Electrical System

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Exploded View

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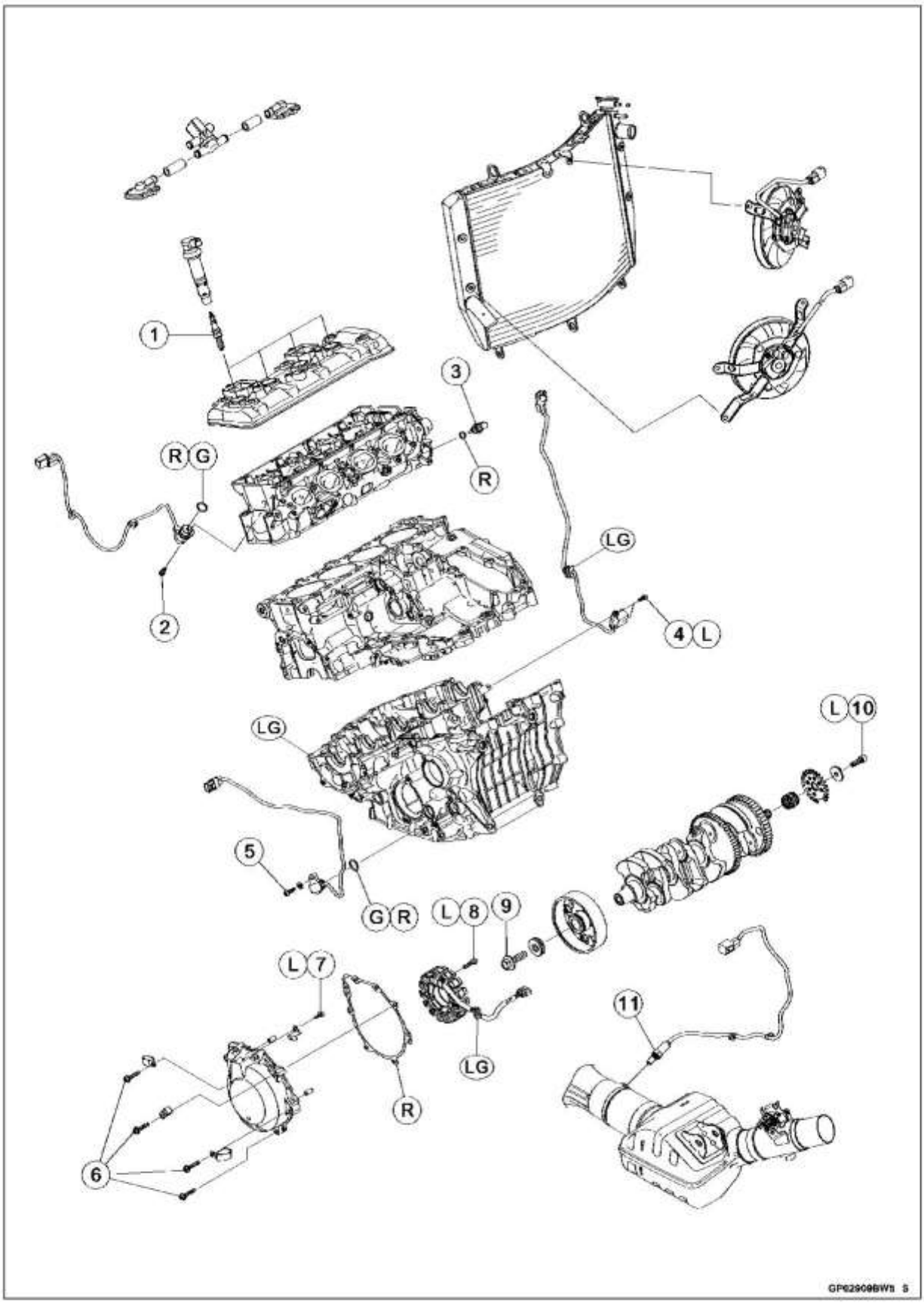
Exploded View

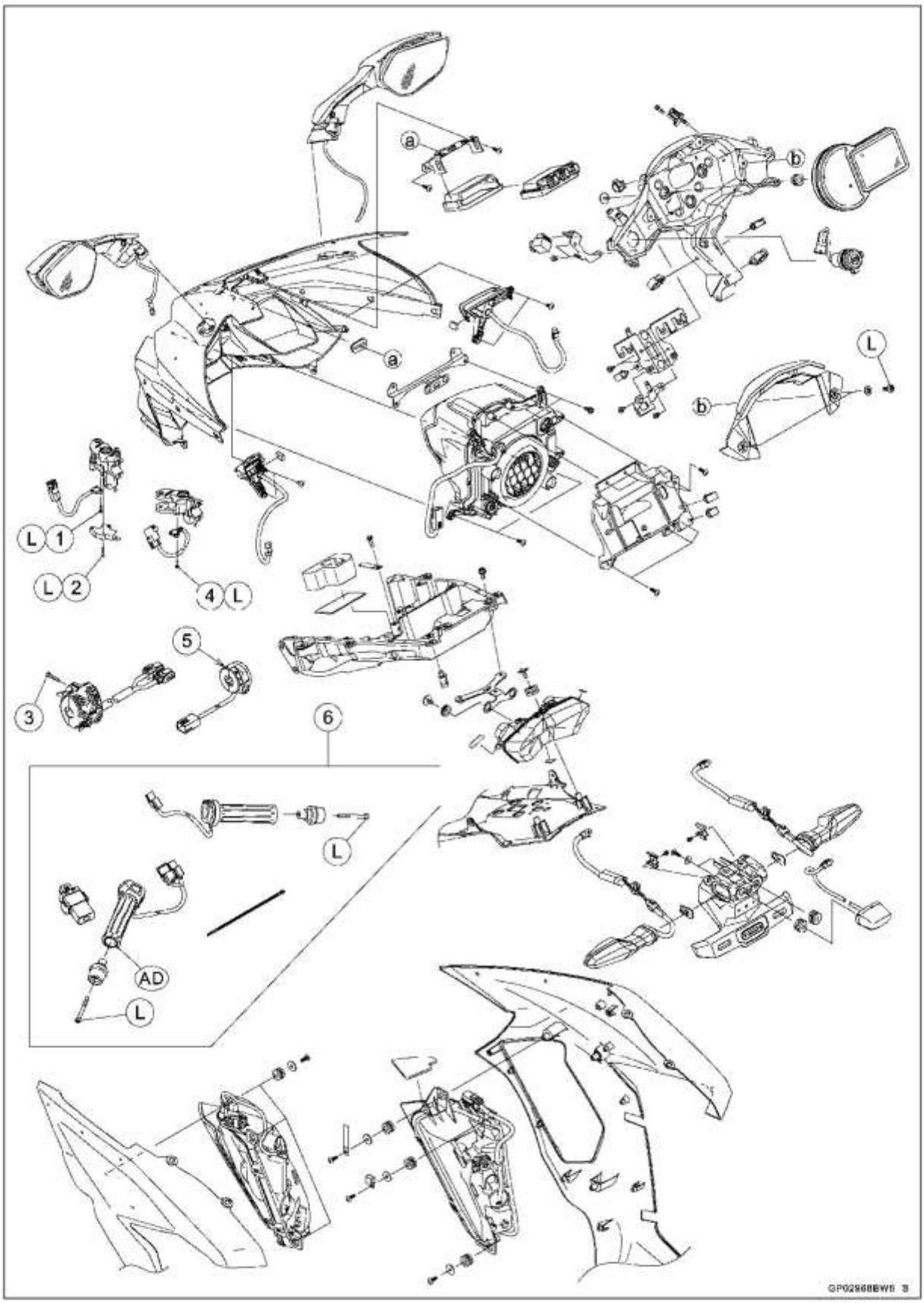


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Spark Plugs	13	1.3	115 in·lb	
2	Camshaft Position Sensor Bolt	10	1.0	89 in·lb	
3	Water Temperature Sensor	12	1.2	106 in·lb	
4	Crankshaft Sensor Bolts	6.0	0.61	53 in·lb	L
5	Gear Position Sensor Bolt	10	1.0	89 in·lb	
6	Alternator Cover Bolts	10	1.0	89 in·lb	
7	Alternator Lead Holding Plate Bolt	10	1.0	89 in·lb	L
8	Stator Coil Bolts	12	1.2	106 in·lb	L
9	Alternator Rotor Bolt	155	15.8	114	
10	Timing Rotor Bolt	39	4.0	29	L
11	Oxygen Sensor	25	2.5	18	

G: Apply grease.
L: Apply a non-permanent locking agent.
LG: Apply liquid gasket.
R: Replacement Parts

Exploded View

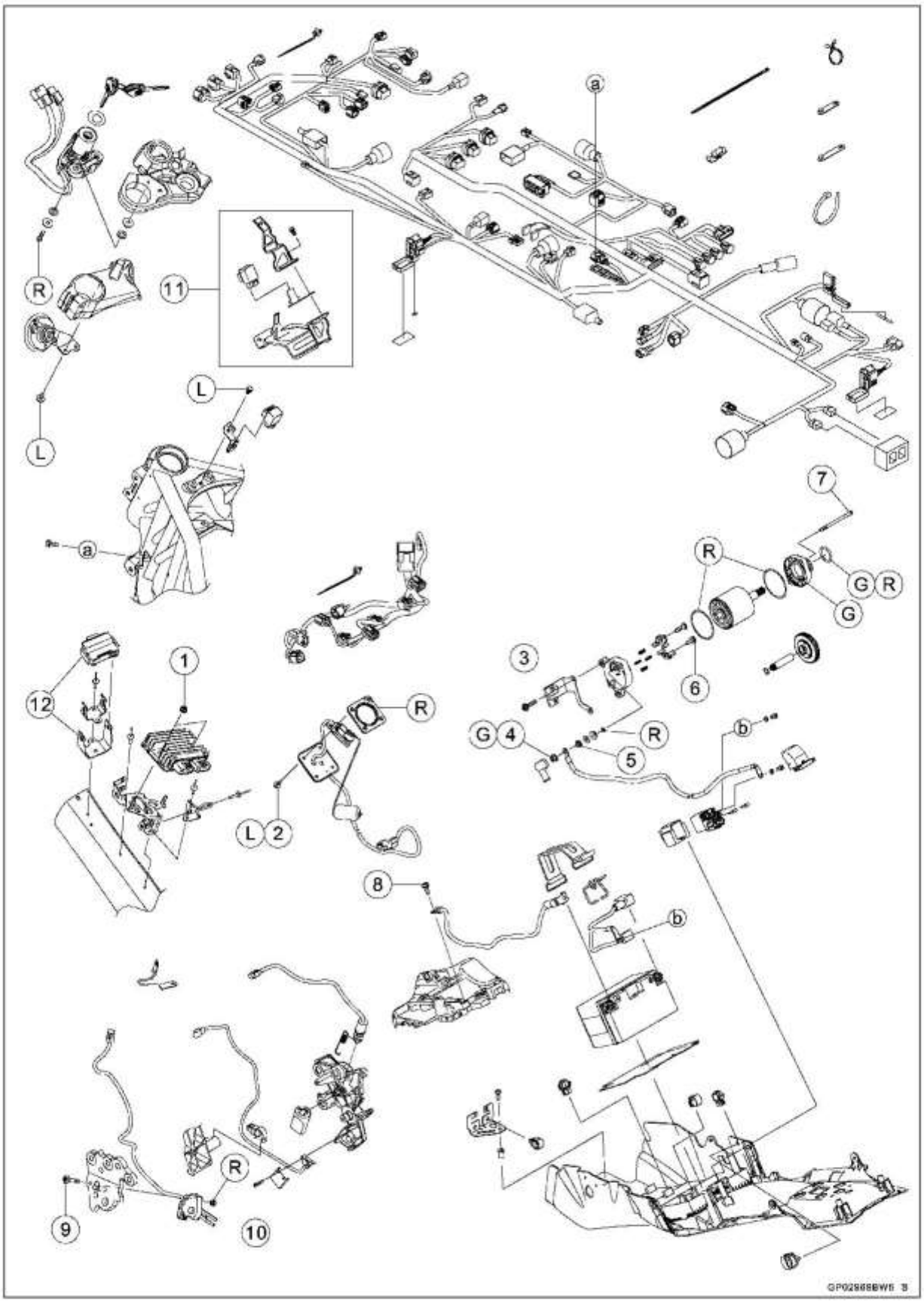


Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Electronic Cruise Control Cancel Switch (Clutch) Screw	0.30	0.03	2.7 in·lb	L
2	Starter Lockout Switch Screw	0.70	0.07	6.2 in·lb	L
3	Left Handlebar Switch Housing Screws	3.5	0.36	31 in·lb	
4	Brake/Electronic Cruise Control Cancel Switch Screw	0.30	0.03	2.7 in·lb	L
5	Right Handlebar Switch Housing Screws	0.90	0.09	8 in·lb	

6. Equipped Models
AD: Apply adhesive.
L: Apply a non-permanent locking agent.

Exploded View



Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Regulator/Rectifier Mounting Nuts	7.0	0.71	62 in·lb	
2	Fuel Level Sensor Bolts	7.0	0.71	62 in·lb	L
3	Starter Motor Mounting Bolts	10	1.0	89 in·lb	
4	Starter Motor Cable Terminal Nut	6.0	0.61	53 in·lb	G
5	Starter Motor Terminal Locknut	11	1.1	97 in·lb	
6	Brush Holder Screw	3.8	0.39	34 in·lb	
7	Starter Motor Through Bolts	5.0	0.51	44 in·lb	
8	Engine Ground Terminal Bolt	10	1.0	89 in·lb	
9	Side Stand Switch Bolt	9.0	0.92	80 in·lb	
10	Electronic Cruise Control Cancel Switch (Rear Brake) Screw	1.2	0.12	11 in·lb	

11. Other than US, CA Models
12. Immobilizer System Equipped Models

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

Specifications

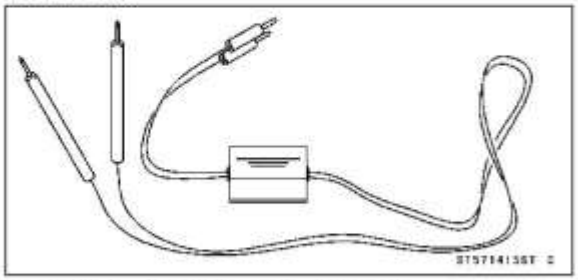
Item	Standard
Battery	
Type	Sealed Battery
Model Name	YTZ10S
Capacity	12 V 8.6 Ah (10 HR)
Voltage	12.8 V or more
Gross Weight	3.2 kg (7.1 lb)
Electrolyte Volume	0.45 L (27 cu in.)
Charging System	
Type	Three-phase AC
Charging Voltage (Regulator/Rectifier Output Voltage)	DC 14.6 ~ 15.0 V @25°C (77°F)
Alternator Output Voltage	AC 48 ~ 72 V @4 000 r/min (rpm)
Stator Coil Resistance	0.112 ~ 0.168 Ω @20°C (68°F)
Ignition System	
Crankshaft Sensor:	
Resistance	376 ~ 564 Ω @20°C (68°F)
Peak Voltage	3 V or more
Camshaft Position Sensor:	
Resistance	344 ~ 516 Ω @20°C (68°F)
Peak Voltage	0.6 V or more
Stick Coil:	
Primary Winding Resistance	1.19 ~ 1.61 Ω @20°C (68°F)
Secondary Winding Resistance	10.2 ~ 13.8 kΩ @20°C (68°F)
Primary Peak Voltage	100 V or more
Spark Plug:	
Type	NGK SILMAR9E9
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in.)
Electric Starter System	
Starter Motor:	
Brush Length	12.05 mm (0.4744 in.) (Service Limit: 6.55 mm (0.258 in.))
Air Switching Valve	
Resistance	20 ~ 24 Ω @20°C (68°F)
Grip Heater (Equipped Models)	
Resistance:	
Left Grip Heater	7.4 ~ 9.0 Ω @20°C (68°F)
Right Grip Heater	6.3 ~ 7.7 Ω @20°C (68°F)
Meter, Gauge, Indicator Unit	
CAN Communication Line Resistance	131 ~ 133 Ω at meter unit connector
Switches and Sensors	
Rear Brake Light Switch Timing	ON after about 7 mm (0.28 in.) of pedal travel
Oil Pressure Switch Connections	When engine is stopped: ON When engine is running: OFF
Water Temperature Sensor Resistance	In the text

Specifications

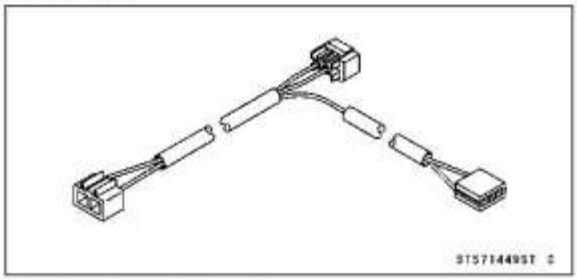
Item	Standard
Fuel Level Sensor Resistance:	
Full Position	9 ~ 11 Ω
Empty Position	213 ~ 219 Ω
Outside Temperature Sensor Resistance	5.4 ~ 6.6 kΩ @0°C (32°F) 0.29 ~ 0.39 kΩ @80°C (176°F)

Special Tools and Sealant

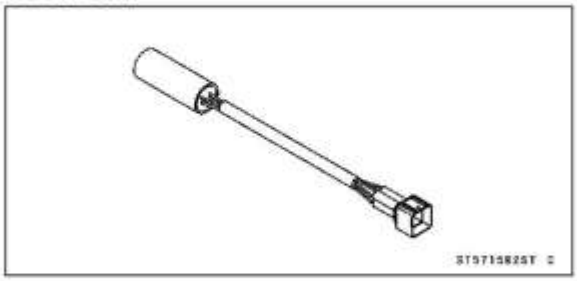
Peak Voltage Adapter:
57001-1415



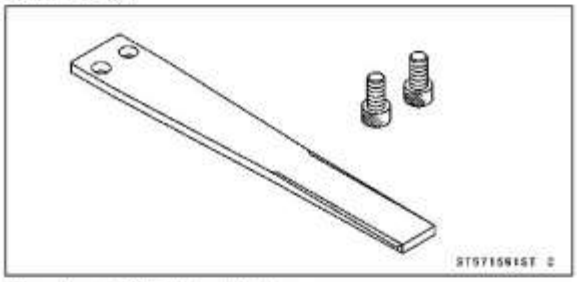
Lead Wire - Peak Voltage Adapter:
57001-1449



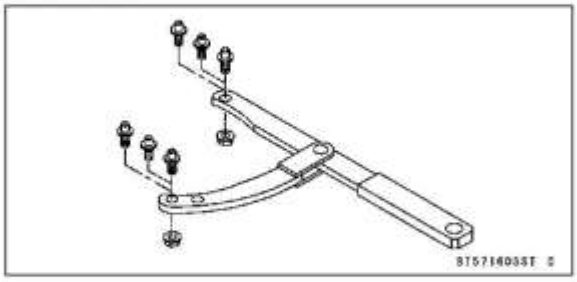
Key Registration Unit:
57001-1582



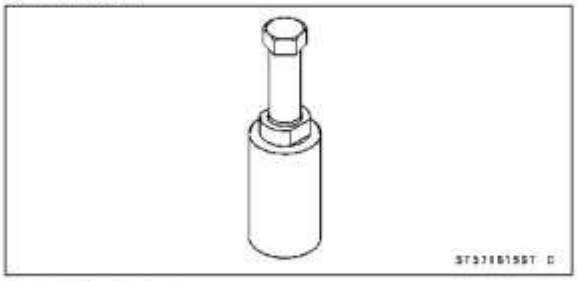
Grip:
57001-1591



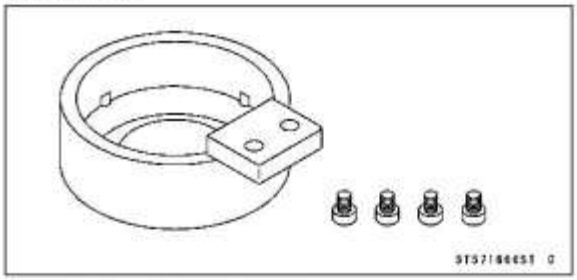
Flywheel & Pulley Holder:
57001-1605



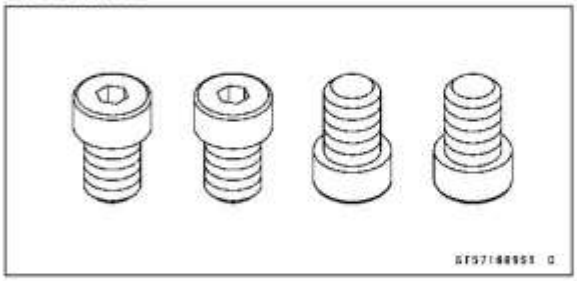
Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5:
57001-1615



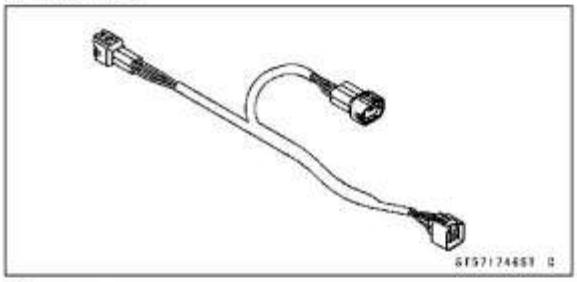
Rotor Holder:
57001-1666



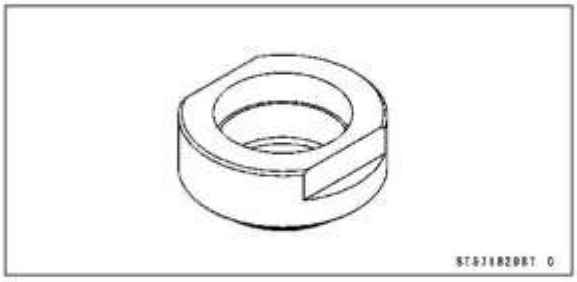
Rotor Holder Attachment:
57001-1689



Key Registration Adapter:
57001-1746

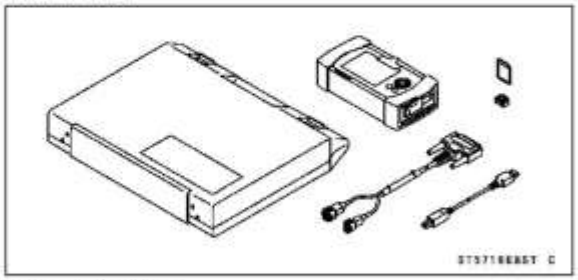


Stopper:
57001-1829

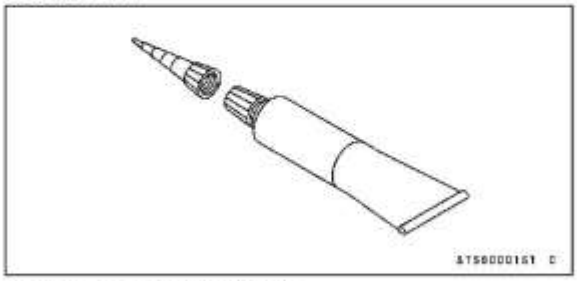


Special Tools and Sealant

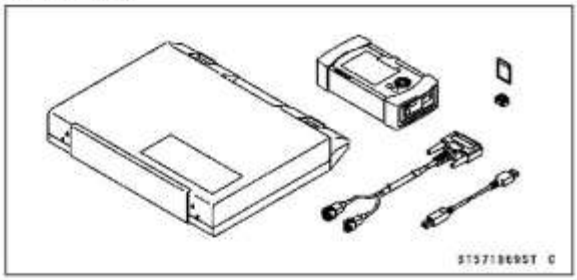
K-VCI Kit:
57001-1868



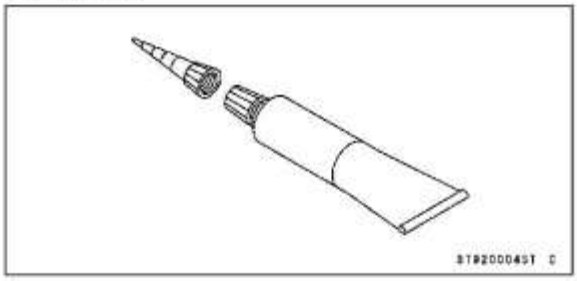
Adhesive, TB1530C:
56042-0001



K-VCI Kit (BT):
57001-1869

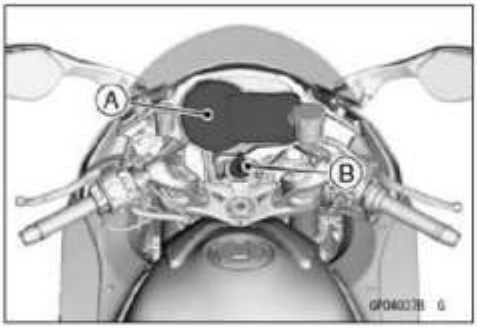


Liquid Gasket, TB1211F:
92104-0004

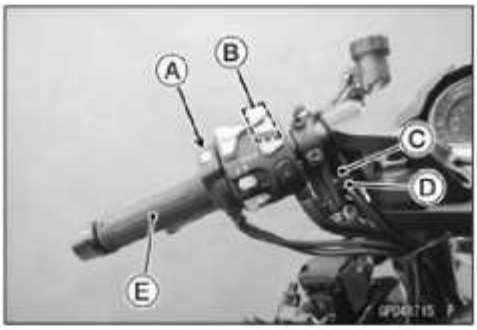


Parts Location

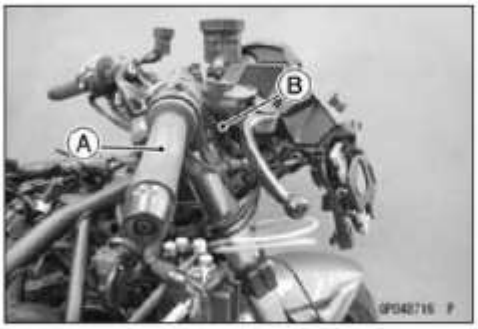
Meter Unit [A]
Ignition Switch [B] (Immobilizer Equipped Models: Including Immobilizer Antenna)



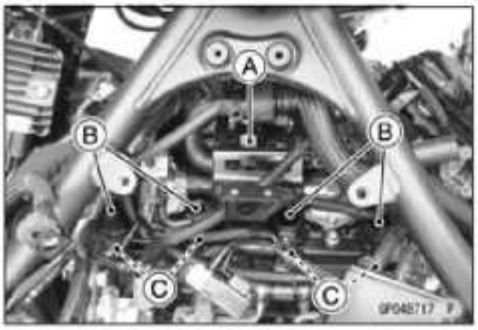
Grip Heater Switch [A] (Equipped Models)
Electronic Cruise Control Buttons [B]
Electronic Cruise Control Cancel Switch (Clutch) [C]
Starter Lockout Switch [D]
Left Grip Heater [E] (Equipped Models)



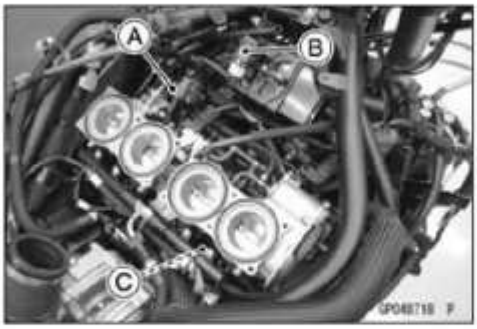
Right Grip Heater [A] (Equipped Models)
Brake/Electronic Cruise Control Cancel Switch [B]



Air Switching Valve [A]
Stick Coils [B]
Spark Plugs [C]

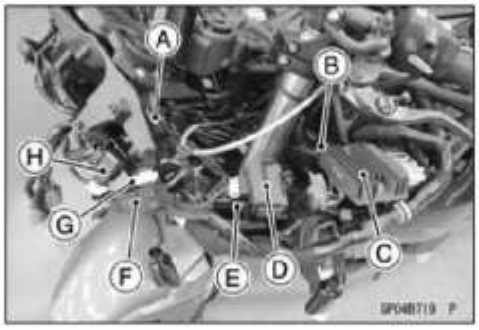


Electronic Cruise Control Cancel Switch (Throttle) [A]
Accessory Relay [B]
Water Temperature Sensor [C]

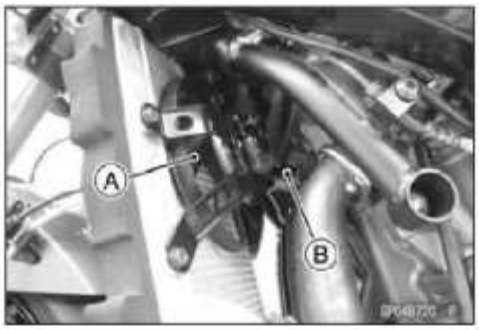


Parts Location

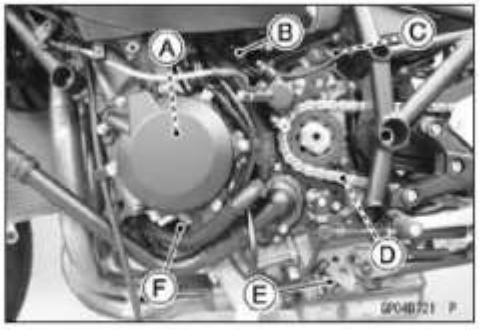
Accessory Socket [A]
Frame Ground [B]
Regulator/Rectifier [C]
Immobilizer Amplifier [D] (Immobilizer Equipped Models)
Grip Heater Controller [E] (Equipped Models)
Fuse Box (1) [F]
Fuse Box (3) [G]
Cornering Light Relay [H]



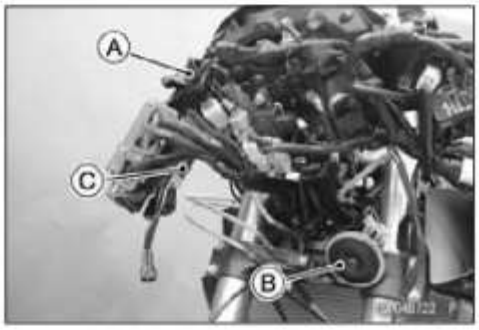
Radiator Fan Motor [A] (Both Sides)
Camshaft Position Sensor [B]



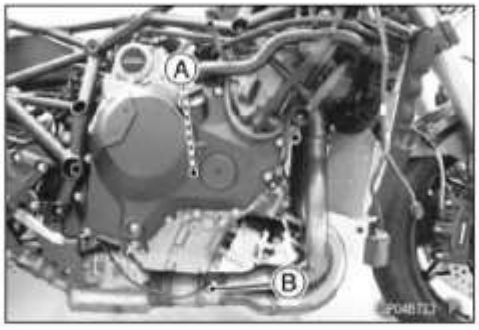
Alternator [A]
Starter Motor [B]
Engine Ground [C]
Gear Position Sensor [D]
Side Stand Switch [E]
Oil Pressure Switch [F]



Outside Temperature Sensor [A]
Horn [B]
ETV Actuator Relay [C]



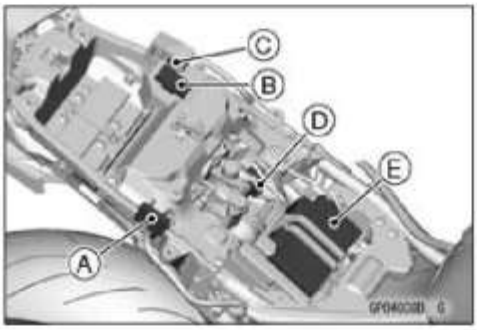
Crankshaft Sensor [A]
Oxygen Sensor [B]



Parts Location

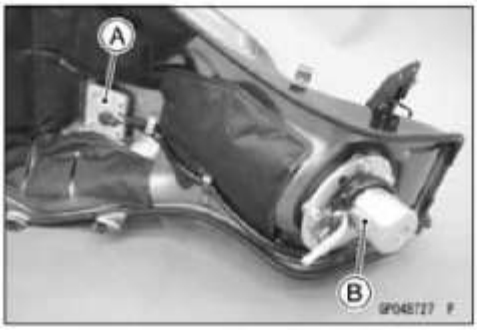
Rear Brake Light Switch [A]
Electronic Cruise Control Cancel Switch (Rear Brake) [B]

Fuse Box (4) [A]
Fuse Box (2) [B]
Immobilizer (Equipped Models)/Kawasaki Diagnostic System Connector [C]
Starter Relay [D]
Battery [E]



Relay Box [A]

Fuel Level Sensor [A]
Fuel Reserve Switch in Fuel Pump [B]



Cornering Light [A] (Both Sides)

Parts Location

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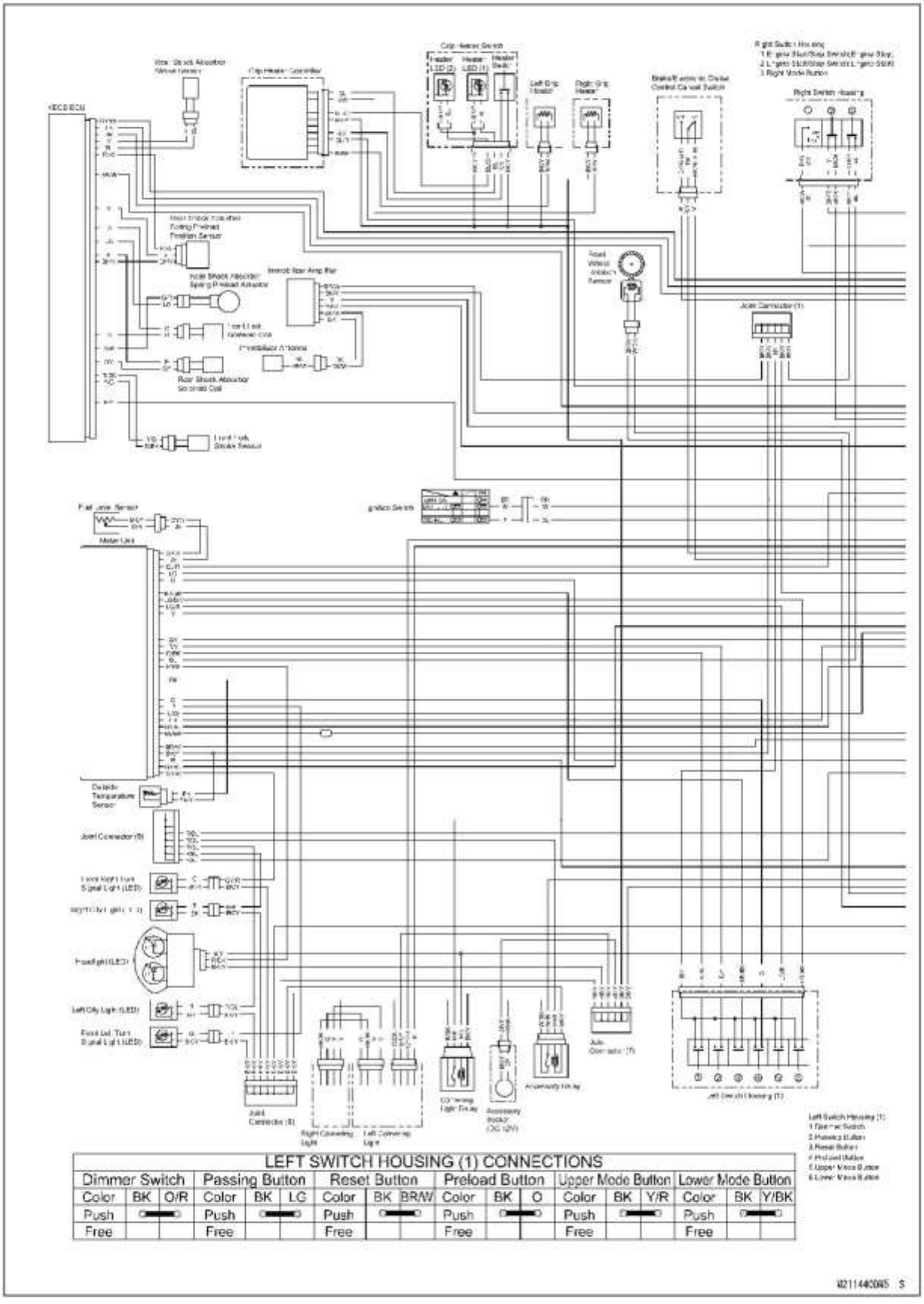
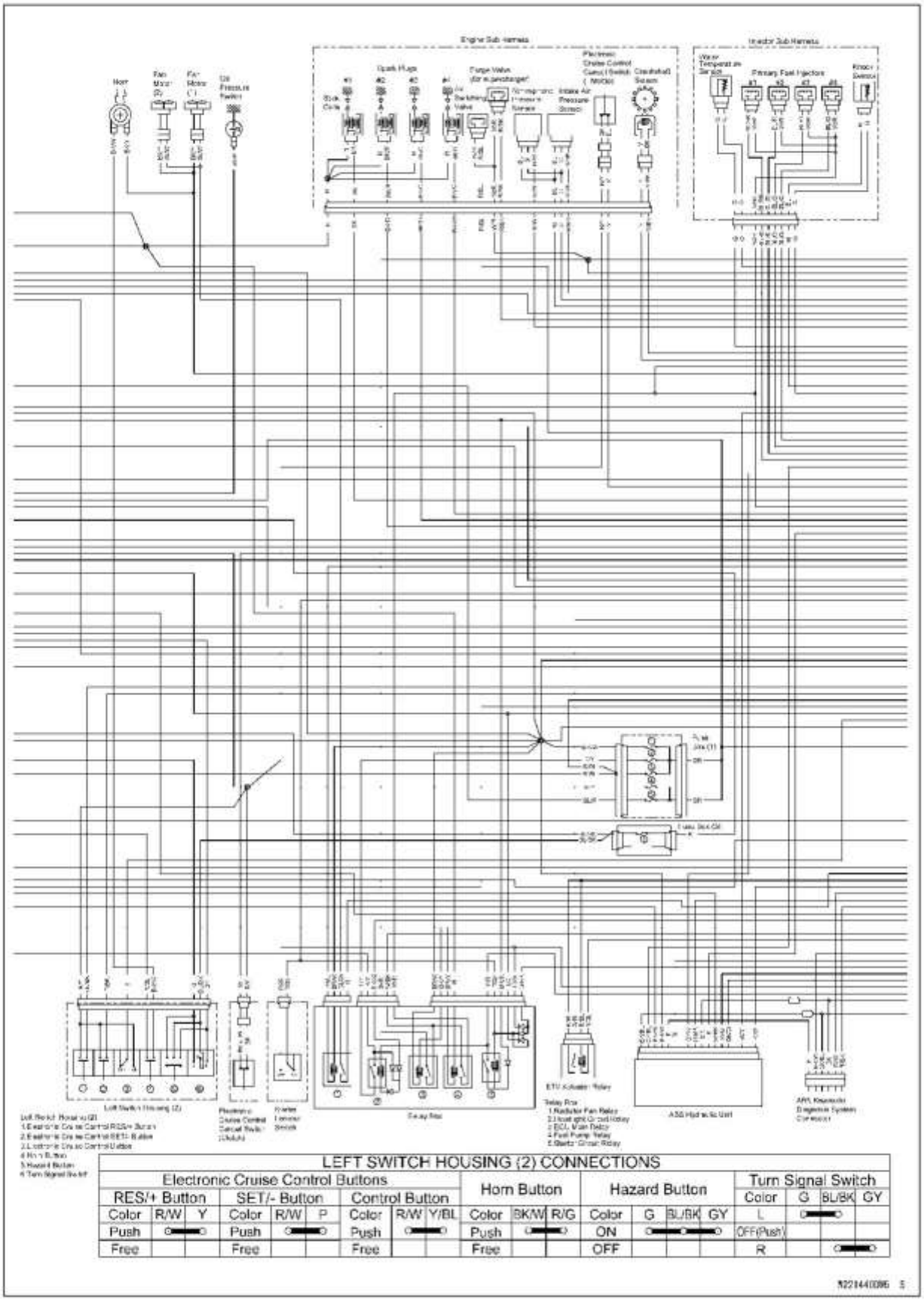
Wiring Diagram (with Immobilizer)



LEFT SWITCH HOUSING (1) CONNECTIONS																	
Dimmer Switch			Passing Button			Reset Button			Preload Button			Upper Mode Button			Lower Mode Button		
Color	BK	O/R	Color	BK	LG	Color	BK	BR/W	Color	BK	O	Color	BK	Y/R	Color	BK	Y/BK
Push			Push			Push			Push			Push			Push		
Free			Free			Free			Free			Free			Free		

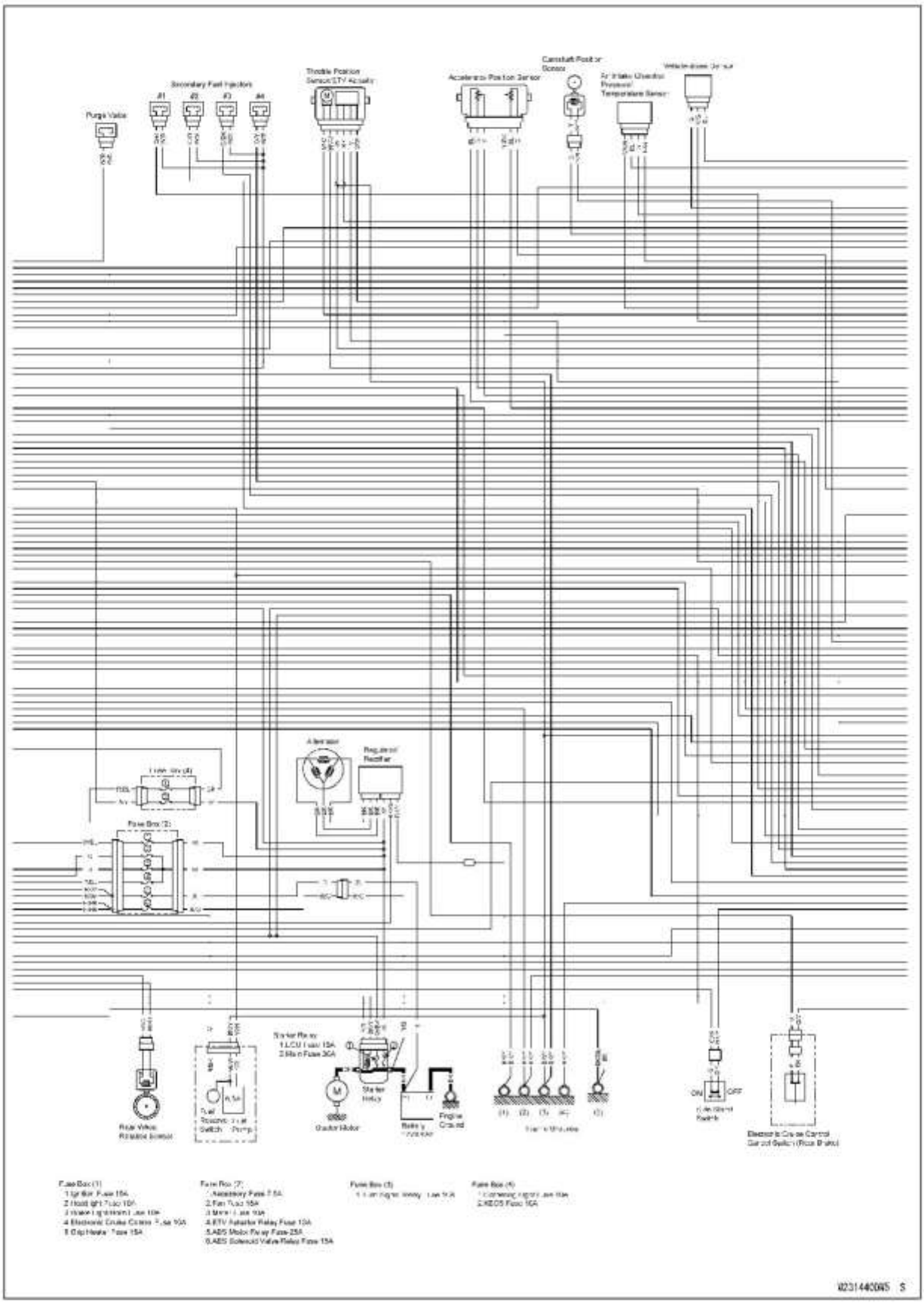
Wiring Diagram (with Immobilizer)



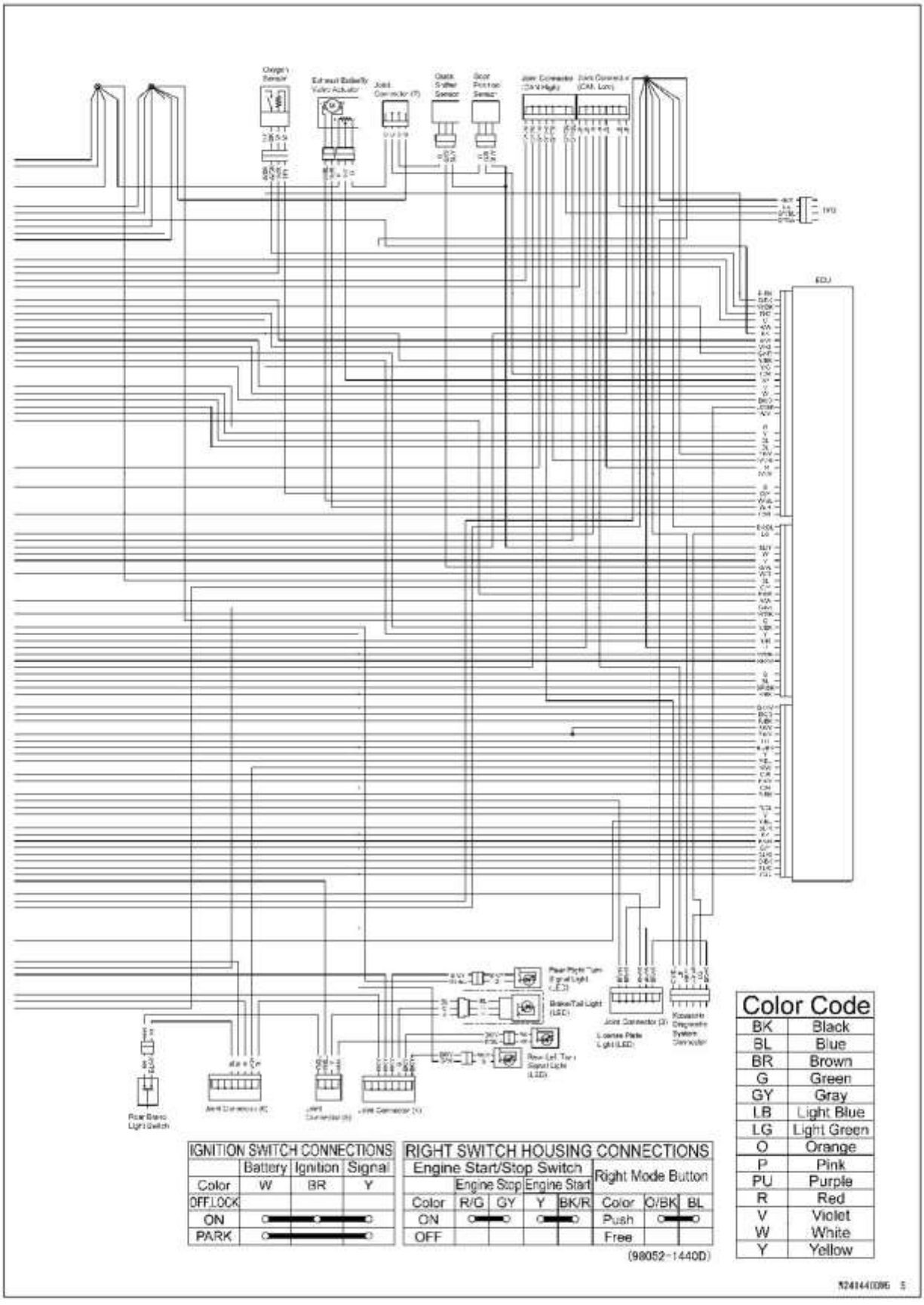
LEFT SWITCH HOUSING (2) CONNECTIONS																				
Electronic Cruise Control Buttons									Horn Button			Hazard Button				Turn Signal Switch				
RES/+ Button			SET/- Button			Control Button														
Color	R/W	Y	Color	R/W	P	Color	R/W	Y/BL	Color	BK/W	R/G	Color	G	BL/BK	GY	Color	G	BL/BK	GY	
Push	○—●		Push	○—●		Push	○—●		Push	○—●		ON	○—●		○—●		OFF(Push)	○—●		
Free			Free			Free			Free			OFF					R		○—●	

N221440086 5

Wiring Diagram (with Immobilizer)



Wiring Diagram (with Immobilizer)



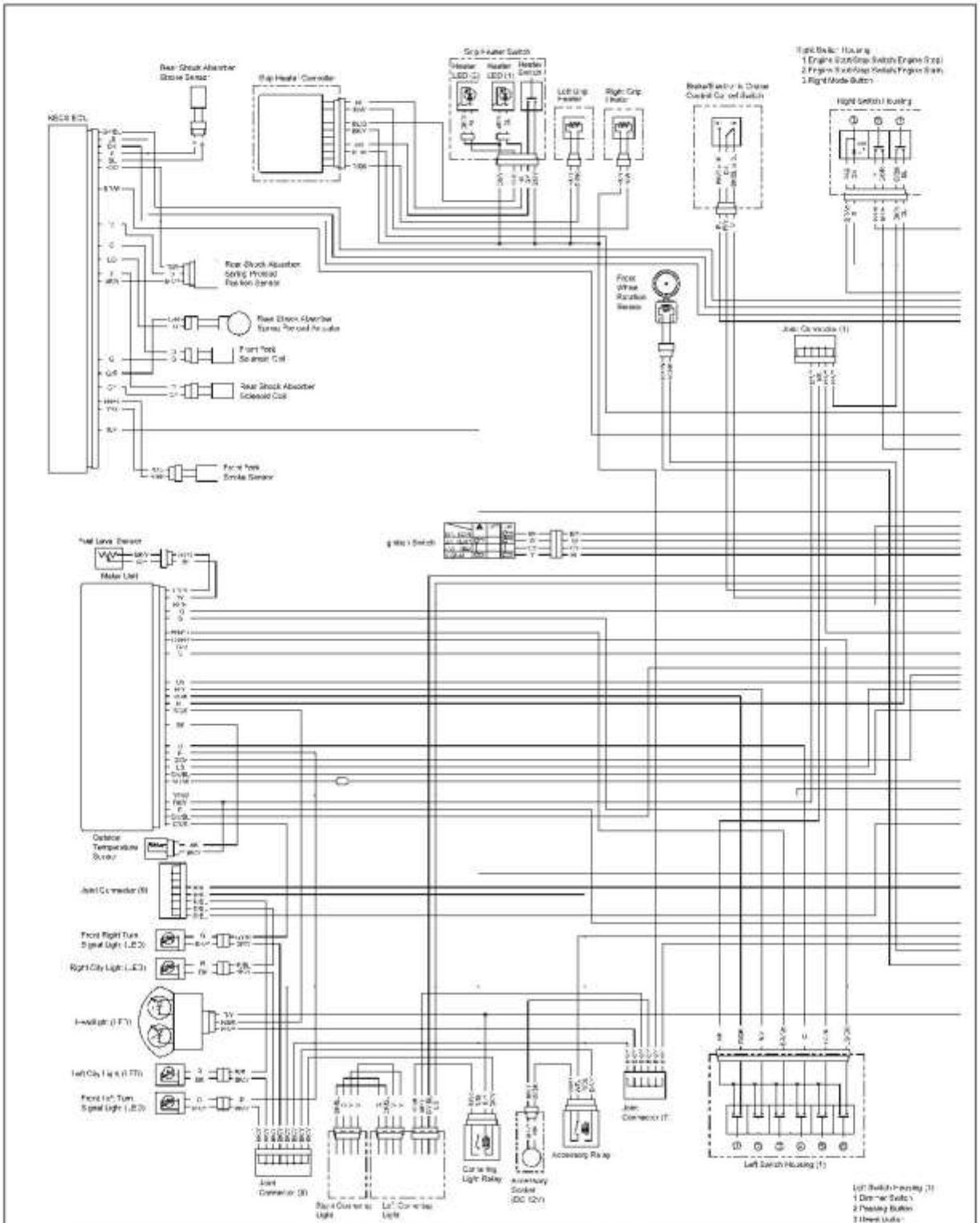
IGNITION SWITCH CONNECTIONS			
	Battery	Ignition	Signal
Color	W	BR	Y
OFF/LOCK			
ON	○	○	○
PARK	○		○

RIGHT SWITCH HOUSING CONNECTIONS							
	Engine Start/Stop Switch				Right Mode Button		
	Engine Stop		Engine Start				
Color	R/G	GY	Y	BK/R	Color	O/BK	BL
ON	○		○		Push	○	
OFF					Free		○

Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
V	Violet
W	White
Y	Yellow

(99052-1440D)

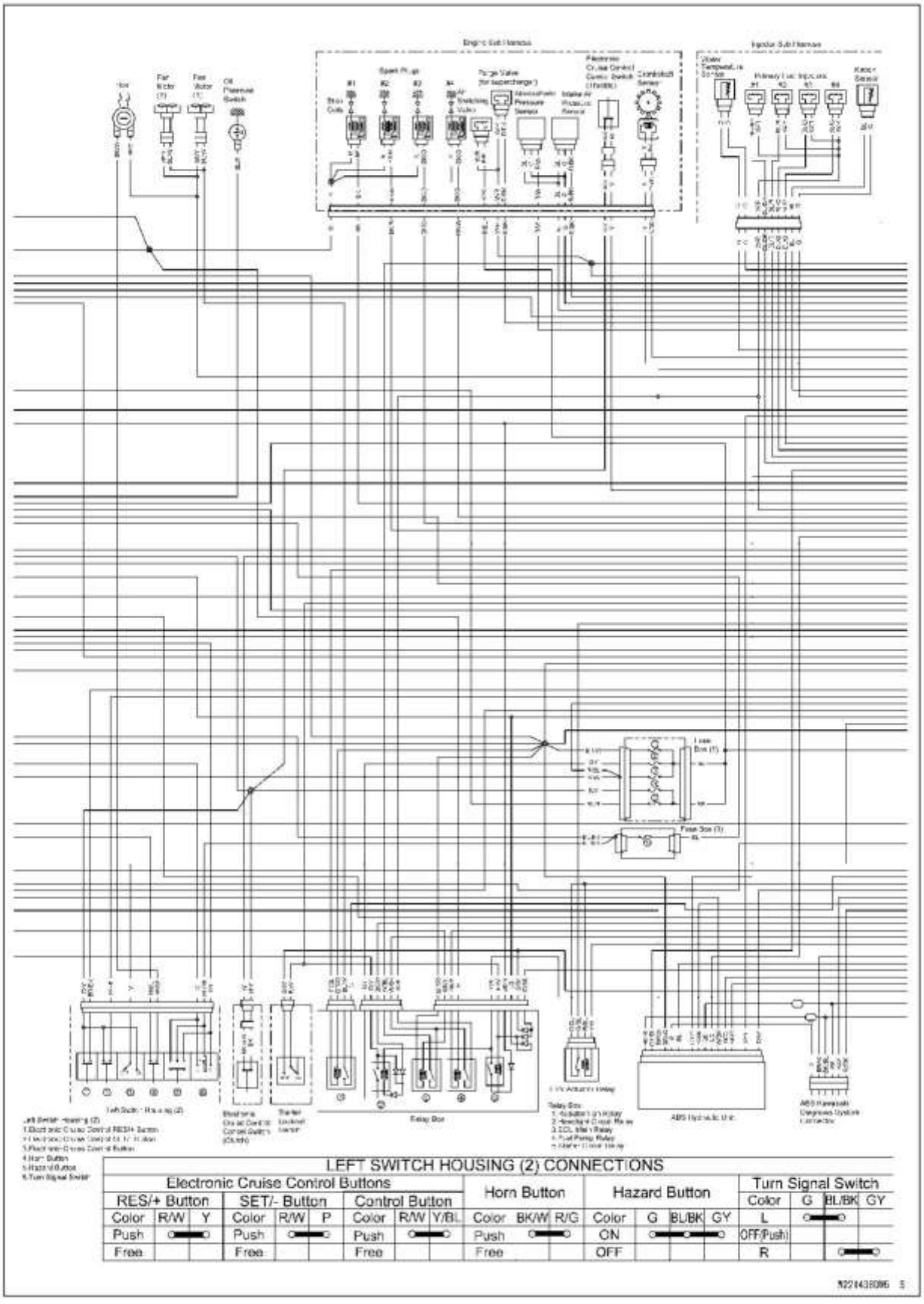
Wiring Diagram (without Immobilizer)



LEFT SWITCH HOUSING (1) CONNECTIONS

Dimmer Switch			Passing Button			Reset Button			Preload Button			Upper Mode Button			Lower Mode Button		
Color	BK	O/R	Color	BK	LG	Color	BK	BR/W	Color	BK	O	Color	BK	Y/R	Color	BK	Y/BK
Push	○—●		Push	○—●		Push	○—●		Push	○—●		Push	○—●		Push	○—●	
Free			Free			Free			Free			Free			Free		

Wiring Diagram (without Immobilizer)



LEFT SWITCH HOUSING (2) CONNECTIONS

Electronic Cruise Control Buttons									Horn Button			Hazard Button				Turn Signal Switch			
RES/+ Button			SET/- Button			Control Button													
Color	R/W	Y	Color	R/W	P	Color	R/W	Y/BL	Color	BK/W	R/G	Color	G	BL/BK	GY	Color	G	BL/BK	GY
Push	○	●	Push	○	●	Push	○	●	Push	○	●	ON	●	●	●	L	○	●	○
Free			Free			Free			Free			OFF				R		○	●

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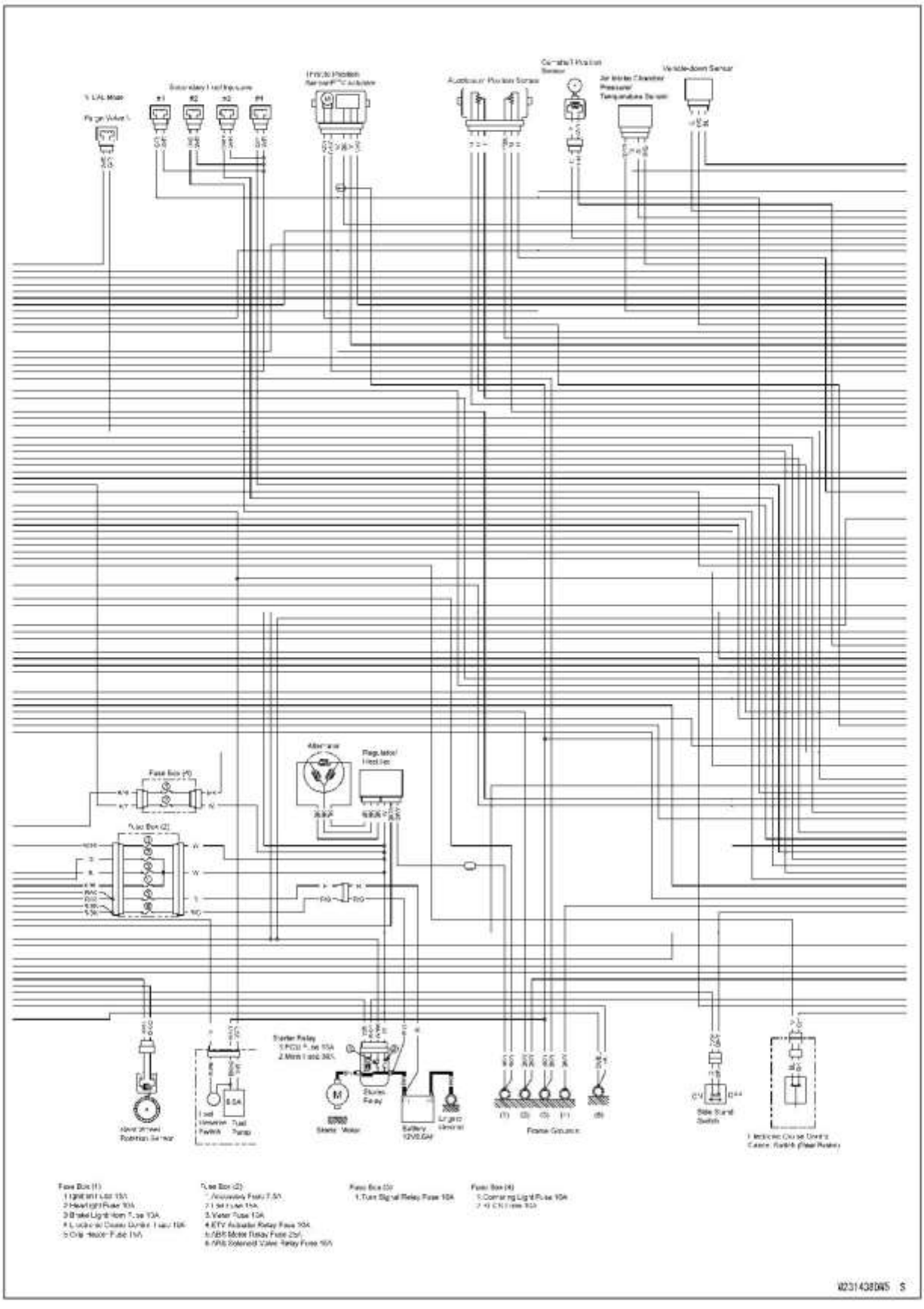
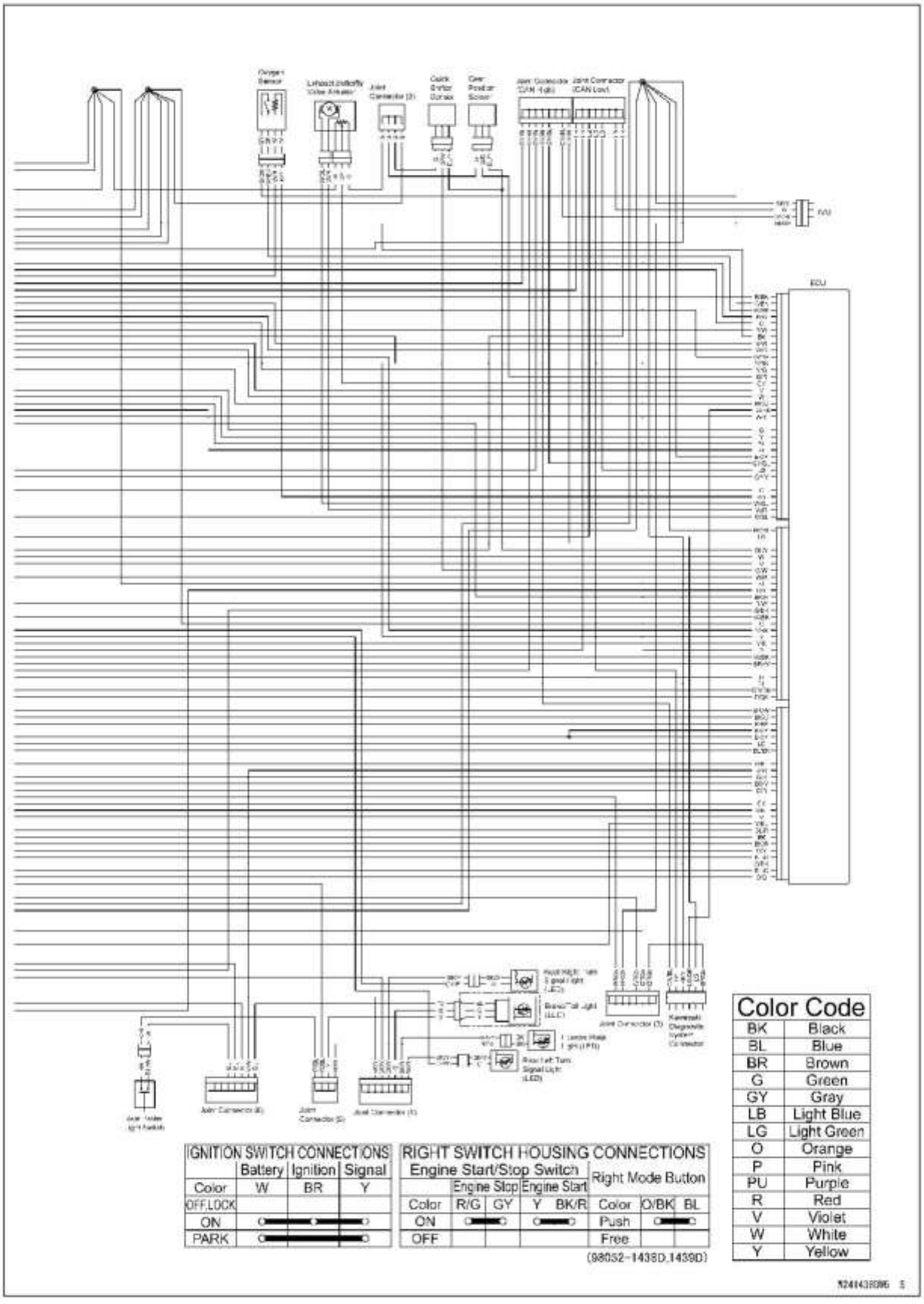
Wiring Diagram (without Immobilizer)



Wiring Diagram (without Immobilizer)



IGNITION SWITCH CONNECTIONS			
	Battery	Ignition	Signal
Color	W	BR	Y
OFF/LOCK			
ON	○	○	○
PARK	○		○

RIGHT SWITCH HOUSING CONNECTIONS							
	Engine Start/Stop Switch				Right Mode Button		
	Engine Stop		Engine Start				
Color	R/G	GY	Y	BK/R	Color	O/BK	BL
ON	○		○		Push	○	
OFF					Free		

(98032-1438D,1439D)

Color Code	
BK	Black
BL	Blue
BR	Brown
G	Green
GY	Gray
LB	Light Blue
LG	Light Green
O	Orange
P	Pink
PU	Purple
R	Red
V	Violet
W	White
Y	Yellow

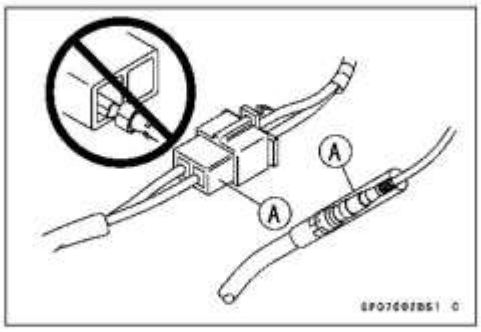
Precautions

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

- Do not reverse the battery cable connections. This will burn out the diodes on the electrical parts.
- Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- To prevent damage to electrical parts, do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running.
- Because of the large amount of current, never keep the engine start/stop switch slided when the starter motor will not turn over, or the current may burn out the starter motor windings.
- Take care not to short the cables that are directly connected to the battery positive (+) terminal to the chassis ground.
- Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was caused by some other item or items, they must be repaired or replaced, or the new replacement will soon fail again.
- Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation.
- Measure coil and winding resistance when the part is cold (at room temperature).

Electrical Wiring

Wiring Inspection



- Visually inspect the wiring for signs of burning, fraying, etc.

★If any wiring is poor, replace the damaged wiring.

- Pull each connector [A] apart and inspect it for corrosion, dirt, and damage.

★If the connector is corroded or dirty, clean it carefully. If it is damaged, replace it.

- Check the wiring for continuity.

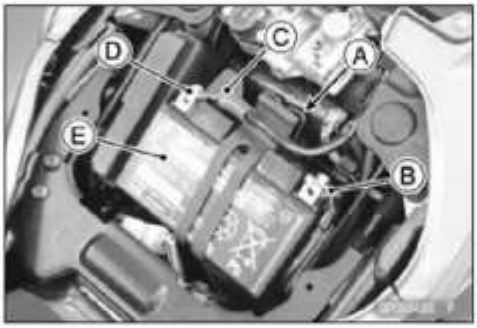
○Use the wiring diagram to find the ends of the lead which is suspected of being a problem.

○Connect a tester between the ends of the leads.

★If the tester does not read about 0 Ω, the lead is defective. Replace the lead or the wiring harness if necessary.

Battery

Battery Removal

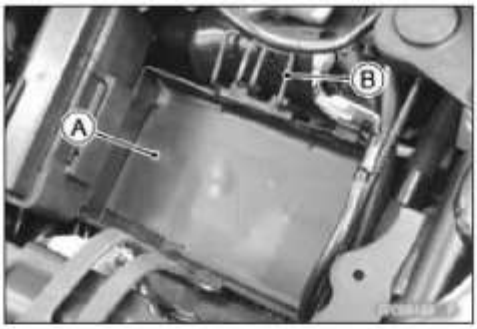


- Turn the ignition switch off.
- Remove:
  Front Seat (see Front Seat Removal(15-13))
- Remove the upper side of the band from the clamp [A].
- Disconnect the negative (–) cable [B].

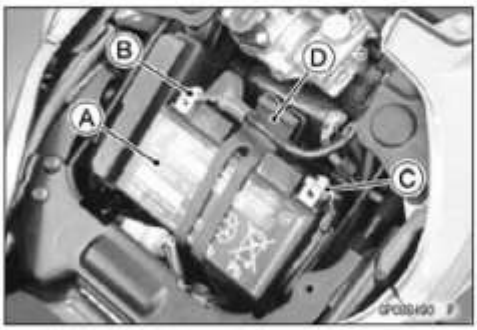
NOTICE
Be sure to disconnect the negative (–) cable first.

- Slide out the red cap [C] and disconnect the positive (+) cable [D].
- Remove the battery [E].

Battery Installation



- Turn the ignition switch off.
- Check that the pad [A] and the clamp [B] are in place on the rear fender.



- Put the battery [A] into the rear fender.
- Install the positive (+) cable [B] first.
- Install the negative (–) cable [C].
- Apply a light coat of grease on the terminals to prevent corrosion.
- Cover the (+) terminal with the red cap.
- Install the band [D].
- Install the front seat (see Front Seat Installation(15-13)).

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 seal cap to add water is very dangerous. Never do that.
2) Refreshing charge.
   Give refresh charge for 5 to 10 hours with charge current shown in the text (see Refreshing Charge(16-29)).
   When a fast charge is inevitably required, do it following precisely the maximum charge current and time conditions indicated on the battery.

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

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 cable removed. Give a refresh charge **once a month** during storage.
4) Battery life.

Battery

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).

⚠ DANGER

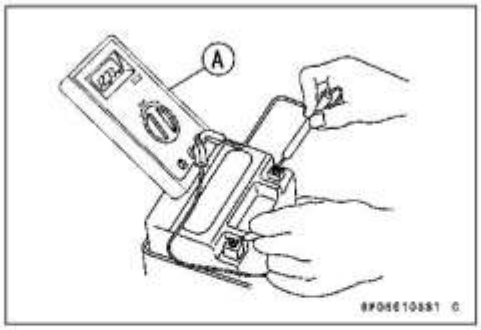
Batteries produce an explosive gas mixture of hydrogen and oxygen that can cause serious injury and burns if ignited. Keep the battery away from sparks and open flames during charging. When using a battery charger, connect the battery to the charger before turning on the charger. This procedure prevents sparks at the battery terminals which could ignite any battery gases. The electrolyte contains sulfuric acid. Be careful not to have it touch your skin or eyes. If touched, wash it off with liberal amount of water and seek medical attention for more severe burns.

Interchange

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

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

Charging Condition Inspection



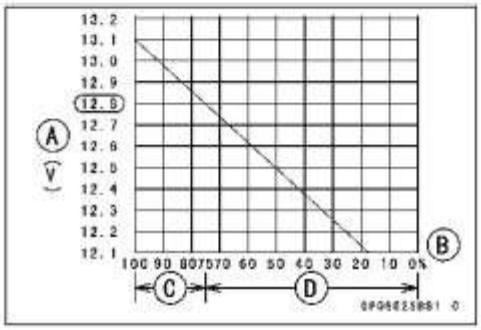
○Battery charging condition can be checked by measuring battery terminal voltage with a digital meter [A].

- Remove:
  Battery (see Battery Removal(16-28))
- Measure the battery terminal voltage.

NOTE

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

★If the reading is 12.8 V or more, no refresh charge is required, however, if the read is below the specified, refresh charge is required.



Battery Terminal Voltage
Standard: 12.8 V or more

Terminal Voltage (V) [A]
Battery Charge Rate (%) [B]
Good [C]
Refresh charge is required [D]

Refreshing Charge

- Remove the battery (see Battery Removal(16-28)).
- Do refresh charge by following method according to the battery terminal voltage.

⚠ WARNING

This battery is sealed type. Charge with current and time as stated below.

Battery

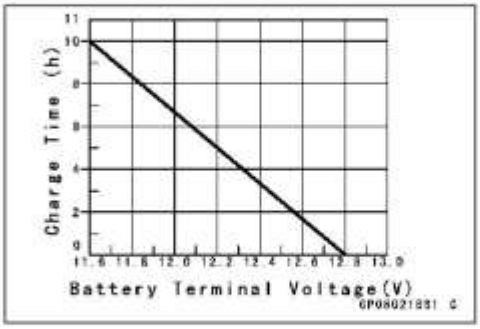
Terminal Voltage: 12.0 ~ 12.7 V
Standard Charge: 0.9 A × 5 ~ 10 h (see following chart)
Quick Charge: 4.5 A × 1 h

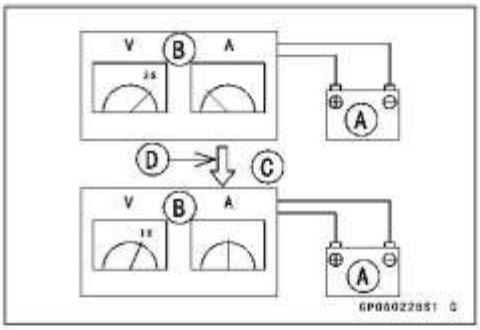
NOTICE
If possible, do not quick charge. If quick charge is done unavoidably, do standard charge later on.

Terminal Voltage: 12 V or lower
Charging Method: 0.9 A × 20 h

Kawasaki-recommended chargers:
Battery Mate 150-9
OptiMate PRO 4-S/PRO S/PRO2
Yuasa MB-2040/2060
Christie C10122S

★If the above chargers are not available, use equivalent one.





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 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]
Current starts to flow [D].

● Determine the battery condition after refresh charge.
○Determine the condition of the battery left for 30 minutes after completion of the charge by measuring the terminal voltage according to the table below.

Criteria	Judgement
12.8 V or higher	Good
12.0 ~ lower than 12.8 V	Charge insufficient → Recharge
lower than 12.0 V	Unserviceable → Replace

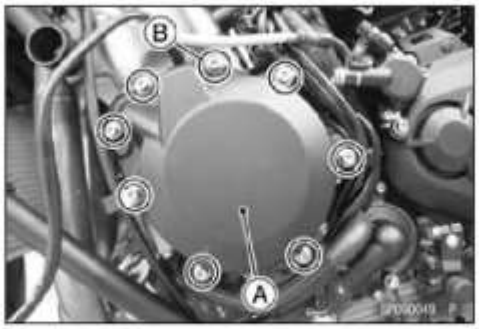
Charging System

Alternator Cover Removal

- Drain:
  Engine Oil (see Engine Oil Change(2-40))
- Remove:
  Left Lower Fairing (see Lower Fairing Removal(15-14))
  Rear Intake Duct (see Intake Duct Removal(15-23))
- Disconnect the alternator lead connector [A].

- Clear the lead [A].

- Place a suitable container under the alternator cover [A].
- Remove:
  Alternator Cover Bolts [B]
  Alternator Cover



Alternator Cover Installation

- Using a high flash-point solvent, clean off any oil or dirt that may be on the mating surface. Dry them with a clean cloth.
- Apply liquid gasket to the alternator lead grommet and crankcase halves mating surface [A] on the front and rear sides of the cover mount.

  Sealant - Liquid Gasket, TB1211F: 92104-0004

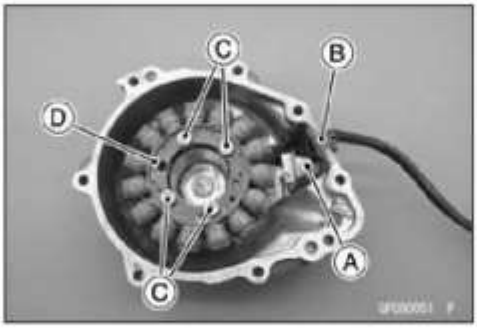
- Check that dowel pins [B] are in place on the crankcase.
- Replace the alternator cover gasket with a new one.
- Install the alternator cover.
- When installing the clamps, fit the clamp to the projection of the alternator cover.
- Tighten:

  Torque - Alternator Cover Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

- Run the alternator lead correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Install the removed parts.

Charging System

Stator Coil Removal



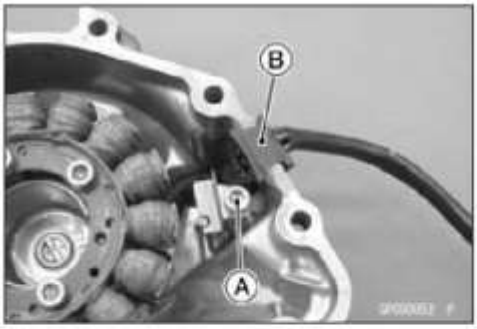
- Remove:
  Alternator Cover (see Alternator Cover Removal(16-31))
  Alternator Lead Holding Plate Bolt [A] and Plate
  Alternator Lead Grommet [B]
  Stator Coil Bolts [C]
- Remove the stator coil [D] from the alternator cover.

Stator Coil Installation

- Apply a non-permanent locking agent to the threads of the stator coil bolts and tighten them.

  Torque - Stator Coil Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

- Secure the alternator lead with a holding plate.



- Apply a non-permanent locking agent to the threads of the plate bolt [A] and tighten it.

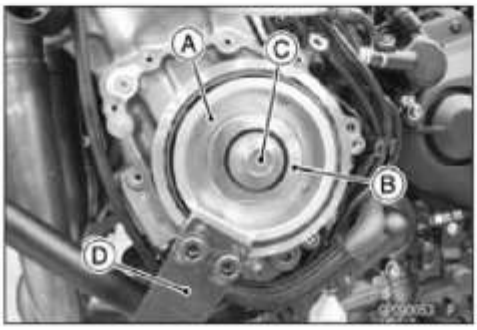
  Torque - Alternator Lead Holding Plate Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)

- Using a high flash-point solvent, clean off any oil or dirt that may be on the liquid gasket coating area. Dry them with a clean cloth.
- Apply liquid gasket to the circumference of the alternator lead grommet [B], and fit the grommet into the notch of the cover securely.

  Sealant - Liquid Gasket, TB1211F: 92104-0004

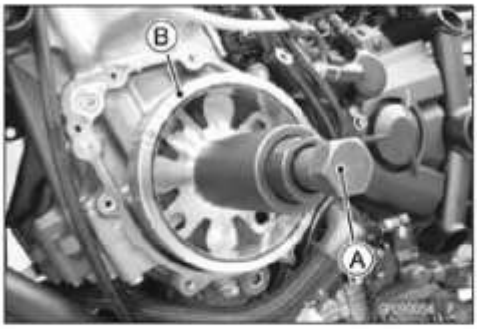
- Install the removed parts.

Alternator Rotor Removal



- Remove:
  Alternator Cover (see Alternator Cover Removal(16-31))
- Hold the alternator rotor steady with the rotor holder [A] and stopper [B].
- Remove the rotor bolt [C] and washer.

  Special Tools - Grip [D]: 57001-1591
  Rotor Holder: 57001-1666
  Rotor Holder Attachment: 57001-1689
  Stopper: 57001-1829



- Using the flywheel puller [A], remove the alternator rotor [B] from the crankshaft.

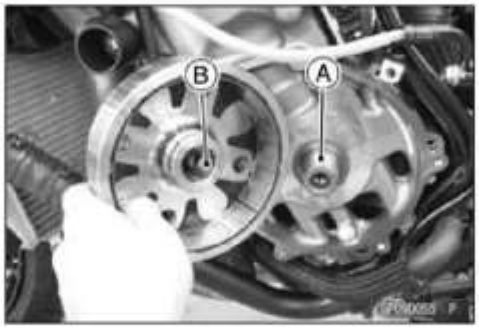
  Special Tool - Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5: 57001-1615

NOTICE
Do not attempt to strike the alternator rotor itself. Striking the rotor can cause the magnets to lose their magnetism.

Charging System

Alternator Rotor Installation

- Using a cleaning fluid, clean off any oil or dirt on the following portions and dry them with a clean cloth.
  Crankshaft Tapered Portion [A]
  Alternator Rotor Tapered Portion [B]



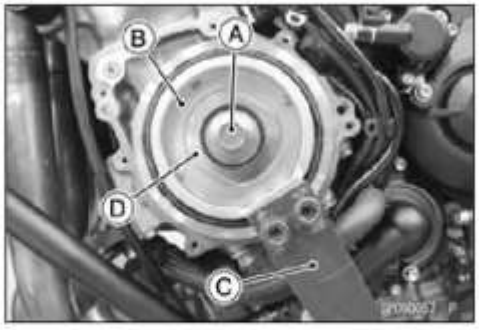
- Install the washer [A] and rotor bolt [B].

NOTE

○*Confirm the alternator rotor fit or not to the crankshaft before tightening it with specified torque.*

- Tighten the alternator rotor bolt [A] with 70 N·m (7.1 kgf·m, 52 ft·lb) of torque while holding the alternator rotor steadily with the holder [B].

Special Tools - Grip [C]: 57001-1591
Rotor Holder: 57001-1666
Rotor Holder Attachment: 57001-1689
Stopper [D]: 57001-1829



- Remove the rotor bolt and washer.
- Check the tightening torque with flywheel puller [A].

Special Tool - Flywheel Puller Assembly, M38 × 1.5/M35 × 1.5: 57001-1615

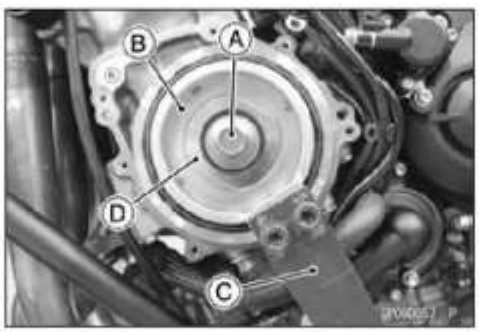
★If the rotor is not pulled out with 20 N·m (2.0 kgf·m, 15 ft·lb) of drawing torque, it is installed correctly.

★If the rotor is pulled out with under 20 N·m (2.0 kgf·m, 15 ft·lb) of drawing torque, clean off any oil dirt or flaw of the crankshaft and rotor tapered portion, and dry them with a clean cloth. Then, confirm that it is not pulled out with above torque.

- Install the washer and rotor bolt.
- Tighten the alternator rotor bolt [A] while holding the alternator rotor steadily with the holder [B].

Special Tools - Grip [C]: 57001-1591
Rotor Holder: 57001-1666
Rotor Holder Attachment: 57001-1689
Stopper [D]: 57001-1829

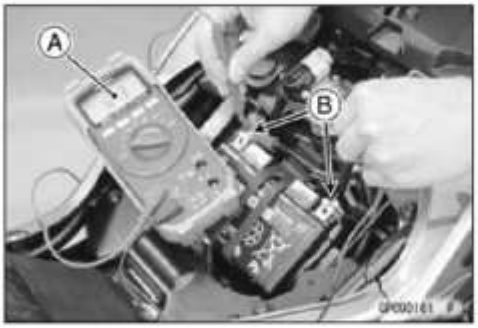
Torque - Alternator Rotor Bolt: 155 N·m (15.8 kgf·m, 114 ft·lb)



- Install the removed parts.

Charging System

Charging Voltage Inspection



- Check the battery condition (see Charging Condition Inspection(16-29)).
- Warm up the engine to obtain actual alternator operating conditions.
- Check that the ignition switch is turned off, and connect a tester [A] to the battery terminals [B].
- Start the engine, and note the voltage readings at various engine speeds (except idling engine speed) with the headlight turned on and then turned off (To turn off the headlight, disconnect the headlight connector on the headlight unit.). The readings should show nearly battery voltage when the engine speed is low, and, as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage.

Charging Voltage **@25°C (77°F)**

Connections		Reading
Tester (+) to	Tester (–) to	
Battery (+)	Battery (–)	DC 14.6 ~ 15.0 V

- Turn off the ignition switch to stop the engine, and disconnect the tester.

★If the charging voltage is kept between the values given in the table, the charging system is considered to be working normally.

★If the charging 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 charging voltage does not rise 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.

Alternator Inspection

There are three types of alternator failures: short, open (wire burned out), 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.

Charging System

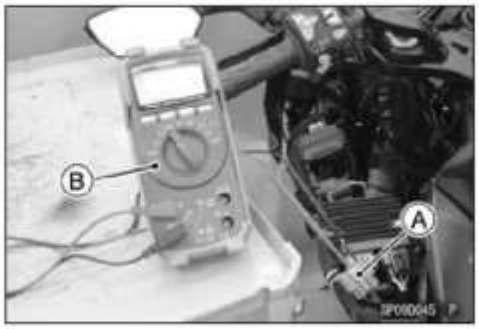
- To check the alternator output voltage, do the following procedures.

○Turn the ignition switch off.
○Remove:
Left Upper Inner Fairing (see Upper Inner Fairing Removal(15-18))
Left Lower Fairing (see Lower Fairing Removal(15-14))
○Disconnect the alternator lead connector [A].
○Connect a tester as shown in the table 1.
○Start the engine.
○Run it at the rpm given in the table 1.
○Note the voltage readings (total 3 measurements).

Table 1 Alternator Output Voltage @4 000 r/min (rpm)

Connections		Reading
Tester (+) to	Tester (–) to	
One White Lead	Another White Lead	AC 48 ~ 72 V

★If the output voltage shows the value in the table, the alternator operates properly.
★If the output voltage shows a much lower reading than that given in the table, stop the engine and inspect the stator coil resistance.



- Check the stator coil resistance as follows.

○Stop the engine.
○Disconnect the alternator lead connector [A].
○Connect the tester [B] as shown in the table 2.
○Note the readings (total 3 measurements).

Table 2 Stator Coil Resistance @20°C (68°F)

Connections		Reading
Tester (+) to	Tester (–) to	
One White Lead	Another White Lead	0.112 ~ 0.168 Ω

When measuring the resistance, use a tester that can measure the standard value.

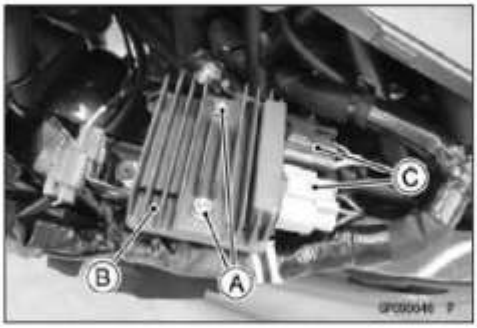
★If there is more resistance than shown in the table, or no tester reading (infinity) for any two leads, the stator has an open lead and must be replaced. Much less than this resistance means the stator is shorted, and must be replaced.

- Measure the resistance between each of the white leads and chassis ground.

★Any tester reading less than infinity (∞) indicates a short, necessitating stator replacement.
★If the stator coils have normal resistance, but the voltage check showed the alternator to be defective; then the rotor magnets have probably weakened, and the rotor must be replaced.

Charging System

Regulator/Rectifier Removal



- Remove:
  Left Upper Inner Fairing (see Upper Inner Fairing Removal(15-18))
  Left Lower Fairing (see Lower Fairing Removal(15-14))
  Regulator/Rectifier Mounting Nuts [A]
  Regulator/Rectifier [B]
- Disconnect the connectors [C].

Regulator/Rectifier Installation

- Installation is the reverse of removal.
- Tighten:

Torque - Regulator/Rectifier Mounting Nuts: 7.0 N·m (0.71 kgf·m, 62 in·lb)

- Install the removed parts.

Regulator/Rectifier Inspection

- Refer to the Charging System Troubleshooting for the Regulator/Rectifier Inspection.

Charging System Troubleshooting

- Before inspection, remove all accessories that consume electrical power.

NOTE

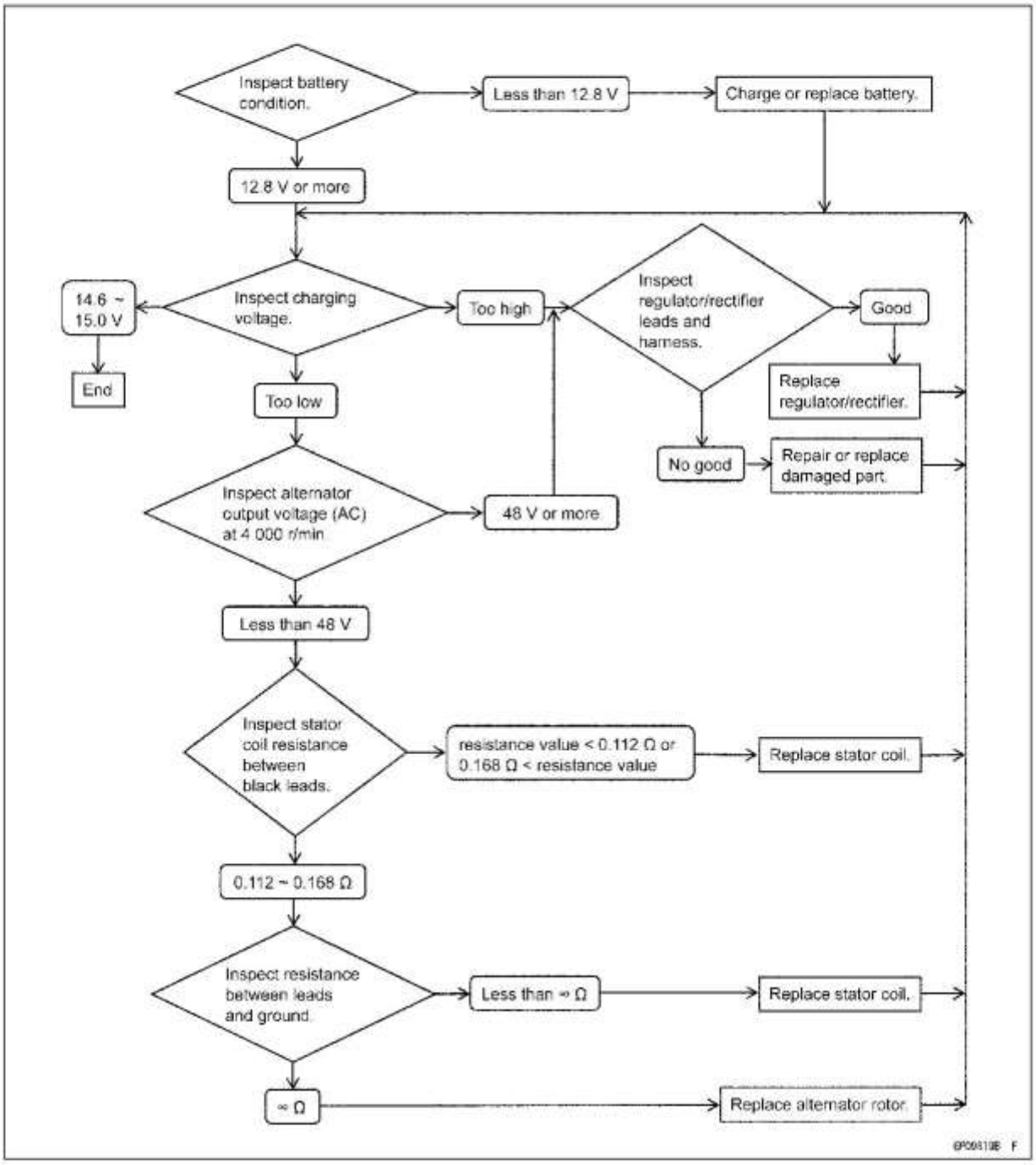
○*Even when the charging system is working properly, the battery may discharge if the motorcycle is equipped with too many accessories.*

- Pay attention to riding conditions and the customer's riding habits which could affect the charging system such as:

Frequent use at low engine speed
Frequent and unnecessary brake pedal dragging
→ Battery Discharged

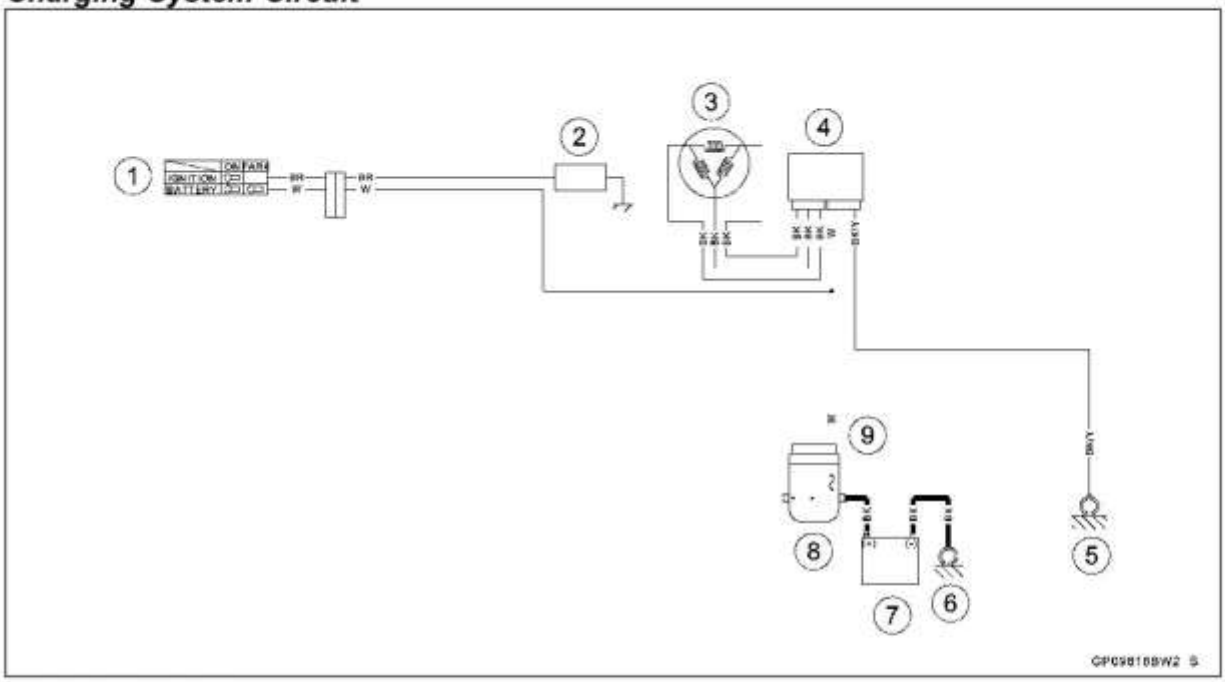
- Recharge the battery if it is discharged.

Charging System



Charging System

Charging System Circuit



1. Ignition Switch
2. Load
3. Alternator
4. Regulator/Rectifier
5. Frame Ground (1)
6. Engine Ground
7. Battery
8. Starter Relay
9. Main Fuse 30 A

Ignition System

⚠ WARNING

The ignition system produces extremely high voltage. Do not touch the spark plug, stick coil or stick coil lead while the engine is running, or you could receive a severe electrical shock.

NOTICE

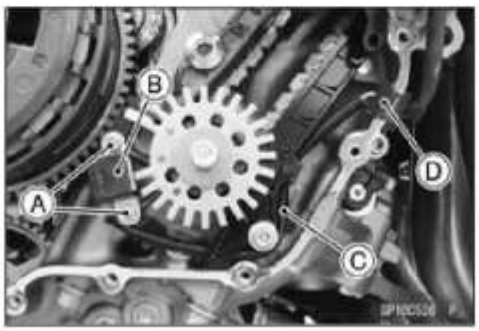
Do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent ECU damage.
Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the ECU.

Crankshaft Sensor Removal

NOTICE

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

- Remove:
  Clutch Cover (see Clutch Cover Removal(6-14))
- Remove the crankshaft sensor lead connector [A] from the bracket, and disconnect it.



- Remove:
  Crankshaft Sensor Bolts [A]
  Crankshaft Sensor [B]
- Clear the lead [C].
- Remove the lead grommet [D].

Crankshaft Sensor Installation

- Using a high flash-point solvent, clean off any oil or dirt that may be on the liquid gasket coating area. Dry them with a clean cloth.
- Apply liquid gasket [A] to whole periphery of the crankshaft sensor lead grommet groove.

  Sealant - Liquid Gasket, TB1211F: 92104-0004

Ignition System

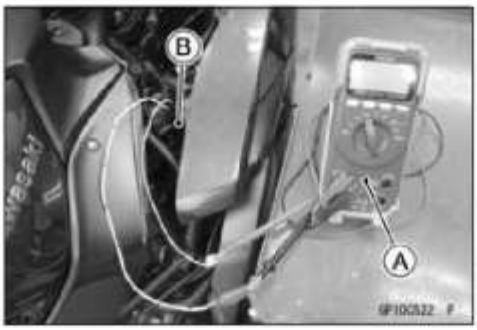
- Install the crankshaft sensor [A].
- Apply a non-permanent locking agent to the threads of the crankshaft sensor bolts [B] and tighten them.

Torque - Crankshaft Sensor Bolts: 6.0 N·m (0.61 kgf·m, 53 in·lb)

- Run the crankshaft sensor lead [C] under the chain guide [D], and pull the lead to upside.
- Install:
  Clutch Cover (see Clutch Cover Installation(6-14))
- Run the crankshaft sensor lead correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Install the removed parts.

Crankshaft Sensor Inspection

- Remove the right upper inner fairing (see Upper Inner Fairing Removal(15-18)).
- Disconnect the crankshaft sensor lead connector (see Crankshaft Sensor Removal(16-39)).
- Set a tester [A], and connect it to the crankshaft sensor lead connector [B].



Crankshaft Sensor Resistance

Connections:	**Y lead ⟷ BK lead**
Standard:	**376 ~ 564 Ω @20°C (68°F)**

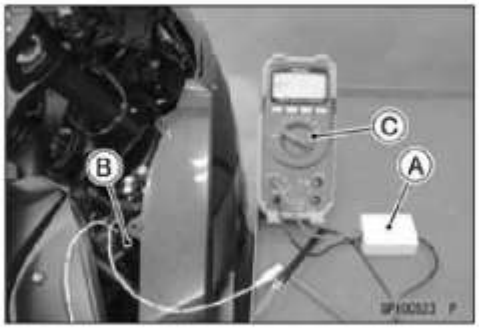
★If there is more resistance than the specified value, the coil has an open lead and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

- Measure the resistance between the crankshaft sensor leads and chassis ground.

★Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the crankshaft sensor.

Ignition System

Crankshaft Sensor Peak Voltage Inspection



NOTE

○Be sure the battery is fully charged.
○Using the peak voltage adapter [A] is more reliable way to determine the condition of the crankshaft sensor than crankshaft sensor internal resistance measurements.

- Remove the right upper inner fairing (see Upper Inner Fairing Removal(15-18)).
- Disconnect the crankshaft sensor lead connector [B] (see Crankshaft Sensor Removal(16-39)).
- Set a tester [C], and connect it to the peak voltage adapter.

Special Tool - Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

- Connect the adapter to the terminals of the crankshaft sensor lead connector.

Connections:

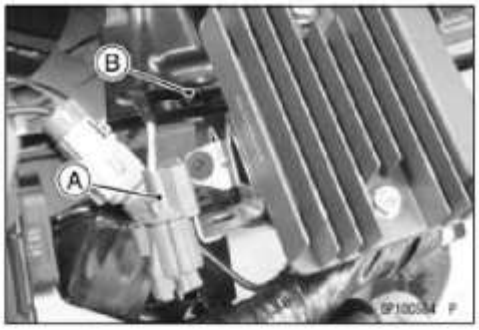
Crankshaft Sensor Lead Connector		Peak Voltage Adapter		Tester
Y lead	←	R lead	→	(+)
BK lead	←	BK lead	→	(–)

- Turn the ignition switch on.
- Slide the engine start/stop switch, turn the engine 4 ~ 5 seconds with the transmission gear in neutral to measure the crankshaft sensor peak voltage.
- Repeat the measurements 5 or more times.

Crankshaft Sensor Peak Voltage
Standard: 3 V or more

★If the reading is less than the standard, inspect the crankshaft sensor (see Crankshaft Sensor Inspection(16-40)).

Camshaft Position Sensor Removal



- Remove:
  Left Upper Inner Fairing (see Upper Inner Fairing Removal(15-18))
  Left Lower Fairing (see Lower Fairing Removal(15-14))
- Remove the camshaft position sensor lead connector [A] from the bracket, and disconnect it.
- Remove the radiator (see Radiator and Radiator Fan Removal(4-15)).
- Remove the clamp [B].

- Remove:
  Camshaft Position Sensor Bolt [A]
  Camshaft Position Sensor [B]

Camshaft Position Sensor Installation

- Replace the O-ring [A] with a new one.
- Apply grease to the new O-ring.
- Tighten:

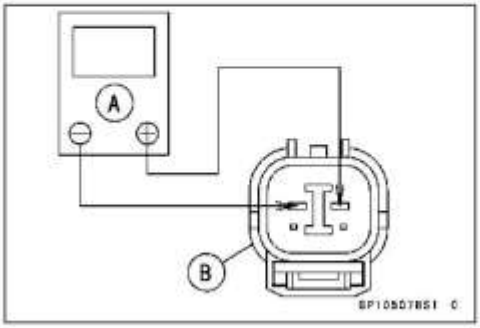
Torque - Camshaft Position Sensor Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)

○When installing the sensor which is fastened by bolt, tighten the bolt after placing the sensor on the bottom surface completely.

- Run the lead correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Install the removed parts.

Camshaft Position Sensor Inspection

- Remove the left upper inner fairing (see Upper Inner Fairing Removal(15-18)).
- Disconnect the camshaft position sensor lead connector (see Camshaft Position Sensor Removal(16-41)).
- Set a tester [A], and connect it to the camshaft position sensor lead connector [B].



Camshaft Position Sensor Resistance

Connections:	**W/Y lead ⟷ Y lead**
Standard:	**344 ~ 516 Ω @20°C (68°F)**

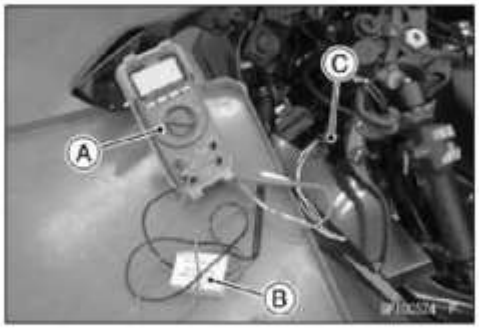
★If there is more resistance than the specified value, the sensor coil has an open lead and must be replaced. Much less than this resistance means the sensor coil is shorted, and must be replaced.

- Measure the resistance between the camshaft position sensor leads and chassis ground.

★Any tester reading less than infinity (∞) indicates a short, necessitating replacement of the camshaft position sensor.

Ignition System

Camshaft Position Sensor Peak Voltage Inspection



NOTE

○*Be sure the battery is fully charged.*

- Remove the left upper inner fairing (see Upper Inner Fairing Removal(15-18)).
- Disconnect the camshaft position sensor lead connector (see Camshaft Position Sensor Removal(16-41)).
- Set a tester [A], and connect it to the peak voltage adapter [B].

Special Tool - Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B

- Connect the adapter to the terminals of the camshaft position sensor lead connector [C].

Connections:

Camshaft Position Sensor Lead Connector		Peak Voltage Adapter		Tester
W/Y lead	←	R lead	→	(+)
Y lead	←	BK lead	→	(–)

- Turn the ignition switch on.
- Slide the engine start/stop switch, turn the engine 4 ~ 5 seconds with the transmission gear in neutral to measure the camshaft position sensor peak voltage.
- Repeat the measurements 5 or more times.

Camshaft Position Sensor Peak Voltage
Standard: 0.6 V or more

★If the reading is less than the standard, inspect the camshaft position sensor (see Camshaft Position Sensor Inspection(16-42)).

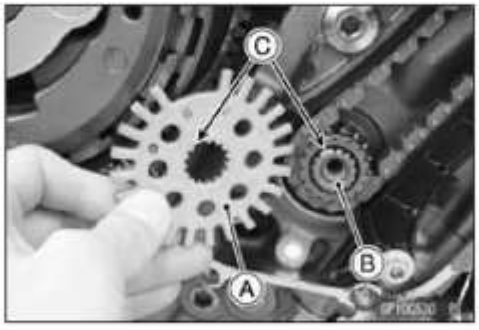
Timing Rotor Removal

- Remove the crankshaft sensor (see Crankshaft Sensor Removal(16-39)).
- Holding the timing rotor with the flywheel & pulley holder [A] and remove the timing rotor bolt [B] and washer [C].

Special Tool - Flywheel & Pulley Holder: 57001-1605

- Remove the timing rotor [D].

Timing Rotor Installation



- Install the timing rotor [A] on the crankshaft [B] with their teeth [C] aligned.
- Apply a non-permanent locking agent to the threads of the timing rotor bolt.
- Install the washer so that the chamfer side faces outward.
- Holding the timing rotor with the flywheel & pulley holder and tighten the timing rotor bolt.

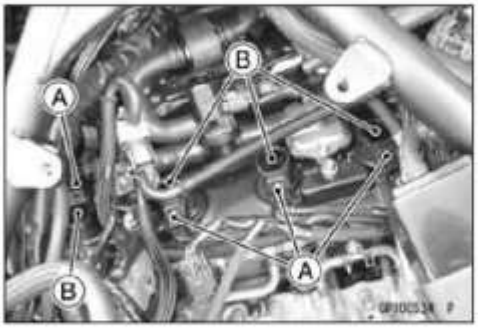
Special Tool - Flywheel & Pulley Holder: 57001-1605

Torque - Timing Rotor Bolt: 39 N·m (4.0 kgf·m, 29 ft·lb)

- Install the removed parts.

Ignition System

Stick Coil Removal



NOTICE
Never drop the stick coils, especially on a hard surface. Such a shock to the stick coils can damage it.

- Remove:
  Left Air Suction Valve Cover Bolts (see Air Suction Valve Removal(5-11))
- Disconnect the stick coil connectors [A].
- Remove the stick coils [B].

NOTICE
Do not pry the connector part of the coil while removing the coil.

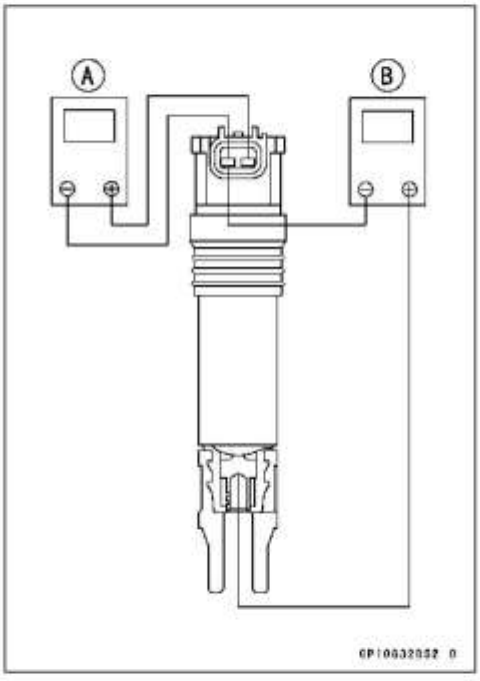
Stick Coil Installation

- Insert the stick coils [A] so that the coil heads face as shown.

NOTICE
Do not tap the coil head while installing the coil.

- After installation, be sure the stick coils are installed securely by pulling up them lightly.
- Run the leads correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Install the removed parts.

Stick Coil Inspection



- Remove the stick coils (see Stick Coil Removal(16-44)).
- Measure the primary winding resistance [A] as follows.

○Connect a tester between the coil terminals.

- Measure the secondary winding resistance [B] as follows.

○Connect the tester between the plug terminal and (–) coil terminal.

Stick Coil Winding Resistance

Primary Windings:	**1.19 ~ 1.61 Ω @20°C (68°F)**
Secondary Windings:	**10.2 ~ 13.8 kΩ @20°C (68°F)**

★If the tester does not read as specified, replace the coil.

Ignition System

Stick Coil Primary Peak Voltage Inspection

NOTE

○*Be sure the battery is fully charged.*

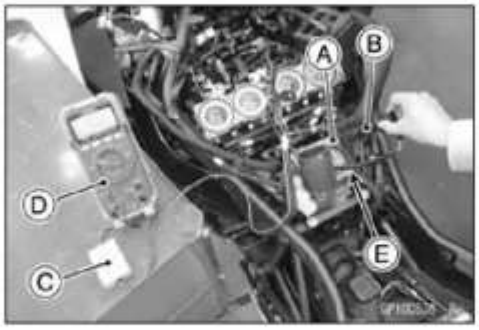
- Remove the stick coils (see Stick Coil Removal(16-44)), but do not remove the spark plugs.
- Measure the primary peak voltage as follows.

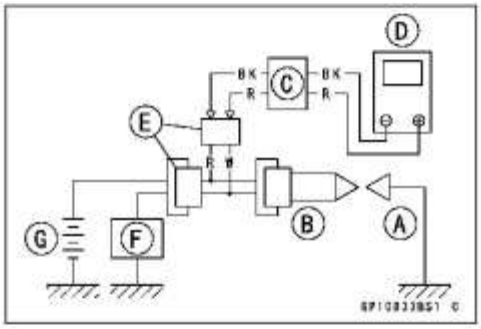
○Install the new spark plug [A] into each stick coil [B], and ground them onto the engine.
○Connect the peak voltage adapter [C] into a tester [D].
○Connect the adapter to the lead wire - peak voltage adapter [E] which is connected between the stick coil connector and stick coil.

ECU [F]
Battery [G]

Special Tools - Peak Voltage Adapter: 57001-1415
Type: KEK-54-9-B
Lead Wire - Peak Voltage Adapter: 57001 -1449

Primary Lead Connection
Adapter (R, +) to lead wire-peak voltage adapter (W)
Adapter (BK, –) to lead wire-peak voltage adapter (R)





⚠ WARNING

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

- Turn the ignition switch on.
- Slide the engine start/stop switch, turn the engine 4 ~ 5 seconds with the transmission gear in neutral to measure the primary peak voltage.
- Repeat the measurements 5 times for one stick coil.

Stick Coil Primary Peak Voltage
Standard: 100 V or more

- Repeat the test for the other stick coil.

★If the reading is less than the specified value, check the following.

Stick Coils (see Stick Coil Inspection(16-44))
Crankshaft Sensor (see Crankshaft Sensor Inspection(16-40))
ECU (see ECU Power Supply Inspection(3-40))

Spark Plug Removal

- Refer to the Spark Plug Replacement (see Spark Plug Replacement(2-73)).

Spark Plug Installation

- Refer to the Spark Plug Replacement (see Spark Plug Replacement(2-73)).

Spark Plug Condition Inspection

- Refer to the Spark Plug Condition Inspection (see Spark Plug Condition Inspection(2-73)).

Ignition System

Interlock Operation Inspection

● Raise the rear wheel off the ground with the stand.

1st Check

● Start the engine to the following conditions.

Condition:
Transmission Gear → 1st Position
Clutch Lever → Release
Side Stand → Down or Up

○Turn the ignition switch on and slide the engine start/stop switch.

○Then the starter motor should not turn when the starter system circuit is normality.

★If the engine is start, inspect the starter lockout switch, gear position sensor and relay box.

2nd Check

● Start the engine to the following conditions.

Condition:
Transmission Gear → 1st Position
Clutch Lever → Pulled in
Side Stand → Up

○Turn the ignition switch on and slide the engine start/stop switch.

○Then the starter motor should turn when the starter system circuit is normality.

★If the starter motor is not turn, inspect the starter lockout switch, side stand switch, relay box and starter relay.

3rd Check

● Inspect the engine for its secure stop after the following operations are completed.

● Run the engine to the following conditions.

Condition:
Transmission Gear → 1st Position
Clutch Lever → Release
Side Stand → Up

● Set the side stand on the ground, then the engine will stop.

★If the engine does not stop, inspect the gear position sensor, side stand switch and relay box.

★If their parts are normality, replace the ECU.

Ignition System

IC Igniter Inspection

○The IC igniter is built in the ECU [A].

● Refer to the following items.

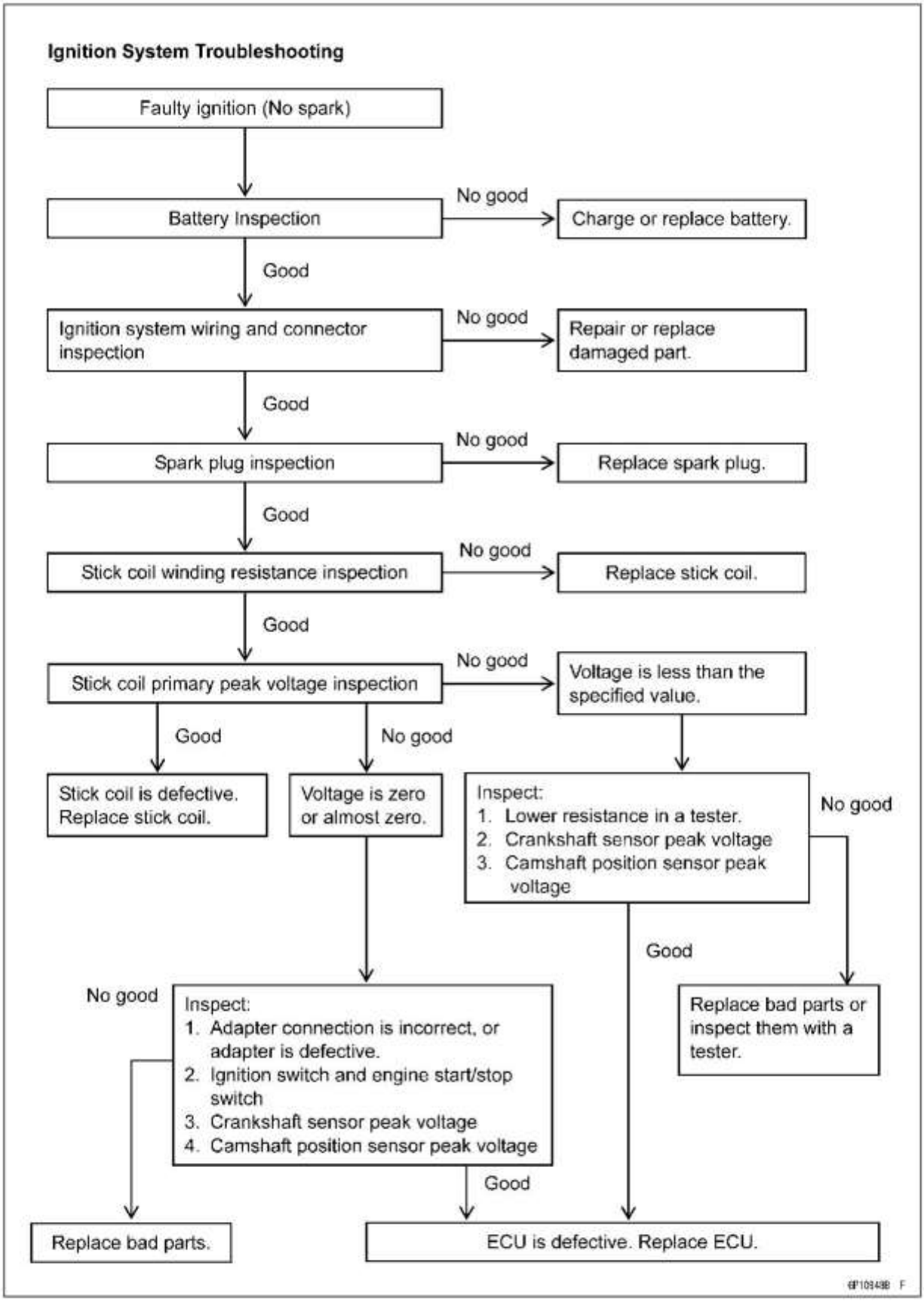
Interlock Operation Inspection (see Interlock Operation Inspection(16-46))

Ignition System Troubleshooting (see Ignition System section (16-39))

ECU Power Supply Inspection (see ECU Power Supply Inspection(3-40))

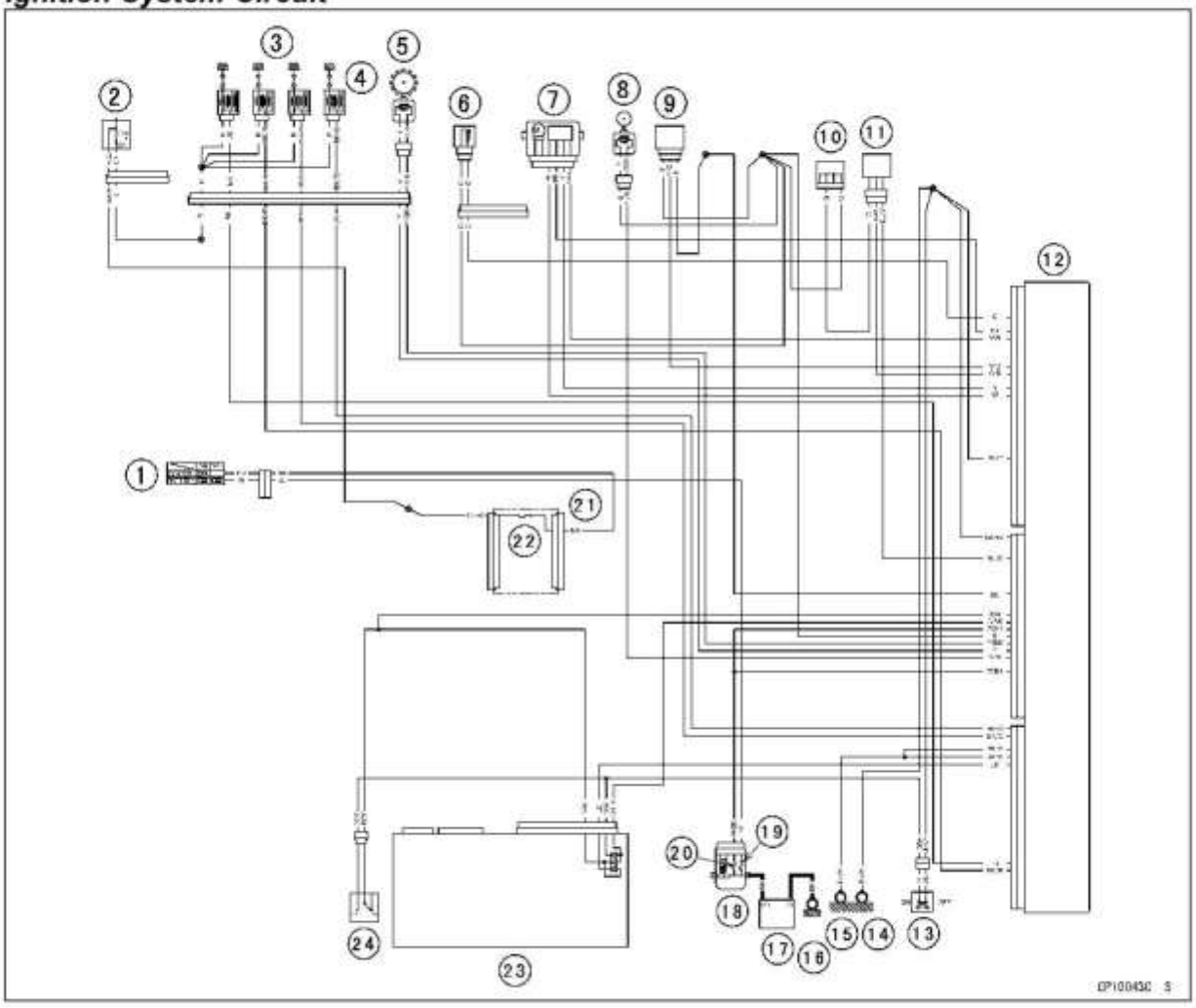
Ignition System

Ignition System Troubleshooting



Ignition System

Ignition System Circuit



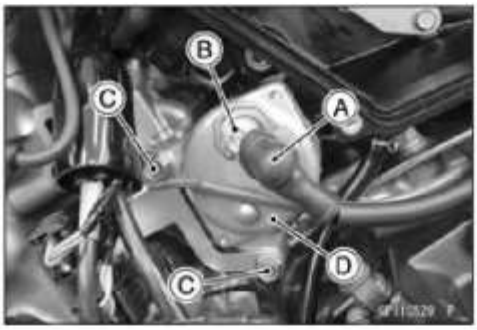
1. Ignition Switch
2. Engine Start/Stop Switch (Engine Stop)
3. Spark Plugs
4. Stick Coils
5. Crankshaft Sensor
6. Water Temperature Sensor
7. Throttle Position Sensor
8. Camshaft Position Sensor
9. Vehicle-down Sensor
10. Joint Connector (2)
11. Gear Position Sensor
12. ECU
13. Side Stand Switch
14. Frame Ground (4)
15. Frame Ground (3)
16. Engine Ground
17. Battery
18. Starter Relay
19. Main Fuse 30 A
20. ECU Fuse 15 A
21. Fuse Box (1)
22. Ignition Fuse 15 A
23. Relay Box
24. Starter Lockout Switch

Electric Starter System

Starter Motor Removal

- Drain the coolant (see Coolant Change(2-28)).
- Open the clamp [A].
- Remove:
  Air Cleaner Housing Cover (see Air Cleaner Element Replacement(2-17))
  Water Hose Fitting Bolts [B]
  Water Hose Fitting [C]

- Slide out the rubber cap [A].
- Remove:
  Starter Motor Cable Terminal Nut [B]
  Starter Motor Mounting Bolts [C]
  Starter Motor [D]



Starter Motor Installation

NOTICE
Do not tap the starter motor shaft or body. Tapping the shaft or body could damage the motor.

- Clean the starter motor legs [A] and crankcase [B] where the starter motor is ground.

- Replace the O-ring [A] with a new one.
- Apply grease to the new O-ring.
- Install the starter motor.
- Tighten:

Torque - Starter Motor Mounting Bolts: 10 N·m (1.0 kgf·m, 89 in·lb)

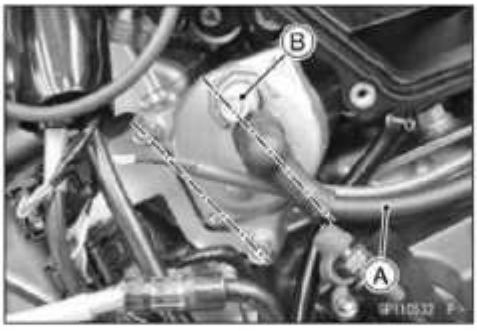
- Install the starter motor cable [A] as shown.

○The starter motor cable should be parallel with the straight line that links the starter motor mounting bolts.

- Apply grease to the starter motor cable terminal nut [B].
- Tighten:

Torque - Starter Motor Cable Terminal Nut: 6.0 N·m (0.61 kgf·m, 53 in·lb)

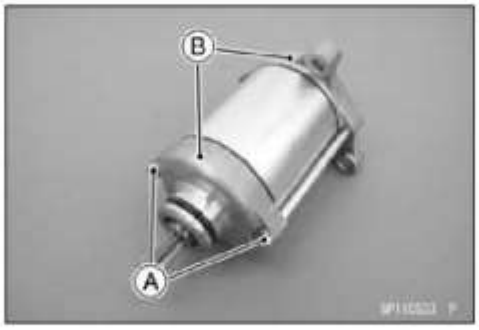
- Slide back the rubber cap to the original position.
- Install the removed parts.



Electric Starter System

Starter Motor Disassembly

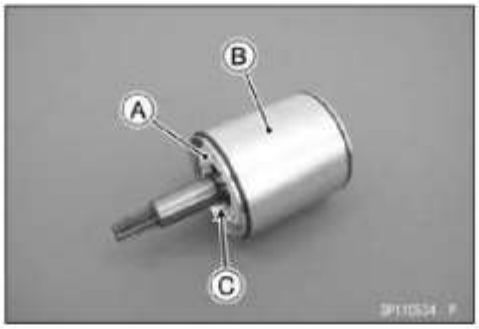
- Remove the starter motor (see Starter Motor Removal(16-50)).
- Take off the starter motor through bolts [A] and remove the both end covers [B].



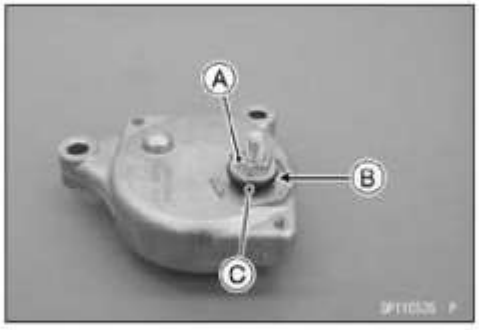
- Pull out the armature [A] out of the yoke [B].

NOTE

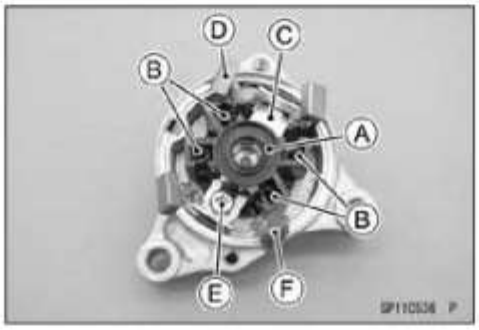
○*Do not remove the circlip [C] from the shaft.*



- Remove:
  Starter Motor Terminal Locknut [A]
  Washer [B]
  Collar [C]

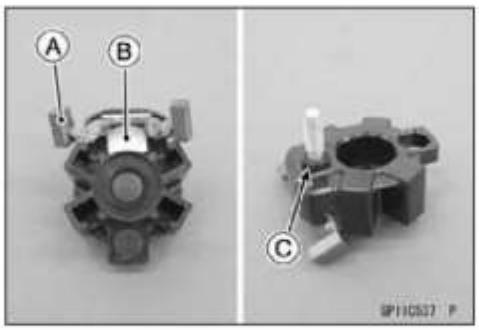


- Pull out the brushes from the brush holder [A].
- Remove:
  Brush Springs [B]
  Starter Motor Terminal [C] and O-ring
  Positive Brush Assy [D]
  Screw [E]
  Negative Brush Assy [F]
  Brush Holder



Starter Motor Assembly

- Install the positive brush assy [A] and the starter motor terminal [B] as shown.
- Replace the O-ring [C] with a new one, and install it.



Electric Starter System

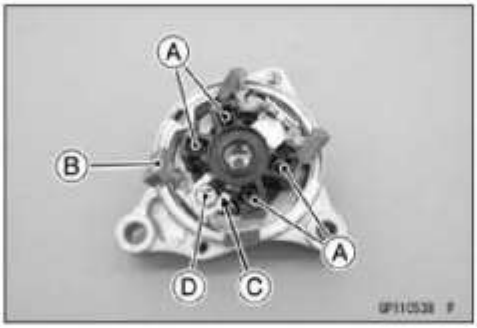
- Install:
  Brush Springs [A]
  Negative Brush Assy [B]

○Turn the stopper side [C] to inside.

- Tighten:

Torque - Brush Holder Screw [D]: 3.8 N·m (0.39 kgf·m, 34 in·lb)

- Install the brushes onto the brush springs.

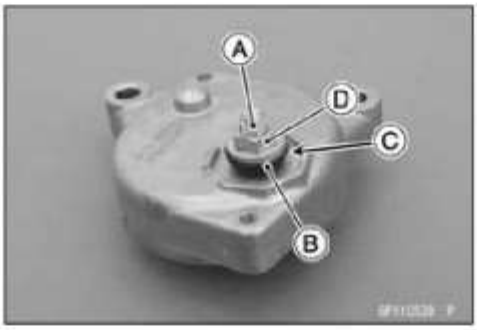


- Install the following parts to the starter motor terminal [A].
  Collar [B]
  Washer [C]
  Starter Motor Terminal Locknut [D]

○Turn the flange of the collar to the locknut as shown.

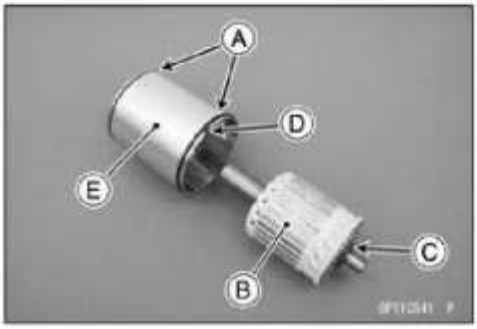
- Tighten:

Torque - Starter Motor Terminal Locknut: 11 N·m (1.1 kgf·m, 97 in·lb)

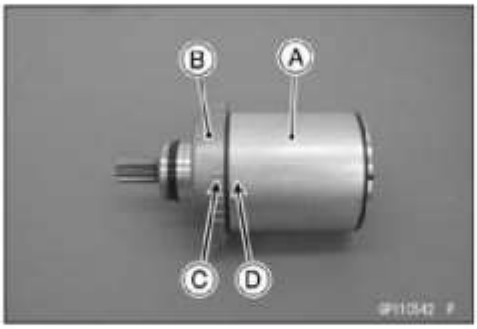


- Apply thin coat of grease to the oil seal [A].

- Replace the O-rings [A] with new ones.
- Insert the armature [B] so that commutator side [C] faces hollow side [D] of the yoke [E].

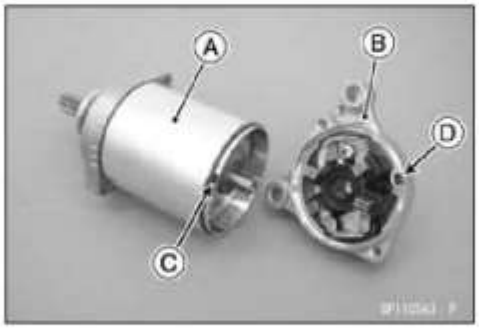


- Assemble the yoke [A] and the end cover [B] as shown.
  Mark [C]
  Mark [D]



Electric Starter System

- Assemble the yoke [A] and the end cover [B] so that the hollow [C] of the yoke fits the projection [D] of the end cover.



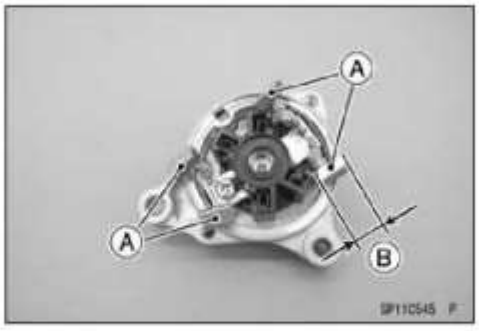
- Tighten:

Torque - Starter Motor Through Bolts [A]: 5.0 N·m (0.51 kgf·m, 44 in·lb)

Brush Inspection

- Measure the length of each brush [A].
★If any is worn down to the service limit, replace the brush assy.

Starter Motor Brush Length [B]
Standard: 12.05 mm (0.4744 in.)
Service Limit: 6.55 mm (0.258 in.)



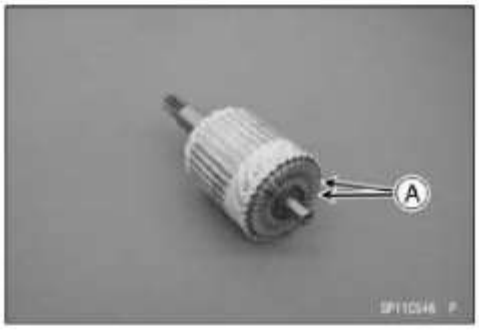
Commutator Cleaning and Inspection

- Clean the metallic dust off the between commutator segments [A].

NOTE

○*Do not use emery or sand paper on the commutator.*

- Check the commutator for damage or abnormal wear.
★Replace the starter motor with a new one if there is any damage or wear.
- Visually inspect the commutator segments for discoloration.
★Replace the starter motor with a new one if discoloration is noticed.



Electric Starter System

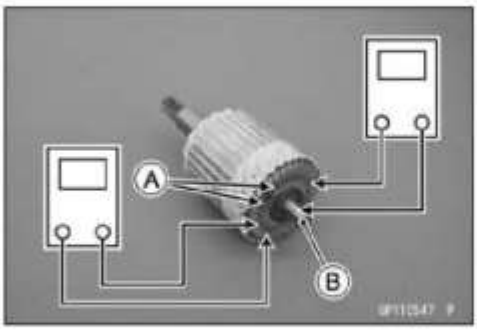
Armature Inspection

- 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 and the starter motor must be replaced.

- Measure the resistance between the segments and the shaft [B].

★If there is any reading at all, the armature has a short and the starter motor must be replaced.



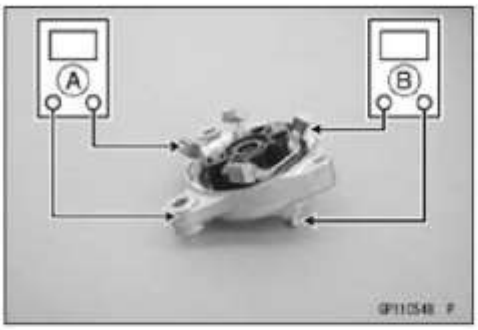
NOTE

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

Brush Lead Inspection

- Measure the resistance as shown.
  End Cover and Negative Brushes [A]
  Terminal Bolt and Positive Brushes [B]

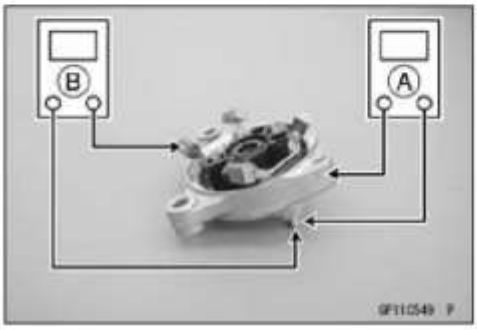
★If there is not close to zero ohms, the brush lead has an open. Replace the brush assy.



Left-hand End Cover Inspection

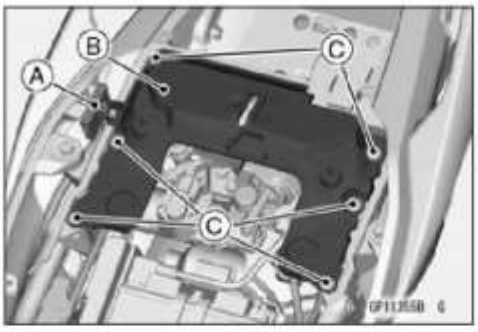
- Measure the resistance as shown.
  Terminal Bolt and End Cover [A]
  Terminal Bolt and Negative Brushes [B]

★If there is any reading, the brush assy and/or terminal bolt assy have a short. Replace the brush assy and/or terminal bolt assy.



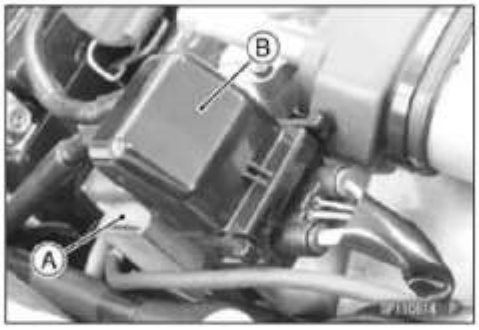
Starter Relay Inspection

- Remove:
  Seat Sub Covers (see Seat Cover Removal(15-27))
- Free the fuse box [A] from the seat lock bracket [B].
- Remove:
  Bolts [C]
  Seat Lock Bracket



Electric Starter System

- Remove the starter relay [A] from the rear fender.
- Remove:
  Starter Relay Cover [B]



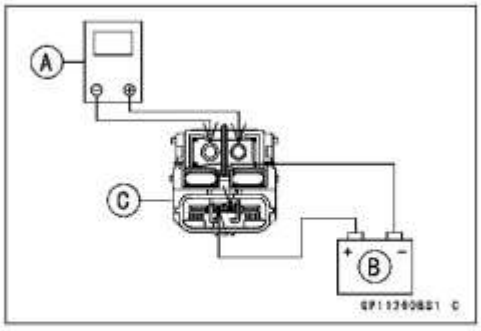
- Remove the cable terminal bolts [A] and washers.
- Disconnect the connector [B].

- Connect a tester [A] and 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.

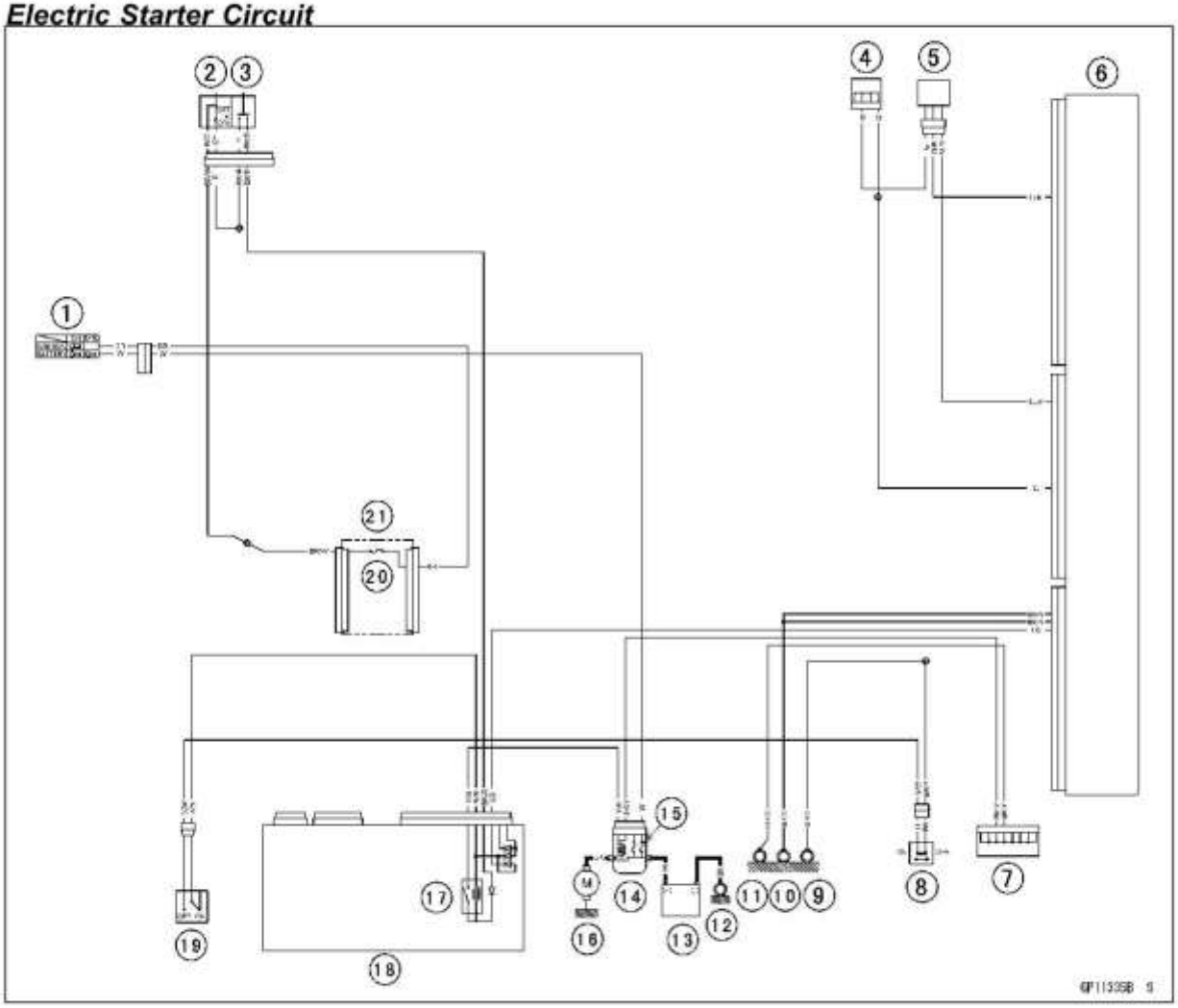
Testing Relay

Criteria: **When battery is connected → 0 Ω**
When battery is disconnected → ∞ Ω



Electric Starter System

Electric Starter Circuit



1. Ignition Switch
2. Engine Start/Stop Switch (Engine Stop)
3. Engine Start/Stop Switch (Engine Start)
4. Joint Connector (2)
5. Gear Position Sensor
6. ECU
7. Joint Connector (4)
8. Side Stand Switch
9. Frame Ground (4)
10. Frame Ground (3)
11. Frame Ground (2)
12. Engine Ground
13. Battery
14. Starter Relay
15. Main Fuse 30 A
16. Starter Motor
17. Starter Circuit Relay
18. Relay Box
19. Starter Lockout Switch
20. Ignition Fuse 15 A
21. Fuse Box (1)

Lighting System

This motorcycle adopt the daylight system and have a headlight circuit relay in the relay box. The headlight does not go on when the ignition switch and the engine start/stop switch are first turned on. The headlight comes on after the engine start/stop switch is released and stays on until the ignition switch is turned off. The headlight will go out momentarily whenever the engine start/stop switch is slided and come back on when the engine start/stop switch is released.

Headlight Beam Horizontal Adjustment

- Refer to the Headlight Aiming Inspection (see Headlight Aiming Inspection(2-68)).

Headlight Beam Vertical Adjustment

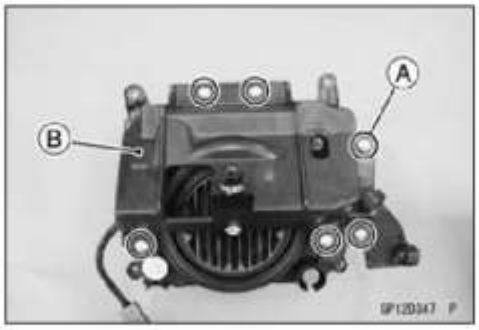
- Refer to the Headlight Aiming Inspection (see Headlight Aiming Inspection(2-68)).

Headlight (LED) Assembly Removal/Installation

- Refer to the Upper Fairing Disassembly/Assembly (see Upper Fairing Disassembly(15-20)) (see Upper Fairing Assembly(15-21)).

Headlight (LED) Assembly Disassembly

- Remove:
  Headlight Cover Screws [A]
  Headlight Cover [B]



Headlight (LED) Assembly Assembly

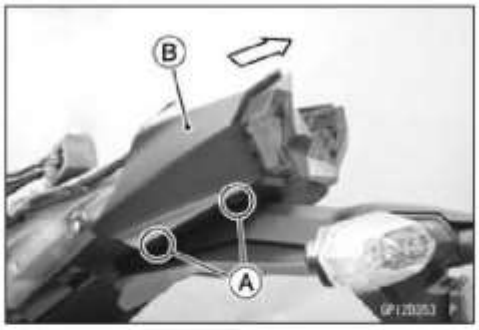
- Assembly is the reverse of disassembly.

City Light (LED) Removal/Installation

- Refer to the Upper Fairing Disassembly/Assembly (see Upper Fairing Disassembly(15-20)) (see Upper Fairing Assembly(15-21)).

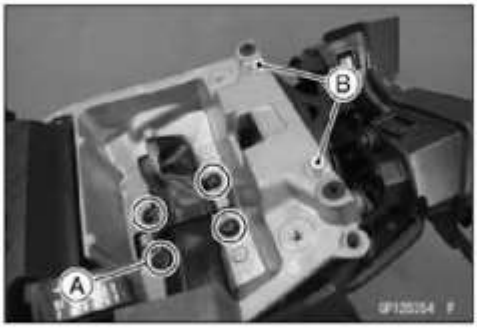
Brake/Tail Light (LED) Removal

- Remove:
  Seat Covers (see Seat Cover Removal(15-27))
  Quick Rivets [A] (Both Sides)
  Tail Cover [B]

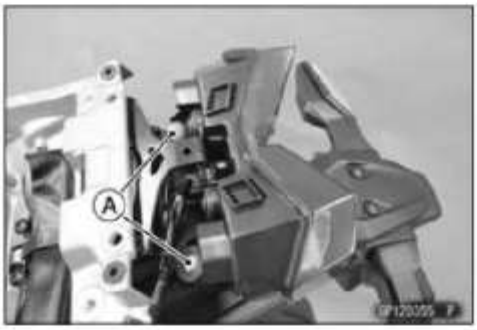


Lighting System

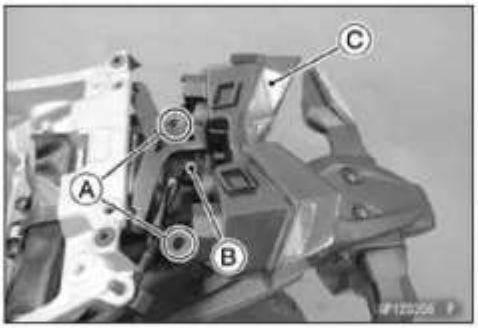
- Loosen the bolts [A].
- Remove the bolts [B].



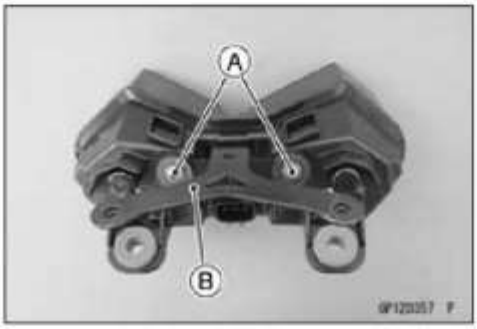
- Remove the screws [A].



- Clear the grommets [A] from the projections.
- Disconnect the brake/tail light lead connector [B].
- Remove the brake/tail light (LED) [C].



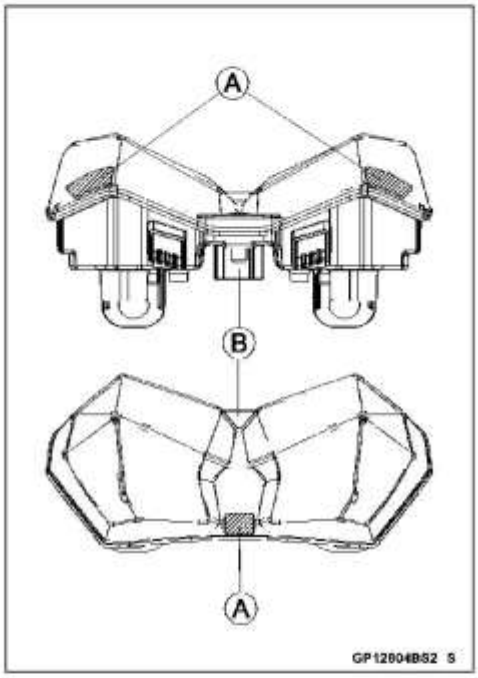
- Remove:
  Screws [A]
  Bracket [B]



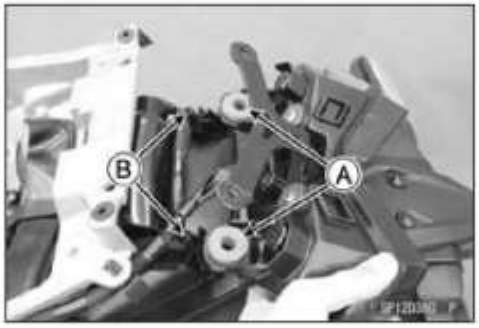
Lighting System

Brake/Tail Light (LED) Installation

- Installation is the reverse of removal.
- When installing the pads [A], install them as shown.
  Brake/Tail Light (LED) [B]



- Fit the grommets [A] to the projections [B].

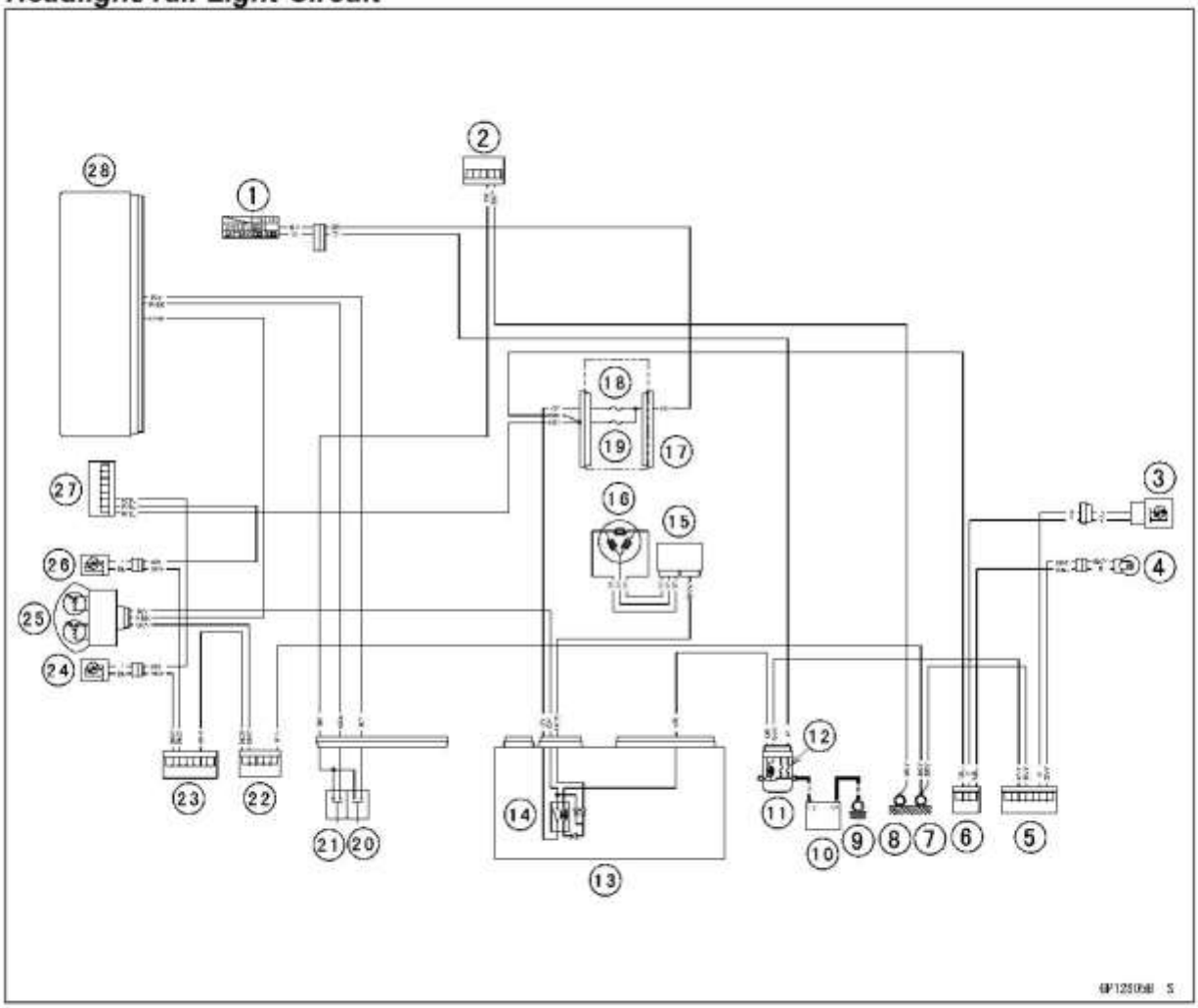


License Plate Light (LED) Removal/Installation

- Refer to the Flap Disassembly/Assembly (see Flap Disassembly(15-29)) (see Flap Assembly(15-30)).

Lighting System

Headlight/Tail Light Circuit



1. Ignition Switch
2. Joint Connector (1)
3. Brake/Tail Light (LED)
4. License Plate Light (LED)
5. Joint Connector (4)
6. Joint Connector (5)
7. Frame Ground (2)
8. Frame Ground (1)
9. Engine Ground
10. Battery
11. Starter Relay
12. Main Fuse 30 A
13. Relay Box
14. Headlight Circuit Relay
15. Regulator/Rectifier
16. Alternator
17. Fuse Box (1)
18. Headlight Fuse 10 A
19. Brake Light/Horn Fuse 10 A
20. Passing Button
21. Dimmer Switch
22. Joint Connector (7)
23. Joint Connector (8)
24. Left City Light (LED)
25. Headlight (LED)
26. Right City Light (LED)
27. Joint Connector (9)
28. Meter Unit

Turn Signal Light (LED) Removal/Installation

- Refer to the Rear View Mirror Removal/Installation and Flap Disassembly/Assembly (see Rear View Mirror Removal(15-42)) (see Rear View Mirror Installation(15-42)) (see Flap Disassembly(15-29)) (see Flap Assembly(15-30)).

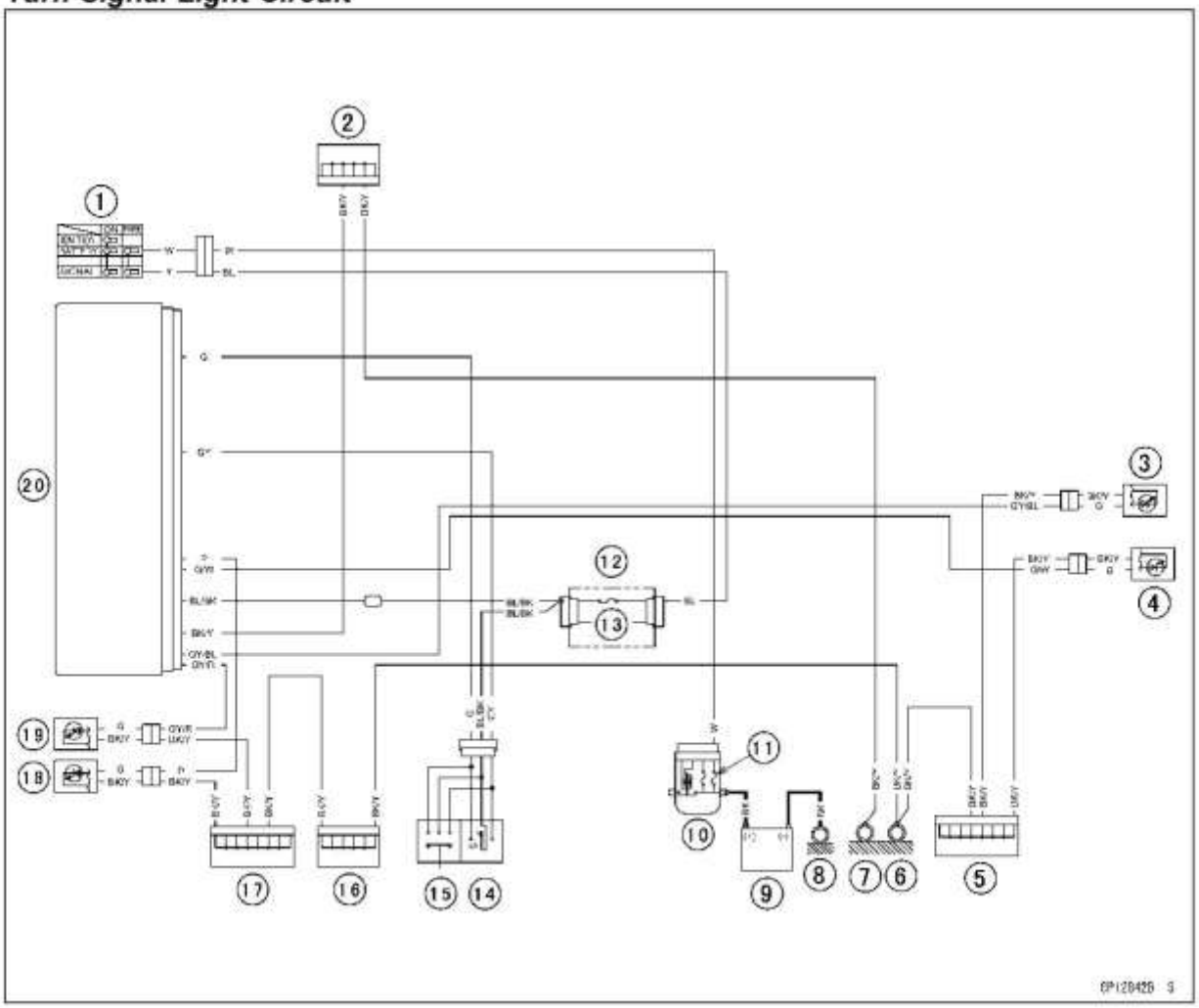
Lighting System

Turn Signal Light Circuit Inspection

★If the turn signal light function does not work, check the wiring for continuity in the turn signal light circuit (see Turn Signal Light Circuit(16-61)).

★If the wiring is good, replace the meter unit.

Turn Signal Light Circuit



1. Ignition Switch
2. Joint Connector (1)
3. Rear Right Turn Signal Light (LED)
4. Rear Left Turn Signal Light (LED)
5. Joint Connector (4)
6. Frame Ground (2)
7. Frame Ground (1)
8. Engine Ground
9. Battery
10. Starter Relay
11. Main Fuse 30 A
12. Fuse Box (3)
13. Turn Signal Relay Fuse 10 A
14. Turn Signal Switch
15. Hazard Button
16. Joint Connector (7)
17. Joint Connector (8)
18. Front Left Turn Signal Light (LED)
19. Front Right Turn Signal Light (LED)
20. Meter Unit

Cornering Light Vertical Adjustment

- Refer to the Headlight Aiming Inspection (see Headlight Aiming Inspection(2-68)).

Lighting System

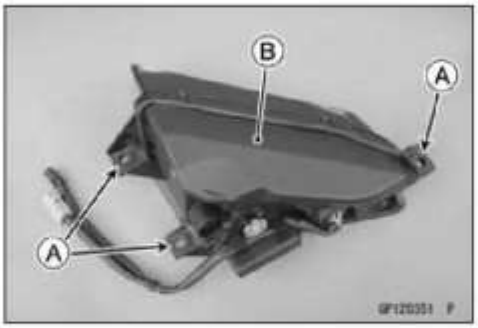
Cornering Light Removal

- Remove the lower fairings (see Lower Fairing Removal(15-14)).
- Open the clamp [A] (left side).
- Remove the screws [B].

- Pull up the cornering light [A] to clear the projections [B].

Cornering Light Installation

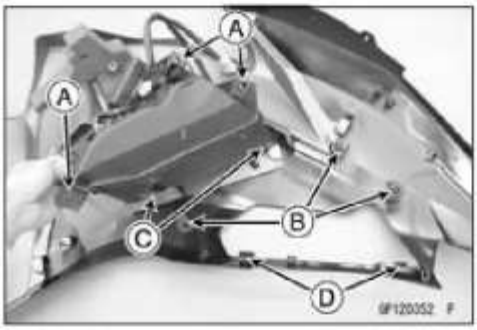
- Installation is the reverse of removal.
- Check that the grommets [A] are in place on the cornering light [B].



- Fit the grommets [A] to the projections [B].

NOTE

○*Be careful not to damage the protect tapes [C] by tabs [D] of the lower fairing.*



Cornering Light Relay Inspection

- Remove:
  Upper Fairing (see Upper Fairing Removal(15-18))
  Cornering Light Relay [A]
- Disconnect the cornering light relay connector [B].

Lighting System

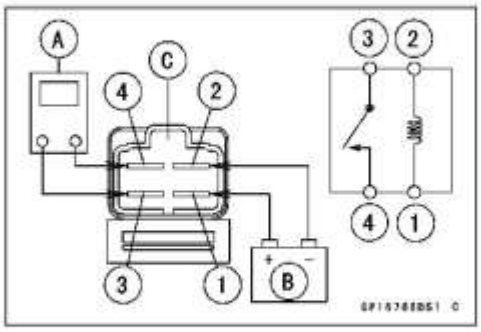
- Connect a digital meter [A] between the relay terminals [3] and [4].
- Connect a 12 V battery [B] between the relay terminals [1] and [2].

★If the relay [C] does not work as specified, the relay is defective. Replace the relay.

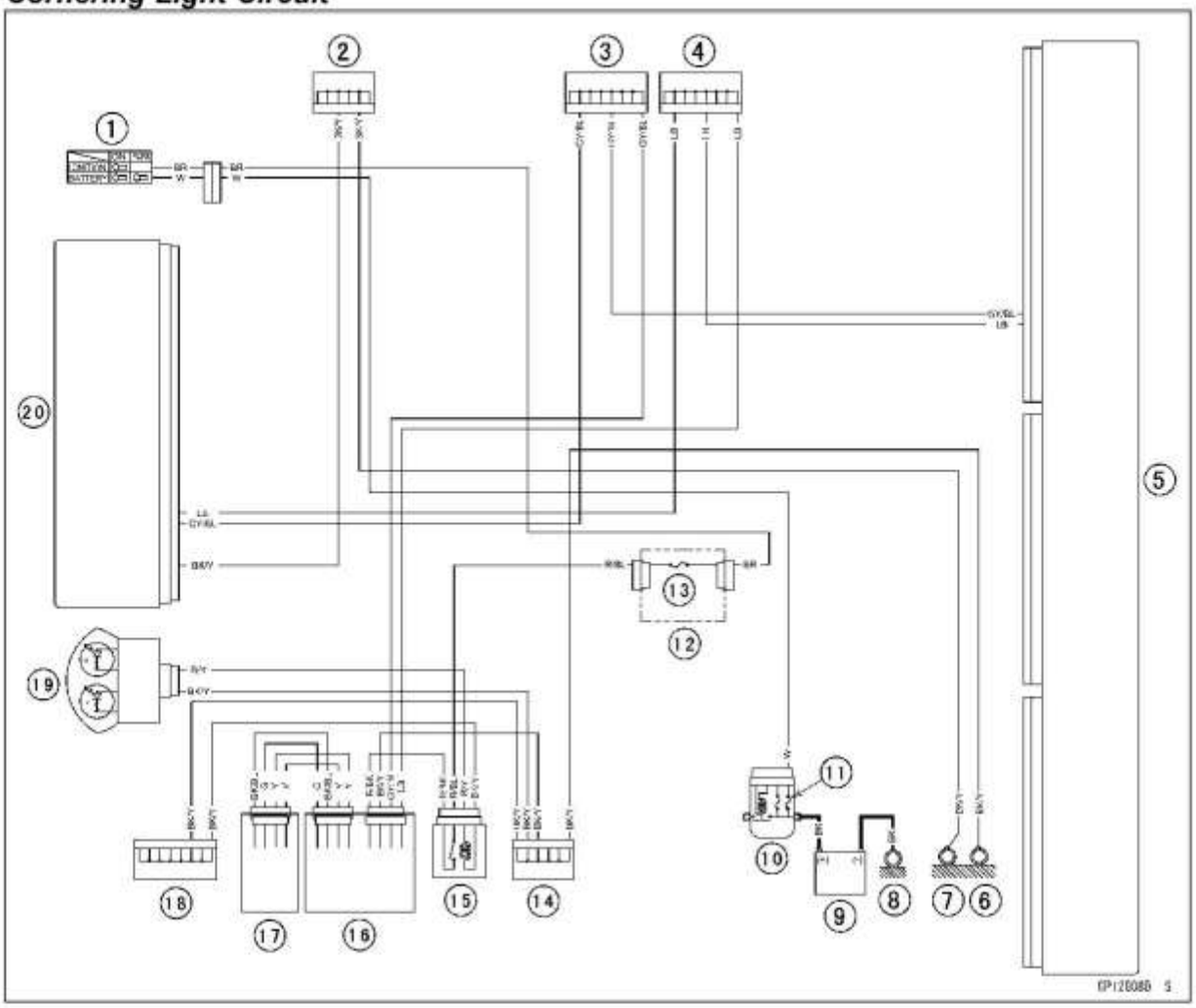
Testing Relay

Criteria: **When battery is connected → 0 Ω**

When battery is disconnected → ∞ Ω



Cornering Light Circuit



1. Ignition Switch
2. Joint Connector (1)
3. Joint Connector (CAN High)
4. Joint Connector (CAN Low)
5. ECU
6. Frame Ground (2)
7. Frame Ground (1)
8. Engine Ground
9. Battery
10. Starter Relay
11. Main Fuse 30 A
12. Fuse Box (4)
13. Cornering Light Fuse 10 A
14. Joint Connector (7)
15. Cornering Light Relay
16. Left Cornering Light
17. Right Cornering Light
18. Joint Connector (8)
19. Headlight (LED)
20. Meter Unit

Air Switching Valve

Air Switching Valve Operation Test

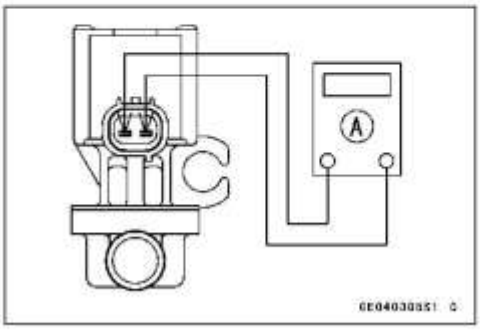
- Refer to the Air Suction System Damage Inspection (see Air Suction System Damage Inspection(2-36)).

Air Switching Valve Unit Test

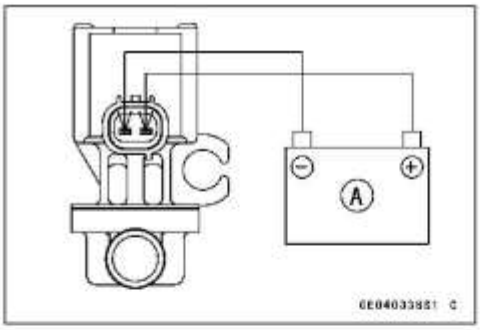
- Remove the air switching valve (see Air Switching Valve Removal(5-12)).
- Connect a tester [A] to the air switching valve terminals as shown.

Air Switching Valve Resistance
Standard: 20 ~ 24 Ω @20°C (68°F)

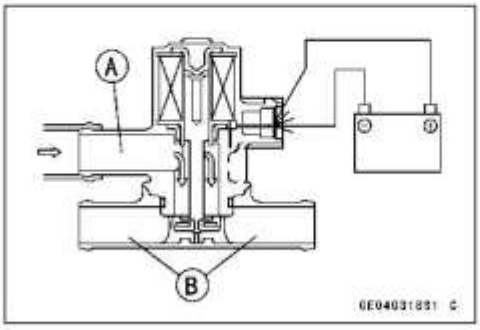
★If the resistance reading is out of the specified value, replace it with a new one.



- Connect the 12 V battery [A] to the air switching valve terminals as shown.



- Blow the air to the intake air duct [A], and make sure does not flow the blown air from the outlet air ducts [B].

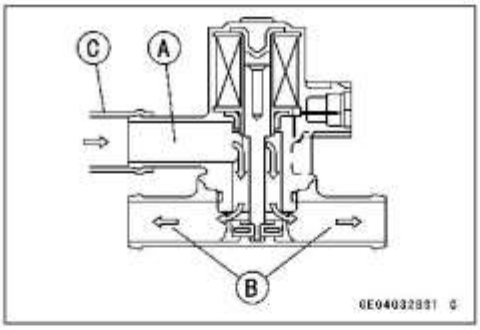


- Disconnect the 12 V battery.
- Blow the air to the intake air duct [A] again, and make sure flow the blown air from the outlet air duct [B].

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

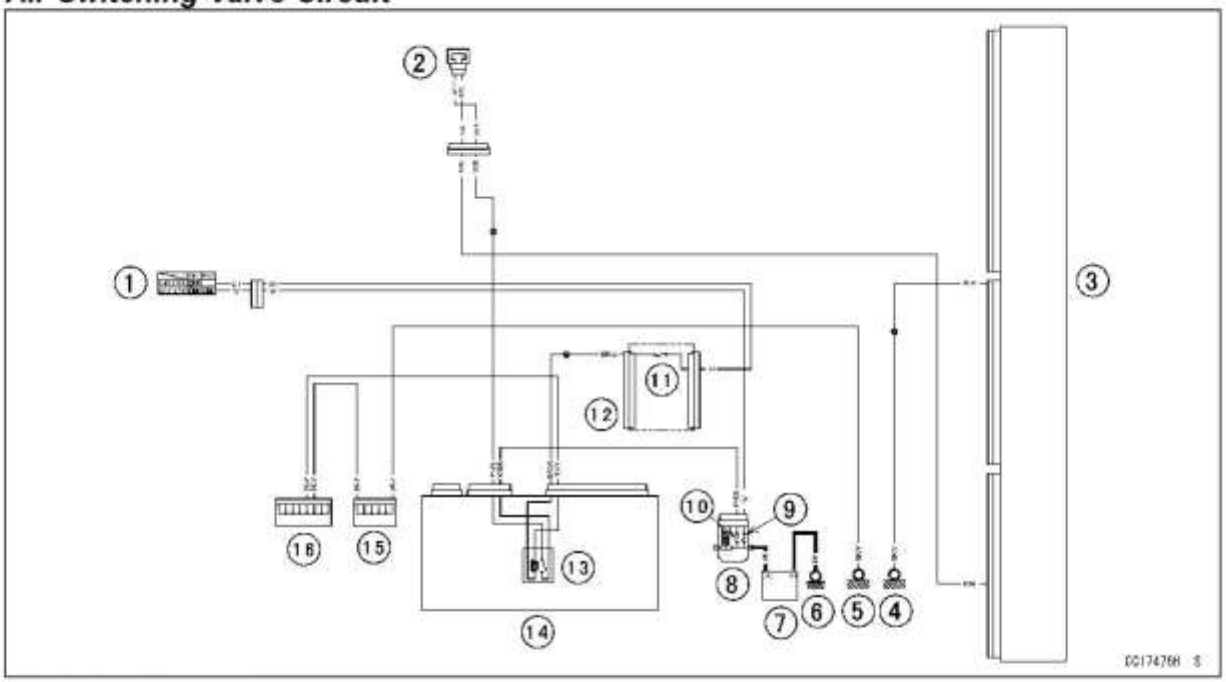
NOTE

○*To check air flow through the air switching valve, just blow through the air switching valve hose (intake side) [C].*



Air Switching Valve

Air Switching Valve Circuit



1. Ignition Switch
2. Air Switching Valve
3. ECU
4. Frame Ground (4)
5. Frame Ground (2)
6. Engine Ground
7. Battery
8. Starter Relay
9. Main Fuse 30 A
10. ECU Fuse 15 A
11. Ignition Fuse 15 A
12. Fuse Box (1)
13. ECU Main Relay
14. Relay Box
15. Joint Connector (7)
16. Joint Connector (8)

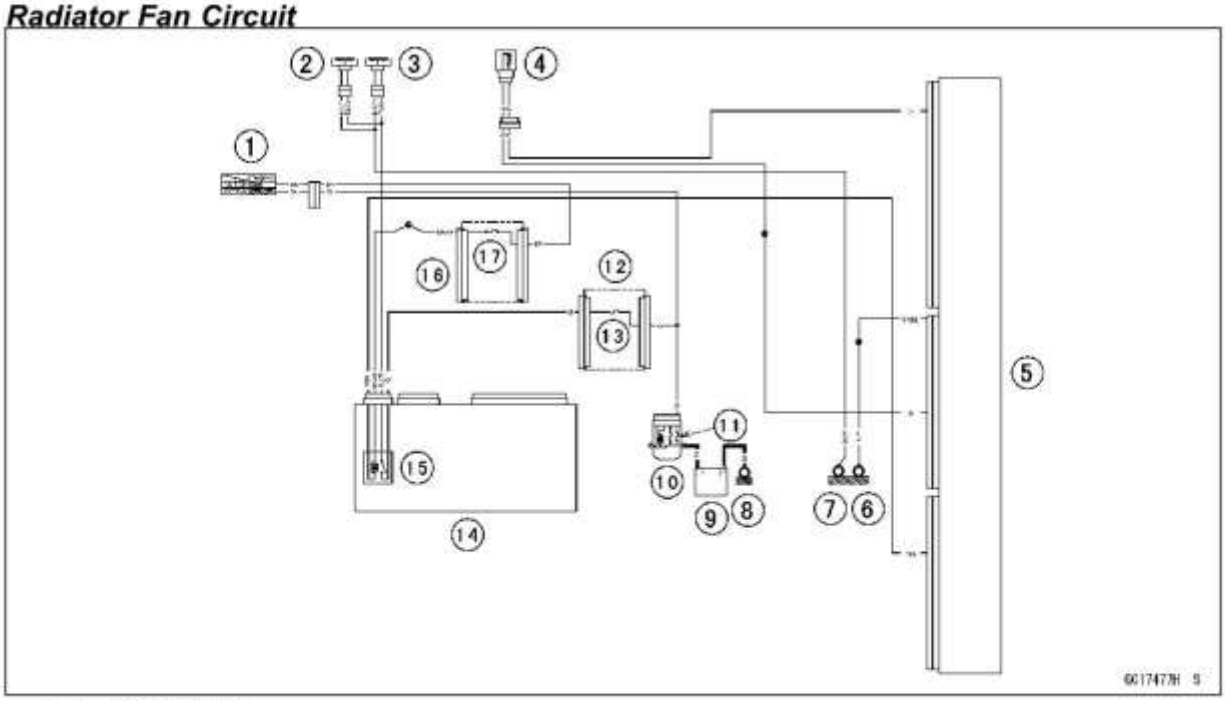
Radiator Fan System

Fan Motor Inspection

- Remove the right lower fairing (see Lower Fairing Removal(15-14)).
- Slide the dust cover [A].
- Disconnect the connectors [B].
- Using an auxiliary leads, supply battery power to the fan motor.

★If the fan does not rotate, the fan motor is defective and must be replaced.

Radiator Fan Circuit



1. Ignition Switch
2. Fan Motor (2)
3. Fan Motor (1)
4. Water Temperature Sensor
5. ECU
6. Frame Ground (4)
7. Frame Ground (3)
8. Engine Ground
9. Battery
10. Starter Relay
11. Main Fuse 30 A
12. Fuse Box (2)
13. Fan Fuse 15 A
14. Relay Box
15. Radiator Fan Relay
16. Fuse Box (1)
17. Ignition Fuse 15 A

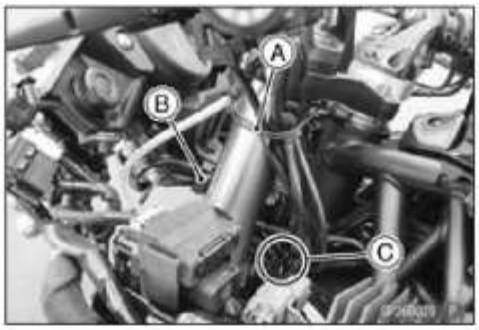
Grip Heater (Equipped Models)

Grip Heater Removal

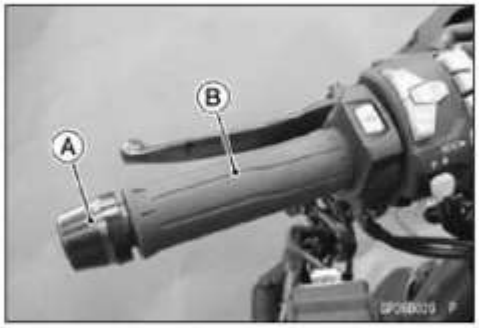
Left Side

- Remove the upper fairing (see Upper Fairing Removal(15-18)).
- Open the clamp [A].
- Disconnect the connectors [B], and remove them from the bracket.

- Remove the band [A].
- Open the clamp [B].
- Clear the leads [C].



- Remove:
  Handlebar Weight Assembly [A] (see Handlebar Removal(14-11))
  Left Grip Heater [B]



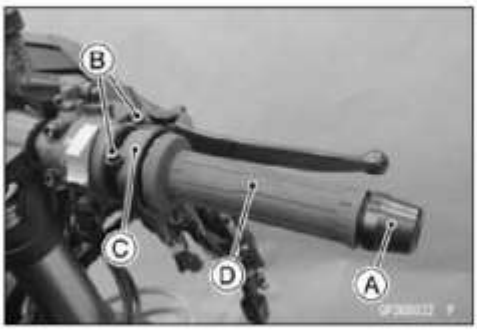
Right Side

- Remove the upper fairing (see Upper Fairing Removal(15-18)).
- Disconnect the connector [A], and remove it from the bracket.

- Open the clamps [A].

Grip Heater (Equipped Models)

- Remove:
  Handlebar Weight Assembly [A] (see Handlebar Removal(14-11))
  Bolts [B]
  Throttle Case [C]
  Right Grip Heater [D]

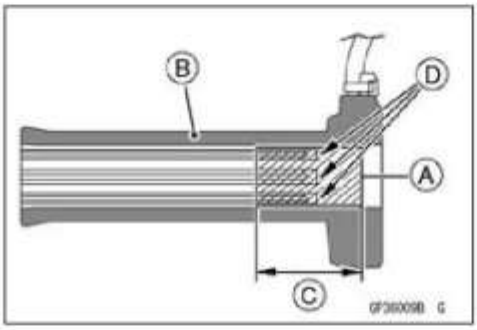


Grip Heater Installation

Left Side

- Using a cleaning fluid, clean off any oil or dirt on the handlebar and dry them with a clean cloth.
- Apply heat resistant adhesive [A] inside the left grip heater [B] as shown.
  30 mm (1.2 in.) [C] from this side of the rib ends [D]

  Sealant - Adhesive, TB1530C: 56042-0001



NOTE

○*Quickly complete bonding process before the adhesive is dry. To prevent motorcycle from falling over, work with an assistant.*

○*Once installed left grip heater cannot be reused.*

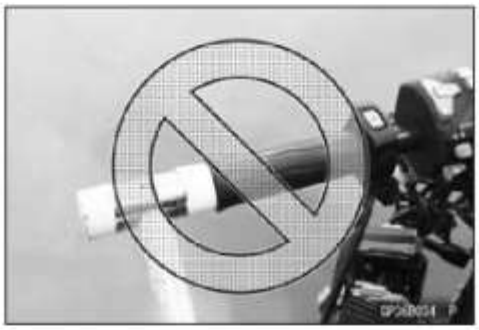
⚠ WARNING

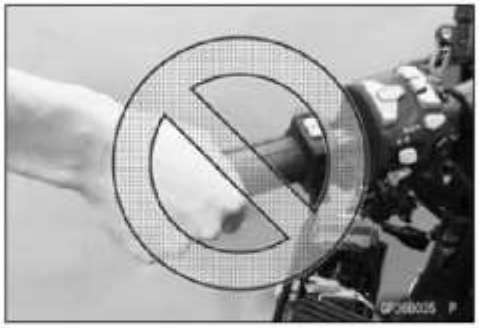
Be sure to use the specified adhesive to securely bond the left grip heater with the handlebar. Dry them until bonded. Make sure that they are completely bonded together. Using an unspecified adhesive or insufficient drying time can cause the grip heater to fall off during riding, which leads to turnover accidents resulting in severe injury or death.

Grip Heater (Equipped Models)

NOTE

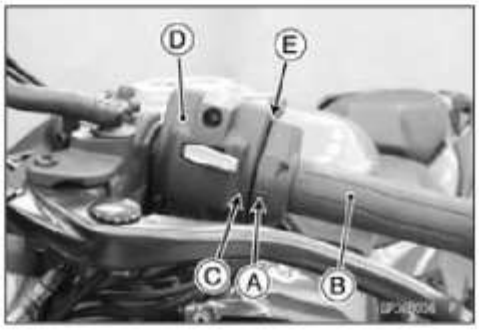
○*When inserting the grip heater into the handlebar, do not grasp the grip heater switch portion strongly, do not hammer the grip end, or do not twist the grip strongly. The circuit in the grip heater may be broken. If the grip heater stops in the middle of the handlebar, inject degreaser into the gap between the handlebar and the grip heater to remove the grip heater. Never try to prize out the grip heater with a wiring driver. The circuit in the grip heater may be broken.*



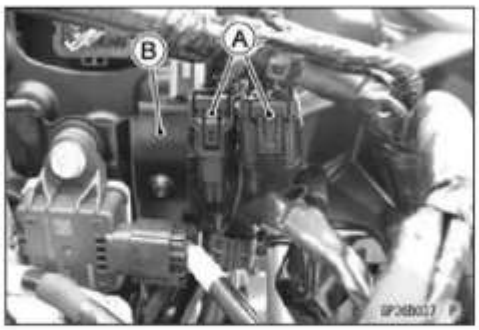


- Align the mark [A] on the left grip heater [B] with the mark [C] on the left switch housing [D].
  No Clearance [E]

○Wipe out excess adhesive.



- Run the left grip heater leads correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Connect the connectors [A], and fix them to the bracket [B].
- Install the removed parts.



Grip Heater (Equipped Models)

Right Side

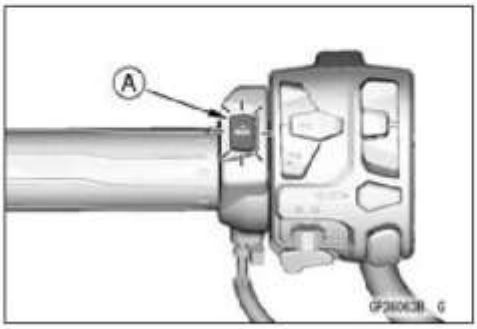
- Install the right grip heater in the same way as the throttle grip (see Handlebar Installation(14-13)).
- Run the right grip heater lead correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Connect the connector [A], and fix it to the bracket [B].
- Install the removed parts.
- Check that the throttle grip moves smoothly from full open to close.

⚠ WARNING

After having installed the right grip heater to the motorcycle, open and close the throttle to make sure that it moves smoothly. Driving without conducting proper checks on the throttle can lead to an accident. If the throttle becomes stuck, it possibly causes motorcycle fall over accident, resulting in severe injury or death.

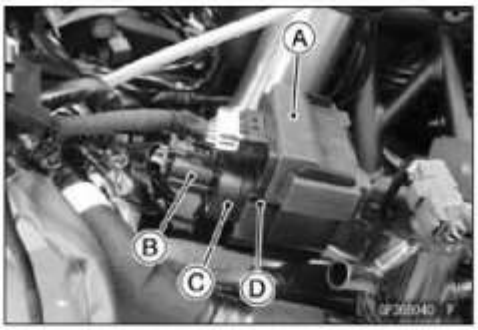
- Turn the handlebar to both sides.

★If the interfere with handlebar movement, inspect the installation condition of parts.



- Turn the ignition switch on.
- Push the grip heater switch, check the indicator light (LED) [A] goes on.
- If the indicator light does not go on, inspect the installation condition of parts.

Grip Heater Controller Removal



- Remove:
  Left Upper Inner Fairing (see Upper Inner Fairing Removal(15-18))
  Immobilizer Amplifier [A] (see Immobilizer System Parts Replacement(16-113))
- Disconnect the connector [B].
- Remove the grip heater controller [C] from the bracket [D].

NOTE

○*In this photo, the left lower fairing has been removed for clarity.*

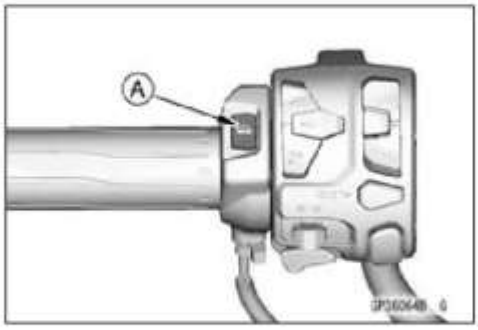
Grip Heater Controller Installation

- Installation is the reverse of removal.

Grip Heater (Equipped Models)

Grip Heater System Self-Diagnosis Outline

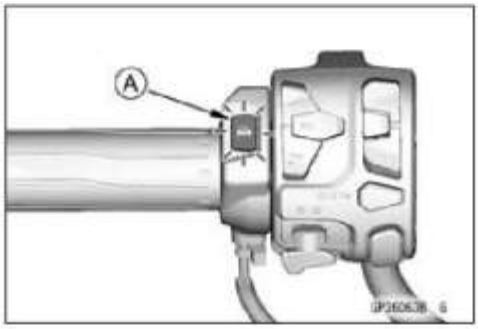
When a problem occurs with grip heater system, the indicator light (LED) [A] of the grip heater switch blinks or goes on to alert the rider.



Self-Diagnosis Procedures

NOTE

○*Use a fully charged battery when confirming the blinking pattern of the indicator light (LED) [A]. Otherwise, the indicator light (LED) blinks very slowly or does not blink.*

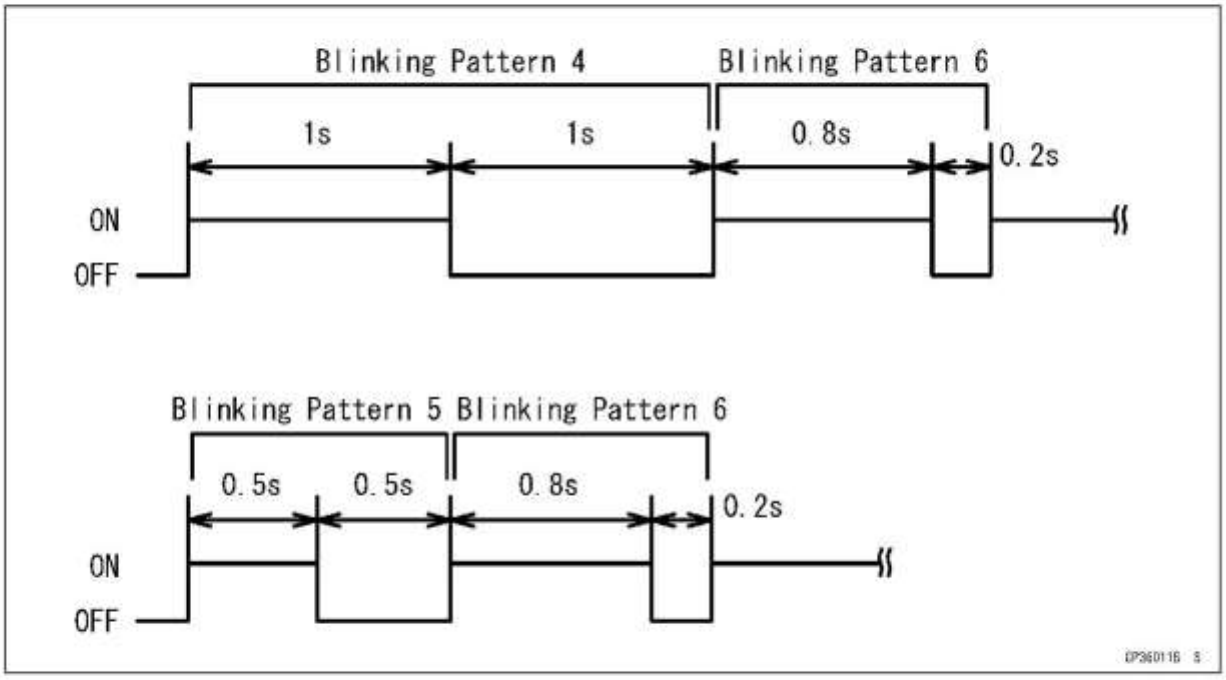


- Turn the ignition switch on.
- Push the grip heater switch.
- Confirm the blinking pattern of the indicator light (LED).

How to Read Blinking Patterns

○Blinking patterns are shown by a series of long and short blinks of the indicator light (LED).

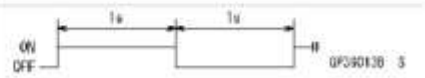
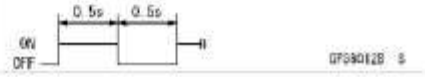
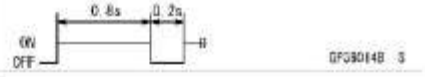
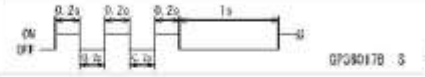
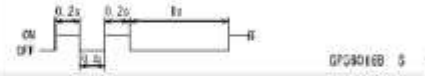
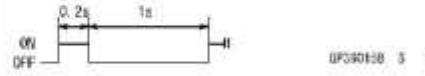
○When there are a number of faults, the indicator light (LED) blinks as shown below.



Grip Heater (Equipped Models)

Blinking Pattern Table

The blinking pattern No.1 ~ 7 is abnormal.

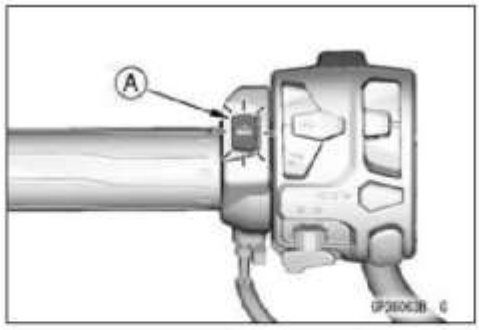
Blinking Pattern	Indicator Light (LED)*1	Color	Problems
1	Blinks	Green	Red indicator light (LED) trouble
2	Blinking pattern 8 ~ 10	Green	Red indicator light (LED) trouble
3	Goes on	Red	Green indicator light (LED) trouble
4		Red	Left and/or right grip heater trouble (shorted or open)
5		Red	Power supply voltage abnormal (battery low-voltage or over-voltage)
6		Red	Grip heater switch trouble (shorted or open)
7	Goes on*2	Yellow	Grip heater controller trouble (controller operation abnormal)
8	 *3	Yellow	Normal (during heater level 3 setting)*4
9	 *3	Yellow	Normal (during heater level 2 setting)*4
10	 *3	Yellow	Normal (during heater level 1 setting)*4
11	Goes on*5	Green	Normal (heater level setting was fixed.)
12	Goes off	–	Normal (heater off)

*1: The indicator light (LED) has two LEDs (red and green).
*2: After turning the ignition switch on.
*3: 5 cycles
*4: Level 3 is warmest. Push the grip heater switch to change the heater level. (heater level: 3 → 2 → 1 → off)
*5: After during heater level setting

Indicator Light (LED) Operation Inspection

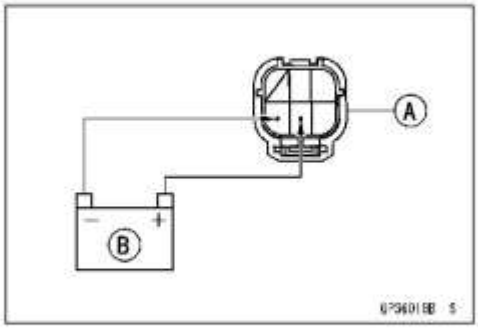
- Turn the ignition switch on.
- Push the grip heater switch.
- Confirm the indicator light (LED) [A] blinks or goes on.

★If the indicator light (LED) does not blink or go on, replace the left grip heater.



Grip Heater (Equipped Models)

Red Indicator Light (LED) Inspection (Blinking Pattern 1, 2)

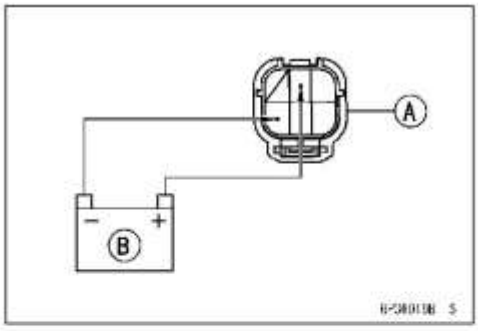


- Disconnect the left grip heater lead connector (5 pins) [A] (see Grip Heater Removal(16-67)).
- Connect the 12 V [B] battery to the left grip heater lead connector as shown.

Connections:
Battery (+) → R Lead Terminal
Battery (–) → BL Lead Terminal

★If the red indicator light (LED) does not go on, replace the left grip heater.
★If the red indicator light (LED) goes on, check the wiring for continuity between the left grip heater and grip heater controller (see Grip Heater System Circuit(16-75)).
★If the wiring is good, replace the grip heater controller.

Green Indicator Light (LED) Inspection (Blinking Pattern 3)

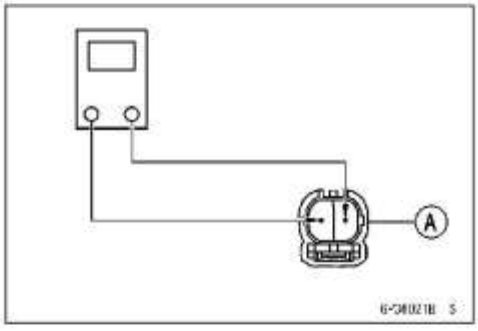


- Disconnect the left grip heater lead connector (5 pins) [A] (see Grip Heater Removal(16-67)).
- Connect the 12 V [B] battery to the left grip heater lead connector as shown.

Connections:
Battery (+) → G Lead Terminal
Battery (–) → BL Lead Terminal

★If the green indicator light (LED) does not go on, replace the left grip heater.
★If the green indicator light (LED) goes on, check the wiring for continuity between the left grip heater and grip heater controller (see Grip Heater System Circuit(16-75)).
★If the wiring is good, replace the grip heater controller.

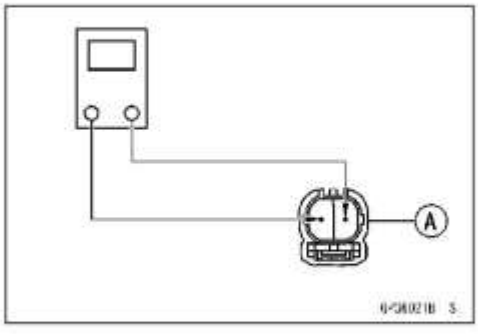
Left and/or Right Grip Heater Inspection (Blinking Pattern 4)



- Disconnect the left grip heater lead connector (2 pins) [A] (see Grip Heater Removal(16-67)).
- Measure the left grip heater resistance.

Left Grip Heater Resistance
Standard: 7.4 ~ 9.0 Ω @20°C (68°F)

★If the reading is out of the standard, replace the left grip heater.



- Disconnect the right grip heater lead connector [A] (see Grip Heater Removal(16-67)).
- Measure the right grip heater resistance.

Right Grip Heater Resistance
Standard: 6.3 ~ 7.7 Ω @20°C (68°F)

★If the reading is out of the standard, replace the right grip heater.
★If the left and right grip heaters are good, check the wiring for continuity between each grip heater and grip heater controller (see Grip Heater System Circuit(16-75)).
★If the wiring is good, replace the grip heater controller.

Grip Heater (Equipped Models)

Power Supply Voltage Abnormal (Blinking Pattern 5)

- Check the battery condition (see Charging Condition Inspection(16-29)).

★If the battery is good condition, go to next step.

- Check the charging voltage (see Charging Voltage Inspection(16-34)).

★If the charging voltage is good, go to next step.

- Turn the ignition switch off, and then on.
- Push the grip heater switch, and recheck the indicator light (LED).

★If the indicator light (LED) blinks, replace the grip heater controller.

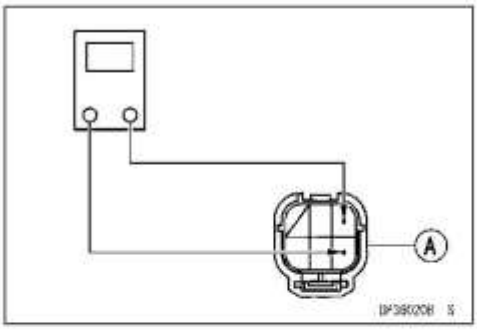
★If the indicator light (LED) does not blink, grip heater system is normal (temporary failure).

Grip Heater Switch Inspection (Blinking Pattern 6)

- Disconnect the left grip heater lead connector (5 pins) [A] (see Grip Heater Removal(16-67)).
- Check the wiring of the switch for continuity (at free the switch).

★If there is continuity, replace the left grip heater.

★If there is no continuity, check the wiring for continuity between the grip heater switch and grip heater controller (see Grip Heater System Circuit(16-75)).



- Push the grip heater switch, check the wiring for continuity.

★If there is no continuity, replace the left grip heater.

★If there is continuity, check the wiring for continuity between the grip heater switch and grip heater controller (see Grip Heater System Circuit(16-75)).

★If the wiring is good, replace the grip heater controller.

Grip Heater Controller Inspection (Blinking Pattern 7)

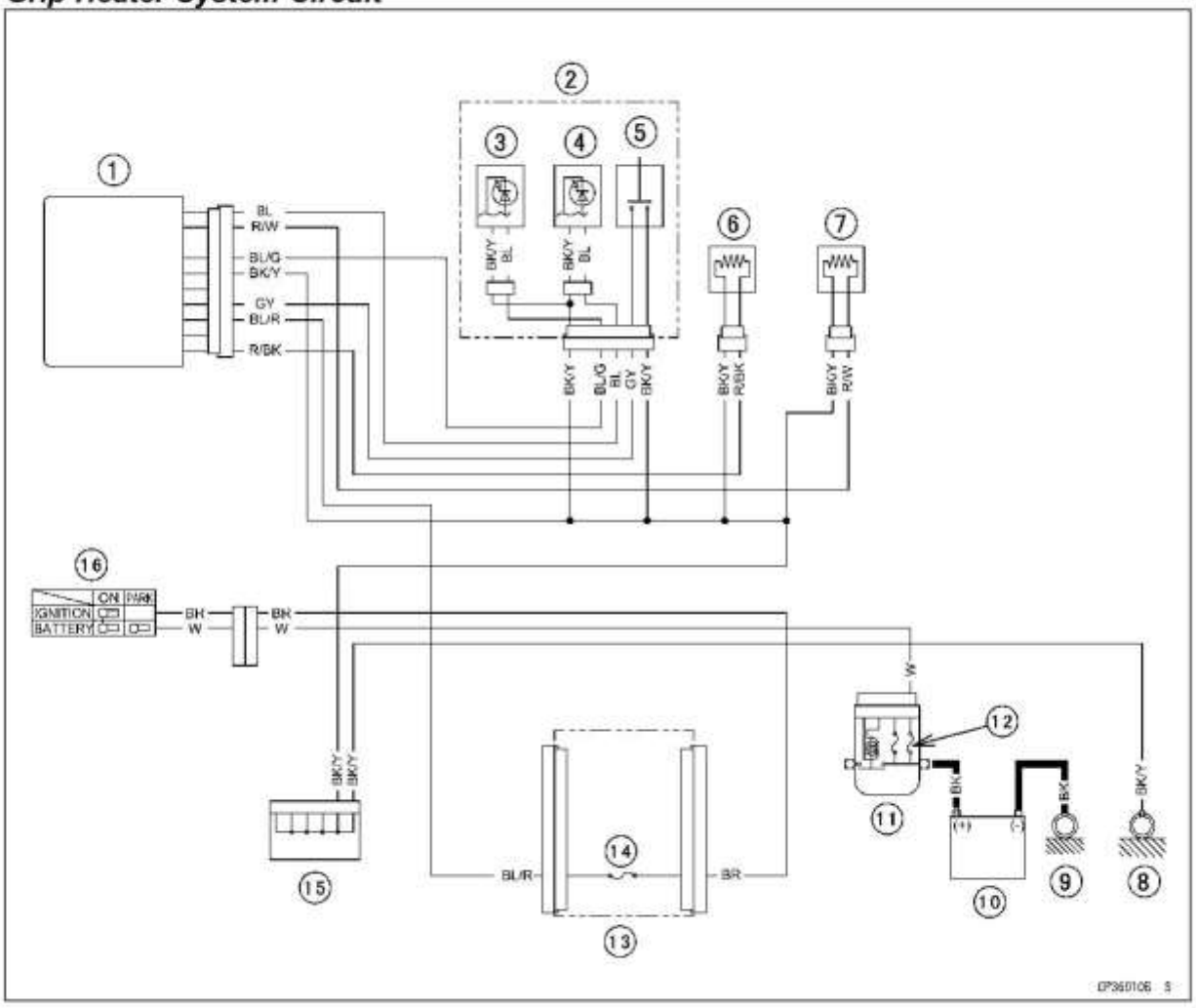
- Turn the ignition switch off, and then on.
- Recheck the indicator light (LED).

★If the indicator light (LED) goes on, replace the grip heater controller.

★If the indicator light (LED) does not go on, grip heater system is normal (temporary failure).

Grip Heater (Equipped Models)

Grip Heater System Circuit



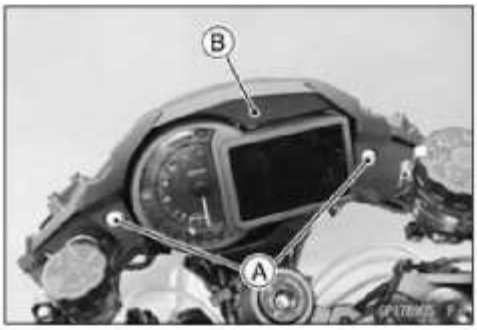
1. Grip Heater Controller
2. Grip Heater Switch
3. Heater LED (2) (Red)
4. Heater LED (1) (Green)
5. Heater Switch
6. Left Grip Heater
7. Right Grip Heater
8. Frame Ground (2)
9. Engine Ground
10. Battery
11. Starter Relay
12. Main Fuse 30 A
13. Fuse Box (1)
14. Grip Heater Fuse 15 A
15. Joint Connector (7)
16. Ignition Switch

Meter, Gauge, Indicator Unit

Meter Unit Removal

- Remove:
  Upper Fairing (see Upper Fairing Removal(15-18))
  Screw [A]

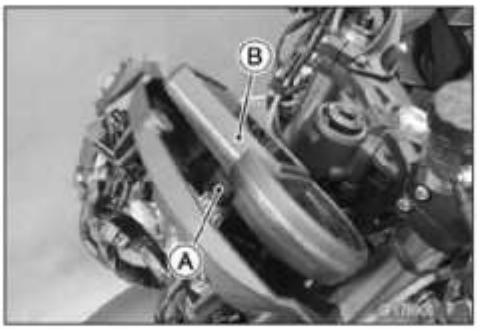
- Remove:
  Bolts [A]
  Meter Cover [B]



- Remove the connector [A] from the bracket.
- Remove the bolts [B].

- Remove the screws [A].

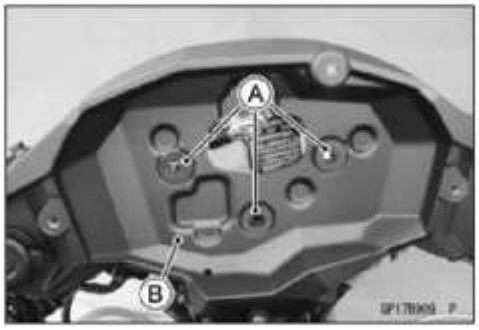
- Disconnect the connector [A].
- Remove the meter unit [B].



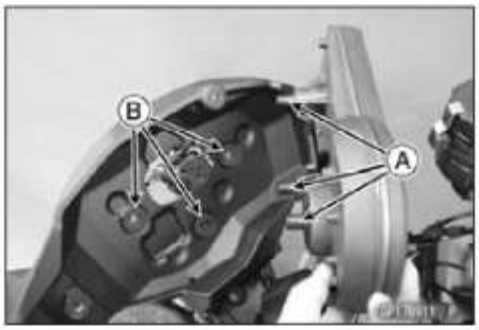
Meter, Gauge, Indicator Unit

Meter Unit Installation

- Installation is the reverse of removal.
- Check that the grommets [A] are in place on the meter bracket [B].



- Insert the projections [A] in the grommets [B].
- Install the removed parts.

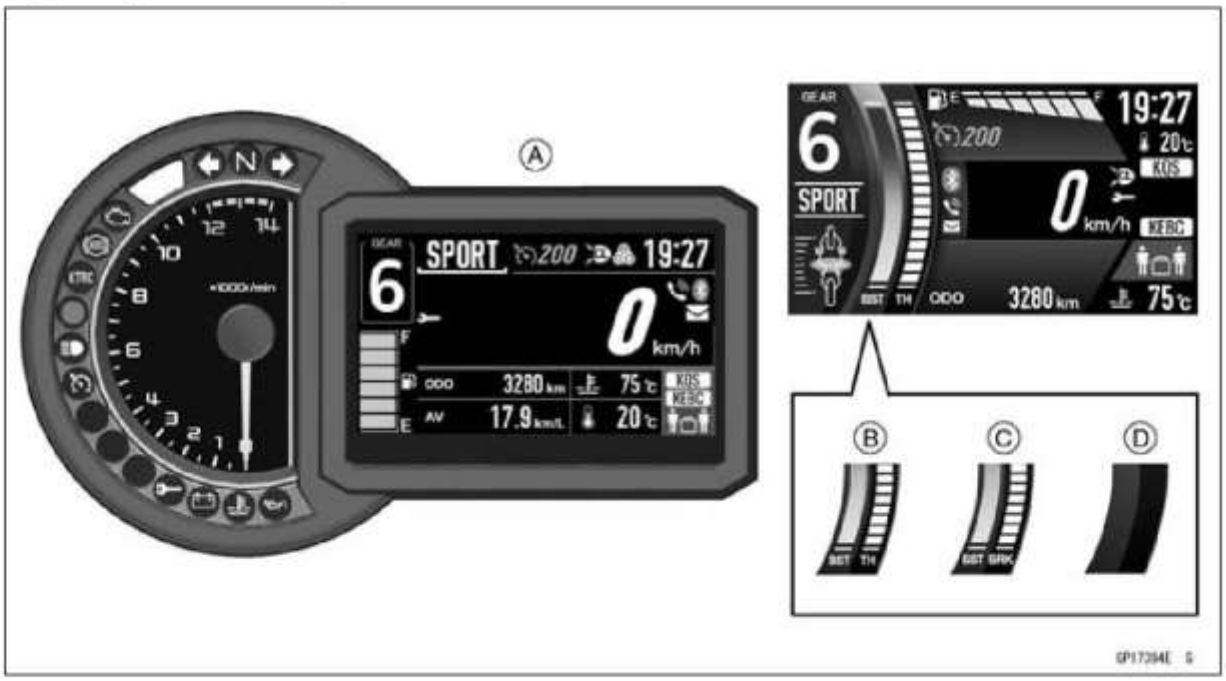


Meter Operation Inspection

- The display screen has 4 different display types (Type 1, 2, 3 and 4) and they can be selected in the menu mode.
  Type 1 [A]
  Type 2 [B]
  Type 3 [C]
  Type 4 [D]

○Refer to the Inspection of Long Press (Mode Selection Inspection) paragraph for detail.

○To simplify the instructions, some drawings are used with typical type if it is basically similar.



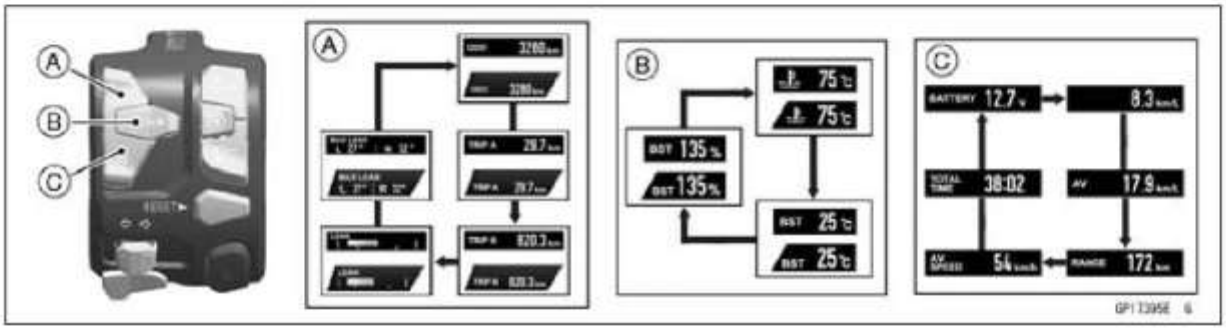
Meter, Gauge, Indicator Unit

Check 1: Switching Inspection

- Turn the ignition switch on and check the followings.

Inspection of Short Press

- By pushing each button, check that the multifunction display changes as shown.
  Upper Mode Button [A]
  Preload Button [B]
  Lower Mode Button [C]



- Check that the background color of the display screen [A] can be changed by pushing the reset button [B].

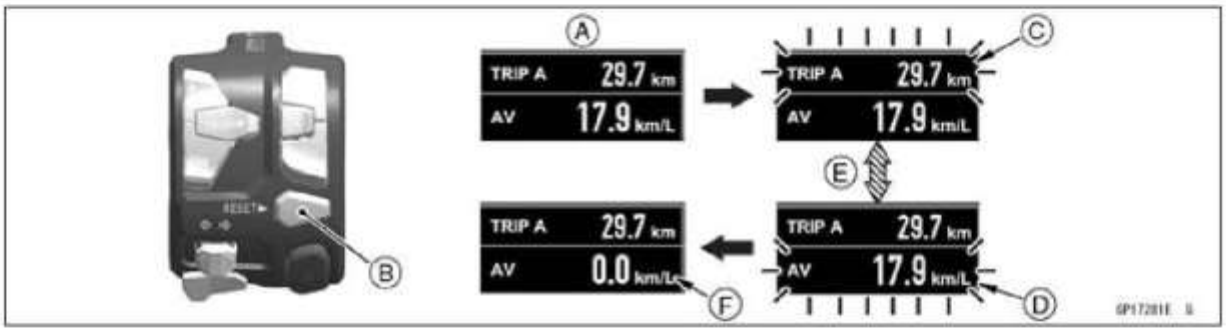
★If the meter does not work properly, check the left switch housing and the wiring for continuity (see Meter Circuit(16-89)).

★If the left switch housing and the wiring are good, replace the meter unit.

Meter, Gauge, Indicator Unit

Inspection of Long Press

- Select the resettable items such as the trip meter or average mileage on the multifunction display [A].
- Press and hold the reset button [B], the resettable item should start blink [C] to indicate that it has been selected.
- The blinking item can be changed another resettable item [D] each time short pressing [E] the reset button.
- The selected item should be reset [F] when press and hold the reset button.

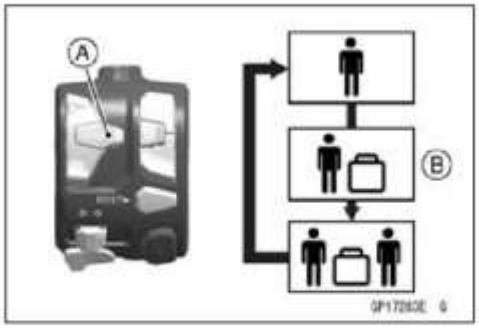


- By continue to push the preload button [A], check that the preload mode display [B] changes as shown.

○The preload mode cannot be changed when the throttle grip has been opened or when using the cruise control system situations.

★If the meter does not work, check the left switch housing and the wiring for continuity (see Meter Circuit(16-89)).

★If the left switch housing and the wiring are good, replace the meter unit.



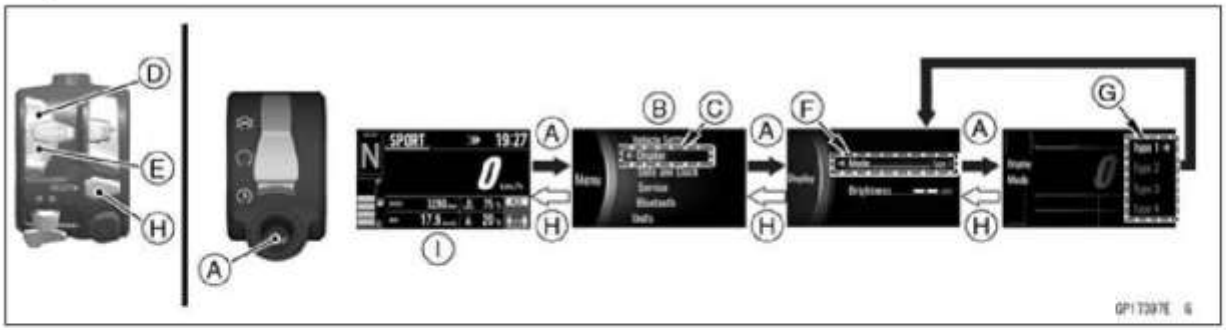
Meter, Gauge, Indicator Unit

Inspection of Long Press (Mode Selection Inspection)

- By continue to push the right mode button [A], check that the display screen changes to the menu mode [B].
- Select the "Display" [C] using the upper [D] or lower [E] mode button.
- Push the right mode button to shift to the next screen and select the "Mode" [F] using the upper or lower mode button.
- Push the right mode button to shift to the next screen and select the type [G] using the upper or lower mode button.
- Push the reset button [H] few times until exit the menu mode and return to the normal display mode [I].

★If the meter does not work, check the right or left switch housing and the wiring for continuity (see Meter Circuit(16-89)).

★If the right and left switch housing and the wiring are good, replace the meter unit.

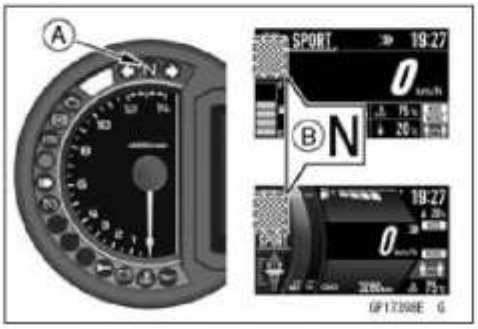


Meter System Inspection

Check 2-1: Gear Position Indicator Inspection

- Turn the ignition switch on and shift the transmission gear into neutral position.

○The green neutral indicator light (LED) [A] goes on, and the gear position indicator is displayed the "N" mark [B].



- Set the low gear position, and check that the display changes from "N" to "1" mark [A] and the green neutral indicator light (LED) goes off.
- Using the center stand, raise the rear wheel off the ground.
- Rotate the rear wheel by hand or start the engine, and change the gear position.
- Check that the display corresponding to each gear position (1, N, 2, 3, 4, 5 or 6) appears.

★If the display function does not work, check the following parts.

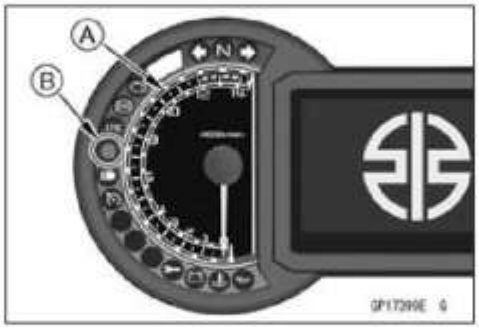
Gear Position Sensor (see Gear Position Sensor Inspection(16-123))

Wiring (see Meter Circuit(16-89))

★If the above parts are good, replace the meter unit and/or ECU.

Meter, Gauge, Indicator Unit

Check 2-2: Ambient Brightness Sensor Inspection



NOTE

○This meter unit has the automatically tachometer brightness function by the sensor in addition to the manual brightness setting.

- Turn the ignition switch on.
- Check if the tachometer brightness [A] is changed by shining a light on the sensor [B] with a penlight.

★If the meter does not work, replace the meter unit.

Check 2-3: Red Battery Warning Indicator Light (LED) Inspection

- When the battery condition is low voltage (10.8 ~ 11.2 V or less) or high voltage (15.5 ~ 16.5 V or more), the red battery warning indicator light (LED) [A] goes on.

★If the red battery warning indicator light (LED) goes on, inspect the charging voltage (see Charging Voltage Inspection(16-34)).

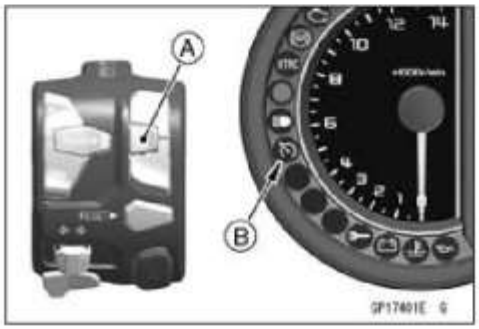
★If the charging voltage is good, replace the meter unit.

Check 2-4: Clock Inspection

- Turn the ignition switch on.
- Record the time.
- Turn the ignition switch off, and then turn the ignition switch on after a few minutes.
- Check that the clock was counting time while turning the ignition switch off.

★If the meter does not work, replace the meter unit.

Check 2-5: White Electronic Cruise Control Indicator Light (LED) Inspection



- Turn the ignition switch on.
- Push the electronic cruise control button [A].
- Check that the white electronic cruise control indicator light (LED) [B] goes on.
- Push the electronic cruise control button.
- Check that the white electronic cruise control indicator light (LED) goes off.

★If the indicator light (LED) does not operate properly, check the following parts.

Electronic Cruise Control Button (see Switch Inspection(16-117))

Wiring (see Electronic Cruise Control System Circuit(16-94))

★If the above parts are good, replace the meter unit and/or ECU.

Meter, Gauge, Indicator Unit

Check 2-6: Electronic Cruise Control Set Indicator Inspection

○The electronic cruise control set indicator [A] is displayed when activating the electronic cruise control system.
Electronic Cruise Control Main Conditions:
The electronic cruise control indicator light (LED) has been turned on.
The vehicle speed is 35 km/h (22 mph) or more.
The gear position is 3rd, 4th, 5th or 6th.
Any service code does not appear.
The electronic cruise control SET/– button [B] is pushed on.

★If the indicator does not display at the electronic cruise control condition, check the following parts.
Electronic Cruise Control Button (see Switch Inspection(16-117))
Rear Wheel Rotation Sensor (see Rear Wheel Rotation Sensor Signal Inspection(17-57))
Gear Position Sensor (see Gear Position Sensor Inspection(16-123))
Electronic Cruise Control SET/– Button (see Switch Inspection(16-117))
Electronic Cruise Control System Switches and Buttons (see Electronic Cruise Control System Switches and Buttons Inspection(16-90))
Wiring (see Electronic Cruise Control System Circuit(16-94))

★If the above parts are good, replace the meter unit and/or ECU.

Check 2-7: Throttle Opening Gauge Inspection

- Change the display screen to the type 2 display mode.
- Check that the throttle opening gauge [A] is changed by opening the throttle.

★If the display function does not work, check the following parts.
Wiring (see Wiring Inspection(16-27))
Throttle Cables (see Throttle Grip and Cables section (3-52))
Throttle Position Sensor (see Throttle Position Sensor (Service Code 11) (DTC P0120, P0121, P0122, P0220, P0223) section (17-27))

★If the above parts are good, replace the meter unit and/or ECU.

Check 2-8: Front Brake Fluid Pressure Gauge Inspection

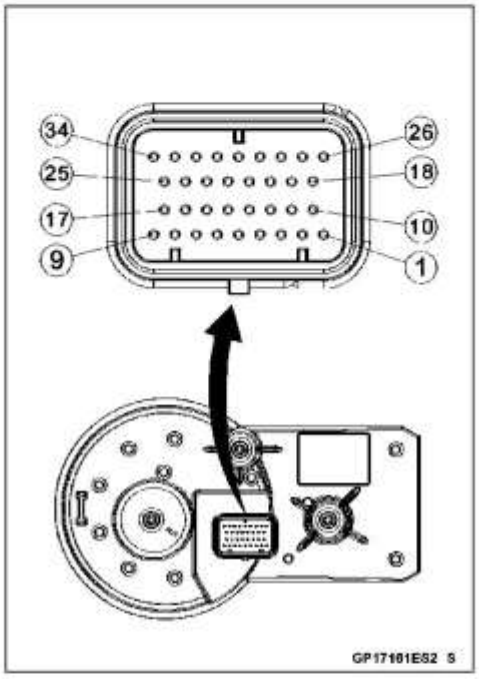
- Change the display screen to the type 3 display mode.
- Check that the front brake fluid pressure gauge [A] is changed by applying the brake lever.

★If the display function does not work, check the following parts.
Wiring (see Wiring Inspection(16-27))
ABS Hydraulic Unit (see Anti-Lock Brake System section (12-31))

★If the above parts are good, replace the meter unit and/or ECU.

Meter, Gauge, Indicator Unit

Meter Unit Inspection



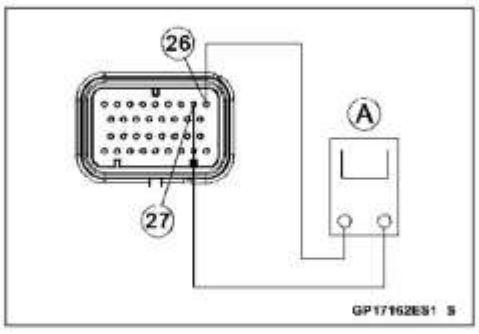
- Remove the meter unit (see Meter Unit Removal(16-76)).

[1] Fuel Level Sensor Ground
[2] Fuel Level Sensor
[3] Red Oil Pressure Warning Indicator Light (LED) (–)
[4] Green Neutral Indicator Light (LED) (–)
[5] Green Left Turn Signal Indicator Light (LED) (+)
[6] Unused
[7] Reset Button
[8] Lower Mode Button
[9] Upper Mode Button
[10] Fuel Reserve Switch
[11] Unused
[12] Unused
[13] Unused
[14] Green Right Turn Signal Indicator Light (LED) (+)
[15] Passing (–)
[16] Blue High Beam Indicator Light (LED) (–)
[17] Right Mode Button
[18] High Beam Output
[19] Unused
[20] Outside Temperature Sensor
[21] Unused
[22] Unused
[23] Preload Button
[24] Front Left Turn Signal Light Output
[25] Rear Left Turn Signal Light Output
[26] CAN Communication Line (Low)
[27] CAN Communication Line (High)
[28] Parking (+)
[29] Unused
[30] Ignition (+)
[31] Ground (–)
[32] Battery (+)
[33] Rear Right Turn Signal Light Output
[34] Front Right Turn Signal Light Output

NOTICE

Do not drop the meter unit. Place the meter unit so that it faces upward. If the meter assembly is left upside down or sideways for a long time or dropped, it will malfunction. Do not short each terminal.

Check 3-1: CAN Communication Line Resistance Inspection



- Connect a tester [A] between the terminal [26] and [27] in the meter unit.

CAN Communication Line Resistance (at Meter Unit Connector)
Standard: 131 ~ 133 Ω

★If the tester reading is not specified, replace the meter unit.

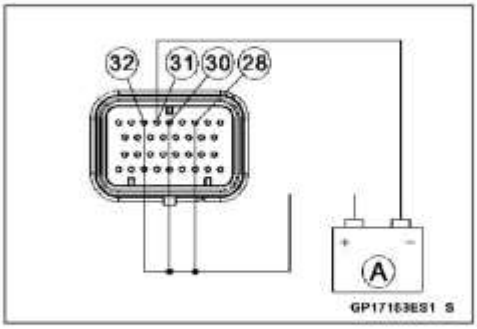
Meter, Gauge, Indicator Unit

Check 3-2: Meter Unit Power Supply Check

- Using the auxiliary leads, connect the 12 V battery [A] to the meter unit connector as follows.

○Connect the battery positive (+) terminal to the terminal [28], [30] and [32].

○Connect the battery negative (–) terminal to the terminal [31].



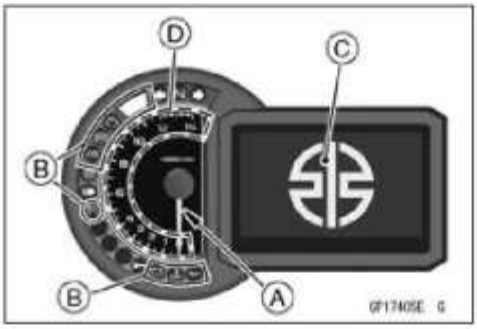
- Check the following items.

○The tachometer needle [A] momentarily points their last readings and back to the minimum position.

○The indicator lights (LED) [B] except neutral and both turn signal indicators, and the LCD [C] go on for a few seconds.

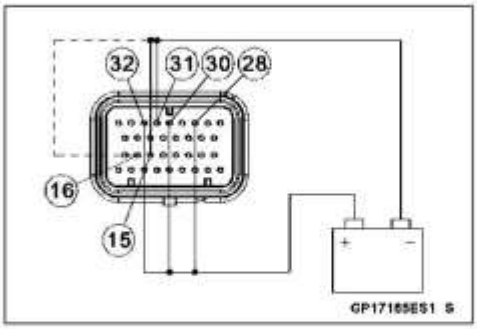
○The tachometer [D] goes on.

★If the meter does not work, replace the meter unit.



Check 3-3: Blue High Beam Indicator Light (LED) Inspection

- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [15] or [16] to the battery (–) terminal.



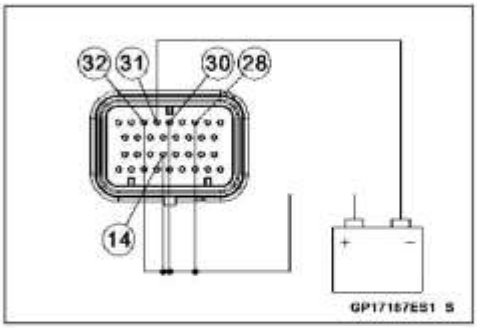
- Check that the blue high beam indicator light (LED) [A] goes on.

★If the indicator light (LED) does not go on, replace the meter unit.

○Once the terminal [16] is connected to the battery (–) terminal, the blue high beam indicator light (LED) is remains on even if disconnecting the terminal [16]. In this case, the indicator light goes off by connecting and disconnecting the terminal [15] from the battery (–) terminal.

Check 3-4: Green Turn Signal Indicator Lights (LED) Inspection

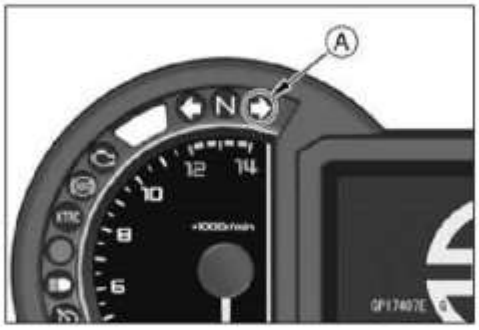
- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [14] to the battery (+) terminal.



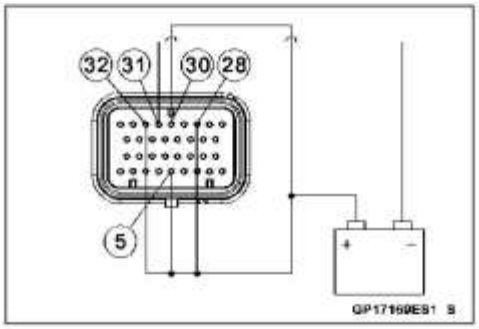
Meter, Gauge, Indicator Unit

- Check that the green right turn signal indicator light (LED) [A] goes on.

★If the indicator light (LED) does not go on, replace the meter unit.

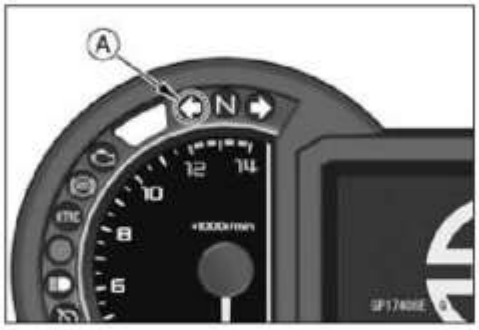


- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [5] to the battery (+) terminal.



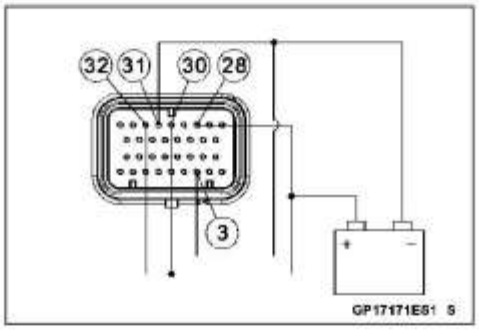
- Check that the green left turn signal indicator light (LED) [A] goes on.

★If the indicator light (LED) does not go on, replace the meter unit.



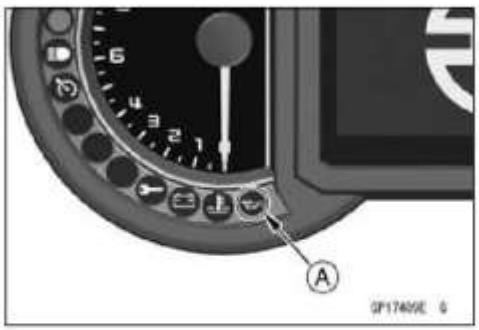
Check 3-5: Red Oil Pressure Warning Indicator Light (LED) Inspection

- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [3] to the battery (–) terminal.



- Check that the red oil pressure warning indicator light (LED) [A] goes on.

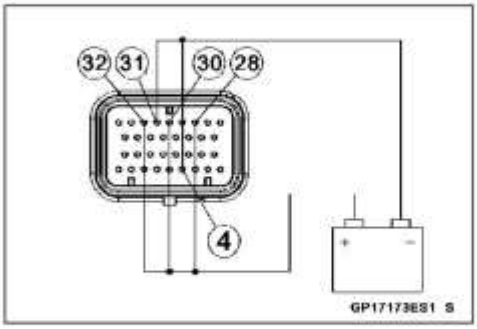
★If the indicator light (LED) does not go on, replace the meter unit.



Meter, Gauge, Indicator Unit

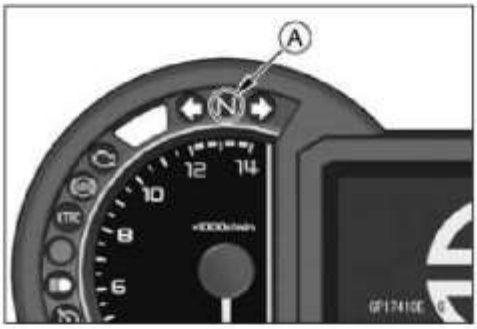
Check 3-6: Green Neutral Indicator Light (LED) Inspection

- Connect the leads in the same circuit as Check 3-2.
- Connect the terminal [4] to the battery (–) terminal.



- Check that the green neutral indicator light (LED) [A] goes on.

★If the indicator light (LED) does not go on, replace the meter unit.

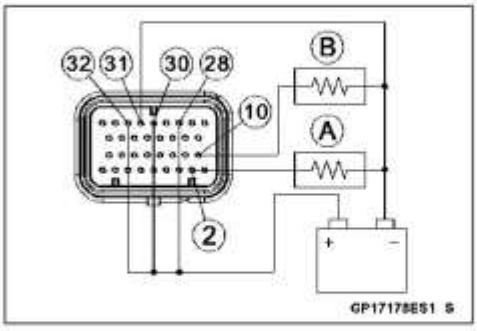


Check 3-7: Fuel Level Warning Inspection

- Connect the leads in the same circuit as Check 3-2.

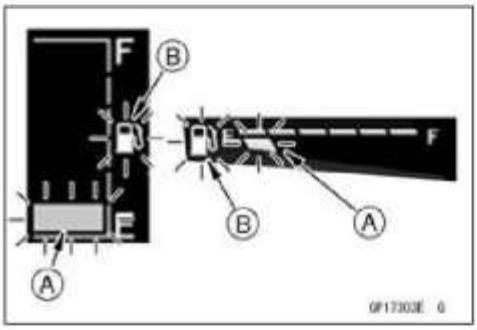
○The all segments of the fuel gauge in the display will blink.

- Connect the resistor (above 200 Ω) [A] between the terminal [2] and the battery (–) terminal.
- Connect the resistor (about 10 Ω) [B] between the terminal [10] and the battery (–) terminal.



- Check that the lowest segment [A] and fuel level warning indicator [B] blink.

★If the display function does not work properly, replace the meter unit.

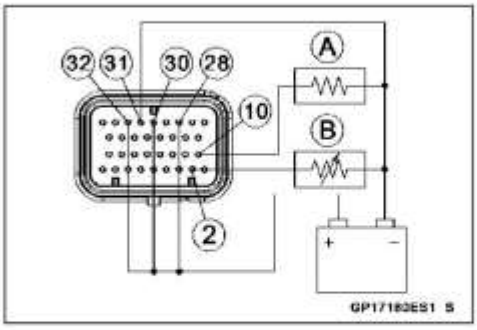


Check 3-8: Fuel Gauge Inspection

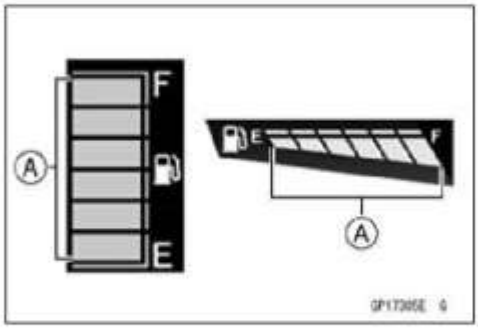
- Connect the leads in the same circuit as Check 3-2.

○The all segments of the fuel gauge in the display will blink.

- Connect the resistor (about 300 Ω) [A] between the terminal [10] and the battery (–) terminal.
- Connect the variable rheostat [B] between the terminal [2] and the battery (–) terminal.



Meter, Gauge, Indicator Unit



- Check that the number of segments [A] on the fuel gauge matches the resistance value of the variable rheostat.

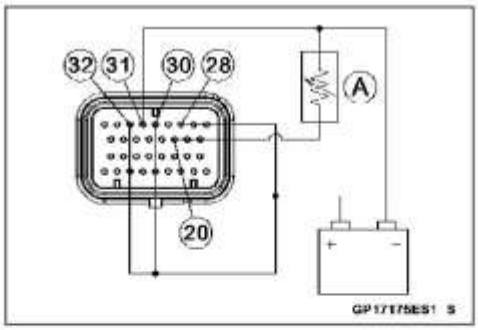
○After changing the resistance between the terminal [2] and ground, the segment(s) in the fuel gauge should change after 15 seconds.

Variable Rheostat Resistance (Ω)	Display Segments
20	6 segments go on
50	5 segments go on
70	4 segments go on
100	3 segments go on
150	2 segments go on
200	1 segment goes on

★If the display function does not work properly, replace the meter unit.

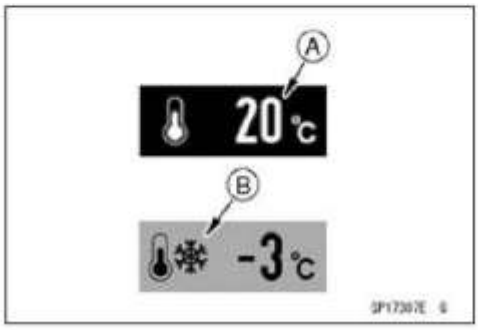
Check 3-9: Outside Temperature Inspection

- Connect the leads in the same circuit as Check 3-2.
- Connect the variable rheostat [A] between the terminal [20] and the battery (–) terminal.



- Check that the temperature [A] on the display is matches the resistance value of the variable rheostat.

○When the outside temperature is less than 3°C (37°F), the multifunction display displays the snow symbol mark [B].



	Resistance		
	11.07 kΩ	2.889 kΩ	0.6715 kΩ
Temperature	–13 ±2°C	17 ±2°C	57 ±2°C
	9 ±4°F	63 ±4°F	135 ±4°F

★If the display function does not work properly, replace the meter unit.

Check 3-10: Other Inspection

- Other items of the meter unit are related to the CAN communication line.
- When the other items are faulty indication, check the following items.

  Wiring (see Wiring Inspection(16-27))

  Each Sensor

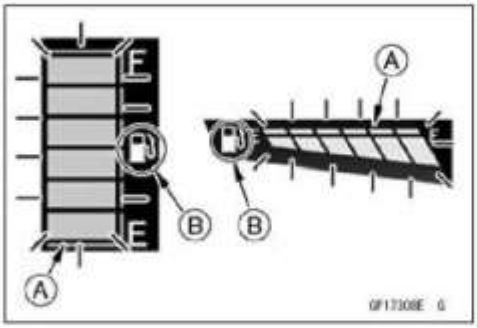
★If the above items are good, replace the meter unit and/or ECU.

Meter, Gauge, Indicator Unit

Fuel Level Line Self-Diagnosis Mode Inspection

NOTE

○*Usually when the open or short of the fuel level circuit is detected, it becomes the Fuel Level Line Self-Diagnosis Mode.*



○The all segments [A] of the fuel gauge and fuel level warning indicator [B] in the display will blink. (This function is Fuel Level Line Self-Diagnosis Mode.)

★If the meter enters the self-diagnosis mode when the meter is installed in the motorcycle, check the following items.

Fuel Level Sensor (see Fuel Level Sensor Inspection(16-120))

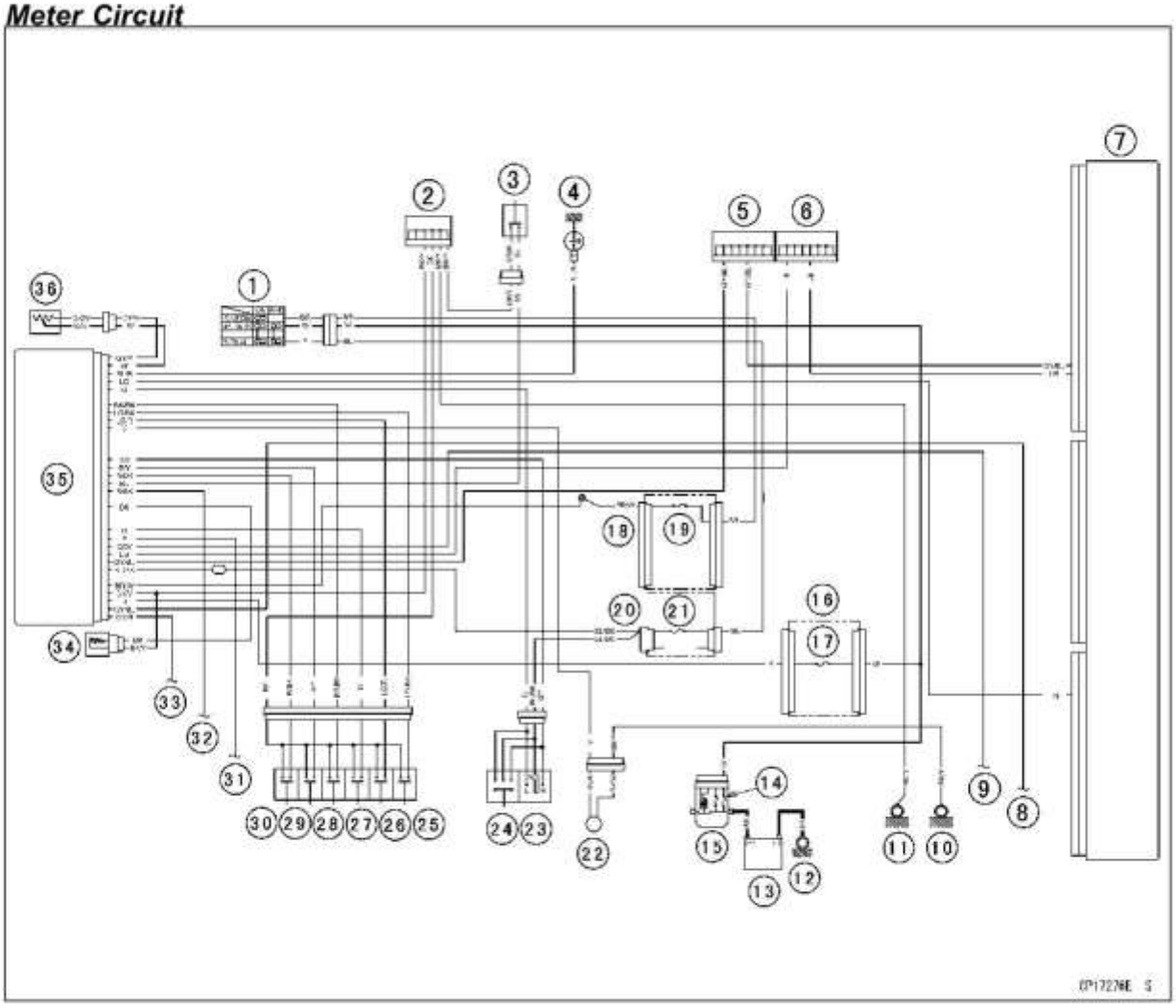
Fuel Reserve Switch (see Fuel Reserve Switch Inspection(16-121))

Wiring (see Wiring Inspection(16-27))

★If the above items are good, replace the meter unit.

Meter, Gauge, Indicator Unit

Meter Circuit



1. Ignition Switch
2. Joint Connector (1)
3. Right Mode Button
4. Oil Pressure Switch
5. Joint Connector (CAN High)
6. Joint Connector (CAN Low)
7. ECU
8. To Rear Right Turn Signal Light (LED)
9. To Rear Left Turn Signal Light (LED)
10. Frame Ground (3)
11. Frame Ground (1)
12. Engine Ground
13. Battery
14. Main Fuse 30 A
15. Starter Relay
16. Fuse Box (2)
17. Meter Fuse 10 A
18. Fuse Box (1)
19. Ignition Fuse 15 A
20. Fuse Box (3)
21. Turn Signal Relay Fuse 10 A
22. Fuel Reserve Switch
23. Turn Signal Switch
24. Hazard Button
25. Lower Mode Button
26. Upper Mode Button
27. Preload Button
28. Reset Button
29. Passing Button
30. Dimmer Switch
31. To Front Left Turn Signal Light (LED)
32. To Headlight (LED)
33. To Front Right Turn Signal Light (LED)
34. Outside Temperature Sensor
35. Meter Unit
36. Fuel Level Sensor

Electronic Cruise Control System

Electronic Cruise Control System Switches and Buttons Inspection

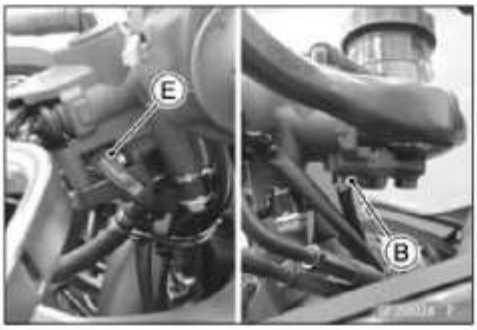
The inspection of electronic cruise control system switches and buttons can check by the following diagnostic mode and the operating of each switch or button. The numbers in the following chart are indicates that the kind of input signal from the switches or buttons. While entering the diagnostic mode, the ECU shows the code numbers in the multifunction display if receipt the signals normally.

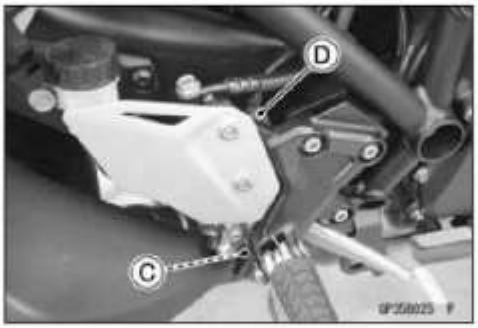
Electronic Cruise Control System Switches and Buttons

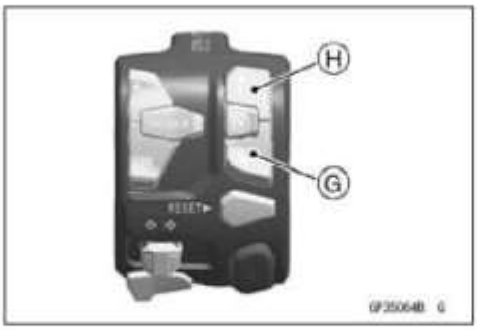
Number	Signal	Signal from
1	Electronic Cruise Control Cancel Signal (Throttle)	Electronic Cruise Control Cancel Switch (Throttle) [A]
2	Electronic Cruise Control Cancel Signal (Brakes)	Brake/Electronic Cruise Control Cancel Switch [B] or Electronic Cruise Control Cancel Switch (Rear Brake) [C]
3	Brake Light Signal	Brake/Electronic Cruise Control Cancel Switch [B] or Rear Brake Light Switch [D]
4	Electronic Cruise Control Cancel Signal (Clutch)	Starter Lockout/Electronic Cruise Control Cancel Switch (Clutch) [E]
5	Gear Position Signal (Neutral)	Gear Position Sensor [F]
6	Electronic Cruise Control SET/– Signal	Electronic Cruise Control SET/– Button [G]
7	Electronic Cruise Control RES/+ Signal	Electronic Cruise Control RES/+ Button [H]

NOTE

○ *The numbers which has been appears in the diagnostic mode are remains on until exiting the diagnostic mode.*







Electronic Cruise Control System

Inspection Procedure

- Turn ignition switch off.
- Shift the transmission to 1st gear, and down the side stand.
- Connect the K-VCI kit to the Kawasaki diagnostic system connector to enter the diagnostic mode for the cruise control system.

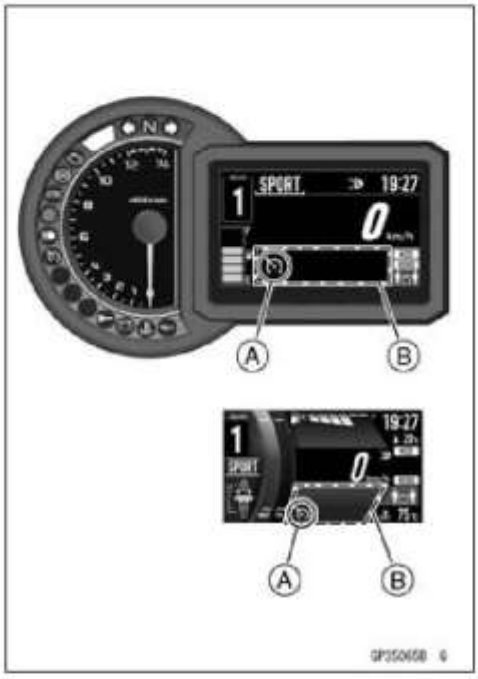
Special Tools - K-VCI Kit: 57001-1868 or
K-VCI Kit (BT): 57001-1869

○Read the instructions for the K-VCI kit.

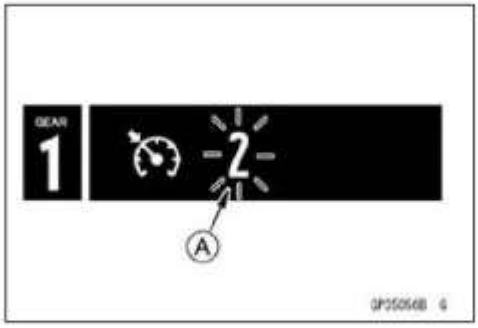
- Turn the ignition switch on.

○When entering the diagnostic mode, the electronic cruise control symbol mark [A] will displays in the multifunction display.

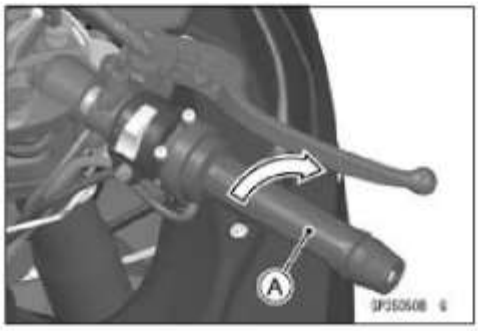
○Also a part of multifunction display will disappears in order to display the code numbers in this area [B].



★If a number [A] is blinked, inspect the switch or button which corresponding with the number in the previous table (see Switches and Sensors section (16-117)).



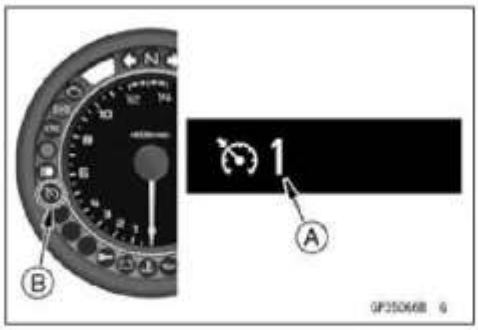
- Close the throttle grip [A] to the fully closed position and force the throttle grip beyond the fully closed position.



- The number "1" [A] will appear and the white electronic cruise control indicator light (LED) [B] goes on.

★If the number "1" does not appear, inspect the electronic cruise control cancel switch (throttle) (see Switch Inspection(16-117)).

★If the switch is good, check the cable condition (see Cable Installation(3-52)).

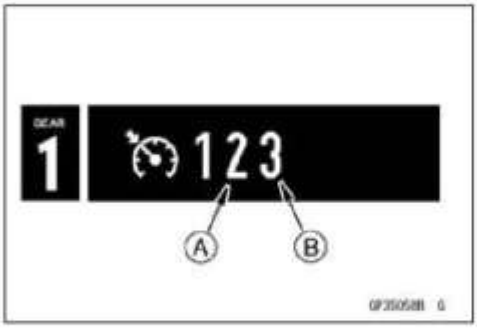


Electronic Cruise Control System

- Pull in the brake lever.
- The number "2" [A] and "3" [B] will appear and the white electronic cruise control indicator light (LED) goes on.
- While releasing the brake lever, the indicator light (LED) goes off.

★If the number "2" does not appear, inspect the brake/electronic cruise control cancel switch (see Switch Inspection(16-117)).

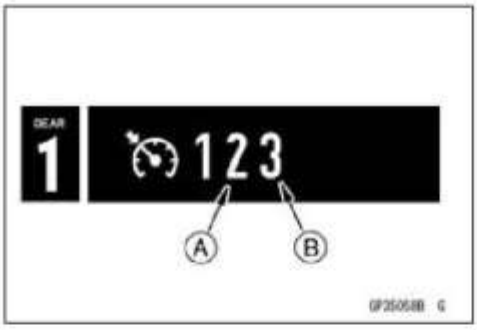
★If the number "3" does not appear, inspect the brake/electronic cruise control cancel switch (front brake light switch) (see Switch Inspection(16-117)).



- Turn the ignition switch off, and reset the meter to the diagnostic mode.
- Depress the brake pedal.
- The number "2" [A] and "3" [B] will appear and the white electronic cruise control indicator light (LED) goes on.
- While releasing the brake pedal, the indicator light (LED) goes off.

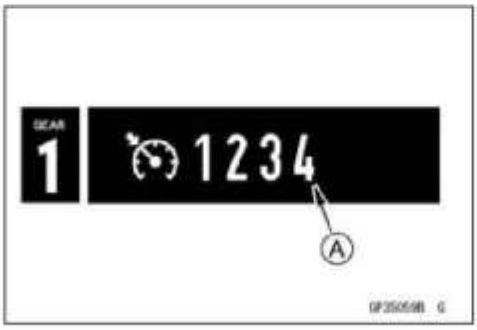
★If the number "2" does not appear, inspect the electronic cruise control cancel switch (rear brake) (see Switch Inspection(16-117)).

★If the number "3" does not appear, inspect the rear brake light switch (see Switch Inspection(16-117)).



- Pull in the clutch lever.
- The number "4" [A] will appear and the white electronic cruise control indicator light (LED) goes on.
- While releasing the clutch lever, the indicator light (LED) goes off.

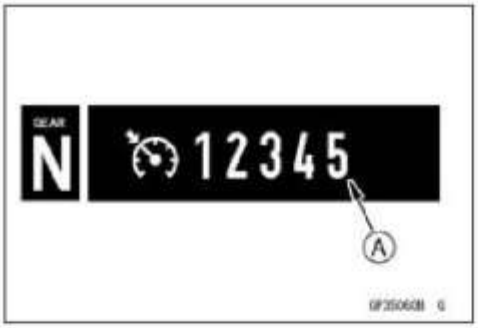
★If the number "4" does not appear, inspect the electronic cruise control cancel switch (clutch) (see Switch Inspection(16-117)).



- Shift the transmission to the neutral position.
- The number "5" [A] will appear and the white electronic cruise control indicator light (LED) goes on.
- While shifting to 1st gear, the indicator light (LED) goes off.

★If the number "5" does not appear, inspect the gear position sensor (see Gear Position Sensor Inspection(16-123)).

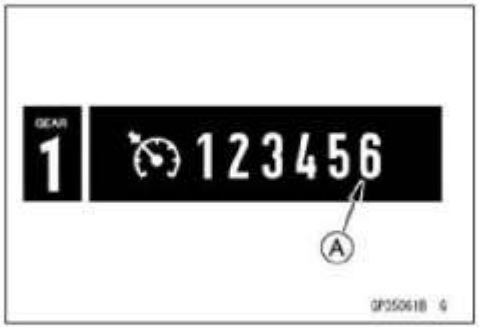
- Shift the transmission to the neutral position.



Electronic Cruise Control System

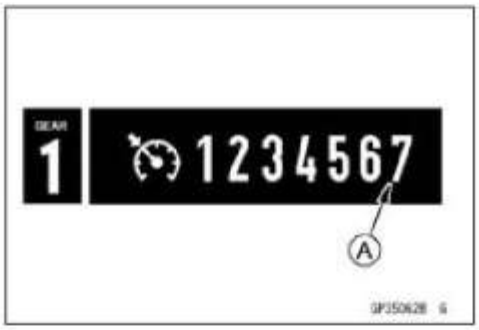
- Push the electronic cruise control SET/– button.
- The number “6” [A] will appear and the white electronic cruise control indicator light (LED) goes on.
- While pushing the button to its original position, the indicator light (LED) goes off.

★If the number “6” does not appear, inspect the electronic cruise control SET/– button (see Switch Inspection(16-117)).



- Push the electronic cruise control RES/+ button.
- The number “7” [A] will appear and the white electronic cruise control indicator light (LED) goes on.
- While pushing the button to its original position, the indicator light (LED) goes off.

★If the number “7” does not appear, inspect the electronic cruise control RES/+ button (see Switch Inspection(16-117)).

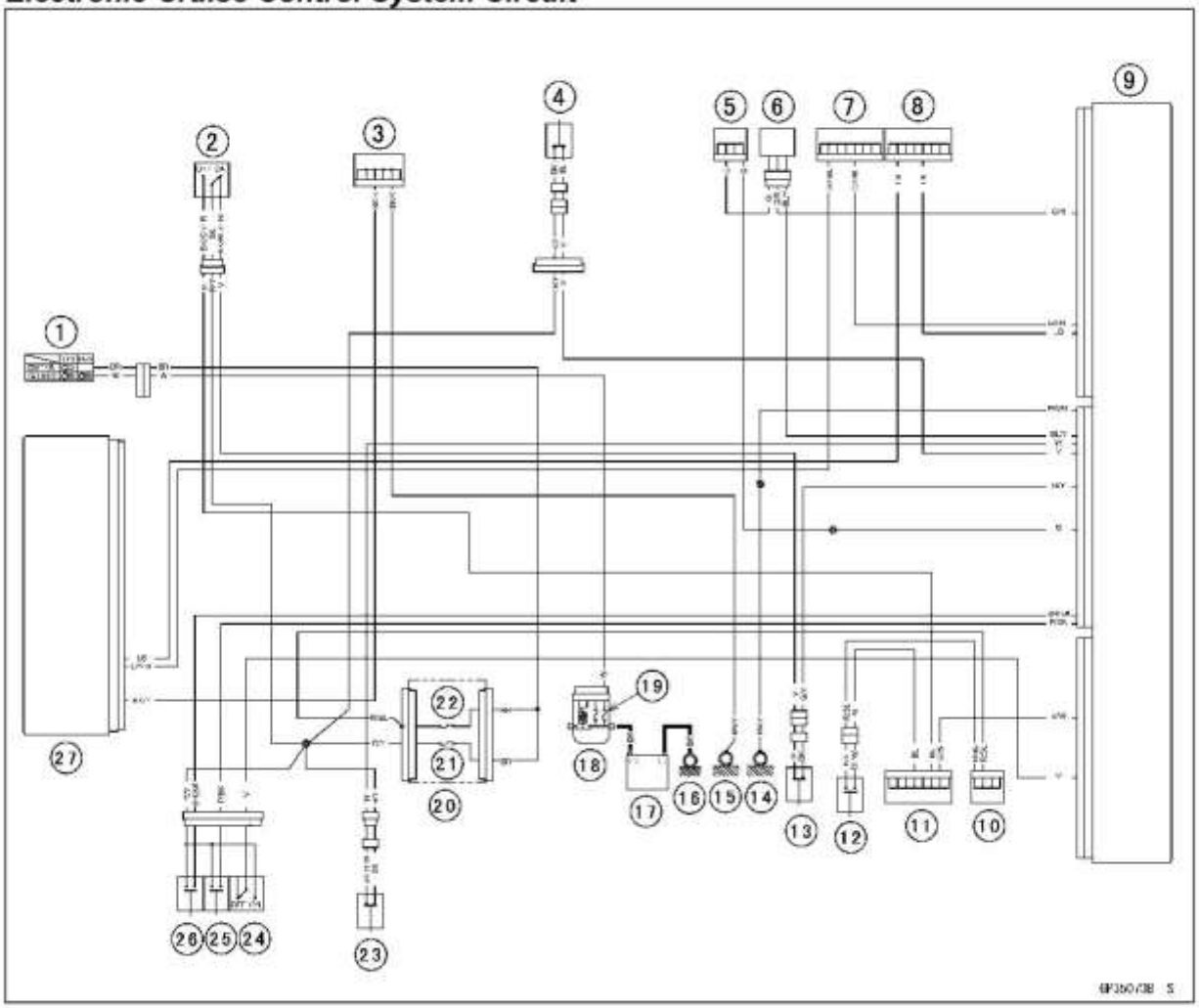


- To exit the diagnostic mode.

○Turn the ignition switch off.
○Operate the motorcycle above 5 km/h (3.1 mph).
○When the ECU does not receive a signal from the cancel switches or buttons for 10 minutes while in the diagnostic mode.

Electronic Cruise Control System

Electronic Cruise Control System Circuit



1. Ignition Switch
2. Brake/Electronic Cruise Control Cancel Switch
3. Joint Connector (1)
4. Electronic Cruise Control Cancel Switch (Throttle)
5. Joint Connector (2)
6. Gear Position Sensor
7. Joint Connector (CAN High)
8. Joint Connector (CAN Low)
9. ECU
10. Joint Connector (5)
11. Joint Connector (6)
12. Rear Brake Light Switch
13. Electronic Cruise Control Cancel Switch (Rear Brake)
14. Frame Ground (4)
15. Frame Ground (1)
16. Engine Ground
17. Battery
18. Starter Relay
19. Main Fuse 30 A
20. Fuse Box (1)
21. Electronic Cruise Control Fuse 10 A
22. Brake Light/Horn Fuse 10 A
23. Electronic Cruise Control Cancel Switch (Clutch)
24. Electronic Cruise Control Button
25. Electronic Cruise Control SET/– Button
26. Electronic Cruise Control RES/+ Button
27. Meter Unit

Immobilizer System (Equipped Models)

This motorcycle is equipped with an immobilizer system to protect the motorcycle from theft. This system provides a theft proof device by means of matching a code between the inbuilt key transponder and ECU. If the code does not match, ignition system, injectors, subthrottle valve actuator and exhaust butterfly valve actuator will not operate and the engine will not start.

Abstract

- Do not keep more than one immobilizer key of any system on a key ring. Jamming of the key code signal may occur and the operation of the system may be affected.
- The red immobilizer warning indicator light (LED) [A] will blink for a period of 24 hours once the ignition switch has been switched off and the key removed. This blinking can be set to on or off as desired by holding the upper and lower buttons on the left switch housing down for 2 seconds within 20 seconds of switching the ignition off.
- If all coded keys are lost the ECU and ignition switch will have to be replaced.
- The immobilizer system can not function until the ignition key code is registered in the ECU.
- A total of five keys can be registered in the ECU at any one time.

Operational Cautions

1. Do not put two keys of any immobilizer system on the same key ring.
2. Do not submerge any key in water.
3. Do not expose any key to excessively high temperature.
4. Do not place any key close to magnet.
5. Do not place a heavy item on any key.
6. Do not grind any key or alter its shape.
7. Do not disassemble the plastic part of any key.
8. Do not drop the key and/or apply any shocks to the key.
9. When a ignition key is lost, the user should go to his dealer to invalidate the lost key registration in the ECU.
10. When the all ignition keys are lost, the user should go to his dealer and have a new ECU installed and register the ignition keys.

NOTE

○No.9 and 10 are strongly recommended to the customer to ensure security of the motorcycle.

Key Registration

Case 1: When additional spare ignition key is required.

NOTE

○Two ignition keys have been already registered in this case.

- Prepare a new spare ignition key.
- Cut the key in accordance with the shape of the current ignition key.
- Remove the rear seat (see Rear Seat Removal(15-13)).
- Remove the immobilizer/Kawasaki diagnostic system connector cap [A].

Immobilizer System (Equipped Models)

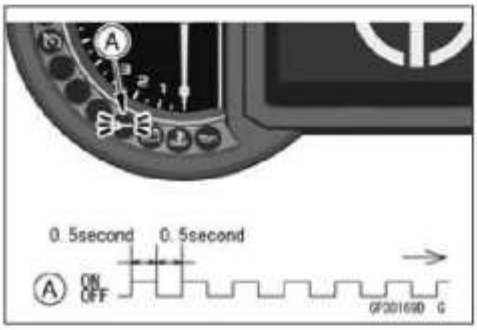
- Connect the key registration unit [A] and key registration adapter [B] as shown.

Special Tools - Key Registration Unit: 57001-1582
Key Registration Adapter: 57001-1746

- Insert one of the registered ignition keys to the ignition switch and turn it to "ON."

Verified

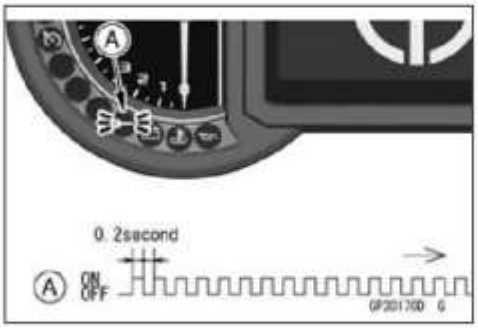
○The red immobilizer warning indicator light (LED) [A] blinks to display the registration mode (go to the next step).



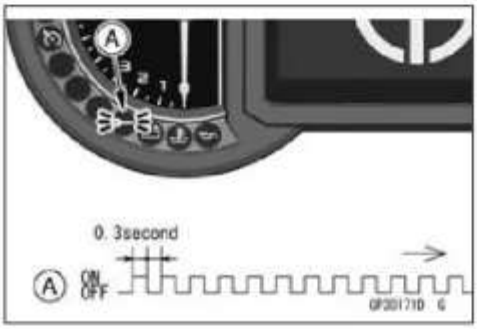
Not Verified

○The red immobilizer warning indicator light (LED) [A] blinks to display the collation error (refer to the following failure illustrations).

Immobilizer Amplifier Failure

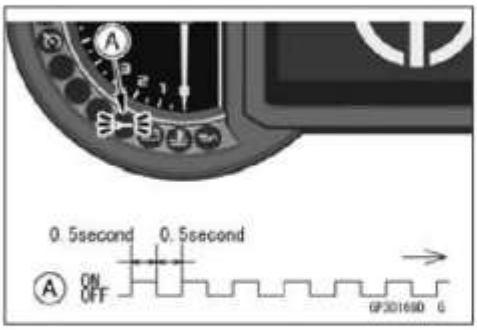


Registered Ignition Key Collation Error

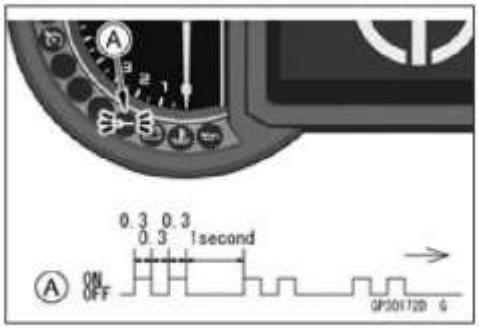


- Turn the registered ignition key to "OFF" and remove the registered ignition key.

○The red immobilizer warning indicator light (LED) [A] blinks continuously to display that the ECU is in the registration mode for 15 seconds.



Immobilizer System (Equipped Models)



- Insert the other registered ignition key to the ignition switch and turn it to "ON."
- Confirm that following.

○The red immobilizer warning indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats.

○If there is any problem in the registration, the red immobilizer warning indicator light (LED) blinks to display collation error as mentioned above.

- Turn the registered ignition key to "OFF" and remove the registered ignition key.

NOTE

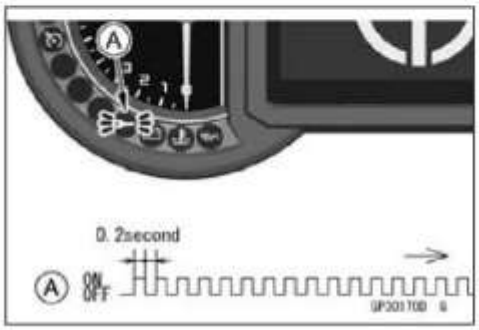
○*Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF" and removed otherwise registration mode will be ended and the red immobilizer warning indicator light (LED) stops blinking.*

○*To return to the registration mode start the registered ignition key(s) verification procedure. This applies to all ignition key registration.*

- Insert the new ignition key 1 to the ignition switch and turn it to "ON."

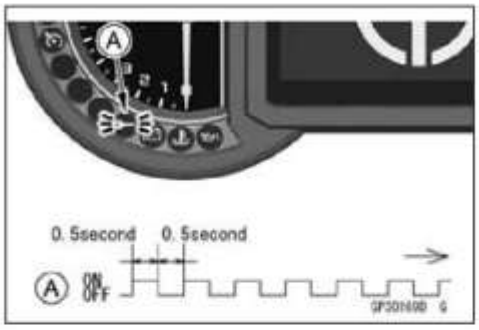
NOTE

○*Keep the other ignition key away from the immobilizer antenna.*



○If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

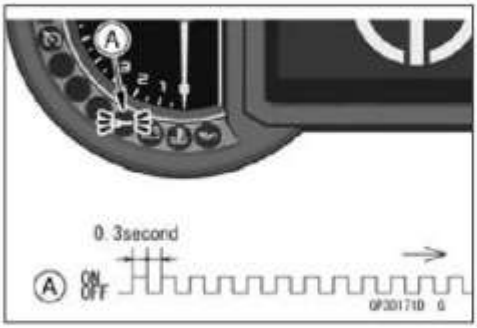
Immobilizer Amplifier Failure



When Registered Ignition Key is Inserted.

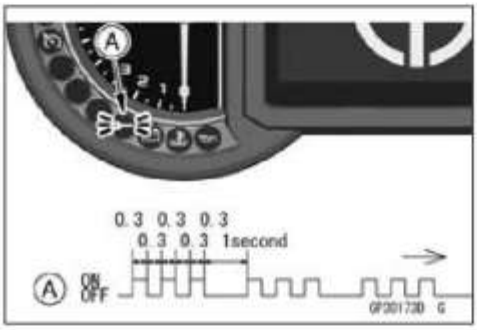
Immobilizer System (Equipped Models)

Ignition Key Collation Error



- The ignition key 1 is successfully registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 3 times and stops for 1 second and then repeats this cycle.



- Turn the ignition key 1 to "OFF" and remove the ignition key 1.

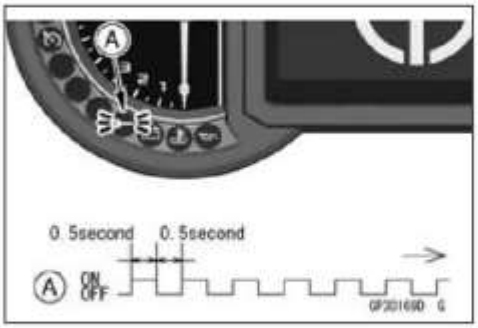
○The red immobilizer warning indicator light (LED) [A] blinks to display the registration mode.

NOTE

○*Turn to "OFF" the ignition switch and wait for the period of 15 seconds or more. The registration mode automatically finishes and the red immobilizer warning indicator light (LED) will switch off.*

○*This procedure registered the registered ignition key and one ignition key.*

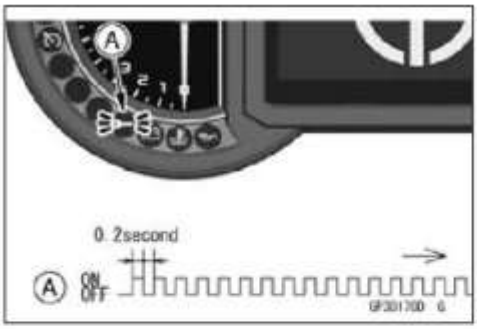
○*Continue with the procedure to register the second and later keys before the 15 seconds period has elapsed.*



- Insert the new ignition key 2 to the ignition switch and turn it to "ON."

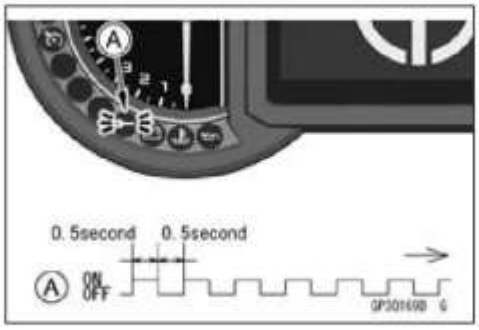
○If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

Immobilizer Amplifier Failure

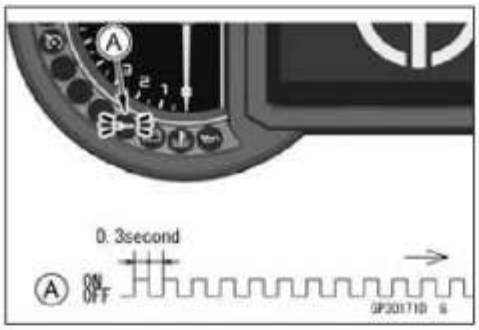


Immobilizer System (Equipped Models)

When Registered Ignition Key is Inserted.



Ignition Key Collation Error

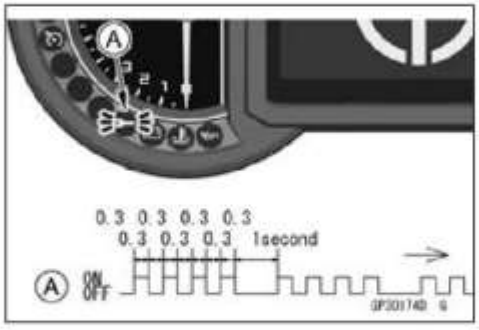


- The ignition key 2 is registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 4 times and stops for 1 second and then repeats this cycle.

○This procedure has registered the 2 ignition keys.

- Continue with the procedure to register an additional one ignition key.



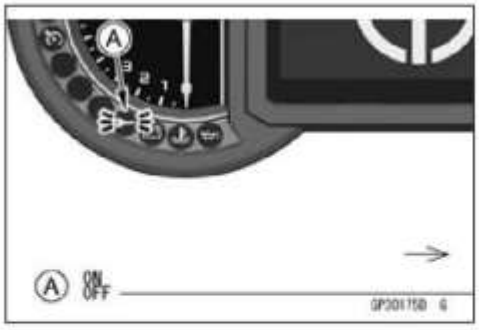
NOTE

○*The ECU can store up the five key codes.*

Red Immobilizer Warning Indicator Light (LED)

	Indicator Blinks	Indicator Stop	Remarks
Ignition Key 3	5 times	1 second	Repeat

- Turn to "OFF" the ignition switch and wait for period of more than 15 seconds.
- The registration mode automatically ends.
- The red immobilizer warning indicator light (LED) [A] goes off.



Immobilizer System (Equipped Models)

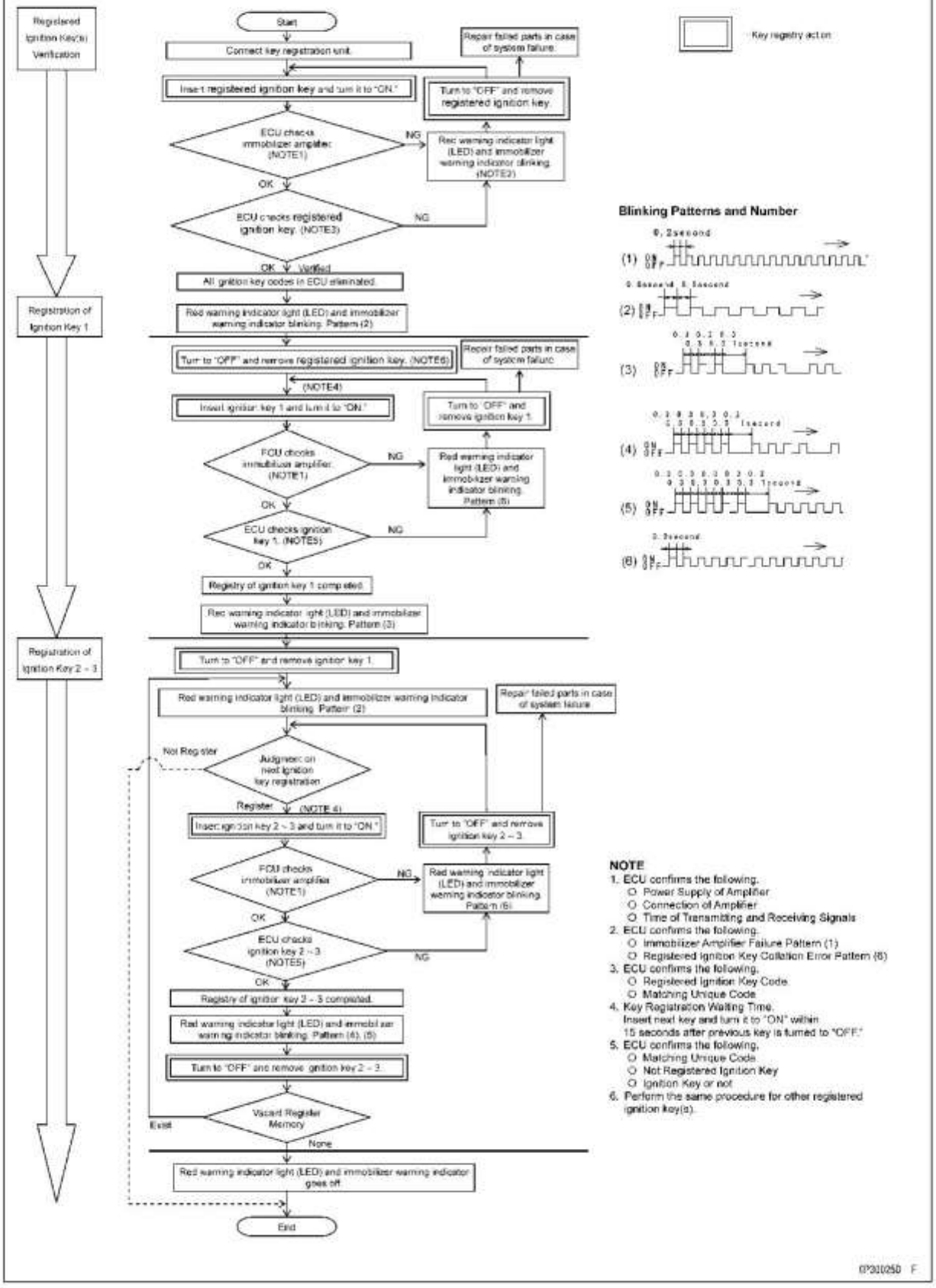
- Remove the key registration unit, key registration adapter and install the immobilizer/Kawasaki diagnostic system connector cap.

NOTE

- *Turn the ignition switch to "ON" with the registered ignition key.*
- *Check that the engine can be started using all registered ignition keys.*

Immobilizer System (Equipped Models)

Spare Ignition Key Registration Flow Chart (Ignition Key 1: 3rd Key)



NOTE

1. ECU confirms the following.
   - O Power Supply of Amplifier
   - O Connection of Amplifier
   - O Time of Transmitting and Receiving Signals
2. ECU confirms the following.
   - O Immobilizer Amplifier Failure Pattern (1)
   - O Registered Ignition Key Collation Error Pattern (6)
3. ECU confirms the following.
   - O Registered Ignition Key Code
   - O Matching Unique Code
4. Key Registration Waiting Time.
   Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF."
5. ECU confirms the following.
   - O Matching Unique Code
   - O Not Registered Ignition Key
   - O Ignition Key or not
6. Perform the same procedure for other registered ignition key(s).

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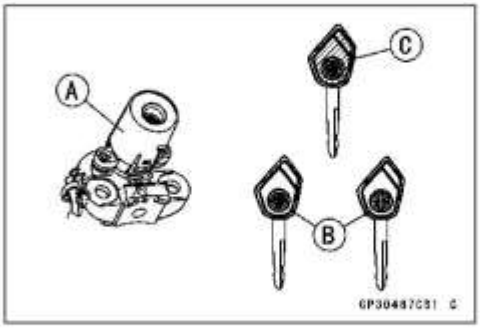
Immobilizer System (Equipped Models)

Case 2: When the ignition switch is faulty and to be replaced.

- Prepare a new ignition switch [A] and two new ignition keys [B].

○These parts are available as a set. Prepare the current registered ignition key [C].



- Remove:
  Ignition Switch (see Immobilizer System Parts Replacement(16-113))
  Rear Seat (see Rear Seat Removal(15-13))
- Remove the immobilizer/Kawasaki diagnostic system connector cap [A].

- Connect the key registration unit [A] and key registration adapter [B] as shown.

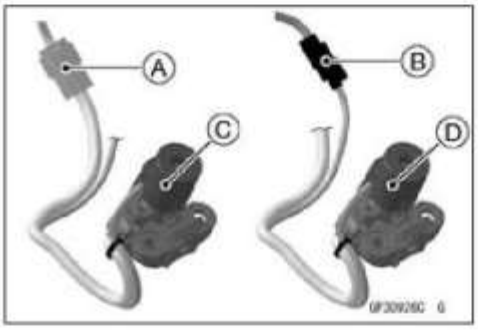
Special Tools - Key Registration Unit: 57001-1582
Key Registration Adapter: 57001-1746

- Connect:
  New Ignition Switch Lead Connector [A]
  Current Immobilizer Antenna Lead Connector [B]

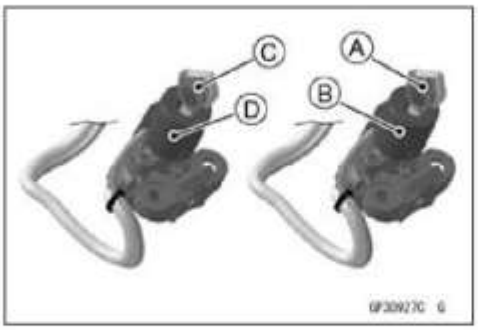
NOTE

○*Keep the ignition switches more than 15 cm (5.9 in.).*

New Ignition Switch [C]
Current Ignition Switch [D]

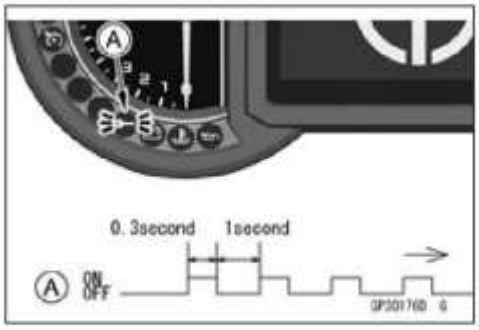


- Insert the current registered ignition key [A] at the current ignition switch [B].
- Insert the new ignition key 1 [C] to the new ignition switch [D] and turn it to "ON."



Immobilizer System (Equipped Models)

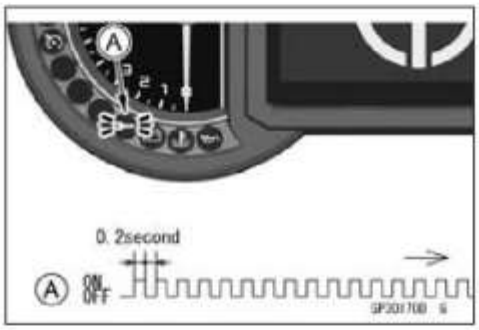
○The red immobilizer warning indicator light (LED) [A] blinks 1 time and stops for 1 second and repeats this cycle.



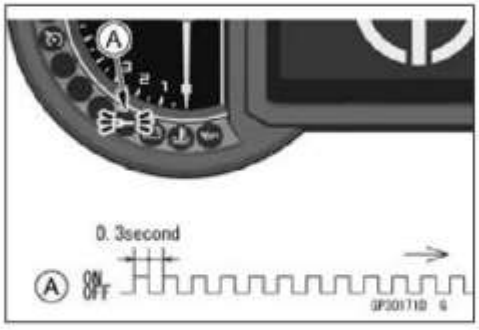
Not Verified

○The red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

Immobilizer Amplifier Failure



Registered Ignition Key Collation Error



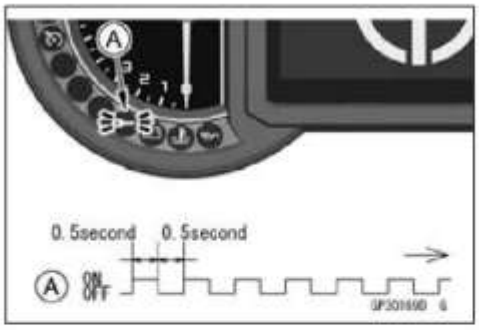
● Turn to "OFF" and remove the new ignition key 1.

NOTE

○*Insert the next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF" and removed otherwise registration mode will be ended and the red immobilizer warning indicator light (LED) stops blinking.*

Verified

○The red immobilizer warning indicator light (LED) [A] blinks to display the ECU is in the registration mode (go to the next step).



Immobilizer System (Equipped Models)

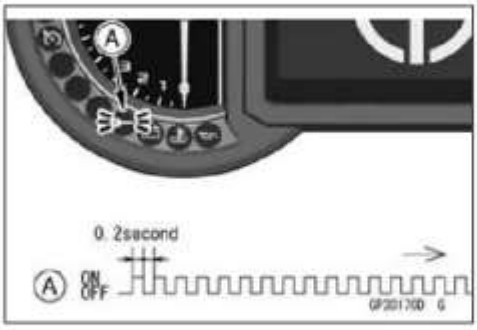
- Disconnect the immobilizer antenna lead connector, then connect the antenna lead connector of the new ignition switch.
- Insert the ignition key 1 [A] again into the new ignition switch and turn it to "ON."

NOTE

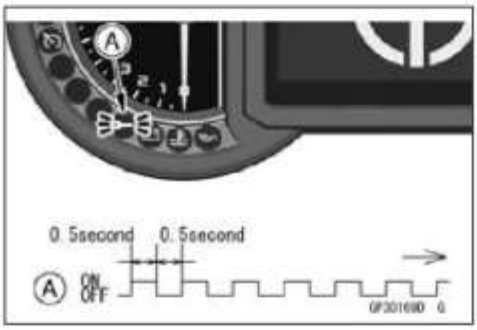
- *Insert the next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF" and removed otherwise registration mode will be ended and the red immobilizer warning indicator light (LED) stops blinking.*
- *To return to the registration mode start the registered ignition key verification procedure. This applies to all ignition key registration.*
- *Keep other ignition keys away from the ignition switch.*

- If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

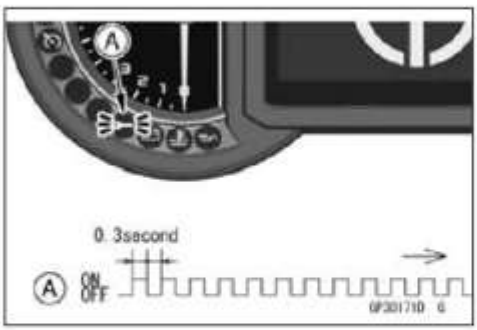
Immobilizer Amplifier Failure



When Registered Ignition Key is Inserted.

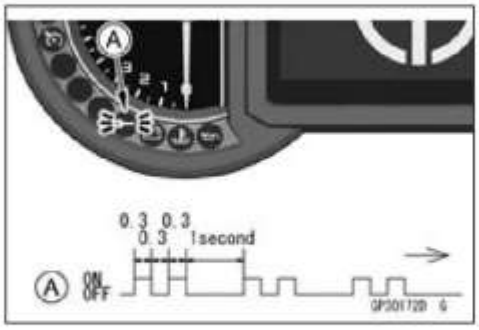


Ignition Key Collation Error



Immobilizer System (Equipped Models)

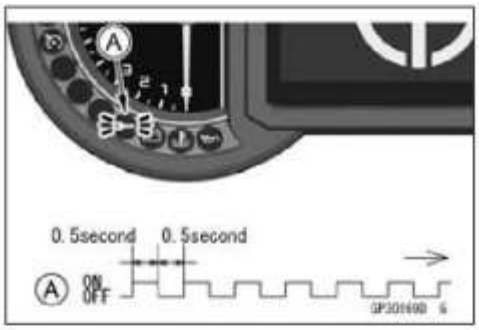
● The ignition key 1 is successfully registered in the ECU.
○The red immobilizer warning indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registering of ignition key 1.



● Turn to "OFF" and remove ignition key 1.
○The red immobilizer warning indicator light (LED) [A] blinks to display the registration mode.

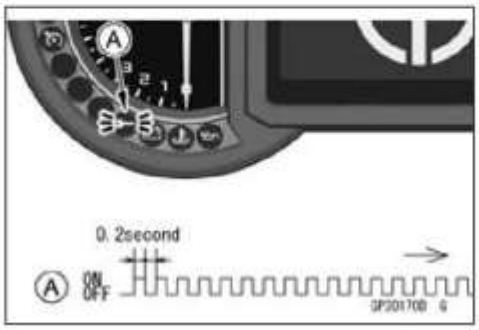
NOTE

○*Turn to "OFF" the ignition switch and wait for the period more than 15 seconds. The registration mode automatically ends and red immobilizer warning indicator light (LED) goes off.*
○*This procedure has registered the registered ignition key and one ignition key.*
○*Continue the procedure to program the second and later keys.*

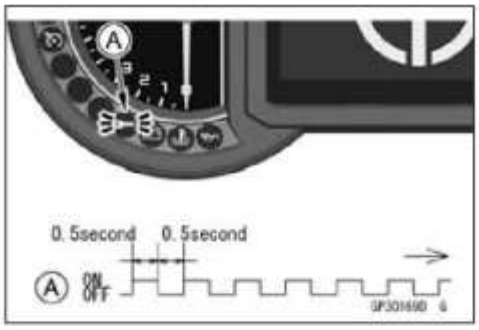


● Insert the ignition key 2 to the ignition switch and turn it to "ON."

○If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.
Immobilizer Amplifier Failure

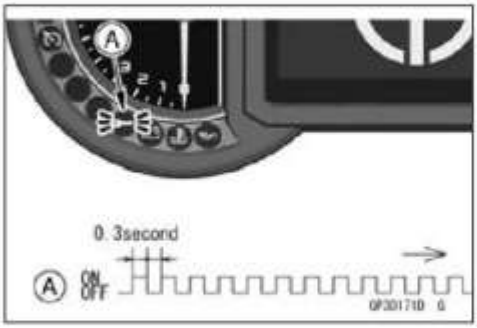


When Registered Ignition Key is Inserted.



Immobilizer System (Equipped Models)

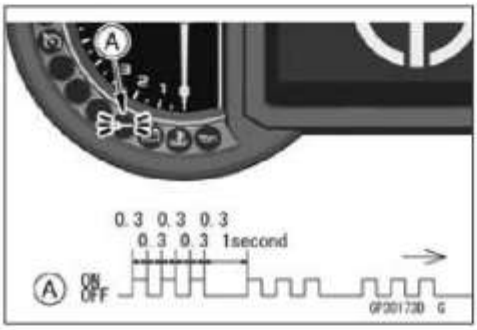
Ignition Key Collation Error



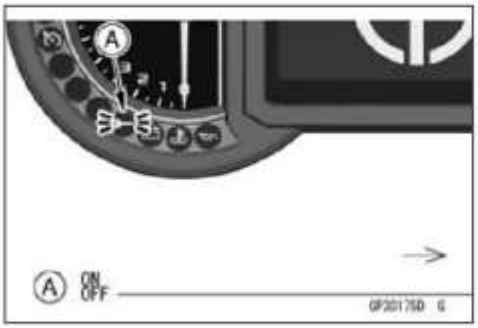
- The ignition key 2 is successfully registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 3 times and stops for 1 second and then repeat this cycle to indicate successful programming of ignition key 2.

- Turn to "OFF" the ignition switch and wait for period more than 15 seconds.
- The registration mode automatically ends.



- The red immobilizer warning indicator light (LED) [A] goes off.



- Remove the key registration unit, key registration adapter and install the immobilizer/Kawasaki diagnostic system connector cap.

NOTE

○*Turn the ignition switch to "ON" with the registered ignition key.*

○*Check that the engine can be started using all registered ignition keys.*

- Install the new ignition switch (see Immobilizer System Parts Replacement(16-113)).

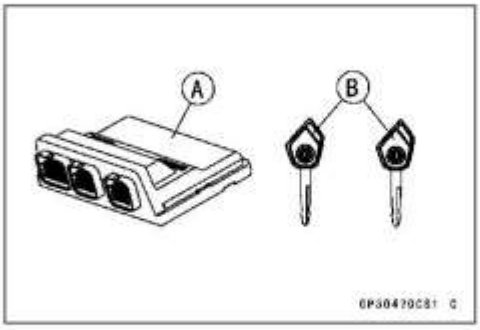
Case 3: When the ECU is faulty and has to be replaced.

- Prepare a new ECU [A] and current registered ignition key(s) [B].

NOTE

○*The key registration unit is not required.*

○*After replacing the ECU, be sure to register the 2 ignition keys. If the 2 keys are not registered, the engine can not be started.*

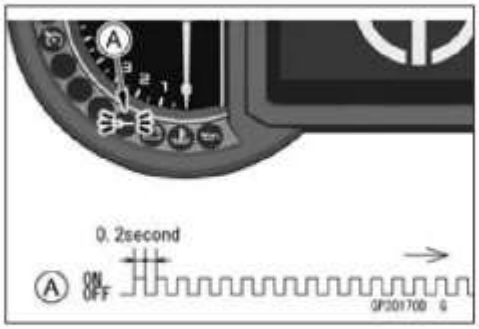


- Replace the ECU (see ECU Removal(3-39)) (see ECU Installation(3-40)).
- Insert the current registered ignition key into the ignition switch and turn it to "ON."

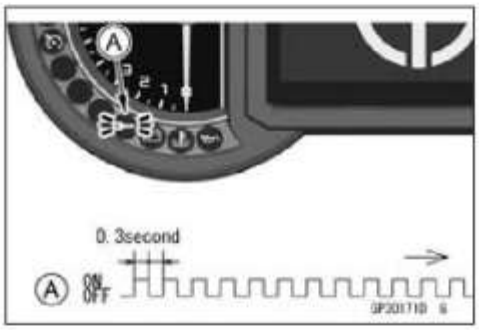
Immobilizer System (Equipped Models)

○If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

Immobilizer Amplifier Failure

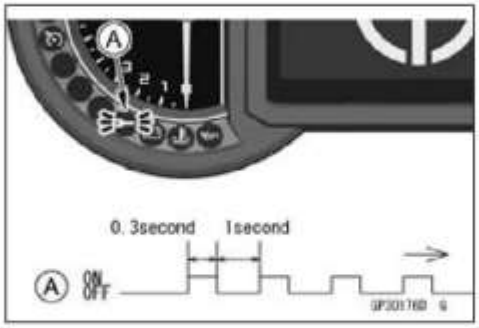


Registered Ignition Key Collation Error



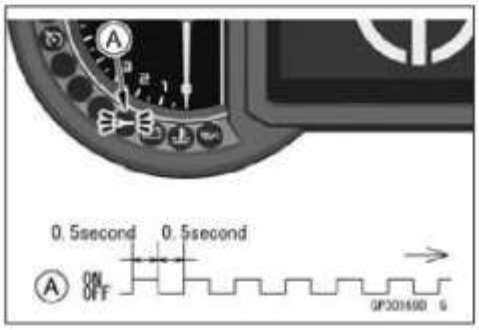
- The registered ignition key is registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 1 time and stops for 1 second and the repeats this cycle to indicate successful registration of the registered ignition key.



- Turn to "OFF" the registered ignition key and remove it.

○The red immobilizer warning indicator light (LED) [A] blinks to display the registration mode.



NOTE

○*Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF" and removed otherwise registration mode will be ended and the red immobilizer warning indicator light (LED) goes off.*

○*To return to the registration mode start the registered ignition key verification procedure. This applies to all ignition key registration.*

- Insert the other remaining registered ignition key to the ignition switch and turn it to "ON."

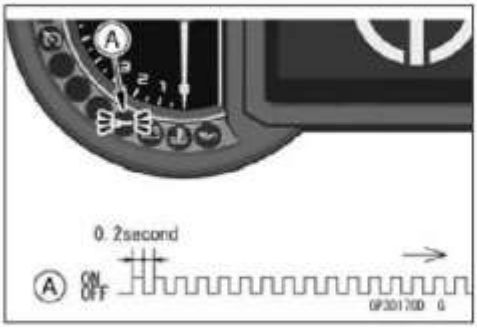
NOTE

○*Keep the other ignition keys away from the immobilizer antenna.*

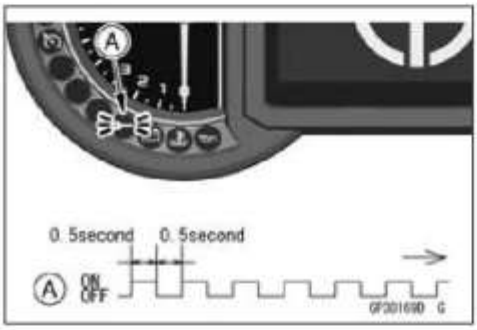
Immobilizer System (Equipped Models)

○If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

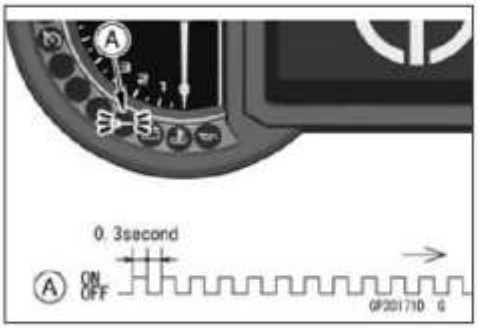
Immobilizer Amplifier Failure



When Registered Ignition Key is Inserted.

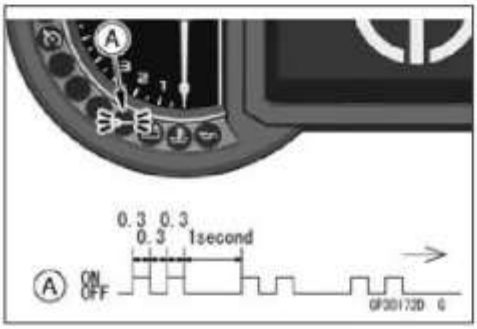


Ignition Key Collation Error



- The other remaining ignition key is registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registration of ignition key.



- Turn to "OFF" the ignition switch and wait for period more than 15 seconds.
- The registration mode automatically ends.

Immobilizer System (Equipped Models)

- The red immobilizer warning indicator light (LED) [A] goes off.

NOTE

- *Turn the ignition switch to "ON" with the registered ignition key.*
- *Check that the engine can be started using all registered ignition keys.*

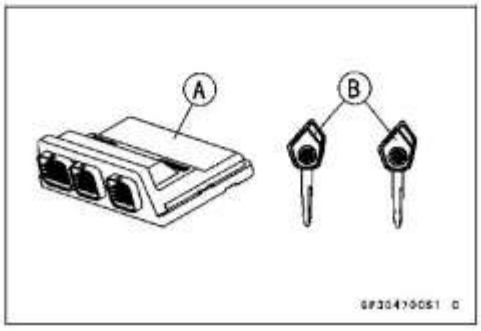
Case 4: When all registered ignition keys are faulty or lost.

The all registered ignition keys replacement is considered very rare case. However if it is required, the following is necessary.

NOTE

- *The ECU must be replaced with a new one because the registered ignition key code that is registered in the current ECU can not be rewritten.*

- Prepare a new ECU [A] and 2 new ignition keys [B].



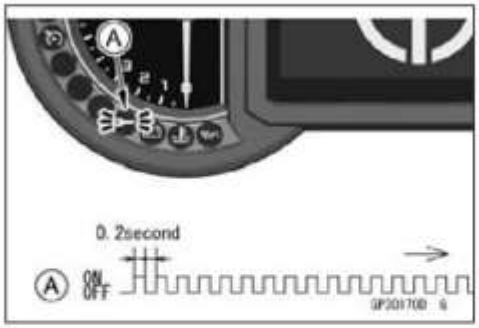
NOTE

- *The key registration unit is not required.*
- *After replacing the ECU, be sure to register the 2 ignition keys. If the 2 keys are not registered, the engine can not be started.*

- Insert the first ignition key into the ignition switch and turn it to "ON."

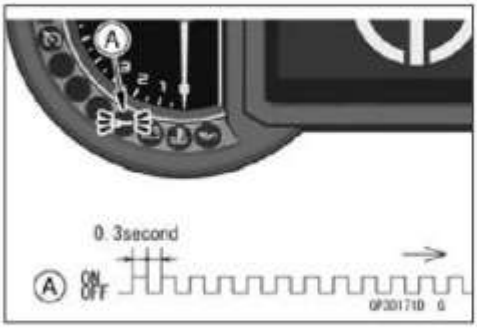
- If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

  Immobilizer Amplifier Failure



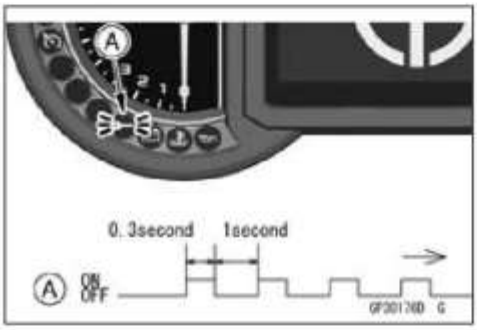
Immobilizer System (Equipped Models)

Ignition Key Collation Error



- The first ignition key is registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 1 time and stops for 1 second and the repeats this cycle to indicate successful registration of the first ignition key.



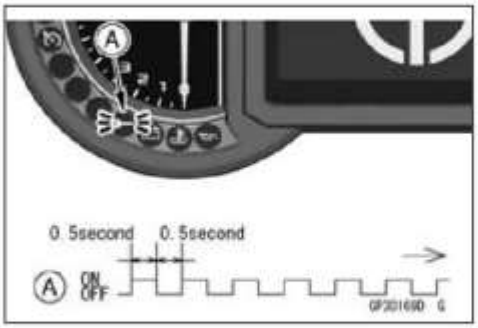
- Turn to "OFF" the first ignition key and remove it.

○The red immobilizer warning indicator light (LED) [A] blinks to display the registration mode.

NOTE

○*Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF" and removed otherwise registration mode will be ended and the red immobilizer warning indicator light (LED) goes off.*

○*To return to the registration mode start the registered ignition key verification procedure. This applies to all ignition key registration.*



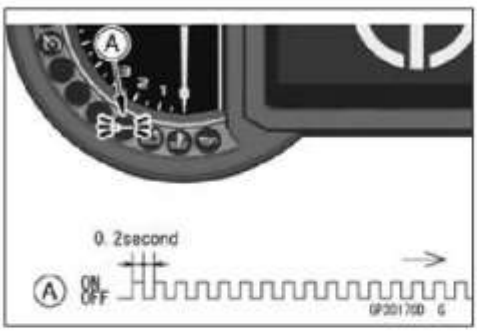
- Insert the second ignition key to the ignition switch and turn it to "ON."

NOTE

○*Keep the other ignition keys away from the immobilizer antenna.*

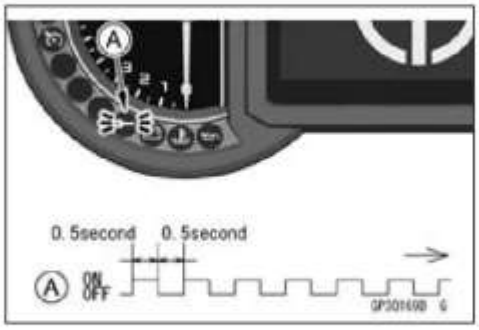
○If there is any problem in the registration, the red immobilizer warning indicator light (LED) [A] blinks to display the collation error.

Immobilizer Amplifier Failure

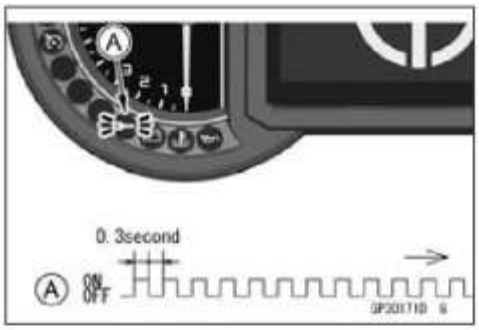


Immobilizer System (Equipped Models)

When Registered Ignition Key is Inserted



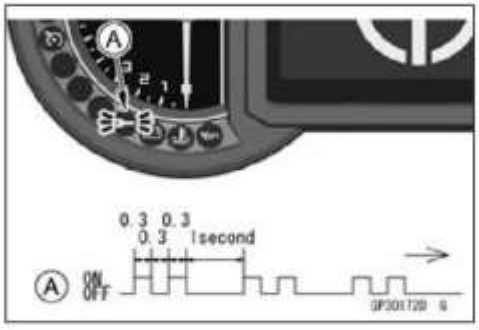
Ignition Key Collation Error



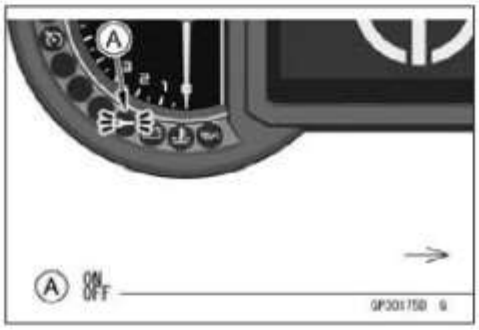
- The second ignition key is registered in the ECU.

○The red immobilizer warning indicator light (LED) [A] blinks 2 times and stops for 1 second and then repeats this cycle to indicate successful registration of second ignition key.

- Turn to "OFF" the ignition switch and wait for period more than 15 seconds.
- The registration mode automatically ends.



- The red immobilizer warning indicator light (LED) [A] goes off.



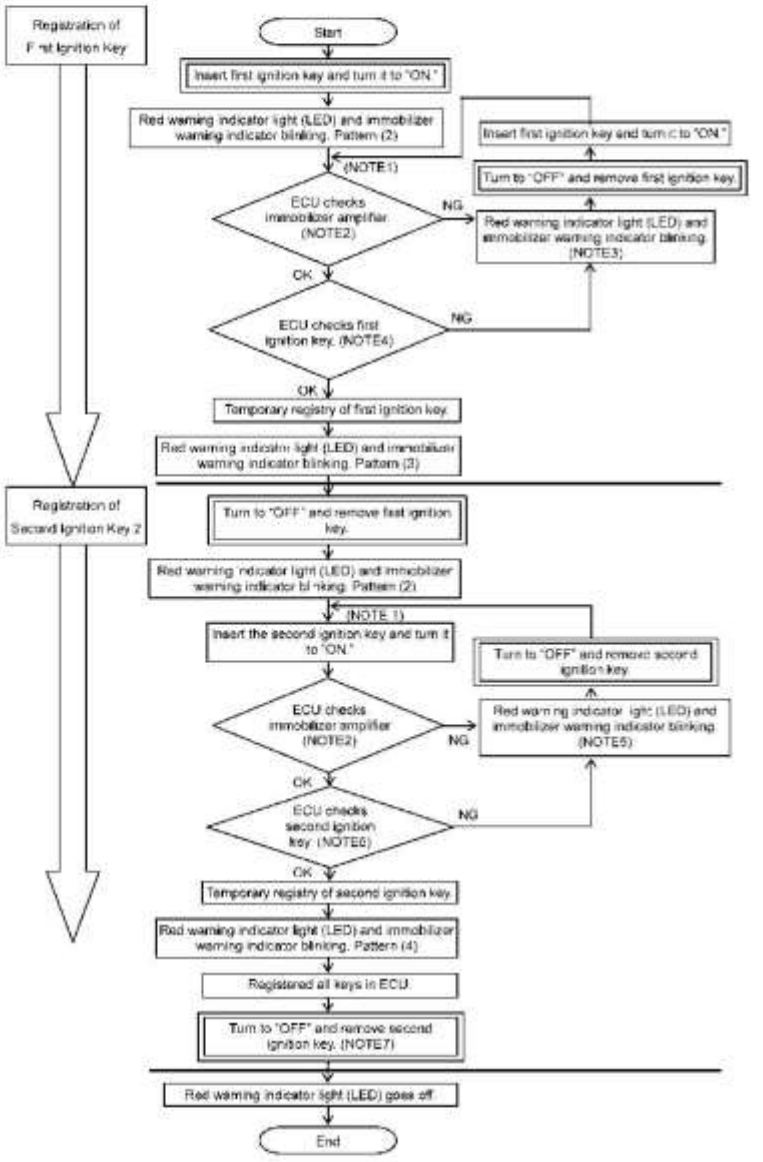
NOTE

○*Turn the ignition switch to "ON" with the registered ignition key.*

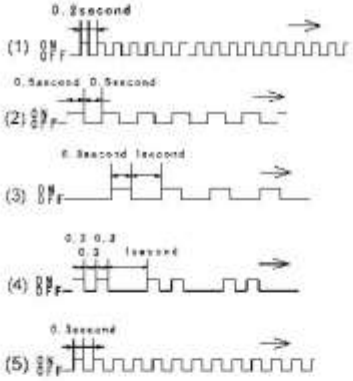
○*Check that the engine can be started using all registered ignition keys.*

Immobilizer System (Equipped Models)

All Keys Initial Registration Flow Chart



Blinking Patterns and Number



NOTE

1. Key Substitute Time
   Insert next key and turn it to "ON" within 15 seconds after previous key is turned to "OFF."
2. ECU confirms the following.
   - Power Supply of Amplifier
   - Connection of Amplifier
   - Time of Transmitting and Receiving Messages.
3. ECU confirms the following.
   - Immobilizer Amplifier Failure Pattern (1)
   - Ignition Key Collation Error Pattern (5)
4. ECU confirms the following.
   - Ignition Key or Not
   - Match the Unique Code
5. ECU confirms the following.
   - Immobilizer Amplifier Failure Pattern (1)
   - Second Ignition Key Collation Error Pattern (5)
   - Registered Ignition Key is Inserted Pattern (2)
6. ECU confirms the following.
   - Ignition Key or Not
   - Match the Unique Code
   - Not Registered Ignition Key
7. When the ECU-registered key is turned to "OFF", ECU keeps the power on for two seconds.
   And then, in two seconds after the key is turned to "OFF", ECU turns the power off.

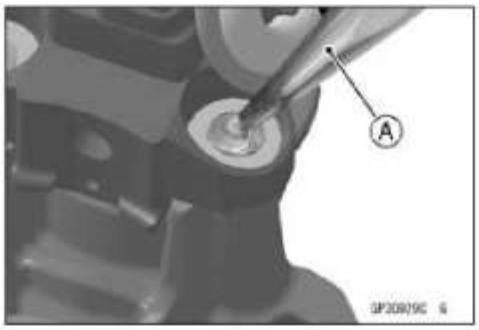
Immobilizer System (Equipped Models)

Immobilizer System Parts Replacement

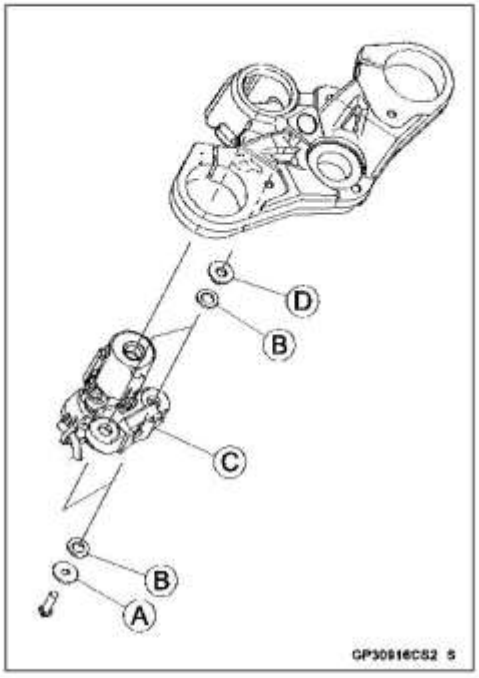
Ignition Switch Replacement

- Remove:
  Steering Stem Head (see Stem, Stem Bearing Removal(14-6))
- Disconnect:
  Ignition Switch Lead Connector [A]
  Immobilizer Antenna Lead Connector [B]
- Open the clamp and free the ignition switch lead and immobilizer antenna lead.

- Using a small chisel or punch [A], turn out the bolts.

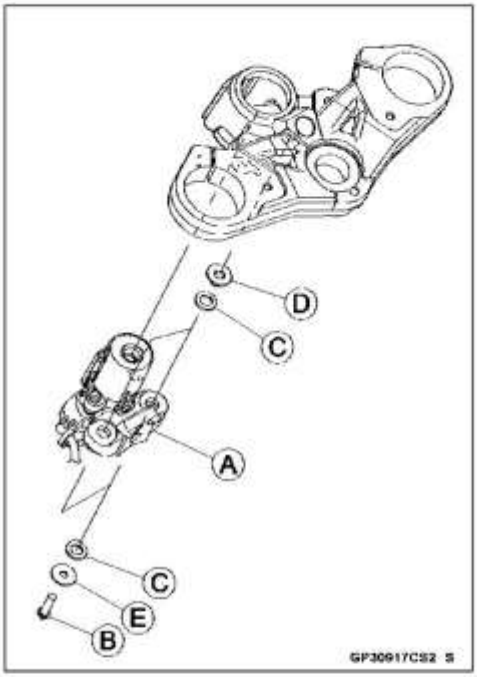


- Remove:
  Washers [A]
  Dampers [B]
  Ignition Switch [C]
  Collars [D]

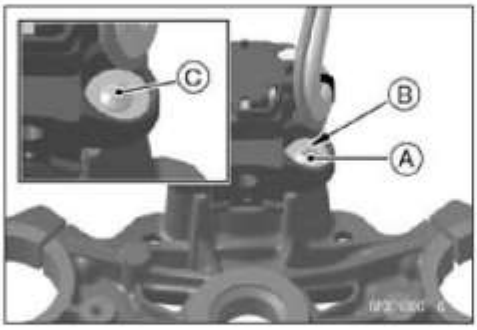


Immobilizer System (Equipped Models)

- Replace the ignition switch [A] and two Torx bolts [B] with new ones.
- Install:
  Dampers [C]
  Collars [D]
  Washers [E]
  Torx Bolts

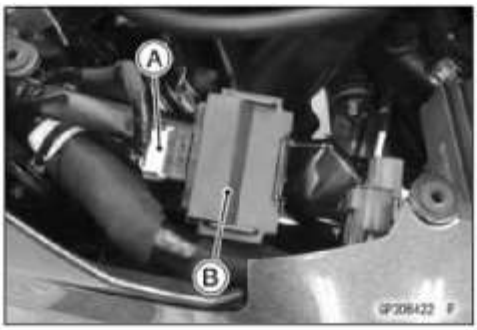


- Register the more than two ignition keys (see Key Registration(16-95))).
- Tighten a new Torx bolt [A] until the bolt head [B] is broken [C].
- Install the removed parts.
- Run the leads correctly (see Cable, Wire, and Hose Routing section (18-2)).



Immobilizer Amplifier Replacement

- Remove the left upper inner fairing (see Upper Inner Fairing Removal(15-18)).
- Disconnect the connector [A].
- Remove the immobilizer amplifier [B] from the bracket.
- Installation is the reverse of removal.



ECU Replacement

- Refer to the ECU Removal/Installation (see ECU Removal(3-39)) (see ECU Installation(3-40)).

Immobilizer System (Equipped Models)

Registered Immobilizer Relational Parts Replacement Chart

		Failed or Lost Part			
		Ignition Key	Ignition Switch	Amplifier	ECU
*	Ignition Key	●	○		
	Ignition Switch		●		
	Amplifier			●	
	ECU	○			●

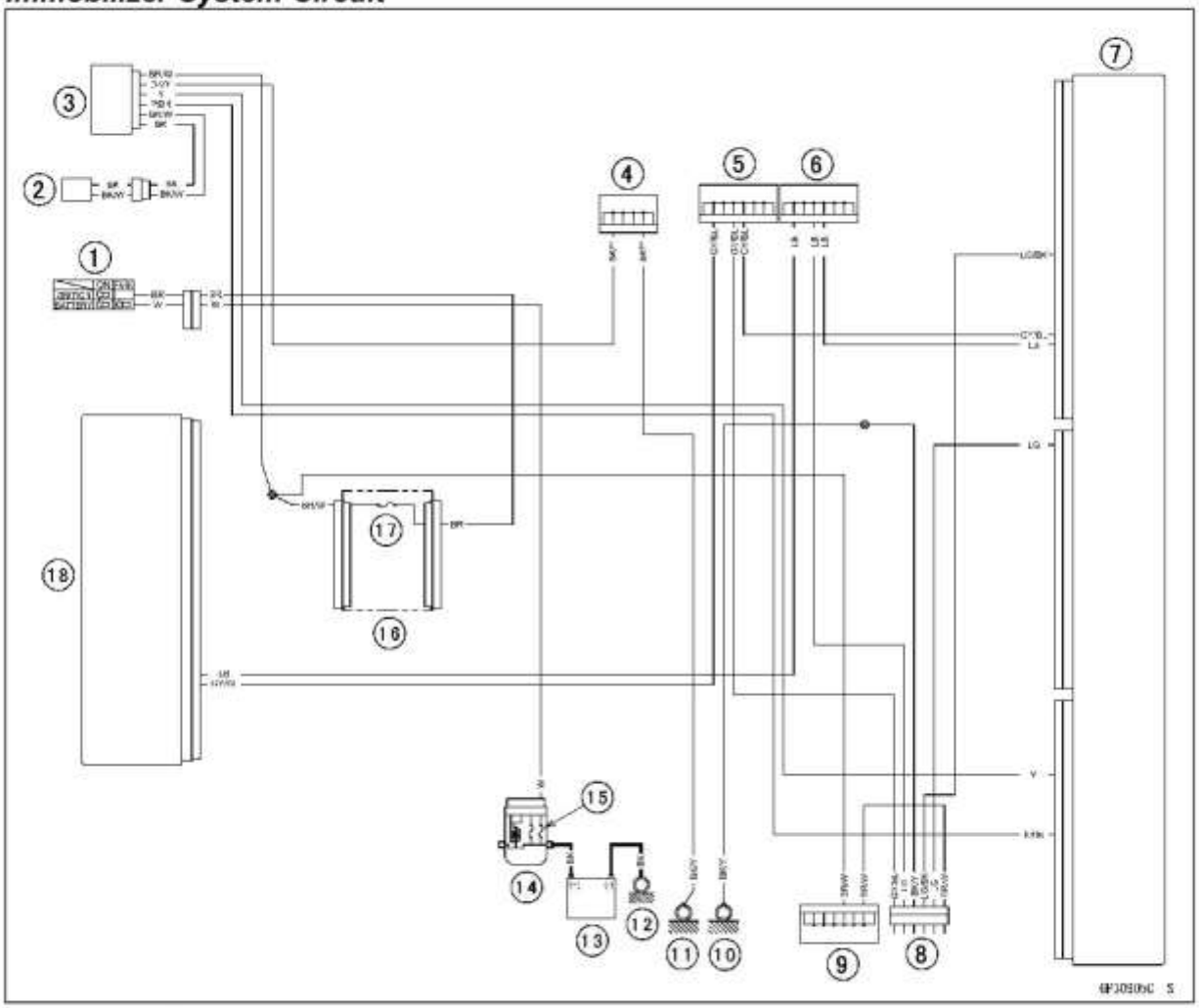
*	Replacement Part
●	Main Replacement Part
○	Additional Replacement Part

Immobilizer System Inspection

- Refer to the Immobilizer Amplifier and Blank Key Detection section (see Immobilizer Amplifier (Service Code 35, Equipped Models) section (17-76)) (see Blank Key Detection (Service Code 36, Equipped Models) section (17-77)).

Immobilizer System (Equipped Models)

Immobilizer System Circuit



1. Ignition Switch
2. Immobilizer Antenna
3. Immobilizer Amplifier
4. Joint Connector (1)
5. Joint Connector (CAN High)
6. Joint Connector (CAN Low)
7. ECU
8. Immobilizer/Kawasaki Diagnostic System Connector
9. Joint Connector (3)
10. Frame Ground (4)
11. Frame Ground (1)
12. Engine Ground
13. Battery
14. Starter Relay
15. Main Fuse 30 A
16. Fuse Box (1)
17. Ignition Fuse 15 A
18. Meter Unit

Switches and Sensors

Brake Light Timing Inspection

- Refer to the Brake Light Switch Operation Inspection (see Brake Light Switch Operation Inspection(2-59)).

Brake Light Timing Adjustment

- Refer to the Brake Light Switch Operation Inspection (see Brake Light Switch Operation Inspection(2-59)).

Switch Inspection

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

○For the switch housings and the ignition switch, refer to the tables in the Wiring Diagram.

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

Rear Brake Light Switch Connections

Rear Brake Light Switch Connections		
Color	BR	BL/W
When brake pedal is pushed down	○	○
When brake pedal is released		

Side Stand Switch Connections

Side Stand Switch Connections		
Color	BK	G
When side stand is down		
When side stand is up	○	○

Oil Pressure Switch Connections*

Oil Pressure Switch Connections *		
Color	SW. Terminal	Ground
When engine is stopped	○	○
When engine is running		

*: Engine lubrication system is in good condition.

Starter Lockout Switch Connections

Starter Lockout Switch Connections		
Color	G/W	R/W
When clutch lever is pulled in.	○	○
When clutch lever is released.		

Electronic Cruise Control Cancel Switch (Throttle) Connections

Electronic Cruise Control Cancel Switch (Throttle) Connections		
Color	BK	BL
When throttle grip is closed.		
When throttle grip is not closed.	○	○

Switches and Sensors

Electronic Cruise Control Cancel Switch (Clutch) Connections

Electronic Cruise Control Cancel Switch (Clutch) Connections		
Color	BK	BK
When clutch lever is pulled in.		
When clutch lever is released.	○——	——○

or

Electronic Cruise Control Cancel Switch (Clutch) Connections		
Color	BL	BK
When clutch lever is pulled in.		
When clutch lever is released.	○——	——○

Brake/Electronic Cruise Control Cancel Switch Connections

Brake/Electronic Cruise Control Cancel Switch Connections			
Color	BK/G	BK	BK/BL
When brake lever is pulled in.	○——	——○	
When brake lever is released.		○——	——○

or

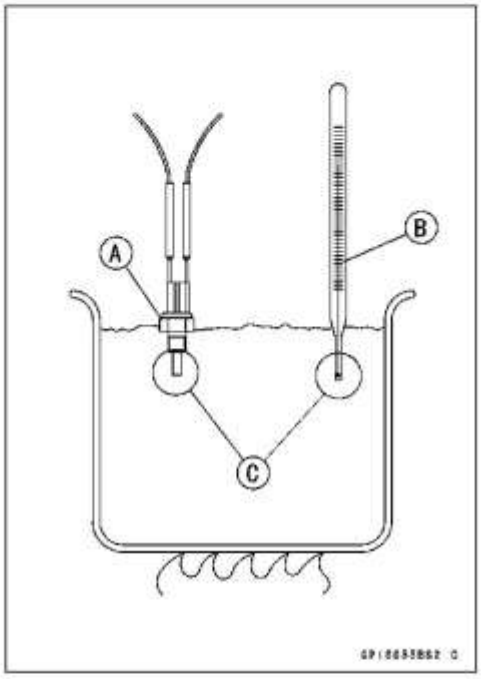
Brake/Electronic Cruise Control Cancel Switch Connections			
Color	R	BK	BL
When brake lever is pulled in.	○——	——○	
When brake lever is released.		○——	——○

Electronic Cruise Control Cancel Switch (Rear Brake) Connections

Electronic Cruise Control Cancel Switch (Rear Brake) Connections		
Color	BL	BK
When brake pedal is pushed down.		
When brake pedal is released.	○——	——○

Switches and Sensors

Water Temperature Sensor Inspection



- Remove the water temperature sensor (see Water Temperature Sensor Removal/Installation(17-41)).
- Suspend the sensor [A] in a container of coolant so that the threaded portion is submerged.
- Suspend an accurate thermometer [B] with temperature sensing portions [C] located in almost the same depth.

NOTE

○*The sensor and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the coolant while stirring the coolant gently.
- Using a digital meter, measure the internal resistance of the sensor.

★If the digital meter does not show the specified values, replace the sensor.

Water Temperature Sensor Resistance

Temperature	Resistance (kΩ)
–20°C (–4°F)	*18.80 ±2.37
0°C (32°F)	*(about 6.544)
40°C (104°F)	1.136 ±0.095
100°C (212°F)	0.1553 ±0.0070

*: Reference Information

Oxygen Sensor Removal

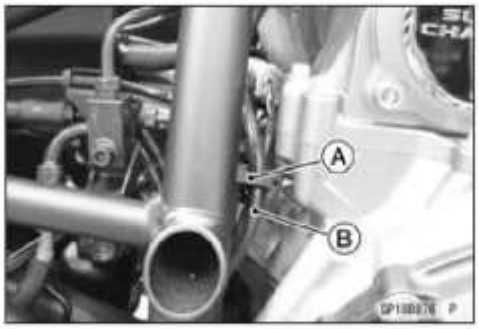
NOTICE

Never drop the sensor especially on a hard surface. Such a shock to the sensor can damage it.

NOTICE

Do not pull strongly, twist, or bend the oxygen sensor lead. This may cause the wiring open.

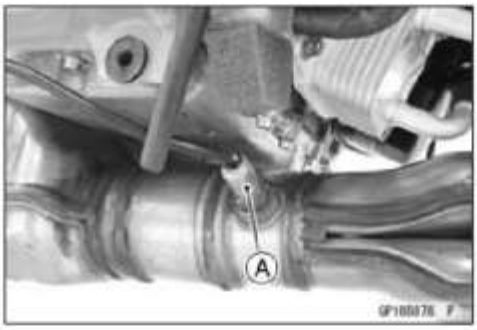
- Remove:
  Fuel Tank (see Fuel Tank Removal(3-75))
  Right Lower Fairing (see Lower Fairing Removal(15-14))
- Disconnect the oxygen sensor lead connector [A].



- Open the clamp [A].
- Clear the lead [B].

- Remove the clamps [A].

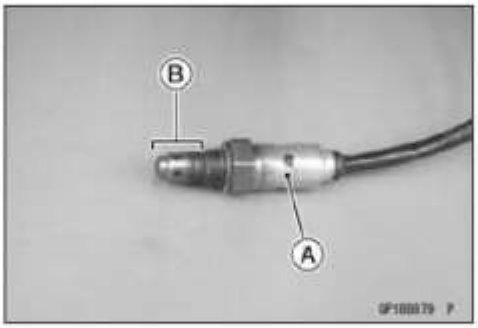
- Remove the oxygen sensor [A].



Oxygen Sensor Installation

NOTICE

Never drop the oxygen sensor [A] especially on a hard surface. Such a shock to the unit can damage it. Do not touch the sensing part [B] to prevent oil contact. Oil contamination from hands can reduce sensor performance.



- Tighten:

  Torque - Oxygen Sensor: 25 N·m (2.5 kgf·m, 18 ft·lb)

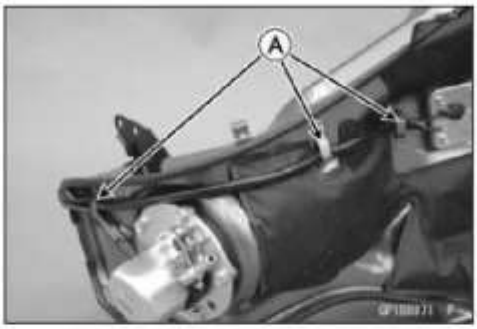
- Run the oxygen sensor lead correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Install the removed parts.

Oxygen Sensor Inspection

- Refer to the Oxygen Sensor Inspection (see Oxygen Sensor Inspection(17-69)).

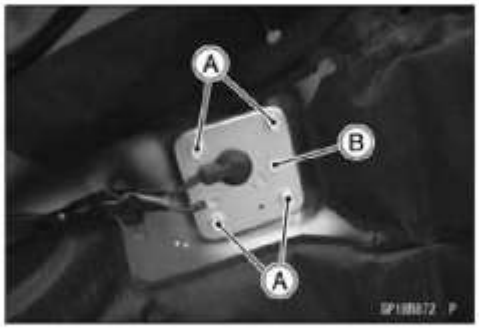
Fuel Level Sensor Inspection

- Remove the fuel tank (see Fuel Tank Removal(3-75)).
- Open the clamps [A].



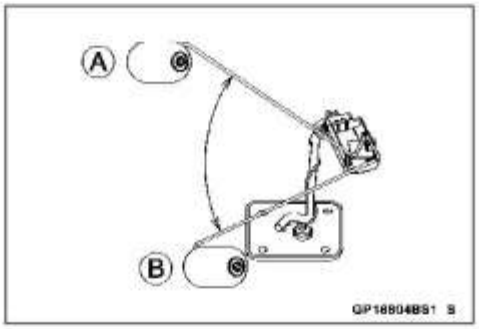
Switches and Sensors

- Remove:
  Bolts [A]
  Fuel Level Sensor [B]



- Check that the float moves up and down smoothly without binding. It should go down under its own weight.

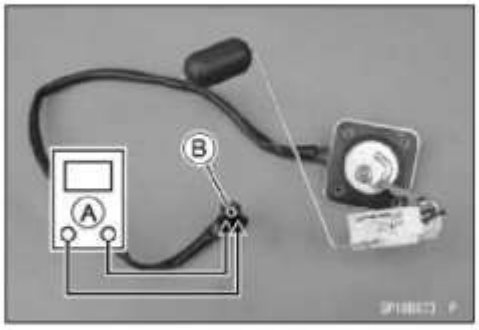
★If the float does not move smoothly, replace the sensor.
  Float in Full Position [A]
  Float in Empty Position [B]



- Using a tester [A], measure the resistance across the terminals in the fuel level sensor lead connector [B].

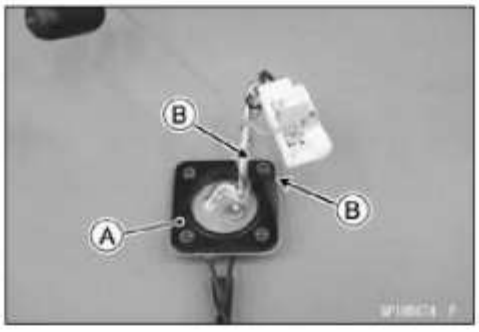
★If the tester readings are not as specified, or do not change smoothly according as the float moves up and down, replace the sensor.

Fuel Level Sensor Resistance
Standard: Full Position: 9 ~ 11 Ω
Empty Position: 213 ~ 219 Ω



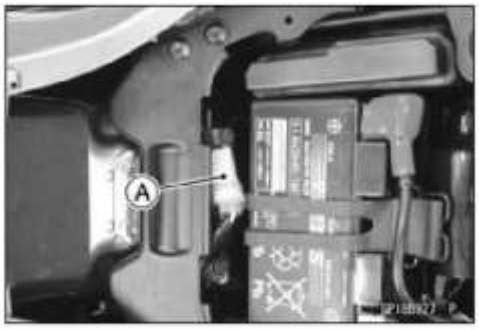
- Install a new gasket [A] on the fuel level sensor as shown.
  Hollows [B]
- Apply a non-permanent locking agent to the threads of the fuel level sensor bolts and tighten them.

Torque - Fuel Level Sensor Bolts: 7.0 N·m (0.71 kgf·m, 62 in·lb)

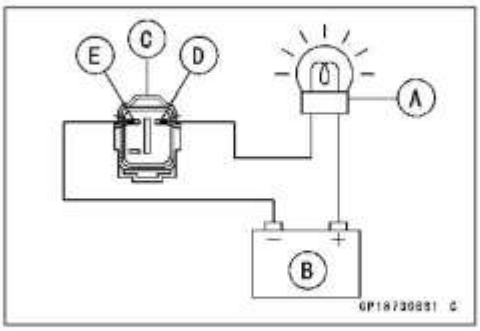


Fuel Reserve Switch Inspection

- Fill the fuel tank with fuel and close the fuel tank cap.
- Remove the front seat (see Front Seat Removal(15-13)).
- Disconnect the fuel pump lead connector [A].



Switches and Sensors



- Connect the test light [A] (12 V 3.4 W bulb in a socket with leads) and the 12 V battery [B] to the fuel pump lead connector [C].

Connections:
Battery (+) → 12 V 3.4 W Bulb (One Side)
12 V 3.4 W Bulb (Other Side) → R/BK lead [D]
Battery (–) → BK/W lead [E]

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

- Draw the fuel out from the fuel tank with a commercially available pump (see Fuel Tank Removal(3-75)).
- Connect the test light (12 V 3.4 W bulb in a socket with leads) and the 12 V battery to the fuel pump lead connector in the same way again.

Connections:
Battery (+) → 12 V 3.4 W Bulb (One Side)
12 V 3.4 W Bulb (Other Side) → R/BK lead
Battery (–) → BK/W lead

★If the test light does not 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 is drawn. Leave the fuel pump lead connector with leads for inspection connected for few minutes.*

Gear Position Sensor Removal

- Remove:
  Rear Intake Duct (see Intake Duct Removal(15-23))
  Engine Sprocket Cover (see Engine Sprocket Removal(11-10))
- Disconnect the gear position sensor lead connector [A].

- Open the clamps [A] to clear the gear position sensor lead.

Switches and Sensors

- Remove:
  Gear Position Sensor Bolt [A]
  Gear Position Sensor [B]

Gear Position Sensor Installation

- Replace the O-ring [A] with a new one.
- Apply grease to the new O-ring.
- Install the gear position sensor so that the slit [B] fits to the projection [C] on the shift drum.
- Tighten:

Torque - Gear Position Sensor Bolt: 10 N·m (1.0 kgf·m, 89 in·lb)

○When installing the sensor which is fastened by bolt, tighten the bolt after placing the sensor on the bottom surface completely.

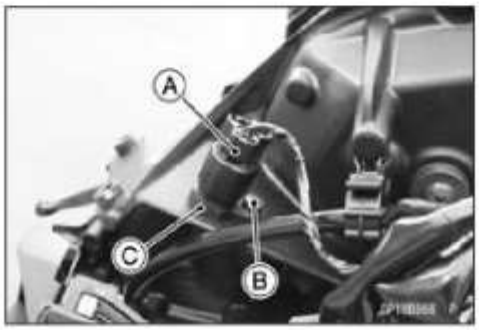
- Run the lead correctly (see Cable, Wire, and Hose Routing section (18-2)).
- Install the removed parts.

Gear Position Sensor Inspection

- Refer to the Gear Position Sensor Output Voltage Inspection (see Gear Position Sensor Output Voltage Inspection(17-60)).

Outside Temperature Sensor Removal

- Remove:
  Upper Fairing (see Upper Fairing Removal(15-18))
- Disconnect the connector [A].
- Remove:
  Bolt [B]
  Outside Temperature Sensor [C]

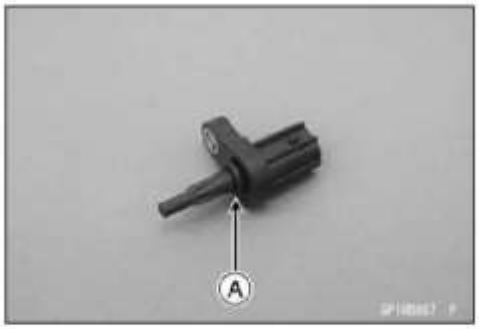


Outside Temperature Sensor Installation

- Check that the O-ring [A] is in place on the outside temperature sensor.
- Install the outside temperature sensor.
- Tighten the sensor bolt securely.

○When installing the sensor which is fastened by bolt, tighten the bolt after placing the sensor on the bottom surface completely.

- Install the removed parts.



Switches and Sensors

Outside Temperature Sensor Inspection

- Remove the outside temperature sensor (see Outside Temperature Sensor Removal(16-123)).
- Suspend the sensor [A] in a container of water so that the heat-sensitive portion is submerged.
- Suspend a thermometer [B] with the heat-sensitive portion [C] located in almost the same depth with the sensor.

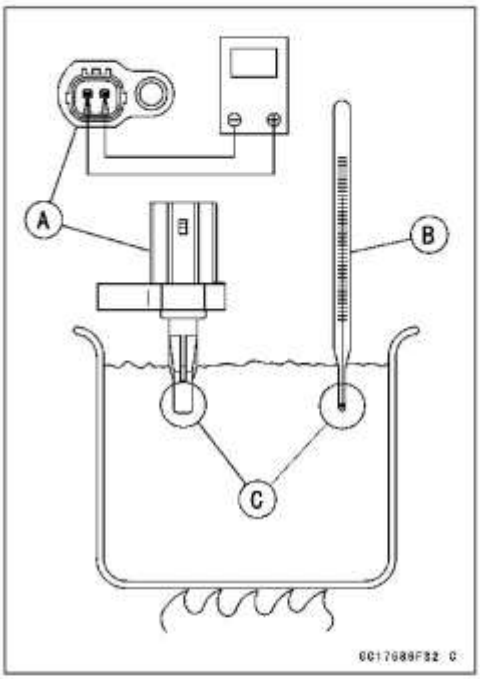
NOTE

○*The sensor and thermometer must not touch the container side or bottom.*

- Place the container over a source of heat and gradually raise the temperature of the water while stirring the oil gently for even temperature.
- Using a digital meter, measure the internal resistance of the sensor across the terminals at the temperatures shown in the following.

Outside Temperature Sensor Resistance
Standard: 5.4 ~ 6.6 kΩ @0°C (32°F)
0.29 ~ 0.39 kΩ @80°C (176°F)

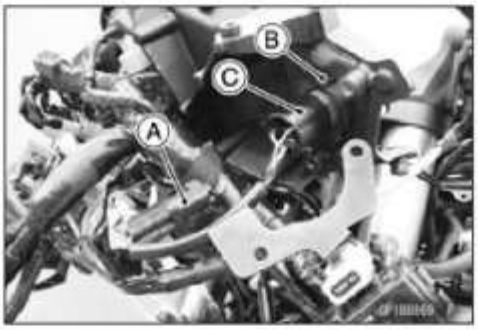
★If the reading is out of the standard, replace the sensor.



Accessory Socket Removal/Installation

- Remove:
  Upper Fairing (see Upper Fairing Removal(15-18))
  Bolts [A]

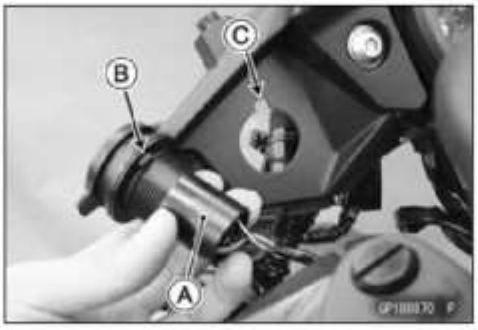
- Disconnect the connector [A].
- Remove:
  Accessory Socket Nut [B]
  Accessory Socket [C]



- Installation is the reverse of removal.
- Insert the accessory socket [A] to the meter bracket.

○Align the tab [B] with the cut-out [C].

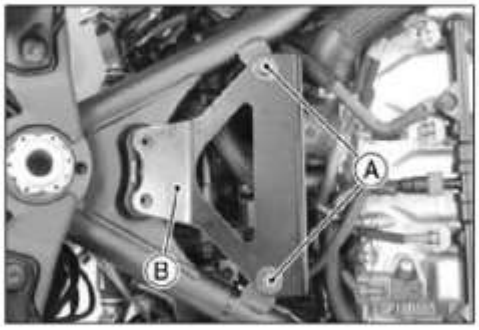
- Tighten the accessory socket nut securely.
- Install the removed parts.



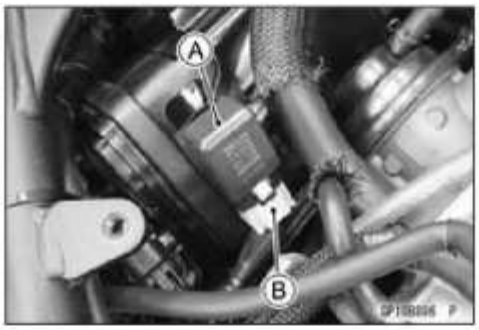
Switches and Sensors

Accessory Relay Inspection

- Remove:
  Fuel Tank (see Fuel Tank Removal(3-75))
  Bolts [A]
  Bracket [B]



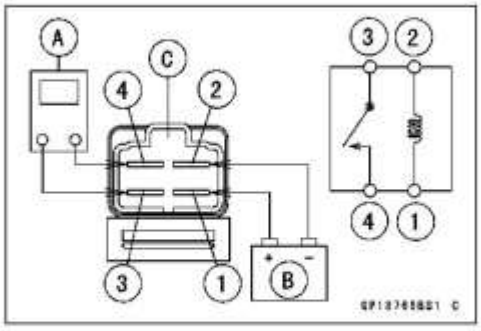
- Remove the accessory relay [A].
- Disconnect the accessory relay connector [B].



- Connect a digital meter [A] between the relay terminals [3] and [4].
- Connect a 12 V battery [B] between the relay terminals [1] and [2].
- ★If the relay [C] does not work as specified, the relay is defective. Replace the relay.

Testing Relay

Criteria: **When battery is connected → 0 Ω**
When battery is disconnected → ∞ Ω



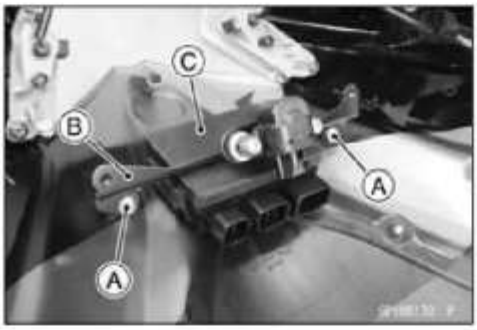
Relay Box

NOTE

○*The relay box [A] has relays and diodes. The relays and diodes can not be removed.*

Relay Box Removal

NOTICE
Never drop the relay box especially on a hard surface. Such a shock to the relay box can damage it.



- Remove:
  Upper Fairing (see Upper Fairing Removal(15-18))
  Screws [A]
  Bracket [B]
  Relay Box [C]

Relay Circuit Inspection

- Remove the relay box (see Relay Box Removal(16-126)).
- Check conductivity of the following numbered terminals by connecting a tester and one 12 V battery to the relay box as shown (see Relay Box Internal Circuit(16-128)).

★If the tester does not read as specified, replace the relay box.

Relay Circuit Inspection (with the battery disconnected)

	Tester Connection	Tester Reading (Ω)
Headlight Circuit Relay	1-3	∞
ECU Main Relay	7-6	∞
	4-5	Not ∞*
Fuel Pump Relay	7-8	∞
	9-10	Not ∞*
Starter Circuit Relay	11-16	∞
	11-12	∞
Radiator Fan Relay	17-20	∞
	18-19	Not ∞*

*: The actual reading varies with the tester used.

Relay Box

Relay Circuit Inspection (with the battery connected)

	Battery Connection (+) (–)	Tester Connection	Tester Reading (Ω)
Headlight Circuit Relay	2-11	1-3	0
ECU Main Relay	4-5	7-6	0
Fuel Pump Relay	9-10	7-8	0
Radiator Fan Relay	18-19	17-20	0

	Battery Connection (+) (–)	Tester Connection (+) (–)	Tester Reading (V)
Starter Circuit Relay	16-12	11-12	Nearly Battery Voltage *

(+): Apply positive lead.
(–): Apply negative lead.
*: The voltage goes down slightly by the diode.

Diode Circuit Inspection

- Remove the relay box (see Relay Box Removal(16-126)).
- Check conductivity of the following pairs of terminals (see Relay Box Internal Circuit(16-128)).

Diode Circuit Inspection

Tester Connection	1-11, 2-11, 12-13, 12-15, 12-16, 13-14, 13-15

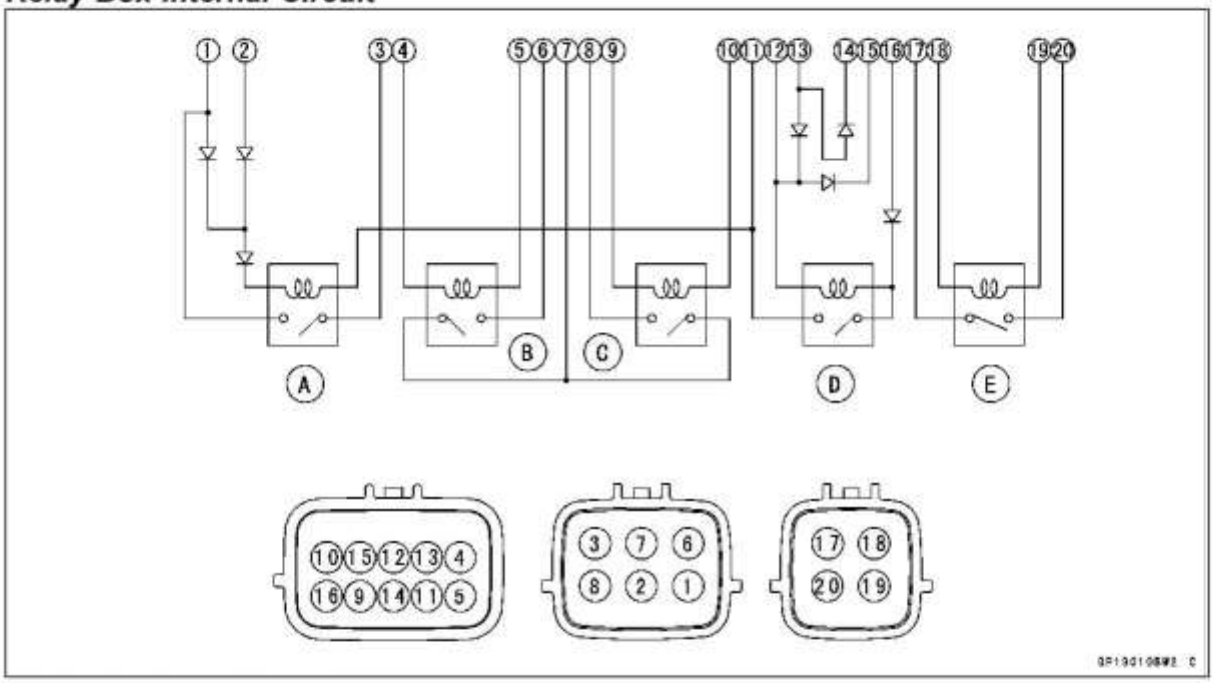
★The resistance should be low in one direction and more than 10 times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the relay box must be replaced.

NOTE

○*The actual meter reading varies with the meter or tester used and the individual diodes, but generally speaking, the lower reading should be from zero to one half the scale.*

Relay Box

Relay Box Internal Circuit



A: Headlight Circuit Relay
B: ECU Main Relay
C: Fuel Pump Relay
D: Starter Circuit Relay
E: Radiator Fan Relay

Fuse

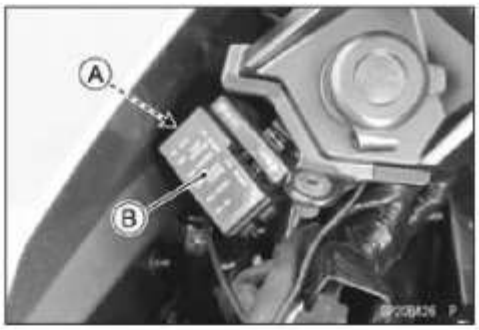
30 A Main/15 A ECU Fuse Removal

- Remove:
  Starter Relay Cover (see Starter Relay Inspection(16-54))
- Pull out the fuses [A] from the starter relay with needle nose pliers.

Fuse Box Fuse Removal

Fuse Box (1)

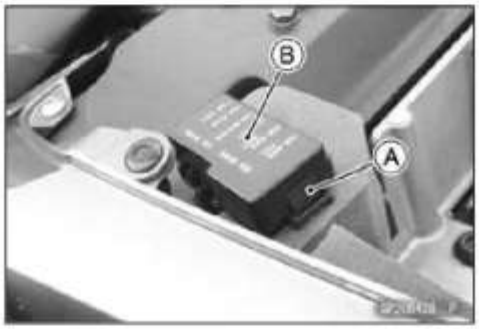
- Remove:
  Left Upper Inner Fairing (see Upper Inner Fairing Removal(15-18))
- Unlock the hook [A] to lift up the lid [B].



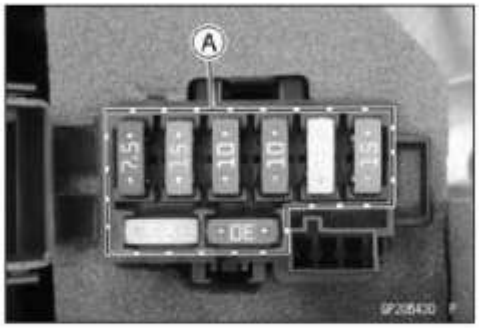
- Pull the fuses [A] straight out of the fuse box with needle nose pliers.

Fuse Box (2)

- Remove:
  Rear Seat (see Rear Seat Removal(15-13))
- Unlock the hook [A] to lift up the lid [B].



- Pull the fuses [A] straight out of the fuse box with needle nose pliers.

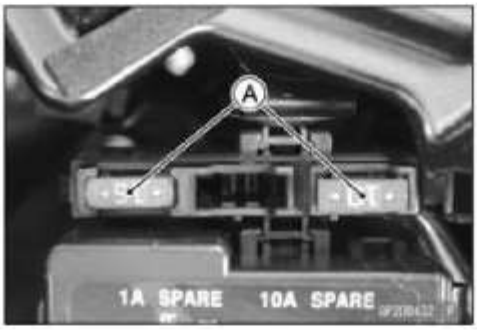


Fuse

Fuse Box (3)

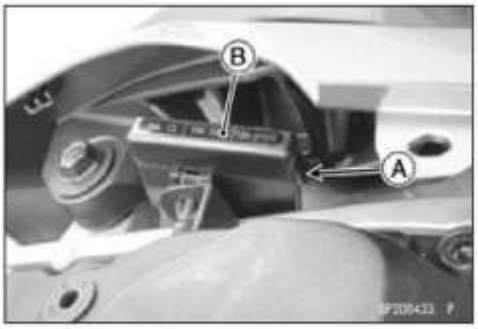
- Remove:
  Left Upper Inner Fairing (see Upper Inner Fairing Removal(15-18))
- Unlock the hook [A] to lift up the lid [B].

- Pull the fuses [A] straight out of the fuse box with needle nose pliers.



Fuse Box (4)

- Remove:
  Right Seat Sub Cover (see Seat Cover Removal(15-27))
- Unlock the hook [A] to lift up the lid [B].



- Pull the fuses [A] straight out of the fuse box with needle nose pliers.

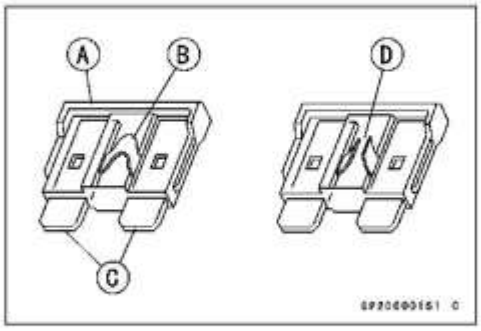
Fuse Installation

★If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of proper amperage.

- Install the fuse box fuses on the original position as specified on the lid.

Fuse

Fuse Inspection



- Remove the fuse (see 30 A Main/15 A ECU Fuse Removal(16-129)) (see Fuse Box Fuse Removal(16-129)).
- Inspect the fuse element.

★If it is blown out, replace the fuse. Before replacing a blown fuse, always check the amperage in the affected circuit. If the amperage is equal to or greater than the fuse rating, check the wiring and related components for a short circuit.

Housing [A]
Fuse Element [B]
Terminals [C]
Blown Element [D]

NOTICE

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