Kawasaki

JET SKi® watercraft

ULTRA LX

JET SKi® Watercraft Service Manual

General Information

Table of Contents

General Specifications

Items	JT1500KC
Engine	
Type	4-stroke, DOHC, 4-cylinder, water cooled
Displacement	1 498 cm³ (91.4 cu in.)
Bore and Stroke	83 × 69.2 mm (3.27 × 2.72 in.)
Compression Ratio	10.6:1
Maximum Horsepower	112 kW (152 PS) @7 500 r/min (rpm) (AU) 118 kW (160 PS) @7 500 r/min (rpm) (US) – – –
Maximum Torque	144 N·m (14.7 kgf·m, 106 ft·lb) @7 250 r/min (rpm) (AU) 152 N·m (15.5 kgf·m, 112 ft·lb) @7 250 r/min (rpm) (US) – – –
Ignition System	Digital transistor
Lubrication System	Forced lubrication (semi-dry sump)
Carburetion System	FI (fuel injection) MIKUNI AC 60 × 1
Starting System	Electric starter
Cylinder Numbering Method	Front (bow) to rear (stern), 1-2-3-4
Firing Order	1-2-4-3
Valve Timing:	
Intake:	
Open	22.5° BTDC
Close	67.5° ABDC
Duration	270°
Exhaust:	
Open	74.5° BBDC
Close	9.5° ATDC
Duration	264°
Tuning Specifications	
Spark plug:	
Type	NGK CR9EK
Terminal	Threaded terminal
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in.)
Ignition Timing	3° ATDC @1 300 r/min ~ 32° BTDC @3 000 r/min (rpm)
Idle Speed	1 300 ±100 r/min (rpm) -in water 1 300 ±100 r/min (rpm) -out of water
Compression Pressure	1 190 ~ 1 799 kPa (12.1 ~ 18.3 kgf/cm², 173 ~ 261 psi) @430 r/min (rpm)
Drive System	
Coupling	Direct drive from engine
Jet Pump:	
Type	Axial flow single stage
Thrust:	
EUR Model	4 130 N (421.3 kgf, 928.4 lb)
Other than EUR Models	4 250 N (433.5 kgf, 955.4 lb)
Steering	Steerable nozzle
Braking	Water drag

Torque and Locking Agent

Fastener	Torque			Remarks
	N·m	kgf·m	ft·lb	
Meter Unit Mounting Bolts	9.8	1.0	87 in·lb	L
Oil Temperature Sensor	15	1.5	11	
Regulator/Rectifier Bolts	7.8	0.80	69 in·lb	
Relay Mounting Bolts	2.5	0.25	22 in·lb	L
Rubber Grommet Holder Screws	4.5	0.46	40 in·lb	L
Spark Plugs	13	1.3	115 in·lb	
Speed Sensor Mounting Screws	3.9	0.40	35 in·lb	L
Starter Motor Ground Bolt	8.8	0.90	78 in·lb	L
Starter Motor Mounting Bolts	8.8	0.90	78 in·lb	L
Starter Motor Terminal Nut	8.8	0.90	78 in·lb	
Starter Motor Through Bolts	6.4	0.65	57 in·lb	L, R
Starter Relay Terminal Bolts	5.5	0.56	49 in·lb	
Stator Coil Bolts	12	1.2	106 in·lb	L
Stator Coil Grommet Holder Plate Bolts	8.8	0.90	78 in·lb	L
Timing Rotor Bolt	20	2.0	15	L
Vehicle-down Sensor Mounting Screws	1.5	0.15	13 in·lb	
Water Temperature Sensor	14.7	1.5	11	
Water Temperature Sensor (for Meter Unit)	8.8	0.90	78 in·lb	

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

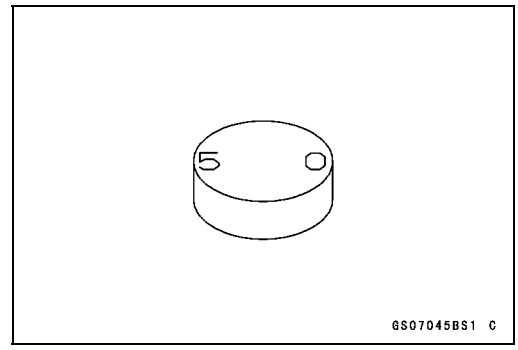
Basic Torque for General Fasteners (stainless bolt and nut)

Threads Diameter (mm)	Torque		
	N·m	kgf·m	ft·lb
6	5.9 ~ 8.8	0.60 ~ 0.90	52 ~ 78 in·lb
8	16 ~ 22	1.6 ~ 2.2	12 ~ 16
10	30 ~ 41	3.1 ~ 4.2	22 ~ 30

Periodic Maintenance Procedures

Adjustment Shims

Thickness	Part Number	Mark
2.000	92025-1870	0
2.050	92025-1871	5
2.100	92025-1872	10
2.150	92025-1873	15
2.200	92025-1874	20
2.250	92025-1875	25
2.300	92025-1876	30
2.350	92025-1877	35
2.375	92180-1058	38
2.400	92025-1878	40
2.425	92025-1982	43
2.450	92025-1879	45
2.475	92025-1983	48
2.500	92025-1880	50
2.525	92025-1984	53
2.550	92025-1881	55
2.575	92025-1985	58
2.600	92025-1882	60
2.625	92180-1059	63
2.650	92025-1883	65
2.675	92180-1194	68
2.700	92025-1884	70
2.725	92180-1195	73
2.750	92025-1885	75
2.775	92180-1196	78
2.800	92025-1886	80
2.850	92025-1887	85
2.900	92025-1888	90
2.950	92025-1889	95
3.000	92025-1890	00



Periodic Maintenance Procedures

All Hoses, Hose Clamps, Nuts, Bolts and Fasteners Check

Nuts, Bolts, and Fasteners Tightness Inspection

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

NOTE

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

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

★If cotter pins are damaged, replace them with new ones.

Nut, Bolt and Fastener to be checked

Engine:
- Oil Filter
- Engine Mounting Bolts (and bracket bolts)
- Engine Damper Mounting Bolts
- Cylinder Head Cover Bolts
- Cylinder Head Bolts
- Crankcase Bolts

Drive Shaft, Pump, and Impeller:
- Drive Shaft Holder Mounting Bolts
- Pump Mounting Bolts
- Pump Cover Mounting Bolts
- Grate Mounting Bolts
- Steering Nozzle Pivot Bolts
- Reverse Bucket Pivot Bolts

Steering:
- Handlebar Clamp Bolts
- Steering Neck Mounting Bolts
- Steering Holder Mounting Nuts
- Steering Shaft Locknut
- Steering Cable Nut
- Steering Cable Joint Bolt
- Shift Cable Nut

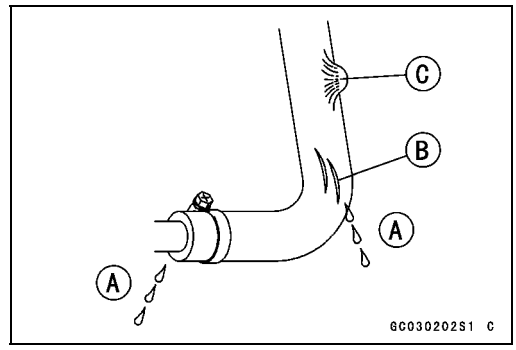
Hull and Engine Hood:
- Stabilizer Bolts
- Handrail Plate Nuts

Electrical System:
- Spark Plugs
- Battery Terminal

Hose and Hose Connect Inspection

● Check the following hoses for leakage [A], hardening, cracking [B], checking, cuts, abrasions, breaks and bulges [C]. And make sure the hoses are not kinked or pinched.
- Fuel Vent Hose
- Oil Hoses
- Water Hoses
- Bilge Hoses

★If a hose is damaged in any way, replace it immediately and check all the others for damage.



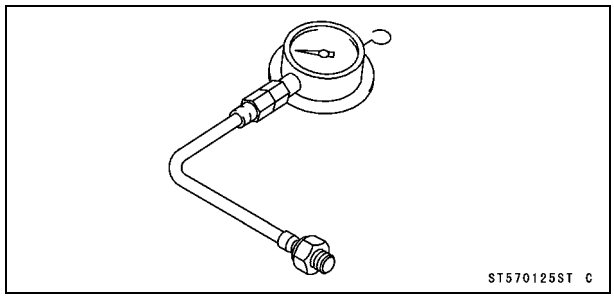
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Fuel Filler Hose Clamp Screws	2.9	0.30	26 in·lb	
2	Fuel Pump Rubber Holder Clamp Screws	2.9	0.30	26 in·lb	

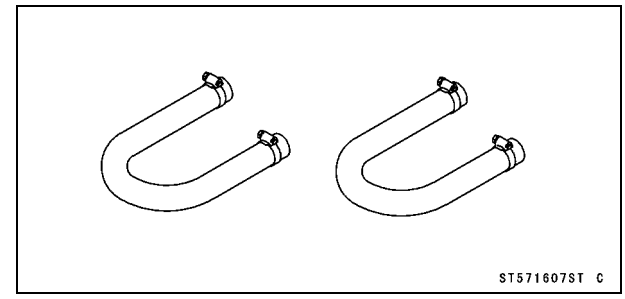
3. AU and EUR Models
R: Replacement Parts

Special Tools and Sealant

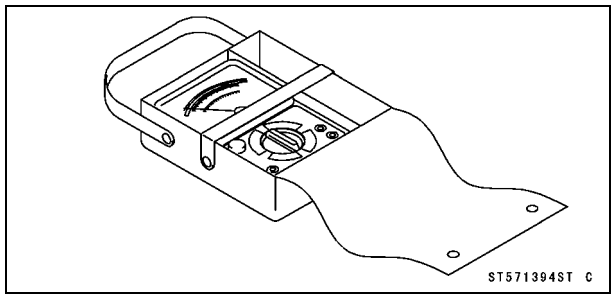
Oil Pressure Gauge, 5 kgf/cm²:
57001-125



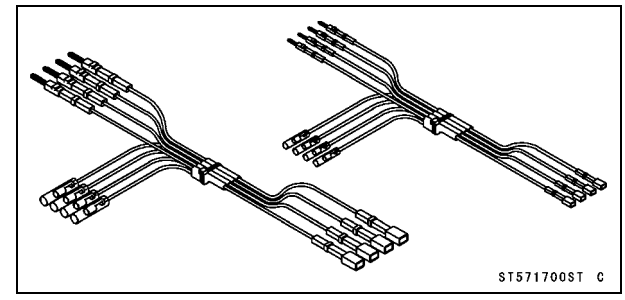
Fuel Hose:
57001-1607



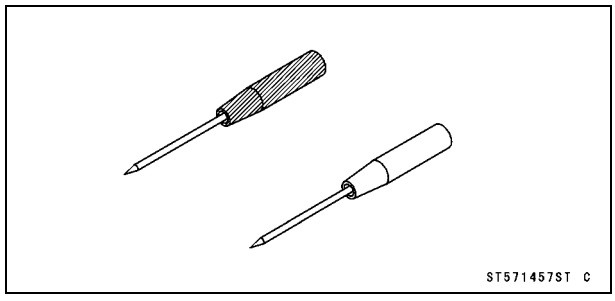
Hand Tester:
57001-1394



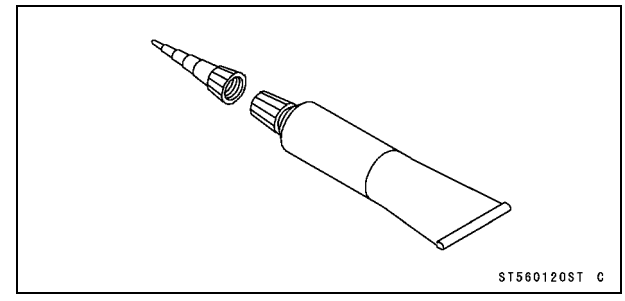
Measuring Adapter:
57001-1700



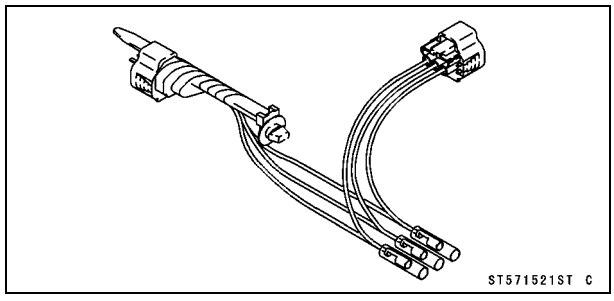
Needle Adapter Set:
57001-1457



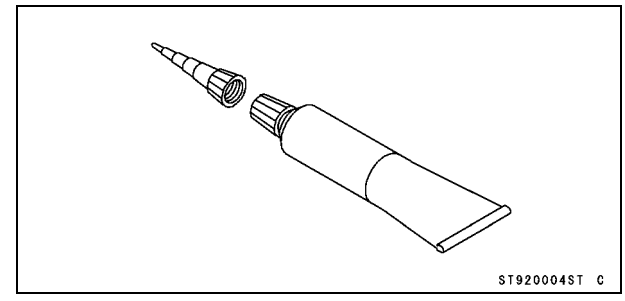
Liquid Gasket, TB1211:
56019-120



Throttle Sensor Setting Adapter:
57001-1521



Liquid Gasket, TB1211F:
92104-0004



Fuel Pressure Gauge Adapter:
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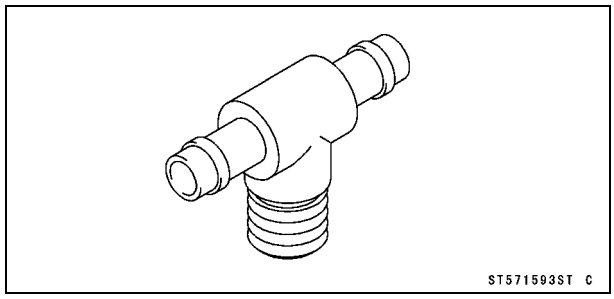
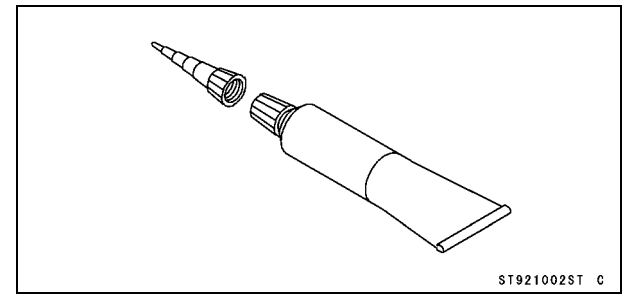


Heat Transfer Grease, SCH-20:
92137-1002



DFI System Troubleshooting Guide

NOTE

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

○*The ECU may be involved in the DFI electrical and ignition system troubles. If these parts and circuits are checked out good, be sure to check the ECU for ground and power supply. If the ground and power supply are checked good, replace the ECU.*

Engine Won't Turn Over

Symptoms or Possible Causes	Actions
Immobilizer system trouble	Inspect (see chapter 14).
Vehicle-down sensor operated	Turn ignition switch OFF (see chapter 3).
Vehicle-down sensor trouble	Inspect (see chapter 3).
Crankshaft sensor trouble	Inspect (see chapter 14).
Ignition coil shorted or not in good contact	Inspect or reinstall (see chapter 14).
Ignition coil trouble	Inspect (see chapter 14).
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).
Spark plug incorrect	Replace it with the correct plug (see chapter 2).
ECU ground and power supply trouble	Inspect (see chapter 3).
ECU trouble	Inspect (see chapter 3).
No or little fuel in tank	Supply fuel (see Owner's Manual).
Fuel injector trouble	Inspect and replace (see chapter 3).
Fuel pump not operating	Inspect (see chapter 3).
Fuel pump relay trouble	Inspect and replace (see chapter 3).
Fuel filter or pump screen clogged	Inspect and replace fuel pump (see chapter 3).
Fuel pressure regulator trouble	Inspect fuel pressure and replace fuel pump (see chapter 3).
Fuel line clogged	Inspect and repair (see chapter 3).

Poor Running at Low Speed

Symptoms or Possible Causes	Actions
Spark weak:	
Ignition coil shorted or not in good contact	Inspect or reinstall (see chapter 14).
Ignition coil trouble	Inspect (see chapter 14).
Spark plug dirty, broken or gap maladjusted	Inspect and replace (see chapter 2).
Spark plug incorrect	Replace it with the correct plug (see chapter 2).
ECU trouble	Inspect (see chapter 3).
Fuel/air mixture incorrect:	
Little fuel in tank	Supply fuel (see Owner's Manual).
Air cleaner clogged, poorly sealed, or missing	Replace element or inspect sealing (see chapter 3).
Intake manifold loose	Reinstall (see chapter 3).
Throttle body assy loose	Reinstall (see chapter 3).
Throttle body assy gasket damage	Replace (see chapter 3).
Fuel injector O-ring damage	Replace (see chapter 3).
Fuel filter or pump screen clogged	Inspect and replace fuel pump (see chapter 3).

Self-Diagnosis

Service Code (used in ECU)	Service Code Character (displayed on Meter Unit)	Problems	Backups by ECU
75		ECU main relay malfunction, wiring is open or relay is stuck.	–
76		Engine oil overheat	The ECU slows down the engine speed less than 3 000 r/min (rpm) by controlling the ignition.

Note:

(1): D-J Method: When the engine load is light like at idling or low speed, the ECU determines the injection quantity by calculating from the throttle vacuum (intake air pressure sensor output voltage) and engine speed (crankshaft sensor output voltage). This method is called D-J method.

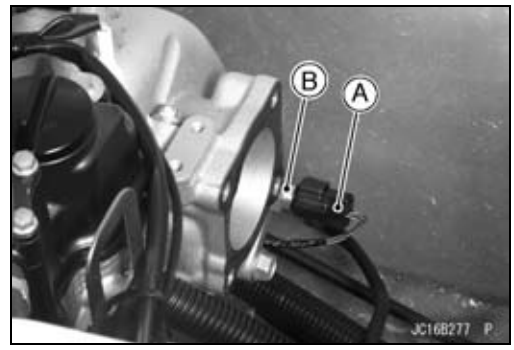
(2): α-N Method: As the engine speed increases, and the engine load turns middle to heavy, the ECU determines the injection quantity by calculating from the throttle opening (throttle position sensor output voltage) and the engine speed. This method is called α-N method.

Intake Air Temperature Sensor (Service Code/Character - 13/AIrt)

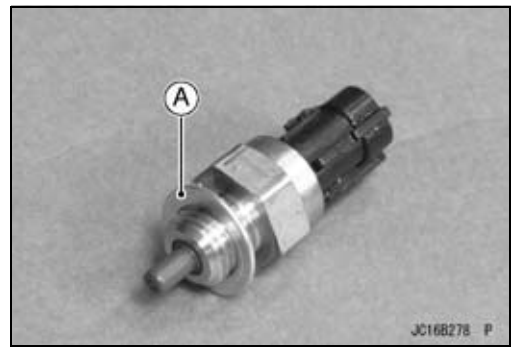
Intake Air Temperature Sensor Removal/Installation

NOTICE

A shock to the intake air temperature sensor can damage it. Do not drop the intake air temperature sensor.



- Remove the throttle body assy (see Throttle Body Assy Removal).
- Disconnect the connector [A].
- Remove the intake air temperature sensor [B] and washer.



- Install the intake air temperature sensor and washer [A].
- Tighten:

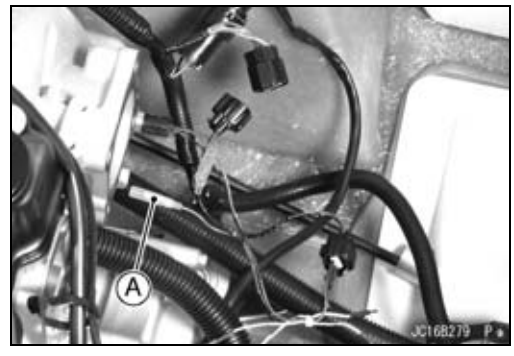
Torque - Intake Air Temperature Sensor: 20 N·m (2.0 kgf·m, 15 ft·lb)

Intake Air Temperature Sensor Output Voltage Inspection

NOTE

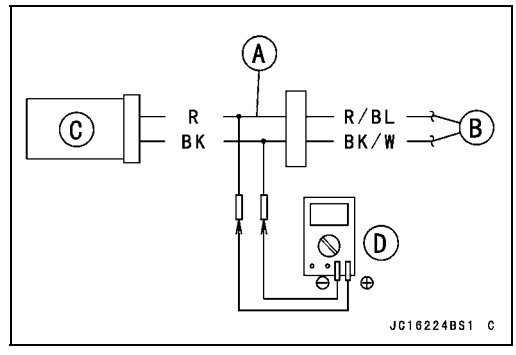
○*Be sure the battery is fully charged.*

- Remove the ignition key.
- Remove the throttle body assy (see Throttle Body Assy Removal).
- Disconnect the intake air temperature sensor connector and connect the measuring adapter [A] between these connectors as shown in the figure.
  Main Harness [B]
  Intake Air Temperature Sensor [C]



Special Tool - Measuring Adapter: 57001-1700

- Connect a digital meter [D] to the measuring adapter leads.



Intake Air Temperature Sensor Output Voltage
Connections to Adapter:
Digital Meter (+) → R (sensor R/BL) lead
Digital Meter (–) → BK (sensor BK/W) lead

- Measure the output voltage with the engine stopped and with the connector joined.
- Insert the ignition key in the ignition switch to turn it on.

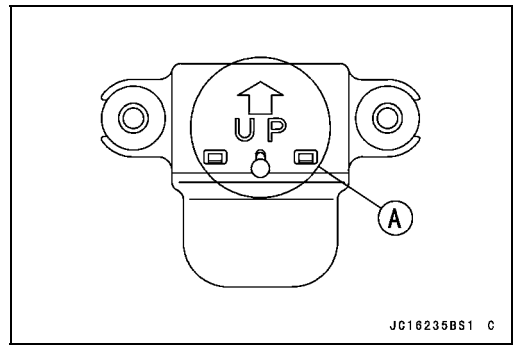
Output Voltage
Standard: About DC 2.25 ~ 2.50 V at intake air temperature 20°C (68°F)

NOTE

○*The output voltage changes according to the intake air temperature.*

Vehicle-down Sensor (Service Code/Character - 31/dOS)

Vehicle-down Sensor Installation



● The UP mark [A] of the sensor should face upward.

⚠ WARNING

Incorrect installation of the vehicle-down sensor could cause sudden loss of engine power. The rider could lose balance during certain riding situations for an accident resulting in injury or death. Ensure that the vehicle-down sensor is held in place by the sensor bracket.

● Tighten:

Torque - Vehicle-down Sensor Mounting Screws: 1.5 N·m (0.15 kgf·m, 13 in·lb)

● Connect the connectors.

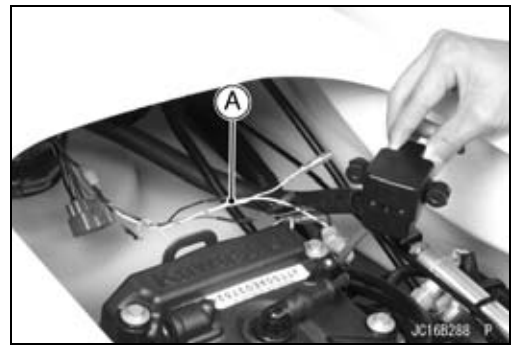
● Apply a non-permanent locking agent to the threads of the bracket bolts, and tighten them.

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

Vehicle-down Sensor Input Voltage Inspection

NOTE

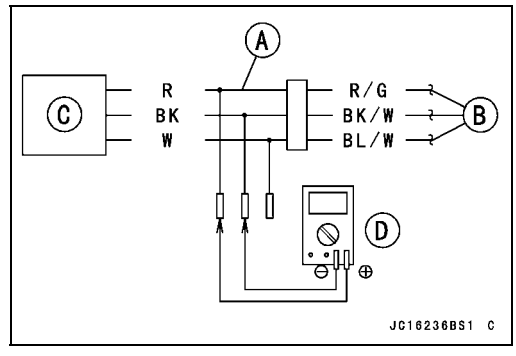
○*Be sure the battery is fully charged.*



● Remove the ignition key.

● Remove the seats (see Seat Removal in the Hull/Engine Hood chapter).

● Disconnect the vehicle-down sensor connector and connect the measuring adapter [A] between these connectors as shown in the figure.
Main Harness [B]
Vehicle-down Sensor [C]



Special Tool - Measuring Adapter: 57001-1700

● Connect a digital meter [D] to the measuring adapter leads.

Vehicle-down Sensor Input Voltage
Connections to Adapter:
Digital Meter (+) → R (sensor R/G) lead
Digital Meter (–) → BK (sensor BK/W) lead

● Measure the input voltage with the engine stopped and with the connector joined.

● Insert the ignition key in the ignition switch to turn it on.

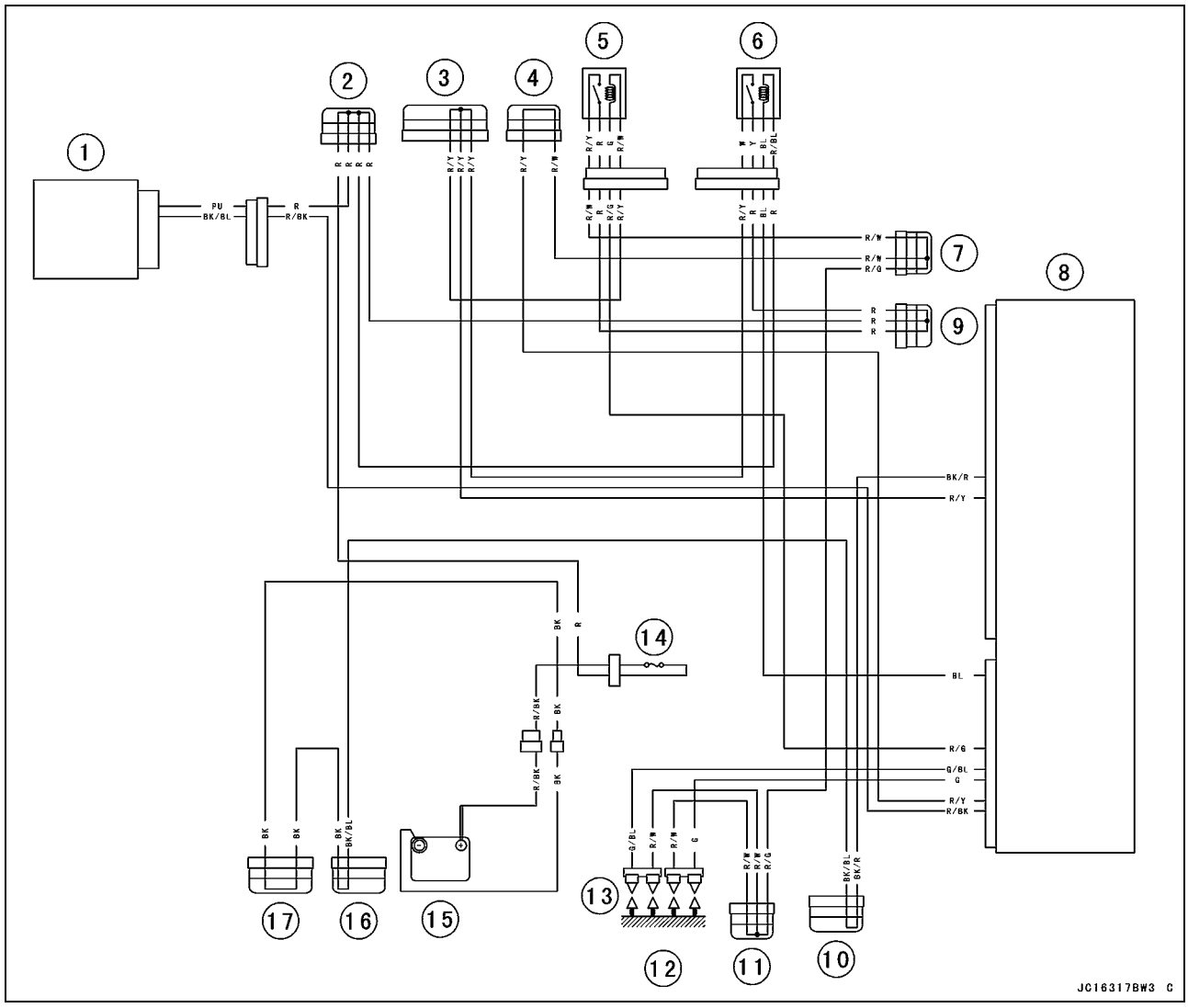
Input Voltage
Standard: DC 4.75 ~ 5.25 V

● Remove the ignition key.

★If the reading is within the standard, check the output voltage (see Vehicle-down Sensor Output Voltage Inspection).

Ignition Coils (Service Code/Character - 51, 52/COL1, COL2)

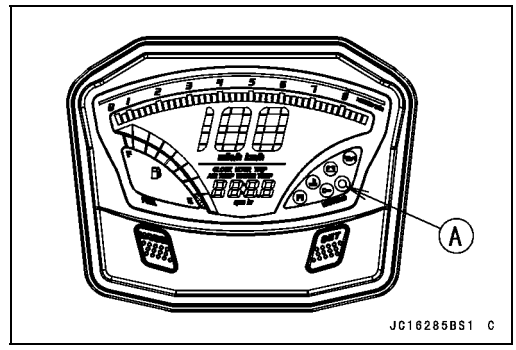
Ignition Coil Circuit



1. Ignition Switch
2. Joint Connector P (12 V)
3. Joint Connector R (12 V)
4. Joint Connector T (12 V)
5. ECU Main Relay
6. System Relay
7. Joint Connector D (12 V)
8. ECU
9. Joint Connector C (12 V)
10. Joint Connector E (Ground)
11. Joint Connector M (12 V)
12. Spark Plugs
13. Ignition Coils
14. Main Fuse 20 A
15. Battery
16. Joint Connector Y (Ground)
17. Joint Connector S (Ground)

Red Warning Indicator Light (LED)

Light (LED) Inspection

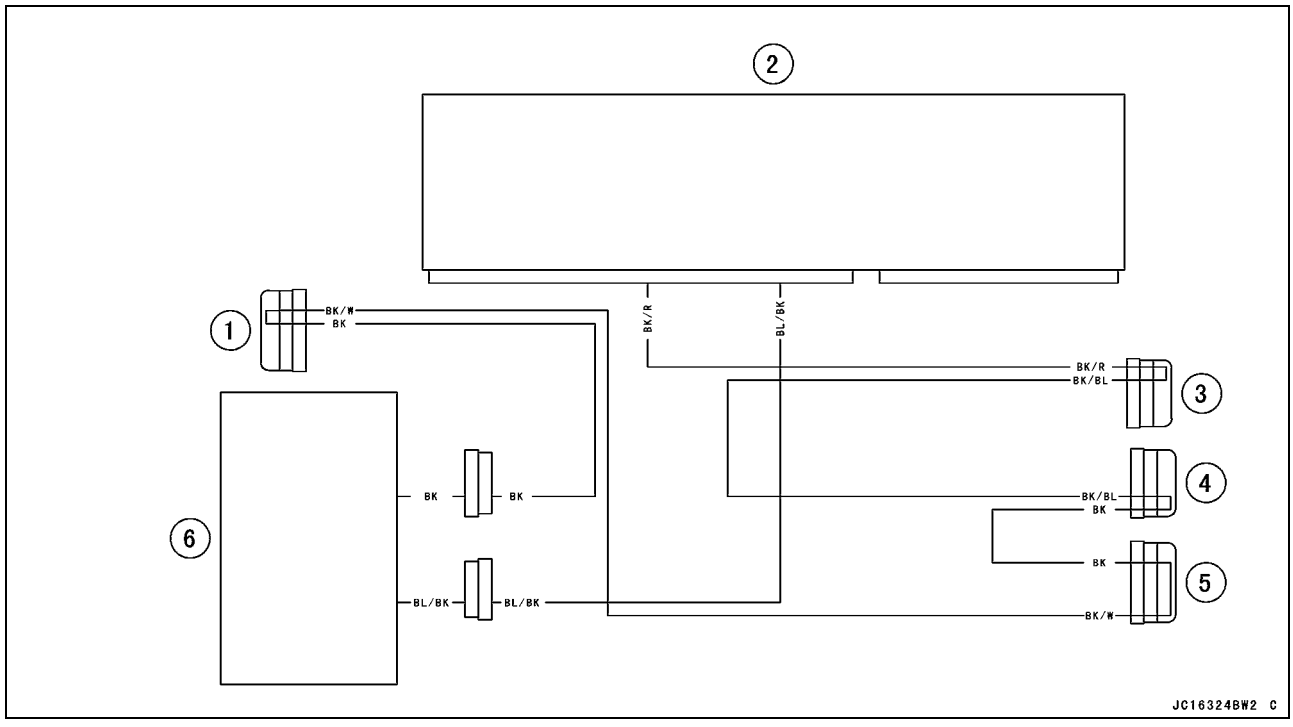


The red warning indicator light (LED) [A] is used for the following warnings.

Fuel Level
Low Battery Voltage
Engine Cooling Water Temperature
Engine Oil Pressure
Oil Temperature Sensor
Engine Oil Overheat
FI
Immobilizer

● Refer to the Meter Unit Operation Inspection in the Electrical System chapter.

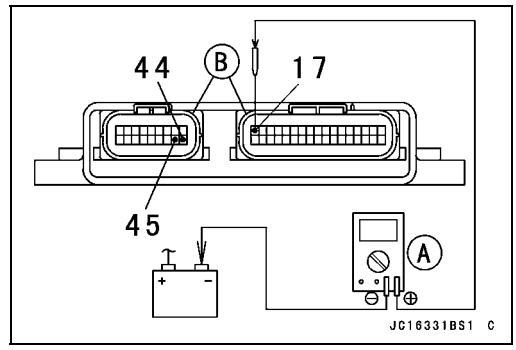
Red Warning Indicator Light (LED) (FI/Immobilizer) Circuit



1. Joint Connector Q (Ground)
2. ECU
3. Joint Connector E (Ground)
4. Joint Connector Y (Ground)
5. Joint Connector S (Ground)
6. Meter Unit

ECU

★If the wiring is good, check the power source voltage of the ECU.



NOTE

○*Be sure the battery is fully charged.*

- Connect the ECU connectors.
- Connect a digital meter [A] to the connectors [B] with the needle adapter set.

Special Tool - Needle Adapter Set: 57001-1457

ECU Power Supply Inspection

Connections:

(I) Digital Meter (+) → Terminal 17 (R/Y)

Digital Meter (–) → Battery (–) terminal

(II) Digital Meter (+) → Terminal 44 (R/Y)

Digital Meter (–) → Battery (–) terminal

(III) Digital Meter (+) → Terminal 45 (R/BK)

Digital Meter (–) → Battery (–) terminal

Ignition Switch OFF:

Terminal 17 (R/Y): 0 V

Terminal 44 (R/Y): 0 V

Terminal 45 (R/BK): 0 V

Ignition Switch ON:

Terminal 17 (R/Y): Battery Voltage

Terminal 44 (R/Y): Battery Voltage

Terminal 45 (R/BK): Battery Voltage (while pushing ignition switch)

★If the reading is out of the specification, check the following.

Main Fuse 20 A (see Fuse Inspection in the Electrical System chapter)

Ignition Switch (see Switch Inspection in the Electrical System chapter)

System Relay (see Relay Assembly Inspection in the Electrical System chapter)

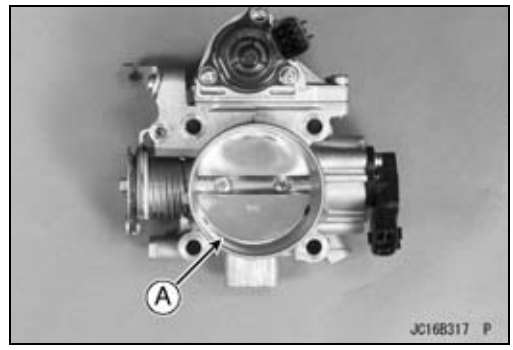
ECU Main Relay (see Relay Assembly Inspection in the Electrical System chapter)

Power Source Wiring (see wiring diagram in this section)

★If the fuse, ignition switch, relay and wiring are good, replace the ECU (see ECU Removal/Installation).

Throttle Body Assy

Throttle Bore Cleaning



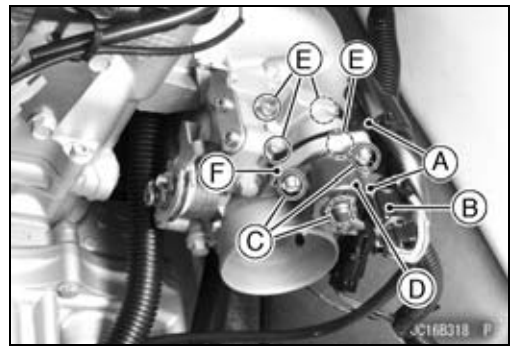
- Remove the throttle body assy (see Throttle Body Assy Removal).
- Check the throttle bore [A] for carbon deposits by opening the valve.

★If any carbon accumulates, wipe the carbon off the throttle bore and throttle valve, using a cotton pad.

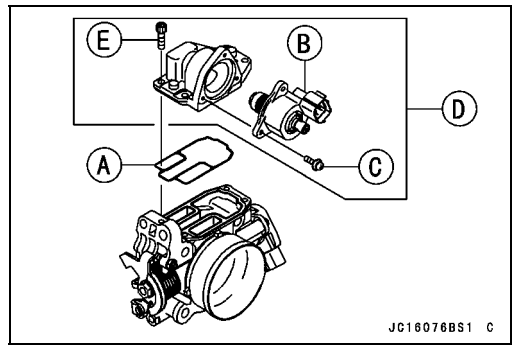
NOTICE

Do not rub these surfaces hard and do not use a carburetor cleaning solution.

ISC (Idle Speed Controller) Removal/Installation



- Remove:
  Seats (see Seat Removal in the Hull/Engine Hood chapter)
  Air Box (see Air Box Removal)
  Bands [A]
  ISC Connector [B]
  Stepping Motor Mounting Screws [C]
  Stepping Motor [D]
  ISC Actuator Mounting Bolts [E]
  ISC Actuator [F]



- Clean the mating surface of throttle body and ISC actuator (stepping motor).
- Replace the O-ring [A] with a new one.
- Install the stepping motor [B] and tighten the screws [C].

Torque - Stepping Motor Mounting Screws: 2.0 N·m (0.20 kgf·m, 18 in·lb)

- Install the ISC actuator [D] and tighten the bolts [E].

Torque - ISC Actuator Mounting Bolts: 5.0 N·m (0.51 kgf·m, 44 in·lb)

- Run the harness and tighten the bands correctly (see Cable, Wire and Hose Routing section in the Appendix chapter).
- After installing the ISC actuator, check the Smart Steering System Operation in the water.

ISC (Idle Speed Controller) Inspection

- Check idle speed with a tachometer in the multifunction meter.

○With the engine idling, open and close the throttle lever.

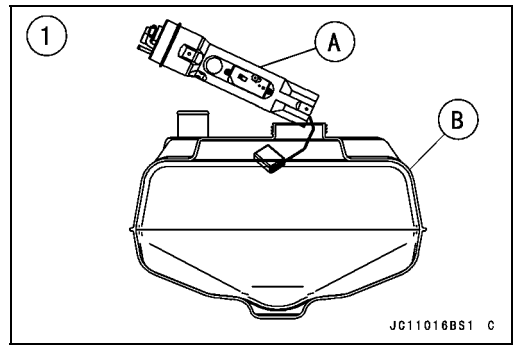
Idle Speed
Standard: 1 300 ±100 r/min (rpm) - both in and out of water

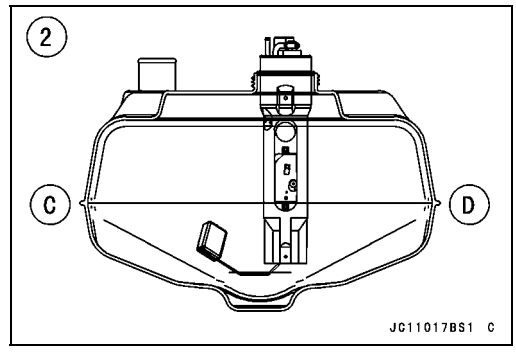
★If the idle speed is within the standard, the ISC operates properly.

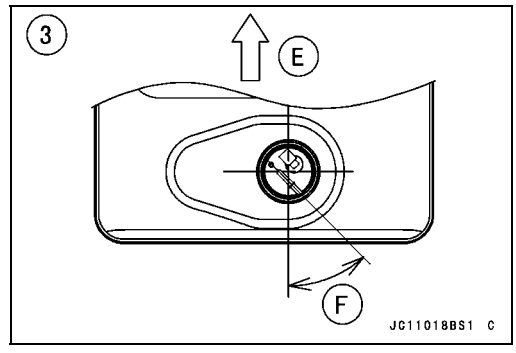
★If the idle speed is out of the specified range, inspect the audible operation.

Fuel Pump

- Insert the fuel pump [A] in the fuel tank [B].
  Port Side [C]
  Starboard Side [D]
  Bow [E]
  45° [F]

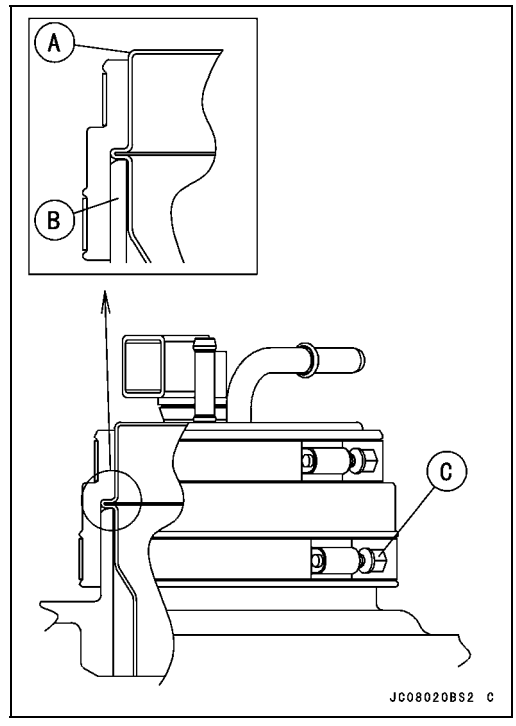






- Press down the pump [A] so that the fuel pump completely contacts the top surface of the tank [B].
- Set the lower side clamp (large diameter) onto the groove (for clamp installation) of the rubber holder securely, tighten the lower side clamp screw [C].

Torque - Fuel Pump Rubber Holder Clamp Screw: 2.9 N·m (0.30 kgf·m, 26 in·lb)



Engine Lubrication System

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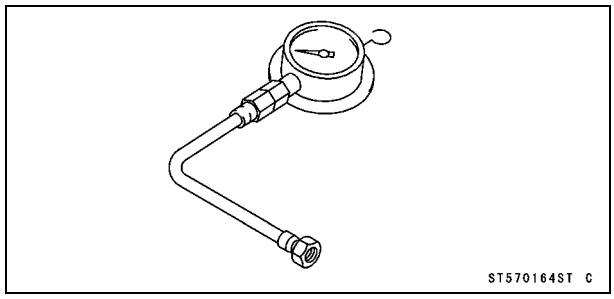
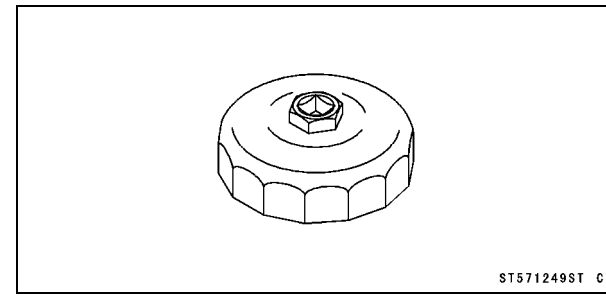
Special Tools

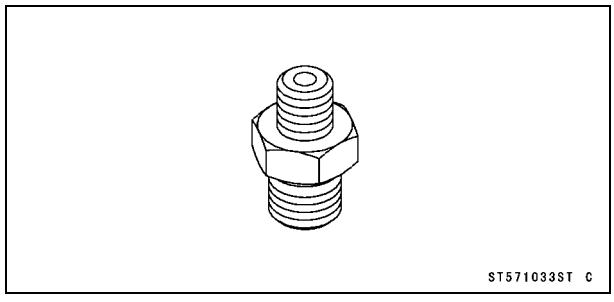
Oil Pressure Gauge, 10 kgf/cm²:
57001-164



Oil Filter Wrench:
57001-1249



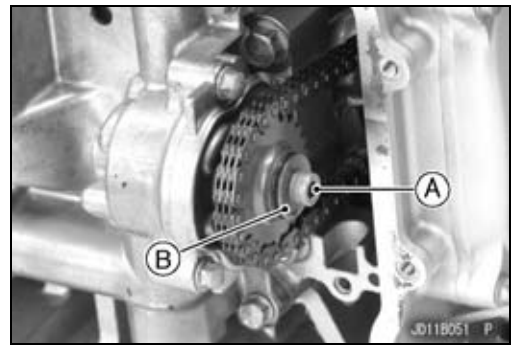
Oil Pressure Gauge Adapter, PT 1/8:
57001-1033



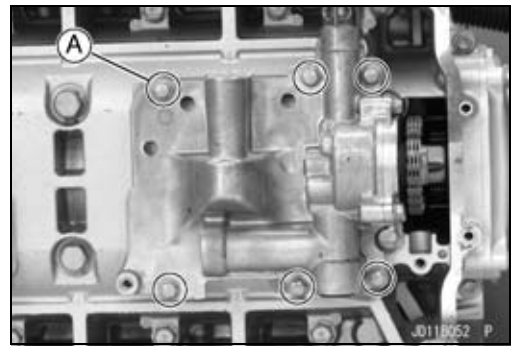
Oil Pump Sprocket, Oil Pump and Oil Pressure Relief Valve

Oil Pump Sprocket Removal

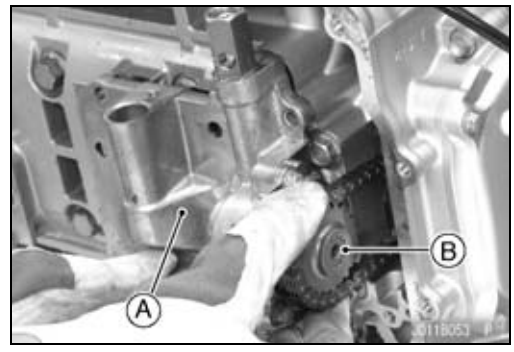
- Drain:
  Engine Oil (see Engine Oil Change in the Periodic Maintenance chapter)
- Remove:
  Engine (see Engine Removal in the Engine Removal/Installation chapter)
  Oil Pan (see Oil Pan Removal)
  Oil Pump Sprocket Bolt [A]
  Washer [B]



- Remove the oil pump body bolts [A].

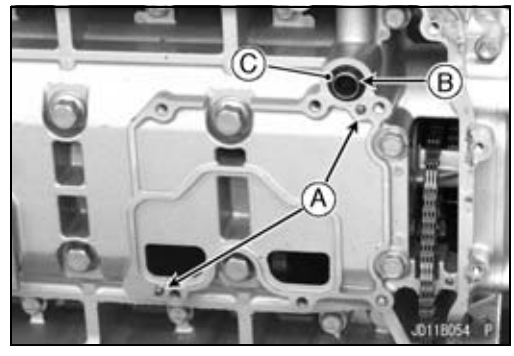


- Pull out the oil pump body [A] and remove the oil pump sprocket [B].



Oil Pump Sprocket Installation

- Check that dowel pins [A] and oil pipe [B] are in place on the crankcase.
- Replace the O-ring [C] with a new one.

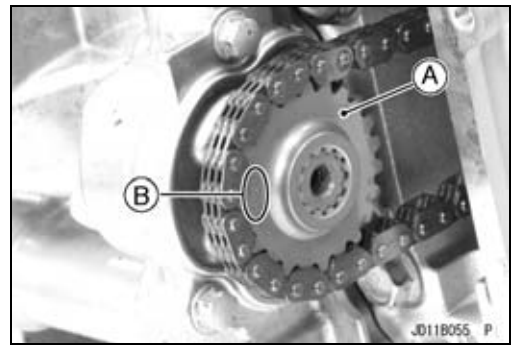


- Engage the oil pump chain with the oil pump sprocket [A].
- Install the oil pump sprocket so that the “620” Mark [B] faces outward on the oil pump body.
- Install the oil pump body.
- Tighten:

Torque - Oil Pump Body Bolts: 7.8 N·m (0.80 kgf·m, 69 in·lb)

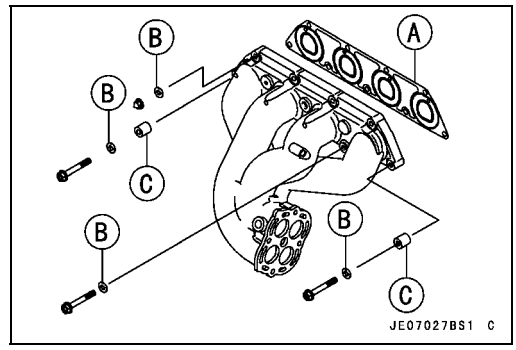
- Apply a non-permanent locking agent (high strength: Loctite 271 equivalent) to the oil pump sprocket bolt.
- Install the oil pump sprocket bolt and washer.
- Tighten:

Torque - Oil Pump Sprocket Bolt: 16 N·m (1.6 kgf·m, 12 ft·lb)



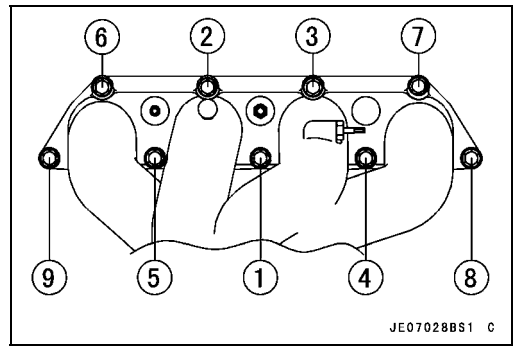
Exhaust Manifold

- Replace the exhaust manifold gasket [A] with a new one.
- Install the exhaust manifold, washers [B] and collars [C] as shown in the figure.
- Apply a non-permanent locking agent to the exhaust manifold mounting bolts.



- Tighten the exhaust manifold mounting nuts and bolts following the specified tightening sequence.

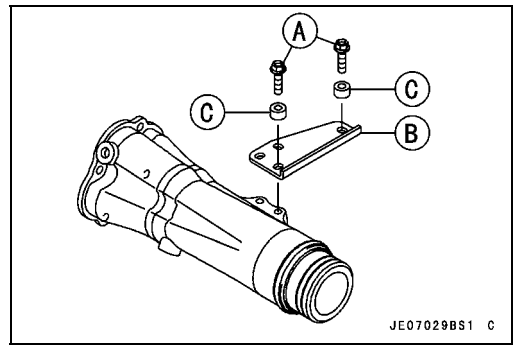
Torque - Exhaust Manifold Mounting Nuts: 25 N·m (2.5 kgf·m, 18 ft·lb)
Exhaust Manifold Mounting Bolts: 25 N·m (2.5 kgf·m, 18 ft·lb)



- Apply a non-permanent locking agent to the exhaust pipe mounting plate bolts [A] and install the plate [B] and collars [C].
- Tighten:

Torque - Exhaust Pipe Mounting Plate Bolts: 30 N·m (3.1 kgf·m, 22 ft·lb)

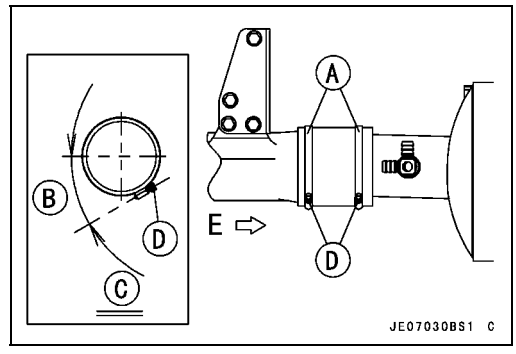
- Connect the water box muffler to the exhaust pipe after binding the two rings with the paper tape (see Exhaust Pipe Installation).



- Check the hose routing and clamp screw position (see Cable, Wire, and Hose Routing section in the Appendix chapter).
- Install the clamps [A] as shown in the figure.
  30° [B]
  View E [C]
- Tighten:

Torque - Front Exhaust Hose Clamp Screws [D]: 5.0 N·m (0.51 kgf·m, 44 in·lb)

- Install the removed parts (see appropriate chapters).



Exhaust Manifold Cleaning and Inspection

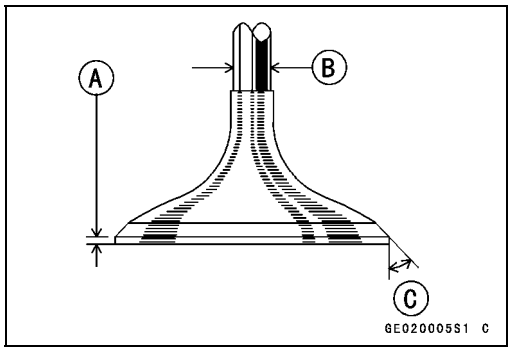
- Remove the exhaust manifold parts (see Exhaust Manifold Removal).
- Clean the carbon deposits out of the exhaust passages with a blunt, round edged tool.
- Flush foreign matter out of the water passages with fresh water.
- Check the insides of the water passages for corrosion.
- Check the gasket surfaces for nicks or other damage.

★If there is excessive corrosion or if the gasket surfaces are so badly damaged that they will not seal properly, replace the part.

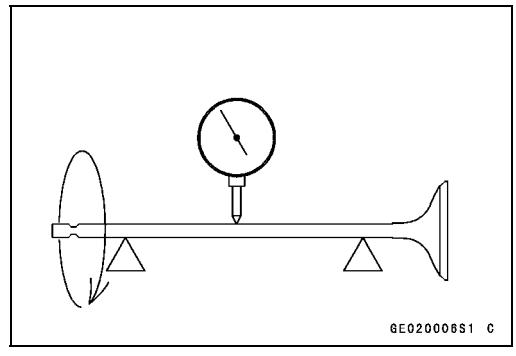
Specifications

Item	Standard	Service Limit
Intake (Outer)	45.8 mm (1.80 in.)	44.2 mm (1.74 in.)
Cylinder, Piston		
Cylinder Inside Diameter	82.994 ~ 83.006 mm (3.2675 ~ 3.2679 in.)	83.10 mm (3.272 in.)
Piston Diameter	82.919 ~ 82.934 mm (3.2645 ~ 3.2651 in.)	82.77 mm (3.259 in.)
Piston/Cylinder Clearance	0.060 ~ 0.087 mm (0.0024 ~ 0.0034 in.)	– – –
Piston Ring/Groove Clearance:		
Top	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in.)	0.17 mm (0.0067 in.)
Second	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in.)	0.16 mm (0.0063 in.)
Piston Ring Groove Width:		
Top	0.92 ~ 0.94 mm (0.0362 ~ 0.0370 in.)	1.02 mm (0.0402 in.)
Second	1.01 ~ 1.03 mm (0.0398 ~ 0.0406 in.)	1.11 mm (0.0437 in.)
Piston Ring Thickness:		
Top	0.87 ~ 0.89 mm (0.0343 ~ 0.0350 in.)	0.80 mm (0.0315 in.)
Second	0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)	0.90 mm (0.0354 in.)
Piston Ring End Gap:		
Top	0.25 ~ 0.40 mm (0.0098 ~ 0.0157 in.)	0.7 mm (0.028 in.)
Second	0.40 ~ 0.55 mm (0.0157 ~ 0.0217 in.)	0.8 mm (0.031 in.)

Valve Head Thickness



Valve Stem Bend



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

Camshaft, Camshaft Chain

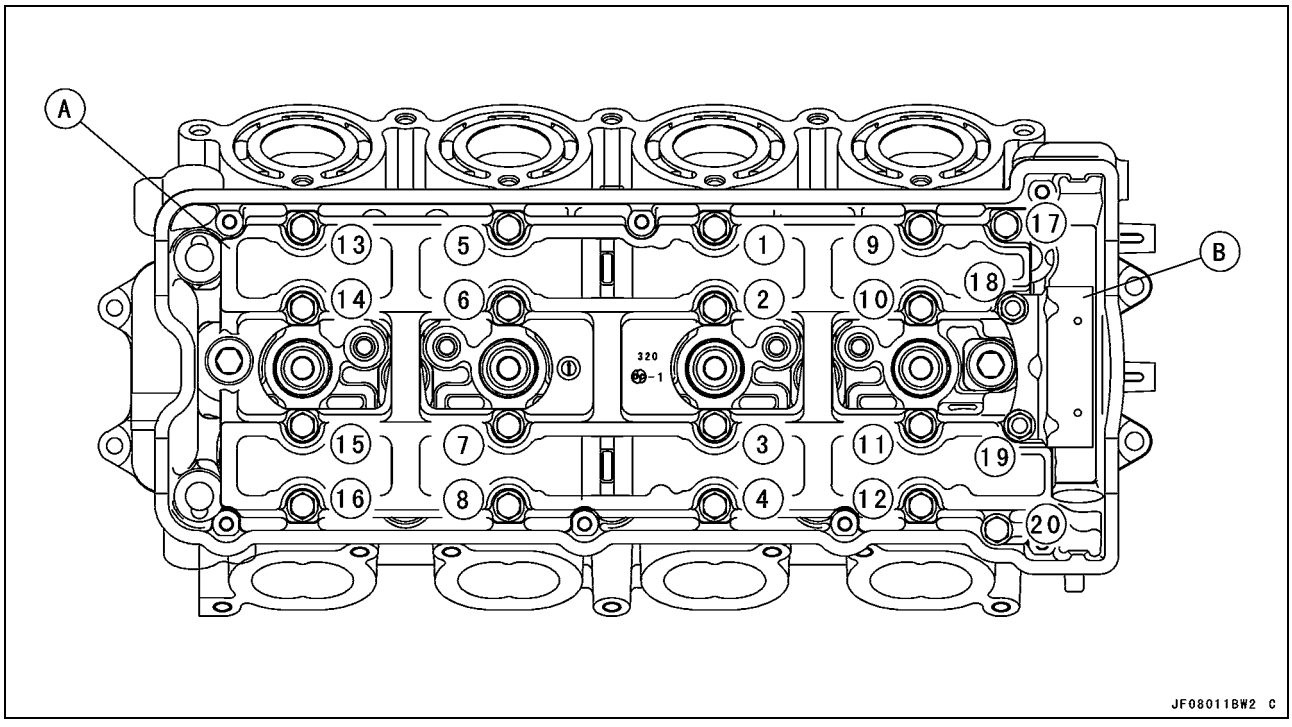
- Install the camshaft cap [A] and upper camshaft chain guide [B]. While pushing the camshaft chain, tighten all camshaft bolts and chain guide bolts.

○Install the longer (white) bolts to the #10 and #14 position shown by triangle marks.

○First tighten the all camshaft cap and chain guide bolts evenly to seat the camshaft in place, then tighten all bolts following the specified tightening sequence [1 ~ 20].

Torque - Camshaft Cap Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)
Upper Camshaft Chain Guide Bolts: 12 N·m (1.2 kgf·m, 106 in·lb)

- Install the camshaft chain tensioner (see Camshaft Chain Tensioner Installation).
- Turn the crankshaft 2 turns counterclockwise to allow the tensioner to expand and recheck the camshaft chain timing.
- Install the cylinder head cover (see Cylinder Head Cover Installation).



Piston TDC Finding

This job can be done when the engine is on the hull and during camshaft installation.

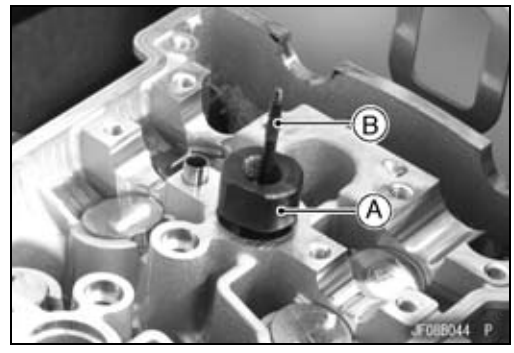
- Install the piston top detector [A] in the hole of the #1 spark plug.

Special Tool - TDC Measurement Tool: 57001-1560

- Insert the gauge extender [B] into the detector.
- Viewing from the bow, turn the crankshaft clockwise by using the shaft wrench until the gauge extender reaches its highest point.

Special Tool - Shaft Wrench: 57001-1551

- Remove the extender and install it to the gauge.



Valves

Valve-to-Guide Clearance Measurement (Wobble Method)

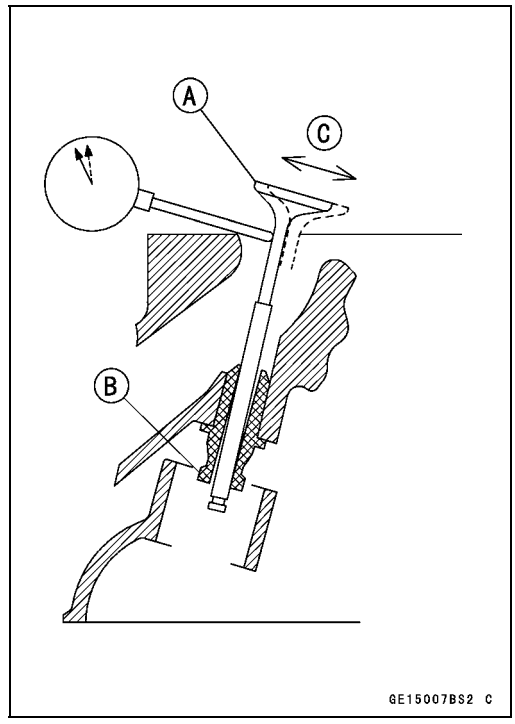
If a small bore gauge is not available, inspect the valve guide wear by measuring the valve to valve guide clearance with the wobble method as indicated below.

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

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

NOTE

○*The reading is not actual valve/valve guide clearance because the measuring point is above the guide.*



Valve/Valve Guide Clearance (Wobble Method)

Standard:

Exhaust	**0.09 ~ 0.17 mm (0.0035 ~ 0.0067 in.)**
Intake	**0.03 ~ 0.11 mm (0.0012 ~ 0.0043 in.)**

Service Limit:

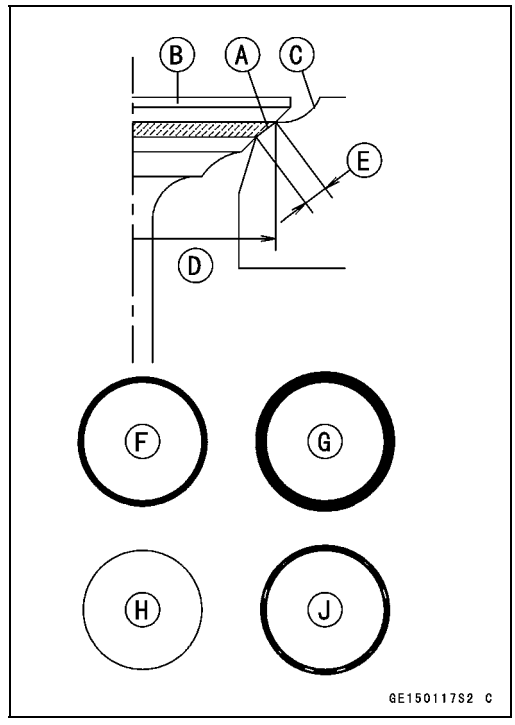
Exhaust	**0.35 mm (0.014 in.)**
Intake	**0.29 mm (0.011 in.)**

Valve Seat Inspection

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

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

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



Valve Seating Surface Outside Diameter

Standard:

Exhaust	**27.6 ~ 27.8 mm (1.087 ~ 1.094 in.)**
Intake	**32.6 ~ 32.8 mm (1.283 ~ 1.291 in.)**

○Measure the seat width [E] of the portion where there is no build-up carbon (white portion) of the valve seat with a vernier caliper.

Good [F]

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

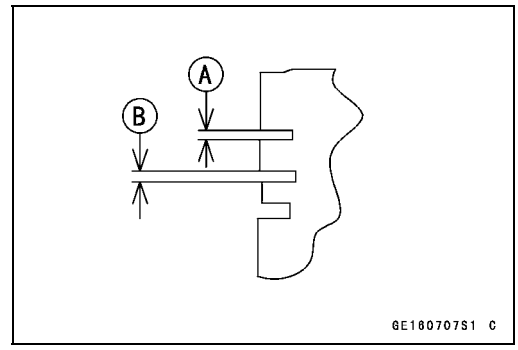
Valve Seating Surface Width

Standard:

Exhaust	**0.8 ~ 1.2 mm (0.031 ~ 0.047 in.)**
Intake	**0.5 ~ 1.0 mm (0.020 ~ 0.039 in.)**

Cylinder, Pistons

Piston Ring Groove Width Inspection



● Measure the piston ring groove width.
○Use a vernier caliper at several points around the piston.

Piston Ring Groove Width
Standard:

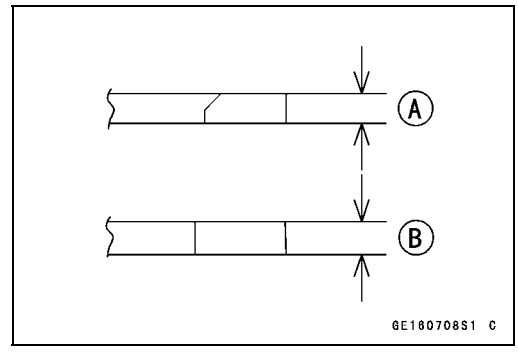
Top [A]	**0.92 ~ 0.94 mm (0.0362 ~ 0.0370 in.)**
Second [B]	**1.01 ~ 1.03 mm (0.0398 ~ 0.0406 in.)**

Service Limit:

Top [A]	**1.02 mm (0.0402 in.)**
Second [B]	**1.11 mm (0.0437 in.)**

★If the width of any of the two grooves is wider than the service limit at any point, replace the piston.

Piston Ring Thickness Inspection



● Measure the piston ring thickness.
○Use the micrometer to measure at several points around the ring.

Piston Ring Thickness
Standard:

Top [A]	**0.87 ~ 0.89 mm (0.0343 ~ 0.0350 in.)**
Second [B]	**0.97 ~ 0.99 mm (0.0382 ~ 0.0390 in.)**

Service Limit:

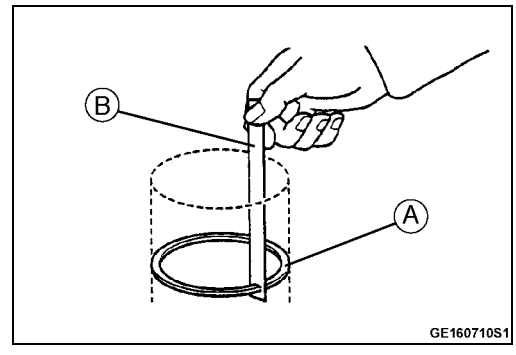
Top [A]	**0.80 mm (0.0315 in.)**
Second [B]	**0.90 mm (0.0354 in.)**

★If any of the measurements is less than the service limit on either of the rings, replace all the rings.

NOTE

○*When using new rings in a used piston, check for uneven groove wear. The rings should fit perfectly parallel to the groove sides. If not, replace the piston.*

Piston Ring End Gap Inspection



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

Piston Ring End Gap
Standard:

Top	**0.25 ~ 0.40 mm (0.0098 ~ 0.0157 in.)**
Second	**0.40 ~ 0.55 mm (0.0157 ~ 0.0217 in.)**

Service Limit:

Top	**0.7 mm (0.028 in.)**
Second	**0.8 mm (0.031 in.)**

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

Engine Bottom End

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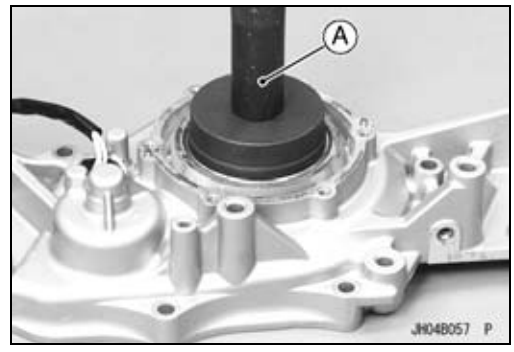
Coupling/Output Shaft

● Using a press and the bearing driver set [A], install the new bearing until it stops at the bottom of its housing.

Special Tool - Bearing Driver Set: 57001-1129



Ball Bearing Lubrication

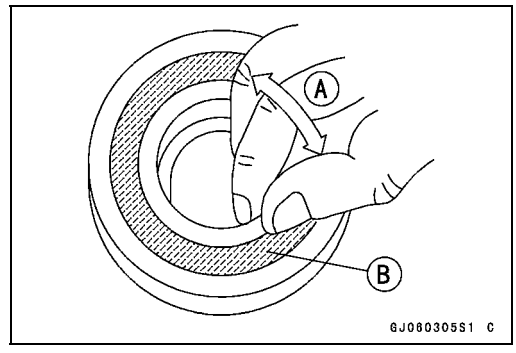
NOTE

○*Since the bearings are packed with grease and sealed on both sides, lubrication is not required.*

Ball Bearing Inspection

NOTE

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



● Spin [A] it by hand to check its condition.

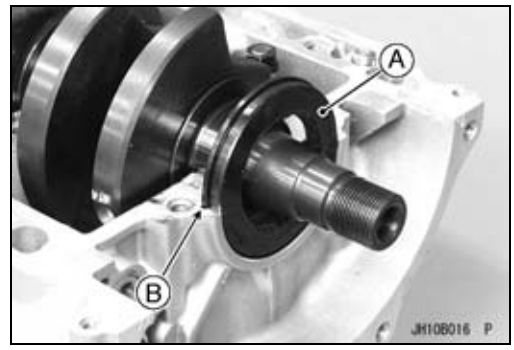
★If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced.

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

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

Crankshaft and Connecting Rods

- Fit the oil seal [A] into the groove [B] of the crankcase.
- Assemble the crankcase (see Crankcase Assembly).

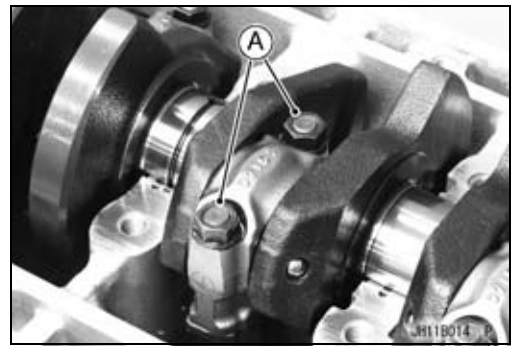


Connecting Rod Removal

- Split the crankcase (see Crankcase Splitting).
- Remove the connecting rod nuts [A].
- Remove the crankshaft.

NOTE

○*Mark and record the locations of the connecting rods and their big end caps so that they can be reassembled in their original positions.*



- Remove the connecting rods from the crankshaft.

Connecting Rod Installation

⚠ WARNING

Gasoline and low flash-point solvents are extremely flammable and can be explosive under certain conditions. To prevent a fire or explosion, clean the crankshaft, bolts, nuts and connecting rods in a well-ventilated area with a high flash-point solvent away from any ignition sources, including any appliance with a pilot light.

- After removing the connecting rods from the crankshaft, clean them with high flash-point solvent.
- Blow the crankshaft oil passages with compressed air to remove any foreign particles or residue that may have accumulated in the passages.

Cooling and Bilge Systems

Table of Contents

After Submerging

NOTICE

If water enters the engine it will cause severe damage. Do not operate the watercraft with water in the engine. Do not try to start the engine until it is completely empty of water. If water gets into the engine, follow this procedure immediately! If water is left in the engine more than a few hours, it will destroy the crankshaft bearings and damage other internal engine parts.

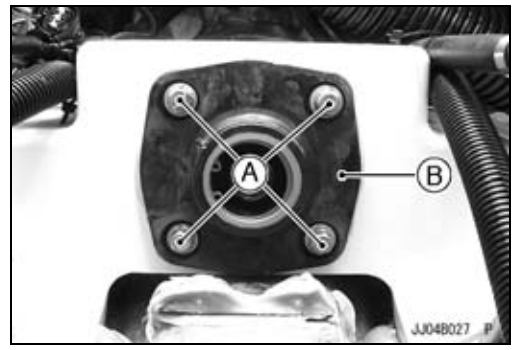
If the watercraft becomes swamped, water may enter the engine through the throttle body assy. Water may also enter the fuel tank.

The following procedures explain the necessary steps you must provide.

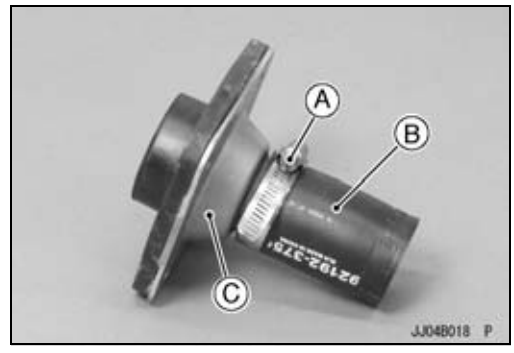
Read the summary of the procedure first and then their detailed procedures carefully.

Drive Shaft/Drive Shaft Holder

- Remove:
  Drive Shaft (see Drive Shaft Removal)
  Drive Shaft Holder Mounting Bolts [A]
- Remove the drive shaft holder [B] together with the pipe and tube.

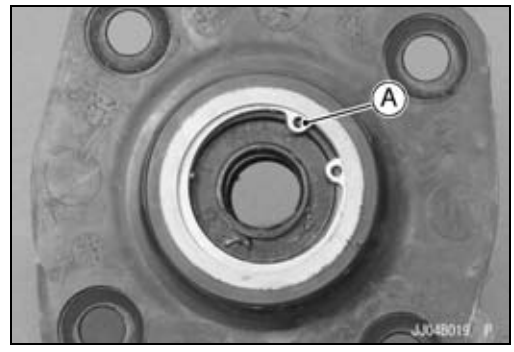


- Loosen the clamp screw [A].
- Remove:
  Tube [B]
  Pipe [C]



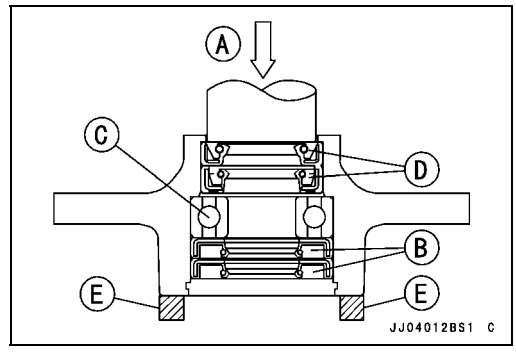
- Remove the circlip [A].

Special Tool - Inside Circlip Pliers: 57001-143



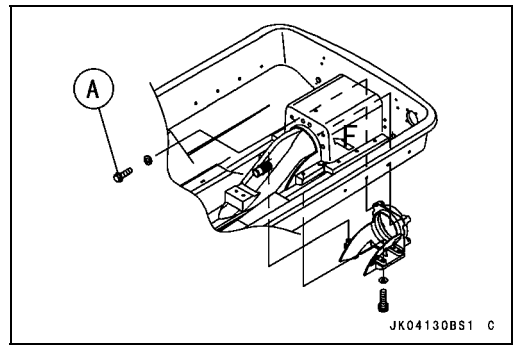
- Using the press, press [A] the small grease seal to remove the large grease seals [B], bearing [C] and small grease seals [D] come out of the holder.
  [E] Blocks

Special Tool - Bearing Driver Set: 57001-1129

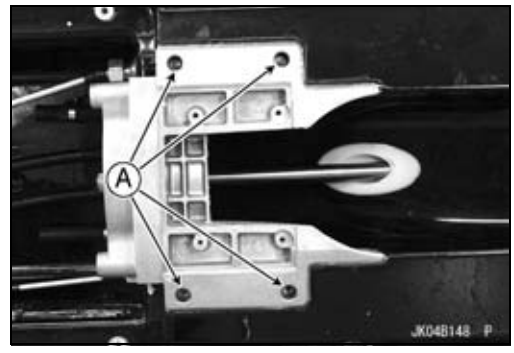


Pump and Impeller

○Take out the pump bracket mounting bolts [A] and washers in the hull.



○Take out the pump bracket mounting bolts [A] and washers.

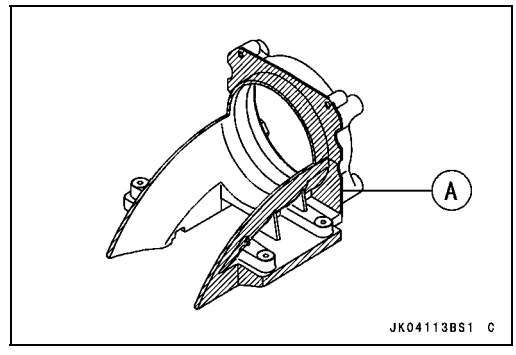


○Cut the sealant at the indicated area [A] in the figure and remove the pump bracket [B].

Pump Installation

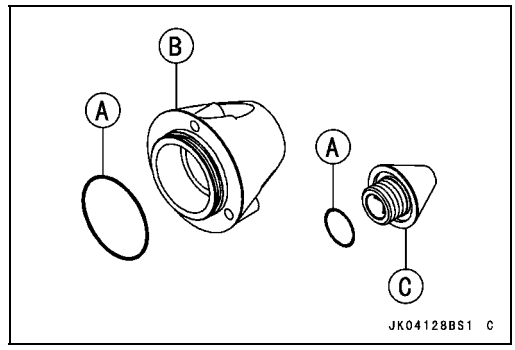
- Strip off all the old sealant around the pump bracket.
- Liberally coat the outside edge of the pump bracket with silicon sealant [A] to form a seal between the bracket and the hull.

  Sealant - Liquid Gasket, TB1211: 56019-120



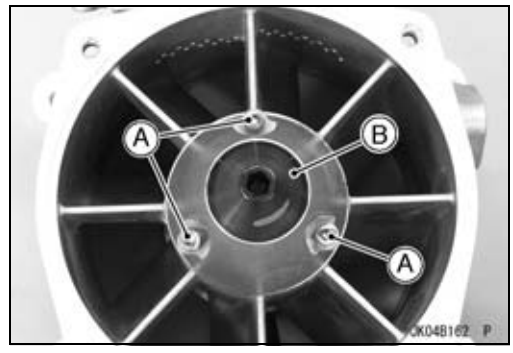
Pump and Impeller

- Replace the O-rings [A] with new ones, and install them.
- Apply lithium grease (NLGI Grade No.2) to the O-rings.
  [B] Pump Cap
  [C] Pump Cap Plug

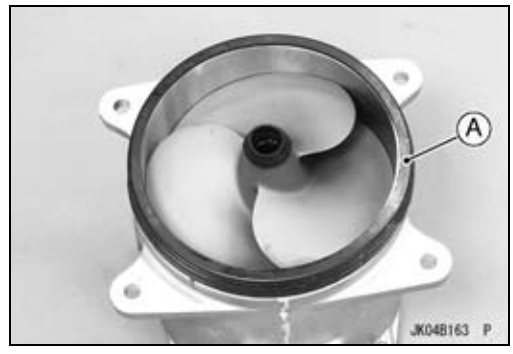


- Apply a non-permanent locking agent to the threads of the pump cap bolts [A].
- Install the pump cap bolts and washers.
- Tighten:

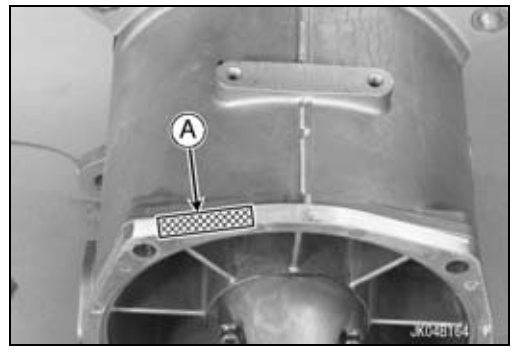
  Torque - Pump Cap Bolts: 3.9 N·m (0.40 kgf·m, 35 in·lb)
- Apply a non-permanent locking agent to the threads of the pump cap plug [B], and tighten it.



- Install the trim seal [A] to the pump case.

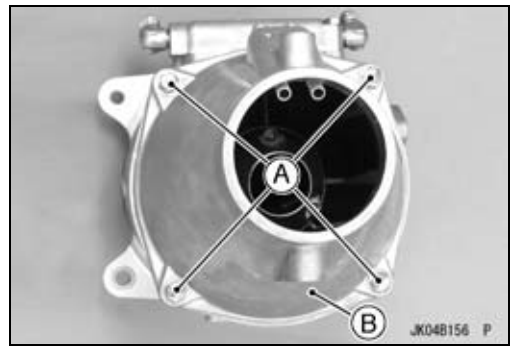


- Install the spacer so that the marked side [A] faces downward.



- Apply a non-permanent locking agent to the thread of the pump outlet mounting bolts [A].
- Install the pump outlet [B].
- Tighten:

  Torque - Pump Outlet Mounting Bolts: 19 N·m (1.9 kgf·m, 14 ft·lb)

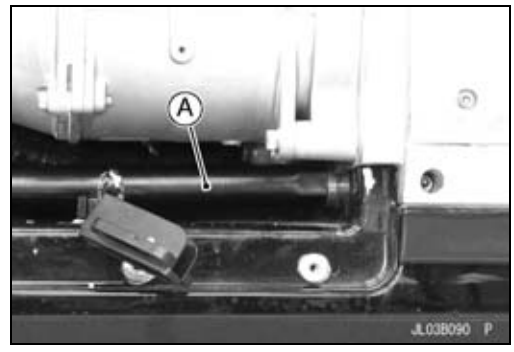


Steering Cable

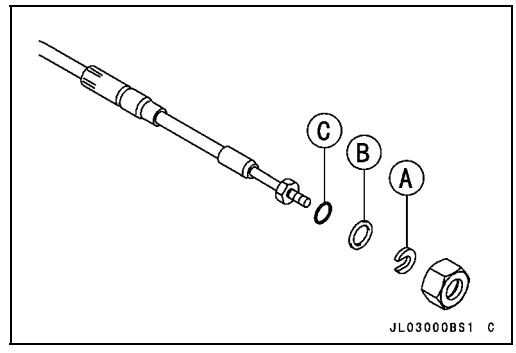
● Unscrew the large nut (steering cable nut) in the hull with the box wrench.
○Special tool, box wrench [A] is useful to remove the large nut (steering cable nut).

Special Tool - Box Wrench (27 mm): 57001-1749

○When using the box wrench, avoid bending the steering cable. Such a bend to the cable can damage it.



● Slide off the snap ring [A], washer [B] and O-ring [C].
● Pull out the steering cable toward the rear.



Steering Cable Installation

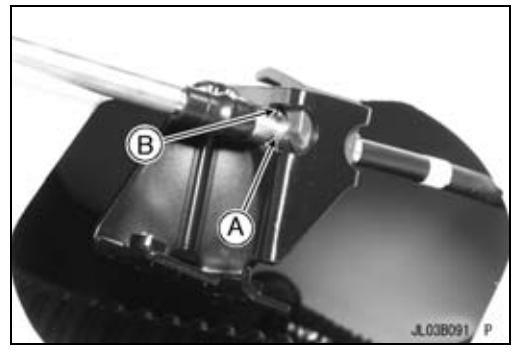
● Installation is the reverse of removal. Note the following.
○Slide a short piece of rubber or plastic tubing over the front cable end to guide the cable through the hull.
○Lubricate the outside of the new cable to ease cable installation.
○Replace the O-ring with a new one.
○Apply water-resistance grease to the new O-ring.
○Tighten the steering cable nut with the box wrench.

Special Tool - Box Wrench (27 mm): 57001-1749

Torque - Steering Cable Nut: 39.2 N·m (4.0 kgf·m, 29 ft·lb)

○Engage the groove [A] on the steering cable with the opening portion [B] on the cable bracket as shown.
○Apply water-resistance grease to the joint ball.
○Install the steering cable both end to the joints. The steering cable ends must be inserted to the joints a minimum of 5 mm (0.2 in.).
○Apply a non-permanent locking agent to the cable joint bolt and the steering cable bracket bolts.
○Tighten:

Torque - Steering Cable Joint Bolt: 9.8 N·m (1.0 kgf·m, 87 in·lb)
Steering Cable Bracket Bolts: 9.8 N·m (1.0 kgf·m, 87 in·lb)



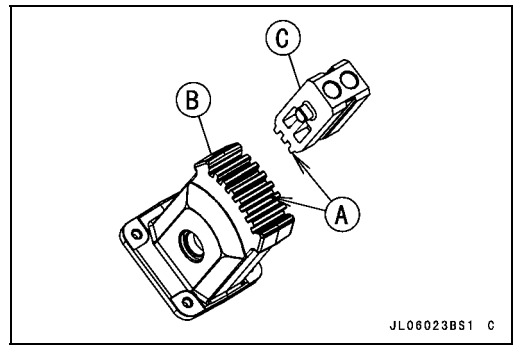
● Adjust the steering cable (see Steering Cable Adjustment).

Steering Cable Inspection

● Refer to the Steering Cable/Shift Cable Inspection in the Periodic Maintenance chapter.

Steering

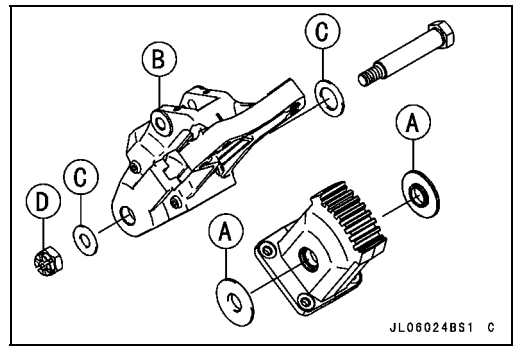
● Apply water-resistance grease [A] to the steering neck [B] and the adjustable rod [C].



● Install:
Bushings [A]
Adjustable Steering Holder [B]
Washers [C]
Adjustable Steering Holder Nut [D] and Bolt

● Tighten:

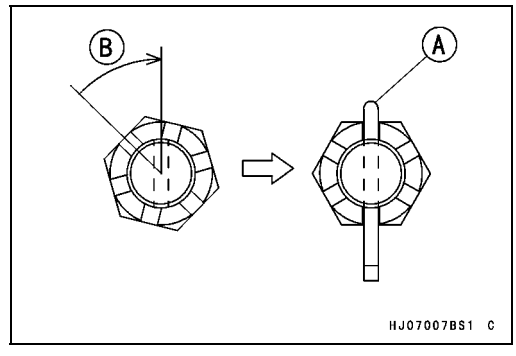
Torque - Adjustable Steering Holder Nut: 4.9 N·m (0.50 kgf·m, 43 in·lb)



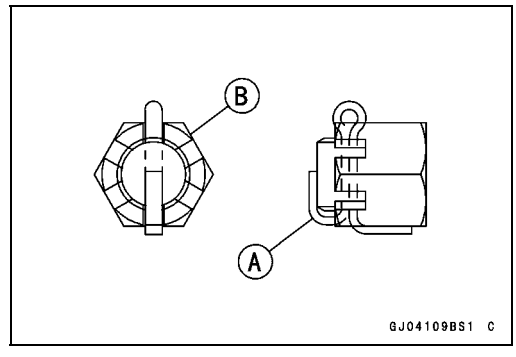
● Insert a new cotter pin [A].

NOTE

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



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



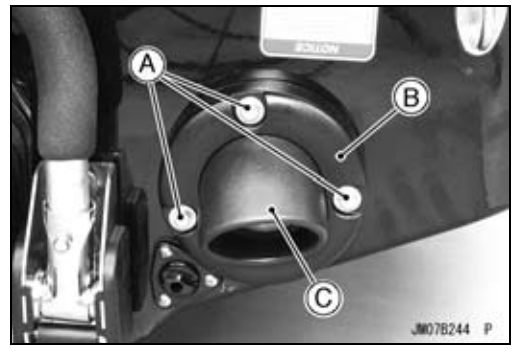
Exploded View

No.	Fastener	Torque			Remarks
		N·m	kgf·m	ft·lb	
1	Front Hatch Mounting Screws	2.0	0.20	18 in·lb	AD
2	Latch Handle Screws	2.0	0.20	18 in·lb	
3	Handrail Plate Nuts	9.8	1.0	87 in·lb	L
4	Seat Lock Ratchet Pins	27	2.8	20	L
5	Handrail Mounting Screws	4.0	0.41	35 in·lb	
6	Bracket Bolts	8.8	0.90	78 in·lb	L

7. US and EUR Models
AD: Apply adhesive.
G: Apply grease.
L: Apply a non-permanent locking agent.
R: Replacement Parts
SS: Apply silicone sealant.
WG: Apply water resistance grease.

Fittings

Exhaust Outlet Removal

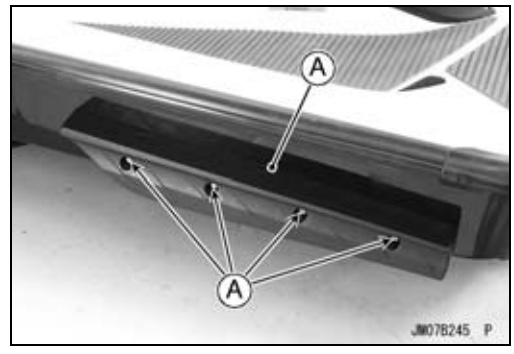


- Remove the mounting bolts [A] and washers, and remove the holder [B] and exhaust outlet [C].

Exhaust Outlet Installation

- Installation is the reverse of removal.
- Apply a non-permanent locking agent to the mounting bolts and tighten them securely.

Stabilizer Removal



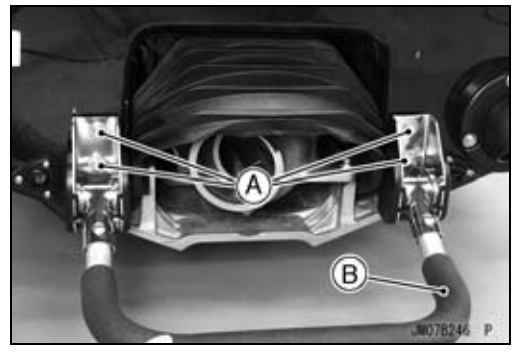
- Remove:
  Stabilizer Bolts [A]
  Stabilizer [B]

Stabilizer Installation

- Installation is the reverse of removal.
- Apply a non-permanent locking agent (High Strength: Loctite 271 equivalent) to the stabilizer bolt and tighten them.

Torque - Stabilizer Bolts: 15.7 N·m (1.6 kgf·m, 12 ft·lb)

Reboarding Step Removal



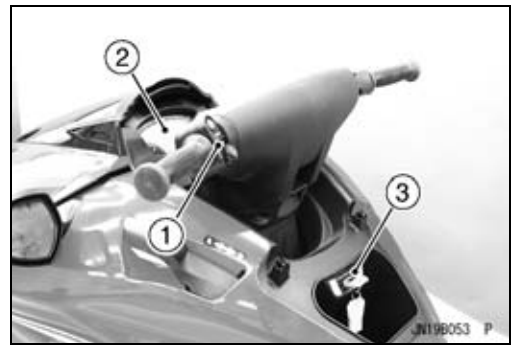
- Remove the reboarding step bolts [A] and washers, and remove the reboarding step [B].

Reboarding Step Installation

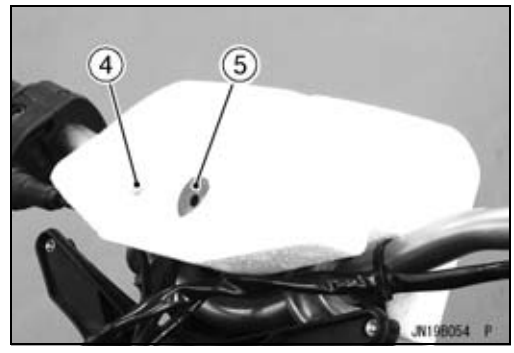
- Installation is the reverse of removal.
- Apply a non-permanent locking agent to the reboarding step bolts and tighten them securely.

Parts Location

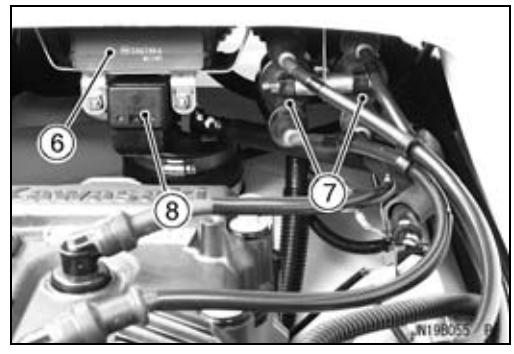
1. Start/Stop Switch Case
2. Meter Unit
3. Ignition Switch/Immobilizer Amplifier



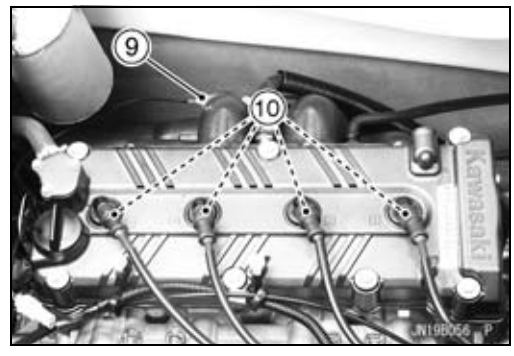
4. Air Temperature Sensor (for Meter Unit)
5. Buzzer



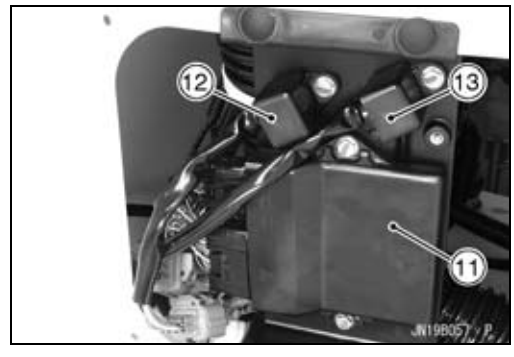
6. Regulator/Rectifier
7. Ignition Coils
8. Vehicle-down Sensor



9. Water Temperature Sensor
10. Spark Plugs



11. ECU
12. ECU Main Relay
13. Fuel Pump/System Relay

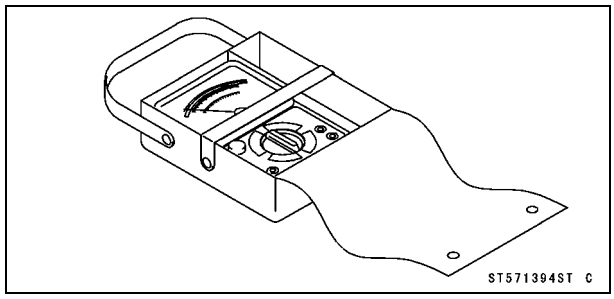


NOTE

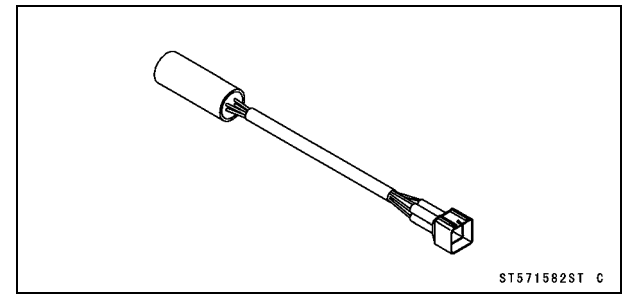
○*In this photo, the front access cover has been removed.*

Special Tools and Sealant

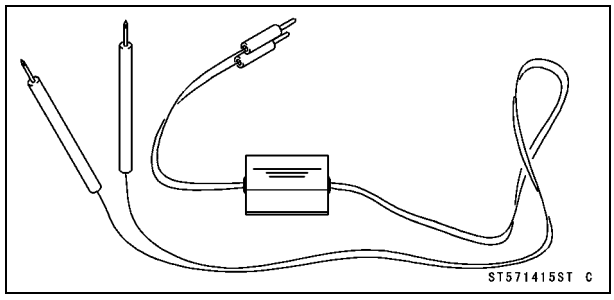
Hand Tester:
57001-1394



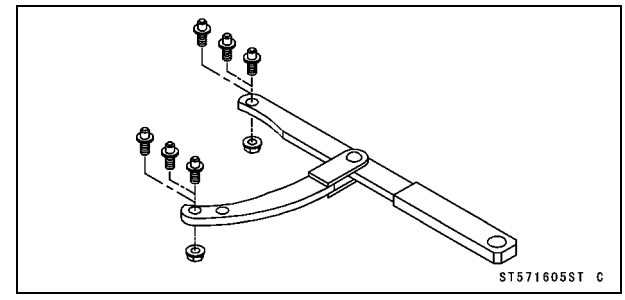
Key Registration Unit:
57001-1582



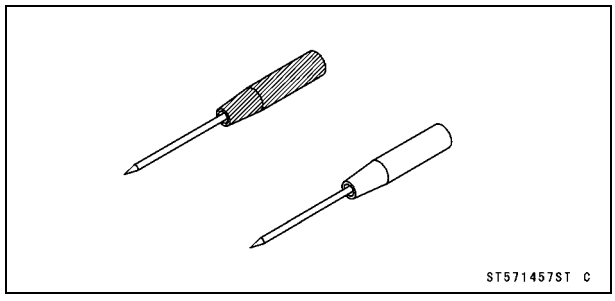
Peak Voltage Adapter:
57001-1415



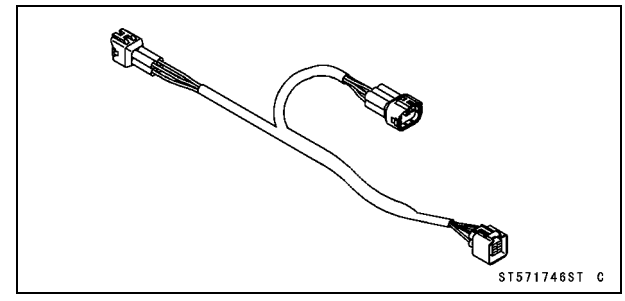
Flywheel & Pulley Holder:
57001-1605



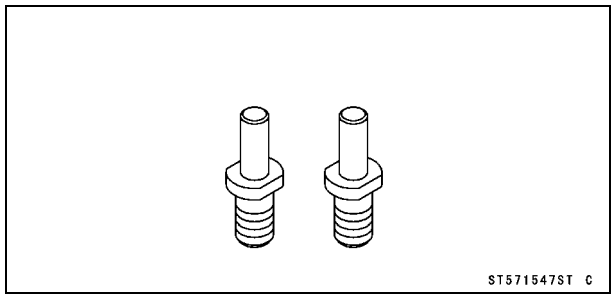
Needle Adapter Set:
57001-1457



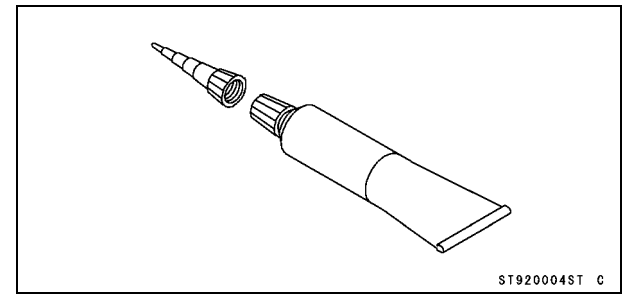
Key Registration Adapter:
57001-1746



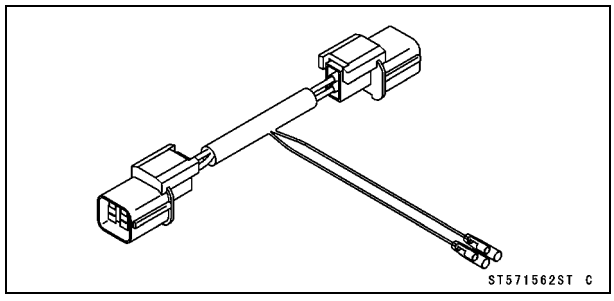
Holder Attachment:
57001-1547



Liquid Gasket, TB1211F:
92104-0004

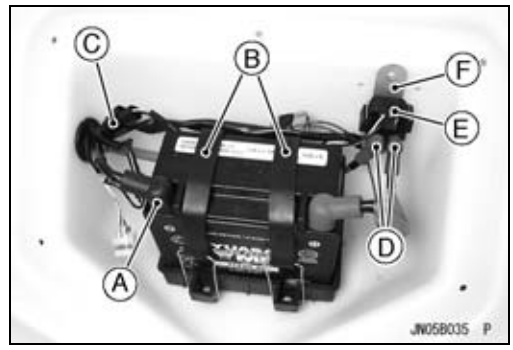


Harness Adapter:
57001-1562



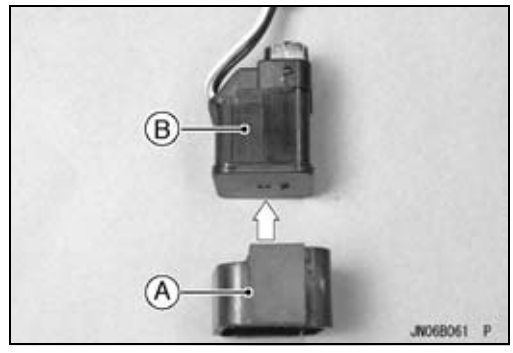
Electric Starter System

Starter Relay Removal

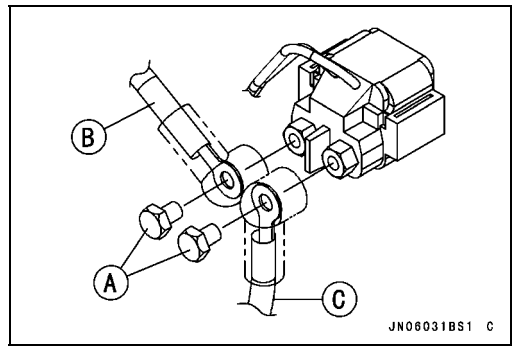


- Remove:
  Battery Cover (see Battery Cover Removal/Installation)
- Disconnect the negative battery cable [A].
- Unhook the battery straps [B].
- Disconnect the starter relay lead connector [C].
- Slide out the rubber caps [D] and remove the starter relay terminal bolts.
- Take the starter relay [E] off the bracket [F].

Starter Relay Installation



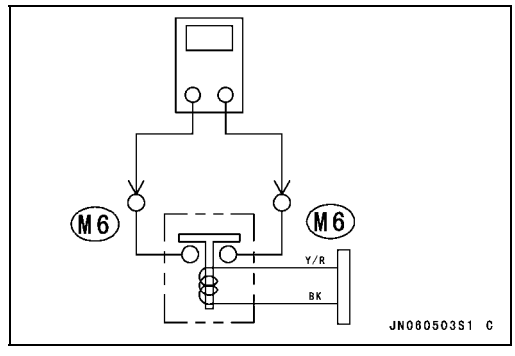
- Install the rubber damper [A] to the starter relay [B] as shown in the figure.



- Install the starter relay, and tighten the starter relay terminal bolts [A].
  Starter Motor Cable [B]
  Battery Positive Cable [C]

  Torque - Starter Relay Terminal Bolts: 5.5 N·m (0.56 kgf·m, 49 in·lb)
- Apply water-resistance grease to both terminals.
- Fill the terminal rubber caps full with water-resistance grease and install the rubber caps on the terminal bolts.
- Connect the starter relay lead connector.
- Hold the starter relay lead and the starter motor cable with the battery strap.

Starter Relay Inspection



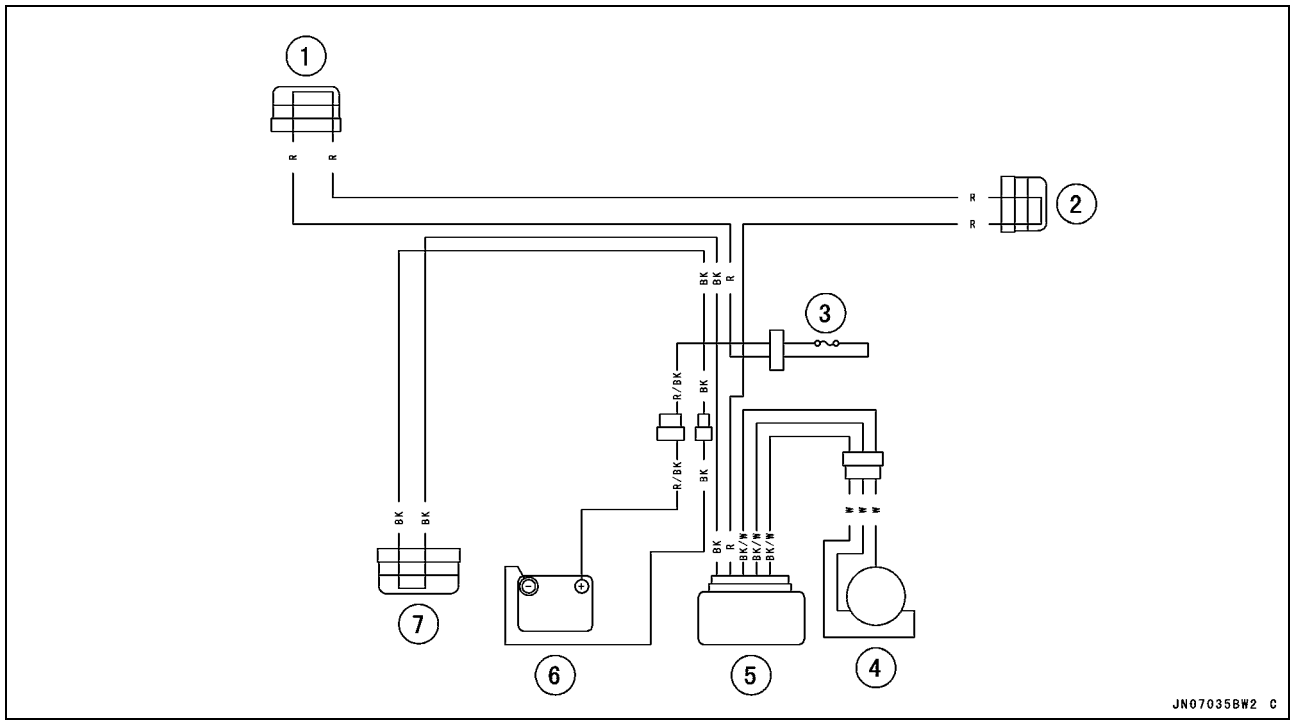
- Remove the starter relay (see Starter Relay Removal).
- Set the hand tester to × 1 Ω range.

  Special Tool - Hand Tester: 57001-1394
- Connect the tester leads as shown in the figure.

★If resistance is less than infinite, the starter relay switch is not returning and must be replaced.

Charging System

Charging System Circuit



1. Joint Connector P (12 V)
2. Joint Connector C (12 V)
3. Main Fuse 20 A
4. Alternator
5. Regulator/Rectifier
6. Battery
7. Joint Connector S (Ground)

Ignition System

● Insert the ignition key in the ignition switch to turn it on and insert the lanyard key under the stop button.
● Pushing the starter button, turn the engine 4 ~ 5 seconds to measure the peak voltage.
○Do not operate the starter for longer than 5 seconds. Wait 15 seconds before using it again.
● Repeat the measurements 5 times or more times.

Camshaft Position Sensor Peak Voltage
Standard: 0.4 V or more

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

IC Igniter Inspection

○The igniter is built in the ECU.
● Refer to the following items.
Ignition System Troubleshooting (see Ignition System Troubleshooting)
ECU Power Supply Inspection (see ECU Power Supply Inspection in the Fuel System (DFI) chapter)

NOTICE

Disconnecting the battery cables or any other electrical connections when the ignition switch is on or while the engine is running can damage the igniter in the ECU (Electronic Control Unit). Do not disconnect the battery cables or any other electrical connections when the ignition switch is on, or while the engine is running.

Spark Plug Removal

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

Spark Plug Installation

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

Spark Plug Inspection

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

Spark Plug Adjustment

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

Spark Plug Cleaning

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

Sensors

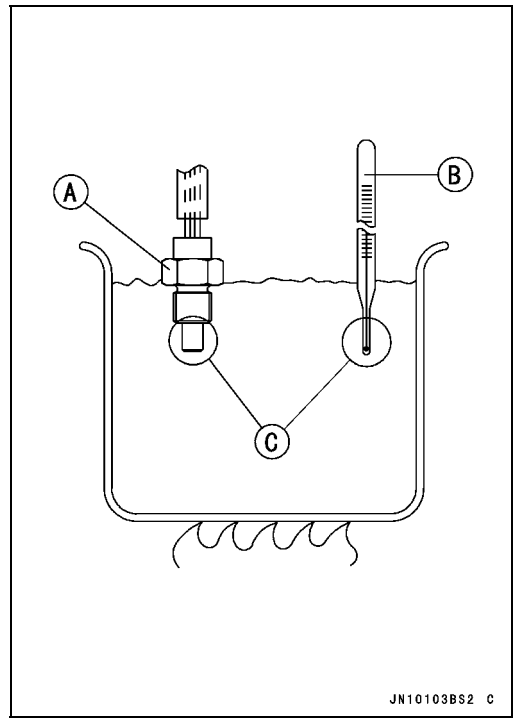
Water Temperature Sensor Inspection

- Remove the water temperature sensor (see Water Temperature Sensor Removal/Installation in the Fuel System (DFI) chapter).
- Suspend the sensor [A] in a container of water 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 water while stirring the water gently.



- Measure the internal resistance of the sensor with a digital meter.

○The sensor sends electric signals to the ECU.

○Measure the resistance across the terminals and the body (for the gauge) at the temperatures shown in the table.

Water Temperature Sensor Resistance

Water Temperature	Sensor Resistance
20°C (68°F)	12.17 ~ 13.92 kΩ
50°C (122°F)	4.025 ~ 4.810 kΩ
90°C (194°F)	1.182 ~ 1.481 kΩ
100°C (212°F)	0.9025 ~ 1.142 kΩ

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

Oil Temperature Sensor Removal/Installation

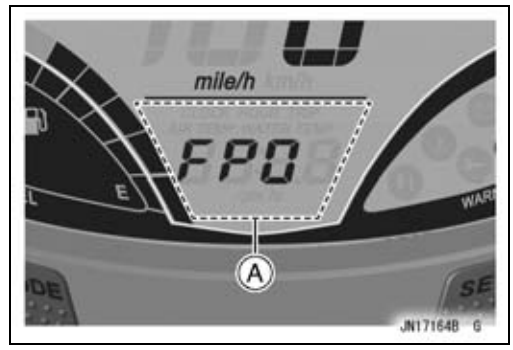
- Refer to the Oil Temperature Sensor Removal/Installation in the Fuel System (DFI) chapter.

Multifunction Meter

Check 1-7: FPO (Full Power Operation) Mode Display Inspection

- Using the FPO key (orange-colored), insert the ignition key in the ignition switch to turn it on.
- Check that the "FPO" appears in the display [A] for 2 seconds before the normal display appears.

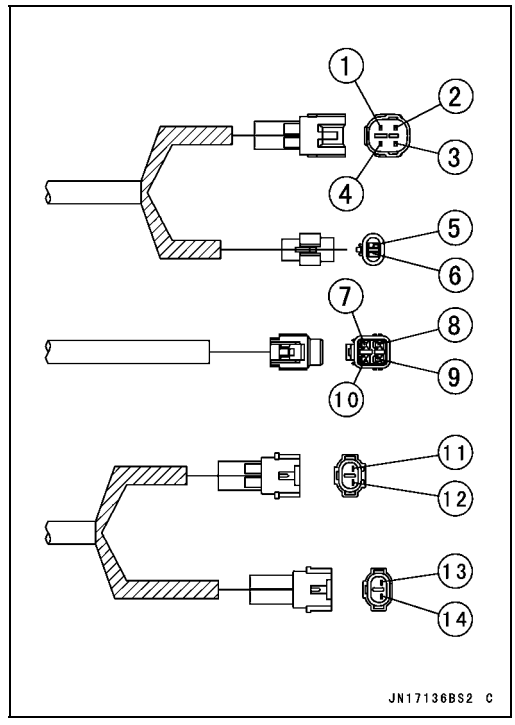
★If the display function does not work, replace the meter unit.



Meter Unit Inspection

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

[1] Battery (+): R
[2] Ground (–): BK
[3] Speed Sensor/Steering Position Sensor (+): R/BL
[4] Ignition Switch (+): R/W
[5] Buzzer (–): BK/W
[6] Buzzer (+): R/BK
[7] Fuel Level Sensor: W/R
[8] ECU communication Signal: BL/BK
[9] Unused
[10] Speed Sensor Signal: G/R
[11] Water Temperature Sensor (+): BR
[12] Water Temperature Sensor (–): BK/BR
[13] Air Temperature Sensor (+): LG
[14] Air Temperature Sensor (–): BK/R



NOTICE

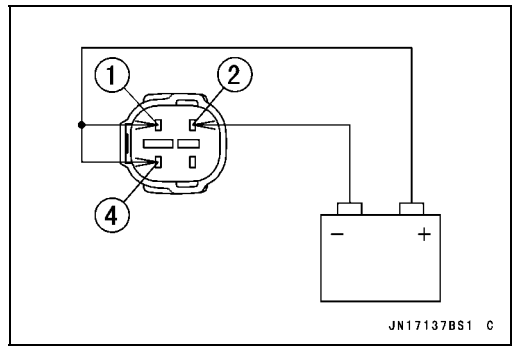
Do not drop the meter unit. Place the meter unit so that it faces upward. If the meter unit is left upside down or sideways for a long time or dropped, it will malfunction. Do not short each terminal.

Check 2-1: Meter Unit Power Supply Inspection

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

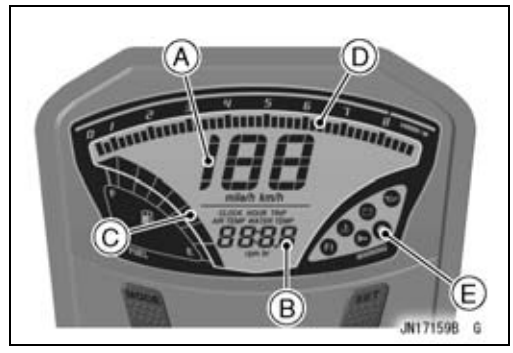
○Connect the battery (+) terminal to the terminal [1].
○Connect the battery (–) terminal to the terminal [2].

- Connect the terminal [4] to the battery (+) terminal.



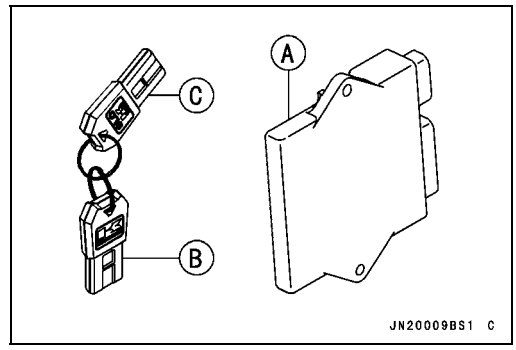
- Check the following items.

○Following LCD segments appear gradually.
Speedometer [A]
Multifunction Meter [B]
Fuel Level Gauge [C]
Tachometer [D]
○The red warning indicator light (LED) [E] goes on.



Immobilizer System

Case 2: When the ECU is faulty and has to be replaced.



NOTE

○*Be sure the battery is fully charged.*
○*The key registration unit is not required.*

- Prepare the following.
  New ECU [A]
  Current FPO Key [B] (orange-colored)
  Current SLO Key [C] (yellow-colored and marked SLO)
- Replace:
  ECU (see ECU Removal and Installation in the Fuel System (DFI) chapter)

Pre-registration of User Key 1

NOTE

○*Keep the other user key away from the ignition switch.*

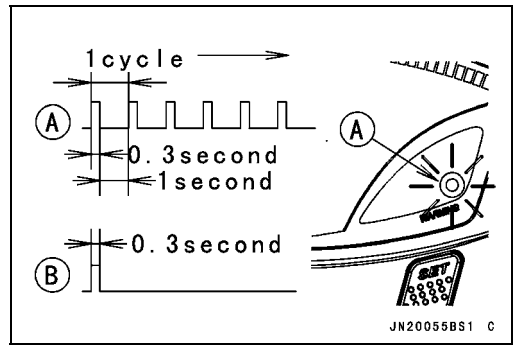
- Insert the current key (user key 1) to the ignition switch and press it for a short time (within 2 seconds) or long time (2 seconds or more).

Verified

○The ECU confirms the following.
Receiving signals from immobilizer amplifier are correct.

- The user key 1 is successfully pre-registered in the ECU, and ECU starts the key registration mode.

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

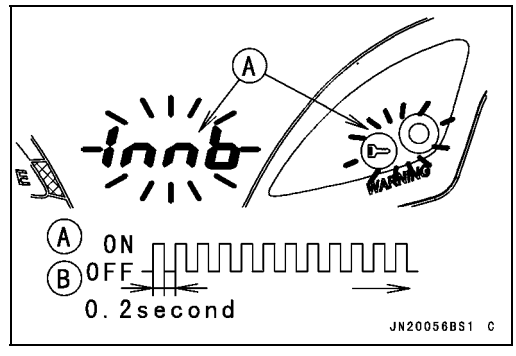


NOTE

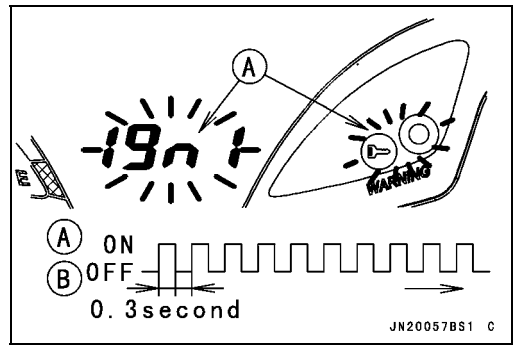
○*Only the first one cycle, the buzzer sound [B] goes off synchronizing with the blink of the red warning indicator light (LED).*

Not Verified

○The red warning indicator light (LED), immobilizer symbol and letters [A] blink to display the collation error. The buzzer sound [B] goes off. (refer to the following failure illustrations).
Immobilizer Amplifier Failure (Service Code/Character -35/Imb)



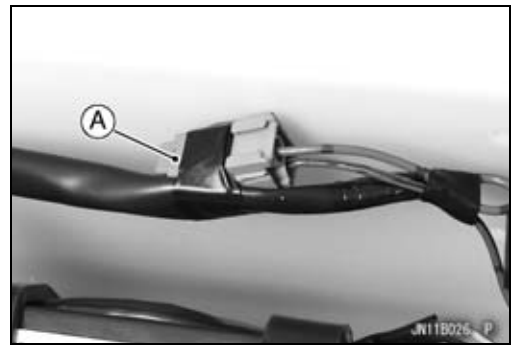
Key Collation Error (Service Code/Character-36/IgnI)



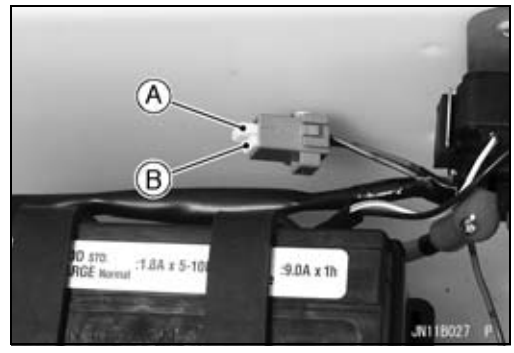
Fuse

Fuse Inspection

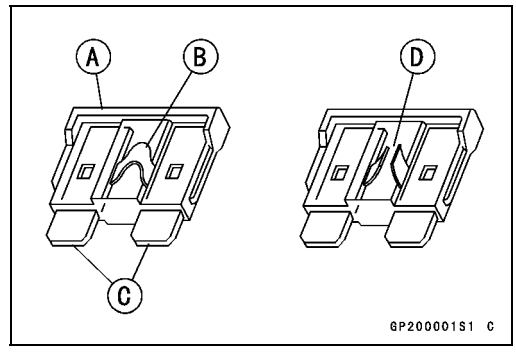
● Remove:
Battery Cover (see Battery Removal)
Fuse Case Cap [A]



● Remove:
Main Fuse 20 A [A]
Spare Fuse 20 A [B]



● Inspect the fuse element.
★If it 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

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

Appendix

Table of Contents

Cable, Wire and Hose Routing

1. Right Rear Duct
2. Right Bilge Hose
3. Left Bilge Hose
4. Left Rear Duct
5. Water Box Muffler
6. Right Bilge Breather Hose
7. Left Bilge Breather Hose
8. Right Front Duct
9. Left Front Duct (Run the left front duct through the right front duct rearward.)
10. Band
11. 225 mm (8.86 in.)

Cable, Wire and Hose Routing

1. ECU Main Relay
2. Fuel Pump Relay/System Relay
3. ECU
4. View from Bow
5. View from Port Side
6. Bow
7. Regulator/Rectifier
8. Vehicle-down Sensor
9. View from Top
10. #1 Ignition Coil Lead
11. #2 Ignition Coil Lead
12. #3 Ignition Coil Lead
13. #4 Ignition Coil Lead
14. View from Stern
15. Black Lead
16. Red Lead
17. View from A