SUZUKI

GSF1250/S/A/SA

SERVICE MANUAL

99500-39300-01E

FOREWORD

This manual contains an introductory description on the SUZUKI GSF1250/S/A/SA and procedures for its inspection/service and overhaul of its main components.
Other information considered as generally known is not included.
Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance. Use this section as well as other sections to use as a guide for proper inspection and service.
This manual will help you know the motorcycle better so that you can assure your customers of fast and reliable service.

- ** This manual has been prepared on the basis of the latest specifications at the time of publication. If modifications have been made since then, differences may exist between the content of this manual and the actual motorcycle.*
- ** Illustrations in this manual are used to show the basic principles of operation and work procedures. They may not represent the actual motorcycle exactly in detail.*
- ** This manual is written for persons who have enough knowledge, skills and tools, including special tools, for servicing SUZUKI motorcycles. If you do not have the proper knowledge and tools, ask your authorized SUZUKI motorcycle dealer to help you.*

⚠ WARNING

Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual.
Improper repair may result in injury to the mechanic and may render the motorcycle unsafe for the rider and passenger.

TABLE OF CONTENTS

Section 00

Precautions

CONTENTS

Precautions

Precautions

Warning / Caution / Note

B718H10000001

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol and the words WARNING, CAUTION and NOTE have special meanings. Pay special attention to the messages highlighted by these signal words.

⚠ WARNING

Indicates a potential hazard that could result in death or injury.

⚠ CAUTION

Indicates a potential hazard that could result in motorcycle damage.

NOTE

Indicates special information to make maintenance easier or instructions clearer.

Please note, however, that the warnings and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the motorcycle. In addition to the WARNINGS and CAUTIONS stated, you must use good judgement and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

General Precautions

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⚠ WARNING

- **Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the motorcycle.**
- **When 2 or more persons work together, pay attention to the safety of each other.**
- **When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors.**
- **When working with toxic or flammable materials, make sure that the area you work in is well ventilated and that you follow all of the material manufacturer's instructions.**
- **Never use gasoline as a cleaning solvent.**
- **To avoid getting burned, do not touch the engine, engine oil, oil cooler and exhaust system until they have cooled.**
- **After servicing the fuel, oil, water, exhaust or brake systems, check all lines and fittings related to the system for leaks.**

⚠ CAUTION

- **If parts replacement is necessary, replace the parts with Suzuki Genuine Parts or their equivalent.**
- **When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.**
- **Be sure to use special tools when instructed.**
- **Make sure that all parts used in reassembly are clean. Lubricate them when specified.**
- **Use the specified lubricant, bond, or sealant.**
- **When removing the battery, disconnect the negative (–) cable first and then the positive (+) cable.**
- **When reconnecting the battery, connect the positive (+) cable first and then the negative (–) cable, and replace the terminal cover on the positive (+) terminal.**
- **When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative (–) cable the battery.**
- **When tightening the cylinder head or case bolts and nuts, tighten the larger sizes first. Always tighten the bolts and nuts diagonally from the inside toward outside and to the specified tightening torque.**
- **Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, self-locking nuts, cotter pins, circlips and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.**
- **Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.**

- **Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them.**
- **After reassembling, check parts for tightness and proper operation.**
- **To protect the environment, do not unlawfully dispose of used motor oil, engine coolant and other fluids: batteries, and tires.**
- **To protect Earth's natural resources, properly dispose of used motorcycle and parts.**

Precautions for Electrical Circuit Service

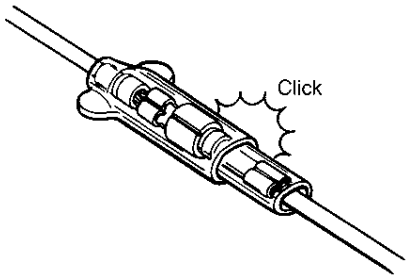
B718H10000003

When handling the electrical parts or servicing the FI and ABS systems, observe the following points for the safety of the systems.

Electrical Parts

Connector / Coupler

- When connecting a connector, be sure to push it in until a click is felt.



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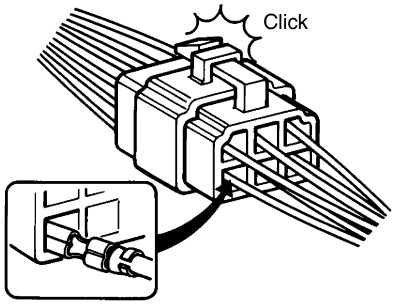
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



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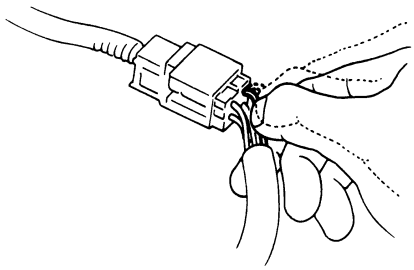
- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



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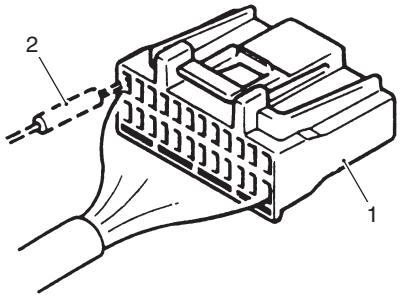
- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (rear) of the connector/coupler.



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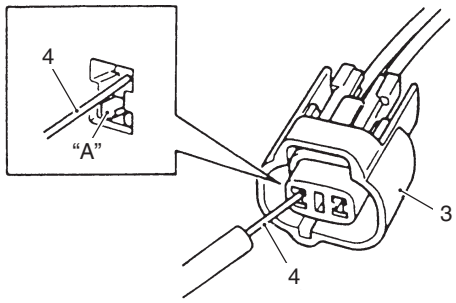
1. Coupler	2. Probe

- When connecting meter probe from the terminal side of the coupler (where connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open. Connect the probe as shown to avoid opening of female terminal. Never push in the probe where male terminal is supposed to fit.

- Check the male connector for bend and female connector for excessive opening. Also check the coupler for locking (looseness), corrosion, dust, etc.



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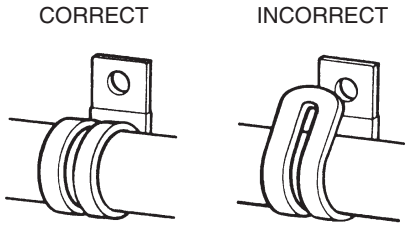
3. Coupler	4. Probe	"A": Where male terminal fits

Clamp

- Clamp the wire harness at such positions as indicated in "Wiring Harness Routing Diagram in Section 9A (Page 9A-8)".
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.



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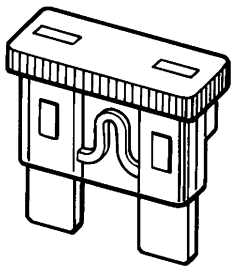
Fuse

- When a fuse is blown, always investigate the cause to correct it and then replace the fuse.
- Do not use a fuse of different capacity.
- Do not use wire or any other substitute for the fuse.



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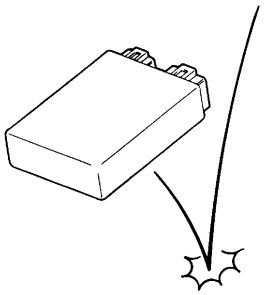
Switch

Never apply grease material to switch contact points to prevent damage.

ECM / ABS control unit / HU / Various sensors

- Since each component is a high-precision part, great care should be taken not to apply any severe impacts during removal and installation.



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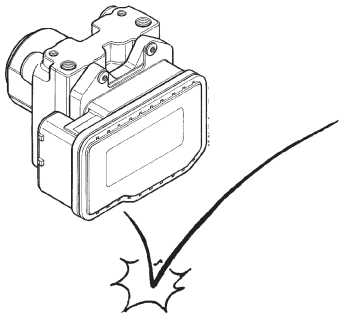

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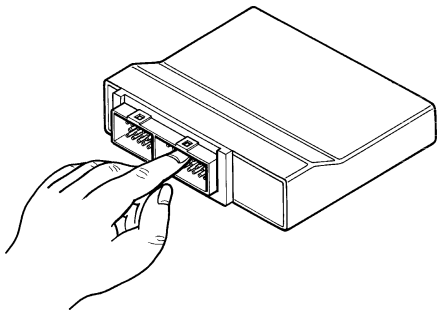
- Be careful not to touch the electrical terminals of the electronic parts (ECM, ABS control unit/HU, etc.). The static electricity from your body may damage them.



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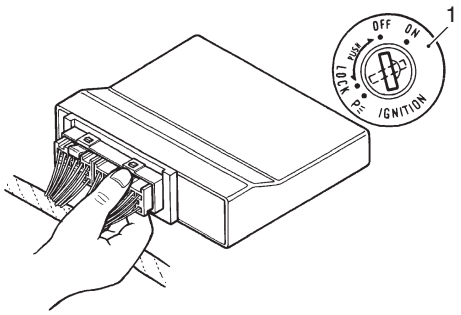
- When disconnecting and connecting the coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



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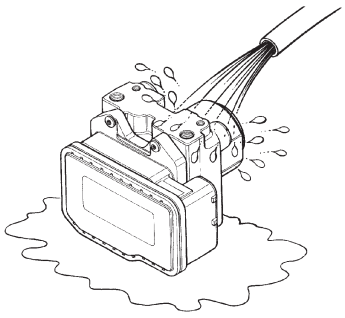
1. Ignition switch

- Never allow dust or water to contact the ABS control unit/HU.



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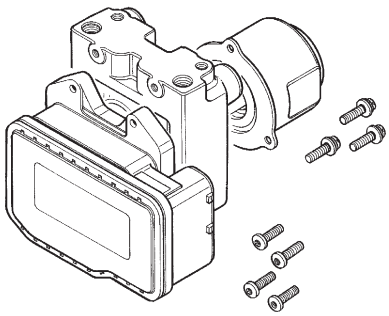
- The ABS control unit/HU cannot be disassembled. Replace the whole unit with a new one.



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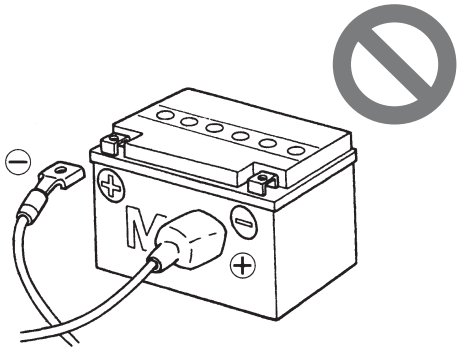
Battery

- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI and ABS systems instantly when reverse power is applied.



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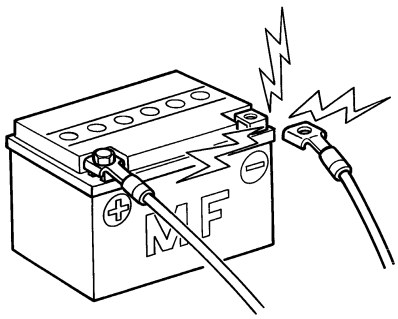
- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



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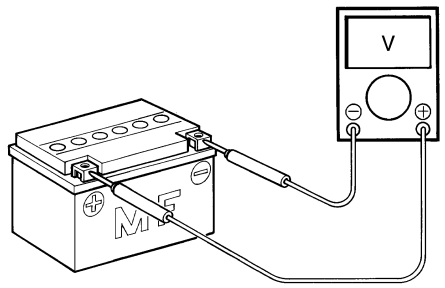
- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check with a low battery voltage will lead to erroneous diagnosis.



I310G1000012-01

- Never connect any tester (voltmeter, ohmmeter, or whatever) to the electronic unit when its coupler is disconnected. Otherwise, damage to electronic unit may result.
- Never connect an ohmmeter to the electronic unit with its coupler connected. If attempted, damage to ECM or sensors may result.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained and personal injury may result.

Electrical Circuit Inspection Procedure

While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

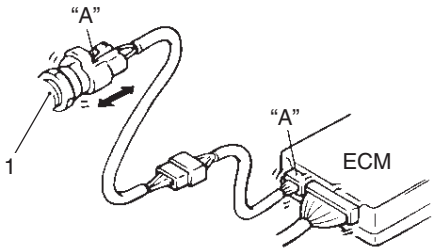
Open circuit check

Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- Loose connection of connector/coupler
- Poor contact of terminal (due to dirt, corrosion or rust, poor contact tension, entry of foreign object etc.)
- Wire harness being open.
- Poor terminal-to-wire connection.

When checking system circuits including an electronic control unit such as ECM, ABS control unit/HU, etc., it is important to perform careful check, starting with items which are easier to check.

1) Disconnect the negative (–) cable from the battery.
2) Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.



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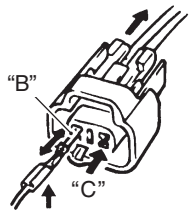
1. Sensor	"A": Check for loose connection

3) Using a test male terminal, check the female terminals of the circuit being checked for contact tension.
Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted in the coupler and locked.
If contact tension is not enough, rectify the contact to increase tension or replace. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



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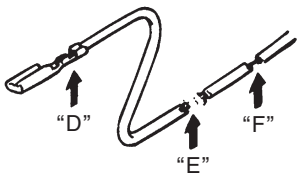
"B": Check contact tension by inserting and removing.
"C": Check each terminal for bend and proper alignment.

4) Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.

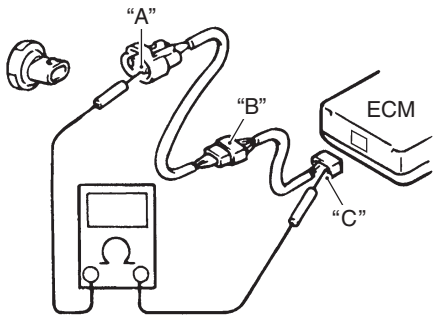


I649G1000028-01

"D": Looseness of crimping
"E": Open
"F": Thin wire (A few strands left)

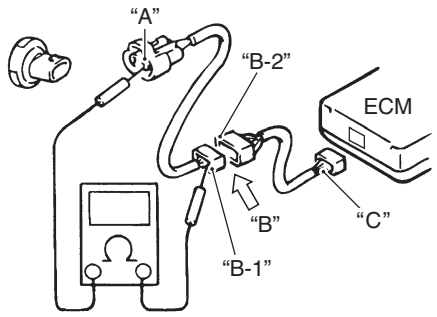
Continuity check

1) Measure resistance across coupler “B” (between “A” and “C” in figure).
   If no continuity is indicated (infinity or over limit), the circuit is open between terminals “A” and “C”.



I705H1000006-02

2) Disconnect the coupler “B” and measure resistance between couplers “A” and “B-1”.
   If no continuity is indicated, the circuit is open between couplers “A” and “B-1”. If continuity is indicated, there is an open circuit between couplers “B-2” and “C” or an abnormality in coupler “B-2” or coupler “C”.



I705H1000010-02

Voltage check

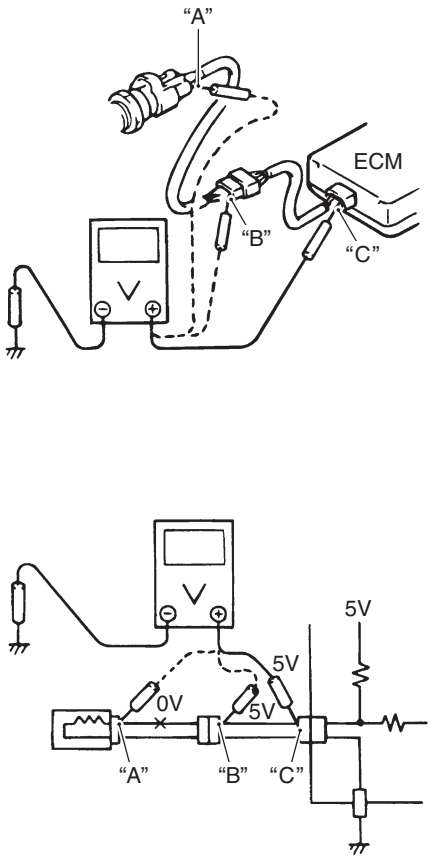
If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

1) With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.
2) If measurements were taken as shown in the figure and results were listed in the following, it means that the circuit is open between terminals “A” and “B”.

   Voltage between
   “A” and body ground: Approx. 5 V
   “B” and body ground: Approx. 5 V
   “C” and body ground: 0 V

3) Also, if measured values are as listed following, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals “A” and “B”.

   Voltage between
   “A” and body ground: Approx. 5 V
   “B” and body ground: Approx. 5 V – 2 V voltage drop
   “C” and body ground: 3 V – 2 V voltage drop



I705H1000007-01

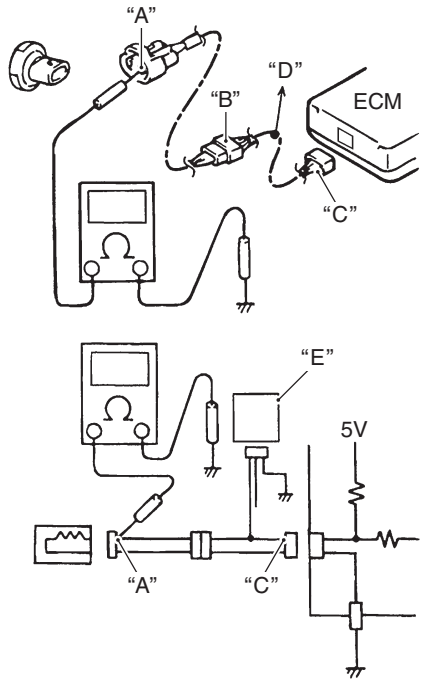
Short circuit check (Wire harness to ground)

1) Disconnect the negative (–) cable from the battery.
2) Disconnect the connectors/couplers at both ends of the circuit to be checked.

NOTE

If the circuit to be checked branches to other parts as shown, disconnect all connectors/ couplers of those parts. Otherwise, diagnosis will be wrong.

3) Measure resistance between terminal at one end of circuit (“A” terminal in figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals “A” and “C”.



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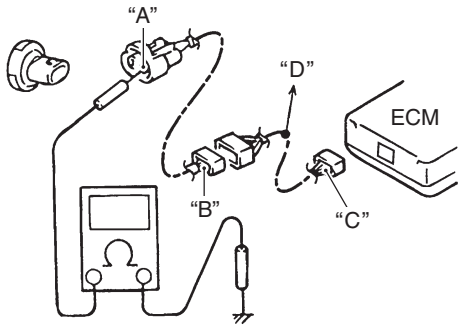
“D”: To other parts	“E”: Other parts

4) Disconnect the connector/coupler included in circuit (coupler “B”) and measure resistance between terminal “A” and body ground. If continuity is indicated, the circuit is shorted to the ground between terminals “A” and “B”.



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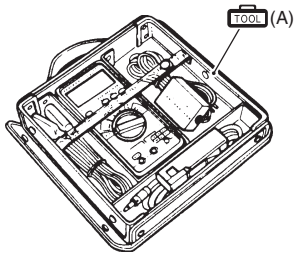
“D”: To other parts

Using The Multi-Circuit Testers

- Use the Suzuki multi-circuit tester set.
- Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.

Special tool
(A): 09900–25008 (Multi-circuit tester set)



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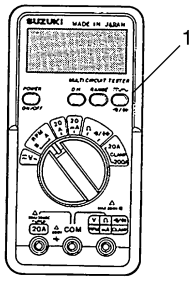
Using the testers

- Incorrectly connecting the (+) and (–) probes may cause the inside of the tester to be burned.
- If the voltage and current are not known, make measurements using the highest range.
- When measuring the resistance with the multi-circuit tester (1), ∞ will be shown as 10.00 MΩ and “1” flashes in the display.
- Check that no voltage is applied before making the measurement. If voltage is applied the tester may be damaged.

- After using the tester, turn the power off.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)



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NOTE

- **When connecting the multi-circuit tester, use the needle pointed probe to the back side of the lead wire coupler and connect the probes of tester to them.**
- **Use the needle pointed probe to prevent the rubber of the water proof coupler from damage.**
- **When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.**

Special tool
TOOL (A): 09900–25009 (Needle pointed probe set)

I649G1000025-02

Section 0

General Information

CONTENTS

General Information

General Description

Symbols

B718H10101001

Listed in the table below are the symbols indicating instructions and other information necessary for servicing. The meaning of each symbol is also included in the table.

Symbol	Definition
	Torque control required. Data beside it indicate specified torque.
	Apply oil. Use engine oil unless otherwise specified.
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1:1).
	Apply SUZUKI SUPER GREASE “A” or equivalent. 99000-25010
	Apply SUZUKI MOLY PASTE or equivalent. 99000-25140
	Apply SUZUKI SILICONE GREASE or equivalent. 99000-25100
1207B	Apply SUZUKI BOND “1207B” or equivalent. 99000-31140
1215	Apply SUZUKI BOND “1215” or equivalent. 99000-31110
1303	Apply THREAD LOCK SUPER “1303” or equivalent. 99000-32030
1322	Apply THREAD LOCK SUPER “1322” or equivalent. 99000-32110
1360	Apply THREAD LOCK SUPER “1360” or equivalent. 99000-32130
LLC	Use engine coolant or equivalent. 99000-99032-11X
FORK	Use fork oil or equivalent. 99000-99001-SS8
BF	Apply or use brake fluid.
TOOL	Use special tool.
	Do not reuse.
	Note on reassembly.

Abbreviations

B718H10101002

A:
ABDC: After Bottom Dead Center
ABS: Anti-lock brake system
AC: Alternating Current
ACL: Air Cleaner, Air Cleaner Box
API: American Petroleum Institute
ATDC: After Top Dead Center
A/F: Air Fuel Mixture
B:
BBDC: Before Bottom Dead Center
BTDC: Before Top Dead Center
B+: Battery Positive Voltage
C:
CKP Sensor: Crankshaft Position Sensor (CKPS)
CKT: Circuit
CLP Switch: Clutch Lever Position Switch (Clutch Switch)
CO: Carbon Monoxide
CPU: Central Processing Unit
D:
DC: Direct Current
DMC: Dealer Mode Coupler
DOHC: Double Over Head Camshaft
DRL: Daytime Running Light
DTC: Diagnostic Trouble code
E:
ECM: Engine Control Module Engine Control Unit (ECU) (FI Control Unit)
ECT Sensor: Engine Coolant Temperature Sensor (ECTS)
Water Temp. Sensor (WTS)
F:
FI: Fuel Injection, Fuel Injector
FP: Fuel pump
FPR: Fuel Pressure Regulator

FP Relay: Fuel Pump Relay
G:
GEN: Generator
GND: Ground
GP Switch: Gear Position Switch
H:
HC: Hydrocarbons
HO2 sensor: Heated Oxygen Sensor (HO2S)
I:
IAP Sensor: Intake Air Pressure Sensor (IAPS)
IAT Sensor: Intake Air Temperature Sensor (IATS)
IG: Ignition
ISC Valve: Idle Speed Control Valve (ISCV)
J:
JASO: Japanese Automobile Standards Organization
L:
LCD: Liquid Crystal Display
LED: Light Emitting Diode (Malfunction Indicator Lamp)
LH: Left Hand
M:
MAL-CODE: Malfunction Code (Diagnostic Code)
Max: Maximum
MIL: Malfunction Indicator Lamp (LED)
Min: Minimum
N:
NOx: Nitrogen Oxides
O:
OHC: Over Head Camshaft
OPS: Oil Pressure Switch
P:
PAIR: Pulsed Secondary Air Injection
PCV: Positive Crankcase Ventilation (Crankcase Breather)
R:
RH: Right Hand
ROM: Read Only Memory
S:
SAE: Society of Automotive Engineers
SDS: Suzuki Diagnosis System
STC System: Secondary Throttle Control System (STCS)
STP Sensor: Secondary Throttle Position Sensor (STPS)
ST Valve: Secondary Throttle Valve (STV)
STV Actuator: Secondary Throttle Valve Actuator (STVA)
T:
TO Sensor: Tip-over Sensor (TOS)
TP Sensor: Throttle Position Sensor (TPS)

SAE-to-Former SUZUKI Term

B718H10101012

This list shows SAE (Society of Automotive Engineers) J1930 terms and abbreviations which may be used in this manual in compliance with SAE recommendations, as well as their former SUZUKI names.
Ex. SAE term (Abbreviation): Former SUZUKI term
A:
Air Cleaner (ACL): Air Cleaner, Air Cleaner Box
B:
Battery Positive Voltage (B+): Battery Voltage, +B
C:
Crankshaft Position Sensor (CKP Sensor): Crankshaft Position Sensor (CKPS), Crank Angle
D:
Data Link Connector (DLC): Dealer Mode Coupler
Diagnostic Test Mode (DTM): —
Diagnostic Trouble Code (DTC): Diagnostic Code, Malfunction Code
E:
Electronic Ignition (EI): —
Engine Control Module (ECM): Engine Control Module (ECM), FI Control Unit, Engine Control Unit (ECU)
Engine Coolant Level (ECL): Coolant Level
Engine Coolant Temperature (ECT): Coolant Temperature, Engine Coolant Temperature, Water Temperature
Engine Speed (RPM): Engine Speed (RPM)
Evaporative Emission (EVAP): Evaporative Emission
Evaporative Emission Canister (EVAP Canister): — (Canister)
F:
Fan Control (FC): —
Fuel Level Sensor: Fuel Level Sensor, Fuel Level Gauge
Fuel Pump (FP): Fuel Pump (FP)
G:
Generator (GEN): Generator
Ground (GND): Ground (GND, GRD)
H:
Hydrocarbons (HC): Hydrocarbons
Heated Oxygen Sensor (HO2S): Heated Oxygen Sensor (HO2S), O2 sensor
I:
Ignition Control Module (ICM): —
Intake Air Temperature (IAT): Intake Air Temperature (IAT), Air Temperature
Idle Speed Control (ISC): —
Ignition Control (IC): Electronic Spark Advance (ESA)
Ignition Control Module (ICM): —
Intake Air Temperature (IAT): Intake Air Temperature (IAT), Air Temperature
M:
Malfunction Indicator Lamp (MIL): LED Lamp, Malfunction Indicator Lamp (MIL)
Manifold Absolute Pressure (MAP): Intake Air Pressure (IAP), Intake Vacuum
Mass Air Flow (MAF): Air Flow
O:
On-Board Diagnostic (OBD): Self-Diagnosis Function, Diagnostic
Open Loop (OL): —
P:
Programmable Read Only Memory (PROM): —
Pulsed Secondary Air Injection (PAIR): Pulse Air Control (PAIR)
Purge Valve (Purge Valve): Purge Valve (SP Valve)
R:
Random Access Memory (RAM): —

Read Only Memory (ROM): ROM
S:
Secondary Air Injection (AIR): —
Secondary Throttle Control System (STCS): STC System (STCS)
Secondary Throttle Valve (STV): ST Valve (STV)
Secondary Throttle Valve Actuator (STVA): STV Actuator (STVA)
T:
Throttle Body (TB): Throttle Body (TB)
Throttle Body Fuel Injection (TBI): Throttle Body Fuel Injection (TBI)
Throttle Position Sensor (TP Sensor): TP Sensor (TPS)
V:
Voltage Regulator (VR): Voltage Regulator
Volume Air Flow (VAF): Air Flow

Vehicle Side View

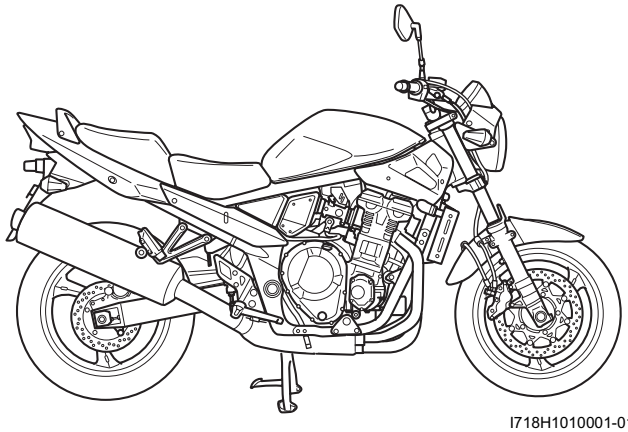
B718H10101003

NOTE

Difference between illustration and actual motorcycles may exist depending on the markets.

SUZUKI GSF1250 (2007-model)

Right Side



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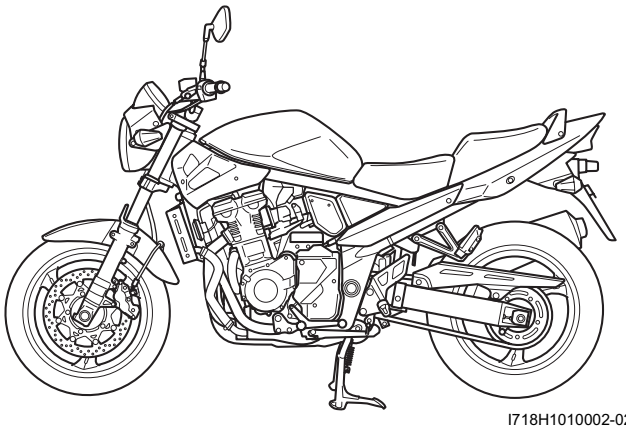
Left Side



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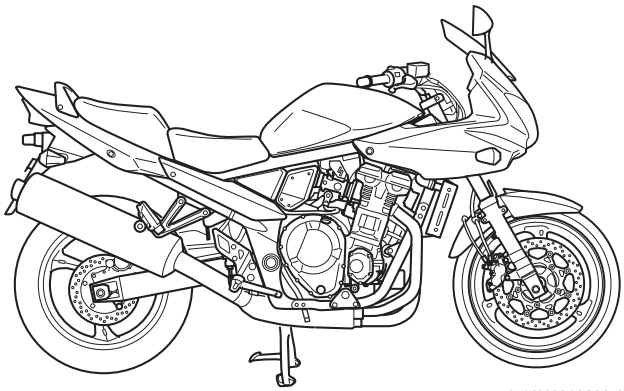
SUZUKI GSF1250S (2007-model)

Right Side



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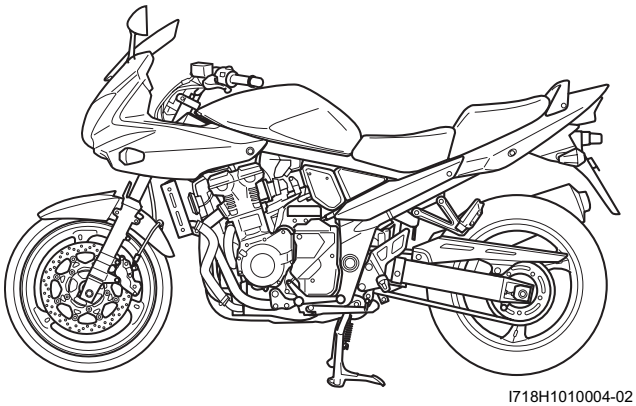
Left Side



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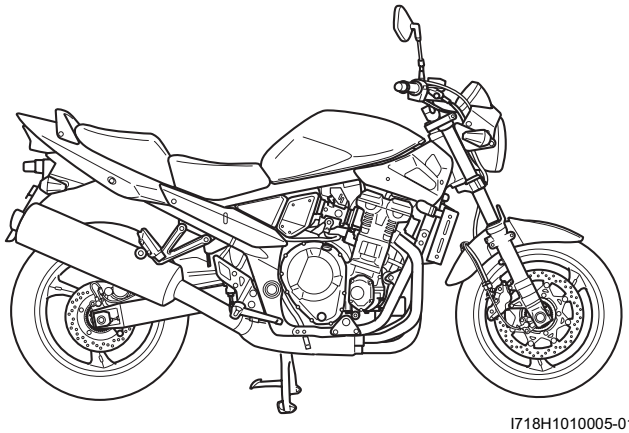
SUZUKI GSF1250A (2007-model)

Right Side



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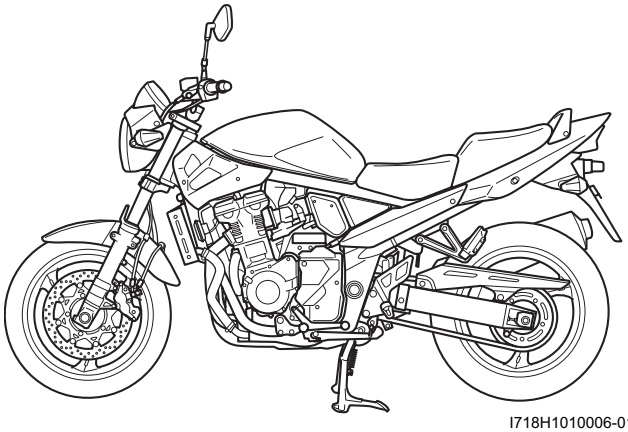
Left Side



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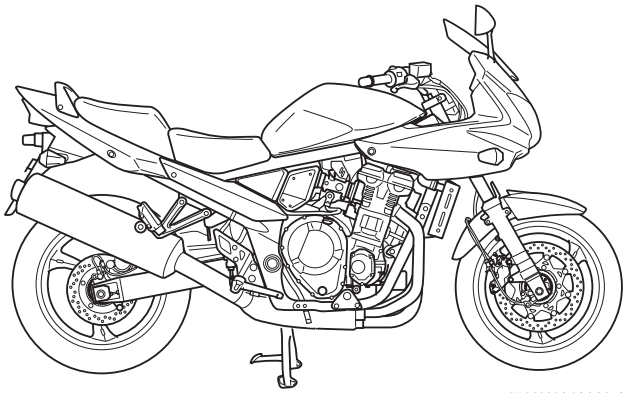
SUZUKI GSF1250SA (2007-model)

Right Side



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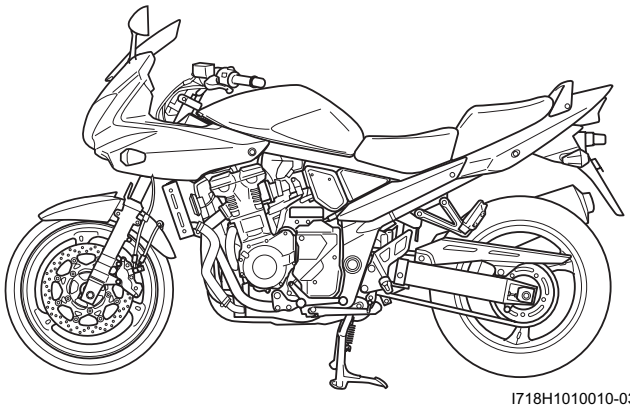
Left Side

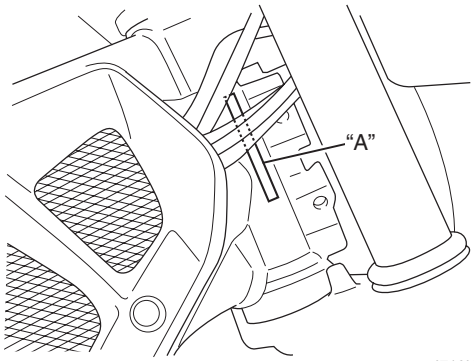


I718H1010010-03

Vehicle Identification Number

B718H10101004

The frame serial number or V.I.N. (Vehicle Identification Number) “A” is stamped on the right side of the steering head pipe. The engine serial number “B” is located on the right side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.



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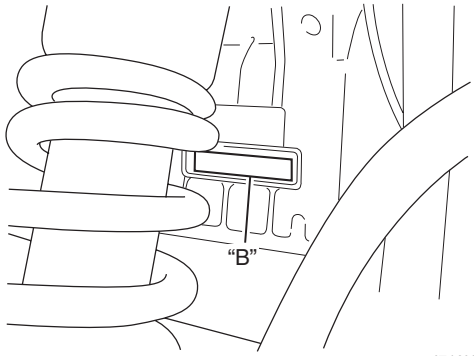


I718H1010012-03

Fuel and Oil Recommendation

B718H10101005

Fuel (For USA and Canada)

Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method.

Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.

Fuel (For Other Countries)

Gasoline used should be graded 91 octane (Research Method) or higher. Unleaded gasoline is recommended.

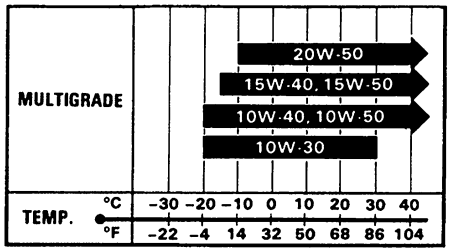
Engine Oil (For USA)

Oil quality is a major contributor to your engine’s performance and life. Always select good quality engine oil.

Suzuki recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or equivalent engine oil. Use of SF/SG or SH/SJ in API with MA in JASO.

Suzuki recommends the use of SAE 10W-40 engine oil. If SAE 10W-40 engine oil is not available, select and alternative according to the chart.

Engine Oil (For Other Countries)
Oil quality is a major contributor to your engine's performance and life. Always select good quality engine oil. Use of SF/SG or SH/SJ in API with MA in JASO. Suzuki recommends the use of SAE 10W-40 engine oil. If SAE 10W-40 engine oil is not available, select an alternative according to the chart.



I310G1010005-01

Brake Fluid
Specification and classification: DOT 4

⚠ WARNING

Since the brake system of this motorcycle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result.
Do not use any brake fluid taken from old or used or unsealed containers.
Never reuse brake fluid left over from a previous servicing, which has been stored for a long period.

Front Fork Oil
Use fork oil SS8 or an equivalent fork oil.

Engine Coolant Recommendation

B718H10101011

Engine Coolant
Use an anti-freeze/engine coolant compatible with an aluminum radiator, mixed with distilled water only.

Water for mixing
Use distilled water only. Water other than distilled water can corrode and clog the aluminum radiator.

Anti-freeze/Engine coolant
The engine coolant perform as a corrosion and rust inhibitor as well as anti-freeze. Therefore, the engine coolant should be used at all times even though the atmospheric temperature in your area does not go down to freezing point.
Suzuki recommends the use of SUZUKI COOLANT anti-freeze/engine coolant. If this is not available, use an equivalent which is compatible with an aluminum radiator.

Liquid amount of water/Engine coolant

Solution capacity (total)
3 250 ml (3.4/2.9 US/Imp qt)

For engine coolant mixture information, refer to "Engine Coolant Description in Section 1F (Page 1F-1)".

⚠ CAUTION

Mixing of anti-freeze/engine coolant should be limited to 60%. Mixing beyond it would reduce its efficiency. If the anti-freeze/engine coolant mixing ratio is below 50%, rust inhibiting performance is greatly reduced. Be sure to mix it above 50% even though the atmospheric temperature does not go down to the freezing point.

BREAK-IN Procedures

B718H10101006

During manufacture only the best possible materials are used and all machined parts are finished to a very high standard but it is still necessary to allow the moving parts to "BREAK-IN" before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. The general rules are as follows.

1) Keep to these break-in engine speed limits:

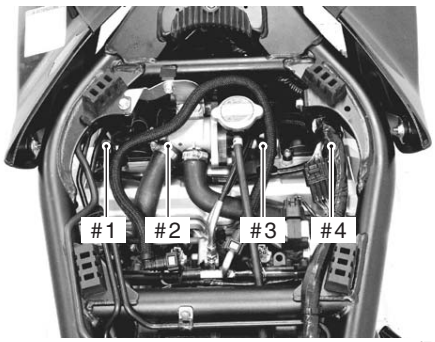
   Speed limits
   Initial 800 km (500 miles): Below 4 500 r/min
   Up to 1 600 km (1 000 miles): Below 7 000 r/min
   Over 1 600 km (1 000 miles): Below 9 500 r/min

2) Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation. However, do not exceed 9 500 r/min at any time.

Cylinder Identification

B718H10101007

The four cylinders of this engine are identified as #1, 2, 3 and #4 cylinder, as counted from left to right (as viewed by the rider on the seat).



I718H1010013-01

Country and Area Codes

B718H10101008

The following codes stand for the applicable country(-ies) and area(-s).

Code	Country or Area	Effective Frame No.
GSF1250 K7 (E-02)	U.K.	JS1CH122200100001 –
GSF1250 K7 (E-19)	E.U.	JS1CH122100100001 –
GSF1250S K7 (E-02)	U.K.	JS1CH111200100001 –
GSF1250S K7 (E-03)	U.S.A (Except for California)	JS1GW72A 72100001 –
GSF1250S K7 (E-19)	E.U.	JS1CH111100100001 –
GSF1250S K7 (E-24)	Australia	JS1CH111300100001 –
GSF1250S K7 (E-28)	Canada	JS1GW72A 72100001 –
GSF1250S K7 (E-33)	California (U.S.A)	JS1GW72A 72100001 –
GSF1250A K7 (E-02)	U.K.	JS1CH124200100001 –
GSF1250A K7 (E-19)	E.U.	JS1CH124100100001 –
GSF1250SA K7 (E-02)	U.K.	JS1CH113200100001 –
GSF1250SA K7 (E-03)	U.S.A (Except for California)	JS1GW72B 72100001 –
GSF1250SA K7 (E-19)	E.U.	JS1CH113100100001 –
GSF1250SA K7 (E-24)	Australia	JS1CH113300100001 –
GSF1250SA K7 (E-28)	Canada	JS1GW72B 72100001 –
GSF1250SA K7 (E-33)	California (U.S.A)	JS1GW72B 72100001 –

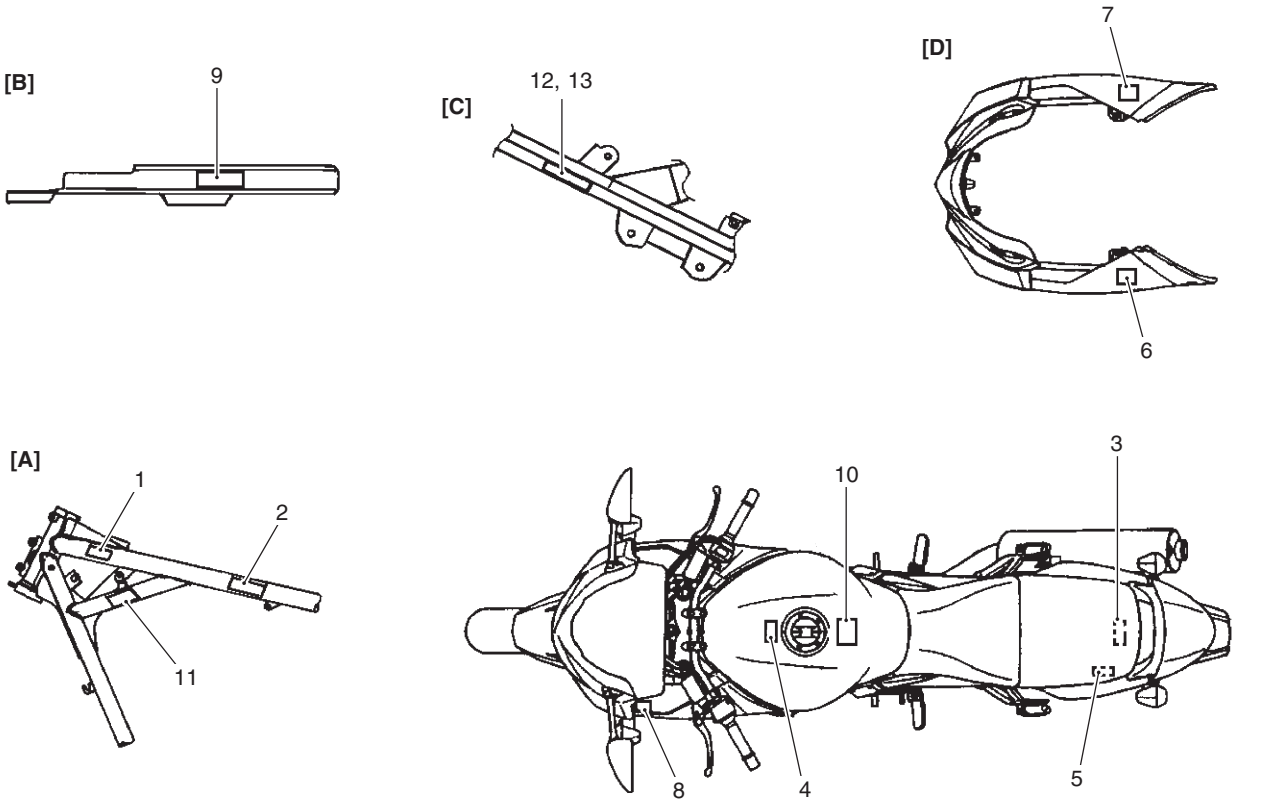
Wire Color Symbols

B718H10101009

Symbol	Wire Color	Symbol	Wire Color
B	Black	Bl/Y	Blue with Yellow tracer
Bl	Blue	Br/B	Brown with Black tracer
Br	Brown	G/B	Green with Black tracer
Dbr	Dark brown	G/Y	Green with Yellow tracer
Dg	Dark green	Gr/B	Gray with Black tracer
G	Green	Gr/R	Gray with Red tracer
Gr	Gray	Gr/W	Gray with White tracer
Lbl	Light blue	Gr/Y	Gray with Yellow tracer
Lg	Light green	O/G	Orange with Green tracer
O	Orange	O/R	Orange with Red tracer
P	Pink	O/W	Orange with White tracer
R	Red	O/Y	Orange with Yellow tracer
W	White	P/B	Pink with Black tracer
Y	Yellow	P/W	Pink with White tracer
B/Bl	Black with Blue tracer	R/B	Red with Black tracer
B/Br	Black with Brown tracer	R/Bl	Red with Blue tracer
B/G	Black with Green tracer	W/B	White with Black tracer
B/Lg	Black with Light green tracer	W/Bl	White with Blue tracer
B/O	Black with Orange tracer	W/G	White with Green tracer
B/R	Black with Red tracer	W/R	White with Red tracer
B/W	Black with White tracer	W/Y	White with Yellow tracer
B/Y	Black with Yellow tracer	Y/B	Yellow with Black tracer
Bl/B	Blue with Black tracer	Y/Bl	Yellow with Blue tracer
Bl/G	Blue with Green tracer	Y/R	Yellow with Red tracer
Bl/W	Blue with White tracer	Y/W	Yellow with White tracer

Warning, Caution and Information Labels Location

B718H10101010



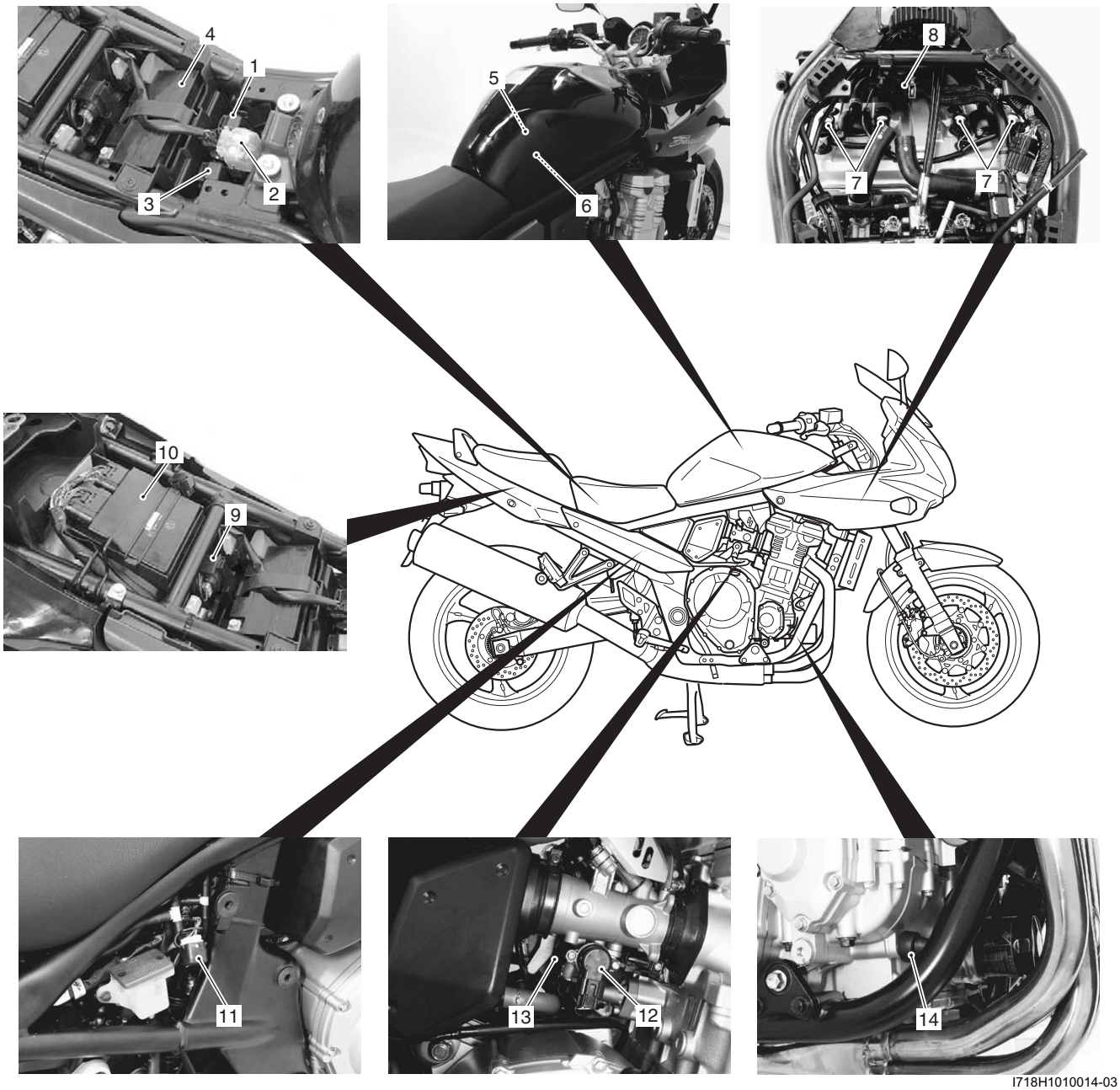
I718H1010016-02

	GSF1250/A	GSF1250S/SA
1. Noise label	—	For E-03, 24, 33
2. Information label	—	For E-03, 28, 33
3. Vacuum hose routing label	—	For E-33
4. Fuel caution label	For E-02	For E-02, 24
5. Manual notice label	—	For E-03, 33
6. Screen label	—	For E-03, 19, 24, 28, 33
7. Screen label	—	For E-28
8. Warning steering label	—	For E-03, 19, 24, 28, 33
9. Tire information label	For E-02, 19	For E-03, 19, 24, 28, 33
10. General warning label	For E-02, 19	For E-03, 19, 24, 28, 33
11. ICES Canada label	—	For E-28
12. I.D. plate	For E-02, 19	For E-02, 19, 24
13. Safety plate	—	For E-03, 28, 33
[A]: Frame head (Left side)		
[B]: Chain cover		
[C]: Frame side tube (Right side)		
[D]: Cowling body		

Component Location

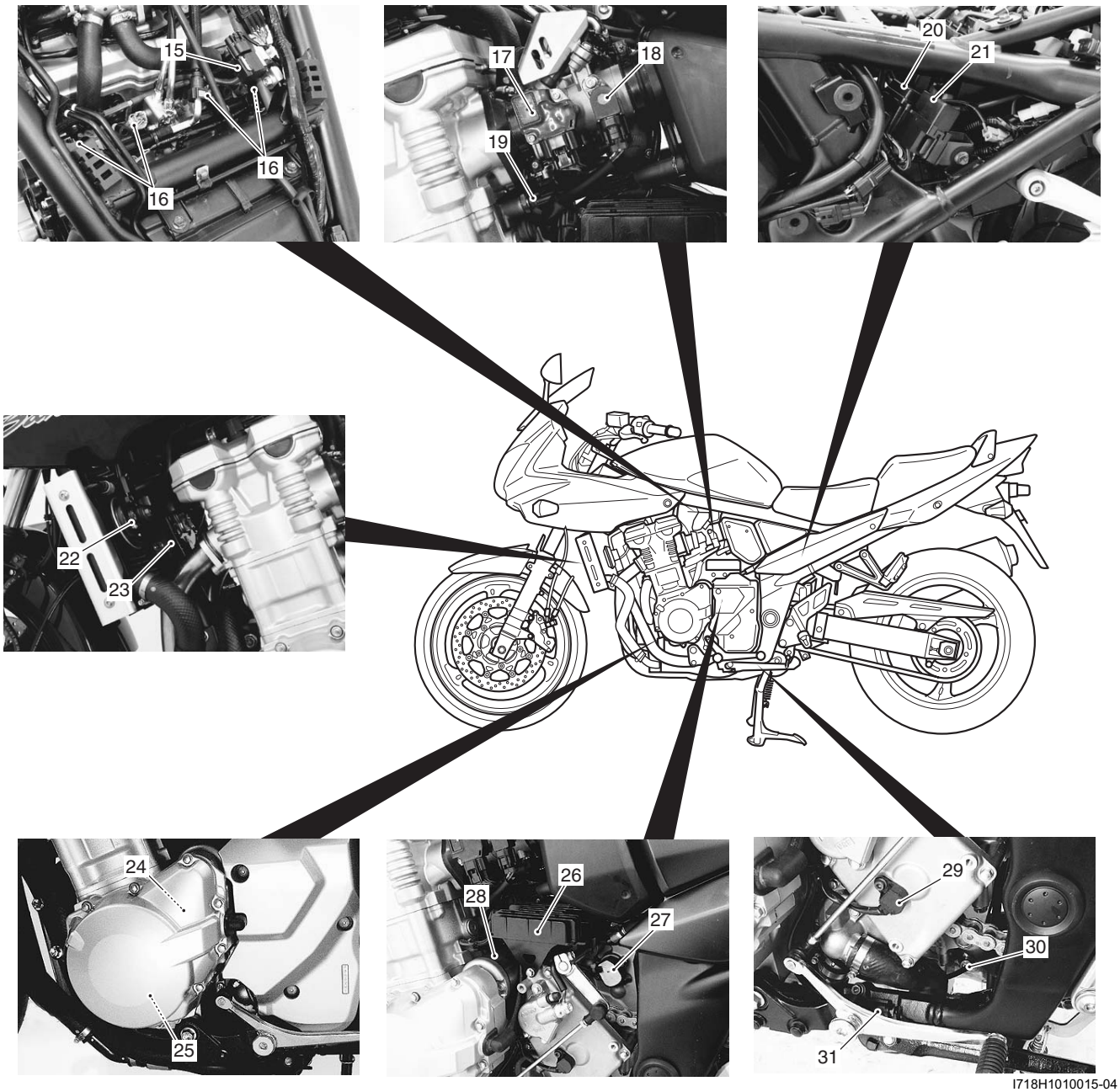
Electrical Components Location

B718H10103001



I718H1010014-03

1. Fuel pump relay	6. Fuel level gauge	11. Mode selection switch coupler
2. Starter relay/Main fuse	7. Ignition coil/plug cap	12. ISC valve
3. Cooling fan relay	8. PAIR control solenoid valve	13. STV actuator
4. Battery	9. TO sensor	14. Oil pressure switch
5. Fuel pump	10. ECM	



I718H1010015-04

15. IAP sensor (No.1)	21. Turn signal/side-stand relay	27. GP switch
16. Fuel injector	22. Horn	28. Starter motor
17. IAP/TP/IAT sensor	23. Cooling fan	29. Speed sensor
18. STP sensor	24. CKP sensor	30. HO2 sensor
19. ECT sensor	25. Generator	31. Side-stand switch
20. Fuse box	26. Regulator/rectifier	

Specifications

Specifications (GSF1250/S)

B718H10107002

NOTE

These specifications are subject to change without notice.

Dimensions and dry mass

Item	Specification	Remark
Overall length	2 130 mm (83.9 in)	
Overall width	790 mm (31.1 in)	
Overall height	1 095 mm (43.1 in)	GSF1250
	1 235 mm (48.6 in)	GSF1250S
Wheelbase	1 485 mm (58.5 in)	
Ground clearance	135 mm (5.3 in)	
Seat height	785/805 mm (30.9/31.7 in)	Low/High
Dry mass	222 kg (489 lbs)	GSF1250
	225 kg (496 lbs)	GSF1250S

Engine

Item	Specification	Remark
Type	4-stroke, liquid-cooled, DOHC	
Number of cylinders	4	
Bore	79.0 mm (3.110 in)	
Stroke	64.0 mm (2.519 in)	
Displacement	1 255 cm^3 (76.6 cu. in)	
Compression ratio	10.5 : 1	
Carburetor	Fuel injection	
Air cleaner	Non-woven fabric element	
Starter system	Electric	
Lubrication system	Wet sump	
Idle speed	1 200 $\pm$ 100 r/min	

Drive train

Item		Specification	Remark
Clutch		Wet multi-plate type	
Transmission		6-speed constant mesh	
Gearshift pattern		1-down, 5-up	
Primary reduction ratio		1.537 (83/54)	
Gear ratios	Low	3.076 (40/13)	
	2nd	2.058 (35/17)	
	3rd	1.550 (31/20)	
	4th	1.304 (30/23)	
	5th	1.160 (29/25)	
	Top	1.071 (30/28)	
Final reduction ratio		2.388 (43/18)	
Drive chain		RK GB50GSVZ3, 118 links	

Chassis

Item	Specification	Remark
Front suspension	Telescopic, coil spring, oil damped	
Rear suspension	Link type, coil spring, oil damped	
Front suspension stroke	130 mm (5.1 in)	
Rear wheel travel	136 mm (5.4 in)	
Steering angle	35° (right & left)	
Caster	25° 20’	
Tail	104 mm (4.09 in)	
Turning radius	2.8 m (9.2 ft)	
Front brake	Disc brake, twin	
Rear brake	Disc brake	
Front tire size	120/70ZR17M/C (58W), tubeless	
Rear tire size	180/55ZR17M/C (73W), tubeless	

Electrical

Item	Specification	Remark
Ignition type	Electronic ignition (Transistorized)	
Ignition timing	8° B.T.D.C. at 1 200 r/min	
Spark plug	NGK CR7E or DENSO U22ESR-N	
Battery	12 V 36 kC (10 Ah)/10 HR	
Generator	Three-phase A.C. generator	
Main fuse	30 A	
Fuse	10/10/15/15/10/15 A	
Headlight	12 V 60/55 W (H4)	GSF1250
	12 V 55 W (H7) + 12 V 55 W (H7)	GSF1250S
Position light	12 V 5 W	GSF1250
	12 V 5 W x 2	GSF1250S
Turn signal light	12 V 21 W	
Brake light/Taillight	12 V 21/5 W	
License plate light	12 V 5 W	
Speedometer light	LED	
Tachometer light	LED	
Neutral indicator light	LED	
High beam indicator light	LED	
Turn signal indicator light	LED	
Oil pressure indicator light	LED	
Coolant temperature indicator light	LED	
Fuel injection indicator light	LED	

Capacities

Item		Specification	Remark
Fuel tank	Including reserve	18.5 L (4.9/4.1 US/Imp gal)	E-33
		19.0 L (5.0/4.2 US/Imp gal)	Others
Engine oil	Oil change	3 000 ml (3.2/2.6 US/Imp qt)	
	With filter change	3 500 ml (3.7/3.1 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Coolant		3.3 L (3.5/2.9 US/Imp gal)	

Specifications (GSF1250A/SA)

B718H10107001

NOTE

These specifications are subject to change without notice.

Dimensions and dry mass

Item	Specification	Remark
Overall length	2 130 mm (83.9 in)	
Overall width	790 mm (31.1 in)	
Overall height	1 095 mm (43.1 in)	GSF1250A
	1 235 mm (48.6 in)	GSF1250SA
Wheelbase	1 485 mm (58.5 in)	
Ground clearance	135 mm (5.3 in)	
Seat height	785/805 mm (30.9/31.7 in)	Low/High
Dry mass	226 kg (498 lbs)	GSF1250A
	229 kg (504 lbs)	GSF1250SA

Engine

Item	Specification	Remark
Type	4-stroke, liquid-cooled, DOHC	
Number of cylinders	4	
Bore	79.0 mm (3.110 in)	
Stroke	64.0 mm (2.519 in)	
Displacement	1 255 cm^3 (76.6 cu. in)	
Compression ratio	10.5 : 1	
Carburetor	Fuel injection	
Air cleaner	Non-woven fabric element	
Starter system	Electric	
Lubrication system	Wet sump	
Idle speed	1 200 $\pm$ 100 r/min	

Drive train

Item		Specification	Remark
Clutch		Wet multi-plate type	
Transmission		6-speed constant mesh	
Gearshift pattern		1-down, 5-up	
Primary reduction ratio		1.537 (83/54)	
Gear ratios	Low	3.076 (40/13)	
	2nd	2.058 (35/17)	
	3rd	1.550 (31/20)	
	4th	1.304 (30/23)	
	5th	1.160 (29/25)	
	Top	1.071 (30/28)	
Final reduction ratio		2.388 (43/18)	
Drive chain		RK GB50GSVZ3, 118 links	

Chassis

Item	Specification	Remark
Front suspension	Telescopic, coil spring, oil damped	
Rear suspension	Link type, coil spring, oil damped	
Front suspension stroke	130 mm (5.1 in)	
Rear wheel travel	136 mm (5.4 in)	
Steering angle	35° (right & left)	
Caster	25° 20’	
Tail	104 mm (4.09 in)	
Turning radius	2.8 m (9.2 ft)	
Front brake	Disc brake, twin	
Rear brake	Disc brake	
Front tire size	120/70ZR17M/C (58W), tubeless	
Rear tire size	180/55ZR17M/C (73W), tubeless	

Electrical

Item	Specification	Remark
Ignition type	Electronic ignition (Transistorized)	
Ignition timing	8° B.T.D.C. at 1 200 r/min	
Spark plug	NGK CR7E or DENSO U22ESR-N	
Battery	12 V 36 kC (10 Ah)/10 HR	
Generator	Three-phase A.C. generator	
Main fuse	30 A	
Fuse	10/10/15/15/15/10/20/15 A	
Headlight	12 V 60/55 W (H4)	GSF1250A
	12 V 55 W (H7) + 12 V 55 W (H7)	GSF1250SA
Position light	12 V 5 W	GSF1250A
	12 V 5 W x 2	GSF1250SA
Turn signal light	12 V 21 W	
Brake light/Taillight	12 V 21/5 W	
License plate light	12 V 5 W	
Speedometer light	LED	
Tachometer light	LED	
Neutral indicator light	LED	
High beam indicator light	LED	
Turn signal indicator light	LED	
Oil pressure indicator light	LED	
Coolant temperature indicator light	LED	
Fuel injection indicator light	LED	
ABS indicator light	LED	

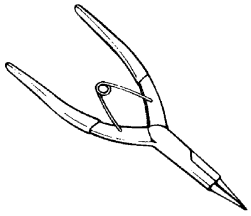
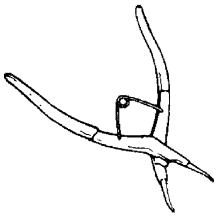
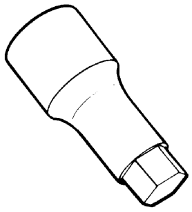
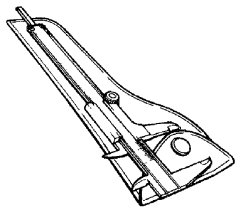
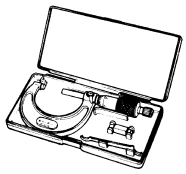
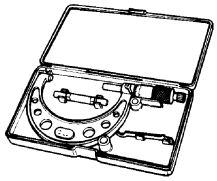
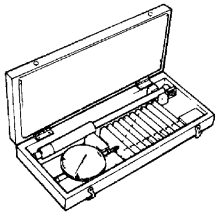
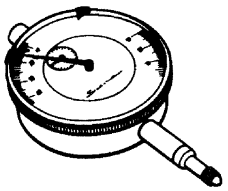
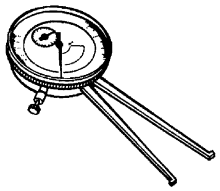
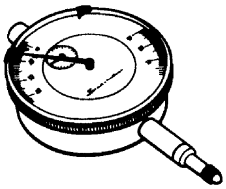
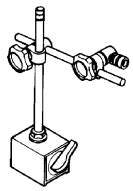
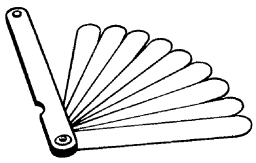
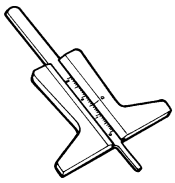
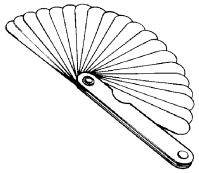
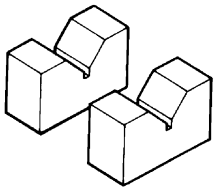
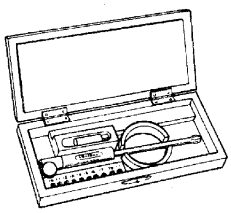
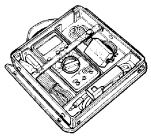
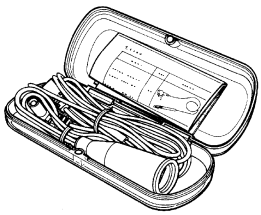
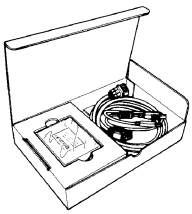
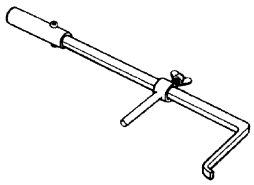
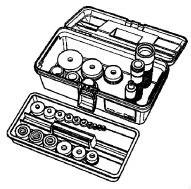
Capacities

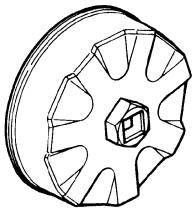
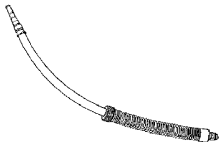
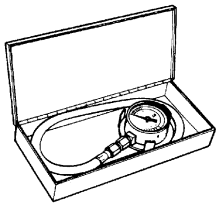
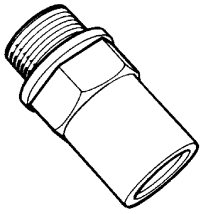
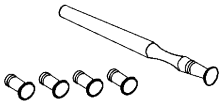
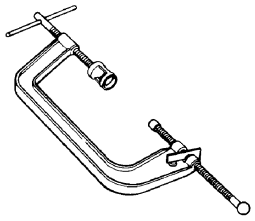
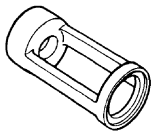
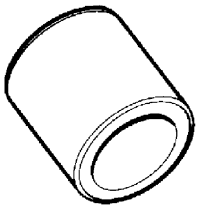
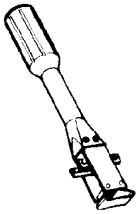
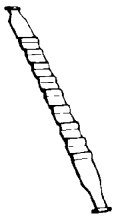
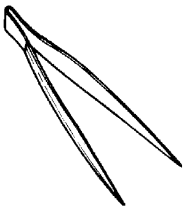
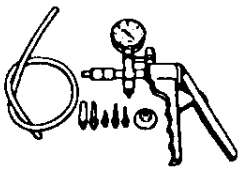
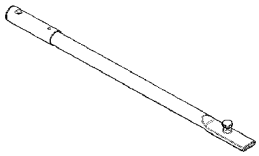
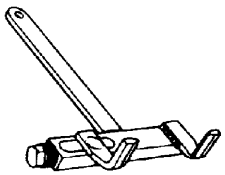
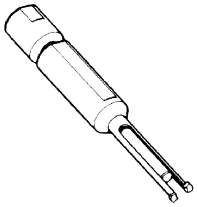
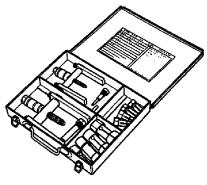
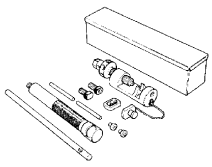
Item		Specification	Remark
Fuel tank	Including reserve	18.5 L (4.9/4.1 US/Imp gal)	E-33
		19.0 L (5.0/4.2 US/Imp gal)	Others
Engine oil	Oil change	3 000 ml (3.2/2.6 US/Imp qt)	
	With filter change	3 500 ml (3.7/3.1 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Coolant		3.3 L (3.5/2.9 US/Imp gal)	

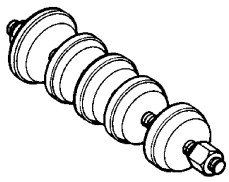
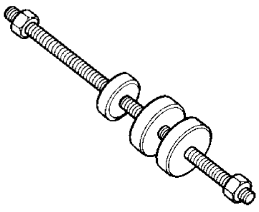
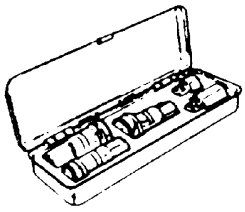
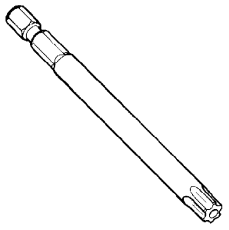
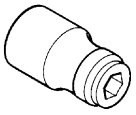
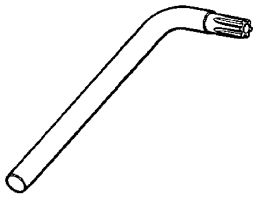
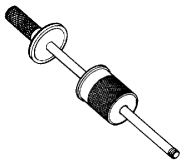
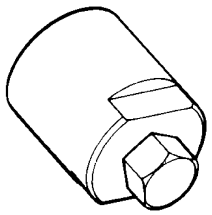
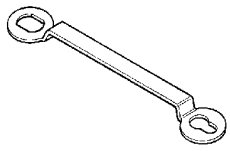
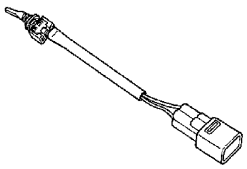
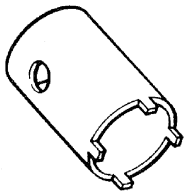
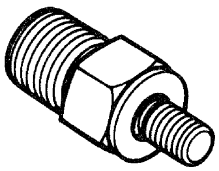
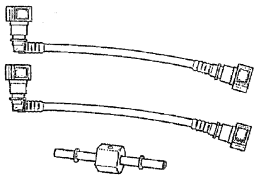
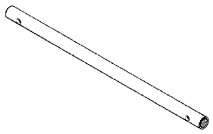
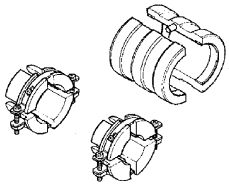
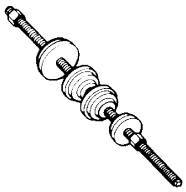
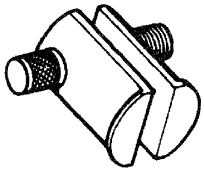
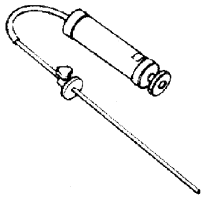
Special Tools and Equipment

Special Tool

B718H10108002

 **09900–06107** Snap ring pliers	 **09900–06108** Snap ring pliers	 **09900–18740** Hexagon socket (24 mm)	 **09900–20102** Vernier calipers (1/20 mm, 200 mm)	 **09900–20202** Micrometer (1/100 mm, 25 – 50 mm)
 **09900–20204** Micrometer (75 – 100 mm)	 **09900–20205** Micrometer (0 – 25 mm)	 **09900–20508** Cylinder gauge set	 **09900–20602** Dial gauge (1/1000 mm, 1 mm)	 **09900–20605** Dial calipers (1/100 mm, 10 – 34 mm)
 **09900–20607** Dial gauge (1/100 mm, 10 mm)	 **09900–20701** Magnetic stand	 **09900–20803** Thickness gauge	 **09900–20805** Tire depth gauge	 **09900–20806** Thickness gauge
 **09900–21304** V-block (100 mm)	 **09900–22301** Plastigauge (0.025 – 0.076 mm)	 **09900–22302** Plastigauge (0.051 – 0.152 mm)	 **09900–22403** Small bore gauge (18 – 35 mm)	 **09900–25008** Multi-circuit tester set
 **09900–25009** Needle pointed probe set	 **09904–41010** SDS set	 **09910–60611** Universal clamp wrench	 **09913–50121** Oil seal remover	 **09913–70210** Bearing installer set

 **09915–40610** Oil filter wrench	 **09915–40611** Oil filter wrench	 **09915–63311** Compression gauge attachment	 **09915–64512** Compression gauge	 **09915–74521** Oil pressure gauge hose
 **09915–74540** Oil pressure gauge attachment	 **09915–77331** Meter (for high pressure)	 **09916–10911** Valve lapper set	 **09916–14510** Valve spring compressor	 **09916–14521** Valve spring compressor attachment
 **09916–33210** Valve guide reamer (4.5 mm)	 **09916–34542** Reamer handle	 **09916–34580** Valve guide reamer (10.8 mm)	 **09916–43211** Valve guide remover/ installer	 **09916–43230** Attachment
 **09916–74521** Holder body	 **09916–74550** Band (Piston diam.: 73 – 85 mm)	 **09916–84511** Valve adjuster driver	 **09917–47011** Vacuum pump gauge	 **09920–31020** Extension handle
 **09920–53740** Clutch sleeve hub holder	 **09921–20210** Bearing remover	 **09921–20240** Bearing remover set	 **09922–22711** Drive chain cutting and joining tool	 **09923–73210** Bearing remover

 **09923–74511** Bearing remover	 **09924–84510** Bearing installer set	 **09924–84521** Bearing installer set	 **09930–10121** Spark plug wrench set	 **09930–11920** Torx bit (JT40H)
 **09930–11940** Bit holder	 **09930–11950** Torx wrench	 **09930–30104** Rotor remover slide shaft	 **09930–34970** Rotor remover set	 **09930–44530** Rotor holder
 **09930–82710** Mode select switch	 **09930–82720** Mode select switch	 **09940–14911** Steering stem nut wrench	 **09940–40211** Fuel pressure gauge adapter	 **09940–40220** Fuel pressure gauge hose attachment
 **09940–52841** Inner rod holder	 **09940–52861** Front fork oil seal installer	 **09940–92720** Spring scale	 **09941–34513** Steering race installer	 **09941–54911** Bearing outer race remover
 **09941–74911** Steering bearing installer	 **09943–74111** Fork oil level gauge	 **99565–01010–010** CD-ROM Ver.10		

Maintenance and Lubrication

Precautions

Precautions for Maintenance

B718H10200001

The “Periodic Maintenance Schedule Chart” lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Maintenance intervals are expressed in terms of kilometers, miles and months for your convenience.

NOTE

More frequent servicing may be required on motorcycles that are used under severe conditions.

General Description

Recommended Fluids and Lubricants

B718H10201001

Refer to “Fuel and Oil Recommendation in Section 0A (Page 0A-4)”. and “Engine Coolant Recommendation in Section 0A (Page 0A-5)”.

Scheduled Maintenance

Periodic Maintenance Schedule Chart

B718H10205001

NOTE

I = Inspect and clean, adjust, replace or lubricate as necessary.
R = Replace.
T = Tighten.

Item	Interval					
	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	14 500
	months	2	12	24	36	48
Air cleaner element		—	I	I	R	I
Exhaust pipe bolts, muffler bolts and nut		T	—	T	—	T
Valve clearance		—	—	—	—	I
Spark plugs		—	I	R	I	R
Fuel line		—	I	I	I	I
Evaporative emission control system (E-33 only)		—	—	I	—	I
Engine oil		R	R	R	R	R
Engine oil filter		R	—	—	R	—
Throttle cable play		I	I	I	I	I
Throttle valve synchronization		I (E-33 only)	—	I	—	I
PAIR (air supply) system		—	—	I	—	I
Engine coolant		Replace every 2 years.				
Radiator hose		—	I	I	I	I
Clutch hose		—	I	I	I	I
		Replace every 4 years.				
Clutch fluid		—	I	I	I	I
		Replace every 2 years.				
Drive chain		I	I	I	I	I
		Clean and lubricate every 1 000 km (600 miles).				
Brakes		I	I	I	I	I
Brake hose		—	I	I	I	I
		Replace every 4 years.				

Item	Interval					
	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	14 500
	months	2	12	24	36	48
Brake fluid		—	I	I	I	I
		Replace every 2 years.				
Tires		—	I	I	I	I
Steering		I	—	I	—	I
Front forks		—	—	I	—	I
Rear suspension		—	—	I	—	I
Chassis bolts and nuts		T	T	T	T	T

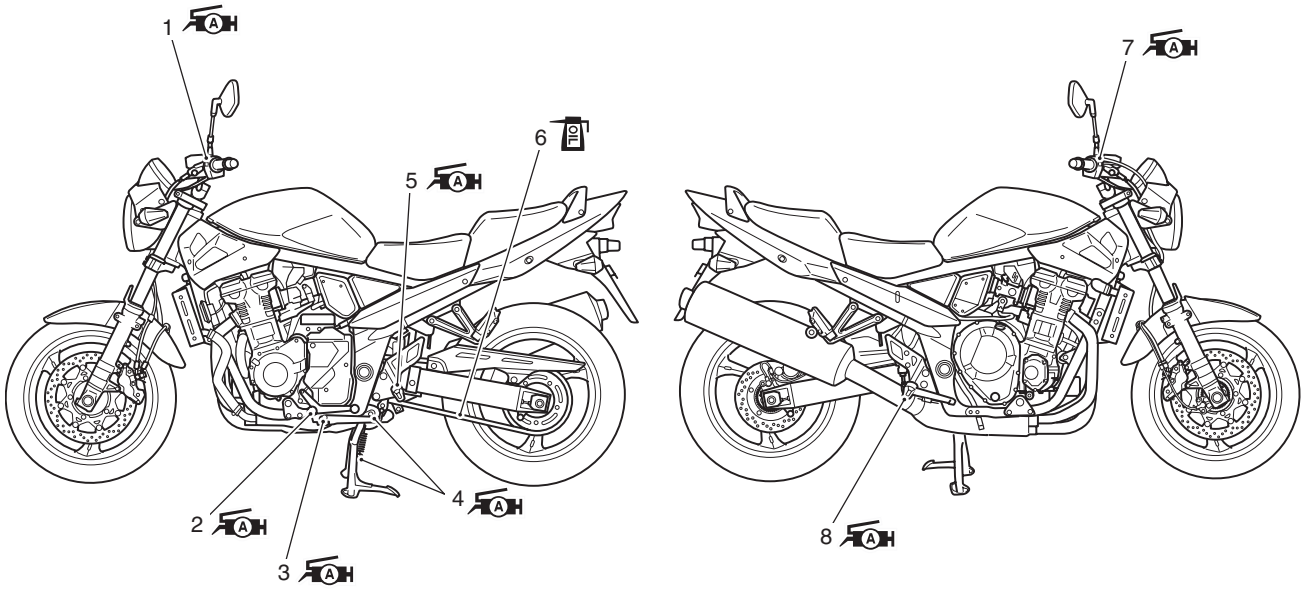
Lubrication Points

B718H10205002

Proper lubrication is important for smooth operation and long life of each working part of the motorcycle. Major lubrication points are indicated as follows.

NOTE

- **Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.**
- **Lubricate exposed parts which are subject to rust, with a rust preventative spray whenever the motorcycle has been operated under wet or rainy conditions.**



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1. Clutch lever holder	6. Drive chain
2. Gearshift lever pivot	7. Brake lever holder
3. Side-stand pivot and spring hook	8. Brake pedal pivot and footrest pivot
4. Center stand pivot and spring hook	: Apply oil.
5. Footrest pivot	: Apply grease.

Repair Instructions

Air Cleaner Element Replacement

B718H10206001

Replace air cleaner element
Every 18 000 km (11 000 miles, 36 months)

Refer to “Air Cleaner Element Removal and Installation in Section 1D (Page 1D-6)”.

Air Cleaner Element Inspection and Cleaning

B718H10206002

Inspect air cleaner element
Every 6 000 km (4 000 miles, 12 months)

Inspection

1) Remove the air cleaner element. Refer to “Air Cleaner Element Removal and Installation in Section 1D (Page 1D-6)”.
2) Inspect the air cleaner element for clogging. If it is clogged with dirt, replace it with a new one.

⚠ CAUTION

If driving under dusty conditions, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to operate the engine without the element or to use a torn element. Make sure that the air cleaner is in good condition at all times. Life of the engine depends largely on this component.

I718H1020009-01

3) After finishing the air cleaner element inspection, reinstall the removed parts.

Cleaning

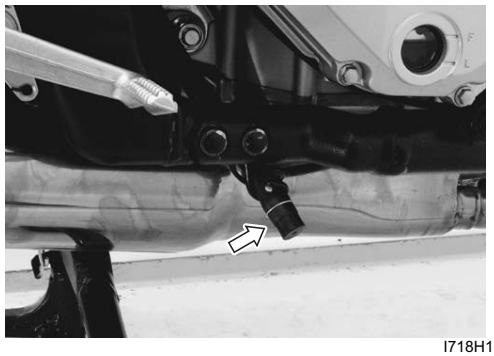
1) Remove the air cleaner element. Refer to “Air Cleaner Element Removal and Installation in Section 1D (Page 1D-6)”.
2) Carefully use compressed air to clean the air cleaner element.

⚠ CAUTION

Always apply compressed air to the inside of the air cleaner element. If compressed air is applied to the outside, dirt will be forced into the pores of the air cleaner element, restricting air flow through the air cleaner element.

I718H1020010-01

3) After cleaning the air cleaner element, reinstall the removed parts.
4) Drain water from the air cleaner by removing the drain plug.



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5) Reinstall the drain plug.

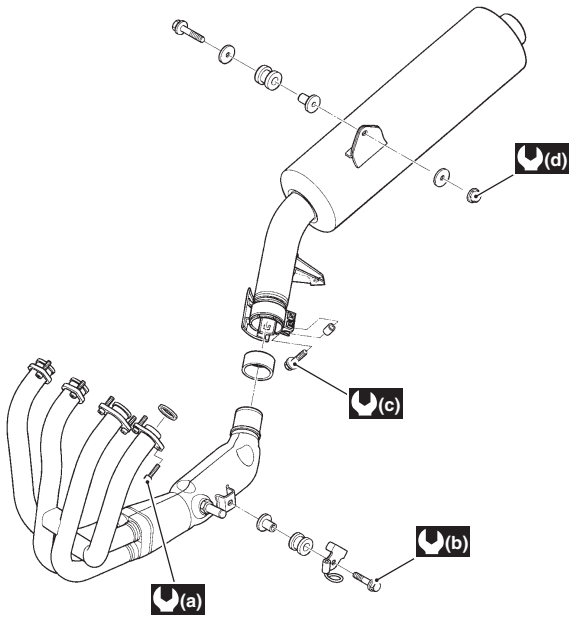
Exhaust Pipe Bolt and Muffler Bolt Inspection

B718H10206005

Tighten exhaust pipe bolts, muffler bolt and nut
Initially at 1 000 km (600 miles, 2 months) and every 12 000 km (7 500 miles, 24 months) thereafter.

Check the exhaust pipe bolts, muffler bolts and nut to the specified torque.

Tightening torque
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Exhaust pipe mounting bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Muffler connecting bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Muffler mounting bolt (d): 26 N·m (2.6 kgf-m, 19.0 lb-ft)



I718H1020007-04

Spark Plug Replacement

B718H10206003

Replace spark plug
Every 12 000 km (7 500 miles, 24 months)

Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.

Spark Plug Inspection and Cleaning

B718H10206004

Inspect spark plug
Every 6 000 km (4 000 miles, 12 months)

Heat Range

1) Remove the spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
2) Check spark plug heat range by observing electrode color.
   If it appears white or glazed, replace the spark plug with colder type one.

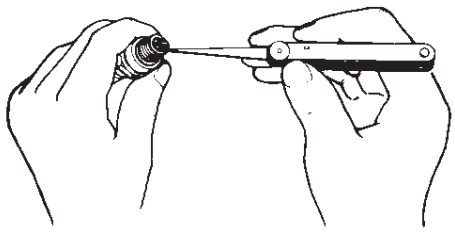
Heat range

	Standard	Cold type	Hot type
NGK	CR7E	CR8E	CR6E
DENSO	U22ESR-N	U24ESR-N	U20ESR-N

3) After finishing the spark plug inspection, reinstall the removed parts.

Carbon Deposits

1) Remove the spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
2) Check carbon deposits on the spark plug.
   If carbon is deposited, remove it using a spark plug cleaner machine or carefully use a tool with a pointed end.



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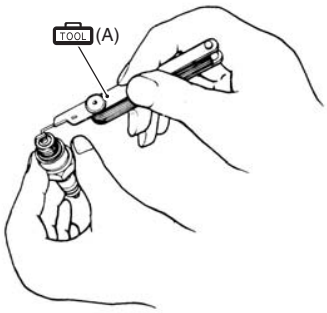
3) After finishing the spark plug inspection, reinstall the removed parts.

Spark Plug Gap

1) Remove the spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
2) Measure the spark plug gap using a thickness gauge.
   Adjust the spark plug gap if necessary.

   Spark plug gap
   0.7 – 0.8 mm (0.028 – 0.030 in)



I649G1020011-03

3) After finishing the spark plug inspection, reinstall the removed parts.

Electrodes Condition

1) Remove the spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
2) Check to see the worn or burnt condition of the electrodes.
   If it is extremely worn or burnt, replace the plug. And also replace the plug if it has a broken insulator, or damaged thread.
3) After finishing the spark plug inspection, reinstall the removed parts.

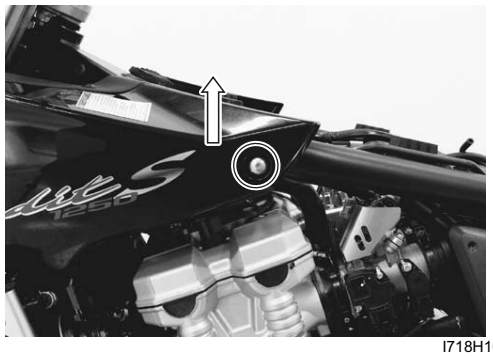
Valve Clearance Inspection and Adjustment

B718H10206006

Inspect valve clearance
Initially at 1 000 km (600 miles, 2 months) and every 12 000 km (7 500 miles, 24 months) thereafter.

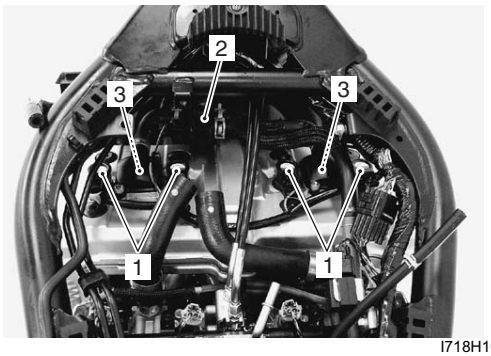
Inspection
Valve clearance adjustment must be checked and adjusted, a) at the time of periodic inspection, b) when the valve mechanism is serviced, and c) when the camshafts are removed for servicing.

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Remove the frame head covers. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Move the cowling by removing the screws. (GSF1250S/SA)



I718H1020012-01

4) Drain a small amount of engine coolant and remove the thermostat connector. Refer to “Thermostat Connector / Thermostat Removal and Installation in Section 1F (Page 1F-9)”.
5) Remove the ignition coil/caps (1) and spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
6) Remove the PAIR control solenoid valve (2) and reed valves (3). Refer to “PAIR Control Solenoid Valve Removal and Installation in Section 1B (Page 1B-6)” and “PAIR Reed Valve Removal and Installation in Section 1B (Page 1B-6)”.



I718H1020013-02

7) Remove the cylinder head cover. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-24)”.

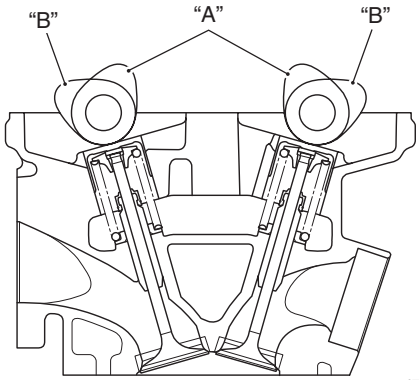
NOTE

The valve clearance specification is different for both intake and exhaust valves.

Valve clearance (When cold)
IN.: 0.10 – 0.20 mm (0.004 – 0.008 in)
EX.: 0.20 – 0.30 mm (0.008 – 0.012 in)

NOTE

- **The cam must be at positions, “A” or “B”, when checking or adjusting the valve clearance. Clearance readings should not be taken with the cam in any other position than these two positions.**
- **The valve clearance should be taken when each cylinder is at Top Dead Center (TDC) of compression stroke.**
- **The clearance specification is for COLD state.**
- **To turn the crankshaft for clearance checking, be sure to use a wrench, and rotate in the normal running direction.**



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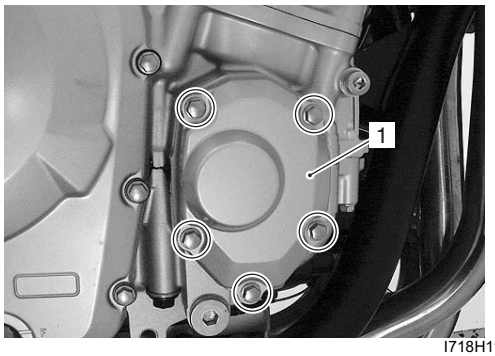
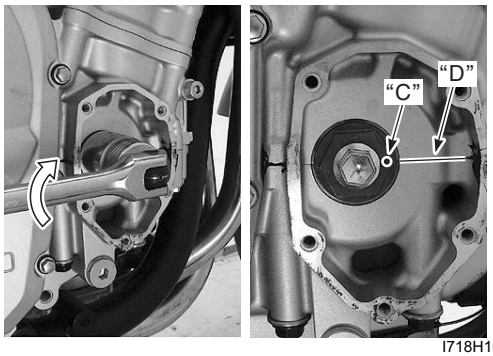
8) Remove the right crankshaft cover (1).



I718H1140011-01

9) Turn the crankshaft clockwise and align the match mark “C” on the crankshaft with the mating surfaces “D” of the crankcases. Also, position the notches “E” on the right end of each camshaft as shown. Then, measure the following valve clearances “F”.
   - Cylinder #1: Intake and exhaust valve clearances
   - Cylinder #2: Exhaust valve clearance
   - Cylinder #3: Intake valve clearance



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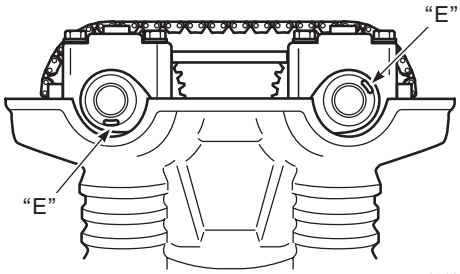

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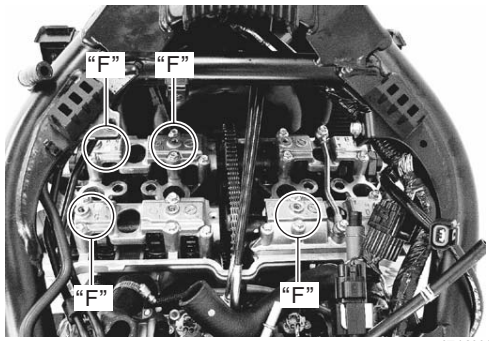

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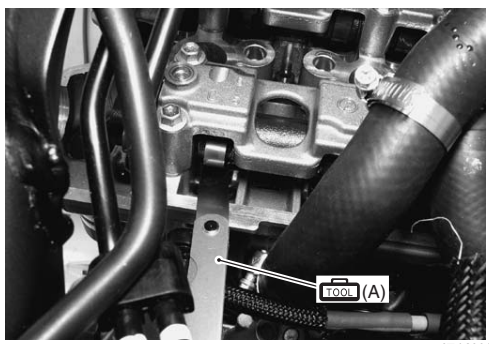
Camshaft position	Notch “E” position faces outside
Measuring position	“F”

10) Insert the thickness gauge between the tappet and the cam. If the clearance is out of specification, adjust it to the specified range.

Special tool
TOOL (A): 09900–20803 (Thickness gauge)



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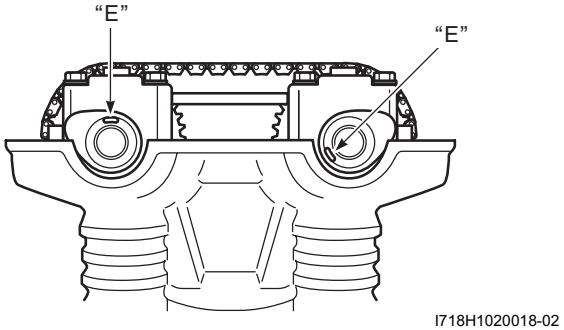
11) Turn the crankshaft clockwise 360° (one full rotation) and align the match mark on the crankshaft with the mating surfaces of crankcases. Also, position the notches “E” on the right end of each camshaft as shown. Then, measure the following valve clearances “G”.
    - Cylinder #2: Intake valve clearance
    - Cylinder #3: Exhaust valve clearance
    - Cylinder #4: Intake and exhaust valve clearances
12) Measure the valve clearances of the remaining valves “E” and adjust them if necessary.



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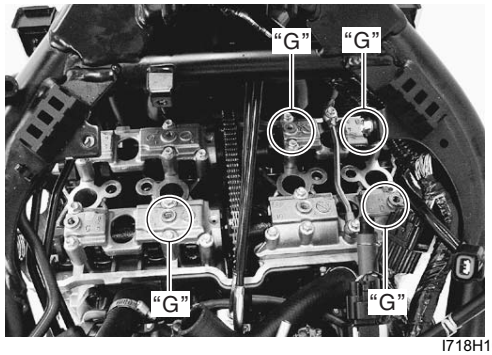


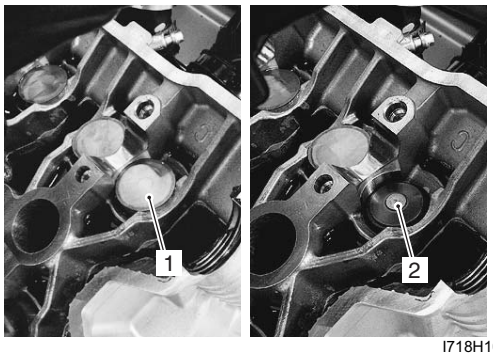
I718H1020020-01

Camshaft position	Notch “E” position faces inside
Measuring position	“G”

Adjustment

The clearance is adjusted by replacing the existing tappet shim with a thicker or thinner shim.

1) Remove the intake or exhaust camshafts. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-24)”.
2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



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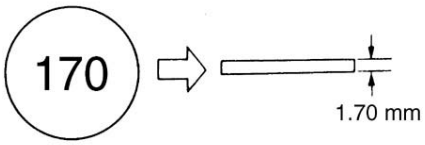
3) Check the figures printed on the shim. These figures indicate the thickness of the shim, as illustrated.



I310G1020023-01

4) Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 21 sizes of tappet shim are available ranging from 1.20 to 2.20 mm in steps of 0.05 mm.

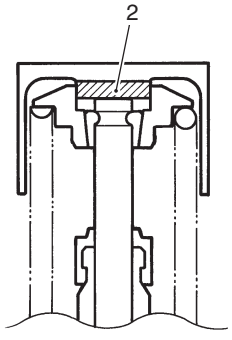
⚠ CAUTION

Both the right and left valve clearances should be as closely as possible.

5) Fit the selected shim (2) to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size.

NOTE

- **Be sure to apply engine oil to tappet shim top and bottom faces.**
- **When seating the tappet shim, be sure the figure printed surface faces the tappet.**



I718H1020002-02

(INTAKE SIDE)

TAPPET SHIM SELECTION TABLE [INTAKE]
TAPPET SHIM NO. (12892-05C00-XXX)

TAPPET SHIM SET (12800-05830)

MEASURED TAPPET CLEARANCE (mm) \ SUFFIX NO. / PRESENT SHIM SIZE (mm)	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.00-0.04	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.05-0.09		1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15
0.10-0.20	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																				
0.21-0.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	
0.26-0.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20			
0.31-0.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20				
0.36-0.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20					
0.41-0.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20						
0.46-0.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20							
0.51-0.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20								
0.56-0.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20									
0.61-0.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20										
0.66-0.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20											
0.71-0.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20												
0.76-0.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20													
0.81-0.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20														
0.86-0.90	1.95	2.00	2.05	2.10	2.15	2.20															
0.91-0.95	2.00	2.05	2.10	2.15	2.20																
0.96-1.00	2.05	2.10	2.15	2.20																	
1.01-1.05	2.10	2.15	2.20																		
1.06-1.10	2.15	2.20																			
1.11-1.15	2.20																				

HOW TO USE THIS CHART:

I. Measure tappet clearance. "ENGINE IS COLD"
II. Measure present shim size.
III. Match clearance in vertical column with present shim size in horizontal column.

EXAMPLE

Tappet clearance is 0.23 mm
Present shim size 1.70 mm
Shim size to be used 1.80 mm

I718H1020003-02

(EXHAUST SIDE)

TAPPET SHIM SELECTION TABLE [EXHAUST]
TAPPET SHIM NO. (12892-05C00-XXX)

TAPPET SHIM SET (12800-05830)

MEASURED TAPPET CLEARANCE (mm) / SUFFIX NO.	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
PRESENT SHIM SIZE (mm)	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.05-0.09				1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05
0.10-0.14			1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10
0.15-0.19		1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15
0.20-0.30	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																				
0.31-0.35	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	
0.36-0.40	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20			
0.41-0.45	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20				
0.46-0.50	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20					
0.51-0.55	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20						
0.56-0.60	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20							
0.61-0.65	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20								
0.66-0.70	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20									
0.71-0.75	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20										
0.76-0.80	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20											
0.81-0.85	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20												
0.86-0.90	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20													
0.91-0.95	1.90	1.95	2.00	2.05	2.10	2.15	2.20														
0.96-1.00	1.95	2.00	2.05	2.10	2.15	2.20															
1.01-1.05	2.00	2.05	2.10	2.15	2.20																
1.06-1.10	2.05	2.10	2.15	2.20																	
1.11-1.15	2.10	2.15	2.20																		
1.16-1.20	2.15	2.20																			
1.21-1.25	2.20																				

HOW TO USE THIS CHART:

I. Measure tappet clearance. “ENGINE IS COLD”
II. Measure present shim size.
III. Match clearance in vertical column with present shim size in horizontal column.

EXAMPLE

Tappet clearance is	0.33 mm
Present shim size	1.70 mm
Shim size to be used	1.80 mm

I718H1020004-02

6) Install the camshafts and cam chain tension adjuster. Refer to “Engine Top Side Assembly in Section 1D (Page 1D-28)”.
7) Rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement, then check the clearance again to confirm that it is within the specified range.
8) After finishing the tappet clearance adjustment, reinstall the removed parts. Refer to “Engine Top Side Assembly in Section 1D (Page 1D-28)”.

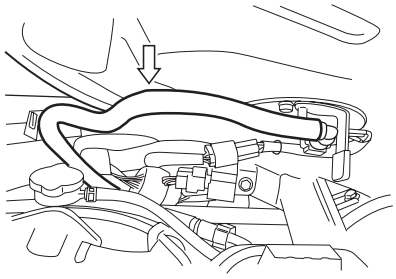
Fuel Line Inspection

B718H10206007

Inspect fuel line
Every 6 000 km (4 000 miles, 12 months)

Inspect the fuel line in the following procedures:

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the fuel tank mounting bolts. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Lift up the fuel tank.
4) Inspect the fuel feed hose for damage and fuel leakage. If any defects are found, the fuel feed hose must be replaced.



I718H1020008-07

5) After finishing the Fuel feed hose Inspection, reinstall the removed parts.

Evaporative Emission Control System Inspection (E-33 Only)

B718H10206034

Inspect evaporative emission control system
Every 12 000 km (7 500 miles, 24 months)

Inspect the evaporative emission control system periodically (E-33 only).

Engine Oil and Filter Replacement

B718H10206008

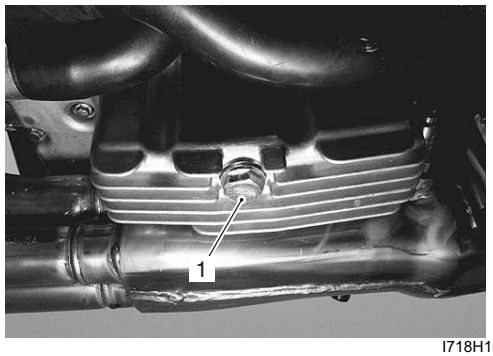
Replace engine oil
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter.

Replace oil filter
Initially at 1 000 km (600 miles, 2 months) and every 18 000 km (11 000 miles, 36 months) thereafter.

Oil should be changed while the engine is warm. Oil filter replacement at the above intervals, should be done together with the engine oil change.

Engine Oil Replacement

1) Keep the motorcycle upright with the center stand.
2) Place an oil pan below the engine, and drain engine oil by removing the oil drain plug (1) and filler cap (2).



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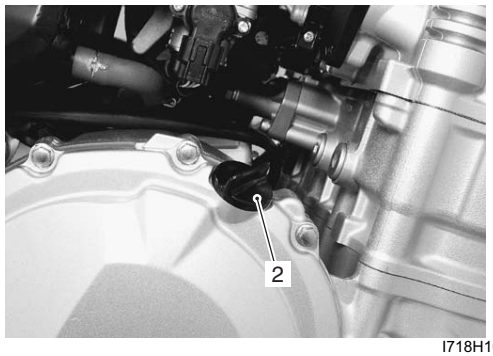


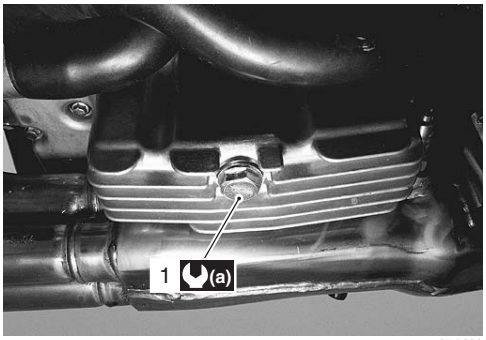
I718H1020022-01

3) Tighten the oil drain plug (1) to the specified torque.

⚠ CAUTION

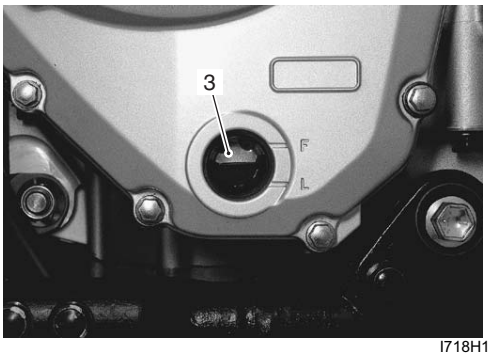
Replace the gasket washer with a new one.

Tightening torque
Oil drain plug (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1020023-02

4) Pour new oil through the oil filler. When performing an oil change (without oil filter replacement), the engine will hold about 3.0 L (3.2/2.6 US/Imp qt) of oil. Use of SF/SG or SH/SJ in API with MA in JASO.
5) Start up the engine and allow it to run for several minutes at idling speed.
6) Turn off the engine and wait about three minutes, then check the oil level through the inspection window (3). If the level is below the “L” mark, add oil to the “F” mark. If the level is above the “F” mark, drain the oil until the level reaches the “F” mark.



I718H1020024-02

Oil Level Inspection

1) Keep the motorcycle upright with the center stand.
2) Start up the engine and allow it to run for several minutes at idle speed.
3) Turn off the engine and wait about three minutes, then check the oil level through the inspection window (1). If the level is below mark “L”, add oil to “F” level. If the level is above mark “F”, drain oil to “F” level.

I718H1020027-01

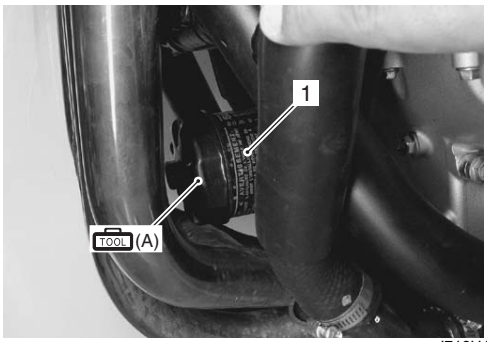
Oil Filter Replacement

1) Drain engine oil as described in the engine oil replacement procedure.
2) Remove the oil filter (1) using the special tool.

NOTE

- **Remove the oil filter wrench once the oil filter has come loose.**
- **Remove the oil filter from the left side of the vehicle. Push the radiator hose aside if it interferes with the removal operation.**

Special tool
TOOL (A): 09915–40611 (Oil filter wrench)



I718H1020025-03

3) Apply engine oil lightly to the O-ring of new oil filter, before installation.

⚠ CAUTION

ONLY USE A GENUINE SUZUKI MOTORCYCLE OIL FILTER.
Other manufacturer’s oil filters may differ in thread specifications (thread diameter and pitch), filtering performance and durability which may lead to engine damage or oil leaks. Also, do not use a genuine Suzuki automobile oil filter on this motorcycle.

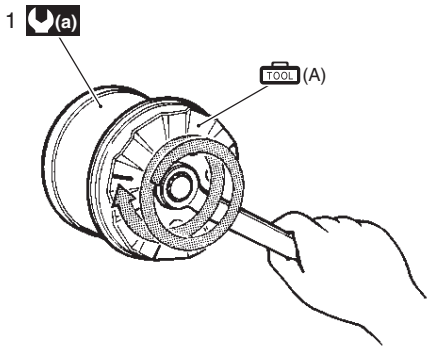
4) Install a new oil filter. Turn it by hand until you feel that the oil filter O-ring contacts the oil filter mounting surface. Then, tighten the oil filter two full turns (or to specified torque) using the special tool.

NOTE

To properly tighten the oil filter, use the special tool. Never tighten the oil filter by hand only.

Special tool
(A): 09915–40611 (Oil filter wrench)

Tightening torque
Oil filter (a): 20 N·m (2.0 kgf-m, 14.5 lb-ft)



I718H1020026-01

5) Add new engine oil and check the oil level is as described in the engine oil replacement procedure.

Necessary amount of engine oil
Oil change: 3 000 ml (3.2/2.6 US/Imp qt)
Oil and filter change: 3 500 ml (3.7/3.1 US/Imp qt)
Engine overhaul: 3 700 ml (3.9/3.3 US/Imp qt)

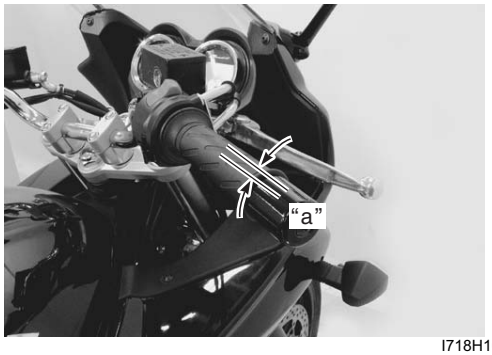
Throttle Cable Play Inspection and Adjustment

B718H10206009

Inspect throttle cable play
Initially at 1 000 km (6 000 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter.

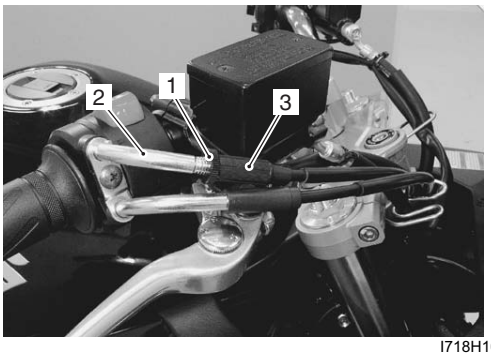
Inspect and adjust the throttle cable play “a” as follows.

Throttle cable play “a”
2.0 – 4.0 mm (0.08 – 0.16 in)



I718H1020063-01

1) Loosen the lock-nut (1) of the throttle pulling cable (2).
2) Turn the adjuster (3) in or out until the throttle cable play “a” (at the throttle grip) is between 2 – 4 mm (0.08 – 0.16 in).
3) Tighten the lock-nut (1) while holding the adjuster (3).



I718H1020064-02

⚠ WARNING

After the adjustment is completed, check that handlebar movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.

Throttle Valve Synchronization

B718H10206011

Inspect throttle valve synchronization
Every 12 000 km (7 500 miles, 24 months)

Inspect the throttle valve synchronization periodically. Refer to “Throttle Valve Synchronization in Section 1D (Page 1D-15)”.

PAIR System Inspection

B718H10206012

Inspect PAIR system
Every 12 000 km (7 500 miles, 24 months)

Inspect the PAIR (air supply) system periodically. Refer to “PAIR System Inspection in Section 1B (Page 1B-6)”.

Cooling System Inspection

B718H10206031

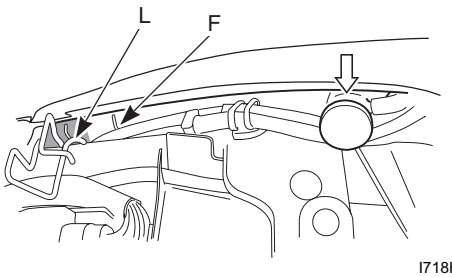
Inspect cooling system
Every 6 000 km (4 000 miles, 6 months)

Replace engine coolant
Every 2 years

Engine Coolant Level Inspection

1) Keep the motorcycle upright with the center stand.
2) Remove the seat. Refer to “Exterior Parts Construction in Section 9D (Page 9D-2)”.

3) Check the engine coolant level by observing the full and lower lines on the engine coolant reservoir tank. If the level is below the lower line, add engine coolant to the full line from the engine coolant reservoir tank filler.



I718H1020065-02

4) Reinstall the seat.

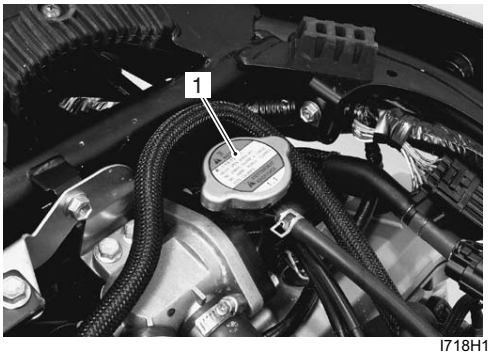
Engine Coolant Change

Refer to "Engine Coolant Description in Section 1F (Page 1F-1)".

⚠ WARNING

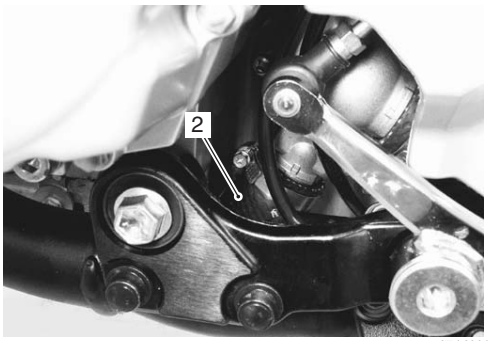
Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor. Engine coolant may be harmful if swallowed or if it comes in contact with skin or eyes. If engine coolant gets into the eyes or in contact with the skin, flush thoroughly with plenty of water. If swallowed, induce vomiting and call physician immediately.

1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
2) Remove the radiator cap (1).



I718H1020029-01

3) Drain engine coolant by disconnecting the water pump outlet hose (2).



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4) Flush the radiator with fresh water if necessary.
5) Reconnect the water pump outlet hose.
6) Pour the specified engine coolant up to the thermostat connector inlet.

Engine coolant capacity (excluding reservoir)
3 000 ml (3.2/2.6 US/Imp qt)

7) Bleed air from the cooling circuit.
8) After changing engine coolant, reinstall the removed parts.

Air Bleeding From the Cooling Circuit

1) Support the motorcycle upright with the center stand.
2) Lift up the fuel tank by removing the mounting bolts. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
3) Place a rag under the thermostat connector.
4) Pour engine coolant up to the thermostat connector inlet.

I718H1020031-02

5) Slowly swing the motorcycle, right and left, to bleed the air trapped in the cooling circuit.
6) Add engine coolant up to the thermostat connector inlet.
7) Start up the engine and bleed air from the thermostat connector inlet completely.
8) Add engine coolant up to the thermostat connector inlet.
9) Repeat the 6), 7) procedures until no air bleeds from the thermostat connector inlet.
10) Close the radiator cap securely.
11) After warming up and cooling down the engine several times, add the engine coolant up to the full level of the reservoir.

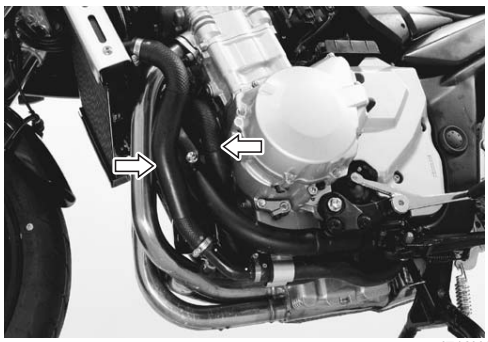
⚠ CAUTION

Make sure that the radiator is filled with engine coolant up to the reservoir full level.

12) Reinstall the removed parts.

Radiator Hose Inspection

Check the radiator hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.



I718H1020032-01

I718H1020033-01

Clutch System Inspection

B718H10206013

Inspect clutch hose and clutch fluid
Every 6 000 km (4 000 miles, 12 months)

⚠ WARNING

The clutch system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based or petroleum-based. Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for a long period of mine. Check the clutch hose and hose joints for cracks and fluid leakage.

Clutch Fluid Level Check

1) Keep the motorcycle upright and place the handlebars straight.
2) Check the clutch fluid level by observing the lower limit line on the clutch fluid reservoir.
When the clutch fluid level is below the lower limit line, replenish with clutch fluid that meets the following specification.

BF: Brake fluid (DOT 4)

I718H1020034-01

Clutch Hose Inspection

1) Remove the seat and left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.

3) Inspect the clutch hose for crack, damage or clutch fluid leakage. If it is damaged, replace the clutch hose with a new one.

I718H1020035-01

4) After finishing the clutch hose inspection, reinstall the removed parts.

Clutch Hose Replacement

B718H10206014

Replace clutch hose
Every 4 years

Refer to “Clutch Hose Removal and Installation in Section 5C (Page 5C-5)”.

Clutch Fluid Replacement

B718H10206016

Replace clutch fluid
Every 2 years

Refer to “Clutch Fluid Replacement in Section 5C (Page 5C-4)”.

Air Bleeding from Clutch Fluid Circuit
Refer to “Air Bleeding from Clutch Fluid Circuit in Section 5C (Page 5C-4)”.

Drive Chain Inspection and Adjustment

B718H10206017

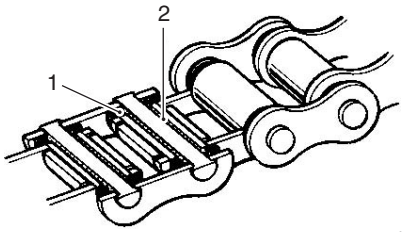
Inspect drive chain
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter.

Drive Chain Visual Check

1) With the transmission in neutral, support the motorcycle using the center-stand and turn the rear wheel slowly by hand.
2) Visually check the drive chain for the possible defects listed as follows. If any defects are found, the drive chain must be replaced. Refer to “Drive Chain Replacement in Section 3A (Page 3A-7)”.
   - Loose pins
   - Damaged rollers
   - Dry or rusted links
   - Kinked or binding links
   - Excessive wear
   - Improper chain adjustment
   - Missing O-ring seals

NOTE

When replacing the drive chain, replace the drive chain and sprockets as a set.



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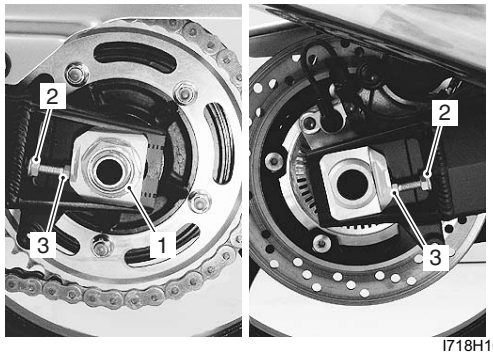
1. O-ring seal	2. Grease

Drive Chain Length Inspection

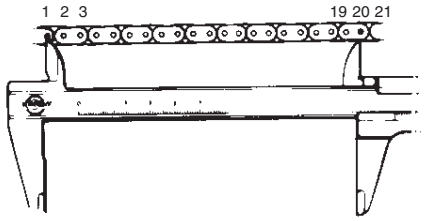
1) Loosen the axle nut (1).
2) Loosen the chain adjuster lock-nuts (2).
3) Give tension to the drive chain fully by turning both chain adjuster bolts (3).



I718H1020036-02

4) Count out 21 pins (20 pitches) on the chain and measure the distance between the two points. If the distance exceeds the service limit, the chain must be replaced.

Drive chain 20-pitch length
Service limit: 319.4 mm (12.57 in)



I649G1020034-01

5) After finishing the drive chain length inspection, adjust the drive chain slack.

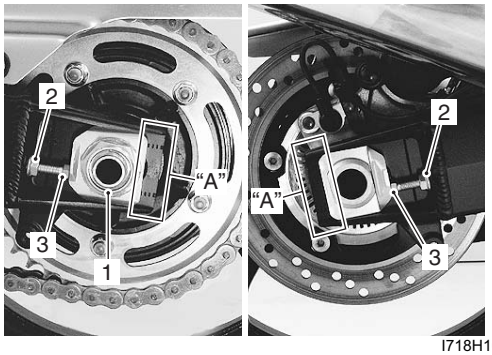
Drive Chain Slack Adjustment

1) Place the motorcycle on its center stand for fine adjustment.
2) Loosen the axle nut (1).
3) Loosen the chain adjuster lock-nuts (2).
4) Loosen or tighten both chain adjuster bolts (3) until there is 20 – 30 mm (0.8 – 1.2 in) “a” of slack at the middle of the chain between the engine and rear sprockets as shown.

⚠ CAUTION

The reference marks “A” on both sides of the swingarm and the edge of each chain adjuster must be aligned to ensure that the front and rear wheels are correctly aligned.

Drive chain slack “a”
Standard 20 – 30 mm (0.8 – 1.2 in)



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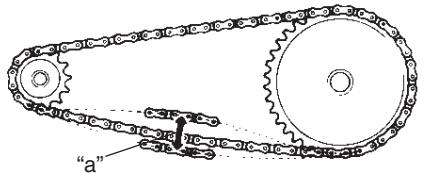

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5) After adjusting the drive chain, tighten the axle nut (1) to the specified torque.

Tightening torque
Rear axle nut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

6) Tighten both chain adjuster lock-nuts (2) securely.
7) Recheck the drive chain slack after tightening the axle nut.

Drive Chain Cleaning and Lubricating

B718H10206018

Clean and lubricate drive chain
Every 1 000 km (600 miles)

Clean and lubricate the drive chain in the following procedures:

1) Clean the drive chain with kerosine. If the drive chain tends to rust quickly, the intervals must be shortened.

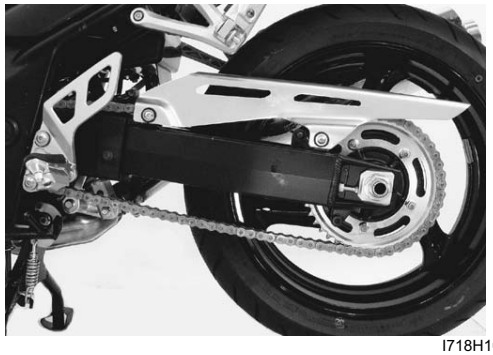
⚠ CAUTION

Do not use trichloroethylene, gasoline or any similar solvent.
These fluids have too great a dissolving power for this chain and they can damage the O-rings. Use only kerosine to clean the drive chain.

2) After cleaning and drying the chain, oil it with a heavyweight motor oil.

⚠ CAUTION

- **Do not use any oil sold commercially as “drive chain oil”. Such oil can damage the O-rings.**
- **The standard drive chain is a RK GB50GSVZ3. SUZUKI recommends to use this standard drive chain as a replacement.**



I718H1020038-01

Brake System Inspection

B718H10206019

Inspect brake system
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter.

Inspect brake hose and brake fluid
Every 6 000 km (4 000 miles, 12 months)

⚠ WARNING

- **The brake system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluids. Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for a long period of time.**
- **Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and oil leakage before riding.**

Brake Fluid Level Check

1) Keep the motorcycle upright and place the handlebars straight.
2) Check the brake fluid level by observing the lower limit lines on the front and rear brake fluid reservoirs. When the brake fluid level is below the lower limit line, replenish with brake fluid that meets the following specification.

BF: Brake fluid (DOT 4)

I718H1020039-01

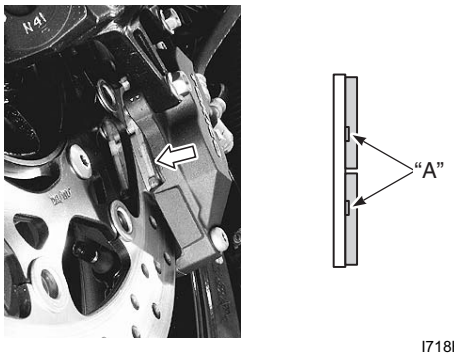
I718H1020040-01

Brake Pads Check

The extent of brake pad wear can be checked by observing the grooved limit line “A” on the pad. When the wear exceeds the grooved limit line, replace the pads with new ones. Refer to “Front Brake Pad Replacement in Section 4B (Page 4B-2)” and “Rear Brake Pad Replacement in Section 4C (Page 4C-2)”.

⚠ CAUTION

Replace the brake pad as a set, otherwise braking performance will be adversely affected.



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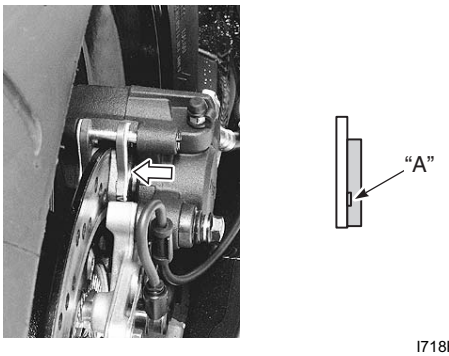
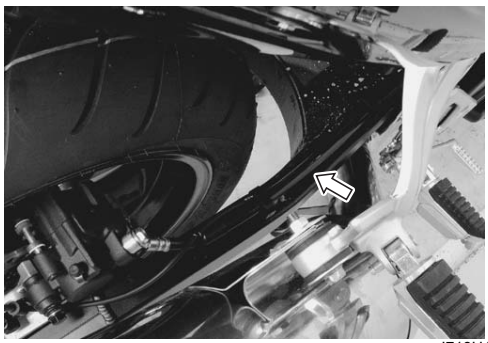


I718H1020042-01

Front and Rear Brake Hose Inspection

1) Remove the seat, right frame cover and fuel tank. (GSF1250A/SA) Refer to “Exterior Parts Construction in Section 9D (Page 9D-2)” and “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Inspect the brake hoses and hose joints for crack, damage or brake oil leakage. If any defects are found, replace the brake hose with a new one. Refer to “Front Brake Hose Removal and Installation in Section 4A (Page 4A-12)” and “Rear Brake Hose Removal and Installation in Section 4A (Page 4A-13)”.

I718H1020043-01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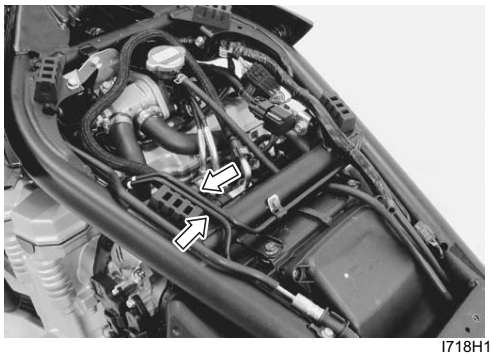
GSF1250A/SA only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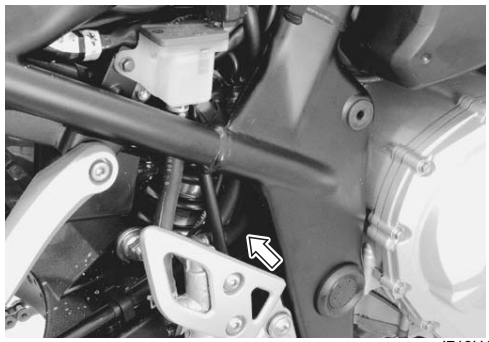
GSF1250A/SA only


I718H1020046-01

3) Reinstall the removed parts. (GSF1250A/SA)

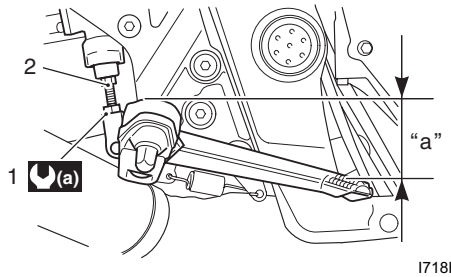
Brake Pedal Height Inspection and Adjustment

1) Inspect the brake pedal height “a” between the pedal top face and footrest.
   Adjust the brake pedal height if necessary.

   Brake pedal height “a”
   Standard: 50 – 60 mm (2.0 – 2.4 in)

2) Loosen the lock-nut (1).
3) Turn the push rod (2) until the brake pedal becomes 50 – 60 mm (2.0 – 2.4 in.) “a” below the top of the footrest.
4) Tighten the lock-nut (1) securely.

   Tightening torque
   Rear master cylinder rod lock-nut (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



I718H1020066-07

Brake Hose Replacement

Replace brake hose
Every 4 years

Refer to “Front Brake Hose Removal and Installation in Section 4A (Page 4A-12)” and “Rear Brake Hose Removal and Installation in Section 4A (Page 4A-13)”.

Brake Fluid Replacement

Replace brake fluid
Every 2 years

Refer to “Brake Fluid Replacement in Section 4A (Page 4A-10)”.

Air Bleeding from Brake Fluid Circuit
Refer to “Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-8)”.

Rear Brake Light Switch Adjustment
Refer to “Rear Brake Light Switch Inspection and Adjustment in Section 4A (Page 4A-8)”.

Tire Inspection

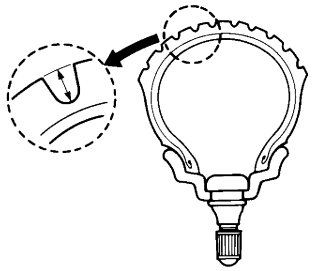
B718H10206024

Inspect tire
Every 6 000 km (4 000 miles, 12 months)

Tire Tread Condition
Operating the motorcycle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace a tire when the remaining depth of tire tread reaches the following specification.

Special tool
TOOL : 09900–20805 (Tire depth gauge)

Tire tread depth (Service limit)
Front: 1.6 mm (0.06 in.)
Rear: 2.0 mm (0.08 in.)



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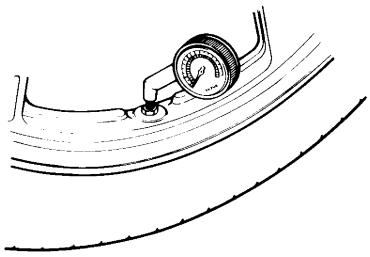
Tire Pressure
If the tire pressure is too high or too low, steering will be adversely affected and tire wear increased. Therefore, maintain the correct tire pressure for good roadability or shorter tire life will result. Cold inflation tire pressure is as follows.

Cold inflation tire pressure

	Solo riding			Dual riding		
	kPa	kgf/cm^2	psi	kPa	kgf/cm^2	psi
Front	250	2.50	36	250	2.50	36
Rear	290	2.90	42	290	2.90	42



I310G1020069-01

⚠ CAUTION

The standard tire fitted on this motorcycle is 120/70 ZR17 M/C (58W) for front and 180/55 ZR17 M/C (73W) for rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires.

Tire type
DUNLOP

- **Front: D218FT**
- **Rear: D218N**

Steering System Inspection

B718H10206025

Inspect steering system
Initially at 1 000 km (600 miles, 2 months) and every 12 000 km (7 500 miles, 24 months) thereafter.

Steering should be adjusted properly for smooth turning of handlebars and safe running. Overtighten steering prevents smooth turning of the handlebars and too loose steering will cause poor stability.

1) Check that there is no play in the front fork.
2) Support the motorcycle so that the front wheel is off the ground, with the wheel facing straight ahead, grasp the lower fork tubes near the axle and pull forward.
   If play is found, readjust the steering. Refer to "Steering Tension Adjustment in Section 6B (Page 6B-10)".

I718H1020048-03

Front Fork Inspection

B718H10206026

Inspect front fork
Every 12 000 km (7 500 miles, 24 months)

Inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes. Replace any defective parts, if necessary. Refer to "Front Fork Disassembly and Assembly in Section 2B (Page 2B-4)".

I718H1020049-01

Rear Suspension Inspection

B718H10206027

Inspect rear suspension
Every 12 000 km (7 500 miles, 24 months)

Inspect the rear shock absorbers for oil leakage and check that there is no play in the swingarm.
Replace any defective parts, if necessary. Refer to "Rear Shock Absorber Removal and Installation in Section 2C (Page 2C-3)", "Cushion Lever Removal and Installation in Section 2C (Page 2C-5)" and "Swingarm / Cushion Rod Removal and Installation in Section 2C (Page 2C-7)".

I718H1020050-01

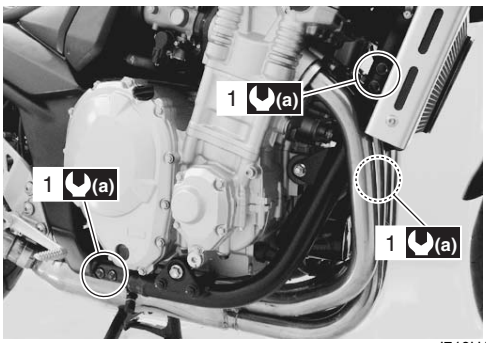
I718H1020051-01

Chassis Bolt and Nut Inspection

B718H10206028

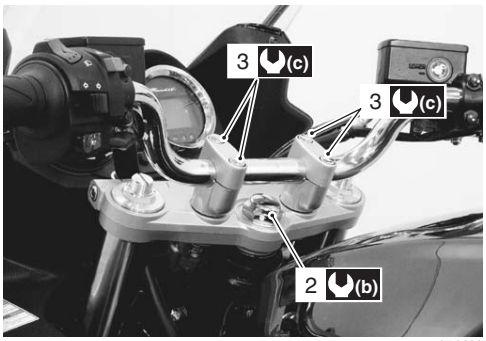
Tighten chassis bolt and nut
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter.

Check that all chassis bolts and nuts are tightened to their specified torque.



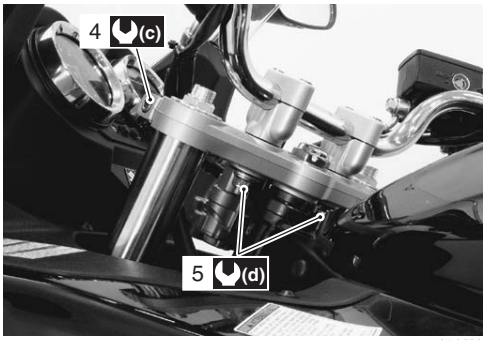
I718H1020052-01

1.	Frame down tube
(a) :	50 N·m (5.0 kgf-m, 36.0 lb-ft)



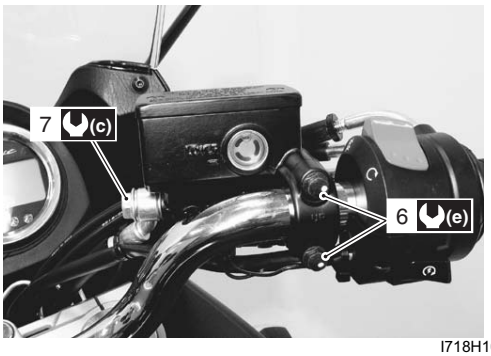
I718H1020053-01

2.	Steering stem head nut
3.	Handlebar holder bolt
(b) :	65 N·m (6.5 kgf-m, 47.0 lb-ft)
(c) :	23 N·m (2.3 kgf-m, 16.5 lb-ft)



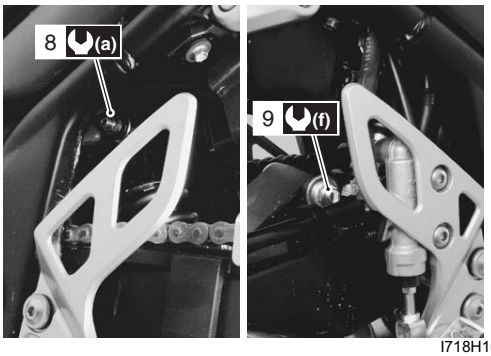
I718H1020054-02

4.	Front fork upper clamp bolt
5.	Handlebar holder set nut
(c) :	23 N·m (2.3 kgf-m, 16.5 lb-ft)
(d) :	45 N·m (4.5 kgf-m, 32.5 lb-ft)



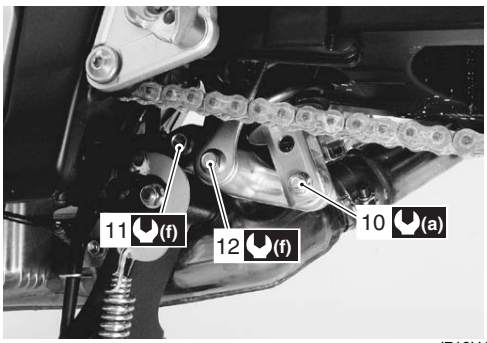
I718H1020055-02

6.	Front brake master cylinder mounting bolt
7.	Brake hose union bolt
(c) :	23 N·m (2.3 kgf-m, 16.5 lb-ft)
(e) :	10 N·m (1.0 kgf-m, 7.0 lb-ft)



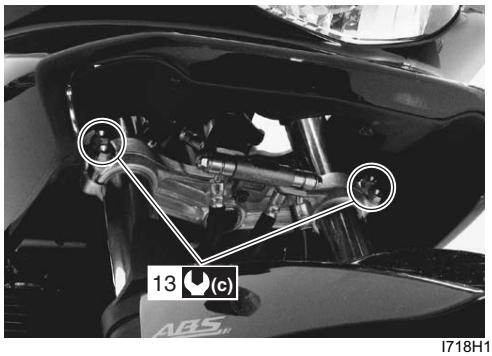
I718H1020056-01

8.	Rear shock absorber mounting nut (Upper)
9.	Cushion rod mounting nut
(a) :	50 N·m (5.0 kgf-m, 36.0 lb-ft)
(f) :	78 N·m (7.8 kgf-m, 56.5 lb-ft)



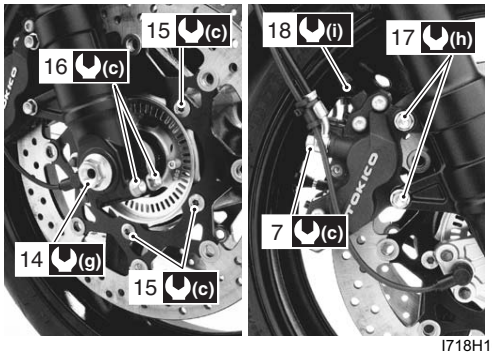
I718H1020057-01

10.	Rear shock absorber mounting nut (Lower)
11.	Cushion lever mounting nut
12.	Cushion rod mounting nut
(a) :	50 N·m (5.0 kgf-m, 36.0 lb-ft)
(f) :	78 N·m (7.8 kgf-m, 56.5 lb-ft)



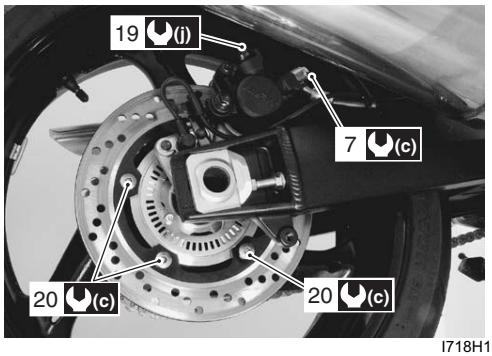
I718H1020058-01

13.	Front fork lower clamp bolt
(c) :	23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1020059-01

7.	Brake hose union bolt
14.	Front axle bolt
15.	Brake disc bolt (Front)
16.	Front axle pinch bolt
17.	Front brake caliper mounting bolt
18.	Air bleeder valve (Front brake)
(c) :	23 N·m (2.3 kgf-m, 16.5 lb-ft)
(g) :	100 N·m (10.0 kgf-m, 72.5 lb-ft)
(h) :	26 N·m (2.6 kgf-m, 19.0 lb-ft)
(i) :	7.5 N·m (0.75 kgf-m, 5.5 lb-ft)



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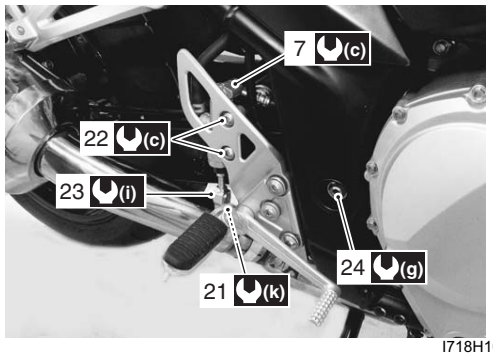
7.	Brake hose union bolt
19.	Air bleeder valve (Rear brake)
20.	Brake disc bolt (Rear)
(c) :	23 N·m (2.3 kgf-m, 16.5 lb-ft)
(j) :	6 N·m (0.6 kgf-m, 4.5 lb-ft)



I718H1020061-02

7.	Brake hose union bolt
21.	Front footrest bolt
22.	Rear brake master cylinder mounting bolt
23.	Rear brake master cylinder rod lock-nut
24.	Swingarm pivot nut
(c) :	23 N·m (2.3 kgf-m, 16.5 lb-ft)
(g) :	100 N·m (10.0 kgf-m, 72.5 lb-ft)
(i) :	18 N·m (1.8 kgf-m, 13.0 lb-ft)
(k) :	35 N·m (3.5 kgf-m, 25.5 lb-ft)

I718H1020062-02

25.	Rear sprocket nut
(g) :	100 N·m (10.0 kgf-m, 72.5 lb-ft)

Compression Pressure Check

B718H10206029

Refer to “Compression Pressure Check in Section 1D (Page 1D-3)”.

Oil Pressure Check

B718H10206030

Refer to “Oil Pressure Check in Section 1E (Page 1E-3)”.

SDS check

B718H10206033

Refer to “SDS Check in Section 1A (Page 1A-15)”.

Specifications

Tightening Torque Specifications

B718H10207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Exhaust pipe bolt	23	2.3	16.5	☞(Page 0B-4)
Exhaust pipe mounting bolt	23	2.3	16.5	☞(Page 0B-4)
Muffler connecting bolt	23	2.3	16.5	☞(Page 0B-4)
Muffler mounting bolt	26	2.6	19.0	☞(Page 0B-4)
Oil drain plug	23	2.3	16.5	☞(Page 0B-11)
Oil filter	20	2.0	14.5	☞(Page 0B-12)
Rear axle nut	100	10.0	72.5	☞(Page 0B-16)
Rear master cylinder rod lock-nut	18	1.8	13.0	☞(Page 0B-18)

NOTE

The specified tightening torque is also described in the following.
“Chassis Bolt and Nut Inspection (Page 0B-21)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H10208001

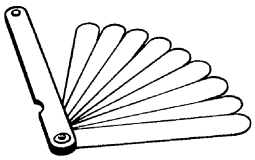
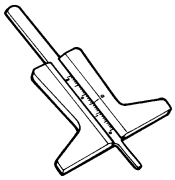
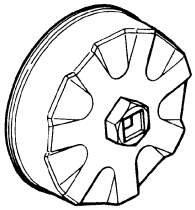
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 0B-14) / ☞(Page 0B-17)

NOTE

Required service material is also described in the following.
“Lubrication Points (Page 0B-2)”

Special Tool

B718H10208002

09900–20803 Thickness gauge ☞(Page 0B-6) 	09900–20805 Tire depth gauge ☞(Page 0B-19) 
09915–40611 Oil filter wrench ☞(Page 0B-11) / ☞(Page 0B-12) 	

Service Data

Specifications

Service Data

B718H10307001

Valve + Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	31 (1.22)	—
	EX.	27 (1.06)	—
Valve clearance (when cold)	IN.	0.10 – 0.20 (0.004 – 0.008)	—
	EX.	0.20 – 0.30 (0.008 – 0.012)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.475 – 4.490 (0.1762 – 0.1768)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN. & EX.	—	39.6 (1.56)
Valve spring tension	IN. & EX.	Approx. 147 N (15.0 kgf, 33.1 lbs) at length 36.0 mm (1.42 in)	—

Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	35.28 – 35.33 (1.389 – 1.391)	34.98 (1.377)
	EX.	34.18 – 34.23 (1.346 – 1.348)	33.88 (1.334)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012 – 24.025 (0.9454 – 0.9459)	—
Camshaft journal O.D.	IN. & EX.	23.959 – 23.980 (0.9433 – 0.9441)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow “3”)	16th pin		—
Cylinder head distortion	—		0.20 (0.008)

Cylinder + Piston + Piston Ring

Unit: mm (in)

Item	Standard			Limit
Compression pressure	1 300 – 1 700 kPa (13 – 17 kgf/cm^2, 185 – 242 psi)			1 000 kPa (10 kgf/cm^2, 142 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm^2, 28 psi)
Piston-to-cylinder clearance	0.025 – 0.035 (0.0010 – 0.0014)			0.120 (0.0047)
Cylinder bore	79.000 – 79.015 (3.1102 – 3.1108)			Nicks or Scratches
Piston diam.	78.970 – 78.985 (3.1090 – 3.1096) Measure 15 mm (0.6 in) from the skirt end.			78.880 (3.1055)
Cylinder distortion	—			0.02 (0.008)
Piston ring free end gap	1st	IN	Approx. 9 (0.35)	7.2 (0.28)
	2nd	N	Approx. 9.5 (0.37)	7.6 (0.30)
Piston ring end gap	1st	IN	0.06 – 0.21 (0.002 – 0.008)	0.5 (0.020)
	2nd	N	0.06 – 0.21 (0.002 – 0.008)	0.5 (0.020)
Piston ring-to-groove clearance	1st		—	0.180 (0.0071)
	2nd		—	0.150 (0.0059)
Piston ring groove width	1st		1.01 – 1.03 (0.040 – 0.041)	—
	2nd		0.81 – 0.83 (0.032 – 0.033)	—
	Oil		1.51 – 1.53 (0.059 – 0.060)	—
Piston ring thickness	1st		0.97 – 0.99 (0.038 – 0.039)	—
	2nd		0.77 – 0.79 (0.030 – 0.031)	—
Piston pin bore I.D.	18.002 – 18.008 (0.7087 – 0.7090)			18.030 (0.7098)
Piston pin O.D.	17.996 – 18.000 (0.7085 – 0.7087)			17.980 (0.7079)

Conrod + Crankshaft

Unit: mm (in)

Item	Standard		Limit
Conrod small end I.D.	18.010 – 18.018 (0.7091 – 0.7094)		18.040 (0.7102)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)		0.30 (0.012)
Conrod big end width	20.95 – 21.00 (0.825 – 0.827)		—
Crank pin width	21.10 – 21.15 (0.831 – 0.833)		—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)		0.080 (0.0031)
Crank pin O.D.	37.976 – 38.000 (1.4951 – 1.4961)		—
Crankshaft journal oil clearance	0.016 – 0.040 (0.0006 – 0.0016)		0.080 (0.0031)
Crankshaft journal O.D.	33.976 – 34.000 (1.3376 – 1.3386)		—
Crankshaft thrust clearance	0.055 – 0.110 (0.0022 – 0.0043)		—
Crankshaft thrust bearing thickness	Right side	2.425 – 2.450 (0.0955 – 0.0965)	—
	Left side	2.350 – 2.500 (0.0925 – 0.0984)	—
Crankshaft runout	—		0.05 (0.002)

Oil Pump

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	100 – 400 kPa (1.0 – 4.0 kgf/cm^2, 14 – 57 psi) at 3 000 r/min	—

Clutch

Unit: mm (in)

Item	Standard		Limit
Clutch drive plate thickness	No.1, 2, 3	3.72 – 3.88 (0.146 – 0.153)	3.42 (0.135)
Clutch drive plate claw width	No.1, 2, 3	13.9 – 14.0 (0.547 – 0.551)	13.1 (0.52)
Clutch driven plate distortion	—		0.10 (0.004)
Clutch spring free length	65.0 (2.56)		61.8 (2.43)
Clutch master cylinder bore	14.000 – 14.043 (0.5511 – 0.5529)		—
Clutch master cylinder piston diam.	13.957 – 13.984 (0.5495 – 0.5506)		—
Clutch release cylinder bore	38.18 – 38.23 (1.503 – 1.505)		—
Clutch release cylinder piston diam.	38.08 – 38.13 (1.500 – 1.501)		—
Clutch fluid type	Brake fluid DOT 4		—

Transmission + Drive Chain

Unit: mm (in) Except ratio

Item		Standard		Limit
Primary reduction ratio		1.537 (83/54)		—
Final reduction ratio		2.388 (43/18)		—
Gear ratios	1st	3.076 (40/13)		—
	2nd	2.058 (35/17)		—
	3rd	1.550 (31/20)		—
	4th	1.304 (30/23)		—
	5th	1.160 (29/25)		—
	Top	1.071 (30/28)		—
Shift fork to groove clearance		No.1, 2, 3	0.1 – 0.3 (0.004 – 0.012)	0.5 (0.02)
Shift fork groove width		No.1, 2, 3	5.0 – 5.1 (0.197 – 0.201)	—
Shift fork thickness		4.8 – 4.9 (0.189 – 0.193)		—
Drive chain		Type	RK GB50GSVZ3	—
		Links	118 links	—
		20-pitch length	—	319.4 (12.75)
Drive chain slack (on center stand)		20 – 30 (0.8 – 1.2)		—
Gearshift lever height		45 – 55 (1.8 – 2.2)		—

Thermostat + Radiator + Fan + Coolant

Item	Standard/Specification		Note
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		—
Thermostat valve lift	8 mm (0.31 in) and over at 95 °C (203 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	50 °C (122 °F)	Approx. 0.811 kΩ	—
	80 °C (176 °F)	Approx. 0.318 kΩ	—
	110 °C (230 °F)	Approx. 0.142 kΩ	—
Radiator cap valve opening pressure	93 – 123 kPa (0.93 – 1.23 kgf/cm^2, 13.2 – 17.5 psi)		—
Cooling fan operating temperature	OFF→ON	Approx. 105 °C (221 °F)	—
	ON→OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant	Reservoir tank side	Approx. 250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	Approx. 3 000 ml (3.2/2.6 US/Imp qt)	—

Injector + Fuel Pump + Fuel Pressure Regulator

Item	Specification	Note
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	166 ml (5.6/5.8 US/Imp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm^2, 43 psi)	

FI Sensors + Secondary Throttle Valve Actuator

Item	Standard/Specification		Note
CKP sensor resistance	90 – 150 Ω		
CKP sensor peak voltage	2.0 V and more		When cranking
IAP sensor input voltage (No.1)	4.5 – 5.5 V		
IAP sensor output voltage (No.1)	Approx. 2.7 V at idle speed		
IAP sensor input voltage (No.2)	4.5 – 5.5 V		
IAP sensor output voltage (No.2)	2.0 – 3.0 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.15 – 4.85 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	Approx. 2.4 V at 20 °C (68 °F)		
IAT sensor resistance	Approx. 2.56 kΩ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	80 V and more		When cranking
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 4.5 V	
STV actuator resistance	Approx. 7.0 Ω		
ISC valve resistance	Approx. 20 Ω at 20 °C (68 °F)		
HO2 sensor resistance	Approx. 8 Ω at 23 °C (73 °F)		
HO2 sensor output voltage	0.3 V and less at idle speed		
	0.6 V and more at 3 000 r/min		
PAIR control solenoid valve resistance	18 – 22 Ω at 20 – 30 °C (68 – 86 °F)		
EVAP purge control valve	Approx. 32 Ω at 20 °C (68 °F)		E-33 only

Throttle Body

Item	Specification
Bore size	36 mm
I.D. No.	18H1 (For E-33), 18H0 (For the others)
Idle r/min.	1 200 ± 100 r/min.
Fast idle r/min.	1 200 – 2 000 r/min. (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

Electrical

Unit: mm

Item			Specification		Note
Firing order			1 · 2 · 4 · 3		
Spark plug			Type	NGK: CR7E DENSO: U22ESR-N	
			Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance			Over 8 (0.3) at 1 atm.		
CKP sensor resistance			90 – 150 Ω		
CKP sensor peak voltage			2.0 V and more		When cranking
Ignition coil resistance			Primary	1.1 – 1.9 Ω	Terminal – Terminal
			Secondary	10.8 – 16.2 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage			80 V and more		
Generator coil resistance			0.2 – 0.8 Ω		
Generator maximum output			Approx. 400 W at 5 000 r/min		
Generator no-load voltage (When engine is cold)			60 V (AC) and more at 5 000 r/min		
Regulated voltage			14.0 – 15.5 V at 5 000 r/min		
Starter motor brush length			Standard	12.0 (0.47)	
			Limit	6.5 (0.26)	
Starter relay resistance			3 – 6 Ω		
Battery	Type designation		FT12A-BS		
	Capacity		12 V 36 kC (10 Ah)/10 HR		
	Standard electrolyte S.G.		1.330 at 20 °C (68 °F)		
Fuse size	Headlight	HI	10 A		
		LO	10 A		
	Fuel		10 A		
	Ignition		15 A		
	Signal		15 A		
	Fan		15 A		
	Main		30 A		
	ABS motor (GSF1250A/SA only)		20 A		
	ABS valve (GSF1250A/SA only)		15 A		

Wattage

Unit: W

Item		Specification	
		GSF1250/A	**GSF1250S/SA**
Headlight	HI	60	55
	LO	55	←
Position/Parking light		5	5 x 2
Brake light/Taillight		21/5	←
Turn signal light		21 x 4	←
License plate light		5	←
Speedometer light		LED	←
Tachometer light		LED	←
Turn signal indicator light		LED x 2	←
High beam indicator light		LED	←
Neutral position indicator light		LED	←
Oil pressure indicator light		LED	←
FI indicator light		LED	←
Engine coolant temp. indicator light		LED	←
ABS indicator light (GSF1250A/SA only)		LED	←

Brake + Wheel

Unit: mm (in)

Item	Standard			Limit
Rear brake pedal height	50 – 60 (2.0 – 2.4)			—
Brake disc thickness	Front	4.8 – 5.2 (0.189 – 0.205)		4.5 (0.18)
	Rear	4.8 – 5.2 (0.189 – 0.205)		4.5 (0.18)
Brake disc runout	—			0.30 (0.012)
Master cylinder bore	Front	14.000 – 14.043 (0.5512 – 0.5529)		—
	Rear	14.000 – 14.043 (0.5512 – 0.5529)		—
Master cylinder piston diam.	Front	13.957 – 13.984 (0.5495 – 0.5506)		—
	Rear	13.957 – 13.984 (0.5495 – 0.5506)		—
Brake caliper cylinder bore	Front	Leading	27.050 – 27.126 (1.0650 – 1.0680)	—
		Trailing	30.280 – 30.356 (1.1921 – 1.1951)	—
	Rear	38.180 – 38.230 (1.5031 – 1.5051)		—
Brake caliper piston diam.	Front	Leading	26.920 – 26.970 (1.0598 – 1.0618)	—
		Trailing	30.150 – 30.200 (1.1870 – 1.1890)	—
	Rear	38.080 – 38.130 (1.4992 – 1.5012)		—
Brake fluid type	DOT 4			—
Wheel rim runout	Axial	—		2.0 (0.08)
	Radial	—		2.0 (0.08)
Wheel axle runout	Front	—		0.25 (0.010)
	Rear	—		0.25 (0.010)
Wheel rim size	Front	17 M/C x MT3.50		—
	Rear	17 M/C x MT5.50		—

Tire

Item	Standard		Limit
Cold inflation tire pressure (Solo riding)	Front	250 kPa (2.50 kgf/cm^2, 36 psi)	—
	Rear	290 kPa (2.90 kgf/cm^2, 42 psi)	—
Cold inflation tire pressure (Dual riding)	Front	250 kPa (2.50 kgf/cm^2, 36 psi)	—
	Rear	290 kPa (2.90 kgf/cm^2, 42 psi)	—
Tire size	Front	120/70 ZR17 M/C (58 W)	—
	Rear	180/55 ZR17 M/C (73 W)	—
Tire type	Front	DUNLOP D218FT	—
	Rear	DUNLOP D218N	—
Tire tread depth (Recommended depth)	Front	—	1.6 mm (0.06 in)
	Rear	—	2.0 mm (0.08 in)

Suspension

Unit: mm (in)

Item	Standard		Limit
Front fork stroke	130 (5.1)		—
Front fork inner tube O.D.	43 (1.7)		—
Front fork spring free length	390.4 (15.37)		382 (15.0)
Front fork oil level (Without spring, outer tube fully compressed)	GSF1250/A	143 (5.6)	—
	GSF1250S/SA	144 (5.7)	
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil		—
Front fork oil capacity (Each leg)	GSF1250/A	472 ml (16.0/16.6 US/lmp oz)	—
	GSF1250S/SA	471 ml (15.9/16.6 US/lmp oz)	
Front fork spring adjuster	3rd groove from top		—
Rear shock absorber spring adjuster	GSF1250/A	3rd position	
	GSF1250S/SA	4th position	—
Rear shock absorber damping force adjuster	Rebound	1-1/4 turns out from stiffest position	—
Rear wheel travel	136 (5.4)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

Fuel + Oil

Item	Specification		Note
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline type is recommended.		Others
Fuel tank capacity	Including reserve	18.5 L (4.9/4.1 US/Imp gal)	E-33
		19 L (5.0/4.2 US/Imp gal)	Others
Engine oil type	SAE 10 W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 500 ml (3.7/3.1 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	

Tightening Torque Specifications

B718H10307002

Engine

Item			N·m	kgf-m	lb-ft
Exhaust pipe bolt			23	2.3	16.5
Exhaust pipe mounting bolt			23	2.3	16.5
Muffler connecting bolt			23	2.3	16.5
Muffler mounting nut			26	2.6	19.0
Speed sensor rotor bolt			25	2.5	18.0
Speed sensor bolt			6.5	0.65	4.7
Engine sprocket nut			115	11.5	83.0
Engine mounting nut	Front upper		55	5.5	40.0
	Rear upper		88	8.8	63.5
	Rear lower		88	8.8	63.5
Engine mounting bolt	Center lower		47	4.7	34.0
Engine mounting No.1 bracket bolt			23	2.3	16.5
Engine mounting No.2 bracket bolt			23	2.3	16.5
Cylinder head cover bolt			14	1.4	10.0
Spark plug			11	1.1	8.0
Camshaft journal holder bolt			10	1.0	7.0
Oil pipe mounting bolt			10	1.0	7.0
Camshaft sprocket bolt		Initial	16	1.6	11.5
		Final	25	2.5	18.0
Cam chain tension adjuster cap bolt			23	2.3	16.6
Cam chain tension adjuster mounting bolt			10	1.0	7.0
Cylinder head bolt	[L: 175]	Initial	25	2.5	18.0
		Final	42	4.2	30.5
	[L: 65]		10	1.0	7.0
Water jacket plug			30	3.0	21.5
Water inlet connector bolt			10	1.0	7.0
Balancer shaft arm bolt			10	1.0	7.0
Balancer shaft mounting bolt			10	1.0	7.0
PAIR reed valve cover bolt			11	1.1	8.0
Clutch sleeve hub nut			150	15.0	108.5
Clutch spring set bolt			10	1.0	7.0
Starter clutch cover bolt			25	2.5	18.0
Generator rotor bolt			120	12.0	87.0
Generator stator set bolt			11	1.1	8.0
Gearshift cam stopper bolt			10	1.0	7.0
Gearshift cam stopper plate bolt			13	1.3	9.5
Gearshift arm stopper			19	1.9	13.5
Gearshift lever bolt			40	4.0	29.0
Gearshift shaft end bolt			10	1.0	7.0
Oil pressure switch			14	1.4	10.0

Item			N·m	kgf-m	lb-ft
Oil pressure switch lead wire bolt			1.5	0.15	1.1
Crankcase bolt	[M6]	(initial)	6	0.6	4.5
		(Final)	11	1.1	8.0
	[M8]	(initial)	15	1.5	11.0
		(Final)	26	2.6	19.0
Crankshaft journal bolt	[M9]	(initial)	18	1.8	13.0
		(Final)	32	3.2	23.0
Oil gallery plug	[M6]		10	1.0	7.0
	[M8]		10	1.0	7.0
	[M12]		15	1.5	11.0
	[M16]		35	3.5	25.5
Oil gallery bolt			10	1.0	7.0
Oil gallery jet			22	2.2	16.0
Oil drain plug			23	2.3	16.5
Piston cooling oil jet bolt			10	1.0	7.0
Oil pump mounting bolt			10	1.0	7.0
Conrod cap bolt	initial		21	2.1	15.0
	Final		90° (1/4 turn)		
Gearshift fork shaft retainer screw			10	1.0	7.0
Countershaft bearing retainer screw			12	1.2	8.5
Push rod oil seal bolt			12	1.2	8.5
Oil filter			20	2.0	14.5
Oil cooler union bolt			70	7.0	50.5
Starter motor lead wire mounting bolt			5	0.5	3.5
Brush housing set nut			7	0.7	5.0
Starter motor housing bolt			5	0.5	3.5

FI System and Intake Air System

Item	N·m	kgf-m	lb-ft
CKP sensor mounting bolt	11	1.1	8.0
Fuel delivery pipe mounting screw	3.5	0.35	2.5
Fuel pump mounting bolt	10	1.0	7.0
STPS mounting screw	3.5	0.35	2.5
ISC valve mounting screw	3.5	0.35	2.5
GP switch mounting bolt	6.5	0.65	4.7
HO2 sensor	25	2.5	18.0

Cooling System

Item	N·m	kgf-m	lb-ft
Impeller securing bolt	8	0.8	6.0
Water pump case screw	6	0.6	4.5
Water pump mounting bolt	10	1.0	7.0
Water pump air vent bolt	13	1.3	9.5
Water hose clamp bolt	2	0.2	1.5
ECT sensor	18	1.8	13.0
Thermostat cover bolt	10	1.0	7.0

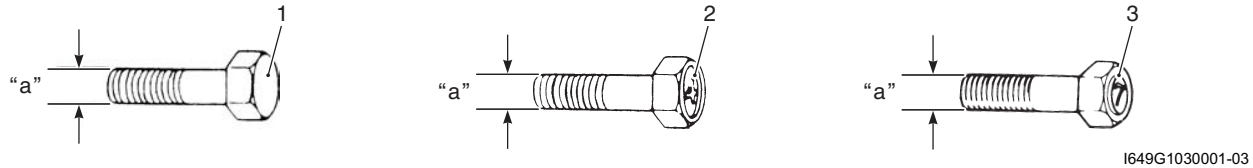
Chassis

Item	N·m	kgf-m	lb-ft
Steering stem head nut	65	6.5	47.0
Steering stem nut	Tighten 45 N·m (4.5 kgf-m, 32.5 lb-ft) then turn back 1/2 – 1/4.		
Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	23	2.3	16.5
Front fork cap bolt	23	2.3	16.5
Front fork damper rod bolt	20	2.0	14.5
Inner rod lock-nut	20	2.0	14.5
Front axle bolt	100	10.0	72.5
Front axle pinch bolt	23	2.3	16.5
Handlebar holder bolt	23	2.3	16.5
Handlebar holder set nut	45	4.5	32.5
Master cylinder mounting bolt (Front brake and Clutch)	10	1.0	7.0
Front brake caliper housing bolt	22	2.2	16.0
Front brake caliper mounting bolt	26	2.6	19.0
Front brake pad mounting pin	16	1.6	11.5
Brake hose union bolt	23	2.3	16.5
Brake pipe flare nut (GSF1250A/SA only)	16	1.6	11.5
Air bleeder valve (Front brake caliper)	7.5	0.75	5.5
Air bleeder valve (Rear brake caliper)	6.0	0.6	4.5
Air bleeder valve (Clutch)	6.0	0.6	4.5
Side-stand bolt	50	5.0	36.0
Side-stand nut	40	4.0	29.0
Side-stand switch mounting bolt	14	1.4	10.0
Rear combination light mounting bolt	2	0.2	1.5
Brake disc bolt (front and Rear)	23	2.3	16.5
Front footrest bolt	35	3.5	25.5
Swingarm pivot nut	100	10.0	72.5
Rear shock absorber mounting nut (upper and Lower)	50	5.0	36.0
Cushion lever mounting nut	78	7.8	56.5
Cushion rod mounting nut	78	7.8	56.5
Rear brake caliper mounting bolt	22	2.2	16.0
Rear brake caliper sliding pin	27	2.7	19.5
Rear brake pad mounting pin	18	1.8	13.0
Pad pin plug	2.5	0.25	1.8
Rear brake master cylinder mounting bolt	23	2.3	16.5
Rear brake master cylinder rod lock-nut	18	1.8	13.0
Rear footrest bracket mounting bolt	23	2.3	16.5
Rear axle nut	100	10.0	72.5
Rear sprocket nut	60	6.0	43.5
Frame down tube bolt	50	5.0	36.0
Brake lever pivot bolt	6	0.6	4.5
Brake lever pivot bolt lock-nut	6	0.6	4.5
Clutch lever pivot bolt	6	0.6	4.5
Clutch lever pivot bolt lock-nut	6	0.6	4.5
Licence light mounting bolt	5	0.5	3.5
Front reflex refractor (For E-03, 24, 28, 33)	1.8	0.18	1.3
Front side refractor bolt (For E-03, 24, 28, 33)	4.5	0.45	3.25
Rear side refractor nut (For E-03, 28, 33)	4.5	0.45	3.25

Tightening Torque Chart

For other bolts and nuts not listed in the preceding page, refer to this chart:

Bolt Diameter "a" (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kgf-m	lb-ft	N·m	kgf-m	lb-ft
4	1.5	0.15	1.0	2.3	0.23	1.5
5	3	0.3	2.0	4.5	0.45	3.0
6	5.5	0.55	4.0	10	1.0	7.0
8	13	1.3	9.5	23	2.3	16.5
10	29	2.9	21.0	50	5.0	36.0
12	45	4.5	32.5	85	8.5	61.5
14	65	6.5	47.0	135	13.5	97.5
16	105	10.5	76.0	210	21.0	152.0
18	160	16.0	115.5	240	24.0	173.5



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1. Conventional bolt	2. "4" marked bolt	3. "7" marked bolt

Section 1

Engine

CONTENTS

Precautions

Precautions

Precautions for Engine

B718H11000001

Refer to “General Precautions in Section 00 (Page 00-1)” and “Precautions for Electrical Circuit Service in Section 00 (Page 00-2)”.

Engine General Information and Diagnosis

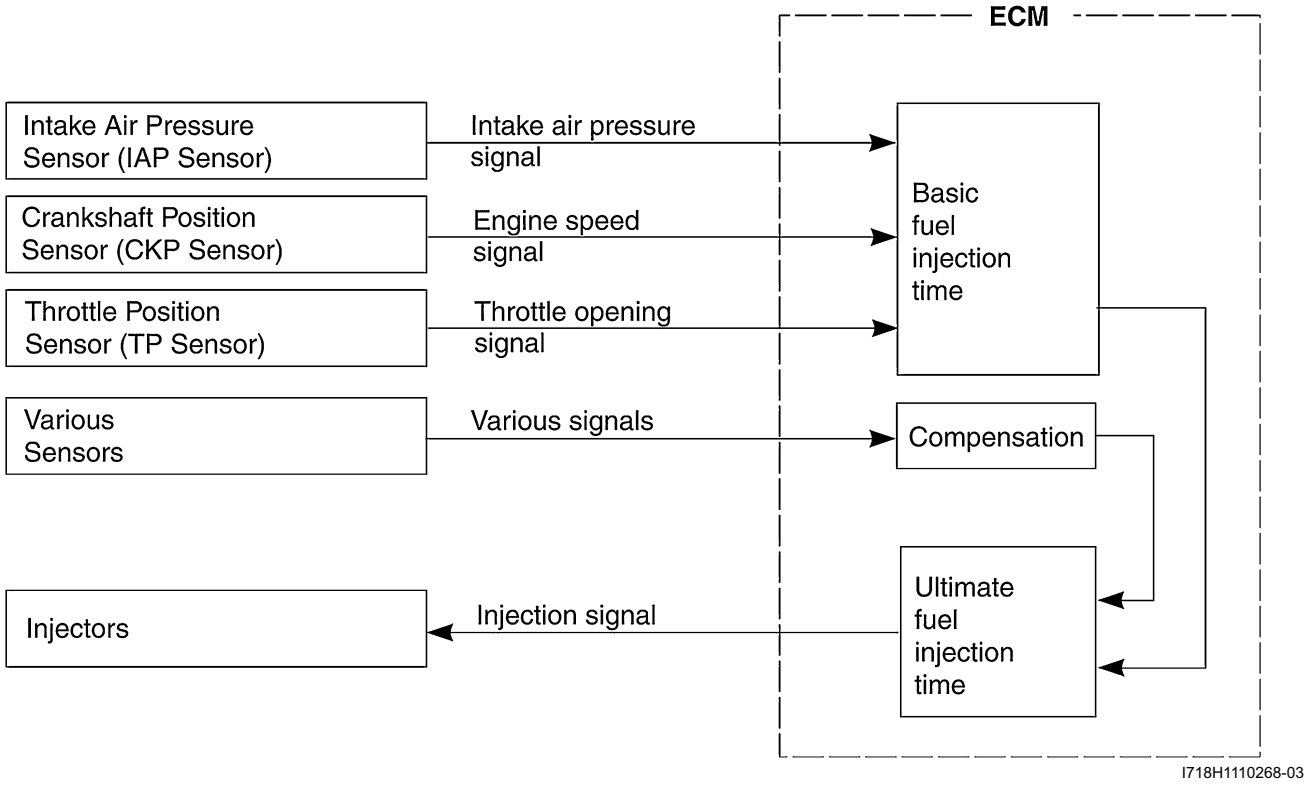
General Description

Injection Timing Description

B718H11101001

Injection Time (Injection Volume)

The factors to determine the injection time include the basic fuel injection time, which is calculated on the basis of the intake air pressure, engine speed and throttle opening angle, and various compensations. These compensations are determined according to the signals from various sensors that detect the engine and driving conditions.



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Compensation of Injection Time (Volume)
The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

Signal	Descriptions
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL	When engine coolant temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
HEATED OXYGEN SENSOR SIGNAL	Air/fuel ratio is compensated to the theoretical ratio from density of oxygen in exhaust gasses. The compensation occurs in such a way that more fuel is supplied if detected air/fuel ratio is lean and less fuel is supplied if it is rich.
BATTERY VOLTAGE SIGNAL	ECM operates on the battery voltage and at the same time, it monitors the voltage signal for compensation of the fuel injection time (volume). A longer injection time is needed to adjust injection volume in the case of low voltage.
ENGINE RPM SIGNAL	At high speed, the injection time (volume) is increased.
STARTING SIGNAL	When starting engine, additional fuel is injected during cranking engine.
ACCELERATION SIGNAL/ DECELERATION SIGNAL	During acceleration, the fuel injection time (volume) is increased, in accordance with the throttle opening speed and engine rpm. During deceleration, the fuel injection time (volume) is decreased.

Injection Stop Control

Signal	Descriptions
TIP-OVER SENSOR SIGNAL (FUEL SHUT-OFF)	When the motorcycle tips over, the tip-over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injectors and ignition coils.
OVER-REV. LIMITER SIGNAL	The fuel injector stops operation when engine rpm reaches rev. limit rpm.

Self-Diagnosis Function

B718H11101002

The self-diagnosis function is incorporated in the ECM. The function has two modes, “User mode” and “Dealer mode”. The user can only be notified by the LCD (DISPLAY) panel and LED (FI indicator light). To check the function of the individual FI system devices, the dealer mode is provided. In this check, the special tool is necessary to read the code of the malfunction items.

User Mode

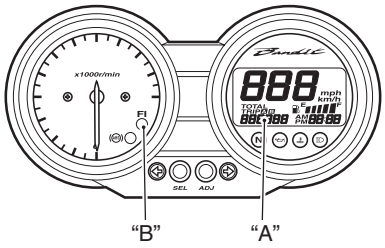
Malfunction		LCD (display) indication “A”	FI indicator light indication “B”	Indication mode
“NO”		Odometer *1	—	—
“YES”	Engine can start	Odometer (*1) and “FI” letters *2	FI indicator light turns ON.	Each 2 sec. Odometer (*1) and “FI” is indicated alternately.
	Engine can not start	“FI” letters *3	FI indicator light turns ON and blinks.	“FI” is indicated continuously.

***1**
Current letter displayed any one of the odometer or tripmeter.
***2**
When one of the signals is not received by ECM, the fail-safe circuit works and injection is not stopped. In this case, “FI” and odometer (*1) are indicated in the LCD panel and motorcycle can run.
***3**
The injection signal is stopped, when the crankshaft position sensor signal, tip-over sensor signal, ignition signal, #1, #2, #3 and #4 injector signals, fuel pump relay signal or ignition switch signal is not sent to ECM. In this case, “FI” is indicated in the LCD panel. Motorcycle does not run.
“CHEC”:
The LCD panel indicates “CHEC” when no communication signal from the ECM is received for 5 seconds and more.

For Example:
The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the speedometer does not receive any signal from the ECM, and the panel indicates “CHEC”.
If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and speedometer couplers.
The possible cause of this indication is as follows:
Engine stop switch is in OFF position. Side-Stand/ignition inter-lock system is not working. Ignition fuse is burnt.

NOTE

Until starting the engine, the FI light turns ON.
The FI indicator light is also turned ON when engine temperature is high or oil pressure is low.



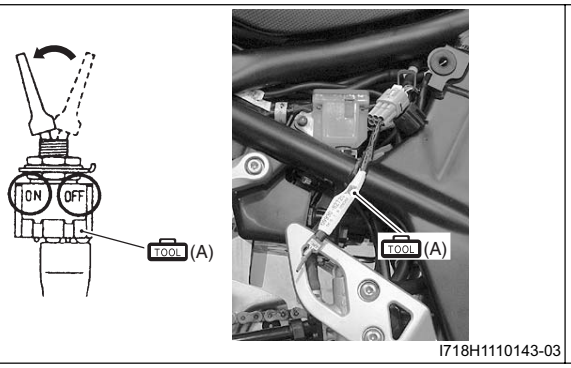
I718H1110002-03

Dealer Mode
The defective function is memorized in the computer. Use the special tool’s coupler to connect to the mode select switch. The memorized malfunction code is displayed on LCD (DISPLAY) panel. Malfunction means that the ECM does not receive signal from the devices. These affected devices are indicated in the code form.

⚠ CAUTION

Before checking the malfunction code, do not disconnect the ECM coupler.
If the coupler from the ECM is disconnected, the malfunction code memory is erased and the malfunction code can not be checked.

Special tool
TOOL (A): 09930–82720 (Mode select switch)



I718H1110143-03

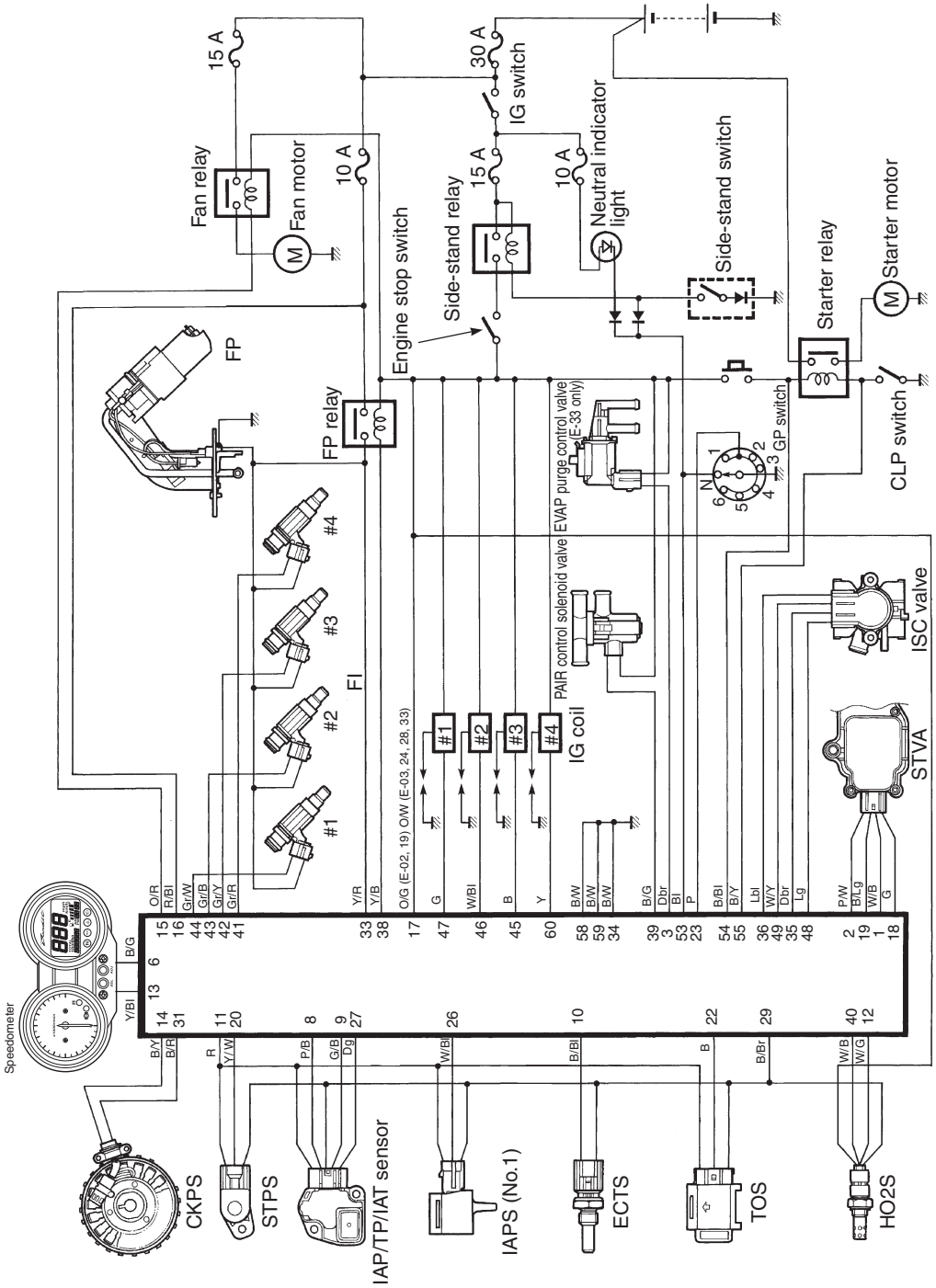
I718H1110144-01

Malfunction	LCD (display) indication	FI light indication	Indication mode
“NO”	C00	FI indicator light turns OFF.	—
“YES”	C** code is indicated from small numeral to large one.		For each 2 sec., code is indicated.

Schematic and Routing Diagram

FI System Wiring Diagram

B718H11102001



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Terminal Alignment of ECM Coupler

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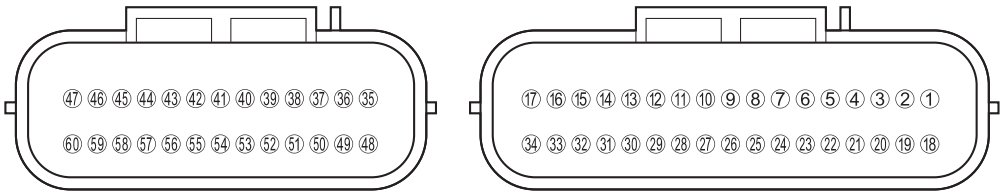

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TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
1	STVA signal (STVA, 2A)	31	CKP sensor signal (CKP-)
2	STVA signal (STVA, 1A)	32	Serial data for self-diagnosis
3	EVAP page control valve [E-33 only]	33	Power source for fuel injector (VM)
4	—	34	ECM ground (E1)
5	—	35	ISC signal (ISC, 2A)
6	Serial data for speedometer	36	ISC signal (ISC, 1A)
7		37	—
8	TP sensor signal (TP)	38	Fuel pump relay (FP Relay)
9	IAP sensor signal No.2 (IAP, 2)	39	PAIR control solenoid valve (PAIR)
10	ECT sensor signal (ECT)	40	HO2 sensor heater (HO2, H)
11	Power source for sensors (Vcc)	41	Fuel injector #4 (#4, 1)
12	HO2 sensor signal (HO2S)	42	Fuel injector #3 (#3, 1)
13	Tachometer	43	Fuel injector #2 (#2, 1)
14	CKP sensor signal (CKP+)	44	Fuel injector #1 (#1, 1)
15	Cooling fan relay (FAR)	45	Ignition coil #3
16	Power source for back-up	46	Ignition coil #2
17	Power source	47	Ignition coil #1
18	STVA signal (STVA, 2B)	48	ISC signal (ISC, 2B)
19	STVA signal (STVA, 1B)	49	ISC signal (ISC, 1B)
20	STP sensor (STP)	50	—
21	Ignition switch signal	51	—
22	TO sensor signal (TOS)	52	—
23	GP sensor signal (GP)	53	Neutral switch
24		54	Starter relay
25		55	Clutch position switch
26	IAP sensor signal No.1 (IAP, 1)	56	—
27	IAT sensor signal (IAT)	57	—
28		58	Ground
29	Sensors ground (E2)	59	Ground for ignition system
30	Mode select switch	60	Ignition coil #4

Component Location

FI System Parts Location

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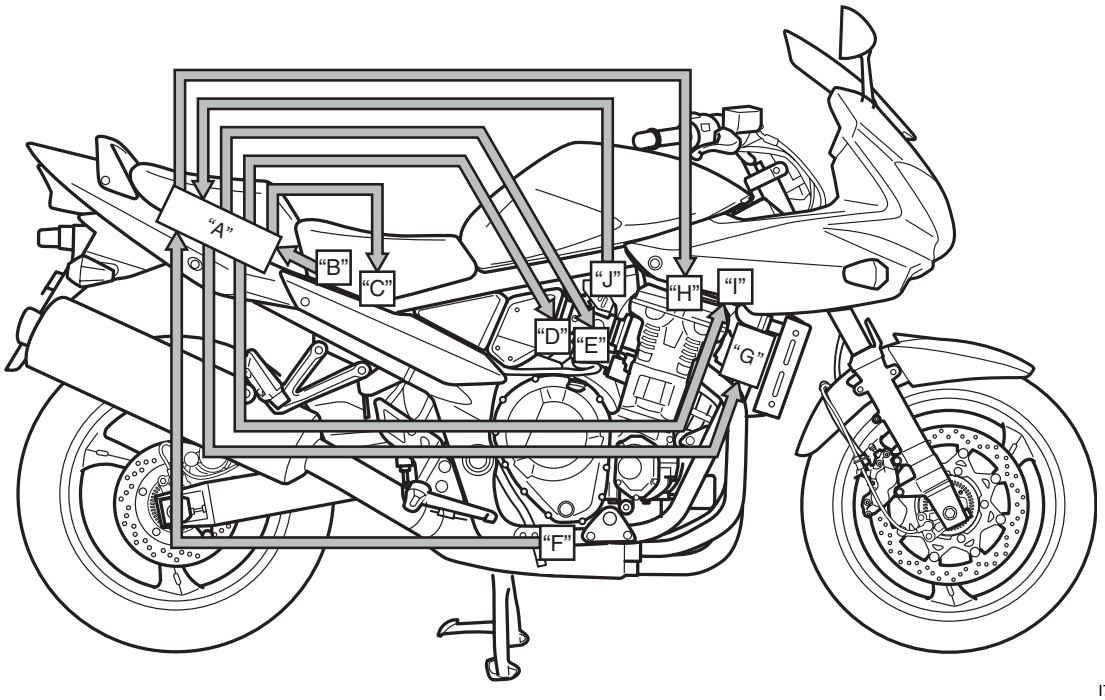

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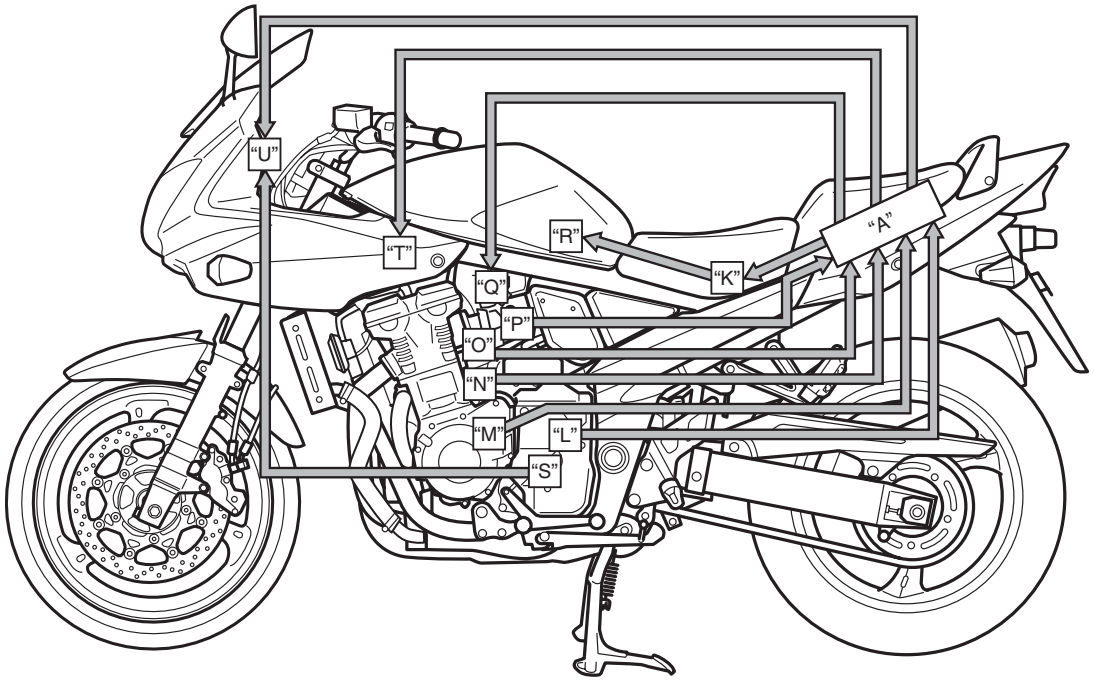
"A": ECM	"C": Cooling fan relay	"E": ISC valve	"G": Cooling fan	"I": PAIR control solenoid valve
"B": TO sensor	"D": STV actuator	"F": HO2 sensor	"H": Ignition coil	"J": IAP sensor (No.1)



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"A": ECM	"M": CKP sensor	"P": STP sensor	"S": Speed sensor
"K": Fuel pump relay	"N": ECT sensor	"Q": Fuel injector	"T": EVAP purge control valve (E-33 only)
"L": GP switch	"O": IAP/TP/IAT sensor	"R": Fuel pump	"U": Speedometer

Diagnostic Information and Procedures

Engine Symptom Diagnosis

B718H11104001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (Compression too low)	Valve clearance out of adjustment.	*Adjust.*
	Worn valve guides or poor seating of valves.	*Repair or replace.*
	Mistimed valves.	*Adjust.*
	Excessively worn piston rings.	*Replace.*
	Worn-down cylinder bores.	*Replace.*
	Starter motor cranks too slowly.	*Refer to "Starting System Diagram in Section 1I (Page 1I-1)".*
	Poor seating of spark plugs.	*Retighten.*
	Blown cylinder head gasket.	*Replace.*
Engine will not start or is hard to start (Plugs not sparking)	Fouled spark plugs.	*Clean.*
	Wet spark plugs.	*Clean and dry.*
	Defective ignition coil/plug cap.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connections.	*Repair or replace.*
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	*Clean or replace.*
	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Defective fuel injectors.	*Replace.*
	Defective fuel pump relay.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connections.	*Check and repair.*
Engine will not start or is hard to start (Incorrect fuel/air mixture)	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Defective TP sensor.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective IAT sensors.	*Replace.*
	Dirty throttle body.	*Clean.*
	Defective ISC valve.	*Replace.*
Engine idles poorly	Valve clearance out of adjustment.	*Adjust.*
	Poor seating of valves.	*Replace or repair.*
	Defective valve guides.	*Replace.*
	Worn down camshafts.	*Replace.*
	Too wide spark plug gaps.	*Adjust or replace.*
	Defective ignition coil/plug caps.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective TP sensor.	*Replace.*
	Defective fuel pump.	*Replace.*
	Imbalanced throttle valve.	*Adjust.*
	Dirty throttle body.	*Clean.*
	Damaged or cranked vacuum hose.	*Replace.*
	Sucking air from intake pipe joint.	*Repair or replace.*
	Damaged or clogged ISC valve.	*Repair or replace.*
	ISC bad leaning.	*Reset learned value.*

Condition	Possible cause	Correction / Reference Item
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	*Repair or replace.*
	Clogged fuel filter.	*Clean or replace.*
	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Damaged or cracked vacuum hose.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective thermostat.	*Replace.*
	Defective IAT sensors.	*Replace.*
	Defective ISC valve.	*Replace.*
Engine stalls often (Fuel injector improperly operating)	Defective fuel injectors.	*Replace.*
	No injection signal from ECM.	*Repair or replace.*
	Open or short circuited wiring connection.	*Repair or replace.*
	Defective battery or low battery voltage.	*Replace or recharge.*
Engine stalls often (Control circuit or sensor improperly operating)	Defective ECM.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensors.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective fuel pump relay.	*Replace.*
	Defective ISC valve.	*Replace.*
	ISC bad learning.	*Reset learned value.*
Engine stalls often (Engine parts improperly operating)	Fouled spark plugs.	*Clean.*
	Defective CKP sensor or ECM.	*Replace.*
	Clogged fuel hose.	*Clean.*
	Out of adjustment tappet clearance.	*Adjust.*
	Dirty throttle body.	*Clean.*
Engine noisy (Excessive valve chatter)	Too large tappet clearance.	*Adjust.*
	Weakened or broken valve springs.	*Replace.*
	Worn tappet or cam surface.	*Replace.*
	Worn and burnt camshaft journal.	*Replace.*
Engine noisy (Noise seems to come from piston)	Worn down pistons or cylinders.	*Replace.*
	Combustion chambers fouled with carbon.	*Clean.*
	Worn piston pins or piston pin bores.	*Replace.*
	Worn piston rings or ring grooves.	*Replace.*
Engine noisy (Noise seems to come from timing chain)	Stretched chain.	*Replace.*
	Worn sprockets.	*Replace.*
	Tension adjuster not working.	*Repair or replace.*
Engine noisy (Noise seems to come from crankshaft)	Rattling bearings due to wear.	*Replace.*
	Worn and burnt big-end bearings.	*Replace.*
	Worn and burnt journal bearings.	*Replace.*
	Worm bearings.	*Replace thrust bearing.*
Engine noisy (Noise seems to come from balancer)	Rattling bearings due to wear.	*Replace.*
Engine noisy (Noise seems to come from clutch)	Worn splines of countershaft or hub.	*Replace.*
	Worn teeth of clutch plates.	*Replace.*
	Distorted clutch plate, driven and drive.	*Replace.*
	Worn clutch release bearing.	*Replace.*
	Weakened clutch dampers.	*Replace the primary driven gear.*
Engine noisy (Noise seems to come from transmission)	Worn or rubbing gears.	*Replace.*
	Worn splines.	*Replace.*
	Worn or rubbing primary gears.	*Replace.*
	Worn bearings.	*Replace.*

Condition	Possible cause	Correction / Reference Item
Engine noisy (Noise seems to come from water pump)	Worn or damaged impeller shaft.	*Replace.*
	Worn or damaged mechanical seal.	*Replace.*
	Contact between pump case and impeller.	*Replace.*
	Too much play on pump shaft bearing.	*Replace.*
Engine runs poorly in high speed range (Defective engine internal/ electrical parts)	Weakened valve springs.	*Replace.*
	Worn camshafts.	*Replace.*
	Valve timing out of adjustment.	*Adjust.*
	Too narrow spark plug gap.	*Adjust.*
	Ignition not advanced sufficiently due to poorly working timing advance circuit.	*Replace ECM.*
	Defective ignition coil/plug gap.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Clogged air cleaner element.	*Clean.*
	Clogged fuel hose, resulting in inadequate fuel supply to injector.	*Clean and prime.*
	Defective fuel pump.	*Replace.*
	Defective TP sensor.	*Replace.*
	Defective STP sensor or STVA.	*Replace.*
Engine runs poorly in high speed range (Defective air flow system)	Clogged air cleaner element.	*Clean or replace.*
	Defective throttle valves.	*Adjust or replace.*
	Defective ISC valve.	*Replace.*
	Sucking air from throttle body joint.	*Repair or replace.*
	Defective ECM.	*Replace.*
	Imbalancing throttle valve synchronization.	*Adjust.*
	Defective STP sensor or STVA.	*Replace.*
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensors.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	TP sensor out of adjustment.	*Adjust.*
	Defective STP sensor or STVA.	*Replace.*
	Defective GP sensor.	*Replace.*
	Defective CKP sensor.	*Replace.*
Engine lacks power (Defective engine internal/ electrical parts)	Loss of tappet clearance.	*Adjust.*
	Weakened valve springs.	*Replace.*
	Valve timing out of adjustment.	*Adjust.*
	Worn piston rings or cylinders.	*Replace.*
	Poor seating of valves.	*Repair.*
	Fouled spark plugs.	*Clean or replace.*
	Incorrect spark plugs.	*Adjust or replace.*
	Clogged fuel injectors.	*Replace.*
	Defective TP sensor.	*Replace.*
	Clogged air cleaner element.	*Clean.*
	Sucking air from throttle valve or vacuum hose.	*Retighten or replace.*
	Too much engine oil.	*Drain out excess oil.*
	Defective fuel pump or ECM.	*Replace.*
	Defective CKP sensor and ignition coil/ plug caps.	*Replace.*
	Imbalancing throttle valve synchronization.	*Adjust.*
	Defective STP sensor or STVA.	*Replace.*

Condition	Possible cause	Correction / Reference Item
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective GP sensor.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective STP sensor or STVA.	*Replace.*
Engine overheats (Defective engine internal parts)	Heavy carbon deposit on piston crown.	*Clean.*
	Not enough oil in the engine.	*Add oil.*
	Defective oil pump or clogged oil circuit.	*Replace or clean.*
	Use of incorrect engine oil.	*Change.*
	Sucking air from intake pipe.	*Retighten or replace.*
	Defective cooling system.	*Refer to “Cooling Circuit Diagram in Section 1F (Page 1F-2)”.*
Engine overheats (Lean fuel/air mixture)	Short-circuited IAP sensor/lead wire.	*Repair or replace.*
	Short-circuited IAT sensor/lead wire.	*Repair or replace.*
	Sucking air from intake pipe joint.	*Repair or replace.*
	Defective fuel injector.	*Replace.*
	Defective ECT sensor.	*Replace.*
Engine overheats (The other factors)	Ignition timing too advanced due to defective timing advance system (ECT sensor, CKP sensor, GP sensor and ECM.)	*Replace.*
	Drive chain is too tight.	*Adjust.*
	ISC bad learning.	*Reset learned value.*
Dirty or heavy exhaust smoke	Worn piston rings or cylinders.	*Replace.*
	Too much engine oil in the engine.	*Check and drain excess oil.*
	Worn valve guides.	*Replace.*
	Scored or scuffed cylinder walls.	*Replace.*
	Worn valves stems.	*Replace.*
	Defective stem seals.	*Replace.*
	Worn oil ring side rails.	*Replace.*

Self-Diagnostic Procedures

B718H11104005

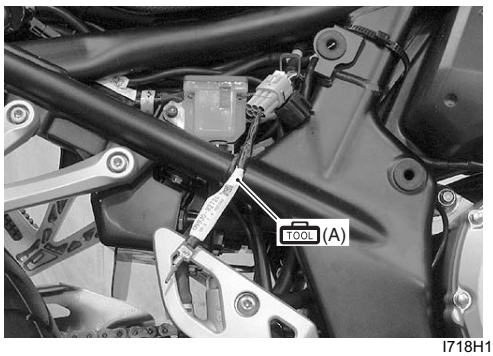
Use of Mode Select Switch

NOTE

- **Do not disconnect coupler from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection will erase memorized information in ECM memory.**
- **DTC stored in ECM memory can be checked by the special tool.**
- **Before checking DTC, read self-diagnosis function "User mode and dealer mode" (Refer to "Self-Diagnosis Function (Page 1A-2)".) carefully to have good understanding as to what functions are available and how to use it.**
- **Be sure to read "Precautions for Electrical Circuit Service" (Refer to "Precautions for Electrical Circuit Service in Section 00 (Page 00-2)".) before inspection and observe what is written there.**

1) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
2) Connect the special tool to the mode select switch at the wiring harness.

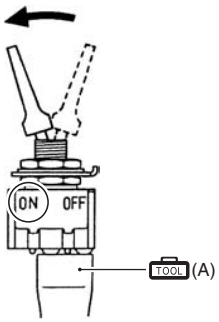
Special tool
TOOL (A): 09930–82720 (Mode select switch)



I718H1110145-02

3) Start the engine or crank the engine for more than 4 seconds.
4) Turn the special tool's switch ON.
5) Check the DTC to determine the malfunction part. Refer to "DTC Table (Page 1A-18)".

Special tool
TOOL (A): 09930–82720 (Mode select switch)



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I718H1110144-01

6) After repairing the trouble, turn OFF the ignition switch and turn ON again. If DTC is indicated (C00), the malfunction is cleared.

NOTE

- **Even though DTC (C00) is indicated, the previous malfunction history DTC still remains stored in the ECM. Therefore, erase the history DTC memorized in the ECM using SDS.**
- **DTC is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored history DTC using SDS. Refer to "Use of SDS Diagnosis Reset Procedures (Page 1A-13)".**

7) Turn the ignition switch OFF and disconnect the special tool from the mode select switch.
8) Reinstall the right frame cover.

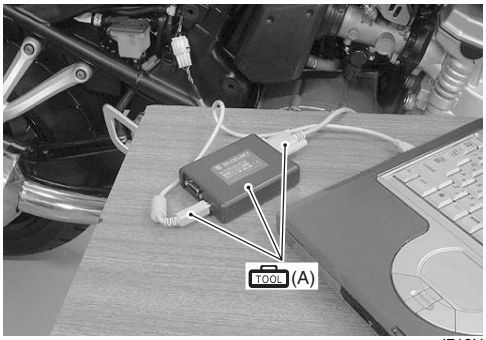
Use of SDS

NOTE

- **Do not disconnect the coupler from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection will erase the memorized information in ECM memory.**
- **DTC stored in ECM memory can be checked by the SDS.**
- **Be sure to read "Precautions for Electrical Circuit Service in Section 00 (Page 00-2)" before inspection and observe what is written there.**

1) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
2) Set up the SDS tools. (Refer to the SDS operation manual for further details.)

Special tool
TOOL (A): 09904–41010 (SDS Set)
TOOL (B): 99565–01010–010 (CD-ROM Ver.10)



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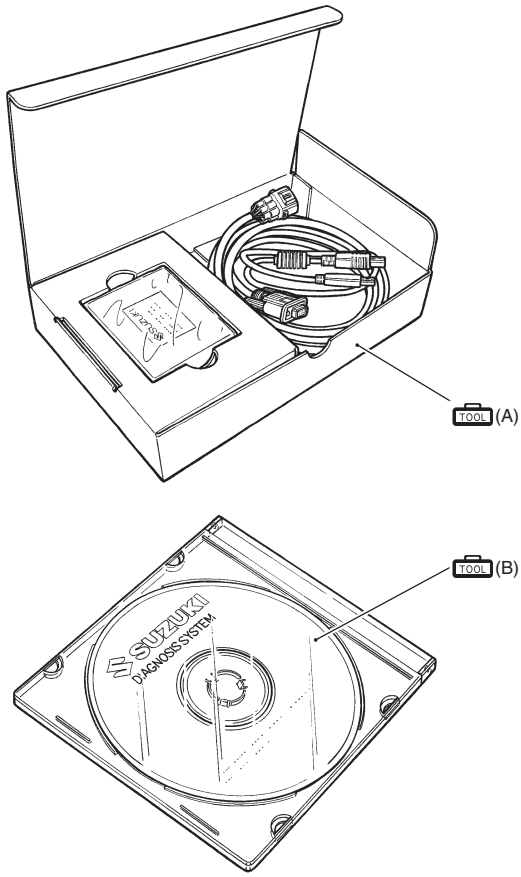

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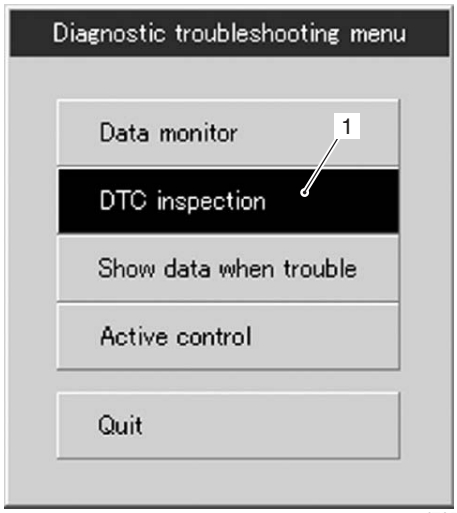
3) Click the DTC inspection button (1).



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4) Start the engine or crank the engine for more than 4 seconds.
5) Check the DTC to determine the malfunction part. Refer to “DTC Table (Page 1A-18)”.

NOTE

- **Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.**
- **Not only SDS is used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger. (Refer to “Show Data When Trouble (Displaying Data at the Time of DTC) (Page 1A-14)”.)**
- **How to use trigger. (Refer to the SDS operation manual for further details.)**

6) After repairing the trouble, clear to delete history code (Past DTC). Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.
7) Close the SDS tool and turn the ignition switch OFF.
8) Disconnect the SDS tool and install the right frame cover.

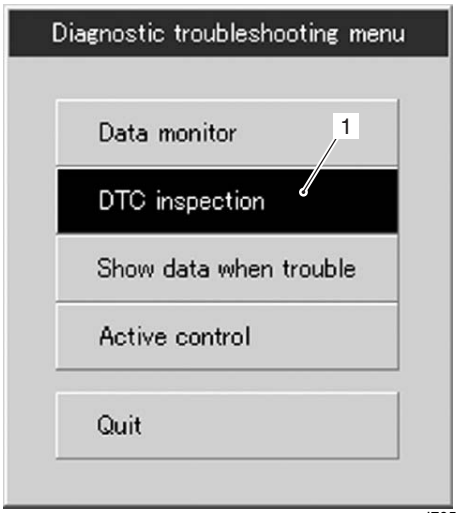
Use of SDS Diagnosis Reset Procedures

B718H11104007

NOTE

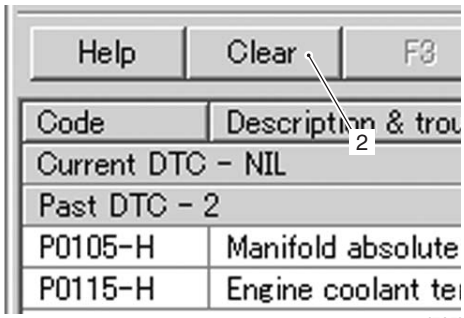
The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.

1) After repairing the trouble, turn OFF the ignition switch and turn ON again.
2) Click the DTC inspection button (1).



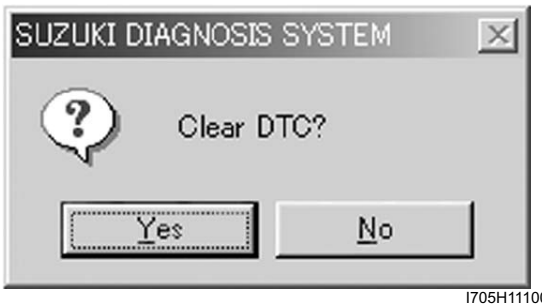
I705H1110003-01

3) Check the DTC.
4) The previous malfunction history code (Past DTC) still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS tool.
5) Click “Clear” (2) to delete history code (Past DTC).



I705H1110005-01

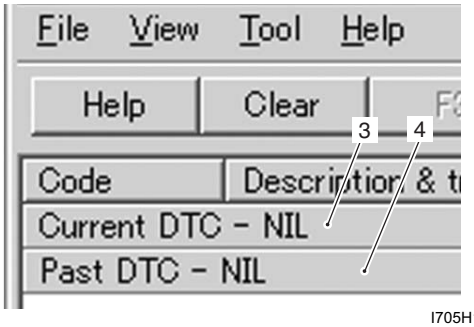
6) Follow the displayed instructions.



I705H1110006-01

I705H1110009-01

7) Check that both “Current DTC” (3) and “Past DTC” (4) are deleted (NIL).



I705H1110008-01

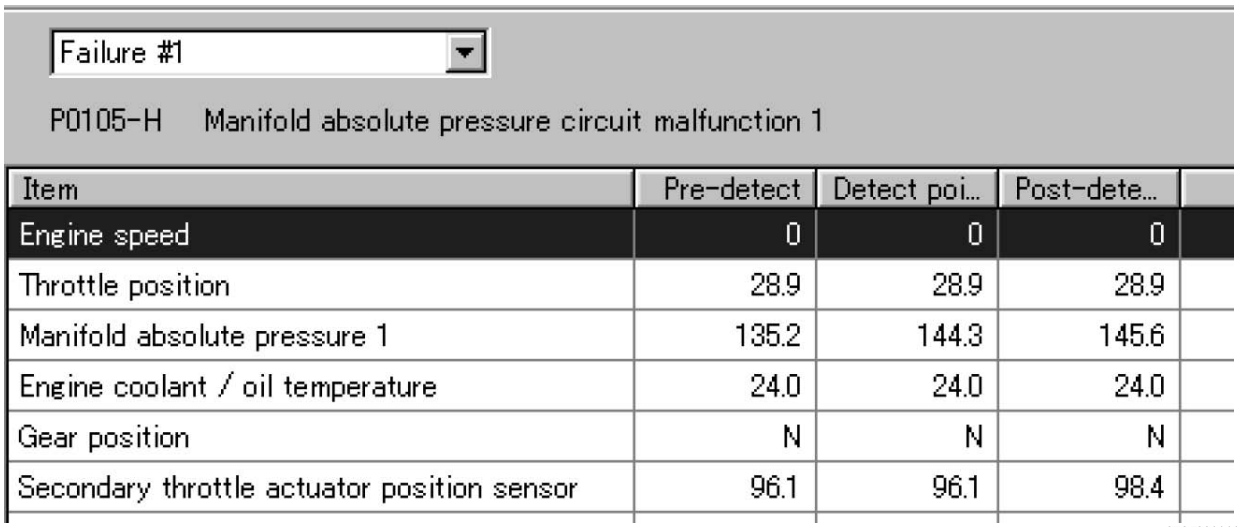
8) Close the SDS tool and turn the ignition switch OFF.
9) Disconnect the SDS tool and install the right frame cover.

Show Data When Trouble (Displaying Data at the Time of DTC)

B718H11104008

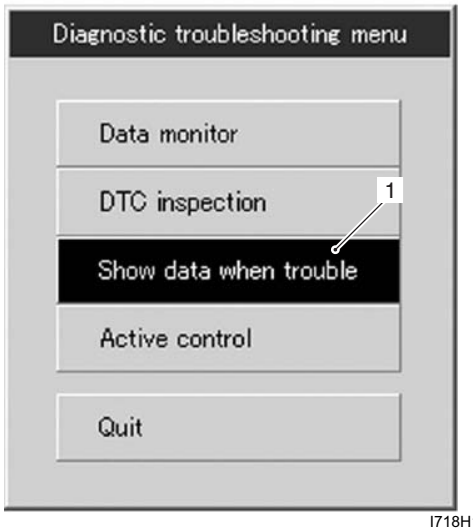
Use of SDS

ECM stores the engine and driving conditions (in the form of data as shown in the figure) at the moment of the detection of a malfunction in its memory. This data is called “Show data when trouble”.
Therefore, it is possible to know engine and driving conditions (e.g., whether the engine was warm or not, where the motorcycle was running or stopped) when a malfunction was detected by checking the show data when trouble. This show data when trouble function can record the maximum of two Diagnostic Trouble Codes in the ECM.
Also, ECM has a function to store each show data when trouble for two different malfunctions in the order of occurrence as the malfunction is detected. Utilizing this function, it is possible to know the order of malfunctions that have been detected. Its use is helpful when rechecking or diagnosing a trouble.



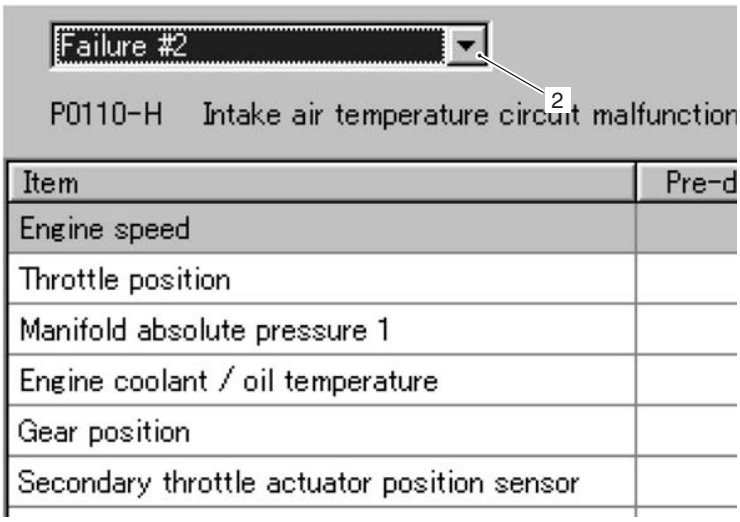
I705H1110010-01

1) Click “Show data when trouble” (1) to display the data.



I718H1110269-02

2) Click the drop down button (2), either “Failure #1” or “Failure #2” can be selected.



I718H1110270-01

SDS Check

B718H11104009

Using SDS, sample the data at the time of new and periodic vehicle inspections.
After saving the sampled data in the computer, file them by model and by user.
The periodically filed data help improve the accuracy of troubleshooting since they can indicate the condition of vehicle functions that has changed with time.
For example, when a vehicle is brought in for service but the troubleshooting of a failure is not easy, comparing the current data value to past filed data value at time of normal condition can allow the specific engine failure to be determined.
Also, in the case of a customer vehicle which is not periodically brought in for service with no past data value having been saved, if the data value of a good vehicle condition have been already saved as a master (STD), comparison between the same models helps to facilitate the troubleshooting.

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

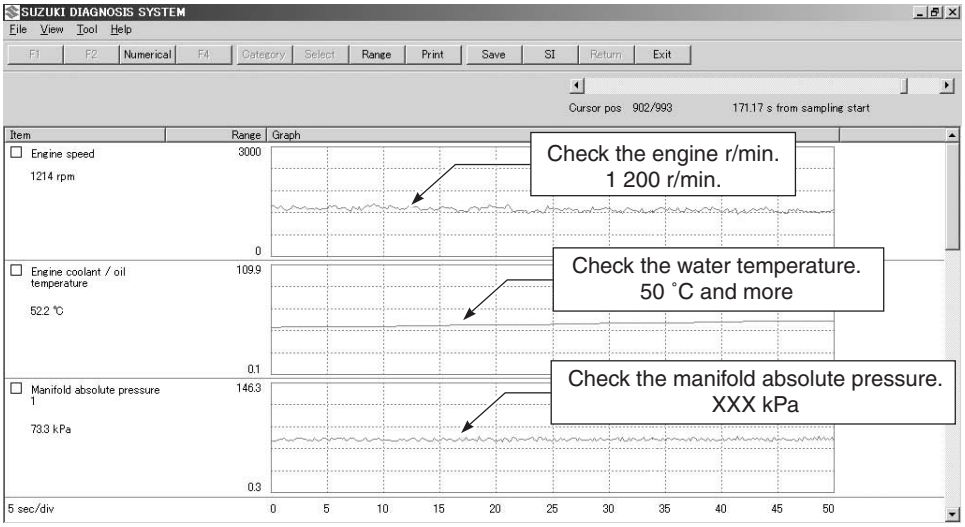
Special tool
TOOL : 09904–41010 (SDS set)
TOOL : 99565–01010–010 (CD-ROM Ver.10)

NOTE

- **Before taking the sample of data, check and clear the Past DTC.**
- **A number of different data under a fixed condition as shown should be saved or filed as sample.**

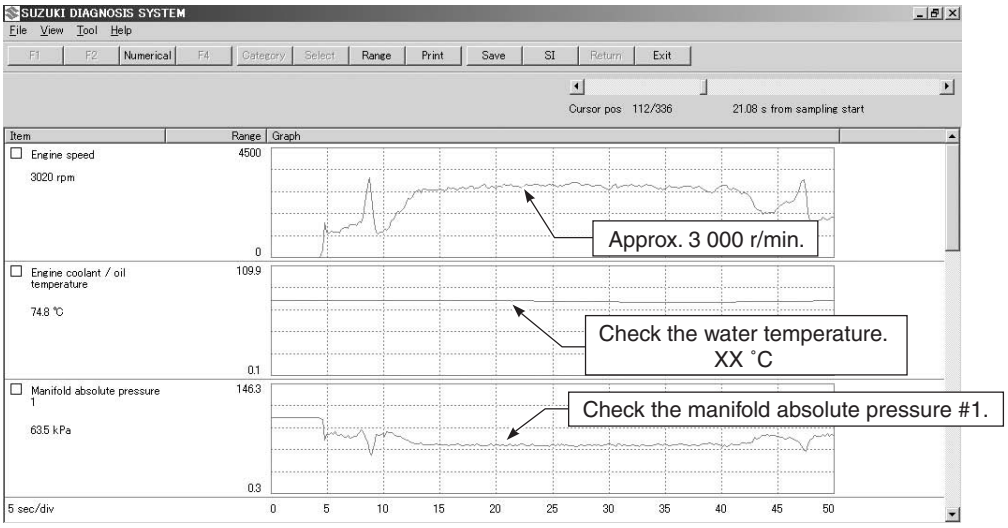
Sample

Data sampled from cold starting through warm-up



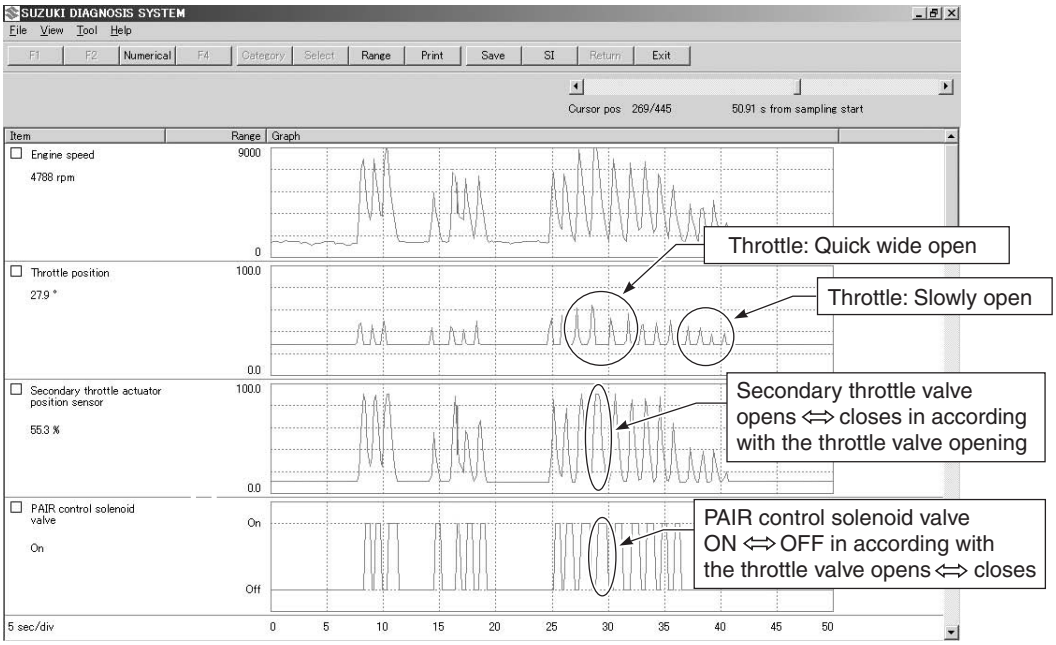
I718H1110149-01

Data at 3 000 r/min under no load



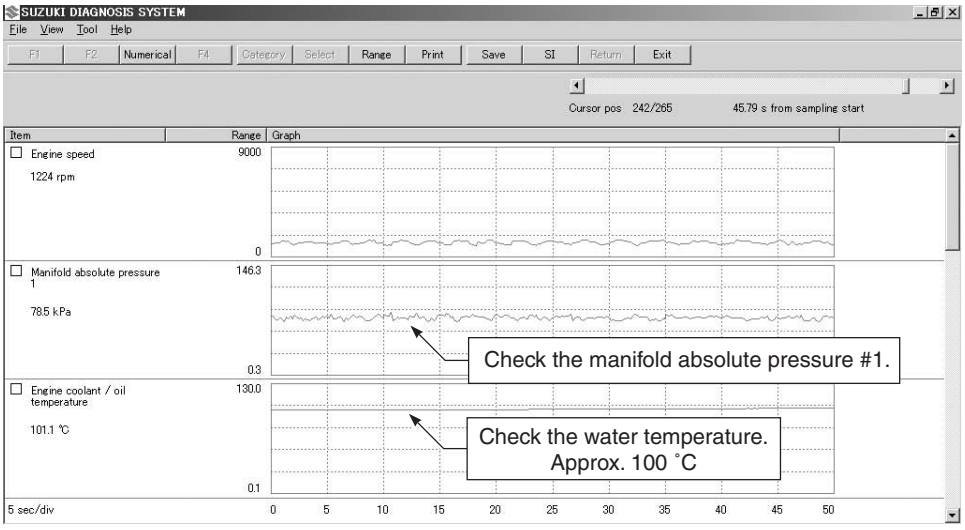
I718H1110150-01

Data at the time of racing



I718H1110151-01

Data of intake negative pressure during idling (100 °C)



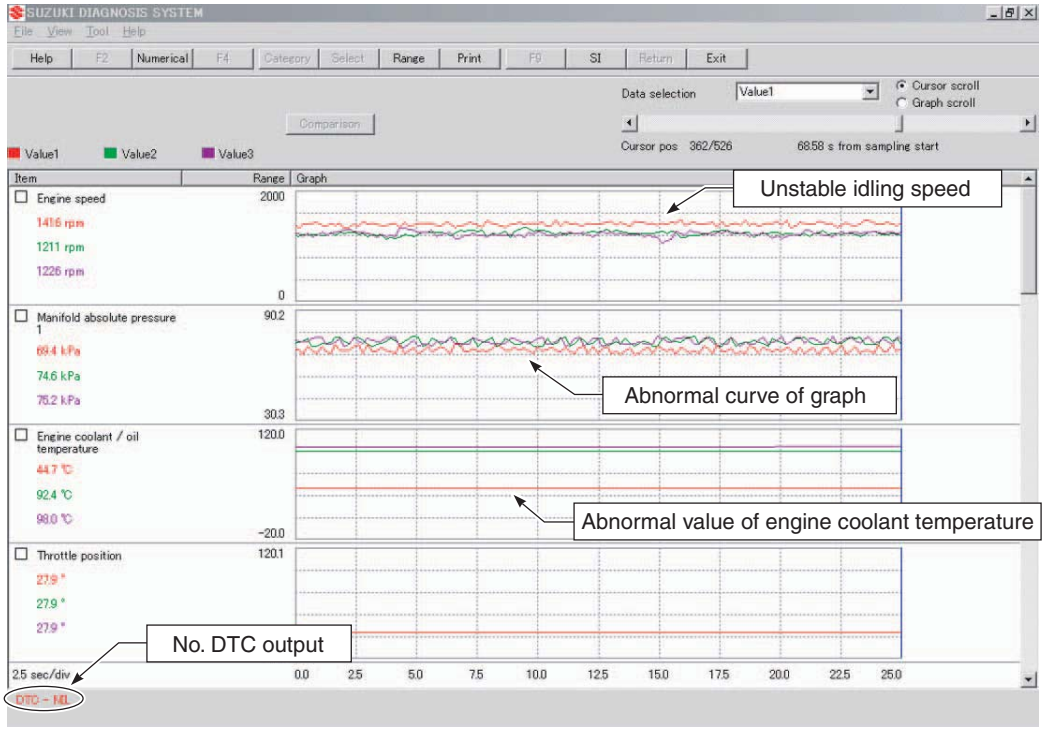
I718H1110152-01

Example of Trouble

Three data; value 1 (current data 1), value 2 (past data 2) and value 3 (past data 3); can be made in comparison by showing them in the graph. Read the change of value by comparing the current data to the past data that have been saved under the same condition, then you may determine how changes have occurred with the passing of time and identify what problem is currently occurring.

NOTE

With DTC not output, if the value of engine coolant temperature is found to be lower than the data saved previously, the possible cause may probably lie in a sensor circuit opened, ground circuit opened or influence of internal resistance value changes, etc.



I718H1110153-03

DTC Table

B718H11104002

Code	Malfunction Part	Remarks
C00	None	No defective part
C12 (P0335) ☞(Page 1A-25)	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C13 (P0105-H/L) ☞(Page 1A-28)	Intake air pressure sensor No.1 (IAPS)	
C14 (P0120-H/L) ☞(Page 1A-37)	Throttle position sensor (TPS)	
C15 (P0115-H/L) ☞(Page 1A-45)	Engine coolant temperature sensor (ECTS)	
C17 (P1750/-H/L) ☞(Page 1A-52)	Intake air pressure sensor No.2 (IAPS)	
C21(P0110-H/L) ☞(Page 1A-60)	Intake air temperature sensor (IATS)	
C23 (P1651-H/L) ☞(Page 1A-67)	Tip-over sensor (TOS)	
C24 (P0351) ☞(Page 1A-73)	Ignition signal #1 (IG coil #1)	For #1 cylinder
C25 (P0352) ☞(Page 1A-73)	Ignition signal #2 (IG coil #2)	For #2 cylinder

Code	Malfunction Part	Remarks
C26 (P0353) ☞(Page 1A-73)	Ignition signal #3 (IG coil #3)	For #3 cylinder
C27 (P0354) ☞(Page 1A-73)	Ignition signal #4 (IG coil #4)	For #4 cylinder
C28 (P1655) ☞(Page 1A-73)	Secondary throttle valve actuator (STVA)	*1
C29 (P1654-H/L) ☞(Page 1A-77)	Secondary throttle position sensor (STPS)	
C31 (P0705) ☞(Page 1A-85)	Gear position signal (GP switch)	
C32 (P0201) ☞(Page 1A-87)	Injector signal #1 (FI #1)	For #1 cylinder
C33 (P0202) ☞(Page 1A-87)	Injector signal #2 (FI #2)	For #2 cylinder
C34 (P0203) ☞(Page 1A-87)	Injector signal #3 (FI #3)	For #3 cylinder
C35 (P0204) ☞(Page 1A-87)	Injector signal #4 (FI #4)	For #4 cylinder
C40 (P0505/P0506/ 0507) ☞(Page 1A-91)	Idle speed control valve (ISC valve)	
C41 (P0230-H/L, P2505) ☞(Page 1A-97) / ☞(Page 1A-100)	Fuel pump control system (FP control system), ECM/PCM power input signal	Fuel pump, Fuel pump relay
C42 (P1650) ☞(Page 1A-102)	Ignition switch signal (IG switch signal)	Anti-theft
C44 (P0130, P0135) ☞(Page 1A-102)	Heated oxygen sensor (HO2S)	
C49 (P1656) ☞(Page 1A-108)	PAIR control solenoid valve	
C60 (P0480) ☞(Page 1A-111)	Cooling fan control system	Cooling fan relay
P62 (P0443)	EVAP system purge control valve (E-33 only)	

In the LCD (DISPLAY) panel, the malfunction code is indicated from small code to large code.

*1

When the secondary throttle valve actuator and secondary throttle position sensor signals are not sent to ECM. In this case, C28 and C29 are indicated alternately.

Fail-Safe Function Table

B718H11104003

FI system is provided with fail-safe function to allow the engine to start and the motorcycle to run in a minimum performance necessary even under malfunction condition.

Item	Fail-Safe Mode	Starting Ability	Running Ability
IAP sensor (No.1)	Intake air pressure is fixed to 101 kPa (760 mmHg).	"YES"	"YES"
IAP sensor (No.2)	Intake air pressure is fixed to 101 kPa (760 mmHg).	"YES"	"YES"
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	"YES"	"YES"
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F).	"YES"	"YES"
IAT sensor	Intake air temperature value is fixed to 40 °C (104 °F).	"YES"	"YES"
Ignition signal	#1 ignition – off and #1 Fuel-cut	"YES"	"YES"
		#2, #3 & #4 cylinder can run.	
	#2 ignition – off and #2 Fuel-cut	"YES"	"YES"
		#1, #3 & #4 cylinder can run.	
	#3 ignition – off and #3 Fuel-cut	"YES"	"YES"
		#1, #2 & #4 cylinder can run.	
	#4 ignition – off and #4 Fuel-cut	"YES"	"YES"
		#1, #2 & #3 cylinder can run.	
Injection signal	#1 Fuel – cut	"YES"	"YES"
		#2, #3 & #4 cylinder can run.	
	#2 Fuel – cut	"YES"	"YES"
		#1, #3 & #4 cylinder can run.	
	#3 Fuel – cut	"YES"	"YES"
		#1, #2 & #4 cylinder can run.	
	#4 Fuel – cut	"YES"	"YES"
		#1, #2 & #3 cylinder can run.	
Secondary throttle valve actuator	When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
STP sensor	Secondary throttle valve is fixed to full close position.	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 6th gear.	"YES"	"YES"
HO2 sensor	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	"YES"	"YES"
PAIR control solenoid valve	ECM stops controlling PAIR control solenoid valve.	"YES"	"YES"
ISC valve	When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
EVAP purge control valve (E-33 only)	ECM stops controlling EVAP purge control valve.	"YES"	"YES"

The engine can start and can run even if the signal in the table is not received from each sensor. But, the engine running condition is not complete, providing only emergency help (by fail-safe circuit). In this case, it is necessary to bring the motorcycle to the workshop for complete repair.

When two ignition signals or two injector signals are not received by ECM, the fail-safe circuit can not work and ignition or injection is stopped.

FI System Troubleshooting

B718H11104004

Customer Complaint Analysis

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of such an inspection form such as following will facilitate collecting information to the point required for proper analysis and diagnosis.

NOTE

This form is a standard sample. The form should be modified according to conditions and characteristic of each market.

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

User name:	**Model:**	**VIN:**	
Date of issue:	**Date Reg.:**	**Date of problem:**	**Mileage:**

Malfunction indicator light condition (LED)	**☐ Always ON / ☐ Sometimes ON / ☐ Always OFF / ☐ Good condition**
Malfunction display/code (LCD)	**User mode: ☐ No display / ☐ Malfunction display ( )**
	Dealer mode: ☐ No code / ☐ Malfunction code ( )

PROBLEM SYMPTOMS	
☐ Difficult Starting **☐ No cranking**	**☐ Poor Driveability** **☐ Hesitation on acceleration**
☐ No initial combustion **☐ No combustion**	**☐ Back fire / ☐ After fire** **☐ Lack of power**
☐ Poor starting at **(☐ cold / ☐ warm / ☐ always)** **☐ Other**	**☐ Surging** **☐ Abnormal knocking** **☐ Engine rpm jumps briefly** **☐ Other**
☐ Poor Idling **☐ Poor fast Idle** **☐ Abnormal idling speed** **(☐ High / ☐ Low) (r/min)** **☐ Unstable** **☐ Hunting (r/min to r/min)** **☐ Other**	**☐ Engine Stall when** **☐ Immediately after start** **☐ Throttle valve is opened** **☐ Throttle valve is closed** **☐ Load is applied** **☐ Other**
☐ OTHERS:	

MOTORCYCLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental condition	
Weather	**☐ Fair / ☐ Cloudy / ☐ Rain / ☐ Snow / ☐ Always / ☐ Other**
Temperature	**☐ Hot / ☐ Warm / ☐ Cool / ☐ Cold (°C / °F) / ☐ Always**
Frequency	**☐ Always / ☐ Sometimes (times / day, month) / ☐ Only once** **☐ Under certain condition**
Road	**☐ Urban / ☐ Suburb / ☐ Highway / ☐ Mountainous (☐ Uphill / ☐ Downhill)** **☐ Tarmacadam / ☐ Gravel / ☐ Other**
Motorcycle condition	
Engine condition	**☐ Cold / ☐ Warming up phase / ☐ Warmed up / ☐ Always / ☐ Other at starting** **☐ Immediately after start / ☐ Racing without load / ☐ Engine speed (r/min)**
Motorcycle condition	**During driving: ☐ Constant speed / ☐ Accelerating / ☐ Decelerating** **☐ Right hand corner / ☐ Left hand corner** **☐ At stop / ☐ Motorcycle speed when problem occurs (km/h, mile/h)** **☐ Other:**

Visual Inspection

Prior to diagnosis using the mode select switch or SDS, perform the following visual inspections. The reason for visual inspection is that mechanical failures (such as oil leakage) cannot be displayed on the screen with the use of mode select switch or SDS.

- Engine oil level and leakage. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
- Engine coolant level and leakage. Refer to “Cooling Circuit Inspection in Section 1F (Page 1F-4)”.
- Fuel level and leakage. Refer to “Fuel Line Inspection in Section 0B (Page 0B-10)”.
- Clogged air cleaner element. Refer to “Air Cleaner Element Inspection and Cleaning in Section 0B (Page 0B-3)”.
- Battery condition.
- Throttle cable play. Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)”.
- Vacuum hose looseness, bend and disconnection.
- Broken fuse.
- FI light operation. Refer to “Combination Meter Inspection in Section 9C (Page 9C-5)”.
- Each warning light operation. Refer to “Combination Meter Inspection in Section 9C (Page 9C-5)”.
- Speedometer operation. Refer to “Speedometer Inspection in Section 9C (Page 9C-8)”.
- Exhaust gas leakage and noise. Refer to “Exhaust System Inspection in Section 1K (Page 1K-6)”.
- Each coupler disconnection.
- Clogged radiator fins. Refer to “Radiator Inspection and Cleaning in Section 1F (Page 1F-5)”.

Malfunction Code and Defective Condition Table

B718H11104010

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C00		NO FAULT	—	—
C12		CKP sensor	The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts CKP sensor, lead wire/coupler connection
P0335				
C13		IAP sensor (No.1)	The sensor should produce following voltage. 0.5 V ≤ sensor voltage < 4.85 V In other than the above range, C13 (P0105) is indicated.	IAP sensor (No.1), lead wire/coupler connection
P0105	H		Sensor voltage is higher than specified value.	IAP sensor (No.1) circuit open or shorted to Vcc or ground circuit open
	L		Sensor voltage is lower than specified value.	IAP sensor (No.1) circuit shorted to the ground or Vcc circuit open
C14		TP sensor	The sensor should produce following voltage. 0.2 V ≤ sensor voltage < 4.8 V In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection
P0120	H		Sensor voltage is higher than specified value.	TP sensor circuit shorted to Vcc or ground circuit open
	L		Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to the ground or Vcc circuit open
C15		ECT sensor	The sensor voltage should be the following. 0.15 V ≤ sensor voltage < 4.85 V In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to the ground

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C17		IAP sensor (No.2)	The sensor should produce following voltage. 0.5 V ≤ sensor voltage < 4.85 V In other than the above range, C17 (P1750) is indicated.	IAP sensor (No.2), lead wire/ coupler connection
P1750	H		Sensor voltage is higher than specified value.	IAP sensor (No.2) circuit open or shorted to Vcc or ground circuit open
	L		Sensor voltage is lower than specified value.	IAP sensor (No.2) circuit shorted to the ground or Vcc circuit open
C17/P1750			If the pressure variation (voltage variation) does not exist even under the engine operating condition, this malfunction code is output.	Make sure to check that IAP sensor (No.2) is securely installed on the throttle body.
C21		IAT sensor	The sensor voltage should be the following. 0.15 V ≤ sensor voltage < 4.85 V In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection
P0110	H		Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	IAT sensor circuit shorted to the ground
C23		TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 V ≤ sensor voltage < 4.8 V In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit shorted to Vcc or ground circuit open
	L		Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to the ground or Vcc circuit open
C24/C25 C26/C27 P0351/P0352 P0353/P0354		Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 8 times or more continuously. In this case, the code C24 (P0351), C25 (P0352), C26 (P0353) or C27 (P0354) is indicated.	Ignition coil, wiring/coupler connection, power supply from the battery
C28 P1655		Secondary throttle valve actuator	When no actuator control signal is supplied from the ECM, communication signal does not reach ECM or operation voltage does not reach STVA motor, C28 (P1655) is indicated. STVA can not operate.	STVA motor, STVA lead wire/ coupler
C29		STP sensor	The sensor should produce following voltage. 0.15 V ≤ sensor voltage < 4.85 V In other than the above range, C29 (P1654) is indicated.	STP sensor, lead wire/coupler connection
P1654	H		Sensor voltage is higher than specified value.	STP sensor circuit shorted to Vcc or ground circuit open
	L		Sensor voltage is lower than specified value.	STP sensor circuit open or shorted to the ground or Vcc circuit open
C31 P0705		Gear position signal	Gear position signal voltage should be higher than the following for 3 seconds and more. Gear position sensor voltage > 0.6 V If lower than the above value, C31 (P0705) is indicated.	GP switch, wiring/coupler connection, gearshift cam, etc.

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C32/C33 C34/C35		Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted 4 times or more continuously. In this case, the code C32 (P0201), C33 (P0202), C34 (P0203) or C35 (P0204) is indicated.	Primary fuel injector, wiring/ coupler connection, power supply to the injector.
P0201/P0202 P0203/P0204				
C40 /P0505		ISC valve	The circuit voltage of motor drive is unusual.	ISC valve circuit open or shorted to the ground
C40 /P0506			Idle speed is lower than the desired idle speed.	Air passage clogged ISC valve fixed ISC valve preset position is incorrect
C40 /P0507			Idle speed is higher than the desired idle speed.	ISC valve hose connection ISC valve is fixed ISC valve preset position is incorrect
C41		Fuel pump relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump although fuel pump relay is turned OFF.	Fuel pump relay, lead wire/ coupler connection, power source to fuel pump relay and fuel injectors
P0230	H		Voltage is applied to fuel pump although fuel pump relay is turned OFF.	Fuel pump relay switch circuit shorted to power source Fuel pump relay (switch side)
	L		No voltage is applied to the fuel pump, although fuel pump relay is turned ON.	Fuel pump relay circuit open or short Fuel pump relay (coil side)
C41/P2505		ECM/PCM power input signal	No voltage is applied to the ECM, although FP relay is turned ON.	Lead wire/coupler connection of ECM terminal to fuel fuse, Fuel fuse, Power source of speedometer shorted to ground
C42		Ignition switch	Ignition switch signal is not input to the ECM.	Ignition switch, lead wire/ coupler, etc.
P1650				
C44/P0130		HO2 sensor (HO2S)	HO2 sensor output voltage is not input to ECM during engine operation and running condition. (Sensor voltage > 1.0 V) In other than the above value, C44 (P0130) is indicated.	HO2S lead sensor circuit open or shorted to the power source, HO2 sensor lead wire/coupler connection
C44/P0135			The Heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0135) is indicated.	HO2 sensor circuit open or shorted to the ground Battery voltage supply to the HO2 sensor
C49		PAIR control solenoid valve	PAIR control solenoid valve ampere is not input to ECM.	PAIR control solenoid valve, lead wire/coupler
P1656				
C60		Cooling fan relay	Cooling fan relay signal is not input to ECM.	Cooling fan relay, lead wire/ coupler connection
P0480				
C62		EVAP purge control valve (E-33 only)	EVAP purge control valve voltage is not input to ECM	EVAP purge control valve, lead wire/coupler
P0443				

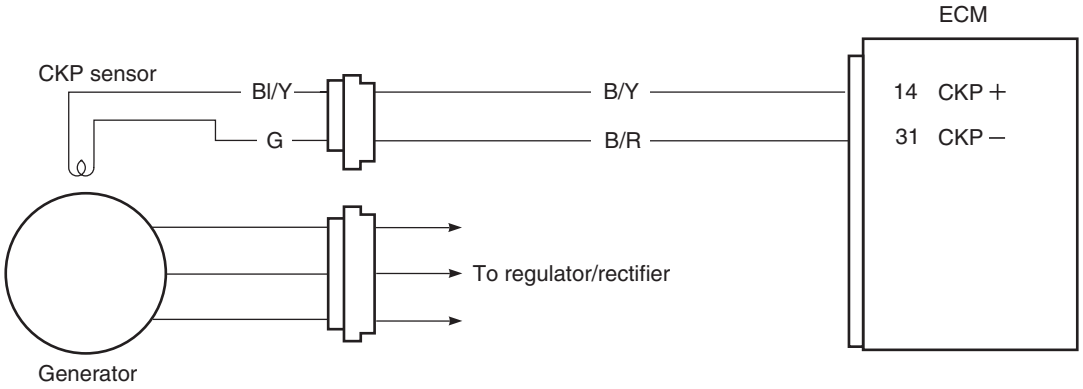
DTC “C12” (P0335): CKP Sensor Circuit Malfunction

B718H11104011

Detected Condition and Possible Cause

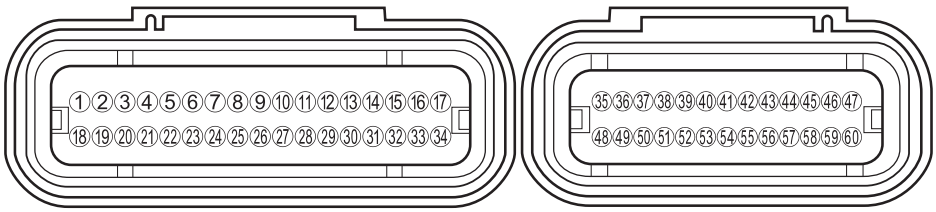
Detected Condition	Possible Cause
The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	• Metal particles or foreign material being stuck on the CKP sensor and rotor tip. • CKP sensor circuit open or short. • CKP sensor malfunction. • ECM malfunction.

Wiring Diagram



I718H1110262-01

ECM coupler (Harness side)

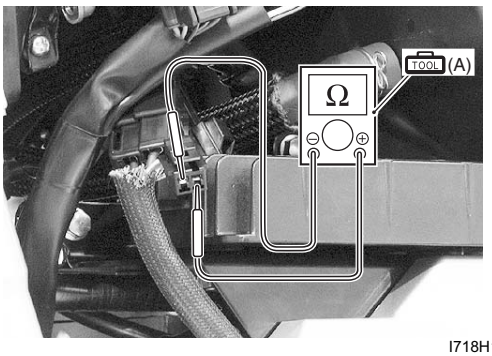
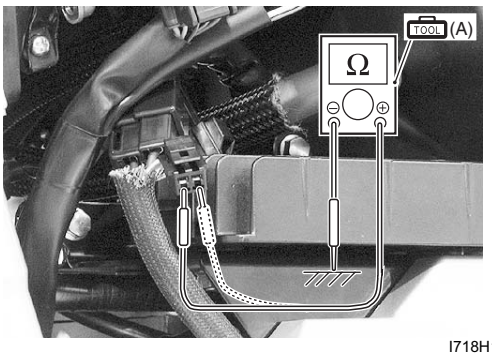


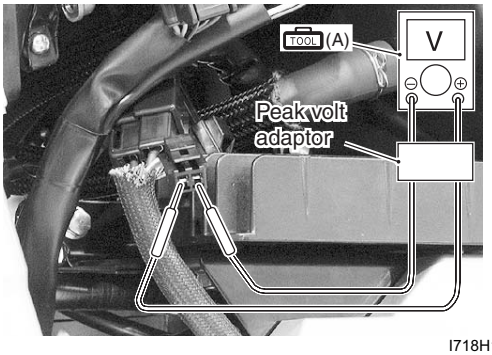
I718H1110240-01

Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Check the CKP sensor coupler for loose or poor contacts. If OK, then measure the CKP sensor resistance.  I718H1110154-02 3) Disconnect the CKP sensor coupler and measure the resistance. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **CKP sensor resistance** **90 – 150 Ω (Bl /Y– G)**  I718H1110156-03 4) If OK, then check the continuity between each terminal and ground. **CKP sensor continuity** **∞ Ω (Infinity) (Bl/Y – Ground, G – Ground)**  I718H1110157-04 *Are the resistance and continuity OK?*	Go to Step 2.	Replace the CKP sensor with a new one.

Step	Action	Yes	No
2	1) Crank the engine several seconds with the starter motor, and measure the CKP sensor peak voltage at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **CKP sensor peak voltage** **2.0 V and more** **((+) terminal: Bl/Y – (–) terminal: G)**  I718H1110158-03 2) Repeat the 1) test procedures several times and measure the highest peak voltage. *Is the voltage OK?*	• G/Y or Br wire open or shorted to the ground. • Loose or poor contacts on the CKP sensor coupler or ECM coupler (terminal “14” or “31”). • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	• Inspect that metal particles or foreign material stuck on the CKP sensor and rotor tip. • If there are no metal particles and foreign material, then replace the CKP sensor with a new one. Refer to “CKP Sensor Removal and Installation in Section 1C (Page 1C-1)”.

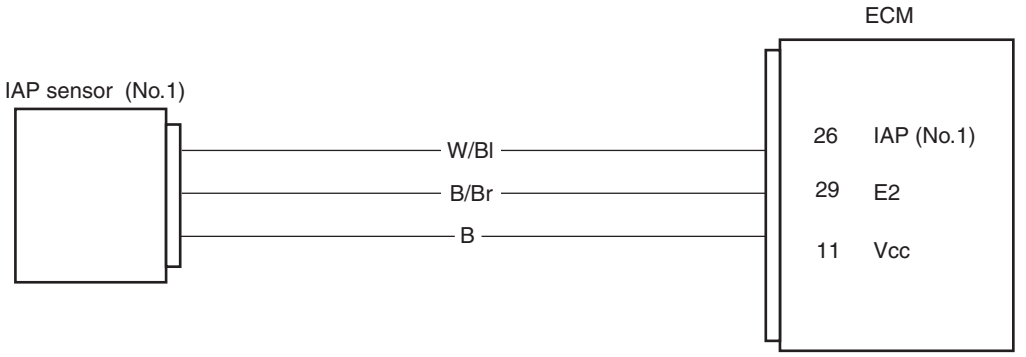
DTC “C13” (P0105-H/L): IAP Sensor (No.1) Circuit Malfunction

B718H11104012

Detected Condition and Possible Cause

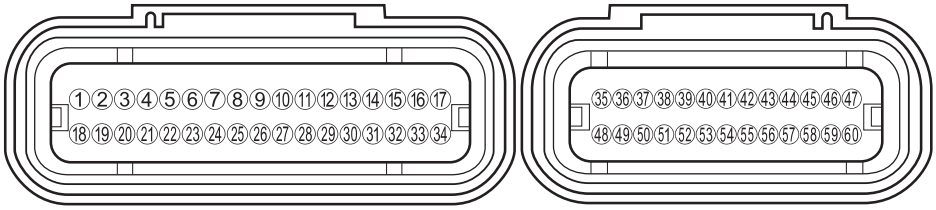
Detected Condition			Possible Cause
C13		IAP sensor (No.1) voltage is not within the following range. 0.5 V ≤ Sensor voltage < 4.85 V **NOTE** **Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.**	• Clogged vacuum passage between throttle body and IAP sensor (No.1). • Air being drawn from vacuum passage between throttle body and IAP sensor (No.1). • IAP sensor (No.1) circuit open or shorted to the ground. • IAP sensor (No.1) malfunction. • ECM malfunction.
P0105	H	Sensor voltage is higher than specified value.	• IAP sensor (No.1) circuit is open or shorted to Vcc or ground circuit open.
	L	Sensor voltage is lower than specified value.	• IAP sensor (No.1) circuit is shorted to the ground or Vcc circuit open.

Wiring Diagram



I718H1110017-08

ECM coupler (Harness side)



I718H1110240-01

Troubleshooting

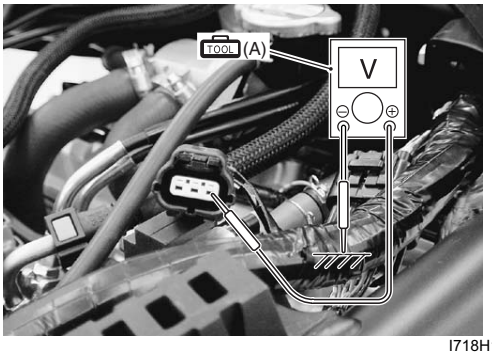
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

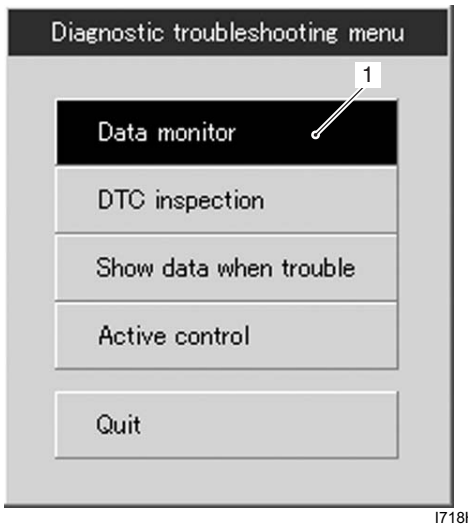
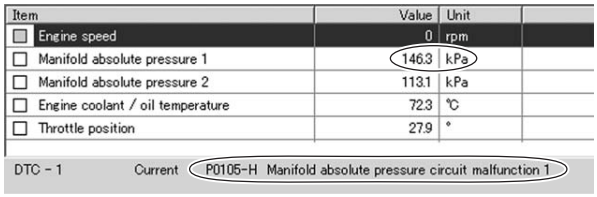
NOTE

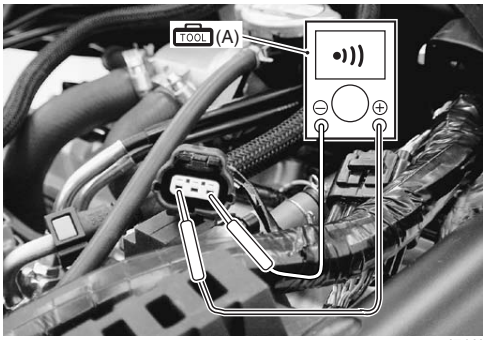
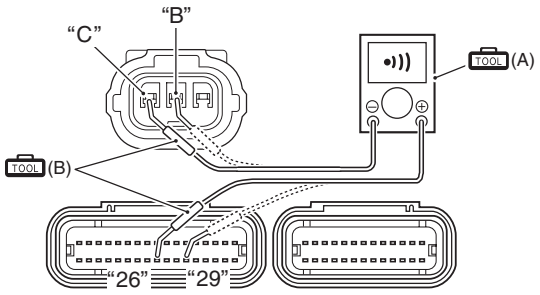
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

C13 for IAP sensor No.1 (Use of mode select switch)

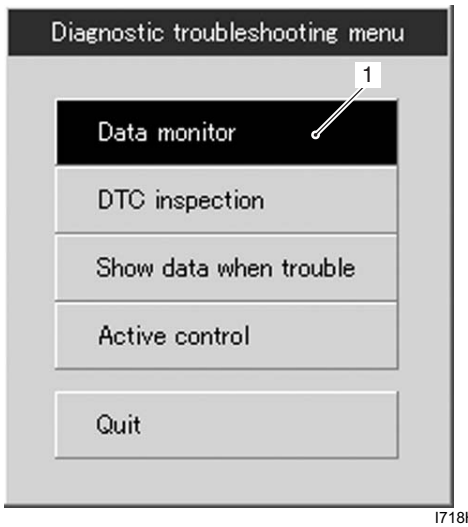
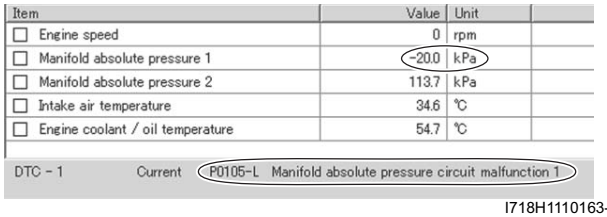
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”. 3) Check the IAP sensor coupler for loose or poor contacts. If OK, then measure the IAP sensor (No.1) input voltage.  I718H1110257-01 4) Disconnect the IAP sensor (No.1) coupler. 5) Turn the ignition switch ON. 6) Measure the voltage at the B wire and ground. If OK, then measure the voltage at the B wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **IAP sensor (No.1) input voltage** **4.5 – 5.5 V** **((+) terminal: B – (–) terminal: Ground, (+) terminal: B – (–) terminal: B/Br)**  I718H1110258-01 *Is the voltage OK?*	Go to Step 4.	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the B wire or B/Br wire.

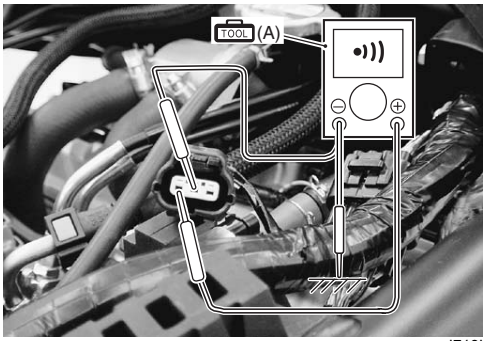
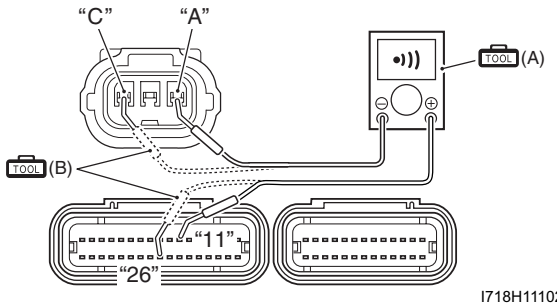
P0105-H for IAP sensor (No.1) (Use of SDS)

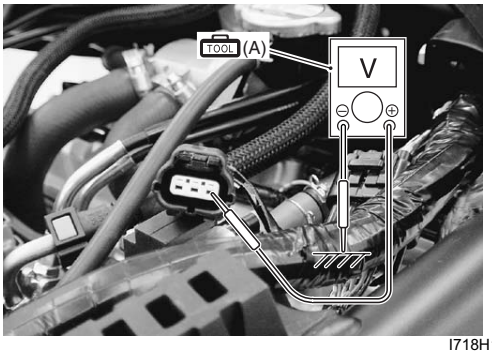
Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the manifold absolute pressure 1 data.  I718H1110161-02 *Approx. 146 kPa (1.46 kgf/cm^3, 21 psi) and more OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”. 3) Check the IAP sensor (No.1) coupler for loose or poor contacts. If OK, then check the IAP sensor (No.1) lead wire continuity.  I718H1110257-01	Go to Step 4.	W/Bl wire shorted to Vcc, or B/Br wire open.

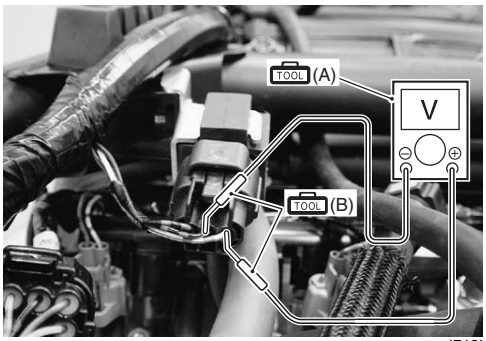
Step	Action	Yes	No
2	4) Disconnect the IAP sensor (No.1) coupler. 5) Check the continuity between the B wire and W/Bl wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•)))**  I718H1110259-01 6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Insert the needle pointed probes to the lead wire coupler. 8) Check the continuity between the W/Bl wire “C” and terminal “26”. If OK, then check the continuity between the B/Br wire “B” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))**  I718H1110024-03 *Is the continuity OK?*	Go to Step 4.	W/Bl wire shorted to Vcc, or B/Br wire open.

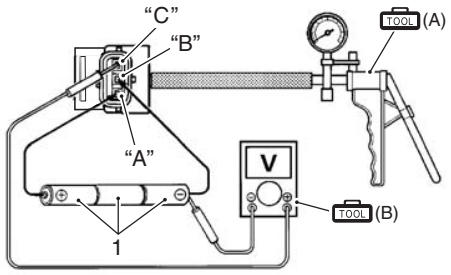
P0105-L for IAP sensor (No.1) (Use of SDS)

Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the manifold absolute pressure 1 data.  I718H1110163-02 *Approx. –20 kPa (–0.2 kgf/cm³, –2.8 psi) and less OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”. 3) Check the IAP sensor (No.1) coupler for loose or poor contacts. If OK, then check the IAP sensor (No.1) lead wire continuity.  I718H1110257-01	Go to Step 3.	R and W/Bl wire open, W/Bl wire shorted to the ground.

Step	Action	Yes	No
2	4) Disconnect the IAP sensor (No.1) coupler. 5) Check the continuity between the W/Bl wire and ground. Also, check the continuity between the W/Bl wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I718H1110260-02 6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Insert the needle pointed probes to the lead wire coupler. 8) Check the continuity between the B wire “A” and terminal “11”. Also, check the continuity between the W/Bl wire “C” and terminal “26”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))**  I718H1110241-01 *Is the continuity OK?*	Go to Step 3.	B and W/Bl wire open, W/Bl wire shorted to the ground.

Step	Action	Yes	No
3	1) Connect the ECM coupler. 2) Turn the ignition switch ON. 3) Measure the input voltage at the B wire and ground with the needle pointed probes. If OK, the measure the input voltage at the B wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **IAP sensor input voltage (No.1)** **4.5 – 5.5 V** **((+) terminal: B – (–) terminal: Ground,(+) terminal: B – (–) terminal: B/Br)**  I718H1110258-01 *Is the voltage OK?*	Go to Step 4.	Open or short circuit in the B wire or B/Br wire.

Step	Action	Yes	No
4	1) Turn the ignition switch OFF. 2) Connect the ECM coupler and IAP sensor (No.1) coupler. 3) Insert the needle pointed probes to the lead wire coupler. 4) Start the engine at idle speed and measure the IAP sensor (No.1) output voltage at the wire side coupler between the W/Bl wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **IAP sensor (No.1) output voltage** **Approx. 2.7 V at idle speed** **((+) terminal: W/Bl – (–) terminal: B/Br)**  I718H1110261-01 *Is the voltage OK?*	Go to Step 5.	• Check the vacuum hose for crack or damage. • Open or short circuit in the W/Bl wire. • If vacuum hose and wire is OK, replace the IAP sensor (No.1) with a new one. Refer to “IAP Sensor (No.1) Removal and Installation in Section 1C (Page 1C-2)”.

<table>
<tr><th>Step</th><th>Action</th><th>Yes</th><th>No</th></tr>
<tr>
<td>5</td>
<td>1) Turn the ignition switch OFF.
2) Remove the IAP sensor (No.1). Refer to “IAP Sensor (No.1) Removal and Installation in Section 1C (Page 1C-2)”.
3) Connect the vacuum pump gauge to the vacuum port of the IAP sensor (No.1).
4) Arrange 3 new 1.5 V batteries in series (1) (check that total voltage is 4.5 – 5.0 V) and connect (–) terminal to the ground terminal “B” and (+) terminal to the Vcc terminal “A”.
5) Check the voltage between Vout terminal “C” and ground. Also, check if voltage reduces when vacuum is applied by using vacuum pump gauge.
Special tool
TOOL (A): 09917–47011 (Vacuum pump gauge)
TOOL (B): 09900–25008 (Multi-circuit tester set)
<u>Tester knob indication</u>
Voltage (⎓)
 

I718H1110030-02
<table>
<tr><th colspan="2">ALTITUDE (Reference)</th><th colspan="2">ATOMOSPHERIC PRESSURE</th><th>OUTPUT VOLTAGE</th></tr>
<tr><th>ft</th><th>m</th><th>mmHg</th><th>kPa</th><th>V</th></tr>
<tr><td>0 – 2 000</td><td>0 – 610</td><td>760 – 707</td><td>100 – 94</td><td>3.4 – 4.0</td></tr>
<tr><td>2 001 – 5 000</td><td>611 – 1 524</td><td>707 – 634</td><td>94 – 85</td><td>3.0 – 3.7</td></tr>
<tr><td>5 001 – 8 000</td><td>1 525 – 2 438</td><td>634 – 567</td><td>85 – 76</td><td>2.6 – 3.4</td></tr>
<tr><td>8 001 – 10 000</td><td>2 439 – 3 048</td><td>567 – 526</td><td>76 – 70</td><td>2.4 – 3.1</td></tr>
</table>
I718H1110167-02
Is the voltage OK?</td>
<td>• B, W/Bl or B/Br wire open or shorted to the ground, or poor “11”, “26” or “29” connection.
• If wire and connection are OK, intermittent trouble or faulty ECM.
• Recheck each terminal and wire harness for open circuit and poor connection.
• Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.</td>
<td>If check result is not satisfactory, replace the IAP sensor (No.1) with a new one. Refer to “IAP Sensor (No.1) Removal and Installation in Section 1C (Page 1C-2)”.</td>
</tr>
</table>

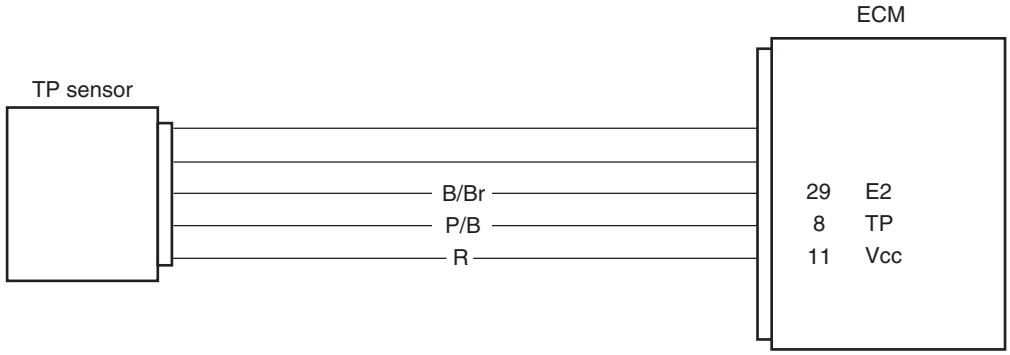
DTC “C14” (P0120-H/L): TP Sensor Circuit Malfunction

B718H11104013

Detected Condition and Possible Cause

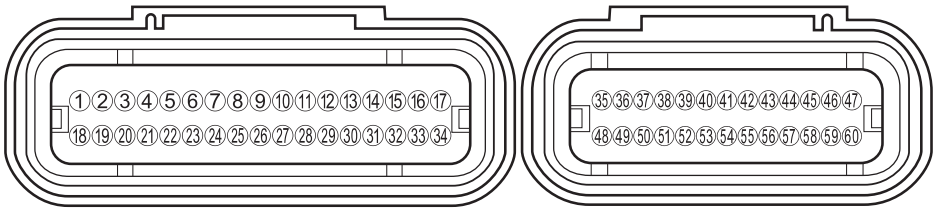
Detected Condition			Possible Cause
C14		Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.2 V ≤ Sensor voltage < 4.8 V	• TP sensor maladjusted. • TP sensor circuit open or short. • TP sensor malfunction. • ECM malfunction.
P0120	H	Sensor voltage is higher than specified value.	• TP sensor circuit is shorted to Vcc or ground circuit is open.
	L	Sensor voltage is lower than specified value.	• TP sensor circuit is open or shorted to the ground or Vcc circuit is open.

Wiring Diagram



I718H1110031-05

ECM coupler (Harness side)



I718H1110240-01

Troubleshooting

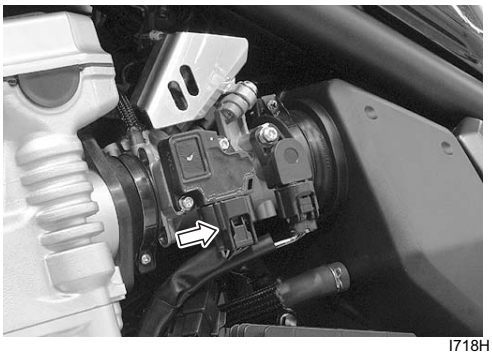
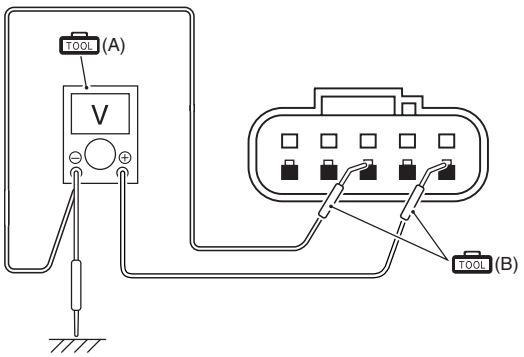
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

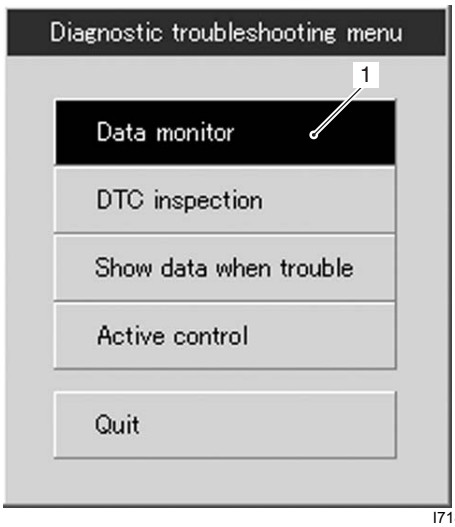
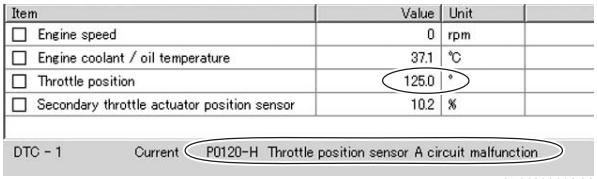
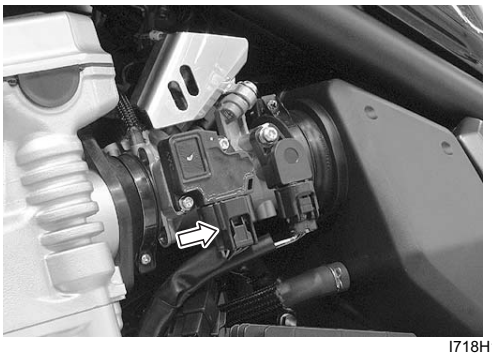
NOTE

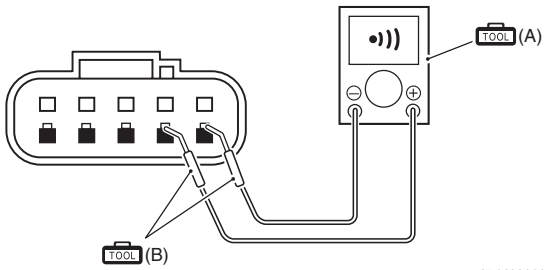
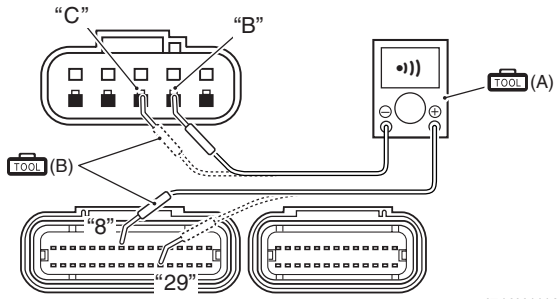
- **After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.**
- **TP sensor is incorporated in the IAP sensor/IAT sensor.**

C14 (Use of mode select switch)

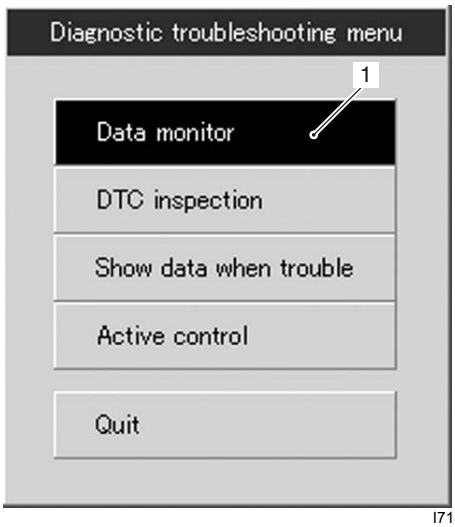
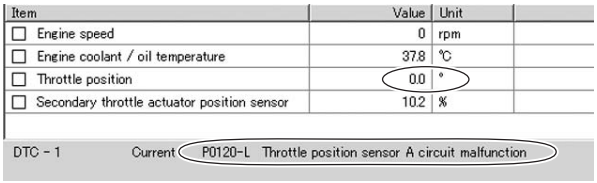
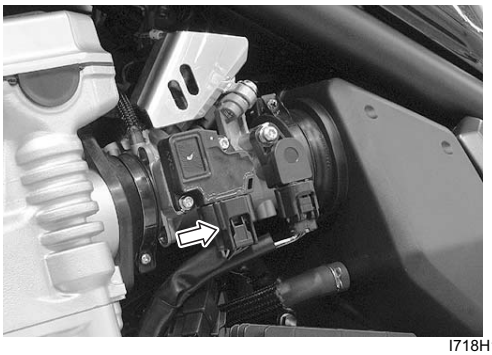
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Check the TP sensor coupler for loose or poor contacts. If OK, then measure the TP sensor input voltage.  I718H1110168-03 3) Disconnect the TP sensor coupler. 4) Turn the ignition switch ON. 5) Insert the needle pointed probes to the lead wire coupler. 6) Measure the input voltage at the R wire and ground. If OK, then measure the input voltage at the R wire and B/Br wire. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **TP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I718H1110035-03 *Is the voltage OK?*	Go to Step 4.	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the R or B/Br wire.

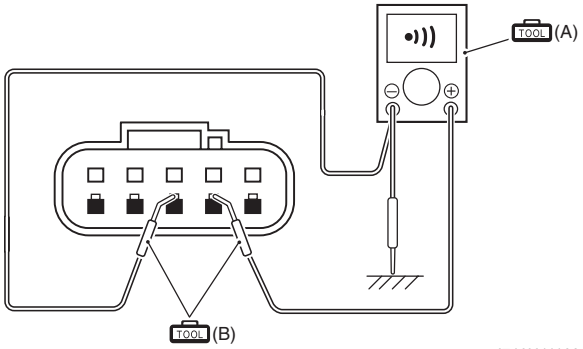
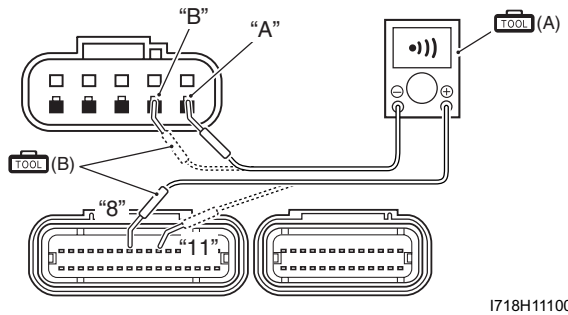
P0120-H (Use of SDS)

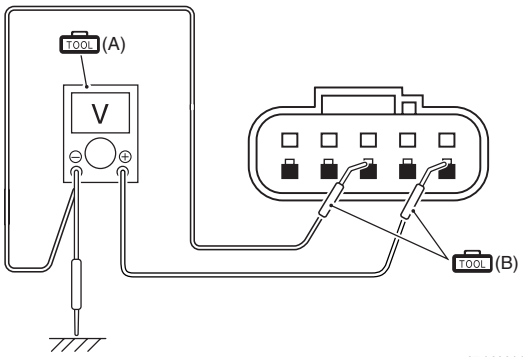
Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the throttle position data.  I718H1110169-01 *Throttle position approx. 125° and more OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Check the TP sensor coupler for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.  I718H1110168-03 3) Disconnect the TP sensor coupler.	Go to Step 4.	P/B wire shorted to Vcc, or B/Br wire open.

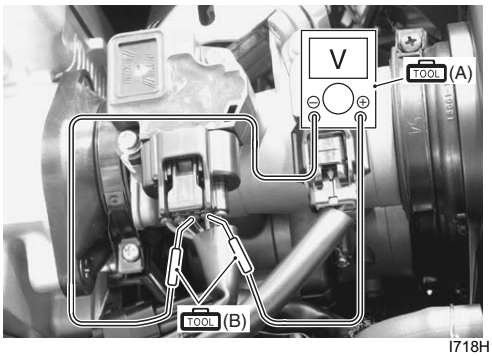
Step	Action	Yes	No
2	4) Insert the needle pointed probes to the lead wire coupler. 5) Check the continuity between the P/B wire and R wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))**  I718H1110170-02 6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Check the continuity between the P/B wire “B” and terminal “8”. Also, check the continuity between the B/Br wire “C” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))**  I718H1110171-02 *Is the continuity OK?*	Go to Step 4.	P/B wire shorted to Vcc, or B/Br wire open.

P0120-L (Use of SDS)

Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the throttle position data.  I718H1110172-01 *Throttle position approx. 0° OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Check the TP sensor coupler for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.  I718H1110168-03 3) Disconnect the TP sensor coupler. 4) Insert the needle pointed probes to the lead wire coupler.	Go to Step 3.	R and P/B wire open, or P/B wire shorted to the ground.

Step	Action	Yes	No
2	5) Check the continuity between the P/B wire and ground. Also, check the continuity between the P/B wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•))))**  I718H1110040-03 6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Check the continuity between the P/B wire “B” and terminal “8”. Also, check the continuity between the R wire “A” and terminal “11”. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)**  I718H1110041-03 *Is the continuity OK?*	Go to Step 3.	R and P/B wire open, or P/B wire shorted to the ground.

Step	Action	Yes	No
3	1) Connect the ECM coupler. 2) Turn the ignition switch ON. 3) Measure the input voltage at the R wire and ground. If OK, the measure the input voltage at the R and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **TP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I718H1110035-03 *Is the voltage OK?*	Turn the ignition switch OFF and go to Step 4.	Open or short circuit in the R or B/Br wire.

Step	Action	Yes	No
4	1) Turn the ignition switch OFF. 2) Connect the ECM coupler and TP sensor coupler. 3) Insert the needle pointed probes to the lead wire coupler. 4) Turn the ignition switch ON. 5) Measure the TP sensor output voltage at the P/B wire and B/Br wire by turning the throttle grip. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **TP sensor output voltage** **Throttle valve is closed: Approx. 1.1 V** **Throttle valve is opened: Approx. 4.3 V** **((+) terminal: P/B – (–) terminal: B/Br)**  I718H1110173-03 *Is the voltage OK?*	• P/B, R or B/Br wire open or shorted to the ground, or poor “8”, “11” or “29” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	If check result is not satisfactory, replace TP sensor with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

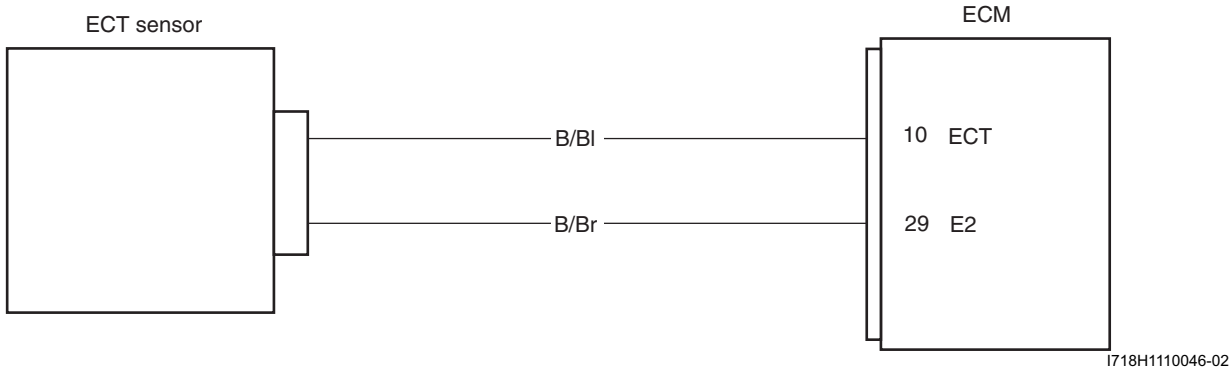
DTC “C15” (P0115-H/L): ECT Sensor Circuit Malfunction

B718H11104014

Detected Condition and Possible Cause

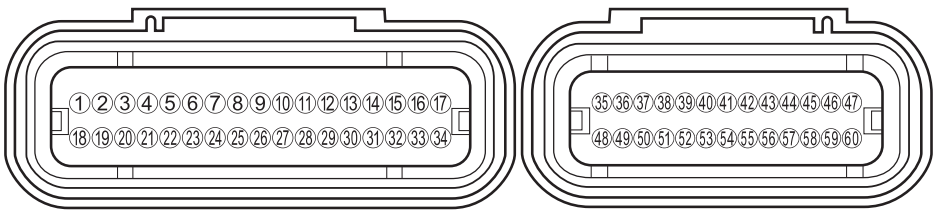
Detected Condition			Possible Cause
C15		Output voltage is not with in the following range. 0.15 V ≤ Sensor voltage < 4.85 V	• ECT sensor circuit open or short. • ECT sensor malfunction. • ECM malfunction.
P0115	H	Sensor voltage is higher than specified value.	• ECT sensor circuit is open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• ECT sensor circuit shorted to the ground.

Wiring Diagram



I718H1110046-02

ECM coupler (Harness side)



I718H1110240-01

Troubleshooting

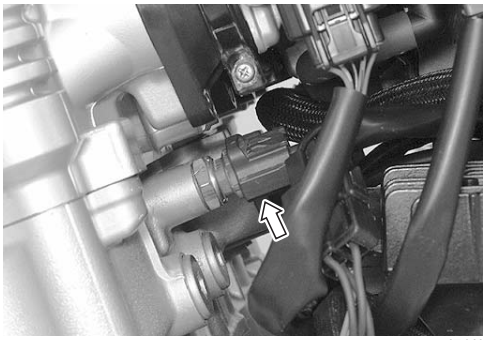
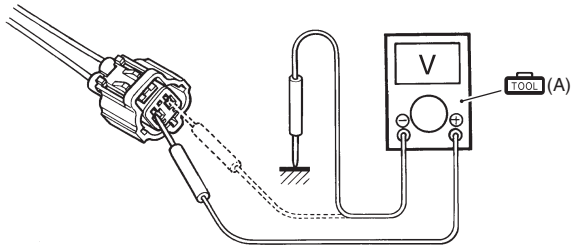
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

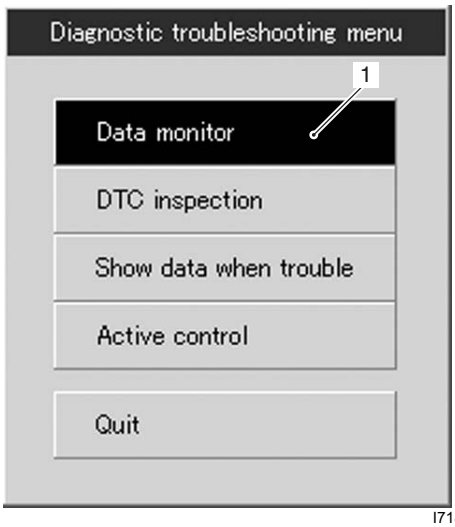
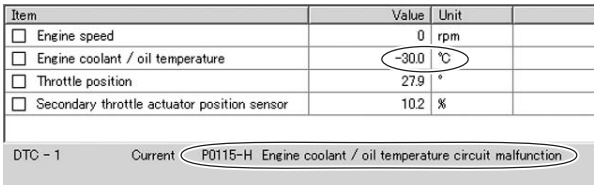
NOTE

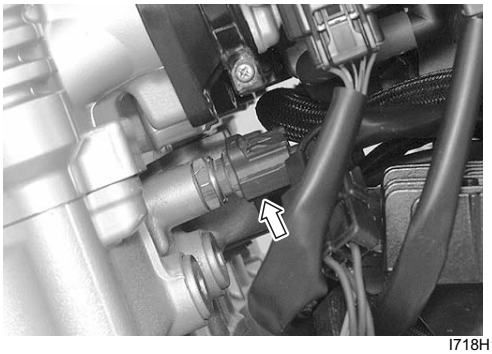
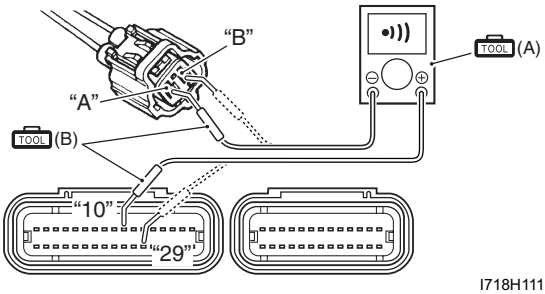
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

C15 (Use of mode select switch)

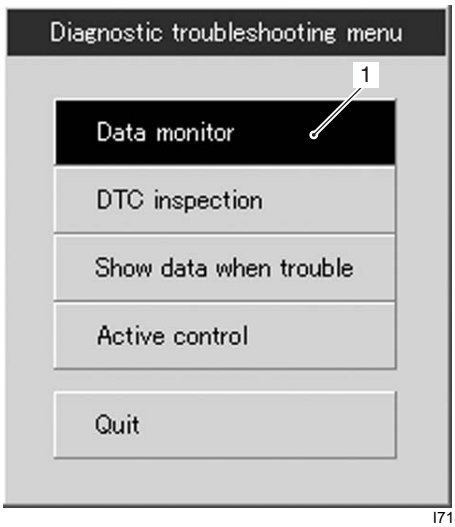
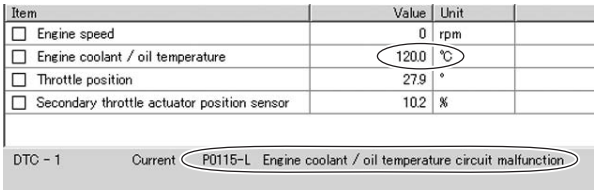
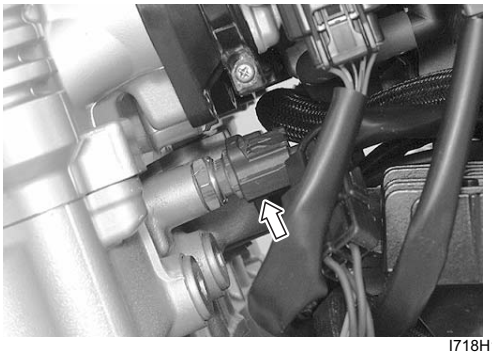
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Check the ECT sensor coupler for loose or poor contacts. If OK, then measure the ECT sensor input voltage at the wire side coupler.  I718H1110174-02 3) Disconnect the coupler and turn the ignition switch ON. 4) Measure the input voltage between the B/Bl wire terminal and ground. If OK, then measure the input voltage between the B/Bl wire terminal and B/Br wire terminal. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **ECT sensor input voltage** **4.5 – 5.5 V** **((+) terminal: B/Bl – (–) terminal: Ground, (+) terminal: B/Bl – (–) terminal: B/Br)**  I718H1110048-03 *Is the voltage OK?*	Go to Step 3.	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the B/Bl or B/Br wire.

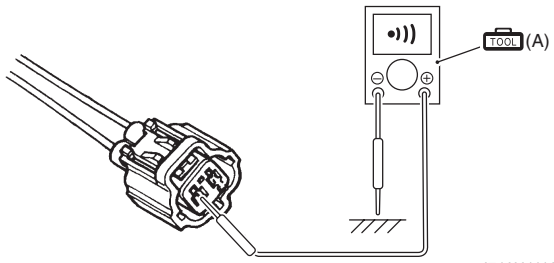
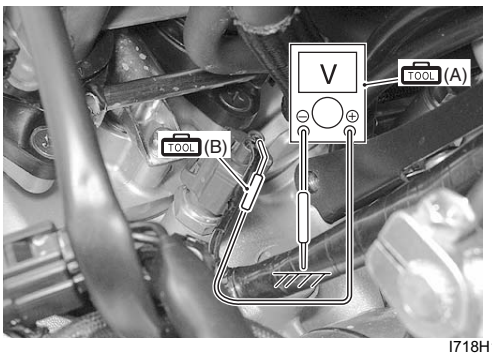
P0115-H (Use of SDS)

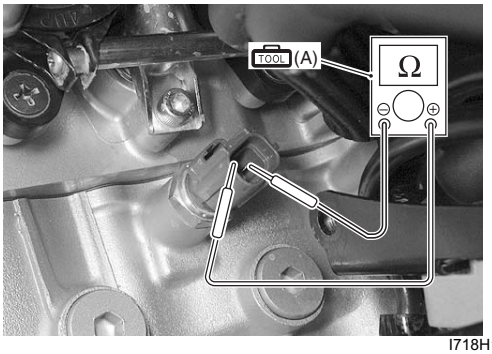
Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the engine coolant/oil temperature data.  I718H1110175-01 *Approx. –30 °C (–22 °F) and less OK?*	Go to Step 2.	Go to Step 3.

Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Check the ECT sensor coupler for loose or poor contacts. If OK, then check the ECT sensor lead wire continuity.  I718H1110174-02 3) Disconnect the ECT coupler. 4) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Insert the needle pointed probes to the lead wire coupler. 6) Check the continuity between the B/Bl wire “A” and terminal “10”. Also, check the continuity between the B/Br wire “B” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•))))**  I718H1110051-02 *Is the continuity OK?*	Go to Step 3.	B/Bl or B/Br wire open.

P0115-L (Use of SDS)

Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the engine coolant/oil temperature data.  I718H1110176-01 *Approx. 120 °C (248 °F) and more OK?*	Go to Step 2.	Go to Step 3.
2	1) Turn the ignition switch OFF. 2) Check the ECT sensor coupler for loose or poor contacts. If OK, then check the ECT sensor lead wire.  I718H1110174-02 3) Disconnect the ECT sensor coupler.	Go to Step 3.	• B/Bl wire shorted to the ground. • If wire is OK, go to Step 3.

Step	Action	Yes	No
2	4) Check the continuity between the B/Bl wire and ground. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity test (•))))**  I718H1110054-03 5) Connect the ECT sensor coupler. 6) Remove the regulator/rectifier. Refer to “Regulator / Rectifier Inspection in Section 1J (Page 1J-8)”. 7) Insert the needle pointed probes to the lead wire coupler. 8) Turn the ignition switch ON. 9) Measure the output voltage between the B/Bl wire and ground. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **ECT sensor output voltage** **0.15 – 4.85 V** **((+) terminal: B/Bl – (–) terminal: Ground)**  I718H1110177-05 *Are the continuity and voltage OK?*	Go to Step 3.	• B/Bl wire shorted to the ground. • If wire is OK, go to Step 3.

Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Connect the ECM coupler. 3) Remove the regulator/rectifier. Refer to “Regulator / Rectifier Inspection in Section 1J (Page 1J-8)”. 4) Disconnect the ECT sensor coupler. 5) Measure the ECT sensor resistance. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **ECT sensor resistance** **Approx. 2.45 kΩ at 20 °C (68 °F)** **(Terminal – Terminal)**  I718H1110178-03 **NOTE** **Refer to “ECT Sensor Inspection in Section 1C (Page 1C-3)” for details.** *Is the resistance OK?*	• B/Bl or B/Br wire open or shorted to the ground, or poor “10” or “29” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the ECT sensor with a new one. Refer to “ECT Sensor Removal and Installation in Section 1C (Page 1C-2)”.

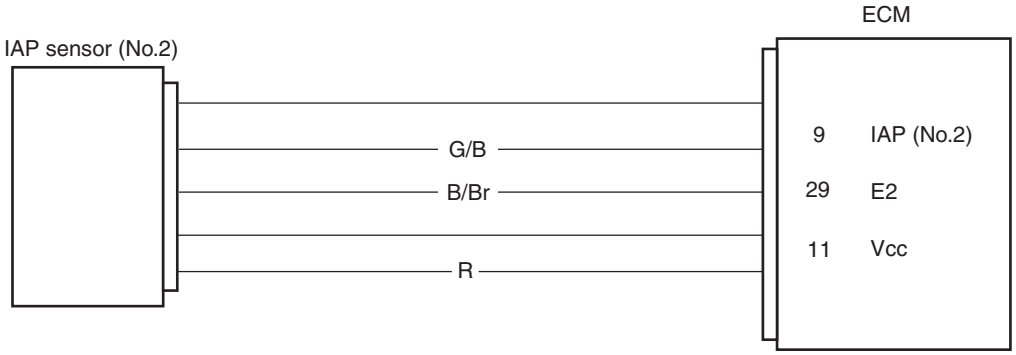
DTC “C17” (P1750-H/L): IAP Sensor (No.2) Circuit Malfunction

B718H11104030

Detected Condition and Possible Cause

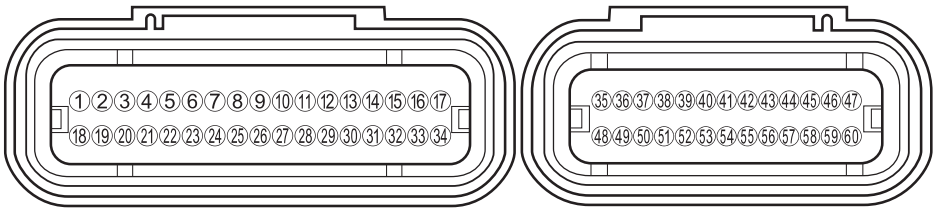
Detected Condition			Possible Cause
C17		IAP sensor (No.2) voltage is not within the following range. 0.5 V ≤ Sensor voltage < 4.85 V **NOTE** **Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.**	• Clogged vacuum passage. • IAP sensor (No.2) circuit open or shorted to the ground. • IAP sensor (No.2) malfunction. • ECM malfunction.
P1750	H	Sensor voltage is higher than specified value.	• IAP sensor (No.2) circuit is open or shorted to Vcc or ground circuit open.
	L	Sensor voltage is lower than specified value.	• IAP sensor (No.2) circuit is shorted to the ground or Vcc circuit open.
C17/P1750		When the sensor has unfastened (or being unfastened) from the throttle body or the pressure variation (voltage variation) cannot be detected, this malfunction code is output.	• Loosen the IAP sensor (No.2) mounting. • IAP sensor (No.2) malfunction.

Wiring Diagram



I718H1110179-04

ECM coupler (Harness side)



I718H1110240-01

Troubleshooting

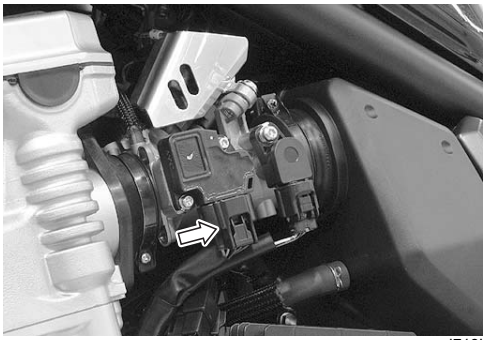
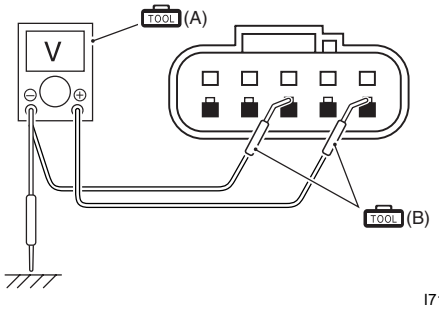
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

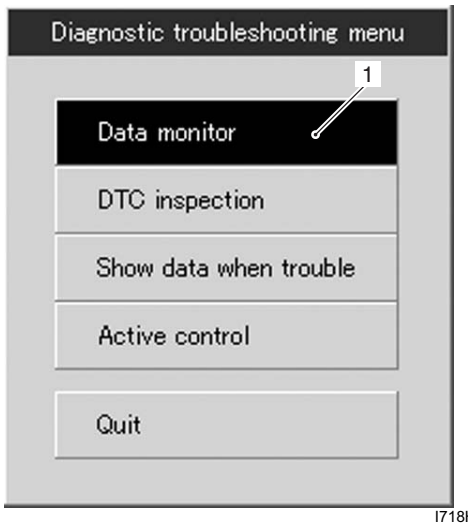
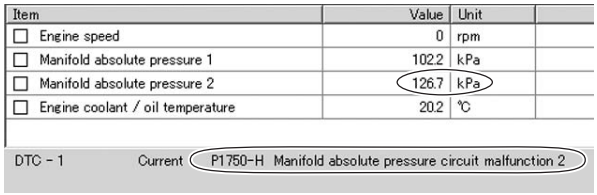
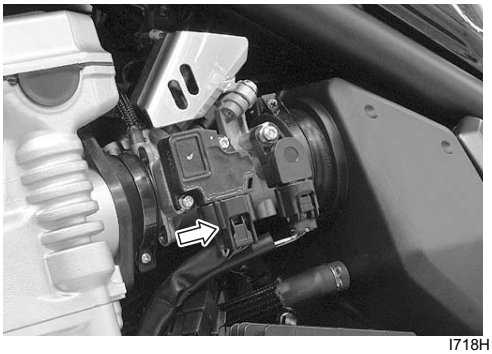
NOTE

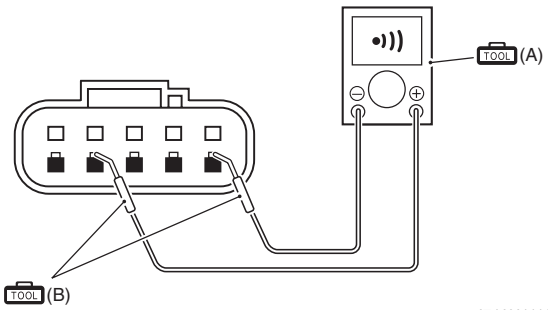
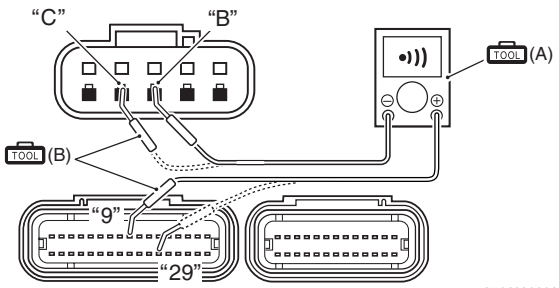
- **After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures (Page 1A-13)".**
- **IAP sensor (No.2) is incorporated in the TP sensor/IAT sensor.**

C17 for IAP sensor No.2 (Use of mode select switch)

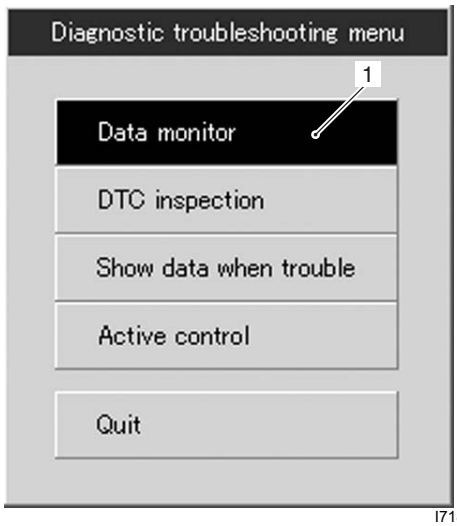
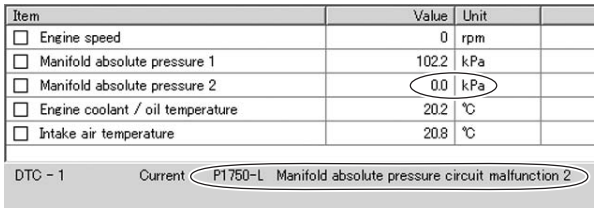
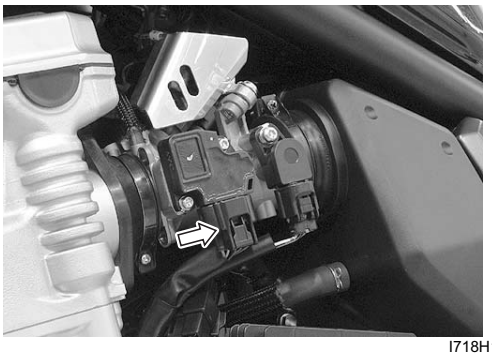
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Check the IAP sensor (No.2) coupler for loose or poor contacts. If OK, then measure the IAP sensor (No.2) input voltage.  I718H1110168-03 3) Disconnect the IAP sensor (No.2) coupler. 4) Turn the ignition switch ON. 5) Insert the needle pointed probes to the lead wire coupler. 6) Measure the voltage at the R wire and ground. If OK, then measure the voltage at the R wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **IAP sensor (No.2) input voltage** **4.5 – 5.5 V** **((+) terminal: B – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I718H1110180-03 *Is the voltage OK?*	Go to Step 4 (or P1750 for IAP sensor No.2 (Use of SDS)).	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the R or B/Br wire.

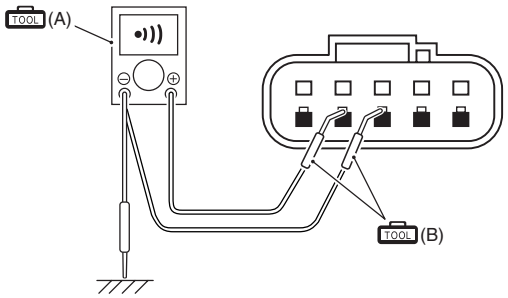
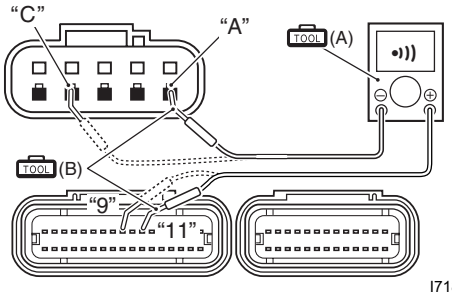
P1750-H for IAP sensor No.2 (Use of SDS)

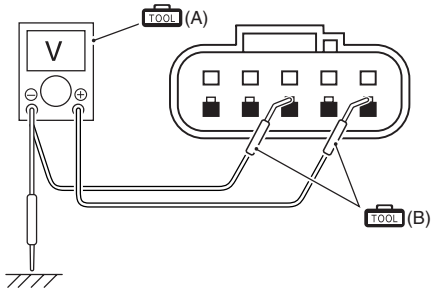
Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the manifold absolute pressure 2 data.  I718H1110181-03 *Approx. 126 kPa (1.26 kgf/cm^3, 18 psi) and more OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”. 3) Check the IAP sensor (No.2) coupler for loose or poor contacts. If OK, then check the IAP sensor (No.2) lead wire continuity.  I718H1110168-03 4) Disconnect the IAP sensor (No.2) coupler. 5) Insert the needle pointed probes to the lead wire coupler.	Go to Step 4.	W/Bl wire shorted to Vcc, or B/Br wire open.

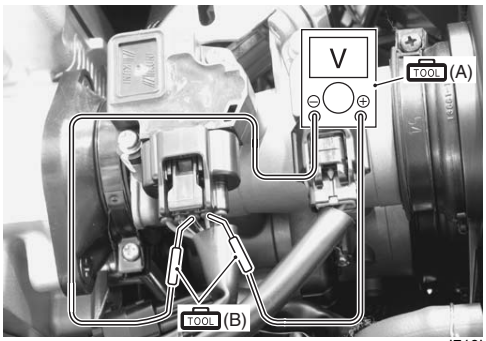
Step	Action	Yes	No
2	6) Check the continuity between the R and G/B wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I718H1110023-03 7) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 8) Check the continuity between the G/B wire “C” and terminal “9”. If OK, then check the continuity between the B/Br wire “B” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))**  I718H1110182-02 *Is the continuity OK?*	Go to Step 4.	W/Bl wire shorted to Vcc, or B/Br wire open.

P1750-L for IAP sensor No.2 (Use of SDS)

Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the manifold absolute pressure 2 data.  I718H1110183-02 *Approx. 0 kPa (0 kgf/cm^3, 0 psi) and less OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Check the IAP sensor (No.2) coupler for loose or poor contacts. If OK, then check the IAP sensor (No.2) lead wire continuity.  I718H1110168-03	Go to Step 3.	R and G/B wire open, W/Bl wire shorted to the ground.

Step	Action	Yes	No
2	3) Disconnect the IAP sensor (No.2) coupler. 4) Insert the needle pointed probes to the lead wire coupler. 5) Check the continuity between the G/B wire and ground. Also, check the continuity between the G/B wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I718H1110027-04 6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Check the continuity between the R wire “A” and terminal “11”. Also, check the continuity between the G/B wire “C” and terminal “9”. **Tester knob indication** **Continuity (•)))**  I718H1110028-03 *Is the continuity OK?*	Go to Step 3.	R and G/B wire open, W/Bl wire shorted to the ground.

Step	Action	Yes	No
3	1) Connect the ECM coupler. 2) Turn the ignition switch ON. 3) Insert the needle pointed probes to the lead wire coupler. 4) Measure the input voltage at the R wire and ground with the needle pointed probes. If OK, the measure the input voltage at the R wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **IAP sensor (No.2) input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I718H1110180-03 *Is the voltage OK?*	Go to Step 4.	Open or short circuit in the R wire or B/Br wire.

Step	Action	Yes	No
4	1) Turn the ignition switch OFF. 2) Connect the ECM coupler and IAP sensor (No.2) coupler. 3) Insert the needle pointed probes to the lead wire coupler. 4) Starter the engine at idle speed and measure the IAP sensor (No.2) output voltage at the wire side coupler between G/B wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **IAP sensor (No.2) output voltage** **2.0 – 3.0 V at idle speed** **((+) terminal: G/Bl – (–) terminal: B/Br)**  I718H1110173-03 *Is the voltage OK?*	• G/B, R or B/Br wire open or shorted to the ground, or poor “9”, “11” or “29” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	• Open or short circuit in the G/B wire. • If wire is OK, replace the IAP sensor (No.2) with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

P1750 for IAP sensor No.2 (Use of SDS)

Step	Action	Yes	No
1	1) Check the IAP sensor (No.2) is installed securely on the throttle body.  I718H1110242-02 *Is the IAP sensor (No.2) installed securely?*	Intermittent trouble.	• Retighten the IAP sensor (No.2). • Replace the IAP sensor (No.2) with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

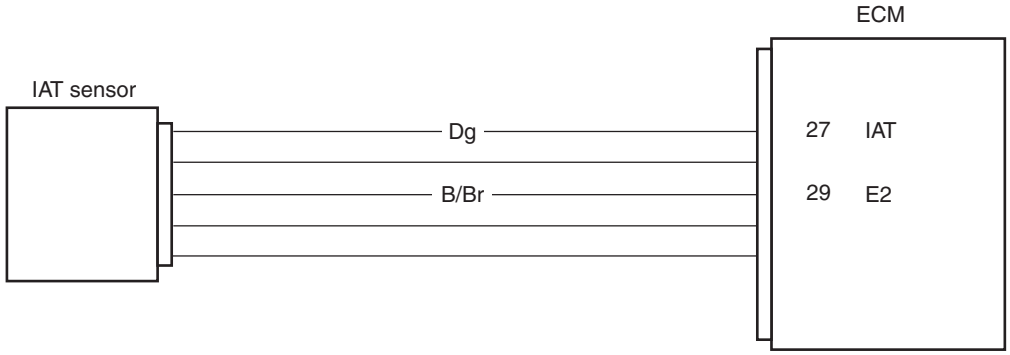
DTC “C21” (P0110-H/L): IAT Sensor Circuit Malfunction

B718H11104015

Detected Condition and Possible Cause

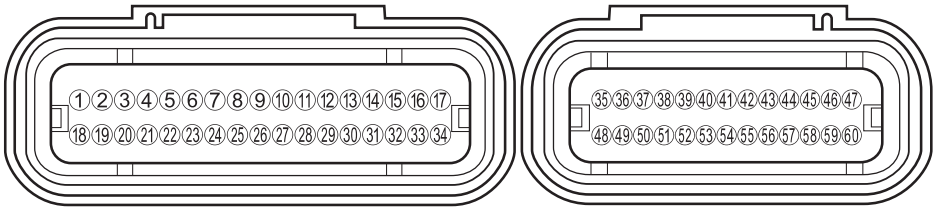
Detected Condition			Possible Cause
C21		Output voltage is not with in the following range. 0.15 V ≤ Sensor voltage < 4.85 V	• IAT sensor circuit open or short. • IAT sensor malfunction. • ECM malfunction.
P0110	H	Sensor voltage is higher than specified value.	• IAT sensor circuit open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• IAT sensor circuit shorted to the ground.

Wiring Diagram



I718H1110056-04

ECM coupler (Harness side)



I718H1110240-01

Troubleshooting

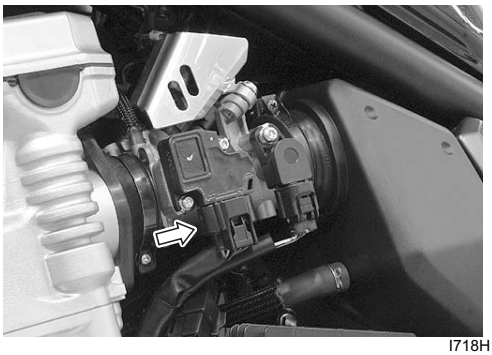
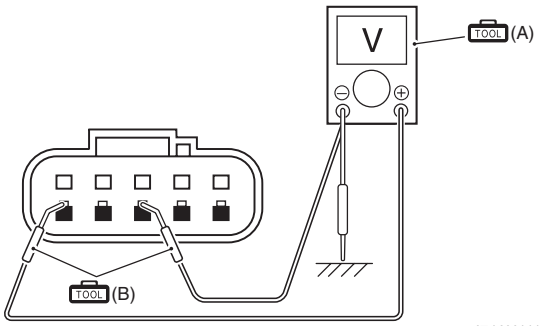
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

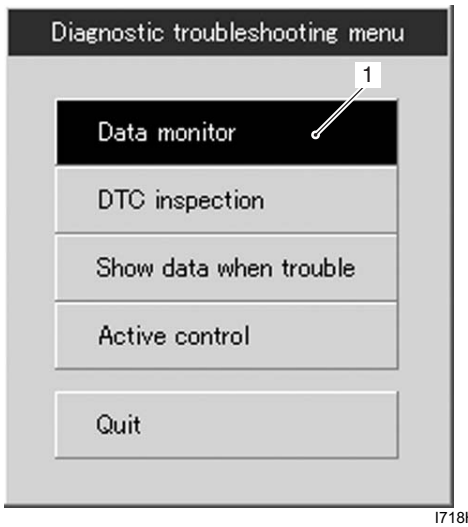
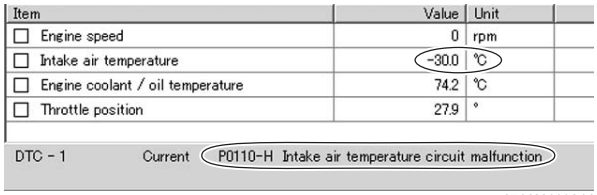
NOTE

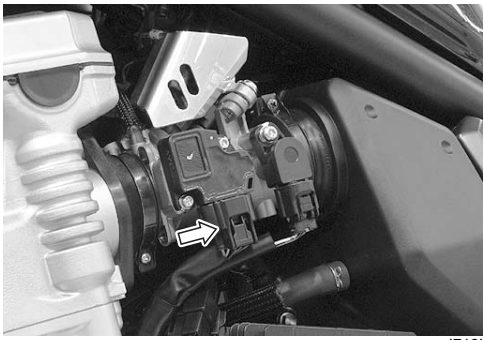
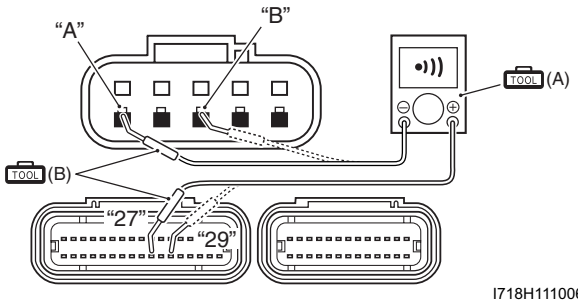
- **After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.**
- **IAT sensor is incorporated in the IAP sensor/TP sensor.**

C21 (Use of mode select switch)

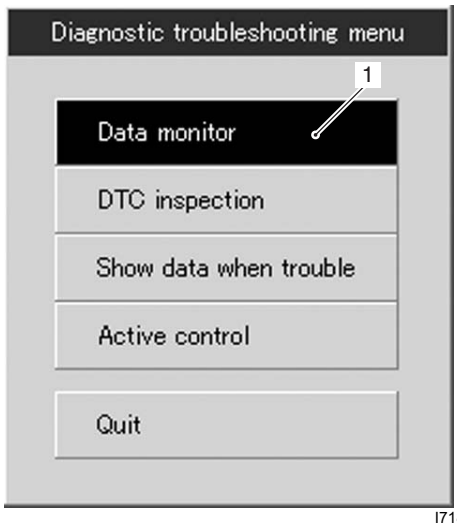
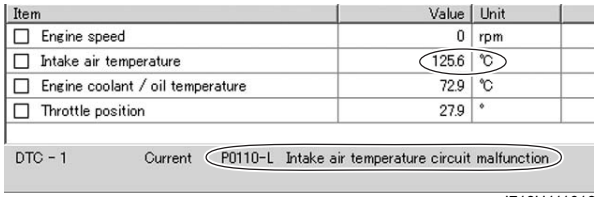
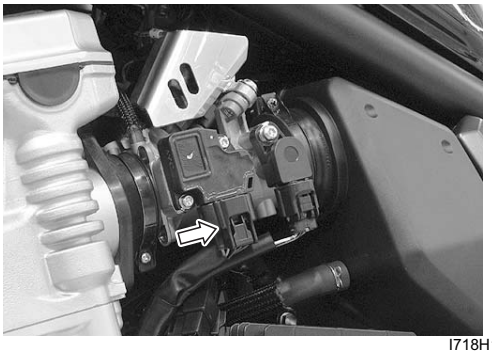
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Check the IAT sensor coupler for loose or poor contacts. If OK, then measure the IAT sensor input voltage.  I718H1110252-02 3) Disconnect the IAT sensor coupler and turn the ignition switch ON. 4) Insert the needle pointed probes to the lead wire coupler. 5) Measure the voltage between the Dg wire terminal and ground. If OK, then measure the input voltage between the Dg wire terminal and B/Br wire terminal. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **IAT sensor input voltage** **4.5 – 5.5 V** **((+) terminal: Dg – (–) terminal: Ground, (+) terminal: Dg – (–) terminal: B/Br)**  I718H1110057-04 *Is the voltage OK?*	Go to Step 3.	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the Dg or B/Br wire.

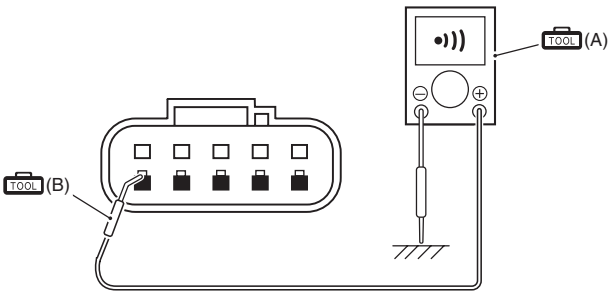
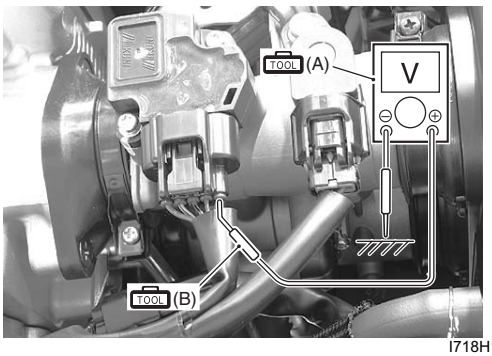
P0110-H (Use of SDS)

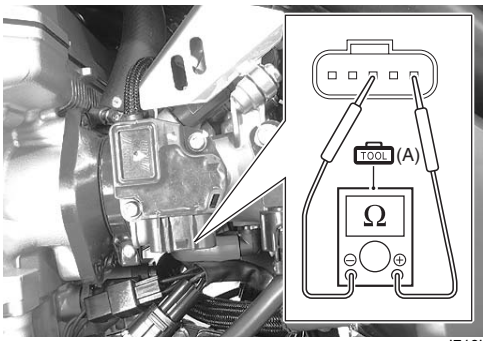
Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the intake air temperature data.  I718H1110184-02 *Approx. –30 °C (–22 °F) and less OK?*	Go to Step 2.	Go to Step 3.

Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Check the IAT sensor coupler for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.  I718H1110168-03 3) Disconnect the IAT sensor coupler. 4) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Insert the needle pointed probes to the lead wire coupler. 6) Check the continuity between the Dg wire “B” and terminal “27”. Also, check the continuity between the B/Br wire “A” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))**  I718H1110060-03 *Is the continuity OK?*	Connect the ECM coupler and go to Step 3.	Dg or B/Br wire open.

P0110-L (Use of SDS)

Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the intake air temperature data.  I718H1110185-02 *Approx. 125 ℃ (257 ℉) and more OK?*	Go to Step 2.	Go to Step 3.
2	1) Turn the ignition switch OFF. 2) Check the IAT sensor coupler for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.  I718H1110168-03 3) Disconnect the IAT sensor coupler.	Go to Step 3.	• Dg wire shorted to the ground. • If wire is OK, go to Step 3.

Step	Action	Yes	No
2	4) Insert the needle pointed probes to the lead wire coupler. 5) Check the continuity between the Dg wire and ground. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•))))**  I718H1110063-03 6) Connect the IAT sensor coupler. 7) Turn the ignition switch ON. 8) Insert the needle pointed probes to the lead wire coupler. 9) Measure the output voltage between the Dg wire and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **IAT sensor output voltage** **2.4 V at 23 °C (68 °F)** **((+) terminal: Dg – (–) terminal: Ground)**  I718H1110238-03 *Are the continuity and voltage OK?*	Go to Step 3.	• Dg wire shorted to the ground. • If wire is OK, go to Step 3.

Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Disconnect the IAT sensor coupler. 3) Measure the IAT sensor resistance. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **IAT sensor resistance** **Approx. 2.56 kΩ at 20 °C (68 °F)** **(Terminal – Terminal)**  I718H1110186-02 *Is the resistance OK?*	• Dg or B/Br wire open or shorted to the ground, or poor “27” or “29” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the IAT sensor with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

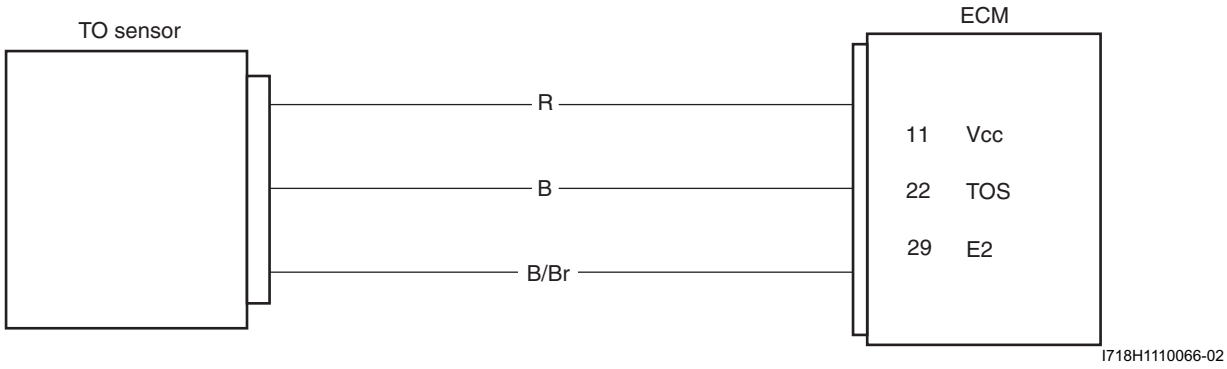
DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction

B718H11104016

Detected Condition and Possible Cause

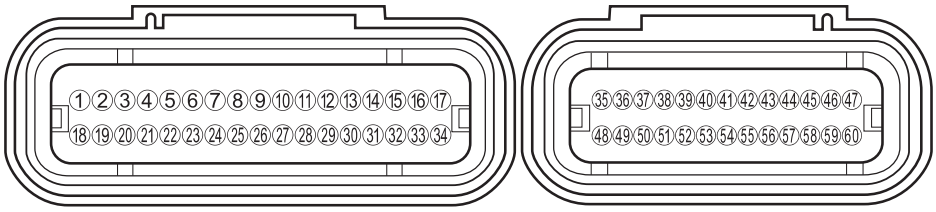
Detected Condition			Possible Cause
C23		The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 V ≤ Sensor voltage < 4.8 V	• IAT sensor circuit open or short. • IAT sensor malfunction. • ECM malfunction.
P1651	H	Sensor voltage is higher than specified value.	• IAT sensor circuit open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• IAT sensor circuit shorted to the ground.

Wiring Diagram



I718H1110066-02

ECM coupler (Harness side)



I718H1110240-01

Troubleshooting

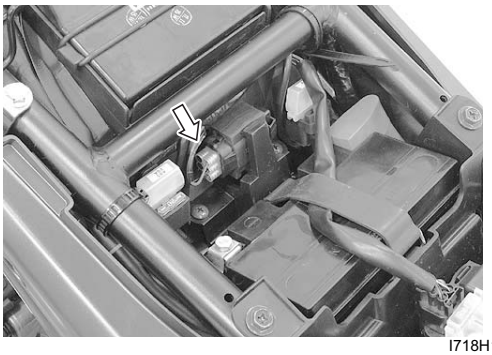
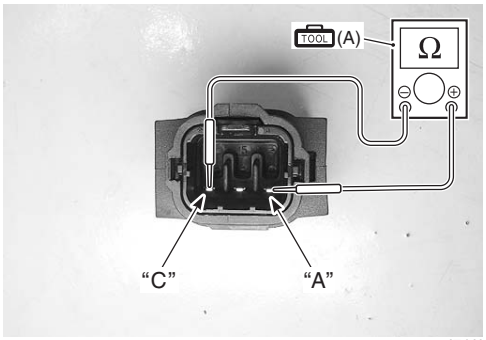
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

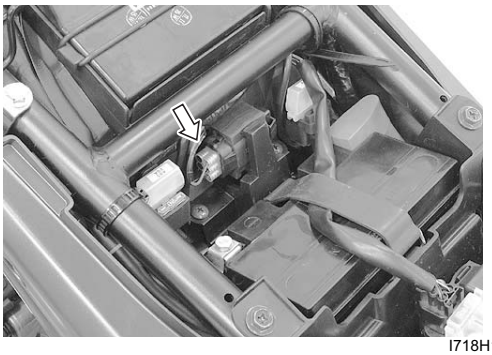
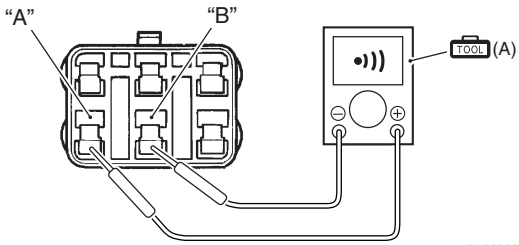
NOTE

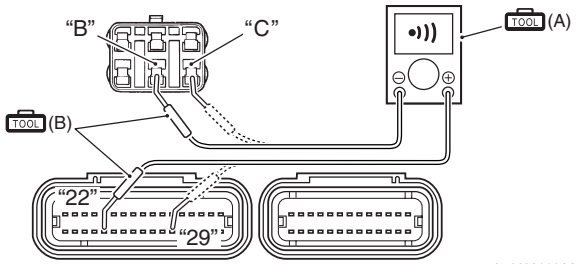
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

C23 (Use of mode select switch)

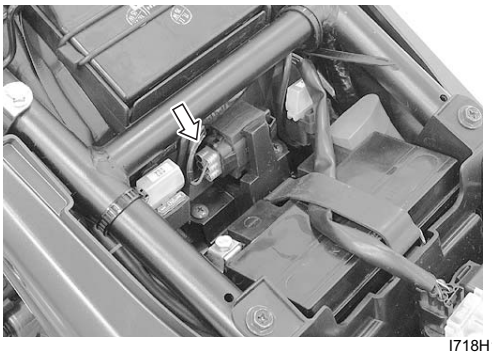
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the TO sensor coupler for loose or poor contacts. If OK, then measure the TO sensor resistance.  I718H1110187-02 4) Disconnect the TO sensor coupler and dismount the TO sensor. Refer to “TO Sensor Removal and Installation in Section 1C (Page 1C-3)”. 5) Measure the resistance between terminal “A” and terminal “C”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TO sensor resistance** **16.5 – 22.3 kΩ** **(Terminal “A” – Terminal “C”)** **Tester knob indication** **Resistance (Ω)**  I718H1110188-02 *Is the resistance OK?*	Go to Step 2.	Replace the TO sensor with a new one. Refer to “TO Sensor Removal and Installation in Section 1C (Page 1C-3)”.

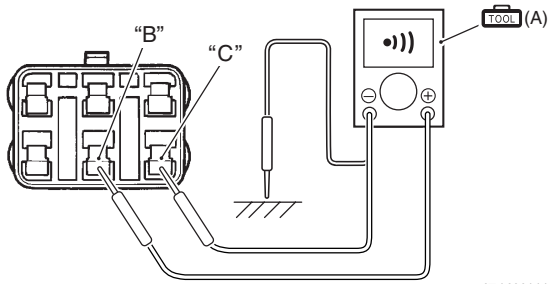
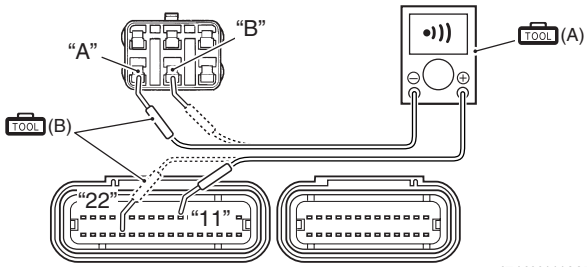
P1651-H (Use of SDS)

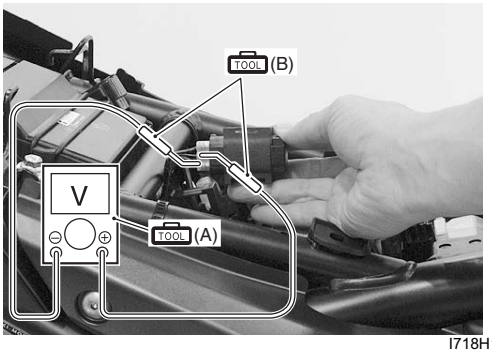
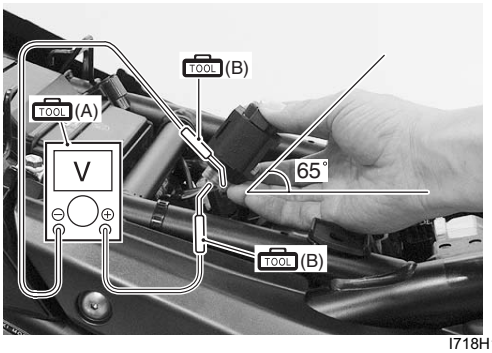
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the TO sensor coupler for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.  I718H1110187-02 4) Disconnect the TO sensor coupler. 5) Check the continuity between the R wire “A” and B wire “B”. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity test (•)))**  I718H1110070-02 6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Insert the needle pointed probes to the lead wire coupler.	Go to Step 2.	B wire shorted to Vcc, or B/Br wire open.

Step	Action	Yes	No
1	8) Check the continuity between the B wire “B” and terminal “22”. Also, check the continuity between B/Br wire “C” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•))))**  I718H1110071-02 *Is the continuity OK?*	Go to Step 2.	B wire shorted to Vcc, or B/Br wire open.

P1651-L (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the TO sensor coupler for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.  I718H1110187-02	Go to Step 2.	R or B wire open, or B wire shorted to the ground.

Step	Action	Yes	No
1	4) Disconnect the TO sensor coupler. 5) Check the continuity between the B wire “B” and ground. Also, check the continuity between the B wire “B” and B/Br wire “C”. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity test (•)))**  I718H1110073-02 6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Insert the needle pointed probes to the lead wire coupler. 8) Check the continuity between the R wire “A” and terminal “11”. Also, then check the continuity between B wire “B” and terminal “22”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))**  I718H1110074-02 *Is the continuity OK?*	Go to Step 2.	R or B wire open, or B wire shorted to the ground.

Step	Action	Yes	No
2	1) Connect the ECM coupler and TO sensor coupler. 2) Dismount the TO sensor from its bracket. Refer to "TO Sensor Removal and Installation in Section 1C (Page 1C-3)". 3) Insert the needle pointed probes to the lead wire coupler. 4) Turn the ignition switch ON. 5) Measure the voltage at the wire side coupler between B and B/Br wire. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **TO sensor voltage (Normal)** **0.4 – 1.4 V** **((+) terminal: B – (–) terminal: B/Br)**  I718H1110189-03 6) Measure the voltage when it is leaned 65° and more to left and right, from the horizontal level. **TO sensor voltage (Leaning)** **3.7 – 4.4 V** **((+) terminal: B – (–) terminal: B/Br)**  I718H1110190-03 *Is the voltage OK?*	• R, B or B/Br wire open or shorted to the ground, or poor "11", "22" or "29" connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation in Section 1C (Page 1C-1)".	• Loosen or poor contacts on the ECM coupler. • Open or short circuit. • Replace the TO sensor with a new one. Refer to "TO Sensor Removal and Installation in Section 1C (Page 1C-3)".

DTC “C24” (P0351), “C25” (P0352), “C26” (P0353) or “C27” (P0354): Ignition System Malfunction

B718H11104017

NOTE

Refer to “No Spark or Poor Spark in Section 1H (Page 1H-3)” for details.

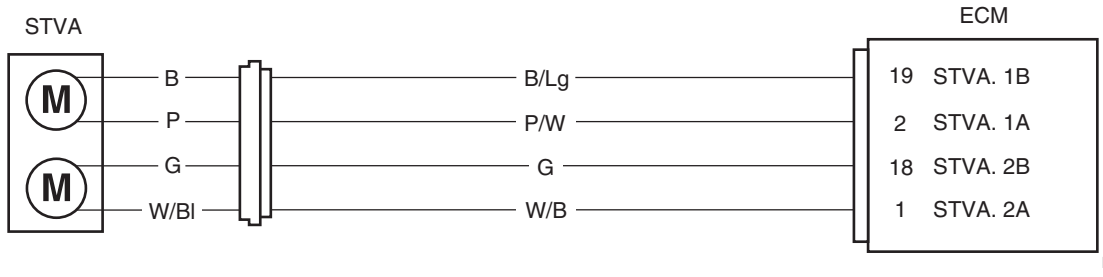
DTC “C28” (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction

B718H11104018

Detected Condition and Possible Cause

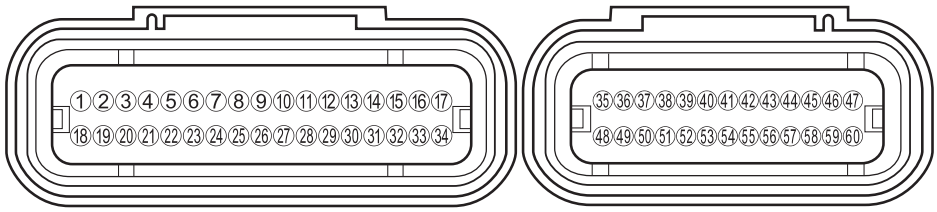
Detected Condition	Possible Cause
The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA.	• STVA malfunction. • STVA circuit open or short. • STVA motor malfunction.

Wiring Diagram



I718H1110077-04

ECM coupler (Harness side)



I718H1110240-01

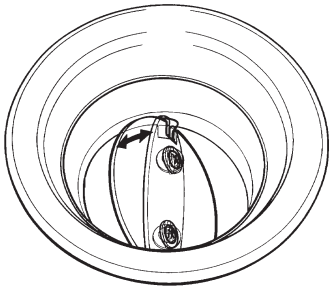
Troubleshooting

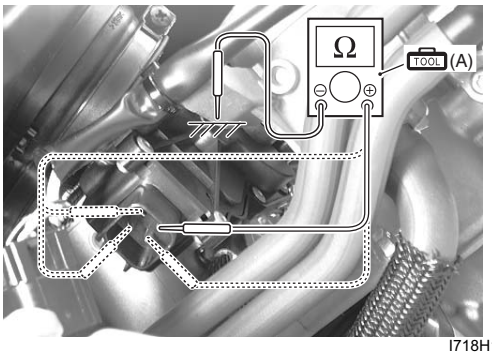
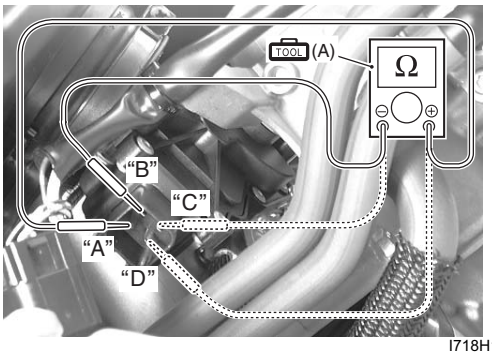
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

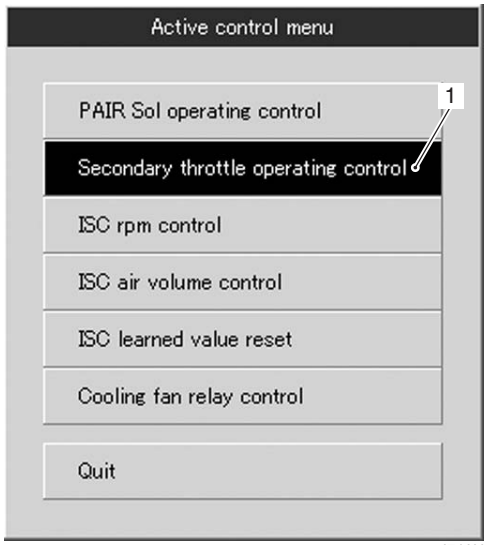
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

Step	Action	Yes	No
1	1) Remove the regulator/rectifier. Refer to “Regulator / Rectifier Construction in Section 1J (Page 1J-8)”. 2) Check the STVA lead wire coupler for loose or poor contacts.  I718H1110191-01 3) Move the air cleaner backward. Refer to “Air Cleaner Element Removal and Installation in Section 1D (Page 1D-6)”. 4) Turn the ignition switch ON to check the STV operation. (STVA operating order: Full open → 15% open)  I705H1110063-01 *Is the operating OK?*	Go to Step 2.	• Loose or poor contacts on the coupler. • Open or short circuit in the B/Lg, P/W, W/B or G wire. • If wire and connection are OK, go to Step 2.

Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Move the throttle body right side. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-9)”. 3) Disconnect the STVA lead wire coupler. 4) Check the continuity between each terminal and ground. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **STVA continuity** **∞ Ω (Infinity)** **(Terminal – Ground)**  I718H1110192-02 5) If OK, then measure the STVA resistance (between the B wire “A” and P wire “B”) and (between the G wire “C” and W/Bl wire “D”). **STVA resistance** **Approx. 7.0 Ω** **(Terminal “A” – Ground “B”, Terminal “C” – Ground “D”)**  I718H1110193-02 *Is the resistance OK?*	• W/B, P/W, G and B/Lg wire open or shorted to the ground, or poor “1”, “2”, “18” and “19” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	• Loose or poor contacts on the ECM coupler. • Replace the STVA with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

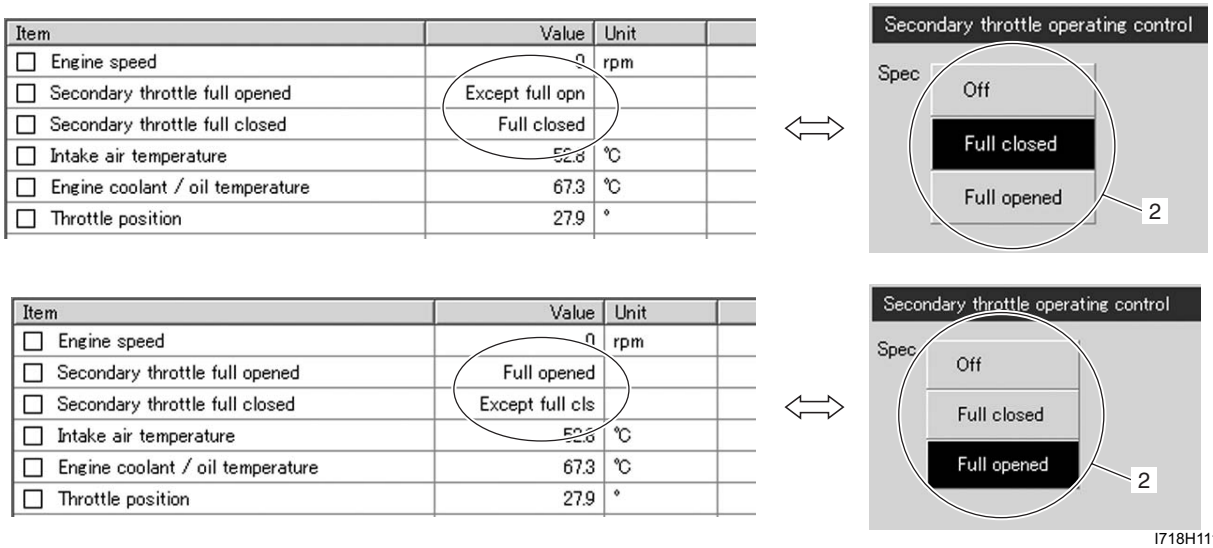
Active Control Inspection

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Turn the ignition switch ON.
3) Click “Secondary throttle operating control” (1).



I718H1110247-01

4) Click each button (2).
At this time, if an operation sound is heard from the STVA, the function is normal.



I718H1110195-02

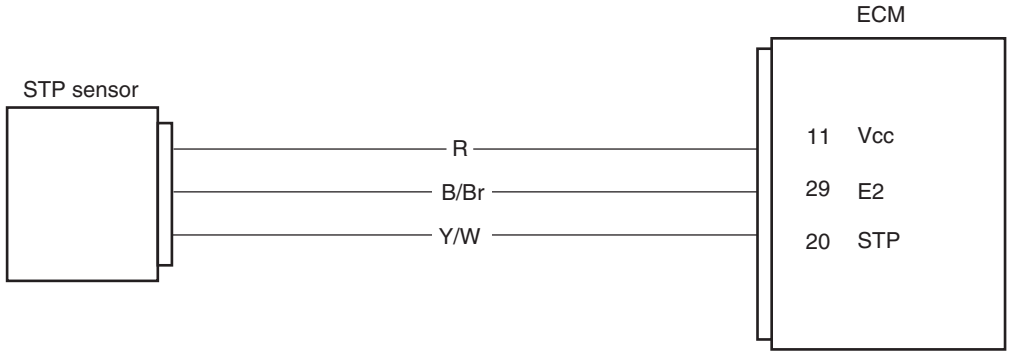
DTC “C29” (P1654-H/L): Secondary Throttle Position Sensor (STPS) Circuit Malfunction

B718H11104019

Detected Condition and Possible Cause

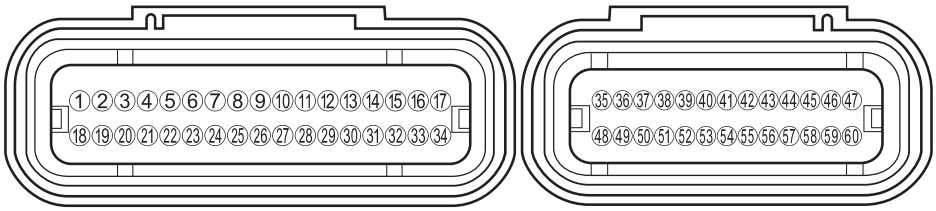
Detected Condition			Possible Cause
C29		Signal voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.15 V ≤ Sensor voltage < 4.85 V	• STP sensor maladjusted. • STP sensor circuit open or short. • STP sensor malfunction. • ECM malfunction.
P1654	H	Sensor voltage is higher than specified value.	• STP sensor circuit shorted to Vcc or ground circuit open.
	L	Sensor voltage is lower than specified value.	• STP sensor circuit open or shorted to the ground or Vcc circuit open.

Wiring Diagram



I718H1110083-02

ECM coupler (Harness side)



I718H1110240-01

Troubleshooting

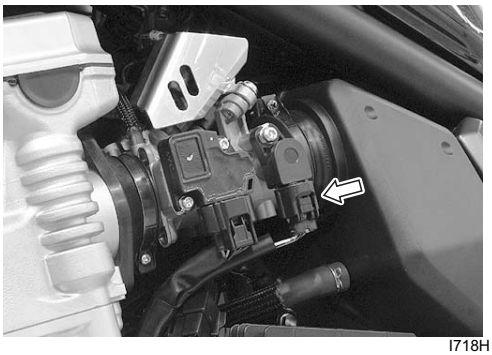
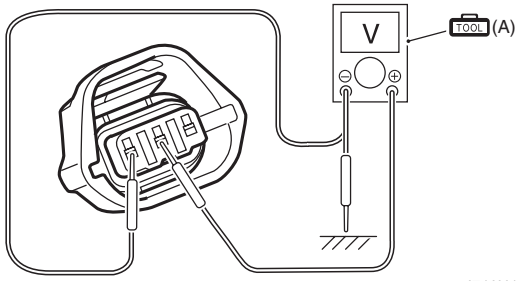
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

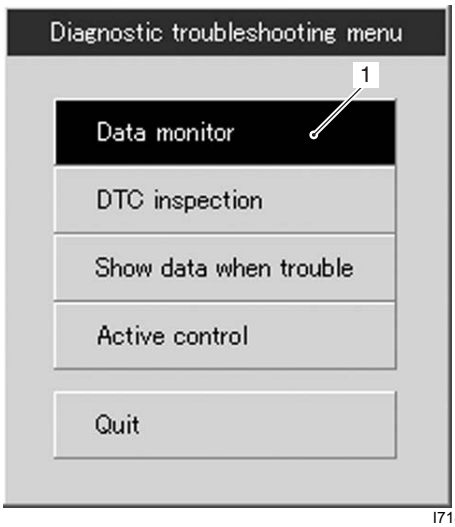
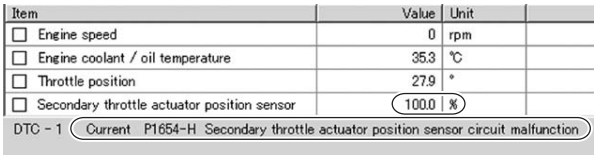
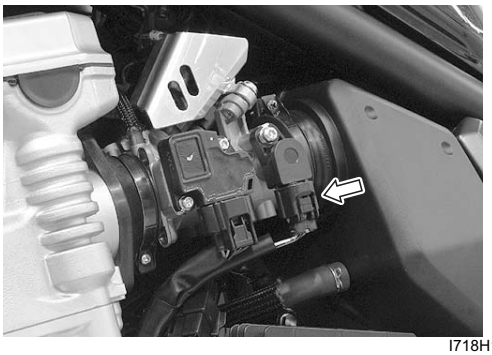
NOTE

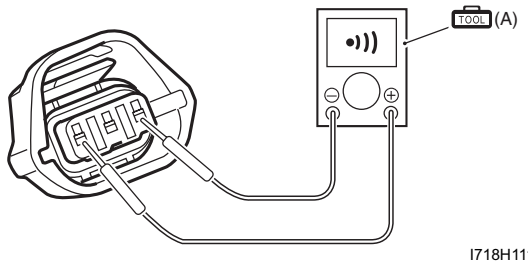
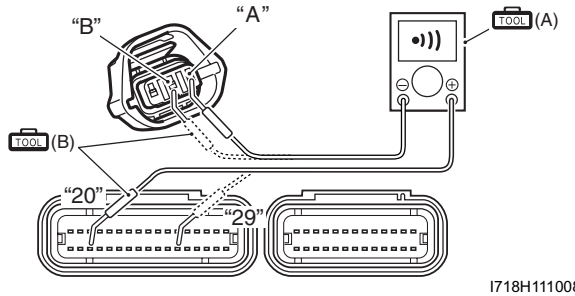
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

C29 (Use of mode select switch)

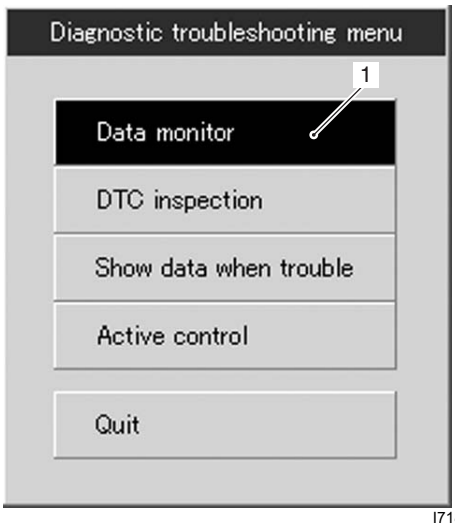
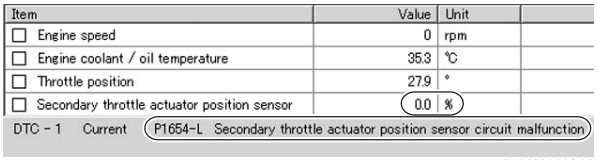
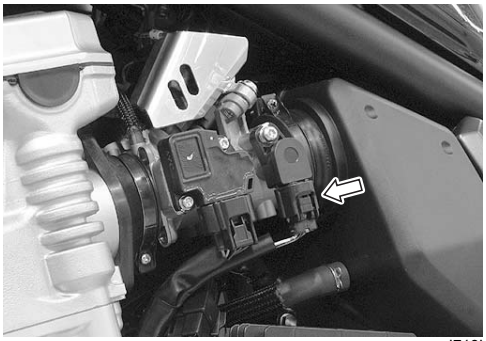
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Check the STP sensor coupler for loose or poor contacts. If OK, then measure the STP sensor input voltage.  I718H1110253-01 3) Disconnect the STP sensor coupler. 4) Turn the ignition switch ON. 5) Measure the voltage at the R wire and ground. Also, measure the voltage at the R wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **STP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I718H1110197-02 *Is the voltage OK?*	Go to Step 4.	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the R wire or B/Br wire.

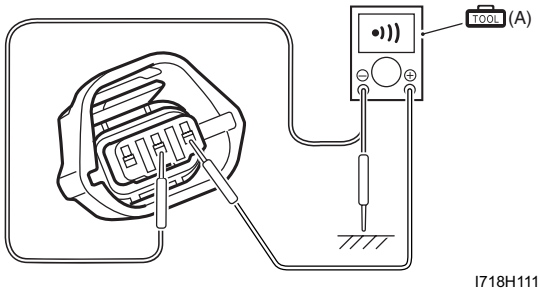
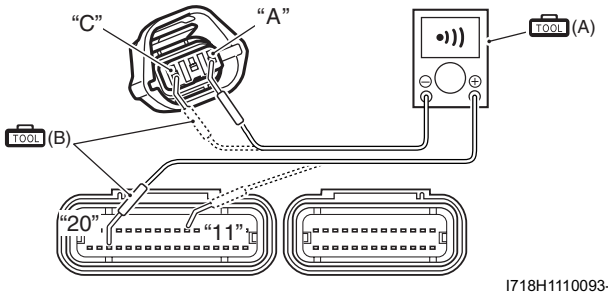
P1654-H (Use of SDS)

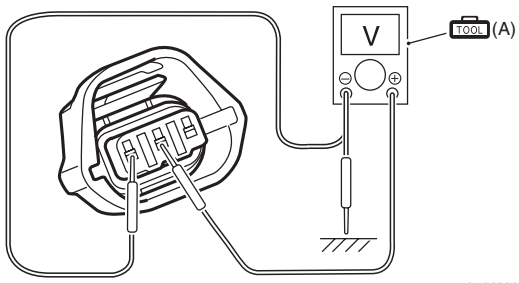
Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the secondary throttle actuator position sensor data.  I718H1110198-01 *Secondary throttle position approx. 100% and more OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Check the STP sensor coupler for loose or poor contacts. If OK, then check the STP sensor lead wire continuity.  I718H1110253-01	Go to Step 4.	Y/W wire shorted to Vcc, or B/Br wire open.

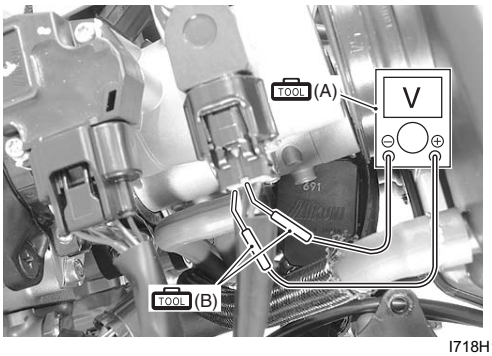
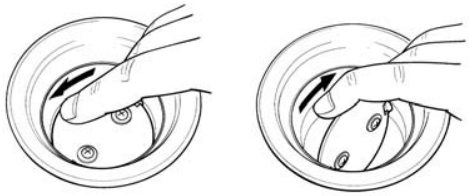
Step	Action	Yes	No
2	3) Disconnect the STP sensor coupler. 4) Check the continuity between the Y/W wire and R wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I718H1110088-04 5) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 6) Check the continuity between the Y/W wire “A” and terminal “20”. Also, check the continuity between the B/Br wire “B” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•))))**  I718H1110089-04 *Is the continuity OK?*	Go to Step 4.	Y/W wire shorted to Vcc, or B/Br wire open.

P1654-L (Use of SDS)

Step	Action	Yes	No
1	1) Click the data monitor button (1).  I718H1110251-01 2) Check the secondary throttle actuator position sensor data.  I718H1110199-01 *Secondary throttle position approx. 0% OK?*	Go to Step 2.	Go to Step 4.
2	1) Turn the ignition switch OFF. 2) Check the STP sensor coupler for loose or poor contacts. If OK, then check the STP sensor lead wire continuity.  I718H1110253-01 3) Disconnect the STP sensor coupler.	Go to Step 3.	R or Y/W wire open, or Y/W wire shorted to the ground.

Step	Action	Yes	No
2	4) Check the continuity between the Y/W wire and ground. Also, check the continuity between the Y/W wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity test (•)))**  I718H1110092-03 5) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 6) Check the continuity between the Y/W wire “A” and terminal “20”. Also, check the continuity between the R wire “C” and terminal “11”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))**  I718H1110093-02 *Is the continuity OK?*	Go to Step 3.	R or Y/W wire open, or Y/W wire shorted to the ground.

Step	Action	Yes	No
3	1) Connect the ECM coupler. 2) Disconnect the STP sensor coupler. 3) Turn the ignition switch ON. 4) Measure the input voltage at the R wire and ground. Also, measure the input voltage at the R wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **STP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I718H1110197-02 *Is the voltage OK?*	Go to Step 4.	Open or short circuit in the R or B/Br wire.

Step	Action	Yes	No
4	1) Turn the ignition switch OFF. 2) Connect the ECM coupler and STP sensor coupler. 3) Move the air cleaner box backward. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-9)”. 4) Disconnect the STVA lead wire coupler. Refer to “DTC “C28” (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction (Page 1A-73)”. 5) Insert the needle point probes to the lead wire coupler. 6) Turn the ignition switch ON. 7) Measure the STP sensor output voltage at the coupler (between the (+) Y/W wire and (–) B/Br wire) by turning the secondary throttle valve (close and open) with your finger. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **STP sensor output voltage** **Secondary throttle valve is closed: Approx. 0.6 V** **Secondary throttle valve is opened: Approx. 4.5 V** **((+) terminal: Y/W – (–) terminal: B/Br)**  I718H1110201-03  I705H1110071-01 *Is the voltage OK?*	• R, Y/W or B/Br wire open or shorted to the ground, or poor “11”, “20” or “29” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	If check result is not satisfactory, replace the STP sensor with a new one. Refer to “STP Sensor Removal and Installation in Section 1C (Page 1C-4)”.

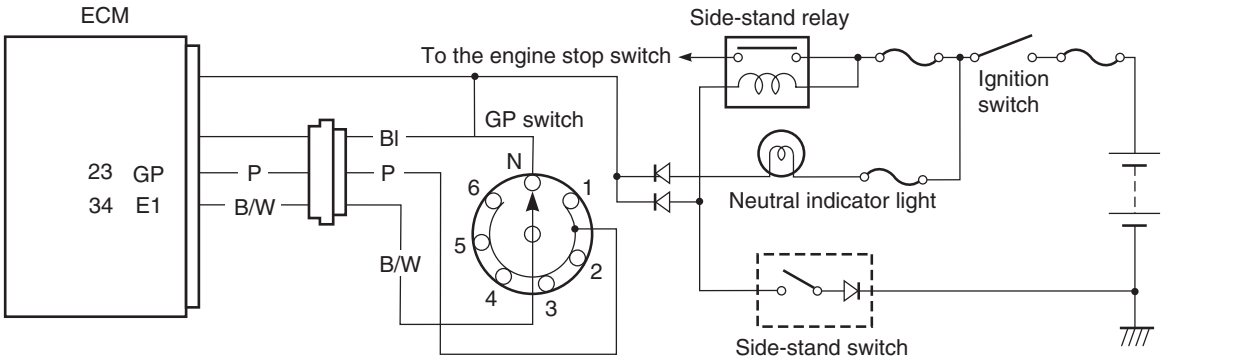
DTC “C31” (P0705): GP Switch Circuit Malfunction

B718H11104020

Detected Condition and Possible Cause

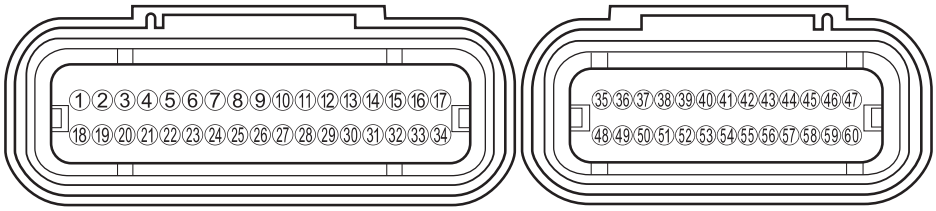
Detected Condition	Possible Cause
No Gear Position switch voltage Switch voltage is not within the following range. Switch voltage > 0.6 V	• Gear position switch circuit open or short. • Gear position switch malfunction. • ECM malfunction.

Wiring Diagram



I718H1110097-02

ECM coupler (Harness side)



I718H1110240-01

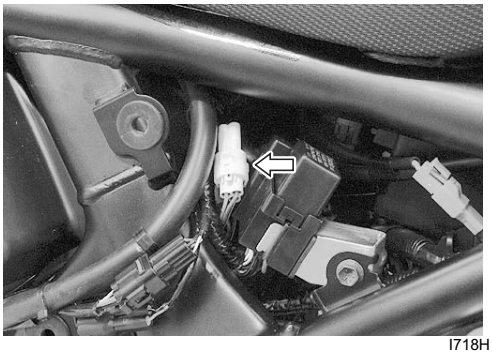
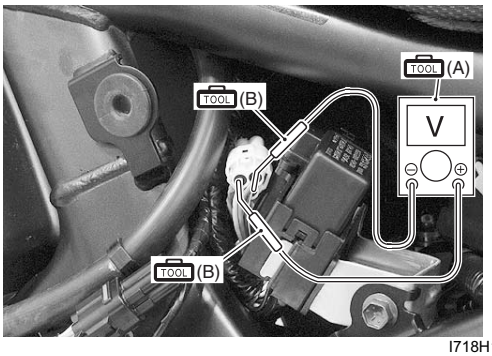
Troubleshooting

⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the GP switch coupler for loose or poor contacts. If OK, then measure the GP switch voltage.  I718H1110254-01 4) Support the motorcycle with a jack. 5) Fold the side-stand to up position. 6) Make sure the engine stop switch is in the “RUN” position. 7) Insert the needle pointed probe to the lead wire coupler. 8) Turn the ignition switch ON. 9) Measure the voltage at the wire side coupler between the P and B/W wire, when shifting the gearshift lever from 1st to Top. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **GP switch voltage** **0.6 V and more** **((+) terminal: P – (–) terminal: B/W)**  I718H1110203-03 *Is the voltage OK?*	• P wire open or shorted to the ground. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	• P or B/W wire open, or P wire shorted to the ground. • Loose or poor contacts on the ECM coupler. • If wire and connection are OK, replace the GP switch with a new one. Refer to “Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)”.

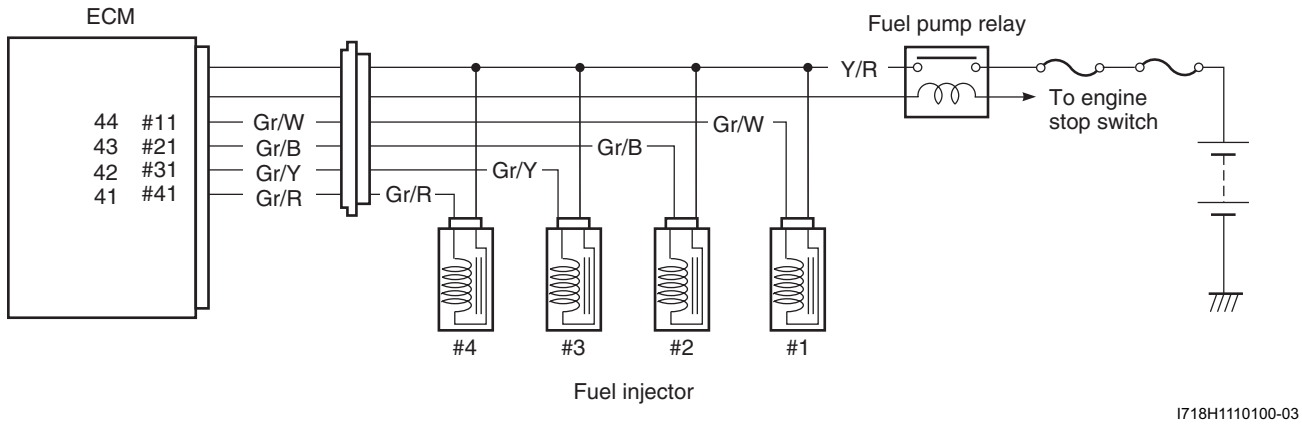
DTC “C32” (P0201), “C33” (P0202), “C34” (P0203) or “C35” (P0204): Fuel Injector Circuit Malfunction

B718H11104021

Detected Condition and Possible Cause

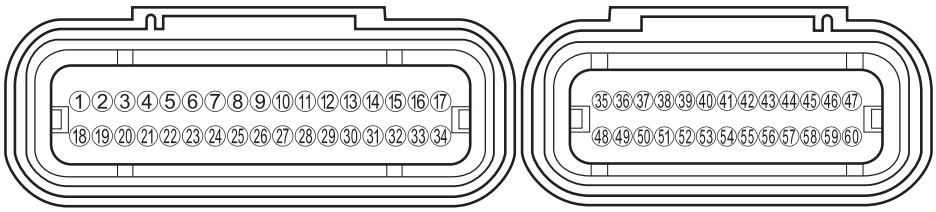
Detected Condition	Possible Cause
CKP signal is produced but fuel injector signal is interrupted by 4 times or more continuity.	• Injector circuit open or short. • Injector malfunction. • ECM malfunction.

Wiring Diagram



I718H1110100-03

ECM coupler (Harness side)



I718H1110240-01

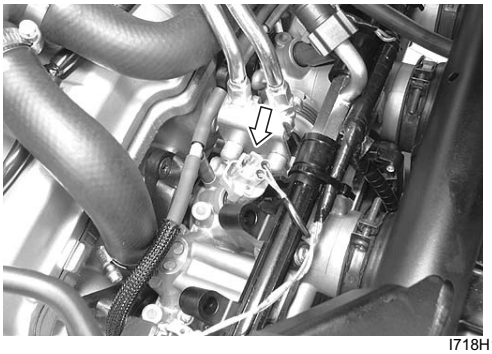
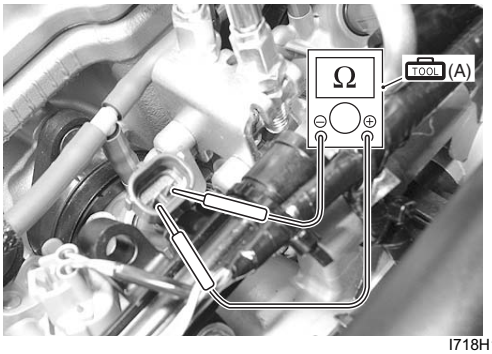
Troubleshooting

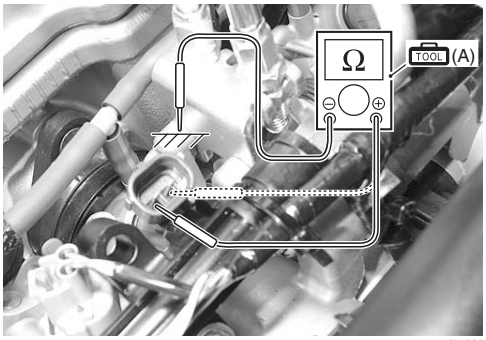
⚠ CAUTION

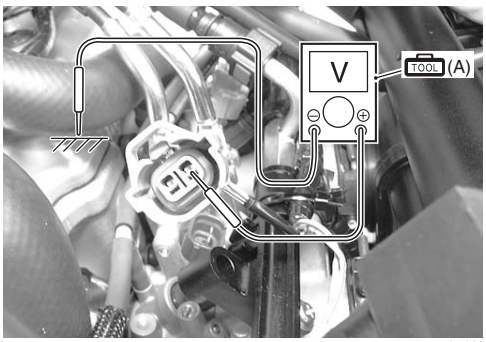
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

- **After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.**
- **Injector voltage can be detected only for 3 seconds after ignition switch is turned ON.**

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”. 3) Check the injector coupler for loose or poor contacts. If OK, then measure the injector resistance.  I718H1110204-01 4) Disconnect the injector coupler and measure the resistance between terminals. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **Injector resistance** **11 – 13 Ω at 20 °C (68 °F)** **(Terminal – Terminal)**  I718H1110205-02	Go to Step 2.	Replace the injector with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

Step	Action	Yes	No
1	5) If OK, then check the continuity between each terminal and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Injector continuity** ∞ Ω **(Infinity)**  I718H1110206-02 *Are the resistance and continuity OK?*	Go to Step 2.	Replace the injector with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

Step	Action	Yes	No
2	1) Turn the ignition switch ON. 2) Measure the injector voltage between the Y/R wire and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Injector voltage** **Battery voltage** **((+) terminal: Y/R – (–) terminal: Ground)**  I718H1110207-03 *Is the voltage OK?*	• Gr/W wire open or shorted to the ground, or poor “44” connection (#1 cylinder side). • Gr/B wire open or shorted to the ground, or poor “43” connection (#2 cylinder side). • Gr/Y wire open or shorted to the ground, or poor “42” connection (#3 cylinder side). • Gr/R wire open or shorted to the ground, or poor “41” connection (#4 cylinder side). • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Open circuit in the Y/R wire.

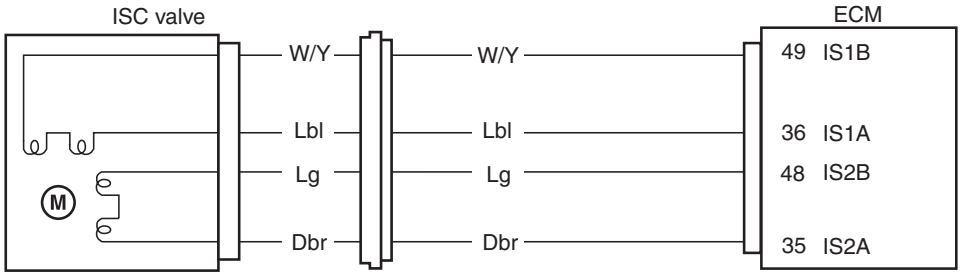
DTC “C40” (P0505 / P0506 / P0507): ISC Valve Circuit Malfunction

B718H11104022

Detected Condition and Possible Cause

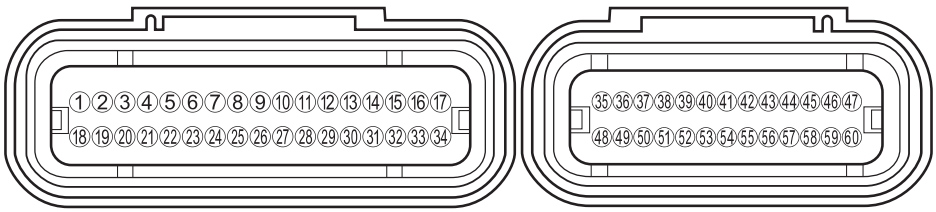
Detected Condition		Possible Cause
C40/P0505	The circuit voltage of motor drive is unusual.	• ISC valve circuit open or shorted to the ground. • Air passage clogged. • ISC valve is fixed. • ISC valve preset position is incorrect. • Disconnect ISC valve hose. • ISC valve is fixed. • ISC valve preset position is incorrect.
C40/P0506	Idle speed is lower than the desired idle speed.	
C40/P0507	Idle speed is high than the desired idle speed.	

Wiring Diagram



I718H1110105-03

ECM coupler (Harness side)



I718H1110240-01

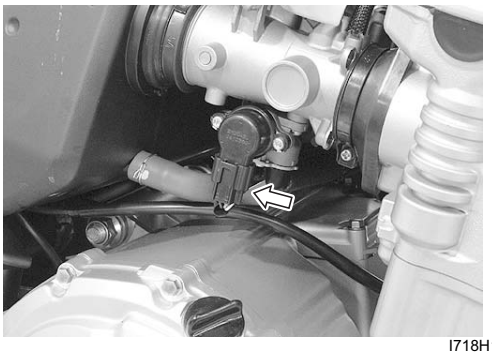
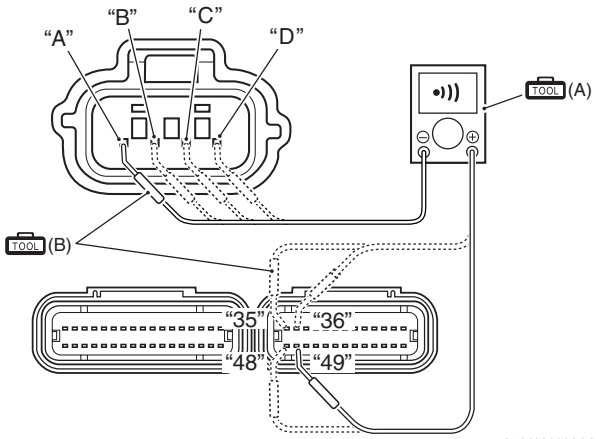
Troubleshooting

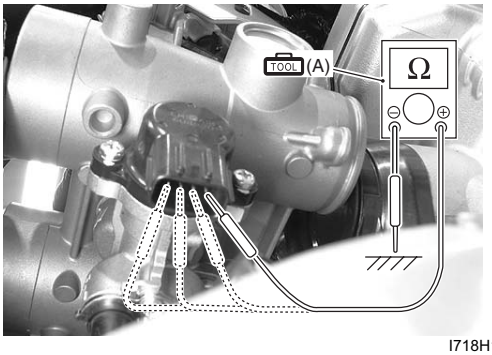
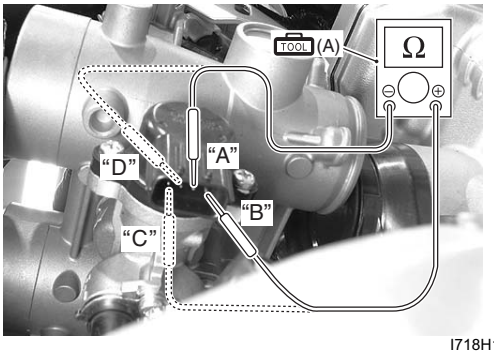
⚠ CAUTION

- **Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.**
  If the ECM coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an usual valve being written in ECM and causing an error of ISC valve operation.
- **When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.**

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

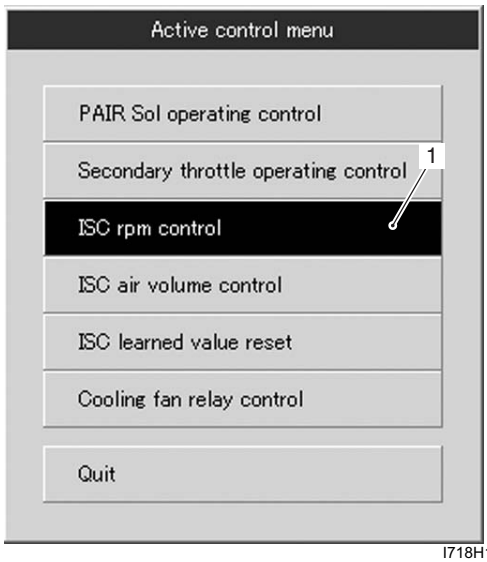
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Check the ISC valve coupler for loose or poor contacts. If OK, then check the ISC valve lead wire continuity.  I718H1110208-02 3) Disconnect the ISC valve coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 4) Check the continuity between terminals “A” and “49”, terminals “B” and “36”, terminals “C” and “48”, terminals “D” and “35”. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•))))**  I718H1110209-03 *Is the continuity OK?*	Go to Step 2.	Lbl, W/Y, Dgr or Lg wire open.

Step	Action	Yes	No
2	1) Move the throttle body right side. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-9)”. 2) Disconnect the ISC valve coupler. 3) Check the continuity between each terminal and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **ISC valve continuity** **∞ Ω (Infinity)** **(Terminal – Ground)**  I718H1110210-02 4) If OK, then measure the resistance (between the Lbl wire “A” and W/Y wire “B”) and (between the Dbr wire “C” and Lg wire “D”). **ISC valve resistance** **Approx. 20 Ω at 20 °C (68 °F)** **(Terminal: Lg – Terminal: W/Y, Terminal: Dbr – Terminal: Lg)**  I718H1110211-02 *Is the resistance OK?*	If wire is OK, intermittent trouble or faulty ECM.	Replace the ISC valve with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

ACTIVE CONTROL INSPECTION (ISC RPM CONTROL)

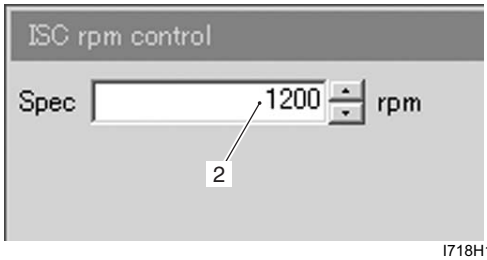
Check 1

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Check that the engine is running.
3) Click the “Active control”.
4) Click the “ISC rpm control” (1).



I718H1110246-01

5) Check that the “Spec” (2) is idle speed 1 200 ± 100 rpm.
6) Check that the “Desired idle speed” (3) is within the specified idle rpm.



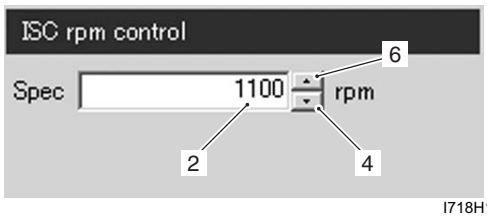
I718H1110213-01

Item	Value	Unit
☐ Engine speed	1268	rpm
☐ Desired idle speed	3 → 1205	rpm
☐ ISC valve position	80	step
☐ Manifold absolute pressure 1	68.9	kPa
☐ Manifold absolute pressure 2	64.1	kPa

I718H1110214-02

Check 2

1) Click the button (4) and decrease the “Spec” (2) to 1 100 rpm slowly.
2) Check that the “Desired idle speed” (3) is nearly equal to the “Spec” (2). At the same time, check that the number of steps (5) in the ISC valve position decreases.
3) Click the button (6) and increase the “Spec” (2) slowly.
4) Check that the “Desired idle speed” (3) is nearly equal to the “Spec” (2). Also, check that the number of steps (5) in the ISC valve position increases.



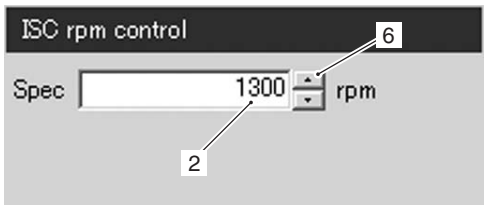
I718H1110215-01

Item	Value	Unit
Engine speed	1054	rpm
Desired idle speed	3 → 1104	rpm
ISC valve position	5 → 74	step
Manifold absolute pressure 1	72.8	kPa
Manifold absolute pressure 2	64.1	kPa

I718H1110216-02

Check 3

1) Click the button (6) and increase the “Spec” (2) to 1 300 rpm slowly.
2) Check that the “Desired idle speed” (3) is nearly equal to the “Spec” (2). Also, check that the number of steps (5) in the ISC valve position increases.



I718H1110217-01

Item	Value	Unit
Engine speed	1356	rpm
Desired idle speed	3 → 1305	rpm
ISC valve position	5 → 84	step
Manifold absolute pressure 1	69.6	kPa
Manifold absolute pressure 2	80.0	kPa

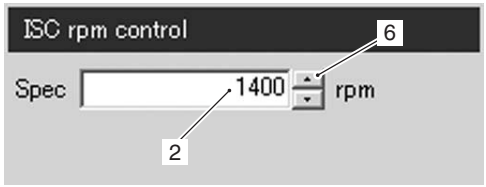
I718H1110218-02

Check 4

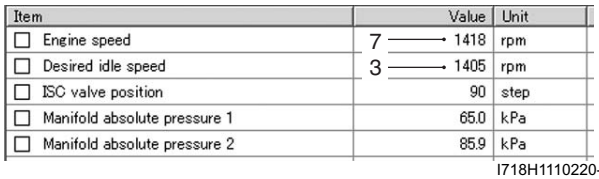
1) Click the button (6) and increase the “Spec” (2) to 1 400 rpm.
2) Check that the “Desired idle speed” (3) is approx. 1 400 rpm.
3) Check that the “Engine speed” (7) is close to 1 400 rpm.

NOTE

Be careful not to increase the “Spec” to 1 700 rpm, or the “Engine speed” may reach the upper limit.



I718H1110219-01



I718H1110220-02

If the ISC valve does not function properly, replace the ISC valve or inspect the ISC valve. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

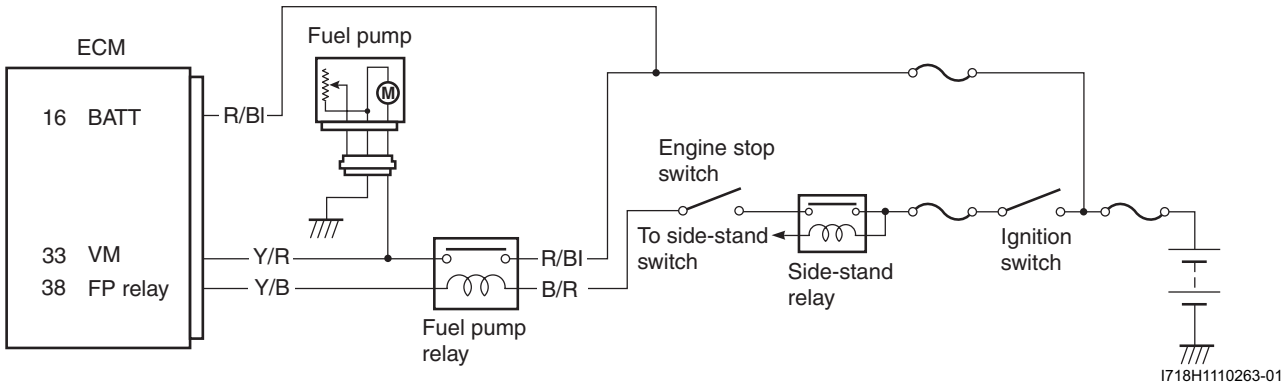
DTC “C41” (P0230-H/L): FP Relay Circuit Malfunction

B718H11104023

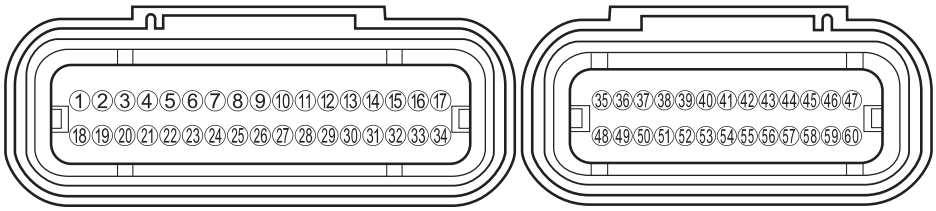
Detected Condition and Possible Cause

Detected Condition			Possible Cause
C41		No voltage is applied to fuel pump although fuel pump relay is turned ON, or voltage is applied to fuel pump, although fuel pump relay is turned OFF.	• Fuel pump relay circuit open or short. • Fuel pump relay malfunction. • ECM malfunction.
P0230	H	Voltage is applied to fuel pump although fuel pump relay is turned OFF.	• Fuel pump relay switch circuit is shorted to power source. • Faulty pump relay (switch side).
	L	No voltage is applied to fuel pump although fuel pump relay is turned ON.	• Fuel pump relay coil circuit open or short. • Faulty pump relay (coil side).

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting

⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

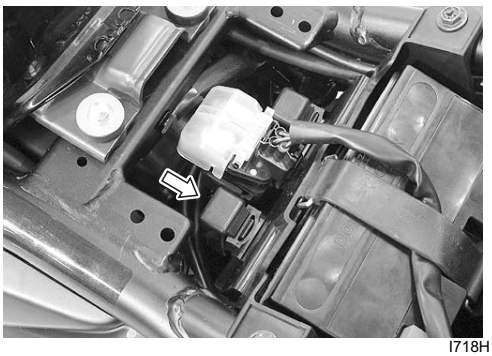
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

C41 (Use of mode select switch)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the FP relay coupler for loose or poor contacts. If OK, then check the FP relay. Refer to “Fuel Pump Relay Inspection in Section 1G (Page 1G-7)”.  I718H1110221-03 *Is the FP relay OK?*	• ECM power input signal malfunction. Refer to “DTC “C41” (P2505): ECM Power Input Signal Malfunction (Page 1A-100)”. • Y/B or B/R wire open or short or poor “38” connection. • Y/R or R/Bl wire open, shorted or poor “33” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the FP relay with a new one.

P0230-H (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the FP relay coupler for loose or poor contacts. If OK, then check the FP relay. Refer to “Fuel Pump Relay Inspection in Section 1G (Page 1G-7)”.  I718H1110221-03 *Is the FP relay OK?*	• Y/B wire shorted to power source. • Y/B wire shorted to the ground. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the FP relay with a new a new one.

P0230-L (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the FP relay coupler for loose or poor contacts. If OK, then check the FP relay. Refer to “Fuel Pump Relay Inspection in Section 1G (Page 1G-7)”.  I718H1110221-03 *Is the FP relay OK?*	• Y/B wire open or poor “38” connection. • B/R wire open or shorted to the ground. • R/Bl or Y/R wire open or shorted to the ground or poor “33” connection. • If wire and connection are OK, intermittent trouble of faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the FP relay with a new one.

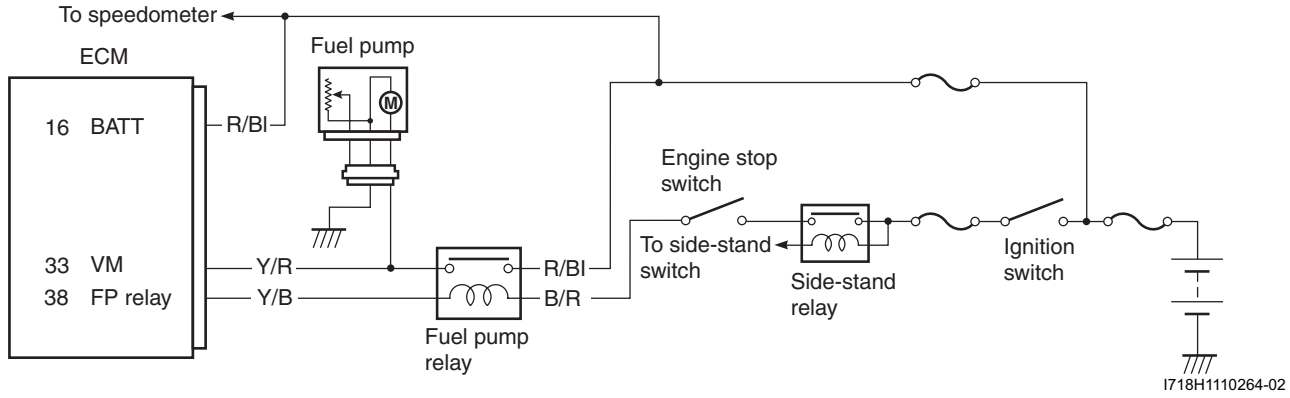
DTC “C41” (P2505): ECM Power Input Signal Malfunction

B718H11104031

Detected Condition and Possible Cause

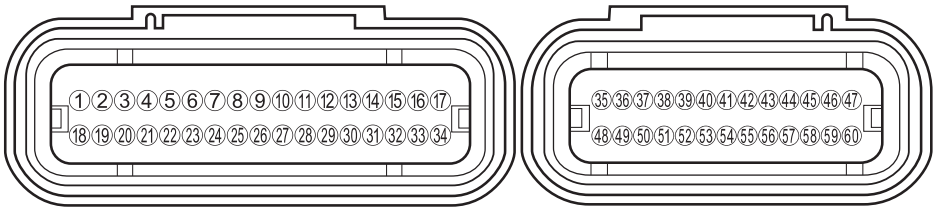
Detected Condition		Possible Cause
C41/P2505	No voltage is applied to the ECM, although FP relay is turned ON.	• Lead wire/coupler connection of ECM terminal to fuel fuse • Fuel fuse • Power source of speedometer shorted to ground

Wiring Diagram



I718H1110264-02

ECM coupler (Harness side)



I718H1110240-01

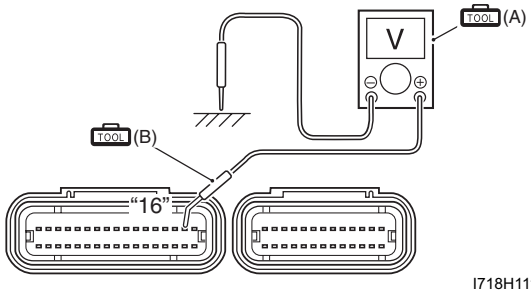
Troubleshooting

⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Check the ECM coupler for loose or poor contacts. If OK, then measure the ECM input voltage.  I718H1110256-01 4) Disconnect the ECM coupler. 5) Insert the needle pointed probe to ECM coupler. 6) Measure the voltage between terminal “16” and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **ECM input voltage** **Battery voltage** **((+) terminal: “16” – (–) terminal: Ground)**  I718H1110250-01 *Is the voltage OK?*	• Fuel pump relay circuit malfunction. Refer to “DTC “C41” (P0230-H/L): FP Relay Circuit Malfunction (Page 1A-97)”. • R/Bl wire open or short or poor “16” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Open or short circuit in the R/Bl wire.

DTC “42” (P1650): IG Switch Circuit Malfunction

B718H11104024

Detected Condition and Possible Cause

Detected Condition	Possible Cause
Ignition switch signal is not input in the ECM.	• Ignition system circuit open or short. • ECM malfunction.

Troubleshooting

NOTE

- **Refer to “Ignition Switch Inspection in Section 9C (Page 9C-10)” for details.**
- **After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.**

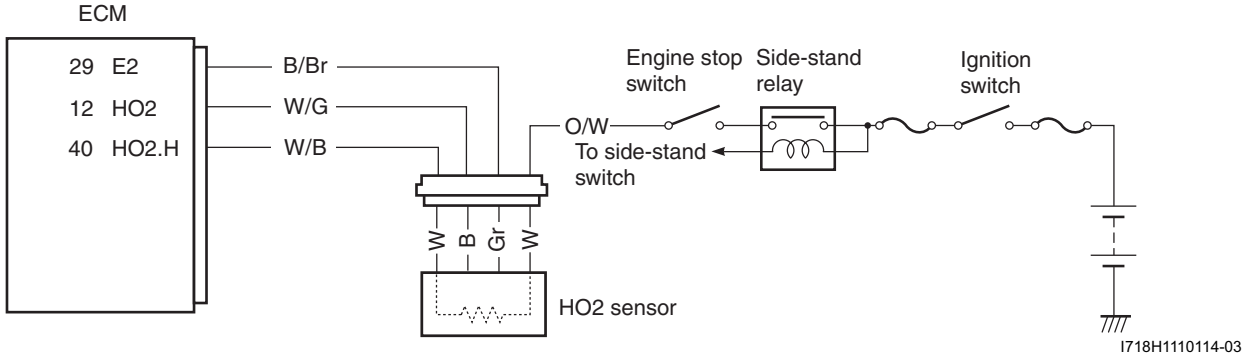
DTC “C44” (P0130/P0135): HO2 Sensor (HO2S) Circuit Malfunction

B718H11104025

Detected Condition and Possible Cause

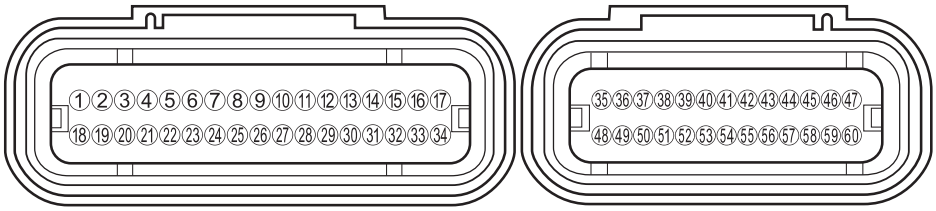
Detected Condition	Possible Cause
HO2 sensor output voltage is not input to ECM during engine operation and running condition. Sensor voltage > 1.0 V The heater can not operate so that heater operation voltage is not supplied to the oxygen heater circuit.	• HO2 sensor circuit open or short. • ECM malfunction. • HO2 sensor lead wire/coupler connection. • Battery voltage supply to the HO2 sensor

Wiring Diagram



I718H1110114-03

ECM coupler (Harness side)



I718H1110240-01

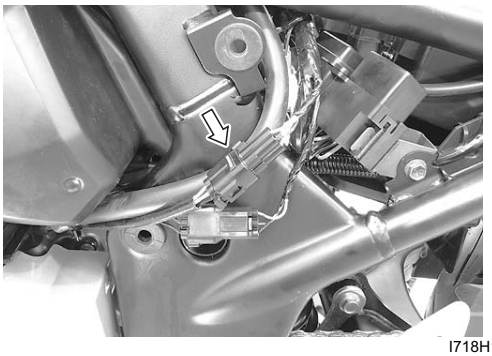
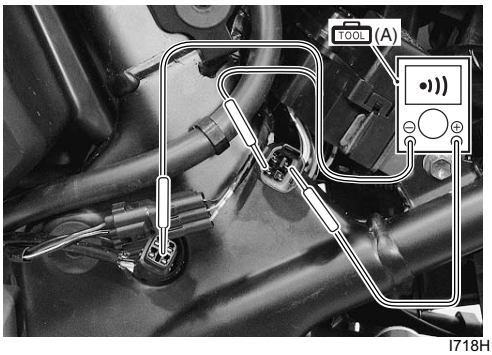
Troubleshooting (When Indicating C44/P0130:)

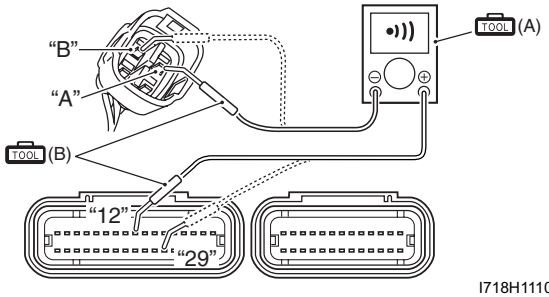
⚠ CAUTION

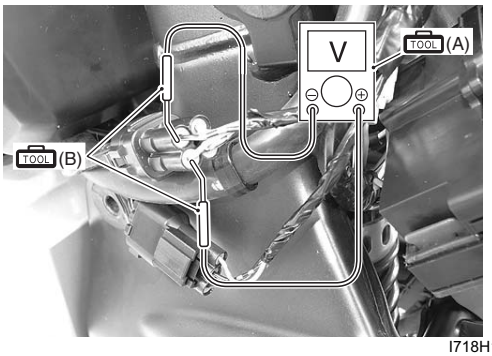
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures (Page 1A-13)".

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)". 3) Check the HO2 sensor coupler for loose or poor contacts. If OK, then check the HO2 sensor lead wire continuity.  I718H1110223-01 4) Disconnect the HO2 sensor coupler. 5) Check the continuity between the W/G wire and O/W wire. Also, check the continuity between the W/G wire and W wire. If the sound is not heard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity test (•)))**  I718H1110265-01	Go to Step 2.	W/G wire shorted to the power source, or W/G or B/Br wire open.

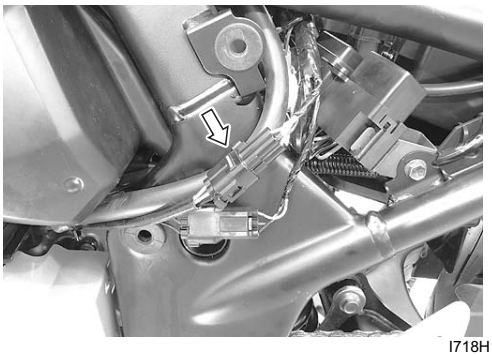
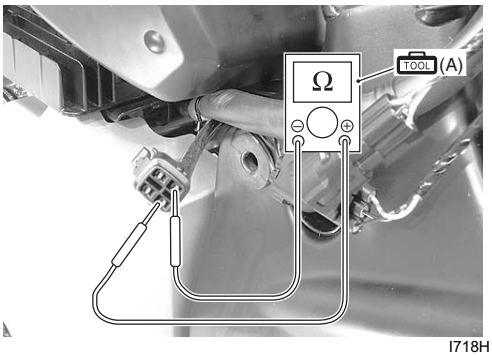
Step	Action	Yes	No
1	6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 7) Check the continuity between the W/G wire “A” and terminal “12”. Also, check the continuity between the B/Br wire “B” and terminal “29”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I718H1110229-02 *Is the continuity OK?*	Go to Step 2.	W/G wire shorted to the power source, or W/G or B/Br wire open.

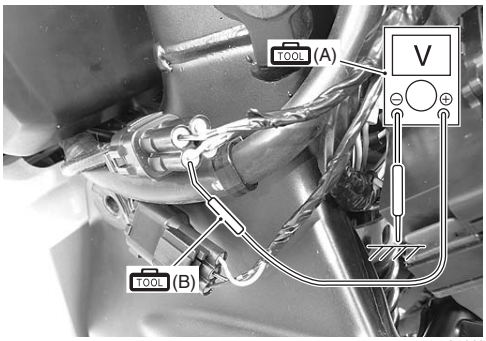
Step	Action	Yes	No
2	1) Connect the ECM coupler and HO2 sensor coupler. 2) Warm up the engine enough. 3) Insert the needle pointed probes to the lead wire coupler. 4) Measure the HO2 sensor output voltage between the W/G wire and B/Br wire, when idling condition. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **HO2 sensor output voltage at idle speed** **0.3 V and less** **((+) terminal: W/G – (–) terminal: B/Br)**  I718H1110230-02 5) If OK, then pinch the PAIR hose (1) with a proper hose clamp.  I718H1110266-01 6) Measure the HO2 sensor output voltage while holding the engine speed at 3 000 r/min. **HO2 sensor output voltage at 3 000 r/min** **0.6 V and more** **((+) terminal: W/G – (–) terminal: B/Br)** *Is the voltage OK?*	• W/G or B/Br wire open or shorted to the power source, or poor “12” or “29” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspection it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the HO2 sensor with a new one. Refer to “Heated Oxygen Sensor (HO2S) Removal and Installation in Section 1B (Page 1B-5)”.

Troubleshooting (When Indicating C44/P0135:)

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures (Page 1A-13)".

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)". 3) Check the HO2 sensor for loose or poor contacts. If OK, then measure the HO2 sensor resistance.  I718H1110223-01 4) Disconnect the HO2 sensor coupler and measure the resistance between terminals. **⚠ CAUTION** • **Temperature of the sensor affects resistance value largely.** • **Make sure that the sensor heater is in correct temperature.** **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **HO2 heater resistance** **Approx. 8 Ω at 23 °C (73 °F)** **(W – W)**  I718H1110243-01 *Is the resistance OK?*	Go to Step 2.	Replace the HO2 sensor with a new one. Refer to "HO2 Sensor Removal and Installation in Section 1C (Page 1C-6)".

Step	Action	Yes	No
2	1) Connect the HO2 sensor coupler. 2) Insert the needle pointed probes to the lead wire coupler. 3) Turn the ignition switch ON and measure the heater voltage between the W/B wire and ground. If the tester voltage indicates the battery voltage, it is good condition. **NOTE** **Battery voltage can be detected only before starting the engine.** **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **Heater voltage** **Battery voltage** **((+) terminal: W/B – (–) terminal: Ground)**  I718H1110232-02 *Is the voltage OK?*	• O/W or W/B wire open or shorted to the ground, or poor “40” connection. • Recheck each terminal and wire harness for open circuit and poor connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	• Open or short circuit in the W/B wire or O/W wire. • Loose or poor contacts on the ECM coupler or HO2 sensor coupler.

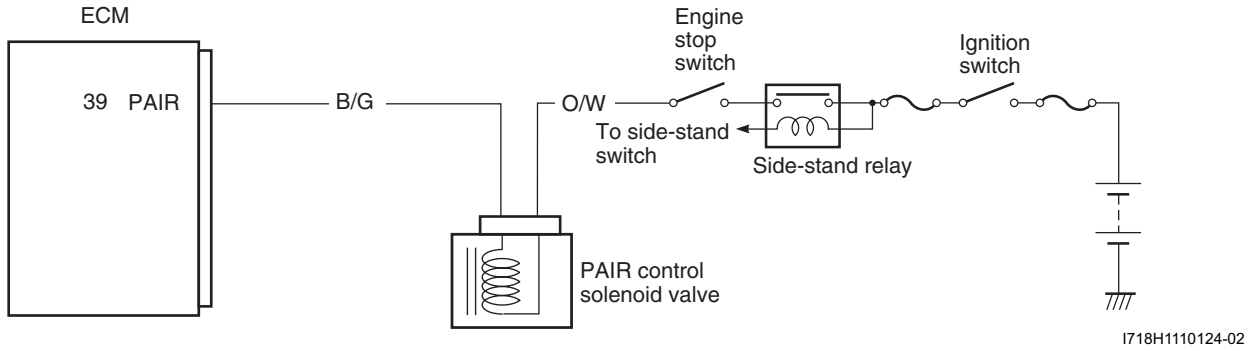
DTC “C49” (P1656): PAIR Solenoid Valve Circuit Malfunction

B718H11104028

Detected Condition and Possible Cause

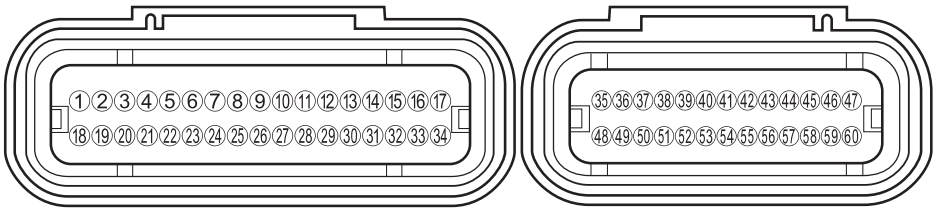
Detected Condition	Possible Cause
PAIR control solenoid valve ampere is not input to ECM.	• PAIR control solenoid valve circuit open or short. • PAIR control solenoid valve malfunction. • ECM malfunction.

Wiring Diagram



I718H1110124-02

ECM coupler (Harness side)



I718H1110240-01

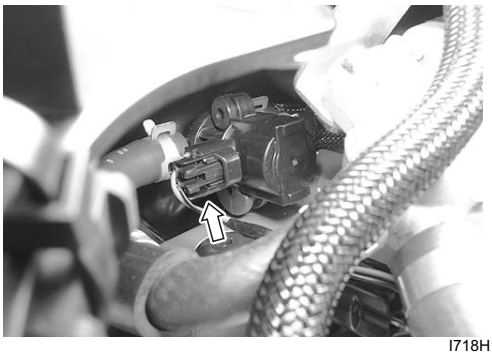
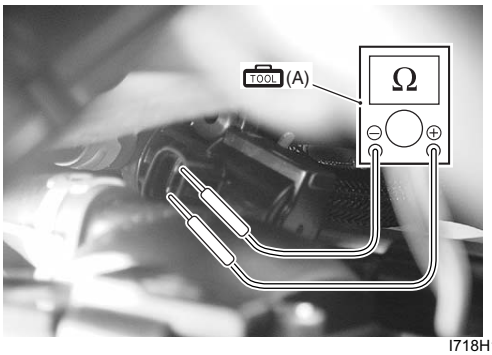
Troubleshooting

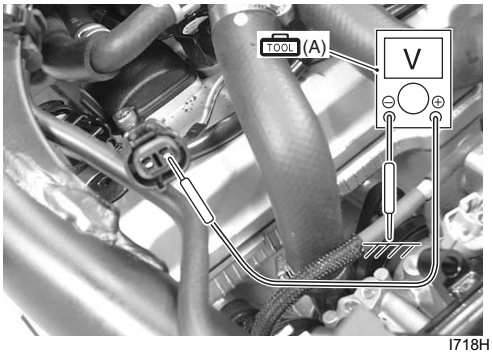
⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

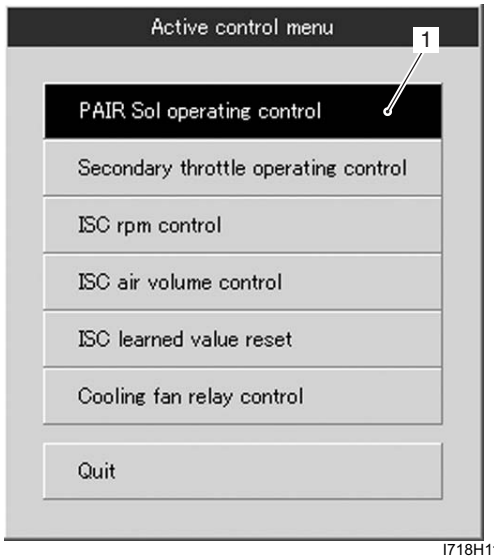
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-13)”.

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”. 3) Check the PAIR control solenoid valve coupler for loose or poor contacts. If OK, then measure the PAIR solenoid valve resistance.  I718H1110233-01 4) Disconnect the PAIR control solenoid valve coupler. 5) Measure the resistance between terminals. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **PAIR control solenoid valve resistance** **18 – 22 Ω at 20 – 30 °C (68 – 86 °F)** **(Terminal – Terminal)**  I718H1110234-02 *Is the resistance OK?*	Go to Step 2.	Replace the PAIR control solenoid with a new one. Refer to “PAIR Control Solenoid Valve Removal and Installation in Section 1B (Page 1B-6)”.

Step	Action	Yes	No
2	1) Turn the ignition switch ON. 2) Measure the voltage between the O/W wire and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **PAIR control solenoid valve voltage** **Battery voltage** **((+) terminal: O/W – (–) terminal: Ground)**  I718H1110235-02 *Is the voltage OK?*	• B/G wire open or shorted to the ground, or poor “39” connection failure. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Open or short circuit in the O/W wire.

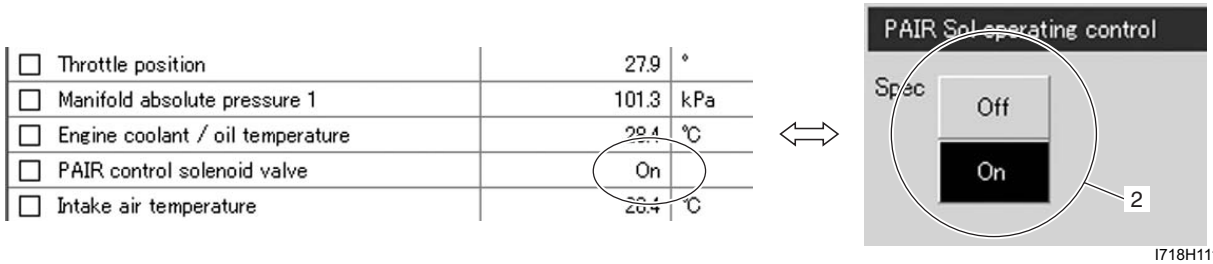
Active Control Inspection

1) Set up the SDS tool. (Refer to SDS operation manual for further details.)
2) Turn the ignition switch ON.
3) Click “PAIR Sol operating control” (1).



I718H1110245-01

4) Click each button (2). At this time, if an operating sound is heard from the PAIR control solenoid valve, the function is normal.



I718H1110236-01

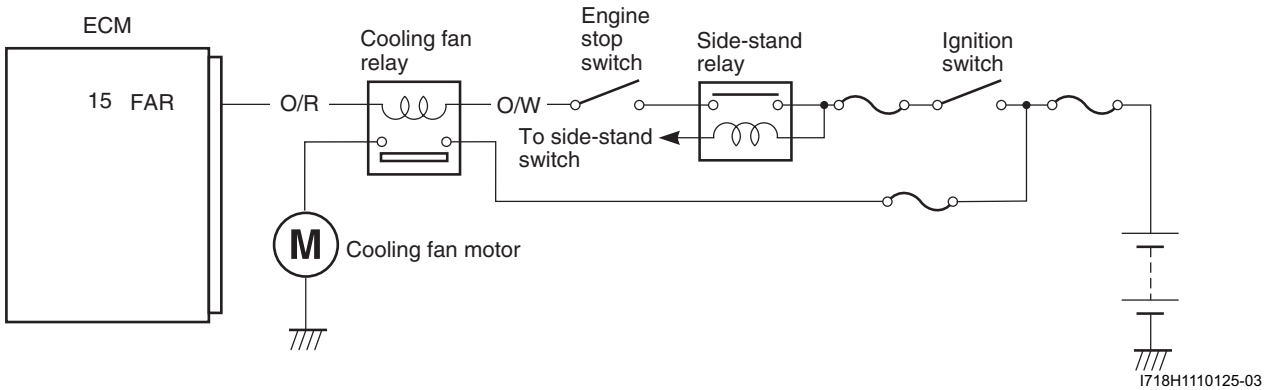
DTC "C60" (P0480): Cooling Fan Relay Circuit Malfunction

B718H11104029

Detected Condition and Possible Cause

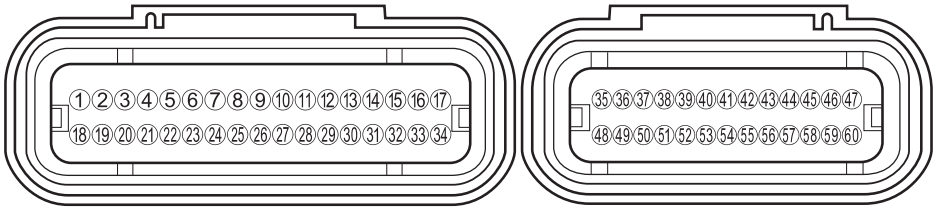
Detected Condition	Possible Cause
Cooling fan relay signal is not input to ECM.	• Cooling fan relay circuit open or short. • ECM malfunction.

Wiring Diagram



I718H1110125-03

ECM coupler (Harness side)



I718H1110240-01

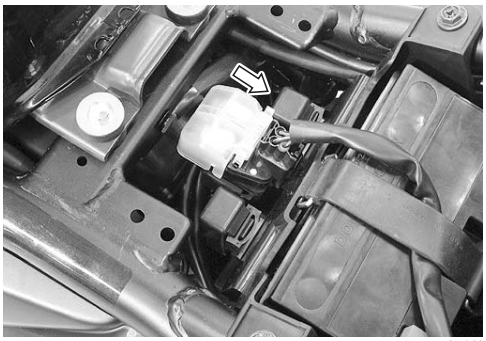
Troubleshooting

⚠ CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures (Page 1A-13)".

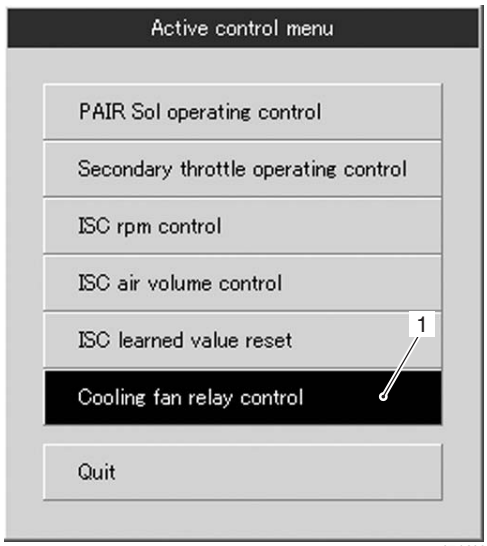
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)". 3) Check the cooling fan relay coupler for loose or poor contacts. If OK, then inspection the cooling fan relay. Refer to "Cooling Fan Inspection in Section 1F (Page 1F-8)".  I718H1110255-01 *Is the cooling fan relay OK?*	• O/W and O/R wire open or shorted to the ground, or poor "15" connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation in Section 1C (Page 1C-1)".	Replace the cooling fan relay with a new one.

Active Control Inspection

NOTE

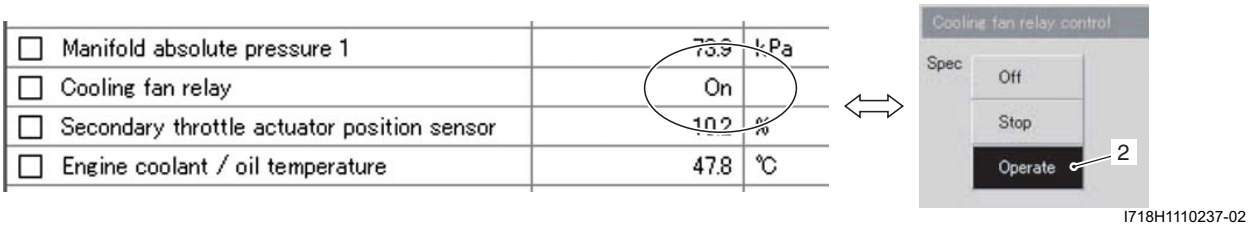
Cooling fan relay and cooling fan motor operation can be checked until the engine coolant temperature is less than 100 °C (212 °F) after starting the engine.

1) Set up the SDS tool. (Refer to SDS operation manual for further details.)
2) Start the engine and run it in idling condition.
3) Click “Cooling fan relay control” (1).



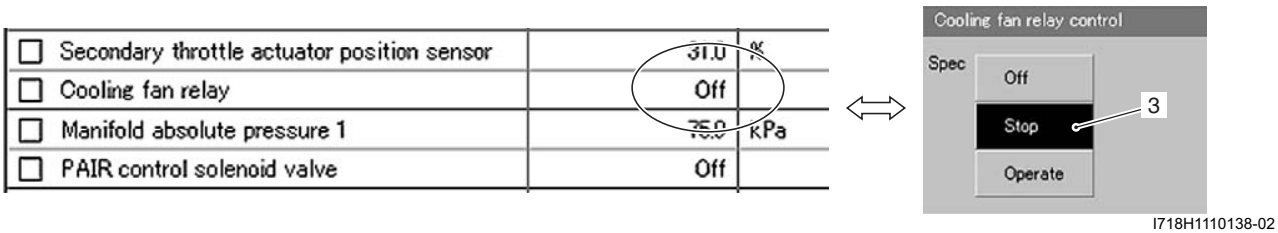
I718H1110244-01

4) Click the operate button (2).
At this time, if an operation sound is heard from the cooling fan relay and cooling fan motor is operated, the function is normal.



I718H1110237-02

5) Click the stop button (3) to check the operation properly.



I718H1110138-02

Specifications

Service Data

B718H11107001

Injector

Item	Specification	Note
Injector resistance	11 – 13 Ω at 20 °C (68 F°)	—

FI Sensors

Item	Specification		Note
CKP sensor resistance	90 – 150 Ω		
CKP sensor peak voltage	2.0 V and more		When cranking
IAP sensor input voltage (No.1)	4.5 – 5.5 V		
IAP sensor output voltage (No.1)	Approx. 2.7 V at idle speed		
IAP sensor input voltage (No.2)	4.5 – 5.5 V		
IAP sensor output voltage (No.2)	2.0 – 3.0 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.15 – 4.85 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	Approx. 2.4 V at 20 °C (68 °F)		
IAT sensor resistance	Approx. 2.56 kΩ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 kΩ		
TO sensor output voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Injection coil primary peak voltage	80 V and more		When cranking
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 4.5 V	
STV actuator resistance	Approx. 7.0 Ω		
ISC valve resistance	Approx. 20 Ω at 20 °C (68 °F)		
HO2 sensor resistance	Approx. 8 Ω at 23 °C (73 °F)		
HO2 sensor output voltage	0.3 V and less at idle speed		
	0.6 V and more at 3 000 r/min		
PAIR control solenoid valve resistance	Approx. 18 – 22 Ω at 20 – 30 °C (68 – 86 °F)		
EVAP purge control valve	Approx. 32 Ω at 20 °C (68 °F)		E-33 only

Special Tools and Equipment

Special Tool

B718H11108001

09900–25008
Multi-circuit tester set
☞(Page 1A-26) /
☞(Page 1A-27) /
☞(Page 1A-29) /
☞(Page 1A-109) /
☞(Page 1A-110) /
☞(Page 1A-31) /
☞(Page 1A-31) /
☞(Page 1A-33) /
☞(Page 1A-33) /
☞(Page 1A-34) /
☞(Page 1A-35) /
☞(Page 1A-36) /
☞(Page 1A-38) /
☞(Page 1A-40) /
☞(Page 1A-40) /
☞(Page 1A-42) /
☞(Page 1A-42) /
☞(Page 1A-43) /
☞(Page 1A-44) /
☞(Page 1A-46) /
☞(Page 1A-48) /
☞(Page 1A-50) /
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☞(Page 1A-58) /
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☞(Page 1A-63) /
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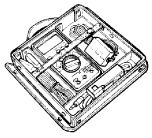
☞(Page 1A-65)



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☞(Page 1A-68) /
☞(Page 1A-69) /
☞(Page 1A-70) /
☞(Page 1A-71) /
☞(Page 1A-71) /
☞(Page 1A-72) /
☞(Page 1A-75) /
☞(Page 1A-78) /
☞(Page 1A-80) /
☞(Page 1A-80) /
☞(Page 1A-82) /
☞(Page 1A-82) /
☞(Page 1A-83) /
☞(Page 1A-84) /
☞(Page 1A-86) /
☞(Page 1A-88) /
☞(Page 1A-89) /
☞(Page 1A-90) /
☞(Page 1A-92) /
☞(Page 1A-93) /
☞(Page 1A-101) /
☞(Page 1A-103) /
☞(Page 1A-104) /
☞(Page 1A-105) /
☞(Page 1A-106) /
☞(Page 1A-107)

09900–25009
Needle pointed probe set
☞(Page 1A-107) /
☞(Page 1A-31) /
☞(Page 1A-33) /
☞(Page 1A-35) /
☞(Page 1A-38) /
☞(Page 1A-40) /
☞(Page 1A-40) /
☞(Page 1A-42) /
☞(Page 1A-42) /
☞(Page 1A-44) /
☞(Page 1A-48) /
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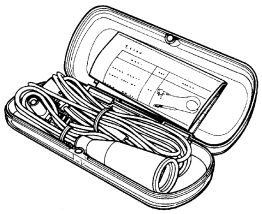
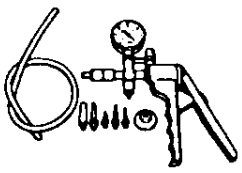


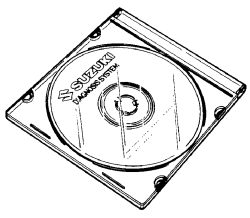
09904–41010
SDS set
☞(Page 1A-12) /
☞(Page 1A-15)

09917–47011
Vacuum pump gauge
☞(Page 1A-36)



09930–82720
Mode select switch
☞(Page 1A-3) / ☞(Page 1A-11) / ☞(Page 1A-11)

99565–01010–010
CD-ROM Ver.10
☞(Page 1A-12) /
☞(Page 1A-15)



Emission Control Devices

Precautions

Precautions for Emission Control Devices

B718H11200001

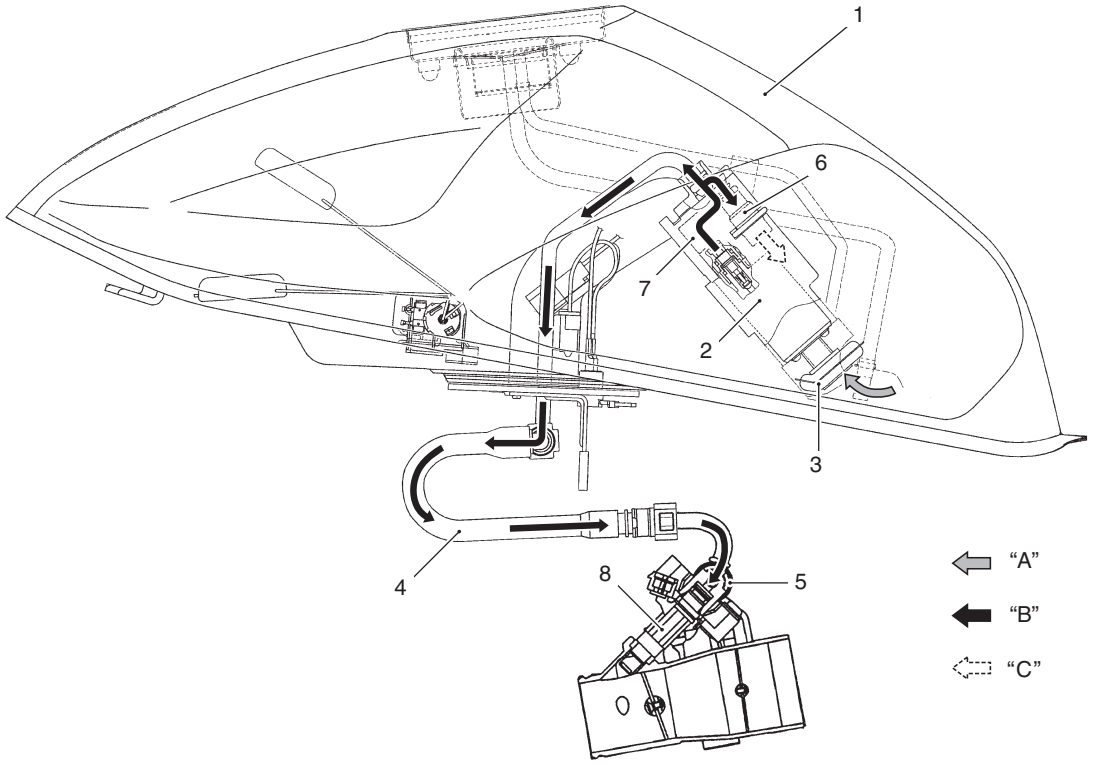
Refer to “General Precautions in Section 00 (Page 00-1)”.

General Description

Fuel Injection System Description

B718H11201001

GSF1250 motorcycles are equipped with a fuel injection system for emission level control. This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits. With varying engine conditions, all of the fuel injection volumes are precisely controlled by the programmed injection maps in the ECM to reduce CO, NOX and HC. Adjusting, interfering with, improper replacement, or resetting of any of the fuel injection components may adversely affect injection performance and cause the motorcycle to exceed the exhaust emission level limits.



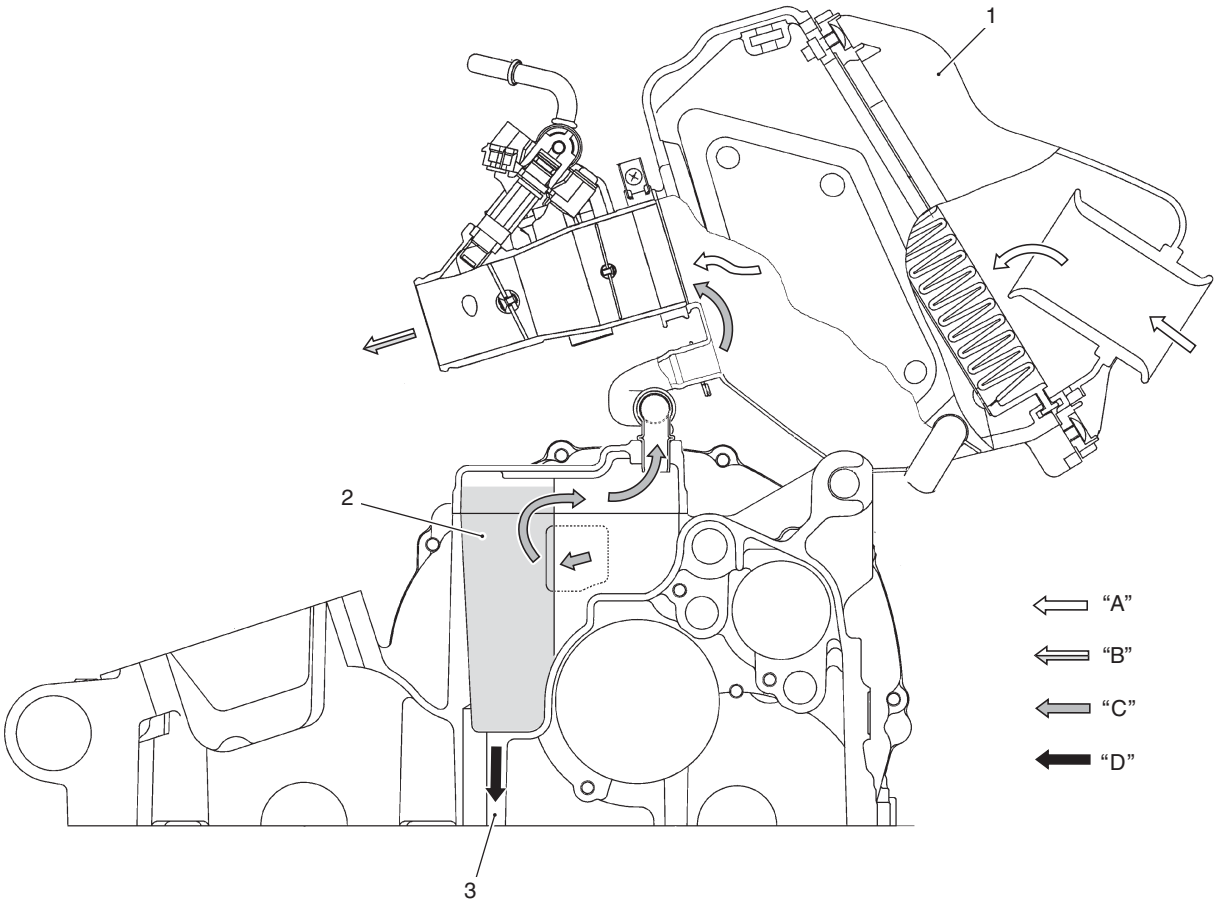
I718H1170001-02

1. Fuel tank	5. Fuel delivery pipe	“A”: Before-pressurized fuel
2. Fuel pump	6. Fuel pressure regulator	“B”: Pressurized fuel
3. Fuel mesh filter (For low pressure)	7. Fuel filter (For high pressure)	“C”: Relieved fuel
4. Fuel feed hose	8. Fuel injector	

Crankcase Emission Control System Description

B718H11201002

The engine is equipped with a PCV system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas in the engine is constantly drawn into the crankcase, which is returned to the combustion chamber through the PCV (breather) hose, air cleaner and throttle body.



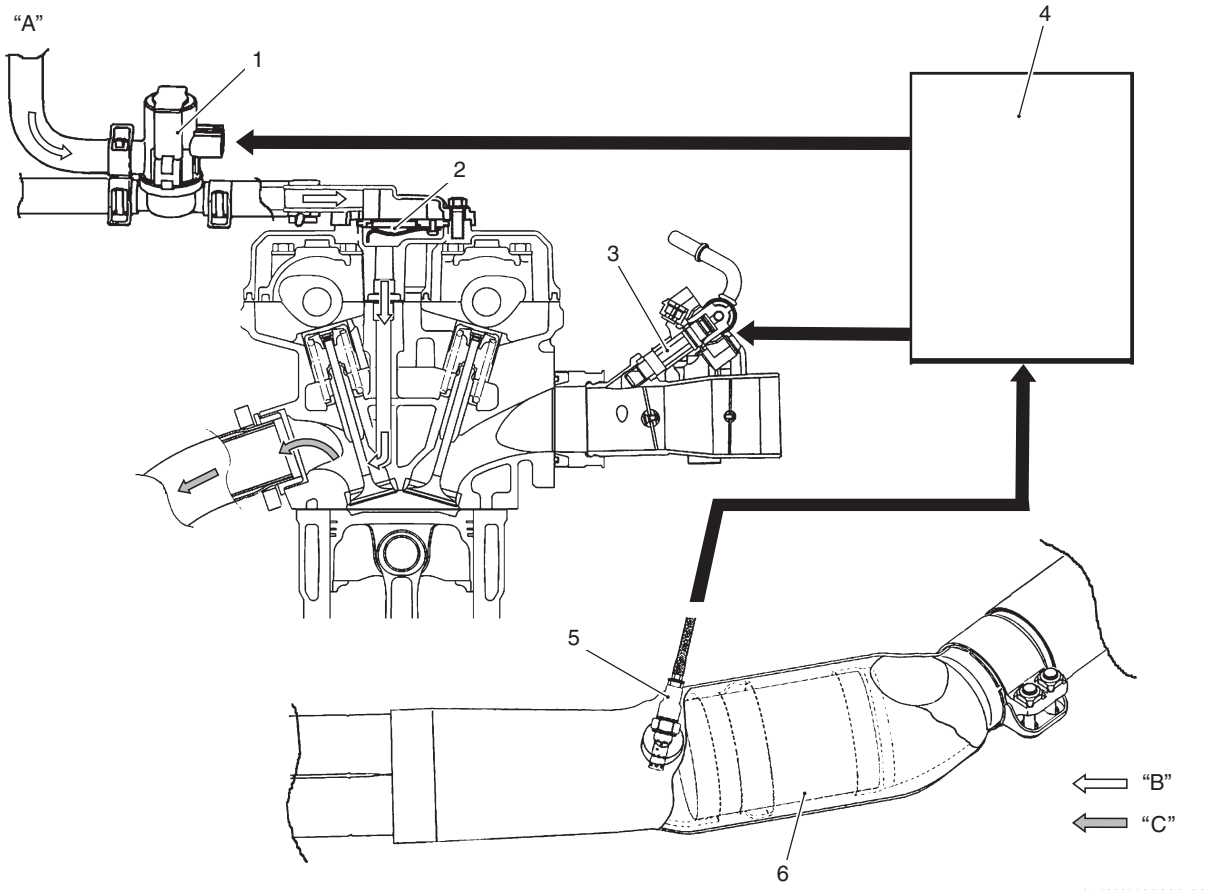
I718H1120038-04

1. Air cleaner box	3. Oil return	“B”: Fuel/Air mixture	“D”: Engine oil
2. Oil breather separator	“A”: Fresh air	“C”: Blow-by gas	

Exhaust Emission Control System Description

B718H11201003

The exhaust emission control system is composed of the PAIR system, catalyst system and ISC system. The fresh air is drawn into the exhaust port through the PAIR control solenoid valve and PAIR reed valve. The PAIR control solenoid valve is operated by the ECM, which is controlled according to the signals from TPS, ECTS, IATS, IAPS and CKPS. ISC valve adjusts the bypass air volume of the throttle body to control engine idling speed with various sensor signals by varying engine running conditions and the idling control contributes to reduce exhaust emission level.



I718H1120039-03

1. PAIR control solenoid valve	4. ECM	"A": From air cleaner box
2. PAIR reed valve	5. HO2 sensor	"B": Fresh air
3. Fuel injector	6. Catalyst	"C": Exhaust gas

Noise Emission Control System Description

B718H11201004

TAMPERING WITH THE NOISE CONTROL SYSTEM PROHIBITED: Local law or federal law prohibits the following acts or the causing thereof:

- The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or
- The use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

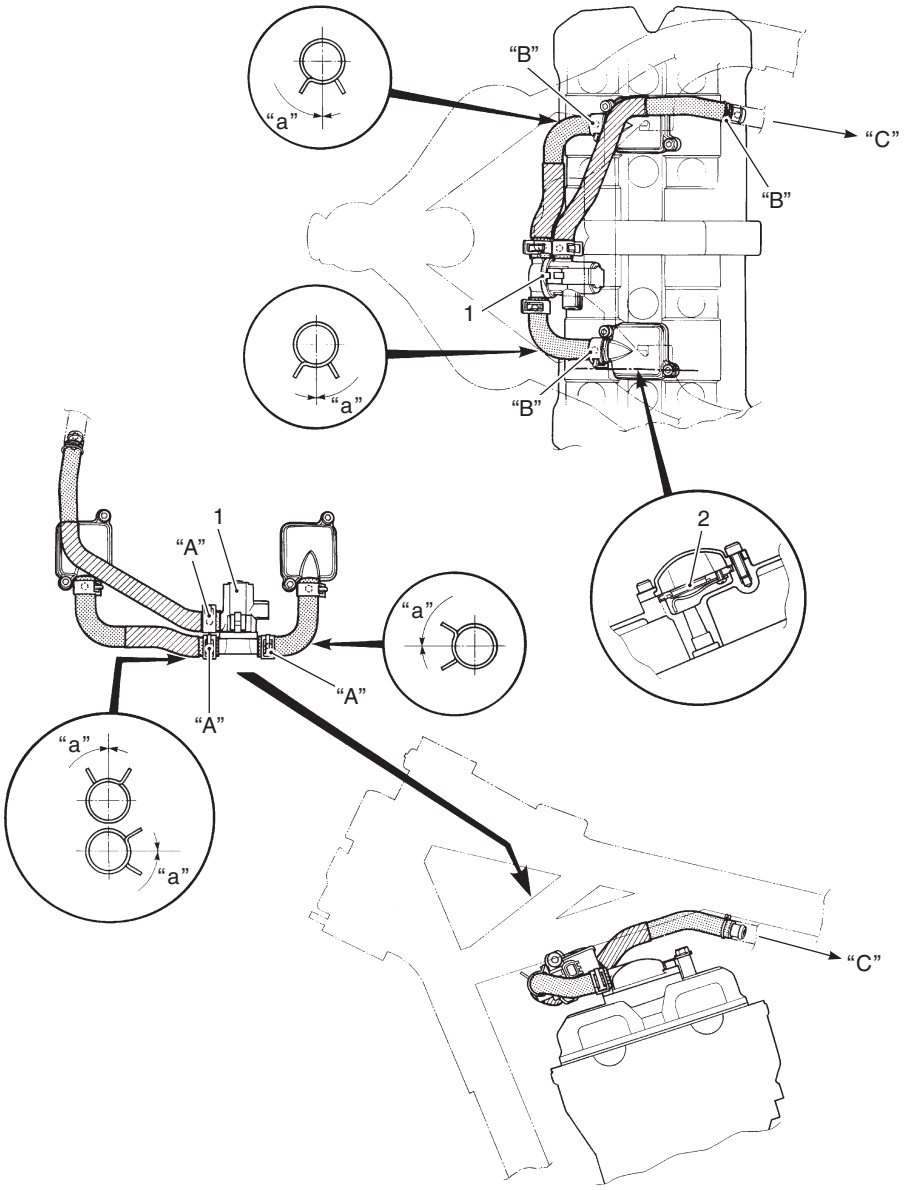
Among Those Acts Presumed to Constitute Tampering are the Acts Listed Below:

- Removing or puncturing the muffler, baffles, header pipes, screen type spark arrester (if equipped) or any other component which conducts exhaust gases.
- Removing or puncturing the air cleaner case, air cleaner cover, baffles or any other component which conducts intake air.
- Replacing the exhaust system or muffler with a system or muffler not marked with the same model specific code as the code listed on the Motorcycle Noise Emission Control Information label.

Schematic and Routing Diagram

PAIR System Hose Routing Diagram

B718H11202001



I718H1120043-01

1. PAIR control solenoid valve	"A": Marking (Yellow)	"C": To air cleaner box
2. PAIR reed valve	"B": Marking (White)	"a": Approx. 0°

Repair Instructions

Heated Oxygen Sensor (HO2S) Removal and Installation

B718H11206005

Removal

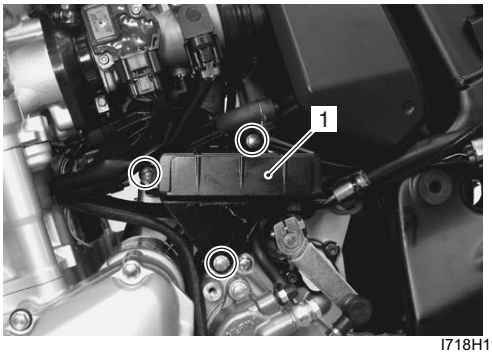
⚠ WARNING

Do not remove the HO2 sensor while it is hot.

⚠ CAUTION

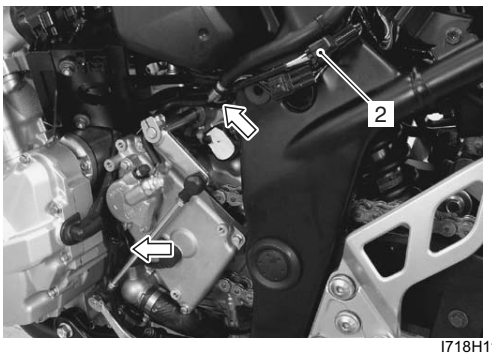
- **Be careful not to expose the HO2 sensor to excessive shock.**
- **Do not use an impact wrench when removing or installing the HO2 sensor.**
- **Be careful not to twist or damage the sensor lead wires.**

1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the engine sprocket outer cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
3) Move the regulator/rectifier assembly (1) by removing the regulator/rectifier bracket bolts.



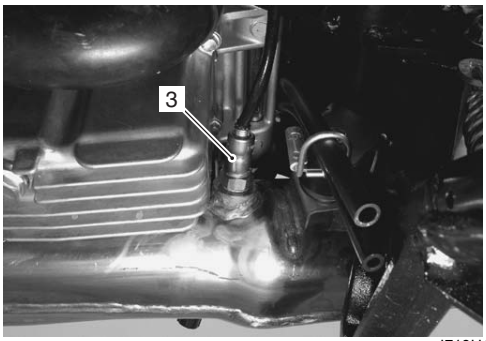
I718H1120018-01

4) Disconnect the HO2 sensor coupler (2).
5) Release the HO2 sensor lead wire from the clamps.



I718H1120019-01

6) Remove the HO2 sensor (3).



I718H1120020-01

Installation

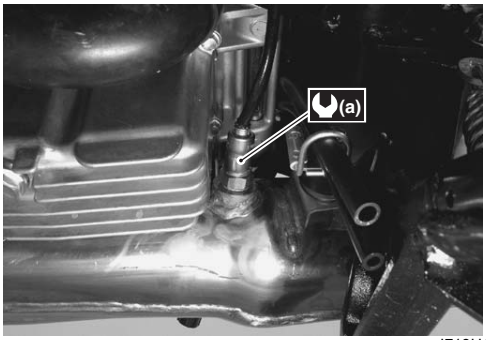
Install the HO2 sensor in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

Do not apply oil or other materials to the sensor air hole.

- Tighten the HO2 sensor to the specified torque.

  Tightening torque
  HO2 sensor (a): 25 N·m (2.5 kgf-m, 18.0 lb-ft)



I718H1120021-01

- Route the HO2 sensor lead wire properly. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-8)”.

Heated Oxygen Sensor (HO2S) Inspection

B718H11206006

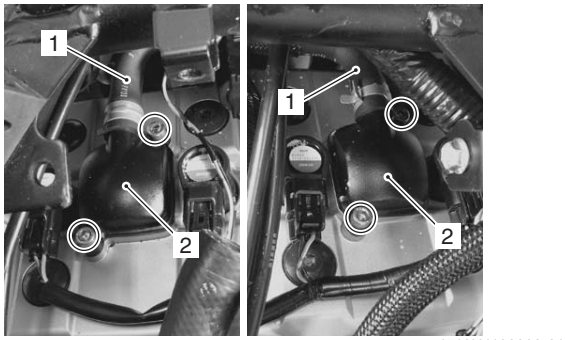
Refer to “DTC “C44” (P0130/P0135): HO2 Sensor (HO2S) Circuit Malfunction in Section 1A (Page 1A-102)”.

PAIR Reed Valve Removal and Installation

B718H11206008

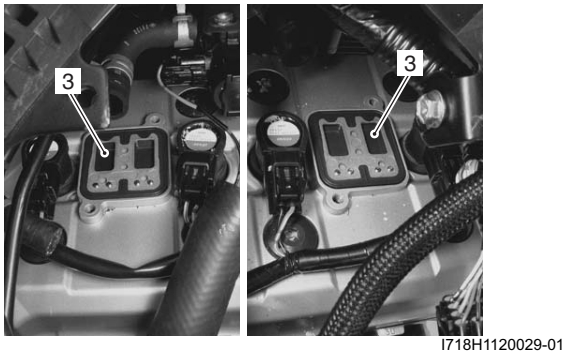
Removal

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Drain engine coolant and remove the thermostat connector. Refer to “Thermostat Connector / Thermostat Removal and Installation in Section 1F (Page 1F-9)”.
3) Disconnect the hoses (1) and remove the PAIR reed valve covers (2).



I718H1120023-01

4) Remove the PAIR reed valves (3).



I718H1120029-01

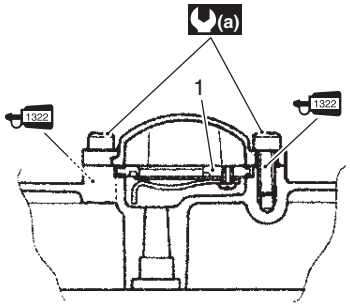
Installation

Install the PAIR reed valve in the reverse order of removal. Pay attention to the following points:

- Install the PAIR reed valves (1) as shown.
- Apply thread lock to the bolts and tighten them to the specified torque.

1342 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
PAIR reed valve cover bolt (a): 11 N·m (1.1 kgf-m, 8.0 lb-ft)



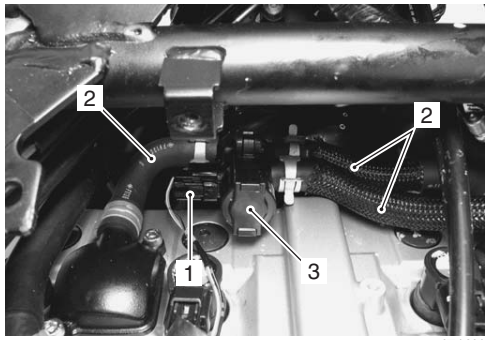
I718H1120042-01

PAIR Control Solenoid Valve Removal and Installation

B718H11206001

Removal

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Drain engine coolant and remove the thermostat connector. Refer to “Thermostat Connector / Thermostat Removal and Installation in Section 1F (Page 1F-9)”.
3) Disconnect the PAIR control solenoid valve coupler (1) and PAIR hoses (2).
4) Remove the PAIR control solenoid valve (3).



I718H1120007-02

Installation

Install the PAIR control solenoid valve in the reverse order of removal. Pay attention to the following point:

- Connect the PAIR control solenoid valve coupler and PAIR hoses securely. Refer to “PAIR System Hose Routing Diagram (Page 1B-4)”.

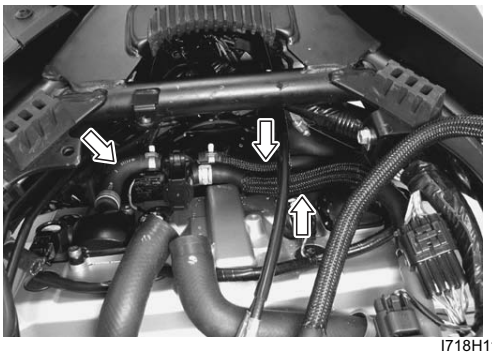
PAIR System Inspection

B718H11206002

PAIR Hose

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.

2) Inspect the hoses for wear or damage. If it is worn or damaged, replace the PAIR hose with a new one. Refer to “PAIR System Hose Routing Diagram (Page 1B-4)”.



I718H1120031-01

3) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.

PAIR Reed Valve

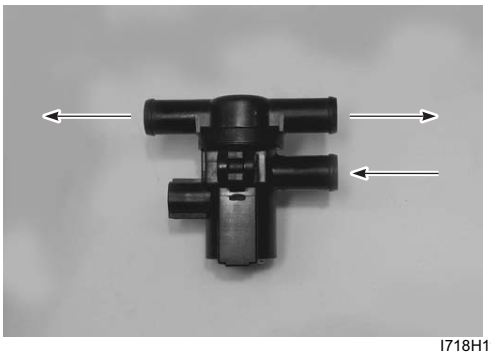
1) Remove the PAIR reed valves. Refer to “PAIR Reed Valve Removal and Installation (Page 1B-6)”.
2) Inspect the reed valves for the carbon deposit. If the carbon deposit is found in the reed valve, replace the PAIR reed valve with a new one.

I718H1120041-01

3) Reinstall the PAIR reed valve. Refer to “PAIR Reed Valve Removal and Installation (Page 1B-6)”.

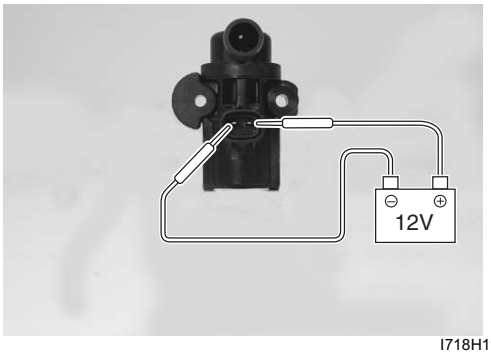
PAIR Control Solenoid Valve

1) Remove the PAIR control solenoid valve. Refer to “PAIR Control Solenoid Valve Removal and Installation (Page 1B-6)”.
2) Check that air flows through the air inlet port to the air outlet port. If air does not flow out, replace the PAIR control solenoid valve with a new one.



I718H1120033-01

3) Connect the 12 V battery to the PAIR control solenoid valve terminals and check the air flow. If air does not flow out, the solenoid valve is in normal condition.



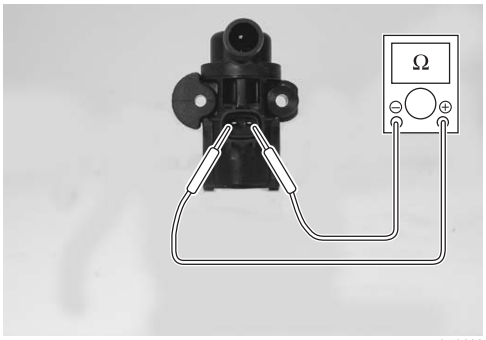
I718H1120034-01

4) Check the resistance between the terminals of the PAIR control solenoid valve.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Resistance (Ω)

PAIR control solenoid valve resistance
18 – 22 Ω at 20 – 30 °C (68 – 86 °F)



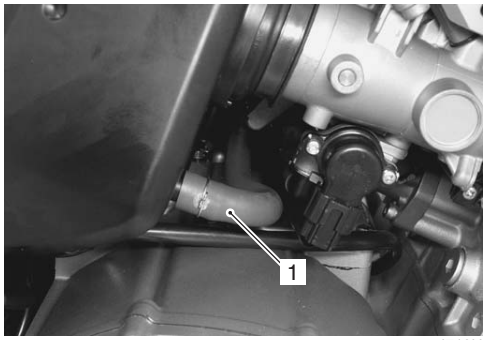
I718H1120035-01

5) Reinstall the PAIR control solenoid valve. Refer to "PAIR Control Solenoid Valve Removal and Installation (Page 1B-6)".

Crankcase Breather (PCV) Hose Inspection

B718H11206003

Inspect the PCV hose (1) for wear and damage.
If it is worn or damaged, replace the PCV hose with a new one.
Check that the PCV hose (1) is securely connected.



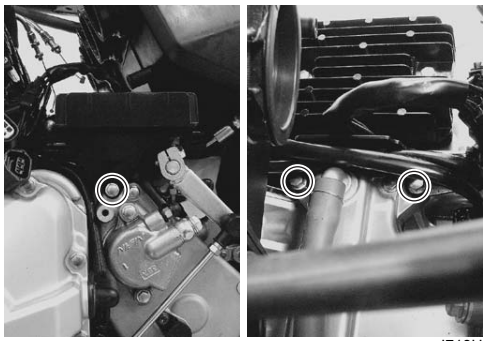
I718H1120022-01

Crankcase Breather (PCV) Hose / Cover / Separator Removal and Installation

B718H11206009

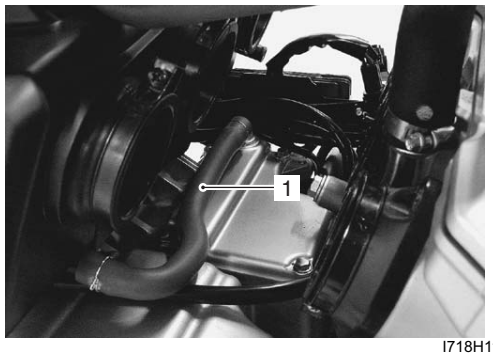
Removal

1) Remove the throttle body. Refer to "Throttle Body Removal and Installation in Section 1D (Page 1D-9)".
2) Remove the engine sprocket outer cover. Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)".
3) Remove the regulator/rectifier bracket bolts and move the regulator/rectifier assembly.



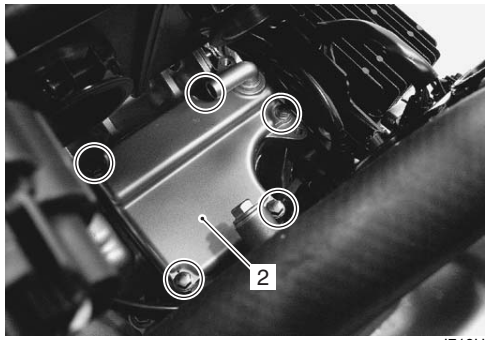
I718H1120036-01

4) Remove the PCV hose (1).



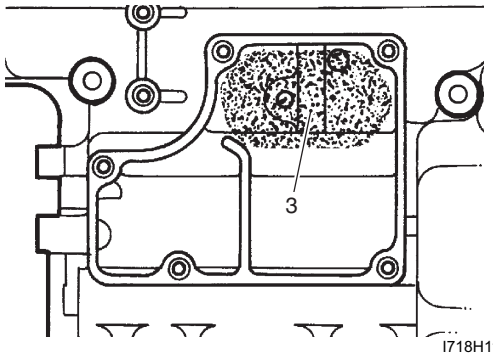
I718H1120037-01

5) Remove the crankcase breather (PCV) cover (2).



I718H1120011-02

6) Remove the oil breather separator (3).



I718H1120028-01

Installation

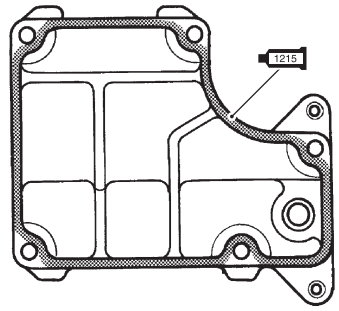
Installation is in the reverse order of removal.
Pay attention to the following points:

- Apply bond to the mating surface of the breather cover.

  1215 : Sealant 99000–31110 (SUZUKI BOND No.1215 or equivalent)

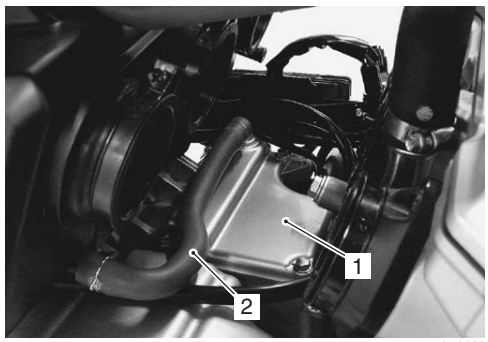
  NOTE

  - **Make surfaces free from moisture, oil, dust and other foreign materials.**
  - **Spread the sealant on surfaced thinly to form an even layer, and assembly the crankcases within a few minutes.**



I718H1120040-03

- Fit the breather cover (1) and tighten the bolts.
- Connect the PCV hose (2) securely.



I718H1120014-02

Crankcase Breather (PCV) Cover Inspection

B718H11206010

Inspect the crankcase breather (PCV) cover in the following procedures.

1) Remove the crankcase breather cover. Refer to “Crankcase Breather (PCV) Hose / Cover / Separator Removal and Installation (Page 1B-8)”.
2) Inspect the crankcase breather cover in the carbon deposit. If the carbon deposit is found in the crankcase breather cover, remove it.

I718H1120015-02

3) Reinstall the crankcase breather cover. Refer to “Crankcase Breather (PCV) Hose / Cover / Separator Removal and Installation (Page 1B-8)”.

Specifications

Service Data

B718H11207002

FI sensors

Item	Specification	Note
HO2 sensor resistance	Approx. 8 Ω at 23 °C (73 F°)	
HO2 sensor output voltage	0.3 V and less at idle speed	
	0.6 V and more at 3 000 r/min	
PAIR control solenoid valve resistance	18 – 22 Ω at 20 – 30 °C (68 – 86 °F)	

Tightening Torque Specifications

B718H11207003

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
HO2 sensor	25	2.5	18.0	☞(Page 1B-5)
PAIR reed valve cover bolt	11	1.1	8.0	☞(Page 1B-6)

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

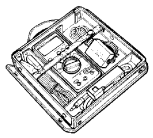
Recommended Service Material

B718H11208001

Material	SUZUKI recommended product or Specification		Note
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000–31110	☞(Page 1B-9)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 1B-6)

Special Tool

B718H11208002

09900–25008 Multi-circuit tester set ☞(Page 1B-7)		

Engine Electrical Devices

Precautions

Precautions for Engine Electrical Device

B718H11300001

Refer to “General Precautions in Section 00 (Page 00-1)” and “Precautions for Electrical Circuit Service in Section 00 (Page 00-2)”.

Component Location

Engine Electrical Components Location

B718H11303001

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

Diagnostic Information and Procedures

Engine Symptom Diagnosis

B718H11304001

Refer to “Engine Symptom Diagnosis in Section 1A (Page 1A-7)”.

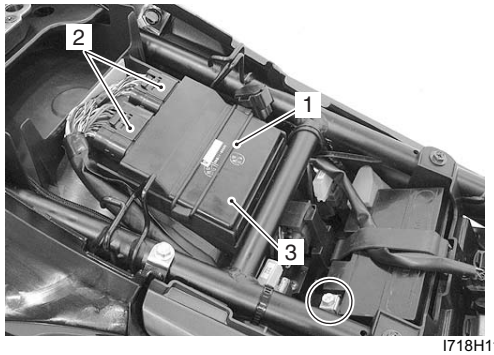
Repair Instructions

ECM Removal and Installation

B718H11306023

Removal

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the battery (–) lead wire.
3) Remove the rubber band (1).
4) Disconnect the ECM couplers (2) and remove the ECM (3).



I718H1130020-01

Installation

Install the ECM in the reverse order of removal.

CKP Sensor Inspection

B718H11306003

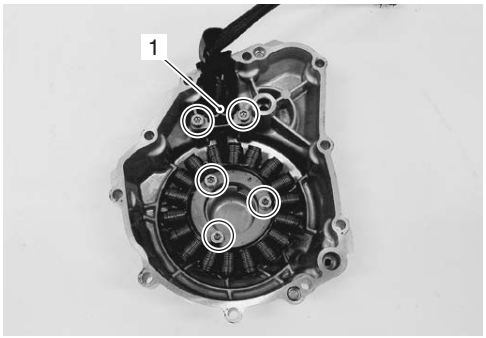
Refer to “CKP Sensor Inspection in Section 1H (Page 1H-7)”.

CKP Sensor Removal and Installation

B718H11306004

Removal

1) Remove the generator cover. Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.
2) Remove the CKP sensor (1) along with generator starter.



I718H1130012-01

Installation

Install the CKP sensor in the reverse order of removal. Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.

IAP Sensor (No.1) Inspection

B718H11306005

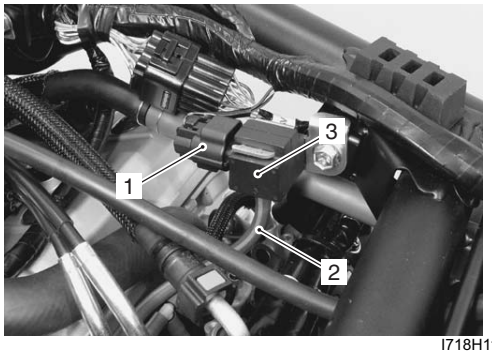
Refer to “DTC “C13” (P0105-H/L): IAP Sensor (No.1) Circuit Malfunction in Section 1A (Page 1A-28)”.

IAP Sensor (No.1) Removal and Installation

B718H11306035

Removal

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Disconnect the IAP sensor (No.1) coupler (1) and vacuum hose (2).
3) Remove the IAP sensor (No.1) (3).



I718H1130013-01

Installation

Install the IAP sensor (No.1) in the reverse order of removal.

IAP / TP / IAT Sensor Inspection

B718H11306029

Refer to “DTC “C17” (P1750-H/L): IAP Sensor (No.2) Circuit Malfunction in Section 1A (Page 1A-52)”, “DTC “C14” (P0120-H/L): TP Sensor Circuit Malfunction in Section 1A (Page 1A-37)” and “DTC “C21” (P0110-H/L): IAT Sensor Circuit Malfunction in Section 1A (Page 1A-60)”.

NOTE

IAP sensor (No.2)/TP sensor/IAT sensor are combined into one.

IAP / TP / IAT Sensor Removal and Installation

B718H11306006

Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

⚠ CAUTION

- **Never remove the IAP/TP/IAT sensor from the throttle body.**
- **The IAP/TP/IAT sensor, STVA and throttle body are available only as an assembly.**

ECT Sensor Removal and Installation

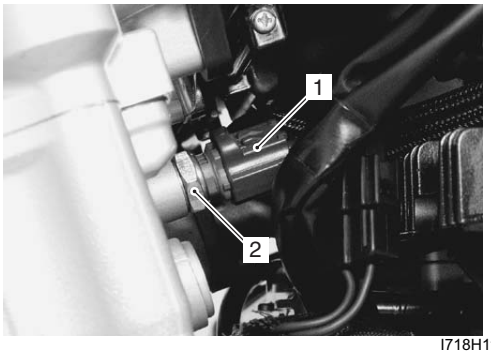
B718H11306011

Removal

1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Disconnect the coupler (1) and remove the ECT sensor (2).

⚠ CAUTION

Take special care when handling the ECT sensor. It may cause damage if it gets an excessive impact.



I718H1130015-01

Installation

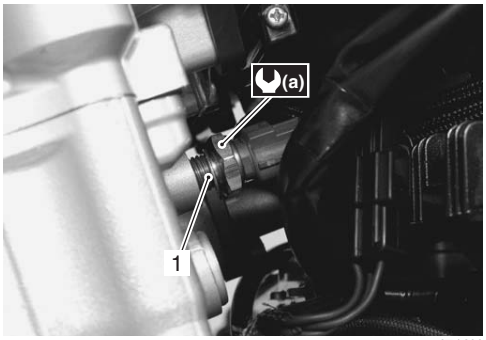
Install the ECT sensor in the reverse order of removal. Pay attention to the following points:

- Tighten the ECT sensor to the specified torque.

⚠ CAUTION

Use the new gasket washer (1) to prevent engine coolant leakage.

Tightening torque
ECT sensor (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



I718H1130007-01

- Pour engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.

ECT Sensor Inspection

B718H11306010

Refer to “DTC “C15” (P0115-H/L): ECT Sensor Circuit Malfunction in Section 1A (Page 1A-45)”.
Inspect the ECT sensor in the following procedures:

1) Remove the ECT sensor. Refer to “ECT Sensor Removal and Installation (Page 1C-2)”.
2) Connect the ECT sensor (1) to a circuit tester and place it in the oil (2) contained in a pan, which is placed on a stove.
3) Heat the oil to raise its temperature slowly and read the column thermometer (3) and the ohmmeter.
   If the ECT sensor ohmic valve does not change in the proportion indicated, replace it with a new one.

⚠ CAUTION

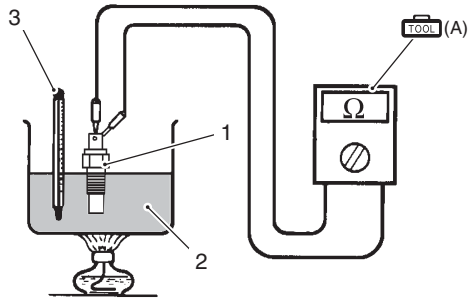
- **Take special care when handling the ECT sensor. It may cause damage if it gets an excessive sharp impact.**
- **Do not contact the ECT sensor and the column thermometer with a pan.**

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)

Tester knob indication
Resistance (Ω)

Temperature sensor specification

Temperature	Standard resistance
20 °C (68 °F)	Approx. 2.45 kΩ
50 °C (122 °F)	Approx. 0.811 kΩ
80 °C (176 °F)	Approx. 0.318 kΩ
110 °C (230 °F)	Approx. 0.142 kΩ



I718H1130014-01

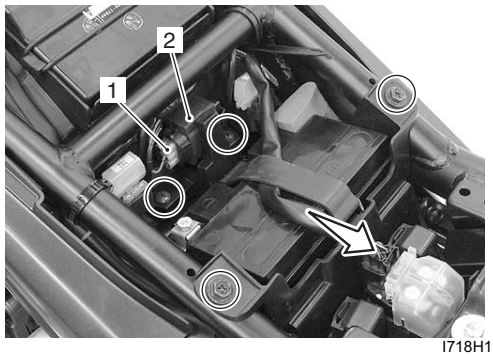
4) Install the ECT sensor. Refer to “ECT Sensor Removal and Installation (Page 1C-2)”.

TO Sensor Removal and Installation

B718H11306019

Removal

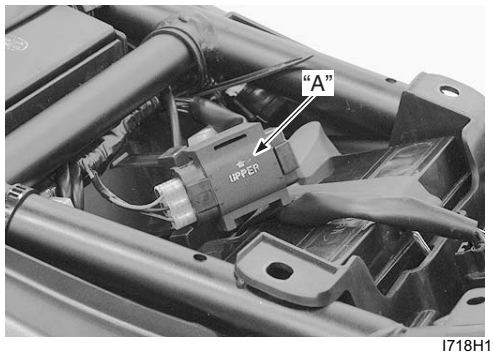
1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Move the battery case by removing the bolts and screws.
3) Disconnect the coupler (1) and remove the TO sensor (2).



I718H1130024-01

Installation
Install the TO sensor in the reverse order of removal.
Pay attention to the following point:

- When installing the TO sensor, bring the “UPPER” letters and arrow mark “A” upward.



I718H1130022-01

TO Sensor Inspection

B718H11306018

Refer to “DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction in Section 1A (Page 1A-67)”.

STP Sensor Inspection

B718H11306024

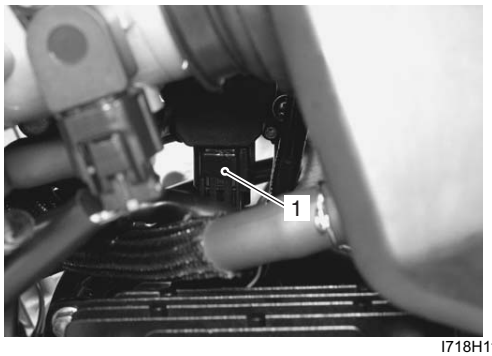
Refer to “DTC “C29” (P1654-H/L): Secondary Throttle Position Sensor (STPS) Circuit Malfunction in Section 1A (Page 1A-77)”.

STP Sensor Adjustment

B718H11306025

Adjust the STP sensor in the following procedures:

1) Remove the air cleaner cover and air cleaner element. Refer to “Air Cleaner Element Removal and Installation in Section 1D (Page 1D-6)”.
2) Disconnect the STVA lead wire coupler (1).



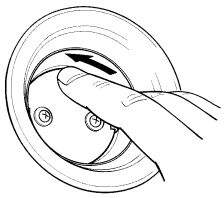
I718H1130002-01

3) Insert the needle pointed probes to the STP sensor coupler (between Y/W and B/Br wires).
4) Turn the ignition switch ON.
5) Close the secondary throttle valve by finger and measure the STP sensor output voltage.

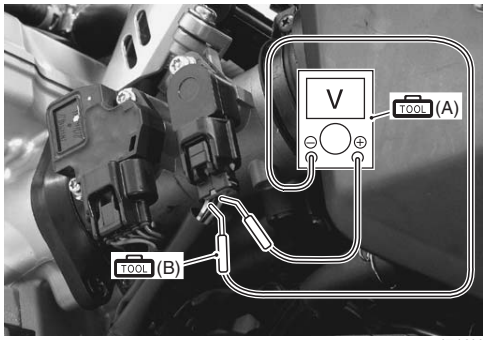
Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)
TOOL (B): 09900–25009 (Needle pointed probe set)

Tester knob indication
Voltage (⎓)

STP sensor output voltage
ST valve is fully closed: Approx. 0.6 V ((+): Y/W – (–): B/Br)



I718H1130017-01

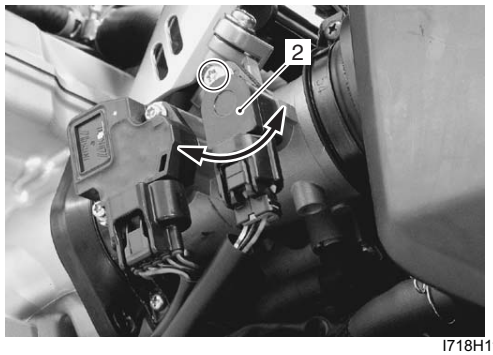


I718H1130016-02

6) Loosen the STP sensor mounting screw adjust the STP sensor (2) until the output voltage comes within the specified value and tighten the STP sensor mounting screw.

Special tool
TOOL : 09930–11950 (Torx wrench)

Tightening torque
STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



I718H1130003-01

7) Reinstall the removed parts.

STP Sensor Removal and Installation

B718H11306026

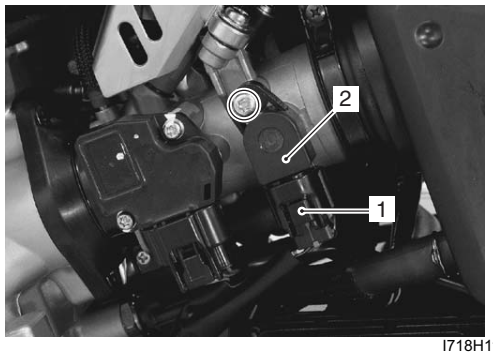
Removal

1) Turn the ignition switch OFF.
2) Disconnect the coupler (1) and remove the STP sensor (2) with the special tool.

NOTE

Prior to disassembly, mark each sensor’s original position with a paint or scribe for accurate reinstallation.

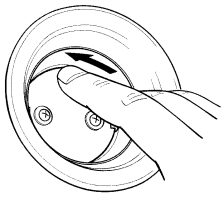
Special tool
TOOL : 09930–11950 (Torx wrench)



I718H1130004-01

Installation

1) Remove the air cleaner cover and air cleaner element. Refer to “Air Cleaner Element Removal and Installation in Section 1D (Page 1D-6)”.
2) Close the secondary throttle valve by finger.



I718H1130017-01

3) With the STV fully closed, install the STP sensor (1) and tighten the STP sensor mounting screw to the specified torque.

⚠ CAUTION

Replace the O-ring (2) with a new one.

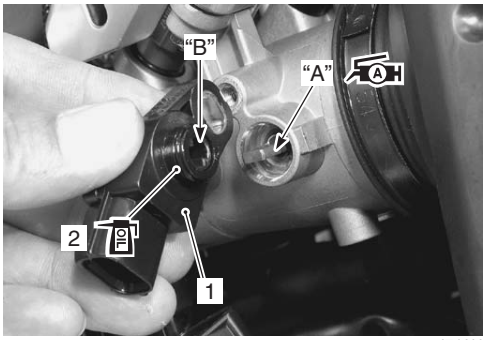
NOTE

- **Apply a thin coat of engine oil to the O-ring.**
- **Align the secondary throttle shaft end “A” with the groove “B” of STP sensor.**
- **Apply grease to the secondary throttle shaft end “A” if necessary.**

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

Special tool
: 09930–11950 (Torx wrench)

Tightening torque
STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



I718H1130009-01

4) Make sure the STP valve open or close smoothly.
5) Adjust the position of STP sensor. Refer to “STP Sensor Adjustment (Page 1C-4)”.
6) Reinstall the removed parts.

STV Actuator Inspection

B718H11306031

Refer to “DTC “C28” (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction in Section 1A (Page 1A-73)”.

STV Actuator Removal and Installation

B718H11306032

Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

⚠ CAUTION

- **Never remove the STVA from the throttle body.**
- **The STVA, IAP/TP/IAT sensor and throttle body are available only as an assembly.**

ISC Valve Inspection

B718H11306027

Refer to “DTC “C40” (P0505 / P0506 / P0507): ISC Valve Circuit Malfunction in Section 1A (Page 1A-91)”.

ISC Valve Removal and Installation

B718H11306028

Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

⚠ CAUTION

Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF. If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve position being written in ECM and causing an error of ISC valve operation.

NOTE

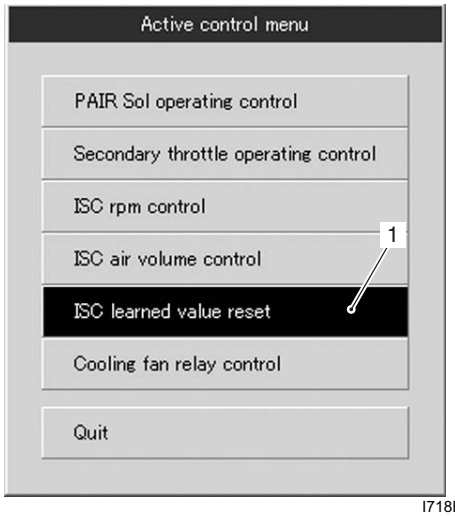
When the ISC valve is removed or replaced, the ISC valve or new one should be set to Preset position. Refer to “ISC Valve Preset and Opening Initialization (Page 1C-6)”.

ISC Valve Preset and Opening Initialization

B718H11306036

When removing or replacing the ISC valve, set the ISC valve to the following procedures:

1) Turn the ignition switch ON.
2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
3) Click the “Active control”.
4) Click the “ISC learned valve reset” (1).



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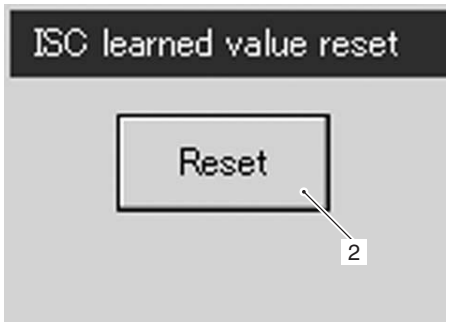
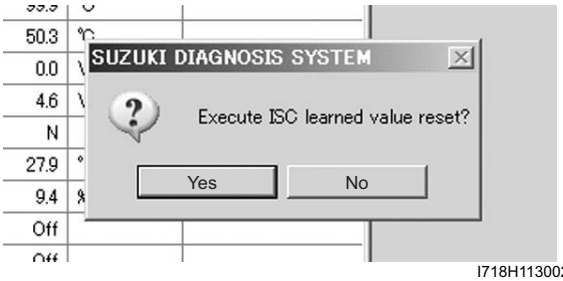
5) Click the “Reset” button to clear the ISC leaned valve.

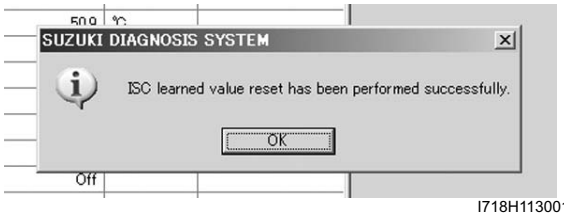




I718H1130023-02

NOTE

The leaned value of the ISC valve is set at Preset position.



I718H1130019-01

6) Close the SDS tool and turn the ignition switch OFF.

NOTE

The ISC valve opening initialization is automatically started after the ignition switch is turned OFF position.

HO2 Sensor Inspection

B718H11306020

Refer to “DTC “C44” (P0130/P0135): HO2 Sensor (HO2S) Circuit Malfunction in Section 1A (Page 1A-102)”.

HO2 Sensor Removal and Installation

B718H11306021

Refer to “Heated Oxygen Sensor (HO2S) Removal and Installation in Section 1B (Page 1B-5)”.

GP Switch Inspection

B718H11306033

Refer to “Side-stand / Ignition Interlock System Parts Inspection in Section 1I (Page 1I-8)”.

GP Switch Removal and Installation

B718H11306034

Refer to “Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)”.

Specifications

Service Data

B718H11307002

FI Sensors

Item	Specification		Note
CKP sensor resistance	90 – 150 Ω		
CKP sensor peak voltage	2.0 V and more		When cranking
IAP sensor input voltage (No.1)	4.5 – 5.5 V		
IAP sensor output voltage (No.1)	Approx. 2.7 V at idle speed		
IAP sensor input voltage (No.2)	4.5 – 5.5 V		
IAP sensor output voltage (No.2)	2.0 – 3.0 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.15 – 4.85 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	Approx. 2.4 V at 20 °C (68 °F)		
IAT sensor resistance	Approx. 2.56 kΩ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	80 V and more		When cranking
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 4.5 V	
STV actuator resistance	Approx. 7.0 Ω		
ISC valve resistance	Approx. 20 Ω at 20 °C (68 °F)		
HO2 sensor resistance	Approx. 8 Ω at 23 °C (73 °F)		
HO2 sensor output voltage	0.3 V and less at idle speed		
	0.6 V and more at 3 000 r/min		
PAIR control solenoid valve resistance	18 – 22 Ω at 20 – 30 °C (68 – 86 °F)		
EVAP purge control valve	Approx. 32 Ω at 20 °C (68 °F)		

Tightening Torque Specifications

B718H11307003

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
ECT sensor	18	1.8	13.0	☞(Page 1C-2)
STP sensor mounting screw	3.5	0.35	2.5	☞(Page 1C-4) / ☞(Page 1C-5)

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

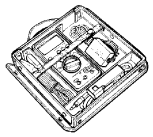
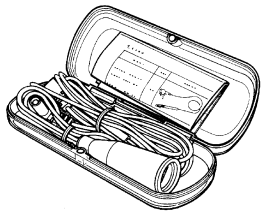
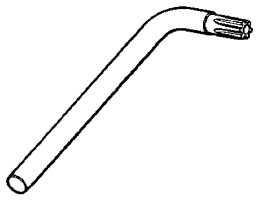
Recommended Service Material

B718H11308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1C-5)

Special Tool

B718H11308002

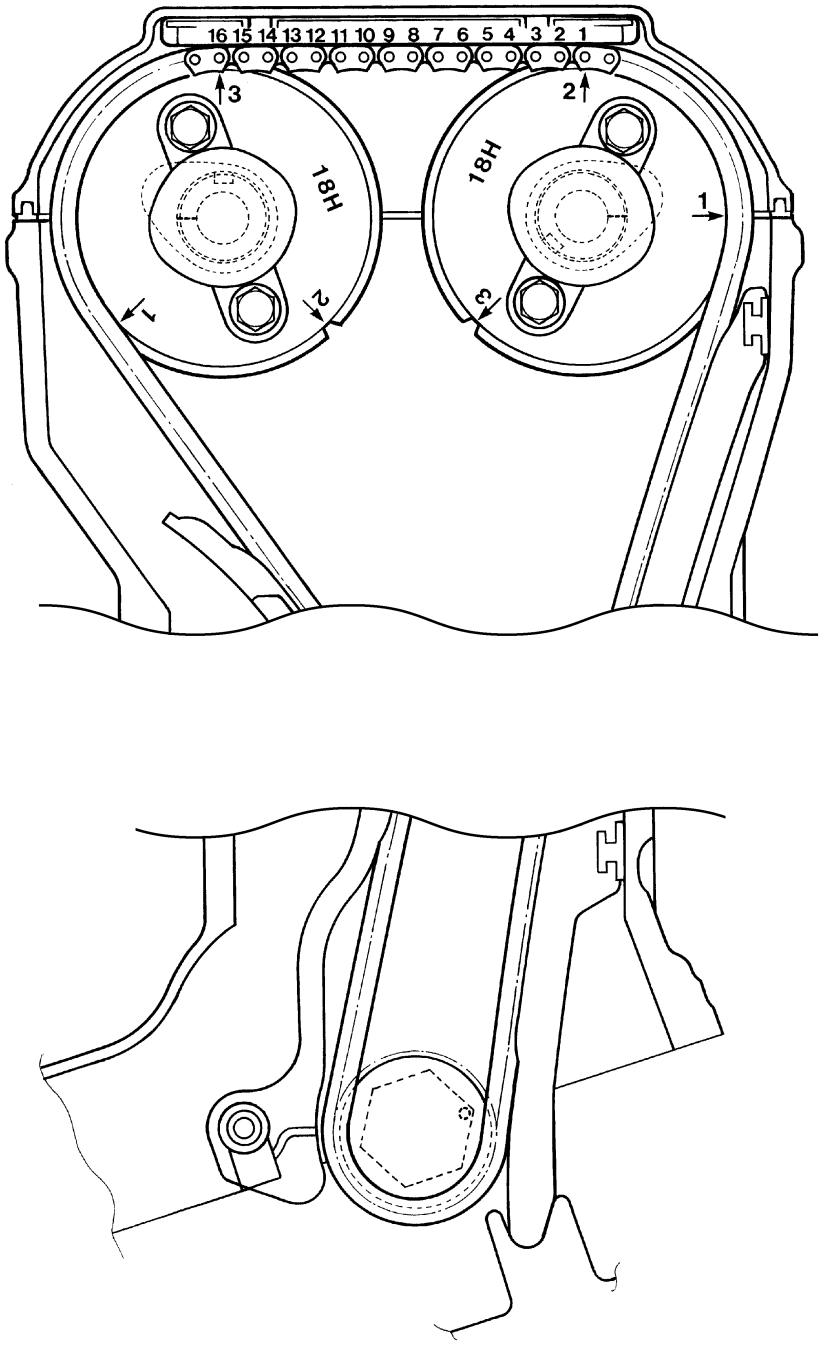
09900–25008 Multi-circuit tester set ☞(Page 1C-3) / ☞(Page 1C-4) 	09900–25009 Needle pointed probe set ☞(Page 1C-4) 
09930–11950 Torx wrench ☞(Page 1C-4) / ☞(Page 1C-4) / ☞(Page 1C-5) 	

Engine Mechanical

Schematic and Routing Diagram

Camshaft and Sprocket Assembly Diagram

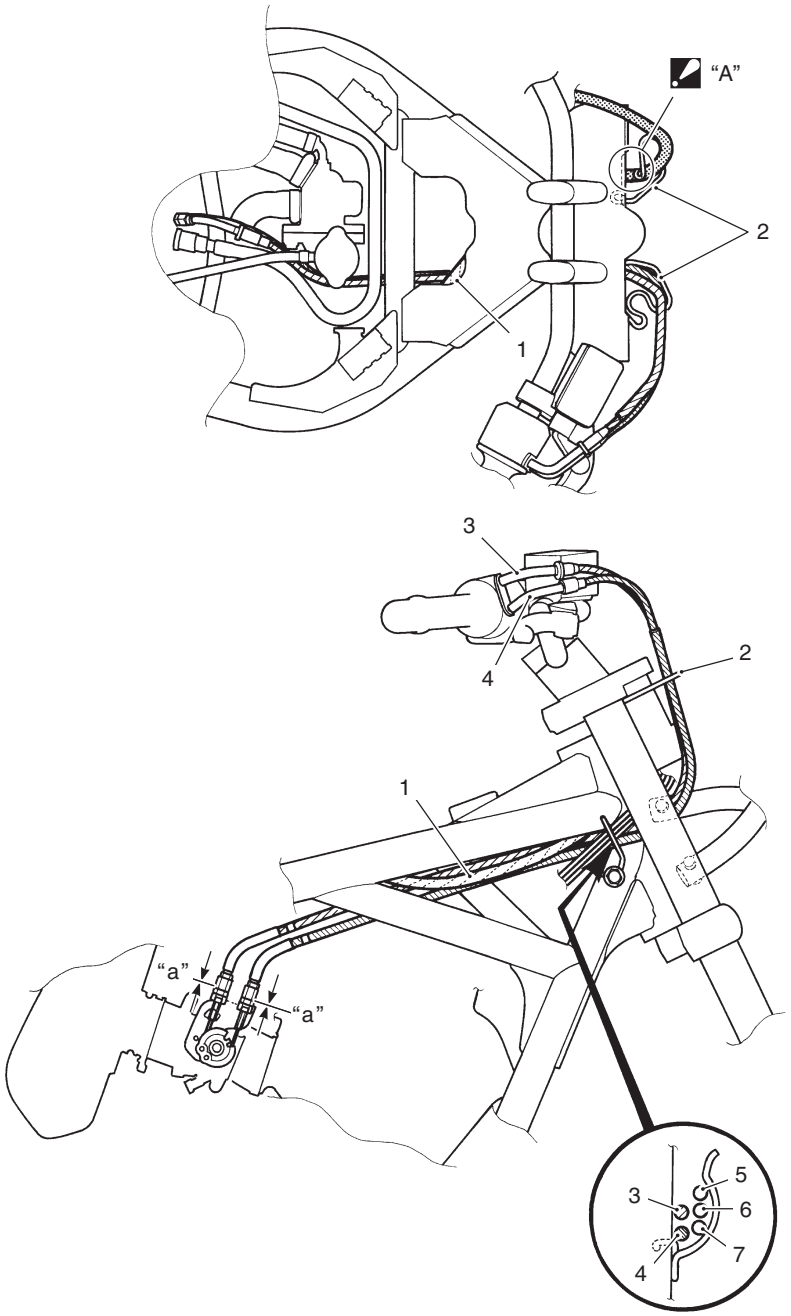
B718H11402001



I718H1140393-01

Throttle Cable Routing Diagram

B718H11402002



I718H1140308-03

1. Wiring harness	4. Throttle cable No.2	7. Ignition switch lead wire
2. Cable guide (GSF1250S/SA only)	5. Handlebar switch lead wire (L)	"a": 0 mm (0 in)
3. Throttle cable No.1	6. Handlebar switch lead wire (R)	"A": Don't contact the tip of cable guide with the upper bracket.

Diagnostic Information and Procedures

Engine Mechanical Symptom Diagnosis

B718H11404002

Refer to “Engine Symptom Diagnosis in Section 1A (Page 1A-7)”.

Compression Pressure Check

B718H11404001

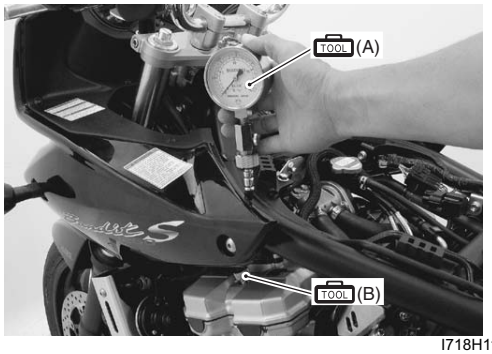
The compression pressure reading of a cylinder is a good indicator of its internal condition.
The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

NOTE

- **Before checking the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values and the valves are properly adjusted.**
- **Make sure that the battery is in fully-charged condition.**

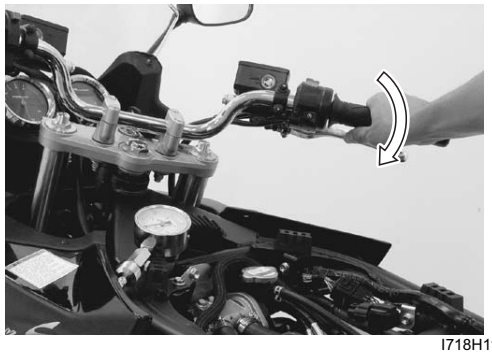
1) Warm up the engine.
2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Remove the frame head covers, left and right. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
4) Remove all the spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
5) Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.

Special tool
TOOL (A): 09915–64512 (Compression gauge)
TOOL (B): 09915–63311 (Compression gauge attachment)



I718H1140380-01

6) Keep the throttle grip in the fully-opened position.



I718H1140381-01

7) Press the starter button and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.
8) Repeat this procedure with the other cylinders.

Compression pressure specification

Standard	Limit	Difference
1 300 – 1 700 kPa (13 – 17 kgf/cm², 185 – 242 psi)	**1 000 kPa (10 kgf/cm², 142 psi)**	**200 kPa (2 kgf/cm², 28 psi)**

Low compression pressure can indicate any of the following conditions:

- Excessively worn cylinder walls
- Worn piston or piston rings
- Piston rings stuck in grooves
- Poor valve seating
- Ruptured or otherwise defective cylinder head gasket

Overhaul the engine in the following cases:

- Compression pressure in one of the cylinders is 1 000 kPa (10 kgf/cm², 142 psi) and less.
- The difference in compression pressure between any two cylinders is 200 kPa (2 kgf/cm², 28 psi) and more.
- All compression pressure readings are below 1 300 kPa (13 kgf/cm², 185 psi) even when they measure 1 000 kPa (10 kgf/cm², 142 psi) and more.

9) After checking the compression pressure, reinstall the removed parts.

Repair Instructions

Engine Components Removable with the Engine in Place

B718H11406001

Engine components which can be removed while the engine is installed on the frame are as follows. For the installing and removing procedures, refer to respective paragraphs describing each component.

Center of Engine

Item	Removal	Inspection	Installation
Air cleaner element	Refer to “Air Cleaner Element Removal and Installation (Page 1D-6)”.	Refer to “Air Cleaner Element Inspection and Cleaning in Section 0B (Page 0B-3)”.	Refer to “Air Cleaner Element Removal and Installation (Page 1D-6)”.
Exhaust pipes/Muffler	Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.	Refer to “Exhaust System Inspection in Section 1K (Page 1K-6)”.	Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.
Oil filter	Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.	—	Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
Oil cooler	Refer to “Oil Cooler Removal and Installation in Section 1E (Page 1E-7)”.	—	Refer to “Oil Cooler Removal and Installation in Section 1E (Page 1E-7)”.
Oil pan	Refer to “Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation in Section 1E (Page 1E-4)”.	—	Refer to “Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation in Section 1E (Page 1E-4)”.
Throttle body	Refer to “Throttle Body Removal and Installation (Page 1D-9)”.	Refer to “Throttle Body Inspection and Cleaning (Page 1D-15)”.	Refer to “Throttle Body Removal and Installation (Page 1D-9)”.
Cam chain tension adjuster	Refer to “Engine Top Side Disassembly (Page 1D-24)”.	Refer to “Cam Chain Tension Adjuster Inspection (Page 1D-39)”.	Refer to “Engine Top Side Assembly (Page 1D-28)”.
Cylinder head cover	Refer to “Engine Top Side Disassembly (Page 1D-24)”.	—	Refer to “Engine Top Side Assembly (Page 1D-28)”.
Camshafts	Refer to “Engine Top Side Disassembly (Page 1D-24)”.	Refer to “Camshaft Inspection (Page 1D-36)”.	Refer to “Engine Top Side Assembly (Page 1D-28)”.
Cylinder head	Refer to “Engine Top Side Disassembly (Page 1D-24)”.	Refer to “Cylinder Head Related Parts Inspection (Page 1D-44)”.	Refer to “Engine Top Side Assembly (Page 1D-28)”.
Cylinder	Refer to “Engine Top Side Disassembly (Page 1D-24)”.	Refer to “Cylinder Inspection (Page 1D-50)”.	Refer to “Engine Top Side Assembly (Page 1D-28)”.
Pistons	Refer to “Engine Top Side Disassembly (Page 1D-24)”.	Refer to “Piston and Piston Ring Inspection (Page 1D-52)”.	Refer to “Engine Top Side Assembly (Page 1D-28)”.
Starter motor	Refer to “Starter Motor Removal and Installation in Section 1I (Page 1I-4)”.	Refer to “Starter Motor Inspection in Section 1I (Page 1I-6)”.	Refer to “Starter Motor Removal and Installation in Section 1I (Page 1I-4)”.
Crank balancer	Refer to “Engine Bottom Side Disassembly (Page 1D-53)”.	Refer to “Crank Balancer Inspection (Page 1D-73)”.	Refer to “Engine Bottom Side Assembly (Page 1D-61)”.

Engine Right Side

Item	Removal	Inspection	Installation
Clutch cover	Refer to “Clutch Removal in Section 5C (Page 5C-13)”.	—	Refer to “Clutch Installation in Section 5C (Page 5C-14)”.
Clutch plates	Refer to “Clutch Removal in Section 5C (Page 5C-13)”.	Refer to “Clutch Parts Inspection in Section 5C (Page 5C-18)”.	Refer to “Clutch Installation in Section 5C (Page 5C-14)”.
Clutch sleeve hub	Refer to “Clutch Removal in Section 5C (Page 5C-13)”.	—	Refer to “Clutch Installation in Section 5C (Page 5C-14)”.
Primary driven gear	Refer to “Clutch Removal in Section 5C (Page 5C-13)”.	Refer to “Clutch Parts Inspection in Section 5C (Page 5C-18)”.	Refer to “Clutch Installation in Section 5C (Page 5C-14)”.
Oil pump drive gear	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-11)”.	—	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-11)”.
Oil pump	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-11)”.	Refer to “Oil Pump Inspection in Section 1E (Page 1E-13)”.	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-11)”.
Oil pressure switch	Refer to “Oil Pressure Switch Removal and Installation in Section 1E (Page 1E-7)”.	Refer to “Gearshift Linkage Inspection in Section 5B (Page 5B-18)”.	Refer to “Oil Pressure Switch Removal and Installation in Section 1E (Page 1E-7)”.
Gearshift shaft	Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation in Section 5B (Page 5B-15)”.	Refer to “Gearshift Linkage Inspection in Section 5B (Page 5B-18)”.	Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation in Section 5B (Page 5B-15)”.

Engine Left Side

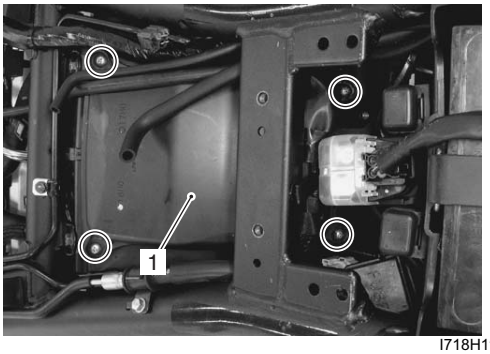
Item	Removal	Inspection	Installation
Generator	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.	Refer to “Generator Inspection in Section 1J (Page 1J-3)”.	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.
Engine sprocket	Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.	Refer to “Drive Chain Related Parts Inspection in Section 3A (Page 3A-5)”.	Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
Driven chain	Refer to “Drive Chain Replacement in Section 3A (Page 3A-7)”.	Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.	Refer to “Drive Chain Replacement in Section 3A (Page 3A-7)”.
Gear position switch	Refer to “Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)”.	Refer to “Gear Position (GP) Switch Inspection in Section 5B (Page 5B-12)”.	Refer to “Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)”.
Starter idle gear	Refer to “Starter Clutch Removal and Installation in Section 1I (Page 1I-10)”.	—	Refer to “Starter Clutch Removal and Installation in Section 1I (Page 1I-10)”.
Starter clutch	Refer to “Starter Clutch Removal and Installation in Section 1I (Page 1I-10)”.	Refer to “Starter Clutch Inspection in Section 1I (Page 1I-12)”.	Refer to “Starter Clutch Removal and Installation in Section 1I (Page 1I-10)”.
CKP sensor	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.	Refer to “CKP Sensor Inspection in Section 1H (Page 1H-7)”.	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.
Water pump	Refer to “Water Pump Removal and Installation in Section 1F (Page 1F-13)”.	Refer to “Water Pump Related Parts Inspection in Section 1F (Page 1F-17)”.	Refer to “Water Pump Removal and Installation in Section 1F (Page 1F-13)”.

Air Cleaner Element Removal and Installation

B718H11406034

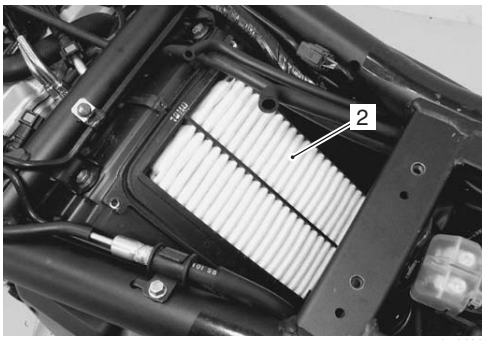
Removal

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Remove the air cleaner cover screws.
3) Remove the air cleaner cover (1).



I718H1140310-04

4) Remove the air cleaner element (2).



I718H1140311-01

Installation

Installation in the reverse order of removal.

Air Cleaner Element Inspection and Cleaning

B718H11406035

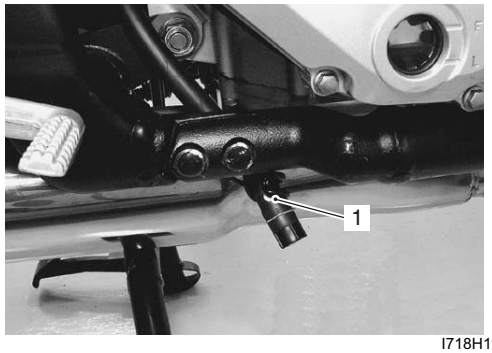
Refer to “Air Cleaner Element Inspection and Cleaning in Section 0B (Page 0B-3)”.

Air Cleaner Box Removal and Installation

B718H11406036

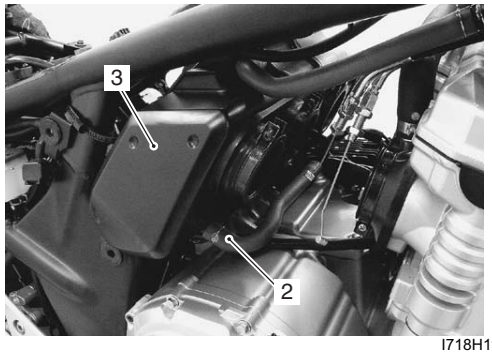
Removal

1) Remove the throttle body. Refer to “Throttle Body Removal and Installation (Page 1D-9)”.
2) Remove the air cleaner cover and air cleaner element. Refer to “Air Cleaner Element Removal and Installation (Page 1D-6)”.
3) Release the drain hose from the clamp (1).



I718H1140312-01

4) Disconnect the breather hose (2) and remove the air cleaner box (3).



I718H1140313-01

Installation

Install the air cleaner box in the reverse order of removal. Pay attention to the following point:

- Route the hoses properly. Refer to “Throttle Body Construction (Page 1D-8)”.

Throttle Cable Removal and Installation

B718H11406037

Removal

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Remove the right handlebar switch box. Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.
3) Remove the throttle cables as shown in the cable routing diagram. Refer to “Throttle Cable Routing Diagram (Page 1D-2)”.

Installation

Install the throttle cables in the reverse order of removal. Pay attention to the following points:

- Install the throttle cables as shown in the cable routing diagram. Refer to “Throttle Cable Routing Diagram (Page 1D-2)”.
- Check the throttle cable play and proper operation.

Throttle Cable Inspection

B718H11406038

Check that the throttle grip moves smoothly from full open to full close. If it does not move smoothly, lubricate the throttle cables.

Throttle Cable Play Inspection and Adjustment

B718H11406039

Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)”.

Throttle Body Components

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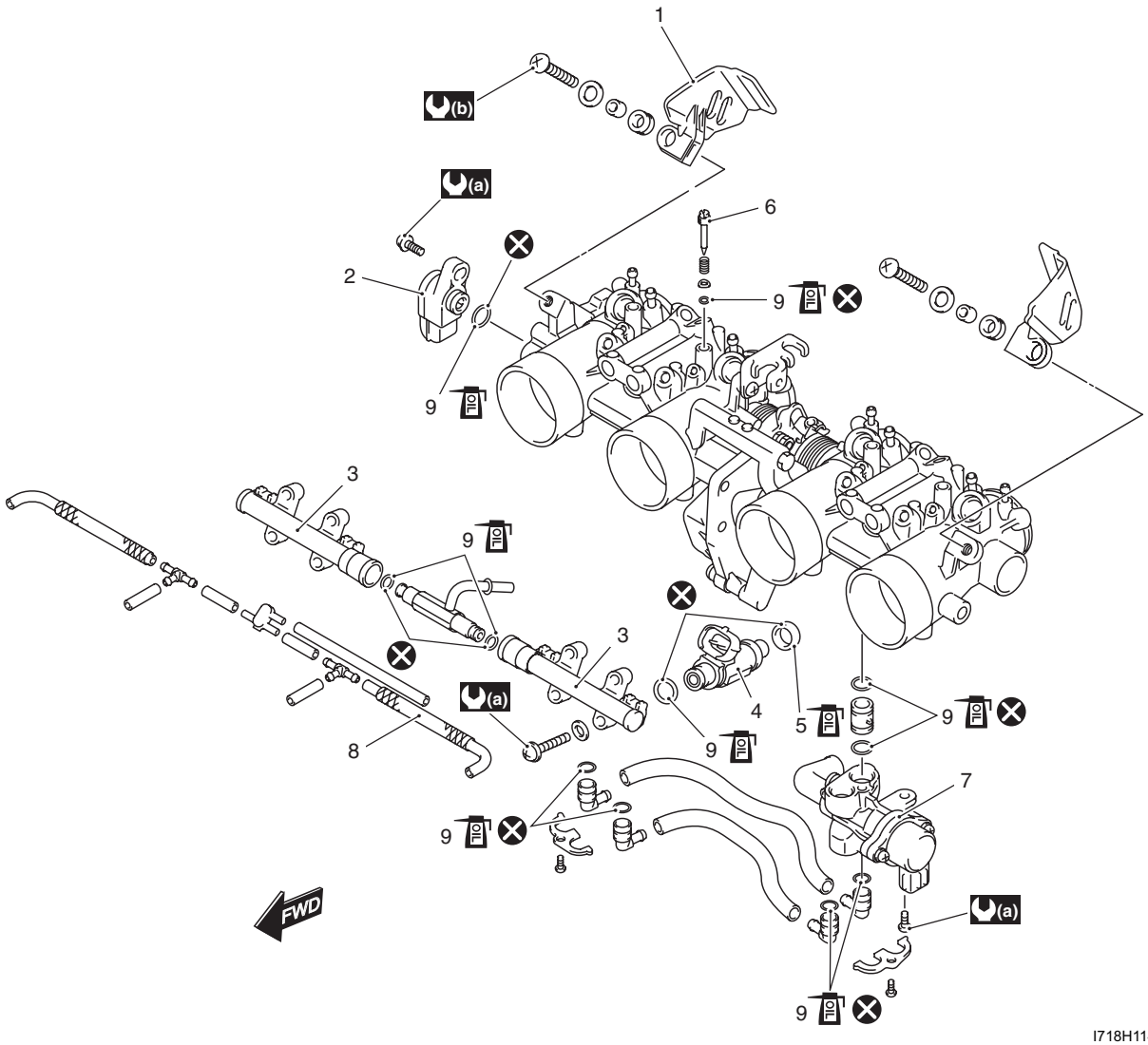

I718H1140309-01

1. Fuel injector cover	6. Air screw	(a) : 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)
2. STP sensor	7. ISC valve	(b) : 5 N·m (0.5 kgf-m, 3.5 lb-ft)
3. Fuel delivery pipe	8. Vacuum hose	: Do not reuse.
4. Fuel injector	9. O-ring	
5. Cushion seal	: Apply engine oil	

Throttle Body Construction

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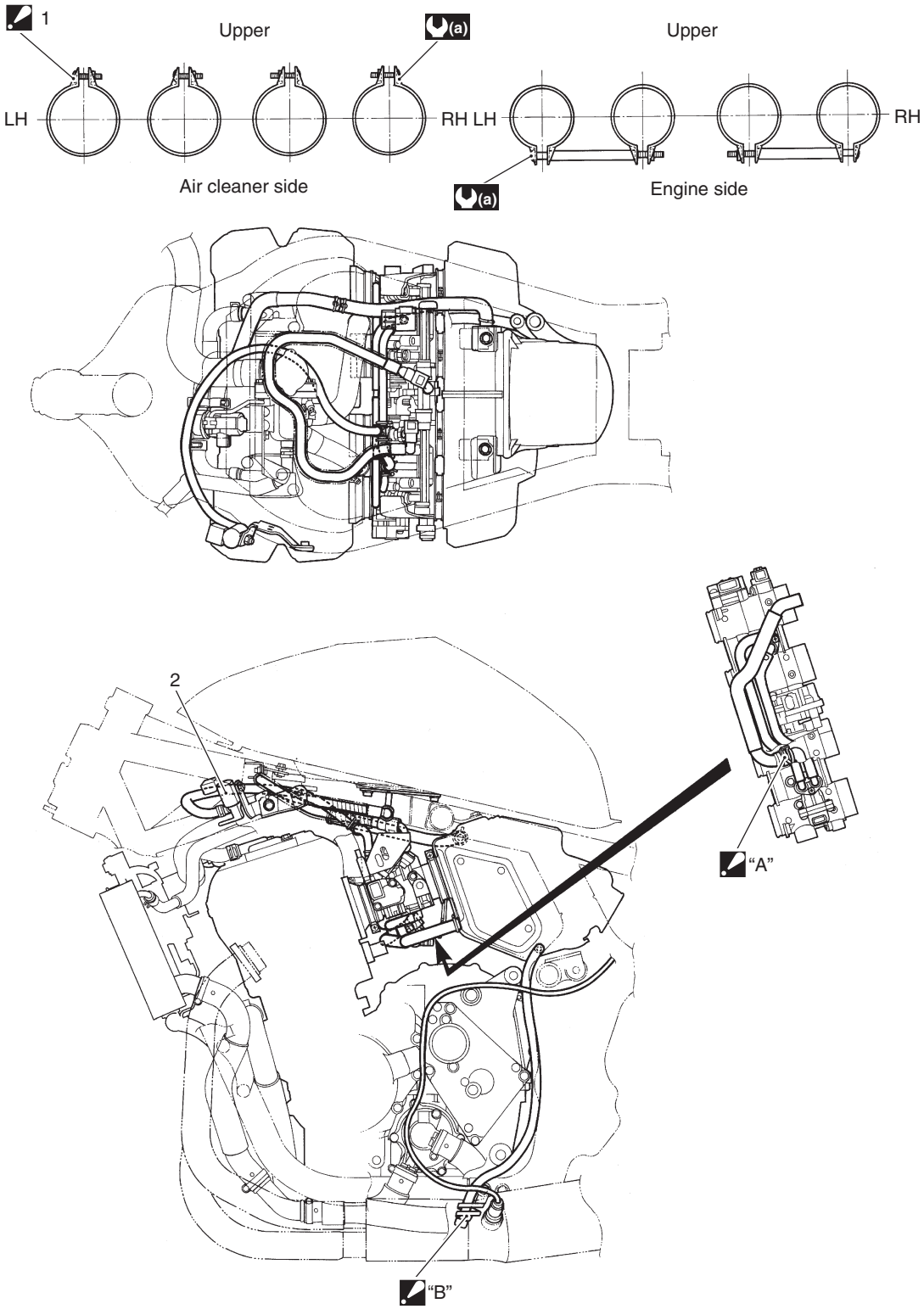


I718H1140314-01

1. Clamp (Air cleaner side) : After tighten the clamp band #3, 4 and tighten the clamp band #1, 4.	"B": Clamp the drain hose at mark position.
2. EVAP purge control valve (E-33 only)	(a) : 1.5 N·m (0.15 kgf-m, 1.0 lb-ft)
"A": White mark downward.	

Throttle Body Removal and Installation

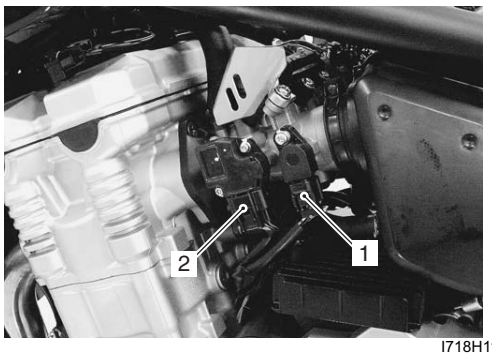
B718H11406042

Removal

1) Disconnect the battery (–) lead wire. Refer to "Battery Removal and Installation in Section 1J (Page 1J-12)".
2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
3) Remove the air cleaner box mounting bolts.

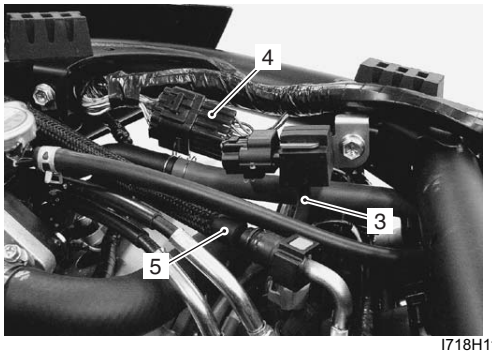
I718H1140315-01

4) Disconnect the STP sensor coupler (1) and IAP/TP/IAT sensor coupler (2).



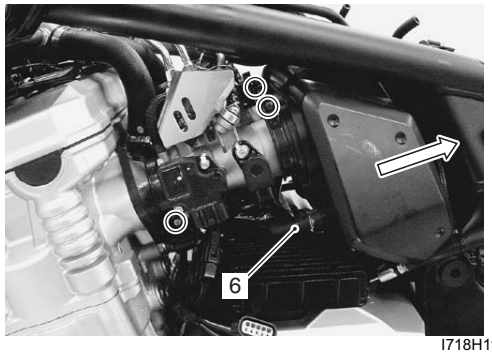
I718H1140316-01

5) Disconnect the vacuum hose (3) and fuel injector coupler (4).
6) Remove the fuel feed hose (5).



I718H1140317-01

7) Loosen the throttle body clamp screws and disconnect the ISC valve hose (6).
8) Move the air cleaner box backward.



I718H1140318-01

I718H1140319-01

9) Move the throttle body right side.
10) Disconnect the throttle cables and remove the throttle body.

⚠ CAUTION

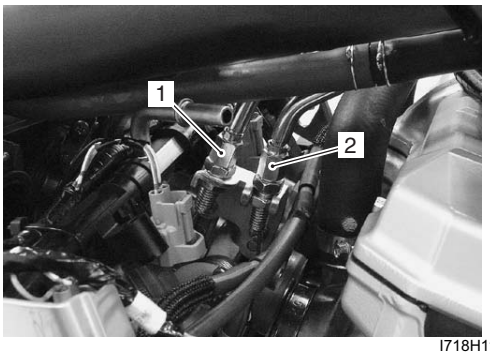
After disconnecting the throttle cables, do not snap the throttle valve from the open to full close. It may cause damage to the throttle valve and throttle body.

I718H1140320-01

Installation

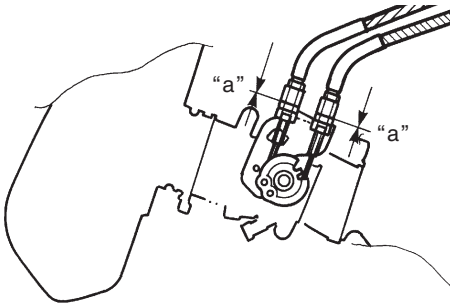
Install the throttle body in the reverse order of removal. Pay attention to the following points:

- Connect the throttle pulling cable (1) and throttle returning cable (2) to the throttle cable drum.



I718H1140321-01

- Tighten the throttle body clamp screws. Refer to “Throttle Body Construction (Page 1D-8)”.
- Loosen each throttle cable lock-nut.
- Turn in each throttle cable adjuster fully and locate each outer cable so that the clearance “a” is 0 mm (0 in).



I718H1140322-01

“a”: 0 mm (0 in)

- Tighten each lock-nut.
- Adjust the throttle cable play. Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)”.

Throttle Body Disassembly and Assembly

B718H11406043

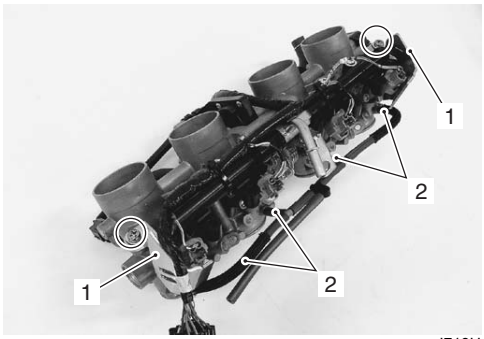
Refer to “Throttle Body Removal and Installation (Page 1D-9)”.

Disassembly

⚠ CAUTION

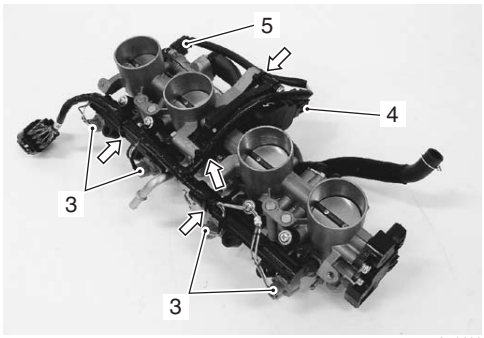
Identify the position of each removed part. Organize the parts in their respective groups so that they can be reinstalled in their original positions.

1) Remove the injector covers (1) and disconnect the respective vacuum hoses (2) from each throttle body.



I718H1140324-01

2) Remove the clamps and disconnect the fuel injector couplers (3), STVA coupler (4) and ISC valve coupler (5).

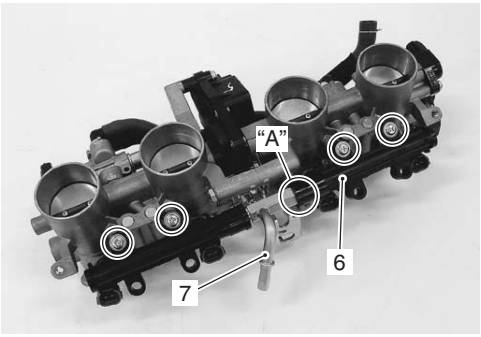


I718H1140325-01

3) Remove the fuel delivery pipe assembly (6).

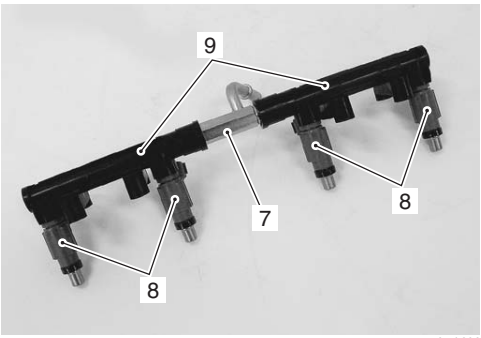
⚠ CAUTION

Be careful not to twist the fuel delivery pipe's T-joint (7), when disconnecting the fuel feed hose or removing the fuel delivery pipes, or joint part "A" of the fuel delivery pipe get damage.



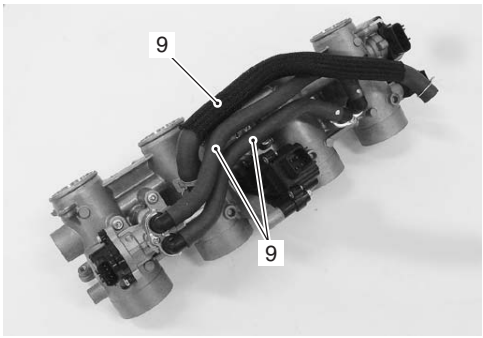
I718H1140326-01

4) Remove the fuel injectors (8) and fuel delivery pipes (9) from the T-joint (7).



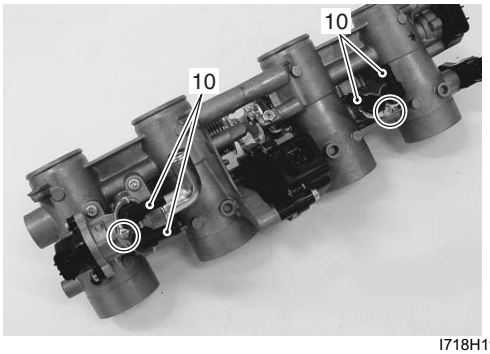
I718H1140323-02

5) Disconnect the ISC valve hoses (9).



I718H1140328-01

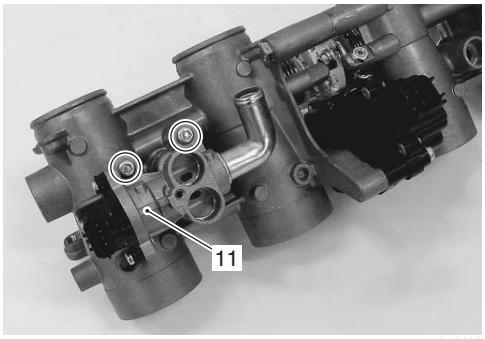
6) Remove the plates and joint pipes (10).



I718H1140329-01

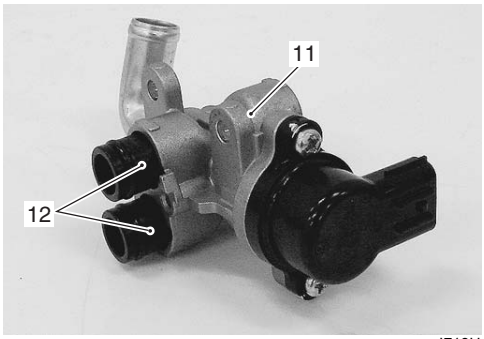
7) Remove the ISC valve assembly (11).

Special tool
TOOL : 09930–11950 (Torx wrench)



I718H1140330-02

8) Remove the joint pipes (12) from the ISC valve assembly (11).



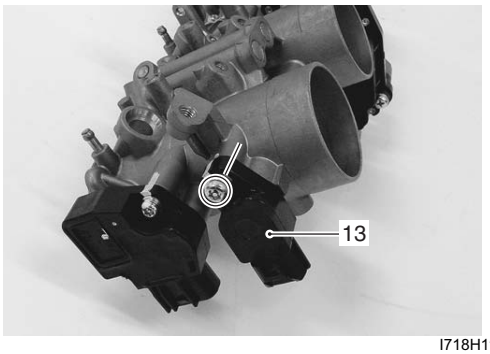
I718H1140031-01

9) Remove the STP sensor (13).

NOTE

Prior to disassembly, mark sensor's original position with a paint or scribe for accurate reinstallation.

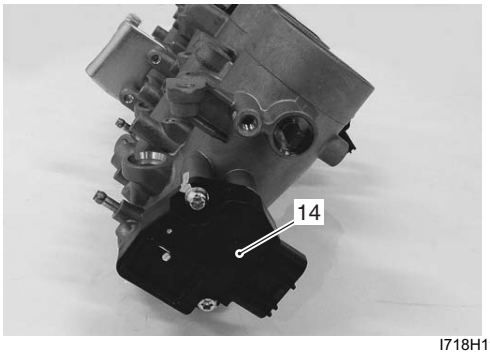
Special tool
TOOL : 09930–11950 (Torx wrench)



I718H1140327-02

⚠ CAUTION

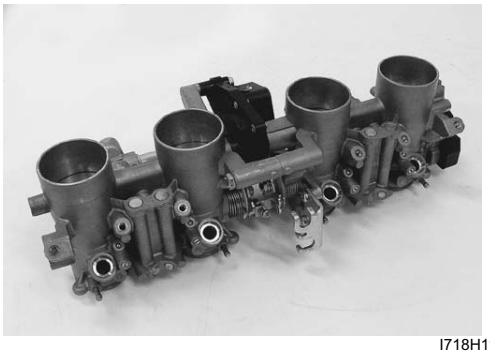
Never remove the IAP/TP/IAT sensor (14) from the throttle body.



I718H1140331-02

⚠ CAUTION

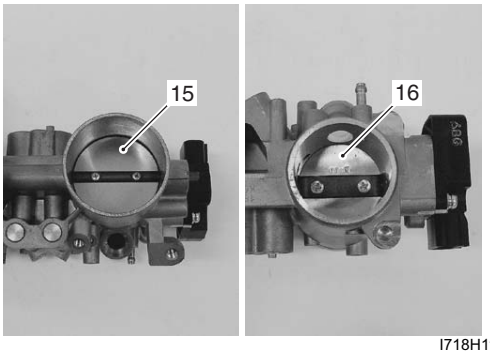
Never separate the throttle bodies, left and right.



I718H1140332-01

⚠ CAUTION

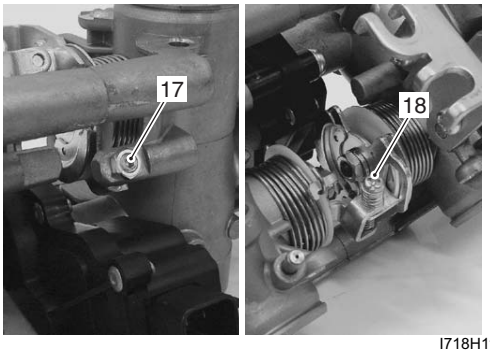
Never remove the throttle valve (15) and secondary throttle valve (16).



I718H1140333-03

⚠ CAUTION

These adjusting screws (17), (18) are factory-adjusted at the time of delivery and therefore avoid removing or turning them unless necessary.



I718H1140334-02

Assembly
Assembly is the throttle body in the reverse order of removal. Pay attention to the following points:

- Apply a thin coat of engine oil to the O-ring.
- With the STV fully closed, install the STP sensor (1) and tighten the STP sensor mounting screw to the specified torque.

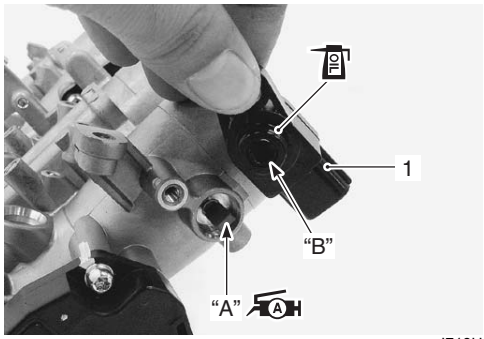
NOTE

- **Align the secondary throttle shaft end "A" with the groove "B" of STP sensor.**
- **Apply grease to the secondary throttle shaft end "A" if necessary.**

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

Special tool
: 09930–11950 (Torx wrench)

Tightening torque
STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



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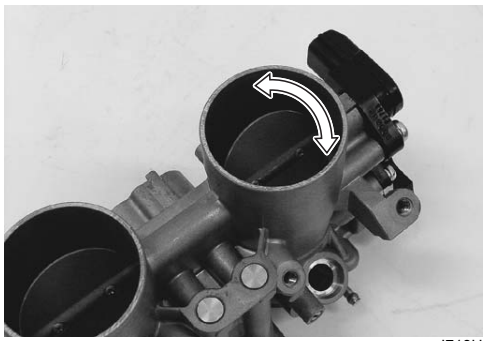
NOTE

Make sure the STP valve open or close smoothly. If the STP sensor adjustment is necessary, refer to "STP Sensor Adjustment in Section 1C (Page 1C-4)".



I718H1140336-01

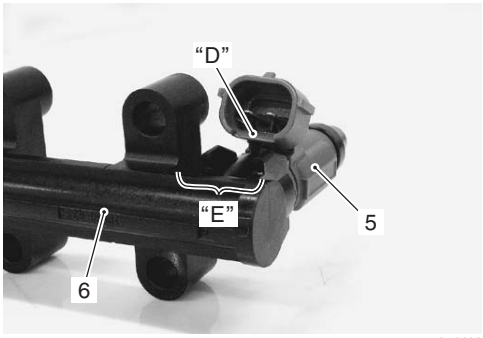
- Apply a thin coat of engine oil to the O-rings and install the ISC valve assembly.

⚠ CAUTION

Replace the O-rings with new ones.

Special tool
: 09930–11950 (Torx wrench)

Tightening torque
ISC valve mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



I718H1140395-01

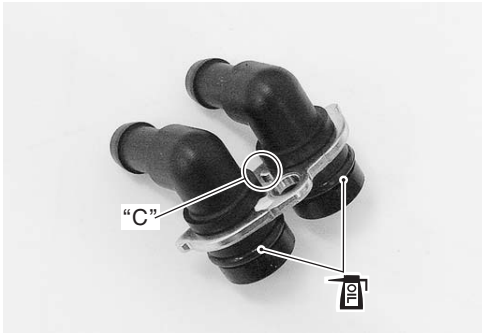
- Apply a thin coat of engine oil to the O-rings and install the plate.

⚠ CAUTION

Replace the O-rings with new ones.

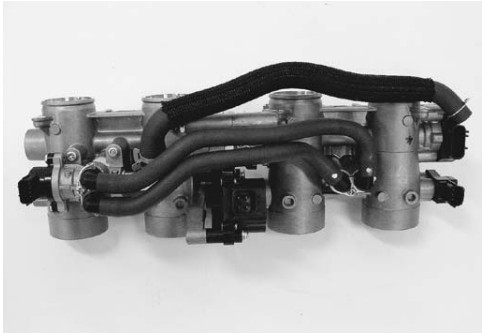
NOTE

The boss "C" of the outside.



I718H1140338-01

- Connect the ISC valve hoses securely.

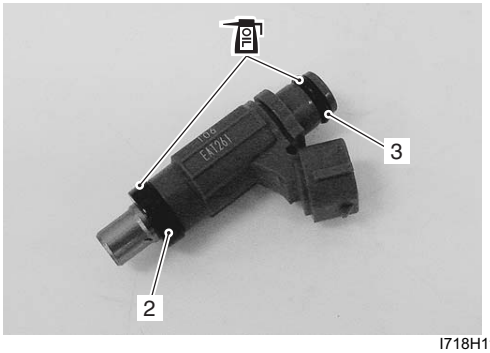


I718H1140339-02

- Apply a thin coat of engine oil to the new cushion seal (2) and the O-ring (3).

⚠ CAUTION

Replace the cushion seal and O-ring with the new ones.

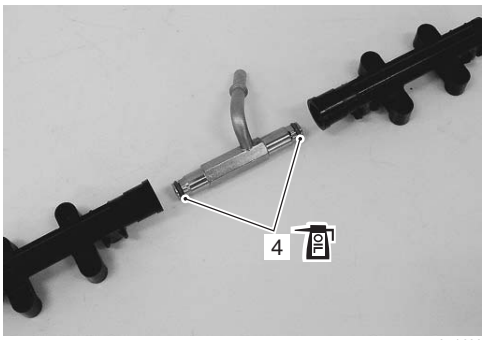


I718H1140340-02

- Apply a thin coat of engine oil to the new O-rings (4).

⚠ CAUTION

Replace the O-rings with the new ones.



I718H1140341-02

- Assemble the fuel delivery pipes as shown.

I718H1140342-01

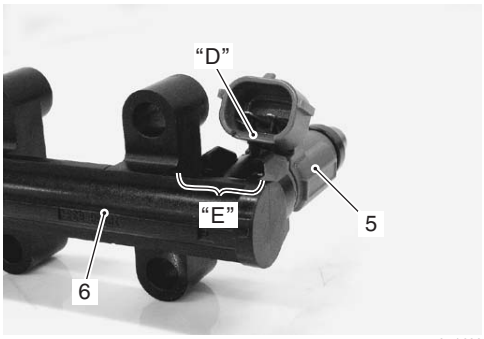
- Install the fuel injector (5) by pushing it straight to the delivery pipe (6).

⚠ CAUTION

Never turn the injector while pushing it.

NOTE

Align the coupler "D" of injector with boss "E" of the delivery pipe.

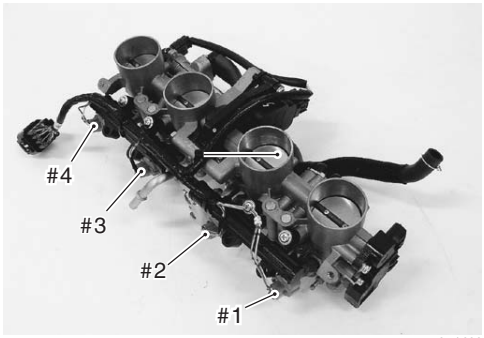


I718H1140404-01

- Connect the fuel injector couplers to the fuel injectors.

NOTE

Make sure that each coupler is installed in the correct position.



I718H1140344-01

Coupler	Wire color
#1	Y/R and Gr/W
#2	Y/R and Gr/B
#3	Y/R and Gr/Y
#4	Y/R and Gr/R

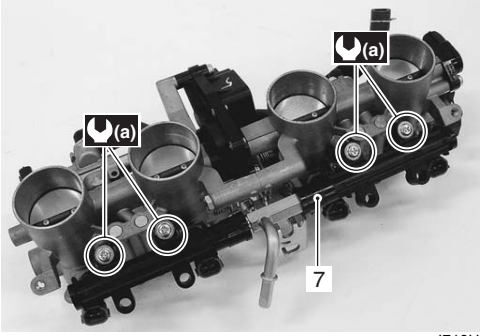
- Install the fuel delivery pipe assembly (7) to the throttle body assembly.

⚠ CAUTION

Never turn the fuel injectors while installing them.

- Tighten the fuel delivery pipe mounting screws to the specified torque.

  Tightening torque
  Fuel delivery pipe mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.45 lb-ft)



I718H1140345-02

Throttle Body Inspection and Cleaning

B718H11406044

Refer to “Throttle Body Disassembly and Assembly (Page 1D-10)”.

Cleaning

⚠ WARNING

Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer’s instructions on proper use, handling and storage.

- Clean passageways with a spray-type carburetor cleaner and blow dry with compressed air.

⚠ CAUTION

- **Never clean the main bore of throttle body to prevent come off molybdenum from the throttle valve.**
- **Do not use wire to clean passageways. Wire can damage passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer’s instructions for proper use and cleaning of the throttle body components. Do not apply carburetor cleaning chemicals to the rubber and plastic materials.**

Inspection

Check following items for any defects or clogging. Replace the throttle body if necessary.

- O-ring
- Throttle valve
- Secondary throttle valve
- Vacuum hose

ISC Valve Visual Inspection

Visually inspect the ISC valve if necessary.

1) Remove the screws.
2) Inspect the ISC valve for any carbon deposition defects. Clean or replace the ISC valve if necessary.

⚠ CAUTION

Normally, the removed O-ring must be replaced with a new one. However, this O-ring is not available for the spare parts. If it is found to be damaged, replace the ISC valve assembly with new one.

I718H1140346-02

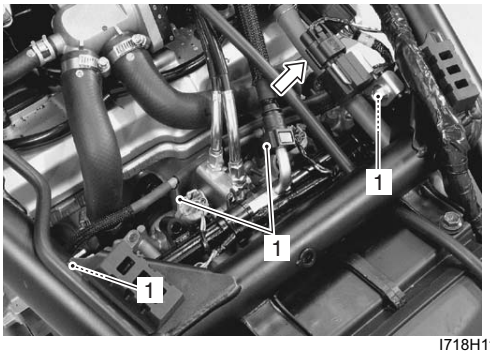
Throttle Valve Synchronization

B718H11406045

Use of SDS Tool

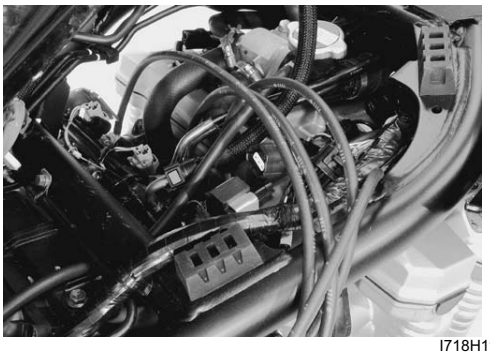
Check and adjust the throttle valve synchronization among four cylinders.

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Disconnect the IAP sensor (No.1) coupler and vacuum hoses (1) from the throttle body.



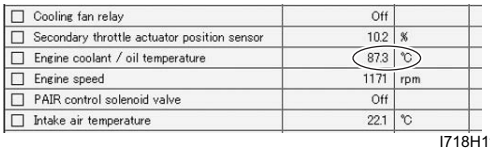
I718H1140347-02

3) Connect the respective vacuum tester hoses to each vacuum nipple on the throttle body.



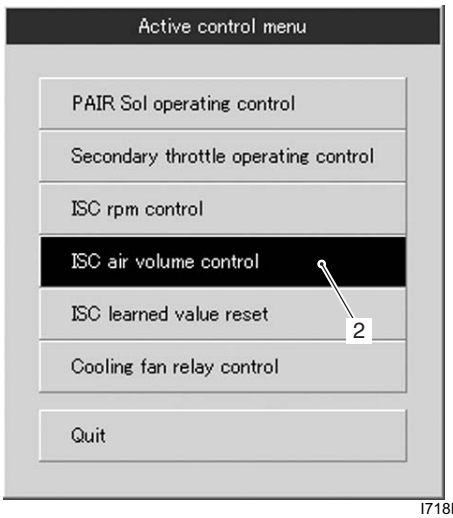
I718H1140389-01

4) Start the engine.
5) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
6) Click “Data monitor”.
7) Warm up the engine (Water temp. more than 80° (176 °F)).



I718H1140382-01

8) Click “Active control”.
9) Click “ISC air volume control” (2).

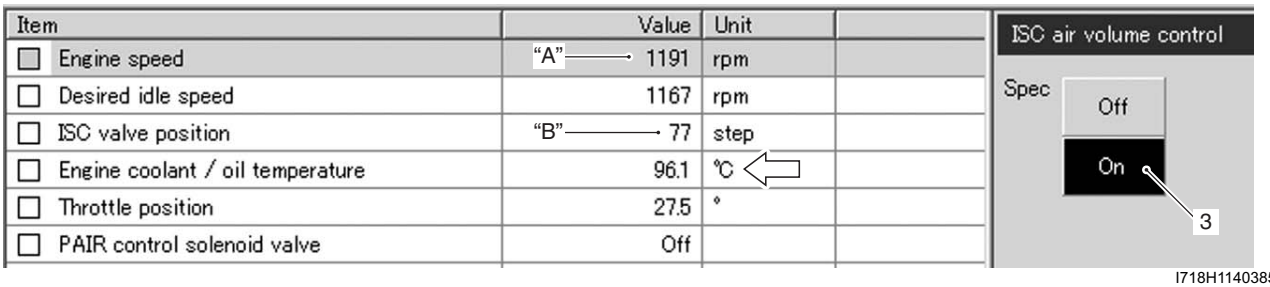


I718H1140384-01

10) Click “ON” button (3) to fix the ISC air volume of four cylinders.

NOTE

When making this synchronization, be sure that the water temperature is within 80 – 100 °C (176 – 212 °F).



I718H1140385-01

“A”: Engine speed: Approx. 1 200 rpm	“B”: ISC valve position: Approx. 77 step

11) Check for the synchronization of vacuum from #1 to #4 cylinders.

I718H1140390-01

12) Equalize the vacuum of the cylinders by turning each air screw and keep it running at idling speed.

NOTE

Always set the engine rpm at idle rpm.

I718H1140354-01

13) If the adjustment is not yet correct, remove each air screw and clean them with a spray-type carburetor cleaner and blow dry with a compressed air. Also, clean the air screw passageways.

NOTE

- **Slowly turn the air screw in clockwise and count the number of turns until the screw is lightly seated.**
- **Make a note of how many turns were made in order that the screw can be reset correctly after cleaning.**

14) Repeat the procedures from 4) to 12).

15) Close the SDS tool and turn the ignition switch OFF.

16) Disconnect the vacuum tester and reinstall the removed parts.

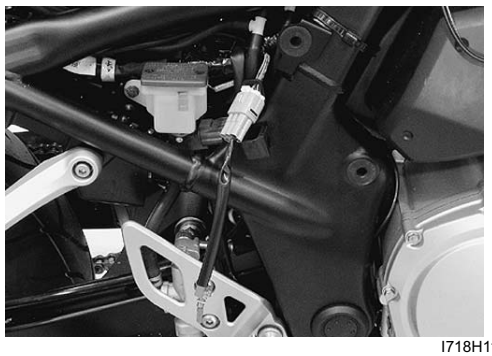
17) After compleating the throttle valve synchronization, clear the DTC and reset the ISC learned valve using SDS tool. Refer to “ISC Valve Preset and Opening Initialization in Section 1C (Page 1C-6)”.

Use of Mode Select Switch

The following procedure describes only difference between use of SDS tool and use of mode select switch.

1) 1), 2) and 3) are the same as the using SDS tool.

2) Connect the special tool (Mode select switch) and turn ON.



I718H1140391-01

3) Start the engine and warm up it.
   * Summer: Approx. 5 min. at idle speed
   * Winter: Approx. 8 min. at idle speed

NOTE

- **The ISC valve automatically is set at synchronization mode.**
- **Water temperature should be more than 80 °C (176 °F) and then wait 30 seconds.**

4) This step is the same as the step 11) of the use of SDS.

5) This step is the same as the step 12) of the use of SDS.

6) This step is the same as the step 13) of the use of SDS.

7) Repeat the procedures of 3).

8) Turn OFF the mode select switch.

9) Disconnect the vacuum tester and reinstall the removed parts.

Engine Assembly Removal

B718H11406002

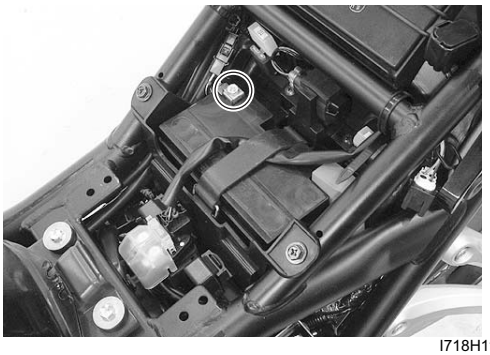
Before taking the engine out of the frame, wash the engine using a steam cleaner. Engine removal is sequentially explained in the following steps:

1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

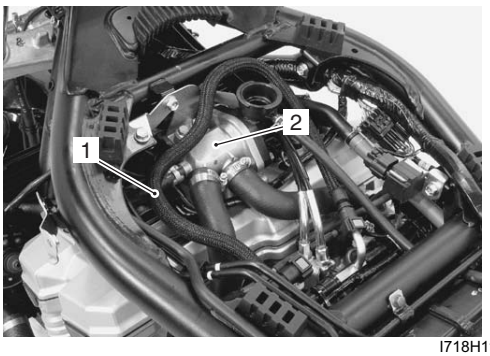
2) Remove the seat and frame covers. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

3) Remove the frame head covers (GSF1250/A) or cowling (GSF1250S/SA). Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

4) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
5) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
6) Disconnect the battery (–) lead wire.

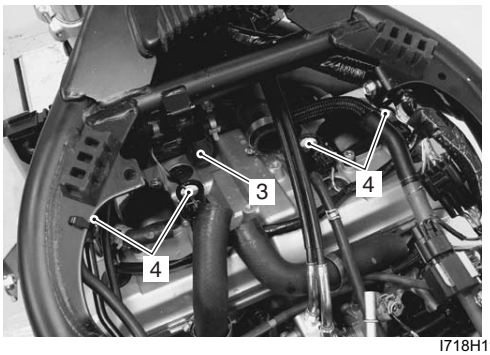

I718H1140388-01

7) Disconnect the fuel feed hose (1).
8) Remove the thermostat connector (2) and its bracket. Refer to “Thermostat Connector / Thermostat Removal and Installation in Section 1F (Page 1F-9)”.



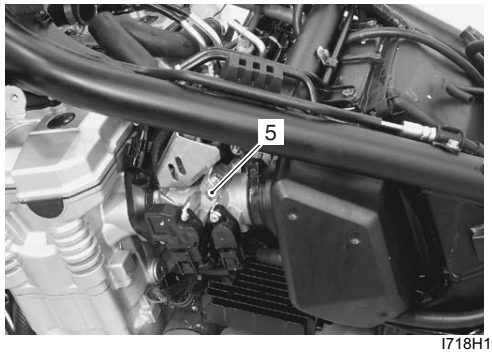
I718H1140356-01

9) Remove the PAIR control solenoid valve (3) and hoses.
10) Disconnect all ignition coil/plug cap couplers and then remove the ignition coil/plug caps (4).



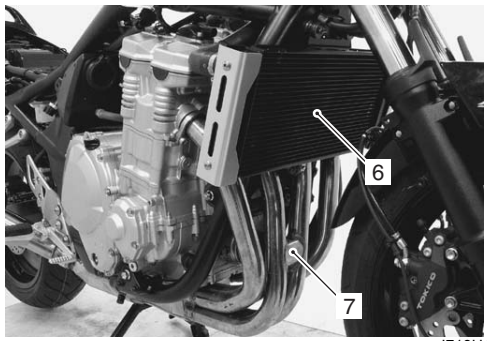
I718H1140357-01

11) Remove the throttle body assembly (5). Refer to “Throttle Body Removal and Installation (Page 1D-9)”.



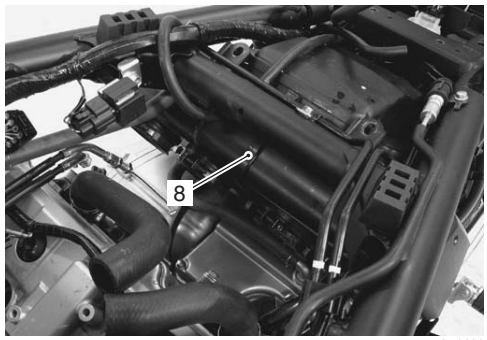
I718H1140358-01

12) Remove the radiator (6). Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.
13) Remove the muffler and exhaust pipes (7) along with the HO2 sensor. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.



I718H1140359-01

14) Remove the air cleaner box (8). Refer to “Air Cleaner Box Removal and Installation (Page 1D-6)”.



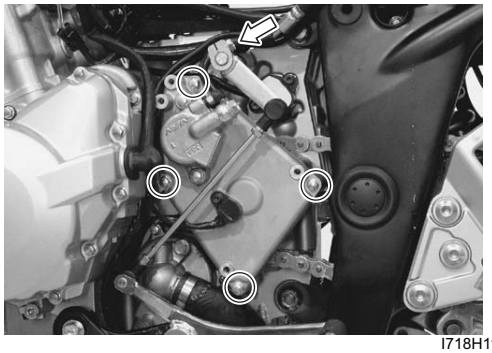
I718H1140360-01

15) Disengage the gearshift link arm by removing the bolt.

NOTE

Mark the gearshift shaft head at which the gearshift link arm slit is set for correct reinstallation.

16) Remove the engine sprocket inner cover by removing the bolts.

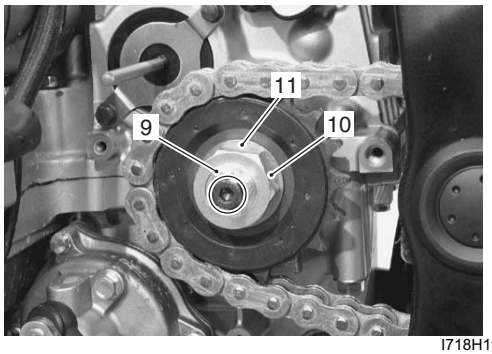


I718H1140361-01

17) Remove the speed sensor rotor (9) while depressing the rear brake pedal.

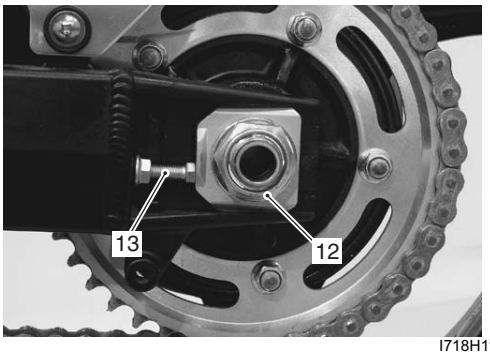
18) Remove the engine sprocket nut (10) while depressing the rear brake pedal.

19) Remove the washer (11).



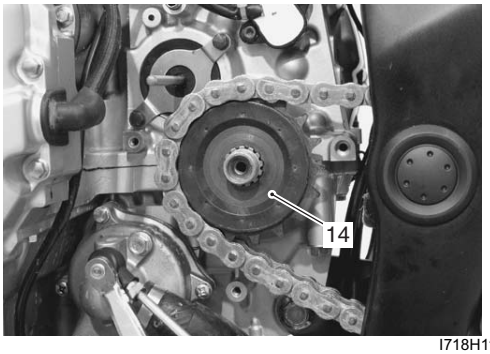
I718H1140362-01

20) Loosen the rear axle nut (12) and chain adjusters (13) to provide additional chain slack.



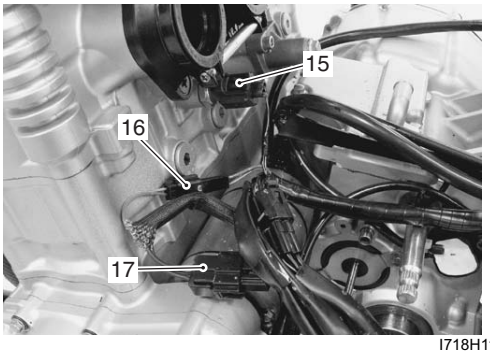
I718H1140363-01

21) Remove the engine sprocket (14).



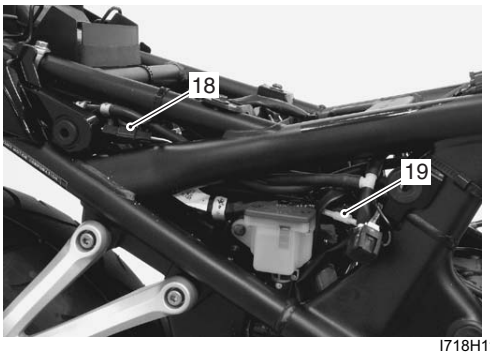
I718H1140364-01

22) Disconnect the ECT sensor coupler (15), CKP sensor coupler (16) and generator coupler (17).



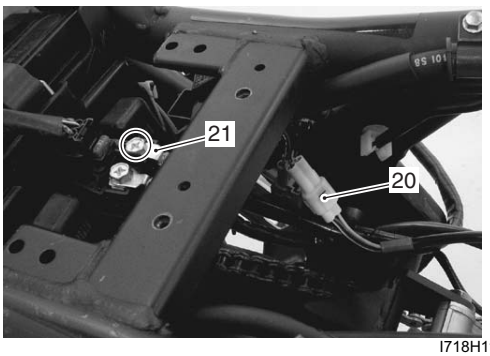
I718H1140365-01

23) Disconnect the engine ground wire coupler (18) and oil pressure switch coupler (19).



I718H1140366-01

24) Disconnect the GP switch coupler (20) and starter motor lead wire (21).



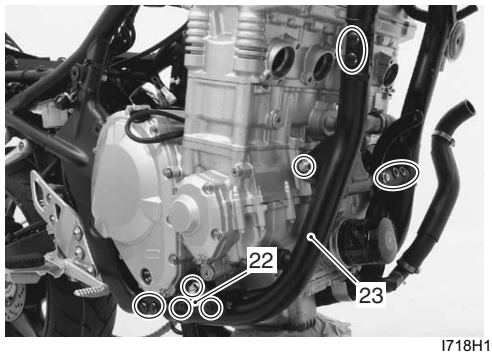
I718H1140367-01

25) Support the engine with a proper jack.

I718H1140368-01

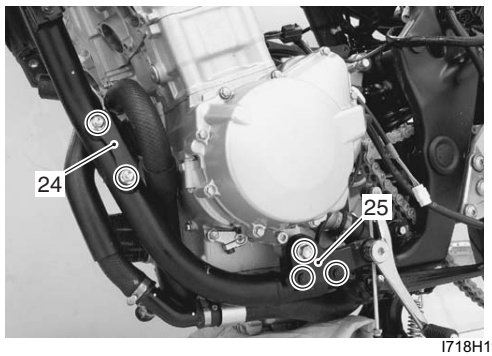
26) Remove the right engine mounting No.2 bracket (22).

27) Remove the frame down tube (23) by removing their bolts and nuts.



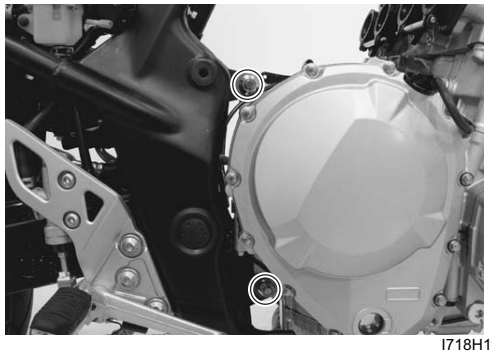
I718H1140369-01

28) Remove the engine mounting brackets, No.1 (24) and No.2 (L) (25).



I718H1140370-01

29) Remove the engine mounting bolts and nuts.



I718H1140371-01

30) Gradually lower the front side of the engine and remove the engine.

⚠ WARNING

Care should be taken not to drop the engine accidentally when the engine mounting bolts and nuts are removed.

Engine Assembly Installation

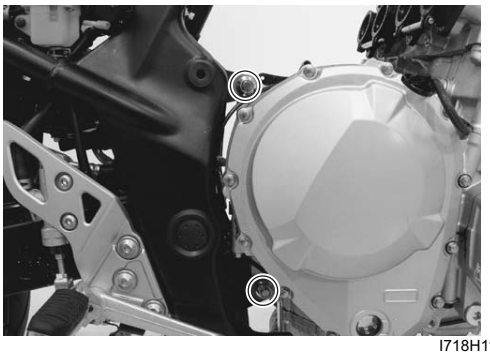
B718H11406003

Reinstall the engine in the reverse order of engine removal. Pay attention to the following points:

- Insert the two mounting bolts from left side, and tighten their nuts.

NOTE

The engine mounting nuts are self-locking. Once the nuts have been removed, they are no longer of any use.



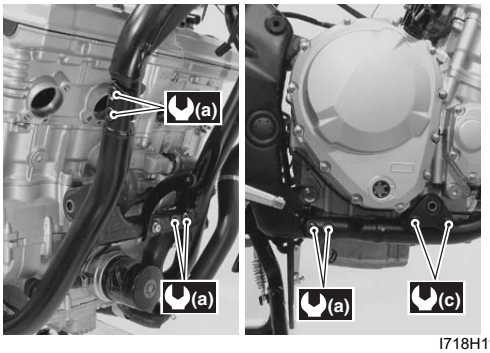
I718H1140371-01

- Install the frame down tube and engine mounting brackets.
- Tighten the bolts and nuts to the specified torque.

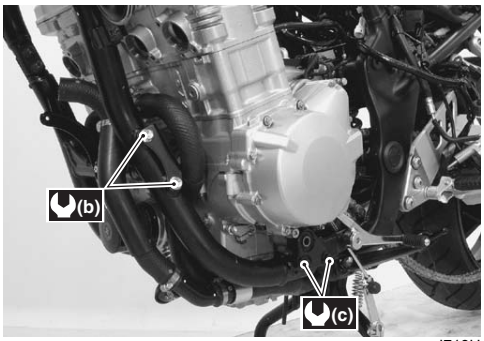
NOTE

The frame down tube nuts are self-locking. Once the nuts have been removed, they are no longer of any use.

Tightening torque
Frame down tube bolt (a): 50 N·m (5.0 kgf-m, 36.0 lb-ft)
Engine mounting No.1 bracket bolts (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Engine mounting No.2 bracket bolts (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

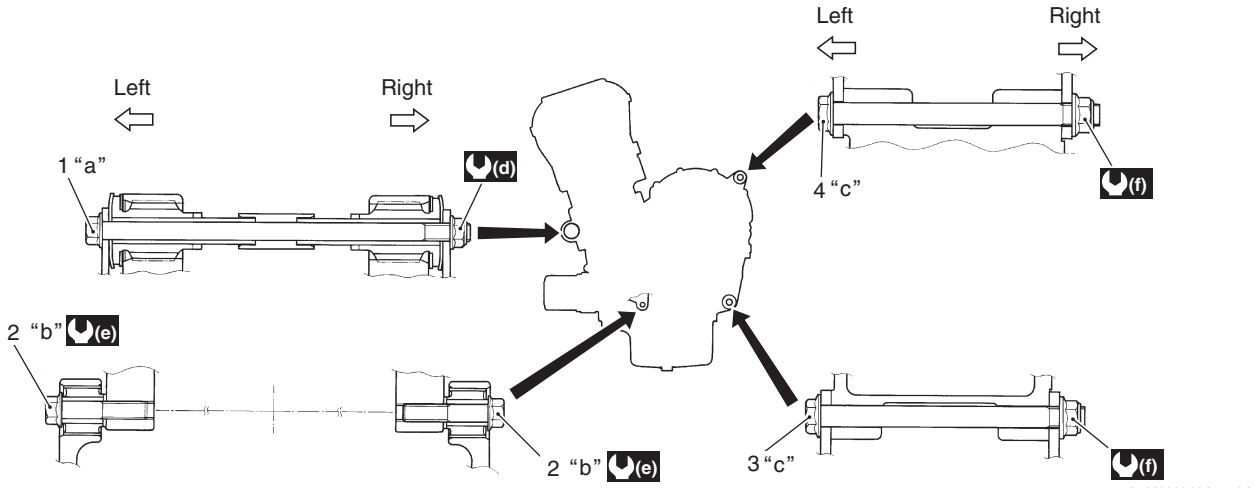


I718H1140373-01



I718H1140374-01

- Tighten all engine mounting bolts and nuts to the specified torque, as shown in the following illustration.



I718H1140375-02

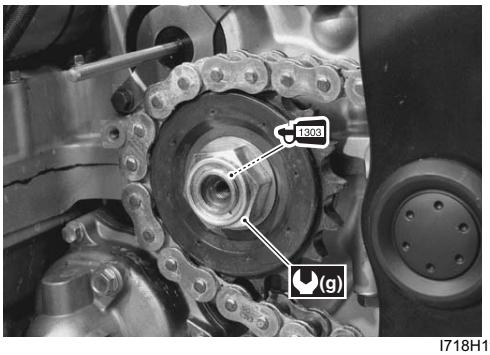
1. Engine mounting bolt (Front upper)	“a”: 215 mm (8.5 in)	(e) : 47 N·m (4.7 kgf-m, 34.0 lb-ft)
2. Engine mounting bolt (Center lower)	“b”: 50 mm (2.0 in)	(f) : 88 N·m (8.8 kgf-m, 63.5 lb-ft)
3. Engine mounting bolt (Rear lower)	“c”: 155 mm (6.1 in)	
4. Engine mounting bolt (Rear upper)	(d) : 55 N·m (5.5 kgf-m, 40.0 lb-ft)	

- Apply THREAD LOCK SUPER to the driveshaft.

  1303 : Thread lock cement 99000–32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

- Tighten the engine sprocket nut to the specified torque.

  Tightening torque
  Engine sprocket nut (g): 115 N·m (11.5 kgf-m, 83.0 lb-ft)



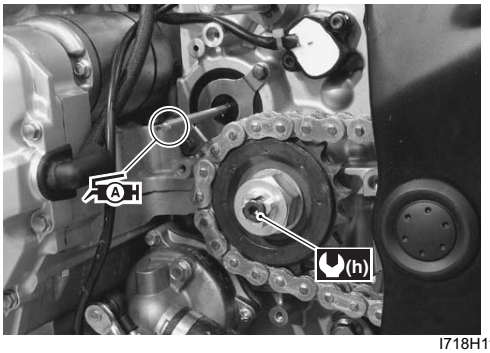
I718H1140376-01

- Tighten the speed sensor rotor bolt to the specified torque.

  Tightening torque
  Speed sensor rotor bolt (h): 25 N·m (2.5 kgf-m, 18.0 lb-ft)

- Before installing the engine sprocket inner cover, apply a small quantity of SUZUKI SUPER GREASE to the clutch push rod.

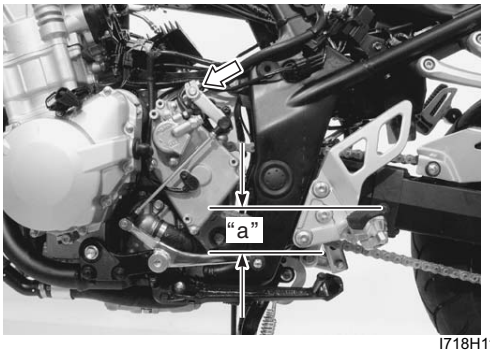
  : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1140377-01

- Install the engine sprocket inner cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
- Install the gearshift link arm to the gearshift shaft in the correct position.

  Gearshift lever height “d”
  Standard: 45 – 55 mm (1.8 – 2.2 in)



I718H1140378-01

- Install the exhaust pipe assembly and muffler. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.
- Install the radiator. Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.
- Install the throttle body. Refer to “Throttle Body Removal and Installation (Page 1D-9)”.
- After remounting the engine, route the wiring harness, cable and hoses properly. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-8)”, “Throttle Cable Routing Diagram (Page 1D-2)” and “Water Hose Routing Diagram in Section 1F (Page 1F-3)”.
- Pour engine coolant and engine oil. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)” and “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
- After finishing the engine installation, check the following items.
  - Throttle cable play
    Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)”.
  - Throttle valve synchronization
    Refer to “Throttle Valve Synchronization (Page 1D-15)”.
  - Drive chain slack
    Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.
  - Engine oil and coolant leakage
    Refer to “Cooling Circuit Inspection in Section 1F (Page 1F-4)”.

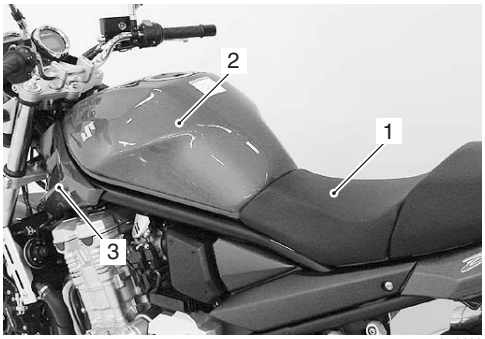
Engine Top Side Disassembly

B718H11406006

⚠ CAUTION

Identify the position of each removed part. Organize the parts in their respective groups (e.g., intake, exhaust) so that they can be reinstalled in their original positions.

1) Remove the seat (1) and disconnect the battery (–) lead wire.
2) Remove the fuel tank (2). Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Remove the frame head covers (3) (GSF1250/A) or cowling (GSF1250S/SA).
Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.



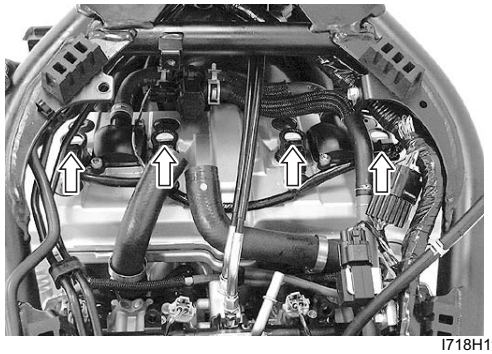
I718H1140001-02

4) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
5) Disconnect the water hoses and remove the thermostat connector (4) along with bracket.

I718H1140002-01

Ignition Coil / Plug Cap

1) Disconnect all lead wire couplers from ignition coil/ plug caps.
2) Remove the ignition coil caps. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.



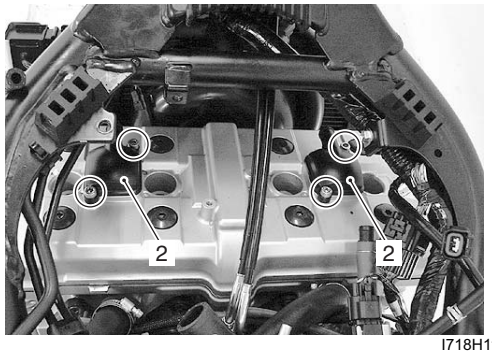
I718H1140007-01

PAIR System

1) Disconnect the PAIR hoses and lead wire coupler.
2) Remove the PAIR control solenoid valve (1).

I718H1140008-01

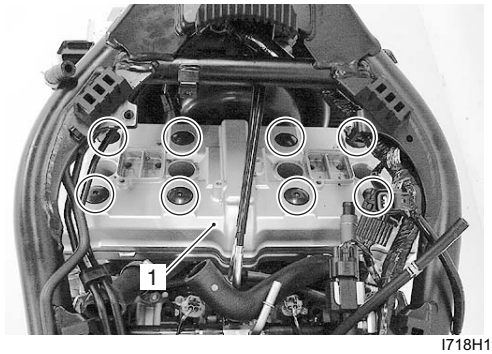
3) Remove the PAIR reed valve covers (2) and reed valves.



I718H1140009-01

Cylinder Head Cover

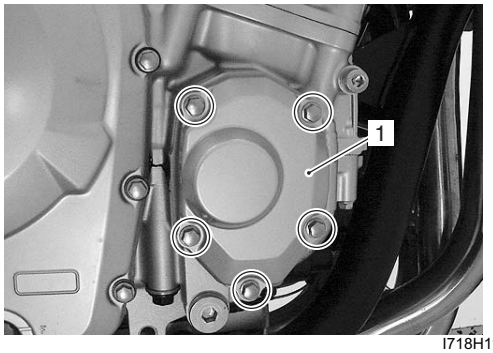
Remove the cylinder head cover (1) and its gasket.



I718H1140010-01

Camshaft

1) Remove the right crankshaft cover (1).

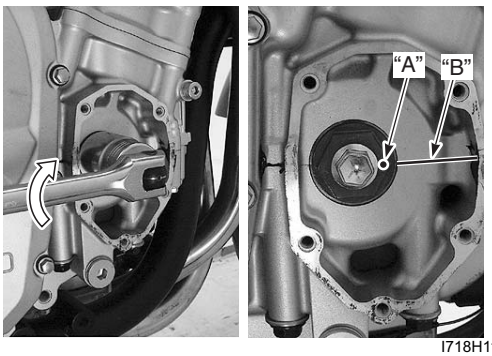


I718H1140011-01

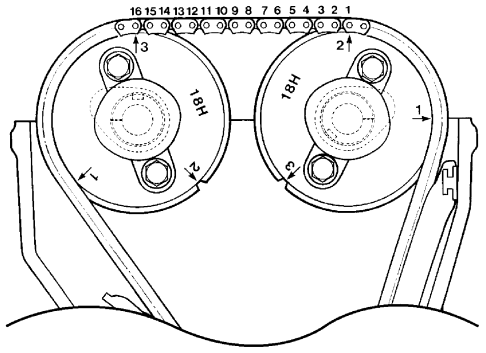
2) Remove all of the spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.

Special tool
TOOL : 09930–10121 (Spark plug wrench set)

3) Turn the crankshaft clockwise and align the match mark “A” on the crankshaft with the mating surfaces “B” of the crankcases. Also position each of the camshaft as shown.

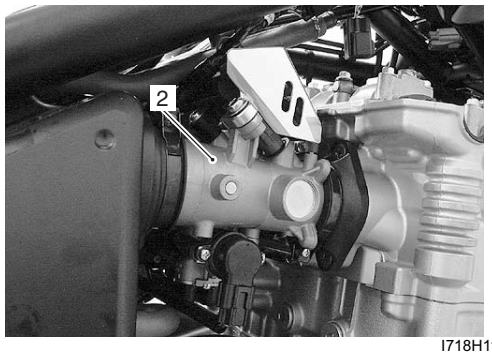


I718H1140012-02



I718H1140394-01

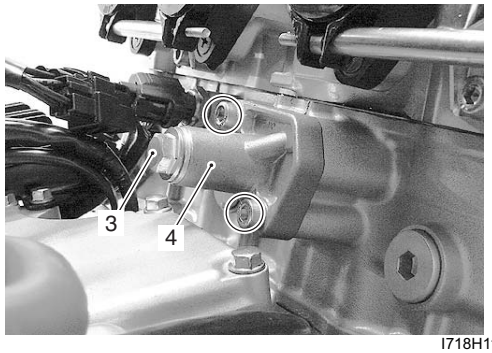
4) Remove the throttle body (2). Refer to “Throttle Body Removal and Installation (Page 1D-9)”.



I718H1140022-01

5) Remove the cam chain tension adjuster cap bolt (3) and spring.

6) Remove the cam chain tension adjuster (4).

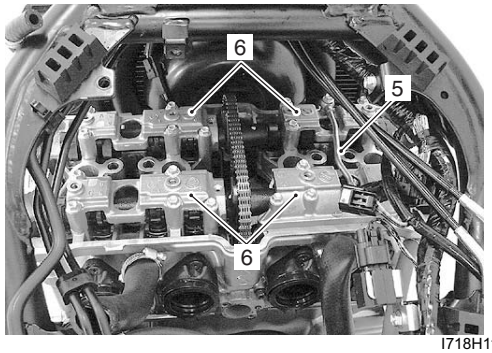


I718H1140033-01

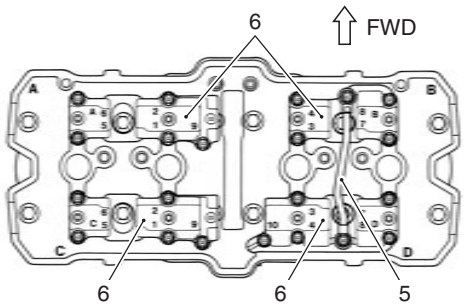
7) Remove the oil pipe (5) and camshaft journal holders (6).

⚠ CAUTION

Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench in the descending order of numbers.

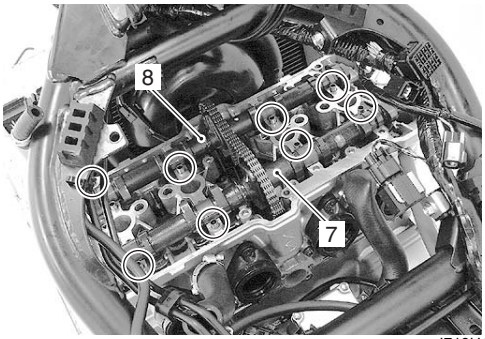


I718H1140034-01



I718H1140035-01

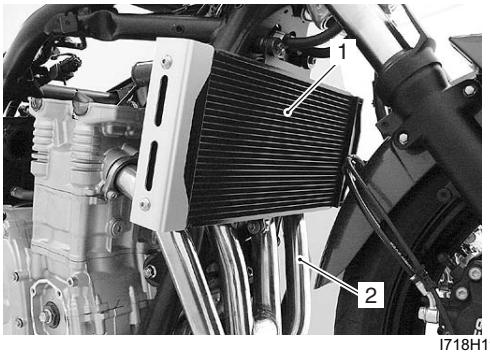
8) Remove the intake (7) and exhaust camshafts (8).
9) Remove the dowel pins.



I718H1140036-01

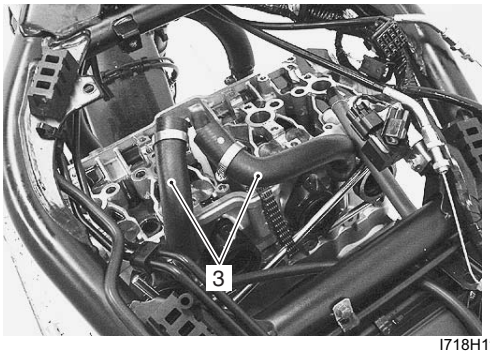
Cylinder Head

1) Remove the radiator (1). Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.
2) Remove the exhaust pipe assembly (2) and muffler. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.



I718H1140032-01

3) Remove the water hoses (3).

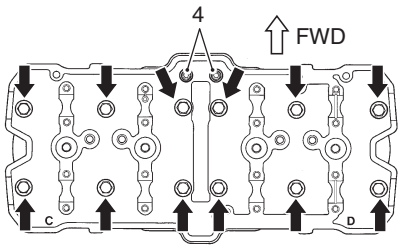


I718H1140037-01

4) Remove the cylinder head bolts (L65) (4).
5) Remove the cylinder head bolts (L175) and washers.

NOTE

When loosening the cylinder head bolts, loosen each bolt little by little diagonally.

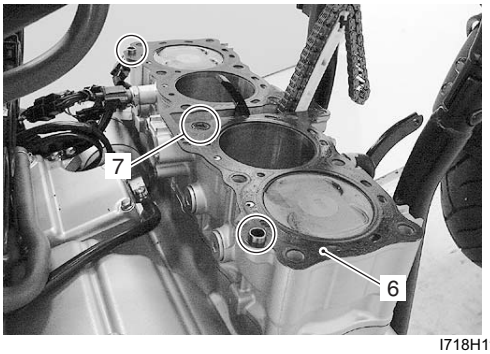


I718H1140038-03

6) Remove the cylinder head (5).

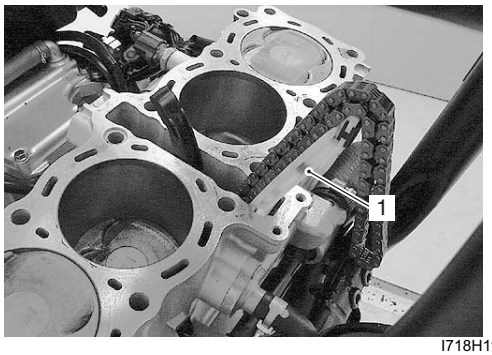
I718H1140039-01

7) Remove the cylinder head gasket (6), O-ring (7) and dowel pins.



I718H1140040-01

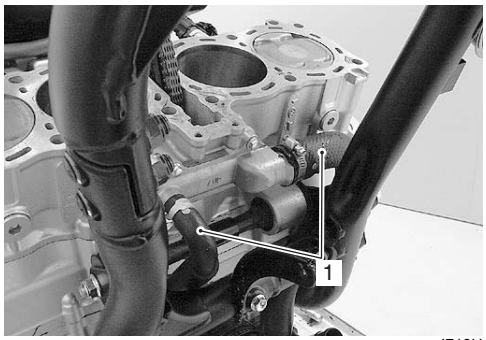
Cam Chain No.1 Guide
Remove the cam chain No.1 guide (1).



I718H1140041-01

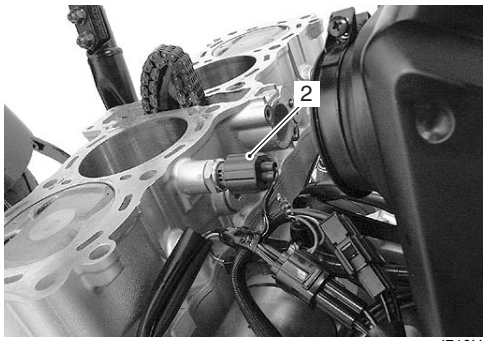
Cylinder

1) Disconnect the water hoses (1).



I718H1140042-01

2) Disconnect the ECT sensor coupler (2).

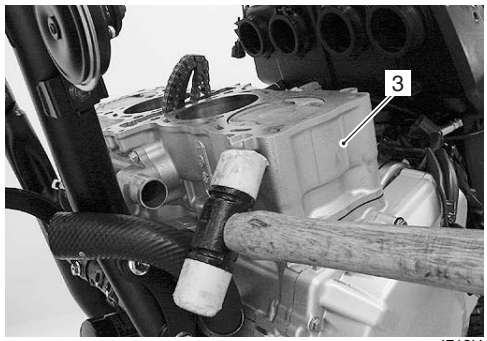


I718H1140043-02

3) Remove the cylinder (3).

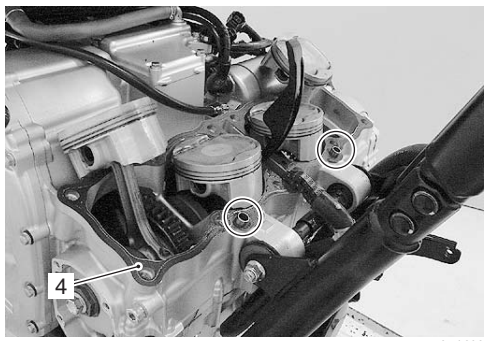
NOTE

If the cylinder does not come off easily, lightly tap it using a plastic hammer.



I718H1140044-02

4) Remove the cylinder gasket (4) and dowel pins.



I718H1140045-02

Piston

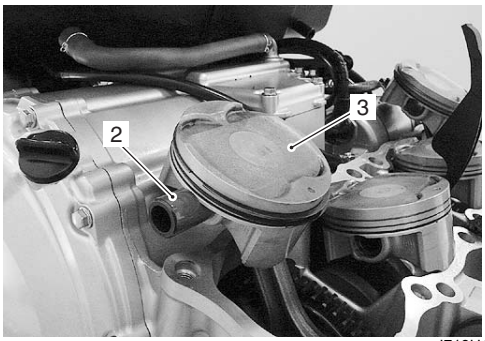
1) Place a clean rag over the cylinder base so as not to drop the piston pin circlips into the crankcase.
2) Remove each piston pin circlip (1).

I718H1140046-02

3) Draw out each piston pin (2) and remove the pistons (3).

NOTE

Scribe the cylinder number on the piston head.



I718H1140047-02

Engine Top Side Assembly

B718H11406007

Assemble the engine top side in the reverse order of disassembly. Pay attention to the following points:

Piston

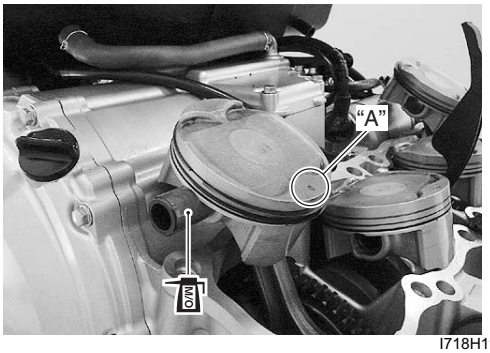
- When installing the piston pins, apply molybdenum oil solution onto each piston pin.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- Install the pistons and piston pins.

NOTE

- **Be sure to install the pistons in the cylinders from which they were removed in disassembly, refer to the cylinder numbers, #1 through #4, scribed on the piston.**
- **When installing the pistons, the indent "A" on the piston head must be faced to each exhaust side.**



I718H1140048-01

- Place a clean rag over the cylinder base so as not to drop the piston pin circlips (1) into the crankcase.
- Install the piston pin circlips (1).

⚠ CAUTION

Use new piston pin circlips (1) to prevent circlip failure which will occur when it is bent.

NOTE

End gap of the circlip (1) should not be aligned with the cutaway in the piston pin bore.

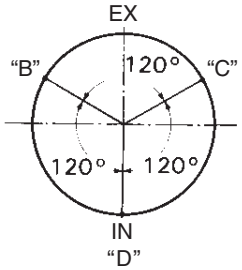
I718H1140049-02

⚠ CAUTION

When turning the crankshaft, pull the cam chain upward, or the chain will be caught between the crankcase and the cam drive sprocket.

I718H1140050-01

- Position the piston ring gaps as shown. Before inserting each piston into its cylinder, check that the gaps are properly positioned.



I718H1140051-01

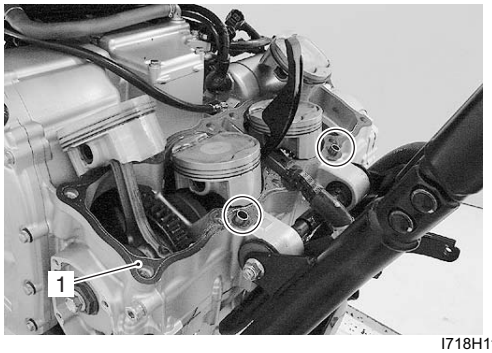
"B":	2nd ring and lower side rail
"C":	Upper side rail
"D":	1st ring and spacer

Cylinder

- Install the dowel pins and cylinder gasket (1).

⚠ CAUTION

Replace the cylinder gasket (1) with a new one.



I718H1140052-03

- Apply molybdenum oil solution to the sliding surface of the pistons.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

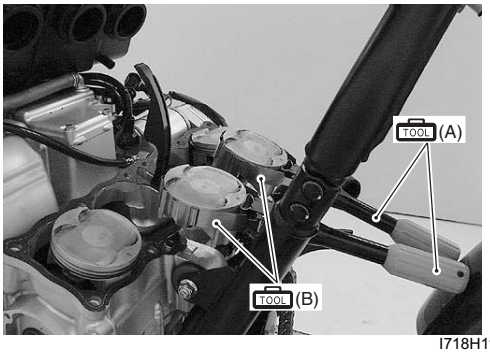
I718H1140053-02

- Install each special tool to the #2 and #3 pistons.

NOTE

Do not overtighten the bands, or piston installation into the cylinders will be difficult.

Special tool
TOOL (A): 09916–74521 (Holder body)
TOOL (B): 09916–74550 (Band (Piston diam.: 73 – 85 mm))



I718H1140054-02

- Apply engine oil to the sliding surface of the cylinder.
- Insert the #2 and #3 pistons into the cylinder.

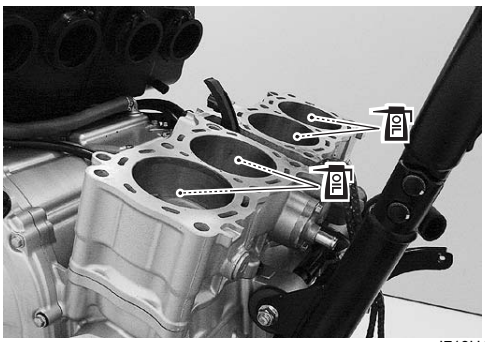
NOTE

Some light resistance must be overcome to lower the cylinder.

- After inserting the #2 and #3 pistons in place, insert the #1 and #4 pistons in the same manner of the #2 and #3 pistons.

NOTE

When installing the cylinder, keep the cam chain taut. The cam chain must not be caught between cam drive sprocket and crankcase when turning the crankshaft.



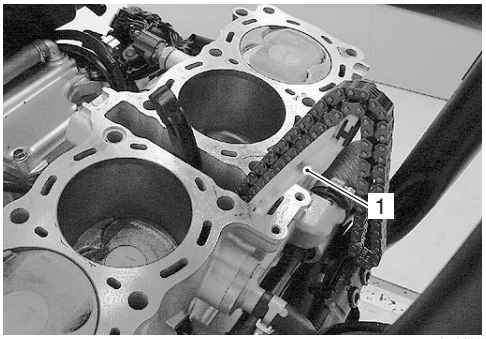
I718H1140055-03

Cam Chain No.1 Guide

- Pull the cam chain out of the cylinder and install the cam chain guide (1).

⚠ CAUTION

Be sure that the cam chain guide (1) is installed properly.



I718H1140041-01

Cylinder Head

- Install the dowel pins, O-ring (1) and cylinder head gasket (2).

⚠ CAUTION

Replace the O-ring (1) and cylinder head gasket (2) with new ones.

I718H1140057-01

- Place the cylinder head on the cylinder (3).

NOTE

When installing the cylinder head (3), keep the cam chain taut.

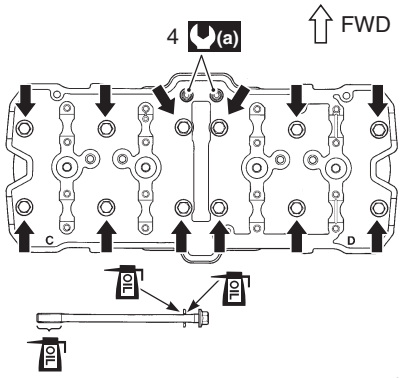
I718H1140058-01

- Apply engine oil to the bolt threads and both sides of washers.
- Tighten the cylinder head bolts (L175) to the specified two-step torque with a torque wrench sequentially and diagonally.

Tightening torque
Cylinder head bolt (L175) (initial): 25 N·m (2.5 kgf-m, 18.0 lb-ft)
Cylinder head bolt (L175) (Final): 42 N·m (4.2 kgf-m, 30.5 lb-ft)

- After firmly tightening the cylinder head bolts (L175), install the cylinder head bolts (L65) (4).
- Tighten the cylinder head bolts (4) to the specified torque.

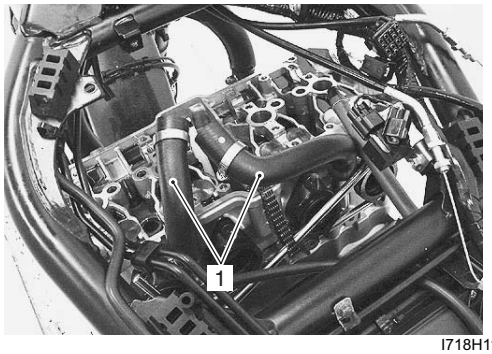
Tightening torque
Cylinder head bolt (L65) (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1140392-01

Water Hose

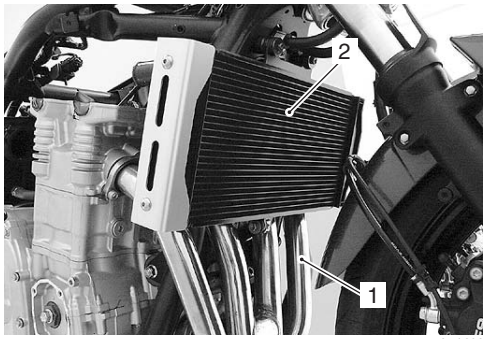
- Install the water hoses (1). Refer to “Water Hose Routing Diagram in Section 1F (Page 1F-3)”.



I718H1140060-01

Exhaust Pipe / Muffler

- Install the exhaust pipe assembly (1), muffler and radiator (2). Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)” and “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.



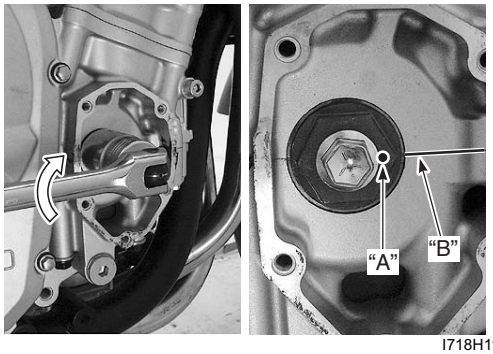
I718H1140061-01

Camshaft

- Turn the crankshaft clockwise and align the match mark “A” on the crankshaft with the mating surfaces “B” of crankcases.

⚠ CAUTION

- **Pull the cam chain upward, or the chain will be caught between crankcase and cam drive sprocket.**
- **To adjust the camshaft timing correctly, be sure to align the match mark “A” with the mating surfaces “B” and hold this position when installing the camshafts.**

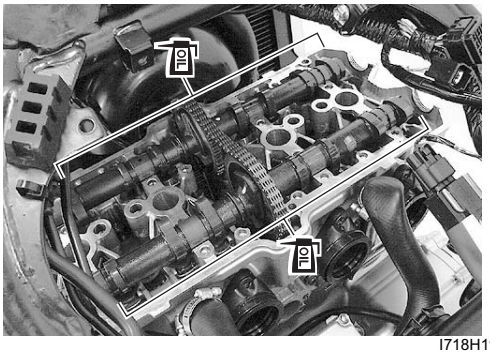


I718H1140062-02

- Before replacing the camshafts on cylinder head, apply engine oil to their journals and cam faces.
- Apply engine oil to the camshaft journal holders.

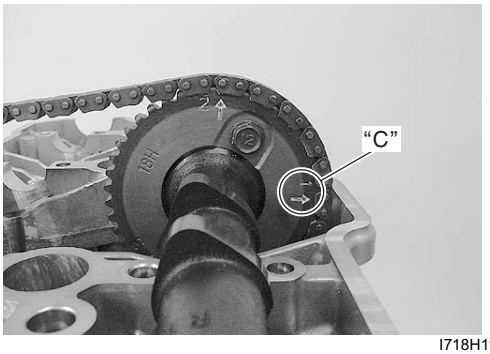
NOTE

- **Before installing the camshaft, check that the tappets are installed correctly.**
- **The camshafts are identified by the embossed letters.**



I718H1140063-01

- Pull the cam chain lightly.
- The exhaust camshaft sprocket has an arrow marked “1” “C”. Turn the exhaust camshaft so that the arrow is aligned with the gasket surface of the cylinder head.
- Engage the cam chain with the exhaust camshaft sprocket.

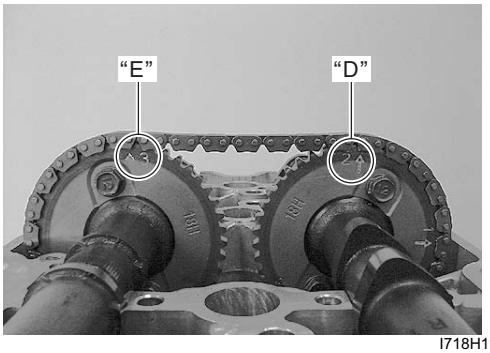


I718H1140064-01

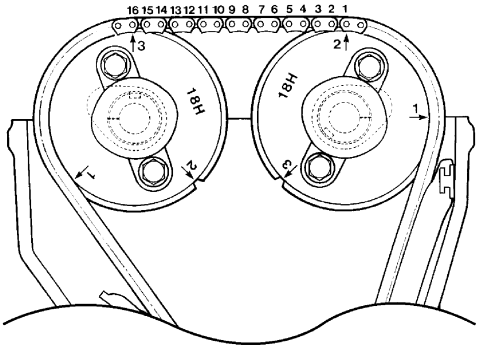
- The other arrow marked “2” “D” should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked “2” “D”, count out 16 roller pins (from the exhaust camshaft side going towards the intake camshaft side).
- Engage the 16th roller pin “E” on the cam chain with the marked “3” on the intake sprocket.

NOTE

The cam chain should now be on all three sprockets. Be careful not to move the crankshaft until the camshaft journal holders and cam chain tension adjuster are secured.

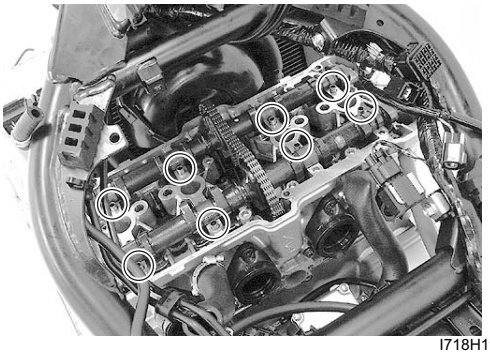


I718H1140065-01



I718H1140394-01

- Install the dowel pins.



I718H1140387-01

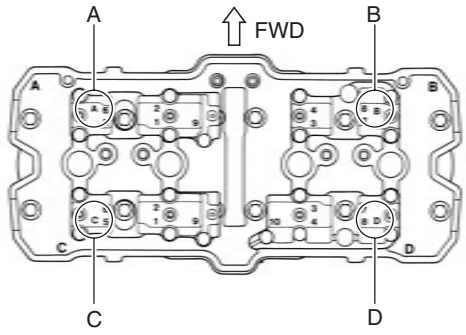
- Install the camshaft journal holders.

⚠ CAUTION

Damage to head or camshaft journal holder thrust surfaces may result if the camshaft journal holders are not drawn down evenly.

NOTE

Each camshaft journal holder is identified with an embossed letter.



I718H1140068-01

- Fasten the camshaft journal holders evenly by tightening the camshaft journal holder bolts lightly, in the ascending order of numbers.

⚠ CAUTION

The camshaft journal holder bolts are made of a special material and much superior in strength, compared with other types of high strength bolts.
Take special care not to use other types of bolts.

NOTE

The ascending order of numbers are indicated on the camshaft journal holders.

- Tighten the camshaft journal holder bolts in the ascending order of numbers to the specified torque.

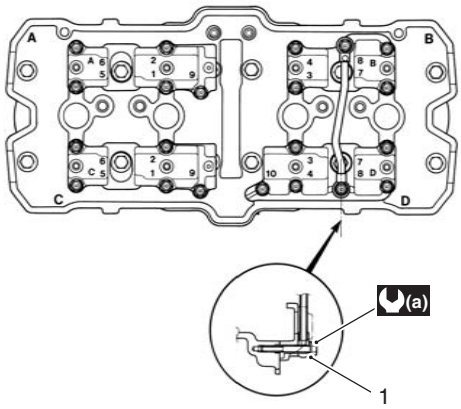
Tightening torque
Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

- Install the oil pipe and tighten the mounting bolts to specified torque.

NOTE

Fit the washer (1) to each oil pipe mounting bolt.

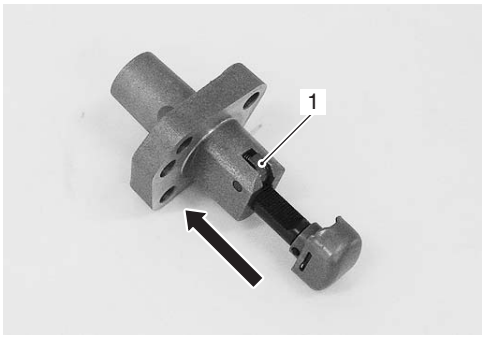
Tightening torque
Oil pipe mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1140069-01

Cam Chain Tension Adjuster

- Retract the push rod by pushing the stopper (1).



I718H1140070-03

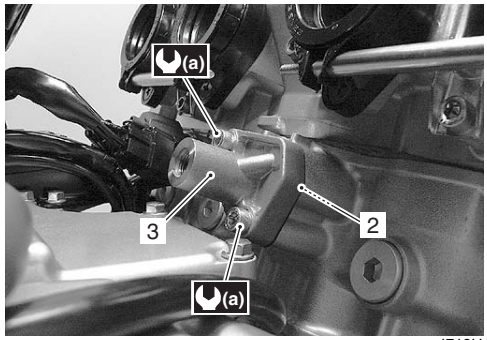
- Install a new gasket (2).

⚠ CAUTION

Use a new gasket to prevent oil leakage.

- Install the cam chain tension adjuster (3) and tighten its mounting bolts.

Tightening torque
Cam chain tension adjuster mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1140071-03

- Install the spring (4).
- Install the gasket (5) and cam chain tension adjuster cap bolt (6).

NOTE

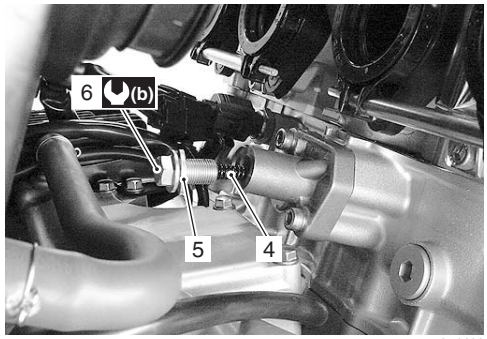
Click sound is heard when the cam chain tension adjuster cap bolt is installed.

- Tighten the cam chain tension adjuster cap bolt (6) to the specified torque.

Tightening torque
Cam chain tension adjuster cap bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

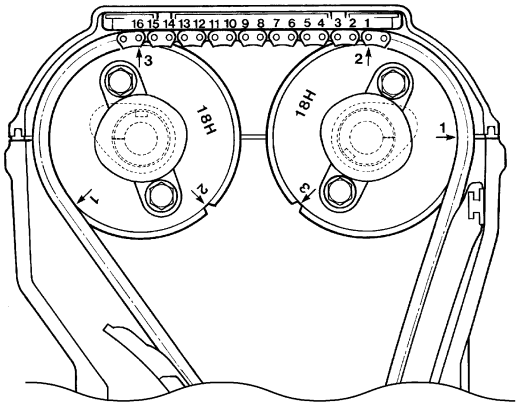
⚠ CAUTION

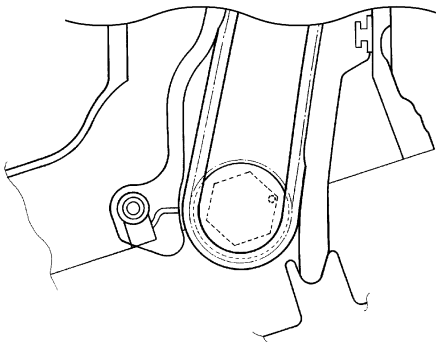
After installing the cam chain tension adjuster, check to be sure that the adjuster works properly by checking the slack of cam chain.



I718H1140072-03

- After installing the cam chain tension adjuster, rotate the crankshaft (some turns), and recheck the positions of the camshafts.





I718H1140396-01

- Be sure to check and adjust the valve clearance. Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-5)”.

Throttle Body

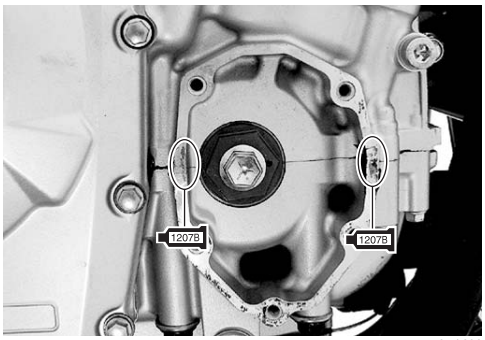
- Install the throttle body (1). Refer to “Throttle Body Removal and Installation (Page 1D-9)”.

I718H1140074-02

Right Crankshaft Cover

- Apply SUZUKI BOND lightly to the mating surfaces at the parting line between the upper and lower crankcases as shown.

1207B : Sealant 99000–31140 (SUZUKI Bond 1207B or equivalent)

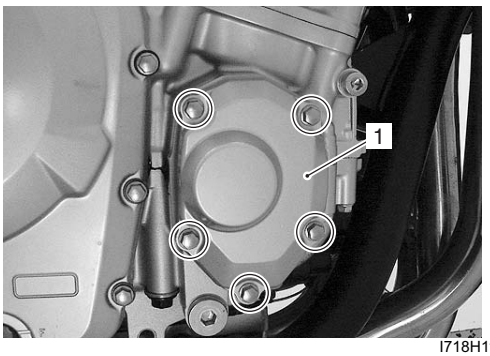


I718H1140075-03

- Install the gasket and right crankcase cover (1).

⚠ CAUTION

Use a new gasket to prevent oil leakage.



I718H1140077-01

Spark Plug

- Install the spark plugs. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.

Cylinder Head Cover

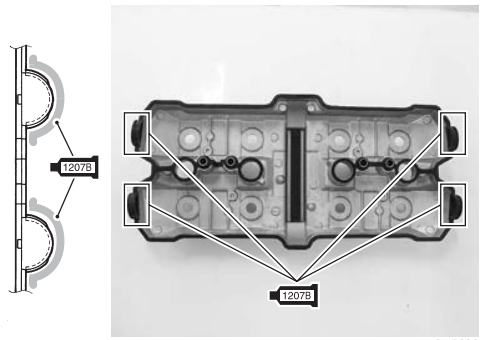
- Install a new gasket to the cylinder head cover.

⚠ CAUTION

Use the new gasket to prevent oil leakage.

- Apply SUZUKI BOND to the cam end caps of the gasket as shown.

  1207B : Sealant 99000–31140 (SUZUKI Bond 1207B or equivalent)



I718H1140076-01

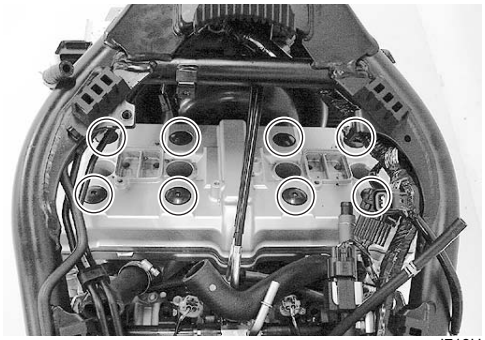
- Apply engine oil to both sides of the gaskets.

  ⚠ CAUTION

  Use the gaskets with new ones to prevent oil leakage.

- Tighten the cylinder head cover bolts (4) to the specified torque.

  Tightening torque
  Cylinder head cover bolt: 14 N·m (1.4 kgf-m, 10.0 lb-ft)



I718H1140078-01

PAIR System

- Install the PAIR component parts. Refer to “PAIR Reed Valve Removal and Installation in Section 1B (Page 1B-6)”.

I718H1140079-01

Ignition Coil / Plug Cap and Spark

- Install the ignition coil/plug caps. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.

I718H1140080-01

Thermostat Inlet Connector

- Install the thermostat connector and pour engine coolant. Refer to “Thermostat Connector / Thermostat Removal and Installation in Section 1F (Page 1F-9)” and “Cooling System Inspection in Section 0B (Page 0B-12)”.

I718H1140151-01

Valve Clearance Inspection and Adjustment

B718H11406008

Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-5)”.

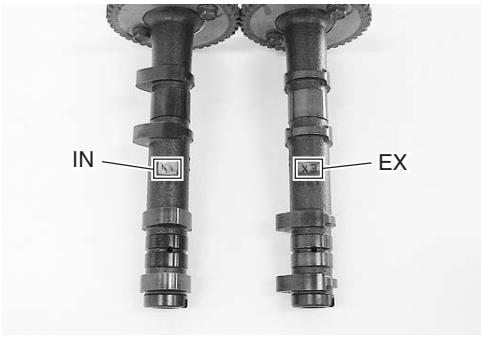
Camshaft Inspection

B718H11406009

Refer to “Engine Top Side Disassembly (Page 1D-24)”.
Refer to “Engine Top Side Assembly (Page 1D-28)”.

Camshaft Identification

The exhaust camshaft has the embossed letters “EX” and the intake camshaft has the embossed letters “IN”.



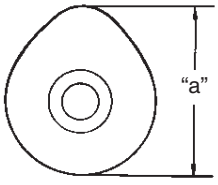
I718H1140081-01

Cam Wear

Check the camshaft for wear or damage.
Measure the cam height “a” with a micrometer.
Replace a camshaft if the cams are worn to the service limit.

Special tool
TOOL : 09900–20202 (Micrometer (1/100 mm, 25 – 50 mm))

Cam height “a”
Service limit: (IN) 34.98 mm (1.377 in)
Service limit: (EX) 33.88 mm (1.334 in)



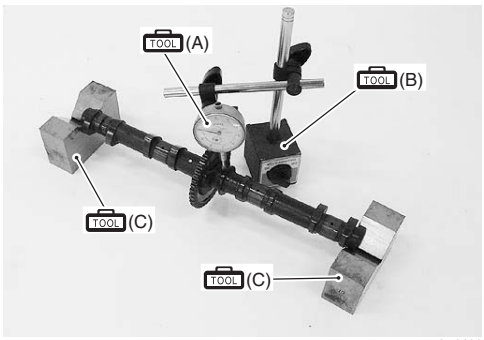
I649G1140199-01

Camshaft Runout

Measure the runout using the dial gauge. Replace the camshaft if the runout exceeds the limit.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)
TOOL (C): 09900–21304 (V-block (100 mm))

Camshaft runout (IN & EX)
Service limit: 0.10 mm (0.004 in)



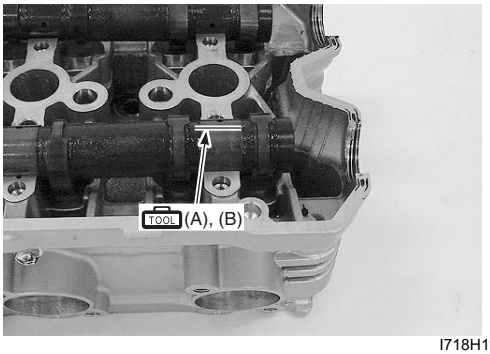
I718H1140082-01

Camshaft Journal Wear

Inspect the camshaft journal wear in the following procedures:

1) Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.
2) Use the plastigauge to read the clearance at the widest portion, which is specified as follows.

   Special tool
   TOOL (A): 09900–22301 (Plastigauge (0.025 - 0.076 mm))
   TOOL (B): 09900–22302 (Plastigauge (0.051 - 0.152 mm))



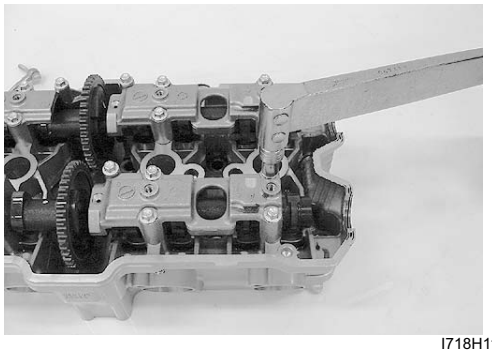
I718H1140083-03

3) Install each camshaft journal holder to its original position. Refer to “Engine Top Side Assembly (Page 1D-28)”.
4) Tighten the camshaft journal holder bolts in ascending order of numbers to the specified torque. Refer to “Engine Top Side Assembly (Page 1D-28)”.

NOTE

Do not rotate the camshafts with the plastigauge in place.

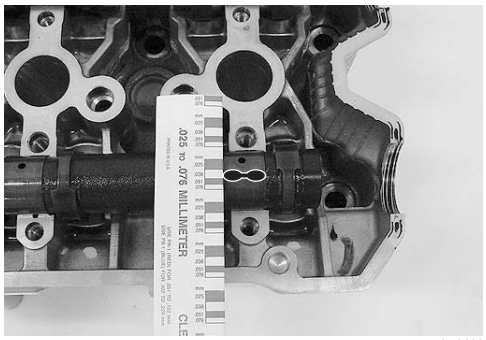
Tightening torque
Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1140084-01

5) Remove the camshaft journal holders and measure the width of the compressed plastigauge using the envelope scale.
6) This measurement should be taken at the widest part of the compressed plastigauge.

Camshaft journal oil clearance (IN & EX)
Service limit: 0.150 mm (0.0059 in)



I718H1140085-01

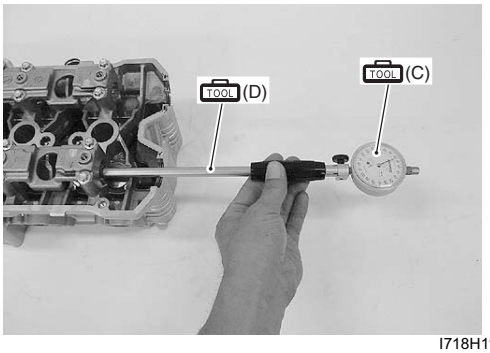
7) If the camshaft journal oil clearance exceeds the limit, measure the inside diameter of the camshaft journal holder and the outside diameter of the camshaft journal. Replace the camshaft or the cylinder head depending upon which one exceeds the specification.

Special tool
TOOL (C): 09900–20602 (Dial gauge (1/1000 mm, 1 mm))
TOOL (D): 09900–22403 (Small bore gauge (18 – 35 mm))

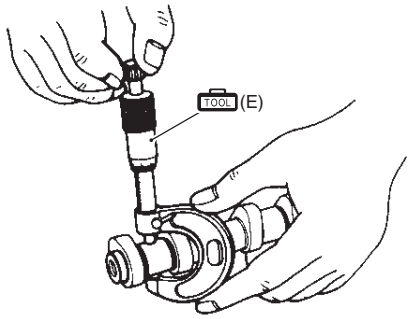
Camshaft journal holder I.D. (IN & EX)
Standard: 24.012 – 24.025 mm (0.9454 – 0.9459 in)

Special tool
TOOL (E): 09900–20205 (Micrometer (0 – 25 mm))

Camshaft journal O.D. (IN & EX)
Standard: 23.959 – 23.980 mm (0.9433 – 0.9441 in)



I718H1140086-01



I649G1140204-02

Camshaft Sprocket Inspection

B718H11406010

Inspect the camshaft sprocket in the following procedures:

1) Remove the intake and exhaust camshafts. Refer to “Engine Top Side Disassembly (Page 1D-24)”.
2) Inspect the teeth of each camshaft sprocket for wear or damage.
   If they are worn or damaged, replace the sprockets and cam chain as a set.

I718H1140087-01

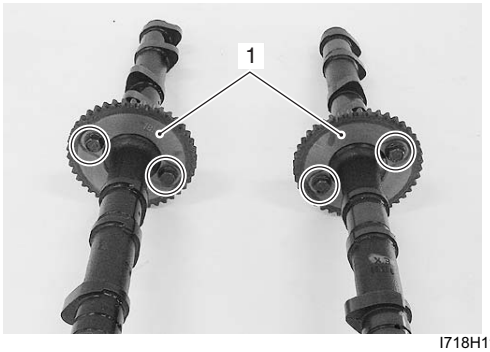
3) Install the camshafts. Refer to “Engine Top Side Assembly (Page 1D-28)”.

Camshaft Sprocket Removal and Installation

B718H11406011

Removal

1) Remove the camshafts. Refer to “Engine Top Side Disassembly (Page 1D-24)”.
2) Remove the camshaft sprockets (1).



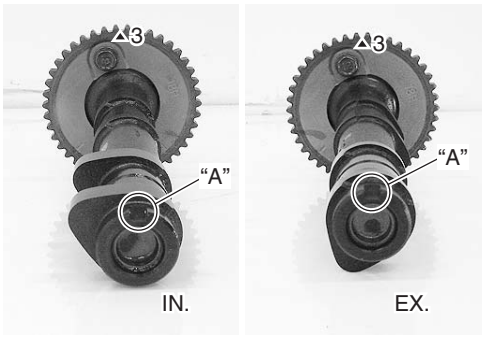
I718H1140088-02

Installation

1) Set the camshaft sprocket to the camshafts.

NOTE

Align the arrow mark “3” on camshaft sprocket with the notch “A” on the camshaft.

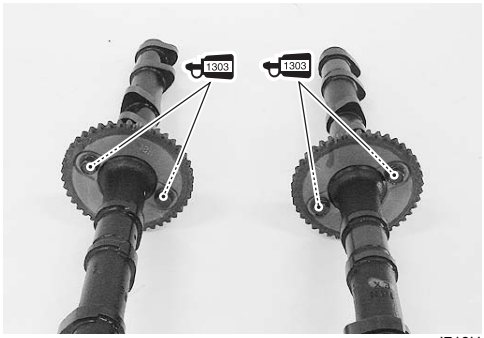


I718H1140089-02

2) Apply THREAD LOCK SUPER to the threads of the camshaft sprocket bolts and then tighten them to the specified torque.

1303 : Thread lock cement 99000–32030 (Thread Lock Cement Super 1303 or equivalent)

Tightening torque
Camshaft sprocket bolt (Initial): 16 N·m (1.6 kgf-m, 11.5 lb-ft)
Camshaft sprocket bolt (Final): 25 N·m (2.5 kgf-m, 18.0 lb-ft)



I718H1140090-02

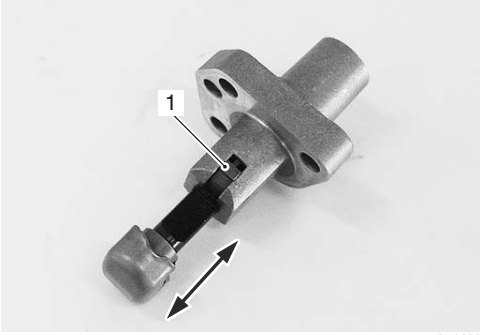
3) Install the camshafts. Refer to “Engine Top Side Assembly (Page 1D-28)”.

Cam Chain Tension Adjuster Inspection

B718H11406012

The cam chain tension adjuster is maintained at the proper tension by an automatically adjusted.

1) Remove the cam chain tension adjuster. Refer to “Engine Top Side Disassembly (Page 1D-24)”.
2) Check that the push rod slides smoothly when releasing stopper (1). If it does not slide smoothly, replace the cam chain tension adjuster with a new one.



I718H1140091-01

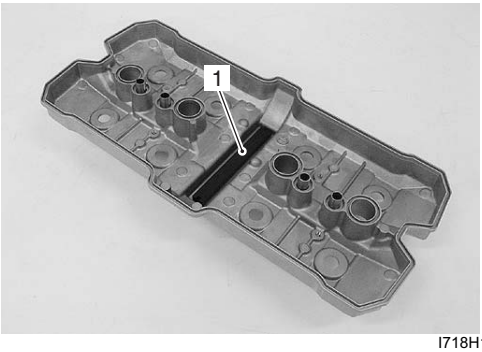
3) Install the cam chain tension adjuster. Refer to “Engine Top Side Assembly (Page 1D-28)”.

Cam Chain Guide Removal and Installation

B718H11406013

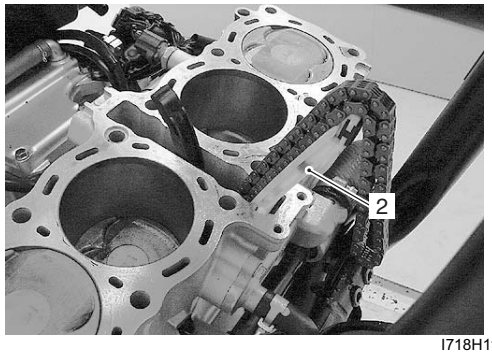
Removal

1) Remove the cylinder head cover. Refer to “Engine Top Side Disassembly (Page 1D-24)”.
2) Remove the cam chain No.2 guide (1) from the cylinder head cover.



I718H1140092-01

3) Remove the cylinder head. Refer to “Engine Top Side Disassembly (Page 1D-24)”.
4) Remove the cam chain No.1 guide (2).



I718H1140056-02

Installation

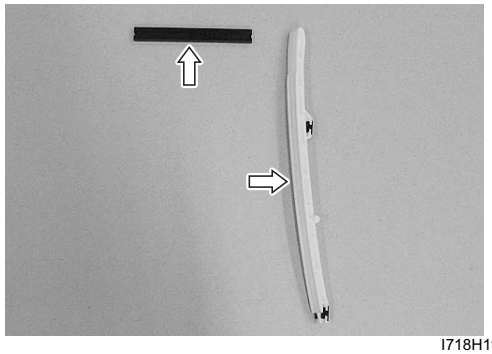
Install the cam chain guides in the reverse order of removal.

Cam Chain Guide Inspection

B718H11406014

Inspect the cam chain guide in the following procedures:

1) Remove the cam chain guides. Refer to “Cam Chain Guide Removal and Installation (Page 1D-39)”.
2) Check the contacting surface of the cam chain guide. If it is worn or damaged, replace it with a new one.



I718H1140095-01

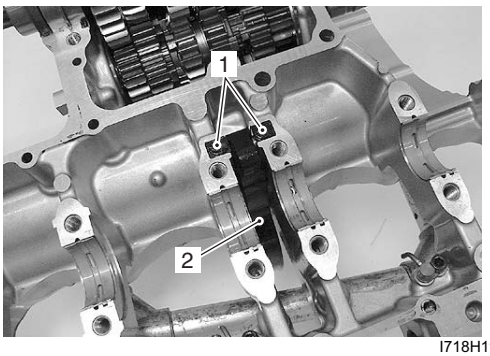
3) Install the cam chain guides. Refer to “Cam Chain Guide Removal and Installation (Page 1D-39)”.

Cam Chain Tensioner Inspection

B718H11406015

Inspect the cam chain tensioner in the following procedures:

1) Separate the crankcases, upper and lower. Refer to “Engine Bottom Side Disassembly (Page 1D-53)”.
2) Remove the crankshaft assembly from the upper crankcase. Refer to “Engine Bottom Side Disassembly (Page 1D-53)”.
3) Remove the dampers (1) of the cam chain tensioner.
4) Remove the cam chain tensioner (2) and pin.



I718H1140096-01

5) Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.

I718H1140097-01

6) Install the pin, cam chain tensioner and dampers.
7) Reinstall the crankshaft assembly. Refer to “Engine Bottom Side Assembly (Page 1D-61)”.
8) Reassemble the crankcases, upper and lower. Refer to “Engine Bottom Side Assembly (Page 1D-61)”.

Cylinder Head Disassembly and Assembly

B718H11406016

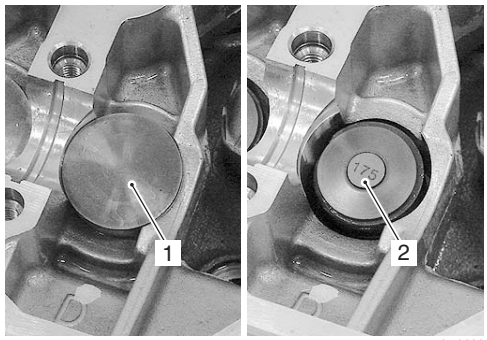
Refer to “Engine Top Side Disassembly (Page 1D-24)”.
Refer to “Engine Top Side Assembly (Page 1D-28)”.

⚠ CAUTION

Identify the position of each removed part. Organize the parts in their respective groups (i.e., intake, exhaust, No.1 or No.2) so that they can be installed in their original locations.

Disassembly

1) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



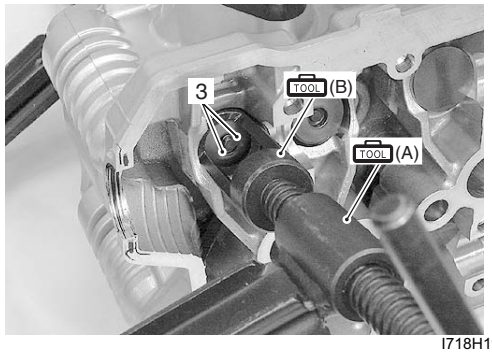
I718H1140098-01

2) Using the special tools, compress the valve spring and remove the two cotter halves (3) from the valve stem.

⚠ CAUTION

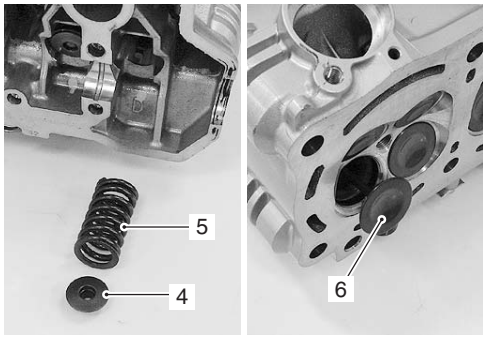
Be careful not to damage of the tappet sliding surface with the special tool.

Special tool
TOOL (A): 09916–14510 (Valve spring compressor)
TOOL (B): 09916–14521 (Valve spring compressor attachment)
TOOL : 09916–84511 (Tweezers)



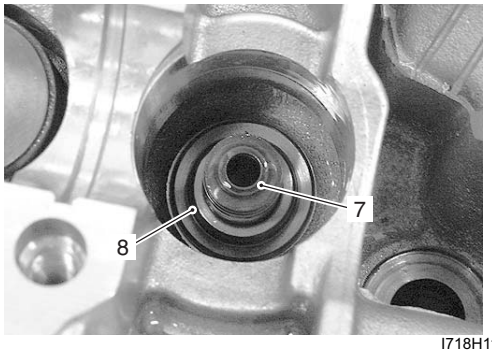
I718H1140100-01

3) Remove the valve spring retainer (4) and valve spring (5).
4) Pull out the valve (6) from the combustion chamber side.



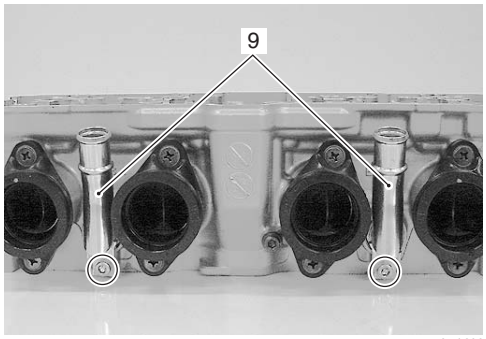
I718H1140101-01

5) Remove the oil seal (7) and spring seat (8).



I718H1140102-01

6) Remove the other valves in the same manner as described previously.
7) Remove the water outlet pipes (9).

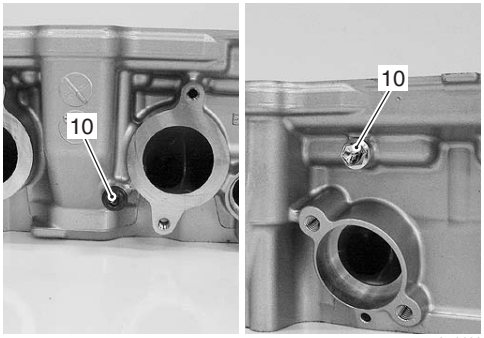


I718H1140103-01

8) Remove the intake pipes.


I718H1140105-01

9) Remove the oil gallery plugs (cylinder head) (10).



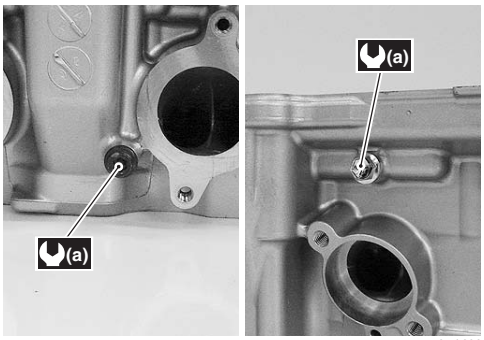
I718H1140106-01

Assembly
Assembly is in the reverse order of disassembly. Pay attention to the following points:

- Tighten the oil gallery plugs (cylinder head) to the specified torque.

⚠ CAUTION

Replace the gasket with new ones.



I718H1140107-01

Tightening torque
Oil gallery plug (cylinder head) (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

- Apply grease to O-ring of the intake pipe.

⚠ CAUTION

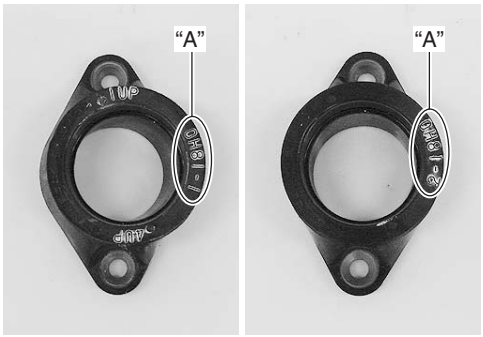
Replace the O-rings with new ones.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

I718H1140109-01

NOTE

- **When replacing the intake pipes, identify the different intake pipes according to each I.D. code "A".**
  (1-18H0 for cylinder #1 and #4)
  (2-18H0 for cylinder #2 and #3)
- **Make sure that the "1 UP" mark faces up. (for cylinder #1)**
- **Make sure that the "4 UP" mark faces up. (for cylinder #4)**



I718H1140112-04

- Apply engine coolant to O-rings of water outlet pipe.

⚠ CAUTION

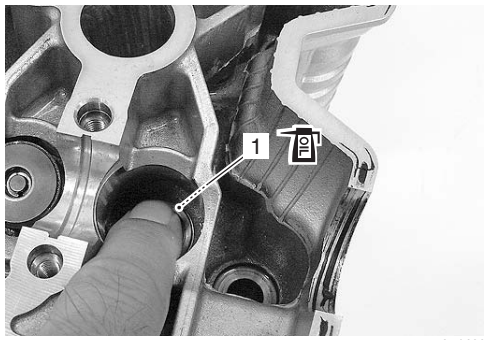
Replace the O-rings with new ones.

I718H1140114-01

- Install the valve spring seat.
- Apply engine oil to the oil seal (1), and press-fit it into position.

⚠ CAUTION

Do not reuse the removed oil seal.



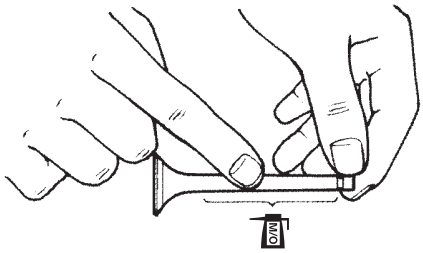
I718H1140113-03

- Insert the valve, with its stem coated with MOLYBDENUM OIL SOLUTION all around and along the full stem length without any break.

⚠ CAUTION

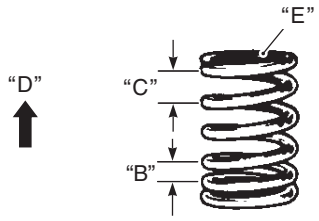
When inserting the valve, take care not to damage the lip of the oil seal.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I705H1140165-01

- Install the valve spring with the small-pitch portion “B” facing cylinder head.



I718H1140004-01

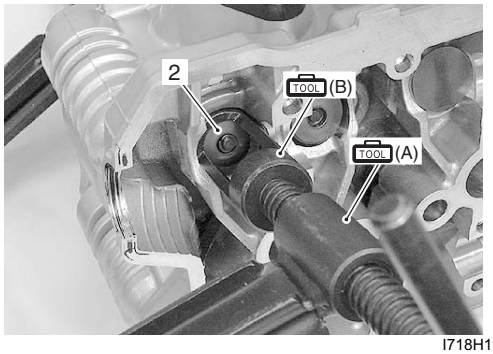
“B”: Small-pitch portion	“D”: UPWARD
“C”: Large-pitch portion	“E”: Paint

- Put on the valve spring retainer (2), and using the special tools, press down the spring, fit the cotter halves to the stem end, and release the lifter to allow the cotter halves to wedge in between retainer and stem.

⚠ CAUTION

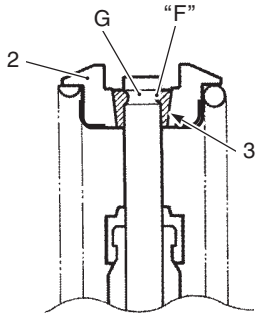
- **Be sure to restore each spring and valve to their original positions.**
- **Be careful not to damage the valve and valve stem when handling them.**
- **Be careful to damage of the tappet sliding surface with the special tool.**

Special tool
TOOL (A): 09916–14510 (Valve spring compressor)
TOOL (B): 09916–14521 (Valve spring compressor attachment)
TOOL : 09916–84511 (Tweezers)



I718H1140116-02

- Be sure that the rounded lip “F” of the cotter fits snugly into the groove “G” in the stem end.



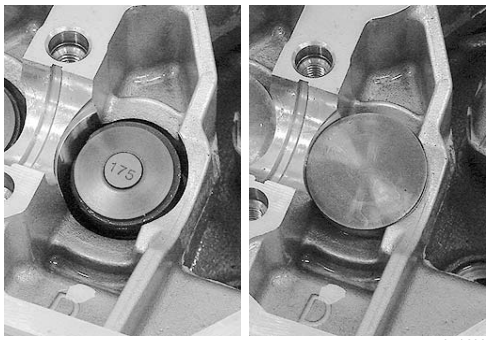
I718H1140117-02

2. Valve spring retainer	3. Cotter

- Install the other valves and springs in the same manner as described previously.
- Install the tappet shims and the tappets to their original positions.

NOTE

- **Apply engine oil to the stem end, shim and tappet before fitting them.**
- **When seating the tappet shim, be sure the figure printed surface faces the tappet.**



I718H1140118-01

Cylinder Head Related Parts Inspection

B718H11406017

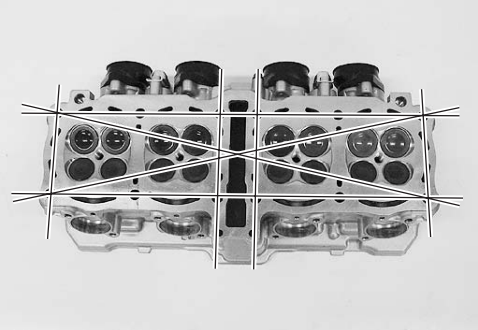
Refer to “Cylinder Head Disassembly and Assembly (Page 1D-40)”.

Cylinder Head Distortion

1) Decarbonize the combustion chambers.
2) Check the gasket surface of the cylinder head for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If readings exceed the service limit, replace the cylinder head.

Special tool
TOOL : 09900–20803 (Thickness gauge)

Cylinder head distortion
Service limit: 0.20 mm (0.008 in)



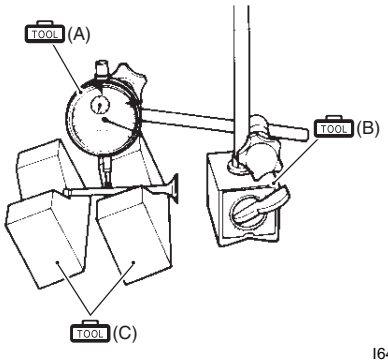
I718H1140119-01

Valve Stem Runout

Support the valve using V-blocks, as shown, and check its runout using the dial gauge. If the runout exceeds the service limit, replace the valve.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)
TOOL (C): 09900–21304 (V-block (100 mm))

Valve stem runout (IN. & EX.)
Service limit: 0.05 mm (0.002 in)



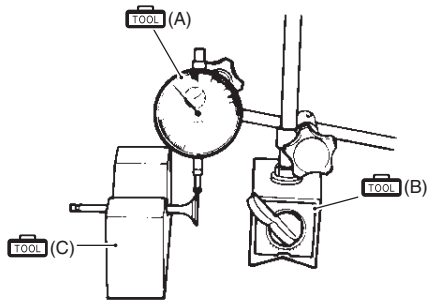
I649G1140231-02

Valve Head Radial Runout

Place the dial gauge at a right angle to the valve head face and measure the valve head radial runout. If it measures more than the service limit, replace the valve.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)
TOOL (C): 09900–21304 (V-block (100 mm))

Valve head radial runout (IN. & EX.)
Service limit: 0.03 mm (0.001 in)



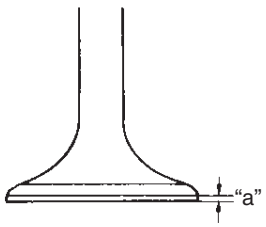
I649G1140232-02

Valve Face Wear

Visually inspect each valve face for wear. Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve head “a”. If it is out of specification replace the valve with a new one.

Special tool
TOOL : 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Valve head thickness “a” (IN. & EX.)
Service limit: 0.5 mm (0.02 in)

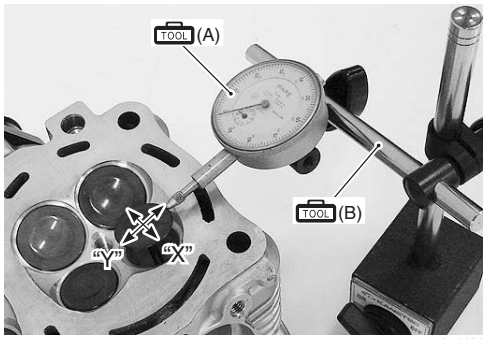


I649G1140233-01

Valve Stem Deflection
Lift the valve about 10 mm (0.39 in) “a” from the valve seat. Measure the valve stem deflection in two directions, “X” and “Y”, perpendicular to each other. Position the dial gauge as shown. If the deflection exceeds the service limit, then determine whether the valve or the guide should be replaced with a new one.

Special tool
(A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
(B): 09900–20701 (Magnetic stand)

Valve stem deflection (IN. & EX.)
Service limit: 0.35 mm (0.014 in)



I718H1140121-01

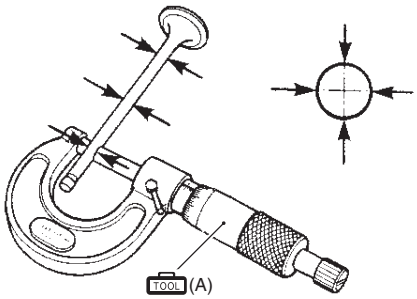
Valve Stem Wear
Measure the valve stem O.D. using the micrometer. If it is out of specification, replace the valve with a new one. If the valve stem O.D. is within specification but the valve stem deflection is not, replace the valve guide. After replacing the valve or valve guide, recheck the deflection.

Special tool
(A): 09900–20205 (Micrometer (0 – 25 mm))

Valve stem O.D.
Standard (IN.): 4.475 – 4.490 mm (0.1762 – 0.1768 in)
Standard (EX.): 4.455 – 4.470 mm (0.1754 – 0.1760 in)

NOTE

If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide replacement. Refer to “Valve Guide Replacement (Page 1D-47)”.



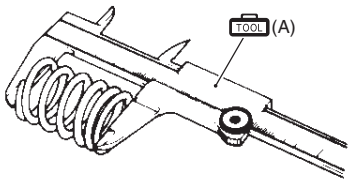
I718H1140122-01

Valve Spring
The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.
Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the specified range, replace the valve spring.

Special tool
(A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Valve spring free length (IN. & EX.)
Service limit: 39.6 mm (1.56 in)

Valve spring tension (IN. & EX.)
Standard: Approx. 147 N (15.0 kgf, 33.1 lb-ft)/36.0 mm (1.42 in)



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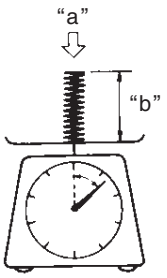


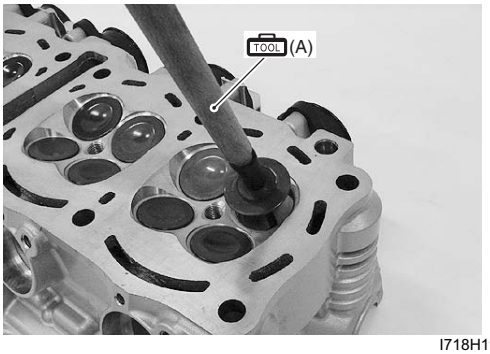
I649G1140238-02

Tension “a”	Length “b”
Approx. 147 N (15.0 kgf, 33.1 lbs)	36.0 mm (1.42 in)

Valve Seat Width

1) Visually check for valve seat width on each valve face. If the valve face has worn abnormally, replace the valve.
2) Coat the valve seat with a red lead (Prussian Blue) and set the valve in place.
3) Rotate the valve with light pressure.

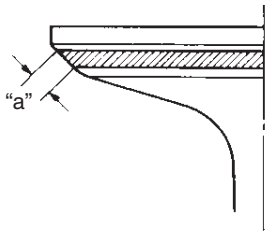
Special tool
TOOL (A): 09916–10911 (Valve lapper set)



I718H1140123-01

4) Check that the transferred red lead (blue) on the valve face is uniform all around and in center of the valve face.
If the seat width “a” measured exceeds the standard value, or seat width is not uniform reface the seat using the seat cutter. Refer to “Valve Seat Repair (Page 1D-48)”.

Valve seat width “a” (IN. & EX.)
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)



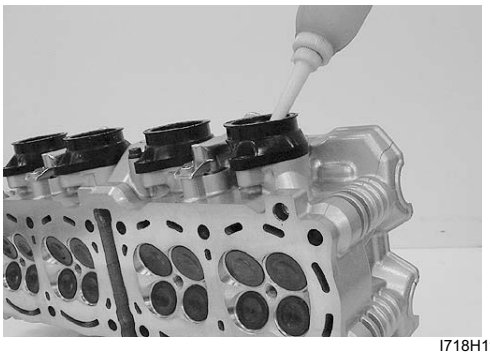
I649G1140246-01

Valve Seat Sealing Condition

1) Clean and assemble the cylinder head and valve components.
2) Fill the intake and exhaust ports with gasoline to check for leaks. If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing. Refer to “Valve Seat Repair (Page 1D-48)”.

⚠ WARNING

Always use extreme caution when handling gasoline.



I718H1140124-01

NOTE

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-5)”.

Valve Guide Replacement

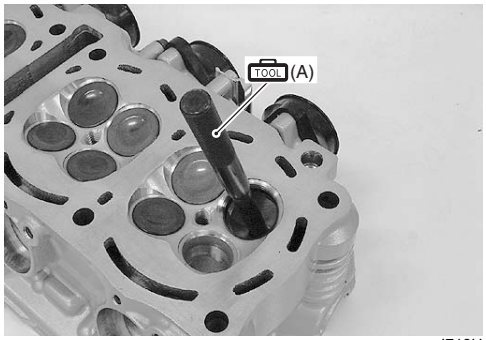
B718H11406018

1) Remove the cylinder head. Refer to “Engine Top Side Disassembly (Page 1D-24)”.
2) Remove the valves. Refer to “Cylinder Head Disassembly and Assembly (Page 1D-40)”.
3) Using the valve guide remover, drive the valve guide out toward the intake or exhaust camshaft side.

Special tool
TOOL (A): 09916–43211 (Valve guide remover/ installer)

NOTE

- **Discard the removed valve guide sub-assemblies.**
- **Only oversized valve guides are available as replacement parts. (Part No. 11115-17E70)**



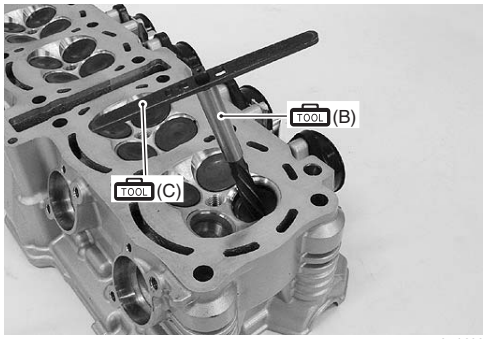
I718H1140125-01

4) Refinish the valve guide holes in the cylinder head using the reamer and handle.

⚠ CAUTION

When refinishing or removing the reamer from the valve guide hole, always turn it clockwise.

Special tool
TOOL (B): 09916–34580 (Valve guide reamer (10.8 mm))
TOOL (C): 09916–34542 (Reamer handle)



I718H1140126-01

5) Cool down the new valve guides in a freezer for about one hour and heat the cylinder head to 100 – 150 °C (212 – 302 °F) with a hot plate.

⚠ CAUTION

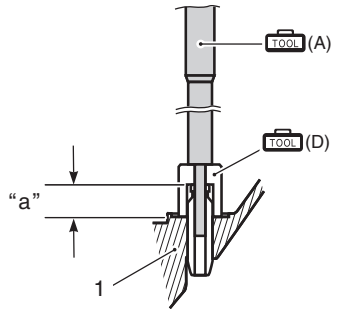
Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

6) Apply engine oil to each valve guide and valve guide hole.
7) Drive the guide into the guide hole using the valve guide installer.

⚠ CAUTION

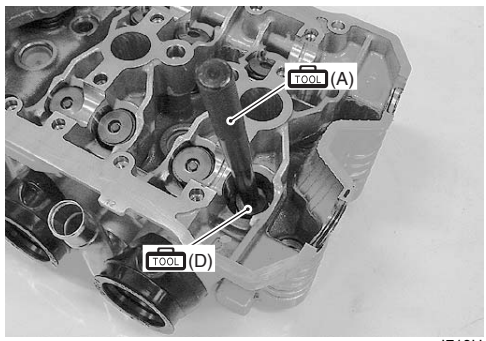
Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

Special tool
TOOL (A): 09916–43211 (Valve guide remover/ installer)
TOOL (D): 09916–43230 (Attachment)



I718H1140127-01

1. Cylinder head	2. 19.0 mm (0.75 in)



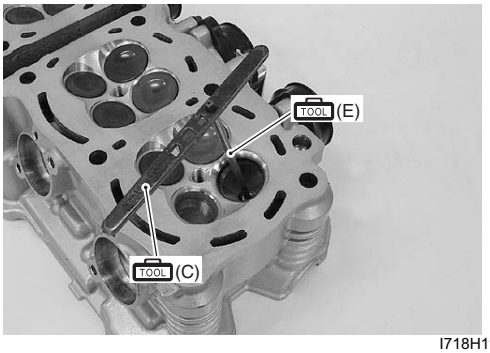
I718H1140128-01

8) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

Special tool
TOOL (C): 09916–34542 (Reamer handle)
TOOL (E): 09916–33210 (Valve guide reamer (4.5 mm))

NOTE

- **Be sure to cool down the cylinder head to ambient air temperature.**
- **Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.**



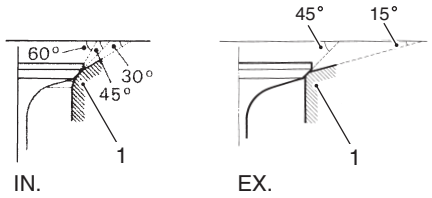
I718H1140129-01

9) Reassemble the cylinder head. Refer to “Cylinder Head Disassembly and Assembly (Page 1D-40)”.
10) Install the cylinder head assembly. Refer to “Engine Top Side Assembly (Page 1D-28)”.

Valve Seat Repair

B718H11406019

The valve seats (1) for both the intake and exhaust valves are machined to three different angles. The seat contact surface is cut at 45°.



I718H1140130-01

	Intake	Exhaust
Seat angle	15°/45°/60°	15°/45°
Seat width	0.9 – 1.1 mm (0.035 – 0.043 in)	←
Valve diameter	31 mm (1.22 in)	27 mm (1.06 in)
Valve guide I.D.	4.500 – 4.512 mm (0.1772 – 0.1776 in)	←

⚠ CAUTION

- **The valve seat contact area must be inspected after each cut.**
- **Do not use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish but not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.**

NOTE

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-5)”.

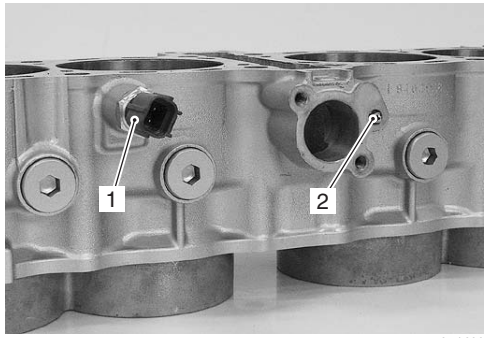
Cylinder Disassembly and Assembly

B718H11406031

Refer to “Engine Top Side Disassembly (Page 1D-24)”.
Refer to “Engine Top Side Assembly (Page 1D-28)”.

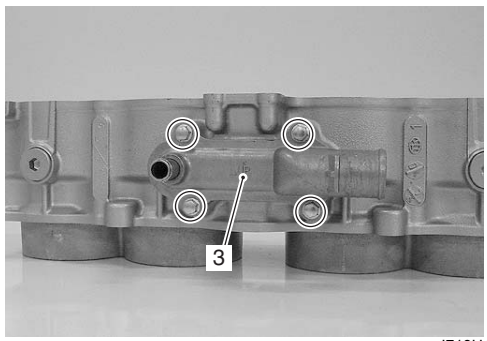
Disassembly

1) Remove the ECT sensor (1) and oil jet (for cam chain tension adjuster) (2).



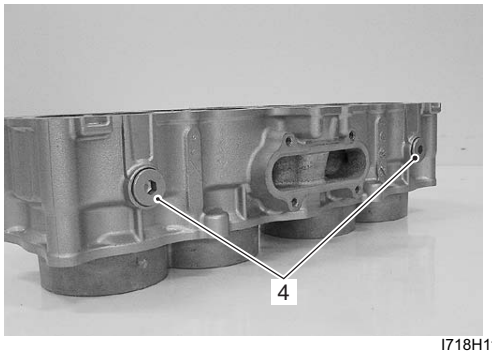
I718H1140131-01

2) Remove the water inlet connector (3).



I718H1140132-01

3) Remove the water jacket plugs (4).



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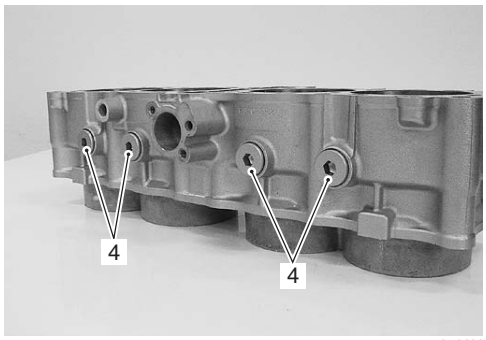


I718H1140134-01

Assembly

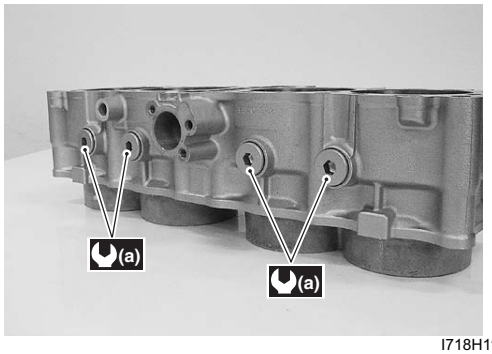
Assembly is in the reverse order of disassembly. Pay attention to the following points:

- Tighten the water jacket plugs to the specified torque.

⚠ CAUTION

Replace the gaskets with new ones.

Tightening torque
Water jacket plug (a): 30 N·m (3.0 kgf-m, 21.5 lb-ft)



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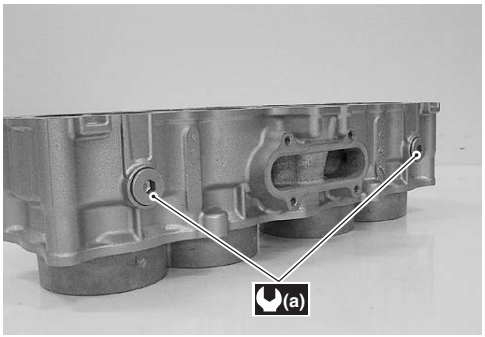
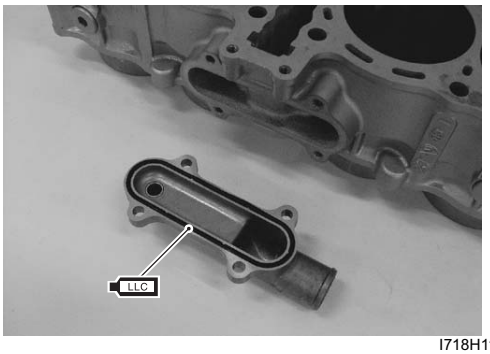


I718H1140136-01

- Apply engine coolant to O-ring of water inlet connector.

⚠ CAUTION

Replace the O-ring with a new one.



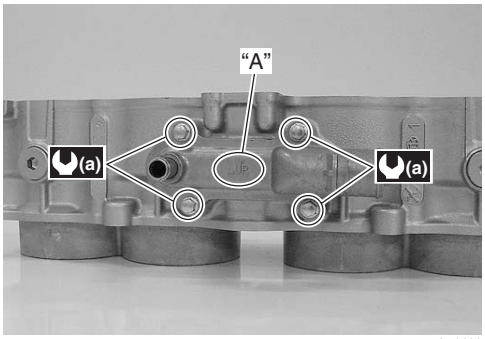
I718H1140137-01

- Tighten the water inlet connector bolts to the specified torque.

⚠ CAUTION

Make sure that the “up” mark “A” face up.

Tightening torque
Water inlet connector bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



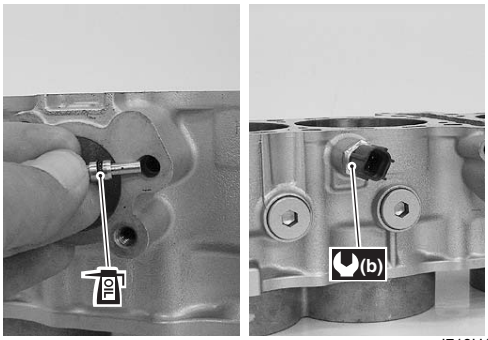
I718H1140398-01

- Apply engine oil to O-ring and install the oil jet.
- Tighten the ECT sensor to the specified torque.

⚠ CAUTION

Replace the O-ring and gasket with new ones.

Tightening torque
ECT sensor (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



I718H1140138-01

Cylinder Inspection

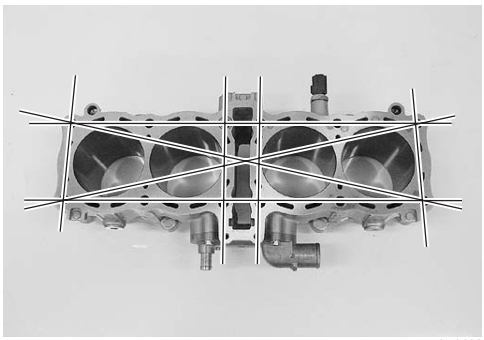
B718H11406020

Refer to “Engine Top Side Disassembly (Page 1D-24)”.
Refer to “Engine Top Side Assembly (Page 1D-28)”.

Cylinder Distortion
Check the gasket surface of the cylinder for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If any reading exceeds the service limit, replace the cylinder.

Special tool
TOOL : 09900–20803 (Thickness gauge)

Cylinder distortion
Service limit: 0.02 mm (0.008 in)

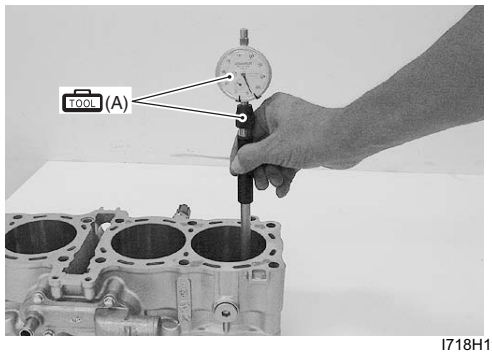


I718H1140139-01

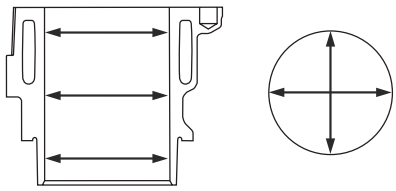
Cylinder Bore
Measure the cylinder bore diameter at six places. If any one of the measurements exceed the limit, overhaul the cylinder and replace the piston with an oversize piston. The remaining cylinders must also be rebored accordingly; otherwise, the imbalance might cause excessive vibration.

Special tool
TOOL (A): 09900–20508 (Cylinder gauge set)

Cylinder bore
Standard: 79.000 – 79.015 mm (3.1102 – 3.1108 in)



I718H1140140-01



I718H1140141-01

Piston-to-cylinder Clearance
Refer to “Piston and Piston Ring Inspection (Page 1D-52)”.

Piston Ring Removal and Installation

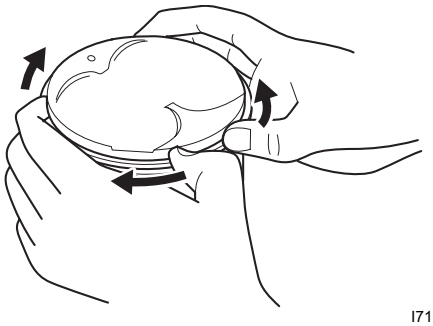
B718H11406022

Removal

1) Draw out the piston pin and remove the piston. Refer to “Engine Top Side Disassembly (Page 1D-24)”.
2) Carefully spread the ring opening with your thumbs and then push up the opposite side of the 1st ring (2) to remove it.

NOTE

Do not expand the piston ring excessively since it is apt to be broken down.



I718H1140142-01

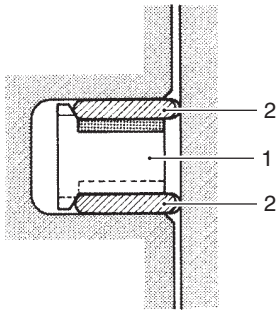
3) Remove the 2nd ring and oil ring in the same manner.

Installation

NOTE

- **When installing the piston ring, be careful not to damage the piston.**
- **Do not expand the piston ring excessively since it is apt to be broken down.**

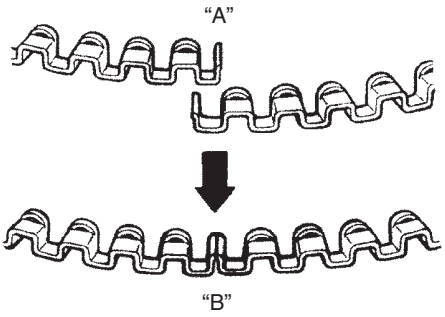
1) Install the piston rings in the order of the oil ring, second ring and top ring.
   a) The first member to go into the of the oil ring groove is a spacer (1).
   After placing the spacer, fit the two side rails (2).



I718H1140143-02

⚠ CAUTION

When installing the spacer, be careful so that the both edges are not overlapped.



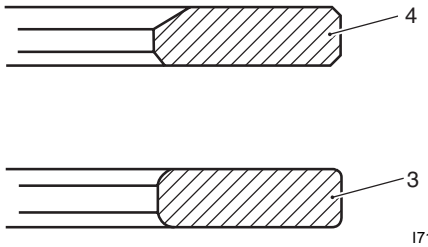
I705H1140170-02

“A”: INCORRECT	“B”: CORRECT

b) Install the 2nd ring (3) and 1st ring (4) to piston.

NOTE

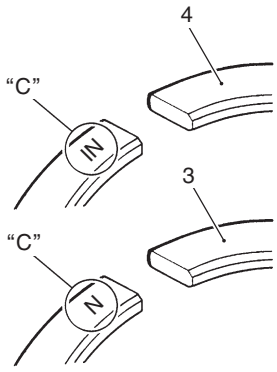
1st ring (4) and 2nd ring (3) differ in shape.



I718H1140144-01

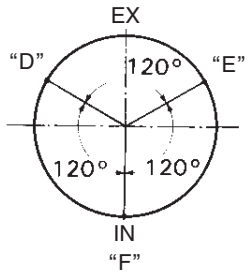
NOTE

Face the side with the stamped mark “C” upward when assembling.



I718H1140145-02

2) Position the gaps of the three rings and side rails as shown. Before inserting piston into the cylinder, check that the gaps are so located.



I718H1140146-02

"D": 2nd ring and lower side rail
"E": Upper side rail
"F": 1st ring and spacer

3) Install the piston and piston pin. Refer to "Engine Top Side Assembly (Page 1D-28)".

Piston and Piston Ring Inspection

B718H11406023

Refer to "Piston Ring Removal and Installation (Page 1D-51)".

Piston Diameter

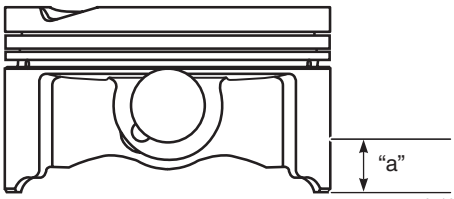
Measure the piston diameter using the micrometer at 15 mm (0.6 in) "a" from the skirt end. If the piston diameter is less than the service limit, replace the piston.

Special tool

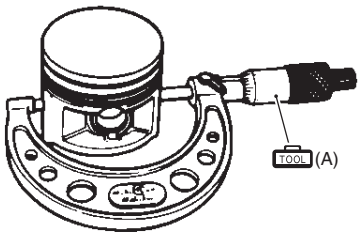
TOOL (A): 09900–20204 (Micrometer (75 – 100 mm))

Piston diameter

Service limit: 78.880 mm (3.1055 in)



I718H1140147-01



I649G1140262-02

Piston-to-cylinder Clearance

Subtract the piston diameter from the cylinder bore diameter. If the piston-to-cylinder clearance exceeds the service limit, replace both the cylinder and the piston.

Piston-to-cylinder clearance

Service limit: 0.120 mm (0.0047 in)

Piston Ring-to-groove Clearance

Measure the side clearances of the 1st and 2nd piston rings using the thickness gauge. If any of the clearances exceed the limit, replace both the piston and piston rings.

Special tool

TOOL (A): 09900–20803 (Thickness gauge)
TOOL (B): 09900–20205 (Micrometer (0 – 25 mm))

Piston ring-to-groove clearance

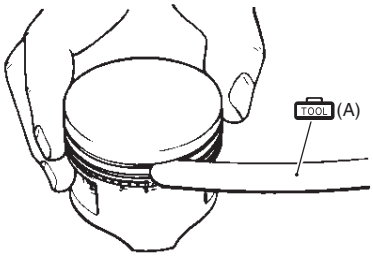
Service limit: (1st): 0.180 mm (0.0071 in)
Service limit: (2nd): 0.150 mm (0.0059 in)

Piston ring groove width

Standard: (1st): 1.01 – 1.03 mm (0.040 – 0.041 in)
Standard: (2nd): 0.81 – 0.83 mm (0.032 – 0.033 in)
Standard: (Oil): 1.51 – 1.53 mm (0.059 – 0.060 in)

Piston ring thickness

Standard: (1st): 0.97 – 0.99 mm (0.038 – 0.039 in)
Standard: (2nd): 0.77 – 0.79 mm (0.030 – 0.031 in)



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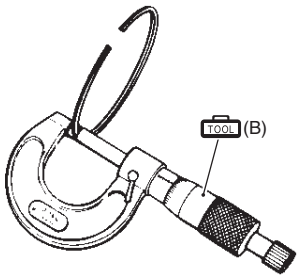


I649G1140264-02

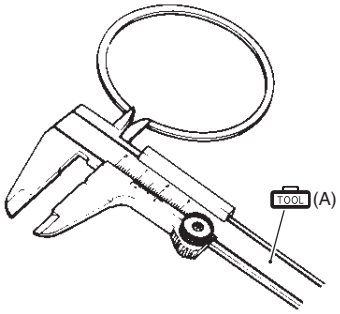
Piston Ring Free End Gap and Piston Ring End Gap
Measure the piston ring free end gap using vernier calipers. Next, fit the piston ring squarely into the cylinder and measure the piston ring end gap using the thickness gauge. If any of the measurements exceed the service limit, replace the piston ring with a new one.

Special tool
(A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

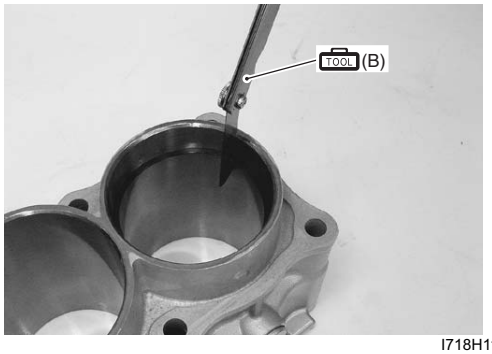
Piston ring free end gap
Service limit: (1st): 7.2 mm (0.28 in)
Service limit: (2nd): 7.6 mm (0.30 in)

Special tool
(B): 09900–20803 (Thickness gauge)

Piston ring end gap
Service limit: (1st): 0.50 mm (0.020 in)
Service limit: (2nd): 0.50 mm (0.020 in)



I649G1140265-02

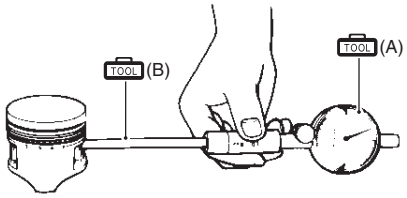


I718H1140148-01

Piston Pin and Pin Bore
Measure the piston pin bore inside diameter using the small bore gauge. If either is out of specification or the difference between these measurements surpass limits, replace the piston.

Special tool
(A): 09900–20602 (Dial gauge (1/1000 mm, 1 mm))
(B): 09900–22403 (Small bore gauge (18 – 35 mm))

Piston pin bore I.D.
Service limit: 18.030 mm (0.7098 in)

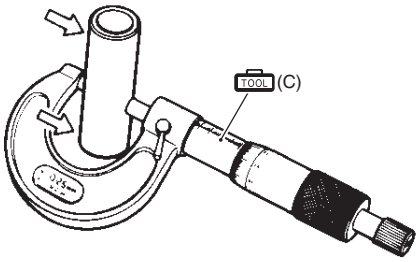


I649G1140267-02

Measure the piston pin outside diameter at three positions using the micrometer. If any of the measurements are out of specification, replace the piston pin.

Special tool
(C): 09900–20205 (Micrometer (0 – 25 mm))

Piston pin O.D.
Service limit: 17.980 mm (0.7079 in)



I649G1140268-02

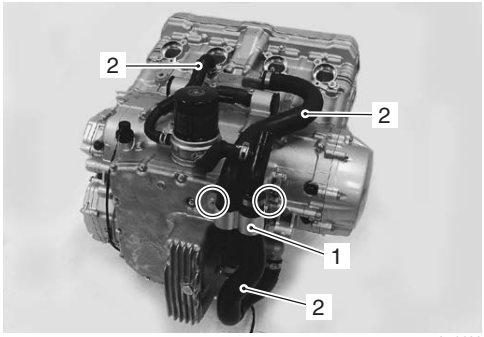
Engine Bottom Side Disassembly

B718H11406024

NOTE

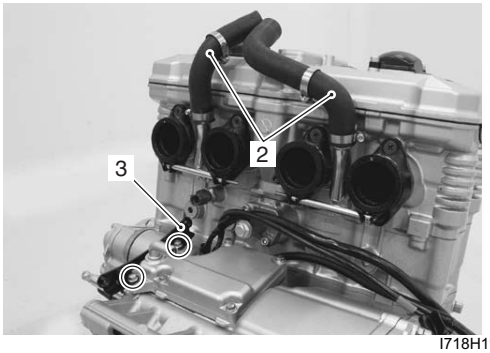
The crankcase must be separated to service the crankshaft and conrod.

1) Remove the engine assembly. Refer to “Engine Assembly Removal (Page 1D-17)”.
2) Remove the water hose bracket (1) and water hoses (2).



I718H1140154-02

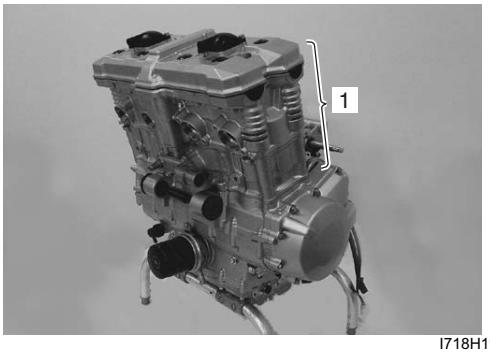
3) Remove the water hoses (2) and regulator/rectifier bracket (3).



I718H1140005-01

Engine Top Side

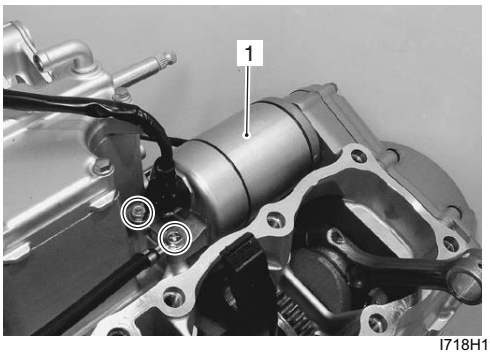
Disassemble the engine top side (1). Refer to “Engine Top Side Disassembly (Page 1D-24)”.



I718H1140158-01

Starter Motor

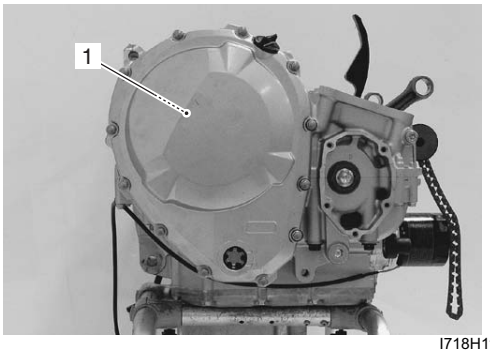
Remove the starter motor (1).



I718H1140159-01

Clutch

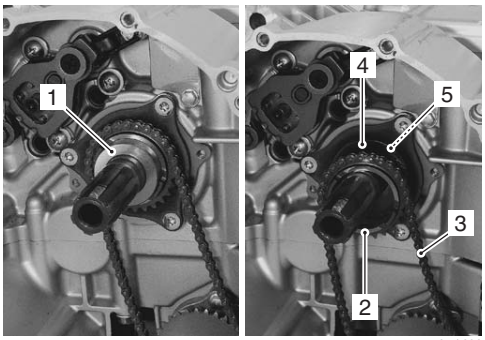
Remove the clutch component parts (1). Refer to “Clutch Removal in Section 5C (Page 5C-13)”.



I718H1140160-01

Oil Pump

1) Remove the spacer (1).
2) Remove the oil pump drive sprocket (2) and chain (3).
3) Remove the thrust washer (4) and washer (5).



I718H1140161-01

4) Remove the snap ring (6).

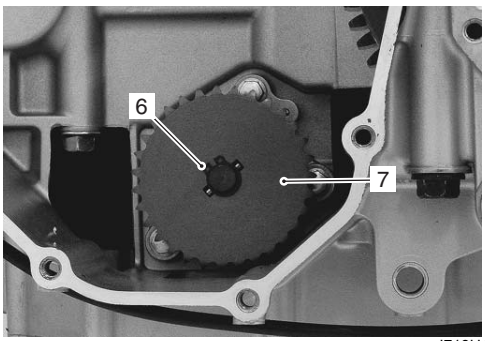
NOTE

Do not drop the snap ring (6) into the crankcase.

Special tool

TOOL : 09900–06107 (Snap ring pliers)

5) Remove the oil pump driven gear (7).



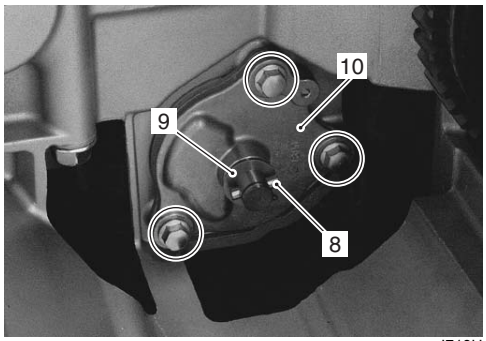
I718H1140162-02

6) Remove the pin (8) and washer (9).

NOTE

Do not drop the pin (8) and washer (9) into the crankcase.

7) Remove the oil pump (10).



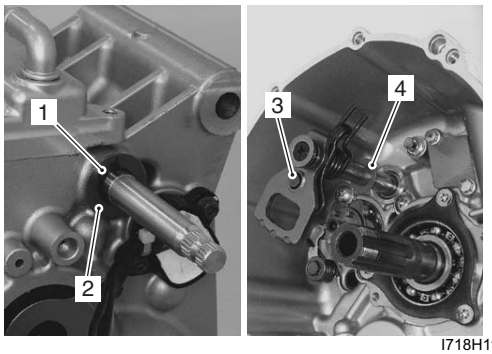
I718H1140163-03

Gearshift System

1) Remove the snap ring (1) and washer (2) from the gearshift shaft.

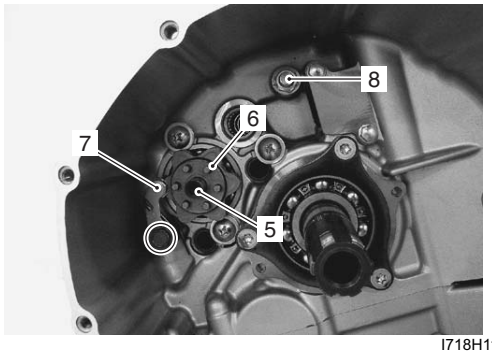
Special tool
TOOL : 09900–06107 (Snap ring pliers)

2) Remove the gearshift shaft assembly (3) and washer (4).



I718H1140164-01

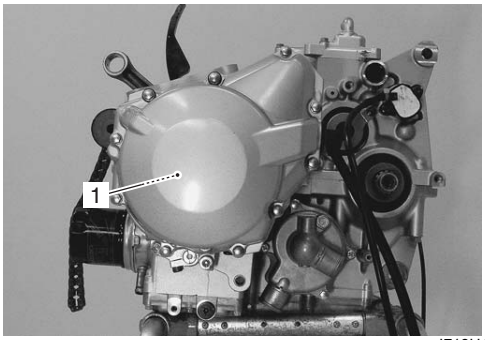
3) Remove the gearshift cam plate bolt (5) and gearshift cam plate (6).
4) Remove the gearshift cam stopper (7) and gearshift arm stopper (8).



I718H1140165-02

Generator

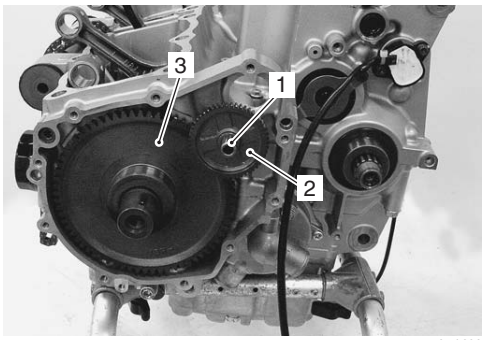
Remove the generator component parts (1). Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.



I718H1140166-01

Starter

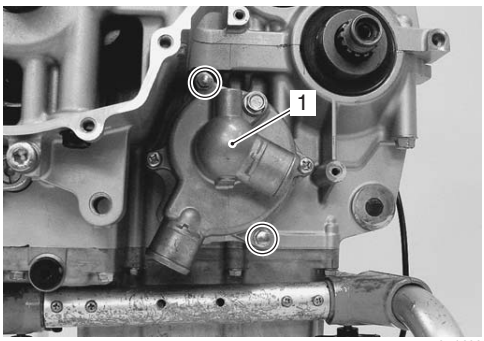
Remove the idle gear shaft (1), idle gear (2) and starter driven gear (3). Refer to “Starter Clutch Removal and Installation in Section 1I (Page 1I-10)”.



I718H1140167-02

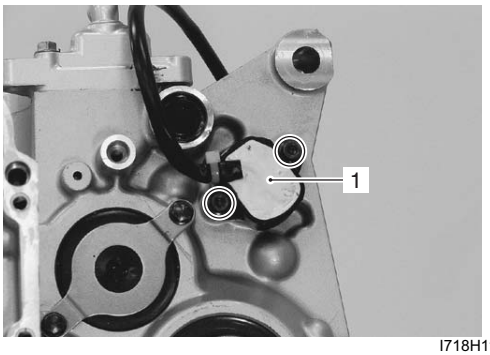
Water Pump

Remove the water pump (1).



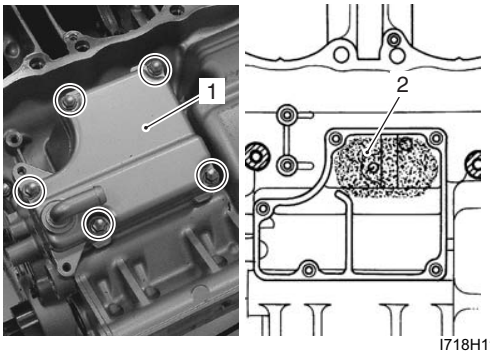
I718H1140168-01

Gear Position Switch
Remove the gear position switch (1).



I718H1140169-01

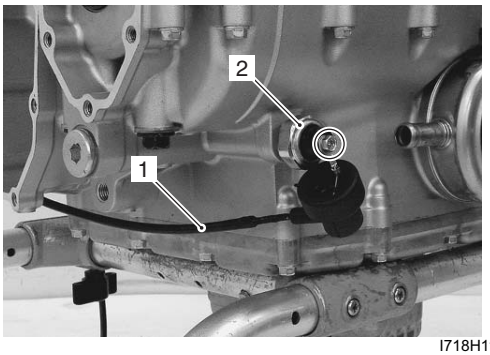
Crankcase Breather Cover
Remove the crankcase breather cover (1) and oil breather separator (2).



I718H1140170-02

Oil Pressure Switch

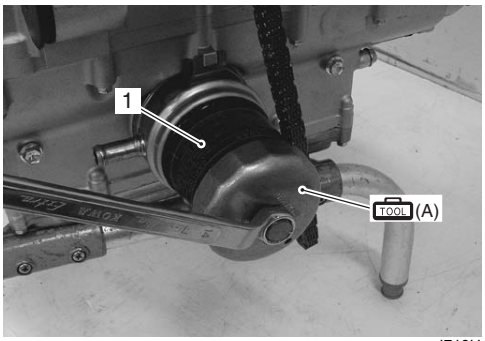
1) Disconnect the oil pressure switch lead wire (1) and remove the oil pressure switch (2).



I718H1140171-01

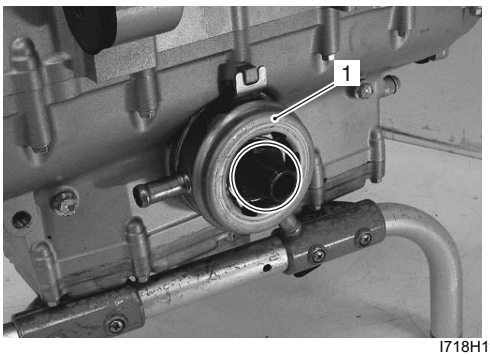
Oil Filter
Remove the oil filter (1) with the special tool.

Special tool
(A): 09915–40610 (Oil filter wrench)



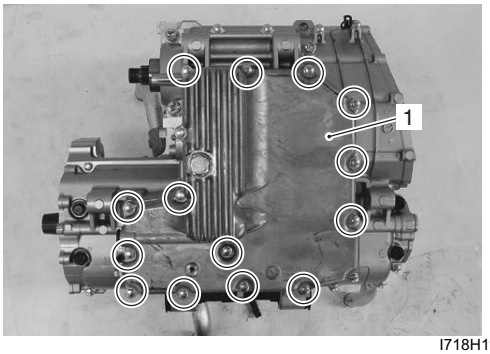
I718H1140172-01

Oil Cooler
Remove the oil cooler (1).



I718H1140173-02

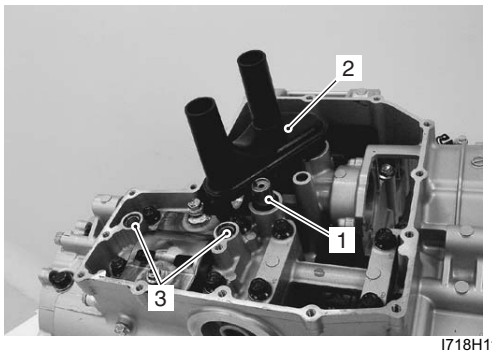
Oil Pan
Remove the oil pan (1).



I718H1140174-01

Oil Pressure Regulator / Oil Strainer

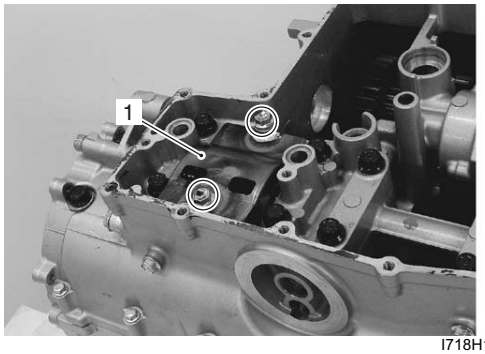
1) Remove the oil pressure regulator (1).
2) Remove the oil strainer (2).
3) Remove the O-rings (3).



I718H1140175-01

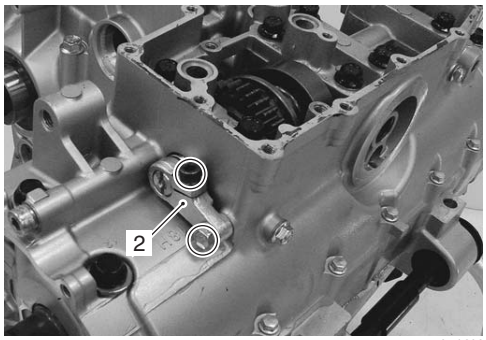
Crank Balancer

1) Remove the plate (1).



I718H1140176-01

2) Remove the balancer shaft arm (2).

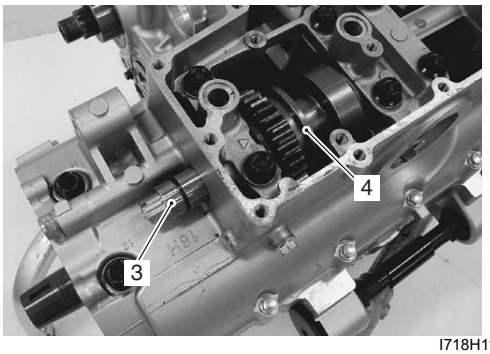


I718H1140177-02

3) Draw out the balancer shaft (3) and remove the crank balancer assembly (4).

NOTE

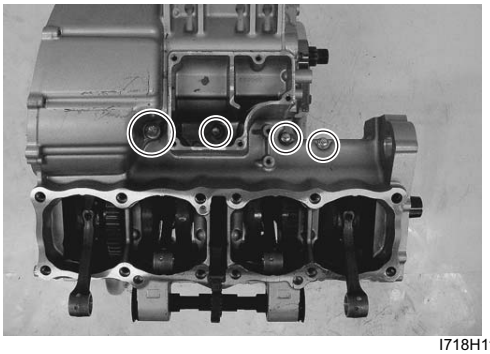
Disassemble the crank balancer assembly if necessary. Refer to "Crank Balancer Disassembly and Assembly (Page 1D-72)".



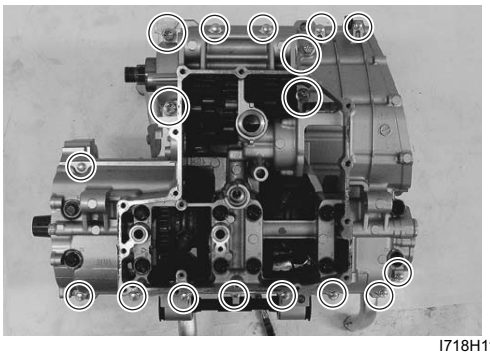
I718H1140178-01

Crankcase

1) Remove the crankcase bolts (M6).
2) Remove the crankcase bolts (M8).

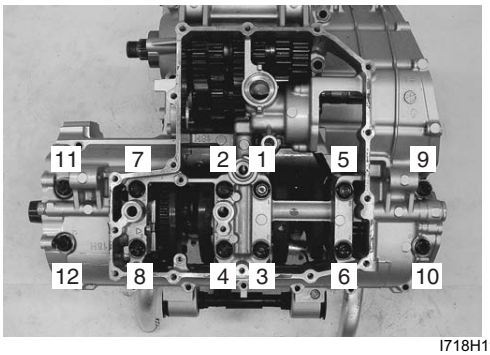


I718H1140179-01



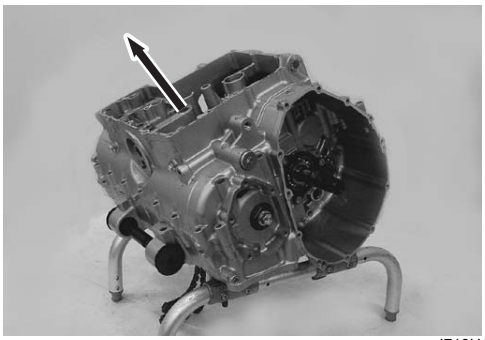
I718H1140180-02

3) Loosen the crankcase bolts evenly by shifting the wrench in the descending order of numbers.



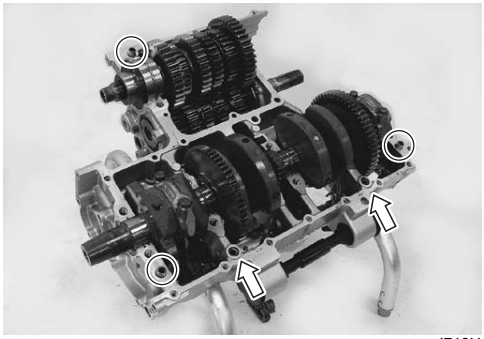
I718H1140181-01

4) Make sure that all of the bolts are removed. Then, tap the sides of the lower crankcase using a plastic hammer to separate the upper and lower crankcase halves and then lift the lower crankcase off of the upper crankcase.



I718H1140182-02

5) Remove the dowel pins and O-rings.



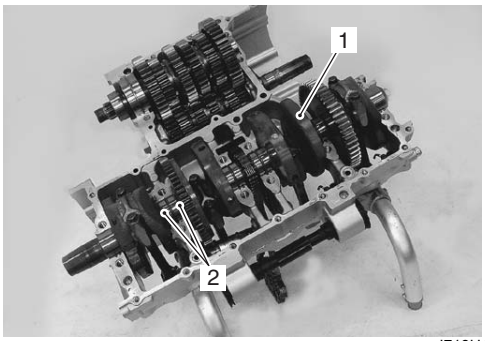
I718H1140183-01

Crankshaft / Conrod / Cum Chain

1) Remove the crankshaft assembly (1) from the upper crankcase.
2) Remove the thrust bearings (2).

NOTE

The crankshaft thrust bearings (2) are located between the crankshaft assembly and upper crankcase.

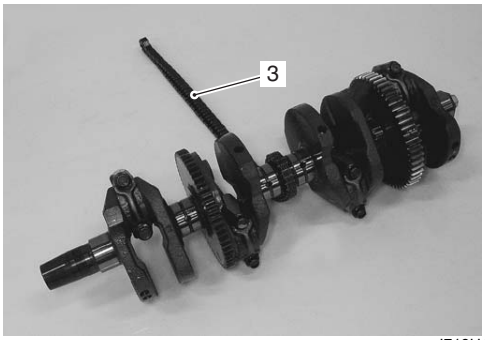


I718H1140184-01

3) Remove the cam chain (3) from the crankshaft.

NOTE

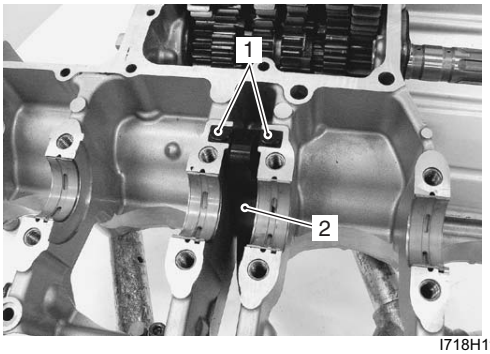
Remove the conrod if necessary. Refer to "Conrod Removal and Installation (Page 1D-74)".



I718H1140185-01

Cam Chain Tensioner

Remove the dampers (1), cam chain tensioner (2) and pin.



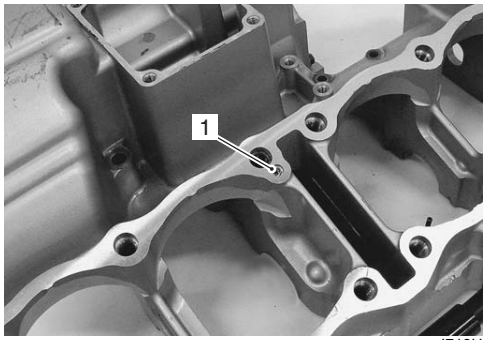
I718H1140186-01

Transmission
Remove the transmission component. Refer to "Transmission Removal in Section 5B (Page 5B-3)".


I718H1140187-01

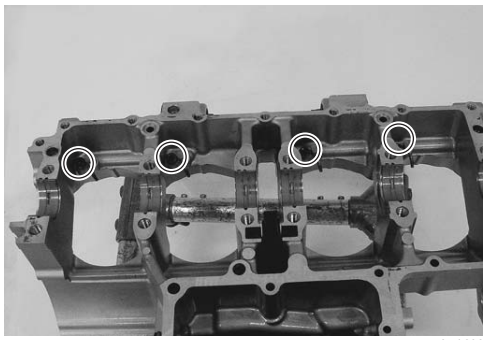
Oil Jet

1) Remove the oil jet (1) (for engine top side) from the upper crankcase.

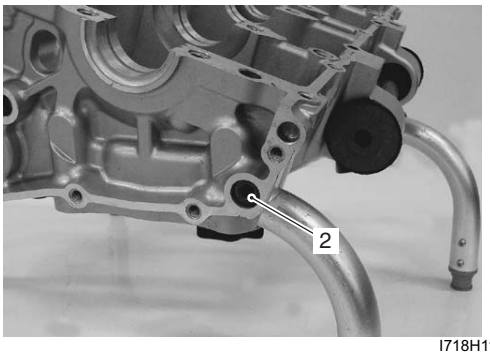


I718H1140188-01

2) Remove the piston cooling oil jets from the upper crankcase.

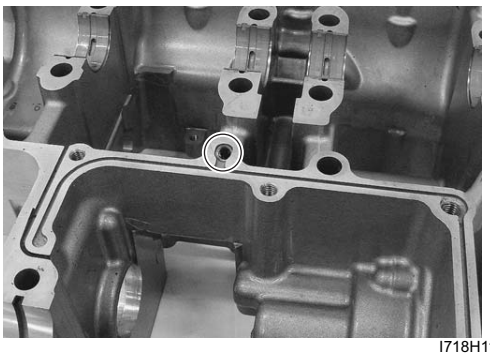

I718H1140189-01

3) Remove the oil gallery jet (2) from the upper crankcase.



I718H1140190-01

4) Remove the oil jet (for transmission) from the lower crankcase.


I718H1140191-01

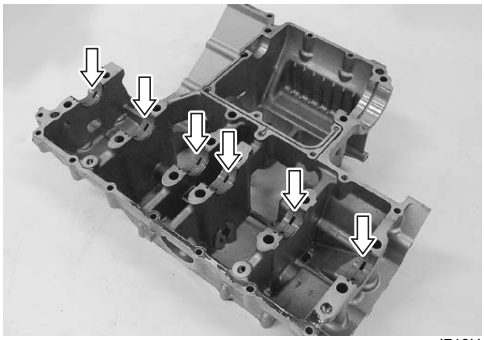
Crankshaft Journal Bearing
Remove the crankshaft journal bearings, upper and lower.

⚠ CAUTION

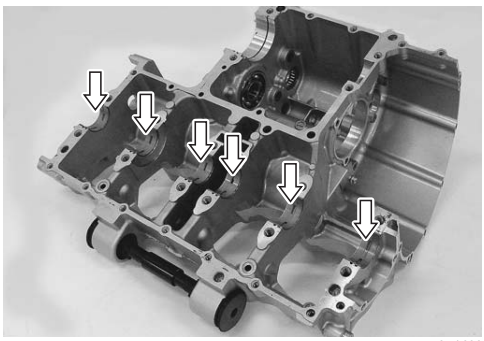
- **When removing the crankshaft journal bearings, be careful not to scratch the crankcase and the crankshaft journal bearings.**
- **Do not touch the bearing surfaces with your hands. Grasp the bearings by their edges.**

NOTE

- **Do not remove the crankshaft journal bearings unless absolutely necessary.**
- **Make a note of where the crankshaft journal bearings are removed from so that they can be reinstalled in their original positions.**



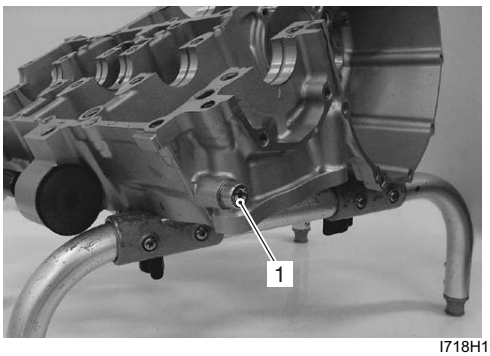
I718H1140192-01



I718H1140193-01

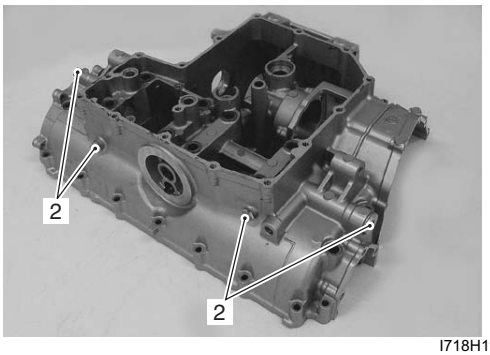
Oil Gallery Plug

1) Remove the oil gallery plug (1) from the upper crankcase.



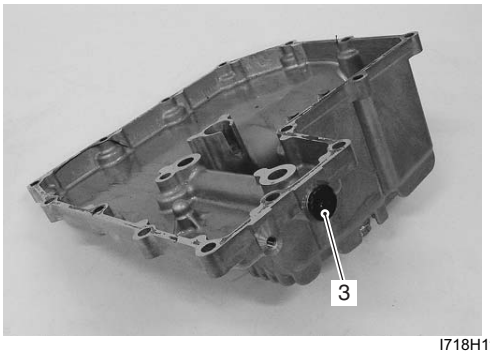
I718H1140194-01

2) Remove the oil gallery plugs (2) from the lower crankcase.



I718H1140195-01

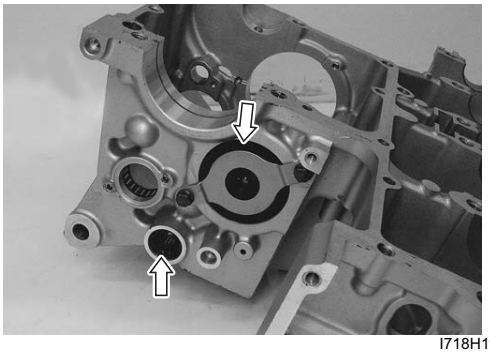
3) Remove the oil gallery plug (3) from the oil pan.



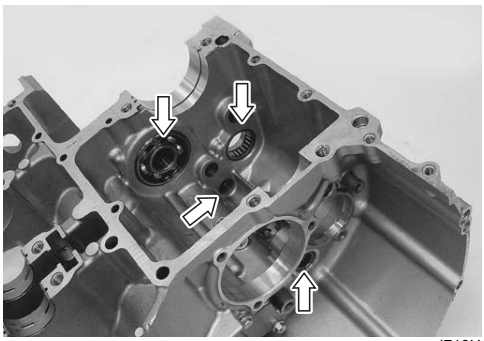
I718H1140196-01

Oil seal /Bearing

Remove the oil seals and bearings if necessary. Refer to “Transmission Removal in Section 5B (Page 5B-3)” and “Gearshift Shaft Oil Seal / Bearing Removal and Installation in Section 5B (Page 5B-19)”.

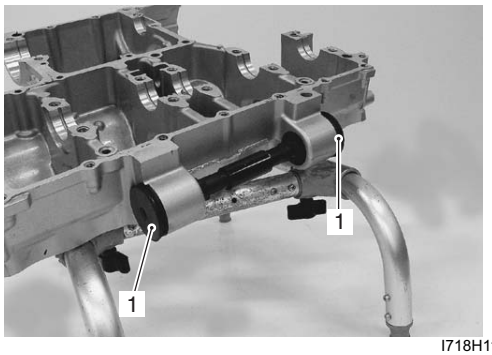


I718H1140197-01



I718H1140198-01

Engine Mount Bushing
Remove the engine mount bushings (1) if necessary.



I718H1140199-02

Engine Bottom Side Assembly

B718H11406025

Assemble the engine bottom side in the reverse order of disassembly. Pay attention to the following points:

NOTE

Apply engine oil to each running and sliding part before reassembling.

Oil Seal / Bearing

- Install the oil seals and bearings. Refer to "Transmission Installation in Section 5B (Page 5B-5)" and "Gearshift Shaft Oil Seal / Bearing Removal and Installation in Section 5B (Page 5B-19)".

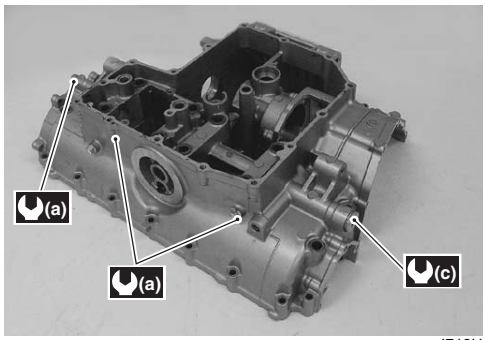
Oil Gallery Plug

- Tighten each plug to the specified torque.

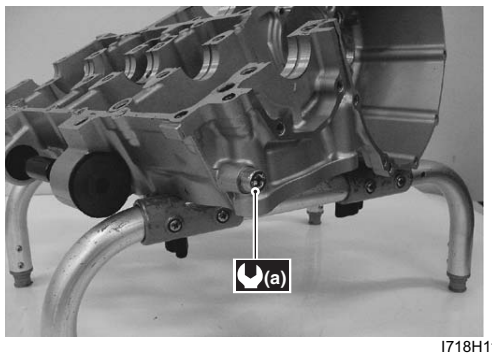
⚠ CAUTION

Use each new gasket.

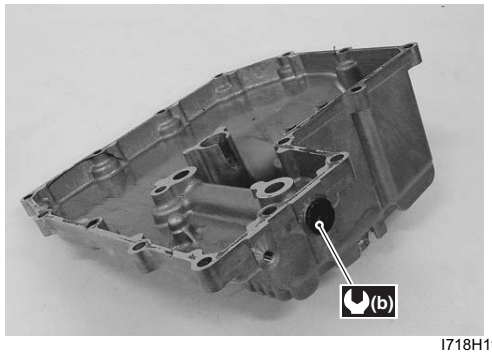
Tightening torque
Oil gallery plug (M6 and M8) (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)
Oil gallery plug (M12) (b): 15 N·m (1.5 kgf-m, 11.0 lb-ft)
Oil gallery plug (M16) (c): 35 N·m (3.5 kgf-m, 25.5 lb-ft)



I718H1140200-01



I718H1140201-01



I718H1140202-01

Crankshaft Journal Bearing

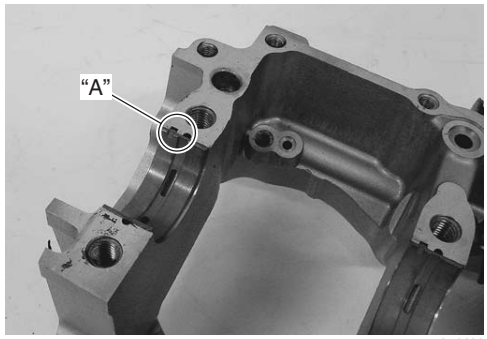
- When fitting the crankshaft journal bearings to the upper and lower crankcases, be sure to fix the stopper part "A" first and press the other end.

⚠ CAUTION

Do not touch the bearing surfaces with your hands. Grasp by the edge of the bearing shell.

NOTE

Inspect and select the crankshaft journal bearing if necessary. Refer to "Crankshaft Journal Bearing Inspection and Selection (Page 1D-78)".



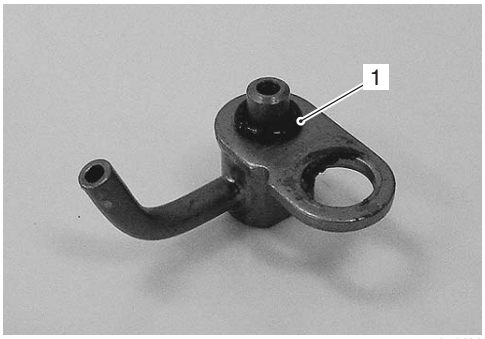
I718H1140203-01

Oil Jet

- Fit the new O-ring (1) to each piston cooling oil jet as shown and apply engine oil to them.

⚠ CAUTION

Use the new O-rings to prevent oil pressure leak.

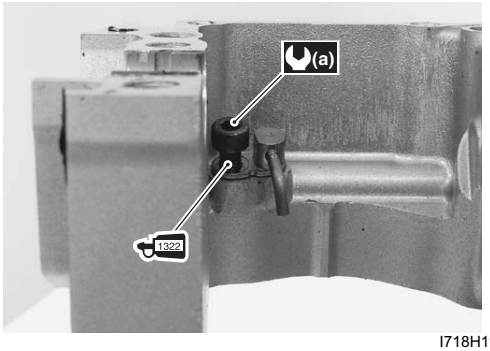


I718H1140204-01

- Apply a small quantity of THREAD LOCK to the bolts and tighten them to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Piston cooling oil jet bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1140205-02

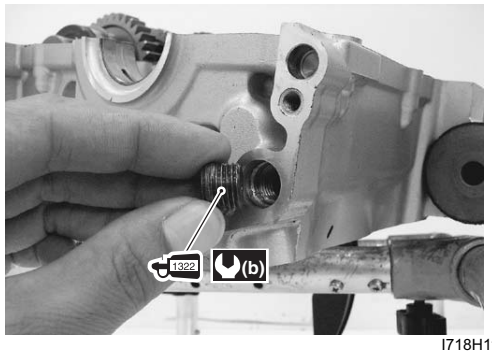
- Apply THREAD LOCK to the oil gallery jet and tighten it to the specified torque.

NOTE

After tightening the jet, make sure that the jet end is flush with the cover mating surface.

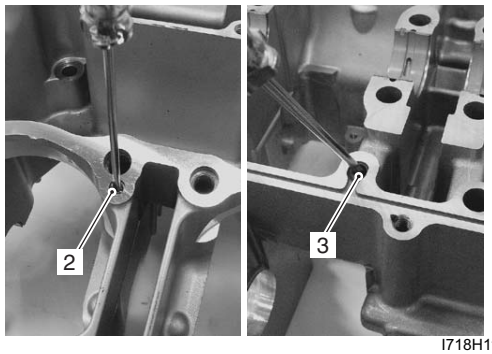
1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Oil gallery jet (b): 22 N·m (2.2 kgf-m, 16.0 lb-ft)



I718H1140206-02

- Install the oil jets, (2) and (3).



I718H1140207-02

2. Oil jet (#14)	3. Oil jet (#18)

Transmission

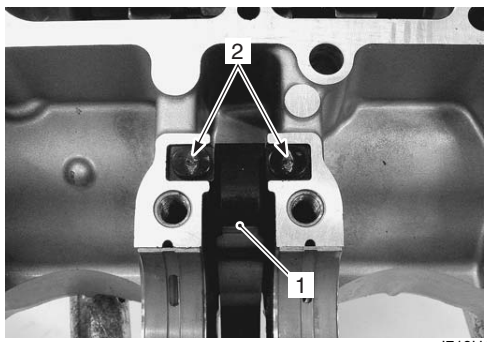
- Install the transmission. Refer to “Transmission Installation in Section 5B (Page 5B-5)”.

Cam Chain Tensioner

- Install the pin, cam chain tensioner (1) and two dampers (2) properly.

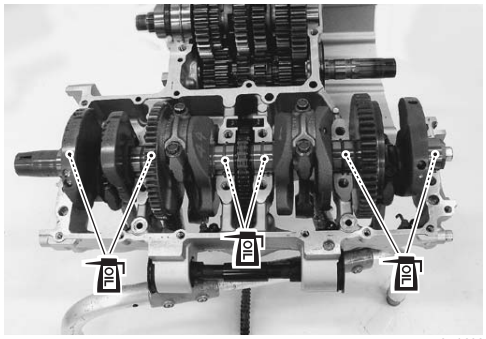
NOTE

Be sure to face the arrow mark on the damper towards the front and rear, not towards the left and right.



I718H1140208-01

- Before installing the crankshaft assembly, apply engine oil to each crankshaft journal bearing.
- Install the crankshaft assembly along with the cam chain into the upper crankcase.

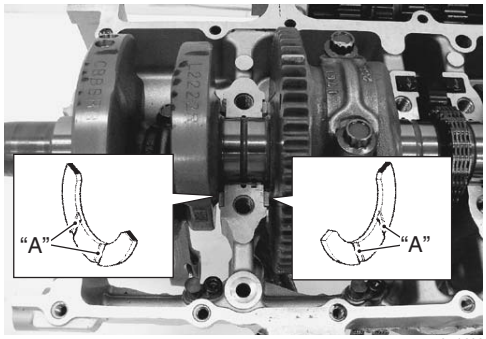


I718H1140209-01

- Insert the right and left-thrust bearings with the oil grooves “A” facing towards the crankshaft web.

NOTE

- **Right-thrust bearing has green painting.**
- **Inspect and select the crankshaft thrust clearance if necessary. Refer to “Crankshaft Thrust Clearance Inspection and Selection (Page 1D-80)”.**



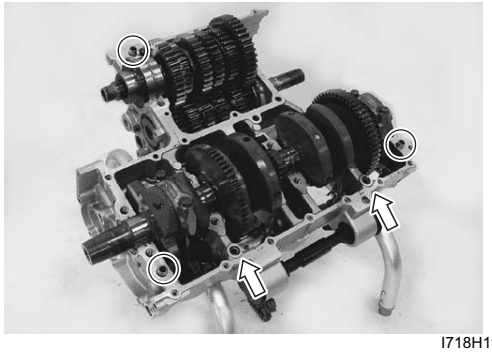
I718H1140399-01

Crankcase

- Install the dowel pins and O-rings in the upper crankcase.

⚠ CAUTION

Replace the O-rings with new ones.



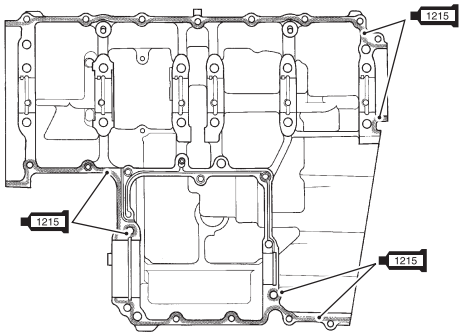
I718H1140183-01

- Apply SUZUKI BOND to the mating surface of the lower crankcase as follows.

NOTE

- **Make surfaces free from moisture, oil, dust and other foreign materials.**
- **Spread the sealant on surfaces thinly to form an even layer, and assemble the crankcases within a few minutes.**
- **Take extreme care not to apply any bond to the oil hole, oil groove and bearing.**
- **Apply to distorted surfaces as it forms a comparatively thick film.**

1215 : Sealant 99000–31110 (SUZUKI BOND No.1215 or equivalent)



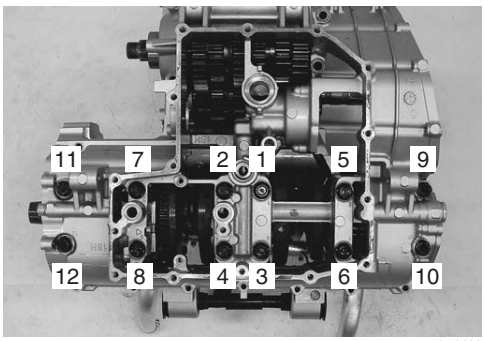
I718H1140213-01

- Tighten the crankshaft journal bolts (M9) in ascending order of numbers assigned to these bolts. Tighten each bolt a little at a time to equalize the pressure in the following two steps.

⚠ CAUTION

Fit new gasket washers to the bolts (“9”, “10”, “11” and “12”) to prevent oil leakage.

Tightening torque
Crankcase journal bolt (M9) (Initial): 18 N·m (1.8 kgf-m, 13.0 lb-ft)
Crankcase journal bolt (M9) (Final): 32 N·m (3.2 kgf-m, 23.0 lb-ft)



I718H1140181-01

- Tighten the other crankcase bolts a little at a time to equalize the pressure.

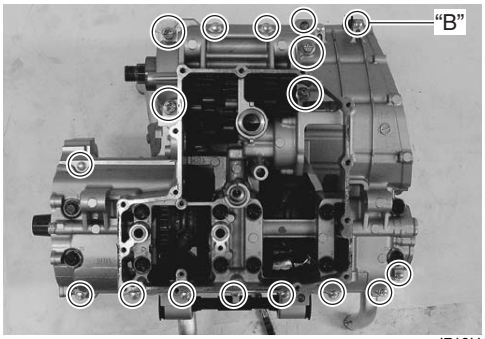
⚠ CAUTION

Fit new gasket washer to the bolt "A".

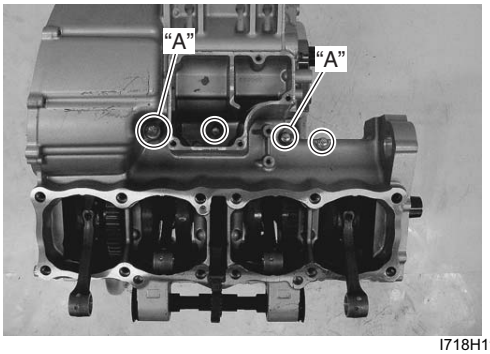
NOTE

Fit the clamp to the bolt "B".

Tightening torque
Crankcase bolt (M6) (Initial): 6 N·m (0.6 kgf-m, 4.5 lb-ft)
Crankcase bolt (M6) (Final): 11 N·m (1.1 kgf-m, 8.0 lb-ft)
Crankcase bolt (M8) (Initial): 15 N·m (1.5 kgf-m, 11.0 lb-ft)
Crankcase bolt (M8) (Final): 26 N·m (2.6 kgf-m, 19.0 lb-ft)

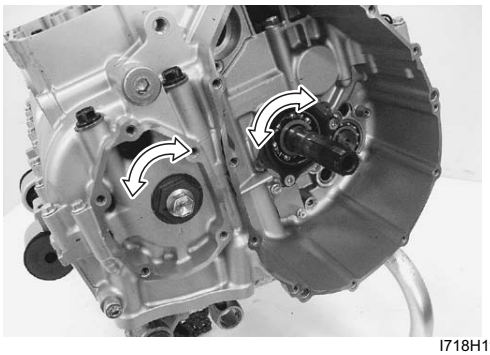


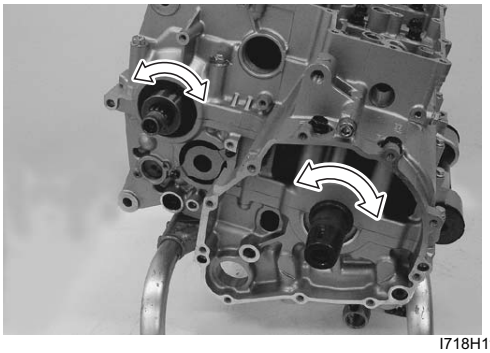
I718H1140215-02



I718H1140216-04

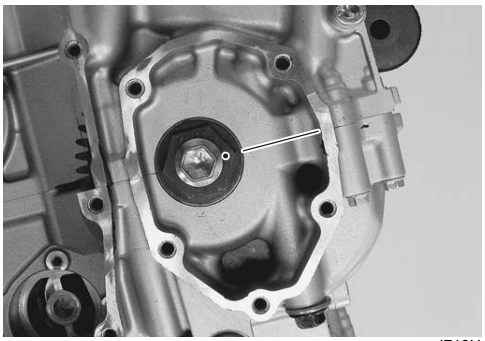
- After the crankshaft journal bolts and crankcase bolts have been tightened, check that the crankshaft rotates smoothly.
- Also check that the driveshaft and countershaft rotate smoothly.


I718H1140217-01


I718H1140218-01

Clank Balancer

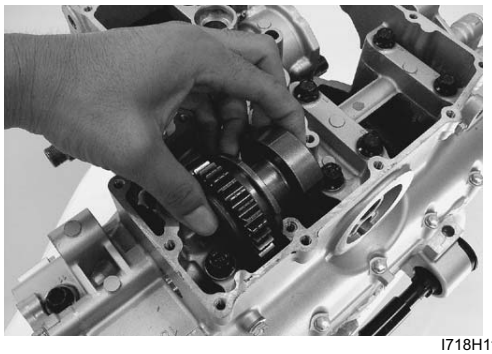
- Turn the crankshaft and align the drilled mark with the mating surface of crankcases.


I718H1140219-02

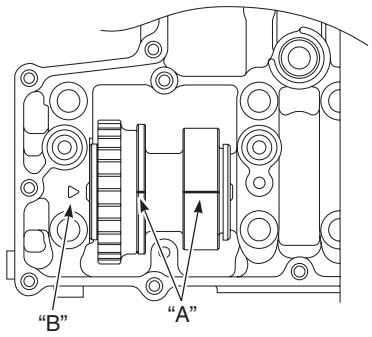
- Hold the crankshaft and install the crank balancer assembly.

NOTE

Align the engraved line “A” on the crank balancer with the triangle mark “B” on the crankcase.



I718H1140220-01



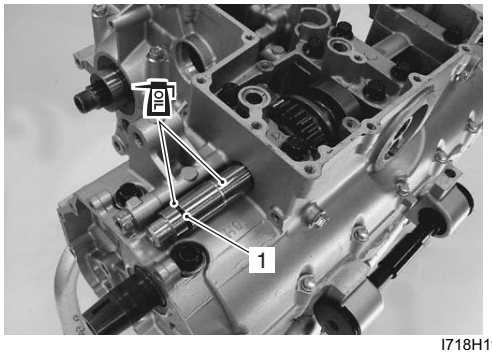
I718H1140221-01

- Apply engine oil to the balancer shaft and O-ring.

⚠ CAUTION

Replace the O-ring (1) with a new one.

- Insert the balancer shaft.

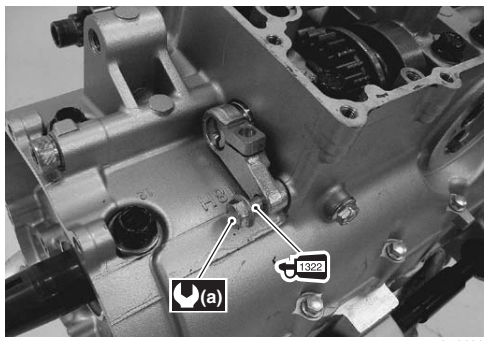


I718H1140222-02

- Install the balancer shaft arm.
- Apply a small quantity of THREAD LOCK to the balancer shaft arm bolt and tighten it to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Balancer shaft arm bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



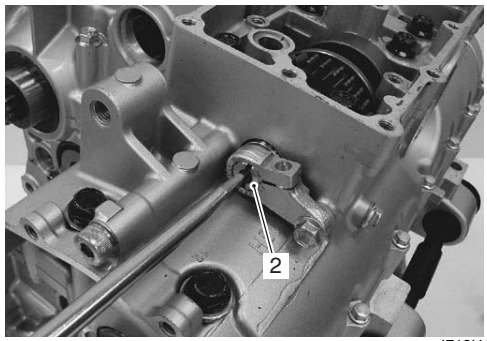
I718H1140223-02

- Slowly turn the balancer shaft (2) clockwise until it is stop (position “C”) with a (–) screwdriver.
- From this position, turn the balancer shaft (2) counterclockwise by 1.5 – 2 graduations “D” and tighten the balancer shaft mounting bolt (3).

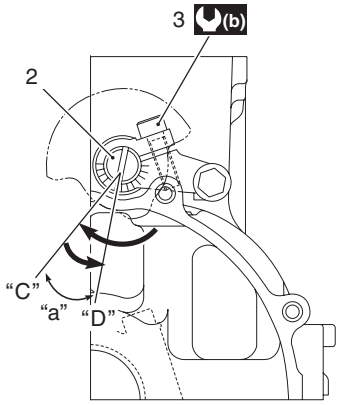
Tightening torque
Balancer shaft mounting bolt (b): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

NOTE

If the balancer gear is noisy after starting the engine, turn in or out the balancer shaft with in 1 graduation from standard setting to reduce the gear noise.



I718H1140402-01



I718H1140401-03

"a": 1.5 – 2 graduations

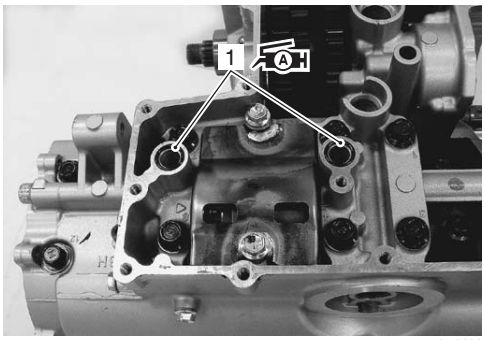
Oil Pressure Regulator / Oil Strainer / Oil Pan

- Apply SUZUKI SUPER GREASE to the O-rings (1) and install them.

⚠ CAUTION

Replace the O-rings (1) with new ones.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



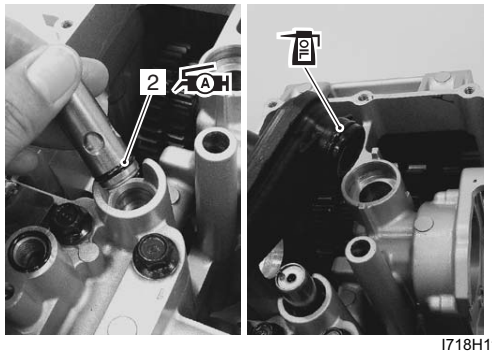
I718H1140226-01

- Apply SUZUKI SUPER GREASE to the O-rings (2) and press in the oil strainer and oil pressure regulator to the crankcase.

⚠ CAUTION

Replace the O-rings (2) with new ones.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



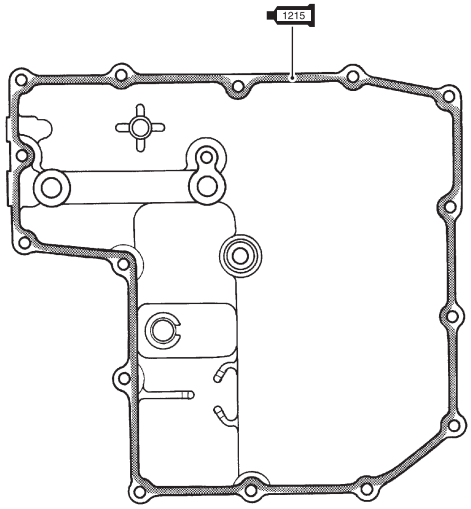
I718H1140227-01

- Apply SUZUKI BOND to the mating surface of the oil pan.

NOTE

- **Make surfaces free from moisture, oil, dust and other foreign materials.**
- **Spread the sealant on surfaces thinly to from an even layer, and assemble the oil pan within a few minutes.**
- **Apply to distorted surfaces as it forms a comparatively thick film.**

1215 : Sealant 99000–31110 (SUZUKI BOND No.1215 or equivalent)

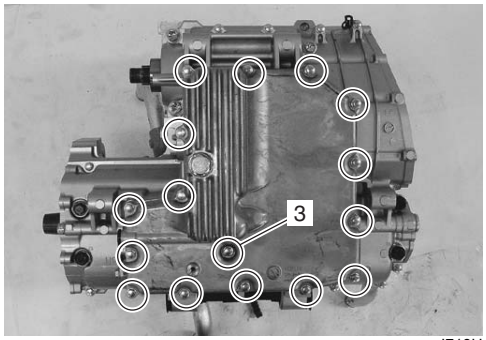


I718H1140228-01

- Tighten the oil pan bolts.

⚠ CAUTION

Fit a new gasket washer to the bolt (3).



I718H1140229-01

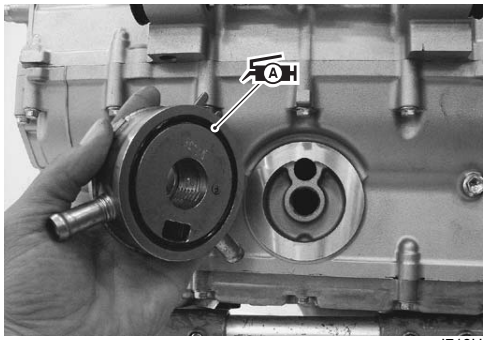
Oil Cooler

- Apply SUZUKI SUPER GREASE to the O-ring.

⚠ CAUTION

Replace the O-ring with a new one.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



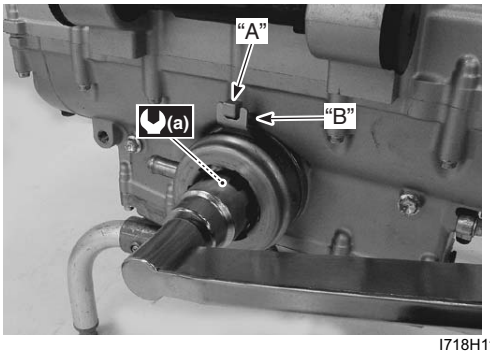
I718H1140230-02

- Install the oil cooler to the crankcase and tighten the union bolt to the specified torque.

NOTE

When installing the oil cooler, fit the convex part "A" of lower crankcase onto the concave part "B" of the oil cooler.

Tightening torque
Oil cooler union bolt (a): 70 N·m (7.0 kgf-m, 50.5 lb-ft)

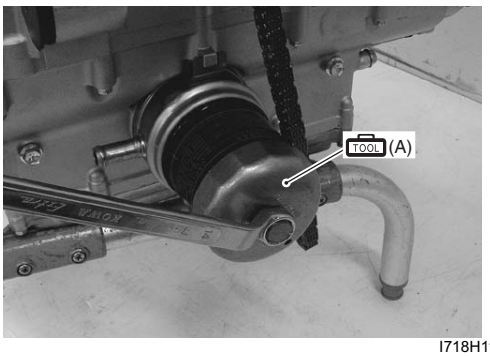


I718H1140231-01

Oil Filter

- Install the oil filter with the special tool. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".

Special tool
TOOL (A): 09915–40610 (Oil filter wrench)



I718H1140232-01

Oil Pressure Switch

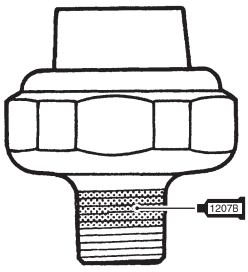
- Apply SUZUKI BOND to the thread part of oil pressure switch and tighten oil pressure switch to the specified torque.

NOTE

Be careful not to apply SUZUKI BOND to the hole of thread end.

1207B : Sealant 99000–31140 (SUZUKI BOND No.1207B or equivalent)

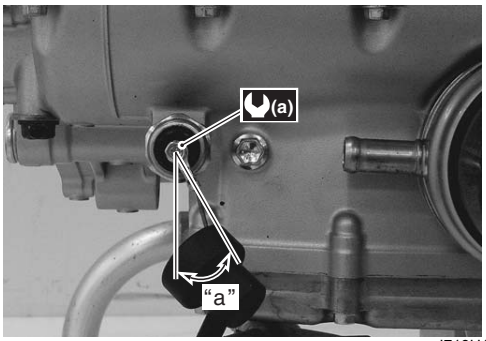
Tightening torque
Oil pressure switch: 14 N·m (1.4 kgf-m, 10.0 lb-ft)



I718H1140233-01

- Connect the oil pressure switch lead wire as shown.

Tightening torque
Oil Pressure switch lead wire mounting bolt (a): 1.5 N·m (0.15 kgf-m, 1.1 lb-ft)



I718H1140234-01

"a": 20° ± 10°

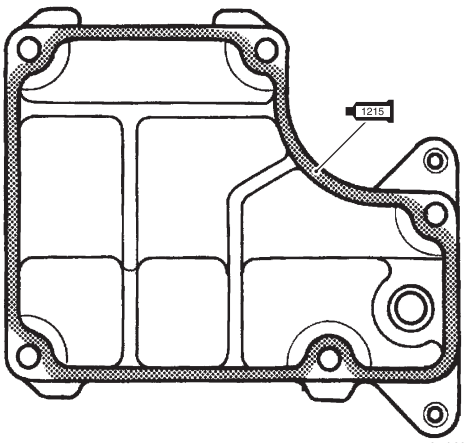
Crankcase Breather Cover

- Apply SUZUKI BOND to the mating surface of the breather cover.

NOTE

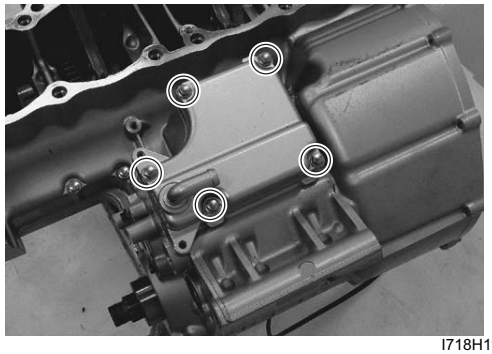
- **Make surfaces free from moisture, oil, dust and other foreign materials.**
- **Spread the sealant on surfaces thinly to form an even layer, and assemble the breather cover within a few minutes.**
- **Apply to distorted surfaces as it forms a comparatively thick film.**

1215 : Sealant 99000–31110 (SUZUKI BOND No.1215 or equivalent)



I718H1140235-01

- Tighten the breather cover bolts.



I718H1140236-01

- Apply SUZUKI SUPER GREASE to the O-ring.

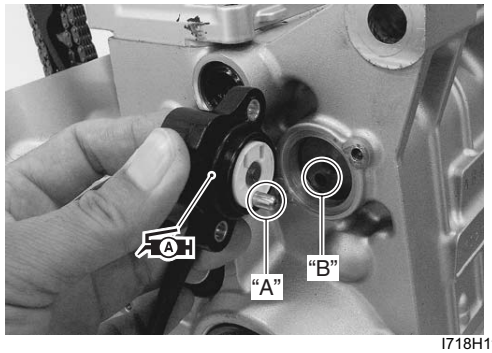
⚠ CAUTION

Replace the O-ring with a new one.

NOTE

Align the gear position switch pin "A" with the gearshift cam hole "B".

A : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

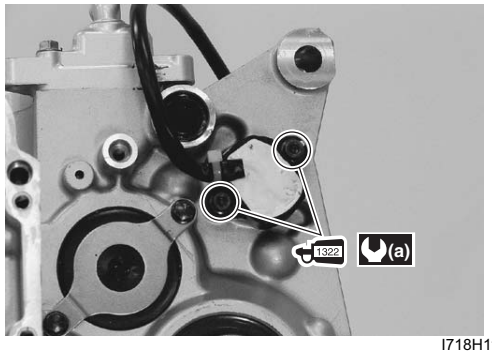


I718H1140237-01

- Apply THREAD LOCK to the gear position switch bolts and tighten them to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Gear position switch mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)



I718H1140238-01

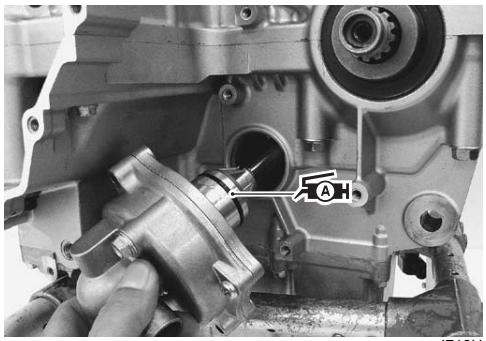
Water Pump

- Apply SUZUKI SUPER GREASE to the O-ring.

⚠ CAUTION

Replace the O-ring with a new one.

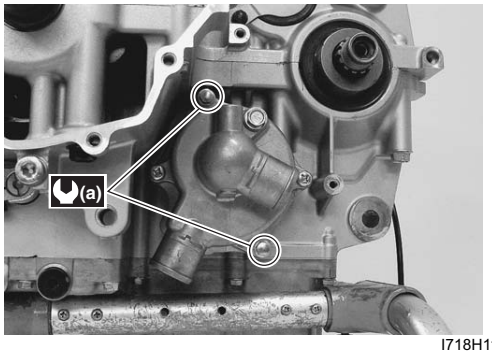
: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1140239-01

- Tighten the water pump mounting bolts to the specified torque.

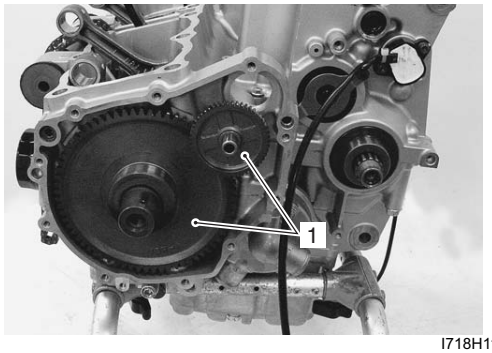
Tightening torque
Water pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1140403-01

Starter

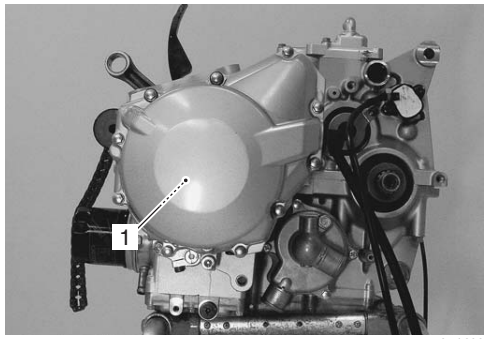
- Install the starter component parts (1). Refer to "Starter Clutch Removal and Installation in Section 1I (Page 1I-10)".



I718H1140242-01

Generator

- Install the generator component parts (1). Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".



I718H1140243-01

Gearshift

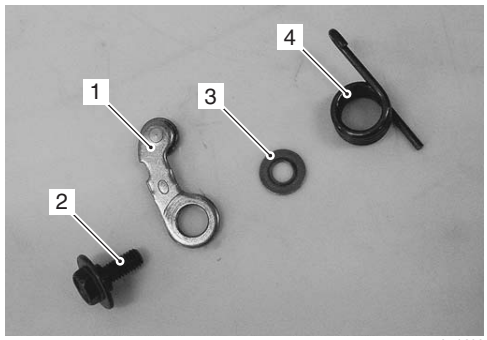
- Install the gearshift cam stopper (1), bolt (2), washer (3) and return spring (4).

NOTE

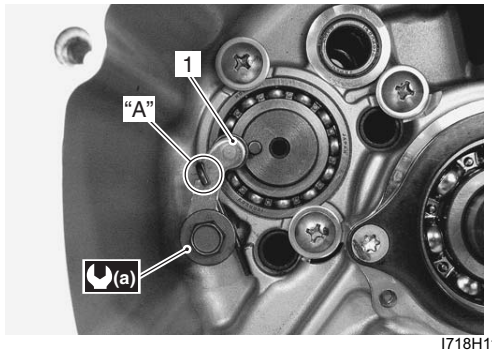
Hook the return spring end "A" to the stopper (1).

Tightening torque
Gearshift cam stopper bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

- Check the gearshift cam stopper moves smoothly.
- Locate the gearshift cam in the neutral position.



I718H1140244-01

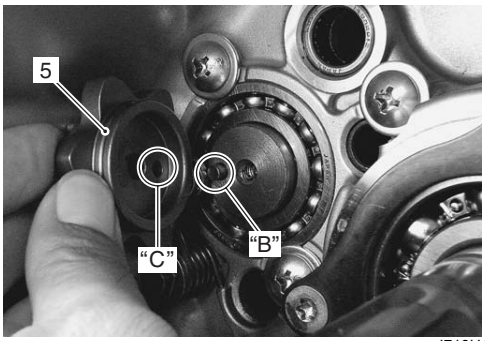


I718H1140018-02

- Install the gearshift cam stopper plate (5).

NOTE

Align the gearshift cam pin “B” with the gearshift cam stopper plate hole “C”.

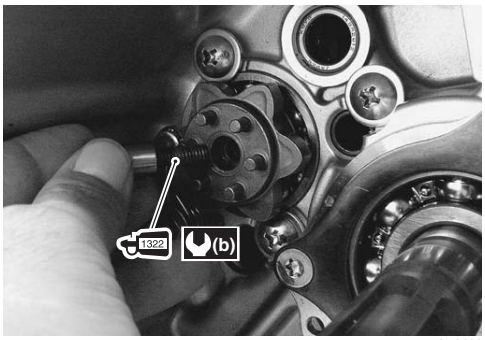


I718H1140245-01

- Apply a small quantity of THREAD ROCK to the gearshift cam stopper plate bolt and tighten it to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Gearshift cam stopper plate bolt (b): 13 N·m (1.3 kgf-m, 9.5 lb-ft)

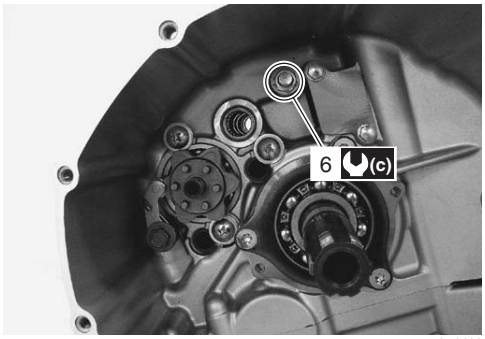


I718H1140246-03

- Apply a small quantity of THREAD LOCK to the gearshift arm stopper (6) and tighten it to the specified torque.

1303 : Thread lock cement 99000–32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

Tightening torque
Gearshift arm stopper (c): 19 N·m (1.9 kgf-m, 13.5 lb-ft)

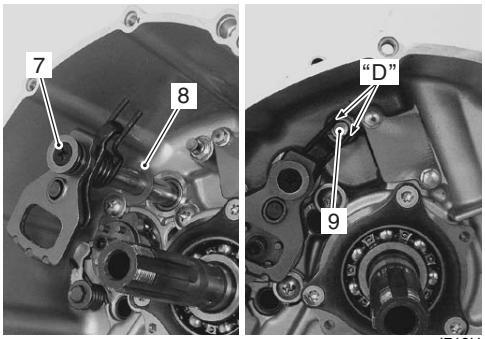


I718H1140247-02

- Install the gearshift shaft assembly (7) and washer (8) as shown.

NOTE

Pinch the gearshift arm stopper (6) with return spring ends “D”.

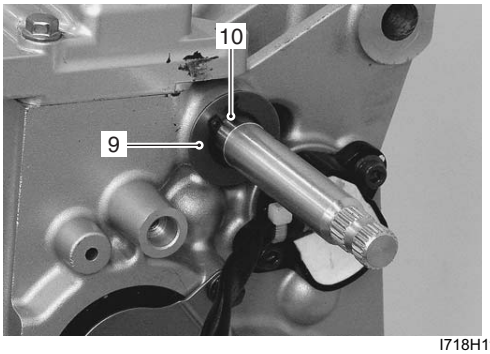


I718H1140248-02

- Install the washer (9) and snap ring (10).

⚠ CAUTION

Never reuse a snap ring.



I718H1140249-01

Oil Pump

- Install the O-ring to the oil pump and apply SUZUKI SUPER GREASE to it.

⚠ CAUTION

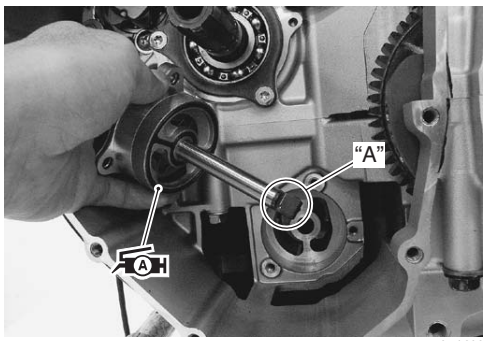
Replace the O-ring with a new one.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

- Install the oil pump.

NOTE

Set the oil pump shaft end "A" to the water pump shaft.



I718H1140250-02

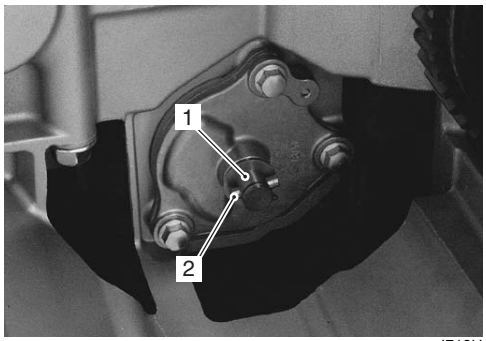
- Tighten the oil pump mounting bolts to the specified torque.

Tightening torque
Oil pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

- Install the washer (1) and pin (2).

NOTE

Be careful not to drop the washer (1) and pin (2) into the crankcase.



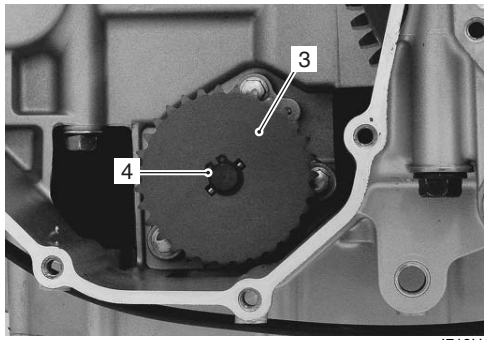
I718H1140252-01

- Install the oil pimp driven gear (3).
- Install the snap ring (4).

⚠ CAUTION

Never reuse a snap ring.

Special tool
: 09900–06107 (Snap ring pliers (opening type))

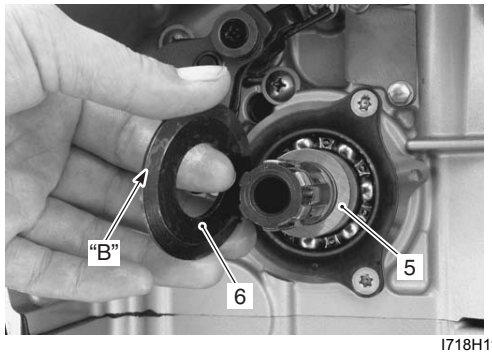


I718H1140253-01

- Install the washer (5) and thrust washer (6) onto the countershaft.

NOTE

The chamfer side "B" of thrust washer should face the crankcase side.



I718H1140254-01

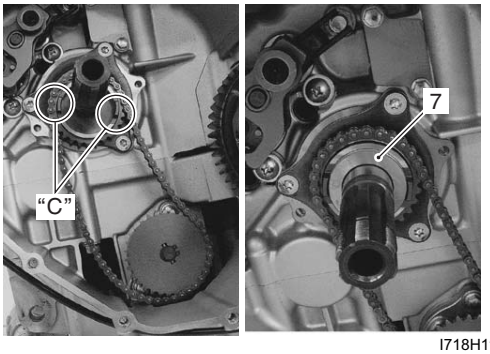
- Install the oil pump drive sprocket to the countershaft.

NOTE

Teeth "C" on the sprocket must face the clutch side.

- Pass the chain between the oil pump drive and driven sprockets.

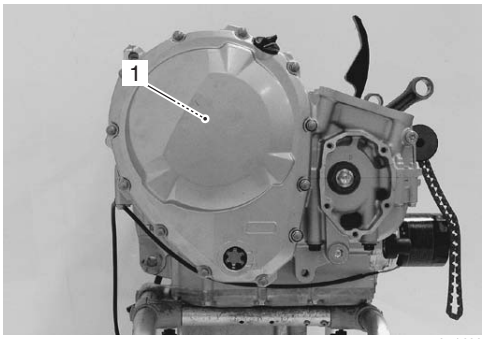
- Install the spacer (7).



I718H1140255-01

Clutch

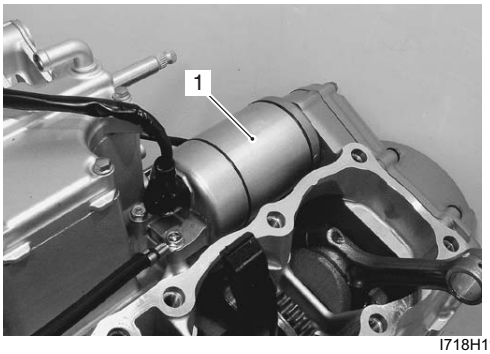
- Install the clutch component parts (1). Refer to "Clutch Installation in Section 5C (Page 5C-14)".



I718H1140256-01

Starter Motor

- Install the starter motor (1). Refer to "Starter Motor Removal and Installation in Section 1I (Page 1I-4)".



I718H1140257-01

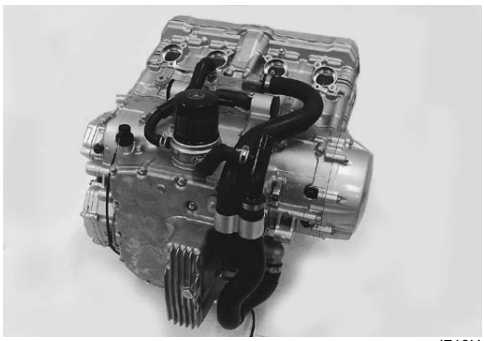
Engine Top Side

- Assemble the engine top side. Refer to "Engine Top Side Assembly (Page 1D-28)".

I718H1140258-01

Water Hose

- Connect the water hoses. Refer to "Water Hose Routing Diagram in Section 1F (Page 1F-3)".



I718H1140259-01

Crank Balancer Disassembly and Assembly

B718H11406032

Refer to"Engine Bottom Side Disassembly (Page 1D-53)".

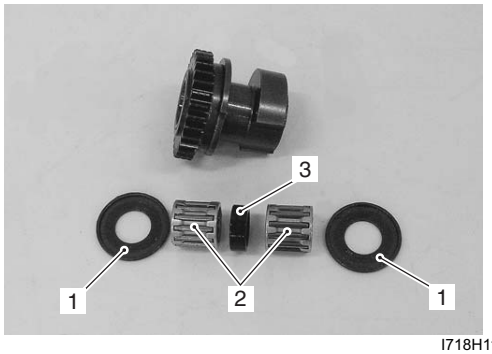
Refer to "Engine Bottom Side Assembly (Page 1D-61)".

NOTE

It is unnecessary to remove the engine assembly from the frame when removing the crank balancer.

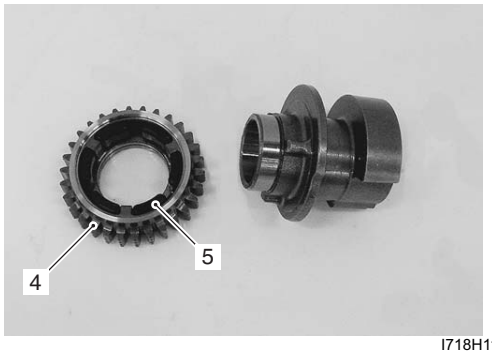
Disassembly

1) Remove the washers (1), bearings (2) and spacer (3) from the crank balancer.



I718H1140260-01

2) Remove the balancer gear (4) along with the dampers (5) from the crank balancer.
3) Remove the dampers (5) from the balancer gear (4).

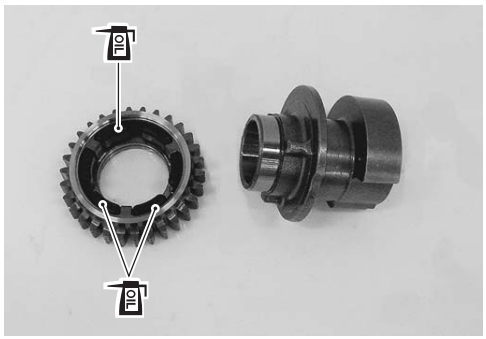


I718H1140261-01

Assembly

Assemble the crank balancer in the reverse order of disassembly. Pay attention to the following point:

- Apply engine oil to the dampers.



I718H1140263-01

- Apply engine oil to the bearings, spacer and washers.

I718H1140262-01

Crank Balancer Inspection

B718H11406033

Refer to “Crank Balancer Disassembly and Assembly (Page 1D-72)”.

Damper

Inspect the damper for wear and damage, replace it if any defects are found.

I718H1140264-01

Bearing and Washer

Inspect the bearings and the washers for wear or damage. Replace the bearing or the washer if there is anything unusual.

I718H1140265-01

Balancer Shaft
Inspect the balancer shaft for wear or damage. Replace the balancer shaft if there is anything unusual.

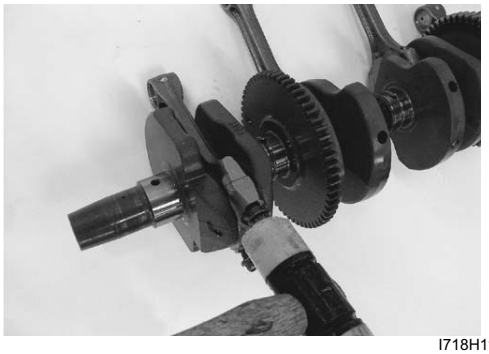
I718H1140267-01

Conrod Removal and Installation

B718H11406026

Removal

1) Remove the crankshaft assembly from the crankcase. Refer to “Engine Bottom Side Disassembly (Page 1D-53)”.
2) Loosen the conrod cap bolts by using a 10 mm, 12 point socket wrench, and tap the conrod cap bolts lightly with plastic hammer to remove the conrod cap.
3) Remove the conrods and mark them to identify their respective cylinders.



I718H1140268-01

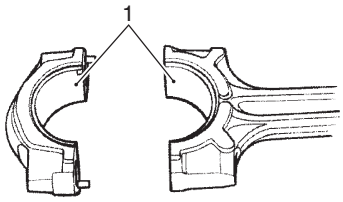
4) Remove the bearings (1).

NOTE

- **Do not remove the bearings (1) unless absolutely necessary.**
- **Make a note of where the bearings are removed from so that they can be reinstalled in their original positions.**

⚠ CAUTION

When removing the bearings, be careful not to scratch the conrods and the bearings.



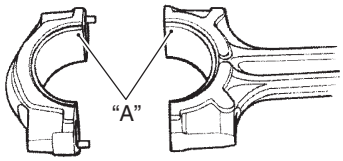
I718H1140269-01

Installation

1) When installing the bearings into the conrod cap and conrod, be sure to install the tab “A” first, and then press in the opposite side of the bearing.

NOTE

Inspect and select the conrod crank pin bearing if necessary. Refer to “Conrod Crank Pin Bearing Inspection and Selection (Page 1D-76)”.



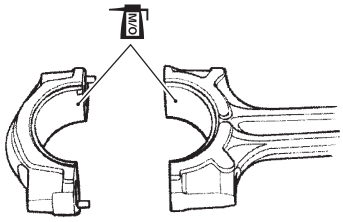
I718H1140272-01

2) Apply molybdenum oil solution to the crank pin and bearing surface.

⚠ CAUTION

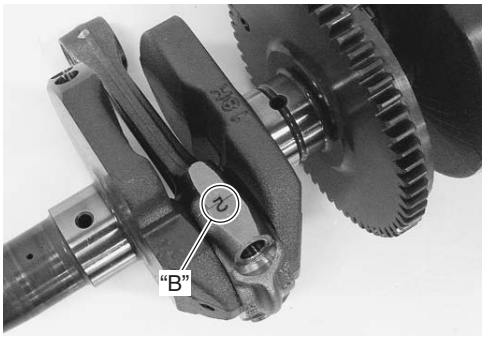
Be sure to clean the conrod big end.

M/O: Molybdenum oil (Molybdenum oil solution)



I718H1140273-01

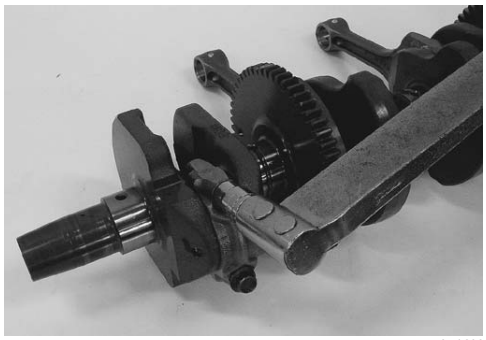
3) When fitting the conrod cap, make sure that I.D. code “B” on each conrod faces intake side.



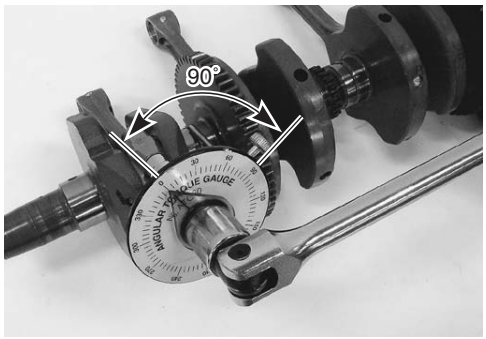
I718H1140274-01

4) Apply engine oil to the conrod cap bolts.
5) Tighten the conrod cap bolt by using a 10 mm, 12 point socket wrench in the following two steps.

Tightening torque
Conrod cap bolt: 21 N·m (2.1 kgf-m, 15.0 lb-ft) then turn in 1/4 (90°) turn.



I718H1140275-01



I718H1140279-01

6) Check that the conrod moves smoothly.
7) Install the crankshaft assembly to the crankcase. Refer to “Engine Bottom Side Assembly (Page 1D-61)”.

Conrod and Crankshaft Inspection

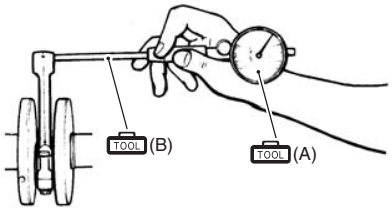
B718H11406027

Refer to “Conrod Removal and Installation (Page 1D-74)”.

Conrod Small End I.D.
Measure the conrod small end inside diameter using the small bore gauge.
If the conrod small end inside diameter exceeds the service limit, replace the conrod.

Special tool
(A): 09900–20602 (Dial gauge (1/1000 mm, 1 mm))
(B): 09900–22403 (Small bore gauge (18 – 35 mm))

Conrod small end I.D.
Service limit: 18.040 mm (0.7102 in)



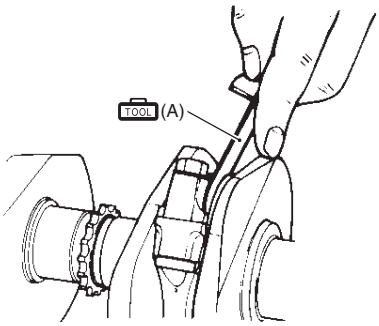
I718H1140280-01

Conrod Big End Side Clearance

1) Check the conrod big end side clearance using the thickness gauge.

Special tool
(A): 09900–20803 (Thickness gauge)

Conrod big end side clearance
Service limit: 0.3 mm (0.012 in)



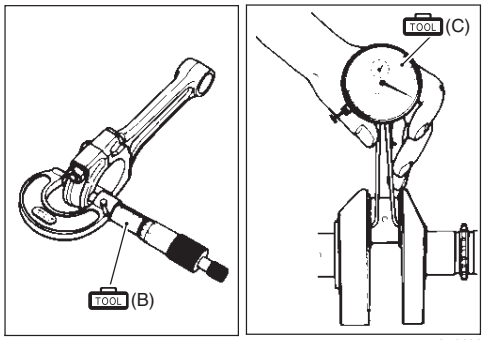
I718H1140281-01

2) If the clearance exceeds the limit, remove the conrod and measure the conrod big end width and crank pin width. Refer to “Conrod Removal and Installation (Page 1D-74)”. If any of the measurements are out of specification, replace the conrod or crankshaft.

Special tool
(B): 09900–20205 (Micrometer (0 – 25 mm))
(C): 09900–20605 (Dial calipers (1/100 mm, 10 - 34 mm))

Conrod big end width
Standard: 20.95 – 21.00 mm (0.825 – 0.827 in)

Crank pin width
Standard: 21.10 – 21.15 mm (0.831 – 0.833 in)

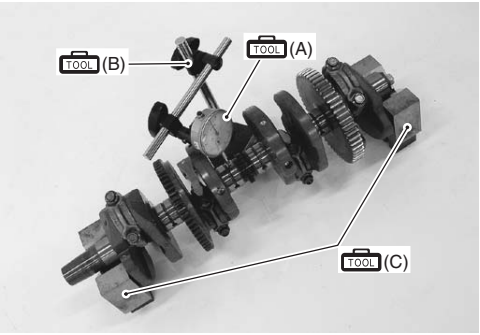


I718H1140282-01

Crankshaft Runout
Support the crankshaft using V-blocks as shown, with the two end journals resting on the blocks. Set up the dial gauge as shown, and rotate the crankshaft slowly to read the runout. Replace the crankshaft if the runout exceeds the service limit.

Special tool
(A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
(B): 09900–20701 (Magnetic stand)
(C): 09900–21304 (V-block (100 mm))

Crankshaft runout
Service limit: 0.05 mm (0.002 in)



I718H1140283-01

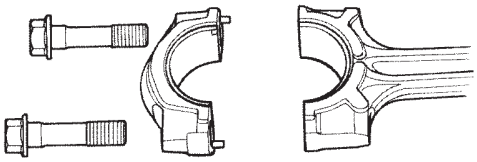
Conrod Crank Pin Bearing Inspection and Selection

B718H11406028

Refer to “Conrod Removal and Installation (Page 1D-74)”.

Inspection

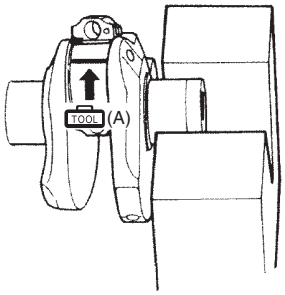
1) Inspect the bearing surfaces for any signs of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.



I718H1140285-01

2) Place the plastigauge axially along the crank pin, avoiding the oil hole, as shown.

Special tool
(A): 09900–22301 (Plastigauge (0.025 - 0.076 mm))



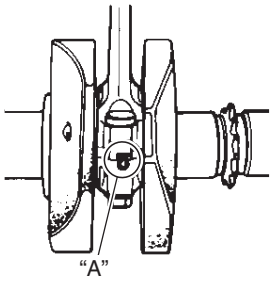
I718H1140286-01

3) Tighten the conrod cap bolts to the specified torque, in two stages.

NOTE

- **When installing the conrod cap to the crank pin, make sure that I.D code “A” on the conrod faces towards the intake side.**
- **Never rotate the crankshaft or conrod when a piece of plastigauge is installed.**

Tightening torque
Conrod cap bolt: 21 N·m (2.1 kgf-m, 15.0 lb-ft) then turn in 1/4 (90°) turn.

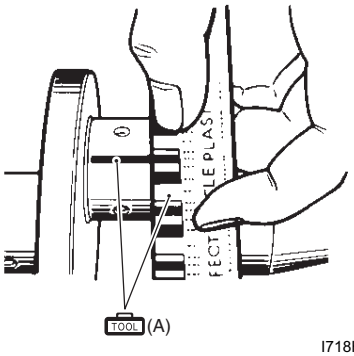


I718H1140287-01

4) Remove the conrod caps and measure the width of the compressed plastigauge using the envelope scale. This measurement should be taken at the widest part of the compressed plastigauge.
If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Conrod big end oil clearance
Standard: 0.032 – 0.056 mm (0.0013 – 0.0022 in)

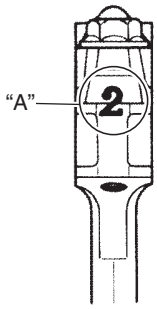
Conrod big end oil clearance
Service limit: 0.080 mm (0.0031 in)



I718H1140289-01

Selection

1) Check the corresponding conrod I.D. code numbers ([1] or [2]) “A”.

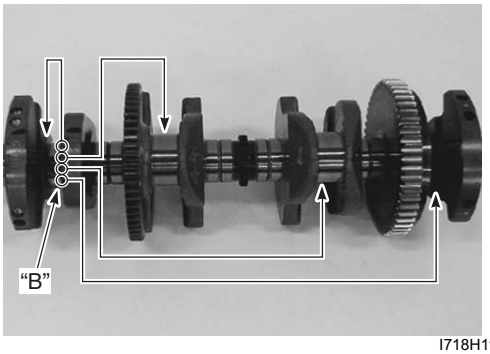


I718H1140290-01

Conrod I.D. specification

Code “A”	I.D. specification
1	41.000 – 41.008 mm (1.6142 – 1.6145 in)
2	41.008 – 41.016 mm (1.6145 – 1.6148 in)

2) Check the corresponding crank pin O.D. code numbers ([1], [2] or [3]) “B”.



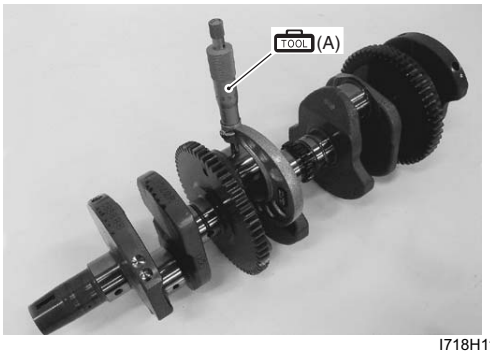
I718H1140291-02

3) Measure the conrod crank pin O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

Crank pin O.D. specification

Code “B”	O.D. specification
1	37.992 – 38.000 mm (1.4957 – 1.4961 in)
2	37.984 – 37.992 mm (1.4954 – 1.4957 in)
3	37.976 – 37.984 mm (1.4951 – 1.4954 in)

Special tool
TOOL (A): 09900–20202 (Micrometer (1/100 mm, 25 – 50 mm))



I718H1140292-01

4) Select the specified bearings from the bearing selection table.

⚠ CAUTION

The bearings should be replaced as a set.

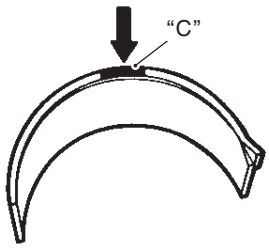
Bearing selection table

		Crank pin O.D. "B"		
	Code	1	2	3
Conrod I.D. "A"	1	Green	Black	Brown
	2	Black	Brown	Yellow

I718H1140293-01

Bearing thickness specification

Color "C" (Part No.)	Thickness
Green (12164-46E01-0A0)	**1.480 – 1.484 mm (0.0583 – 0.0584 in)**
Black (12164-46E01-0B0)	**1.484 – 1.488 mm (0.0584 – 0.0586 in)**
Brown (12164-46E01-0C0)	**1.488 – 1.492 mm (0.0586 – 0.0587 in)**
Yellow (12164-46E01-0D0)	**1.492 – 1.496 mm (0.0587 – 0.0589 in)**



I649G1140336-01

"C": Color code

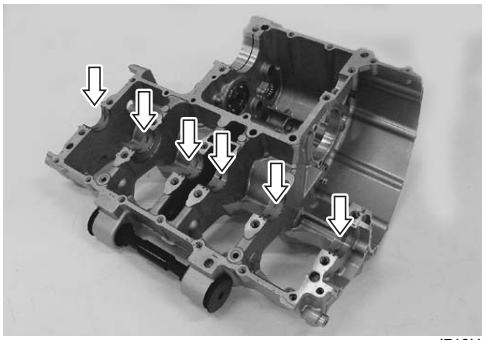
Crankshaft Journal Bearing Inspection and Selection

B718H11406029

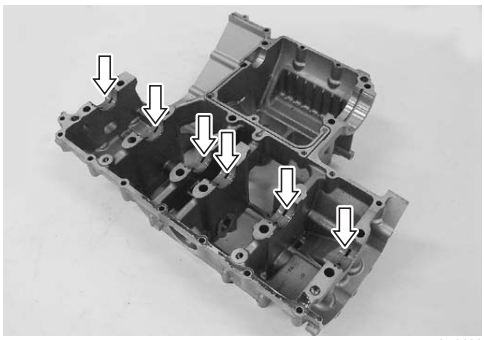
Refer to "Engine Bottom Side Disassembly (Page 1D-53)".
Refer to "Engine Bottom Side Assembly (Page 1D-61)".

Inspection

1) Inspect each upper and lower crankcase bearing for any damage.



I718H1140294-01



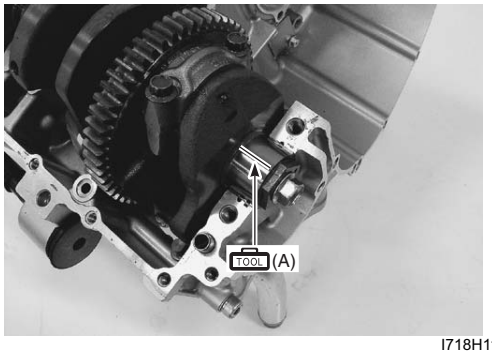
I718H1140295-01

2) Install the plastigauge onto each crankshaft journal as shown.

Special tool
(A): 09900–22301 (Plastigauge (0.025 – 0.076 mm))

NOTE

Do not place the plastigauge on the oil hole.



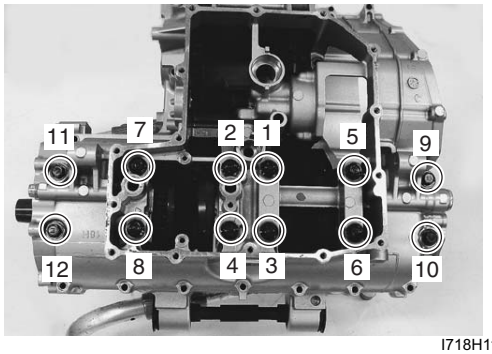
I718H1140296-02

3) Mate the lower crankcase with the upper crankcase.
4) Tighten the crankshaft journal bolts (M9) in ascending order of numbers assigned to these bolts. Tighten each bolt a little at a time to equalize the pressure in the following two steps.

NOTE

Do not rotate the crankshaft when a piece of plastigauge is installed.

Tightening torque
Crankcase journal bolt (Initial): 18 N·m (1.8 kgf-m, 13.0 lb-ft)
Crankcase journal bolt (Final): 32 N·m (3.2 kgf-m, 23.0 lb-ft)

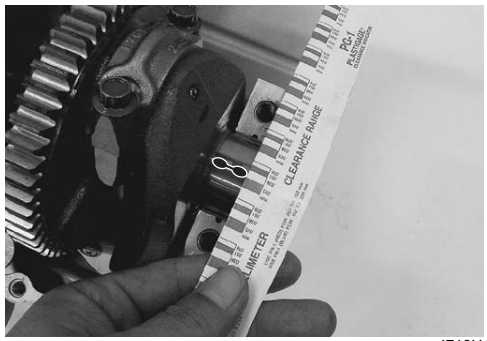


I718H1140297-01

5) Remove the lower crankcase and measure the width of compressed plastigauge using the envelope scale. This measurement should be taken at the widest part of the compressed plastigauge. If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Crankshaft journal oil clearance
Standard: 0.016 – 0.040 mm (0.0006 – 0.0016 in)

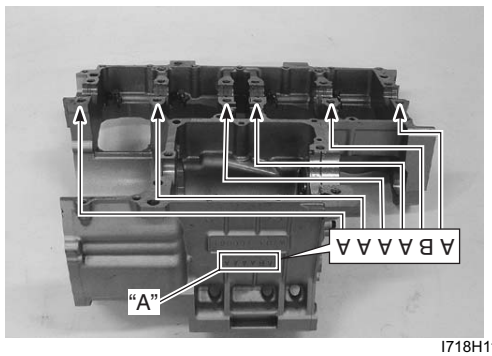
Crankshaft journal oil clearance
Service limit: 0.080 mm (0.0031 in)



I718H1140298-01

Selection

1) Check the corresponding crankcase journal I.D. codes ([A] or [B]) “A”, which are stamped on the rear of the upper crankcase.

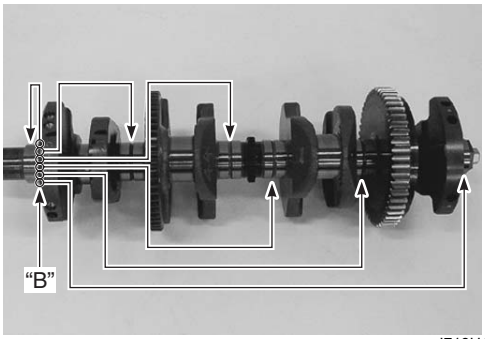


I718H1140299-02

Crankcase journal I.D. specification

Code “A”	I.D. specification
A	37.000 – 37.008 mm (1.4567 – 1.4570 in)
B	37.008 – 37.016 mm (1.4570 – 1.4573 in)

2) Check the corresponding crankshaft journal O.D. codes ([A], [B] or [C]) “B”, which are stamped on the crankshaft.



I718H1140300-02

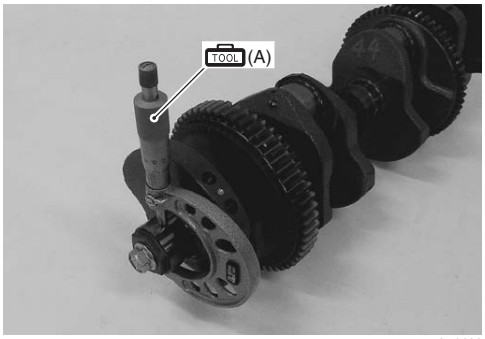
3) Measure the crankshaft O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

Crankshaft journal O.D. specification

Code “B”	O.D. specification
A	**33.992 – 34.000 mm (1.3383 – 1.3386 in)**
B	**33.984 – 33.992 mm (1.3380 – 1.3383 in)**
C	**33.976 – 33.984 mm (1.3367 – 1.3380 in)**

Special tool

TOOL (A): 09900–20202 (Micrometer (1/100 mm, 25 – 50 mm))



I718H1140301-01

4) Select the specified bearings from the bearing selection table.

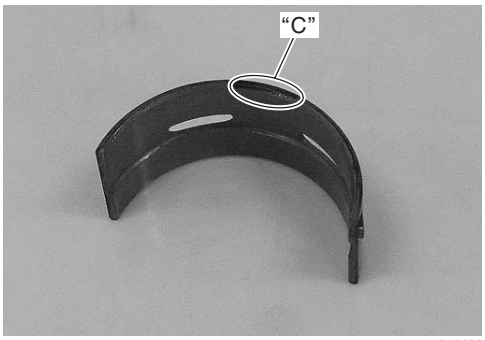
Bearing selection table

		Crankshaft O.D. “B”		
	Code	A	B	C
Crankcase I.D. “A”	A	Green	Black	Brown
	B	Black	Brown	Yellow

I718H1140302-02

Bearing thickness specification

Color “C” (Part No.)	Thickness
Green (12229-34E00-0A0)	**1.488 – 1.492 mm (0.0586 – 0.0587 in)**
Black (12229-34E00-0B0)	**1.492 – 1.496 mm (0.0587 – 0.0589 in)**
Brown (12229-34E00-0C0)	**1.496 – 1.500 mm (0.0589 – 0.0591 in)**
Yellow (12229-34E00-0D0)	**1.500 – 1.504 mm (0.0591 – 0.0592 in)**



I718H1140303-01

“C”: Color code

Crankshaft Thrust Clearance Inspection and Selection

B718H11406030

Refer to “Engine Bottom Side Disassembly (Page 1D-53)”.
Refer to “Engine Bottom Side Assembly (Page 1D-61)”.

Inspection

1) With the crankshaft’s right-side and left-side thrust bearings inserted into the upper crankcase.

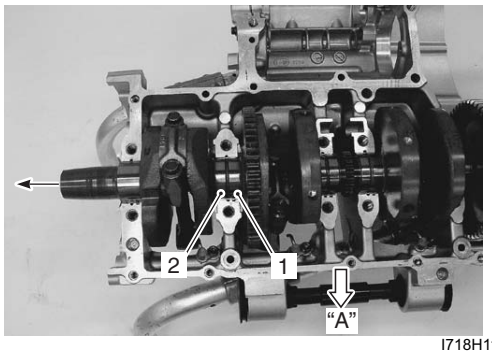
2) Measure the thrust clearance “a” between the left-side thrust bearing and crankshaft using the thickness gauge. If the thrust clearance exceeds the standard range, adjust the thrust clearance.

NOTE

Pull the crankshaft to the left (starter clutch side) so that there is no clearance on the right-side thrust bearing.

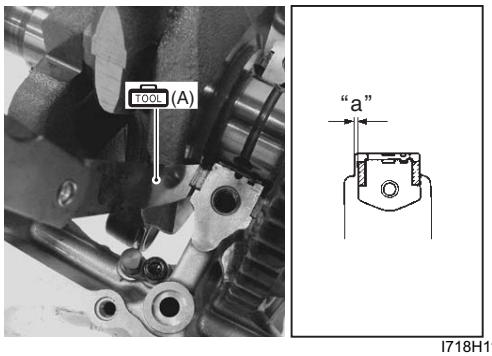
Special tool
(A): 09900–20803 (Thickness gauge)

Crankshaft thrust clearance “a”
Standard: 0.055 – 0.110 mm (0.0022 – 0.0043 in)



I718H1140304-01

1.	Right side thrust bearing
2.	Left side thrust bearing
“A”:	Front side



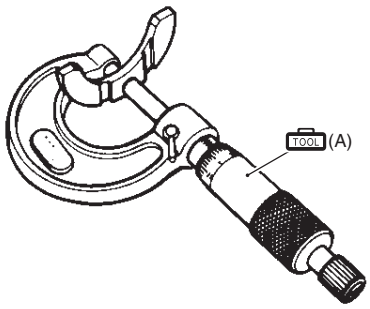
I718H1140306-01

Selection

1) Remove the right-side thrust bearing and measure its thickness using the micrometer. If the thickness of the right-side thrust bearing is below standard, replace it with a new bearing and measure the thrust clearance again, as described above.

Special tool
(A): 09900–20205 (Micrometer (0 – 25 mm))

Right-side thrust bearing thickness
Standard: 2.425 – 2.450 mm (0.0955 – 0.0965 in)

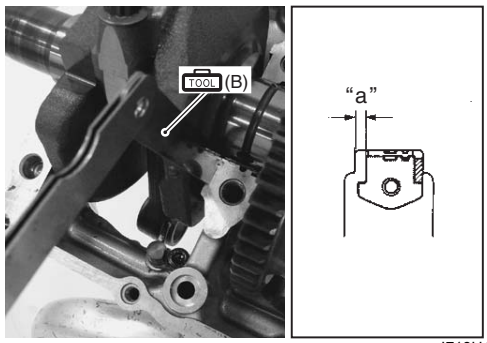


I649G1140343-01

2) If the right-side thrust bearing is within the standard range, reinsert the right-side thrust bearing and remove the left-side thrust bearing.

3) With the left-side thrust bearing removed, measure the clearance “a” using the thickness gauge as shown.

Special tool
(B): 09900–20803 (Thickness gauge)



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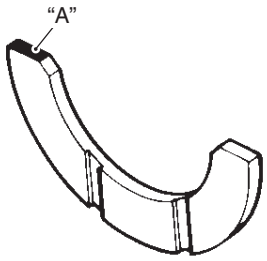
4) Select a left-side thrust bearing from the selection table.

NOTE

Right-side thrust bearing has the same specification as the GREEN (12228-48B00-0E0) of left-side thrust bearing.

Left-side thrust bearing selection table

Clearance before inserting the left-side thrust bearing	Color "A" (Part No.)	Thrust bearing thickness	Thrust clearance
2.560 – 2.585 mm (0.1008 – 0.1018 in)	White (12228-17E00-0F0)	2.475 – 2.500 mm (0.0974 – 0.0984 in)	0.060 – 0.110 mm (0.0024 – 0.0043 in)
2.535 – 2.560 mm (0.0998 – 0.1008 in)	Yellow (12228-17E00-0E0)	2.450 – 2.475 mm (0.0965 – 0.0974 in)	
2.510 – 2.535 mm (0.0988 – 0.0998 in)	Green (12228-17E00-0D0)	2.425 – 2.450 mm (0.0955 – 0.0965 in)	
2.485 – 2.510 mm (0.0978 – 0.0988 in)	Blue (12228-17E00-0C0)	2.400 – 2.425 mm (0.0945 – 0.0955 in)	
2.460 – 2.485 mm (0.0969 – 0.0978 in)	Black (12228-17E00-0B0)	2.375 – 2.400 mm (0.0935 – 0.0945 in)	
2.430 – 2.460mm (0.0957 – 0.0969 in)	Red (12228-17E00-0A0)	2.350 – 2.375 mm (0.0925 – 0.0935 in)	0.055 – 0.110 mm (0.0022 – 0.0043 in)



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"A": Color code

5) After selecting a left-side thrust bearing, install it and then measure the thrust clearance again.

Specifications

Service Data

B718H11407001

Valve + Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	31 (1.22)	—
	EX.	27 (1.06)	—
Valve clearance (when cold)	IN.	0.10 – 0.20 (0.004 – 0.008)	—
	EX.	0.20 – 0.30 (0.008 – 0.012)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.475 – 4.490 (0.1762 – 0.1768)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN. & EX.	—	39.6 (1.56)
Valve spring tension	IN. & EX.	Approx. 147 N (15.0 kgf, 33.1 lbs) at length 36.0 mm (1.42 in)	—

Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	35.28 – 35.33 (1.389 – 1.391)	34.98 (1.377)
	EX.	34.18 – 34.23 (1.346 – 1.348)	33.88 (1.334)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012 – 24.025 (0.9454 – 0.9459)	—
Camshaft journal O.D.	IN. & EX.	23.959 – 23.980 (0.9433 – 0.9441)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow “3”)	16th pin		—
Cylinder head distortion	—		0.20 (0.008)

Cylinder + Piston + Piston Ring

Unit: mm (in)

Item	Standard			Limit
Compression pressure	1 300 – 1 700 kPa (13 – 17 kgf/cm^2, 185 – 242 psi)			1 000 kPa (10 kgf/cm^2, 142 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm^2, 28 psi)
Piston-to-cylinder clearance	0.025 – 0.035 (0.0010 – 0.0014)			0.120 (0.0047)
Cylinder bore	79.000 – 79.015 (3.1102 – 3.1108)			Nicks or Scratches
Piston diam.	78.970 – 78.985 (3.1090 – 3.1096) Measure 15 mm (0.6 in) from the skirt end.			78.880 (3.1055)
Cylinder distortion	—			0.02 (0.008)
Piston ring free end gap	1st	IN	Approx. 9 (0.35)	7.2 (0.28)
	2nd	N	Approx. 9.5 (0.37)	7.6 (0.30)
Piston ring end gap	1st	IN	0.06 – 0.21 (0.002 – 0.008)	0.5 (0.020)
	2nd	N	0.06 – 0.21 (0.002 – 0.008)	0.5 (0.020)
Piston ring-to-groove clearance	1st		—	0.180 (0.0071)
	2nd		—	0.150 (0.0059)
Piston ring groove width	1st		1.01 – 1.03 (0.040 – 0.041)	—
	2nd		0.81 – 0.83 (0.032 – 0.033)	—
	Oil		1.51 – 1.53 (0.059 – 0.060)	—
Piston ring thickness	1st		0.97 – 0.99 (0.038 – 0.039)	—
	2nd		0.77 – 0.79 (0.030 – 0.031)	—

Item	Standard	Limit
Piston pin bore	18.002 – 18.008 (0.7087 – 0.7090)	18.030 (0.7098)
Piston pin O.D.	17.996 – 18.000 (0.7085 – 0.7087)	17.980 (0.7079)

Conrod + Crankshaft

Unit: mm (in)

Item	Standard		Limit
Conrod small end I.D.	18.010 – 18.018 (0.7091 – 0.7094)		18.040 (0.7102)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)		0.30 (0.012)
Conrod big end width	20.95 – 21.00 (0.825 – 0.827)		—
Crank pin width	21.10 – 21.15 (0.831 – 0.833)		—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)		0.080 (0.0031)
Crank pin O.D.	37.976 – 38.000 (1.4951 – 1.4961)		—
Crankshaft journal oil clearance	0.016 – 0.040 (0.0006 – 0.0016)		0.080 (0.0031)
Crankshaft journal O.D.	33.976 – 34.000 (1.3376 – 1.3386)		—
Crankshaft thrust clearance	0.055 – 0.110 (0.0022 – 0.0043)		—
Crankshaft thrust bearing thickness	Right side	2.425 – 2.450 (0.0955 – 0.0965)	—
	Left side	2.350 – 2.500 (0.0925 – 0.0984)	—
Crankshaft runout	—		0.05 (0.002)

Tightening Torque Specifications

B718H11407002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
STP sensor mounting screw	3.5	0.35	2.5	☞(Page 1D-13)
ISC valve mounting screw	3.5	0.35	2.5	☞(Page 1D-13)
Fuel delivery pipe mounting screw	3.5	0.35	2.45	☞(Page 1D-15)
Frame down tube bolt	50	5.0	36.0	☞(Page 1D-21)
Engine mounting No.1 bracket bolts	23	2.3	16.5	☞(Page 1D-21)
Engine mounting No.2 bracket bolts	23	2.3	16.5	☞(Page 1D-21)
Engine sprocket nut	115	11.5	83.0	☞(Page 1D-22)
Speed sensor rotor bolt	25	2.5	18.0	☞(Page 1D-23)
Cylinder head bolt (L175)	25	2.5	18.0	☞(Page 1D-30)
Cylinder head bolt (L175)	42	4.2	30.5	☞(Page 1D-30)
Cylinder head bolt (L65)	10	1.0	7.0	☞(Page 1D-30)
Camshaft journal holder bolt	10	1.0	7.0	☞(Page 1D-32) / ☞(Page 1D-37)
Oil pipe mounting bolt	10	1.0	7.0	☞(Page 1D-33)
Cam chain tension adjuster mounting bolt	10	1.0	7.0	☞(Page 1D-33)
Cam chain tension adjuster cap bolt	23	2.3	16.5	☞(Page 1D-33)
Cylinder head cover bolt	14	1.4	10.0	☞(Page 1D-35)
Camshaft sprocket bolt	16	1.6	11.5	☞(Page 1D-38)
Camshaft sprocket bolt	25	2.5	18.0	☞(Page 1D-38)
Oil gallery plug (cylinder head)	10	1.0	7.0	☞(Page 1D-41)
Water jacket plug	30	3.0	21.5	☞(Page 1D-49)
Water inlet connector bolt	10	1.0	7.0	☞(Page 1D-49)
ECT sensor	18	1.8	13.0	☞(Page 1D-50)
Oil gallery plug (M6 and M8)	10	1.0	7.0	☞(Page 1D-61)
Oil gallery plug (M12)	15	1.5	11.0	☞(Page 1D-61)
Oil gallery plug (M16)	35	3.5	25.5	☞(Page 1D-61)
Piston cooling oil jet bolt	10	1.0	7.0	☞(Page 1D-62)
Oil gallery jet	22	2.2	16.0	☞(Page 1D-62)
Crankcase journal bolt (M9) (Initial)	18	1.8	13.0	☞(Page 1D-63)
Crankcase journal bolt (M9) (Final)	32	3.2	23.0	☞(Page 1D-63)
Crankcase bolt (M6) (Initial)	6	0.6	4.5	☞(Page 1D-64)
Crankcase bolt (M6) (Final)	11	1.1	8.0	☞(Page 1D-64)
Crankcase bolt (M8) (Initial)	15	1.5	11.0	☞(Page 1D-64)
Crankcase bolt (M8) (Final)	26	2.6	19.0	☞(Page 1D-64)
Balancer shaft arm bolt	10	1.0	7.0	☞(Page 1D-65)

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Balancer shaft mounting bolt	10	1.0	7.0	☞(Page 1D-65)
Oil cooler union bolt	70	7.0	50.5	☞(Page 1D-67)
Oil pressure switch	14	1.4	10.0	☞(Page 1D-67)
Oil Pressure switch lead wire mounting bolt	1.5	0.15	1.1	☞(Page 1D-68)
Gear position switch mounting bolt	6.5	0.65	4.7	☞(Page 1D-68)
Water pump mounting bolt	10	1.0	7.0	☞(Page 1D-69)
Gearshift cam stopper bolt	10	1.0	7.0	☞(Page 1D-69)
Gearshift cam stopper plate bolt	13	1.3	9.5	☞(Page 1D-70)
Gearshift arm stopper	19	1.9	13.5	☞(Page 1D-70)
Oil pump mounting bolt	10	1.0	7.0	☞(Page 1D-71)
Conrod cap bolt	21 N·m (2.1 kgf-m, 15.0 lb-ft) then turn in 1/4 (90°) turn.			☞(Page 1D-75) / ☞(Page 1D-76)
Crankcase journal bolt (Initial)	18	1.8	13.0	☞(Page 1D-79)
Crankcase journal bolt (Final)	32	3.2	23.0	☞(Page 1D-79)

NOTE

The specified tightening torque is also described in the following.
“Throttle Body Components (Page 1D-7)”
“Throttle Body Construction (Page 1D-8)”
“Engine Assembly Installation (Page 1D-21)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H11408001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1D-13) / ☞(Page 1D-23) / ☞(Page 1D-41) / ☞(Page 1D-66) / ☞(Page 1D-66) / ☞(Page 1D-67) / ☞(Page 1D-68) / ☞(Page 1D-69) / ☞(Page 1D-71)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞(Page 1D-28) / ☞(Page 1D-29) / ☞(Page 1D-42) / ☞(Page 1D-74)
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000–31110	☞(Page 1D-63) / ☞(Page 1D-66) / ☞(Page 1D-68)
	SUZUKI BOND No.1207B or equivalent	P/No.: 99000–31140	☞(Page 1D-67)
	SUZUKI Bond 1207B or equivalent	P/No.: 99000–31140	☞(Page 1D-34) / ☞(Page 1D-35)

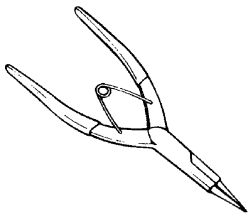
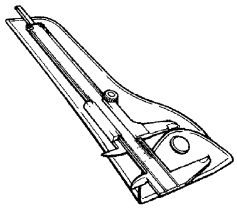
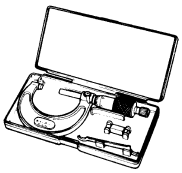
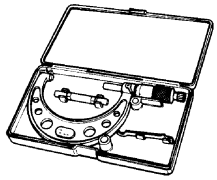
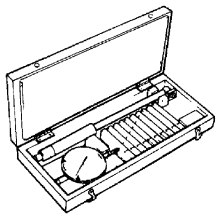
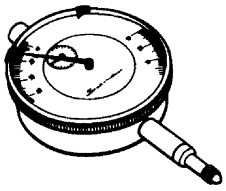
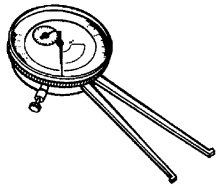
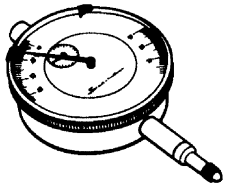
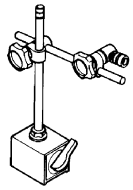
Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000–32030	☞(Page 1D-22) / ☞(Page 1D-38) / ☞(Page 1D-70)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 1D-62) / ☞(Page 1D-62) / ☞(Page 1D-65) / ☞(Page 1D-68) / ☞(Page 1D-70)

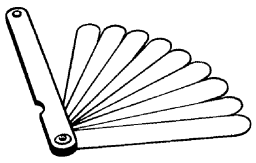
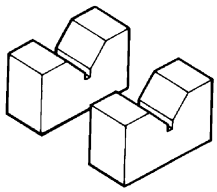
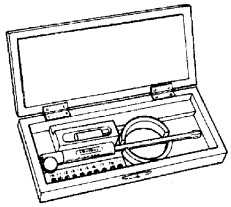
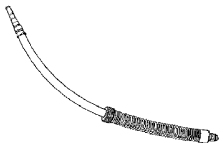
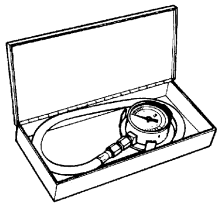
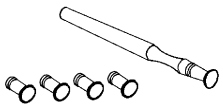
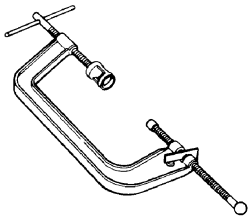
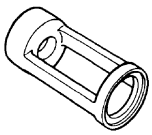
NOTE

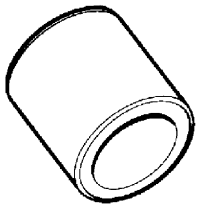
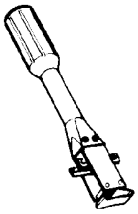
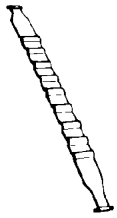
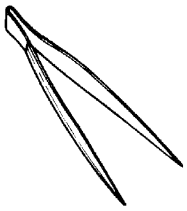
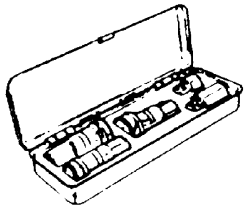
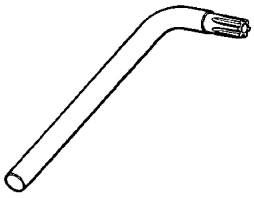
Required service material is also described in the following.
“Throttle Body Components (Page 1D-7)”

Special Tool

B718H11408002

09900–06107 Snap ring pliers ☞(Page 1D-54) / ☞(Page 1D-55) / ☞(Page 1D-71)		09900–20102 Vernier calipers (1/20 mm, 200 mm) ☞(Page 1D-44) / ☞(Page 1D-45) / ☞(Page 1D-53)	
09900–20202 Micrometer (1/100 mm, 25 – 50 mm) ☞(Page 1D-36) / ☞(Page 1D-77) / ☞(Page 1D-80)		09900–20204 Micrometer (75 – 100 mm) ☞(Page 1D-52)	
09900–20205 Micrometer (0 – 25 mm) ☞(Page 1D-37) / ☞(Page 1D-45) / ☞(Page 1D-52) / ☞(Page 1D-53) / ☞(Page 1D-75) / ☞(Page 1D-81)		09900–20508 Cylinder gauge set ☞(Page 1D-50)	
09900–20602 Dial gauge (1/1000 mm, 1 mm) ☞(Page 1D-37) / ☞(Page 1D-53) / ☞(Page 1D-75)		09900–20605 Dial calipers (1/100 mm, 10 – 34 mm) ☞(Page 1D-75)	
09900–20607 Dial gauge (1/100 mm, 10 mm) ☞(Page 1D-36) / ☞(Page 1D-44) / ☞(Page 1D-44) / ☞(Page 1D-45) / ☞(Page 1D-76)		09900–20701 Magnetic stand ☞(Page 1D-36) / ☞(Page 1D-44) / ☞(Page 1D-44) / ☞(Page 1D-45) / ☞(Page 1D-76)	

09900–20803 Thickness gauge ☞(Page 1D-44) / ☞(Page 1D-50) / ☞(Page 1D-52) / ☞(Page 1D-53) / ☞(Page 1D-75) / ☞(Page 1D-81) / ☞(Page 1D-81) 	09900–21304 V-block (100 mm) ☞(Page 1D-36) / ☞(Page 1D-44) / ☞(Page 1D-44) / ☞(Page 1D-76) 
09900–22301 Plastigauge (0.025 – 0.076 mm) ☞(Page 1D-36) / ☞(Page 1D-76) / ☞(Page 1D-79) 	09900–22302 Plastigauge (0.051 – 0.152 mm) ☞(Page 1D-36) 
09900–22403 Small bore gauge (18 – 35 mm) ☞(Page 1D-37) / ☞(Page 1D-53) / ☞(Page 1D-75) 	09915–40610 Oil filter wrench ☞(Page 1D-56) / ☞(Page 1D-67) 
09915–63311 Compression gauge attachment ☞(Page 1D-3) 	09915–64512 Compression gauge ☞(Page 1D-3) 
09916–10911 Valve lapper set ☞(Page 1D-46) 	09916–14510 Valve spring compressor ☞(Page 1D-40) / ☞(Page 1D-43) 
09916–14521 Valve spring compressor attachment ☞(Page 1D-40) / ☞(Page 1D-43) 	09916–33210 Valve guide reamer (4.5 mm) ☞(Page 1D-48) 
09916–34542 Reamer handle ☞(Page 1D-47) / ☞(Page 1D-48) 	09916–34580 Valve guide reamer (10.8 mm) ☞(Page 1D-47) 

09916–43211 Valve guide remover/ installer ☞(Page 1D-47) / ☞(Page 1D-47) 	09916–43230 Attachment ☞(Page 1D-47) 
09916–74521 Holder body ☞(Page 1D-29) 	09916–74550 Band (Piston diam.: 73 – 85 mm) ☞(Page 1D-29) 
09916–84511 Valve adjuster driver ☞(Page 1D-40) / ☞(Page 1D-43) 	09930–10121 Spark plug wrench set ☞(Page 1D-25) 
09930–11950 Torx wrench ☞(Page 1D-11) / ☞(Page 1D-12) / ☞(Page 1D-13) / ☞(Page 1D-13) 	

Engine Lubrication System

Precautions

Precautions for Engine Oil

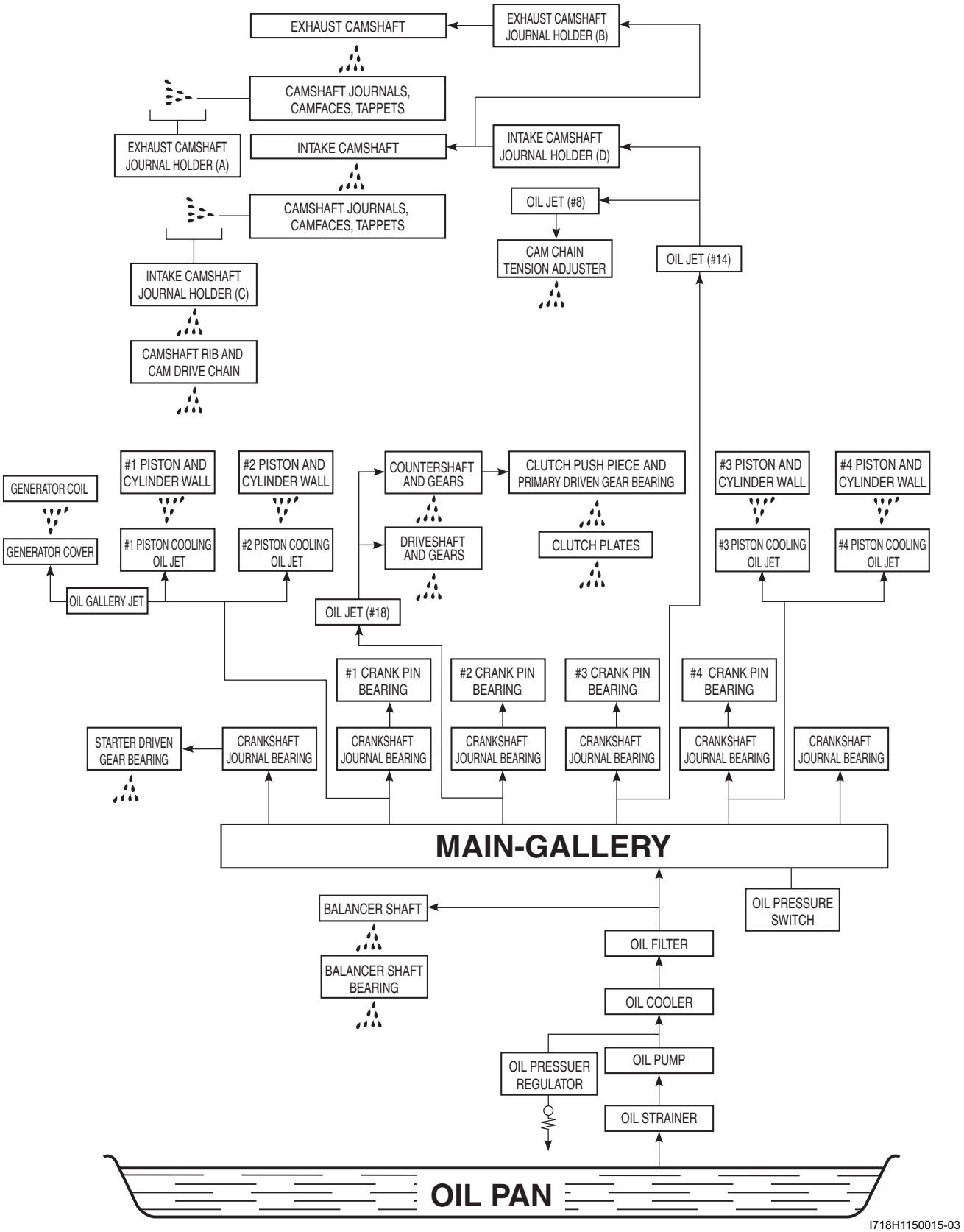
B718H11500001

Refer to “Fuel and Oil Recommendation in Section 0A (Page 0A-4)”.

Schematic and Routing Diagram

Engine Lubrication System Chart Diagram

B718H11502002



I718H1150015-03

Diagnostic Information and Procedures

Engine Lubrication Symptom Diagnosis

B718H11504001

Condition	Possible cause	Correction / Reference Item
Engine overheats.	Insufficient amount of engine oil.	*Check level and add.*
	Defective oil pump.	*Replace.*
	Clogged oil circuit.	*Clean.*
	Clogged oil cooler	*Clean or replace.*
	Incorrect engine oil.	*Change.*
Exhaust smoke is dirty or thick.	Excessive amount of engine oil.	*Check level and drain.*
Engine lacks power.	Excessive amount of engine oil.	*Check level and drain.*

Oil Pressure Check

B718H11504002

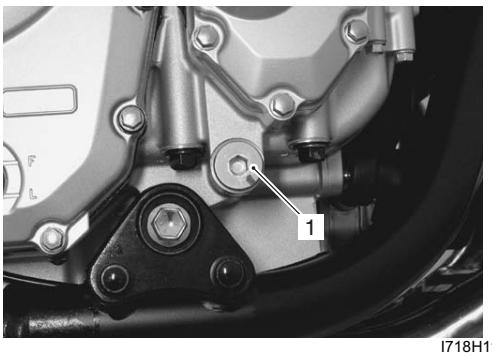
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

NOTE

Before checking the oil pressure, check the following.

- **Oil level (Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)")**
- **Oil leaks (If leak is found, repair it.)**
- **Oil quality (If oil is discolored or deteriorated, replace it.)**

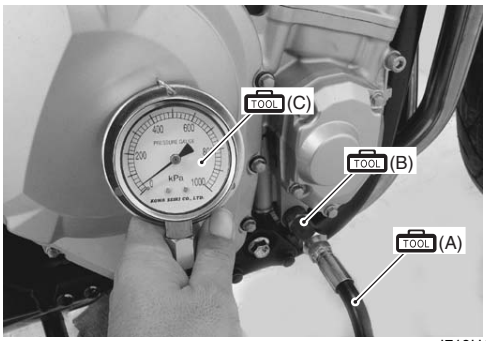
1) Start the engine and check if the oil pressure indicator light is turned on. If the light stays on, check the oil pressure indicator light circuit. If the circuit is OK, check the oil pressure in the following manner.
2) Remove the main oil gallery plug (1).



I718H1150018-01

3) Install the oil pressure gauge and attachment into the main oil gallery.

Special tool
TOOL (A): 09915–74521 (Oil pressure gauge hose)
TOOL (B): 09915–74540 (Oil pressure gauge attachment)
TOOL (C): 09915–77331 (Meter (for high pressure))



I718H1150019-01

4) Warm up the engine as follows:
Summer: 10 min. at 2 000 r/min
Winter: 20 min. at 2 000 r/min
5) After warm up, increase the engine speed to 3 000 r/min (Observe the tachometer), and read the oil pressure gauge.
If the oil pressure is lower or higher than the specification, the following causes may be considered.

Oil pressure specification
100 – 400 kPa (1.0 – 4.0 kgf/cm^2, 14 – 57 psi) at 3 000 r/min, Oil temp. at 60 °C (140 °F)

High oil pressure	Low oil pressure
• Engine oil viscosity is too high • Clogged oil passage • Combination of the above items	• Clogged oil filter • Oil leakage from the oil passage • Damaged O-ring • Defective oil pump • Combination of the above items

6) Stop the engine and remove the oil pressure gauge and attachment.
7) Reinstall the main oil gallery plug and tighten it to the specified torque.

⚠ CAUTION

Use a new gasket to oil leakage.

Tightening torque
Main Oil gallery plug (M16) (a): 35 N·m (3.5 kgf-m, 25.5 lb-ft)

I718H1150020-01

8) Check the engine oil level. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

Repair Instructions

Engine Oil and Filter Replacement

B718H11506001

Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

Engine Oil Level Inspection

B718H11506002

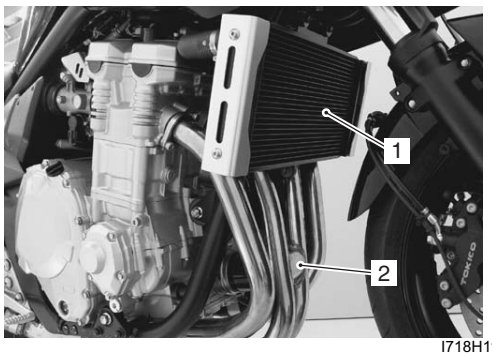
Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation

B718H11506015

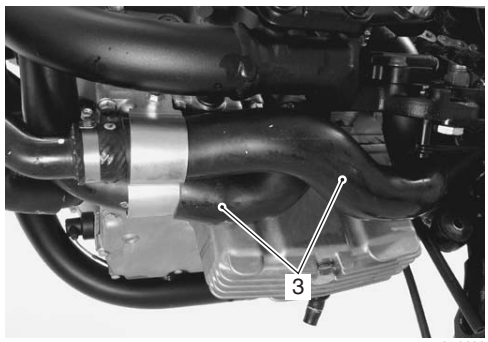
Removal

1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
2) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
3) Remove the radiator (1), exhaust pipe assembly (2) and muffler. Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)” and “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.



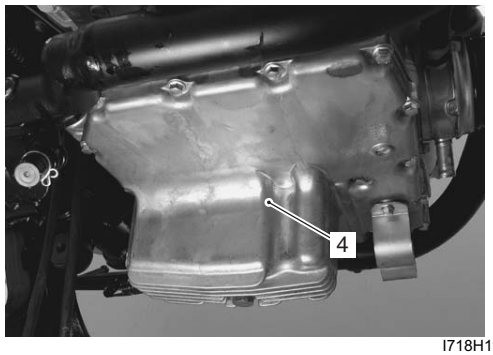
I718H1150021-01

4) Remove the water hoses (3). Refer to “Water Hose Routing Diagram in Section 1F (Page 1F-3)”.



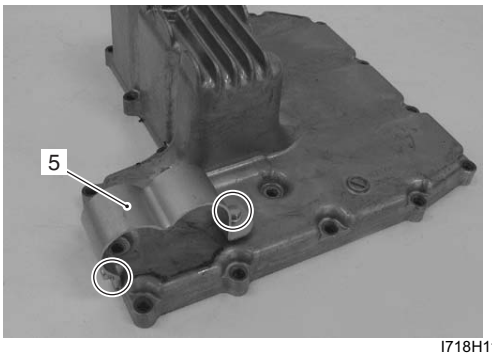
I718H1150022-01

5) Remove the oil pan (4). Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-53)”.



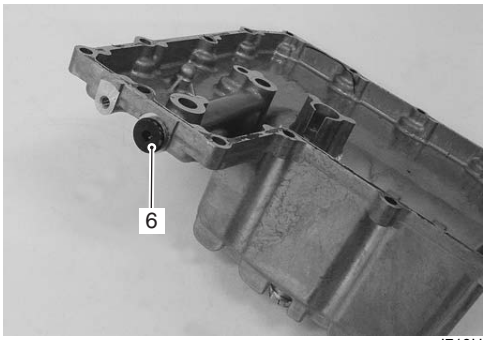
I718H1150023-01

6) Remove the hose clamp plate (5) from the oil pan.



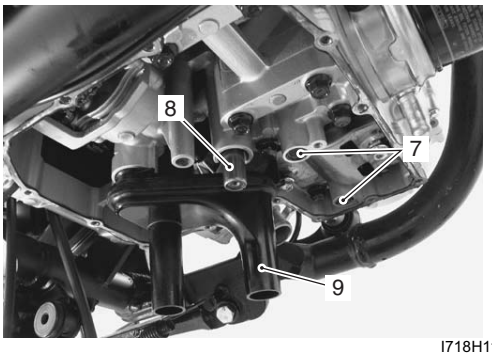
I718H1150064-01

7) Remove the oil gallery plug (6) from the oil pan.



I718H1150024-02

8) Remove the O-rings (7), oil pressure regulator (8) and oil strainer (9).



I718H1150025-02

Installation

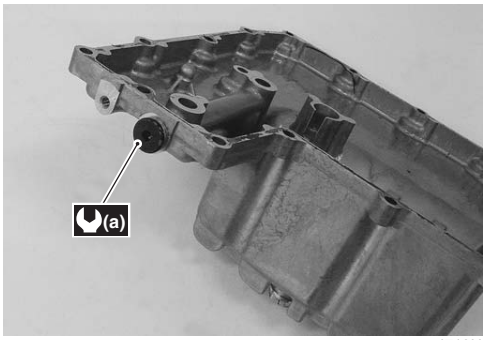
Installation is in the reverse order of removal.
Pay attention to the following points:

- Tighten the oil gallery plug to specified torque.

⚠ CAUTION

Use a new gasket to prevent oil leakage.

Tightening torque
Oil gallery plug (M12) (a): 15 N·m (1.5 kgf-m, 11.0 lb-ft)



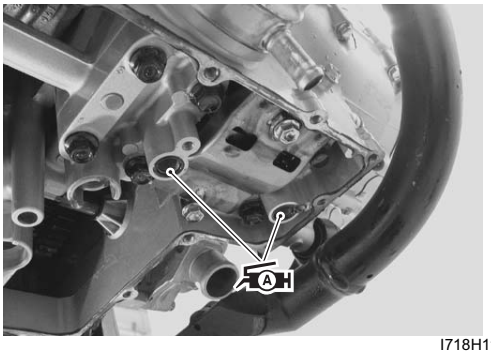
I718H1150026-01

- Apply SUZUKI SUPER GREASE to the O-rings and install them.

⚠ CAUTION

Use new O-rings to prevent oil leakage.

A : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



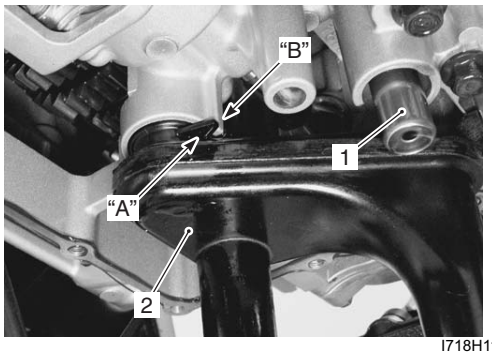
I718H1150027-01

I718H1150028-01

- Install the oil pressure regulator (1) and oil strainer (2).

NOTE

When installing the oil strainer, fit the concave part “A” of the oil strainer onto the convex part “B” of the crankcase.



I718H1150029-01

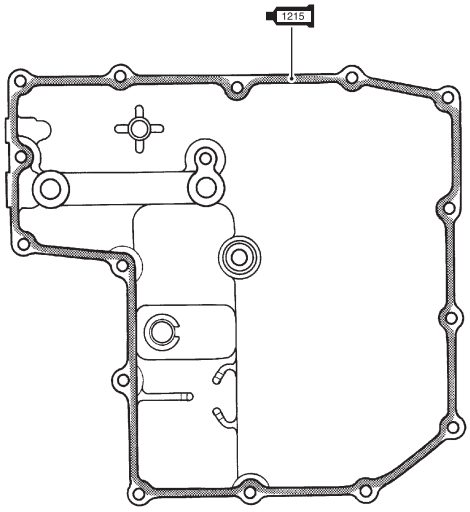
- Apply SUZUKI BOND to the mating surface of the oil pan.

NOTE

Use of SUZUKI BOND is as follows:

- **Make surfaces free from moisture, oil, dust and other foreign materials.**
- **Spread the sealant on surfaces thinly to from an even layer, and assemble the oil pan within a few minutes.**
- **Apply to distorted surfaces as it forms a comparatively thick film.**

1215 : Sealant 99000–31110 (SUZUKI BOND No.1215 or equivalent)



I718H1140228-01

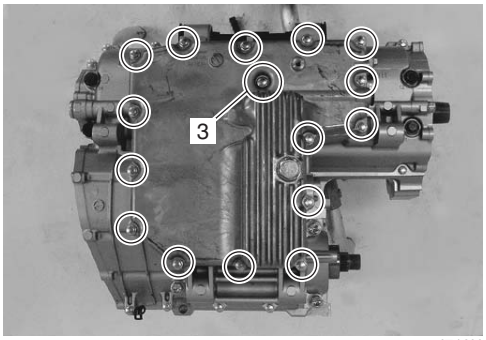
- Tighten the oil pan bolts diagonally.

NOTE

Fit a new gasket washer to the oil pan bolt (3).

⚠ CAUTION

Use a new gasket washer to prevent oil leakage.



I718H1150032-01

- After installing the removed parts, pour engine oil and engine coolant. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)” and “Cooling System Inspection in Section 0B (Page 0B-12)”.

Oil Pressure Regulator / Oil Strainer Inspection

B718H11506006

Refer to “Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation (Page 1E-4)”.

Oil pressure regulator

Inspect the operation of the oil pressure regulator by pushing on the piston with a proper bar.
If the piston does not operate, replace the oil pressure regulator with a new one.

I718H1150033-01

Oil Strainer

Clean the oil strainer if necessary.
Inspect the oil strainer body for damage. If necessary, replace it with a new one.

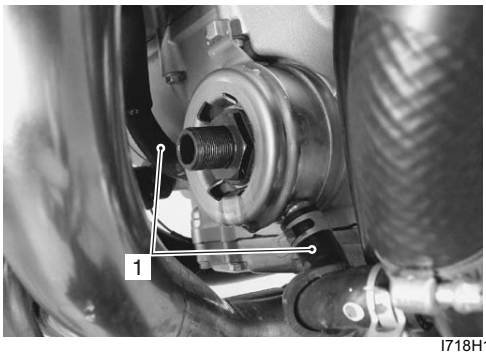
I718H1150034-01

Oil Cooler Removal and Installation

B718H11506017

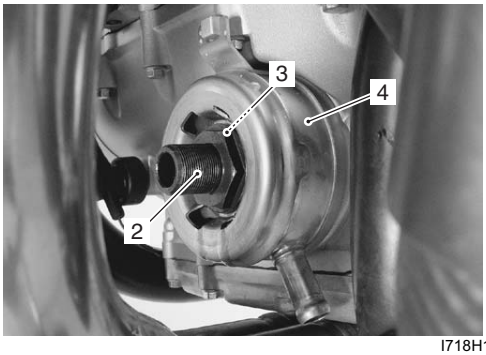
Removal

1) Drain engine oil and engine coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
2) Remove the Oil filter. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".
3) Disconnect the oil cooler hoses (1).



I718H1150035-01

4) Remove the washer (3) and oil cooler (4) by removing the union bolt (2).



I718H1150036-02

Installation

Install the oil cooler in the revers order of removal. Pay attention to the following points:

- Apply SUZUKI SUPER GREASE to the O-ring.

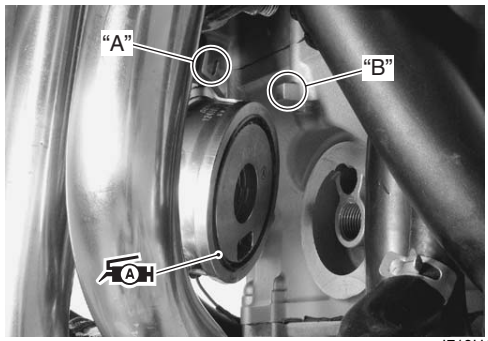
⚠ CAUTION

Use a new O-ring to prevent oil leakage.

NOTE

When installing the oil cooler, fit the concave part "A" of the oil cooler onto the convex part "B" of the crankcase.

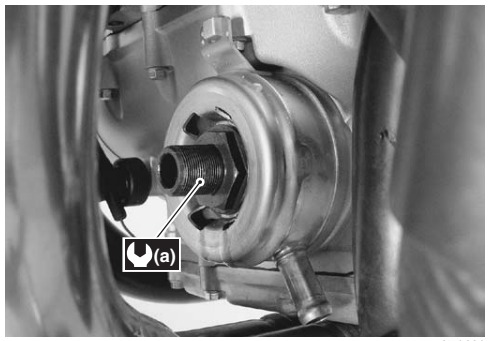
: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1150037-01

- Tighten the union bolt to the specified torque.

Tightening torque
Oil cooler union bolt (a): 70 N·m (7.0 kgf-m, 50.5 lb-ft)



I718H1150038-01

Oil Pressure Switch Removal and Installation

B718H11506008

Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

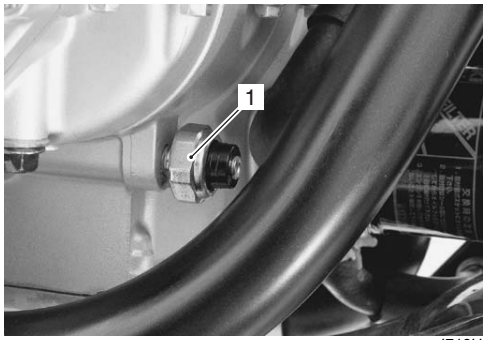
Removal

1) Turn the ignition switch OFF.
2) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".

3) Disconnect the oil pressure switch lead wire.

I718H1150039-01

4) Remove the oil pressure switch (1).



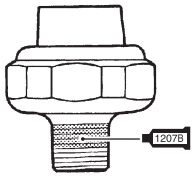
I718H1150040-01

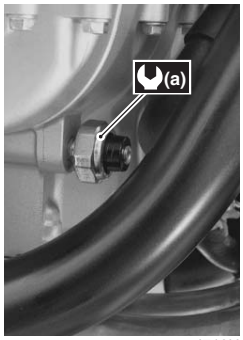
Installation

1) Install the oil pressure switch, apply the SUZUKI BOND to its thread and tighten it to the specified torque.

1207B : Sealant 99000–31140 (SUZUKI Bond 1207B or equivalent)

Tightening torque
Oil pressure switch (a): 14 N·m (1.4 kgf-m, 10.0 lb-ft)

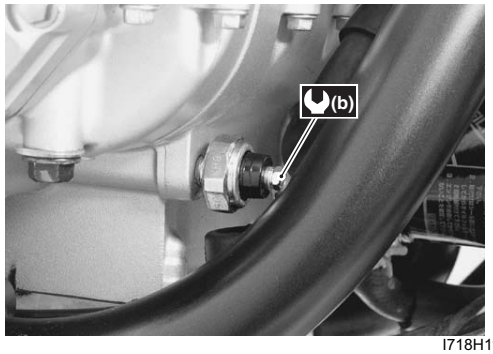




I718H1150041-01

2) Connect the oil pressure switch lead wire securely. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-8)”.

Tightening torque
Oil pressure switch lead wire bolt (b): 1.5 N·m (0.15 kgf-m, 1.1 lb-ft)



I718H1150042-01

3) Pour engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

Oil Pressure Switch Inspection

B718H11506009

Refer to “Oil Pressure Indicator Inspection in Section 9C (Page 9C-9)”.

Oil Jet Removal and Installation

B718H11506018

Oil Jet (For Cam Chain Tension Adjuster)

Removal

1) Remove the cam chain tension adjuster. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-24)”.
2) Remove the oil jet (1).

I718H1150043-01

Installation
Installation is in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the O-ring.

⚠ CAUTION

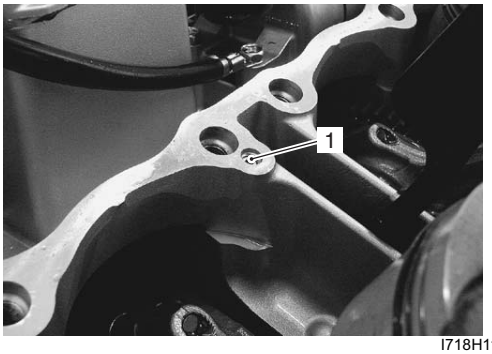
Use a new O-ring to prevent oil leakage.

I718H1150044-01

Oil Jet (For Cylinder Head)

Removal

1) Remove the cylinder. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-24)”.
2) Remove the oil jet (1).



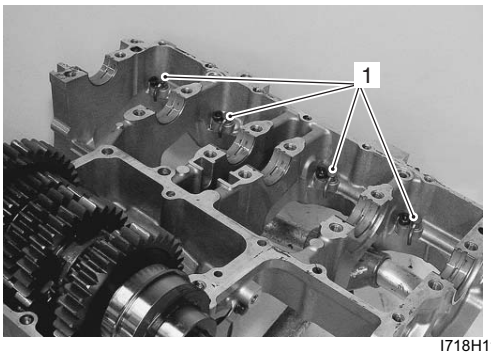
I718H1150045-02

Installation
Installation is in the reverse order of removal. Refer to “Engine Top Side Assembly in Section 1D (Page 1D-28)”.

Oil Jet (For the Piston Cooling and Transmission)

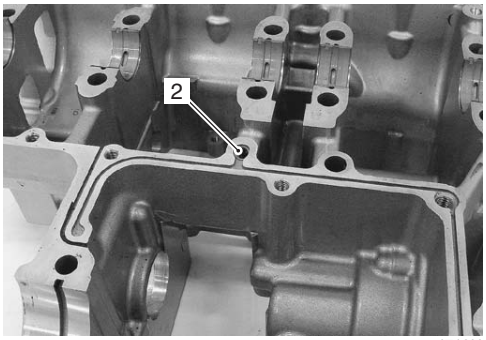
Removal

1) Remove the engine assembly. Refer to “Engine Assembly Removal in Section 1D (Page 1D-17)”.
2) Separate the crankcases, upper and lower. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-53)”.
3) Remove the crankshaft assembly. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-53)”.
4) Remove the piston cooling oil jets (1) from the upper crankcase.



I718H1150046-01

5) Remove the oil jet (2) (for transmission) from the lower crankcase.



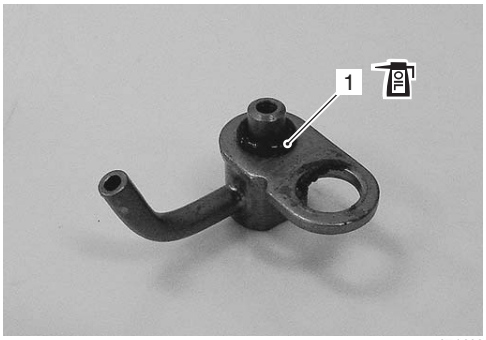
I718H1150047-01

Installation
Installation is in the reverse order of removal.
Pay attention to the following points:

- Fit new O-ring (1) to each piston cooling oil jet as shown and apply engine oil to them.

⚠ CAUTION

Use new O-rings to prevent oil pressure leakage.

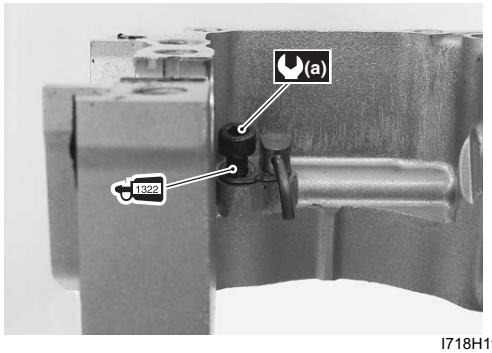


I718H1150048-01

- Apply a small quantity of THREAD LOCK to the bolts and tighten them to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Piston cooling oil jet bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



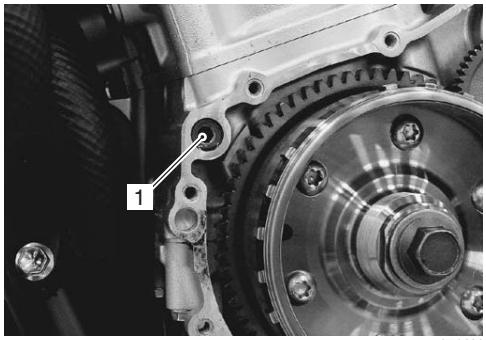
I718H1150049-02

Oil Gallery Jet Removal and Installation

B718H11506019

Removal

1) Remove the generator cover. Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.
2) Remove the oil gallery jet (1).



I718H1150050-01

Installation

Installation is in the reverse order of removal. Pay attention to the following point:

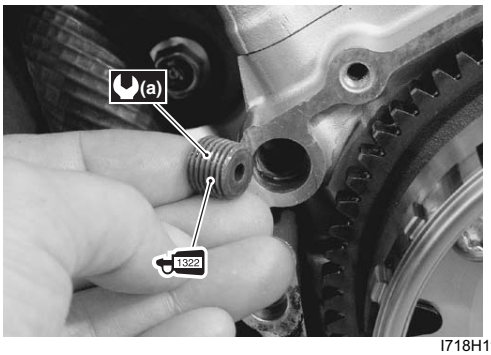
- Apply THREAD LOCK to the oil gallery jet and tighten it to the specified torque.

NOTE

After tighten the jet, make sure that the jet end is flush with the cover mating surface.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Oil gallery jet (a): 22 N·m (2.2 kgf-m, 16.0 lb-ft)



I718H1150051-02

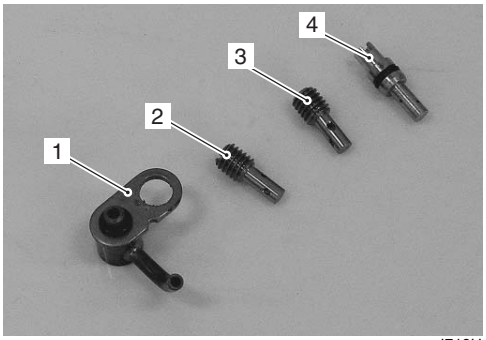
Oil Jet / Oil Gallery Jet Inspection

B718H11506020

Refer to “Oil Jet Removal and Installation (Page 1E-8)”.
Refer to “Oil Gallery Jet Removal and Installation (Page 1E-10)”.

Oil Jet

Make sure that the oil jets are not clogged. If they are clogged, clean their oil passage using a wire of the proper size and compressed air.



I718H1150052-01

1.	Piston cooling jet
2.	Oil jet (#14) (For cylinder head)
3.	Oil jet (#18) (For transmission)
4.	Oil jet (#8) (For can chain tension adjuster)

Oil Gallery Jet

Inspect the oil gallery jet for clogging. Clean the oil gallery if necessary.

I718H1150053-01

Oil Pump Removal and Installation

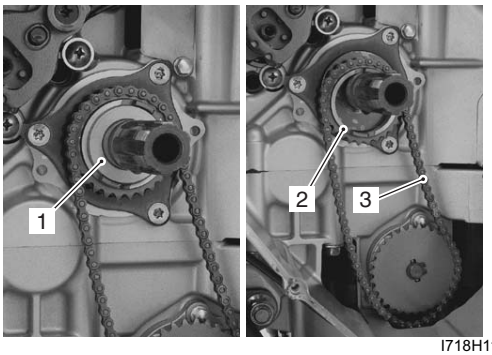
B718H11506016

NOTE

Do not drop the each parts into the crankcase.

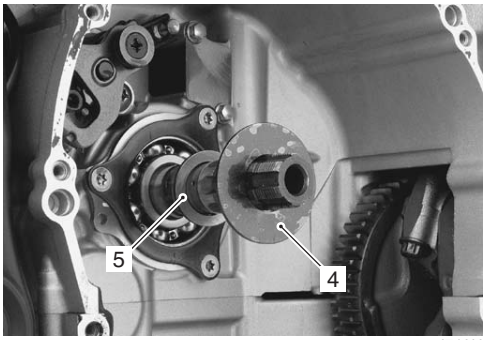
Removal

1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
2) Remove the clutch. Refer to “Clutch Removal in Section 5C (Page 5C-13)”.
3) Remove the spacer (1).
4) Remove the oil pump drive sprocket (2) and chain (3).



I718H1150054-01

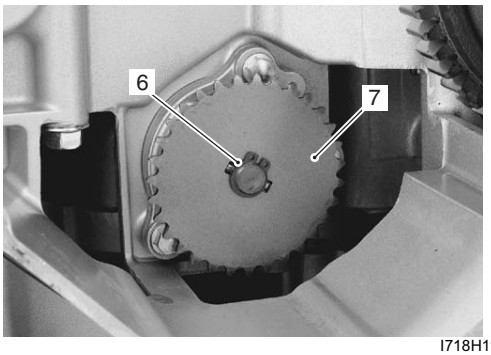
5) Remove the thrust washer (4) and washer (5).



I718H1150056-01

6) Remove the snap ring (6) and oil pump driven gear (7).

Special tool
TOOL : 09900–06107 (Snap ring pliers)



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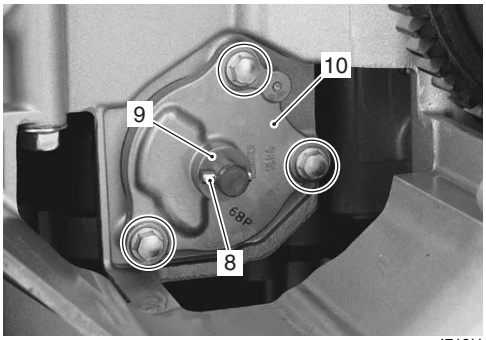
7) Remove the pin (8) and washer (9).
8) Remove the oil pump (10).



I718H1150057-01

Installation

Installation is in reverse order of removal.
Pay attention to the following points:

- Apply SUZUKI SUPER GREASE to the O-ring.

⚠ CAUTION

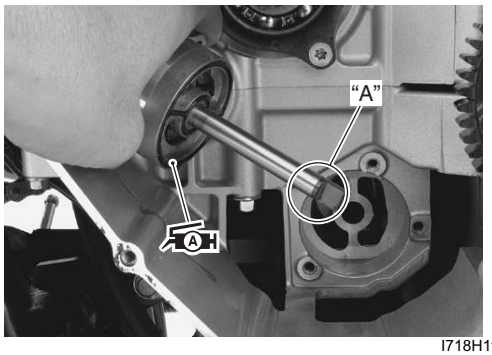
Use a new O-ring to prevent oil leakage.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

- Install the oil pump.

NOTE

Set the oil pump shaft end “A” to the water pump shaft.



I718H1150058-01

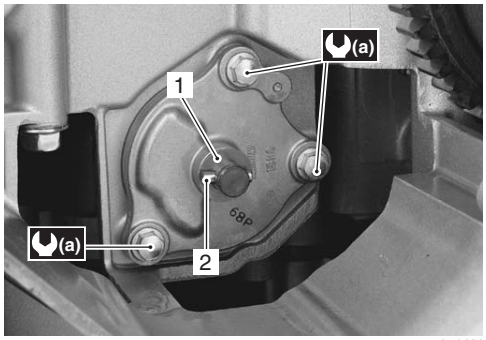
- Tighten the oil pump mounting bolts to the specified torque.

Tightening torque
Oil pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

- Install the washer (1) and pin (2).

NOTE

Be careful not to drop the washer (1) and pin (2) into the crankcase.



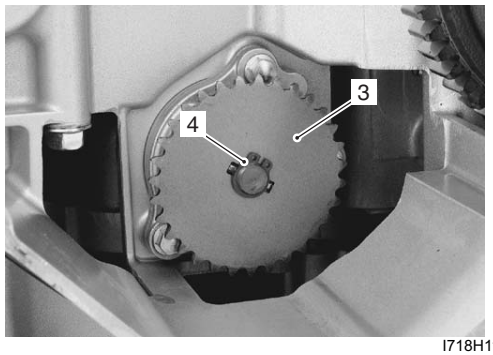
I718H1150059-01

- Install the oil pump driven gear (3) and snap ring (4).

⚠ CAUTION

Never reuse a snap ring.

Special tool
TOOL : 09900–06107 (Snap ring pliers)

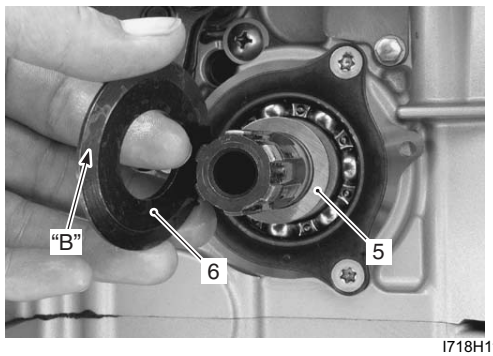


I718H1150060-01

- Install the washer (5) and thrust washer (6) onto the countershaft.

NOTE

The chamfer side “B” of thrust washer faces inside.



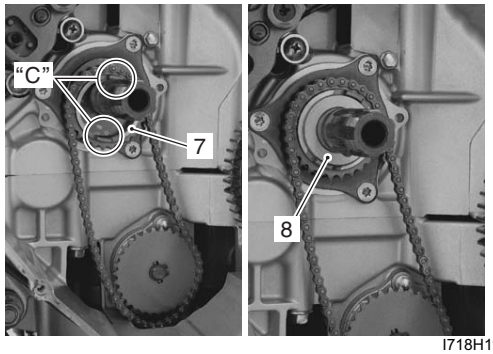
I718H1150061-01

- Install the oil pump drive sprocket (7) to the countershaft.

NOTE

Teeth “C” on the sprocket must face the clutch side.

- Pass the chain between the oil pump drive and driven sprockets.
- Install the spacer (8).



I718H1150062-01

- Reinstall the clutch. Refer to “Clutch Installation in Section 5C (Page 5C-14)”.

Oil Pump Inspection

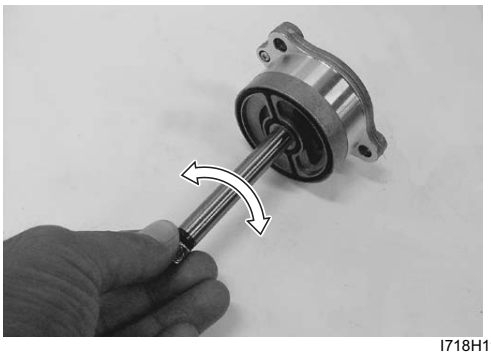
B718H11506014

Inspect the oil pump in the following procedures:

1) Remove the oil pump. Refer to “Oil Pump Removal and Installation (Page 1E-11)”.
2) Rotate the oil pump by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.

⚠ CAUTION

Do not attempt to disassemble the oil pump assembly.
The oil pump is available only as an assembly.



I718H1150063-01

3) Install the oil pump. Refer to “Oil Pump Removal and Installation (Page 1E-11)”.

Specifications

Service Data

B718H11507001

Oil Pump

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	100 – 400 kPa (1.0 – 4.0 kgf/cm^2, 14 – 57 psi) at 3 000 r/min	—

Oil

Item	Specification		Note
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 500 ml (3.7/3.1 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	

Tightening Torque Specifications

B718H11507002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Main Oil gallery plug (M16)	35	3.5	25.5	☞(Page 1E-4)
Oil gallery plug (M12)	15	1.5	11.0	☞(Page 1E-5)
Oil cooler union bolt	70	7.0	50.5	☞(Page 1E-7)
Oil pressure switch	14	1.4	10.0	☞(Page 1E-8)
Oil pressure switch lead wire bolt	1.5	0.15	1.1	☞(Page 1E-8)
Piston cooling oil jet bolt	10	1.0	7.0	☞(Page 1E-10)
Oil gallery jet	22	2.2	16.0	☞(Page 1E-10)
Oil pump mounting bolt	10	1.0	7.0	☞(Page 1E-12)

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

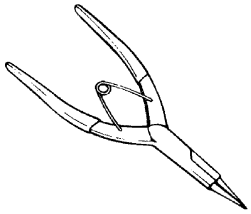
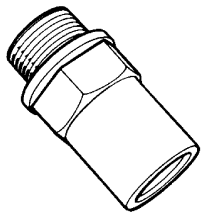
Recommended Service Material

B718H11508001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1E-5) / ☞(Page 1E-7) / ☞(Page 1E-11)
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000–31110	☞(Page 1E-6)
	SUZUKI Bond 1207B or equivalent	P/No.: 99000–31140	☞(Page 1E-8)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 1E-10) / ☞(Page 1E-10)

Special Tool

B718H11508002

09900–06107 Snap ring pliers ☞(Page 1E-11) / ☞(Page 1E-12)		09915–74521 Oil pressure gauge hose ☞(Page 1E-3)	
09915–74540 Oil pressure gauge attachment ☞(Page 1E-3)		09915–77331 Meter (for high pressure) ☞(Page 1E-3)	

Engine Cooling System

Precautions

Precautions for Engine Cooling System

B718H11600001

⚠ WARNING

- **You can be injured by boiling fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.**
- **The engine must be cool before servicing the cooling system.**
- **Coolant is harmful:**
  - **If it comes in contact with skin or eyes, flush with water.**
  - **If swallowed accidentally, induce vomiting and call physician immediately.**
  - **Keep it away from children.**

Precautions for Engine Coolant

B718H11600002

Refer to “Engine Coolant Recommendation in Section 0A (Page 0A-5)”.

General Description

Engine Coolant Description

B718H11601001

⚠ CAUTION

- **Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.**
- **Do not put in more than 60% anti-freeze or less than 50%. (Refer to Fig. 1 and 2.)**

At the time of manufacture, the cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol anti-freeze. This 50:50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above –31 °C (–24 °F).
If the vehicle is to be exposed to temperatures below –31 °C (–24 °F), this mixing ratio should be increased up to 55% or 60% according to the figure.

Anti-freeze Proportioning Chart

Anti-freeze density	Freezing point
50%	–31 °C (–24 °F)
55%	–40 °C (–40 °F)
60%	–55 °C (–67 °F)

Fig.1: Engine coolant density-freezing point curve

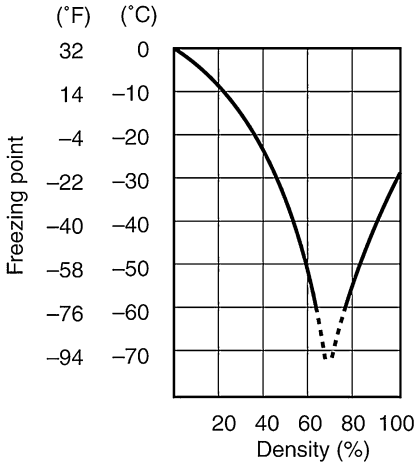


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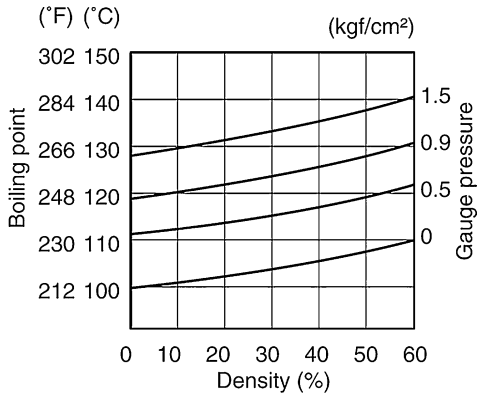
Fig.2: Engine coolant density-boiling point curve



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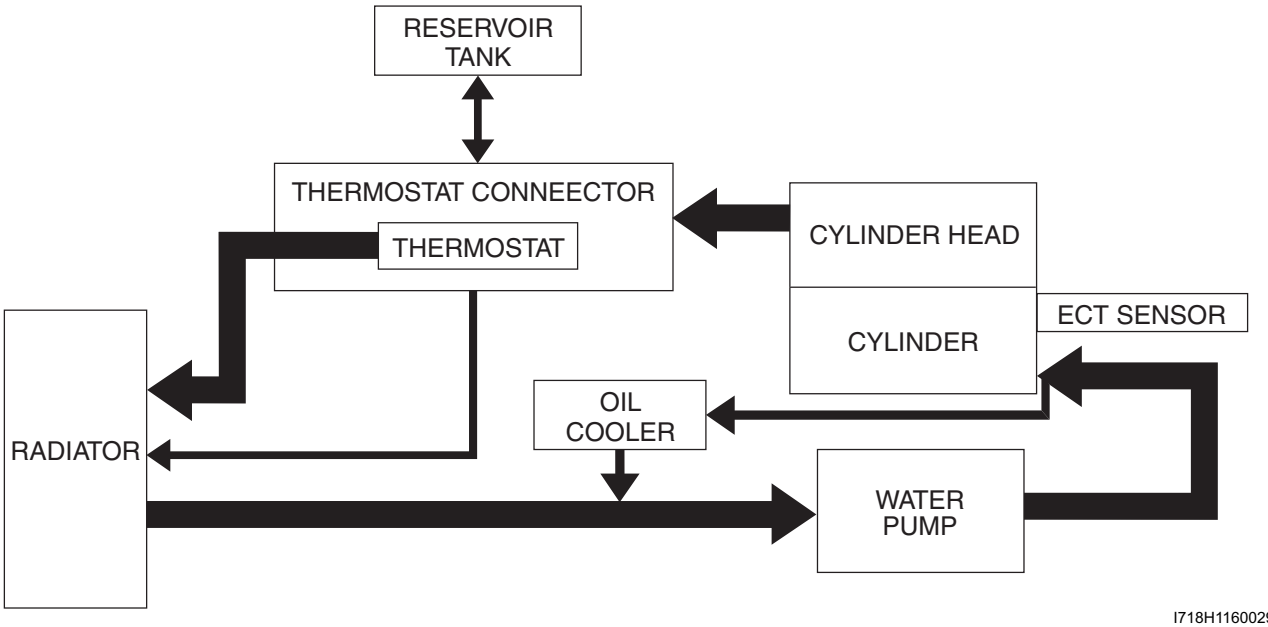
Schematic and Routing Diagram

Cooling Circuit Diagram

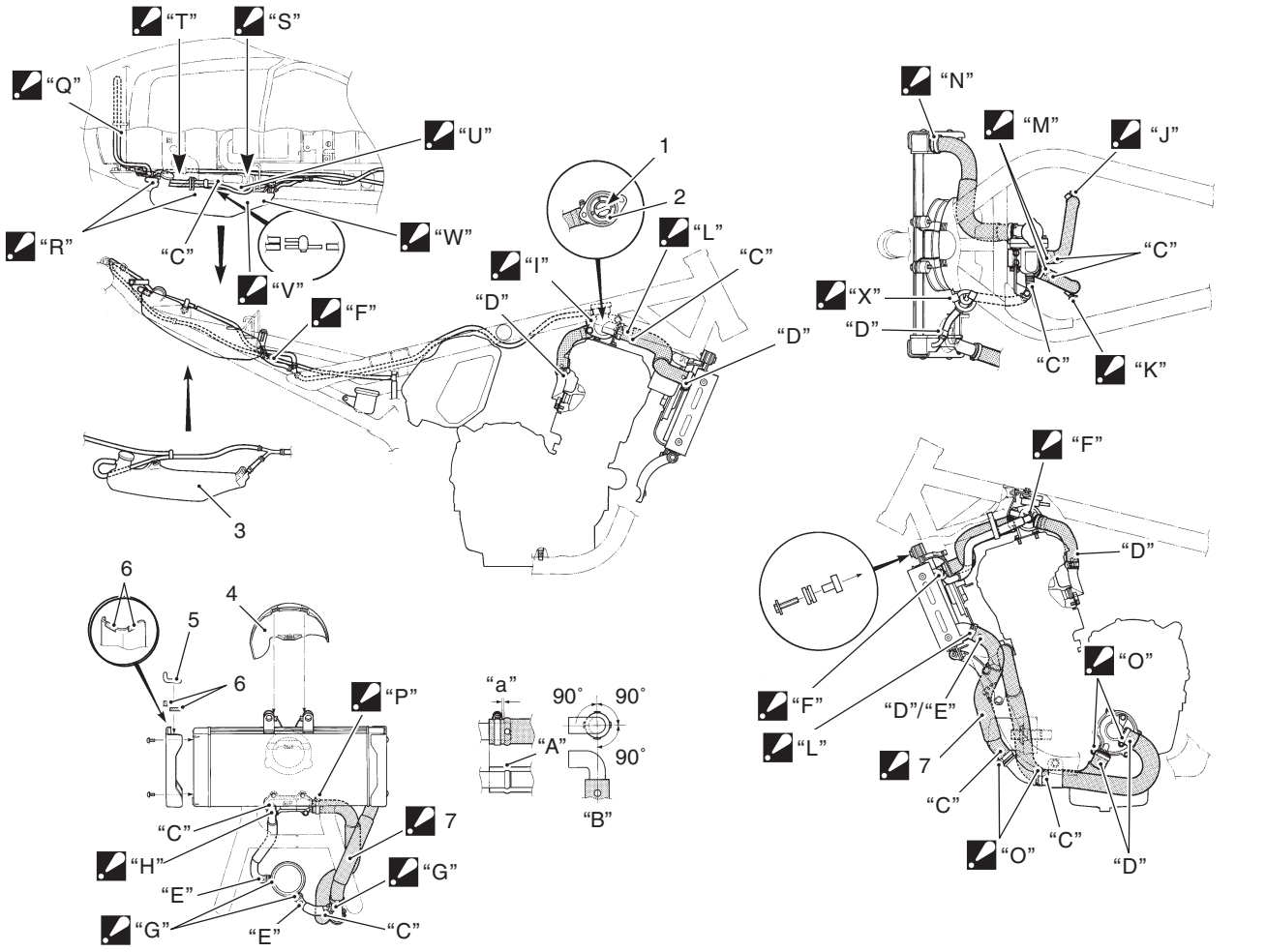
B718H11602004



I718H1160029-03

Water Hose Routing Diagram

B718H11602005



I718H1160068-03

1. Jiggle valve	"J": The clamp screw head should face right backward.
2. Thermostat	"K": The clamp screw head should face left backward.
3. Reservoir tank	"L": The clamp screw head should face upward.
4. Radiator heat shield	"M": The clamp screw head should face left upward.
5. Radiator cover molding (GSF1250/A only)	"N": The clamp screw head should face right side.
6. Tape (GSF1250/A only)	"O": The clamp screw head should face left side.
7: Radiator outlet hose : Check that there is at least 20 mm (0.8 in) of clearance between the radiator outlet hose and the exhaust pipe.	"P": The clamp screw head should face forward.
"A": Match mark	"Q": Clamp the hose on yellow marking with the tail lamp harness.
"B": Marking position	"R": Clamp the hose on white marking.
"C": White marking	"S": Pass through the hose under the wiring harness.
"D": Yellow marking	"T": Pass through the hose under the seat lock plate.
"E": Red marking	"U": Be careful not to pinch the hose between seat cushion and fender.
"F": The end of the clamp should face upward.	"V": Pass through the hose between frame and reservoir tank. Be careful for the hose not to be slackened.
"G": The end of the clamp should face forward.	"W": Pass through the hose under the helmet holder.
"H": The end of the clamp should face right side.	"X": Clamp the hose with the fan motor lead wire. Be careful not to insert the coupler to the radiator heat shield hole.
"I": The end of the clamp should face left side.	"a": Clearance

Diagnostic Information and Procedures

Engine Cooling Symptom Diagnosis

B718H11604001

Condition	Possible cause	Correction / Reference Item
Engine overheats	Not enough engine coolant.	*Add engine coolant.*
	Radiator core clogged with dirt or scale.	*Clean.*
	Faulty cooling fan.	*Repair or replace.*
	Defective cooling fan relay, or open-or-short circuited.	*Repair or replace*
	Clogged water passage.	*Clean.*
	Air trapped in the cooling circuit.	*Bleed air.*
	Defective water pump.	*Replace.*
	Use of incorrect engine coolant.	*Replace.*
	Defective thermostat.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Damaged ISC valve.	*Replace.*
	ISC bad learning.	*Reset learned value.*
Engine over cools	Defective cooling fan relay, or open-or-short circuited.	*Repair or replace*
	Extremely cold weather.	*Put on radiator cover.*
	Defective thermostat.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective ECM	*Replace.*

Repair Instructions

Cooling Circuit Inspection

B718H11606012

⚠ WARNING

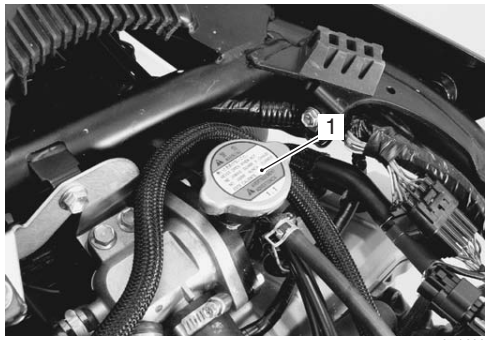
- **Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.**
- **When removing the radiator cap tester, put a rag on the filler to prevent the engine coolant from spraying out.**

Inspect the cooling circuit in the following procedures:

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Remove the radiator cap (1) and connect the radiator tester (2) to the filler.
3) Pressurize the cooling system with 120 kPa (1.2 kgf/cm, 17 psi) of pressure, and then check if it holds the pressure for 10 seconds.

⚠ CAUTION

Do not exceed the radiator cap release pressure, or the radiator cap and subsequently the radiator, can be damaged.



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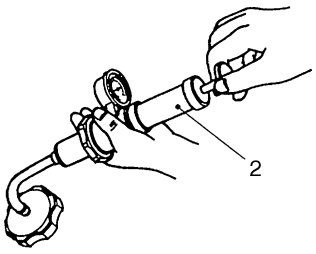


I705H1160004-01

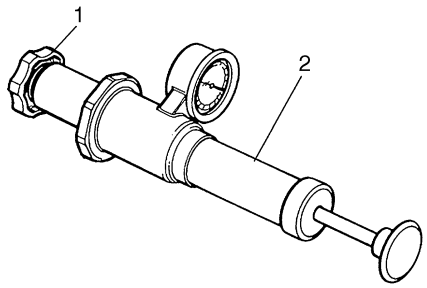
4) After finishing the cooling circuit inspection, reinstall the removed parts.

Radiator Cap Inspection

B718H11606013

Inspect the radiator cap in the following procedures:

1) Remove the radiator cap. Refer to “Cooling Circuit Inspection (Page 1F-4)”.
2) Attach the radiator cap (1) to the radiator tester (2) as shown.



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3) Slowly apply pressure to the radiator cap.
   If the radiator cap does not hold the pressure for at least 10 seconds, replace it with a new one.

   Radiator cap release pressure
   93 – 123 kPa (0.93 – 1.23 kgf/cm^2, 13.2 – 17.5 psi)

4) After finishing the radiator cap inspection, reinstall the removed parts.

Radiator Inspection and Cleaning

B718H11606015

Radiator Hose

Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.

Radiator

Inspect the radiator for water leaks. If any defects are found, replace the radiator with a new one.
If the fins are bent or dented, repair them by carefully straightening them with the blade of a small screwdriver.

I718H1160001-01

Radiator Cleaning

Blow out any foreign matter that is stuck in the radiator fins using compressed air.

⚠ CAUTION

- **Make sure not to bend the fins when using compressed air.**
- **Always apply compressed air from the engine side of engine. If compressed air is applied from the front side, dirt will be forced into the pores of radiator.**

I718H1160002-01

Radiator / Cooling Fan Motor Removal and Installation

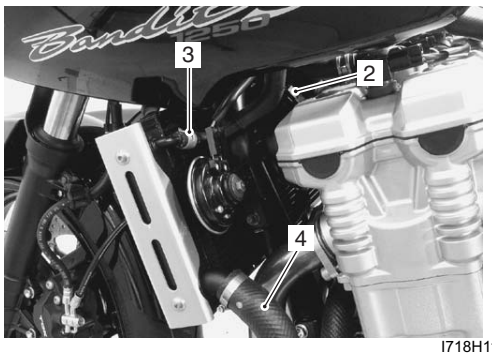
B718H11606014

Removal

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
3) Disconnect the radiator inlet hose (1).

I718H1160028-01

4) Disconnect the cooling fan motor coupler (2), water bypass hose (3) and radiator outlet hose (4).



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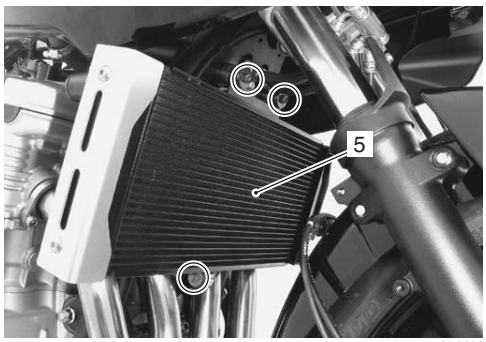
5) Remove the radiator assembly (5) by removing the bolts.



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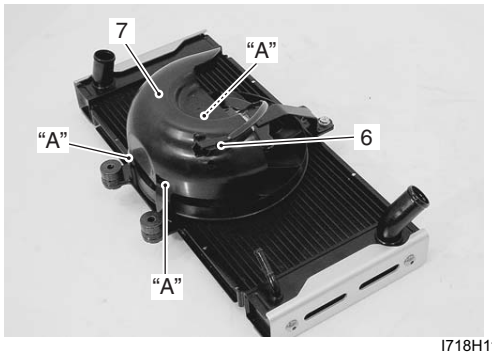
6) Unhook the coupler (6) and remove the radiator heat shield (7).



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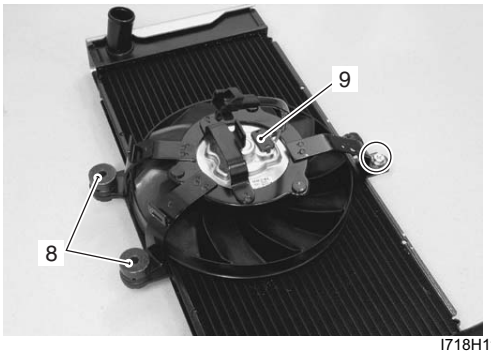
"A": Hooked point

7) Remove the spacers (8) and mounting bolt.

8) Remove the cooling fan motor from the radiator (9).



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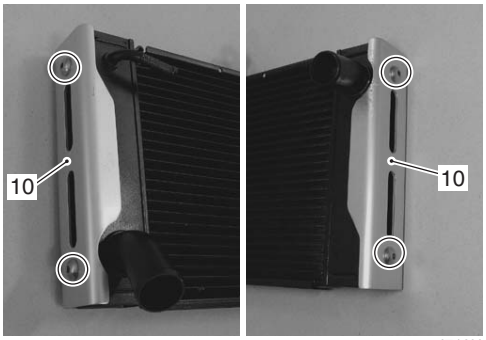
9) Remove the radiator covers (10), left and right.



I718H1160038-01

Installation

Install the radiator in the reverse order of removal. Pay attention to the following points:

- Connect the radiator hoses securely. Refer to "Water Hose Routing Diagram (Page 1F-3)".
- Pour engine coolant. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".

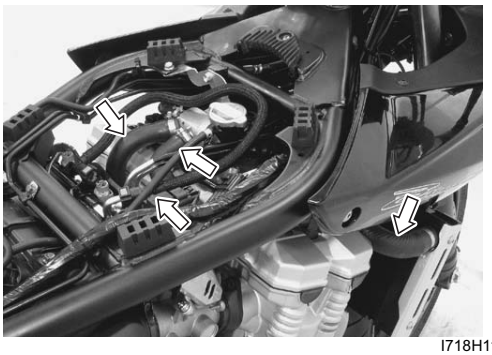
Water Hose Inspection

B718H11606031

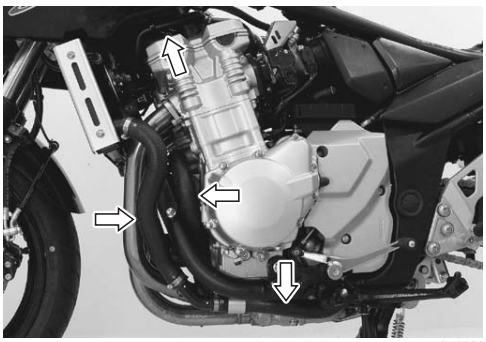
Inspect the water hoses in the following procedures:

1) Remove the seat, right frame cover and fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
2) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.

3) Any leakage from the connecting section should be corrected by proper tightening. Refer to “Water Hose Routing Diagram (Page 1F-3)”.

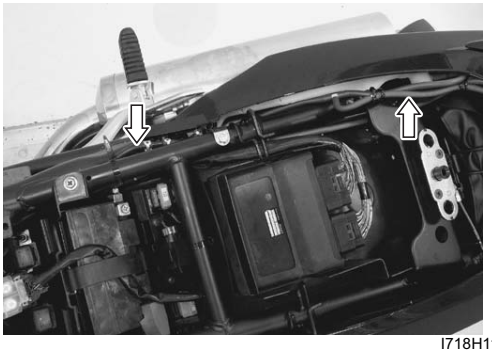


I718H1160039-02



I718H1160040-01

I718H1160041-02



I718H1160042-01

4) After finishing the water hose inspection, reinstall the removed parts.

Water Hose Removal and Installation

B718H11606016

Removal

1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Remove the water hose as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.

Installation

1) Install the water hose as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.

NOTE

Check that there is at least 20 mm of clearance shown as “a” between the radiator outlet hose and the exhaust pipe.

I718H1160063-02

2) Pour engine coolant and bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
3) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.

Radiator Reservoir Tank Inspection

B718H11606018

Inspect the radiator reservoir tank in the following procedures:

1) Remove the seat tail cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

2) Inspect the radiator reservoir tank cooling leaks. If any defects are found, replace the radiator reservoir tank with a new one.

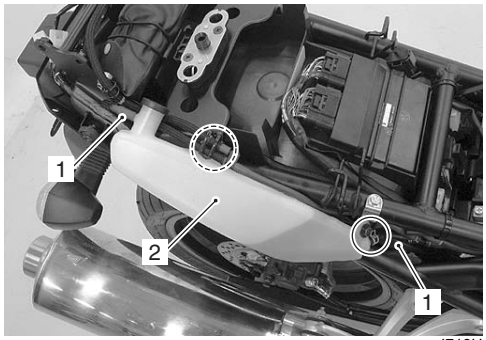
I718H1160065-01

Radiator Reservoir Tank Removal and Installation

B718H11606017

Removal

1) Remove the seat tail cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the reservoir tank bolts.
3) Disconnect the hoses (1) and drain the engine coolant.
4) Remove the reservoir tank (2).



I718H1160066-01

Installation

Install radiator reservoir tank in the reverse order of removal. Pay attention to the following points:

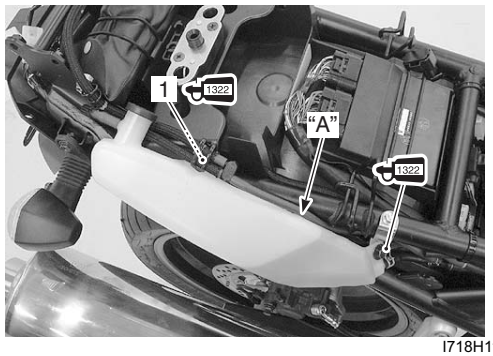
- Apply thread lock to the reservoir tank mounting bolts and tighten them.

NOTE

Fit the clamp to bolt (1).

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

- Fill the reservoir tank to the upper level “A”. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.



I718H1160067-01

“A”: Upper level

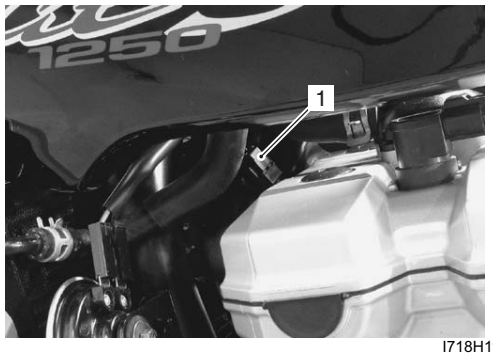
Cooling Fan Inspection

B718H11606019

Cooling fan operating temperature
Standard
(ON→OFF): Approx. 100 °C (212 °F)
(OFF→ON): Approx. 105 °C (221 °F)

Inspect the cooling fan in the following procedures:

1) Disconnect the cooling fan motor coupler (1).

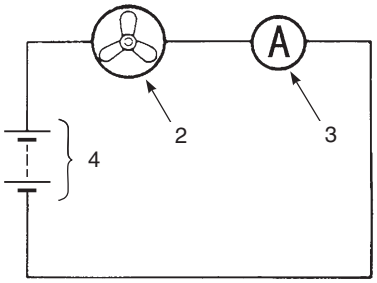


I718H1160047-01

2) Test the cooling fan motor for load current with an ammeter connected as shown in the figure.
If the fan motor does not turn, replace the cooling fan assembly with a new one. Refer to “Radiator / Cooling Fan Motor Removal and Installation (Page 1F-5)”.

NOTE

- **When making this test, it is not necessary to remove the cooling fan.**
- **The voltmeter is for making sure that the battery applies 12 V to the motor. With the fan motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 A.**



I718H1160048-01

2. Fan motor	3. Ammeter	4. Battery

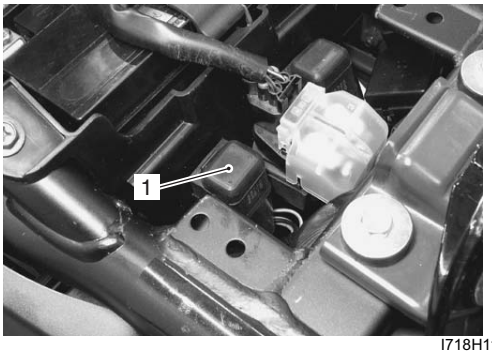
3) Connect the cooling fan motor coupler.

Cooling Fan Relay Inspection

B718H11606021

Inspect the fan relay in the following procedures:

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the cooling fan relay (1).

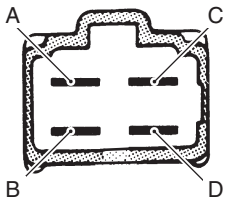


I718H1160005-01

3) First check the insulation between “A” and “B” terminals with tester. Then apply 12 volts to “C” and “D” terminals, (+) to “C” and (–) to “D”, and check the continuity between “A” and “B”.
If there is no continuity, replace it with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication set
Continuity test (•))))



I718H1160006-02

4) Reinstall the removed parts.

ECT Sensor Removal and Installation

B718H11606022

Refer to “ECT Sensor Removal and Installation in Section 1C (Page 1C-2)”.

ECT Sensor Inspection

B718H11606023

Refer to “ECT Sensor Inspection in Section 1C (Page 1C-3)”.

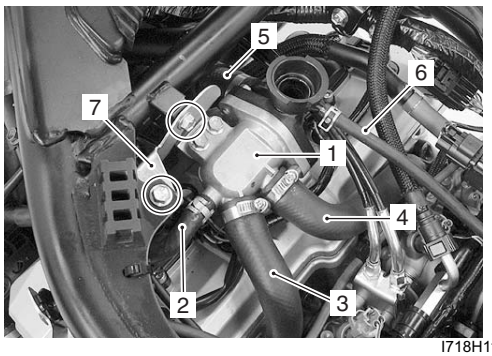
Thermostat Connector / Thermostat Removal and Installation

B718H11606024

Removal

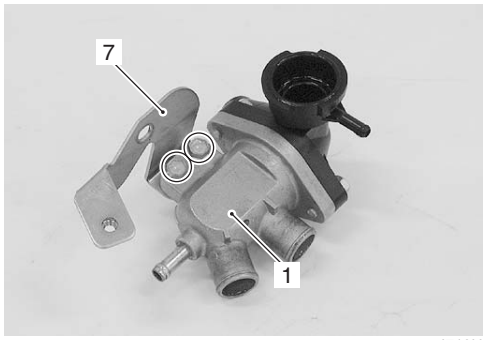
1) Drain a small amount of engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Remove the thermostat connector bracket bolts.
4) Disconnect the following parts from the thermostat connector (1).
   - Water bypass hose (2)
   - Cylinder outlet left hose (3)
   - Cylinder outlet right hose (4)
   - Radiator inlet hose (5)
   - Reservoir tank inlet hose (6)

5) Remove the thermostat connector (1) along with bracket (7).



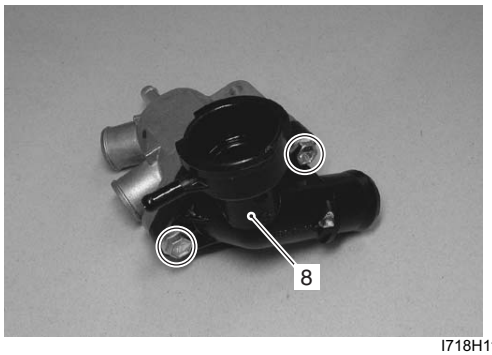
I718H1160004-02

6) Remove the bracket (7) from the thermostat connector (1).



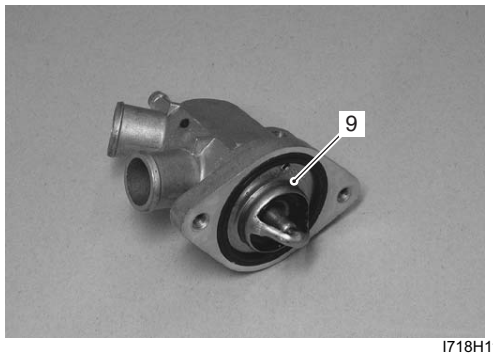
I718H1160060-01

7) Remove the connector cap (8).



I718H1160049-01

8) Remove the thermostat (9).



I718H1160050-01

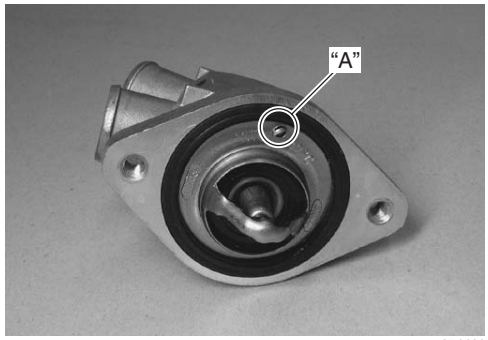
Installation

Install the thermostat in the reverse order of removal. Pay attention to the following points:

- Install the thermostat.

NOTE

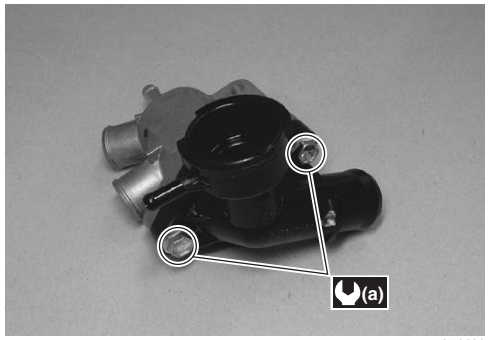
The jiggle valve “A” of the thermostat faces upside.



I718H1160007-01

- Tighten the thermostat connector bolts to the specified torque.

Tightening torque
Thermostat connector bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1160069-01

- Connect the water hoses securely. Refer to “Water Hose Routing Diagram (Page 1F-3)”.
- Pour engine coolant and bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.

Thermostat Inspection

B718H11606025

Inspect the thermostat in the following procedures:

1) Remove the thermostat. Refer to “Thermostat Connector / Thermostat Removal and Installation (Page 1F-9)”.
2) Inspect the thermostat pellet for signs of cracking.

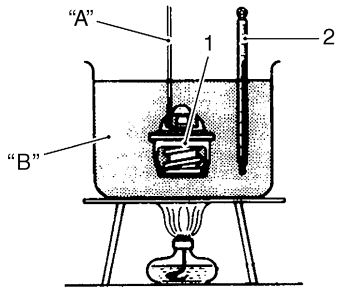
I718H1160051-01

3) Test the thermostat at the bench for control action.

⚠ CAUTION

- **Do not contact the thermostat (1) and the column thermometer (2) with a pan.**
- **As the thermostat operating response to water temperature change is gradual, do not raise water temperature too quickly.**
- **The thermostat with its valve open even slightly under normal temperature must be replaced.**

4) Immerse the thermostat (1) in the water contained in a beaker and note that the immersed thermostat is in suspension.
5) Heat the water by placing the beaker on a stove and observe the rising temperature on a thermometer (2).



I705H1160030-03

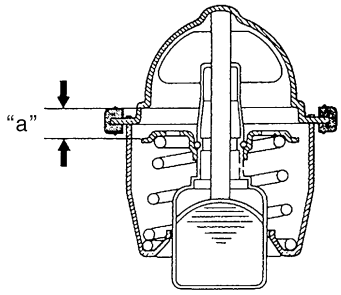
“A”: String	“B”: Water

6) Read the thermometer just when opening the thermostat. If this reading, which is the temperature level at which the thermostat valve begins to open, is out of the standard value, replace the thermostat with a new one.

Thermostat valve opening temperature
Standard: Approx. 82 °C (180 °F)

7) Keep on heating the water to raise its temperature.
8) Just when the water temperature reaches specified value, the thermostat valve should have been lifted by at least 8 mm (0.31 in). A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

Thermostat valve lift “a”
Standard: 8 mm and over at 95 °C (0.31 in and over at 203 °F)

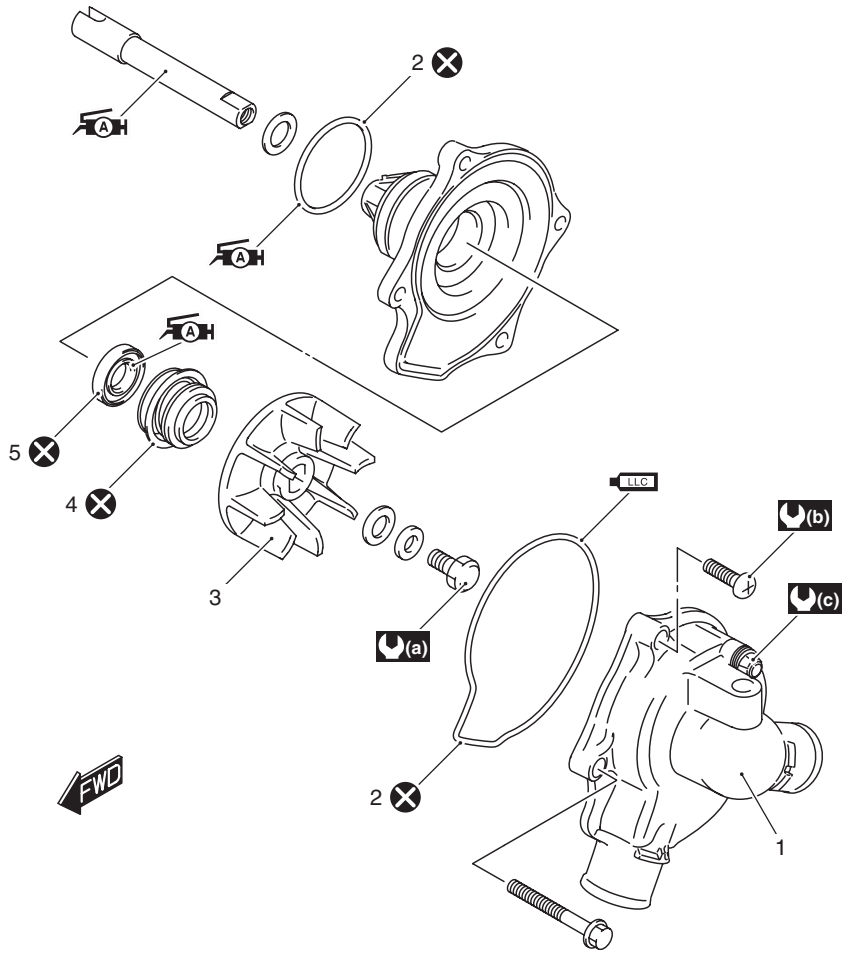


I705H1160031-04

9) Install the thermostat. Refer to “Thermostat Connector / Thermostat Removal and Installation (Page 1F-9)”.

Water pump Components

B718H11606026

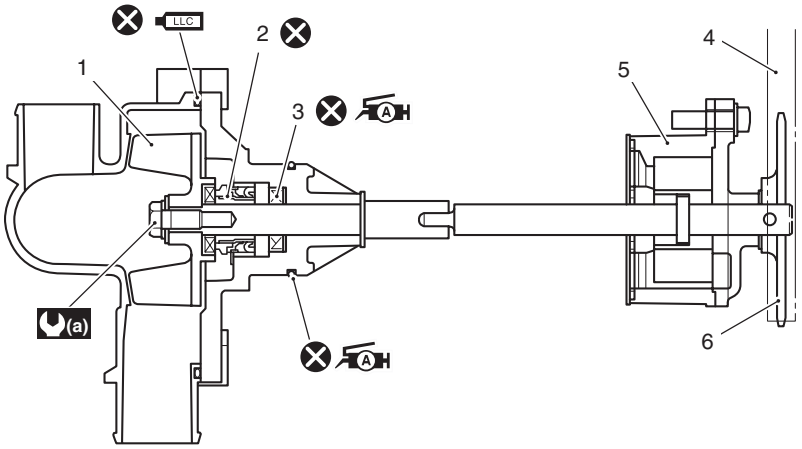


I718H1160062-01

1. Water pump case	4. Mechanical seal	(b) : 6 N·m (0.6 kgf-n, 4.5 lb-ft)	LLC : Apply engine coolant.
2. O-ring	5. Oil seal	(c) : 13 N·m (1.3 kgf-n, 9.5 lb-ft)	: Do not reuse.
3. Impeller	(a) : 8 N·m (0.8 kgf-n, 6.0 lb-ft)	A : Apply grease.	

Water Pump Construction

B718H11606027



I718H1160052-02

1. Impeller	4. Oil pump drive chain	(a) : 8 N·m (0.8 kgf-n, 6.0 lb-ft)	: Do not reuse.
2. Mechanical seal	5. Oil pump	A : Apply grease.	
3. Oil seal	6. Oil pump driven sprocket	LLC : Apply engine coolant.	

Water Pump Removal and Installation

B718H11606028

Removal

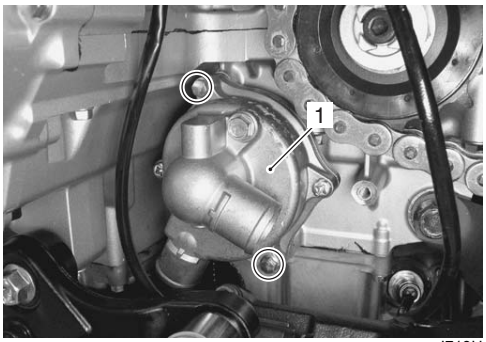
NOTE

Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal washer. Refer to "Water Pump Related Parts Inspection (Page 1F-17)".

1) Drain engine oil and coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
2) Remove the engine sprocket covers, outer and inner. Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)".
3) Disconnect the water pump inlet hose (1).

I718H1160011-01

4) Remove the water pump (1).



I718H1160008-01

Installation

Install the water pump in the reverse order of removal. Pay attention to the following points:

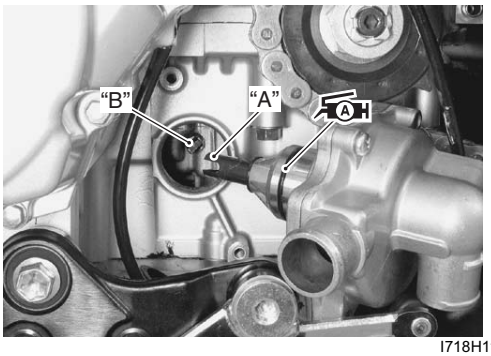
- Apply grease to the O-ring.

⚠ CAUTION

Replace the O-ring with the a new one.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

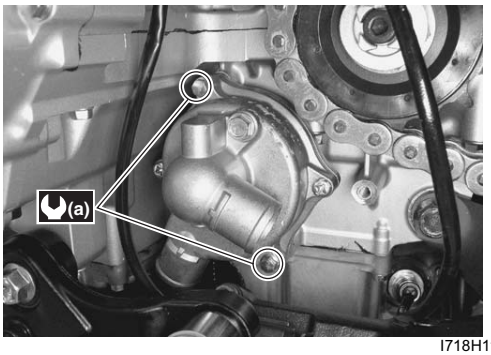
- Install the water pump assembly with the slot on the pump shaft end "A" securely engaged with the flat "B" on the oil pump shaft.



I718H1160053-01

- Tighten the water pump mounting bolts to the specified torque.

Tightening torque
Water pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1160071-01

- Connect the water hoses securely. Refer to "Water Hose Routing Diagram (Page 1F-3)".
- Pour engine oil and coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".

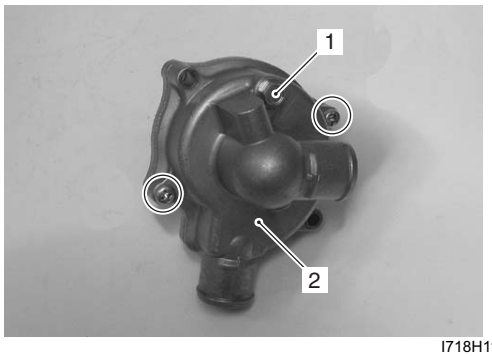
Water Pump Disassembly and Assembly

B718H11606029

Refer to “Water Pump Removal and Installation (Page 1F-13)”.

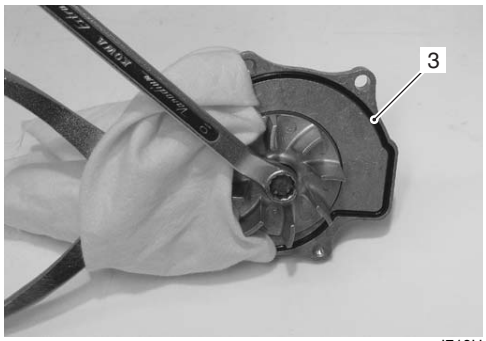
Disassembly

1) Remove the air vent bolt (1) if necessary.
2) Remove the water pump case (2).



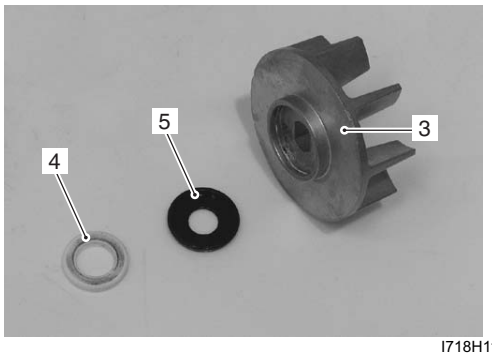
I718H1160054-01

3) Remove the O-ring (3).
4) Remove the impeller securing bolt by holding the impeller with a water pump pliers.



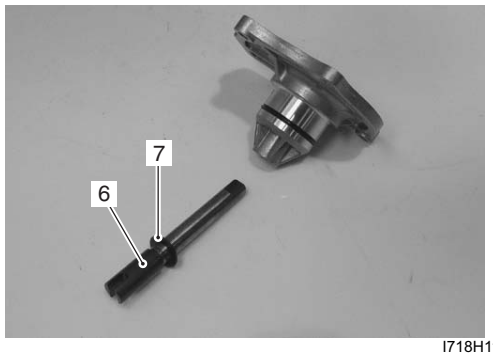
I718H1160012-01

5) Remove the mechanical seal ring (4) and rubber seal (5) from the impeller (3).



I718H1160013-01

6) Remove the impeller shaft (6) and washer (7).



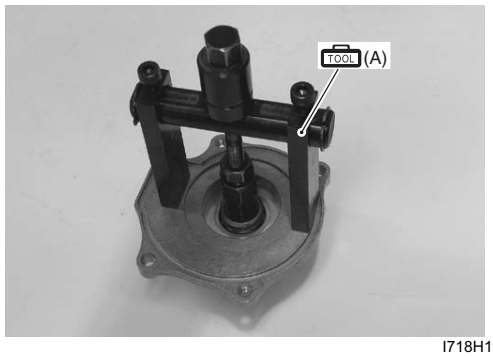
I718H1160014-01

7) Remove the mechanical seal with the special tool.

NOTE

If there is no abnormal condition, the mechanical seal removal is not necessary.

Special tool
TOOL (A): 09921–20240 (Bearing remover set)



I718H1160055-01

8) Remove the oil seal.

NOTE

If there is no abnormal condition, the oil seal removal is not necessary.

I718H1160016-01

Assembly

1) Install the oil seal with the special tool.

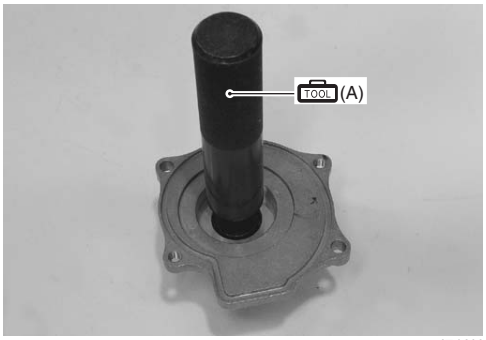
⚠ CAUTION

Replace the oil seal with a new one.

NOTE

The stamped mark on the oil seal should face mechanical seal side.

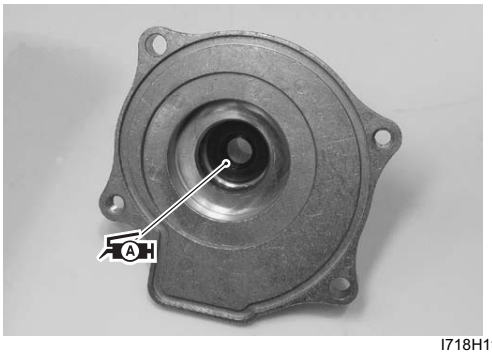
Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I718H1160056-01

2) Apply a small quantity of the SUPER GREASE to the oil seal lip.

A H : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1160057-01

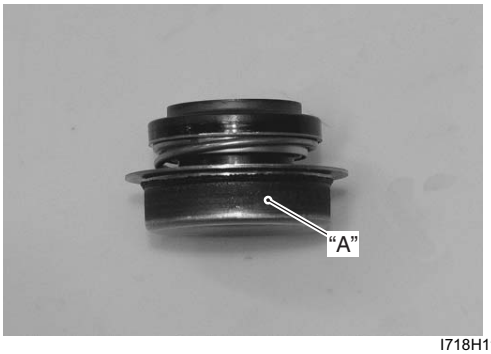
3) Install a new mechanical seal using a suitable size socket wrench.

⚠ CAUTION

Replace the mechanical seal with a new one.

NOTE

On the new mechanical seal, the sealer "A" has been applied.



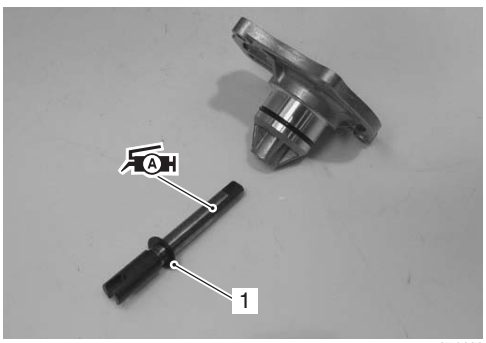
I718H1160058-01

I718H1160059-01

4) Apply SUZUKI SUPER GREASE to the impeller shaft.

A H : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

5) Install the impeller shaft and washer (1) to the water pump body.

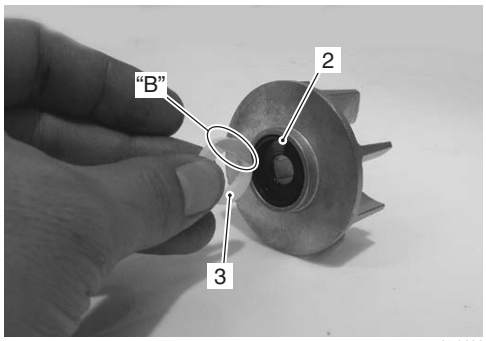


I718H1160017-01

6) Install the rubber seal (2) into the impeller.
7) After wiping off the oily or greasy matter from the mechanical seal ring (3), install it into the impeller.

NOTE

The paint marked side "B" of mechanical seal ring faces the rubber seal.

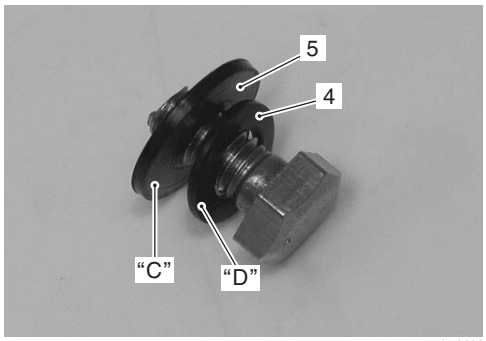


I718H1160018-01

8) Install the washer (4) and seal washer (5) onto the impeller securing bolt.

NOTE

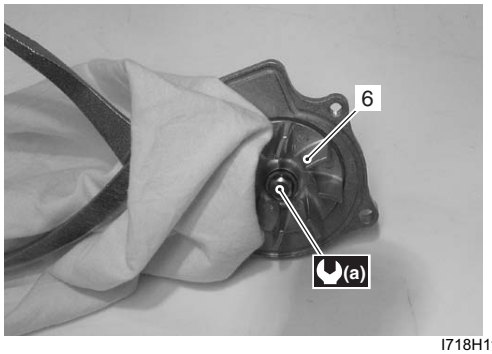
The metal side "C" of seal washer and the curved side "D" of washer face the impeller securing bolt head.



I718H1160019-02

9) Install the impeller (6) and tighten the impeller securing bolt to the specified torque.

Tightening torque
Impeller securing bolt (a): 8 N·m (0.8 kgf-m, 6.0 lb-ft)

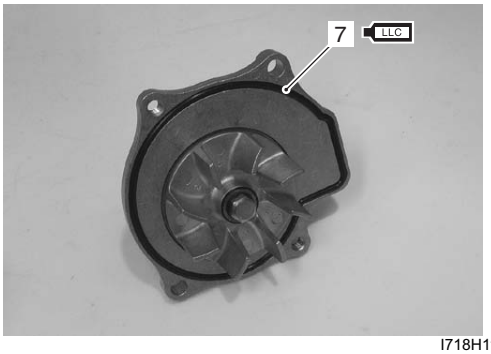


I718H1160021-02

10) Install a new O-ring (7) and apply engine coolant to it.

⚠ CAUTION

Use a new O-ring to prevent engine coolant leakage.



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11) Fit the water pump case and tighten the water pump case screws to the specified torque.

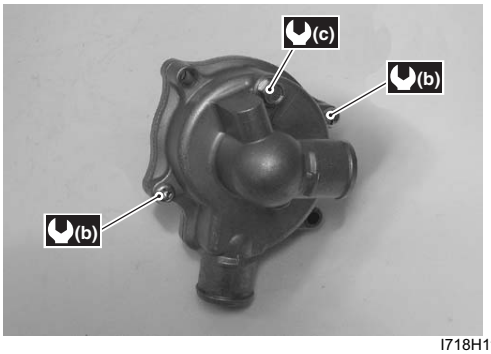
Tightening torque
Water pump case screw (b): 6 N·m (0.6 kgf-m, 4.5 lb-ft)

12) Tighten the water pump air vent bolt to the specified torque.

⚠ CAUTION

Use a new gasket washer to prevent engine coolant leakage.

Tightening torque
Water pump air vent bolt (c): 13 N·m (1.3 kgf-m, 9.5 lb-ft)



I718H1160025-01

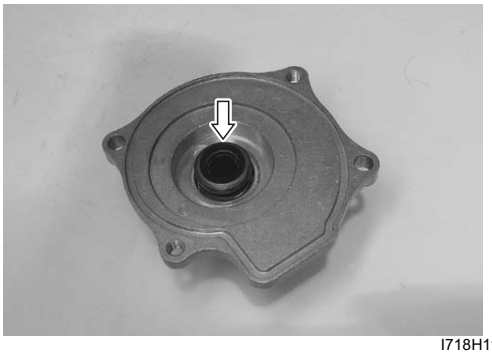
Water Pump Related Parts Inspection

B718H11606030

Refer to “Water Pump Disassembly and Assembly (Page 1F-14)”.

Mechanical Seal

Visually inspect the mechanical seal for damage, with particular attention given to the sealing face.
Replace the mechanical seal that shows indications of leakage.



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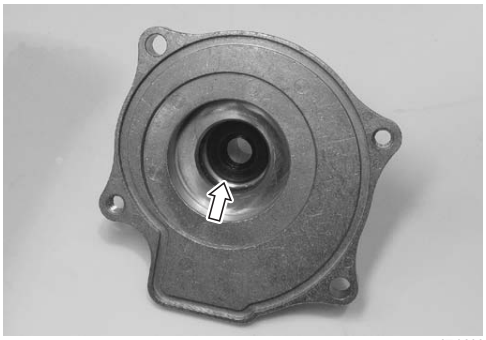
Oil Seal

Visually inspect the oil seal for damage, with particular attention given to the lip.
Replace the oil seal that shows indications of leakage.



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Seal Washer

Visually inspect the seal washer for damage, with particular attention given to the sealing face.
Replace the seal washer that shows indications of leakage.

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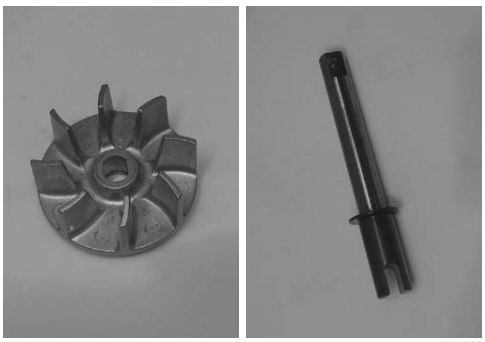
Impeller / Shaft

Visually inspect the impeller and its shaft for damage.
Replace the impeller or shaft if necessary.



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Impeller Shaft Journal

Visually inspect the journal for damage or scratch.
Replace the water pump body if necessary.

I718H1160027-01

Specifications

Service Data

B718H11607001

Thermostat + Radiator + Fan + Coolant

Item	Specification		Note
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		—
Thermostat valve lift	8 mm (0.31 in) and over at 95 °C (203 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	50 °C (122 °F)	Approx. 0.811 kΩ	—
	80 °C (176 °F)	Approx. 0.318 kΩ	—
	110 °C (230 °F)	Approx. 0.142 kΩ	—
Radiator cap valve opening pressure	93 – 123 kPa (0.93 – 1.23 kgf/cm^2, 13.2 – 17.5 psi)		—
Cooling fan operating temperature	OFF→ON	Approx. 105 °C (221 °F)	—
	ON→OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant	Reserve tank side	Approx. 250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	Approx. 3 000 ml (3.2/2.6 US/Imp qt)	—

Tightening Torque Specifications

B718H11607002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Thermostat connector bolt	10	1.0	7.0	☞(Page 1F-10)
Water pump mounting bolt	10	1.0	7.0	☞(Page 1F-13)
Impeller securing bolt	8	0.8	6.0	☞(Page 1F-16)
Water pump case screw	6	0.6	4.5	☞(Page 1F-16)
Water pump air vent bolt	13	1.3	9.5	☞(Page 1F-16)

NOTE

The specified tightening torque is also described in the following.
“Water pump Components (Page 1F-12)”
“Water Pump Construction (Page 1F-12)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H11608001

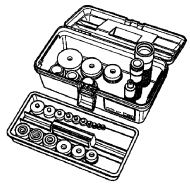
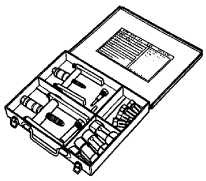
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1F-13) / ☞(Page 1F-15) / ☞(Page 1F-15)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 1F-8)

NOTE

Required service material is also described in the following.
“Water pump Components (Page 1F-12)”
“Water Pump Construction (Page 1F-12)”

Special Tool

B718H11608002

09900–25008 Multi-circuit tester set ☞(Page 1F-9)		09913–70210 Bearing installer set ☞(Page 1F-15)	
09921–20240 Bearing remover set ☞(Page 1F-14)			

Fuel System

Precautions

Precautions for Fuel System

B718H11700001

⚠ WARNING

- **Keep away from fire or spark.**
- **During disassembling, use care to minimize spillage of gasoline.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

⚠ CAUTION

- **To prevent the fuel system (fuel tank, fuel hose, etc.) from contamination with foreign particles, blind all openings.**
- **After removing the throttle body, tape the cylinder intake section to prevent foreign particles from entering.**

General Description

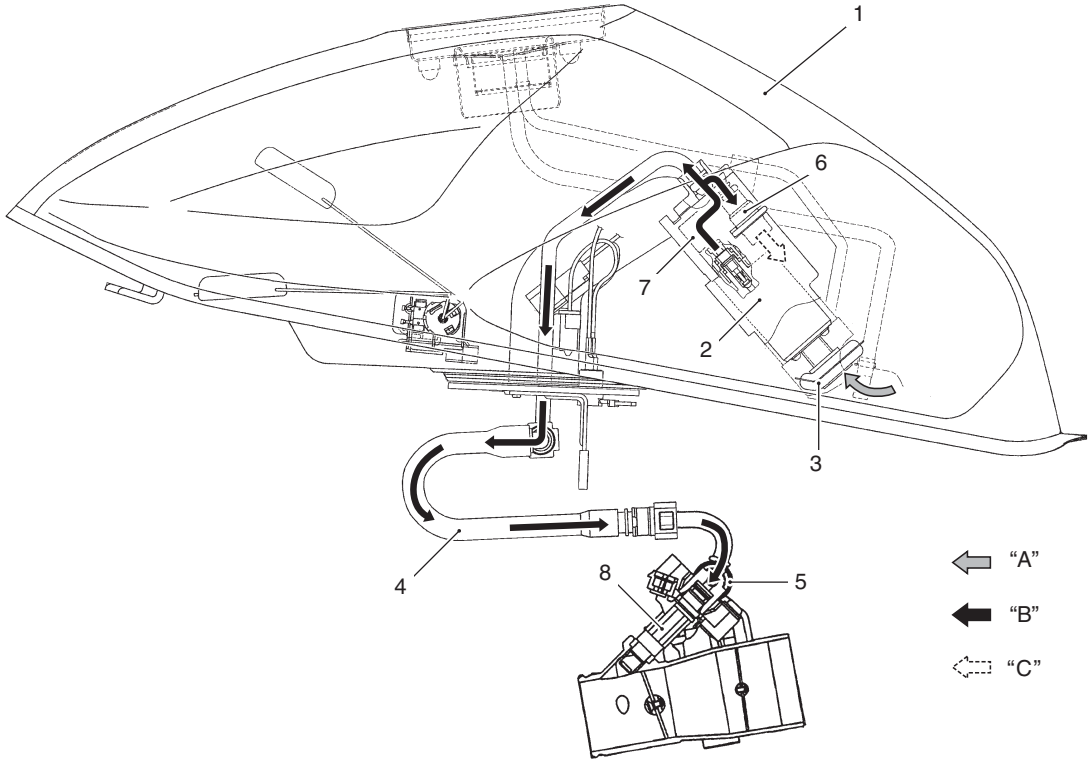
Fuel System Description

B718H11701002

Fuel System

The fuel delivery system consists of the fuel tank (1), fuel pump (2), fuel filter (3), fuel feed hose (4), fuel delivery pipe (5) (including fuel injectors) and fuel pressure regulator (6). There is no fuel return hose. The fuel in the fuel tank (1) is pumped up by the fuel pump (2) and pressurized fuel flows into the injector (7) installed in the fuel delivery pipe (5). Fuel pressure is regulated by the fuel pressure regulator (6). As the fuel pressure applied to the fuel injector (7) (the fuel pressure in the fuel delivery pipe) is always kept at absolute fuel pressure of 300 kPa (3.0 kgf/cm^2, 43 psi), the fuel is injected into the throttle body in conic dispersion when the injector (7) opens according to the injection signal from the ECM.

The fuel relieved by the fuel pressure regulator (6) flows back to the fuel tank (1).



I718H1170001-02

1. Fuel tank	5. Fuel delivery pipe	"A": Before-pressurized fuel
2. Fuel pump	6. Fuel pressure regulator	"B": Pressurized fuel
3. Fuel mesh filter	7. Fuel filter	"C": Relieved fuel
4. Fuel feed hose	8. Fuel injector	

Schematic and Routing Diagram

Fuel Tank Drain Hose and Breather Hose Routing Diagram

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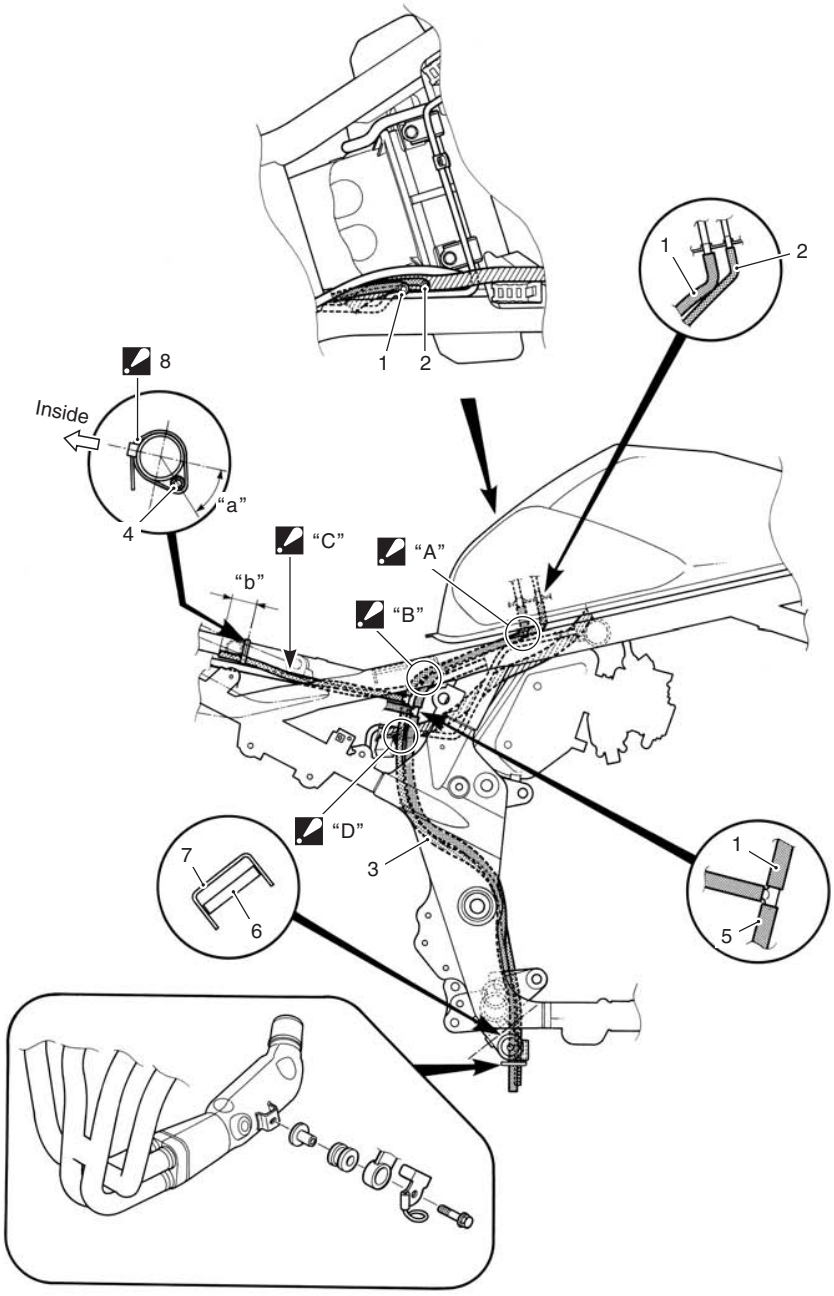


I718H1170040-02

1. Fuel tank drain hose	8. Clamp : Clamp end should face inside. Tip of clamp should face downward.
2. Fuel tank breather hose No.1	"A". Be careful not to bind the fuel tank drain hose and fuel tank breather hose with the other hoses and wire harness.
3. Fuel tank breather hose No.2	"B". Pass the breather hose and drain hose through outside the reservoir tank inlet hose.
4. Fuel tank breather hose No.3	"C". Be careful for the hose not to be slackened.
5. Fuel tank drain hose No.2	"D". Pass the breather hose and drain hose through outside the brake pipe. Pass the breather hose and drain hose through ahead of connector.
6. Frame	"a". 45° ± 15°
7. Drain hose guide	"b". 30 ± 10 mm (1.2 ± 0.4 in)

Diagnostic Information and Procedures

Fuel System Diagnosis

B718H11704001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	*Clean or replace.*
	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Defective fuel injectors.	*Replace.*
	Defective fuel pump relay.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connections.	*Check and repair.*
Engine will not start or is hard to start (Incorrect fuel/air mixture)	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Defective TP sensor.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective IAT sensors.	*Replace.*
	Dirty throttle body.	*Clean.*
	Defective ISC valve.	*Replace.*
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	*Repair or replace.*
	Clogged fuel filter.	*Clean or replace.*
	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Damaged or cracked vacuum hose.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective thermostat.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective ISC valve.	*Replace.*
Engine stalls often (Fuel injector improperly operating)	Defective fuel injectors.	*Replace.*
	No injection signal from ECM.	*Repair or replace.*
	Open or short circuited wiring connection.	*Repair or replace.*
	Defective battery or low battery voltage.	*Replace or recharge.*
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective STP sensor or STVA.	*Replace.*
	Defective GP switch.	*Replace.*
	Defective CKP sensor.	*Replace.*
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective GP switch.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective STP sensor or STVA.	*Replace.*

Repair Instructions

Fuel Pressure Inspection

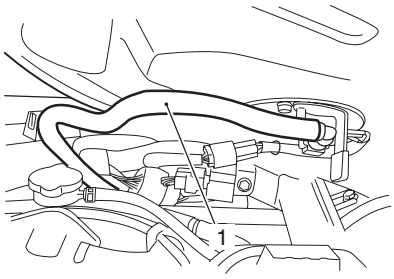
B718H11706042

⚠ WARNING

- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

Inspect the fuel pressure in the following procedures:

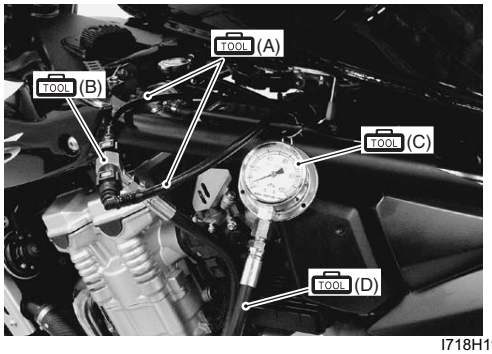
1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.
2) Place a rag under the fuel feed hose and disconnect fuel feed hose (1) from the fuel pump.



I718H1170017-04

3) Install the special tools between the fuel pump and fuel delivery pipe.

Special tool
TOOL (A): 09940–40211 (Fuel pressure gauge adapter)
TOOL (B): 09940–40220 (Fuel pressure gauge hose attachment)
TOOL (C): 09915–77331 (Meter (for high pressure))
TOOL (D): 09915–74521 (Oil pressure gauge hose)



I718H1170018-01

4) Turn the ignition ON and check for fuel pressure.

Fuel pressure
Approx. 300 kPa (3.0 kgf/cm², 43.5 psi)

If the fuel pressure is lower than the specification, check for the followings:

- Fuel hose leakage
- Clogged fuel filter
- Pressure regulator
- Fuel pump

If the fuel pressure is higher than the specification, check for the followings:

- Fuel pump
- Pressure regulator

5) Remove the special tools.

⚠ WARNING

Before removing the special tools, turn the ignition switch OFF and release the fuel pressure slowly.

6) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.

Fuel Pump Inspection

B718H11706027

Turn the ignition switch ON and check that the fuel pump operates for a few seconds.
If the fuel pump motor does not make operating sound, inspect the fuel pump circuit connections or inspect the fuel pump relay and TO sensor. Refer to “Fuel Pump Relay Inspection (Page 1G-7)” and “DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction in Section 1A (Page 1A-67)”.
If the fuel pump relay, TO sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one. Refer to “Fuel Pump Assembly / Fuel Level Gauge Removal and Installation (Page 1G-11)”.

Fuel Discharge Amount Inspection

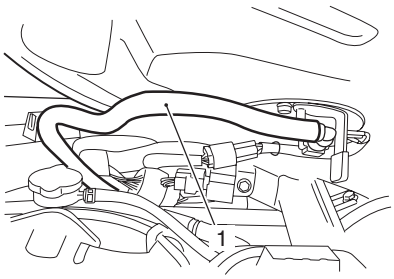
B718H11706028

⚠ WARNING

- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

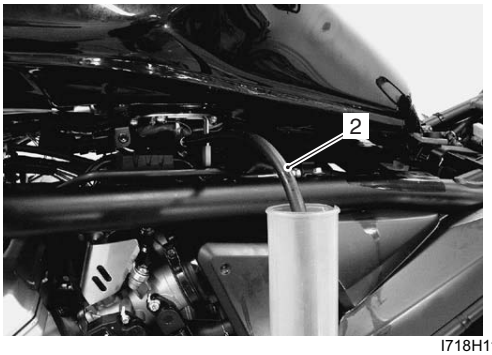
Inspect the fuel discharge amount in the following procedures:

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.
2) Place a rag under the fuel feed hose (1) from the fuel pump.



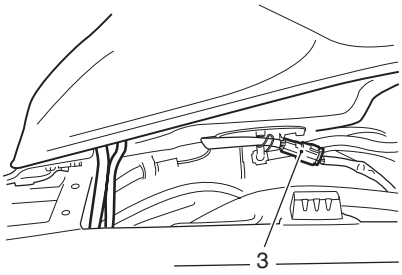
I718H1170017-04

3) Connect a proper fuel hose (2) to the fuel pump.
4) Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



I718H1170014-01

5) Disconnect the fuel pump lead wire coupler (3).



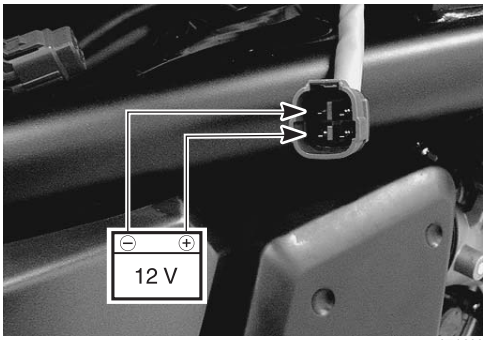
I718H1170043-01

6) Connect a proper lead wire into the fuel pump lead wire coupler (fuel pump side) and apply 12 V to the fuel pump (between (+) Y/R wire and (–) B/W wire) for 10 seconds and measure the amount of fuel discharged.
If the discharge amount is out of the specification, the probable cause may be failure of the fuel pump or clogged fuel filter.

NOTE

The battery must be in fully charged condition.

Fuel discharge amount
166 ml (5.6/5.8 US/Imp oz) and more/10 seconds



I718H1170016-02

7) After finishing the fuel discharge inspection, reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.

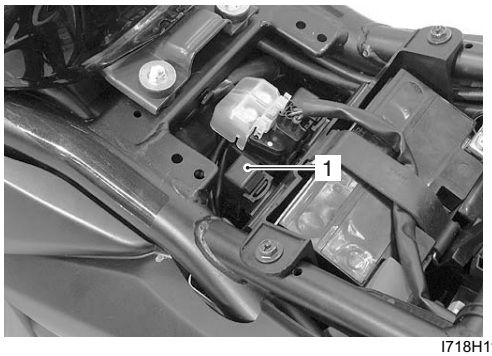
Fuel Pump Relay Inspection

B718H11706029

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

Inspect the fuel pump relay in the following procedures:

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the fuel pump relay (1).

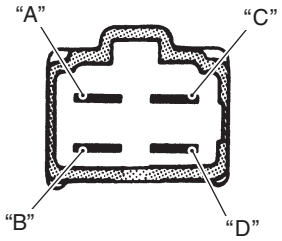


I718H1170041-01

3) First, check for insulation with the tester between terminals “A” and “B”. Next, check for continuity between “A” and “B” with 12 V voltage applied, positive (+) to terminal “C” and negative (–) to terminal “D”. If continuity does not exist, replace the relay with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity test (•)))



I718H1170013-01

Fuel Hose Inspection

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Refer to “Fuel Line Inspection in Section 0B (Page 0B-10)”.

Fuel Level Gauge Inspection

B718H11706031

Refer to “Fuel Level Gauge Inspection in Section 9C (Page 9C-8)”.

Fuel Level Indicator Inspection

B718H11706032

Refer to “Fuel Level Indicator Inspection in Section 9C (Page 9C-6)”.

Fuel Level Indicator Switch (Thermistor) Inspection

B718H11706040

Refer to “Fuel Level Indicator Switch (Thermistor) Inspection in Section 9C (Page 9C-7)”.

Fuel Tank Construction

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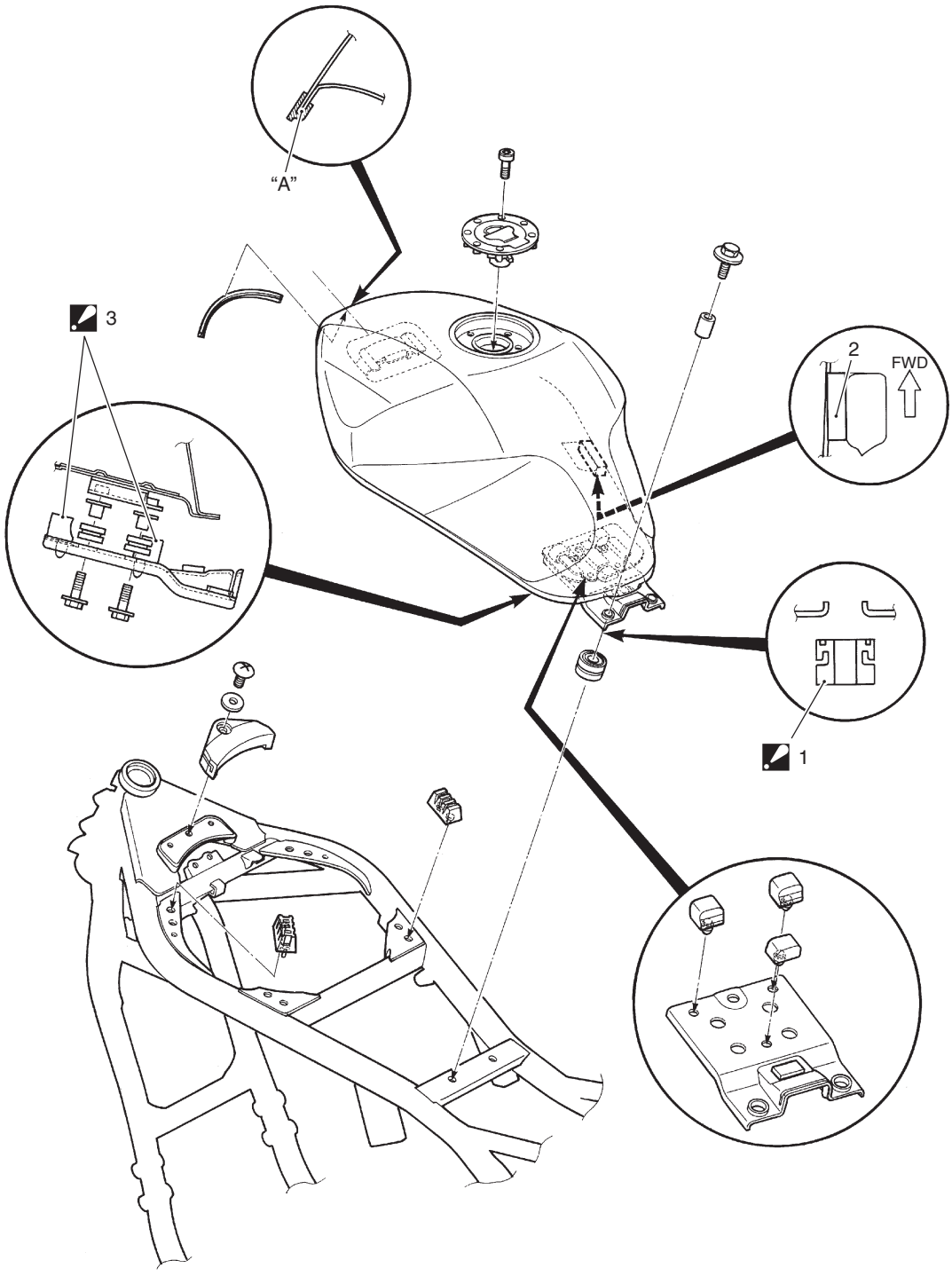


I718H1170020-02

1. Fuel tank rear cushion : Be careful not to mistake the assembling position and direction.	3. Rear bracket cushion : Be careful not to mistake the assembling position and direction.
2. EVAP pipe cushion (E-33 only) : Matched with cushion seat surface.	"A": Apply adhesive agent to the cushion rubber.

Fuel Tank Removal and Installation

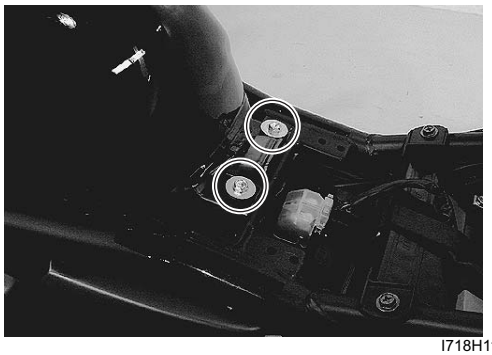
B718H11706002

Removal

⚠ WARNING

- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the fuel tank mounting bolts.

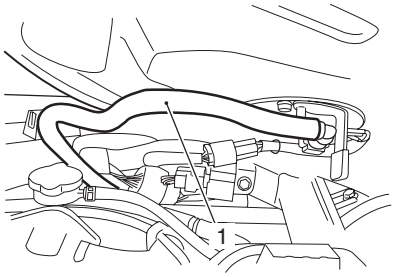


I718H1170021-01

3) Place a rag under the fuel feed hose and disconnect the fuel feed hose (1).

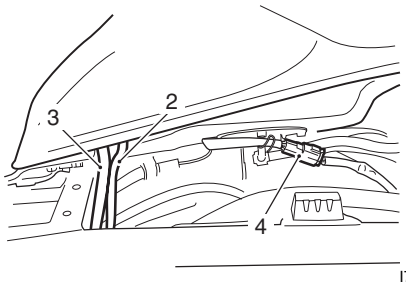
⚠ CAUTION

When removing the fuel tank, do not leave the fuel feed hose (1) on the fuel pump side.



I718H1170017-04

4) Disconnect the fuel tank breather hose (2) and drain hose (3).
5) Disconnect the fuel pump lead wire coupler (4).
6) Remove the fuel tank.



I718H1170042-01

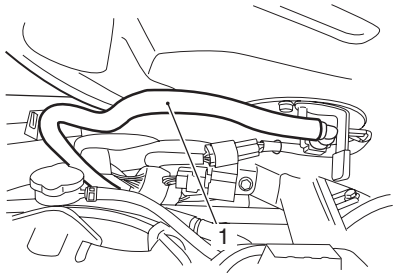
Installation

Install the fuel tank in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

Be careful not to bend the hoses. Refer to “Fuel Tank Drain Hose and Breather Hose Routing Diagram (Page 1G-3)”.

- Connect the fuel feed hose (1) until it locks securely (a click is heard).



I718H1170017-04

Fuel Pump Components

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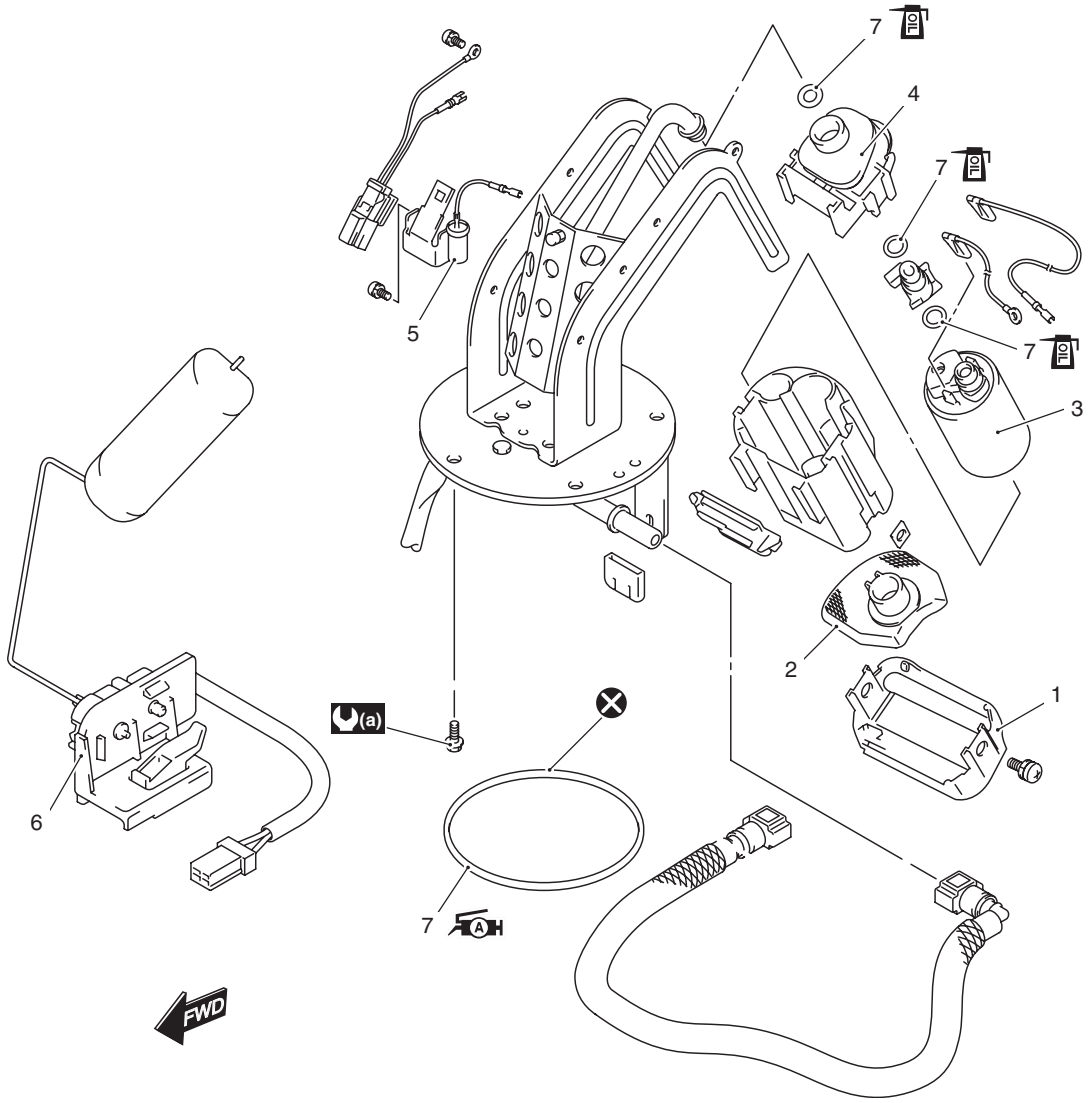


I718H1170002-03

1. Vessel	5. Thermistor	: Apply grease.
2. Fuel mesh filter	6. Fuel level gauge	: Do not reuse.
3. Fuel pump	7. O-ring	(a) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)
4. Fuel pressure regulator assembly	: Apply engine oil.	

Fuel Pump Assembly / Fuel Level Gauge Removal and Installation

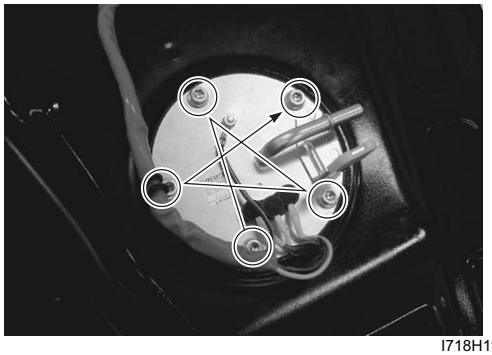
B718H11706034

Removal

⚠ WARNING

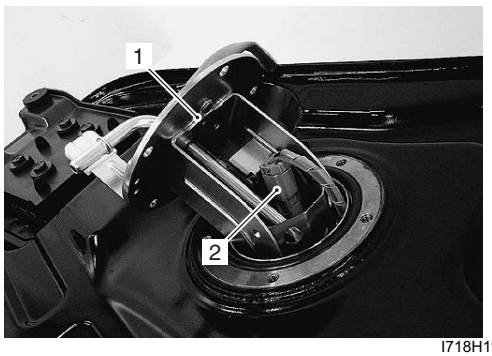
- **Spilled gasoline should be wiped off immediately.**
- **Keep away from fire or spark.**
- **Work in a well-ventilated area.**

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.
2) Remove the fuel pump mounting bolts diagonally.



I718H1170023-04

3) Remove the fuel pump assembly (1) and disconnect the fuel level gauge lead wire coupler (2).

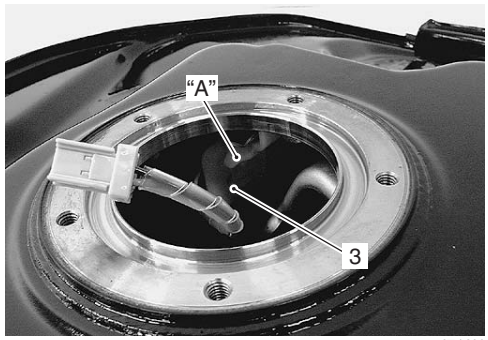


I718H1170025-02

4) Remove the fuel level gauge (3) while pushing the pawl end “A”.

⚠ CAUTION

Do not pull the lead wire when removing the fuel gauge.



I718H1170026-02

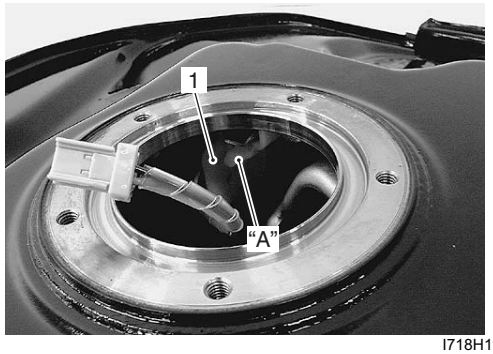
Installation

Install the fuel pump assembly in the reverse order of removal. Pay attention the following points:

- Install the fuel level gauge (1) into the fuel tank.

NOTE

Push the lock position “A” fully until the clicking sound heard.



I718H1170024-02

- Apply grease to the O-ring (2).

⚠ CAUTION

Replace the O-ring with a new one.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

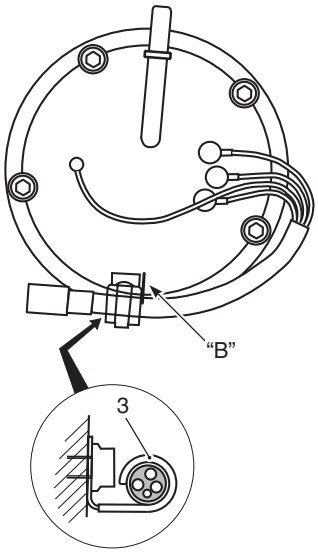
I718H1170027-02

- When installing the fuel pump assembly, first tighten all the fuel pump mounting bolts lightly and then to the specified torque as shown.

NOTE

Install the clamp (3) so that its base is located in parallel with the line "B" on the fuel pump.

Tightening torque
Fuel pump mounting bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1170028-02

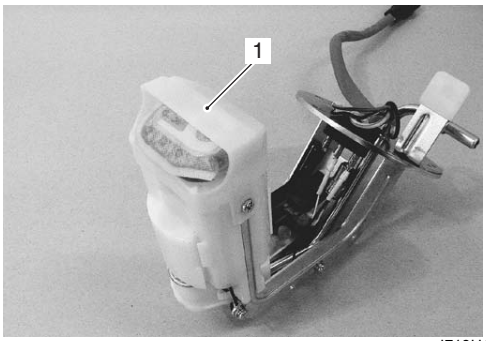
Fuel Pump Disassembly and Assembly

B718H11706041

Refer to "Fuel Pump Assembly / Fuel Level Gauge Removal and Installation (Page 1G-11)".

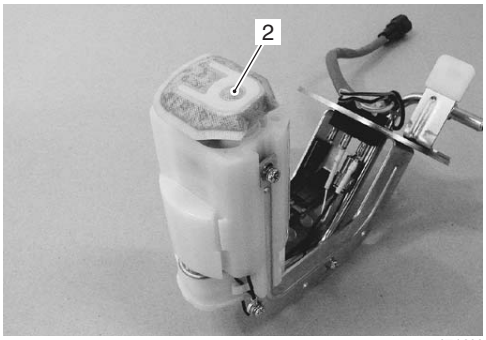
Disassembly

1) Remove the vessel (1).



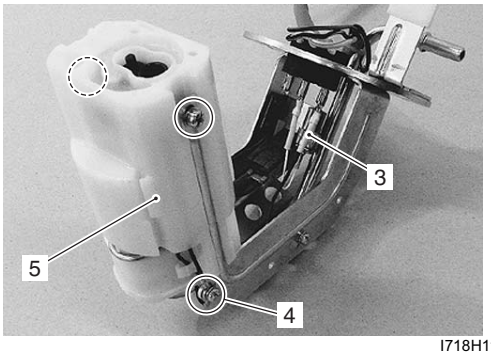
I718H1170029-01

2) Remove the fuel mesh filter (2).



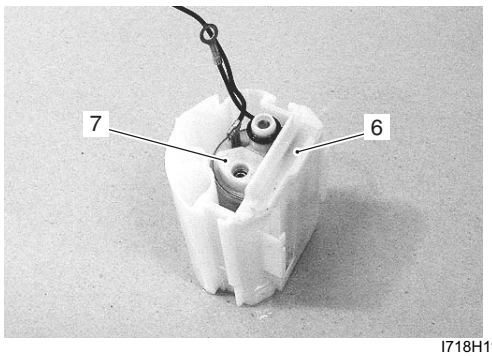
I718H1170030-01

3) Disconnect the lead wire (BI) (3) and remove the connecting screw (4).
4) Remove the fuel pump assembly (5).



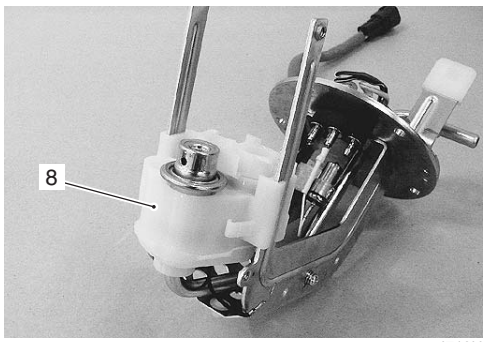
I718H1170031-02

5) Remove the cup cover (6) and fuel pump (7) from the reservoir cup.



I718H1170032-02

6) Remove the fuel pressure regulator assembly (8).

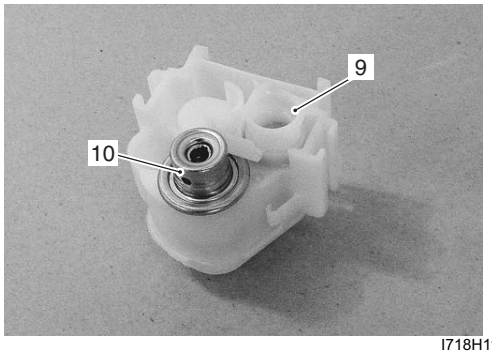


I718H1170033-02

7) Remove the joint (9).

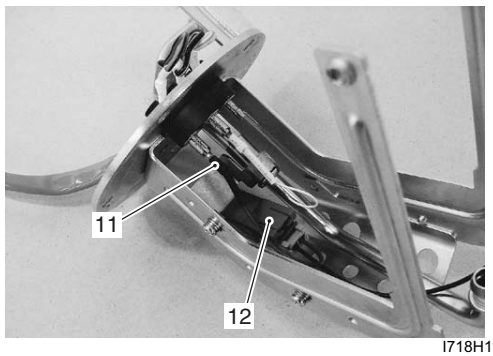
⚠ CAUTION

Never remove the fuel pressure regulator (10) from the holder.



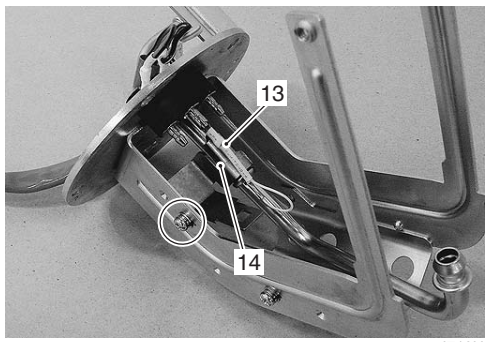
I718H1170034-02

8) Disconnect the lead wire (BI) (11) and remove the fuel level gauge coupler (12).



I718H1170036-03

9) Disconnect the lead wire (W) (13) and remove the thermistor (14).



I718H1170035-02

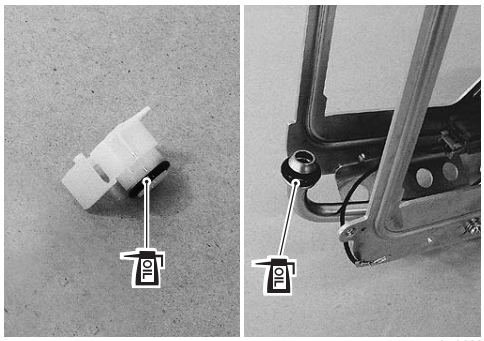
Assembly

Refer to “Fuel Mesh Filter Inspection and Cleaning (Page 1G-14)”.

Assemble the fuel tank pump in the reverse order of the disassembly. Pay attention to the following points:

⚠ CAUTION

- **To prevent fuel leakage, each O-ring must be replaced with a new one.**
- **Apply engine oil lightly to each of the O-rings.**



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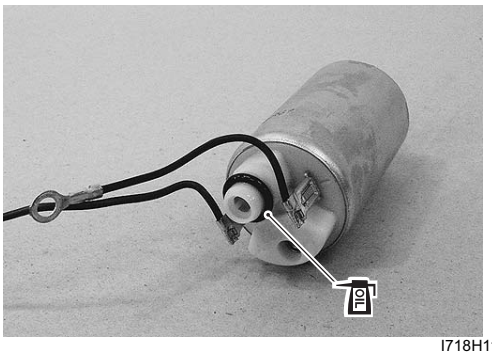
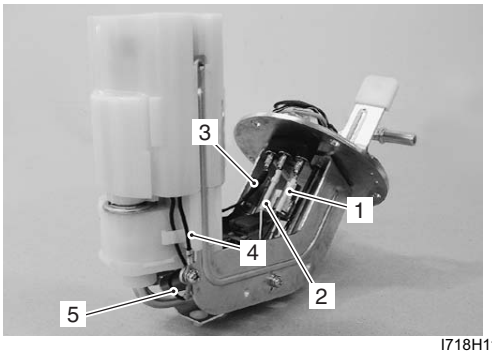


I718H1170039-01

- Connect all wiring couplers securely so as not to cause contact failure.



I718H1170037-01

1.	Fuel pump (+) lead wire (BI)
2.	Fuel level thermistor lead wire (W)
3.	Fuel level gauge (+) lead wire (BI)
4.	Fuel pump (–) lead wire (B)
5.	Fuel level gauge (–) lead wire (B)

Fuel Mesh Filter Inspection and Cleaning

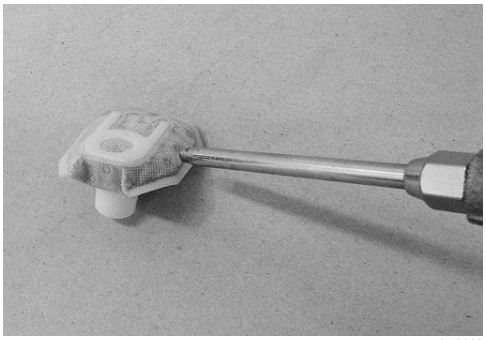
B718H11706036

Inspect the fuel mesh filter in the following procedures:

1) Remove the fuel mesh filter. Refer to “Fuel Pump Disassembly and Assembly (Page 1G-12)”.
2) If the fuel mesh filter is clogged with foreign particles, it hinders smooth gasoline flow resulting in loss of engine power. Such a filter should be cleaned by blowing with compressed air.

NOTE

When the fuel mesh filter is dirtied excessively, replace the fuel filter cartridge with a new one.



I718H1170003-01

3) After finishing the fuel mesh filter inspection, reinstall the fuel mesh filter. Refer to “Fuel Pump Disassembly and Assembly (Page 1G-12)”.

Fuel Injector / Fuel Delivery Pipe / T-joint Removal and Installation

B718H11706038

Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

Fuel Injector Inspection and Cleaning

B718H11706039

Inspect the fuel injector in the following procedures:

1) Remove the fuel injector. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.
2) Check the fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel lines and fuel tank.

I718H1170012-01

3) Install the fuel injector. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)”.

Specifications

Service Data

B718H11707001

Injector + Fuel Pump + Fuel Pressure Regulator

Item	Specification	Note
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	—
Fuel pump discharge amount	166 ml (5.6/5.8 US/Imp oz) and more/10 sec.	—
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm^2, 43 psi)	—

Fuel

Item	Specification		Note
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline type is recommended.		Others
Fuel tank capacity	Including reserve	18.5 L (4.9/4.1 US/Imp gal)	E-33
		19 L (5.0/4.2 US/Imp gal)	Others

Tightening Torque Specifications

B718H11707002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Fuel pump mounting bolt	10	1.0	7.0	☞(Page 1G-12)

NOTE

The specified tightening torque is also described in the following.
“Fuel Pump Components (Page 1G-10)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0B (Page 0B-23)”.

Special Tools and Equipment

Recommended Service Material

B718H11708001

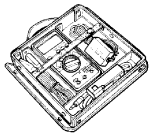
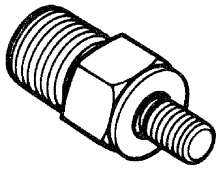
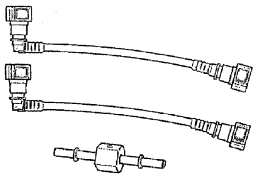
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1G-12)

NOTE

Required service material is also described in the following.
"Fuel Pump Components (Page 1G-10)"

Special Tool

B718H11708002

09900–25008 Multi-circuit tester set ☞(Page 1G-7) 	09915–74521 Oil pressure gauge hose ☞(Page 1G-5) 
09915–77331 Meter (for high pressure) ☞(Page 1G-5) 	09940–40211 Fuel pressure gauge adapter ☞(Page 1G-5) 
09940–40220 Fuel pressure gauge hose attachment ☞(Page 1G-5) 	

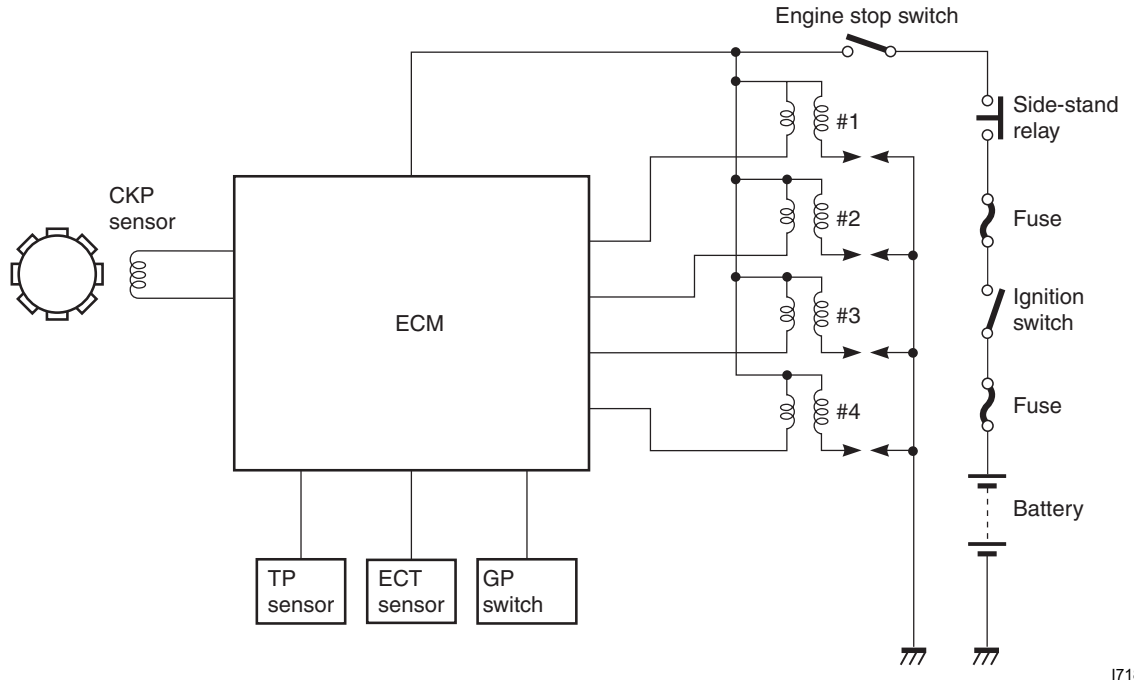
Ignition System

Schematic and Routing Diagram

Ignition System Diagram

B718H11802001

Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.



I718H1180001-02

Ignition System Components Location

B718H11802002

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

Diagnostic Information and Procedures

Ignition System Symptom Diagnosis

B718H11804001

Condition	Possible cause	Correction / Reference Item
Spark plug not sparking	Damaged spark plug.	*Replace.*
	Fouled spark plugs.	*Clean or replace.*
	Wet spark plugs.	*Clean and dry or replace.*
	Defective ignition coil/plug caps.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connections.	*Repair or replace.*
Engine stalls easily. (No spark)	Fouled spark plugs.	*Clean or replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
Spark plug is wet or quickly becomes fouled with carbon.	Excessively rich air/fuel mixture.	*Inspect FI system.*
	Excessively high idling speed.	*Inspect FI system.*
	Incorrect gasoline.	*Change.*
	Dirty air cleaner element.	*Clean or replace.*
	Incorrect spark plug (Cold type).	*Change to hot type spark plug.*
Spark plug quickly becomes fouled with oil or carbon.	Worn piston rings.	*Replace.*
	Worn pistons.	*Replace.*
	Worn cylinders.	*Rebore or replace.*
	Excessive valve-stem to valve-guide clearance.	*Replace.*
	Worn valve stem oil seals.	*Replace.*
Spark plug electrodes overheat or burn.	Incorrect spark plug (Hot type).	*Change to cold type spark plug.*
	Overheated engine.	*Tune-up.*
	Loose spark plugs.	*Tighten.*
	Excessively lean air/fuel mixture.	*Inspect FI system.*

No Spark or Poor Spark

B718H11804002

Troubleshooting

NOTE

Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Grasp the clutch lever. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step	Action	Yes	No
1	Check the ignition system couplers for poor connections. *Is there connection in the ignition system couplers?*	Go to step 2.	Poor connection of couplers.
2	Measure the battery voltage between input lead wires at the ECM with the ignition switch in the "ON" position. (E02, 19: O/G and B/W, E03, 24, 28, 33: O/W and B/W) *Is the voltage OK?*	Go to Step 3.	• Faulty ignition switch. • Faulty turn signal/ side-stand relay. • Faulty engine stop switch. • Broken wire harness or poor connection of related circuit couplers.
3	Measure the ignition coil primary peak voltage. Refer to "Ignition Coil / Plug Cap Inspection (Page 1H-5)". **NOTE** **This inspection method is applicable only with the multi-circuit tester and the peak volt adaptor.** *Is the peak voltage OK?*	Go to step 4.	Go to step 5.
4	Inspect the spark plugs. Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page 0B-4)". *Is the spark plug(-s) OK?*	Go to Step 5.	Faulty spark plug(-s).
5	Inspect the ignition coil/plug cap(-s). Refer to "Ignition Coil / Plug Cap Inspection (Page 1H-5)". *Is the ignition coil/plug cap(-s) OK?*	Go to step 6.	• Faulty ignition coil/ plug cap(-s). • Poor connection of the ignition coil/plug cap(-s).
6	Measure the CKP sensor peak voltage and its resistance. Refer to "CKP Sensor Inspection (Page 1H-7)". **NOTE** **The CKP sensor peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.** *Are the peak voltage and resistance OK?*	• Faulty ECM. • Open or short circuit in wire harness. • Poor connection of ignition couplers.	• Faulty CKP sensor. • Metal particles or foreign material being stuck on the CKP sensor and rotor tip.

Repair Instructions

Ignition Coil / Plug Cap and Spark Plug Removal and Installation

B718H11806014

Removal

⚠ WARNING

The hot engine can burn you.
Wait until the engine is cool enough to touch.

1) Turn the ignition switch OFF.
2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Remove the frame head cover. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
4) Disconnect all lead wire couplers (1) from ignition coil/plug caps.

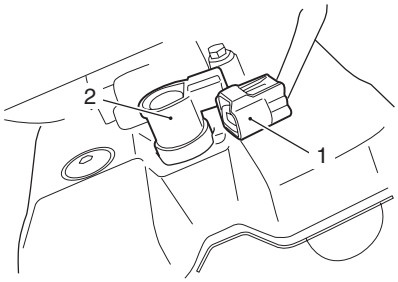
⚠ CAUTION

Disconnect the lead wire coupler before removing the ignition coil/plug cap to avoid lead wire coupler damage.

5) Remove the ignition coils/plug caps (2).

⚠ CAUTION

- **Do not pry up the ignition coil/plug cap with a screw driver or a bar to avoid its damage.**
- **Be careful not to drop the ignition coil/plug cap to prevent short/open circuit.**



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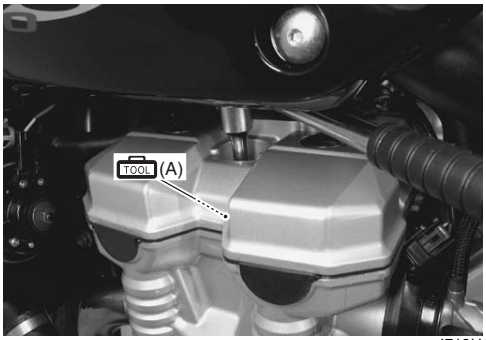
6) Remove the spark plugs with a spark plug wrench.

Special tool
TOOL (A): 09930–10121 (Spark plug wrench set)



I718H1180010-02

Installation

Install the spark plugs in the reverse order of removal. Pay attention to the following points:

- Screw the spark plugs into the cylinder head with fingers, and then tighten them to the specified torque.

⚠ CAUTION

Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder head.

Special tool
TOOL (A): 09930–10121 (Spark plug wrench set)

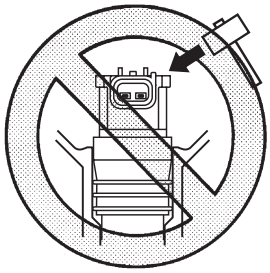
Tightening torque
Spark plug: 11 N·m (1.1 kgf-m, 8.0 lb-ft)

I718H1180011-02

- Install the ignition coil/plug caps and connect their lead wire couplers.

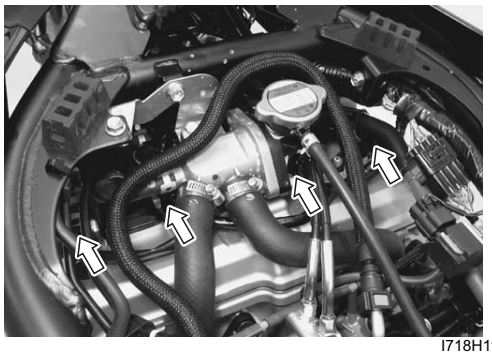
⚠ CAUTION

Do not hit the ignition coil/plug cap with a plastic hammer when installing it.



INCORRECT

I718H1180012-01



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Spark Plug Inspection and Cleaning

B718H11806003

Refer to “Spark Plug Inspection and Cleaning in Section 0B (Page 0B-4)”.

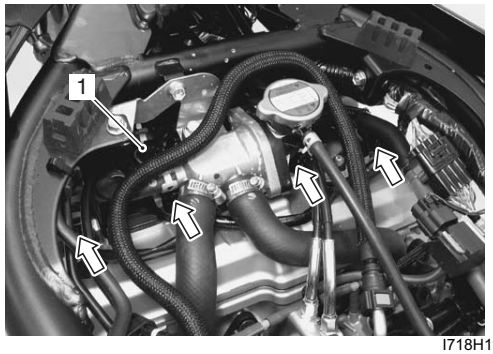
Ignition Coil / Plug Cap Inspection

B718H11806004

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

Ignition Coil Primary Peak Voltage

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
2) Disconnect all ignition coil/plug cap and PAIR control solenoid valve coupler (1). Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation (Page 1H-4)”.



I718H1180014-01

3) Connect new spark plug to each ignition coil/spark plug cap.
4) Connect all the ignition coil/plug cap lead wire couplers to the ignition coil/plug caps respectively, and ground them on the cylinder head.

NOTE

Be sure that all the spark plugs are connected properly and the battery used is in fully-charged condition.

I718H1180015-01

5) Insert the needle pointed probe to the lead wire coupler.

NOTE

Use the special tool, to prevent the rubber of the water proof coupler from damage.

6) Connect the multi-circuit tester with the peak voltage adaptor as follows.

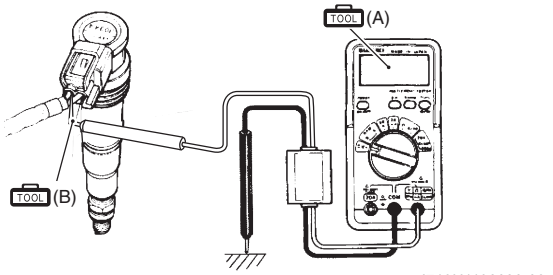
⚠ CAUTION

Before using the multi-circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)
TOOL (B): 09900–25009 (Needle pointed probe set)

Tester knob indication: Voltage (⎓)

	((+) Probe)	((–) Probe)
Ignition coil/Plug cap #1	**Green wire terminal**	**Ground**
Ignition coil/Plug cap #2	**W/Bl wire terminal**	**Ground**
Ignition coil/Plug cap #3	**Black wire terminal**	**Ground**
Ignition coil/Plug cap #4	**Yellow wire terminal**	**Ground**



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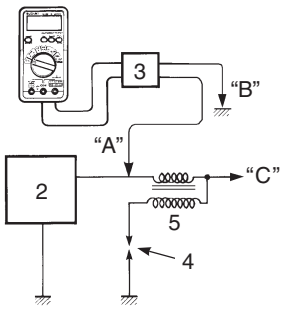


I718H1180004-02

2. ECM	"A": (+) probe
3. Peak voltage adaptor	"B": (–) probe
4. New spark plug	"C": To engine stop switch
5. Ignition coil	

7) Measure the ignition coil primary peak voltage in the following procedures.

⚠ WARNING

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

a) Shift the transmission into neutral, turn the ignition switch ON and grasp the clutch lever.
b) Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.

8) Repeat the b) procedure several times and measure the highest peak voltage.
If the voltage is lower than standard range, inspect the ignition coil/plug cap and the CKP sensor.

Ignition coil primary peak voltage
80 V and more

9) After measuring the ignition coil primary peak voltage, reinstall the removed parts.

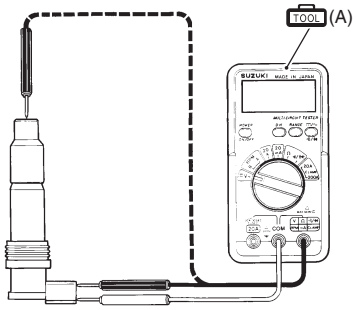
Ignition Coil / Plug Cap Resistance

1) Remove the ignition coil/plug caps. Refer to “Ignition Coil / Plug Cap and Spark Plug Removal and Installation (Page 1H-4)”.
2) Measure the ignition coil/plug cap for resistance in both primary and secondary coils. If the resistance is not within the standard range, replace the ignition coil/plug cap with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Resistance (Ω)

Ignition coil resistance
Primary: 1.1 – 1.9 Ω ((+) terminal – (–) terminal)
Secondary: 10.8 – 16.2 kΩ (Spark plug cap – (–) terminal)



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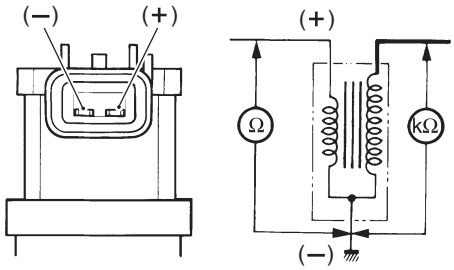


I718H1180006-01

3) After measuring the ignition coil/plug cap resistance, reinstall the removed parts.

CKP Sensor Inspection

B718H11806008

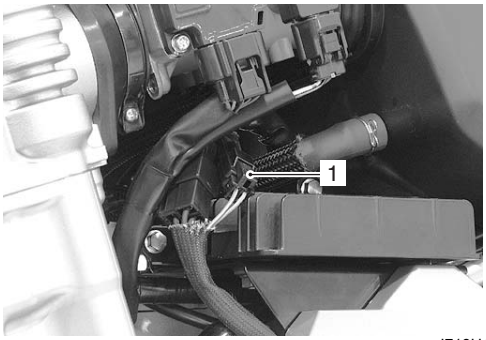
Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

CKP Sensor Peak Voltage

1) Remove the CKP sensor coupler (1).

NOTE

Be sure that all of the couplers are connected properly and the battery is fully-charged.



I718H1180026-01

2) Connect the multi-circuit tester with the peak volt adaptor as follows.

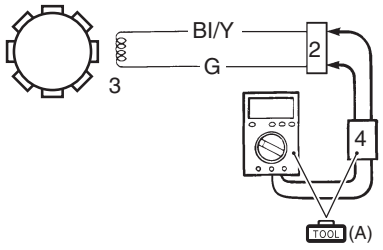
⚠ CAUTION

Before using the multi-circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)

Tester knob indication: Voltage (⎓)

CKP sensor	(+) Probe	(–) Probe
	BI/Y	G



I718H1180007-02

2. CKP sensor coupler	4. Peak voltage adaptor
3. CKP sensor	

3) Measure the CKP sensor peak voltage in the following procedure.
   a) Shift the transmission into neutral, turn the ignition switch ON and grasp the clutch lever.
   b) Press the starter button and allow the engine to crank for a few seconds, and then measure the CKP sensor peak voltage.
4) Repeat the b) procedure several times and measure the highest CKP sensor peak voltage.

CKP sensor peak voltage
2.0 V and more (B/Bl – Y/W)

5) If the peak voltage is within the specification, check the continuity between the CKP sensor coupler and ECM coupler.

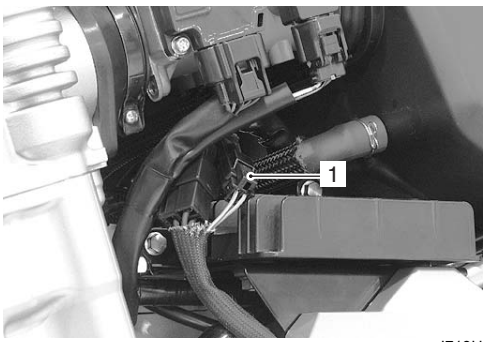
⚠ CAUTION

Normally, use the needle pointed probe to the backside of the lead wire coupler to prevent the terminal bend and terminal alignment.

6) After measuring the CKP sensor peak voltage, connect the CKP sensor coupler.

CKP Sensor Resistance

1) Disconnect the CKP sensor coupler (1).

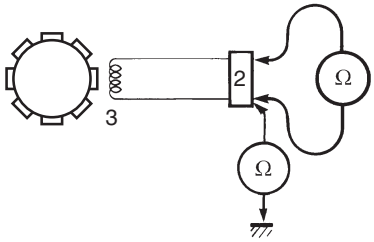


I718H1180026-01

2) Measure the resistance between the lead wires and ground. If the resistance is not within the standard range, replace the CKP sensor with a new one. Refer to “CKP Sensor Removal and Installation (Page 1H-8)”.

Tester knob indication
Resistance (Ω)

CKP sensor resistance
90 – 150 Ω (Bl/Y – Green)
∞ Ω (Bl/Y – Ground)



I718H1180008-02

2. CKP sensor coupler	3. CKP sensor

3) After measuring the CKP sensor resistance, connect the CKP sensor coupler.

CKP Sensor Removal and Installation

B718H11806009

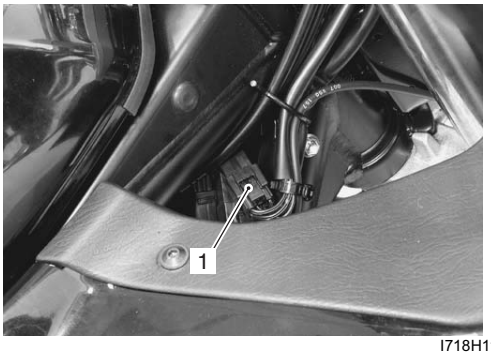
Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.

Engine Stop Switch Inspection

B718H11806010

Inspect the engine stop switch in the following procedures:

1) Turn the ignition switch OFF.
2) Remove the right frame head cover. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Disconnect the right handlebar switch coupler (1).



I718H1180017-01

4) Inspect the engine stop switch for continuity with a tester.
If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebar Removal and Installation in Section 6B (Page 6B-3)".

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•))))

Color / Position	B/BI	B/R
OFF (⊗)		
RUN (◯)	○	○

I649G1180022-01

5) After finishing the engine stop switch inspection, reinstall the removed parts.

Ignition Switch Inspection

B718H11806011

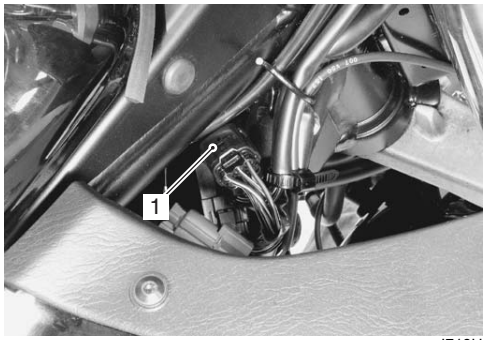
Refer to "Ignition Switch Inspection in Section 9C (Page 9C-10)".

Ignition Switch Removal and Installation

B718H11806015

Removal

1) Support the motorcycle with the center stand.
2) Remove the right frame head cover. (GSF1250/A) Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
3) Disconnect the ignition switch coupler (1) and clamp.



I718H1180018-01

4) Remove the brake hose clamp bolt (GSF1250/S) or brake hose joint bolt (2) (GSF1250A/SA).

I718H1180019-01

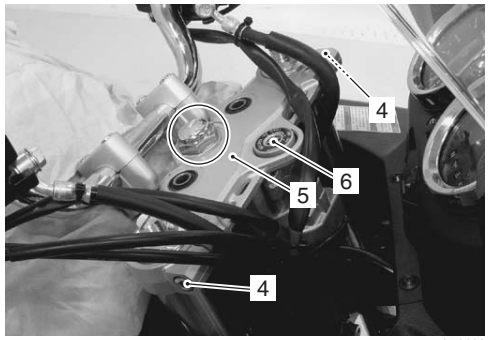
5) Remove the combination meter bracket bolts (GSF1250/A) or cable guides (3) (GSF1250S/SA).
6) Dismount the handlebars by removing the handlebar holder set nuts.

NOTE

Place a rag on the fuel tank to prevent the fuel tank scratched.

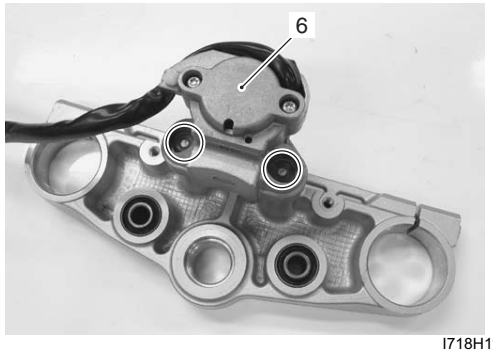
I718H1180020-03

7) Loosen the front fork upper clamp bolts (4).
8) Remove the steering stem head nut and washer.
9) Remove the steering stem upper bracket (5) along with the ignition switch (6).



I718H1180021-03

10) Using a center punch, remove the ignition switch mounting bolts.
11) Remove the ignition switch (6) from the upper bracket.



I718H1180022-01

Installation
Install the ignition switch in the reverse order of removal. Pay attention to the following points:

- Install the ignition switch and new bolts.
- Tighten each bolt until its head is broken off.

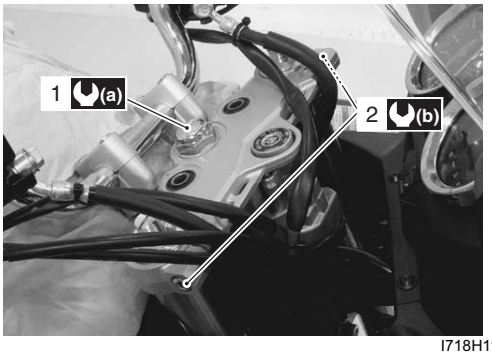
NOTE

The spare ignition switch comes equipped with the special bolts, however, the bolts are also individually available as spare parts.

I718H1180023-01

- First tighten the steering stem head nut (1), then tighten the front fork upper clamp bolts (2).

  Tightening torque
  Steering stem head nut (a): 65 N·m (6.5 kgf-m, 47.0 lb-ft)
  Front fork upper clamp bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

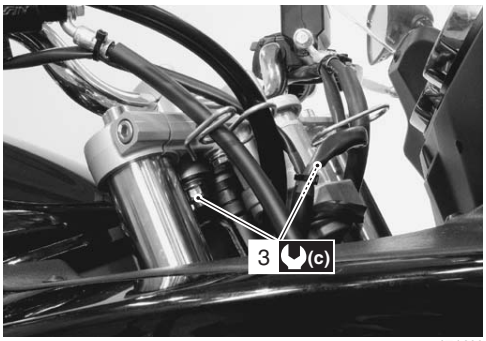


I718H1180024-04

- Tighten the handlebar holder set nuts (3) to the specified torque.

  Tightening torque
  Handlebar holder set nut (c): 45 N·m (4.5 kgf-m, 32.5 lb-ft)

- Route the cables, hoses and lead wires. Refer to “Throttle Cable Routing Diagram in Section 1D (Page 1D-2)”, “Front Brake Hose Routing Diagram in Section 4A (Page 4A-1)” and “Wiring Harness Routing Diagram in Section 9A (Page 9A-8)”.



I718H1180025-02

Specifications

Service Data

B718H11807001

Electrical

Unit: mm (in)

Item	Specification		Note
Firing order	1 · 2 · 4 · 3		
Spark plug	Type	NGK: CR7E DENSO: U22ESR-N	
	Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance	Over 8 (0.3) at 1 atm.		
CKP sensor resistance	90 – 150 Ω		
CKP sensor peak voltage	2.0 V and more		
Ignition coil resistance	Primary	1.1 – 1.9 Ω	Terminal – Terminal
	Secondary	10.8 – 16.2 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage	80 V and more		When cranking

Tightening Torque Specifications

B718H11807002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Spark plug	11	1.1	8.0	☞(Page 1H-4)
Steering stem head nut	65	6.5	47.0	☞(Page 1H-10)
Front fork upper clamp bolt	23	2.3	16.5	☞(Page 1H-10)
Handlebar holder set nut	45	4.5	32.5	☞(Page 1H-10)

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

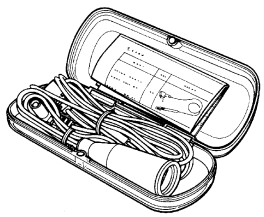
Special Tools and Equipment

Special Tool

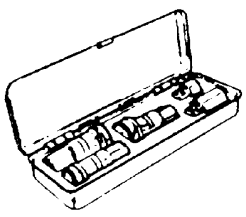
B718H11808001

09900–25008
Multi-circuit tester set
☞(Page 1H-6) / ☞(Page 1H-7) / ☞(Page 1H-7) / ☞(Page 1H-9)

09900–25009
Needle pointed probe set
☞(Page 1H-6)



09930–10121
Spark plug wrench set
☞(Page 1H-4) / ☞(Page 1H-4)



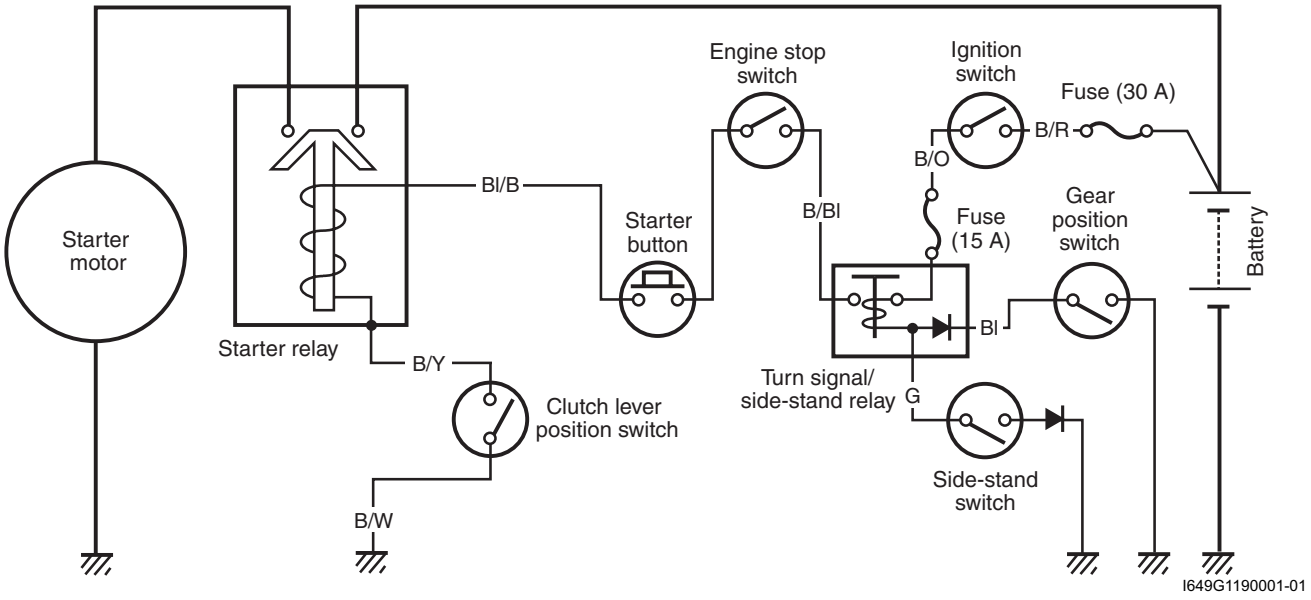
Starting System

Schematic and Routing Diagram

Starting System Diagram

B718H11902001

Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.



Component Location

Starting System Components Location

B718H11903001

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

Diagnostic Information and Procedures

Starting System Symptom Diagnosis

B718H11904001

Condition	Possible cause	Correction / Reference Item
Engine does not turn though the starter motor runs	Faulty starter clutch	*Replace.*
Starter button is not effective	Run down battery.	*Repair or replace.*
	Defective switch contacts.	*Replace.*
	Brushes not seating properly on starter motor commutator.	*Repair or replace.*
	Defective starter relay or starter interlock switch.	*Replace.*
	Defective main fuse.	*Replace.*

Starter motor will not run

B718H11904002

NOTE

Make sure the fuses are not blown and the battery is fully-charged before diagnosing.

Troubleshooting

Step	Action	Yes	No
1	1) Shift the transmission into neutral. 2) Grasp the clutch lever, turn on the ignition switch with the engine stop switch in the “RUN” position and listen for a click from the starter relay when the starter button is pushed. *Is a click sound heard?*	Go to step 2.	Go to step 3.
2	Check if the starter motor runs when its terminal is connected to the battery (+) terminal. (Do not use thin “wire” because a large amount of current flows.) *Does the starter motor run?*	• Faulty starter relay • Loose or disconnected starter motor lead wire • Loose or disconnected between starter relay and battery (+) terminal.	Faulty starter motor.
3	Measure the starter relay voltage at the starter relay connectors (between B/Bl (+) and B/Y (–)) when the starter button is pushed. *Is the voltage OK?*	Go to Step 4.	• Faulty ignition switch • Faulty engine stop switch • Faulty clutch lever position switch • Faulty gear position switch • Faulty turn signal/ side-stand relay • Faulty starter button • Faulty side-stand switch • Poor contact of connector • Open circuit in wire harness
4	Check the starter relay. Refer to “Starter Relay Inspection (Page 1I-7)”. *Is the starter relay OK?*	Poor contact of the starter relay.	Faulty starter relay.

Starter Motor Runs but Does not Crank the Engine

B718H11904003

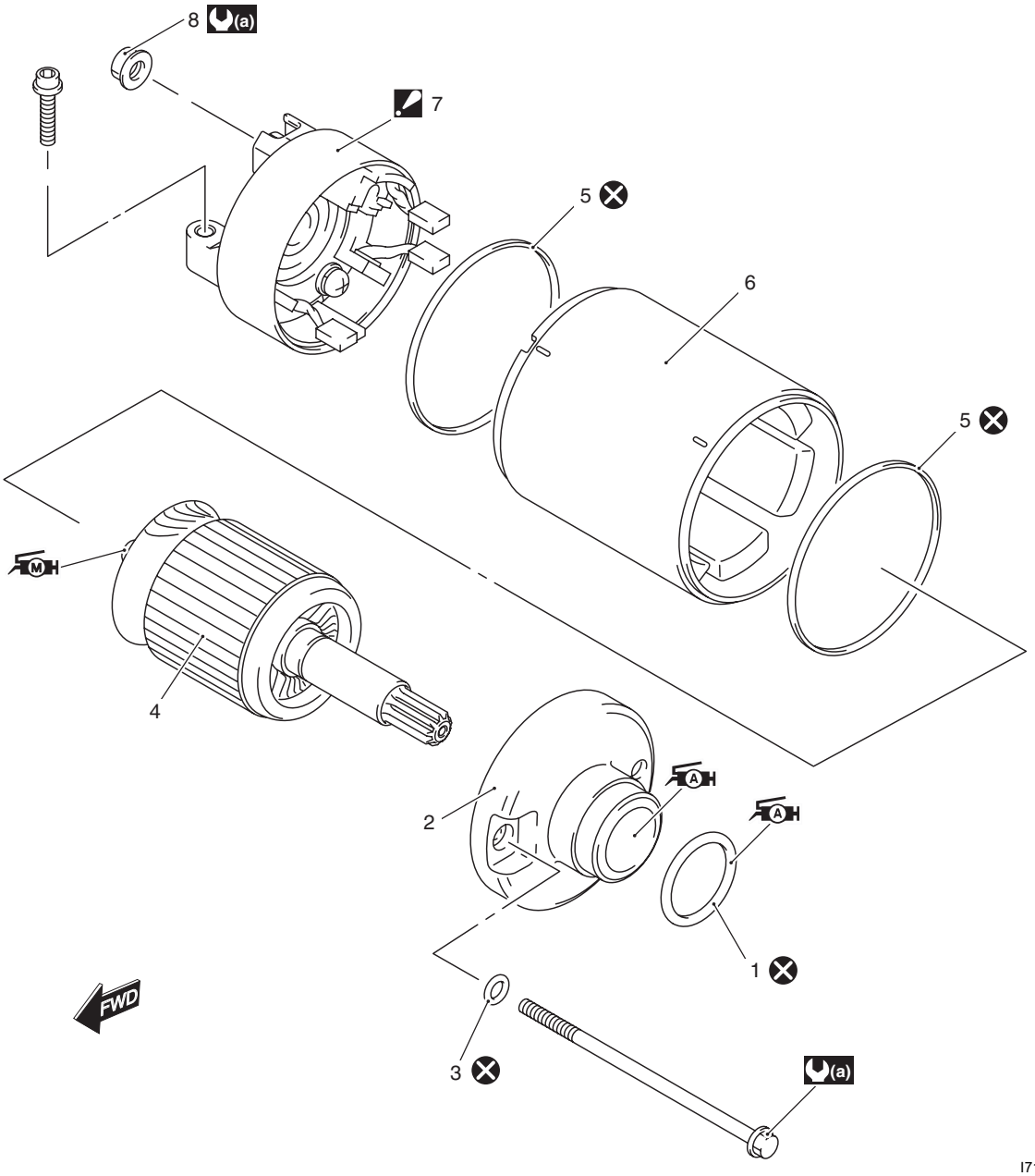
The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral, with the side-stand up.

Step	Action	Yes	No
1	Check the side-stand switch. Refer to “Side-stand / Ignition Interlock System Parts Inspection (Page 1I-8)”. *Is the side-stand switch OK?*	Go to Step 2.	Faulty side-stand switch.
2	Check the starter clutch. Refer to “Starter Clutch Inspection (Page 1I-12)”. *Is the starter clutch OK?*	• Open circuit in wire harness • Poor contact of connector	Faulty starter clutch.

Repair Instructions

Starter Motor Components

B718H11906001



I718H1190038-03

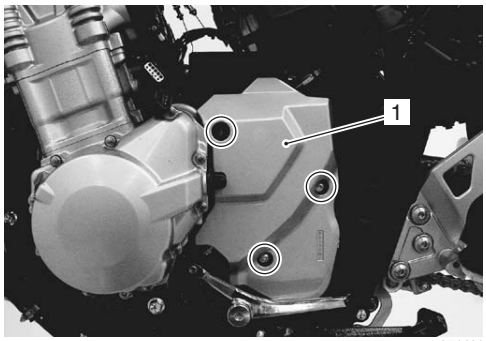
1. O-ring	5. O-ring	: 5 N·m (0.5 kgf-m, 3.5 lb-ft)
2. Housing end (Inside)	6. Starter motor case	: Apply grease to sliding surface.
3. O-ring	7: Housing end assembly (Outside) : Never remove the brush, spring and brush holder.	: Apply moly past to sliding surface.
4. Armature	8. Starter motor lead wire nut	: Do not reuse.

Starter Motor Removal and Installation

B718H11906002

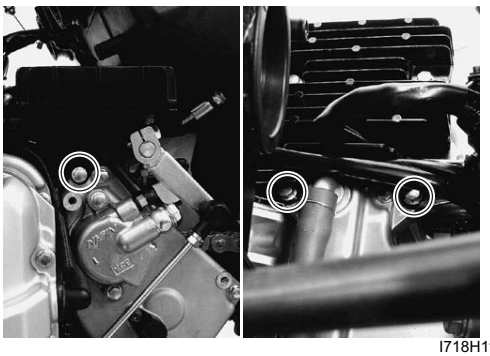
Removal

1) Turn the ignition switch OFF and disconnect the battery (–) lead wire. Refer to “Battery Removal and Installation in Section 1J (Page 1J-12)”.
2) Remove the throttle body. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-9)”.
3) Remove the engine sprocket outer cover (1).



I718H1190002-01

4) Remove the regulator/rectifier bracket mounting bolts.

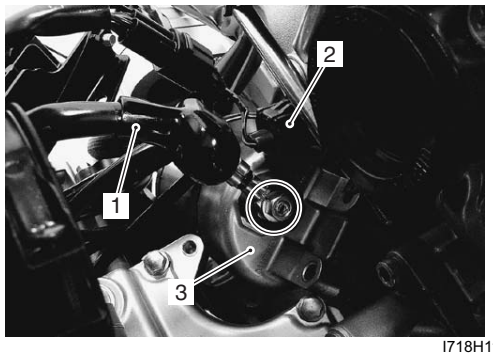


I718H1190003-01

5) Remove the starter motor mounting bolts.

I718H1190004-01

6) Disconnect the starter motor lead wire (1) and ECT sensor coupler (2).
7) Remove the starter motor (3).



I718H1190005-01

Installation

Install the starter motor in the reverse order of removal. Pay attention to the following points:

- Apply grease to the starter motor O-ring.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

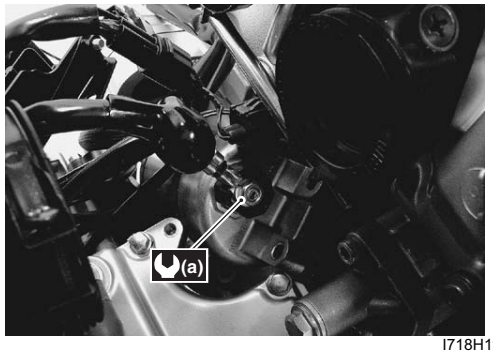
⚠ CAUTION

Replace the O-ring with a new one.

I718H1190006-01

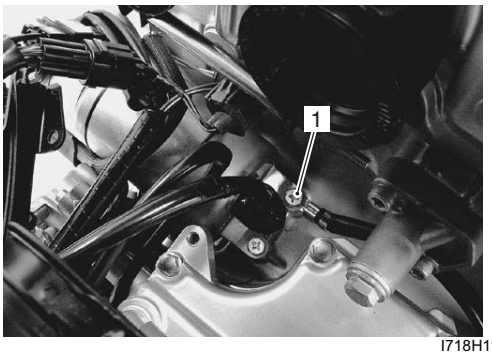
- Connect the starter motor lead wire.

Tightening torque
Starter motor lead wire mounting nut (a): 5 N·m (0.5 kgf-m, 3.5 lb-ft)



I718H1190007-01

- Tighten the starter motor mounting bolt (1) with the battery (–) lead wire. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-8)”.



I718H1190008-01

Starter Motor Disassembly and Assembly

B718H11906003

Refer to “Starter Motor Removal and Installation (Page 1I-4)”.

Disassembly

Disassemble the starter motor as shown in the starter motor components diagram. Refer to “Starter Motor Components (Page 1I-3)”.

Assembly

Reassemble the starter motor in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

Replace the O-rings with new ones to prevent oil leakage and moisture.

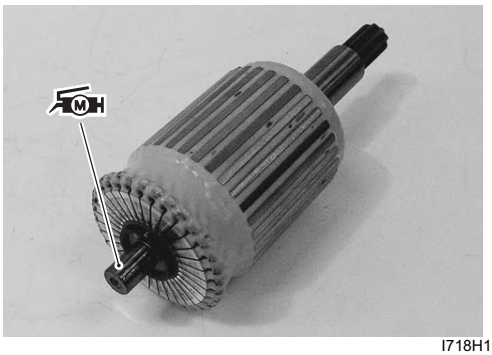
- Apply grease to the lip of the oil seal.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

I718H1190009-01

- Apply a small quantity of moly paste to the armature shaft.

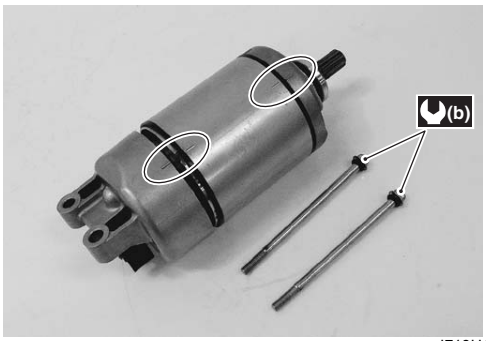
: Moly paste 99000–25140 (SUZUKI Moly paste or equivalent)



I718H1190011-01

- Align the match mark on the starter motor case with the match mark on the housing end.
- Tighten the starter motor housing bolts to the specified torque.

Tightening torque
Starter motor housing bolt (b): 5 N·m (0.5 kgf-m, 3.5 lb-ft)



I718H1190012-01

Starter Motor Inspection

B718H11906004

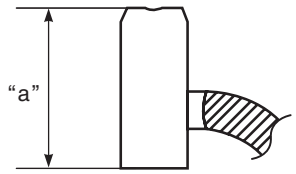
Refer to “Starter Motor Disassembly and Assembly (Page 1I-5)”.

Carbon Brush

Inspect the carbon brushes for abnormal wear, cracks or smoothness in the brush holder.
If either carbon brush is defective, replace the brush holder set with a new one.
Measure the length “a” of the carbon brushes using a vernier calipers. If the measurement is less then the service limit, replace the housing end assembly (outside) with a new one.

Brush length “a”
Service limit: 6.5 mm (0.26 in)

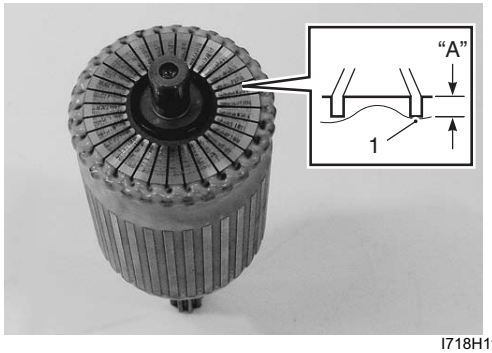
Special tool
TOOL : 09900–20102 (Vernier calipers (1/20 mm, 200 mm))



I718H1190013-01

Commutator

Inspect the commutator for discoloration, abnormal wear or undercut “A”.
If the commutator is abnormally worn, replace the armature.
If the commutator surface is discolored, polish it with #400 sandpaper and wipe it using a clean, dry cloth.
If there is no undercut, scrape out the insulator (1) with a saw blade.



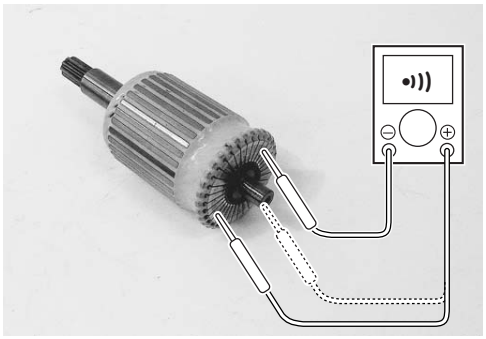
I718H1190014-02

Armature Coil

Measure for continuity between each segment. Measure for continuity between each segment and the armature shaft.
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)

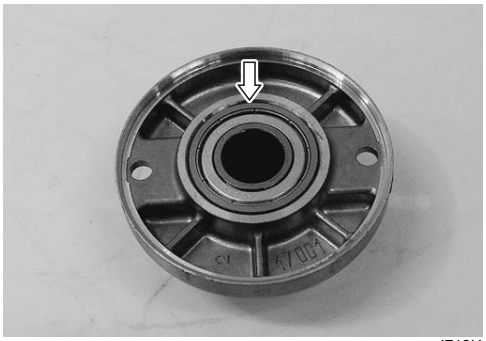
Tester knob indication
Continuity set (•)))



I718H1190015-01

Bearing

Check the bearing of housing end for damage.
If any damage is found, replace the housing end.



I718H1190016-01

Oil Seal

Check the seal lip for damage.
If any damage is found, replace the housing end (Inside).

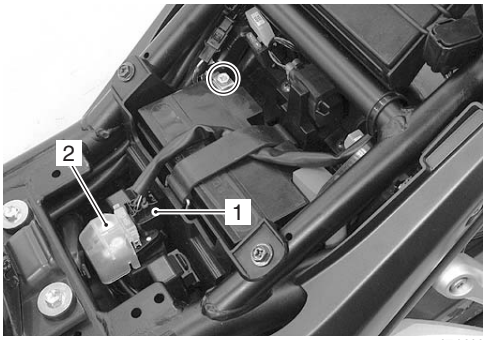
I718H1190018-01

Starter Relay Removal and Installation

B718H11906005

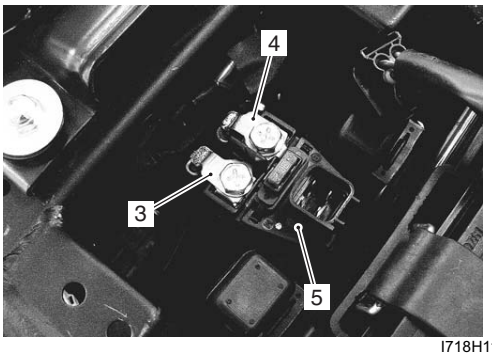
Removal

1) Turn the ignition switch OFF.
2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Disconnect the battery (–) lead wire from the battery.
4) Disconnect the starter relay coupler (1) and remove the starter relay cover (2).



I718H1190039-01

5) Disconnect the starter motor lead wire (3) and battery (+) lead wire (4).
6) Remove the starter relay (5).



I718H1190019-01

Installation

Install the starter relay in the reverse order of removal.

Starter Relay Inspection

B718H11906006

Inspect the starter relay in the following procedures:

1) Remove the starter relay. Refer to “Starter Relay Removal and Installation (Page 1I-7)”.
2) Apply 12 V to “A” and “B” terminals and check for continuity between the positive and negative terminals using the multi-circuit tester. If the starter relay clicks and continuity is found, the relay is ok.

⚠ CAUTION

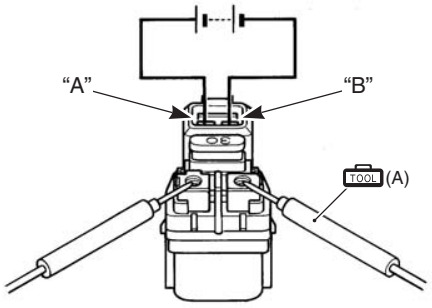
Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.

Special tool

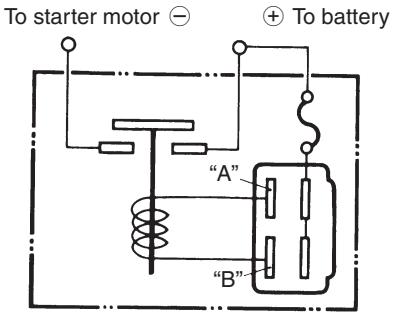
TOOL (A): 09900–25008 (Multi-circuit tester set)

Tester knob indication

Continuity test (•))))



I649G1190021-03

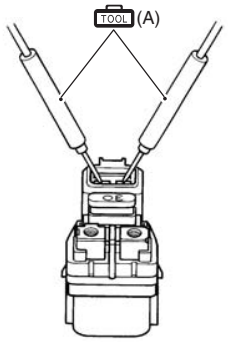


I649G1190022-01

3) Measure the relay coil resistance between the terminals using the multi-circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)

Starter relay resistance
3 – 6 Ω



I649G1190023-02

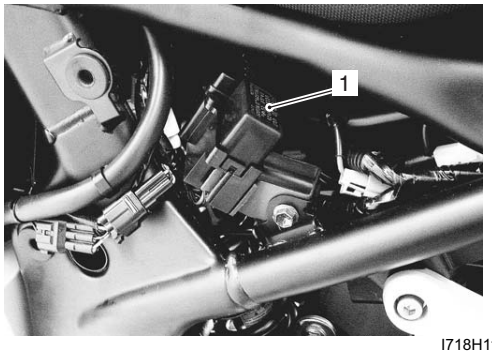
4) Install the starter relay. Refer to "Starter Relay Removal and Installation (Page 1I-7)".

Turn Signal / Side-stand Relay Removal and Installation

B718H11906007

Removal

1) Turn the ignition switch OFF.
2) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
3) Remove the turn signal/side-stand relay (1).



I718H1190022-01

Installation

Install the turn signal/side-stand relay in the reverse order of removal.

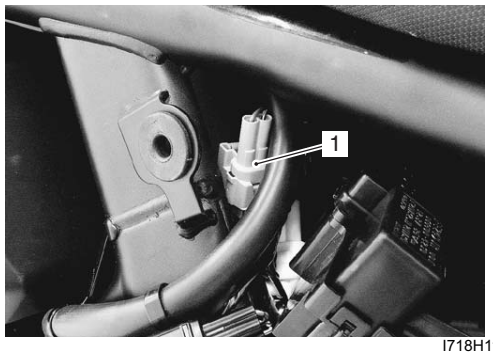
Side-stand / Ignition Interlock System Parts Inspection

B718H11906008

Check the interlock system for proper operation. If the interlock system does not operate properly, check each component for damage or abnormalities. If any abnormality is found, replace the component with a new one.

Side-stand Switch

1) Turn the ignition switch OFF.
2) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
3) Disconnect the side-stand switch coupler (1).



I718H1190020-01

4) Measure the voltage between Green and Black/White lead wires.

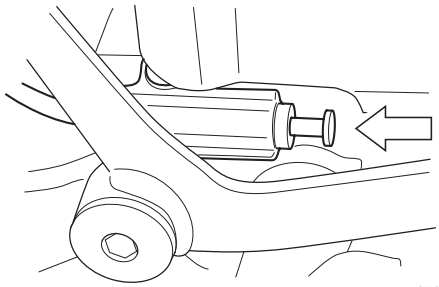
Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Diode test (⊣◀)

	G ((+) probe)	B/W ((–) probe)
ON (Side-stand up)	0.4 – 0.6 V	
OFF (Side-stand down)	1.4 V and more (Tester's battery voltage)	

NOTE

If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

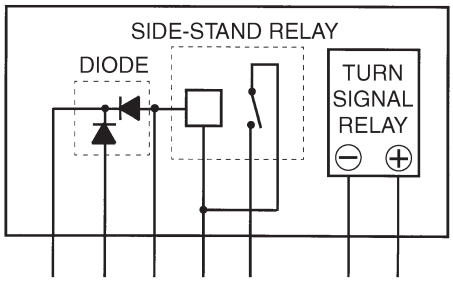


I718H1190023-01

5) Connect the side-stand switch coupler.
6) Install the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

Turn Signal / Side-stand Relay

The turn signal/side-stand relay is composed of the turn signal relay, side-stand relay and diode.



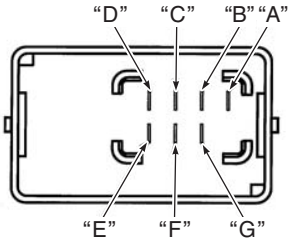
I649G1190027-01

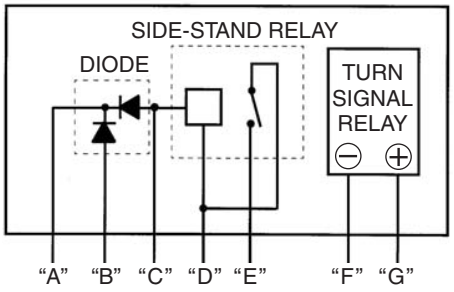
Side-stand relay

1) Remove the turn signal/side-stand relay. Refer to “Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)”.
2) Check the insulation between “D” and “E” terminals using the multi-circuit tester.
3) Apply 12 V to terminals “D” and “C” ((+) to “D” and (–) to “C”) and check the continuity between “D” and “E”. If there is no continuity, replace the turn signal/side-stand relay with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity test (•))))





I649G1190028-01

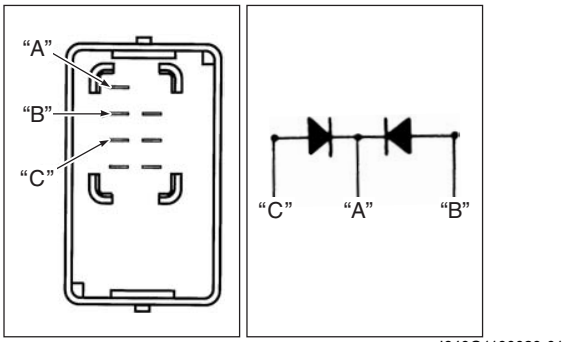
4) Install the turn signal/side-stand relay. Refer to “Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)”.

Diode inspection

1) Remove the turn signal/side-stand relay. Refer to “Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)”.
2) Measure the voltage between the “A”, “B” and “C” terminals using the multi-circuit tester.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Diode test (⊣◀)



I649G1190029-01

	⊕ Probe of tester to:		
		“B”, “C”	“A”
⊖ Probe of tester to:	“B”, “C”	—	1.4 V and more (Tester's battery voltage)
	“A”	0.4 – 0.6 V	—

I649G1190046-03

NOTE

If the multi circuit tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

3) Install the turn signal/side-stand relay. Refer to “Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)”.

Gear Position Switch

1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the gear position switch coupler.

⚠ CAUTION

When disconnecting and connecting the gear position switch coupler, make sure to turn off the ignition switch, or electronic parts may get damaged.

I718H1190024-01

3) Check the continuity between Blue and Black/White lead wires with the transmission in “NEUTRAL”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity test (•)))

	BI	B/W
ON (Neutral)	○	○
OFF (Except neutral)		

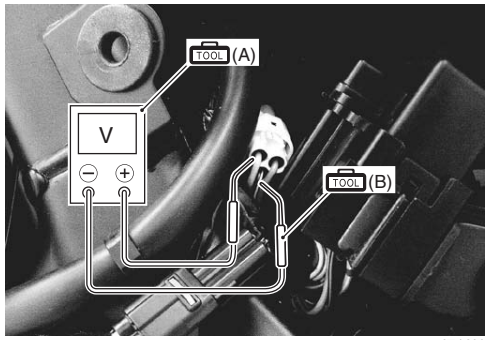
I649G1190045-02

4) Connect the gear position switch coupler to the wiring harness.
5) Insert the needle pointed probes to the lead wire coupler.
6) Turn the ignition switch ON and side-stand to upright position.
7) Measure the voltage between Pink and Black/White lead wires using the multi-circuit tester when shifting the gearshift lever from low to top.

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)
TOOL (B): 09900–25009 (Needle pointed probe set)

Tester knob indication
Voltage (⎓)

Gear position switch voltage (Except neutral position)
0.6 V and more ((+) P – (–) B/W)



I718H1190001-02

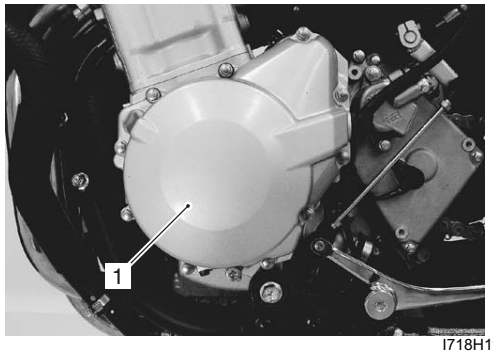
8) Turn the ignition switch OFF.
9) Install the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

Starter Clutch Removal and Installation

B718H11906010

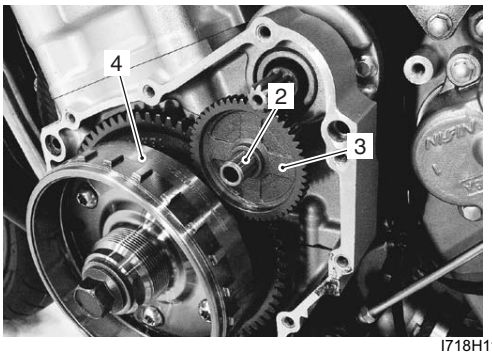
Removal

1) Drain engine oil.
2) Remove the generator cover (1). Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.



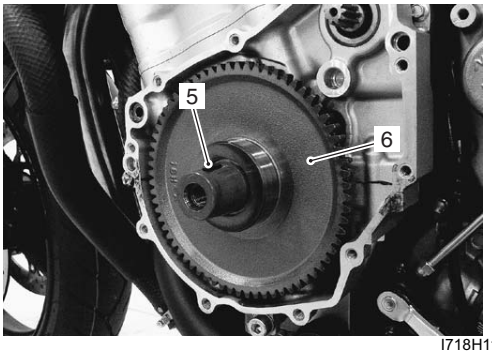
I718H1190025-01

3) Remove the idle gear shaft (2) and starter idle gear (3).
4) Remove the generator rotor assembly (4). Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".



I718H1190026-01

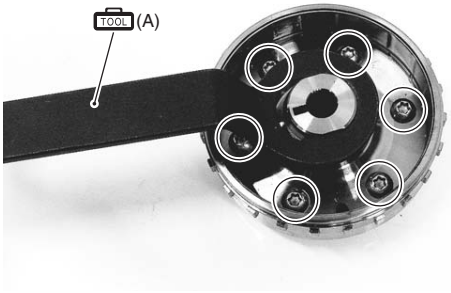
5) Remove the key (5) and starter driven gear (6).



I718H1190027-01

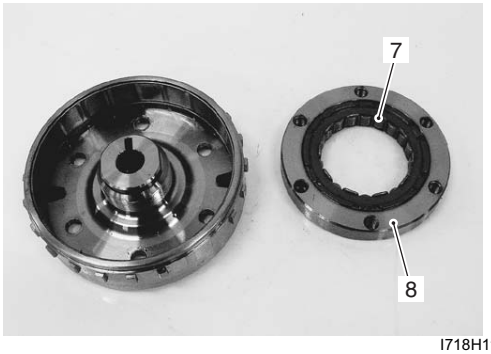
6) Hold the generator rotor with the special tool and remove the starter clutch bolts.

Special tool
(A): 09930–44530 (Rotor holder)



I718H1190028-01

7) Remove the one way clutch (7) from the guide (8).



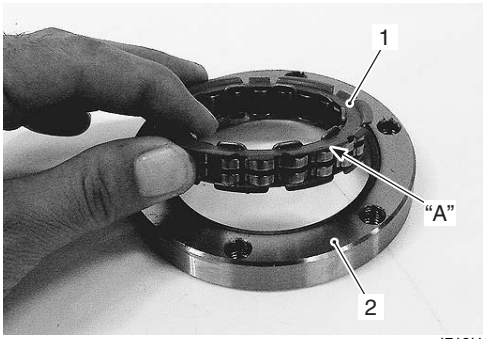
I718H1190029-01

Installation
Install the starter clutch in the reverse order of removal. Pay attention to the following points:

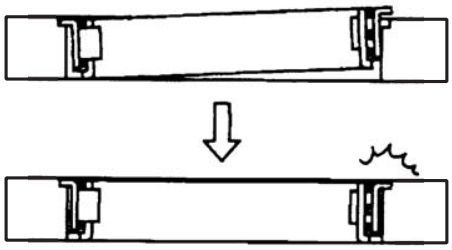
- When inserting the one way clutch (1) into the guide (2), fit the flange "A" in the step of the guide (2).

NOTE

Be sure to seat the flange "A" of the one way clutch (1) to the guide (2).



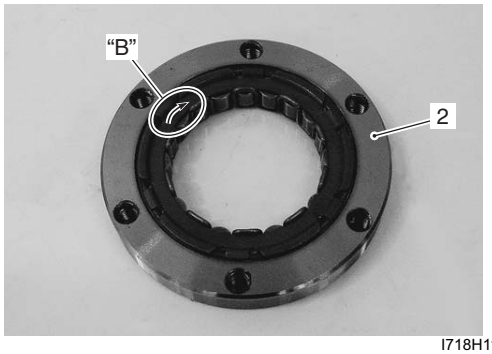
I718H1190030-02


I718H1190031-01

- Install the guide (2) to the generator rotor.

NOTE

The arrow mark "B" must face to the generator rotor side.



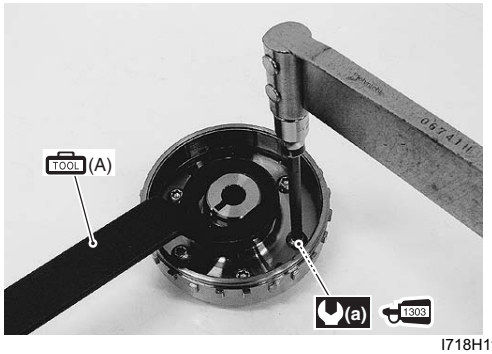
I718H1190032-01

- Apply thread lock to the bolts, and then tighten them to the specified torque with the special tool.

1303 : Thread lock cement 99000–32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

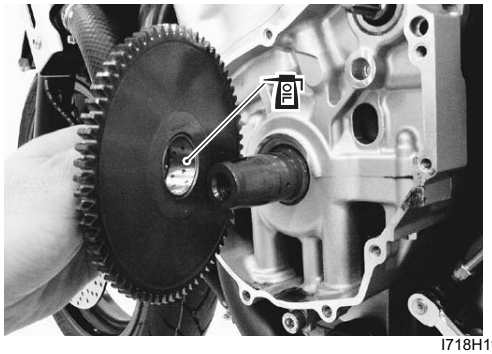
Special tool
TOOL (A): 09930–44530 (Rotor holder)

Tightening torque
Starter clutch bolt (a): 25 N·m (2.5 kgf-m, 18.0 lb-ft)



I718H1190033-02

- Apply engine oil to the bushing of the starter driven gear.



I718H1190034-01

- Install the generator rotor assembly onto crankshaft. Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".

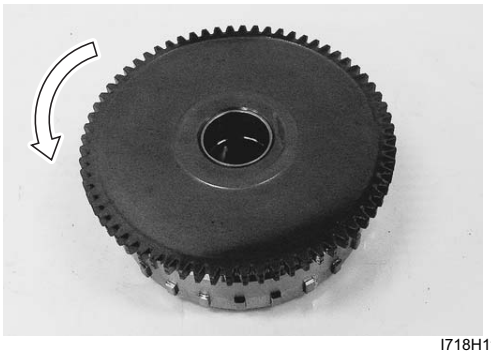
Starter Clutch Inspection

B718H11906011

Refer to "Starter Clutch Removal and Installation (Page 1I-10)".

Starter Clutch

1) Install the starter driven gear onto the starter clutch.
2) Turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns in one direction only. If a large resistance is felt for rotation, inspect the starter clutch or the starter clutch contacting surface on the starter driven gear for wear or damage.
   If they are found to be damaged, replace them with new ones.



I718H1190035-01

Starter Driven Gear Bearing

Inspect the starter driven gear bearing for wear or damage.

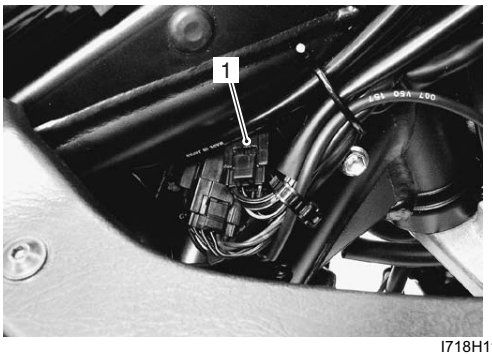
I718H1190036-01

Starter Button Inspection

B718H11906012

Inspect the starter button in the following procedures:

1) Remove the right frame head cover. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the right handlebar switch coupler (1).



I718H1190037-01

3) Inspect the starter button for continuity with a tester. If any abnormality is found, replace the right handle switch assembly with a new one. Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Color / Position	B/R	Bl/B
•		
PUSH	○———	———○

I649G1190044-01

4) After finishing the starter button inspection, reinstall the removed parts.

Specifications

Service Data

B718H11907001

Unit: mm (in)

Item	Specification		Note
Starter motor brush length	Standard	12.0 (0.47)	
	Limit	6.5 (0.26)	
Starter relay resistance	3 – 6 Ω		

Tightening Torque Specifications

B718H11907002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Starter motor lead wire mounting nut	5	0.5	3.5	☞(Page 1I-4)
Starter motor housing bolt	5	0.5	3.5	☞(Page 1I-5)
Starter clutch bolt	25	2.5	18.0	☞(Page 1I-12)

NOTE

The specified tightening torque is also described in the following.
“Starter Motor Components (Page 1I-3)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H11908001

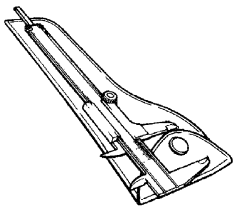
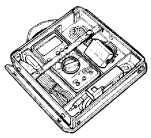
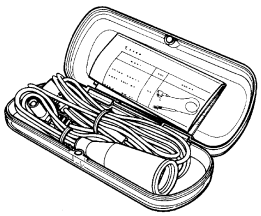
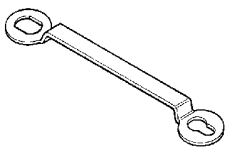
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1I-4) / ☞(Page 1I-5)
Moly paste	SUZUKI Moly paste or equivalent	P/No.: 99000–25140	☞(Page 1I-5)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000–32030	☞(Page 1I-12)

NOTE

Required service material is also described in the following.
"Starter Motor Components (Page 1I-3)"

Special Tool

B718H11908002

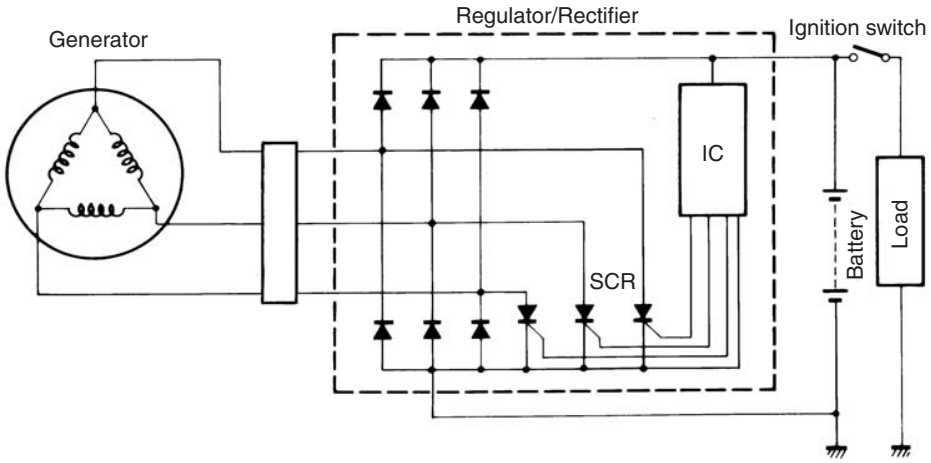
09900–20102 Vernier calipers (1/20 mm, 200 mm) ☞(Page 1I-6) 	09900–25008 Multi-circuit tester set ☞(Page 1I-6) / ☞(Page 1I-7) / ☞(Page 1I-8) / ☞(Page 1I-8) / ☞(Page 1I-9) / ☞(Page 1I-9) / ☞(Page 1I-10) / ☞(Page 1I-10) / ☞(Page 1I-13) 
09900–25009 Needle pointed probe set ☞(Page 1I-10) 	09930–44530 Rotor holder ☞(Page 1I-11) / ☞(Page 1I-12) 

Charging System

Schematic and Routing Diagram

Charging System Diagram

B718H11A02001



I718H11A0001-01

Component Location

Charging System Components Location

B718H11A03001

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

Diagnostic Information and Procedures

Charging System Symptom Diagnosis

B718H11A04001

Condition	Possible cause	Correction / Reference Item
Generator does not charge	Open- or short-circuited lead wires, or loose lead connections.	*Repair, replace or connect properly.*
	Short-circuited, grounded or open generator coil.	*Replace.*
	Short-circuited or punctured regulator/ rectifier.	*Replace.*
Generator does charge, but charging rate is below the specification	Lead wires tend to get short- or open-circuited or loosely connected at terminals.	*Repair or retighten.*
	Grounded or open-circuited generator coil.	*Replace.*
	Defective regulator/rectifier.	*Replace.*
	Defective cell plates in the battery.	*Replace the battery.*
Generator overcharges	Internal short-circuit in the battery.	*Replace the battery.*
	Damaged or defective regulator/rectifier.	*Replace.*
	Poorly grounded regulator/rectifier.	*Clean and tighten ground connection.*
Unstable charging	Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	*Repair or replace.*
	Internally short-circuited generator.	*Replace.*
	Defective regulator/rectifier.	*Replace.*

Condition	Possible cause	Correction / Reference Item
Battery overcharges	Faulty regulator/rectifier.	*Replace.*
	Faulty battery.	*Replace.*
	Poor contact of generator lead wire coupler.	*Repair.*
Battery runs down quickly	Trouble in charging system.	*Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation.*
	Cell plates have lost much of their active materials a result of overcharging.	*Replace the battery and correct the charging system.*
	Internal short-circuit in the battery.	*Replace the battery.*
	Too low battery voltage.	*Recharge the battery fully.*
	Too old battery.	*Replace the battery.*
Battery "sulfation"	Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	*Replace the battery.*
	The battery was left unused in a cold climate for too long.	*Replace the battery if badly sulfated.*

Battery Runs Down Quickly

B718H11A04002

Troubleshooting

Step	Action	Yes	No
1	Check accessories which use excessive amounts of electricity. *Are accessories being installed?*	Remove accessories.	Go to Step 2.
2	Check the battery for current leakage. Refer to "Battery Current Leakage Inspection (Page 1J-3)". *Is the battery for current leakage OK?*	Go to Step 3.	• Short circuit of wire harness • Faulty electrical equipment
3	Measure the regulated voltage between the battery terminals. Refer to "Regulated Voltage Inspection (Page 1J-3)". *Is the regulated voltage OK?*	• Faulty battery • Abnormal driving condition	Go to Step 4.
4	Measure the resistance of the generator coil. Refer to "Generator Inspection (Page 1J-3)". *Is the resistance of generator coil OK?*	Go to Step 5.	• Faulty generator coil • Disconnected lead wires
5	Measure the generator no-load performance. Refer to "Generator Inspection (Page 1J-3)". *Is the generator no-load performance OK?*	Go to Step 6.	Faulty generator
6	Inspect the regulator/rectifier. Refer to "Regulator / Rectifier Inspection (Page 1J-8)". *Is the regulator/rectifier OK?*	Go to Step 7.	Faulty regulator/rectifier
7	Inspect wirings. *Is the wirings OK?*	Faulty battery	• Short circuit of wire harness • Poor contact of couplers

Repair Instructions

Battery Current Leakage Inspection

B718H11A06001

Inspect the battery current leakage in the following procedures:

1) Turn the ignition switch OFF.
2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Disconnect the battery (–) lead wire.
4) Measure the current between (–) battery terminal and the (–) battery lead wire using the multi-circuit tester. If the reading exceeds the specified value, leakage is evident.

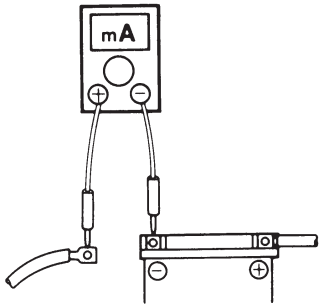
⚠ CAUTION

- **In case of a large current leak, turn the tester to high range first to avoid tester damage.**
- **Do not turn the ignition switch ON when measuring current.**

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)

Tester knob indication
Current (⎓ , 20 mA)

Battery current (Leak)
Under 3 mA



I649G11A0002-01

5) Connect the (–) battery terminal and install the seat. Refer to “Battery Removal and Installation (Page 1J-12)” and “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

Regulated Voltage Inspection

B718H11A06002

Inspect the regulated voltage in the following procedures:

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Start the engine and keep it running at 5 000 r/min with the dimmer switch turned HI position.
3) Measure the DC voltage between the (+) and (–) battery terminals using the multi-circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. Refer to “Generator Inspection (Page 1J-3)” and “Regulator / Rectifier Inspection (Page 1J-8)”.

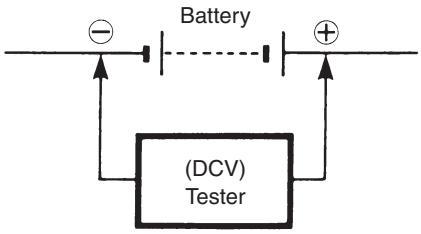
NOTE

When making this test, be sure that the battery is in fully charged condition.

Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)

Tester knob indication
Voltage (⎓)

Regulated voltage (Charging output)
Standard: 14.0 – 15.5 V at 5 000 r/min



I649G11A0003-01

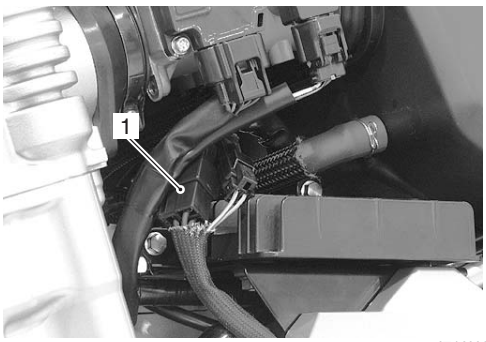
4) Install the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

Generator Inspection

B718H11A06011

Generator Coil Resistance

1) Disconnect the generator coupler (1).



I718H11A0030-01

2) Measure the resistance between the three lead wires.
If the resistance is out of specified value, replace the stator with a new one. Also, check that the generator core is insulated properly.

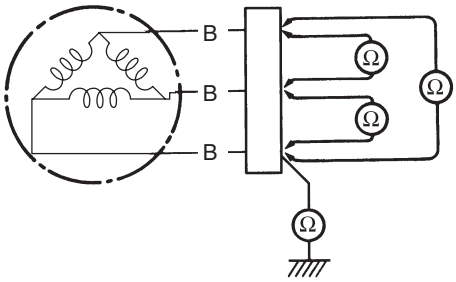
NOTE

When making this test, be sure that the battery is in fully charged condition.

Special tool
(TOOL) : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Resistance (Ω)

Generator coil resistance
0.2 – 0.8 Ω (B – B)
∞Ω (B – Ground)

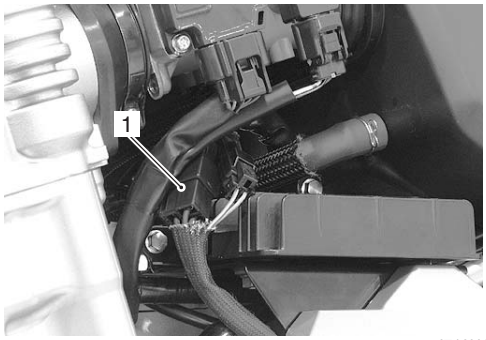


I718H11A0005-02

3) Connect the generator coupler.

No-load Performance

1) Disconnect the generator coupler (1).



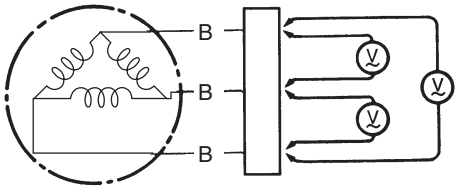
I718H11A0030-01

2) Start the engine and keep it running at 5 000 r/min.
3) Using the multi-circuit tester, measure the voltage between three lead wires.
If the tester reads under the specified value, replace the generator with a new one.

Special tool
(TOOL) : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Voltage (~)

Generator no-load performance (When engine is cold)
60 V (AC) and more at 5 000 r/min



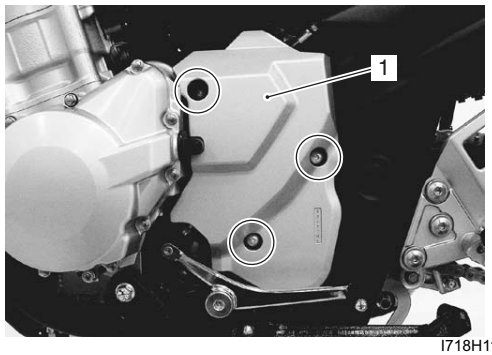
I718H11A0006-02

Generator Removal and Installation

B718H11A06004

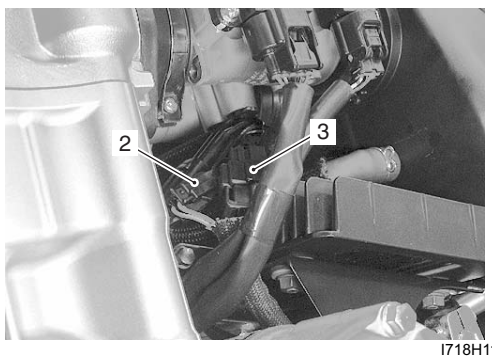
Removal

1) Disconnect the battery (–) lead wire. Refer to “Battery Removal and Installation (Page 1J-12)”.
2) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
3) Remove the engine sprocket outer cover (1).



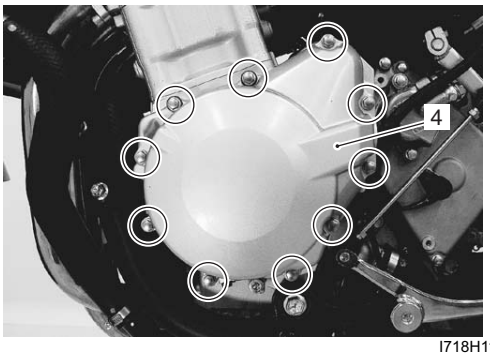
I718H11A0007-01

4) Disconnect the CKP sensor coupler (2) and generator coupler (3).



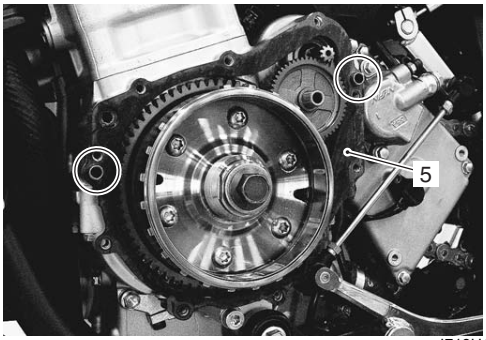
I718H11A0031-01

5) Remove the generator cover (4).



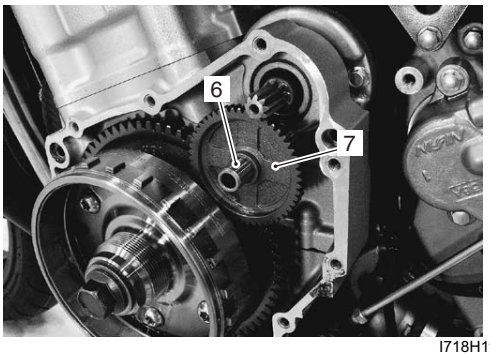
I718H11A0010-01

6) Remove the gasket (5) and dowel pins.



I718H11A0011-01

7) Remove the idle gear shaft (6) and starter idle gear (7).



I718H11A0012-01

8) Hold the generator rotor with the special tool.

Special tool
(A): 09930–44530 (Rotor holder)

9) Loosen the generator rotor bolt.

NOTE

When loosen the rotor bolt, do not remove it. The rotor bolt is used in conjunction with the rotor remover when removing the rotor.

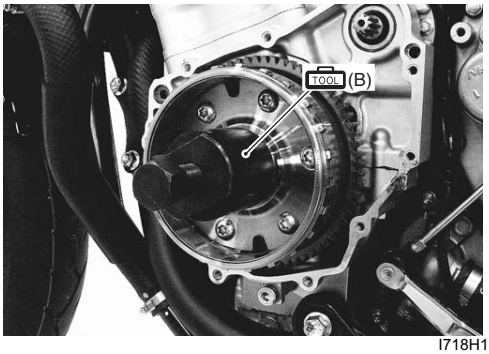
I718H11A0013-01

10) Remove the generator rotor assembly (8) with the special tool.

NOTE

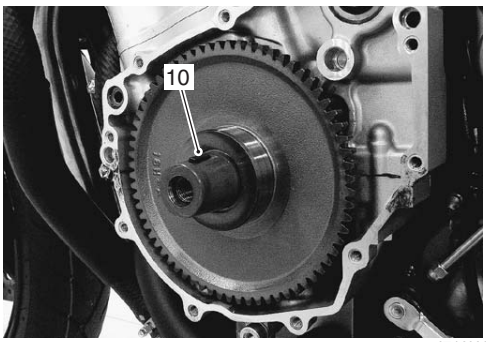
Remove the starter clutch if necessary. Refer to "Starter Clutch Removal and Installation in Section 1I (Page 1I-10)".

Special tool
(B): 09930–34970 (Rotor remover set)



I718H11A0014-01

11) Remove the key (10).



I718H11A0015-01

12) Remove the generator stator (11) along with the CKP sensor (12).

I718H11A0016-01

Installation

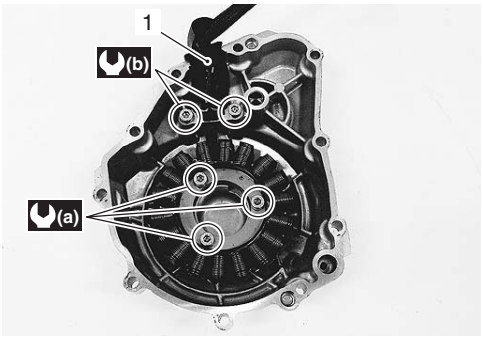
Install the generator in the reverse order of removal. Pay attention to the following points:

- Tighten the generator starter set bolts and CKP sensor mounting bolts to the specified torque.

NOTE

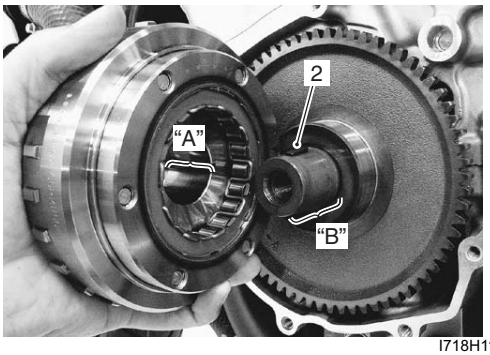
Be sure the grommet (1) is set to the generator cover.

Tightening torque
Generator stator set bolt (a): 11 N·m (1.1 kgf-m, 8.0 lb-ft)
CKP sensor mounting bolt (b): 11 N·m (1.1 kgf-m, 8.0 lb-ft)



I718H11A0017-01

- Degrease the tapered portion “A” of generator rotor and also the crankshaft “B”. Use nonflammable cleaning solvent to wipe off oily or greasy matter and make these surfaces completely dry.
- Fit the key (2) in the key slot on the crankshaft.
- Install the generator rotor onto crankshaft.

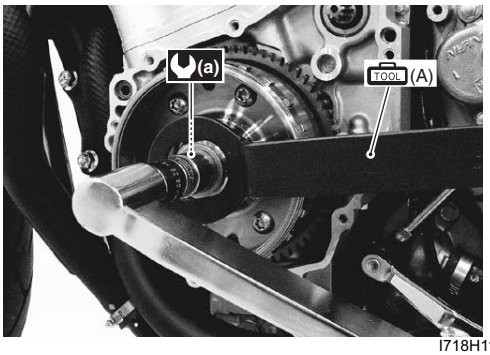


I718H11A0018-01

- Hold the generator rotor with the special tool and tighten its bolt to the specified torque.

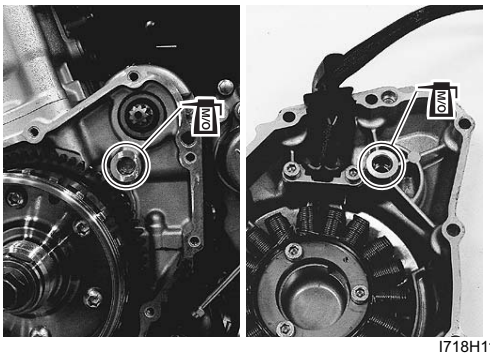
Special tool
TOOL (A): 09930–44530 (Rotor holder)

Tightening torque
Generator rotor bolt (a): 120 N·m (12.0 kgf-m, 87.0 lb-ft)



I718H11A0019-01

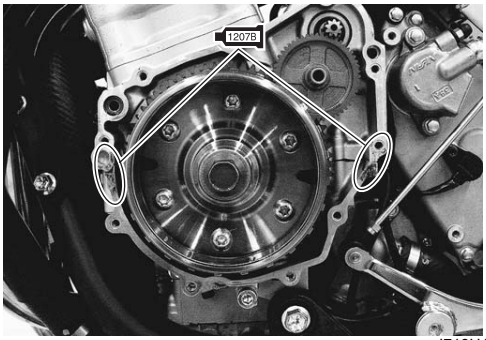
- Apply molybdenum oil solution to the idle gear shaft holes.



I718H11A0020-01

- Apply bond lightly to the mating surfaces at the parting line between the upper and lower crankcases as shown.

  1207B : Sealant 99000–31140 (SUZUKI BOND No.1207B or equivalent)

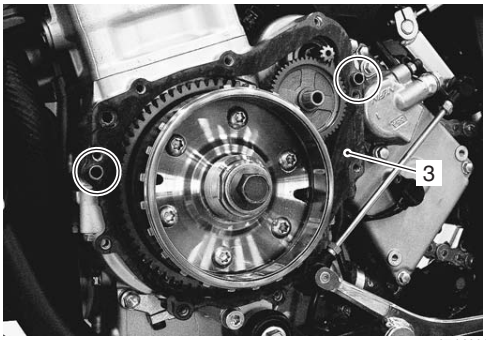


I718H11A0022-01

- Install the dowel pins and new gasket (3).

⚠ CAUTION

Use a new gasket to prevent oil leakage.



I718H11A0023-01

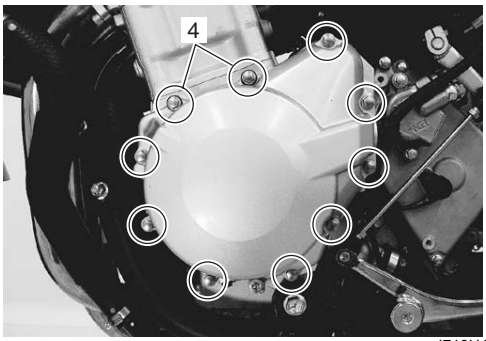
- Install the generator cover and tighten the generator cover bolts.

⚠ WARNING

Be careful not to pinch the finger between the generator cover and the crankcase.

⚠ CAUTION

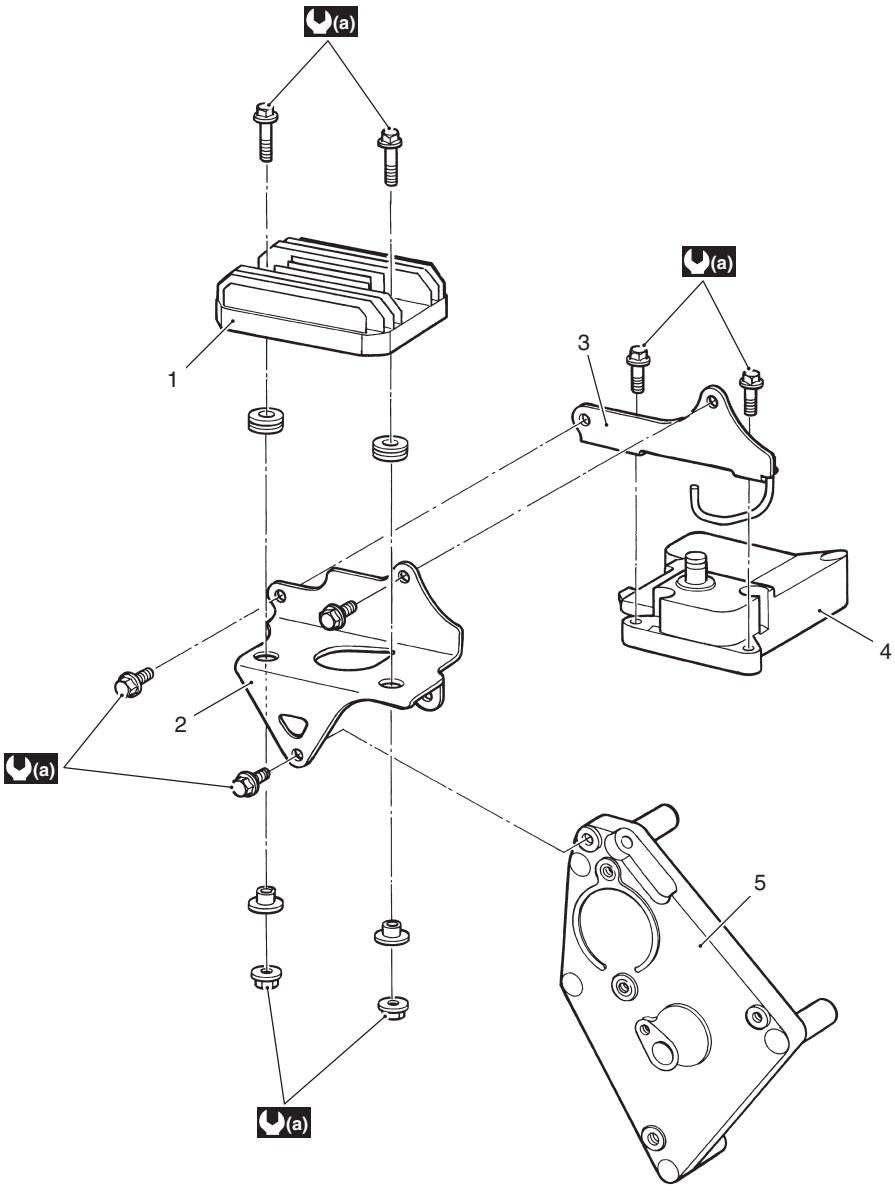
Fit new gasket washer to the bolt (4).



I718H11A0024-01

Regulator / Rectifier Construction

B718H11A06013



I718H11A0002-01

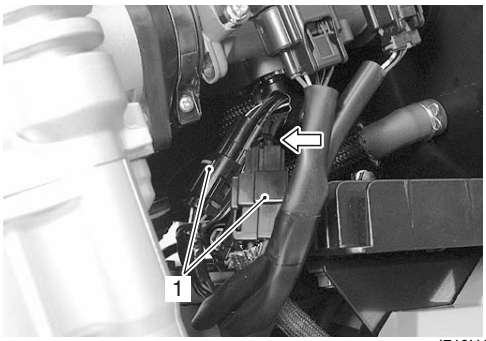
1. Regulator/rectifier	3. Regulator/rectifier bracket No.2	5. Engine sprocket inner cover
2. Regulator/rectifier bracket No.1	4. Breather cover	(a) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)

Regulator / Rectifier Inspection

B718H11A06012

Inspect the regulator/rectifier in the following procedures:

1) Turn the ignition switch OFF.
2) Remove the clamp.
3) Disconnect the regulator/rectifier couplers (1).



I718H11A0032-02

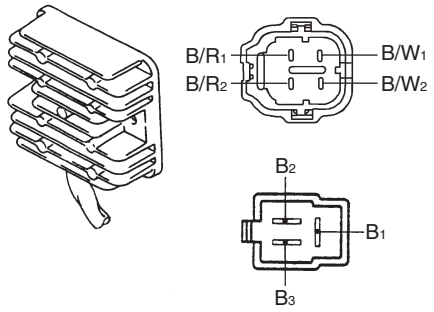
4) Measure the voltage between the terminals using the multi-circuit tester as indicated in the following table. If the voltage is not within the specified value, replace the regulator/rectifier with a new one. Refer to “Regulator / Rectifier Construction (Page 1J-8)”.

NOTE

If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Diode test (⊣◀)



I718H11A0026-01

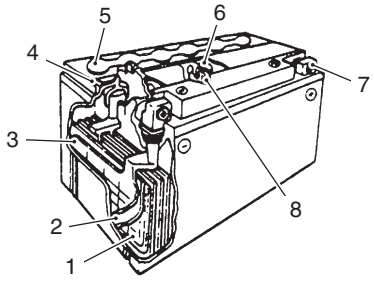
Unit: V

		(+) probe of tester to:						
		B/R_1	B/R_2	B_1	B_2	B_3	B/W_1	B/W_2
(–) probe of tester to:	B/R_1	—	0	0.2 – 0.8	0.2 – 0.8	0.2 – 0.8	0.4 – 1.0	0.4 – 1.0
	B/R_2	0	—	0.2 – 0.8	0.2 – 0.8	0.2 – 0.8	0.4 – 1.0	0.4 – 1.0
	B_1	*	*	—	0.6 – 1.2	0.6 – 1.2	0.2 – 0.8	0.2 – 0.8
	B_2	*	*	0.6 – 1.2	—	0.6 – 1.2	0.2 – 0.8	0.2 – 0.8
	B_3	*	*	0.6 – 1.2	0.6 – 1.2	—	0.2 – 0.8	0.2 – 0.8
	B/W_1	*	*	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	—	0
	B/W_2	*	*	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0	—
*1.4 V and more (tester’s battery voltage)								

5) Connect the regulator/rectifier couplers and bind the clamp.

Battery Components

B718H11A06007



I649G11A0046-02

1. Anode plates	5. Stopper
2. Separator (Fiberglass plate)	6. Filter
3. Cathode plates	7. Terminal
4. Upper cover breather	8. Safety valve

Battery Charging

B718H11A06008

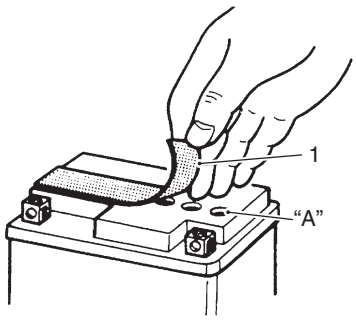
Initial Charging

Filling electrolyte

NOTE

When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.

1) Remove the aluminum tape (1) which seals the battery filler holes “A”.

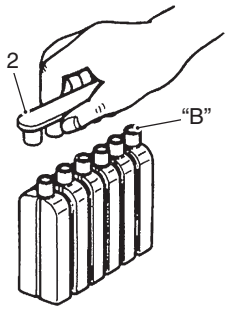


I649G11A0039-02

2) Remove the caps (2) from the electrolyte container.

NOTE

- **Do not remove or pierce the sealed areas “B” of the electrolyte container.**
- **After filling the electrolyte completely, use the removed cap (2) as sealing caps of battery-filler holes.**



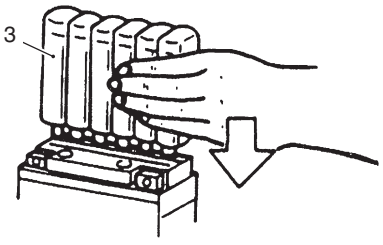
I649G11A0040-02

3) Insert the nozzles of the electrolyte container (3) into the electrolyte filler holes of the battery.

4) Hold the electrolyte container firmly so that it does not fall.

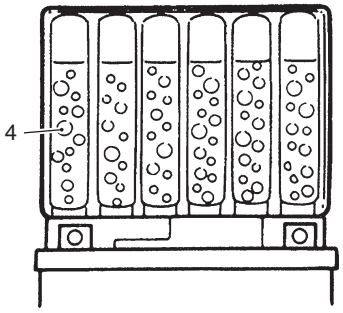
NOTE

Do not allow any of the electrolyte to spill.



I649G11A0041-02

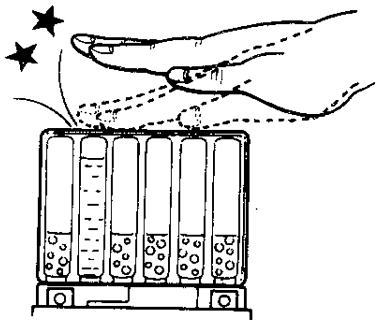
5) Make sure that air bubbles (4) rise to the top of each electrolyte container, and leave in this position for about more than 20 minutes.



I649G11A0042-02

NOTE

If no air bubbles come out from a filler port, tap the bottom of the electrolyte container two or three times.
Never remove the container from the battery.

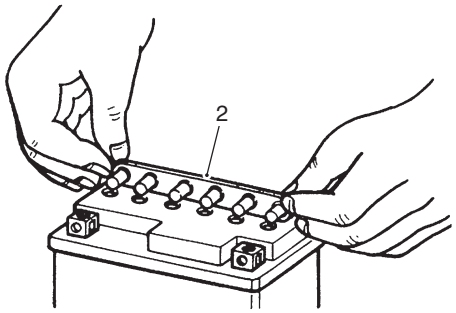


I310G11A0024-01

6) After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery.
7) Wait for about 20 minutes.
8) Insert the caps (2) into the filler holes, pressing in firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.

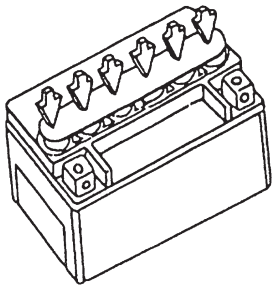
⚠ CAUTION

- **Once the caps are installed to the battery, do not remove the caps.**
- **Do not tap the caps with a hammer when installing them.**

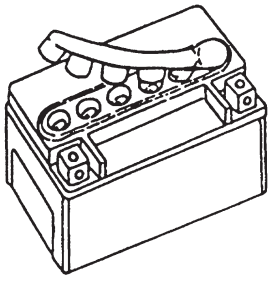


I718H11A0027-01

Correct



Incorrect



I649G11A0047-01

Charging

For initial charging, use the charger specially designed for MF battery.

⚠ CAUTION

- **For charging the battery, make sure to use the charger specially designed for MF battery. Otherwise, the battery may be overcharged resulting in shortened service life.**
- **Do not remove the cap during charging.**
- **Position the battery with the cap facing upward during charging.**

Battery Recharging

⚠ CAUTION

Do not remove the caps on the battery top while recharging.

NOTE

When the motorcycle is not used for a long period, check the battery every 1 month to prevent the battery discharge.

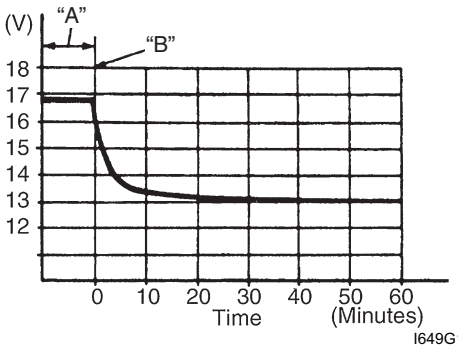
1) Remove the battery from the motorcycle. Refer to "Battery Removal and Installation (Page 1J-12)".
2) Measure the battery voltage using the multi-circuit tester.
   If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

Recharging time
1.2 A for 5 to 10 hours or 5 A for 1 hour.

⚠ CAUTION

Be careful not to permit the charging current to exceed 5 A at any time.

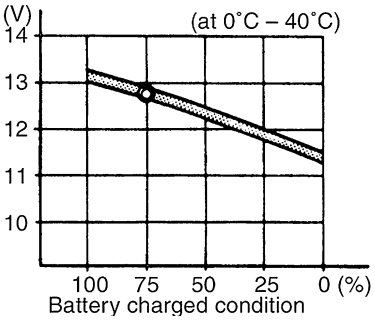
3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi-circuit tester.
If the battery voltage is less than 12.5 V, recharge the battery again.
If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.



I649G11A0045-01

"A": Charging period	"B": Stop charging

4) Install the battery to the motorcycle. Refer to "Battery Removal and Installation (Page 1J-12)".



I310G11A0030-01

Battery Removal and Installation

B718H11A06009

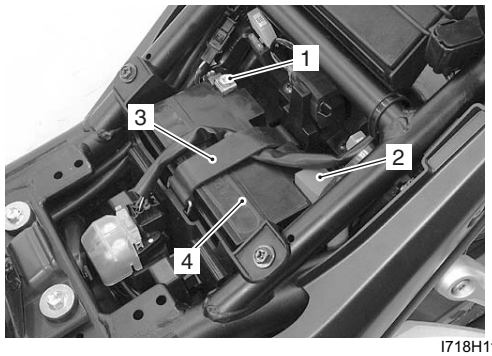
Removal

1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
2) Disconnect the battery (–) lead wire (1).
3) Disconnect the battery (+) lead wire (2).

NOTE

Be sure to disconnect the battery (–) lead wire (1) first, then disconnect the battery (+) lead wire (2).

4) Remove the rubber band (3).
5) Remove the battery (4) from the motorcycle.



I718H11A0033-01

Installation

Install the battery in the reverse order of removal.
Pay attention to following points:

⚠ CAUTION

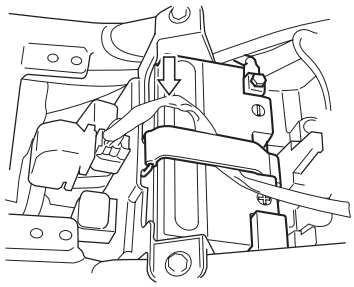
Never use anything except the specified battery.

- Install the rubber band.

⚠ CAUTION

Be careful not to slack the wiring harness between the battery and starter relay.

- Tighten the battery lead wire mounting bolts securely.



I718H11A0029-01

Battery Visual Inspection

B718H11A06010

Inspect the battery in the following procedures:

1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
2) Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one.
If the battery terminals are found to be coated with rust or an acidic white powdery substance, clean the battery terminals with sandpaper.
3) Install the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".

Specifications

Service Data

B718H11A07001

Battery

⚠ CAUTION

Never use anything except the specified battery.

Item	Specification	Note
Type designation	FT12A-BS	
Capacity	12 V, 36.0 kC (10 Ah)/10HR	
Standard electrolyte S.G.	1.330 at 20 °C (68 °F)	

Generator

Item	Specification	Note
Generator coil resistance	0.2 – 0.8 Ω	
Generator maximum output	Approx. 400 W at 5 000 r/min	
Generator no-load voltage (When engine is cold)	60 V (AC) and more at 5 000 r/min	
Regulated voltage	14.0 – 15.5 V at 5 000 r/min	

Tightening Torque Specifications

B718H11A07002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Generator stator set bolt	11	1.1	8.0	☞(Page 1J-6)
CKP sensor mounting bolt	11	1.1	8.0	☞(Page 1J-6)
Generator rotor bolt	120	12.0	87.0	☞(Page 1J-6)

NOTE

The specified tightening torque is also described in the following.
“Regulator / Rectifier Construction (Page 1J-8)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

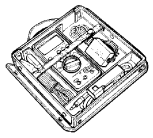
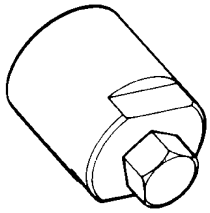
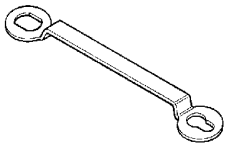
Recommended Service Material

B718H11A08001

Material	SUZUKI recommended product or Specification		Note
Sealant	SUZUKI BOND No.1207B or equivalent	P/No.: 99000–31140	☞(Page 1J-7)

Special Tool

B718H11A08002

09900–25008 Multi-circuit tester set ☞(Page 1J-3) / ☞(Page 1J-3) / ☞(Page 1J-4) / ☞(Page 1J-4) / ☞(Page 1J-9) 	09930–34970 Rotor remover set ☞(Page 1J-5) 
09930–44530 Rotor holder ☞(Page 1J-5) / ☞(Page 1J-6) 	

Exhaust System

Precautions

Precautions for Exhaust System

B718H11B00001

⚠ WARNING

To avoid the risk of being burned, do not touch the exhaust system when the system is hot. Any service on the exhaust system should be performed when the system is cool.

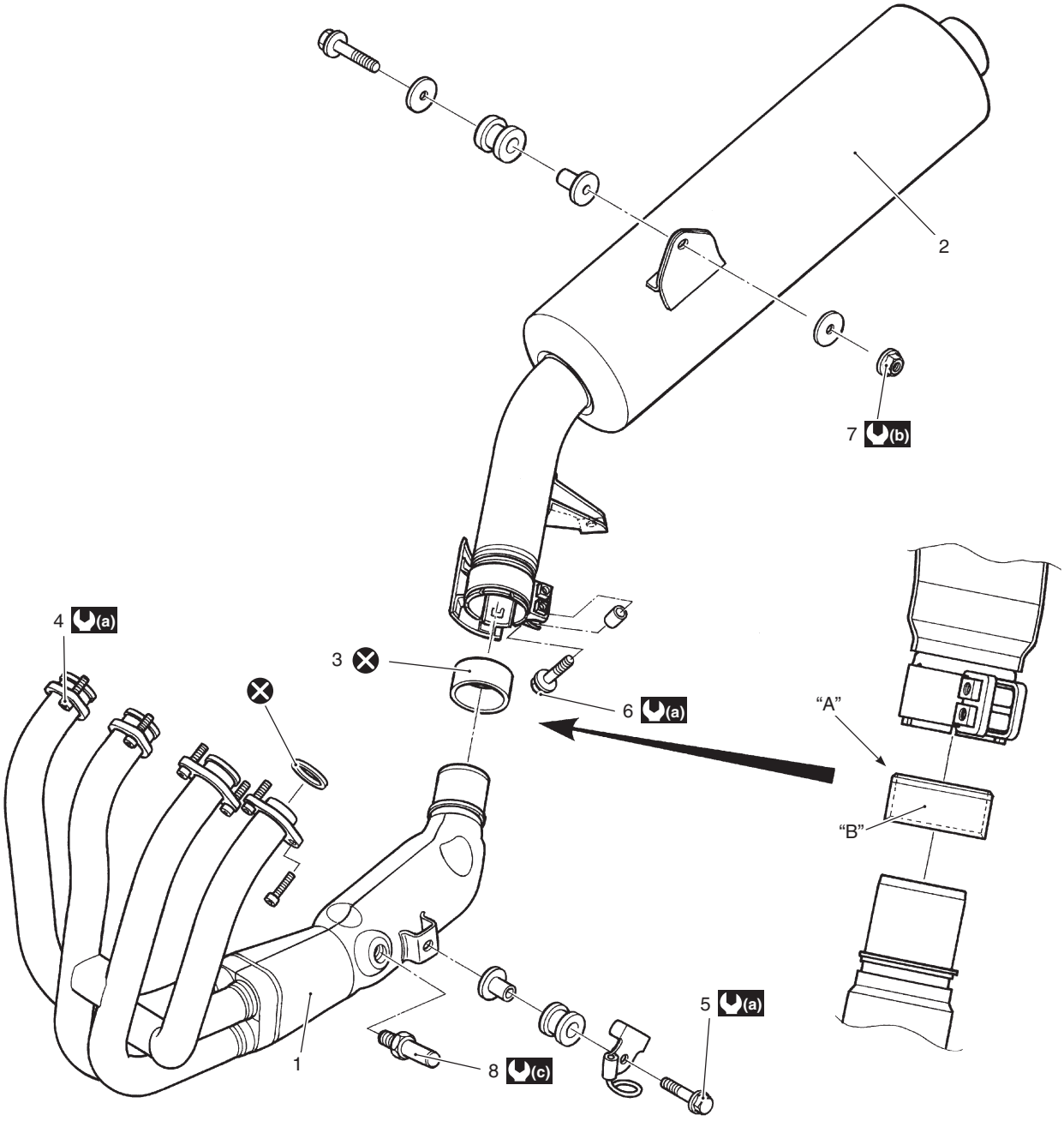
⚠ CAUTION

Make sure that the exhaust pipes and muffler have enough clearance from the rubber parts and plastic parts to avoid melting.

Repair Instructions

Exhaust System Construction

B718H11B06001



I718H11B0001-03

1. Exhaust pipes	5. Exhaust pipe mounting bolt	"A": Chamfer	(c) : 25 N·m (2.5 kgf-m, 18.0 lb-ft)
2. Muffler	6. Muffler connecting bolt	"B": Apply exhaust gas sealer.	⊗ : Do not reuse.
3. Connector	7. Muffler mounting nut	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	
4. Exhaust pipe bolt	8. HO2 sensor	(b) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)	

Exhaust Pipe / Muffler Removal and Installation

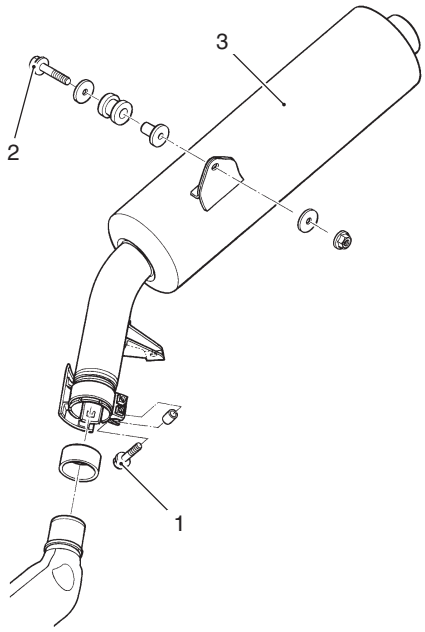
B718H11B06002

Removal

1) Loosen the muffler connecting bolts (1).
2) Remove the muffler (3) by removing the mounting bolt (2) and nut.

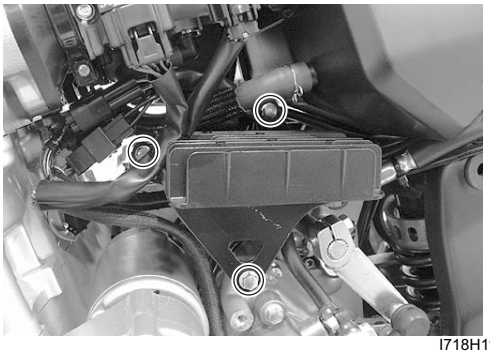
NOTE

Support the muffler to prevent it from falling.



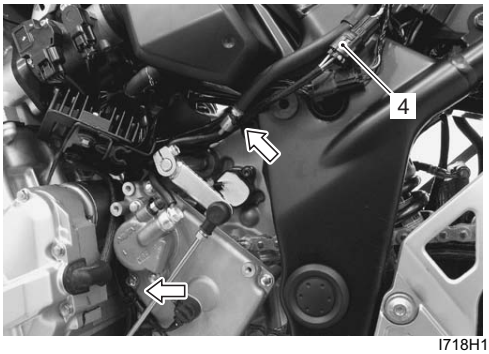
I718H11B0005-03

3) Remove the radiator. Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.
4) Remove the engine sprocket outer cover and regulator/rectifier bracket bolts. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.



I718H11B0017-01

5) Disconnect the HO2 sensor coupler (4) and clamps.

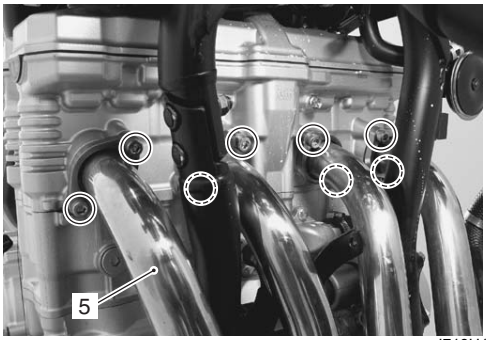


I718H11B0007-03

6) Remove the exhaust pipe assembly (5) by removing the exhaust pipe bolts and mounting bolt.

NOTE

Support the exhaust pipe assembly to prevent it from falling.



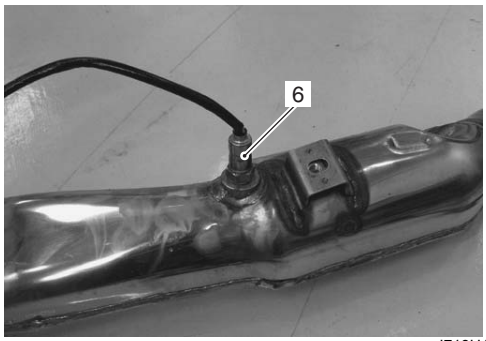
I718H11B0008-05

I718H11B0009-03

7) Remove the HO2 sensor (6) from the exhaust pipe.

⚠ CAUTION

- **Be careful not to expose it to an excessive shock.**
- **Be careful not to twist or damage the sensor lead wire.**



I718H11B0010-03

Installation

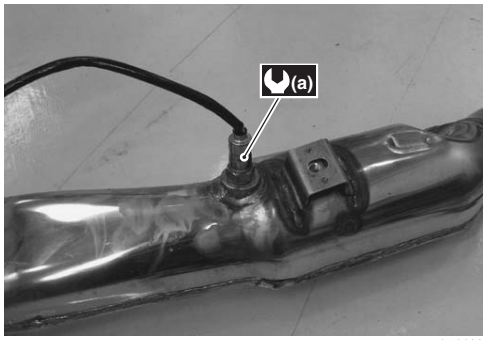
Installation is in the reverse order of removal. Pay attention to the following points:

- Tighten the HO2 sensor to the specified torque.

Tightening torque
HO2 sensor (a): 25 N·m (2.5 kgf-m, 18.0 lb-ft)

⚠ CAUTION

- **Be careful not to expose it to an excessive shock.**
- **Do not use an impact wrench when installing the HO2 sensor.**
- **Be careful not to twist or damage the sensor lead wires.**
- **Do not apply oil or other materials to the sensor air hole.**



I718H11B0011-01

- Install the exhaust pipe gaskets (1) and connector (2).

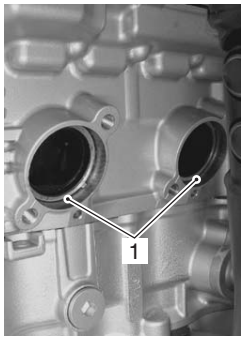
⚠ CAUTION

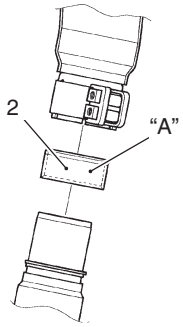
Replace the gaskets and connector with new ones.

NOTE

When installing a new connector, remove all of the old sealer from the exhaust pipe and muffler. Apply the exhaust gas sealer "A" to both the inside and outside of the new connector.

: Exhaust gas sealer (PERMATEX 1372 (commercially available))

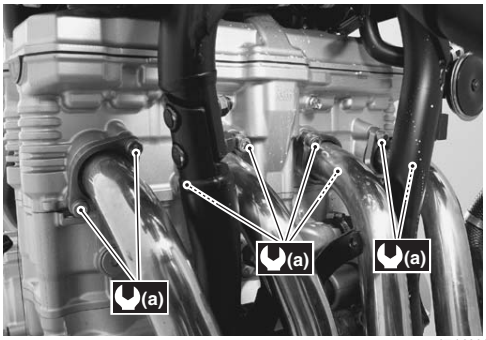




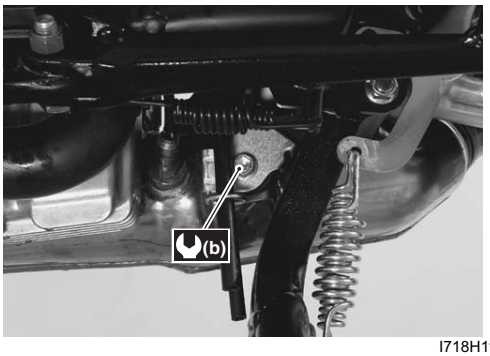
I718H11B0012-03

- Tighten the exhaust pipe bolts and exhaust pipe mounting bolt to the specified torque.

  Tightening torque
  Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
  Exhaust pipe mounting bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



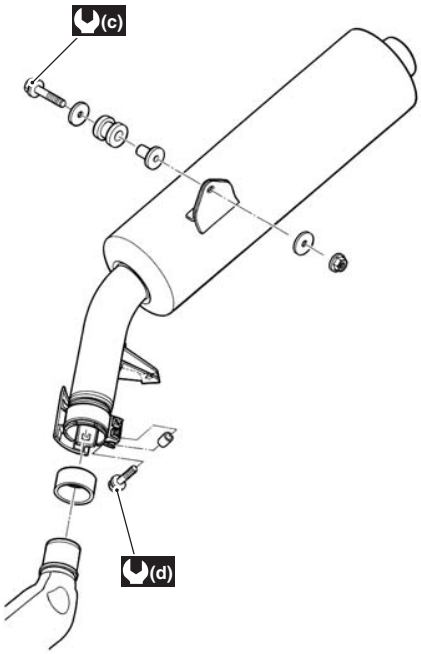
I718H11B0016-02



I718H11B0014-01

- Route the HO2 sensor lead wire. Refer to “Throttle Body Construction in Section 1D (Page 1D-8)” and “Wiring Harness Routing Diagram in Section 9A (Page 9A-8)”.
- Tighten the muffler mounting nut and muffler connecting bolts to the specified torque.

  Tightening torque
  Muffler mounting nut (c): 26 N·m (2.6 kgf-m, 19.0 lb-ft)
  Muffler connecting bolt (d): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



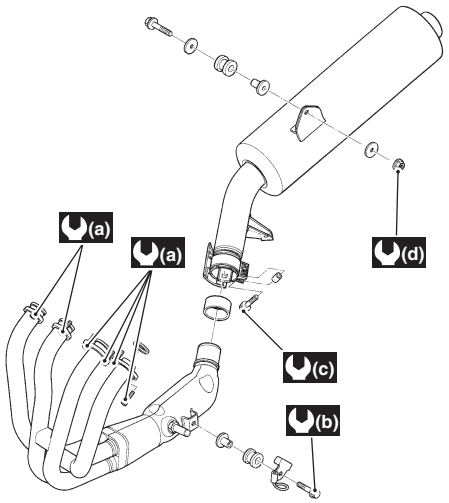
I718H11B0015-02

Exhaust System Inspection

B718H11B06003

Inspect the exhaust pipe connection and muffler connection for exhaust gas leakage and mounting condition. If any defect is found, replace the exhaust pipe assembly or muffler with a new one.
Check the exhaust pipe bolts, muffler connecting bolts and muffler mounting nut are tightened to their specified torque.

Tightening torque
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Exhaust pipe mounting bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Muffler connecting bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Muffler mounting nut (d): 26 N·m (2.6 kgf-m, 19.0 lb-ft)



I718H11B0013-02

Specifications

Tightening Torque Specifications

B718H11B07001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
HO2 sensor	25	2.5	18.0	☞(Page 1K-4)
Exhaust pipe bolt	23	2.3	16.5	☞(Page 1K-5) / ☞(Page 1K-6)
Exhaust pipe mounting bolt	23	2.3	16.5	☞(Page 1K-5) / ☞(Page 1K-6)
Muffler mounting nut	26	2.6	19.0	☞(Page 1K-5) / ☞(Page 1K-6)
Muffler connecting bolt	23	2.3	16.5	☞(Page 1K-5) / ☞(Page 1K-6)

NOTE

The specified tightening torque is also described in the following.
"Exhaust System Construction (Page 1K-2)"

Reference:
For the tightening torque of fastener not specified in this section, refer to "Tightening Torque Specifications in Section 0C (Page 0C-7)".

Special Tools and Equipment

Recommended Service Material

B718H11B08001

Material	SUZUKI recommended product or Specification		Note
Exhaust gas sealer	PERMATEX 1372 (commercially available)	—	☞(Page 1K-4)

Section 2

Suspension

CONTENTS

Precautions

Precautions

Precautions for Suspension

B718H12000001

Refer to “General Precautions in Section 00 (Page 00-1)”.

⚠ WARNING

All suspensions, bolts and nuts are an important part in that it could affect the performance of vital parts. They must be tightened to the specified torque periodically and if the suspension effect is lost, replace it with a new one.

⚠ CAUTION

Never attempt to heat, quench or straighten any suspension part. Replace it with a new one, or damage to the part may result.

Suspension General Diagnosis

Diagnostic Information and Procedures

Suspension and Wheel Symptom Diagnosis

B718H12104001

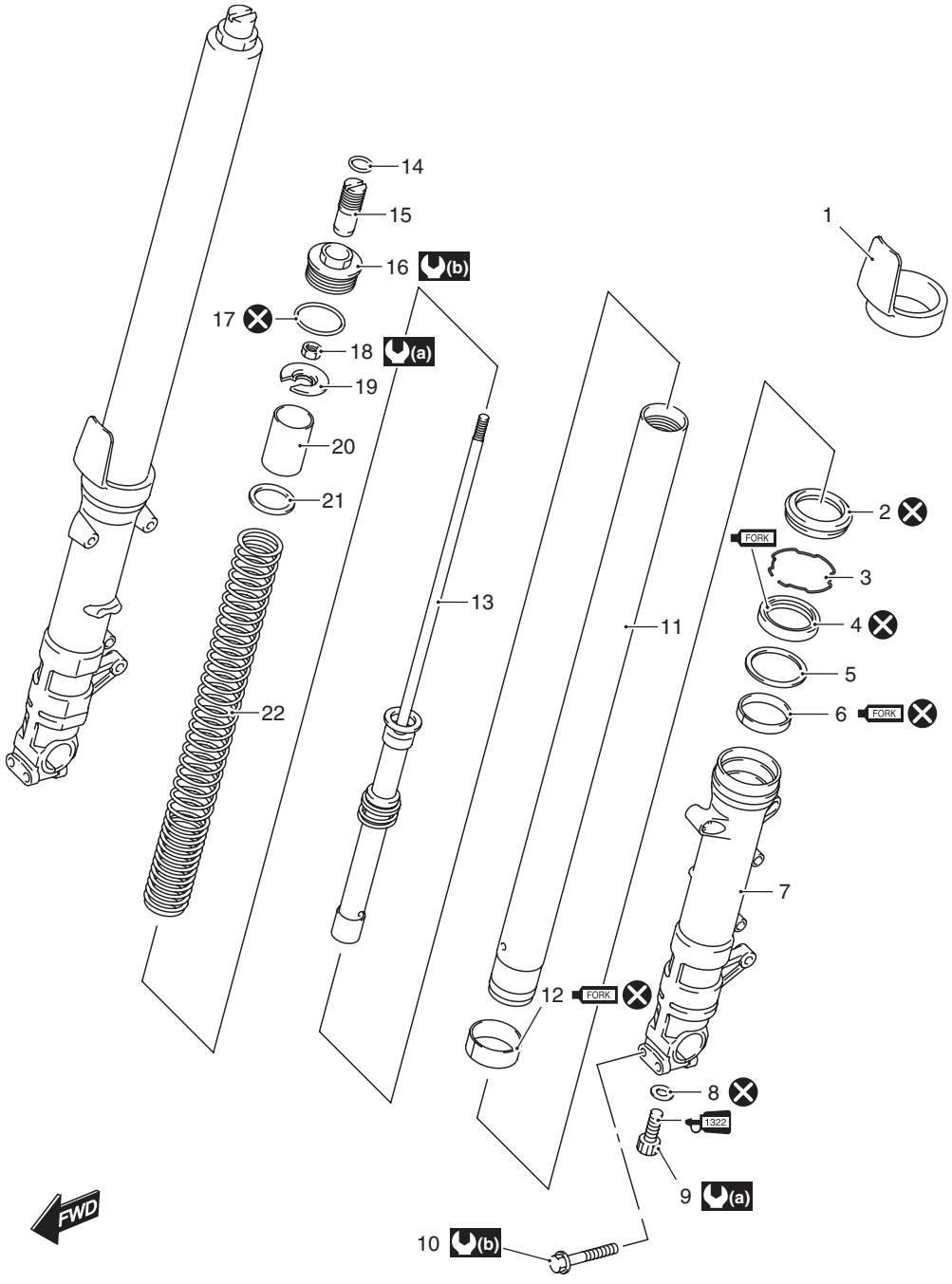
Condition	Possible cause	Correction / Reference Item
Wobbly front wheel	Distorted wheel rim.	*Replace.*
	Worn front wheel bearings.	*Replace.*
	Defective or incorrect tire.	*Replace.*
	Loose front axle nut.	*Tighten.*
	Loose front axle pinch bolt.	*Tighten.*
	Incorrect fork oil level.	*Adjust.*
Front suspension too soft	Weak spring.	*Replace.*
	Insufficient fork oil.	*Check level and add.*
	wrong weight fork oil.	*Replace.*
Front suspension too stiff	Excessively viscous fork oil.	*Replace.*
	Excessive fork oil.	*Check level and drain.*
	Bent front axle.	*Replace.*
Front suspension too noisy	Insufficient fork oil.	*Check level and add.*
	Loose front suspension fastener.	*Tighten.*
Wobbly rear wheel	Distorted wheel rim.	*Replace.*
	Worn rear wheel bearing.	*Replace.*
	Defective or incorrect tire.	*Replace.*
	Worn swingarm bearing.	*Replace.*
	Worn rear suspension bushing.	*Replace.*
	Loose rear suspension fastener.	*Tighten.*
Rear suspension too soft	Weak rear shock absorber spring.	*Replace.*
	Rear shock absorber leaks oil.	*Replace.*
	Improperly suspension setting.	*Adjust.*
Rear suspension too stiff	Improper suspension setting.	*Adjust.*
	Bent rear shock absorber shaft.	*Replace.*
	Bent swingarm.	*Replace.*
	Worn swingarm and rear suspension related bearings.	*Replace.*
Rear suspension too noisy	Loose rear suspension fastener.	*Tighten.*
	Worn rear suspension bushing.	*Replace.*
	Worn swingarm bearing.	*Replace.*

Front Suspension

Repair Instructions

Front Fork Components

B718H12206001



I718H1220001-04

1. Front fork protector	10. Front axle pinch bolt	19. Spring seat
2. Dust seal	11. Inner tube	20. Spacer
3. Oil seal stopper ring	12. Inner tube slide metal	21. Washer
4. Oil seal	13. Damper rod (Inner rod cylinder)	22. Spring
5. Oil seal retainer	14. O-ring	(a) : 20 N·m (2.0 kgf-m, 14.5 lb-ft)
6. Outer tube slide metal	15. Spring adjuster	(b) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
7. Outer tube	16. Front fork cap bolt	1322 : Apply thread lock to thread part.
8. Gasket	17. O-ring	FORK : Apply fork oil.
9. Damper rod bolt	18. Inner rod lock-nut	: Do not reuse.

Front Fork Removal and Installation

B718H12206002

NOTE

The right and left front forks are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

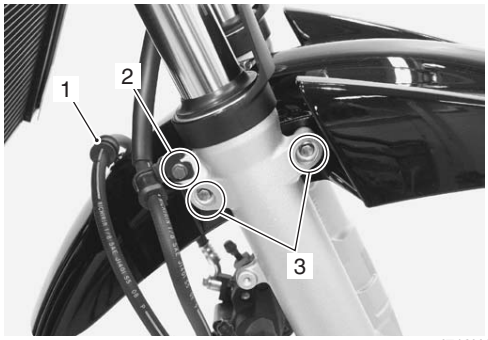
1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-6)”.

⚠ CAUTION

- **Make sure that the motorcycle is supported securely.**
- **Do not operate the front brake lever with the front wheel removed.**

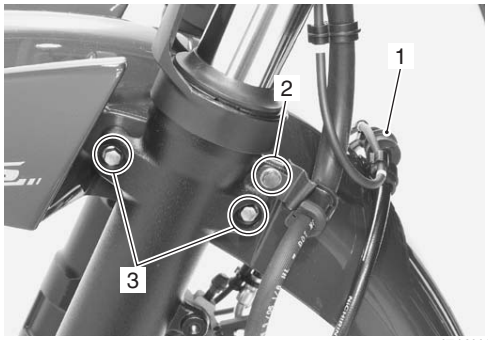
2) Disconnect the brake hose clamp (1) from the front fender.
3) Remove the brake hose clamp bolt (2).
4) Remove the front fender by removing the bolts (3), left and right.

GSF1250/S



I718H1220003-03

GSF1250A/SA

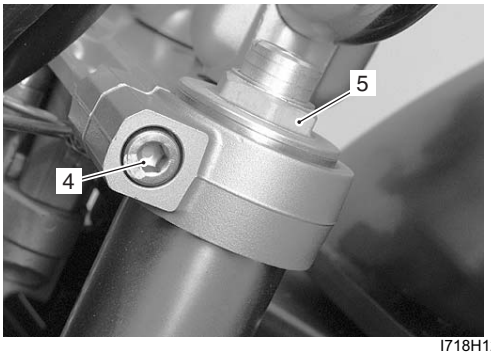


I718H1220004-02

5) Loose the front fork upper clamp bolt (4).

NOTE

Slightly loosen the front fork cap bolt (5) to facilitate later disassembly.

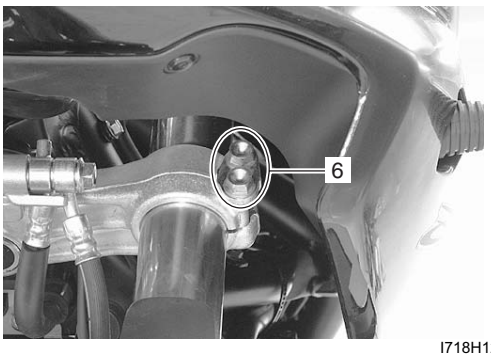


I718H1220002-02

6) Loosen the front fork lower clamp bolts (6) and remove the front fork.

NOTE

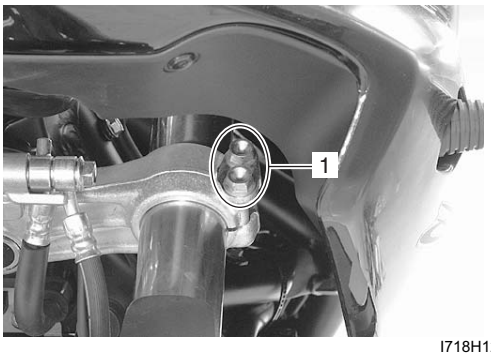
Hold the front fork by the hand to prevent sliding out of the steering stem.



I718H1220005-03

Installation

1) Set the front fork to the front fork lower bracket temporarily by tightening the lower clamp bolts (1).



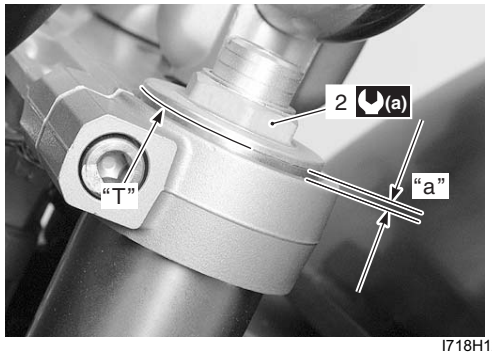
I718H1220006-03

2) Tighten the front fork cap bolt (2) to the specified torque with the special tool.

Tightening torque
Front fork cap bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

3) Loosen the lower clamp bolts.

4) Set the front fork with the upper surface "T" of the inner tube positioned 1.8 mm (0.071 in) "a" from the upper surface of the upper bracket.

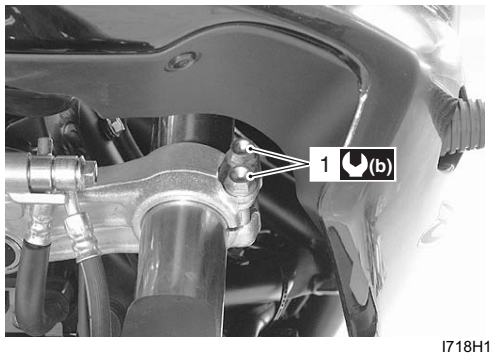


I718H1220007-06

"a": 1.8 mm (0.71 in))

5) Tighten the front fork lower clamp bolts (1).

Tightening torque
Front fork lower clamp bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1220008-05

6) Tighten the front fork upper fork clamp bolt (3).

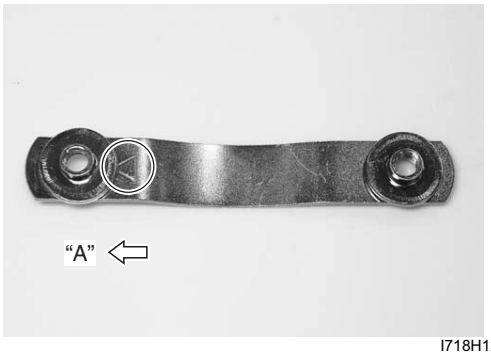
Tightening torque
Front fork upper clamp bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

I718H1220009-03

7) Set the front fender plate nut to the front fender.

NOTE

Face the triangle mark on the front fender brace to the front side "A".



I718H1220010-02

8) Remount the front fender along with the fender plate nut.

9) Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-6)".

NOTE

Before tightening the front axle and front axle pinch bolts, move the front fork up and down four or five times.

⚠ WARNING

After remounting the brake caliper, pump the brake lever until the pistons push the pads correctly.

I718H1240014-02

Front Fork Inspection

B718H12206004

Refer to "Front Fork Inspection in Section 0B (Page 0B-20)".

Front Fork Adjustment

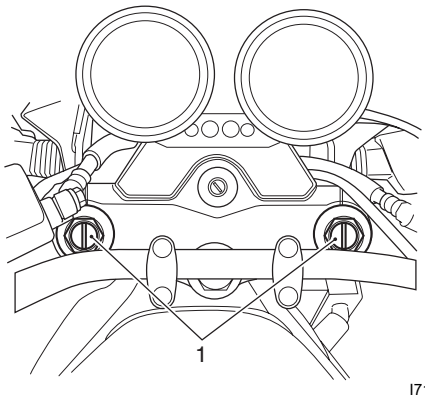
B718H12206006

Turn the adjustment (1) to the desired position.

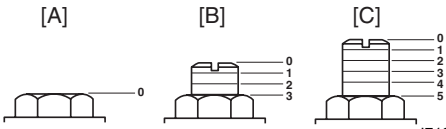
⚠ CAUTION

Adjust the left and right front forks to the same setting.

STD position
3rd groove from top



I718H1220014-01



I718H1220015-01

[A]: Position 0	[C]: Position 5
[B]: Position 3 (STD)	

Front Fork Disassembly and Assembly

B718H12206003

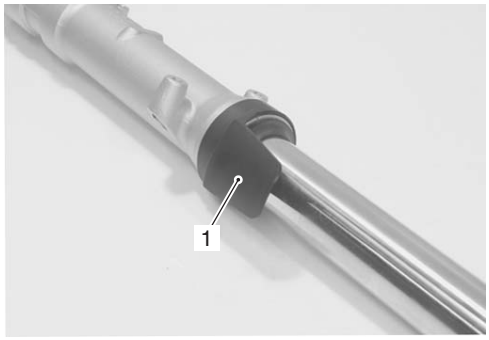
Refer to “Front Fork Removal and Installation (Page 2B-2)”.

NOTE

The right and left front forks are installed symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

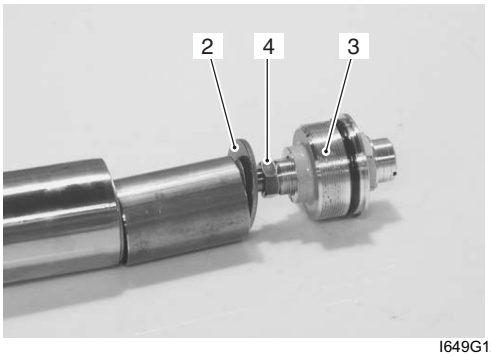
Disassembly

1) Remove the front fork protector (1).



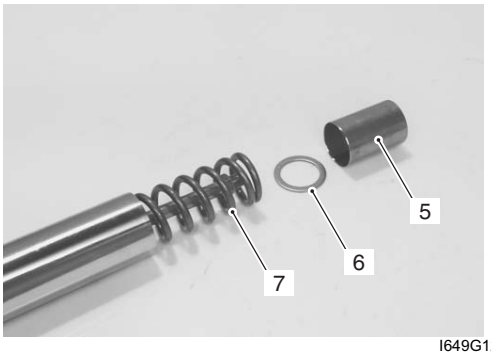
I649G1220039-01

2) Remove the front fork cap bolt (3) from the outer tube.
3) Remove the spring seat (2).
4) Remove the front fork cap bolt (3) with spring adjuster by loosening the inner rod lock-nut (4).



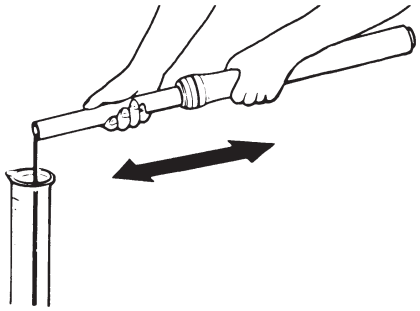
I649G1220040-01

5) Remove the spacer (5), washer (6) and spring (7).



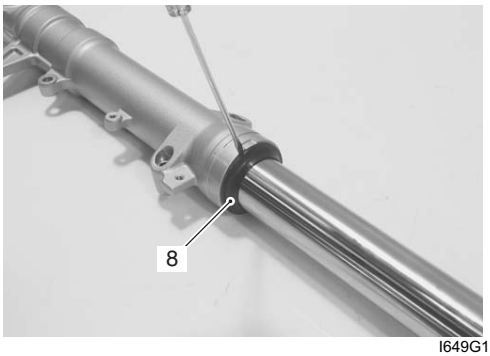
I649G1220041-01

6) Invert the fork and stroke it several times to drain out fork oil.
7) Hold the fork inverted for a few minutes to drain oil.



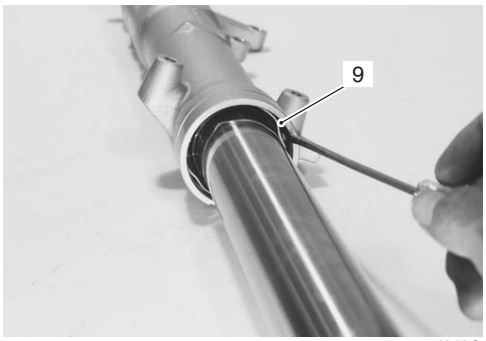
I649G1220012-01

8) Remove the dust seal (8).



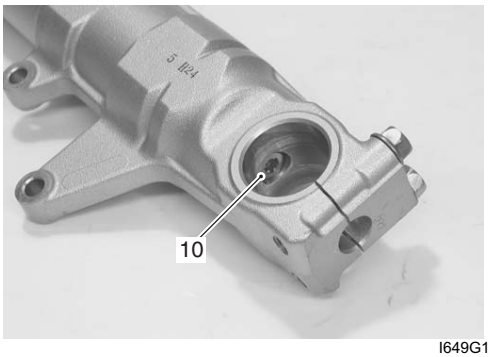
I649G1220013-02

9) Remove the oil seal stopper ring (9).



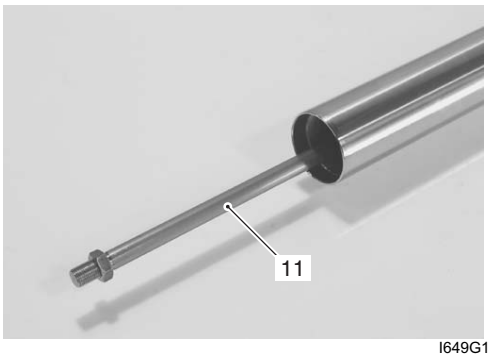
I649G1220014-02

10) Remove the damper rod bolt (10).



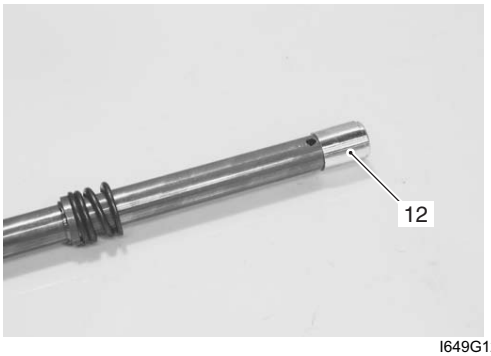
I649G1220015-02

11) Remove the inner rod cylinder (11).



I649G1220016-02

12) Remove the oil lock piece (12).

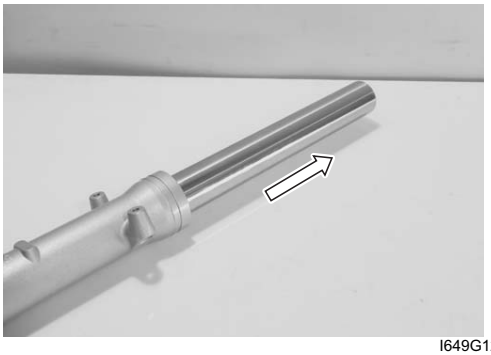


I649G1220017-02

13) Remove the oil seal by slowly pulling out the inner tube.

NOTE

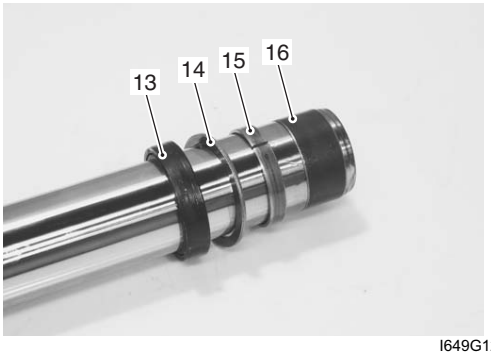
Be careful not to damage the inner tube.



I649G1220018-01

14) Remove the following parts.

- Oil seal (13)
- Oil seal retainer (14)
- Outer tube slide metal (15)
- Inner tube slide metal (16)



I649G1220019-04

Assembly
Assemble the front fork in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

The outer and inner tube's slide metals must be replaced along with the oil seal and dust seal when assembling the front fork.

Inner tube

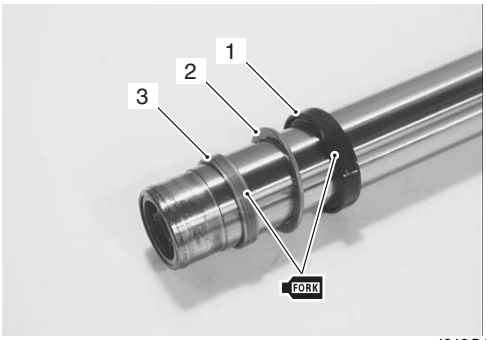
- Install the following parts onto the inner tube.
  - Oil seal (1)
  - Oil seal retainer (2)
  - Outer tube slide metal (3)

⚠ CAUTION

When installing the oil seal to inner tube, be careful not to damage the oil seal lip.

- Apply fork oil to the outer slide metal and oil seal lip.

FORK : Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)



I649G1220020-01

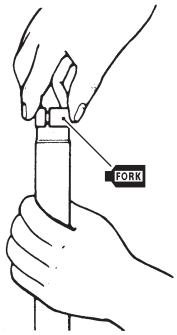
- Hold the inner tube vertically, clean the metal groove and install the inner tube slide metal by hand.

⚠ CAUTION

Do not damage the Teflon coated surface of the inner tube's slide metal when mounting it.

- Apply fork oil to the inner tube slide metal.

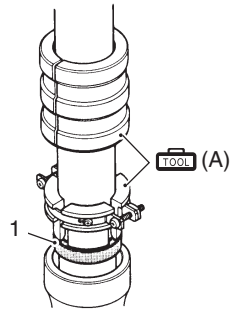
FORK : Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)



I649G1220021-01

- Insert the inner tube into the outer tube and install the oil seal (1) using the special tool.

Special tool
TOOL (A): 09940–52861 (Front fork oil seal installer)



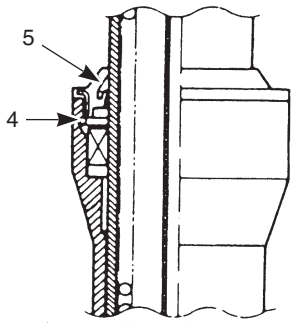
I649G1220022-04

- Install the oil seal stopper ring (4).

⚠ CAUTION

Make sure that the oil seal stopper ring is fitted securely.

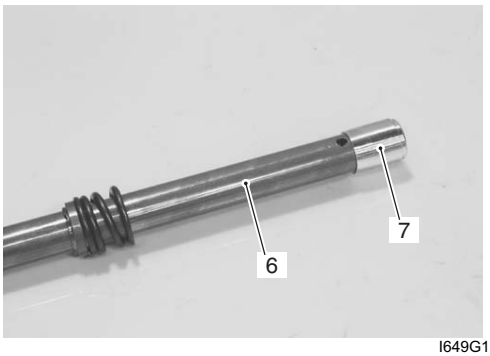
- Install the dust seal (5).



I649G1220023-02

Damper rod bolt

- Insert the inner rod/damper rod (cartridge) (6) and the oil lock piece (7) into the inner tube.



I649G1220024-01

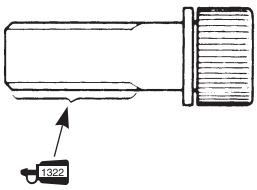
- Apply thread lock to the damper rod bolt and tighten it to the specified torque with a 6-mm hexagon wrench and special tools.

⚠ CAUTION

Use a new gasket to prevent oil leakage.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Front fork damper rod bolt: 20 N·m (2.0 kgf-m, 14.5 lb-ft)



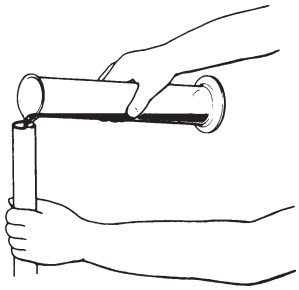
I718H1220012-03

Fork oil

- Place the front fork vertically without spring.
- Compress it fully.
- Pour specified front fork oil up to the top level of the inner tube.

FORK : Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)

Capacity (each leg)
GSF1250/A: 472 ml (16.0/16.6 US/Imp oz)
GSF1250S/SA: 471 ml (15.9/16.0 US/Imp oz)



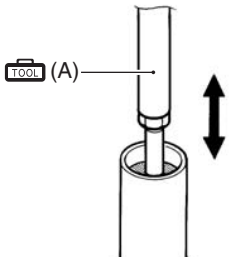
I649G1220026-01

- Move the inner rod slowly with the special tool more than ten times until bubbles do not come out from the oil.

NOTE

Refill front fork oil up to the top of the inner tube to find bubbles while bleeding air.

Special tool
TOOL (A): 09940–52841 (Inner rod holder)

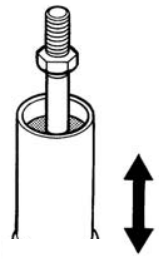


I649G1220027-04

- Refill specified front fork oil up to the top level of the inner tube again. Move the inner tube up and down several strokes until bubbles do not come out from the oil.
- Keep the front fork vertically and wait 5 – 6 minutes.

NOTE

- **Always keep oil level over the cartridge top end, or air may enter the cartridge during this procedure.**
- **Take extreme attention to pump out air completely.**



I649G1220028-02

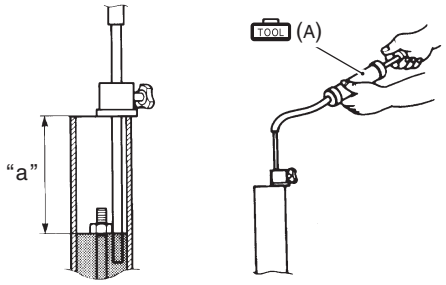
- Hold the front fork vertically and adjust fork oil level with the special tool.

NOTE

When adjusting the fork oil level, remove the fork spring and compress the inner tube fully.

Special tool
(A): 09943–74111 (Fork oil level gauge)

Fork oil level “a”
GSF1250/A: 143 mm (5.6 in.)
GSF1250S/SA: 144 mm (5.7 in)



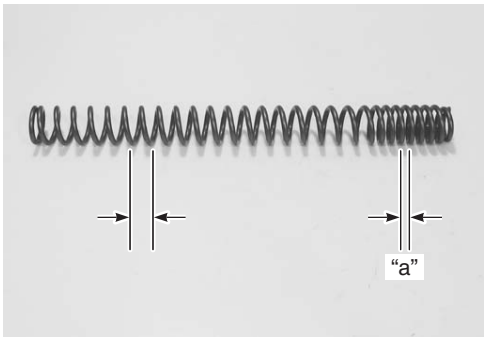
I649G1220029-02

Fork spring

- Install the fork spring as shown.

NOTE

The smaller pitch “a” should face to the bottom side of the front fork.

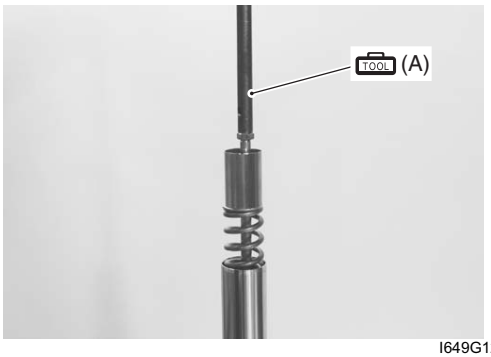


I649G1220030-02

Inner rod and lock-nut

- Install the special tool and pull up the inner rod.

Special tool
(A): 09940–52841 (Inner rod holder)



I649G1220031-03

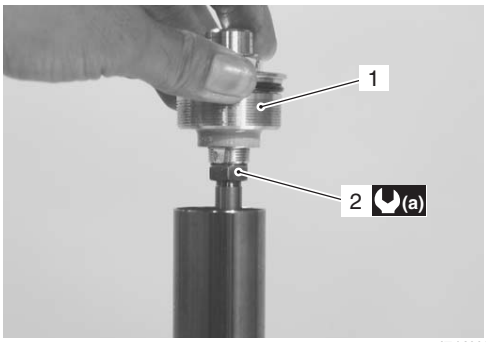
- Install the front fork cap (1).

NOTE

Before installing the front fork cap, turn the inner rod lock-nut (2) completely to the lower position as shown.

- Tighten the lock-nut (2) to the specified torque.

Tightening torque
Inner rod lock-nut (a): 20 N·m (2.0 kgf-m, 14.5 lb-ft)



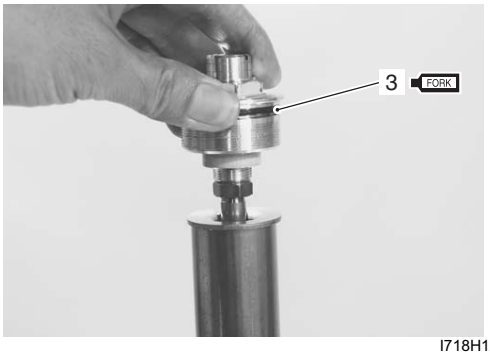
I718H1220013-01

- Apply fork oil lightly to the O-ring (3).

⚠ CAUTION

Use a new O-ring (3) to prevent oil leakage.

FORK : Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)



I718H1220016-01

- Install the front fork protector (4).

NOTE

Fit the projection of the front fork protector to the depression of the front fork outer tube.

I649G1220034-01

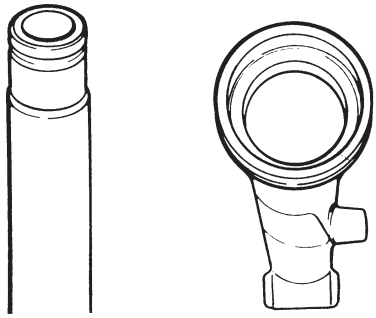
Front Fork Parts Inspection

B718H12206005

Refer to “Front Fork Disassembly and Assembly (Page 2B-4)”.

Inner and Outer Tubes

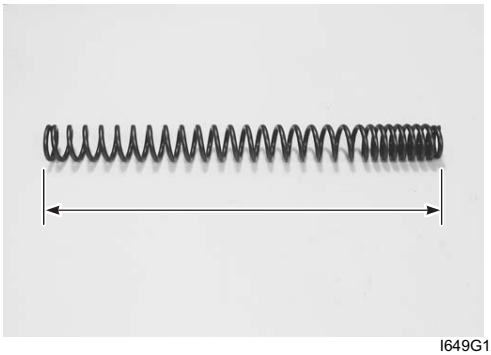
Inspect the inner tube sliding surface and outer tube sliding surface for scuffing.



I649G1220035-02

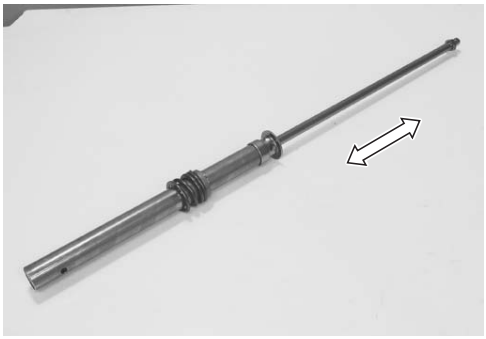
Fork Spring
Measure the fork spring free length. If it is shorter than the service limit, replace it with a new one.

Front fork spring free length
Service limit: 382 mm (15.0 in.)



I649G1220036-01

Damper Rod
Move the inner rod by hand to inspect it if operating smoothly.



I649G1220037-01

Specifications

Service Data

B718H12207001

Front Fork
Unit: mm (in.)

Item	Standard		Limit
Front fork stroke	130 (5.1)		—
Front fork inner tube O.D.	43 (1.7)		—
Front fork spring free length	390.4 (15.37)		382 (15.0)
Front fork oil level (without spring, outer tube fully compressed)	GSF1250/A	143 (5.6)	—
	GSF1250S/SA	144 (5.7)	
Front fork spring adjuster	3rd groove from top		—

Oil

Item	Specification		Note
Front fork oil type	Fork oil SS-08 or equivalent fork oil		
Front fork oil capacity (each leg)	GSF1250/A	472 ml (16.0/16.6 US/Imp oz)	—
	GSF1250S/SA	471 ml (15.9/16.6 US/Imp oz)	

Tightening Torque Specifications

B718H12207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Front fork cap bolt	23	2.3	16.5	☞(Page 2B-3)
Front fork lower clamp bolt	23	2.3	16.5	☞(Page 2B-3)
Front fork upper clamp bolt	23	2.3	16.5	☞(Page 2B-3)
Front fork damper rod bolt	20	2.0	14.5	☞(Page 2B-7)
Inner rod lock-nut	20	2.0	14.5	☞(Page 2B-9)

NOTE

The specified tightening torque is also described in the following.
“Front Fork Components (Page 2B-1)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H12208001

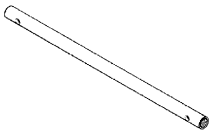
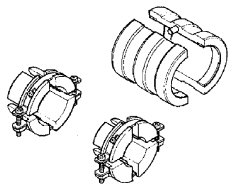
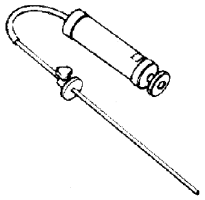
Material	SUZUKI recommended product or Specification		Note
Oil	SUZUKI FORK OIL SS-08 or equivalent	P/No.: 99000–99001–SS8	☞(Page 2B-6) / ☞(Page 2B-6) / ☞(Page 2B-7) / ☞(Page 2B-9)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 2B-7)

NOTE

Required service material is also described in the following.
“Front Fork Components (Page 2B-1)”

Special Tool

B718H12208002

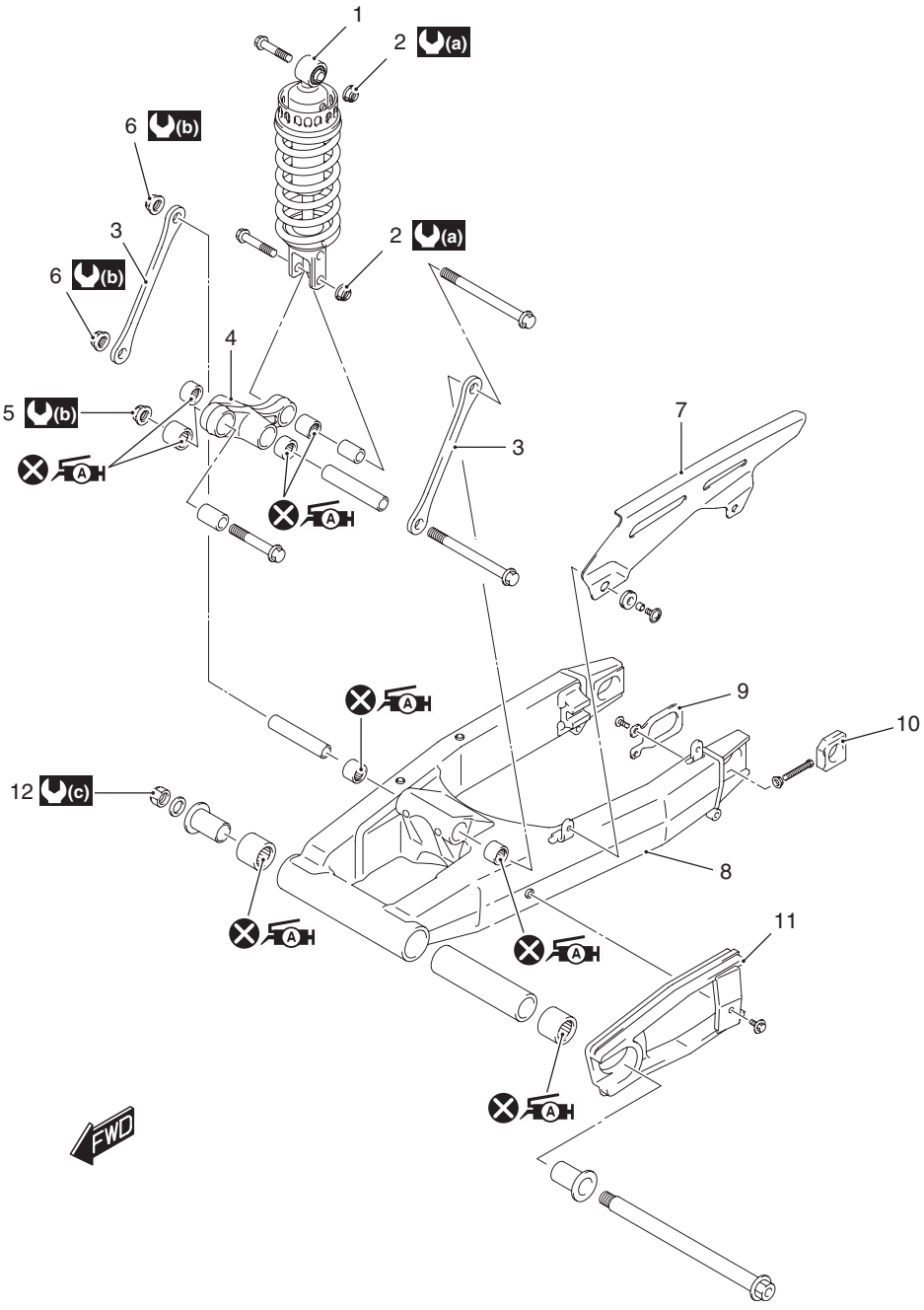
09940–52841 Inner rod holder ☞(Page 2B-7) / ☞(Page 2B-8) 	09940–52861 Front fork oil seal installer ☞(Page 2B-6) 
09943–74111 Fork oil level gauge ☞(Page 2B-8) 	

Rear Suspension

Repair Instructions

Rear Suspension Components

B718H12306001

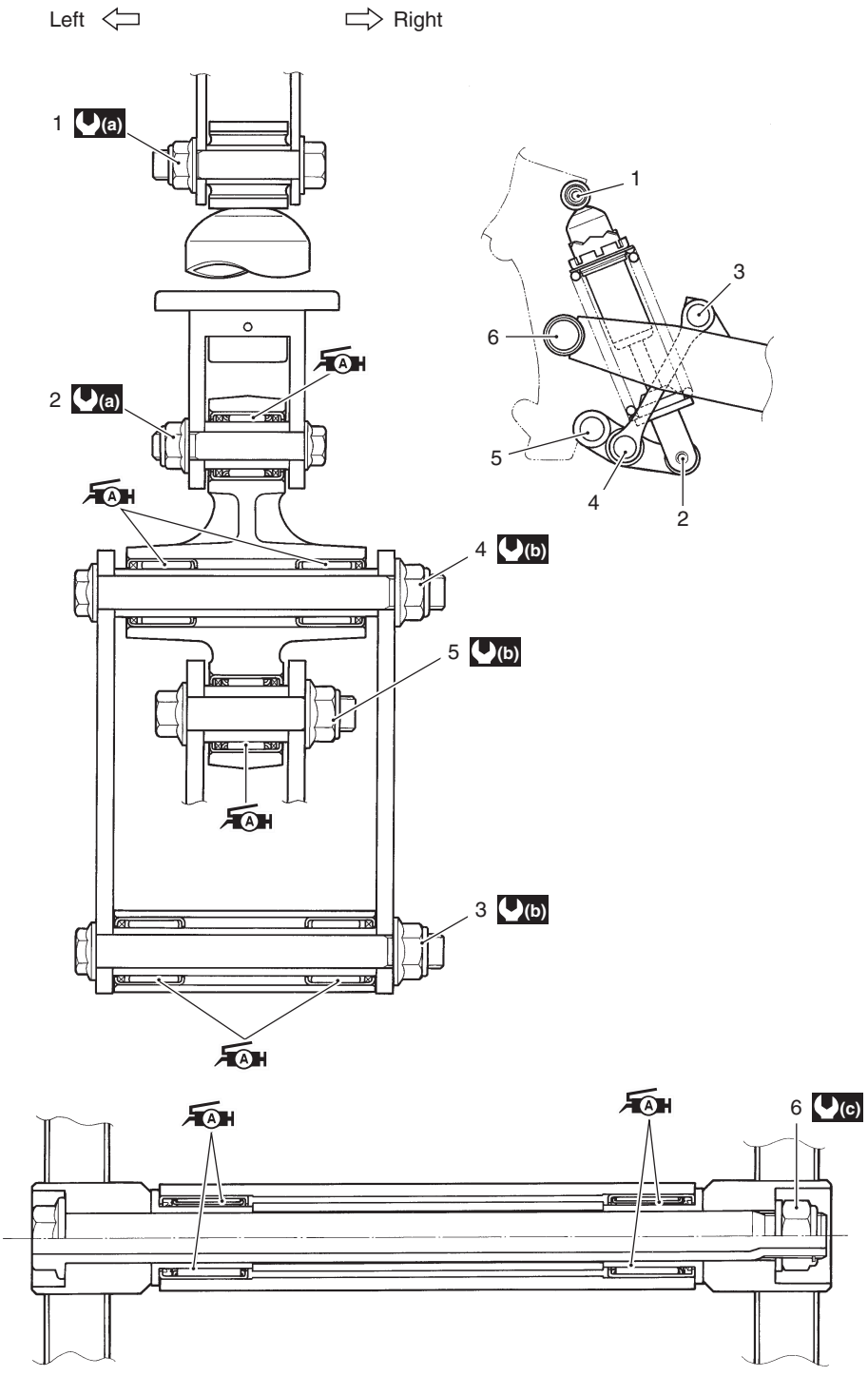


I718H1230001-01

1. Rear shock absorber	7. Chain case	(a) : 50 N·m (5.0 kgf-m, 36.0 lb-ft)
2. Rear shock absorber mounting nut	8. Swingarm	(b) : 78 N·m (7.8 kgf-m, 56.5 lb-ft)
3. Cushion rod	9. Plate	(c) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)
4. Cushion lever	10. Chain adjuster	A : Apply grease to the bearing.
5. Cushion lever mounting nut	11. Chain buffer	: Do not reuse.
6. Cushion rod mounting nut	12. Swingarm pivot nut	

Rear Suspension Assembly Construction

B718H12306002



I718H1230042-01

1. Rear shock absorber mounting nut (Upper)	5. Cushion lever mounting nut	(c) : 100 N·m (10.0 kgf-m 72.5 lb-ft)
2. Rear shock absorber mounting nut (Lower)	6. Swingarm pivot nut	A H : Apply grease to the bearing.
3. Cushion rod mounting nut (Upper)	(a) : 50 N·m (5.0 kgf-m 36.0 lb-ft)	
4. Cushion rod mounting nut (Lower)	(b) : 78 N·m (7.8 kgf-m 56.5 lb-ft)	

Rear Shock Absorber Removal and Installation

B718H12306003

Removal

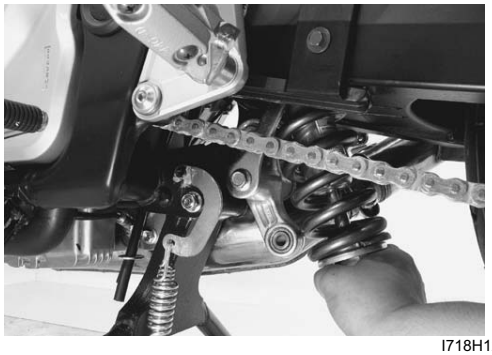
1) Place the motorcycle on the center stand and support the motorcycle with a jack to be no load for the rear shock absorber.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Remove the shock absorber lower mounting bolt and nut, and cushion lever mounting bolt and nut.

I718H1230002-01

4) Remove the shock absorber upper mounting bolt and nut.

I718H1230003-01

5) Remove the shock absorber.



I718H1230004-01

Installation

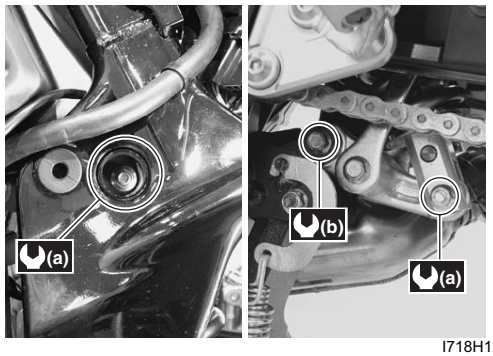
Install the rear shock absorber in the reverse order of removal. Pay attention to the following points:

- Temporary install the rear shock absorber and cushion lever.
- Tighten the rear shock absorber upper/lower mounting bolts and nuts.

  Tightening torque
  Rear shock absorber mounting nut (a): 50 N·m (5.0 kgf-m, 36.0 lb-ft)

- Tighten the cushion lever mounting bolt and nut.

  Tightening torque
  Cushion lever mounting nut (b): 78 N·m (7.8 kgf-m, 56.5 lb-ft)



I718H1230005-03

Rear Suspension Inspection

B718H12306004

Refer to “Rear Suspension Inspection in Section 0B (Page 0B-20)”.

Rear Shock Absorber Inspection

B718H12306005

Inspect the rear shock absorber in the following procedures:

1) Remove the rear shock absorber. Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.
2) Inspect the rear shock absorber for damage and oil leakage, and absorber bushing for wear and damage. If any defect is found, replace the rear shock absorber with a new one.

⚠ CAUTION

Do not attempt to disassemble the rear shock absorber. It is unserviceable.

I718H1230006-01

3) Install the rear shock absorber. Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.

Rear Suspension Adjustment

B718H12306006

After installing the rear suspension, adjust the spring pre-load and damping force as follows.

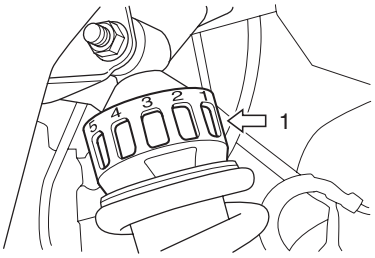
Spring Pre-load Adjustment

Turn the spring tension ring (1) to the desired position.

NOTE

Position 1 provides the softest spring tension and position 7 provides the stiffest.

STD position
GSF1250/A: 3rd position
GSF1250S/SA: 4th position



I649G1230006-02

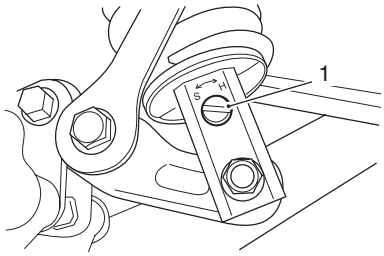
Damping Force Adjustment

Turn the damping force adjuster (1) to the desired position.

NOTE

Turn the adjuster clockwise to stiffen the damping force and turn it counterclockwise to soften the damping force.

STD position
1-1/4 turns out from stiffest position



I649G1230007-01

Rear Shock Absorber Disposal

B718H12306007

Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.
The rear shock absorber unit contains high-pressure nitrogen gas.

⚠ WARNING

- **Mishandling can cause explosion.**
- **Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.**
- **Release gas pressure before disposing.**

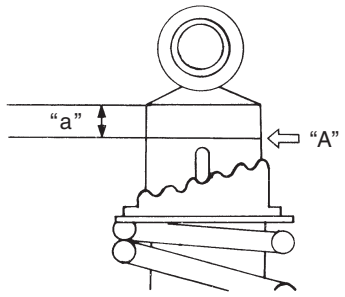
Gas Pressure Release

Make sure to observe the following precautions.

⚠ WARNING

- **Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.**
- **When discarding the rear cushion unit, be sure to release gas pressure from the unit following the procedures.**

1) Mark the drill center at the location “A” using a center punch.



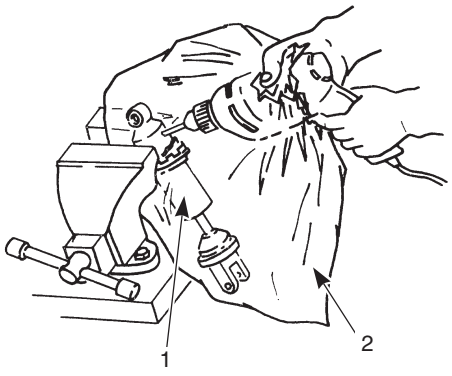
I649G1230008-01

“a”: 10 mm (0.39 in.)	“A”: Mark the drill hole

2) Wrap rear shock absorber (1) with a vinyl bag (2) and fix it on a vise as shown.
3) Drill a 2 – 3 mm (0.08 – 0.12 in.) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the vinyl bag entangled with the drill bit.

⚠ WARNING

- **Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.**
- **Make sure to drill at the specified position. Otherwise, pressurized oil many spout out forcefully.**



I649G1230009-02

Cushion Lever Removal and Installation

B718H12306008

Removal

1) Place the motorcycle on the center stand and support the motorcycle with a jack to be no load for the cushion lever.
2) Remove the cushion lever by removing its related bolts and nuts.

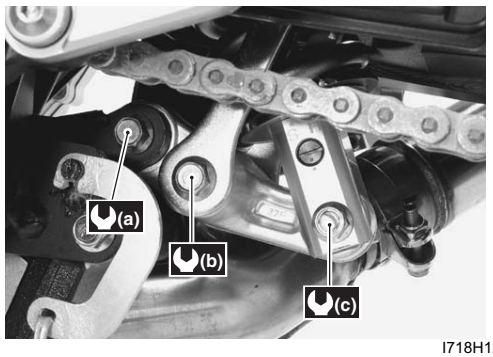
I718H1230007-01

Installation

Install the cushion lever in the reverse order of removal. Pay attention to the following point:

- Tighten each nut to the specified torque.

Tightening torque
Cushion lever mounting nut (a): 78 N·m (7.8 kgf-m, 56.5 lb-ft)
Cushion rod mounting nut (b): 78 N·m (7.8 kgf-m, 56.5 lb-ft)
Rear shock absorber mounting nut (c): 50 N·m (5.0 kgf-m, 36.0 lb-ft)



I718H1230008-01

Cushion Lever Inspection

B718H12306009

Refer to “Cushion Lever Removal and Installation (Page 2C-5)”.

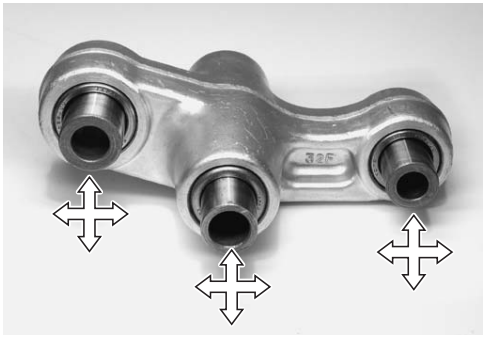
Spacer

1) Remove the spacers from the cushion lever.
2) Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with new ones.

I718H1230009-01

Cushion Lever Bearing

1) Insert the spacers into bearings.
2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. Refer to “Cushion Lever Bearing Removal and Installation (Page 2C-6)”.



I718H1230010-01

Cushion Lever

Inspect the cushion lever for damage. If any defect is found, replace the cushion lever with a new one.

I718H1230011-01

Cushion Rod

Refer to “Swingarm Related Parts Inspection (Page 2C-9)”.

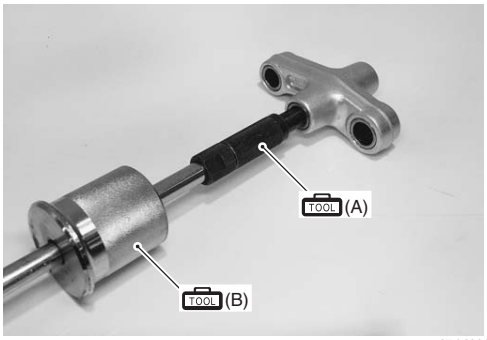
Cushion Lever Bearing Removal and Installation

B718H12306010

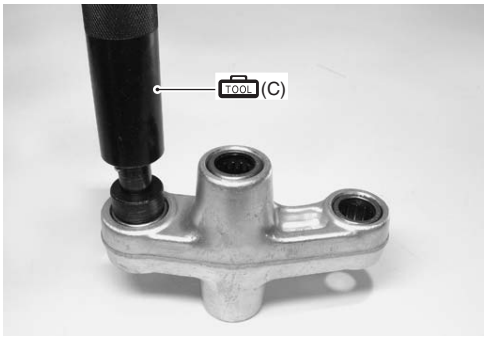
Removal

1) Remove the cushion lever. Refer to “Cushion Lever Removal and Installation (Page 2C-5)”.
2) Remove the cushion lever bearings using the special tools.

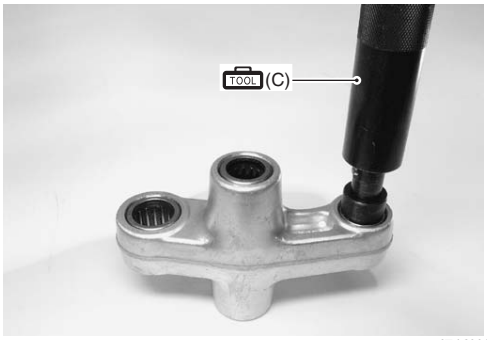
Special tool
TOOL (A): 09923–73210 (Bearing remover)
TOOL (B): 09930–30104 (Rotor remover slide shaft)
TOOL (C): 09913–70210 (Bearing installer set)



I718H1230012-01



I718H1230013-01



I718H1230015-01

Installation

⚠ CAUTION

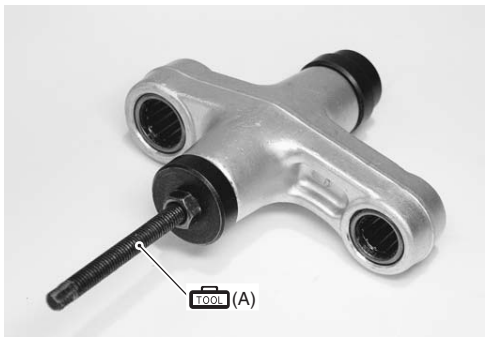
The removed bearings must be replaced with new ones.

1) Press the bearings into the cushion lever with the special tool.

NOTE

When installing the bearing, stamped mark on the bearing must face outside.

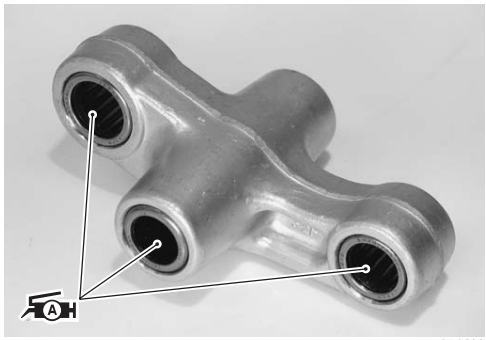
Special tool
TOOL (A): 09924–84521 (Bearing installer set)



I718H1230014-02

2) Apply grease to the bearings.

A : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1230016-01

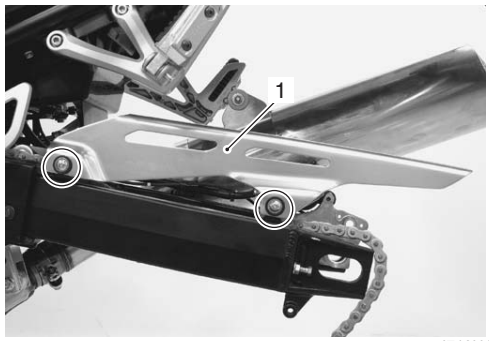
3) Install the cushion lever. Refer to “Cushion Lever Removal and Installation (Page 2C-5)”.

Swingarm / Cushion Rod Removal and Installation

B718H12306011

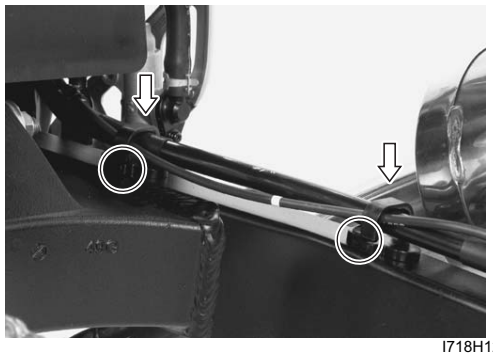
Removal

1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.
2) Remove the drive chain cover (1).



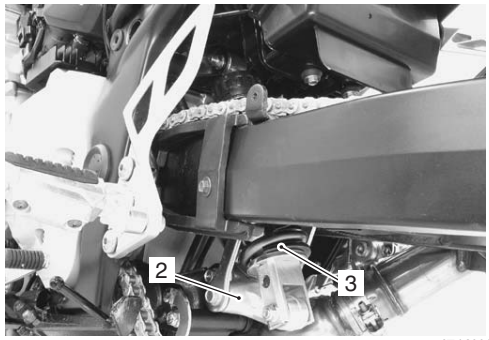
I718H1230017-01

3) Remove the brake hose clamps.



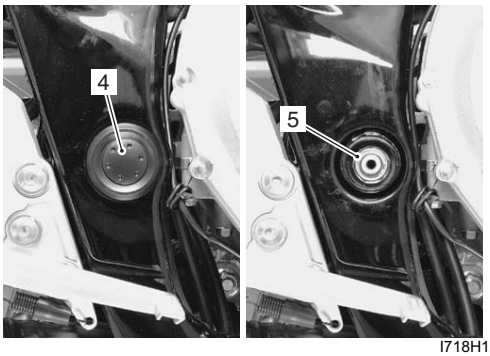
I718H1230018-01

4) Remove the cushion lever (2) and rear shock absorber (3). Refer to “Cushion Lever Removal and Installation (Page 2C-5)” and “Rear Shock Absorber Removal and Installation (Page 2C-3)”.



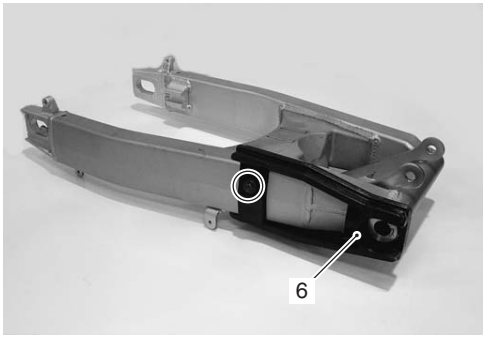
I718H1230019-01

5) Remove the pivot shaft end caps (4), left and right.
6) Remove the swingarm by removing the pivot shaft nut (5) and washer.



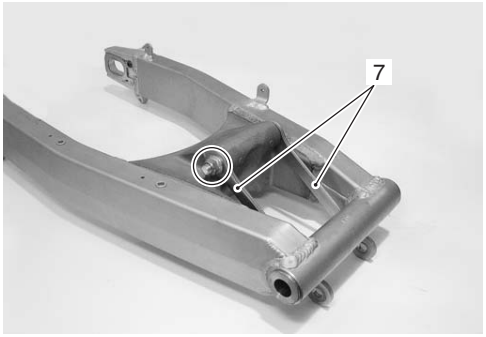
I718H1230020-01

7) Remove the chain buffer (6).



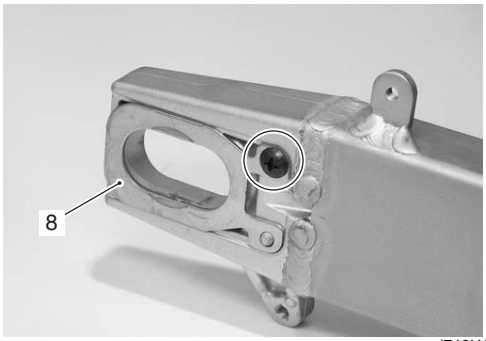
I718H1230021-02

8) Remove the cushion rods (7).



I718H1230022-01

9) Remove the plates (8).



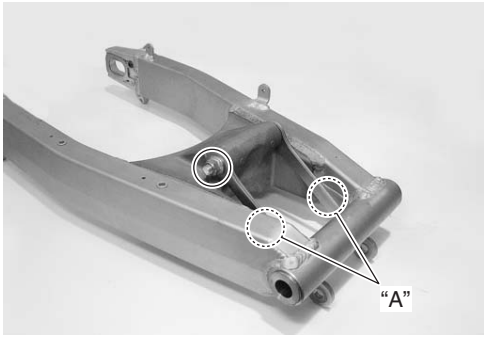
I718H1230023-01

Installation
Install the swingarm in the reverse order of removal. Pay attention to the following points:

- Temporarily the cushion rod mounting nut.

NOTE

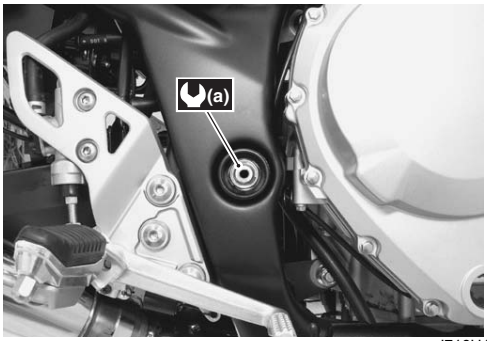
The stamped marks “A” on the cushion rod should be face out side.



I718H1230024-04

- Install the washer and swingarm pivot nut.
- Tighten the swingarm pivot nut to the specified torque.

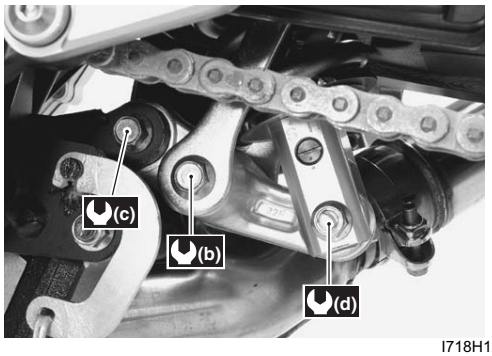
Tightening torque
Swingarm pivot nut (a): 100 N·m (10.0 kgf-m, 72.5 lb-ft)



I718H1230025-02

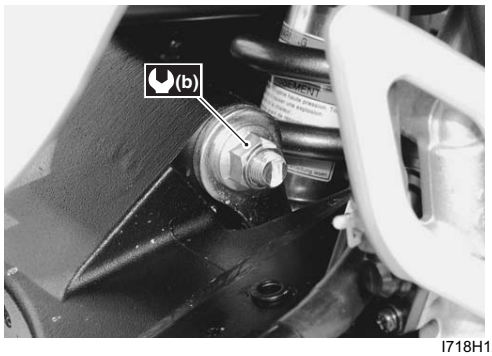
- Tighten the cushion lever, cushion rod and rear shock absorber mounting nut to the specified torque.

  Tightening torque
  Cushion rod mounting nut (b): 78 N·m (7.8 kgf-m, 56.5 lb-ft)
  Cushion lever mounting nut (c): 78 N·m (7.8 kgf-m, 56.5 lb-ft)
  Rear shock absorber mounting nut (d): 50 N·m (5.0 kgf-m, 36.0 lb-ft)



I718H1230040-02

I718H1230027-02



I718H1230041-01

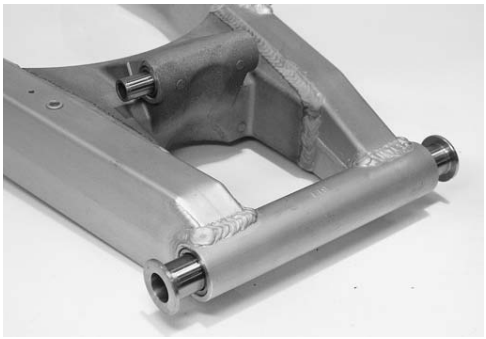
Swingarm Related Parts Inspection

B718H12306012

Refer to “Swingarm / Cushion Rod Removal and Installation (Page 2C-7)”.

Spacers

1) Remove the spacers from the swingarm.
2) Inspect the spacers for wear and damage. If any defects are found, replace the spacers with new ones.


I718H1230028-01

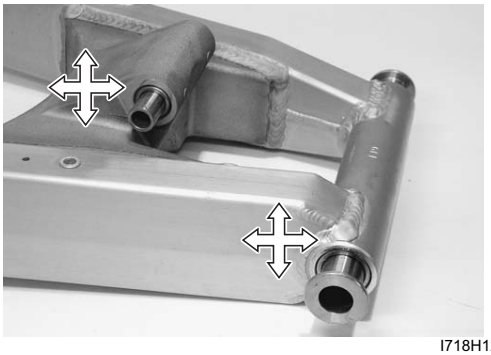
Chain Buffer

Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.

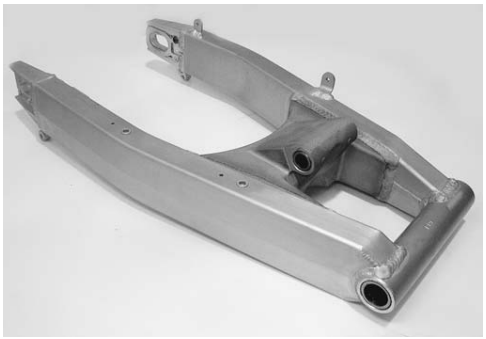

I718H1230029-01

Swingarm Bearing and Cushion Rod Bearing

1) Insert the spacers into bearings.
2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. Refer to “Swingarm Bearing Removal and Installation (Page 2C-10)”.


I718H1230030-01

Swingarm
Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.



I718H1230031-01

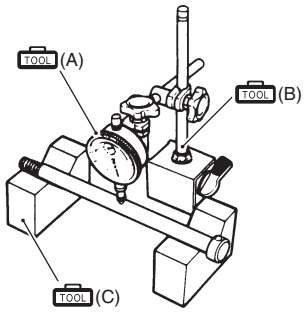
Cushion Rod
Inspect the cushion rods for damage and bend. If any defects are found, replace the cushion rods with new ones.

I718H1230032-01

Swingarm Pivot Shaft
Measure the swingarm pivot shaft runout using the dial gauge. If the runout exceeds the service limit, replace the pivot shaft.

Special tool
(A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
(B): 09900–20701 (Magnetic stand)
(C): 09900–21304 (V-block (100 mm))

Swingarm pivot shaft runout
Service limit: 0.3 mm (0.01 in)



I649G1230034-02

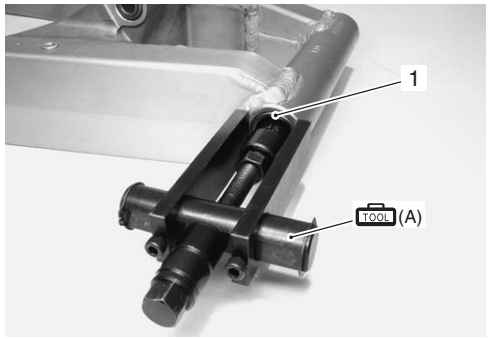
Swingarm Bearing Removal and Installation

B718H12306013

Removal

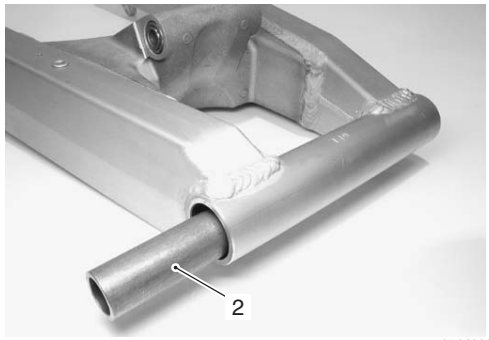
1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.
2) Remove the swingarm. Refer to “Swingarm / Cushion Rod Removal and Installation (Page 2C-7)”.
3) Draw out the swingarm pivot bearings (1) using the special tool.

Special tool
(A): 09921–20240 (Bearing remover set)



I718H1230033-01

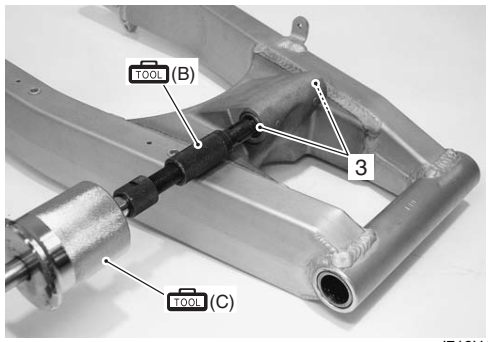
4) Remove the center spacer (2).



I718H1230034-01

5) Remove the swingarm cushion rod bearings (3) using the special tools.

Special tool
(B): 09923–73210 (Bearing remover)
(C): 09930–30104 (Rotor remover slide shaft)



I718H1230035-04

Installation

⚠ CAUTION

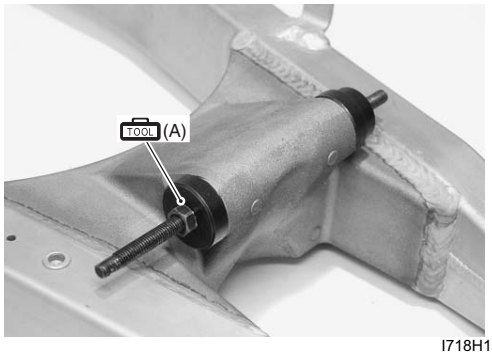
The removed bearings must be replaced with new ones.

1) Press the swingarm cushion rod bearings with the special tool.

NOTE

When installing the bearing, stamped mark on the bearing must face outside.

Special tool
TOOL (A): 09924–84521 (Bearing installer set)



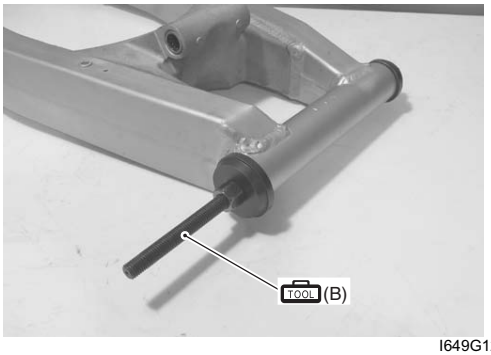
I718H1230036-01

2) Install the center spacer.
3) Press the bearings into the swingarm pivot with the special tool.

NOTE

When installing the bearing, stamped mark on the bearing must face outside

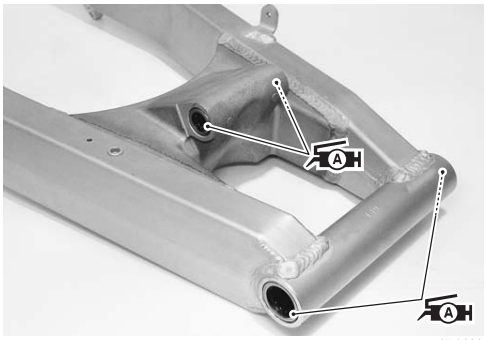
Special tool
TOOL (B): 09941–34513 (Steering race installer)



I649G1230039-03

4) Apply grease to the bearings.

A : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1230038-03

5) Install the swingarm. Refer to “Swingarm / Cushion Rod Removal and Installation (Page 2C-7)”.
6) Install the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.

Specifications

Service Data

B718H12307001

Unit: mm (in)

Item	Standard		Limit
Rear shock absorber spring adjuster	GSF1250/A	3rd position	
	GSF1250S/SA	4th position	—
Rear shock absorber damping force adjuster	Rebound	1-1/4 turns out from stiffest position	—
Rear wheel travel	136 (5.4)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

Tightening Torque Specifications

B718H12307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Rear shock absorber mounting nut	50	5.0	36.0	☞(Page 2C-3) / ☞(Page 2C-5) / ☞(Page 2C-9)
Cushion lever mounting nut	78	7.8	56.5	☞(Page 2C-3) / ☞(Page 2C-5) / ☞(Page 2C-9)
Cushion rod mounting nut	78	7.8	56.5	☞(Page 2C-5) / ☞(Page 2C-9)
Swingarm pivot nut	100	10.0	72.5	☞(Page 2C-8)

NOTE

The specified tightening torque is also described in the following.
“Rear Suspension Components (Page 2C-1)”
“Rear Suspension Assembly Construction (Page 2C-2)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H12308001

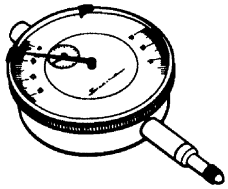
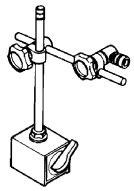
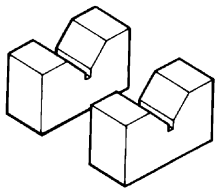
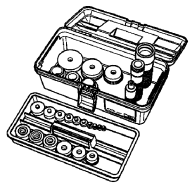
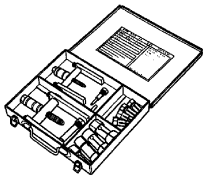
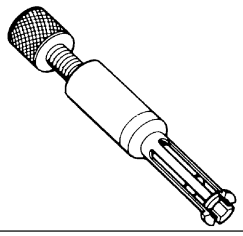
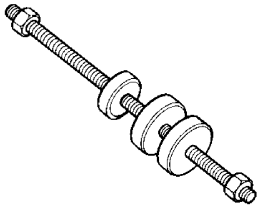
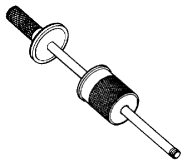
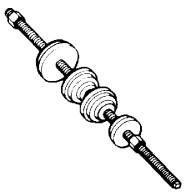
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 2C-7) / ☞(Page 2C-11)

NOTE

Required service material is also described in the following.
"Rear Suspension Components (Page 2C-1)"
"Rear Suspension Assembly Construction (Page 2C-2)"

Special Tool

B718H12308002

09900–20607 Dial gauge (1/100 mm, 10 mm) ☞(Page 2C-10)		09900–20701 Magnetic stand ☞(Page 2C-10)	
09900–21304 V-block (100 mm) ☞(Page 2C-10)		09913–70210 Bearing installer set ☞(Page 2C-6)	
09921–20240 Bearing remover set ☞(Page 2C-10)		09923–73210 Bearing remover ☞(Page 2C-6) / ☞(Page 2C-10)	
09924–84521 Bearing installer set ☞(Page 2C-7) / ☞(Page 2C-11)		09930–30104 Rotor remover slide shaft ☞(Page 2C-6) / ☞(Page 2C-10)	
09941–34513 Steering race installer ☞(Page 2C-11)			

Wheels and Tires

Precautions

Precautions for Wheel and Tire

B718H12400001

⚠ WARNING

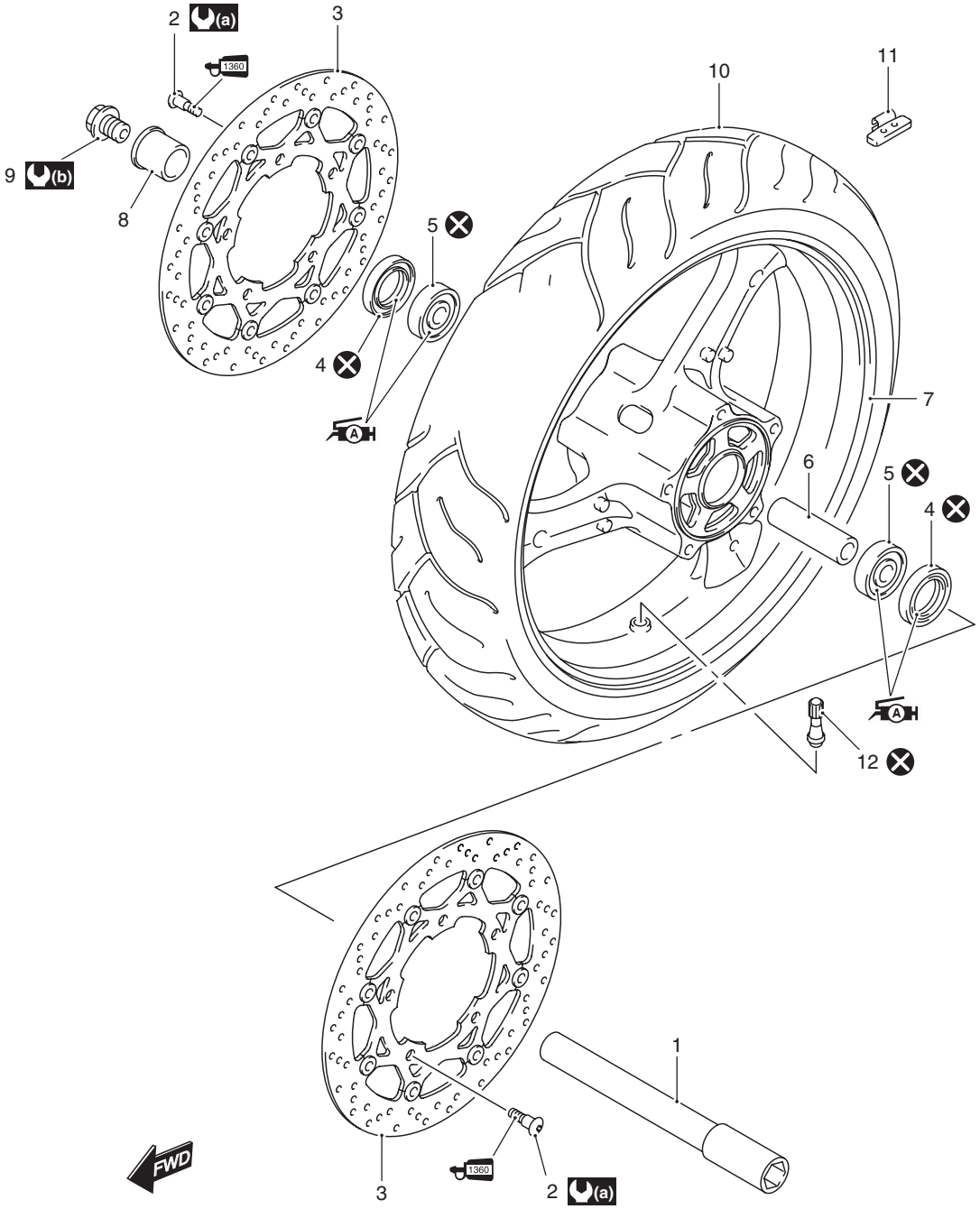
- **Proper tire pressure and proper tire loading are important factors. Over loading tire can lead to tire failure and loss of motorcycle control.**
- **Under-inflated tires make smooth cornering difficult, and can result in rapid tire wear.**
- **Over-inflated tires have a smaller amount of tire in contact with the load, which can contribute to skidding and loss of control.**
- **Replace the wheel when wheel runout exceed the service limit or if find damage such as distortion, crack, nick or scratch.**
- **When tire replacement is necessary, the original equipment type tire should be used.**
- **Do not mix different types of tires on the same vehicle such as radial and bias-belted tires except in emergencies, because handling may be seriously affected and may result in loss of control.**
- **Replacement wheel must be equivalent to the original equivalent wheel.**

Repair Instructions

Front Wheel Components

B718H12406015

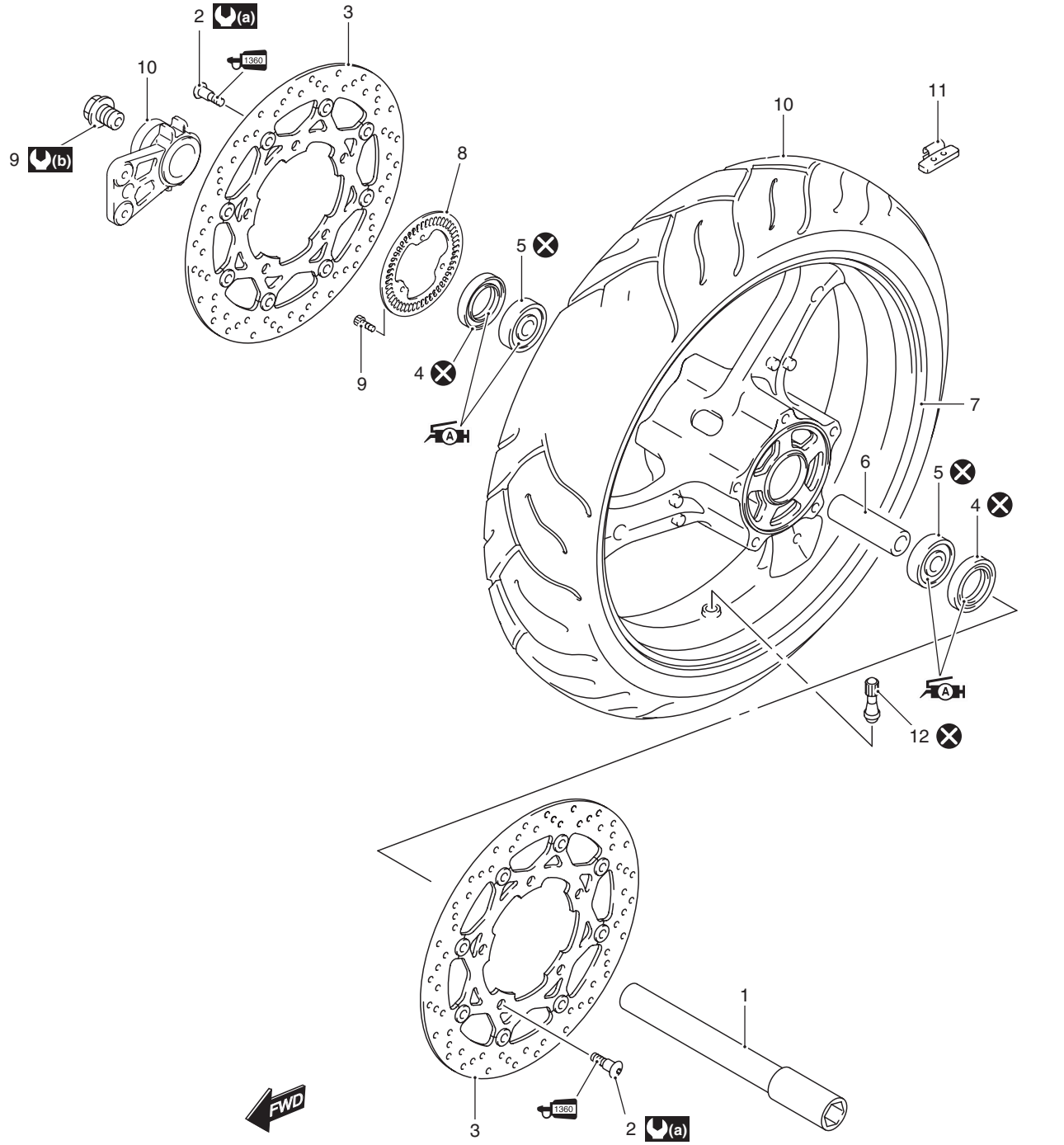
GSF1250/S



I718H1240050-02

1. Front axle	7. Front wheel	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
2. Brake disc bolt	8. Collar	(b) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)
3. Brake disc	9. Front axle bolt	A : Apply grease.
4. Dust seal	10. Tire	1360 : Apply thread lock to thread part.
5. Bearing	11. Wheel balancer	: Do not reuse.
6. Spacer	12. Air valve	

GSF1250A/SA



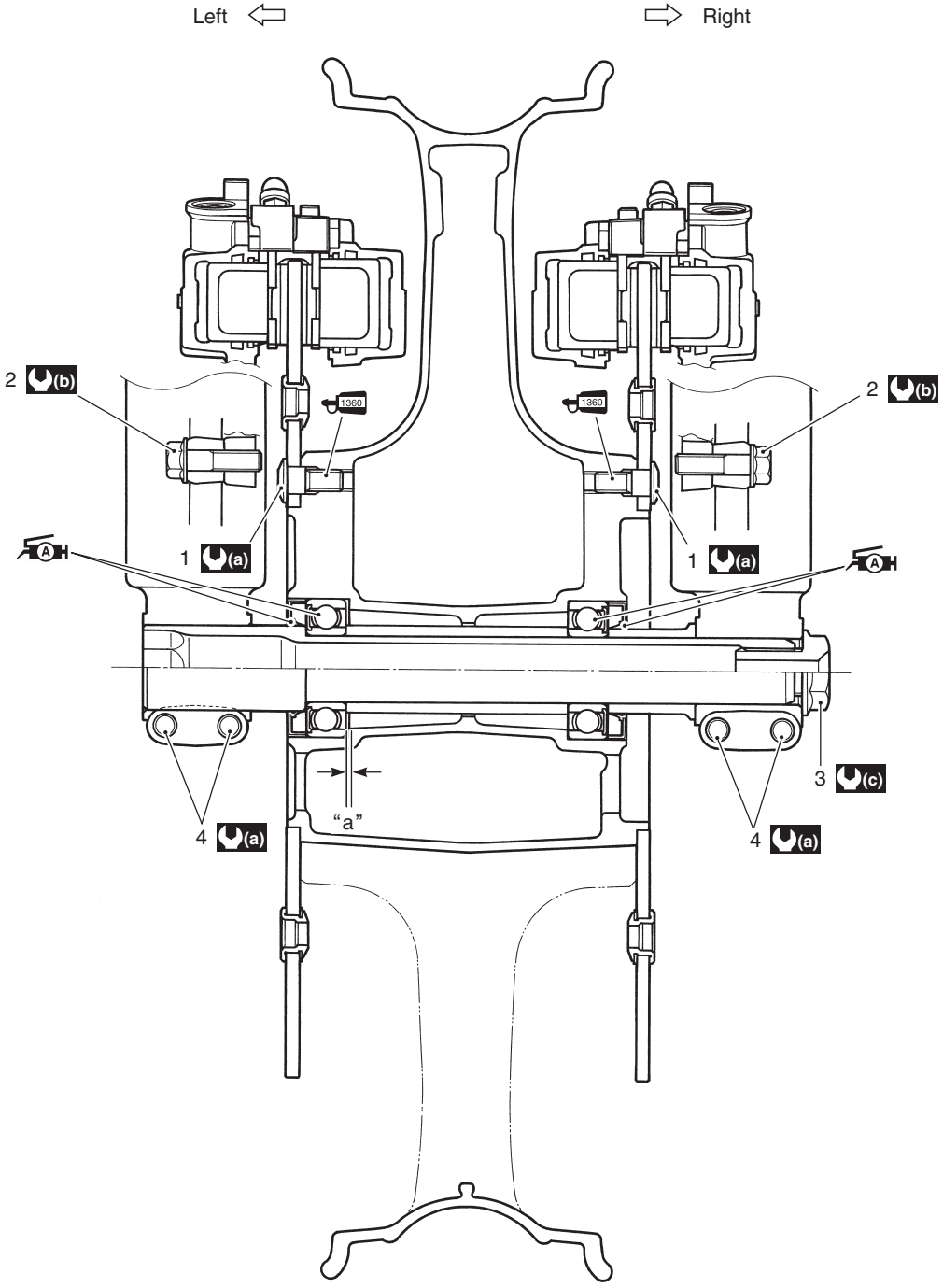
I718H1240001-03

1. Front axle	8. Wheel speed sensor rotor	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
2. Brake disc bolt	9. Sensor rotor bolt	(b) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)
3. Brake disc	10. Wheel speed sensor bracket	A : Apply grease.
4. Dust seal	11. Front axle bolt	1360 : Apply thread lock to thread part.
5. Bearing	12. Tire	: Do not reuse.
6. Spacer	13. Wheel balancer	
7. Front wheel	14. Air valve	

Front Wheel Assembly Construction

B718H12406002

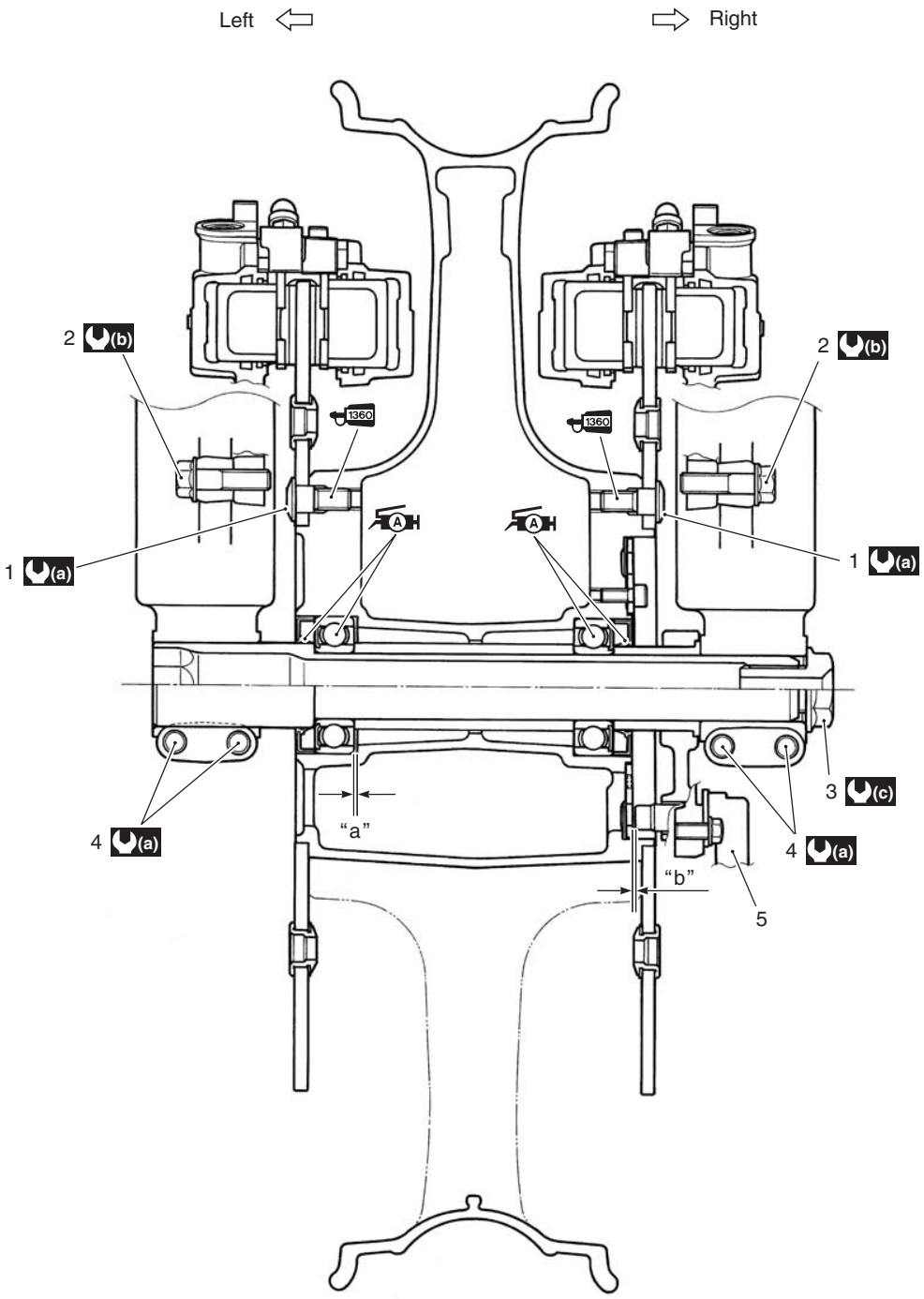
GSF1250/S



I718H1240044-02

1. Brake disc bolt	"a": Clearance	: Apply grease.
2. Brake caliper mounting bolt	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	1360 : Apply thread lock to thread part.
3. Front axle bolt	(b) : 26 N·m (2.6 kgf-m, 19 lb-ft)	
4. Front axle pinch bolt	(c) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)	

GSF1250A/SA



I718H1240002-02

1. Brake disc bolt	5. Front wheel speed sensor	(b) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)
2. Brake caliper mounting bolt	"a": Clearance	(c) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)
3. Front axle bolt	"b": 0.3 – 1.5 mm (0.012 – 0.059 in)	A : Apply grease.
4. Front axle pinch bolt	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	1360 : Apply thread lock to thread part.

Front Wheel Assembly Removal and Installation

B718H12406003

Removal

1) Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.

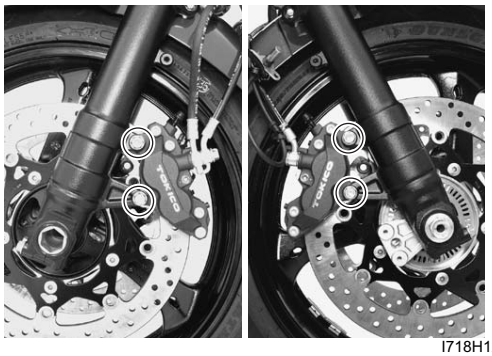
⚠ CAUTION

Do not carry out the work with the motorcycle resting on the side-stand. Do not support the motorcycle with the exhaust pipes. Make sure that the motorcycle is supported securely.

2) Remove the front wheel speed sensor by removing the mounting bolts. (GSF1250A/SA) Refer to “Front Wheel Speed Sensor Removal and Installation in Section 4E (Page 4E-71)”.
3) Remove the brake calipers. Refer to “Front Brake Caliper Removal and Installation in Section 4B (Page 4B-3)”.

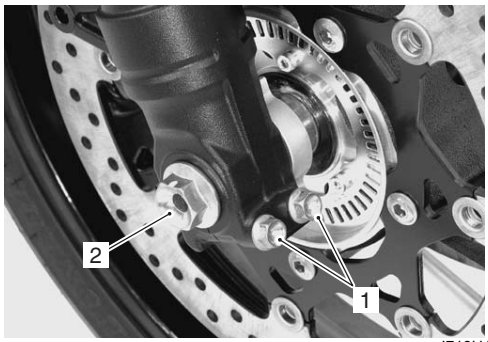
⚠ CAUTION

Do not operate the brake lever while removing the caliper.



I718H1240004-03

4) Loosen two axle pinch bolts (1) on the right front fork leg.
5) Remove the front axle bolt (2).



I718H1240005-01

6) Loosen two axle pinch bolts (3) on the left front fork leg.
7) Draw out the front axle and remove the front wheel.

NOTE

After removing the front wheel, fit the calipers temporarily to the original positions.

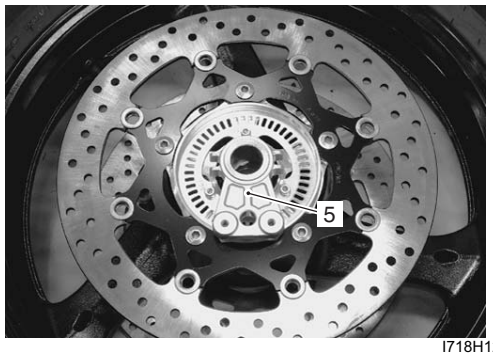
I718H1240006-02

8) Remove the collar (4) (GSF1250/S) or front wheel speed sensor bracket (5) (GSF1250A/SA).

GSF1250/S

I718H1240008-02

GSF1250A/SA



I718H1240007-02

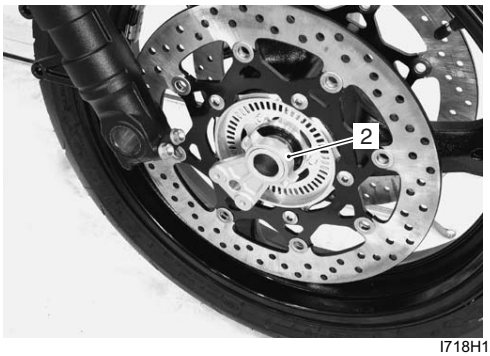
Installation

1) Install the collar (1) (GSF1250/S) or front wheel speed sensor bracket (2) (GSF1250A/SA) into the right side of the wheel.

GSF1250/S

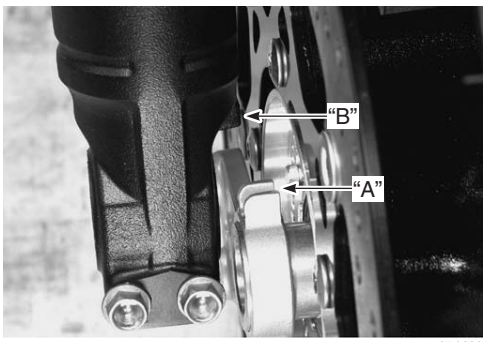
I718H1240010-02

GSF1250A/SA



I718H1240009-02

2) Align the recess “A” on the speed sensor bracket with the stopper “B” on the right front fork. (GSF1250A/SA)



I718H1240046-01

3) Install the front wheel with the front axle and tighten the front axle bolt temporarily.

⚠ WARNING

The directional arrow on the tire should point to the wheel rotation, when remounting the wheel.

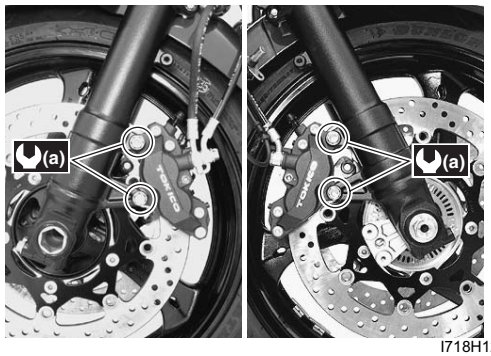
I718H1240011-01

4) Tighten the brake caliper mounting bolts to the specified torque.

Tightening torque
Front brake caliper mounting bolt (a): 26 N·m (2.6 kgf-m, 19.0 lb-ft)

⚠ WARNING

After remounting the brake calipers, pump the brake lever until the pistons push the pad correctly.



I718H1240012-01

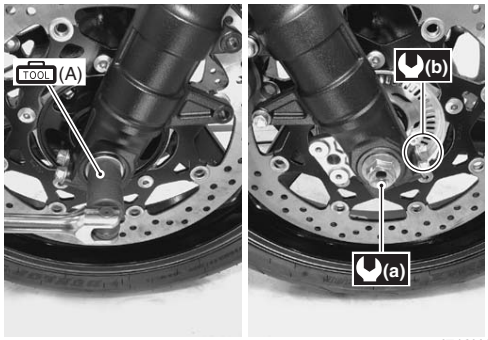
5) Hold the front axle with the special tool and tighten the front axle bolt to the specified torque.

Special tool
TOOL (A): 09900–18740 (Hexagon socket (24 mm))

Tightening torque
Front axle bolt (a): 100 N·m (10.0 kgf-m, 72.5 lb-ft)

6) Tighten two axle pinch bolts on the right fork leg to the specified torque.

Tightening torque
Front axle pinch bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1240013-01

7) Move the front fork up and down 4 or 5 times.

I718H1240014-02

8) Tighten two axle pinch bolts on the left front fork leg to the specified torque.

Tightening torque
Front axle pinch bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

I718H1240015-01

9) Install the front wheel speed sensor mounting bolts. (GSF1250A/SA) Refer to “Front Wheel Speed Sensor Removal and Installation in Section 4E (Page 4E-71)”.
10) Check the clearance between the front wheel speed sensor and sensor rotor. (GSF1250A/SA) Refer to “Front Wheel Speed Sensor Removal and Installation in Section 4E (Page 4E-71)”.

Front Wheel Related Parts Inspection

B718H12406004

Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)”

Tire
Refer to “Tire Inspection in Section 0B (Page 0B-19)”.

Front Brake Disc
Refer to “Front Brake Disc Inspection in Section 4B (Page 4B-7)”.

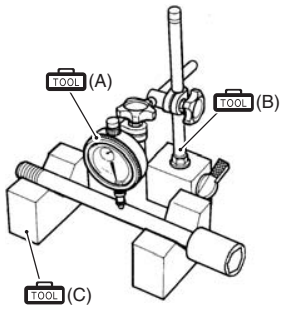
Dust Seal
Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seal with the new ones. Refer to “Front Wheel Dust Seal / Bearing Removal and Installation (Page 2D-9)”.

I718H1240017-02

Wheel Axle
Using a dial gauge, check the wheel axle for runout. If the runout exceeds the limit, replace the axle shaft.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)
TOOL (C): 09900–21304 (V-block (100 mm))

Wheel axle runout
Service limit: 0.25 mm (0.010 in.)

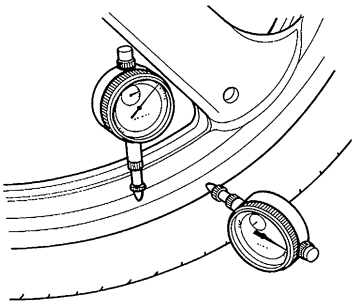


I649G1240054-01

Wheel

1) Remove the brake pads. Refer to “Front Brake Pad Replacement in Section 4B (Page 4B-2)”.
2) Make sure that the wheel runout checked as shown does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.
3) Install the brake pads. Refer to “Front Brake Pad Replacement in Section 4B (Page 4B-2)”.

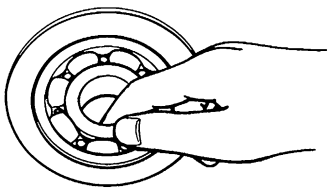
Wheel rim runout
Service limit (Axial and Radial): 2.0 mm (0.08 in.)



I649G1240014-01

Wheel Bearing

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation. Replace the bearing in the following procedure if there is anything unusual. Refer to “Front Wheel Dust Seal / Bearing Removal and Installation (Page 2D-9)”.



I649G1240015-01

Front Wheel Speed Sensor Rotor (GSF1250A/SA)

Refer to “Wheel Speed Sensor and Sensor Rotor Inspection in Section 4E (Page 4E-74)”.

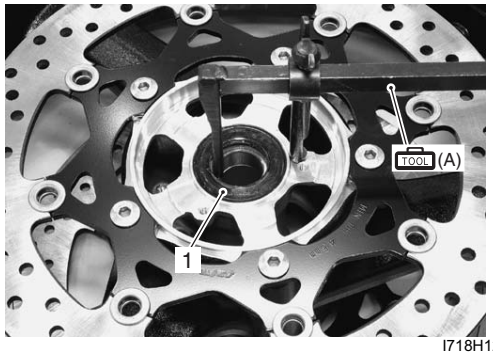
Front Wheel Dust Seal / Bearing Removal and Installation

B718H12406005

Removal

1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)”.
2) Remove the front wheel sensor speed sensor rotor by removing the mounting bolts. (GSF1250A/SA) Refer to “Front Wheel Speed Sensor Rotor Removal and Installation in Section 4E (Page 4E-72)”.
3) Remove the dust seals (1).

Special tool
TOOL (A): 09913–50121 (Oil seal remover)



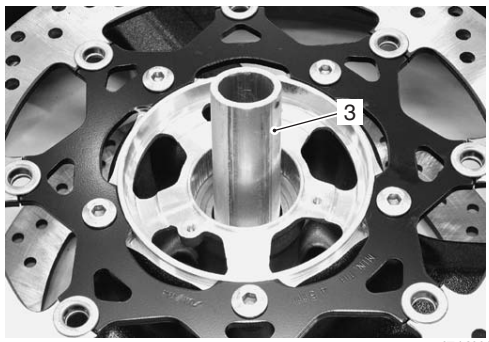
I718H1240020-02

4) Remove the bearings (2) using the special tool.

Special tool
TOOL (B): 09921–20240 (Bearing remover set)

I718H1240018-02

5) Remove the spacer (3).



I718H1240019-02

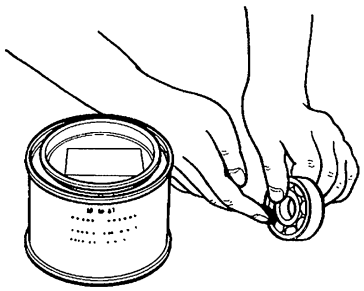
Installation

⚠ CAUTION

The removed dust seals and bearings must be replaced with new ones.

1) Apply grease to the wheel bearings.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



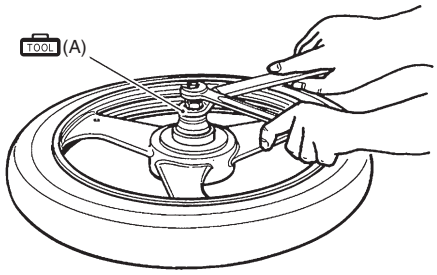
I649G1240019-01

2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tool.

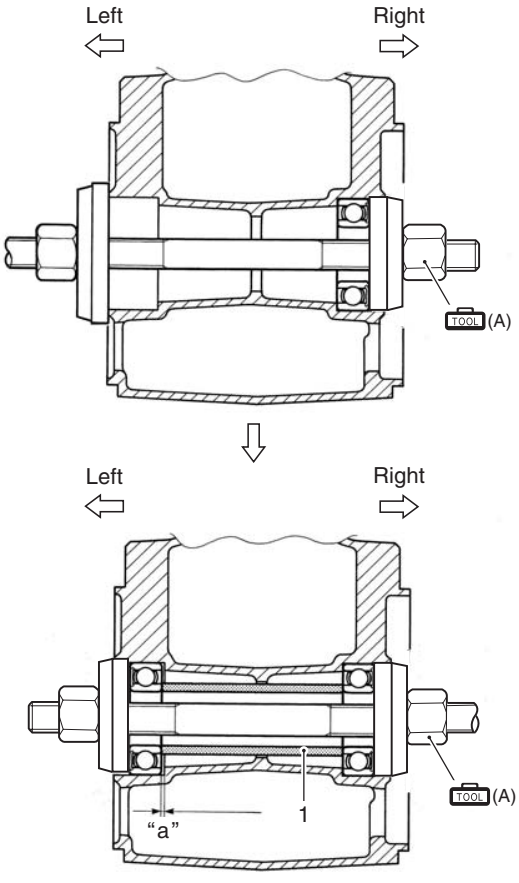
Special tool
(A): 09924–84510 (Bearing installer set)

⚠ CAUTION

The sealed cover of the bearing must face outside.



I649G1240020-02



I649G1240021-05

1. Spacer	"a": Clearance

3) Install the dust seals with the special tool.

Special tool
(B): 09913–70210 (Bearing installer set)

I718H1240021-01

4) Apply grease to the lip of dust seals.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

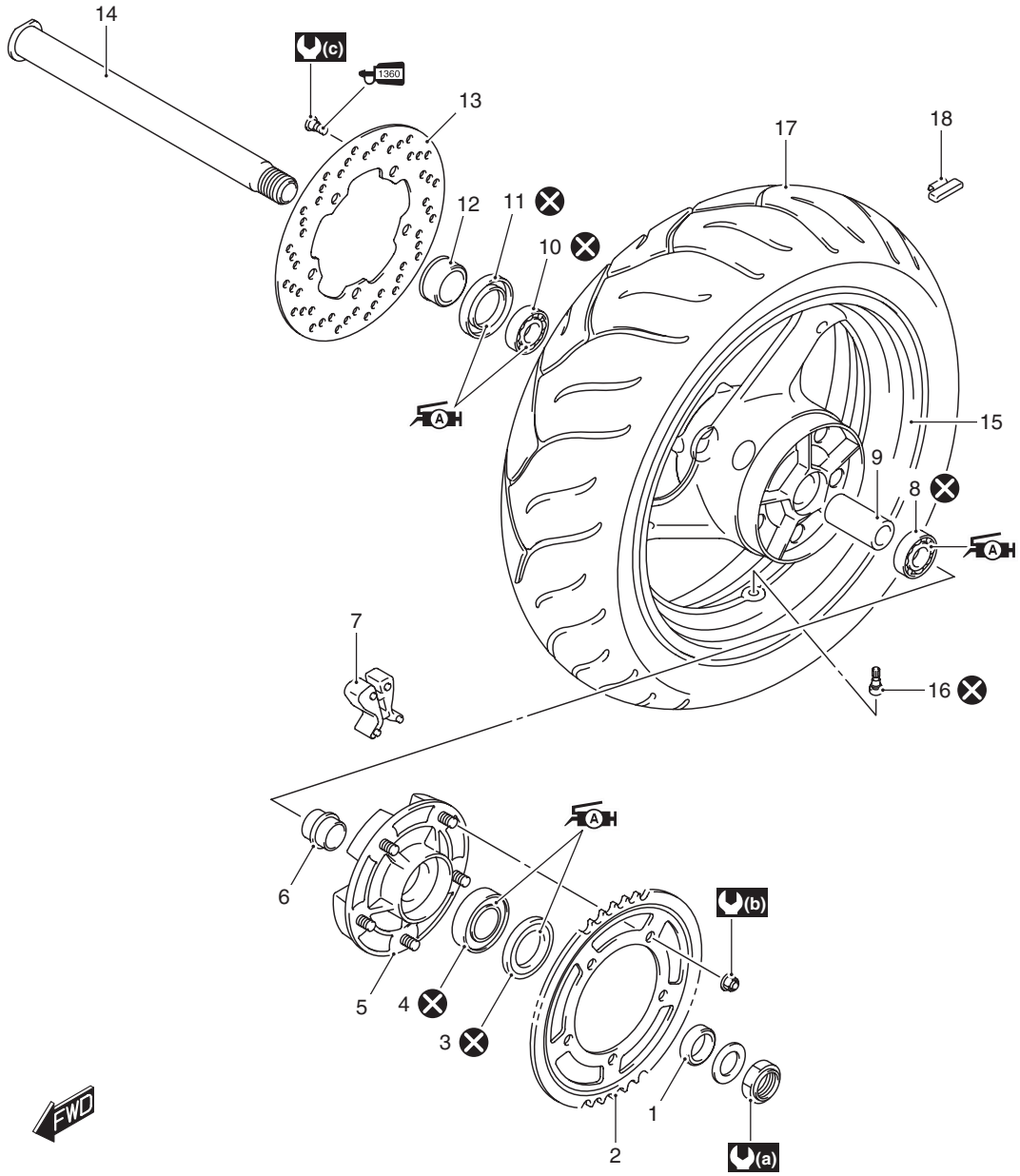
I718H1240022-01

5) Install the front wheel speed sensor rotor as the letters “50T” face outside. (GSF1250A/SA) Refer to “Front Wheel Speed Sensor Rotor Removal and Installation in Section 4E (Page 4E-72)”.
6) Install the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)”.

Rear Wheel Components

B718H12406006

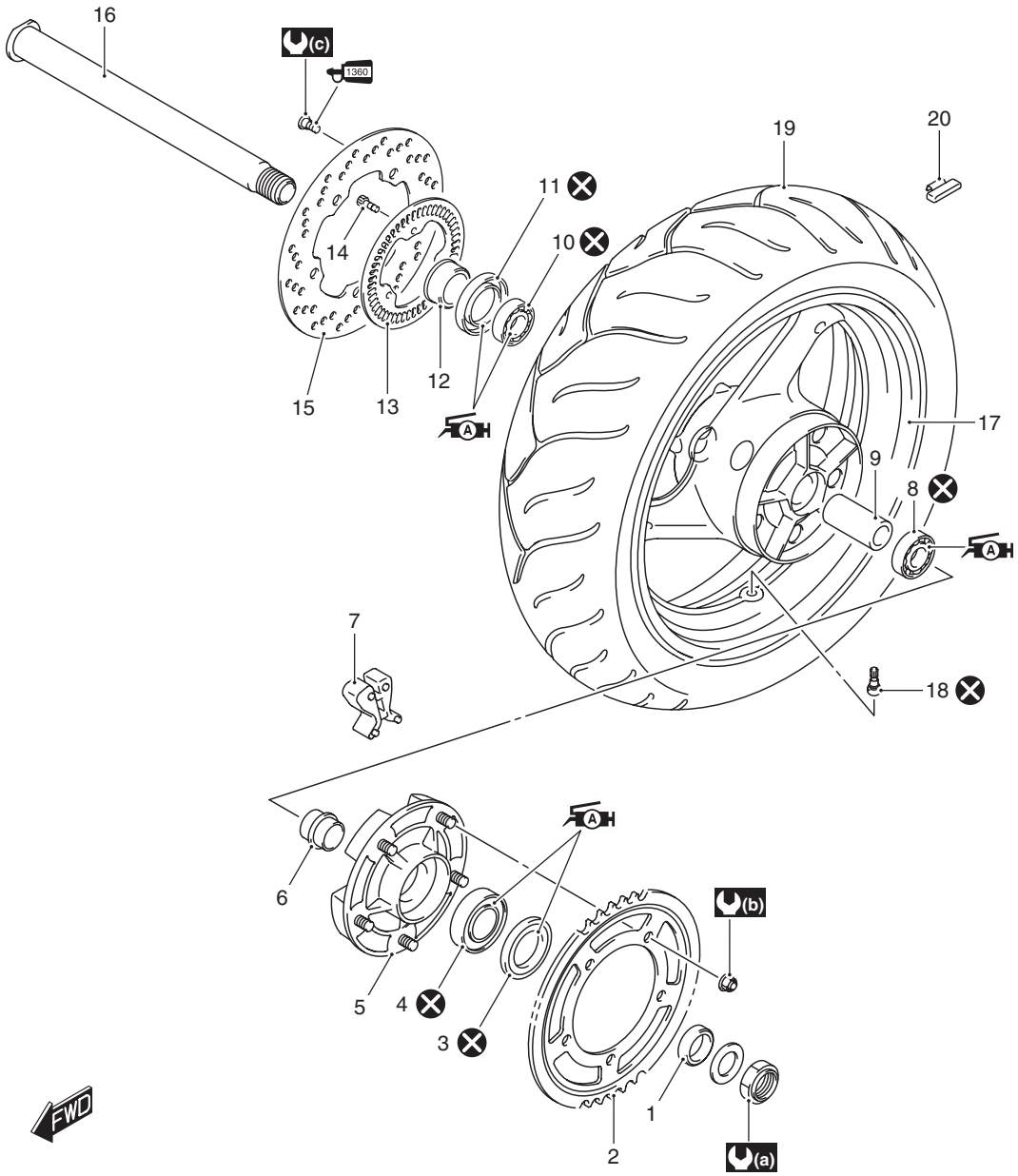
GSF1250/S



I718H1240024-03

1. Spacer	10. Bearing	(a) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)
2. Rear sprocket	11. Dust seal	(b) : 60 N·m (6.0 kgf-m, 43.5 lb-ft)
3. Dust seal	12. Collar	(c) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
4. Bearing	13. Rear brake disc	: Apply grease.
5. Sprocket mounting drum	14. Rear axle	1360 : Apply thread lock to thread part.
6. Retainer	15. Rear wheel	: Do not reuse.
7. Wheel damper	16. Air valve	
8. Bearing	17. Tire	
9. Spacer	18. Wheel balancer	

GSF1250A/SA



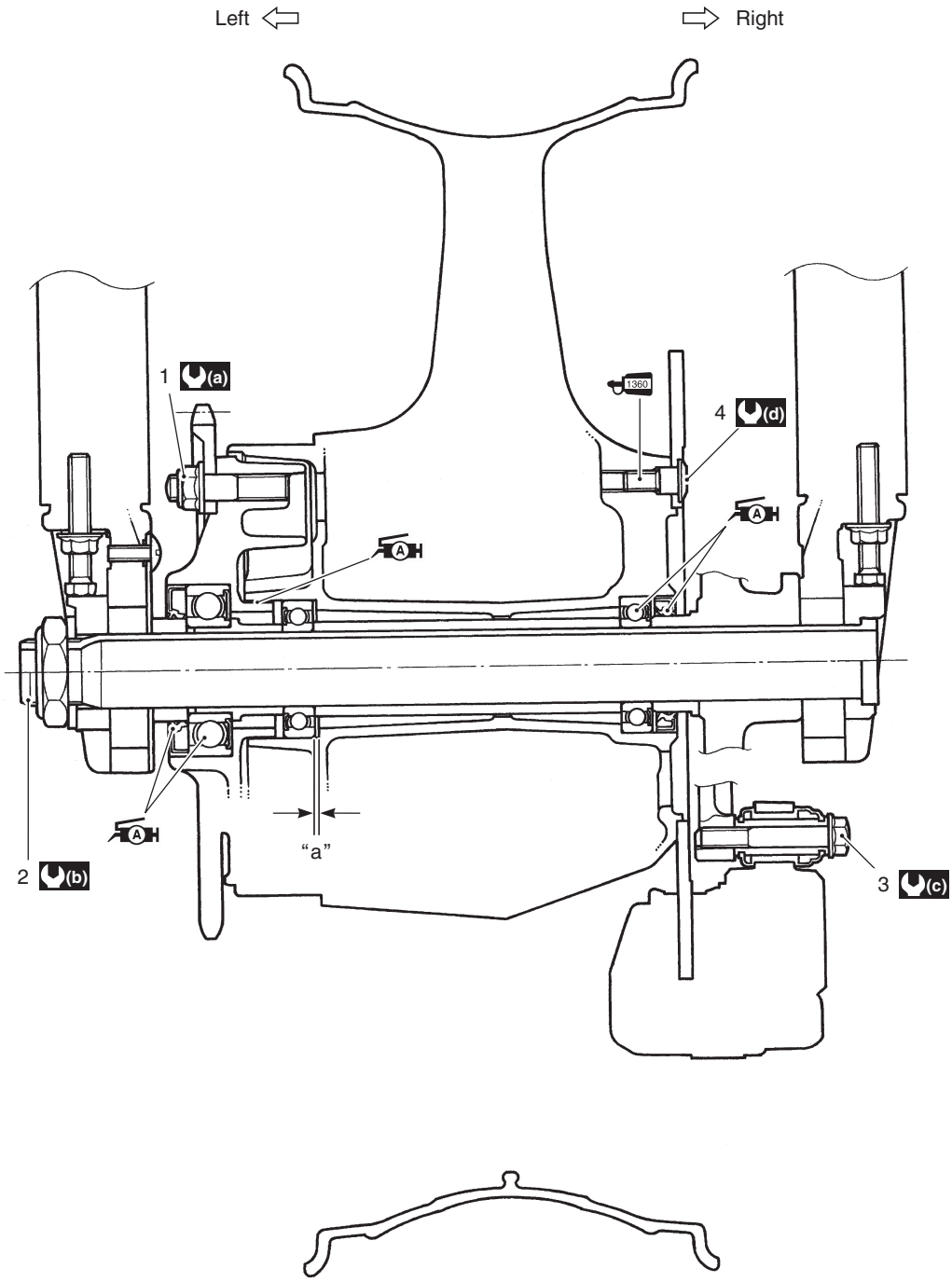
I718H1240025-03

1. Spacer	10. Bearing	19. Tire
2. Rear sprocket	11. Dust seal	20. Wheel balancer
3. Dust seal	12. Collar	(a) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)
4. Bearing	13. Wheel speed sensor rotor	(b) : 60 N·m (6.0 kgf-m, 43.5 lb-ft)
5. Sprocket mounting drum	14. Sensor rotor bolt	(c) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
6. Retainer	15. Rear brake disc	A : Apply grease.
7. Wheel damper	16. Rear axle	1360 : Apply thread lock to thread part.
8. Bearing	17. Rear wheel	: Do not reuse.
9. Spacer	18. Air valve	

Rear Wheel Assembly Construction

B718H12406018

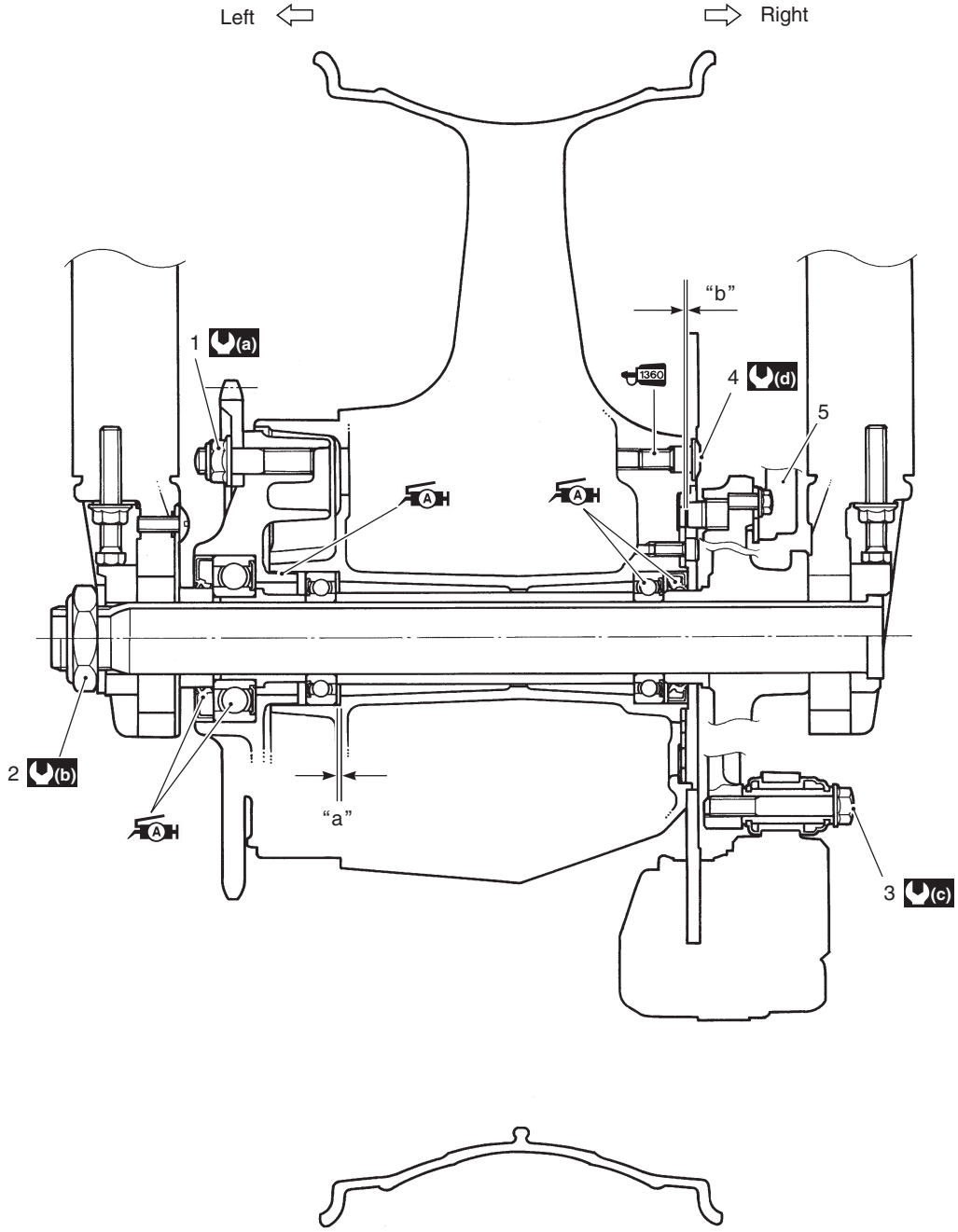
GSF1250/S



I718H1240027-03

1. Rear sprocket nut	"a": Clearance	(d) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
2. Rear axle nut	(a) : 60 N·m (6.0 kgf-m, 43.5 lb-ft)	A H : Apply grease.
3. Brake caliper mounting bolt	(b) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)	1360 : Apply thread lock to thread part.
4. Brake disc bolt	(c) : 22 N·m (2.2 kgf-m, 16.0 lb-ft)	

GSF1250A/SA



I718H1240026-07

1. Rear sprocket nut	"a": Clearance	(d) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
2. Rear axle nut	"b": 0.3 – 1.5 mm (0.012 – 0.059 in)	A : Apply grease.
3. Brake caliper mounting bolt	(a) : 60 N·m (6.0 kgf-m, 43.5 lb-ft)	1360 : Apply thread lock to thread part.
4. Brake disc bolt	(b) : 100 N·m (10.0 kgf-m, 72.5 lb-ft)	
5. Rear wheel speed sensor	(c) : 22 N·m (2.2 kgf-m, 16.0 lb-ft)	

Rear Wheel Assembly Removal and Installation

B718H12406008

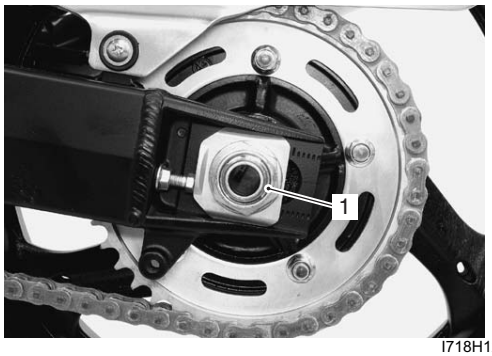
Removal

1) Support the motorcycle with the center stand.

⚠ CAUTION

Make sure that the motorcycle is supported securely.

2) Remove the rear wheel speed sensor by removing the mounting bolts. (GSF1250A/SA) Refer to “Rear Wheel Speed Sensor Removal and Installation in Section 4E (Page 4E-71)”.
3) Remove the rear axle nut (1) and draw out the rear axle.



I718H1240029-01

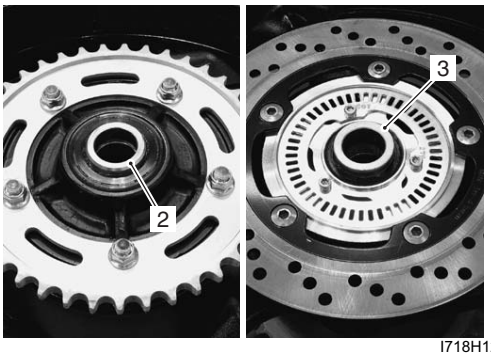
4) Remove the rear axle and disengage the drive chain from the rear sprocket.
5) Remove the rear wheel assembly.

⚠ CAUTION

Do not operate the rear brake pedal with the rear wheel removed.

I718H1240030-02

6) Remove the spacer (2) and collar (3).

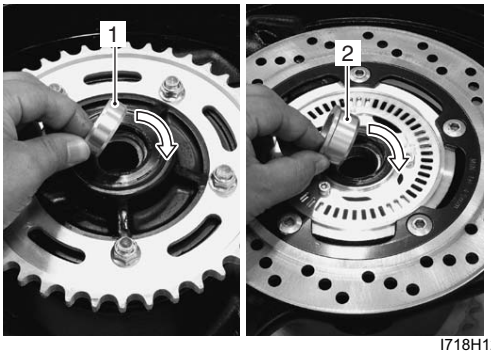


I718H1240031-01

Installation

Refer to “Wheel Speed Sensor and Sensor Rotor Inspection in Section 4E (Page 4E-74)”.

1) Install the spacer (1) and collar (2).



I718H1240033-01

2) Install the rear wheel with the rear axle and tighten the rear axle nut temporarily.
3) Adjust the drive chain slack after installing the rear wheel. Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.
4) Tighten the rear axle nut (3) to the specified torque.

Tightening torque
Rear axle nut (a): 100 N·m (10.0 kgf-m, 72.5 lb-ft)

⚠ WARNING

After remounting the rear wheel, pump the brake pedal several times to check for proper brake operation.

I718H1240034-01

5) Install the rear wheel speed sensor mounting bolts. (GSF1250A/SA) Refer to “Rear Wheel Speed Sensor Removal and Installation in Section 4E (Page 4E-71)”.
6) Check the clearance between the rear wheel speed sensor. (GSF1250A/SA) Refer to “Rear Wheel Speed Sensor Removal and Installation in Section 4E (Page 4E-71)”.

Rear Wheel Related Parts Inspection

B718H12406009

Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.

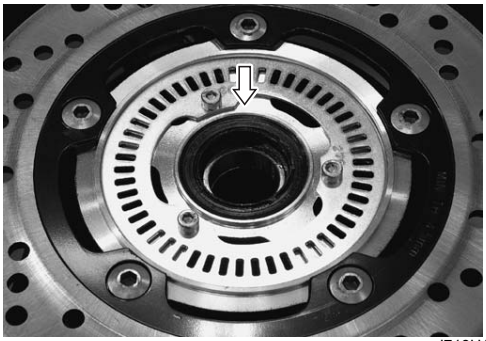
Tire
Refer to “Tire Inspection in Section 0B (Page 0B-19)”.

Rear Brake Disc
Refer to “Rear Brake Disc Inspection in Section 4C (Page 4C-7)”.

Wheel Damper
Refer to “Drive Chain Related Parts Inspection in Section 3A (Page 3A-5)”.

Sprocket
Refer to “Drive Chain Related Parts Inspection in Section 3A (Page 3A-5)”.

Dust Seal
Inspect the dust seal lip for wear or damage. If any defects is found, replace the dust seal with a new one. Refer to “Rear Wheel Dust Seal / Bearing Removal and Installation (Page 2D-18)”.

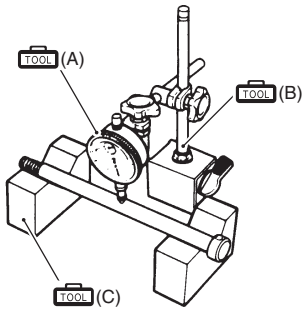


I718H1240037-02

Wheel Axle
Using a dial gauge, check the wheel axle for runout, If the runout exceeds the limit, replace the axle shaft.

Wheel axle runout
Service limit: 0.25 mm (0.010 in.)

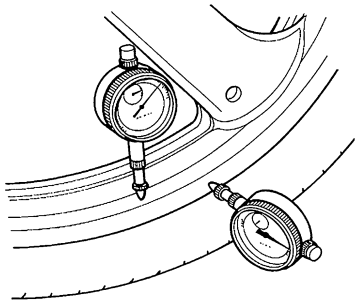
Special tool
(A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
(B): 09900–20701 (Magnetic stand)
(C): 09900–21304 (V-block (100 mm))



I649G1230034-02

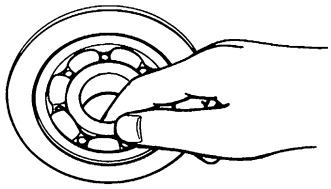
Wheel
1) Remove the brake pads. Refer to “Rear Brake Pad Replacement in Section 4C (Page 4C-2)”.
2) Make sure that the wheel runout checked as shown does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.
3) Install the brake pads. Refer to “Rear Brake Pad Replacement in Section 4C (Page 4C-2)”.

Wheel rim runout
Service limit (Axial and Radial): 2.0 mm (0.08 in.)



I649G1240014-01

Bearing
Inspect the play of the wheel bearings by hand while they are in the wheel. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to “Rear Wheel Dust Seal / Bearing Removal and Installation (Page 2D-18)”.



I649G1240015-01

Rear Wheel Speed Sensor Rotor (GSF1250A/SA)
Refer to “Wheel Speed Sensor and Sensor Rotor Inspection in Section 4E (Page 4E-74)”.

Rear Wheel Dust Seal / Bearing Removal and Installation

B718H12406010

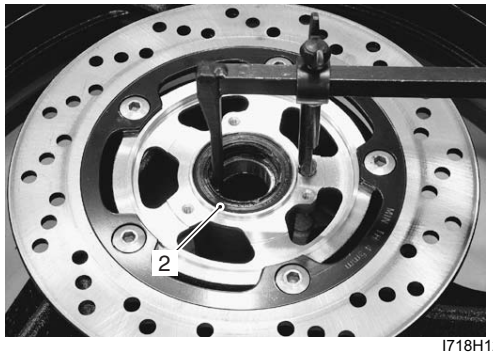
Removal

1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
2) Remove the rear sprocket mounting drum assembly (1) from the rear wheel.

I718H1240052-02

3) Remove the rear wheel speed sensor rotor by removing the mounting bolts. (GSF1250A/SA) Refer to “Wheel Speed Sensor and Sensor Rotor Inspection in Section 4E (Page 4E-74)”.
4) Remove the dust seal (2).

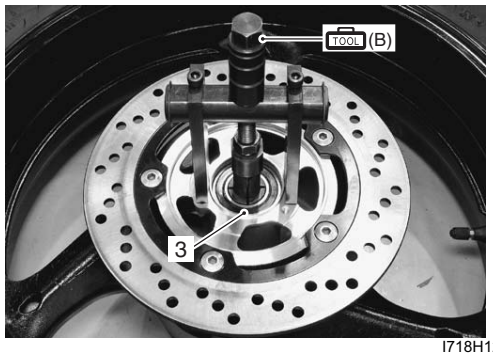
Special tool
(A): 09913–50121 (Oil seal remover)



I718H1240038-03

5) Remove the bearings (3) on both sides using the special tool.

Special tool
(B): 09921–20240 (Bearing remover set)



I718H1240040-03

6) Remove the spacer.

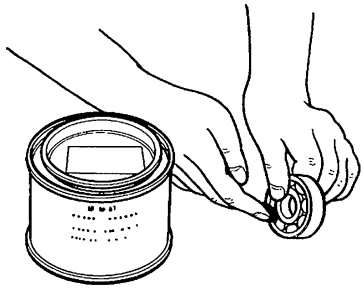
Installation

⚠ CAUTION

The removed dust seals and bearings must be replaced with new ones.

1) Apply grease to the wheel bearings.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



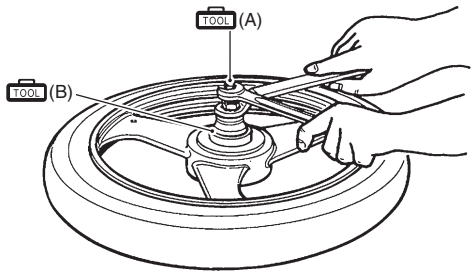
I649G1240019-01

2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tools.

Special tool
(A): 09941–34513 (Steering race installer)
(B): 09924–84510 (Bearing installer set)

⚠ CAUTION

The sealed cover of the bearing must face outside.



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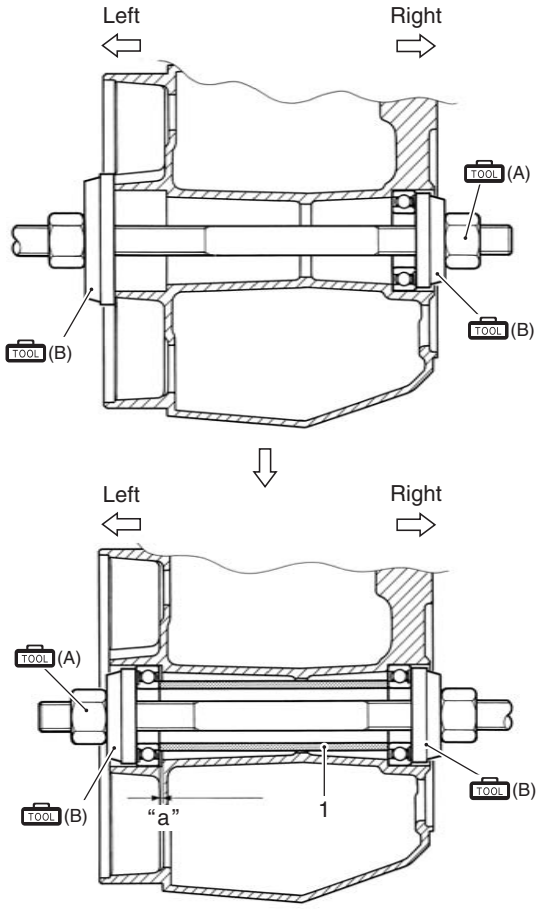
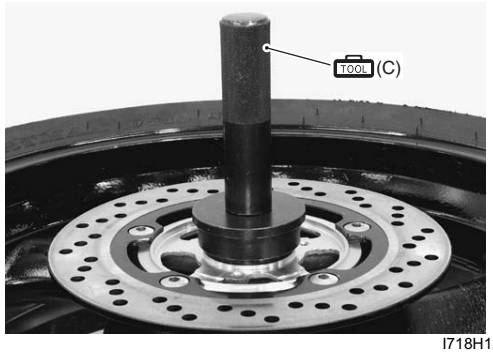


I649G1240034-02

1. Spacer	"a": Clearance

3) Install a new dust seal with the special tool.

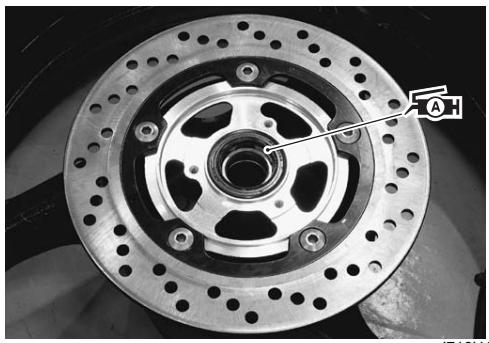
Special tool
(C): 09913–70210 (Bearing installer set)



I718H1240042-01

4) Apply grease to the dust seal lip.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1240043-01

5) Install the rear wheel speed sensor rotor. (GSF1250A/SA) Refer to "Rear Wheel Speed Sensor Rotor Removal and Installation in Section 4E (Page 4E-73)".

6) Install the rear sprocket mounting drum assembly.

I718H1240053-01

7) Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation (Page 2D-16)".

Tire Removal and Installation

B718H12406011

Removal

The most critical factor of a tubeless tire is the seal between the wheel rim and the tire bead. For this reason, it is recommended to use a tire changer that can satisfy this sealing requirement and can make the operation efficient as well as functional.

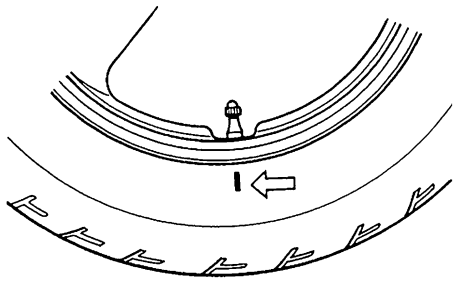
1) Removal the wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)” and “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
2) Remove the mounting drum from the rear wheel. (For rear wheel)
   Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
3) Remove the valve core.
4) Remove the tire using the tire changer.

⚠ CAUTION

For operating procedures, refer to the instructions supplied by the tire changer manufacturer.

NOTE

When removing the tire in case of repair or inspection, mark the tire with a chalk to indicate the tire position relative to the valve position. Even though the tire is refitted to the original position after repairing puncture, the tire may have to be balanced again since such a repair can cause imbalance.



I649G1240037-01

Installation

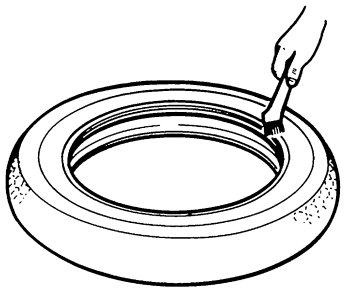
⚠ CAUTION

Do not reuse the valve which has been once removed.

1) Apply tire lubricant to the tire bead.

⚠ CAUTION

Never use oil, grease or gasoline on the tire bead in place of tire lubricant.



I649G1240038-01

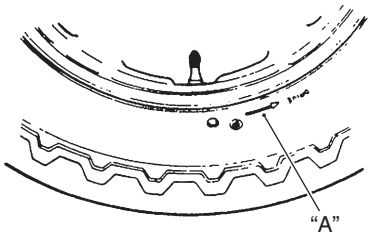
2) Install the tire onto the wheel.

⚠ CAUTION

For installation procedure of tire onto the wheel, follow the instructions given by the tire changer manufacturer.

NOTE

- **When installing the tire, the arrow “A” on the side wall should point to the direction of wheel rotation.**
- **Align the chalk mark put on the tire at the time of removal with the valve position.**



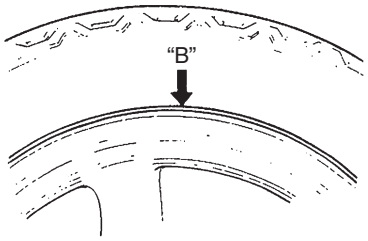
I649G1240039-01

3) Bounce the tire several times while rotating. This makes the tire bead expand outward to contact the wheel, thereby facilitating air inflation.
4) Install the valve core and inflate the tire.

⚠ WARNING

- **Do not inflate the tire to more than 400 kPa (4.0 kgf/cm², 57 psi). If inflated beyond this limit, the tire can burst and possibly cause injury. Do not stand directly over the tire while inflating.**
- **In the case of preset pressure air inflator, pay special care for the set pressure adjustment.**

5) In this condition, check the “grim line” “B” cast on the tire side walls. The line must be equidistant from the wheel rim all around.
6) If the distance between the rim line and wheel rim varies, this indicates that the bead is not properly seated. If this is the case, deflate the tire completely and unseat the bead for both sides. Coat the bead with lubricant and fit the tire again.



I649G1240040-01

7) When the bead has been fitted properly, adjust the pressure to specification.
8) As necessary, adjust the tire balance. Refer to “Wheel Balance Check and Adjustment (Page 2D-23)”.

Cold inflation tire pressure

	Front	Rear
Solo riding	**250 kPa (2.50 kgf/cm², 36 psi)**	**290 kPa (2.90 kgf/cm², 42 psi)**
Dual riding	**250 kPa (2.50 kgf/cm², 36 psi)**	**290 kPa (2.90 kgf/cm², 42 psi)**

9) Install the mounting drum to the rear wheel. (For rear wheel) Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
10) Install the wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)” and “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.

Wheel / Tire / Air Valve Inspection and Cleaning

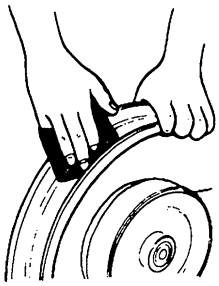
B718H12406012

Refer to “Tire Removal and Installation (Page 2D-20)”.

Wheel

Wipe the wheel clean and check for the following points:

- Distortion and crack
- Any flaws and scratches at the bead seating area.
- Wheel rim runout. Refer to “Front Wheel Related Parts Inspection (Page 2D-8)” and “Rear Wheel Related Parts Inspection (Page 2D-17)”.

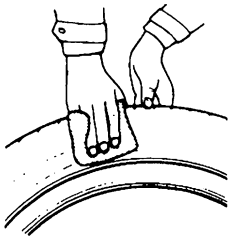


I649G1240041-01

Tire

Tire must be checked for the following points:

- Nick and rupture on side wall
- Tire tread depth (Refer to “Tire Inspection in Section 0B (Page 0B-19)”.)
- Tread separation
- Abnormal, uneven wear on tread
- Surface damage on bead
- Localized tread wear due to skidding (Flat spot)
- Abnormal condition of inner liner



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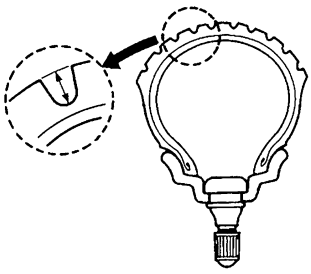
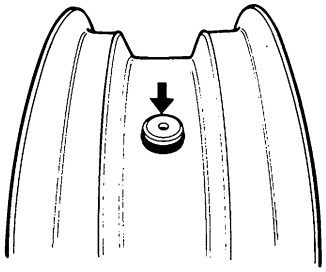


I649G1240043-01

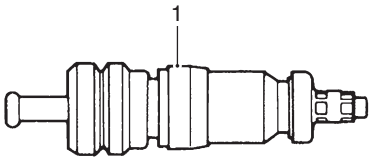
Air Valve

Inspect the air valve for peeling and damage. If any defect is found, replace the air valve with a new one. Refer to “Air Valve Removal and Installation (Page 2D-22)”.



I649G1240044-01

Inspect the valve core seal (1) for wear and damage. If any defect is found, replace the valve core with a new one. Refer to “Air Valve Removal and Installation (Page 2D-22)”.



I649G1240045-01

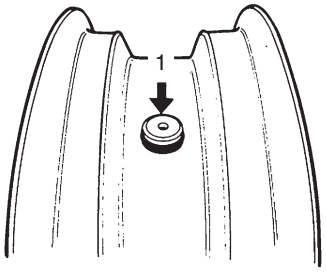
1. Seal

Air Valve Removal and Installation

B718H12406013

Removal

1) Remove the wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)” and “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
2) Remove the tire. Refer to “Tire Removal and Installation (Page 2D-20)”.
3) Remove the air valve (1) from the wheel.

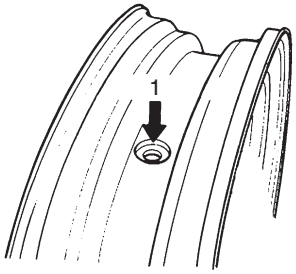


I649G1240046-01

Installation

Install the air valve in the reverse order of removal. Pay attention to the following points:

- Any dust or rust around the valve hole (1) must be cleaned off.



I718H1240054-01

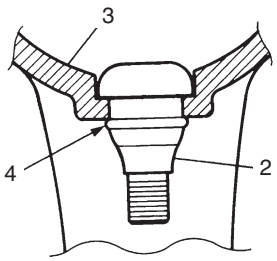
- Install the air valve (2) in the wheel (3).

⚠ CAUTION

- **Be careful not to damage the lip (4) of the valve.**
- **Replace the air valve with a new one.**

NOTE

To properly install the valve into the valve hole, apply a special tire lubricant or neutral soapy liquid to the valve.



I718H1240055-01

2. Valve	3. Wheel	4. Valve lip

Wheel Balance Check and Adjustment

B718H12406014

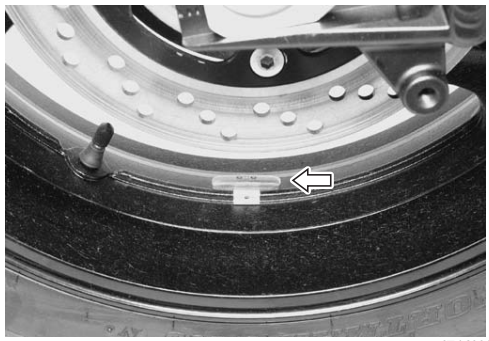
Check and adjust the wheel balance in the following procedures:

1) Removal the wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)” and “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
2) Remove the mounting drum from the rear wheel. (For rear wheel)
   Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
3) Check the wheel balance using the balancer and adjust the wheel balance if necessary.

⚠ CAUTION

For operating procedures, refer to the instructions supplied by the wheel balancer manufacturer.

4) When installing the balancer weight to the wheel, set the balancer weight on center rib of the wheel.



I718H1240051-01

5) Recheck the wheel balance.
6) Install the mounting drum to the rear wheel. (For rear wheel)
   Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.
7) Install the wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-6)” and “Rear Wheel Assembly Removal and Installation (Page 2D-16)”.

Specifications

Service Data

B718H12407001

Wheel

Unit: mm (in.)

Item	Standard		Limit
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	17 M/C x MT3.50	—
	Rear	17 M/C x MT5.50	—

Tire

Item	Standard		Limit
Cold inflation tire pressure (Solo/Dual riding)	Front	250 kPa (2.50 kgf/cm^2, 36 psi)	—
	Rear	290 kPa (2.90 kgf/cm^2, 42 psi)	—
Tire size	Front	120/70 ZR17M/C (58 W)	—
	Rear	180/55 ZR17M/C (73 W)	—
Tire type	Front	DUNLOP D218FT	—
	Rear	DUNLOP D218N	—
Tire tread depth (Recommended depth)	Front	—	1.6 mm (0.06 in.)
	Rear	—	2.0 mm (0.08 in.)

Tightening Torque Specifications

B718H12407002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Front brake caliper mounting bolt	26	2.6	19.0	☞(Page 2D-7)
Front axle bolt	100	10.0	72.5	☞(Page 2D-7)
Front axle pinch bolt	23	2.3	16.5	☞(Page 2D-8) / ☞(Page 2D-8)
Rear axle nut	100	10.0	72.5	☞(Page 2D-16)

NOTE

The specified tightening torque is also described in the following.
"Front Wheel Components (Page 2D-2)"
"Front Wheel Assembly Construction (Page 2D-4)"
"Rear Wheel Components (Page 2D-12)"
"Rear Wheel Assembly Construction (Page 2D-14)"

Reference:
For the tightening torque of fastener not specified in this section, refer to "Tightening Torque Specifications in Section 0C (Page 0C-7)".

Special Tools and Equipment

Recommended Service Material

B718H12408001

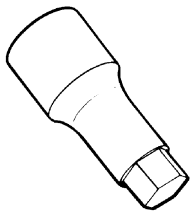
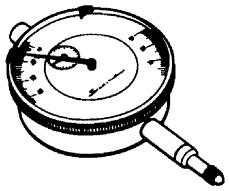
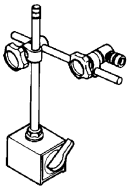
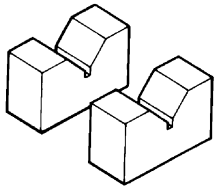
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 2D-10) / ☞(Page 2D-11) / ☞(Page 2D-18) / ☞(Page 2D-19)

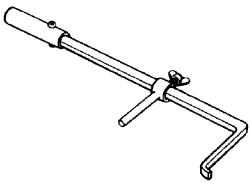
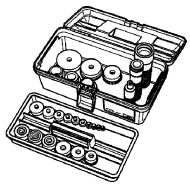
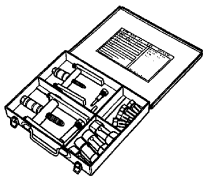
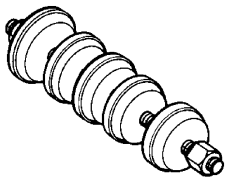
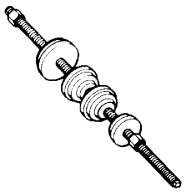
NOTE

Required service material is also described in the following.
"Front Wheel Components (Page 2D-2)"
"Front Wheel Assembly Construction (Page 2D-4)"
"Rear Wheel Components (Page 2D-12)"
"Rear Wheel Assembly Construction (Page 2D-14)"

Special Tool

B718H12408002

09900–18740 Hexagon socket (24 mm) ☞(Page 2D-7)		09900–20607 Dial gauge (1/100 mm, 10 mm) ☞(Page 2D-8) / ☞(Page 2D-17)	
09900–20701 Magnetic stand ☞(Page 2D-8) / ☞(Page 2D-17)		09900–21304 V-block (100 mm) ☞(Page 2D-8) / ☞(Page 2D-17)	

09913–50121 Oil seal remover ☞(Page 2D-9) / ☞(Page 2D-18) 	09913–70210 Bearing installer set ☞(Page 2D-11) / ☞(Page 2D-19) 
09921–20240 Bearing remover set ☞(Page 2D-9) / ☞(Page 2D-18) 	09924–84510 Bearing installer set ☞(Page 2D-10) / ☞(Page 2D-19) 
09941–34513 Steering race installer ☞(Page 2D-19) 	

Section 3

Driveline / Axle

CONTENTS

Precautions

Precautions

Precautions for Driveline / Axle

B718H13000001

Refer to “General Precautions in Section 00 (Page 00-1)”.

⚠ WARNING

Never inspect or adjust the drive chain while the engine is running.

⚠ CAUTION

- **Do not use trichloroethylene, gasoline or such similar solvent. These fluids will damage the O-rings of the drive chain.**
- **Clean the drive chain with a spray-type chain cleaner and blow dry with compressed air. If the drive chain cannot be cleaned with a spray cleaner, it may be necessary to use a kerosine. Always follow the chemical manufacturer’s instructions on proper use, handling and storage.**
- **Lubricate the drive chain with a heavy weight motor oil. Wipe off any excess oil or chain lubricant. Do not use any oil sold commercially as “drive chain oil”. Such oil can damage the O-rings.**
- **The standard drive chain is RK GB50GSVZ3. Suzuki recommends to use this standard drive chain as a replacement.**

Drive Chain / Drive Train / Drive Shaft

Diagnostic Information and Procedures

Drive Chain and Sprocket Symptom Diagnosis

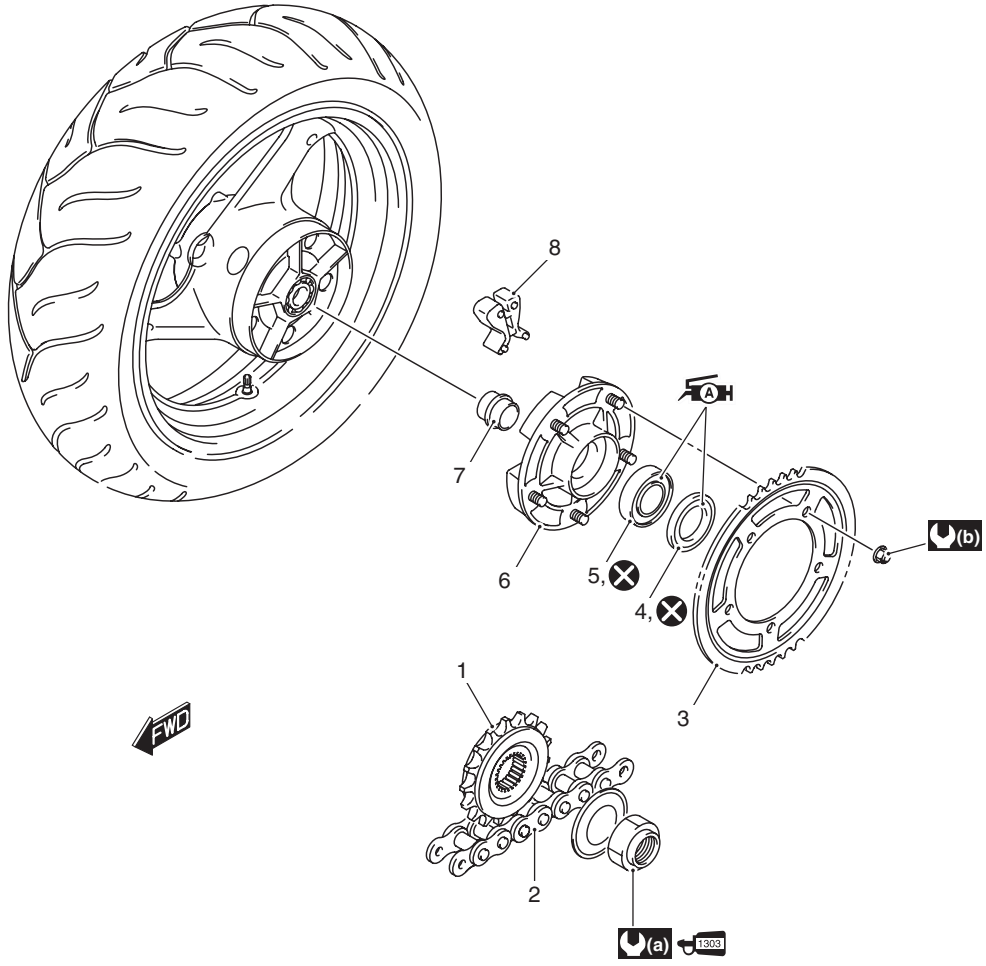
B718H13104001

Condition	Possible cause	Correction / Reference Item
Noisy Drive Chain	Worn sprocket.	*Replace.*
	Worn drive chain.	*Replace.*
	Stretched drive chain.	*Replace.*
	Too large drive chain slack.	*Adjust.*
	Drive chain out of adjustment.	*Adjust.*

Repair Instructions

Drive Chain Related Components

B718H13106001



I718H1310026-01

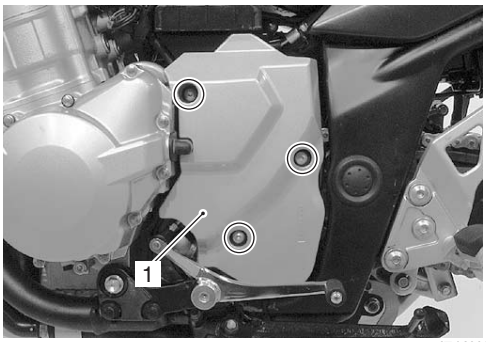
1. Engine sprocket	5. Bearing	(a) : 115 N·m (11.5 kgf-m, 83.0 lb-ft)
2. Drive chain	6. Sprocket mounting drum	(b) : 60 N·m (6.0 kgf-m, 43.5 lb-ft)
3. Rear sprocket	7. Retainer	A : Apply grease.
4. Dust seal	8. Wheel damper	1303 : Apply thread lock to thread part.

Engine Sprocket Removal and Installation

B718H13106002

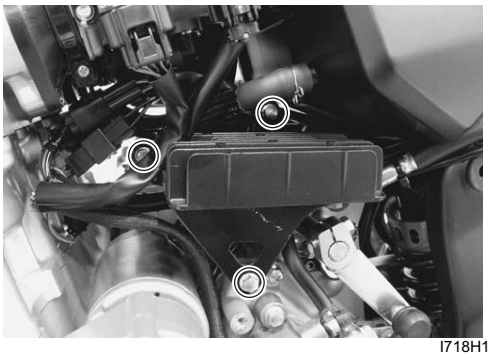
Removal

1) Support the motorcycle with the center stand.
2) Remove the engine sprocket outer cover (1).



I718H1310001-02

3) Remove the regulator/rectifier bracket mounting bolts.

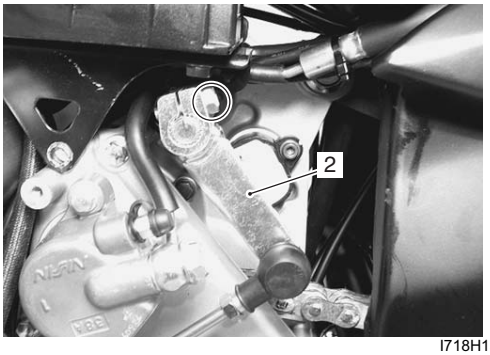


I718H1310033-01

4) Disengage the gearshift link arm (2) by removing the bolt.

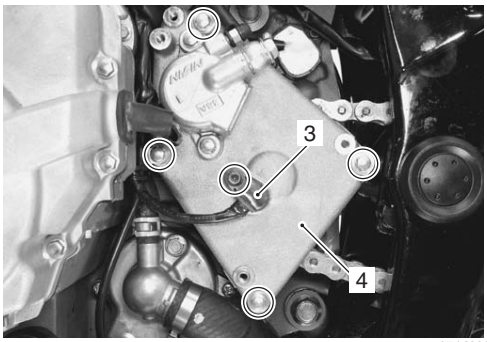
NOTE

Mark the gearshift shaft head at which the gearshift link arm slit set for correct reinstallation.



I718H1310034-01

5) Remove the speed sensor (3).
6) Remove the engine sprocket inner cover (4) along with the clutch release cylinder.

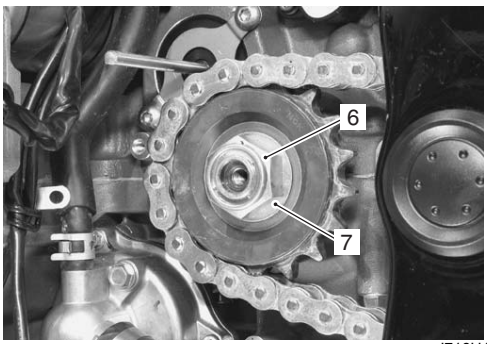


I718H1310003-05

7) Remove the speed sensor rotor (5) by removing its bolt while depressing the rear brake pedal.

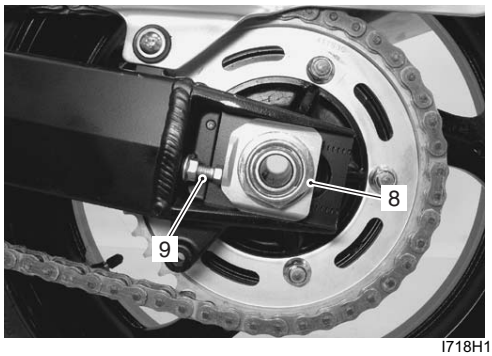
I718H1310005-04

8) Remove the engine sprocket nut (6) while depressing the rear brake pedal.
9) Remove the washer (7).



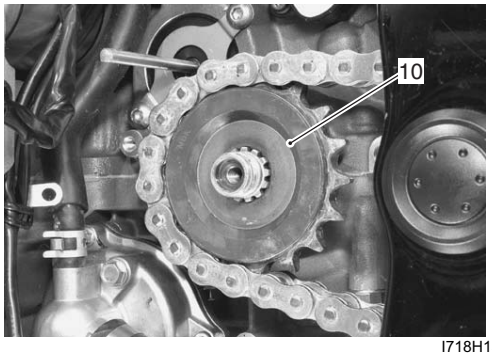
I718H1310006-04

10) Loosen the rear axle nut (8).
11) Loosen the chain adjusters (9) to provide additional chain slack.



I718H1310023-05

12) Remove the engine sprocket (10).



I718H1310008-02

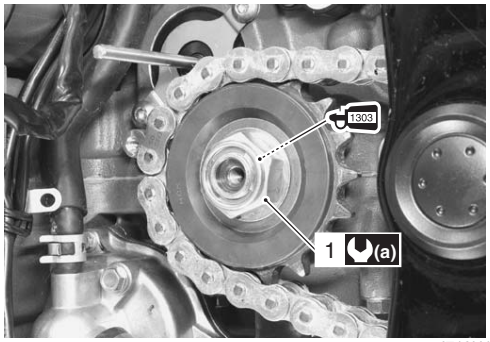
Installation
Install the engine sprocket in the reverse order of removal. Pay attention to the following points:

- Apply THREAD LOCK SUPER to the driveshaft.

  1303 : Thread lock cement 99000–32030 (Thread Lock Cement Super 1303 or equivalent)

- Tighten the engine sprocket nut (1) to the specified torque.

  Tightening torque
  Engine sprocket nut (a): 115 N·m (11.5 kgf-m, 83.0 lb-ft)



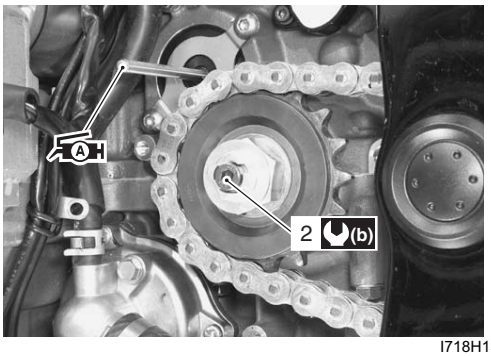
I718H1310035-02

- Tighten the speed sensor rotor bolt (2) to the specified torque.

  Tightening torque
  Speed sensor rotor bolt (b): 25 N·m (2.5 kgf-m, 18.0 lb-ft)

- Before installing the engine sprocket inner cover, apply a small quantity of SUZUKI SUPER GREASE to the clutch push rod.

  A : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



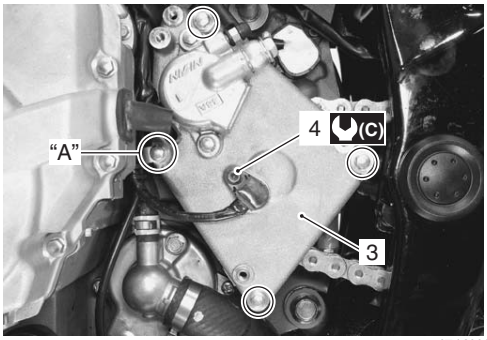
I718H1310010-02

- Install the engine sprocket inner cover (3).

  NOTE
  Fit the clamp to the bolt “A”.

- Tighten the speed sensor mounting bolt (4) to the specified torque.

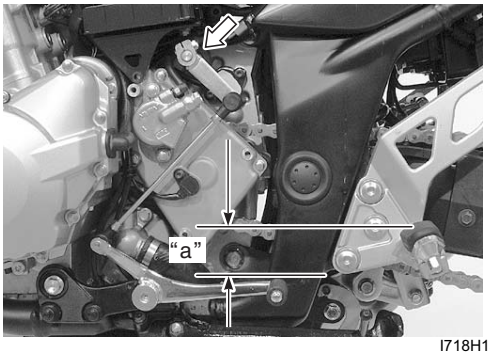
  Tightening torque
  Speed sensor bolt (c): 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)



I718H1310024-02

- Fit the gearshift link arm to the gearshift shaft so that the gearshift lever is located at height “a” above the footrest.

  Gearshift lever height “a”
  Standard: 45 – 55 mm (1.8 – 2.2 in)



I718H1310013-02

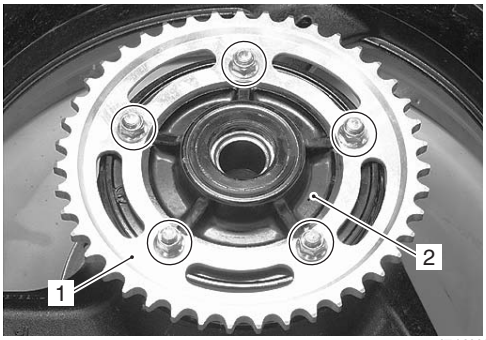
- Adjust the drive chain slack. Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.

Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation

B718H13106003

Removal

1) Remove the rear wheel assembly by disengaging the drive chain. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.
2) Remove the rear sprocket nuts and separate the rear sprocket (1) from its mounting drum (2).
3) Draw out the mounting drum (2) from the wheel hub.

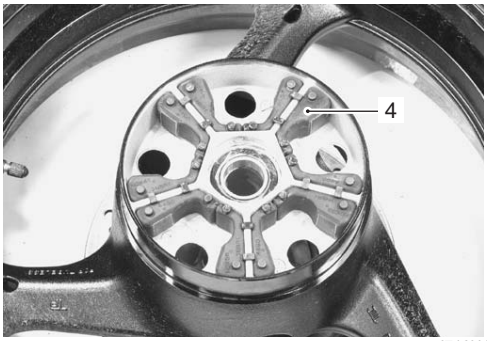


I718H1310014-03

4) Remove the retainer (3).

I718H1310015-02

5) Remove the wheel dampers (4).



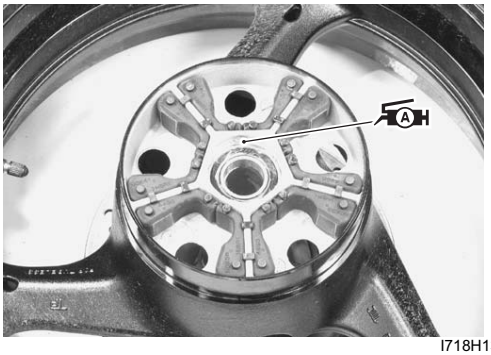
I718H1310016-02

Installation

Install the rear sprocket and rear sprocket mounting drum in the reverse order of removal. Pay attention to the following points:

- Apply grease to the contacting surface between the rear wheel hub and the mounting drum.

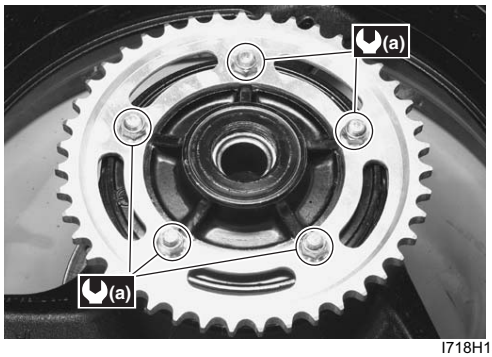
  : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1310036-01

- Tighten the rear sprocket nuts to the specified torque.

  Tightening torque
  Rear sprocket nut (a): 60 N·m (6.0 kgf-m, 43.5 lb-ft)



I718H1310037-05

- Install the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.

Drive Chain Related Parts Inspection

B718H13106004

Refer to “Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation (Page 3A-4)”

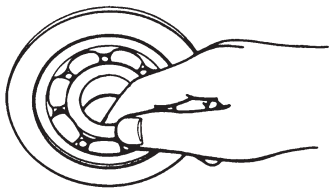
Dust Seal

Inspect the sprocket mounting drum dust seal for wear or damage. If any damage is found, replace the dust seal with a new one.

I718H1310028-02

Bearing

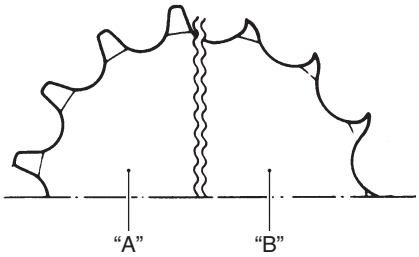
Inspect the play of the sprocket mounting drum bearings by hand while they are in the wheel and drum. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



I649G1310015-01

Engine Sprocket and Rear Sprocket

Inspect the sprocket teeth for wear. If they are worn as shown, replace the engine sprocket, rear sprocket and drive chain as a set.



I649G1310016-01

“A”: Normal wear	“B”: Excessive wear

Wheel Damper

Inspect the dampers for wear and damage. Replace the damper if there is anything unusual.

I718H1310038-02

Drive Chain

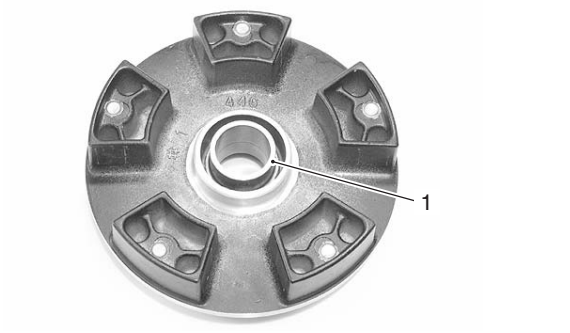
Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.

Sprocket Mounting Drum Dust Seal / Bearing Removal and Installation

B718H13106005

Removal

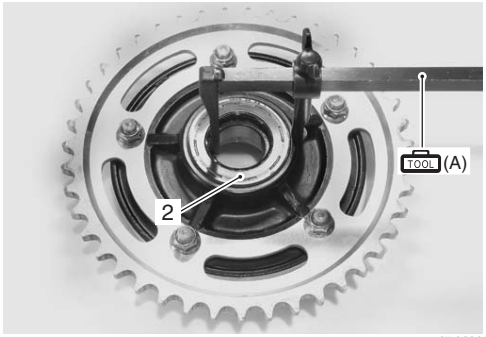
1) Remove the rear sprocket mounting drum assembly from the rear wheel hub. Refer to “Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation (Page 3A-4)”.
2) Remove the retainer (1).



I718H1310029-01

3) Remove the sprocket mounting drum dust seal (2) using the special tool.

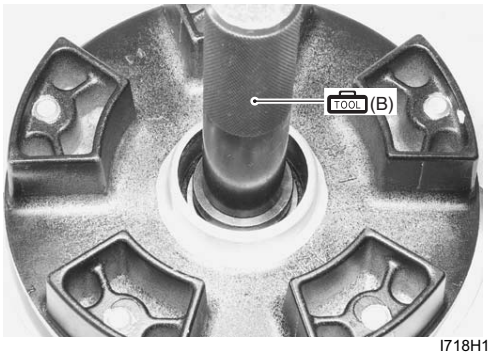
Special tool
TOOL (A): 09913–50121 (Oil seal remover)



I718H1310020-02

4) Remove the sprocket mounting drum bearing using the special tool.

Special tool
TOOL (B): 09913–70210 (Bearing installer set)



I718H1310025-01

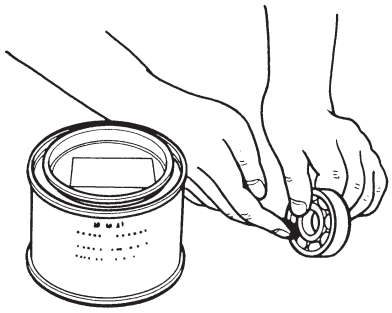
Installation

⚠ CAUTION

The removed dust seal and bearing must be replaced with new ones.

1) Apply grease to the bearing before installing.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



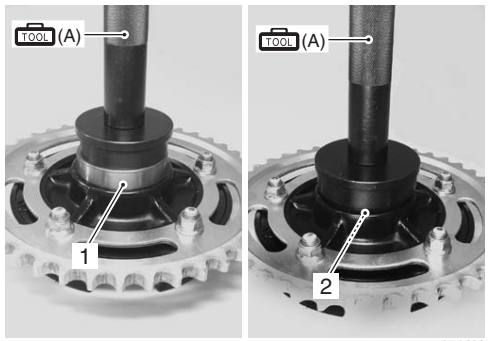
I649G1310020-01

2) Install the bearing (1) and dust seal (2) to the sprocket mounting drum using the special tool.

⚠ CAUTION

The sealed cover of the bearing must face outside.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I718H1310021-03

3) Apply grease to the dust seal lip.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

I718H1310022-02

4) Apply grease to the retainer before installing the rear sprocket mounting drum.
5) Install the rear sprocket mounting drum assembly to rear wheel hub. Refer to “Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation (Page 3A-4)”.
6) Install the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.

Drive Chain Replacement

B718H13106006

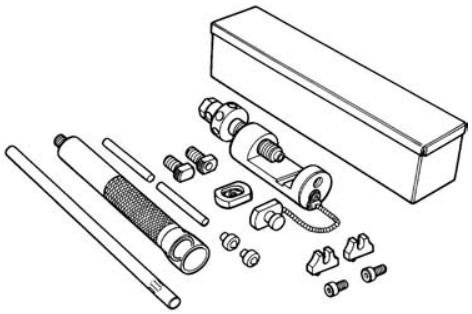
Use the special tool in the following procedures, to cut and rejoin the drive chain.

NOTE

When using the special tool, apply a small quantity of grease to the threaded parts of the special tool.

Special tool

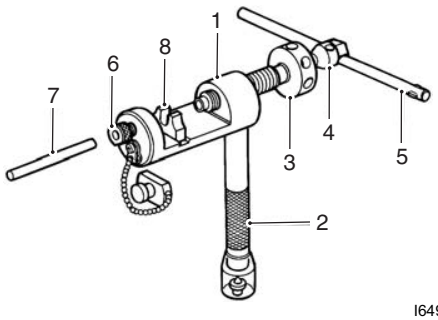
(TOOL) : 09922–22711 (Drive chain cutting and joining tool)



I649G1310023-01

Drive Chain Cutting

1) Set up the special tool as shown in the illustration.

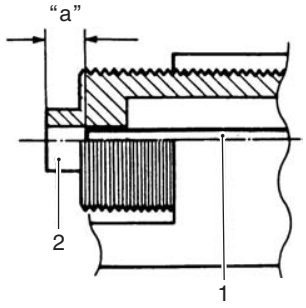


I649G1310024-01

1.	Tool body
2.	Grip handle
3.	Pressure bolt [A]
4.	Pressure bolt [B]
5.	Bar
6.	Adjuster bolt (With through hole)
7.	Pin remover
8.	Chain holder (Engraved mark 500) with reamer bolt M5 x 10

NOTE

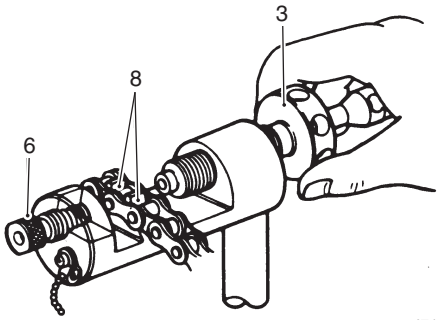
The tip of pin remover (1) should be positioned inside “a” approximately 5 mm (0.2 in) from the end face of pressure bolt [A] (2) as shown in the illustration.



I649G1310025-01

“a”: 5 mm (0.2 in)

2) Place the drive chain link being disjointed on the holder part (8) of the tool.
3) Turn in both the adjuster bolt (6) and pressure bolt [A] (3) so that each of their end hole fits over the chain joint pin properly.
4) Tighten the pressure bolt [A] (3) with the bar.



I718H1310032-01

5) Turn in the pressure bolt [B] (4) with the bar (5) and force out the drive chain joint pin (9).

⚠ CAUTION

Continue turning in the pressure bolt [B] (4) until the joint pin should been completely pushed out of the chain.

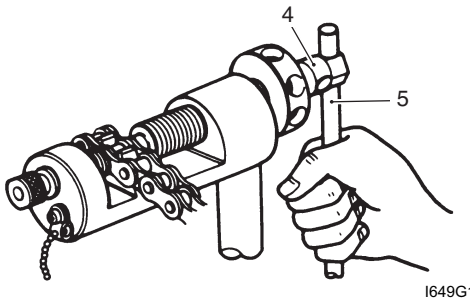
NOTE

After the joint pin (9) is removed, loosen the pressure bolt [B] (4) and then pressure bolt [A] (3).

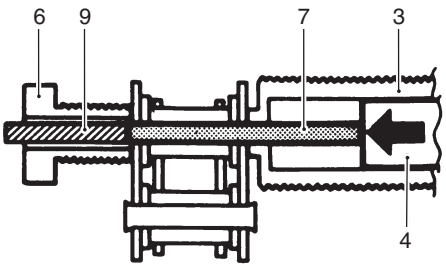
6) Remove the joint pin (9) of the other side of joint plate.

⚠ CAUTION

Never reuse joint pins, O-rings and plates.



I649G1310027-01



I649G1310028-01

Drive Chain Connecting

⚠ WARNING

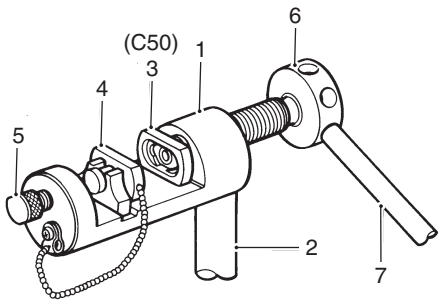
Do not use joint clip type of drive chain. The joint clip may have a chance to drop which may cause severe damage to motorcycle and severe injury.

⚠ CAUTION

Replace the joint pins (8), O-rings (9) and plates (10) with new ones.

Joint plate installation

1) Set up the special tool as shown in the illustration.



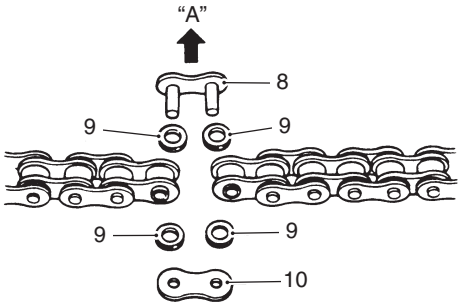
I718H1310027-03

1.	Tool body
2.	Grip handle
3.	Joint plate holder (Engraved mark “C50”)
4.	Wedge holder & wedge pin
5.	Adjuster bolt (Without hole)
6.	Pressure bolt [A]
7.	Bar

2) Apply grease to the joint pins (8), O-rings (9) and plates (10).

3) Connect both ends of the drive chain with the joint pin (8) inserted from the wheel side “A” as installed on the motorcycle.

Joint set part number
RK: 27620 – 24F00



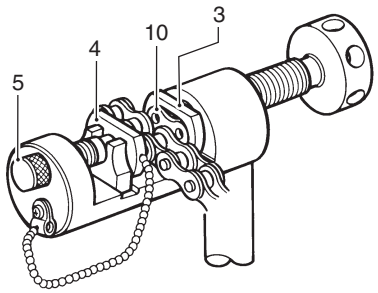
I649G1310030-01

4) Apply grease on the recessed portion of the joint plate holder (3) and set the joint plate (10).

NOTE

When positioning the joint plate (10) on the tool, its stamp mark must face the joint plate holder (3) side.

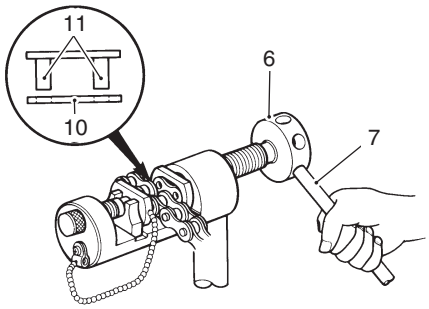
5) Set the drive chain on the tool as illustrated and turn in the adjuster bolt (5) to secure the wedge holder and wedge pin (4).



I649G1310031-01

6) Turn in the pressure bolt [A] (6) and align two joint pins (11) properly with the respective holes of the joint plate (10).

7) Turn in the pressure bolt [A] (6) further using the bar (7) to press the joint plate over the joint pins.



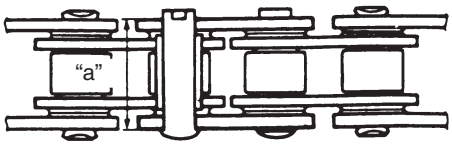
I649G1310032-01

8) Continue pressing the joint plate until the distance between the two joint plates comes to the specification.

Joint plate distance specification "a"
21.85 – 22.15 mm (0.860 – 0.872 in)

⚠ CAUTION

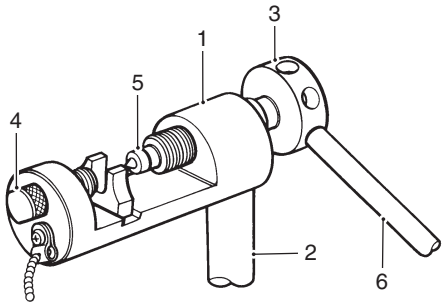
If pressing of the joint plate makes the dimension out of specification excessively, the work must be carried out again by using new joint parts.



I649G1310033-02

Joint pin staking

1) Set up the special tool as shown in the illustration.



I649G1310034-01

1.	Tool body
2.	Grip handle
3.	Pressure bolt "A"
4.	Adjuster bolt (Without hole)
5.	Staking pin (Stowed inside grip handle behind rubber cap)
6.	Bar

NOTE

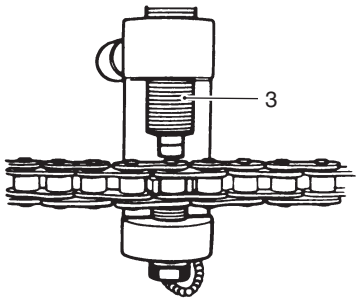
Before staking the joint pin, apply a small quantity of grease to the staking pin (5).

2) Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt [A] (3) with the bar until the pin end diameter becomes the specified dimension.

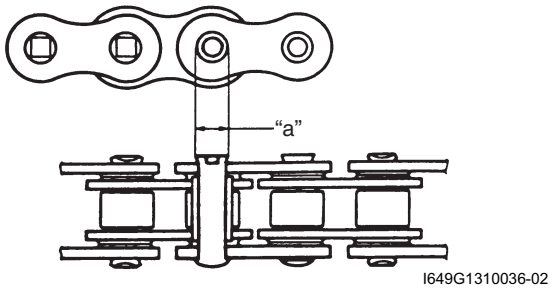
⚠ CAUTION

- **After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.**
- **Should any abnormal condition be found, reassemble the chain link using the new joint parts.**

Pin end diameter specification "a"
RK: 5.45 – 5.85 mm (0.215 – 0.230 in)



I649G1310035-01



I649G1310036-02

3) Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)".

Specifications

Service Data

B718H13107001

Drive Chain

Unit: mm (in)

Item	Standard		Limit
Final reduction ratio	2.388 (43/18)		—
Drive chain	Type	RK GB50GSVZ3	—
	Links	118 links	—
	20-pitch length	—	319.4 (12.57)
Drive chain slack (on center stand)	20 – 30 (1.8 – 2.2)		—

Tightening Torque Specifications

B718H13107002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Engine sprocket nut	115	11.5	83.0	☞(Page 3A-3)
Speed sensor rotor bolt	25	2.5	18.0	☞(Page 3A-3)
Speed sensor bolt	6.5	0.65	4.7	☞(Page 3A-3)
Rear sprocket nut	60	6.0	43.5	☞(Page 3A-5)

NOTE

The specified tightening torque is also described in the following.
"Drive Chain Related Components (Page 3A-1)"

Reference:
For the tightening torque of fastener not specified in this section, refer to "Tightening Torque Specifications in Section 0C (Page 0C-7)".

Special Tools and Equipment

Recommended Service Material

B718H13108001

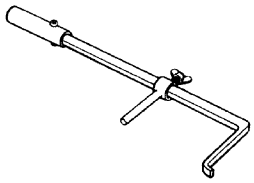
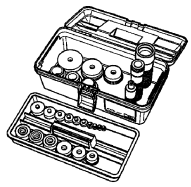
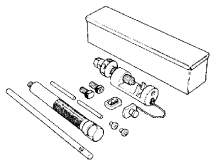
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 3A-3) / ☞(Page 3A-4) / ☞(Page 3A-6) / ☞(Page 3A-6)
Thread lock cement	Thread Lock Cement Super 1303 or equivalent	P/No.: 99000–32030	☞(Page 3A-3)

NOTE

Required service material is also described in the following.
"Drive Chain Related Components (Page 3A-1)"

Special Tool

B718H13108002

09913–50121 Oil seal remover ☞(Page 3A-6) 	09913–70210 Bearing installer set ☞(Page 3A-6) / ☞(Page 3A-6) 
09922–22711 Drive chain cutting and joining tool ☞(Page 3A-7) 	

Section 4

Brake

CONTENTS

Precautions

Precautions

Precautions for Brake System

B718H14000001

Refer to “General Precautions in Section 00 (Page 00-1)”.

Brake Fluid Information

B718H14000002

⚠ WARNING

- **This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not use or mix different types of fluid, such as silicone-based or petroleum-based.**
- **Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or which has been stored for a long period of time.**
- **When storing brake fluid, seal the container completely and keep it away from children.**
- **When replenishing brake fluid, take care not to get dust into the fluid.**
- **When washing brake components, use new brake fluid. Never use cleaning solvent.**
- **A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the disc with high quality brake cleaner or neutral detergent.**

⚠ CAUTION

Immediately and completely wipe off any brake fluid contacting any part of the motorcycle. The brake fluid reacts chemically with paint, plastics and rubber materials, etc., and will damage them severely.

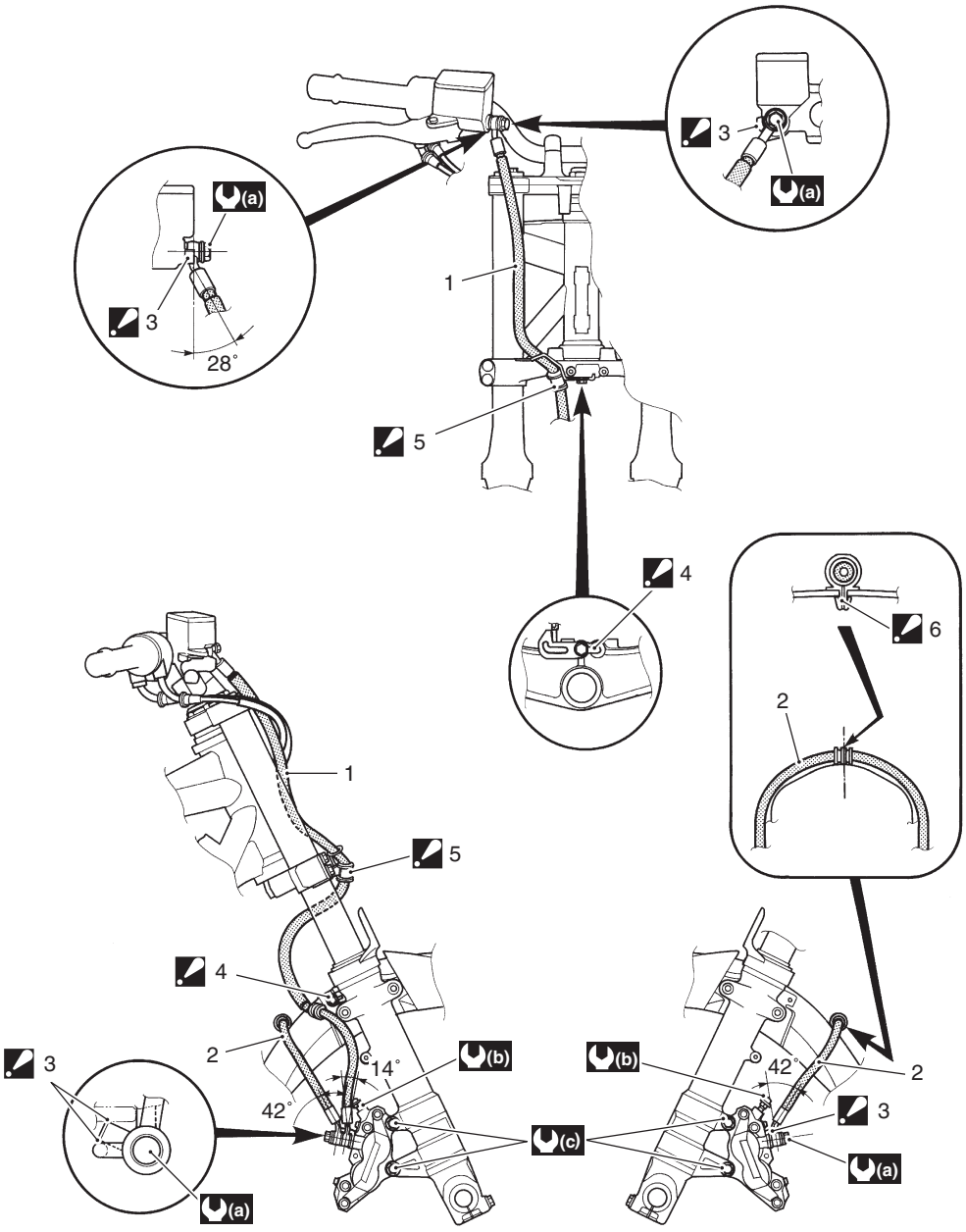
Brake Control System and Diagnosis

Schematic and Routing Diagram

Front Brake Hose Routing Diagram

B718H14102001

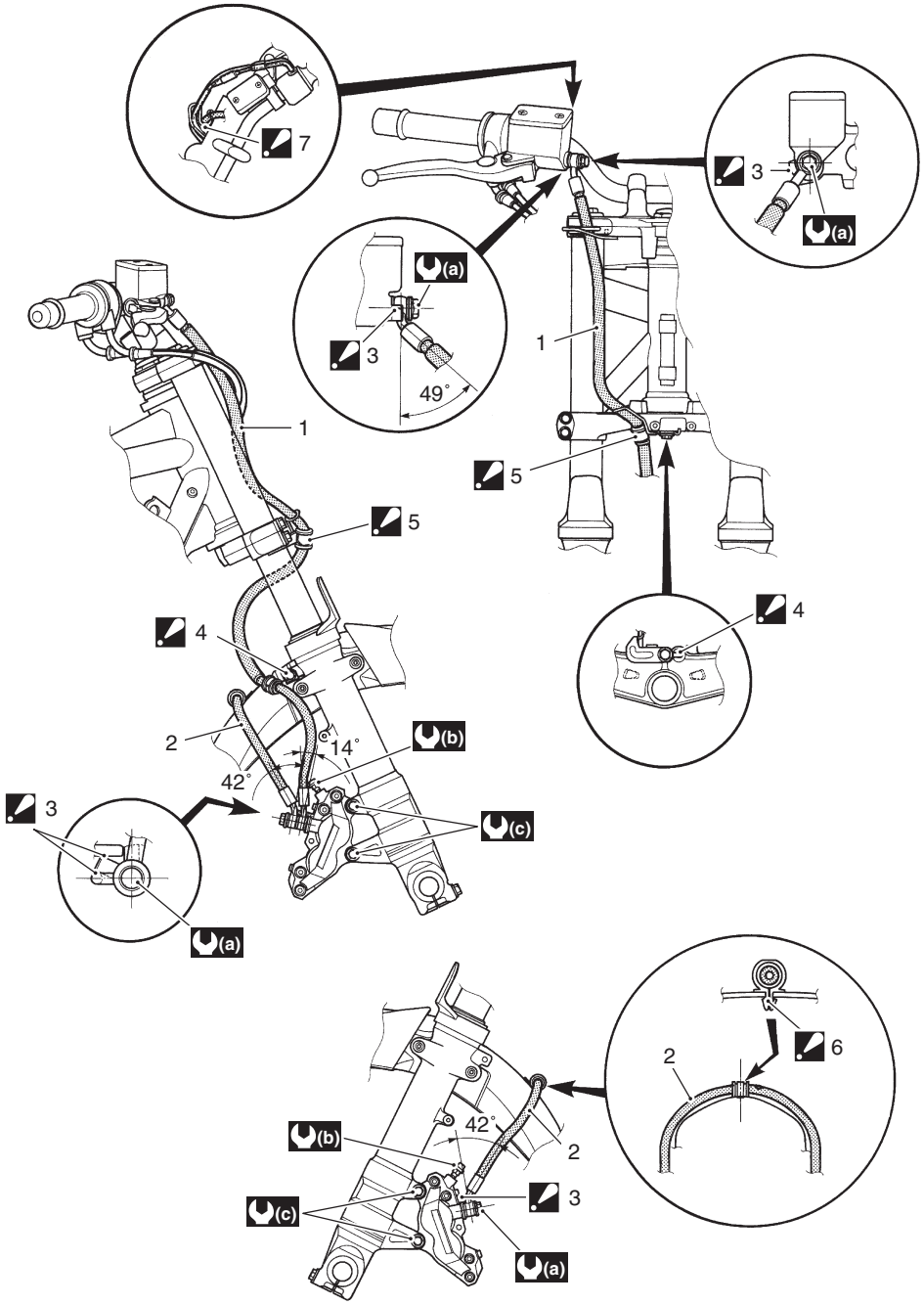
GSF1250



I718H1410001-04

1. Front brake hose No.1	6: Clamp : Insert the clamp to the hole of the front fender fully.
2. Front brake hose No.2	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
3: Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	(b) : 7.5 N·m (0.75 kgf-m, 5.5 lb-ft)
4: Clamp : After positioning the clamp with the stopper, tighten the clamp bolt.	(c) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)
5: Brake hose : Clamp the brake hose firmly.	

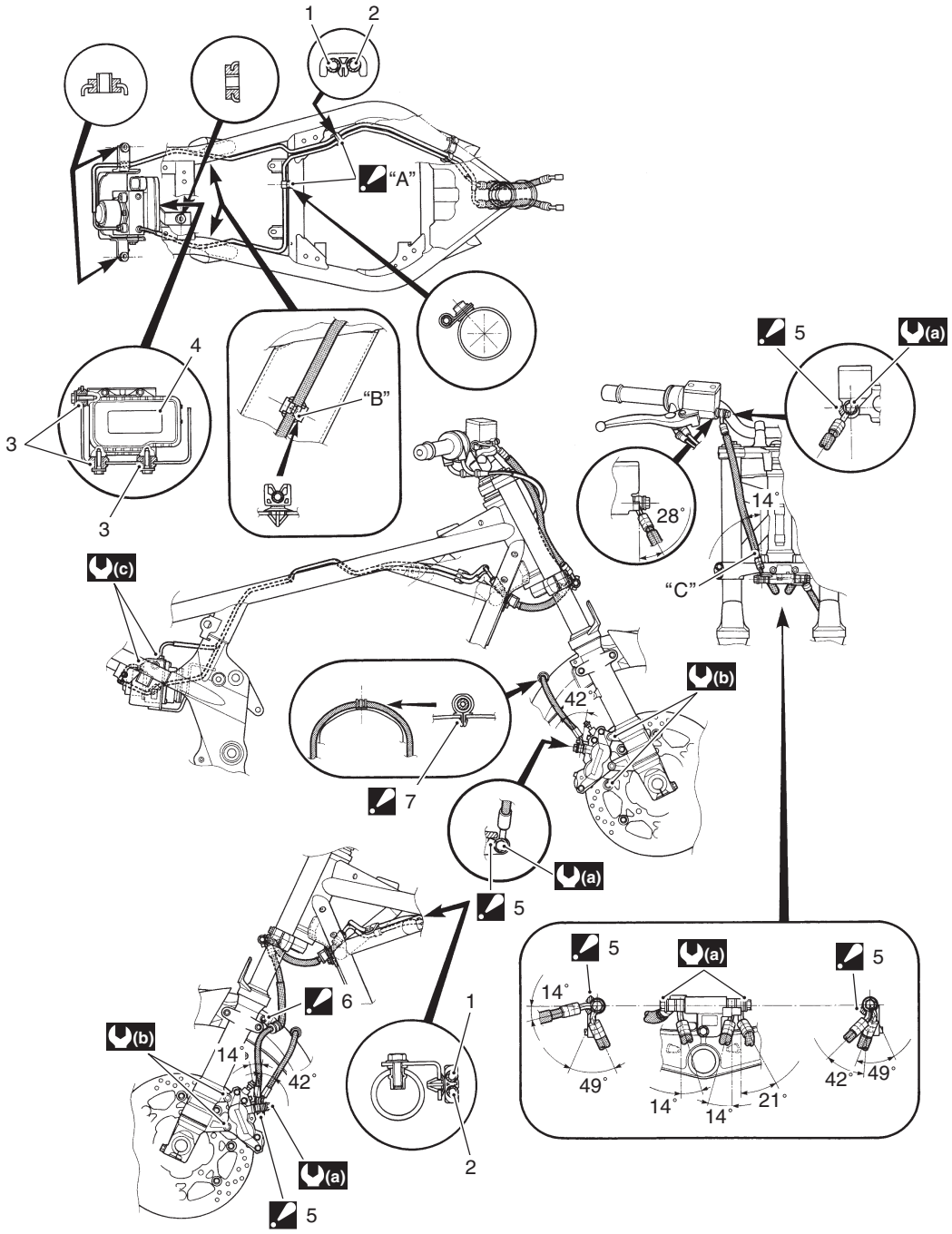
GSF1250S



I718H1410002-05

1. Front brake hose No.1	6: Clamp : Insert the clamp to the hole of the front fender fully.
2. Front brake hose No.2	7: Front brake hose No.1 : Pass the front brake hose No.1 to the brake hose guide.
3: Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
4: Clamp : After positioning the clamp with the stopper, tighten the clamp bolt.	(b) : 7.5 N·m (0.75 kgf-m, 5.5 lb-ft)
5: Brake hose : Clamp the brake hose firmly.	(c) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)

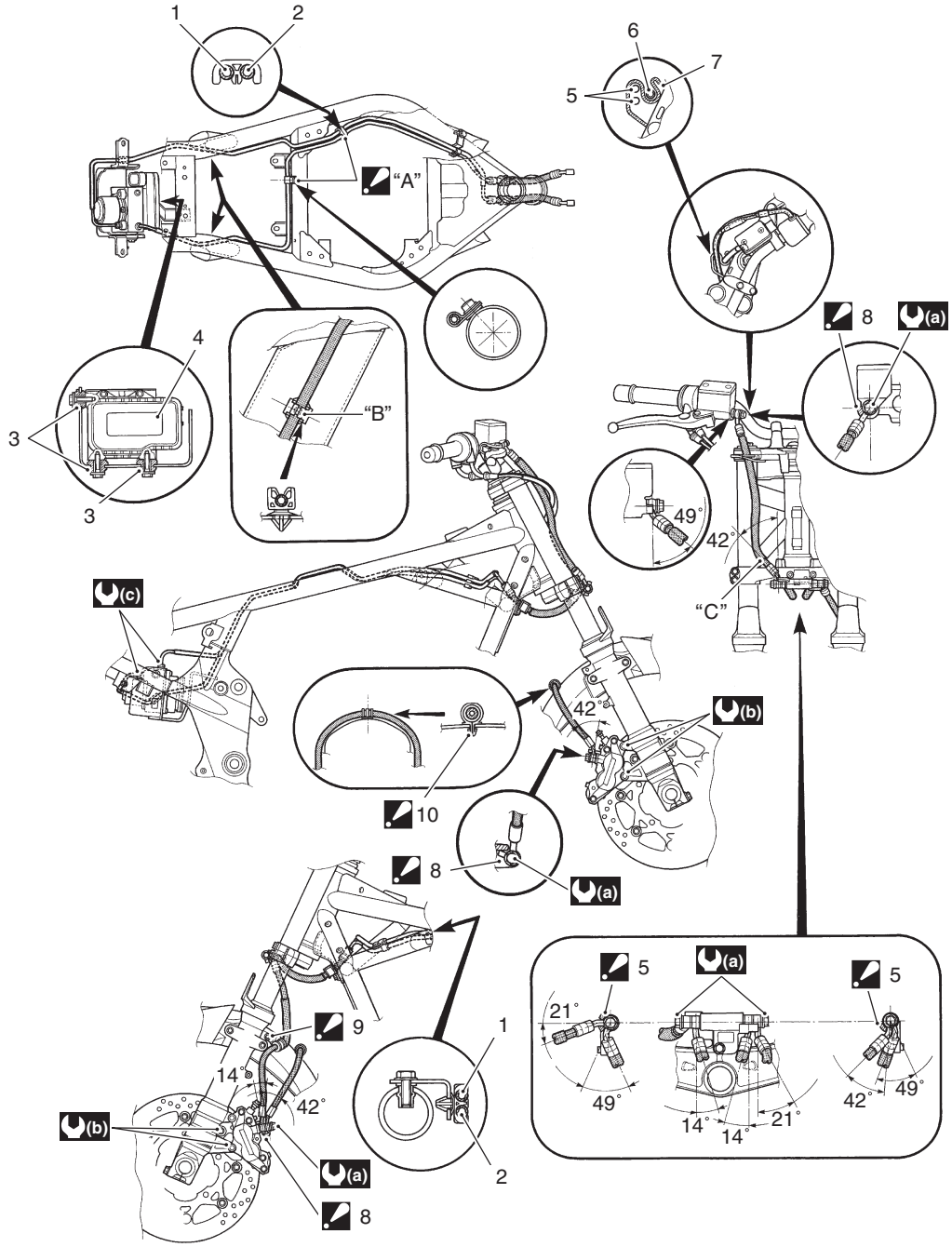
GSF1250A



I718H1410003-07

1. Brake hose No.1 (ABS)	"A": Clamp white paint part of brake hose.
2. Brake hose No.2 (ABS)	"B": White paint
3. Rubber cushion	"C": Yellow paint
4. ABS control unit/HU	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
5. Stopper :After the brake hose union has contacted the stopper, tighten the union bolt.	(b) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)
6. Clamp :After positioning the clamp with the stopper, tighten the clamp bolt.	(c) : 16 N·m (1.6 kgf-m, 11.5 lb-ft)
7. Clamp :Insert the clamp to the hole of the fender fully.	

GSF1250SA



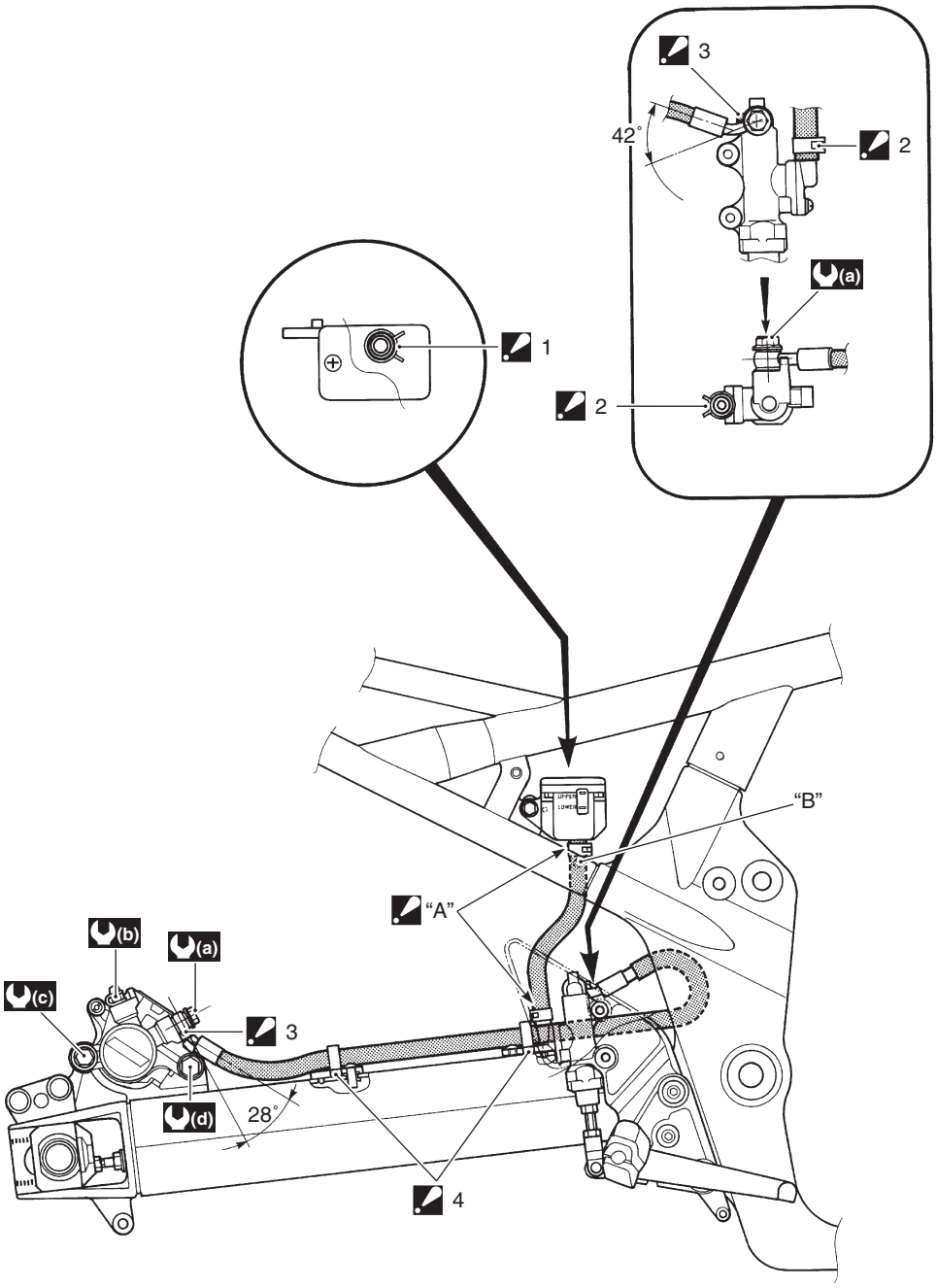
I718H1410004-05

1. Brake hose No.1 (ABS)	9. Clamp :After positioning the clamp with the stopper, tighten the clamp bolt.
2. Brake hose No.2 (ABS)	10. Clamp :Insert the clamp to the hole of the fender fully.
3. Rubber cushion	"A": Clamp white paint part of brake hose.
4. ABS control unit/HU	"B": White paint
5. Throttle cable	"C": Blue paint
6. Brake hose No.1	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
7. Throttle cable guide :Set the brake hose into the guide firmly.	(b) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)
8. Stopper :After the brake hose union has contacted the stopper, tighten the union bolt.	(c) : 16 N·m (1.6 kgf-m, 11.5 lb-ft)

Rear Brake Hose Routing Diagram

B718H14102002

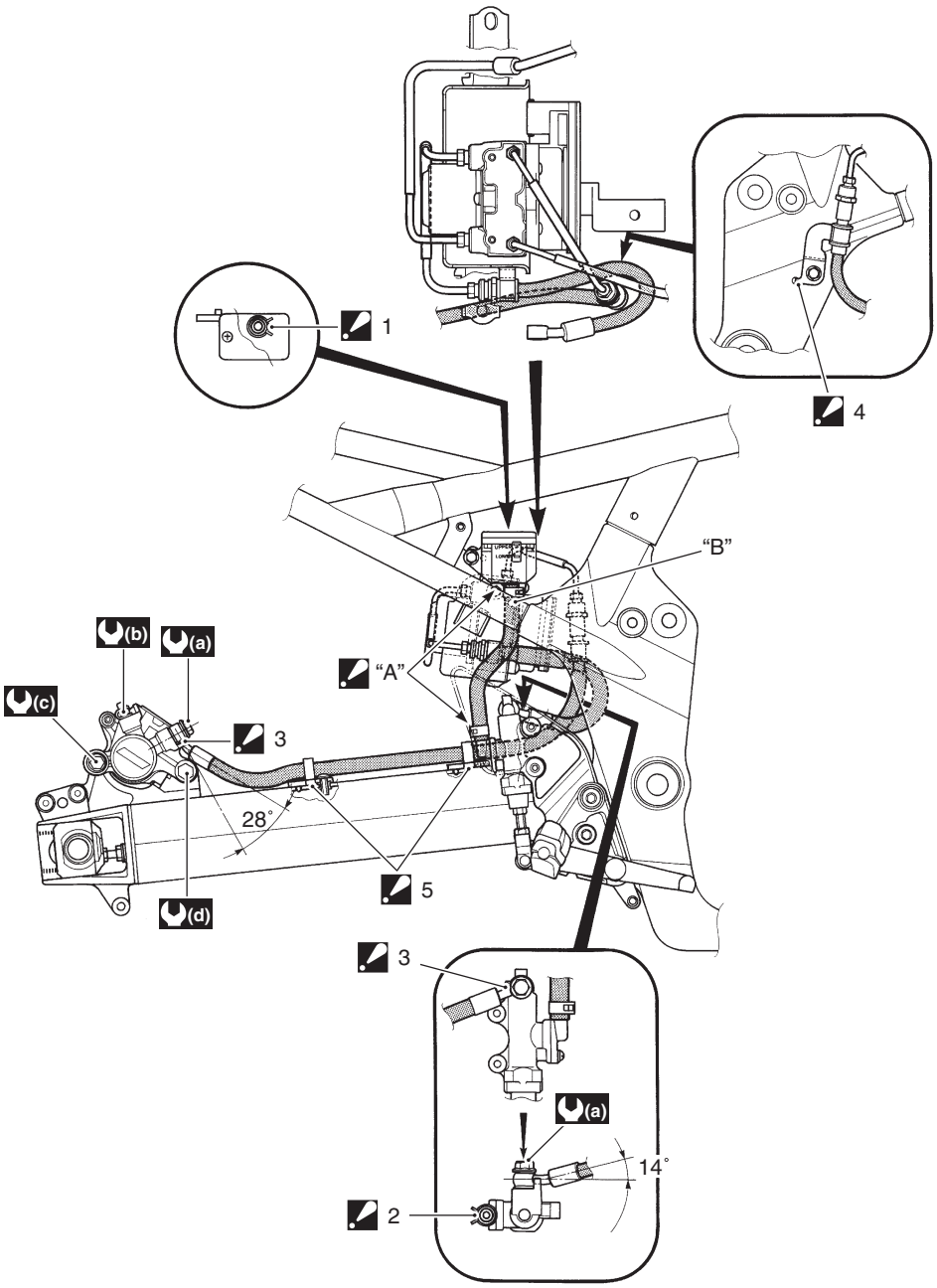
GSF1250/S



I718H1410062-03

1. Brake hose clamp : Brake hose clamp ends should face forward.	"B": White paint
2. Brake hose clamp : Brake hose clamp ends should face backward.	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
3: Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	(b) : 6 N·m (0.6 kgf-m, 4.5 lb-ft)
4: Guide : Position the guide with hole of swinging arm before tightening.	(c) : 22 N·m (2.2 kgf-m, 16.0 lb-ft)
"A": Insert the brake hose firmly.	(d) : 27 N·m (2.7 kgf-m, 19.5 lb-ft)

GSF1250A/SA



I718H1410005-03

1. Brake hose clamp : Brake hose clamp ends should face forward.	"B" : White paint
2. Brake hose clamp : Brake hose clamp ends should face backward.	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
3: Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	(b) : 6 N·m (0.6 kgf-m, 4.5 lb-ft)
4: Clamp : After positioning the clamp with hole of frame before tightening.	(c) : 22 N·m (2.2 kgf-m, 16.0 lb-ft)
5: Guide : Position the guide with hole of swinging arm before tightening.	(d) : 27 N·m (2.7 kgf-m, 19.5 lb-ft)
"A": Insert the brake hose firmly.	

Diagnostic Information and Procedures

Brake Symptom Diagnosis

B718H14104001

Condition	Possible cause	Correction / Reference Item
Insufficient brake power	Leakage of brake fluid from hydraulic system.	*Repair or replace.*
	Worn pads and disc.	*Replace.*
	Oil adhesion on friction surface of pads.	*Clean disc and pads.*
	Air in hydraulic system.	*Bleed air.*
	Not enough brake fluid in the reservoir.	*Replenish.*
Brake squeaking	Carbon adhesion on pad surface.	*Repair surface with sandpaper.*
	Tilted pad.	*Correct pad fitting or replace.*
	Damaged wheel bearing.	*Replace.*
	Loose front-wheel axle or rear-wheel axle.	*Tighten to specified torque.*
	Worn pads and disc.	*Replace.*
	Foreign material in brake fluid.	*Replace brake fluid.*
	Clogged return port of master cylinder.	*Disassemble and clean master cylinder.*
Excessive brake lever stroke	Air in hydraulic system.	*Bleed air.*
	Insufficient brake fluid.	*Replenish fluid to specified level; bleed air.*
	Improper quality of brake fluid.	*Replace with correct fluid.*
Leakage of brake fluid	Insufficient tightening of connection joints.	*Tighten to specified torque.*
	Cracked hose.	*Replace.*
	Worn piston and/or cup.	*Replace piston and/or cup.*
	Worn piston seal and dust seal.	*Replace piston seal and dust seal.*
Brake drags	Rusty part.	*Clean and lubricate.*
	Insufficient brake lever or brake pedal pivot lubrication.	*Lubricate.*
Brake locked (GSF1250A/SA)	Malfunctioning ABS, if equipped.	*Inspect ABS.*

Repair Instructions

Brake Pedal Height Inspection and Adjustment

B718H14106001

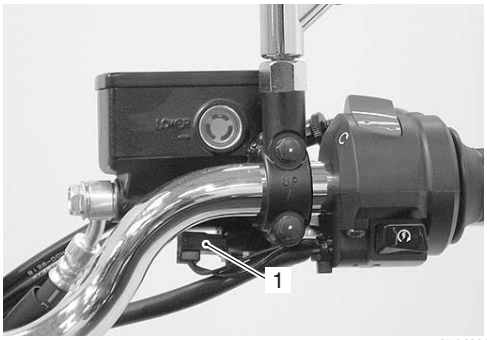
Refer to “Brake System Inspection in Section 0B (Page 0B-17)”.

Front Brake Light Switch Inspection

B718H14106002

Inspect the front brake light switch in the following procedures:

1) Disconnect the front brake light switch lead coupler (1).



I718H1410038-02

2) Inspect the switch for continuity with a tester.
If any abnormality is found, replace the front brake light switch with a new one. Refer to “Front Brake Master Cylinder / Brake Lever Disassembly and Assembly (Page 4A-15)”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Color / Position	Terminal (B/G)	Terminal (B)
OFF		
ON	○	○

I649G1410004-02

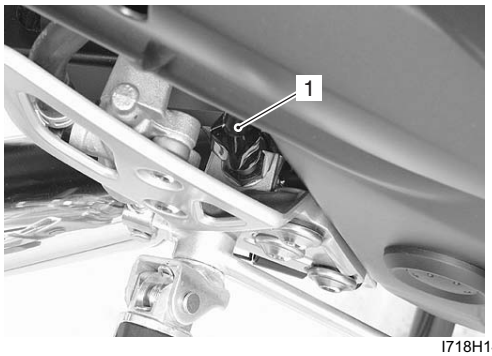
3) Connect the front brake light switch lead coupler.

Rear Brake Light Switch Inspection

B718H14106003

Inspect the rear brake light switch in the following procedures:

1) Disconnect the rear brake light switch lead coupler (1).



I718H1410039-02

2) Inspect the switch for continuity with a tester.
If any abnormality is found, replace the rear brake light switch with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Rear brake light switch

Color / Position	Terminal (O/G)	Terminal (W/B)
ON	○	○
OFF		

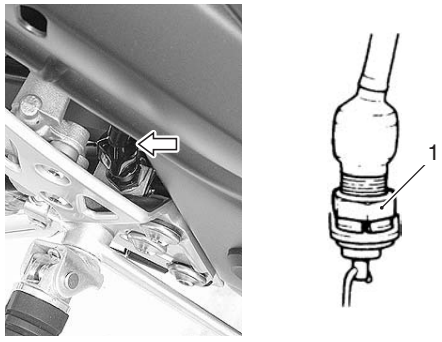
I649G1410006-02

3) Connect the rear brake light switch lead coupler.

Rear Brake Light Switch Inspection and Adjustment

B718H14106004

Check the rear brake light switch so that the brake light will come on just before pressure is felt when the brake pedal is depressed. If the brake light switch adjustment is necessary, turn the adjuster nut (1) in or out while holding the brake pedal.



I718H1410008-02

Brake Fluid Level Check

B718H14106005

Refer to “Brake System Inspection in Section 0B (Page 0B-17)”.

Brake Hose Inspection

B718H14106006

Refer to “Brake System Inspection in Section 0B (Page 0B-17)”.

Air Bleeding from Brake Fluid Circuit

B718H14106007

Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by “sponginess” of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner:

⚠ CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

Front Brake

1) Fill the master cylinder reservoir to the top of the inspection window. Place the reservoir cap to prevent dirt from entering.

I718H1410063-03

2) Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
3) Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it.

I718H1410010-01

4) Loosen the air bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip.

I718H1410040-01

5) Close the air bleeder valve, pump and squeeze the lever, and open the valve.
6) Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.

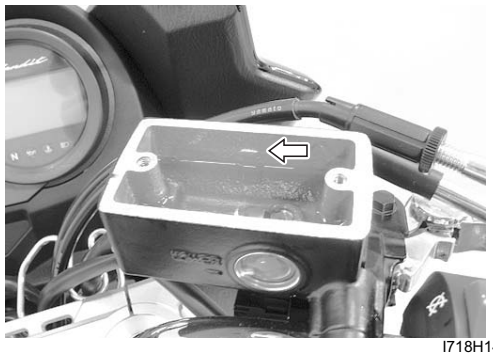
NOTE

While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

7) Close the air bleeder valve and disconnect the hose.

Tightening torque
Air bleeder valve (Front brake): 7.5 N·m (0.75 kgf-m, 5.5 lb-ft)

8) Fill the reservoir with brake fluid to the upper mark of the reservoir.



I718H1410064-01

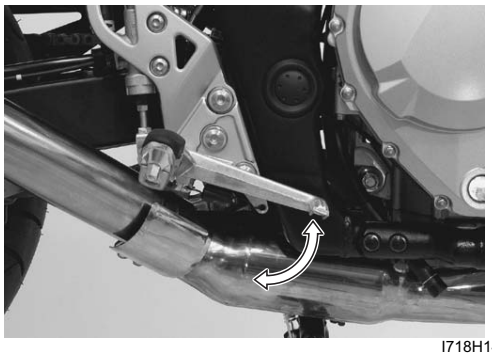
9) Install the reservoir cap.

Rear Brake
Bleed air from the rear brake system as the same manner of front brake.

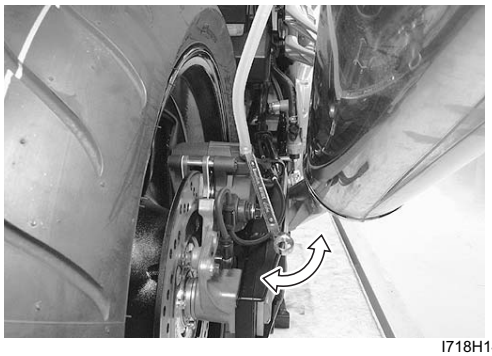
NOTE

The only difference of bleeding operation from the front brake is that the rear master cylinder is actuated by a pedal.

Tightening torque
Air bleeder valve (Rear brake): 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)

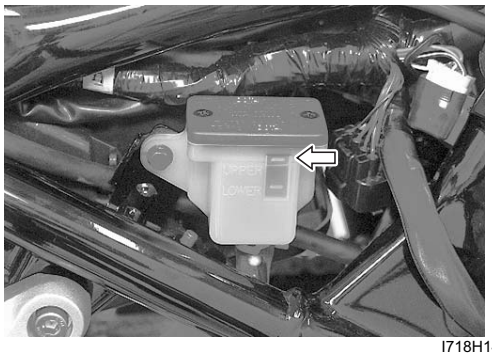


I718H1410068-02



I718H1410041-01

- Fill the reservoir with brake fluid to the upper mark of the reservoir.



I718H1410065-02

- Install the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

Brake Fluid Replacement

B718H14106008

⚠ CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

Front Brake

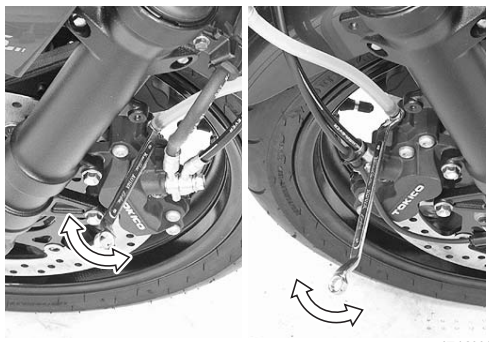
1) Place the motorcycle on a level surface and keep the handlebars straight.
2) Remove the brake fluid reservoir cap and diaphragm.
3) Suck up the old brake fluid as much as possible.

I718H1410042-02

4) Fill the reservoir with new brake fluid.

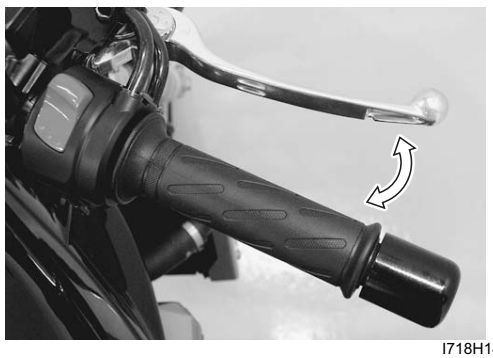
   BF: Brake fluid (DOT 4)

5) Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.



I718H1410043-01

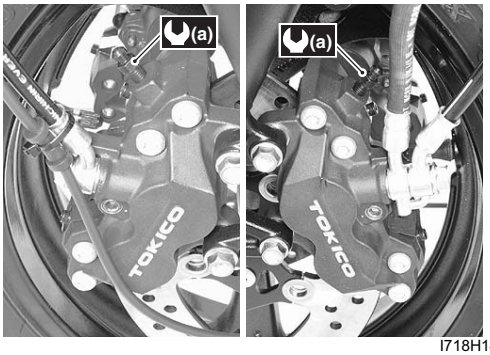
6) Loosen the air bleeder valve and pump the brake lever until the old brake fluid flows out of the brake system.



I718H1410010-01

7) Close the air bleeder valve and disconnect the clear hose.

Tightening torque
Air bleeder valve (Front brake) (a): 7.5 N·m (0.75 kgf-m, 5.5 lb-ft)



I718H1410044-01

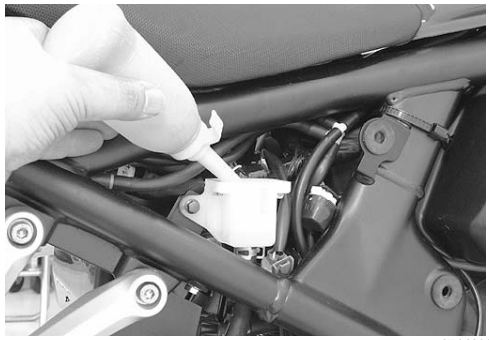
8) Fill the reservoir with brake fluid to the upper mark of the reservoir.

I718H1410066-01

9) Install the reservoir cap.

Rear Brake

1) Place the motorcycle on a level surface.
2) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Remove the brake fluid reservoir cap and diaphragm.
4) Suck up the old brake fluid as much as possible.

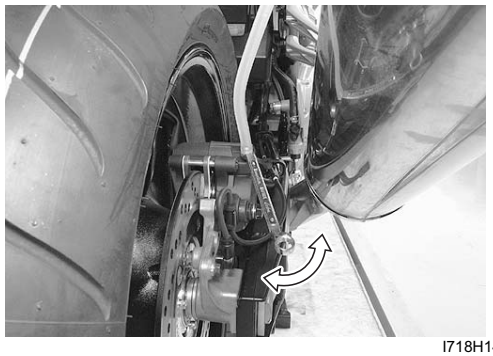


I718H1410045-01

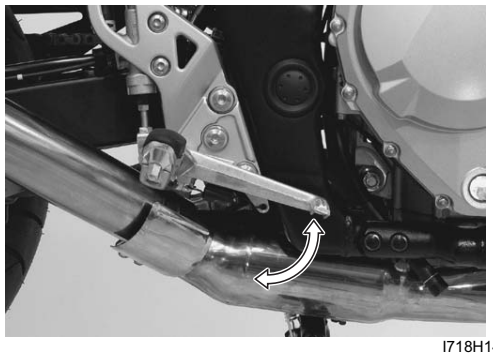
5) Fill the reservoir with new brake fluid.

BF: Brake fluid (DOT 4)

6) Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
7) Loosen the air bleeder valve and pump the brake pedal until the old brake fluid flows out of the brake system.



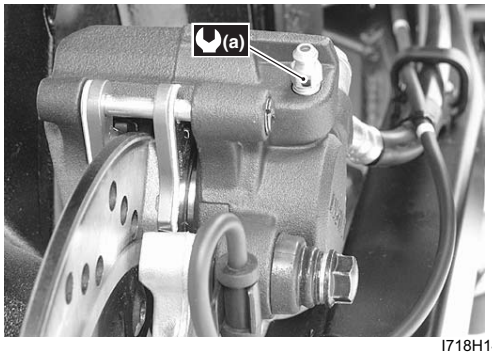
I718H1410041-01



I718H1410068-02

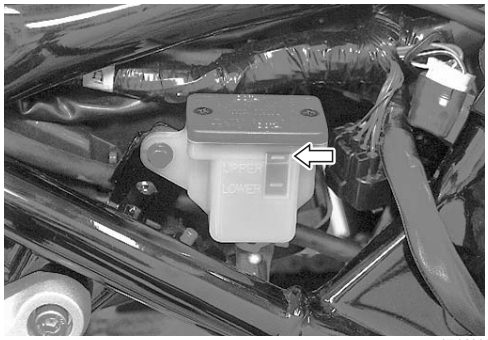
8) Close the air bleeder valve and disconnect the clear hose.

Tightening torque
Air bleeder valve (Rear brake) (a): 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)



I718H1410047-01

9) Fill the reservoir with brake fluid to the upper mark of the reservoir.



I718H1410067-02

Front Brake Hose Removal and Installation

B718H14106009

GSF1250/S

Removal

1) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-10)”.
2) Remove the front brake hoses as shown in the front brake hose routing diagram. Refer to “Front Brake Hose Routing Diagram (Page 4A-1)”.

Installation

⚠ CAUTION

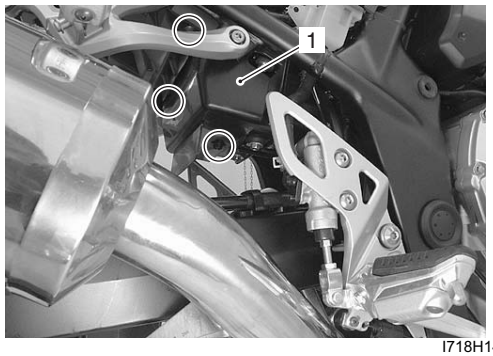
The seal washers should be replaced with the new ones to prevent fluid leakage.

1) Install the front brake hose as shown in the front brake hose routing diagram. Refer to “Front Brake Hose Routing Diagram (Page 4A-1)”.
2) Bleed air from the front brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-8)”.

GSF1250A/SA

Removal

1) Remove the seat and left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-10)”.
4) Remove the battery and battery case. Refer to “ABS Control Unit/HU Removal and Installation in Section 4E (Page 4E-74)”.
5) Remove the fender lower cover (1).



I718H1410019-03

6) Remove the front brake hose as shown in the front brake hose routing diagram. Refer to “Front Brake Hose Routing Diagram (Page 4A-1)”.

Installation

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

1) Install the front brake hose as shown in the front brake hose routing diagram. Refer to “Front Brake Hose Routing Diagram (Page 4A-1)”.
2) Bleed air from the front brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-8)”.
3) Reinstall the removed parts.

Rear Brake Hose Removal and Installation

B718H14106019

GSF1250/S

Removal

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-10)”.
3) Remove the rear brake hoses as shown in the rear brake hose routing diagram. Refer to “Rear Brake Hose Routing Diagram (Page 4A-5)”.

Installation

⚠ CAUTION

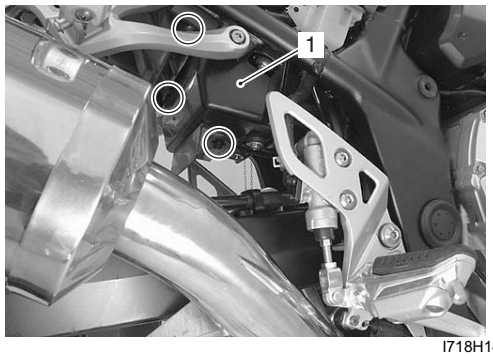
The seal washers should be replaced with the new ones to prevent fluid leakage.

1) Install the front brake hose as shown in the rear brake hose routing diagram. Refer to “Rear Brake Hose Routing Diagram (Page 4A-5)”.
2) Bleed air from the rear brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-8)”.
3) Reinstall the removed parts.

GSF1250A/SA

Removal

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the seat, battery and battery case. Refer to “ABS Control Unit/HU Removal and Installation in Section 4E (Page 4E-74)”.
3) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-10)”.
4) Remove the fender lower cover (1).



I718H1410020-01

5) Remove the rear brake hose as shown in the rear brake hose routing diagram. Refer to “Rear Brake Hose Routing Diagram (Page 4A-5)”.

Installation

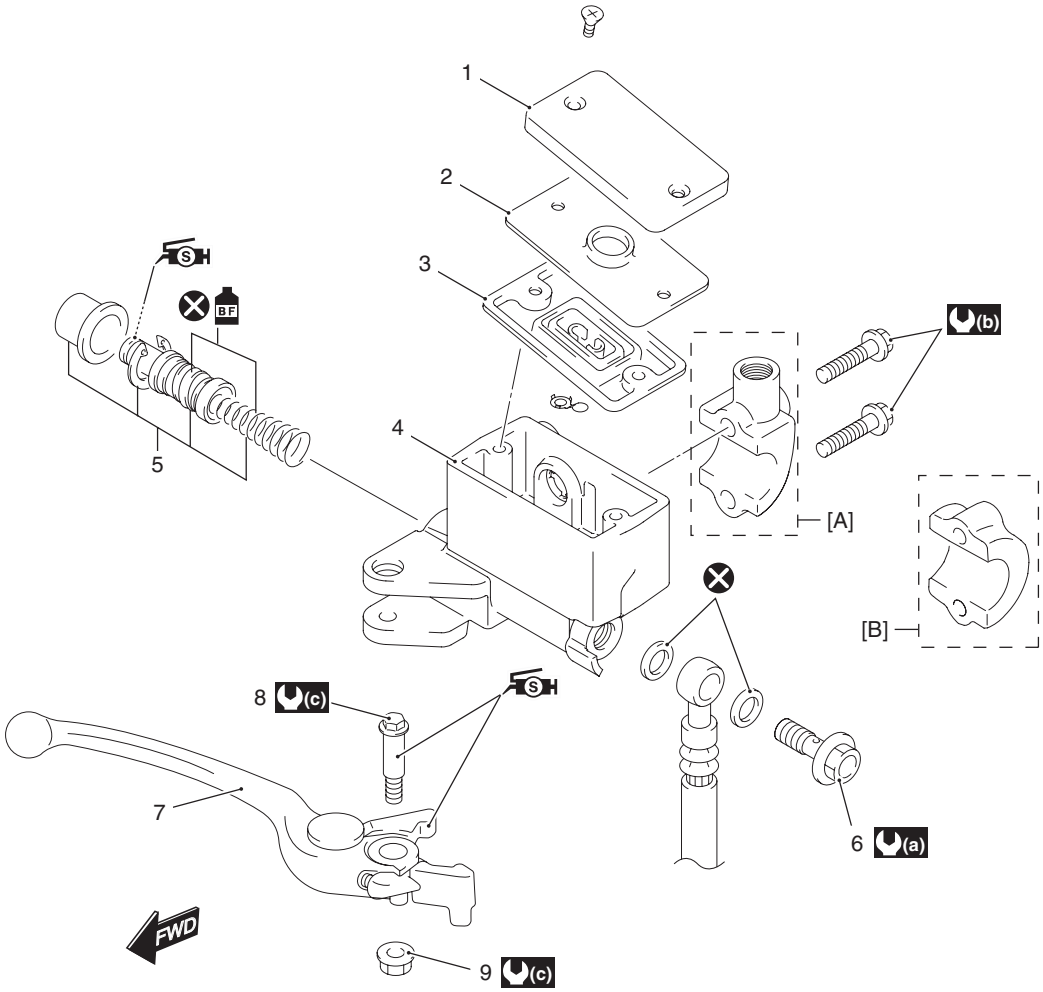
⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

1) Install the rear brake hose as shown in the rear brake hose routing diagram. Refer to “Rear Brake Hose Routing Diagram (Page 4A-5)”.
2) Bleed air from the rear brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-8)”.
3) Reinstall the removed parts.

Front Brake Master Cylinder Components

B718H14106011



I718H1410070-01

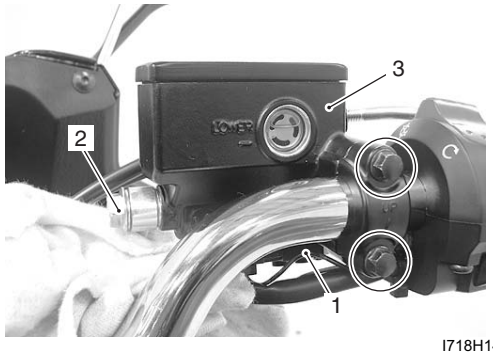
1. Reservoir cap	7. Brake lever	(b) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)
2. Plate	8. Brake lever pivot bolt	(c) : 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)
3. Diaphragm	9. Brake lever pivot bolt lock-nut	BF : Apply brake fluid.
4. Master cylinder	[A]: For GSF1250/A	S : Apply silicone grease.
5. Piston/Cup set	[B]: For GSF1250S/SA	: Do not reuse.
6. Brake hose union bolt	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	

Front Brake Master Cylinder Assembly Removal and Installation

B718H14106012

Removal

1) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-10)”.
2) Disconnect the front brake light switch lead coupler (1).
3) Place a rag underneath the brake hose union bolt (2) on the master cylinder to catch any spilt brake fluid.
4) Remove the brake hose union bolt (2) and disconnect the brake hose.
5) Remove the right rear view mirror. (GSF1250/A)
6) Remove the master cylinder assembly (3).



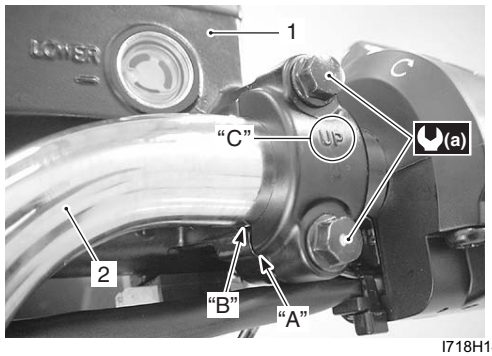
I718H1410048-04

Installation

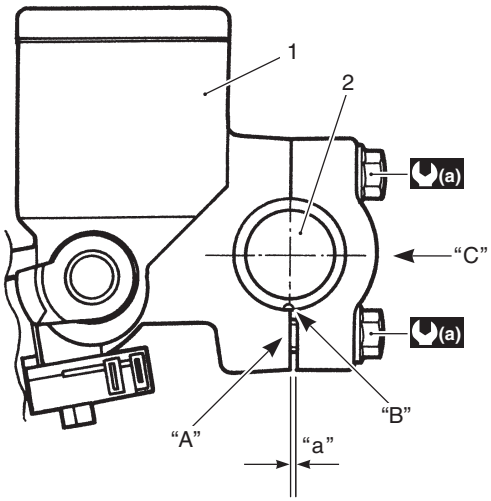
Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

- When installing the master cylinder (1) onto the handlebars (2), align the master cylinder holder's mating surface "A" with the punch mark "B" on the handlebars (2) and tighten the upper holder bolt first. Refer to "Handlebar Construction in Section 6B (Page 6B-2)".

  Tightening torque
  Master cylinder holder bolt (Upper and Lower) (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1410051-04



I718H1410072-01

"C": Up mark	"a": Clearance

- After setting the brake hose union to the stopper, tighten the union bolt to the specified torque.

  ⚠ CAUTION

  The seal washers should be replaced with the new ones to prevent fluid leakage.

  Tightening torque
  Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

I718H1410050-03

- Bleed air from the brake system. Refer to "Air Bleeding from Brake Fluid Circuit (Page 4A-8)".

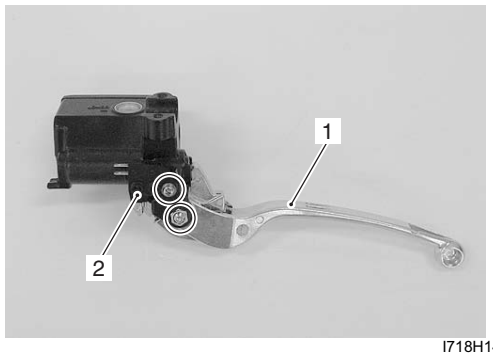
Front Brake Master Cylinder / Brake Lever Disassembly and Assembly

B718H14106013

Refer to "Front Brake Master Cylinder Assembly Removal and Installation (Page 4A-14)".

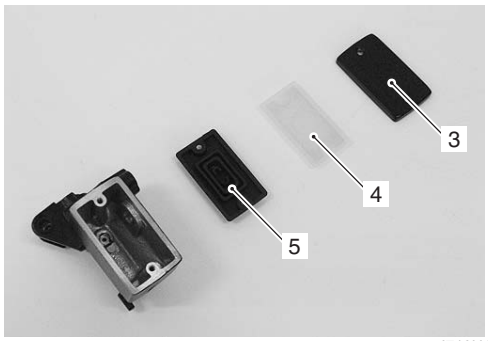
Disassembly

1) Remove the brake lever (1) and brake light switch (2).



I718H1410052-01

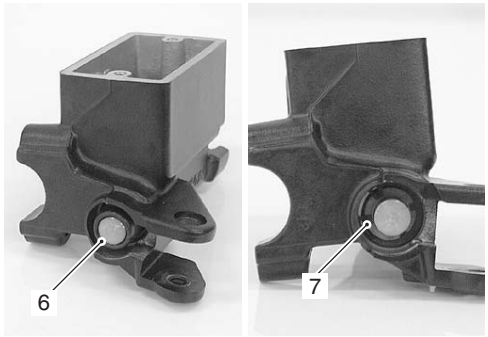
2) Remove the reservoir cap (3), plate (4) and diaphragm (5).



I718H1410053-01

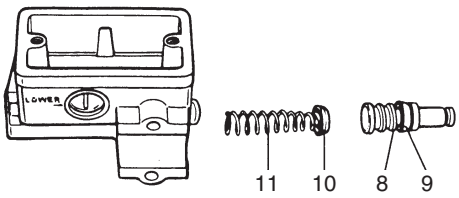
3) Pull out the dust boot (6) and remove the snap ring (7).

Special tool
TOOL : 09900–06108 (Snap ring pliers)



I718H1410054-02

4) Remove the following parts from the master cylinder.
- Piston (8)
- Secondary cup (9)
- Primary cup (10)
- Spring (11)



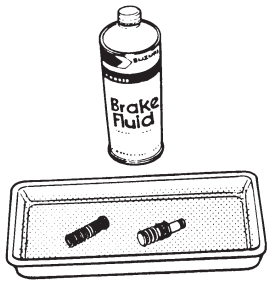
I649G1410023-01

Assembly
Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

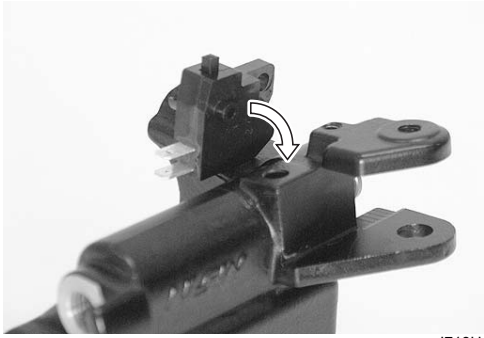
- **Wash the master cylinder components with new brake fluid before reassembly.**
- **Do not wipe the brake fluid off after washing the components.**
- **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
- **Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.**

BF: Brake fluid (DOT 4)



I649G1410024-01

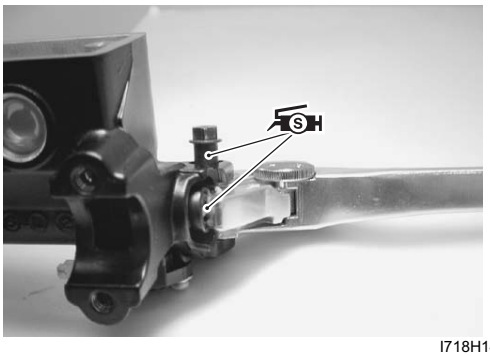
- When installing the brake light switch, align the projection on the switch with the hole in the master cylinder.



I718H1410055-01

- Apply grease to the brake lever pivot bolt.
- Apply grease to the contact point between piston and brake lever.

: Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)



I718H1410071-01

- Tighten the pivot bolt and lock-nut to the specified torque.

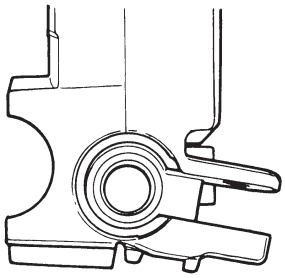
Tightening torque
Brake lever pivot bolt: 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)
Brake lever pivot bolt lock-nut: 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)

Front Brake Master Cylinder Parts Inspection

B718H14106014

Refer to “Front Brake Master Cylinder / Brake Lever Disassembly and Assembly (Page 4A-15)”.

Master Cylinder
Inspect the master cylinder bore for any scratches or other damage.



I649G1410027-01

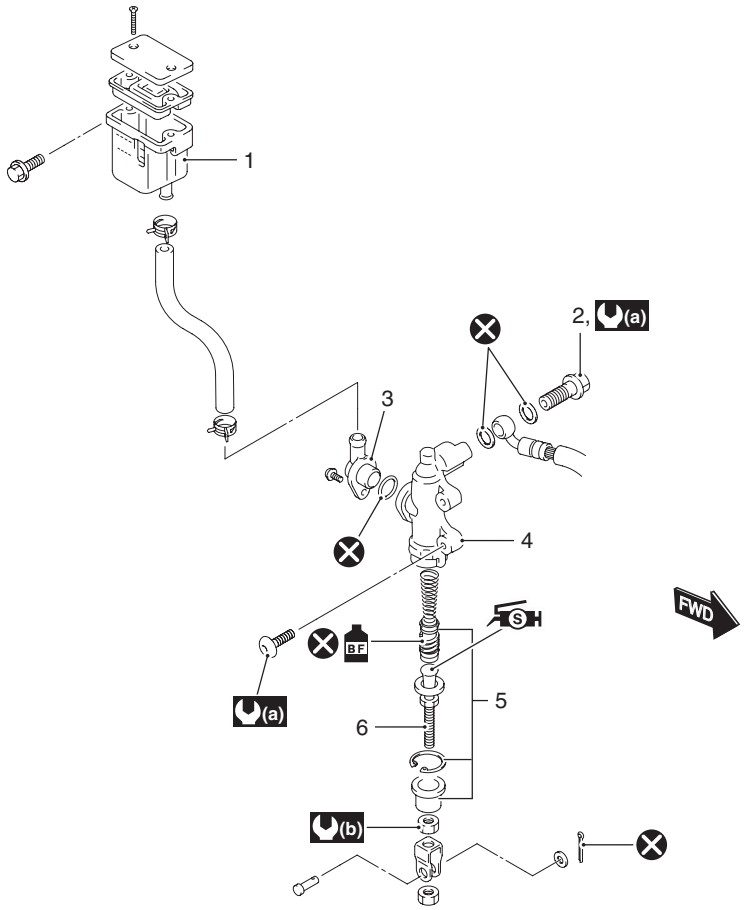
Piston
Inspect the piston surface for any scratches or other damage.

Rubber Parts
Inspect the primary cup, secondary cup and dust boot for wear or damage.

I649G1410028-01

Rear Brake Master Cylinder Components

B718H14106015



I649G1410029-05

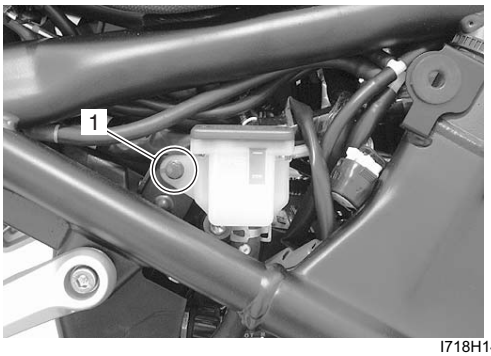
1. Reservoir tank	4. Master cylinder	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	BF : Apply brake fluid.
2. Brake hose union bolt	5. Piston/Cup set	(b) : 18 N·m (1.8 kgf-m, 13.0 lb-ft)	: Do not reuse.
3. Brake hose connector	6. Push rod	(S) H : Apply silicone grease.	

Rear Brake Master Cylinder Assembly Removal and Installation

B718H14106016

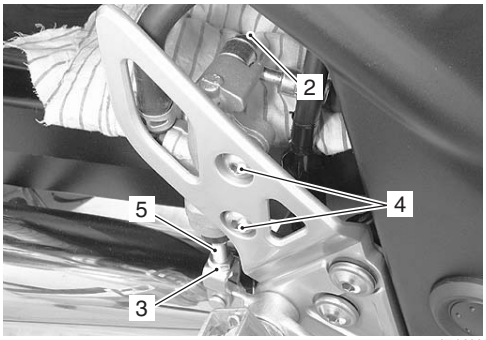
Removal

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-10)”.
3) Remove the reservoir mounting bolt (1).



I718H1410056-01

4) Place a rag underneath the brake hose union bolt (2) on the master cylinder to catch any spilt brake fluid.
5) Remove the brake hose union bolt (2) and disconnect the brake hose.
6) Loosen the lock-nut (3).
7) Remove the master cylinder mounting bolts (4).
8) Remove the master cylinder along with the reservoir by turning the push rod (5).



I718H1410057-01

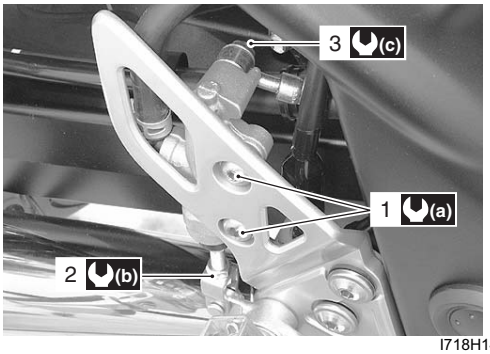
Installation
Install the rear brake master cylinder in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

- Tighten the master cylinder mounting bolts (1) to the specified torque.
- Tighten the lock-nut (2) to the specified torque.
- After setting the brake hose union to the stopper, tighten the union bolt (3) to the specified torque.

Tightening torque
Rear master cylinder mounting bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Rear master cylinder rod lock-nut (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)
Brake hose union bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1410058-01

- Bleed air from the system after reassembling the master cylinder. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-8)”.
- Adjust the brake pedal height. Refer to “Brake System Inspection in Section 0B (Page 0B-17)”.

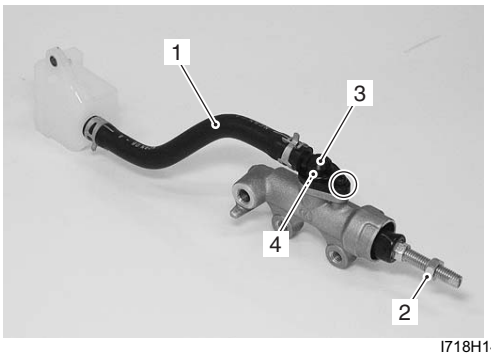
Rear Brake Master Cylinder Disassembly and Assembly

B718H14106017

Refer to “Front Brake Master Cylinder Assembly Removal and Installation (Page 4A-14)”.

Disassembly

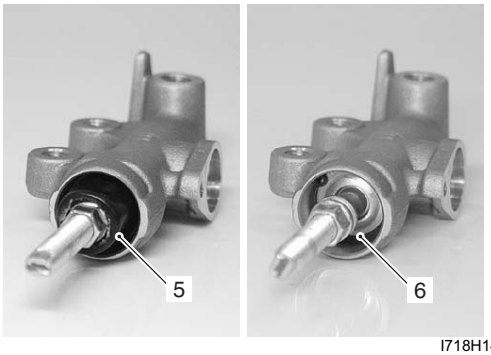
1) Disconnect the reservoir hose (1).
2) Remove the lock-nut (2).
3) Remove the brake hose connector (3) and O-ring (4).



I718H1410059-04

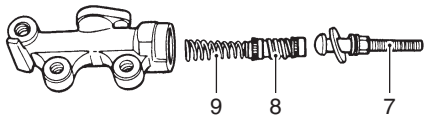
4) Pull out the dust boot (5) and remove the snap ring (6).

Special tool
TOOL : 09900–06108 (Snap ring pliers)



I718H1410060-01

5) Remove the push rod (7), piston/cup set (8) and spring (9).



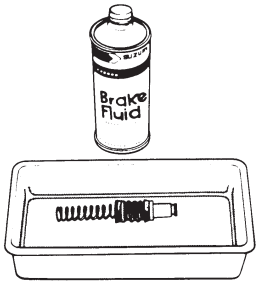
I649G1410035-01

Assembly
Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

- **Wash the master cylinder components with new brake fluid before reassembly.**
- **Do not wipe the brake fluid off after washing the components.**
- **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
- **Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.**

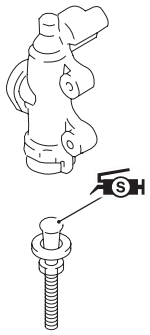
BF: Brake fluid (DOT 4)



I649G1410036-01

- Apply grease to the push rod end.

: Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)

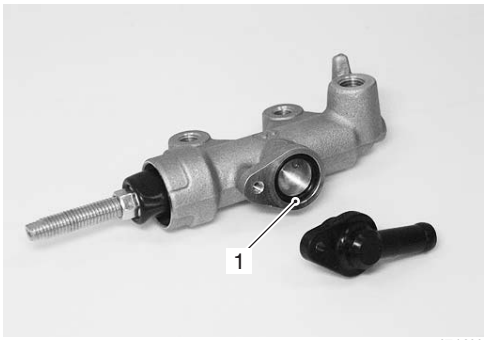


I649G1410041-02

- Install the O-ring (1).

⚠ CAUTION

Replace the O-ring (1) with a new one.



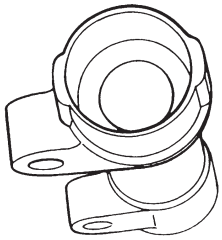
I718H1410061-01

Rear Brake Master Cylinder Parts Inspection

B718H14106018

Refer to “Rear Brake Master Cylinder Disassembly and Assembly (Page 4A-19)”.

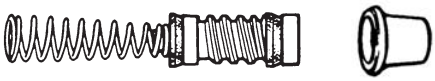
Master Cylinder
Inspect the master cylinder bore for any scratches or other damage.



I649G1410038-01

Piston
Inspect the piston surface for any scratches or other damage.

Rubber Parts
Inspect the primary cup, secondary cup and dust boot for wear or damage.



I649G1410039-01

Specifications

Service Data

B718H14107001

Brake

Unit: mm (in)

Item	Standard		Limit
Rear brake pedal height	50 – 60 (2.0 – 2.4)		—
Master cylinder bore	Front	14.000 – 14.043 (0.5512 – 0.5529)	—
	Rear	14.000 – 14.043 (0.5512 – 0.5529)	—
Master cylinder piston diam.	Front	13.957 – 13.984 (0.5495 – 0.5506)	—
	Rear	13.957 – 13.984 (0.5495 – 0.5506)	—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B718H14107002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Air bleeder valve (Front brake)	7.5	0.75	5.5	☞(Page 4A-9) / ☞(Page 4A-11)
Air bleeder valve (Rear brake)	6.0	0.6	4.5	☞(Page 4A-10) / ☞(Page 4A-12)
Master cylinder holder bolt (Upper and Lower)	10	1.0	7.0	☞(Page 4A-15)
Brake hose union bolt	23	2.3	16.5	☞(Page 4A-15) / ☞(Page 4A-19)
Brake lever pivot bolt	6.0	0.6	4.5	☞(Page 4A-17)
Brake lever pivot bolt lock-nut	6.0	0.6	4.5	☞(Page 4A-17)
Rear master cylinder mounting bolt	23	2.3	16.5	☞(Page 4A-19)
Rear master cylinder rod lock-nut	18	1.8	13.0	☞(Page 4A-19)

NOTE

The specified tightening torque is also described in the following.
“Front Brake Hose Routing Diagram (Page 4A-1)”
“Rear Brake Hose Routing Diagram (Page 4A-5)”
“Front Brake Master Cylinder Components (Page 4A-14)”
“Rear Brake Master Cylinder Components (Page 4A-18)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H14108001

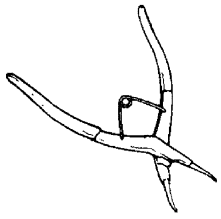
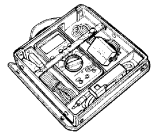
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4A-10) / ☞(Page 4A-11) / ☞(Page 4A-16) / ☞(Page 4A-20)
Grease	SUZUKI Silicone Grease or equivalent	P/No.: 99000–25100	☞(Page 4A-17) / ☞(Page 4A-20)

NOTE

Required service material is also described in the following.
"Front Brake Master Cylinder Components (Page 4A-14)"
"Rear Brake Master Cylinder Components (Page 4A-18)"

Special Tool

B718H14108002

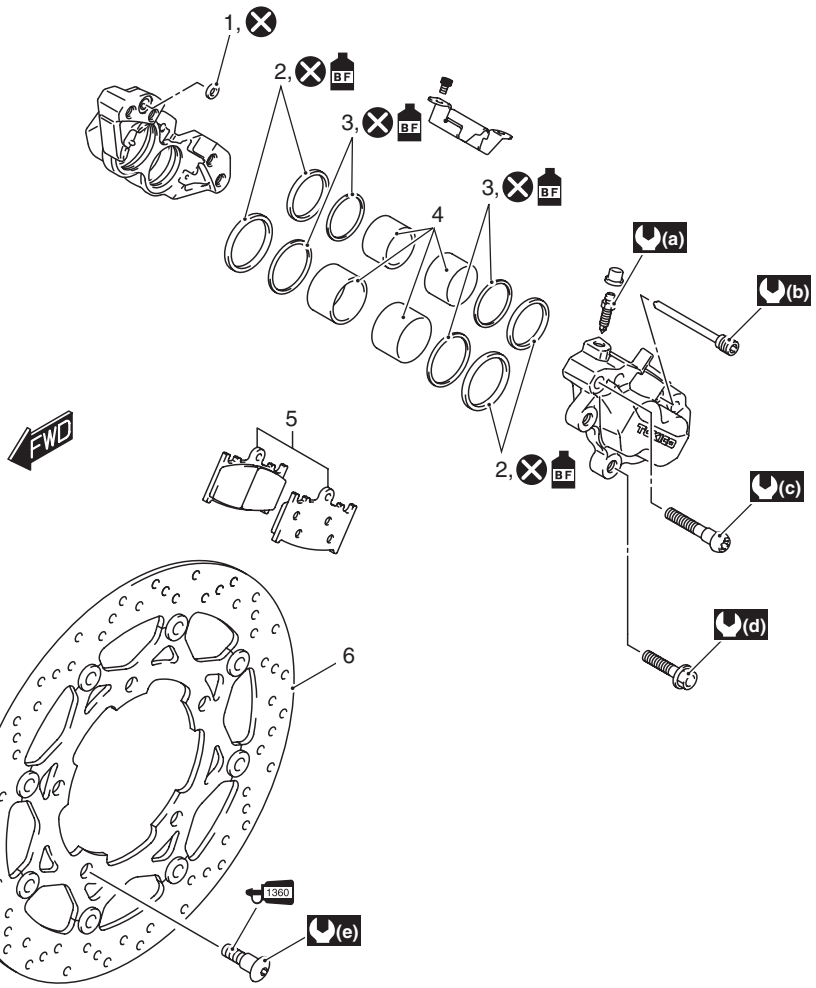
09900–06108 Snap ring pliers ☞(Page 4A-16) / ☞(Page 4A-19)		09900–25008 Multi-circuit tester set ☞(Page 4A-8) / ☞(Page 4A-8)	

Front Brakes

Repair Instructions

Front Brake Components

B718H14206001



I649G1420001-04

1. O-ring	6. Front brake disc	(e) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
2. Piston seal	(a) : 7.5 N·m (0.75 kgf-m, 5.5 lb-ft)	1360 : Apply thread lock to thread part.
3. Dust seal	(b) : 16 N·m (1.6 kgf-m, 11.5 lb-ft)	BF : Apply brake fluid.
4. Piston	(c) : 22 N·m (2.2 kgf-m, 16.0 lb-ft)	: Do not reuse.
5. Front brake pad set	(d) : 26 N·m (2.6 kgf-m, 19.0 lb-ft)	

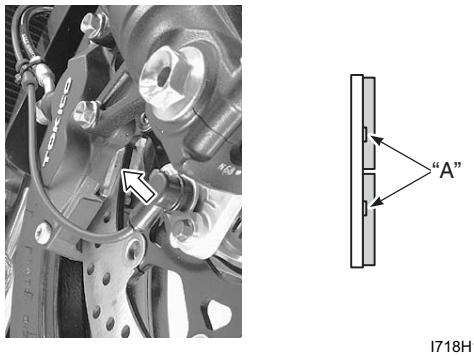
Front Brake Pad Inspection

B718H14206002

The extent of brake pads wear can be checked by observing the grooved limit line “A” on the pads. When the wear exceeds the grooved limit line, replace the pads with new ones. Refer to “Front Brake Pad Replacement (Page 4B-2)”.

⚠ CAUTION

Replace the brake pad as a set, otherwise braking performance will be adversely affected.

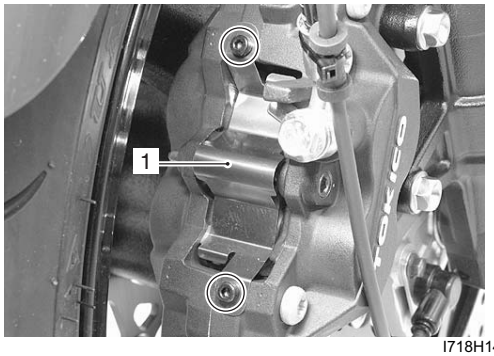


I718H1420001-03

Front Brake Pad Replacement

B718H14206003

1) Remove the spring (1).

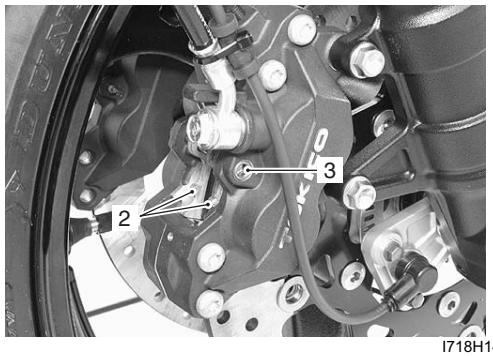


I718H1420011-01

2) Remove the brake pads (2) by removing the pad mounting pin (3).

NOTE

When removing the pads, push the piston all the way into the brake caliper.



I718H1420012-03

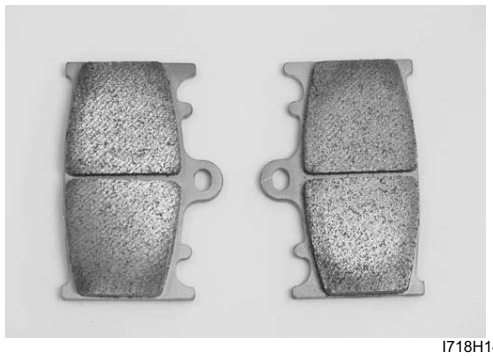
⚠ CAUTION

Do not operate the brake lever while dismounting the pads.

3) Clean up the caliper especially around the caliper piston.
4) Install the new brake pads.

⚠ CAUTION

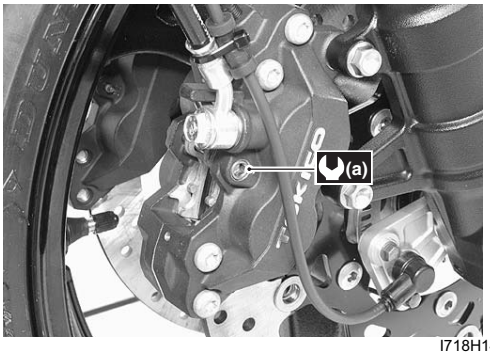
Replace the brake pads as a set, otherwise braking performance will be adversely affected.



I718H1420003-01

5) Tighten the pad mounting pin to the specified torque.

Tightening torque
Front brake pad mounting pin (a): 16 N·m (1.6 kgf-m, 11.5 lb-ft)



I718H1420013-01

NOTE

After replacing the brake pads, pump the brake lever several times to check for proper brake operation and then check the brake fluid level.

Front Brake Caliper Removal and Installation

B718H14206004

NOTE

The right and left calipers are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

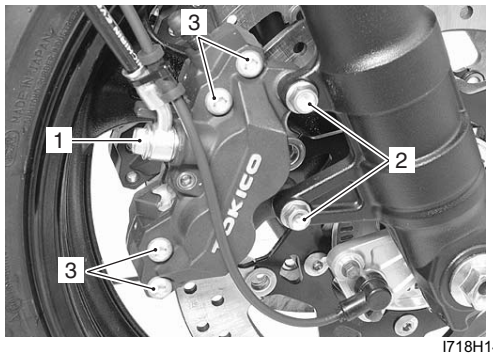
1) Drain brake fluid. Refer to “Brake Fluid Replacement in Section 4A (Page 4A-10)”.
2) Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

NOTE

- **Place a rag underneath the union bolt on the brake caliper to catch any spilt brake fluid.**
- **Slightly loosen the brake caliper housing bolts (3) to facilitate later disassembly, if necessary.**

Special tool
TOOL : 09930–11920 (Torx bit (JT 40H))
TOOL : 09930–11940 (Bit holder)

3) Remove the brake caliper by removing the caliper mounting bolts (2).



I718H1420014-01

Installation

Install the brake caliper in the reverse order of removal. Pay attention to the following points:

- Tighten each bolt to the specified torque.

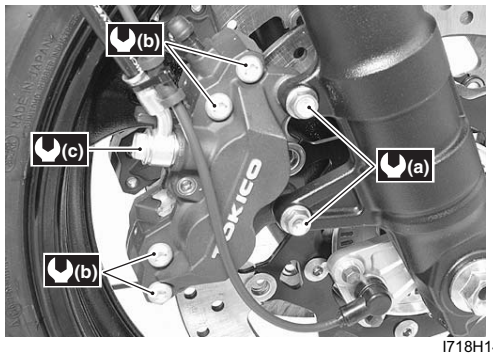
Tightening torque
Front brake caliper mounting bolt (a): 26 N·m (2.6 kgf-m, 19.0 lb-ft)
Front brake caliper housing bolt (b): 22 N·m (2.2 kgf-m, 16.0 lb-ft)

- After setting the brake hose union to the stopper, tighten the union bolt to the specified torque.

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

Tightening torque
Front brake hose union bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1420015-01

- Bleed air from the brake system after installing the caliper. Refer to “Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-8)”.

- Check the brake fluid leakage and brake operation.

⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.

Front Brake Caliper Disassembly and Assembly

B718H14206005

Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.

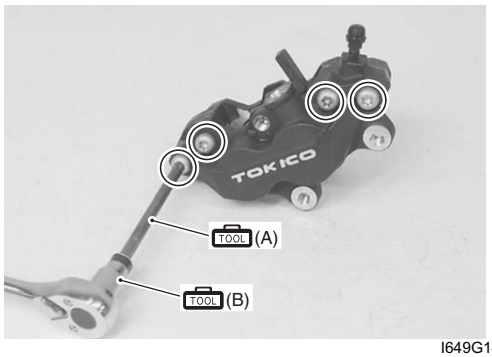
NOTE

The right and left calipers are installed symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

Disassembly

1) Remove the brake pads. Refer to “Front Brake Pad Replacement (Page 4B-2)”.
2) Separate the caliper halves by removing the caliper housing bolts with special tools.

Special tool
TOOL (A): 09930–11920 (Torx bit (JT 40H))
TOOL (B): 09930–11940 (Bit holder)



I649G1420021-01

3) Remove the O-ring.

I649G1420009-01

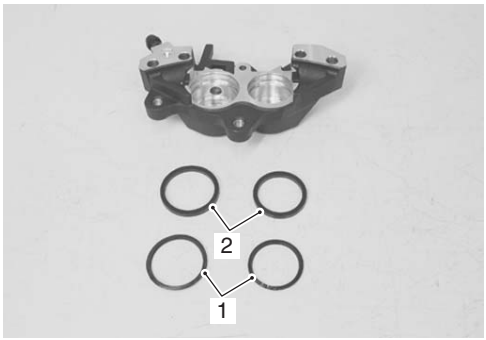
4) Place a rag over the pistons to prevent it from popping out and then force out the pistons using compressed air.

⚠ CAUTION

Do not use high pressure air to prevent piston damage.

I649G1420010-01

5) Remove the dust seals (1) and piston seals (2).



I718H1420008-01

Assembly

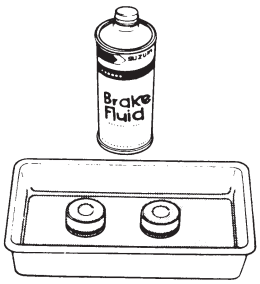
Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bores and pistons with specified brake fluid. Particularly wash the dust seal grooves and piston seal grooves.

  BF: Brake fluid (DOT 4)

  ⚠ CAUTION

  - **Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
  - **Do not wipe the brake fluid off after washing the components.**
  - **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.**



I649G1420012-01

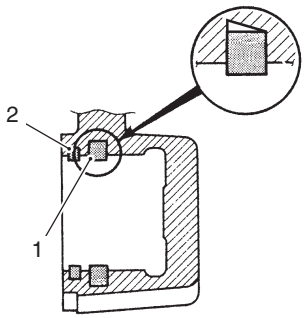
- Apply the brake fluid to piston seals (1) and dust seals (2).

  ⚠ CAUTION

  Replace the piston seals (1) and dust seals (2) with new ones

  BF: Brake fluid (DOT 4)

- Install the piston seals as shown.

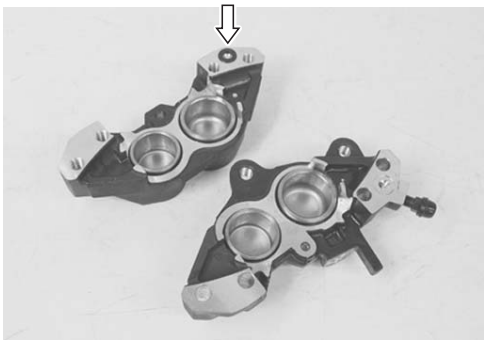


I649G1420013-01

- Install a new O-ring and reassemble caliper halves.

  ⚠ CAUTION

  Replace the O-ring with a new one.



I649G1420014-01

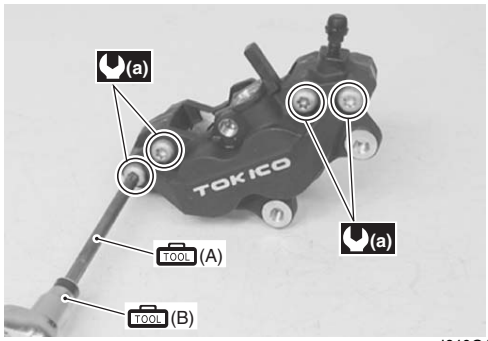
- Temporarily tighten the brake caliper housing bolts.

⚠ CAUTION

After installing the brake caliper to the front fork, tighten the brake caliper housing bolts to the specified torque. Refer to "Front Brake Caliper Removal and Installation (Page 4B-3)".

Special tool
(A): 09930–11920 (Torx bit (JT 40H))
(B): 09930–11940 (Bit holder)

Tightening torque
Front brake caliper housing bolt (a): 22 N·m (2.2 kgf-m, 16.0 lb-ft)



I649G1420008-03

- Install the brake pads. Refer to "Front Brake Pad Replacement (Page 4B-2)".

Front Brake Caliper Parts Inspection

B718H14206006

Refer to "Front Brake Caliper Disassembly and Assembly (Page 4B-4)".

Brake Caliper Cylinder
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.

I649G1420015-01

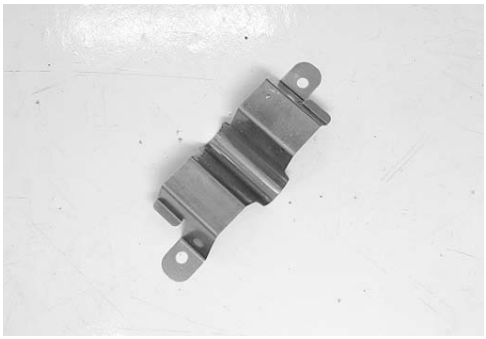
Brake Caliper Piston
Inspect the brake caliper piston surface for any scratches or other damage. If any damage is found, replace the piston with a new one.

I649G1420016-01

Brake Pad Mounting Pin
Inspect the brake Pad mounting pin for wear and other damage. If any damage is found, replace the mounting pin with a new one.

I718H1420018-03

Brake Pad Spring
Inspect the brake pad springs for damage and excessive bend. If any defects are found, replace them with new ones.



I718H1420019-03

Front Brake Disc Removal and Installation

B718H14206007

Removal

1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-6)”.
2) Remove the front brake disc.

I718H1420016-01

Installation

Install the front brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake discs are clean and free of any grease.
- Apply thread lock to the brake disc bolts and tighten them to the specified torque.

1360 : Thread lock cement 99000–32130 (Thread Lock Cement Super 1360 or equivalent)

Tightening torque
Brake disc bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

I718H1420017-01

Front Brake Disc Inspection

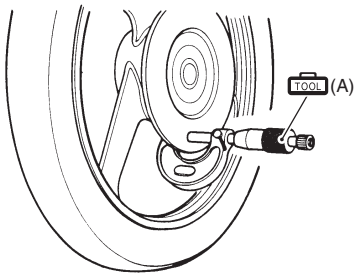
B718H14206008

Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool
TOOL (A): 09900–20205 (Micrometer (0 – 25 mm))

Brake disc thickness
Service limit (Front): 4.5 mm (0.18 in)



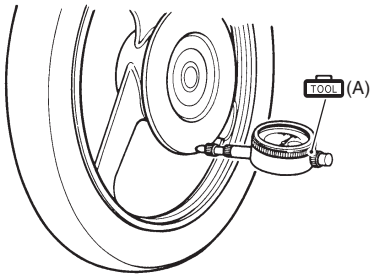
I649G1420019-02

Brake Disc Runout

1) Dismount the front brake caliper. Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.
2) Measure the runout using the dial gauge. Replace the disc if the runout exceeds the service limit.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL : 09900–20701 (Magnetic stand)

Brake disc runout
Service limit: 0.30 mm (0.012 in)



I649G1420020-02

3) Remount the front brake caliper. Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.

Specifications

Service Data

B718H14207001

Brake

Unit: mm (in)

Item	Standard			Limit
Brake disc thickness	Front	4.8 – 5.2 (0.189 – 0.205)		4.5 (0.18)
Brake disc runout	—			0.30 (0.012)
Brake caliper cylinder bore	Front	Leading	27.050 – 27.126 (1.0650 – 1.0680)	—
		Trailing	30.280 – 30.356 (1.1921 – 1.1951)	—
Brake caliper piston diam.	Front	Leading	26.920 – 26.970 (1.0598 – 1.0618)	—
		Trailing	30.150 – 30.200 (1.1870 – 1.1890)	—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B718H14207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Front brake pad mounting pin	16	1.6	11.5	☞(Page 4B-3)
Front brake caliper mounting bolt	26	2.6	19.0	☞(Page 4B-3)
Front brake caliper housing bolt	22	2.2	16.0	☞(Page 4B-3) / ☞(Page 4B-6)
Front brake hose union bolt	23	2.3	16.5	☞(Page 4B-3)
Brake disc bolt	23	2.3	16.5	☞(Page 4B-7)

NOTE

The specified tightening torque is also described in the following.
“Front Brake Components (Page 4B-1)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H14208001

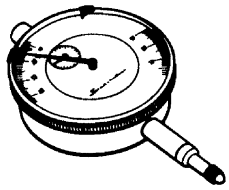
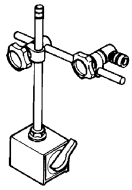
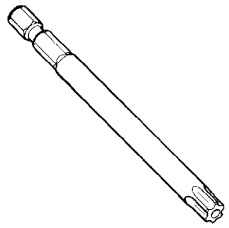
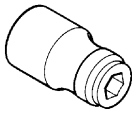
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4B-5) / ☞(Page 4B-5)
Thread lock cement	Thread Lock Cement Super 1360 or equivalent	P/No.: 99000–32130	☞(Page 4B-7)

NOTE

Required service material is also described in the following.
“Front Brake Components (Page 4B-1)”

Special Tool

B718H14208002

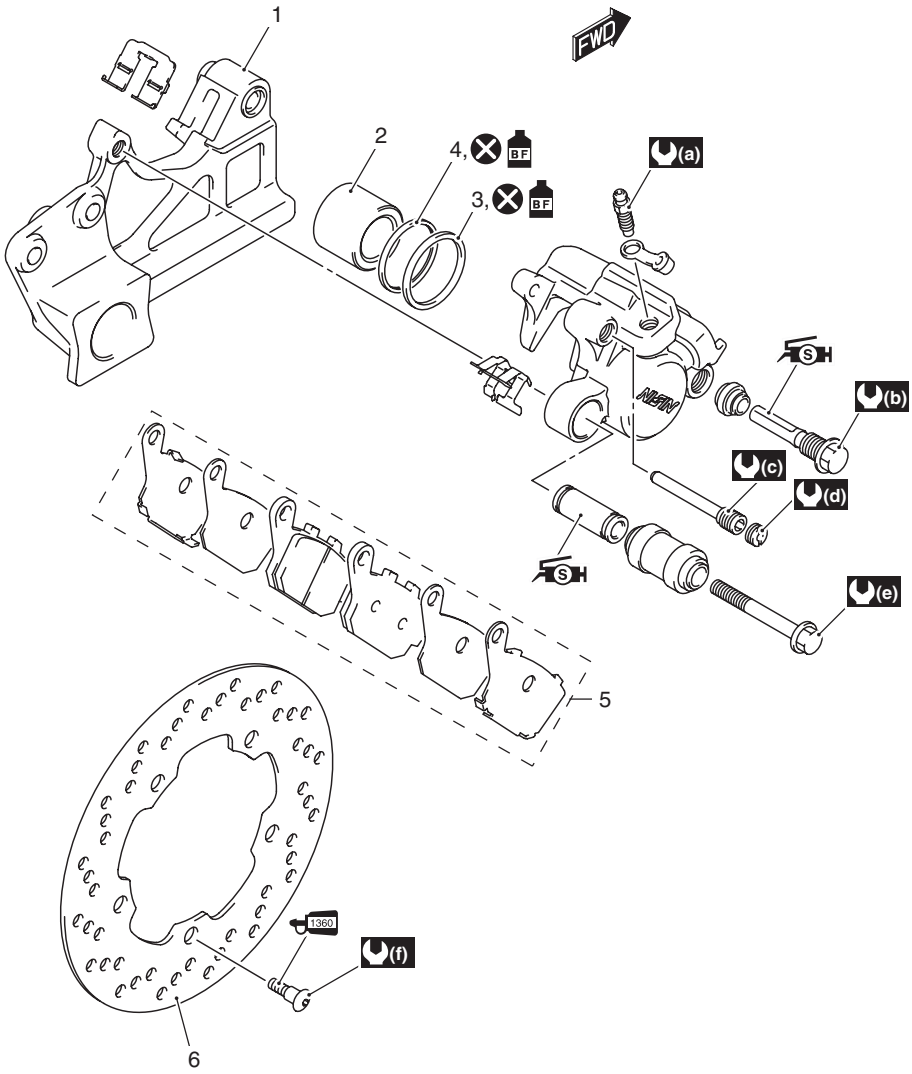
09900–20205 Micrometer (0 – 25 mm) ☞(Page 4B-7) 	09900–20607 Dial gauge (1/100 mm, 10 mm) ☞(Page 4B-7) 
09900–20701 Magnetic stand ☞(Page 4B-7) 	09930–11920 Torx bit (JT40H) ☞(Page 4B-3) / ☞(Page 4B-4) / ☞(Page 4B-6) 
09930–11940 Bit holder ☞(Page 4B-3) / ☞(Page 4B-4) / ☞(Page 4B-6) 	

Rear Brakes

Repair Instructions

Rear Brake Components

B718H14306001



I649G1430001-04

1. Rear caliper bracket	(a) : 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)	: Apply silicone grease to sliding surface.
2. Piston	(b) : 27 N·m (2.7 kgf-m, 19.5 lb-ft)	1360 : Apply thread lock to thread part.
3. Piston seal	(c) : 18 N·m (1.8 kgf-m, 13.0 lb-ft)	BF : Apply brake fluid.
4. Dust seal	(d) : 2.5 N·m (0.25 kgf-m, 1.8 lb-ft)	: Do not reuse.
5. Rear brake pad/Shim set	(e) : 22 N·m (2.2 kgf-m, 16.0 lb-ft)	
6. Rear brake disc	(f) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	

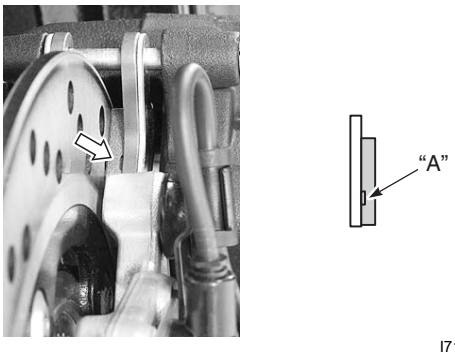
Rear Brake Pad Inspection

B718H14306002

The extent of brake pads wear can be checked by observing the grooved limit line “A” on the pads. When the wear exceeds the grooved limit line, replace the pads with new ones. Refer to “Rear Brake Pad Replacement (Page 4C-2)”.

⚠ CAUTION

Replace the brake pad as a set, otherwise braking performance will be adversely affected.

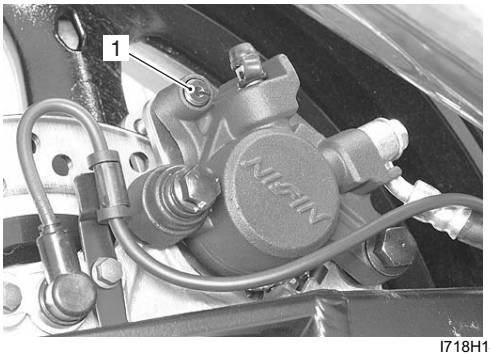


I718H1430001-02

Rear Brake Pad Replacement

B718H14306003

1) Remove the plug (1).



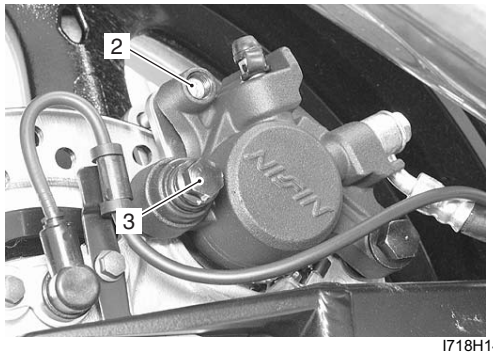
I718H1430016-01

2) Loosen the pad mounting pin (2).

3) Remove the caliper mounting bolt (3).

⚠ CAUTION

Do not operate the brake pedal while dismounting the pads.

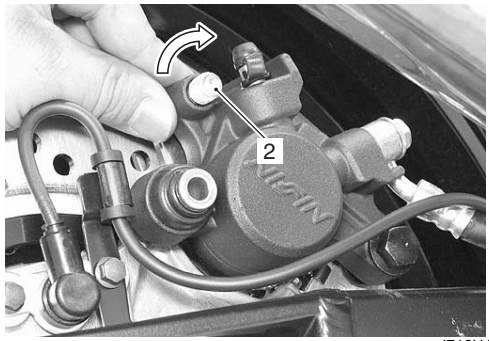


I718H1430018-02

4) Remove the pad mounting pin (2) and brake pads with the rear caliper pivoted up.

NOTE

When removing the pads, push the piston all the way into brake caliper.

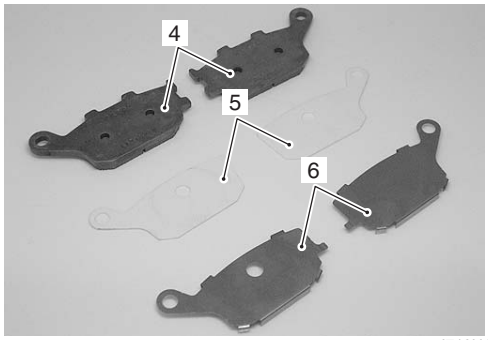


I718H1430017-02

5) Clean up the caliper, especially around the caliper piston.
6) Assemble the new brake pad (4), insulator (5) and shim (6).

⚠ CAUTION

Replace the brake pads as a set, otherwise braking performance will be adversely affected.

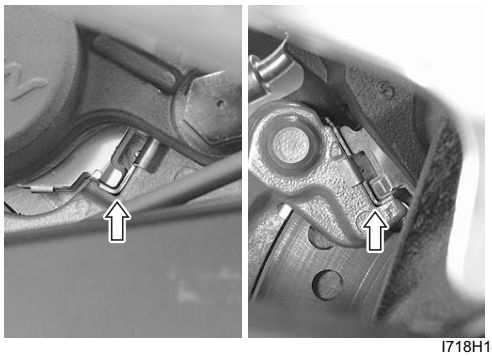


I718H1430019-02

7) Install the new brake pads.

NOTE

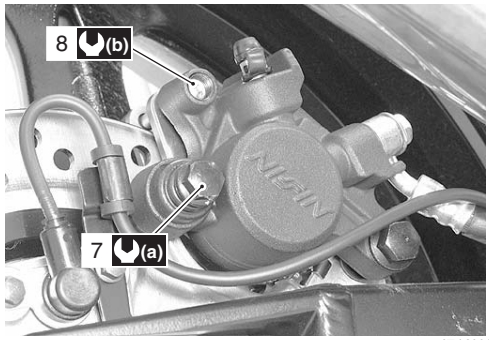
Make sure that the detent of the pad is seated onto the retainer on the caliper bracket.



I718H1430020-01

8) Tighten the caliper mounting bolt (7) and pad mounting pin (8) to the specified torque.

Tightening torque
Rear brake caliper mounting bolt (a): 22 N·m (2.2 kgf-m, 16.0 lb-ft)
Rear brake pad mounting pin (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



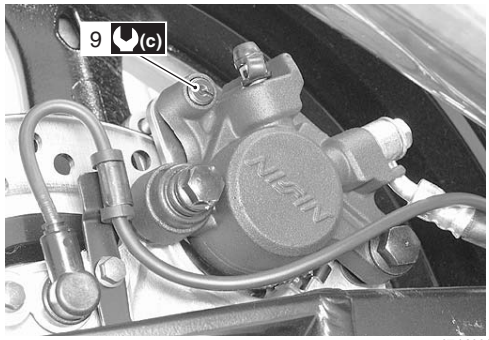
I718H1430021-02

9) Install the plug (9) to the specified torque.

Tightening torque
Pad pin plug (c): 2.5 N·m (0.25 kgf-m, 1.8 lb-ft)

NOTE

After replacing the brake pads, pump the brake pedal several times to check for proper brake operation and then check the brake fluid level.



I718H1430022-01

Rear Brake Caliper Removal and Installation

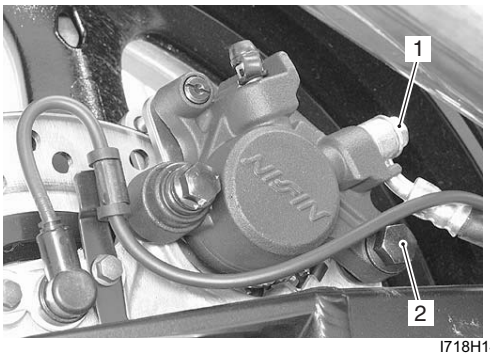
B718H14306004

Removal

1) Drain brake fluid. Refer to “Brake Fluid Replacement in Section 4A (Page 4A-10)”.
2) Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

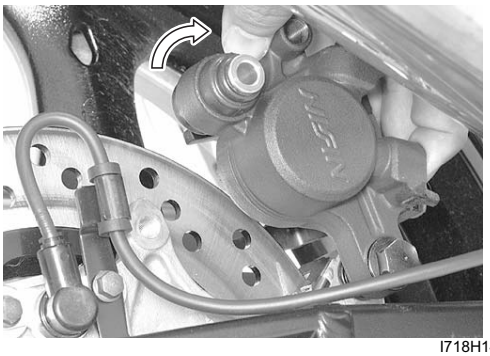
NOTE

- **Place a rag underneath the union bolt on the brake caliper to catch any spilt brake fluid.**
- **Slightly loosen the sliding pin (2) to facilitate later disassembly, if necessary.**



I718H1430023-01

3) Remove the brake pads. Refer to “Rear Brake Pad Replacement (Page 4C-2)”.
4) Pivot the caliper up and remove the caliper from the caliper bracket.



I718H1430024-01

Installation

Install the brake caliper in the reverse order of removal. Pay attention to the following points:

- Install the brake pad and remount the brake caliper. Refer to “Rear Brake Pad Replacement (Page 4C-2)”.
- Tighten the sliding pin (1) to the specified torque.

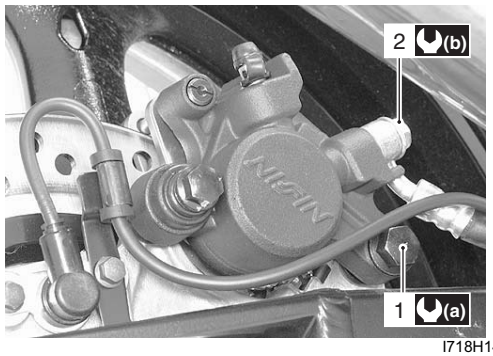
Tightening torque
Rear brake caliper sliding pin (a): 27 N·m (2.7 kgf-m, 19.5 lb-ft)

- After setting the brake hose union to the stopper, tighten the union bolt (2) to the specified torque.

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

Tightening torque
Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1430026-01

- Bleed air from the brake system after installing the caliper. Refer to “Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-8)”.
- Check the brake fluid leakage and brake operation.

⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.

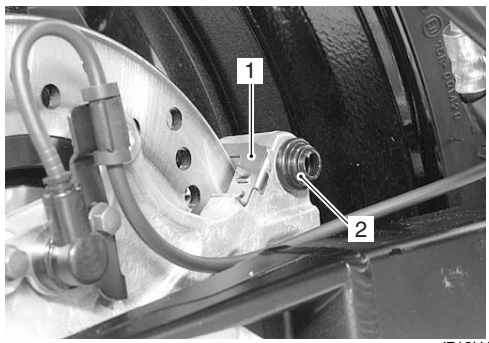
Rear Brake Caliper Disassembly and Assembly

B718H14306005

Refer to “Rear Brake Caliper Removal and Installation (Page 4C-4)”.

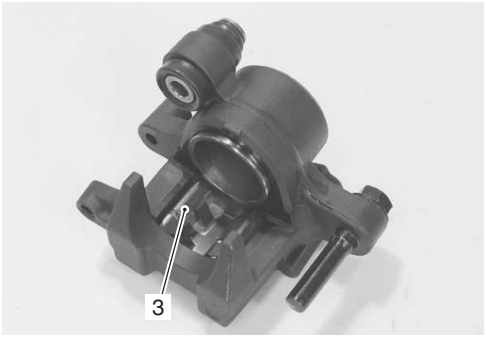
Disassembly

1) Remove the pad spring (1) and rubber boot (2).



I718H1430027-01

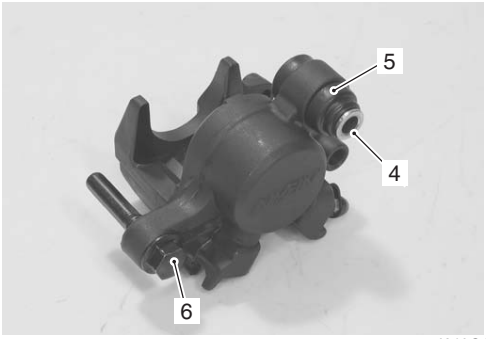
2) Remove the pad spring (3).



I649G1430014-01

3) Remove the spacer (4) and rubber boot (5) from the caliper.

4) Remove the slide pin (6).



I649G1430015-02

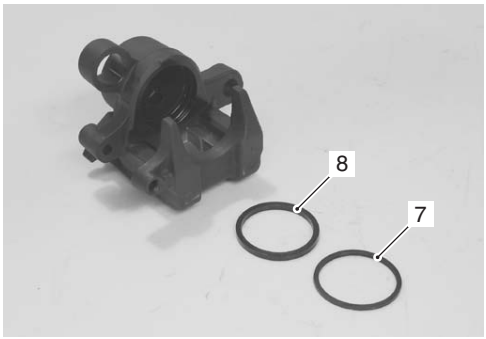
5) Place a rag over the piston to prevent it from popping out and then force out the piston using compressed air.

⚠ CAUTION

Do not use high pressure air to prevent piston damage.

I649G1430016-01

6) Remove the dust seal (7) and piston seal (8).



I649G1430017-01

Assembly

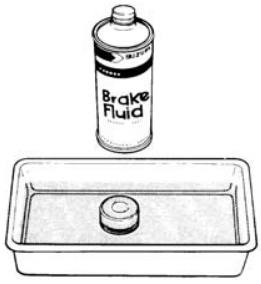
Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bore and piston with specified brake fluid. Particularly wash the dust seal groove and piston seal groove.

  BF: Brake fluid (DOT 4)

⚠ CAUTION

- **Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
- **Do not wipe the brake fluid off after washing the components.**
- **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.**



I649G1430018-01

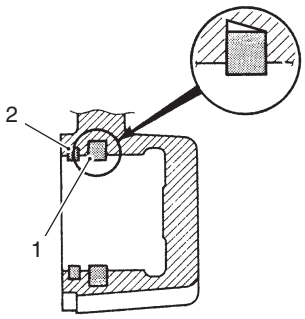
- Apply the brake fluid to piston seal (1) and dust seal (2).

⚠ CAUTION

Replace the piston seal (1) and dust seal (2) with new ones.

BF: Brake fluid (DOT 4)

- Install the piston seals as shown.



I649G1420013-01

- Apply grease to the inside of the boot.

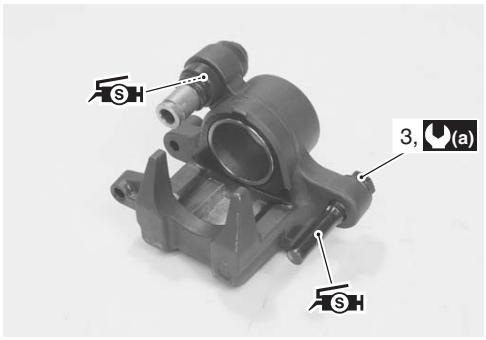
: Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)

- Temporarily tighten the sliding pin (3) and apply grease to the sliding pin.

: Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)

- After mounting the caliper, tighten the sliding pin (3) to the specified torque. Refer to “Rear Brake Caliper Removal and Installation (Page 4C-4)”.

Tightening torque
Rear brake caliper sliding pin (a): 27 N·m (2.7 kgf-m, 19.5 lb-ft)



I649G1430019-02

Rear Brake Caliper Parts Inspection

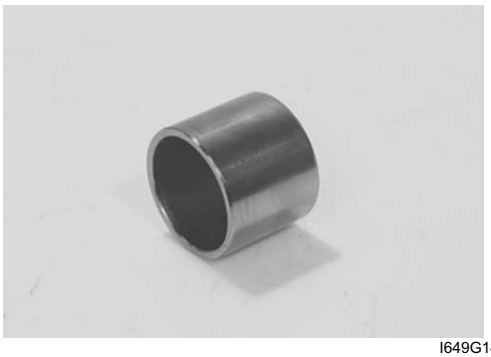
B718H14306006

Refer to “Rear Brake Caliper Disassembly and Assembly (Page 4C-4)”.

Brake Caliper Cylinder
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.

I649G1430020-01

Brake Caliper Piston
Inspect the brake caliper piston surface for any scratches or other damage. If any damage is found, replace the piston with a new one.



I649G1430021-01

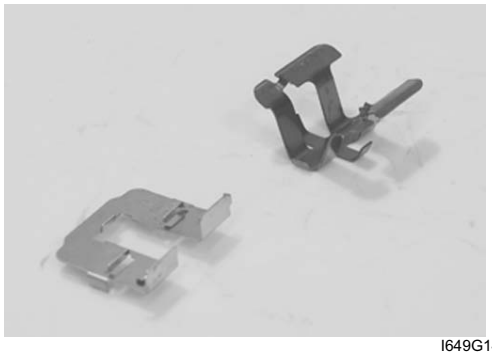
Brake Caliper Sliding Pin
Inspect the brake caliper sliding pin for wear and other damage. If any damage is found, replace the sliding pin with a new one.

I649G1430022-01

Boot and Spacer
Inspect the boots and spacer for damage and wear. If any defects are found, replace them with new ones.

I649G1430023-01

Brake Pad Spring
Inspect the brake pad springs for damage and excessive bend. If any defects are found, replace them with new ones.



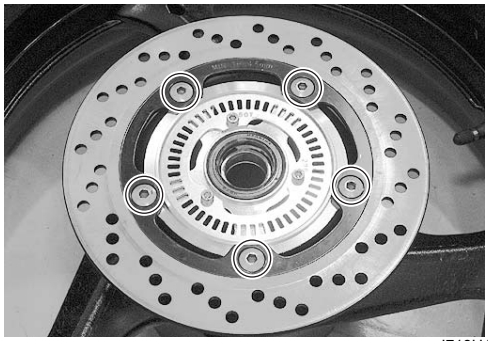
I649G1430024-01

Rear Brake Disc Removal and Installation

B718H14306007

Removal

1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.
2) Remove the rear brake disc.



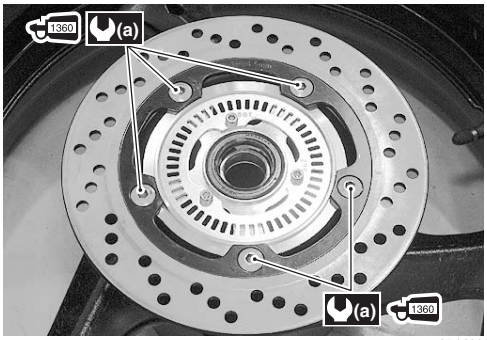
I718H1430028-01

Installation
Install the rear brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake discs are clean and free of any grease.
- Apply thread lock to the brake disc bolts and tighten them to the specified torque.

1360 : Thread lock cement 99000–32130 (Thread Lock Cement Super 1360 or equivalent)

Tightening torque
Brake disc bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I718H1430029-02

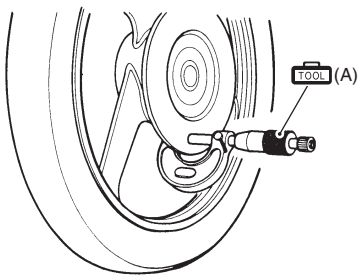
Rear Brake Disc Inspection

B718H14306008

Brake Disc Thickness
Check the brake disc for damage or cracks and measure the thickness using the micrometer.
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool
TOOL (A): 09900–20205 (Micrometer (0 – 25 mm))

Brake disc thickness
Service limit (Rear): 4.5 mm (0.18 in)



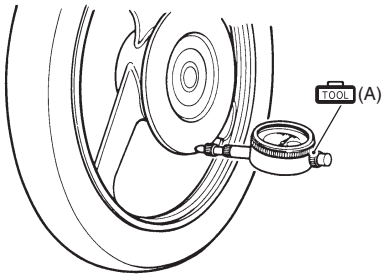
I649G1430027-02

Brake Disc Runout

1) Dismount the rear brake caliper. Refer to “Rear Brake Caliper Removal and Installation (Page 4C-4)”.
2) Measure the runout using the dial gauge. Replace the disc if the runout exceeds the service limit.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)

Brake disc runout
Service limit: 0.30 mm (0.012 in)



I649G1430028-02

3) Remount the rear brake caliper. Refer to “Rear Brake Caliper Removal and Installation (Page 4C-4)”.

Specifications

Service Data

B718H14307001

Brake
Unit: mm (in)

Item	Standard		Limit
Brake disc thickness	Rear	4.8 – 5.2 (0.189 – 0.205)	4.5 (0.18)
Brake disc runout	—		0.30 (0.012)
Brake caliper cylinder bore	Rear	38.180 – 38.230 (1.5031 – 1.5051)	—
Brake caliper piston diam.	Rear	38.080 – 38.130 (1.4992 – 1.5012)	—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B718H14307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Rear brake caliper mounting bolt	22	2.2	16.0	☞(Page 4C-3)
Rear brake pad mounting pin	18	1.8	13.0	☞(Page 4C-3)
Pad pin plug	2.5	0.25	1.8	☞(Page 4C-3)
Rear brake caliper sliding pin	27	2.7	19.5	☞(Page 4C-4) / ☞(Page 4C-6)
Brake hose union bolt	23	2.3	16.5	☞(Page 4C-4)
Brake disc bolt	23	2.3	16.5	☞(Page 4C-7)

NOTE

The specified tightening torque is also described in the following.
“Rear Brake Components (Page 4C-1)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H14308001

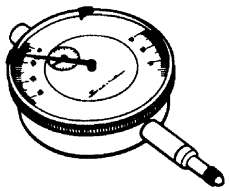
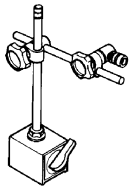
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4C-5) / ☞(Page 4C-6)
Grease	SUZUKI Silicone Grease or equivalent	P/No.: 99000–25100	☞(Page 4C-6) / ☞(Page 4C-6)
Thread lock cement	Thread Lock Cement Super 1360 or equivalent	P/No.: 99000–32130	☞(Page 4C-7)

NOTE

Required service material is also described in the following.
"Rear Brake Components (Page 4C-1)"

Special Tool

B718H14308002

09900–20205 Micrometer (0 – 25 mm) ☞(Page 4C-7)		09900–20607 Dial gauge (1/100 mm, 10 mm) ☞(Page 4C-8)	
09900–20701 Magnetic stand ☞(Page 4C-8)			

ABS

Precautions

Precautions for ABS

B718H14500001

Refer to “Precautions for Electrical Circuit Service in Section 00 (Page 00-2)”.

ABS Information

B718H14500002

⚠ WARNING

- **Be sure to bleed air from the brake fluid circuit when the brake is felt spongy or when a brake relating part is replaced.**
- **Never ride the motorcycle before bleeding the air.**

- Be sure to route the brake hoses correctly.
- The ABS does not shorten the motorcycle’s braking distance. When riding down slopes or on wet or bumpy roads the braking distance is lengthened as compared to a motorcycle without ABS. In addition, braking distance increases more, when the road is slippery.
- The ABS does not control slides which may occur when braking while turning. As with a motorcycle that does not have ABS, it is best not apply the brakes while turning.
- The brake levers may move by themselves when they are applied. This is not a malfunction.
- Only use the specified tires.

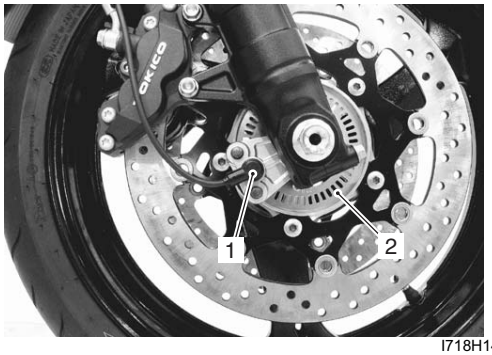
General Description

Wheel Speed Sensor Description

B718H14501001

Wheel speed sensor consists of wheel speed sensor (1) and sensor rotor (2).

Front



I718H1450005-01

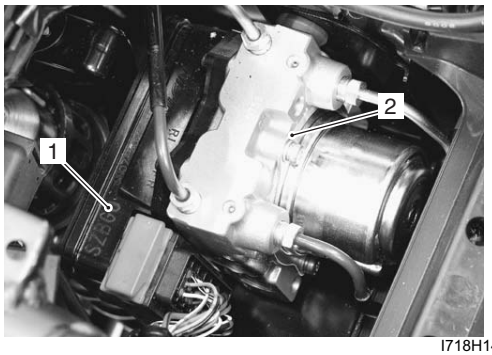
Rear

I718H1450006-01

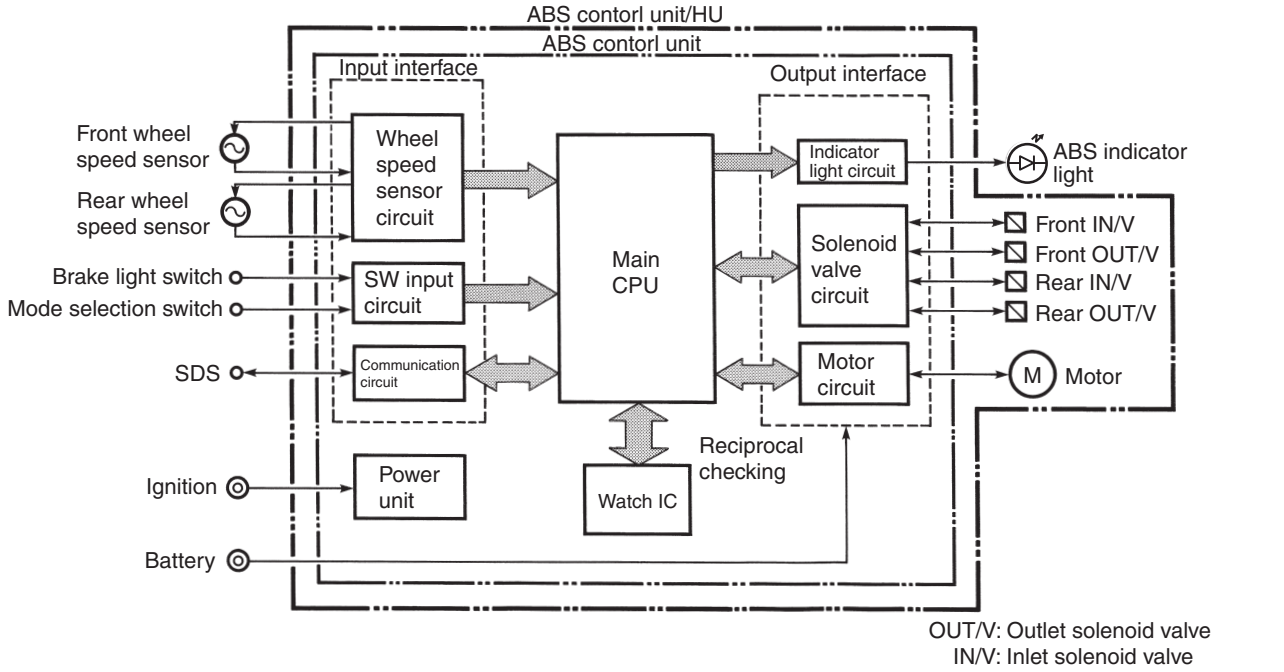
ABS Control Unit Description

B718H14501002

ABS control unit (1) calculates signals input from each one of front and rear wheel speed sensors, monitors the slipping conditions of the wheels and, at the same time, sends control signal to Hydraulic Unit (HU) (2).
This ABS control unit/HU can not be disassembled.



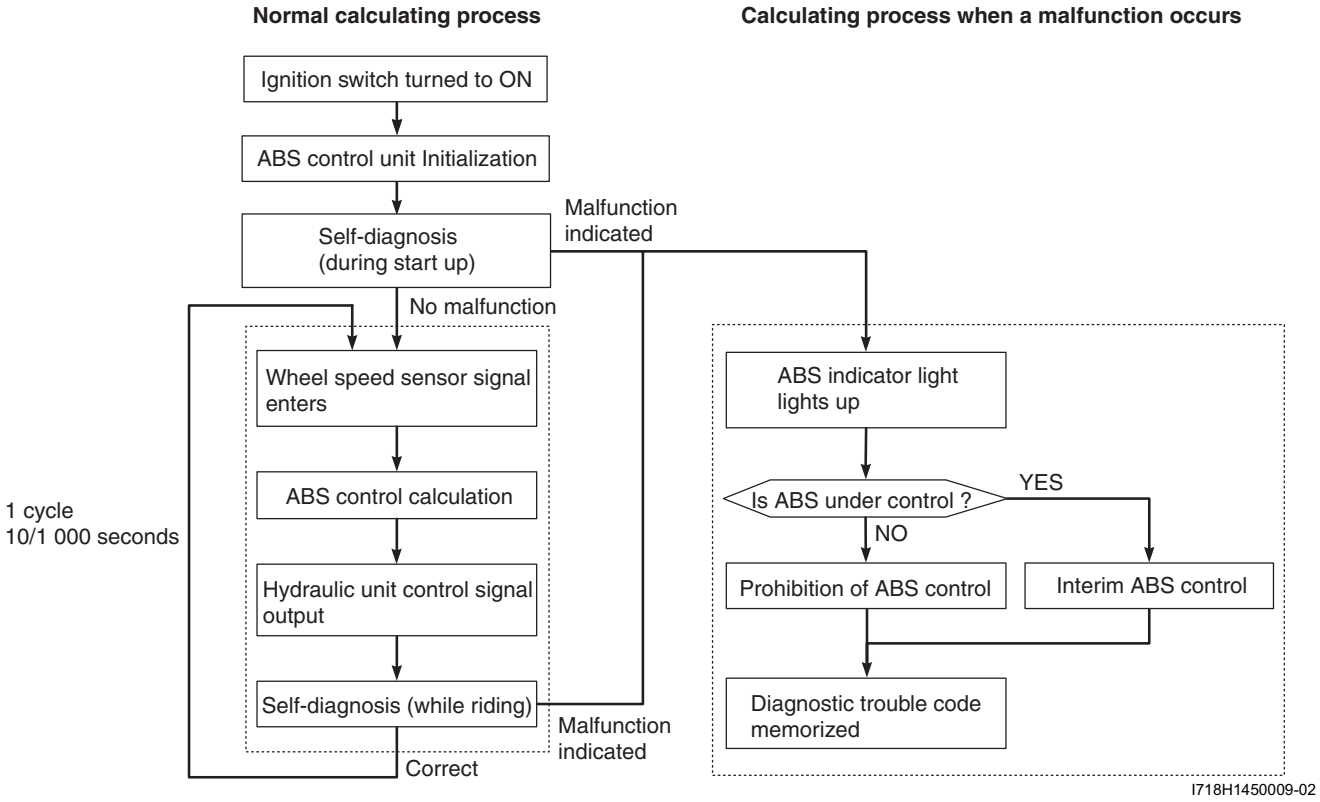
I718H1450007-03



I718H1450008-01

ABS Control Unit Calculating Process

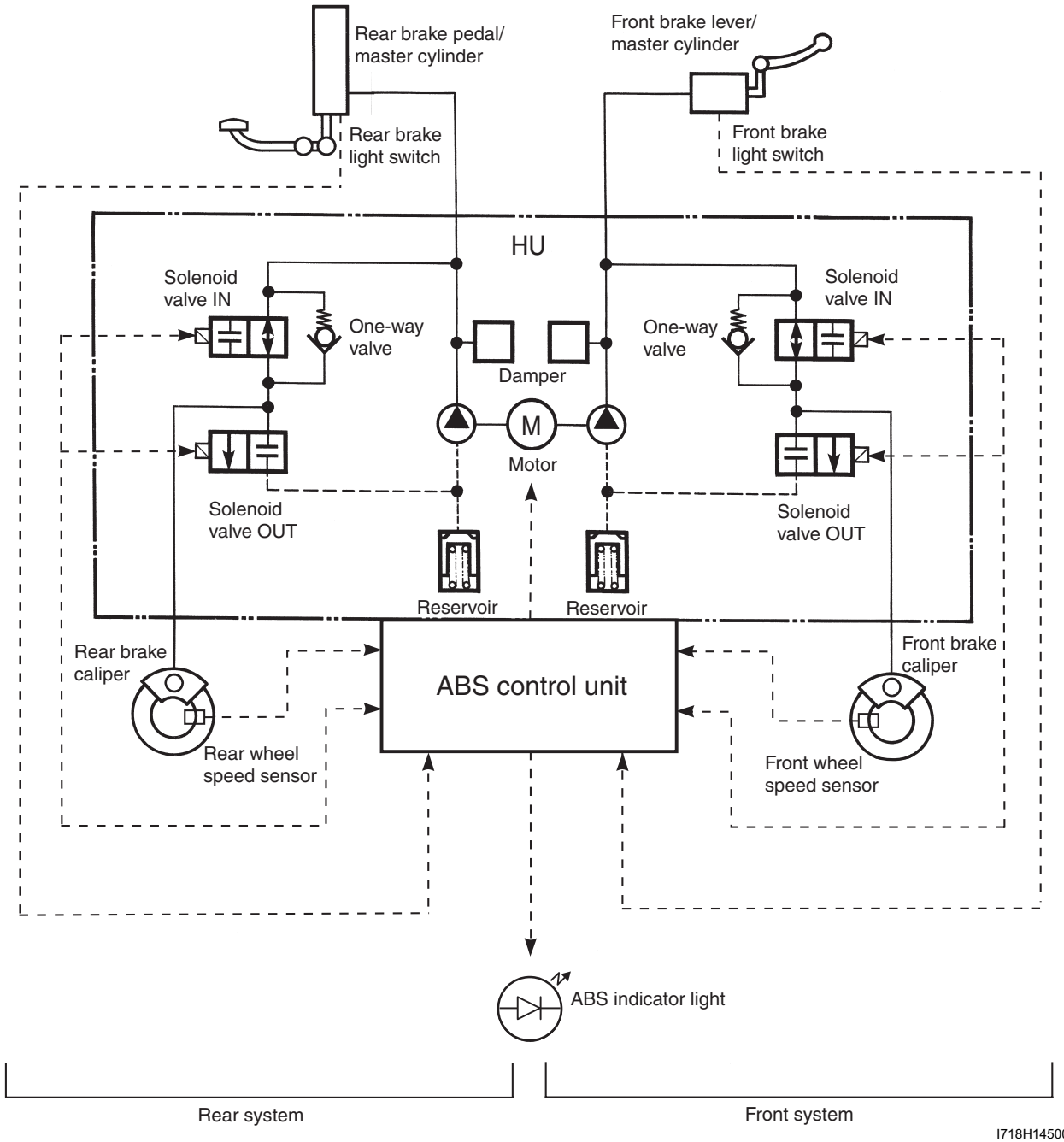
The ABS controls and its calculations, in addition to the self-diagnosing and the fail-safe processes, occur during the ABS control unit calculating process. ABS control is performed in one cycle every 10/1 000 seconds. In addition, if a malfunction is detected by the self-diagnosis function, the brake stops being controlled by the ABS and a diagnostic trouble code is stored.



Hydraulic Unit (HU) Description

B718H14501003

The hydraulic unit operates the solenoid valves based upon the signal which is output from the ABS control unit. The brake fluid pressure is then adjusted accordingly. The hydraulic unit controls the front and rear brake systems individually by operating separate components for the front and the rear, except for the pump drive motor, which is shared by both systems.



I718H1450010-01

Self-diagnosis Function and ABS Indicator Light Description

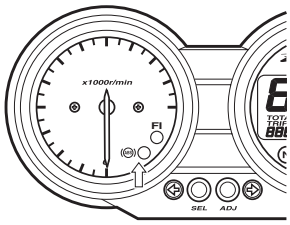
B718H14501006

The ABS control unit performs the self-diagnosis and can store any electronically detected malfunctions as diagnostic trouble codes. If a malfunction has occurred, the indicator light lights up to inform the rider of the malfunction. The special tool, when connected to the mode select coupler, enables the ABS indicator light to display the diagnostic trouble codes.

ABS Indicator Light

The ABS indicator light informs the rider of any ABS malfunctions. If a malfunction occurred, the ABS indicator light flashes, during the self-diagnosis, to indicate the diagnostic trouble code so that the correct part can be repaired.

- When the ignition switch is turned to ON, the ABS indicator light lights up even if no malfunction has occurred, to indicate that the bulb is not burnt out. It will go off after the motorcycle is ridden at more than 10 km/h (6.2 mile/h).
- If an ABS malfunction has occurred, the ABS indicator light keeps lighting up.



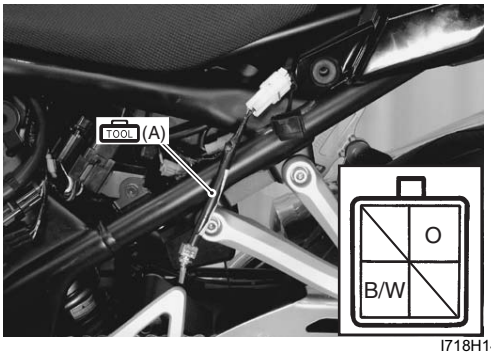
I718H1450122-04

NOTE

When a malfunction has occurred in the ABS, connect the special tool to the mode select coupler to display the diagnostic trouble code on the ABS indicator light. Refer to "DTC (Diagnostic Trouble Code) Output (Page 4E-23)".

Special tool

TOOL (A): 09930–82710 (Mode select switch)

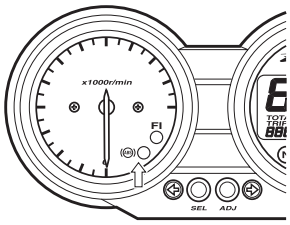


I718H1450042-03

ABS Operation and ABS Indicator Light

The ABS indicator light shows the ABS operating condition. During normal operation, the ABS indicator light lights up when the ignition switch is turned to ON and goes off after the motorcycle is ridden at more than 10 km/h (6.2 mile/h). If a malfunction has occurred, the ABS indicator light keeps lighting up.

The ABS indicator light goes off when the motorcycle is ridden at more than 10 km/h.	The ABS is normally activated.
The ABS indicator light keeps lighting up even though the motorcycle is ridden at more than 10 km/h (6.2 mile/h).	One or more malfunction has been found and ABS activation been hanged up.
The ABS indicator light does not light up when turning the ignition switch ON.	Check the wire harness and combination meter. Refer to "ABS Indicator Light Inspection (Page 4E-17)".



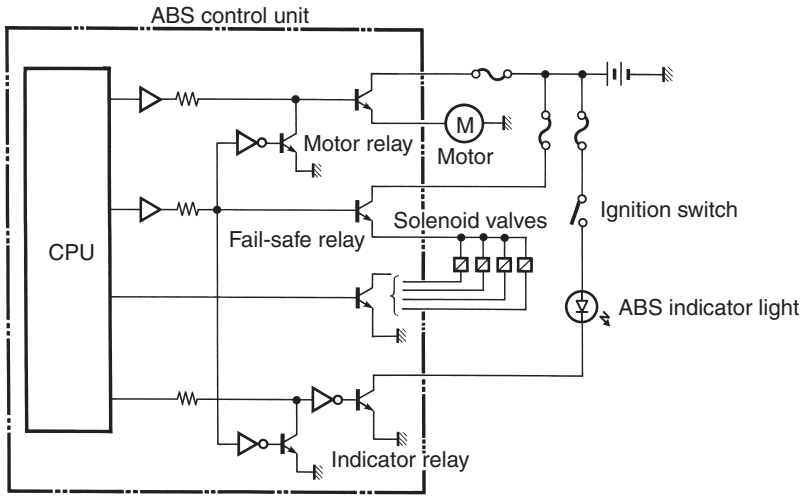
I718H1450122-04

Stored DTCs (Diagnostic Trouble Codes)
As for the diagnostic trouble code, the code of the first malfunction occurred during one ignition ON period will be stored. Pay attention to the fact that even though there may occur several malfunctions in one ON-period, only one code will be stored. Codes of malfunction that occurred in the past are all stored, but the same diagnostic trouble code will not be redundant.
Check and see if any diagnostic trouble code remains, by actually running the machine to activate ABS and by carrying out the self-diagnosis after deleting the diagnostic trouble code once the malfunctioned part is repaired.

Fail-safe Function Description

B718H14501007

If malfunction occurs in the ABS electric system, this sets fail-safe relay OFF. Consequently, motor relay will be set OFF and the indicator light ON, and no current will be applied to motor solenoid valve inactivating ABS and turning ABS indicator light ON. In this case, it functions as the normal brake. However, if malfunctions occurs while ABS is being activated, when ABS control unit diagnoses that the operation can continue, it will effectuate ABS provisional control (turning the ABS indicator light ON). Upon the moment when ABS provisional control is over, the fail-safe relay will be set OFF.



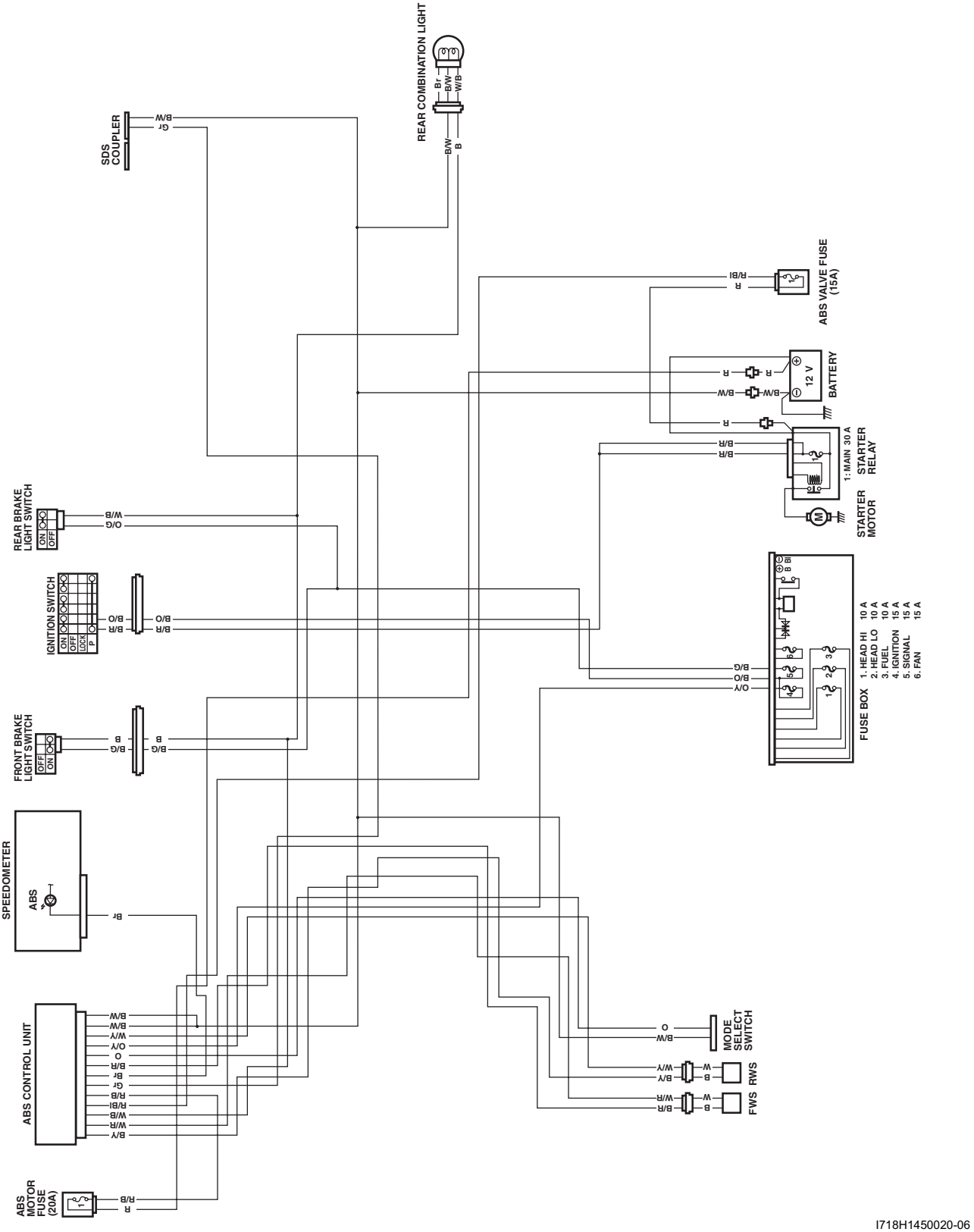
I718H1450019-01

Schematic and Routing Diagram

ABS Wiring Diagram

B718H14502001

Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.

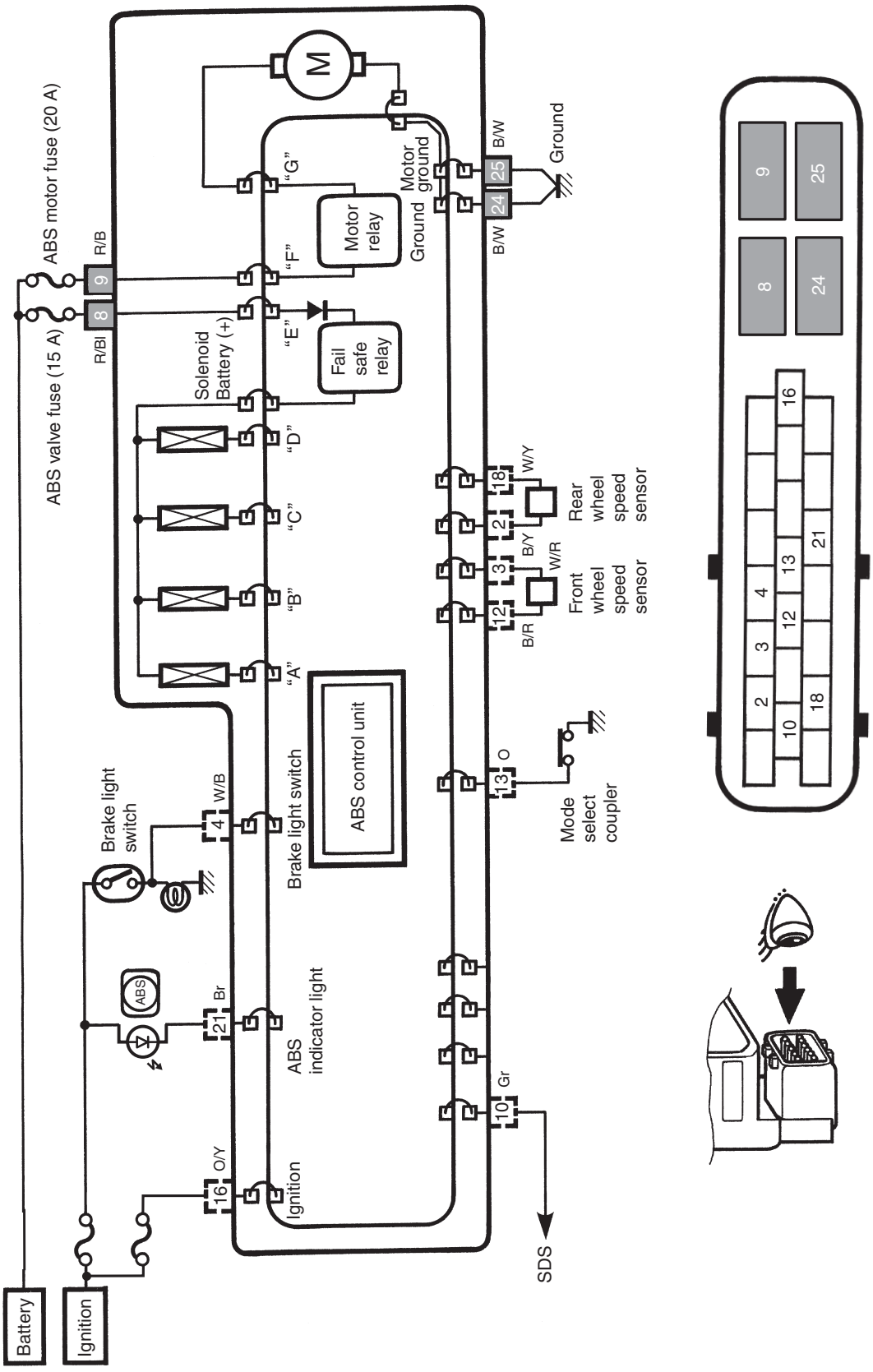


I718H1450020-06

ABS Unit Diagram

B718H14502002

Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.



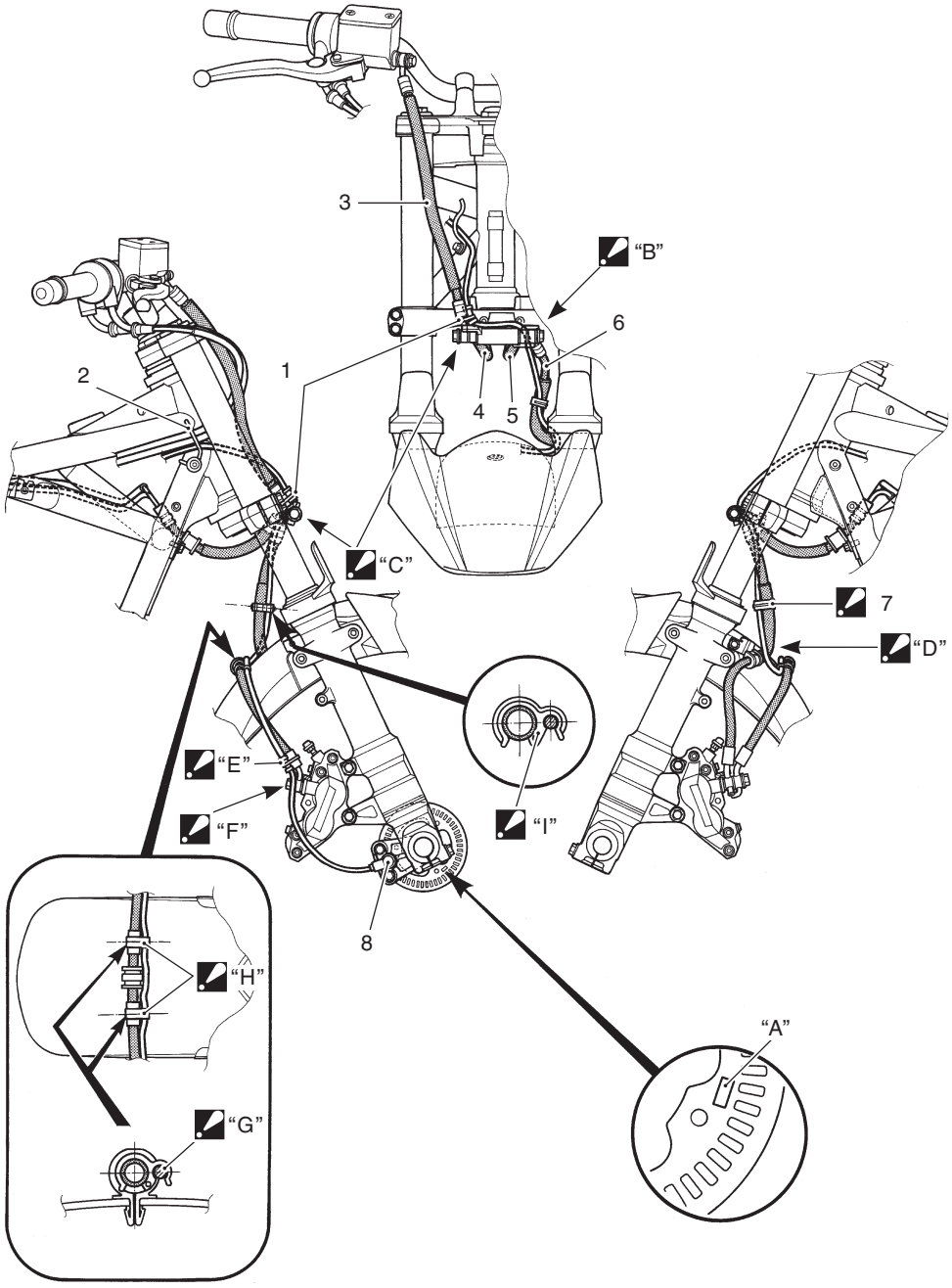
I718H1450021-04

“A”: Rear brake solenoid OUT	“C”: Front brake solenoid OUT	“E”: Fail safe (+) B	“G”: Motor (+) B
“B”: Rear brake solenoid IN	“D”: Front brake solenoid IN	“F”: Motor relay (+) B	

Front Wheel Speed Sensor Routing Diagram

B718H14502003

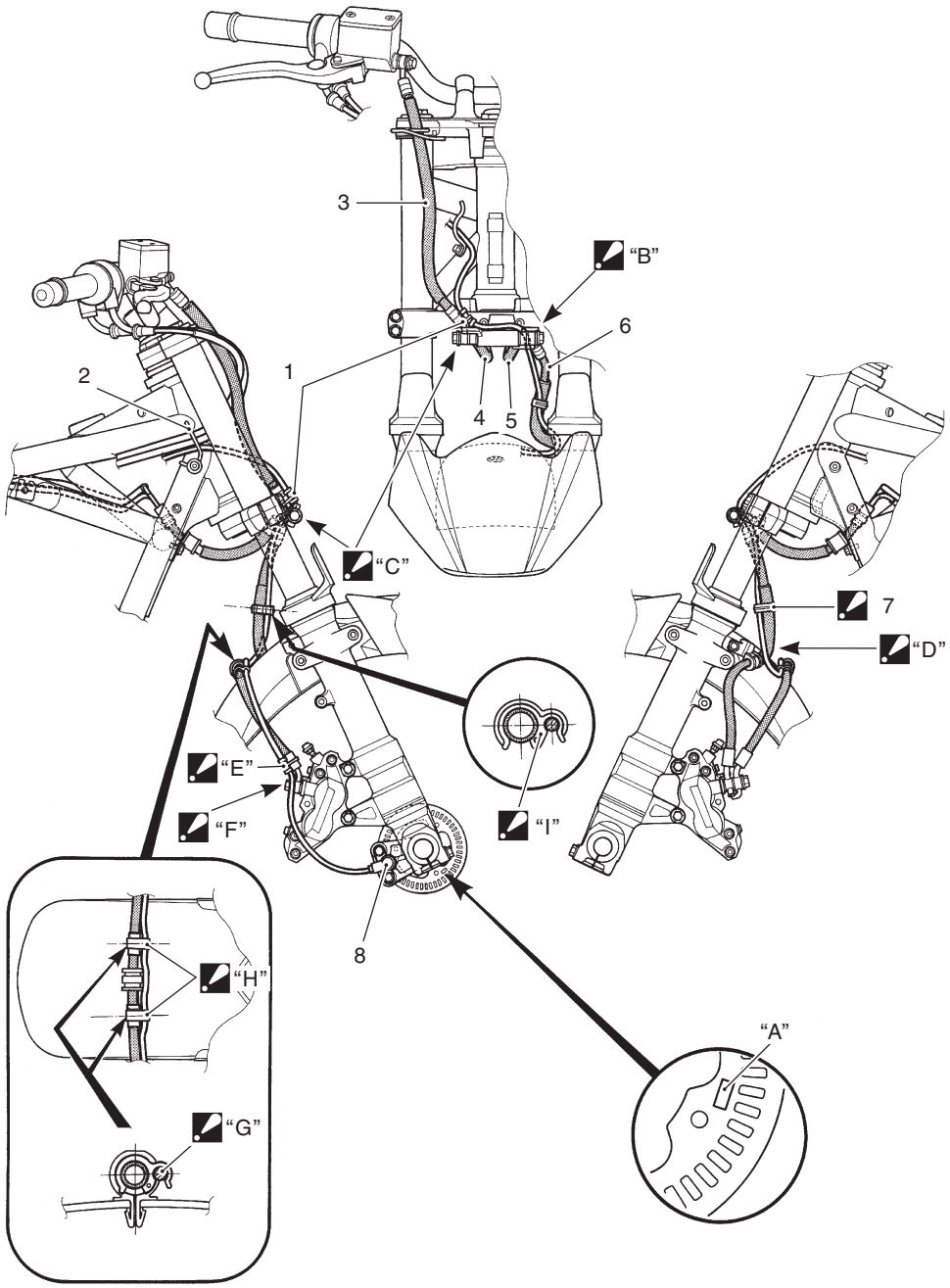
GSF1250A



I718H1450022-03

1. Clamp	7: Clamp : Clamp the sensor lead wire at the white marking.	"E": Clamp the sensor lead wire sleeve with the brake hose.
2. Guide	8. Front wheel speed sensor	"F": Pass through the sensor lead wire outside of the brake hose union bolt.
3. Front brake hose No.1	"A": Outside mark	"G": Clamp the sensor lead wire at front side of the brake hose. Make clearance from the front fender.
4. Front brake hose No.1 (L)	"B": Pass through the sensor lead wire between brake hose No.2 and brake hose No.2 (L).	"H": Clamp the sensor lead wire on the protector of brake hose.
5. Front brake hose No.2	"C": Pass through the sensor lead wire in front of the brake hose.	"I": Clamp the sensor lead wire at front side of the brake hose.
6. Front brake hose No.2 (L)	"D": Pass through the sensor lead wire outside of the brake hose.	

GSF1250SA

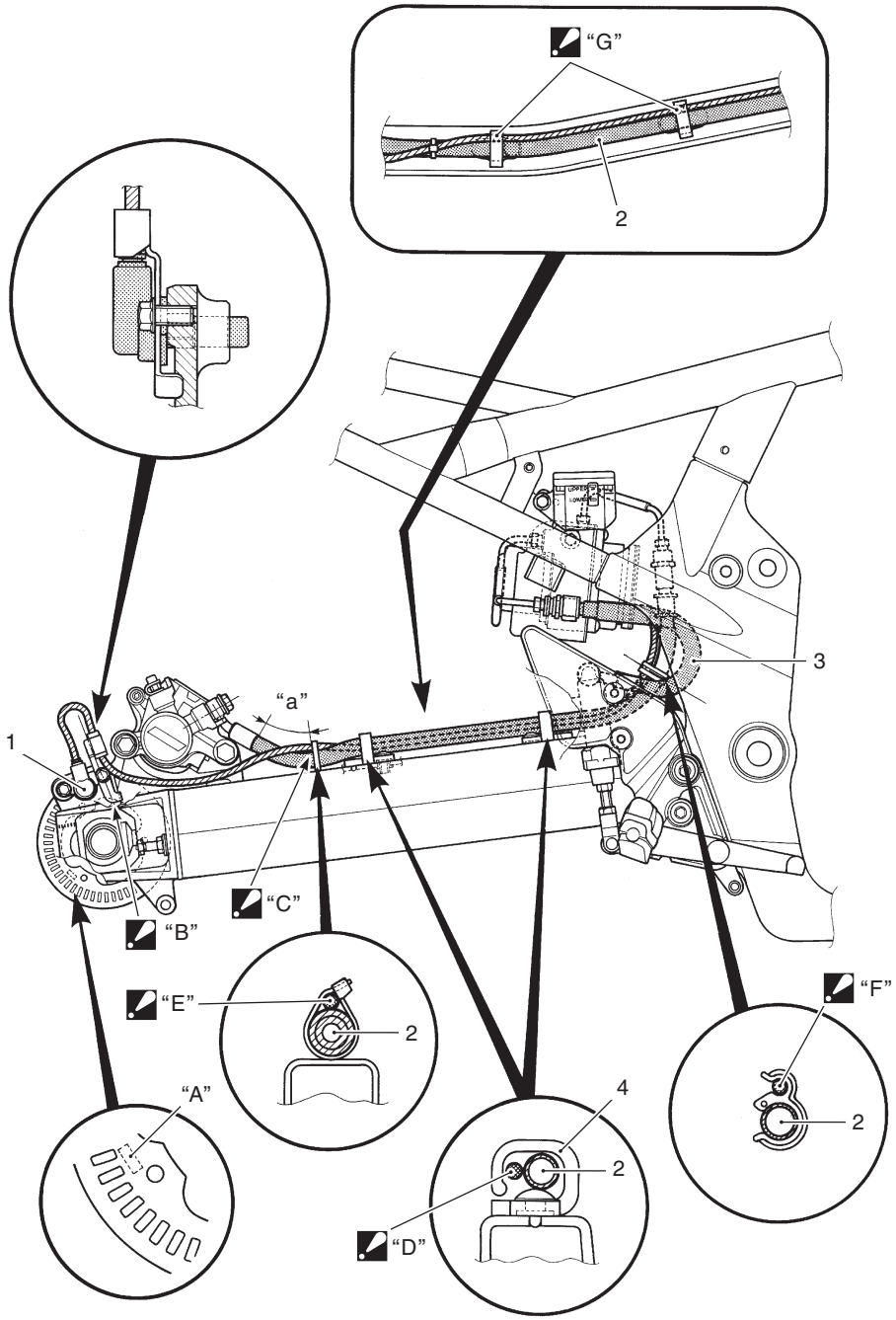


I718H1450023-03

1. Clamp	7: Clamp : Clamp the sensor lead wire at the white marking.	"E": Clamp the sensor lead wire sleeve with the brake hose.
2. Guide	8. Front wheel speed sensor	"F": Pass through the sensor lead wire outside of the brake hose union bolt.
3. Front brake hose No.1	"A": Outside mark	"G": Clamp the sensor lead wire at front side of the brake hose. Make clearance from the front fender.
4. Front brake hose No.1 (L)	"B": Pass through the sensor lead wire between brake hose No.2 and brake hose No.2 (L).	"H": Clamp the sensor lead wire on the protector of brake hose.
5. Front brake hose No.2	"C": Pass through the sensor lead wire in front of the brake hose.	"I": Clamp the sensor lead wire at front side of the brake hose.
6. Front brake hose No.2 (L)	"D": Pass through the sensor lead wire outside of the brake hose.	

Rear Wheel Speed Sensor Routing Diagram

B718H14502004



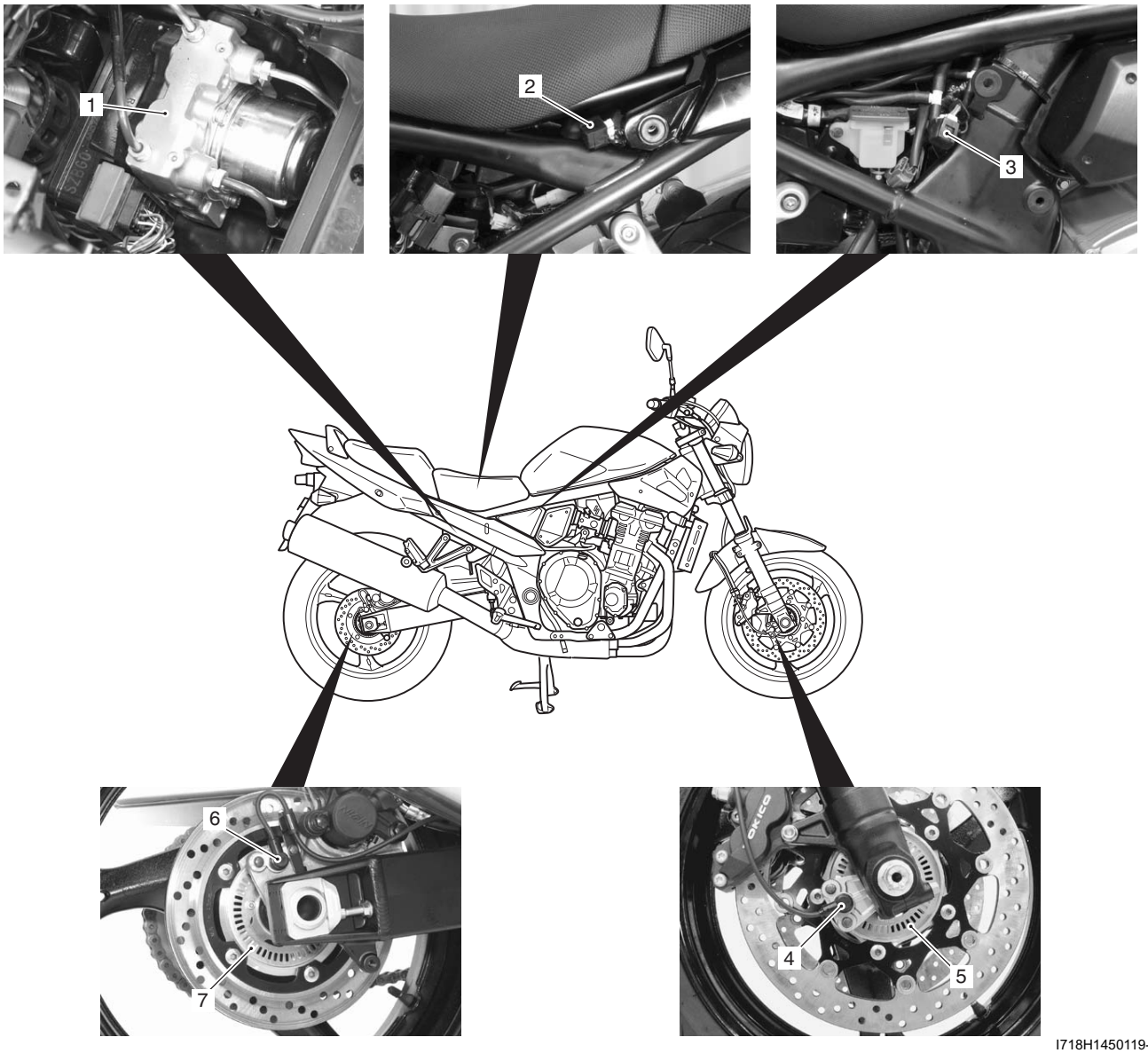
I718H1450118-03

1. Rear wheel speed sensor	"A": Outside mark	"E": Pass through the sensor lead wire on the brake hose.
2. Brake hose No.2	"B": After the clamp has contacted to the stopper, tighten the bolt.	"F": Clamp the sensor lead wire upper side of brake hose.
3. Brake hose No.1	"C": Clamp sensor lead wire with white tape matched green paint of brake hose.	"G": Pass through the sensor lead wire inside of the brake hose.
4. Brake hose guide	"D": Pass through the sensor lead wire inside of the brake hose guide.	"a": 35 mm (1.4 in)

Component Location

ABS Components Location

B718H14503001



I718H1450119-02

1. ABS control unit/HU	4. Front wheel speed sensor	7. Rear wheel speed sensor rotor
2. Mode selection coupler	5. Front wheel speed sensor rotor	
3. SDS coupler	6. Rear wheel speed sensor	

Diagnostic Information and Procedures

ABS Troubleshooting

B718H14504001

Many of the ABS malfunction diagnosing operations are performed by checking the wiring continuity. Quick and accurate detection of malfunctions within the complex circuitry assures the proper operation of the ABS. Before beginning any repairs, thoroughly read and understand this Supplementary Service Manual.
The ABS is equipped with a self-diagnosis function. The detected malfunction is stored as a diagnostic trouble code which causes the ABS indicator light to light up or flash in set patterns to indicate the malfunction. Diagnostic trouble codes are stored even when the ignition switch is turned to OFF and they can only be erased manually. In order to repair the ABS correctly, ask the customer for the exact circumstances under which the malfunction occurred, then check the ABS indicator light and the output diagnostic trouble codes. Explain to the customer that depending on how the motorcycle is operated (e.g., if the front wheel is off the ground), the ABS indicator light may light up even though the ABS is operating correctly.

Troubleshooting Procedure

Troubleshooting should be proceed as follows. If the order is performed incorrectly or any part is omitted, an error in misdiagnosis may result.

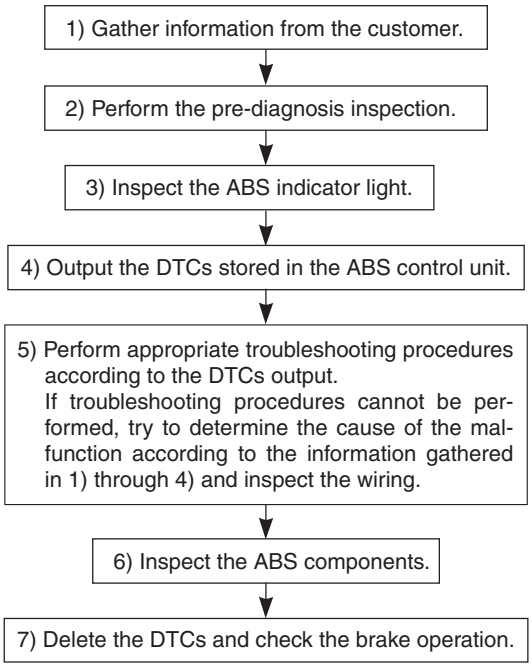
1) Gather information from the customer.
2) Perform the pre-diagnosis inspection. Refer to “Pre-diagnosis Inspection (Page 4E-15)”.
3) Inspect the ABS indicator light. Refer to “ABS Indicator Light Inspection (Page 4E-17)”.
4) Output the DTCs stored in the ABS control unit. Refer to “DTC (Diagnostic Trouble Code) Output (Page 4E-23)”.
5) Perform appropriate troubleshooting procedures according to the DTCs output. Refer to “DTC Table (Page 4E-34)”.
   If troubleshooting procedures cannot be performed, try to determine the cause of the malfunction according to the information gathered in 1) through 4) and inspect the wiring. Refer to “ABS Wiring Diagram (Page 4E-7)” and “ABS Unit Diagram (Page 4E-8)”.

⚠ CAUTION

- **When disconnecting couplers and turning the ignition switch ON, disconnect the ABS control unit coupler in order to prevent a DTC from being stored.**
- **Each time a resistance is measured, the ignition switch should be set to OFF.**

6) Inspect the ABS components. Refer to “Wheel Speed Sensor and Sensor Rotor Inspection (Page 4E-74)”.
7) Delete the DTCs and check the brake operation. Refer to “DTC (Diagnostic Trouble Code) Deleting (Page 4E-25)”.

Basic Troubleshooting Diagram



I718H1450120-01

Information Gathering

To properly diagnose a malfunction, one must not make guesses or assumptions about the circumstances that caused it. Proper diagnosis and repair require duplicating the situation in which the malfunction occurred. If a diagnosis is made without duplicating the malfunction, even an experienced service technician may make a misdiagnosis and not perform the servicing procedure correctly, resulting in the malfunction not being repaired. For example, a malfunction that occurs only while braking on slippery surfaces will not occur if the motorcycle is ridden on a non-slippery surface. Therefore, in order to properly diagnose and repair the motorcycle, the customer must be questioned about the conditions at the time that the malfunction occurred making “Information gathering” very important. In order that the information obtained from the customer to be used as a reference during troubleshooting, it is necessary to ask certain important questions concerning the malfunction. Therefore, a questionnaire has been created to improve the information-gathering procedure.

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

User name:	Model:	VIN:	Date of issue:
Date Reg.	Date of problem:	Mileage:	

PROBLEM SYMPTOMS	
ABS operation	Past malfunctions and repairs
ABS does not work	
ABS works so often with	
Too long stopping distance	
Other	

CONDITION WHEN MALFUNCTION OCCURED	
ABS indicator light	Riding conditions
Does not light up	While stopping
Lights up	Over 10 km/h
Goes off after running over 10 km/h: Yes / No	When turning
Flashes	Others
Tires	Brake operating conditions
Abnormal air pressure	Usual braking
Less thread depth	Quick/hard braking
No specified tires installed	
	Interface
Road surface	Too big pulsations at brake levers
Paved road:	Too large brake lever strokes
Dry / Wet / Others	Others
Unpaved road:	
Gravel / Muddy / Uneven / Others	Others
	Abnormal noise from the ABS control unit/HU
	Skid noise from the calipers
	Vibration at the brake levers
NOTE:	

NOTE

This form is a standard sample. The form should be modified according to conditions and characteristic of each market.

Pre-diagnosis Inspection

B718H14504019

The mechanical and hydraulic components of the brake system should be inspected prior to performing any electrical checks. These inspections may find problems that the ABS could not detect; thus, shortening repair time.

Brake

Brake fluid level check
Refer to “Brake System Inspection in Section 0B (Page 0B-17)”.

Brake pad inspection
Refer to “Brake System Inspection in Section 0B (Page 0B-17)”.

Brake fluid circuit air bleeding
Refer to “Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-8)”.

Tire

Tire type

Tire type
Front: DUNLOP D218FT
Rear: DUNLOP D218N

Tire pressure
Refer to “Tire Inspection in Section 0B (Page 0B-19)”.

⚠ CAUTION

- **The standard tire fitted on this motorcycle is 120/70ZR17M/C (58W) for front and 180/55ZR17M/C (73W) for rear. The use of tires other than those specified may cause instability. It is highly recommended to use a SUZUKI Genuine Tire.**
- **Replace the tire as a set, otherwise the DTC “25” (C1625) may be stored.**

Wheel
Refer to “Front Wheel Related Parts Inspection in Section 2D (Page 2D-8)” and “Rear Wheel Related Parts Inspection in Section 2D (Page 2D-17)”.

Battery

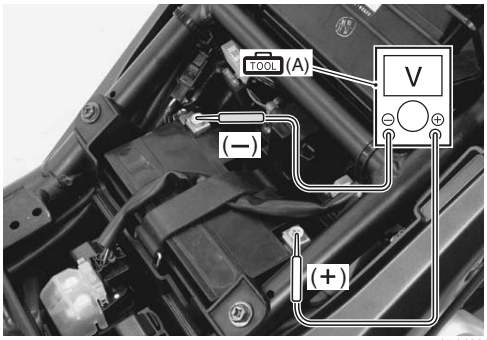
Battery voltage inspection

1) Turn the ignition switch OFF.
2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Measure the voltage between the (+) and (–) battery terminals using the multi-circuit tester.
   If the voltage is less than 12.0 V, charge or replace the battery and inspect the charging system. Refer to “Battery Runs Down Quickly in Section 1J (Page 1J-2)”.

   Special tool
   TOOL (A): 09900–25008 (Multi-circuit tester set)

   Tester knob indication
   Voltage (⎓)

   Battery voltage
   12.0 V and more



I718H1450123-01

4) Reinstall the seat.

ABS Component

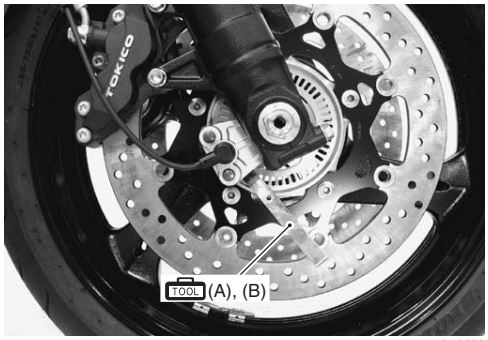
Wheel speed sensor – sensor rotor clearance inspection

Inspect the clearance between the wheel speed sensor and sensor rotor for each wheel using the thickness gauge.

Special tool
(A): 09900–20803 (Thickness gauge)
(B): 09900–20806 (Thickness gauge)

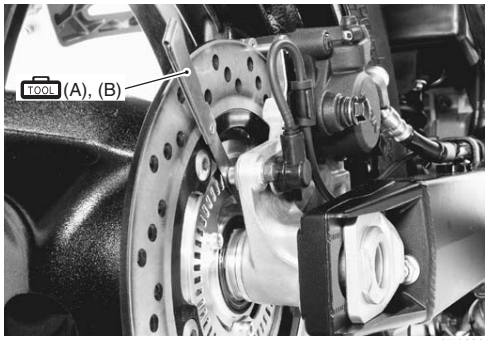
Wheel speed sensor – Sensor rotor clearance
0.3 – 1.5 mm (0.012 – 0.059 in)

Front



I718H1450025-01

Rear



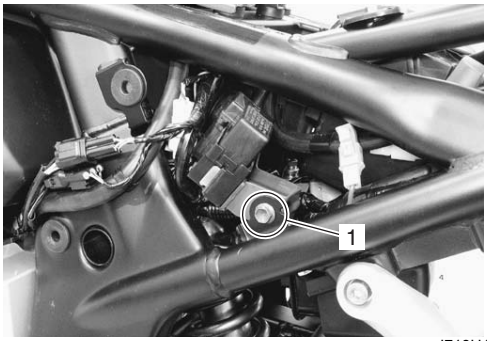
I718H1450026-01

ABS control unit/HU ground wire inspection

1) Turn the ignition switch OFF.
2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Disconnect the battery (–) lead wire.

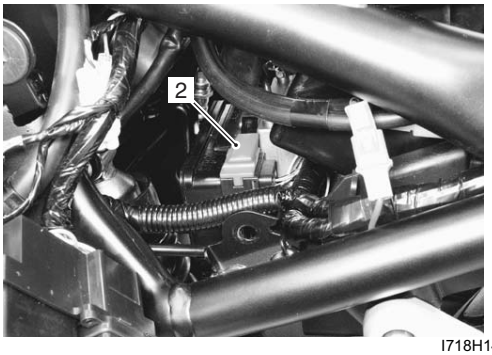
I718H1450124-01

4) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
5) Remove the fuse box mounting bolt (1).



I718H1450028-01

6) Disconnect the ABS control unit coupler (2).



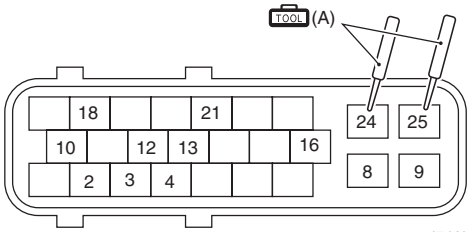
I718H1450115-01

7) Check for continuity between “24” (B/W) at the coupler and the battery (–) terminal, also “25” (B/W) at the coupler and the battery (–) terminal.

Special tool
(A): 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

ABS control unit coupler (Harness end)



I718H1450030-03

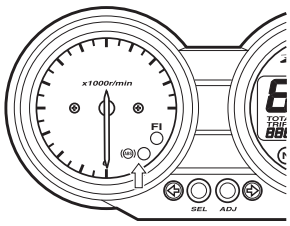
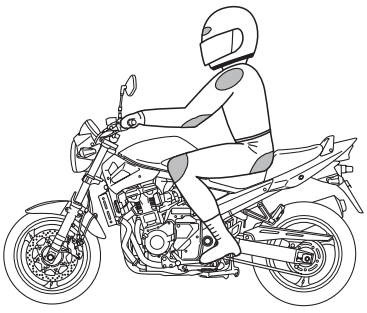
I718H1450125-01

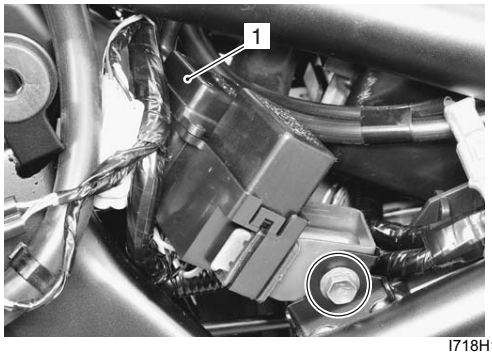
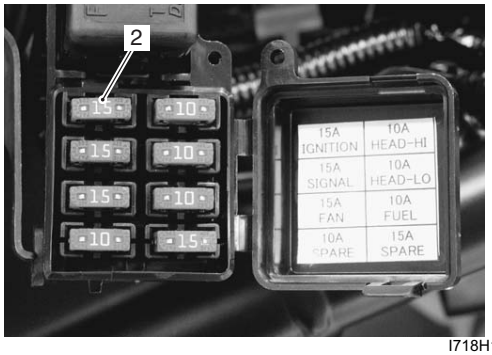
ABS Indicator Light Inspection

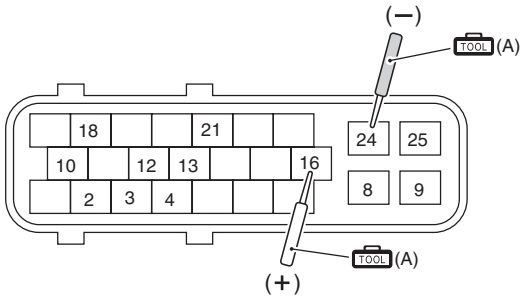
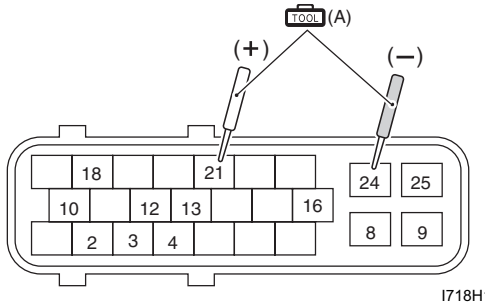
B718H14504020

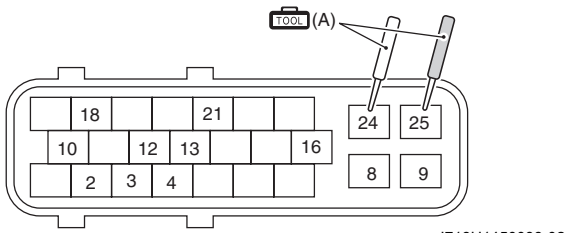
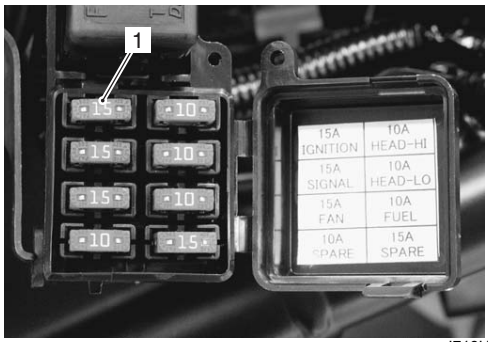
Wiring Diagram
Refer to “ABS Unit Diagram (Page 4E-8)”.

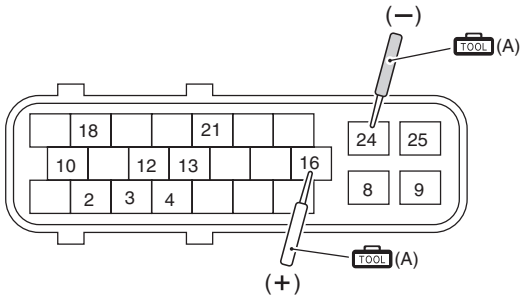
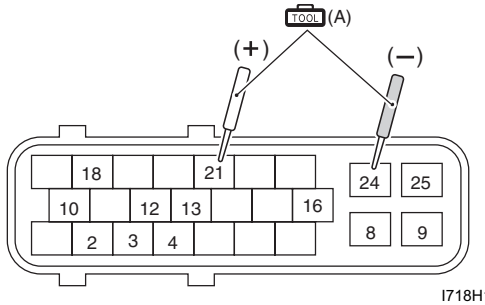
Troubleshooting

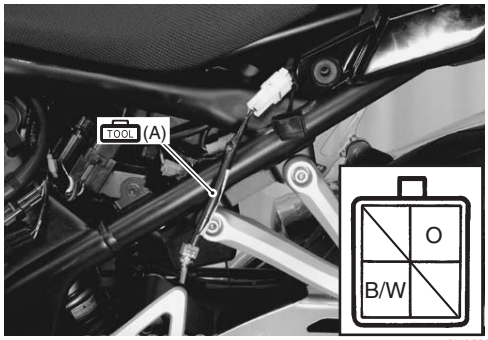
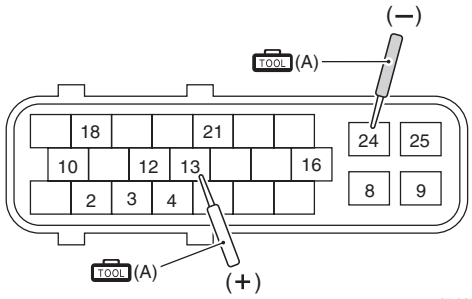
Step	Action	Yes	No
1	1) Check if the ABS indicator light lights up when turning the ignition switch ON.  I718H1450122-04 *Does the ABS indicator light up?*	Go to Step 2.	Go to Step 3.
2	**(The ABS indicator light lights up)** 1) Ride the motorcycle at more than 10 km/h (6.2 mile/h).  I718H1450033-02 *Does the ABS indicator light go off?*	Normal (No DTC exists)	• DTC output (Refer to “DTC (Diagnostic Trouble Code) Output (Page 4E-23)”) • If DTC can not be output (the ABS indicator light does not flash), go to Step 7.

Step	Action	Yes	No
3	**(The ABS indicator light does not light up)** 1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 2) Remove the fuse box (1) by removing the mounting bolt.  I718H1450034-01 3) Open the fuse box and inspect the ignition fuse (2). **⚠ CAUTION** **If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.** **Ignition fuse** **15 A**  I718H1450035-01 *Is the ignition fuse OK?*	Go to Step 4.	Replace the ignition fuse.

Step	Action	Yes	No
4	1) Turn the ignition switch OFF. 2) Disconnect the ABS control unit coupler. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 3) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between “16” (O/Y) and “24” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value (“16” – “24”)** **Battery voltage (12.0 V and more)** **ABS control unit coupler (Harness end)**  I718H1450036-04 *Is the voltage between “16” and “24” normal?*	Go to Step 5.	Inspect the wire harness. (Faulty ignition or ground wire)
5	1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between “21” (Brown) and “24” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value (“21” – “24”)** **7.0 V and more** **ABS control unit coupler (Harness end)**  I718H1450037-02 *Is the voltage between “21” and “24” normal?*	Go to Step 6.	• Inspect the wire harness. (Faulty indicator light wire) • Signal fuse or indicator light is blown.

Step	Action	Yes	No
6	1) Turn the ignition switch OFF. 2) Check for continuity between “24” (B/W) at the coupler and body ground, also “25” (B/W) at the coupler and body ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))** **ABS control unit coupler (Harness end)**  I718H1450038-02 *Are there continuity between “24”, “25” and body ground?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty ground wire)
7	**(The ABS indicator light does not go off)** 1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 4) Open the fuse box and inspect the ignition fuse (1). **⚠ CAUTION** **If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.** **Ignition fuse** **15 A**  I718H1450039-01 *Is the ignition fuse OK?*	Go to Step 8.	Replace the ignition fuse.

Step	Action	Yes	No
8	1) Turn the ignition switch OFF. 2) Disconnect the ABS control unit coupler. Refer to "ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)" 3) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "16" (O/Y) and "24" (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value ("16" – "24")** **Battery voltage (12.0 V and more)** **ABS control unit coupler (Harness end)**  I718H1450036-04 *Is the voltage between "16" and "24" normal?*	Go to Step 9.	Inspect the wire harness. (Faulty ignition or ground wire)
9	1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "21" (Brown) and "24" (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value ("21" – "24")** **7.0 V and more** **ABS control unit coupler (Harness end)**  I718H1450037-02 *Is the voltage between "21" and "24" normal?*	Go to Step 10.	Inspect the wire harness. (Faulty indicator light wire)

Step	Action	Yes	No
10	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Short the mode select coupler terminals (O – B/W) using the special tool. **Special tool** **TOOL (A): 09930–82710 (Mode select switch)**  I718H1450042-03 4) Check for continuity between “13” (O) and “24” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))** **ABS control unit coupler (Harness end)**  I718H1450043-02 *Is there continuity between “13” and “24”?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty mode select switch wire)

DTC (Diagnostic Trouble Code) Output

B718H14504021

NOTE

- **Even through the ABS is operating correctly, a DTC is memorized in any of the following conditions.**
  - **– If the motorcycle is put on its centerstand, the engine is started and only the rear wheel is rotated.**
  - **– Previous malfunctions were repaired, but the DTCs were not deleted.**
- **After carrying out DTC deleting and ABS operation check, explain to the customer that the ABS is operating correctly. Refer to "DTC (Diagnostic Trouble Code) Deleting (Page 4E-25)".**

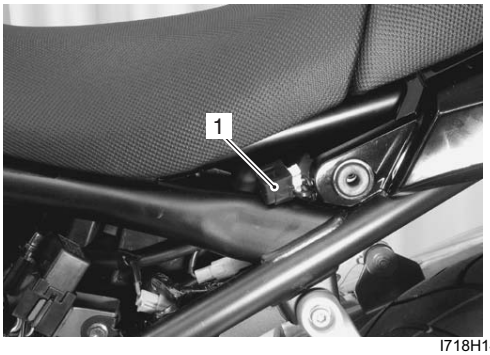
Use of Mode Select Switch

Connect the special tool to the mode select coupler to output the memorized DTCs on the ABS indicator light.

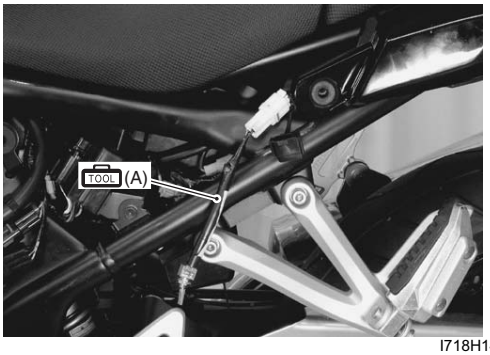
1) Turn the ignition switch OFF.
2) Remove the left frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
3) Connect the special tool to the mode select coupler (1) (O – B/W).

Special tool

TOOL (A): 09930–82710 (Mode select switch)



I718H1450044-02



I718H1450045-02

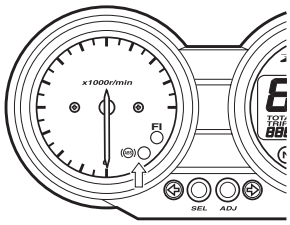
4) Switch the special tool to ON.

I718H1450040-02

5) Turn the ignition switch ON.
The ABS indicator light starts flashing to indicate the DTC. Refer to "DTC Table (Page 4E-34)".

NOTE

- **If there is a DTC, the ABS indicator light keeps flashing cyclically and repeatedly.**
- **If there is no DTC, the ABS indicator light keeps lighting on.**
- **If the DTCs are to be output for a long time, remove the HEAD-LO fuse in order to prevent the battery from discharging.**



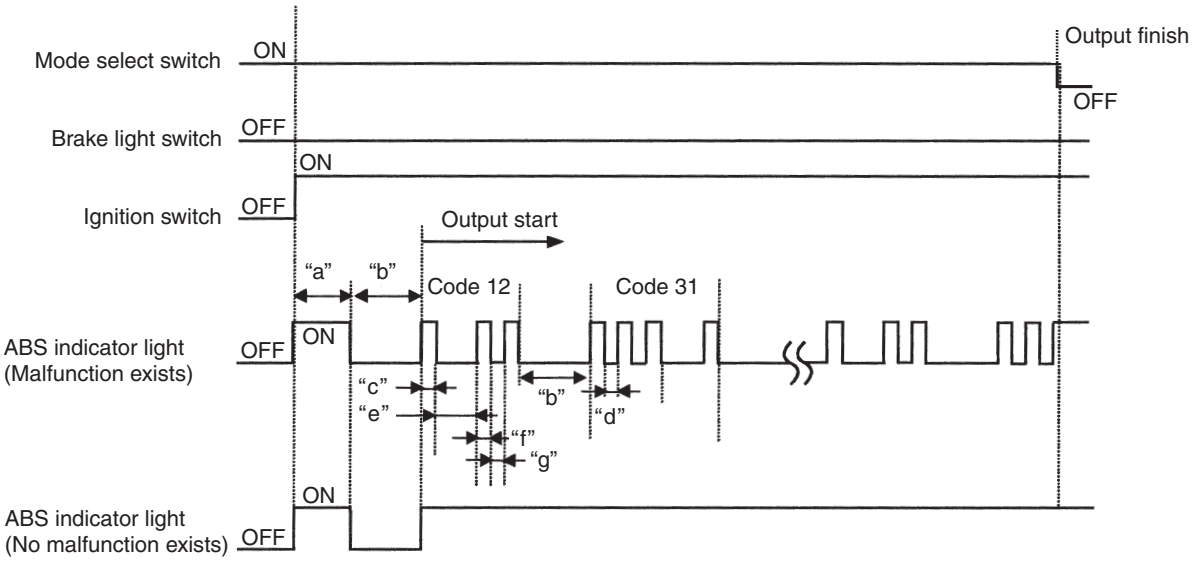
I718H1450122-04

6) Turn the ignition switch OFF and disconnect the special tool.

Understanding the DTC (Diagnostic Trouble Code)

A two-digit DTC is shown through the flashing pattern of the ABS indicator light. A number between 1 and 9 is represented by the number of times that the ABS indicator light lights up in interval of 0.4 seconds and the separation between the tens and ones are indicated by the light staying off for 1.6 seconds. In addition, the separation between the start code and the DTC is indicated by the light being off for 3.6 seconds. After the start code is displayed, DTCs appear from the smallest number code.

If no DTCs are memorized, the ABS indicator light keeps lighting up.



I718H1450046-03

"a": Initial minimum light ON time (About 2 seconds)	"e": Main-sub code interval (1.6 seconds)
"b": Error code interval (About 3.6 seconds)	"f": Sub code light ON time (0.4 seconds)
"c": Main code light ON time (0.4 seconds)	"g": Sub code light OFF time (0.4 seconds)
"d": Main code light OFF time (0.4 seconds)	

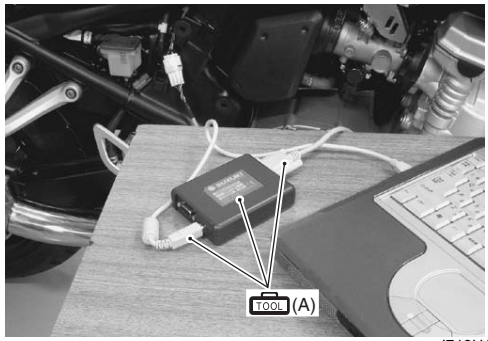
Use of SDS

NOTE

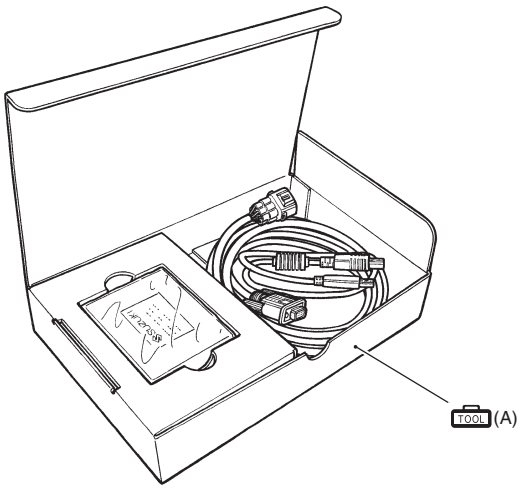
- **Don't disconnect couplers from ABS HU, the battery cable from the battery, ABS HU ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ABS HU memory.**
- **DTC stored in ABS HU memory can be checked by the SDS.**

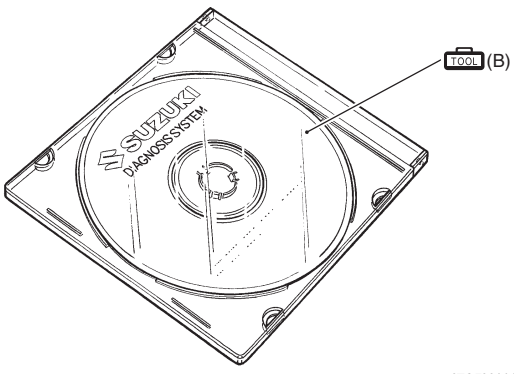
1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

Special tool
TOOL (A): 09904–41010 (SDS set)
TOOL (B): 99565–01010–010 (CD-ROM Ver.10)



I718H1450047-01





I705H1110116-03

3) Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.

NOTE

- **Not only is SDS used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.**
- **How to use trigger. (Refer to the SDS operation manual for further details.)**

4) Close the SDS tool and turn the ignition switch OFF.

DTC (Diagnostic Trouble Code) Deleting

B718H14504022

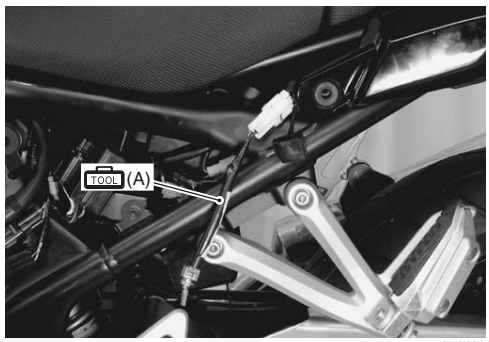
Use of Mode Select Switch

1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

I718H1450049-02

2) Connect the special tool to the mode select coupler (O – B/W) and output the DTCs.

Special tool
TOOL (A): 09930–82710 (Mode select switch)



I718H1450045-02

3) While the DTCs are being output, set the special tool to OFF.

⚠ CAUTION

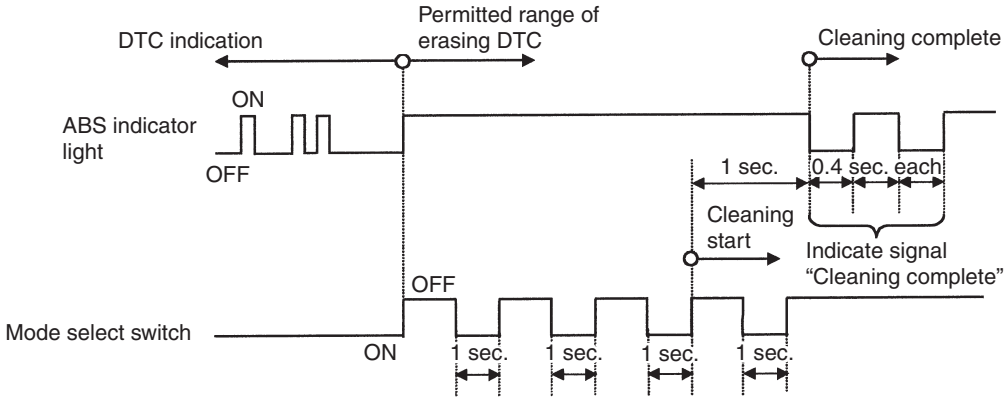
The DTC deletion mode starts 12.5 seconds after the switch is set to OFF.

I718H1450050-01

4) In the DTC deletion mode, switch the ABS test switch from OFF to ON three times, each time leaving it at ON for more than 1 second.

I718H1450051-01

DTC Deleting Diagram



I718H1450052-01

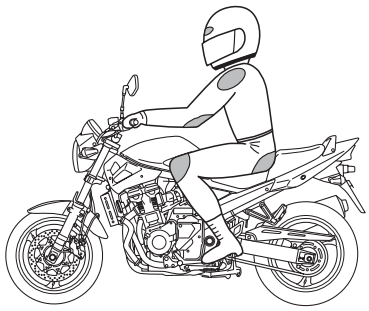
5) After deleting the DTCs, repeat the code output procedure and make sure that no DTCs remain (the ABS indicator light no longer flashes).

NOTE

If any DTCs remain, perform the appropriate procedures, then delete the codes. If DTCs are left stored, confusion may occur and unnecessary repairs may be made.

6) Disconnect the mode select switch and install the left frame cover.

7) Afterwards, ride the motorcycle at more than 30 km/h (18.6 mile/h) and quickly apply the brakes to check that the ABS activates correctly.



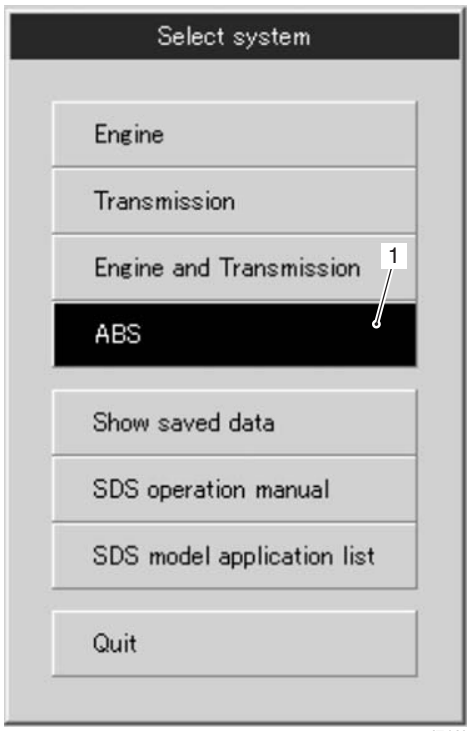
I718H1450053-01

Use of SDS

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) After repairing the trouble, turn OFF the ignition switch and turn ON again.
3) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

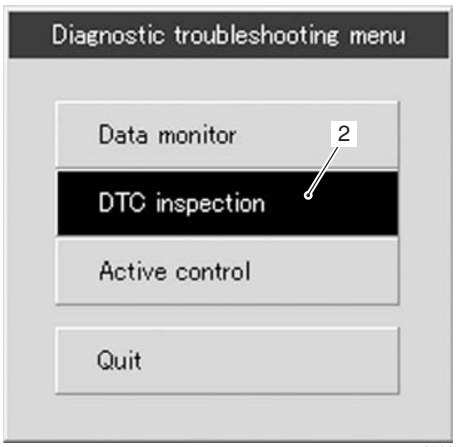
   Special tool
   TOOL : 09904–41010 (SDS set)
   TOOL : 99565–01010–010 (CD-ROM Ver.10)

4) Click the ABS button (1).



I718H1450054-01

5) Click the “DTC inspection” button (2).



I718H1450055-01

6) Check the DTC.

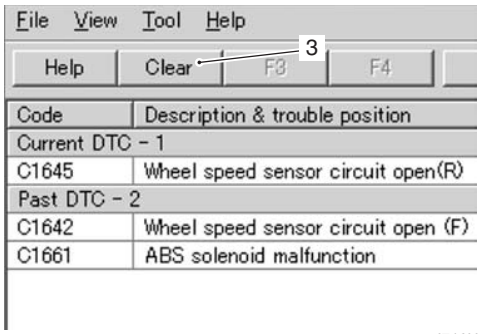
NOTE

The previous malfunction history code (Past DTC) still remains stored in the ABS HU. Therefore, erase the history code memorized in the ABS HU using SDS tool.

7) Click “Clear” (3) to delete history code (Past DTC).

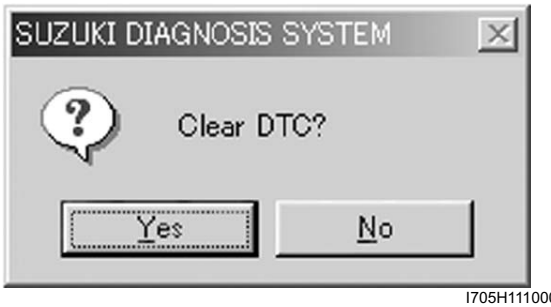
NOTE

The DTC is memorized in the ABS HU also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.



I718H1450056-01

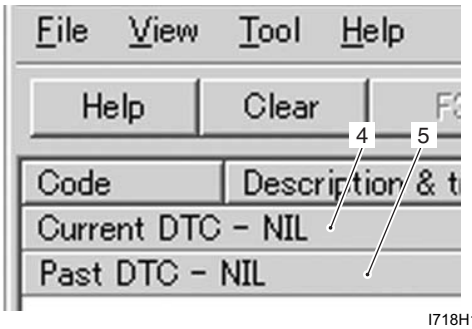
8) Follow the displayed instructions.



I705H1110006-01

I705H1110009-01

9) Check that both “Current DTC” (4) and “Past DTC” (5) are deleted (NIL).

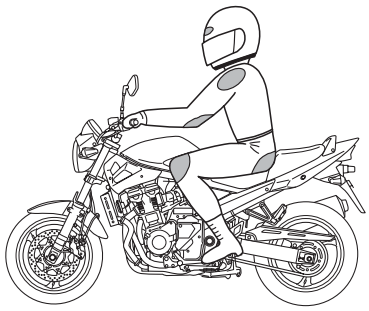


I718H1450057-01

10) Close the SDS tool and turn the ignition switch OFF.

11) Disconnect the SDS tool and install the left frame cover.

12) Ride the motorcycle at more than 30 km/h (18.6 mile/h) and quickly apply the brakes to check that the ABS activates correctly.



I718H1450053-01

SDS Check

B718H14504023

Using SDS, take the sample of data from the new motorcycle and at the time of periodic maintenance at your dealer. Save the data in the computer or by printing and filing the hard copies. The saved or filed data are useful for troubleshooting as they can be compared periodically with changes over time or failure conditions of the motorcycle. For example, when a motorcycle is brought in for service but the troubleshooting is difficult, comparison with the normal data that have been saved or filed can allow the specific ABS failure to be determined.

1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Set up the SDS tool. (Refer to “SDS operation manual for further details.)

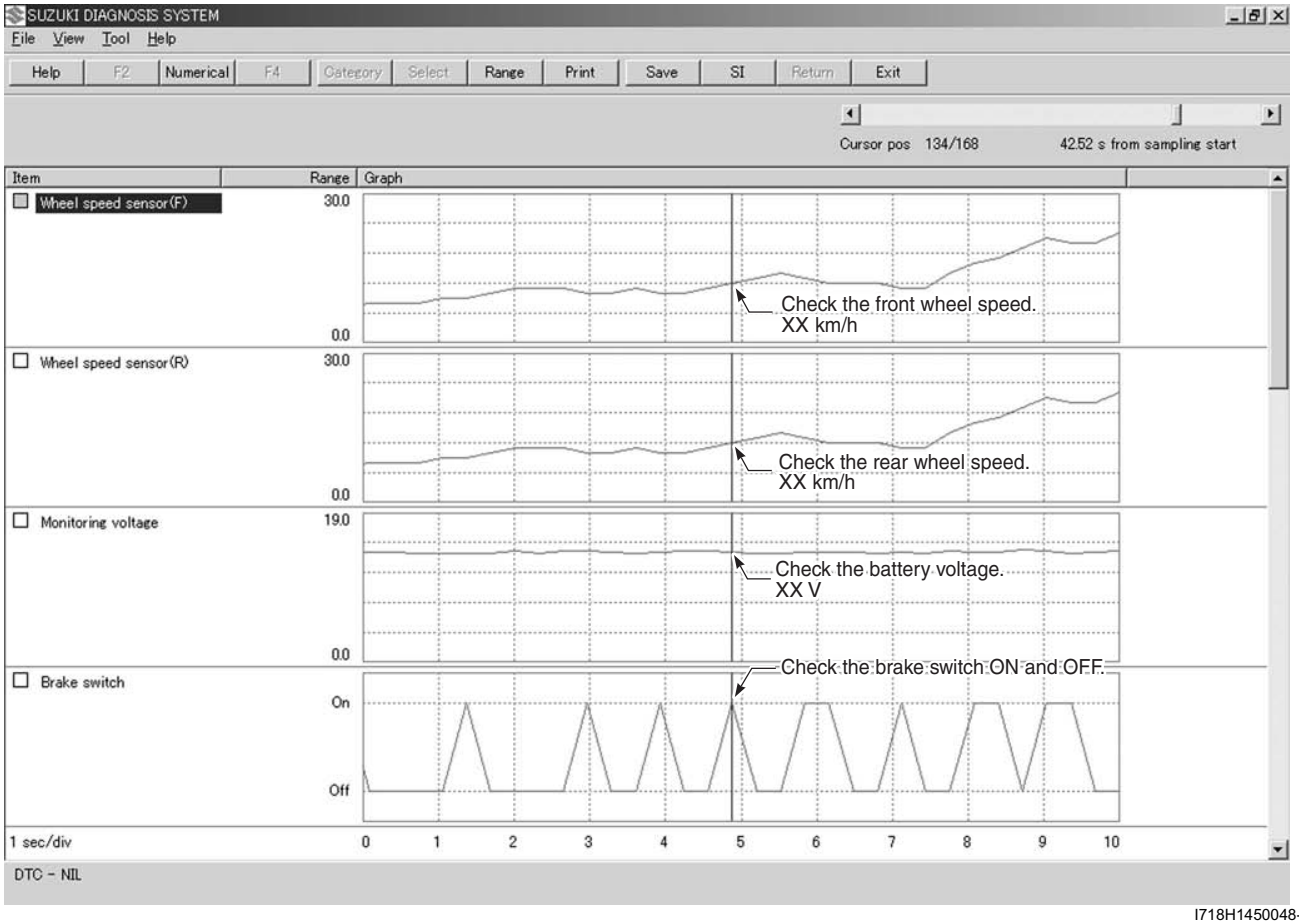
NOTE

- **Before taking the sample of data, check and clear the Past DTC. Refer to “DTC (Diagnostic Trouble Code) Deleting (Page 4E-25)”.**
- **A number of different data under a fixed condition as shown should be saved or filed as sample.**

Special tool

TOOL : 09904–41010 (SDS set)
TOOL : 99565–01010–010 (CD-ROM Ver.10)

DATA sampled from ABS HU system

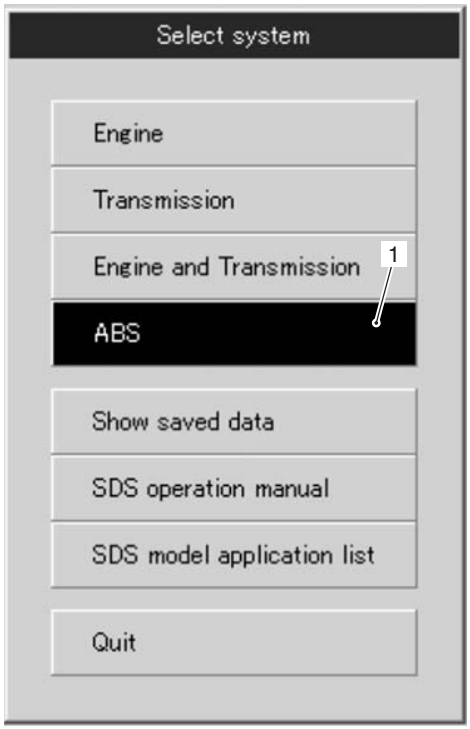


I718H1450048-03

Active Control Inspection

B718H14504024

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
3) Click “ABS” (1).

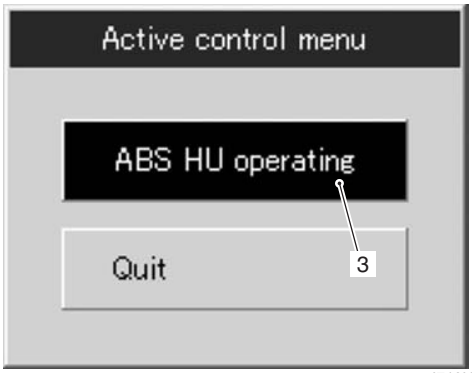


I718H1450054-01

4) Click “Active control” (2).

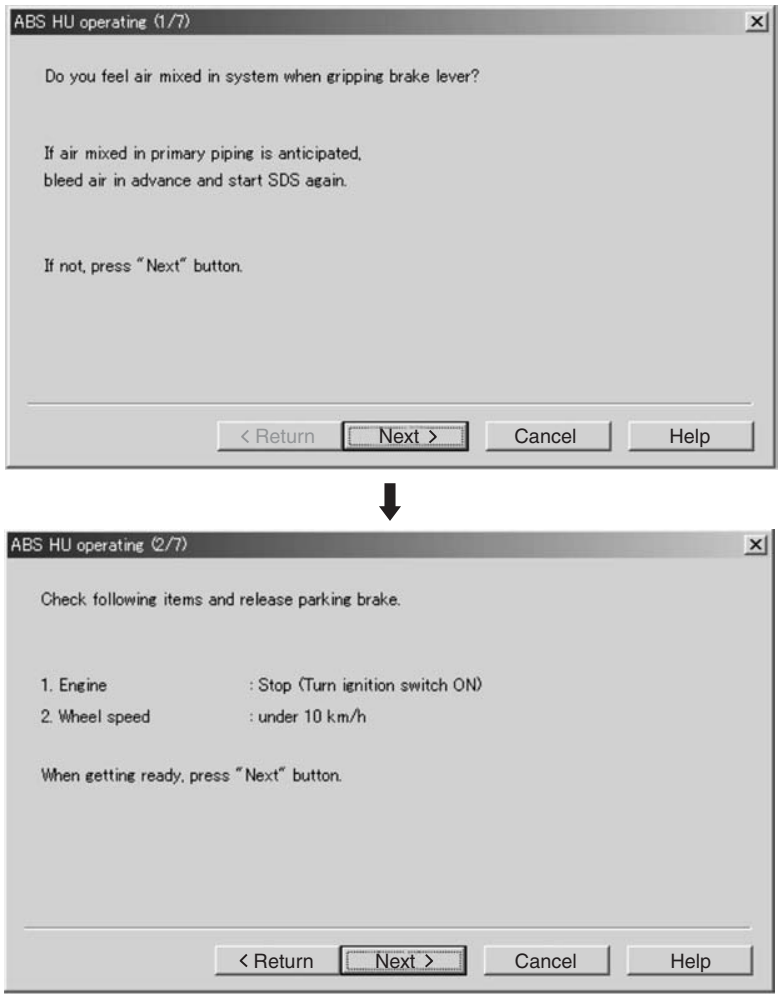
I718H1450058-01

5) Click “ABS HU operating” (3).



I718H1450059-01

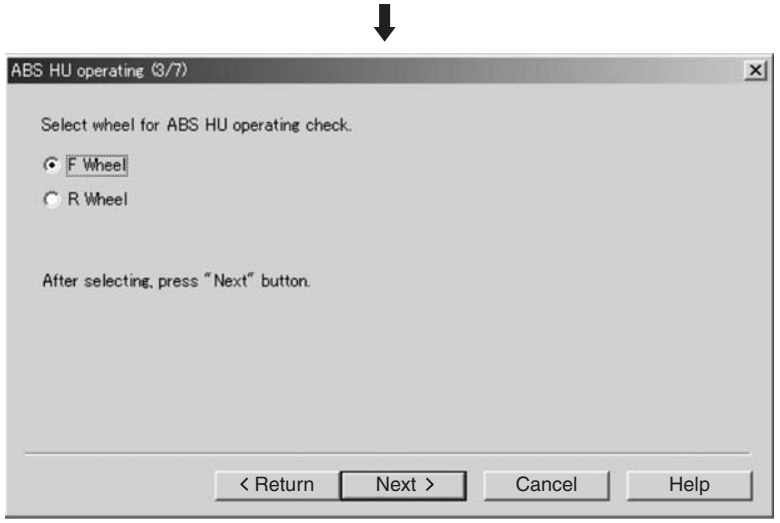
6) Click “Next” according to the screen indication.



I718H1450060-02

NOTE

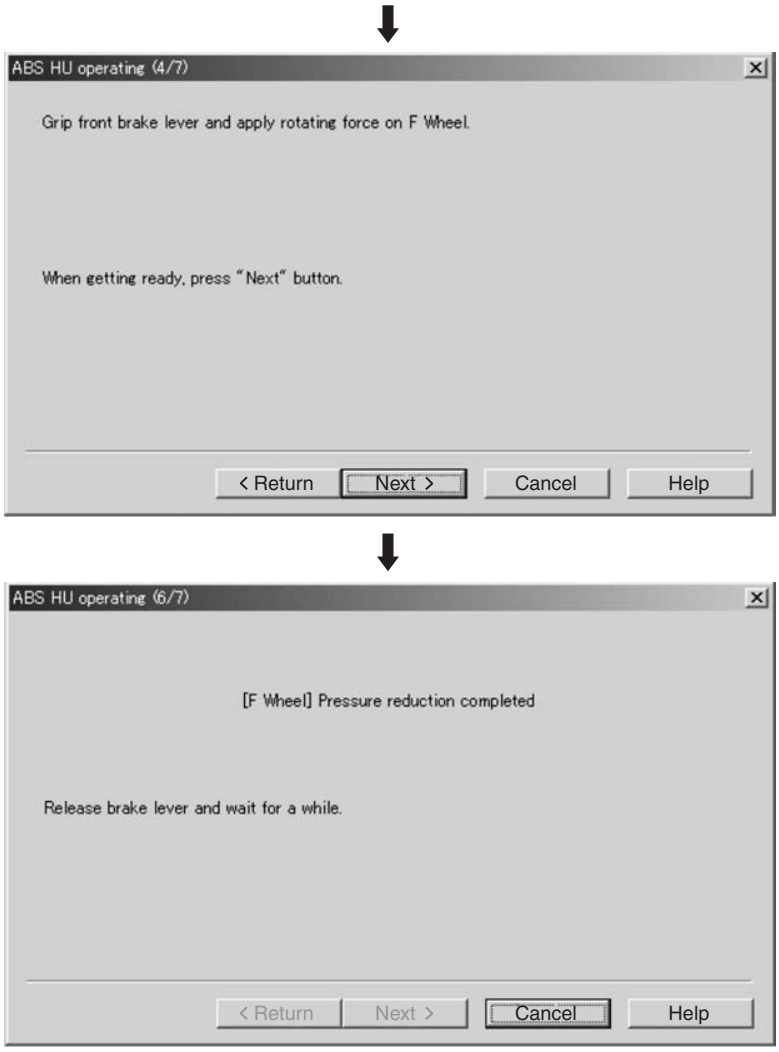
Skip this screen as this vehicle is not equipped with parking brake.



I718H1450121-01

NOTE

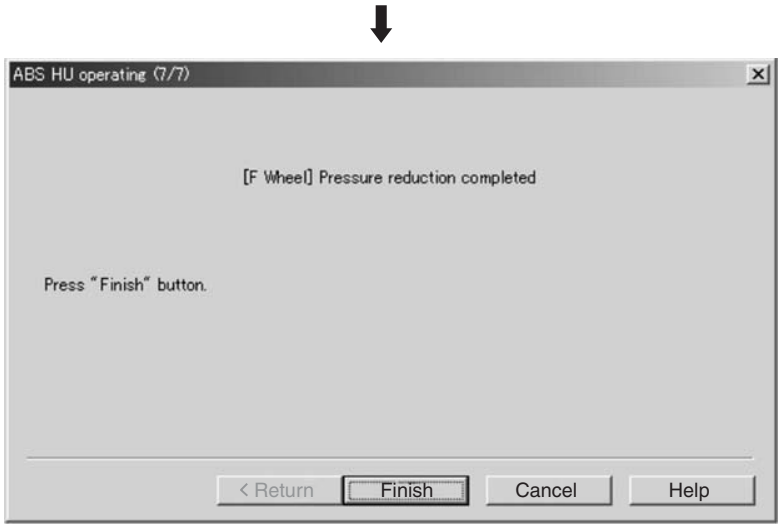
- **If the front wheel is selected, place the motorcycle on the center stand and lift the front wheel off the ground using a jack.**
- **Two operators are needed in this work; One should apply a rotational force to the front wheel.**



I718H1450061-01

NOTE

- **In normal cases, the front brake lever feels a reaction force and the front wheel turns discontinuously. At the same time, the ABS HU operating sound will be heard.**
- **The ABS HU motor operates for 6 seconds and then stops automatically.**



I718H1450062-01

NOTE

- **Inspect the rear brake in the same manner of front brake.**
- **If the ABS does not function, the cause may lie in the ABS control unit/HU.**
- **In checking the rear brake at the time of pressure reduction drive (4/7), "brake lever" appears on the screen. This is because the present screen shares with other model having front brake only. Therefore, in the case of rear brake pedal equipped vehicle, ignore this instruction and operate the rear brake pedal.**

7) Close the SDS tool and turn the ignition switch OFF.
8) Disconnect the SDS tool and install the right frame cover.

DTC Table

B718H14504002

DTC	Malfunction cause	Indicator status	Reference
None	Normal	ON *1	—
13 (C1613)	Wheel speed sensor rotor malfunction (F)	ON	Refer to “DTC “13” (C1613): Wheel Speed Sensor Rotor Malfunction (F) (Page 4E-35)”.
14 (C1614)	Wheel speed sensor rotor malfunction (R)	ON	Refer to “DTC “14” (C1614): Wheel Speed Sensor Rotor Malfunction (R) (Page 4E-37)”.
22 (C1622)	ABS actuator circuit malfunction (F)	ON	Refer to “DTC “22” (C1622): ABS Actuator Circuit Malfunction (F) (Page 4E-39)”.
23 (C1623)	ABS actuator circuit malfunction (R)	ON	Refer to “DTC “23” (C1623): ABS Actuator Circuit Malfunction (R) (Page 4E-41)”.
25 (C1625)	Wheel speed sensor related malfunction	ON	Refer to “DTC “25” (C1625): Wheel Speed Sensor Related Malfunction (Page 4E-43)”.
35 (C1635)	ABS motor malfunction	ON	Refer to “DTC “35” (C1635): ABS Motor Malfunction (Page 4E-45)”.
41 (C1641)	Wheel speed sensor signal malfunction (F) *2	ON	Refer to “DTC “41” (C1641): Wheel Speed Sensor Signal Malfunction (F) (Page 4E-47)”.
42 (C1642)	Wheel speed sensor circuit open (F) *2	ON	Refer to “DTC “42” (C1642): Wheel Speed Sensor Circuit Open (F) (Page 4E-49)”.
43 (C1643)	Wheel speed sensor circuit short (F) *2	ON	Refer to “DTC “43” (C1643): Wheel Speed Sensor Circuit Short (F) (Page 4E-53)”.
44 (C1644)	Wheel speed sensor signal malfunction (R) *2	ON	Refer to “DTC “44” (C1644): Wheel Speed Sensor Signal Malfunction (R) (Page 4E-55)”.
45 (C1645)	Wheel speed sensor circuit open (R) *2	ON	Refer to “DTC “45” (C1645): Wheel Speed Sensor Circuit Open (R) (Page 4E-57)”.
46 (C1646)	Wheel speed sensor circuit short (R) *2	ON	Refer to “DTC “46” (C1646): Wheel Speed Sensor Circuit Short (R) (Page 4E-61)”.
47 (C1647)	Supply voltage (Increased)	ON	Refer to “DTC “47” (C1647): Supply Voltage (Increased) (Page 4E-63)”.
48 (C1648)	Supply voltage (Decreased)	ON	Refer to “DTC “48” (C1648): Supply Voltage (Decreased) (Page 4E-65)”.
55 (C1655)	ABS control unit malfunction	ON	Refer to “DTC “55” (C1655): ABS Control Unit Malfunction (Page 4E-67)”.
61 (C1661)	ABS solenoid malfunction	ON	Refer to “DTC “61” (C1661): ABS Solenoid Malfunction (Page 4E-69)”.

*1: It goes off after running at more than 10 km/h (6.2 mile/h).
*2: The wheel speed sensor lead wire is connected to the ABS control unit, but a short-circuit or faulty continuity inside the ABS control unit caused this DTC to appear, therefore, the ABS control unit/HU assembly must be replaced. An insufficient wheel speed sensor output voltage is the cause of a malfunction in which the ABS is activated even if the brakes are not suddenly applied. If this occurs frequently even though the wheel speed sensor is operating correctly, the ABS control unit/HU assembly should be replaced.

⚠ CAUTION

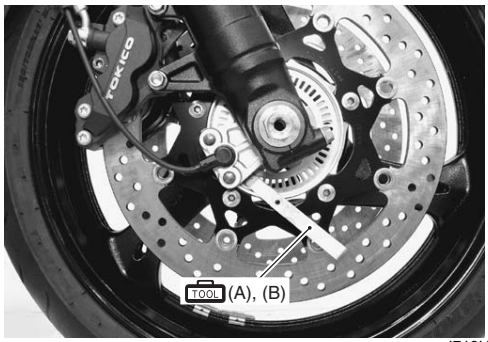
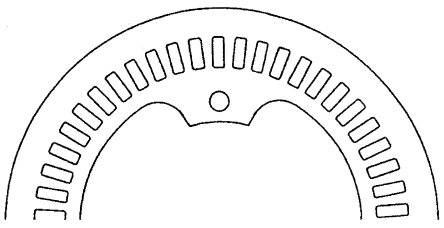
When disconnecting couplers and turning the ignition switch ON, disconnect the ABS control unit coupler in order to prevent a DTC from being stored. Each time a resistance is measured, the ignition switch should be set to OFF.

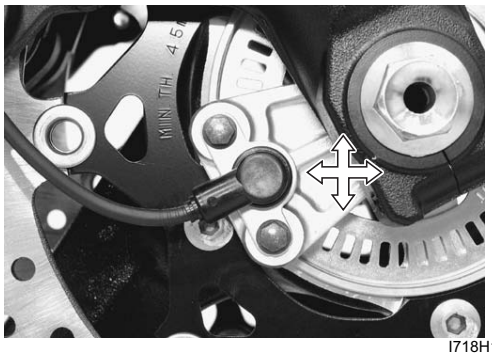
DTC "13" (C1613): Wheel Speed Sensor Rotor Malfunction (F)

B718H14504003

Possible Cause
• Front wheel speed sensor rotor distortion
• Faulty front wheel speed sensor or wiring discontinuity, etc.

Troubleshooting

Step	Action	Yes	No
1	1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. **Special tool** **TOOL (A): 09900–20803 (Thickness gauge)** **TOOL (B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)**  I718H1450063-01 *Is the clearance OK?*	Go to Step 2.	Adjust the clearance.
2	1) Inspect the front wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings.  I718H1450064-01 *Is the sensor rotor OK?*	Go to Step 3.	Clean or replace the sensor rotor.

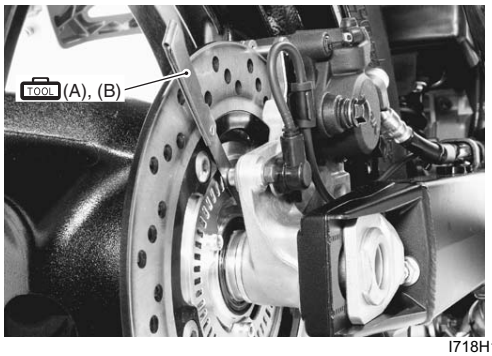
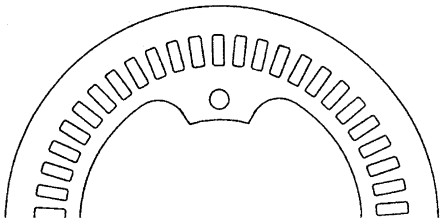
Step	Action	Yes	No
3	1) Check that the front wheel speed sensor is mounted securely.  I718H1450066-01 *Is the sensor mounted securely?*	Go to Step 4.	Tighten the mounting bolts or replace the bracket if necessary.
4	1) Inspect the front tire and wheel. **Tire type and size** **DUNLOP D218FT 120/70ZR17M/C (58W)** **Cold inflation tire pressure (Solo riding)** **250 kPa (2.50 kgf/cm^2, 36 psi)** **Cold inflation tire pressure (Dual riding)** **250 kPa (2.50 kgf/cm^2, 36 psi)** **Wheel runout** **Service limit (axial and radial): 2.0 mm (0.08 in)**  I718H1450067-01 *Are the front tire type, tire pressure and wheel runout OK?*	Replace the ABS control unit/HU.	Adjust or replace the front tire and wheel.

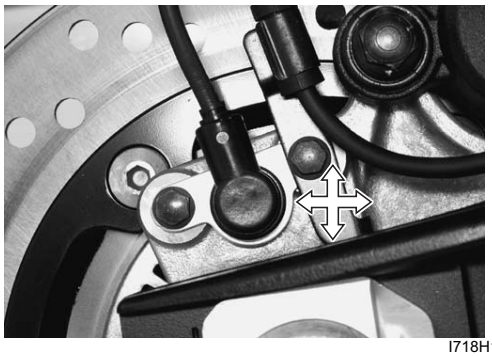
DTC “14” (C1614): Wheel Speed Sensor Rotor Malfunction (R)

B718H14504004

Possible Cause
• Rear wheel speed sensor rotor distortion
• Faulty rear wheel speed sensor or wiring discontinuity, etc.

Troubleshooting

Step	Action	Yes	No
1	1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge. **Special tool** **(A): 09900–20803 (Thickness gauge)** **(B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)**  I718H1450026-01 *Is the clearance OK?*	Go to Step 2.	Adjust the clearance.
2	1) Inspect the rear wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings.  I718H1450064-01 *Is the sensor rotor OK?*	Go to Step 3.	Clean or replace the sensor rotor.

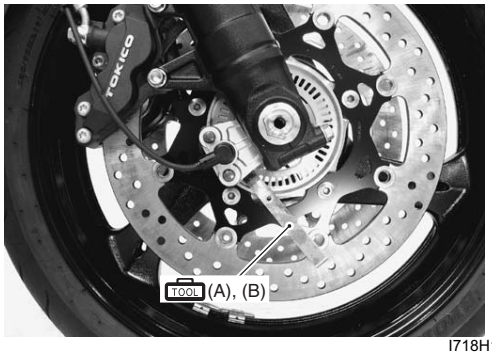
Step	Action	Yes	No
3	1) Check that the rear wheel speed sensor is mounted securely.  I718H1450068-01 *Is the sensor mounted securely?*	Go to Step 4.	Tighten the mounting bolts or replace the bracket if necessary.
4	1) Inspect the rear tire and wheel. **Tire type and size** **DUNLOP D218N 180/55ZR17M/C (73W)** **Cold inflation tire pressure (Solo riding)** **290 kPa (2.90 kgf/cm^2, 42 psi)** **Cold inflation tire pressure (Dual riding)** **290 kPa (2.90 kgf/cm^2, 42 psi)** **Wheel runout** **Service limit (axial and radial): 2.0 mm (0.08 in)**  I718H1450069-01 *Are the rear tire type, tire pressure and wheel runout OK?*	Replace the ABS control unit/HU.	Adjust or replace the rear tire and wheel.

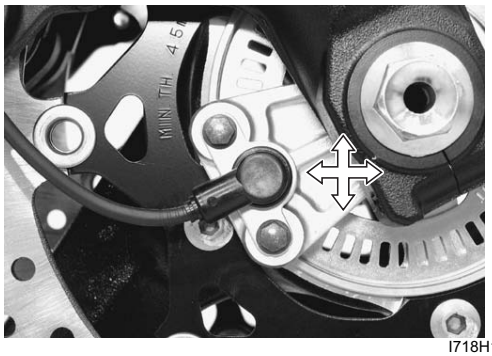
DTC “22” (C1622): ABS Actuator Circuit Malfunction (F)

B718H14504005

Possible Cause
• Wire harness discontinuity
• Front wheel locking, etc.

Troubleshooting

Step	Action	Yes	No
1	1) Raise the front wheel off the ground and support the motorcycle with a jack or wooden block. 2) Inspect the dragging of the front brake.  I718H1450067-01 *Is there any dragging in the front brake?*	Inspect the front brake master cylinder and the calipers.	Go to step 2.
2	1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. **Special tool** **TOOL (A): 09900–20803 (Thickness gauge)** **TOOL (B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)**  I718H1450025-01 *Is the clearance OK?*	Go to Step 3.	Adjust the clearance.

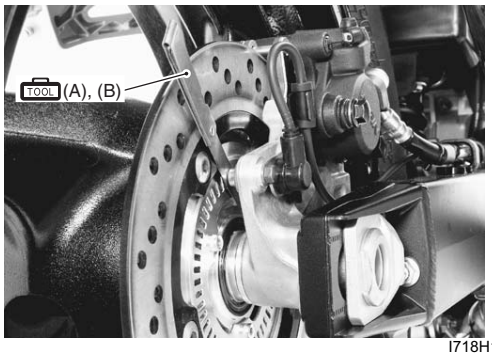
Step	Action	Yes	No
3	1) Check that the front wheel speed sensor is mounted securely.  I718H1450066-01 *Is the sensor mounted securely?*	Replace the ABS control unit/HU.	Tighten the mounting bolts or replace the bracket if necessary.

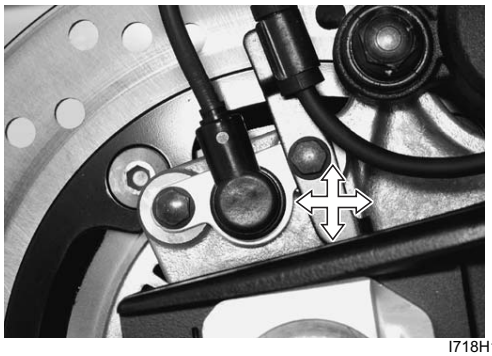
DTC “23” (C1623): ABS Actuator Circuit Malfunction (R)

B718H14504006

Possible Cause
• Wire harness discontinuity • Rear wheel locking, etc.

Troubleshooting

Step	Action	Yes	No
1	1) Support the motorcycle with its center stand. 2) Inspect the dragging of the rear brake.  I718H1450069-01 *Is there any dragging in the rear brake?*	Inspect the rear brake master cylinder and the caliper.	Go to step 2.
2	1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge. **Special tool** **TOOL (A): 09900–20803 (Thickness gauge)** **TOOL (B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)**  I718H1450026-01 *Is the clearance OK?*	Go to Step 3.	Adjust the clearance.

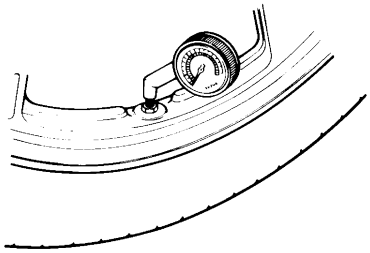
Step	Action	Yes	No
3	1) Check that the rear wheel speed sensor is mounted securely.  I718H1450068-01 *Is the sensor mounted securely?*	Replace the ABS control unit/HU.	Tighten the mounting bolts or replace the bracket if necessary.

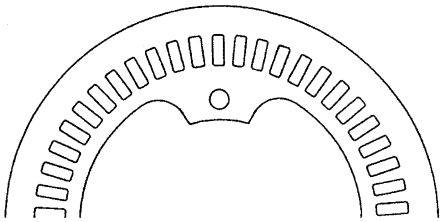
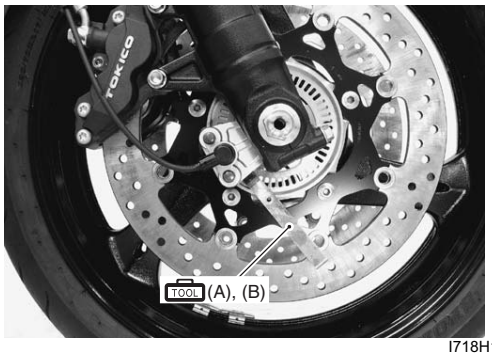
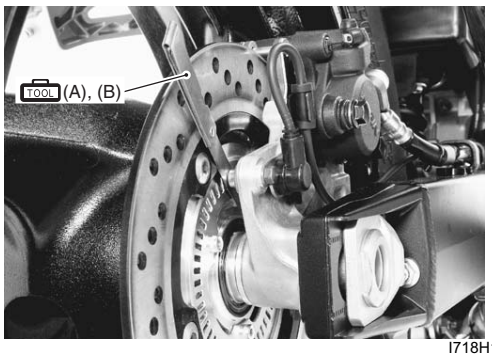
DTC “25” (C1625): Wheel Speed Sensor Related Malfunction

B718H14504007

Possible Cause
• Incorrect tire size, poor tire pressure
• Deformed wheel, etc.

Troubleshooting

Step	Action	Yes	No
1	1) Check that the specified tires are installed. **Tire type and size** **Front: DUNLOP D218FT 120/70ZR17M/C (58W)** **Rear: DUNLOP D218N 180/55ZR17M/C (73W)**  I718H1450070-01 *Are the tires OK?*	Go to Step 2.	Use the specified tires.
2	1) Make sure the tire pressure for each tire. Refer to “Tire Inspection in Section 0B (Page 0B-19)”. **Cold inflation tire pressure (Solo riding)** **Front: 250 kPa (2.50 kgf/cm^2, 36 psi)** **Rear: 290 kPa (2.90 kgf/cm^2, 42 psi)** **Cold inflation tire pressure (Dual riding)** **Front: 250 kPa (2.50 kgf/cm^2, 36 psi)** **Rear: 290 kPa (2.90 kgf/cm^2, 42 psi)**  I718H1450071-01 *Is the tire pressure for each tire correct?*	Go to Step 3.	Adjust the tire pressure.

Step	Action	Yes	No
3	1) Inspect both wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings.  I718H1450064-01 *Are the rotors OK?*	Go to Step 4.	Clean or replace the rotor.
4	1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge. **Special tool** **(A): 09900–20803 (Thickness gauge)** **(B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)** **Front**  I718H1450025-01 **Rear**  I718H1450026-01 *Are the clearances OK?*	Replace the ABS control unit/HU.	Adjust the clearance.

DTC “35” (C1635): ABS Motor Malfunction

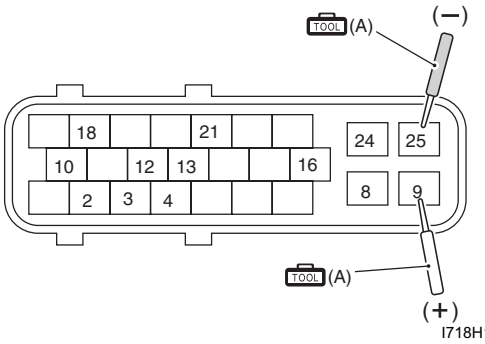
B718H14504008

Possible Cause
• Faulty HU motor
• Faulty wiring, etc.

Wiring Diagram
Refer to “ABS Unit Diagram (Page 4E-8)”.

Troubleshooting

Step	Action	Yes	No
1	1) Inspect if the pump motor makes turning noise by setting the ignition switch to ON from OFF when the vehicle stands still.  I718H1450074-01 *Does the pump motor make any turning noise?*	• Faulty HU motor • Replace the ABS control unit/HU.	Go to Step 2.
2	1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 2) Inspect the ABS motor fuse. **⚠ CAUTION** **If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.** **ABS motor fuse** **20 A**  I718H1450126-02 *Is the ABS motor fuse OK?*	Go to Step 3.	Replace the ABS motor fuse.

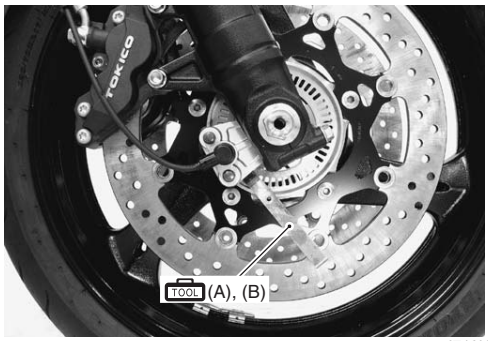
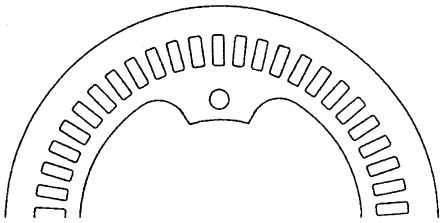
Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 4) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. 5) Measure the voltage between “9” (R/B) and “25” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value (“9” – “25”)** **Battery voltage (12.0 V and more)** **ABS control unit coupler (Harness end)**  I718H1450076-02 *Is the voltage between “9” and “25” normal?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty motor power supply or ground wire)

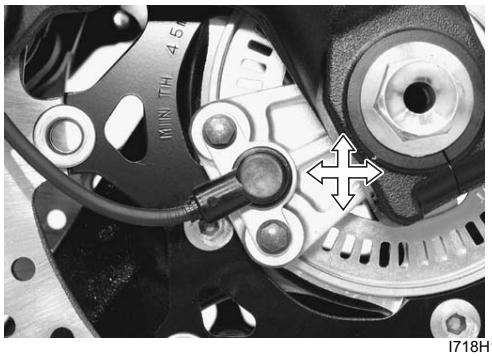
DTC “41” (C1641): Wheel Speed Sensor Signal Malfunction (F)

B718H14504009

Possible Cause
• Poor contact in the front wheel speed sensor coupler
• Faulty front wheel speed sensor, etc.

Troubleshooting

Step	Action	Yes	No
1	1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. **Special tool** **TOOL (A): 09900–20803 (Thickness gauge)** **TOOL (B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)**  I718H1450025-01 *Is the clearance OK?*	Go to Step 2.	Adjust the clearance.
2	1) Inspect the front wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings.  I718H1450064-01 *Is the sensor rotor OK?*	Go to Step 3.	Clean or replace the sensor rotor.

Step	Action	Yes	No
3	1) Check that the front wheel speed sensor is mounted securely.  I718H1450066-01 *Is the sensor mounted securely?*	Go to DTC “42” (C1642). (Refer to “DTC “42” (C1642): Wheel Speed Sensor Circuit Open (F) (Page 4E-49)”.)	Tighten the mounting bolts or replace the bracket if necessary.

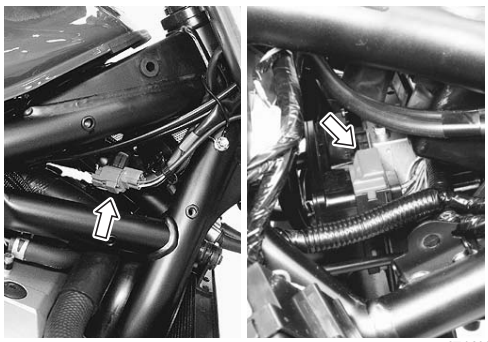
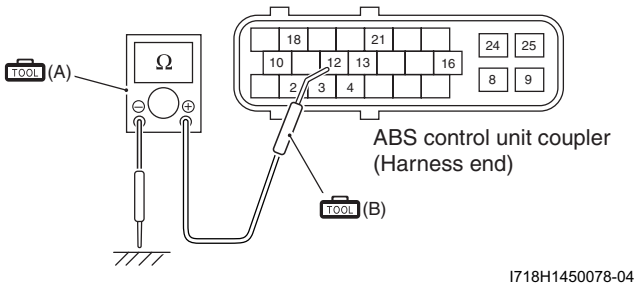
DTC “42” (C1642): Wheel Speed Sensor Circuit Open (F)

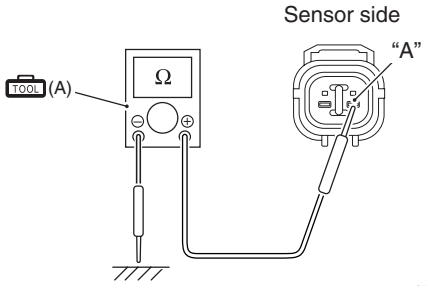
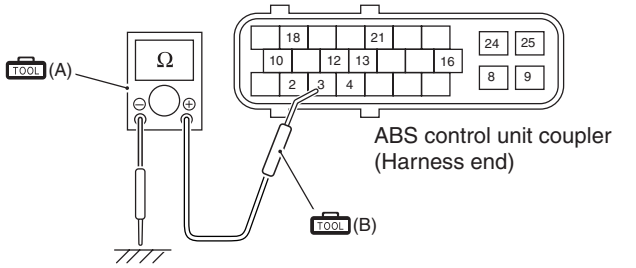
B718H14504010

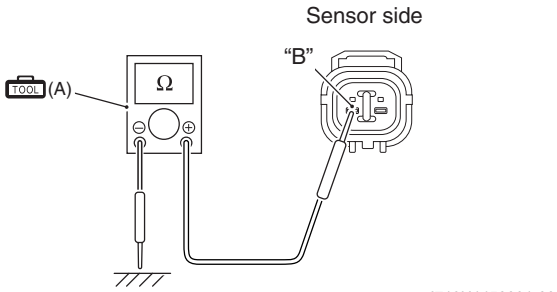
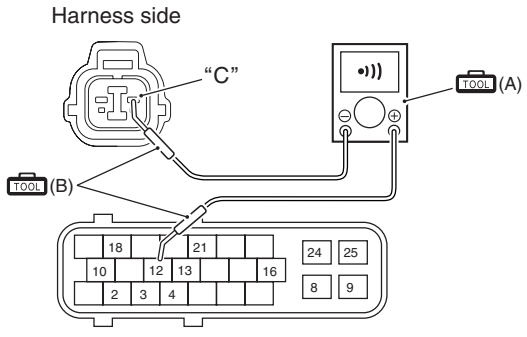
Possible Cause
• Poor contact in the front wheel speed sensor coupler
• Faulty front wheel speed sensor, etc.

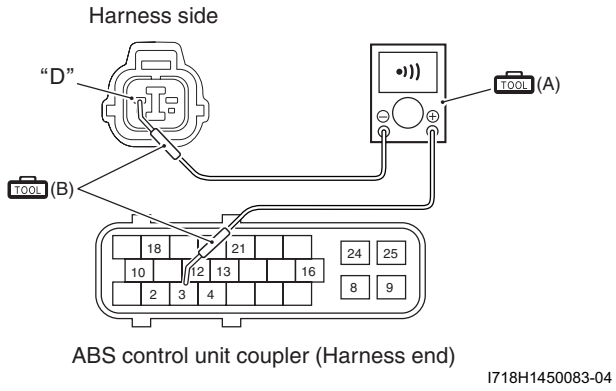
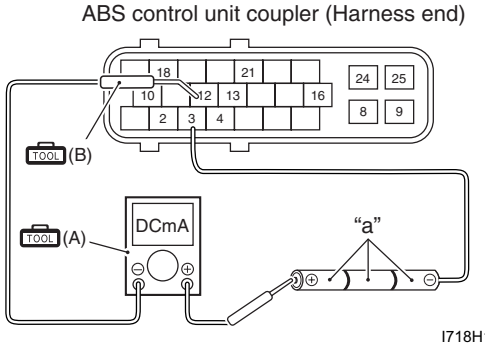
Wiring Diagram
Refer to “ABS Unit Diagram (Page 4E-8)”.

Troubleshooting

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the right frame head cover. (GSF1250A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 4) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 5) Check the ABS control unit coupler and front wheel speed sensor coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler.  I718H1450077-01 6) Measure the resistance between “12” (B/R) and ground at the ABS control unit coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“12” – Ground)** **∞ Ω (Infinity)**  I718H1450078-04 *Is the resistance between “12” and ground OK?*	Go to Step 3.	Go to Step 2.

Step	Action	Yes	No
2	1) Disconnect the front wheel speed sensor coupler. 2) Measure the resistance between “A” (Black) and ground at the front wheel speed sensor coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“A” – Ground)** **∞ Ω (Infinity)**  I718H1450079-03 *Is the resistance between “A” and ground OK?*	Inspect the wire harness. (Faulty B/R wire)	Faulty front wheel speed sensor
3	1) Measure the resistance between “3” (W/R) and ground at the ABS control unit coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“3” – Ground)** **∞ Ω (Infinity)**  I718H1450080-04 *Is the resistance between “3” and ground OK?*	Go to Step 5.	Go to Step 4.

Step	Action	Yes	No
4	1) Measure the resistance between “B” (White) and ground at the front wheel speed sensor coupler. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“B” – Ground)** **∞ Ω (Infinity)**  I718H1450081-03 *Is the resistance between “B” and ground OK?*	Inspect the wire harness. (Faulty W/R wire)	Faulty front wheel speed sensor
5	1) Check for continuity between “12” (B/R) on the ABS control unit coupler and “C” (B/R) on the front wheel speed sensor coupler. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))** **Normal value (“12” – “C”)** **Continuity (•)))**  ABS control unit coupler (Harness end) I718H1450082-04 *Is there continuity between “12” and “C”?*	Go to Step 6.	Inspect the wire harness. (Faulty B/R wire)

Step	Action	Yes	No
6	1) Check for continuity between “3” (W/R) on the ABS control unit coupler and “D” (W/R) on the front wheel speed sensor coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))** **Normal value (“3” – “D”)** **Continuity (•)))**  ABS control unit coupler (Harness end) I718H1450083-04 *Is there continuity between “3” and “D”?*	Go to Step 7.	Inspect the wire harness. (Faulty W/R wire)
7	1) Connect the front wheel speed sensor coupler. 2) Connect three 1.5 V dry cells “a” in series as shown and make sure that their total voltage is more than 4.5 V. Measure the current between (+) dry cell terminal and “12” (B/R) on the ABS control unit coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Current (⎓ , 20 mA)** **Normal value** **3 – 14 mA**  I718H1450084-03 *Is the current OK?*	Replace the ABS control unit/HU.	Faulty front wheel speed sensor.

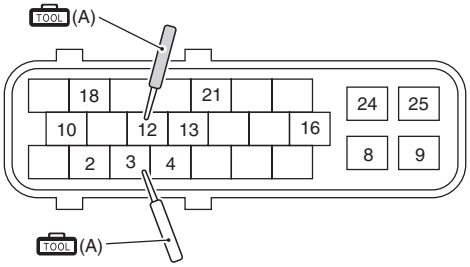
DTC “43” (C1643): Wheel Speed Sensor Circuit Short (F)

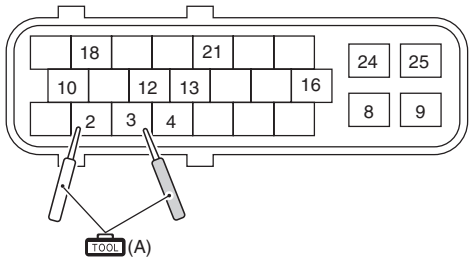
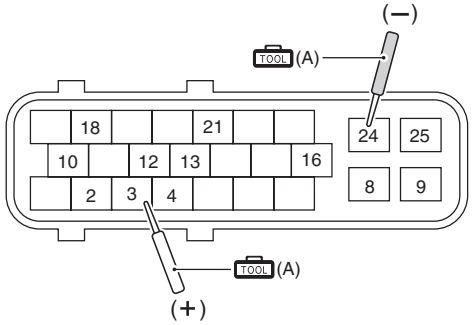
B718H14504011

Possible Cause
• Poor contact in the front wheel speed sensor coupler
• Faulty front wheel speed sensor, etc.

Wiring Diagram
Refer to “ABS Unit Diagram (Page 4E-8)”.

Troubleshooting

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 4) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. 5) Check for continuity between “3” (W/R) and “12” (B/R) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•)))** **ABS control unit coupler (Harness end)**  I718H1450085-02 *Is there continuity between “3” and “12”?*	• Inspect the wire harness. (Faulty sensor wire) • Faulty front wheel speed sensor	Go to Step 2.

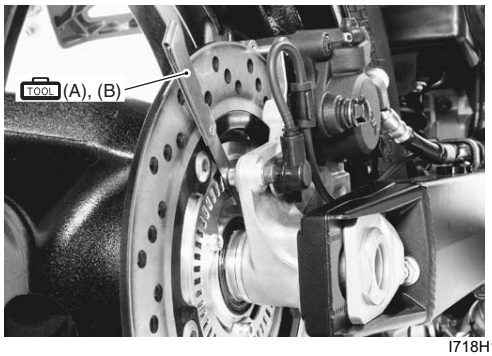
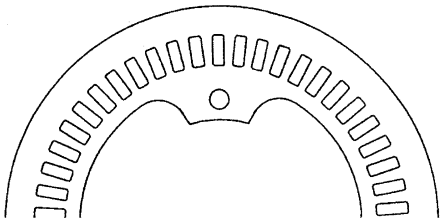
Step	Action	Yes	No
2	1) Check for continuity between “2” (B/Y) and “3” (W/R) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•)))** **ABS control unit coupler (Harness end)**  I718H1450086-02 *Is there continuity between “2” and “3”?*	• Inspect the wire harness. (Faulty sensor wire) • Faulty front wheel speed sensor	Go to Step 3.
3	1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between “3” (W/R) and “24” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value (“3” – “24”)** **0 V** **ABS control unit coupler (Harness end)**  I718H1450087-02 *Is the voltage between “3” and “24” normal value?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty sensor signal or power supply wire)

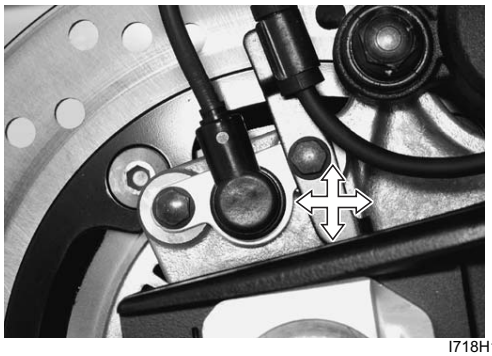
DTC “44” (C1644): Wheel Speed Sensor Signal Malfunction (R)

B718H14504012

Possible Cause
• Poor contact in the rear wheel speed sensor coupler
• Faulty rear wheel speed sensor, etc.

Troubleshooting

Step	Action	Yes	No
1	1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge. **Special tool** **(A): 09900–20803 (Thickness gauge)** **(B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)**  I718H1450026-01 *Is the clearance OK?*	Go to Step 2.	Adjust the clearance.
2	1) Inspect the rear wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings.  I718H1450064-01 *Is the sensor rotor OK?*	Go to Step 3.	Clean or replace the sensor rotor.

Step	Action	Yes	No
3	1) Check that the rear wheel speed sensor is mounted securely.  I718H1450068-01 *Is the sensor mounted securely?*	Go to DTC “45” (C1645). (Refer to “DTC “45” (C1645): Wheel Speed Sensor Circuit Open (R) (Page 4E-57)”.)	Tighten the mounting bolts or replace the bracket if necessary.

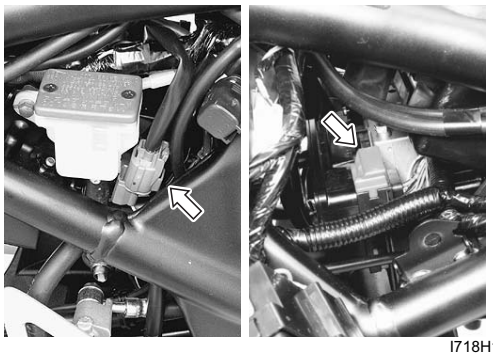
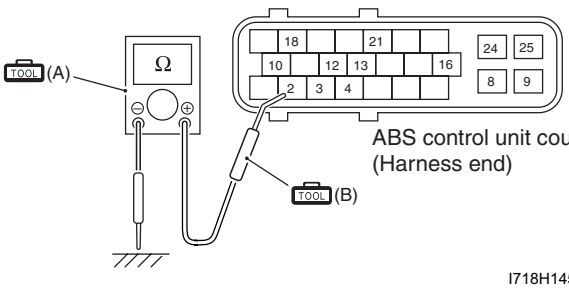
DTC “45” (C1645): Wheel Speed Sensor Circuit Open (R)

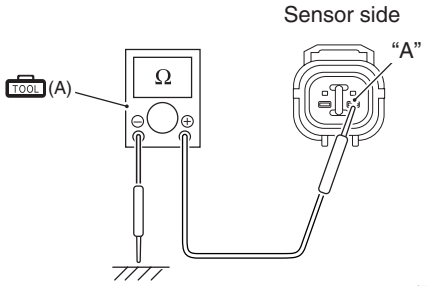
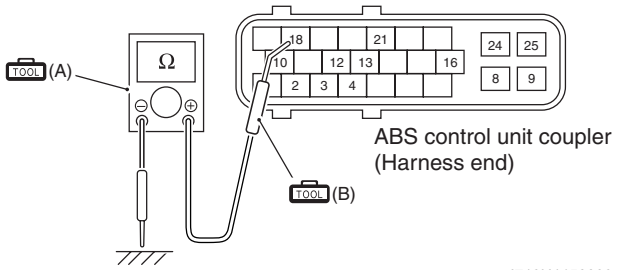
B718H14504013

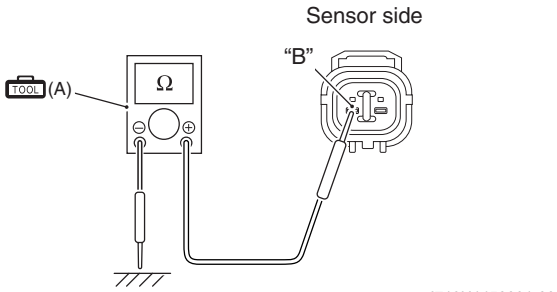
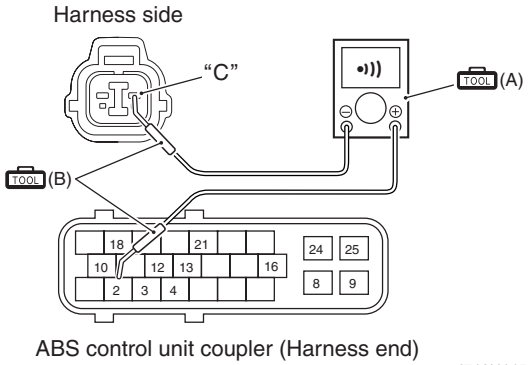
Possible Cause
• Poor contact in the rear wheel speed sensor coupler
• Faulty rear wheel speed sensor, etc.

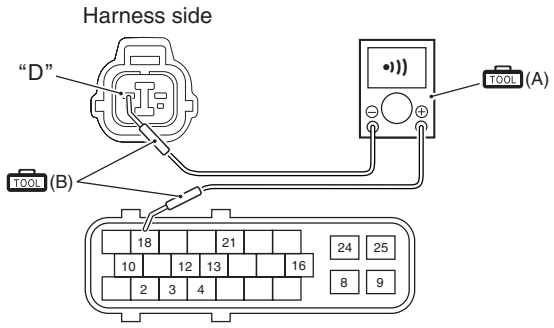
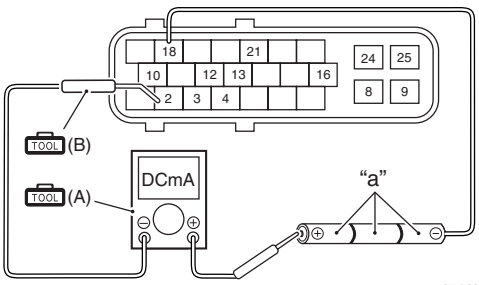
Wiring Diagram
Refer to “ABS Unit Diagram (Page 4E-8)”.

Troubleshooting

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the frame covers, left and right. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 4) Check the ABS control unit coupler and rear wheel speed sensor coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler.  I718H1450116-01 5) Measure the resistance between “2” (B/Y) and ground at the ABS control unit coupler. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“2” – Ground)** ∞ Ω **(Infinity)**  I718H1450088-03 *Is the resistance between (2) and ground OK?*	Go to Step 3.	Go to Step 2.

Step	Action	Yes	No
2	1) Disconnect the rear wheel speed sensor coupler. 2) Measure the resistance between “A” (Black) and ground at the rear wheel speed sensor coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“A” – Ground)** **∞ Ω (Infinity)**  *Is the resistance between “A” and ground OK?*	Inspect the wire harness. (Faulty B/Y wire)	Replace the rear wheel speed sensor.
3	1) Measure the resistance between “18” (W/Y) and ground at the ABS control unit coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“18” – Ground)** **∞ Ω (Infinity)**  *Is the resistance between “18” and ground OK?*	Go to Step 5.	Go to Step 4.

Step	Action	Yes	No
4	1) Measure the resistance between “B” (White) and ground at the rear wheel speed sensor coupler. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **Normal value (“B” – Ground)** **∞ Ω (Infinity)**  I718H1450081-03 *Is the resistance between “B” and ground OK?*	Inspect the wire harness. (Faulty W/Y wire)	Replace the rear wheel speed sensor.
5	1) Check for continuity between “2” (B/Y) on the ABS control unit coupler and “C” (B/Y) on the rear wheel speed sensor coupler. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))** **Normal value (“2” – “C”)** **Continuity (•)))**  ABS control unit coupler (Harness end) I718H1450090-03 *Is there continuity between “2” and “C”?*	Go to Step 6.	Inspect the wire harness. (Faulty B/Y wire)

Step	Action	Yes	No
6	1) Check the continuity between “18” (W/Y) on the ABS control unit coupler and “D” (W/Y) on the rear wheel speed sensor coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity test (•)))** **Normal value (“18” – “D”)** **Continuity (•)))**  ABS control unit coupler (Harness end) I718H1450092-03 *Is the resistance between “18” and “D”?*	Go to Step 7.	Inspect the wire harness. (Faulty W/Y wire)
7	1) Connect the rear wheel speed sensor coupler. 2) Connect three 1.5 V dry cells “a” in series as shown and make sure that their total voltage is more than 4.5 V. Measure the current between (+) dry cell terminal and “2” (B/Y) on the ABS control unit coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Current (⎓ , 20 mA)** **Normal value** **3 – 14 mA** ABS control unit coupler (Harness end)  I718H1450091-04 *Is the current OK?*	Replace the ABS control unit/HU.	Replace the rear wheel speed sensor.

DTC “46” (C1646): Wheel Speed Sensor Circuit Short (R)

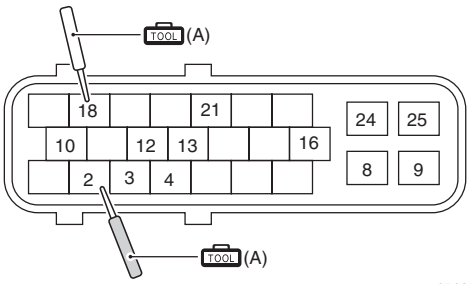
B718H14504014

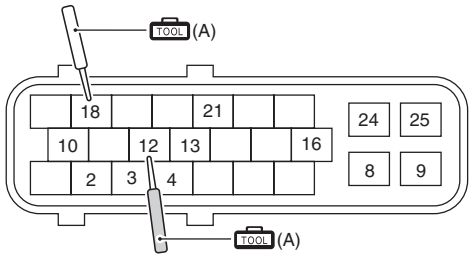
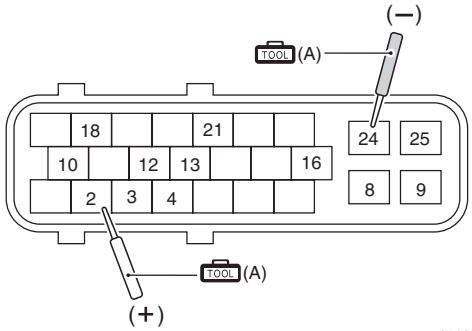
Possible Cause
• Poor contact in the rear wheel speed sensor coupler
• Faulty rear wheel speed sensor, etc.

Wiring Diagram

Refer to “ABS Unit Diagram (Page 4E-8)”.

Troubleshooting

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 4) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. 5) Check for continuity between “2” (B/Y) and “18” (W/Y) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•)))** **ABS control unit coupler (Harness end)**  I718H1450093-02 *Is there continuity between “2” and “18”?*	• Inspect the wire harness. (Faulty sensor wire) • Faulty rear wheel speed sensor	Go to Step 2.

Step	Action	Yes	No
2	1) Check for continuity between “12” (B/R) and “18” (W/Y) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•)))** **ABS control unit coupler (Harness end)**  I718H1450094-03 *Is there continuity between “12” and “18”?*	• Inspect the wire harness. (Faulty sensor wire) • Faulty wheel speed sensor	Go to Step 3.
3	1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between “2” (B/Y) and “24” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value (“2” – “24”)** **0 V** **ABS control unit coupler (Harness end)**  I718H1450095-02 *Is the voltage between “2” and “24” 0 V?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty sensor signal or power supply wire)

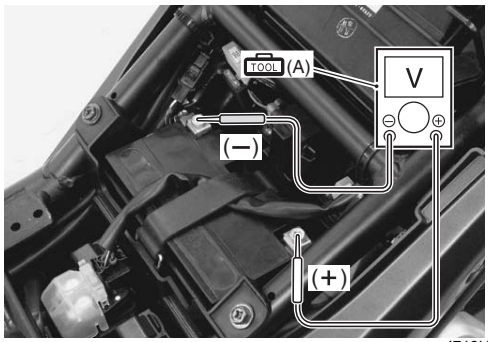
DTC “47” (C1647): Supply Voltage (Increased)

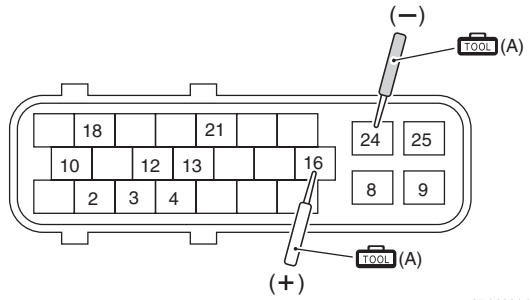
B718H14504015

Possible Cause
• Faulty regulator/rectifier
• Faulty ABS control unit
• Faulty wire harness, etc.

Wiring Diagram
Refer to “ABS Unit Diagram (Page 4E-8)”.

Troubleshooting

Step	Action	Yes	No
1	1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 2) Measure the voltage between the (+) and (–) battery terminals using the multi-circuit tester. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Battery voltage** **12.0 V and more**  I718H1450123-01 *Is the voltage over 12 V?*	Go to Step 2.	Charge or replace the battery.
2	1) Start the engine at 5 000 r/min with the dimmer switch set to HI. 2) Measure the voltage between the (+) and (–) battery terminals. **Special tool** **TOOL : 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Regulated voltage** **14.0 – 15.5 V at 5 000 r/min** *Is the voltage 14.0 – 15.5 V?*	Go to Step 3.	Inspect the regulator/rectifier. Refer to “Regulator / Rectifier Inspection in Section 1J (Page 1J-8)”.

Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 4) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. 5) Start the engine at 5 000 r/min with the dimmer switch set to HI. 6) Measure the voltage between “16” (O/Y) and “24” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)**  I718H1450036-04 *Is the voltage same as Step 2?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty ignition or ground wire)

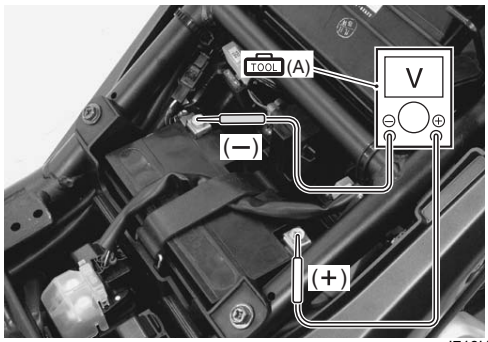
DTC “48” (C1648): Supply Voltage (Decreased)

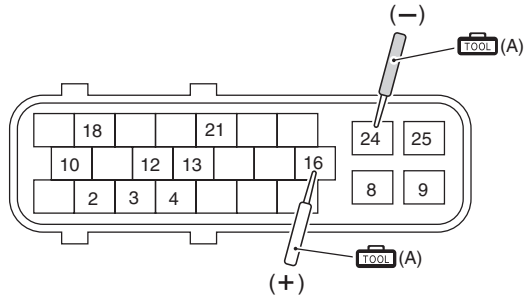
B718H14504016

Possible Cause
• Faulty generator or regulator/rectifier
• Faulty ABS control unit
• Faulty wire harness, etc.

Wiring Diagram
Refer to “ABS Unit Diagram (Page 4E-8)”.

Troubleshooting

Step	Action	Yes	No
1	1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 2) Measure the voltage between the (+) and (–) battery terminals using the multi-circuit tester. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Battery voltage** **12.0 V and more**  I718H1450123-01 *Is the voltage over 12 V?*	Go to Step 2.	Charge or replace the battery.
2	1) Start the engine at 5 000 r/min with the dimmer switch set to HI. 2) Measure the voltage between the (+) and (–) battery terminals. **Special tool** **TOOL : 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Regulated voltage** **14.0 – 15.5 V at 5 000 r/min** *Is the voltage 14.0 – 15.5 V?*	Go to Step 3.	Inspect the generator and regulator/rectifier. Refer to “Generator Inspection in Section 1J (Page 1J-3)” and “Regulator / Rectifier Inspection in Section 1J (Page 1J-8)”.

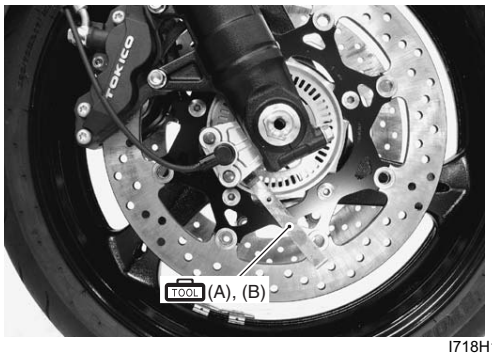
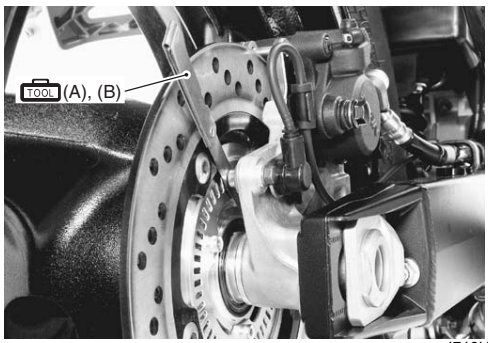
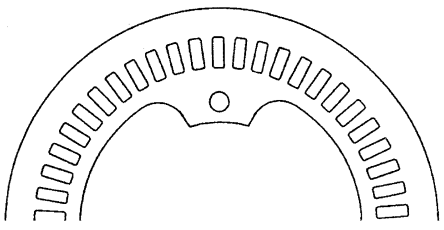
Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect (Page 4E-70)”. 4) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. 5) Start the engine at 5 000 r/min with the dimmer switch set to HI. 6) Measure the voltage between “16” (O/Y) and “24” (B/W) at the coupler. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **ABS control unit coupler (Harness end)**  I718H1450036-04 *Is the voltage same as Step 2?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty ignition or ground wire)

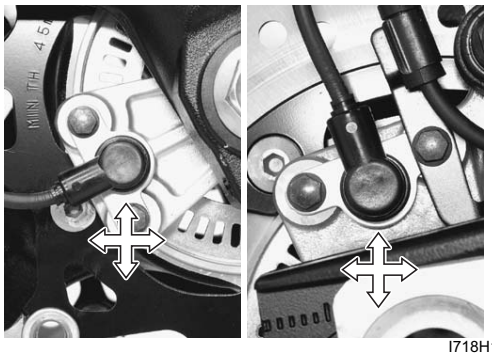
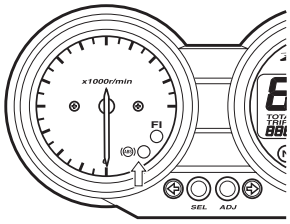
DTC “55” (C1655): ABS Control Unit Malfunction

B718H14504017

Possible Cause
Faulty ABS control unit

Troubleshooting

Step	Action	Yes	No
1	1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge. **Special tool** **(A): 09900–20803 (Thickness gauge)** **(B): 09900–20806 (Thickness gauge)** **Wheel speed sensor – sensor rotor clearance** **0.3 – 1.5 mm (0.012 – 0.059 in)** **Front**  I718H1450025-01 **Rear**  I718H1450026-01 *Are the clearances OK?*	Go to Step 2.	Adjust the clearance.
2	1) Inspect both of the wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings.  I718H1450064-01 *Are the rotors OK?*	Go to Step 3.	Clean or replace the rotor.

Step	Action	Yes	No
3	1) Check that the front and rear wheel speed sensors are mounted securely.  I718H1450097-01 *Are the sensors mounted securely?*	Go to Step 4.	Tighten the mounting bolts or replace the bracket if necessary.
4	1) Delete DTCs and repeat the code output procedure. Refer to “DTC (Diagnostic Trouble Code) Deleting (Page 4E-25)” and “DTC (Diagnostic Trouble Code) Output (Page 4E-23)”.  I718H1450122-04 *Is the DTC “55” (C1655) output again?*	Replace the ABS control unit/HU.	Intermittent trouble.

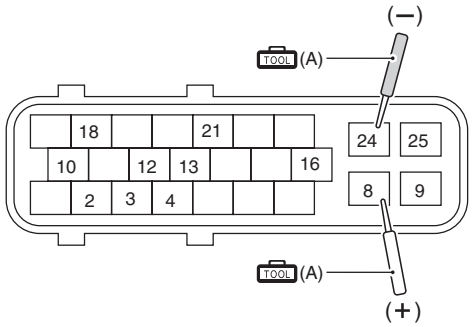
DTC “61” (C1661): ABS Solenoid Malfunction

B718H14504018

Possible Cause
Faulty solenoid valve or relay

Troubleshooting

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”. 3) Inspect the ABS solenoid valve fuse. **⚠ CAUTION** **If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.** **ABS solenoid valve fuse** **15 A**  I718H1450127-01 *Is the ABS solenoid valve fuse OK?*	Go to Step 2.	Replace the ABS solenoid valve fuse.

Step	Action	Yes	No
2	1) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. 2) Measure the voltage between “8” (R/Bl) and “24” (B/W) at the coupler. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Normal value (“8” – “24”)** **Battery voltage (12.0 V and more)** **ABS control unit coupler (Harness end)**  I718H1450096-02 *Is the voltage between “8” and “24” normal?*	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty solenoid or ground wire)

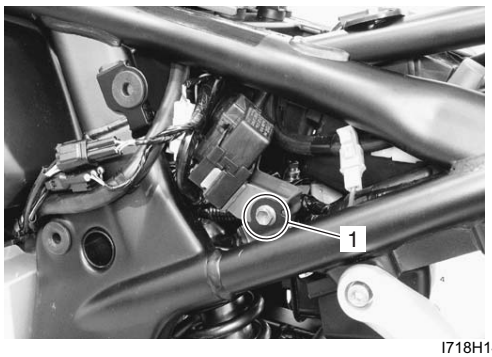
Repair Instructions

ABS Control Unit Coupler Disconnect and Connect

B718H14506003

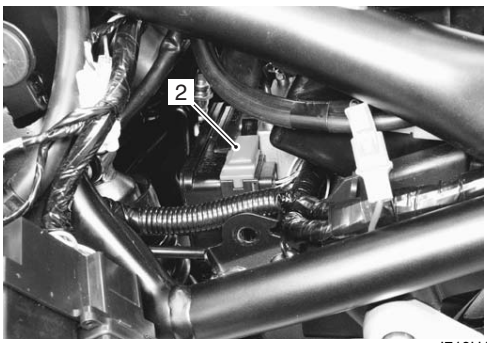
Disconnect

1) Turn the ignition switch OFF.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Remove the fuse box mounting bolt (1).



I718H1450028-01

4) Disconnect the ABS control unit coupler (2).



I718H1450029-01

Connect

Connect the ABS control unit coupler in the reverse order of disconnect.

Front Wheel Speed Sensor Removal and Installation

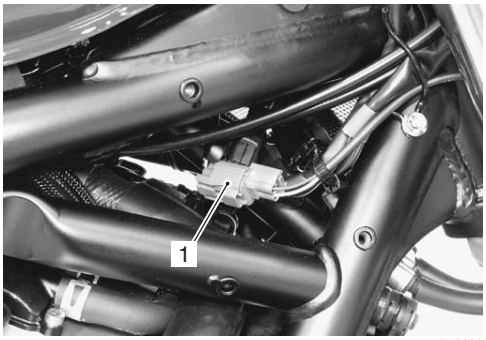
B718H14506004

⚠ CAUTION

- **The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
- **The wheel speed sensor cannot be disassembled.**

Removal

1) Turn the ignition switch OFF.
2) Remove the right frame head cover. (GSF1250A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Disconnect the front wheel speed sensor coupler (1).



I718H1450100-01

4) Remove the front wheel speed sensor mounting bolts.

I718H1450103-02

5) Remove the front wheel speed sensor as shown in the front wheel speed sensor routing diagram. Refer to “Front Wheel Speed Sensor Routing Diagram (Page 4E-9)”.

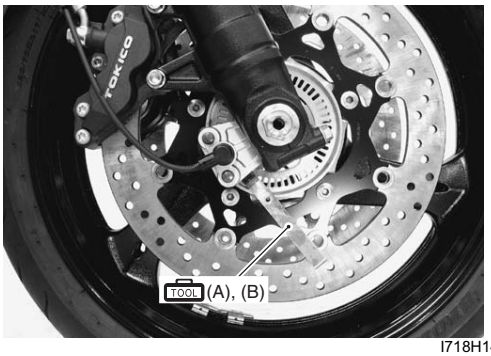
Installation

Refer to “Wheel Speed Sensor and Sensor Rotor Inspection (Page 4E-74)”.
Install the front wheel speed sensor in the reverse order of removal. Pay attention to the following points:

- Install the front wheel speed sensor as shown in the front wheel speed sensor routing diagram. Refer to “Front Wheel Speed Sensor Routing Diagram (Page 4E-9)”.
- Check the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge.

Special tool
TOOL (A): 09900–20803 (Thickness gauge)
TOOL (B): 09900–20806 (Thickness gauge)

Wheel speed sensor – sensor rotor clearance
0.3 – 1.5 mm (0.012 – 0.059 in)



I718H1450025-01

Rear Wheel Speed Sensor Removal and Installation

B718H14506005

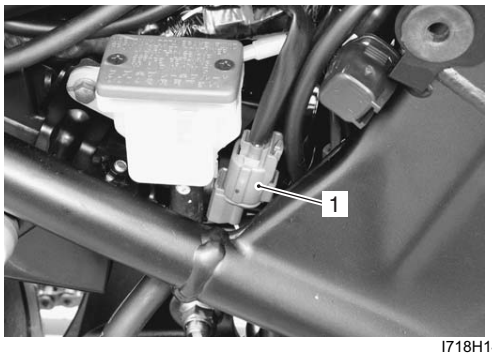
⚠ CAUTION

- **The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
- **The wheel speed sensor cannot be disassembled.**

Removal

1) Turn the ignition switch OFF.
2) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

3) Disconnect the rear wheel speed sensor coupler (1).



I718H1450102-01

4) Remove the rear wheel speed sensor mounting bolts.

I718H1450101-02

5) Remove the rear wheel speed sensor as shown in the rear wheel speed sensor routing diagram. Refer to “Rear Wheel Speed Sensor Routing Diagram (Page 4E-11)”.

Installation

Refer to “Wheel Speed Sensor and Sensor Rotor Inspection (Page 4E-74)”.

Install the rear wheel speed sensor in the reverse order of removal. Pay attention to the following points:

- Install the rear wheel speed sensor as shown in the rear wheel speed sensor routing diagram. Refer to “Rear Wheel Speed Sensor Routing Diagram (Page 4E-11)”.
- Check the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge

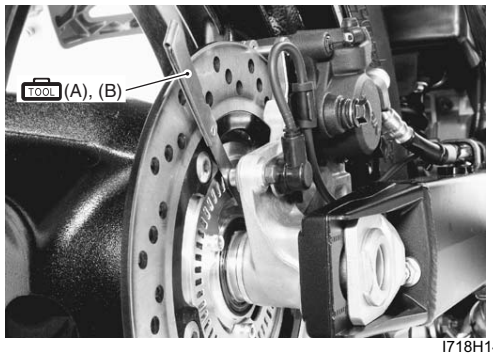
Special tool

TOOL (A): 09900–20803 (Thickness gauge)

TOOL (B): 09900–20806 (Thickness gauge)

Wheel speed sensor – sensor rotor clearance

0.3 – 1.5 mm (0.012 – 0.059 in)



I718H1450026-01

Front Wheel Speed Sensor Rotor Removal and Installation

B718H14506006

⚠ CAUTION

- **The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
- **Do not hit the front wheel speed sensor rotor when dismounting the front wheel.**

Removal

1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-6)”.
2) Remove the front wheel speed sensor rotor (1).

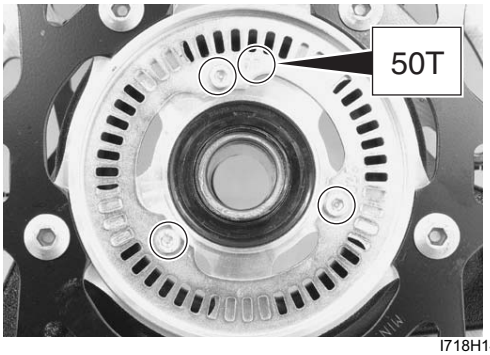
⚠ CAUTION

When replacing the tire, make sure not to damage the sensor rotor.

I718H1450104-01

Installation
Refer to “Wheel Speed Sensor and Sensor Rotor Inspection (Page 4E-74)”.
Install the front wheel speed sensor rotor in the reverse order of removal. Pay attention to the following points:

- Install the wheel speed sensor rotor as the letters “50T” face outside.

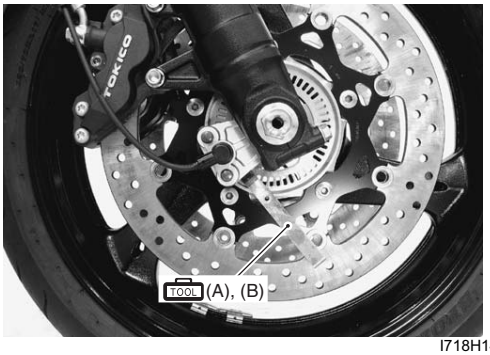


I718H1450105-02

- Install the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-6)”.
- Check the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge.

Special tool
(A): 09900–20803 (Thickness gauge)
(B): 09900–20806 (Thickness gauge)

Wheel speed sensor – sensor rotor clearance
0.3 – 1.5 mm (0.012 – 0.059 in)



I718H1450025-01

Rear Wheel Speed Sensor Rotor Removal and Installation

B718H14506007

⚠ CAUTION

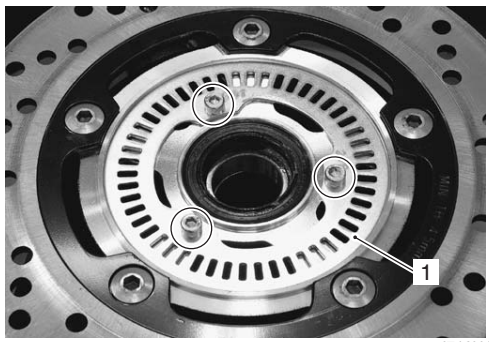
- **The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
- **Do not hit the rear wheel speed sensor rotor when dismounting the rear wheel.**

Removal

1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.
2) Remove the rear wheel speed sensor rotor (1).

⚠ CAUTION

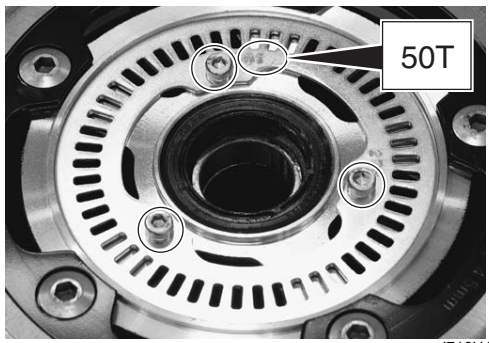
When replacing the tire, make sure not to damage the sensor rotor.



I718H1450106-02

Installation
Refer to “Wheel Speed Sensor and Sensor Rotor Inspection (Page 4E-74)”.
Install the rear wheel speed sensor rotor in the reverse order of removal. Pay attention to the following points:

- Install the wheel speed sensor rotor as the letters “50T” face outside.

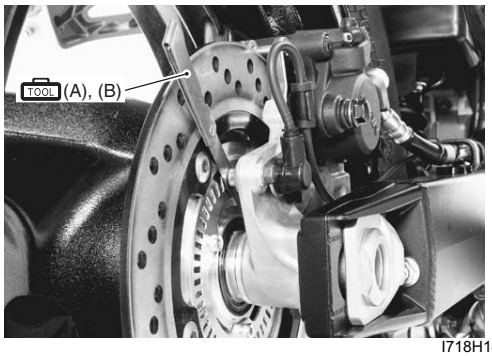


I718H1450107-02

- Install the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-16)”.
- Check the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge.

Special tool
(A): 09900–20803 (Thickness gauge)
(B): 09900–20806 (Thickness gauge)

Wheel speed sensor – sensor rotor clearance
0.3 – 1.5 mm (0.012 – 0.059 in)



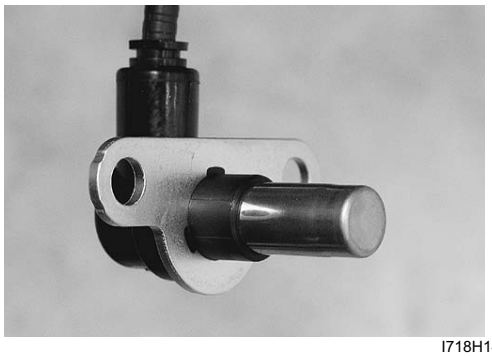
I718H1450026-01

Wheel Speed Sensor and Sensor Rotor Inspection

B718H14506008

Wheel Speed Sensor

1) Remove the wheel speed sensor. Refer to “Front Wheel Speed Sensor Removal and Installation (Page 4E-71)” and “Rear Wheel Speed Sensor Removal and Installation (Page 4E-71)”.
2) Inspect the wheel speed sensor for damage. Clean the sensor if any metal particle or foreign material stuck on it.


I718H1450108-01

3) After finishing the speed sensor inspection, install the wheel speed sensor.

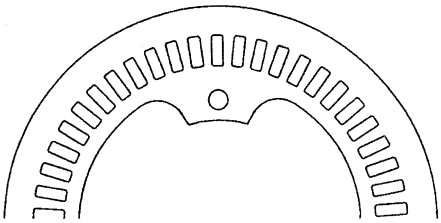
Wheel Speed Sensor Rotor

1) Raise the wheel off the ground and support the motorcycle with a jack or wooden block.

⚠ CAUTION

Make sure that the motorcycle is supported securely.

2) Check that no wheel speed sensor rotor teeth are broken and that no foreign objects are caught in the wheel speed sensor.


I718H1450064-01

ABS Control Unit/HU Removal and Installation

B718H14506009

Removal

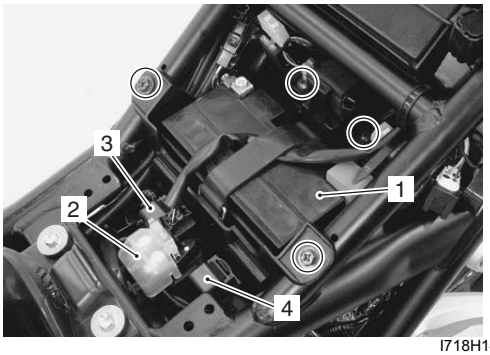
⚠ WARNING

When storing the brake fluid, seal the container completely and keep away from children.

⚠ CAUTION

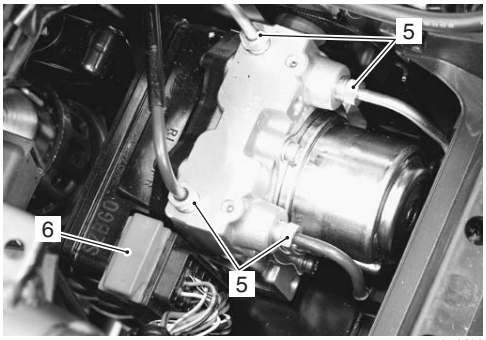
- **This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not mix different types of fluid such as silicone-based or petroleum-based.**
- **Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for long periods.**
- **Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials etc. and will damage then severely.**
- **The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
- **The ABS control unit/HU cannot be disassembled.**

1) Remove the seat and frame covers. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
2) Remove the battery (1). Refer to "Battery Removal and Installation in Section 1J (Page 1J-12)".
3) Remove the starter relay (2) from the battery case.
4) Remove the cooling fan relay (3) and fuel pump relay (4) from the battery case.
5) Remove the battery case.



I718H1450128-01

6) Drain the brake fluid. Refer to "Brake Fluid Replacement in Section 4A (Page 4A-10)".
7) Loosen the flare nuts (5) and disconnect the brake pipes.
8) Disconnect the ABS control unit coupler (6).



I718H1450110-02

9) Remove the reservoir mounting bolt. Refer to "Rear Brake Master Cylinder Assembly Removal and Installation in Section 4A (Page 4A-18)".
10) Remove the ABS control unit/HU by removing the mounting bolts.


I718H1450111-01


I718H1450112-01

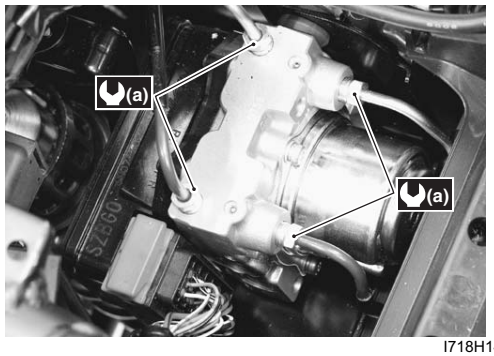
Installation
Installation is in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

- **Route the brake hoses and pipes correctly. Refer to "Front Brake Hose Routing Diagram in Section 4A (Page 4A-1)" or "Rear Brake Hose Routing Diagram in Section 4A (Page 4A-5)".**
- **Make sure to hold the brake pipe when tightening the flare nut, or it may be misaligned.**

- Tighten the brake pipe flare nuts to the specified torque.

Tightening torque
Brake pipe flare nut (a): 16 N·m (1.6 kgf-m, 11.5 lb-ft)



I718H1450113-03

- Bleed air from the brake fluid circuit. Refer to "Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-8)".

Specifications

Tightening Torque Specifications

B718H14507001

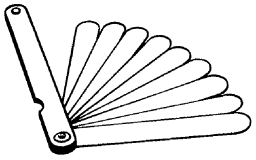
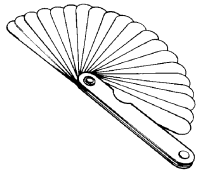
Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Brake pipe flare nut	16	1.6	11.5	☞(Page 4E-75)

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0B (Page 0B-23)”.

Special Tools and Equipment

Special Tool

B718H14508001

09900–20803 Thickness gauge ☞(Page 4E-16) / ☞(Page 4E-35) / ☞(Page 4E-37) / ☞(Page 4E-39) / ☞(Page 4E-41) / ☞(Page 4E-44) / ☞(Page 4E-47) / ☞(Page 4E-55) / ☞(Page 4E-67) / ☞(Page 4E-71) / ☞(Page 4E-72) / ☞(Page 4E-73) / ☞(Page 4E-74)	
09900–20806 Thickness gauge ☞(Page 4E-16) / ☞(Page 4E-35) / ☞(Page 4E-37) / ☞(Page 4E-39) / ☞(Page 4E-41) / ☞(Page 4E-44) / ☞(Page 4E-47) / ☞(Page 4E-55) / ☞(Page 4E-67) / ☞(Page 4E-71) / ☞(Page 4E-72) / ☞(Page 4E-73) / ☞(Page 4E-74)	

09900–25008 Multi-circuit tester set ☞(Page 4E-15) / ☞(Page 4E-17) / ☞(Page 4E-19) / ☞(Page 4E-19) / ☞(Page 4E-20) / ☞(Page 4E-21) / ☞(Page 4E-21) / ☞(Page 4E-22) / ☞(Page 4E-46) / ☞(Page 4E-49) / ☞(Page 4E-50) / ☞(Page 4E-50) / ☞(Page 4E-51) / ☞(Page 4E-51) / ☞(Page 4E-52) / ☞(Page 4E-52) / ☞(Page 4E-53) / ☞(Page 4E-54) / ☞(Page 4E-54) / ☞(Page 4E-57) / ☞(Page 4E-58) / ☞(Page 4E-58) / ☞(Page 4E-59) / ☞(Page 4E-59) / ☞(Page 4E-60) / ☞(Page 4E-60) / ☞(Page 4E-61) / ☞(Page 4E-62) / ☞(Page 4E-62) / ☞(Page 4E-63) / ☞(Page 4E-63) / ☞(Page 4E-64) / ☞(Page 4E-65) / ☞(Page 4E-65) / ☞(Page 4E-66) / ☞(Page 4E-70)	09900–25009 Needle pointed probe set ☞(Page 4E-49) / ☞(Page 4E-50) / ☞(Page 4E-51) / ☞(Page 4E-52) / ☞(Page 4E-52) / ☞(Page 4E-57) / ☞(Page 4E-58) / ☞(Page 4E-59) / ☞(Page 4E-60) / ☞(Page 4E-60)
09904–41010 SDS set ☞(Page 4E-25) / ☞(Page 4E-27) / ☞(Page 4E-29)	09930–82710 Mode select switch ☞(Page 4E-5) / ☞(Page 4E-22) / ☞(Page 4E-23) / ☞(Page 4E-25)
99565–01010–010 CD-ROM Ver.10 ☞(Page 4E-25) / ☞(Page 4E-27) / ☞(Page 4E-29)	

Section 5

Tranmission / Transaxle

CONTENTS

Precautions

Precautions

Precautions for Transmission / Transaxle

B718H15000001

Refer to “General Precautions in Section 00 (Page 00-1)”.

Manual Transmission

Diagnostic Information and Procedures

Manual Transmission Symptom Diagnosis

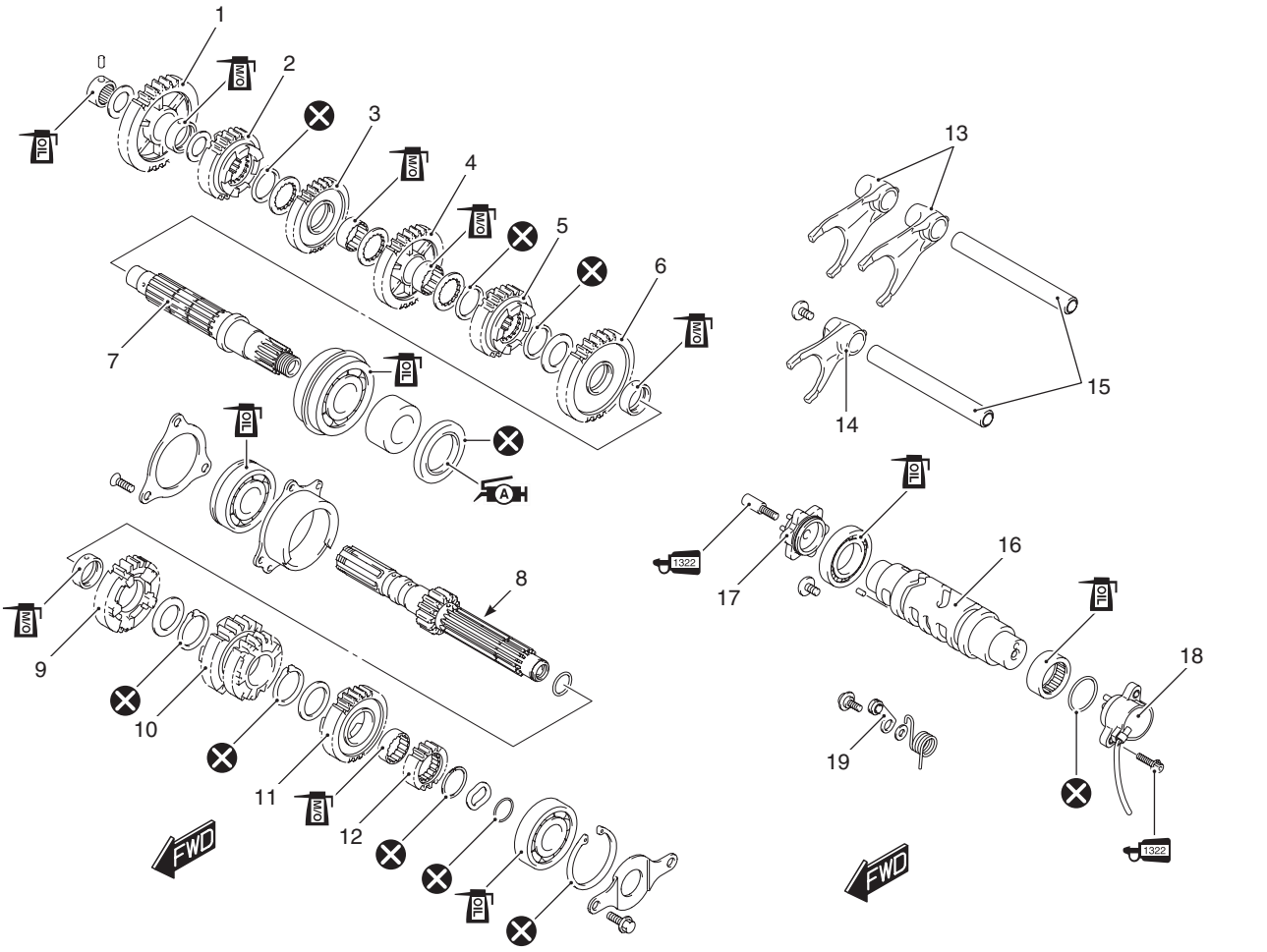
B718H15204001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the transmission).	Worn or rubbing gear.	*Replace.*
	Worn countershaft spline.	*Replace countershaft.*
	Worn driveshaft spline.	*Replace driveshaft.*
	Worn or rubbing primary gear.	*Replace.*
	Worn bearing.	*Replace.*
Transmission will not shift.	Broken gearshift cam.	*Replace.*
	Distorted gearshift fork.	*Replace.*
	Worn gearshift pawl.	*Replace.*
Transmission will not shift back.	Broken gearshift shaft return spring.	*Replace.*
	Rubbing or stuck gearshift shaft.	*Repair or replace.*
	Worn or distorted gearshift fork.	*Replace.*
Transmission jumps out of gear.	Worn shifting gears on driveshaft or countershaft.	*Replace.*
	Worn or distorted gearshift fork.	*Replace.*
	Weakened gearshift stopper spring.	*Replace.*
	Worn gearshift cam plate.	*Replace.*

Repair Instructions

Transmission Components

B718H15206001



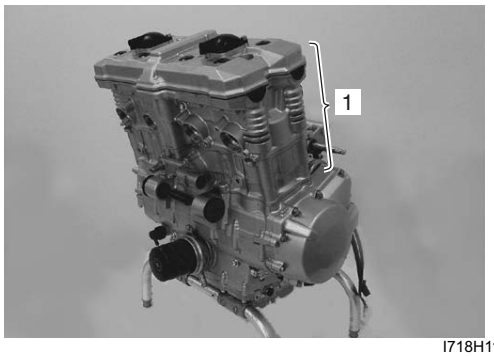
I718H1520076-02

1. 1st driven gear	9. 5th drive gear	17. Gearshift cam plate
2. 5th driven gear	10. 3rd/4th drive gear	18. Gear position switch
3. 4th driven gear	11. 6th drive gear	19. Gearshift cam stopper plate
4. 3rd driven gear	12. 2nd drive gear	OIL : Apply oil.
5. 6th driven gear	13. Gearshift fork No.1	M/O : Apply molybdenum oil solution.
6. 2nd driven gear	14. Gearshift fork No.3	A : Apply grease to oil seal lip.
7. Driveshaft	15. Gearshift fork	1322 : Apply thread lock to thread part.
8. Countershaft/1st drive gear	16. Gearshift cam	: Do not reuse.

Transmission Removal

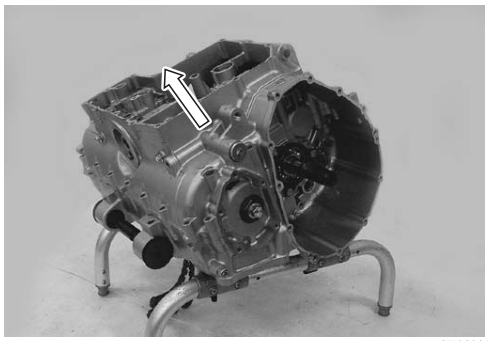
B718H15206002

1) Remove the engine assembly from the frame. Refer to “Engine Assembly Removal in Section 1D (Page 1D-17)”.
2) Disassemble the engine top side (1). Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-24)”.



I718H1140158-01

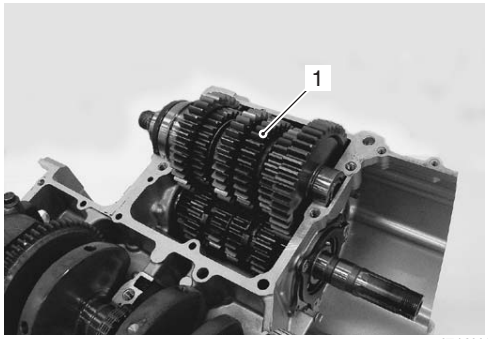
3) Separate the upper and lower crankcases. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-53)”.



I718H1520004-01

Driveshaft Assembly

1) Remove the driveshaft assembly (1).

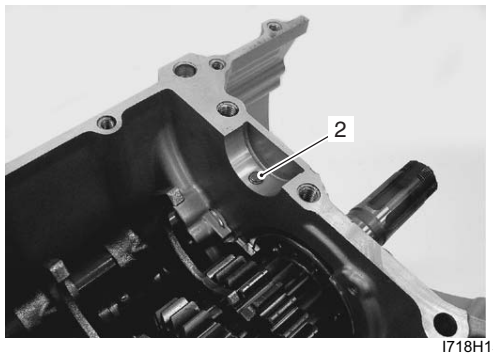


I718H1520005-01

2) Remove the bearing pin (2).

NOTE

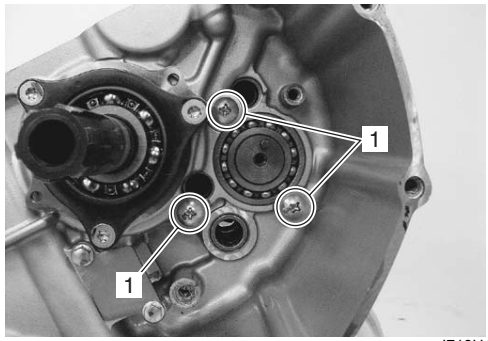
Do not lose the bearing pin (2).



I718H1520006-01

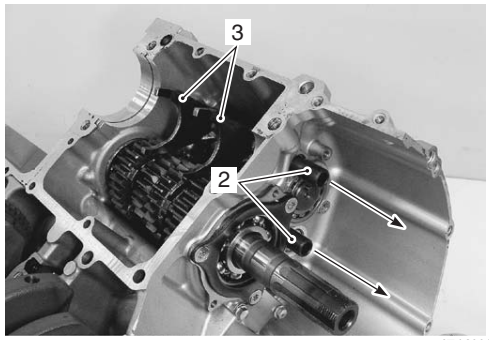
Gearshift Cam / Gearshift Fork

1) Remove the retainer screws (1).



I718H1520007-01

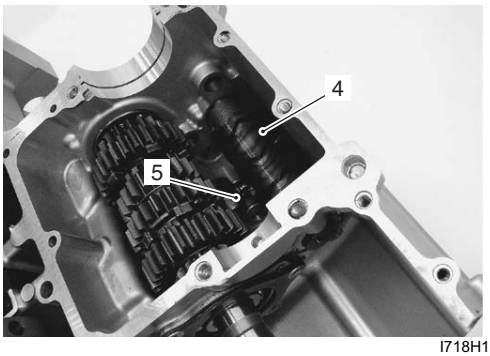
2) Remove the gearshift fork shafts (2) and No.1 gearshift forks (3).



I718H1520008-01

3) Remove the gearshift cam bearing and gearshift cam (4).

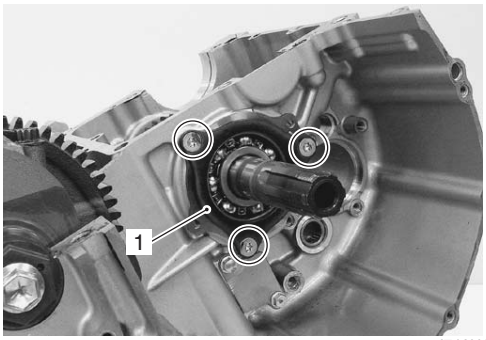
4) Remove the No.3 gearshift fork (5).



I718H1520009-01

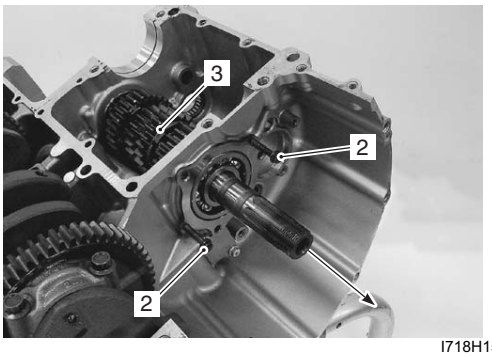
Countershaft Assembly

1) Remove the bearing retainer (1).



I718H1520010-01

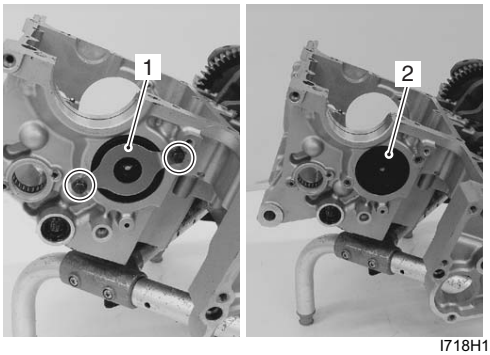
2) By using suitable size bolts (2), pull out the countershaft assembly (3).



I718H1520011-01

Bearing / Oil Seal

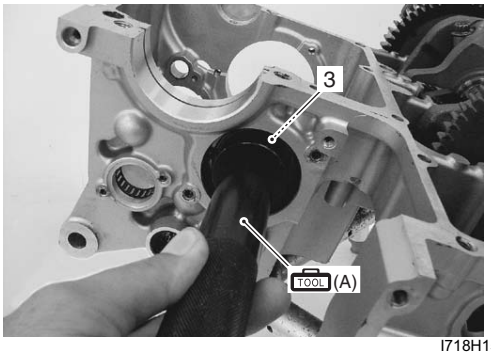
1) Remove the oil seal retainer (1) and oil seal (2).



I718H1520012-01

2) Remove the countershaft bearing (3) with the special tool.

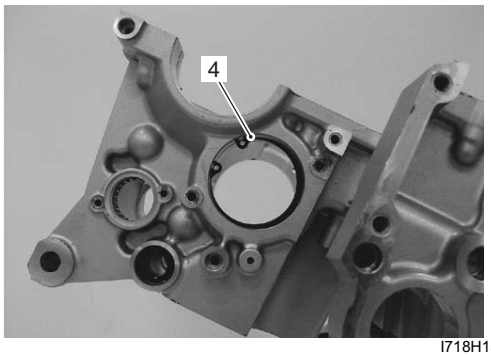
Special tool
(A): 09913–70210 (Bearing installer set)



I718H1520013-01

3) Remove the snap ring (4).

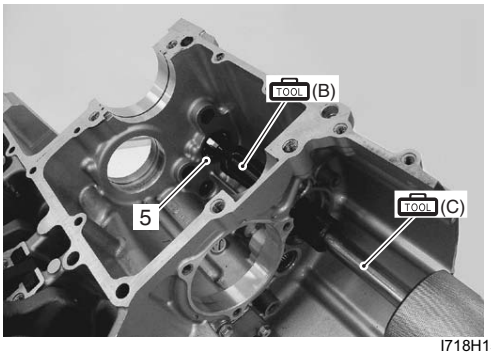
Special tool
: 09900–06108 (Snap ring pliers)



I718H1520014-01

4) Remove the gearshift cam bearing (5) with the special tools.

Special tool
(B): 09923–74511 (Bearing puller)
(C): 09930–30104 (Rotor remover slide shaft)



I718H1520015-01

Transmission Installation

B718H15206003

Install the transmission in the reverse order of removal. Pay attention to the following points:

Bearing / Oil Seal

⚠ CAUTION

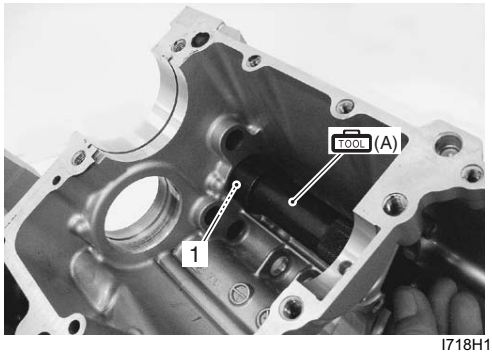
Replace the removed oil seal, bearings and snap ring with new ones.

- Install the bearings (1), (2) with the special tool.

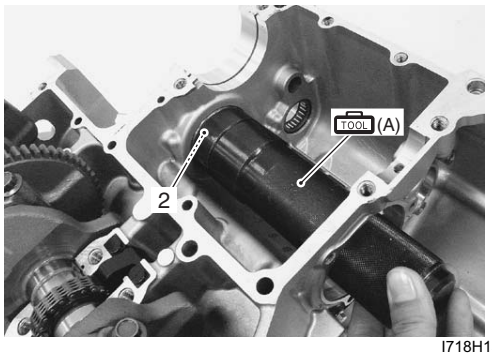
NOTE

- **The stamped mark side of gearshift cam bearing (1) faces inside.**
- **The sealed side of countershaft bearing (2) faces outside.**

Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I718H1520016-02



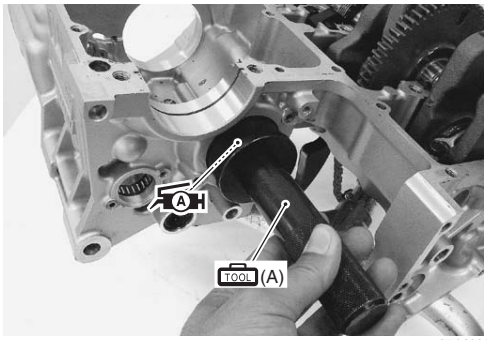
I718H1520017-02

- Install the oil seal with the special tool.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)

- Apply grease to the oil seal lip.

A : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

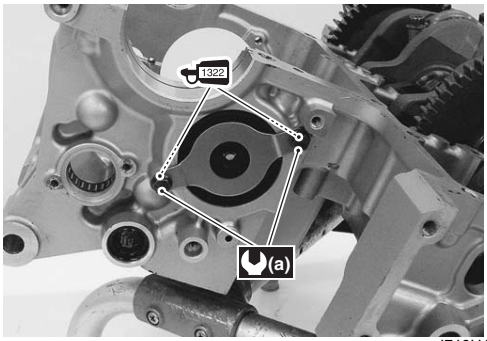


I718H1520018-02

- Apply a small quantity of thread lock to the oil seal bolts and tighten them to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Push rod oil seal bolt (a): 12 N·m (1.2 kgf-m, 8.5 lb-ft)



I718H1520019-03

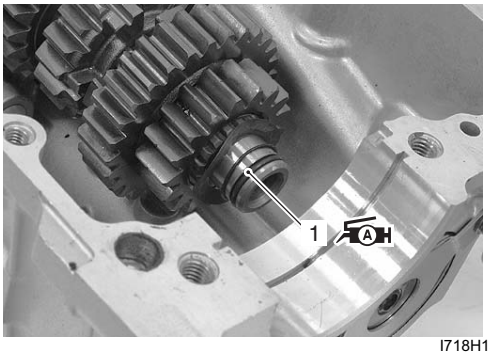
Countershaft Assembly

- Apply grease to the O-rings.

⚠ CAUTION

Replace the O-rings (1) with new ones.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

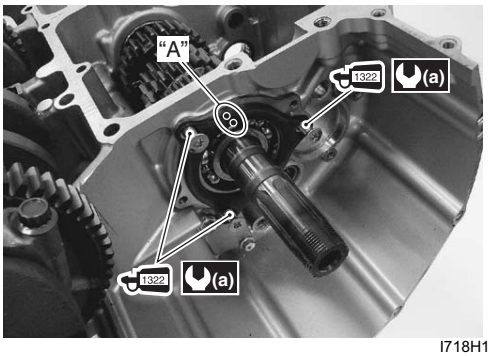


I718H1520020-02

- Align the punch marks “A” on the countershaft bearing housing and bearing retainer.
- Apply a small quantity of thread lock to the bearing retainer screw and tighten them to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

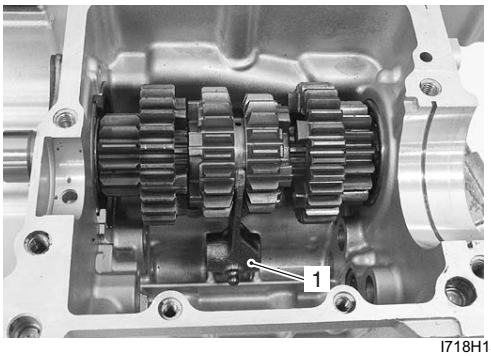
Tightening torque
Countershaft bearing retainer screw (a): 12 N·m (1.2 kgf-m, 8.5 lb-ft)



I718H1520021-02

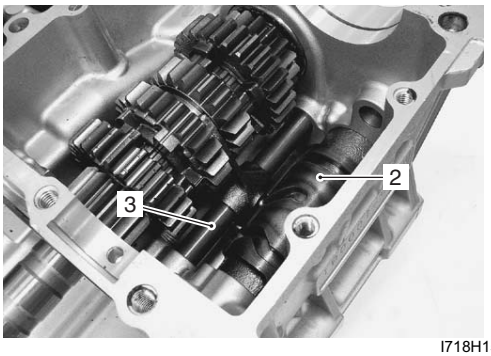
Gearshift Cam and Gearshift Fork

- Install the No.3 gearshift fork (1) as shown.



I718H1520022-03

- Install the gearshift cam (2) with the bearing fitted.
- With engaging the fork end to the cam groove, insert the fork shaft (3).



I718H1520023-01

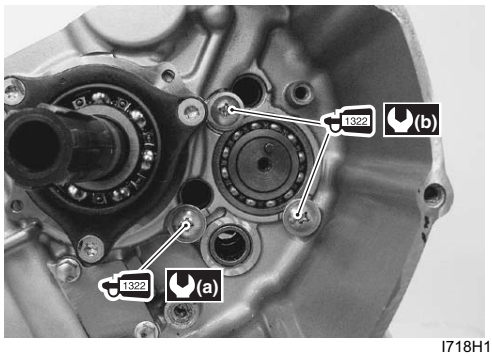
- With engaging each fork end to the cam groove, insert the fork shaft (4).

I718H1520024-01

- Apply thread lock to the screws and tighten them to the specified torque.

  1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

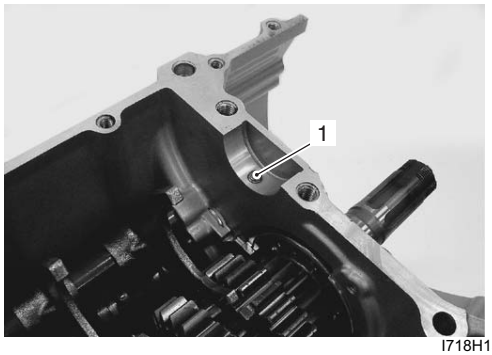
  Tightening torque
  Gearshift fork shaft retainer screw (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)
  Gearshift cam retainer screw (b): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1520025-02

Driveshaft Assembly

- Install the bearing pin (1).

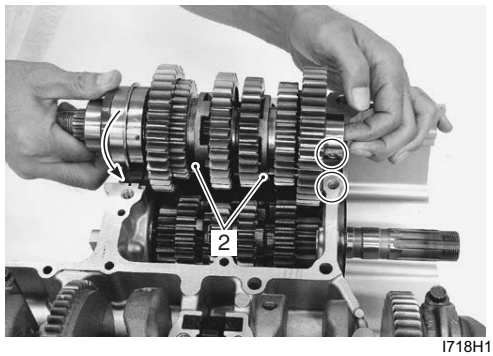


I718H1520026-01

- Install the driveshaft assembly on the upper crankcase.

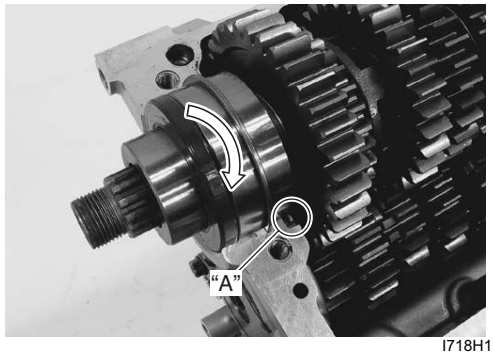
NOTE

- **Align the gearshift forks (2) with their grooves.**
- **Align the C-ring with the groove of bearing and the bearing pin with the indent on the bearing.**



I718H1520027-02

- Turn the bearing to fit the bearing dowel pin in the position “A”.

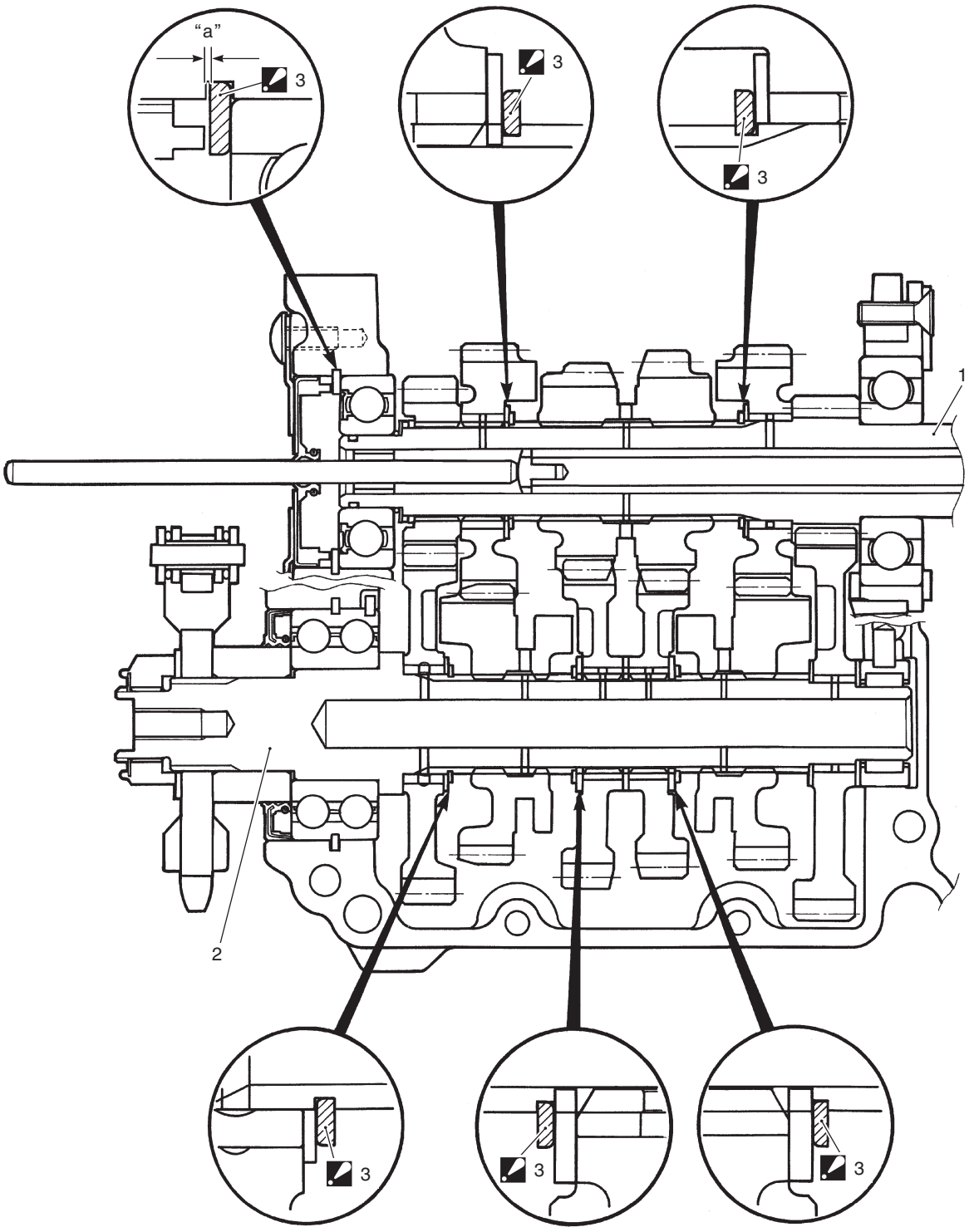


I718H1520028-02

- Assemble the engine. Refer to “Engine Bottom Side Assembly in Section 1D (Page 1D-61)” and “Engine Top Side Assembly in Section 1D (Page 1D-28)”.
- Remount the engine assembly. Refer to “Engine Assembly Installation in Section 1D (Page 1D-21)”.

Transmission Construction

B718H15206004



I718H1520071-04

1. Counter shaft	2. Drive shaft	3. Snap ring :Assemble snap ring with sharp edge side out.	"a": 0.2 mm (0.008 in)

Countershaft Gear / Driveshaft Gear Disassembly and Assembly

B718H15206005

Refer to “Transmission Removal (Page 5B-3)” and “Transmission Installation (Page 5B-5)”.

Disassembly

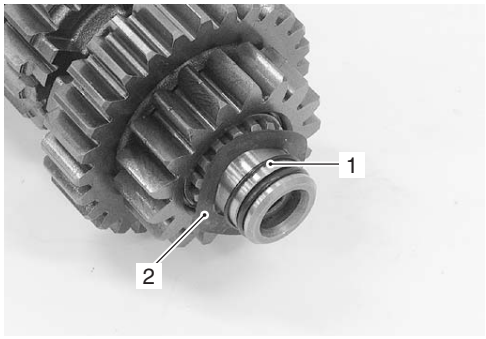
⚠ CAUTION

Identify the position of each removed part. Organize the parts in their respective groups (i.e., drive or driven) so that they can be reinstalled in their original positions.

Disassemble the countershaft and driveshaft as shown in the transmission construction. Refer to “Transmission Construction (Page 5B-8)”.
Pay attention to the following points:

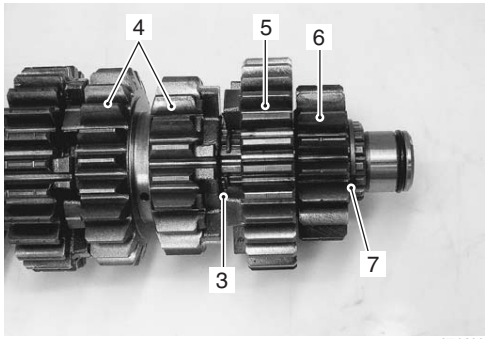
Countershaft

- Remove the O-ring (1) and wave washer (2).



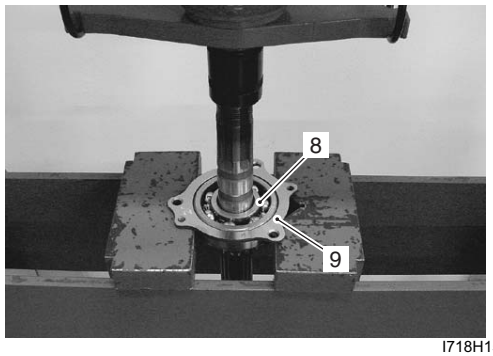
I718H1520072-01

- Remove the 6th drive gear snap ring (3) from its groove and slide it towards the 3rd/4th drive gears (4).
- Slide the 6th (5) and 2nd (6) drive gears toward the 3rd/4th drive gears (4), then remove the 2nd drive gear circlip (7).



I718H1520030-02

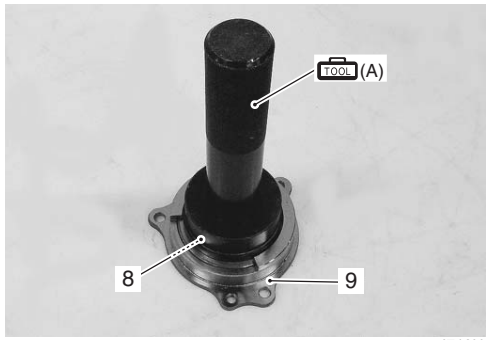
- Remove the countershaft bearing (8) along with the housing (9), using the hydraulic press.



I718H1520031-02

- Remove the countershaft bearing (8) from the housing (9), using the special tool.

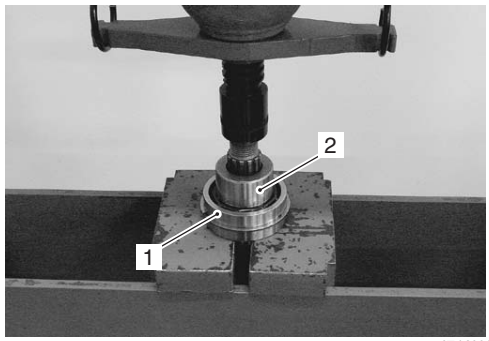
Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I718H1520032-02

Driveshaft

- Remove the driveshaft bearing (1) along with the spacer (2), using the hydraulic press.



I718H1520033-01

Assembly

NOTE

When reassembling the transmission gears, attention must be given to the locations and positions of washers and snap rings. The cross sectional view shows the correct position of the gears, bushings, washers and snap rings. Refer to "Transmission Construction (Page 5B-8)".

⚠ CAUTION

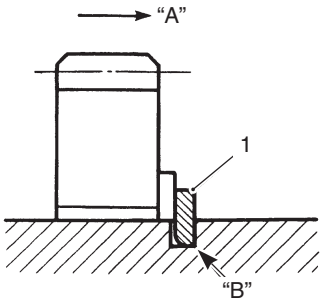
- **Never reuse a snap rings. After a snap rings has been removed from a shaft, it should be discarded and a new snap rings must be installed.**
- **When installing a new snap rings, do not expand the end gap larger than required to slip the snap rings over the shaft.**
- **After installing snap rings, make sure that they are completely seated in their groove and securely fitted.**

NOTE

- **Rotate the bearing by hand to inspect if there are any abnormal noises and smooth rotation. Replace the bearing if there is anything unusual.**
- **Before installing the gears, apply engine oil to the driveshaft and countershaft.**
- **Before installing the oil seal, apply grease to the oil seal lip.**

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

- When installing a new snap ring (1), pay attention to its direction. Fit it to the side where the thrust is as shown in the illustration.



I649G1520049-01

"A": Thrust	"B": Sharp edge	1. Snap ring

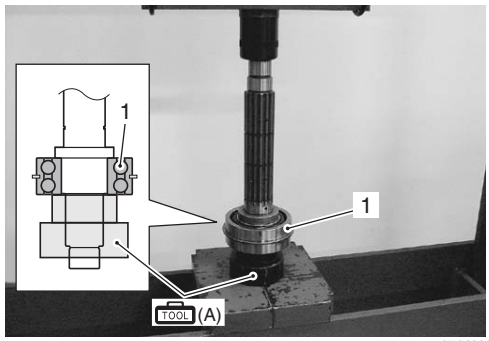
Driveshaft

- Install the driveshaft bearing (1), using the hydraulic press and special tool.

⚠ CAUTION

Never reuse driveshaft bearing (1).

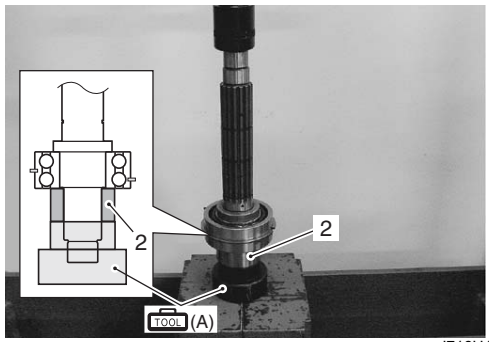
Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I718H1520034-01

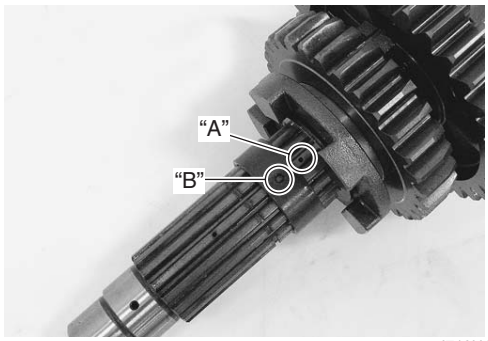
- Install the spacer (2), using the hydraulic press and special tool.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)

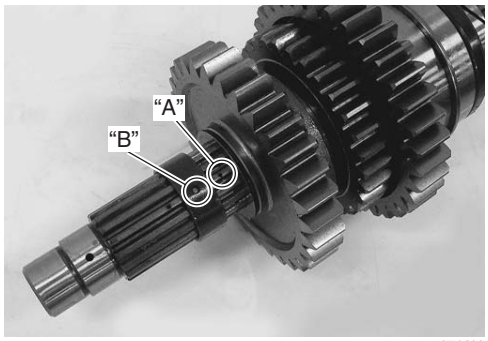


I718H1520035-01

- When installing the gear bushing onto the driveshaft, align the shaft oil hole “A” with the bushing oil hole “B”.



I718H1520036-01



I718H1520037-01

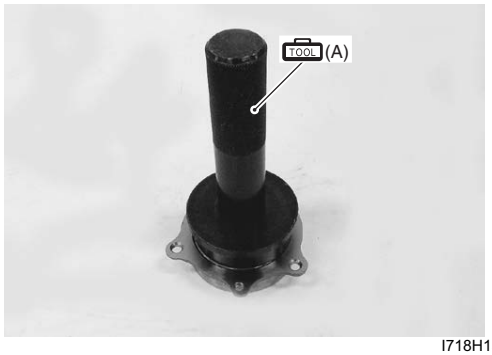
Countershaft

- Install the countershaft bearing (1) into the housing (2), using the special tool.

⚠ CAUTION

Never reuse countershaft bearing (1).

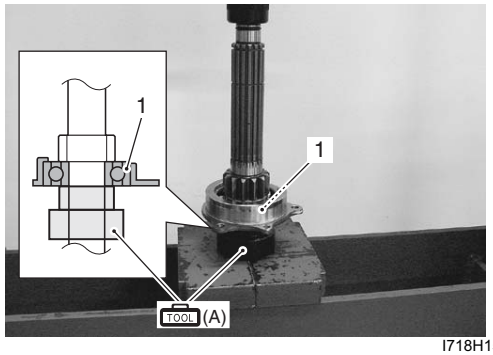
Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I718H1520038-01

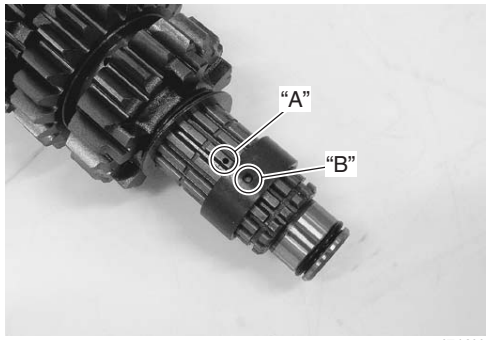
- Install the countershaft bearing (1) to the countershaft, using the hydraulic press and special tool.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I718H1520039-01

- When installing the gear bushing onto the countershaft (3), align the shaft oil hole “A” with the bushing oil hole “B”.

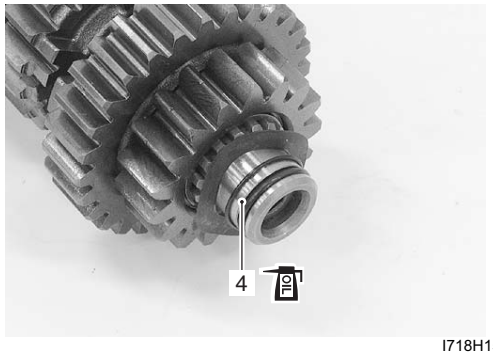


I718H1520040-01

- Apply engine oil to O-ring (4).

⚠ CAUTION

Replace the O-ring (4) with a new one.



I718H1520073-01

Transmission Related Parts Inspection

B718H15206007

Refer to “Transmission Removal (Page 5B-3)”, “Transmission Installation (Page 5B-5)” and “Countershaft Gear / Driveshaft Gear Disassembly and Assembly (Page 5B-9)”.

Gearshift Fork to Groove Clearance

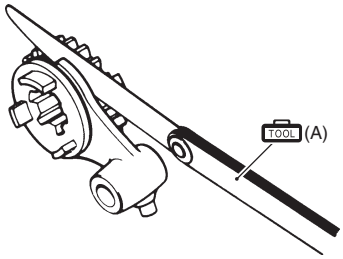
NOTE

The clearance for each gearshift fork plays an important role in the smoothness and positiveness of the shifting action.

Using a thickness gauge, check the gearshift fork clearance in the groove of its gear.
If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

Special tool
TOOL (A): 09900–20803 (Thickness gauge)

Gearshift fork to gearshift fork groove clearance
Standard: 0.1 – 0.3 mm (0.004 – 0.012 in)
Service limit: 0.5 mm (0.02 in)



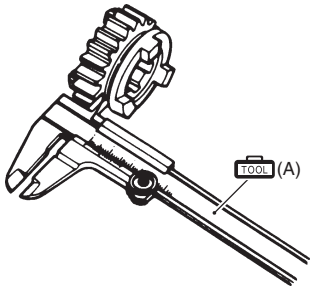
I649G1520056-02

Gearshift Fork Groove Width

Measure the gearshift fork groove width using the vernier calipers.

Special tool
TOOL (A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Gearshift fork groove width
Standard (No.1, No.2 & No.3): 5.0 – 5.1 mm (0.197 – 0.201 in)



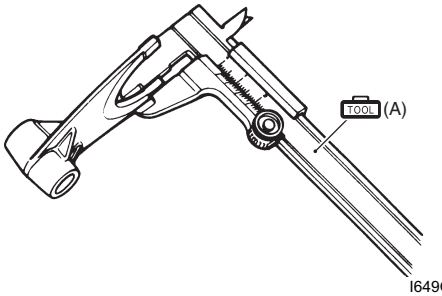
I649G1520057-02

Gearshift Fork Thickness

Measure the gearshift fork thickness using the vernier calipers.

Special tool
TOOL (A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

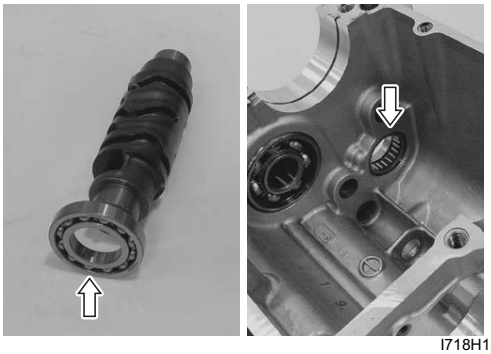
Gearshift fork thickness
Standard (No.1, No.2 & No.3): 4.8 – 4.9 mm (0.189 – 0.193 in)



I649G1520058-02

Gearshift Cam Bearing

Inspect the gearshift cam bearings, left and right for abnormal noise and smooth rotation.
Replace the bearing if there is anything unusual. Refer to “Transmission Removal (Page 5B-3)” and “Transmission Installation (Page 5B-5)”.



I718H1520041-01

Gear Position (GP) Switch Inspection

B718H15206008

Refer to “Side-stand / Ignition Interlock System Parts Inspection in Section 1I (Page 1I-8)”.

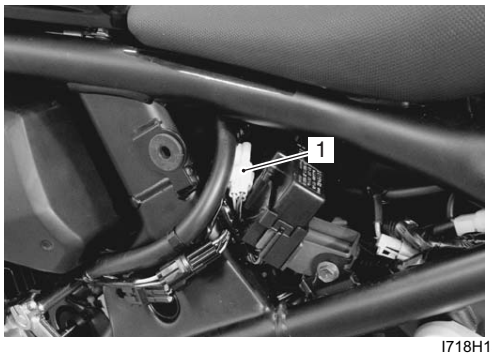
Gear Position (GP) Switch Removal and Installation

B718H15206009

Removal

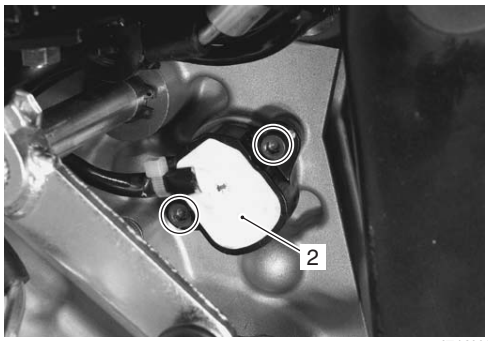
1) Turn the ignition switch OFF.
2) Remove the left flame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Remove the engine sprocket outer cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.

4) Disconnect the gear position switch coupler (1).



I718H1520042-01

5) Remove the gear position switch (2).



I718H1520043-01

Installation

Install the gear position switch in the reverse order of removal. Pay attention to the following points:

- Apply grease to the O-ring.

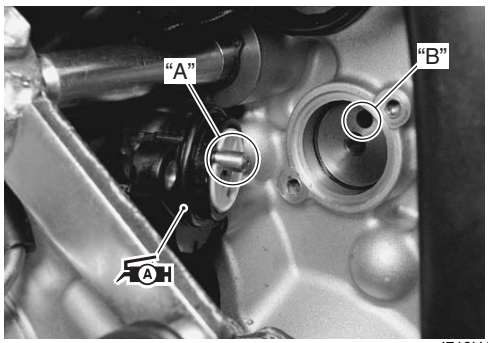
⚠ CAUTION

Replace the O-ring with a new one.

NOTE

Align the gear position switch pin "A" with the gearshift cam hole "B".

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

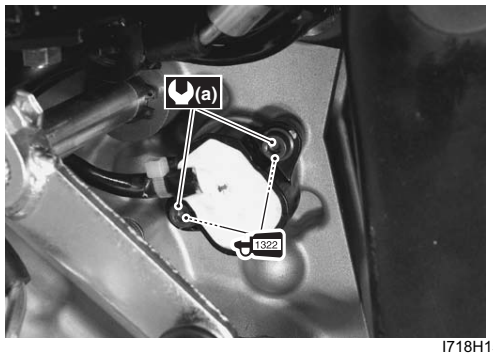


I718H1520044-01

- Apply thread lock to the gear position switch bolts and tighten them to the specified torque.

: Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
GP switch mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)

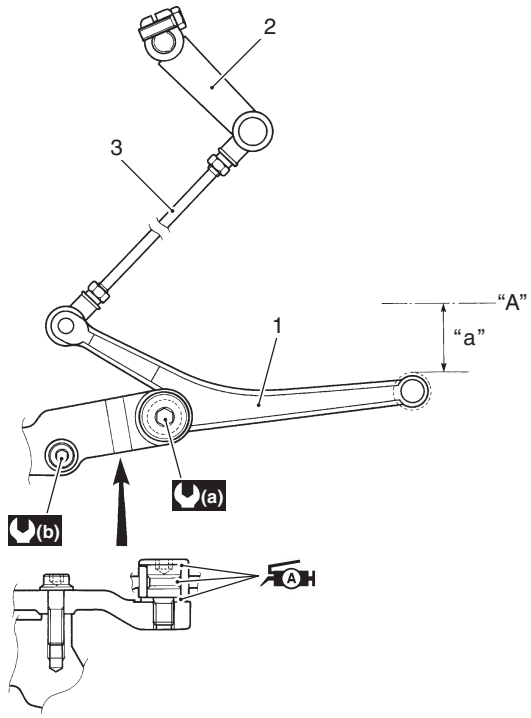


I718H1520045-02

- Route the gear position switch lead wire. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-8)".

Gearshift Lever Construction

B718H15206016



I718H1520074-02

1. Gearshift lever	"a". 45 – 55 mm (1.8 – 2.2 in)
2. Gearshift link arm	(a) : 40 N·m (4.0 kgf-m, 29.0 lb-ft)
3. Gearshift link rod	(b) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
"A". Footrest top surface	: Apply grease.

Gearshift Lever Removal and Installation

B718H15206017

Removal

1) Place the motorcycle on the center stand.
2) Remove the gearshift lever as shown in the gearshift lever construction. Refer to “Gearshift Lever Construction (Page 5B-13)”.

Installation

1) Install the gearshift lever as shown in the gearshift lever construction. Refer to “Gearshift Lever Construction (Page 5B-13)”.
2) After installing the gearshift lever, check the gearshift lever height. Refer to “Gearshift Lever Height Inspection and Adjustment (Page 5B-14)”.

Gearshift Lever Height Inspection and Adjustment

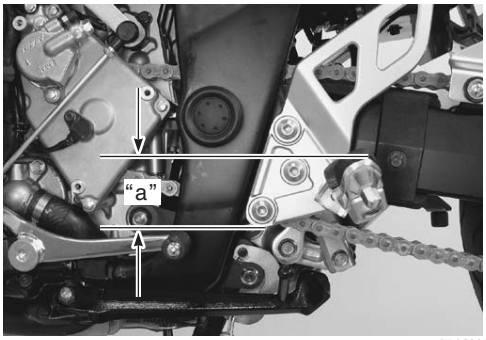
B718H15206014

Inspect and adjust the gearshift lever height in the following procedures:

1) Inspect the gearshift lever height “a” between the pedal top face and footrest.
   Adjust the gearshift lever height if necessary.

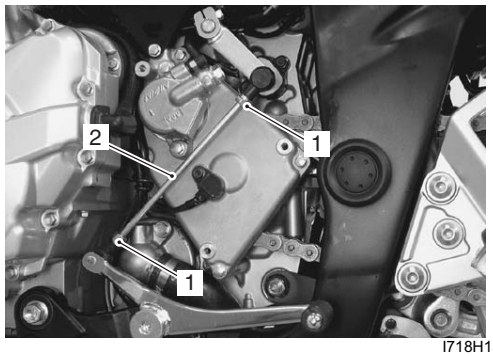
   Gearshift lever height “a”
   Standard 45 – 55 mm (1.8 – 2.2 in.)

2) Remove the engine sprocket outer cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.



I718H1520068-01

3) Loosen the lock-nuts (1).
4) Turn the gearshift link rod (2) until the gearshift lever is 45 – 55 mm (1.8 – 2.2 in.) below the top of the footrest.
5) Tighten the lock-nuts securely.

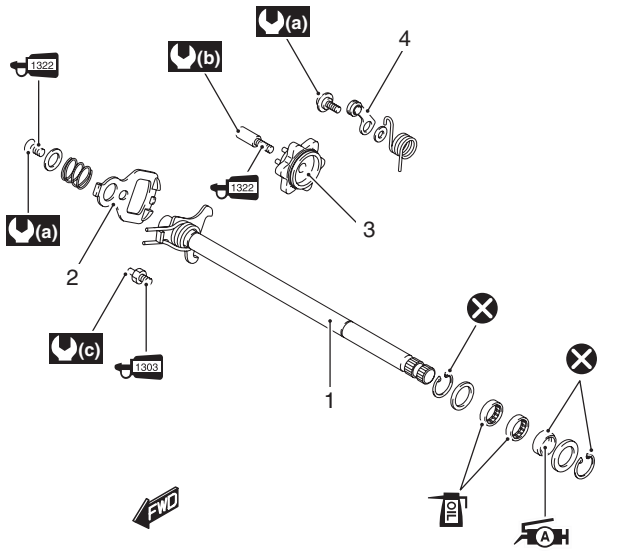


I718H1520069-01

6) Reinstall the engine sprocket outer cover.

Gearshift Shaft / Gearshift Cam Plate Components

B718H15206010

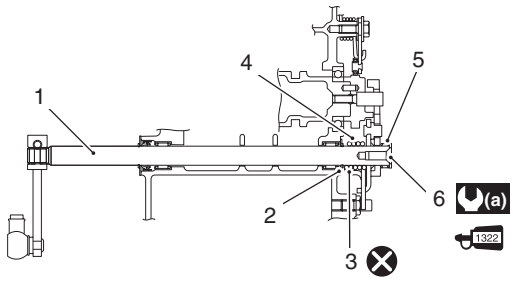


I718H1520075-03

1.	Gearshift shaft
2.	Gearshift cam drive plate
3.	Gearshift cam plate
4.	Gearshift cam stopper
(a)	: 10 N·m (1.0 kgf-m, 7.0 lb-ft)
(b)	: 13 N·m (1.3 kgf-m, 9.5 lb-ft)
(c)	: 19 N·m (1.9 kgf-m, 13.5 lb-ft)
1303	: Apply thread lock to thread part.
1322	: Apply thread lock to thread part.
A	: Apply grease to oil seal lip.
OIL	: Apply engine oil.
	: Do not reuse.

Gearshift Construction

B718H15206015



I718H1520002-02

1.	Gearshift shaft
2.	Washer
3.	Snap ring
4.	Gearshift shaft return spring
5.	Gearshift plate return spring
6.	Gearshift shaft end bolt
(a) :	10 N·m (1.0 kgf-m, 7.0 lb-ft)
1322 :	Apply thread lock to thread part.
⊗ :	Do not reuse.

Gearshift Shaft / Gearshift Cam Plate Removal and Installation

B718H15206011

Removal

1) Remove the engine sprocket outer cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
2) Disengage the gearshift link arm by removing the bolt.

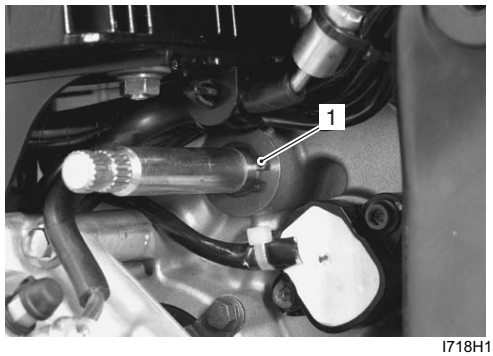
NOTE

Mark the gearshift shaft head at which the gearshift link arm slit set for correct reinstallation.

I718H1520046-01

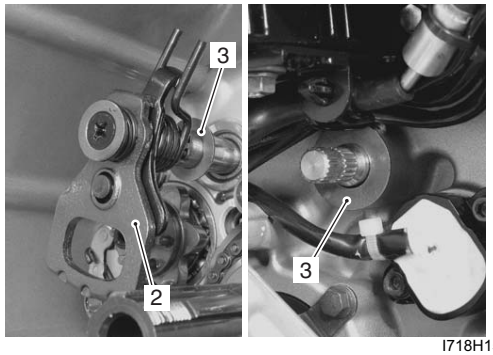
3) Remove the clutch components. Refer to “Clutch Removal in Section 5C (Page 5C-13)”.
4) Remove the snap ring (1) from the gearshift shaft.

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I718H1520047-01

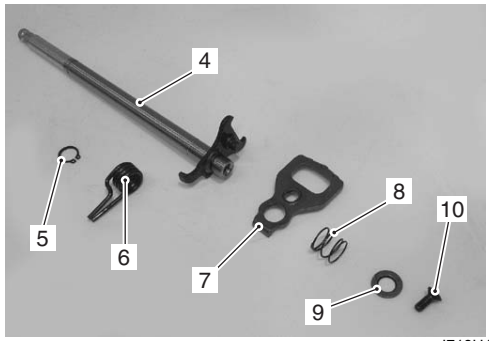
5) Remove the gearshift shaft assembly (2) and washers (3).



I718H1520048-02

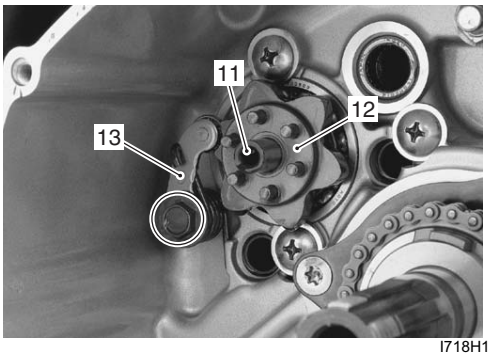
6) Remove the following parts from the gearshift shaft (4).
   - Snap ring (5)
   - Gearshift return spring (6)
   - Gearshift cam drive plate (7)
   - Plate return spring (8)
   - Washer (9)
   - End bolt (10)

Special tool
TOOL : 09900–06107 (Snap ring pliers)



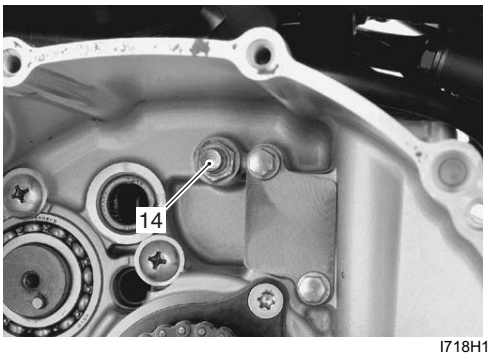
I718H1520049-02

7) Remove the gearshift cam plate bolt (11) and gearshift cam plate (12).
8) Remove the gearshift cam stopper (13).



I718H1520050-01

9) Remove the gearshift arm stopper (14).



I718H1520051-01

Installation
Install the gearshift shaft and gearshift cam plate in the reverse order of removal. Pay attention to the following points:

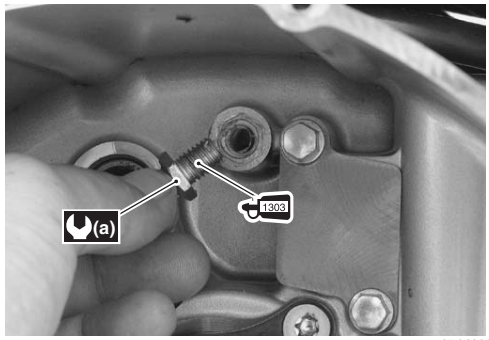
⚠ CAUTION

The removed snap rings must be replaced with new ones.

- Apply a small quantity of thread lock to the gearshift arm stopper and tighten it to the specified torque.

1303 : Thread lock cement 99000–32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

Tightening torque
Gearshift arm stopper (a): 19 N·m (1.9 kgf-m, 13.5 lb-ft)



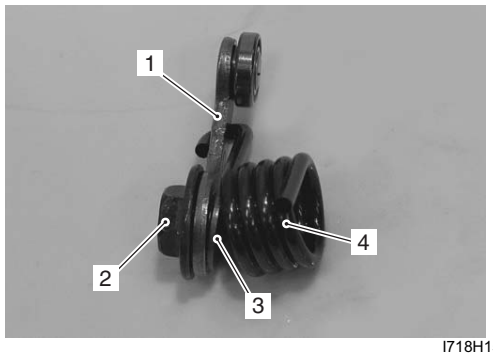
I718H1520052-01

- Install the gearshift cam stopper (1), bolt (2), washer (3) and return spring (4).
- Tighten the gearshift cam stopper bolt (2) to the specified torque.

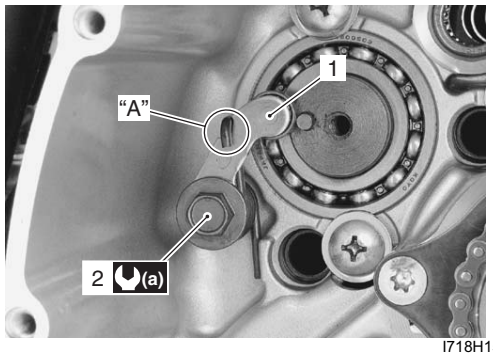
NOTE

Hook the return spring end "A" to the stopper (1).

Tightening torque
Gearshift cam stopper bolt (b): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1520003-03

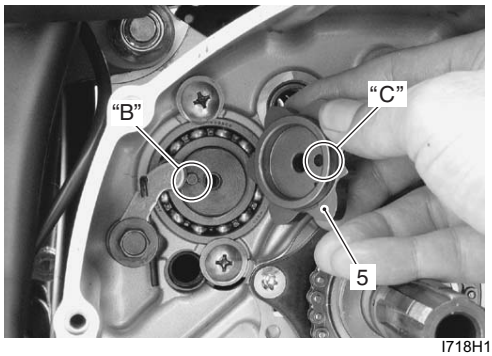


I718H1520082-01

- Check the gearshift cam stopper moves smoothly.
- Locate the gearshift cam in the neutral position.
- Install the gearshift cam stopper plate (5).

NOTE

Align the gearshift cam pin “B” with the gearshift cam stopper plate hole “C”.

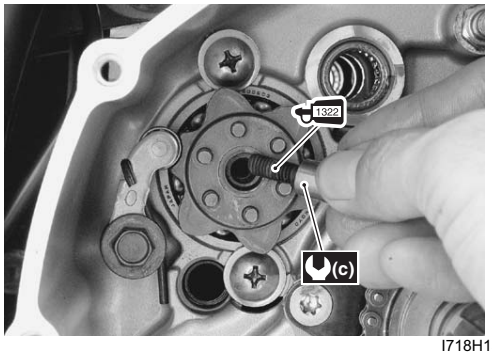


I718H1520054-01

- Apply a small quantity of thread lock to the gearshift cam stopper plate bolt and tighten it to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Gearshift cam stopper plate bolt (c): 13 N·m (1.3 kgf-m, 9.5 lb-ft)

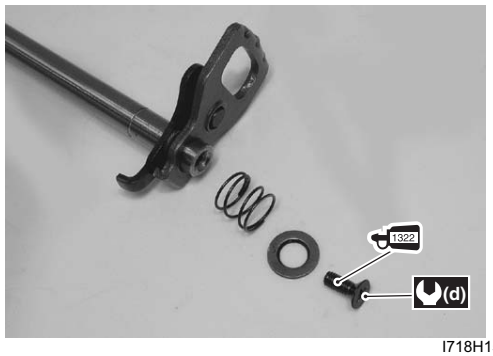


I718H1520055-02

- Apply a small quantity of thread lock to the gearshift shaft end bolt and tighten it to the specified torque.

1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

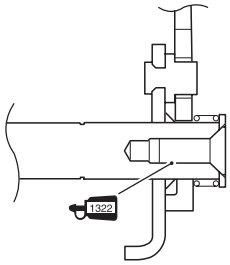
Tightening torque
Gearshift shaft end bolt (d): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1520056-02

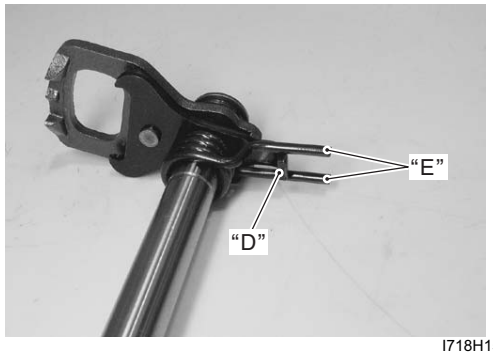
NOTE

The concave side of washer faces outside.



I718H1520084-01

- When installing the gearshift shaft return spring, position the stopper “D” of gearshift arm between the shaft return spring ends “E”.

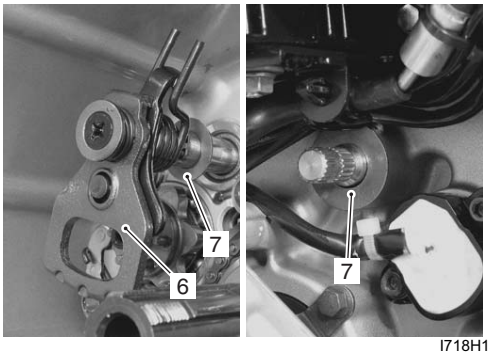


I718H1520057-01

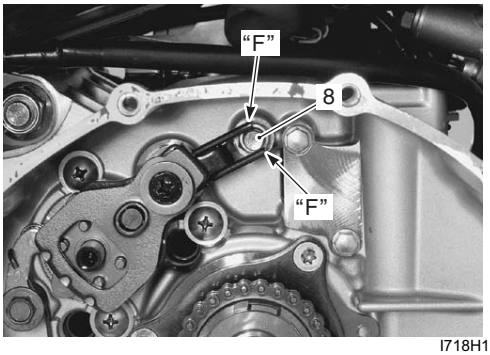
- Install the gearshift shaft assembly (6) and washers (7) as shown.

NOTE

Pinch the gearshift arm stopper (8) with return spring ends “F”.



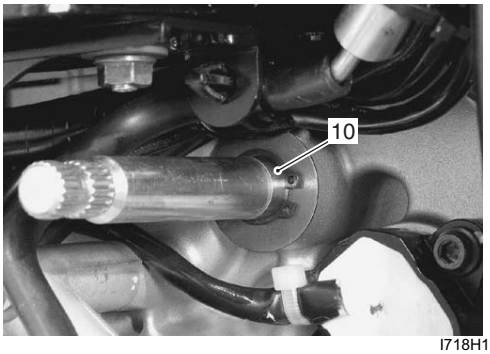
I718H1520058-02



I718H1520059-02

- Install a new snap ring (10).

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I718H1520060-01

- After installing the gearshift lever, check the gearshift lever height. Refer to “Gearshift Lever Height Inspection and Adjustment (Page 5B-14)”.

Gearshift Linkage Inspection

B718H15206012

Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation (Page 5B-15)”.

Gearshift Shaft

Check the gearshift shaft for bend or wear.
Check the return spring for damage or fatigue.
If any defects are found, replace the defective part(-s).

I718H1520061-01

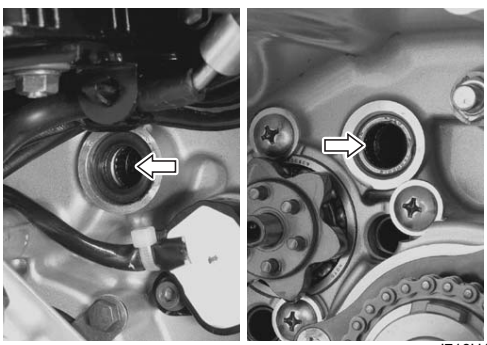
Gearshift Shaft Oil Seal

Inspect the gearshift shaft oil seal lip for damage or wear. If any defect is found, replace the oil seal with a new one.

I718H1520062-01

Gearshift Shaft Bearing

Inspect the gearshift shaft bearing for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



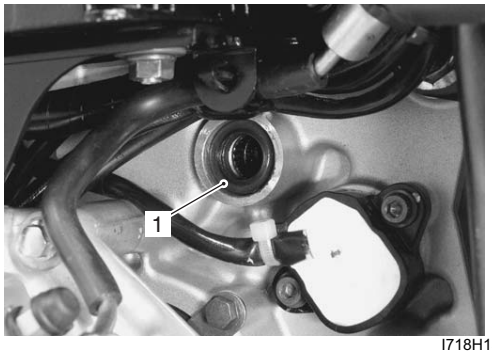
I718H1520063-01

Gearshift Shaft Oil Seal / Bearing Removal and Installation

B718H15206013

Removal

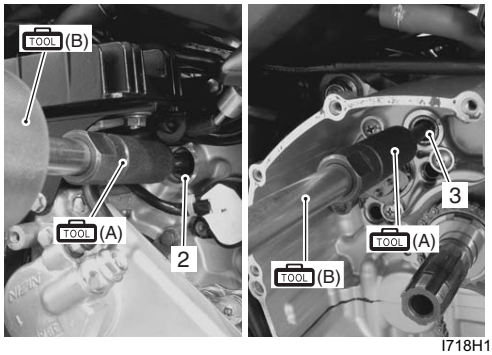
1) Remove the gearshift shaft. Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation (Page 5B-15)”.
2) Remove the gearshift shaft oil seal (1).



I718H1520064-01

3) Remove the bearings (2), (3) with the special tools.

Special tool
(A): 09921–20210 (Bearing remover)
(B): 09930–30104 (Rotor remover slide shaft)



I718H1520065-01

Installation

Install the oil seal and bearing in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

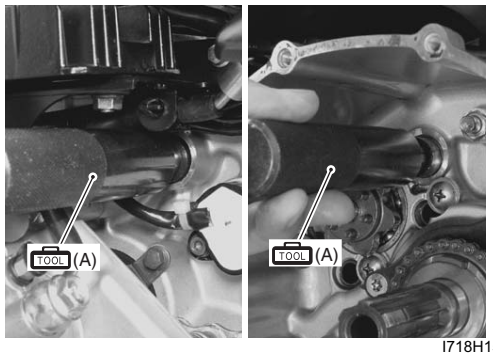
The removed oil seal and bearings must be replaced with new ones.

- Install the bearings with the special tool.

NOTE

The stamped mark side of gearshift shaft bearing faces outside.

Special tool
(A): 09913–70210 (Bearing installer set)



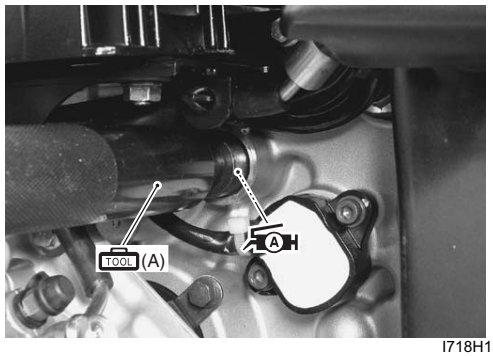
I718H1520066-01

- Install the oil seal with the special tool.

Special tool
(A): 09913–70210 (Bearing installer set)

- Apply grease to the oil seal lip.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1520067-01

Specifications

Service Data

B718H15207001

Transmission + Drive Chain

Unit: mm (in) Except ratio

Item		Standard		Limit
Primary reduction ratio		1.537 (83/54)		—
Final reduction ratio		2.388 (43/18)		—
Gear ratios	Low	3.076 (40/13)		—
	2nd	2.058 (35/17)		—
	3rd	1.550 (31/20)		—
	4th	1.304 (30/23)		—
	5th	1.160 (29/25)		—
	Top	1.071 (30/28)		—
Gearshift-fork to gearshift-fork groove clearance		No.1, 2, 3	0.1 – 0.3 (0.004 – 0.012)	0.5 (0.020)
Gearshift fork groove width		No.1, 2, 3	5.0 – 5.1 (0.197 – 0.201)	—
Gearshift fork thickness		No.1, 2, 3	4.8 – 4.9 (0.189 – 0.193)	—
Gearshift lever height		45 – 55 (1.8 – 2.2)		—

Tightening Torque Specifications

B718H15207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Push rod oil seal bolt	12	1.2	8.5	☞(Page 5B-5)
Countershaft bearing retainer screw	12	1.2	8.5	☞(Page 5B-6)
Gearshift fork shaft retainer screw	10	1.0	7.0	☞(Page 5B-7)
Gearshift cam retainer screw	10	1.0	7.0	☞(Page 5B-7)
GP switch mounting bolt	6.5	0.65	4.7	☞(Page 5B-13)
Gearshift arm stopper	19	1.9	13.5	☞(Page 5B-16)
Gearshift cam stopper bolt	10	1.0	7.0	☞(Page 5B-16)
Gearshift cam stopper plate bolt	13	1.3	9.5	☞(Page 5B-17)
Gearshift shaft end bolt	10	1.0	7.0	☞(Page 5B-17)

NOTE

The specified tightening torque is also described in the following.
“Gearshift Lever Construction (Page 5B-13)”
“Gearshift Shaft / Gearshift Cam Plate Components (Page 5B-14)”
“Gearshift Construction (Page 5B-15)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H15208001

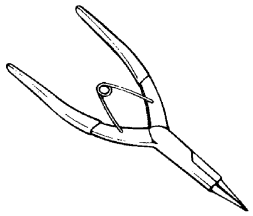
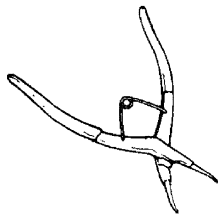
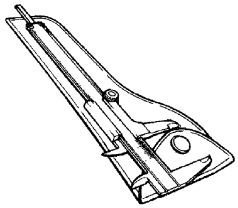
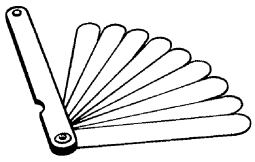
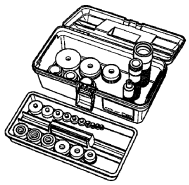
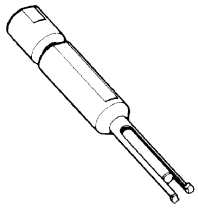
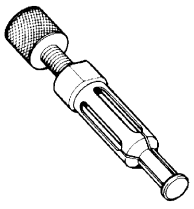
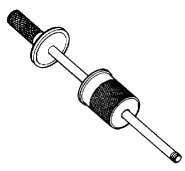
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 5B-5) / ☞(Page 5B-6) / ☞(Page 5B-10) / ☞(Page 5B-13) / ☞(Page 5B-19)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000–32030	☞(Page 5B-16)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 5B-5) / ☞(Page 5B-6) / ☞(Page 5B-7) / ☞(Page 5B-13) / ☞(Page 5B-17) / ☞(Page 5B-17)

NOTE

Required service material is also described in the following.
“Transmission Components (Page 5B-2)”
“Gearshift Lever Construction (Page 5B-13)”
“Gearshift Shaft / Gearshift Cam Plate Components (Page 5B-14)”
“Gearshift Construction (Page 5B-15)”

Special Tool

B718H15208002

09900–06107 Snap ring pliers ☞(Page 5B-15) / ☞(Page 5B-15) / ☞(Page 5B-18)		09900–06108 Snap ring pliers ☞(Page 5B-4)	
09900–20102 Vernier calipers (1/20 mm, 200 mm) ☞(Page 5B-12) / ☞(Page 5B-12)		09900–20803 Thickness gauge ☞(Page 5B-12)	
09913–70210 Bearing installer set ☞(Page 5B-4) / ☞(Page 5B-5) / ☞(Page 5B-5) / ☞(Page 5B-9) / ☞(Page 5B-10) / ☞(Page 5B-10) / ☞(Page 5B-11) / ☞(Page 5B-11) / ☞(Page 5B-19) / ☞(Page 5B-19)		09921–20210 Bearing remover ☞(Page 5B-19)	
09923–74511 Bearing remover ☞(Page 5B-4)		09930–30104 Rotor remover slide shaft ☞(Page 5B-4) / ☞(Page 5B-19)	

Clutch

Precautions

Precautions for Clutch System

B718H15300001

Refer to “General Precautions in Section 00 (Page 00-1)”.

Clutch Fluid (Brake Fluid) Information

B718H15300002

⚠ WARNING

- **This clutch system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not use or mix different types of fluid such as silicone-based or petroleum-based.**
- **Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for long periods.**
- **When storing brake fluid, seal the container completely and keep away from children.**
- **When replenishing brake fluid, take care not to get dust into fluid.**
- **When washing clutch components, use fresh brake fluid. Never use cleaning solvent.**

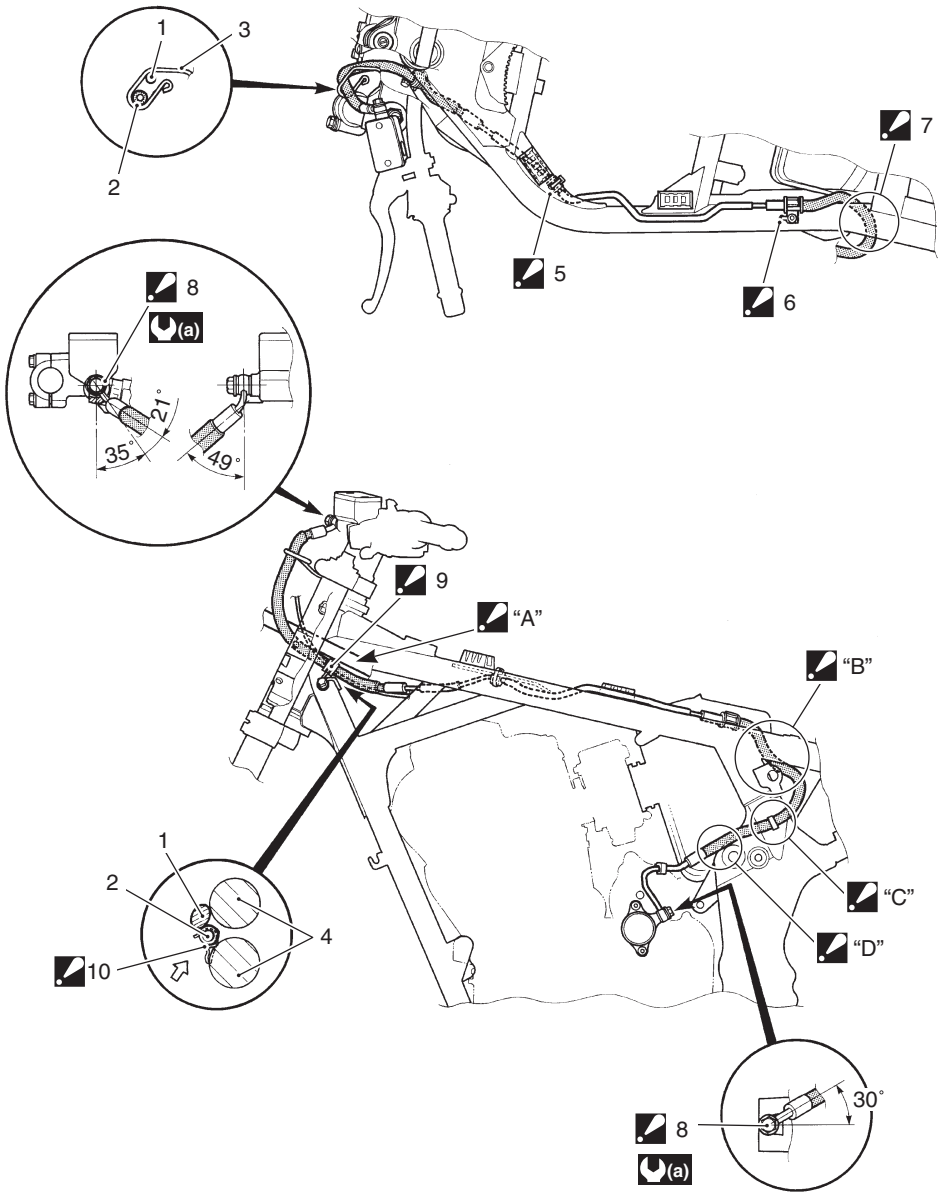
⚠ CAUTION

Immediately and completely wipe off any brake fluid contacting any part of the motorcycle. The brake fluid reacts chemically with paint, plastics and rubber materials, etc., and will damage them severely.

Schematic and Routing Diagram

Clutch Hose Routing Diagram

B718H15302001



I718H1530005-05

1. Wiring harness	9. Clutch hose No.3 clamp : After positioning the clamp with stopper, tighten the bolt.
2. Clutch hose	10. Grommet : Install the grommet of the clutch hose to the clutch hose guide properly.
3. Guide (GSF1250S/SA only)	"A": Pass the wiring harness through upper the clutch hose No.3 clamp.
4. Frame	"B": Clutch hose : Pass through the clutch hose between the frame and fuel tank rail. Be careful not to contact the clutch hose and frame cover bracket.
5. Clutch hose clamp : Insert the clutch hose clamp end to the hole of the frame fully.	"C": pass the clutch hose through outside of the frame.
6. Clutch hose No.2 clamp : After positioning the clamp with stopper, tighten the bolt.	"D": Pass the clutch hose through outside of the wiring harness.
7. Clutch hose : Pass through the clutch hose under the frame.	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
8. Union bolt : After the clutch hose union has contacted the stopper, tighten the union bolt.	

Diagnostic Information and Procedures

Clutch System Symptom Diagnosis

B718H15304001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the clutch).	Worn countershaft spline.	*Replace countershaft.*
	Worn clutch hub spline.	*Replace clutch hub.*
	Worn clutch plate teeth.	*Replace clutch plate.*
	Distorted clutch plate.	*Replace.*
	Worn clutch release bearing.	*Replace.*
	Weakened clutch damper.	*Replace primary driven gear.*
Clutch slips.	Weakened clutch spring.	*Replace.*
	Worn or distorted clutch pressure plate.	*Replace.*
	Distorted clutch plate.	*Replace.*
Clutch drags.	Leakage of clutch fluid.	*Repair or replace.*
	Worn or damaged clutch cylinder/ release cylinder.	*Replace.*
	Some clutch springs are weak, while others are not.	*Replace.*
	Worn or distorted clutch pressure plate.	*Replace.*
	Distorted clutch plate.	*Replace.*
Leakage of clutch fluid.	Leakage of clutch fluid from system.	*Repair or replace.*
Excessive clutch lever stroke.	Air in hydraulic system.	*Bleed air.*

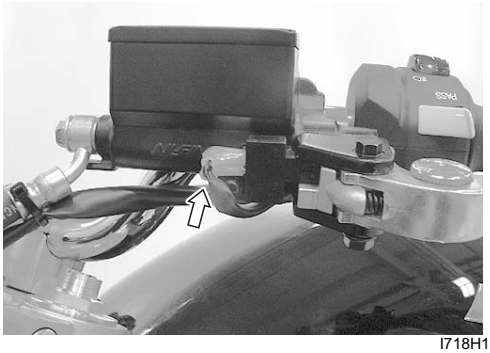
Repair Instructions

Clutch Lever Position Switch Inspection

B718H15306001

Inspect the clutch lever position switch in the following procedures:

1) Disconnect the clutch lever position switch lead wires.



I718H1530007-01

2) Inspect the switch for continuity with a tester.
If any abnormality is found, replace the switch with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Clutch lever position switch

Color / Position	Terminal (B/Y)	Terminal (B/W)
FREE		
•	○	○

I649G1530004-02

3) Connect the clutch lever position switch lead wires.

Clutch Fluid Level Check

B718H15306002

Refer to “Clutch System Inspection in Section 0B (Page 0B-14)”.

Clutch Hose Inspection

B718H15306003

Refer to “Clutch System Inspection in Section 0B (Page 0B-14)”.

Air Bleeding from Clutch Fluid Circuit

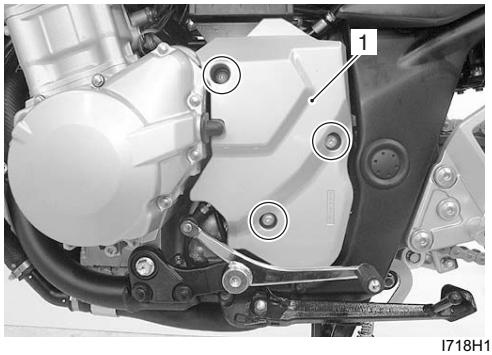
B718H15306004

⚠ CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials, etc.

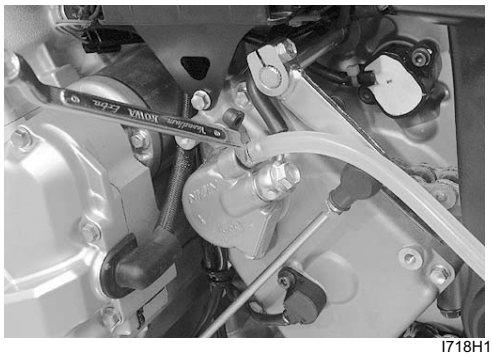
The clutch fluid circuit may be purged of air in the following manner:

1) Keep the motorcycle upright and place the handlebars straight.
2) Fill up the master cylinder reservoir to the upper end of the inspection window. Replace the reservoir cap to prevent entry of dirt.
3) Remove the engine sprocket outer cover (1).



I718H1530008-01

4) Attach a pipe to the bleeder valve and insert the free end of the pipe into a receptacle.



I718H1530009-01

5) Squeeze and release the clutch lever several times in rapid succession, and squeeze the lever fully without releasing it.

I718H1530010-01

6) Loosen the bleeder valve by turning it a quarter of a turn so that the fluid runs into the receptacle; this will remove the tension of the clutch lever causing it to touch the handlebar grip.
7) Close the valve, pump and squeeze the lever, and open the valve.
8) Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.
9) Close the bleeder valve and disconnect the pipe.

Tightening torque
Air bleeder valve (Clutch): 6 N·m (0.6 kgf-m, 4.5 lb-ft)

10) Fill the reservoir with brake fluid to the upper end of the inspection window.
11) Reinstall the removed parts.

Clutch Fluid Replacement

B718H15306005

⚠ CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

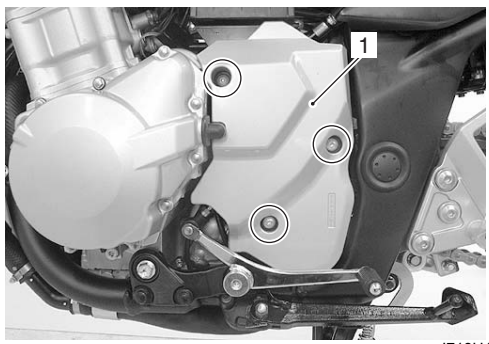
1) Place the motorcycle on a level surface and keep the handlebars straight.
2) Remove the clutch fluid reservoir cap and diaphragm.
3) Suck up the old clutch fluid as much as possible.

I718H1530011-01

4) Fill the reservoir with new clutch fluid.

BF: Brake fluid (DOT 4)

5) Remove the engine sprocket outer cover (1).

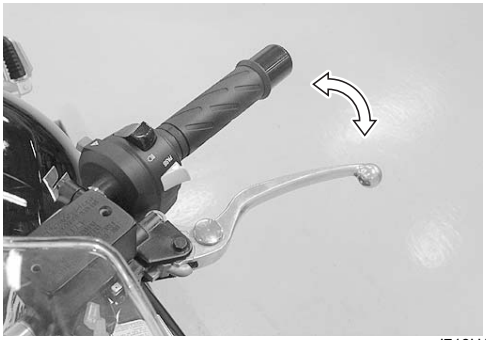


I718H1530012-01

6) Connect a clear hose to the air bleeder valve and insert the other end of hose into a receptacle.

I718H1530009-01

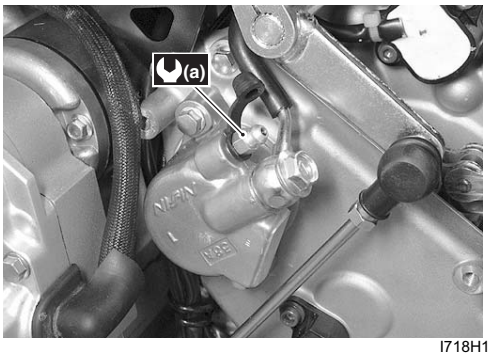
7) Loosen the air bleeder valve and pump the clutch lever until old clutch fluid flows out of the bleeder system.



I718H1530010-01

8) Close the air bleeder valve and disconnect a clear hose.

Tightening torque
Air bleeder valve (Clutch) (a): 6 N·m (0.6 kgf-m, 4.5 lb-ft)



I718H1530015-01

9) Fill the reservoir with new fluid to the upper mark of the reservoir.
10) Reinstall the removed parts.

Clutch Hose Removal and Installation

B718H15306006

Removal

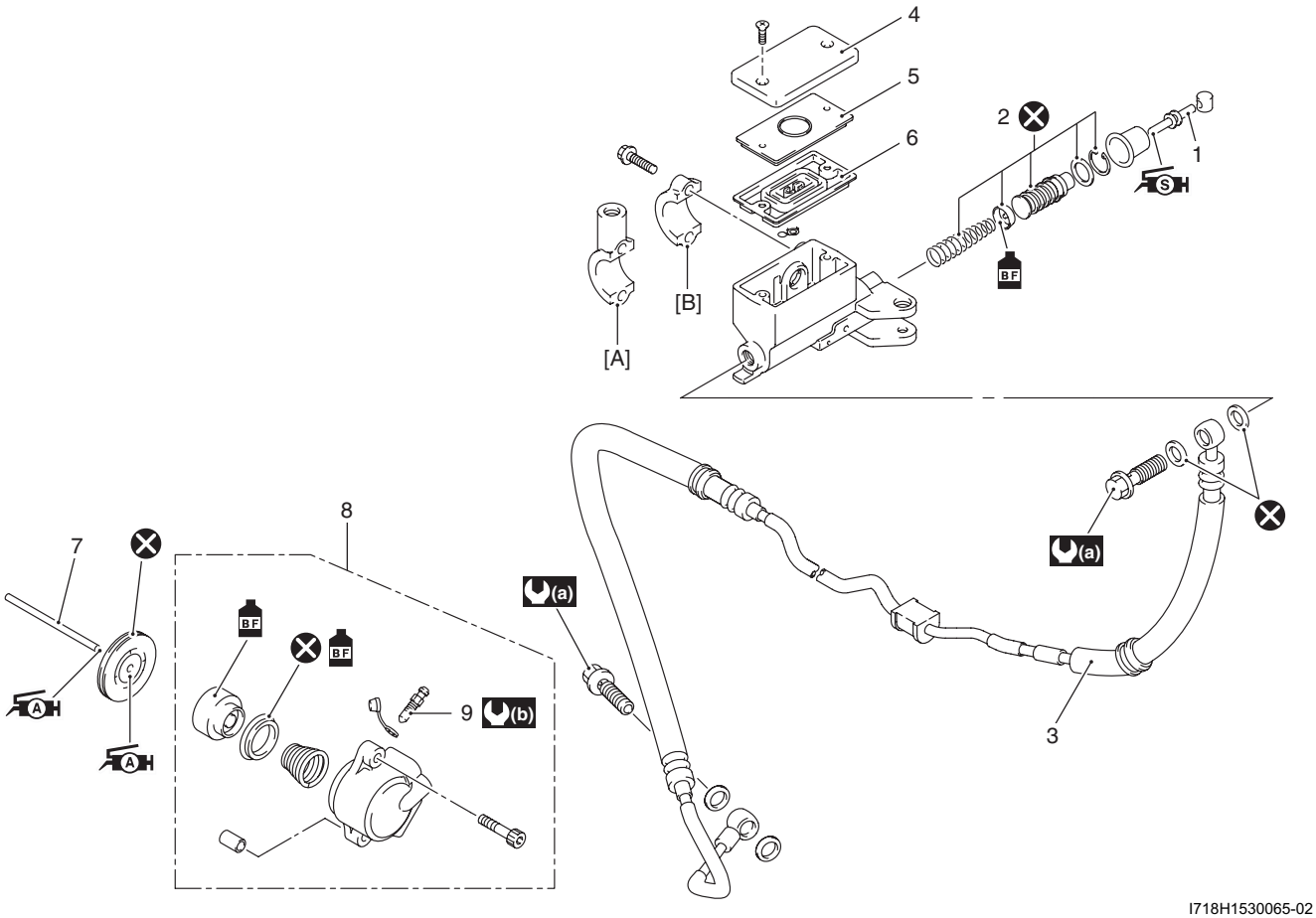
1) Drain clutch fluid. Refer to “Clutch Fluid Replacement (Page 5C-4)”.
2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
3) Remove the left frame cover and engine sprocket outer cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)” and “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
4) Remove the clutch hose as shown in the clutch hose routing diagram. Refer to “Clutch Hose Routing Diagram (Page 5C-2)”.

Installation

1) Install the clutch hose as shown in the clutch hose routing diagram. Refer to “Clutch Hose Routing Diagram (Page 5C-2)”.
2) Bleed air from the clutch system. Refer to “Air Bleeding from Clutch Fluid Circuit (Page 5C-4)”.
3) Reinstall the removed parts.

Clutch Control System Components

B718H15306007



I718H1530065-02

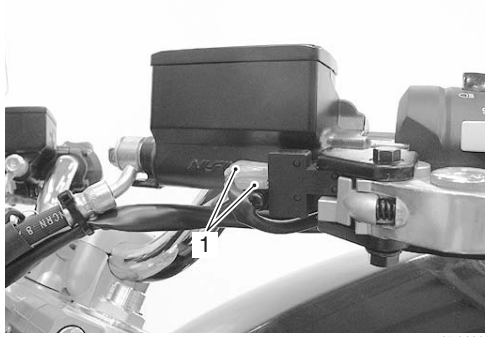
1. Push rod	7. Push rod	(b): 6 N·m (0.6 kgf-m, 4.5 lb-ft)
2. Piston/Cup set	8. Clutch release cylinder set	BF: Apply brake fluid.
3. Clutch hose	9. Air bleeder	A: Apply grease.
4. Reservoir cap	[A]: For GSF1250/A	S: Apply silicone grease.
5. Plate	[B]: For GSF1250S/SA	: Do not reuse.
6. Diaphragm	(a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)	

Clutch Master Cylinder Assembly Removal and Installation

B718H15306008

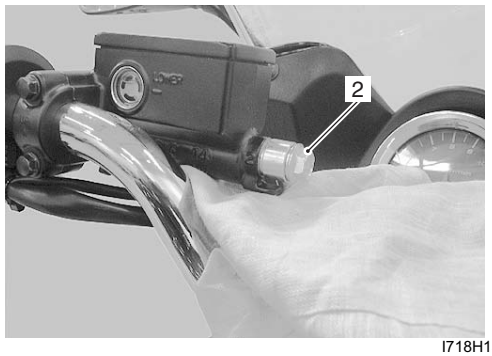
Removal

1) Drain clutch fluid. Refer to “Clutch Fluid Replacement (Page 5C-4)”.
2) Disconnect the clutch lever position switch lead wires (1).



I718H1530017-01

3) Place a rag under the clutch hose union bolt (2) on the master cylinder to catch any spilt brake fluid.
4) Remove the clutch hose union bolt (2) and disconnect the clutch hose.



I718H1530018-01

5) Remove the left rear view mirror. (GSF1250/A)
6) Remove the master cylinder assembly.

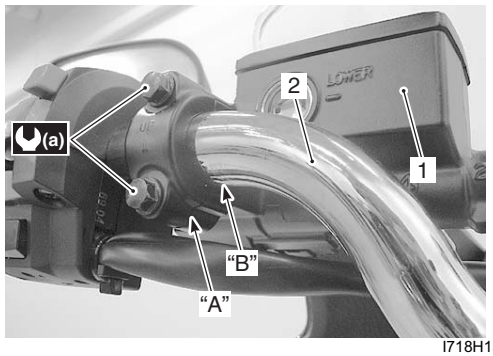
I718H1530019-01

Installation

Install the clutch master cylinder in the reverse order of removal. Pay attention to the following points:

- When installing the master cylinder (1) onto the handlebars (2), align the master cylinder holder’s mating surface “A” with the punch mark “B” on the handlebars (2) and tighten the upper holder bolt first. Refer to “Handlebar Construction in Section 6B (Page 6B-2)”.

Tightening torque
Clutch master cylinder holder bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



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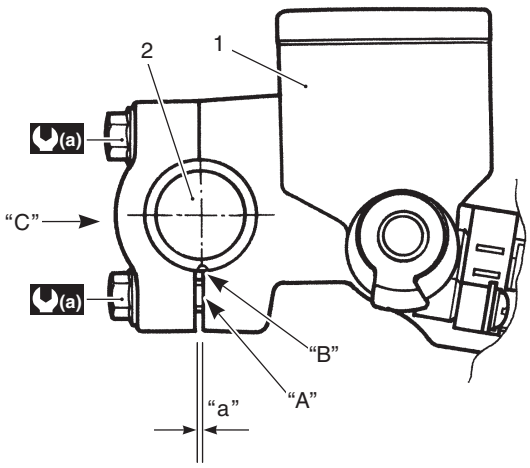


I718H1530073-01

“C”: “UP” mark	“a”: Clearance

- After setting the clutch hose union to the stopper, tighten the union bolt to the specified torque.

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

Tightening torque
Clutch hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

I718H1530021-01

- Bleed air from the clutch system. Refer to “Air Bleeding from Clutch Fluid Circuit (Page 5C-4)”.

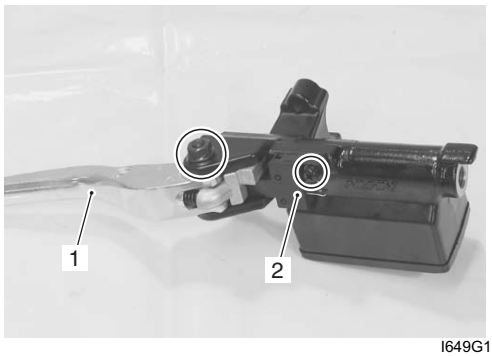
Clutch Master Cylinder / Clutch Lever Disassembly and Assembly

B718H15306009

Refer to “Clutch Master Cylinder Assembly Removal and Installation (Page 5C-7)”.

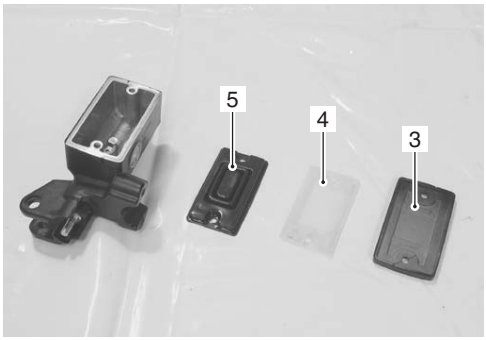
Disassembly

1) Remove the clutch lever (1) and clutch lever position switch (2).



I649G1530012-01

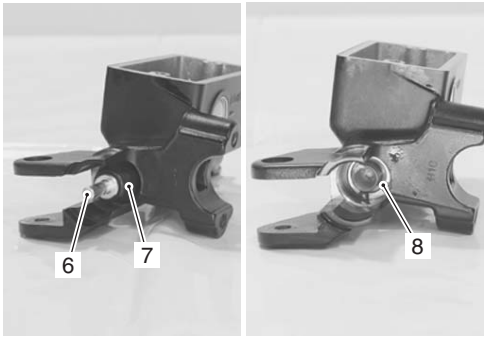
2) Remove the reservoir cap (3), plate (4) and diaphragm (5).



I649G1530013-01

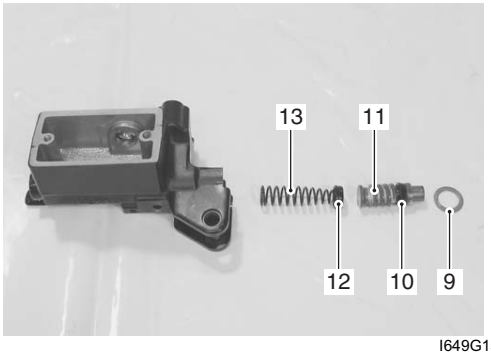
3) Pull out the push rod (6) and dust boot (7).
4) Remove the snap ring (8).

Special tool
TOOL : 09900–06108 (Snap ring pliers)



I649G1530014-01

5) Remove the following parts from the master cylinder.
   - Washer (9)
   - Secondary cup (10)
   - Piston (11)
   - Primary cup (12)
   - Spring (13)



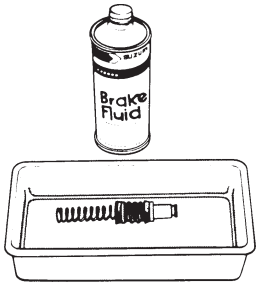
I649G1530015-01

Assembly
Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

- **Wash the master cylinder components with new brake fluid before reassembly.**
- **Do not wipe the clutch fluid off after washing the components.**
- **When washing the components, use the specified clutch fluid (Brake fluid). Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
- **Apply brake fluid to the master cylinder bore and to all of the master cylinder components to be inserted into the bore.**

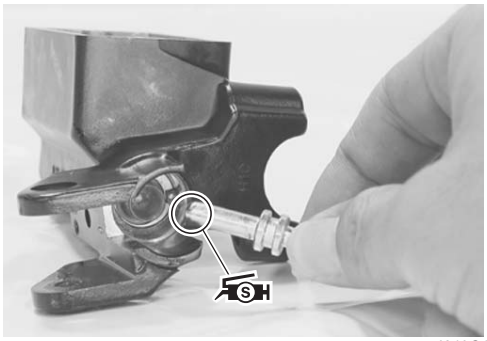
BF: Brake fluid (DOT 4)



I649G1530016-01

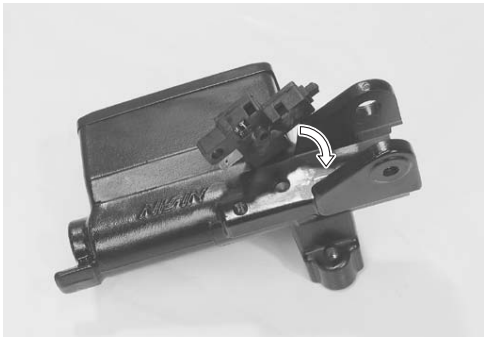
- Apply SUZUKI SILICONE GREASE to the push rod end.

: Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)



I649G1530017-02

- When installing the clutch lever position switch, align the projection on the switch with the hole in the master cylinder.



I649G1530018-01

- Apply SUZUKI SILICONE GREASE to the clutch lever pivot bolt when installing.

: Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)

I718H1530069-01

Tightening torque
Clutch lever pivot bolt: 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)
Clutch lever pivot bolt lock-nut: 6.0 N·m (0.6 kgf-m, 4.5 lb-ft)

Clutch Master Cylinder Parts Inspection

B718H15306010

Refer to “Clutch Master Cylinder / Clutch Lever Disassembly and Assembly (Page 5C-8)”.

Master Cylinder

Inspect the master cylinder bore for any scratches or other damage.

I649G1530020-01

Piston

Inspect the piston surface for any scratches or other damage.

Rubber Parts

Inspect the primary cup, secondary cup and dust boot for wear or damage.

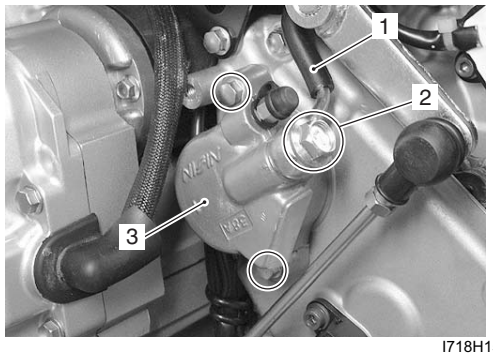
I649G1530021-01

Clutch Release Cylinder / Push Rod Removal and Installation

B718H15306011

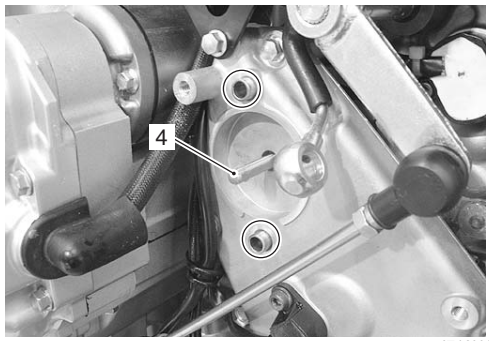
Removal

1) Drain clutch fluid. Refer to “Clutch Fluid Replacement (Page 5C-4)”.
2) Remove the engine sprocket outer cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
3) Disconnect the clutch hose (1) by removing the union bolt (2).
4) Remove the clutch release cylinder (3).



I718H1530070-01

5) Remove the dowel pins and push rod (4).



I718H1530023-01

Installation

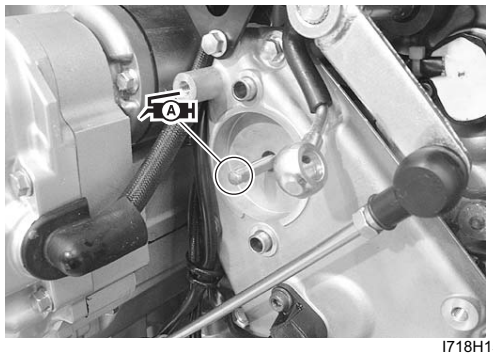
Install the clutch release cylinder in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

- Apply a small quantity of SUZUKI SUPER GREASE “A” to the push rod.

: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1530024-01

- Install the clutch hose as shown in the clutch hose routing diagram. Refer to “Clutch Hose Routing Diagram (Page 5C-2)”.
- Bleed air from the clutch system. Refer to “Air Bleeding from Clutch Fluid Circuit (Page 5C-4)”.

Clutch Push Rod (Left) Inspection

B718H15306019

Inspect the push rod in the following procedures:

1) Remove the clutch push rod. Refer to “Clutch Release Cylinder / Push Rod Removal and Installation (Page 5C-10)”.
2) Inspect the push rod for wear or bend. If any defects are found, replace it with a new one.

I718H1530025-01

3) Reinstall the removed parts. Refer to “Clutch Release Cylinder / Push Rod Removal and Installation (Page 5C-10)”.

Clutch Release Cylinder Disassembly and Assembly

B718H15306012

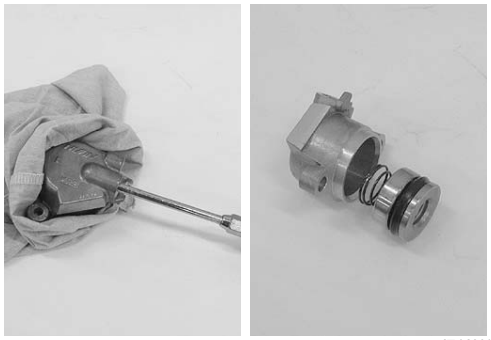
Refer to “Clutch Release Cylinder / Push Rod Removal and Installation (Page 5C-10)”.

Disassembly

1) Place a rag over the piston to prevent popping up.
2) Force out the piston by using air gun.

⚠ CAUTION

Do not use high pressure air to prevent piston damage.



I718H1530026-01

Assembly

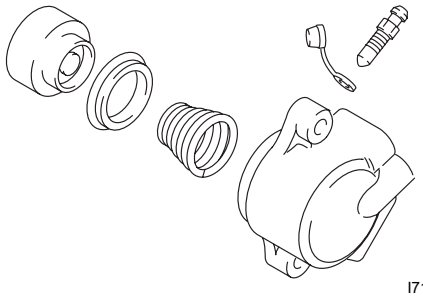
Assemble the clutch cylinder in the reverse order of disassembly. Pay attention to the following points:

- Wash the cylinder bore and piston with specified brake fluid.

  BF: Brake fluid (DOT 4)

⚠ CAUTION

- **Wash the cylinder components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
- **Do not wipe the brake fluid off after washing the components.**
- **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.**



I718H1530066-02

- Bleed air from the clutch system. Refer to “Air Bleeding from Clutch Fluid Circuit (Page 5C-4)”.

Clutch Release Cylinder Inspection

B718H15306013

Refer to “Clutch Release Cylinder Disassembly and Assembly (Page 5C-11)”.

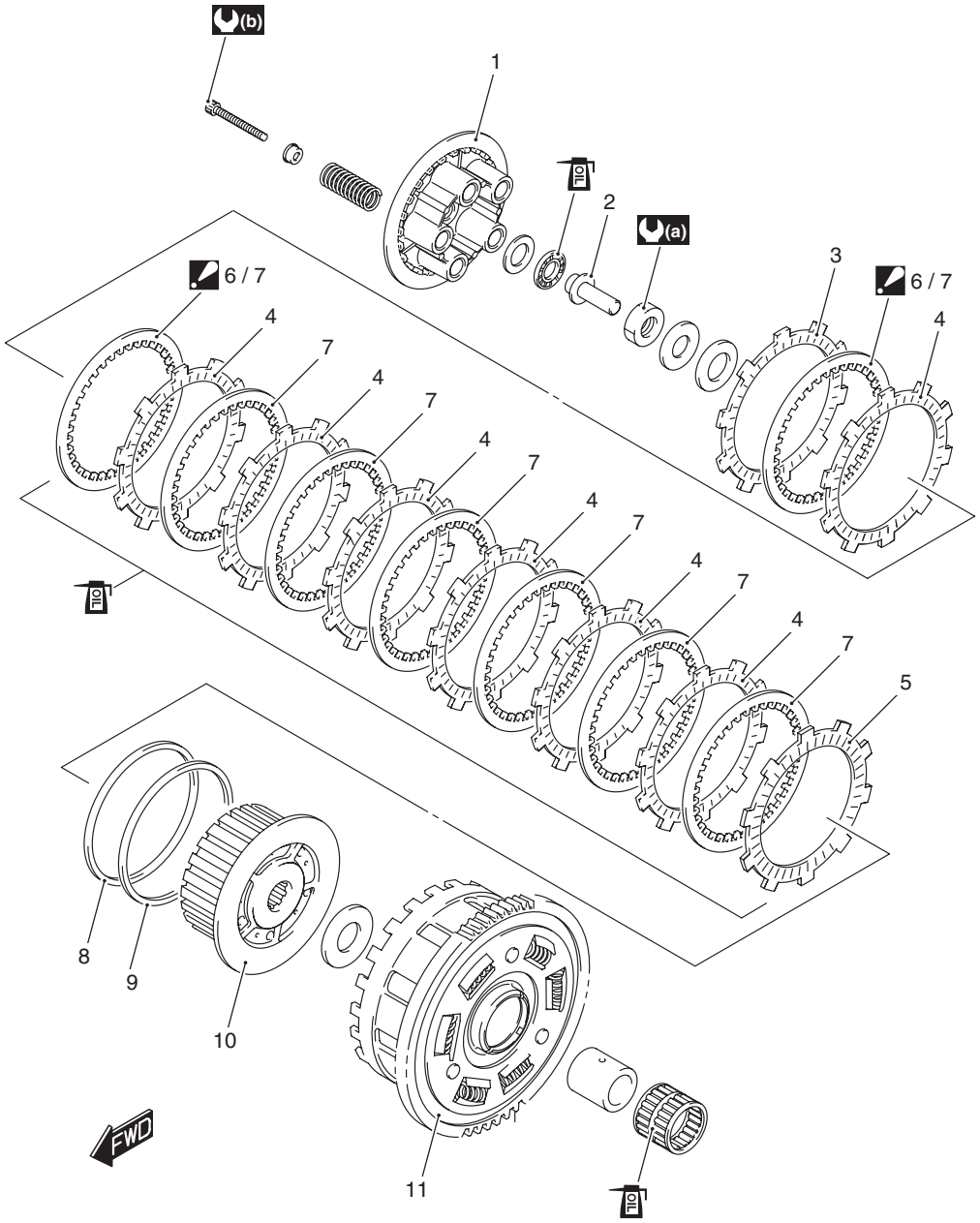
Inspect the clutch cylinder bore wall for nicks, scratches or other damage.

Inspect the piston surface for any scratches or other damage.

I718H1530028-03

Clutch Components

B718H15306014



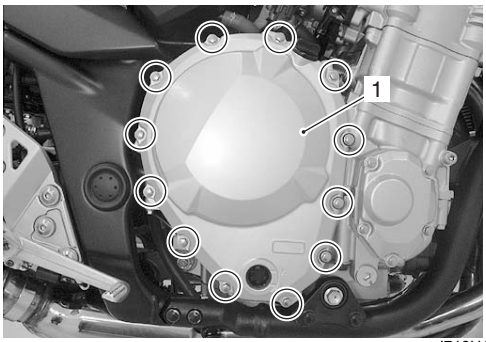
I718H1530067-03

1. Clutch pressure plate	6. No.1 driven plate (0 – 2 pcs) : The No.1 and No.2 driven plates are 8 in total.	11. Primary driven gear assembly
2. Clutch push piece	7. No.2 driven plate (6 – 8 pcs)	(a) : 150 N·m (15.0 kgf-m, 108.5 lb-ft)
3. No.3 drive plate	8. Spring washer	(b) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)
4. No.1 drive plate	9. Spring washer seat	OIL : Apply engine oil.
5. No.2 drive plate	10. Clutch sleeve hub	

Clutch Removal

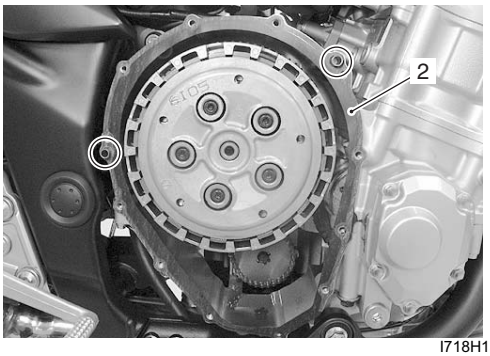
B718H15306016

1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
2) Remove the clutch cover (1).



I718H1530029-01

3) Remove the gasket (2) and dowel pins.

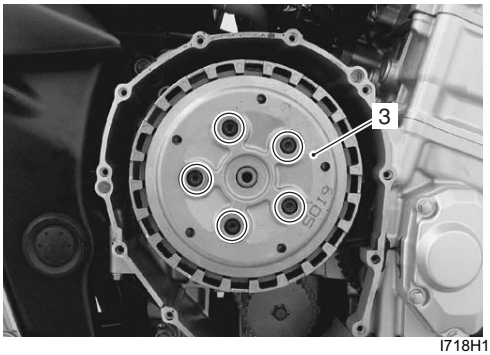


I718H1530030-01

4) Remove the clutch spring set bolts, clutch springs and pressure plate (3).

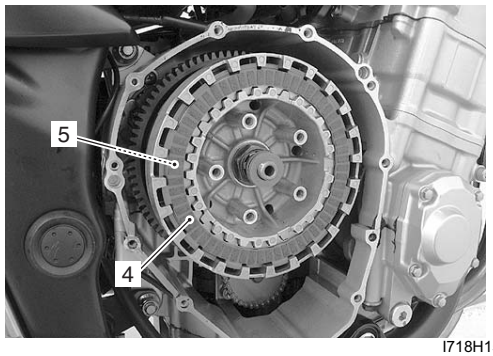
NOTE

Loosen the clutch spring set bolts little by little and diagonally.



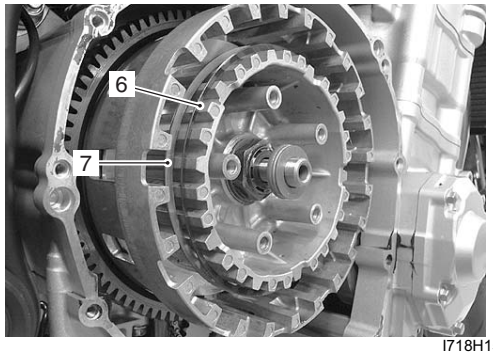
I718H1530071-01

5) Remove the clutch drive plates (4) and driven plates (5).



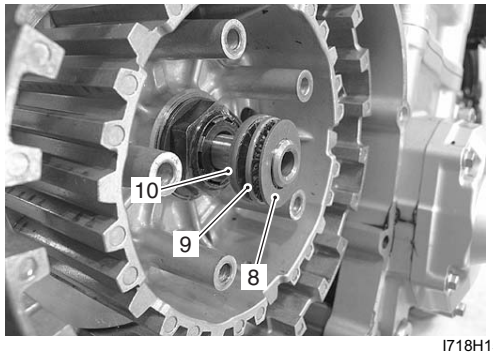
I718H1530033-01

6) Remove the spring washer (6) and its seat (7).



I718H1530034-02

7) Remove the thrust washer (8), bearing (9) and clutch push piece (10).



I718H1530035-02

8) Remove the clutch push rod (11).

NOTE

If it is difficult to pull out the push rod (11), use a magnetic hand or a wire.

I718H1530036-01

9) Unlock the clutch sleeve hub nut.

I718H1530037-01

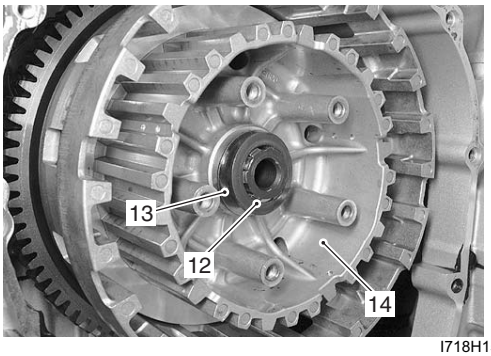
10) Hold the clutch sleeve hub with the special tools.

Special tool
TOOL (A): 09920–53740 (Clutch sleeve hub holder)
TOOL : 09920–31020 (Extension handle)

11) Remove the clutch sleeve hub nut.

I718H1530039-01

12) Remove the conical spring washer (12), washer (13) and clutch sleeve hub (14).



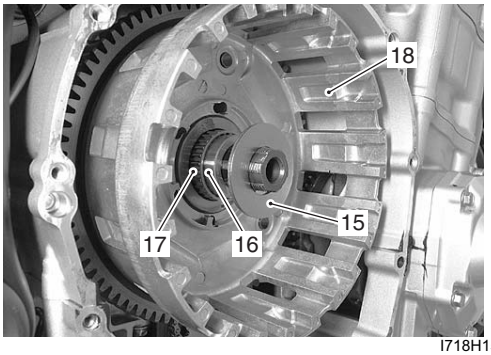
I718H1530040-01

13) Remove the thrust washer (15), spacer (16) and bearing (17).

14) Remove the primary driven gear assembly (18).

NOTE

If it is difficult to remove the primary driven gear, rotate the crankshaft.



I718H1530041-01

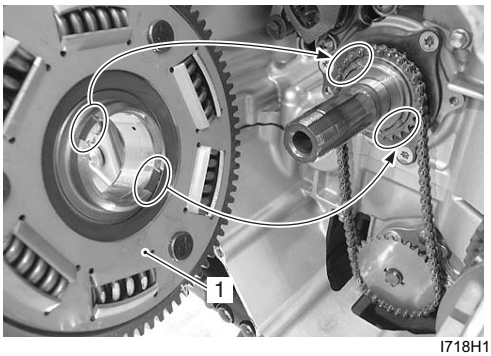
Clutch Installation

B718H15306017

1) Install the primary driven gear assembly (1).

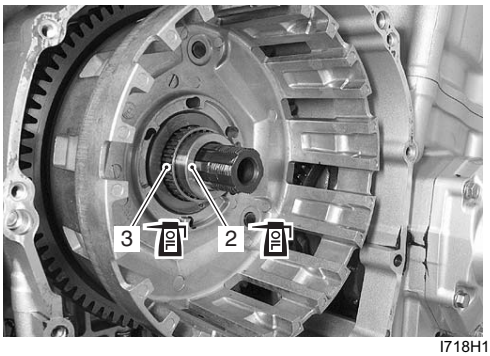
NOTE

- **If it is difficult to install the primary driven gear, rotate the crankshaft.**
- **Be sure to engage the oil pump drive sprocket with the primary driven gear.**



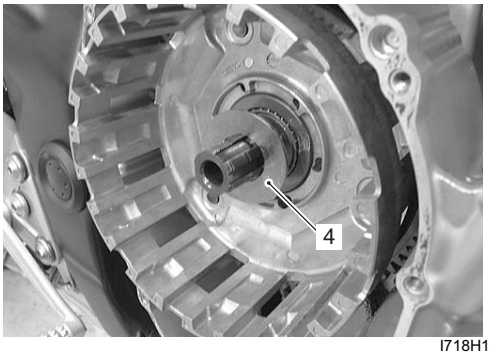
I718H1530043-01

2) Install the spacers (2) and bearing (3), and apply engine oil to them.



I718H1530042-01

3) Install the thrust washer (4).

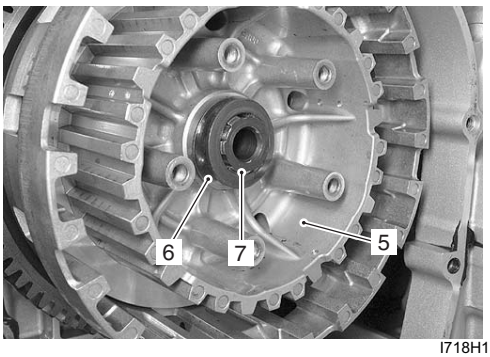


I718H1530044-01

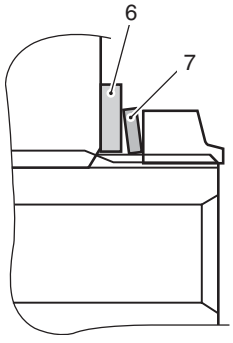
4) Install the clutch sleeve hub (5), washer (6) and spring washer (7)

NOTE

The conical curve side of spring washer (7) faces outside.



I718H1530045-01



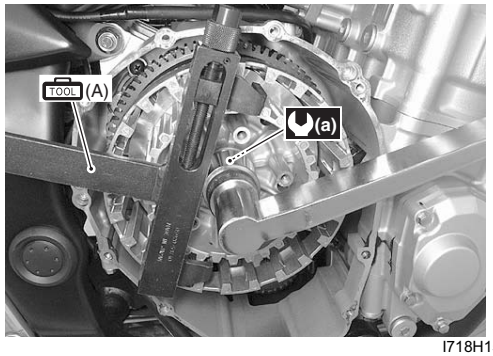
I718H1530068-02

5) Hold the clutch sleeve hub with the special tools.

Special tool
(A): 09920–53740 (Clutch sleeve hub holder)
: 09920–31020 (Extension handle)

6) Tighten the clutch sleeve hub nut to the specified torque.

Tightening torque
Clutch sleeve hub nut (a): 150 N·m (15.0 kgf-m, 108.5 lb-ft)

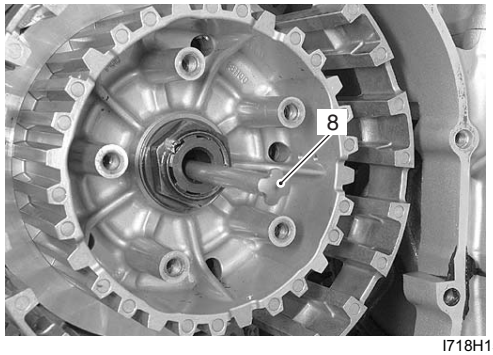


I718H1530047-01

7) Lock the clutch sleeve hub nut with a center punch.

I718H1530048-01

8) Install the clutch push rod (8) into the countershaft.

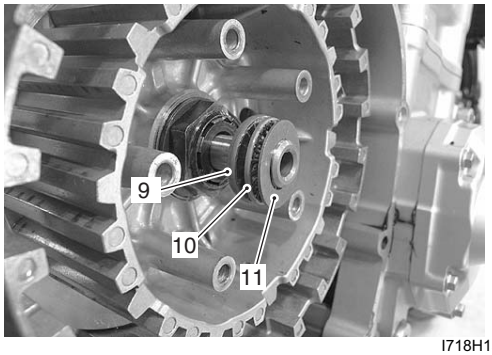


I718H1530049-01

9) Install the clutch push piece (9), bearing (10) and thrust washer (11) to the countershaft.

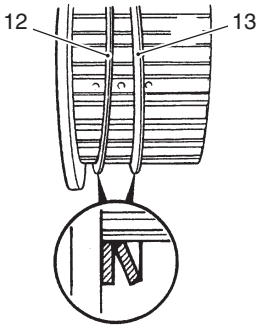
NOTE

Thrust washer (11) is located between the pressure plate and bearing (10).



I718H1530050-01

10) Install the spring washer seat (12) and spring washer (13) onto the clutch sleeve hub correctly.

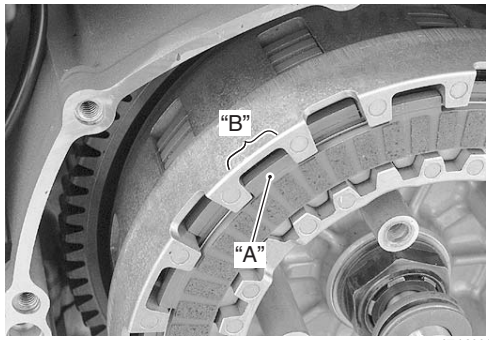


I718H1530051-01

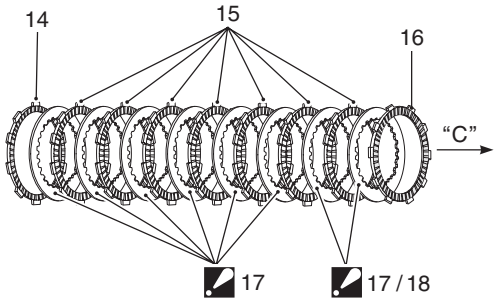
11) Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order.

NOTE

Insert the outermost No.2 drive plate claws "A" to the other slits "B" of clutch housing as shown.



I718H1530052-01

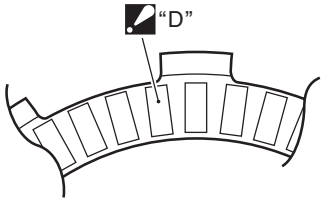


I718H1530053-05

14.	No.2 drive plate
15.	No.1 drive plate
16.	No.3 drive plate
17.	No.1 driven plate (6 – 8 pcs) : The No.1 and No.2 driven plates are 8 in total.
18.	No.2 driven plate (0 – 2 pcs) : The No.1 and No.2 driven plates are 8 in total.
"C":	Direction of outside

NOTE

For drive plate
Three kinds of the drive plate (No.1, No.2 and No.3) are equipped in the clutch system, they can be distinguished by the inside diameter and clutch facing "D".



I718H1530055-01

"D":	Clutch facing : No.1 and No.2 drive plates resemble each other very closely in external appearance. Make sure to check the numbers of clutch facing, before installing them.

Drive plate	I.D.	Clutch facing “D”
No.1	127 mm (5.0 in)	48 pcs
No.2	135 mm (5.3 in)	60 pcs
No.3	127 mm (5.0 in)	60 pcs

NOTE

For driven plate
Two kinds of the driven plate (No.1 and No.2) are equipped in the clutch system, they can be distinguished by the thickness. The No.1 and No.2 driven plates are 8 in total. The driven plate No.2 should be used within 2 pcs. The driven plate No.2 should be installed pressure plate side.

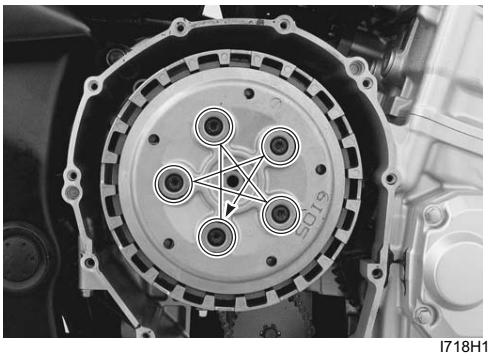
Driven plate	Thickness
No.1	2.0 mm (0.08 in)
No.2	2.3 mm (0.09 in)

12) Install the pressure plate and clutch springs.
13) Tighten the clutch spring set bolts to the specified torque.

NOTE

Tighten the clutch spring set bolts diagonally.

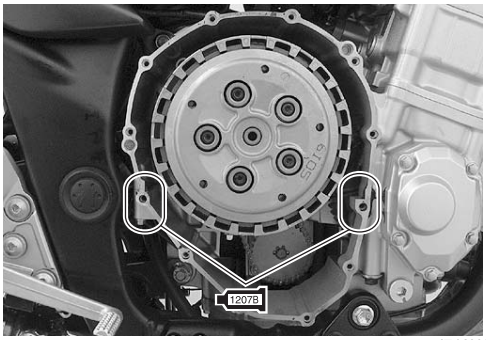
Tightening torque
Clutch spring set bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I718H1530072-01

14) Apply a light coat of the SUZUKI BOND “1207B” to the clutch cover gasket mating surface as shown.

1207B : Sealant 99000–31140 (SUZUKI Bond 1207B or equivalent)

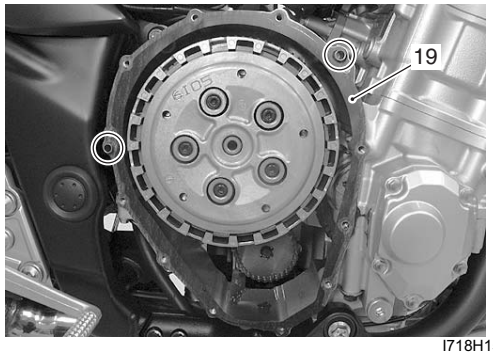


I718H1530058-03

15) Install the dowel pins and gasket (19).

⚠ CAUTION

Use a new gasket to prevent oil leakage.



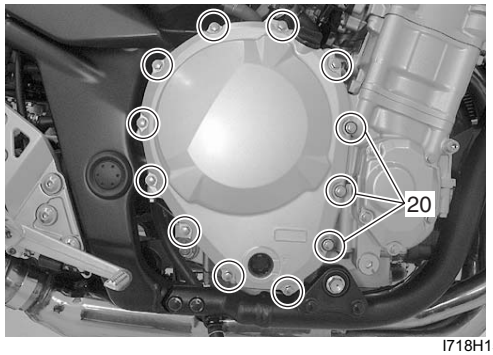
I718H1530059-01

16) Fit new gasket washer to the bolt (20).

⚠ CAUTION

Use the gasket washers to prevent oil leakage.

17) Install the clutch cover and tighten the clutch cover bolts.



I718H1530061-01

18) Pour engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

Clutch Parts Inspection

B718H15306018

Refer to “Clutch Removal (Page 5C-13)” and “Clutch Installation (Page 5C-14)”.

Clutch Drive and Driven Plate

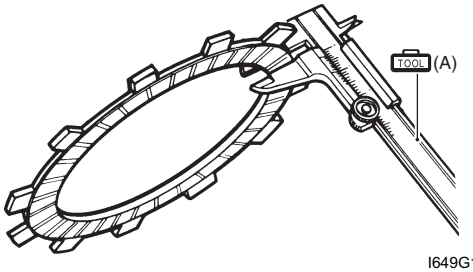
NOTE

Wipe off the engine oil from the drive and driven plates with a clean rag.

Measure the thickness of drive plates with a vernier calipers. If the drive plate thickness is found to have reached the limit, replace it with a new one.

Special tool
(A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Clutch drive plate thickness
Service limit (No.1, No.2 and No.3 drive plates): 3.42 mm (0.135 in)

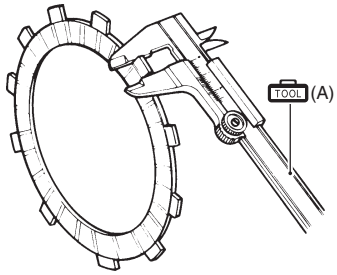


I649G1530056-02

Measure the claw width of drive plates with a vernier calipers. Replace the drive plates found to have worn down to the limit.

Special tool
(A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Clutch drive plate claw width
Service limit (No.1, No.2 and No.3 drive plates): 13.1 mm (0.52 in)

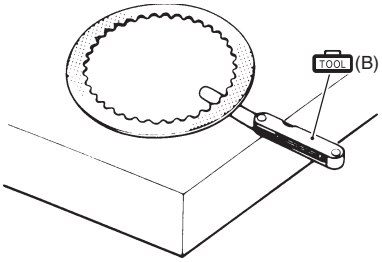


I649G1530057-02

Measure each driven plate for distortion with a thickness gauge and surface plate.
Replace driven plates which exceed the limit.

Special tool
(B): 09900–20803 (Thickness gauge)

Clutch driven plate distortion
Service limit: 0.10 mm (0.004 in)



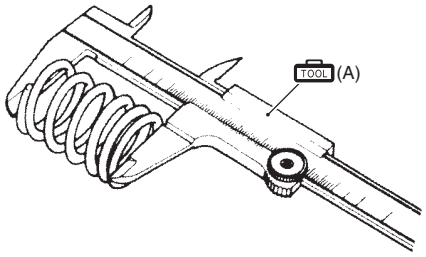
I649G1530058-02

Clutch Spring

Measure the free length of each coil spring with a vernier calipers, and compare the length with the specified limit. Replace all the springs if any spring is not within the limit.

Special tool
(A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

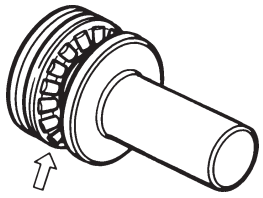
Clutch spring free length
Service limit: 61.8 mm (2.43 in)



I718H1530062-01

Clutch Release Bearing

Inspect the clutch release bearing for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.
Smooth engagement and disengagement of the clutch depends on the condition of this bearing.

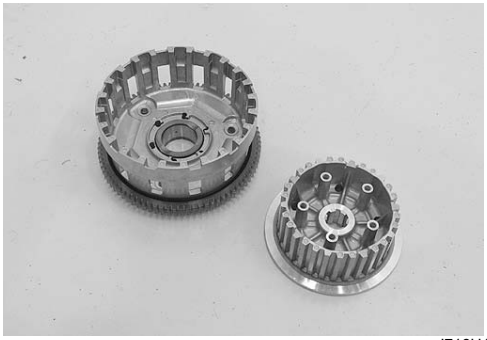


I649G1530059-01

Push Rod (Right)
Inspect the push rod for wear and damage.
If any defects are found, replace the push rod with a new one.

I718H1530063-01

Clutch Sleeve Hub and Primary Driven Gear Assembly
Inspect the slot of the clutch sleeve hub and primary driven gear assembly for damage or wear caused by the clutch plates. If necessary, replace it with a new one.



I718H1530064-01

Specifications

Service Data

B718H15307001

Clutch
Unit: mm (in)

Item	Standard		Limit
Clutch drive plate thickness	No.1, 2, 3	3.72 – 3.88 (0.146 – 0.153)	3.42 (0.135)
Clutch drive plate claw width	No.1, 2, 3	13.9 – 14.0 (0.547 – 0.551)	13.1 (0.52)
Clutch driven plate distortion	—		0.10 (0.004)
Clutch spring free length	65.0 (2.56)		61.8 (2.43)
Clutch master cylinder bore	14.000 – 14.043 (0.5511 – 0.5529)		—
Clutch master cylinder piston diam	13.957 – 13.984 (0.5495 – 0.5506)		—
Clutch release cylinder bore	38.18 – 38.23 (1.503 – 1.505)		—
Clutch release cylinder piston diam	38.08 – 38.13 (1.500 – 1.501)		—
Clutch fluid type	Brake fluid DOT 4		—

Tightening Torque Specifications

B718H15307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Air bleeder valve (Clutch)	6	0.6	4.5	☞(Page 5C-4) / ☞(Page 5C-5)
Clutch master cylinder holder bolt	10	1.0	7.0	☞(Page 5C-7)
Clutch hose union bolt	23	2.3	16.5	☞(Page 5C-8)
Clutch lever pivot bolt	6.0	0.6	4.5	☞(Page 5C-9)
Clutch lever pivot bolt lock-nut	6.0	0.6	4.5	☞(Page 5C-9)
Clutch sleeve hub nut	150	15.0	108.5	☞(Page 5C-15)
Clutch spring set bolt	10	1.0	7.0	☞(Page 5C-17)

NOTE

The specified tightening torque is also described in the following.
“Clutch Hose Routing Diagram (Page 5C-2)”
“Clutch Control System Components (Page 5C-6)”
“Clutch Components (Page 5C-12)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H15308001

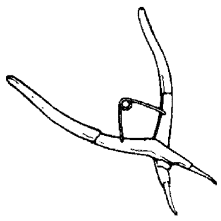
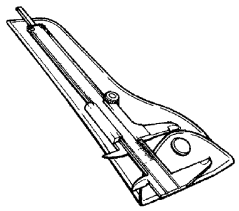
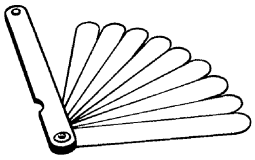
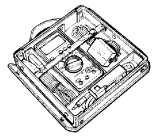
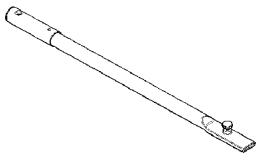
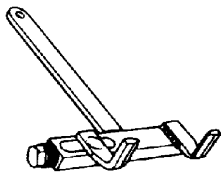
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 5C-4) / ☞(Page 5C-9) / ☞(Page 5C-11)
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 5C-10)
	SUZUKI Silicone Grease or equivalent	P/No.: 99000–25100	☞(Page 5C-9) / ☞(Page 5C-9)
Sealant	SUZUKI Bond 1207B or equivalent	P/No.: 99000–31140	☞(Page 5C-17)

NOTE

Required service material is also described in the following.
“Clutch Control System Components (Page 5C-6)”
“Clutch Components (Page 5C-12)”

Special Tool

B718H15308002

09900–06108 Snap ring pliers ☞(Page 5C-8)		09900–20102 Vernier calipers (1/20 mm, 200 mm) ☞(Page 5C-18) / ☞(Page 5C-18) / ☞(Page 5C-18)	
09900–20803 Thickness gauge ☞(Page 5C-18)		09900–25008 Multi-circuit tester set ☞(Page 5C-3)	
09920–31020 Extension handle ☞(Page 5C-14) / ☞(Page 5C-15)		09920–53740 Clutch sleeve hub holder ☞(Page 5C-14) / ☞(Page 5C-15)	

Section 6

Steering

CONTENTS

Precautions

Precautions

Precautions for Steering

B718H16000001

Refer to “General Precautions in Section 00 (Page 00-1)”.

Steering General Diagnosis

Diagnostic Information and Procedures

Steering Symptom Diagnosis

B718H16104001

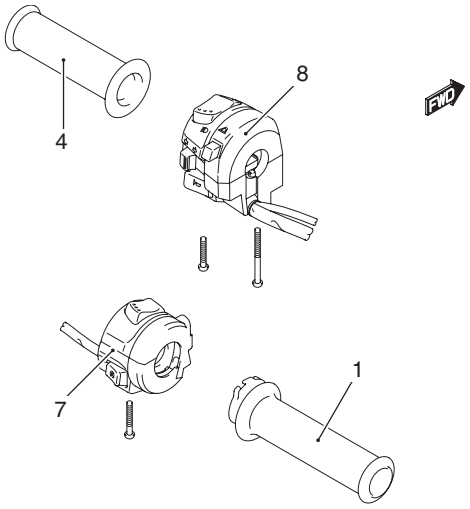
Condition	Possible cause	Correction / Reference Item
Heavy Steering	Over tightened steering stem nut.	*Adjust.*
	Broken bearing in steering stem.	*Replace.*
	Distorted steering stem.	*Replace.*
	Not enough pressure in tires.	*Adjust.*
Wobbly Handlebars	Loss of balance between right and left front forks.	*Replace fork or adjust fork oil level or replace spring.*
	Distorted front fork.	*Repair or replace.*
	Distorted front axle or crooked tire.	*Replace.*
	Loose steering stem nut.	*Adjust.*
	Worn or incorrect tire or wrong tire pressure.	*Adjust or replace.*
	Worn bearing/race in steering stem.	*Replace.*

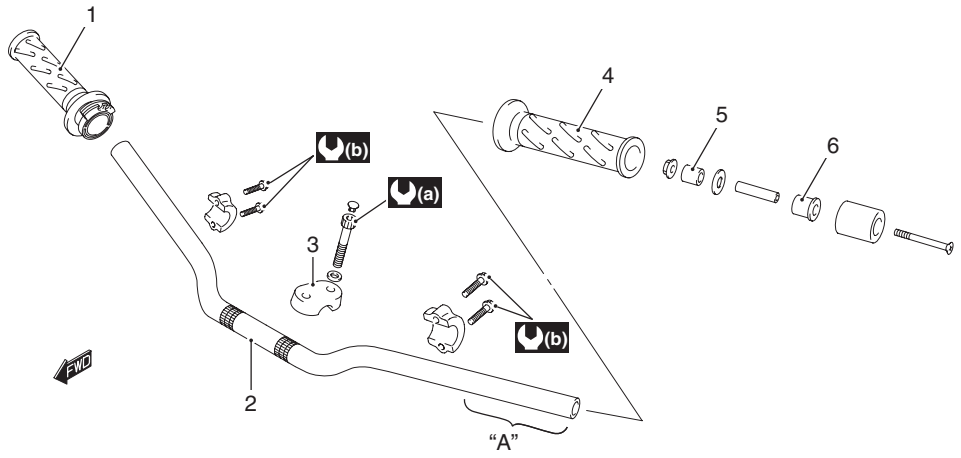
Steering / Handlebar

Repair Instructions

Handlebar Components

B718H16206001



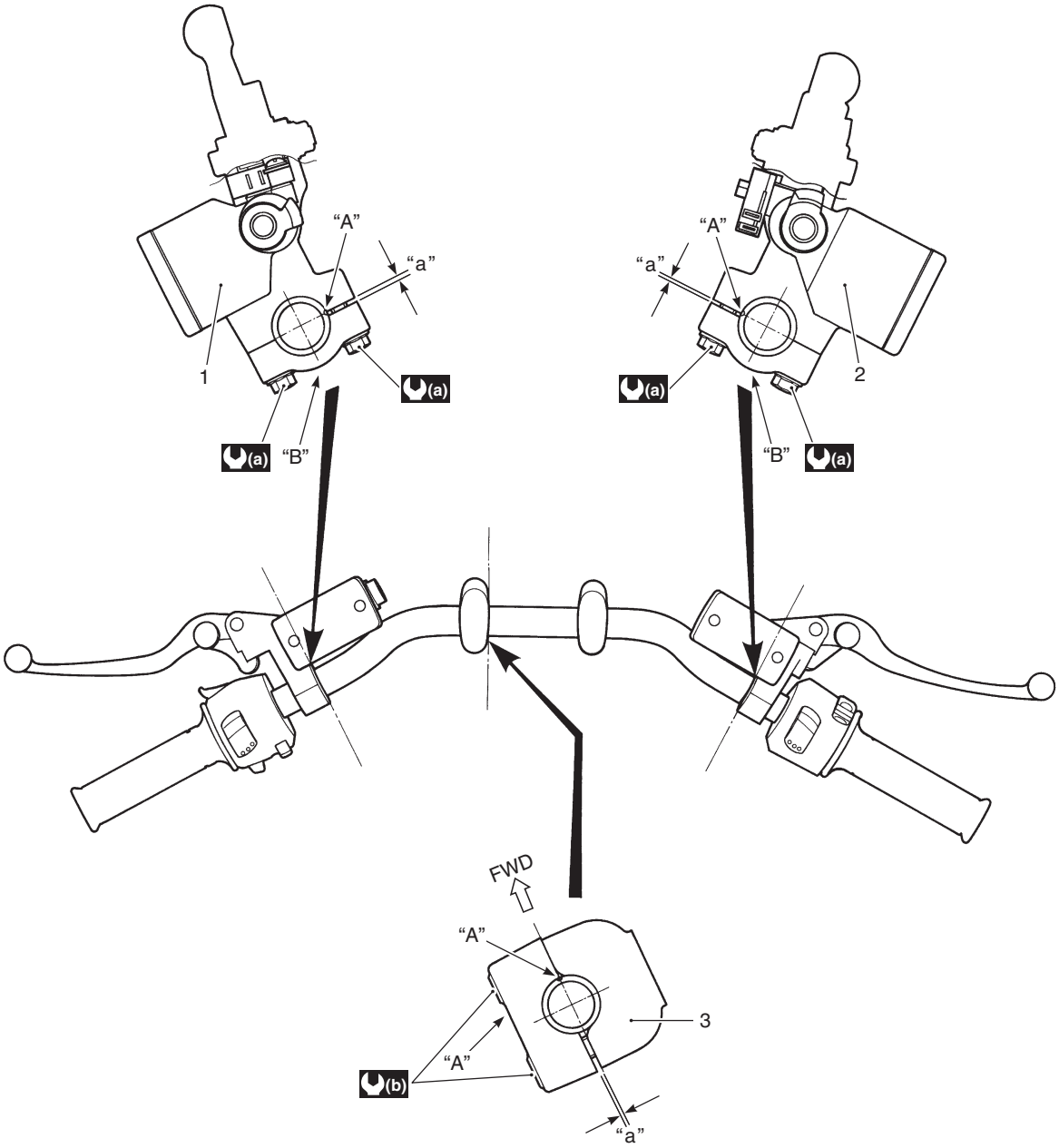


I718H1620037-01

1. Throttle grip	5. Handle expander	"A": Apply handle grip bond.
2. Handlebars	6. Handle balancer expander	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
3. Handlebar holder (Upper)	7. Right handlebar switch box	(b) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)
4. Grip rubber	8. Left handlebar switch box	

Handlebar Construction

B718H16206013



I718H1620040-01

1. Clutch master cylinder	"A": Punch mark	(a) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)
2. Front brake master cylinder	"B": UP mark	(b) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
3. Handlebar holder	"a": Clearance	

Handlebar Removal and Installation

B718H16206002

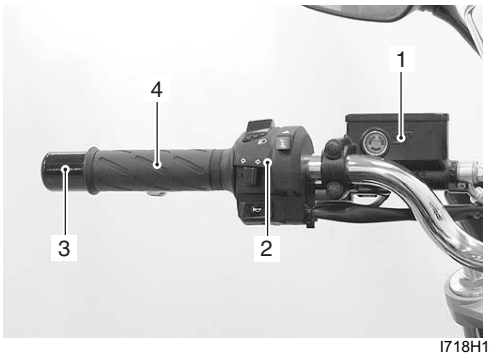
Removal

1) Remove the following parts from the left handlebar.
   a) Rear view mirror (GSF1250/A)
   b) Clutch master cylinder/clutch lever (1)

⚠ CAUTION

Do not turn the clutch master cylinder upside down.

   c) Left handlebar switch box (2)
   d) Handlebar balancer (3)
   e) Grip rubber (4)



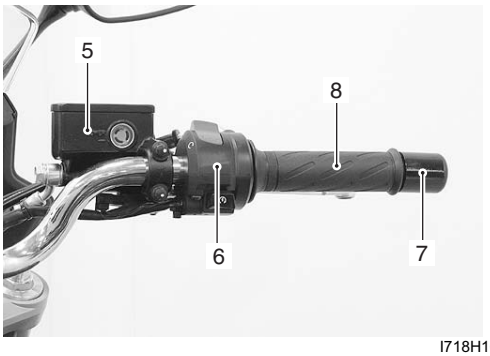
I718H1620001-03

2) Remove the following parts from the right handlebar.
   a) Rear view mirror (GSF1250/A)
   b) Front brake master cylinder/Front brake lever (5)

⚠ CAUTION

Do not turn the front brake master cylinder upside down.

   c) Right handlebar switch box (6)
   d) Handlebar balancer (7)
   e) Throttle grip (8)



I718H1620002-03

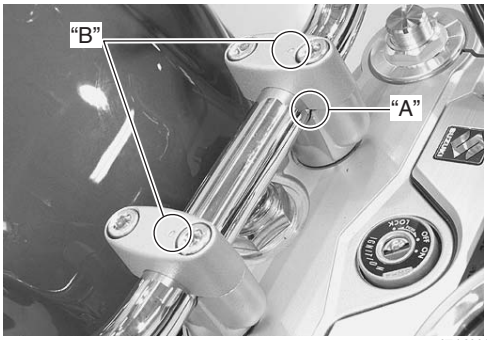
3) Remove the caps and handlebar holder bolts.

I718H1620041-03

Installation

Install the handlebars in the reverse order of removal. Pay attention to the following points:

- Set the handlebars so that its punch mark “A” aligns with the mating surface of the left handlebar holder. Refer to “Handlebar Construction (Page 6B-2)”.
- Set the handlebar holders with their punch marks “B” forward.



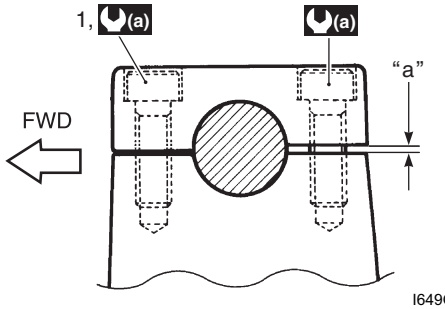
I718H1620020-01

- Tighten the handlebar holder bolts.

NOTE

First tighten the handlebar holder bolts (1) (front ones) to the specified torque.

Tightening torque
Handlebar holder bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



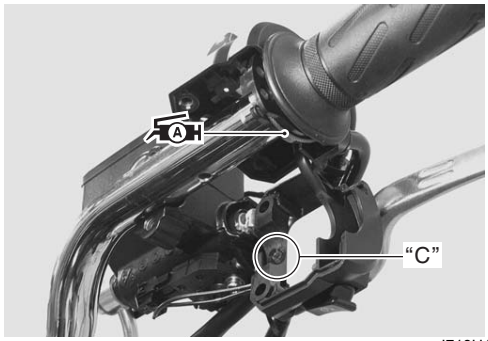
I649G1620006-01

“a”: Clearance

- Apply SUZUKI SUPER GREASE to the end of the throttle cables and cable pulley.

  : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

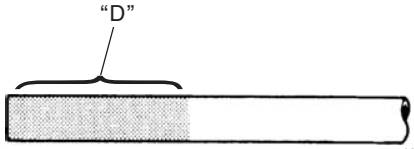
- Insert the projection “C” of the right handlebar switch box into the hole of the handlebars.



I718H1620006-02

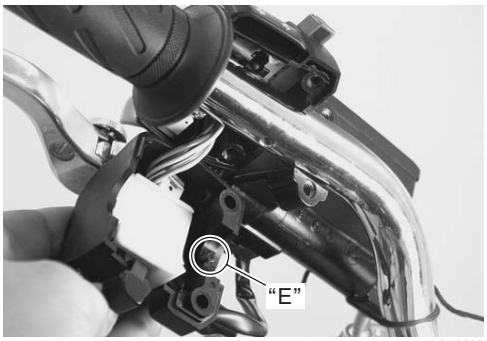
- Install the front brake master cylinder. Refer to “Front Brake Master Cylinder Assembly Removal and Installation in Section 4A (Page 4A-14)”.
- Apply a handle grip bond “D” onto the left handlebar before installing the handlebar grip.

  : Handle grip bond (Handle Grip Bond (commercially available))



I649G1620008-02

- Insert the projection “E” of the left handlebar switch box into the hole of the handlebars.



I718H1620007-03

- Install the clutch master cylinder. Refer to “Clutch Master Cylinder Assembly Removal and Installation in Section 5C (Page 5C-7)”.
- After installing the steering, the following adjustments are required before driving.
  - Cable routing (Refer to “Throttle Cable Routing Diagram in Section 1D (Page 1D-2)”.)
  - Throttle cable play (Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)”.)

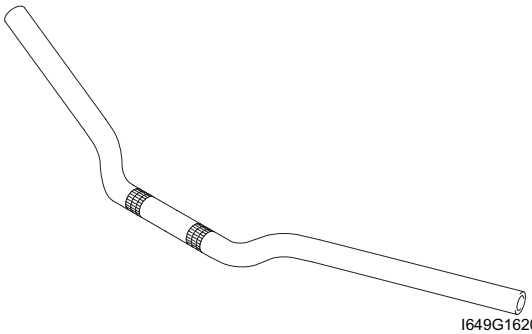
Handlebars Inspection

B718H16206003

Refer to “Handlebar Removal and Installation (Page 6B-3)”.

Inspect the handlebars for distortion and damage.

If any defect is found, replace the handlebars with a new one.



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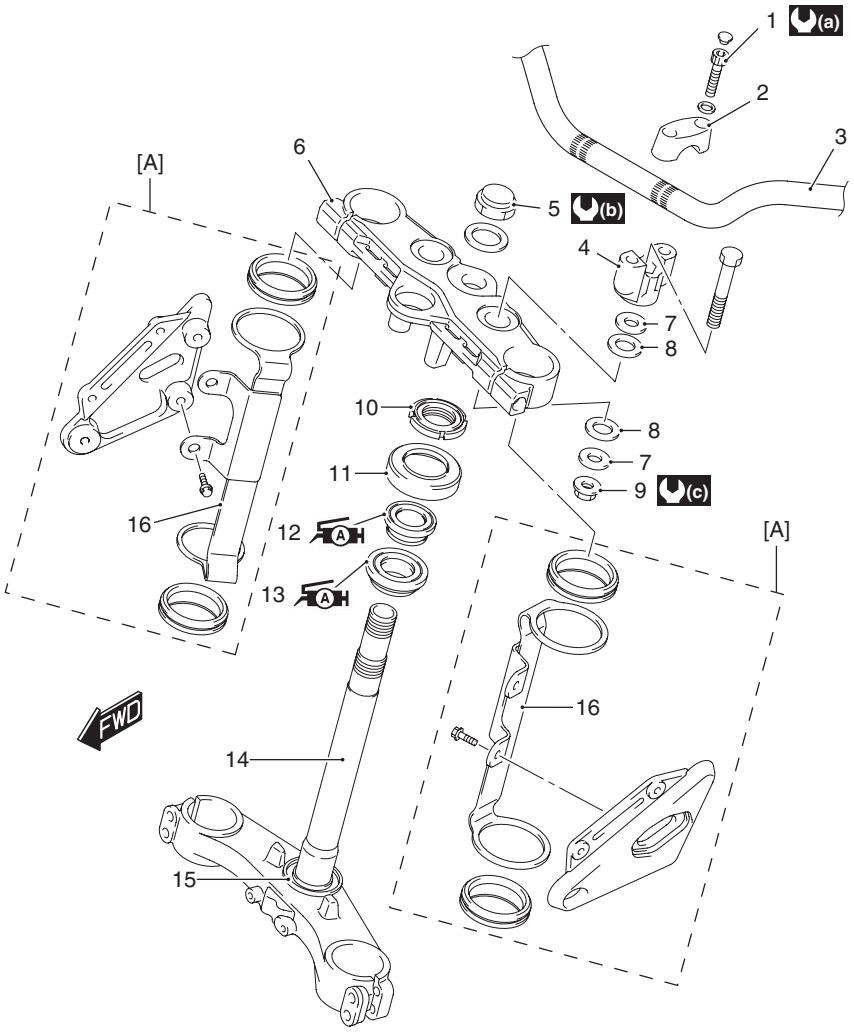
Steering Components

B718H16206004



I718H1620019-04

1. Handlebar holder bolt	8. Rubber seat	15. Lower seal
2. Handlebar holder (Upper)	9. Handlebar holder set nut	16. Headlight housing bracket
3. Handlebars	10. Steering stem nut	[A]: For GSF1250/A
4. Handlebar holder (Lower)	11. Dust seal	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
5. Steering stem head nut	12. Steering stem upper bearing	(b) : 65 N·m (6.5 kgf-m, 47.0 lb-ft)
6. Steering stem upper bracket	13. Steering stem lower bearing	(c) : 45 N·m (4.5 kgf-m, 32.5 lb-ft)
7. Washer	14. Steering stem lower bracket	A : Apply grease to bearing.

Steering Removal and Installation

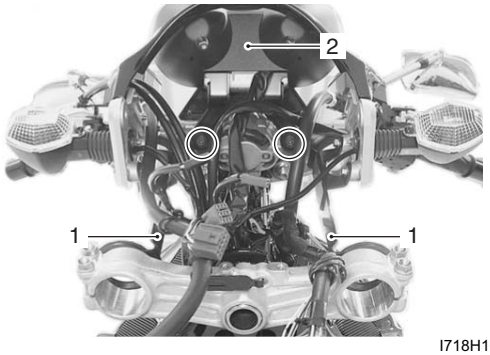
B718H16206005

Removal

GSF1250/A

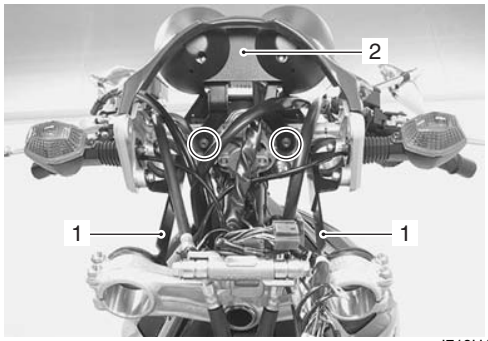
1) Support the motorcycle with a jack or a wooden block.
2) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-6)”.
3) Remove the front forks. Refer to “Front Fork Removal and Installation in Section 2B (Page 2B-2)”.
4) Remove the headlight. Refer to “Headlight Removal and Installation in Section 9B (Page 9B-2)”.
5) Remove the headlight housing brackets (1).
6) Remove the combination meter unit (2).

GSF1250



I718H1620023-08

GSF1250A



I718H1620022-04

7) Dismount the handlebars and steering upper bracket. Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-9)”.

NOTE

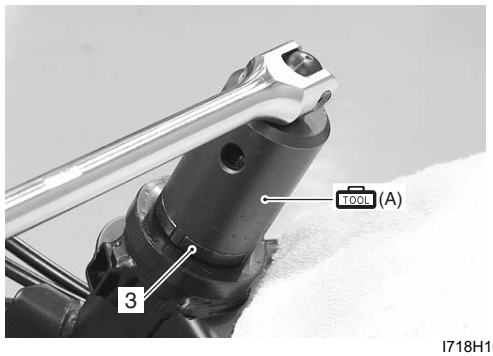
If necessary, remove the ignition switch from the upper bracket. Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-9)”.

8) Remove the steering stem nut (3) using the special tool.

NOTE

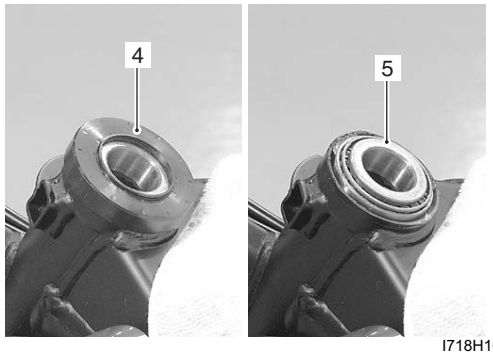
When loosening the stem nuts, hold the steering stem lower bracket to prevent it from falling.

Special tool
TOOL (A): 09940–14911 (Steering stem nut wrench)



I718H1620009-05

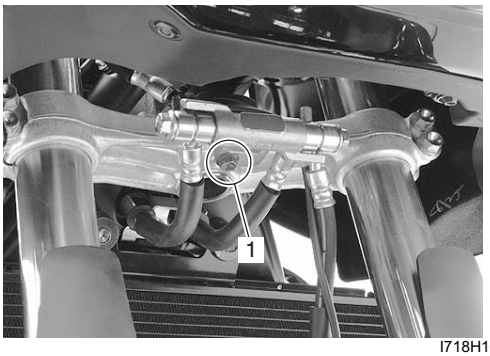
9) Remove the steering stem lower bracket.
10) Remove the dust seal (4) and steering stem upper bearing (5).



I718H1620010-05

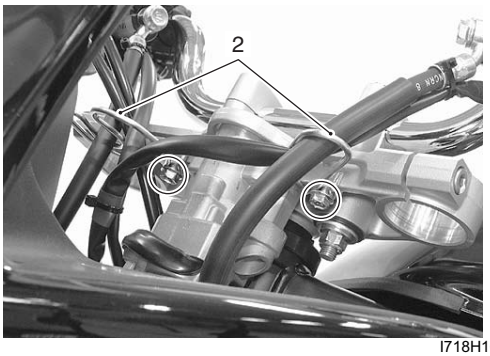
GSF1250S/SA

1) Support the motorcycle with a jack or a wooden block.
2) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-6)”.
3) Remove the brake hose clamp bolt (GSF1250S) or brake hose joint bolt (1) (GSF1250SA).



I718H1620038-01

4) Remove the front forks. Refer to “Front Fork Removal and Installation in Section 2B (Page 2B-2)”.
5) Remove the cable guides (2).



I718H1620027-01

6) Dismount the handlebars and steering upper bracket. Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-9)”.

NOTE

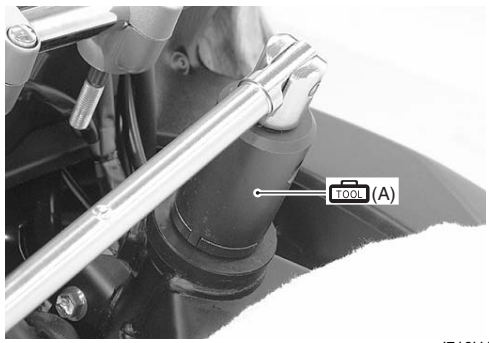
If necessary, remove the ignition switch from the upper bracket. Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-9)”.

7) Remove the steering stem nut using the special tool.

NOTE

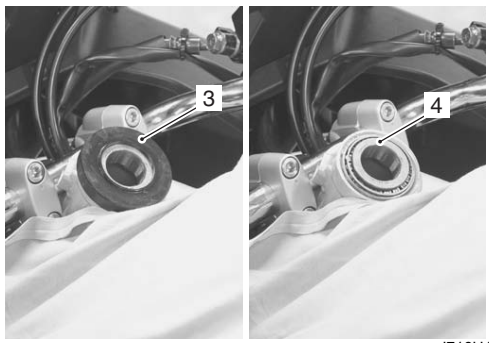
When loosening the stem nuts, hold the steering stem lower bracket to prevent it from falling.

Special tool
TOOL (A): 09940–14911 (Steering stem nut wrench)



I718H1620030-02

8) Remove the steering stem lower bracket.
9) Remove the dust seal (3) and steering stem upper bearing (4).



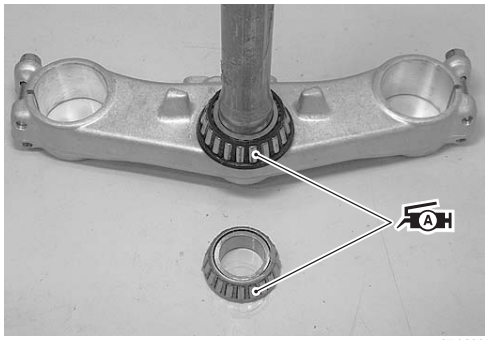
I718H1620031-02

Installation
Install the steering in the reverse order of removal.
Pay attention to the following points:

Bearing

- Apply SUZUKI SUPER GREASE to the bearings, races and dust seals before remounting the steering stem.

  : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



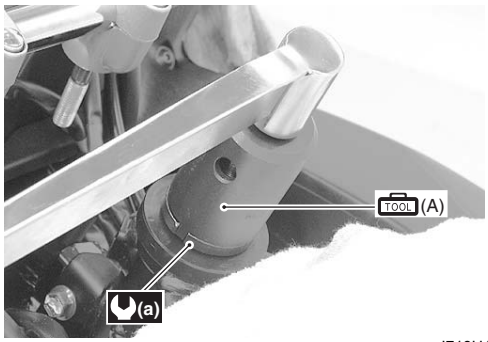
I718H1620032-01

Steering stem nut

- Tighten the steering stem nut to the specified torque using the special tool.

  Special tool
  TOOL (A): 09940–14911 (Steering stem nut wrench)

  Tightening torque
  Steering stem nut (a): 45 N·m (4.5 kgf-m, 32.5 lb-ft) then turn back 1/2 – 1/4.

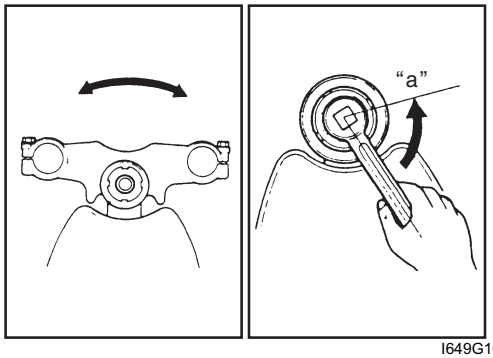


I718H1620033-01

- Turn the steering stem lower bracket about five or six times to the left and right so that the angular ball bearings seat properly.
- Loosen the steering stem nut 1/4 – 1/2 turn “a”.

  NOTE

  This adjustment will vary from motorcycle to motorcycle.

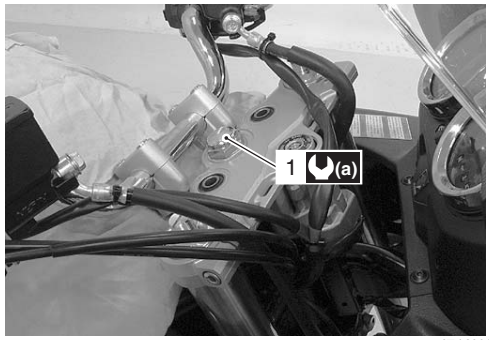


I649G1620026-01

Steering stem upper bracket
Install the front forks and steering stem upper bracket in the following steps:

1) Temporarily install the upper bracket, washer and steering stem head nut (1).
2) Set the headlight housing brackets. (GSF1250/A)
3) Temporarily install the front forks.
4) Tighten the steering stem head nut (1).

   Tightening torque
   Steering stem head nut (a): 65 N·m (6.5 kgf-m, 47.0 lb-ft)



I718H1620034-02

5) Tighten the front fork upper and lower clamp bolts. Refer to “Front Fork Removal and Installation in Section 2B (Page 2B-2)”.

Handlebars

- Tighten the handlebar holder set nuts to the specified torque.

Tightening torque
Handlebar holder set nut (a): 45 N·m (4.5 kgf-m, 32.5 lb-ft)

I718H1620035-04

Inspection after installation

- Check the steering tension. Refer to “Steering Tension Adjustment (Page 6B-10)”.

Steering Related Parts Inspection

B718H16206011

Refer to “Steering Removal and Installation (Page 6B-6)”.
Inspect the removed parts for the following abnormalities.

- Distortion of the steering stem
- Bearing wear or damage
- Abnormal bearing noise
- Race wear or damage
- Bearing lower seal damage
- Rubber seat and damper bushing wear or damage

If any abnormal points are found, replace defective parts with new ones.

I718H1620026-02

I718H1620042-04

Steering System Inspection

B718H16206012

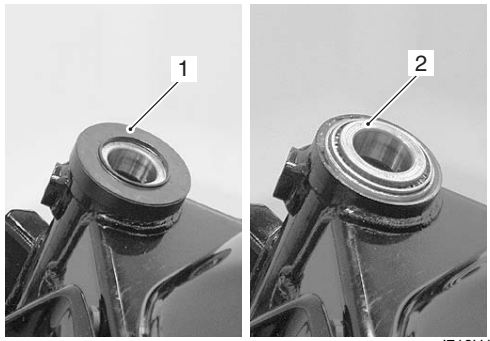
Refer to “Steering System Inspection in Section 0B (Page 0B-20)”.

Steering Stem Bearing Removal and Installation

B718H16206008

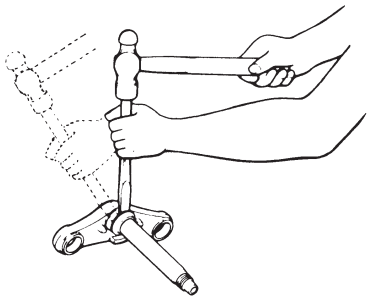
Removal

1) Remove the steering stem lower bracket. Refer to “Steering Removal and Installation (Page 6B-6)”.
2) Remove the dust seal (1) and steering stem upper bearing (2).



I718H1620039-02

3) Remove the steering stem lower bearing and inner race using a chisel.



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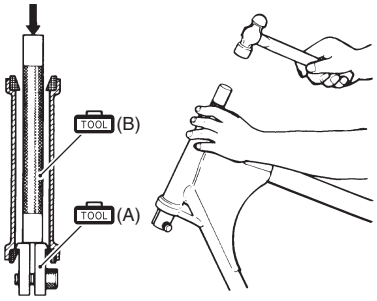
4) Remove the steering stem upper and lower bearing races using the special tools.

Special tool
(A): 09941–54911 (Bearing outer race remover)
(B): 09941–74911 (Steering bearing installer)



I649G1620034-02

Installation
Install the steering stem bearings in the reverse order of removal. Pay attention to the following points:

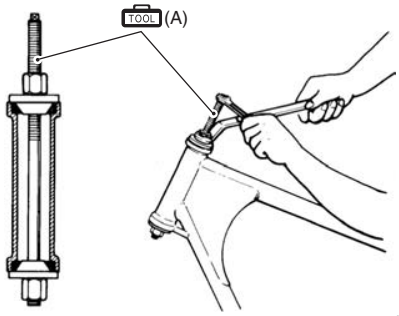
⚠ CAUTION

The removed bearings and races should be replaced with new ones.

Outer race

- Press in the upper and lower outer races using the special tool.

Special tool
(A): 09941–34513 (Steering race installer)

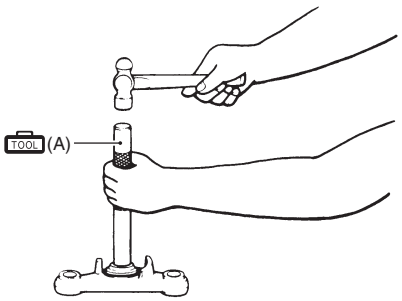


I649G1620035-02

Inner race

- Press in the lower inner race and bearing using the special tool.

Special tool
(A): 09941–74911 (Steering bearing installer)



I649G1620036-02

- Install the steering. Refer to “Steering Removal and Installation (Page 6B-6)”.

Steering Tension Adjustment

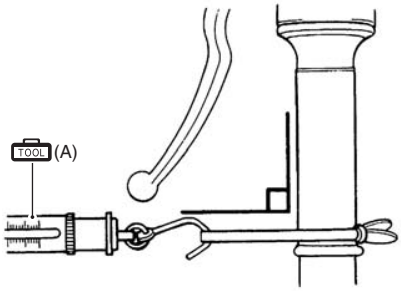
B718H16206009

Check the steering movement in the following procedures:

1) By supporting the motorcycle with a jack, lift the front wheel unit is off the floor 20 – 30 mm (0.8 – 1.2 in).
2) Check to make sure that the cables and wire harnesses are properly routed.
3) With the front wheel in the straight ahead state, hitch the spring scale (special tool) on one handlebar grip end as shown in the figure and read the graduation when the handlebar starts moving.

Initial force
200 – 500 grams

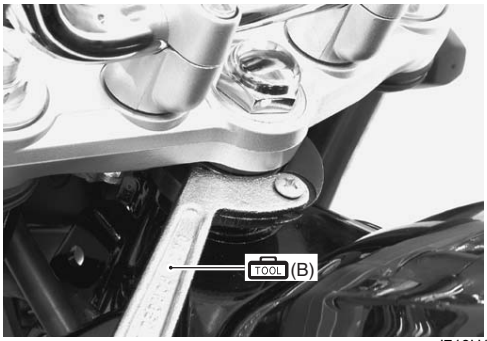
Special tool
(A): 09940–92720 (Spring scale)



I649G1620040-01

4) Do the same on the other grip end.
5) If the initial force read on the scale when the handlebar starts turning is either too heavy or too light, adjust it till it satisfies the specification.
   a) First, loosen the front fork upper and lower clamp bolts, steering stem head nut and steering stem nut, and then adjust the steering stem nut by loosening or tightening it.

      Special tool
      TOOL (B): 09910–60611 (Universal clamp wrench)



I718H1620043-02

   b) Tighten the steering stem nut, stem head nut and front fork upper and lower clamp bolts to the specified torque and recheck the initial force with the spring scale according to the previously described procedure.
   c) If the initial force is found within the specified range, adjustment has been completed.

NOTE

Hold the front fork legs, move them back and forth and make sure that the steering is not loose.

Specifications

Tightening Torque Specifications

B718H16207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Handlebar holder bolt	23	2.3	16.5	☞(Page 6B-3)
Steering stem nut	45	4.5	32.5	then turn back 1/2 – 1/4. ☞(Page 6B-8)
Steering stem head nut	65	6.5	47.0	☞(Page 6B-8)
Handlebar holder set nut	45	4.5	32.5	☞(Page 6B-9)

NOTE

The specified tightening torque is also described in the following.
“Handlebar Components (Page 6B-1)”
“Handlebar Construction (Page 6B-2)”
“Steering Components (Page 6B-5)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H16208001

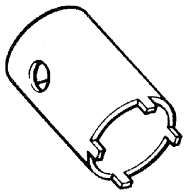
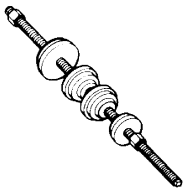
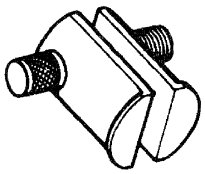
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 6B-4) / ☞(Page 6B-8)
Handle grip bond	Handle Grip Bond (commercially available)	—	☞(Page 6B-4)

NOTE

Required service material is also described in the following.
“Steering Components (Page 6B-5)”

Special Tool

B718H16208002

09910–60611 Universal clamp wrench ☞(Page 6B-11) 	09940–14911 Steering stem nut wrench ☞(Page 6B-6) / ☞(Page 6B-7) / ☞(Page 6B-8) 
09940–92720 Spring scale ☞(Page 6B-10) 	09941–34513 Steering race installer ☞(Page 6B-10) 
09941–54911 Bearing outer race remover ☞(Page 6B-10) 	09941–74911 Steering bearing installer ☞(Page 6B-10) / ☞(Page 6B-10) 

Section 9

Body and Accessories

CONTENTS

Precautions

Precautions

Precautions for Electrical System

B718H19000001

Refer to “General Precautions in Section 00 (Page 00-1)” and “Precautions for Electrical Circuit Service in Section 00 (Page 00-2)”.

Component Location

Electrical Components Location

B718H19003001

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

Wiring Systems

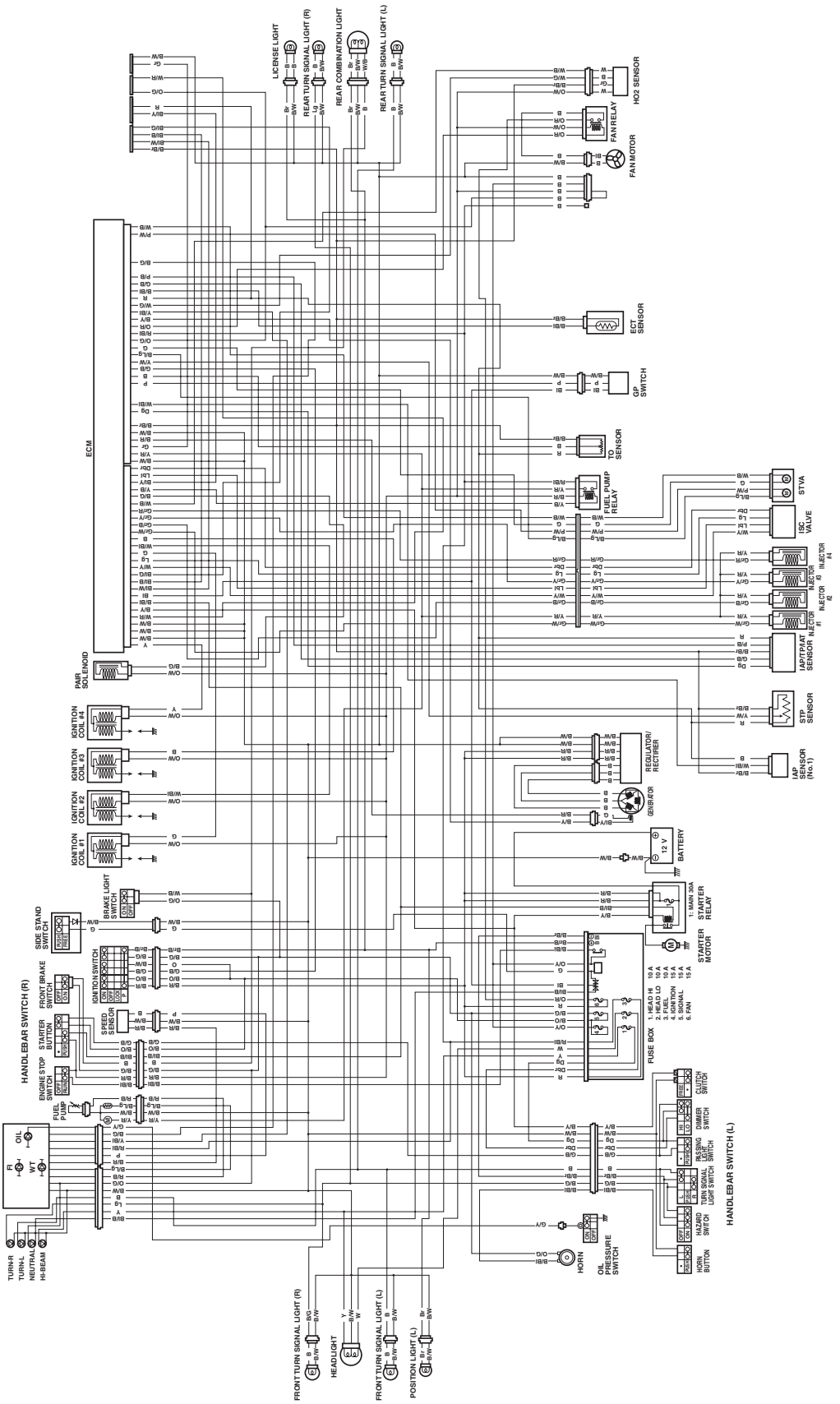
Schematic and Routing Diagram

Wiring Diagram (GSF1250)

B718H19102001

Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.

For E-02, 19



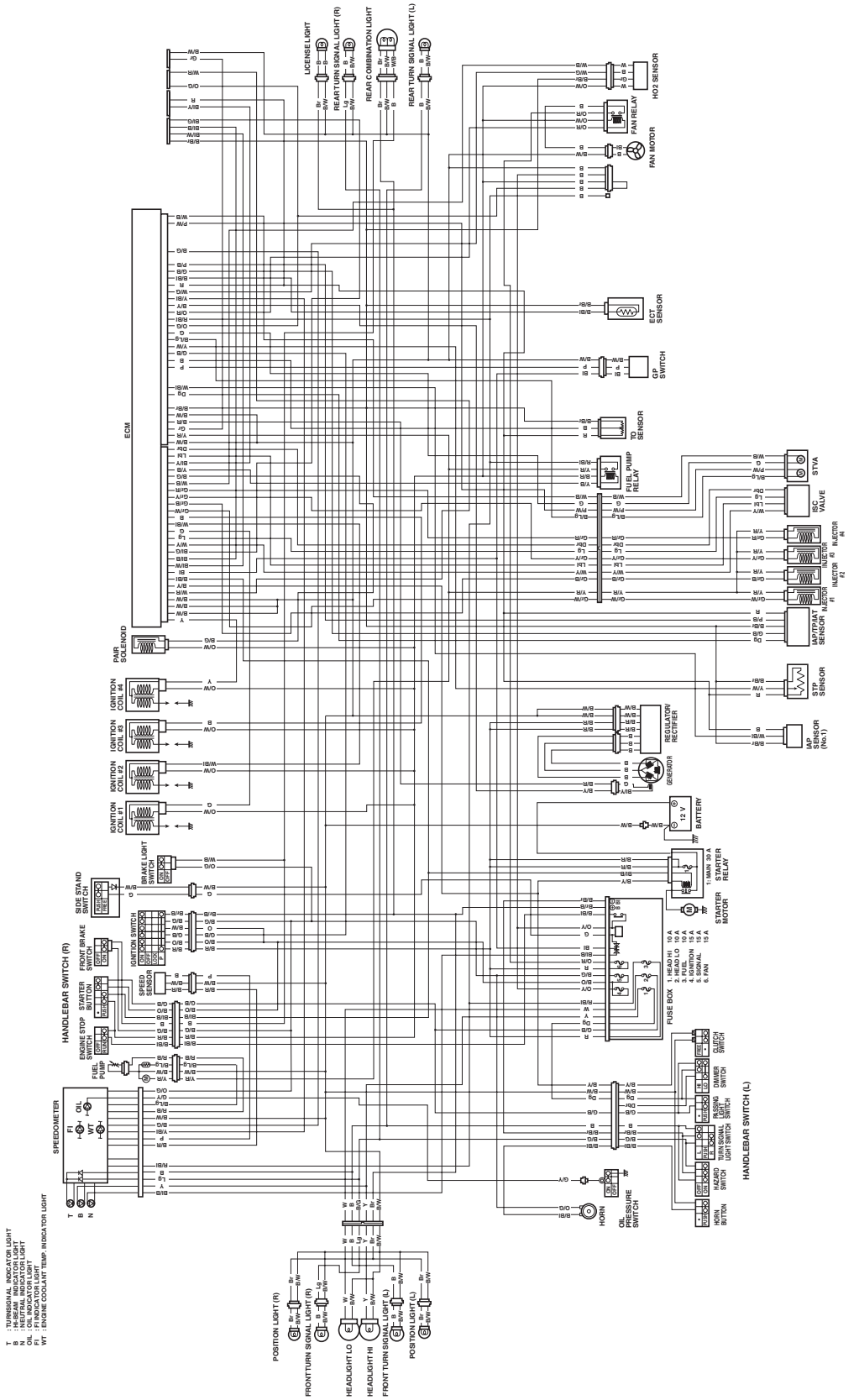
I718H1910901-09

Wiring Diagram (GSF1250S)

B718H19102004

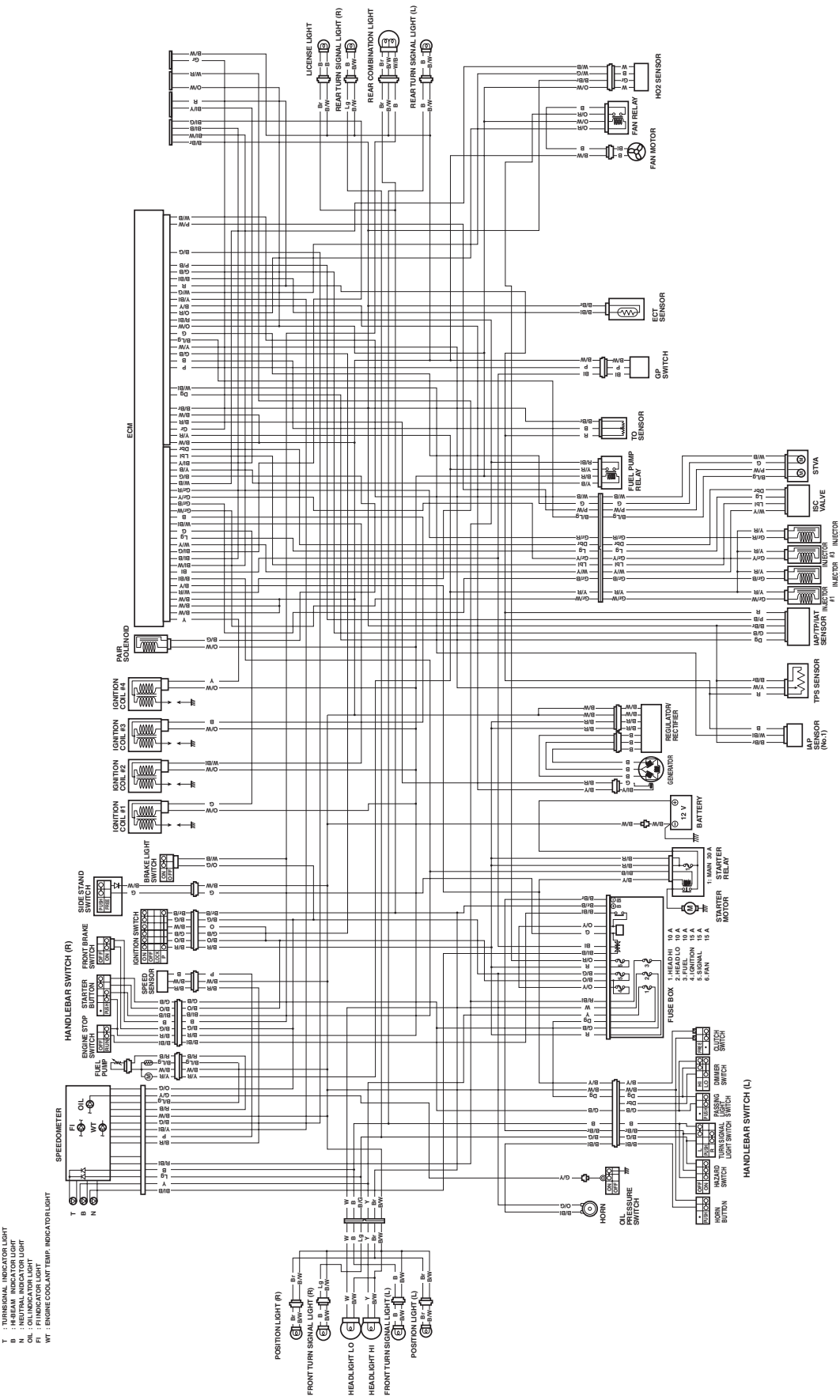
Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.

For E-02, 19



I718H1910902-08

For E-03, 24, 28



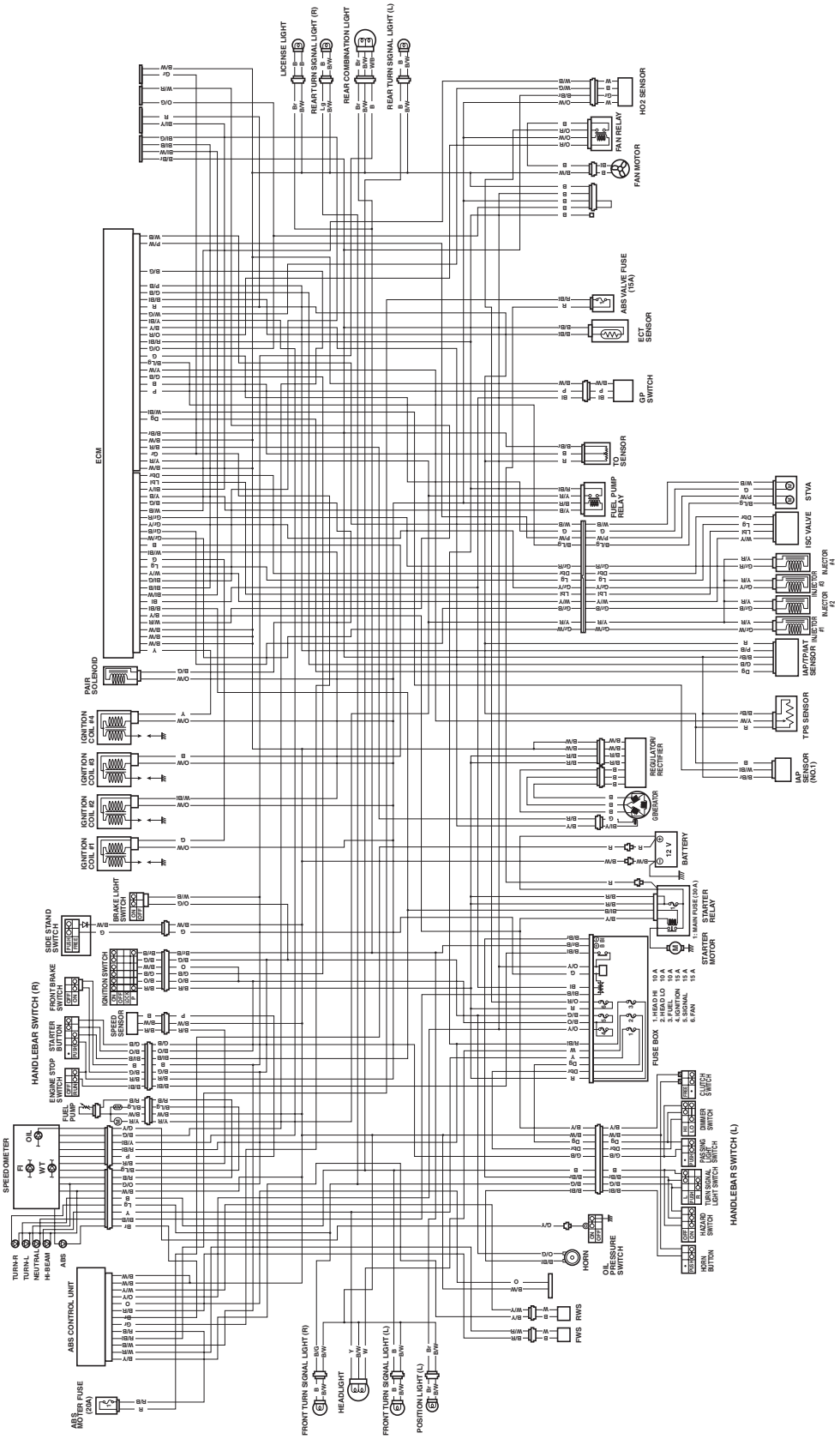
I718H1910903-07

Wiring Diagram (GSF1250A)

B718H19102005

Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.

For E-02, 19



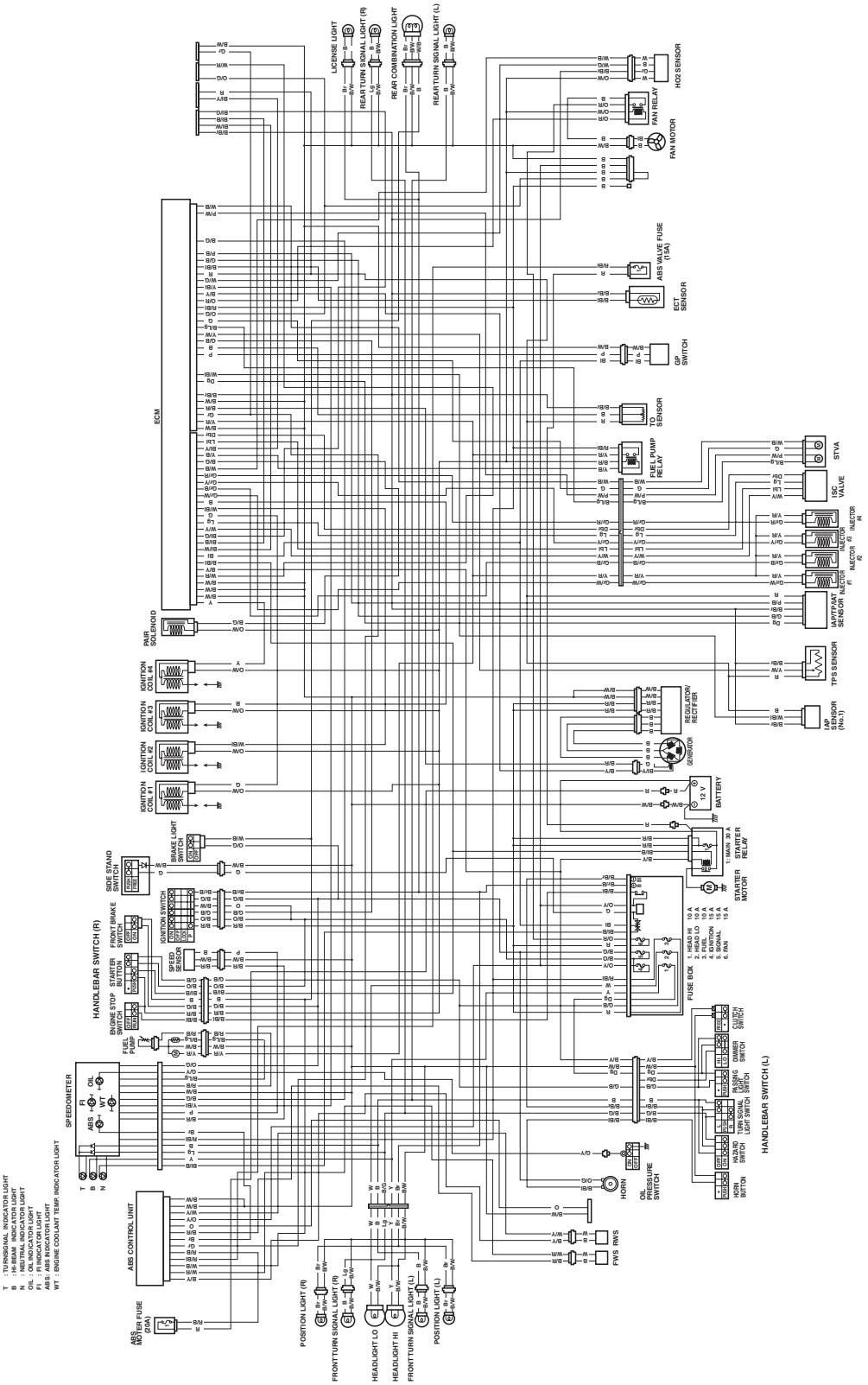
I718H1910905-07

Wiring Diagram (GSF1250SA)

B718H19102006

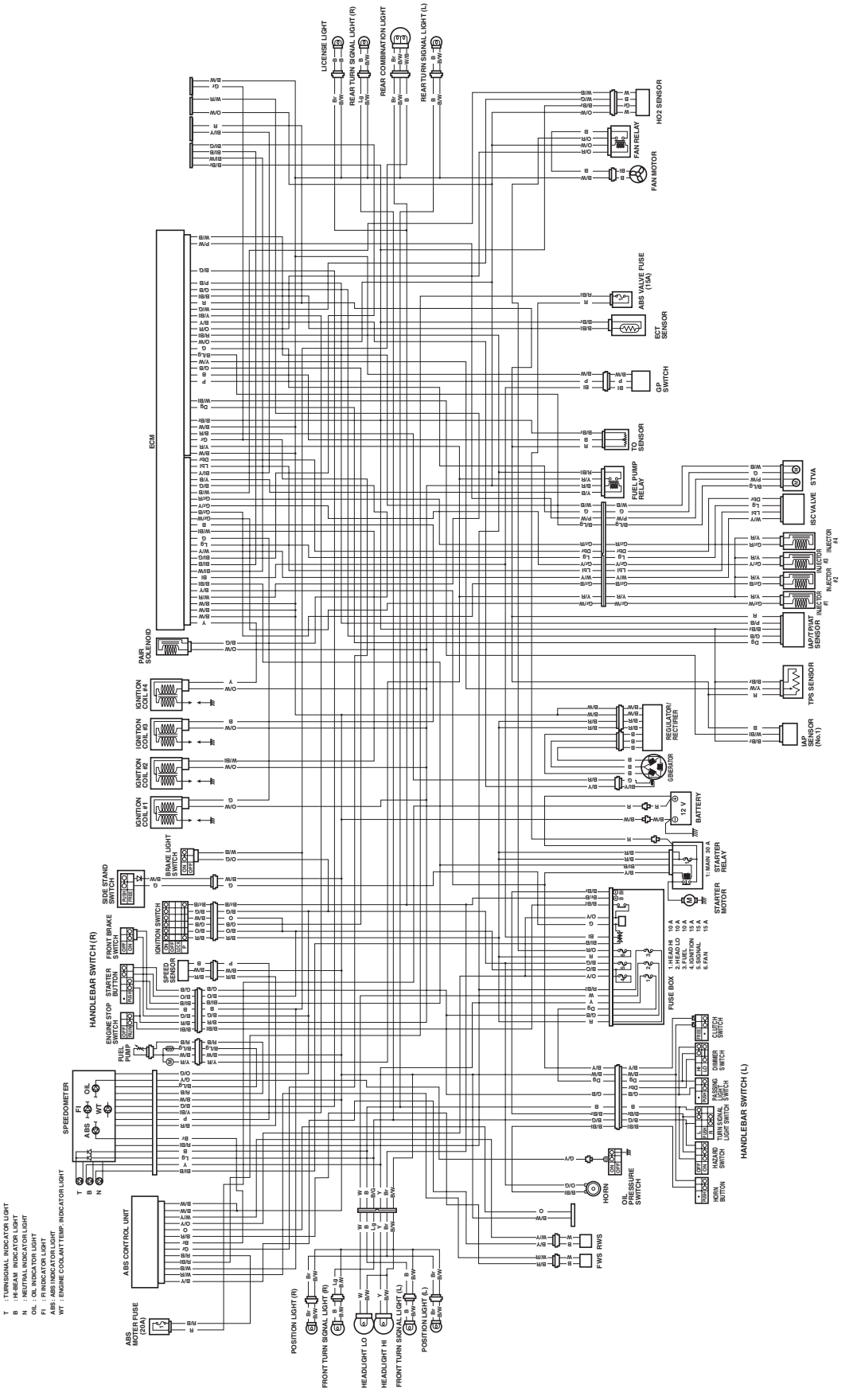
Refer to “Wire Color Symbols in Section 0A (Page 0A-6)”.

For E-02, 19



I718H1910906-07

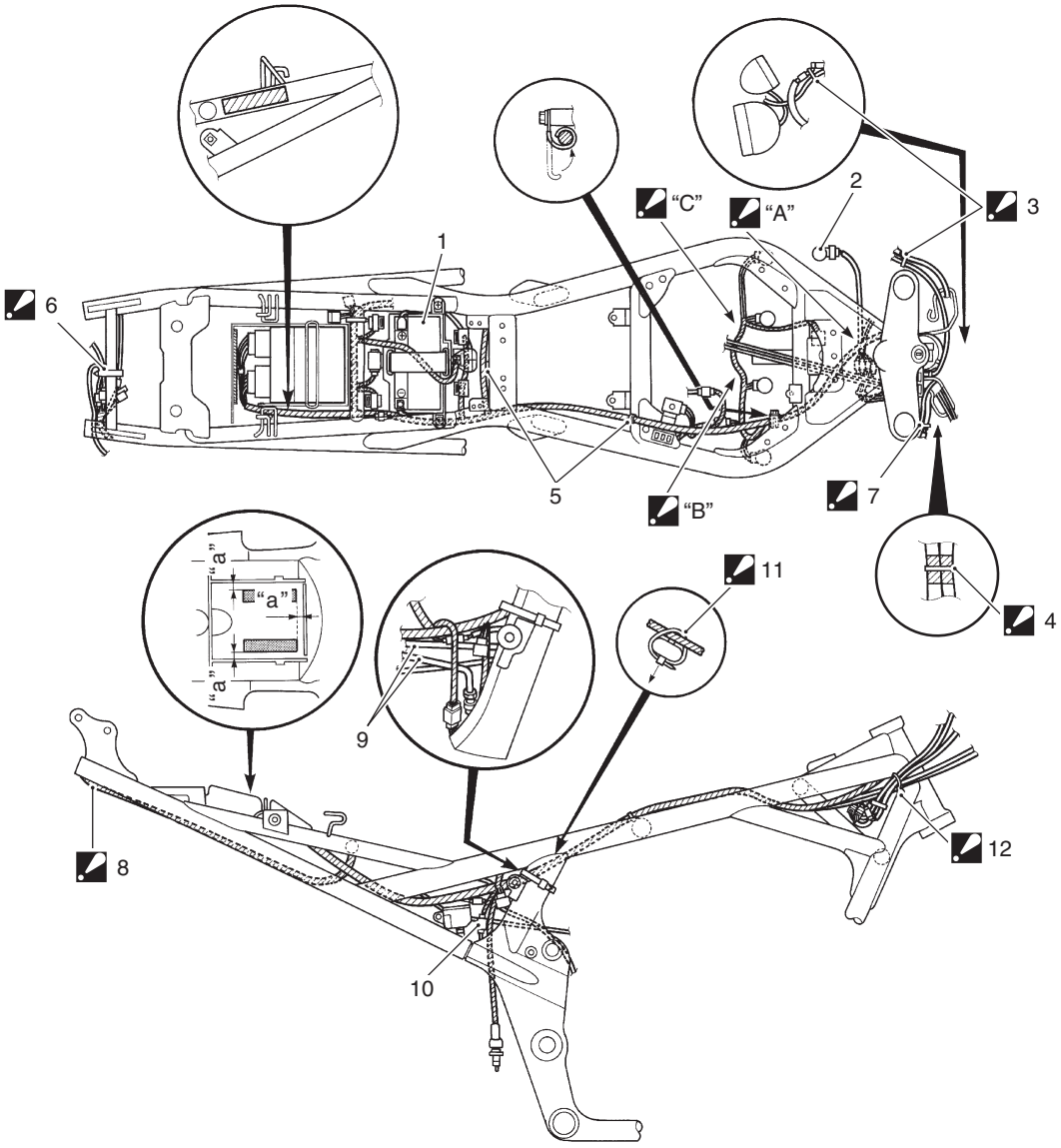
For E-03, 24, 28



I718H1910908-05

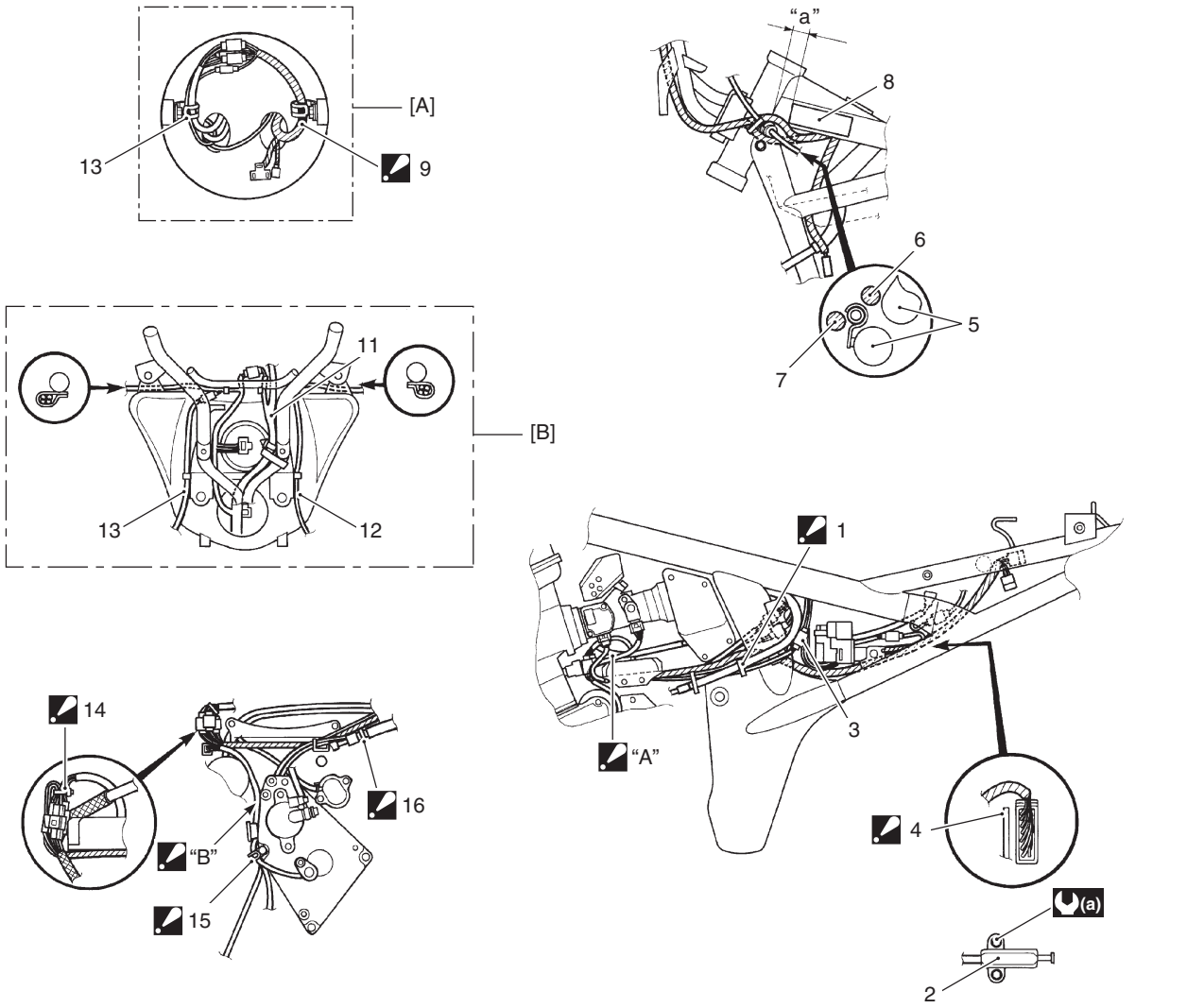
Wiring Harness Routing Diagram

B718H19102003



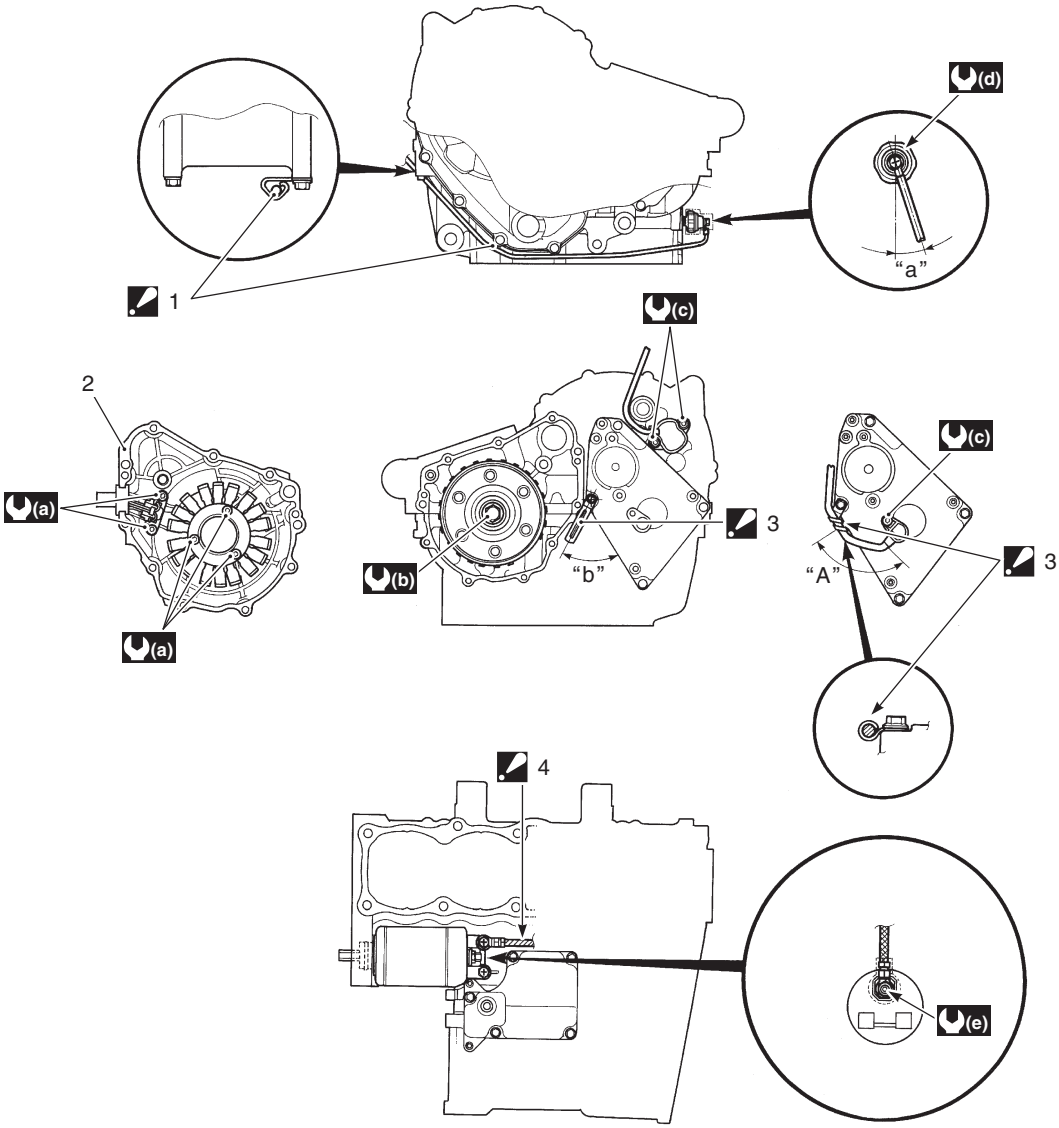
I718H1910910-05

1. Battery	9. Brake hose (ABS) (GSF1250A/SA only)
2. EVAP purge control valve (E-33 only)	10. Rear wheel speed sensor (GSF1250A/SA only)
3. Clamp (GSF1250/A only) : Pass through the speed meter lead right side of ignition switch. Cut the tip of clamp after clamping.	11. Clamp : Clamp the lead wire and ABS brake hose (GSF1250A/SA).
4. Clamp (GSF1250S/SA only) : Clamp the handle switch right and left lead at the middle of blue taping.	12. Clamp : Clamp the handle bar lead wires, ignition switch lead wire and front wheel speed sensor lead wire (GSF1250A/SA).
5. Clamp	"A": Pass through the horn and fan lead wire upper the ABS brake hose (GSF1250A/SA). Pass through the EVAP purge control valve lead wire upper the clutch hose (E-33 only).
6. Clamp : Clamp tip backward.	"B": Pass through the lead wire under the water hoses.
7. Clamp : Cut the tip of clamp after clamping.	"C": Slack the lead wire downward.
8. Wring harness : Be careful not to pinch the wring harness with the frame and fender.	"a": 5 – 10 mm (0.2 – 0.4 in)



I718H1910912-03

1. Clamp : Clamp the speed sensor lead wire and HO2 sensor lead wire.	12. Turn signal lead wire (RH)
2. Side-stand switch	13. Turn signal lead wire (LH)
3. HO2 sensor coupler	14. Clamp : Clamp the regulator/rectifier lead wire and generator lead wire.
4. ABS control unit/HU bracket (GSF1250A/SA only) : Do not contact the ABS unit wiring harness with the bracket.	15. Clamp : Clamp the speed sensor lead wire, HO2 sensor lead wire and side-stand switch lead wire.
5. Frame	16. Clamp : Clamp the lead wire inside of clutch hose.
6. Wiring harness (GSF1250/A)	"A": Pass the regulator/rectifier lead wire behind hose.
7. Wiring harness (GSF1250S/SA)	"B": Set the generator lead wire between starter motor and sprocket inner cover.
8. ICES Canada label (E-28 only)	(a) : 14 N·m (1.4 kgf-m, 10.0 lb-ft)
9. Clamp : Clamp the lead wire at the white marking.	"a": 20 ± 5 mm (0.8 ± 0.2 in)
10. Clamp : Clamp the speed meter lead wire and turn signal lead wires.	[A]: For GSF1250/GSF1250A
11. Wiring harness	[B]: For GSF1250S/GSF1250SA



I718H1910913-02

1. Oil pressure lead wire : Be careful not to slacken the oil pressure lead wire.	(c) : 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)
2. Generator cover	(d) : 1.5 N·m (0.15 kgf-m, 1.0 lb-ft)
3. Clamp : Push the clamp inside after clamping lead wire.	(e) : 5 N·m (0.5 kgf-m, 3.5 lb-ft)
4. Battery (–) lead wire : Set lead wire horizontally for right side.	"a": 20° ± 10°
(a) : 11 N·m (1.1 kgf-m, 8.0 lb-ft)	"b": 60° ± 10°
(b) : 120 N·m (12 kgf-m, 87 lb-ft)	"A": Not slacken lead wire between sensor and clamp.

Specifications

Service Data

B718H19107001

Electrical

Item			Specification	Note
Fuse size	Headlight	HI	10 A	
		LO	10 A	
	Fuel		10 A	
	Ignition		15 A	
	Signal		15 A	
	Main		30 A	
	ABS motor (GSF1250A/SA only)		20 A	
	ABS valve (GSF1250A/SA only)		15 A	

Tightening Torque Specifications

B718H19107002

NOTE

The specified tightening torque is also described in the following.
“Wiring Harness Routing Diagram (Page 9A-8)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

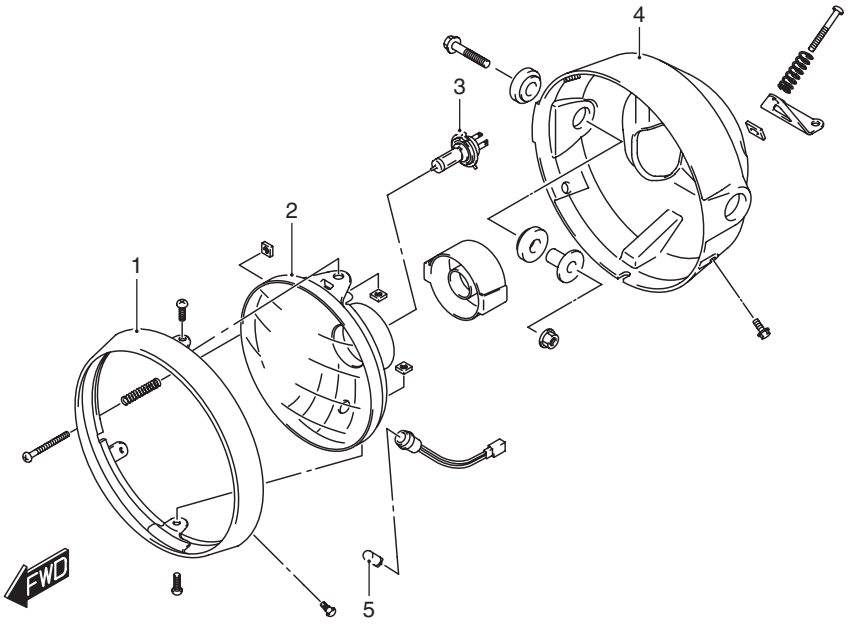
Lighting Systems

Repair Instructions

Headlight Components

B718H19206001

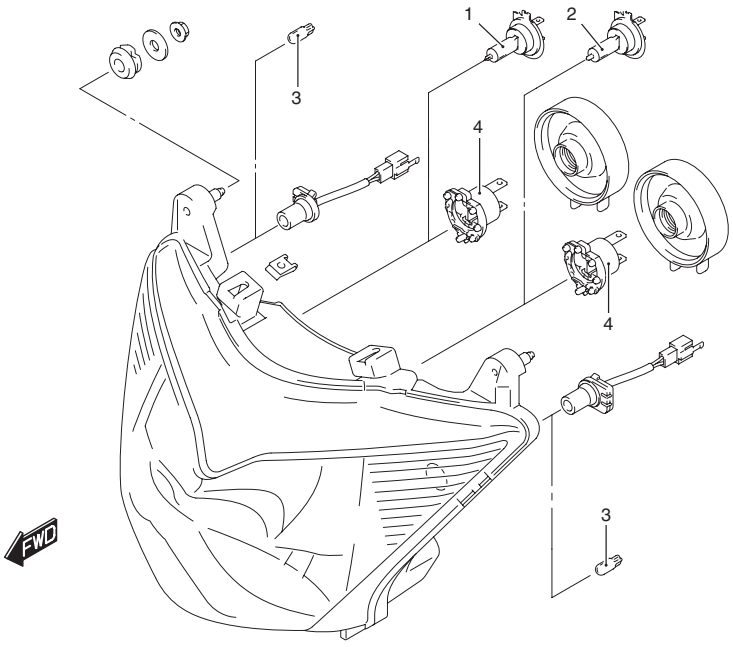
GSF1250/A



I718H1920047-02

1. Headlight rim	3. Headlight bulb (12 V 60/55 W, H4)	5. Position light bulb (12 V 5 W)
2. Headlight unit	4. Headlight housing	

GSF1250S/SA



I718H1920048-02

1. Headlight low beam bulb (12 V 55 W, H7)	3. Position light bulb (12 V 5 W x 2)
2. Headlight highbeam bulb (12 V 55 W, H7)	4. Socket

Headlight Removal and Installation

B718H19206024

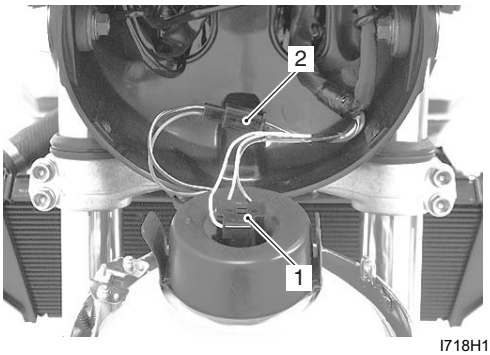
GSF1250/A

Removal

1) Removal the headlight mounting screws.

I718H1920006-01

2) Disconnect the headlight coupler (1) and position light coupler (2).



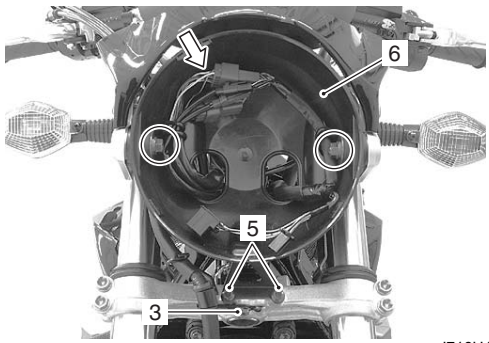
I718H1920007-01

3) Remove the front brake hose clamp bolt (3) (GSF1250) or front brake hose joint mounting bolt (4) (GSF1250A).

4) Remove the headlight beam vertical adjuster plate mounting bolts (5).

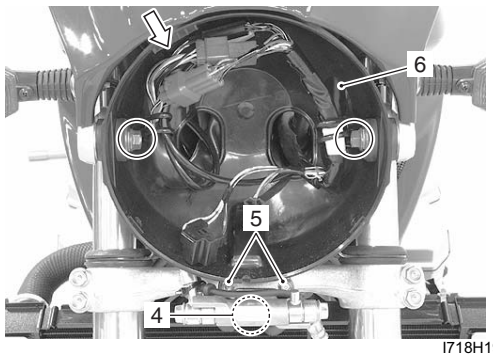
5) Disconnect the respective couplers and remove the headlight housing (6).

GSF1250



I718H1920040-04

GSF1250A



I718H1920008-03

Installation

Installation is in the reverse order of removal. Pay attention to the following point:

- After installing, be sure to inspect the headlight beam. Refer to “Headlight Beam Adjustment (Page 9B-5)”.

GSF1250S/SA

Removal

1) Remove the cowling. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the headlight and position light couplers.
3) Remove the headlight assembly.

I718H1920002-01

Installation

Installation is in the reverse order of removal. Pay attention to the following point:

- After installing, be sure to inspect the headlight beam. Refer to “Headlight Beam Adjustment (Page 9B-5)”.

Headlight Bulb Replacement

B718H19206025

⚠ CAUTION

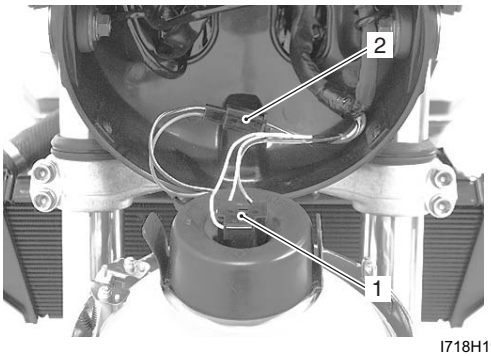
When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soap water to prevent premature bulb failure.

GSF1250/A

1) Remove the headlight mounting screws.

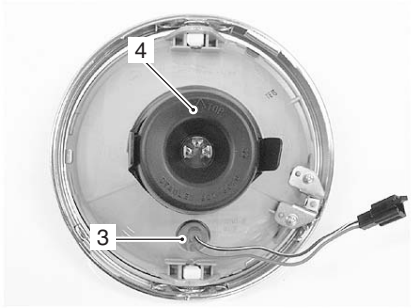
I718H1920006-01

2) Disconnect the headlight coupler (1) and position light coupler (2).



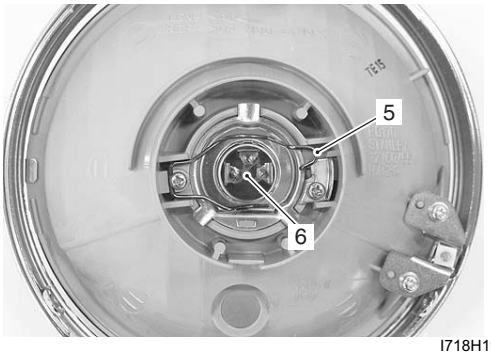
I718H1920014-01

3) Remove the position light socket (3) and replace the position light bulb.
4) Remove the bulb socket rubber cap (4).



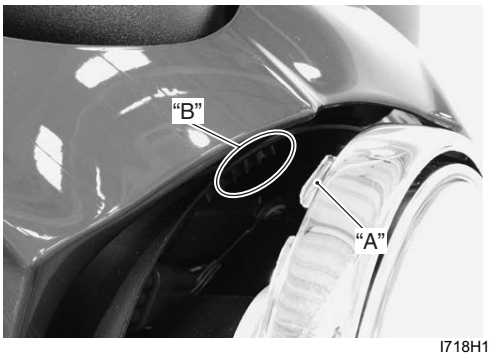
I718H1920015-01

5) Replace the headlight bulb (6) by unhooking the bulb holder spring (5).



I718H1920016-01

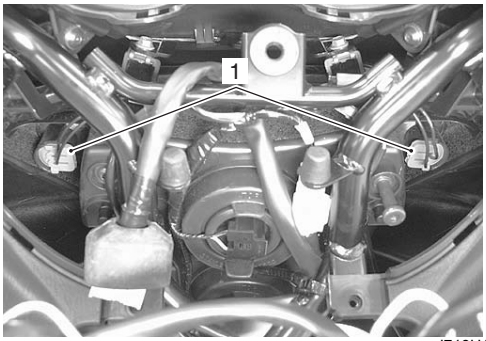
6) Reassemble the headlight.
7) Install the headlight assembly so that the hook “A” on the headlight bezel engages with “B” of the housing.



I718H1920017-03

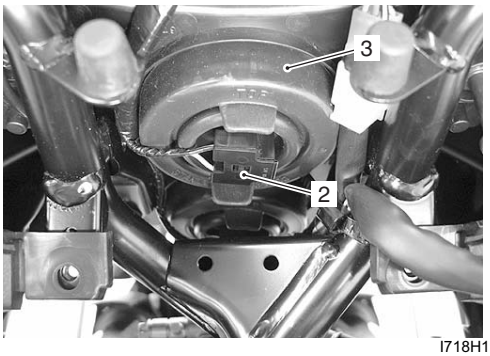
GSF1250S/SA

1) Remove the combination meter assembly. Refer to “Combination Meter Removal and Installation in Section 9C (Page 9C-4)”.
2) Remove the position light sockets (1) and replace the position light bulbs.



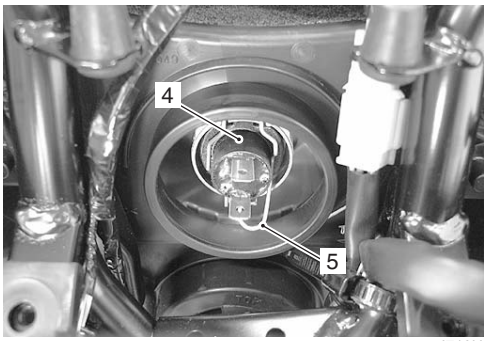
I718H1920009-01

3) Disconnect the headlight (Low beam) coupler (2) and remove the bulb socket rubber cap (3).



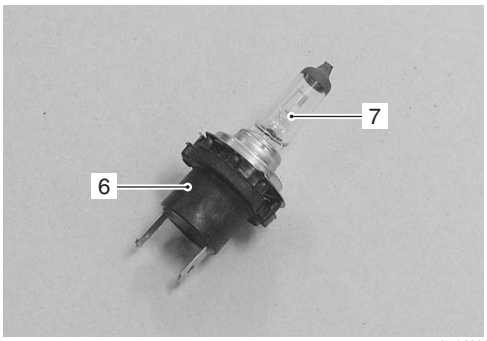
I718H1920010-02

4) Replace the headlight bulb/socket (Low beam) (4) by unhooking the bulb holder spring (5).



I718H1920011-02

5) Disconnect the headlight bulb (7) from the socket (6).
6) Replace the headlight bulb (7) with a new one.



I718H1920049-02

7) Replace the headlight bulb (High beam) in the same way as that of the low beam one.

I718H1920012-01

8) Reinstall the removed parts.

Headlight Beam Adjustment

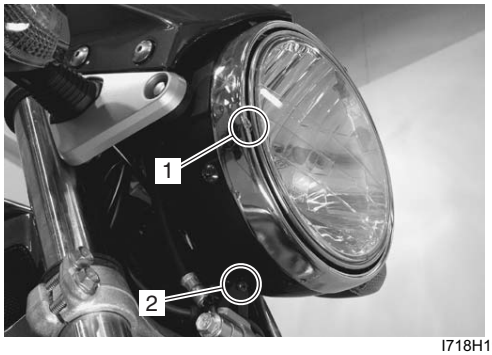
B718H19206026

GSF1250/A

Adjust the headlight beam, both horizontally and vertically.

NOTE

To adjust the headlight beam, adjust the beam horizontally first, then vertically.



I718H1920037-02

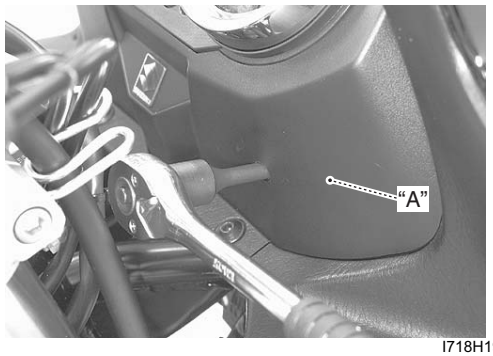
1. Horizontal adjuster	2. Vertical adjuster

GSF1250S/SA

1) Insert 5 mm hexagon wrench as shown and adjust the Low and High headlight beam horizontally.

NOTE

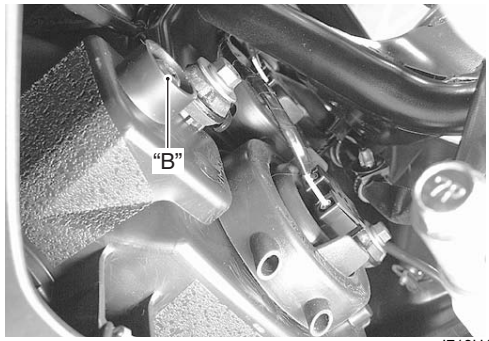
To adjust the headlight beam, adjust the beam horizontally first, then vertically.



I718H1920041-01

"A": Horizontal adjuster (For both Low and High beam)

2) Adjust the Low and High headlight beam vertically from the lower side.

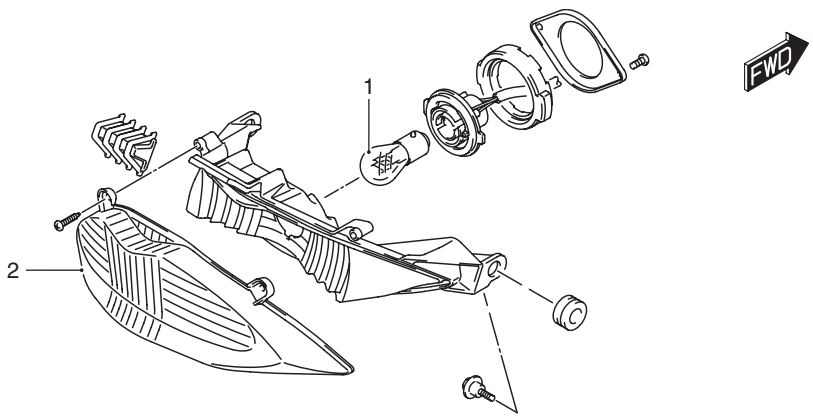


I718H1920042-01

"B": Vertical adjuster (For both Low and High beam)

Rear Combination Light Components

B718H19206005

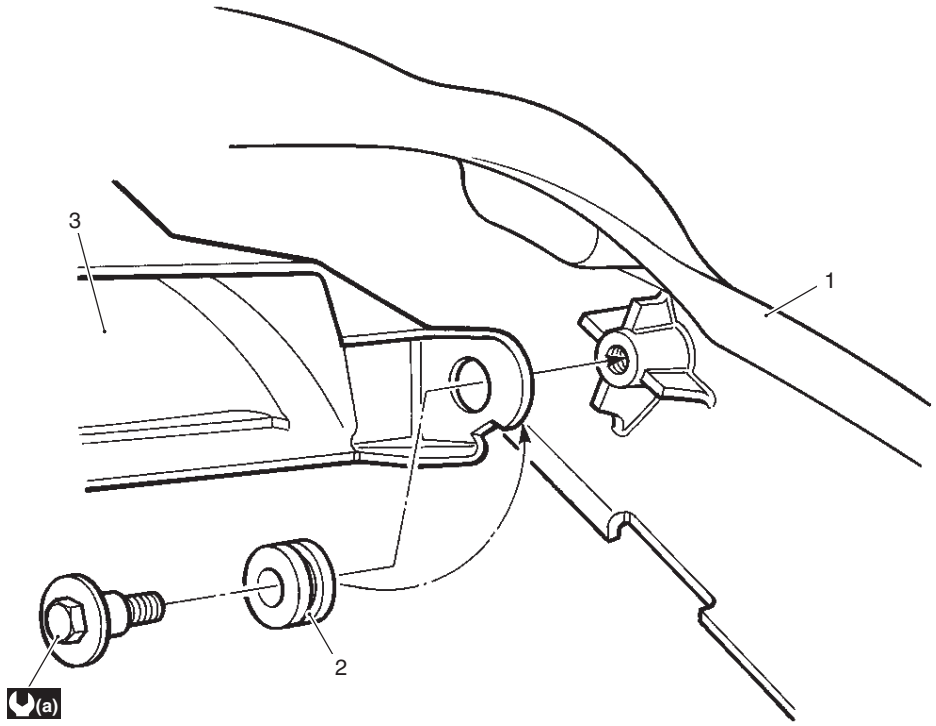


I649G1920017-02

1. Brake light/Taillight bulb (12 V 21/5 W)	2. Lens

Rear Combination Light Construction

B718H19206006



I649G1920018-01

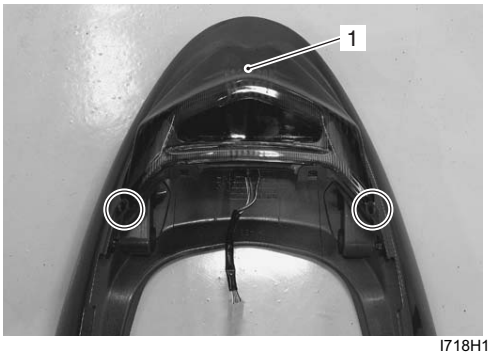
1. Seat tail cover	2. Cushion	3. Rear combination light	(a) : 2.0 N·m (0.2 kgf-m, 1.5 lb-ft)

Rear Combination Light Removal and Installation

B718H19206007

Removal

1) Remove the seat tail cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the rear combination light (1) from the seat tail cover.



I718H1920018-01

Installation

Install the rear combination light in the reverse order of removal. Pay attention to the following point:

- Tighten the rear combination light mounting bolts to the specified torque.

Tightening torque

Rear combination light mounting bolt: 2.0 N·m (0.2 kgf-m, 1.5 lb-ft)

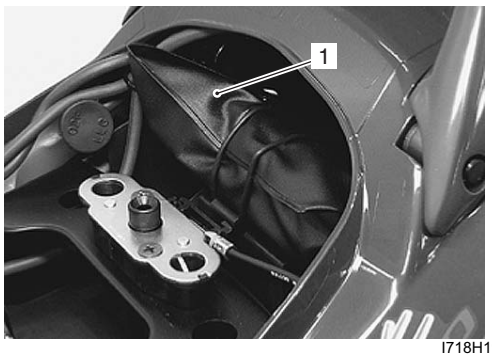
Brake Light Bulb / Taillight Bulb Replacement

B718H19206008

⚠ CAUTION

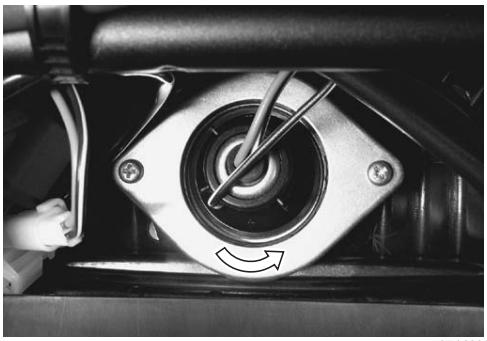
When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soap water to prevent premature bulb failure.

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the tool set (1).



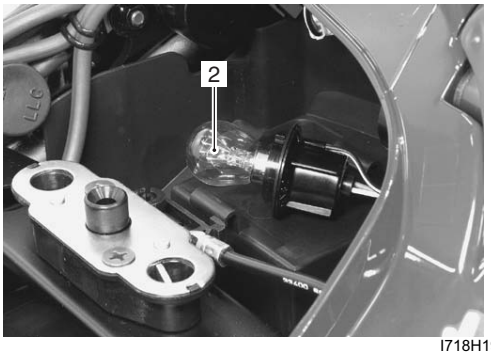
I718H1920051-01

3) Remove the bulb socket by turning it counterclockwise.



I718H1920020-01

4) Replace the bulb (2).

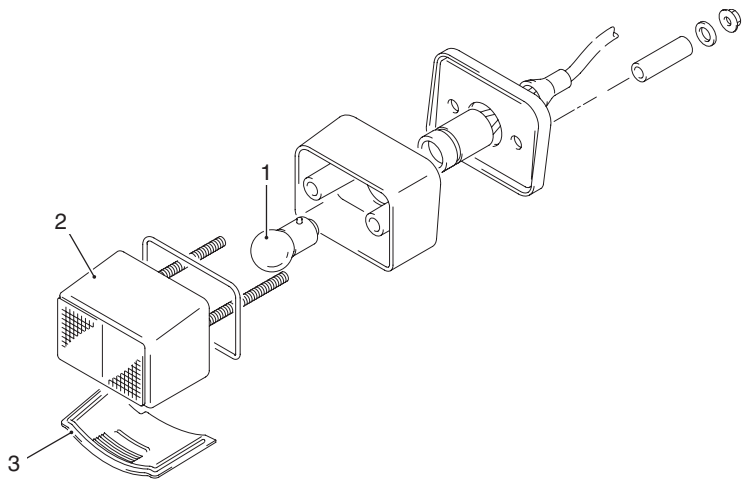


I718H1920021-01

5) Reinstall the removed parts.

License Plate Light Components

B718H19206009



I649G1920023-02

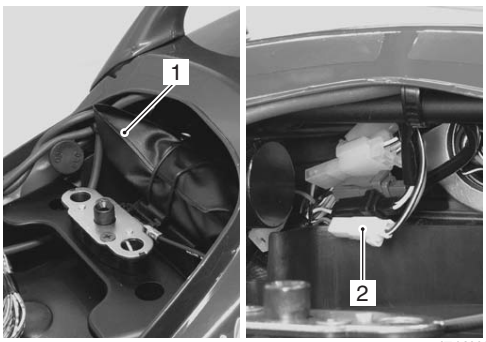
1. License plate light bulb (12 V 5 W)	2. Lens cover	3. Lens

License Plate Light Removal and Installation

B718H19206010

Removal

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the tool set (1) and disconnect the license plate light coupler (2).



I718H1920022-01

3) Remove the license plate light by removing the nuts.

I718H1920023-01

Installation

Install the license plate light in the reverse order of removal.

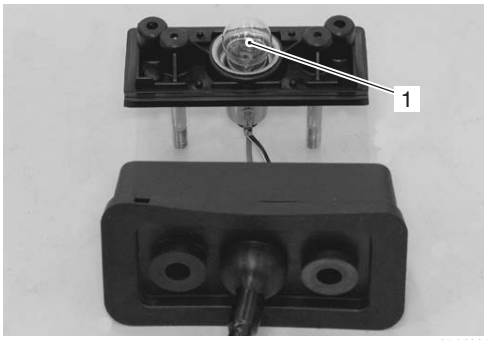
License Plate Light Bulb Replacement

B718H19206011

1) Remove the license plate light. Refer to “License Plate Light Removal and Installation (Page 9B-8)”.
2) Remove the lens by removing the screws.

I718H1920024-01

3) Replace the bulb (1).

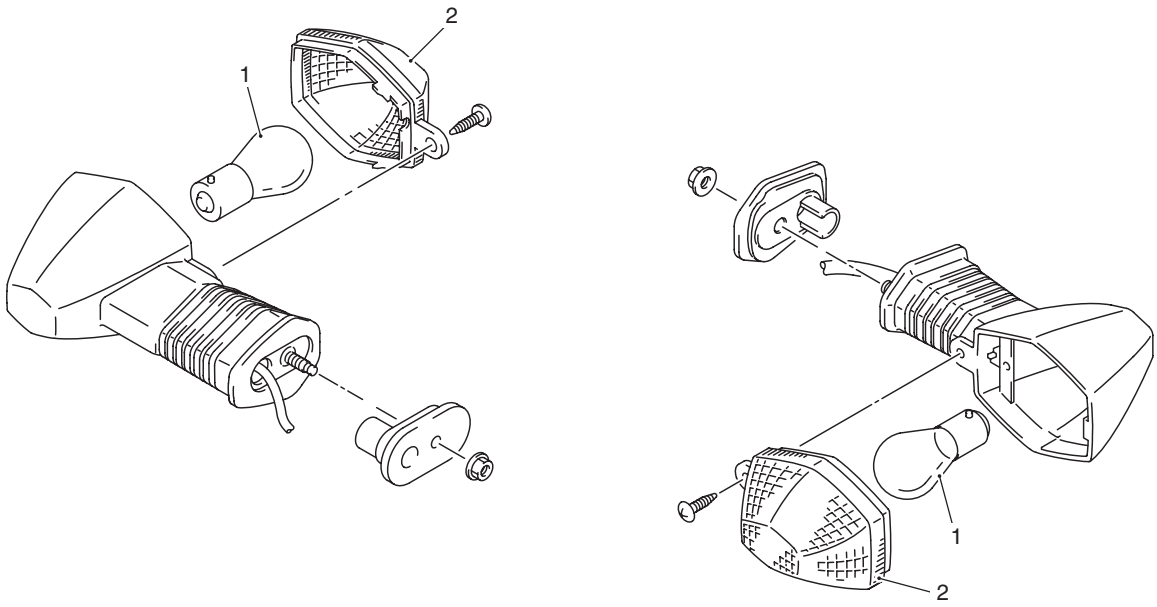


I718H1920026-01

4) Reinstall the removed parts.

Turn Signal Light Components

B718H19206012



I649G1920028-03

1. Turn signal light bulb (12 V 21 W x 4)	2. Lens

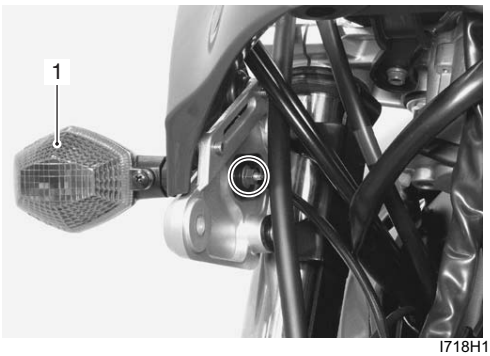
Front Turn Signal Light Removal and Installation

B718H19206013

GSF1250/A

Removal

1) Remove the headlight housing. Refer to “Headlight Removal and Installation (Page 9B-2)”.
2) Remove the front turn signal light (1) by removing the nut.



I718H1920027-01

Installation

Install the front turn signal light in the reverse order of removal.

GSF1250S/SA

Removal

1) Remove the wind screen and upper panel. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the turn signal light coupler and clamp.
3) Remove the front turn signal light (1) by removing the nut.

I718H1920050-01

Installation

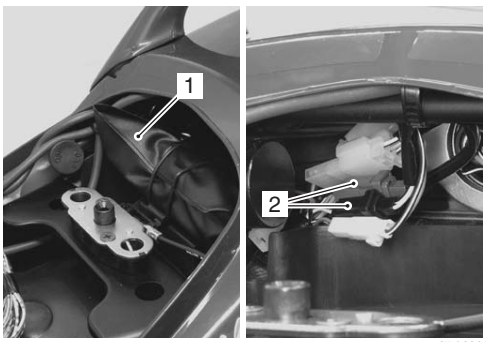
Install the front turn signal light in the reverse order of removal.

Rear Turn Signal Light Removal and Installation

B718H19206014

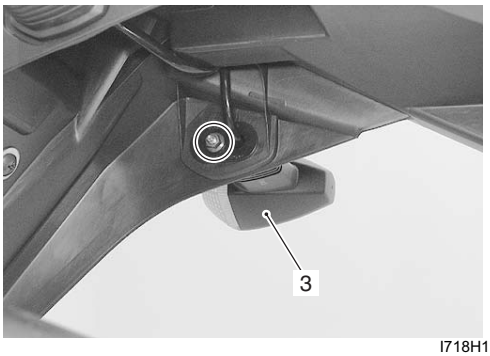
Removal

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the tool set (1) and disconnect the turn signal light coupler (RH: Black, LH: Gray) (2).



I718H1920028-01

3) Remove the turn signal light (3) by removing the nut.



I718H1920029-02

Installation

Install the rear turn signal light in the reverse order of removal.

Turn Signal Light Bulb Replacement

B718H19206015

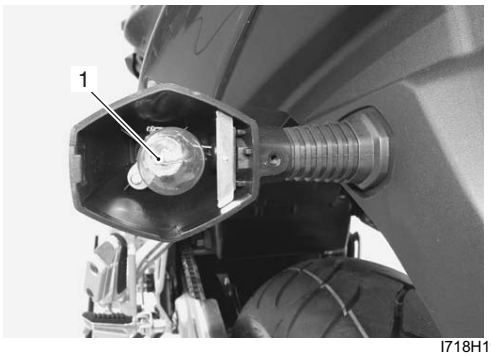
⚠ CAUTION

When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soap water to prevent premature bulb failure.

1) Remove the lens by removing the screw.

I718H1920030-01

2) Replace the bulb (1).

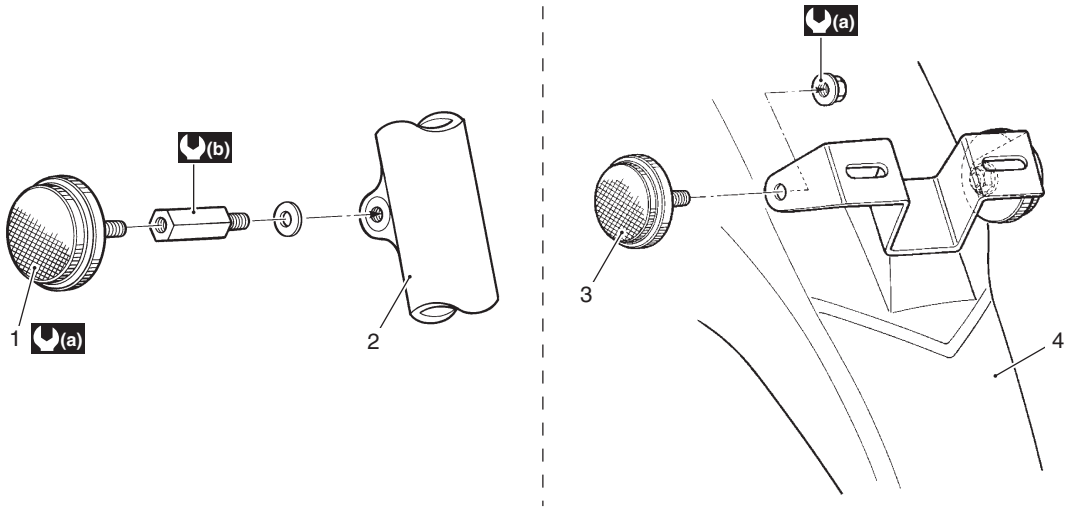


I718H1920031-01

3) Reinstall the lens.

Reflex Refractor Construction

B718H19206016



I718H1920044-05

1. Front reflex refractor (For E-03, 24, 28, 33)	3. Rear reflex refractor (For E-03, 28, 33)	(a) : 1.8 N·m (0.18 kgf-m, 1.3 lb-ft)
2. Front fork	4. Rear fender	(b) : 4.5 N·m (0.45 kgf-m, 3.25 lb-ft)

Turn Signal / Side-stand Relay Inspection

B718H19206017

Refer to “Electrical Components Location in Section 0A (Page 0A-8)”.

NOTE

Make sure that the battery is fully charged.

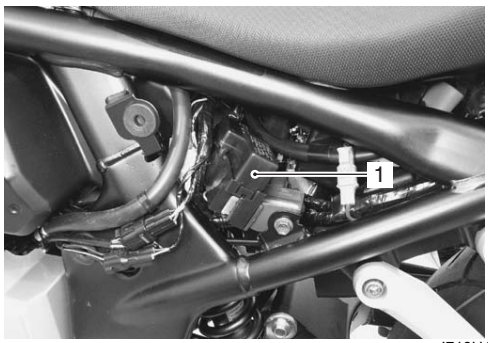
Before removing the turn signal/side-stand relay, check the operation of the turn signal light.
If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection.
If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal/side-stand relay with a new one. Refer to “Turn Signal / Side-stand Relay Removal and Installation (Page 9B-11)”.

Turn Signal / Side-stand Relay Removal and Installation

B718H19206018

Removal

1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the turn signal/side-stand relay (1).



I718H1920034-01

Installation

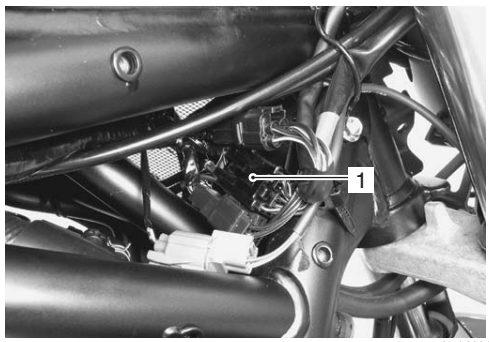
Install the turn signal/side-stand relay in the reverse order of removal.

Hazard Switch Inspection

B718H19206019

Inspect the hazard switch in the following procedures:

1) Remove the right frame head cover. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the left handlebar switch coupler (1).



I718H1920035-01

3) Inspect the hazard switch for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Color / Position	B	B/Br	B/G
OFF			
ON	○	○	○

I718H1920045-01

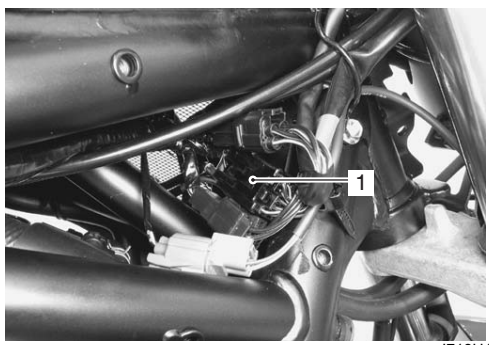
4) After finishing the hazard switch inspection, reinstall the removed parts.

Turn Signal Switch Inspection

B718H19206020

Inspect the turn signal switch in the following procedures:

1) Remove the right frame head cover. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the left handlebar switch coupler (1).



I718H1920035-01

3) Inspect the turn signal switch for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one.
Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Color / Position	B/G	B/Br	B
L		○	○
PUSH			
R	○	○	

I649G1920037-01

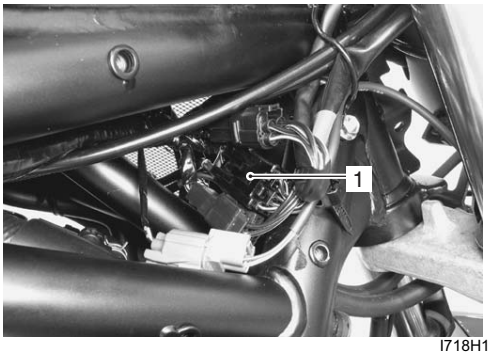
4) After finishing the turn signal switch inspection, reinstall the removed parts.

Passing Light Switch Inspection

B718H19206021

Inspect the passing light switch in the following procedures:

1) Remove the right frame head cover. (GSF1250/A)
Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the left handlebar switch coupler (1).



I718H1920035-01

3) Inspect the passing light switch for continuity with a tester.
If any abnormality is found, replace the left handlebar switch assembly with a new one.
Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Color / Position	G/B	Dg
•		
PUSH	○	○

I649G1920038-01

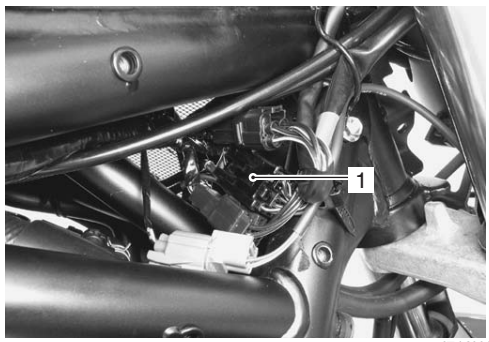
4) After finishing the passing light switch inspection, reinstall the removed parts.

Dimmer Switch Inspection

B718H19206022

Inspect the dimmer switch in the following procedures:

1) Remove the right frame head cover. (GSF1250/A)
Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the left handlebar switch coupler (1).



I718H1920035-01

3) Inspect the dimmer switch for continuity with a tester.
If any abnormality is found, replace the left handlebar switch assembly with a new one.
Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Color / Position	Dbr	Dg	G/B
HI		○	○
LO	○		○

I718H1920046-04

4) After finishing the dimmer switch inspection, reinstall the removed parts.

Specifications

Service Data

B718H19207001

Wattage
Unit: W

Item		Specification	
		GSF1250/A	GSF1250S/SA
Headlight	HI	60	55
	LO	55	←
Parking or position light		5	5 x 2
Brake light/Taillight		21/5	←
Turn signal light		21 x 4	←
License plate light		5	←

Tightening Torque Specifications

B718H19207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Rear combination light mounting bolt	2.0	0.2	1.5	☞(Page 9B-6)

NOTE

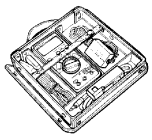
The specified tightening torque is also described in the following.
“Rear Combination Light Construction (Page 9B-6)”
“Reflex Refractor Construction (Page 9B-10)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Special Tool

B718H19208001

09900–25008 Multi-circuit tester set ☞(Page 9B-11) / ☞(Page 9B-12) / ☞(Page 9B-12) / ☞(Page 9B-12)		

Combination Meter / Fuel Meter / Horn

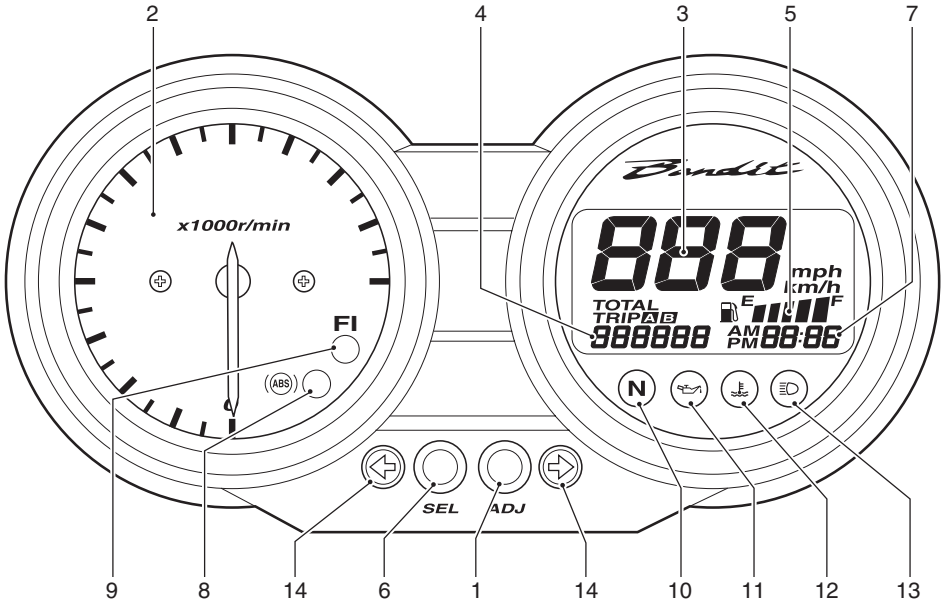
General Description

Combination Meter System Description

B718H19301001

This combination meter mainly consists of the stepping motor, LCD (Liquid Crystal Display) and LED (Light Emitting Diode).
The rpm pointer is driven by the stepping motor.
The LCDs indicate Speed, Odo / Trip A / Trip B, Fuel level indicator and Clock / FI (DTC) respectively.

LED (Light Emitting Diode)
LED is used for the illumination light and each indicator light.
LED is maintenance free. LED is less power consuming and more resistant to vibration resistance compared to the bulb.



I718H1930048-01

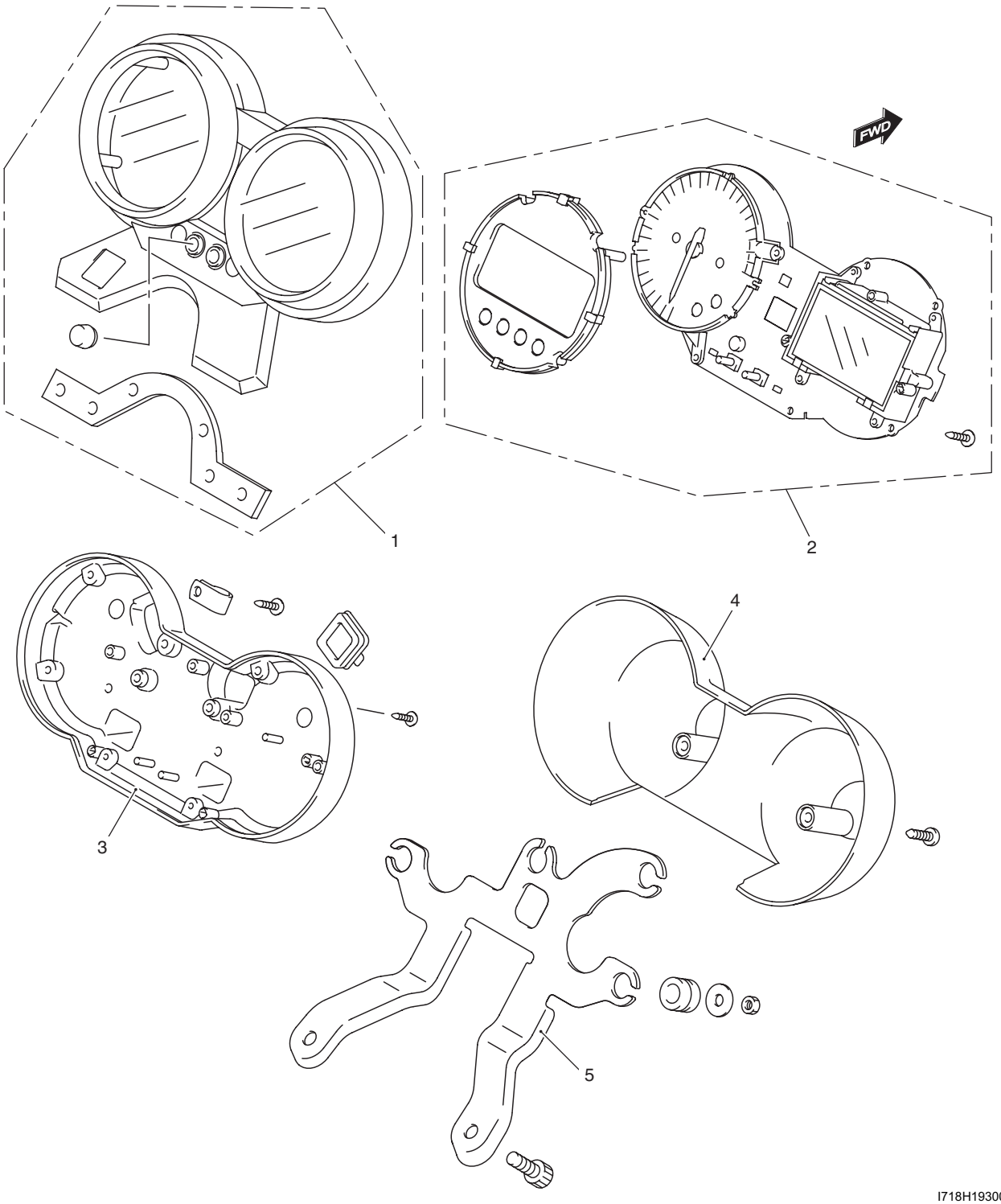
1. Adjust switch (Trip / Clock)	6. Select switch (Odo / Trip A / Trip B)	11. LED (Oil pressure indicator light)
2. Tachometer	7. LCD (FI / Clock)	12. LED (Engine coolant temperature indicator light)
3. LCD (Speedometer)	8. LED (ABS indicator light) [GSF1250A/SA only]	13. LED (High-beam indicator light)
4. LCD (Odo / Trip A / Trip B)	9. LED (FI indicator light)	14. LED (Turn signal indicator light)
5. LCD (Fuel level indicator)	10. LED (Neutral indicator light)	

Repair Instructions

Combination Meter Components

B718H19306001

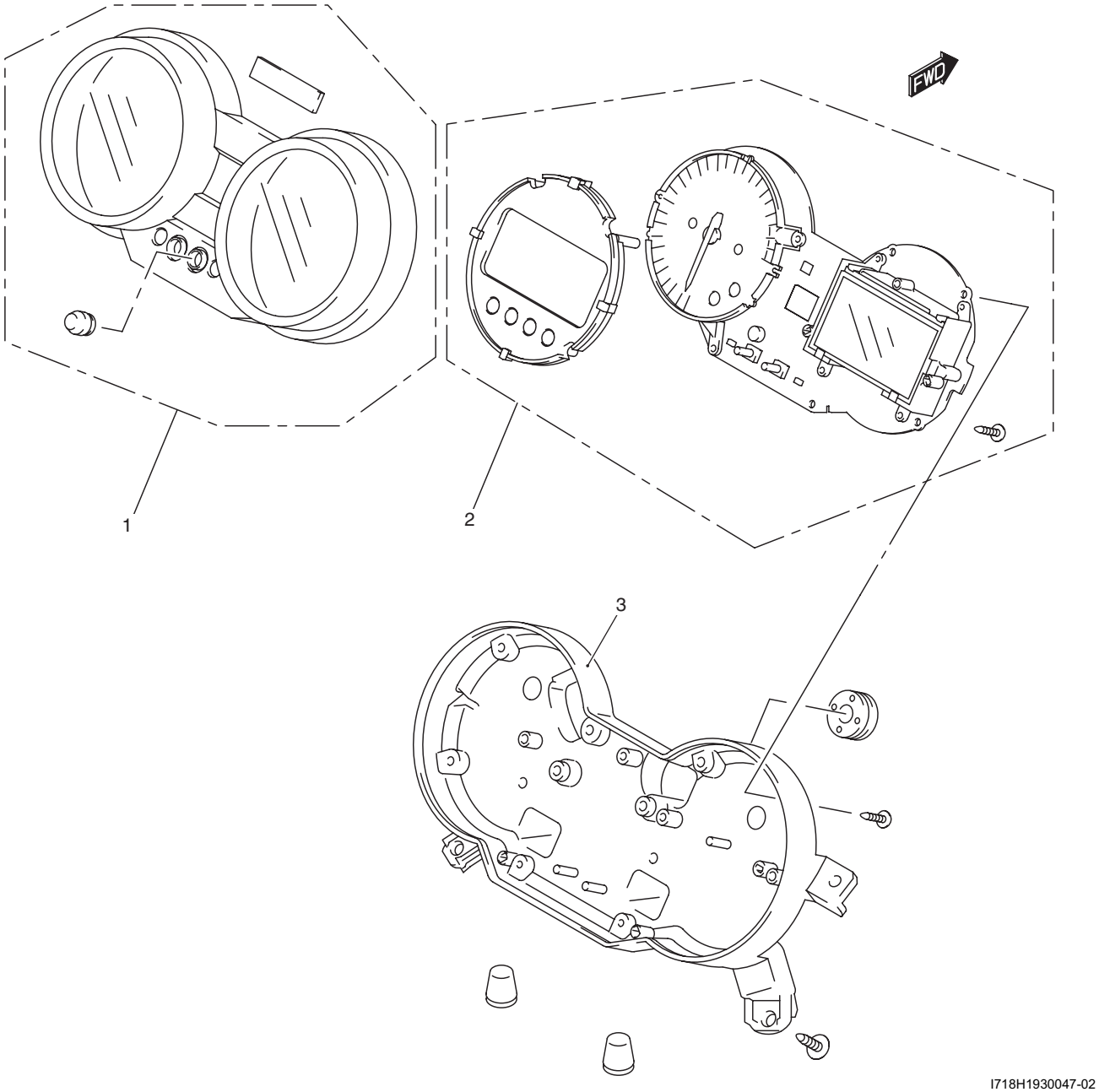
GSF1250/A



I718H1930046-03

1. Upper case	2. Combination meter	3. Lower case	4. Cover	5. Bracket

GSF1250S/SA



I718H1930047-02

1. Upper case	2. Combination meter	3. Lower case

Combination Meter Removal and Installation

B718H19306002

GSF1250/A

Removal

1) Remove the combination meter mounting bolts.

I718H1930057-01

2) Remove the headlight. Refer to “Headlight Removal and Installation in Section 9B (Page 9B-2)”.
3) Disconnect the combination meter couplers and remove the combination meter assembly (1).

I718H1930058-01

Installation

Install the combination meter in the reverse order of removal.

GSF1250S/SA

Removal

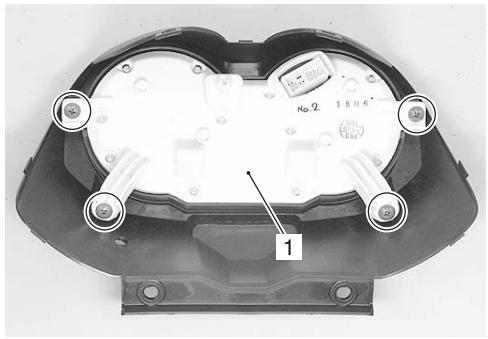
1) Remove the meter panel screws.

I718H1930017-02

2) Disconnect the combination meter coupler and remove the combination meter assembly.

I718H1930018-01

3) Remove the combination meter (1).



I718H1930019-01

Installation

Install the combination meter in the reverse order of removal.

NOTE

Fix the boot of the combination meter coupler properly.

Combination Meter Disassembly and Assembly

B718H19306003

Refer to “Combination Meter Removal and Installation (Page 9C-4)”.

Disassembly

Disassemble the combination meter as shown in the combination meter components. Refer to “Combination Meter Components (Page 9C-2)”.

Assembly

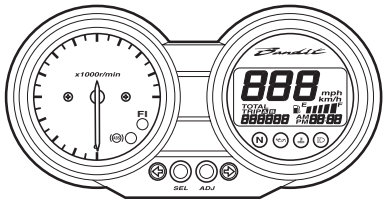
Assemble the combination meter as shown in the combination meter components. Refer to “Combination Meter Components (Page 9C-2)”.

Combination Meter Inspection

B718H19306004

LED Inspection

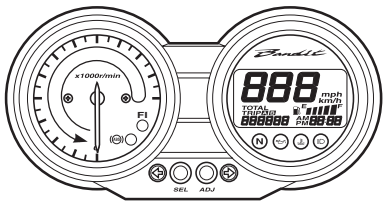
Check that the LEDs (FI indicator light, ABS indicator (GSF1250A/SA only), Oil pressure, Engine coolant temperature indicator light and Meter panel illumination) immediately light up when the ignition switch is turned to ON.
Check that other LEDs (Neutral indicator light, High-beam indicator light and Turn signal indicator lights) light up/go off by operating each switch.
If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/coupler. Refer to “Combination Meter Removal and Installation (Page 9C-4)”.



I718H1930049-01

Stepping Motor Inspection and Adjustment

1) Check that the pointer calibrates itself immediately after turning the ignition switch on and stops at zero point.
   If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/coupler.

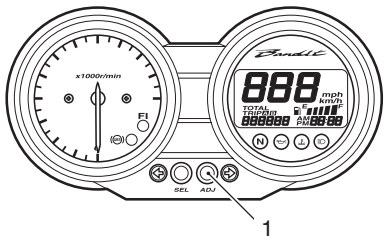


I718H1930050-01

NOTE

- **The pointer may not return to the proper position even turning the ignition switch on under low temperature condition. In that case, you can reset the pointer to the proper position by the following instruction):**
- **Complete the operation within 10 seconds after the ignition switch has been turned on.**

2) With the adjuster switch (1) pressed, turn the ignition switch on.
3) Release the adjuster switch (1), 3 to 5 seconds after turning the ignition switch on.
4) Press the adjuster switch (1) twice (within 1 second).
   → Reset



I718H1930051-01

Time	Ignition switch	Adjuster switch (1)
	OFF	PUSH
0	ON	
• •		
3 sec. • 5 sec.		Release
• • • •		Push Push→Reset
10 sec.		

I718H1930006-01

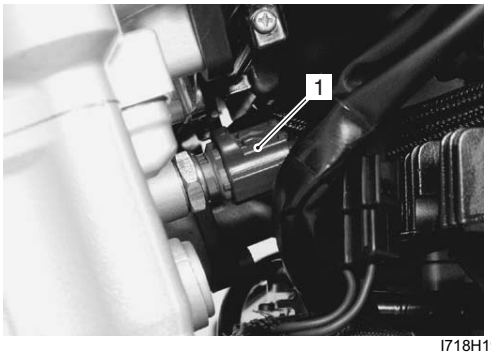
5) Pointer will return to the starting point right after the completion of the operation. In the case of the pointer not returning to the proper position after doing above, replace the combination meter unit. Refer to “Combination Meter Removal and Installation (Page 9C-4)”.

Engine Coolant Temperature Indicator Light Inspection

B718H19306029

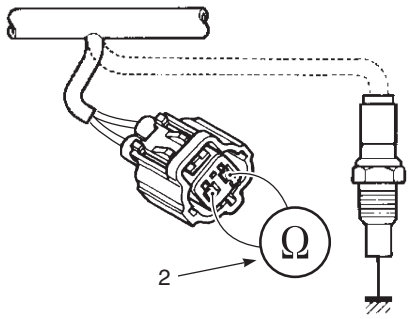
Inspect the engine coolant temperature indicator light in the following procedures:

1) Disconnect the ECT sensor coupler (1).



I718H1930059-01

2) Connect the variable resistor (2) between the terminals.

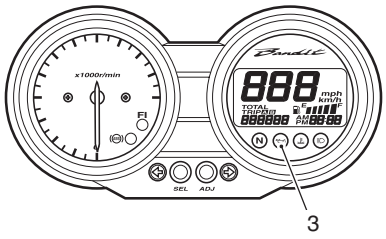


I718H1930009-05

3) Turn the ignition switch ON.

4) Check the LED operations when the resistance is adjusted to the specified values.
If either one or all indications are abnormal, replace the combination meter with a new one. Refer to "Combination Meter Removal and Installation (Page 9C-4)".

Resistance	LED (3)	Water temperature
2.45 kΩ and over	—	19 °C and below
Approx. 0.811 kΩ	—	Approx. 50 °C
Approx. 0.1 kΩ ON	Flicker	120 – 139 °C
0 Ω (Jumper wire)	Flicker	140 °C and over



I718H1930052-02

5) Connect the ECT sensor coupler.

Engine Coolant Temperature Removal and Installation

B718H19306018

Refer to "ECT Sensor Removal and Installation in Section 1C (Page 1C-2)".

Fuel Level Indicator Inspection

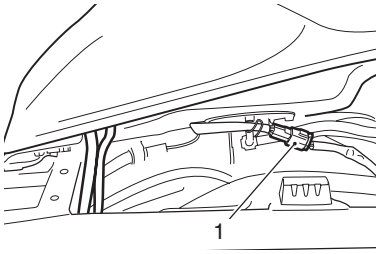
B718H19306030

Inspect the fuel level indicator in the following procedures:

1) Support the motorcycle with the center stand.

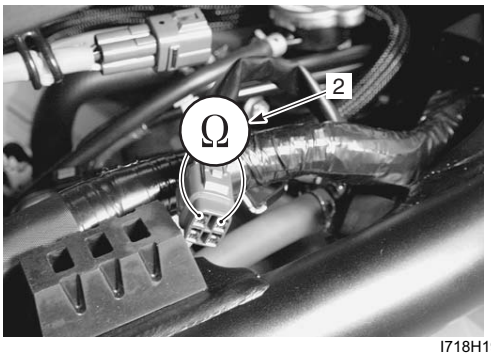
2) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)"

3) Disconnect the fuel level gauge coupler (1).



I718H1930053-01

4) Connect variable resistor (2) between the R/B and B/W lead wires from the wire harness.



I718H1930054-01

5) Turn the ignition switch ON.
6) Check the display of fuel level indicator (LCD) as shown.
If any abnormality is found, replace the combination meter with a new one. Refer to “Combination Meter Removal and Installation (Page 9C-4)”.

NOTE

It takes approx. 30 seconds that the fuel level indicator indicates the detected fuel level.

Resistance	Thermistor	Fuel level meter
—	ON	
More than 212 Ω	OFF	
129 – 212 Ω	OFF	
76 – 160 Ω	OFF	
36 – 93 Ω	OFF	
Less than 36 Ω	OFF	

I718H1930060-01

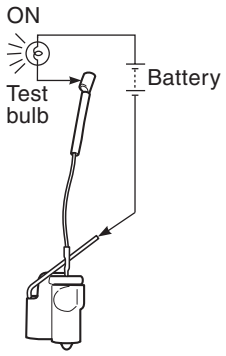
7) Connect the fuel level gauge coupler and reinstall the fuel tank.
Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.

Fuel Level Indicator Switch (Thermistor) Inspection

B718H19306031

Inspect the fuel level indicator switch in the following procedures:

1) Remove the fuel pump. Refer to “Fuel Pump Assembly / Fuel Level Gauge Removal and Installation in Section 1G (Page 1G-11)”.
2) Remove the thermistor from the fuel pump. Refer to “Fuel Pump Disassembly and Assembly in Section 1G (Page 1G-12)”.
3) Connect 12 V battery and test bulb (12 V, 3.4 W) to the fuel level indicator switch as shown in the figure. The bulb should come on after one minutes if the switch is in good condition.

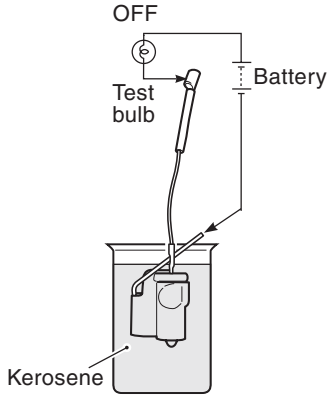


I718H1930013-04

4) When the switch is immersed in kerosene, the bulb should go out. If the bulb remains lit, replace the unit with a new one.

NOTE

- **When the bulb turns off, immediately pick up the switch from kerosene.**
- **After the check has been completed, wash the switch with gasoline.**



I718H1930014-03

5) Reinstall the removed parts. Refer to “Fuel Pump Disassembly and Assembly in Section 1G (Page 1G-12)”.

Fuel Level Gauge Inspection

B718H19306006

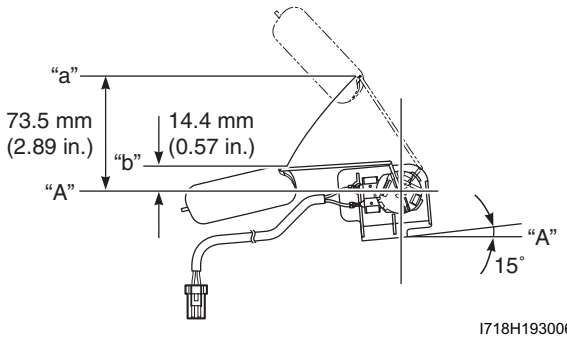
Inspect the fuel level gauge in the following procedures:

1) Remove the fuel level gauge. Refer to “Fuel Pump Assembly / Fuel Level Gauge Removal and Installation in Section 1G (Page 1G-11)”.
2) Measure the resistance at each fuel level gauge in float position. If the resistance is incorrect, replace fuel level gauge with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Resistance (Ω)

Float position	Resistance
Full “a”	Approx. 10 Ω
Empty “b”	Approx. 216 Ω



I718H1930061-01

“A”: Horizontal

3) Install the fuel level gauge. Refer to “Fuel Pump Assembly / Fuel Level Gauge Removal and Installation in Section 1G (Page 1G-11)”.

Speedometer Inspection

B718H19306020

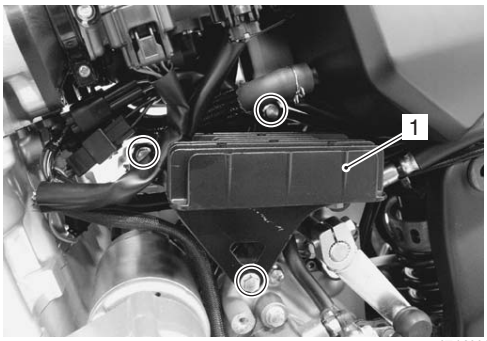
If the speedometer, odometer or tripmeter does not function properly, inspect the speed sensor and the coupler connections. If the speed sensor and coupler connections are OK, replace the combination meter unit with a new one. Refer to “Combination Meter Removal and Installation (Page 9C-4)”.

Speed Sensor Removal and Installation

B718H19306021

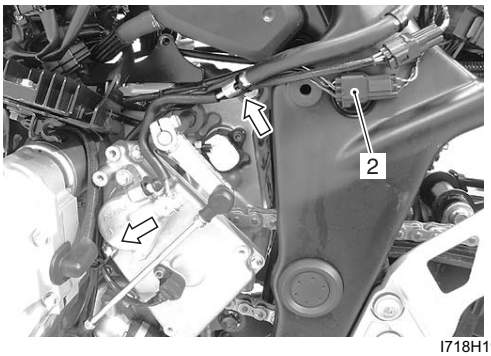
Removal

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
3) Remove the engine sprocket outer cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
4) Move the regulator/rectifier assembly (1) by removing the regulator/rectifier bracket bolts.



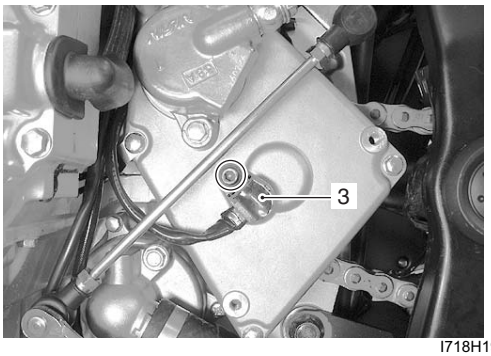
I718H1930056-01

5) Disconnect the speed sensor coupler (2).
6) Release the speed sensor lead wire from the clamps.



I718H1930025-02

7) Remove the speed sensor (3).



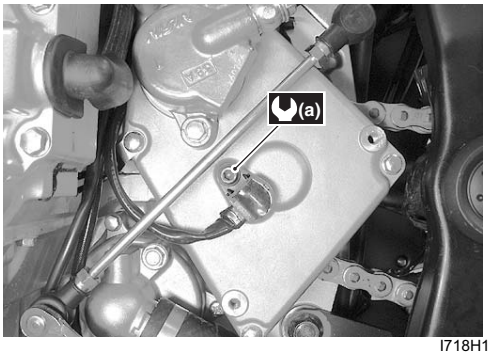
I718H1930024-03

Installation

Install the speed sensor in the reverse order of removal. Pay attention to the following points:

- Tighten the speed sensor mounting bolt to the specified torque.

  Tightening torque
  Speed sensor bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)



I718H1930044-03

- Route the speed sensor lead wire. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-8)”.

Speed Sensor Inspection

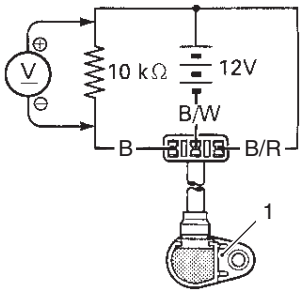
B718H19306022

Inspect the speed sensor in the following procedures:

1) Remove the speed sensor. Refer to “Speed Sensor Removal and Installation (Page 9C-8)”.
2) Connect a 12 V battery (between B and B/W), 10 kΩ resistor (between B/R and B) and multi-circuit tester (tester (+) probe to B and tester (–) probe to B/R) as shown.

   Special tool
   TOOL : 09900–25008 (Multi-circuit tester set)

   Tester knob indication
   Voltage (⎓)



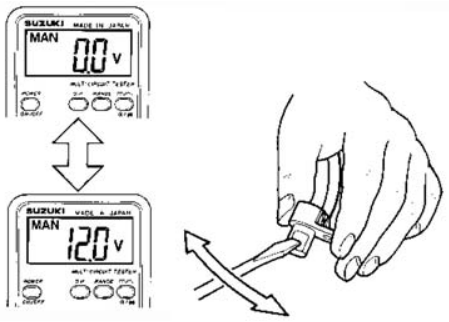
I649G1930016-02

1. Speed sensor

3) Move a screwdriver back and forth across the pick-up surface of the speed sensor. The voltage readings should cycle as follows (0 V → 12 V or 12 V → 0 V). If the voltage reading does not change, replace the speed sensor with a new one.

NOTE

While testing, the highest voltage reading should be the same as the battery voltage (12 V).



I649G1930017-01

Oil Pressure Indicator Inspection

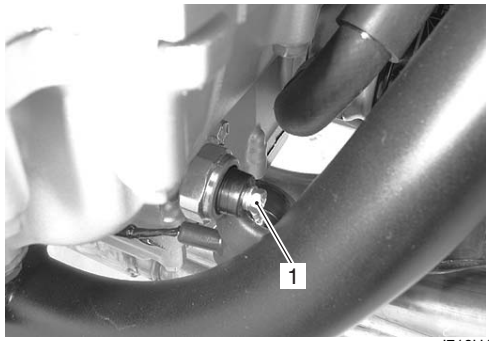
B718H19306023

Inspect the oil pressure indicator in the following procedures:

NOTE

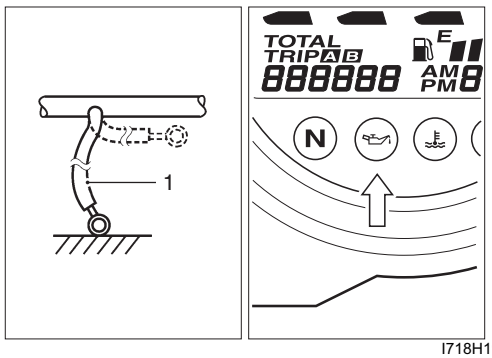
Before inspecting the oil pressure switch, check if the engine oil level is correct. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

1) Disconnect the oil pressure switch lead wire (1) from the oil pressure switch.



I718H1930039-01

2) Turn the ignition switch ON.
3) Check if the oil pressure indicator (LED) will light up when grounding the lead wire (1).
If the oil pressure indicator does not light up, replace the combination meter unit with a new one after checking the connection of couplers.



I718H1930036-02

Oil Pressure Switch Removal and Installation

B718H19306024

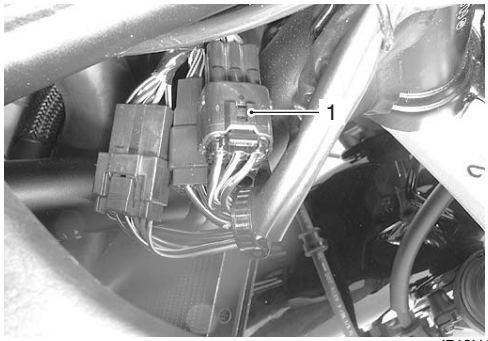
Refer to “Oil Pressure Switch Removal and Installation in Section 1E (Page 1E-7)”.

Ignition Switch Inspection

B718H19306025

Inspect the ignition switch in the following procedures:

1) Remove the right frame head cover. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the ignition switch coupler (1).



I718H1930026-05

3) Inspect the ignition switch for continuity with a tester. If any abnormality is found, replace the ignition switch with a new one.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Continuity (•)))

Position \ Color	B/R	B/O	G/B	B/W	B/G	Br/B
ON	○	○	○	○	○	○
OFF						
LOCK						
P	○					○

I649G1180025-01

4) After finishing the ignition switch inspection, reinstall the removed parts.

Ignition Switch Removal and Installation

B718H19306026

Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-9)”.

Horn Inspection

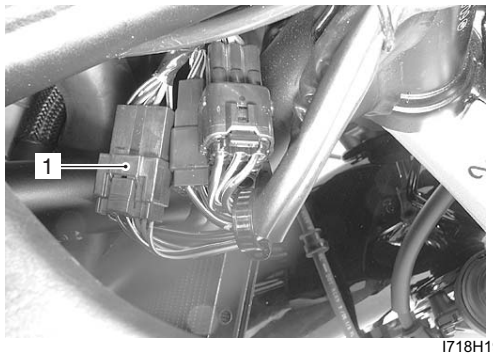
B718H19306027

NOTE

If the horn sound condition is normal, it is not necessary to inspect the horn button continuity.

Horn Button Inspection

1) Remove the right frame head cover. (GSF1250/A) Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
2) Disconnect the left handlebar switch coupler (1).



I718H1930045-01

3) Inspect the horn button for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.

Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

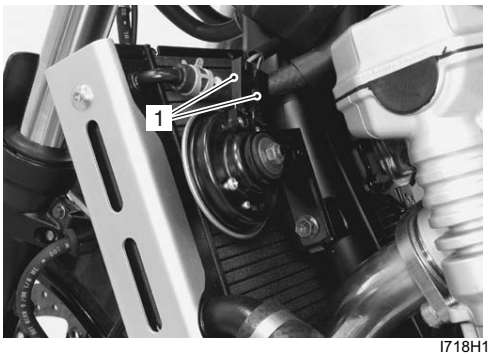
Tester knob indication
Continuity (•)))

Color / Position	B/Bl	B/W
•		
PUSH	○	○

I718H1930028-03

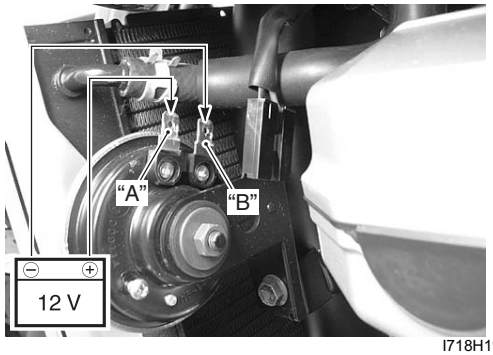
Horn Inspection

1) Disconnect the horn couplers (1).



I718H1930030-01

2) Connect a 12 V battery to terminal “A” and terminal “B”. If the sound is not heard from the horn, replace the horn with a new one.



I718H1930040-02

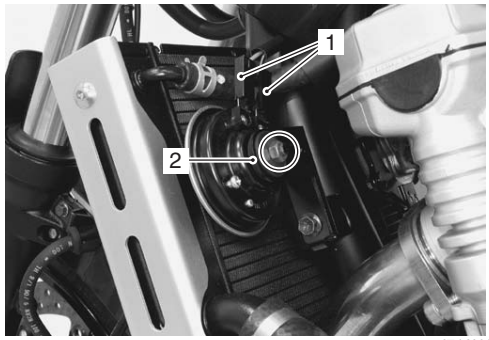
3) Connect the horn coupler.

Horn Removal and Installation

B718H19306028

Removal

1) Disconnect the horn couplers (1).
2) Remove the horn (2) by removing the mounting bolt.



I718H1930031-03

Installation

Install the horn in the reverse order of removal.

Specifications

Service Data

B718H19307001

Wattage

Unit: W

Item	Specification	
	GSF1250/A	GSF1250S/SA
Speedometer light	LED	←
Tachometer light	LED	←
Turn signal indicator light	LED x 2	←
High beam indicator light	LED	←
Neutral position indicator light	LED	←
Oil pressure indicator light	LED	←
FI indicator light	LED	←
Engine coolant temp. indicator light	LED	←
ABS indicator light (GSF1250A/SA only)	LED	←

Tightening Torque Specifications

B718H19307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Speed sensor bolt	6.5	0.65	4.7	☞(Page 9C-9)

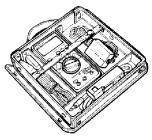
Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Special Tool

B718H19308001

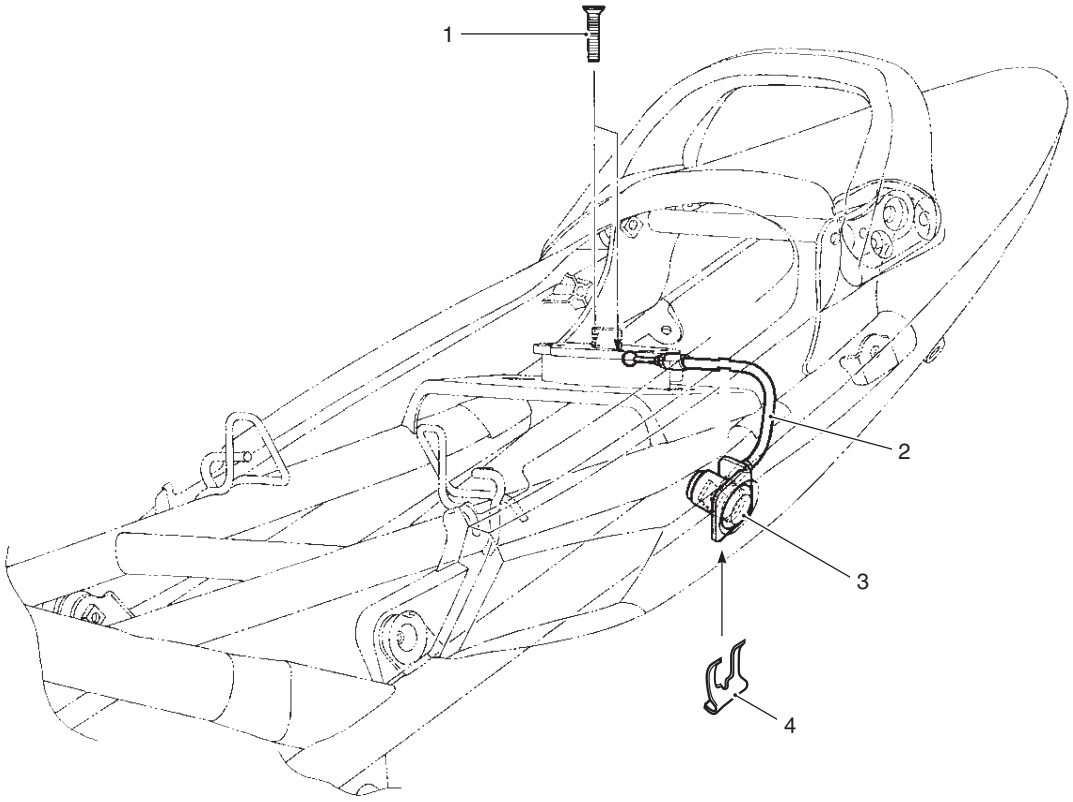
09900–25008 Multi-circuit tester set ☞(Page 9C-8) / ☞(Page 9C-9) / ☞(Page 9C-10) / ☞(Page 9C-11)		

Exterior Parts

Schematic and Routing Diagram

Seat Lock Cable Routing Diagram

B718H19402001



I718H1940028-01

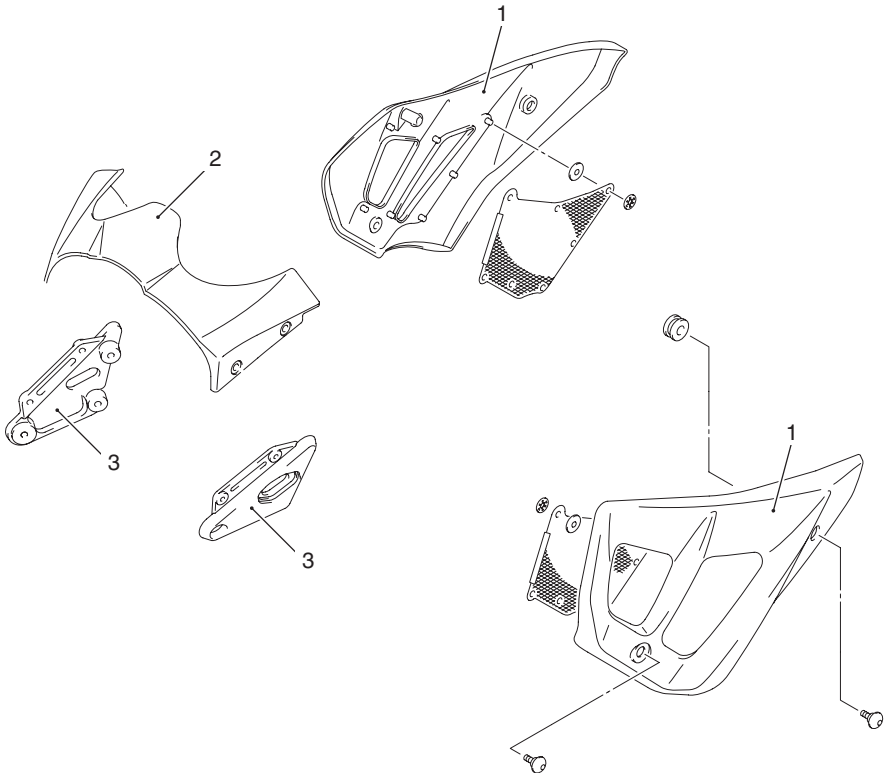
1. Screw	2. Seat lock cable	3. Seat lock	4. Plate

Repair Instructions

Exterior Parts Construction

B718H19406006

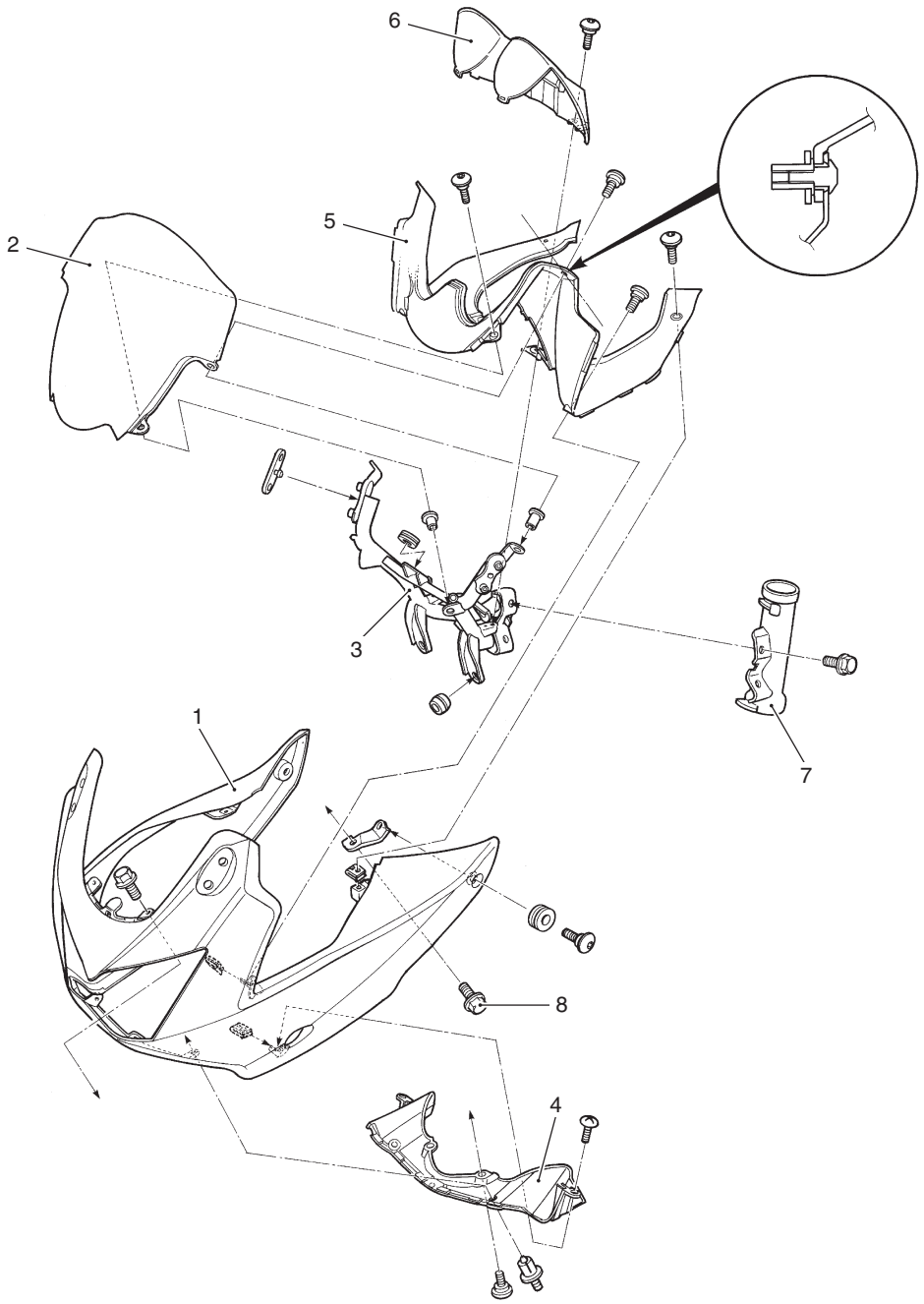
GSF1250/A



I718H1940033-01

1. Frame head cover	2. Headlight housing cover	3. Headlight housing stay

GSF1250S/SA

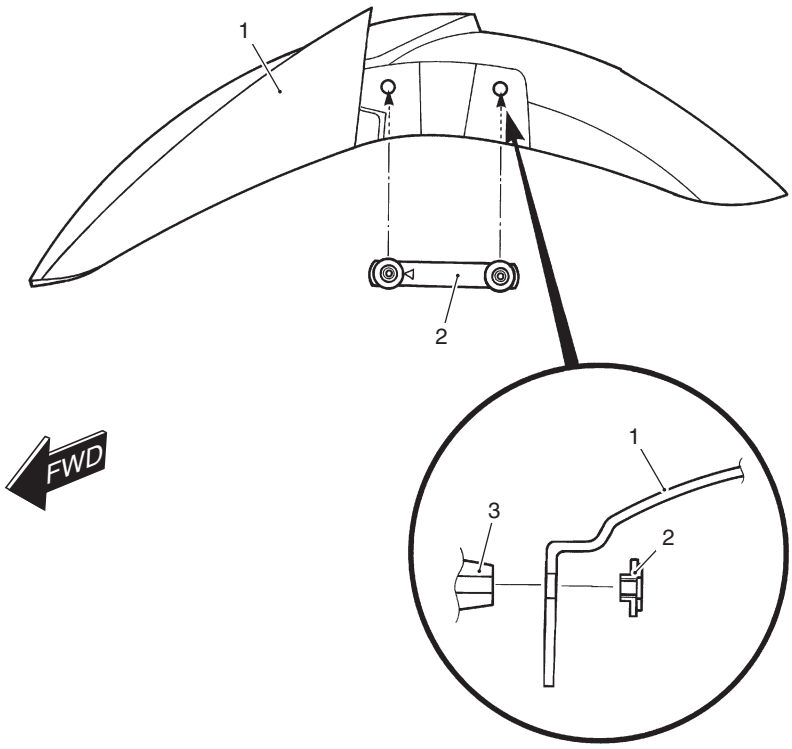


I718H1940026-02

1. Cowling body	3. Cowling brace	5. Upper panel	7. Head pipe
2. Wind screen	4. Lower panel	6. Meter panel lid	8. Bolt (Except E-33)

Front Fender Construction

B718H19406007

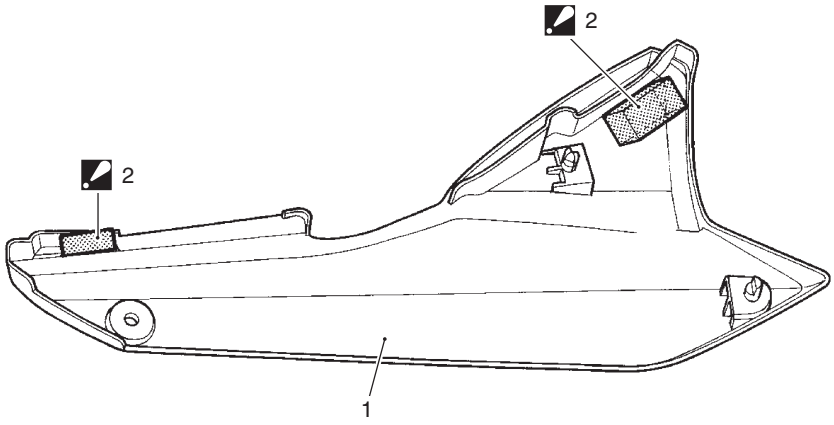


I718H1940029-01

1. Front fender	2. Fender plate nut	3. Front fork

Frame Cover Cushion Construction

B718H19406002

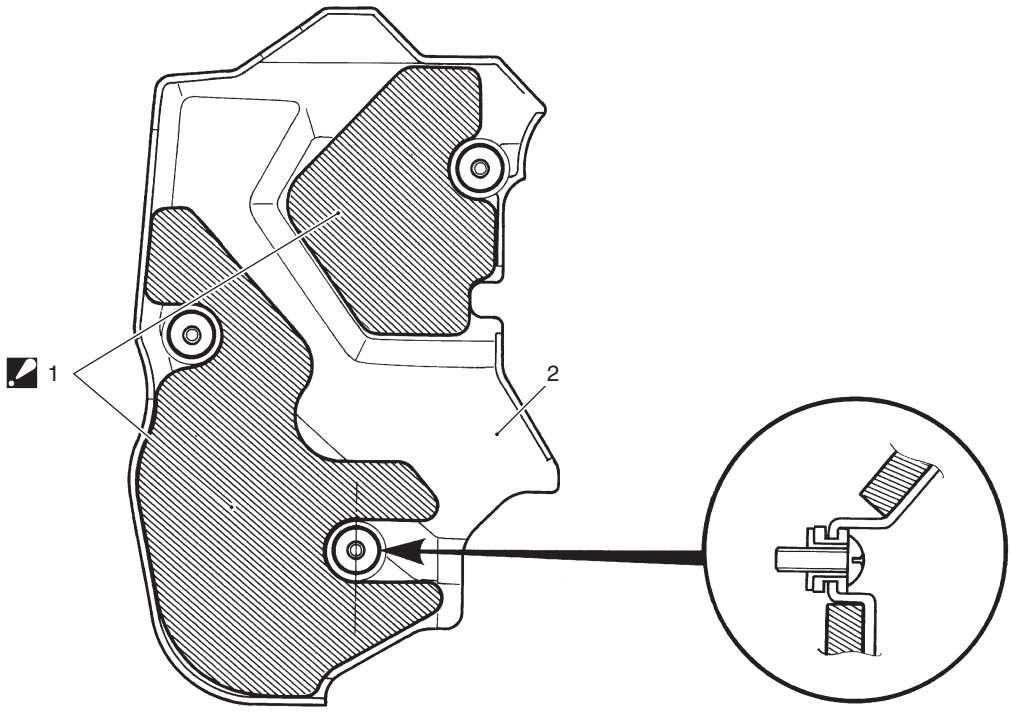


I718H1940030-01

1. Frame cover	2. Cushion : Clean an adhesive surface before adhering the tape cushion.

Engine Sprocket Outer Cover Cushion

B718H19406008



I718H1940031-01

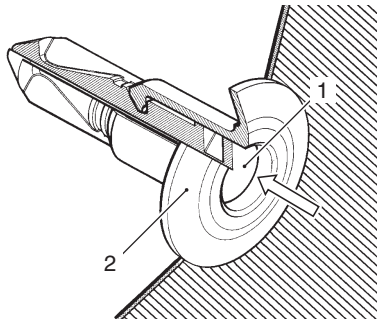
1. Engine sprocket outer cover cushion : Clear adhesive surface before adhering the tape cushion.	2. Engine sprocket outer cover

Fastener Removal and Installation

B718H19406003

Removal

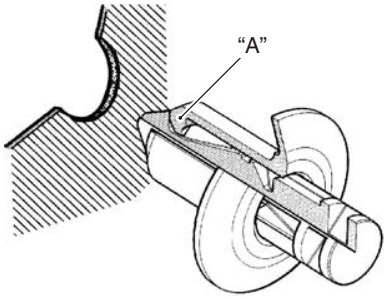
1) Depress the head of fastener center piece (1).
2) Pull out the fastener (2).



I649G1940005-01

Installation

1) Let the center piece stick out toward the head so that the pawls “A” closes.



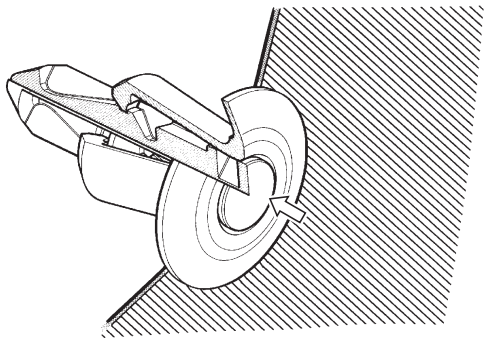
I649G1940006-01

2) Insert the fastener into the installation hole.

NOTE

To prevent the pawl "A" from damage, insert the fastener all the way into the installation hole.

3) Push in the head of center piece until it becomes flush with the fastener outside face.



I649G1940007-01

Exterior Parts Removal and Installation

B718H19406004

Seat

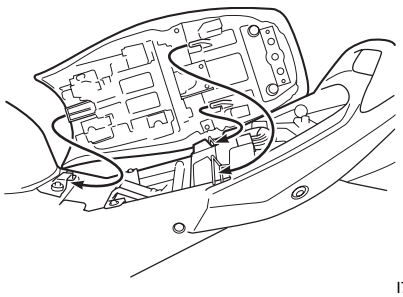
Removal

1) Unlock the seat with the ignition key.
2) Remove the front and rear seats as an assembly.

I718H1940004-01

Installation

Slide the seat hooks into the seat hook retainers and push down firmly until the seat snaps into the locked position.



I718H1940032-03

Frame Cover

Removal

Remove the frame covers (1), left and right.

I718H1940005-02

"A": Hooked point

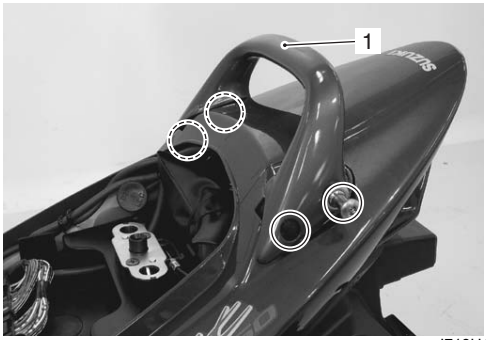
Installation

Install the frame covers in the reverse order of removal.

Pillion Rider Handle and Seat Tail Cover

Removal

1) Remove the seat.
2) Remove the frame covers, left and right.
3) Remove the pillion rider handle (1).

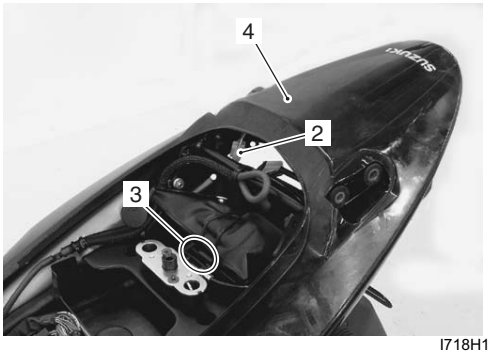


I718H1940006-01

4) Remove the fasteners. Refer to "Fastener Removal and Installation (Page 9D-5)".

I718H1940007-01

5) Disconnect the brake light/taillight lead wire coupler (2).
6) Unhook the seat lock cable (3). Refer to “Seat Lock Cable Routing Diagram (Page 9D-1)”.
7) Remove the seat tail cover (4).

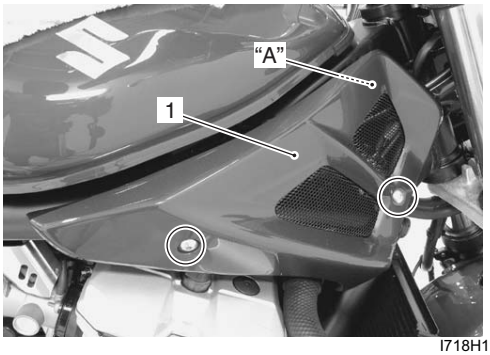


I718H1940034-01

Installation
Install the seat tail cover and pillion rider handle in the reverse order of removal.

Frame Head Cover (GSF1250/A)

Removal
Removal the frame head covers (1), left and right.



I718H1940008-01

“A”: Hooked point

Installation
Install the frame head covers in the reverse order of removal.

Headlight Housing Cover (GSF1250/A)

Removal
Remove the headlight housing cover (1).

I718H1940009-01

Installation
Install the headlight housing cover in the reverse order of removal.

Cowling and Cowling Brace (GSF1250S/SA)

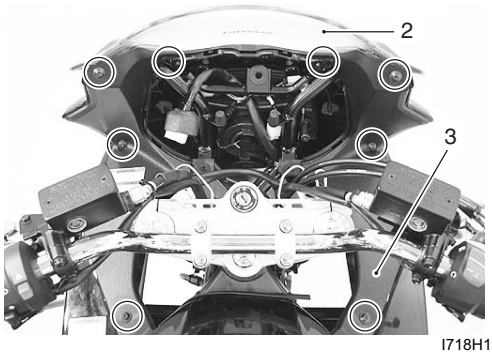
Removal
1) Remove the caps.
2) Remove the rear view mirrors, left and right.


I718H1940011-01

3) Remove the combination meter assembly (1). Refer to “Combination Meter Removal and Installation in Section 9C (Page 9C-4)”.

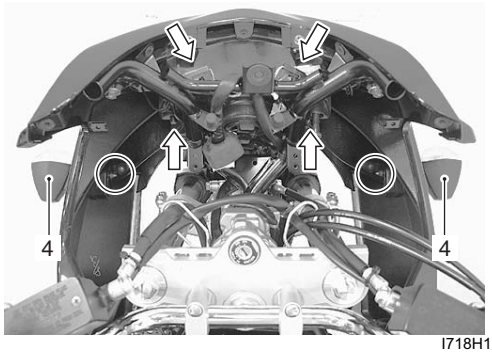
I718H1940013-01

4) Remove the wind screen (2) and upper panel (3).



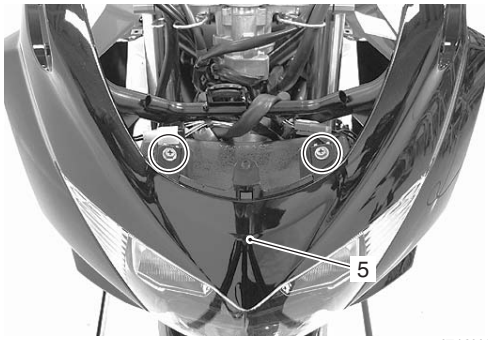
I718H1940012-01

5) Remove the turn signal lights (4), left and right. Refer to “Front Turn Signal Light Removal and Installation in Section 9B (Page 9B-9)”.



I718H1940014-03

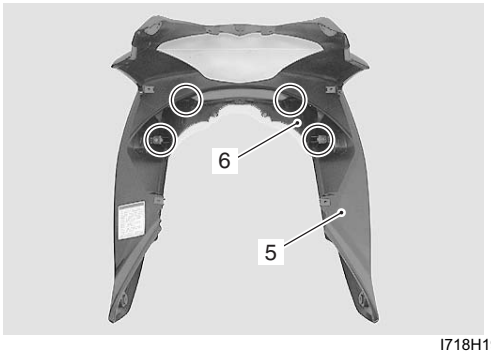
6) Remove the cowling (5) along with the lower panel (6).



I718H1940015-01

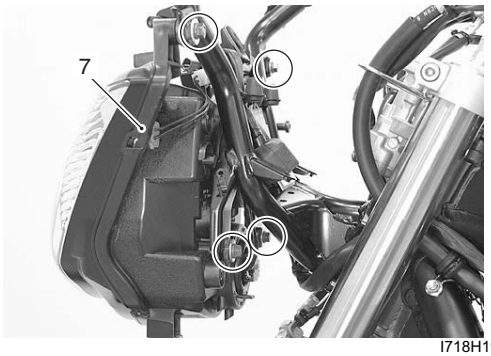
I718H1940016-02

7) Remove the lower panel (6) from the cowling (5).



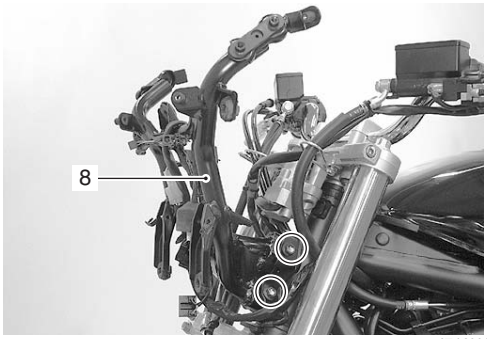
I718H1940017-01

8) Disconnect the headlight and position light couplers.
9) Remove the headlight assembly (7).



I718H1940018-01

10) Remove the cowling brace (8).



I718H1940019-01

Installation

Install the cowling and cowling brace in the reverse order of removal. Pay attention to the following point:

- After installing, be sure to inspect the headlight beam. Refer to “Headlight Beam Adjustment in Section 9B (Page 9B-5)”.

Front Fender

Refer to “Front Fork Removal and Installation in Section 2B (Page 2B-2)”.

Seat Height Adjustment

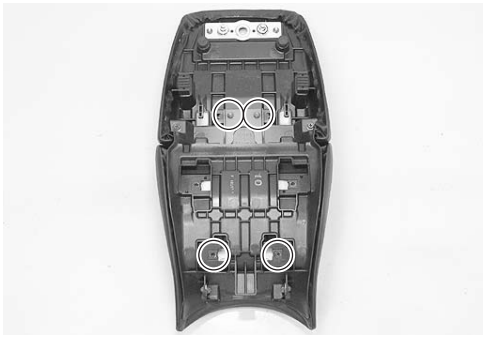
B718H19406005

Adjust the seat height in the following procedures:

1) Remove the seat assembly. Refer to “Exterior Parts Removal and Installation (Page 9D-6)”.
2) Remove the seat height adjusting dampers.

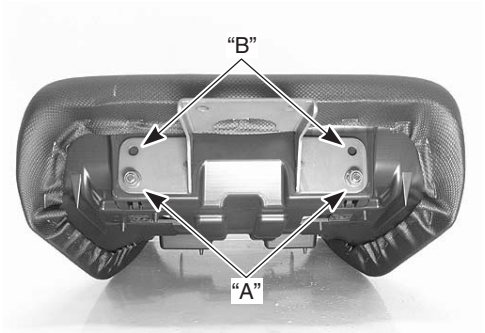
I718H1940020-01

3) Remove the front seat from the rear seat.



I718H1940021-02

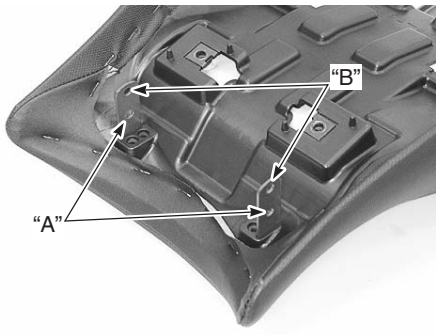
4) Adjust the seat height adjuster position “A” or “B”.



I718H1940022-01

“A”: For low (Normal) position	“B”: For high position

5) Reinstall the front seat and adjust the seat height adjuster position “A” or “B”.



I718H1940023-01

“A”: For low (Normal) position	“B”: For high position

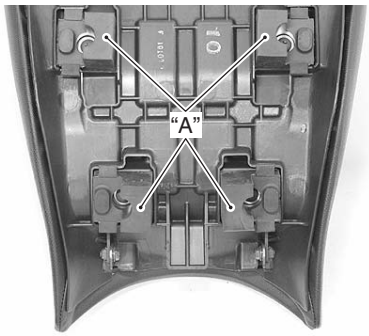
6) Install the seat height adjusting dampers.

NOTE

Dampers are used in two ways “A” or “B”. Pay attention to the direction of dampers when installing them.

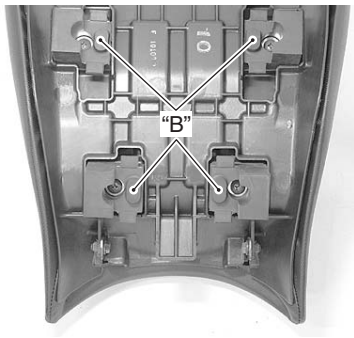
⚠ CAUTION

Position of adjuster and direction of dampers must be unified either “A” or “B”.



I718H1940024-01

“A”: For low (Normal) position



I718H1940025-01

“B”: For high position

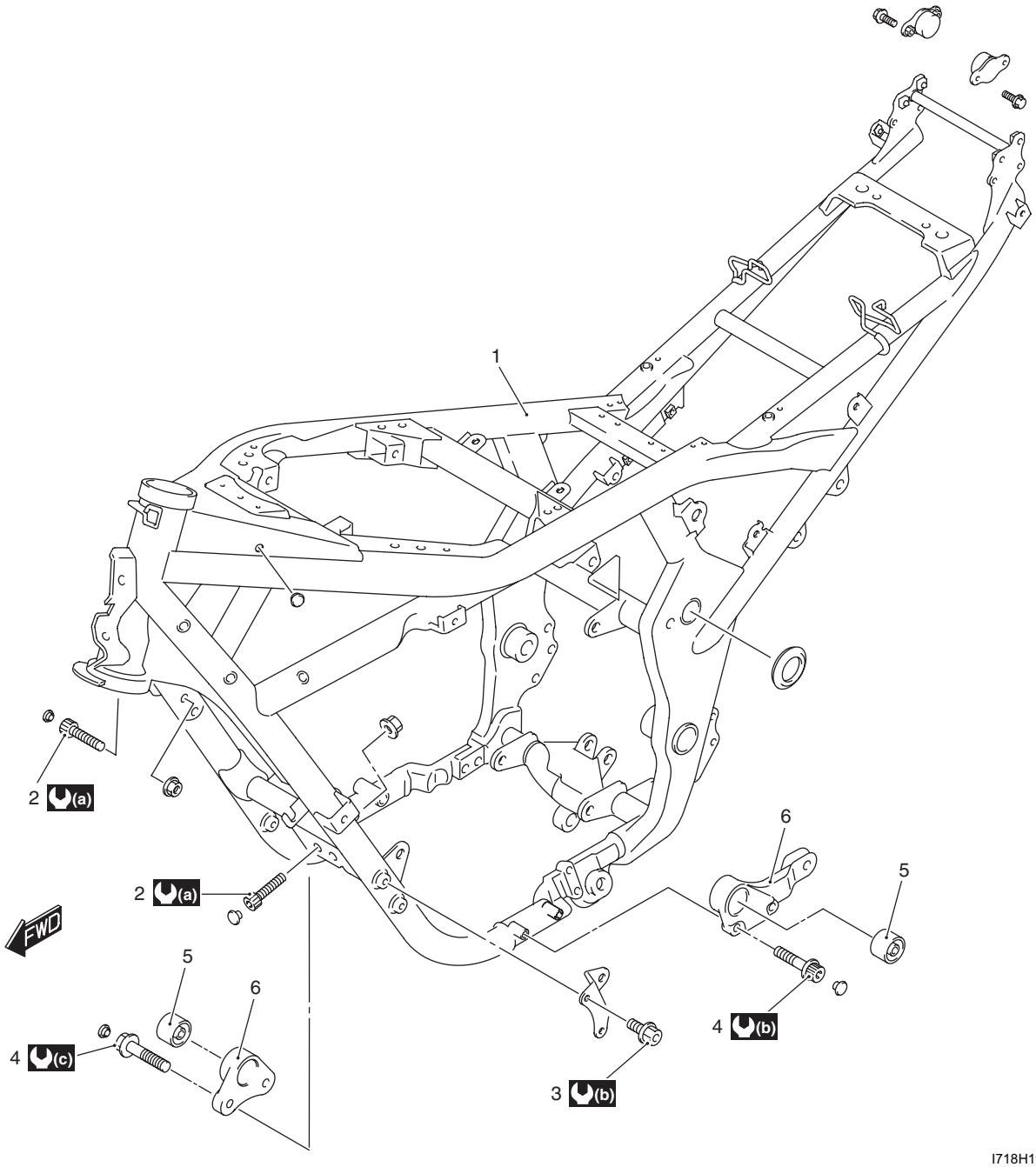
7) Reinstall the seat assembly. Refer to “Exterior Parts Removal and Installation (Page 9D-6)”.

Body Structure

Repair Instructions

Body Frame Construction

B718H19506001



I718H1950003-04

1. Frame	4. Bracket mounting bolt	(a) : 50 N·m (5.0 kgf-m, 36.0 lb-ft)
2. Frame down tube bolt	5. Engine mounting bracket bushing	(b) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
3. Engine mount No.1 bracket bolt	6. Engine mounting No.2 bracket	

Engine Mounting Bracket Bushing Replacement

B718H19506002

Replace the engine mounting bracket bushing if necessary, as shown in the body frame construction. Refer to “Body Frame Construction (Page 9E-1)”.

Engine Mount Bushing Replacement

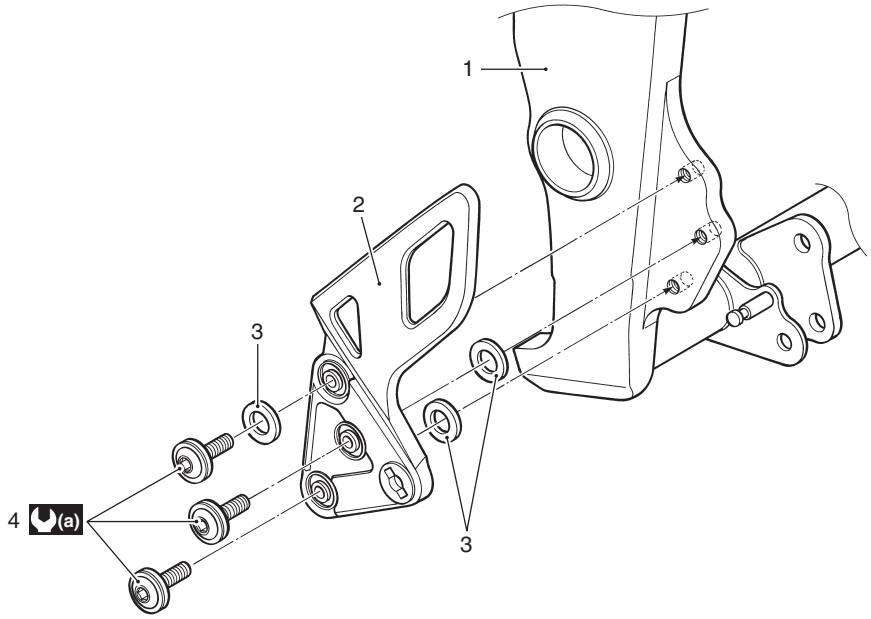
B718H19506003

Replace the engine mount bushing if necessary, as shown in the body frame construction. Refer to “Body Frame Construction (Page 9E-1)”.

Front Footrest Bracket Construction

B718H19506005

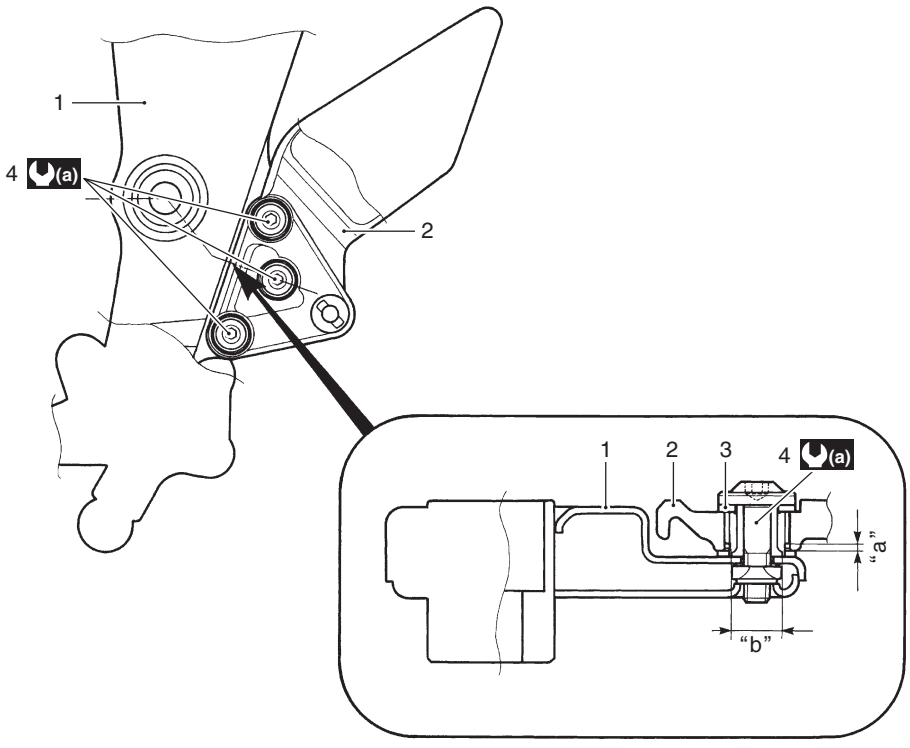
GSF1250/S



I718H1950001-04

1. Frame	2. Footrest bracket	3. Washer	4. Bolt	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)

GSF1250A/SA

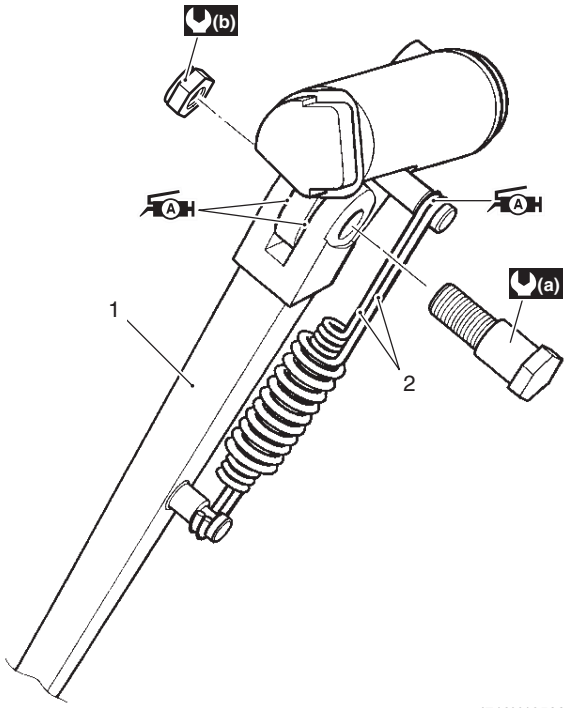


I718H1950004-02

1. Frame	3. Washer	(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	“b”: 16.4 mm (0.65 in)
2. Footrest bracket	4. Bolt	“a”: 2.0 mm (0.08 in)	

Side-stand Construction

B718H19506006



I718H1950005-05

1. Side-stand	(a) : 50 N·m (5.0 kgf-m, 36.0 lb-ft)	A : Apply grease to sliding surface.
2. Spring	(b) : 40 N·m (4.0 kgf-m, 29.0 lb-ft)	

Side-stand Removal and Installation

B718H19506007

Removal

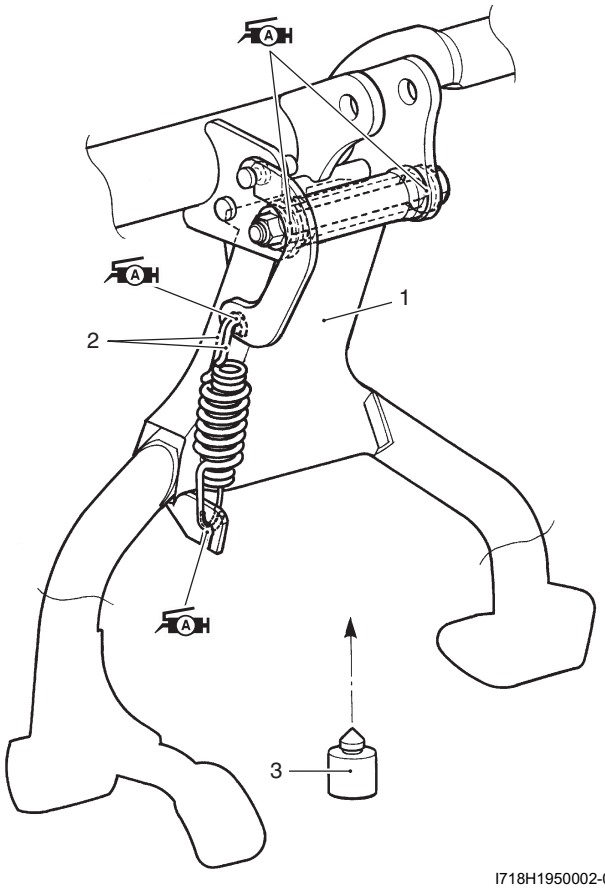
1) Support the motorcycle with the center stand.
2) Remove the side-stand as shown in the side-stand construction. Refer to “Side-stand Construction (Page 9E-3)”.

Installation

Install the side-stand as shown in the side-stand construction. Refer to “Side-stand Construction (Page 9E-3)”.

Center Stand Construction

B718H19506008



I718H1950002-02

1. Center stand	2. Spring	3. Center stand cushion	: Apply grease to sliding surface.

Center Stand Removal and Installation

B718H19506009

Removal

1) Support the motorcycle using a jack.

⚠ CAUTION

Make sure that the motorcycle is supported securely.

2) Remove the center stand as shown in the center stand construction. Refer to “Center Stand Construction (Page 9E-4)”.

Installation

Install the center stand as shown in the center stand construction. Refer to “Center Stand Construction (Page 9E-4)”.

Specifications

Tightening Torque Specifications

B718H19507001

NOTE

The specified tightening torque is also described in the following.
“Body Frame Construction (Page 9E-1)”
“Front Footrest Bracket Construction (Page 9E-2)”
“Side-stand Construction (Page 9E-3)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B718H19508001

NOTE

Required service material is also described in the following.
“Side-stand Construction (Page 9E-3)”
“Center Stand Construction (Page 9E-4)”

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