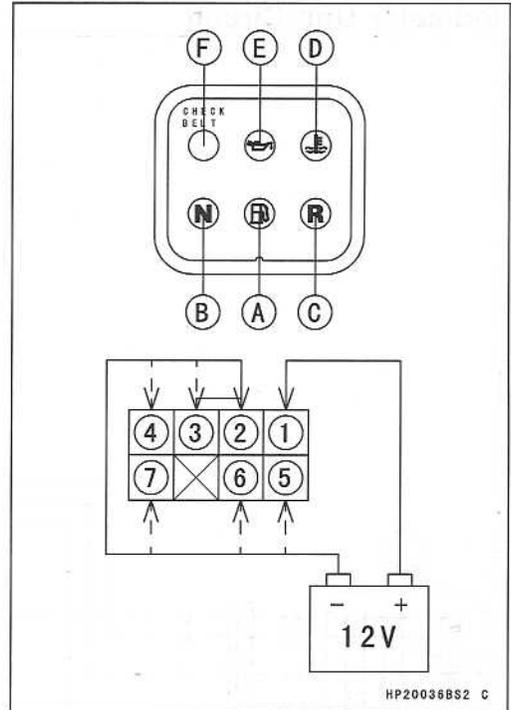
Battery Positive (-) Negative to Terminal [6]

Belt Indicator Light (LED) [F]:

Battery Positive (+) Terminal to Terminal [1]

Battery Positive (-) Negative to Terminal [7]

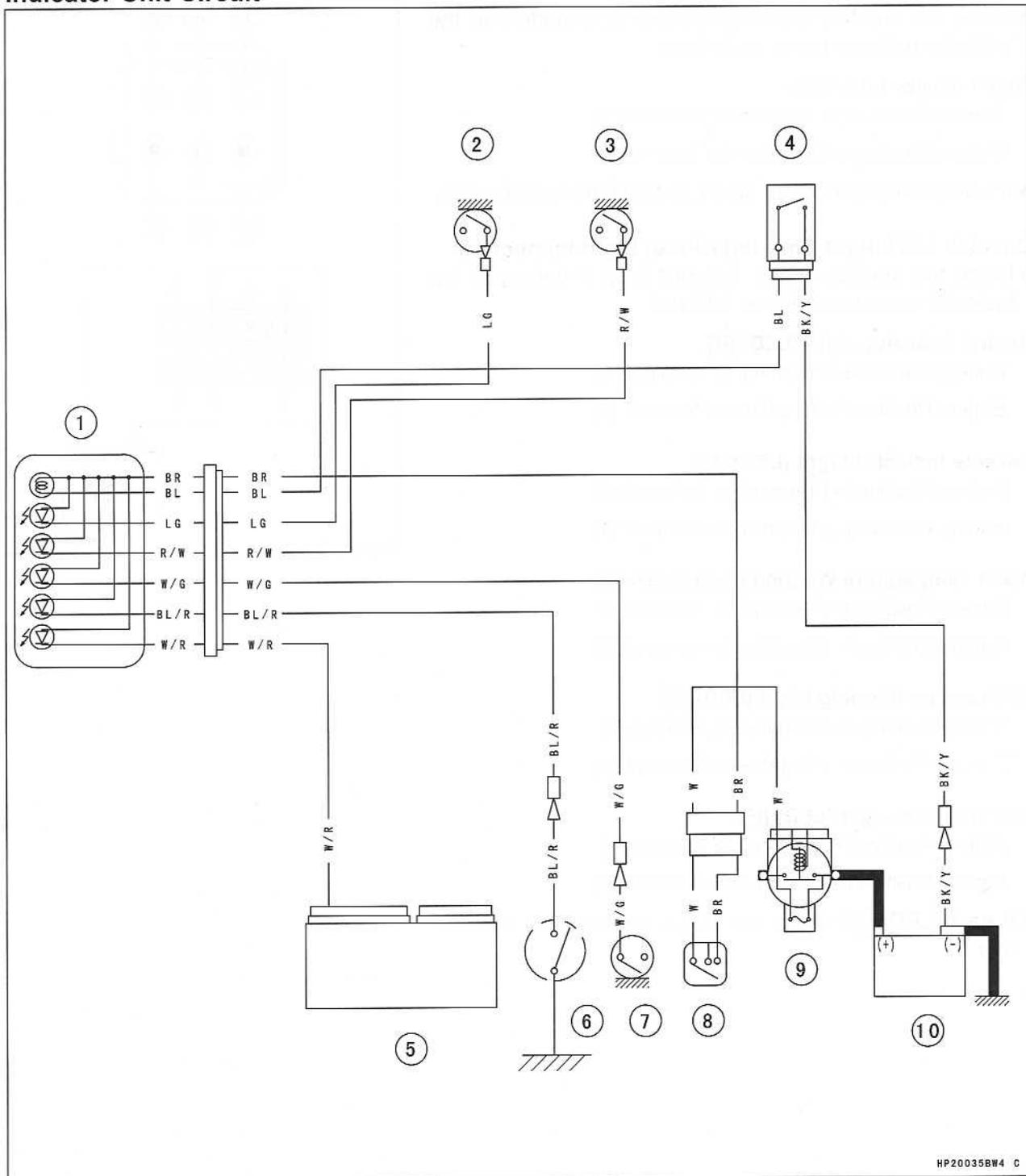
- ★ If each LED light does not go on, replace the indicator unit.



16-66 ELECTRICAL SYSTEM

Indicator Unit

Indicator Unit Circuit



HP20035BW4 C

- 1. Indicator Unit
- 2. Neutral Switch
- 3. Reverse Switch
- 4. Fuel Reserve Switch

- 5. Igniter
- 6. Oil Pressure Switch
- 7. Water Temperature Switch

- 8. Ignition Switch
- 9. Main Fuse 30A
- 10. Battery

Switches

Brake Light Switch Adjustment

- Refer to the Brake Light Switch Inspection in the Periodic Maintenance chapter.

Radiator Fan Switch Inspection

- Remove:
Radiator Fan Switch (see Cooling System chapter)
- Suspend the fan switch [A] in a container of coolant so that the temperature sensing projection and threaded portion are submerged.
- Suspend an accurate thermometer [B] in the coolant.

NOTE

- The switch and thermometer must not touch the container sides or bottom.
- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using the hand tester, measure the internal resistance of the switch across the terminals at the temperatures shown in the table.
- ★ If the hand tester does not show the specified values, replace the switch.

Radiator Fan Switch Resistance

- Rising temperature:

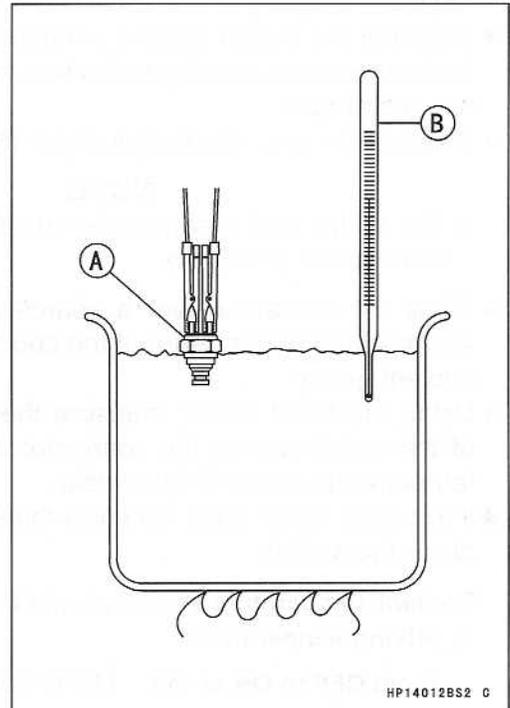
From OFF to ON at 96 ~ 100°C (205 ~ 212°F)

- Falling temperature:

From ON to OFF at 91 ~ 95°C (196 ~ 203°F)

ON: Less than 0.5 Ω

OFF: More than 1 MΩ



16-68 ELECTRICAL SYSTEM

Switches

Coolant Temperature Warning Light Switch Inspection

- Remove:
Coolant Temperature Warning Light 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.

Coolant Temperature Warning Light Switch Resistance

○ Rising temperature:

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

○ Falling temperature:

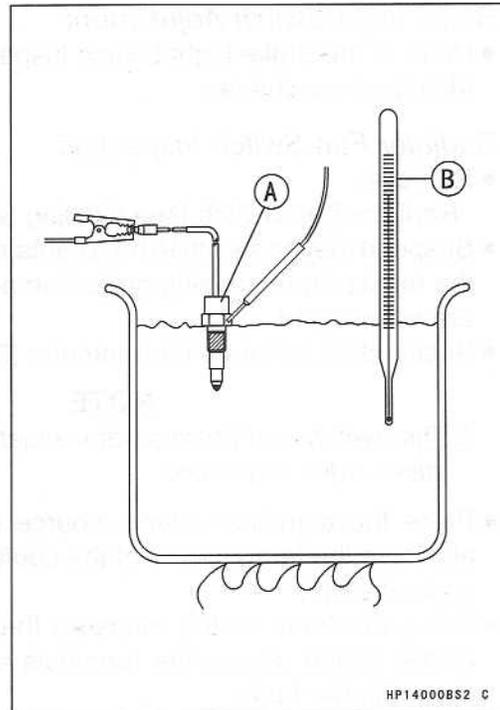
From ON to OFF at 108 ~ 111°C (226 ~ 232°F)

ON: Less than 0.5 Ω

OFF: More than 1 M Ω

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.



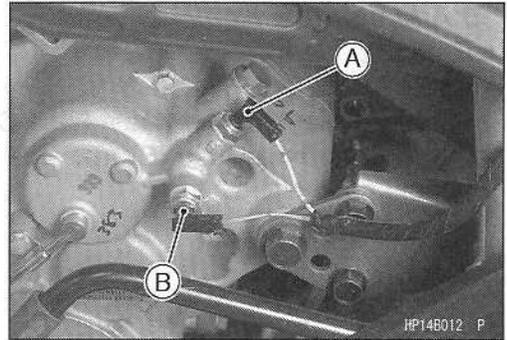
HP14000BS2 C

Switches

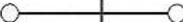
Neutral Switch Connection

	SW.Terminal	
When transmission is in neutral		
When transmission is not in neutral		

[A] Neutral Switch



Reverse Switch Connections

	SW.Terminal	
When transmission is in reverse		
When transmission is not in reverse		

[B] Reverse Switch

Oil Pressure Switch Connections*

	SW. Terminal	
When engine is stopped		
When engine is running		

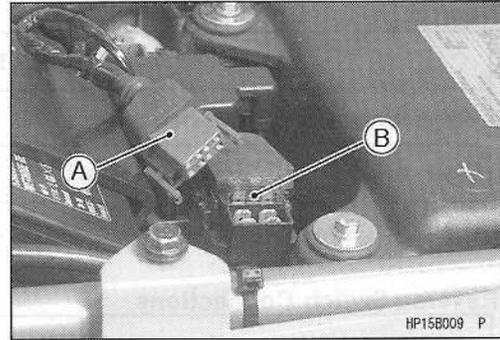
*: Engine lubrication system is in good condition.

16-70 ELECTRICAL SYSTEM

Fuses

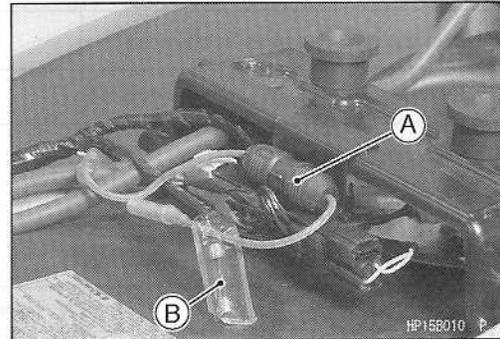
30 A Main Fuse Removal

- Remove:
 - Seat (see Frame chapter)
 - Starter Relay and 30A Main Fuse Connector [A]
- Pull out the main fuse [B] from the starter relay with a needle nose pliers.



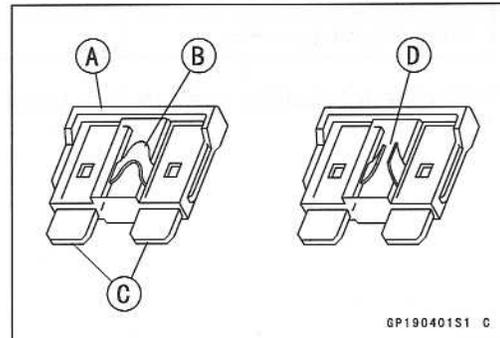
Radiator Fan Fuse Removal

- Remove:
 - Seat (see Frame chapter)
 - Fuse Case Cover [A]
- Pull out the fuse from the fuse case.
 - Spare Fuse [B]



Main Fuse Inspection

- Inspect the fuse element.
- ★ If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.
 - Housing [A]
 - Fuse Element [B]
 - Terminals [C]
 - Blown Element [D]



CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

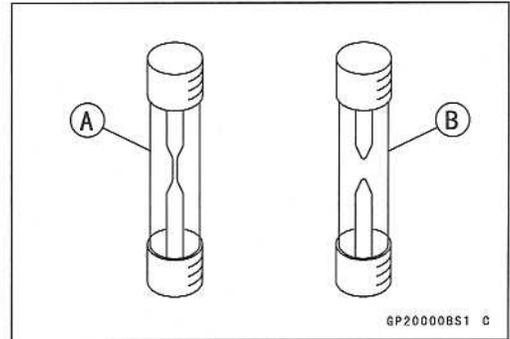
Fuses

Radiator Fan Fuse Inspection

- Remove the fuse (see Radiator Fan Fuse Removal).
- Inspect the fuse element.
- ★ If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

Fuse Element [A]

Blown Element [B]

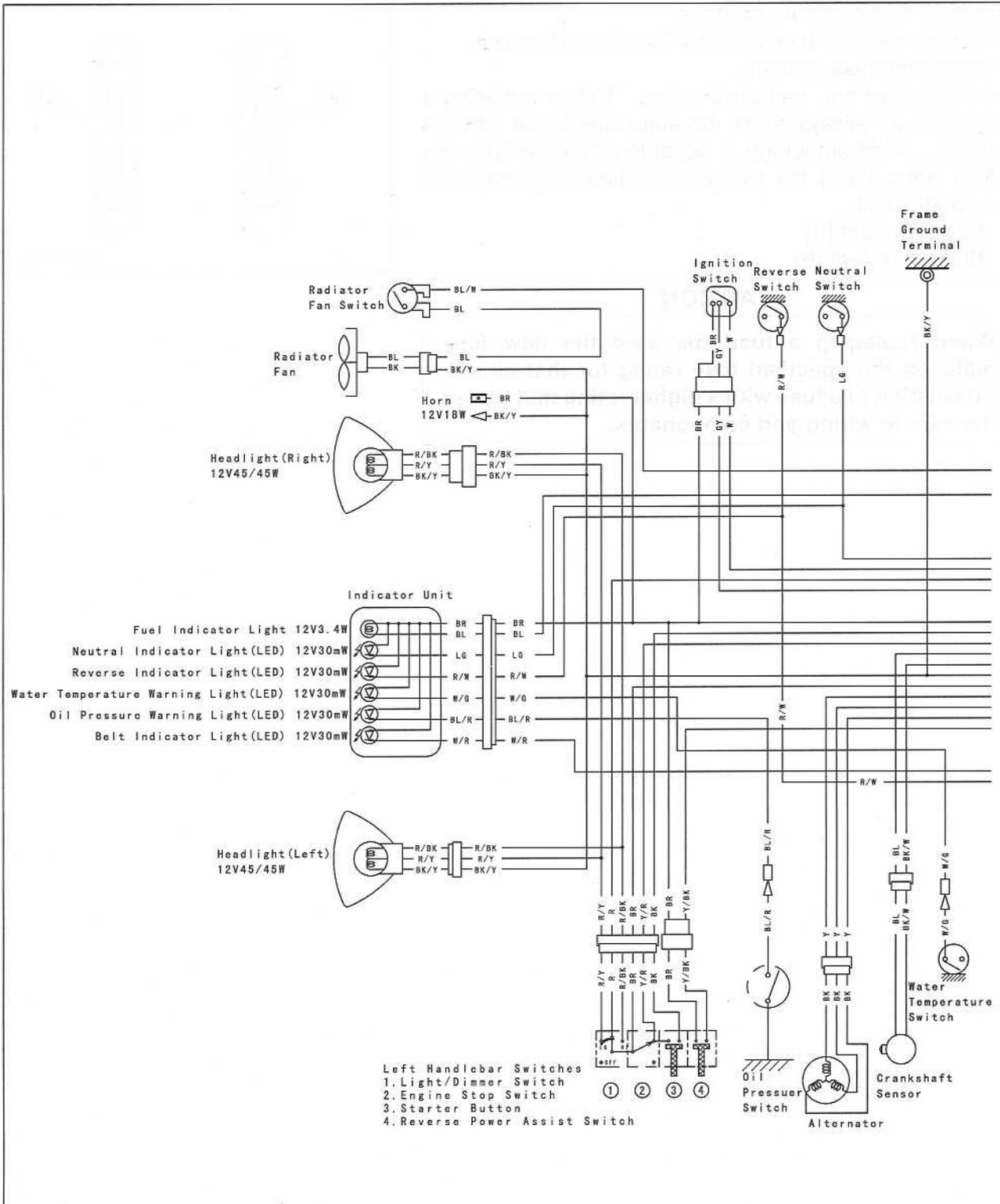


CAUTION

When replacing a fuse, be sure the new fuse matches the specified fuse rating for that circuit. Installation of a fuse with a higher rating may cause damage to wiring and components.

16-72 ELECTRICAL SYSTEM

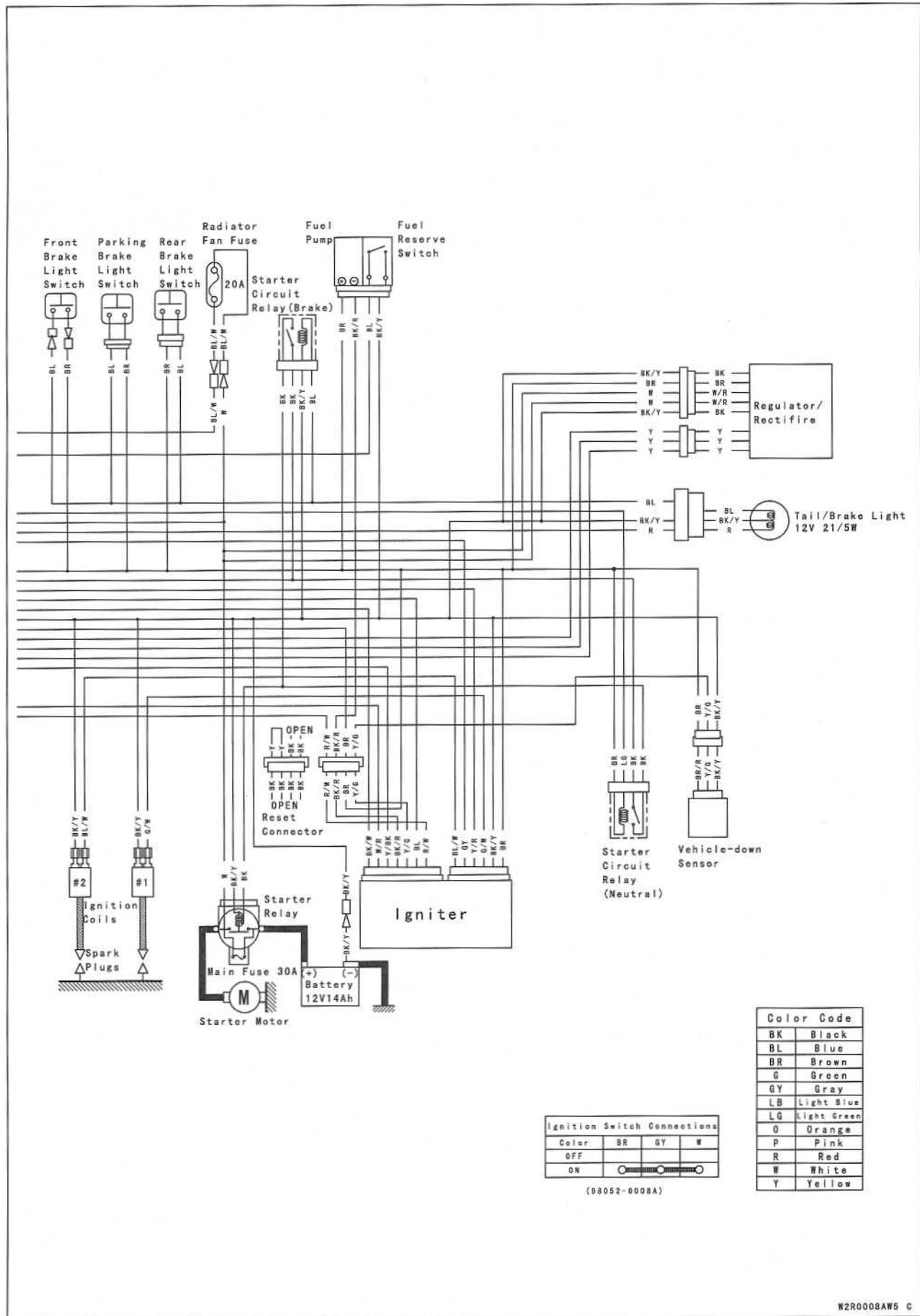
Wiring Diagram



Left Handlebar Switches
 1. Light/Dimmer Switch
 2. Engine Stop Switch
 3. Starter Button
 4. Reverse Power Assist Switch

Left Handlebar Switch Connections													
Light/Dimmer Switch				Engine Stop Switch			Starter Button			Reverse Power Assist Switch			
Color	R/Y	R	R/BK	BR	Color	BR	Y/R	Color	Y/R	BK	Color	BR	Y/BK
OFF	○	○	○	○	OFF	○	○	Released	○	○	OFF	○	○
LO	○	○	○	○	○	○	○	Push	○	○	ON	○	○
HI	○	○	○	○	○	○	○						

Wiring Diagram



Appendix

TABLE OF CONTENTS

Troubleshooting Guide	17-2
Cable, Wire, and Hose Routing	17-6

17-2 APPENDIX

Troubleshooting Guide

NOTE

○ This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties.

Engine Doesn't Start, Starting Difficulty:

Starter motor not rotating:

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

Starter motor rotating but engine doesn't turn over:

- Starter motor clutch trouble

Engine won't turn over:

- Valve seizure
- Rocker arm seizure
- Cylinder, piston seizure
- Crankshaft seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or bearing seizure
- Camshaft seizure

No fuel flow:

- Fuel tank air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded:

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

Fuel/air mixture incorrect:

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

No spark; spark weak:

- Spark plug dirty, broken, or maladjusted
- Spark plug cap or 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
- Pickup coil 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
- Starter plunger stuck open
- Air cleaner clogged, poorly sealed, or missing
- Fuel level too high or too low
- Fuel tank air vent obstructed
- Carburetor holder loose
- Air cleaner duct loose

Compression low:

- Spark plug loose
- Cylinder head not sufficiently tightened down
- No valve clearance

Troubleshooting Guide

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)

Other:

Carburetor vacuum piston doesn't slide smoothly
 Engine oil viscosity too high
 Brake dragging
 Igniter trouble
 Final gear case oil viscosity too high

Poor Running or No Power at High Speed:

Firing incorrect:

Spark plug dirty, broken, or maladjusted
 Spark plug cap or spark plug lead trouble
 Spark plug cap shorted or not in good contact
 Spark plug incorrect
 Pickup coil trouble
 Igniter trouble
 Ignition coil trouble

Fuel/air mixture incorrect:

Main jet clogged or wrong size
 Jet needle or needle jet worn
 Main air jet clogged
 Bleed holes of air bleed pipe or needle jet clogged
 Fuel level too high or too low
 Air cleaner clogged, poorly sealed, or missing
 Starter plunger stuck open
 Water or foreign matter in fuel
 Carburetor holder loose
 Air cleaner duct loose
 Fuel tank air vent obstructed
 Fuel tap clogged
 Fuel line clogged

Compression low:

Spark plug loose
 Cylinder head not sufficiently tightened down
 No valve clearance
 Cylinder, piston worn
 Piston rings bad (worn, weak, broken, or sticking)

Piston ring/groove clearance excessive
 Cylinder head gasket damaged
 Cylinder head warped
 Valve spring broken or weak
 Valve not seating properly (valve bent, worn, or carbon accumulation on the seating surface.)
 Compression release cam (K.A.C.R.) sticks open (Engine stalls when moving off)

Knocking:

Carbon built up in combustion chamber
 Fuel poor quality or incorrect
 Spark plug incorrect
 Igniter trouble

Miscellaneous:

Throttle valve won't fully open
 Carburetor vacuum piston doesn't slide smoothly
 Brake dragging
 Overheating
 Engine oil level too high
 Engine oil viscosity too high
 Final gear case oil viscosity too high

Overheating:

Firing incorrect:

Spark plug dirty, broken, or maladjusted
 Spark plug incorrect
 Igniter trouble

Fuel/air mixture incorrect:

Main jet clogged
 Fuel level too low
 Carburetor holder loose
 Air cleaner poorly sealed, or missing
 Air cleaner duct loose
 Air cleaner clogged

Compression high:

Carbon built up in combustion chamber
 Compression release cam (K.A.C.R.) sticks close

Engine load faulty:

Engine oil level too high
 Engine oil viscosity too high
 Drive train trouble
 Brake dragging

Lubrication inadequate:

Engine oil level too low
 Engine oil poor quality or incorrect

Final gear case overheating:

Insufficient oil
 Bevel gears maladjusted

Coolant incorrect:

Coolant level too low
 Coolant deteriorated

17-4 APPENDIX

Troubleshooting Guide

Thick coolant

Cooling system component incorrect:

Radiator clogged
Thermostat trouble
Radiator cap trouble
Radiator fan switch trouble
Fan motor broken
Fan blade damaged
Water pump not turning
Water pump impeller damaged

Over Cooling:

Cooling system component incorrect:

Radiator fan switch trouble
Thermostat trouble

Converter Operation Faulty:

Belt slipping:

Belt dirty, worn, or wetted
Drive or driven pulley sheave dirty or worn
Drive pulley spring broken or weak

Converter engagement speed too low:

Drive pulley spring broken or weak

Converter engagement speed too high:

Belt dirty or worn
Drive or driven pulley sheave dirty or worn
Drive pulley weight doesn't move smoothly
Drive pulley movable sheave doesn't move smoothly
Drive or driven pulley movable sheave bush worn
Drive pulley weight or roller worn

Shifting too quickly:

Drive pulley spring weak
Driven pulley spring weak or incorrectly installed (too loose)

Shifting too slowly:

Belt dirty or worn
Drive or driven pulley sheave dirty or worn
Drive pulley weight doesn't move smoothly
Drive pulley movable sheave doesn't move smoothly
Drive pulley spring incorrect installed (too tight)
Driven pulley movable sheave doesn't move smoothly

Gear Shifting Faulty:

Doesn't go into gear:

Shift shaft bent or seized
Gear stuck on the shaft
Shift control grip damaged
Shift control cable maladjusted
Reverse lock maladjusted

Jumps out of gear:

Shifter groove worn

Gear dogs worn
Shift block worn
Shift fork worn
Shift shaft spring weak or broken
Shift control cable maladjusted
Drive shaft, output shaft, and/or gear splines worn

Overshifts:

Shift shaft spring weak or broken
Shift control cable maladjusted

Abnormal Engine Noise:

Knocking:

Igniter trouble
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Spark plug incorrect
Overheating

Piston Slap:

Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston holes worn

Valve noise:

Valve clearance incorrect
Valve spring broken or weak
Camshaft bearing worn
Rocker arm worn

Other noise:

Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken, or stuck
Piston seizure, damage
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder head connection
Crankshaft runout excessive
Engine mounts loose
Crankshaft bearing worn
Camshaft chain tensioner trouble
Camshaft chain, sprocket, guides worn
Loose alternator rotor

Abnormal Drive Train Noise:

Converter noise:

Belt worn
Drive or driven pulley sheave worn
Drive or driven pulley movable sheave bush worn
Drive or driven pulley mount loose
Driven pulley shoe worn
Drive pulley weight or roller side washer worn

Troubleshooting Guide

Drive pulley weight or roller worn
Wear guides worn

Transmission noise:

Bearing worn
Transmission gears worn or chipped
Metal chips jammed in gear teeth
Engine oil insufficient or too thin

Final gear case noise:

Insufficient lubricant
Bevel gear bearings worn
Bevel gears worn or chipped
Bevel gears maladjusted

Abnormal Frame Noise:

Shock absorber noise:

Shock absorber damaged

Disc brake noise:

Pad installed incorrectly
Pad surface glazed
Disc warped
Caliper trouble

Rear brake noise:

Foreign matter in hub
Brake not properly adjusted

Other noise:

Bracket, nut, bolt, etc. not properly mounted or tightened

Exhaust Smokes Excessively:

White smoke:

Piston oil ring worn
Cylinder worn
Valve oil seal damaged
Valve guide worn
Cylinder head gasket damaged
Engine oil level too high

Black Smoke:

Air cleaner clogged
Main jet too large or fallen off
Starter plunger stuck open
Fuel level too high

Brown smoke:

Main jet too small
Fuel level too low
Air cleaner duct loose
Air cleaner poorly sealed or missing

Handling and/or Stability Unsatisfactory

Handlebar hard to turn:

Tire air pressure too low
Steering stem bearing damaged
Steering stem bearing lubrication inadequate
Steering stem bent
Damage tie-rod end

Handlebar shakes or excessively vibrates:

Tire worn
Wheel rim warped
Rear axle runout excessive
Wheel bearing worn
Handlebar clamp loose
Steering stem clamp bolt loose

Handlebar pulls to one side:

Frame bent
Wheel maladjustment
Suspension arm bent or twisted
Steering stem bent
Front or rear tire air pressure unbalanced
Front shock absorber unbalanced

Shock absorption unsatisfactory:

Too hard:

Tire air pressure too high
Shock absorber maladjusted

Too soft:

Shock absorber oil leaking
Shock absorber spring weak
Tire air pressure too low
Shock absorber maladjusted

Brake Doesn't Hold

Front brake:

Air in the brake line
Brake fluid leakage
Brake fluid deteriorated
Primary or secondary cup trouble
Master cylinder scratched inside
Pad overworn or worn unevenly
Oil, grease on pads and disc
Disc worn or warped
Brake overheated

Rear Brake:

Brake not properly adjusted
Plates worn
Brake parts worn or damaged

Battery Discharged:

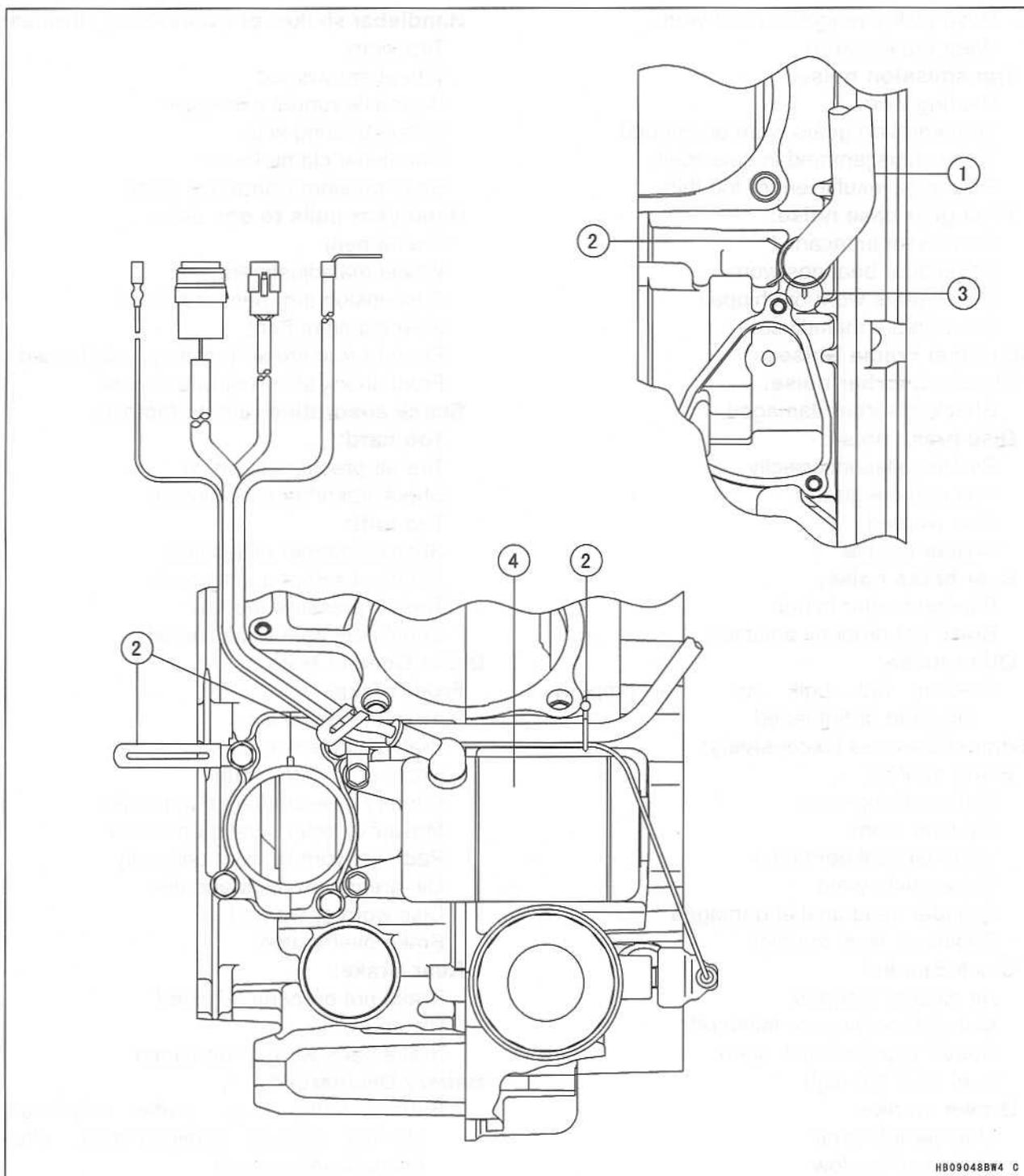
Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
Battery leads making poor contact
Load excessive (e.g., bulb of excessive wattage)
Ignition switch trouble
Regulator/rectifier trouble
Alternator trouble
Wiring faulty

Battery Overcharged:

Regulator/rectifier trouble
Battery trouble

17-6 APPENDIX

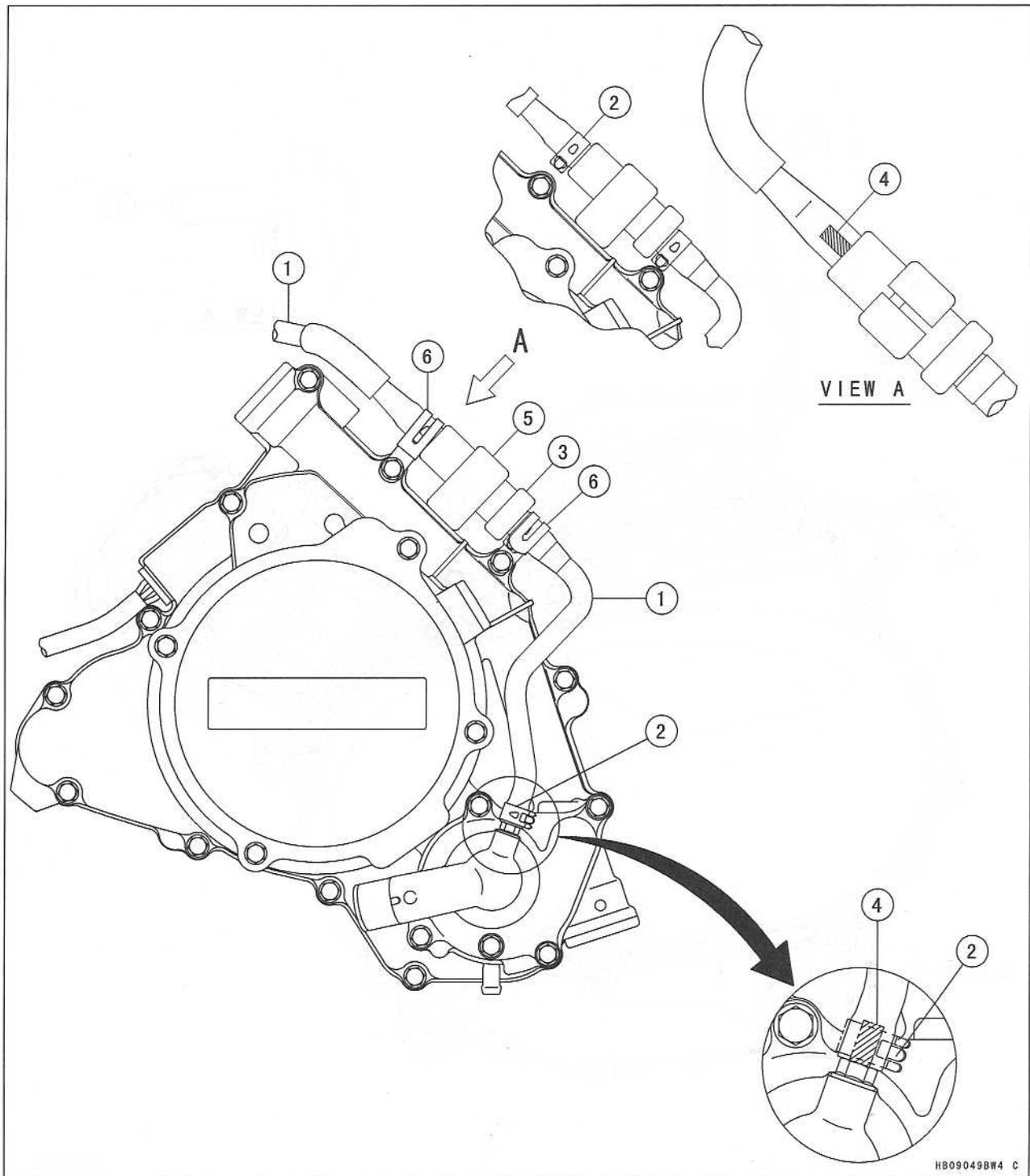
Cable, Wire, and Hose Routing



HB09048BW4 C

1. Tube
2. Clamp
3. Align the white paint mark on the tube with the adjustment mark on the crankcase.
4. Electric Starter

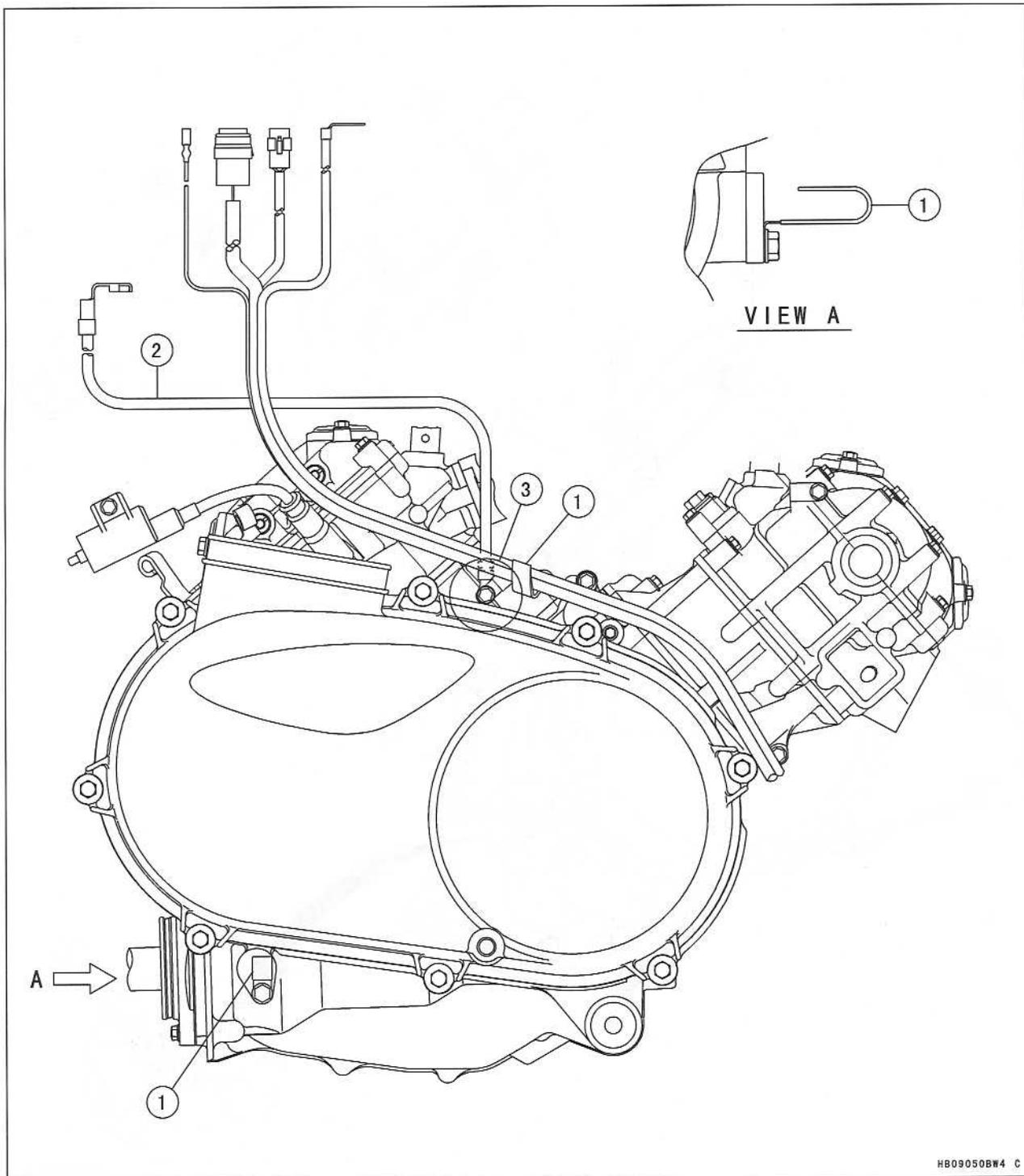
Cable, Wire, and Hose Routing



1. Cooling Hoses
2. Clamps (Install the clamps with the tabs direction as shown.)
3. Coolant Valve
4. Position the white marks on the tube as shown.
5. Damper
6. Clamps

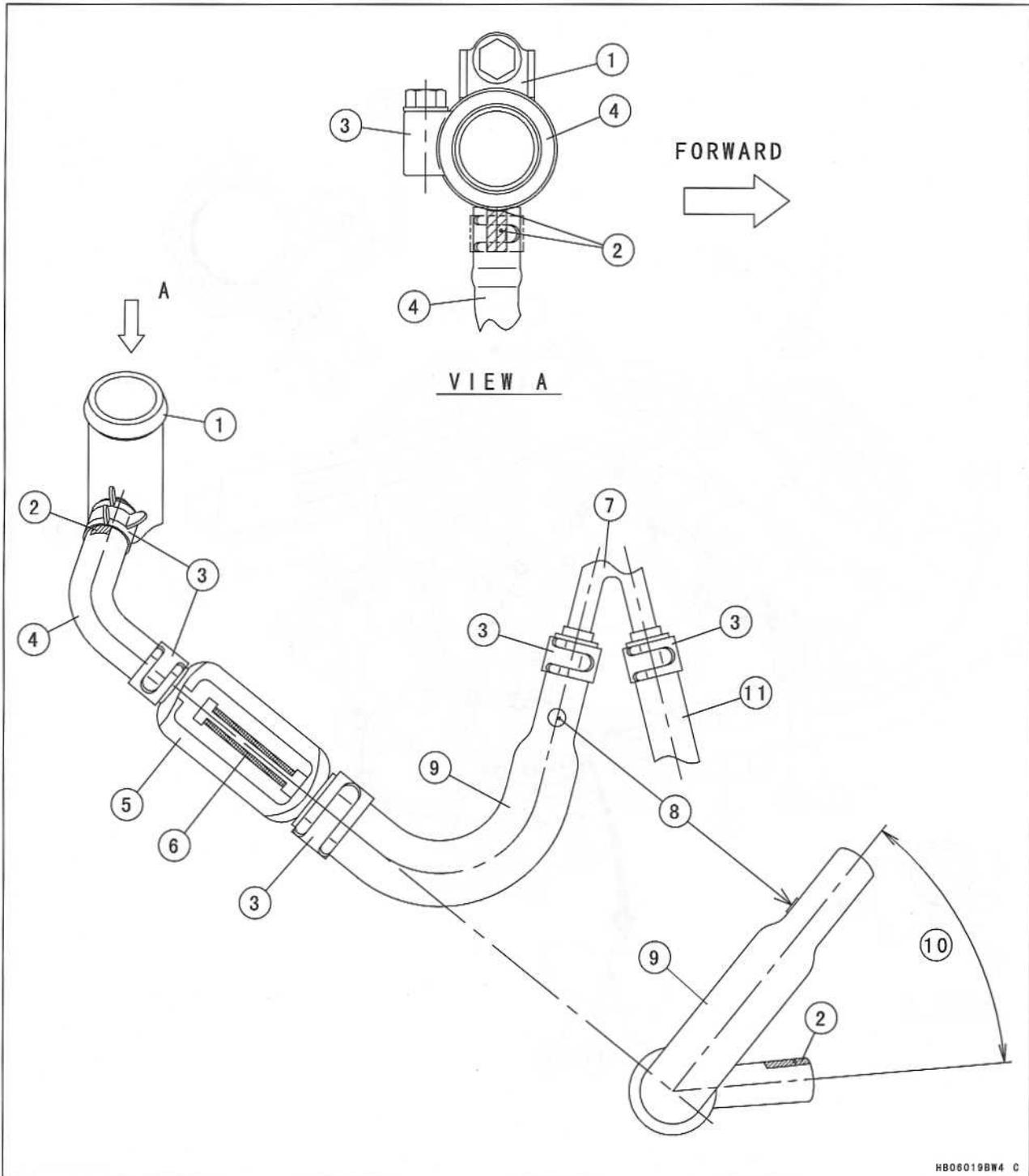
17-8 APPENDIX

Cable, Wire, and Hose Routing



1. Clamp
2. Engine Ground Lead
3. Install the clamp on the engine ground lead.

Cable, Wire, and Hose Routing

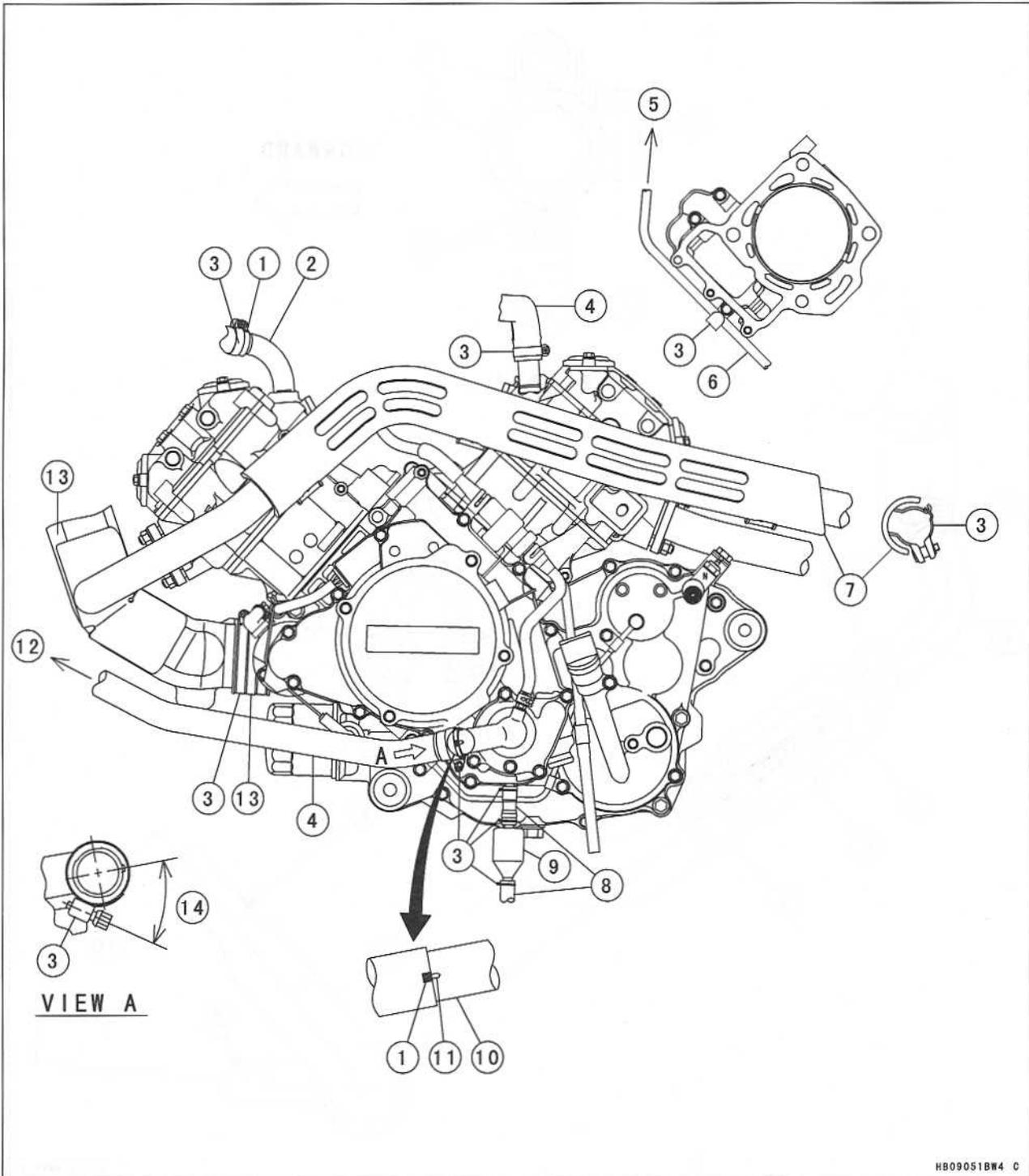


- 1. Water Pipe
- 2. White Paint
- 3. Clamps
- 4. Cooling Hoses
- 5. Coolant Filter Body
- 6. Coolant Filter

- 7. Carburetor
- 8. Mark
- 9. Cooling Hose
- 10. Assemble Angle (about 45°, [4] and [9] hoses)
- 11. Cooling Hose

17-10 APPENDIX

Cable, Wire, and Hose Routing

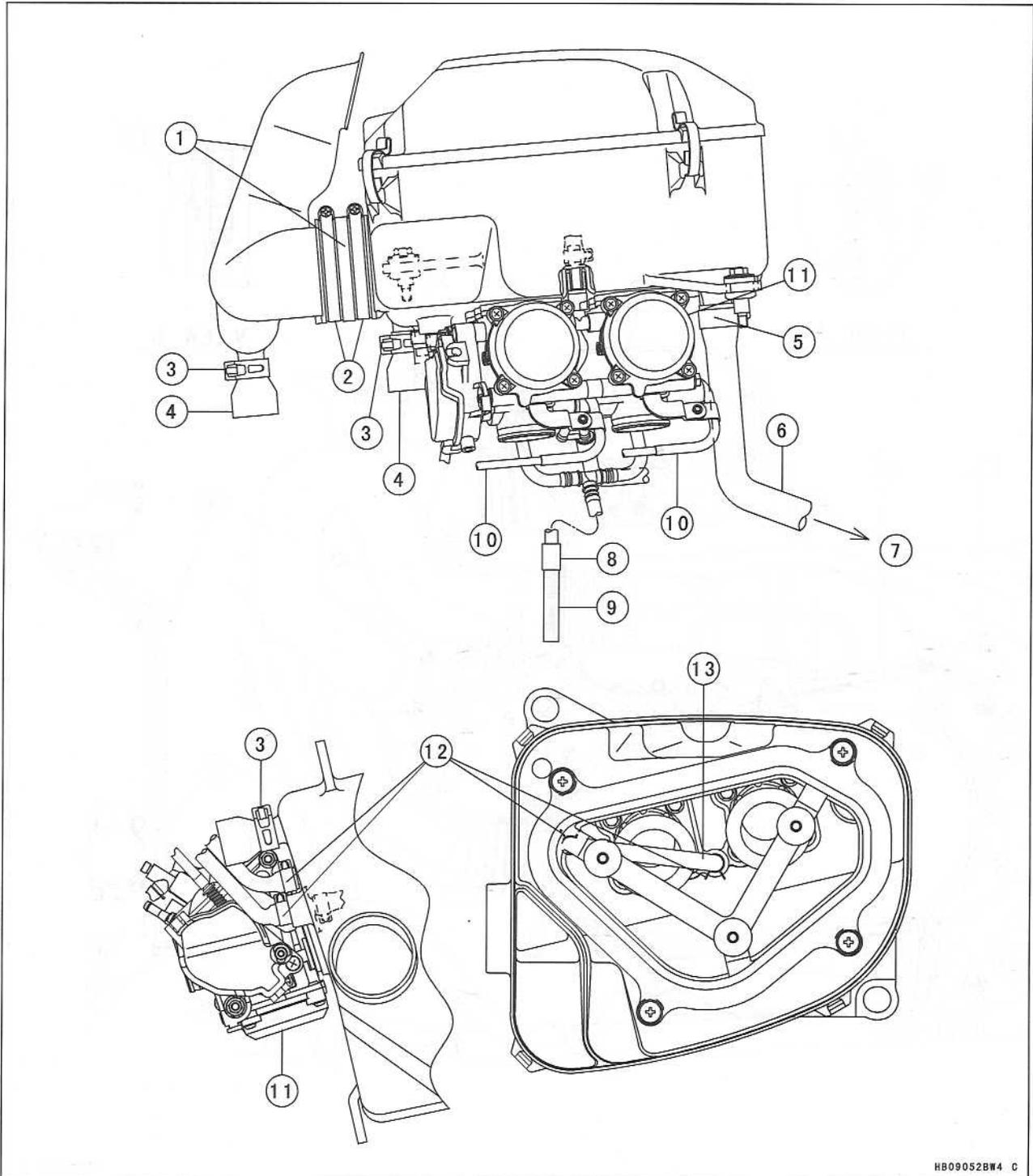


HB09051BW4 C

- 1. White Paint
- 2. Water Pipe
- 3. Clamp
- 4. Cooling Hose
- 5. To Carburetor
- 6. Carburetor Overflow Tube
- 7. Exhaust Pipe Cover

- 8. Tube
- 9. Breather
- 10. Pump Cover
- 11. Mark
- 12. To Radiator
- 13. Duct
- 14. Face the clamp screw as shown.

Cable, Wire, and Hose Routing



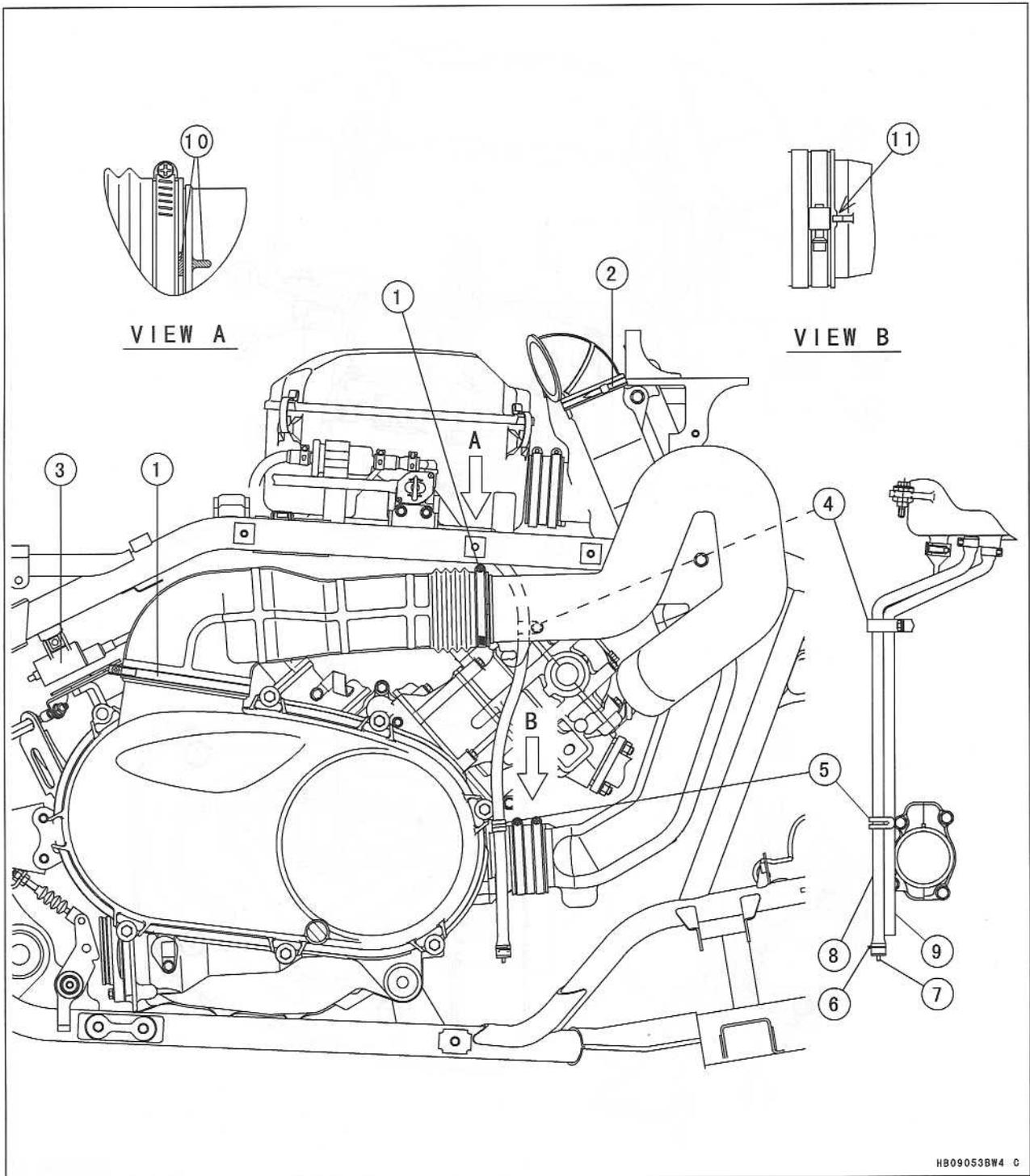
HB09052BW4 C

- 1. Air Cleaner Duct
- 2. Clamps
- 3. Clamps
- 4. Boots
- 5. Clamp
- 6. Vent Hose
- 7. To Crankcase

- 8. Coolant Valve
- 9. Coolant Tube
- 10. Starter Cable
- 11. Carburetor
- 12. Clamps
- 13. Air Vent Tube

17-12 APPENDIX

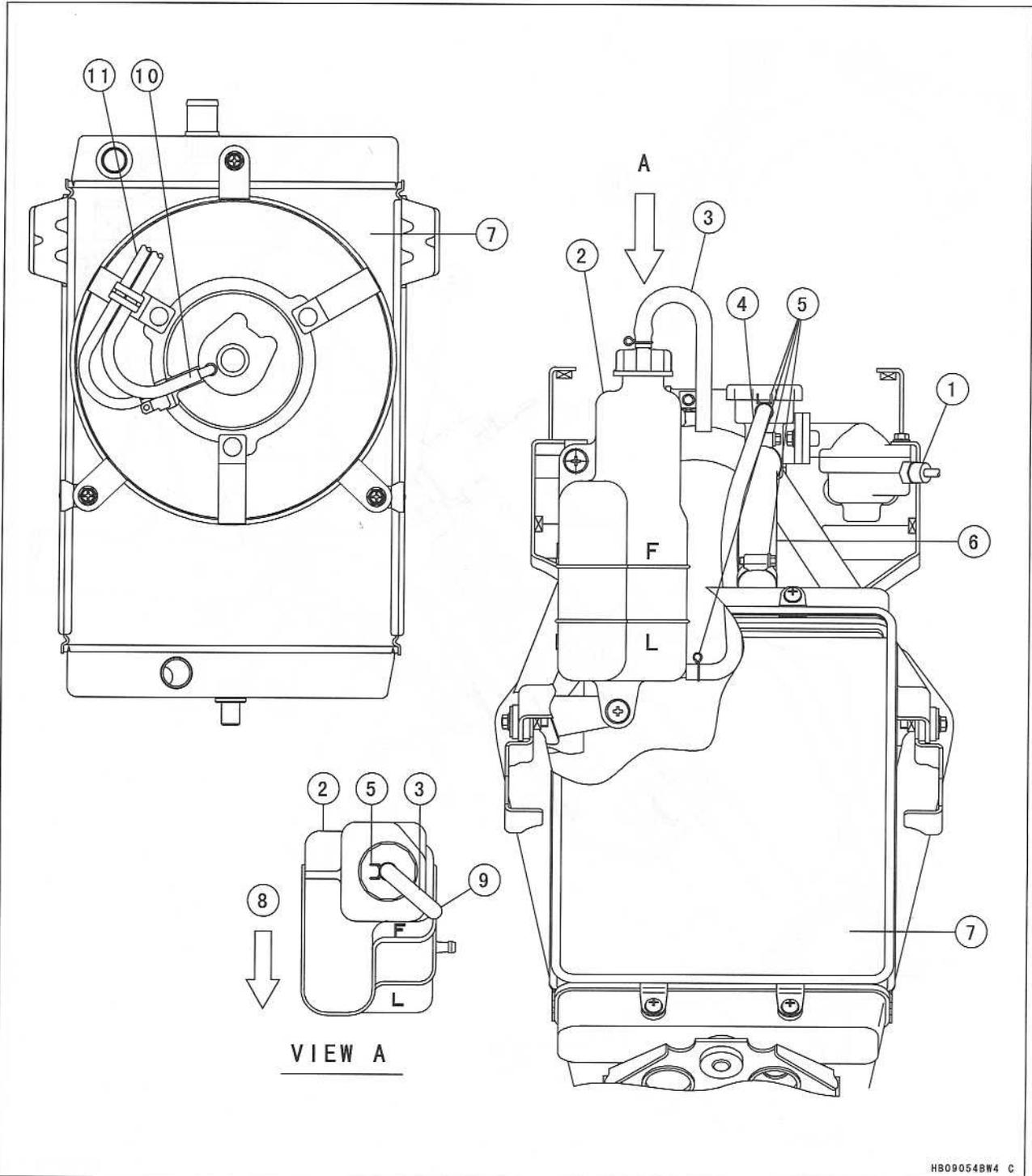
Cable, Wire, and Hose Routing



- 1. Clamps
- 2. Bands
- 3. Ignition Coil (Rear)
- 4. Clamp
- 5. Clamp
- 6. Clamp

- 7. Drain Plug
- 8. Drain Hose
- 9. Vent Hose
- 10. Align the mark.
- 11. Fit the projection and groove of the each ducts.

Cable, Wire, and Hose Routing



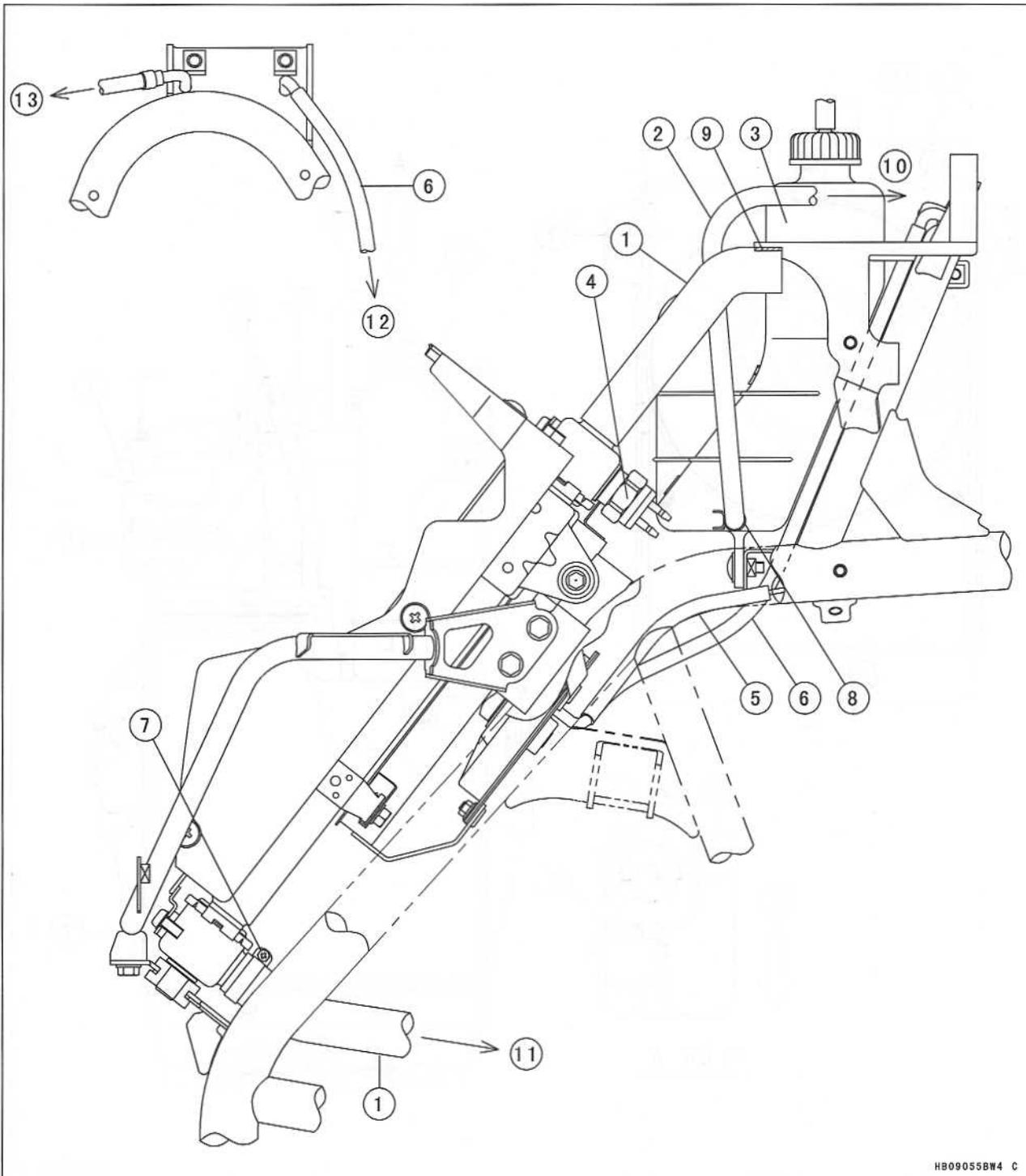
HB09054BW4 C

- 1. Coolant Temperature Warning Light Switch
- 2. Reserve Tank
- 3. Reserve Tank Breather Hose
- 4. Cooling Hose
- 5. Clamp
- 6. Radiator Hose

- 7. Radiator
- 8. Forward
- 9. Face the reserve tank breather hose as shown.
- 10. Fan Motor Breather Hose
- 11. Fan Motor Lead

17-14 APPENDIX

Cable, Wire, and Hose Routing

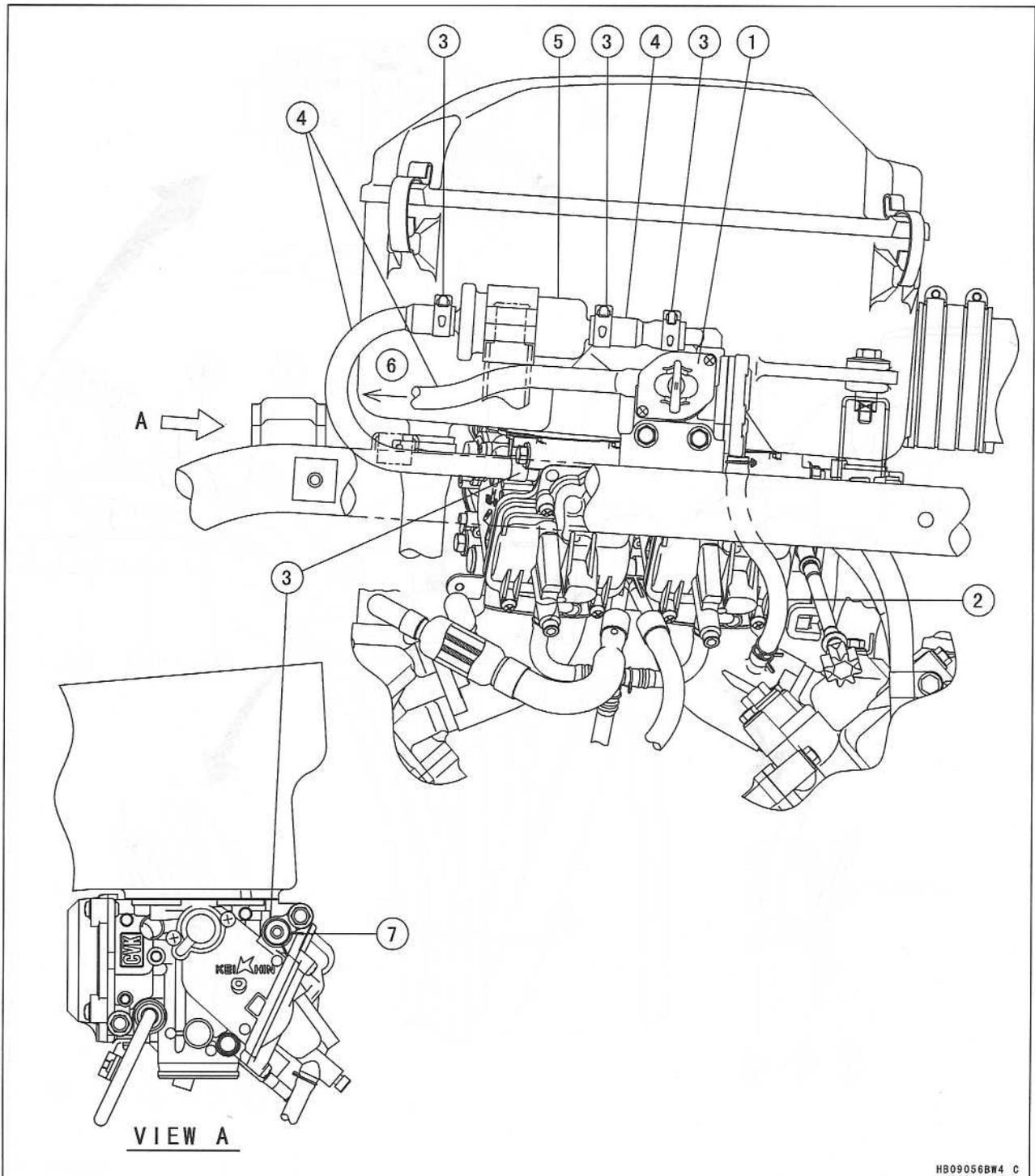


HB09055BW4 C

- 1. Radiator Hose
- 2. Cooling Hose
- 3. Reserve Tank
- 4. Radiator Fan Switch
- 5. Fan Motor Lead
- 6. Fan Motor Breather Hose
- 7. Clamp

- 8. Clamp
- 9. Face the white paint upward.
- 10. To Thermostat
- 11. To Water Pump
- 12. To Fan Motor
- 13. To Final Gear Case

Cable, Wire, and Hose Routing

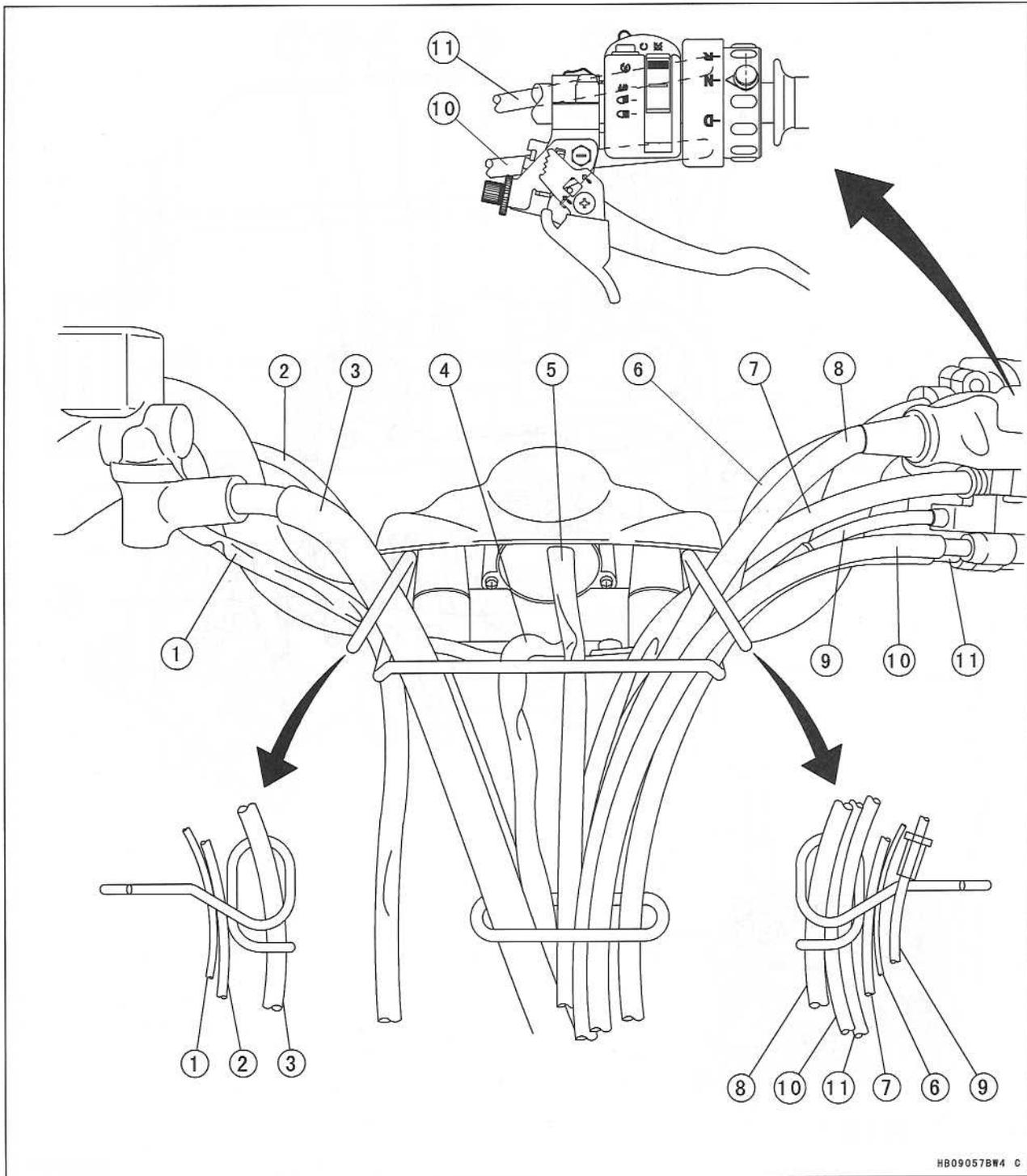


HB09056BW4 C

1. Fuel Tap
2. Fuel Tap Vacuum Hose
3. Clamp
4. Fuel Hose
5. Fuel Filter
6. To Fuel Tank
7. Face the clamp as shown.

17-16 APPENDIX

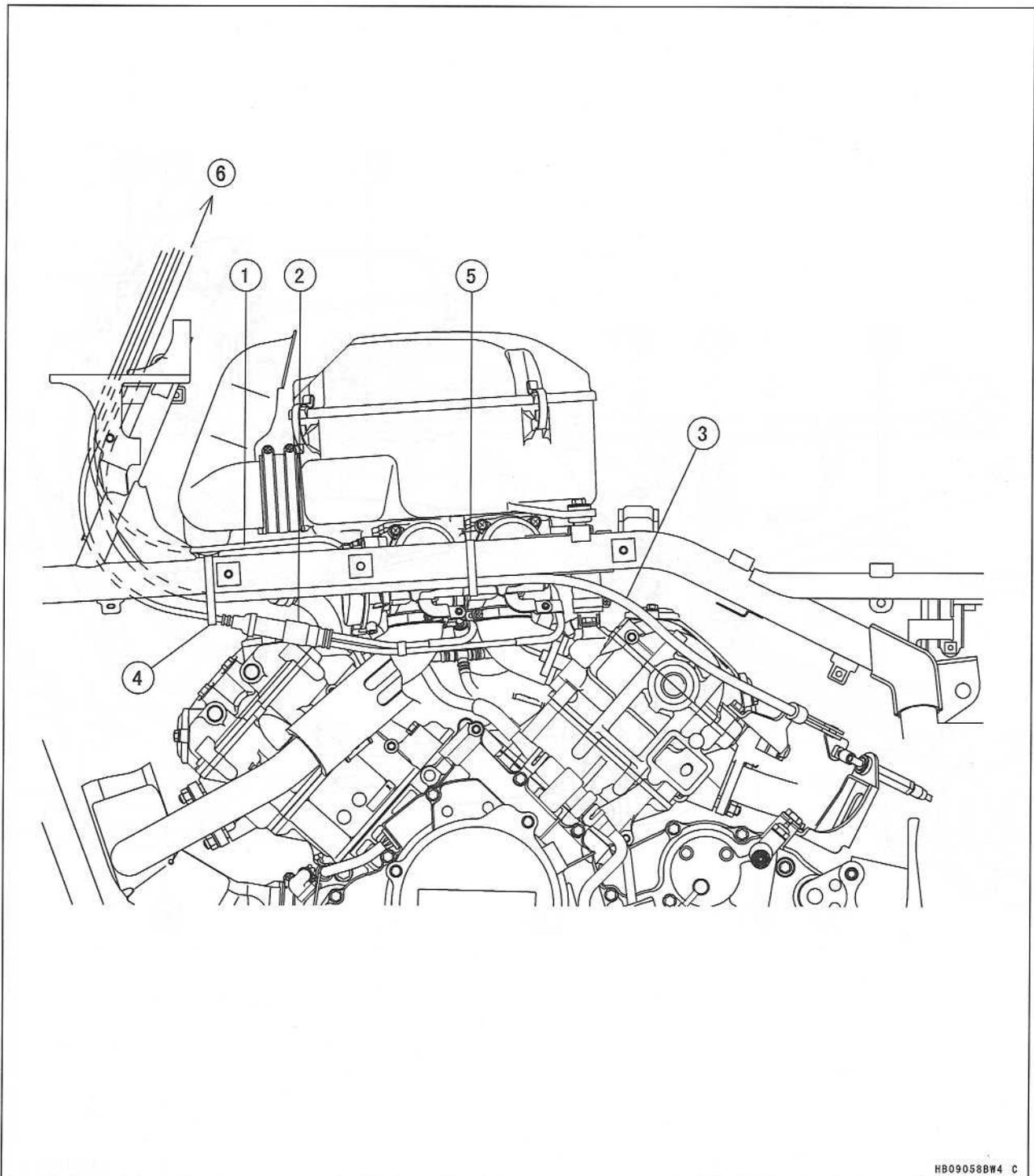
Cable, Wire, and Hose Routing



- 1. Front Brake Switch Lead
- 2. Throttle Cable
- 3. Front Brake Hose
- 4. Indicator Unit Lead
- 5. Ignition Switch Lead
- 6. Brake Switch Lead

- 7. Left Handlebar Switch Lead
- 8. Parking Brake Cable
- 9. Choke Cable
- 10. Shift Control Cable
- 11. Shift Control Cable

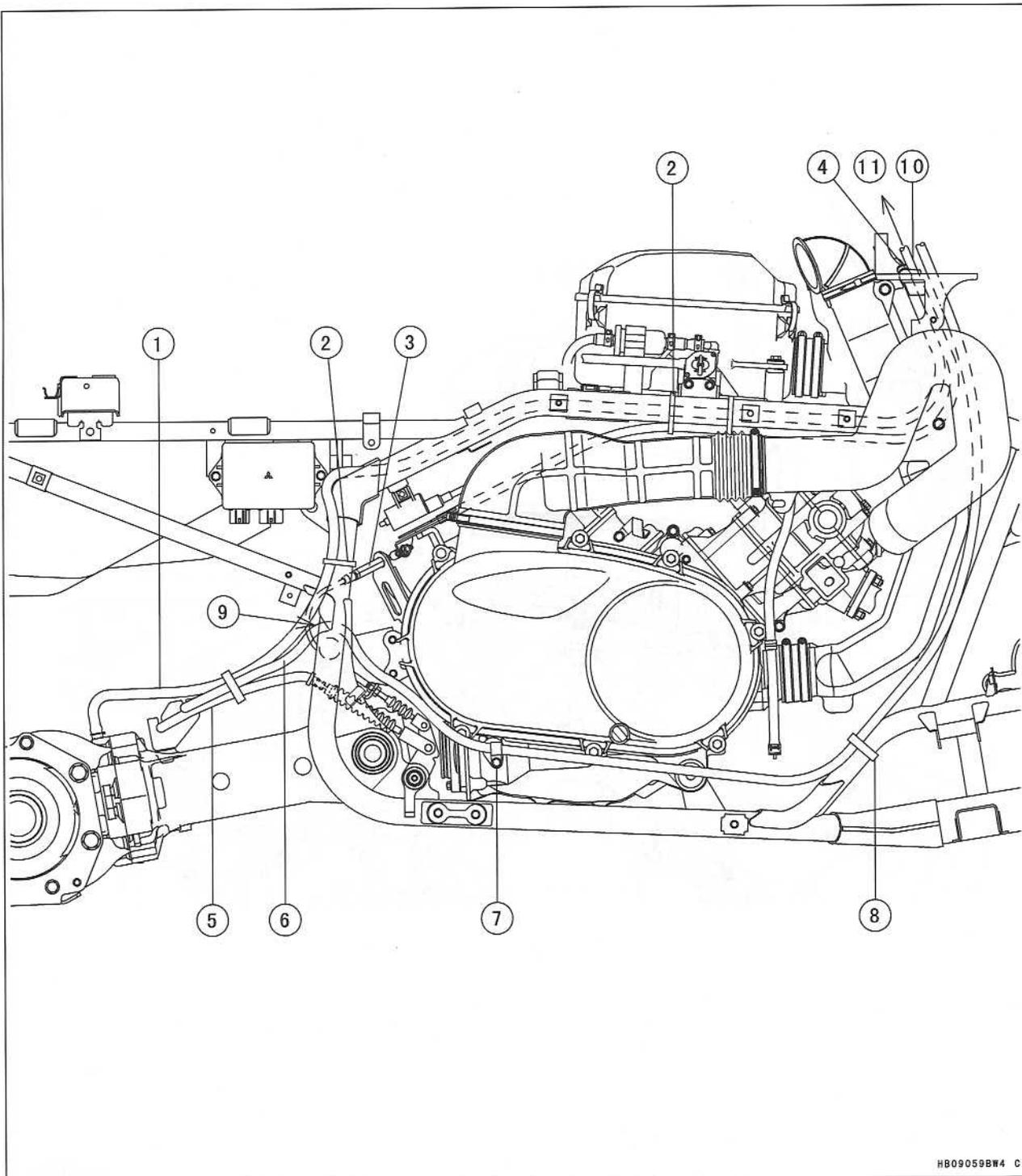
Cable, Wire, and Hose Routing



1. Throttle Cable
2. Choke Cable
3. Shift Control Cable
4. Clamp the choke cable only with the band.
5. Band
6. To Front Side of Shift Control Grip

17-18 APPENDIX

Cable, Wire, and Hose Routing

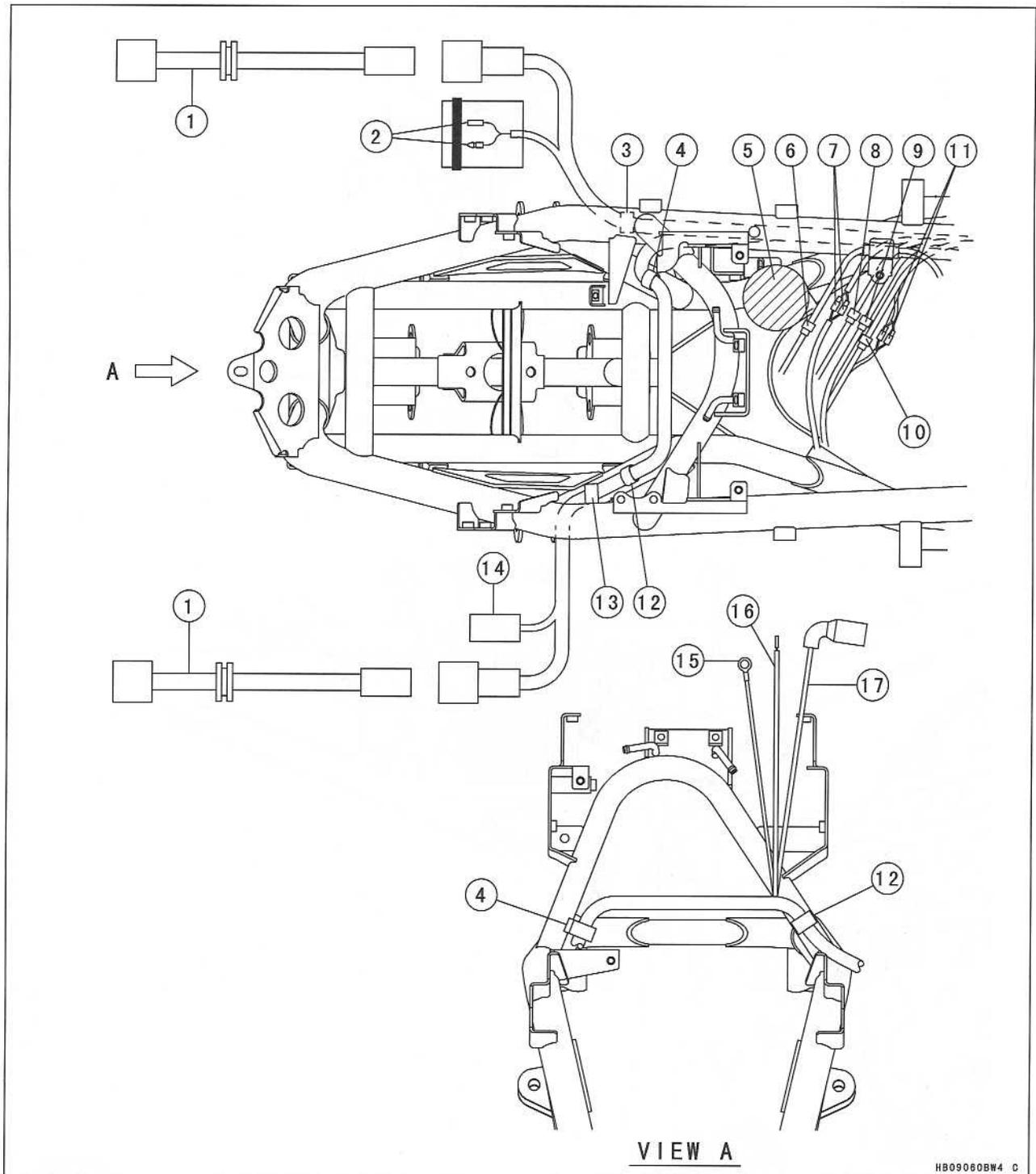


HB09059BW4 C

1. Final Gear Case Breather Hose
2. Band
3. Reverse Lock Cable
4. Clamp
5. Rear Brake Cable
6. Parking Brake Cable

7. Clamp
8. Band (With the Rear Brake Light Switch)
9. Through the parking brake cable upper side on the cross pipe.
10. Shift Control Cable
11. To Rear Side of Shift Control Grip

Cable, Wire, and Hose Routing

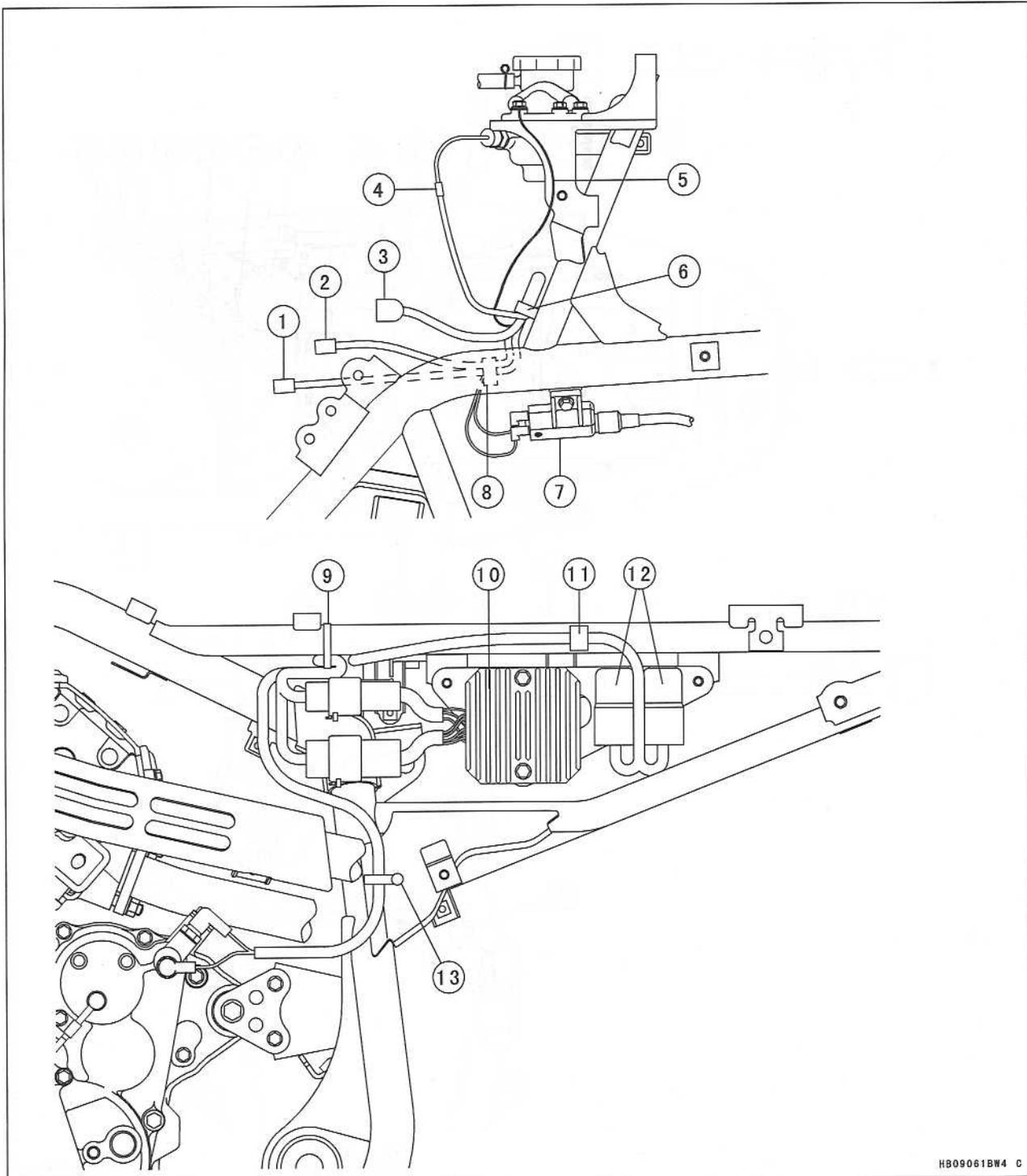


HB09060BW4 C

- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Head Light Lead 2. Horn Connector 3. Clamp 4. Clamp 5. Converter Duct 6. Indicator Unit Lead Connector 7. Rear Brake Switch Lead Connector 8. Front Brake Switch Lead Connector 9. Ignition Switch Lead Connector 10. Left Handlebar Switch Lead Connector | <ul style="list-style-type: none"> 11. Reverse Power Assist Switch Lead Connector 12. Clamp 13. Clamp 14. Radiator Fan Connector 15. Ground (Tighten with the thermostat cover bolt.) 16. Water Temperature Warning Switch Lead 17. Radiator Fan Switch Lead |
|--|---|

17-20 APPENDIX

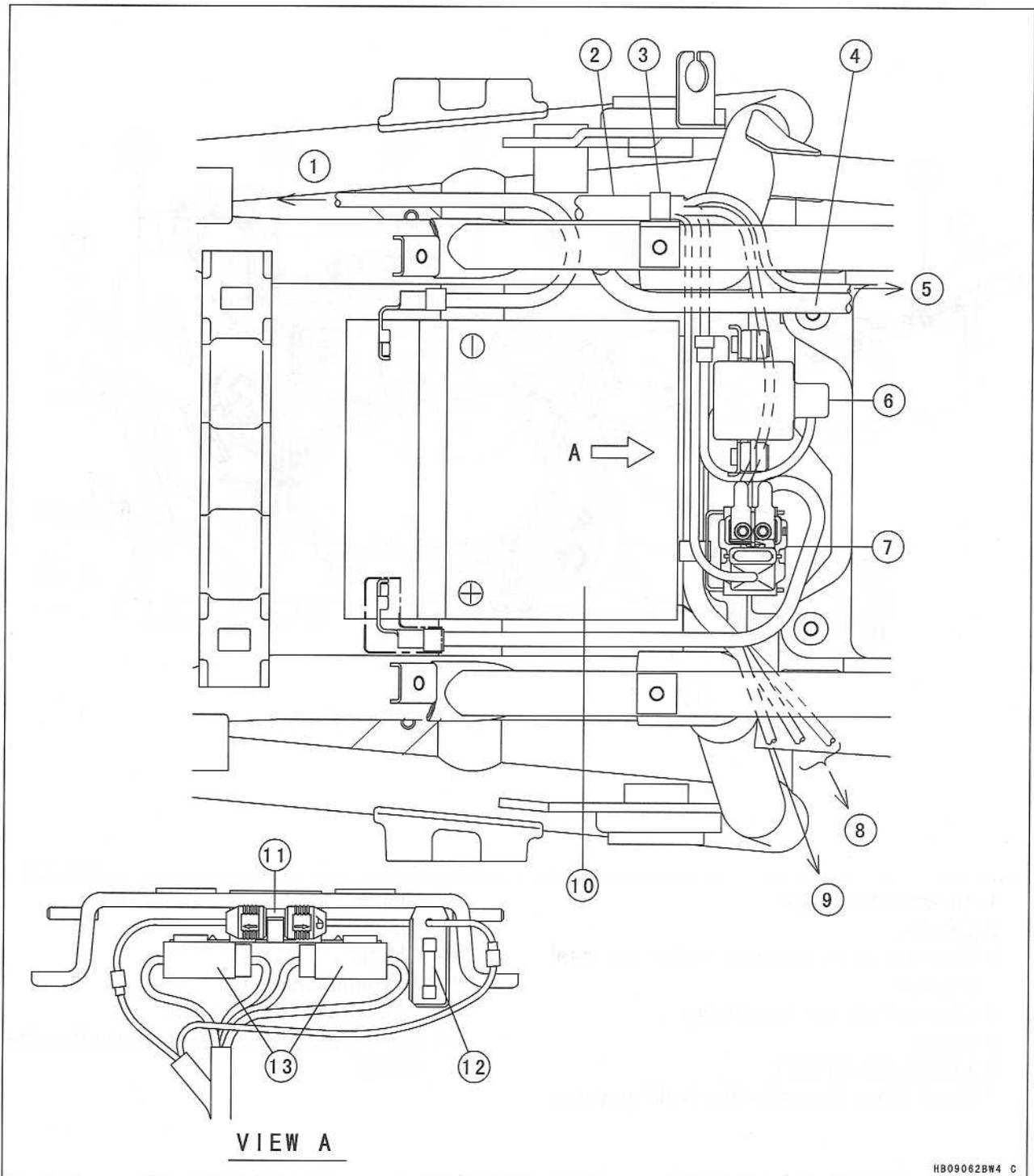
Cable, Wire, and Hose Routing



HB09061BW4 C

- | | |
|---|----------------------------|
| 1. Left Head Light Lead Connector | 7. Ignition Coil (Front) |
| 2. Radiator Fan Connector | 8. Clamp |
| 3. Radiator Fan Switch Connector | 9. Band |
| 4. Water Temperature Warning Switch Lead | 10. Regulator/Rectifier |
| 5. Ground (Tighten with the thermostat cover bolt.) | 11. Clamp |
| 6. Clamp | 12. Starter Circuit Relays |
| | 13. Clamp |

Cable, Wire, and Hose Routing

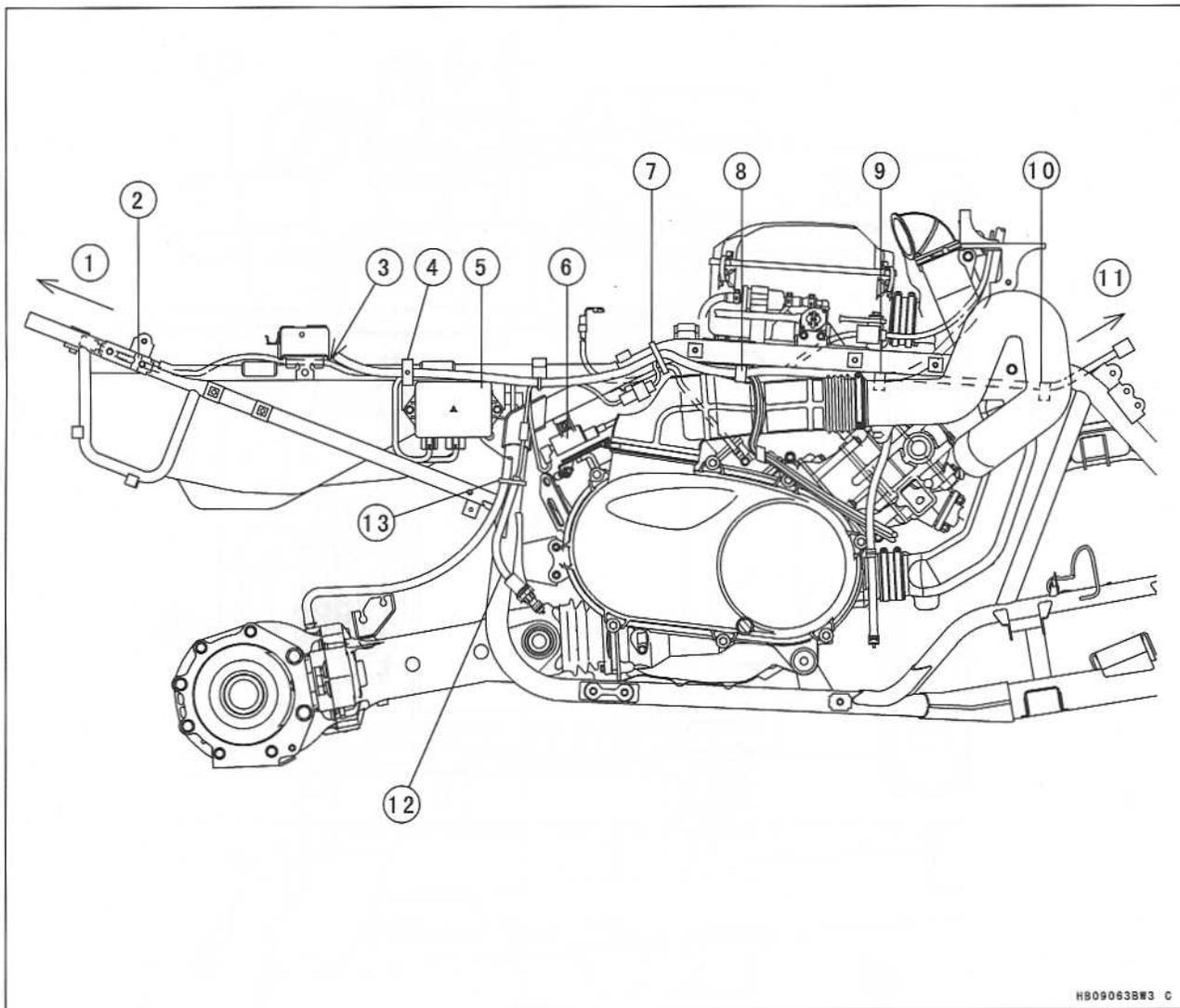


HB09062BW4 C

- | | |
|-----------------------------------|----------------------------------|
| 1. To Engine Ground | 8. To Regulator/Rectifier |
| 2. Main Harness | 9. To Reverse/Neutral Switch |
| 3. Clamp (Main Harness Accessory) | 10. Battery |
| 4. Fuel Tank Breather Hose | 11. Fuse Case (For Radiator Fan) |
| 5. To Tail/Brake Light | 12. Spare Fuse |
| 6. Vehicle-down Sensor | 13. Reset Connectors |
| 7. Starter Relay/Main Fuse | |

17-22 APPENDIX

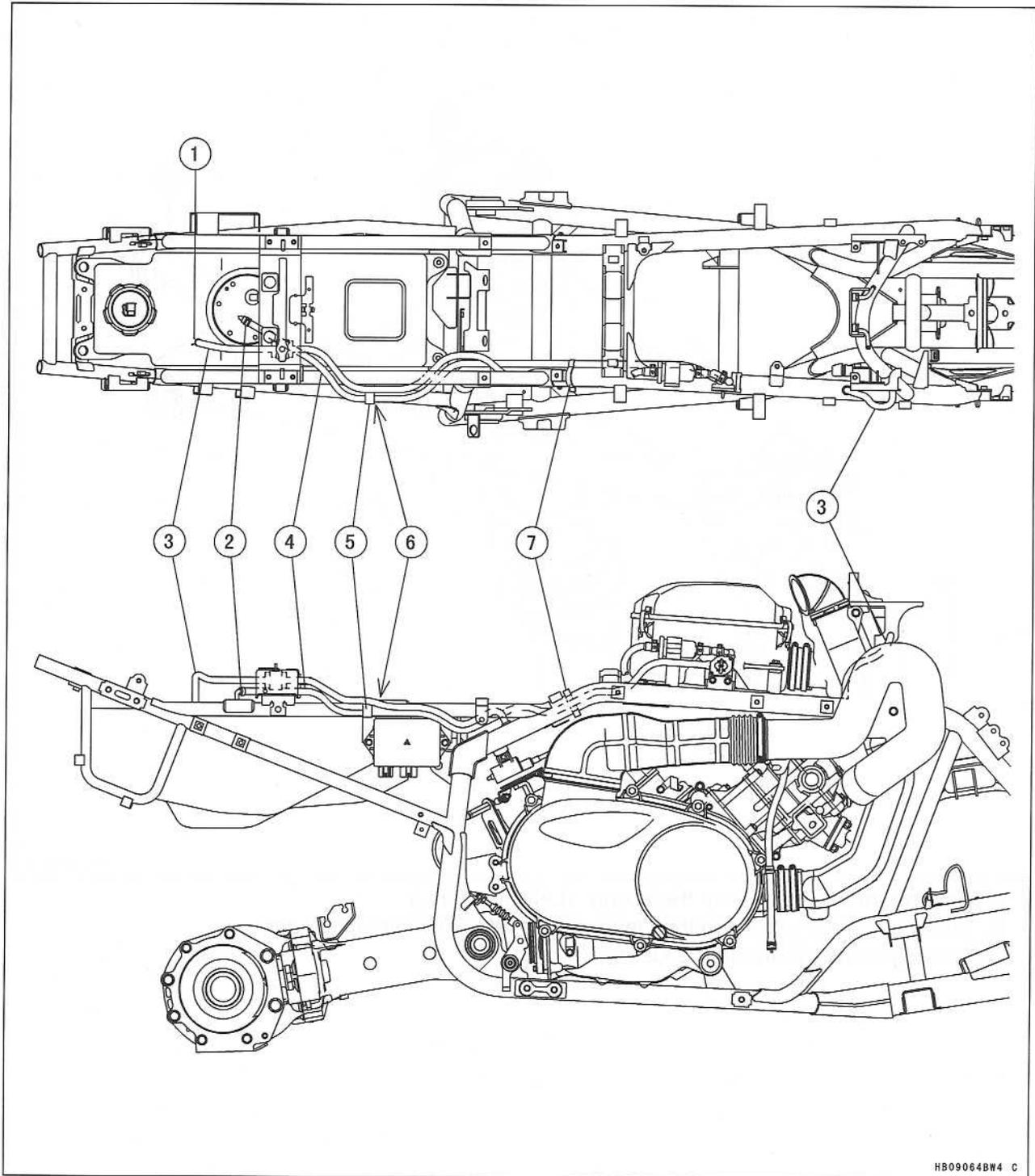
Cable, Wire, and Hose Routing



H809063BWS C

- | | |
|---|---|
| 1. To Tail/Brake Light | 8. Clamp |
| 2. Clamp | 9. Clamp |
| 3. Run the main harness under the seat bracket. | 10. Clamp |
| 4. Clamp (With the Fuel Hose) | 11. To Right Headlight |
| 5. Igniter | 12. Rear Brake Light Switch |
| 6. Ignition Coil (Rear) | 13. Band (With the Final Gear Case Breather Hose) |
| 7. Band (Face the end of the band upward.) | |

Cable, Wire, and Hose Routing



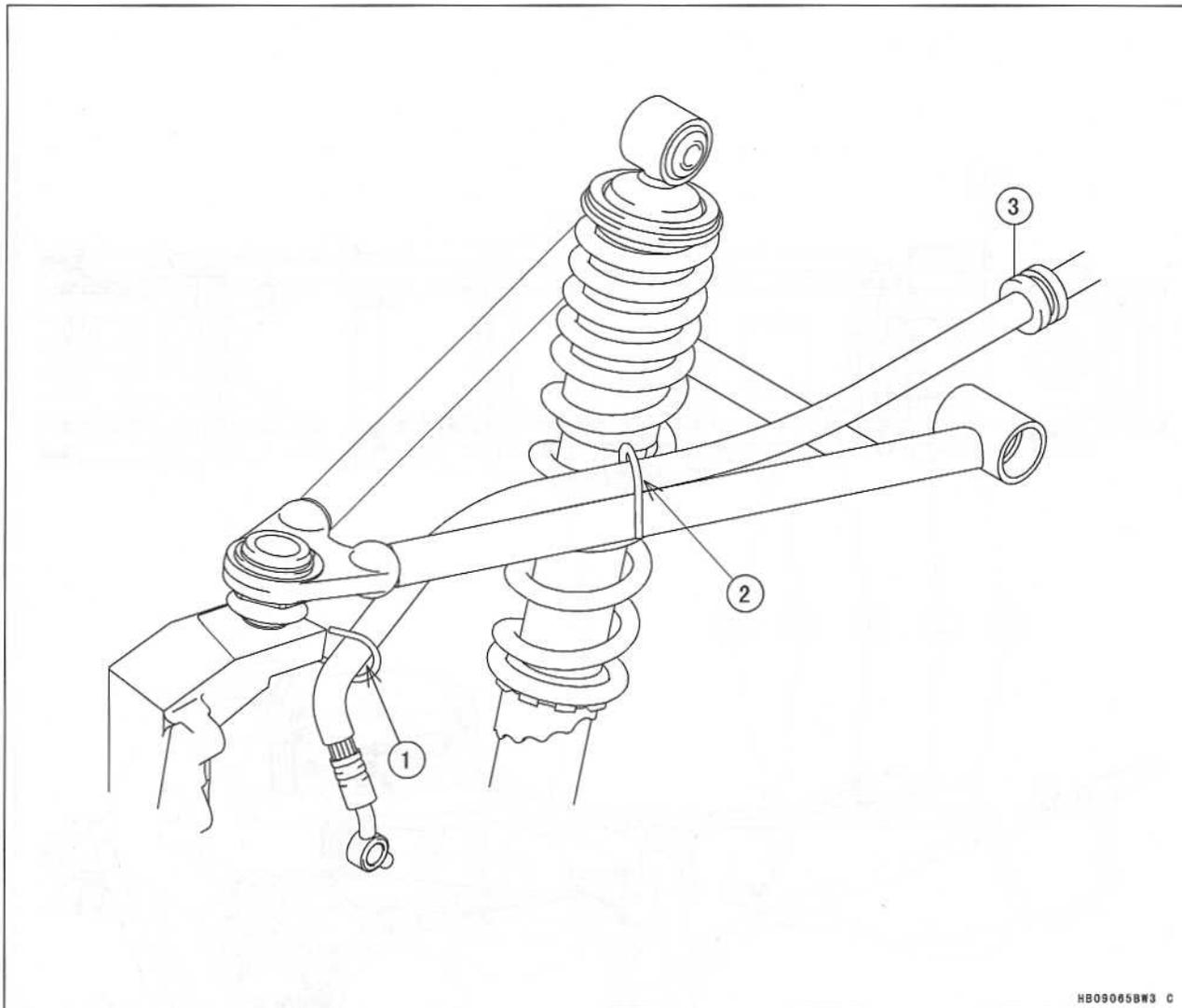
HB09064BW4 C

- 1. Clamp
- 2. Clamp
- 3. Fuel Tank Breather Hose
- 4. Fuel Hose

- 5. Clamp the fuel hose and main harness.
- 6. Through the hoses above the main harness.
- 7. Clamp

17-24 APPENDIX

Cable, Wire, and Hose Routing



1. Through the brake hose to the clamp. (Left Side Only)
2. Through the brake hose to the clamp on the left side suspension arm.
3. Fit the grommet to the frame clamp.