SUZUKI

SV650/A/XA

SERVICE MANUAL

IMPORTANT NOTICE

WARNING / CAUTION / NOTICE / NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol and the words **⚠ WARNING**, **⚠ CAUTION**, ***NOTICE*** 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 serious injury.

⚠ CAUTION

Indicates a potential hazard that could result in minor or moderate injury.

NOTICE

Indicates a potential hazard that could result in motorcycle or equipment 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, CAUTIONS and NOTICES 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.

FOREWORD

This manual contains an introductory description on the SUZUKI SV650/A/XA 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

Applicable Model / VIN

Applicable model

SV650/A L7 – L9 (2017 – 2019)

SV650XA L9 (2019)

Applicable VIN

NOTE

- **"#" indicates any check digit from 0 to 9 and X.**
- **"@" indicates the year of manufacture or the month and year of manufacture.**

Applicable Model	VIN Number	Country or Area
SV650L7	JS1VP55A#H2100001 –	U.S.A. except for California State
	JS1VP55A#H2100001 –	California State
SV650AL7	JS1VP55B#H2100001 –	California State
SV650L8	JS1VP55A#J2100001 –	U.S.A. except for California State
	JS1VP55A#J2100001 –	California State
SV650AL8	JS1VP55B#J2100001 –	California State
SV650L9	JS1VP55A#K7100001 –	U.S.A. except for California State
	JS1VP55A#K7100001 –	California State
SV650AL9	JS1VP55B#K7100001 –	California State
SV650XAL9	JS1VP55B#K7100001 –	California State

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Section 00

Precautions

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Precautions

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.
- To avoid getting burned, do not touch the engine, engine oil and exhaust system until they have cooled.

NOTICE

- Never use gasoline as a cleaning solvent.
- After servicing the fuel, oil, exhaust or brake systems, check all lines and fittings related to the system for leaks.
- 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 performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative (–) cable from 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 and other fluids: batteries, and tires.
- To protect Earth's natural resources, properly dispose of used motorcycle and parts.

Precautions for Catalytic Converter

As this motorcycle equipped with a catalytic converter, use only unleaded gasoline and be careful not to let a large amount of unburned gasoline enter the converter, or it can be damaged.

- Conduct a spark jump test only when necessary to the shortest possible time without opening the throttle.
- Conduct engine compression checks within the shortest possible time.
- Avoid any situations which can result in engine misfire

Precautions for Electrical Circuit Service

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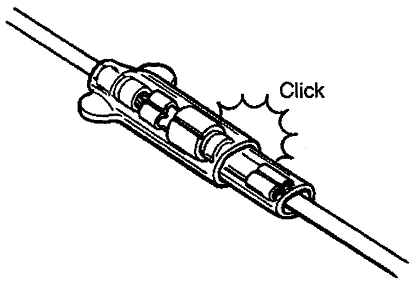
When handling the electrical parts or servicing the electric system, observe the following points for the safety of the system.

Electrical Parts

Connector / Coupler

- Faulty electrical system is often related to poor electrical contact of connector/coupler. Before servicing individual electrical part, check electrical contact of the connector/coupler.
- When connecting a connector, be sure to push it in until a click is felt.



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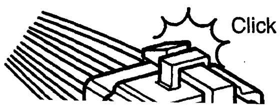
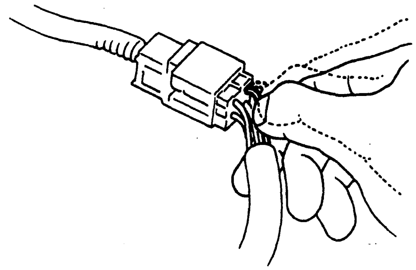
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Push in the coupler straightly. An angled or skewed insertion may cause the terminal to be deformed, possibly resulting in poor electrical contact.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.
- Before refitting the sealed coupler, make sure its seal rubber is positioned properly. The seal rubber may possibly come off the position during disconnecting work and if the coupler is refitted with the seal rubber improperly positioned, it may result in poor water sealing.



shaking it by hand lightly. If any abnormal condition is found, repair or replace.



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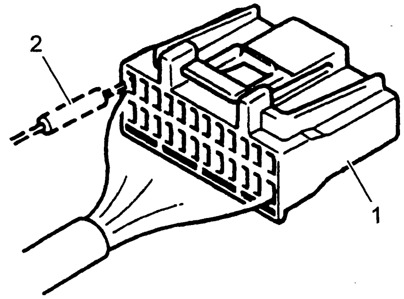
- When taking measurements at electrical coupler (1) using a tester probe (2), be sure to insert the probe from the wire harness side (rear) of the coupler.



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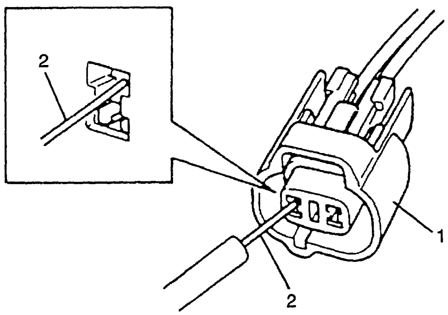
- When connecting meter probe (2) from the terminal side of the coupler (1) because it cannot be connected from harness side, use extra care not to bend the male terminal of coupler of force its female terminal open for connection.
  In case of such coupler as shown connect probe as shown to avoid opening female terminal.
  Never connect probe where male terminal is supposed to fit.



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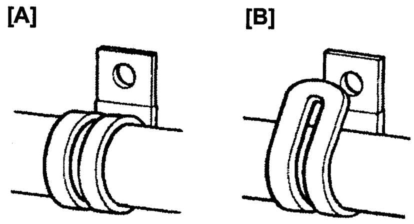
- Avoid applying grease or other similar material to

- Clamp the wire harness at such positions as indicated in “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).
- 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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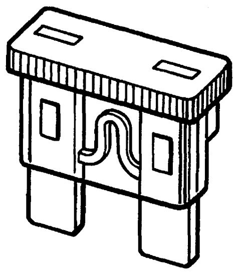
[A]: Correct clamping	[B]: Incorrect clamping

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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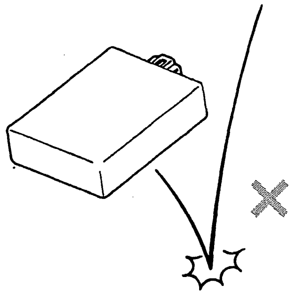
Switch

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

ECM / CDI UNIT / 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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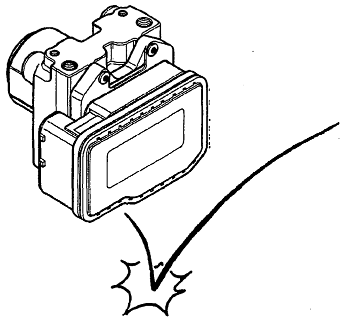

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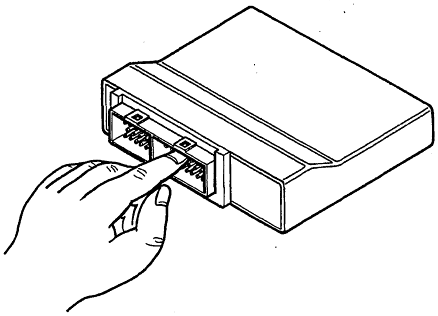
- Be careful not to touch the electrical terminals of the electrical parts (ECM / CDI UNIT, etc.). The static electricity from your body may damage them.



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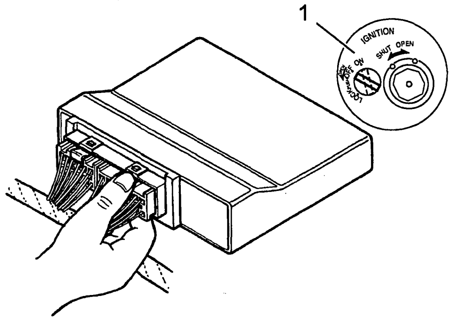
- When disconnecting and connecting the coupler, make sure to turn OFF the ignition switch (1), or electrical parts may get damaged.



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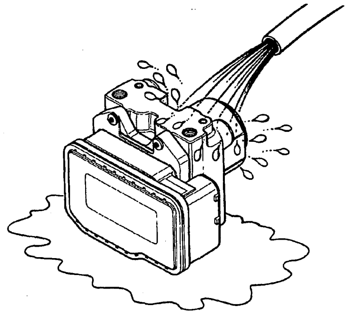
- Never allow dust or water to contact the ABS control unit/HU.



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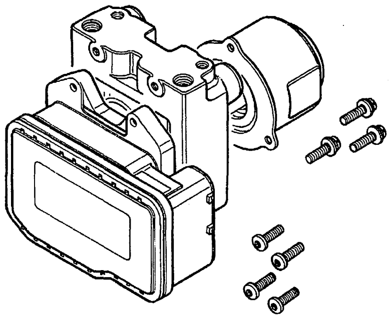
- The ABS control unit/HU cannot be disassembled. Replace the whole unit with a new one.



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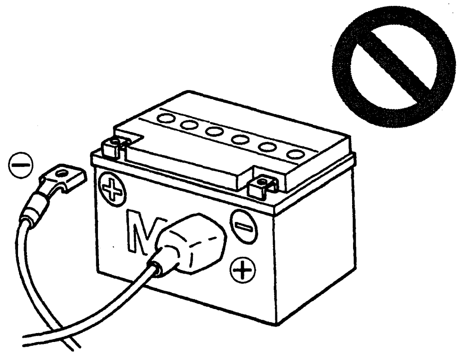
- Never connect any tester (voltmeter, ohmmeter, or whatever) to the electronic unit when its coupler is disconnected. Otherwise, damage to electronic unit may result.
- Never connect an ohmmeter to the electronic unit with its coupler connected. If attempted, damage to ECM / CDI UNIT / ABS control unit/HU or sensor may result.
- Be sure to use a specified voltmeter/ohmmeter.

Battery

- Select the same type MF battery when replacing the battery.
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system and ABS instantly when reverse power is applied.



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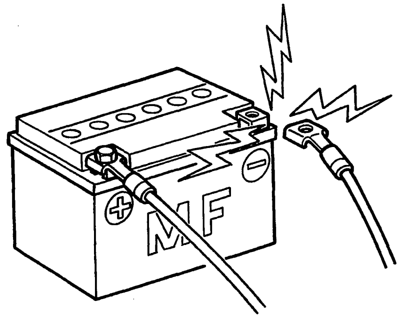
- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



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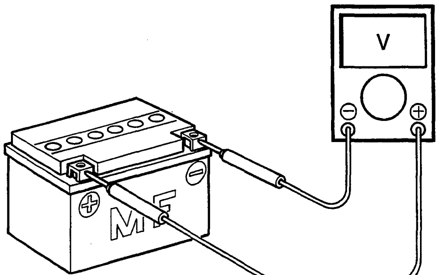
- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check with a low battery voltage will lead to erroneous diagnosis.



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.

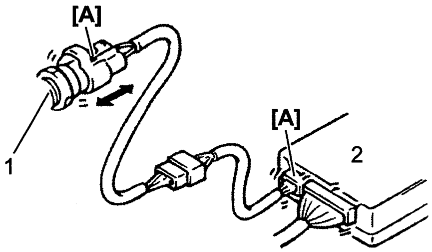
Open circuit check

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, 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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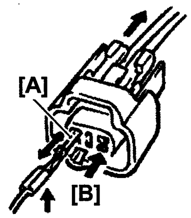
[A]:	Check for loose connection
1.	Sensor
2.	Electrical part

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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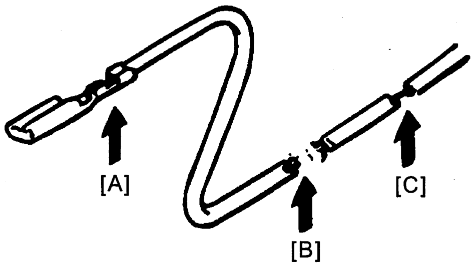
[A]:	Check contact tension by inserting and removing.
[B]:	Check each terminal for bend and proper alignment.

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.



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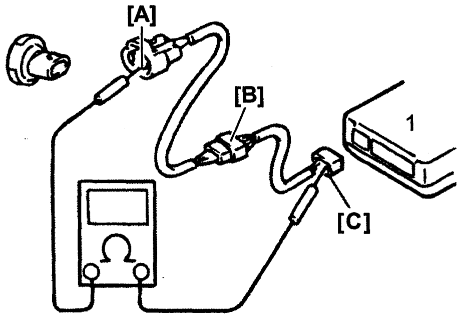
[A]:	Looseness of crimping
[B]:	Open
[C]:	Thin wire (A few strands left)

Continuity check

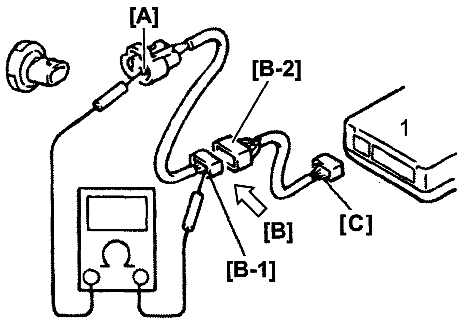
1) Measure resistance across coupler [B] (between [A] and [C] in the figure).
   If no continuity is indicated (infinity or over limit), the circuit is open between terminals [A] and [C].



IE02K1000007-01

1. Electrical part

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].



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1. Electrical part

Voltage check

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

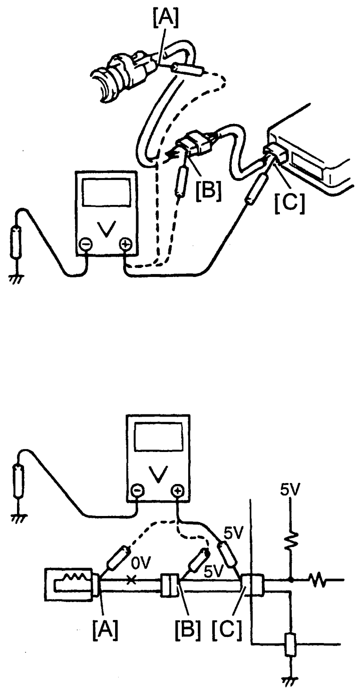
1) With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.

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].

   <u>**Voltage between**</u>
   [A] and body ground: 0 V
   [B] and body ground: Approx. 5 V
   [C] and body ground: Approx. 5 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].

   <u>**Voltage between**</u>
   [A] and body ground: 3 V – 2 V voltage drop
   [B] and body ground: Approx. 5 V
   [C] and body ground: Approx. 5 V



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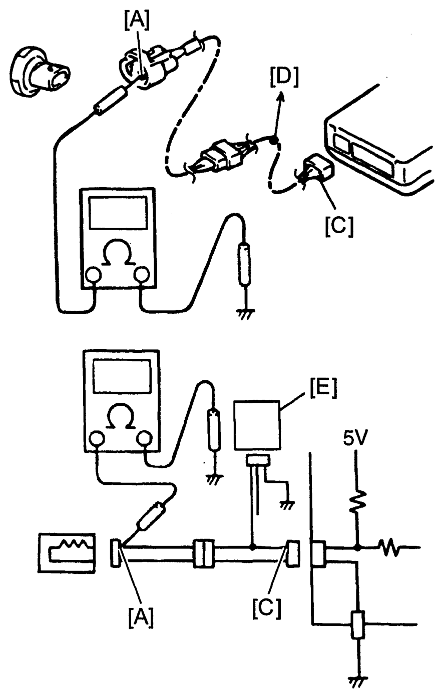
Short circuit check (Wire harness to ground)

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 the figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals [A] and [C].



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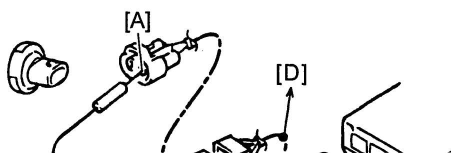
[D]: To other parts	[E]: Other parts

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].



Precautions for Circuit Tester

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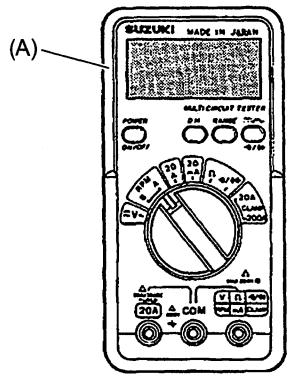
- Use the Suzuki multi circuit tester set.

Special tool
(A): 09900–25008



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- Read the instruction manual to use the tester correctly.
- Be sure to set the tester to the correct testing range.
- If the voltage and current are not known, make measurements using the highest range.

Symbols

Symbol	Definition
⎓	DC
~	AC
Ω	Resistance
•)))	Continuity
─|◀─	Diode

Using Needle Pointed Prove

NOTICE

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

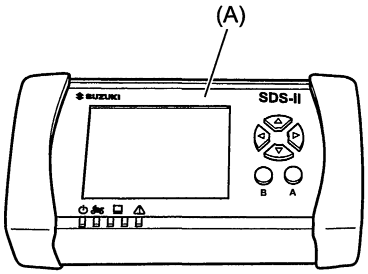
Special tool
09900–25009

Precautions for SDS-II

BENJ18K60000004

- In some models of the SUZUKI motorcycles, the DTC can be confirmed by using SDS-II.
- Read the instruction manual when using SDS-II and operate it properly.

Special tool
(A): 09904–41030
09904–41040



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General Information

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General Information

General Description

Abbreviations

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A:
AAT: Ambient Air Temperature
ABDC: After Bottom Dead Center
ABS: Anti-lock Brake System
AC: Alternating Current
ACL: Air Cleaner
AKI: Anti-knock Index
AP: Atmospheric Pressure
API: American Petroleum Institute
ATDC: After Top Dead Center
A/F: Air Fuel Ratio
B:
BBDC: Before Bottom Dead Center
BTDC: Before Top Dead Center
B+: Battery Positive Voltage
C:
CDI: Capacitive Discharge Ignition
CKP: Crankshaft Position
CKT: Circuit
CLP: Clutch Lever Position
CMP: Camshaft Position
CO: Carbon Monoxide
CPU: Central Processing Unit
CVT: Continuously Variable Transmission
D:
DC: Direct Current
DOHC: Double Over Head Camshaft
DRL: Daytime Running Light
DTC: Diagnostic Trouble Code
E:
ECM: Engine Control Module
ECT: Engine Coolant Temperature
ET: Engine Temperature
EVAP: Evaporative Emission
EX.: Exhaust
EXCV: Exhaust Control Valve
EXCVA: Exhaust Control Valve Actuator
F:
FI: Fuel Injection, Fuel Injector
FP: Fuel Pump
FPR: Fuel Pressure Regulator
FTPC: Fuel Tank Pressure Control
FWD: Forward
G:
GEN: Generator
GND: Ground
I:
IAP: Intake Air Pressure
IAT: Intake Air Temperature
I.D.: Inside Diameter
IG: Ignition
IN.: Intake
ISC: Idle Speed Control
J:
JASO: Japanese Automobile Standards Organization
L:
LCD: Liquid Crystal Display
LED: Light Emitting Diode
LH: Left Hand
LO: Low
M:
Max: Maximum
MIL: Malfunction Indicator Light
Min.: Minimum
MTBE: Methyl Tertiary Butyl Ether
N:
NOx: Nitrogen Oxides
O:
O2: Oxygen
OBD: On-Board Diagnostic System
OHC: Over Head Camshaft
O.D.: Outside Diameter
P:
PAIR: Pulsed Secondary Air Injection
PCV: Positive Crankcase Ventilation
PP: Pulley Position
R:
RH: Right Hand
ROM: Read Only Memory
RON: Research Octane Number
RPM: Engine Speed
S:
SAE: Society of Automotive Engineers
SDS: Suzuki Diagnosis System
SRAD: Suzuki Ram Air Direct
STCS: Secondary Throttle Control System
STD: Standard
STP: Secondary Throttle Position
STV: Secondary Throttle Valve
STVA: Secondary Throttle Valve Actuator
T:
TC: Traction Control
TDC: Top Dead Center

SAE-to-Former SUZUKI Term

BENJ18K60101008

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:

Barometric Pressure (BARO): Barometric Pressure, Atmospheric Pressure (APS, AP Sensor)

Battery Positive Voltage (B+): Battery Voltage, +B

C:

Camshaft Position Sensor (CMP Sensor): Camshaft Position Sensor (CMPS)

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)

Exhaust Control System: EXC System (EXCS)

Exhaust Control Valve: EXC Valve (EXCV)

Exhaust Control Valve Actuator: EXCV Actuator (EXCVA)

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:

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): —

M:

Malfunction Indicator Lamp (MIL): LED Light, Malfunction Indicator Light (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:

Power Control Module (PCM): —

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)

Tank Pressure Control Valve: TPC Valve (TPCV)

Traction Control (TC): Traction Control

V:

Voltage Regulator (VR): Voltage Regulator

Volume Air Flow (VAF): Air Flow

Symbols

BENJ18K60101002

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.

NOTE

The table below shows generally used symbols, and includes some symbols not used in this manual.

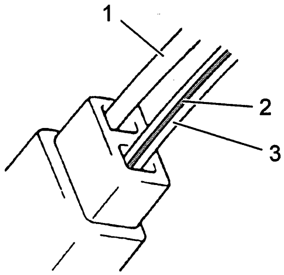
Symbol	Definition
	Torque control required. Data beside it indicate specified torque.
OIL	Apply oil. Use engine oil unless otherwise specified.
M/O	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1 : 1).
A	Apply SUZUKI SUPER GREASE A. 99000-25011
C	Apply SUZUKI SUPER GREASE C. 99000-25030
L	Apply SUZUKI MOLYBDENUM GREASE L. 99000-25280
M	Apply SUZUKI MOLY PASTE. 99000-25140
S	Apply SUZUKI SILICONE GREASE. 99000-25100
W	Apply SUZUKI WATER RESISTANT GREASE EP2. 99000-25350
1207B	Apply SUZUKI BOND 1207B. 99000-31140
1215	Apply SUZUKI BOND 1215. 99000-31110
1216B	Apply SUZUKI BOND 1216B. 99000-31230
1303B	Apply THREAD LOCK CEMENT 1303B. 99000-32030
1322D	Apply THREAD LOCK CEMENT 1322D. 99000-32150
1342H	Apply THREAD LOCK CEMENT 1342H. 99000-32160
1360	Apply THREAD LOCK CEMENT 1360. 99000-32130
LLC	Use SUZUKI SUPER LONG LIFE COOLANT (BLUE). 99000-99032-20X
	Use SUZUKI LONG LIFE COOLANT (GREEN). 99000-99032-12X
FORK	Apply or use fork oil.
BF	Apply or use brake fluid.
TOOL	Use special tool.
	Do not reuse.
	Note on reassembly.

Wire Color Symbols

BENJ18K60101003

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

There are two kinds of colored wire used in this vehicle. One is single-colored wire and the other is dual-colored (striped) wire.
The single-colored wire uses only one color symbol (i.e. G). The dual-colored wire uses two color symbols (i.e. G/Y).
The first symbol represents the base color of the wire and the second symbol represents the color of the stripe.



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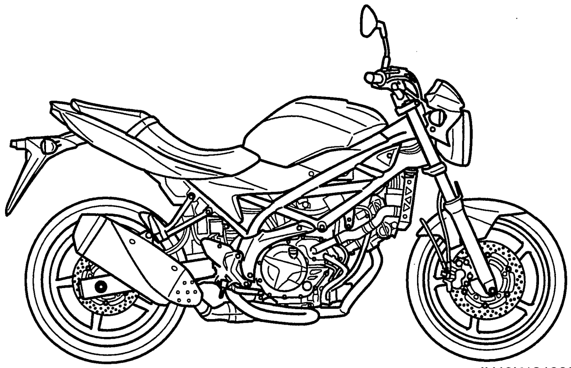
1. G (Base color)	3. G (Base Color)
2. Y (Stripe color)	

Vehicle Side View

BENJ18K60101004

SUZUKI SV650/A



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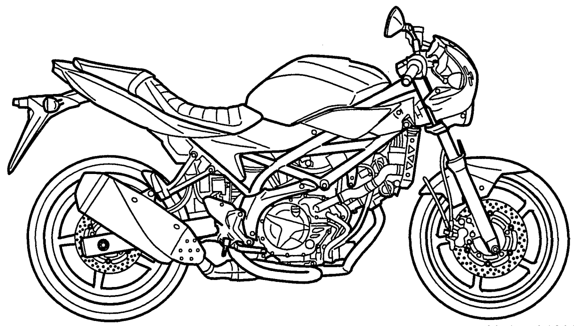
SUZUKI SV650XA

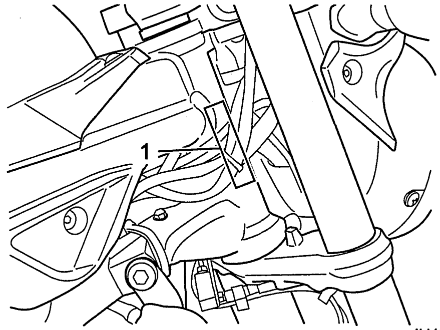


IJ18K1010002-01

Vehicle Identification Number

BENJ18K60101005

The frame serial number or V.I.N. (Vehicle Identification Number) (1) is stamped on the steering head tube. The engine serial number (2) is located on the crankcase assembly.



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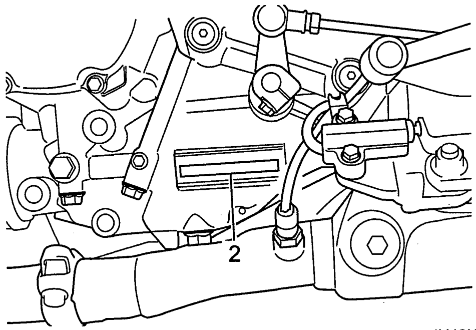


IH18K1010003-01

Country and Area Codes

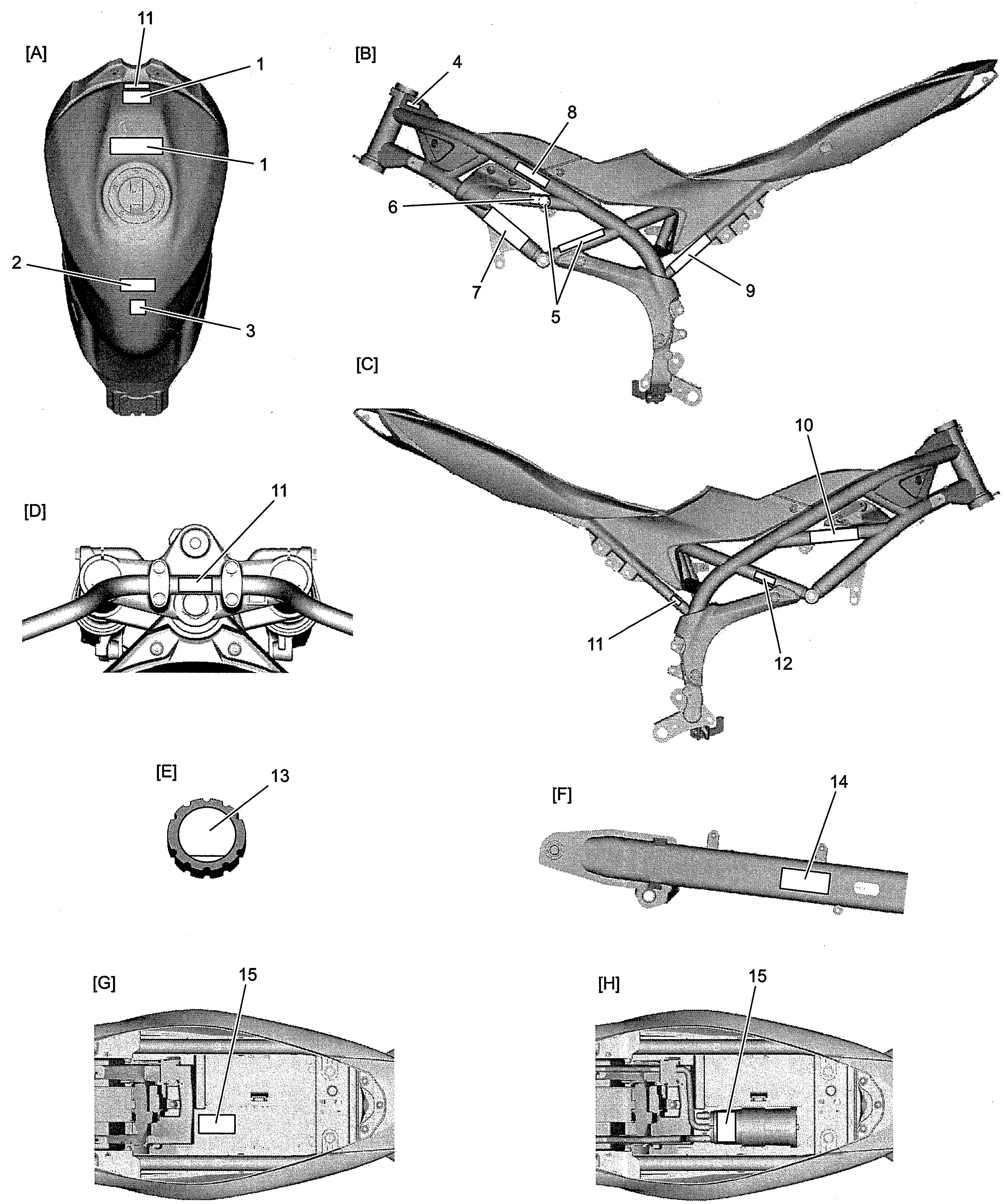
BENJ18K60101006

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

Code	Country or Area
E03	U.S.A. except for California State
E33	California State

Warning, Caution and Information Labels Location

BENJ18K60101007

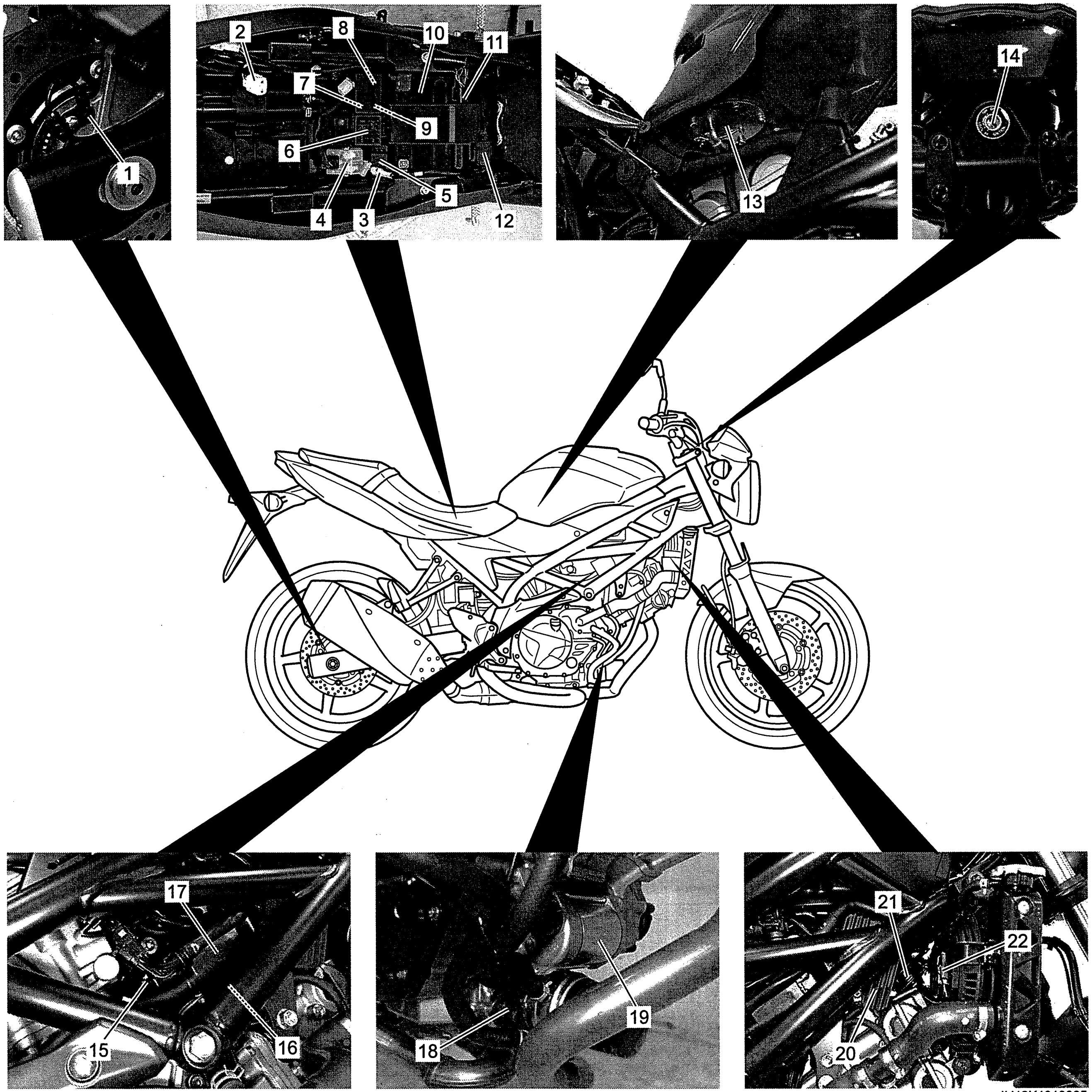


[A]: Fuel tank	1. General warning label (If equipped)	9. Information label or Noise label (If equipped)
[B]: Frame (LH)	2. Helmet label or Gasoline label (If equipped)	10. Information label or Vacuum hose routing label (If equipped)
[C]: Frame (RH)	3. Fuel limitation label (If equipped)	11. Brake fluid information label (If equipped)
[D]: Handlebars (SV650/A)	4. Brake approval mark label (If equipped)	12. ICES Canada label (If equipped)
[E]: Radiator cap	5. Information label (If equipped)	13. Radiator cap label (If equipped)
[F]: Swingarm (LH)	6. UN noise label (If equipped)	14. Tire information label
[G]: Rear fender front	7. I.D. plate, Manufacturer label or Safety plate (If equipped)	15. Manual notice label (If equipped)
[H]: Rear fender front (EVAP canister)	8. EPA noise label (If equipped)	

Component Location

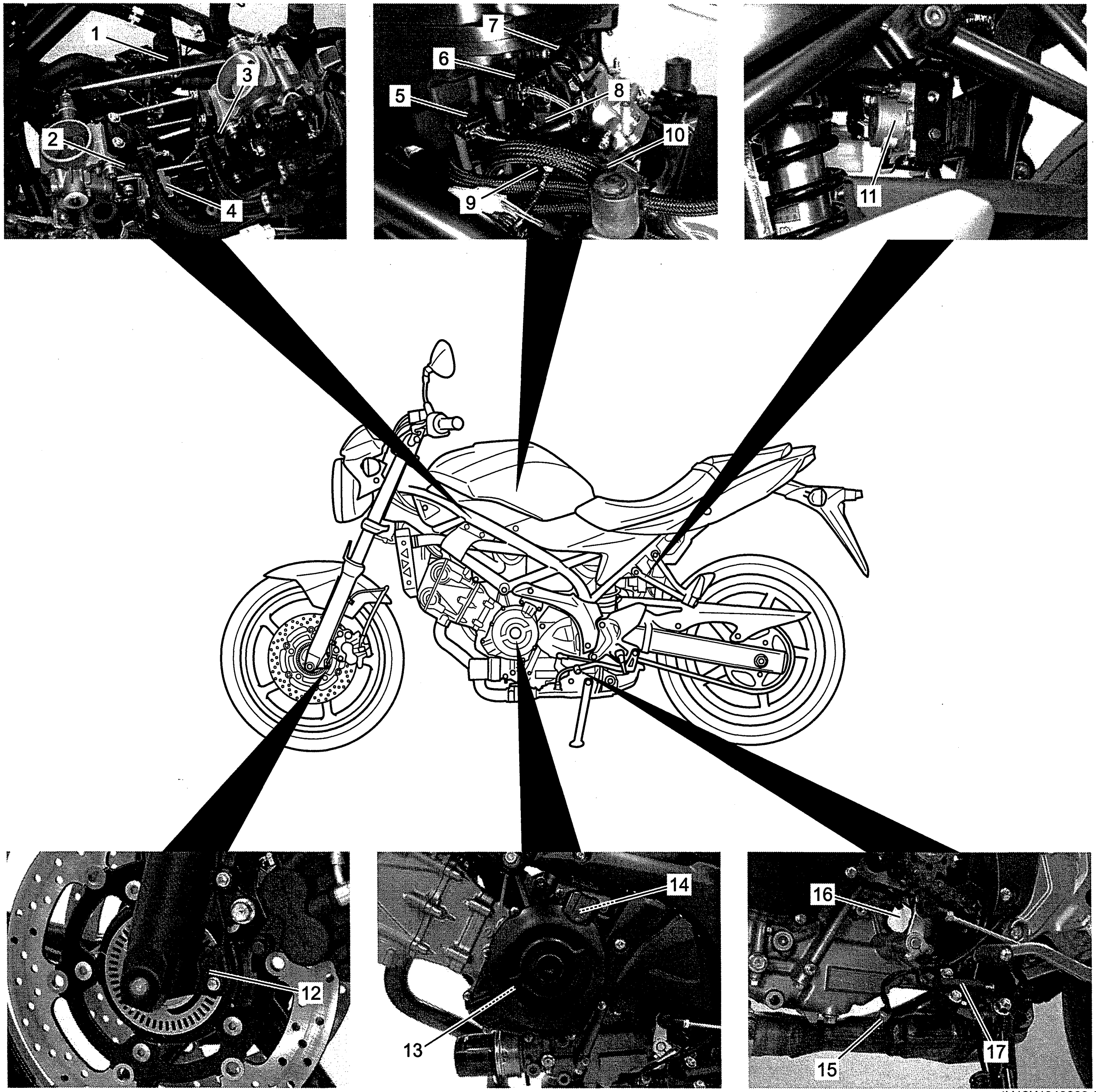
Electrical Components Location

BENJ18K60103001



IH18K1010005-03

1. Rear wheel speed sensor (With ABS)	9. Cooling fan relay	17. Ignition coil #2
2. Mode select coupler (6P)	10. Battery	18. Oil pressure switch
3. Mode select coupler (2P) (With ABS)	11. ECM	19. Starter motor
4. Starter relay/Main fuse	12. TO sensor	20. Regulator/rectifier
5. Turn signal relay	13. Fuel pump/Fuel level gauge	21. Horn



IH18K1010006-02

1. PAIR control solenoid valve (If equipped)	7. IAT sensor	13. Generator
2. Fuel injector #1	8. STP sensor	14. CKP sensor
3. Fuel injector #2	9. STV actuator	15. HO2 sensor
4. EVAP system purge control solenoid valve (If equipped)	10. TP sensor	16. GP switch
5. IAP sensor #1	11. ABS control unit/HU (With ABS)	17. Side-stand switch
6. IAP sensor #2	12. Front wheel speed sensor (With ABS) or Speed sensor (Without ABS)	

Maintenance and Lubrication

Precautions

Precautions for Maintenance

BENJ18K60200001

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.

IMPORTANT: The periodic maintenance intervals and service requirements have been established in accordance with EPA regulations. Following these instructions will ensure that the motorcycle will not exceed emission standards and it will also ensure the reliability and performance of the motorcycle.

NOTE

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

Scheduled Maintenance

Periodic Maintenance Schedule Chart

BENJ18K60205001

NOTE

- **I = Inspect and clean, adjust, replace or lubricate as necessary.**
  R = Replace.
  T = Tighten.
- **(CA. only) means that the item or the maintenance interval is to be applied only for the California model.**

Item		Interval				
	months	**2**	**12**	**24**	**36**	**48**
	km	**1000**	**6000**	**12000**	**18000**	**24000**
	miles	**600**	**4000**	**7500**	**11000**	**14500**
Air cleaner element (I: ☞(Page 0B-2), R: ☞(Page 0B-2))		—	I	I	R	I
Exhaust pipe bolts and muffler bolts (T: ☞(Page 0B-2))		T	—	T	—	T
Valve clearance (I: ☞(Page 0B-2))		Inspect every 24000 km (15000 miles)				
Spark plugs (I: ☞(Page 0B-2), R: ☞(Page 0B-2))		—	I	R	I	R
Fuel hose (I: ☞(Page 0B-2), R: ☞(Page 0B-2))		—	I	I	I	I
		Replace every 4 years				
Evaporative emission control system (If equipped) (I: ☞(Page 0B-2))		—	—	I	—	I
Engine oil (R: ☞(Page 0B-2))		R	R	R	R	R
Engine oil filter (R: ☞(Page 0B-2))		R	—	—	R	—
Throttle cable play (I: ☞(Page 0B-2))		I	I	I	I	I
Throttle valve synchronization (I: ☞(Page 0B-2))		I (CA. only)	—	I	—	I
PAIR (air supply) system (If equipped) (I: ☞(Page 0B-2))		—	—	I	—	I
Engine coolant (R: ☞(Page 0B-	"SUZUKI SUPER LONG LIFE COOLANT" (Blue)	Replace every 4 years or 48000 km (29000 miles)				
	"SUZUKI LONG LIFE COOLANT" (Green) or					

Item	Interval					
	months	2	12	24	36	48
	km	1000	6000	12000	18000	24000
	miles	600	4000	7500	11000	14500
Brakes (I: ☞(Page 0B-3))		I	I	I	I	I
Brake fluid (I: ☞(Page 0B-3), R: ☞(Page 0B-3))		—	I	I	I	I
		Replace every 2 years				
Brake hose (I: ☞(Page 0B-3), R: ☞(Page 0B-3))		—	I	I	I	I
		Replace every 4 years				
Tires (I: ☞(Page 0B-3))		—	I	I	I	I
Steering (I: ☞(Page 0B-3))		I	—	I	—	I
Front forks (I: ☞(Page 0B-3))		—	—	I	—	I
Rear suspension (I: ☞(Page 0B-3))		—	—	I	—	I
Chassis bolts and nuts (T: ☞(Page 0B-4))		T	T	T	T	T
Lubrication (I: ☞(Page 0B-6))		Lubricate at every 1000 km (600 miles)				

Repair Instructions

Air Cleaner Element Inspection

BENJ18K60206001

Refer to “Air Cleaner Element Inspection and Cleaning” in Section 1D (Page 1D-7).

Air Cleaner Element Replacement

BENJ18K60206002

Refer to “Air Cleaner Element Removal and Installation” in Section 1D (Page 1D-7).

Exhaust Pipe Bolt and Muffler Bolt Inspection

BENJ18K60206003

Refer to “Exhaust System Inspection” in Section 1K (Page 1K-5).

Valve Clearance Inspection and Adjustment

BENJ18K60206004

Refer to “Valve Clearance Inspection and Adjustment” in Section 1D (Page 1D-32).

Spark Plug Inspection

BENJ18K60206005

Refer to “Spark Plug Inspection” in Section 1H (Page 1H-8).

Spark Plug Replacement

BENJ18K60206006

Refer to “Spark Plug Removal and Installation” in Section 1H (Page 1H-7).

Fuel Hose Inspection

BENJ18K60206007

Refer to “Fuel Hose Inspection” in Section 1G (Page 1G-7).

Evaporative Emission Control System Inspection (If Equipped)

BENJ18K60206009

Refer to “EVAP Control System Inspection (If Equipped)” in Section 1B (Page 1B-15).

Engine Oil Replacement

BENJ18K60206010

Refer to “Engine Oil Replacement” in Section 1E (Page 1E-5).

Engine Oil Filter Replacement

BENJ18K60206011

Refer to “Oil Filter Replacement” in Section 1E (Page 1E-6).

Throttle Cable Play Inspection and Adjustment

BENJ18K60206012

Refer to “Throttle Cable Play On-Vehicle Inspection and Adjustment” in Section 1D (Page 1D-10).

Throttle Valve Synchronization

BENJ18K60206013

Refer to “Throttle Valve Synchronization” in Section 1D (Page 1D-15).

PAIR System Inspection (If Equipped)

BENJ18K60206014

Refer to “PAIR System Inspection (If Equipped)” in Section 1B (Page 1B-12).

Engine Coolant Replacement

BENJ18K60206015

Refer to “Engine Coolant Replacement” in Section 1F

Clutch Cable Play Inspection and Adjustment

BENJ18K60206017

Refer to "Clutch Cable Play On-Vehicle Inspection and Adjustment" in Section 5C (Page 5C-2).

Drive Chain Inspection and Adjustment

BENJ18K60206018

Refer to "Drive Chain Inspection and Adjustment" in Section 3A (Page 3A-3).

Drive Chain Cleaning and Lubricating

BENJ18K60206019

Refer to "Drive Chain Cleaning and Lubricating" in Section 3A (Page 3A-4).

Brake System Inspection

BENJ18K60206020

Brake Pad

- Front: ☞(Page 4B-3)
- Rear: ☞(Page 4C-2)

Brake Disc

- Front: ☞(Page 4B-13)
- Rear: ☞(Page 4C-7)

Brake Light Switch

Refer to "Rear Brake Light Switch Inspection" in Section 4A (Page 4A-24).

Brake Pedal Height

Refer to "Brake Pedal Height Inspection and Adjustment" in Section 4A (Page 4A-27).

Brake Fluid Inspection

BENJ18K60206021

Refer to "Brake Fluid Level Check" in Section 4A (Page 4A-24).

Brake Fluid Replacement

BENJ18K60206022

Refer to "Brake Fluid Replacement" in Section 4A (Page 4A-31).

Brake Hose Inspection

BENJ18K60206023

Refer to "Brake Hose Inspection" in Section 4A (Page 4A-25).

Brake Hose Replacement

BENJ18K60206024

- Front: ☞(Page 4A-32)
- Rear: ☞(Page 4A-33)

Tire Inspection

BENJ18K60206025

Refer to "Tire Inspection and Cleaning" in Section 2D (Page 2D-14).

Steering System Inspection

BENJ18K60206026

Refer to "Steering On-Vehicle Inspection" in Section 6B (Page 6B-13).

Front Fork Inspection

BENJ18K60206027

Refer to "Front Fork On-Vehicle Inspection" in Section 2B (Page 2B-3).

Rear Suspension Inspection

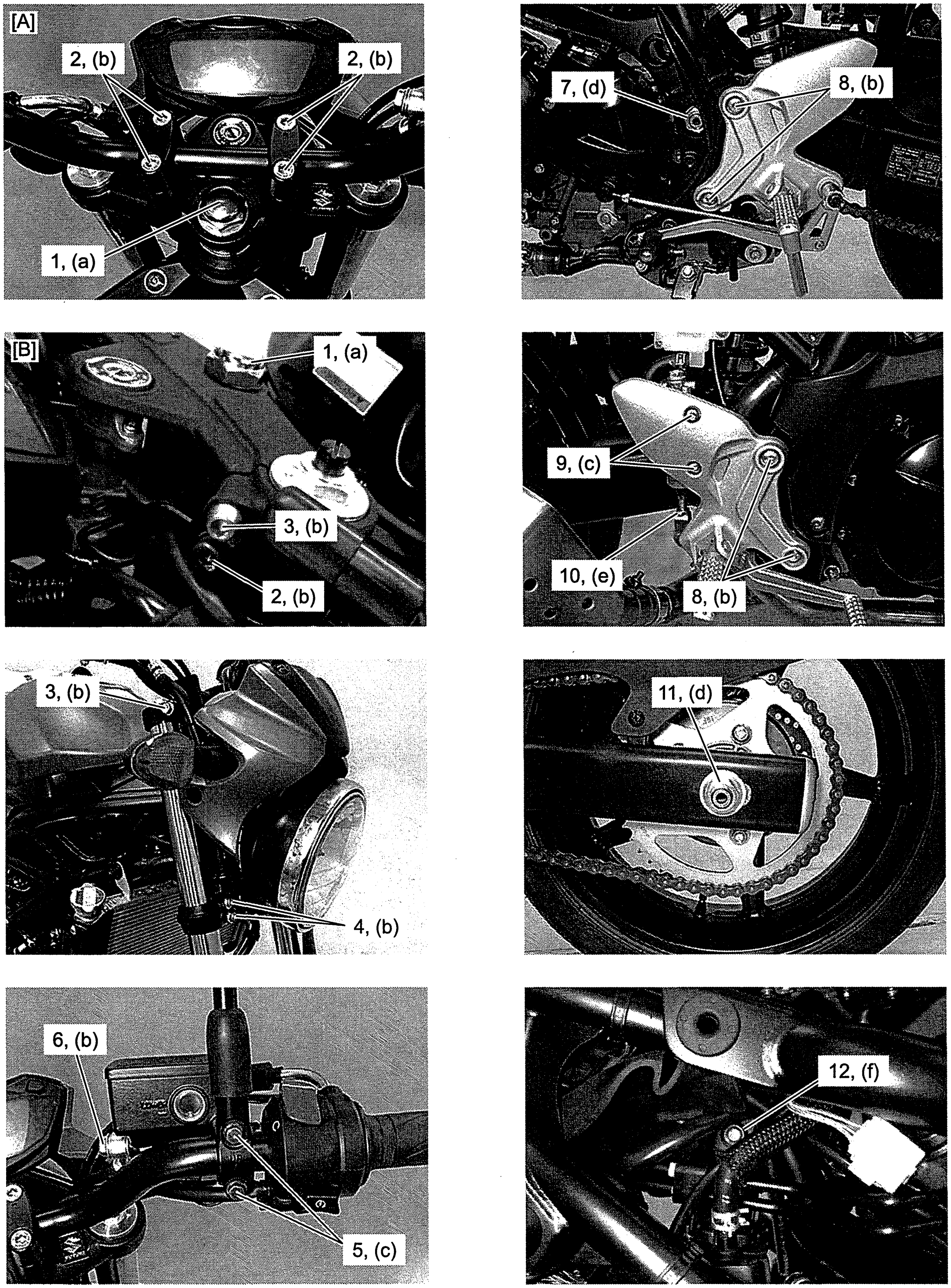
BENJ18K60206028

Refer to "Rear Suspension On-Vehicle Inspection" in Section 2C (Page 2C-3).

Chassis Bolt and Nut Inspection

BENJ18K60206029

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



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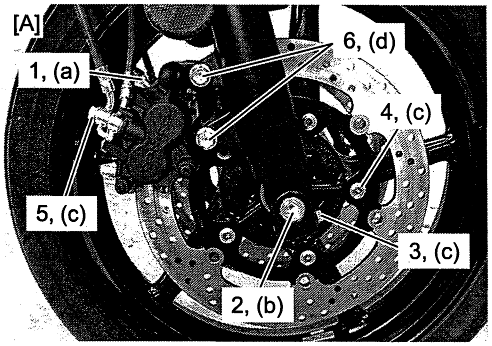
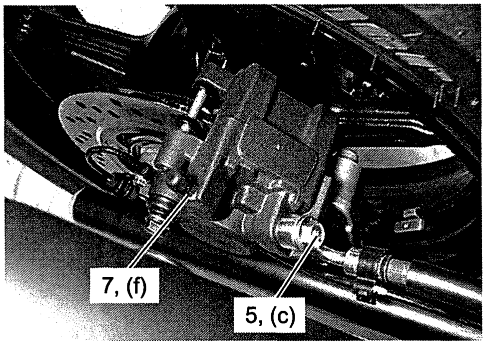
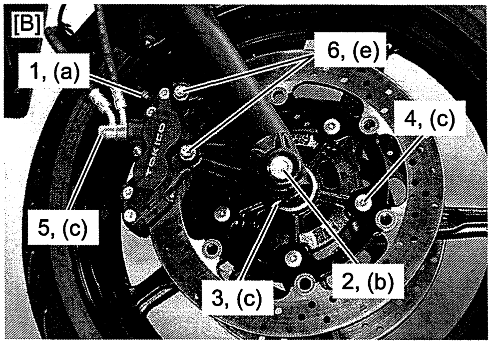
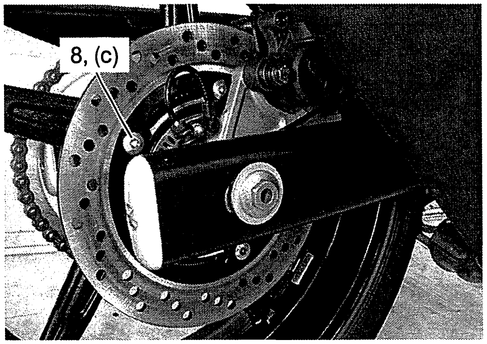
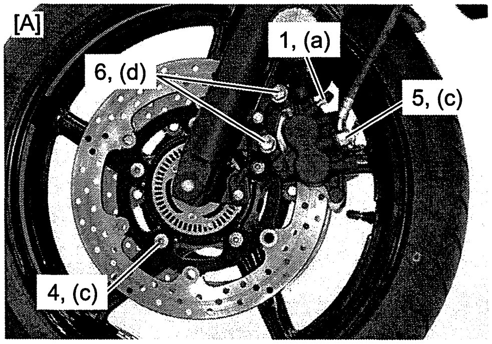
[A]: SV650/A	6. Brake hose union bolt	(a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)

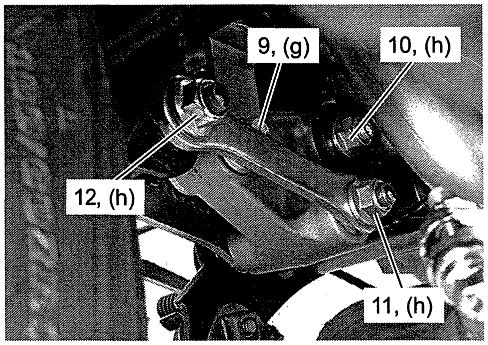


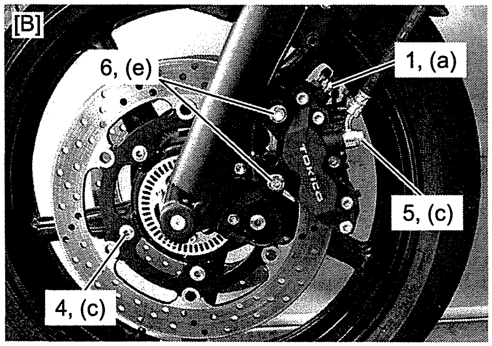






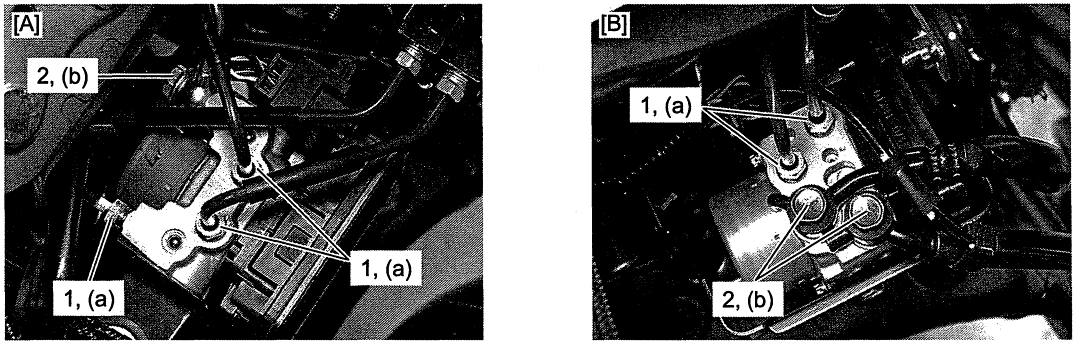






IJ18K5020002-03

[A]: L7 – L8 model	7. Rear brake air bleeder valve	(c): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[B]: L9 – model	8. Rear brake disc bolt	(d): 39 N·m (4.0 kgf-m, 29.0 lbf-ft)
1. Front brake air bleeder valve	9. Rear shock absorber lower bolt	(e): 26 N·m (2.7 kgf-m, 19.5 lbf-ft)
2. Front axle	10. Cushion lever front mounting nut	(f): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)



IJ18K5020003-01

[A]: L7 – L8 model	1. Brake pipe flare nut (With ABS)	(a): 16 N·m (1.6 kgf-m, 12.0 lbf-ft)
[B]: L9 – model	2. Brake hose union bolt (With ABS)	(b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

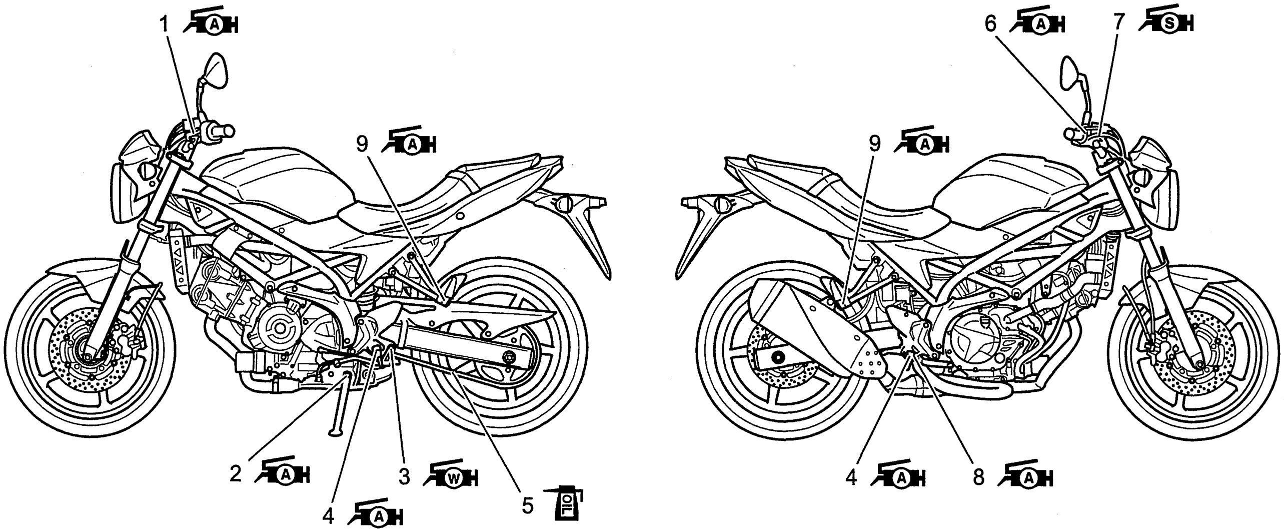
Lubrication Points

BENJ18K60206030

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.**



IH18K1020003-02

1. Clutch lever pivot	6. Throttle cable end	: Apply grease.
2. Side-stand pivot and spring hook	7. Brake lever pivot	: Apply silicone grease.
3. Gearshift lever pivot	8. Brake pedal pivot	: Apply water resistant grease EP2.
4. Footrest pivot	9. Pillion footrest pivot	
5. Drive chain	: Apply oil.	

Precautions

Precautions for Service Data

BENJ18K60300001

NOTE

Specifications and service data are subject to change without notice.

Specifications

Specifications

BENJ18K60307001

Dimensions and curb mass

Item	Specification	Remark
Overall length	2140 mm (84.3 in)	—
Overall width	760 mm (29.9 in)	SV650/A
	730 mm (28.7 in)	SV650XA
Overall height	1090 mm (42.9 in)	—
Wheelbase	1445 mm (56.9 in)	—
Ground clearance	135 mm (5.3 in)	—
Seat height	785 mm (30.9 in)	SV650/A
	790 mm (31.1 in)	SV650XA
Curb mass	196 kg (432 lbs)	SV650
	198 kg (437 lbs)	SV650A/XA

Engine

Item	Specification	Remark
Type	Four-stroke, liquid-cooled, DOHC, 90° V-twin	—
Number of cylinders	2	—
Bore	81.0 mm (3.189 in)	—
Stroke	62.6 mm (2.465 in)	—
Displacement	645 cm^3 (39.4 cu. in)	—
Compression ratio	11.2 : 1	—
Fuel system	Fuel injection	—
Air cleaner	Non-woven fabric element	—
Starter system	Electric	—
Lubrication system	Wet sump	—
Idle speed	1300 ± 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		2.088 (71/34)	—
Gear ratios	Low	2.461 (32/13)	—
	2nd	1.777 (32/18)	—
	3rd	1.380 (29/21)	—

Chassis

Item	Specification	Remark
Front suspension	Telescopic, coil spring, oil damped	—
Rear suspension	Link type, coil spring, oil damped	—
Front fork stroke	125 mm (4.9 in)	—
Steering angle	33° (right and left)	SV650/A
	30° (right and left)	SV650XA
Front brake	Disc brake, twin	—
Rear brake	Disc brake	—
Front tire size	120/70ZR17M/C (58W), tubeless	—
Rear tire size	160/60ZR17M/C (69W), tubeless	—

Electrical

Item	Specification	Remark
Ignition type	Electronic ignition (Transistorized)	—
Spark plug	NGK MR8E-9	—
Battery	12 V 36.0 kC (10 Ah)/10 HR	—
Generator	Three-phase A.C. generator	—
Fuse	30/10/10/15/15/10/15 A	L7 – L8
	30/10/10/15/15/10/10/15 A	L9 –
ABS fuse	30 A	SV650AL7 – L8, SV650XAL8
	20/15 A	SV650A/XAL9 –
Headlight	12 V 60/55 W (H4)	—
Position light	12 V 5 W	If equipped
Brake light/Taillight	LED	—
Turn signal light	12 V 21 W	—
License plate light	12 V 5 W	—
Instrument panel light	LED	—
Neutral indicator light	LED	—
Hi beam indicator light	LED	—
Turn signal indicator light	LED	—
Engine coolant temperature indicator light/Oil pressure indicator light	LED	—
MIL	LED	—
ABS indicator light	LED	SV650A/XA

Capacities

Item		Specification		Remark
Fuel tank		L7	13.8 L (3.6 US gal, 3.0 Imp gal)	Except for U.S.A. (except for California State) and Canada
			14.5 L (3.8 US gal, 3.2 Imp gal)	For U.S.A. (except for California State) and Canada
		L8 –	14.5 L (3.8 US gal, 3.2 Imp gal)	—
Engine oil	Oil change	2400 ml (2.5 US qt, 2.1 Imp qt)		—
	With filter change	2750 ml (2.9 US qt, 2.4 Imp qt)		—
Engine coolant		1850 ml (2.0 US qt, 1.6 Imp qt)		

Service Data

BENJ18K60307002

Emission Control Devices

Item	Specification	Standard	Limit
EVAP system purge control solenoid valve power supply voltage (If equipped)		Battery voltage	—
EVAP system purge control solenoid valve resistance (If equipped)	20 °C (68 °F)	30 – 34 Ω	—
PAIR control solenoid valve power supply voltage (If equipped)		Battery voltage	—
PAIR control solenoid valve resistance (If equipped)	20 – 30 °C (68 – 86 °F)	20 – 24 Ω	—

Engine Electrical Devices

Item	Specification	Standard	Limit
IAP sensor #1 power supply voltage		4.75 – 5.25 V	—
IAP sensor #1 output voltage	Idle speed at 1 atm.	Approx. 2.5 V	—
IAP sensor #2 power supply voltage		4.75 – 5.25 V	—
IAP sensor #2 output voltage	Idle speed at 1 atm.	Approx. 2.5 V	—
IAT sensor power supply voltage		4.5 – 5.5 V	—
IAT sensor resistance	0 °C (32 °F)	5400 – 6600 Ω	—
	80 °C (176 °F)	290 – 390 Ω	—
ECT sensor power supply voltage		4.5 – 5.5 V	—
ECT sensor resistance	20 °C (68 °F)	2320 – 2590 Ω	—
	80 °C (176 °F)	310 – 326 Ω	
TP sensor power supply voltage		4.5 – 5.5 V	—
TP sensor output voltage	Closed	1.10 – 1.14 V	—
	Opened	4.34 – 4.54 V	
STP sensor power supply voltage		4.5 – 5.5 V	—
STP sensor output voltage	Closed	0.57 – 0.67 V	—
	Opened	4.4 – 4.6 V	
HO2 sensor output voltage	Idle speed	0.6 V or less	—
	5000 r/min	0.6 V or more	
HO2 sensor heater power supply voltage		Battery voltage	—
HO2 sensor heater resistance	23 °C (73.4 °F)	11.5 – 17.5 Ω	—
CKP sensor peak voltage	When cranking	4.6 V or more	—
CKP sensor resistance		148 – 222 Ω	—
TO sensor power supply voltage		4.5 – 5.5 V	—
TO sensor output voltage	Normal	0.4 – 1.4 V	—
	Leaning 65°	3.7 – 4.4 V	
TO sensor resistance		16500 – 22300 Ω	—
ECM power supply voltage		Battery voltage	—

Engine Mechanical

Item	Specification	Standard	Limit
Throttle body I.D. No.	Without EVAP Control System	18K0	—
	With EVAP Control System	18K1	—
Throttle body bore size		39 mm (1.5 in)	—
Throttle cable play		2.0 – 4.0 mm (0.079 – 0.16 in)	—
Idle speed	When engine warmed	1300 ± 100 r/min	—
Fast idle speed		1500 – 2000 r/min	—
STVA resistance		Approx. 7 Ω	—
Compression pressure		1300 – 1700 kPa (13.3 – 17.3 kgf/cm², 188 – 246 psi)	1100 kPa (11.2 kgf/cm², 159 psi)
Compression pressure difference		—	200 kPa (2 kgf/cm², 28 psi)
Cam height	Intake	36.38 – 36.43 mm (1.433 – 1.434 in)	36.08 mm (1.421 in)
	Exhaust	35.68 – 35.73 mm (1.405 – 1.406 in)	35.38 mm (1.393 in)
Camshaft journal oil clearance	Intake	0.027 – 0.069 mm (0.0011 – 0.0027 in)	0.150 mm (0.0059 in)
	Exhaust	0.027 – 0.069 mm (0.0011 – 0.0027 in)	0.150 mm (0.0059 in)
Camshaft journal holder I.D.	Intake	22.007 – 22.028 mm (0.8665 – 0.8672 in)	—
	Exhaust	22.007 – 22.028 mm (0.8665 – 0.8672 in)	
Camshaft journal O.D.	Intake	21.959 – 21.980 mm (0.8646 – 0.8653 in)	—
	Exhaust	21.959 – 21.980 mm (0.8646 – 0.8653 in)	
Camshaft runout	Intake & Exhaust	—	0.10 mm (0.004 in)
Cam chain pin	At arrow “3”	16th pin	—
Valve clearance	When engine cold — Intake	0.10 – 0.20 mm (0.0040 – 0.0078 in)	—
	When engine cold — Exhaust	0.20 – 0.30 mm (0.0079 – 0.0118 in)	
Valve diameter	Intake	31 mm (1.2 in)	—
	Exhaust	25.5 mm (1.00 in)	
Valve stem runout	Intake & Exhaust	—	0.05 mm (0.0019 in)
Valve head radial runout	Intake & Exhaust	—	0.03 mm (0.0011 in)
Valve head thickness	Intake	—	0.5 mm (0.019 in)
	Exhaust	—	0.5 mm (0.019 in)
Valve stem deflection	Intake & Exhaust	—	0.35 mm (0.013 in)
		4.475 – 4.490 mm	

Item	Specification	Standard	Limit
Valve guide I.D.	Intake	4.500 – 4.512 mm (0.1772 – 0.1776 in)	—
	Exhaust	4.500 – 4.512 mm (0.1772 – 0.1776 in)	—
Valve guide to valve stem clearance	Intake	0.010 – 0.037 mm (0.0004 – 0.0014 in)	—
	Exhaust	0.030 – 0.057 mm (0.0012 – 0.0022 in)	—
Valve spring free length	Intake	—	37.1 mm (1.46 in)
	Exhaust	—	37.1 mm (1.46 in)
Valve spring pre-load	When compressed to 33.40 mm (1.315 in) – Intake	127 – 147 N (13.0 – 14.9 kgf, 28.6 – 33.0 lbf)	—
	When compressed to 33.40 mm (1.315 in) – Exhaust	127 – 147 N (13.0 – 14.9 kgf, 28.6 – 33.0 lbf)	—
Cylinder head distortion		—	0.05 mm (0.0019 in)
Cylinder distortion		—	0.05 mm (0.0019 in)
Cylinder bore		81.000 – 81.015 mm (3.1890 – 3.1895 in)	No nicks or Scratches
Piston diameter	Measure at 20 mm (0.79 in) from the skirt end.	80.970 – 80.985 mm (3.1878 – 3.1883 in)	80.880 mm (3.1843 in)
Piston to cylinder clearance		0.025 – 0.035 mm (0.0010 – 0.0013 in)	0.120 mm (0.0047 in)
Piston ring to groove clearance	1st	—	0.180 mm (0.0070 in)
	2nd	—	0.150 mm (0.0059 in)
Piston ring groove width	1st	0.83 – 0.85 mm (0.0327 – 0.0334 in)	—
	1st	1.30 – 1.32 mm (0.0512 – 0.0519 in)	—
	2nd	1.01 – 1.03 mm (0.0398 – 0.0405 in)	—
	Oil	2.01 – 2.03 mm (0.0792 – 0.0799 in)	—
Piston ring thickness	1st	0.76 – 0.81 mm (0.030 – 0.031 in)	—
	1st	1.08 – 1.10 mm (0.0426 – 0.0433 in)	—
	2nd	0.97 – 0.99 mm (0.0382 – 0.0389 in)	—
Piston ring free end gap	1st	Approx. 6.5 mm (0.26 in)	5.2 mm (0.21 in)
	2nd	Approx. 9 mm (0.4 in)	7.2 mm (0.29 in)
Piston ring end gap	1st	0.06 – 0.18 mm (0.0024 – 0.0070 in)	0.50 mm (0.019 in)
		0.06 – 0.18 mm	0.50 mm

Item	Specification	Standard	Limit
Conrod big end side clearance		0.170 – 0.320 mm (0.0067 – 0.0125 in)	0.5 mm (0.019 in)
Conrod big end width		20.95 – 21.00 mm (0.8248 – 0.8267 in)	—
Conrod big end I.D.		41.000 – 41.016 mm (1.6142 – 1.6148 in)	—
Conrod big end oil clearance		0.032 – 0.056 mm (0.0013 – 0.0022 in)	0.080 mm (0.0031 in)
Crank pin width		42.17 – 42.22 mm (1.661 – 1.662 in)	—
Crank pin O.D.		37.976 – 38.000 mm (1.4952 – 1.4960 in)	—
Crank pin bearing thickness		1.480 – 1.496 mm (0.0583 – 0.0588 in)	—
Crankshaft journal O.D.		41.985 – 42.000 mm (1.6530 – 1.6535 in)	—
Crankshaft journal oil clearance		0.004 – 0.023 mm (0.0002 – 0.0009 in)	0.080 mm (0.0031 in)
Crankcase journal I.D.		46.000 – 46.018 mm (1.8111 – 1.8117 in)	—
Crankcase journal bearing thickness		1.999 – 2.008 mm (0.0787 – 0.0790 in)	—
Crankshaft journal holder width	Right side	19.8 – 19.9 mm (0.780 – 0.783 in)	—
Crankshaft journal width	Right side	20.00 – 20.05 mm (0.7874 – 0.7893 in)	—
Crankshaft runout		—	0.05 mm (0.0019 in)

Engine Lubrication System

Item	Specification	Standard	Limit
Oil pressure	At 60 °C (140 °F), 3000 r/min	200 – 600 kPa (2.1 – 6.1 kgf/cm², 29.0 – 87.0 psi)	—
Necessary amount of engine oil	Oil change	2400 ml (2.5 US qt, 2.1 Imp qt)	—
	Oil and filter change	2750 ml (2.9 US qt, 2.4 Imp qt)	
	Engine overhaul	3000 ml (3.2 US qt, 2.6 Imp qt)	

Cooling System

Item	Specification	Standard	Limit
Engine coolant	Engine side	Approx. 1600 ml (1.69 US qt, 1.41 Imp qt)	—
	Reserve tank side	Approx. 250 ml (0.26 US qt, 0.22 Imp qt)	
Radiator cap valve opening pressure		108.0 – 137.4 kPa (1.1 – 1.4 kgf/cm², 15.7 – 19.9 psi)	—
Cooling fan relay power supply voltage		Battery voltage	—
Cooling fan operating temperature	OFF → ON	Approx. 105 °C (221 °F)	—
	ON → OFF	Approx. 99 °C (210.2 °F)	

Fuel System

Item	Specification	Standard	Limit
Fuel injector power supply voltage		Battery voltage	—
Fuel injector resistance	20 °C (68 °F)	11.5 – 12.5 Ω	—
FP relay power supply voltage		Battery voltage	—
FP discharge amount	Per 10 seconds	167 ml (5.65 US oz, 5.88 Imp oz) or more	—
Fuel pressure		289 – 299 kPa (2.95 – 3.04 kgf/cm², 42.0 – 43.3 psi)	—

Ignition System

Item	Specification	Standard	Limit
Firing order		1·2	—
Spark plug	Type	NGK: MR8E-9	—
	Gap	0.8 – 0.9 mm (0.032 – 0.035 in)	
Spark performance	At 1 atm	8 mm (0.3 in) or more	—
Ignition coil primary peak voltage		150 V or more	—
Ignition coil resistance	Primary	1 – 3 Ω	—
	Secondary	25000 – 40000 Ω	

Starting System

Item	Specification	Standard	Limit
Starter motor brush length		10 mm (0.39 in)	6.5 mm (0.26 in)
Starter relay resistance		3 – 6 Ω	—
Side-stand switch voltage	ON (Side-stand retracted)	0.4 – 0.6 V	—
	OFF (Side-stand on the ground)	1.4 V or more	

Charging System

Item	Specification		Standard	Limit
Battery leakage current			3 mA or less	—
Regulated voltage	Charging output	At 5000 r/min	14.0 – 15.5 V	—
Generator coil resistance			0.189 – 0.231 Ω	—
Generator no-load voltage	When engine cold	At 5000 r/min	60 V (AC) or more	—
Reaching time	Standard charging		1.2 A for 5 to 10 hours	—
	Fast charging		5 A for 1 hour	
Generator Max. output	At 5000 r/min		Approx. 375 W	—
Battery	Type designation		FT12A-BS	—
	Capacity		12 V 36.0 kC (10 Ah)/10 HR	

Front Suspension

Item	Specification		Standard	Limit
Front fork inner tube O.D.			41 mm (1.6 in)	—
Front fork oil level	Without spring, inner tube fully compressed	SV650/A	84 mm (3.3 in)	—
		SV650XA	104 mm (4.09 in)	
Front fork spring free length	SV650/A		412.4 mm (16.24 in)	404 mm (15.9 in)
	SV650XA	L8	397.1 mm (15.63 in)	389 mm (15.3 in)
		L9 –	399.6 mm (15.73 in)	391 mm (15.4 in)
Front fork oil capacity	Each leg	SV650/A	525 ml (17.75 US oz, 18.48 Imp oz)	—
		SV650XA	506 ml (17.11 US oz, 17.81 Imp oz)	
Front fork spring adjuster	SV650XA		9 mm (0.4 in)	—

Rear Suspension

Item	Specification	Standard	Limit
Rear shock absorber spring adjuster		3rd position from softest end	—
Swingarm pivot shaft runout		—	0.3 mm (0.011 in)

Wheels and Tires

Item	Specification		Standard	Limit
Wheel rim runout	Front	Axial & Radial	—	2.0 mm (0.08 in)
	Rear	Axial & Radial	—	2.0 mm (0.08 in)
Wheel axle runout	Front & Rear		—	0.25 mm (0.010 in)
Tire size	Front		120/70ZR17M/C (58W)	—
	Rear		160/60ZR17M/C (69W)	
Tire type	Front	L7	DUNLOP/Qualifier J	—
		L8 –	DUNLOP/ROADSMART III J	
	Rear	L7	DUNLOP/Qualifier J	
		L8 –	DUNLOP/ROADSMART III J	
Tire tread depth	Recommend depth	Front	—	1.6 mm (0.062 in)
		Rear	—	2.0 mm (0.078 in)
Cold inflation tire pressure	Solo riding	Front	225 kPa (2.25 kgf/cm², 33 psi)	—
		Rear	250 kPa (2.50 kgf/cm², 36 psi)	
	Dual riding	Front	225 kPa (2.25 kgf/cm², 33 psi)	—
		Rear	250 kPa (2.50 kgf/cm², 36 psi)	
Wheel rim size	Front		17 M/C × MT 3.50	—
	Rear		17 M/C × MT 5.00	

Drive Chain / Drive Train / Drive Shaft

Brake Control System and Diagnosis

Item	Specification	Standard	Limit
Rear brake pedal height		45 – 55 mm (1.8 – 2.1 in)	—
Master cylinder bore / piston diameter	Front	Approx. 14.0 mm (0.551 in)	—
	Rear	Approx. 14.0 mm (0.551 in)	

Front Brakes

Item	Specification	Standard	Limit
Front brake disc thickness		4.5 mm (0.18 in)	4.0 mm (0.16 in)
Front brake disc runout		—	0.30 mm (0.012 in)
Front brake caliper cylinder bore / piston diameter	L7 – L8	Approx. 27.0 mm (1.06 in)	—
	L9 –	Approx. 27.0 mm (1.06 in) Approx. 30.2 mm (1.19 in)	

Rear Brakes

Item	Specification	Standard	Limit
Rear brake disc thickness		5.0 mm (0.20 in)	4.5 mm (0.18 in)
Rear brake disc runout		—	0.30 mm (0.012 in)
Rear brake caliper cylinder bore / piston diameter		Approx. 38.2 mm (1.50 in)	—

ABS

Item	Specification	Standard	Limit
Wheel speed sensor – sensor rotor clearance	Front	0.45 – 1.53 mm (0.0178 – 0.0602 in)	—
	Rear	0.25 – 1.33 mm (0.0099 – 0.0523 in)	—

Manual Transmission

Item	Specification	Standard	Limit
Gearshift fork to groove clearance	No. 1	0.1 – 0.3 mm (0.004 – 0.011 in)	0.5 mm (0.019 in)
	No. 2	0.1 – 0.3 mm (0.004 – 0.011 in)	0.5 mm (0.019 in)
	No. 3	0.1 – 0.3 mm (0.004 – 0.011 in)	0.5 mm (0.019 in)
Gearshift fork groove width	No. 1	5.5 – 5.6 mm (0.217 – 0.220 in)	—
	No. 2	5.5 – 5.6 mm (0.217 – 0.220 in)	
	No. 3	5.5 – 5.6 mm (0.217 – 0.220 in)	
Gearshift fork thickness	No. 1	5.3 – 5.4 mm (0.209 – 0.212 in)	—
	No. 2	5.3 – 5.4 mm (0.209 – 0.212 in)	
	No. 3	5.3 – 5.4 mm (0.209 – 0.212 in)	
Gearshift lever height		45 – 55 mm (1.8 – 2.1 in)	—
GP switch power supply voltage		4.5 – 5.5 V	—
GP switch voltage	From 1st to Top	0.6 V or more	—

Clutch

Item	Specification	Standard	Limit
Clutch lever play		10 – 15 mm (0.4 – 0.6 in)	—
Clutch release screw		1 turn counterclockwise	—
Drive plate thickness	No. 1	2.92 – 3.08 mm (0.115 – 0.121 in)	2.62 mm (0.104 in)
	No. 2	2.92 – 3.08 mm (0.115 – 0.121 in)	2.62 mm (0.104 in)
Drive plate claw width	No. 1	13.7 – 13.8 mm (0.540 – 0.543 in)	13.2 mm (0.520 in)
	No. 2	13.7 – 13.8 mm (0.540 – 0.543 in)	13.2 mm (0.520 in)
Driven plate distortion		—	0.10 mm (0.004 in)
Clutch spring free length		53.1 mm (2.09 in)	50.5 mm (1.99 in)

Steering / Handlebar

Item	Specification	Standard	Limit
Steering tension initial force		2 – 5 N (0.21 – 0.50 kgf, 0.45 – 1.12 lbf)	—

Wiring Systems

Item	Specification		Standard	Limit
Fuse size	Headlight	HI	10 A	—
		LO	10 A	—
	Ignition		15 A	—
	Signal		15 A	—
	Fan		15 A	—
	Fuel		10 A	—
	L9 –	Parking	10 A	—
	Main		30 A	—
	L7 – L8	ABS (With ABS)	30 A	—
	L9 –	ABS motor (With ABS)	20 A	—
		ABS valve (With ABS)	15 A	—

Lighting Systems

Item	Specification	Standard	Limit
Headlight		12 V 60/55 W (H4)	—
Position light (If equipped)		12 V 5 W	—
Brake light/Taillight		LED	—
Turn signal light		12 V 21 W × 4	—
License plate light		12 V 5 W	—

Combination Meter / Fuel Meter / Horn

Item	Specification	Standard	Limit
Speed sensor power supply voltage (Without ABS)		12 V	—

Fasteners Information

BENJ18K60307003

Metric Fasteners

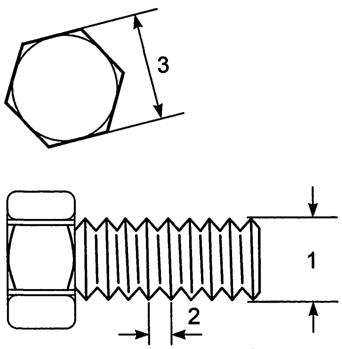
Most of the fasteners used for this vehicle are JIS-defined and ISO-defined metric fasteners. When replacing any fasteners, it is most important that replacement fasteners are of the correct diameter, thread pitch and strength.

NOTICE

Combining male and female fasteners with different thread pitches will damage both fasteners.
It is important to note that, even when the nominal diameter (1) of the threads is the same, JIS-defined and ISO-defined fasteners may be different in thread pitch (2) or width across flats (3). Refer to the following table for these differences.
Before installing a fastener, check it for correct thread pitch and then, screw it in or on the mating fastener by hand. If the fastener is too tight to turn by hand, its thread pitch may be different from that of the mating fastener.

JIS-TO-ISO main fasteners comparison table

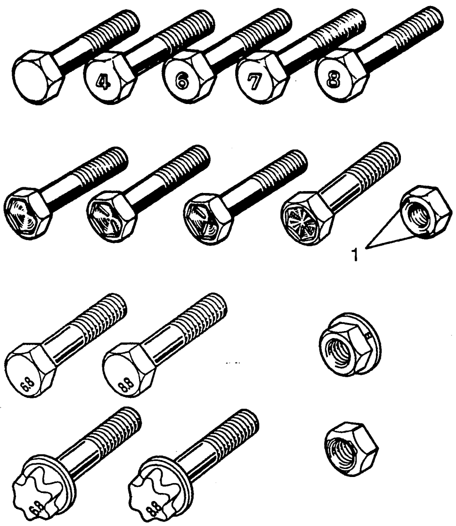
		Nominal diameter				
		M6	**M8**	**M10**	**M12**	**M14**
JIS	Thread pitch	1.0	1.25	1.25	1.25	1.5
	Width across flats	10	12	14	17	19
ISO	Thread pitch	1.0	1.25	1.5	1.5	1.5
	Width across flats	10	13	16	18	21



IE31J1030001-02

Fastener Strength Identification

Most commonly used strength classes of metric fasteners are 4T, 6.8, 7T and 8.8. Strength class is indicated by a number or radial line(s) embossed on the head of each bolt. Some metric nuts have a punched number, 6 or 8 on their end surfaces. Figure shows different strength markings.
When replacing metric fasteners, use bolts and nuts of the same strength class as or higher class than the original bolts and nuts. It is also important to select replacement fasteners of the correct diameter and thread pitch. Correct replacement bolts and nuts are available as SUZUKI spare parts.
Metric bolts and nuts: Strength class numbers or marks (The larger the number, the greater the strength).



IE31J1030002-01

1. Nut strength identification

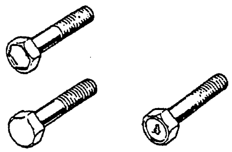
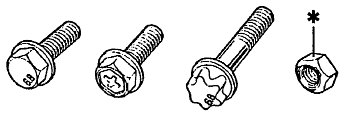
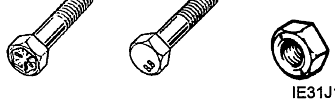
Standard Tightening Torques

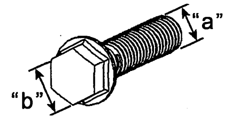
Each fastener should be tightened to the torque specified in each section. If no torque description or specification is provided in the relevant section, refer to the following tightening torque chart for the applicable torque for each fastener. When a fastener of greater strength than the original one is used, use the torque specified for the original fastener.

NOTE

- **For flanged bolts, flanged nuts and self-locking nuts of the 4T and 7T strength classes, add 10% to the applicable tightening torques given in the following chart.**
- **The following chart is applicable only where the fastened parts are made of steel or light alloy.**

Tightening torque chart

Strength	Unit	Thread diameter (Nominal diameter) (mm)								
		4	5	6	8	10	12	14	16	18
Fastener of strength class equivalent to 4T	N·m	1.5	3.0	5.5	13	29	45	65	105	160
	kgf-m	0.15	0.31	0.56	1.3	3.0	4.6	6.6	10.7	16.3
 IE31J1030003-01	lbf-ft	1.5	2.5	4.0	9.5	21.5	33.5	48.0	77.5	118.0
Fastener of strength class equivalent to 6.8	N·m	2.4	4.7	8.4	20	42	80	125	193	280
	kgf-m	0.24	0.48	0.86	2.0	4.3	8.2	12.7	19.7	28.6
 IE31J1030004-01	lbf-ft	2.0	3.5	6.5	15.0	31.0	59.0	92.5	142.5	206.5
Flanged fastener of strength class equivalent to 6.8	N·m	2.4	4.9	8.8	21	44	84	133	203	298
	kgf-m	0.24	0.50	0.90	2.1	4.5	8.6	13.6	20.7	30.4
*: Self-locking nut (6 strength)  IE31J1030005-01	lbf-ft	2.0	4.0	6.5	15.5	32.5	62.0	98.5	150.0	220.0
Fastener of strength class equivalent to 7T	N·m	2.3	4.5	10	23	50	85	135	210	240
	kgf-m	0.23	0.46	1.0	2.3	5.1	8.7	13.8	21.4	24.5
 IE31J1030006-01	lbf-ft	2.0	3.5	7.5	17.0	37.0	63.0	99.5	155.0	177.0
Fastener of strength class equivalent to 8.8 (bolt) or 8 (nut)	N·m	3.1	6.3	11	27	56	105	168	258	373
	kgf-m	0.32	0.64	1.1	2.8	5.7	10.7	17.1	26.3	38
 IE31J1030007-01	lbf-ft	2.5	5.0	8.5	20.0	41.5	77.5	124.0	190.5	275.5
Flanged fastener of strength class equivalent to 8.8 (bolt) or 8 (nut)	N·m	3.2	6.5	12	29	59	113	175	270	395
	kgf-m	0.33	0.66	1.2	3.0	6.0	11.5	17.8	27.5	40.3
	lbf-ft	2.5	5.0	9.0	21.5	43.5	83.5	129.0	199.5	291.5

Small crown shape bolt	Width across flats "b" [mm]	Thread diameter "a" [mm]	Unit		
			N·m	kgf-m	lbf-ft
 ID26J1030004-01	7	5	4.5	0.46	3.5
	8	6	10	1.0	7.5

***: Self-locking nut**

Special Tools and Equipment

Fuel / Oil / Fluid / Coolant Recommendation

BENJ18K60308001

Fuel

NOTICE

Do not use leaded gasoline. If it is used, the engine and the emission control system will be damaged.

For U.S.A. and Canada

Use unleaded gasoline with an octane rating of 87 AKI or higher.
Unleaded gasoline containing up to 15% MTBE by volume may be used.
Unleaded gasoline containing up to 10% ethanol by volume may be used.
Unleaded gasoline containing up to 5% methanol by volume may be used if it contains appropriate co-solvents and corrosion inhibitors.

For other countries

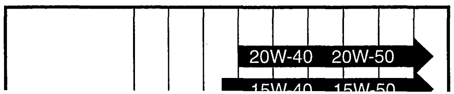
Use unleaded gasoline with an octane rating of 91 RON or higher.

Engine Oil

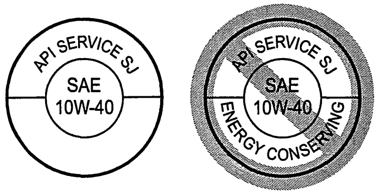
Use engine oils which meet the following requirements.

	Engine oil
API service classification	SG, SH, SJ or SL
JASO T903 standard	MA
Viscosity	SAE 10W-40

If SAE 10W-40 engine oils are not available, select oils of an appropriate viscosity grade according to the following chart.



Suzuki does not recommend the use of engine oil which have an "ENERGY CONSERVING" indication in the API service symbol for any of its motorcycles / ATVs.
It can affect the engine life and the clutch performance.



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For U.S.A. and Canada

Suzuki recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL.

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.

Engine Coolant

Suzuki recommends the use of SUZUKI LONG LIFE COOLANT or SUZUKI SUPER LONG LIFE COOLANT.

For SUZUKI LONG LIFE COOLANT

NOTICE

- **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.)**

The 50:50 mixture of distilled water and ethylene glycol anti-freeze 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

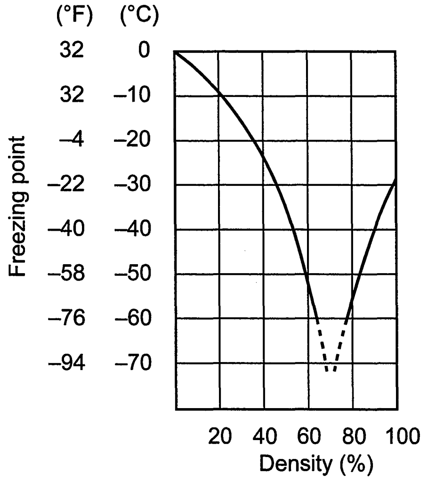

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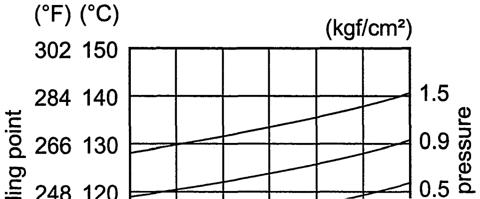
Fig.2: Engine coolant density-boiling point curve



For SUZUKI SUPER LONG LIFE COOLANT

NOTICE

- **Ethanol or methanol base coolant or water alone should not be used in cooling system at any time as damage to cooling system could occur.**
- **Do not mix the distilled water, SUZUKI LONG LIFE COOLANT (coolant color: Green) or equivalent.**

SUZUKI SUPER LONG LIFE COOLANT will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above –36 °C (–33 °F).

Anti-freeze concentration table

Anti-freeze density	Freezing point
50%	–36 °C (–33 °F)

Water for mixing

Use distilled water only. Water other than distilled water can corrode and clog the aluminum radiator.
For engine coolant mixture information, refer to “Engine Coolant” (Page 0C-13).

NOTICE

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 inhabiting performance is greatly reduced. Be sure to mix it above 50% even though the atmospheric temperature does not go down to the freezing point.

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.

Front Fork Oil

Use SUZUKI FORK OIL SS-8.

Fork oil 99000–99001–SA8 (SUZUKI FORK OIL SS-8)

Special Tool

BENJ18K60308002

NOTE

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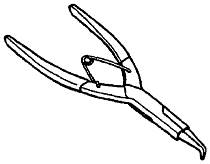
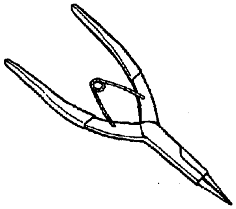
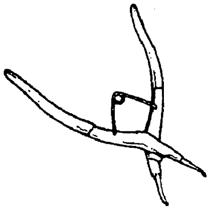
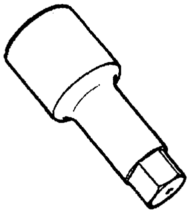
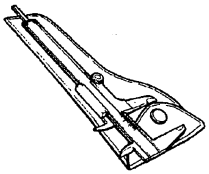
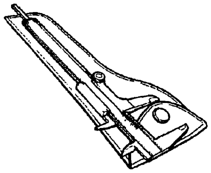
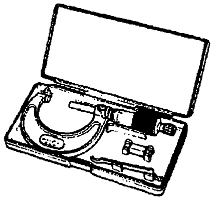
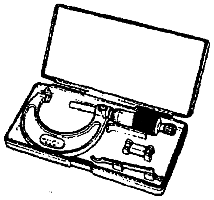
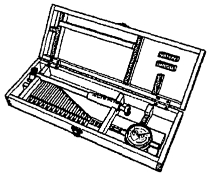
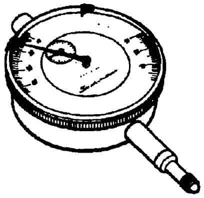
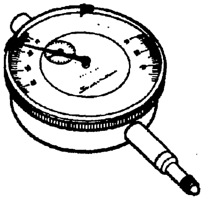
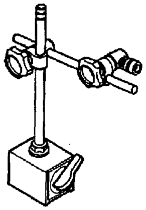
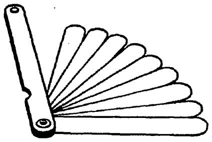
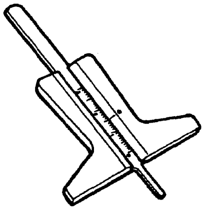
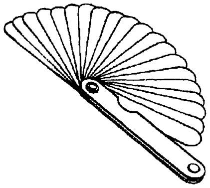
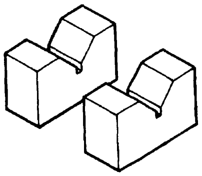
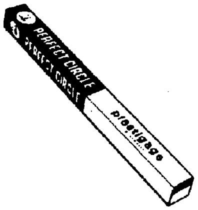
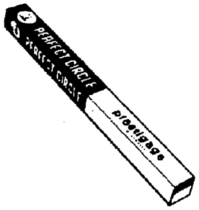
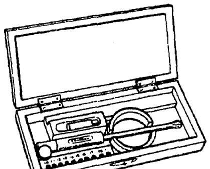
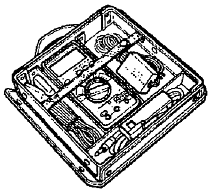
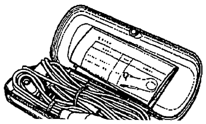
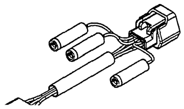
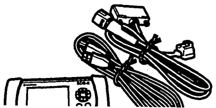
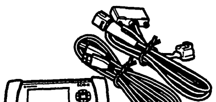
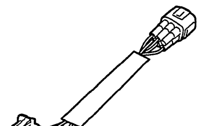
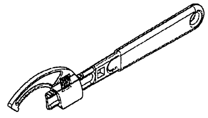
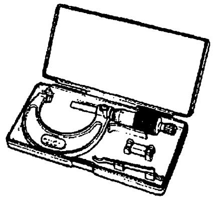
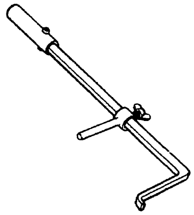
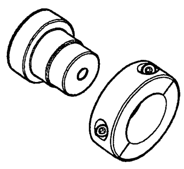
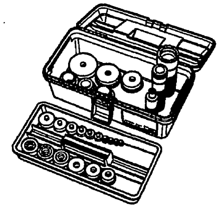
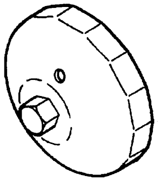
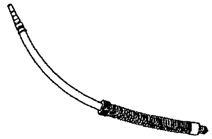
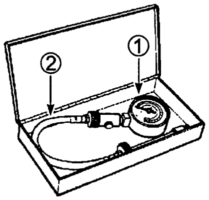
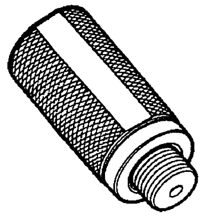
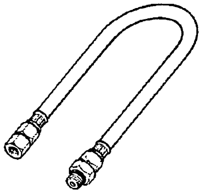
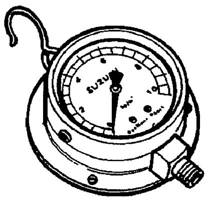
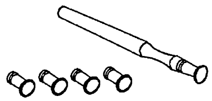
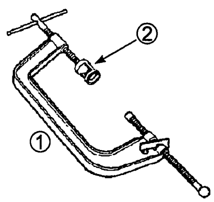
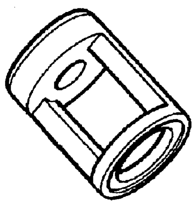
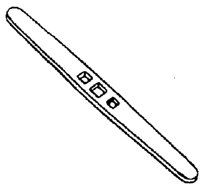
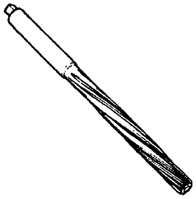
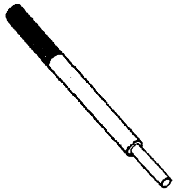
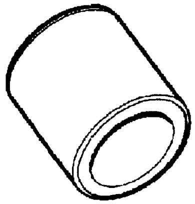
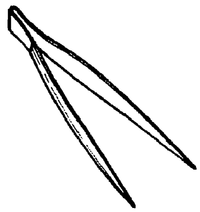
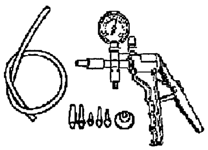
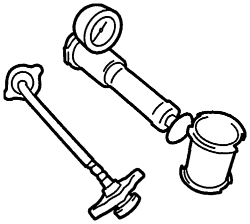
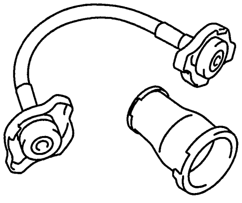
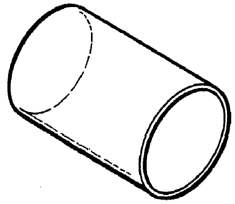
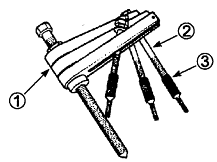
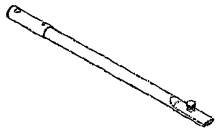
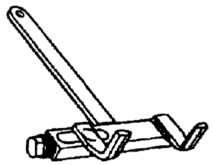
 **09900–06104** Snap ring pliers (External: Bent nose)	 **09900–06107** Snap ring pliers (External)	 **09900–06108** Snap ring pliers (Internal)	 **09900–18710** Hexagon bit socket (12 mm: 1/2 sq.)	 **09900–20101** Vernier calipers (150 mm)
 **09900–20102** Vernier calipers (200 mm)	 **09900–20202** Micrometer (25 - 50 mm)	 **09900–20204** Micrometer (75 - 100 mm)	 **09900–20530** Cylinder gauge set	 **09900–20602** Dial gauge (1 x 0.001 mm)
 **09900–20607** Dial gauge (10 x 0.01 mm)	 **09900–20701** Dial gauge chuck	 **09900–20803** Thickness gauge	 **09900–20805** Tire depth gauge	 **09900–20806** Thickness gauge
 **09900–21304** V blocks	 **09900–22301** Plastigage (0.025 - 0.076 mm)	 **09900–22302** Plastigage (0.051 - 0.152 mm)	 **09900–22403** Small bore gauge (18 - 35 mm)	 **09900–25008** Multi circuit tester set
				

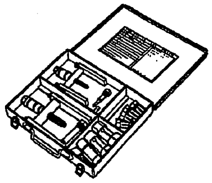
 **09910–60620** Adjustable wrench	 **09912–66310** Micrometer (0 - 25 mm)	 **09913–50121** Oil seal remover	 **09913–60221** Journal bearing installer / holder set	 **09913–70210** Bearing installer set
 **09915–40620** Oil filter wrench	 **09915–63311** Compression gauge adapter	 **09915–64512** Compression gauge set (2500 kPa)	 **09915–70610** Oil pressure gauge attachment	 **09915–74521** Oil pressure gauge hose
 **09915–77331** Oil pressure gauge (1000 kPa)	 **09916–10911** Valve lapper set	 **09916–14510** Valve lifter	 **09916–14522** Valve lifter attachment	 **09916–33210** Valve guide reamer (ø4.5)
 **09916–34542** Reamer handle	 **09916–34580** Valve guide reamer (ø10.8)	 **09916–43211** Valve guide installer / remover	 **09916–53330** Valve guide installer attachment	 **09916–84511** Tweezers
 **09917–47011** Vacuum pump gauge set	 **09918–78211** Radiator cap tester kit	 **09918–78220** Radiator cap tester adapter	 **09919–28620** Sleeve protector	 **09920–13120** Crankcase separator



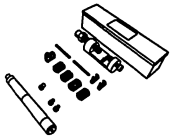
09920–31020
Extension handle



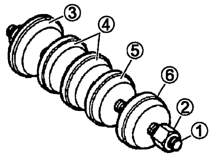
09920–53740
Clutch sleeve hub holder



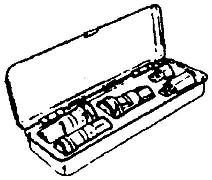
09921–20240
Bearing remover set



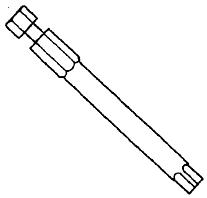
09922–22712
Drive chain cut / rivet tool set



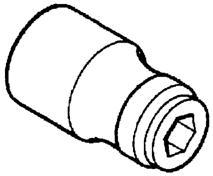
09924–84510
Bearing installer set



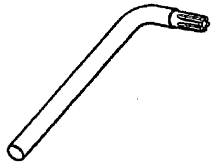
09930–10121
Spark plug socket set



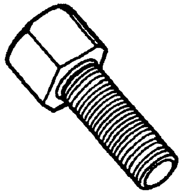
09930–11920
Torx® bit (JT40H)



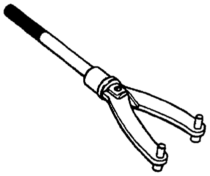
09930–11940
Torx® bit holder (3/8 sq.)



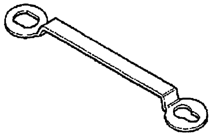
09930–11950
Torx® wrench (T25H)



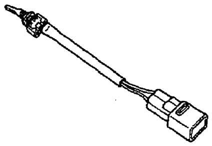
09930–30450
Rotor remover bolt



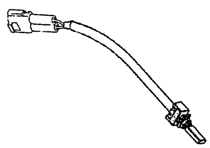
09930–40113
Rotor holder



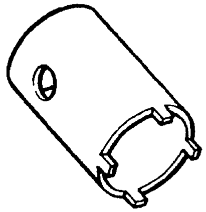
09930–44530
Rotor holder



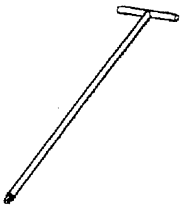
09930–82720
Mode selection switch



09930–82760
Mode selection switch

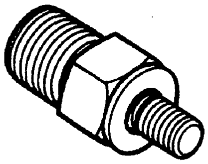


09940–14911
Steering stem nut socket

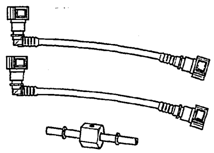


09940–34520
T-handle (Long shank: 3/8 sq.)

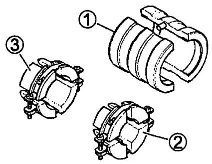
09940–34531
Front fork assembling attachment (A)



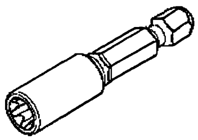
09940–40211
Fuel pressure gauge adapter



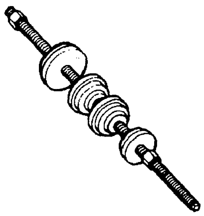
09940–40220
Fuel pressure gauge attachment



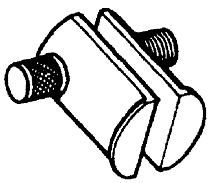
09940–52861
Front fork oil seal installer set



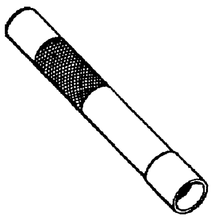
09940–63110
Torx® bit (E8)



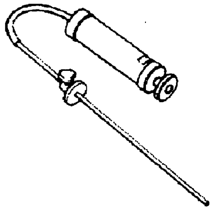
09941–34513
Bearing installer set



09941–54911
Bearing outer race



09941–74911
Steering stem bearing



09943–74111
Front fork oil level

Section 1

Engine

CONTENTS

1

Precautions

Precautions for Engine

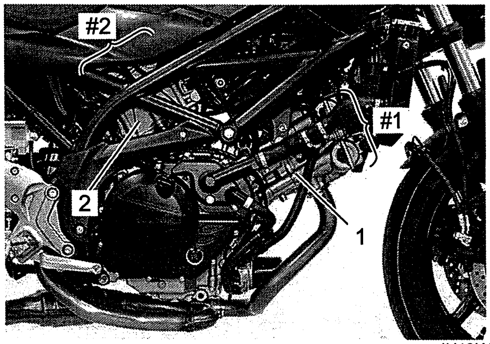
BENJ18K61000001

Refer to “General Precautions” in Section 00 (Page 00-1), “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2) and “Precautions for Circuit Tester” in Section 00 (Page 00-7).

Precautions for Identification

BENJ18K61000002

When viewed from the state in sitting on the seat, the front cylinder (1) is distinguished as No. 1 cylinder, and the rear cylinder (2) is as No. 2 cylinder.
The sensor, actuator or the like for the front cylinder are distinguished as #1, and the ones for the rear cylinder are as #2.



IH18K1100001-02

DTC Names and The Terms That Are Used In The Service Manual

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

The comparison with the terms used in DTC name and this service manual are shown in the table below.

DTC name	Term in the service manual
CKP Sensor "A" Circuit	CKP Sensor
ECT Sensor Circuit	ECT Sensor
ECT Sensor Circuit Low	
EVAP System Purge Control Valve Circuit	EVAP System Purge Control Solenoid Valve
EVAP System Vent Valve / Solenoid Circuit	
Fan 1 Control Circuit	Cooling Fan
FP Primary Circuit	Fuel Pump
FP Secondary Circuit Low	
GP Sensor Circuit	GP Switch
HO2 Sensor Heater Control Circuit Bank 1 Sensor 1	HO2 Sensor
HO2 Sensor Heater Control Circuit High Bank 1 Sensor 1	
IAP Sensor Circuit	IAP Sensor #1
IAP Sensor Circuit Low	
IAP Sensor Circuit Range / Performance	
IAP Sensor 2 Circuit	IAP Sensor #2
IAP Sensor 2 Circuit Low	
IAP Sensor 2 Circuit Range / Performance	
IAT Sensor 1 Circuit	IAT Sensor
IAT Sensor 1 Circuit Low	
Ignition Coil "A" Primary / Secondary Circuit	Ignition Coil #1
Ignition Coil "B" Primary / Secondary Circuit	Ignition Coil #2
Ignition Switch Signal Circuit	Ignition Switch
Injector Circuit / Open – Cylinder 1	Fuel Injector #1
Injector Circuit / Open – Cylinder 2	Fuel Injector #2
ISC System RPM Higher Than Expected	ISC Valve
ISC System RPM Lower Than Expected	
O2 Sensor Circuit Bank 1 Sensor 1	HO2 Sensor
O2 Sensor Circuit High Voltage Bank 1 Sensor 1	
O2 Sensor Circuit Low Voltage Bank 1 Sensor 1	
PAIR System Control "A" Circuit	PAIR Control Solenoid Valve
PAIR System Control "A" Circuit High	
Throttle Actuator "A" Control Motor Circuit	STVA
TO Sensor Circuit	TO Sensor
TO Sensor Circuit Low	
TP Sensor / Switch "A" Circuit	TP Sensor
TP Sensor / Switch "A" Circuit High	
TP Sensor / Switch "B" Circuit	STP Sensor
TP Sensor / Switch "B" Circuit Low	
Vehicle Speed Sensor "A"	• Speed Sensor (Without ABS) • Front Wheel Speed Sensor (With ABS)

Engine General Information and Diagnosis

Precautions

Precautions for DTC Trouble Shooting

BENJ18K61100001

Refer to “General Precautions” in Section 00 (Page 00-1), “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2) and “Precautions for Circuit Tester” in Section 00 (Page 00-7).

NOTE

After repairing the trouble, clear the DTC using the special tool. ☞(Page 1A-15)

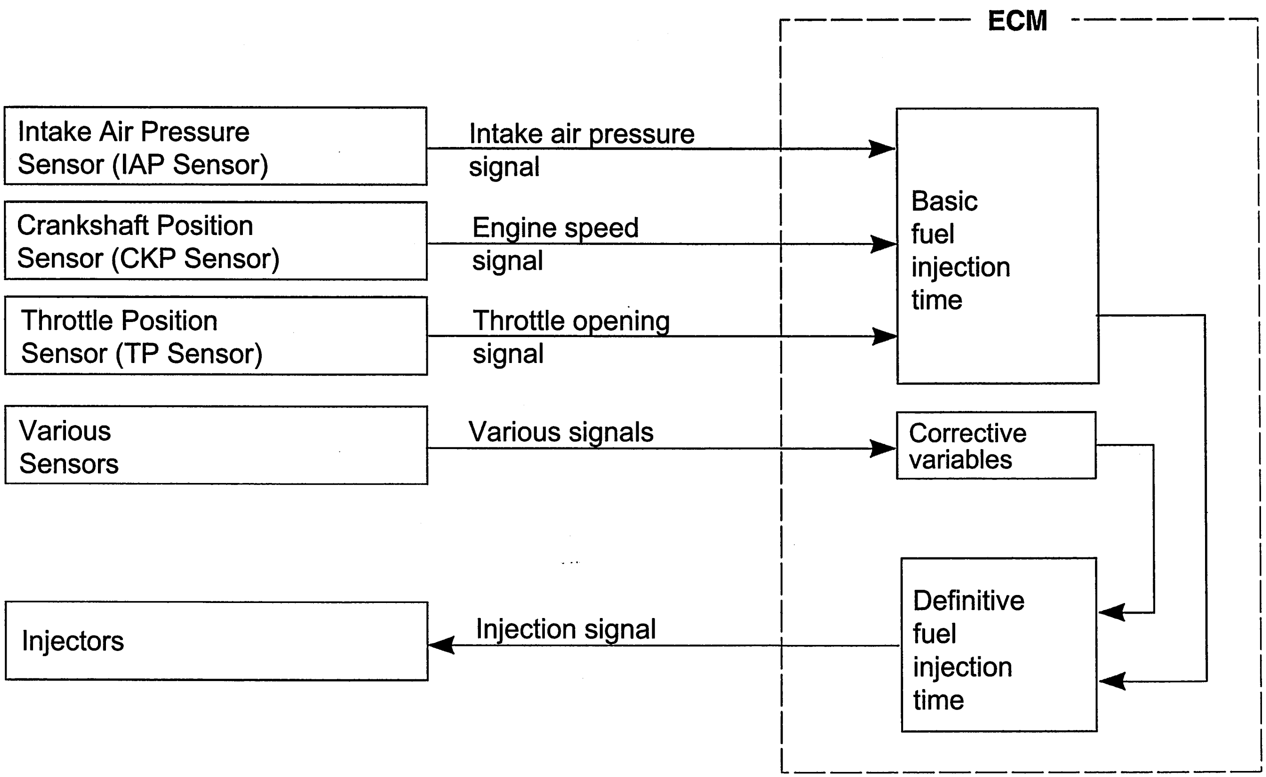
General Description

Injection Timing Description

BENJ18K61101001

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
ECT sensor signal	When engine coolant temperature is low, injection time (volume) is increased.
IAT sensor signal	When intake air temperature is low, injection time (volume) is increased.
HO2 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
TO sensor signal	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	When actual engine speed reaches a programmed maximum, the fuel injection pulses are suppressed.

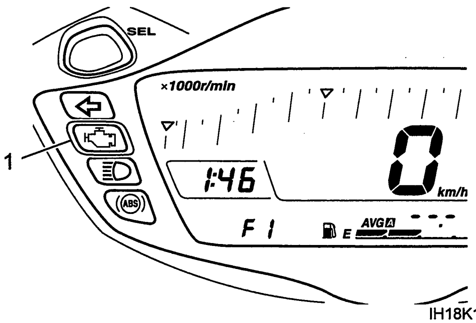
Self-Diagnosis Function

BENJ18K61101002

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 (MIL). 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.

Warning Function

The ECM warns riders to turn the MIL (1) on or blink it depending on the failure place or its content.
And the ECM turns the MIL off when detecting 3 D/C-correct continuously after detecting the first abnormality.
The ECM erases the registered failure data when not detecting the same one during 40 times of warm up cycle after turning MIL on.



IH18K1110066-01

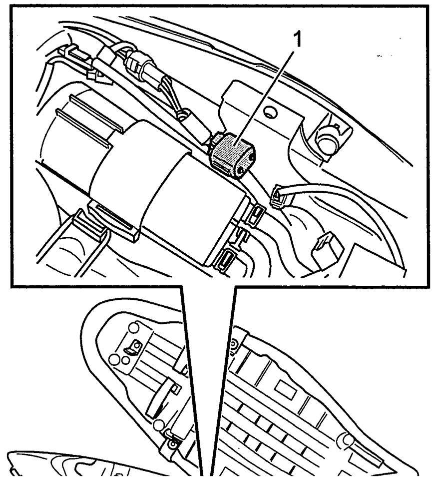
Supplementation

- The driving cycle (D/C) means the cycle beginning from turning the ignition switch ON through starting the engine until turning the ignition switch OFF. The 3 driving cycles are the term repeating 3 times of the above mentioned cycle.
- The warm up cycle means the cycle of engine warm up operation that the engine coolant temperature reaches more than 71 °C (159.8 °F) and also rises more than 22.5 °C (72.5 °F) from the one at engine starting.

Diagnostic coupler location

Mode select coupler (6P) (1) is located under the seat. This coupler can use SDS tool and OBD conversion cable.

Special tool
09904–41051



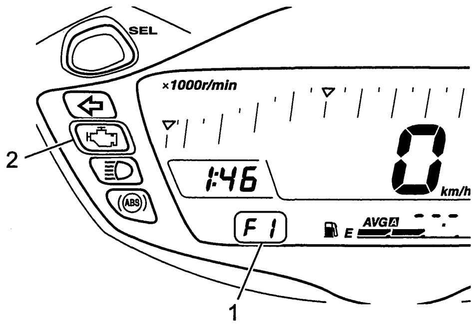
User Mode

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

***1**
Current letter displayed any one of the odometer, tripmeter A or tripmeter B.
***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, #1 and #2 ignition signals, #1 and #2 fuel 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 3 seconds or more.
For Example:
The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the combination meter 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 combination meter couplers.
The possible cause of this indication is as follows:
Engine stop switch is in OFF position. Starter interlock system is not working. Ignition fuse is burnt.

NOTE

The MIL (2) turns ON about 3 seconds after turning the ignition switch ON.



IF04K1110001-02

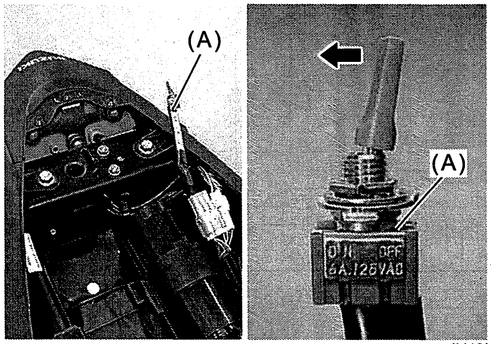
Dealer Mode

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.

NOTE

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

Special tool
(A): 09930–82720



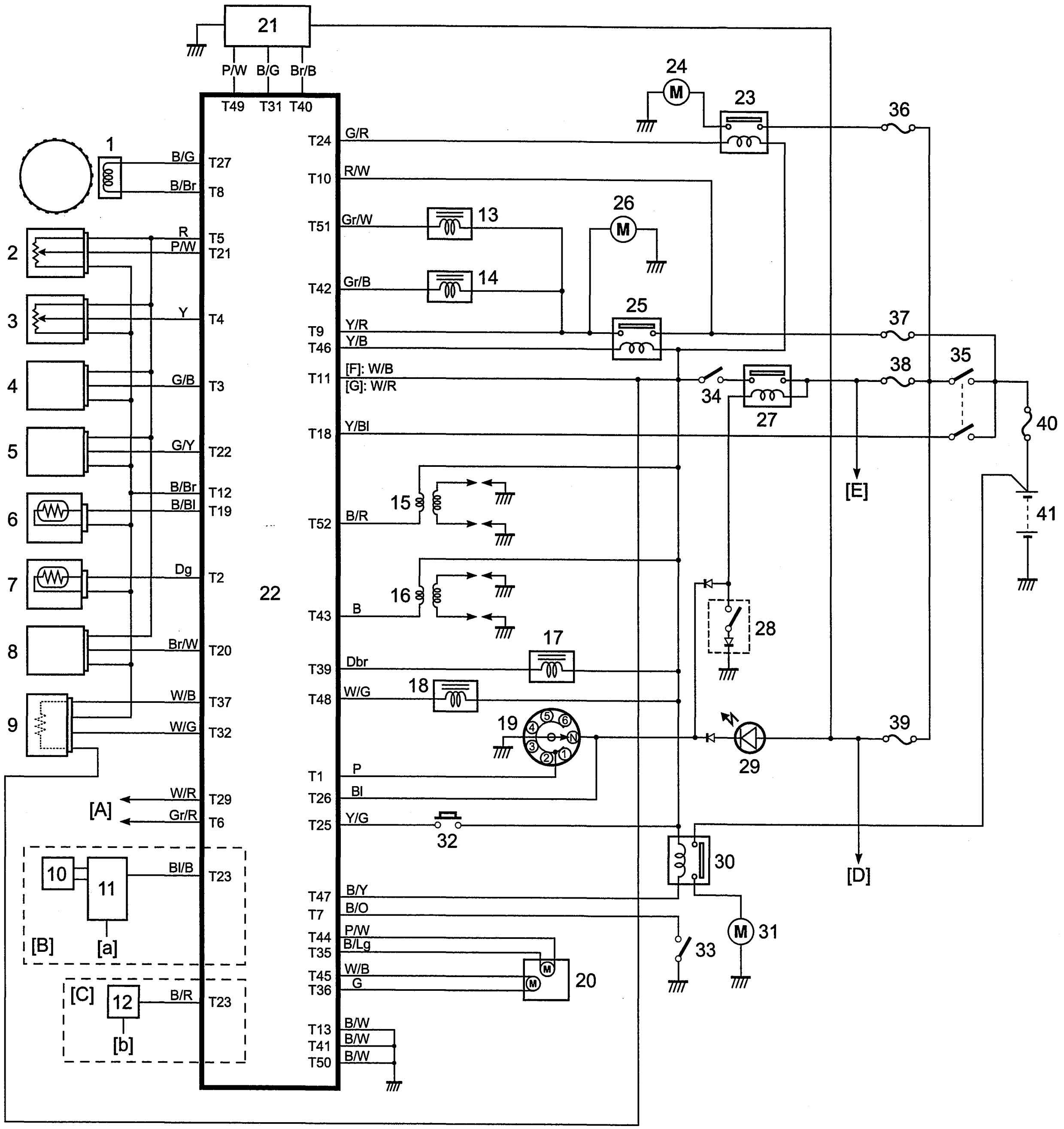
IH18K1110001-01

IH18K1110002-01

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

FI System Wiring Diagram

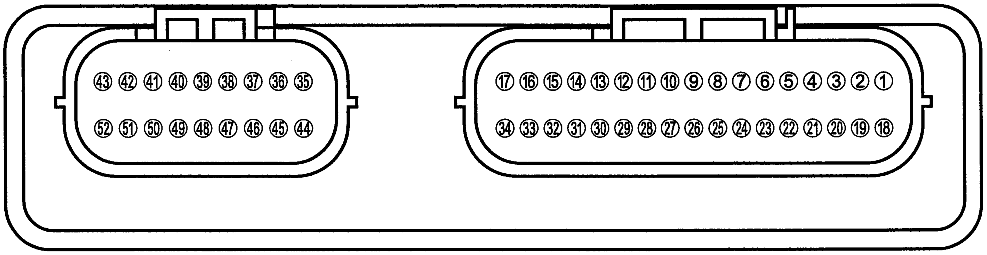
BENJ18K61102001



IH18K1110003-01

[A]: To mode select coupler (6P)	10. Front wheel speed sensor	26. Fuel pump
[B]: With ABS	11. ABS control unit	27. Side-stand relay
[C]: Without ABS	12. Speed sensor	28. Side-stand switch
[D]: To [a]	13. Fuel injector #1	29. Neutral indicator light
[E]: To [b]	14. Fuel injector #2	30. Starter relay
[F]: For U.K., E.U. and Australia	15. Ignition coil #1	31. Starter motor
[G]: Except for U.K., E.U. and Australia	16. Ignition coil #2	32. Starter switch
1. CKP sensor	17. EVAP system purge control solenoid valve (If equipped)	33. Clutch lever position switch
2. TP sensor	18. PAIR control solenoid valve (If equipped)	34. Engine stop switch
3. STP sensor	19. GP switch	35. Ignition switch
4. IAP sensor #1	20. STV actuator	36. Fan fuse (15 A)
5. IAP sensor #2	21. Combination meter	37. Fuel fuse (10 A)
6. ECT sensor	22. ECM	38. Ignition fuse (15 A)
7. IAT sensor	23. Cooling fan relay	39. Signal fuse (15 A)
8. TO sensor	24. Cooling fan motor	40. Main fuse (30 A)
9. HO2 sensor	25. Fuel pump relay	41. Battery

Terminal Arrangement of ECM Connector "T"



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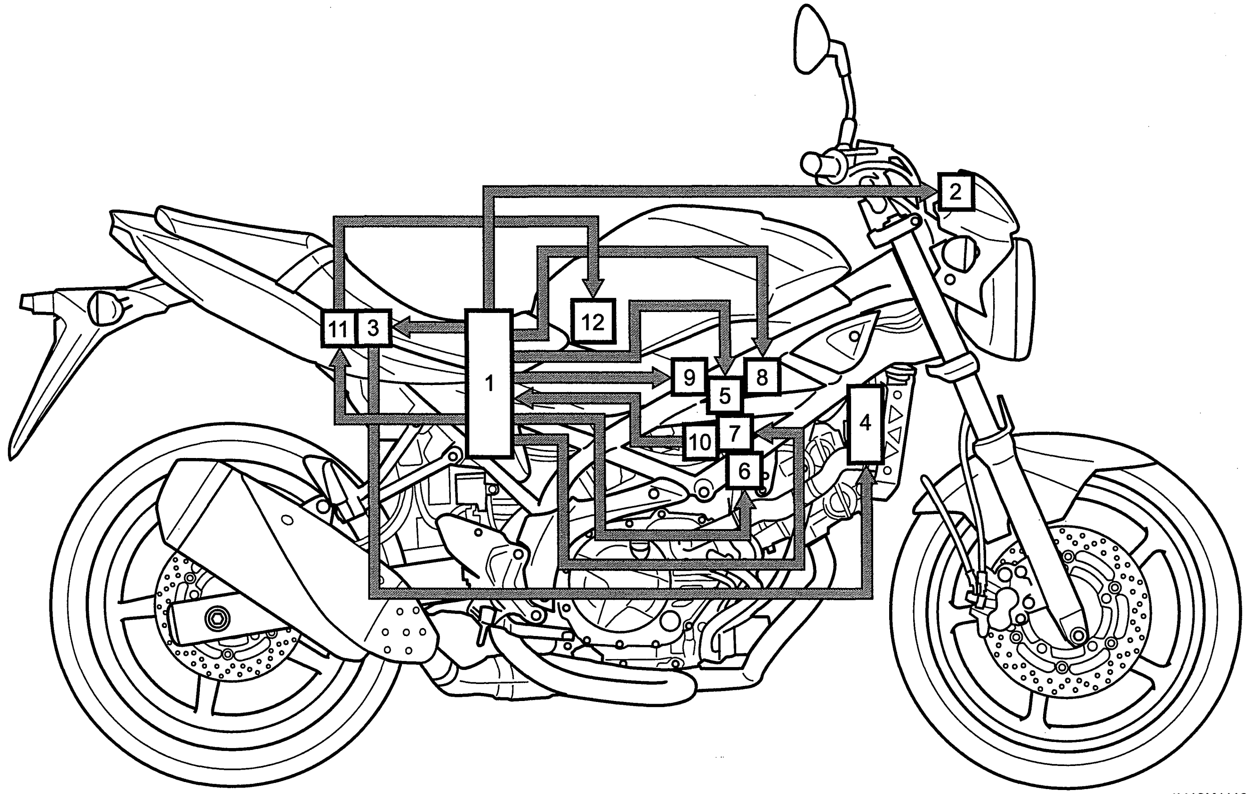
TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
T1	GP switch signal	T27	CKP sensor signal (CKP+)
T2	IAT sensor signal	T28	—
T3	IAP sensor #1 signal	T29	Mode select switch
T4	STP sensor signal	T30	—
T5	Power source for sensors	T31	Serial data for combination meter
T6	Serial data for self-diagnosis	T32	HO2 sensor signal
T7	Clutch lever position switch	T33	—
T8	CKP sensor signal (CKP–)	T34	—
T9	Power source for battery monitor	T35	STVA signal (STVA, 1B)
T10	Power source for back-up	T36	STVA signal (STVA, 2B)
T11	Power source	T37	HO2 sensor heater
T12	Sensor ground (E2)	T38	—
T13	ECM ground (E1)	T39	EVAP system purge control solenoid valve (If equipped)
T14	—	T40	Tachometer
T15	—	T41	General power ground (E01)
T16	—	T42	Fuel injector #2
T17	—	T43	Ignition coil #2
T18	Ignition switch signal	T44	STVA signal (STVA, 1A)
T19	ECT sensor signal	T45	STVA signal (STVA, 2A)
T20	TO sensor signal	T46	Fuel pump relay
T21	TP sensor signal	T47	Starter motor relay
T22	IAP sensor #2 signal	T48	PAIR control solenoid valve (If equipped)

Component Location

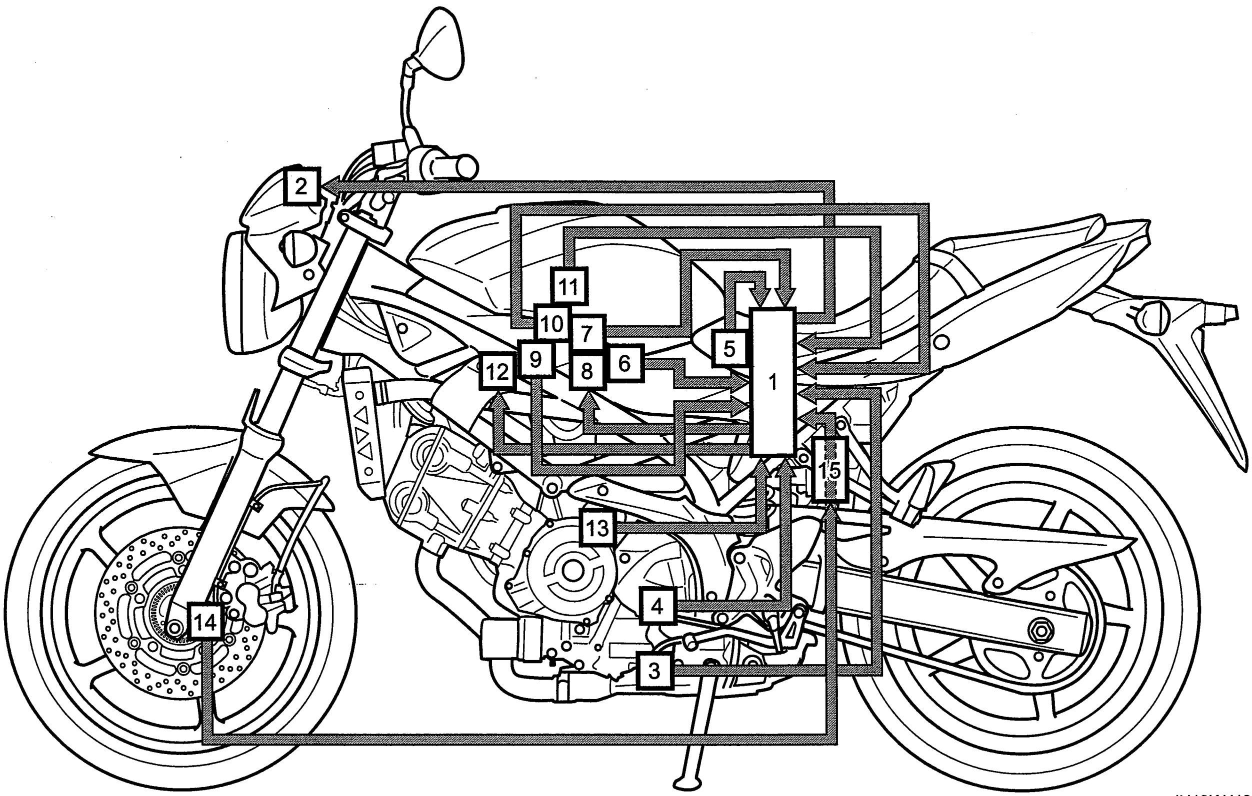
FI System Component Location

BENJ18K61103001



IH18K1110004-01

1. ECM	5. PAIR control solenoid valve (If equipped)	9. Fuel injector #2
2. Combination meter	6. Ignition coil #1	10. ECT sensor
3. Cooling fan relay	7. Ignition coil #2	11. Fuel pump relay
4. Cooling fan motor	8. Fuel injector #1	12. Fuel pump



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1. ECM	6. TP sensor	11. IAT sensor
2. Combination meter	7. STP sensor	12. EVAP system purge control solenoid valve (If equipped)
3. HO2 sensor	8. STV actuator	13. CKP sensor
4. GP switch	9. IAP sensor #1	14. Front wheel speed sensor (With ABS) or Speed sensor (Without ABS)
5. TO sensor	10. IAP sensor #2	15. ABS control unit (With ABS)

Diagnostic Information and Procedures

Engine Symptom Diagnosis

BENJ18K61104001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (Compression too low)	Valve clearance out of adjustment.	*Adjust. ☞(Page 1D-32)*
	Worn valve guides or poor seating of valves.	*Repair or replace. ☞(Page 1D-55)*
	Mistimed valves.	*Adjust. ☞(Page 1D-32)*
	Excessively worn piston rings.	*Replace. ☞(Page 1D-57)*
	Worn-down cylinder bores.	*Replace. ☞(Page 1D-42) ☞(Page 1D-44)*
	Too slow starter motor cranking.	*Repair or replace. ☞(Page 1I-4) ☞(Page 1I-5)*
	Poor seating of spark plugs.	*Retighten. ☞(Page 1H-7)*
Engine will not start or is hard to start (Plug not sparking)	Defective spark plugs.	*Replace. ☞(Page 1H-7)*
	Too wide spark plug gap.	*Adjust or replace. ☞(Page 1H-8)*
	Fouled spark plugs.	*Clean or replace. ☞(Page 1H-8)*
	Wet spark plugs.	*Dry or replace. ☞(Page 1H-8)*
	Defective spark plug caps.	*Replace. ☞(Page 1H-7)*
	Defective ignition coils.	*Replace. ☞(Page 1H-9)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Open-circuited wiring connections.	*Repair or replace.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Open or short in high-tension cords.	*Replace. ☞(Page 1H-9)*
Engine will not start or is hard to start (No fuel reaching the intake port)	Clogged fuel filter or fuel hose.	*Clean or replace.* • *Fuel filter: ☞(Page 1G-15)* • *Fuel hose: ☞(Page 1G-7)*
	Defective fuel pump.	*Replace. ☞(Page 1G-13)*
	Defective fuel pressure regulator.	*Replace. ☞(Page 1G-13)*
	Defective fuel injectors.	*Replace. ☞(Page 1G-16)*
	Defective fuel pump relay.	*Replace. ☞(Page 1G-16)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Open-circuited wiring connections.	*Repair and replace.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
Engine will not start or is hard to start (Incorrect fuel/air mixture)	TP sensor out of adjustment.	*Adjust. ☞(Page 1C-7)*
	Defective fuel pump.	*Replace. ☞(Page 1G-13)*
	Defective fuel pressure regulator.	*Replace. ☞(Page 1G-13)*
	Defective TP sensor.	*Replace. ☞(Page 1C-7)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective IAP sensor.	*Replace. ☞(Page 1C-5)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Defective ECT sensor.	*Replace. ☞(Page 1C-6)*

Condition	Possible cause	Correction / Reference Item
Engine idles poorly	Valve clearance out of adjustment.	*Adjust. ☞(Page 1D-32)*
	Poor seating of valves.	*Repair. ☞(Page 1D-53)*
	Defective valve guides.	*Replace. ☞(Page 1D-55)*
	Worn down camshafts and/or camshafts surface.	*Replace. ☞(Page 1D-19) ☞(Page 1D-21)*
	Too wide spark plug gaps.	*Adjust or replace. ☞(Page 1H-8)*
	Defective ignition coils.	*Replace. ☞(Page 1H-9)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Defective TP sensor.	*Replace. ☞(Page 1C-7)*
	Defective fuel pump.	*Replace. ☞(Page 1G-13)*
	Imbalanced throttle valve.	*Adjust. ☞(Page 1D-15)*
	Damaged or cracked vacuum hose.	*Replace.*
	Damaged or clogged ISC valve.	*Clean or replace. ☞(Page 1D-14)*
	Dirty throttle body.	*Clean. ☞(Page 1D-14)*
	ISC incorrect leaning.	*Reset learned value. ☞(Page 1C-3)*
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	*Repair or replace. ☞(Page 1C-4)*
	Clogged fuel filter.	*Clean or replace. ☞(Page 1G-15)*
	Defective fuel pump.	*Replace. ☞(Page 1G-13)*
	Defective fuel pressure regulator.	*Replace. ☞(Page 1G-13)*
	Defective ECT sensor.	*Replace. ☞(Page 1C-6)*
	Defective thermostat.	*Replace. ☞(Page 1F-12)*
	Defective IAT sensor.	*Replace. ☞(Page 1C-5)*
	Damaged or cracked vacuum hose.	*Replace.*
	Damaged or clogged ISC valve.	*Clean or replace. ☞(Page 1D-14)*
Engine stalls often (Fuel injector improperly operating)	Defective fuel injectors.	*Replace. ☞(Page 1G-16)*
	No injection signal from ECM.	*Repair or replace. ☞(Page 1A-34) ☞(Page 1A-36)*
	Open or short circuited wiring connection.	*Repair or replace.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Defective battery or low battery voltage.	*Replace or recharge. ☞(Page 1J-10)*
Engine stalls often (Control circuit or sensor improperly operating)	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Defective fuel pressure regulator.	*Replace. ☞(Page 1G-13)*
	Defective TP sensor.	*Replace. ☞(Page 1C-7)*
	Defective IAT sensor.	*Replace. ☞(Page 1C-5)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ECT sensor.	*Replace. ☞(Page 1C-6)*
	Defective fuel pump relay.	*Replace. ☞(Page 1G-16)*
	Defective ISC valve.	*Replace. ☞(Page 1D-10)*
	ISC incorrect learning.	*Reset learned value. ☞(Page 1C-3)*
Engine stalls often (Engine internal parts improperly operating)	Fouled spark plugs.	*Clean or replace. ☞(Page 1H-8)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Clogged fuel hose.	*Clean or replace. ☞(Page 1G-7)*
	Valve clearance out of adjustment.	*Adjust. ☞(Page 1D-32)*

Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from piston)	Worn down pistons.	*Replace. ☞(Page 1D-56)*
	Worn down cylinders.	*Replace. ☞(Page 1D-42) ☞(Page 1D-44)*
	Combustion chamber fouled with carbon.	*Clean. ☞(Page 1D-55)*
	Worn piston pins or piston pin bores.	*Replace. ☞(Page 1D-56)*
	Worn piston rings or ring grooves.	*Replace. ☞(Page 1D-57)*
Noisy engine (Noise seems to come from cam chain)	Stretched cam chain.	*Replace. ☞(Page 1D-60)*
	Worn sprockets.	*Replace. ☞(Page 1D-19) ☞(Page 1D-21) ☞(Page 1D-60) ☞(Page 1D-73)*
	Cam chain tension adjuster not working.	*Repair or replace. ☞(Page 1D-31)*
Noisy engine (Noise seems to come from crankshaft)	Rattling bearing due to wear.	*Replace. ☞(Page 1D-70) ☞(Page 1D-71)*
	Worn or burnt conrod crank pin bearings.	*Replace. ☞(Page 1D-73)*
	Worn or burnt journal bearings.	*Replace. ☞(Page 1D-67)*
Noisy engine (Noise seems to come from water pump)	Too much play on pump shaft bearings.	*Replace. ☞(Page 1F-15)*
	Worn or damaged impeller shaft.	*Replace. ☞(Page 1F-15)*
	Worn or damaged mechanical seal.	*Replace. ☞(Page 1F-15)*
	Contact between pump case and impeller.	*Replace. ☞(Page 1F-15)*
Engine runs poorly in high speed range (Defective engine internal/electrical parts)	Weakened valve springs.	*Replace. ☞(Page 1D-49)*
	Worn camshafts.	*Replace. ☞(Page 1D-19) ☞(Page 1D-21)*
	Valve timing out of adjustment.	*Adjust. ☞(Page 1D-32)*
	Too narrow spark plug gaps.	*Adjust or replace. ☞(Page 1H-8)*
	Ignition not advanced sufficiently due to poorly working timing advance circuit.	*Replace ECM. ☞(Page 1C-4)*
	Defective ignition coils.	*Replace. ☞(Page 1H-9)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Clogged air cleaner element.	*Replace. ☞(Page 1D-7)*
	Clogged fuel hose, resulting in inadequate fuel supply to injector.	*Clean and prime.*
	Defective fuel pump.	*Replace. ☞(Page 1G-13)*
	Defective TP sensor.	*Replace. ☞(Page 1C-7)*
	Defective STP sensor.	*Replace. ☞(Page 1C-13)*
	Defective STVA.	*Replace. ☞(Page 1D-12)*
Engine runs poorly in high speed range (Defective air flow system)	Clogged air cleaner element.	*Replace. ☞(Page 1D-7)*
	Defective throttle valve.	*Adjust and replace. ☞(Page 1D-10)*
	Defective secondary throttle valve.	*Adjust and replace. ☞(Page 1D-10)*
	Sucking air from throttle body joint or intake pipe joint.	*Retighten or replace. ☞(Page 1D-8) ☞(Page 1D-16)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Unbalancing throttle valve synchronization.	*Adjust. ☞(Page 1D-15)*
	Defective STP sensor.	*Replace. ☞(Page 1C-13)*
	Defective STVA.	*Replace. ☞(Page 1D-12)*

Condition	Possible cause	Correction / Reference Item
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace. ☞(Page 1G-7) ☞(Page 1G-13)*
	Defective TP sensor.	*Replace. ☞(Page 1C-7)*
	Defective IAT sensor.	*Replace. ☞(Page 1C-5)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective IAP sensor.	*Replace. ☞(Page 1C-5)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	TP sensor out of adjustment.	*Adjust. ☞(Page 1C-7)*
	Defective STP sensor.	*Replace. ☞(Page 1C-13)*
	Defective STVA.	*Replace. ☞(Page 1D-12)*
Engine lacks power (Defective engine internal/ electrical parts)	Loss of valve clearance.	*Adjust. ☞(Page 1D-32)*
	Weakened valve springs.	*Replace. ☞(Page 1D-49)*
	Valve timing out of adjustment.	*Adjust. ☞(Page 1D-32)*
	Worn piston rings or cylinders.	*Replace. ☞(Page 1D-57) ☞(Page 1D-42) ☞(Page 1D-44)*
	Poor seating of valves.	*Repair. ☞(Page 1D-53)*
	Fouled spark plugs.	*Clean or replace. ☞(Page 1H-8)*
	Incorrect spark plugs.	*Replace. ☞(Page 1H-7)*
	Clogged fuel injectors.	*Clean or replace. ☞(Page 1G-18)*
	Clogged air cleaner element.	*Replace. ☞(Page 1D-7)*
	Sucking air from throttle body joint or intake pipe joint.	*Retighten or replace. ☞(Page 1D-8) ☞(Page 1D-16)*
	Too much engine oil.	*Drain out excess oil.*
	Defective fuel pump.	*Replace. ☞(Page 1G-13)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ignition coils.	*Replace. ☞(Page 1H-9)*
	Defective STP sensor.	*Replace. ☞(Page 1C-13)*
	Defective STVA.	*Replace. ☞(Page 1D-12)*
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace. ☞(Page 1G-7) ☞(Page 1G-13)*
	Defective TP sensor.	*Replace. ☞(Page 1C-7)*
	Defective IAT sensor.	*Replace. ☞(Page 1C-5)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective IAP sensor.	*Replace. ☞(Page 1C-5)*
	TP sensor out of adjustment.	*Adjust. ☞(Page 1C-7)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Defective STP sensor.	*Replace. ☞(Page 1C-13)*
	Defective STVA.	*Replace. ☞(Page 1D-12)*
Engine overheats (Defective engine internal parts)	Heavy carbon deposit on piston crown.	*Clean.*
	Not enough oil in the engine.	*Add oil. ☞(Page 1E-5)*
	Defective oil pump or clogged oil circuit.	*Replace or clean. ☞(Page 1E-12)*
	Sucking air from throttle body joint or intake pipe joint.	*Retighten or replace. ☞(Page 1D-8) ☞(Page 1D-16)*
	Use of incorrect engine oil.	*Replace. ☞(Page 1E-5)*
	Defective cooling system.	*Refer to "Engine Cooling Symptom Diagnosis" in Section 1F (Page 1F-5)*

Condition	Possible cause	Correction / Reference Item
Engine overheats (Other factors)	Ignition timing is too advanced due to defective timing advance system (ECT sensor, CKP sensor or ECM).	*Replace.*
Dirty or heavy exhaust smoke	Too much engine oil.	*Drain out excess oil.*
	Worn piston rings or cylinders.	*Replace. ☞(Page 1D-57) ☞(Page 1D-42) ☞(Page 1D-44)*
	Worn valve guides.	*Replace. ☞(Page 1D-55)*
	Scored or scuffed cylinder walls.	*Replace. ☞(Page 1D-42) ☞(Page 1D-44)*
	Worn valve stems.	*Replace. ☞(Page 1D-49)*
	Defective stem seals.	*Replace. ☞(Page 1D-49)*
	Worn oil ring side rails.	*Replace. ☞(Page 1D-57)*

DTC Check

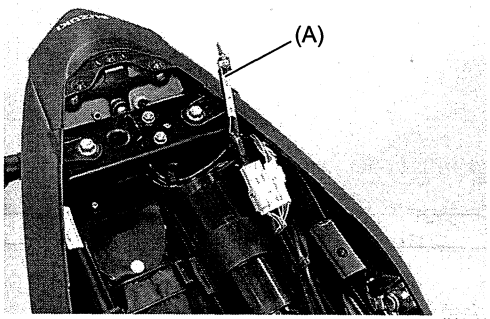
BENJ18K61104002

NOTE

- **Do not disconnect the coupler from ECM, battery cable from battery, ECM ground wire from engine or main fuse before confirming DTC stored in memory. Such disconnection will erase memorized information in ECM memory.**
- **Before checking DTC, read self-diagnosis function "User mode and dealer mode" ☞(Page 1A-3) carefully to have good understanding as to what functions are available and how to use it.**
- **DTC can be checked by using the SDS. Refer to the SDS operation manual for further details.**

1) Remove the seat. ☞(Page 9D-18)
2) Connect the special tool to the mode select coupler (6P) at the wiring harness.

Special tool
(A): 09930–82720



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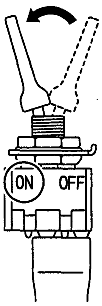
3) Start the engine or crank the engine for more than 4 seconds.
4) Turn the special tool's switch ON.



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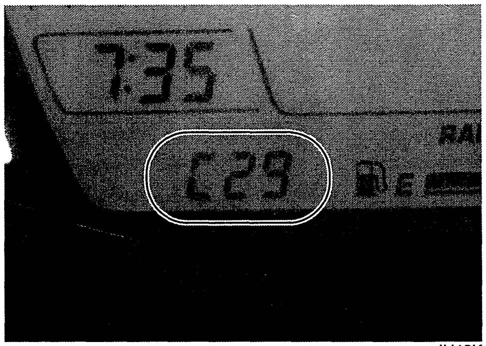
5) Check the DTC to determine the malfunction part. ☞(Page 1A-16)



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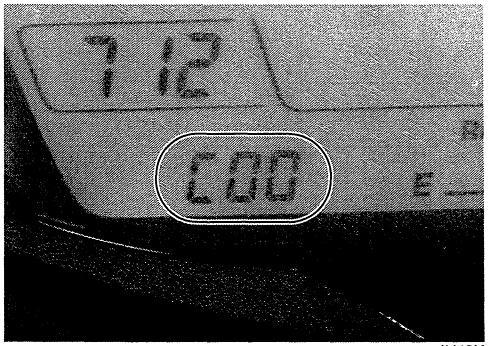
DTC Clearance

BENJ18K61104003

NOTE

- **The malfunction code is memorized in the ECM also when the lead wire coupler of any sensor is disconnected. Therefore, when a lead wire coupler has been disconnected in the diagnosis, erase the stored Past DTC.**
- **Past DTC can be erased by using the SDS. Refer to the SDS operation manual for further details.**

1) Connect the special tool and turn the special tool's switch ON. Refer to "DTC Check" (Page 1A-15).
2) After repairing the trouble, turn OFF the ignition switch and turn ON again.
3) If the DTC is indicated (C00), the malfunction is cleared.



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4) Disconnect the special tool and install the seat.

NOTE

Even though the Current DTC is cleared, Past

DTC Table

BENJ18K61104004

DTC		DTC name	DTC detecting condition
—	C00	None	—
P0030	C44	HO2 Sensor Heater Control Circuit Bank 1 Sensor 1 ☞(Page 1A-20)	HO2 sensor heater drive circuit is shorted to ground or open.
P0032		HO2 Sensor Heater Control Circuit High Bank 1 Sensor 1 ☞(Page 1A-20)	HO2 sensor heater drive circuit is shorted to power supply.
P0105	C17	IAP Sensor Circuit ☞(Page 1A-22)	The sensor output voltage is higher than 4.80 V.
P0106		IAP Sensor Circuit Range / Performance ☞(Page 1A-22)	The IAP sensor #1 vacuum hose has come off.
P0107		IAP Sensor Circuit Low ☞(Page 1A-22)	The sensor output voltage is lower than 0.10 V.
P0110	C21	IAT Sensor 1 Circuit ☞(Page 1A-24)	The sensor output voltage is higher than 4.60 V.
P0112		IAT Sensor 1 Circuit Low ☞(Page 1A-24)	The sensor output voltage is lower than 0.10 V.
P0115	C15	ECT Sensor Circuit ☞(Page 1A-26)	The sensor output voltage is higher than 4.85 V.
P0117		ECT Sensor Circuit Low ☞(Page 1A-26)	The sensor output voltage is lower than 0.10 V.
P0120	C14	TP Sensor / Switch “A” Circuit ☞(Page 1A-28)	The sensor output voltage is lower than 0.10 V.
P0123		TP Sensor / Switch “A” Circuit High ☞(Page 1A-28)	The sensor output voltage is higher than 4.80 V.
P0130	C44	O2 Sensor Circuit Bank 1 Sensor 1 ☞(Page 1A-30)	HO2 sensor output voltage is within 2.1 V – 2.9 V.
P0131		O2 Sensor Circuit Low Voltage Bank 1 Sensor 1 ☞(Page 1A-30)	The sensor output voltage is lower than 0.10 V.
P0132		O2 Sensor Circuit High Voltage Bank 1 Sensor 1 ☞(Page 1A-30)	The sensor output voltage is higher than 3.13 V.
P0170	C45	Fuel Trim Bank 1 ☞(Page 1A-32)	The fuel trim correction is out of its threshold value.
P0201	C32	Injector Circuit / Open – Cylinder 1 ☞(Page 1A-34)	Fuel injector #1 signal is interrupted by 8 times or more continuity although CKP signal is detected.
P0202	C33	Injector Circuit / Open – Cylinder 2 ☞(Page 1A-36)	Fuel injector #2 signal is interrupted by 8 times or more continuity although CKP signal is detected.
P0220	C29	TP Sensor / Switch “B” Circuit ☞(Page 1A-38)	The sensor output voltage is higher than 4.83 V.
P0222		TP Sensor / Switch “B” Circuit Low ☞(Page 1A-38)	The sensor output voltage is lower than 0.10 V.

DTC		DTC name	DTC detecting condition
P0351	C24	Ignition Coil “A” Primary / Secondary Circuit ☞(Page 1A-44)	Ignition coil #1 signal is interrupted by 8 times or more continuity although CKP signal is detected.
P0352	C25	Ignition Coil “B” Primary / Secondary Circuit ☞(Page 1A-44)	Ignition coil #2 signal is interrupted by 8 times or more continuity although CKP signal is detected.
P0418 *1	C49 *1	PAIR System Control “A” Circuit ☞(Page 1A-44)	No voltage is input to ECM even though the PAIR control solenoid valve is OFF.
P0443 *1	C62 *1	EVAP System Purge Control Valve Circuit ☞(Page 1A-46)	No voltage is input to ECM even though the EVAP system purge control solenoid valve is OFF.
P0449 *1		EVAP System Vent Valve / Solenoid Circuit ☞(Page 1A-46)	Voltage is input to ECM even though the EVAP system purge control solenoid valve is ON.
P0480	C60	Fan 1 Control Circuit ☞(Page 1A-48)	Cooling fan relay signal is not input to ECM.
P0500	C16	Vehicle Speed Sensor “A” • Without ABS ☞(Page 1A-50) • With ABS ☞(Page 1A-52)	The speed sensor signal is not input for more than 2.5 sec.
P0506	C65	ISC System RPM Lower Than Expected ☞(Page 1A-53)	Idle speed dropped lower than desired idle speed by more than specified range.
P0507		ISC System RPM Higher Than Expected ☞(Page 1A-53)	Idle speed rose higher than desired idle speed by more than specified range.
P0914	C31	GP Sensor Circuit ☞(Page 1A-54)	Gear position signal voltage is lower than the specified value.
P1100	C13	IAP Sensor 2 Circuit ☞(Page 1A-56)	The sensor output voltage is higher than 4.80 V.
P1101		IAP Sensor 2 Circuit Range / Performance ☞(Page 1A-56)	The IAP sensor #2 vacuum hose has come off.
P1102		IAP Sensor 2 Circuit Low ☞(Page 1A-56)	The sensor output voltage is lower than 0.10 V.
P1610	C42	Ignition Switch Signal Circuit ☞(Page 1A-58)	Ignition switch signal is not input to the ECM.
P1700	C23	TO Sensor Circuit ☞(Page 1A-58)	The sensor output voltage is higher than 4.60 V.
P1701		TO Sensor Circuit Low ☞(Page 1A-58)	The sensor output voltage is lower than 0.20 V.
P2100	C28	Throttle Actuator “A” Control Motor Circuit ☞(Page 1A-60)	STVA control signal is not supplied from the ECM. ECM does not receive communication signal from the STVA or operation voltage does not reach STVA.
P2258 *1	C49 *1	PAIR System Control “A” Circuit High ☞(Page 1A-44)	Voltage is input to ECM even though the PAIR control solenoid valve is ON.

Fail-Safe Function Table

BENJ18K61104005

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	When IAP sensor #1 is fail-safe, pressure the atmospheric pressure from the IAP sensor #2 value.	"YES"	"YES"
	When IAP sensor #2 is fail-safe, intake air pressure value is fixed to 101.3 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 70 °C (158 °F). Cooling fan is fixed on position.	"YES"	"YES"
IAT sensor	Intake air temperature value is fixed to 25 °C (77 °F).	"YES"	"YES"
Ignition signal	#1 fuel-cut	"YES"	"YES"
		Rear cylinder can run.	
	#2 fuel-cut	"YES"	"YES"
		Front cylinder can run.	
Injection signal	#1 fuel-cut	"YES"	"YES"
		Rear cylinder can run.	
	#2 fuel-cut	"YES"	"YES"
		Front cylinder can run.	
STV actuator	Secondary throttle valve is fixed to full close position. 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 (If equipped)	ECM stops controlling PAIR control solenoid valve.	"YES"	"YES"
EVAP system purge control solenoid valve (If equipped)	ECM stops controlling EVAP system purge control solenoid 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

BENJ18K61104006

Customer Complaint Analysis

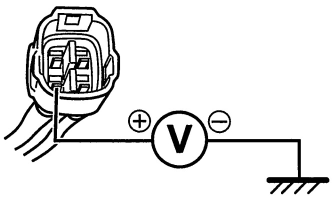
Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of such an inspection form such as following will facilitate collecting information to the point required for proper analysis and diagnosis.

Step 1

HO2 sensor heater power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the HO2 sensor coupler. ☞(Page 1C-9)
3) Check for proper terminal connection to the HO2 sensor coupler.
4) If connections are OK, turn ignition switch ON.
5) Measure the voltage between W/R wire and ground.

HO2 sensor heater power supply voltage
[Standard]: Battery voltage



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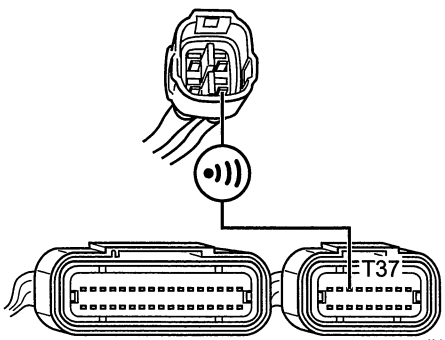
Is check result OK?

Yes	Go to Step 2.
No	Repair or replace the W/R wire.

Step 2

HO2 sensor heater drive circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     - W/B wire: less than 1 Ω



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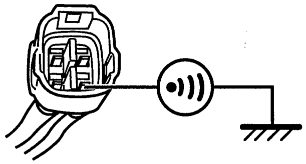
     - Between W/B wire and ground: infinity



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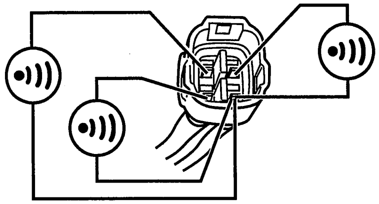
     - Between W/B wire terminal and other terminal at HO2 sensor coupler: infinity



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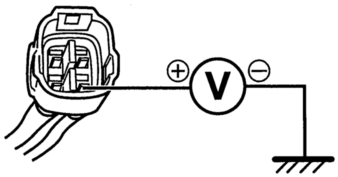
   - Voltage
     - Turn the ignition switch ON.
     - W/B wire: approx. 0 V



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Is check result OK?

Yes	Go to Step 3.
No	Repair or replace the W/B wire.

Step 3

HO2 sensor heater resistance check

1) Turn the ignition switch OFF.
2) Measure the HO2 sensor resistance. Refer to “HO2 Sensor Heater Resistance” under “HO2 Sensor Inspection” in Section 1C (Page 1C-8).

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the HO2 sensor with a new one. ☞(Page 1C-9)

DTC P0105 / P0106 / P0107 (C17)

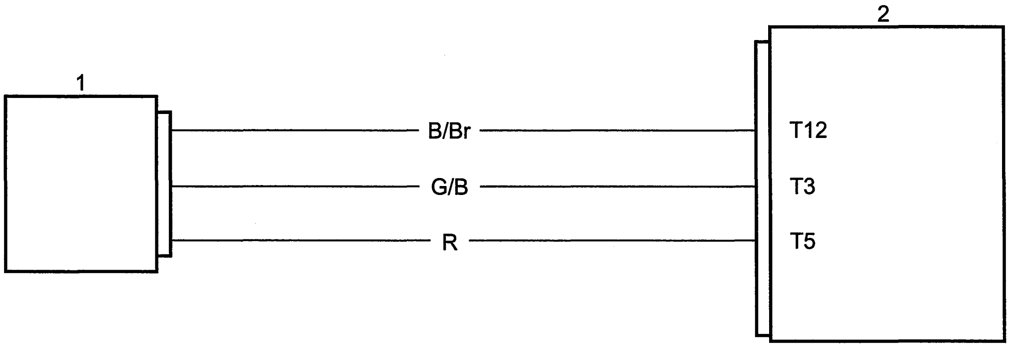
BENJ18K61104008

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0105 (C17): IAP Sensor Circuit The sensor output voltage is higher than 4.80 V.	• Vacuum passage between throttle body and IAP sensor #1 • IAP sensor #1 • IAP sensor #1 circuit • ECM
P0106 (C17): IAP Sensor Circuit Range / Performance The IAP sensor #1 vacuum hose has come off.	
P0107 (C17): IAP Sensor Circuit Low The sensor output voltage is lower than 0.10 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110061-01

1. IAP sensor #1	2. ECM

Troubleshooting

NOTE

When DTC P0106 (C17) and P1101 (C13) are detected together, check that each IAP sensor vacuum hose is connected correctly.

Step 1

IAP sensor power supply circuit check

1) Turn the ignition switch OFF.
2) Disconnect the IAP sensor #1 coupler. ☞(Page 1C-5)
3) Check for proper terminal connection to the IAP sensor #1 coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the R wire and B/Br wire.

<u>**IAP sensor #1 power supply voltage**</u>
[Standard]: 4.75 – 5.25 V

Is check result OK?

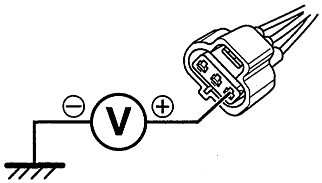
Yes Go to Step 3.

No Go to Step 2.

Step 2

IAP sensor ground circuit check

1) Measure the voltage between the R wire and ground.



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Is voltage same as Step 1?

Yes Repair or replace the B/Br wire.

No Repair or replace the R wire.

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:

MIL 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 □ No initial combustion □ No combustion □ Poor starting at (□ cold / □ warm / □ always) □ Other	□ **Poor Driveability** □ Hesitation on acceleration □ Back fire / □ After fire □ Lack of power □ 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 Temperature Frequency	□ Fair / □ Cloudy / □ Rain / □ Snow / □ Always / □ Other □ Hot / □ Warm / □ Cool / □ Cold (°C / °F) / □ Always □ 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

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.

Inspection Item		Referring section
Engine oil	Level	☞(Page 1E-5)
	Leakage	
Engine coolant	Level	☞(Page 1F-6)
	Leakage	☞(Page 1F-7)
Fuel	Level	—
	Leakage	☞(Page 1G-5)
Air cleaner element	Dirt	☞(Page 1D-7)
	Clogging	
Battery	Corrosion of terminal	☞(Page 1J-13)
Throttle cable	Play	☞(Page 1D-10)
Vacuum hoses of air intake system	Disconnection	—
	Looseness	—
	Bend	—
Fuses	Burning	—
MIL	Operation	☞(Page 1A-3)
Each indicator light	Operation	☞(Page 9C-6)
Combination meter	Operation	☞(Page 9C-10)
Exhaust system	Leakage of exhaust gas	☞(Page 1K-5)
	Noise	
Harness coupler	Disconnection	☞(Page 00-2)
	Poor contact	

DTC P0030 / P0032 (C44)

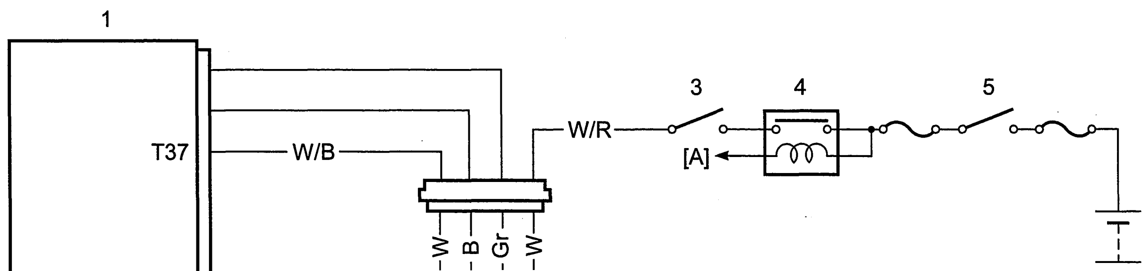
BENJ18K61104007

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0030 (C44): HO2 Sensor Heater Control Circuit Bank 1 Sensor 1 HO2 sensor heater drive circuit is shorted to ground or open.	• HO2 sensor heater • HO2 sensor heater circuit • ECM
P0032 (C44): HO2 Sensor Heater Control Circuit High Bank 1 Sensor 1 HO2 sensor heater drive circuit is shorted to power supply.	

Wiring Diagram

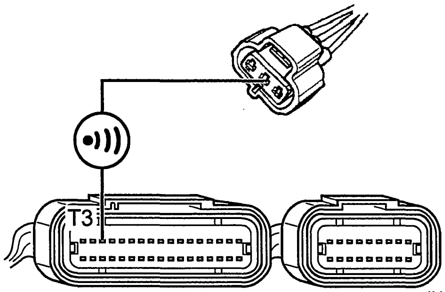
Refer to "FI System Wiring Diagram" (Page 1A-6).



Step 3

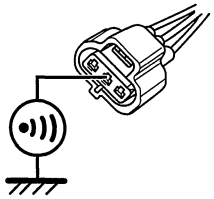
IAP sensor signal circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – G/B wire: less than 1 Ω



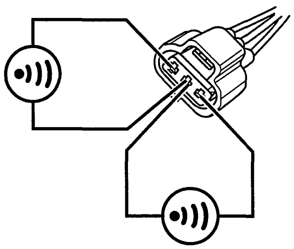
IH18K1110063-01

– Between G/B wire and ground: infinity



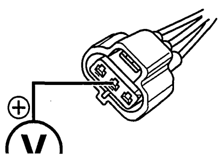
IE31J1110182-02

– G/B wire terminal and other terminal at IAP sensor #1 coupler: infinity



IE31J1110183-02

- Voltage
  – Turn the ignition switch ON.
  – G/B wire: approx. 0 V



Step 4

IAP sensor output voltage at idle speed check

1) Turn the ignition switch OFF.
2) Connect the ECM couplers and IAP sensor #1 coupler.
3) Measure the IAP sensor #1 output voltage at idle speed. Refer to “IAP Sensor Output Voltage at Idle Speed” under “IAP Sensor Inspection” in Section 1C (Page 1C-4).

Is check result OK?

Yes	Go to Step 5.
No	Check the vacuum hose for crack or damage. If vacuum hose is OK, replace the IAP sensor #1 with a new one. ☞(Page 1C-5)

Step 5

IAP sensor output voltage check

1) Turn the ignition switch OFF.
2) Remove the IAP sensor #1. ☞(Page 1C-5)
3) Measure the IAP sensor #1 output voltage. Refer to “IAP Sensor Output Voltage” under “IAP Sensor Inspection” in Section 1C (Page 1C-4).

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the IAP sensor #1 with a new one. ☞(Page 1C-5)

DTC P0110 / P0112 (C21)

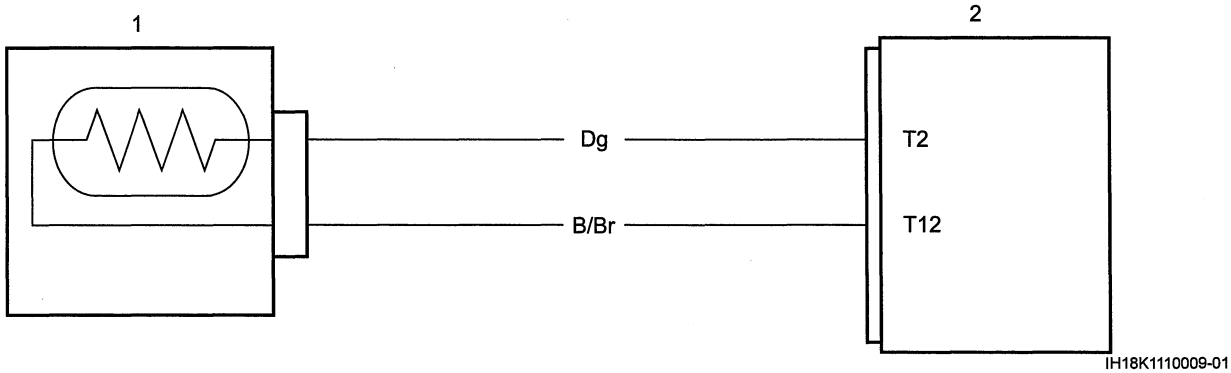
BENJ18K61104009

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0110 (C21): IAT Sensor 1 Circuit The sensor output voltage is higher than 4.60 V.	• IAT sensor • IAT sensor circuit • ECM
P0112 (C21): IAT Sensor 1 Circuit Low The sensor output voltage is lower than 0.10 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



1. IAT sensor	2. ECM

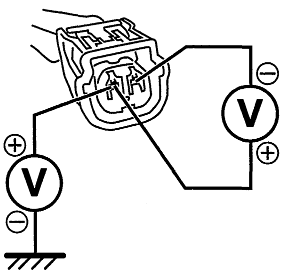
Troubleshooting

Step 1

IAT sensor input voltage check

1) Turn the ignition switch OFF.
2) Disconnect the IAT sensor coupler. ☞(Page 1C-5)
3) Check for proper terminal connection to the IAT sensor coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the Dg wire and ground.
6) If OK, measure the voltage between the Dg wire and B/Br wire.

IAT sensor power supply voltage
[Standard]: 4.5 – 5.5 V



IH18K1110010-02

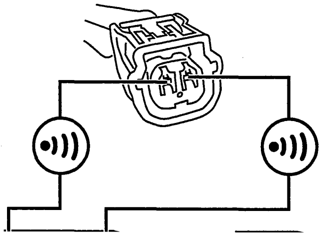
Is check result OK?

Yes	Go to Step 3.
No	Go to Step 2.

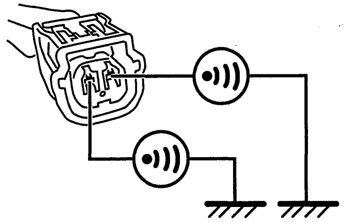
Step 2

IAT sensor circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – Dg wire and B/Br wire: less than 1 Ω

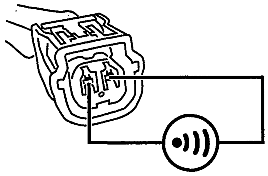


     – Between Dg wire and ground: infinity
     – Between B/Br wire and ground: infinity



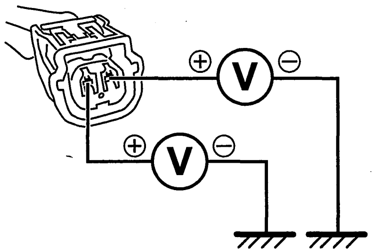
IH18K1110012-01

     – Between Dg wire terminal and B/Br wire terminal at IAT sensor coupler: infinity



IH18K1110013-01

   - Voltage
     – Turn the ignition switch ON.
     – Dg wire and B/Br wire: approx. 0 V



IH18K1110014-01

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Repair or replace the defective wire harness.

Step 3

IAT sensor resistance check

1) Turn the ignition switch OFF.
2) Measure the IAT sensor resistance. ☞(Page 1C-5)

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the IAT sensor with a new one.

DTC P0115 / P0117 (C15)

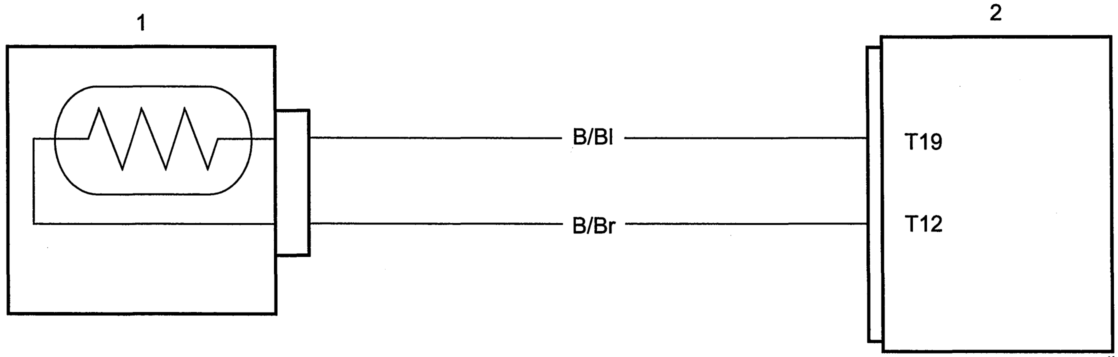
BENJ18K61104010

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0115 (C15): ECT Sensor Circuit The sensor output voltage is higher than 4.85 V.	• ECT sensor • ECT sensor circuit • ECM
P0117 (C15): ECT Sensor Circuit Low The sensor output voltage is lower than 0.10 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110015-01

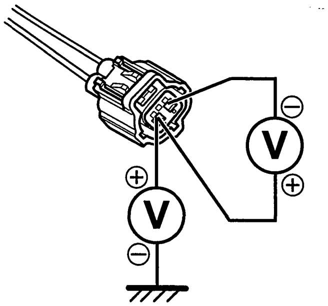
1. ECT sensor	2. ECM

Step 1

ECT sensor power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the ECT sensor coupler. ☞(Page 1C-6)
3) Check for proper terminal connection to the ECT sensor coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the B/Bl wire and ground.
6) If OK, measure the voltage between the B/Bl wire and B/Br wire.

<u>**ECT sensor power supply voltage**</u>
[Standard]: 4.5 – 5.5 V



ID26J1110036-05

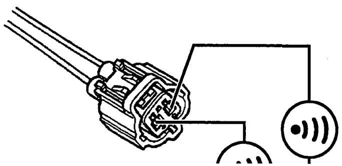
Is check result OK?

Yes	Go to Step 3.
No	Go to Step 2.

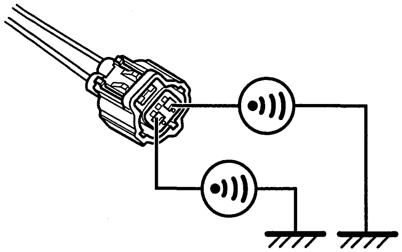
Step 2

ECT sensor circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – B/Bl wire and B/Br wire: less than 1 Ω

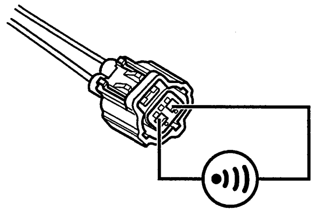


– Between B/Bl wire and ground: infinity
– Between B/Br wire and ground: infinity



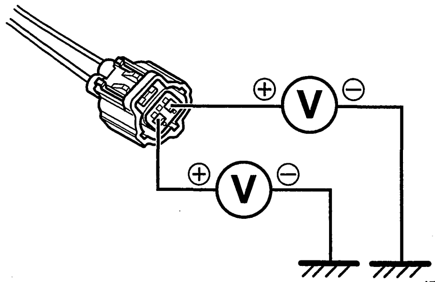
ID26J1110038-04

– Between B/Bl wire terminal and B/Br wire terminal at ECT sensor coupler: infinity



ID26J1110039-04

- Voltage
  – Turn the ignition switch ON.
  – B/Bl wire and B/Br wire: approx. 0 V



ID26J1110040-03

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Repair or replace the defective wire harness.

Step 3

ECT sensor resistance check

1) Turn the ignition switch OFF.
2) Measure the ECT sensor resistance. ☞(Page 1C-6)

Is check result OK?

Yes Replace the ECM with a known good one

DTC P0120 / P0123 (C14)

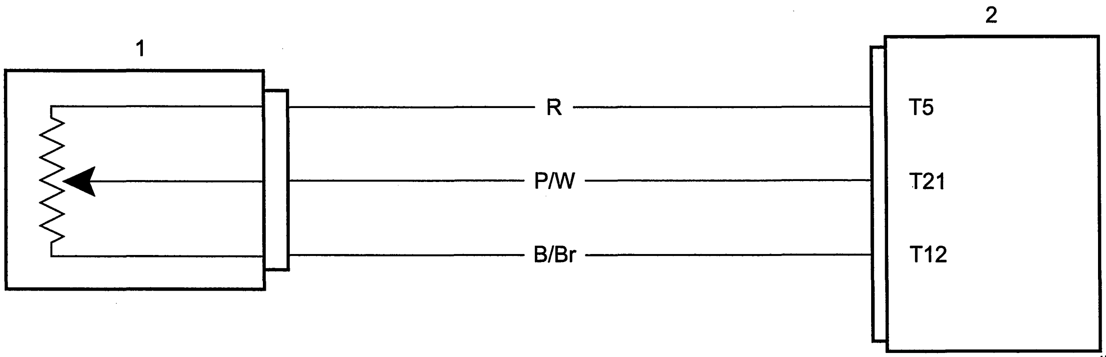
BENJ18K61104011

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0120 (C14): TP Sensor / Switch "A" Circuit The sensor output voltage is lower than 0.10 V.	• TP sensor • TP sensor circuit • ECM
P0123 (C14): TP Sensor / Switch "A" Circuit High The sensor output voltage is higher than 4.80 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110017-01

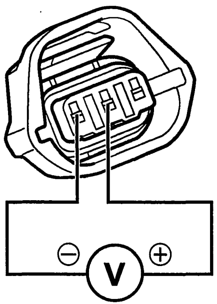
1. TP sensor	2. ECM

Troubleshooting

Step 1
TP sensor power supply circuit check

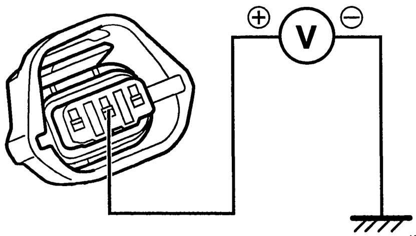
1) Turn the ignition switch OFF.
2) Disconnect the TP sensor coupler. ☞(Page 1C-7)
3) Check for proper terminal connection to the TP sensor coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the R wire and B/Br wire.

<u>TP sensor power supply voltage</u>
[Standard]: 4.5 – 5.5 V



Step 2
TP sensor ground circuit check

1) Measure the voltage between the R wire and ground.



IE31J1110037-02

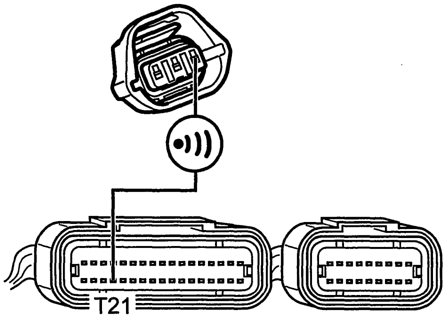
Is voltage same as Step 1?

Yes	Repair or replace the B/Br wire.
No	Repair or replace the R wire.

Step 3

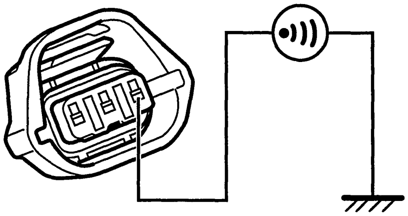
TP sensor signal circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – P/W wire: less than 1 Ω



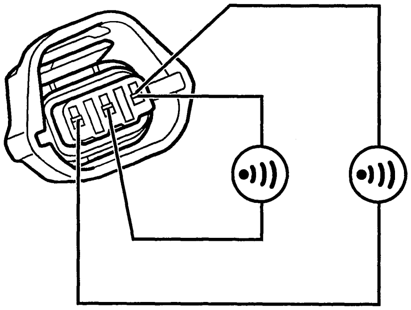
IH18K1110018-01

     – Between P/W wire and ground: infinity



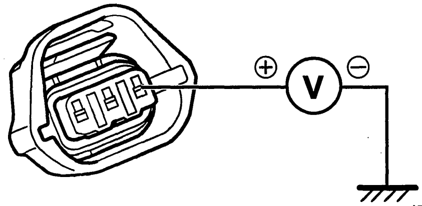
IE31J1110131-01

     – Between P/W wire terminal and other terminal at TP sensor coupler: infinity



IE31J1110040-01

   - Voltage
     – Turn the ignition switch ON.
     – P/W wire: approx. 0 V



IE31J1110041-02

Is check result OK?

Yes	Go to Step 4.
No	Repair or replace the P/W wire.

Step 4

TP sensor output voltage check

1) Turn the ignition switch OFF.
2) Connect the ECM couplers.
3) Measure the TP sensor output voltage. ☞(Page 1C-7)

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the TP sensor with a new one. ☞(Page 1C-7)

DTC P0130 / P0131 / P0132 (C44)

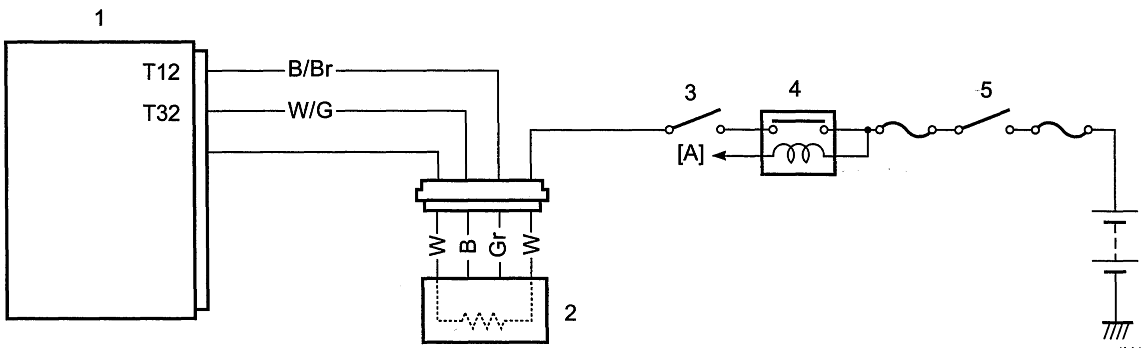
BENJ18K61104012

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
P0130 (C44): O2 Sensor Circuit Bank 1 Sensor 1 HO2 sensor output voltage is within 2.1 V – 2.9 V.	• HO2 sensor • HO2 sensor circuit • ECM
P0131 (C44): O2 Sensor Circuit Low Voltage Bank 1 Sensor 1 The sensor output voltage is lower than 0.10 V.	
P0132 (C44): O2 Sensor Circuit High Voltage Bank 1 Sensor 1 The sensor output voltage is higher than 3.13 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



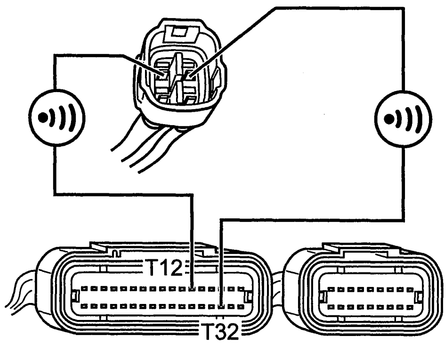
IH18K1110020-01

[A]: To side-stand switch	2. HO2 sensor	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Step 1

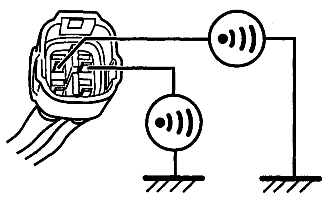
HO2 sensor circuit check

1) Turn the ignition switch OFF.
2) Disconnect the HO2 sensor coupler and ECM couplers.
   - HO2 sensor: ☞(Page 1C-9)
   - ECM: ☞(Page 1C-4)
3) Check for proper terminal connection to the HO2 sensor coupler and ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – W/G wire and B/Br wire: less than 1 Ω



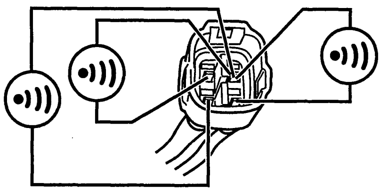
IH18K1110019-01

     – Between W/G wire and ground: infinity
     – Between B/Br wire and ground: infinity



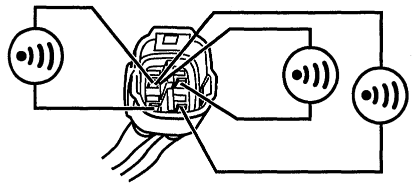
ID26J1110054-03

     – Between W/G wire terminal and other terminal at HO2 sensor coupler: infinity



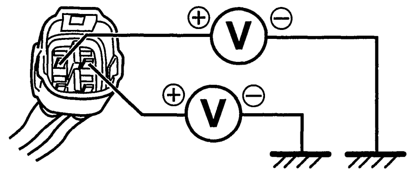
ID26J1110208-01

     – Between B/Br wire terminal and other terminal at HO2 sensor coupler: infinity



ID26J1110209-01

   - Voltage
     – Turn the ignition switch ON.
     – W/G wire and B/Br wire: approx. 0 V



ID26J1110057-02

Is check result OK?

Yes	Go to Step 2.
No	Repair or replace the defective wire harness.

Step 2

HO2 sensor output voltage check

1) Turn the ignition switch OFF.
2) Connect the ECM couplers and HO2 sensor coupler.
3) Measure the HO2 sensor output voltage. Refer to “HO2 Sensor Output Voltage” under “HO2 Sensor Inspection” in Section 1C (Page 1C-8).

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the HO2 sensor with a new one. ☞(Page 1C-9)

DTC P0170 (C45)

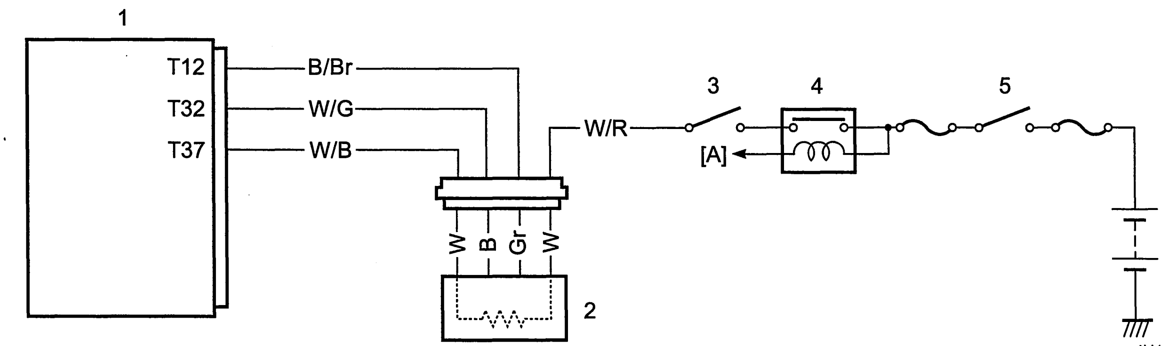
BENJ18K61104013

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
P0170 (C45): Fuel Trim Bank 1 The fuel trim correction is out of its threshold value.	• Fuel system • Air intake system • Exhaust system • Emission control system • HO2 sensor • HO2 sensor circuit • ECM

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



IH18K1110021-01

[A]: To side-stand switch	2. HO2 sensor	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Troubleshooting

Step 1

Fuel system and emission control system check

1) Check the following points related to fuel and emission control systems.
   - Fuel pressure: ☞(Page 1G-6)
   - Fuel injector circuit: Refer to “Wiring Diagram” under “DTC P0201 (C32)” (Page 1A-34) and “DTC P0202 (C33)” (Page 1A-36).
   - Fuel injector: ☞(Page 1G-18)
   - IAP sensor: ☞(Page 1C-4)
   - PAIR system (If equipped): ☞(Page 1B-12)
   - EVAP control system (If equipped): ☞(Page 1B-15)
   - PCV hose: ☞(Page 1B-13)

Is check result OK?

Yes Go to Step 2.

No Repair or replace defective parts.

Step 2

Exhaust system and air intake system check

1) Check exhaust system and air intake system for clogging and leakage.
   - Exhaust system: ☞(Page 1K-5)
   - Air intake system: Refer to “Step 3” under “DTC P0506 / P0507 (C65)” (Page 1A-53).

Is check result OK?

Yes Go to Step 3.

No Repair or replace defective part.

Step 3

HO2 sensor circuit check

1) Check HO2 sensor circuit. Refer to “Step 1” under “DTC P0130 / P0131 / P0132 (C44)” (Page 1A-30).

Is check result OK?

Yes Go to Step 4.

No Repair or replace defective wire harness.

Step 4

DTC recheck

1) Replace the HO2 sensor. ☞(Page 1C-9)
2) Perform “DTC Check” (Page 1A-15) and check DTC.

Is DTC P0170 (C45) still detected?

Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

No End.

DTC P0201 (C32)

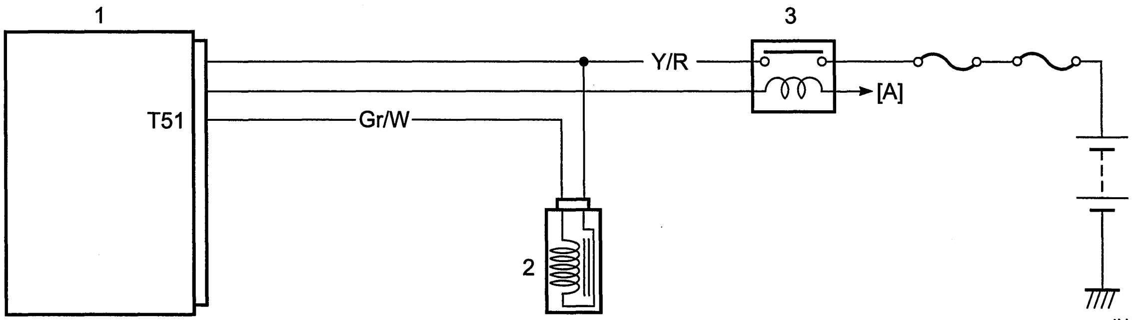
BENJ18K61104014

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0201 (C32): Injector Circuit / Open – Cylinder 1 Fuel injector #1 signal is interrupted by 8 times or more continuity although CKP signal is detected.	• Fuel injector #1 • Fuel injector #1 circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110022-01

[A]: To engine stop switch	2. Fuel injector #1
1. ECM	3. FP relay

Troubleshooting

Step 1

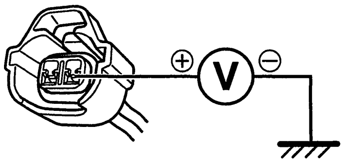
Fuel injector power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the fuel injector #1 coupler. Refer to "Fuel Injector On-Vehicle Inspection" in Section 1G (Page 1G-16).
3) Check for proper terminal connection to the fuel injector #1 coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between Y/R wire and ground.

NOTE

Fuel injector power supply voltage can be detected only for 3 seconds after ignition switch is turned ON.

Fuel injector #1 power supply voltage
[Standard]: Battery voltage



IF04K1110023-01

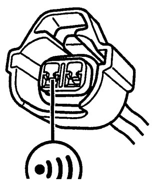
Is check result OK?

Yes	Go to Step 2.
No	Repair or replace the Y/R wire.

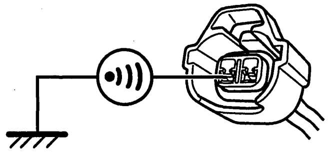
Step 2

Fuel injector drive circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     - Gr/W wire: less than 1 Ω

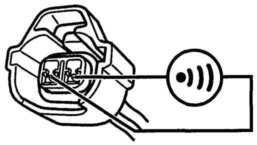


     - Between Gr/W wire and ground: infinity



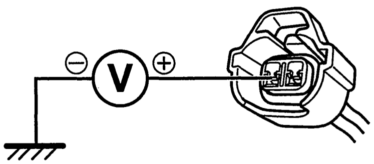
IF04K1110025-01

     - Between Gr/W wire terminal and Y/R wire terminal at fuel injector #1 coupler: infinity



IF04K1110026-01

   - Voltage
     - Turn the ignition switch ON.
     - Gr/W wire: approx. 0 V



IF04K1110027-01

Is check result OK?

Yes	Go to Step 3.
No	Repair or replace the Gr/W wire.

Step 3

Fuel injector resistance check

1) Turn the ignition switch OFF.
2) Measure the fuel injector resistance. ☞(Page 1G-13)

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the fuel injector #1 with a new one. ☞(Page 1G-16)

DTC P0202 (C33)

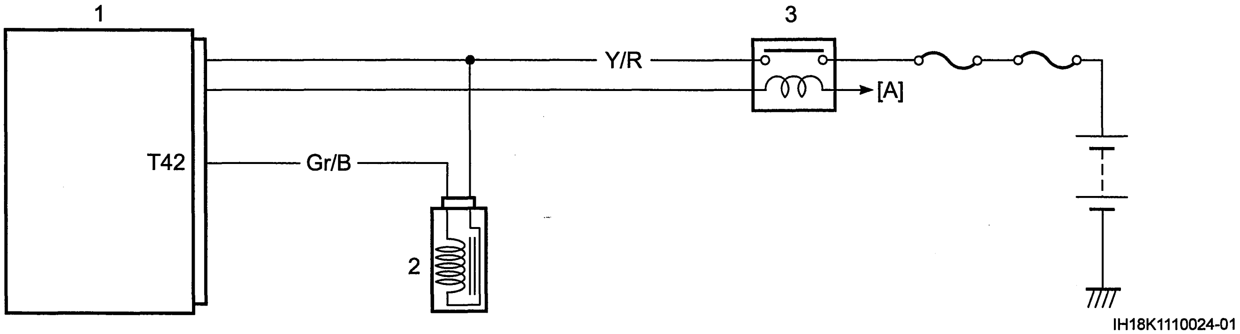
BENJ18K61104015

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0202 (C33): Injector Circuit / Open – Cylinder 2 Fuel injector #2 signal is interrupted by 8 times or more continuity although CKP signal is detected.	• Fuel injector #2 • Fuel injector #2 circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



[A]: To engine stop switch	2. Fuel injector #2
1. ECM	3. FP relay

Troubleshooting

Step 1

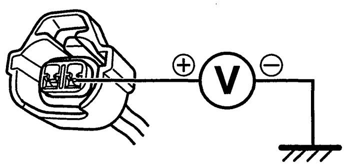
Fuel injector power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the fuel injector #2 coupler. Refer to "Fuel Injector On-Vehicle Inspection" in Section 1G (Page 1G-16).
3) Check for proper terminal connection to the fuel injector #2 coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between Y/R wire and ground.

NOTE

Fuel injector power supply voltage can be detected only for 3 seconds after ignition switch is turned ON.

Fuel injector #2 power supply voltage
[Standard]: Battery voltage



IF04K1110029-01

Is check result OK?

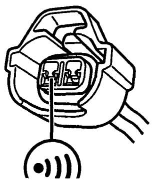
Yes Go to Step 2.

No Repair or replace the Y/R wire.

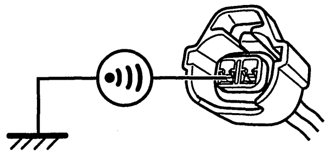
Step 2

Fuel injector drive circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – Gr/B wire: less than 1 Ω

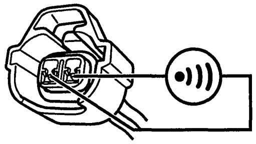


– Between Gr/B wire and ground: infinity



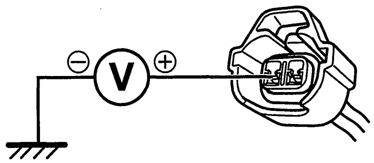
IF04K1110031-01

– Between Gr/B wire terminal and Y/R wire terminal at fuel injector #2 coupler: infinity



IF04K1110032-01

- Voltage
  – Turn the ignition switch ON.
  – Gr/B wire: approx. 0 V



IF04K1110033-01

Is check result OK?

Yes Go to Step 3.

No Repair or replace the Gr/B wire.

Step 3

Fuel injector resistance check

1) Turn the ignition switch OFF.
2) Measure the fuel injector resistance. ☞(Page 1G-16)

Is check result OK?

Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

No Replace the fuel injector #2 with a new one. ☞(Page 1G-16)

DTC P0220 / P0222 (C29)

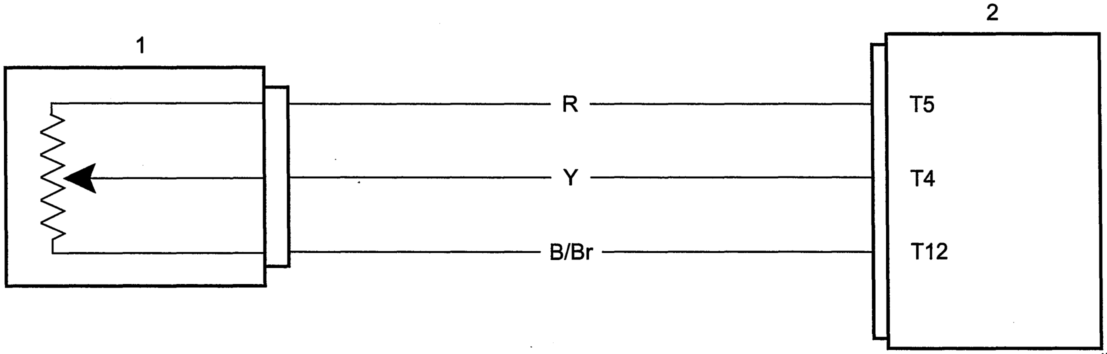
BENJ18K61104016

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0220 (C29): TP Sensor / Switch “B” Circuit The sensor output voltage is higher than 4.83 V.	• STP sensor • STP sensor circuit • ECM
P0222 (C29): TP Sensor / Switch “B” Circuit Low The sensor output voltage is lower than 0.10 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



IH18K1110026-01

1. STP sensor	2. ECM

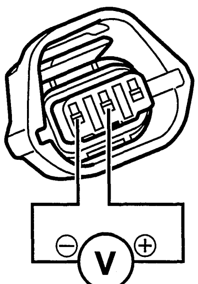
Troubleshooting

Step 1

STP sensor power supply circuit check

1) Turn the ignition switch OFF.
2) Disconnect the STP sensor coupler. ☞(Page 1C-13)
3) Check for proper terminal connection to the STP sensor coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the R wire and B/Br wire.

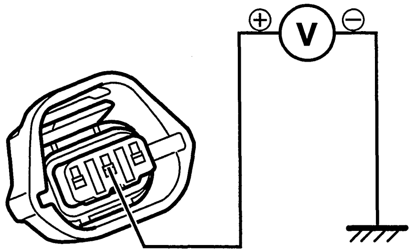
STP sensor power supply voltage
[Standard]: 4.5 – 5.5 V



Step 2

STP sensor ground circuit check

1) Measure the voltage between the R wire and ground.



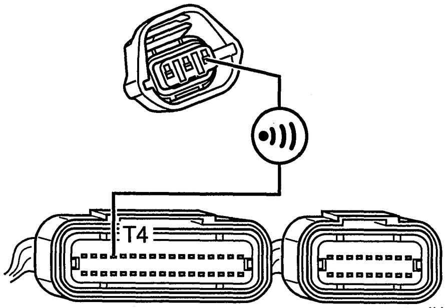
IE31J1110129-02

Is voltage same as Step 1?

Yes	Repair or replace the B/Br wire.
No	Repair or replace the R wire.

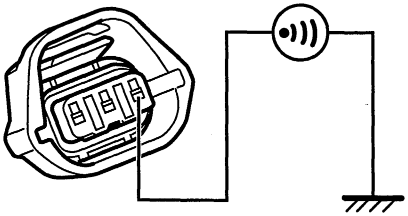
Step 3
STP sensor signal circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – Y wire: less than 1 Ω



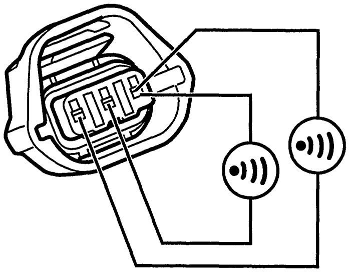
IH18K1110027-01

     – Between Y wire and ground: infinity



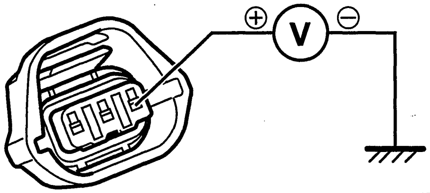
IE31J1110131-01

     – Between Y wire terminal and other terminal at STP sensor coupler: infinity



IE31J1110132-01

   - Voltage
     – Turn the ignition switch ON.
     – Y wire: approx. 0 V



IE31J1110133-01

Is check result OK?

Yes	Go to Step 4.
No	Repair or replace the Y wire.

Step 4
STP sensor output voltage check

1) Turn the ignition switch OFF.
2) Connect the ECM couplers.
3) Measure the STP sensor output voltage. ☞(Page 1C-12)

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the STP sensor with a new one. ☞(Page 1C-13)

DTC P0230 / P0231 (C41)

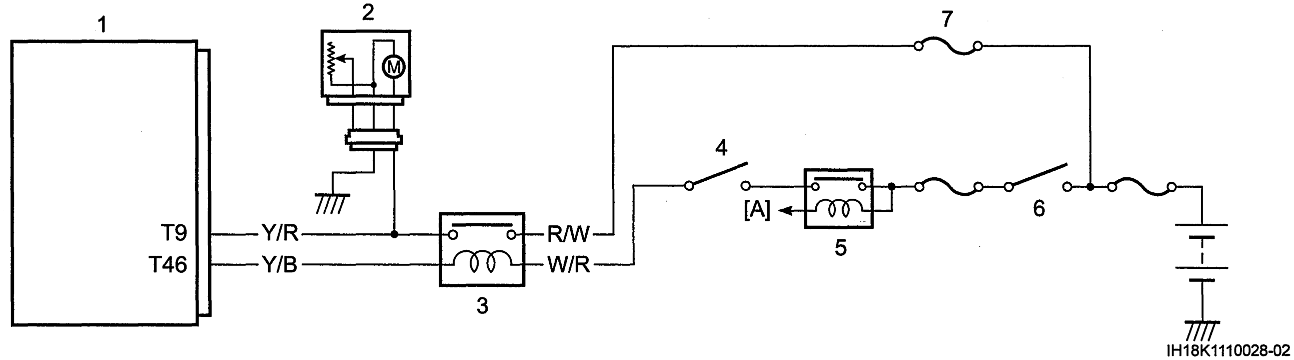
BENJ18K61104017

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0230 (C41): FP Primary Circuit No voltage is detected, although the FP relay is ON.	• Fuel pump relay • Fuel pump relay circuit • ECM
P0231 (C41): FP Secondary Circuit Low Voltage is applied to fuel pump even though the FP relay is OFF.	

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



[A]: To side-stand switch	3. FP relay	6. Ignition switch
1. ECM	4. Engine stop switch	7. Fuel fuse
2. Fuel pump	5. Side-stand relay	

Step 1

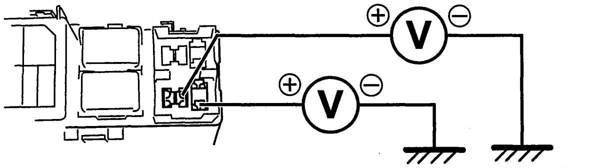
FP relay power supply voltage check

1) Turn the ignition switch OFF.
2) Remove the FP relay. ☞(Page 1G-16)
3) Check for proper terminal connection to the FP relay terminal.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between W/R wire and ground.
6) If OK, measure the voltage between R/W wire and ground.

NOTE

FP relay power supply voltage can be detected only for 3 seconds after ignition switch is turned ON.

<u>FP relay power supply voltage</u>
[Standard]: Battery voltage



IF04K1110040-01

Is check result OK?

Yes Go to Step 2.

No Repair or replace the defective wire harness.

Step 2

FP relay check

Check the FP relay. ☞(Page 1G-16)

Is check result OK?

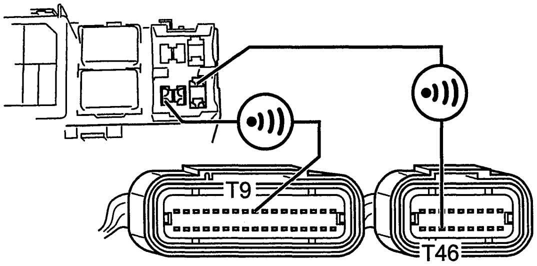
Yes Go to Step 3.

No Replace the FP relay with a new one. ☞(Page 1G-16)

Step 3

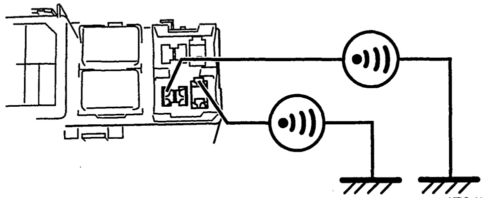
FP relay drive circuit check

1) Turn the ignition switch OFF.
2) Disconnect the fuel pump coupler and ECM couplers.
   - Fuel pump: ☞(Page 1G-9)
   - ECM: ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     - Y/R wire and Y/B wire: less than 1 Ω



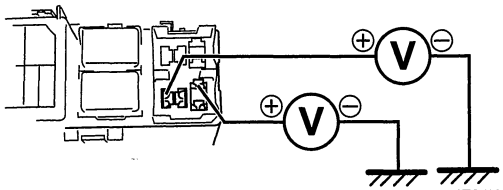
IH18K1110029-01

     - Between Y/R wire and ground: infinity
     - Between Y/B wire and ground: infinity



IF04K1110042-01

   - Voltage
     - Turn the ignition switch ON.
     - Y/R wire and Y/B wire: approx. 0 V



IF04K1110043-01

Is check result OK?

Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

No Repair or replace the defective wire

DTC P0335 (C12)

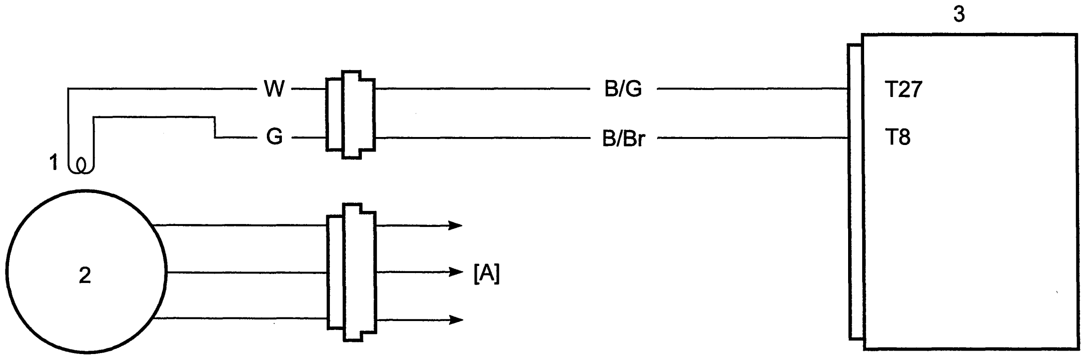
BENJ18K61104018

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0335 (C12): CKP Sensor "A" Circuit The signal does not reach ECM for 2 sec. or more, after receiving the starter signal.	• Metal particles or foreign material being stuck on the CKP sensor and rotor tip • CKP sensor • CKP sensor circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



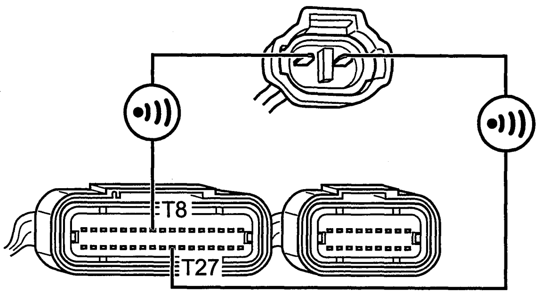
IH18K1110030-01

[A]: To regulator/rectifier	2. Generator
1. CKP sensor	3. ECM

Step 1

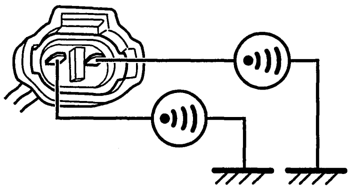
CKP sensor signal circuit check

1) Turn the ignition switch OFF.
2) Disconnect the CKP sensor coupler and ECM couplers.
   - CKP sensor: ☞(Page 1C-11)
   - ECM: ☞(Page 1C-4)
3) Check for proper terminal connection to the CKP sensor coupler and ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – B/Br wire and B/G wire: less than 1 Ω



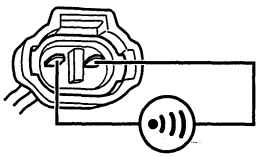
IH18K1110031-01

     – Between B/Br wire and ground: infinity
     – Between B/G wire and ground: infinity



IF04K1110046-01

     – Between the B/Br wire terminal and B/G wire terminal at CKP sensor coupler: infinity



IF04K1110047-01

   - Voltage
     – Turn the ignition switch ON.
     – B/Br wire and B/G wire: approx. 0 V

No   Repair or replace the defective wire harness.

Step 2

CKP sensor resistance check

1) Turn the ignition switch OFF.
2) Measure the CKP sensor resistance. Refer to "CKP Sensor Resistance" under "CKP Sensor Inspection" in Section 1C (Page 1C-10).

Is check result OK?

Yes   Go to Step 3.

No   Replace the CKP sensor with a new one. ☞(Page 1C-11)

Step 3

CKP sensor peak voltage check

1) Connect the ECM couplers.
2) Measure the CKP sensor peak voltage with the peak volt adapter. Refer to "CKP Sensor Peak Voltage" under "CKP Sensor Inspection" in Section 1C (Page 1C-10).

Is check result OK?

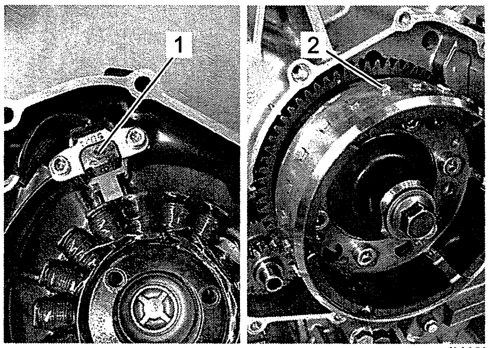
Yes   Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

No   Go to Step 4.

Step 4

CKP sensor and generator rotor check

1) Turn the ignition switch OFF.
2) Remove the generator cover. ☞(Page 1J-5)
3) Check that end face of the CKP sensor (1) and signal generator rotor teeth (2) are free from any metal particles and damage.



IH18K1110032-01

Is check result OK?

DTC P0351 (C24)

BENJ18K61104019

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0351 (C24): Ignition Coil “A” Primary / Secondary Circuit Ignition coil #1 signal is interrupted by 8 times or more continuity although CKP signal is detected.	Refer to “No Spark or Poor Spark” in Section 1H (Page 1H-3).

DTC P0352 (C25)

BENJ18K61104020

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0352 (C25): Ignition Coil “B” Primary / Secondary Circuit Ignition coil #2 signal is interrupted by 8 times or more continuity although CKP signal is detected.	Refer to “No Spark or Poor Spark” in Section 1H (Page 1H-3).

DTC P0418 / P2258 (C49) [If Equipped]

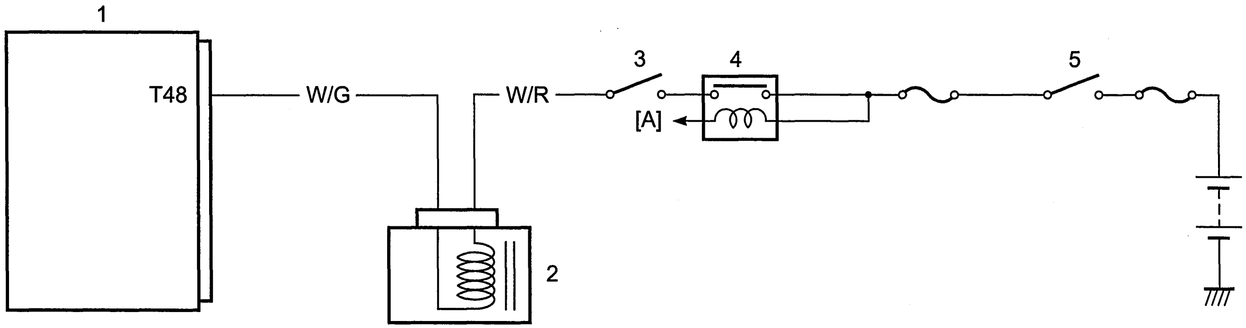
BENJ18K61104021

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0418 (C49): PAIR System Control “A” Circuit No voltage is input to ECM even though the PAIR control solenoid valve is OFF.	• PAIR control solenoid valve • PAIR control solenoid valve circuit • ECM
P2258 (C49): PAIR System Control “A” Circuit High Voltage is input to ECM even though the PAIR control solenoid valve is ON.	

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



IH18K1110033-01

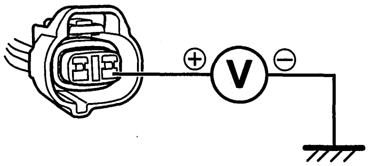
[A]: To side-stand switch	2. PAIR control solenoid valve	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Step 1

PAIR control solenoid valve power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the PAIR control solenoid valve coupler. ☞(Page 1B-12)
3) Check for proper terminal connection to the PAIR control solenoid valve coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the W/R wire and ground.

   PAIR control solenoid valve power supply voltage
   [Standard]: Battery voltage



IF04K1110099-02

Is check result OK?

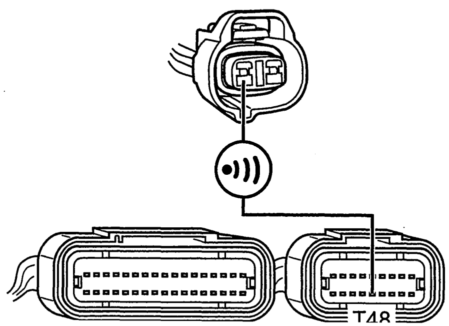
Yes Go to Step 2.

No Repair or replace the W/R wire.

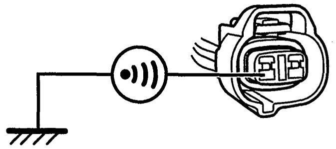
Step 2

PAIR control solenoid valve driver circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – W/G wire: less than 1 Ω

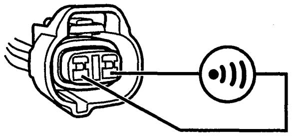


– Between W/G wire and ground: infinity



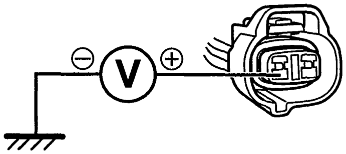
IF04K1110101-01

– Between W/G wire terminal and W/R wire terminal at PAIR control solenoid valve coupler: infinity



IF04K1110103-01

- Voltage
  – Turn the ignition switch ON.
  – W/G wire: approx. 0 V



IF04K1110104-01

Is check result OK?

Yes Go to Step 3.

No Repair or replace the W/G wire.

Step 3

PAIR control solenoid valve resistance check

1) Turn the ignition switch OFF.
2) Measure the PAIR control solenoid valve resistance. Refer to "PAIR Control Solenoid Valve" under "PAIR System Inspection (If Equipped)" in Section 1B (Page 1B-12).

Is check result OK?

Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

No Replace the PAIR control solenoid valve with a new one. ☞(Page 1B-12)

DTC P0443 / P0449 (C62) [If Equipped]

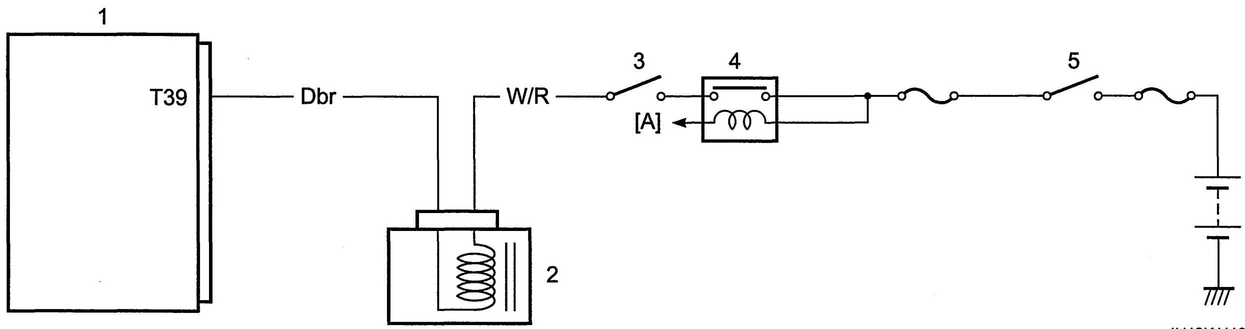
BENJ18K61104022

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0443 (C62): EVAP System Purge Control Valve Circuit No voltage is input to ECM even though the EVAP system purge control solenoid valve is OFF.	• EVAP system purge control solenoid valve • EVAP system purge control solenoid valve circuit • ECM
P0449 (C62): EVAP System Vent Valve / Solenoid Circuit Voltage is input to ECM even though the EVAP system purge control solenoid valve is ON.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110035-01

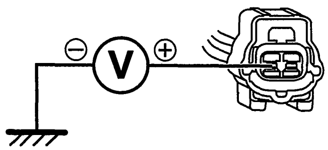
[A]: To side-stand switch	2. EVAP system purge control solenoid valve	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Step 1

EVAP system purge control solenoid valve power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the EVAP system purge control solenoid valve coupler. ☞(Page 1B-13)
3) Check for proper terminal connection to the EVAP system purge control solenoid valve coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the W/R wire and ground.

EVAP system purge control solenoid valve power supply voltage
[Standard]: Battery voltage



ID26J1110239-01

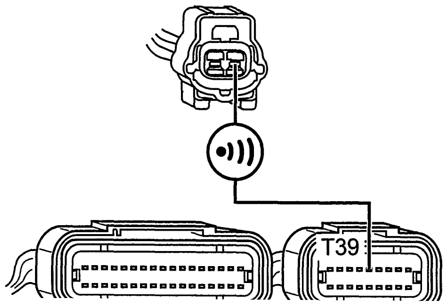
Is check result OK?

Yes	Go to Step 2.
No	Repair or replace the W/R wire.

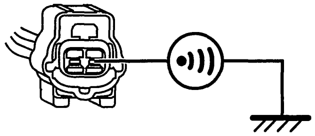
Step 2

EVAP system purge control solenoid valve driver circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – Dbr wire: less than 1 Ω

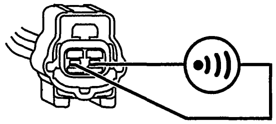


     – Between Dbr wire and ground: infinity



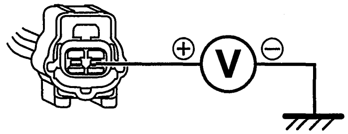
ID26J1110241-01

     – Between Dbr wire terminal and W/R wire terminal at EVAP system purge control solenoid valve coupler: infinity



ID26J1110242-01

   - Voltage
     – Turn the ignition switch ON.
     – Dbr wire: approx. 0 V



ID26J1110243-01

Is check result OK?

Yes	Go to Step 3.
No	Repair or replace the Dbr wire.

Step 3

EVAP system purge control solenoid valve resistance check

1) Turn the ignition switch OFF.
2) Measure the EVAP system purge control solenoid valve resistance. Refer to "EVAP System Purge Control Solenoid Valve" under "EVAP Control System Inspection (If Equipped)" in Section 1B (Page 1B-15).

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the EVAP system purge control solenoid valve with a new one. ☞(Page 1B-13)

DTC P0480 (C60)

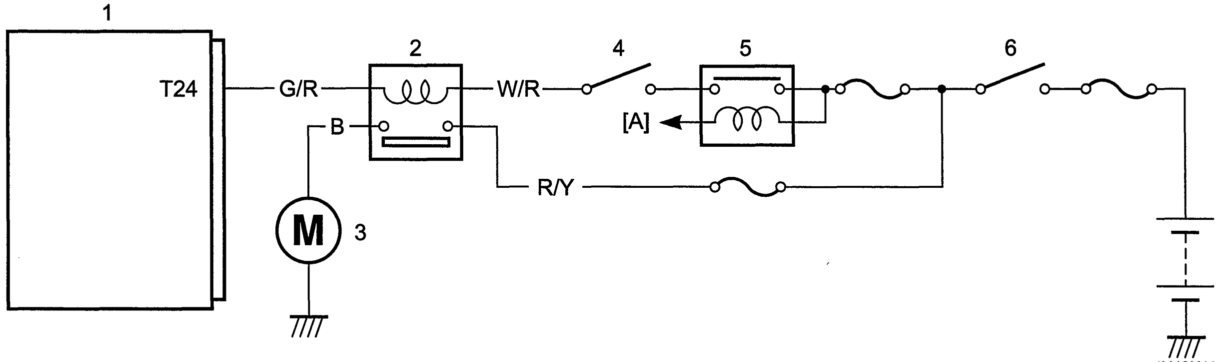
BENJ18K61104023

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0480 (C60): Fan 1 Control Circuit Cooling fan relay signal is not input to ECM.	• Cooling fan relay • Cooling fan relay circuit • ECM

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



IH18K1110037-01

[A]: To side-stand switch	2. Cooling fan relay	4. Engine stop switch	6. Ignition switch
1. ECM	3. Cooling fan motor	5. Side-stand relay	

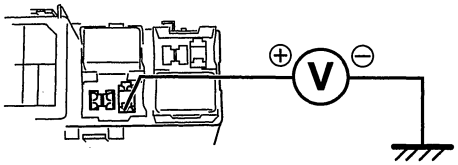
Troubleshooting

Step 1

Cooling fan relay power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the cooling fan relay. ☞(Page 1F-12)
3) Check for proper terminal connection to the cooling fan relay terminal.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between W/R wire and ground.

<u>Cooling fan relay power supply voltage</u>
[Standard]: Battery voltage



IE31J1110092-02

Is check result OK?

Yes	Go to Step 2.
No	Repair or replace the W/R wire.

Step 2

Cooling fan relay check

Check the cooling fan relay. ☞(Page 1F-12)

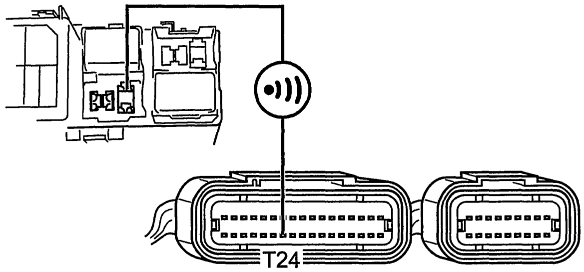
Is check result OK?

Yes	Go to Step 3.
No	Replace the cooling fan relay with a new one. ☞(Page 1F-12)

Step 3

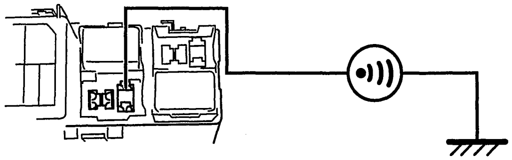
Cooling fan relay drive circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – G/R wire: less than 1 Ω



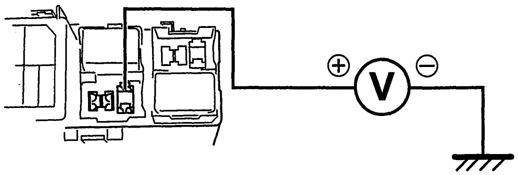
IH18K1110038-01

– Between G/R wire and ground: infinity



IE31J1110095-03

- Voltage
  – Turn the ignition switch ON.
  – G/R wire: approx. 0 V



IF04K1110123-01

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Repair or replace the G/R wire.

DTC P0500 (C16) [Without ABS]

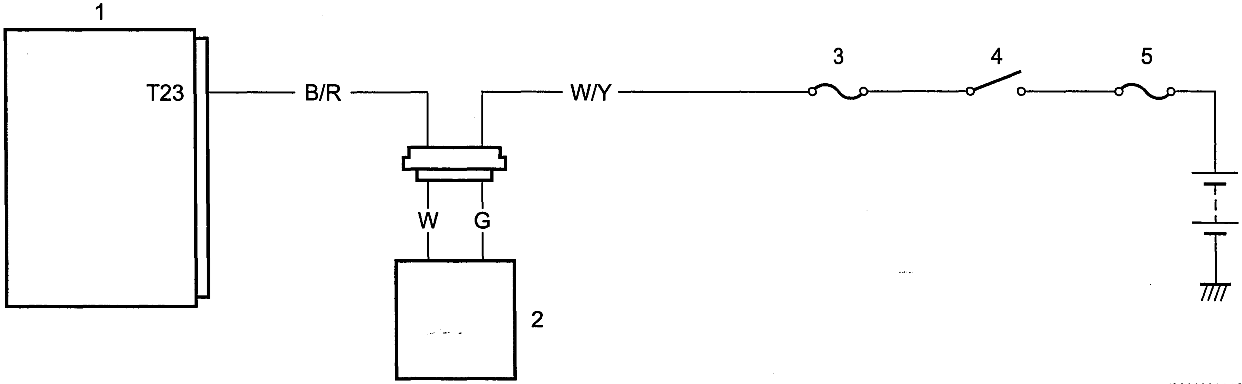
BENJ18K61104024

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0500 (C16): Vehicle Speed Sensor "A" The speed sensor signal is not input for more than 2.5 sec.	• Speed sensor • Speed sensor rotor • Speed sensor circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110039-01

1. ECM	3. Ignition fuse	5. Main fuse
2. Speed sensor	4. Ignition switch	

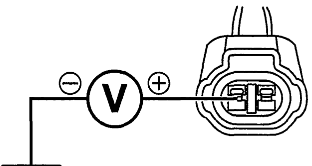
Troubleshooting

Step 1

Speed sensor power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the speed sensor coupler. ☞(Page 9C-10)
3) Check for proper terminal connection to the speed sensor coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the W/Y wire and ground.

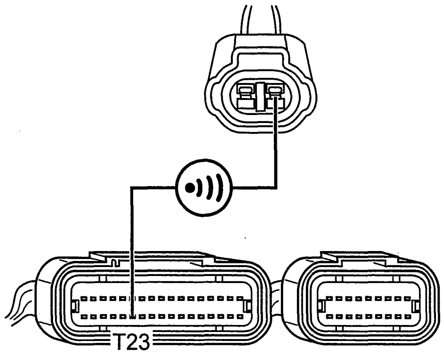
<u>Speed sensor power supply voltage (Without ABS)</u>
[Standard]: 12 V



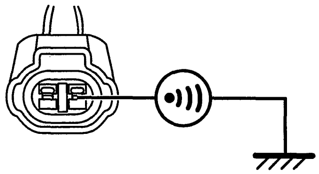
Step 2

Speed sensor circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – B/R wire: less than 1 Ω

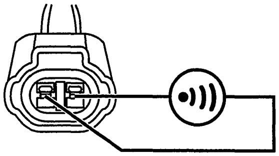


– Between B/R wire and ground: infinity



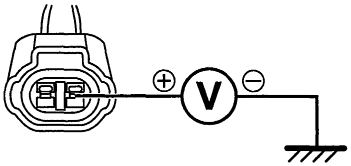
IH18K1110042-01

– Between B/R wire terminal and W/Y wire terminal at front wheel speed sensor coupler: infinity



IH18K1110043-01

- Voltage
  - Turn the ignition switch ON.
  - B/R wire: approx. 0 V



IH18K1110044-01

Is check result OK?

Yes Go to Step 3.

No Repair or replace the B/R wire.

Step 3

Speed sensor – sensor rotor clearance check

1) Turn the ignition switch OFF.
2) Inspect the clearance between the speed sensor and sensor rotor. Refer to “Wheel Speed Sensor – Sensor Rotor Clearance” under “Wheel Speed Sensor and Sensor Rotor Inspection” in Section 4E (Page 4E-44).

Is check result OK?

Yes Go to Step 4.

No Adjust the clearance.

Step 4

Sensor rotor visual check

1) Inspect the speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings. Refer to “Wheel Speed Sensor Rotor” under “Wheel Speed Sensor and Sensor Rotor Inspection” in Section 4E (Page 4E-44).

Is check result OK?

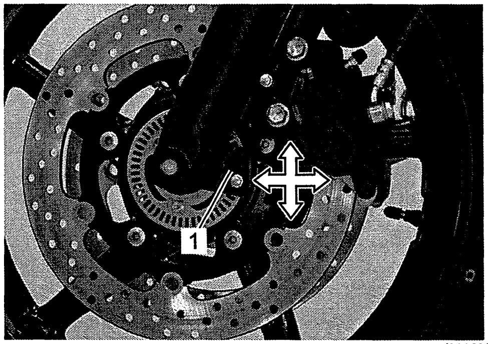
Yes Go to Step 5.

No Clean or replace the sensor rotor. ☞(Page 4E-43)

Step 5

Speed sensor mounting check

1) Check that the speed sensor (1) is mounted securely.



IH18K1450020-01

Is check result OK?

Yes Go to Step 6.

No Tighten the mounting bolt.

Step 6

Speed sensor current check

1) Measure the speed sensor current. Refer to “Wheel Speed Sensor Current” under “Wheel Speed Sensor and Sensor Rotor Inspection” in Section 4E (Page 4E-44).

Is check result OK?

Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

No Replace the speed sensor with a new one. ☞(Page 9C-10)

DTC P0500 (C16) [With ABS]

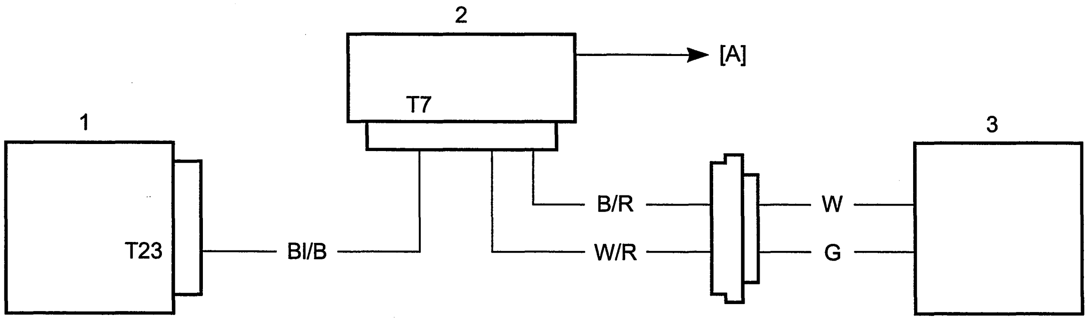
BENJ18K61104025

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0500 (C16): Vehicle Speed Sensor "A" The speed sensor signal is not input for more than 2.5 sec.	• Front wheel speed sensor circuit • ABS control unit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110045-01

[A]: To signal fuse	2. ABS control unit
1. ECM	3. Front wheel speed sensor

Troubleshooting

Step 1

ABS DTC check

1) Check that DTC is detected in ABS. ☞(Page 4E-22)

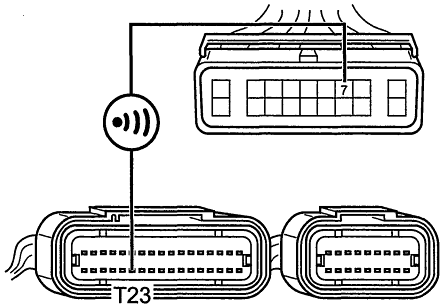
Is the DTC detected?

Yes	Go to troubleshooting for DTCs. Refer to "DTC Table" in Section 4E (Page 4E-25).
No	Go to Step 2.

Step 2

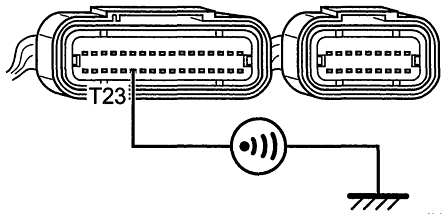
Speed sensor signal circuit check (From ABS control unit to ECM)

1) Turn the ignition switch OFF.
2) Disconnect the ABS control unit coupler and ECM couplers.
   - ABS control unit: ☞(Page 4E-42)
   - ECM: ☞(Page 1C-4)
3) Check for proper terminal connection to the ABS control unit coupler and ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – Bl/B wire: less than 1 Ω



IH18K1110046-01

     – Bl/B wire and ground: infinity



IH18K1110047-01

Is check result OK?

DTC P0506 / P0507 (C65)

BENJ18K61104026

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0506 (C65): ISC System RPM Lower Than Expected Idle speed dropped lower than desired idle speed by more than specified range.	• Air passage • STVA • Engine mechanism
P0507 (C65): ISC System RPM Higher Than Expected Idle speed rose higher than desired idle speed by more than specified range.	

Troubleshooting

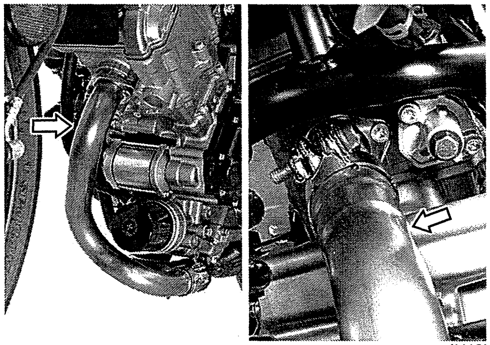
NOTICE

Be careful not to disconnect the STVA 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 unusual value being written in the ECM and causing an error of ISC valve (STV interlinked) operation.

Step 1

Engine combustion check

1) Run the engine at idle speed.
2) By spraying water to exhaust pipes, check evaporation from each of them to make sure for equal combustion among cylinders.



IH18K1110048-01

Is check result OK?

Yes Go to Step 2.

No Repair or replace defective parts.

Step 2

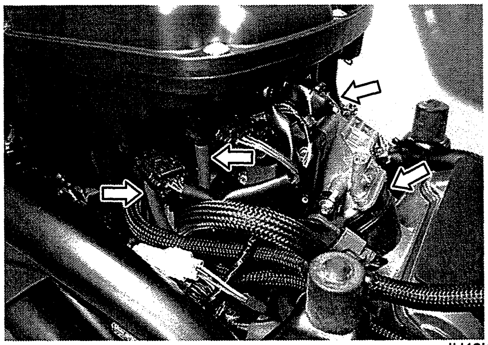
STVA operation check

1) Check STV actuator. Refer to "Step 3" under "DTC P2100 (C28)" (Page 1A-60).

Step 3

Air intake system check

1) Check air intake system air for clogging and leakage.



IH18K1110049-02

Is check result OK?

Yes Go to Step 4.

No Repair or replace defective parts.

Step 4

Engine mechanical systems check

1) Check the following points related to engine mechanical system.
   - Engine compression: ☞(Page 1D-5)
   - Fuel pressure: ☞(Page 1G-6)

Is check result OK?

Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

No Repair or replace defective parts.

DTC P0914 (C31)

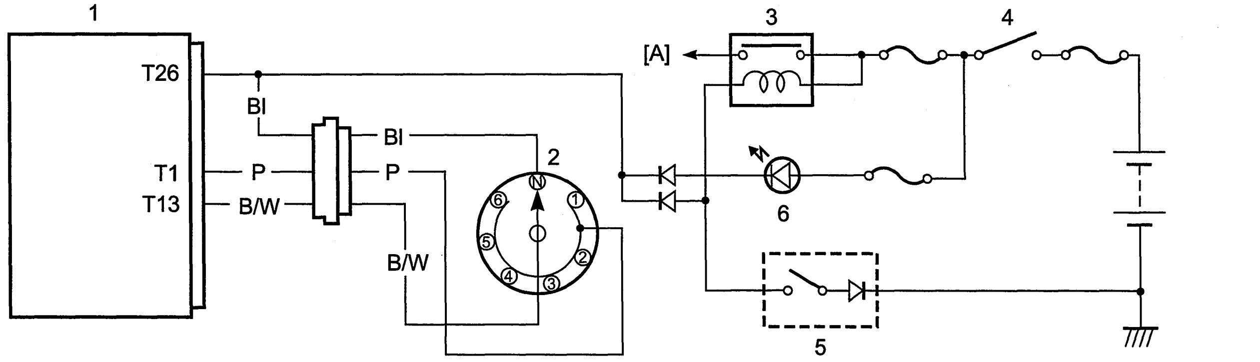
BENJ18K61104027

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0914 (C31): GP Sensor Circuit Gear position signal voltage is lower than the specified value.	• GP switch • GP switch circuit • ECM

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



IH18K1110050-01

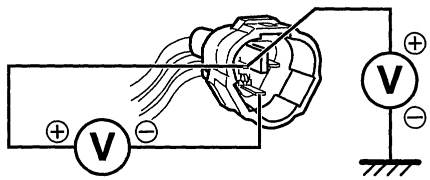
[A]: To engine stop switch	2. GP switch	4. Ignition switch	6. Neutral indicator light
1. ECM	3. Side-stand relay	5. Side-stand switch	

Step 1

GP switch power supply voltage check

1) Turn the ignition switch OFF.
2) Disconnect the GP switch coupler. ☞(Page 5B-12)
3) Support the motorcycle with a jack.
4) Fold the side-stand to up position.
5) Check for proper terminal connection to the GP switch coupler.
6) If connections are OK, turn the ignition switch ON.
7) Measure the voltage between the P wire and ground.
8) If OK, measure the voltage between the P wire and B/W wire.

<u>**GP switch power supply voltage**</u>
[Standard]: 4.5 – 5.5 V



IF04K1110075-01

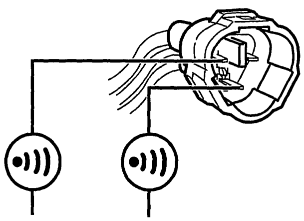
Is check result OK?

Yes	Go to Step 3.
No	Go to Step 2.

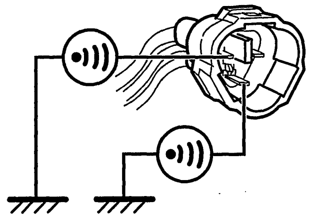
Step 2

GP switch circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     - P wire and B/W wire: less than 1 Ω

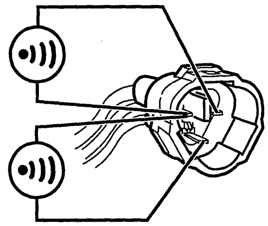


- Between B/W wire and ground: infinity



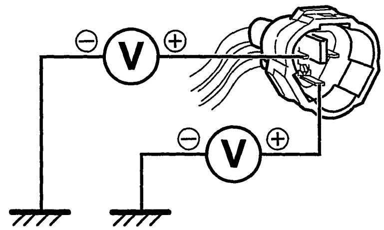
IF04K1110077-01

- Between P wire terminal and other terminal at GP switch coupler: infinity



IF04K1110078-01

- Voltage
  - Turn the ignition switch ON.
  - P wire and B/W wire: approx. 0 V



IF04K1110079-01

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Repair or replace the defective wire harness.

Step 3

GP switch voltage check

1) Turn the ignition switch OFF.
2) Connect the ECM couplers.
3) Measure the GP switch voltage. ☞(Page 5B-11)

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

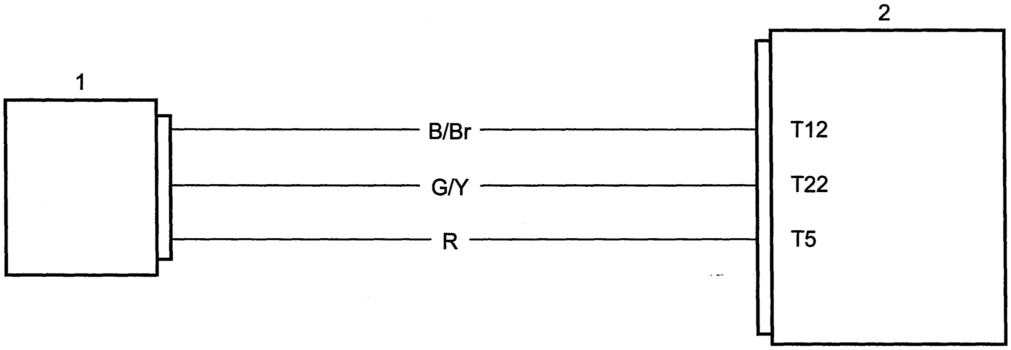
BENJ18K61104028

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1100 (C13): IAP Sensor 2 Circuit The sensor output voltage is higher than 4.80 V.	• Vacuum passage between throttle body and IAP sensor #2 • IAP sensor #2 • IAP sensor #2 circuit • ECM
P1101 (C13): IAP Sensor 2 Circuit Range / Performance The IAP sensor #2 vacuum hose has come off.	
P1102 (C13): IAP Sensor 2 Circuit Low The sensor output voltage is lower than 0.10 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram” (Page 1A-6).



IH18K1110052-01

1. IAP sensor #2	2. ECM

Troubleshooting

NOTE

When DTC P1101 (C13) and P0106 (C17) are detected together, check that each IAP sensor vacuum hose is connected correctly.

Step 1

IAP sensor power supply circuit check

1) Turn the ignition switch OFF.
2) Disconnect the IAP sensor #2 coupler. ☞(Page 1C-5)
3) Check for proper terminal connection to the IAP sensor #2 coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the R wire and B/Br wire.

IAP sensor #2 power supply voltage
[Standard]: 4.75 – 5.25 V

Is check result OK?

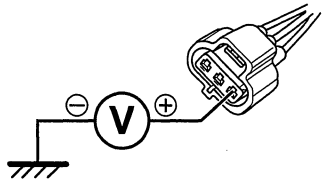
Yes Go to Step 3.

No Go to Step 2.

Step 2

IAP sensor ground circuit check

1) Measure the voltage between the R wire and ground.



ID26J1110028-05

Is voltage same as Step 1?

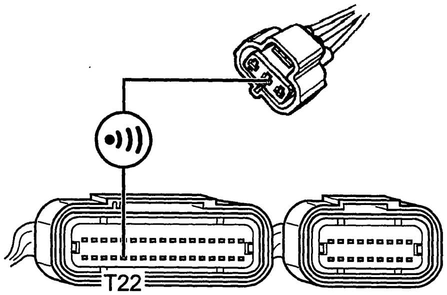
Yes Repair or replace the B/Br wire.

No Repair or replace the R wire.

Step 3

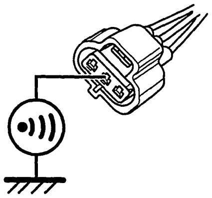
IAP sensor signal circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     - G/Y wire: less than 1 Ω



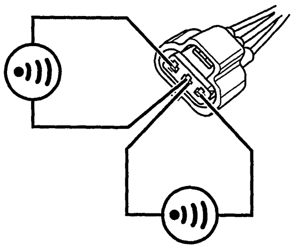
IH18K1110065-01

     - Between G/Y wire and ground: infinity



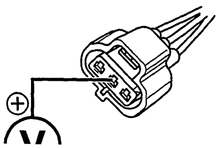
IE31J1110182-02

     - G/Y wire terminal and other terminal at IAP sensor #2 coupler: infinity



IE31J1110183-02

   - Voltage
     - Turn the ignition switch ON.
     - G/Y wire: approx. 0 V



Step 4

IAP sensor output voltage at idle speed check

1) Turn the ignition switch OFF.
2) Connect the ECM couplers and IAP sensor #2 coupler.
3) Measure the IAP sensor #2 output voltage at idle speed. Refer to “IAP Sensor Output Voltage at Idle Speed” under “IAP Sensor Inspection” in Section 1C (Page 1C-4).

Is check result OK?

Yes	Go to Step 5.
No	Check the vacuum hoses for crack or damage. If vacuum hoses are OK, replace the IAP sensor #2 with a new one. ☞(Page 1C-5)

Step 5

IAP sensor output voltage check

1) Turn the ignition switch OFF.
2) Remove the IAP sensor #2. ☞(Page 1C-5)
3) Measure the IAP sensor #2 output voltage. Refer to “IAP Sensor Output Voltage” under “IAP Sensor Removal and Installation” in Section 1C (Page 1C-5).

Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the IAP sensor #2 with a new one. ☞(Page 1C-5)

BENJ18K61104029

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1610 (C42): Ignition Switch Signal Circuit Ignition switch signal is not input to the ECM.	• Ignition switch • Ignition switch circuit • ECM

Troubleshooting

Refer to "Ignition Switch Inspection" in Section 1H (Page 1H-11) for details.

DTC P1700 / P1701 (C23)

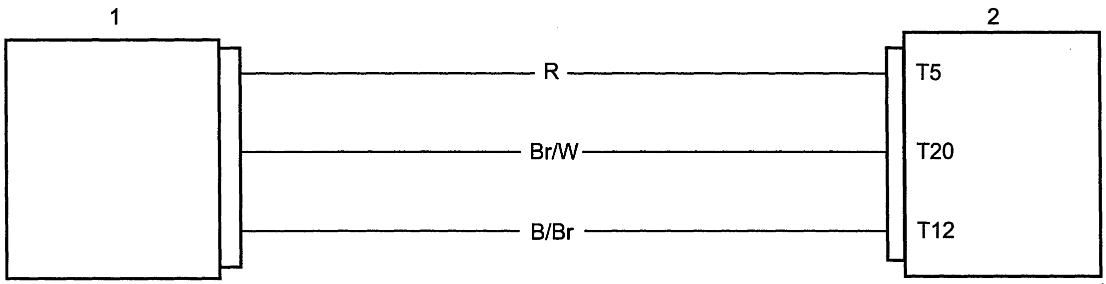
BENJ18K61104030

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1700 (C23): TO Sensor Circuit The sensor output voltage is higher than 4.60 V.	• TO sensor • TO sensor circuit • ECM
P1701 (C23): TO Sensor Circuit Low The sensor output voltage is lower than 0.20 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110054-02

1. TO sensor	2. ECM

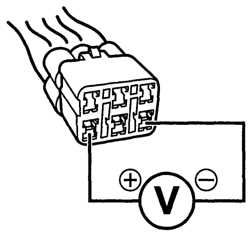
Troubleshooting

Step 1

TO sensor power supply circuit check

1) Turn the ignition switch OFF.
2) Disconnect the TO sensor coupler. ☞(Page 1C-12)
3) Check for proper terminal connection to the TO sensor coupler.
4) If connections are OK, turn the ignition switch ON.
5) Measure the voltage between the R wire and B/Br wire.

<u>**TO sensor power supply voltage**</u>
[Standard]: 4.5 – 5.5 V



ID26J1110153-02

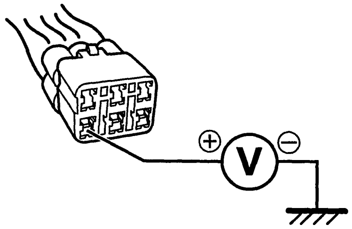
Is check result OK?

Yes Go to Step 3.

Step 2

TO sensor ground circuit check

1) Measure the voltage between the R wire and ground.



ID26J1110154-02

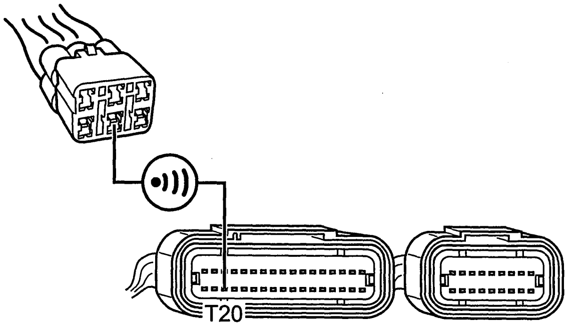
Is voltage same as Step 1?

Yes	Repair or replace the B/Br wire.
No	Repair or replace the R wire.

Step 3

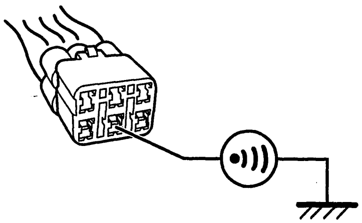
TO sensor signal circuit check

1) Turn the ignition switch OFF.
2) Disconnect the ECM couplers. ☞(Page 1C-4)
3) Check for proper terminal connection to the ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – Br/W wire: less than 1 Ω



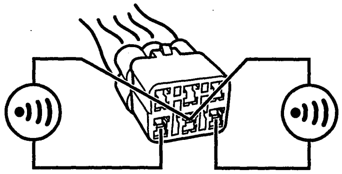
IH18K1110055-01

     – Between Br/W wire and ground: infinity



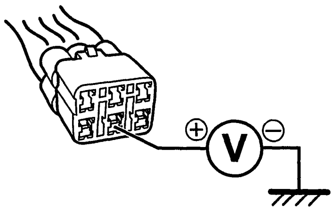
ID26J1110156-03

     terminal at TO sensor coupler: infinity



ID26J1110157-03

   - Voltage
     – Turn the ignition switch ON.
     – Br/W wire: approx. 0 V



ID26J1110158-02

Is check result OK?

Yes	Go to Step 4.
No	Repair or replace the Br/W wire.

Step 4

TO sensor output voltage check

1) Turn the ignition switch OFF.
2) Connect the ECM couplers and TO sensor coupler.
3) Measure the TO sensor output voltage. Refer to “TO Sensor Output Voltage” under “TO Sensor Inspection” in Section 1C (Page 1C-11).

Is check result OK?

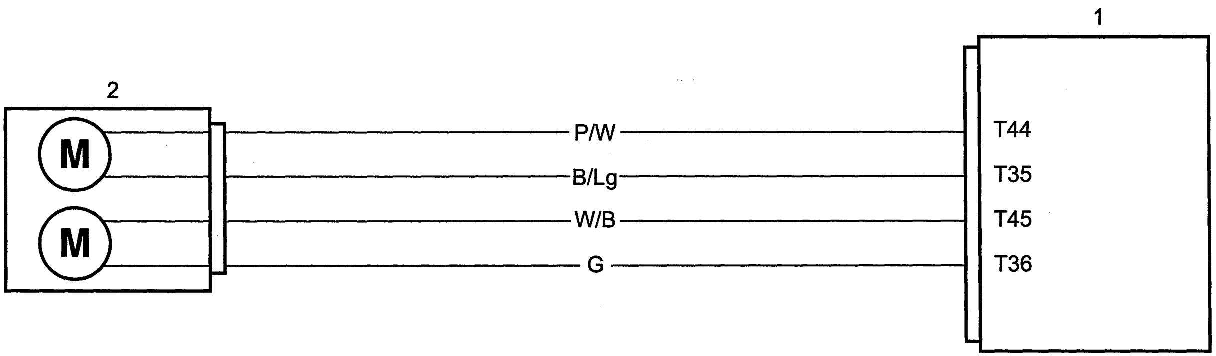
Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
No	Replace the TO sensor with a new one. ☞(Page 1C-12)

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P2100 (C28): Throttle Actuator "A" Control Motor Circuit STVA control signal is not supplied from the ECM. ECM does not receive communication signal from the STVA or operation voltage does not reach STVA.	• STVA • STVA circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-6).



IH18K1110056-01

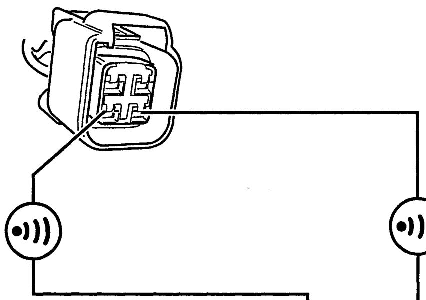
1. ECM	2. STVA

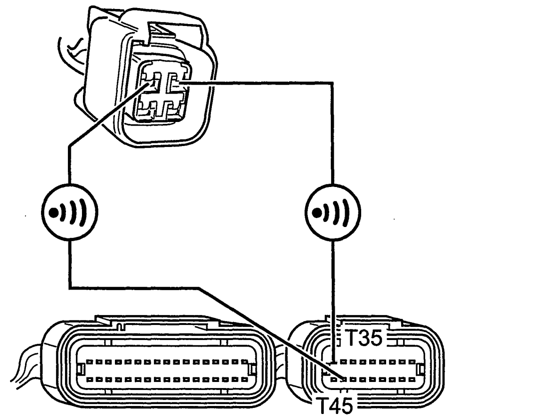
Troubleshooting

Step 1

STVA circuit check

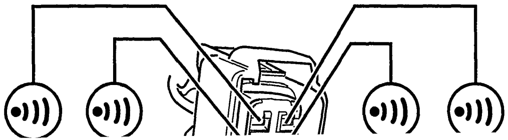
1) Turn the ignition switch OFF.
2) Disconnect the STVA coupler and ECM couplers.
   - STVA: ☞(Page 1C-14)
   - ECM: ☞(Page 1C-4)
3) Check for proper terminal connection to the STVA coupler and ECM couplers.
4) If connections are OK, check the following points.
   - Resistance
     – P/W, B/Lg, W/B and G wires: less than 1 Ω



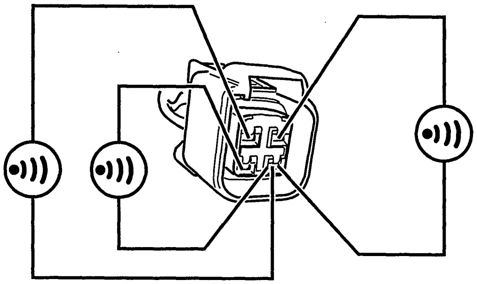


IH18K1110058-01

– Between P/W wire and ground: infinity
– Between B/Lg wire and ground: infinity
– Between W/B wire and ground: infinity
– Between G wire and ground: infinity

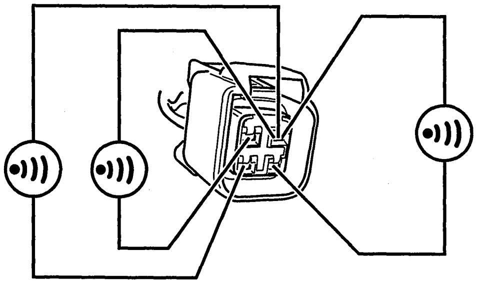


Between P/W wire terminal and other terminal at STVA coupler: infinity



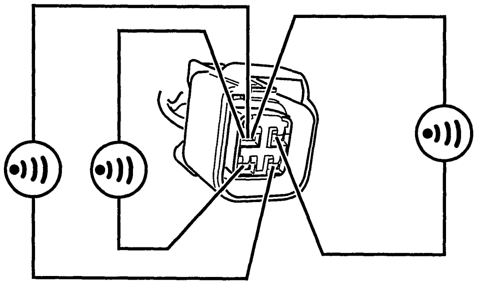
IE31J1110140-01

– Between B/Lg wire terminal and other terminal at STVA coupler: infinity



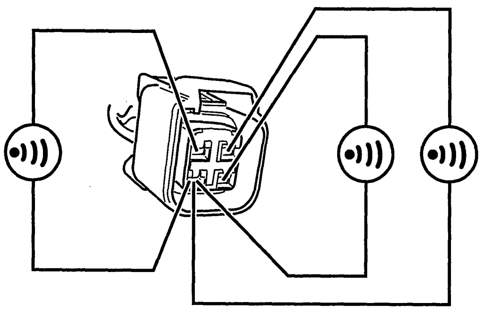
IE31J1110142-01

– Between W/B wire terminal and other terminal at STVA coupler: infinity



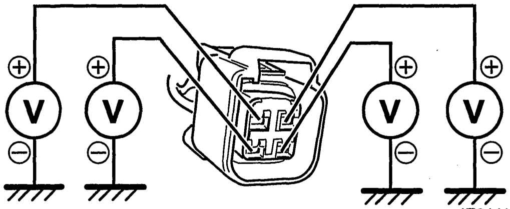
IE31J1110143-01

– Between G wire terminal and other terminal at STVA coupler: infinity



IE31J1110141-01

– Turn the ignition switch ON.
– P/W, B/Lg, W/B and G wires: approx. 0 V



IE31J1110144-02

Is check result OK?

Yes	Go to Step 2.
No	Repair or replace the defective wire harness.

Step 2
STVA resistance check

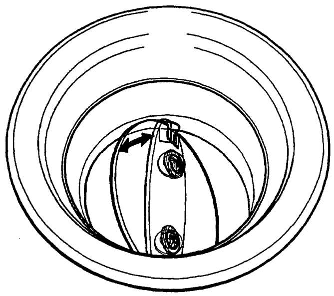
1) Turn the ignition switch OFF.
2) Measure the STVA resistance. ☞(Page 1C-14)

Is check result OK?

Yes	Go to Step 3.
No	Replace the throttle body with a new one. ☞(Page 1D-10)

Step 3
STV operation check

1) Remove the air cleaner element. ☞(Page 1D-7)
2) Connect the STVA coupler and ECM couplers.
3) Check whether the STVs open by turning the ignition switch ON.



I705H1110063-01

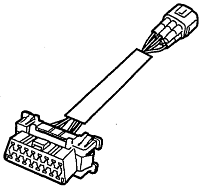
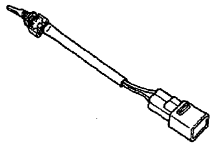
Is check result OK?

Yes	Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)

Special Tools and Equipment

Special Tool

BENJ18K61108001

09904–41051 Conversion cable ☞(Page 1A-3) 	09930–82720 Mode selection switch ☞(Page 1A-5) / ☞(Page 1A-15) 

Emission Control Devices

Precautions

Precautions for Emission Control Devices

BENJ18K61200001

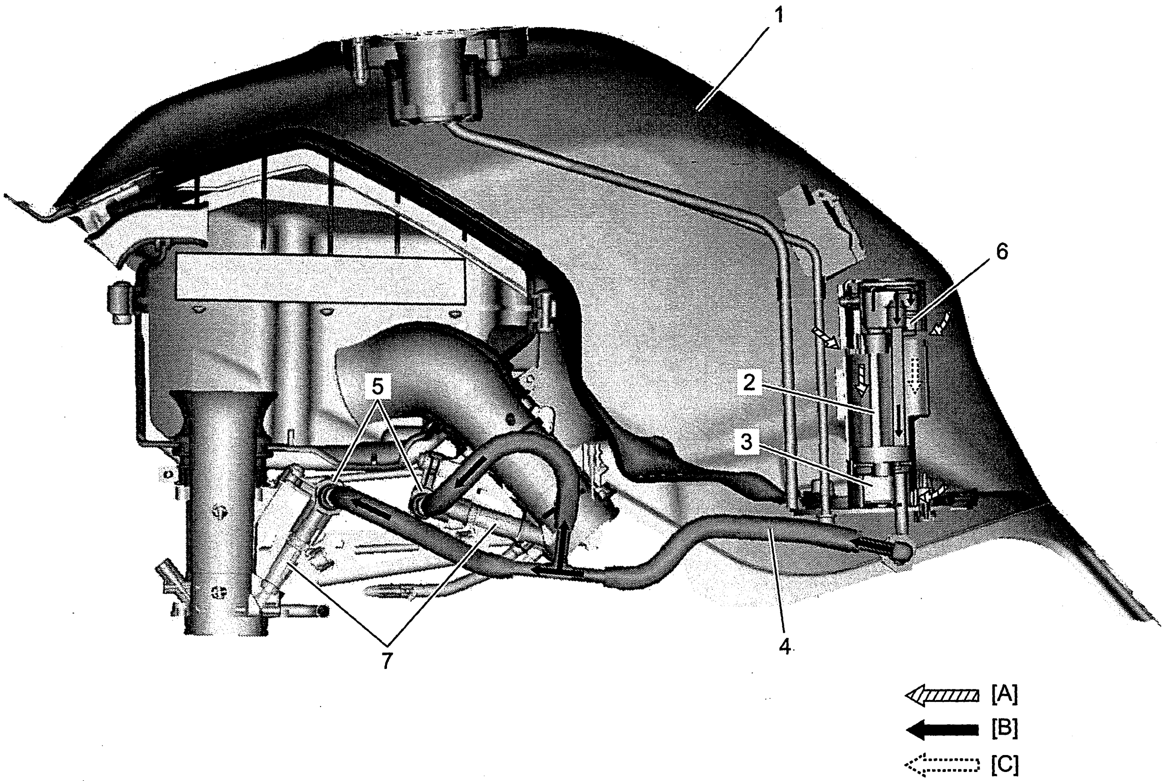
Refer to "General Precautions" in Section 00 (Page 00-1), "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) and "Precautions for Circuit Tester" in Section 00 (Page 00-7).

General Description

Fuel Injection System Description

BENJ18K61201001

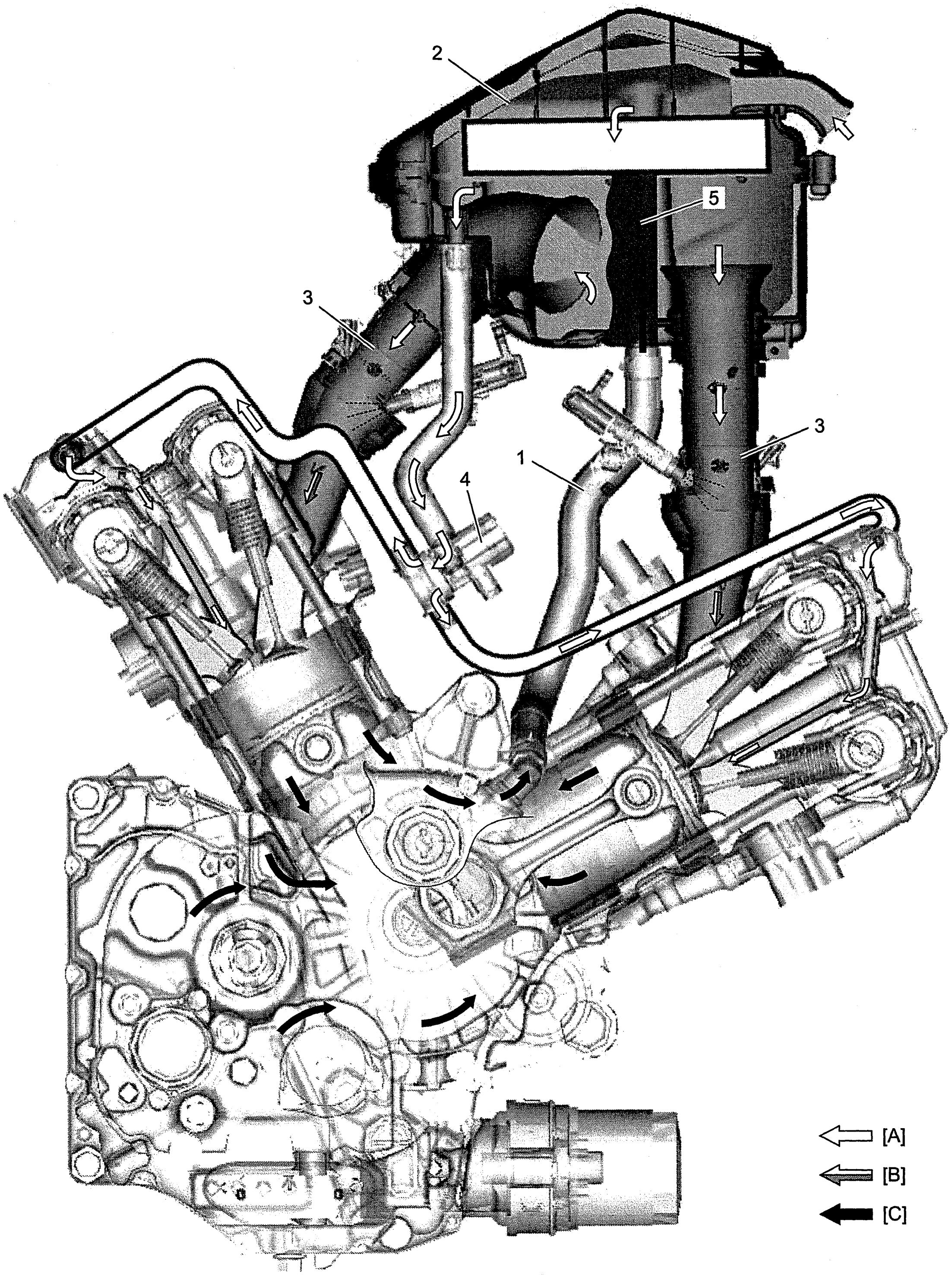
SV650/A motorcycles are equipped with a fuel injection system for emission level control. This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits. With varying engine conditions, all of the fuel injection volumes are precisely controlled 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.



IH18K1120001-02

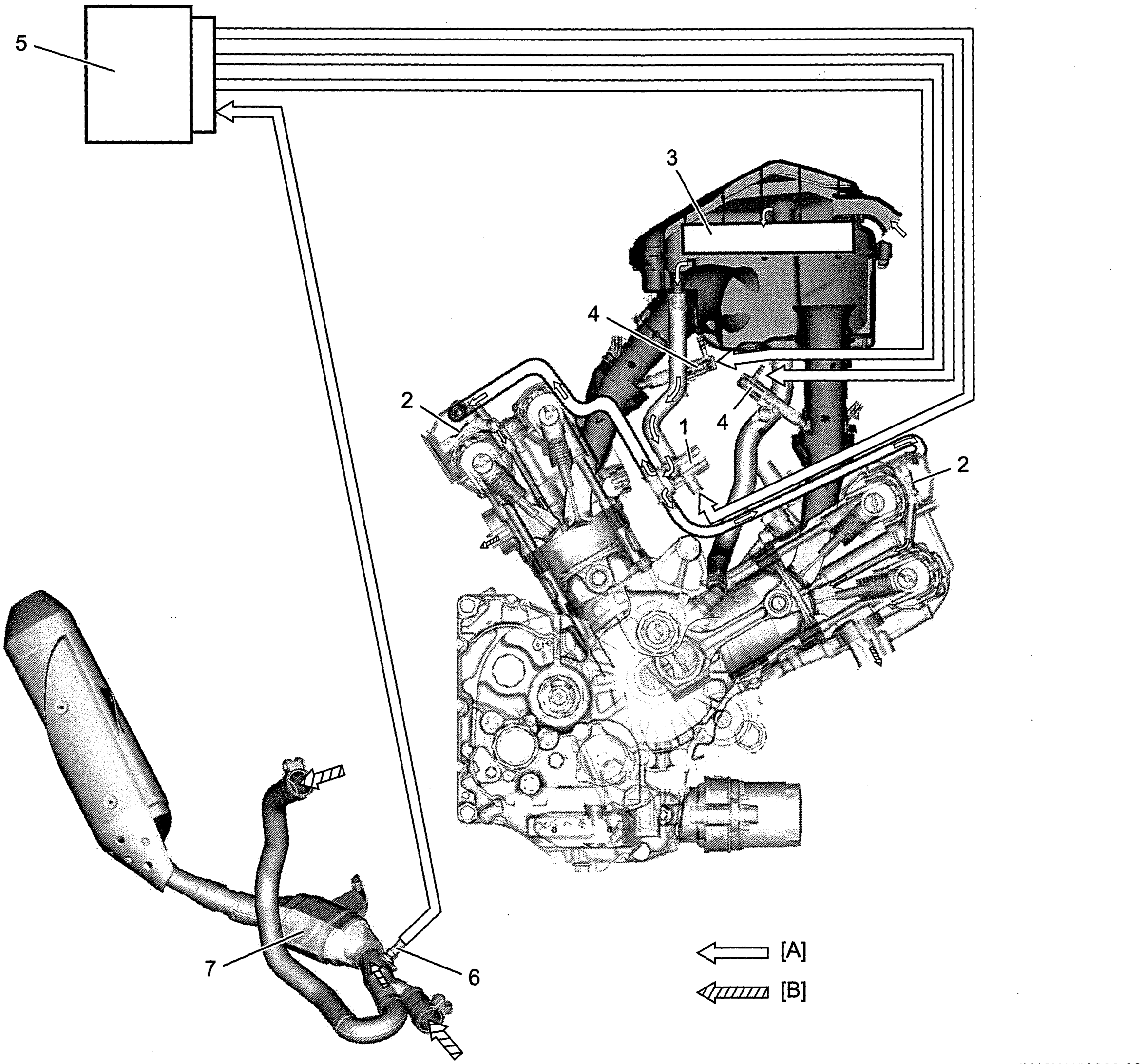
[A]: Before-pressurized fuel	1. Fuel tank	4. Fuel feed hose	7. Fuel injector
[B]: Pressurized fuel	2. Fuel pump	5. Fuel delivery pipe	
[C]: Relieved fuel	3. Fuel mesh filter	6. Fuel pressure regulator	

The engine is equipped with a PCV system. Blow-by gas in the engine is constantly drawn into the crankcase, which is returned to the combustion chamber through the PCV (breather) hose (1), air cleaner (2) and throttle body (3).



Exhaust Emission Control System Description

The exhaust emission control system is composed of the PAIR system (If equipped), exhaust control system, HO2 sensor, three way catalyst system and ISC system. The fresh air is drawn into the exhaust ports through the PAIR control solenoid valve and PAIR reed valves (If equipped). The PAIR control solenoid valve (If equipped) is operated by the ECM, which is controlled according to the signals from TPS, ECTS, IATS, IAPS and CKPS. ISC valve (secondary throttle valve interlinked) 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.



IH18K1120003-03

[A]: Fresh air	2. PAIR reed valve (If equipped)	5. ECM
[B]: Exhaust gas	3. Air cleaner chamber	6. HO2 sensor
1. PAIR control solenoid valve (If equipped)	4. Fuel injector	7. Three-way catalyst

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

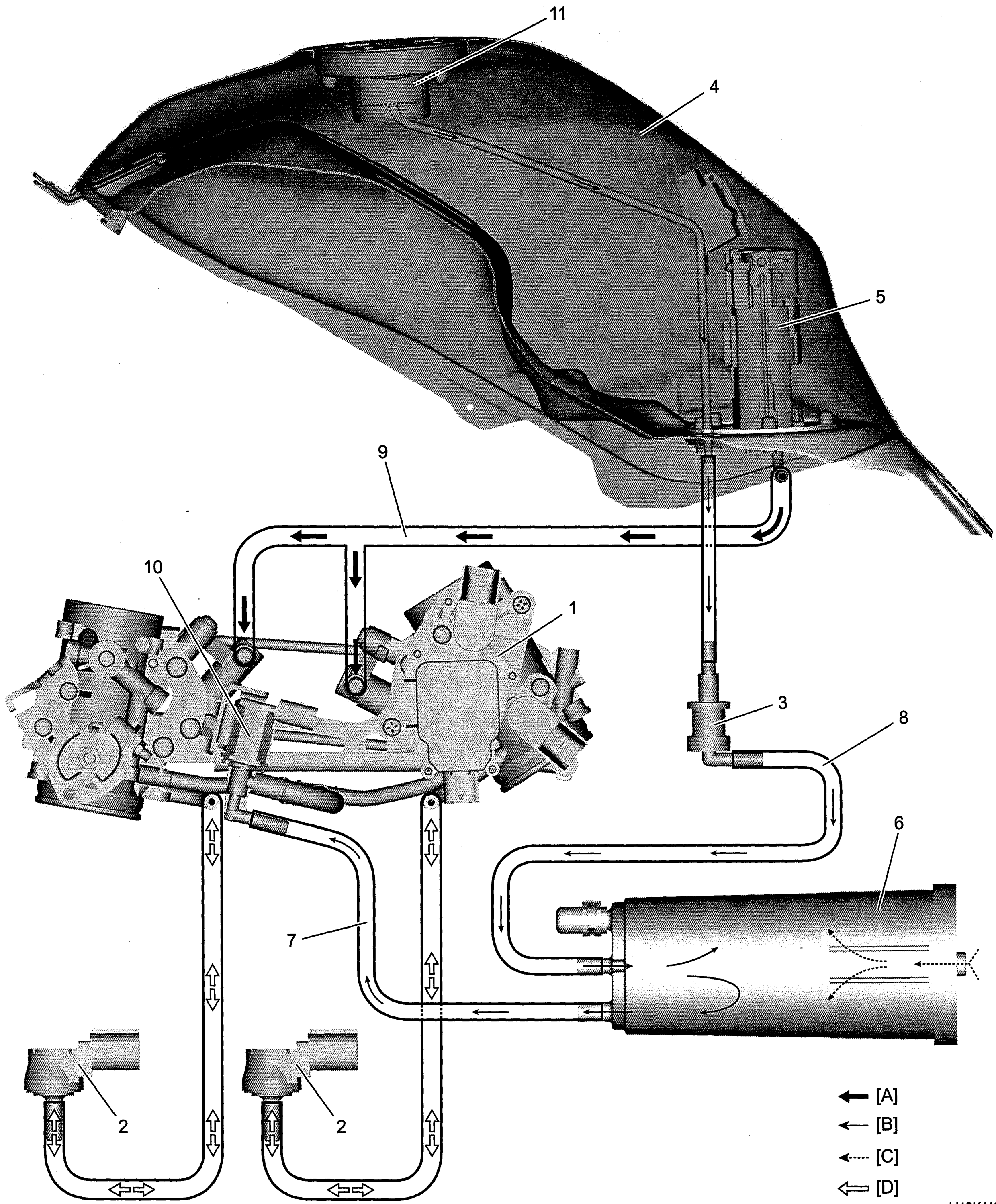
- The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use.
- The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

Evaporative Emission Control System Diagram (If Equipped)

BENJ18K61201005

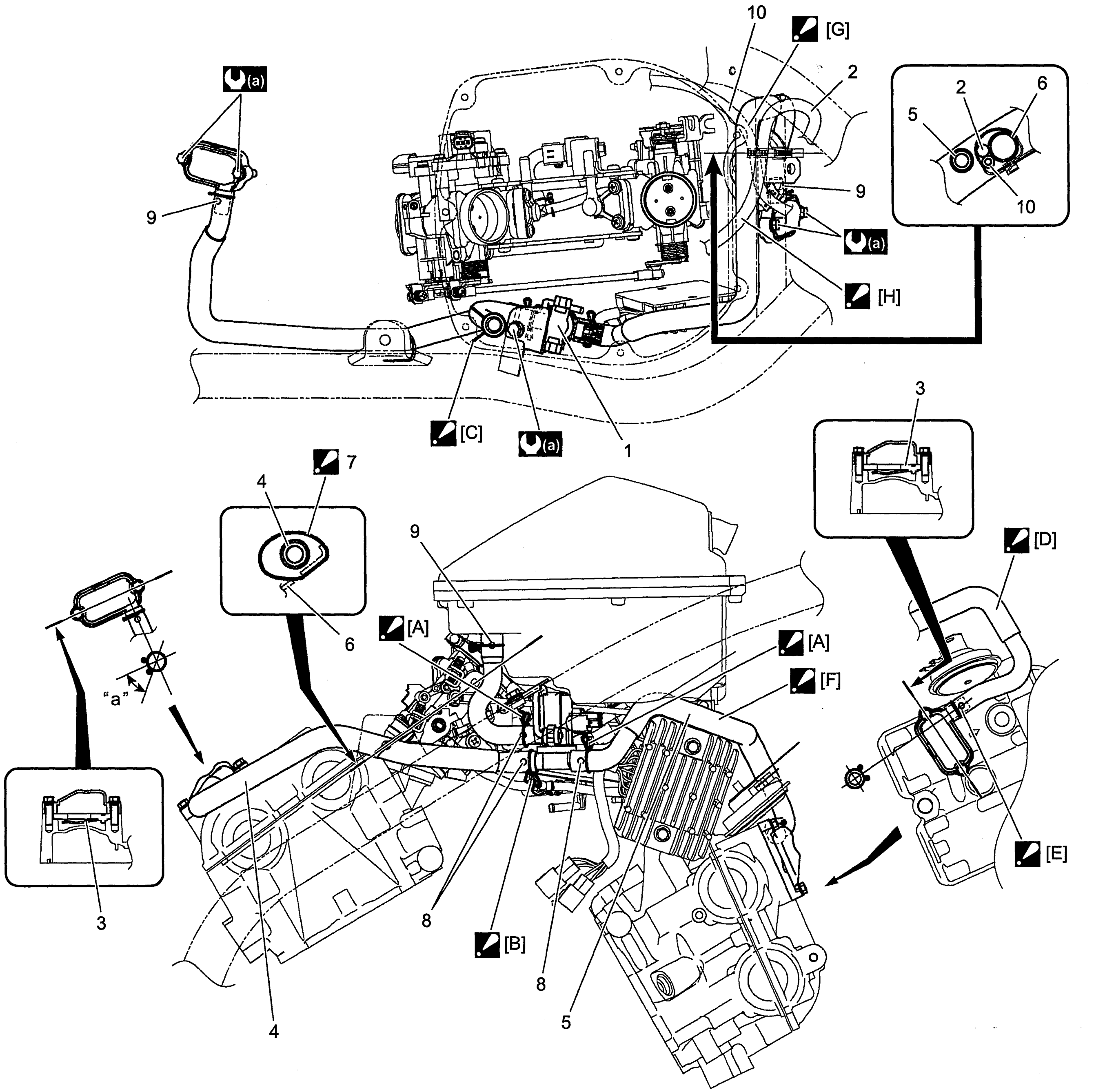


IJ18K1120001-02

[A]: Fuel	2. IAP sensor	7. Purge hose

PAIR System Hose Routing Diagram (If Equipped)

BENJ18K61202001

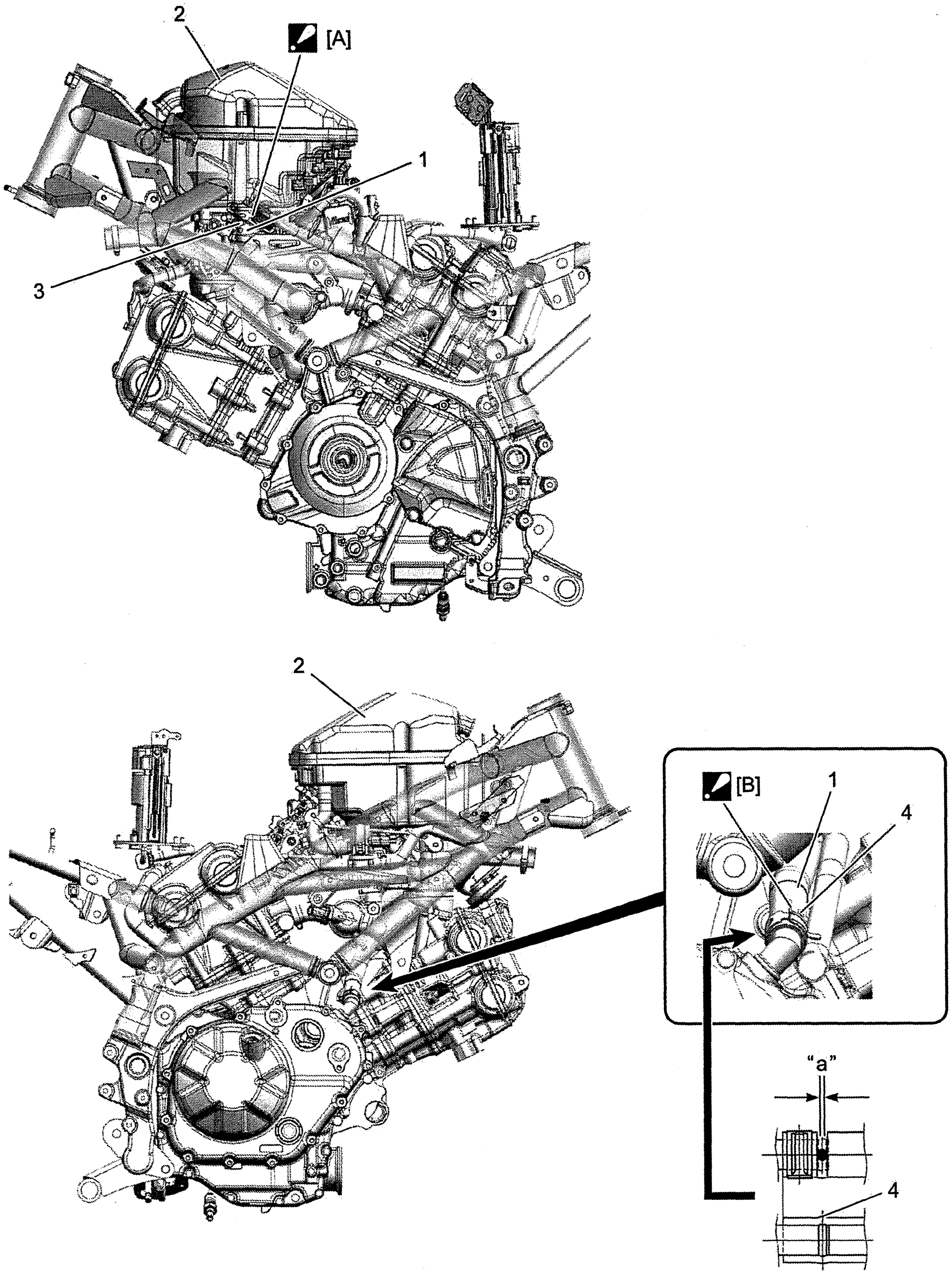


IH18K1120023-02

[A]:	Face the clamp end upward.	3.	PAIR reed valve
[B]:	Face the clamp end downward.	4.	PAIR rear hose
[C]:	Face the clamp end backward.	5.	PAIR front hose
[D]:	Pass the PAIR front hose outside of the horn. Do not contact the PAIR front hose to the horn.	6.	Frame

PCV Hose Routing Diagram

BENJ18K61202002



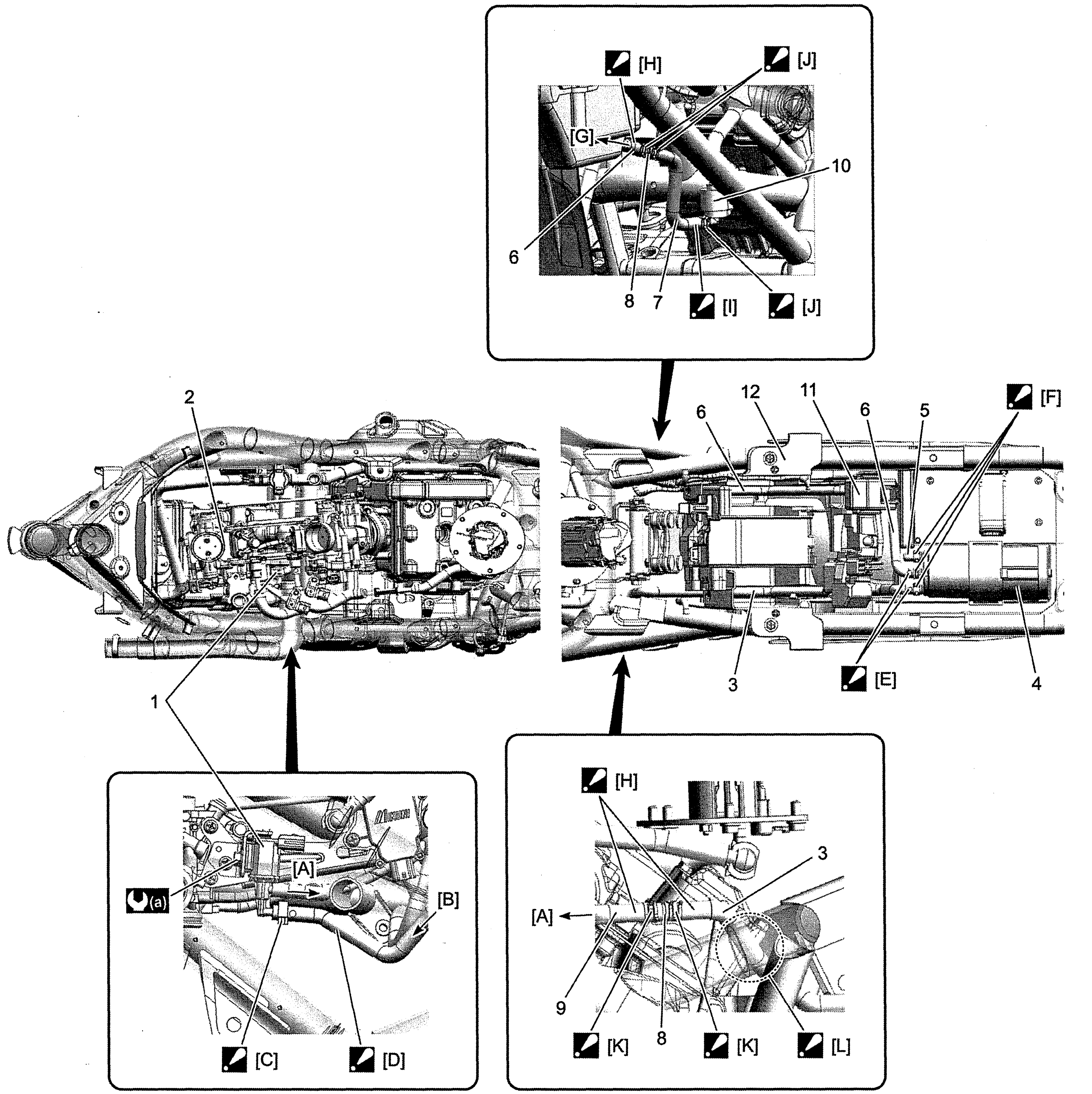
IH18K1120024-02

[A]:	Face the clamp end backward.	3.	Yellow mark
[B]:	Face the clamp end forward. Do not contact the starter motor lead wire and water hose.	4.	White mark
1.	PCV hose	"a":	Clearance
2.	Air cleaner box		

Canister Hose Routing Diagram (If Equipped)

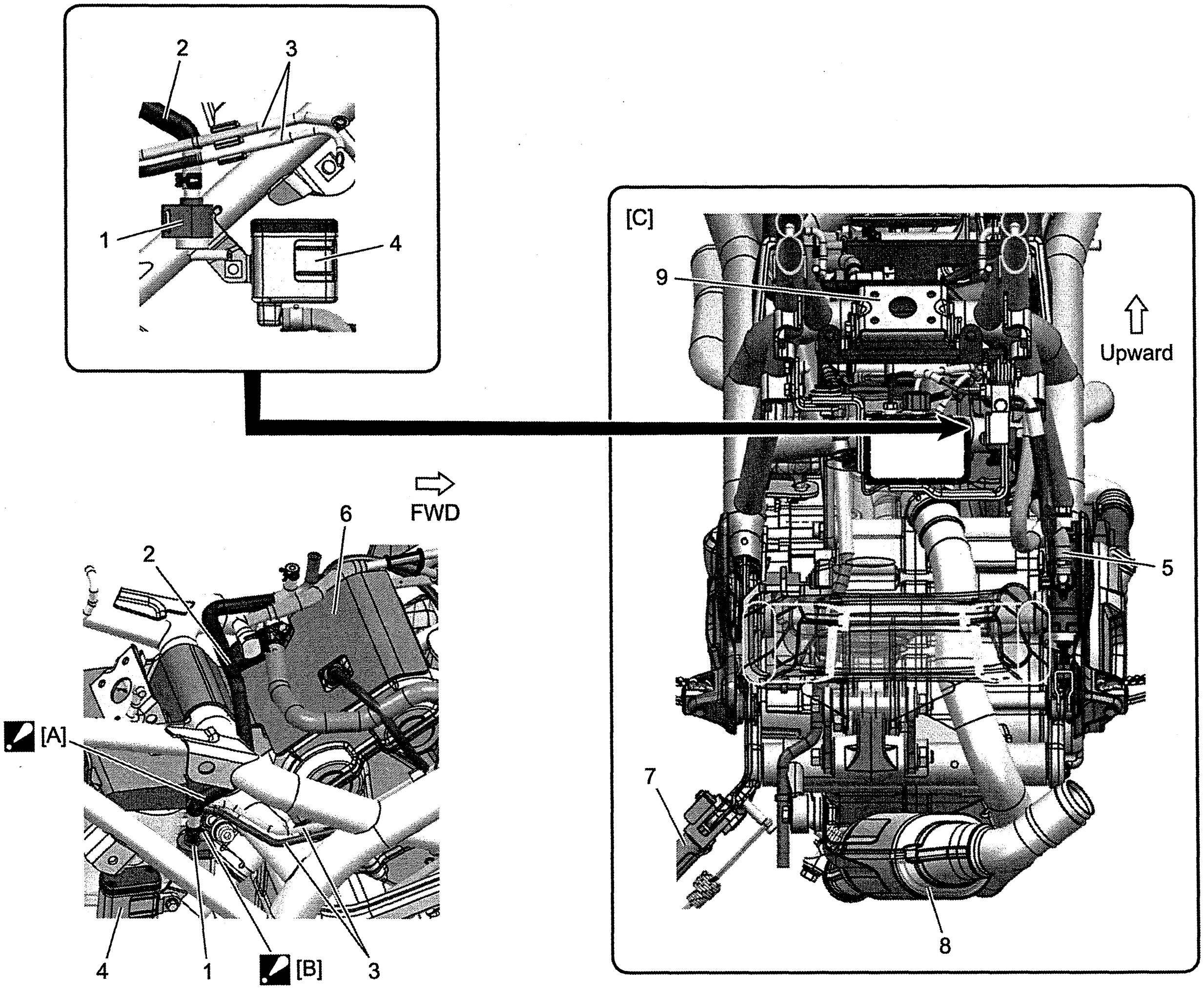
BENJ18K61202003

L7



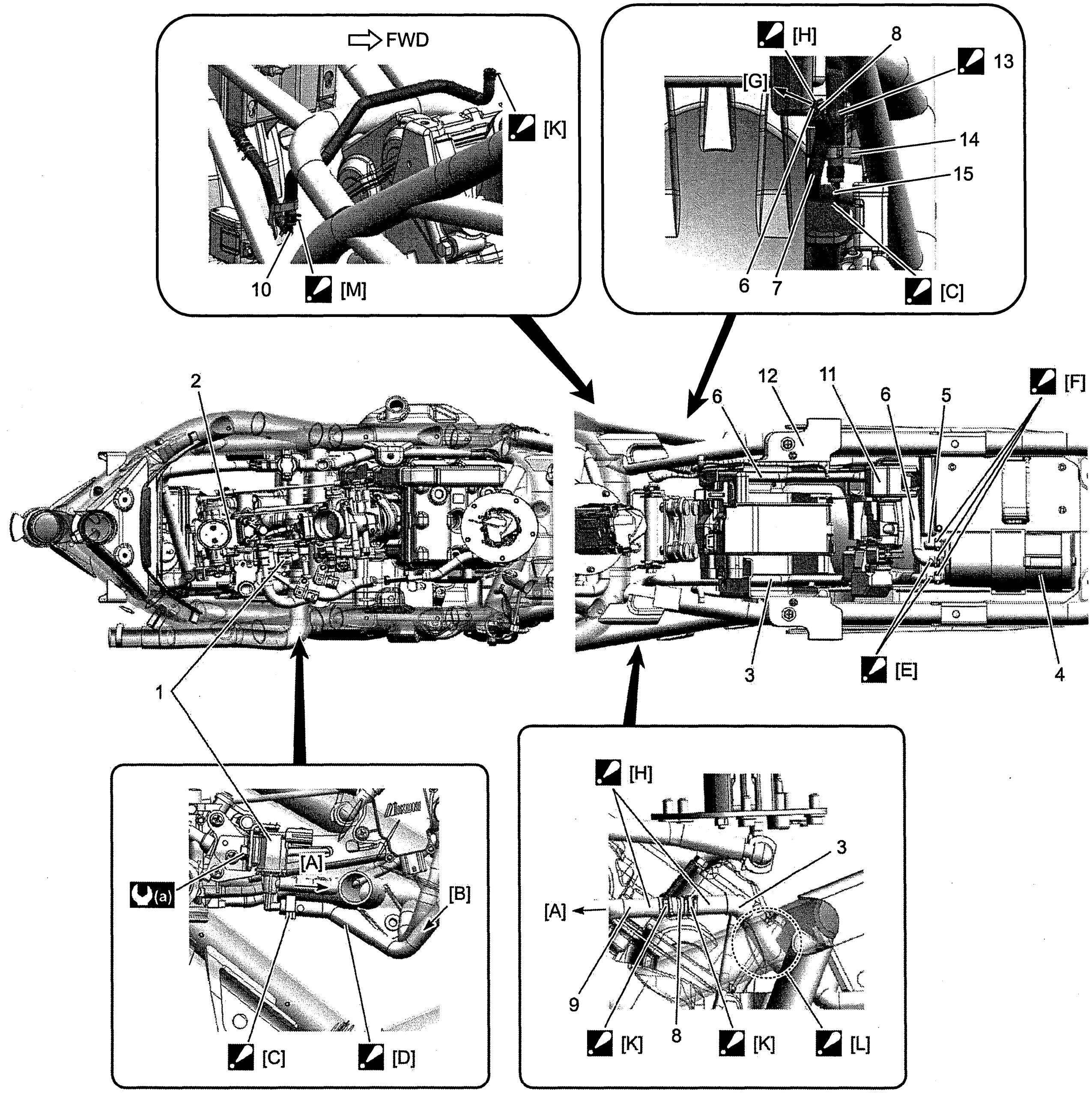
IH18K1120025-02

[A]: To throttle body	2. Throttle body
[B]: From EVAP canister	3. Purge hose No. 1
[C]: Face the clamp end downward.	4. EVAP canister
[D]: Pass the purge hose under the frame.	5. Canister purge cap
[E]: Face the white mark upward.	6. Surge hose No. 2



IH18K1120026-01

[A]:	Pass the fuel tank breather hose outside of the ABS pipe. (If equipped)	2.	Fuel tank breather hose	6.	Rear cylinder
[B]:	Face the clamp end forward.	3.	ABS pipe (With ABS)	7.	Side-stand
[C]:	Vehicle viewed from the backward.	4.	Rear brake reservoir tank	8.	Center exhaust pipe
1.	Fuel shut-off valve	5.	Rear brake master cylinder	9.	Fuel tank



IJ18K1120002-03

[A]: To throttle body	3. Purge hose No. 1
[B]: From EVAP canister	4. EVAP canister
[C]: Face the clamp end downward.	5. Canister purge cap
[D]: Pass the purge hose under the frame.	6. Surge hose No. 2
[E]: Face the white mark upward.	7. Surge hose No. 1
[F]: Face the clamp end upward.	8. Hose joint
[G]: To EVAP canister	9. Purge hose No. 2
[H]: Face the yellow mark upward.	10. Hose joint (L type)
[I]: Face the white mark to right side.	11. Starter relay

PAIR Reed Valve Removal and Installation (If Equipped)

BENJ18K61206001

Removal

⚠ WARNING

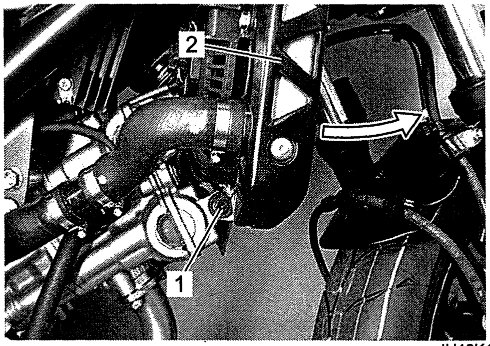
The hot radiator and hot engine can burn you.
Wait until the radiator and the engine are cool enough to touch.

Front side

1) Remove the radiator mounting bolt (1).
2) Move the radiator (2) forward.

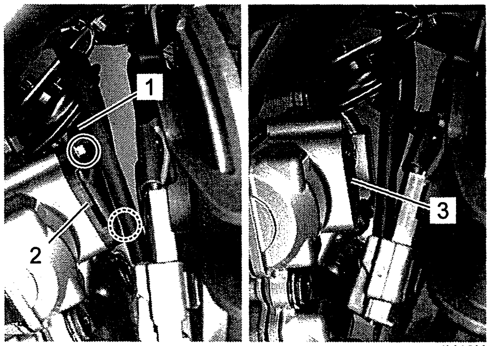
NOTICE

Be careful not to damage the radiator fins.



IH18K1120009-02

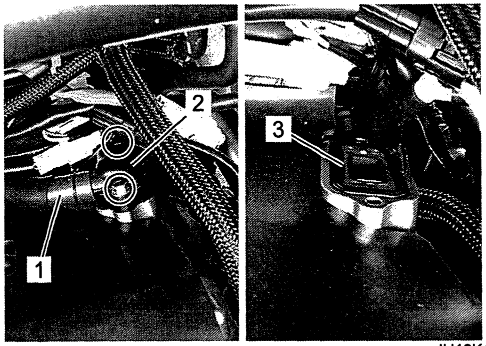
3) Disconnect the PAIR hose (1) and remove the PAIR reed valve cover (2).
4) Remove the PAIR reed valve (3).



IH18K1120010-02

Rear side

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the PAIR hose (1) and remove the PAIR reed valve cover (2).
3) Remove the PAIR reed valve (3).



IH18K1120011-01

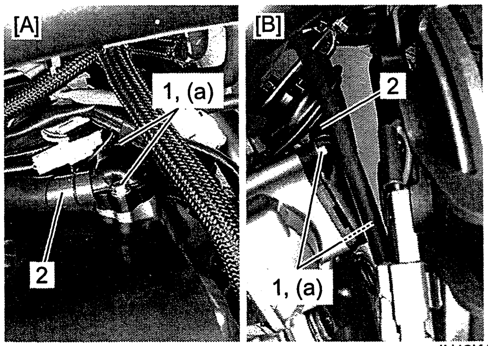
Installation

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

- Tighten PAIR reed valve cover bolts (1) to the specified torque.

  Tightening torque
  PAIR reed valve cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- Connect the PAIR hose (2). Refer to “PAIR System Hose Routing Diagram (If Equipped)” (Page 1B-6).



IH18K1120012-01

[A]: Rear side	[B]: Front side

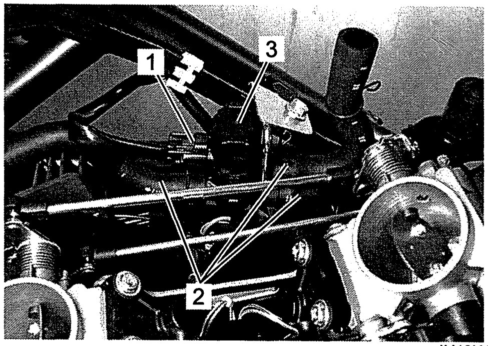
- Install the radiator. ☞(Page 1F-8)

Control Solenoid Valve Removal and Installation (If Equipped)

BENJ18K61206002

Removal

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Disconnect the PAIR control solenoid valve coupler (1) and PAIR hoses (2).
3) Remove the PAIR control solenoid valve (3).



IH18K1120013-01

Installation

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

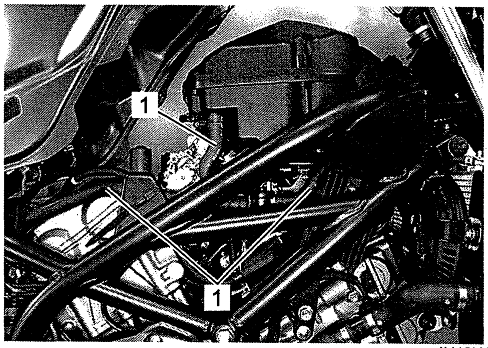
- Connect the PAIR hoses properly. Refer to "PAIR System Hose Routing Diagram (If Equipped)" (Page 1B-6).

PAIR System Inspection (If Equipped)

BENJ18K61206003

PAIR Hose

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Inspect the PAIR hoses (1) for wear or damage. If it is worn or damaged, replace the PAIR hose with a new one. ☞(Page 1B-13)

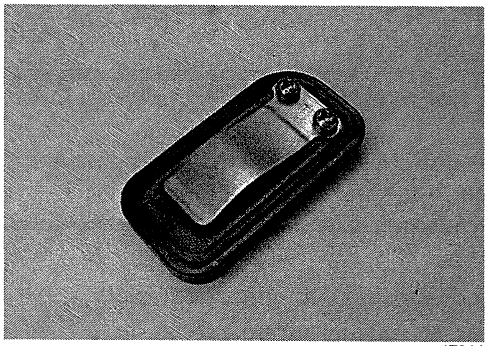


IH18K1120014-01

3) Install the removed parts.

PAIR Reed Valve

1) Remove the PAIR reed valve. ☞(Page 1B-11)
2) Inspect the reed valves for carbon deposit.
   If carbon deposit is found on the reed valve, replace the PAIR reed valve with a new one.

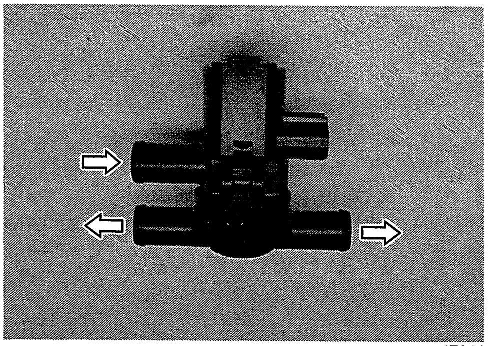


IF31J1120010-01

3) Install the PAIR reed valve. ☞(Page 1B-11)

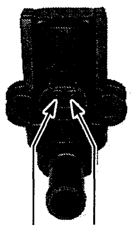
PAIR Control Solenoid Valve

1) Remove the PAIR control solenoid valve. ☞(Page 1B-12)
2) Check that air flows through the air inlet port to the air outlet ports. If air does not flow out, replace the PAIR control solenoid valve with a new one.



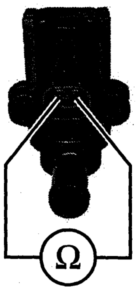
IF31J1120011-01

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.



4) Check the resistance between the terminals of the PAIR control solenoid valve. If the resistance is out of the specified value, replace the PAIR control solenoid valve with a new one.

PAIR solenoid valve resistance (If equipped)
20 – 30 °C (68 – 86 °F) [Standard] 20 – 24 Ω



IF31J1120013-01

5) Install the PAIR control solenoid valve. ☞(Page 1B-12)

PAIR Hose Removal and Installation (If Equipped)

BENJ18K61206004

Refer to "PAIR System Hose Routing Diagram (If Equipped)" (Page 1B-6).

Removal

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Move the radiator forward. Refer to "PAIR Reed Valve Removal and Installation (If Equipped)" (Page 1B-11).
3) Remove the PAIR hose.

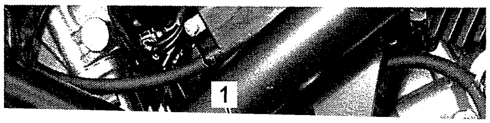
Installation

1) Install the PAIR hose.
2) Install the removed parts.

PCV Hose Inspection

BENJ18K61206005

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Inspect the PCV hose (1) for wear and damage. If it is worn or damaged, replace the PCV hose with a new one. ☞(Page 1B-13)
3) Check that the PCV hose (1) is securely connected.



PCV Hose Removal and Installation

BENJ18K61206006

Refer to "PCV Hose Routing Diagram" (Page 1B-7).

Removal

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Remove the PCV hose.

Installation

1) Install the PCV hose.
2) Install the removed parts.

EVAP Control System Removal and Installation (If Equipped)

BENJ18K61206007

Refer to "EVAP Canister Hose Routing Diagram (If Equipped)" (Page 1B-8).

Hose

Removal

1) Remove the EVAP system purge control solenoid valve. Refer to "EVAP System Purge Control Solenoid Valve" (Page 1B-14).
2) Remove the fuel shut-off valve. Refer to "Fuel Shut-off Valve" (Page 1B-14).
3) Remove the EVAP hoses.

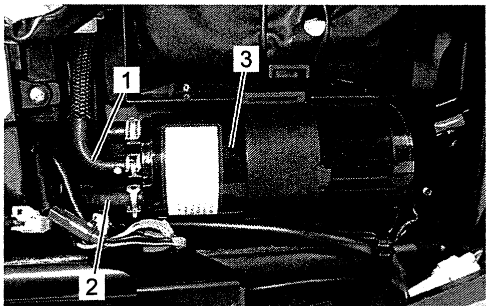
Installation

1) Install the EVAP hoses.
2) Install the removed parts.

EVAP Canister

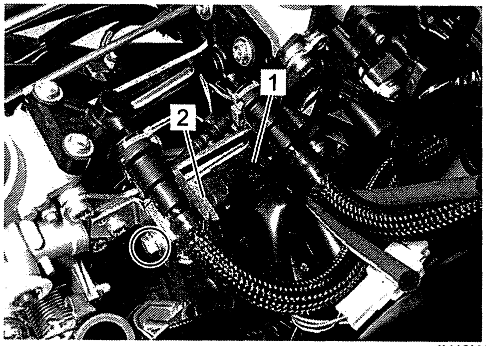
Removal

1) Remove the seat. ☞(Page 9D-18)
2) Disconnect the surge hose No. 2 (1) and purge hose No. 1 (2).
3) Remove the EVAP canister (3).



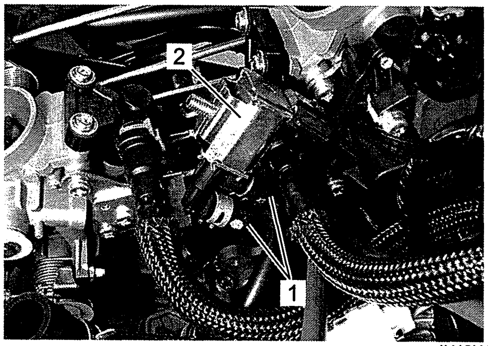
Removal

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Disconnect the coupler (1) and remove the EVAP system purge control solenoid valve (2).



IH18K1120017-01

3) Disconnect the purge hoses (1) and remove the EVAP system purge control solenoid valve (2).



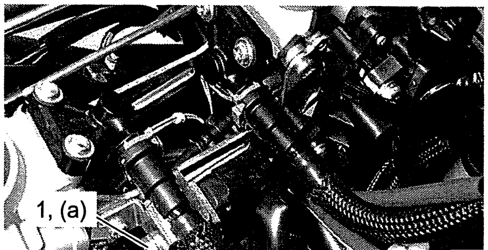
IH18K1120018-01

Installation

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

- Tighten the EVAP system purge control solenoid valve nut (1) to the specified torque.

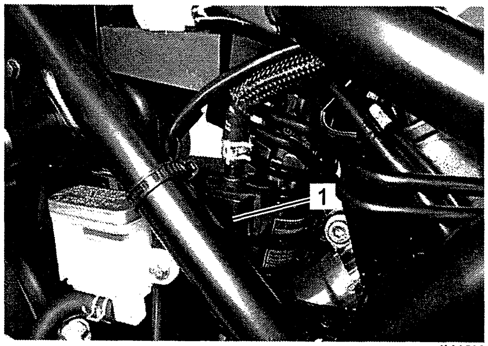
Tightening torque
EVAP system purge control solenoid valve nut (a): 7.0 N·m (0.71 kgf-m, 5.20 lbf-ft)



L7

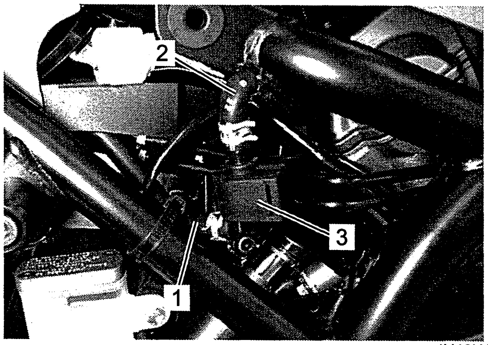
Removal

1) Remove the right frame front cover. ☞(Page 9D-22)
2) Remove the fuel shut-off valve (1).



IH18K1120020-01

3) Disconnect the surge hose No. 1 (1) and fuel tank breather hose (2).
4) Remove the fuel shut-off valve (3).



IH18K1120021-01

Installation

Install the fuel shut-off valve in the reverse order of removal.

L8 –

Refer to "Fuel Tank Cap Removal and Installation" in Section 1G (Page 1G-9).

EVAP Control System Inspection (If Equipped)

BENJ18K61206008

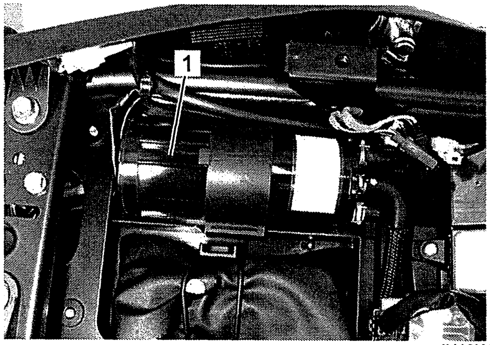
Refer to “EVAP Control System Removal and Installation (If Equipped)” (Page 1B-13).

Hose

Inspect the hoses for wear or damage. If it is worn or damage, replace the hose with a new one.

EVAP Canister

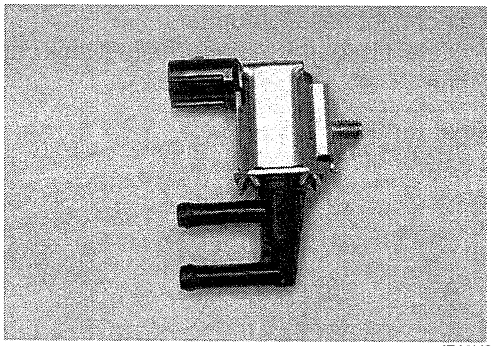
Inspect the EVAP canister body for damage to the body. If any defect is found, replace the EVAP canister (1) with a new one.



IH18K1120022-01

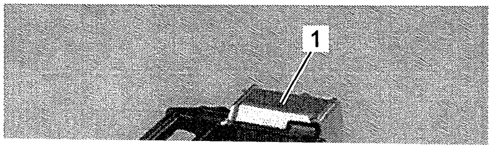
EVAP System Purge Control Solenoid Valve

1) Check that no air flows through both of the air inlet and outlet ports. If air flows out, replace the EVAP system purge control solenoid valve with a new one.



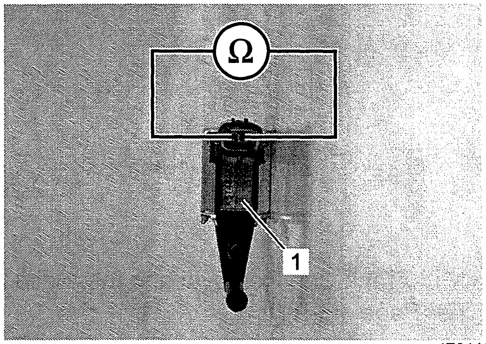
I718H2120003-03

2) Connect the 12 V battery to the terminals of the EVAP system purge control solenoid valve (1) and check the air flow. If air flows out, the solenoid valve is in normal condition.



EVAP system purge control solenoid valve (1). If the resistance is not within the standard range, replace the EVAP system purge control solenoid valve with a new one.

EVAP system purge control solenoid valve resistance (If equipped)
20 °C (68 °F) [Standard] 30 – 34 Ω



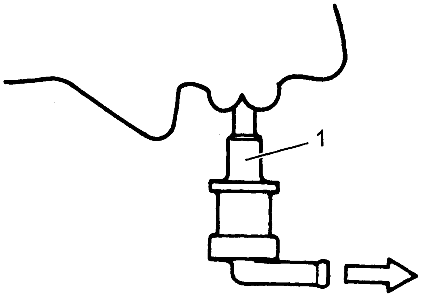
IE31J1120016-01

Fuel Shut-off Valve
L7

⚠ WARNING

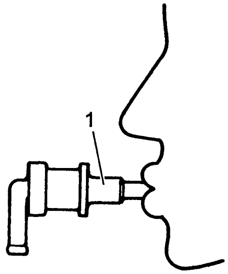
Gasoline and gasoline vapor is toxic. A small amount of fuel remains in the fuel shut-off valve when checking it.
Do not swallow the fuel when blowing the fuel shut-off valve.

1) When air is blown into the fuel shut-off valve with its side (1) positioned upward, the air can pass through to the canister side.



IE31J1120017-01

7) When air is blown into the fuel shut-off valve with its side (1) positioned sideways, the air cannot pass through to the canister side.
If the fuel shut-off valve operates otherwise, it must be replaced.

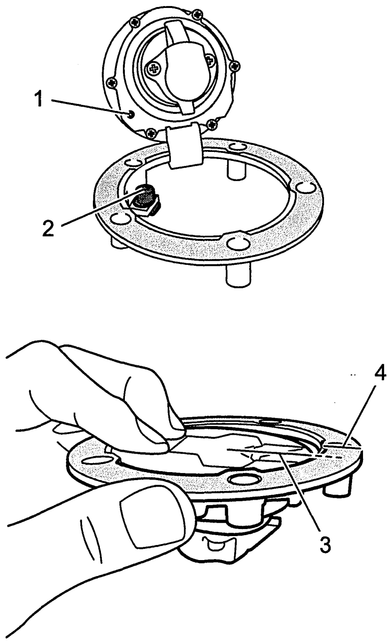


IE31J1120018-01

L8 –

Refer to “Fuel Tank Cap Removal and Installation” in Section 1G (Page 1G-9).

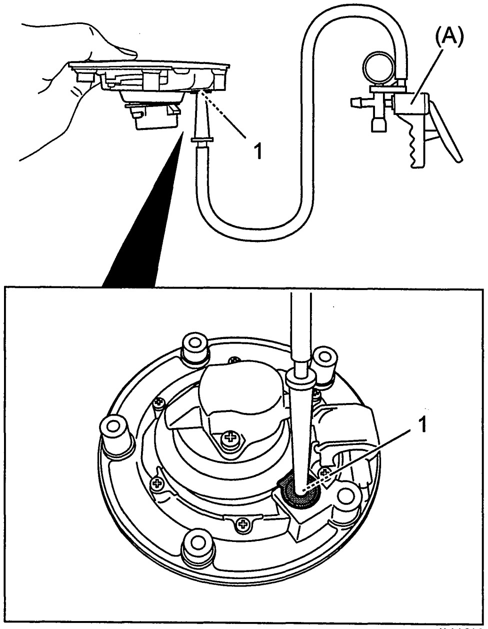
1) Hold the fuel tank cap so that the fuel tank cap breather hole (1) is aligned with and closely contacts the packing breather port (2) and the fuel tank cap upper surface (3) is located lower than the fuel tank cap ring upper surface (4).



IH13K1120032-03

2) Keep the step 1), connect the vacuum pump gauge to the breather port (1) with the fuel tank cap turned upright, and give positive pressure to check that air can pass through.

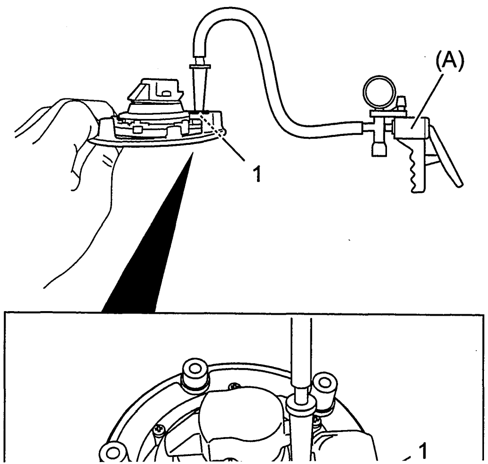
Special tool
(A): 09917–47011



IH13K1120033-03

3) Keep the step 1), connect the vacuum pump gauge to the breather port (1) with the fuel tank cap turned upside down, and give negative pressure to check that air cannot pass through.
If any defect is found, replace the fuel tank cap with a new one.

Special tool
(A): 09917–47011



Specifications

Tightening Torque Specifications

BENJ18K61207001

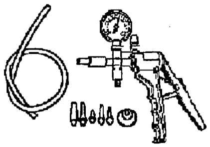
Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
PAIR reed valve cover bolt	10	1.0	7.5	☞(Page 1B-11)
EVAP system purge control solenoid valve nut	7.0	0.71	5.20	☞(Page 1B-14)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"PAIR System Hose Routing Diagram (If Equipped)" (Page 1B-6)
"EVAP Canister Hose Routing Diagram (If Equipped)" (Page 1B-8)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Special Tool

BENJ18K61208001

09917–47011 Vacuum pump gauge set ☞(Page 1B-16) / ☞(Page 1B-16) 	

Engine Electrical Devices

Precautions

Precautions for Engine Electrical Device

BENJ18K61300001

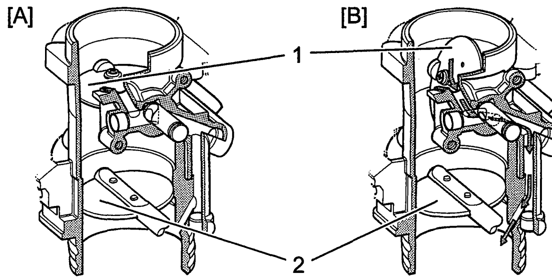
Refer to “General Precautions” in Section 00 (Page 00-1), “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2) and “Precautions for Circuit Tester” in Section 00 (Page 00-7).

General Description

ISC Valve System Description

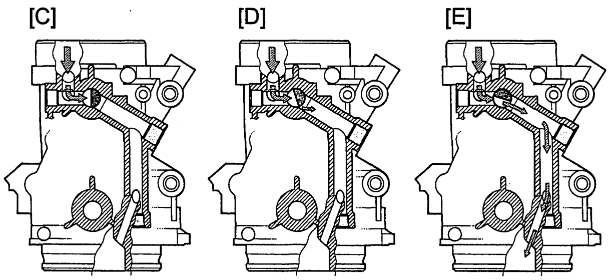
BENJ18K61301001

The ISC valve system is interlinked with the secondary throttle valve. In the throttle body is provided a bypass through which air volume is varied when the cutaway on the secondary throttle shaft is moved, causing the engine idle speed to be adjusted.



IE31J1130001-01

[A]: When ISC Valve is Closed.	1. Secondary throttle valve
[B]: When ISC Valve is Opened.	2. Throttle valve



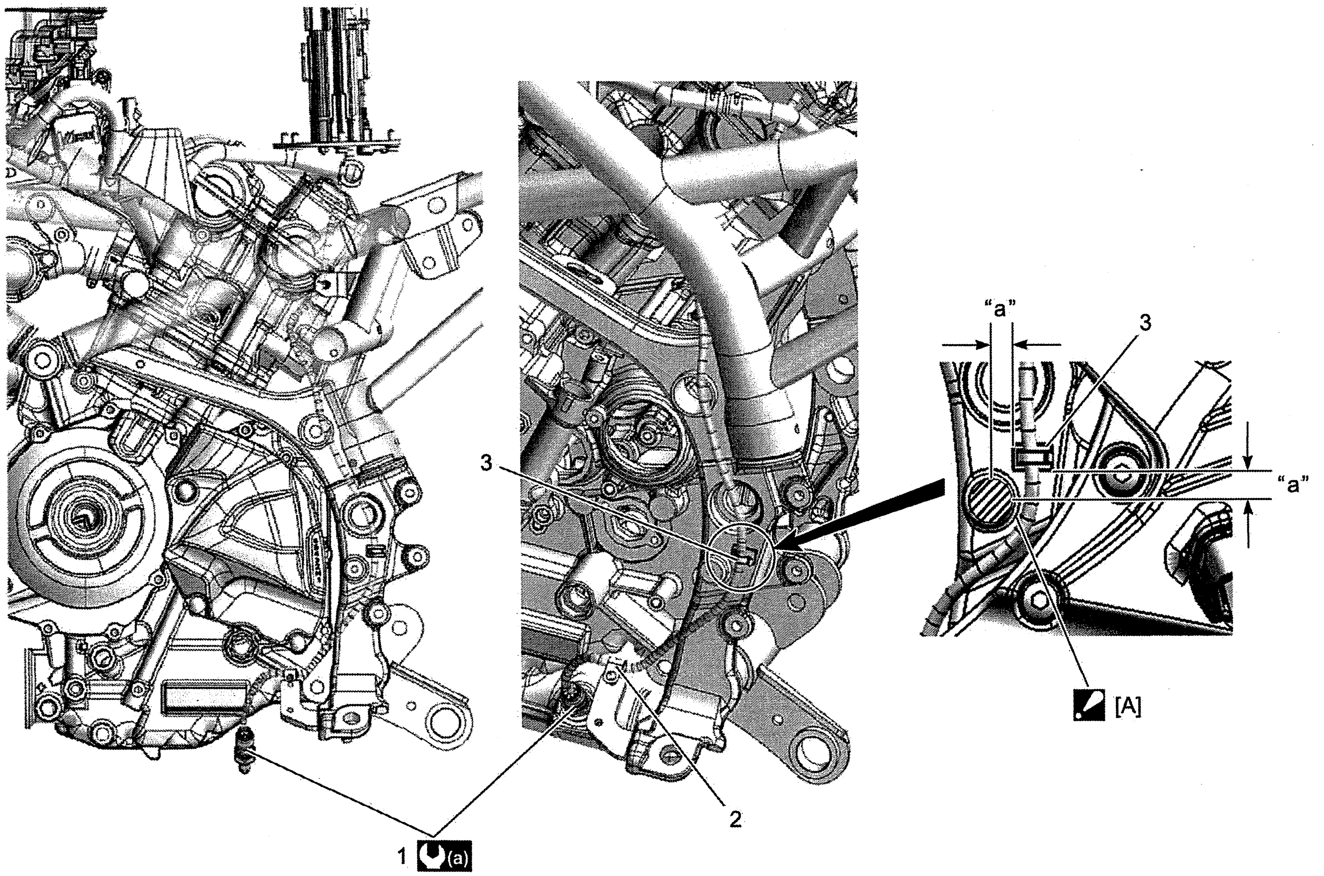
IE31J1130005-01

[C]: Opening angle is 0%	[E]: Opening angle is 80% or more
[D]: Opening angle is 20%	

Schematic and Routing Diagram

HO2 Sensor Lead Wire Routing Diagram

BENJ18K61302001



IH18K1130044-03

[A]: Do not pass the HO2 sensor lead wire onto the hatched area.	3. HO2 sensor lead wire upper clamp
1. HO2 sensor	"a": 10 – 15 mm (0.40 – 0.59 in)
2. HO2 sensor lead wire clamp	(a) : 25 N·m (2.5 kgf-m, 18.5 lbf-ft)

Component Location

Engine Electrical Components Location

BENJ18K61303001

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

Diagnostic Information and Procedures

Engine Symptom Diagnosis

BENJ18K61304001

Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-10).

ISC Valve (Secondary Throttle Valve Interlinked) Inspection

BENJ18K61306001

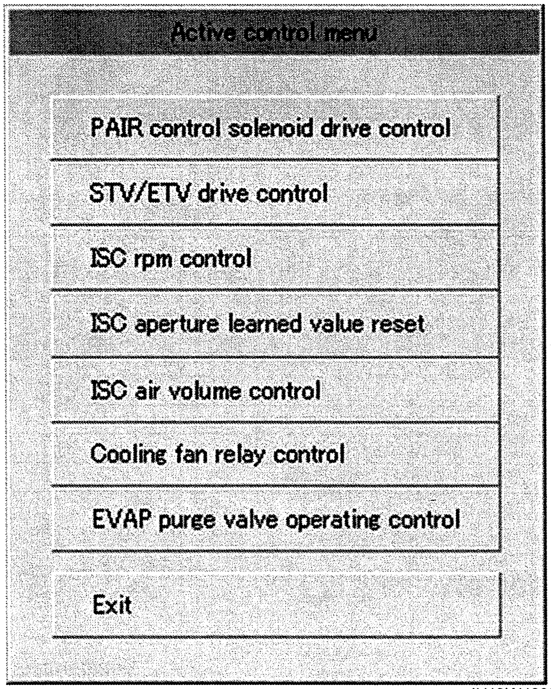
Refer to "STP Sensor Inspection and Adjustment" (Page 1C-12).

ISC Aperture Learned Value Reset

BENJ18K61306002

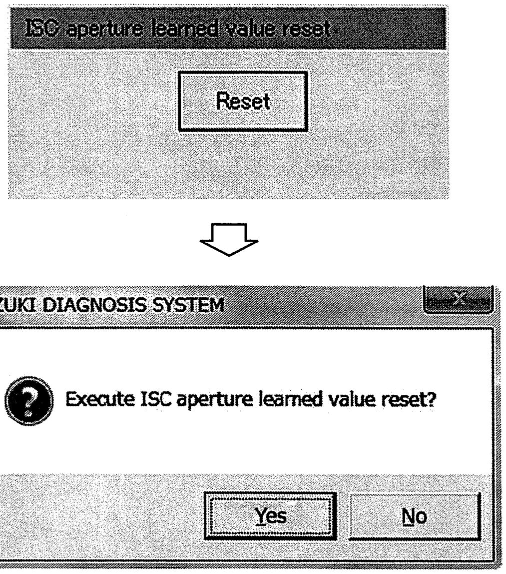
When disassembling or replacing the throttle body, reset the ISC aperture learned value to the following procedures:

1) Remove the seat. ☞(Page 9D-18)
2) Set up the SDS tool referring to the SDS operation manual for further details.
3) Turn the ignition switch ON.
4) Click the "Active control".
5) Click the "ISC aperture learned value reset".



IH18K1130046-01

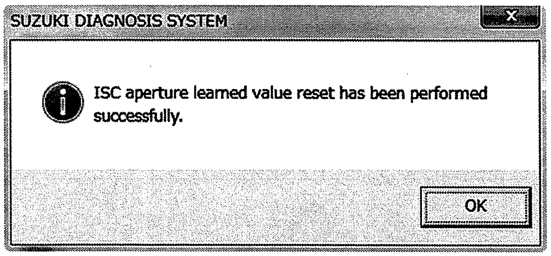
6) Click the "Reset" button to clear the ISC aperture leaned valve.



IF04K1130053-03

NOTE

The leaned value of the ISC valve (secondary throttle valve interlinked) is set at Preset position.



IF04K1130057-02

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

NOTE

The ISC valve (secondary throttle valve interlinked) opening initialization is automatically started after the ignition switch is turned OFF position.

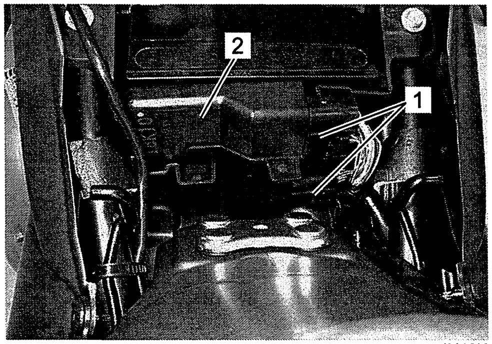
8) Install the seat. ☞(Page 9D-18)

ECM Removal and Installation

BENJ18K61306003

Removal

1) Disconnect the battery (–) lead wire and remove the battery holder lid. ☞(Page 1J-13)
2) Disconnect the ECM couplers (1) and remove the ECM (2).



IH18K1130002-01

Installation

Install the ECM in the reverse order of removal.

IAP Sensor Inspection

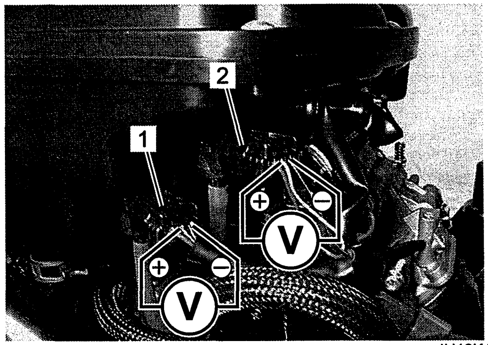
BENJ18K61306004

IAP Sensor Output Voltage at Idle Speed

1) Check the IAP sensor power supply voltage and circuit. Refer to "DTC P0105 / P0106 / P0107 (C17)" in Section 1A (Page 1A-22) and "DTC P1100 / P1101 / P1102 (C13)" in Section 1A (Page 1A-56).
2) Turn the ignition switch OFF.
3) Connect the IAP sensor coupler and ECM couplers.
4) Insert the needle point probes to the lead wire coupler.
5) Run the engine at idle speed, measure the IAP sensor output voltage between the G/B wire and B/Br wire (IAP sensor #1) (1) or G/Y wire and B/Br wire (IAP sensor #2) (2). If the voltage is not within the specified value, replace the IAP sensor. ☞(Page 1C-5)

<u>**IAP sensor #1 output voltage**</u>
Idle speed at 1 atm.
[Standard]: Approx. 2.5 V

<u>**IAP sensor #2 output voltage**</u>
Idle speed at 1 atm.
[Standard]: Approx. 2.5 V



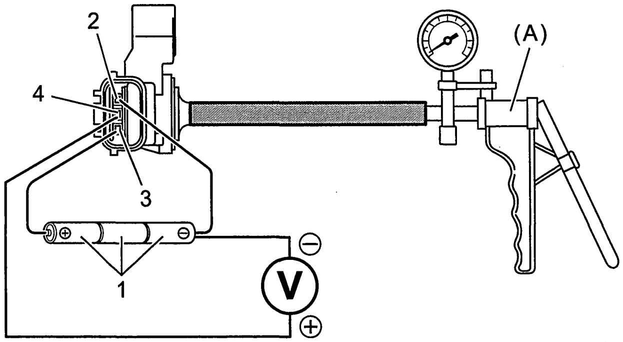
IH18K1130003-01

6) After finishing the IAP sensor inspection, install the removed parts.

IAP Sensor Output Voltage

1) Turn the ignition switch OFF.
2) Remove the IAP sensor. ☞(Page 1C-5)
3) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
4) Arrange 3 new 1.5 V batteries (1) in series (check that total voltage is 4.5 – 5.0 V) and connect (–) terminal to the ground terminal (2) and (+) terminal to the terminal (3).
5) Measure the voltage between terminal (4) and ground. Also, check if voltage reduces when vacuum is applied using the vacuum pump gauge. If the voltage is not within the specified value, replace the IAP sensor. ☞(Page 1C-5)

Special tool
(A): 09917–47011



IH18K1130047-02

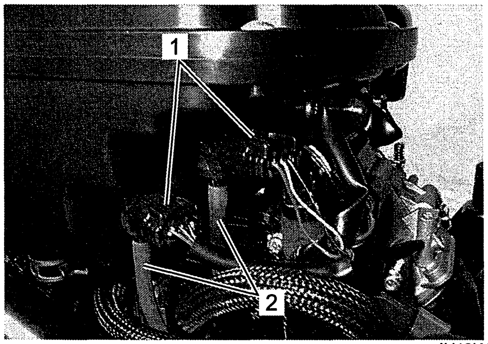
ALTITUDE (Reference)		ATOMOSPHERIC PRESSURE		OUTPUT VOLTAGE
m	ft	kPa	mmHg	V
0 – 610	0 – 2001	100 – 94	760 – 705	3.4 – 4.0
611 – 1524	2005 – 5000	94 – 85	705 – 638	3.0 – 3.7
1525 – 2438	5003 – 7999	85 – 76	638 – 570	2.6 – 3.4

IAP Sensor Removal and Installation

BENJ18K61306005

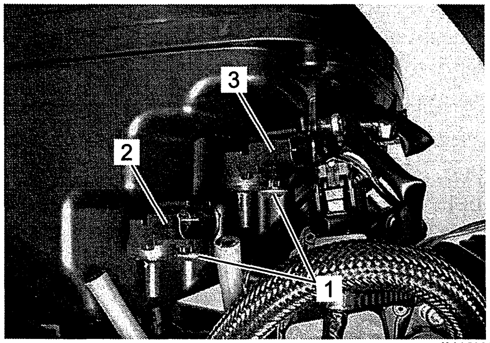
Removal

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the IAP sensor couplers (1) and vacuum hoses (2).



IH18K1130005-01

3) Remove the screws (1).
4) Remove the IAP sensor #1 (2) and #2 (3).



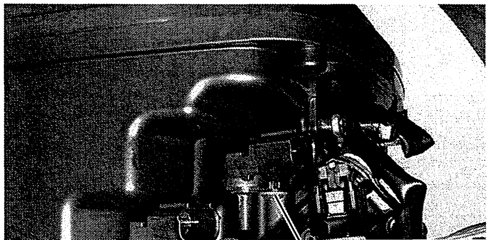
IH18K1130006-02

Installation

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

- Tighten the IAP sensor screws (1) to the specified torque.

  Tightening torque
  IAP sensor screw (a): 1.3 N·m (0.13 kgf-m, 0.95 lbf-ft)



IAT Sensor Inspection

BENJ18K61306006

Refer to "IAT Sensor Removal and Installation" (Page 1C-5).
Measure the resistance of the IAT sensor. Make sure that the resistance value decreases as temperature increase. If measured resistance does not change as specified, replace IAT sensor with a new one.

NOTE

IAT sensor resistance measurement method is the same way as that of the ECT sensor. ☞(Page 1C-6)

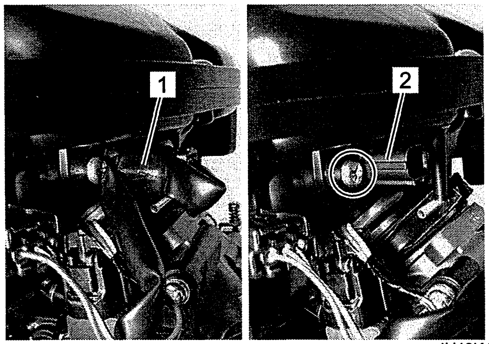
IAT sensor resistance
0 °C (32 °F) [Standard]: 5400 – 6600 Ω
80 °C (176 °F) [Standard]: 290 – 390 Ω

IAT Sensor Removal and Installation

BENJ18K61306007

Removal

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the IAT sensor coupler (1) and remove the IAT sensor (2).



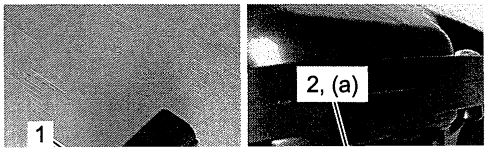
IH18K1130008-01

Installation

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

- Install the new O-ring (1) and tighten the IAT sensor screw (2) to the specified torque.

  Tightening torque
  IAT sensor screw (a): 1.3 N·m (0.13 kgf-m, 0.95 lbf-ft)



ECT Sensor Inspection

BENJ18K61306008

Refer to “ECT Sensor Removal and Installation” (Page 1C-6).

Measure the resistance between terminals of the ECT sensor (1). Make sure that the resistance value decreases as temperature increase. If measured resistance does not change as specified, replace ECT sensor with a new one.

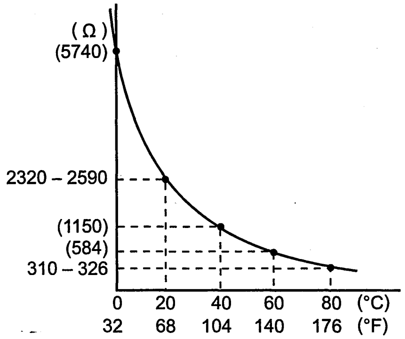
NOTICE

- **Handle the ECT sensor carefully as it will easily be broken if it receives excessively large shocks or forces.**
- **Keep the ECT sensor and thermometer (2) not in contact with the heater’s water container.**

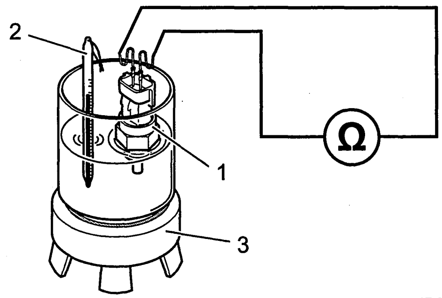
<u>ECT sensor resistance</u>

20 °C (68 °F) [Standard]: 2320 – 2590 Ω

80 °C (176 °F) [Standard]: 310 – 326 Ω



IH18K1130048-01



ID26J1130060-01

3. Heater

ECT Sensor Removal and Installation

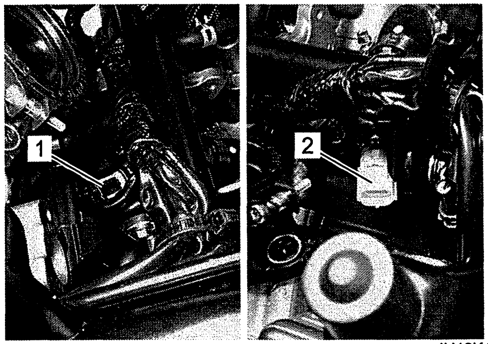
BENJ18K61306009

Removal

1) Drain engine coolant. ☞(Page 1F-6)
2) Remove the throttle body. ☞(Page 1D-10)
3) Disconnect the ECT sensor coupler (1) and remove the ECT sensor (2).

NOTICE

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



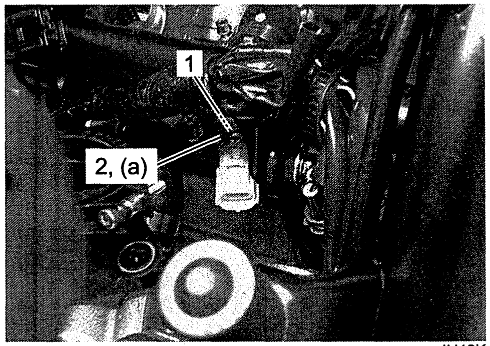
IH18K1130010-02

Installation

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

- Install the new gasket washer (1) and tighten the ECT sensor (2) to the specified torque.

  Tightening torque
  ECT sensor (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



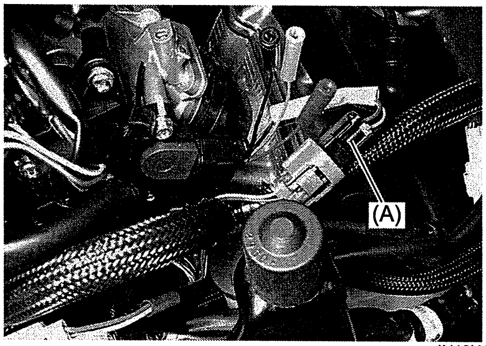
IH18K1130011-03

TP Sensor Inspection

BENJ18K61306010

1) Check that the throttle cable play is within the specification. ☞(Page 1D-10)
2) Check the TP sensor power supply voltage and circuit. ☞(Page 1A-28)
3) Turn the ignition switch OFF and connect the ECM couplers.
4) Connect the special tool between the TP sensor and its coupler.

Special tool
(A): 09900–28631

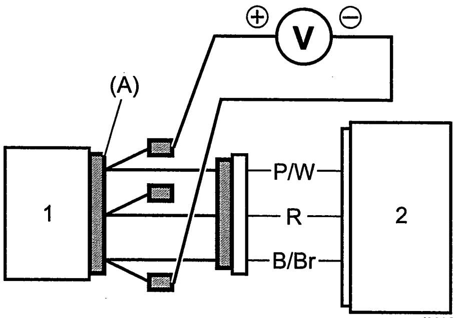


IH18K1130012-01

5) Turn the ignition switch ON.
6) Measure the voltage between the P/W wire and B/Br wire by turning the throttle grip open and close. If the voltage is not within the specified value, adjust or replace the TP sensor. Refer to "TP Sensor Adjustment" (Page 1C-7) or "TP Sensor Removal and Installation" (Page 1C-7).

<u>TP sensor output voltage</u>
Closed [Standard]: 1.10 – 1.14 V
Opened [Standard]: 4.34 – 4.54 V

Special tool
(A): 09900–28631



IH18K1130013-01

1. TP sensor	2. ECM

TP Sensor Adjustment

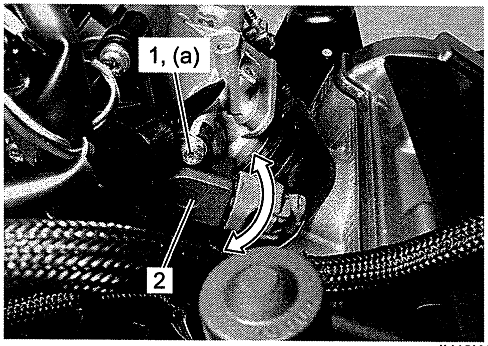
BENJ18K61306011

1) Check the TP sensor output voltage. ☞(Page 1C-7)
2) If voltage is not within the specified value, loosen the TP sensor mounting screw (1) with the special tool.

Special tool
09930–11950

3) Adjust the TP sensor (2) until the output voltage comes within the specified value.
4) Tighten the TP sensor mounting screw (1) to the specified torque.

Tightening torque
TP sensor mounting screw (a): 3.5 N·m (0.36 kgf-m, 2.60 lbf-ft)



IH18K1130014-01

5) Disconnect the special tool and install the removed parts.

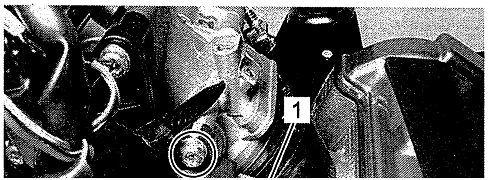
TP Sensor Removal and Installation

BENJ18K61306012

Removal

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank. ☞(Page 1G-9)
3) Disconnect the TP sensor coupler (1).
4) Prior to disassembly, mark the sensor's original position with a paint or scribe for accurate reinstallation.
5) Remove the TP sensor (2) with the special tool.

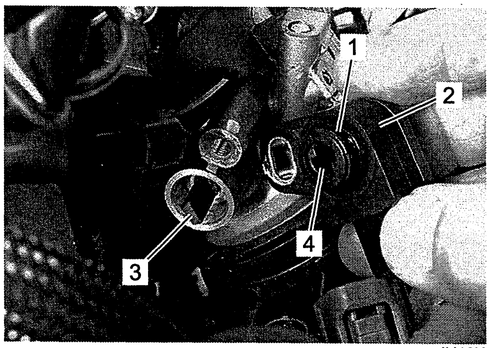
Special tool
09930–11950



Installation

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

- Apply a thin coat of engine oil to the new O-ring (1).
- With the throttle valve fully closed, install the TP sensor (2) aligning the throttle shaft end (3) with the groove (4) of the TP sensor.

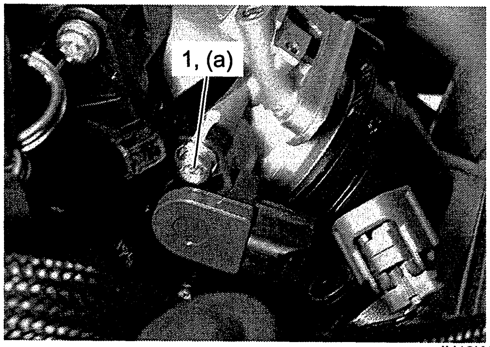


IH18K1130016-01

- Tighten the TP sensor mounting screw (1) to the specified torque.

Special tool
09930–11950

Tightening torque
TP sensor mounting screw (a): 3.5 N·m (0.36 kgf-m, 2.60 lbf-ft)



IH18K1130017-01

- Check the throttle valve operating smoothly.
- Adjust the position of TP sensor. ☞(Page 1C-7)

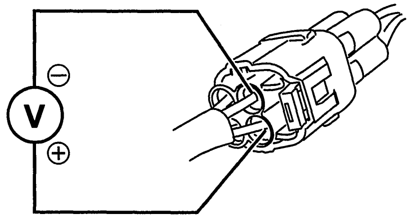
HO2 Sensor Inspection

BENJ18K61306013

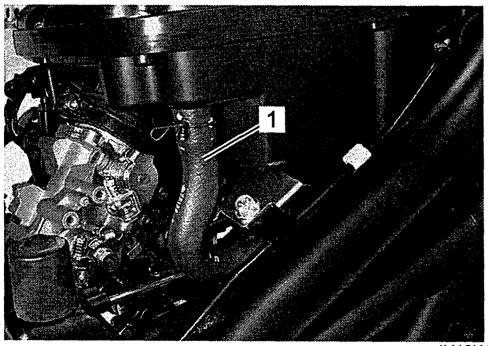
HO2 Sensor Output Voltage

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Insert the needle point probes to the lead wire coupler.
3) Start the engine and warm up the engine enough.
5) If OK, then pinch the PAIR hose (1) (if equipped) with a proper hose clamp.
6) Measure the HO2 sensor output voltage while holding the engine speed at 5000 r/min.

HO2 sensor output voltage
Idle speed [Standard]: 0.6 V or less
5000 r/min [Standard]: 0.6 V or more



IE31J1110198-01



IH18K1130018-02

7) If the HO2 sensor output voltage is not within the standard range, replace the HO2 sensor. ☞(Page 1C-9)
8) After finishing the HO2 sensor inspection, remove a proper hose clamp and install the removed parts.

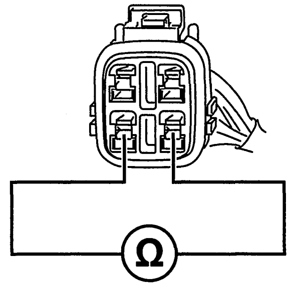
HO2 Sensor Heater Resistance

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the HO2 sensor coupler (1).

IH18K1130019-01

3) Measure the HO2 sensor heater resistance between the terminals of the HO2 sensor. If the resistance is out of the specified value, replace the HO2 sensor. ☞(Page 1C-9)

HO2 sensor heater resistance
23 °C (73.4 °F) [Standard]: 11.5 – 17.5 Ω



IE31J1110206-01

4) After finishing the HO2 sensor inspection, install the removed parts.

HO2 Sensor Removal and Installation

BENJ18K61306014

Removal

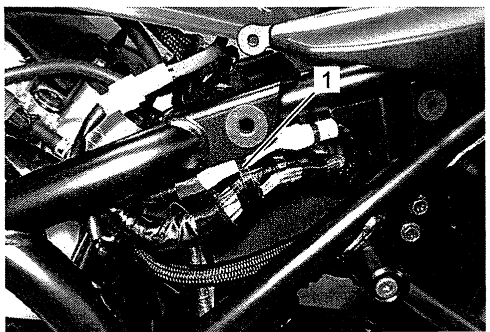
⚠ WARNING

Do not remove the HO2 sensor while it is hot.

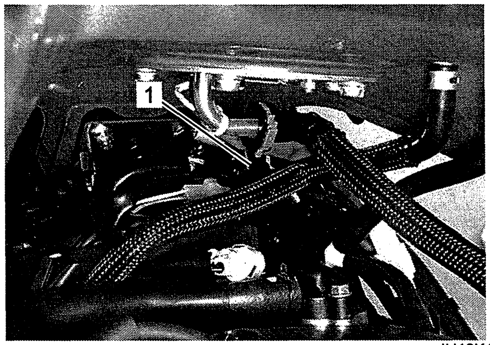
NOTICE

- **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 wire.**

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Remove the left frame lower cover. ☞(Page 9D-22)
3) Disconnect the clamp (1).

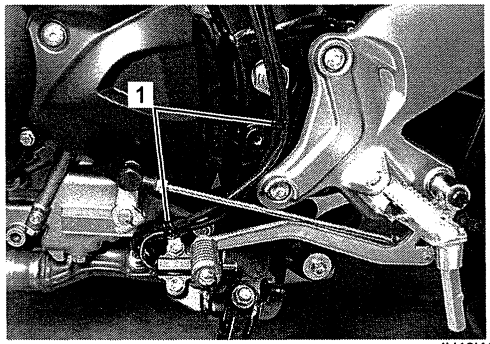


4) Disconnect the HO2 sensor coupler (1).



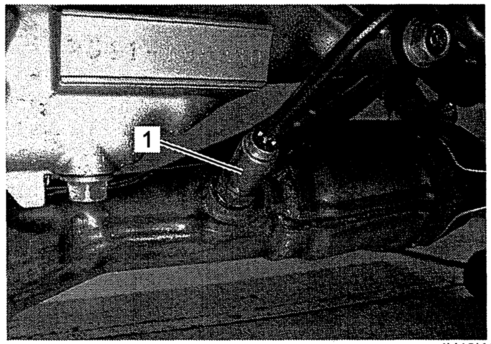
IH18K1130020-02

5) Disconnect the clamps (1).



IH18K1130021-02

6) Remove the HO2 sensor (1).



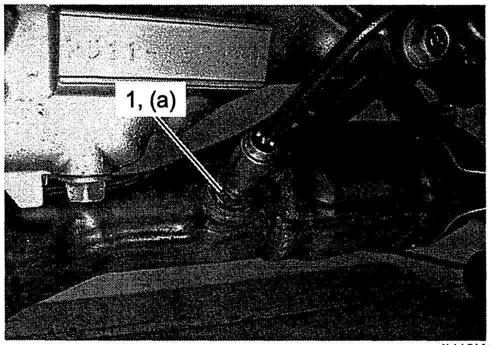
IH18K1130022-01

Installation

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

- Apply nickel based anti seize to the thread part of HO2 sensor (1).
- Tighten the HO2 sensor (1) to the specified torque.

Tightening torque
HO2 sensor (a): 25 N·m (2.5 kgf-m, 18.5 lbf-ft)



IH18K1130023-01

- Route the HO2 sensor lead wires. Refer to "HO2 Sensor Lead Wire Routing Diagram" (Page 1C-2) and "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).

CKP Sensor Inspection

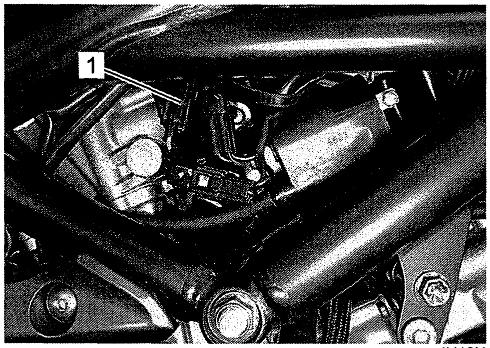
BENJ18K61306015

CKP Sensor Peak Voltage

NOTE

Be sure that all the couplers are connected properly and the battery used is in fully charged condition.

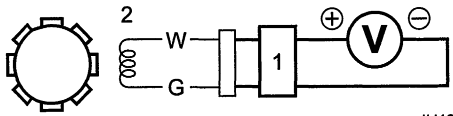
1) Disconnect the fuel injector couplers. Refer to "Fuel Injector On-Vehicle Inspection" in Section 1G (Page 1G-16).
2) Disconnect the CKP sensor coupler (1).



3) Connect the multi circuit tester with the peak volt adapter (1) as follows.

CKP sensor – circuit tester connection

	(+) Probe	(–) Probe
CKP sensor (2)	W lead wire	G lead wire



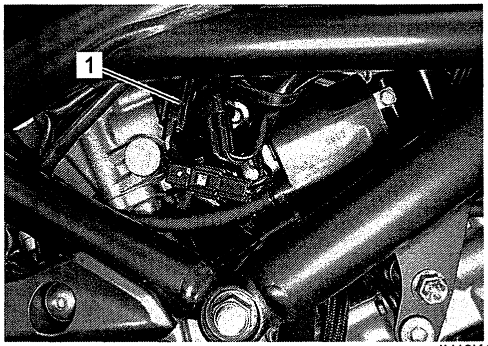
IH18K1130025-02

4) Measure the CKP sensor peak voltage in the following procedures:
   a) Shift the transmission into neutral, turn the ignition switch ON.
   b) Press the starter switch and allow the engine to crank for a few seconds, and then measure the CKP sensor peak voltage.
5) Repeat the b) procedure several times and measure the highest peak voltage.
   If the voltage is lower than standard range, inspect for coupler connection and metal particles or foreign material being stuck on the CKP sensor and rotor tip.
   If the peak voltage is within the standard range, check the continuity between the CKP sensor coupler and ECM coupler.

   CKP sensor peak voltage
   When cranking [Standard]: 4.6 V or more
6) After measuring the CKP sensor peak voltage, install the removed parts.

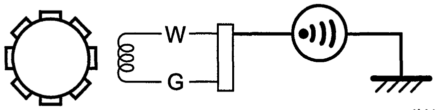
CKP Sensor Resistance

1) Disconnect the CKP sensor coupler (1).



IH18K1130024-01

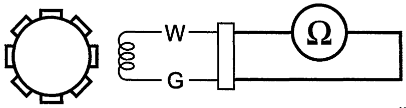
2) Check that the resistance between W lead wire of CKP sensor and ground is infinity.



IH18K1130026-01

3) Measure the resistance between the W lead wire and G lead wire. If the resistance is not within the standard range, replace the CKP sensor. Refer to "CKP Sensor Removal and Installation" (Page 1C-11).

CKP sensor resistance
[Standard]: 148 – 222 Ω



IH18K1130027-01

4) After measuring the CKP sensor resistance, connect the CKP sensor coupler.

CKP Sensor Removal and Installation

BENJ18K61306016

Refer to "Generator Removal" in Section 1J (Page 1J-5) and "Generator Installation" in Section 1J (Page 1J-6).

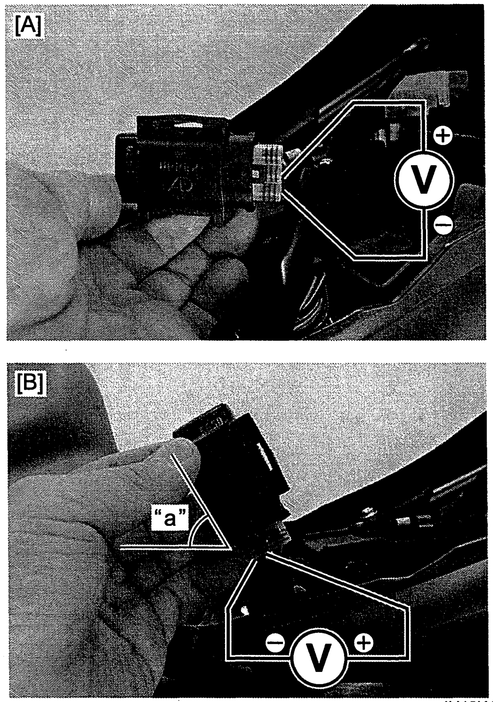
TO Sensor Inspection

BENJ18K61306017

TO Sensor Output Voltage

1) Check the TO sensor power supply voltage and circuit. ☞(Page 1A-58)
2) Turn the ignition switch OFF and connect the ECM couplers.
3) Dismount the TO sensor from its bracket and connect the TO sensor coupler.
4) Insert the needle point probes to the lead wire coupler.
5) Turn the ignition switch ON, measure the TO sensor output voltage between the Br/W wire and B/Br wire. If the voltage is not within the specified value, replace the TO sensor. ☞(Page 1C-12)

TO sensor output voltage
Normal [Standard]: 0.4 – 1.4 V
Leaning 65° [Standard]: 3.7 – 4.4 V



IH18K1130028-01

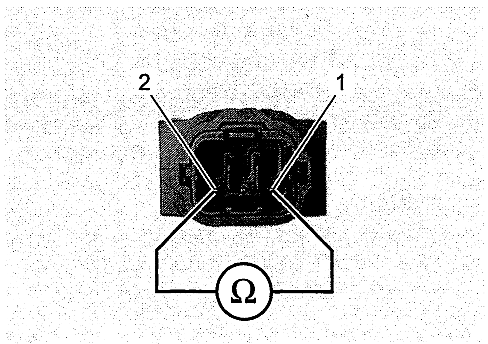
[A]:	When sensor is horizontal (normal) level.
[B]:	When sensor is leaned 65° "a" or more, left and right, from the horizontal level.

6) After finishing the TO sensor inspection, install the removed parts.

TO Sensor Resistance

1) Remove the TO sensor. ☞(Page 1C-12)
2) Measure the resistance between R wire terminal (1) and B/Br wire terminal (2). If the resistance is out of the specified value, replace the TO sensor. ☞(Page 1C-12)

TO sensor resistance
[Standard]: 16500 – 22300 Ω



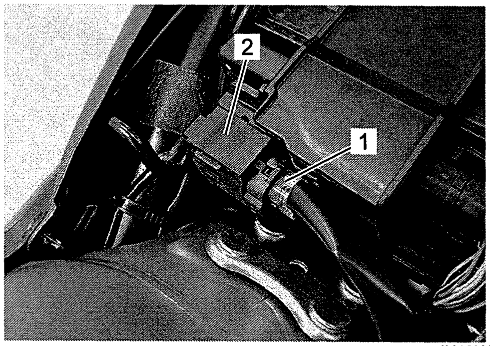
TO Sensor Removal and Installation

BENJ18K61306018

Refer to “Seat Removal and Installation” in Section 9D (Page 9D-18).

Removal

Disconnect the coupler (1) and remove the TO sensor (2).

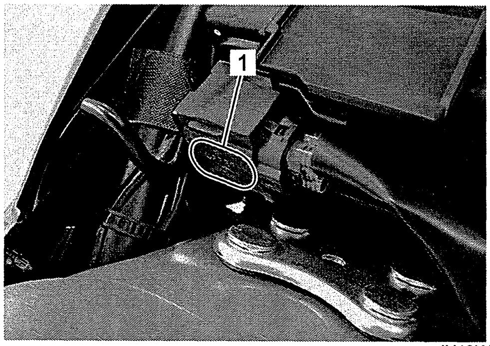


IH18K1130030-01

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 (1) upward.

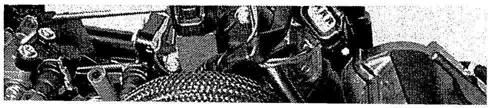


IH18K1130031-01

STP Sensor Inspection and Adjustment

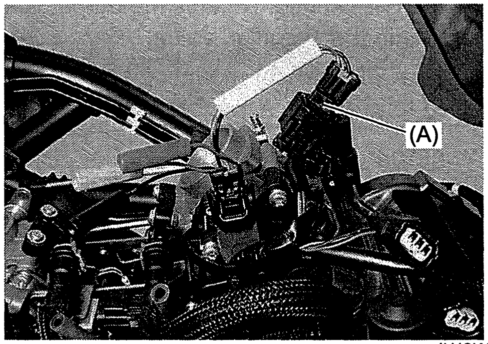
BENJ18K61306019

1) Check the STP sensor power supply voltage and circuit. ☞(Page 1A-38)
2) Turn the ignition switch OFF.
3) Connect the ECM couplers.
4) Disconnect the STVA coupler (1).



5) Connect the special tool between the STP sensor and its coupler.

Special tool
(A): 09900–28631

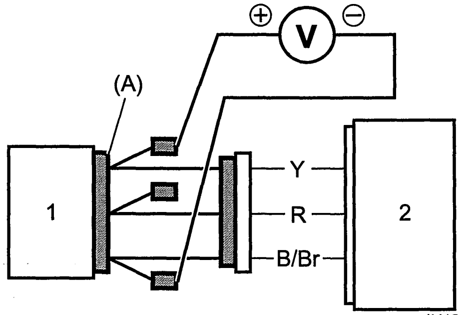


IH18K1130033-01

6) Turn the ignition switch ON.
7) Measure the voltage between the Y wire and B/Br wire by turning the STV close and open with your finger.

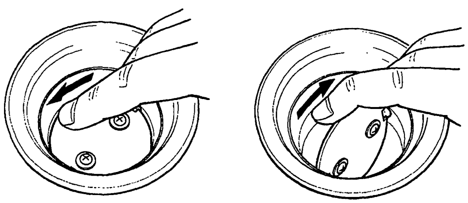
STP sensor output voltage
Closed [Standard]: 0.57 – 0.67 V
Opened [Standard]: 4.4 – 4.6 V

Special tool
(A): 09900–28631



IH18K1130034-01

1. STP sensor	2. ECM



IH18K1130035-01

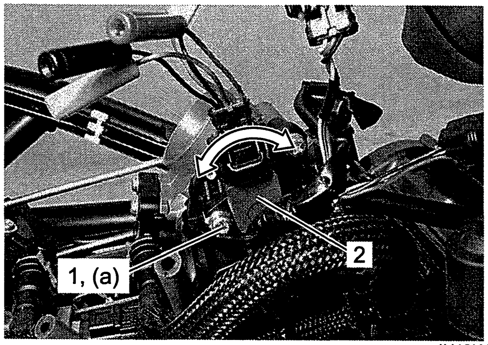
8) If voltage is not within the specified value, loosen the STP sensor mounting screw (1) with the special tool.

Special tool
09930–11950

9) Adjust the STP sensor (2) until the output voltage comes within the specified value.

10) Tighten the STP sensor mounting screw (1) to the specified torque.

Tightening torque
STP sensor mounting screw (a): 3.5 N·m (0.36 kgf-m, 2.60 lbf-ft)



IH18K1130036-02

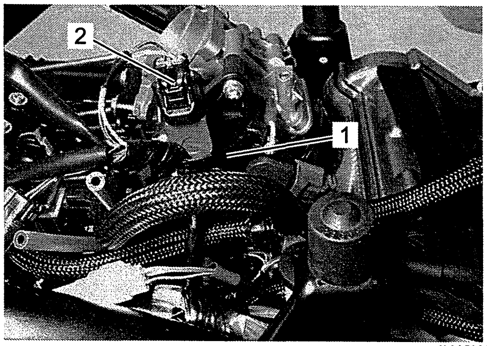
11) Disconnect the special tool and install the removed parts.

STP Sensor Removal and Installation

BENJ18K61306020

Removal

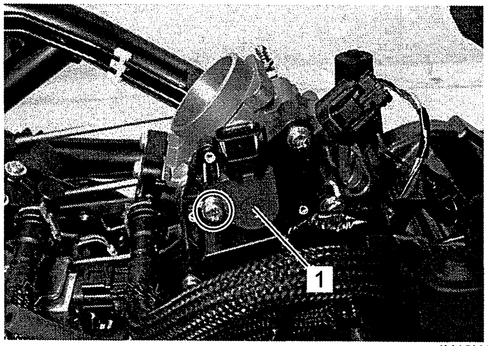
1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the clamp (1) and STP sensor coupler (2).



IH18K1130037-01

4) Prior to disassembly, mark the sensor's original position with a paint or scribe for accurate reinstallation.
5) Remove the STP sensor (1) with the special tool.

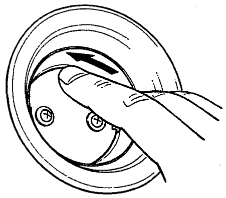
Special tool
09930–11950



IH18K1130038-01

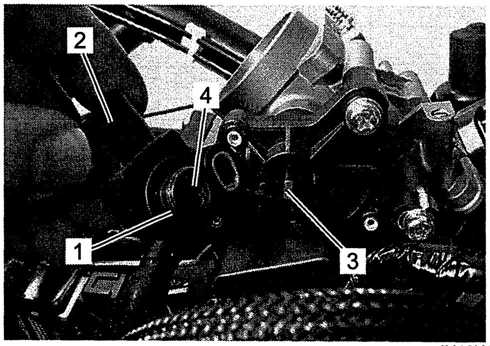
Installation

1) Close the STV by finger.



I718H1130017-01

2) Apply a thin coat of engine oil to the new O-ring (1).
3) With the STV fully closed, install the STP sensor (2) aligning the secondary throttle shaft end (3) with the groove (4) of the STP sensor.

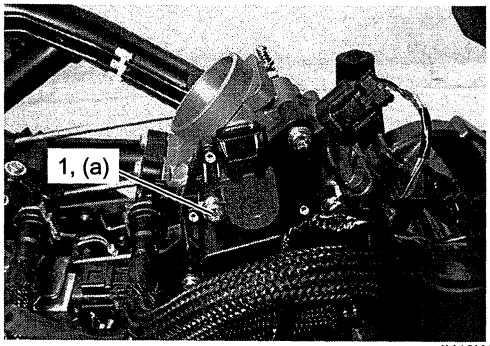


IH18K1130039-01

4) Tighten the STP sensor mounting screw (1) to the specified torque.

Special tool
09930–11950

Tightening torque
STP sensor mounting screw (a): 3.5 N·m (0.36 kgf-m, 2.60 lbf-ft)



IH18K1130040-01

5) Check the STV operating smoothly.
6) Adjust the position of STP sensor. ☞(Page 1C-12)
7) Clamp the wiring harness. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
8) Install the removed parts.

STV Actuator Inspection

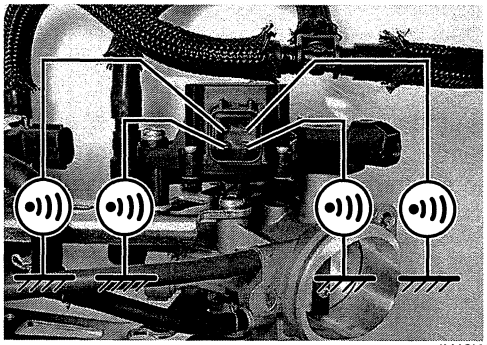
BENJ18K61306021

Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-10).

NOTICE

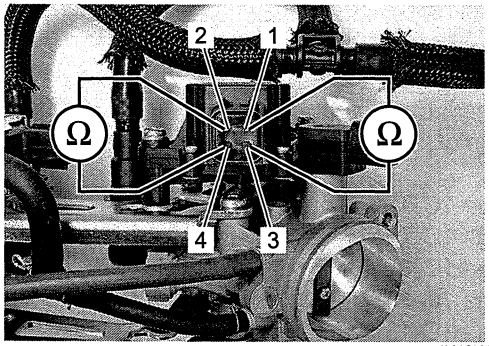
Never remove the STVA from the throttle body. It is available only as a throttle body assembly.

1) Check that the resistance between each terminal of STVA and ground is infinity.


IH18K1130041-01

2) Measure the resistance between the W/B wire terminal (1) and G wire terminal (3), and between the B/Lg wire terminal (2) and P/W wire terminal (4). If the resistance is out of the specified value, replace the throttle body.

STVA resistance
[Standard]: Approx. 7 Ω



IH18K1130042-01

Specifications

Tightening Torque Specifications

BENJ18K61307001

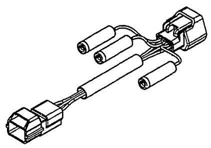
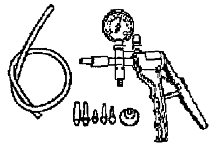
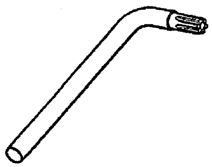
Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
IAP sensor screw	1.3	0.13	0.95	☞(Page 1C-5)
IAT sensor screw	1.3	0.13	0.95	☞(Page 1C-5)
ECT sensor	18	1.8	13.5	☞(Page 1C-6)
TP sensor mounting screw	3.5	0.36	2.60	☞(Page 1C-7) / ☞(Page 1C-8)
HO2 sensor	25	2.5	18.5	☞(Page 1C-10)
STP sensor mounting screw	3.5	0.36	2.60	☞(Page 1C-13) / ☞(Page 1C-14)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"HO2 Sensor Lead Wire Routing Diagram" (Page 1C-2)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Special Tool

BENJ18K61308001

09900–28631 TP Sensor test lead ☞(Page 1C-7) / ☞(Page 1C-7) / ☞(Page 1C-12) / ☞(Page 1C-12) 	09917–47011 Vacuum pump gauge set ☞(Page 1C-4) 
09930–11950 Torx® wrench (T25H) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞(Page 1C-7) / ☞(Page 1C-7) / ☞(Page 1C-8) / ☞(Page 1C-13) / ☞(Page 1C-13) / ☞(Page 1C-14) 	

Engine Mechanical

Precautions

Precautions for Engine Mechanical

BENJ18K61400001

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

NOTE

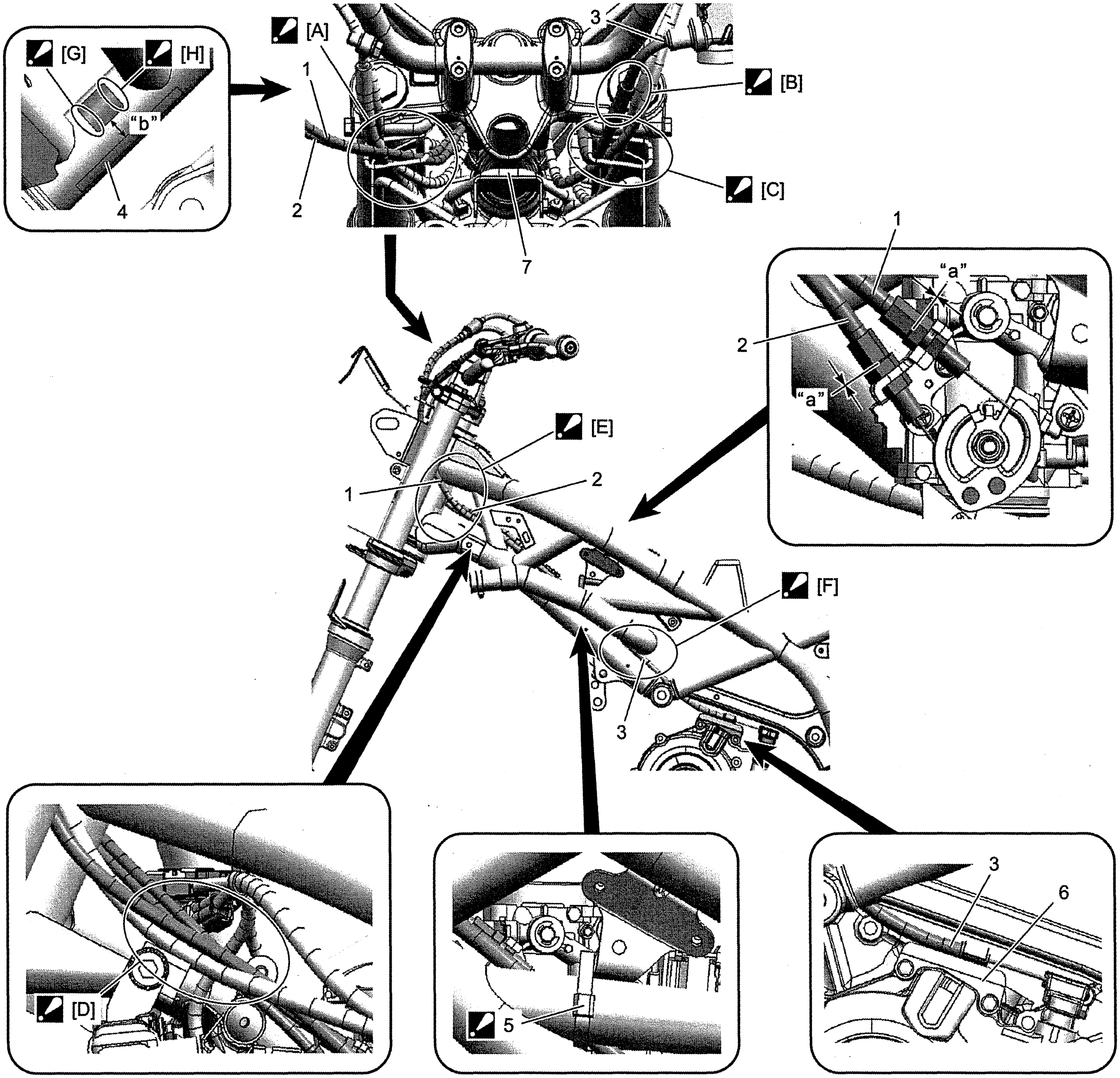
Identify the position of each removed part. Organize the parts in their respective groups (e.g., intake, exhaust) so that they can be reinstalled in their original positions.

Schematic and Routing Diagram

Throttle Cable Routing Diagram

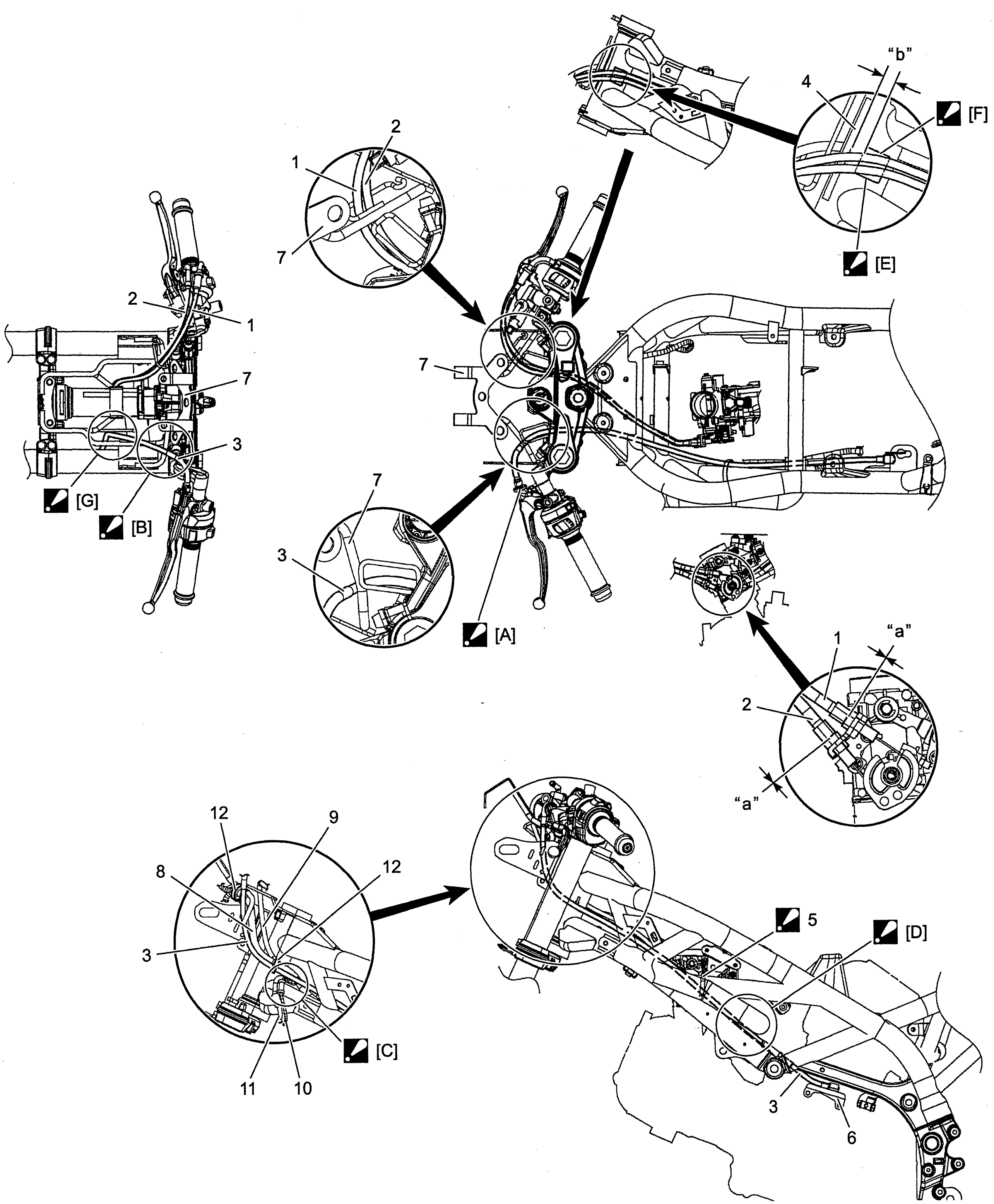
BENJ18K61402001

SV650/A



IH18K1140315-01

[A]: Pass the throttle cables into the guide and behind the headlight brace.	2. Throttle cable No. 2
[B]: The adjustment of clutch cable play should be made on the adjuster on which the clutch cable is installed with 3 – 5 mm (0.12 – 0.19 in) of threads left on the clutch lever.	3. Clutch cable
[C]: Pass the clutch cable into the guide and behind the headlight	4. Seal of frame serial number



"b"
4
[F]
[E]
2
1
7
2
1
7
3
[G]
[B]
7
3
[A]
1
"a"
2
"a"
12
9
8
12
3
[C]
11
10
5
[D]
3
6

[A]: The adjustment of clutch cable play should be made on the adjuster on which the clutch cable is installed with 2 – 6 mm (0.08 – 0.23 in) of threads left on the clutch lever.	5. Clamp : Clamp the clutch cable to frame bridge with the clamp. Set the locked part facing outside. Clamp end should face upper side.
[B]: Pass the clutch cable front of the headlight brace.	6. Clutch cable stopper
[C]: Pass the front wheel speed sensor lead wire along the front brake hose and under the wiring harness and clutch cable.	7. Headlight brace
[D]: Pass the clutch cable under the radiator inlet hose.	8. Wiring harness
[E]: Stick the frame head pipe tape along the edge of welding bead.	9. Left handle switch lead wire
[F]: Be sure not to peeling on the edge of frame head pipe tape.	10. Front wheel speed sensor
[G]: Pass the clutch cable into the cable guide of the headlight brace.	11. Front brake hose
1. Throttle cable No. 1	12. Clamp
2. Throttle cable No. 2	"a": Max. 1 mm (0.04 in)
3. Clutch cable	"b": 15 – 20 mm (0.59 – 0.78 in)
4. Seal of frame serial number	

Engine Mechanical Symptom Diagnosis

BENJ18K61404001

Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-10).

Compression Pressure Check

BENJ18K61404002

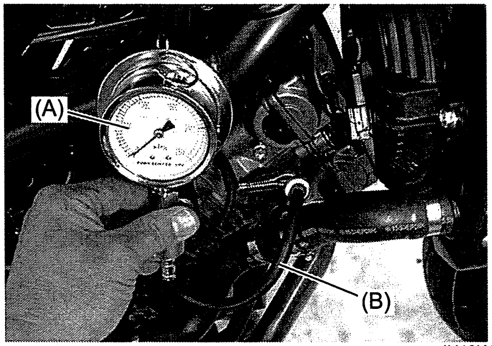
The compression pressure reading of a cylinder is a good indicator of its internal condition.
The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

NOTE

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

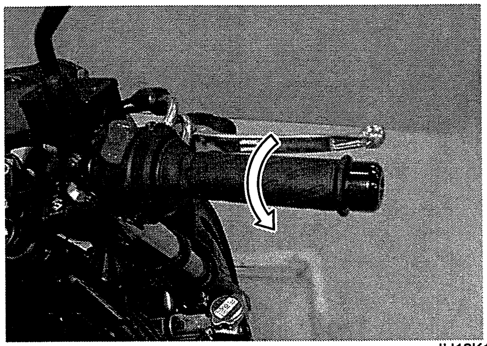
1) Warm up the engine.
2) Disconnect the all spark plug caps and remove the outside spark plug (Front side and rear side). ☞(Page 1H-7)
3) Install the compression gauge and adapter in the spark plug hole. Make sure that the connection is tight.

Special tool
(A): 09915–64512
(B): 09915–63311



IH18K1140002-02

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


IH18K1140003-01

5) Press the starter switch and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.
6) Repeat this procedure with the other cylinder.

Compression pressure
[Standard]: 1300 – 1700 kPa (13.3 – 17.3 kgf/cm^2, 188 – 246 psi)
[Limit]: 1100 kPa (11.2 kgf/cm^2, 159 psi)

Compression pressure difference
[Limit]: 200 kPa (2 kgf/cm^2, 28 psi)

If compression pressure is less than the service limit, it is considered any of the following reasons:

- 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:

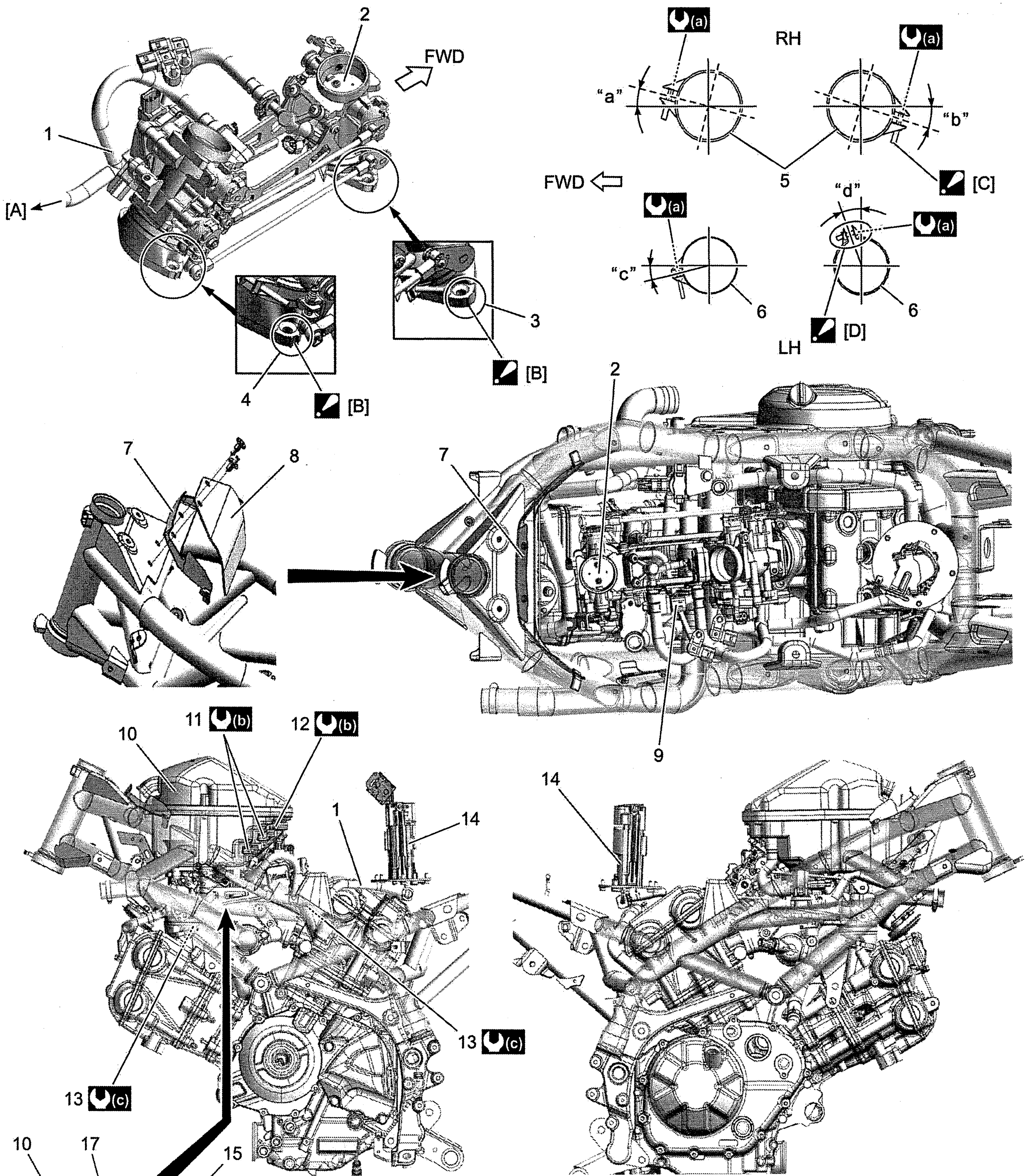
- Compression pressure in one of the cylinder is 1100 kPa (11.2 kgf/cm^2, 159 psi) or less.
- Compression pressures of all cylinders are 1300 kPa (13.3 kgf/cm^2, 188 psi) or less.
- Compression pressure difference between 2 cylinders is more than 200 kPa (2 kgf/cm^2, 28 psi).

7) After checking the compression pressure, install the removed parts.

Repair Instructions

Intake System Construction

BENJ18K61406001



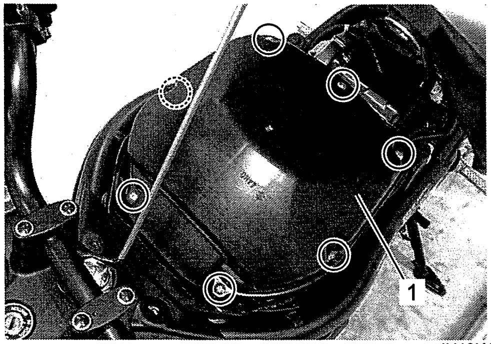
[A]:	To fuel pump	11.	IAP sensor screw
[B]:	Face the rib side of the intake pipe to right side.	12.	IAT sensor screw
[C]:	Do not contact the clamp to the STVA.	13.	Intake pipe screw
[D]:	Do not contact the clamp to the throttle body.	14.	Fuel pump
1.	Fuel feed hose	15.	IAP sensor #1
2.	Throttle body	16.	IAP sensor #2
3.	One rib	17.	EVAP system purge control solenoid valve (If equipped)
4.	Two ribs	"a":	15°
5.	Air cleaner outlet tube clamp	"b":	15 – 25°
6.	Intake pipe clamp	"c":	10 – 15°
7.	Air cleaner inlet cover	"d":	0 – 10°
8.	Air cleaner inlet sheet	(a) :	1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)
9.	EVAP system purge control solenoid valve (If equipped)	(b) :	1.3 N·m (0.13 kgf-m, 0.95 lbf-ft)
10.	Air cleaner box	(c) :	8.5 N·m (0.87 kgf-m, 6.30 lbf-ft)

Air Cleaner Element Removal and Installation

BENJ18K61406002

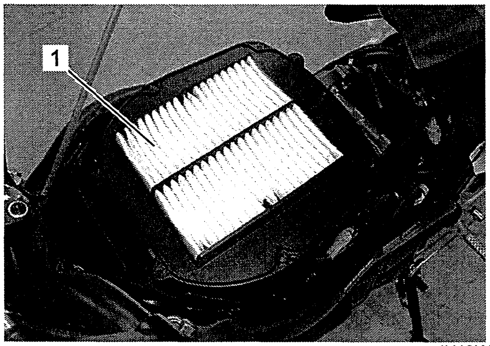
Removal

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Remove the air cleaner cap (1).



IH18K1140005-01

3) Remove the air cleaner element (1).



IH18K1140006-01

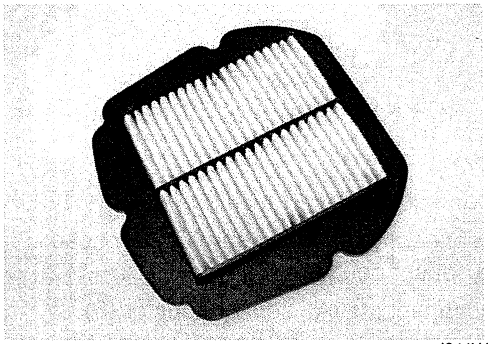
Installation

Install the air cleaner element in the reverse order of removal.

Air Cleaner Element Inspection and Cleaning

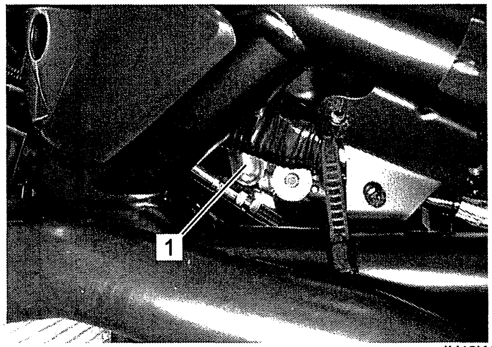
NOTICE

If driving under dusty conditions, clean the air cleaner element more frequently. Make sure that the air cleaner is in good condition at all times. Life of the engine depends largely on this component.



I944H1020002-01

2) Remove the left frame body rear cover. ☞(Page 9D-22)
3) Check the drain plug (1) for clogging, crack or damage. If any defect is found, clean or replace it.



IH18K1140007-01

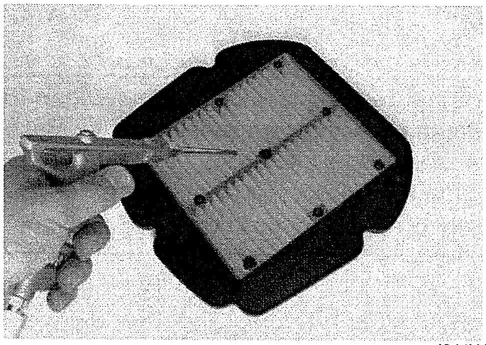
4) After finishing the air cleaner element inspection

Cleaning

Carefully use compressed air to clean the air cleaner element.

NOTICE

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.



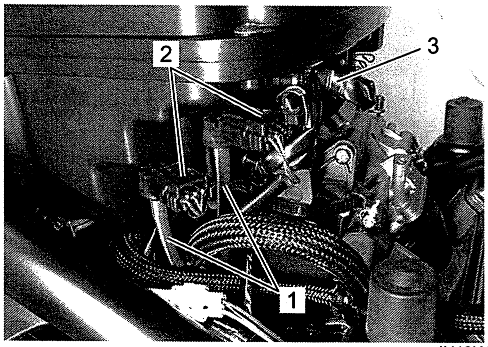
I944H1020003-01

Air Cleaner Box Removal and Installation

BENJ18K61406004

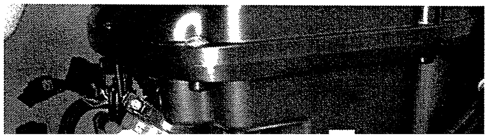
Removal

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the IAP sensor vacuum hoses (1) and IAP sensor couplers (2).
3) Disconnect the IAT sensor coupler (3).

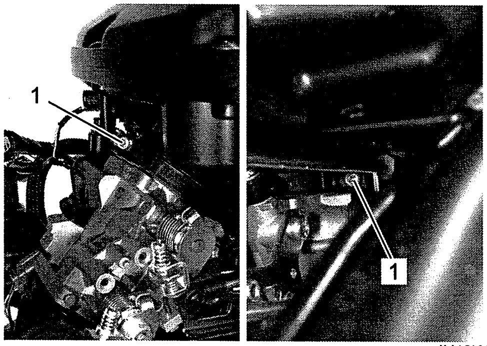


IH18K1140008-02

4) Disconnect the PAIR hose (1). (If equipped)

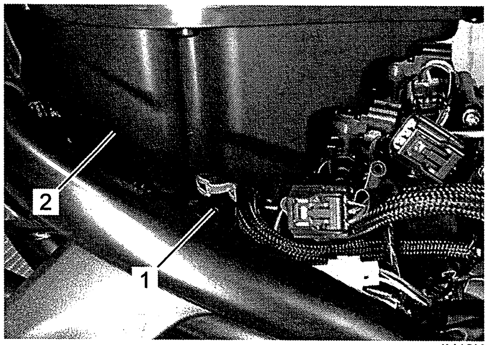


5) Loosen the air cleaner outlet tube clamp screws (1).



IH18K1140010-01

6) Disconnect the PCV hose (1) and then remove the air cleaner box (2).



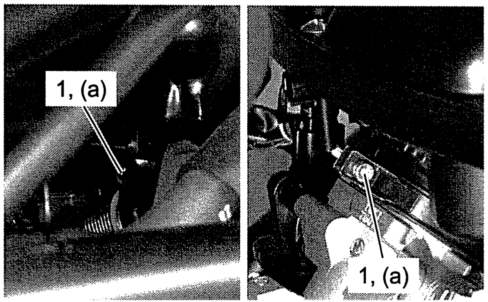
IH18K1140011-01

Installation

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

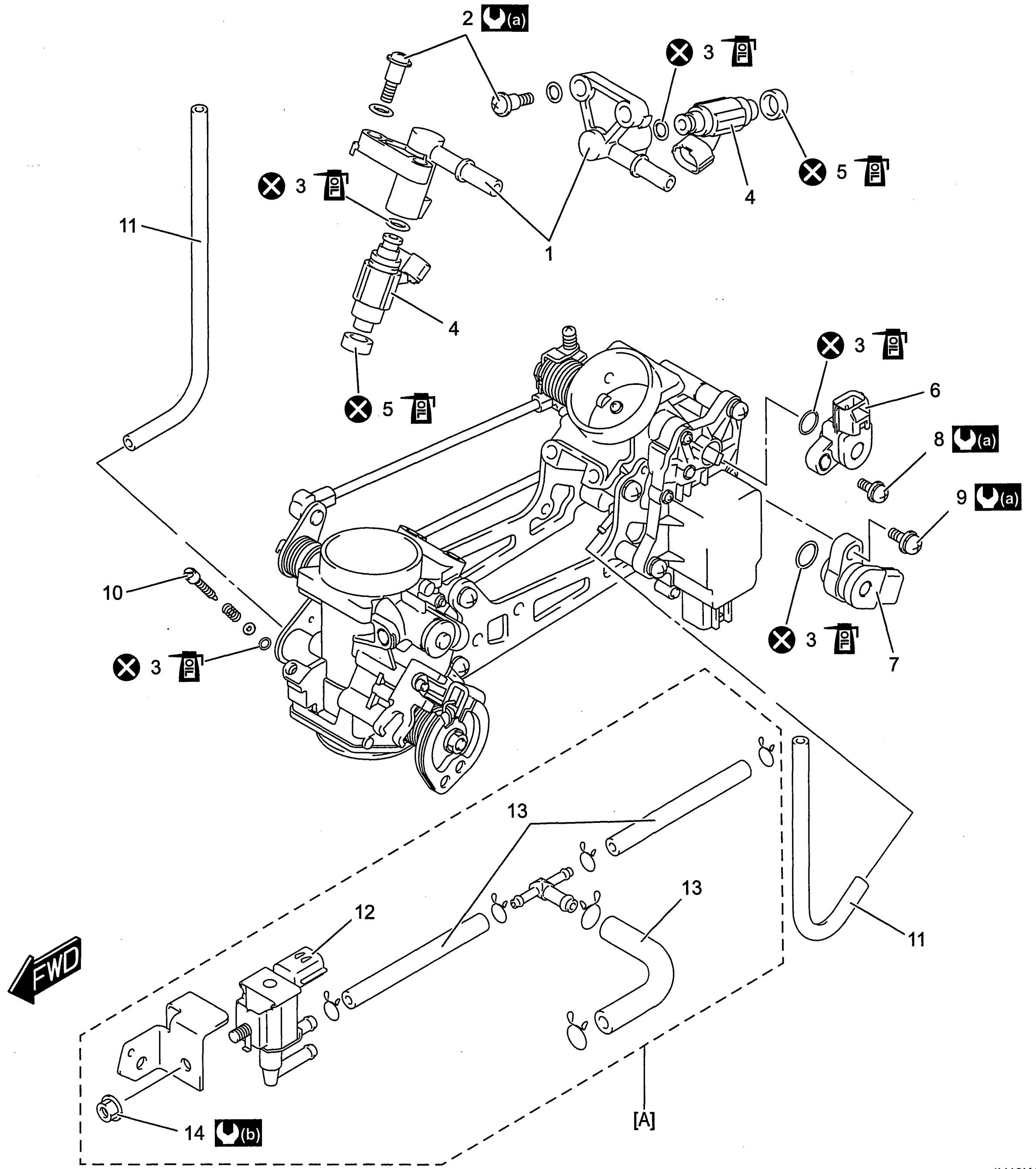
- Connect the PCV hose. Refer to “PCV Hose Routing Diagram” in Section 1B (Page 1B-7).
- Position the air cleaner outlet tube clamps and tighten the air cleaner outlet tube clamp screw (1) to the specified torque. ☞(Page 1D-6)

Tightening torque
Air cleaner outlet tube clamp screw (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)



Throttle Body Components

BENJ18K61406005



IH18K1140317-02

[A]: If equipped	7. TP sensor	14. EVAP system purge control solenoid valve nut
1. Fuel delivery pipe	8. STP sensor mounting screw	(a) : 3.5 N·m (0.36 kgf-m, 2.60 lbf-ft)
2. Fuel delivery pipe mounting screw	9. TP sensor mounting screw	(b) : 7.0 N·m (0.71 kgf-m, 5.20 lbf-ft)
3. O-ring	10. Air screw	OIL : Apply engine oil.
4. Fuel injector	11. IAP sensor vacuum hose	: Do not reuse.

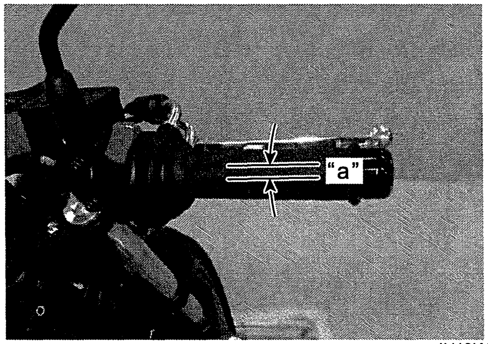
Throttle Cable Play On-Vehicle Inspection and Adjustment

BENJ18K61406006

Inspection

Turn the throttle grip slowly and inspect the throttle cable play "a" at the periphery of the grip.

<u>Throttle cable play</u>
[Standard]: 2.0 – 4.0 mm (0.079 – 0.16 in)



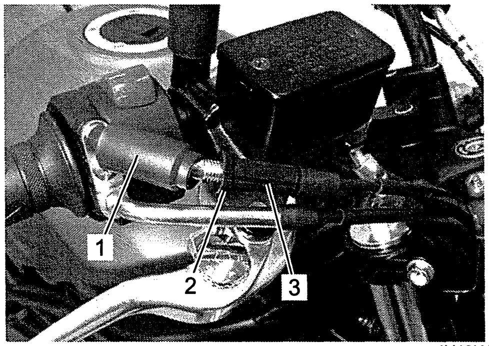
IH18K1140013-01

Adjustment

1) Remove the rubber boot (1).
2) Loosen the lock-nut (2) of the throttle pulling cable.
3) Turn the adjuster (3) in or out until the throttle cable play (at the throttle grip) is within the specification. ☞(Page 1D-10)
4) Tighten the lock-nut (2) while holding the adjuster (3).

⚠ 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.



IH18K1140014-01

5) Install the rubber boot.

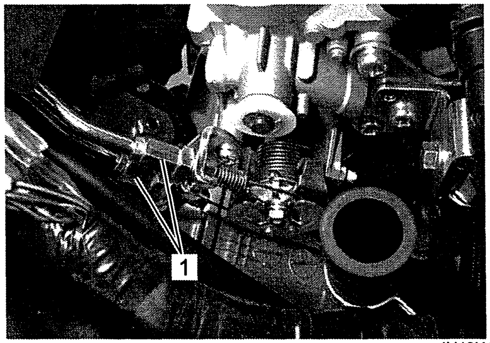
Throttle Cable Removal and Installation

BENJ18K61406007

Refer to "Throttle Cable Routing Diagram" (Page 1D-2).

Removal

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Remove the left frame body cover. ☞(Page 9D-22)
3) Disconnect the throttle cables from the right handle switch. Refer to "Handlebar Removal and Installation (SV650/A)" in Section 6B (Page 6B-5) or "Handlebar Removal and Installation (SV650XA)" in Section 6B (Page 6B-7).
4) Disconnect the throttle cables (1) from the throttle body.



IH18K1140016-01

5) Remove the throttle cables.

Installation

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

- Install the throttle cables to the throttle body. Refer to "Throttle Body Removal and Installation" (Page 1D-10).
- After installing, check the throttle cable play and proper operation. ☞(Page 1D-10)

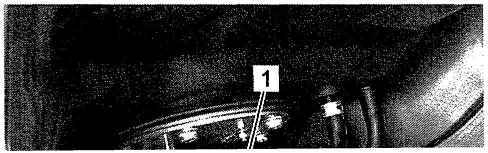
Throttle Body Removal and Installation

BENJ18K61406008

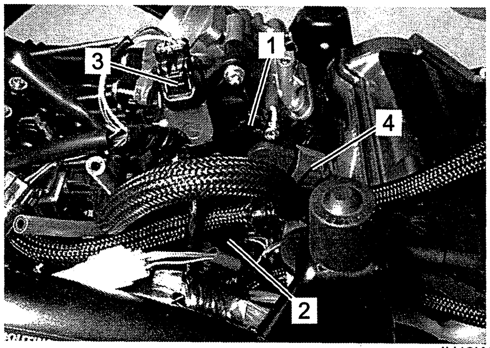
Removal

Refer to "Air Cleaner Box Removal and Installation" (Page 1D-8).

1) Disconnect the fuel feed hose (1) from the fuel pump. ☞(Page 1G-7)

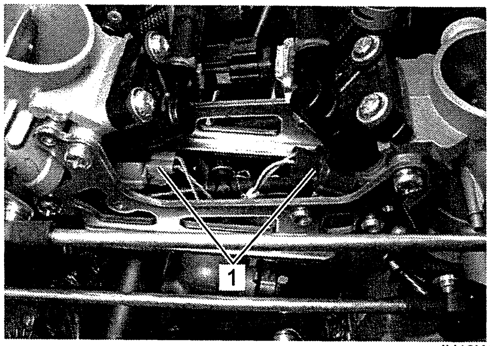


2) Disconnect the clamp (1), STVA coupler (2), STP sensor coupler (3) and TP sensor coupler (4).



IH18K1140017-01

3) Disconnect the fuel injector couplers (1).

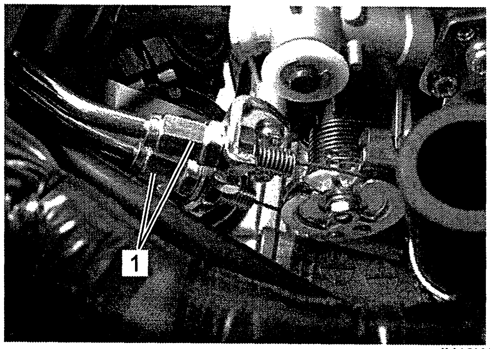


IH18K1140018-01

4) Disconnect the throttle cables (1) from the throttle body.

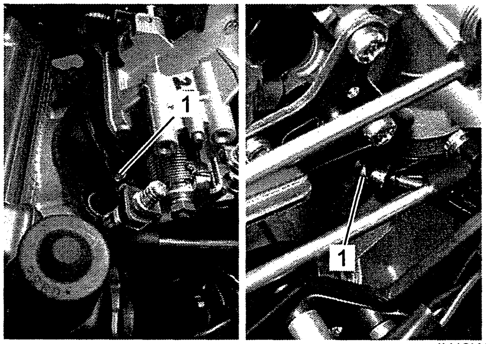
NOTICE

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.



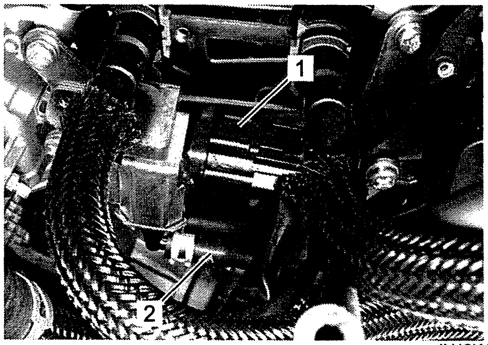
IH18K1140019-01

5) Loosen the intake pipe clamp screws (1) and remove the throttle body upward.



IH18K1140020-01

6) Disconnect the EVAP system purge control solenoid valve coupler (1) and purge hose No. 1 (2). (If equipped)



IH18K1140021-01

7) Remove the throttle body.

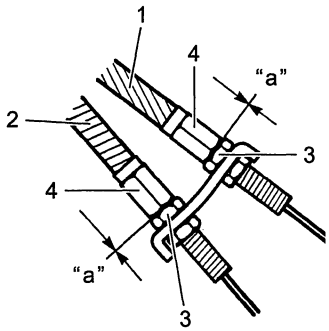
NOTICE

If foreign materials like mud and sand are adhered to the intake pipe or the throttle body, they are likely to get into the intake port.
When foreign materials like mud or sand are adhered, remove them before starting the work.

Installation

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

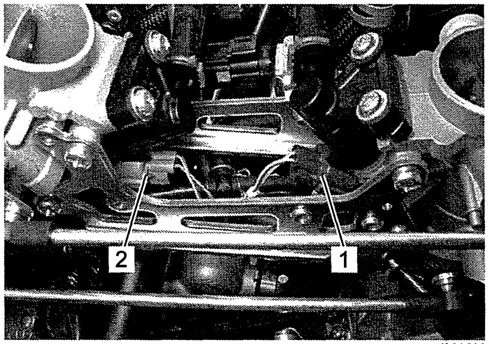
- Connect the purge hose No. 1 and EVAP system purge control solenoid valve coupler. (If equipped) Refer to "EVAP Canister Hose Routing Diagram (If Equipped)" in Section 1B (Page 1B-8).
- Tighten the intake pipe clamp screws. Refer to "Intake System Construction" (Page 1D-6).
- Connect the throttle pulling cable (1) and throttle returning cable (2) to the throttle body.
- Loosen each throttle cable lock-nut (3).
- Turn in each throttle cable adjuster (4) fully and then make the clearance "a", turning it.
- Tighten each lock-nut (3).



IH18K1140022-01

"a":	Max. 1 mm (0.03 in)

- Connect the fuel injector couplers.



IH18K1140023-01

Coupler	Coupler color
Fuel injector #1 (1)	Br
Fuel injector #2 (2)	Gr

- Clamp the wiring harness. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
- Adjust the throttle cable play. ☞(Page 1D-10).

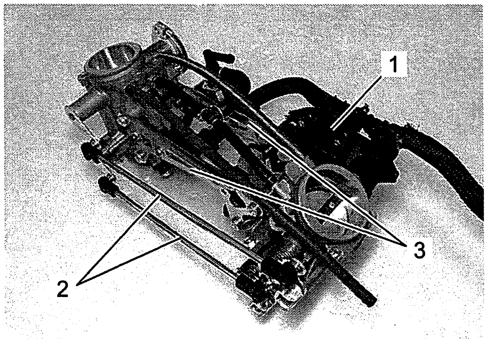
Throttle Body Disassembly and Reassembly

BENJ18K61406009

Refer to "Throttle Body Removal and Installation" (Page 1D-10).

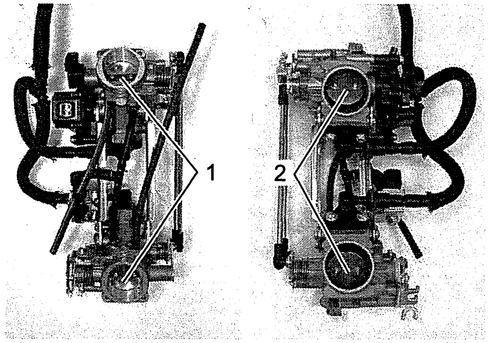
NOTICE

- **Identify the position of each removed part. Organize the parts in their respective groups so that they can be reinstalled in their original positions.**
- **Never remove the STVA (1), link rods (2) and link plates (3).**



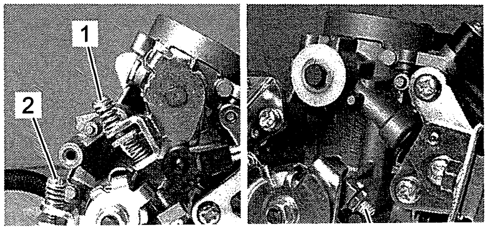
IH18K1140311-01

- **Never remove the throttle valves (1) and secondary throttle valves (2).**



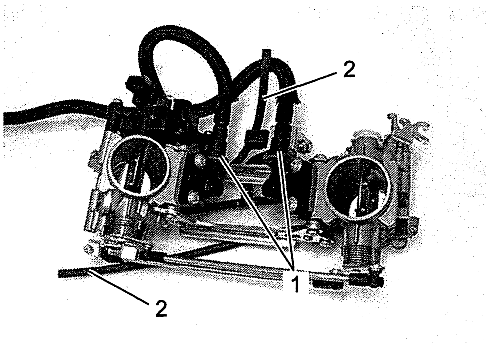
IH18K1140025-01

- **These adjusting screws (1), (2), (3) and (4) are factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.**



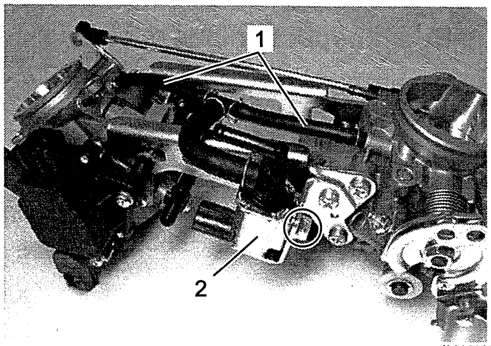
Disassembly

1) Disconnect the fuel feed hoses (1) and IAP sensor vacuum hoses (2). ☞(Page 1G-7)



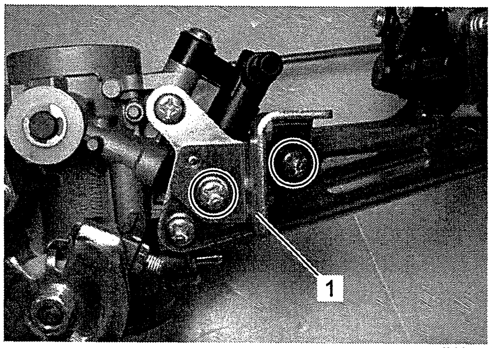
IH18K1140027-01

2) Disconnect the purge hoses (1) and remove EVAP system purge control solenoid valve (2). (If equipped)



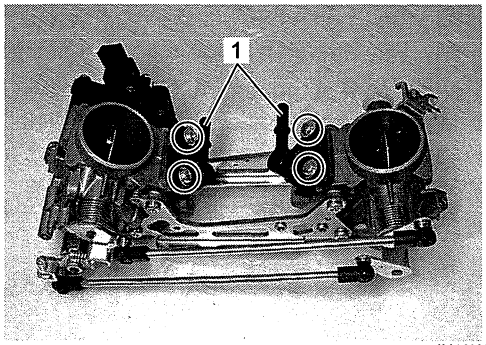
IH18K1140028-01

3) Remove the EVAP system purge control solenoid valve bracket (1). (If equipped)



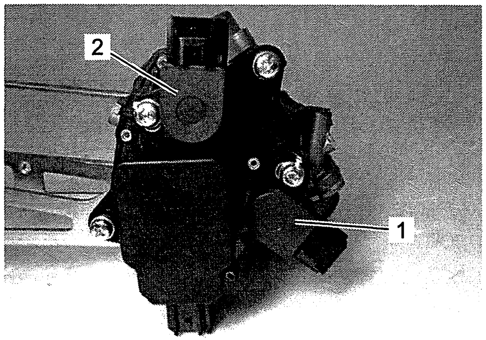
IH18K1140029-01

4) Remove the fuel delivery pipes (1). Refer to "Fuel Injector / Fuel Delivery Pipe Removal and Installation" in Section 1G (Page 1G-16).



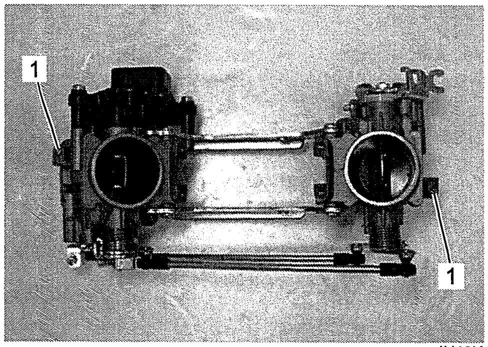
IH18K1140030-01

5) Remove the TP sensor (1). ☞(Page 1C-7)
6) Remove the STP sensor (2). ☞(Page 1C-13)



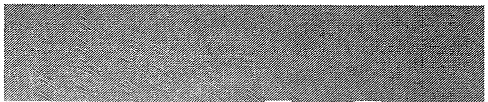
IH18K1140031-01

7) Before removing each air screw (1), determine the setting by slowly turning it clockwise and count the number of turns required to lightly seat the air screw. This counted number is important when reassembling air screw to the original position.
8) Remove the air screws (1).



IH18K1140032-01

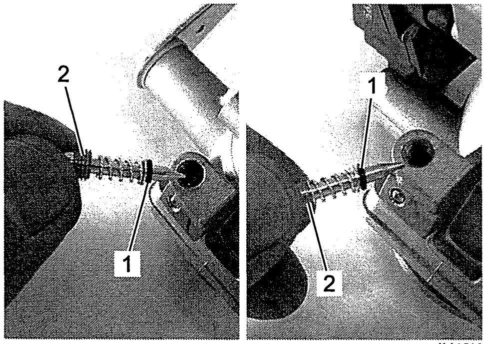
9) Remove the O-ring (1), washer (2) and spring (3).



Reassembly

Reassemble the throttle body in the reverse order of disassembly. Pay attention to the following points:

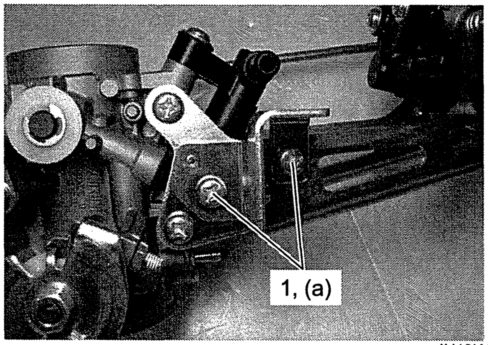
- Apply a thin coat of the engine oil to the new O-rings (1) and install each air screw (2) to the original setting by turning the air screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.



IH18K1140034-01

- Tighten the EVAP system purge control solenoid valve bracket screws (1) to the specified torque. (If equipped)

Tightening torque
EVAP system purge control solenoid valve bracket screw (a): 5.0 N·m (0.51 kgf-m, 3.70 lbf-ft)

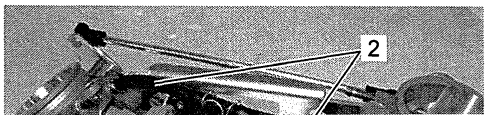


IH18K1140035-01

- Tighten the EVAP system purge control solenoid valve nut (1) to the specified torque. (If equipped)

Tightening torque
EVAP system purge control solenoid valve nut (a): 7.0 N·m (0.71 kgf-m, 5.20 lbf-ft)

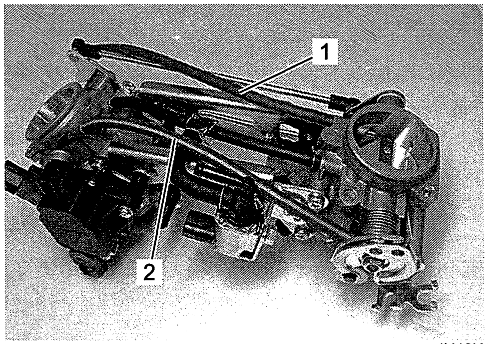
- Connect the purge hoses (2). (If equipped)



- Connect the IAP sensor #1 vacuum hose (1) and IAP sensor #2 vacuum hose (2).

NOTE

The IAP sensor #1 vacuum hose (1) is longer than the IAP sensor #2 vacuum hose (2).



IH18K1140037-01

Throttle Body Inspection and Cleaning

BENJ18K61406010

Refer to “Throttle Body Removal and Installation” (Page 1D-10).

Inspection

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

- O-rings
- Throttle valves
- Secondary throttle valves
- Fuel delivery pipes
- Cushion seals
- Fuel injectors
- Vacuum hoses

Cleaning

- Plug the sensor hole(s) in the main bore with tape or the like.
- Clean the main bore, throttle valve and passage(s) using a cotton swab moistened with a carburetor cleaning chemical.

NOTICE

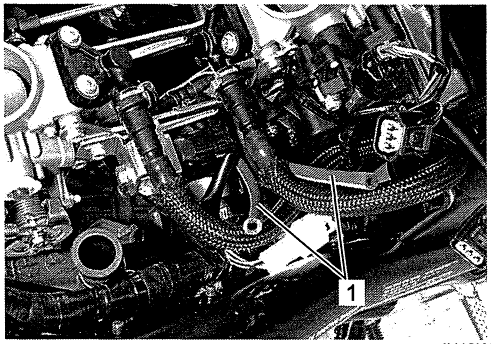
- **Some carburetor cleaning chemicals are very corrosive. Always follow the chemical manufacturer’s instructions for proper use, handling and storage.**
- **Do not dip the throttle body in a carburetor**

- **If the throttle valve is molybdenum-coated, avoid applying cleaning chemical to the coated surfaces. Cleaning chemical loosens the coating, so the air-tightness of the throttle valve would be impaired.**
- **Do not apply any cleaning chemical to parts made of rubber and plastic materials. Cleaning chemical may damage these parts.**

Throttle Valve Synchronization

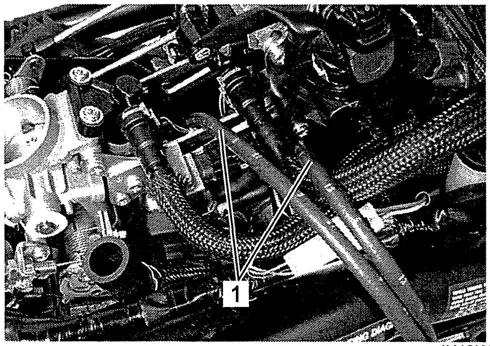
BENJ18K61406011

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Disconnect the IAP sensor vacuum hoses (1) from the throttle body.



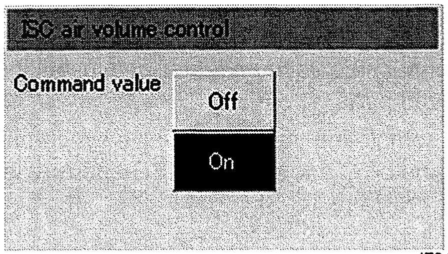
IH18K1140038-01

3) Connect the respective vacuum tester hoses (1) to each vacuum nipple on the throttle body.



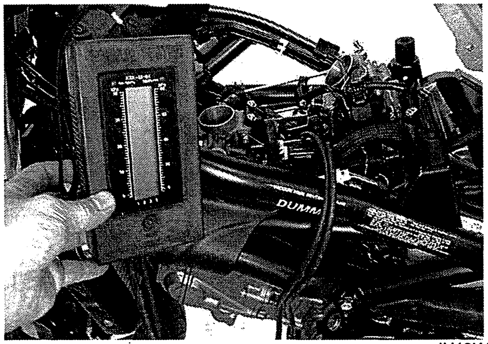
IH18K1140039-01

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



IF04K1140337-02

11) Check for the synchronization of vacuum from front and rear cylinders.

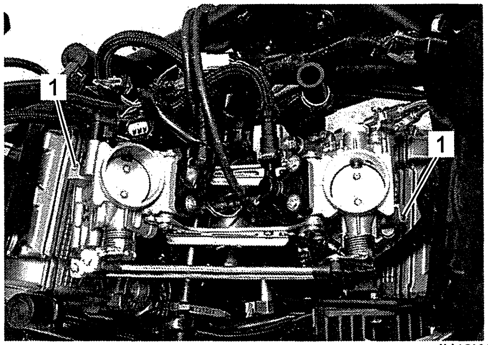


IH18K1140040-01

12) Equalize the vacuum of the cylinders by turning each air screws (1) and keep it turning at idling speed.

NOTE

Always set the engine speed at idle speed.



IH18K1140041-01

13) If the adjustment is not yet correct, remove each air screw and clean them using a swab moistened with a carburetor cleaner (petroleum solvent) and blow dry with a compressed air. Also, clean the air screw passageways. Refer to “Throttle Body Disassembly and Reassembly” (Page 1D-12).

NOTE

- **Slowly turn the air screw in clockwise and**

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

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

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

17) After completing the throttle valve synchronization, clear the DTC and reset the ISC aperture learned value. ☞(Page 1C-3)

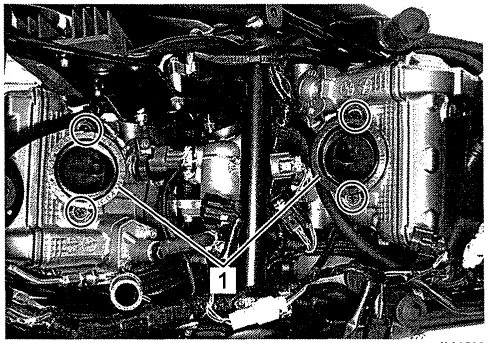
Intake Pipe Removal and Installation

BENJ18K61406012

Refer to "Throttle Body Removal and Installation" (Page 1D-10).

Removal

Remove the intake pipes (1).

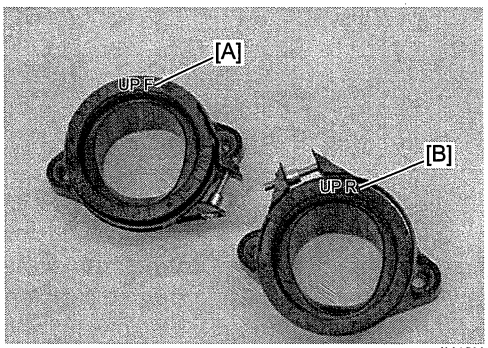


IH18K1140042-01

Installation

NOTE

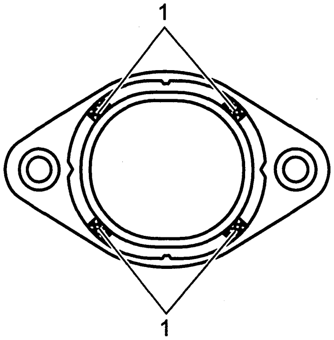
The intake pipe can be identified by the marks.



IH18K1140043-02

[A]:	F (Front cylinder head intake pipe)
[B]:	R (Rear cylinder head intake pipe)

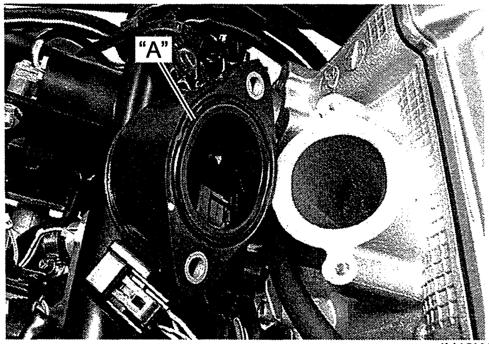
1) Apply adhesive to the intake pipe (1) and install the new O-ring to the intake pipe.



IH18K1140300-02

2) Apply grease to the O-ring.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1140045-01

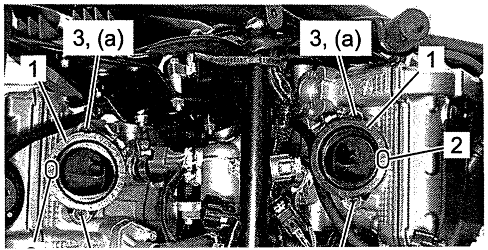
3) Install the intake pipes (1).

NOTE

Face the "UP" mark (2) on the intake pipe to upper.

4) Tighten the intake pipe screws (3) to the specified torque.

Tightening torque
Intake pipe screw (a): 8.5 N·m (0.87 kgf-m, 6.30 lbf-ft)



Cylinder Head Cover Removal and Installation

BENJ18K61406013

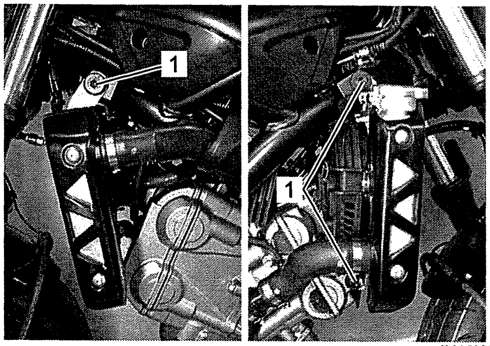
Removal

Front cylinder head cover

1) Remove the radiator mounting bolts (1).

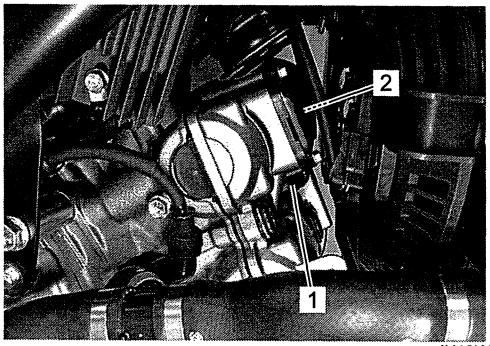
NOTICE

Be careful not to damage the radiator fins.



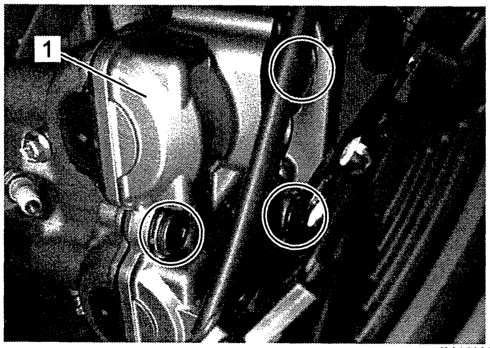
IH18K1140047-01

2) Disconnect the spark plug cap (Center) (1).
3) Remove the PAIR reed valve (2). (If equipped) ☞(Page 1B-11)



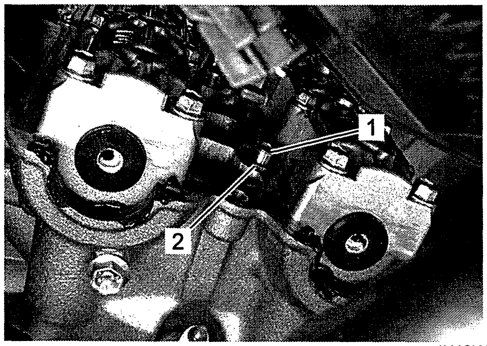
IH18K1140048-03

4) Remove the cylinder head cover (1) and its gasket.



IH18K1140049-01

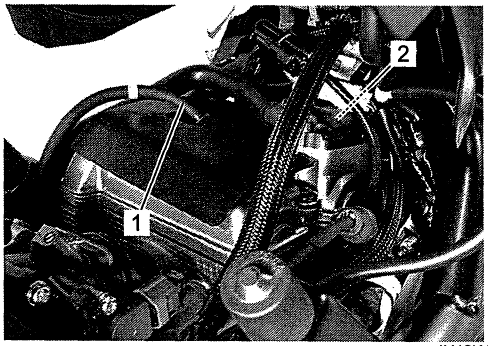
5) Remove the dowel pin (1) and PAIR passage gasket



IH18K1140050-01

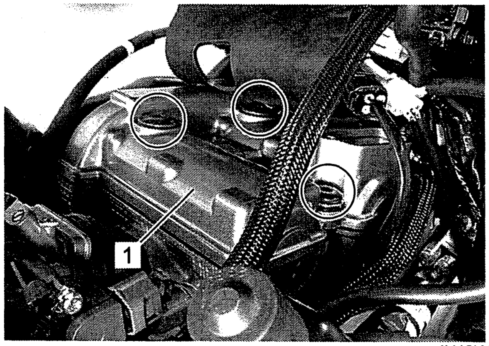
Rear cylinder head cover

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the spark plug cap (Center) (1).
3) Remove the PAIR reed valve (2). (If equipped) ☞(Page 1B-11)



IH18K1140051-02

4) Remove the cylinder head cover (1) and its gasket.



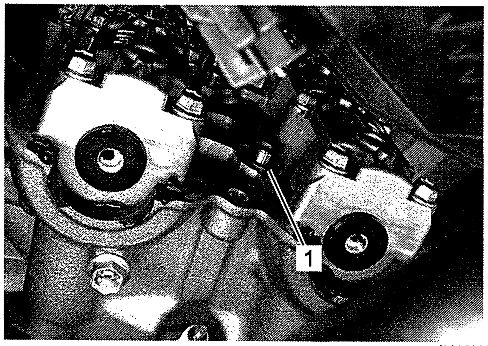
IH18K1140301-01

5) Remove the dowel pin (1) and PAIR passage gasket (2). (If equipped)

Installation

Install the cylinder head cover in the reverse order of removal. Pay attention to the following points:

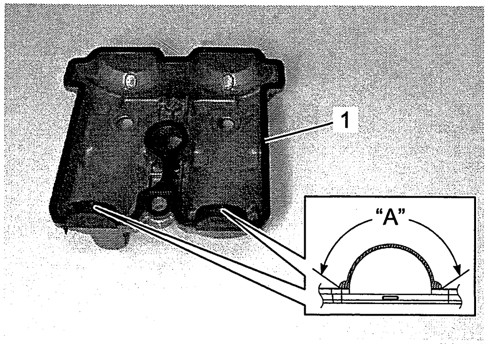
- Install the new PAIR passage gasket (1) (If equipped).



IH18K1140052-01

- Install the new gasket (1) to each cylinder head cover.
- Apply sealant to the "A" of the gasket as shown.

"A": Sealant 99000–31140 (SUZUKI BOND 1207B)

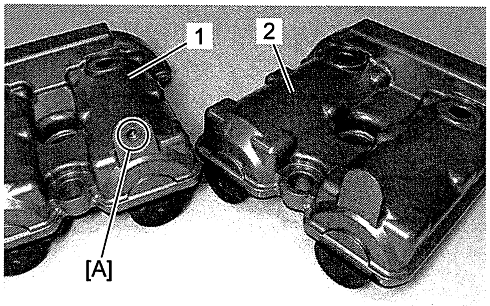


IH18K1140053-02

- Place the cylinder head covers on each cylinder head.

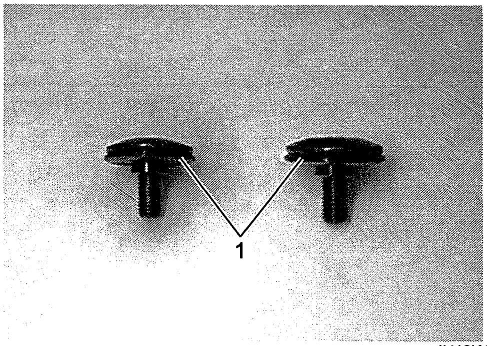
NOTE

The cylinder head covers can be distinguished by radiator mounting hole [A].



IH18K1140054-02

- Set the new gaskets (1) to each cylinder head cover bolts and coat the both sides of the gasket with engine oil.

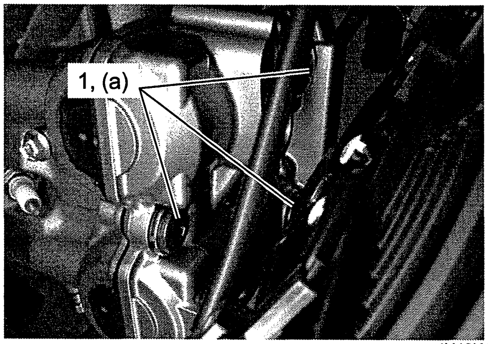


IH18K1140313-01

- Tighten the cylinder head cover bolts (1) to the specified torque.

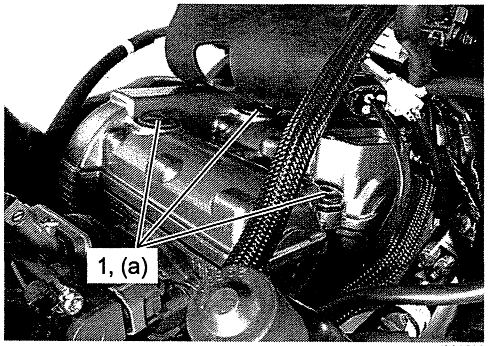
Tightening torque
Cylinder head cover bolt (a): 14 N·m (1.4 kgf-m, 10.5 lbf-ft)

Front cylinder head cover



IH18K1140056-01

Rear cylinder head cover



IH18K1140057-01

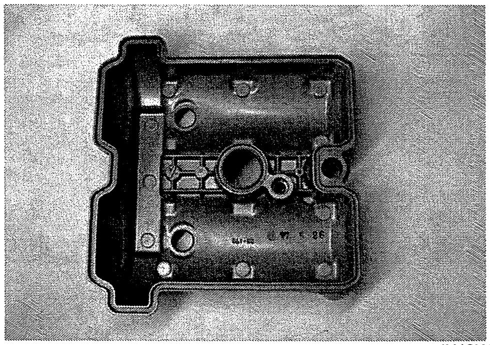
- Connect the spark plug cap. ☞(Page 1H-7)

Cylinder Head Cover Inspection

BENJ18K61406014

Refer to “Cylinder Head Cover Removal and Installation” (Page 1D-17).

Inspect the cylinder head cover for carbon deposit. If carbon deposit is found there, remove the carbon.



IH18K1140058-01

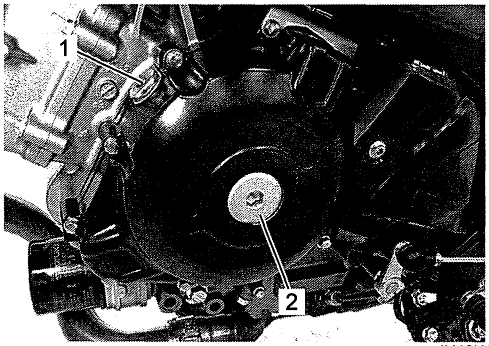
Cam Chain Tension Adjuster / Camshaft Removal

BENJ18K61406015

Refer to “Cylinder Head Cover Removal and Installation” (Page 1D-17) and “Spark Plug Removal and Installation” in Section 1H (Page 1H-7).

Front Cam Chain Tension Adjuster / Front Camshaft

1) Remove the radiator assembly. ☞(Page 1F-8)
2) Remove the throttle body. ☞(Page 1D-10)
3) Remove the TDC plug (1) and camshaft hole plug (2).

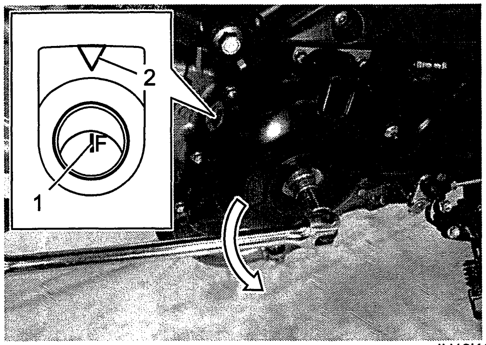


IH18K1140059-01

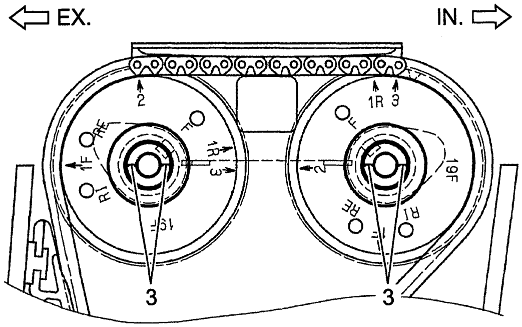
4) Turn the crankshaft to bring the [| F] line (1) on generator rotor to the index mark (2) on the generator cover and also to bring the camshafts to the position as shown.

NOTE

At the above condition, the front cylinder is



IH18K1140060-02



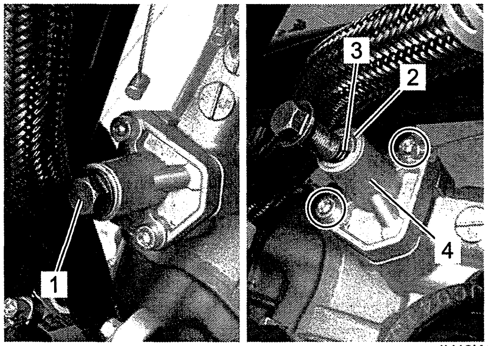
IH18K1140318-01

5) Remove the cam chain tension adjuster cap bolt (1), washer (2) and spring (3).

⚠ CAUTION

The cam chain tension adjuster cap bolt (1) is spring loaded. Be careful when removing it.

6) Remove the front cam chain tension adjuster (4) and gasket.



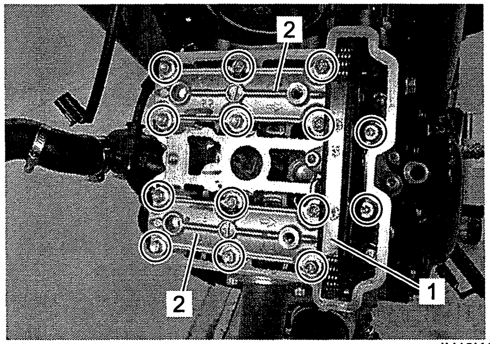
IH18K1140062-01

7) Remove the cam chain guide No. 2 (1).

8) Remove the camshaft journal holders (2).

NOTICE

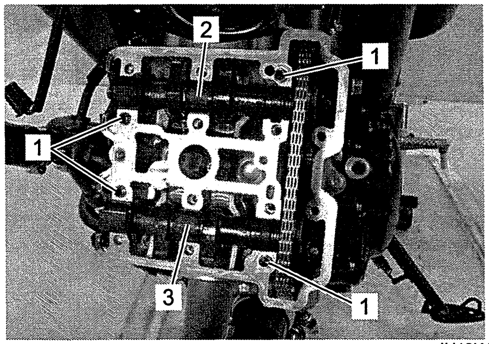
Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench diagonally.



IH18K1140063-01

9) Remove the dowel pins (1).

10) Remove the intake camshaft (2) and exhaust camshaft (3).



IH18K1140064-01

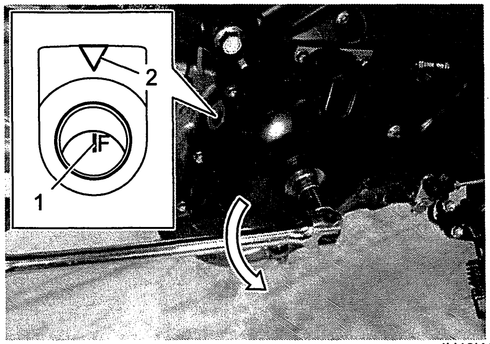
Rear Cam Chain Tension Adjuster / Rear Camshaft

1) Remove the fuel tank. ☞(Page 1G-9)

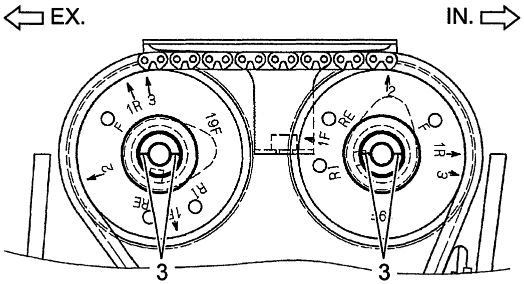
2) Rotate the crankshaft 360 degrees (1 turn) counterclockwise and align the [| F] line (1) on the generator rotor with the index mark (2) on the generator cover.

NOTE

At the above condition, the rear cylinder is at ATDC 90° on expansion stroke and also the engraved lines (3) on the camshafts are parallel with the mating surface of the rear cylinder head.

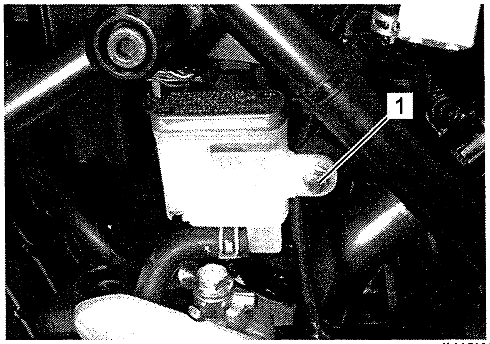


IH18K1140060-02



IH18K1140319-01

3) Remove the rear brake reservoir tank mounting bolt (1).



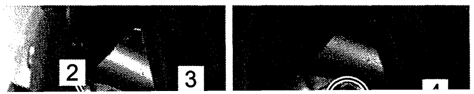
IH18K1140067-01

4) Remove the cam chain tension adjuster cap bolt (1), washer (2) and spring (3).

⚠ CAUTION

The cam chain tension adjuster cap bolt (1) is spring loaded. Be careful when removing it.

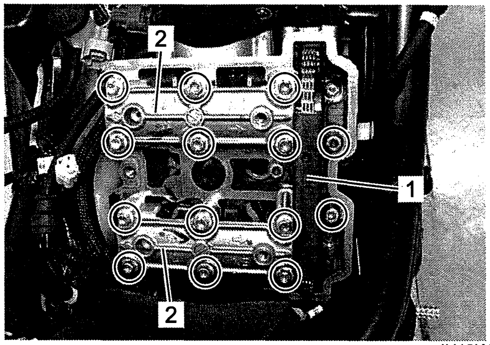
5) Remove the rear cam chain tension adjuster (4) and gasket.



6) Remove the cam chain guide No. 2 (1).
7) Remove the camshaft journal holders (2).

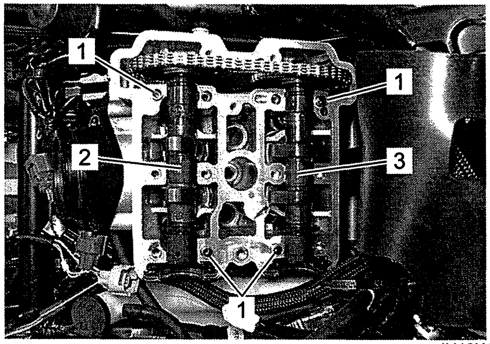
NOTICE

Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench diagonally.



IH18K1140069-01

8) Remove the dowel pins (1).
9) Remove the intake camshaft (2) and exhaust camshaft (3).



IH18K1140070-01

Cam Chain Tension Adjuster / Camshaft Installation

BENJ18K61406016

Front Camshaft / Front Cam Chain Tension Adjuster

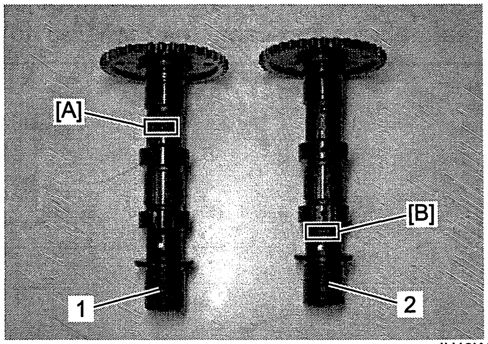
NOTE

Before installing the camshaft, check that the tappets are installed correctly.

1) Apply engine oil to the camshaft journals and cam surfaces.

NOTE

Identify the camshafts according to the following embossed letters.
Intake camshaft (1): [A]
Exhaust camshaft (2): [B]



IH18K1140071-01

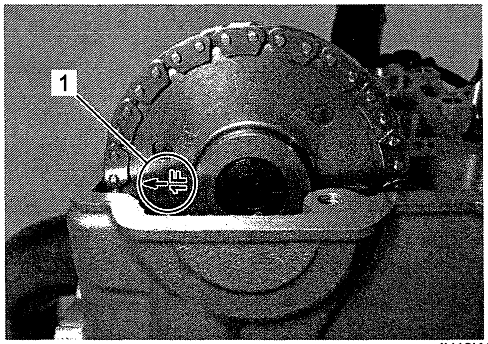
[A]: INF	[B]: EXF

2) Turn the crankshaft counterclockwise and align [| F] line (1) on the generator rotor to the index mark (2) on the generator cover while keeping the cam chains pulled upward.

NOTICE

- **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 [| F] line (1) with the index mark (2) and hold this position when installing the camshafts.**

3) Pull the cam chain lightly.
4) The exhaust camshaft sprocket has an arrow mark 1F (1). Install the exhaust camshaft so that the arrow mark 1F (1) is aligned with the mating surface of the cylinder head.
5) Engage the cam chain with the exhaust camshaft sprocket.

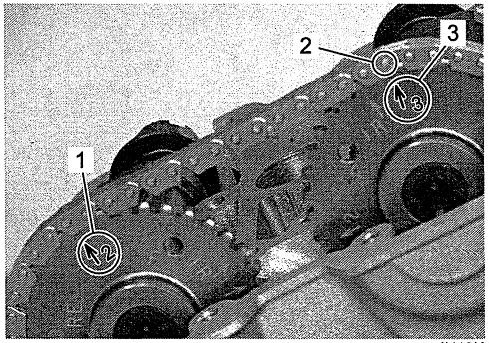


IH18K1140073-03

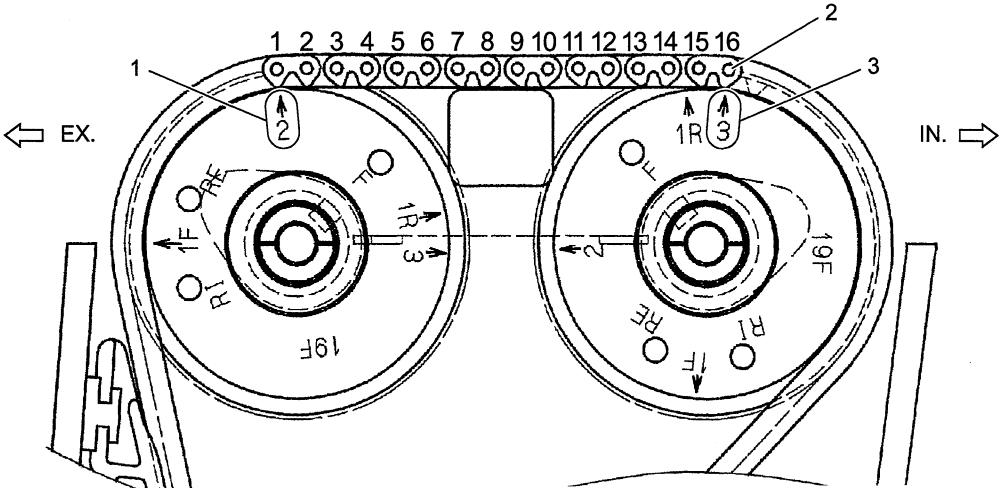
6) The other arrow marked 2 (1) should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked 2 (1), count out 16th roller pins (from the exhaust camshaft side going towards the intake camshaft side).
7) Engage the 16th roller pin (2) on the cam chain with the arrow marked 3 (3) on the intake sprocket.

NOTE

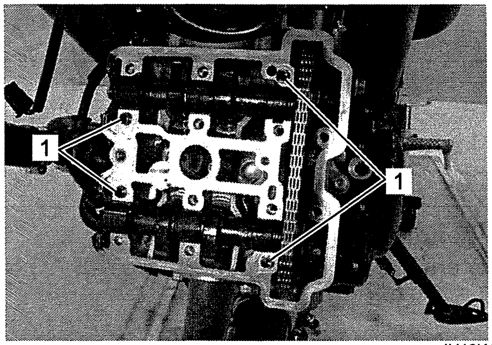
The cam chain should now be on sprockets. Be careful not to move the crankshaft until the camshaft journal holders and cam chain tension adjuster are secured.



IH18K1140302-04



8) Install the dowel pins (1).



IH18K1140076-01

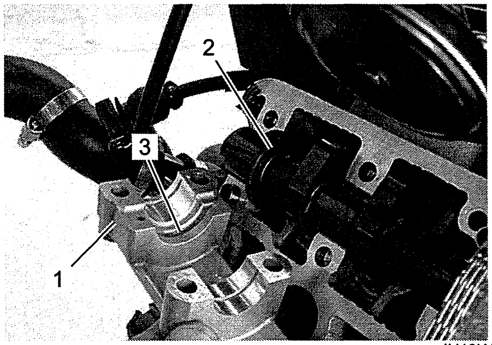
9) Install the camshaft journal holders (1), intake and exhaust.

NOTICE

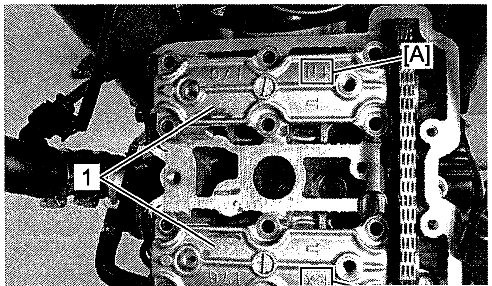
Damage to head or camshaft journal holder thrust surfaces may result if the camshaft journal holders (1) are not drawn down evenly.

NOTE

Align the flange (2) of the camshafts with the groove (3) of the camshaft journal holders. Each camshaft journal holder is identified with a cast-on letters (IN, EX).



IH18K1140077-02



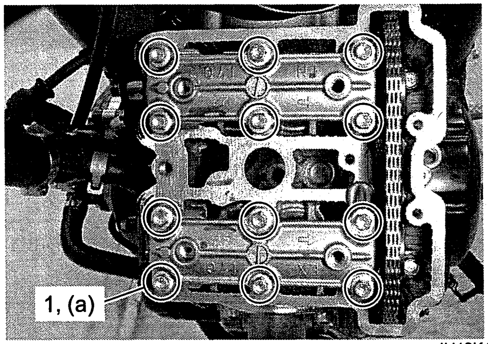
10) Fasten the camshaft journal holders evenly by tightening the camshaft journal holder bolts sequentially and diagonally.

NOTICE

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.

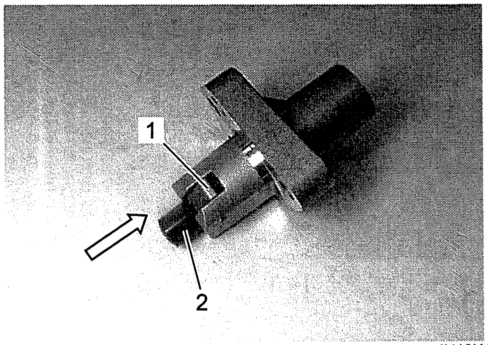
11) Tighten the camshaft journal holder bolts (1) to the specified torque.

Tightening torque
Camshaft journal holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1140079-01

12) Push the stopper (1) and retract the push rod (2).



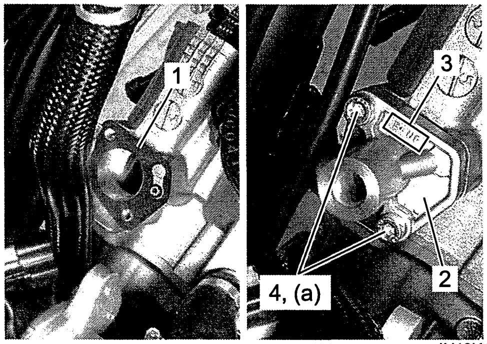
IH18K1140081-01

13) Install a new gasket (1).

14) Install the cam chain tension adjuster (2) with [F-UP] mark (3) faced to the top of cylinder head.

15) Tighten the cam chain tension adjuster bolts (4) to the specified torque.

Tightening torque
Cam chain tension adjuster bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

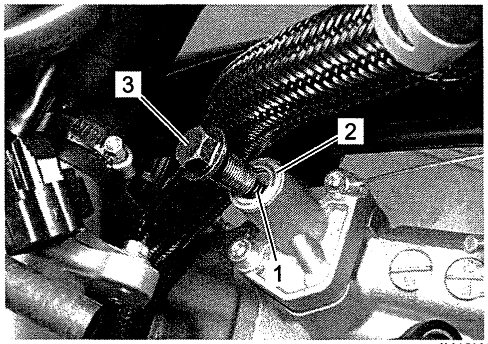


IH18K1140082-02

16) Install the spring (1), new gasket washer (2) and cam chain tension adjuster plug (3).

NOTE

Click sound is heard when the cam chain tension adjuster plug is installed.



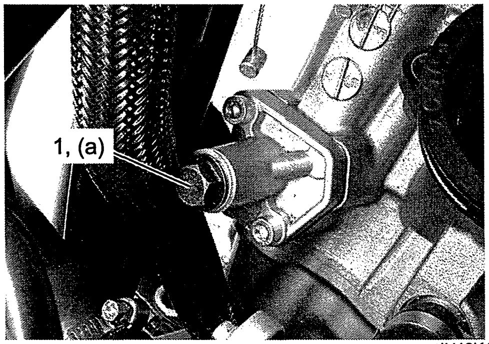
IH18K1140083-01

17) Tighten the cam chain tension adjuster plug (1) to the specified torque.

NOTICE

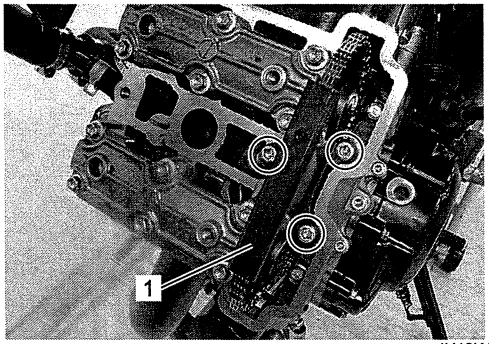
After installing the cam chain tension adjuster, check to be sure that the adjuster works properly by checking the slack of cam chain.

Tightening torque
Cam chain tension adjuster plug (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1140084-01

18) Install the cam chain guide No. 2 (1).

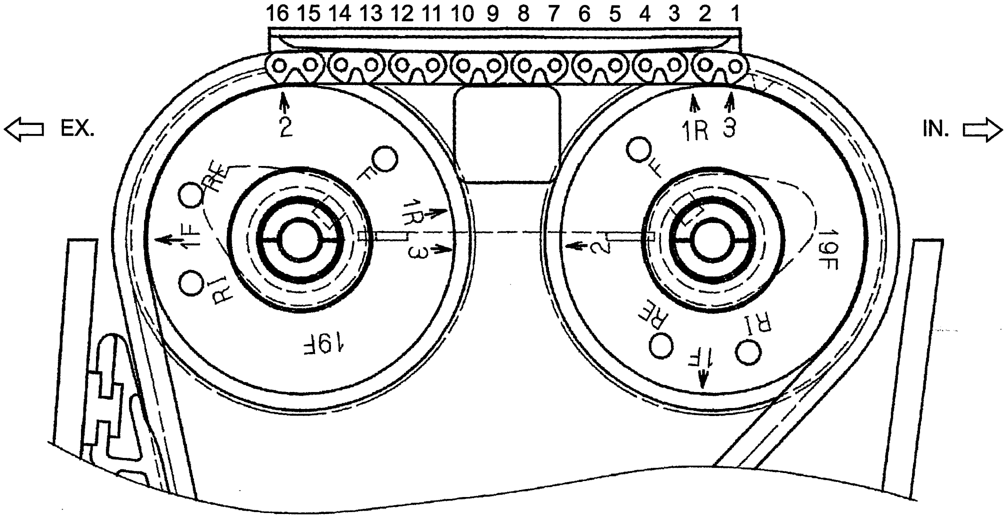


IH18K1140085-02

19) After installing the cam chain guide No. 2, rotate the crankshaft (2 turn), and recheck the positions of the front camshafts.

NOTICE

Pull the rear cam chain upward, or the chain will be caught between crankcase and cam drive sprocket.



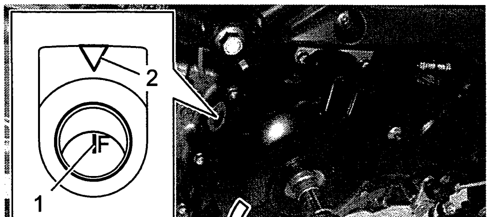
IH18K1140321-01

Rear Camshaft / Rear Cam Chain Tension Adjuster

1) From the position where the front camshafts have now been installed, rotate the crankshaft 360 degrees (1 turn) counterclockwise and align the [| F] line (1) on the generator rotor with the index mark (2) of the generator cover.

NOTICE

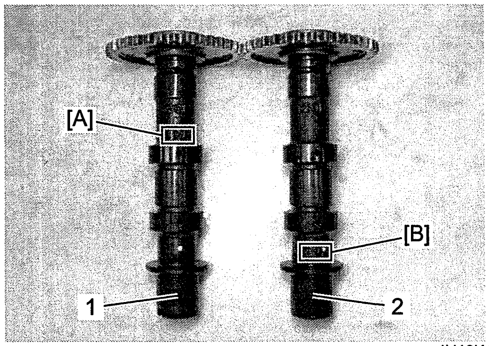
- **Pull the cam chains upward, or the chain will be caught between crankcase and cam drive sprocket.**
- **To adjust the camshaft timing correctly, be sure to align [| F] line (1) with the index mark (2) and hold this position when installing the camshafts.**



2) Apply engine oil solution to the camshaft journal and cam surfaces.

NOTE

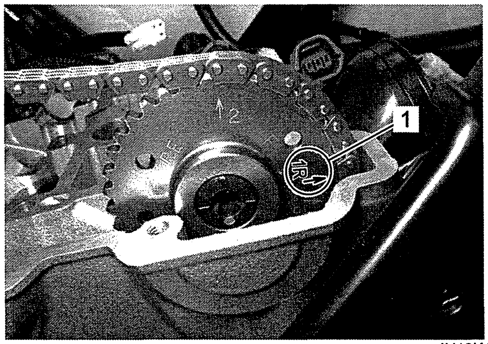
Identify the camshafts according to the following embossed letters.
Intake camshaft (1): [A]
Exhaust camshaft (2): [B]



IH18K1140087-01

[A]: INR	[B]: EXR

3) Pull the cam chain lightly.
4) The intake camshaft sprocket has an arrow mark 1R (1). Install the intake camshaft so that the arrow mark 1R (1) is aligned with the mating surface of the cylinder head.
5) Engage the cam chain with the intake camshaft sprocket.

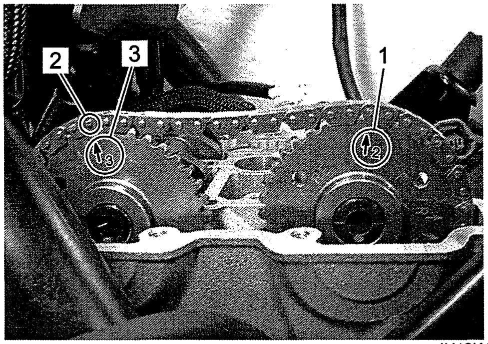


IH18K1140088-03

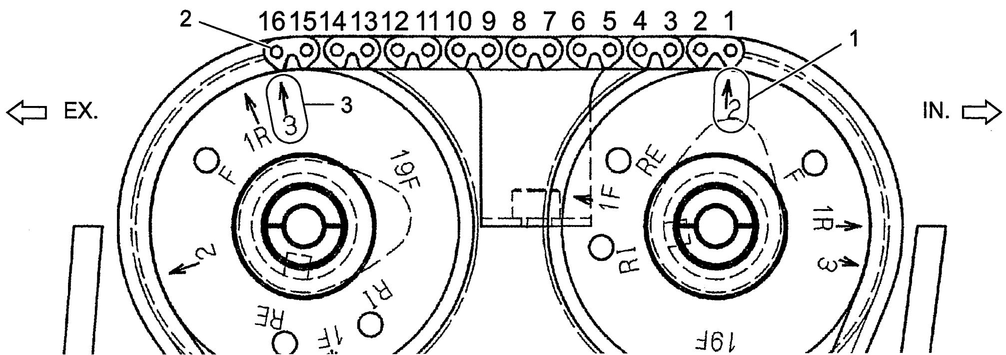
6) The other arrow marked 2 (1) should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked 2 (1), count out 16 roller pins (from the intake camshaft side going towards the exhaust camshaft side).
7) Engage the 16th roller pin (2) on the cam chain with the marked 3 (3) on the exhaust sprocket.

NOTE

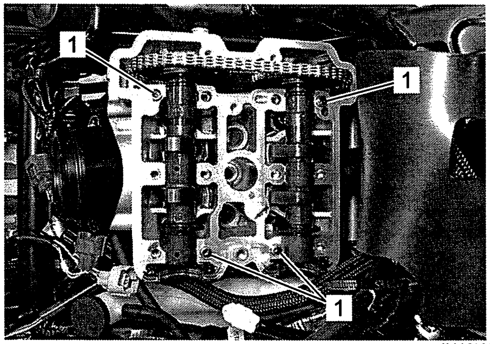
The cam chain should now be on sprockets. Be careful not to move the crankshaft until the camshaft journal holders and cam chain tension adjuster are secured.



IH18K1140089-04



8) Install the dowel pins (1).



IH18K1140091-01

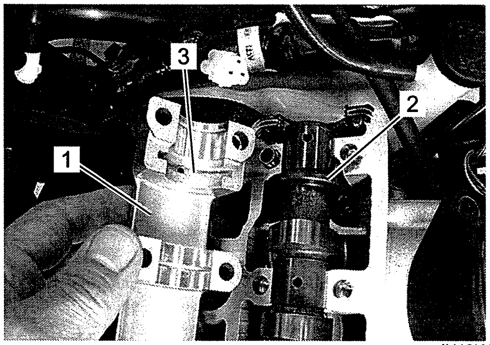
9) Install the camshaft journal holders (1), intake and exhaust.

NOTICE

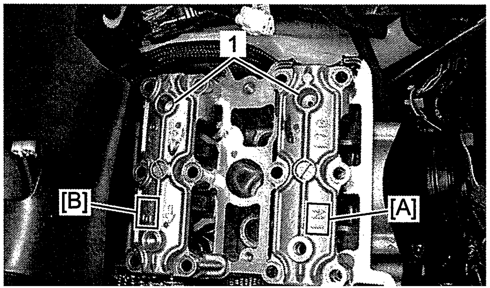
Damage to head or camshaft journal holder thrust surfaces may result if the camshaft journal holders (1) are not drawn down evenly.

NOTE

Align the flange (2) of the camshafts with the groove (3) of the camshaft journal holders. Each camshaft journal holder is identified with a cast-on letters (IN, EX).



IH18K1140092-01



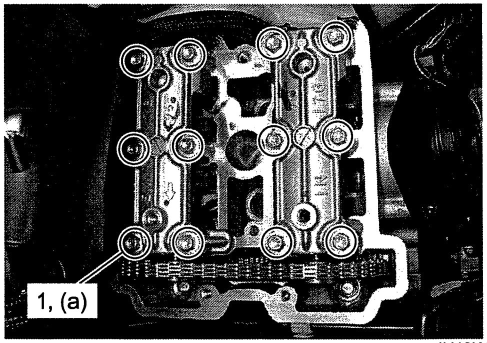
10) Fasten the camshaft journal holders evenly by tightening the camshaft journal holder bolts sequentially and diagonally.

NOTICE

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.

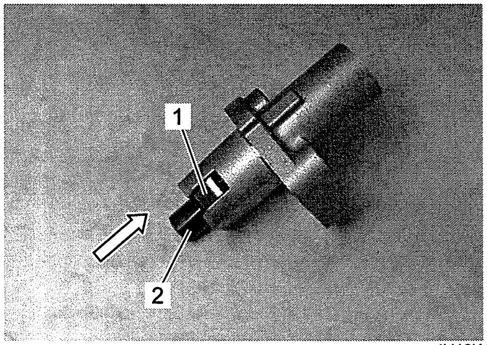
11) Tighten the camshaft journal holder bolts (1) to the specified torque.

Tightening torque
Camshaft journal holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1140094-01

12) Push the stopper (1) and retract push rod (2).



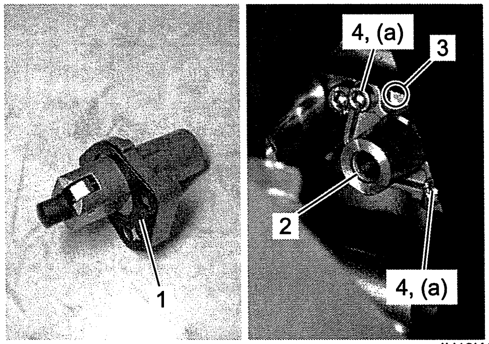
IH18K1140096-01

13) Install a new gasket (1).

14) Install the cam chain tension adjuster (2) with [R-UP] mark (3) faced to the top of cylinder head.

15) Tighten the cam chain tension adjuster bolts (4) to the specified torque.

Tighting torque
Cam chain tension adjuster bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

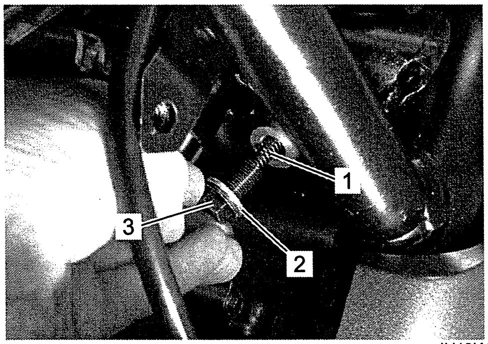


IH18K1140097-02

16) Install the spring (1), new gasket washer (2) and cam chain tension adjuster plug (3).

NOTE

Click sound is heard when the cam chain tension adjuster plug is installed.



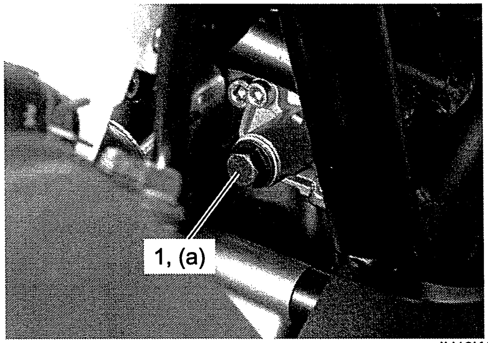
IH18K1140098-01

17) Tighten the cam chain tension adjuster plug (1) to the specified torque.

NOTICE

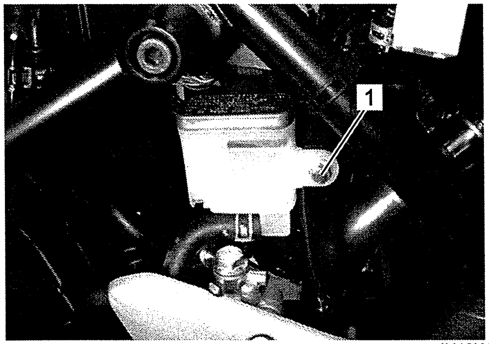
After installing the cam chain tension adjuster, check to be sure that the adjuster works properly by checking the slack of cam chain.

Tightening torque
Cam chain tension adjuster plug (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



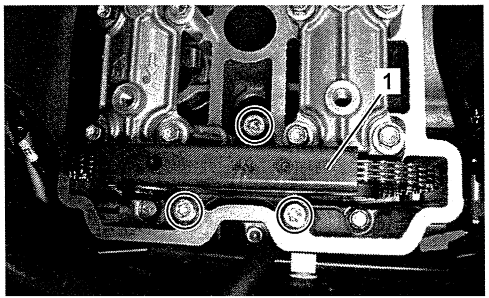
IH18K1140099-01

18) Tighten the rear brake reservoir tank mounting bolt (1). Refer to “Rear Brake Hose Routing Diagram” in Section 4A (Page 4A-18).

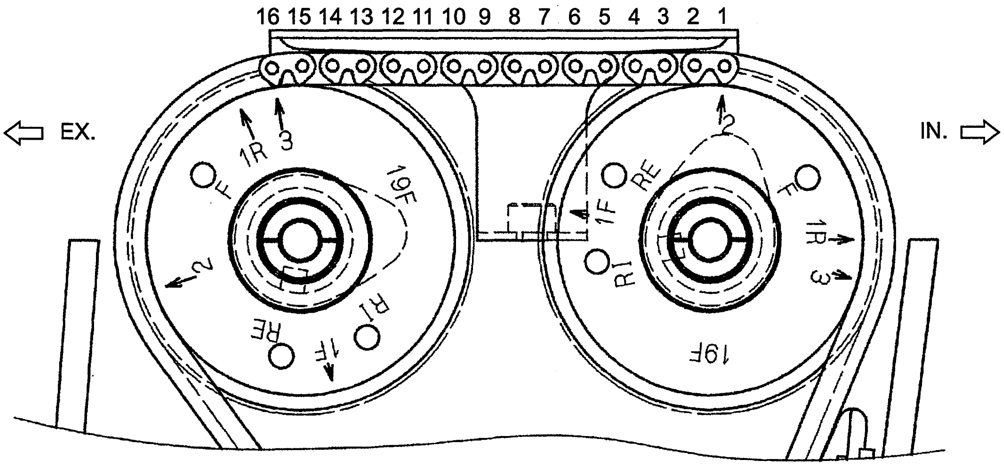


IH18K1140100-01

19) Install the cam chain guide No. 2 (1).



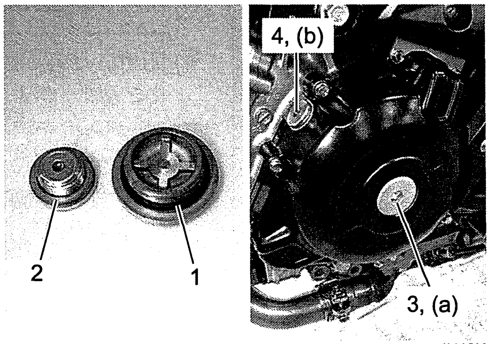
20) After installing the cam chain guide No. 2, rotate the crankshaft (2 turn), and recheck the positions of the rear camshafts.



IH18K1140323-01

21) Check and adjust the valve clearance. ☞(Page 1D-32)
22) Apply engine oil to the new O-ring (1).
23) Install the new gasket (2).
24) Tighten the crankshaft hole plug (3) and TDC plug (4) to the specified torque.

Tightening torque
Crankshaft hole plug (a): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)
TDC plug (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1140103-01

Camshaft Inspection

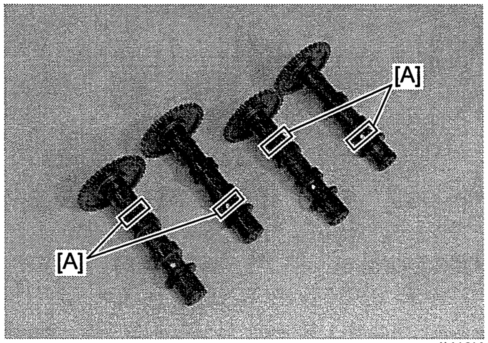
BENJ18K61406017

Refer to "Cam Chain Tension Adjuster / Camshaft Removal" (Page 1D-19) and "Cam Chain Tension Adjuster / Camshaft Installation" (Page 1D-21).

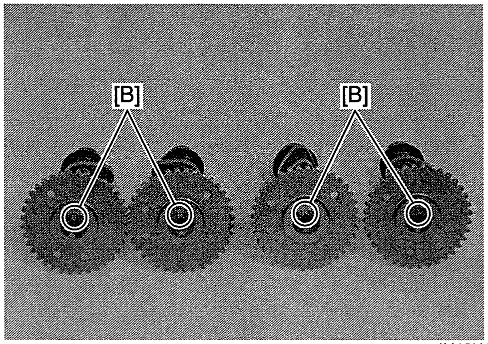
Camshaft Identification

The camshafts can be identified by the engraved letter [A] and I.D. mark [B] stamped on the camshaft ends.

	Letter [A]	I.D. mark [B]
Front intake camshaft	INF	W
Front exhaust camshaft	EXF	X
Rear intake camshaft	INR	Y
Rear exhaust camshaft	EXR	Z



IH18K1140104-02



IH18K1140105-01

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.

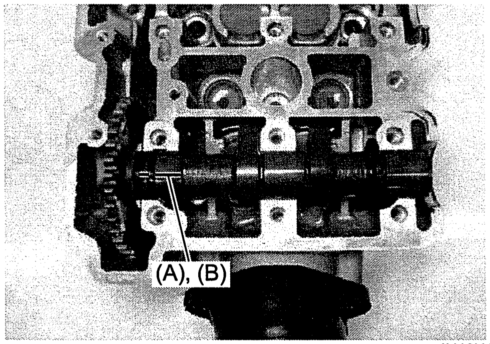
<u>**Cam height**</u>
Intake [Limit]: 36.08 mm (1.421 in)
Exhaust [Limit]: 35.38 mm (1.393 in)

Special tool
09900–20202

Camshaft Journal Wear

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) Measure the clearance at the widest portion with the special tool.

Special tool
(A): 09900–22301
(B): 09900–22302



IH18K1140106-01

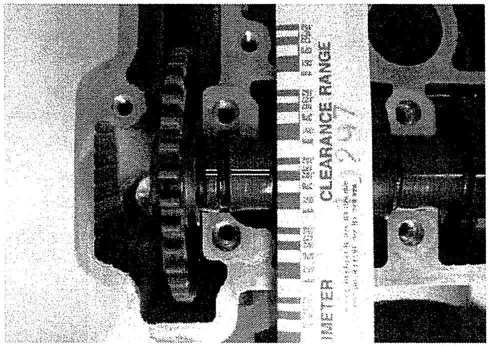
3) Install camshaft journal holder and tighten the camshaft journal holder bolts evenly and diagonally to the specified torque. ☞(Page 1D-21)

NOTE

Do not rotate the camshaft with the plastigage in place.

4) Remove the camshaft journal holder and measure the width of the compressed plastigage using the envelope scale.
5) This measurement should be taken at the widest part of the compressed plastigage.

<u>**Camshaft journal oil clearance**</u>
Intake [Limit]: 0.150 mm (0.0059 in)
Exhaust [Limit]: 0.150 mm (0.0059 in)



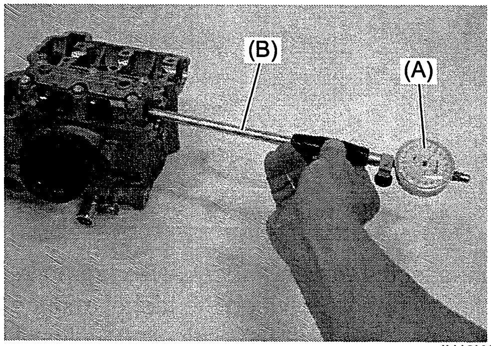
IH18K1140107-01

6) 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.

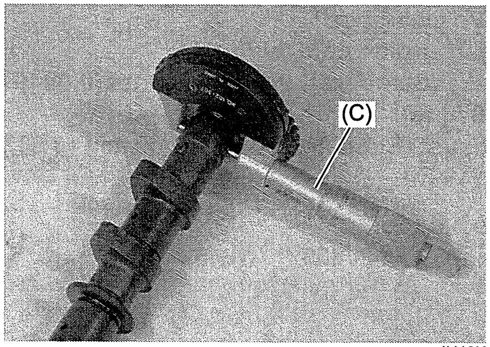
Camshaft journal holder I.D.
Intake [Standard]: 22.007 – 22.028 mm (0.8665 – 0.8672 in)
Exhaust [Standard]: 22.007 – 22.028 mm (0.8665 – 0.8672 in)

Camshaft journal O.D.
Intake [Standard]: 21.959 – 21.980 mm (0.8646 – 0.8653 in)
Exhaust [Standard]: 21.959 – 21.980 mm (0.8646 – 0.8653 in)

Special tool
(A): 09900–20602
(B): 09900–22403
(C): 09912–66310

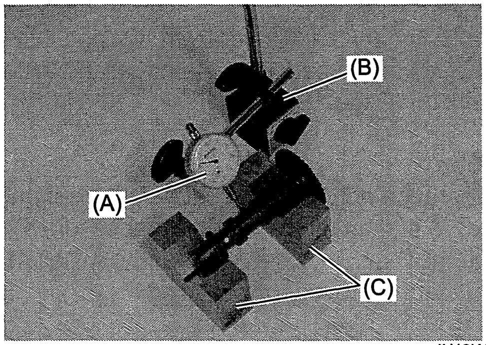


IH18K1140108-01



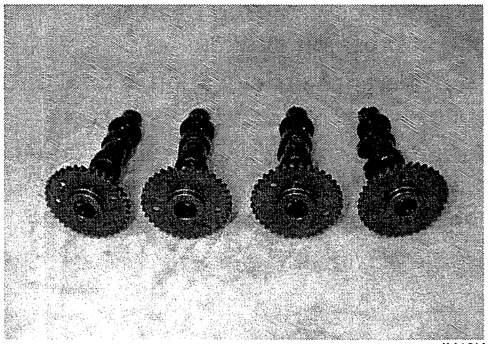
IH18K1140110-01

Camshaft Runout
Measure the runout using the dial gauge. Replace the camshaft if the runout exceeds the limit.



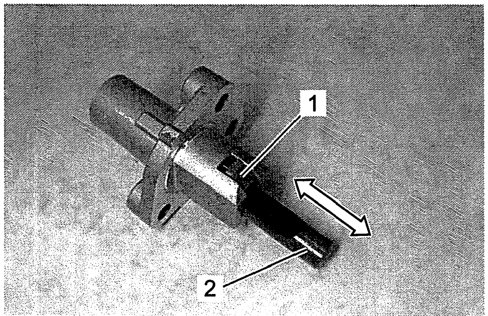
IH18K1140109-01

Camshaft Sprocket
Inspect the teeth of each camshaft sprocket for wear or damage.
If any defects are found, replace the camshaft assembly and cam chain as a set.


IH18K1140111-01

Cam Chain Tension Adjuster Inspection
BENJ18K61406018

Refer to “Cam Chain Tension Adjuster / Camshaft Removal” (Page 1D-19) and “Cam Chain Tension Adjuster / Camshaft Installation” (Page 1D-21).
Unlock the ratchet (1), and move the push rod (2) in place to see if it slides smoothly. If any stickness is noted or ratchet mechanism is faulty, replace the cam chain tension adjuster assembly with a new one.



Valve Clearance Inspection and Adjustment

BENJ18K61406019

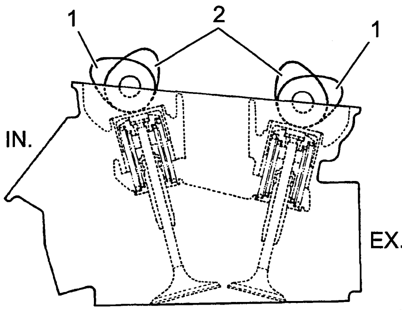
Refer to “Cylinder Head Cover Removal and Installation” (Page 1D-17) and “Spark Plug Removal and Installation” in Section 1H (Page 1H-7).

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.

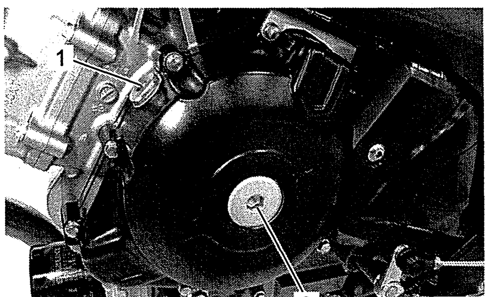
NOTE

- **The cam must be at positions, (1) or (2), 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 valve clearance checking, be sure to use a wrench, and rotate in the normal running direction.**



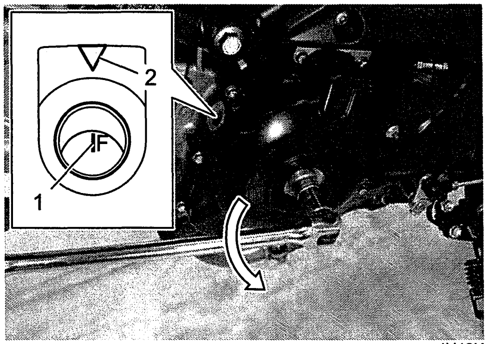
IH18K1140304-01

1) Remove the TDC plug (1) and crankshaft hole plug (2).

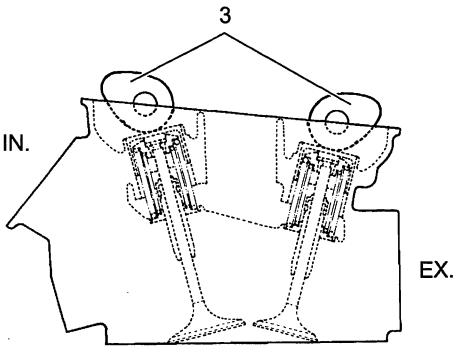


NOTE

If the camshafts are not in position (3), turn the crankshaft 360° (1 turns) and confirm the position again.



IH18K1140115-01

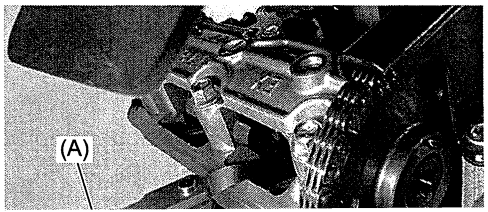


IE31J1140055-01

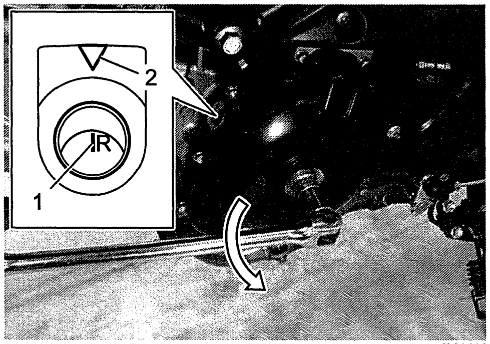
3) To inspect the front cylinder valve clearance, use a thickness gauge between the tappet and the cam. If the clearance is out of specification, adjust it into the specified range.

<u>Valve clearance</u>
When engine cold
Intake [Standard]: 0.10 – 0.20 mm (0.0040 – 0.0078 in)
Exhaust [Standard]: 0.20 – 0.30 mm (0.0079 – 0.0118 in)

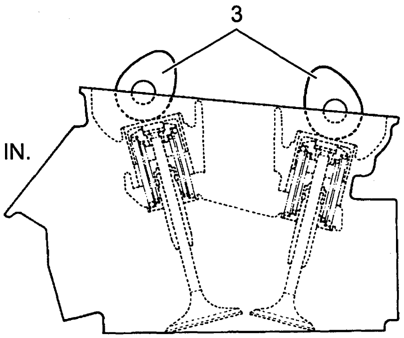
Special tool
(A): 09900–20803



4) Turn the crankshaft 270 degrees (3/4 turn) to set the rear cylinder at TDC of compression stroke. (Align the [| R] line (1) on the generator rotor to the index mark (2) of generator cover hole and also bring the camshafts to the position (3) as shown.)



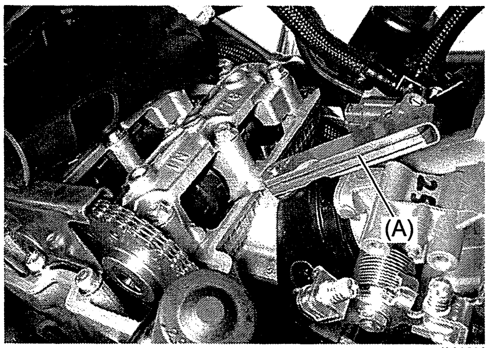
IH18K1140117-01



IE31J1140058-01

5) Inspect the rear cylinder valve clearance as the same manner of front cylinder and adjust the clearance if necessary.

Special tool
(A): 09900–20803

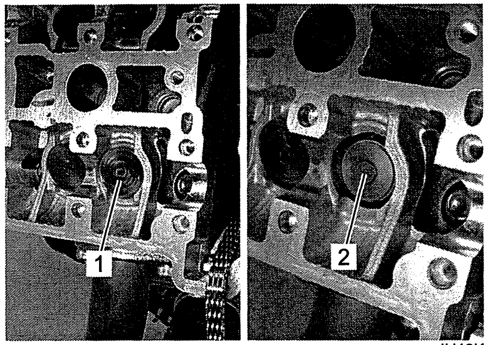


IH18K1140118-01

Adjustment

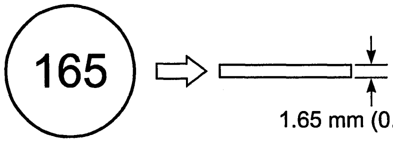
The clearance is adjusted by replacing the existing

2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



IH18K1140119-01

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



IH18K1140120-01

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 (0.0473 – 0.0866 in) in steps of 0.05 mm (0.002 in).

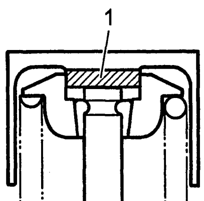
NOTICE

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

5) Fit the selected shim (1) to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size.

NOTE

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



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

TAPPET SHIM SET (12800-05830)

SUFFIX NO.	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
SURED PET ARANCE) \ 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
0.00-0.04			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
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																				

(INTAKE SIDE)

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	1.65 mm
Shim size to be used	1.75 mm

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

TAPPET SHIM SET (12800-05830)

SUFFIX NO.	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
SURED ET RANCE / 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																				

(EXHAUST SIDE)

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	1.65 mm
Shim size to be used	1.75 mm

6) Install the intake camshaft or exhaust camshaft. ☞(Page 1D-21)

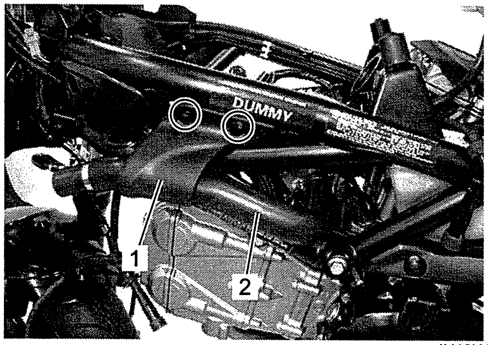
7) Rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement, then check the clearance again to confirm that it is within the specified range.

8) After finishing the valve clearance adjustment, check the engine for smooth starting and free from any abnormal noise.

Engine Assembly Removal

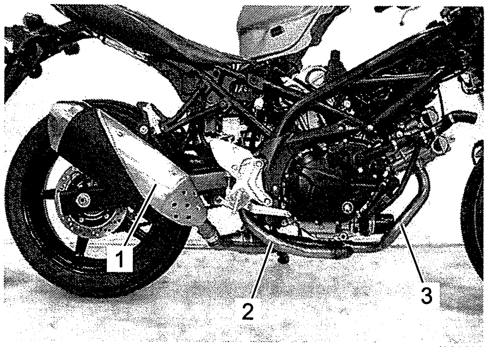
BENJ18K61406020

1) Drain engine oil. ☞(Page 1E-5)
2) Drain engine coolant. ☞(Page 1F-6)
3) Disconnect the battery (–) lead wire. ☞(Page 1J-13)
4) Remove the throttle body. ☞(Page 1D-10)
5) Remove the radiator assembly. ☞(Page 1F-8)
6) Remove the all spark plug caps. ☞(Page 1H-7)
7) Remove the left rear frame body cover (1).
8) Disconnect the radiator inlet hose (2).



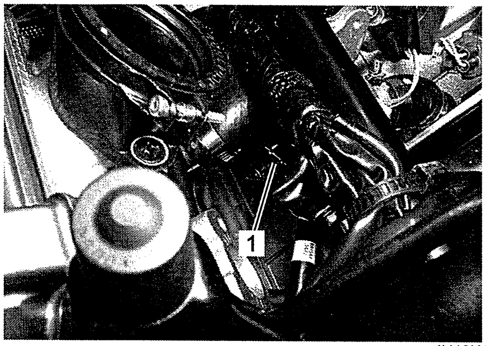
IH18K1140121-01

9) Remove the muffler (1), center exhaust pipe (2) and front exhaust pipe (3). ☞(Page 1K-5)



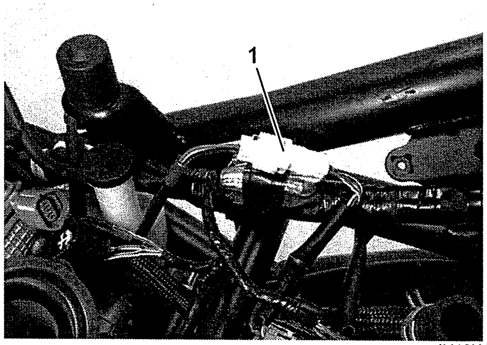
IH18K1140122-01

10) Disconnect the ECT sensor coupler (1).



IH18K1140123-01

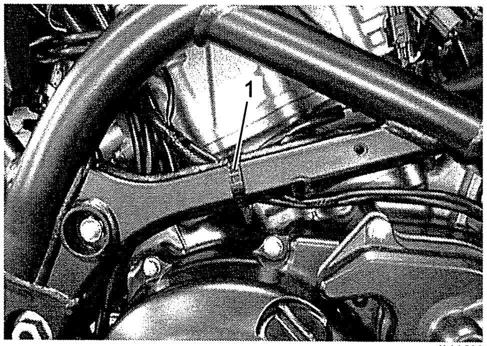
11) Disconnect the GP switch coupler (1).



IH18K1140124-01

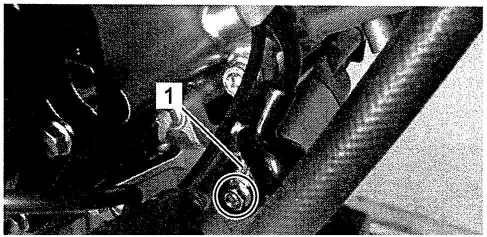
12) Remove the right frame lower cover. ☞(Page 9D-22)

13) Remove the clamp (1).



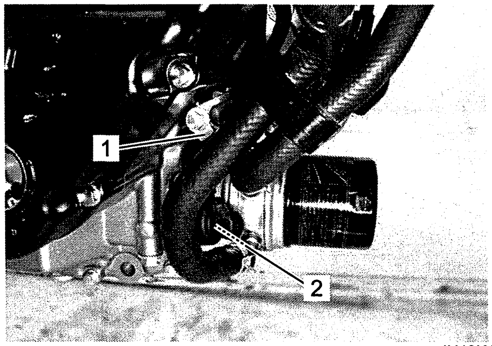
IH18K1140125-03

14) Disconnect the starter motor lead wire (1).



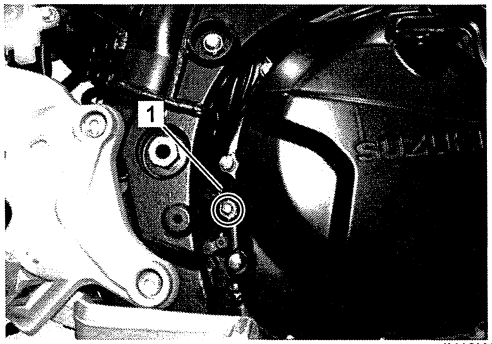
15) Release the water pump drain hose and oil pressure switch lead wire from the clamp (1).

16) Remove the oil pressure switch lead wire (2).



IH18K1140127-02

17) Disconnect the engine ground lead wire (1).

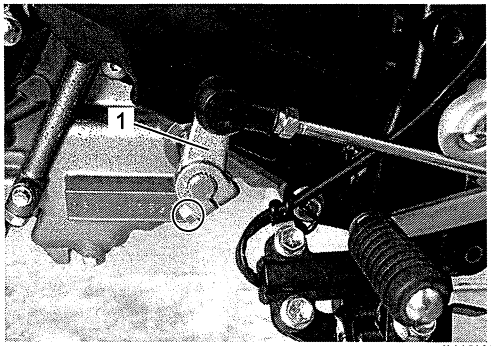


IH18K1140128-02

18) Remove the gearshift link arm (1).

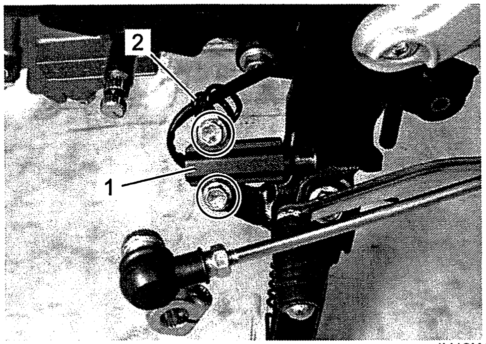
NOTE

Mark the gearshift shaft head at which the gearshift link arm slit is set for correct reinstallation.



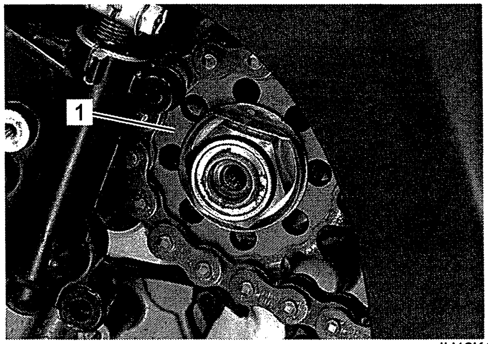
IH18K1140129-01

19) Remove the side-stand switch (1) and clamp (2).



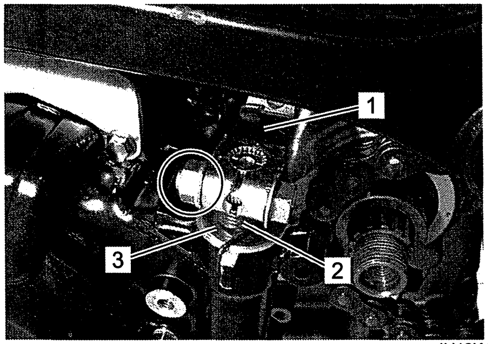
IH18K1140130-01

20) Remove the engine sprocket (1). ☞(Page 3A-4)



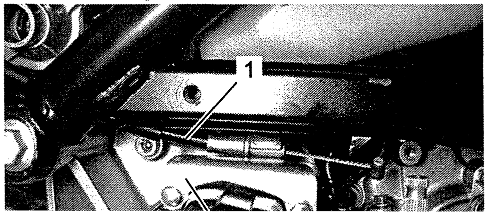
IH18K1140131-01

21) Remove the clutch release arm (1), return spring (2) and washer (3).



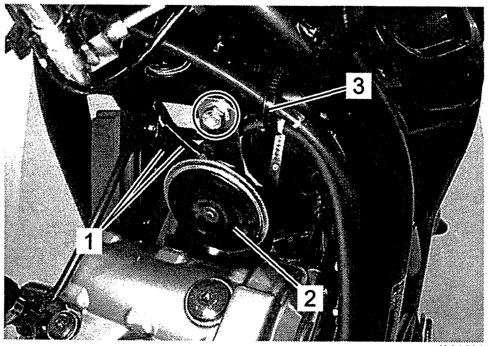
IH18K1140132-01

22) Disconnect the clutch cable (1) from the clutch cable stopper (2).



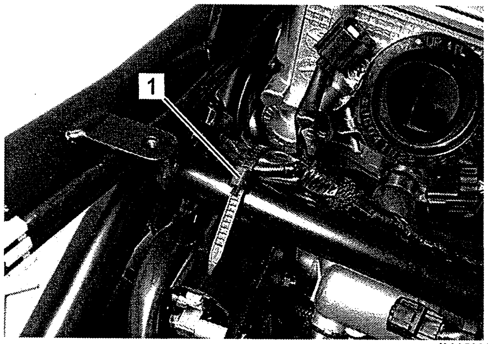
23) Disconnect the horn couplers (1) and remove the horn (2).

24) Remove the clamp (3).



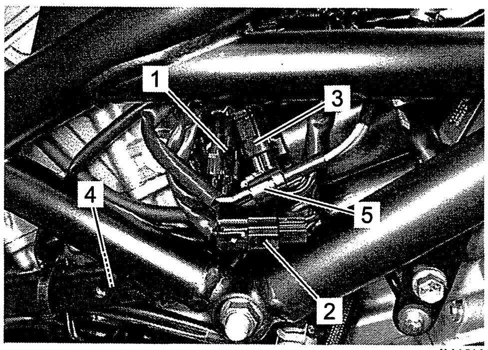
IH18K1140134-01

25) Remove the clamp (1).



IH18K1140135-01

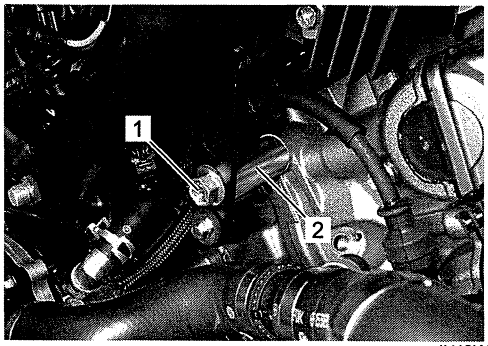
26) Disconnect the CKP sensor coupler (1), generator coupler (2), regulator/rectifier coupler (3), ignition coil #1 (4) and #2 (5) lead wire couplers.



IH18K1140137-02

27) For SV650/A, remove the right frame head cover.
☞(Page 9D-21)

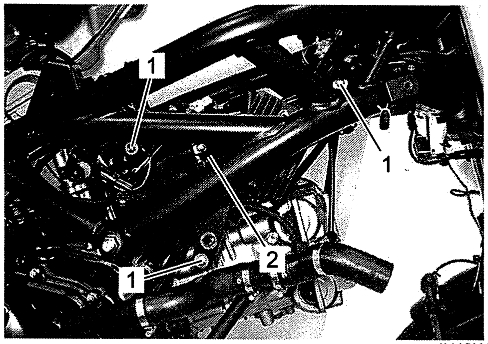
28) Remove the right engine mounting bolt (cylinder head) (1) and spacer (2).



IH18K1140138-01

29) Remove the ignition coil bracket bolts (1).

30) Remove the ignition coil rear bracket assembly (2).

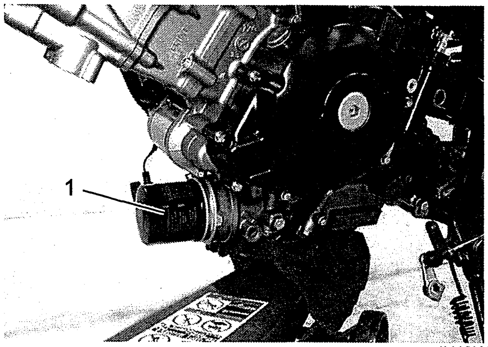


IH18K1140139-02

31) Support the engine with a proper jack.

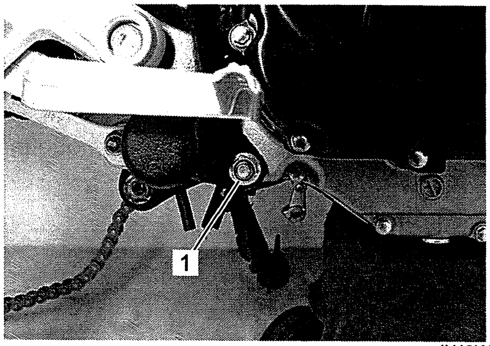
NOTICE

Do not support at the oil filter (1).



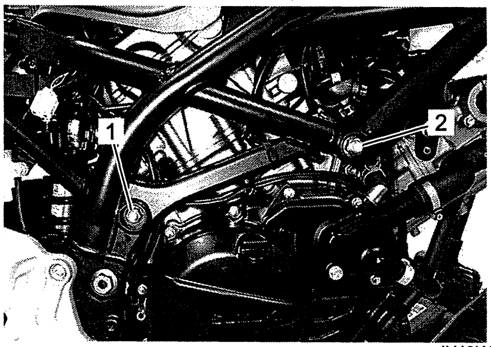
IH18K1140140-01

32) Remove the engine mounting nut (Rear lower) (1).



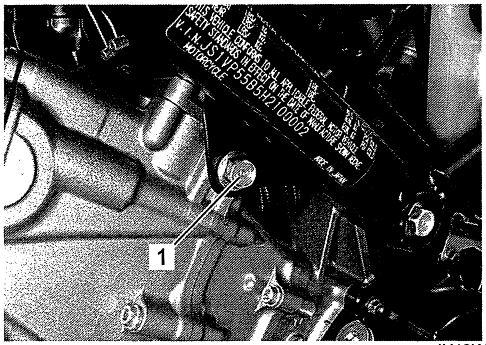
IH18K1140141-01

33) Remove the engine mounting nuts (Rear upper) (1) and (Front upper) (2).



IH18K1140142-01

34) Remove the left engine mounting bolt (Cylinder head) (1).



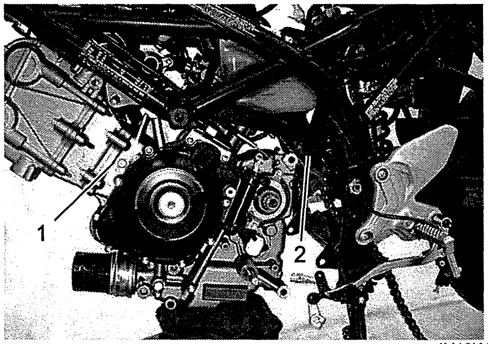
IH18K1140143-01

35) Remove the engine mounting bolts and gradually lower the engine. Then, take off the drive chain from the driveshaft.

36) Remove the engine assembly (1) to the left side of motorcycle.

NOTICE

Be careful not to contact the rear exhaust pipe (2) with the frame and swingarm.



IH18K1140144-01

Engine Assembly Installation

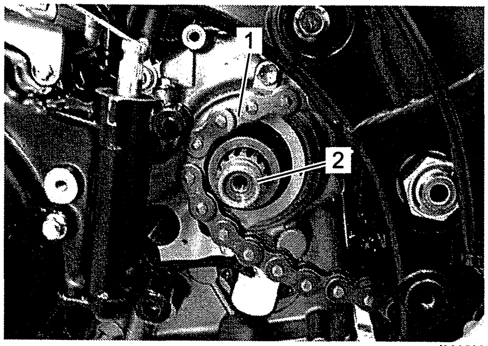
BENJ18K61406021

Install the engine assembly in the reverse order of engine removal. Pay attention to the following points:

- Gradually raise the engine assembly, and then put the drive chain (1) on the driveshaft (2).

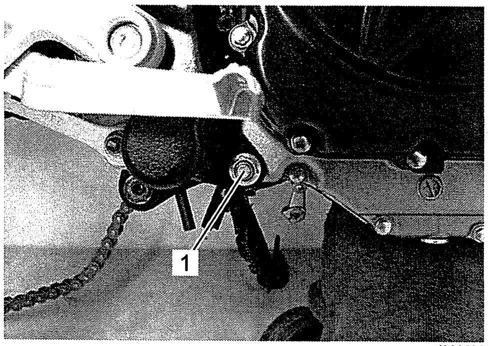
NOTICE

Be careful not to pinch the wiring harness between the frame and the engine.

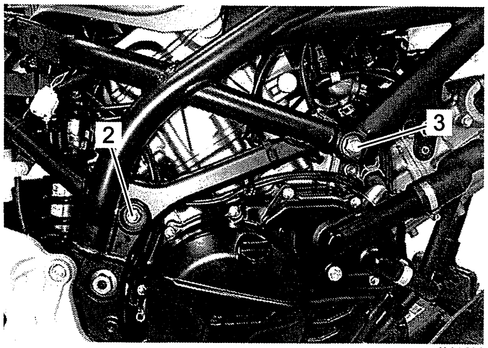


IH18K1140145-01

- Install the engine mounting bolts (Rear lower) (1), (Rear upper) (2) and (Front upper) (3) from left side, and tighten their new nuts temporarily.



IH18K1140146-02

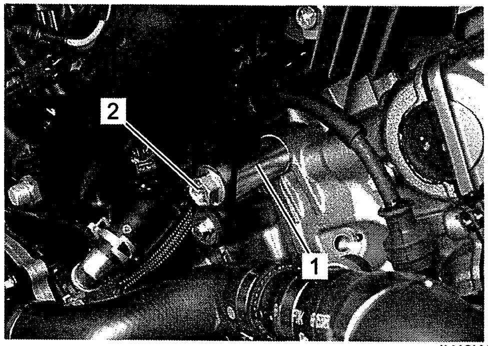


IH18K1140147-02

- Install the ignition coil rear bracket assembly. Refer to "Ignition Coil Construction" in Section 1H (Page 1H-3).

Tightening torque
Ignition coil bracket bolt: 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

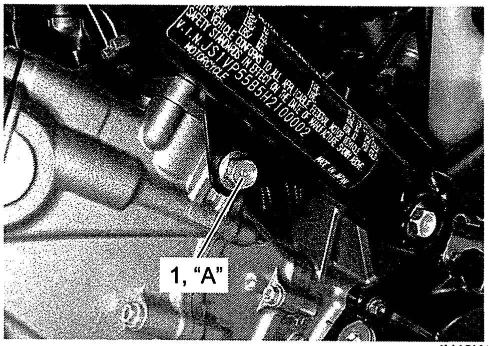
- Install the spacer (1) and right engine mounting bolt (Cylinder head) (2) temporarily.



IH18K1140149-01

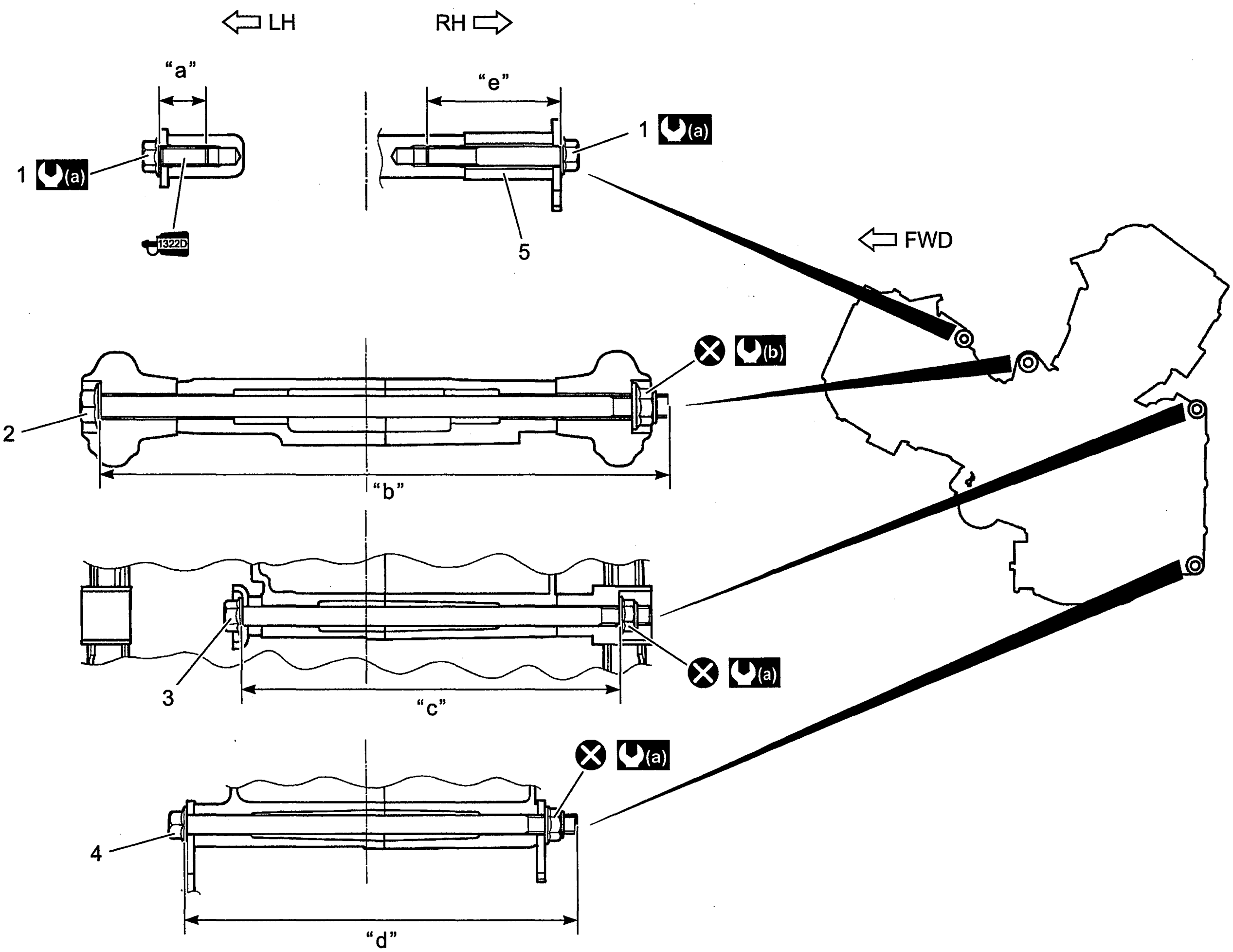
- Apply thread lock to the left engine mounting bolt (Cylinder head) (1) and tighten it temporarily.

"A": Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)



IH18K1140148-03

- Tighten all engine mounting bolts and nuts to the specified torque.



IH18K1140328-03

1. Engine mounting bolt (Cylinder head)	"c": 215 mm (8.46 in)
2. Engine mounting bolt (Front upper)	"d": 205 mm (8.07 in)
3. Engine mounting bolt (Rear upper)	"e": 70 mm (2.7 in)
4. Engine mounting bolt (Rear lower)	(a) : 55 N·m (5.6 kgf-m, 40.5 lbf-ft)
5. Spacer	(b) : 93 N·m (9.5 kgf-m, 68.5 lbf-ft)
"a": 25 mm (0.98 in)	1322D : Apply thread lock to the thread part.
"b": 300 mm (11.8 in)	: Do not reuse.

- Install the clutch release arm. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-7).
- Check the gearshift lever height. ☞(Page 5B-12)
- Check the wiring harness routing. ☞(Page 9A-15)
- Check the radiator hose routing. ☞(Page 1F-2)
- After finishing the engine installation, check the following items.
  - Throttle cable play: ☞(Page 1D-10)
  - Clutch cable play: ☞(Page 5C-2)
  - Throttle valve synchronization: ☞(Page 1D-15)
  - Engine oil leakage: ☞(Page 1E-5)
  - Engine coolant leakage: ☞(Page 1F-7)

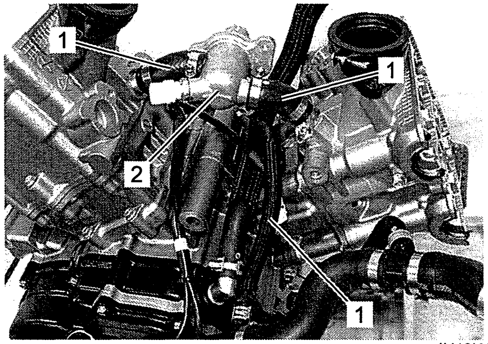
Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal

BENJ18K61406022

Refer to "Engine Assembly Removal" (Page 1D-36) and "Cam Chain Tension Adjuster / Camshaft Removal" (Page 1D-19).

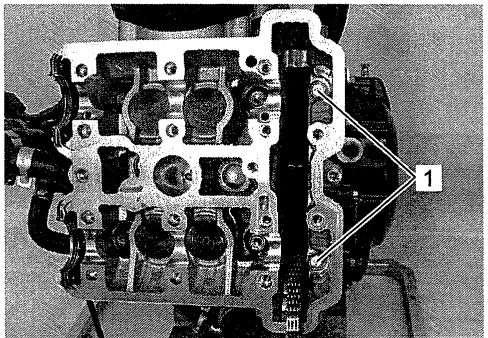
Front Cylinder Head Assembly

1) Disconnect the water hoses (1) and remove the thermostat connector assembly (2).

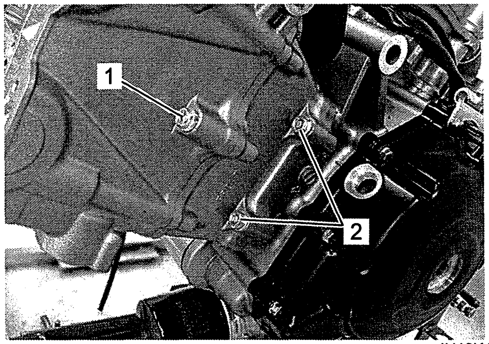


IH18K1140151-01

2) Remove the cylinder head bolts (M6) (1).



3) Remove the cylinder head bolt (M6) (1).
4) Loosen the cylinder nuts (2).



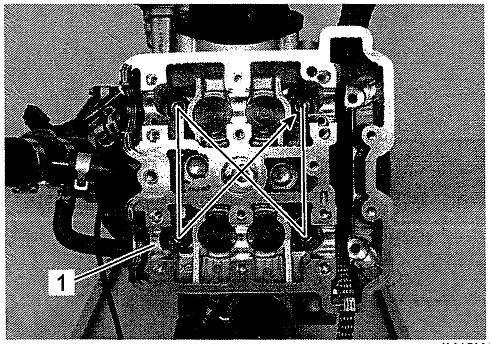
IH18K1140153-01

5) Remove the cylinder head bolts (M10).

NOTE

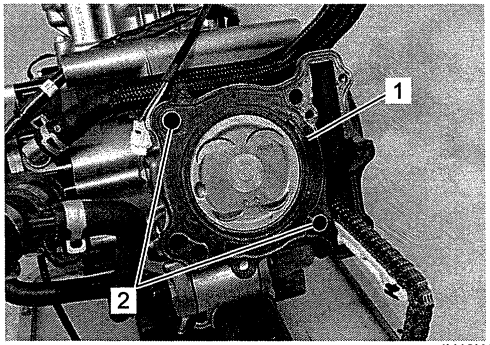
Loosen the cylinder head bolts little by little diagonally.

6) Remove the cylinder head assembly (1).



IH18K1140154-01

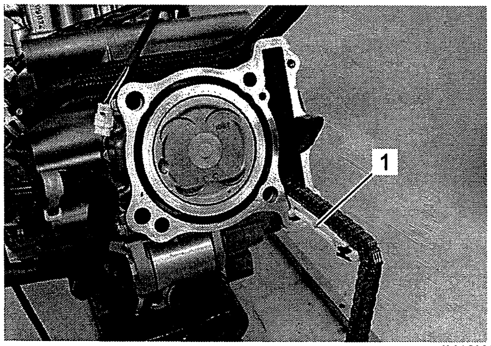
7) Remove the cylinder head gasket (1) and dowel pins (2).



IH18K1140155-02

Front Cylinder Cam Chain Guide

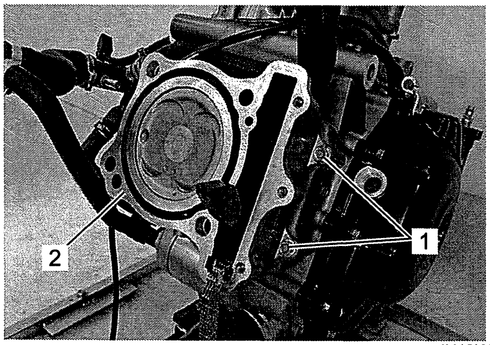
Remove the cam chain guide No. 1 (1).



IH18K1140156-01

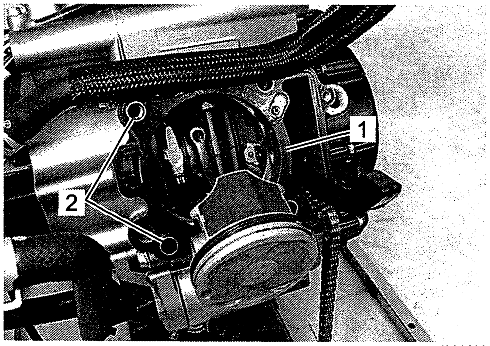
Front Cylinder

1) Remove the cylinder nuts (1) and cylinder (2).



IH18K1140157-01

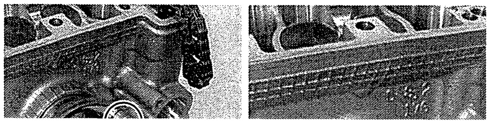
2) Remove the cylinder gasket (1) and dowel pins (2).



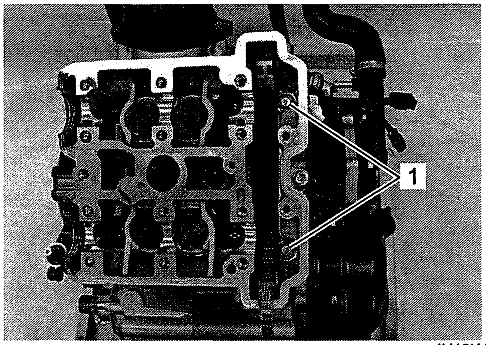
IH18K1140158-01

Rear Cylinder Head Assembly

1) Remove the rear exhaust pipe (1) and gasket (2).



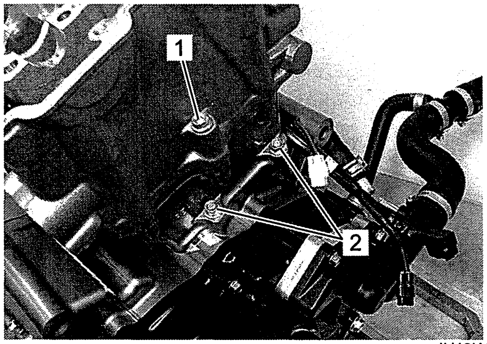
2) Remove the cylinder head bolts (M6) (1).



IH18K1140160-01

3) Remove the cylinder head bolt (M6) (1).

4) Loosen the cylinder nuts (2).



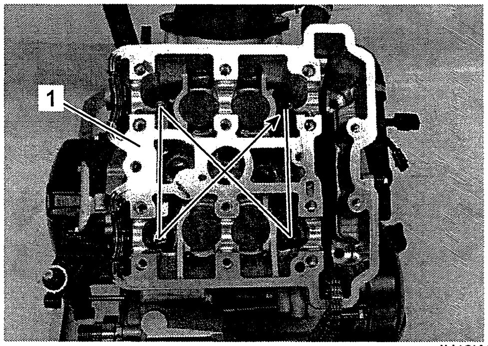
IH18K1140161-02

5) Remove the cylinder head bolts (M10).

NOTE

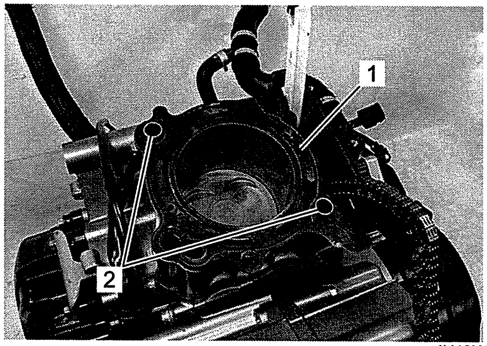
Loosen the cylinder head bolts little by little diagonally.

6) Remove the cylinder head assembly (1).



IH18K1140162-01

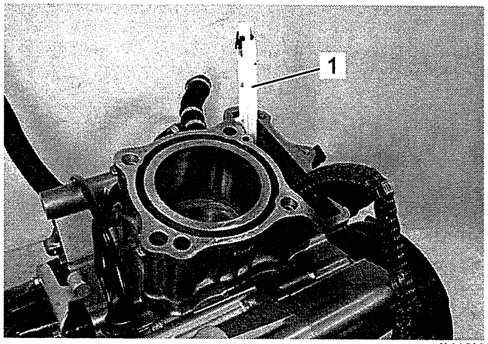
7) Remove the cylinder head gasket (1) and dowel pins (2).



IH18K1140163-01

Rear Cylinder Cam Chain Guide

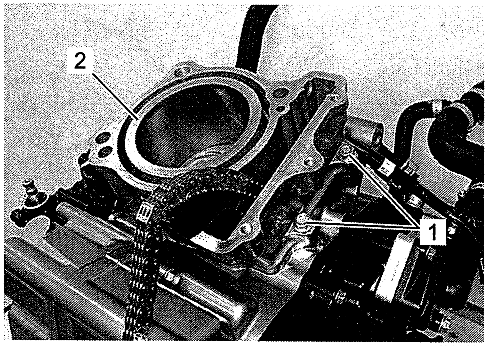
Remove the cam chain guide No. 1 (1).



IH18K1140164-01

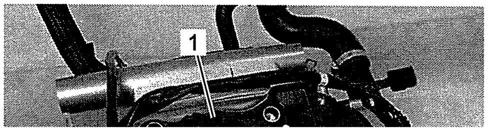
Rear Cylinder

1) Remove the cylinder nuts (1) and cylinder (2).



IH18K1140165-02

2) Remove the cylinder gasket (1) and dowel pins (2).



Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation

BENJ18K61406023

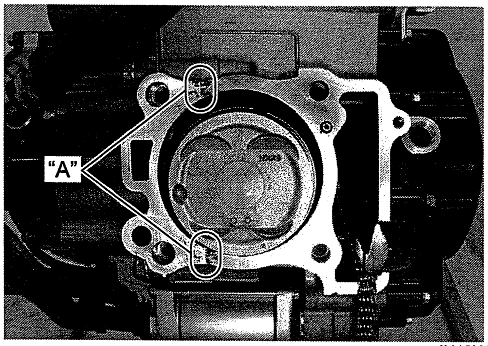
Refer to “Cam Chain Tension Adjuster / Camshaft Installation” (Page 1D-21) and “Engine Assembly Installation” (Page 1D-40).

Cylinder

1) Thoroughly wipe off oil from the fitting surface of the crankcase.
2) Apply sealant lightly to the mating surfaces at the parting line between the right and left crankcases as shown.

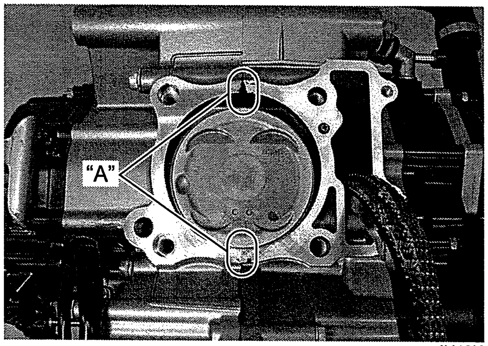
“A”: Sealant 99000–31110 (SUZUKI BOND 1215)

Front cylinder



IH18K1140167-02

Rear cylinder



IH18K1140168-01

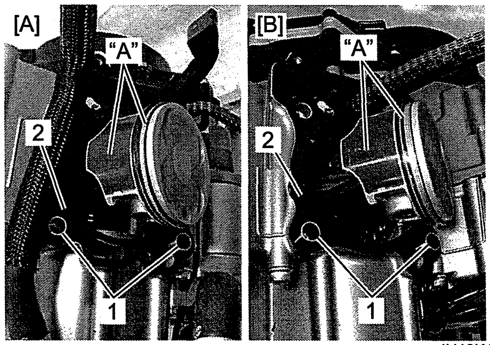
3) Install the dowel pins (1) and new cylinder gaskets (2).

4) Apply molybdenum oil solution to the sliding surface of the pistons, piston rings and cylinder walls.

NOTE

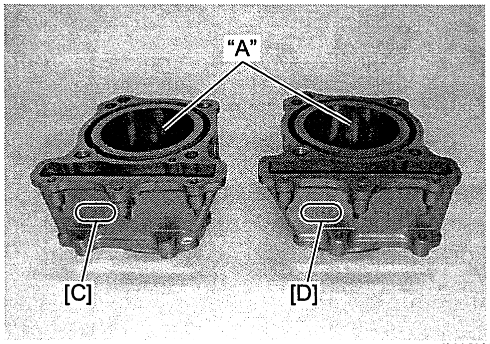
The cylinders can be identified by the embossed letters.

“A”: Assembly lubrication (Molybdenum oil solution)



IH18K1140169-01

[A]: Front	[B]: Rear



IH18K1140170-02

[C]: FRONT (Front cylinder)	[D]: REAR (Rear cylinder)

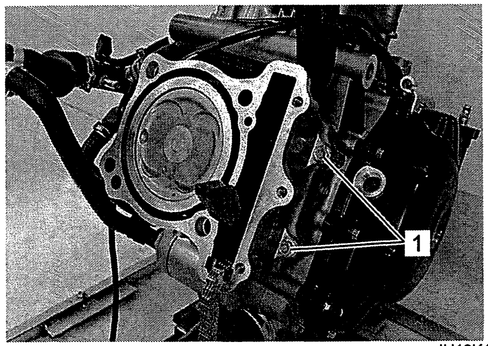
5) Hold the piston rings in proper positions, and insert each piston into the respective cylinders. ☞(Page 1D-57)

NOTICE

- **When installing the position into the cylinder, take care not to bend the piston rings.**
- **When installing the cylinders, keep the cam chains taut.**

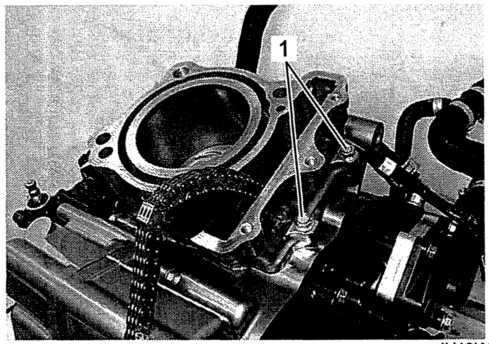
6) Tighten the cylinder nuts (1) temporarily.

Front cylinder



IH18K1140171-01

Rear cylinder



IH18K1140172-02

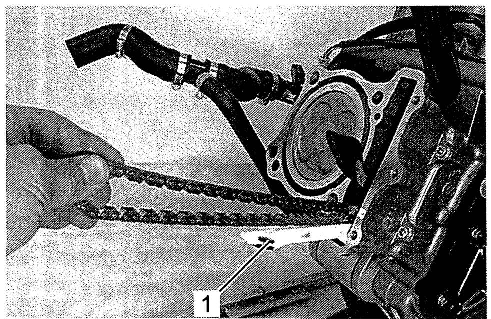
Cam Chain Guide

Pull the cam chains out of the cylinders and install the cam chain guides (1).

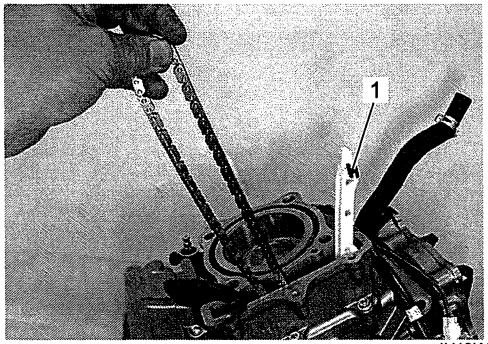
NOTE

There are the guide holders for the bottom ends of each cam chain guide cast in the crankcase. Be sure that the cam chain guides are inserted properly.

Front cylinder



Rear cylinder

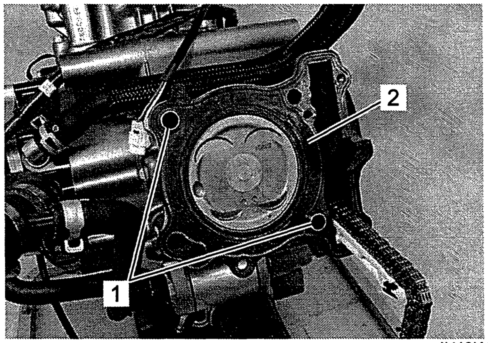


IH18K1140174-01

Cylinder Head Assembly

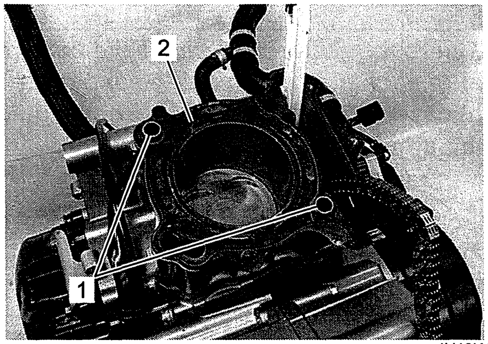
1) Install the dowel pins (1) and new cylinder head gaskets (2).

Front cylinder



IH18K1140175-01

Rear cylinder

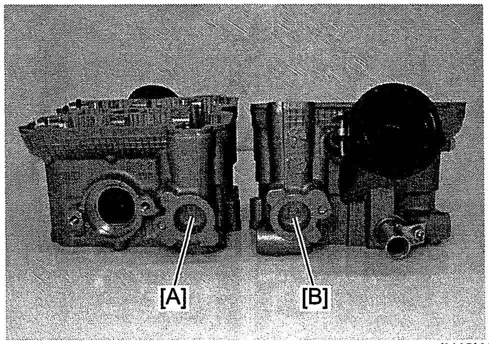


IH18K1140176-01

2) Place each cylinder head assembly on the respective cylinders.

NOTE

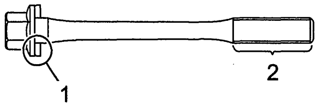
- **The cylinder heads can be identified by the embossed letters.**
- **When installing the cylinder head assemblies, keep the cam chain taut.**



IH18K1140177-01

[A]: F (Front cylinder)	[B]: R (Rear cylinder)

3) Apply engine oil to the both side of the washers (1) and thread portion (2) of the bolts before installing the cylinder head bolts (M10).

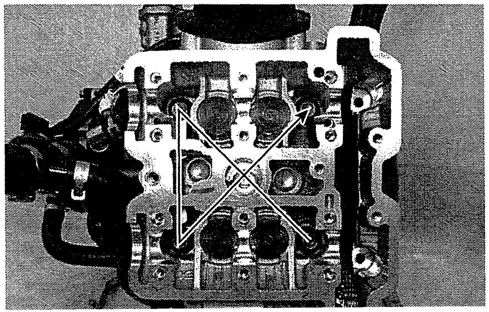


IH18K1140307-01

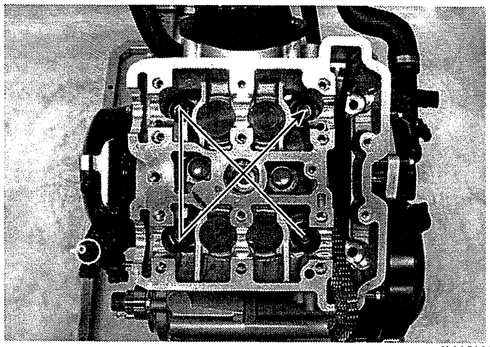
4) Tighten the cylinder head bolts (M10) to the specified two-step torque with a torque wrench sequentially and diagonally.

Tightening torque
Cylinder head bolt (M10): 25 → 42 N·m (2.5 → 4.3 kgf-m, 18.5 → 31.0 lbf-ft)

Front cylinder head



Rear cylinder head

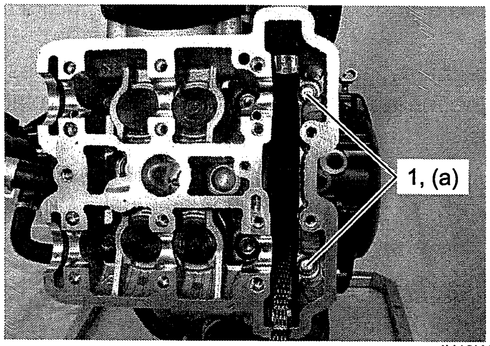


IH18K1140179-01

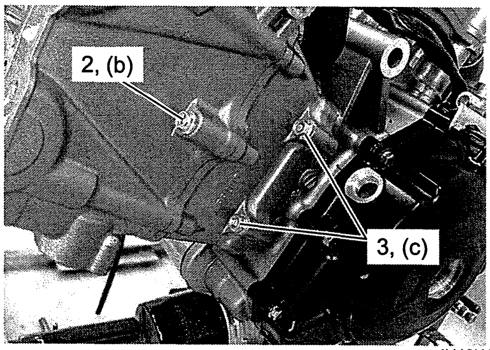
5) Tighten the cylinder head bolts (M6) (L70) (1), cylinder head bolt (M6) (L40) (2) and cylinder nuts (3) to the specified torque.

Tightening torque
Cylinder head bolt (M6) (L70) (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
Cylinder head bolt (M6) (L40) (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
Cylinder nut (c): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Front cylinder head

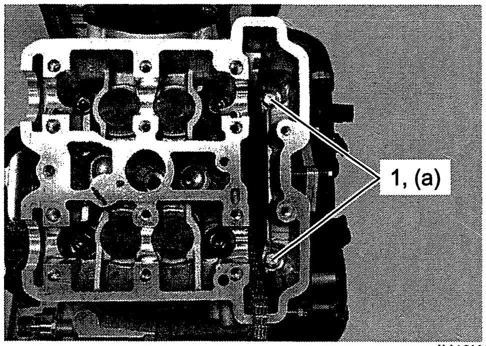


IH18K1140180-01

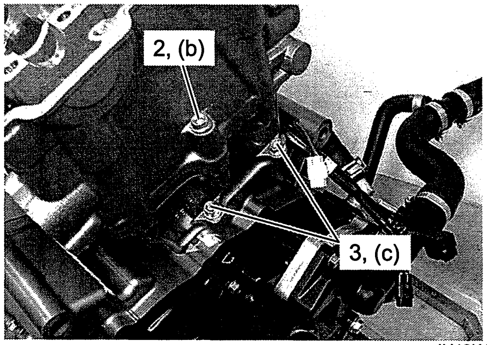


IH18K1140181-01

Rear cylinder head



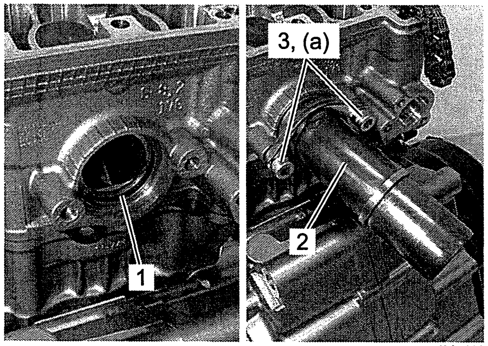
IH18K1140182-01



IH18K1140183-02

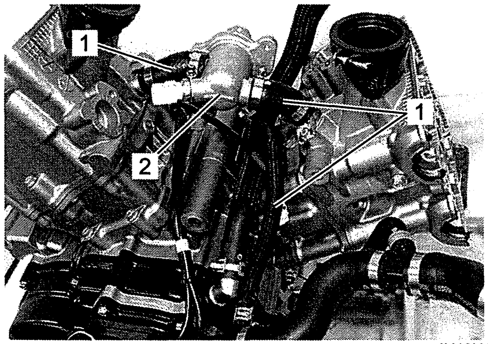
6) Install the new gasket (1) and rear exhaust pipe (2).
7) Tighten the exhaust pipe bolts (3) to the specified torque.

Tightening torque
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1140184-01

8) Connect the water hoses (1) and install the thermostat connector assembly (2). Refer to “Water Hose Routing Diagram” in Section 1F (Page 1F-2).

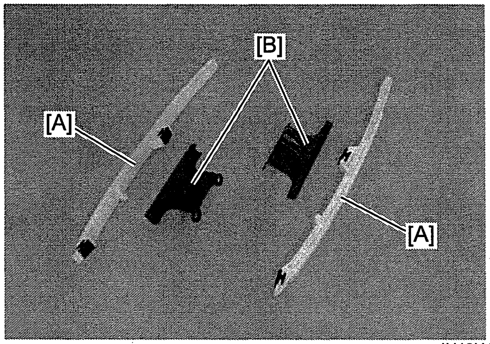


IH18K1140185-01

Cam Chain Guide Inspection

BENJ18K61406024

1) Remove the cam chain guides No. 1 and No. 2. Refer to “Cam Chain Tension Adjuster / Camshaft Removal” (Page 1D-19) and “Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-42).
2) Check the contacting surface of the cam chain guides. If it is worn or damaged, replace it with a new one.



IH18K1140186-01

[A]: Cam chain guide No. 1	[B]: Cam chain guide No. 2

3) Install the cam chain guides No. 1 and No. 2. Refer to “Cam Chain Tension Adjuster / Camshaft Installation” (Page 1D-21) and “Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-44).

Cylinder Inspection

BENJ18K61406025

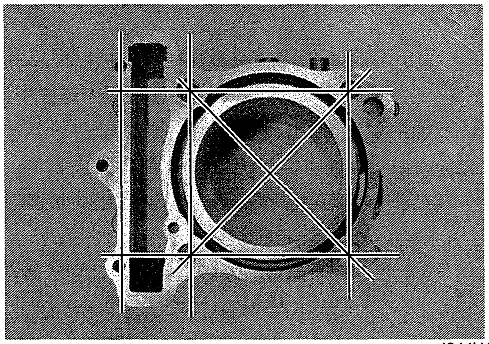
Refer to “Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-42) and “Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation”

Cylinder Distortion

Check the gasket surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

Cylinder distortion
[Limit]: 0.05 mm (0.0019 in)

Special tool
09900–20803



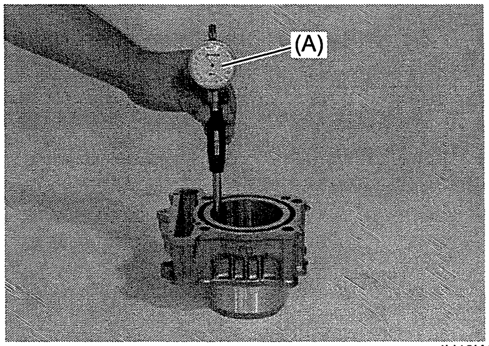
I944H1140244-01

Cylinder Bore

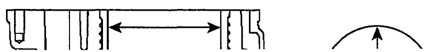
Check the cylinder wall for any scratches, nicks or other damage.
Measure the cylinder bore diameter at six places. If any one of the measurements exceed the limit, replace the cylinder.

Cylinder bore
[Standard]: 81.000 – 81.015 mm (3.1890 – 3.1895 in)
[Limit]: No nicks or Scratches

Special tool
(A): 09900–20530



IH18K1140187-01



Valve / Valve Spring Removal and Installation

BENJ18K61406026

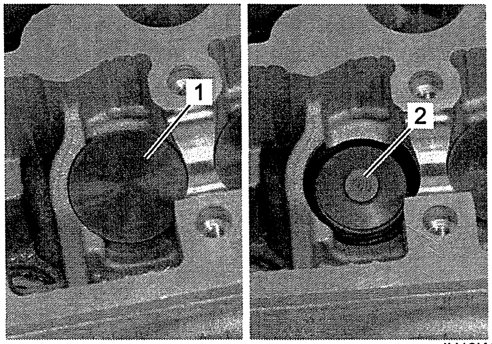
Refer to "Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal" (Page 1D-42) and "Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation" (Page 1D-44).

NOTE

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

Removal

1) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



IH18K1140189-01

2) Install the sleeve protector between the valve spring and cylinder head.

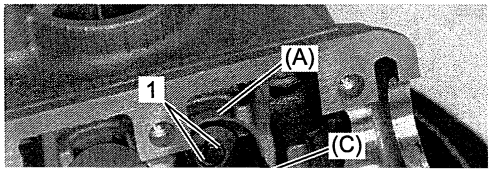
NOTICE

To prevent damage of the tappet sliding surface with the valve lifter attachment, use the special tool.

Special tool
(A): 09919–28620

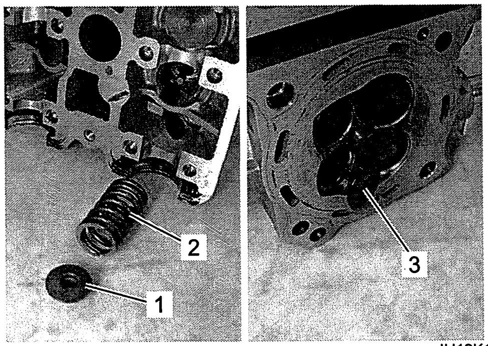
3) Using the special tools, compress the valve spring and remove the two cotter halves (1) from the valve stem.

Special tool
(B): 09916–14510
(C): 09916–14522
09916–84511



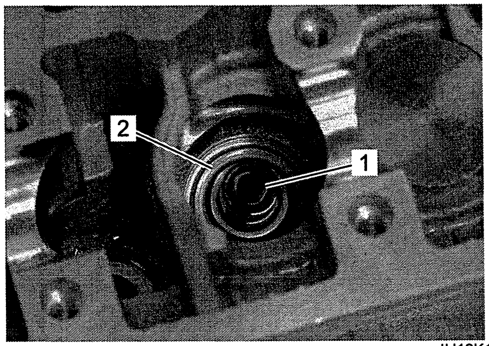
4) Remove the valve spring retainer (1) and valve spring (2).

5) Pull out the valve (3) from the combustion chamber side.



IH18K1140191-01

6) Remove the valve stem oil seal (1) and valve spring seat (2).

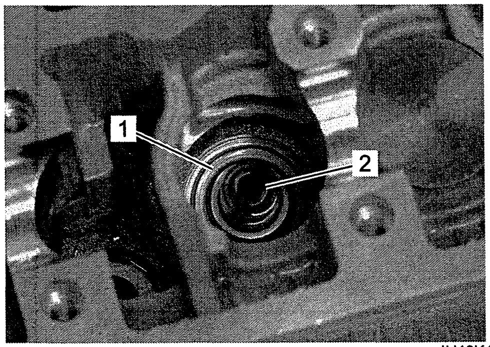


IH18K1140192-01

Installation

1) Install the valve spring seat (1).

2) Apply engine oil to the new valve stem oil seal (2), and press-fit it into position.



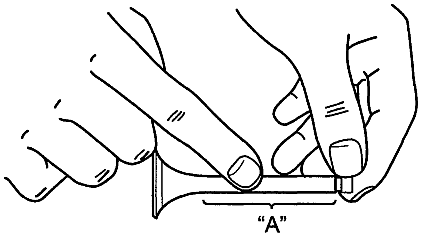
IH18K1140193-01

3) Insert the valve, with its stem coated with molybdenum oil solution all around and along the full stem length without any break.

NOTICE

When inserting the valve, take care not to damage the lip of the oil seal.

“A”: Assembly lubrication (Molybdenum oil solution)



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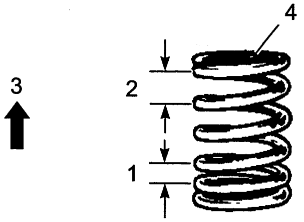
4) Install the valve spring with the small-pitch portion (1) facing cylinder head.



ID26J1140274-03

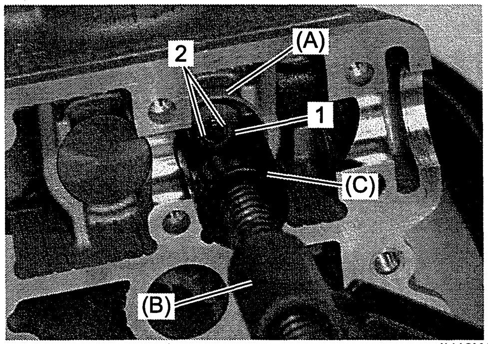
2. Large-pitch portion	4. Paint
3. UPWARD	

5) Put on the valve spring retainer (1), and using the special tools, press down the spring, fit the cotter halves (2) to the stem end.

NOTICE

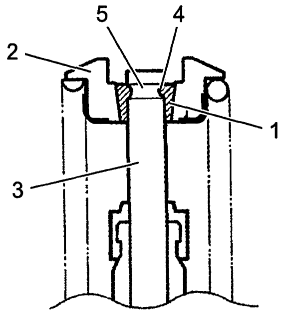
- **Be sure to restore each spring and valve to their original positions.**
- **Be careful not to damage the valve and valve stem when handling it.**
- **Compressing of the valve spring must be limited to the extent only necessary to prevent the spring from fatigue.**

Special tool
(A): 09919–28620
(B): 09916–14510
(C): 09916–14522



IH18K1140194-01

6) Release the lifter to allow the cotter halves (1) to wedge in between valve spring retainer (2) and valve stem (3).
7) Be sure that the rounded lip (4) of the cotter fits snugly into the groove (5) in the stem end.

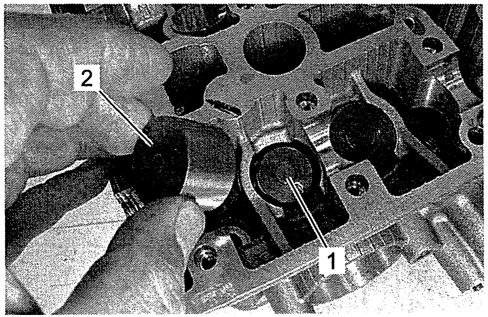


IH18K1140195-01

8) Apply engine oil to the stem ends and tappet shims (1).
9) Apply engine oil to the tappets (2).
10) Install the tappet shims (1) and the tappets (2) to their original positions.

NOTE

When seating the tappet shim, be sure the figure printed surface faces the tappet.



Valve Inspection

BENJ18K61406027

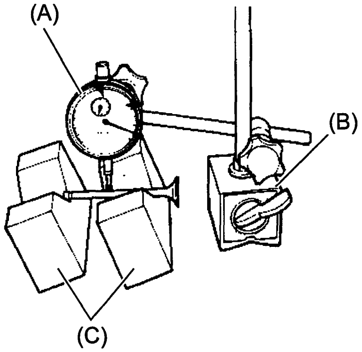
Refer to "Valve / Valve Spring Removal and Installation" (Page 1D-49).

Valve Stem Runout

Support the valve using V-blocks, and check its runout using the dial gauge as shown in the figure. If the runout exceeds the service limit, replace the valve.

Valve stem runout
Intake & Exhaust [Limit]: 0.05 mm (0.0019 in)

Special tool
(A): 09900–20607
(B): 09900–20701
(C): 09900–21304



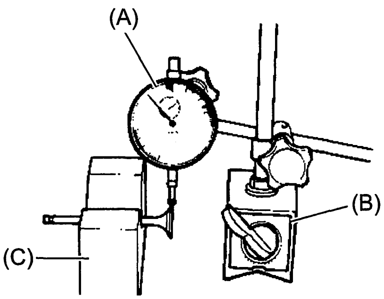
ID26J1140091-01

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.

Valve head radial runout
Intake & Exhaust [Limit]: 0.03 mm (0.0011 in)

Special tool
(A): 09900–20607
(B): 09900–20701
(C): 09900–21304

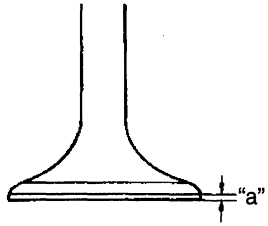


Valve Face Wear

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.

Valve head thickness
Intake [Limit]: 0.5 mm (0.019 in)
Exhaust [Limit]: 0.5 mm (0.019 in)

Special tool
09900–20101



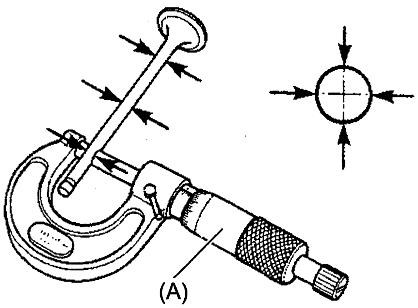
I649G1140233-02

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 valve stem deflection.

Valve stem O.D.
Intake [Standard]: 4.475 – 4.490 mm (0.1762 – 0.1767 in)
Exhaust [Standard]: 4.455 – 4.470 mm (0.1754 – 0.1759 in)

Special tool
(A): 09912–66310



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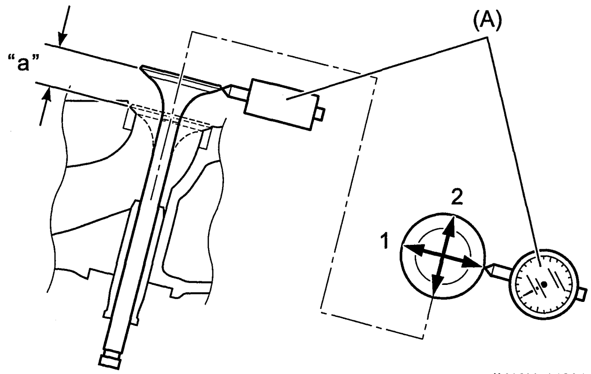
Valve Stem Deflection

Lift the valve about 10 mm (0.39 in) “a” from the valve seat. Measure the valve stem deflection in two directions, (1) and (2), perpendicular to each other, positioning the dial gauge as shown. If the deflection measured exceeds the limit, then determine whether the valve or guide should be replaced with a new one.

Valve stem deflection
Intake & Exhaust [Limit]: 0.35 mm (0.013 in)

Special tool
(A): 09900–20607
09900–20701

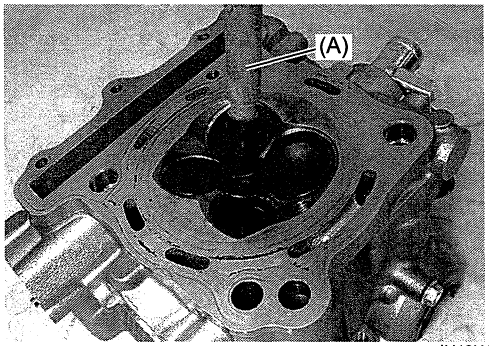


IH18K1140324-02

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.

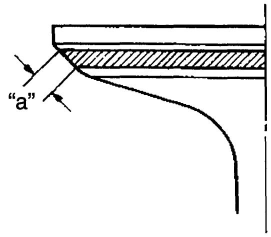
Special tool
(A): 09916–10911



IH18K1140197-01

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. ☞(Page 1D-53)

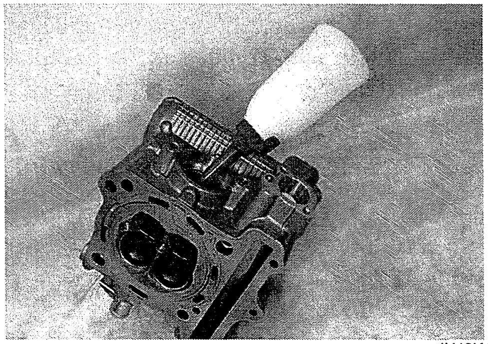
Valve seat width
Intake [Standard]: 0.9 – 1.1 mm (0.036 – 0.043 in)
Exhaust [Standard]: 0.9 – 1.1 mm (0.036 – 0.043 in)



I649G1140246-02

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. ☞(Page 1D-53)



IH18K1140198-01

Valve Seat Repair

BENJ18K61406028

Refer to “Valve / Valve Spring Removal and Installation” (Page 1D-49).

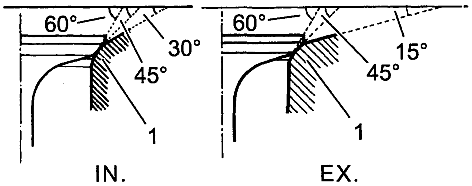
The valve seats (1) for both the intake and exhaust valves are machined to two different angles. The seat contact surface is cut at 45°.

NOTICE

- **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 installed. ☞(Page 1D-32)



IH18K1140314-01

	Intake	Exhaust
Seat angle	30°/45°/60°	15°/45°/60°
Seat width	0.9 – 1.1 mm (0.036 – 0.043 in)	←
Valve diameter	31 mm (1.2 in)	25.5 mm (1.00 in)
Valve guide I.D.	4.500 – 4.512 mm (0.1772 – 0.1776 in)	←

Valve Spring Inspection

BENJ18K61406029

Refer to “Valve / Valve Spring Removal and Installation” (Page 1D-49).

The force of the coil spring keeps the valve seat tight. 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 its free length and also by the force required to compress it. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the range specified, replace spring as a set.

Valve spring free length

Intake [Limit]: 37.1 mm (1.46 in)

Exhaust [Limit]: 37.1 mm (1.46 in)

Intake valve spring pre-load

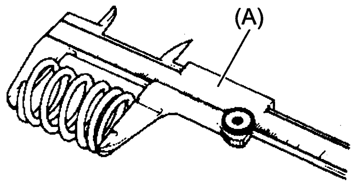
When compressed to 33.40 mm (1.315 in)

Intake [Standard]: 127 – 147 N (13.0 – 14.9 kgf, 28.6 – 33.0 lbf)

Exhaust [Standard]: 127 – 147 N (13.0 – 14.9 kgf, 28.6 – 33.0 lbf)

Special tool

(A): 09900–20102



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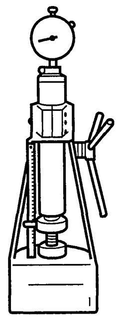


ID26J1140263-01

Cylinder Head Disassembly and Reassembly

BENJ18K61406030

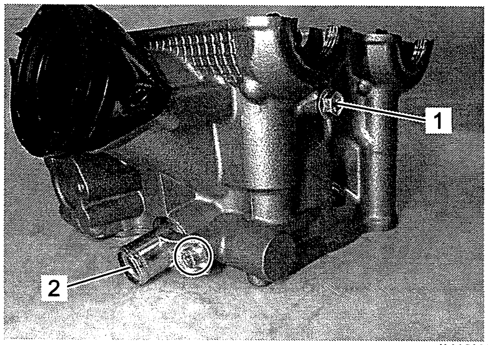
Refer to "Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal" (Page 1D-42) and "Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation" (Page 1D-44).

NOTE

The front and rear cylinder heads are assembled symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

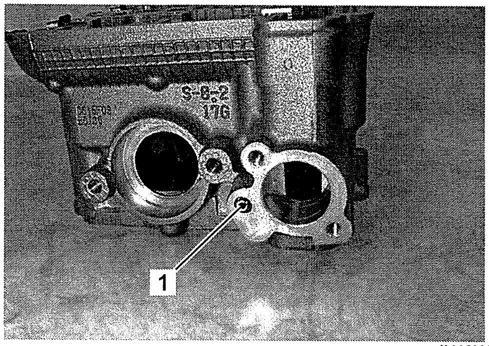
Disassembly

1) Remove the oil gallery plug (M6) (1) and connector hose union (2).



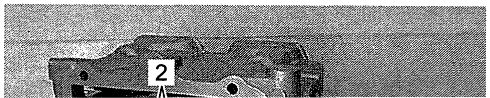
IH18K1140199-01

2) Remove the oil jet (for cam chain tension adjuster) (1). ☞(Page 1E-9)



IH18K1140200-01

3) Remove the following parts.
   - Intake pipe (1): ☞(Page 1D-16)
   - Valves (2) and valve springs: ☞(Page 1D-49)
   - Valve guides: ☞(Page 1D-55)

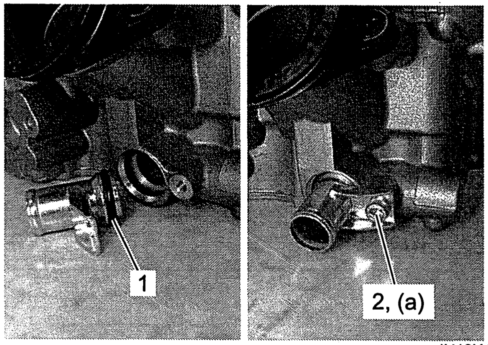


Reassembly

Reassemble the cylinder head in the reverse order of disassembly. Pay attention to the following points:

- Install the new O-ring (1).
- Tighten the connector hose union bolt (2) to the specified torque.

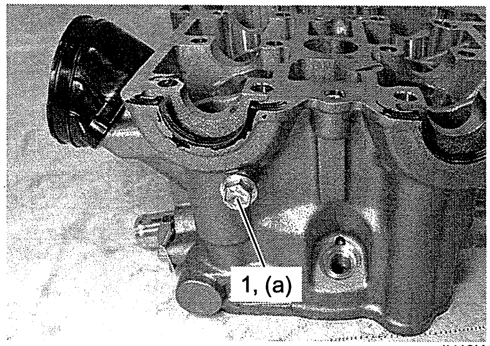
  Tightening torque
  Connector hose union bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1140202-03

- Install the new gasket washer to the oil gallery plug (M6) (1) and tighten it to the specified torque.

  Tightening torque
  Oil gallery plug (M6) (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1140203-01

Cylinder Head Inspection

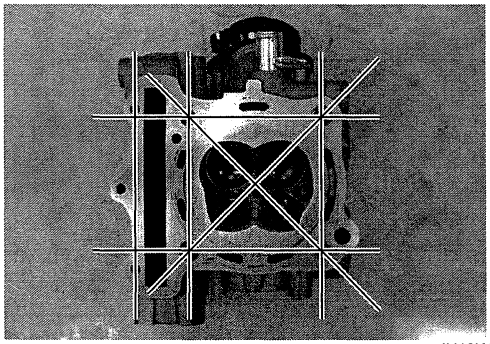
BENJ18K61406031

Refer to "Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal" (Page 1D-42) and "Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation" (Page 1D-44).

1) Decarbonize the combustion chambers.
2) Check the gasket surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.

Cylinder head distortion
[Limit]: 0.05 mm (0.0019 in)

Special tool
09900–20803



IH18K1140204-01

Valve Guide Replacement

BENJ18K61406032

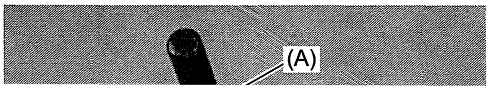
Refer to "Valve / Valve Spring Removal and Installation" (Page 1D-49).

1) Using the special tool, drive the valve guide out toward the intake or exhaust camshaft side.

NOTE

- **Discard the removed valve guide sub assemblies.**
- **Only oversized valve guides are available as replacement parts. (Part No. 11115-18D72)**

Special tool
(A): 09916–43211

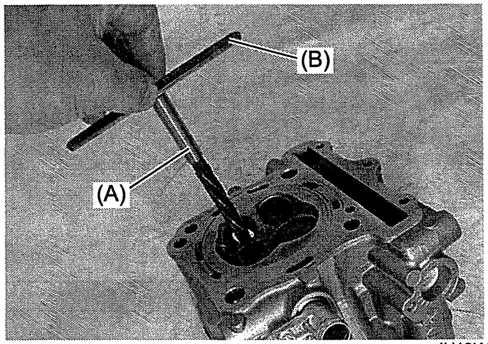


2) Refinish the valve guide holes in the cylinder head using the special tools.
3) Remove the special tools by turning clockwise and raising them at the same time.

NOTICE

Never turn the special tools counterclockwise, as this will dull the blades.

Special tool
(A): 09916–34580
(B): 09916–34542



IH18K1140206-01

4) 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).

NOTICE

Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

5) Apply engine oil to each valve guide and valve guide hole.

NOTICE

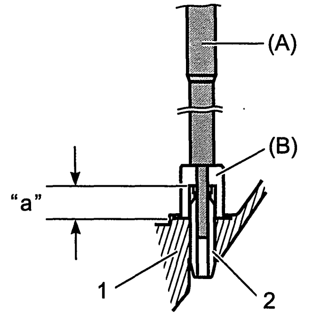
Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

6) Drive the guide into the guide hole using the valve guide installer and attachment.

NOTE

Install the valve guide until the attachment contacts the cylinder head.

Special tool
(A): 09916–43211
(B): 09916–53330



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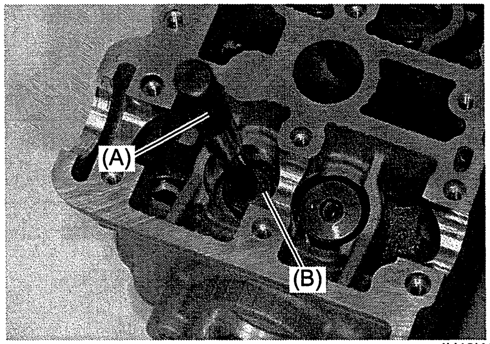
1. Cylinder head	"a": 13.5 mm (0.531 in)
2. Valve guide	



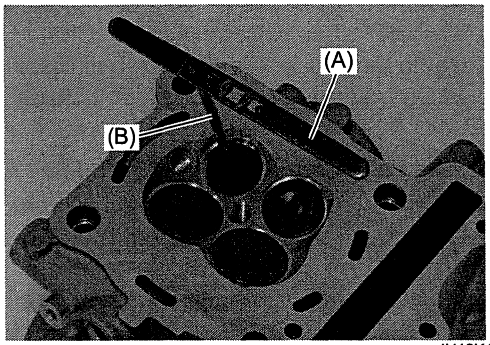
IH18K1140207-01

7) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

NOTE

- **Cool down the cylinder head to ambient air temperature.**
- **Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.**

Special tool
(A): 09916–34542
(B): 09916–33210



IH18K1140208-01

Piston Removal and Installation

BENJ18K61406033

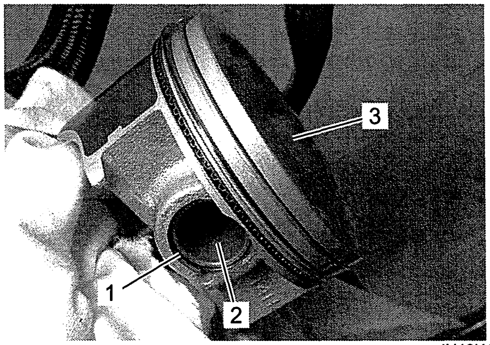
Refer to "Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal" (Page 1D-42) and "Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation" (Page 1D-44).

NOTE

- **The front and rear pistons are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.**
- **Place a clean rag over the cylinder base so as not to drop the piston pin circlip into the crankcase.**

Removal

1) Remove the piston pin circlip (1).
2) Draw out the piston pin (2) and remove the piston (3).



IH18K1140209-01

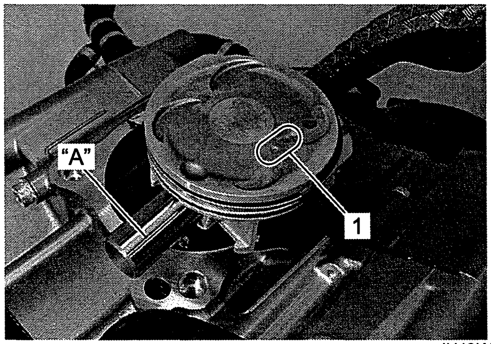
Installation

1) When installing the piston pin, apply molybdenum oil solution onto the piston pin.

NOTE

When installing the piston, the indents (1) on the piston head must be faced to exhaust side.

"A": Assembly lubrication (Molybdenum oil solution)

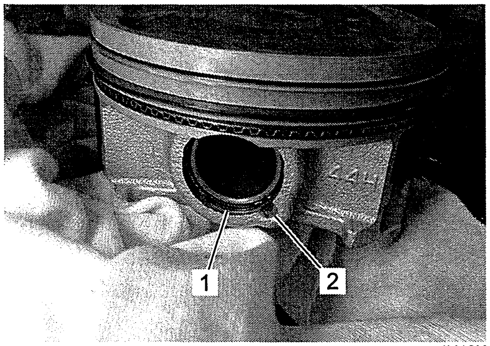


IH18K1140210-01

2) Place a clean rag over the cylinder base so as not to drop the piston pin circlip (1) into the crankcase.
3) Install the new piston pin circlip (1).

NOTE

End gap of the circlip (1) should not be aligned with the cutaway (2) in the piston pin bore.



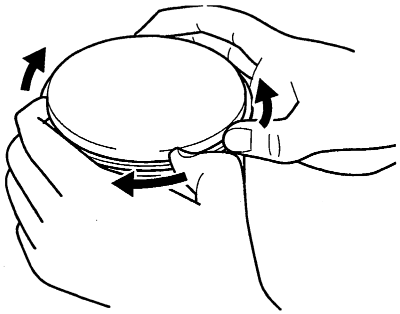
IH18K1140211-01

Piston Ring Removal and Installation

BENJ18K61406034

Refer to "Piston Removal and Installation" (Page 1D-56).

Removal



I831G1140178-01

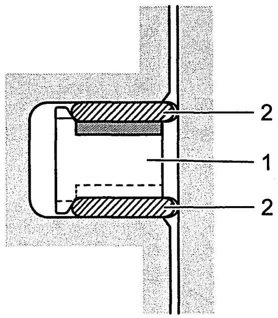
2) Remove the 2nd ring and oil ring in the same procedure.

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.**

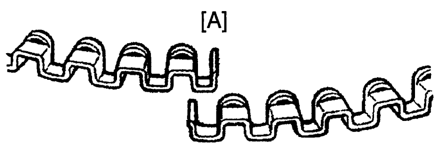
1) Install the piston rings in the order of the oil ring, 2nd ring and 1st ring.
   a) The first member to go into the oil ring groove is a spacer (1).
   After placing the spacer, fit the two side rails (2).



IH18K1140308-02

NOTICE

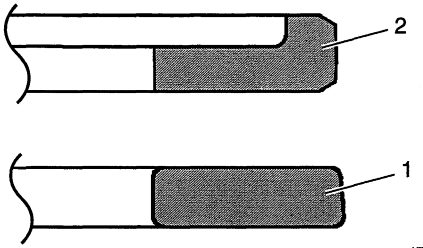
When installing the spacer, be careful not to allow its two ends to overlap in the groove.



b) Install the 2nd ring (1) and 1st ring (2) to piston.

NOTE

- **1st ring (2) and 2nd ring (1) differ in shape.**
- **2nd ring (1) has letters [2T] marked on the side. Be sure to bring the marked side to the top when fitting it to the piston.**
- **Bring the concave side of 1st ring (2) to the top when fitting it to the piston.**



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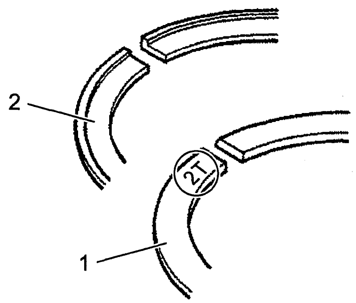
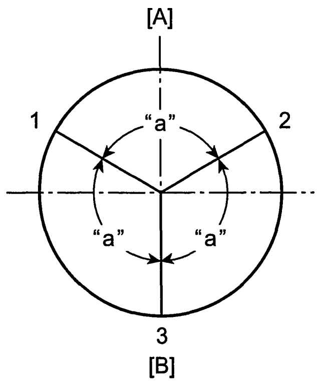


IH18K1140212-01

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.



IH18K1140213-01

[A]:	EX.
[B]:	IN.
1.	2nd ring and lower side rail

Piston and Piston Ring Inspection

BENJ18K61406035

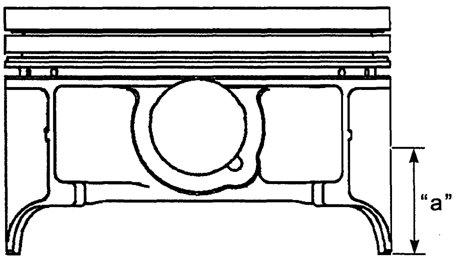
Refer to "Piston Ring Removal and Installation" (Page 1D-57).

Piston Diameter

Measure the piston diameter at "a" position from the skirt end using the micrometer. If the piston diameter is less than the service limit, replace the piston.

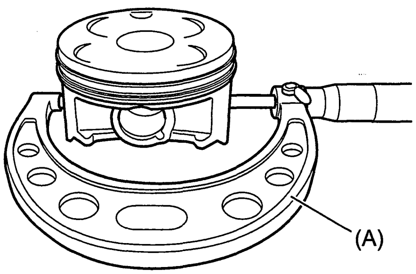
<u>Piston diameter</u>
Measure at 20 mm (0.79 in) from the skirt end
[Limit]: 80.880 mm (3.1843 in)

Special tool
(A): 09900–20204



IH18K1140214-01

"a":	20 mm (0.79 in)



IH18K1140325-02

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.

<u>Piston to cylinder clearance</u>
[Limit]: 0.120 mm (0.0047 in)

Piston Ring to Groove Clearance

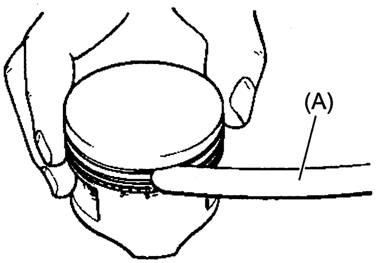
1) Remove the carbon deposit from the piston rings and ring grooves.
2) Install the piston ring and lift the ring upward while pressing it to the piston, and measure the clearance underneath the ring.
   If the clearance exceeds the limit, replace both the piston and piston rings.

   Piston ring to groove clearance
   1st [Limit]: 0.180 mm (0.0070 in)
   2nd [Limit]: 0.150 mm (0.0059 in)

   Piston ring groove width
   1st [Standard]: 0.83 – 0.85 mm (0.0327 – 0.0334 in)
   1st [Standard]: 1.30 – 1.32 mm (0.0512 – 0.0519 in)
   2nd [Standard]: 1.01 – 1.03 mm (0.0398 – 0.0405 in)
   Oil [Standard]: 2.01 – 2.03 mm (0.0792 – 0.0799 in)

   Piston ring thickness
   1st [Standard]: 0.76 – 0.81 mm (0.030 – 0.031 in)
   1st [Standard]: 1.08 – 1.10 mm (0.0426 – 0.0433 in)
   2nd [Standard]: 0.97 – 0.99 mm (0.0382 – 0.0389 in)

   Special tool
   (A): 09900–20803
   (B): 09912–66310



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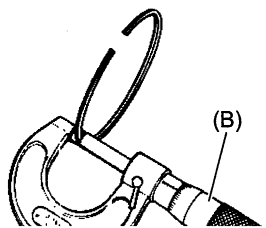
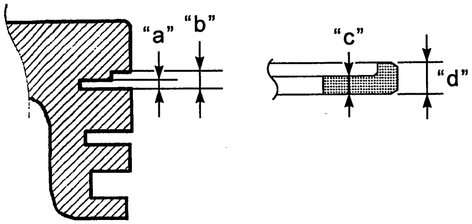




IE31J1140200-01

"a":	0.83 – 0.85 mm (0.0327 – 0.0334 in)
"b":	1.30 – 1.32 mm (0.0512 – 0.0519 in)
"c":	0.76 – 0.81 mm (0.030 – 0.031 in)
"d":	1.08 – 1.10 mm (0.0426 – 0.0433 in)

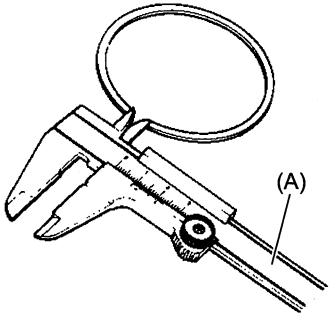
Piston Ring Free End Gap and Piston Ring End Gap

1) Measure the piston ring free end gap using the vernier calipers. If any of the measurements exceed the service limit, replace the piston ring with a new one.
2) Fit the piston ring squarely into the cylinder.
3) Measure the piston ring end gap using the thickness gauge. If any of the measurements exceed the service limit, replace the piston ring with new one.

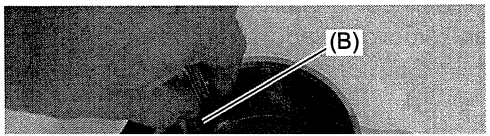
   Piston ring free end gap
   1st [Limit]: 5.2 mm (0.21 in)
   2nd [Limit]: 7.2 mm (0.29 in)

   Piston ring end gap
   1st [Limit]: 0.50 mm (0.019 in)
   2nd [Limit]: 0.50 mm (0.019 in)

   Special tool
   (A): 09900–20101
   (B): 09900–20803



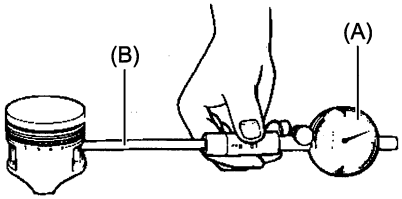
ID26J1140126-02



Piston Pin Bore
Measure the piston pin bore inside diameter using the small bore gauge. If measurement is out of specification, replace the piston.

Piston pin bore I.D.
[Limit]: 20.030 mm (0.7885 in)

Special tool
(A): 09900–20602
(B): 09900–22403

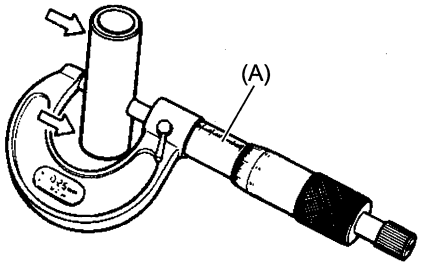


IF04K1140246-01

Piston Pin
Inspect the piston pin outside surface for wear and damage. 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.

Piston pin O.D.
[Limit]: 19.980 mm (0.7867 in)

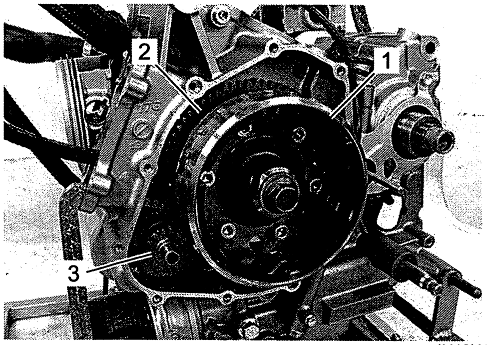
Special tool
(A): 09912–66310



ID26J1140129-01

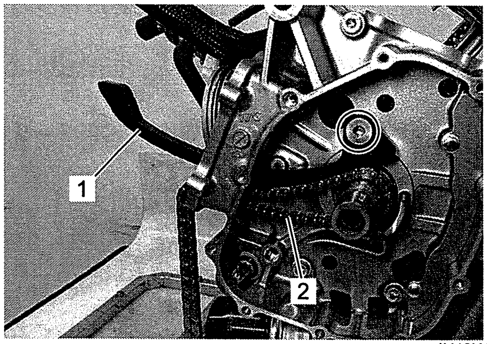
Cam Chain Tensioner / Cam Chain / Cam Chain Drive Sprocket Removal and Installation
BENJ18K61406036

Refer to "Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal" (Page 1D-42) and "Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation" (Page 1D-44).



IH18K1140217-01

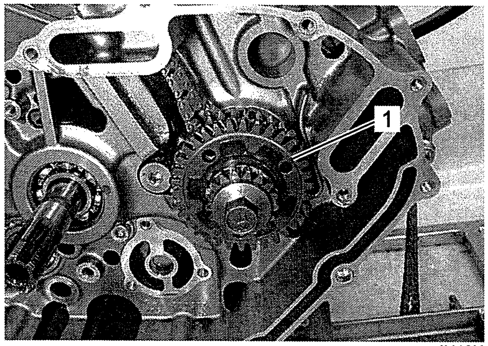
3) Remove the cam chain tensioner (1) and washer.
4) Remove the cam chain (2).



IH18K1140218-01

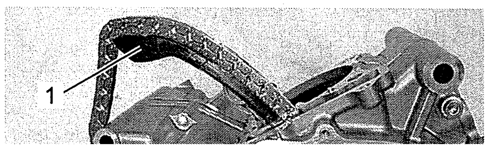
Rear

1) Remove the primary drive gear assembly (1). Refer to "Crankcase Assembly Disassembly" (Page 1D-61).

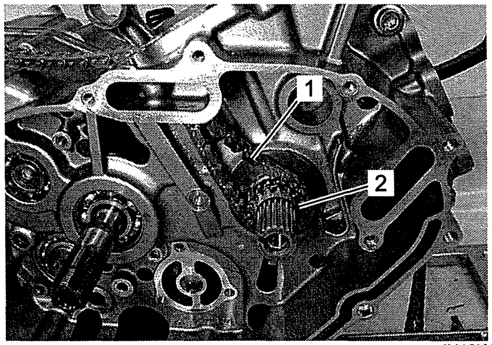


IH18K1140219-01

2) Remove cam chain tensioner (1) and washer.



3) Remove the cam chain (1) and cam chain drive sprocket (2).



IH18K1140221-01

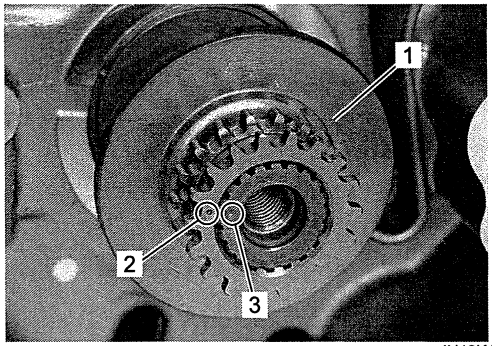
Installation

Install the cam chain tensioner, cam chain and cam chain drive sprocket in the reverse order of removal. Pay attention to the following points:

- Install the cam chain drive sprocket (1).

NOTE

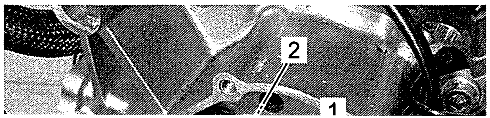
Align the punch mark (2) on the cam chain drive sprocket with the punch mark (3) on the crankshaft.



IH18K1140222-01

- Install the cam chain tensioner (1), washer (2) and cam chain tensioner bolt (3).
- Tighten the cam chain tensioner bolt (3) to the specified torque.

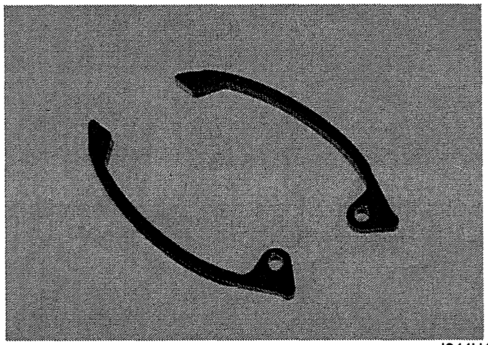
Tightening torque
Cam chain tensioner bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



Cam Chain Tensioner Inspection

BENJ18K61406037

Refer to "Cam Chain Tensioner / Cam Chain / Cam Chain Drive Sprocket Removal and Installation" (Page 1D-60).
Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.



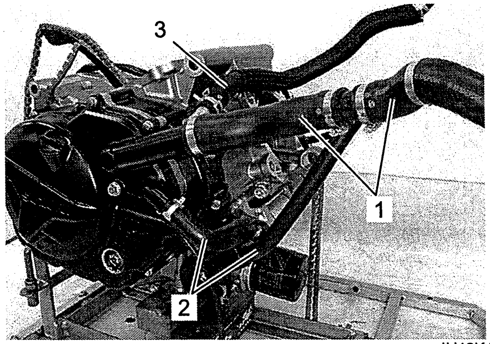
I944H1140224-01

Crankcase Assembly Disassembly

BENJ18K61406038

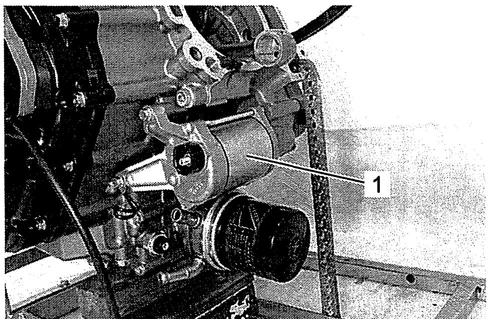
Refer to "Engine Assembly Removal" (Page 1D-36) and "Piston Removal and Installation" (Page 1D-56).

1) Remove the radiator outlet hoses (1), oil cooler hoses (2) and PCV hose (3).

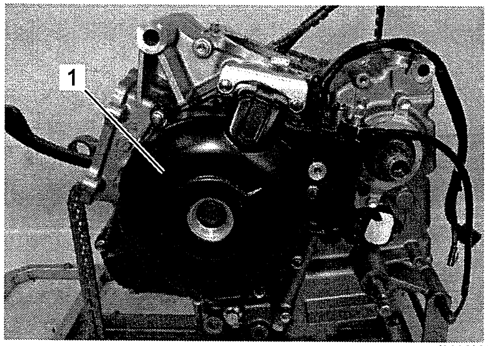


IH18K1140224-02

2) Remove the starter motor assembly (1). ☞(Page 1I-4)

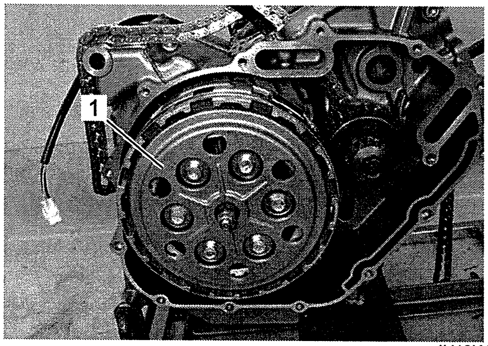


3) Remove the generator cover (1). ☞(Page 1J-5)



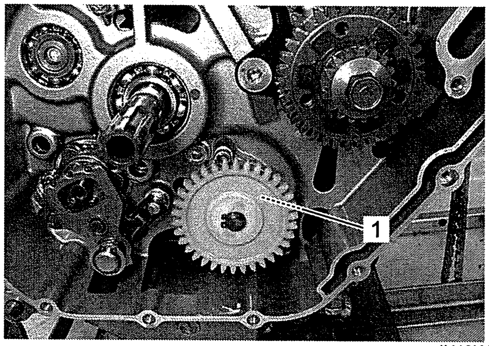
IH18K1140226-01

4) Remove the clutch cover and clutch component parts (1). ☞(Page 5C-10)



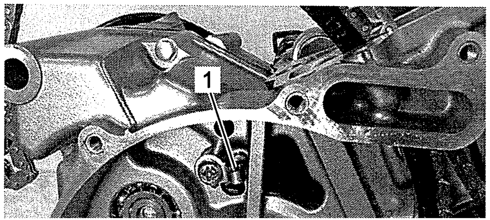
IH18K1140227-01

5) Remove the oil pump assembly (1). ☞(Page 1E-12)

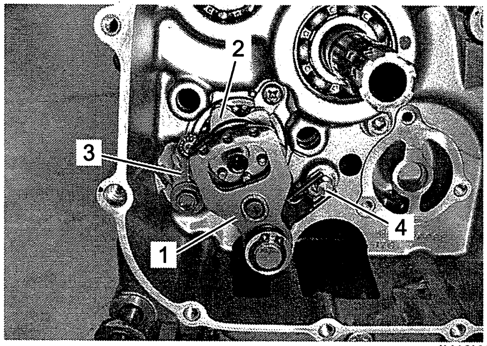


IH18K1140233-01

6) Remove the transmission oil guide (1). ☞(Page 1E-14)



7) Remove the gearshift shaft assembly (1), gearshift cam plate (2), gearshift cam stopper (3) and gearshift arm stopper (4). ☞(Page 5B-13)



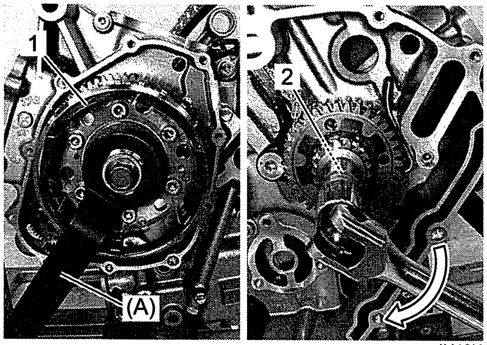
IH18K1140309-01

8) Hold the generator rotor (1) with the special tool and remove the primary drive gear bolt (2).

NOTE

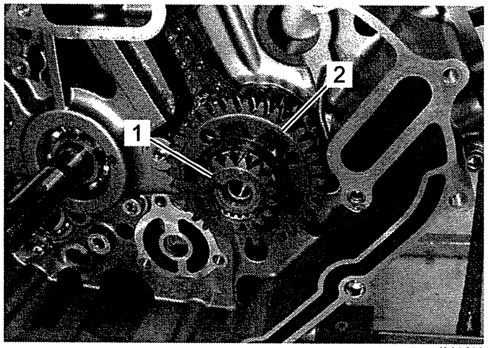
This primary drive gear bolt (2) has left-hand threads.

Special tool
(A): 09930–44530



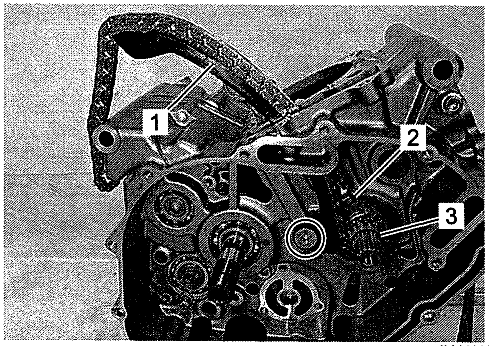
IH18K1140231-01

9) Remove the water pump drive gear (1) and primary drive gear assembly (2).



IH18K1140232-01

10) Remove the cam chain tensioner (1), cam chain (2) and cam chain drive sprocket (3).

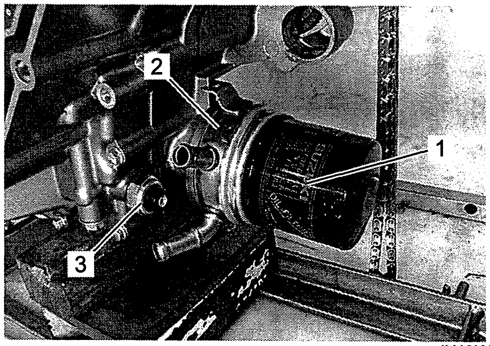


IH18K1140228-02

11) Remove the oil filter (1). ☞(Page 1E-6)

12) Remove the oil cooler (2). ☞(Page 1E-8)

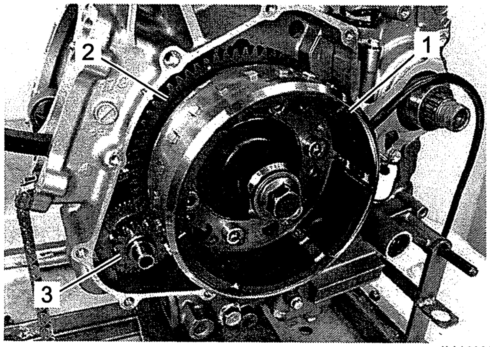
13) Remove the oil pressure switch (3). ☞(Page 1E-8)



IH18K1140234-01

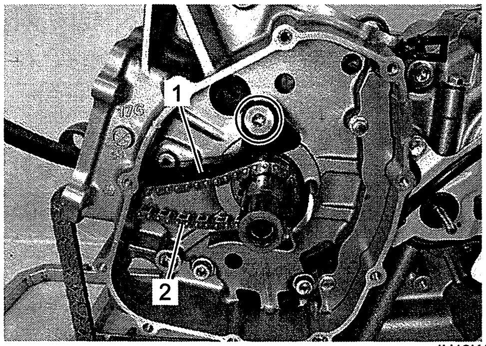
14) Remove the generator rotor (1). ☞(Page 1J-5)

15) Remove the starter clutch gear (2) and starter idle gear (3). ☞(Page 1I-9)



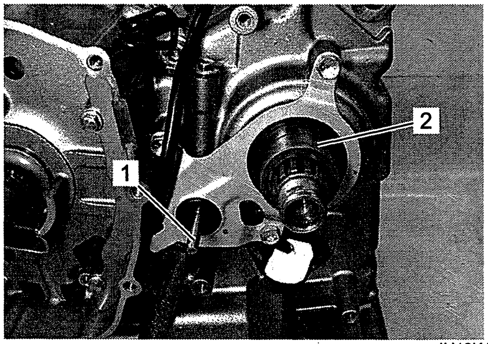
IH18K1140235-01

16) Remove the cam chain tensioner (1) and cam chain (2).



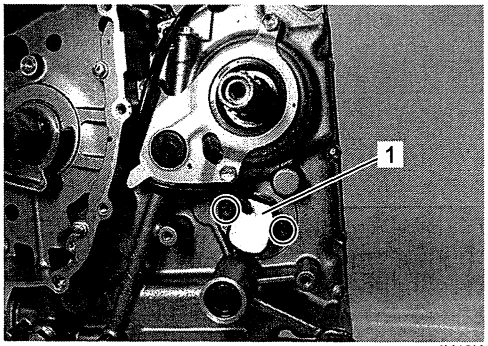
IH18K1140236-02

17) Remove the clutch push rod (Left) (1) and engine sprocket spacer (2).



IH18K1140237-01

18) Remove the GP switch (1).

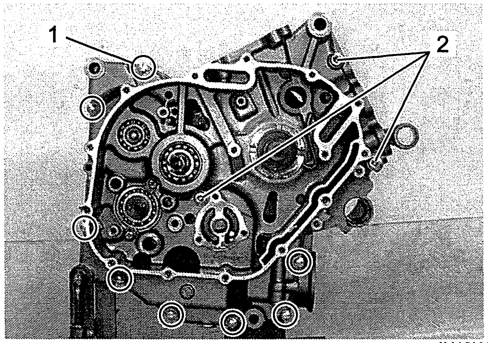


IH18K1140238-02

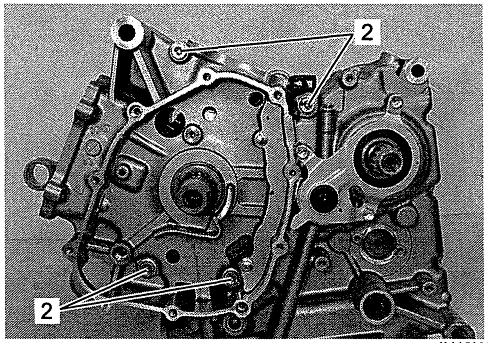
19) Remove the crankcase bolts (M6) (1) and (M8) (2).

NOTE

Loosen the crankcase bolts diagonally with the smaller size first.



IH18K1140240-01



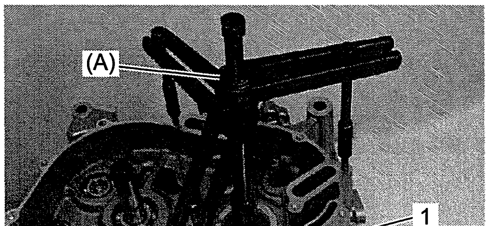
IH18K1140239-02

20) Remove the right crankcase (1) with the special tool.

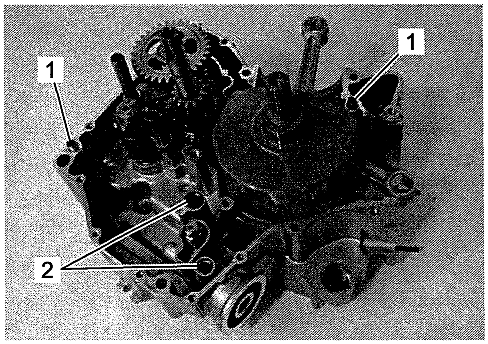
NOTE

- **Fit the crankcase separating tool, so that the tool arms are in parallel with the side of crankcase.**
- **The crankshaft and transmission components should remain in the left crankcase half.**

Special tool
(A): 09920–13120



21) Remove the dowel pins (1) and O-rings (2).



IH18K1140242-01

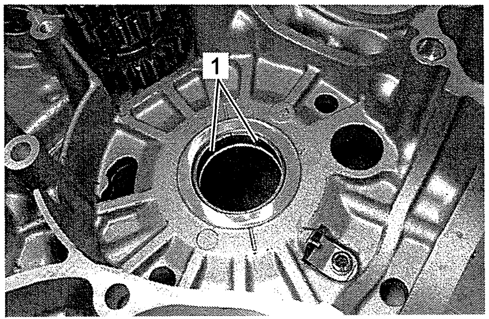
22) Remove the following parts from the crankcases.
- Crankshaft assembly: ☞(Page 1D-67)
- Transmission component parts: ☞(Page 5B-3)
- Oil strainer and oil pressure regulator: ☞(Page 1E-6)
- Left crankcase bearings and oil seals: ☞(Page 1D-70)
- Right crankcase bearing: ☞(Page 1D-71)

Crankcase Assembly Reassembly

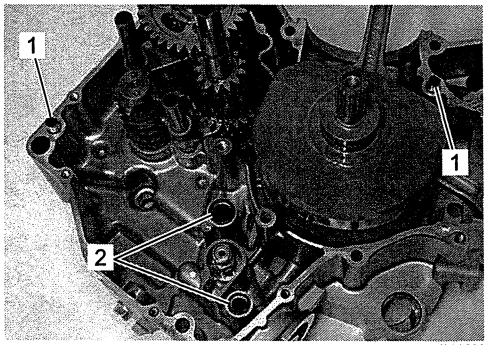
BENJ18K61406039

Refer to “Piston Removal and Installation” (Page 1D-56) and “Engine Assembly Installation” (Page 1D-40).

1) Install the following parts to the crankcases.
   - Right crankcase bearing: ☞(Page 1D-71)
   - Left crankcase bearings and oil seals: ☞(Page 1D-70)
   - Oil strainer and oil pressure regulator: ☞(Page 1E-6)
   - Transmission component parts: ☞(Page 5B-3)
   - Crankshaft assembly: ☞(Page 1D-67)
2) Apply engine oil to each running and sliding part.
3) Apply engine oil to the left crankshaft journal bearing (1).



4) Clean the mating surfaces of the left and right crankcase.
5) Install the dowel pins (1).
6) Apply engine oil to the new O-rings (2) and install it to the left crankcase.



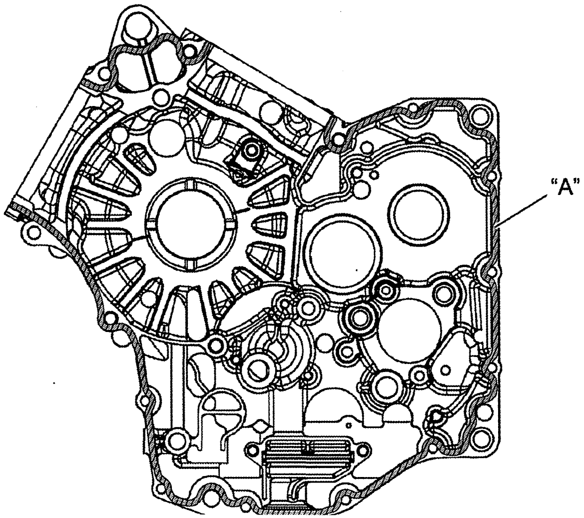
IH18K1140244-01

7) Apply sealant to the mating surface of the right crankcase.

NOTE

- **Make surfaces free from moisture, oil, dust and other foreign materials.**
- **Spread on surfaces thinly to form an even layer, and assemble the crankcases within few minutes.**
- **Take extreme care not to apply any sealant to the oil hole, oil groove and bearing.**
- **Apply to distorted surfaces as it forms a comparatively thick film.**

"A": Sealant 99000–31110 (SUZUKI BOND 1215)

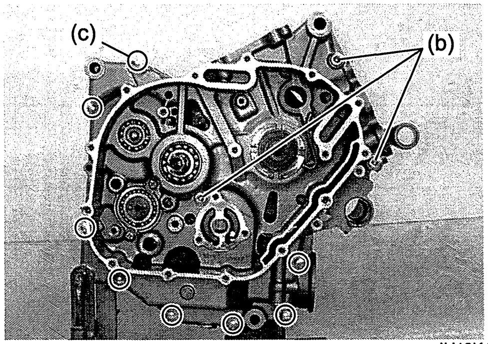


8) Install the right crankcase to the left crankcase.
9) Tighten the crankcase bolts a little at a time to equalize the pressure.

NOTE

- **Tighten the larger diameter crankcase bolts first and then smaller ones diagonally and evenly.**
- **Fit the clamp (1) to the crankcase bolt. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).**

Tightening torque
Crankcase bolt (M8) (L80) (a): 26 N·m (2.7 kgf-m, 19.5 lbf-ft)
Crankcase bolt (M8) (L55) (b): 26 N·m (2.7 kgf-m, 19.5 lbf-ft)
Crankcase bolt (M6) (c): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



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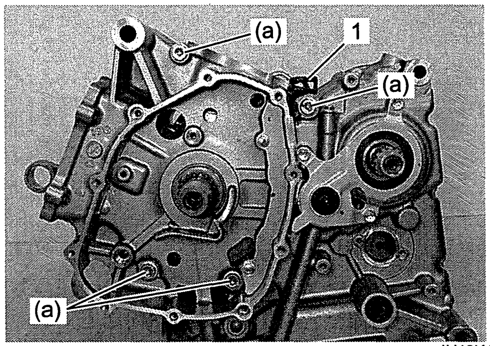
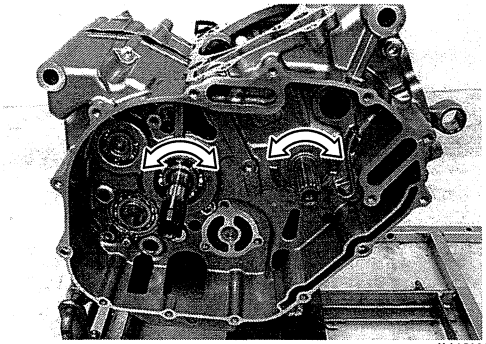


IH18K1140247-01

10) After the crankcase bolts have been tightened, check if the crankshaft, driveshaft and countershaft rotate smoothly.



IH18K1140249-01

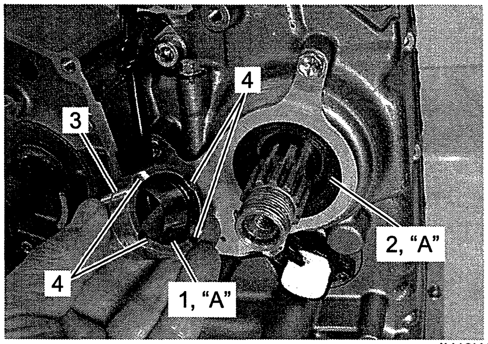
11) Install the GP switch. ☞(Page 5B-12)
12) Install the clutch push rod (Left). ☞(Page 5C-7)
13) Apply grease to the new O-ring (1) and oil seal lip (2).

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

14) Install the engine sprocket spacer (3) onto the driveshaft.

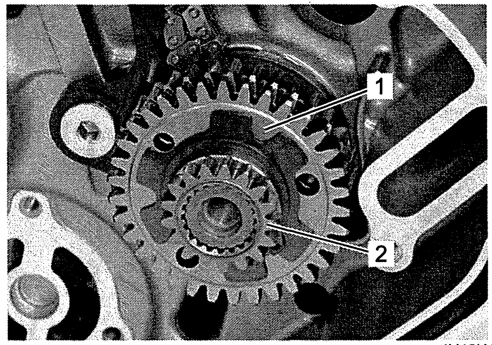
NOTE

The grooved side (4) of the engine sprocket spacer faces crankcase side.



IH18K1140250-01

15) Install the cam chain and cam chain tensioner. ☞(Page 1D-60)
16) Install the starter idle gear and starter clutch gear. ☞(Page 1I-9)
17) Install the generator rotor. ☞(Page 1J-6)
18) Install the oil pressure switch. ☞(Page 1E-8)
19) Install the oil cooler. ☞(Page 1E-8)
20) Install the oil filter. ☞(Page 1E-6)
21) Install the cam chain drive sprocket, cam chain and cam chain tensioner. ☞(Page 1D-60)
22) Install the primary drive gear assembly (1) and water pump drive gear (2).



IH18K1140251-01

23) Install the primary drive gear bolt (1).

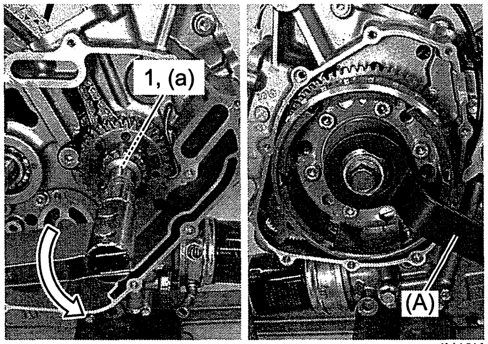
NOTE

The primary drive gear bolt (1) has left-hand threads.

24) Hold the generator rotor with the special tool and tighten the primary drive gear bolt (1) to the specified torque.

Special tool
(A): 09930–44530

Tightening torque
Primary drive gear bolt (a): 70 N·m (7.1 kgf-m, 52.0 lbf-ft)



IH18K1140252-01

25) Install the gearshift arm stopper, gearshift cam stopper, gearshift cam plate and gearshift shaft assembly. ☞(Page 5B-13)
26) Install the transmission oil guide. ☞(Page 1E-14)
27) Install the oil pump assembly. ☞(Page 1E-12)
28) Install the clutch component parts and clutch cover. ☞(Page 5C-12)
29) Install the generator cover. ☞(Page 1J-6)

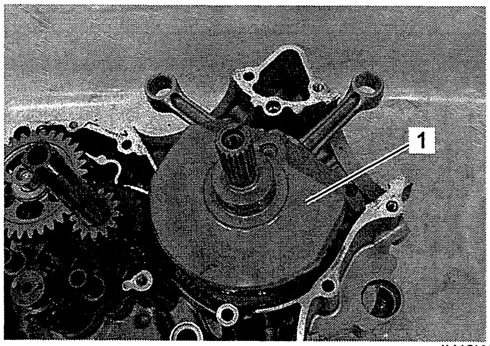
Crankshaft Assembly Removal and Installation

BENJ18K61406040

Refer to “Crankcase Assembly Disassembly” (Page 1D-61) and “Crankcase Assembly Reassembly” (Page 1D-64).

Removal

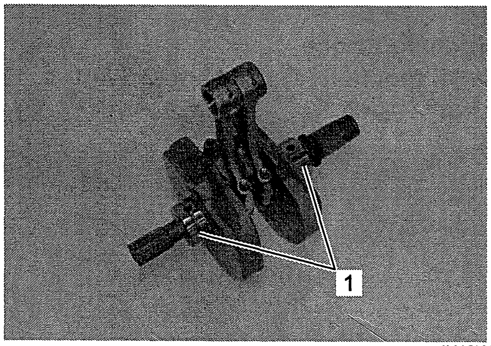
Remove the crankshaft assembly (1).



IH18K1140253-01

Installation

1) Apply engine oil to the crankshaft journals (1).



IH18K1140254-01

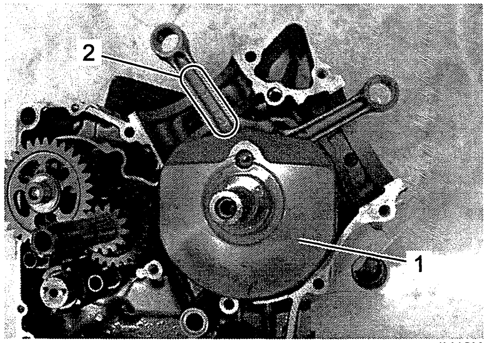
2) Install the crankshaft assembly (1) into the left crankcase.

NOTICE

Never strike the crankshaft assembly (1) with a plastic hammer when inserting it into the crankcase.

NOTE

- **Be sure to set the crankshaft assembly (1) in the proper direction.**
- **Of the two conrods, the one with the embossed letter (2) marked should be brought to the rear cylinder.**



IH18K1140255-01

Crankshaft Journal Bearing Removal and Installation

BENJ18K61406041

Refer to “Crankshaft Assembly Removal and Installation” (Page 1D-67) and “Transmission Removal and Installation” in Section 5B (Page 5B-3).

Removal

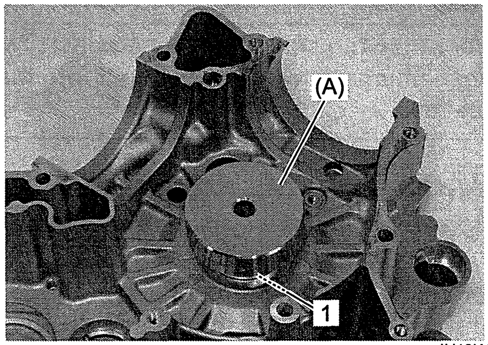
1) Set the special tool as shown to remove the crankshaft journal bearings (1) with the special tool.

NOTE

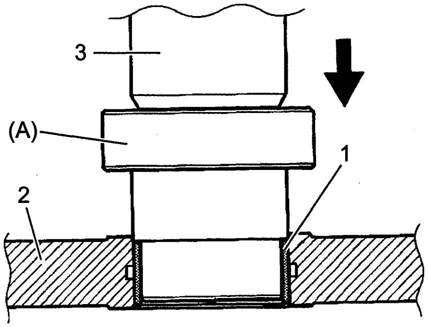
Remove the crankshaft journal bearings in only one direction, from inside to outside of each crankcase half.

Special tool
(A): 09913–60221

2) Gradually press out the crankshaft journal bearings with the special tool by using the hydraulic press.



IH18K1140256-01



ID26J1140177-03

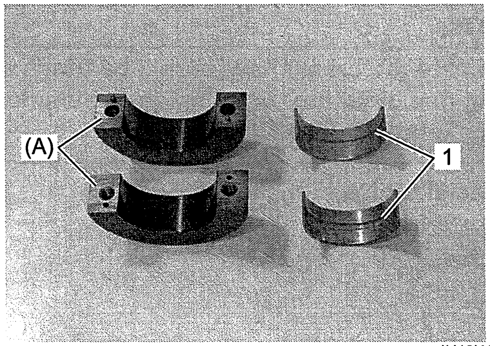
1. Crankshaft journal bearing	3. Hydraulic press
2. Crankcase	

3) Do the same for the other bearings.

Installation

1) Apply engine oil to the inside surface of the special tool before fitting the crankshaft journal bearing (1) in the special tool.

Special tool
(A): 09913–60221

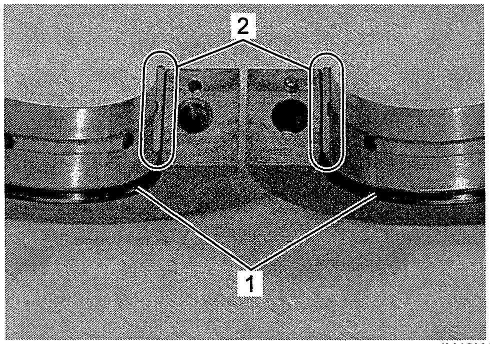


IH18K1140257-01

2) When setting the crankshaft journal bearing into the special tool, align the side edge of the crankshaft journal bearing with the line (1) engraved inside the tool and the end of the crankshaft journal bearing with the mating surface (2) of the tool as well.

NOTE

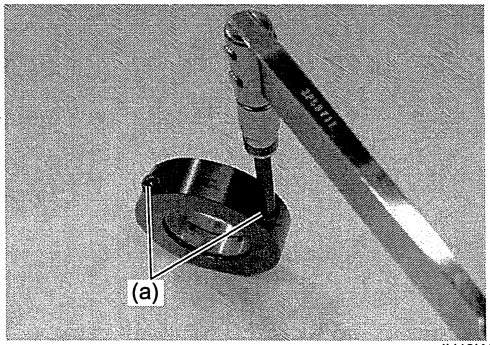
The upper and lower crankshaft journal bearings are same.



IH18K1140258-01

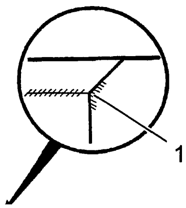
3) Combine the special tool and tighten the bolts to the specified torque.

Tightening torque
Special tool bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1140259-01

4) Before installing the crankshaft journal bearings, lightly shave off the sharp edge part (1) of the crankcase chamfer by using an oilstone.



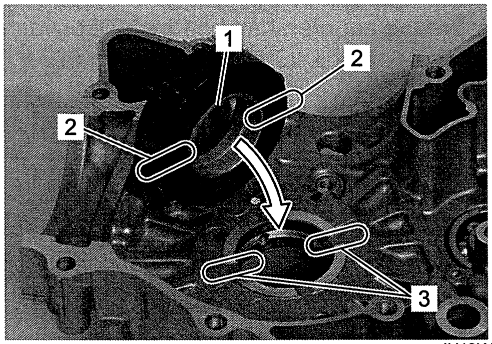
5) Apply engine oil to the inside surface of the crankcase.
6) Set the crankshaft journal bearings installed in the special tool to the crankcase half as shown.

NOTICE

- **Be sure the crankshaft journal bearing protruded side (1) faces the crankcase bore.**
- **Align the bearing/special tool mating surface (2) with the lines (3) on the crankcase.**

NOTE

Install the crankshaft journal bearing from inside to outside of each crankcase half.

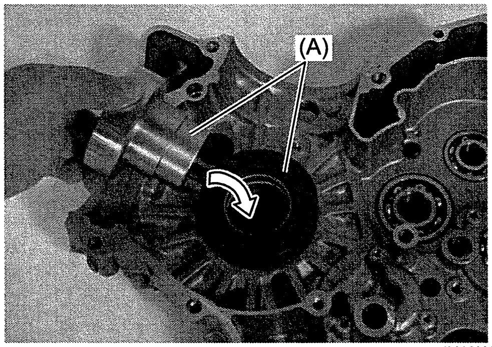


IH18K1140260-02

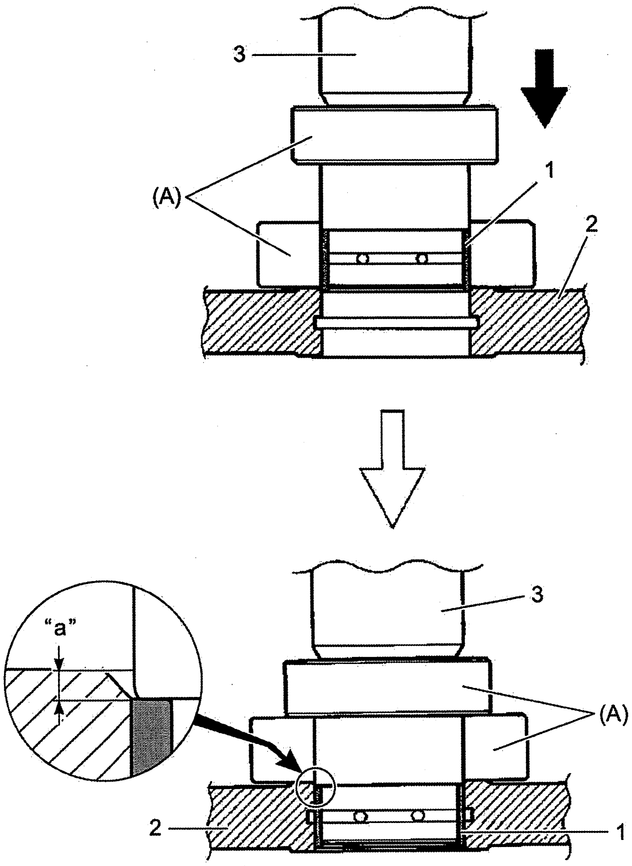
7) Apply enough engine oil to the special tool and the crankshaft journal bearings and then set the special tool carefully.

Special tool
(A): 09913–60221

8) Press fit the crankshaft journal bearing gradually using a hydraulic press.



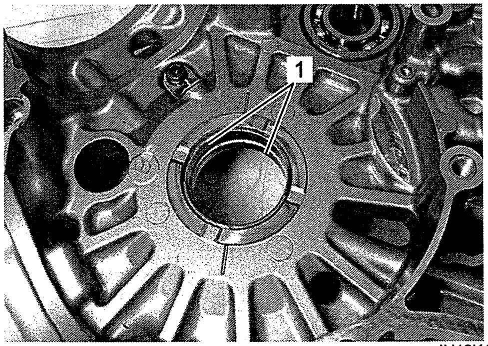
IH18K1140261-01



IH18K1140329-01

1. Crankshaft journal bearing	3. Hydraulic press
2. Crankcase	"a": 1.0 mm (0.04 in)

9) After installing the crankshaft journal bearings (1), check the crankshaft journal bearing surface for any scratch or damage.



IH18K1140263-01

10) Do the same for the other crankshaft journal bearings.

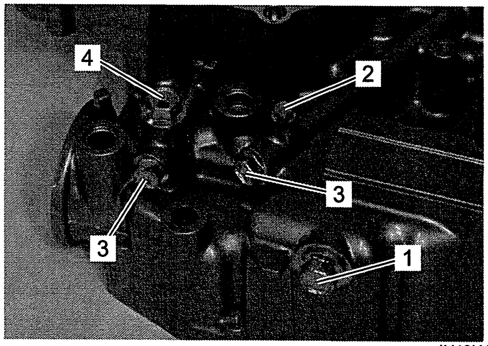
Left Crankcase Disassembly and Reassembly

BENJ18K61406042

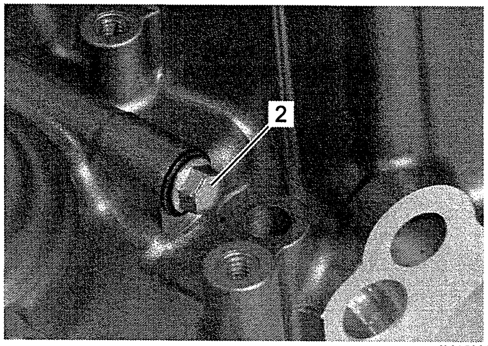
Refer to “Crankshaft Assembly Removal and Installation” (Page 1D-67) and “Transmission Removal and Installation” in Section 5B (Page 5B-3).

Disassembly

1) Remove the oil drain plug (1) and oil gallery plugs (M6) (2), (M8) (3) and (M12) (4).

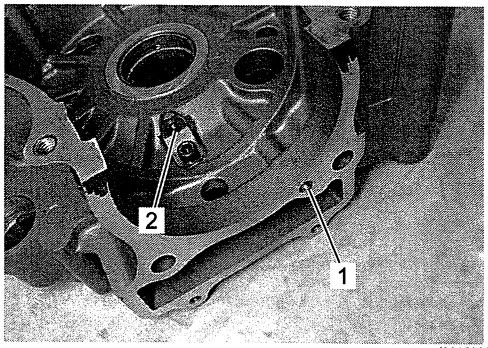


IH18K1140264-01



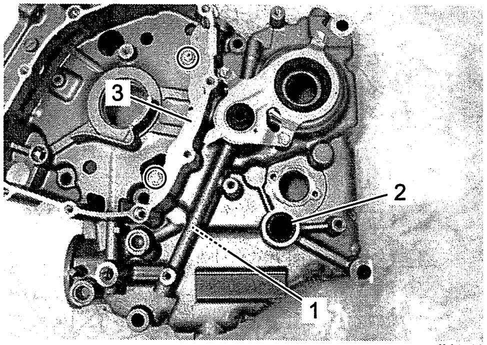
IH18K1140265-01

2) Remove the oil jet (for cylinder head) (1) and piston cooling jet (2). ☞(Page 1E-9)



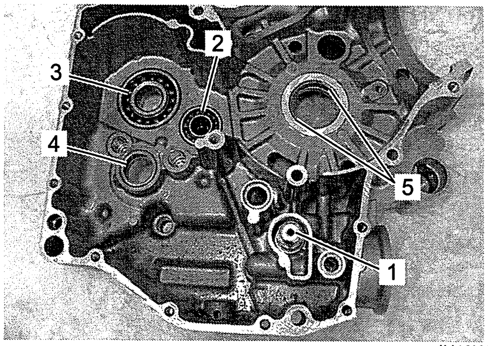
IH18K1140266-01

3) Remove the oil jet (for transmission) (1). ☞(Page 1E-9)
4) Remove the gearshift shaft oil seal (2). ☞(Page 5B-17)
5) Remove the oil separator plate (3).



IH18K1140267-01

6) Remove the oil pressure regulator (1). ☞(Page 1E-6)
7) Remove the countershaft bearing (2), driveshaft bearing (3) and gearshift cam bearing (4). ☞(Page 5B-9)
8) Remove the crankshaft journal bearings (5). ☞(Page 1D-67)



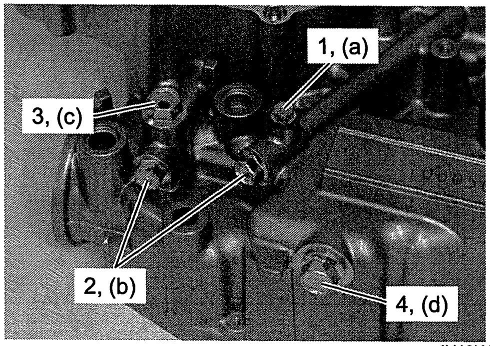
IH18K1140268-02

Reassembly

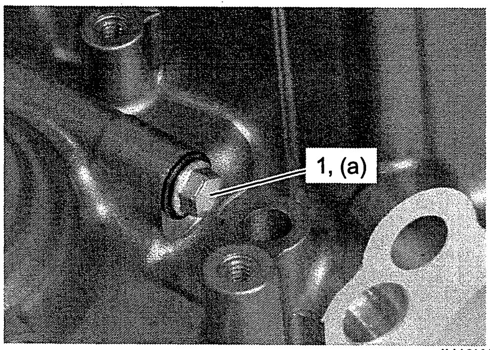
Reassemble the left crankcase in the reverse order of the disassembly. Pay attention to the following point.

- Install the new gasket washers to the oil gallery plugs (M6) (1), (M8) (2) and (M12) (3) and oil drain plug (4) and tighten each plug to the specified torque.

  Tightening torque
  Oil gallery plug (M6) (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
  Oil gallery plug (M8) (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
  Oil gallery plug (M12) (c): 21 N·m (2.1 kgf-m, 15.5 lbf-ft)
  Drain plug (d): 21 N·m (2.1 kgf-m, 15.5 lbf-ft)



IH18K1140269-01



IH18K1140270-01

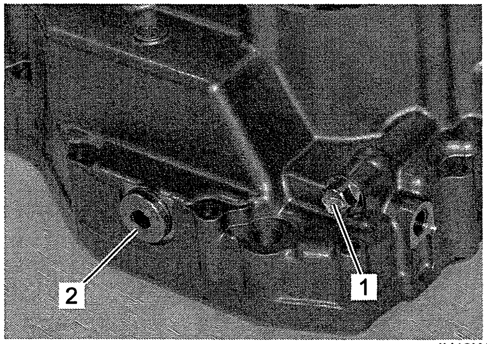
Right Crankcase Disassembly and Reassembly

BENJ18K61406043

Refer to "Crankcase Assembly Disassembly" (Page 1D-61) and "Crankcase Assembly Reassembly" (Page 1D-64).

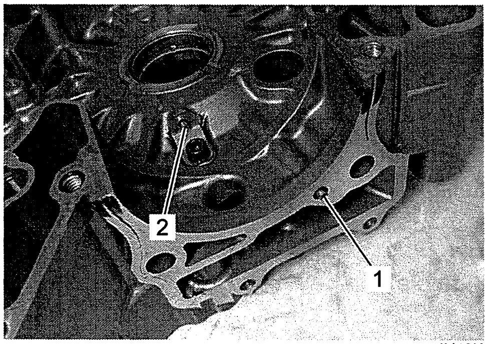
Disassembly

1) Remove the oil gallery plugs (M8) (1) and (M16) (2).



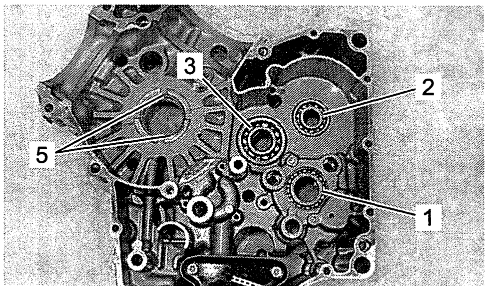
IH18K1140271-01

2) Remove the oil jet (for cylinder head) (1) and piston cooling jet (2). ☞(Page 1E-9)



IH18K1140272-01

3) Remove the gearshift cam bearing (1) driveshaft bearing (2) and countershaft bearing (3). ☞(Page 5B-10)
4) Remove the oil strainer (4). ☞(Page 1E-6)
5) Remove the crankshaft journal bearings (5). ☞(Page 1D-67)

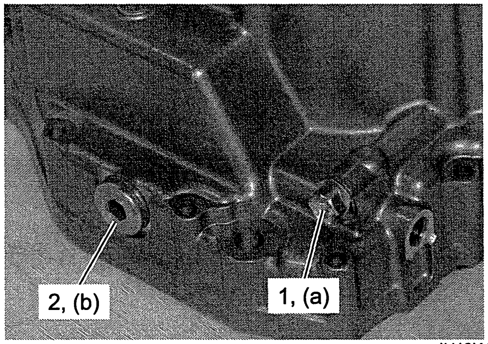


Reassembly

Reassemble the right crankcase in the reverse order of the disassembly. Pay attention to the following point:

- Install the new gasket washers to the oil gallery plugs (M8) (1) and (M16) (2), and tighten each plug to the specified torque.

  Tightening torque
  Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
  Oil gallery plug (M16) (b): 35 N·m (3.6 kgf-m, 26.0 lbf-ft)



IH18K1140274-01

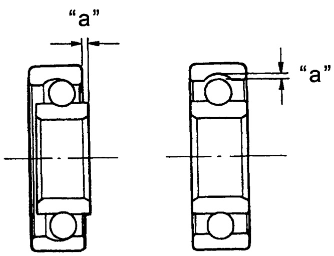
Crankcase Bearing / Oil Seal Inspection

BENJ18K61406044

Refer to "Crankshaft Assembly Removal and Installation" (Page 1D-67) and "Transmission Removal and Installation" in Section 5B (Page 5B-3).

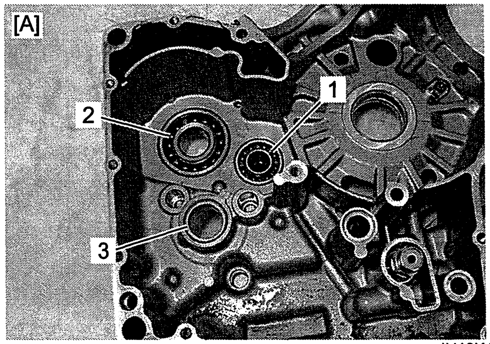
Bearing

Inspect the play of the bearing by hand while it is in the crankcase. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Left Crankcase Disassembly and Reassembly" (Page 1D-70) and "Right Crankcase Disassembly and Reassembly" (Page 1D-71).

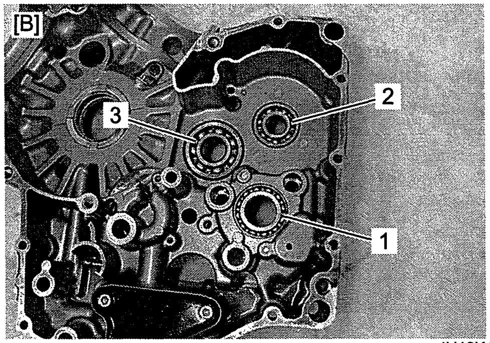


IE31J1140298-01

"a": Play	



IH18K1140275-01

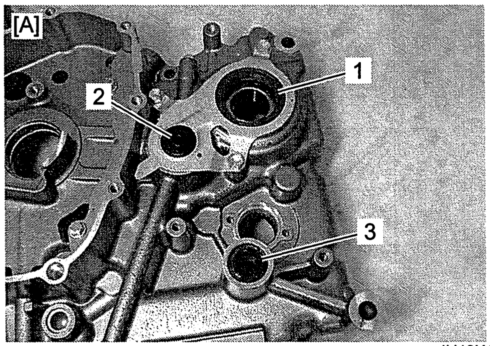


IH18K1140276-01

[A]: Left crankcase	2. Driveshaft bearing
[B]: Right crankcase	3. Countershaft bearing
1. Gearshift cam bearing	

Oil Seal

Inspect oil seal lip for wear or damage. If any defects are found, replace the oil seal with a new one. Refer to "Left Crankcase Bearing / Oil Seal Removal and Installation" in Section 5B (Page 5B-9) and "Gearshift Shaft Oil Seal Removal and Installation" in Section 5B (Page 5B-17).



IH18K1140277-01

[A]: Left crankcase	2. Clutch push rod oil seal
1. Driveshaft oil seal	3. Gearshift shaft oil seal

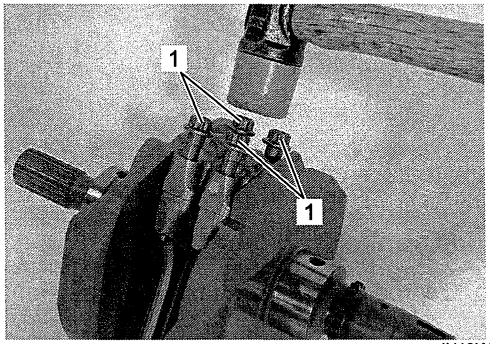
Conrod Removal and Installation

BENJ18K61406045

Refer to “Crankshaft Assembly Removal and Installation” (Page 1D-67).

Removal

1) Loosen the conrod cap bolts (1), and tap the conrod cap bolts lightly with plastic hammer to remove the conrod cap.
2) Remove the conrods and mark them to identify their respective cylinders.



IH18K1140278-01

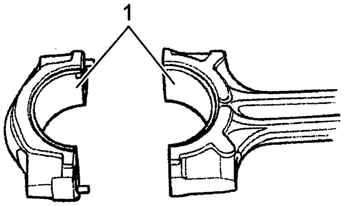
3) Remove the crank pin bearings (1).

NOTICE

When removing the crank pin bearings, be careful not to scratch the conrods and the bearings.

NOTE

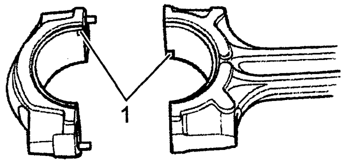
- **Do not remove the crank pin bearings (1) unless absolutely necessary.**
- **Make a note of where the bearings are removed from so that they can be reinstalled in their original positions.**



ID26J1140264-01

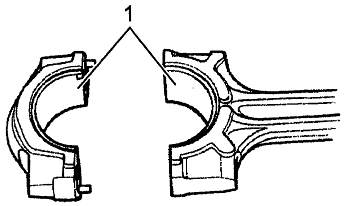
Installation

1) Clean the conrod big end.
2) When installing the crank pin bearings into the conrod cap and conrod, be sure to fix the stopper part (1) first, and then press in the opposite side of the bearing.



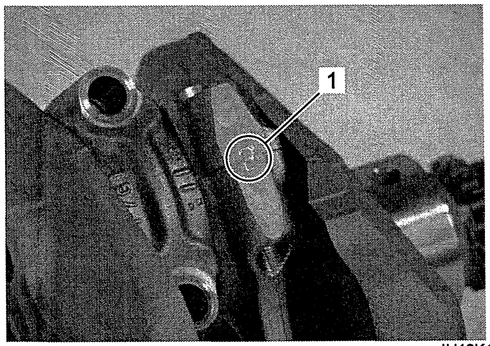
IH18K1140279-01

3) Apply engine oil solution to the crank pin and bearing surface (1).

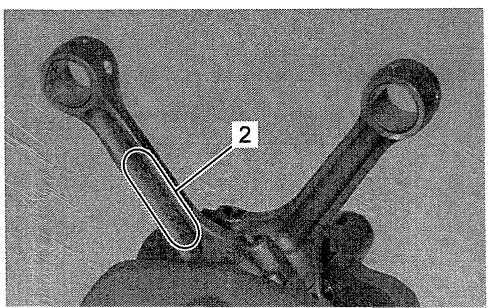


IH18K1140280-01

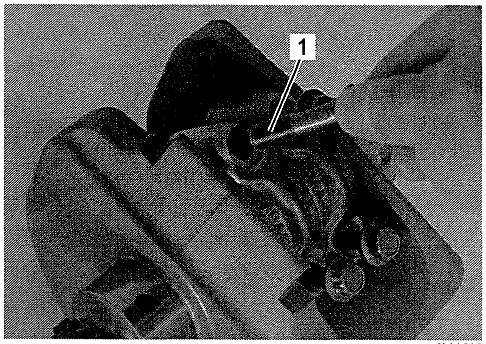
4) When fitting the conrod cap, make sure that I.D. code (1) on each conrod face intake side and that embossed lettering (2) on each conrod faces outside.



IH18K1140281-02



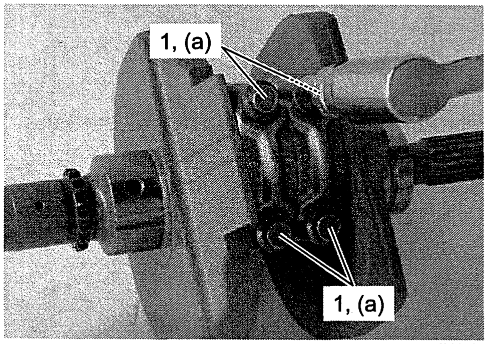
5) Apply engine oil to the flange and thread portion (1) of the conrod cap bolts.



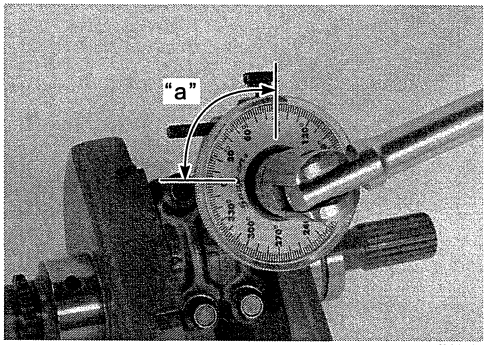
IH18K1140283-01

6) Tighten the conrod cap bolts (1) as following two steps.

Tightening torque
Conrod cap bolt (a): 21 N·m (2.1 kgf-m, 15.5 lbf-ft) → turn clockwise 90°



IH18K1140284-02

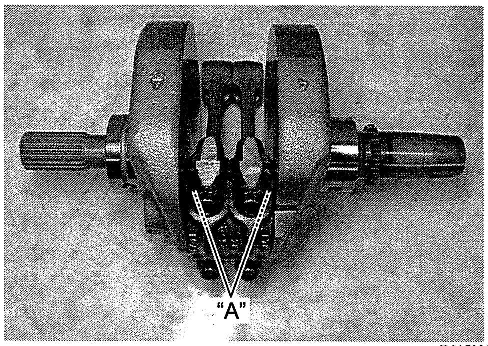


IH18K1140285-01

"a": 90°

7) Apply molybdenum oil to the conrod big end side surfaces.

"A": Assembly lubrication (Molybdenum oil solution)



IH18K1140286-01

8) Check that the conrod moves smoothly.

Conrod / Crankshaft Inspection

BENJ18K61406046

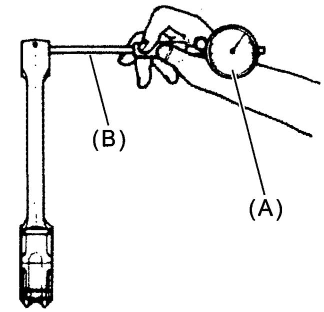
Refer to "Conrod Removal and Installation" (Page 1D-73).

Conrod Small End I.D.

Measure the conrod small end inside diameter with the small bore gauge.
If the conrod small end inside diameter exceeds the service limit, replace the conrod.

<u>Conrod small end I.D.</u>
[Limit]: 20.040 mm (0.7889 in)

Special tool
(A): 09900–20602
(B): 09900–22403



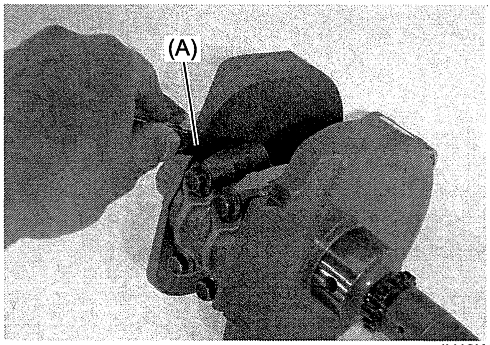
ID26J1140219-01

Conrod Big End Side Clearance

1) Check the conrod big end side clearance with thickness gauge.

Conrod big end side clearance
[Limit]: 0.50 mm (0.019 in)

Special tool
(A): 09900–20803



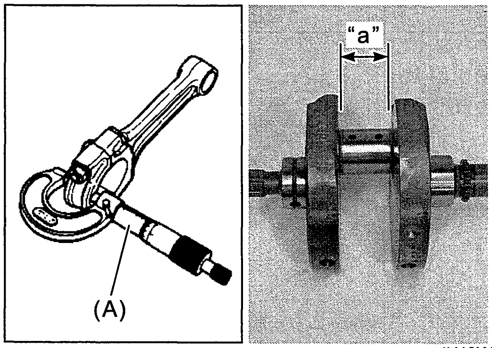
IH18K1140287-01

2) If the clearance exceeds the limit, remove the conrod and measure the conrod big end width and crank pin width "a". If the width exceed the limit, replace the conrod or crankshaft. ☞(Page 1D-73)

Conrod big end width
[Standard]: 20.95 – 21.00 mm (0.8248 – 0.8267 in)

Crank pin width
[Standard]: 42.17 – 42.22 mm (1.661 – 1.662 in)

Special tool
(A): 09912–66310
09900–20101



IH18K1140310-01

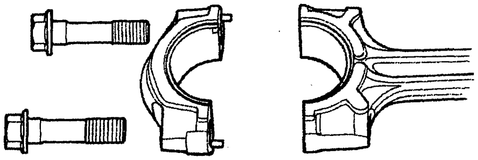
Conrod Crank Pin Bearing Inspection and Selection

BENJ18K61406047

Refer to "Conrod Removal and Installation" (Page 1D-73).

Inspection

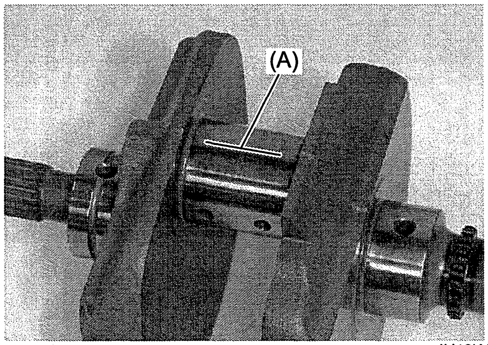
1) Inspect the bearing surfaces for any signs of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.



IH18K1140288-01

2) Place the plastigage axially along the crank pin, avoiding the oil hole, as shown.

Special tool
(A): 09900–22301



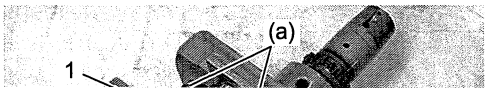
IH18K1140289-01

3) Tighten the conrod cap bolts to the specified torque, in two stages. ☞(Page 1D-73)

NOTE

- **When installing the conrod cap to the crank pin, make sure that I.D. code (1) on the conrod faces towards the intake side.**
- **Never rotate the crankshaft or conrod when a piece of plastigage is installed.**

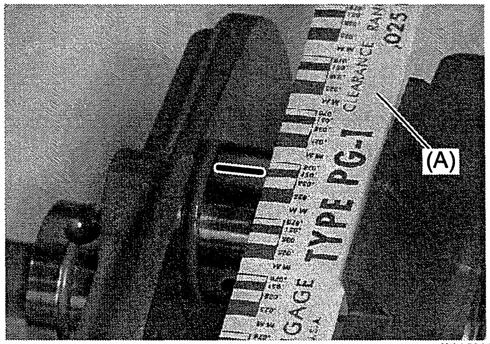
Tightening torque
Conrod cap bolt (a): 21 N·m (2.1 kgf-m, 15.5 lbf-ft) → turn clockwise 90°



4) Remove the conrod caps and measure the width of the compressed plastigage using the envelope scale. This measurement should be taken at the widest part of the compressed plastigage.
If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

<u>Conrod big end oil clearance</u>
[Standard]: 0.032 – 0.056 mm (0.0013 – 0.0022 in)
[Limit]: 0.080 mm (0.0031 in)

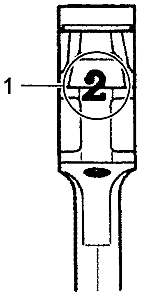
Special tool
(A): 09900–22301



IH18K1140291-01

Selection

1) Check the corresponding conrod I.D. code numbers ([1] or [2]) (1).



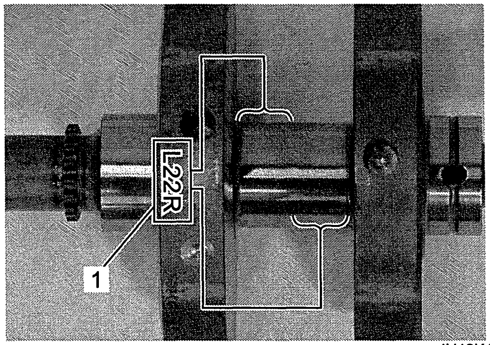
IH18K1140292-01

<u>Conrod big end I.D.</u>
[Standard]: 41.000 – 41.016 mm (1.6142 – 1.6148 in)

<u>Conrod I.D. specification</u>

Code (1)	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]) (1).



IH18K1140293-02

3) Measure the conrod crank pin O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

NOTE

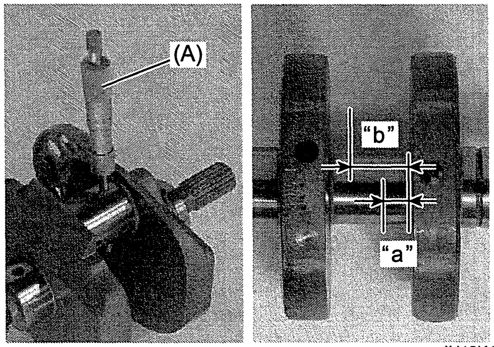
The crank pin O.D. measurement should be taken at 10.5 mm (0.413 in) and 31.5 mm (1.240 in) positions from the crank pin end.

<u>Crank pin O.D.</u>
[Standard]: 37.976 – 38.000 mm (1.4952 – 1.4960 in)

<u>Crank pin O.D. specification</u>

Code	O.D. specification
1	**37.992 – 38.000 mm (1.4958 – 1.4960 in)**
2	**37.984 – 37.992 mm (1.4955 – 1.4957 in)**
3	**37.976 – 37.984 mm (1.4952 – 1.4954 in)**

Special tool
(A): 09900–20202



IH18K1140294-02

"a": 10.5 mm (0.413 in)	"b": 31.5 mm (1.240 in)

4) Select the specified bearings from the bearing selection table.

NOTICE

The bearings should be replaced as a set.

Bearing selection table

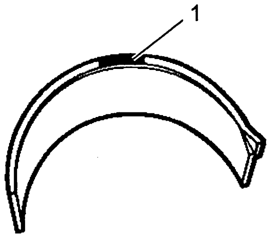
		Crank pin O.D.		
	Code	1	2	3
Conrod I.D.	1	Green	Black	Brown
	2	Black	Brown	Yellow

IH18K1140326-01

Crank pin bearing thickness
[Standard]: 1.480 – 1.496 mm (0.0583 – 0.0588 in)

Bearing thickness specification

Color (1) (Part No.)	Thickness
Green (12164-46E10-0A0)	**1.480 – 1.484 mm (0.0583 – 0.0584 in)**
Black (12164-46E10-0B0)	**1.484 – 1.488 mm (0.05843 – 0.05858 in)**
Brown (12164-46E10-0C0)	**1.488 – 1.492 mm (0.0586 – 0.0587 in)**
Yellow (12164-46E10-0D0)	**1.492 – 1.496 mm (0.05875 – 0.05889 in)**



IH18K1140327-02

1. Color code

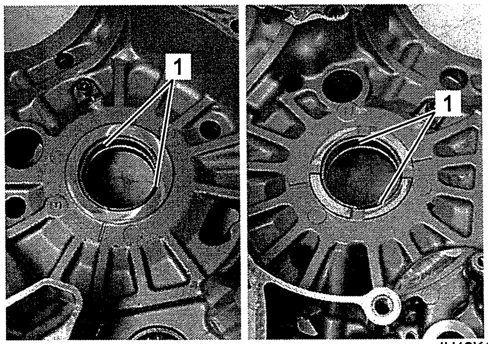
Crankshaft Journal Bearing Inspection and Selection

BENJ18K61406048

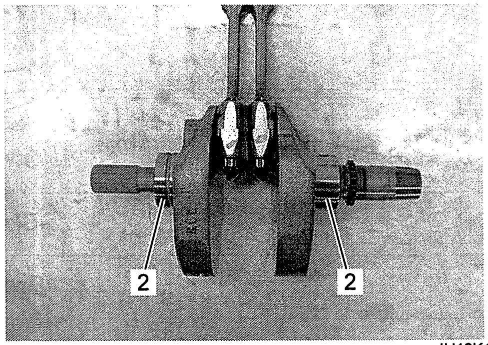
Refer to "Crankshaft Assembly Removal and Installation" (Page 1D-67) and "Transmission Removal and Installation" in Section 5B (Page 5B-3).

Inspection

1) Inspect the crankshaft journal bearings (1) and crankshaft journals (2) on right and left for any damage. If any, replace the bearings and crankshaft as a specified set.



IH18K1140295-02

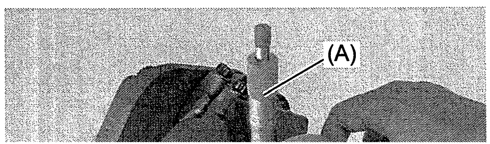


IH18K1140296-01

2) Measure the crankshaft O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft and bearings as a set.

Crankshaft journal O.D.
[Standard]: 41.985 – 42.000 mm (1.6530 – 1.6535 in)

Special tool
(A): 09900–20202

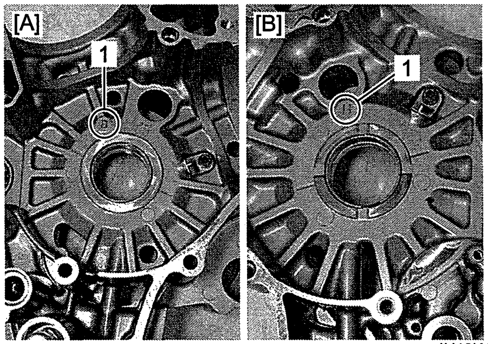


Selection

1) Select the specified bearings from the crankcase journal I.D. codes. The crankcase journal I.D. codes ((A), (B) or (C)) (1), is stamped on the inside of each crankcase half.

NOTICE

The bearings should be replaced as a set.



IH18K1140298-02

[A]: Left crankcase	[B]: Right crankcase

Crankcase journal I.D.
[Standard]: 46.000 – 46.018 mm (1.8111 – 1.8117 in)

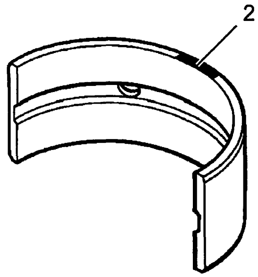
Crankcase journal I.D. specification

Code (1)	I.D. specification	Bearing color
A	46.000 – 46.006 mm (1.8111 – 1.8112 in)	Green
B	46.006 – 46.012 mm (1.8113 – 1.8114 in)	Black
C	46.012 – 46.018 mm (1.8115 – 1.8117 in)	Brown

Crankcase journal bearing thickness
[Standard]: 1.999 – 2.008 mm (0.0787 – 0.0790 in)

Bearing thickness specification

Color (2) (Part No.)	Thickness
Green (12229-44H10-0A0)	1.999 – 2.002 mm (0.07871 – 0.07882 in)
Black (12229-44H10-0B0)	2.002 – 2.005 mm (0.07882 – 0.07893 in)
Brown (12229-44H10-0C0)	2.005 – 2.008 mm (0.07894 – 0.07905 in)



IE31J1140288-01

2. Color code

Specifications

Tightening Torque Specifications

BENJ18K61407001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Air cleaner outlet tube clamp screw	1.5	0.15	1.10	☞(Page 1D-8)
EVAP system purge control solenoid valve bracket screw	5.0	0.51	3.70	☞(Page 1D-14)
EVAP system purge control solenoid valve nut	7.0	0.71	5.20	☞(Page 1D-14)
Intake pipe screw	8.5	0.87	6.30	☞(Page 1D-16)
Cylinder head cover bolt	14	1.4	10.5	☞(Page 1D-18)
Camshaft journal holder bolt	10	1.0	7.5	☞(Page 1D-23) / ☞(Page 1D-27)
Cam chain tension adjuster bolt	10	1.0	7.5	☞(Page 1D-24) / ☞(Page 1D-28)
Cam chain tension adjuster plug	23	2.3	17.0	☞(Page 1D-24) / ☞(Page 1D-28)
Crankshaft hole plug	11	1.1	8.5	☞(Page 1D-29)
TDC plug	23	2.3	17.0	☞(Page 1D-29)
Ignition coil bracket bolt	10	1.0	7.5	☞(Page 1D-40)
Cylinder head bolt (M10)	25 → 42 N·m (2.5 → 4.3 kgf-m, 18.5 → 31.0 lbf-ft)			☞(Page 1D-46)
Cylinder head bolt (M6) (L70)	10	1.0	7.5	☞(Page 1D-47)
Cylinder head bolt (M6) (L40)	10	1.0	7.5	☞(Page 1D-47)
Cylinder nut	10	1.0	7.5	☞(Page 1D-47)
Exhaust pipe bolt	23	2.3	17.0	☞(Page 1D-47)
Connector hose union bolt	10	1.0	7.5	☞(Page 1D-54)
Oil gallery plug (M6)	10	1.0	7.5	☞(Page 1D-54) / ☞(Page 1D-71)
Cam chain tensioner bolt	10	1.0	7.5	☞(Page 1D-61)
Crankcase bolt (M8) (L80)	26	2.7	19.5	☞(Page 1D-65)
Crankcase bolt (M8) (L55)	26	2.7	19.5	☞(Page 1D-65)
Crankcase bolt (M6)	11	1.1	8.5	☞(Page 1D-65)
Primary drive gear bolt	70	7.1	52.0	☞(Page 1D-66)
Special tool bolt	23	2.3	17.0	☞(Page 1D-68)
Oil gallery plug (M8)	18	1.8	13.5	☞(Page 1D-71) / ☞(Page 1D-72)
Oil gallery plug (M12)	21	2.1	15.5	☞(Page 1D-71)
Drain plug	21	2.1	15.5	☞(Page 1D-71)
Oil gallery plug (M16)	35	3.6	26.0	☞(Page 1D-72)
Conrod cap bolt	21 N·m (2.1 kgf-m, 15.5 lbf-ft) → turn clockwise 90°			☞(Page 1D-74) / ☞(Page 1D-75)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

"Intake System Construction" (Page 1D-6)

"Throttle Body Components" (Page 1D-9)

"Engine Assembly Installation" (Page 1D-40)

"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K61408001

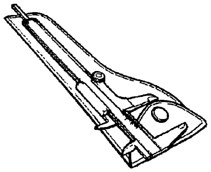
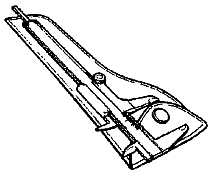
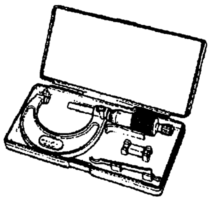
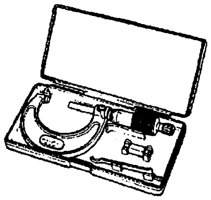
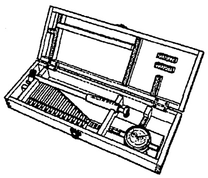
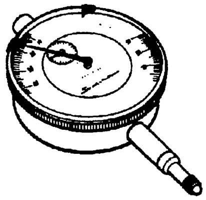
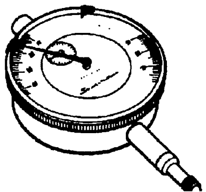
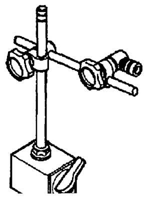
Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞(Page 1D-45) / ☞(Page 1D-50) / ☞(Page 1D-57) / ☞(Page 1D-74)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 1D-16) / ☞(Page 1D-66)
Sealant	SUZUKI BOND 1215	P/No.: 99000–31110	☞(Page 1D-44) / ☞(Page 1D-65)
	SUZUKI BOND 1207B	P/No.: 99000–31140	☞(Page 1D-18)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000–32150	☞(Page 1D-40)

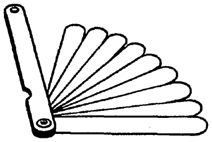
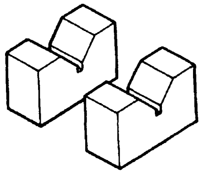
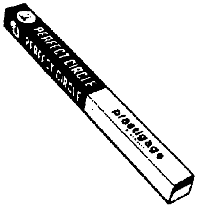
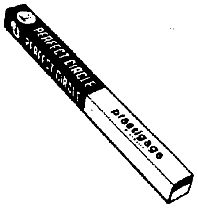
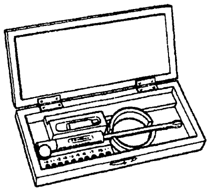
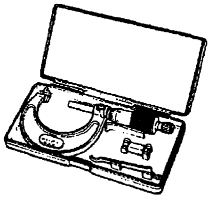
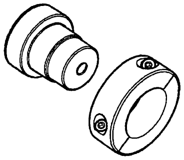
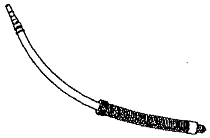
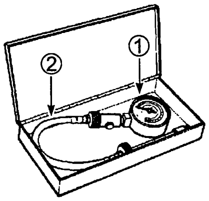
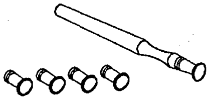
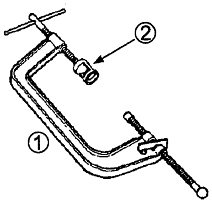
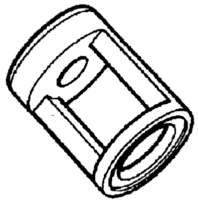
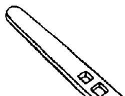
NOTE

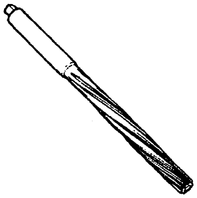
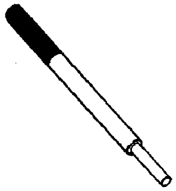
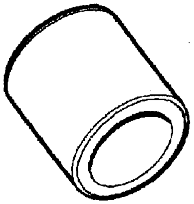
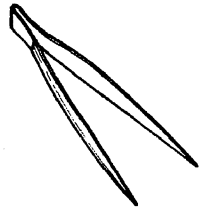
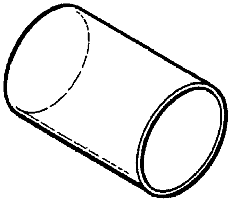
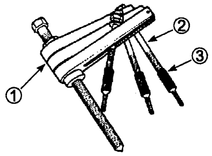
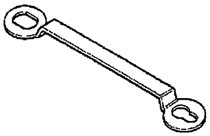
Required service material(s) is also described in:
"Throttle Body Components" (Page 1D-9)
"Engine Assembly Installation" (Page 1D-40)

Special Tool

BENJ18K61408002

09900–20101 Vernier calipers (150 mm) ☞(Page 1D-51) / ☞(Page 1D-59) / ☞(Page 1D-75) 	09900–20102 Vernier calipers (200 mm) ☞(Page 1D-53) 
09900–20202 Micrometer (25 - 50 mm) ☞(Page 1D-30) / ☞(Page 1D-76) / ☞(Page 1D-77) 	09900–20204 Micrometer (75 - 100 mm) ☞(Page 1D-58) 
09900–20530 Cylinder gauge set ☞(Page 1D-48) 	09900–20602 Dial gauge (1 x 0.001 mm) ☞(Page 1D-31) / ☞(Page 1D-60) / ☞(Page 1D-74) 
09900–20607 Dial gauge (10 x 0.01 mm) ☞(Page 1D-31) / ☞(Page 1D-51) / ☞(Page 1D-51) / ☞(Page 1D-52) 	09900–20701 Dial gauge chuck ☞(Page 1D-31) / ☞(Page 1D-51) / ☞(Page 1D-51) / ☞(Page 1D-52) 

09900–20803 Thickness gauge ☞(Page 1D-32) / ☞(Page 1D-33) / ☞(Page 1D-48) / ☞(Page 1D-55) / ☞(Page 1D-59) / ☞(Page 1D-59) / ☞(Page 1D-75) 	09900–21304 V blocks ☞(Page 1D-31) / ☞(Page 1D-51) / ☞(Page 1D-51) 
09900–22301 Plastigage (0.025 - 0.076 mm) ☞(Page 1D-30) / ☞(Page 1D-75) / ☞(Page 1D-76) 	09900–22302 Plastigage (0.051 - 0.152 mm) ☞(Page 1D-30) 
09900–22403 Small bore gauge (18 - 35 mm) ☞(Page 1D-31) / ☞(Page 1D-60) / ☞(Page 1D-74) 	09912–66310 Micrometer (0 - 25 mm) ☞(Page 1D-31) / ☞(Page 1D-51) / ☞(Page 1D-59) / ☞(Page 1D-60) / ☞(Page 1D-75) 
09913–60221 Journal bearing installer / holder set ☞(Page 1D-67) / ☞(Page 1D-68) / ☞(Page 1D-69) 	09915–63311 Compression gauge adapter ☞(Page 1D-5) 
09915–64512 Compression gauge set (2500 kPa) 1. Gauge 2. Hose (Adapter) ☞(Page 1D-5) 	09916–10911 Valve lapper set ☞(Page 1D-52) 
09916–14510 Valve lifter 1. Main unit 2. Attachment ☞(Page 1D-49) / ☞(Page 1D-50) 	09916–14522 Valve lifter attachment ☞(Page 1D-49) / ☞(Page 1D-50) 
09916–33210 Valve guide reamer (ø4.5) ☞(Page 1D-56) 	09916–34542 Reamer handle ☞(Page 1D-55) / ☞(Page 1D-56) 

09916–34580 Valve guide reamer (ø10.8) ☞(Page 1D-55) 	09916–43211 Valve guide installer / remover ☞(Page 1D-55) / ☞(Page 1D-56) 
09916–53330 Valve guide installer attachment ☞(Page 1D-56) 	09916–84511 Tweezers ☞(Page 1D-49) / ☞(Page 1D-50) 
09919–28620 Sleeve protector ☞(Page 1D-49) / ☞(Page 1D-50) 	09920–13120 Crankcase separator 1. Main unit 2. Bolt 3. Attachment ☞(Page 1D-64) 
09930–44530 Rotor holder ☞(Page 1D-62) / ☞(Page 1D-66) 	

Engine Lubrication System

Precautions

Precautions for Engine Oil

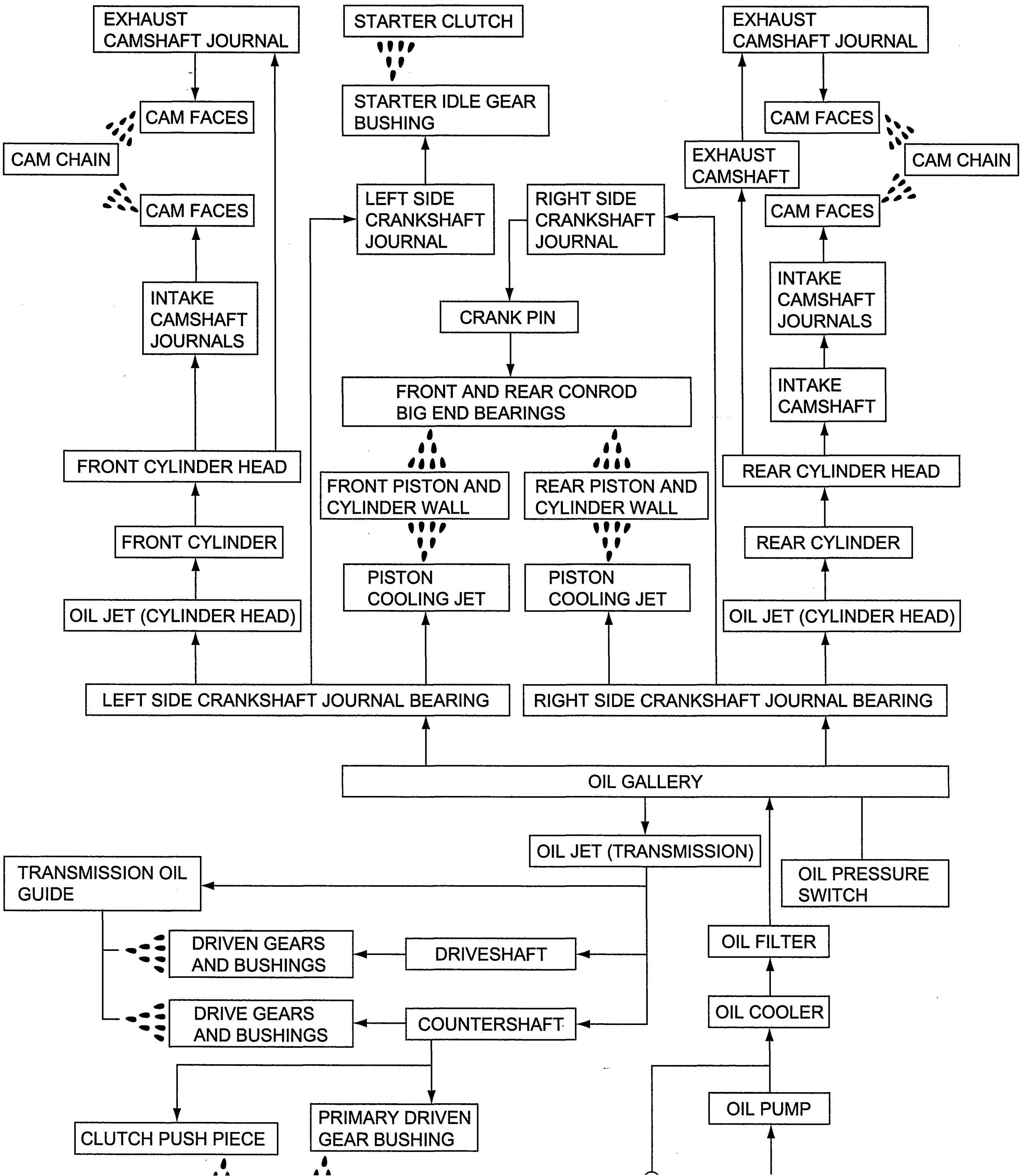
BENJ18K61500001

Refer to “Fuel / Oil / Fluid / Coolant Recommendation” in Section 0C (Page 0C-13).

Schematic and Routing Diagram

Engine Lubrication System Chart Diagram

BENJ18K61502001



Diagnostic Information and Procedures

Engine Lubrication Symptom Diagnosis

BENJ18K61504001

Condition	Possible cause	Correction / Reference Item
Engine overheats	Insufficient amount of engine oil.	*Check level and add. ☞(Page 1E-5)*
	Defective oil pump.	*Replace. ☞(Page 1E-12)*
	Clogged oil circuit.	*Clean.*
	Incorrect engine oil.	*Change. ☞(Page 1E-5)*
	Clogged oil cooler.	*Replace. ☞(Page 1E-8)*
Exhaust smoke is dirty or thick	Excessive amount of engine oil.	*Check level and drain. ☞(Page 1E-5)*
Engine lacks power	Excessive amount of engine oil.	*Check level and drain. ☞(Page 1E-5)*

Oil Pressure Check

BENJ18K61504002

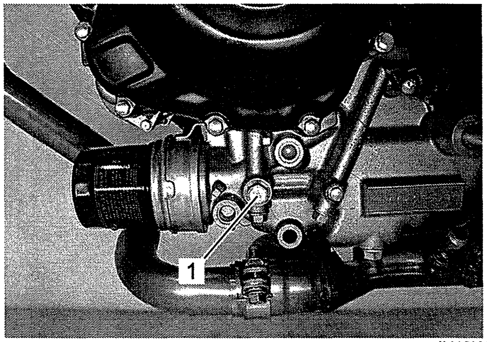
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

NOTE

Before checking the oil pressure, check the following:

- **Oil level: ☞(Page 1E-5)**
- **Oil leaks (If leak is found, repair it.)**
- **Oil quality (If oil is discolored or deteriorated, replace it.)**

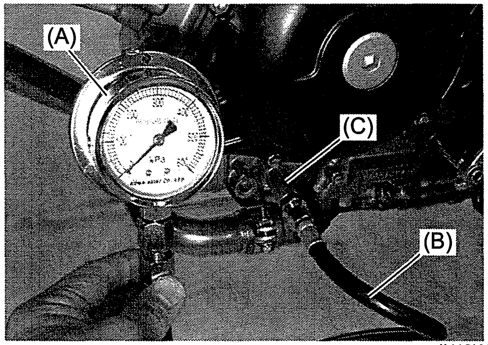
1) Start the engine and check if the oil pressure indicator light is turned on. If the light stays on, check the oil pressure indicator light circuit. If the circuit is OK, check the oil pressure in the following manner.
2) Remove the oil gallery plug (M12) (1).



IH18K1150002-01

3) Install the oil pressure gauge and attachment into the oil gallery.

Special tool
(A): 09915–77331
(B): 09915–74521
(C): 09915–70610



IH18K1150003-01

4) Warm up the engine as follows:
   Summer: 10 min. at 2000 r/min
   Winter: 20 min. at 2000 r/min
5) After warm up, increase the engine speed to 3000 r/min 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
At 60 °C (140 °F), 3000 r/min
[Standard]: 200 – 600 kPa (2.1 – 6.1 kgf/cm², 29.0 – 87.0 psi)

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

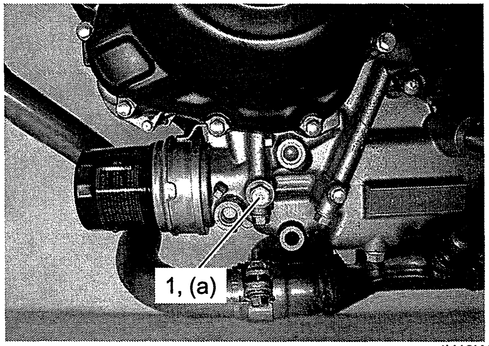
6) Stop the engine and remove the oil pressure gauge and attachment.

⚠ WARNING

To avoid the risk of being burned, remove the oil pressure gauge when the oil has cooled.

7) Install the new gasket to the oil gallery plug (M12) (1).
8) Install the oil gallery plug (M12) and tighten it to the specified torque.

Tightening torque
Oil gallery plug (M12) (a): 21 N·m (2.1 kgf-m, 15.5 lbf-ft)



IH18K1150004-01

9) Check the engine oil level. ☞(Page 1E-5)

Engine Oil Inspection

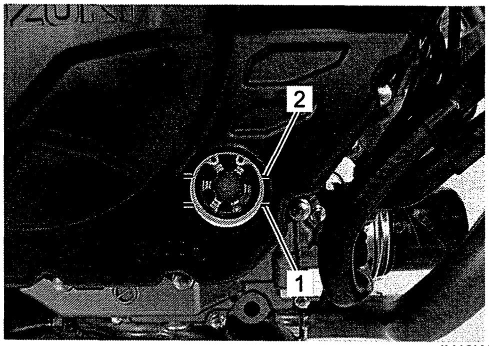
BENJ18K61506001

Engine Oil Leakage Inspection

Visually check the cylinder, crankcase, etc. for oil leakage.

Engine Oil Level Inspection

1) Keep the motorcycle upright.
2) Start the engine and allow it to run for three minutes at idling speed.
3) Turn off the engine and wait about three minutes, then check the oil level through the inspection window. If the level is below LOW level line (1), add oil to FULL level line. If the level is above FULL level line (2), drain oil to FULL level line.

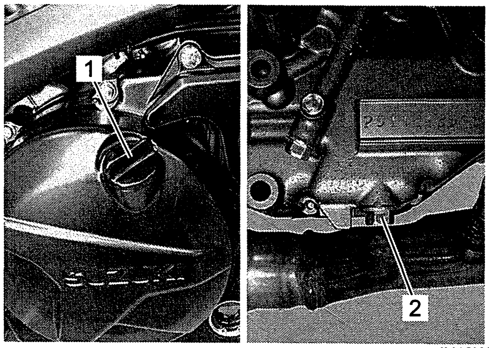


IH18K1150005-01

Engine Oil Replacement

BENJ18K61506002

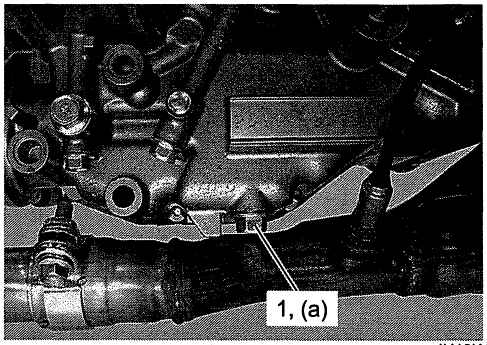
1) Keep the motorcycle upright on the side-stand.
2) Place an oil pan below the engine and remove the oil filler cap (1).
3) Removing the oil drain plug (2) and drain engine oil.



IH18K1150006-01

4) Install the new gasket washer to the oil drain plug (1).
5) Tighten the oil drain plug to the specified torque.

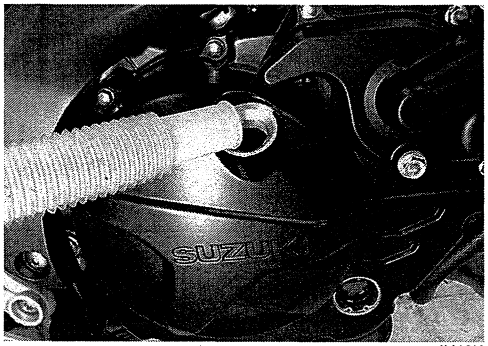
Tightening torque
Oil drain plug (a): 21 N·m (2.1 kgf-m, 15.5 lbf-ft)



IH18K1150007-01

6) Pour new oil through the oil filler hole.

<u>Necessary amount of engine oil</u>
Oil change [Standard]: 2400 ml (2.5 US qt, 2.1 Imp qt)
Oil and filter change [Standard]: 2750 ml (2.9 US qt, 2.4 Imp qt)
Engine overhaul [Standard]: 3000 ml (3.2 US qt, 2.6 Imp qt)



IH18K1150008-01

7) Install the oil filler cap.
8) Check the engine oil level. ☞(Page 1E-5)

Oil Filter Replacement

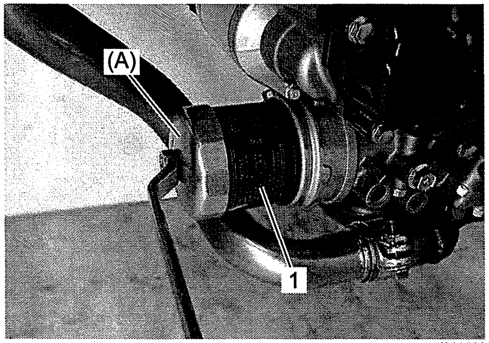
BENJ18K61506003

1) Drain engine oil. ☞(Page 1E-5)
2) Remove the oil filter (1) with the special tool.

NOTE

Detach the special tool once the oil filter has come loose, and then remove the filter by hand.

Special tool
(A): 09915–40620



IH18K1150009-01

3) Apply engine oil lightly to the O-ring of new oil filter (1) before installation.

NOTICE

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.

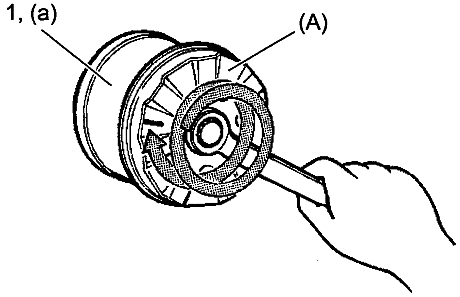
4) Install a new oil filter. Turn it by hand until you feel that the oil filter O-ring contacts the oil filter mounting surface. Then, tighten the oil filter two full turns (or to specified torque) with the special tool.

NOTE

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

Special tool
(A): 09915–40620

Tightening torque
Oil filter (a): 20 N·m (2.0 kgf-m, 15.0 lbf-ft)



IH18K1150050-01

5) Pour new engine oil. ☞(Page 1E-5)

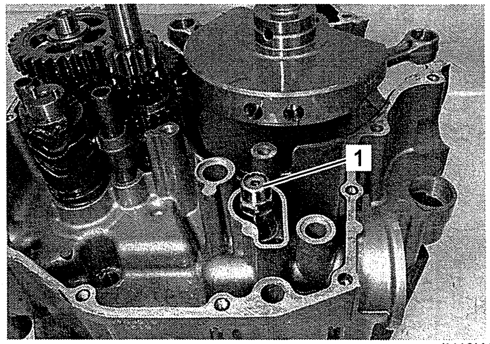
Oil Strainer / Oil Pressure Regulator Removal and Installation

BENJ18K61506004

Refer to "Crankcase Assembly Disassembly" in Section 1D (Page 1D-61) and "Crankcase Assembly Reassembly" in Section 1D (Page 1D-64).

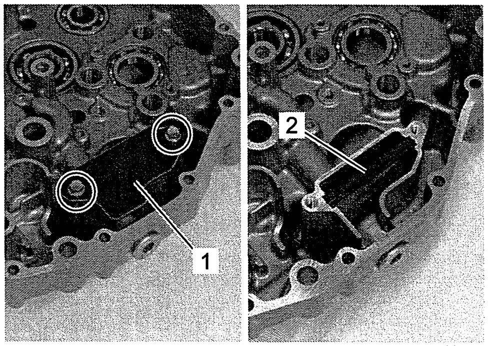
Removal

1) Remove the oil pressure regulator (1).



IH18K1150010-01

2) Remove the oil strainer plate (1).
3) Remove the oil strainer (2).



IH18K1150011-02

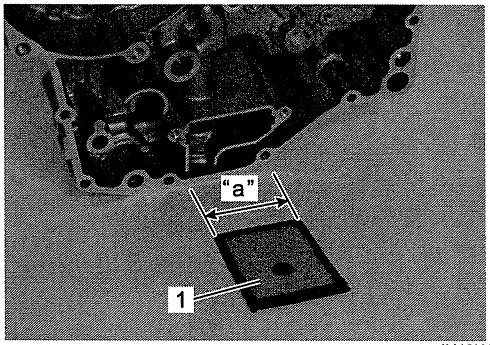
Installation

Install the oil strainer and oil pressure regulator in the reverse order of removal. Pay attention to the following points:

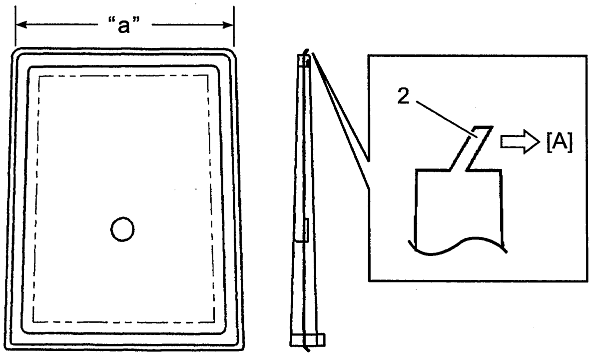
- Install the oil strainer (1).

NOTICE

- **The lip (2) of the oil strainer should be positioned downward.**
- **The shorter side "a" of the oil strainer should be positioned inside.**



IH18K1150051-02

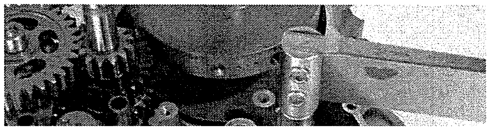


IH18K1150052-01

[A]:	Down side

- Tighten the oil pressure regulator (1) to the specified torque.

Tightening torque
Oil pressure regulator (a): 28 N·m (2.9 kgf-m, 21.0 lbf-ft)



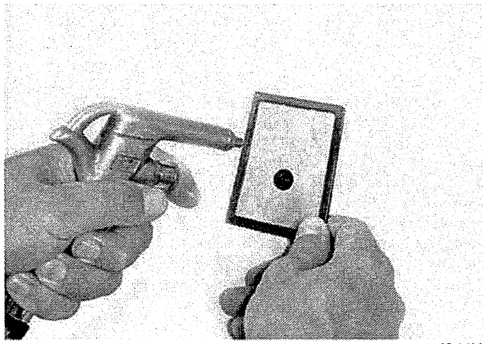
Oil Strainer Inspection and Cleaning

BENJ18K61506005

Refer to "Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).
If the oil strainer is clogged with sediment or rust, clean the oil strainer using compressed air.

NOTE

When the oil strainer is dirtied excessively, replace the oil strainer with a new one.

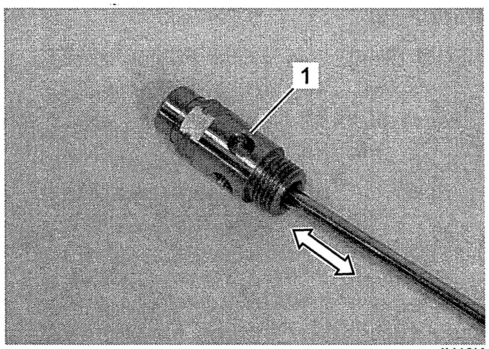


I944H1150009-01

Oil Pressure Regulator Inspection

BENJ18K61506006

Refer to "Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).
Inspect the operation of the oil pressure regulator (1) by pushing on the piston with a proper bar.
If the piston does not operate, replace the oil pressure regulator with a new one.



IH18K1150014-01

Oil Cooler / Oil Cooler Hose Inspection

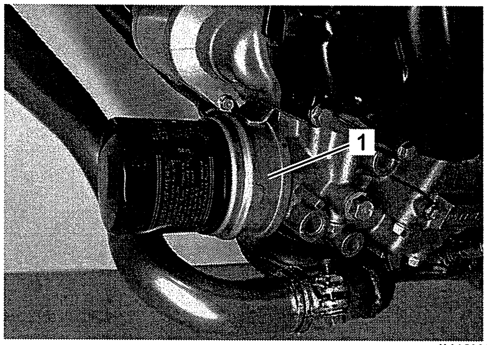
BENJ18K61506007

Oil Cooler Hose Inspection

Refer to "Water Hose Inspection" in Section 1F (Page 1F-11).

Oil Cooler Inspection

Inspect the oil cooler (1) for engine oil leakage. If any defects are found, replace the oil cooler with a new one. ☞(Page 1E-8)



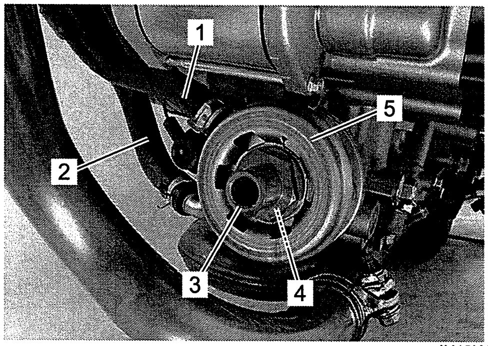
IH18K1150015-01

Oil Cooler Removal and Installation

BENJ18K61506008

Removal

1) Drain engine coolant. ☞(Page 1F-6)
2) Remove the oil filter. ☞(Page 1E-6)
3) Disconnect the oil cooler inlet hose (1) and oil cooler outlet hose (2).
4) Remove the oil cooler union bolt (3) and washer (4).
5) Remove the oil cooler (5).



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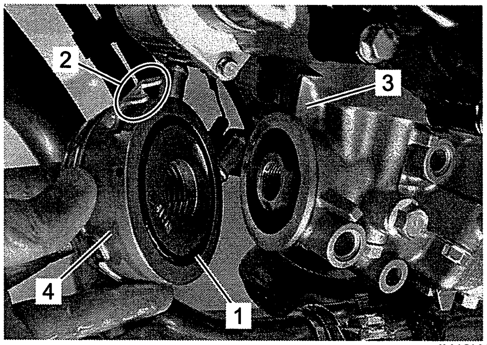
Installation

Install the oil cooler in the reverse order of removal. Pay attention to the following points:

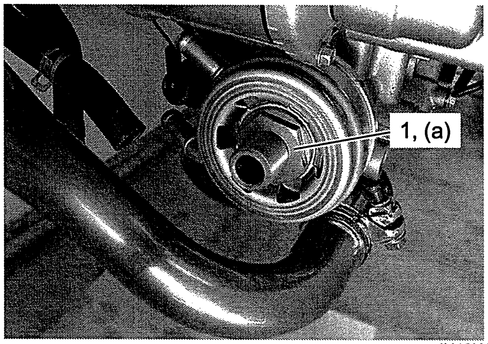
- Apply engine oil to the new O-ring (1).
- Fit the concave part (2) of the oil cooler onto the



IH18K1150017-01

- Tighten the oil cooler union bolt (1) to the specified torque.

  Tightening torque
  Oil cooler union bolt (a): 70 N·m (7.1 kgf-m, 52.0 lbf-ft)



IH18K1150018-01

- Connect the oil cooler inlet hose and oil cooler outlet hose. ☞(Page 1F-2)
- Install the oil filter and pour engine oil. ☞(Page 1E-6)
- Pour engine coolant. ☞(Page 1F-6)

Oil Pressure Switch Removal and Installation

BENJ18K61506009

Removal

1) Turn the ignition switch OFF.
2) Drain engine oil. ☞(Page 1E-5)
3) Disconnect the oil pressure switch lead wire (1).
4) Remove the oil pressure switch (2).

Installation

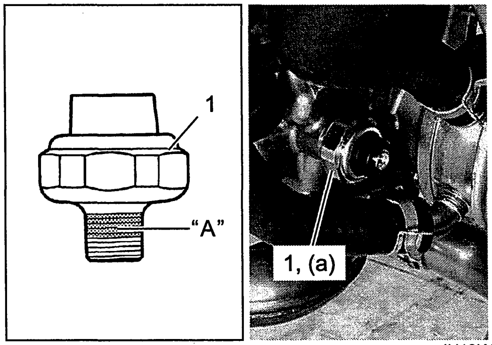
1) Install the oil pressure switch (1), apply the sealant to its thread part and tighten it to the specified torque.

NOTE

Do not apply sealant to oil pressure switch hole.

"A": Sealant 99000–31140 (SUZUKI BOND 1207B)

Tightening torque
Oil pressure switch (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)



IH18K1150020-01

2) Connect the oil pressure switch lead wire. ☞(Page 9A-15)
3) Pour engine oil. ☞(Page 1E-5)

Oil Pressure Switch Inspection

BENJ18K61506010

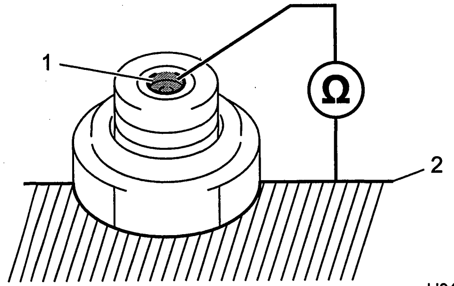
Refer to "Oil Pressure Switch Removal and Installation" (Page 1E-8).

NOTE

Before inspecting the oil pressure switch, check if the engine oil level is correct. ☞(Page 1E-5)

1) Disconnect the oil pressure switch lead wire from the oil pressure switch.
2) Inspect for continuity between the oil pressure switch terminal (1) and crankcase (2) using a circuit tester. If any abnormality is found, replace the oil pressure switch with a new one.

	Oil pressure switch terminal	Crankcase
Engine is at stop	○——	——○
Engine is running		



IJ04K1150003-01

3) After finishing the oil pressure switch inspection, install the removed parts.

Oil Jet / Piston Cooling Jet Removal and Installation

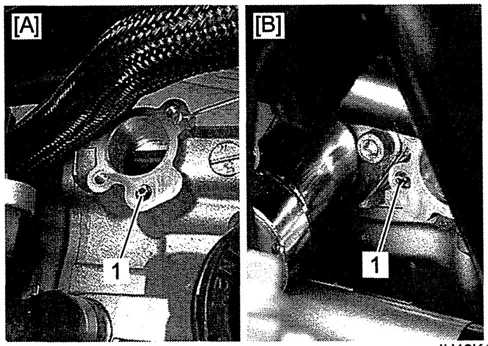
BENJ18K61506011

NOTE

Be careful not to drop any parts into the crankcase.

Oil Jet (For Cam Chain Tension Adjuster) Removal

1) Remove the cam chain tension adjusters. ☞(Page 1D-19)
2) Remove the oil jets (1).



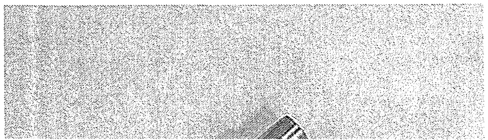
IH18K1150021-01

[A]: Front	[B]: Rear

Installation

Install the oil jet (for cam chain tension adjuster) in the reverse order of removal. Pay attention to the following points:

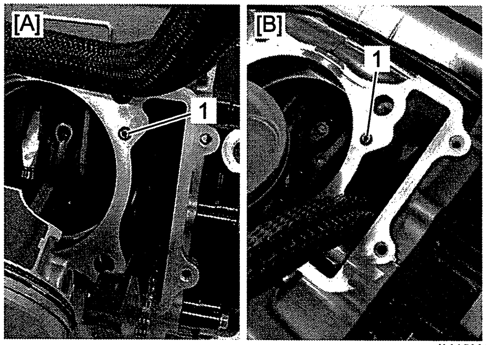
- Apply engine oil to the new O-ring (1).



Oil Jet (For Cylinder Head)

Removal

1) Remove the cylinders. ☞(Page 1D-42)
2) Remove the oil jets (for cylinder head) (1).



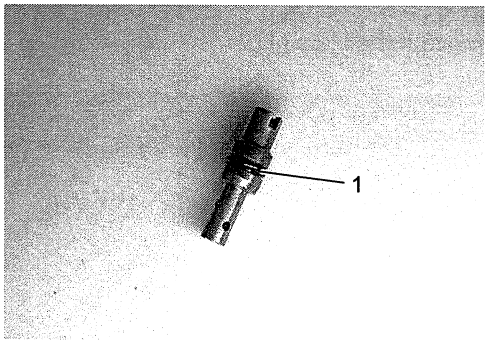
IH18K1150023-01

[A]: Front	[B]: Rear

Installation

Install the oil jet (for cylinder head) in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the new O-ring (1).

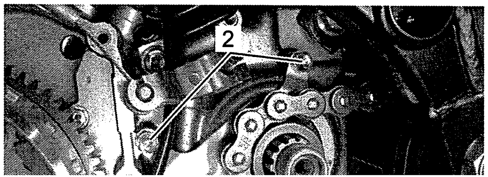


IH18K1150024-01

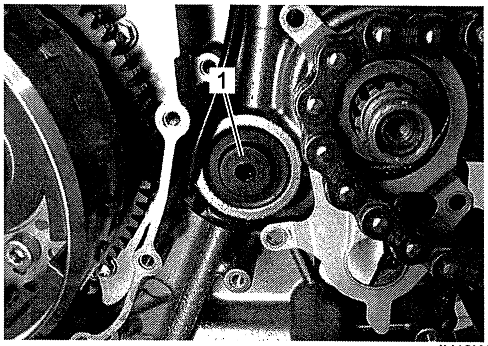
Oil Jet (For Transmission)

Removal

1) Drain engine oil. ☞(Page 1E-5)
2) Remove the generator cover. ☞(Page 1J-5)
3) Remove the engine sprocket. ☞(Page 3A-4)
4) Remove the clutch push rod (Left) (1).
5) Remove the driveshaft oil seal retainer bolts (2).

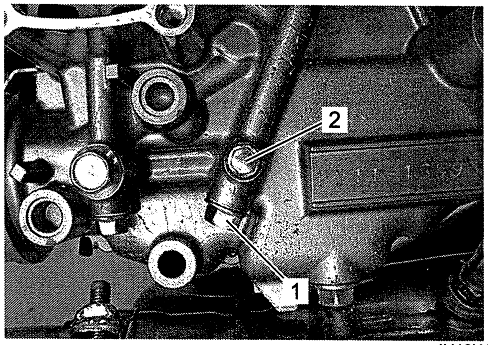


6) Remove the clutch push rod oil seal (1).



IH18K1150026-01

7) Remove the oil gallery plug (M8) (1) and (M6) (2).



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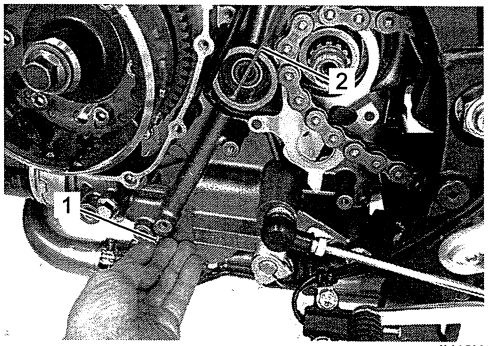
8) Remove the oil gallery jet (for transmission) (1) with a suitable bar (2).

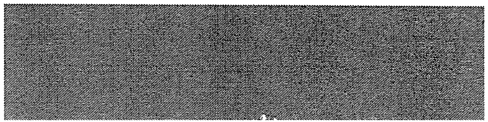


IH18K1150028-01

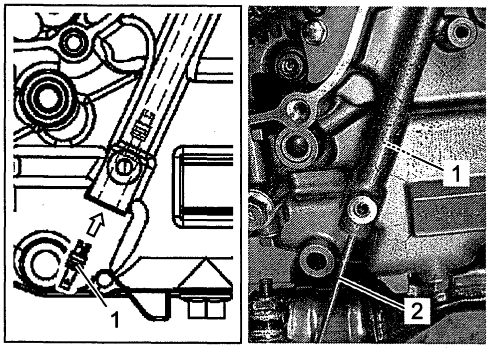
Installation

Install the oil jet (for transmission) in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the new O-ring (1).



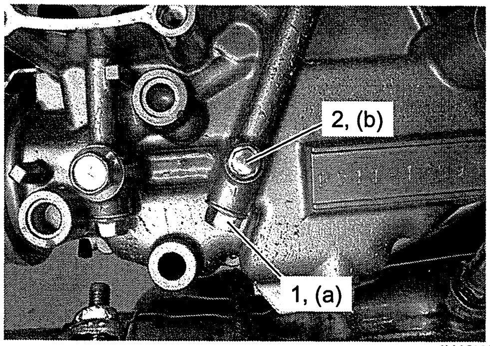
- Install the oil gallery jet (for transmission) (1) with a suitable bar (2).



IH18K1150030-01

- Install the new gaskets.
- Tighten the oil gallery plug (M8) (1) and (M6) (2) to the specified torque.

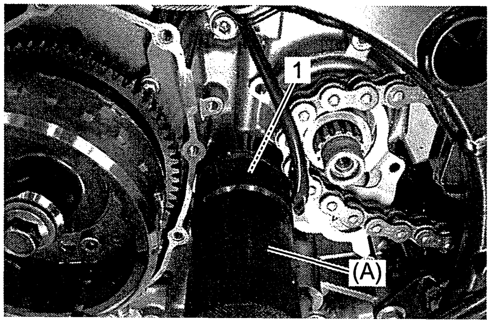
Tighteninig torque
Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
Oil gallery plug (M6) (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1150031-01

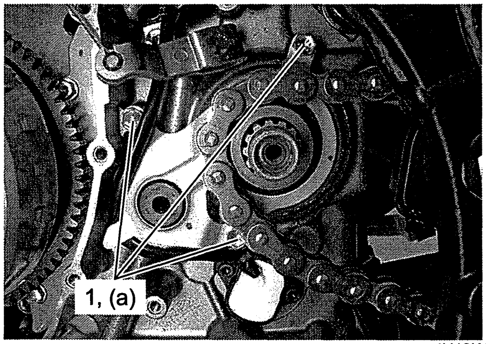
- Install the new clutch push rod oil seal (1) with the special tool.

Special tool
(A): 09913–70210



- Tighten the driveshaft oil seal retainer bolts (1) to the specified torque.

Tightening torque
Driveshaft oil seal retainer bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



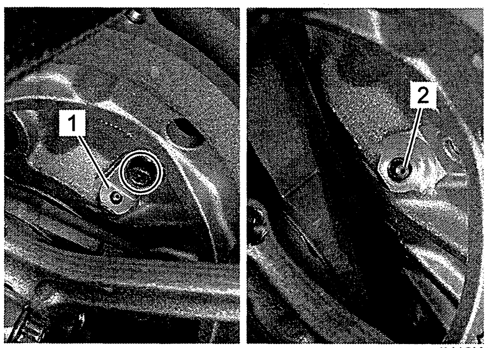
IH18K1150033-01

- Install the clutch push rod (Left). ☞(Page 5C-7)
- Install the engine sprocket. ☞(Page 3A-4)
- Install the generator cover. ☞(Page 1J-6)

Piston Cooling Jet
Removal

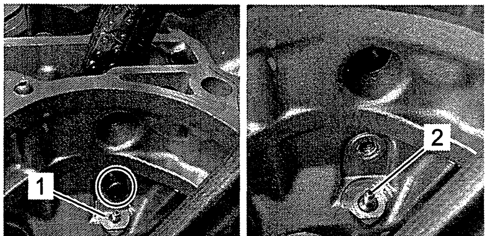
1) Remove the pistons. ☞(Page 1D-56)
2) Remove the piston cooling jet plates (1) and piston cooling oil jets (2).

Front



IH18K1150034-01

Rear



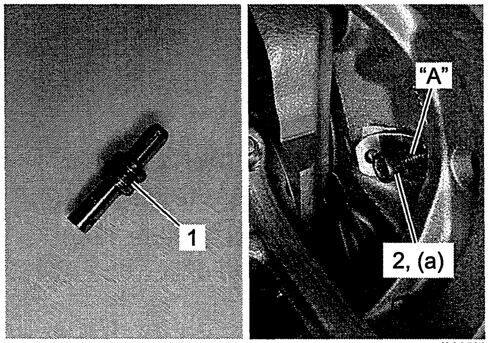
Installation

Install the piston cooling jet in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the new O-ring (1).
- Apply thread lock to the piston cooling jet bolt (2) and tighten it to the specified torque.

"A": Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)

Tightening torque
Piston cooling jet bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

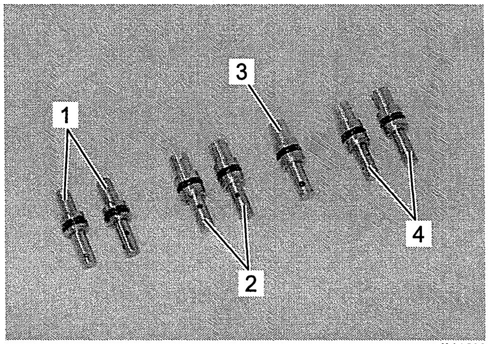


IH18K1150036-03

Oil Jet / Piston Cooling Jet Inspection

BENJ18K61506012

Refer to "Oil Jet / Piston Cooling Jet Removal and Installation" (Page 1E-9).
Make sure that the oil jets and piston cooling jets are not clogged. If they are clogged, clean their oil passage using a wire of the proper size and compressed air.



IH18K1150037-01

1.	Piston cooling jet
2.	Oil jet (for cylinder head)
3.	Oil jet (for transmission)
4.	Oil jet (for cam chain tensioner adjuster)

Oil Pump Removal and Installation

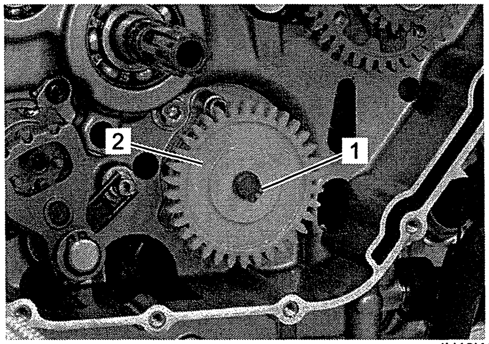
BENJ18K61506013

Refer to "Clutch Removal" in Section 5C (Page 5C-10) and "Clutch Installation" in Section 5C (Page 5C-12).

Removal

1) Remove the snap ring (1) and oil pump driven gear (2).

Special tool
09900–06107

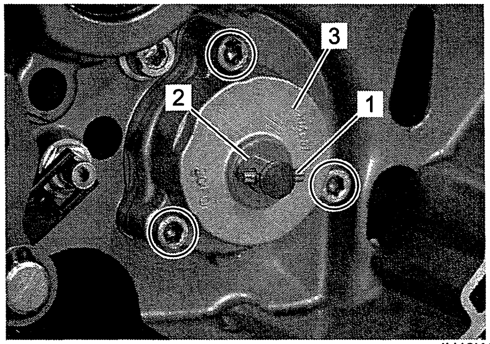


IH18K1150038-02

2) Remove the pin (1) and washer (2).
3) Remove the oil pump assembly (3).

NOTICE

Do not attempt to disassemble the oil pump assembly. The oil pump is available only as an assembly.



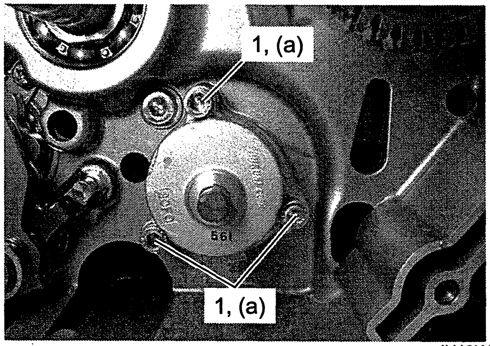
IH18K1150039-02

Installation

Install the oil pump in the reverse order of removal. Pay attention to the following points:

- Tighten the oil pump mounting bolts (1) to the specified torque.

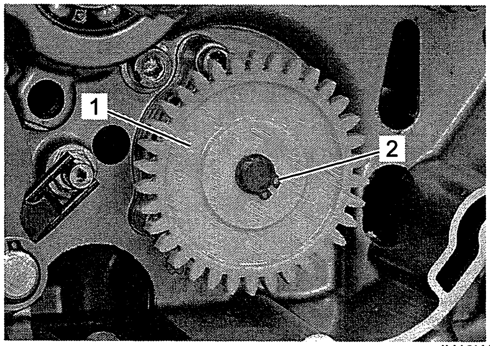
  Tightening torque
  Oil pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1150040-01

- Install the oil pump driven gear (1) and new snap ring (2).

  Special tool
  09900–06107



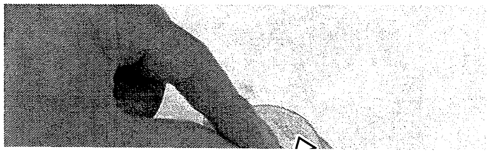
IH18K1150041-02

Oil Pump Inspection

BENJ18K61506014

Refer to “Oil Pump Removal and Installation” (Page 1E-12).

Rotate the oil pump by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.



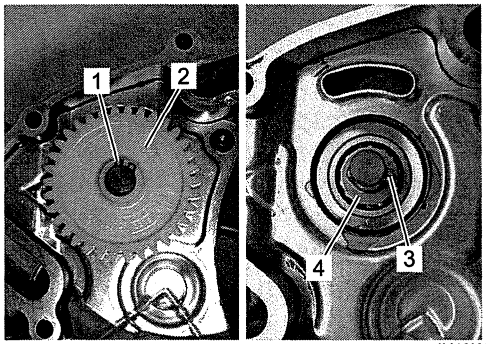
Oil Separator Removal and Installation

BENJ18K61506015

Removal

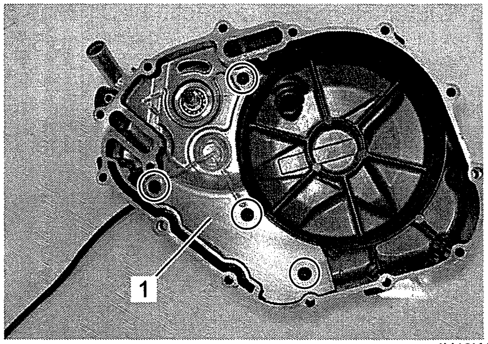
1) Drain engine oil. ☞(Page 1E-5)
2) Drain engine coolant. ☞(Page 1F-6)
3) Remove the clutch cover. ☞(Page 5C-10)
4) Remove the snap ring (1), water pump driven gear (2), pin (3) and washer (4).

   Special tool
   09900–06107



IH18K1150043-01

5) Remove the oil separator (1).

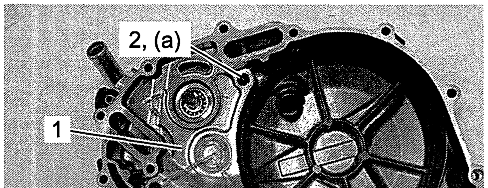


IH18K1150044-01

Installation

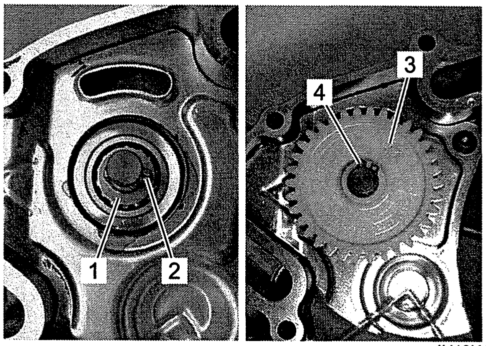
1) Install the oil separator (1) and tighten the screws (2) to the specified torque.

   Tightening torque
   Oil separator screw (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



2) Install the washer (1), pin (2), washer pump driven gear (3) and new snap ring (4).

Special tool
09900–06107



IH18K1150046-01

3) Install the clutch cover. ☞(Page 5C-12)
4) Pour engine oil. ☞(Page 1E-5)
5) Pour engine coolant and bleed air from the cooling system. ☞(Page 1F-6)

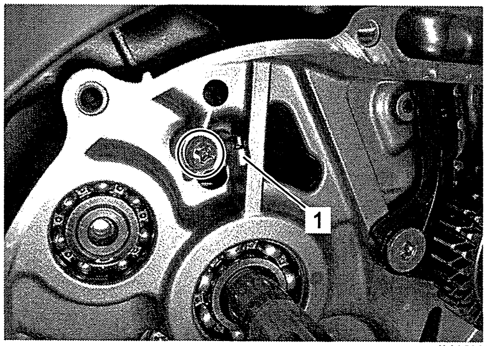
Transmission Oil Guide Removal and Installation

BENJ18K61506016

Refer to “Clutch Removal” in Section 5C (Page 5C-10) and “Clutch Installation” in Section 5C (Page 5C-12).

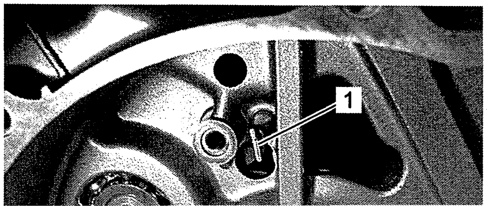
Removal

1) Remove the transmission oil guide retainer (1).



IH18K1150047-01

2) Remove the transmission oil guide (1).



Installation

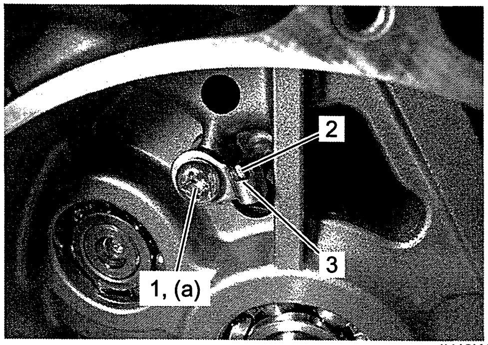
Install the transmission oil guide in the reverse order of removal. Pay attention to the following point:

- Tighten the transmission oil guide retainer screw (1) to the specified torque.

NOTE

Align the projection (2) of the transmission oil guide with the groove (3) of transmission oil guide retainer.

Tightening torque
Transmission oil guide retainer screw (a): 8.5 N·m (0.87 kgf-m, 6.30 lbf-ft)

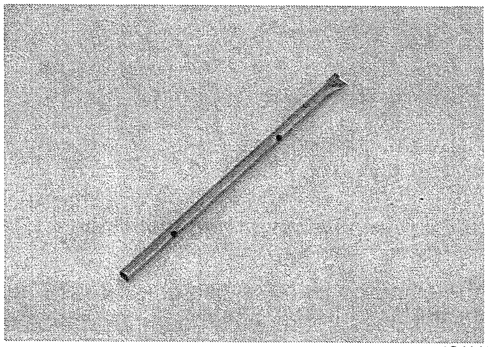


IH18K1150049-02

Transmission Oil Guide Inspection

BENJ18K61506017

Refer to “Transmission Oil Guide Removal and Installation” (Page 1E-14).
If the transmission oil guide is clogged, clean the oil guide.



IC11J1150017-01

Specifications

Tightening Torque Specifications

BENJ18K61507001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Oil gallery plug (M12)	21	2.1	15.5	☞(Page 1E-4)
Oil drain plug	21	2.1	15.5	☞(Page 1E-5)
Oil filter	20	2.0	15.0	☞(Page 1E-6)
Oil pressure regulator	28	2.9	21.0	☞(Page 1E-7)
Oil cooler union bolt	70	7.1	52.0	☞(Page 1E-8)
Oil pressure switch	13	1.3	9.5	☞(Page 1E-9)
Oil gallery plug (M8)	18	1.8	13.5	☞(Page 1E-11)
Oil gallery plug (M6)	10	1.0	7.5	☞(Page 1E-11)
Driveshaft oil seal retainer bolt	10	1.0	7.5	☞(Page 1E-11)
Piston cooling jet bolt	10	1.0	7.5	☞(Page 1E-12)
Oil pump mounting bolt	10	1.0	7.5	☞(Page 1E-13)
Oil separator screw	10	1.0	7.5	☞(Page 1E-13)
Transmission oil guide retainer screw	8.5	0.87	6.30	☞(Page 1E-14)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

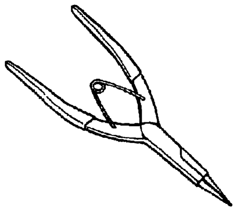
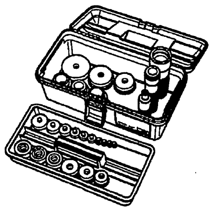
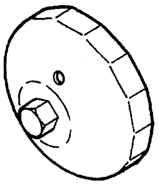
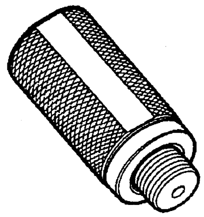
Recommended Service Material

BENJ18K61508001

Material	SUZUKI recommended product or Specification		Note
Sealant	SUZUKI BOND 1207B	P/No.: 99000–31140	☞(Page 1E-9)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000–32150	☞(Page 1E-12)

Special Tool

BENJ18K61508002

09900–06107 Snap ring pliers (External) ☞(Page 1E-12) / ☞(Page 1E-13) / ☞(Page 1E-13) / ☞(Page 1E-14) 	09913–70210 Bearing installer set ☞(Page 1E-11) 
09915–40620 Oil filter wrench ☞(Page 1E-6) / ☞(Page 1E-6) 	09915–70610 Oil pressure gauge attachment ☞(Page 1E-4) 
09915–74521 Oil pressure gauge hose 	09915–77331 Oil pressure gauge (1000 

Engine Cooling System

Precautions

Precautions for Engine Cooling System

BENJ18K61600001

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

⚠ 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, do not induce vomiting and call physician immediately.**
  - **Keep it away from children.**

Precautions for Engine Coolant

BENJ18K61600002

Refer to “Fuel / Oil / Fluid / Coolant Recommendation” in Section 0C (Page 0C-13).

General Description

Engine Coolant Description

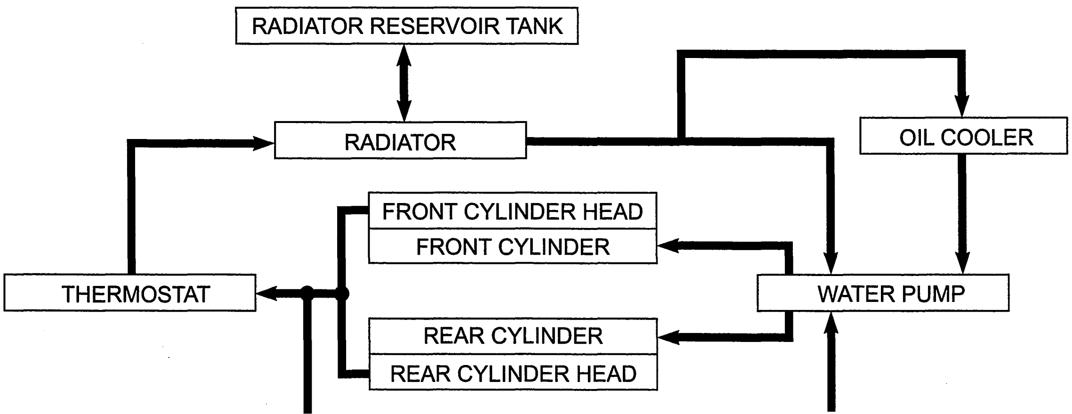
BENJ18K61601001

Refer to “Fuel / Oil / Fluid / Coolant Recommendation” in Section 0C (Page 0C-13).

Schematic and Routing Diagram

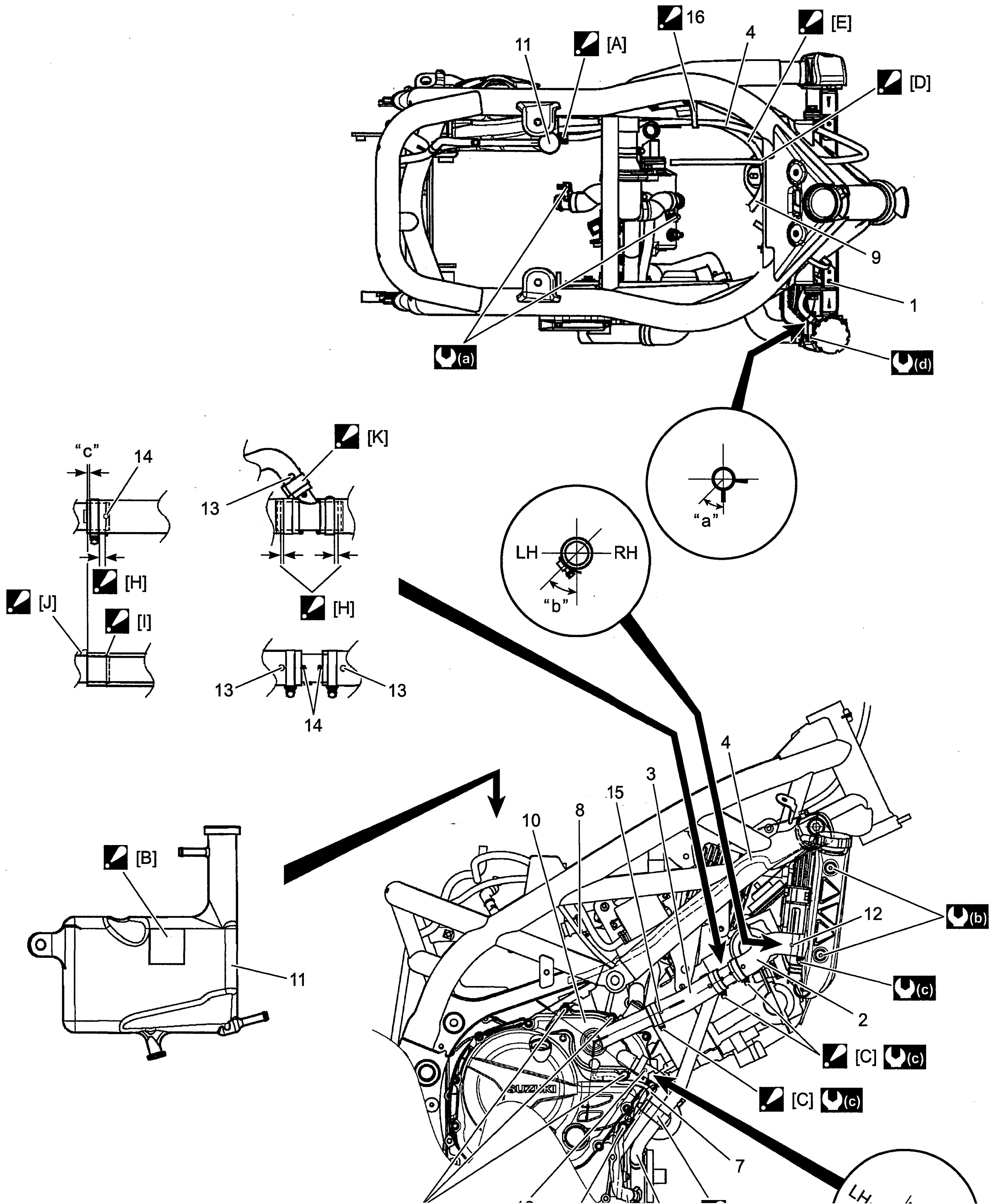
Cooling Circuit Diagram

BENJ18K61602001

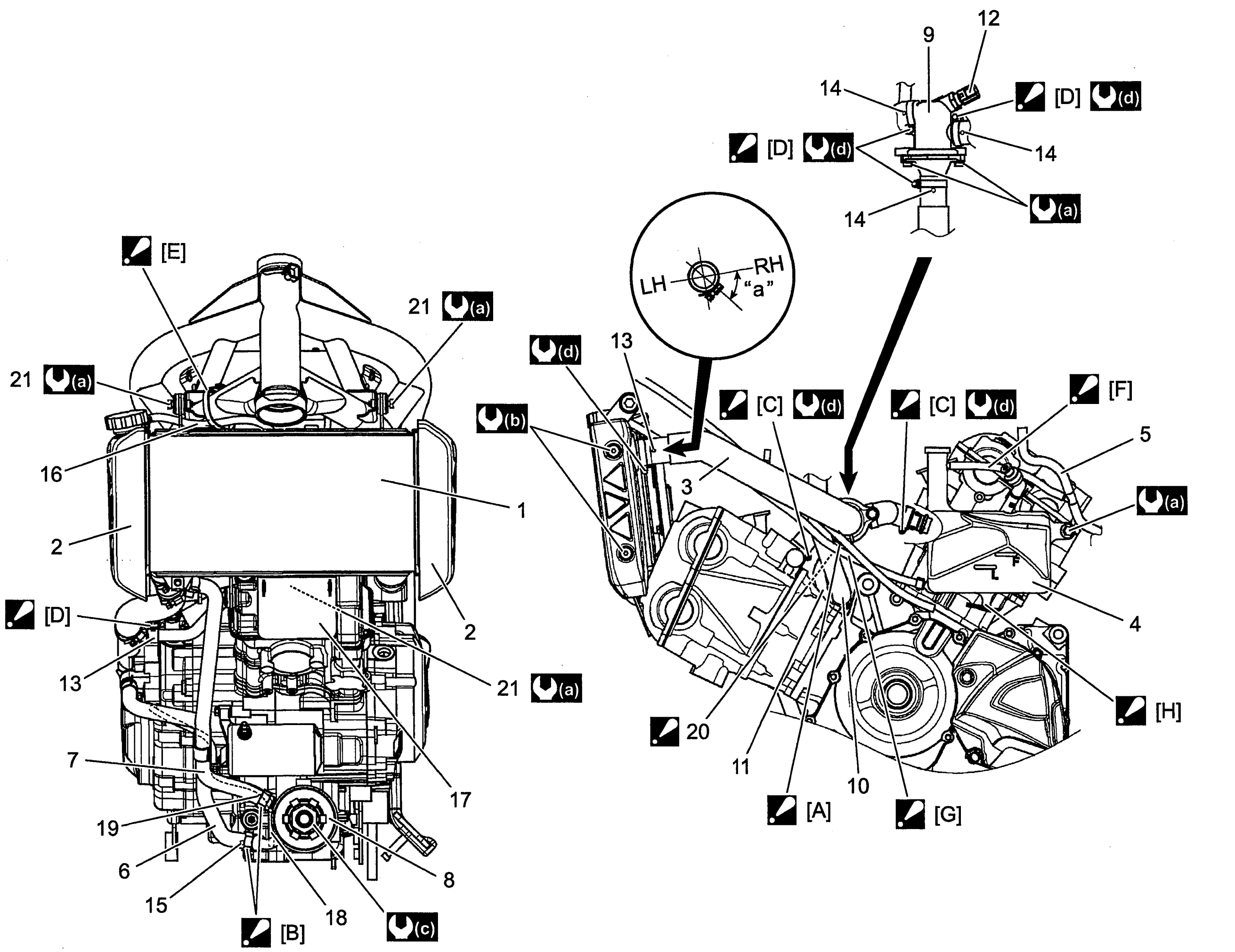


Water Hose Routing Diagram

BENJ18K61602002



[A]:	Clamp ends should face inside.	7.	Water pump drain hose
[B]:	Clean the adhesive surface before sticking the cushion. Do not stick the cushion with the curved surface of reservoir tank.	8.	Regulator/rectifier lead wire
[C]:	Clamp screw head should face right downside.	9.	High-tension cord
[D]:	Clamp the reservoir tank inlet hose and high-tension cord at the marking point.	10.	Water pump
[E]:	Pass the reservoir tank inlet hose in front of horn lead wire.	11.	Reservoir tank
[F]:	Clamp the oil cooler hoses at the white marking point from the right side.	12.	Yellow mark
[G]:	Clamp the water pump drain hose and oil pressure switch lead wire.	13.	White mark
[H]:	Keep clearance	14.	Mark
[I]:	The match mark position on the bulge.	15.	Pink mark
[J]:	Insert the hose to the stopper.	16.	Clamp : Clamp the reservoir tank inlet hose and clutch cable.
[K]:	Clamp ends should face downside.	"a":	35 – 55°
1.	Radiator	"b":	0 – 45°
2.	Radiator outlet No. 1 hose	"c":	2 – 8 mm (0.08 – 0.31 in)
3.	Radiator outlet No. 2 hose	(a):	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
4.	Reservoir tank inlet hose	(b):	7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)
5.	Oil cooler outlet hose	(c):	1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)
6.	Oil cooler inlet hose	(d):	1.0 N·m (0.10 kgf-m, 0.75 lbf-ft)



IH18K1160065-03

[A]:	Clamp ends should face downside.	10.	Crankcase breather (PCV) hose
[B]:	Clamp ends should face forward.	11.	Water bypass hose
[C]:	Clamp screw head should face left downside.	12.	ECT sensor
[D]:	Clamp screw head should face upward.	13.	Yellow mark
[E]:	Fix the marking positions of the frame down tube and reservoir tank inlet hose between the radiator plate and the frame head by using clamps.	14.	White mark
[F]:	Pass the reservoir tank overflow hose over the spark plug cap.	15.	Red mark
[G]:	Pass the reservoir tank inlet hose outside of the crankcase breather (PCV) hose.	16.	Reservoir tank inlet hose
[H]:	Put in boss of the reservoir tank to the hole of the bracket.	17.	Radiator under rubber
1.	Radiator	18.	Water pump drain hose
2.	Radiator cover	19.	Blue mark
3.	Radiator inlet hose	20.	Water hose (Thermostat connector assembly to water pump) : Face the match mark (white) forward.
4.	Reservoir tank	21.	Radiator mounting bolt
5.	Fuel tank water drain hose	“a”:	25 – 65°
6.	Oil cooler outlet hose	(a) :	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
7.	Oil cooler inlet hose	(b) :	7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)
8.	Oil cooler	(c) :	70 N·m (7.1 kgf-m, 52.0 lbf-ft)

Diagnostic Information and Procedures

Engine Cooling Symptom Diagnosis

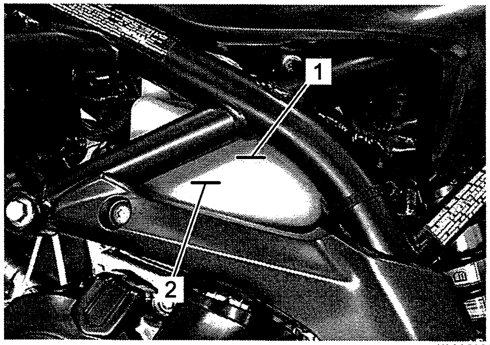
BENJ18K61604001

Condition	Possible cause	Correction / Reference Item
Engine overheats	Not enough engine coolant.	*Add engine coolant. ☞(Page 1F-6)*
	Radiator core clogged with dirt or scale.	*Clean. ☞(Page 1F-10)*
	Faulty cooling fan.	*Repair or replace. ☞(Page 1F-8)*
	Defective cooling fan relay, or open-or-short circuited.	*Repair or replace. ☞(Page 1F-12)*
	Clogged water passage.	*Clean.*
	Air trapped in the cooling circuit.	*Bleed air. ☞(Page 1F-6)*
	Defective water pump.	*Replace. ☞(Page 1F-15)*
	Use of incorrect engine coolant.	*Replace. ☞(Page 1F-6)*
	Defective thermostat.	*Replace. ☞(Page 1F-12)*
	Defective ECT sensor.	*Replace. ☞(Page 1C-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
Engine over cools	Defective cooling fan relay, or open-or-short circuited.	*Repair or replace. ☞(Page 1F-12)*
	Extremely cold weather.	*Put on radiator cover.*
	Defective thermostat.	*Replace. ☞(Page 1F-12)*
	Defective ECT sensor.	*Replace. ☞(Page 1C-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*

Engine Coolant Level Inspection

BENJ18K61606001

1) Keep the motorcycle upright.
2) Check the engine coolant level by observing the full (1) and lower (2) lines on the engine coolant reservoir tank. If the level is below the lower line, lift and support the fuel tank. ☞(Page 1G-9)
Then add engine coolant to the bottom of full line from the engine coolant reservoir tank filler.



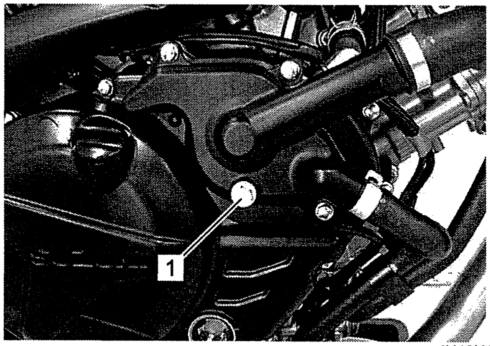
IH18K1160003-01

Engine Coolant Replacement

BENJ18K61606002

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

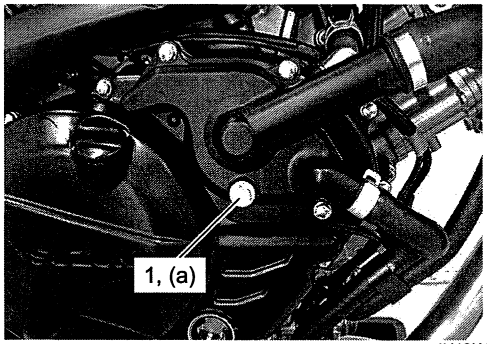
1) Support the motorcycle upright.
2) Remove the radiator cap. ☞(Page 1F-7)
3) Remove the water drain bolt (1) and drain engine coolant.



IH18K1160004-01

4) Flush the radiator with fresh water if necessary.
5) Tighten the water drain bolt (1) to the specified torque.

Tightening torque
Water drain bolt (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)



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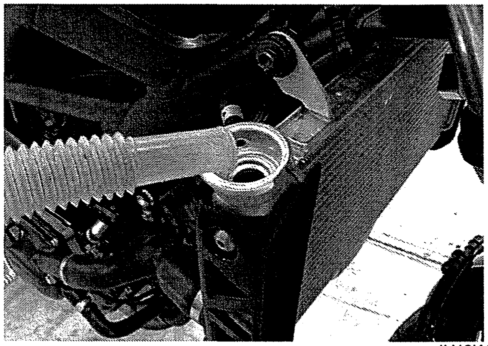
6) Pour the specified engine coolant up to the radiator inlet.

<u>Engine coolant</u>
Engine side [Standard]: Approx. 1600 ml (1.69 US qt, 1.41 Imp, qt)
Reserve tank side [Standard]: Approx. 250 ml (0.26 US qt, 0.22 Imp, qt)



IH18K1160006-01

7) Slowly swing the motorcycle, right and left, to bleed the air trapped in the cooling circuit.
8) Add engine coolant up to the radiator inlet.
9) Start up the engine and bleed air from the radiator inlet completely.
10) Add engine coolant up to the radiator inlet.
11) Repeat the 8), 9) procedures until no air bleeds from the radiator inlet.
12) Close the radiator cap securely. ☞(Page 1F-7)
13) After warming up and cooling down the engine

Engine Cooling System Inspection

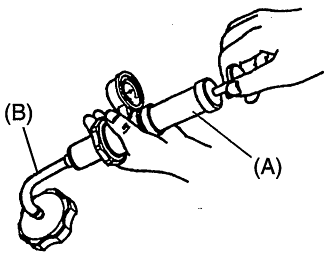
BENJ18K61606003

1) Remove the radiator cap. ☞(Page 1F-7)
2) Connect the special tool to the filler.
3) Pressurize the cooling system with approx. 137 kPa (1.4 kgf/cm², 19.9 psi) of pressure, and then check if it holds the pressure for 10 seconds.

NOTICE

Do not exceed the radiator cap release pressure, or the radiator cap and subsequently the radiator, can be damaged.

Special tool
(A): 09918–78211
(B): 09918–78220



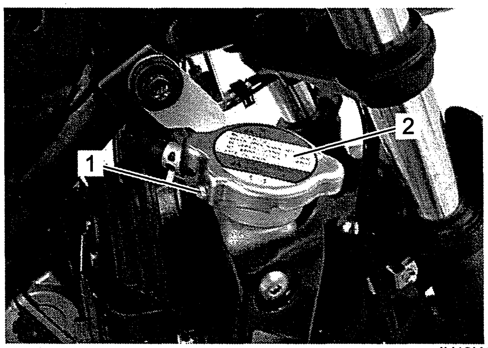
ID26J1160006-05

4) Install the radiator cap. ☞(Page 1F-7)

Radiator Cap Inspection

BENJ18K61606004

1) Remove the radiator cap screw (1) and radiator cap (2).

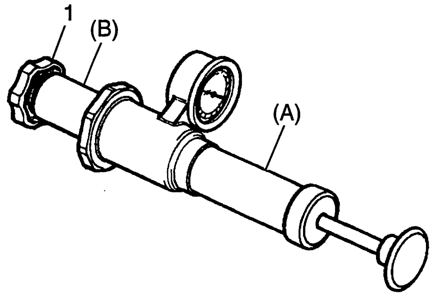


IH18K1160007-01

2) Attach the radiator cap (1) to the special tool.
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 valve opening pressure
[Standard]: 108.0 – 137.4 kPa (1.1 – 1.4 kgf/cm², 15.7 – 19.9 psi)

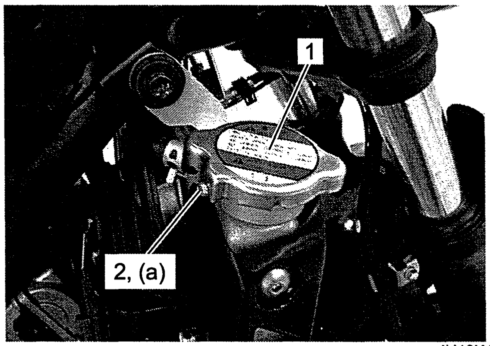
Special tool
(A): 09918–78211
(B): 09918–78220



ID26J1160007-04

4) Install the radiator cap (1) and tighten the radiator cap screw (2) to the specified torque.

Tightening torque
Radiator cap screw (a): 1.0 N·m (0.10 kgf-m, 0.75 lbf-ft)

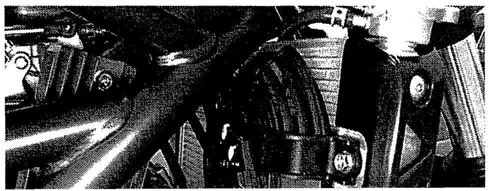


IH18K1160008-01

Cooling Fan On-Vehicle Inspection

BENJ18K61606005

1) Disconnect the cooling fan motor coupler (1).

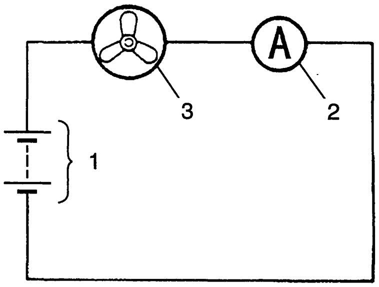


2) Test the cooling fan motor (3) for load current with an ammeter (2) connected.
   If the fan motor does not turn, replace the cooling fan assembly with a new one. ☞(Page 1F-8)

NOTE

- **When making this test, it is not necessary to remove the cooling fan.**
- **Make sure that the battery (1) has a capacity enough to supply the motor with 12 V.**
- **With the motor running at full speed, the ammeter should indicate an amperage not higher than 5 A.**

Cooling fan operating temperature
(OFF→ON) [Standard]: 105 °C (221 °F)
(ON→OFF) [Standard]: 99 °C (210.2 °F)



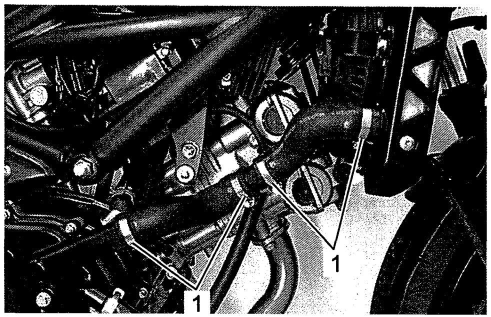
ID26J1160029-01

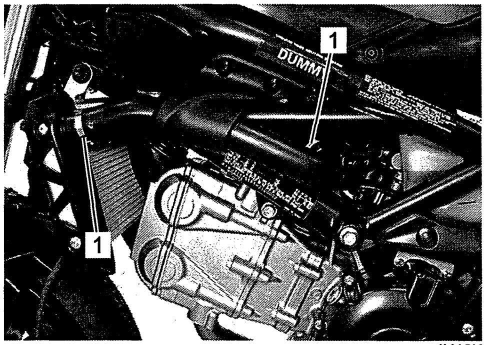
3) After finishing the cooling fan inspection, connect the cooling fan motor coupler.

Radiator Hose Inspection

BENJ18K61606006

1) Check the radiator hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.
2) Any leakage from the connecting section (1) should be corrected by proper tightening. ☞(Page 1F-2)





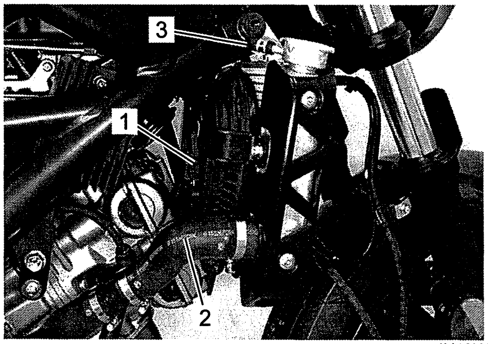
IH18K1160011-01

Radiator / Cooling Fan Motor Removal and Installation

BENJ18K61606007

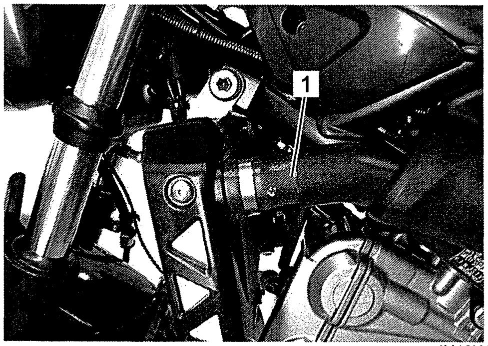
Removal

1) Drain engine coolant. ☞(Page 1F-6)
2) Disconnect the cooling fan motor coupler (1).
3) Disconnect the radiator outlet hose (2) and reservoir tank inlet hose (3).



IH18K1160012-01

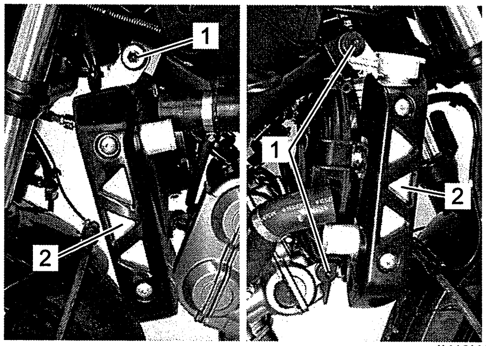
4) Disconnect the radiator inlet hose (1).



IH18K1160013-01

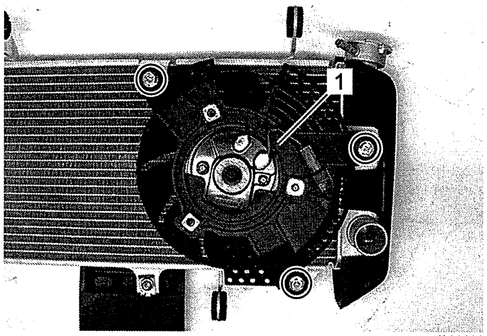
5) Remove the radiator mounting bolts (1).

6) Remove the radiator assembly (2).



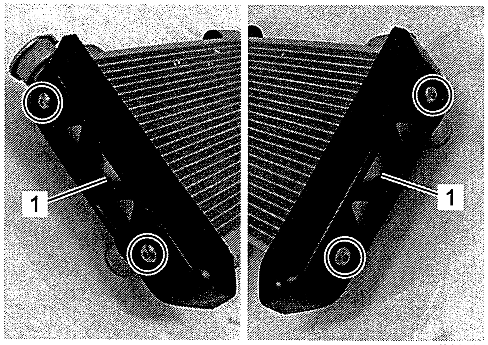
IH18K1160014-01

7) Remove the cooling fan assembly (1).



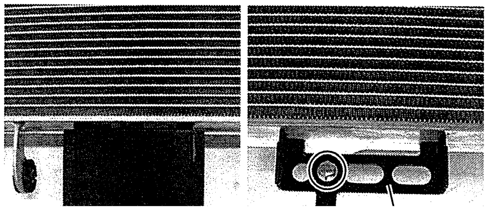
IH18K1160016-01

8) Remove the radiator covers (1).



IH18K1160015-01

9) Remove the radiator under rubber (1) and bracket (2).

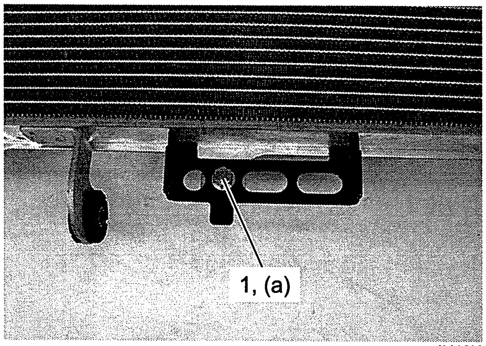


Installation

Install the radiator and cooling fan motor in the reverse order of removal. Pay attention to the following points:

- Tighten the radiator under rubber bracket bolt (1) to the specified torque.

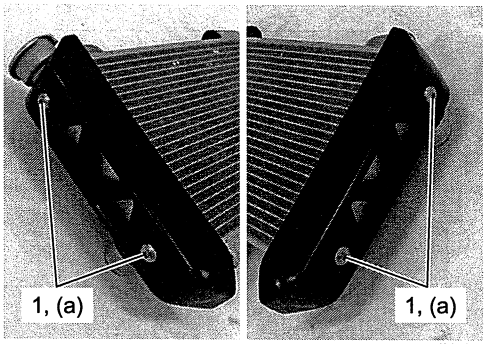
  Tightening torque
  Radiator under rubber bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1160018-01

- Tighten the radiator cover screws (1) to the specified torque.

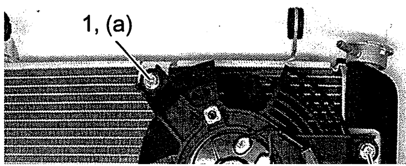
  Tightening torque
  Radiator cover screw (a): 7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)



IH18K1160019-01

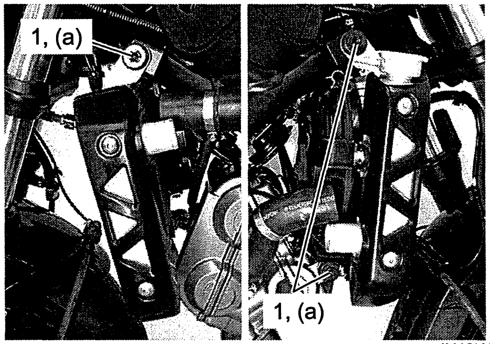
- Tighten the cooling fan assembly mounting bolts (1) to the specified torque.

  Tightening torque
  Cooling fan assembly mounting bolt (a): 8.5 N·m (0.87 kgf-m, 6.30 lbf-ft)



- Tighten the radiator mounting bolts (1) to the specified torque.

Tightening torque
Radiator mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1160021-01

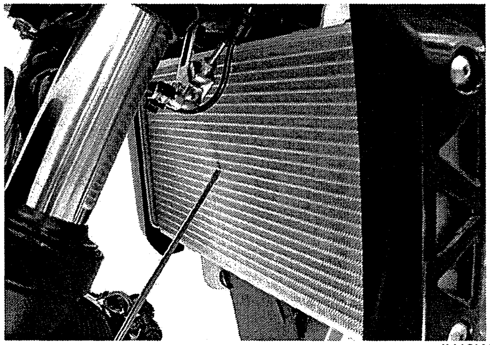
- Connect the radiator hoses securely. ☞(Page 1F-2)
- Pour engine coolant and bleed air from the cooling system. ☞(Page 1F-6)

Radiator Inspection and Cleaning

BENJ18K61606008

Inspection

1) Inspect the radiator for coolant leaks. If any defects are found, replace the radiator with a new one. ☞(Page 1F-8)
2) If the fins are bent or dented, repair them by carefully straightening them with the blade of a small screwdriver.



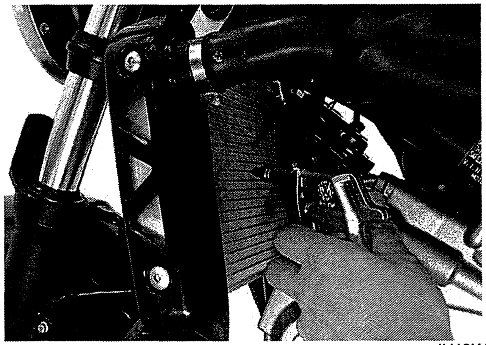
IH18K1160022-01

Cleaning

Blow out any foreign matter that is stuck in the radiator fins using compressed air.

NOTICE

- **Do not bend the fins when using**

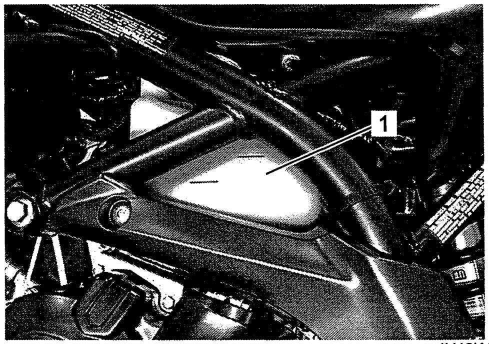


IH18K1160023-01

Radiator Reservoir Tank Inspection

BENJ18K61606009

Inspect the radiator reservoir tank (1) coolant leaks. If any defects are found, replace the radiator reservoir tank with a new one. ☞(Page 1F-10)



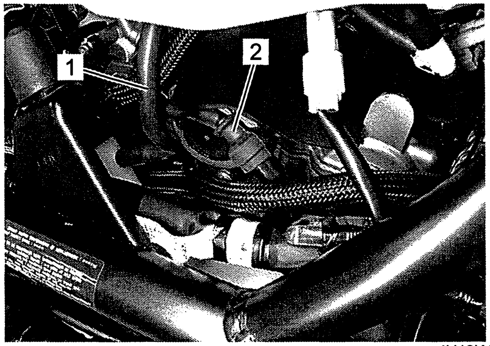
IH18K1160024-01

Radiator Reservoir Tank Removal and Installation

BENJ18K61606010

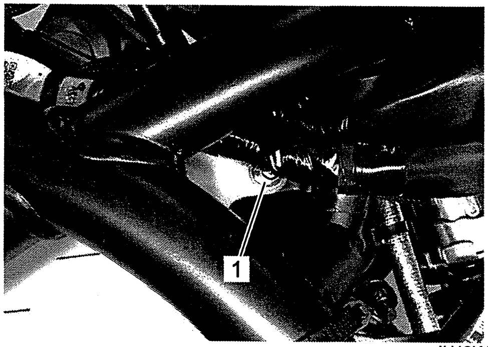
Removal

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the reservoir tank overflow hose (1) and spark plug cap (2).



IH18K1160025-01

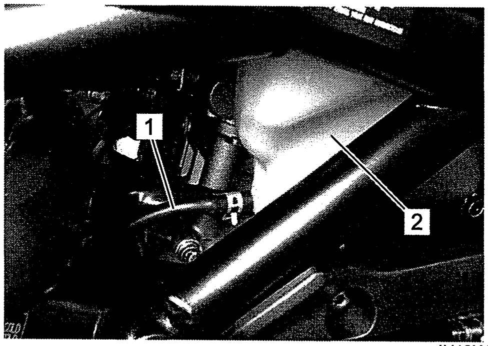
3) Remove the reservoir tank bracket bolt (1).



IH18K1160026-01

4) Disconnect the reservoir tank inlet hose (1) and drain the engine coolant.

5) Remove the reservoir tank (2).



IH18K1160061-01

Installation

Install radiator reservoir tank in the reverse order of removal. Pay attention to the following points:

- Install the reservoir tank. Refer to “Water Hose Routing Diagram” (Page 1F-2).
- Fill the reservoir tank to the full level. ☞(Page 1F-6)

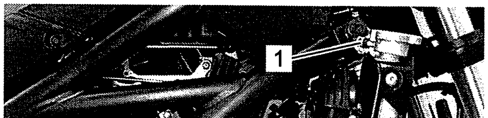
Water Hose Inspection

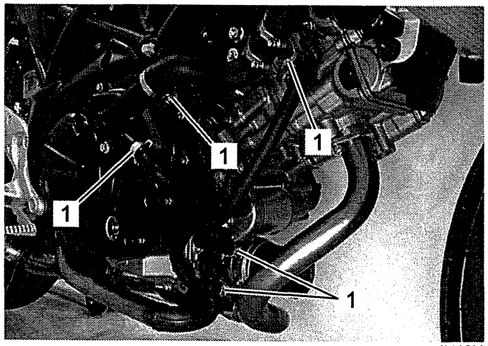
BENJ18K61606011

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

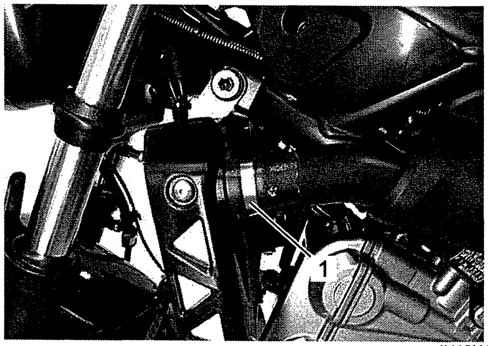
1) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.

2) Any leakage from the connecting section (1) should be corrected by proper tightening. ☞(Page 1F-2)

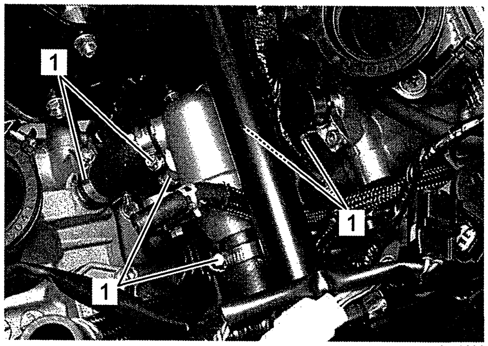




IH18K1160028-02



IH18K1160029-01



IH18K1160030-02

Water Hose Removal and Installation

BENJ18K61606012

Refer to “Water Hose Routing Diagram” (Page 1F-2).

Removal

1) Drain engine coolant. ☞(Page 1F-6)

2) Remove the throttle body. ☞(Page 1D-10)

3) Remove the water hoses.

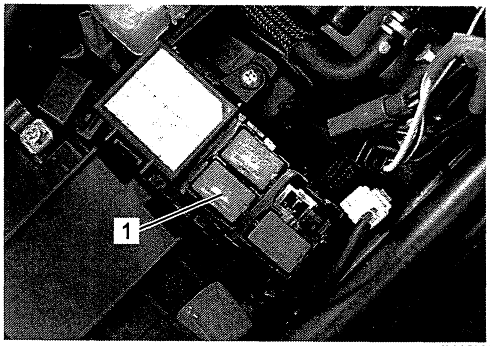
Installation

Install the water hose in the reverse order of removal.

Cooling Fan Relay Inspection

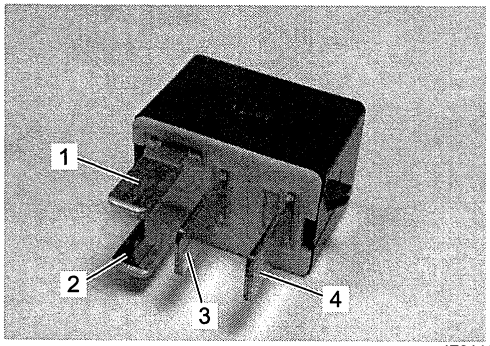
BENJ18K61606013

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Remove the cap and cooling fan relay (1).



IH18K1160031-01

4) First check for insulation with a circuit tester between terminals (3) and (4). Next, check for continuity between (3) and (4) with 12 V voltage applied, positive (+) to terminal (1) and negative (–) to terminal (2). If continuity does not exist, replace the relay with a new one.



IE31J1160038-01

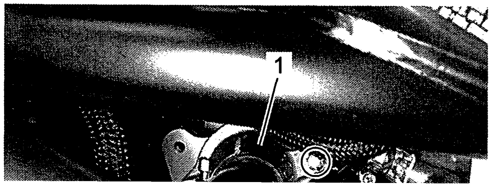
5) Install the removed parts.

Thermostat Removal and Installation

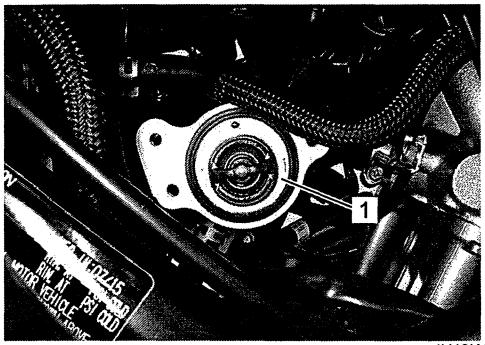
BENJ18K61606014

Removal

1) Drain engine coolant. ☞(Page 1F-6)
2) Place a rag under the thermostat connector cap (1) and then remove the thermostat connector cap (1).



3) Remove the thermostat (1).



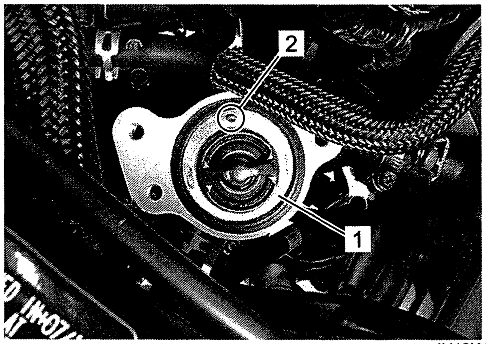
IH18K1160033-01

Installation

1) Install the thermostat (1).

NOTE

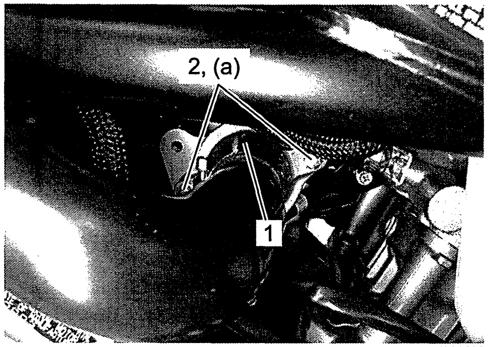
The jiggle valve (2) of the thermostat faces upside.



IH18K1160034-01

2) Install the thermostat connector cap (1) and tighten the bolts (2) to the specified torque.

Tightening torque
Thermostat connector cap bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



Thermostat Inspection

BENJ18K61606015

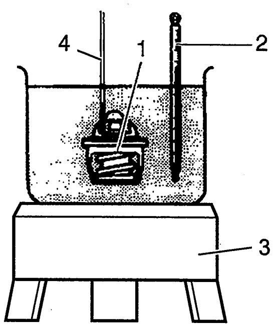
Refer to "Thermostat Removal and Installation" (Page 1F-12).

1) Inspect the thermostat pellet for signs of cracking.
2) Test the thermostat at the bench for control action.

NOTE

- **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.**

3) Immerse the thermostat (1) in the water contained in a beaker and note that the immersed thermostat is in suspension.
4) Heat the water by placing the beaker on a heater (3) and observe the rising temperature on a thermometer (2).



ID26J1160035-04

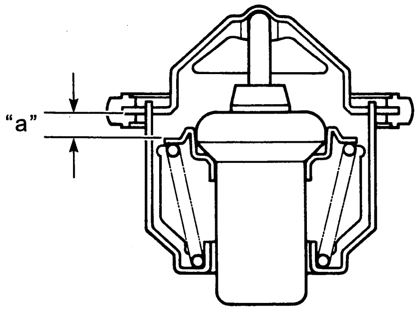
4. String

5) 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]: 80.5 – 83.5 °C (176.9 – 182.3 °F)

6) Keep on heating the water to raise its temperature.
7) Just when the water temperature reaches specified value, the thermostat valve should have been lifted by at least 8 mm (0.3 in) "a". A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

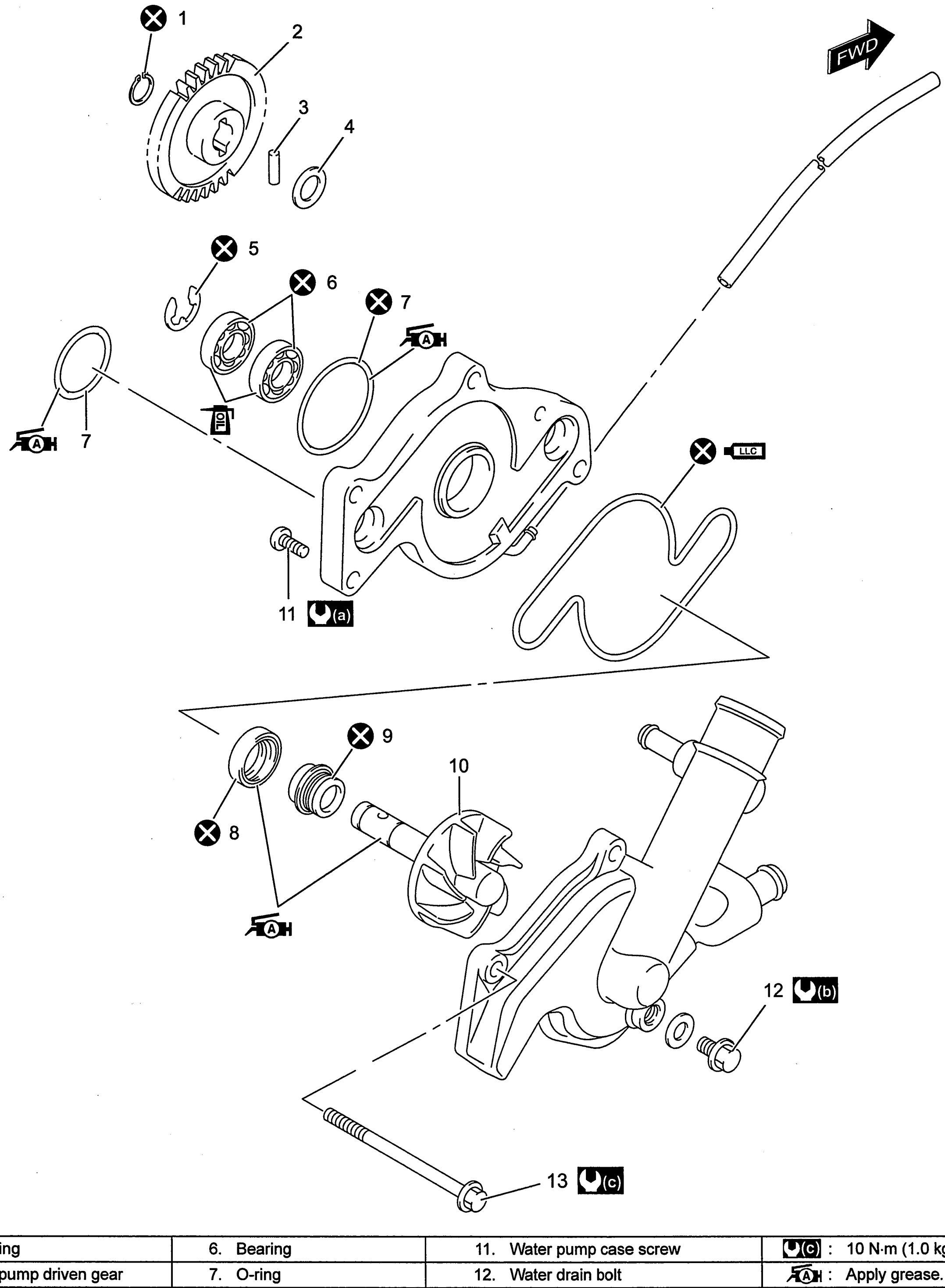
Thermostat valve lift
At 95 °C (203 °F) [Standard]: 8 mm (0.3 in) or more



I944H1160022-01

Water Pump Assembly Components

BENJ18K61606016



IH18K1160063-01

1. Snap ring	6. Bearing	11. Water pump case screw	(c) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
2. Water pump driven gear	7. O-ring	12. Water drain bolt	A : Apply grease.
3. Pin	8. Oil seal	13. Water pump case bolt	LLC : Apply engine coolant.
4. Washer	9. Mechanical seal	(a) : 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)	OIL : Apply engine oil.

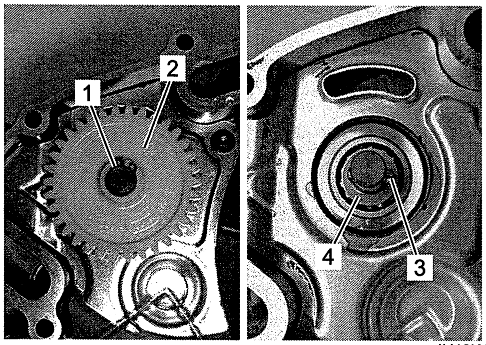
Water Pump Removal and Installation

BENJ18K61606017

Removal

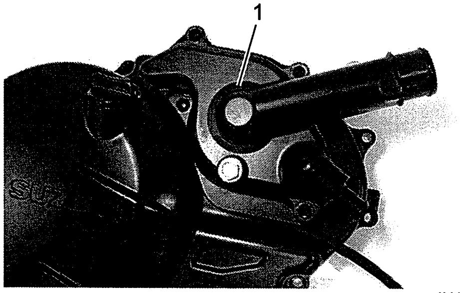
1) Drain engine oil. ☞(Page 1E-5)
2) Drain engine coolant. ☞(Page 1F-6)
3) Remove the clutch cover. ☞(Page 5C-10)
4) Remove the snap ring (1), water pump driven gear (2), pin (3) and washer (4).

   Special tool
   09900–06107



IH18K1160036-01

5) Remove the water pump (1).



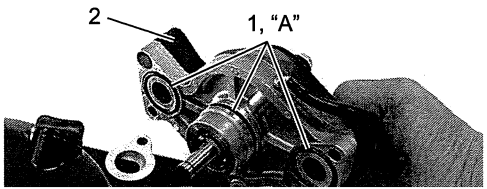
IH18K1160037-01

Installation

1) Apply grease to the new O-rings (1).

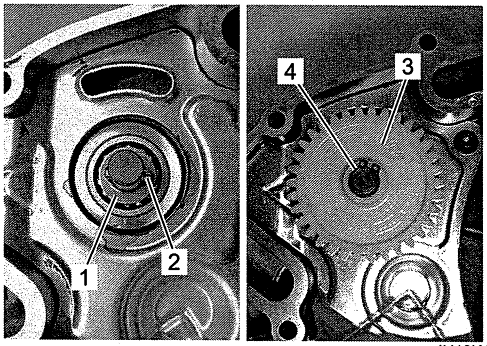
   "A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

2) Install the water pump (2).



3) Install the washer (1), pin (2), water pump driven gear (3) and new snap ring (4).

   Special tool
   09900–06107



IH18K1160039-01

4) Install the clutch cover. ☞(Page 5C-12)
5) Pour engine oil. ☞(Page 1E-5)
6) Pour engine coolant and bleed air from the cooling system. ☞(Page 1F-6)

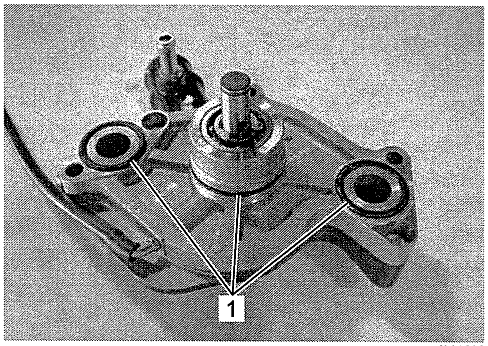
Water Pump Disassembly and Reassembly

BENJ18K61606018

Refer to "Water Pump Removal and Installation" (Page 1F-15).

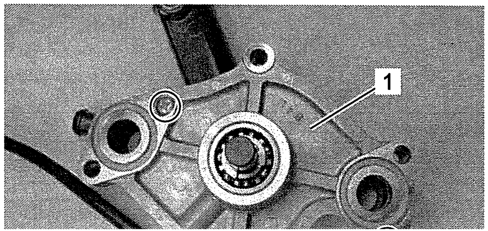
Disassembly

1) Remove the O-rings (1).

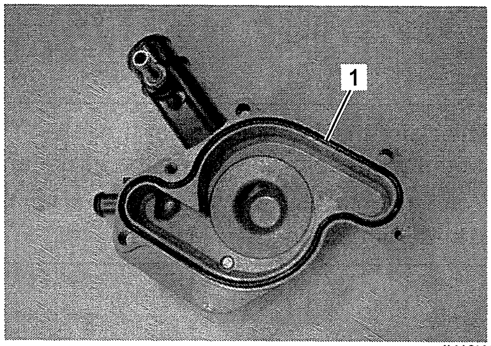


IH18K1160040-02

2) Remove the water pump holder (1).

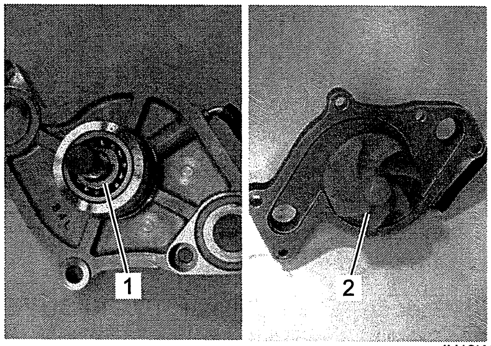


3) Remove the O-ring (1).



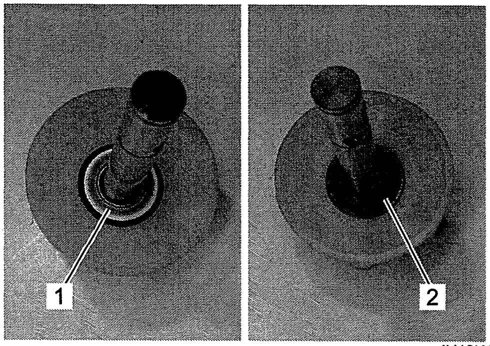
IH18K1160042-01

4) Remove the E-ring (1) and impeller (2).



IH18K1160043-02

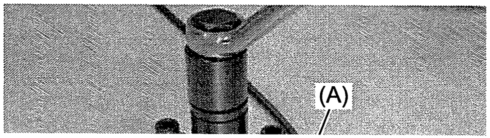
5) Remove the mechanical seal ring (1) and rubber seal (2).



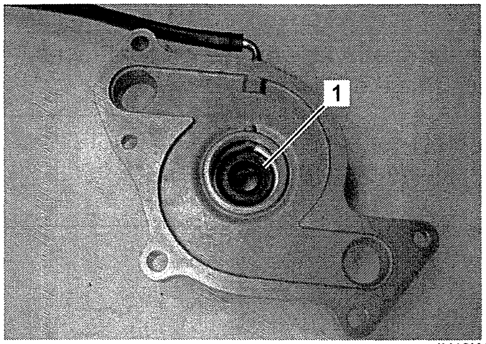
IH18K1160044-02

6) Remove the mechanical seal (1) using the special tool.

Special tool
(A): 09921–20240



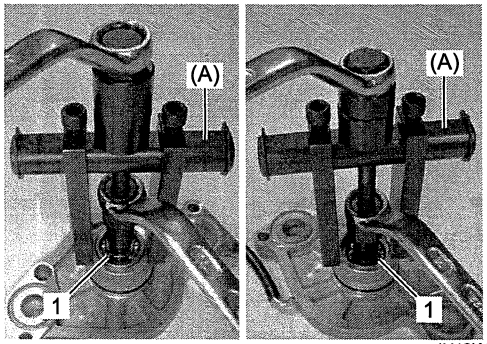
7) Remove the oil seal (1).



IH18K1160046-01

8) Remove the bearings (1) using the special tool.

Special tool
(A): 09921–20240

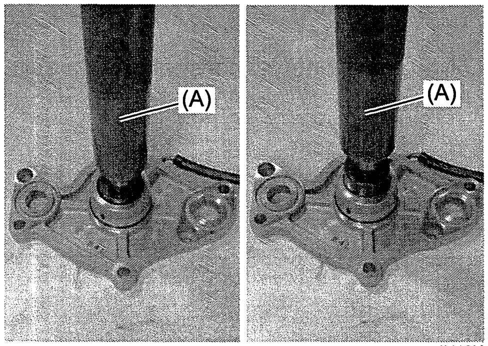


IH18K1160047-02

Reassembly

1) Apply engine oil to the bearings and install the new bearings using the special tool.

Special tool
(A): 09913–70210



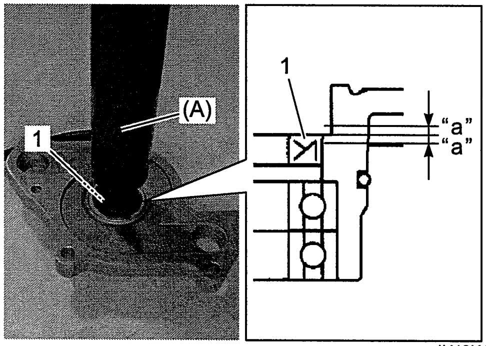
IH18K1160048-01

2) Install the new oil seal (1) using the special tool.

NOTE

The stamped mark on the oil seal faces mechanical seal side.

Special tool
(A): 09913–70210

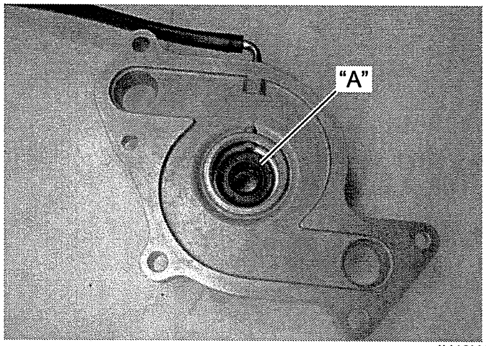


IH18K1160049-04

"a":	Max. 0.5 mm (0.19 in) from the edge

3) Apply grease to the oil seal lip.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1160050-01

4) Install the new mechanical seal using a suitable size socket wrench.

NOTE

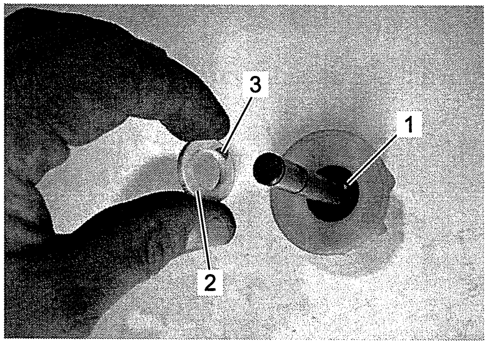
On the new mechanical seal, the sealer has been applied.

5) Install the rubber seal (1) into the impeller.

6) After wiping off the oily or greasy matter from the mechanical seal ring (2), install it into the impeller.

NOTE

- **The paint marked side (3) of the mechanical seal ring faces the impeller.**
- **Make sure the mechanical seal ring is fit into the impeller.**

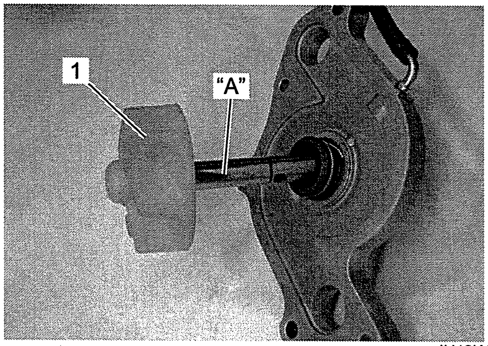


IH18K1160052-02

7) Apply grease to the impeller shaft.

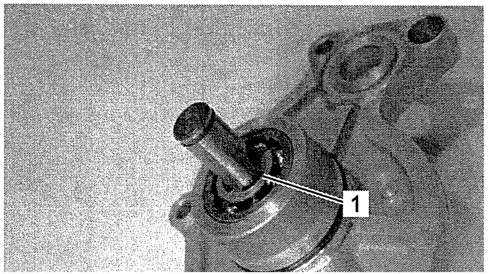
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

8) Install the impeller (1).

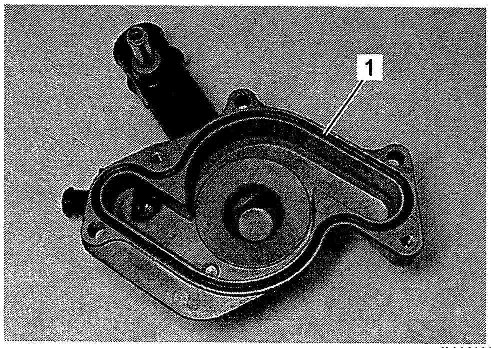


IH18K1160054-01

9) Install the new E-ring (1) to the impeller shaft.



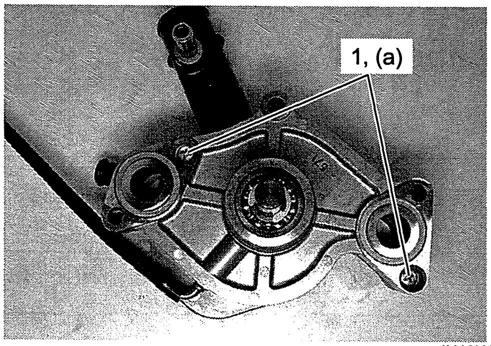
10) Install the new O-ring (1) and apply engine coolant to it.



IH18K1160055-01

11) Install the water pump case and tighten the screws (1) to the specified torque.

Tightening torque
Water pump case screw (a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)



IH18K1160056-01

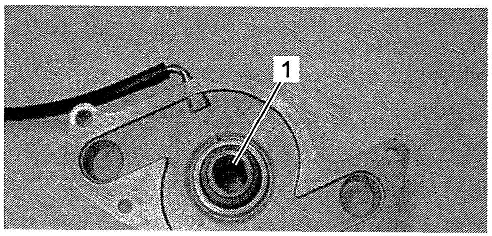
Water Pump Related Parts Inspection

BENJ18K61606019

Refer to "Water Pump Disassembly and Reassembly" (Page 1F-15).

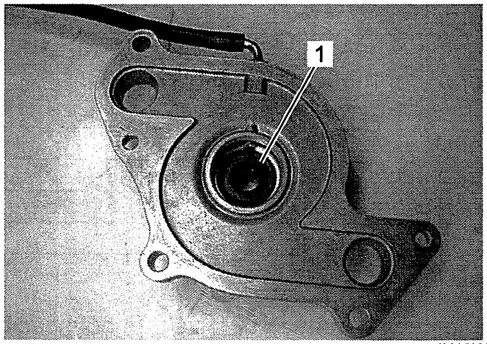
Mechanical Seal

Visually inspect the mechanical seal (1) for damage, with particular attention given to the sealing face.
Replace the mechanical seal (1) that shows indications of leakage.



Oil Seal

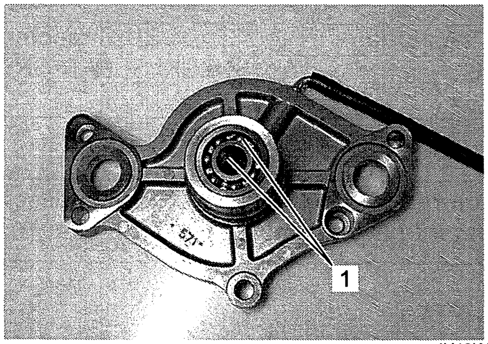
Visually inspect the oil seal (1) for damage, with particular attention given to the lip.
Replace the oil seal (1) that shows indications of leakage.



IH18K1160058-02

Bearing

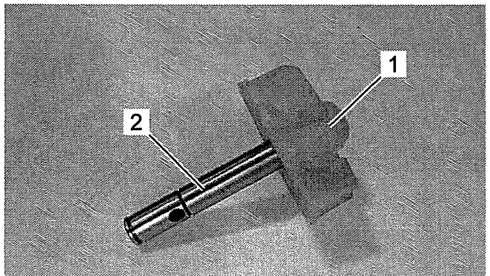
Inspect the play of the outer bearings (1) and inner bearing by hand while it is in the water pump case.
Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
Replace the bearings (1) if necessary.



IH18K1160059-02

Impeller

Visually inspect the impeller (1) and its shaft (2) for damage.
Replace the impeller if necessary.



Specifications

Tightening Torque Specifications

BENJ18K61607001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Water drain bolt	13	1.3	9.5	☞(Page 1F-6)
Radiator cap screw	1.0	0.10	0.75	☞(Page 1F-7)
Radiator under rubber bracket bolt	10	1.0	7.5	☞(Page 1F-9)
Radiator cover screw	7.5	0.76	5.55	☞(Page 1F-9)
Cooling fan assembly mounting bolt	8.5	0.87	6.30	☞(Page 1F-9)
Radiator mounting bolt	10	1.0	7.5	☞(Page 1F-10)
Thermostat connector cap bolt	10	1.0	7.5	☞(Page 1F-12)
Water pump case screw	4.5	0.46	3.35	☞(Page 1F-18)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Water Hose Routing Diagram" (Page 1F-2)
"Water Pump Assembly Components" (Page 1F-14)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K61608001

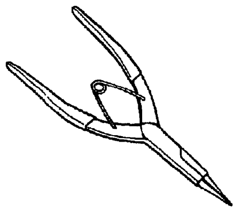
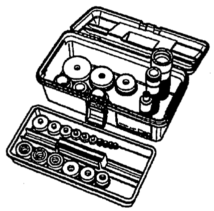
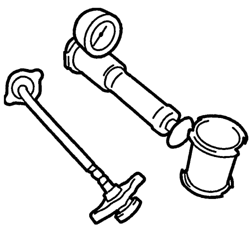
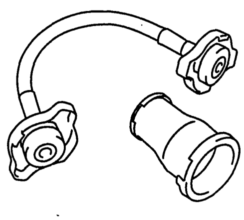
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 1F-15) / ☞(Page 1F-17) / ☞(Page 1F-17)

NOTE

Required service material(s) is also described in:
"Water Pump Assembly Components" (Page 1F-14)

Special Tool

BENJ18K61608002

09900–06107 Snap ring pliers (External) ☞(Page 1F-15) / ☞(Page 1F-15) 	09913–70210 Bearing installer set ☞(Page 1F-16) / ☞(Page 1F-17) 
09918–78211 Radiator cap tester kit ☞(Page 1F-7) / ☞(Page 1F-7) 	09918–78220 Radiator cap tester adapter ☞(Page 1F-7) / ☞(Page 1F-7) 

Fuel System

Precautions

Precautions for Fuel System

BENJ18K61700001

⚠ 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

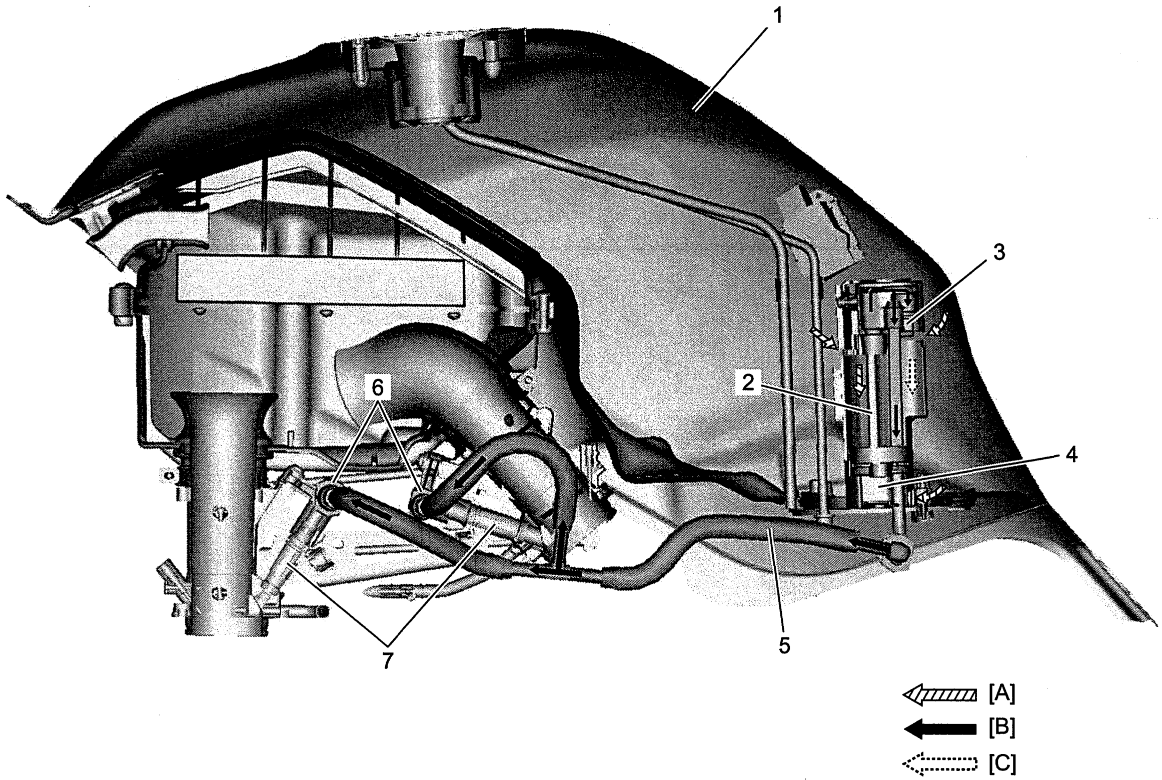
- **To prevent the fuel system (fuel tank, fuel hose, etc.) from contamination with foreign particles, blind all openings.**
- **After removing the throttle body, tape the cylinder intake section to prevent foreign particles from entering.**

Fuel System Description

BENJ18K61701001

Fuel System

The fuel delivery system consists of the fuel tank (1), fuel pump (2) (including fuel pressure regulator (3)) and fuel mesh filter (4), fuel feed hose (5), fuel delivery pipes (6) and fuel injectors (7). There is no fuel return hose. The fuel in the fuel tank is pumped up by the fuel pump and pressurized fuel flows into the injectors installed in the fuel delivery pipes. Fuel pressure is regulated by the fuel pressure regulator. As the fuel pressure applied to the fuel injector (the fuel pressure in the fuel delivery pipe) is always kept at the specified level and fuel is injected into the throttle body in conic dispersion when the injector opens according to the injection signal from the ECM.
The fuel relieved by the fuel pressure regulator flows back to the fuel tank.



IH18K1170001-02

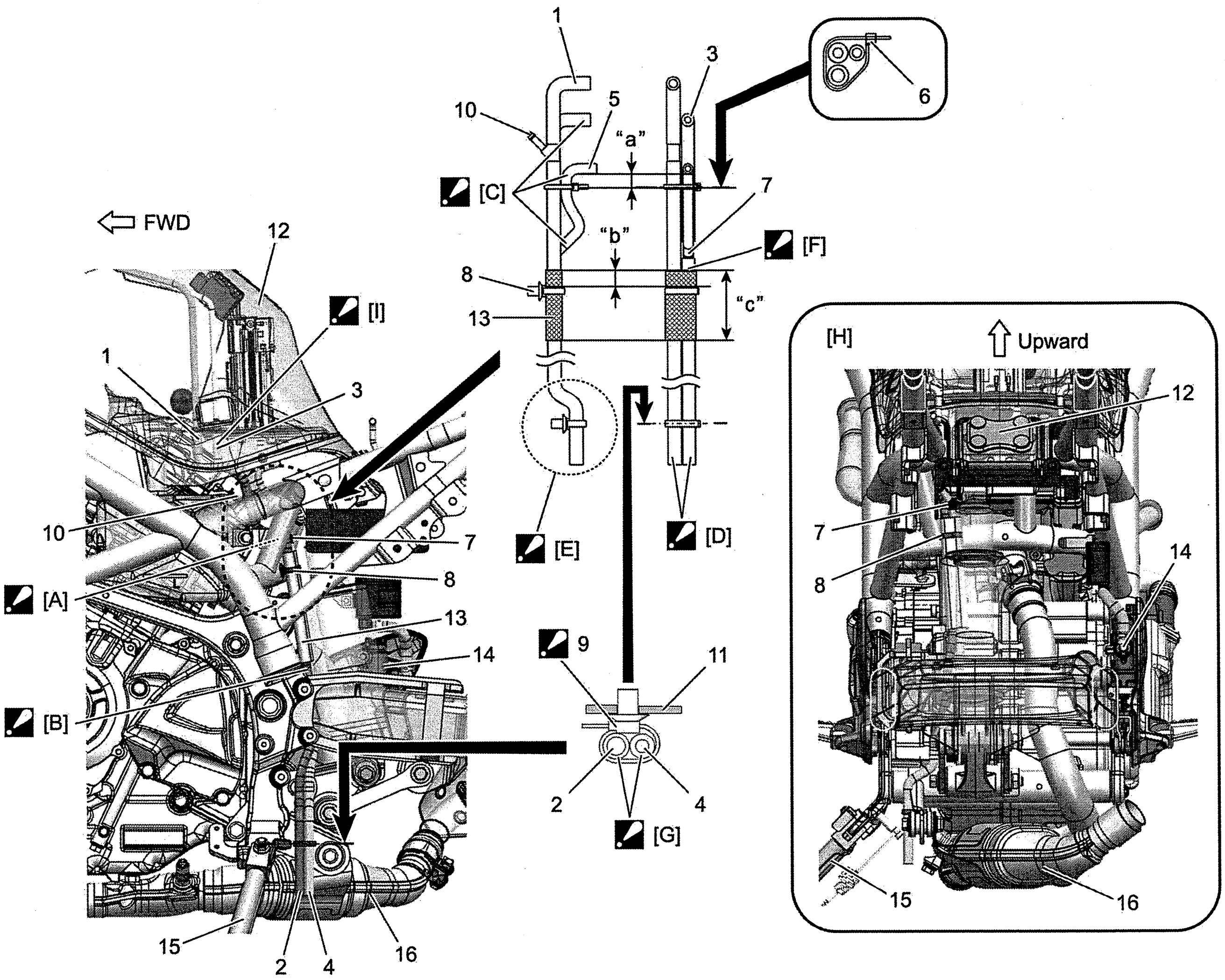
[A]: Before-pressurized fuel	[B]: Pressurized fuel	[C]: Relieved fuel

Schematic and Routing Diagram

Fuel Tank Water Drain Hose and Fuel Tank Breather Hose Routing Diagram

BENJ18K61702001

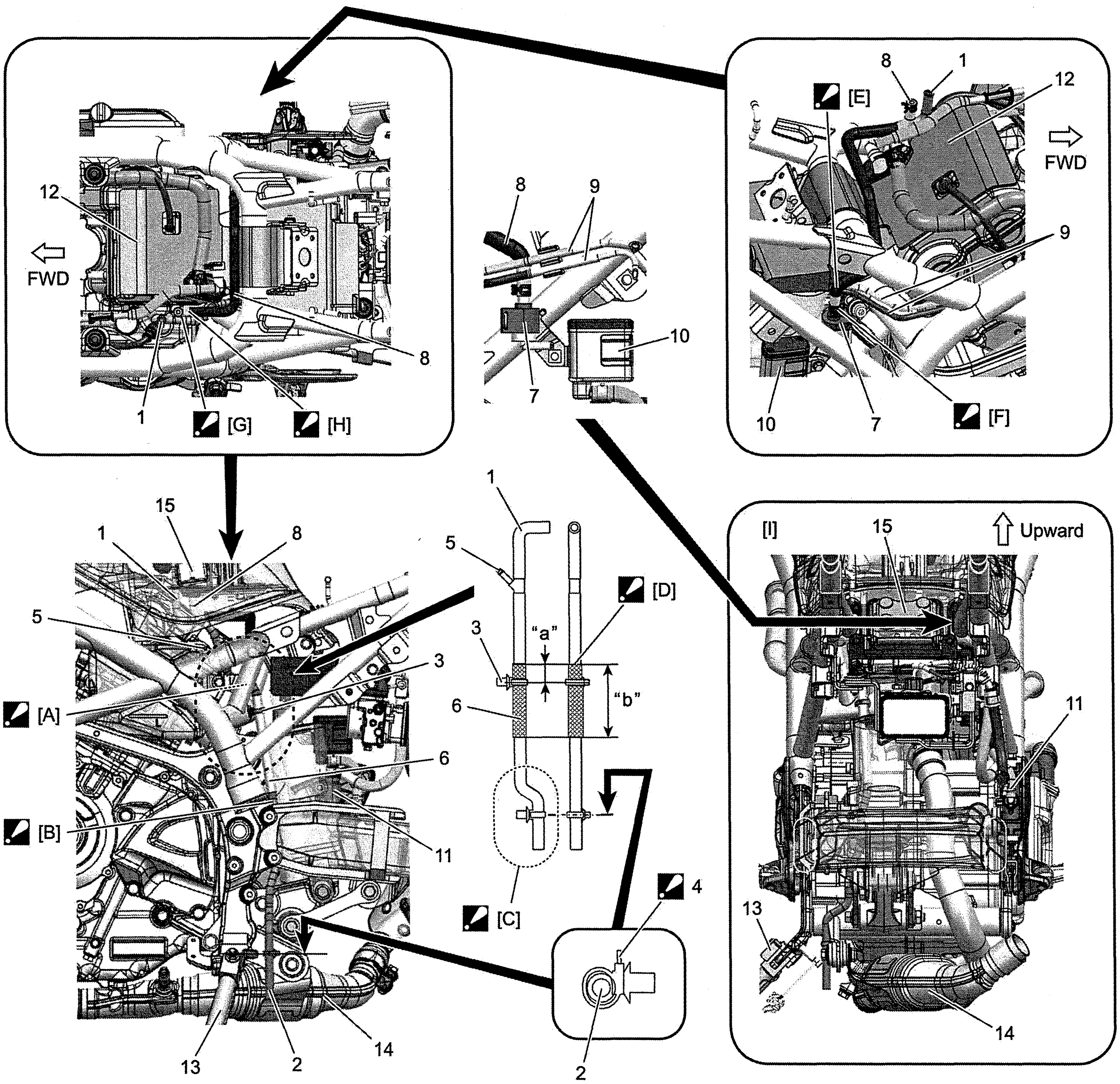
Without EVAP Control System



IH18K1170051-01

[A]:	Pass the hoses inside of the frame.	6.	Drain & breather hose clamp
[B]:	Pass the fuel tank water drain hose No. 2 and fuel tank breather hose No. 2 inside of the swingarm.	7.	Fuel tank breather 3-way joint
[C]:	Match the direction of 3-way joint and fuel tank breather hoses.	8.	Drain hose clamp
[D]:	Match the position of the end of fuel tank water drain hose No. 2 and end of fuel tank breather hose No. 2.	9.	Drain hose clamp : Clamp the white paint of the hoses. Cut off the excess tip of the drain hose clamp.
[E]:	Be careful to the shape of the fuel tank water drain hose No. 2 and fuel tank breather hose No. 2. Be careful to the direction of the drain hose clamp.	10.	Drain hose joint
[F]:	Sticking the drain hose heat shield aligning with the white paint.	11.	Frame
[G]:	Arrange the fuel tank water drain hose No. 2 in parallel with the fuel tank breather hose No. 2.	12.	Fuel tank
[H]:	Vehicle viewed from the backward.	13.	Drain hose heat shield

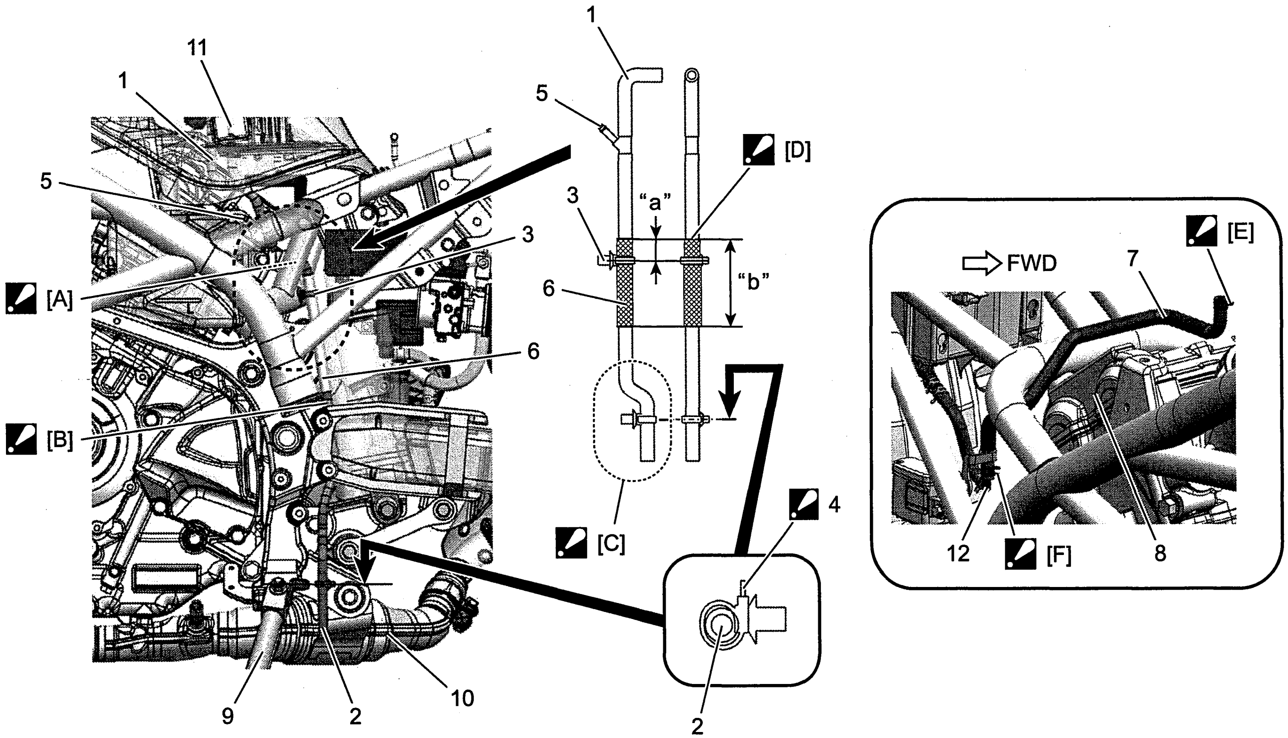
With EVAP Control System (L7)



IH18K1170052-01

[A]: Pass the fuel tank drain hose No. 1 inside of the frame.	5. Drain hose joint
[B]: Pass the fuel tank drain hose No. 2 inside of the swingarm.	6. Drain hose heat shield
[C]: Be careful to the shape of the fuel tank water drain hose No. 2. Be careful to the direction of the drain hose clamp.	7. Fuel shut-off valve
[D]: Sticking the drain hose heat shield aligning with the white paint.	8. Fuel tank breather hose
[E]: Pass the fuel tank breather hose outside of the ABS pipe. (With ABS)	9. ABS pipes (With ABS)
[F]: Face the clamp end forward.	10. Rear brake reservoir tank
[G]: Face the clamp end left side.	11. Rear brake master cylinder

With EVAP Control System (L8 –)



IJ18K1170001-03

[A]:	Pass the fuel tank drain hose No. 1 inside of the frame.	5.	Drain hose joint
[B]:	Pass the fuel tank drain hose No. 2 inside of the swingarm.	6.	Drain hose heat shield
[C]:	Be careful to the shape of the fuel tank water drain hose No. 2. Be careful to the direction of the drain hose clamp.	7.	Fuel tank breather hose
[D]:	Sticking the drain hose heat shield aligning with the white paint.	8.	Rear cylinder
[E]:	Face the clamp end to left side.	9.	Side-stand
[F]:	Face the clamp end forward.	10.	Center exhaust pipe
1.	Fuel tank water drain hose No. 1	11.	Fuel tank
2.	Fuel tank water drain hose No. 2	12.	Hose joint
3.	Drain hose clamp	"a":	15 – 25 mm (0.59 – 0.98 in)
4.	Drain hose clamp : Clamp the white paint of the fuel tank water drain hose No. 2. Cut off the excess tip of the clamp.	"b":	130 mm (5.12 in)

Diagnostic Information and Procedures

Fuel System Diagnosis

BENJ18K61704001

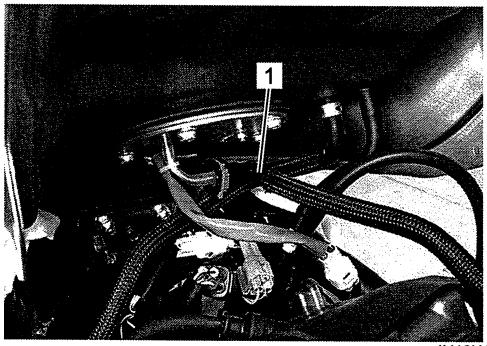
Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-10).

Repair Instructions

Fuel Pressure Inspection

BENJ18K61706001

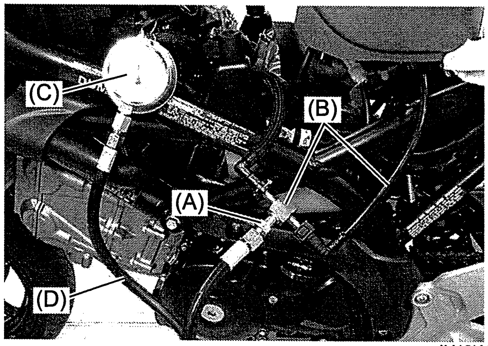
1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the fuel feed hose (1). ☞(Page 1G-7)



IH18K1170004-01

3) Install the special tools between the fuel pump and fuel feed hose.

Special tool
(A): 09940–40211
(B): 09940–40220
(C): 09915–77331
(D): 09915–74521



IH18K1170005-01

4) Turn the ignition ON and check for fuel pressure.
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

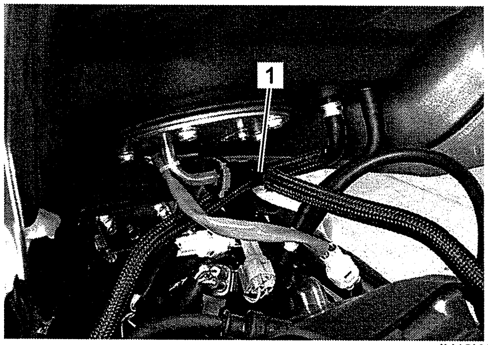
Before removing the special tools, turn the ignition switch OFF and release the fuel pressure slowly.

6) After finishing the fuel pressure inspection, install the removed parts.

Fuel Discharge Amount Inspection

BENJ18K61706002

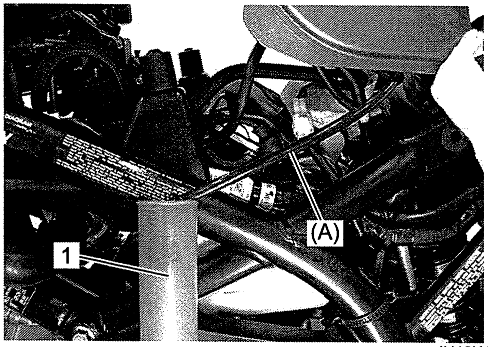
1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the fuel feed hose (1). ☞(Page 1G-7)



IH18K1170006-01

3) Connect a special tool to the fuel pump.
4) Place the measuring cylinder (1) and insert the special tool into the measuring cylinder.

Special tool
(A): 09940–40220



IH18K1170007-01

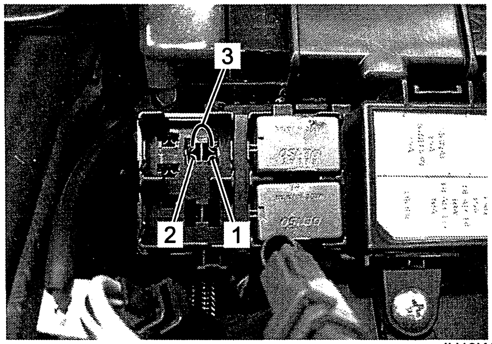
5) Remove the fuel pump relay. ☞(Page 1G-16)
6) Connect the battery (–) lead wire.
7) Connect the fuel pump relay lead wire terminal (between Y/R wire terminal (1) and R/W wire terminal (2)) using a jumper wire (3) for 10 seconds and measure the amount of fuel discharged.
If the discharge amount is out of the specification, the following cause may be considered.

Possible cause	Correction
Clogged fuel mesh filter	Replace
Defective fuel pump	Replace

NOTE

The battery must be in fully charged condition.

FP discharge amount
Per 10 seconds
[Standard]: 167 ml (5.65 US oz, 5.88 Imp oz) or more



IH18K1170008-01

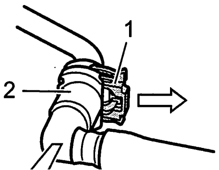
8) After finishing the fuel discharge inspection, install the removed parts.

Fuel Feed Hose Disconnection and Reconnection

BENJ18K61706003

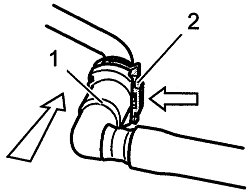
Disconnection

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Place a rag over the fuel feed hose.
3) Pull the retainer (1).
4) Disconnect the fuel feed hose joint (2) from fuel pipe.



Reconnection

1) Insert the fuel feed hose joint (1) to fuel pipe.
2) Lock the retainer (2).



IE31J1170035-01

3) Confirm that fuel feed hose joint is not disconnected by hand.

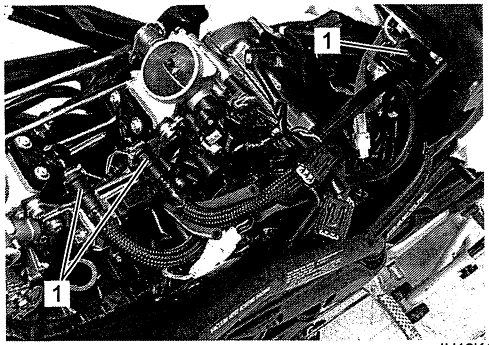
Fuel Feed Hose Removal and Installation

BENJ18K61706004

Refer to “Air Cleaner Box Removal and Installation” in Section 1D (Page 1D-8).

Removal

Disconnect the fuel feed hoses (1). ☞(Page 1G-7)



IH18K1170009-01

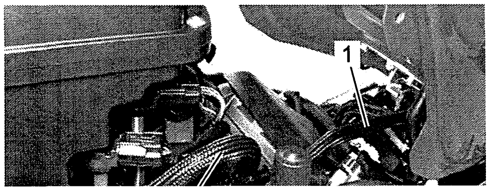
Installation

Connect the fuel feed hoses. Refer to “Intake System Construction” in Section 1D (Page 1D-6).

Fuel Hose Inspection

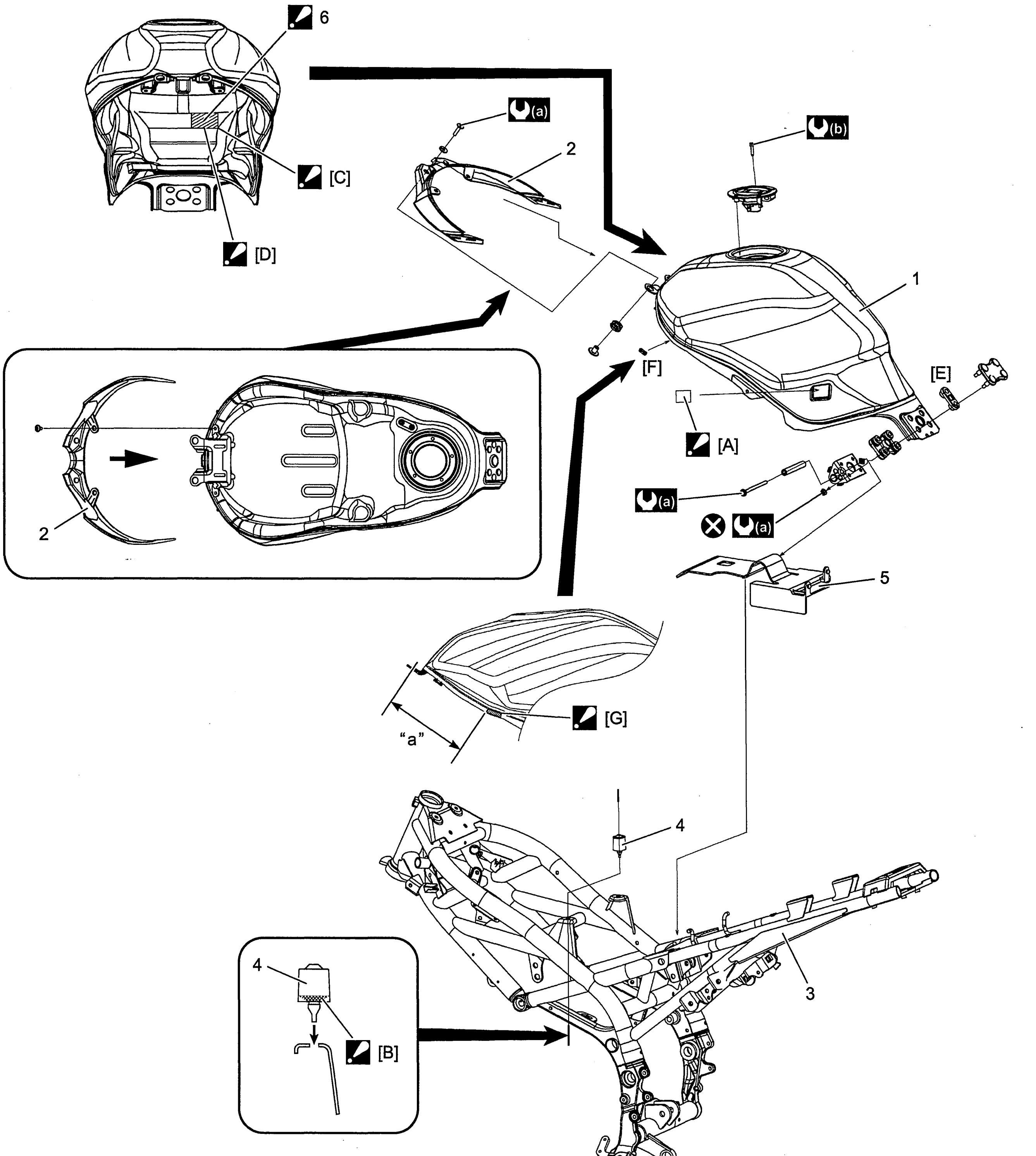
BENJ18K61706005

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Inspect the fuel feed hoses (1) for damage and fuel leakage. If any defects are found, the fuel feed hoses (1) must be replaced. ☞(Page 1G-7)



Fuel Tank Construction

BENJ18K61706006



IJ18K5170002-01

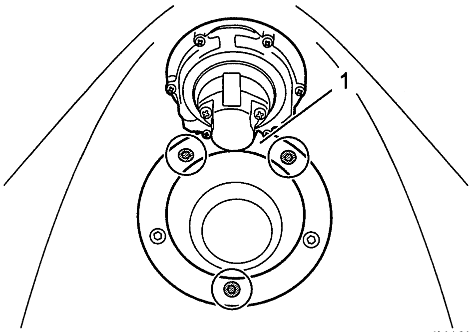
[A]:	Clean the adhesive surface before sticking the fastener. Press the fastener after sticking.	3.	Frame
[B]:	Apply adhesive to the concave position of fuel tank side cushion.	4.	Fuel tank side cushion
[C]:	Stick the fuel tank inner protector end with the curved surface.	5.	Heat shield rubber sheet
[D]:	Stick the fuel tank inner protector aligning with the curved surface.	6.	Fuel tank inner protector : Clean the adhesive surface before sticking the fuel tank inner protector. Press the fuel tank inner protector after sticking.
[E]:	L8 – model	"a":	147.1 – 152.1 mm (5.792 – 5.988 in)
[F]:	SV650XA	(a) :	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
[G]:	Clean the adhesive surface before sticking the cushion. Stick the cushion after matching the edge of the cushion with the bottom of the flange. Press the cushion after sticking.	(b) :	3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)
1.	Fuel tank	:	Do not reuse.
2.	Fuel tank front cover		

Fuel Tank Cap Removal and Installation

BENJ18K61706007

Removal

1) Open the fuel tank cap with the ignition key.
2) Remove the fuel tank cap (1).



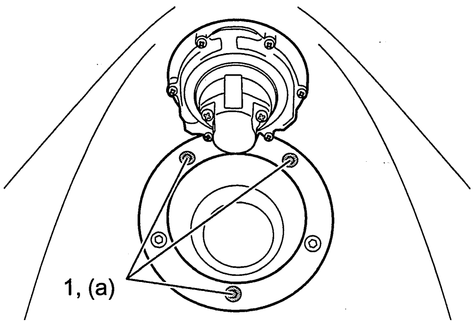
IH13K1170066-06

Installation

Install the fuel tank cap in the reverse order of removal. Pay attention to the following point:

- Tighten the fuel tank cap bolts (1) to the specified torque.

  Tightening torque
  Fuel tank cap bolt (a): 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)

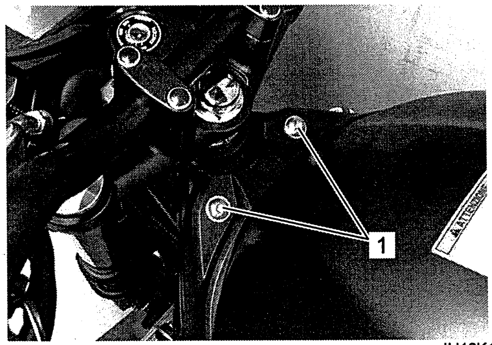


Fuel Tank Removal and Installation

BENJ18K61706008

Removal

1) Remove the following parts.
   - Frame front covers (SV650/A): ☞(Page 9D-22)
   - Frame front cover assemblies (SV650XA): ☞(Page 9D-23)
2) Remove the fuel tank front mounting bolts (1).



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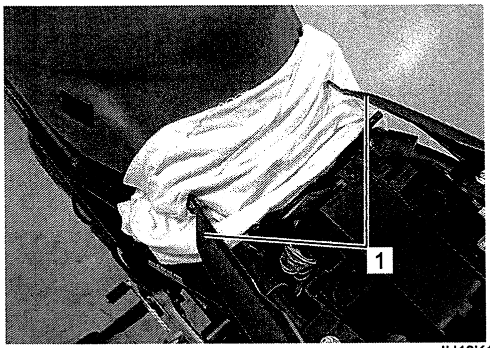
3) Place a rag on the fuel tank to prevent the frame rear covers (1).



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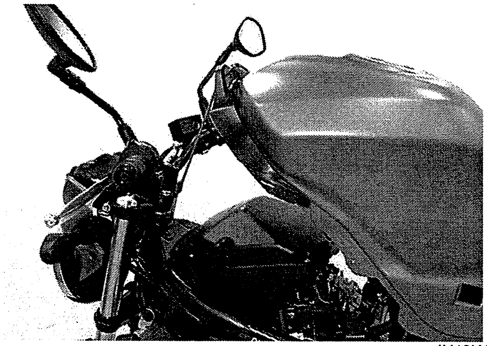
4) Lift and support the fuel tank with the prop stay or the like.



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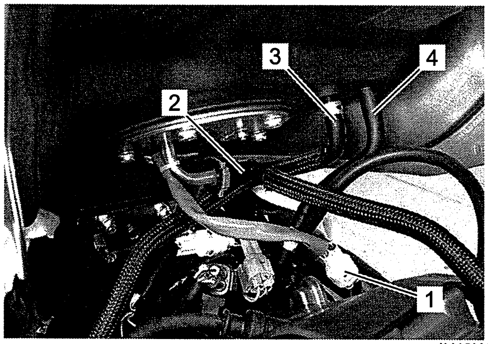
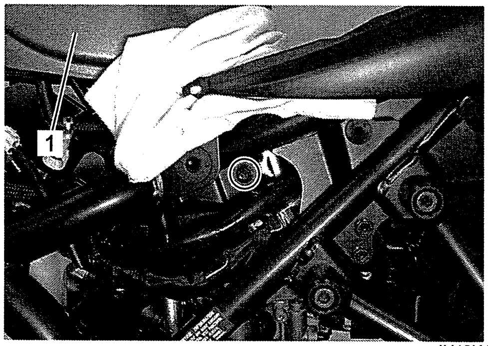
5) Disconnect the fuel pump coupler (1).
6) Disconnect the fuel feed hose (2). ☞(Page 1G-7)
7) Disconnect the fuel tank breather hose (3) and fuel tank water drain hose No. 1 (4).



IH18K1170016-01

8) Remove the fuel tank (1).



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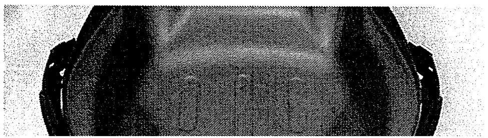
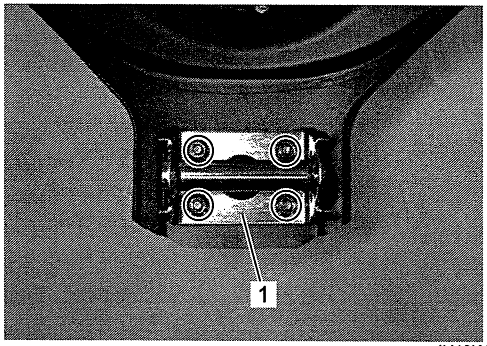
9) Remove the fuel tank front cover (1).



10) Remove the fuel tank rear bracket (lower) (1).



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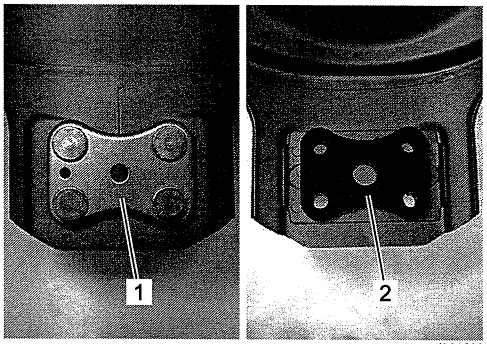
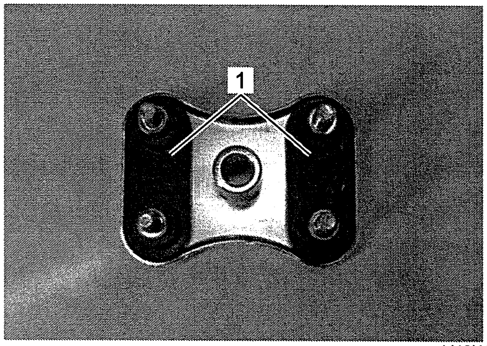
11) Remove the fuel tank rear bracket (upper) (1) and cushion (2).



IH18K1170020-01

12) For L8 – model, remove the cushions (1).



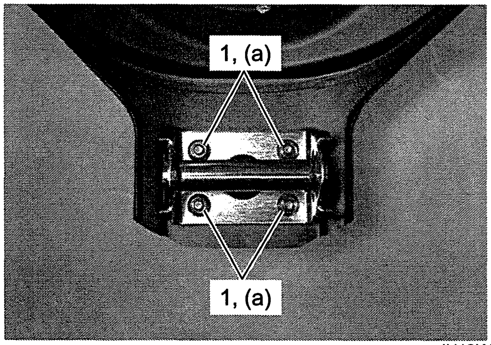
IJ18K1170003-02

Installation

Install the fuel tank in the reverse order of removal. Pay attention to the following points:

- Tighten the new fuel tank rear bracket nuts (1) to the specified torque.

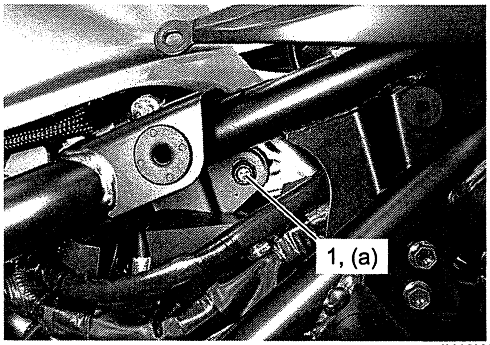
  Tighteninig torque
  Fuel tank rear bracket nut (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1170021-01

- Tighten the fuel tank rear mounting bolt (1) to the specified torque.

  Tightening torque
  Fuel tank rear mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1170022-01

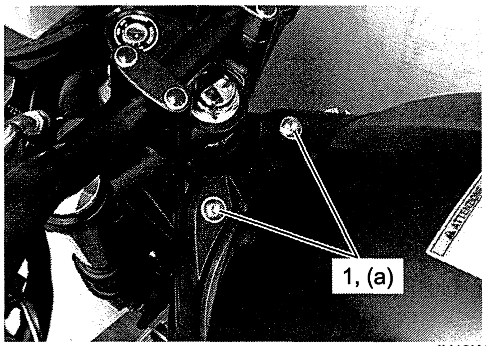
- Connect the fuel tank water drain hose No. 1 and fuel tank breather hose. ☞(Page 1G-3)

NOTICE

Be sure not to bend or twist the hoses when installing.

- Tighten the fuel tank front mounting bolts (1) to the specified torque.

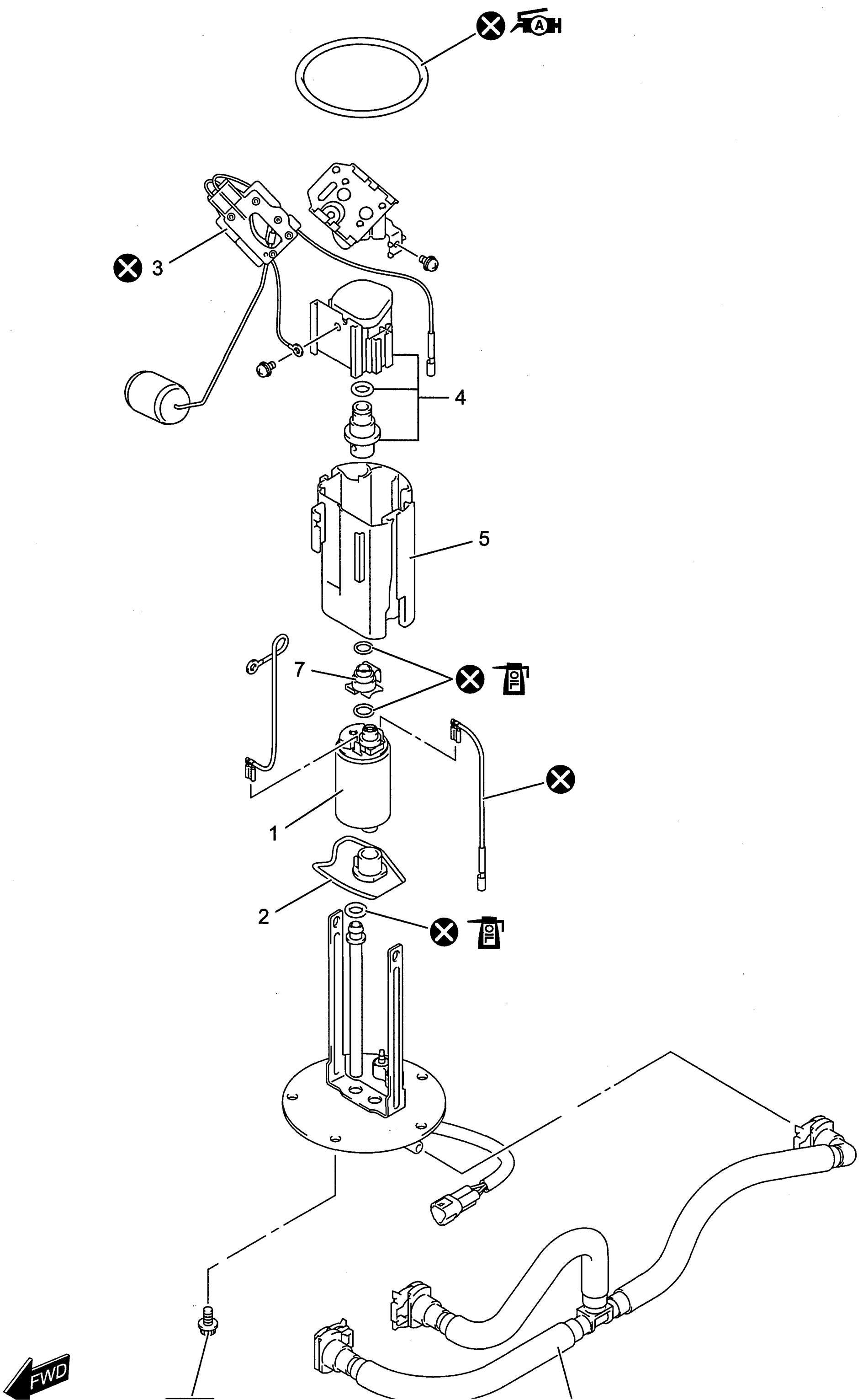
  Tightening torque
  Fuel tank front mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1170023-01

Fuel Pump Components

BENJ18K61706009



Fuel Pump On-Vehicle Inspection

BENJ18K61706010

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, the fuel pump relay and TO sensor.

- Fuel pump relay: ☞(Page 1G-16)
- TO sensor: ☞(Page 1A-58)

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. ☞(Page 1G-13)

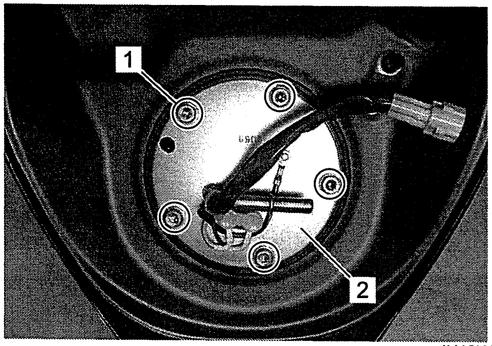
Fuel Pump Assembly Removal and Installation

BENJ18K61706011

Refer to “Fuel Tank Removal and Installation” (Page 1G-9).

Removal

Remove the fuel pump mounting bolts (1) diagonally and remove the fuel pump assembly (2).

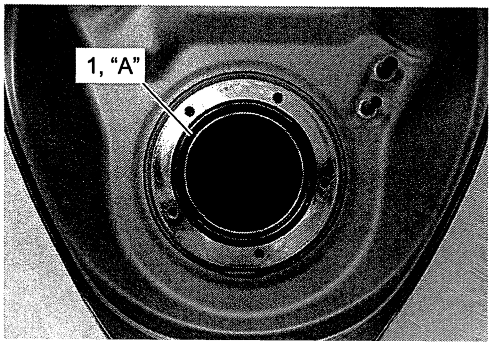


IH18K1170024-01

Installation

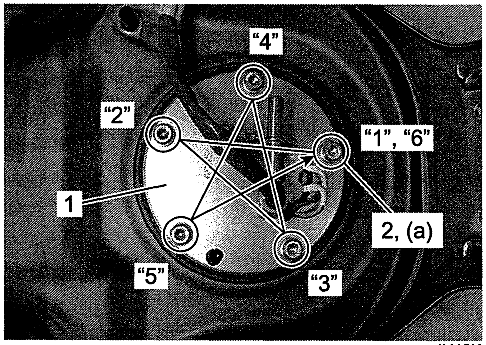
1) Apply grease to the new O-ring (1) and install it.

“A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)



2) Install the fuel pump assembly (1) and first tighten all the fuel pump mounting bolts (2) lightly in the ascending order and then tighten them to the specified torque in the figure.

Tightening torque
Fuel pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1170026-01

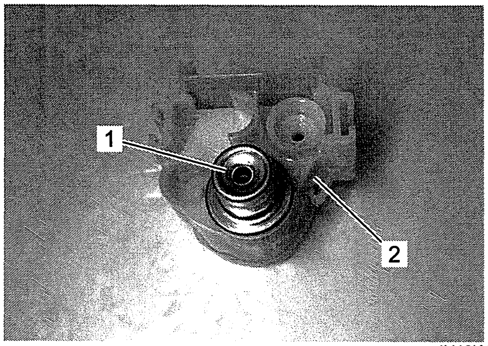
Fuel Pump Disassembly and Reassembly

BENJ18K61706012

Refer to “Fuel Pump Assembly Removal and Installation” (Page 1G-13).

NOTICE

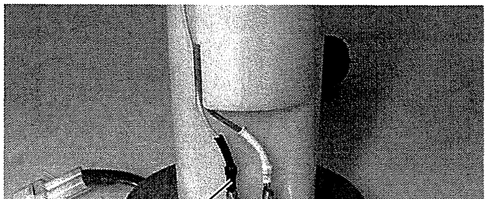
Never remove the fuel pressure regulator (1) from the fuel regulator (2).



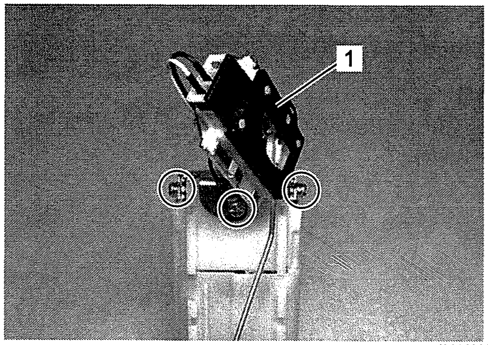
IH18K1170027-01

Disassembly

1) Disconnect the fuel level gauge (+) lead wire (1).

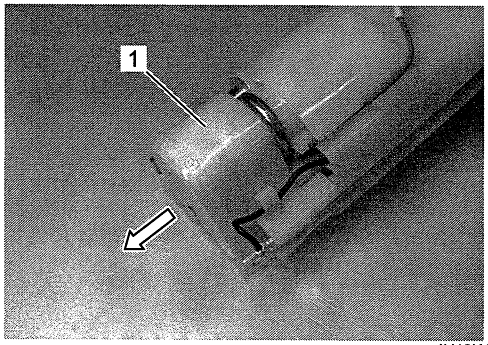


2) Remove the fuel level gauge (1).



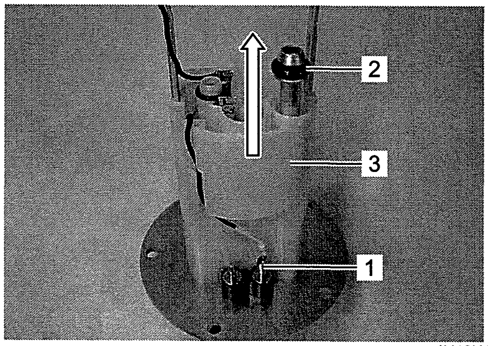
IH18K1170029-01

3) Remove the fuel pressure regulator assembly (1).



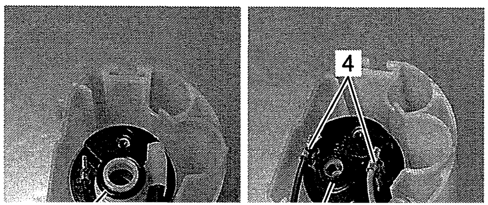
IH18K1170030-01

4) Disconnect the fuel pump (+) lead wire (1).
5) Remove the O-ring (2) and fuel pump assembly (3).

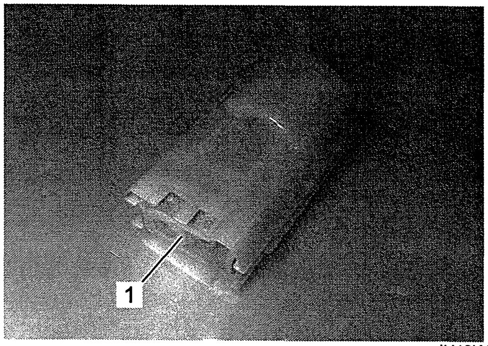


IH18K1170031-01

6) Remove the O-ring (1) and joint (2).
7) Remove the O-ring (3) and lead wires (4).

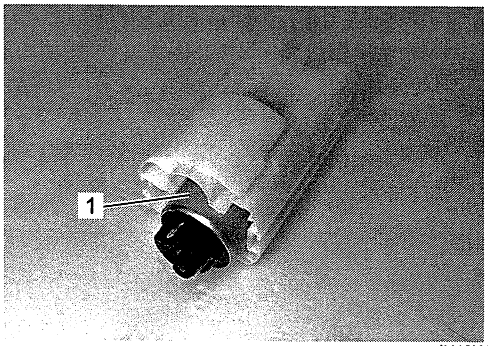


8) Remove the fuel mesh filter (1).



IH18K1170033-01

9) Remove the fuel pump (1) from the reservoir cup.

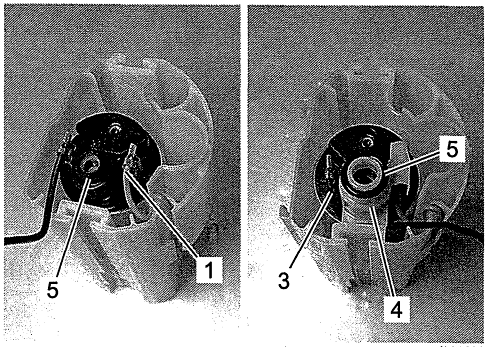


IH18K1170034-01

Reassembly

Reassemble the fuel pump in the reverse order of the disassembly. Pay attention to the following points:

- Replaced the removed fuel pump (+) lead wire (1) and fuel level gauge (+) lead wire (2) with the new ones.
- Pass the fuel pump (–) lead wire (3) under the joint (4).
- Apply engine oil lightly to the new O-rings (5) and install them.



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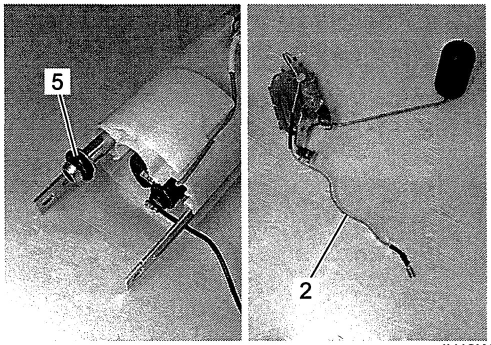
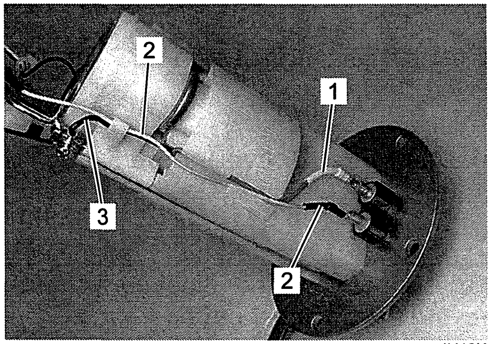


IH18K1170036-01

- Connect all lead wires securely so as not to cause contact failure.
- Route all lead wires securely.



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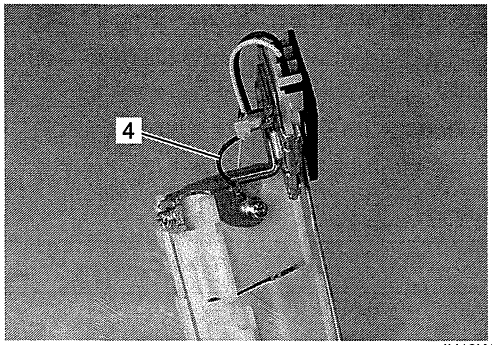


IH18K1170038-01

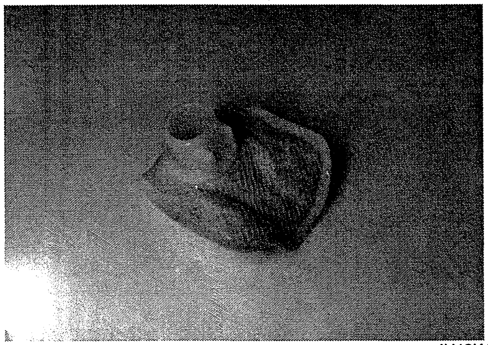
1.	Fuel pump (+) lead wire (Bl)
2.	Fuel level gauge (+) lead wire (Y)
3.	Fuel pump (–) lead wire (B)
4.	Fuel level gauge (–) lead wire (B)

Fuel Mesh Filter Inspection

BENJ18K61706013

Refer to "Fuel Pump Disassembly and Reassembly" (Page 1G-13).

Inspect the fuel mesh filter for dirt. If the fuel mesh filter is dirtied excessively, replace the fuel mesh filter with a new one.



IH18K1170039-01

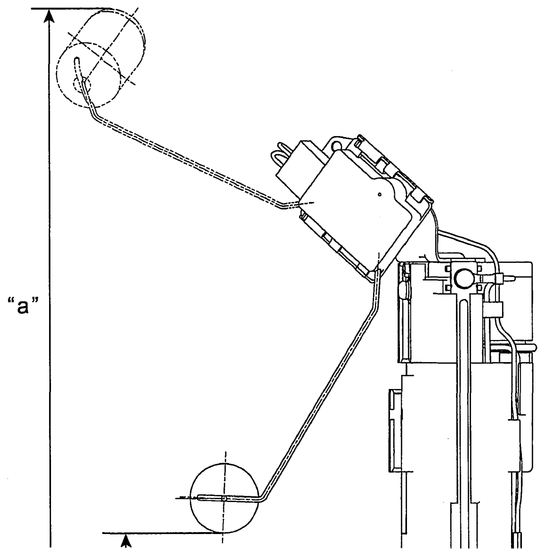
Fuel Level Gauge Inspection

BENJ18K61706014

Refer to "Fuel Pump Assembly Removal and Installation" (Page 1G-13).

Measure the resistance at each fuel level gauge in float position. If the resistance is incorrect, replace fuel level gauge with a new one.

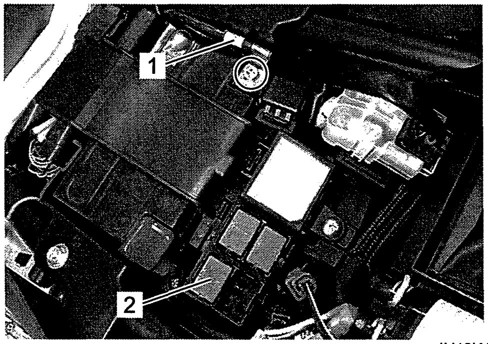
Float position		Resistance
"a"	224 – 238 mm (8.82 – 9.37 in)	9 – 11 Ω
"b"	20.5 – 34.5 mm (0.81 – 1.35 in)	213 – 219 Ω



Fuel Pump Relay Inspection

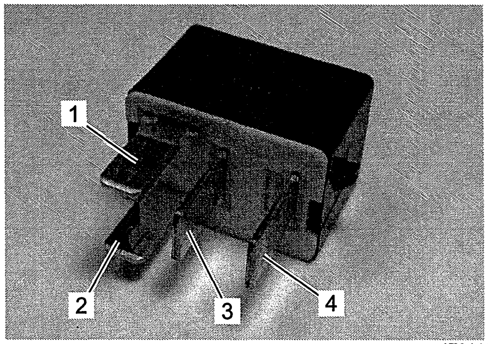
BENJ18K61706015

1) Remove the seat. ☞(Page 9D-18)
2) Disconnect the battery (–) lead wire (1) and remove the cap and fuel pump relay (2).



IH18K1170041-01

3) First, check for insulation with a circuit tester between terminals (3) and (4). Next, check for continuity between (3) and (4) with 12 V voltage applied, positive (+) to terminal (1) and negative (–) to terminal (2). If continuity does not exist, replace the relay with a new one.



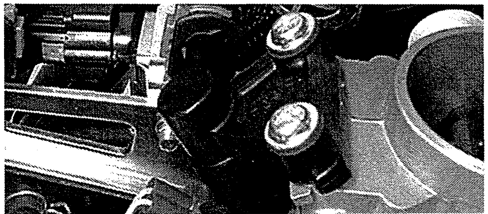
IE31J1170030-01

4) Install the removed parts.

Fuel Injector On-Vehicle Inspection

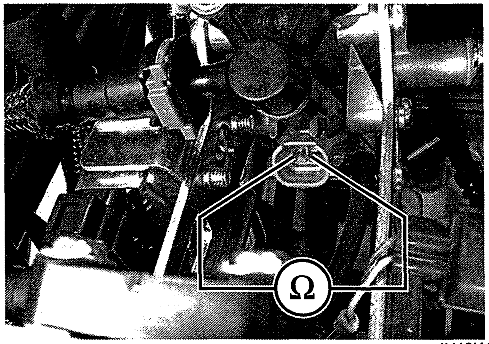
BENJ18K61706016

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the fuel injector coupler (1).



4) Measure the fuel injector resistance between terminals. If resistance is out of specification, replace the fuel injector with a new one. ☞(Page 1G-16)

<u>**Fuel injector resistance**</u>
20 °C (68 °F) [Standard]: 11.5 – 12.5 Ω



IH18K1170043-01

5) After finishing the fuel injector inspection, install the removed parts.

Fuel Injector / Fuel Delivery Pipe Removal and Installation

BENJ18K61706017

NOTE

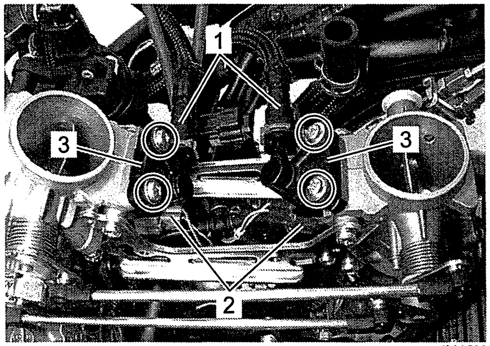
The fuel injector can be removed without removing the throttle body.

Removal

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Disconnect the fuel feed hose (1) from the fuel delivery pipes. ☞(Page 1G-7)
3) Disconnect the fuel injector couplers (2).
4) Remove the fuel delivery pipes (3).

NOTICE

Do not twist the fuel delivery pipe.



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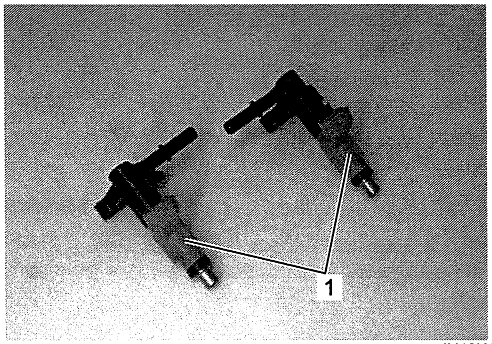
5) Remove the fuel injectors (1) from the fuel delivery pipes.

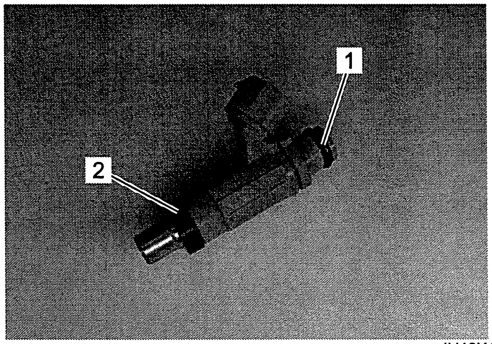


IH18K1170045-01

Installation

Install the fuel injector and fuel delivery pipe in the reverse order of removal. Pay attention to the following points:

- Apply a thin coat of engine oil to the new O-ring (1) and new cushion seal (2).



IH18K1170046-01

- Wipe off the surface on the fuel delivery pipe (1) where the fuel injector (2) will be seated with a clean rag.
- Align the coupler (3) of fuel injector with boss (4) of the fuel delivery pipe, install each fuel injector by pushing it straight to the fuel delivery pipe.

NOTICE

Never turn the fuel injector while pushing it.

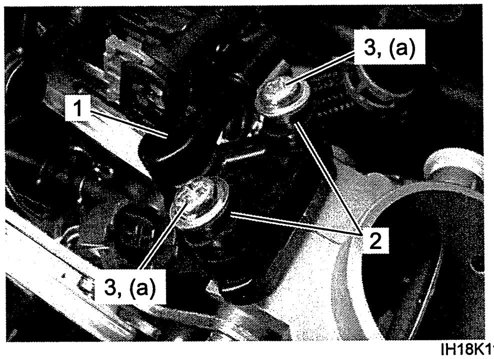
- Install the fuel delivery pipe (1) to the throttle body.

NOTICE

Never turn the fuel injectors while installing it.

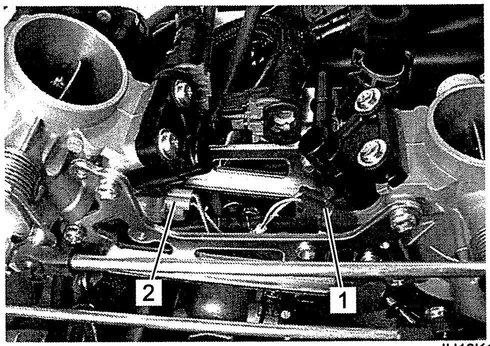
- Install the rubber washers (2).
- Tighten the fuel delivery pipe mounting screws (3) to the specified torque.

Tightening torque
Fuel delivery pipe mounting screw (a): 3.5 N·m (0.36 kgf-m, 2.60 lbf-ft)



IH18K1170048-01

- Connect the fuel injector couplers to the fuel injector. Make sure that each coupler is installed in the correct position. the color on each lead wire refer to the appropriate fuel injector.



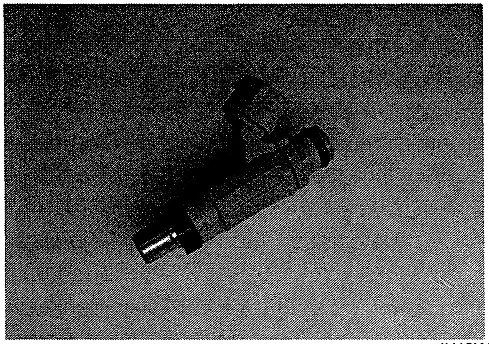
IH18K1170049-02

Coupler	Wire color
Front injector #1 (1)	Y/R and Gr/W
Rear injector #2 (2)	Y/R and Gr/B

Fuel Injector Inspection and Cleaning

BENJ18K61706018

Refer to “Fuel Injector / Fuel Delivery Pipe Removal and Installation” (Page 1G-16).
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.



IH18K1170050-01

Specifications

Tightening Torque Specifications

BENJ18K61707001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Fuel tank cap bolt	3.0	0.31	2.25	☞(Page 1G-9)
Fuel tank rear bracket nut	10	1.0	7.5	☞(Page 1G-11)
Fuel tank rear mounting bolt	10	1.0	7.5	☞(Page 1G-11)
Fuel tank front mounting bolt	10	1.0	7.5	☞(Page 1G-11)
Fuel pump mounting bolt	10	1.0	7.5	☞(Page 1G-13)
Fuel delivery pipe mounting screw	3.5	0.36	2.60	☞(Page 1G-17)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
“Fuel Tank Construction” (Page 1G-8)
“Fuel Pump Components” (Page 1G-12)
“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K61708001

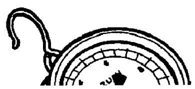
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 1G-13)

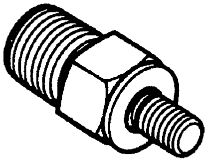
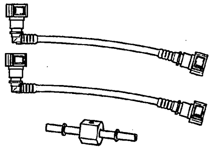
NOTE

Required service material(s) is also described in:
“Fuel Pump Components” (Page 1G-12)

Special Tool

BENJ18K61708002

09915–74521 Oil pressure gauge hose 	09915–77331 Oil pressure gauge (1000 kPa) 

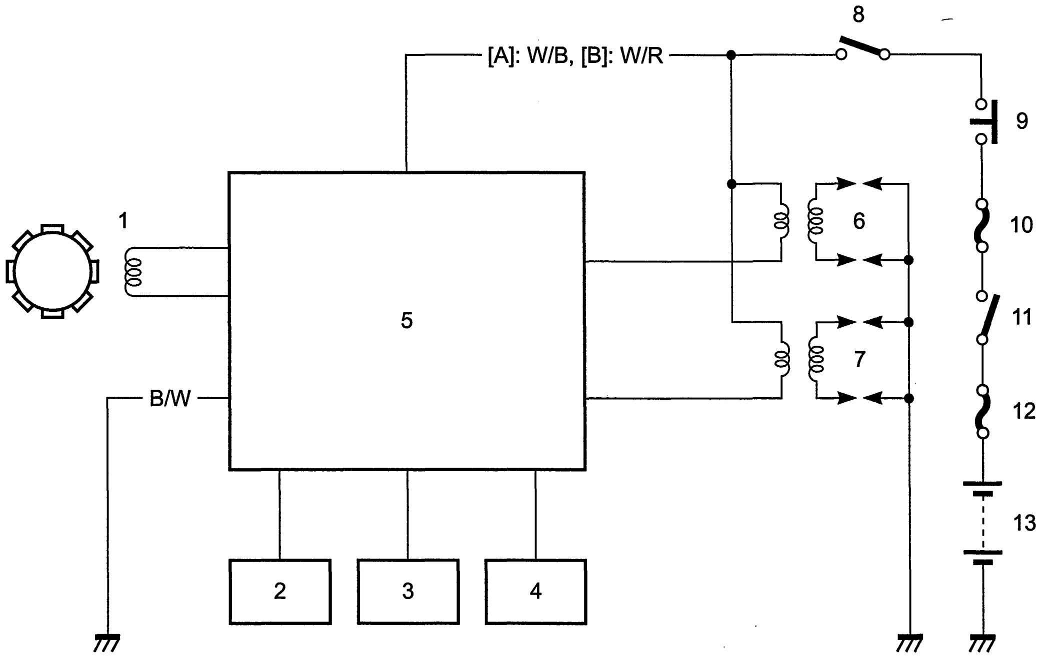
09940–40211 Fuel pressure gauge adapter Discontinued ☞(Page 1G-6) 	09940–40220 Fuel pressure gauge attachment ☞(Page 1G-6) / ☞(Page 1G-6) 

Ignition System

Schematic and Routing Diagram

Ignition System Diagram

BENJ18K61802001



IH18K1180001-02

[A]: For E.U., U.K. and Australia	4. GP switch	9. Side-stand relay
[B]: Except for E.U., U.K. and Australia	5. ECM	10. Ignition fuse
1. CKP sensor	6. Ignition coil #1	11. Ignition switch
2. TP sensor	7. Ignition coil #2	12. Main fuse
3. ECT sensor	8. Engine stop switch	13. Battery

Component Location

Ignition System Components Location

BENJ18K61803001

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

Diagnostic Information and Procedures

Ignition System Symptom Diagnosis

BENJ18K61804001

Condition	Possible cause	Correction / Reference Item
Spark plug not sparking	Defective spark plugs.	*Replace. ☞(Page 1H-7)*
	Fouled spark plugs.	*Clean or replace. ☞(Page 1H-7)*
	Wet spark plugs.	*Clean and dry or replace. ☞(Page 1H-8)*
	Defective ignition coils or spark plug caps.	*Replace. ☞(Page 1H-9)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
	Open-circuited wiring connections.	*Repair or replace. • SV650/A: ☞(Page 9A-5) ☞(Page 9A-9) • SV650XA: ☞(Page 9A-13)*
	Open or short in high-tension cords.	*Replace. ☞(Page 1H-9)*
Engine stalls easily (No spark)	Fouled spark plugs.	*Replace. ☞(Page 1H-7)*
	Defective CKP sensor.	*Replace. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective ECM.	*Replace. ☞(Page 1C-4)*
Spark plug is wet or quickly becomes fouled with carbon	Excessively rich air/fuel mixture.	*Inspect FI system.*
	Excessively idling speed.	*Inspect FI system.*
	Incorrect gasoline.	*Change.*
	Dirty air cleaner element.	*Replace. ☞(Page 1D-7)*
Spark plug quickly becomes fouled with oil or carbon	Worn piston rings.	*Replace. ☞(Page 1D-57)*
	Worn pistons.	*Replace. ☞(Page 1D-56)*
	Worn cylinders.	*Replace. ☞(Page 1D-42) ☞(Page 1D-44)*
	Excessive valve-stem to valve-guide clearance.	*Replace. ☞(Page 1D-49)*
	Worn valve stem oil seals.	*Replace. ☞(Page 1D-49)*
Spark plug electrodes overheat or burn	Overheated engine.	*Tune-up.*
	Loose spark plugs.	*Tighten. ☞(Page 1H-7)*
	Excessively lean air/fuel mixture.	*Inspect FI system.*

No Spark or Poor Spark

BENJ18K61804002

Troubleshooting

Step 1

1) Check that the transmission is in neutral and the engine stop switch is in the "RUN" position.
2) Check that the fuse is not blown and the battery is fully-charged before diagnosing.
3) Check the ignition system couplers for poor connections.

Is check result OK?

Yes	Go to Step 2.
No	Repair or replace defective part.

Step 2

1) Turn the ignition switch ON.
2) Measure the battery voltage between W/B (For E.U., U.K. and Australia) or W/R (Except for E.U., U.K. and Australia) wire (+) and B/W wire (–) of ECM. Refer to "Ignition System Diagram" (Page 1H-1).

Is the voltage OK?

Yes	Go to Step 3.
No	• Faulty ignition switch. • Faulty side-stand relay. • Faulty engine stop switch. • Broken wire harness or poor connection of related circuit couplers.

Step 3

Measure the ignition coil primary peak voltage. Refer to "Ignition Coil Inspection" (Page 1H-9).

Is the peak voltage OK?

Yes	Go to Step 4.
No	Go to Step 5.

Step 4

Inspect the spark plugs. ☞(Page 1H-8)

Is the spark plug(-s) OK?

Yes	Go to Step 5.
No	Faulty spark plug(-s).

Step 5

Inspect the ignition coil(-s). ☞(Page 1H-9)

Is the ignition coil(-s) OK?

Yes	Go to Step 6.
No	Faulty ignition coil(-s).

Step 6

Measure the CKP sensor peak voltage and its resistance. Refer to "CKP Sensor Inspection" in Section 1C (Page 1C-10).

Are the peak voltage and resistance OK?

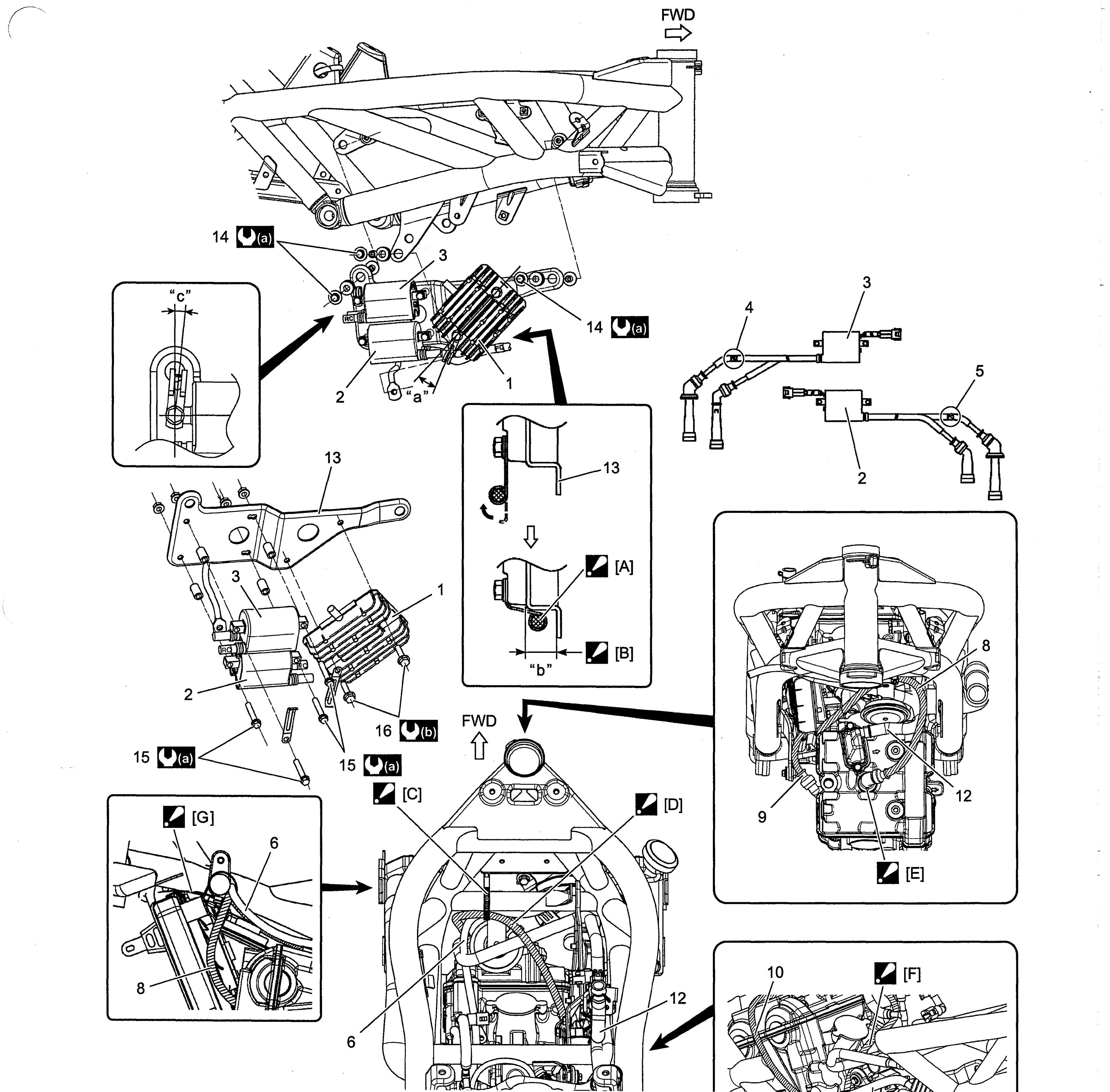
Yes	• Faulty ECM. • Open or short circuit in wire harness. • Poor connection of ignition couplers.
No	• Faulty CKP sensor. • Metal particles or foreign material being stuck on the CKP sensor and rotor tip.

Repair Instructions

Ignition Coil Construction

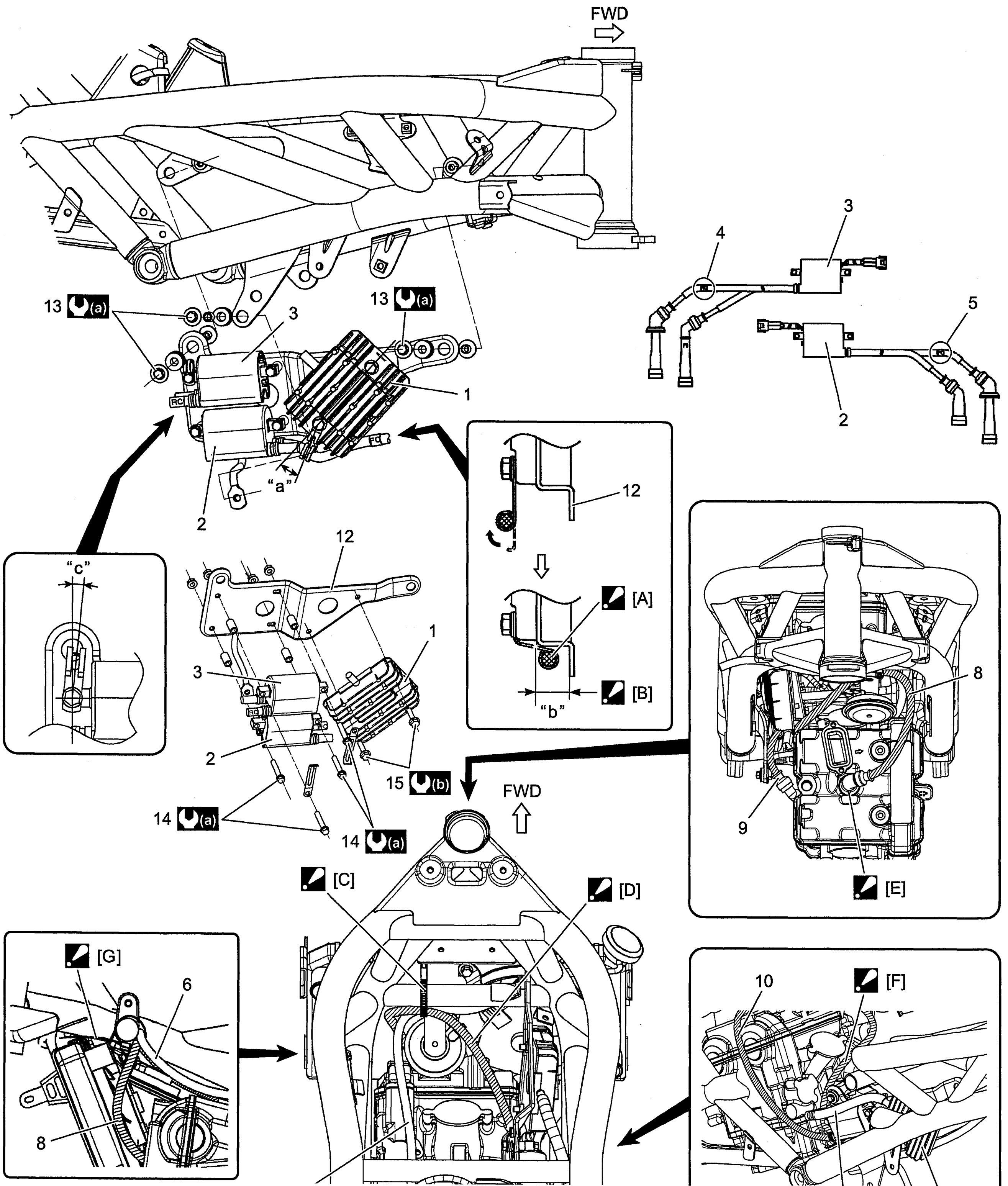
BENJ18K61806001

With PAIR System



[A]: Clamp the high-tension cord firmly. Do not contact the high-tension cord to the ignition coil bracket and regulator/rectifier.	8. High-tension cord (center) of ignition coil #1
[B]: With the high-tension cord (center) of ignition coil #1 clamped and bend inward, check that it is positioned within area "b".	9. High-tension cord (side) of ignition coil #1
[C]: Clamp the high-tension cord in parallel with the frame. Contact the clamp with the horn bracket on its left side and clamp the high-tension cord at the marked position near. Clamp the high-tension cord firmly. Face the clamp end forward.	10. High-tension cord (center) of ignition coil #2
[D]: Pass the high-tension cord (center) of ignition coil #1 over the horn lead wire and reservoir tank inlet hose. Do not contact the high-tension cord to the horn and radiator.	11. High-tension cord (side) of ignition coil #2
[E]: Press firmly on the spark plug cap to fit it securely with mark " △ " on the plug cap facing exhaust side.	12. PAIR hose
[F]: Pass the high-tension cord (side) of ignition coil #2 on the cylinder head side relative to the position of wiring harness and piping.	13. Ignition coil rear bracket
[G]: Do not bend the clamp end strongly by the contact of other parts.	14. Ignition coil bracket bolt
1. Regulator/rectifier	15. Ignition coil bolt
2. Ignition coil #1	16. Regulator/rectifier bolt
3. Ignition coil #2	"a": 5° – 25°
4. RC mark	"c": 5° ± 10°
5. FC mark	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
6. Reservoir tank inlet hose	(b) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
7. Regulator/rectifier lead wire	

Without PAIR System



[A]:	Clamp the high-tension cord firmly. Do not contact the high-tension cord to the ignition coil bracket and regulator/rectifier.	7.	Regulator/rectifier lead wire
[B]:	With the high-tension cord (center) of ignition coil #1 clamped and bend inward, check that it is positioned within area "b".	8.	High-tension cord (center) of ignition coil #1
[C]:	Clamp the high-tension cord in parallel with the frame. Contact the clamp with the horn bracket on its left side and clamp the high-tension cord at the marked position near. Clamp the high-tension cord firmly. Face the clamp end forward.	9.	High-tension cord (side) of ignition coil #1
[D]:	Pass the high-tension cord (center) of ignition coil #1 over the horn and reservoir tank inlet hose. Do not contact the high-tension cord to the horn and radiator.	10.	High-tension cord (center) of ignition coil #2
[E]:	Press firmly on the spark plug cap to fit it securely with mark " △ " on the plug cap facing exhaust side.	11.	High-tension cord (side) of ignition coil #2
[F]:	Pass the high-tension cord (side) of ignition coil #2 on the cylinder head side relative to the position of wiring harness and piping.	12.	Ignition coil rear bracket
[G]:	Do not bend the clamp end strongly by the contact of other parts.	13.	Ignition coil bracket bolt
1.	Regulator/rectifier	14.	Ignition coil bolt
2.	Ignition coil #1	15.	Regulator/rectifier bolt
3.	Ignition coil #2	"a":	5° – 25°
4.	RC mark	"c":	5° ± 10°
5.	FC mark	(a) :	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
6.	Reservoir tank inlet hose	(b) :	5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

Spark Plug Removal and Installation
BENJ18K61806002

Removal

⚠ WARNING

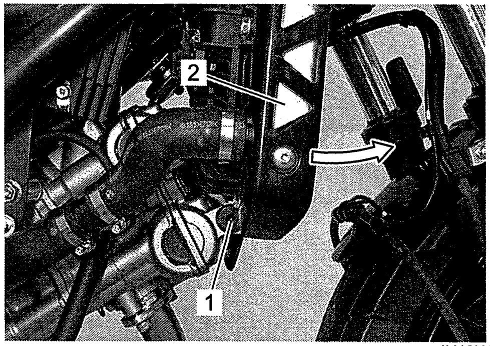
The hot radiator and hot engine can burn you.
Wait until the radiator and the engine are cool enough to touch.

Front

1) Remove the radiator mounting bolt (1).
2) Move the radiator (2) forward.

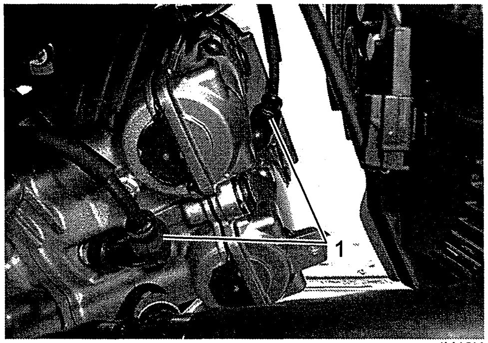
NOTICE

Be careful not to damage the radiator fins.



IH18K1180004-01

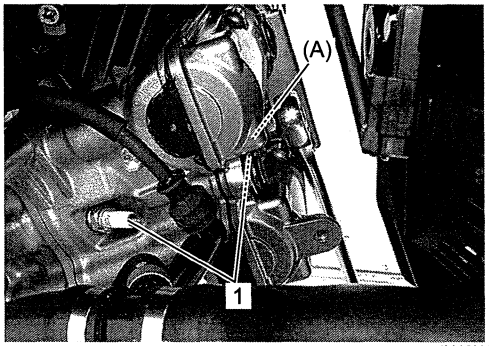
3) Disconnect the spark plug caps (1).



IH18K1180005-01

4) Remove the spark plugs (1) with a spark plug wrench.

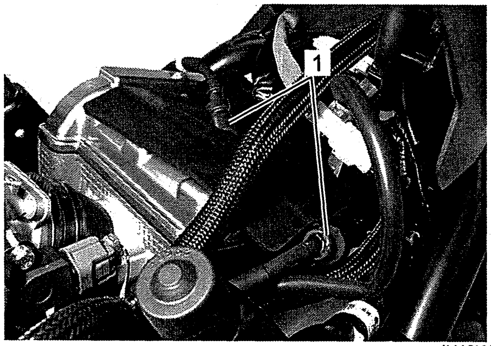
Special tool
(A): 09930–10121



IH18K1180006-03

Rear

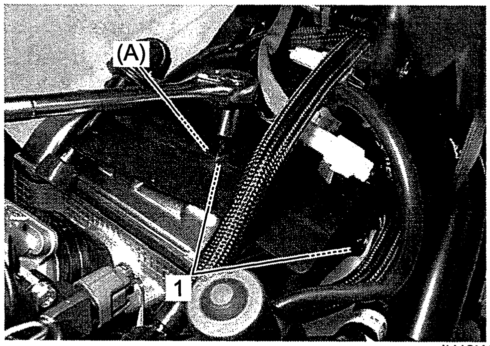
1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the spark plug caps (1).



IH18K1180007-01

3) Remove the spark plugs (1) with a spark plug wrench.

Special tool
(A): 09930–10121



IH18K1180008-01

Installation

Install the spark plug 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.

NOTICE

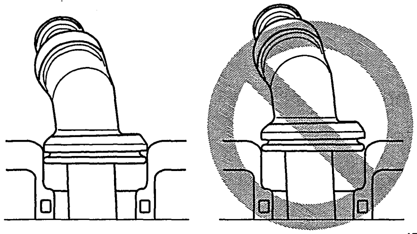
Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder head.

Special tool
09930–10121

Tightening torque
Spark plug: 11 N·m (1.1 kgf-m, 8.5 lbf-ft)

- Connect the spark plug caps. Refer to “Ignition Coil Construction” (Page 1H-3).

Center side of spark plug cap



IE31J1180030-01

- Tighten the radiator mounting bolt. ☞(Page 1F-8)

Spark Plug Inspection

BENJ18K61806003

Refer to “Spark Plug Removal and Installation” (Page 1H-7).

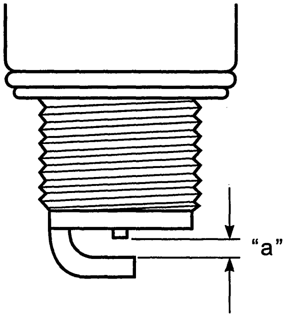
Carbon Deposits

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.

Spark Plug Gap

Measure the spark plug gap “a” using a thickness gauge.
Adjust the spark plug gap if necessary.

Spark plug
Type [Standard]: NGK MR8E-9
Gap [Standard]: 0.8 – 0.9 mm (0.032 – 0.035 in)



ID26J1180010-03

Electrodes Condition

Check the worn or burnt condition of the electrodes.
If it is extremely worn or burnt, replace the spark plug.
And also replace the spark plug if it has a broken insulator, or damaged thread.

NOTICE

Confirm the thread size and reach when

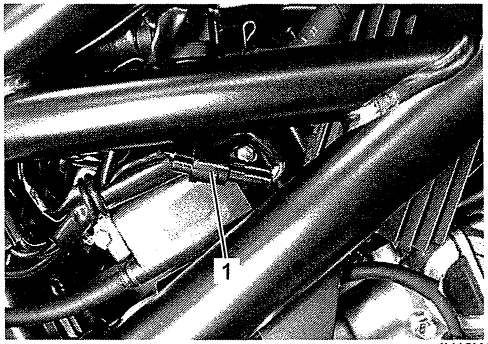
Ignition Coil Removal and Installation

BENJ18K61806004

Refer to “Ignition Coil Construction” (Page 1H-3).

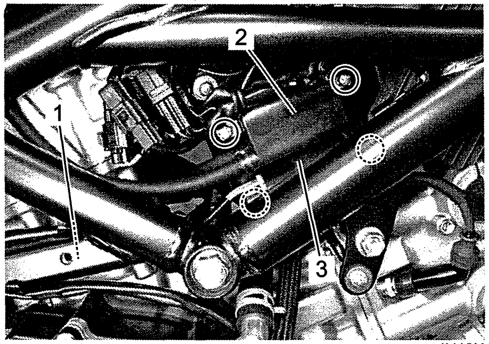
Removal

1) Remove the throttle body. ☞(Page 1D-10)
2) Disconnect the all spark plug caps. ☞(Page 1H-7)
3) Remove the right frame lower cover. ☞(Page 9D-22)
4) Disconnect the ignition coil #2 lead wire coupler (1).



IH18K1180026-03

5) Disconnect the ignition coil #1 lead wire coupler (1).
6) Remove the ignition coil #2 (2) and #1 (3).

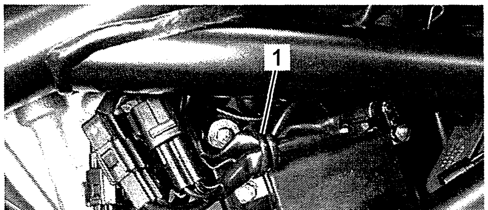


IH18K1180027-03

Installation

Install the ignition coil in the reverse order of removal. Pay attention to the following points:

- Install the clamp (1) to the ignition coil #2 bolt. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).



- Tighten the ignition coil bolts to the specified torque. Refer to “Ignition Coil Construction” (Page 1H-3).

  Tightening torque
  Ignition coil bolt: 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- Connect the ignition coil #1 and #2 lead wire couplers. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).

Ignition Coil Inspection

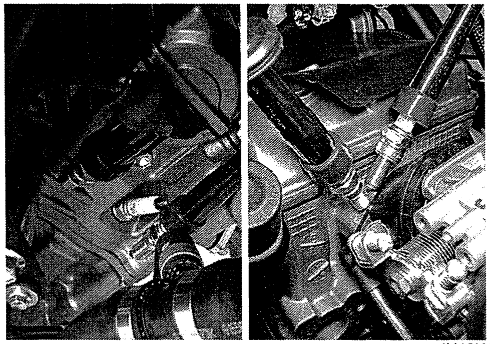
BENJ18K61806005

Ignition Coil Primary Peak Voltage

1) Remove the right frame lower cover. ☞(Page 9D-22)
2) Disconnect the fuel injector couplers. Refer to “Fuel Injector On-Vehicle Inspection” in Section 1G (Page 1G-16).
3) Disconnect the all spark plug caps. ☞(Page 1H-7)
4) Connect the new spark plugs to each spark plug cap and ground them to the cylinder heads.

NOTE

Be sure that all the spark plugs are connected properly and the battery used is in fully-charged condition.



IH18K1180010-02

5) Insert the needle point probe to the lead wire coupler.

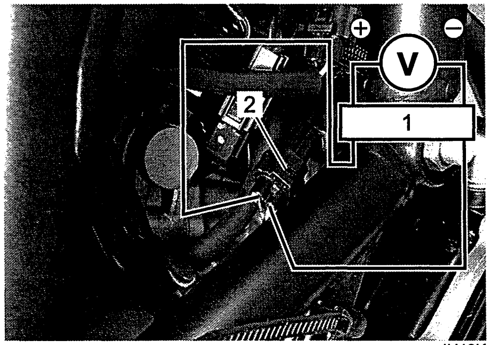
   Special tool
   09900–25008

6) Connect the multi circuit tester with the peak volt adapter (1) as follows:

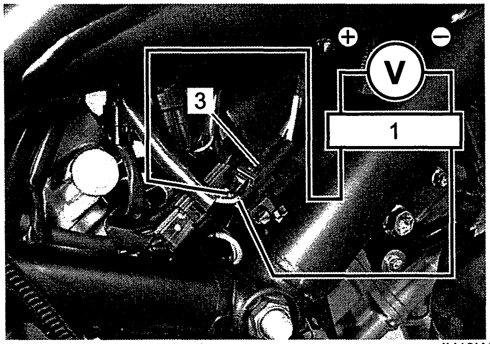
NOTE

Do not disconnect the ignition coil lead wire couplers.

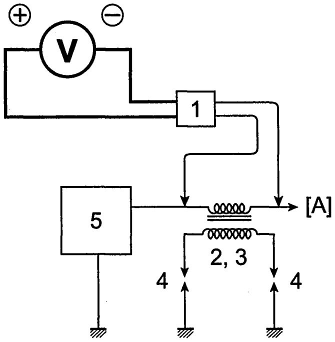
Special tool



IH18K1180011-03



IH18K1180012-02



IH18K1180013-01

[A]:	For engine stop switch
4.	New spark plug
5.	ECM

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 to the neutral and turn the ignition switch ON.

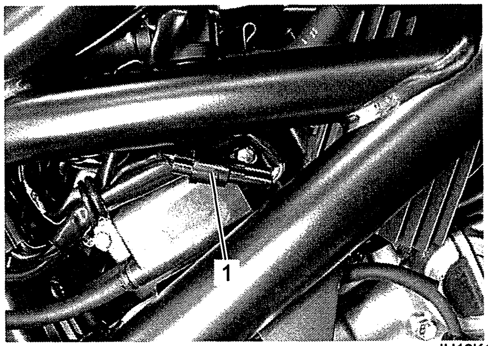
8) Repeat the c) procedure several times and measure the highest peak voltage.
If the voltage is lower than standard range, replace the ignition coil. ☞(Page 1H-9)

<u>Ignition coil primary peak voltage</u>
[Standard]: 150 V or more

9) After measuring the ignition coil primary peak voltage, install the removed parts.

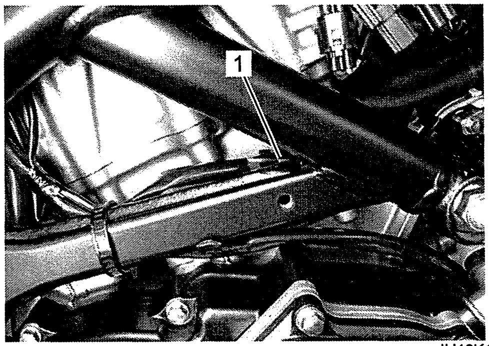
Ignition Coil Resistance

1) Disconnect the spark plug caps. ☞(Page 1H-7)
2) Disconnect the ignition coil #2 lead wire coupler (1).



IH18K1180026-03

3) Remove the right frame lower cover. ☞(Page 9D-22)
4) Disconnect the ignition coil #1 lead wire coupler (1).



IH18K1180014-02

5) Measure the ignition coil for resistance in both primary and secondary coils. If the resistance is not within the standard range, replace the ignition coil with a new one.

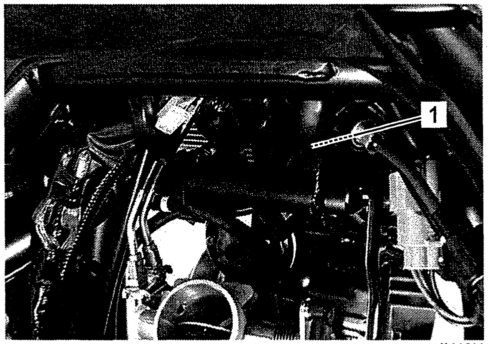
<u>Ignition coil resistance</u>
Primary [Standard]: 1 – 3 Ω ((+) B/W – (–) Brown)
Secondary [Standard]: 25000 – 40000 Ω ((+) Plug cap – Plug cap)

6) After measuring the ignition coil resistance, connect the ignition coil #1 and #2 lead wire couplers. Refer

Engine Stop Switch Inspection

BENJ18K61806006

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the right handle switch coupler (1).



IH18K1180015-01

4) Inspect the engine stop switch for continuity with a multi circuit tester.
If any abnormality is found, replace the right handle switch assembly with a new one. Refer to "Handlebar Removal and Installation (SV650/A)" in Section 6B (Page 6B-5) or "Handlebar Removal and Installation (SV650XA)" in Section 6B (Page 6B-7).

Position \ Color	B/Bl	B/R
OFF		
RUN	○	○

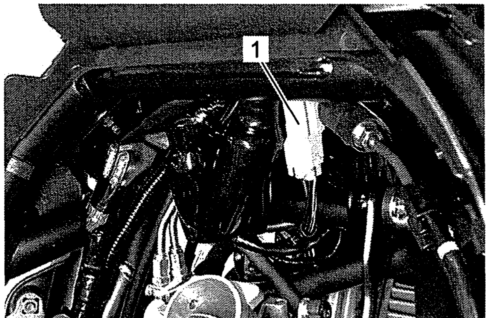
IH18K1180016-01

5) Connect the right handle switch coupler. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
6) Install the air cleaner box. ☞(Page 1D-8)

Ignition Switch Inspection

BENJ18K61806007

1) Remove the air cleaner box. ☞(Page 1D-8)
2) Disconnect the ignition switch coupler (1).



3) Inspect the ignition switch for continuity with a multi circuit tester. If any abnormality is found, replace the ignition switch with a new one.

Position \ Color	B	B/R	Dg	Br/B
ON	○	○	○	○
OFF				
LOCK				
P	○			○

IH18K1180018-02

4) After finishing the ignition switch inspection, install the removed parts.

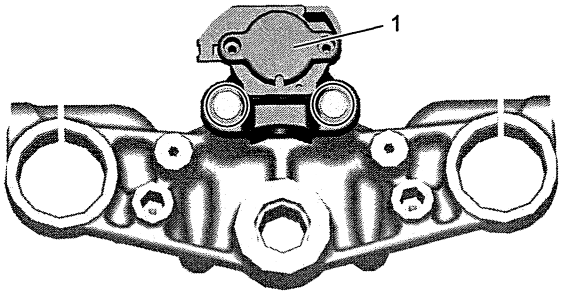
Ignition Switch Removal and Installation

BENJ18K61806008

Removal

For E.U. and U.K.

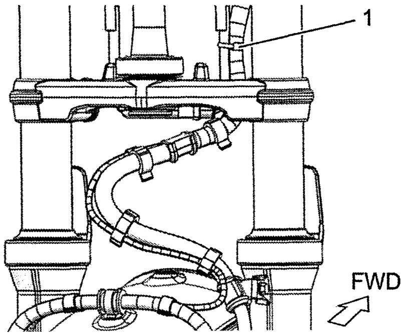
1) Remove the steering stem upper bracket. ☞(Page 6B-15)
2) Remove the ignition switch (1).



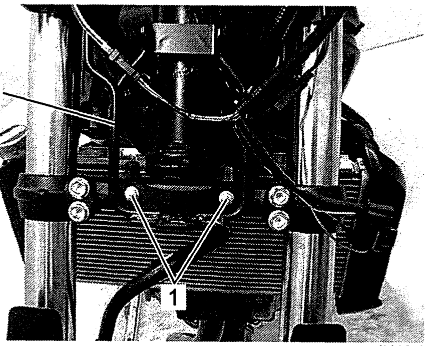
IH18K1180019-03

Except for E.U. and U.K.

1) Remove the meter cover assembly and headlight cover. ☞(Page 9D-20)
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Remove the clamp (1) (Without ABS).

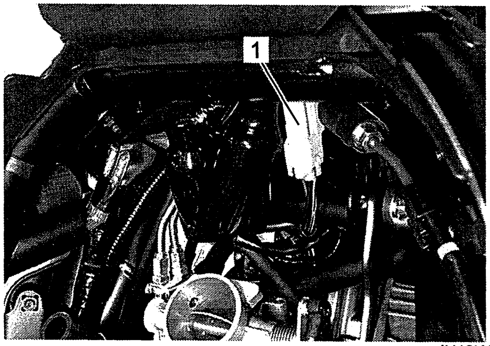


4) Remove the headlight brace bolts (1) and move the headlight brace (2) to the bottom side.



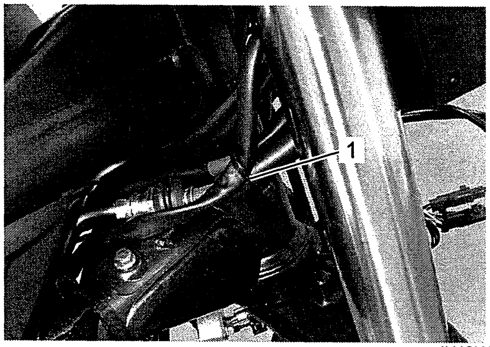
IH18K1180020-02

5) Disconnect the ignition switch coupler (1).



IH18K1180021-02

6) Remove the clamp (1).

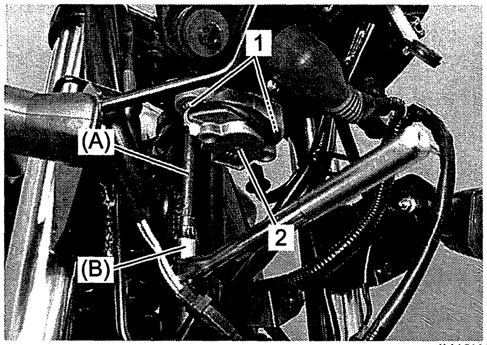


IH18K1180033-01

7) Remove the ignition switch mounting bolts (1) with the special tools.

Special tool
(A): 09930–11920
(B): 09930–11940

8) Remove the ignition switch (2).



IH18K1180022-01

Installation
Install the ignition switch in the reverse order of removal. Pay attention to the following points:

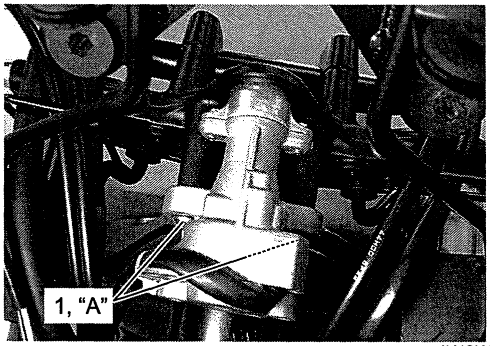
Except for E.U. and U.K.

- When reusing the ignition switch mounting bolts (1), clean the thread part and apply the thread lock to them.

  "A": Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)

- Tighten the ignition switch mounting bolts (1) with the special tools.

  Special tool
  09930–11920
  09930–11940



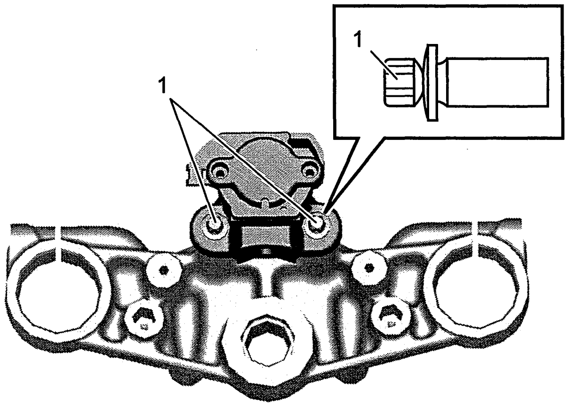
IH18K1180023-02

- Route the ignition switch lead wire. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).
- Install the headlight brace. Refer to “Meter Cover / Headlight Cover Construction” in Section 9D (Page 9D-2).
- Install the clamp (Without ABS).
  Refer to “Speed Sensor Routing Diagram (Without ABS)” in Section 9C (Page 9C-2).

For E.U. and U.K.

- Tighten new ignition switch mounting bolts (1) with the special tools until head of each bolt is broken off.

  Special tool
  09930–11940
  09940–63110



IH18K1180024-02

Specifications

Tightening Torque Specifications

BENJ18K61807001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Spark plug	11	1.1	8.5	☞(Page 1H-8)
Ignition coil bolt	10	1.0	7.5	☞(Page 1H-9)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
“Ignition Coil Construction” (Page 1H-3)
“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

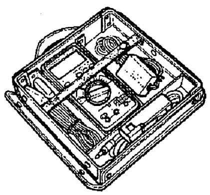
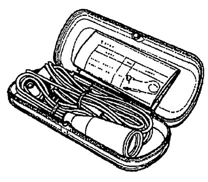
Recommended Service Material

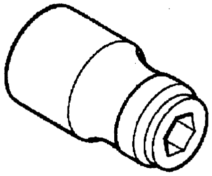
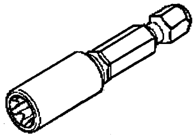
BENJ18K61808001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000–32150	☞(Page 1H-12)

Special Tool

BENJ18K61808002

09900–25008 Multi circuit tester set 1. Multi circuit tester (09900-25004) 2. Revolution sensor (09900-25005) 3. Lead wire (09900-25006) 4. Peak volt adapter (09900-25007) ☞(Page 1H-9) 	09900–25009 Needle point probe set ☞(Page 1H-9) 

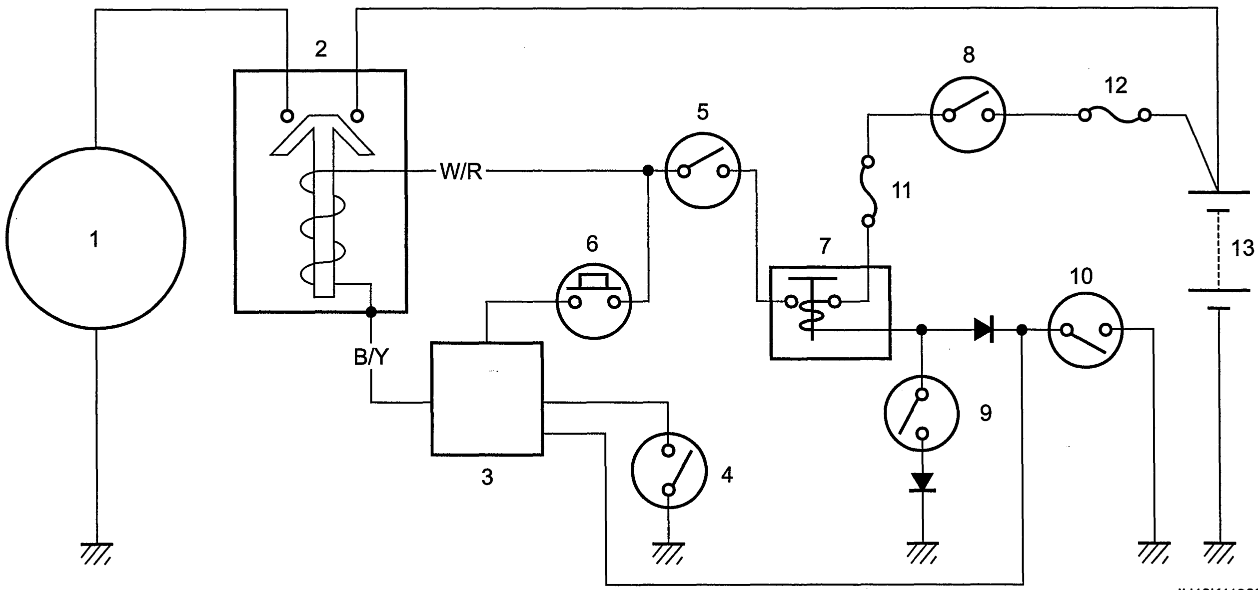
09930–11940 Torx® bit holder (3/8 sq.) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞(Page 1H-12) / ☞(Page 1H-12) / ☞(Page 1H-13) 	09940–63110 Torx® bit (E8) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞(Page 1H-13) 

Starting System

Schematic and Routing Diagram

Starting System Diagram

BENJ18K61902001



IH18K1190001-06

1. Starter motor	5. Engine stop switch	9. Side-stand switch	13. Battery
2. Starter relay	6. Starter switch	10. GP switch	
3. ECM	7. Side-stand relay	11. Ignition fuse	
4. Clutch lever position switch	8. Ignition switch	12. Main fuse	

Component Location

Starting System Components Location

BENJ18K61903001

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

Diagnostic Information and Procedures

Starting System Symptom Diagnosis

BENJ18K61904001

Condition	Possible cause	Correction / Reference Item
Engine does not turn though the starter motor runs	Faulty starter clutch.	*Replace.* ☞*(Page 1I-9)*
Starter button is not effective	Run down battery.	*Repair or replace.* ☞*(Page 1J-10)*
	Defective switch contacts.	*Replace.* • *SV650/A:* ☞*(Page 6B-5)*

Starter Motor Will Not Run

BENJ18K61904002

NOTE

Make sure the fuse is not blown and the battery is fully-charged before diagnosing.

Troubleshooting

Step 1

1) Shift the transmission into neutral.
2) 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 switch is pushed.

Is a click sound heard?

Yes Go to Step 2.

No Go to Step 3.

Step 2

Check if the starter motor runs when its terminal is connected to the battery (+) terminal.

NOTICE

Do not use thin “wire” because a large amount of current flows.

Does the starter motor run?

Yes
- Faulty starter relay.
- Loose or disconnected starter motor lead wire.
- Loose or disconnected between starter relay and battery (+) terminal.

No Faulty starter motor.

Step 3

Measure the voltage between W/R wire (+) and B/Y wire (–) at the starter relay coupler when the starter switch is pushed. Refer to “Starting System Diagram” (Page 1I-1).

Is the voltage OK?

Yes Go to Step 4.

No
- Faulty ignition switch.
- Faulty engine stop switch.
- Faulty clutch lever position switch.
- Faulty GP switch.

Step 4

Check the starter relay. ☞(Page 1I-7)

Is the starter relay OK?

Yes Poor contact of the starter relay.

No Faulty starter relay.

Starter Motor Runs But Does Not Crank the Engine

BENJ18K61904003

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 1

Check the side-stand switch. ☞(Page 1I-7)

Is the side-stand switch OK?

Yes Go to Step 2.

No Faulty side-stand switch.

Step 2

Check the starter clutch. ☞(Page 1I-10)

Is the starter clutch OK?

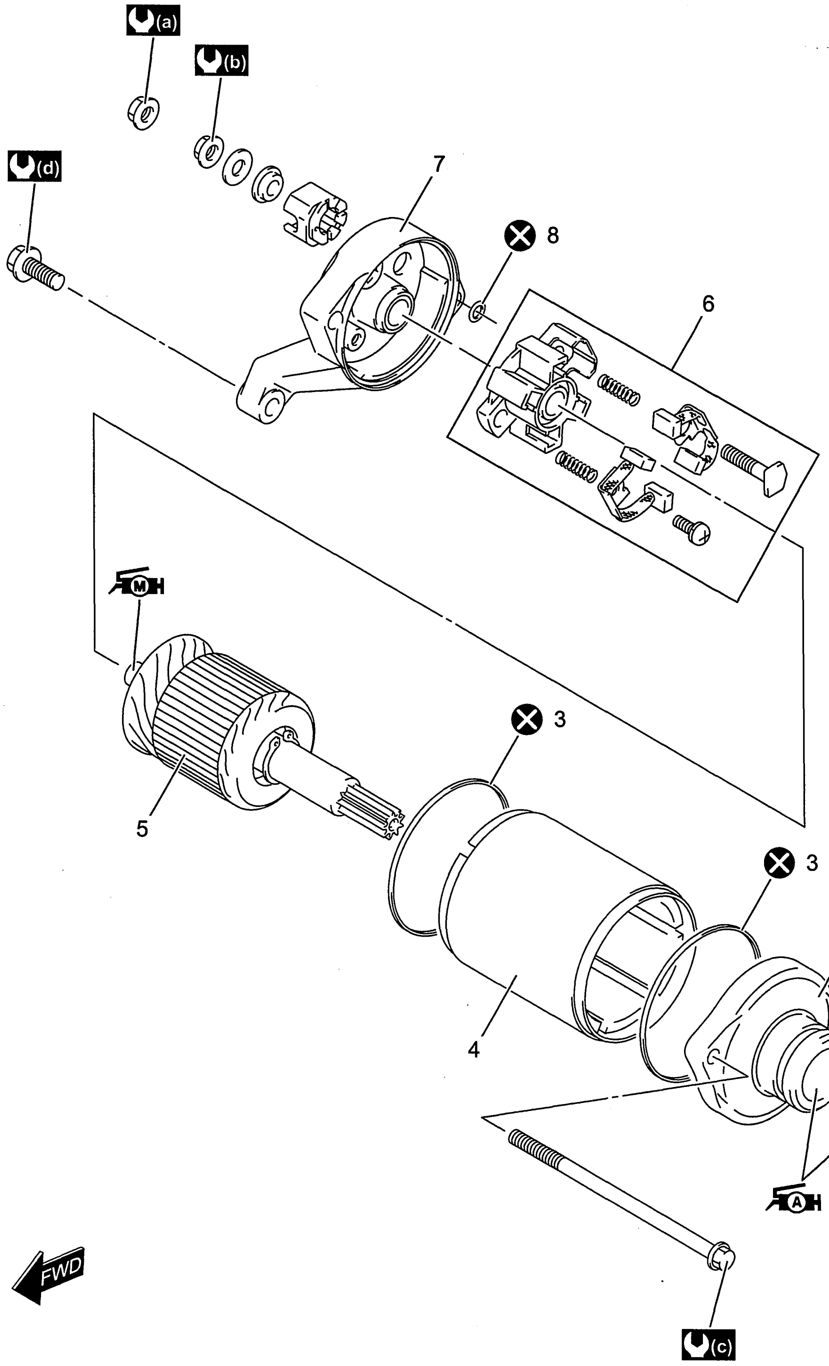
Yes
- Open circuit in wire harness.
- Poor contact of connector.

No Faulty starter clutch.

Repair Instructions

Starter Motor Components

BENJ18K61906001



IH18K1190002-02

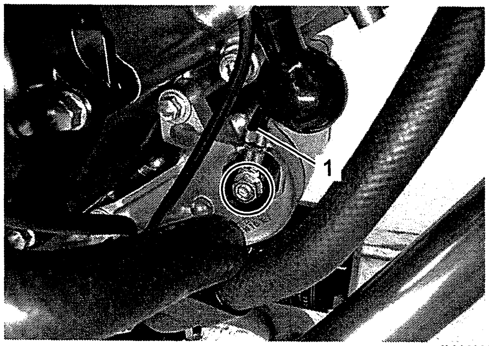
1. O-ring	6. Brush holder set	(c) : 5.0 N·m (0.51 kgf-m, 3.70 lbf-ft)
2. Front bracket	7. Rear bracket	(d) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
3. Square ring	8. O-ring	A : Apply grease.

Starter Motor Assembly Removal and Installation

BENJ18K61906002

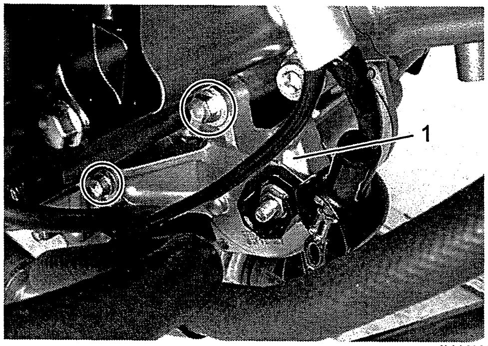
Removal

1) Turn the ignition switch OFF and disconnect the battery (–) lead wire. ☞(Page 1J-13)
2) Disconnect the starter motor lead wire (1).



IH18K1190003-01

3) Remove the starter motor (1).



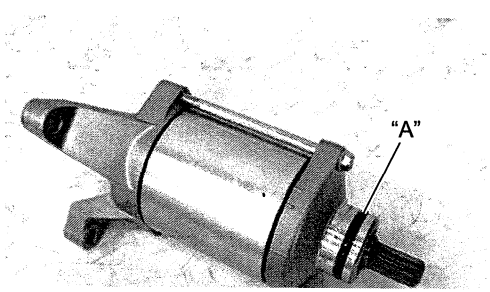
IH18K1190004-01

Installation

Install the starter motor in the reverse order of removal.
Pay attention to the following points:

- Apply grease to the new O-ring.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



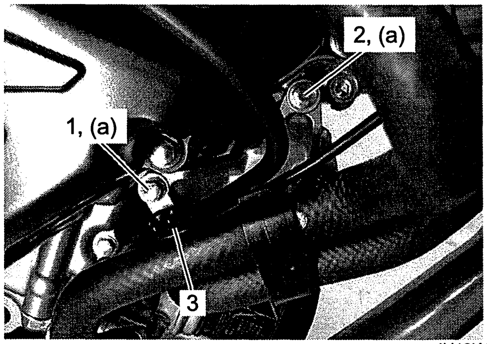
- Tighten the starter motor lower mounting bolt (1) first, then tighten the starter motor upper mounting bolt (2). Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).

NOTE

Fit the clamp (3) to the starter motor lower mounting bolt (1).

Tightening torque
Starter motor mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

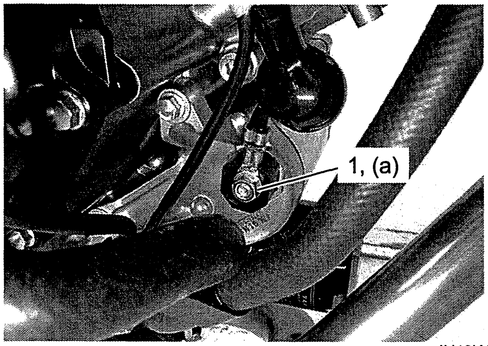
- Clamp the oil pressure lead wire and water pump drain hose with the clamp (3).



IH18K1190006-01

- Tighten the starter motor lead wire mounting nut (1) to the specified torque.

Tightening torque
Starter motor lead wire mounting nut (a): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)



IH18K1190007-01

Starter Motor Disassembly and Reassembly

BENJ18K61906003

Refer to "Starter Motor Assembly Removal and Installation" (Page 1I-4).

Disassembly

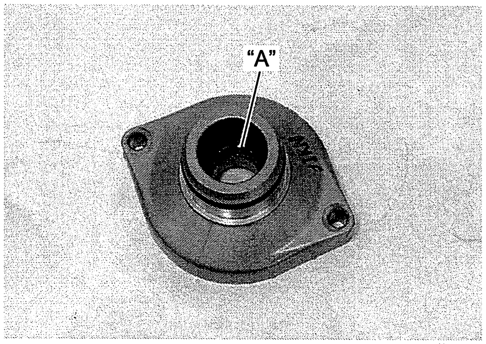
Disassemble the starter motor. ☞(Page 1I-3)

Reassembly

Reassemble the starter motor in the reverse order of disassembly. Pay attention to the following points:

- Replace the O-ring and square ring with new ones.
- Apply grease to the lip of the oil seal.

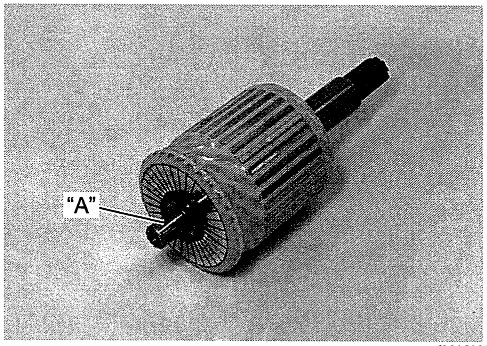
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1190008-01

- Apply a small quantity of moly paste to the armature shaft.

"A": Assembly lubrication 99000–25140 (SUZUKI MOLY PASTE)

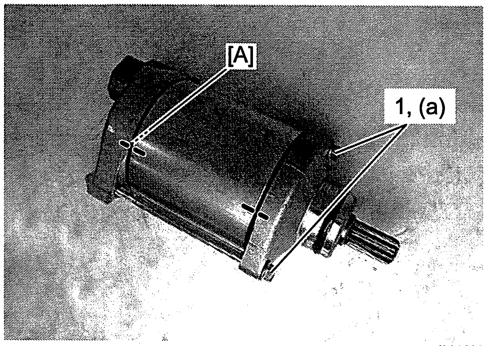


IH18K1190009-03

- Align the match mark on the starter motor case with the match mark on the bracket.

NOTE

The groove side [A] of starter motor case should face rear bracket.



IH18K1190010-02

Starter Motor Inspection

BENJ18K61906004

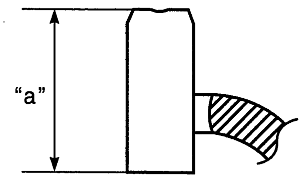
Refer to "Starter Motor Disassembly and Reassembly" (Page 1I-5).

Carbon Brush

Inspect the carbon brushes for abnormal wear, cracks or smoothness in the brush holder.
If any damages are found, replace the brush holder set with a new one.
Make sure that the length "a" is not less than the service limit. If this length becomes less than the service limit, replace the brush holder set with a new one.

<u>Starter motor brush length</u>
[Limit]: 6.5 mm (0.26 in)

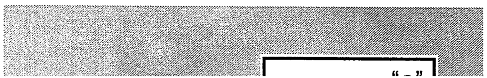
Special tool
09900–20102



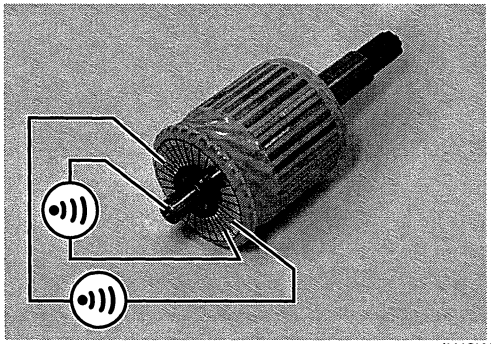
I718H1190013-01

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.

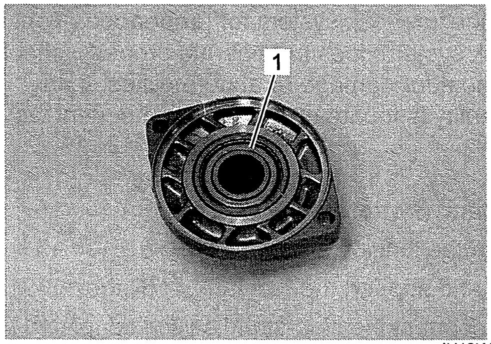


Armature Coil
Measure for continuity between each segment. Measure for continuity between each segment and the armature shaft.
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the starter motor with a new one.



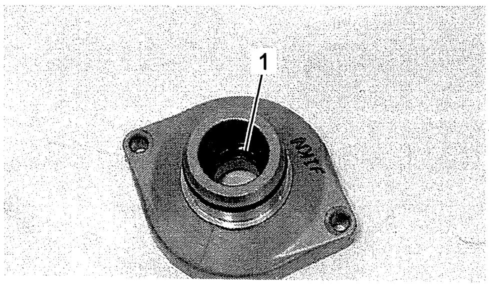
IH18K1190012-02

Bearing
Check the bearing (1) for abnormal noise and smooth rotation. If any defects are found, replace the starter motor with a new one.



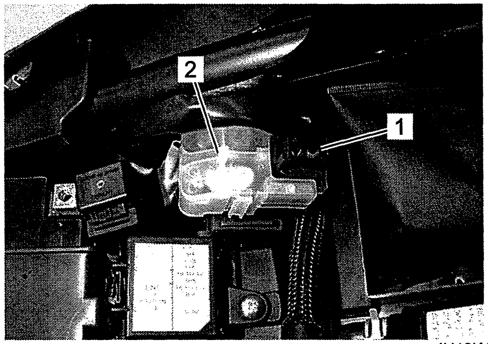
IH18K1190013-01

Oil Seal
Check the seal lip (1) for damage.
If any damage is found, replace the starter motor with a new one.



Starter Relay Removal and Installation
BENJ18K61906005

Removal
1) Remove the seat. ☞(Page 9D-18)
2) Disconnect the battery (–) lead wire. ☞(Page 1J-13)
3) Disconnect the starter relay coupler (1) and remove the starter relay cover (2).



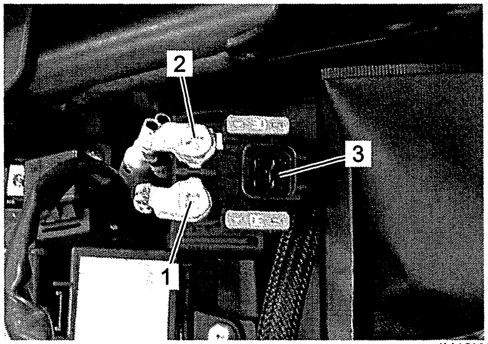
IH18K1190015-02

4) Disconnect the starter motor lead wire (1) and battery (+) lead wire (2).

NOTE

Be sure to disconnect the starter motor lead wire (1) first, then disconnect the battery (+) lead wire (2).

5) Remove the starter relay (3).



IH18K1190016-02

Installation
Install the starter relay in the reverse order of removal.

Starter Relay Inspection

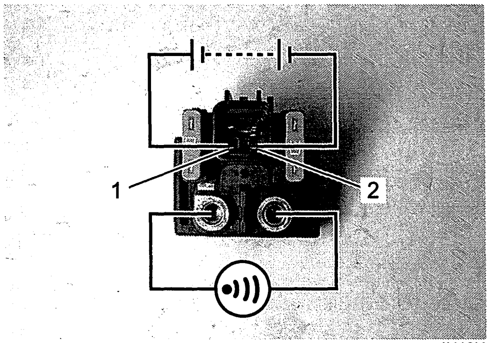
BENJ18K61906006

Refer to "Starter Relay Removal and Installation" (Page 1I-6).

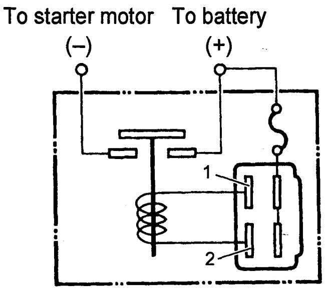
1) Apply 12 V to (1) and (2) terminals and check for continuity between the positive and negative terminals using the multi circuit tester. If the starter relay clicks and continuity is found, the relay is OK.

NOTICE

Do not apply battery voltage to the starter relay for five seconds or more, otherwise the relay coil may overheat and get damaged.



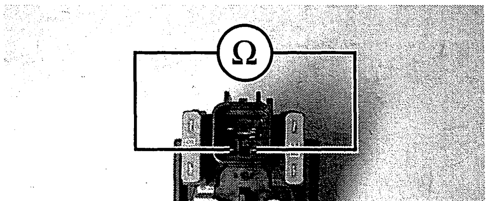
IH18K1190017-01



IE31J1190016-02

2) 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.

Starter relay resistance
[Standard]: 3 – 6 Ω

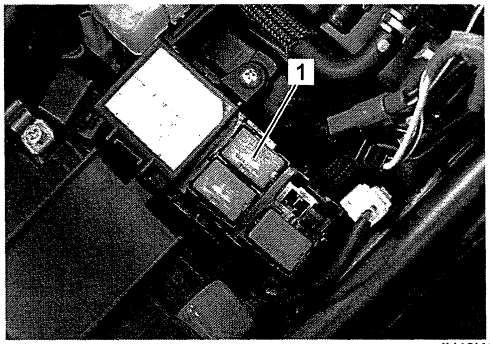


Side-stand Relay Removal and Installation

BENJ18K61906007

Removal

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Remove the cap and side-stand relay (1).



IH18K1190019-01

Installation

Install the side-stand relay in the reverse order of removal.

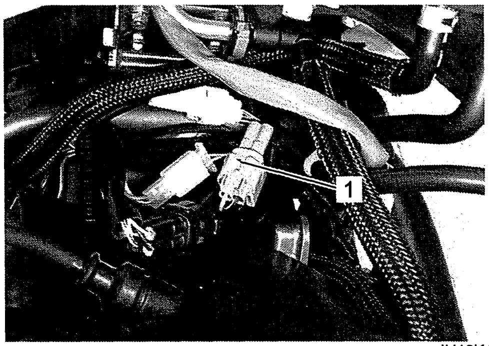
Starter Interlock System Parts Inspection

BENJ18K61906008

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) Lift and support the fuel tank. ☞(Page 1G-9)
3) Disconnect the side-stand switch coupler (1).



IH18K1190020-01

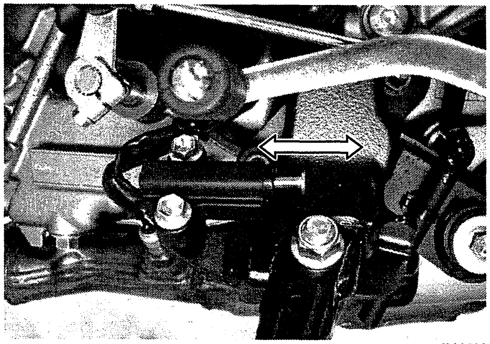
4) Set the "Diode test" of the multi circuit tester. Refer to "Precautions for Circuit Tester" in Section 00 (Page 00-7).
5) Check that the tester reads 1.4 V or more.

NOTE

If the tester reads less than 1.4 V when the tester probes are not connected, replace its battery.

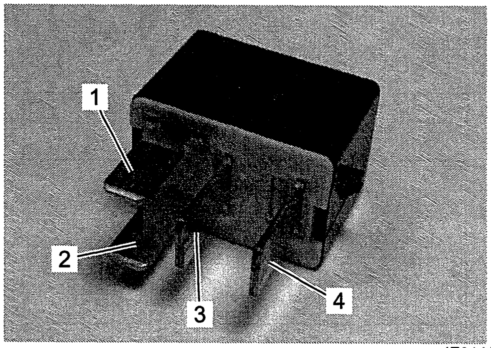
6) Measure the voltage between G ((+) probe) and B/W ((–) probe) lead wires of the side-stand switch.

Side-stand switch voltage
ON (Side-stand retracted) [Standard]: 0.4 – 0.6 V
OFF (Side-stand on the ground) [Standard]: 1.4 V or more



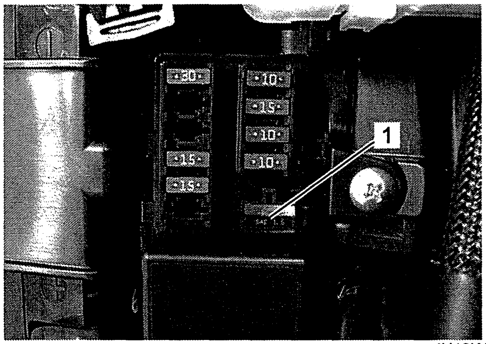
IH18K1190021-02

Side-stand Relay
Refer to "Side-stand Relay Removal and Installation" (Page 1I-7).
First, check for insulation with a circuit tester between terminals (3) and (4). Next, check for continuity between (3) and (4) with 12 V voltage applied, positive (+) to terminal (1) and negative (–) to terminal (2). If continuity does not exist, replace the relay with a new one.



IE31J1190021-01

Diode
1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Remove the fuse box cap and diode (1).



IH18K1190022-01

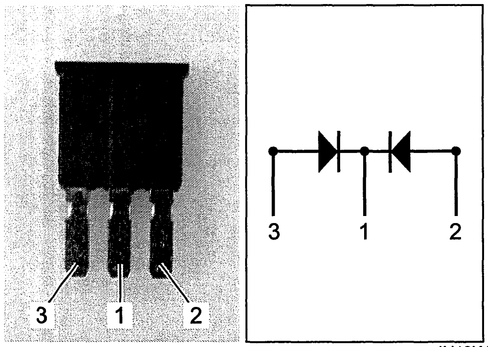
4) Set the "Diode test" of the multi circuit tester. Refer to "Precautions for Circuit Tester" in Section 00 (Page 00-7).
5) Check that the tester reads 1.4 V or more.

NOTE

If the tester reads less than 1.4 V when the tester probes are not connected, replace its battery.

6) Measure the voltage between the (1), (2) and (3) terminals.

Diode voltage



IH18K1190023-02

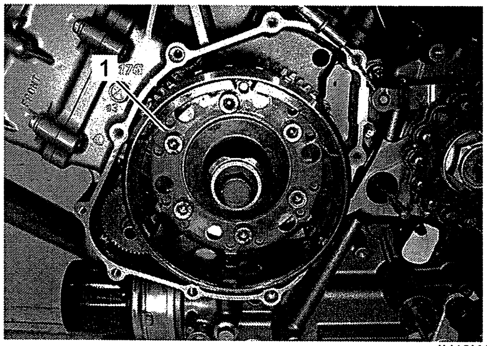
		(+) Probe of tester to:	
(–) Probe of tester to:		2, 3	1
	2, 3	—	1.4 V or more (Tester's battery voltage)
	1	0.4 – 0.6 V	—

Starter Clutch Removal and Installation

BENJ18K61906009

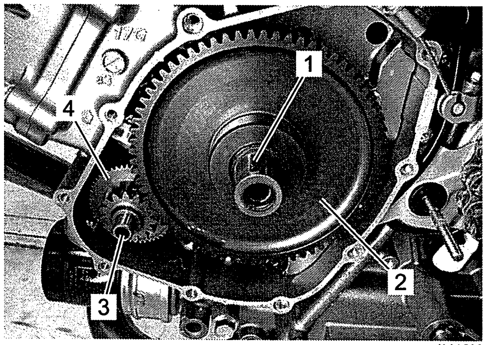
Removal

1) Drain the engine oil. ☞(Page 1E-5)
2) Remove the generator rotor (1). ☞(Page 1J-5)



IH18K1190026-01

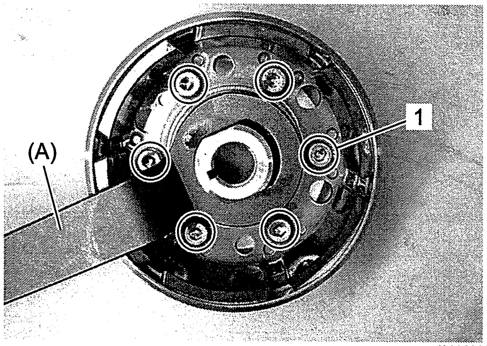
3) Remove the key (1) and starter clutch gear (2).
4) Remove the shaft (3) and starter idle gear (4).



IH18K1190027-01

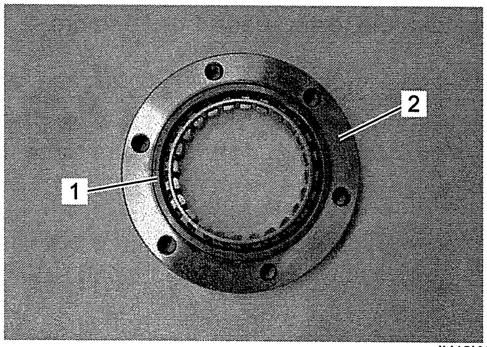
5) Hold the generator rotor with the special tool and remove the starter clutch bolts (1).

Special tool
(A): 09930–44530



IH18K1190028-01

6) Remove the starter one way clutch (1) from the guide (2).



IH18K1190029-01

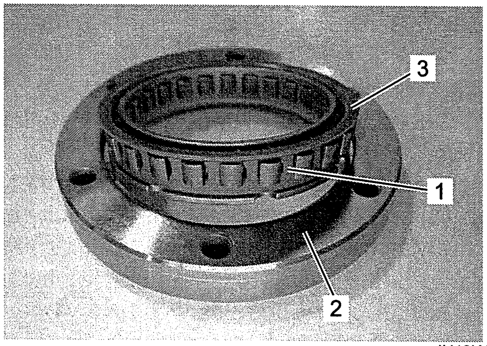
Installation

Install the starter clutch in the reverse order of removal. Pay attention to the following points:

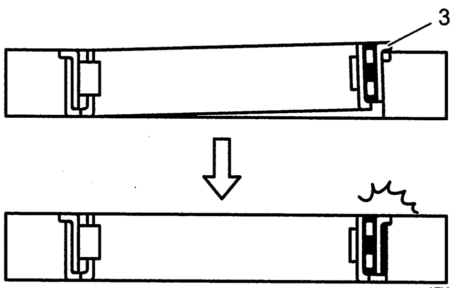
- Apply engine oil to the starter one way clutch (1).
- When inserting the one way clutch (1) into the guide (2), fit the flange (3) in the step of the guide (2).

NOTE

Be sure to seat the flange (3) of the one way clutch (1) to the guide (2).

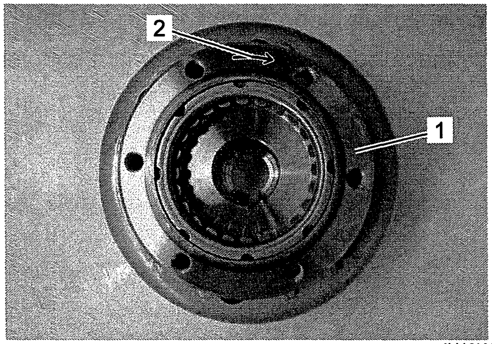


IH18K1190030-02



IE31J1190036-02

- Install the guide (1) to the generator rotor with the arrow mark (2) faced upward.



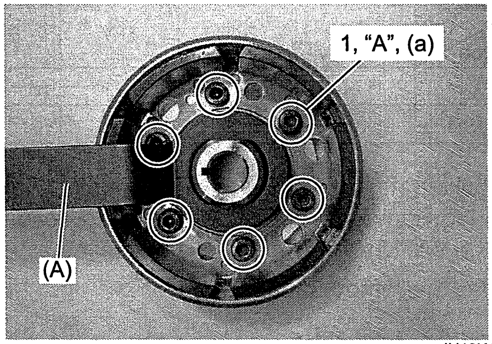
IH18K1190031-01

- Apply thread lock to the bolts (1), and then tighten them to the specified torque with the special tool.

“A”: Thread lock cement 99000–32030 (THREAD LOCK CEMENT 1303B)

Special tool
(A): 09930–44530

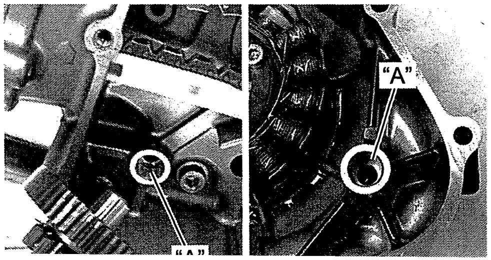
Tightening torque
Starter clutch bolt (a): 25 N·m (2.5 kgf-m, 18.5 lbf-ft)



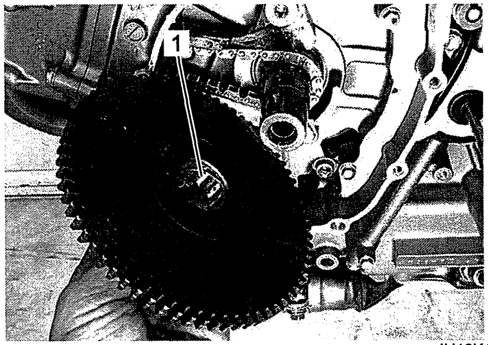
IH18K1190032-01

- Apply molybdenum oil solution to the starter idle gear shaft holes.

“A”: Assembly lubrication (Molybdenum oil solution)

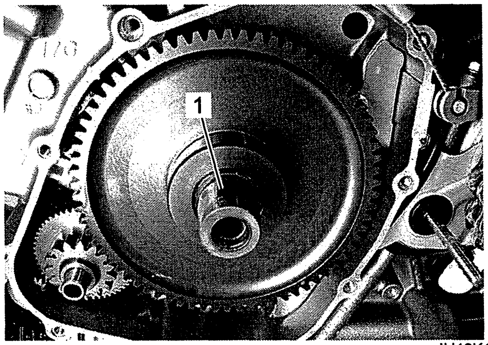


- Apply engine oil to the bushing (1) of the starter clutch gear.



IH18K1190034-01

- Fit the key (1) in the key slot on the crankshaft.



IH18K1190035-01

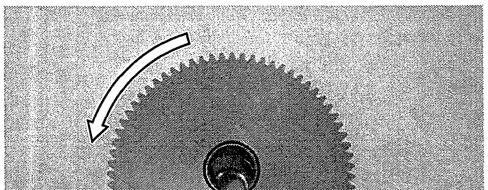
- Install the generator rotor onto crankshaft. ☞(Page 1J-6)

Starter Clutch Inspection

BENJ18K61906010

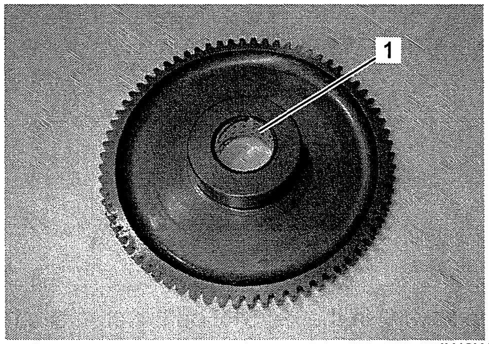
Starter Clutch

1) Install the starter clutch gear onto the starter clutch.
2) Turn the starter clutch 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 clutch gear for wear or damage.
   If they are found to be damaged, replace them with new ones.



Starter Clutch Gear Bushing

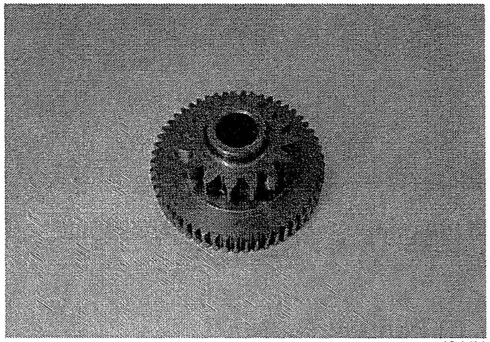
Inspect the starter clutch gear bushing (1) for wear or damage. If any defects are found, replace the starter clutch set with a new one.



IH18K1190037-01

Starter Idle Gear

Inspect the starter idle gear for wear or damage. If any defects are found, replace it with a new one.

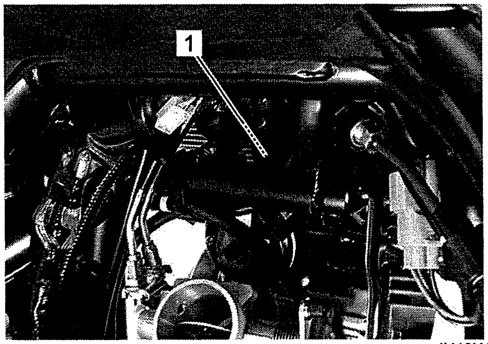


I944H1190037-01

Starter Switch Inspection

BENJ18K61906011

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the right handlebar switch coupler (1).



IH18K1190038-01

4) Inspect the starter switch for continuity with a multi circuit tester.
   If any defect is found, replace the right handle switch assembly with a new one. Refer to "Handlebar Removal and Installation (SV650/A)" in Section 6B (Page 6B-5) or "Handlebar Removal and Installation (SV650XA)" in Section 6B (Page 6B-7).

Position \ Color	B/R	Bl/B	B/Y	B/W
•			O	O
PUSH	O	O		

IH18K1190039-01

5) Install the right handlebar switch coupler. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
6) Install the removed parts.

Specifications

Tightening Torque Specifications

BENJ18K61907001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Starter motor mounting bolt	10	1.0	7.5	☞(Page 1I-4)
Starter motor lead wire mounting nut	6.0	0.61	4.45	☞(Page 1I-4)
Starter motor set bolt	5.0	0.51	3.70	☞(Page 1I-5)
Starter clutch bolt	25	2.5	18.5	☞(Page 1I-10)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Starter Motor Components" (Page 1I-3)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K61908001

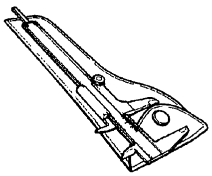
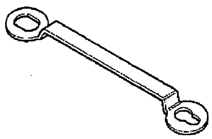
Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞(Page 1I-10)
	SUZUKI MOLY PASTE	P/No.: 99000–25140	☞(Page 1I-5)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 1I-4) / ☞(Page 1I-5)
Thread lock cement	THREAD LOCK CEMENT 1303B	P/No.: 99000–32030	☞(Page 1I-10)

NOTE

Required service material(s) is also described in:
"Starter Motor Components" (Page 1I-3)

Special Tool

BENJ18K61908002

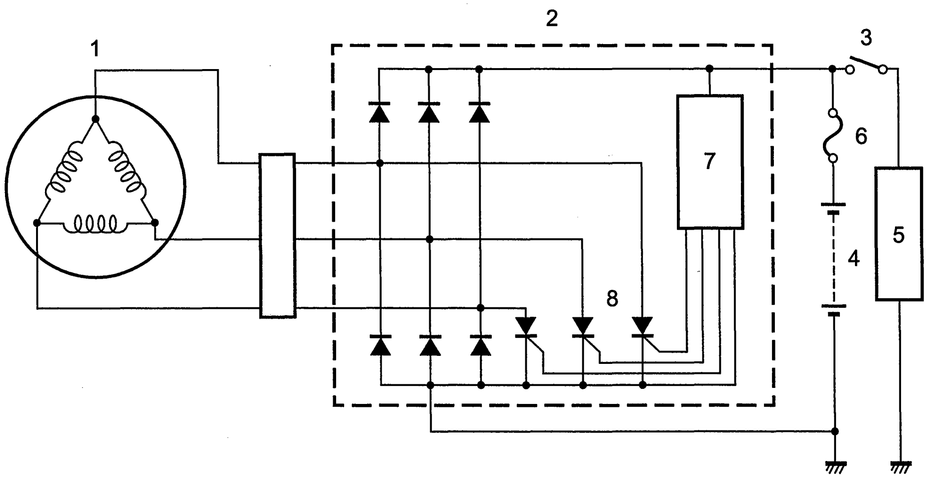
09900–20102 Vernier calipers (200 mm) ☞(Page 1I-5) 	09930–44530 Rotor holder ☞(Page 1I-9) / ☞(Page 1I-10) 

Charging System

Schematic and Routing Diagram

Charging System Diagram

BENJ18K61A02001



IH18K11A0001-02

1. Generator	4. Battery	7. Integrated circuit
2. Regulator/rectifier	5. Load	8. Silicon controlled rectifier
3. Ignition switch	6. Main fuse	

Component Location

Charging System Components Location

BENJ18K61A03001

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

Diagnostic Information and Procedures

Charging System Symptom Diagnosis

BENJ18K61A04001

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. ☞(Page 1J-5) ☞(Page 1J-6)*
	Short-circuited or punctured regulator/ rectifier.	*Replace. ☞(Page 1J-10)*
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. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective regulator/rectifier.	*Replace. ☞(Page 1J-10)*
	Defective cell plates in the battery.	*Replace the battery. ☞(Page 1J-13)*
Generator overcharges	Internal short-circuit in the battery.	*Replace the battery. ☞(Page 1J-13)*
	Damaged or defective regulator/rectifier.	*Replace. ☞(Page 1J-10)*
	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. ☞(Page 1J-5) ☞(Page 1J-6)*
	Defective regulator/rectifier.	*Replace. ☞(Page 1J-10)*
Battery overcharges	Faulty regulator/rectifier.	*Replace. ☞(Page 1J-10)*
	Faulty battery.	*Replace. ☞(Page 1J-13)*
	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. ☞(Page 1J-4)*
	Cell plates have lost much of their active materials a result of overcharging.	*Replace the battery and correct the charging system. ☞(Page 1J-13)*
	Internal short-circuit in the battery.	*Replace the battery. ☞(Page 1J-13)*
	Too low battery voltage.	*Recharge the battery fully. ☞(Page 1J-10)*
	Too old battery.	*Replace the battery. ☞(Page 1J-13)*
Battery "sulfation"	Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	*Replace the battery. ☞(Page 1J-13)*
	The battery was left unused in a cold climate for too long.	*Replace the battery if badly sulfated. ☞(Page 1J-13)*
"Sulfation", acidic white powdery substance or spots on surface of cell plates	Cracked battery case.	*Replace the battery. ☞(Page 1J-13)*
	Battery has been left in a run-down condition for a long time.	*Replace the battery. ☞(Page 1J-13)*

Battery Runs Down Quickly

BENJ18K61A04002

Troubleshooting

Step 1

Check accessories which use excessive amounts of electricity.

Are accessories installed?

Yes Remove accessories.

No Go to Step 2.

Step 2

Check the battery for current leakage. ☞(Page 1J-4)

Is the battery for current leakage OK?

Yes Go to Step 3.

No
- Short circuit of wire harness.
- Faulty electrical equipment.

Step 3

Measure the regulated voltage between the battery terminals. ☞(Page 1J-4)

Is the regulated voltage OK?

Yes
- Faulty battery.
- Abnormal driving condition.

No Go to Step 4.

Step 4

Measure the resistance of the generator coil. ☞(Page 1J-4)

Is the resistance of generator coil OK?

Yes Go to Step 5.

No
- Faulty generator coil.
- Poor contact of couplers.

Step 5

Measure the generator no-load performance. ☞(Page 1J-4)

Is the generator no-load performance OK?

Yes Go to Step 6.

No Faulty generator.

Step 6

Inspect the regulator/rectifier. ☞(Page 1J-8)

Is the regulator/rectifier OK?

Yes Go to Step 7.

No Faulty regulator/rectifier.

Step 7

Inspect wirings.

Is the wirings OK?

Yes Faulty battery.

No
- Short circuit of wire harness.
- Poor contact of couplers.

Battery Current Leakage Inspection

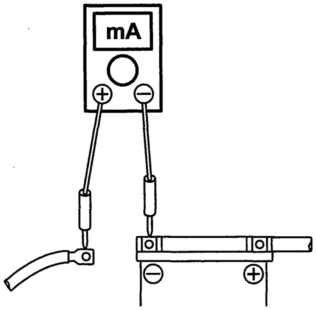
BENJ18K61A06001

1) Turn the ignition switch OFF.
2) Disconnect the battery (–) lead wire. ☞(Page 1J-13)
3) 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.

NOTICE

- **In case of a large current leak, turn the tester to high range first to avoid tester damage.**
- **Do not turn the ignition switch to ON position when measuring current.**

Battery leakage current
[Standard]: 3 mA or less



I649G11A0002-03

4) Connect the battery (–) terminal. ☞(Page 1J-13)

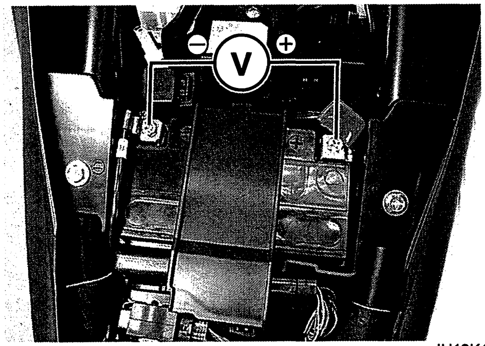
Regulated Voltage Inspection

BENJ18K61A06002

1) Remove the seat. ☞(Page 9D-18)
2) Start the engine and keep it running at 5000 r/min with the dimmer switch turned HI position.
3) Measure the DC voltage between the battery (+) and (–) terminals using the multi circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier.
   - Generator: ☞(Page 1J-4)
   - Regulator/rectifier: ☞(Page 1J-8)

NOTE

When making this test, be sure that the battery is in fully charged condition.



IH18K11A0002-01

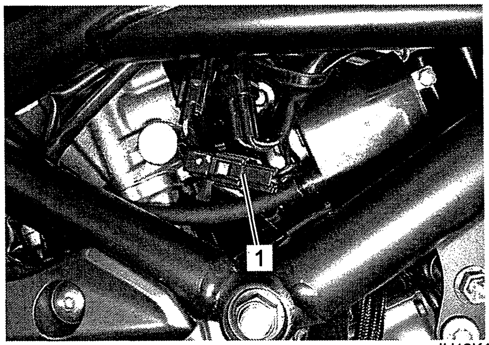
4) Install the removed parts.

Generator Inspection

BENJ18K61A06003

Generator Coil Resistance

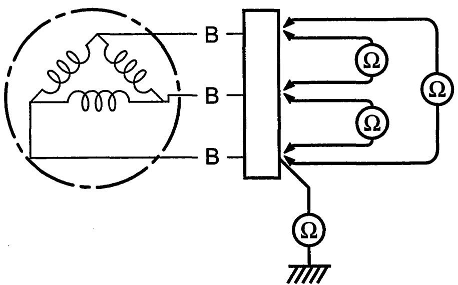
1) Disconnect the generator coupler (1).



IH18K11A0003-01

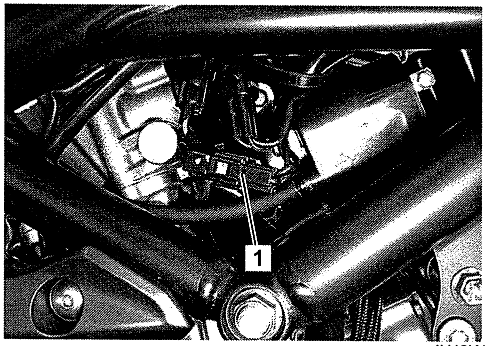
2) Measure the resistance between the three lead wires.
   If the resistance is out of specified value, replace the stator with a new one. Also, check that the generator core is insulated properly.

Generator coil resistance
[Standard]: 0.189 – 0.231 Ω (B – B)
∞ Ω (B – Ground)



No-load Performance

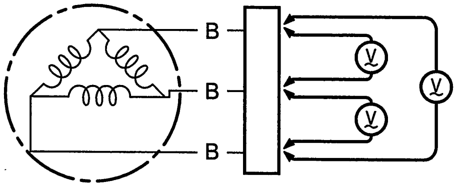
1) Disconnect the generator coupler (1).



IH18K11A0005-02

2) Start the engine and keep it running at 5000 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 stator with a new one.

   <u>**Generator no-load voltage**</u>
   When engine is cold
   At 5000 r/min [Standard]: 60 V (AC) or more



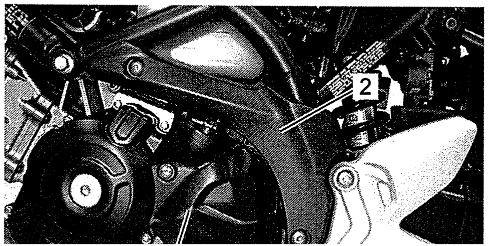
IH18K11A0006-01

4) Connect the generator coupler.

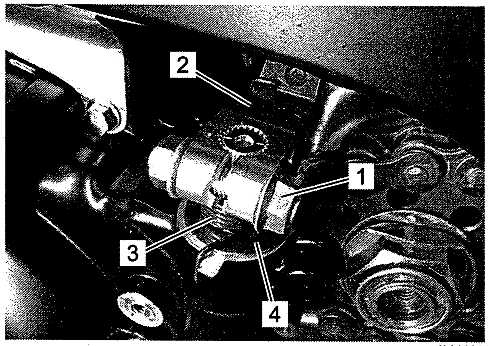
Generator Removal

BENJ18K61A06004

1) Drain engine oil. ☞(Page 1E-5)
2) Lift and support the fuel tank. ☞(Page 1G-9)
3) Remove the engine sprocket cover (1). Refer to “Engine Sprocket Removal and Installation” in Section 3A (Page 3A-4).
4) Remove the left frame lower cover (2). ☞(Page 9D-22)

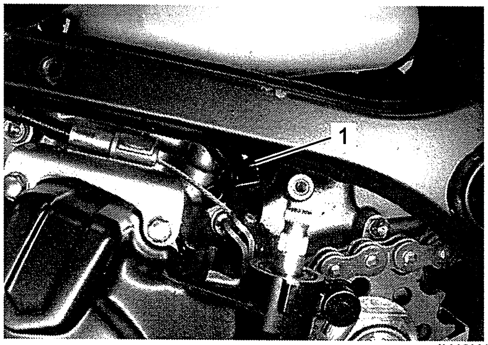


5) Remove the clutch release arm bolt (1) and nut.
6) Remove the clutch release arm (2), spring (3) and washer (4).



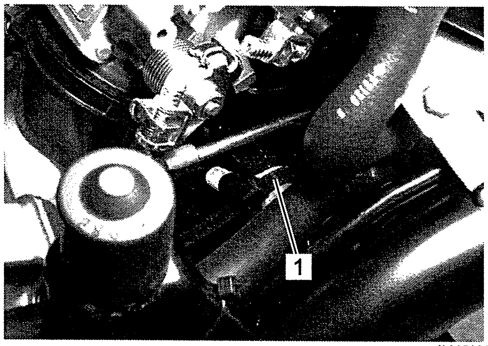
IH18K11A0008-01

7) Release the generator lead wires from the clamp (1).



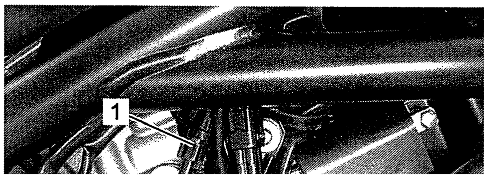
IH18K11A0009-01

8) Remove the clamp (1).

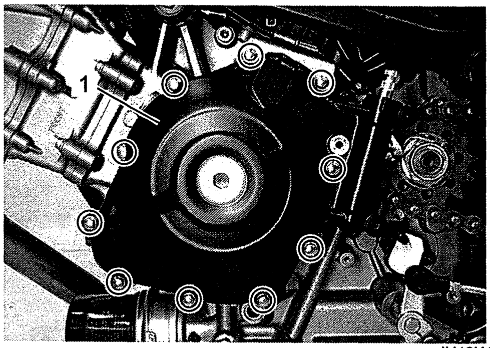


IH18K11A0031-01

9) Disconnect the CKP sensor coupler (1) and generator coupler (2).

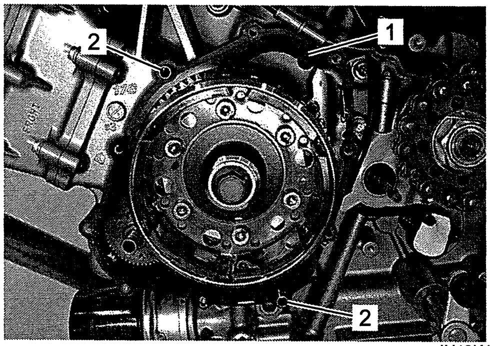


10) Remove the generator cover (1).



IH18K11A0011-01

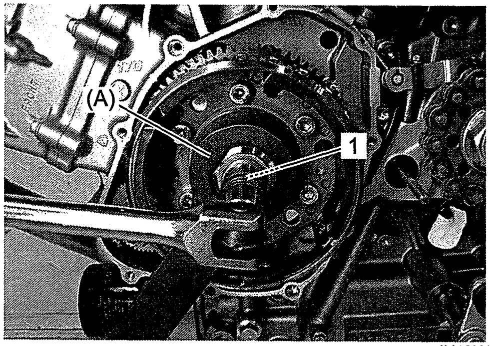
11) Remove the gasket (1) and dowel pins (2).



IH18K11A0012-01

12) Hold the generator rotor with the special tool and remove the generator rotor bolt (1).

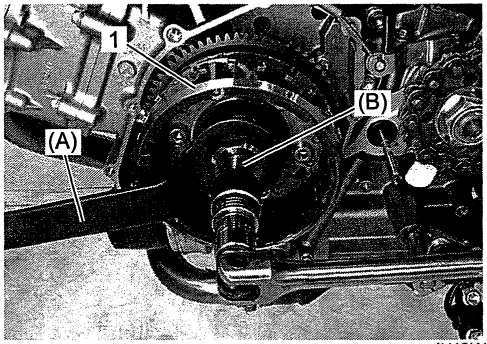
Special tool
(A): 09930–44530



IH18K11A0013-02

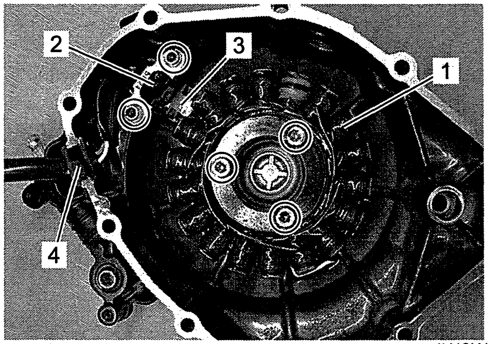
13) Remove the generator rotor (1) with the special tools.

Special tool
(A): 09930–44530
(B): 09930–30450



IH18K11A0014-01

14) Remove the generator stator (1), CKP sensor (2), lead wire clamp (3) and grommet (4).

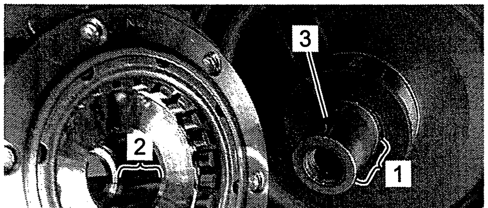


IH18K11A0015-01

Generator Installation

BENJ18K61A06005

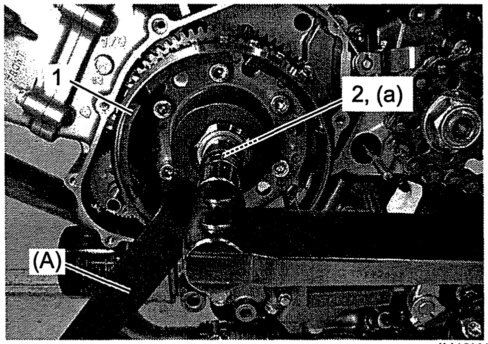
1) Install the generator stator, lead wire clamp and CKP sensor. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
2) Degrease the tapered portion (1) of crankshaft and also the generator rotor (2). Use nonflammable cleaning solvent to wipe off oily or greasy matter and make these surfaces completely dry.
3) Align the key (3) and key slot on the generator rotor.



4) Install the generator rotor (1) on the crankshaft.
5) Hold the generator rotor with the special tool and tighten generator rotor bolt (2) to the specified torque.

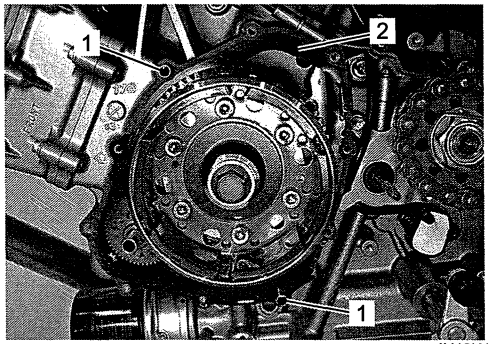
Special tool
(A): 09930–44530

Tightening torque
Generator rotor bolt (a): 140 N·m (14.3 kgf-m, 103.5 lbf-ft)



IH18K11A0017-02

6) Install the dowel pins (1) and new gasket (2).



IH18K11A0018-01

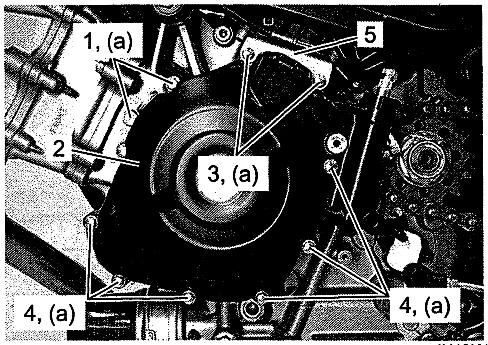
7) Fit the new gasket washer to the generator cover bolts (1).
8) Install the generator cover (2) and tighten the generator cover bolts (1), (3) and (4) to the specified torque.

▲ CAUTION

Be careful not to pinch the finger between the generator cover and the crankcase.

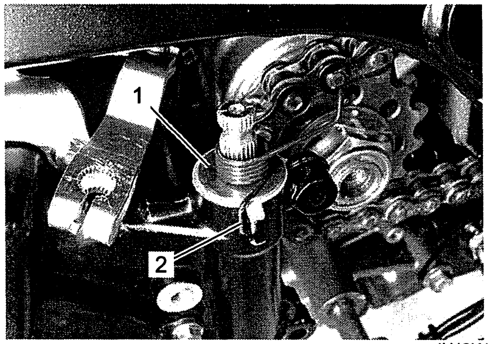
NOTE

Fit the clutch cable stopper (5) to the generator cover bolts (3).



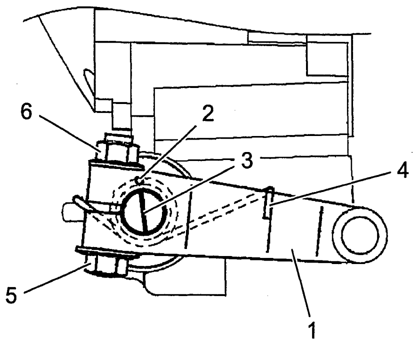
IH18K11A0019-02

9) Route the generator lead wire and connect the generator coupler and CKP sensor coupler. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
10) Install the washer (1) and hook the spring end (2) to the generator cover.



IH18K11A0032-01

11) When installing the clutch release arm (1), align the punch mark (2) of clutch release arm with slit (3) of clutch release camshaft.
12) Hook the spring end (4) to the clutch release arm (1).
13) Install the clutch release arm bolt (5) and tighten the nut (6).

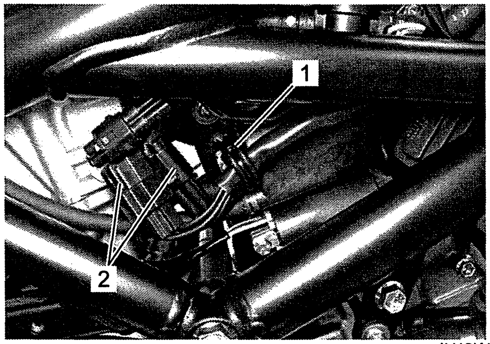


IH18K11A0034-02

Regulator / Rectifier Inspection

BENJ18K61A06006

1) Turn the ignition switch to OFF position.
2) Release the regulator/rectifier lead wires from the clamp (1).
3) Disconnect the regulator/rectifier couplers (2).



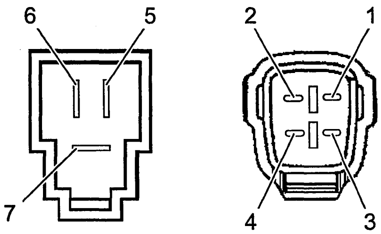
IH18K11A0020-02

4) Set the “Diode test” of the multi circuit tester. Refer to “Precautions for Circuit Tester” in Section 00 (Page 00-7).
5) Check that the tester reads 1.4 V or more.

NOTE

If the tester reads less than 1.4 V when the tester probes are not connected, replace its battery.

6) Measure the voltage between the terminals. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.



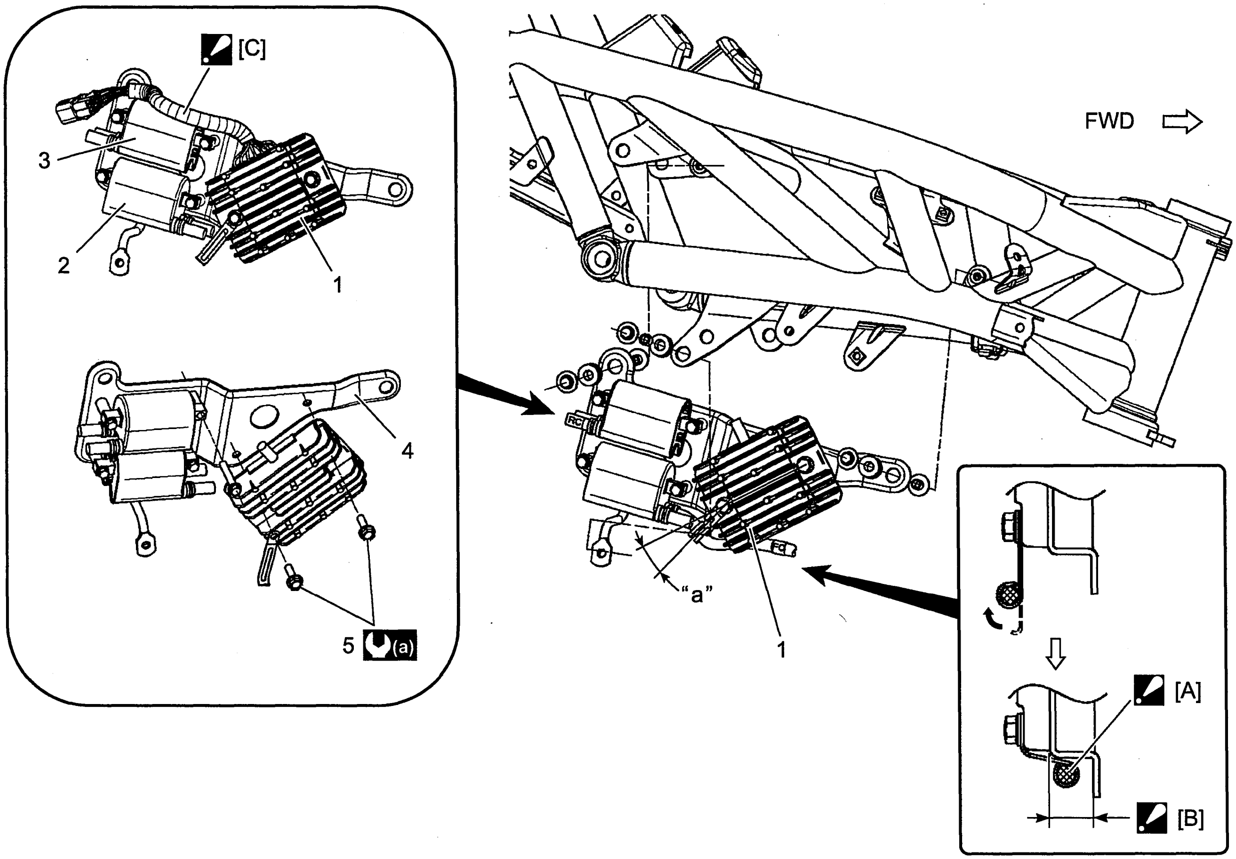
IH18K11A0037-01

		(+) probe of tester to:						
		(4)	(3)	(7)	(6)	(5)	(2)	(1)
(–) probe of tester to:	(4)	—	0 V	0.1 – 0.8 V	0.1 – 0.8 V	0.1 – 0.8 V	0.3 – 1.0 V	0.3 – 1.0 V
	(3)	0 V	—	0.1 – 0.8 V	0.1 – 0.8 V	0.1 – 0.8 V	0.3 – 1.0 V	0.3 – 1.0 V
	(7)	*	*	—	*	*	0.1 – 0.8 V	0.1 – 0.8 V
	(6)	*	*	*	—	*	0.1 – 0.8 V	0.1 – 0.8 V
	(5)	*	*	*	*	—	0.1 – 0.8 V	0.1 – 0.8 V
	(2)	*	*	*	*	*	—	0 V
	(1)	*	*	*	*	*	0 V	—
* 1.4 V and more (tester’s battery voltage)								

7) Connect the regulator/rectifier couplers.
8) Clamp the regulator/rectifier lead wires. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).

Regulator / Rectifier Construction

BENJ18K61A06007



IJ18K51A0002-01

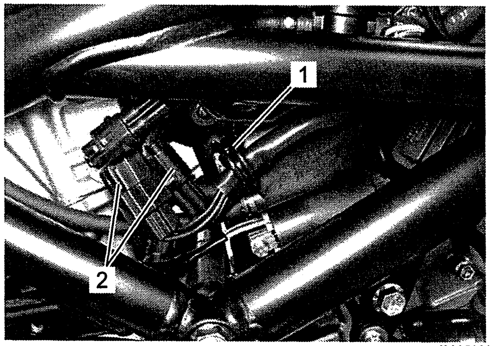
[A]:	Clamp the high-tension cord firmly. : Do not contact the high-tension cord to the ignition coil bracket and regulator/rectifier.	3.	Ignition coil #2
[B]:	Clamp the high-tension cord in this area.	4.	Ignition coil rear bracket
[C]:	Pass the lead wire over the ignition coil.	5.	Regulator/rectifier bolt
1.	Regulator/rectifier	"a":	5° – 25°
2.	Ignition coil #1	(a) :	5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

Regulator / Rectifier Removal and Installation

BENJ18K61A06008

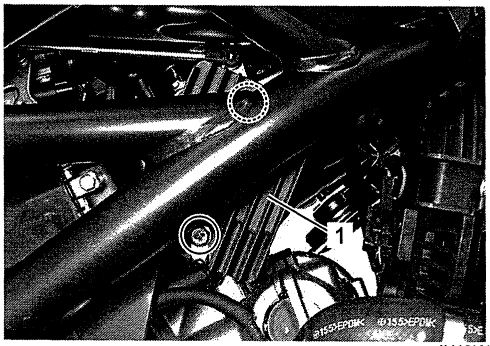
Removal

1) Release the regulator/rectifier lead wires from the clamp (1).
2) Disconnect the regulator/rectifier couplers (2).



IH18K11A0023-02

3) Remove the regulator/rectifier (1).



IH18K11A0024-01

Installation

1) Install the regulator/rectifier. Refer to "Regulator / Rectifier Construction" (Page 1J-9).

   Tightening torque
   Regulator/rectifier bolt: 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

2) Connect the regulator/rectifier coupler.
3) Clamp the regulator/rectifier lead wires. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).

Battery Charging

BENJ18K61A06009

NOTICE

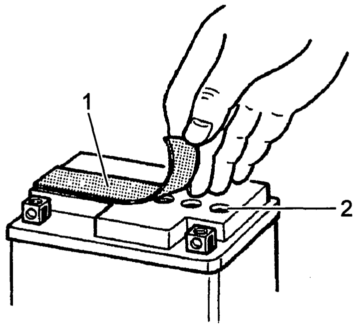
- **For charging the battery, make sure to use the charger specially designed for MF battery. Otherwise, the battery may be overcharged resulting in shortened service life.**
- **Exceeding the maximum charging rate for the battery can shorten its life. Never exceed the maximum charging rate for the battery.**
- **Do not remove the cap during charging.**
- **Position the battery with the cap facing upward during 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 (2).



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2) Remove the caps (1) from the electrolyte container.

NOTE

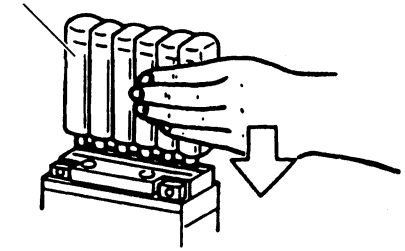
- **Do not remove or pierce the sealed areas (2) of the electrolyte container.**
- **After filling the electrolyte completely, use the removed cap as sealing caps of battery-filler holes.**

3) Insert the nozzles of the electrolyte container (1) 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.



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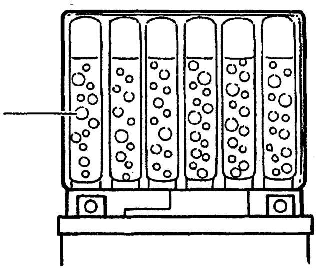
5) Make sure that air bubbles (1) rise to the top of each electrolyte container, and leave in this position for about more than 20 minutes.



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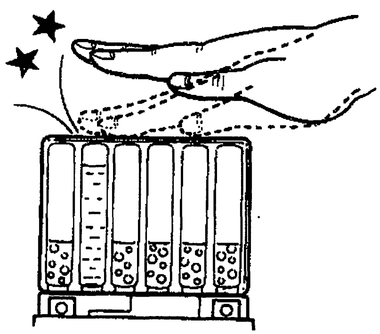
NOTE

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.

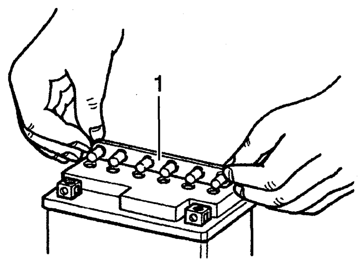


I310G11A0024-01

8) Insert the caps (1) 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.

NOTICE

- **Once the caps are installed to the battery, do not remove the caps.**
- **Do not tap the caps with a hammer when installing them.**



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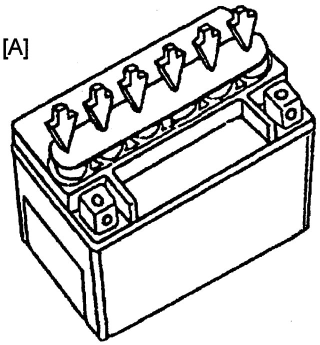
[A]



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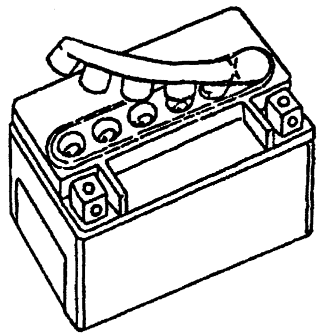
[B]



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[A]:	Correct
[B]:	Incorrect

Battery Recharging

NOTE

When the motorcycle is not used for a long period, check the battery every 1 month to prevent the battery discharge.

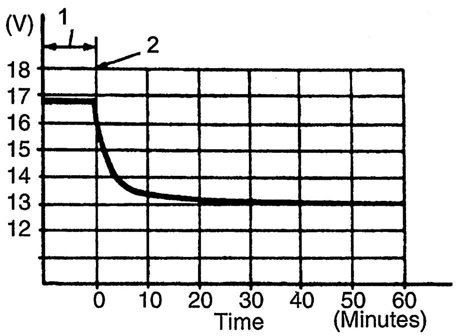
1) Remove the battery from the motorcycle. ☞(Page 1J-13)
2) Measure the battery voltage using the multi circuit tester.
   If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

NOTICE

The charging current must not exceed 5 A.

<u>Recharging time</u>
Standard charging [Standard]: 1.2 A for 5 to 10 hours
Fast charging [Standard]: 5 A for 1 hour

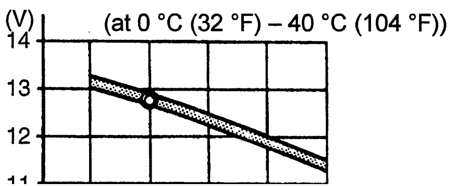
3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester.
   If the battery voltage is less than 12.5 V, recharge the battery again.
   If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.



ID26J11A0039-02

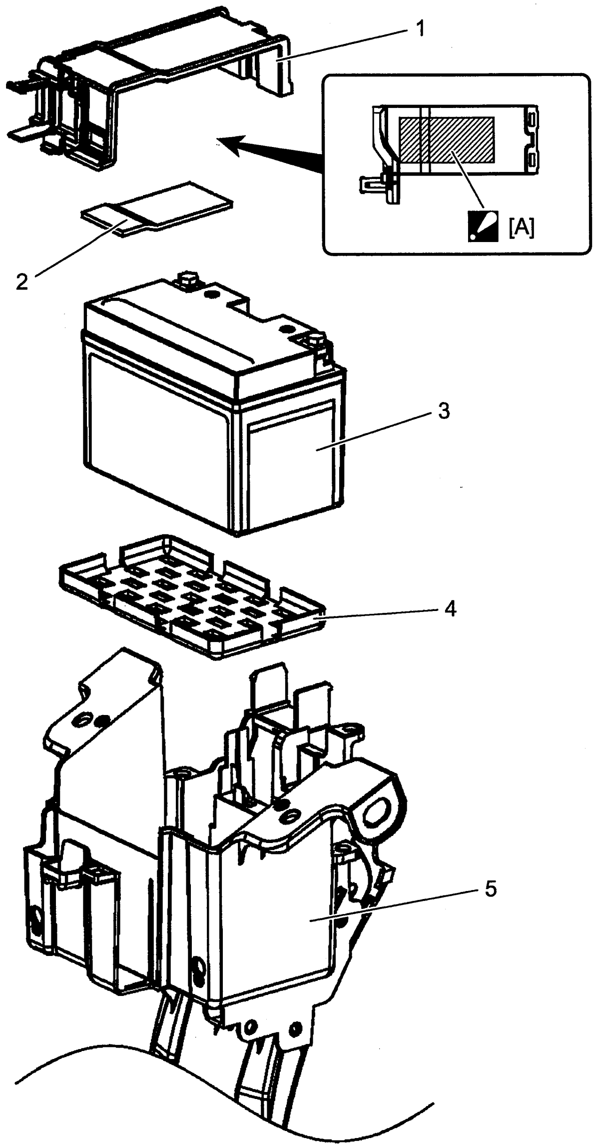
1. Charging period	2. Stop charging

4) Install the battery to the motorcycle. ☞(Page 1J-13)



Battery Protector Construction

BENJ18K61A06010



IH18K11A0036-01

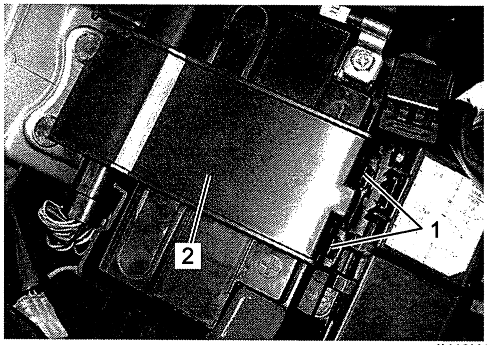
[A]:	Sticking the battery band protector along the emboss line of battery holder lid.
1.	Battery holder lid
2.	Battery protector
3.	Battery
4.	Battery protector
5.	Battery holder

Battery Removal and Installation

BENJ18K61A06011

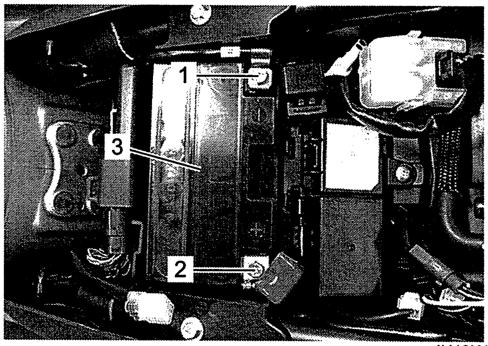
Removal

1) Remove the seat. ☞(Page 9D-18)
2) Remove the TO sensor. ☞(Page 1C-12)
3) Remove the hooks (1) of the battery holder lid (2).
4) Remove the battery holder lid (2).



IH18K11A0027-01

5) Disconnect the battery (–) lead wire (1) first, then disconnect the battery (+) lead wire (2).
6) Remove the battery (3).



IH18K11A0028-02

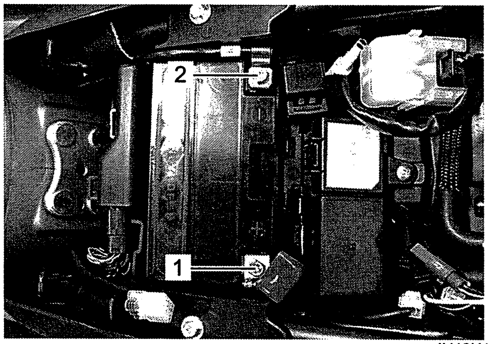
Installation

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

NOTICE

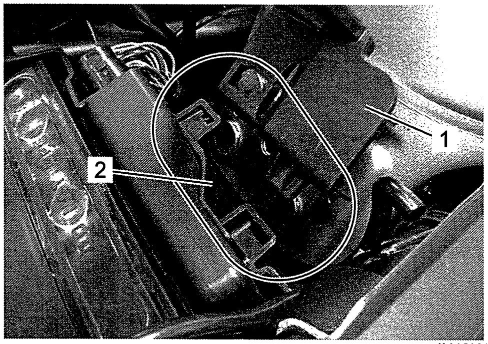
Never use anything except the specified battery.

- Connect the battery (+) lead wire (1) first, then connect battery (–) lead wire (2).
- Tighten the battery lead wire mounting bolts securely.



IH18K11A0029-01

- Fit the battery holder lid (1) to the groove and projection of battery holder (2).



IH18K11A0030-01

Battery Visual Inspection

BENJ18K61A06012

1) Remove the seat. ☞(Page 9D-18)
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. ☞(Page 1J-13)
   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. ☞(Page 9D-18)

Specifications

Tightening Torque Specifications

BENJ18K61A07001

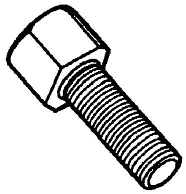
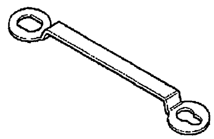
Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Generator rotor bolt	140	14.3	103.5	☞(Page 1J-7)
Generator cover bolt	10	1.0	7.5	☞(Page 1J-7)
Regulator/rectifier bolt	5.5	0.56	4.05	☞(Page 1J-10)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Regulator / Rectifier Construction" (Page 1J-9)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Special Tool

BENJ18K61A08001

09930–30450 Rotor remover bolt ☞(Page 1J-6) 	09930–44530 Rotor holder ☞(Page 1J-6) / ☞(Page 1J-6) / ☞(Page 1J-7) 

Exhaust System

Precautions

Precautions for Exhaust System

BENJ18K61B00001

⚠ WARNING

To avoid the risk of being burned, do not touch the exhaust system when the system is hot.

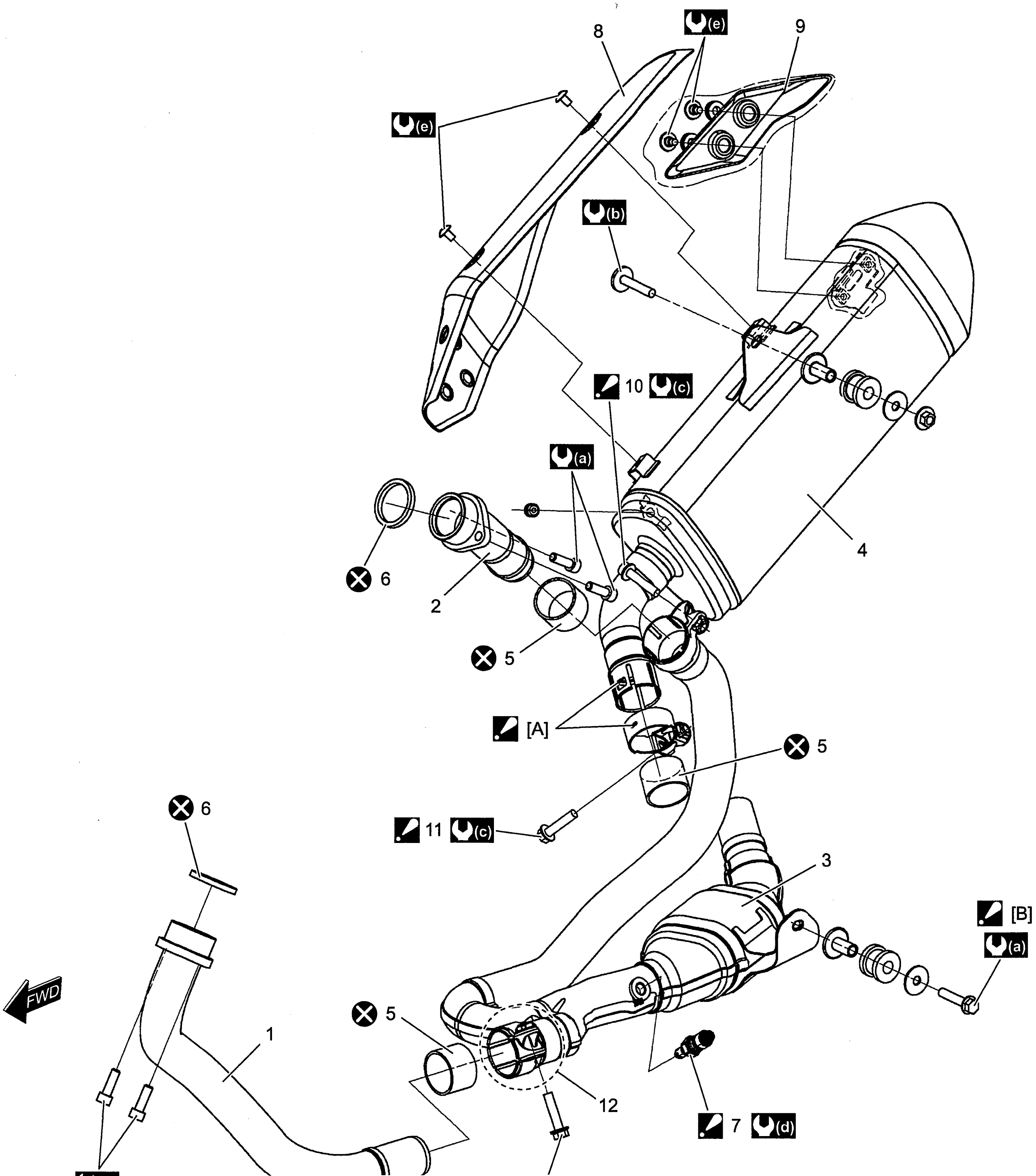
NOTICE

After installation of the muffler, make sure that there is no leakage of exhaust gas.

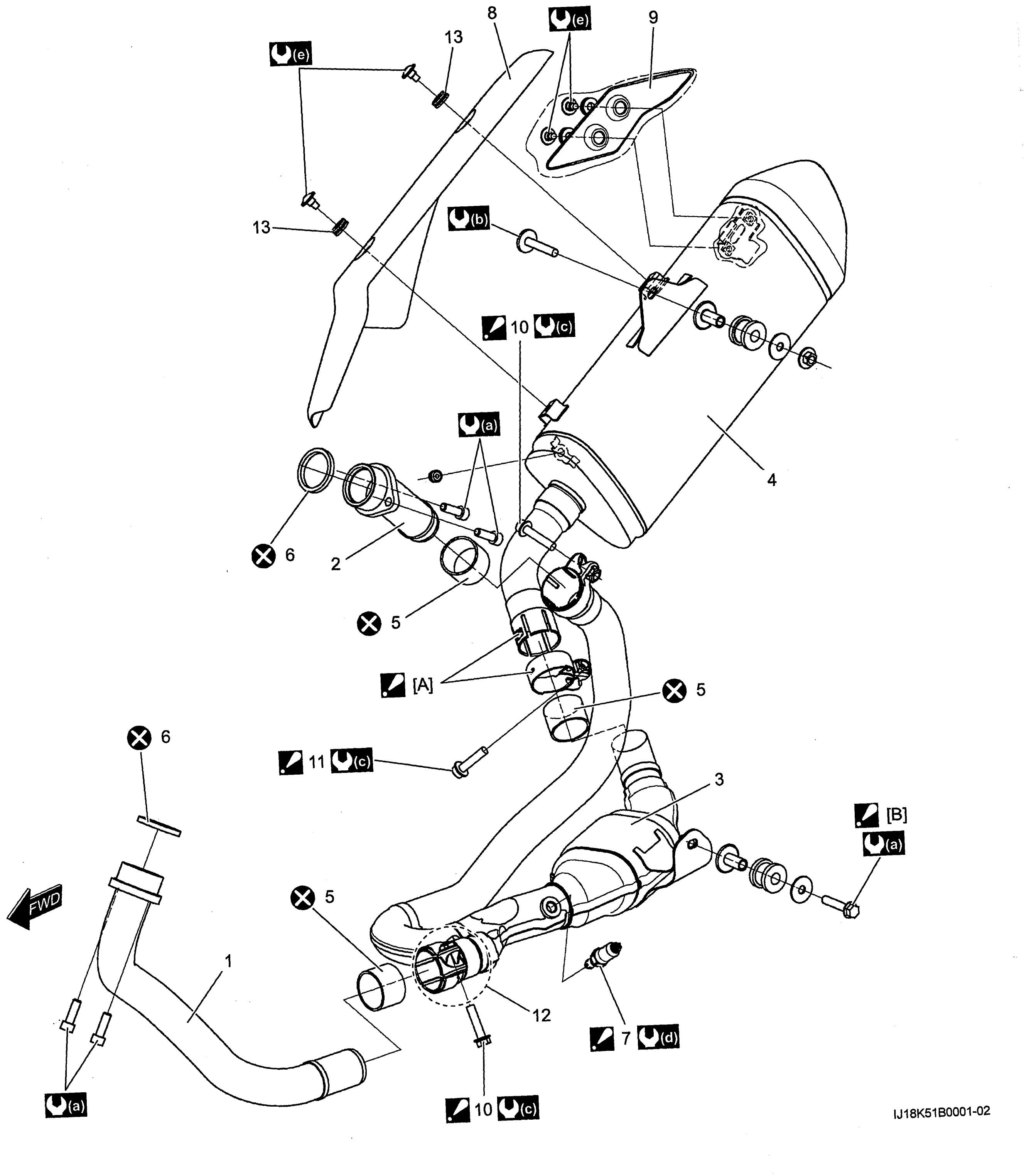
Exhaust System Components

BENJ18K61B06001

L7 – L8



[A]:	Fit the muffler connector clamp hole to the convex part of muffler.	9.	Rear muffler cover (If equipped)
[B]:	After tightening the exhaust support bolt temporary, tighten it to the specified torque while pushing the center exhaust pipe end (12) to the right side of the motorcycle.	10.	Exhaust pipe connector bolt : Apply nickel based anti seize to the thread part.
1.	Front exhaust pipe	11.	Muffler connector bolt : Apply nickel based anti seize to the thread part.
2.	Rear exhaust pipe	12.	Center exhaust pipe end
3.	Center exhaust pipe	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
4.	Muffler	(b) :	30 N·m (3.1 kgf-m, 22.5 lbf-ft)
5.	Connector	(c) :	18 N·m (1.8 kgf-m, 13.5 lbf-ft)
6.	Exhaust pipe gasket	(d) :	25 N·m (2.5 kgf-m, 18.5 lbf-ft)
7.	HO2 sensor : Apply nickel based anti seize to the thread part.	(e) :	5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
8.	Muffler cover	:	Do not reuse.


8
13
(e)
9
13
(b)
10
(c)
(a)
4
6
2
5
[A]
5
11
(c)
6
3
[B]
(a)
FWD
5
1
12
7
(d)
(a)
10
(c)
IJ18K51B0001-02

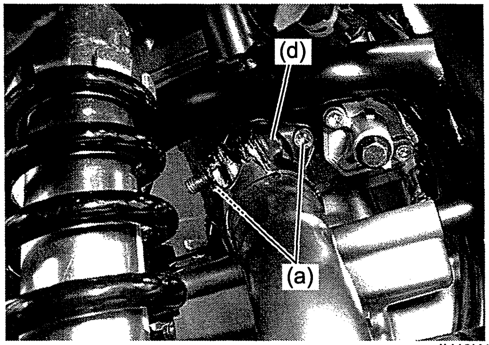
[A]:	Fit the muffler connector clamp hole to the convex part of muffler.	10.	Exhaust pipe connector bolt : Apply nickel based anti seize to the thread part.
[B]:	After tightening the exhaust support bolt temporary, tighten it to the specified torque while pushing the center exhaust pipe end (12) to the right side of the motorcycle.	11.	Muffler connector bolt : Apply nickel based anti seize to the thread part.
1.	Front exhaust pipe	12.	Center exhaust pipe end
2.	Rear exhaust pipe	13.	Muffler cover center cushion
3.	Center exhaust pipe	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
4.	Muffler	(b) :	30 N·m (3.1 kgf-m, 22.5 lbf-ft)
5.	Connector	(c) :	18 N·m (1.8 kgf-m, 13.5 lbf-ft)
6.	Exhaust pipe gasket	(d) :	25 N·m (2.5 kgf-m, 18.5 lbf-ft)
7.	HO2 sensor : Apply nickel based anti seize to the thread part.	(e) :	5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
8.	Muffler cover	:	Do not reuse.
9.	Rear muffler cover (If equipped)		

Exhaust System Inspection

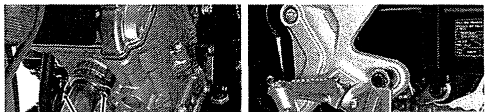
BENJ18K61B06002

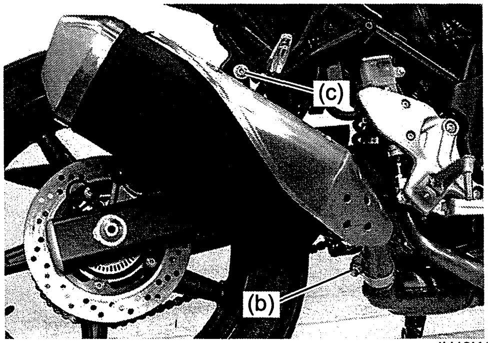
Inspect the exhaust pipe connection and muffler connection for exhaust gas leakage and mounting condition. If any defect is found, replace the exhaust pipe assembly or muffler with a new one.
Check the exhaust pipe bolts, muffler connector bolt, exhaust pipe connector bolts, muffler support bolt and exhaust support bolt are tightened to their specified torque.

Tightening torque
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
Muffler connector bolt (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
Muffler support bolt (c): 30 N·m (3.1 kgf-m, 22.5 lbf-ft)
Exhaust pipe connector bolt (d): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
Exhaust support bolt (e): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K11B0028-02





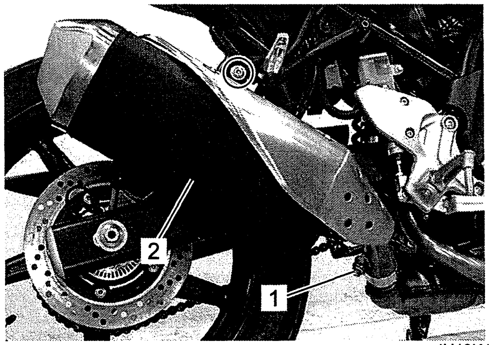
IH18K11B0030-01

Exhaust Pipe / Muffler Removal and Installation

BENJ18K61B06003

Muffler Removal

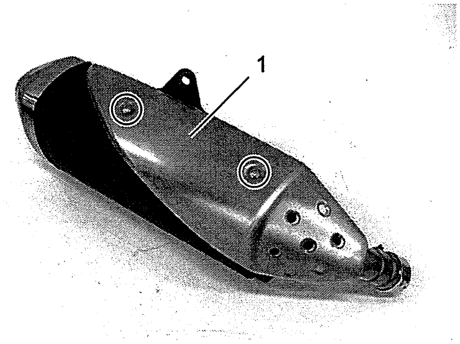
1) Loosen the muffler connector bolt (1).
2) Remove the muffler (2).



IH18K11B0002-01

3) Remove the muffler connector (1).

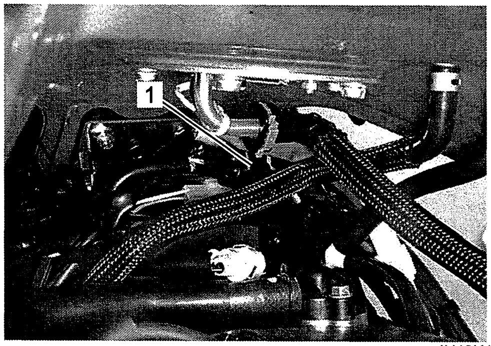
4) Remove the muffler cover (1).
5) Remove the rear muffler cover (If equipped).



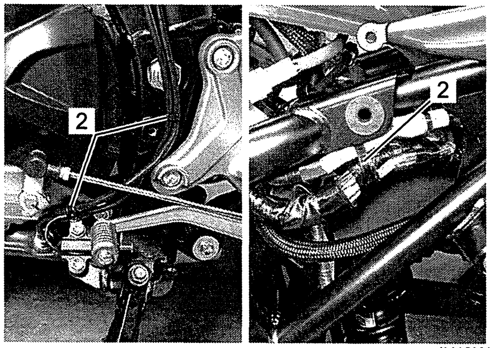
IH18K11B0004-01

Exhaust Pipe Removal

1) Remove the muffler.
2) Lift and support the fuel tank. ☞(Page 1G-9)
3) Remove the left frame lower cover. ☞(Page 9D-22)
4) Disconnect the HO2 sensor coupler (1) and remove the clamps (2).

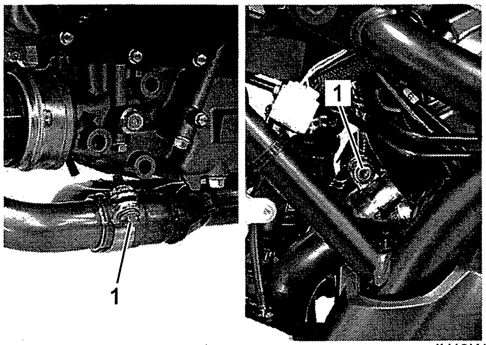


IH18K11B0032-02



IH18K11B0006-03

5) Loosen the rear exhaust pipe connector bolts (1), front and rear.

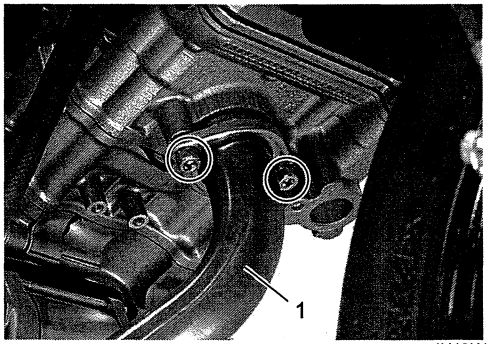


IH18K11B0007-01

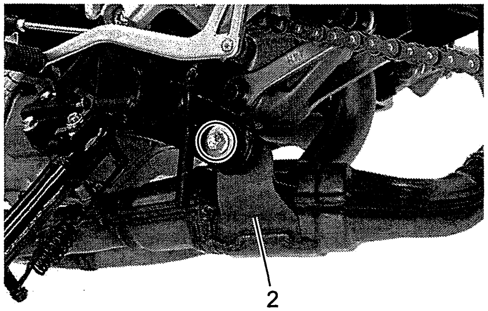
6) Remove the front exhaust pipe (1) with the center exhaust pipe (2).

NOTE

Support the front exhaust pipe with the center exhaust pipe to prevent it from falling.

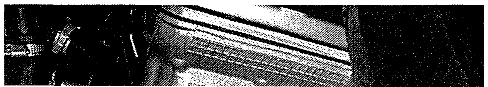


IH18K11B0008-01

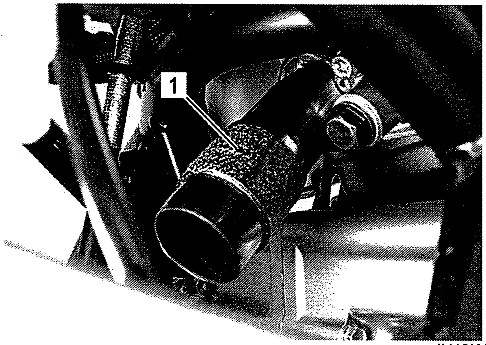


IH18K11B0009-01

7) Remove the front exhaust pipe gasket (1).

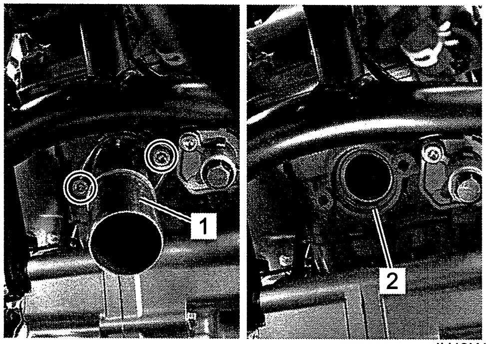


8) Remove the rear exhaust pipe connector (1).



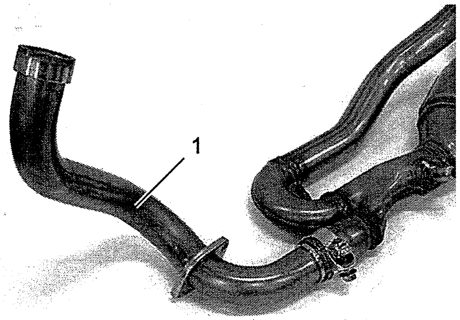
IH18K11B0011-01

9) Remove the rear shock absorber. ☞(Page 2C-3)
10) Remove the rear exhaust pipe (1).
11) Remove the rear exhaust pipe gasket (2).



IH18K11B0012-02

12) Remove the front exhaust pipe (1).



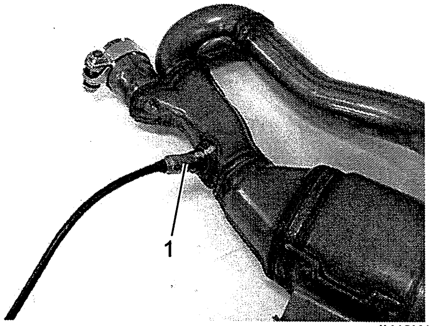
IH18K11B0013-01

13) Remove the front exhaust pipe connector (1).

14) Remove the HO2 sensor (1).

NOTICE

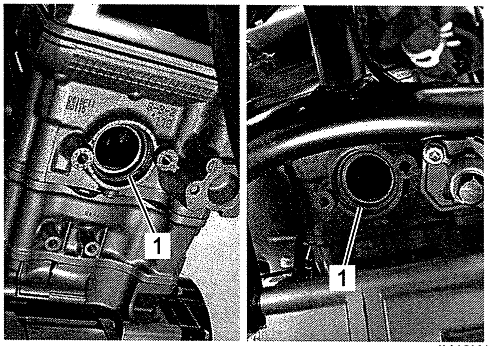
- **Be careful not to expose the HO2 sensor to an excessive shock.**
- **Do not use an impact wrench when removing the HO2 sensor.**
- **Be careful not to twist or damage the HO2 sensor lead wire.**



IH18K11B0014-01

Exhaust Pipe Installation

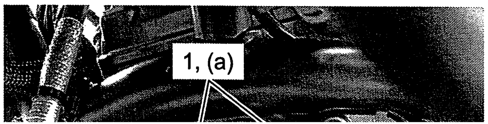
1) Install the HO2 sensor. ☞(Page 1C-9)
2) Install the new front and rear exhaust pipe gaskets (1).



IH18K11B0015-01

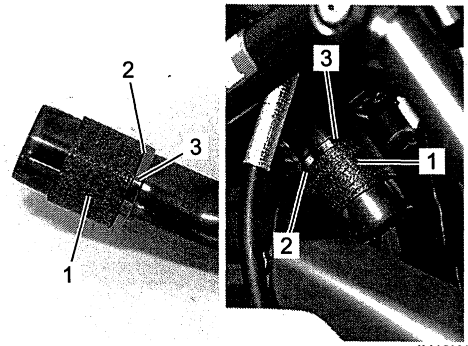
3) Tighten the rear exhaust pipe bolts (1) to the specified torque.

Tightening torque
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



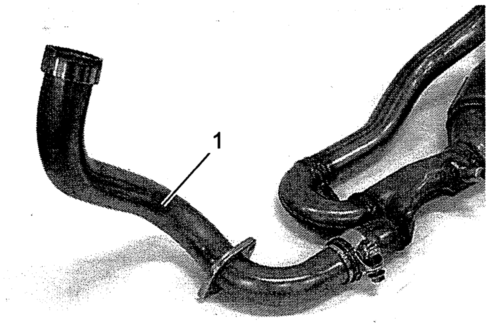
4) Install the rear shock absorber. ☞(Page 2C-3)

5) Put the edge (2) of a new front and rear exhaust pipe connectors (1) to the front and rear exhaust pipe stopper (3).



IH18K11B0017-02

6) Temporarily install the front exhaust pipe (1).



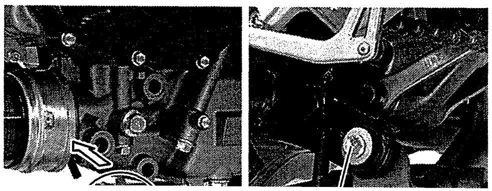
IH18K11B0018-01

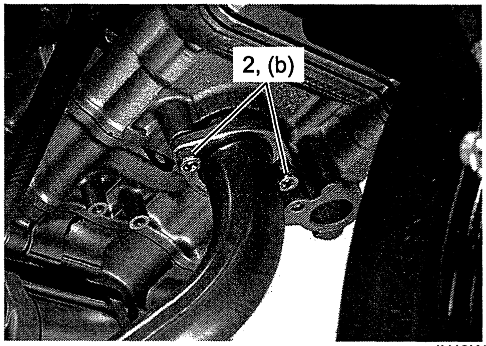
7) Install the center exhaust pipe with the front exhaust pipe, and tighten the exhaust support bolt (1) and front exhaust pipe bolts (2) temporarily.

8) Tighten the exhaust support bolt (1) to the specified torque while pushing the center exhaust pipe end (3) to the right side of the motorcycle.

9) Tighten the front exhaust pipe bolts (2) to the specified torque.

Tightening torque
Exhaust support bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
Exhaust pipe bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



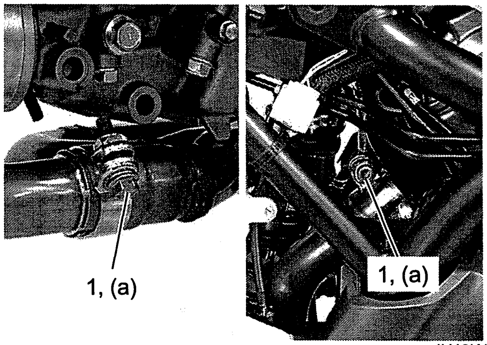


IH18K11B0021-02

10) Apply nickel based anti seize to the thread part of exhaust pipe connector bolts (1).

11) Tighten the front and rear exhaust pipe connector bolts (1) to the specified torque.

Tightening torque
Exhaust pipe connector bolt (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



IH18K11B0022-01

12) Connect the HO2 sensor lead wire coupler and clamps. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).

13) Install the left frame lower cover. ☞(Page 9D-22)

14) Install the fuel tank. ☞(Page 1G-9)

15) Install the muffler.

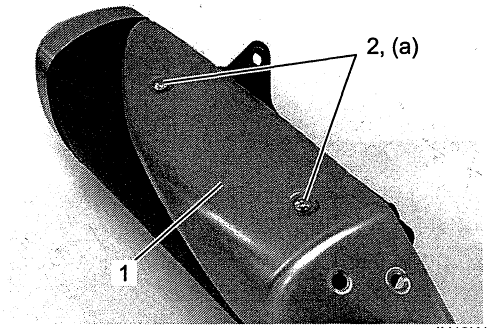
Muffler Installation

1) Install the rear muffler cover (1) and tighten the rear muffler cover screws (2) to the specified torque (If equipped).

Tightening torque
Rear muffler cover screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

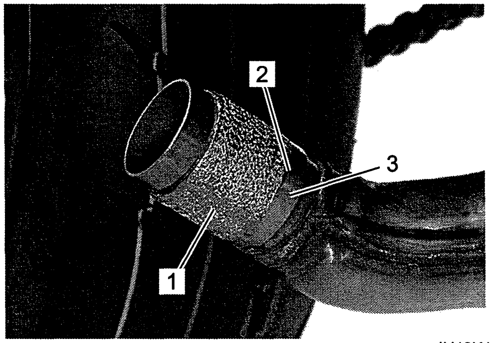
2) Install the muffler cover (1) and tighten the muffler cover screws (2) to the specified torque.

Tightening torque
Muffler cover screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IH18K11B0023-01

3) Put the edge (2) of a new muffler connector (1) to the center exhaust pipe stopper (3).

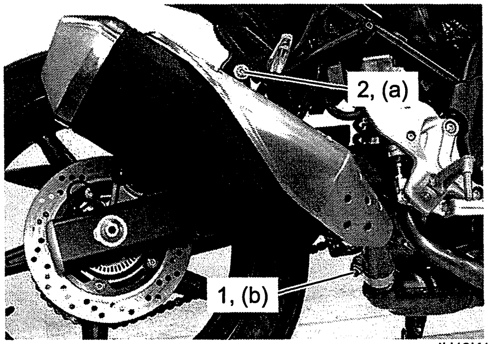


IH18K11B0024-01

4) Apply nickel based anti seize to the thread part of muffler connector bolt (1).

5) Tighten the muffler support bolt (2) and muffler connector bolt (1) to the specified torque.

Tightening torque
Muffler support bolt (a): 30 N·m (3.1 kgf-m, 22.5 lbf-ft)
Muffler connector bolt (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



IH18K11B0026-01

Specifications

Tightening Torque Specifications

BENJ18K61B07001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Exhaust pipe bolt	23	2.3	17.0	☞(Page 1K-5) / ☞(Page 1K-7) / ☞(Page 1K-8)
Muffler connector bolt	18	1.8	13.5	☞(Page 1K-5) / ☞(Page 1K-9)
Muffler support bolt	30	3.1	22.5	☞(Page 1K-5) / ☞(Page 1K-9)
Exhaust pipe connector bolt	18	1.8	13.5	☞(Page 1K-5) / ☞(Page 1K-8)
Exhaust support bolt	23	2.3	17.0	☞(Page 1K-5) / [illegible]

Section 2

Suspension

CONTENTS

Precautions

Precautions for Suspension

BENJ18K62000001

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

⚠ WARNING

- **Never attempt to heat, quench or straighten any suspension part. If any damage or deformation is found, replace the part with a new one without correct it.**
- **When removing or installing the suspension or wheel, place the motorcycle on a level surface and support it securely with a hoist or jack etc.**
- **Do not support the motorcycle with the exhaust pipe.**

Suspension General Diagnosis

Diagnostic Information and Procedures

Suspension and Wheel Symptom Diagnosis

BENJ18K62104001

Condition	Possible cause	Correction / Reference Item
Wobbly front wheel	Distorted wheel rim.	*Replace.* ☞*(Page 2D-15)*
	Worn front wheel bearings.	*Replace.* ☞*(Page 2D-6)*
	Defective or incorrect tire.	*Replace.* ☞*(Page 2D-15)*
	Loose front axle.	*Tighten.* ☞*(Page 0B-4)*
	Loose front axle pinch bolt.	*Tighten.* ☞*(Page 0B-4)*
	Incorrect fork oil level.	*Adjust.* ☞*(Page 2B-7)*
	Incorrect front wheel weight balance.	*Adjust.* ☞*(Page 2D-17)*
Front suspension too soft	Insufficiently viscous fork oil.	*Replace.* ☞*(Page 2B-7)*
	Insufficient fork oil.	*Adjust.* ☞*(Page 2B-7)*
	Weak spring.	*Replace.* ☞*(Page 2B-7)*
Front suspension too stiff	Excessively viscous fork oil.	*Replace.* ☞*(Page 2B-7)*
	Excessive fork oil.	*Adjust.* ☞*(Page 2B-7)*
	Bent front axle.	*Replace.* ☞*(Page 2D-5)*
Front suspension too noisy	Insufficient fork oil.	*Adjust.* ☞*(Page 2B-7)*
	Loose front fork clamp bolt.	*Tighten.* ☞*(Page 0B-4)*
Wobbly rear wheel	Distorted wheel rim.	*Replace.* ☞*(Page 2D-15)*
	Worn rear wheel bearings.	*Replace.* ☞*(Page 2D-11)*
	Defective or incorrect tire.	*Replace.* ☞*(Page 2D-15)*
	Worn swingarm bearings.	*Replace.* ☞*(Page 2C-11)*
	Loose rear suspension related bolt and nut.	*Tighten.* ☞*(Page 0B-4)*
	Loose rear axle nut.	*Tighten.* ☞*(Page 2D-10)*
	Worn rear suspension bearings.	*Replace.* ☞*(Page 2C-6)*
	Incorrect rear wheel weight balance.	*Adjust.* ☞*(Page 2D-17)*
Rear suspension too soft	Weak rear shock absorber spring.	*Replace.* ☞*(Page 2C-3)*
	Rear shock absorber leaks oil.	*Replace.* ☞*(Page 2C-3)*
	Improperly set rear shock absorber spring adjuster.	*Adjust.* ☞*(Page 2C-3)*
Rear suspension too stiff	Bent rear shock absorber shaft.	*Replace.* ☞*(Page 2C-3)*
	Worn swingarm bearings.	*Replace.* ☞*(Page 2C-11)*
	Worn rear suspension bearings.	*Replace.* ☞*(Page 2C-6)*
	Bent swingarm pivot shaft.	*Replace.* ☞*(Page 2C-8)*
	Improperly set rear shock absorber spring adjuster.	*Adjust.* ☞*(Page 2C-3)*
Rear suspension too noisy	Loose rear suspension related bolt and nut.	*Tighten.* ☞*(Page 0B-4)*
	Worn swingarm bearings.	*Replace.* ☞*(Page 2C-11)*
	Worn rear suspension bearings.	*Replace.* ☞*(Page 2C-6)*

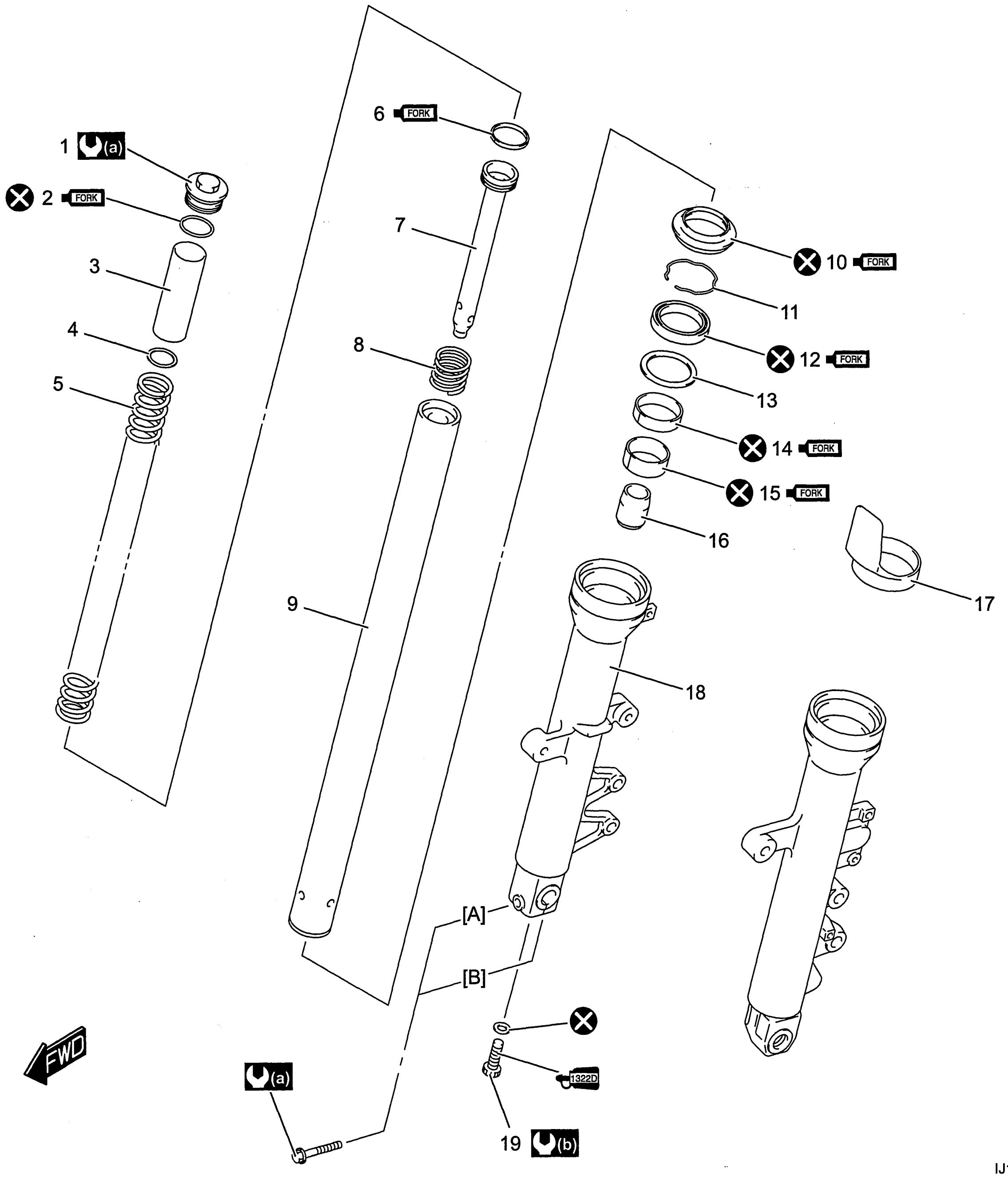
Front Suspension

Repair Instructions

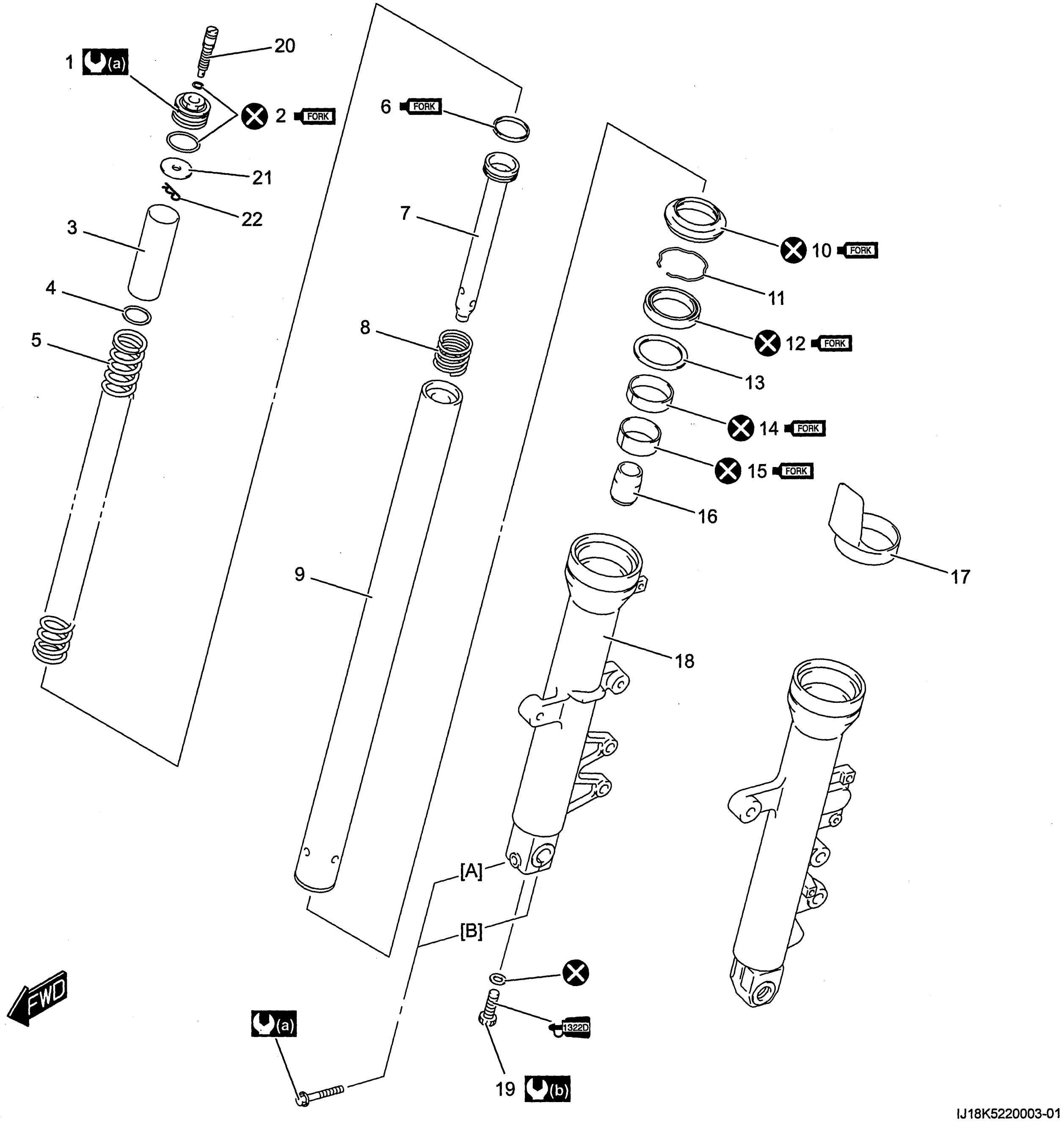
Front Fork Components

BENJ18K62206001

SV650/A



IJ18K5220002-01



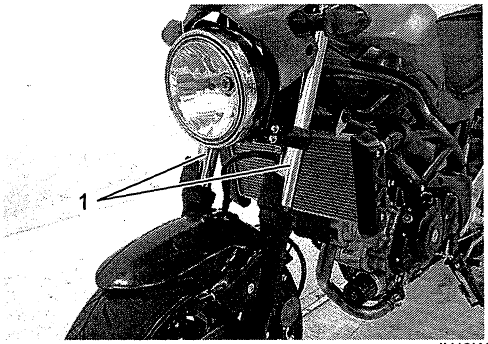
IJ18K5220003-01

[A]:	L8 model	9.	Inner tube	19.	Cylinder bolt
[B]:	L9 – model	10.	Dust seal	20.	Spring adjuster
1.	Front fork cap bolt	11.	Oil seal stopper ring	21.	Seat
2.	O-ring	12.	Oil seal	22.	Pin
3.	Spring collar	13.	Oil seal retainer	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
4.	Washer	14.	Outer tube guide bushing	(b) :	20 N·m (2.0 kgf-m, 15.0 lbf-ft)
5.	Spring	15.	Inner tube slide bushing	1322D :	Apply thread lock to the thread part.
		16.	Oil lock piece	FORK :	Apply fork oil.

Front Fork On-Vehicle Inspection

BENJ18K62206002

Inspect the front forks (1) for oil leakage and damage.
If any defect is found, replace any defective parts.
☞(Page 2B-7)



IH18K1220001-01

Front Suspension Adjustment (SV650XA)

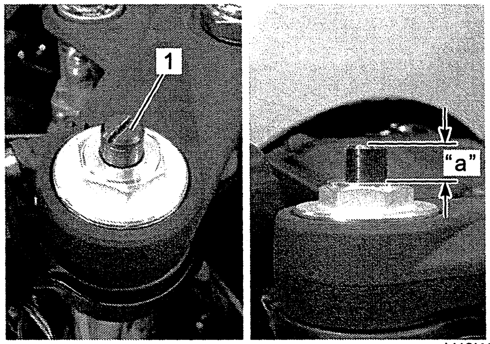
BENJ18K62206003

Turn the spring adjuster (1) to the desired position “a”.

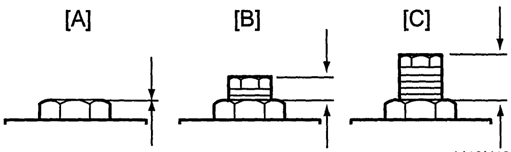
NOTICE

Adjust the left and right front forks to the same setting.

Front fork spring adjuster
[Standard]: 9 mm (0.4 in)



IJ18K1220002-01



IJ18K1220022-01

[A]: 0 mm (0 in) (maximum)	[C]: 15 mm (0.59 in) (minimum)
[B]: 9 mm (0.4 in) (standard)	

Front Fork Assembly Removal and Installation

BENJ18K62206004

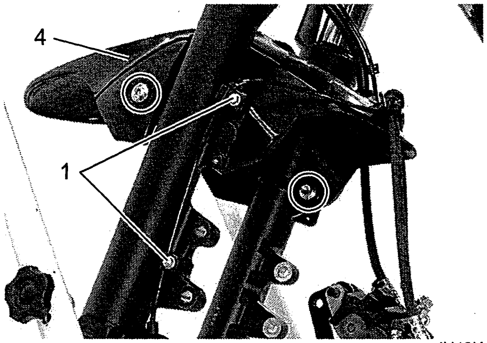
SV650/A

NOTE

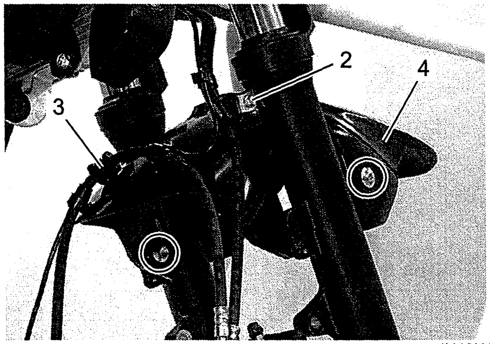
The right and left front forks are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

1) Remove the front wheel. ☞(Page 2D-5)
2) Remove the reflex reflectors (If equipped). Refer to “Front Reflex Reflector Removal and Installation (If Equipped)” in Section 9B (Page 9B-9).
3) Remove the front wheel speed sensor lead wire clamp bolts (1).
4) Remove the brake hose clamp bolt (2).
5) Disconnect the brake hose clamp (3).
6) Remove the front fender (4).



IH18K1220002-01

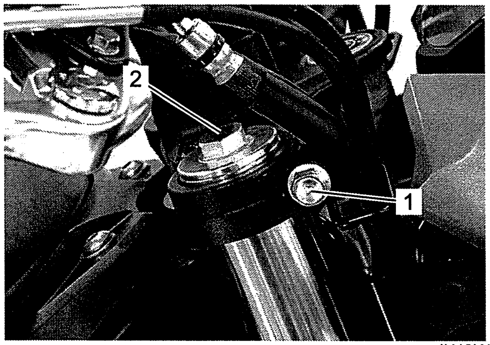


IH18K1220003-01

7) Loosen the front fork upper clamp bolt (1).

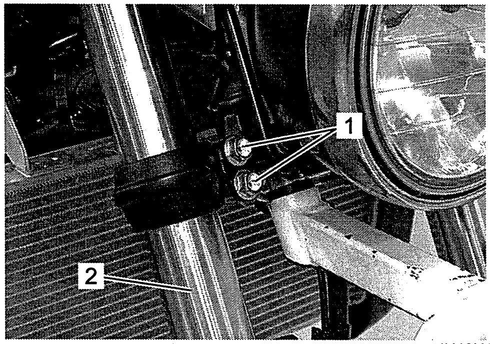
NOTE

Slightly loosen the front fork cap bolt (2) to facilitate later disassembly.



IH18K1220004-01

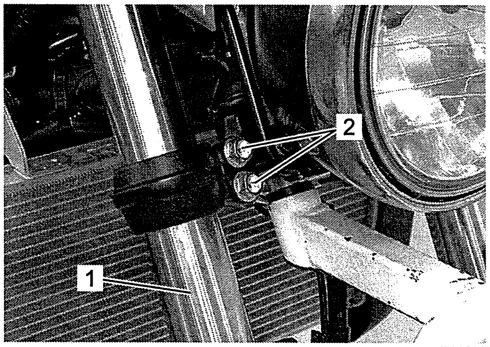
8) Loosen the front fork lower clamp bolts (1), and then remove the front fork (2) by supporting it.



IH18K1220006-01

Installation

1) Set the front fork (1) to the steering stem lower bracket temporarily by tightening the front fork lower clamp bolts (2).



IH18K1220005-01

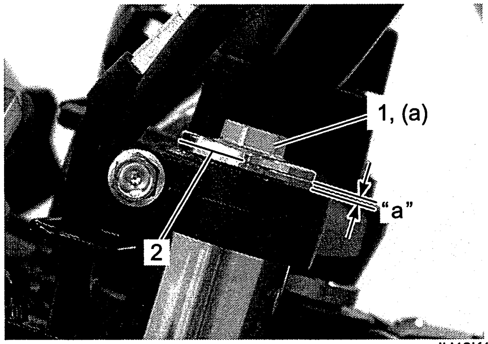
2) Tighten the front fork cap bolt (1) to the specified torque.

NOTE

When the front fork was disassembled, tighten the front fork cap bolt firmly with specified torque.

Tightening torque
Front fork cap bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

3) Loosen the front fork lower clamp bolts.
4) Set the front fork with the upper surface (2) of the inner tube positioned "a" from the upper surface of the steering stem upper bracket.

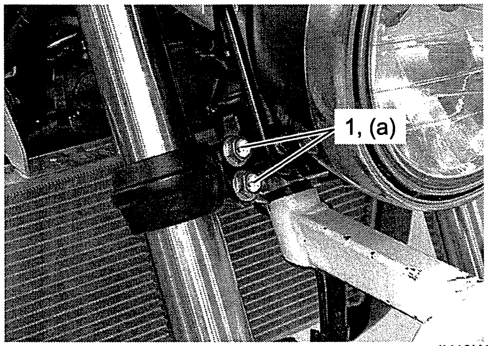


IH18K1220007-01

"a":	1.5 mm (0.059 in)

5) Tighten the front fork lower clamp bolts (1) to the specified torque.

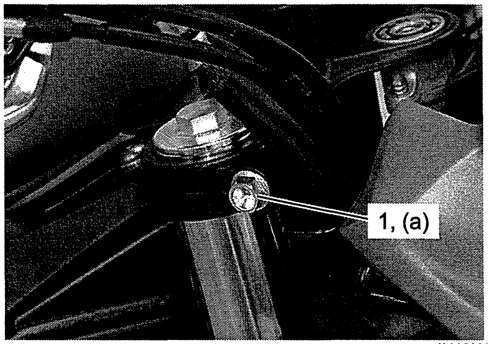
Tightening torque
Front fork lower clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1220008-01

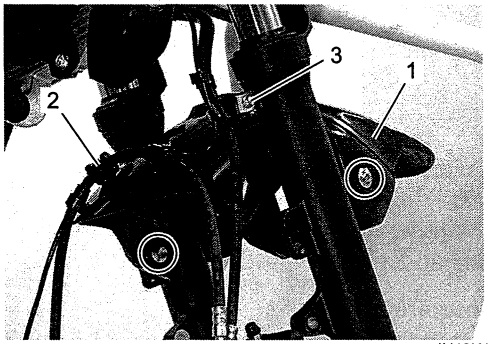
6) Tighten the front fork upper clamp bolt (1) to the specified torque.

Tightening torque
Front fork upper clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

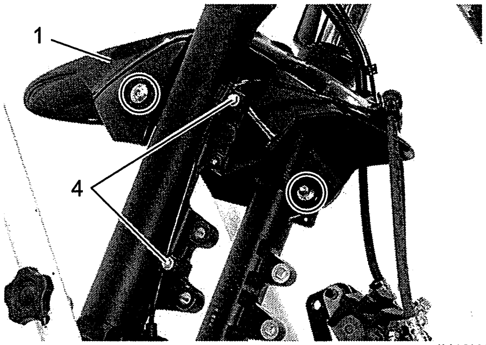


IH18K1220009-01

7) Install the front fender (1).
8) Connect the brake hose clamp (2).
9) Install the brake hose clamp bolt (3) and front wheel speed sensor lead wire clamp bolts (4).



IH18K1220010-01



IH18K1220033-01

10) Install the removed parts.

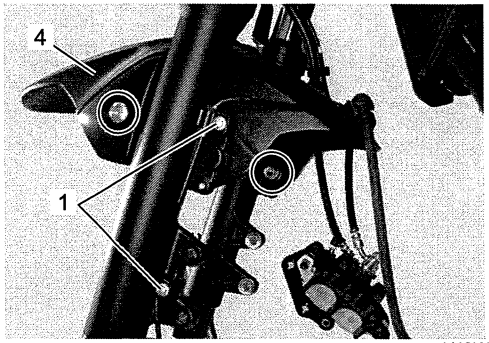
SV650XA

NOTE

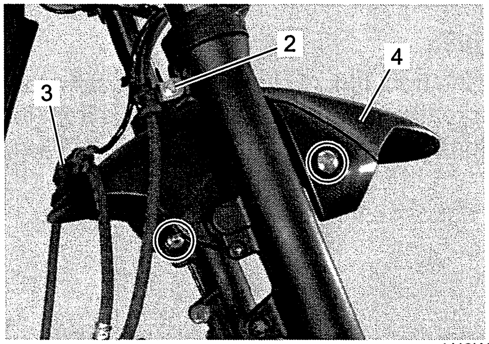
The right and left front forks are installed symmetrically and therefore the removal procedure for one side is almost the same as that for the other side.

Removal

1) Remove the front wheel. ☞(Page 2D-5)
2) Remove the reflex reflectors (If equipped). Refer to "Front Reflex Reflector Removal and Installation (If Equipped)" in Section 9B (Page 9B-9).
3) Remove the front wheel speed sensor lead wire clamp bolts (1).
4) Remove the brake hose clamp bolt (2).
5) Disconnect the brake hose clamp (3).
6) Remove the front fender (4).

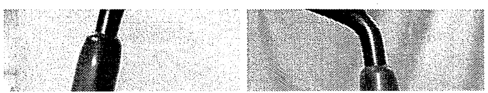


IJ18K1220003-01



IJ18K1220004-01

7) For right side, loosen the front brake master cylinder holder bolts (1).
8) For left side, loosen the clutch lever holder bolt (2).

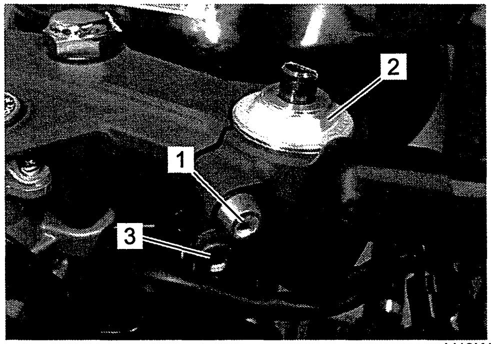


9) Move the front brake master cylinder assembly or clutch lever assembly and loosen the front fork upper clamp bolt (1).

NOTE

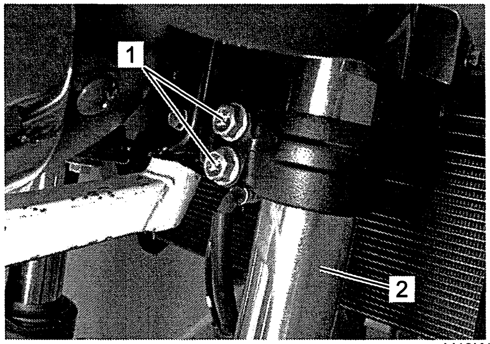
Slightly loosen the front fork cap bolt (2) to facilitate later disassembly.

10) Loosen the handlebar clamp bolt (3).



IJ18K1220006-01

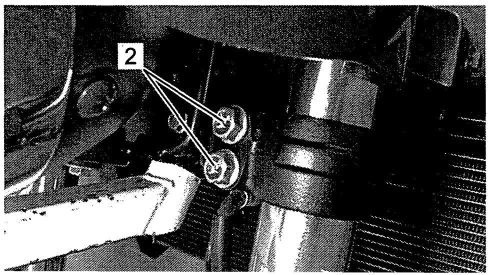
11) Loosen the front fork lower clamp bolts (1), and then remove the front fork (2) by supporting it.



IJ18K1220007-01

Installation

1) Set the front fork (1) to the steering stem lower bracket, handlebar and steering upper bracket temporarily by tightening the front fork lower clamp bolts (2).



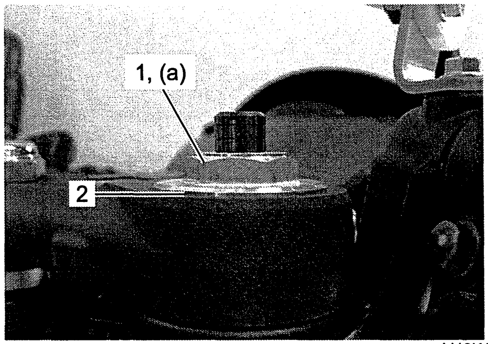
2) Tighten the front fork cap bolt (1) to the specified torque.

NOTE

When the front fork was disassembled, tighten the front fork cap bolt firmly with specified torque.

Tightening torque
Front fork cap bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

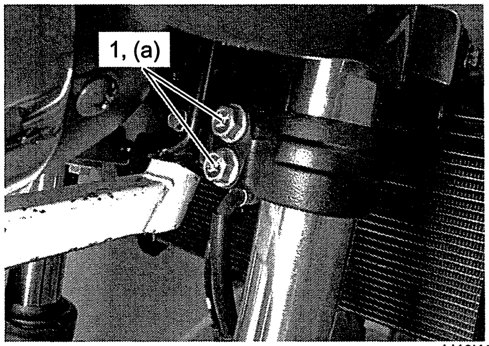
3) Loosen the front fork lower clamp bolts.
4) Set the top end of inner tube to the upper surface (2) of the steering stem upper bracket.



IJ18K1220009-01

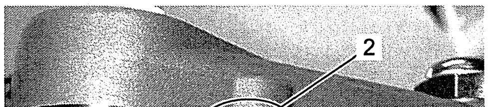
5) Tighten the front fork lower clamp bolts (1) to the specified torque.

Tightening torque
Front fork lower clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



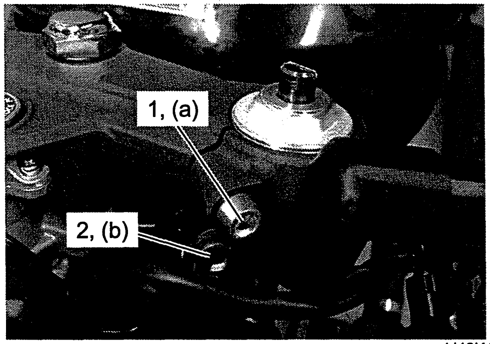
IJ18K1220010-01

6) Insert the projection (1) of the handlebar into the hole (2) of the steering stem upper bracket.



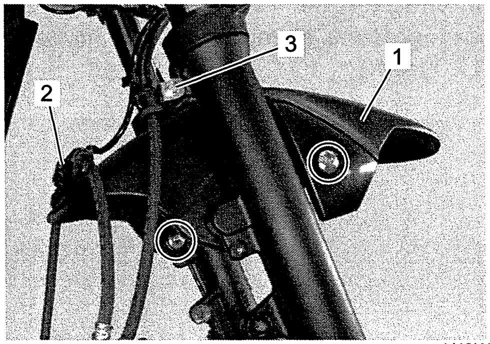
7) Tighten the front fork upper clamp bolt (1) and handlebar clamp bolt (2) to the specified torque.

Tightening torque
Front fork upper clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
Handlebar clamp bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

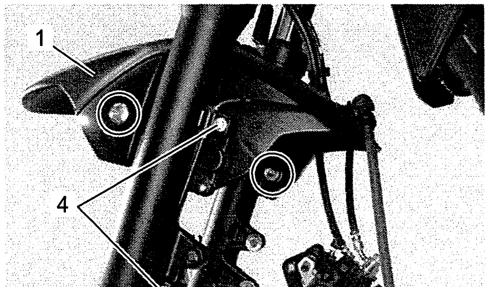


IJ18K1220011-01

8) For left side, install the clutch lever assembly. ☞(Page 5C-5)
9) For right side, install the front brake master cylinder assembly. ☞(Page 4A-35)
10) Install the front fender (1).
11) Connect the brake hose clamp (2).
12) Install the brake hose clamp bolt (3) and front wheel speed sensor lead wire clamp bolts (4).



IJ18K1220013-01



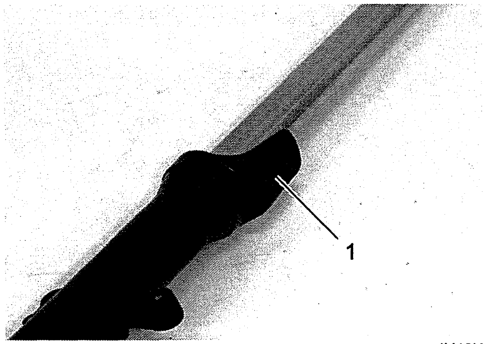
Front Fork Disassembly and Reassembly

BENJ18K62206005

Refer to "Front Fork Assembly Removal and Installation" (Page 2B-3).

Disassembly

1) Remove the protector (1).

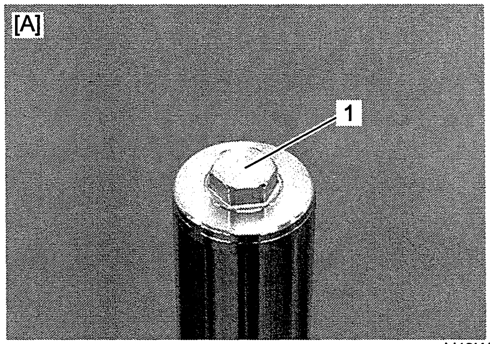


IH18K1220011-01

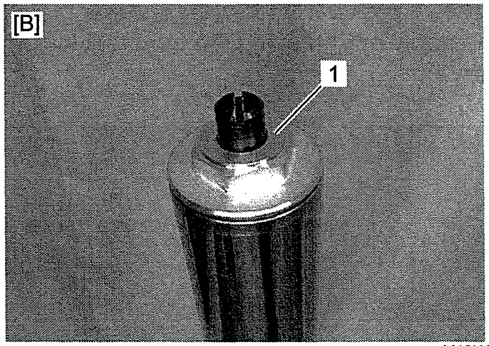
2) Remove the front fork cap bolt (1).

⚠ CAUTION

Hold the front fork cap bolt when removing it, or it will jump out due to the spring pressure.



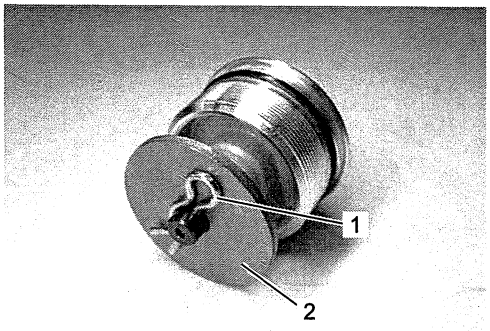
IJ18K1220015-01



IJ18K1220016-01

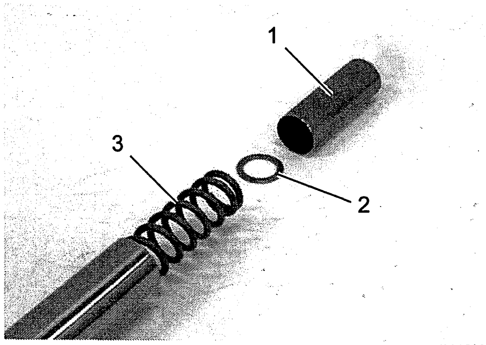
[A]: SV650/A	[B]: SV650XA

3) For SV650XA, remove the pin (1) and seat (2).



IJ18K1220017-01

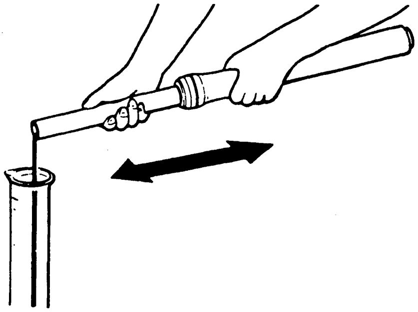
4) Remove the spring collar (1), washer (2) and spring (3).



IH18K1220013-01

5) Invert the fork and stroke it several times to drain out fork oil.

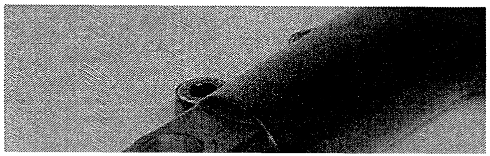
6) Hold the fork inverted for a few minutes to drain oil.



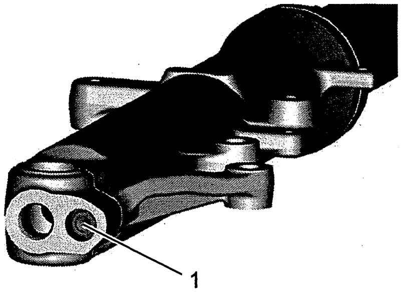
I649G1220012-02

7) Remove the front axle pinch bolt (1). (RH only)

L7 – L8 model



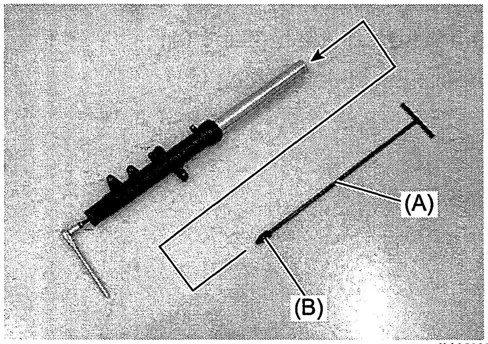
L9 – model



IJ18K5220001-01

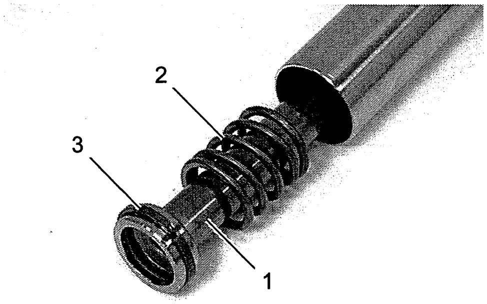
8) Remove the cylinder bolt with the special tools.

Special tool
(A): 09940–34520
(B): 09940–34531



IH18K1220015-01

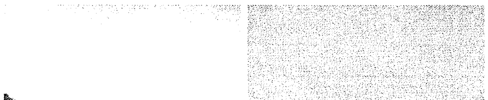
9) Remove the cylinder (1), rebound spring (2) and piston ring (3).



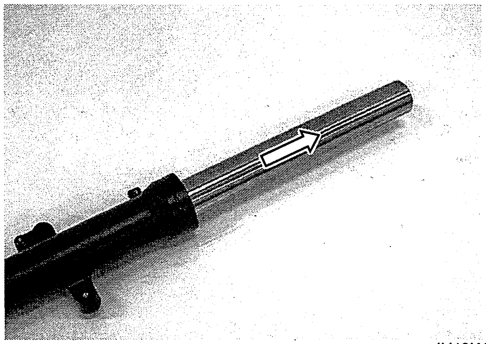
IH18K1220016-01

10) Remove the dust seal (1).

11) Remove the oil seal stopper ring (2).

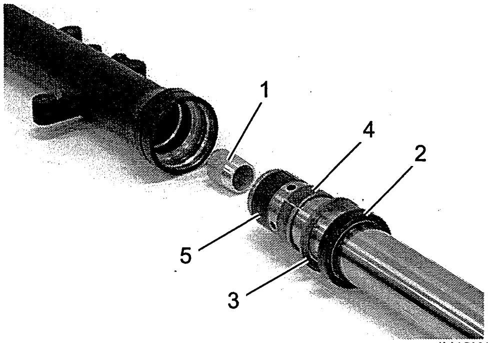


12) Remove the oil seal by slowly pulling out the inner tube.



IH18K1220018-01

13) Remove the following parts.
- Oil lock piece (1)
- Oil seal (2)
- Oil seal retainer (3)
- Outer tube guide bushing (4)
- Inner tube slide bushing (5)



IH18K1220019-01

Reassembly

NOTICE

- **Thoroughly wash all the component parts being assembled.**
  Insufficient washing can result in oil leakage or premature wear of the parts.
- **When reassembling the front fork, use new fork oil.**
- **Use the specified fork oil for the front fork.**

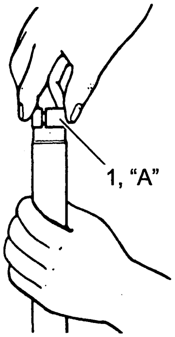
1) Hold the inner tube vertically, clean the metal groove and install the inner tube slide bushing by hand.

NOTICE

Do not damage the Teflon coated surface of

2) Apply fork oil to the new inner tube slide bushing (1).

"A": Fork oil 99000–99001–SA8 (SUZUKI FORK OIL SS-8)



ID26J1220021-01

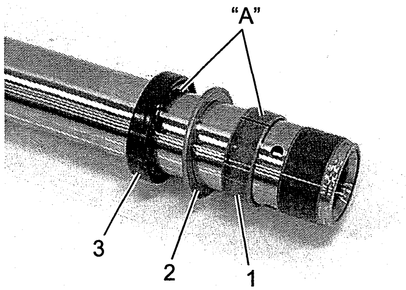
3) Install the following parts onto the inner tube.
- New outer tube guide bushing (1)
- Oil seal retainer (2)
- New oil seal (3)

NOTICE

- **Face the stamp mark side of the oil seal to the dust seal side.**
- **When installing the oil seal to the inner tube, be careful not to damage the oil seal lip.**

4) Apply fork oil to the outer guide bushing and oil seal lip.

"A": Fork oil 99000–99001–SA8 (SUZUKI FORK OIL SS-8)

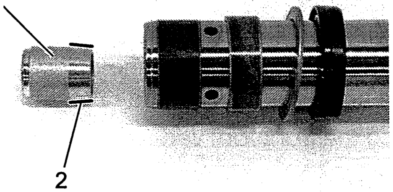


IH18K1220020-01

5) Install the oil lock piece (1) into the inner tube.

NOTE

Face the tapered end (2) of the oil lock piece (1) into the inner tube.



IH18K1220022-02

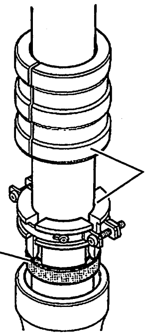
6) Install the inner tube into the outer tube with care not to drop the oil lock piece out.

NOTE

After installing the inner tube into the outer tube, keep the oil lock piece into the inner tube by compressing the front fork fully.

7) Install the oil seal (1) into the outer tube with the special tool.

Special tool
(A): 09940–52861



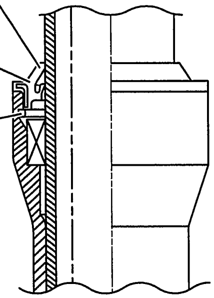
ID26J1220024-02

8) When installing the oil seal stopper ring (1), make sure that the oil seal stopper ring is fitted securely into the groove.

9) Apply fork oil to the lip of new dust seal (2).

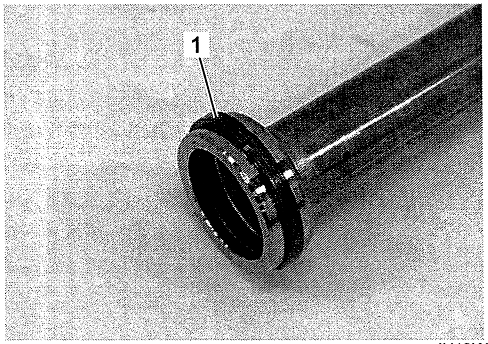
"A": Fork oil 99000–99001–SA8 (SUZUKI FORK OIL SS-8)

10) Install the new dust seal (2).



IH18K1220037-02

11) Install the piston ring (1) to the cylinder.

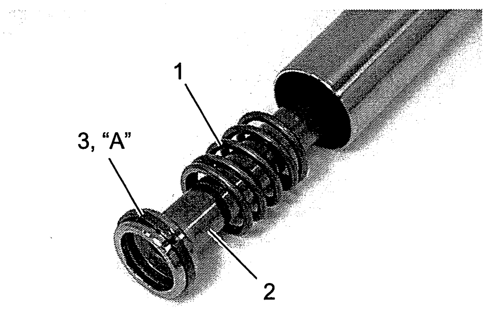


IH18K1220021-01

12) Install the rebound spring (1) to the cylinder (2).

13) Apply fork oil to the piston ring (3) and insert the cylinder into the inner tube.

"A": Fork oil 99000–99001–SA8 (SUZUKI FORK OIL SS-8)



14) Install the new gasket (1) to the cylinder bolt (2).

15) Apply thread lock to the cylinder bolt (2), and tighten it to the specified torque with special tools.

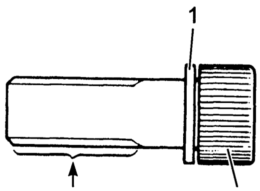
NOTE

Check the front fork for smoothness by stroking it after installing the cylinder.

"A": Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)

Special tool
(A): 09940–34520
(B): 09940–34531

Tightening torque
Cylinder bolt (a): 20 N·m (2.0 kgf-m, 15.0 lbf-ft)



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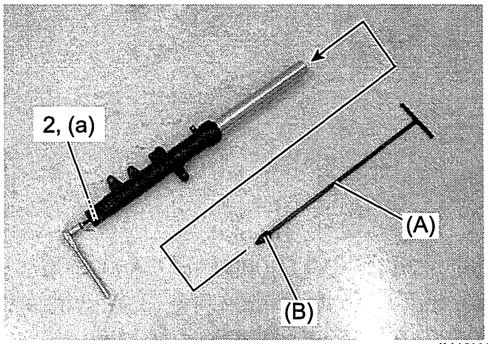

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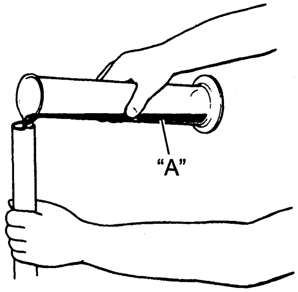
16) Place the front fork vertically without spring.

17) Compress it fully.

18) Pour specified front fork oil up to the top level of the inner tube.

<u>Front fork oil capacity</u>
Each leg
SV650/A [Standard]: 525 ml (17.75 US oz, 18.48 Imp oz)
SV650XA [Standard]: 506 ml (17.11 US oz, 17.81 Imp oz)

"A": Fork oil 99000–99001–SA8 (SUZUKI FORK OIL SS-8)



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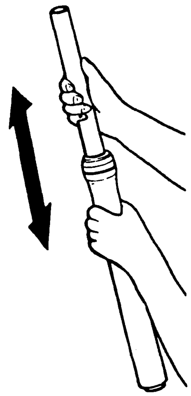
19) Move the inner tube up and down several strokes until bubbles do not come out from the oil.

20) Keep the front fork vertically and wait 5 – 6 minutes.



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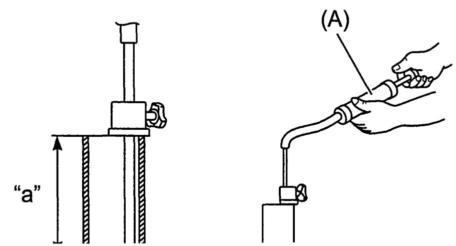
21) Hold the front fork vertically and adjust fork oil level "a" with the special tool.

NOTE

When adjusting the fork oil level, remove the fork spring and compress the inner tube fully.

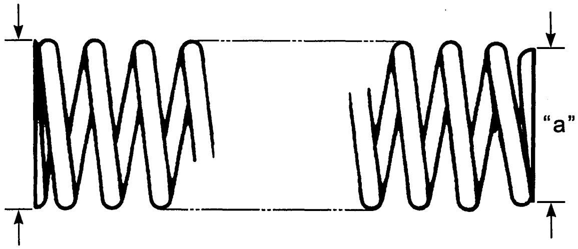
<u>Front fork oil level</u>
Without spring, inner tube fully compressed
SV650/A [Standard]: 84 mm (3.3 in)
SV650XA [Standard]: 104 mm (4.09 in)

Special tool
(A): 09943–74111



22) Install the fork spring (1) into the inner tube with its smaller diameter "a" facing the bottom side.

23) Install the washer (2) and spring collar (3).



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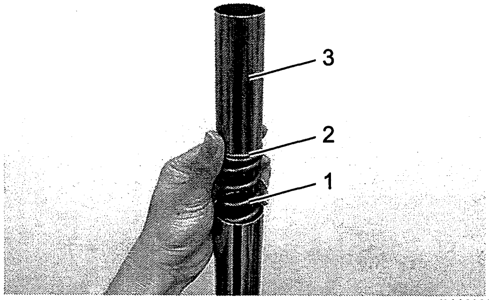

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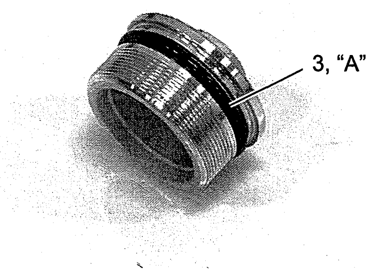
24) For SV650XA, install the seat (1) and pin (2).

25) Apply fork oil lightly to the new front fork cap bolt O-ring (3).

"A": Fork oil 99000–99001–SA8 (SUZUKI FORK OIL SS-8)

[A]



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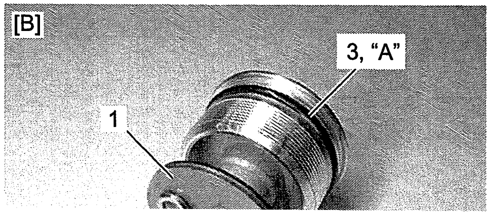
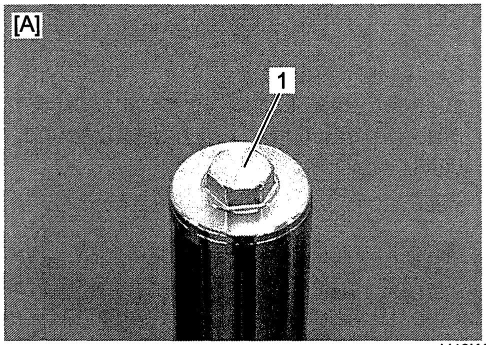


26) Temporarily tighten the front fork cap bolt (1) pushing it down.



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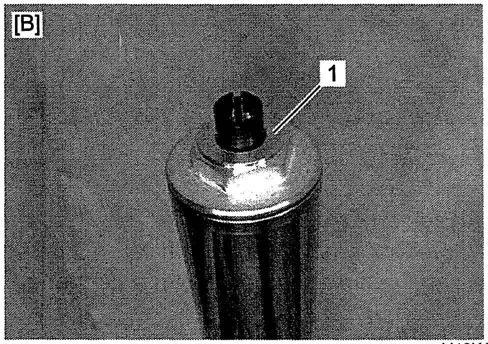


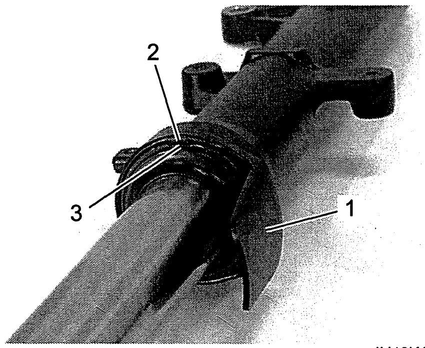
IJ18K1220021-01

[A]: SV650/A	[B]: SV650XA

27) Install the protector (1).

NOTE

Fit the projection (2) of the front fork protector to the depression (3) of the front fork outer tube.



IH18K1220029-01

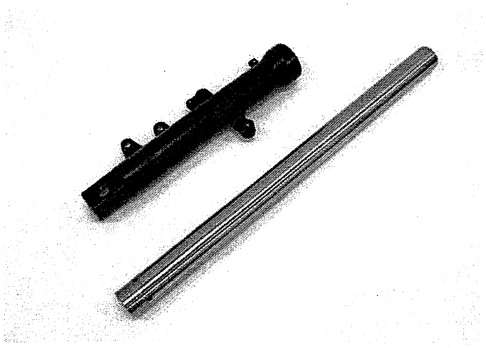
Front Fork Inspection

BENJ18K62206006

Refer to "Front Fork Disassembly and Reassembly" (Page 2B-7).

Inner Tube / Outer Tube

Inspect the inner tube sliding surface and outer tube sliding surface for scuffing. If any defect is found, replace the part with a new one.

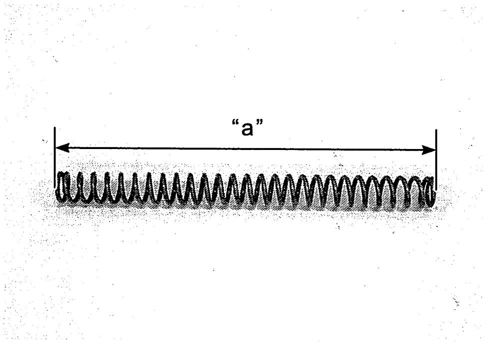


IH18K1220030-01

Fork Spring

Measure the fork spring free length "a". If it is shorter than the service limit, replace it with a new one.

<u>Front fork spring free length</u>
SV650/A
[Limit]: 404 mm (15.9 in)
SV650XA
L8 [Limit]: 389 mm (15.3 in)
L9 – [Limit]: 391 mm (15.4 in)



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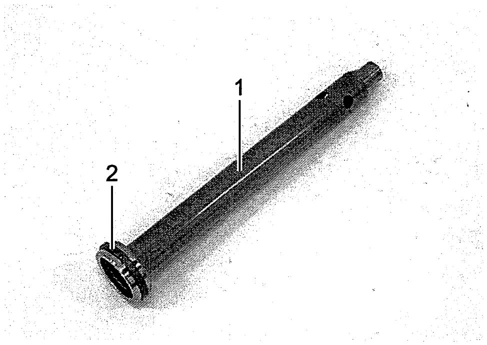
Cylinder / Piston Ring

Inspect the cylinder (1) and piston ring (2) for wear or damage. If any defects are found, replace the damper rod or damper rod ring with a new one.



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Specifications

Tightening Torque Specifications

BENJ18K62207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Front fork cap bolt	23	2.3	17.0	☞(Page 2B-4) / ☞(Page 2B-6)
Front fork lower clamp bolt	23	2.3	17.0	☞(Page 2B-4) / ☞(Page 2B-6)
Front fork upper clamp bolt	23	2.3	17.0	☞(Page 2B-5) / ☞(Page 2B-7)
Handlebar clamp bolt	23	2.3	17.0	☞(Page 2B-7)
Cylinder bolt	20	2.0	15.0	☞(Page 2B-11)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Front Fork Components" (Page 2B-1)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K62208001

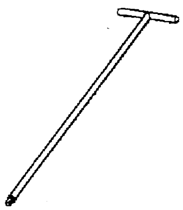
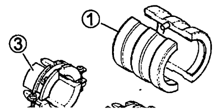
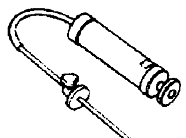
Material	SUZUKI recommended product or Specification		Note
Fork oil	SUZUKI FORK OIL SS-8	P/No.: 99000–99001–SA8	☞(Page 2B-9) / ☞(Page 2B-9) / ☞(Page 2B-10) / ☞(Page 2B-10) / ☞(Page 2B-11) / ☞(Page 2B-12)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000–32150	☞(Page 2B-11)

NOTE

Required service material(s) is also described in:
"Front Fork Components" (Page 2B-1)

Special Tool

BENJ18K62208002

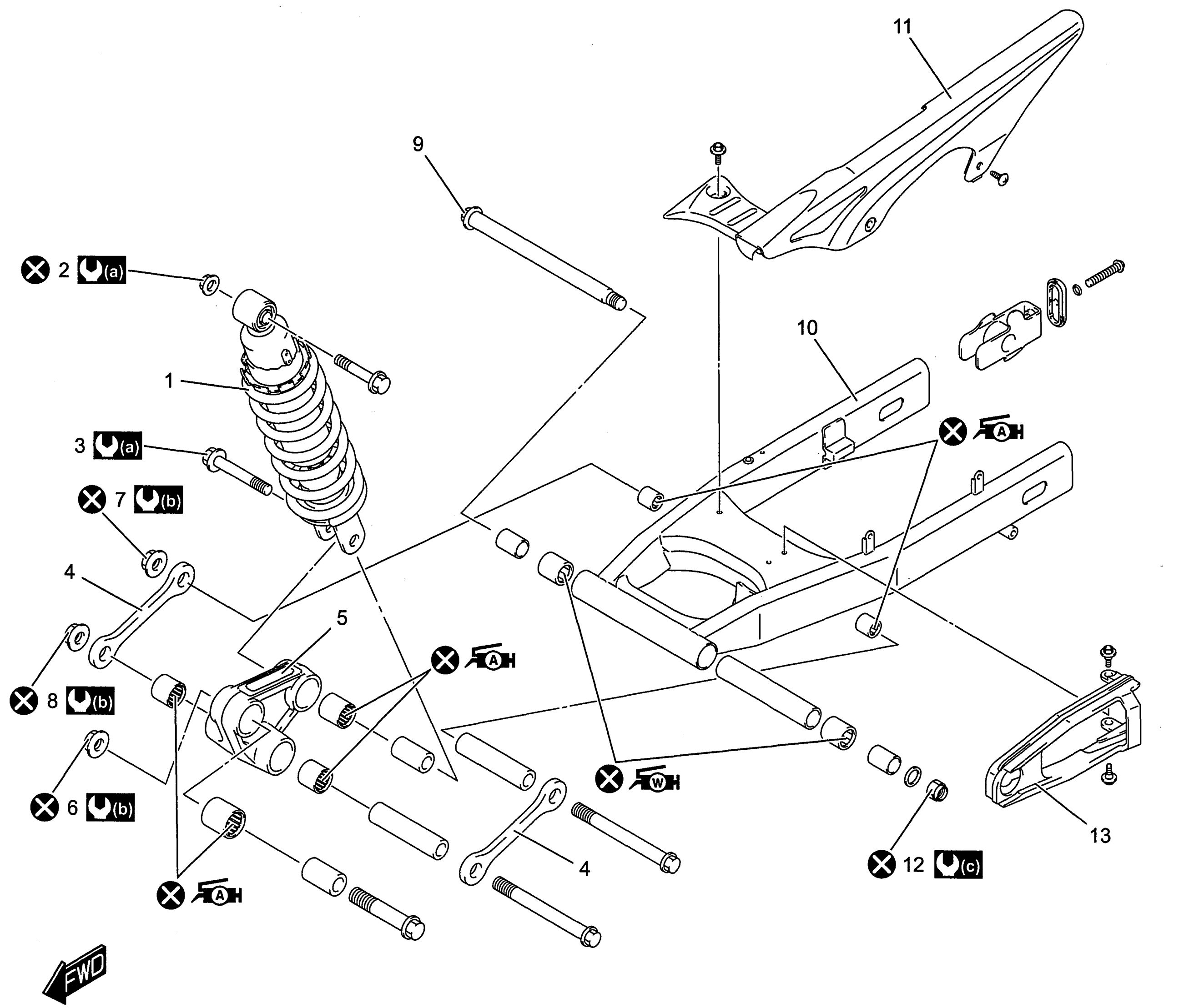
09940–34520 T-handle (Long shank: 3/8 sq.) This tool is included in Front fork assembling tool set (09940-34517). ☞(Page 2B-8) / ☞(Page 2B-11) 	09940–34531 Front fork assembling attachment (A) This tool is included in Front fork assembling tool set (09940-34517). ☞(Page 2B-8) / ☞(Page 2B-11) 
09940–52861 Front fork oil seal installer set 1. Hammer (09941-53610) 2. Attachment (09940 	09943–74111 Front fork oil level gauge ☞(Page 2B-11) 

Rear Suspension

Repair Instructions

Rear Suspension Components

BENJ18K62306001



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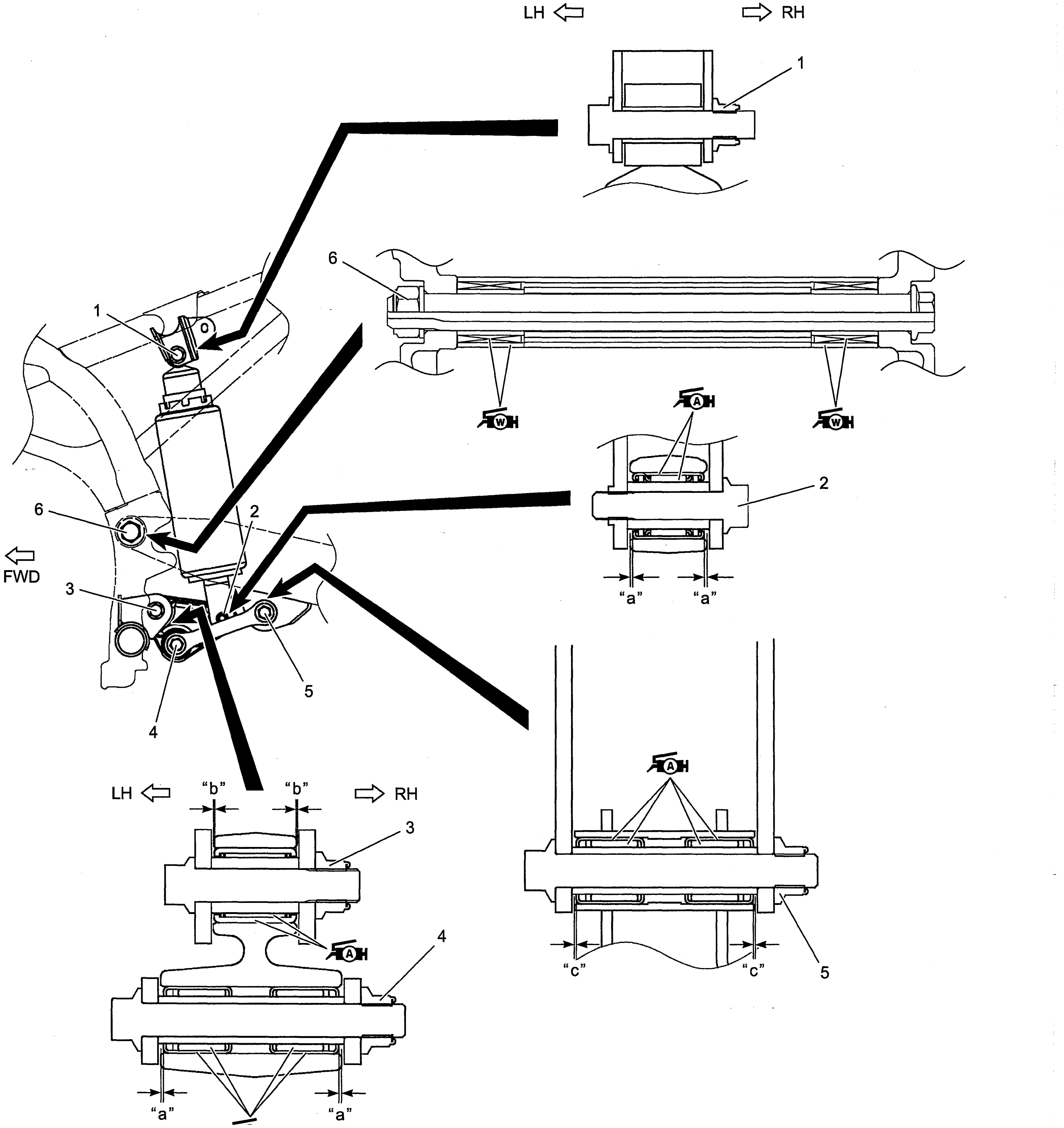
1. Rear shock absorber	8. Cushion lever (center) mounting nut	(b) : 78 N·m (8.0 kgf-m, 57.5 lbf-ft)
2. Rear shock absorber upper mounting nut	9. Swingarm pivot shaft	(c) : 100 N·m (10.2 kgf-m, 74.0 lbf-ft)
3. Rear shock absorber lower mounting bolt	10. Swingarm	AH : Apply grease to the bearing.
4. Cushion rod	11. Chain case	WH : Apply grease.
5. Cushion lever	12. Swingarm pivot nut	⊗ : Do not reuse.
6. Cushion lever (front) mounting nut	13. Chain buffer	
7. Cushion rod mounting nut	(a) : 50 N·m (5.1 kgf-m, 37.0 lbf-ft)	

Rear Suspension Assembly Construction

BENJ18K62306002

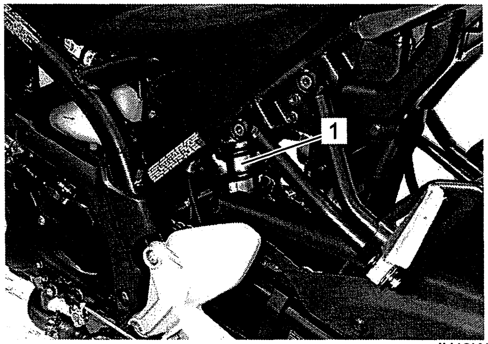


Rear Suspension On-Vehicle Inspection

BENJ18K62306003

Inspect the rear shock absorber (1) for oil leakage and check that there is no play in the swingarm (2).
Replace any defective parts, if necessary.

- Rear shock absorber replace: ☞(Page 2C-3)
- Swingarm pivot shaft and bearing inspection: ☞(Page 2C-10)
- Cushion lever inspection: ☞(Page 2C-5)
- Cushion rod inspection: ☞(Page 2C-8)
- Swingarm inspection: ☞(Page 2C-10)



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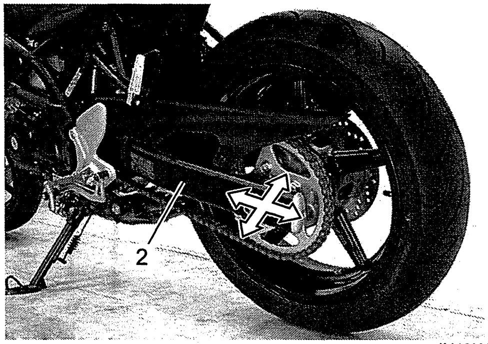

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Rear Shock Absorber Adjustment

BENJ18K62306004

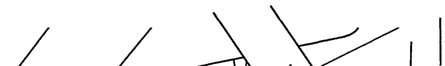
Spring Adjustment

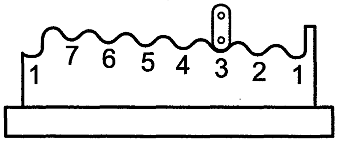
Turn the spring tension ring (1) to the desired position.

NOTE

Position 1 provides the softest spring tension and position 7 provides the stiffest.

Rear shock absorber spring adjuster
[Standard]: 3rd position from softest end





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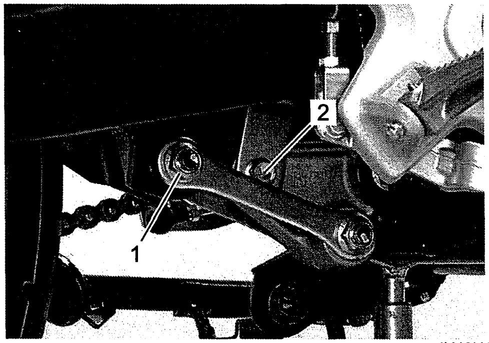
Rear Shock Absorber Removal and Installation

BENJ18K62306005

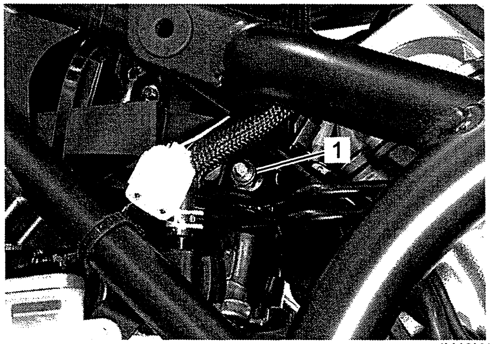
Removal

1) Remove the exhaust pipe and muffler. ☞(Page 1K-5)
2) Support the motorcycle with a jack to relieve load on the rear shock absorber.
3) Remove the cushion rod mounting bolt and nut (1).
4) Remove the rear shock absorber lower mounting bolt (2).



IH18K1230005-01

5) Remove the rear shock absorber upper mounting bolt and nut (1).



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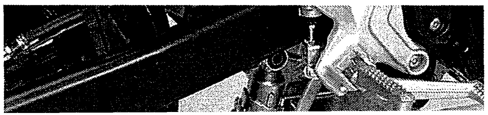
6) Remove the rear shock absorber (1) to the lower side.

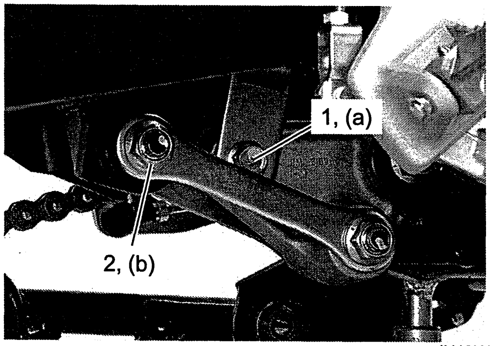


Installation

Install the rear shock absorber in the reverse order of removal. Pay attention to the following points:

- Tighten the rear shock absorber lower mounting bolt (1) to the specified torque.
- Tighten the new cushion rod mounting nut (2) to the specified torque.
- Tighten the new rear shock absorber upper mounting nut (3) to the specified torque.

Tightening torque
Rear shock absorber lower mounting bolt (a): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)
Cushion rod mounting nut (b): 78 N·m (8.0 kgf-m, 57.5 lbf-ft)
Rear shock absorber upper mounting nut (c): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)



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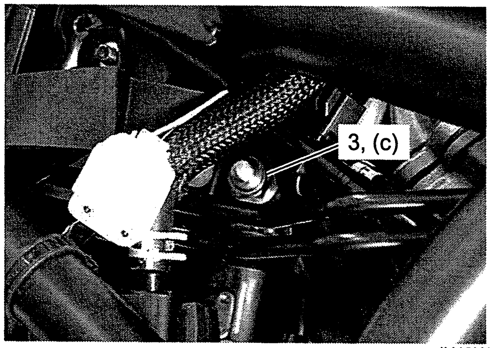

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- Install the exhaust pipe and muffler. ☞(Page 1K-5)

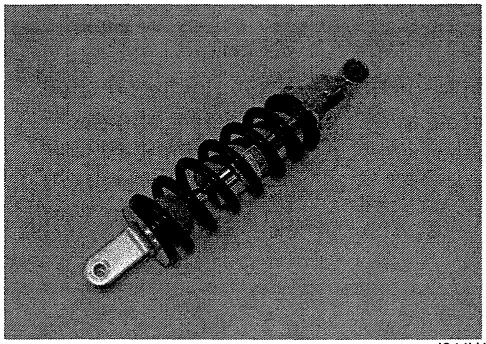
Rear Shock Absorber Inspection

BENJ18K62306006

Refer to “Rear Shock Absorber Removal and Installation” (Page 2C-3).

Rear Shock Absorber

Inspect the rear shock absorber for damage and oil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Rear Shock Absorber Disposal

BENJ18K62306007

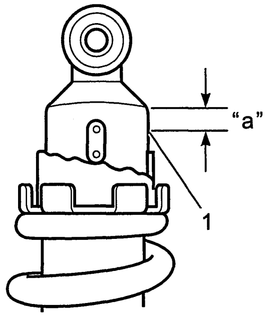
Refer to “Rear Shock Absorber Removal and Installation” (Page 2C-3).
The rear shock absorber unit contains high-pressure nitrogen gas.

⚠ WARNING

- **Mishandling the rear shock absorber can cause explosion.**
- **Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.**
- **Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.**
- **Release gas pressure before disposing.**

Gas Pressure Release

1) Mark the drill center at the location (1) using a center punch.



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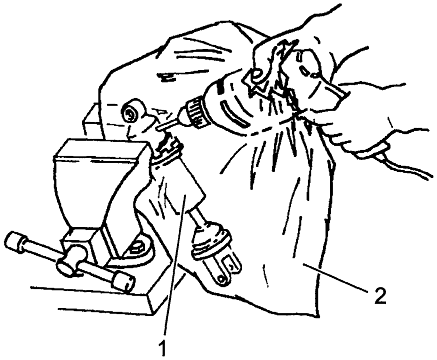
“a”: 7 mm (0.28 in)

2) Wrap rear shock absorber (1) with a plastic bag (2) and fix it on a vise.

⚠ 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.**



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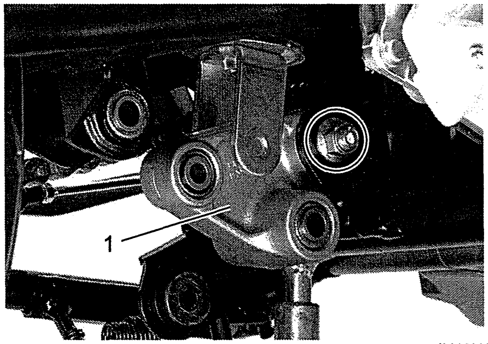
Cushion Lever Removal and Installation

BENJ18K62306008

Removal

1) Remove the cushion rods. ☞(Page 2C-7)
2) Remove the cushion lever (1).



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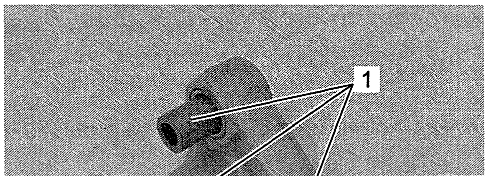
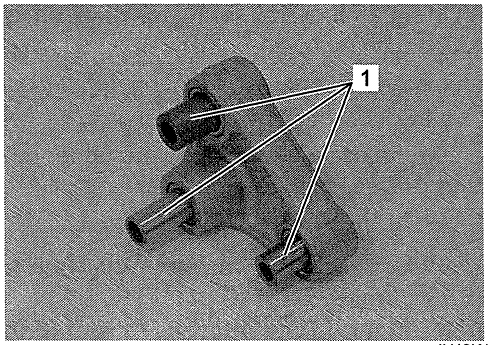
3) Remove the spacers (1).



Installation

1) Install the spacers (1).



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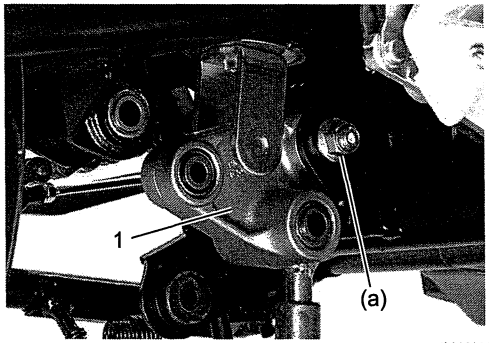
2) Install the cushion lever (1).
3) Tighten the new nut to the specified torque.

Tightening torque
Cushion lever (front) mounting nut (a): 78 N·m (8.0 kgf-m, 57.5 lbf-ft)



IH18K1230015-01

4) Install the cushion rods. ☞(Page 2C-7)

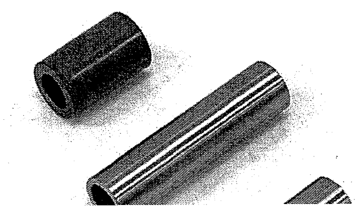
Cushion Lever Inspection

BENJ18K62306009

Refer to “Cushion Lever Removal and Installation” (Page 2C-5).

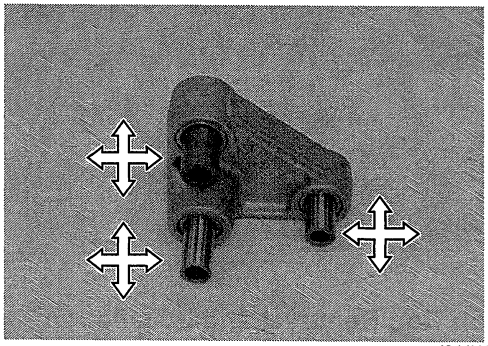
Spacer

Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with new ones.



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).



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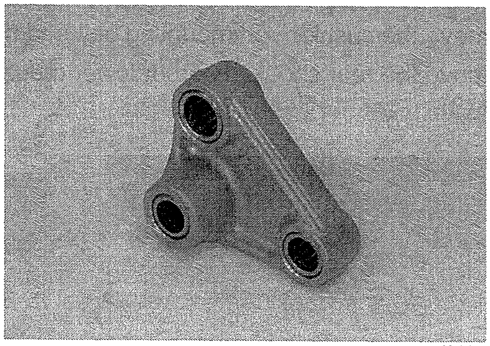
Cushion Lever

Inspect the cushion lever for damage. If any defect is found, replace the cushion lever with a new one.



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Cushion Lever Bearing Removal and Installation

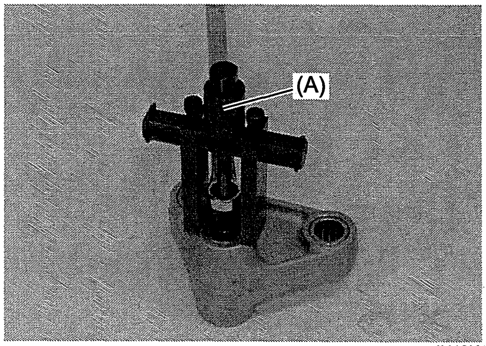
BENJ18K62306010

Refer to "Cushion Lever Removal and Installation" (Page 2C-5).

Removal

1) Remove the cushion lever bearings with the special tools.

Special tool
(A): 09921–20240
(B): 09913–70210



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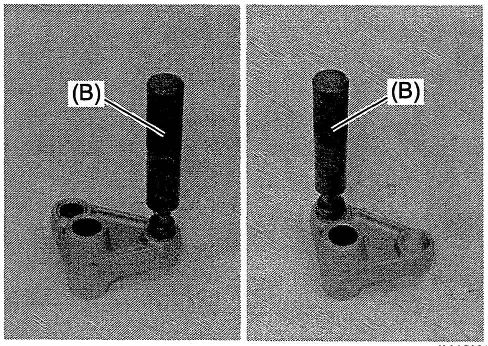

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Installation

1) Apply a small quantity of the grease to housing.

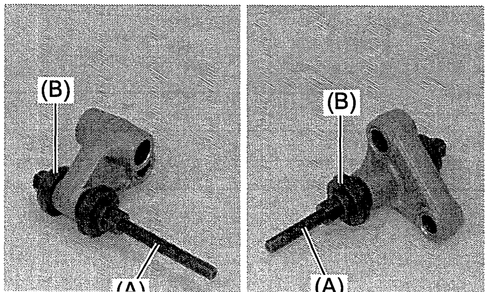
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

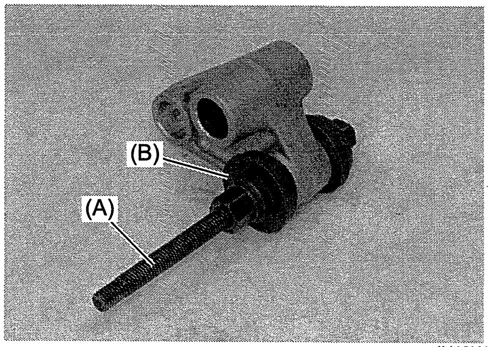
2) Press the new bearings into the cushion lever with the special tools.

NOTE

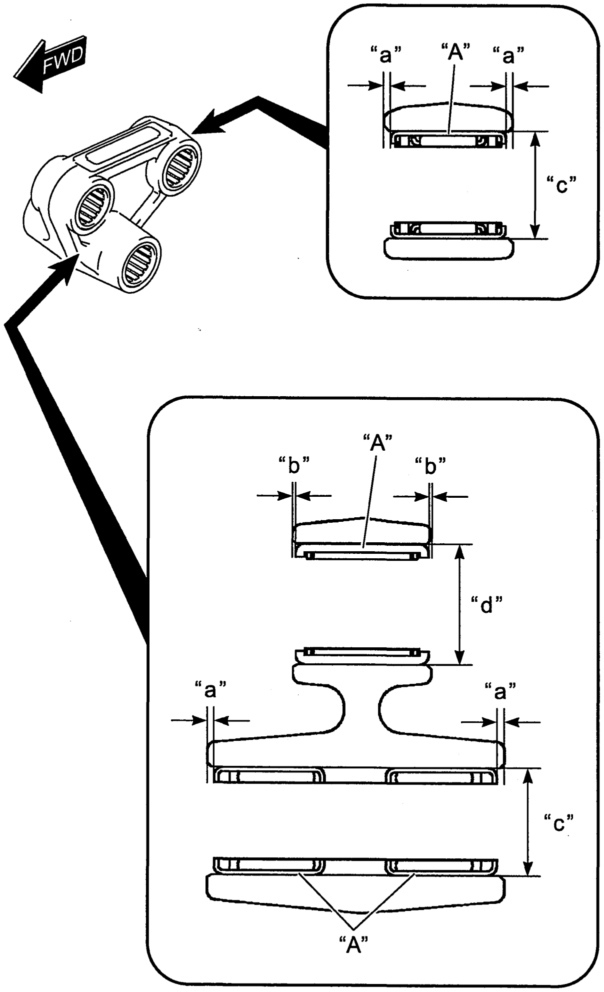
The stamped mark side of the cushion lever bearing faces outside.

Special tool
(A): 09924–84510
(B): 09941–34513





IH18K1230025-01

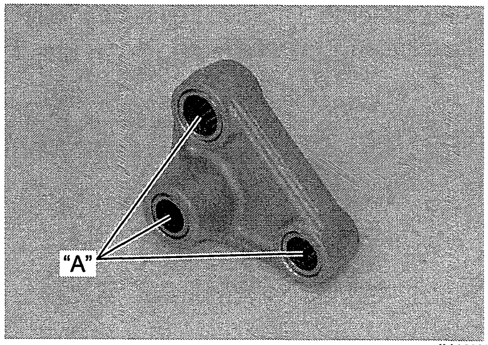


IH18K1230057-02

"a": 1.0 mm (0.04 in)	"c": 24 mm (0.94 in)
"b": 0.25 mm (0.010 in)	"d": 27 mm (1.06 in)

3) Apply grease to the bearings.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



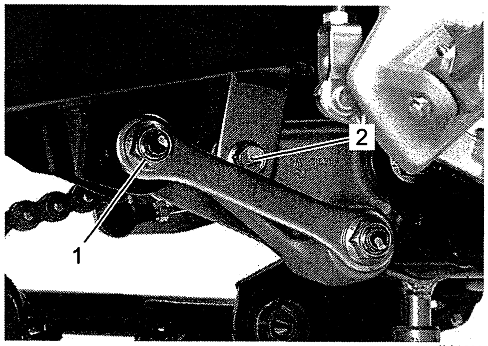
IH18K1230027-02

Cushion Rod Removal and Installation

BENJ18K62306011

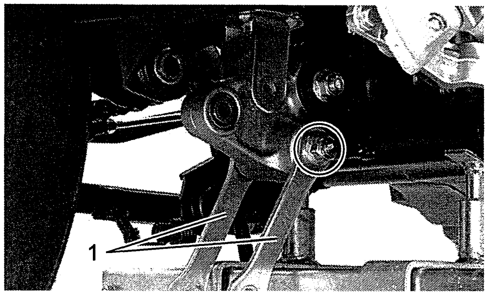
Removal

1) Remove the exhaust pipe and muffler. ☞(Page 1K-5)
2) Support the motorcycle with a jack to relieve load on the cushion rod.
3) Remove the cushion rod mounting bolt and nut (1).
4) Remove the rear shock absorber lower mounting bolt (2).



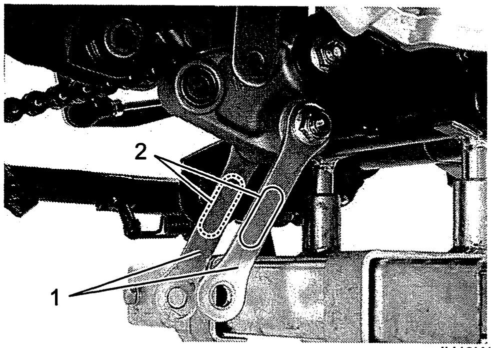
IH18K1230017-01

5) Remove the cushion rods (1).



Installation

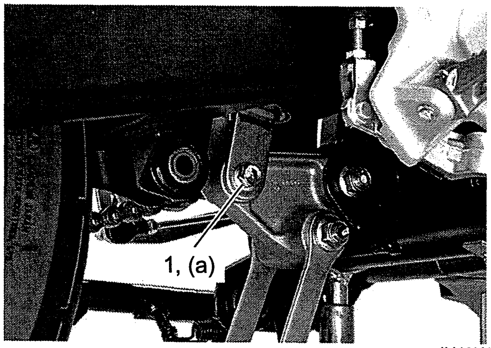
1) Set the cushion rods (1) so that the stamped marks (2) should be face outside.



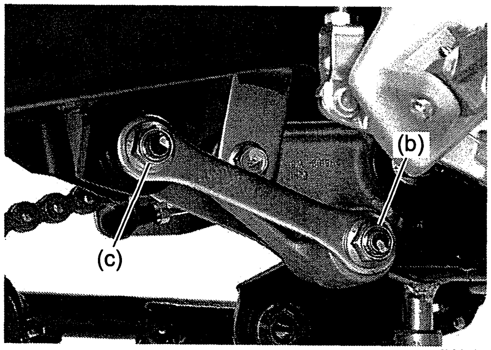
IH18K1230019-01

2) Tighten the rear shock absorber lower mounting bolt (1) to the specified torque.
3) Tighten each new nut to the specified torque.

Tightening torque
Rear shock absorber lower mounting bolt (a): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)
Cushion lever (center) mounting nut (b): 78 N·m (8.0 kgf-m, 57.5 lbf-ft)
Cushion rod mounting nut (c): 78 N·m (8.0 kgf-m, 57.5 lbf-ft)



IH18K1230020-01

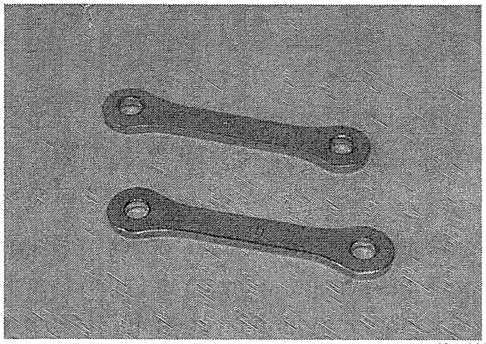


IH18K1230021-01

Cushion Rod Inspection

BENJ18K62306012

Refer to “Cushion Rod Removal and Installation” (Page 2C-7).
Inspect the cushion rods for damage and bend. If any defects are found, replace the cushion rods with new ones.



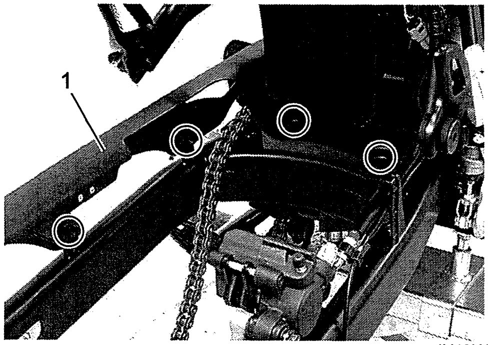
I944H1230020-01

Swingarm Removal and Installation

BENJ18K62306013

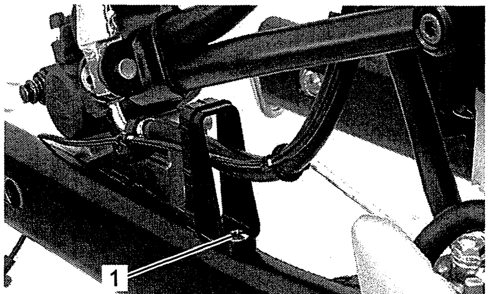
Removal

1) Remove the exhaust pipe and muffler. ☞(Page 1K-5)
2) Remove the rear wheel assembly. ☞(Page 2D-10)
3) Remove the chain case (1).



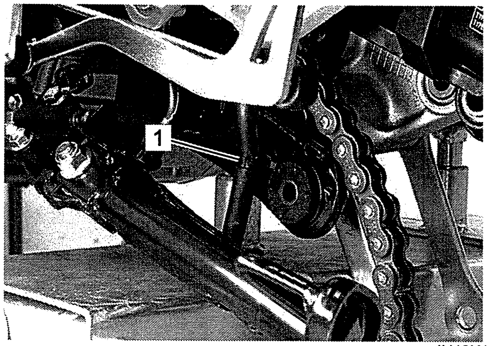
IH18K1230028-01

4) Remove the rear brake hose guide screw (1).



5) Remove the rear shock absorber. ☞(Page 2C-3)

6) Remove the drain hose clamp (1).

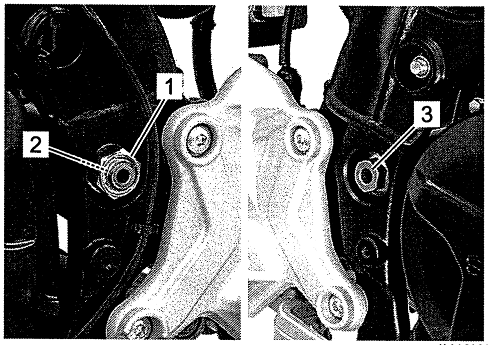


IH18K1230030-01

7) Remove the right frame lower cover. ☞(Page 9D-22)

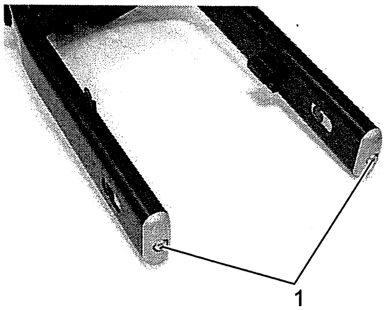
8) Remove the swingarm pivot nut (1) and washer (2).

9) Draw out the swingarm pivot shaft (3) remove the swingarm assembly.



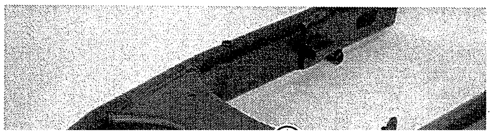
IH18K1230032-01

10) Remove the chain adjusters (1).

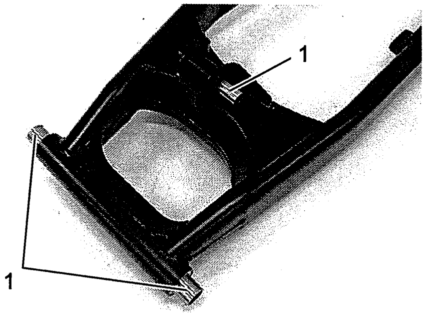


IH18K1230033-01

11) Remove the chain buffer (1).



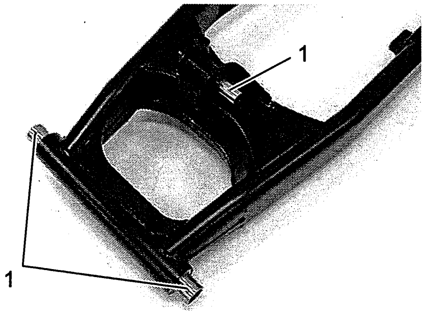
12) Remove the spacers (1).



IH18K1230035-01

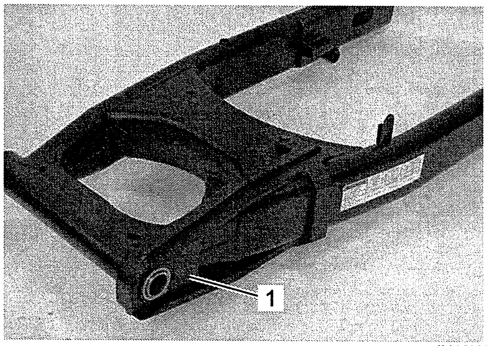
Installation

1) Install the spacers (1).



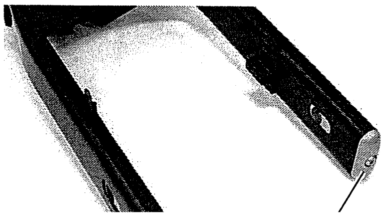
IH18K1230036-01

2) Install the chain buffer (1).

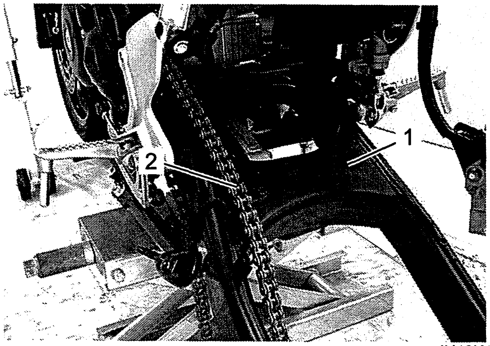


IH18K1230037-01

3) Install the chain adjusters (1).



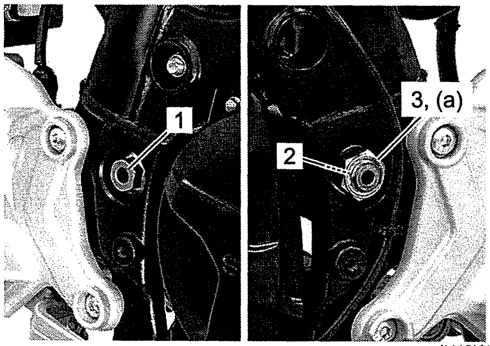
4) When installing the swingarm assembly (1), pass the chain (2) to the swingarm.



IH18K1230039-01

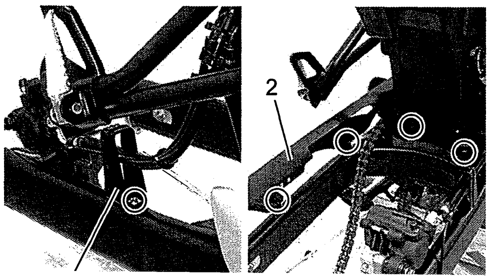
5) Insert the swingarm pivot shaft (1).
6) Install the washer (2) and tighten the new swingarm pivot nut (3) to the specified torque.

Tightening torque
Swingarm pivot nut (a): 100 N·m (10.2 kgf-m, 74.0 lbf-ft)



IH18K1230040-01

7) Install the right frame lower cover. ☞(Page 9D-22)
8) Install the drain hose clamp. Refer to “Fuel Tank Water Drain Hose and Fuel Tank Breather Hose Routing Diagram” in Section 1G (Page 1G-3).
9) Install the rear shock absorber. ☞(Page 2C-3)
10) Install the rear brake hose guide (1).
11) Install the chain case (2).



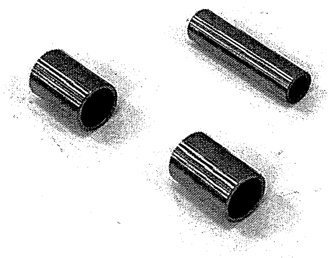
Swingarm Inspection

BENJ18K62306014

Refer to “Swingarm Removal and Installation” (Page 2C-8).

Spacers

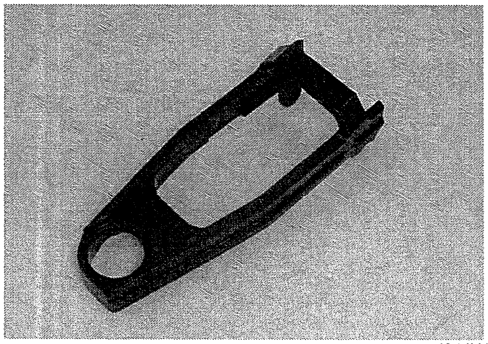
Inspect the spacers for wear and damage. If any defects are found, replace the spacers with new ones.



IH18K1230042-01

Chain Buffer

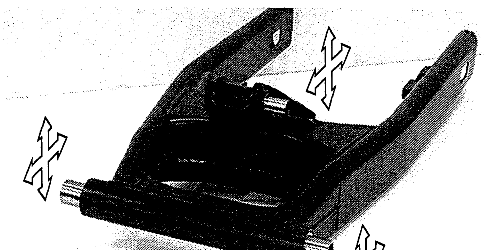
Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.



I944H1230036-01

Swingarm 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 bearings with new ones. ☞(Page 2C-11)



Swingarm

Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.

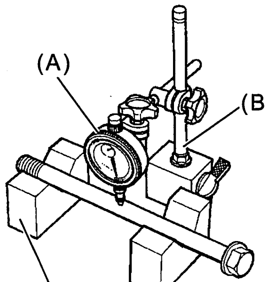
IH18K1230044-01

Swingarm Pivot Shaft

Using a dial gauge, check the swingarm pivot shaft runout. If the runout exceeds the service limit, replace the pivot shaft.

Swingarm pivot shaft runout
[Limit]: 0.3 mm (0.011 in)

Special tool
(A): 09900–20607
(B): 09900–20701
(C): 09900–21304



IF34J1230026-01

Swingarm Bearing Removal and Installation

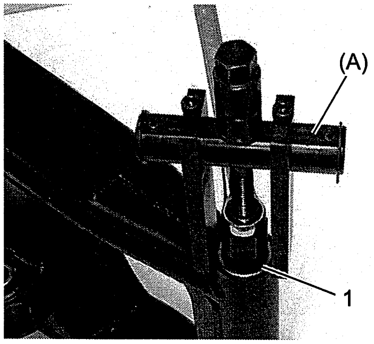
BENJ18K62306015

Refer to "Swingarm Removal and Installation" (Page 2C-8).

Removal

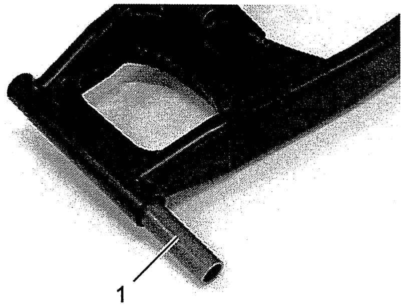
1) Remove the swingarm pivot bearings (1) on both sides with the special tool.

   Special tool
   (A): 09921–20240



IH18K1230045-01

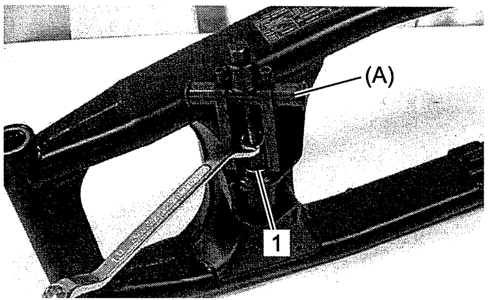
2) Remove the center spacer (1).



IH18K1230046-01

3) Remove the cushion rod bearings (1) on both sides with the special tool.

   Special tool
   (A): 09921–20240



Installation

1) Apply a small quantity of the grease to housing when installing the bearing.

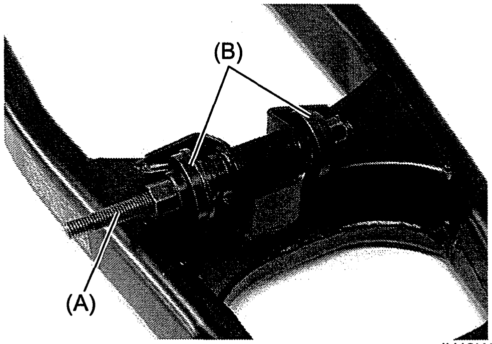
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

2) Press the new cushion rod bearings into the swingarm with the special tools.

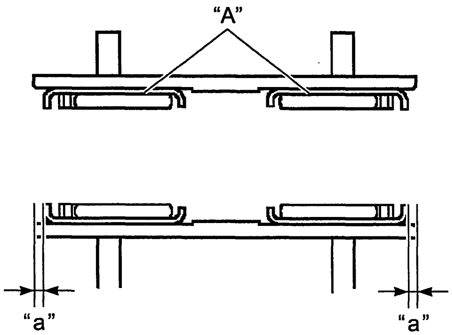
NOTE

The stamped mark side of the cushion rod bearing faces outside.

Special tool
(A): 09924–84510
(B): 09941–34513



IH18K1230048-01



IH18K1230058-01

"a": 0.5 mm (0.02 in)

3) Install the center spacer.

4) Apply a small quantity of the grease to housing, when installing the bearings.

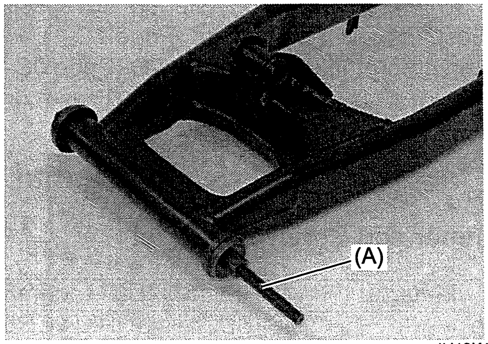
"A": Grease 99000–25350 (SUZUKI WATER RESISTANT GREASE EP2)

5) Press the new pivot bearings into the swingarm with the special tool.

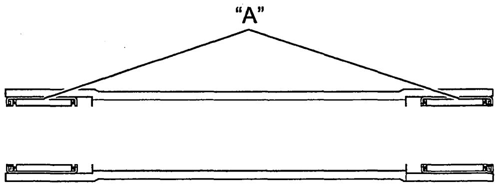
NOTE

The stamped mark side of the pivot bearing faces outside.

Special tool
(A): 09941–34513



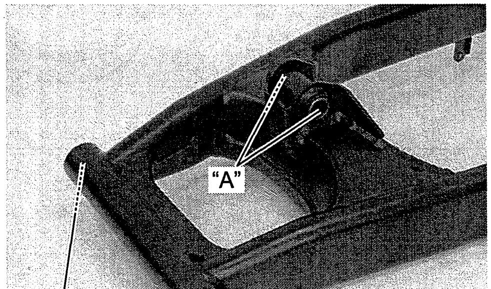
IH18K1230050-01



IH18K1230059-01

6) Apply grease to the bearings.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)
"B": Grease 99000–25350 (SUZUKI WATER RESISTANT GREASE EP2)



Specifications

Tightening Torque Specifications

BENJ18K62307001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear shock absorber lower mounting bolt	50	5.1	37.0	☞(Page 2C-4) / ☞(Page 2C-8)
Cushion rod mounting nut	78	8.0	57.5	☞(Page 2C-4) / ☞(Page 2C-8)
Rear shock absorber upper mounting nut	50	5.1	37.0	☞(Page 2C-4)
Cushion lever (front) mounting nut	78	8.0	57.5	☞(Page 2C-5)
Cushion lever (center) mounting nut	78	8.0	57.5	☞(Page 2C-8)
Swingarm pivot nut	100	10.2	74.0	☞(Page 2C-10)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Rear Suspension Components" (Page 2C-1)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K62308001

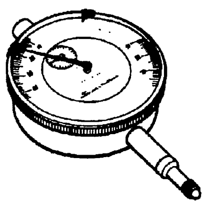
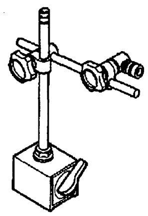
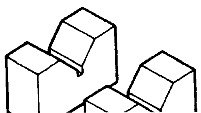
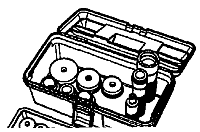
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 2C-6) / ☞(Page 2C-7) / ☞(Page 2C-12) / ☞(Page 2C-12)
	SUZUKI WATER RESISTANT GREASE EP2	P/No.: 99000–25350	☞(Page 2C-12) / ☞(Page 2C-12)

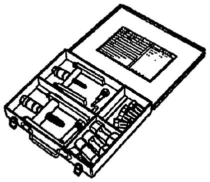
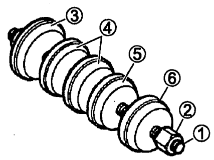
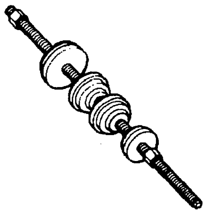
NOTE

Required service material(s) is also described in:
"Rear Suspension Components" (Page 2C-1)
"Rear Suspension Assembly Construction" (Page 2C-2)

Special Tool

BENJ18K62308002

09900–20607 Dial gauge (10 x 0.01 mm) ☞(Page 2C-11) 	09900–20701 Dial gauge chuck ☞(Page 2C-11) 
09900–21304 V blocks ☞(Page 2C-11) 	09913–70210 Bearing installer set ☞(Page 2C-6) 

09921–20240 Bearing remover set ☞(Page 2C-6) / ☞(Page 2C-11) / ☞(Page 2C-11) 	09924–84510 Bearing installer set ☞(Page 2C-6) / ☞(Page 2C-12) 
09941–34513 Bearing installer set ☞(Page 2C-6) / ☞(Page 2C-12) / ☞(Page 2C-12) 	

Wheels and Tires

Precautions

Precautions for Wheel and Tire

BENJ18K62400001

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

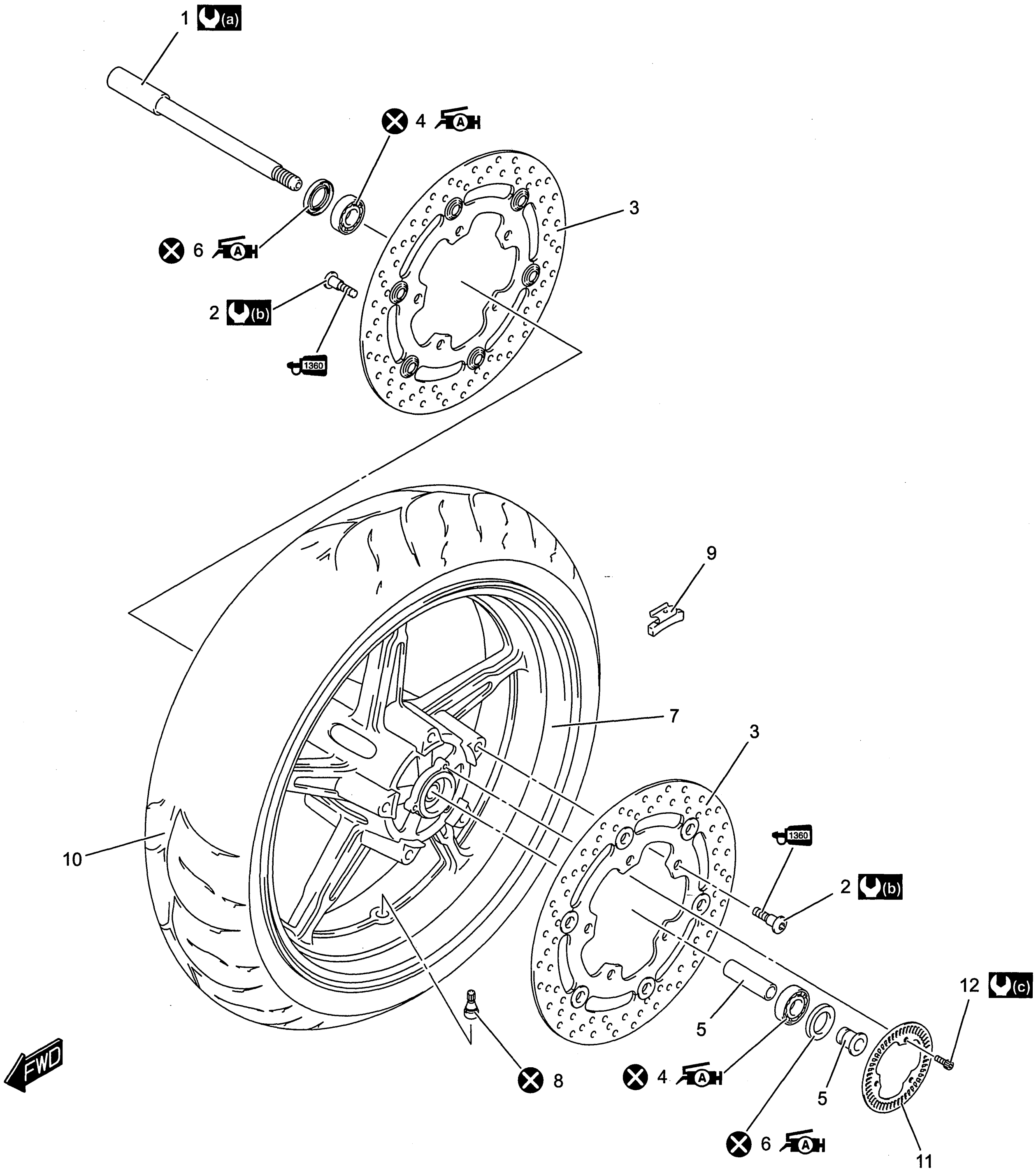
⚠ WARNING

- **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.**
- **Replacement wheel must be equivalent to the original equivalent wheel.**

Repair Instructions

Front Wheel Components

BENJ18K62406001



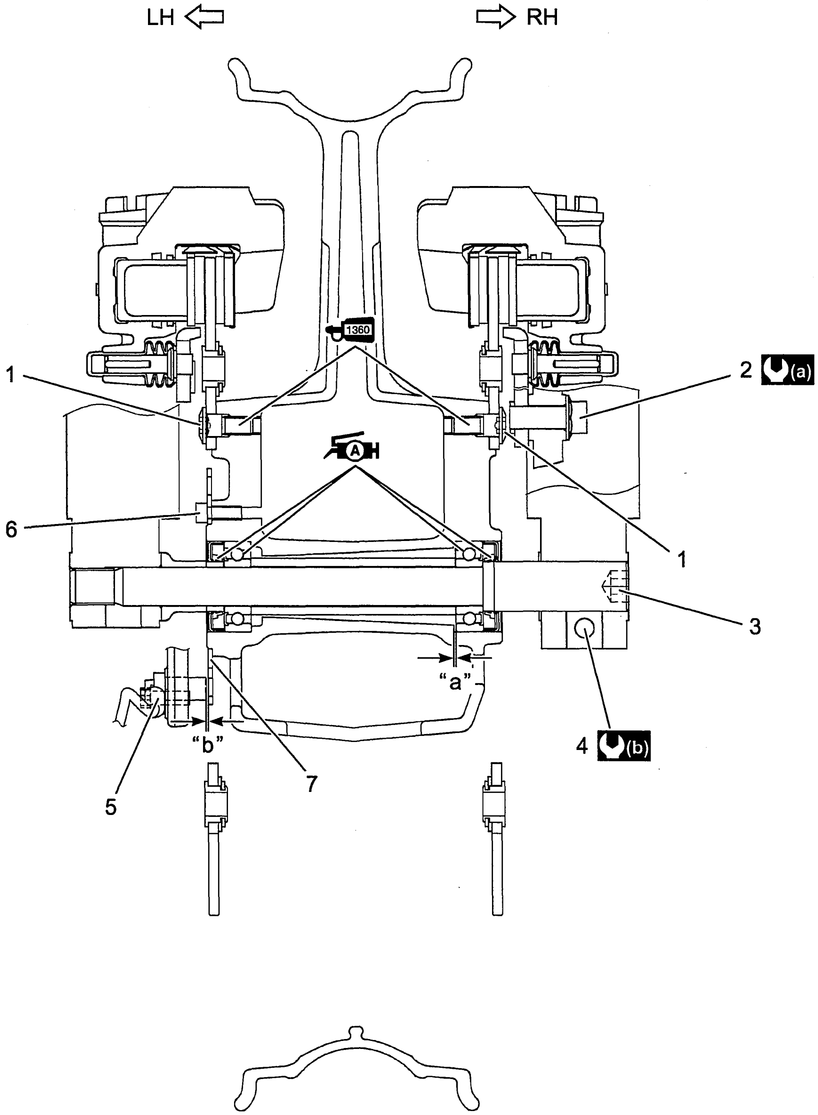
IH18K1240037-01

1. Front axle	6. Dust seal	11. Front wheel speed sensor rotor	AH : Apply grease.

Front Wheel Assembly Construction

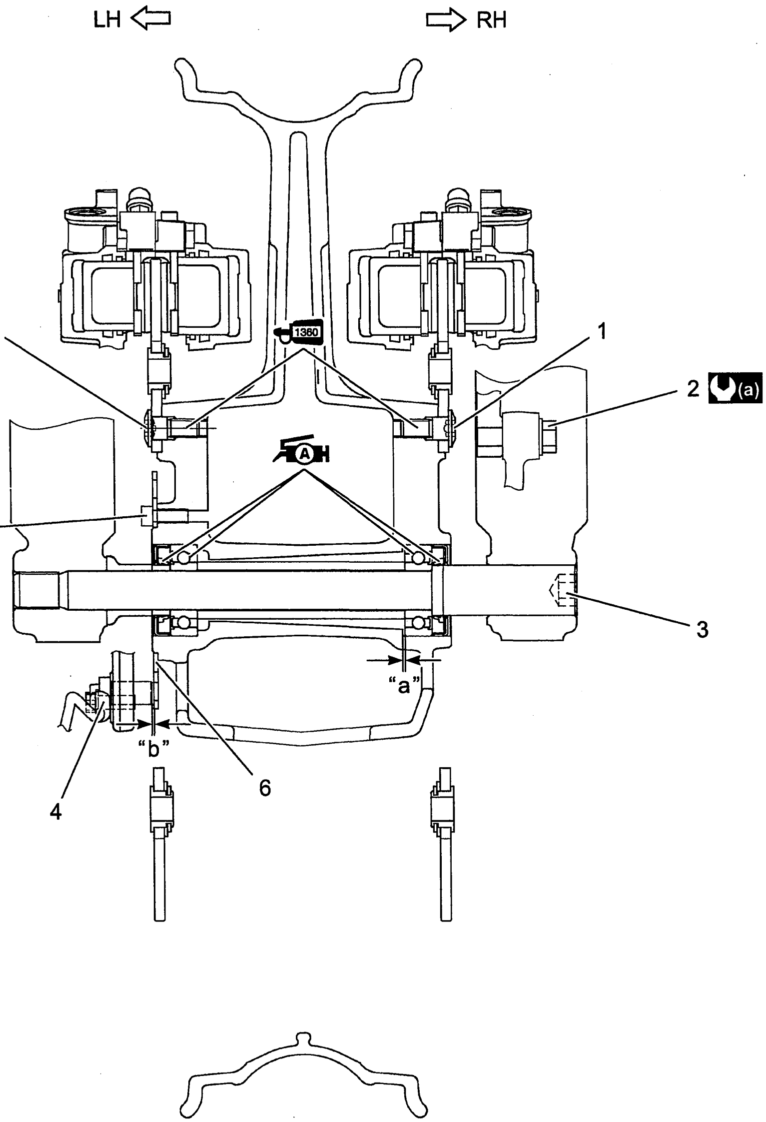
L7 – L8

BENJ18K62406002



IH18K1240039-01

1. Front brake disc bolt	6. Front wheel speed sensor rotor bolt	(b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Front brake caliper mounting bolt	7. Front wheel speed sensor rotor	A H : Apply grease.
3. Front axle	"a": Clearance	1360 : Apply thread lock to the thread part.
4. Front axle pinch bolt	"b": 0.45 – 1.53 mm (0.0178 – 0.0602 in)	
5. Front wheel speed sensor	(a) : 39 N·m (4.0 kgf-m, 29.0 lbf-ft)	



IJ18K5240001-04

1. Front brake disc bolt	5. Front wheel speed sensor rotor bolt	(a) : 26 N·m (2.7 kgf-m, 19.5 lbf-ft)
2. Front brake caliper mounting bolt	6. Front wheel speed sensor rotor	A H : Apply grease.
3. Front axle	"a": Clearance	1360 : Apply thread lock to the thread part.
4. Front wheel speed sensor	"b": 0.45 – 1.53 mm (0.0178 – 0.0602 in)	

Front Wheel Assembly Removal and Installation

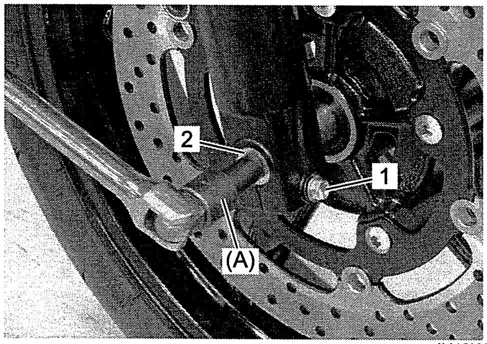
BENJ18K62406003

Removal

1) Remove the front wheel speed sensor mounting bolt. ☞(Page 4E-42)
2) Remove the front brake calipers.
   - L7 – L8 model: ☞(Page 4B-5)
   - L9 – model: ☞(Page 4B-6)
3) Loosen axle pinch bolt (1) on the right front fork leg.
4) Loosen the front axle (2) with the special tool.

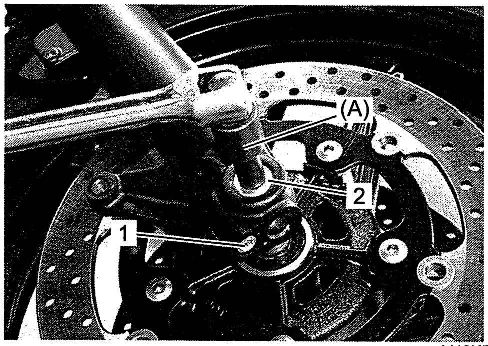
Special tool
(A): 09900–18710

L7 – L8 model



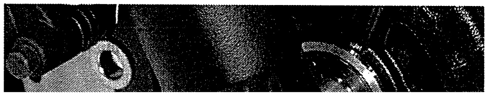
IH18K1240002-01

L9 – model

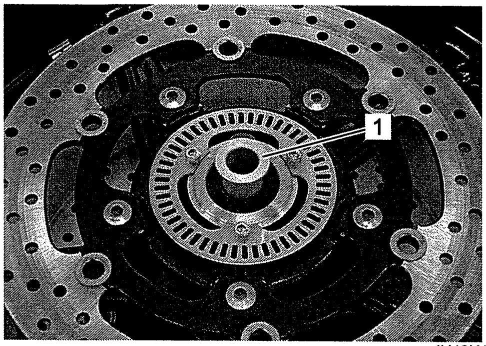


IJ18K5240002-01

5) Raise the front wheel off the ground and support the motorcycle with a jack.
6) Draw out the front axle (1) and remove the front wheel.



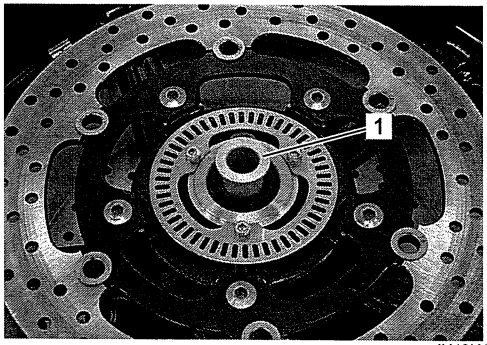
7) Remove the spacer (1).



IH18K1240004-01

Installation

1) Install the spacer (1) into the left side of the wheel.

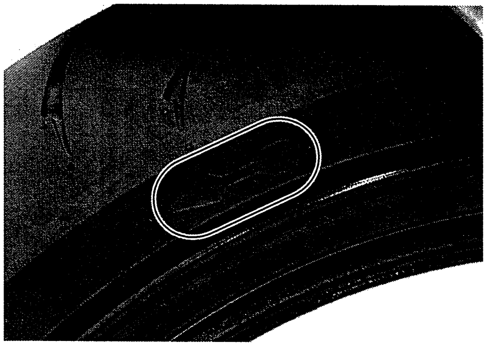


IH18K1240005-01

2) Install the front wheel with the front axle and tighten the front axle temporarily.

⚠ WARNING

The directional arrow on the tire should point to the wheel rotation, when installing the wheel.

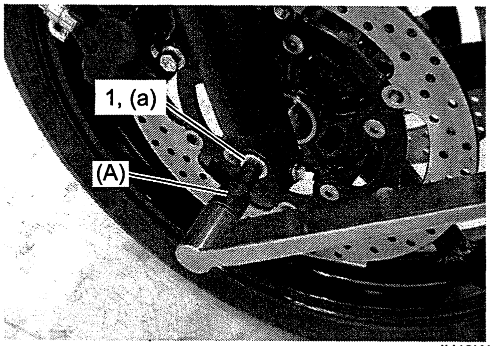


IH18K1240006-01

3) Remove a jack.
4) Install the front brake calipers.
   • L7 – L8 model: ☞(Page 4B-5)
   • L9 – model: ☞(Page 4B-6)
5) Tighten the front axle (1) to the specified torque.

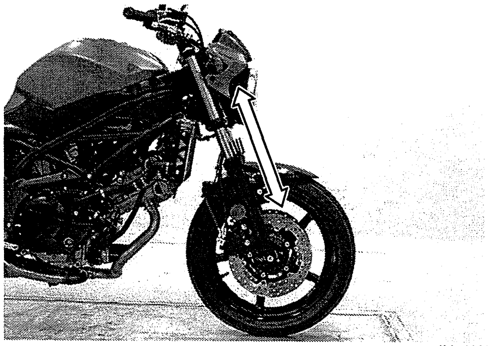
Special tool
(A): 09900–18710

Tightening torque
Front axle (a): 65 N·m (6.6 kgf-m, 48.0 lbf-ft)



IH18K1240007-02

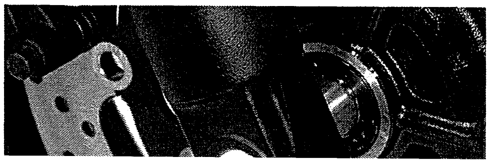
6) Move the front fork up and down 4 or 5 times to stabilize the front axle.


IH18K1240008-01

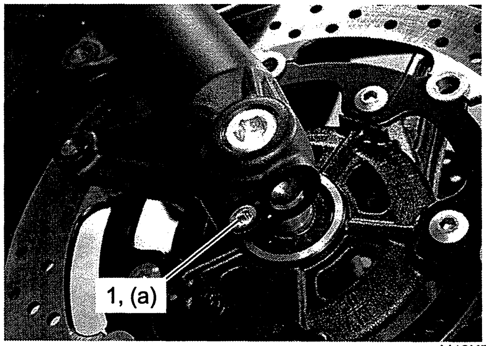
7) Tighten the axle pinch bolt (1) on the right front fork leg to the specified torque.

Tightening torque
Front axle pinch bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

L7 – L8 model



L9 – model



IJ18K5240003-01

8) Install the front wheel speed sensor. ☞(Page 4E-42)

Front Wheel Dust Seal / Front Wheel Bearing Removal and Installation

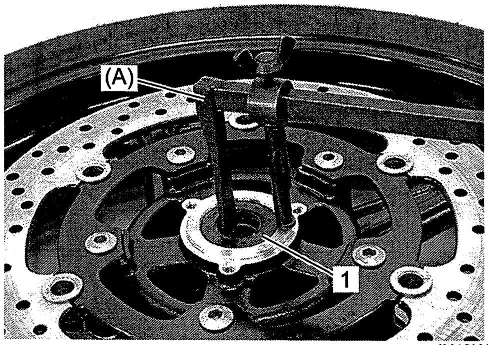
BENJ18K62406004

Refer to “Front Wheel Assembly Removal and Installation” (Page 2D-5).

Removal

1) Remove the front wheel speed sensor rotor. ☞(Page 4E-42)
2) Remove the dust seals (1) on both sides with the special tool.

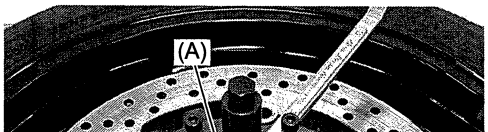
Special tool
(A): 09913–50121



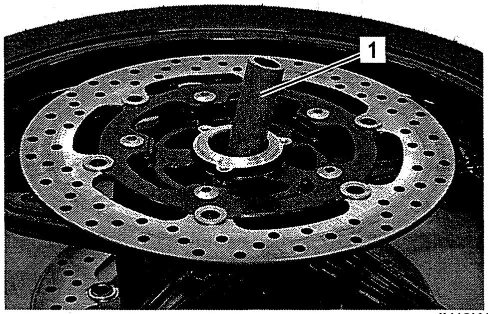
IH18K1240010-01

3) Remove the bearings (1) on both sides with the special tool.

Special tool
(A): 09921–20240



4) Remove the spacer (1).

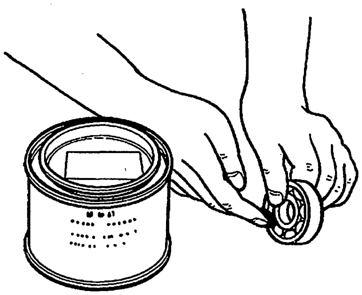


IH18K1240012-01

Installation

1) Apply grease to the new wheel bearings.

Grease 99000–25011 (SUZUKI SUPER GREASE A)



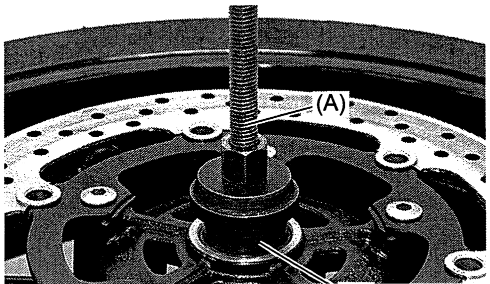
I649G1240019-02

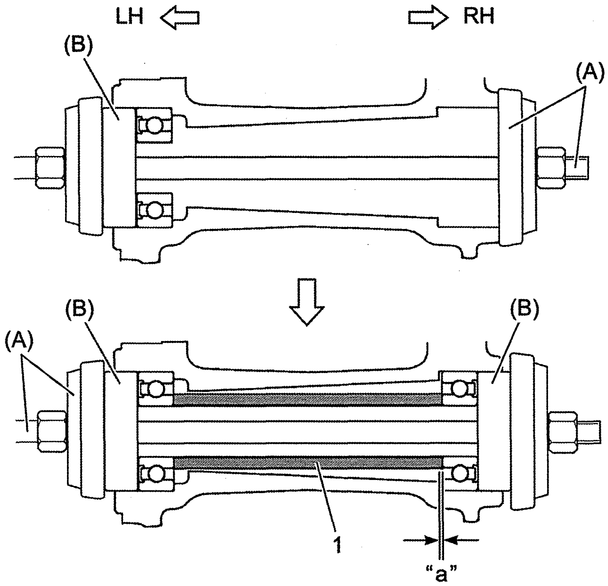
2) First install the left wheel bearing, then install the spacer (1) and right wheel bearing with the special tools.

NOTICE

The sealed cover of the bearing must face outside.

Special tool
(A): 09941–34513
(B): 09913–70210



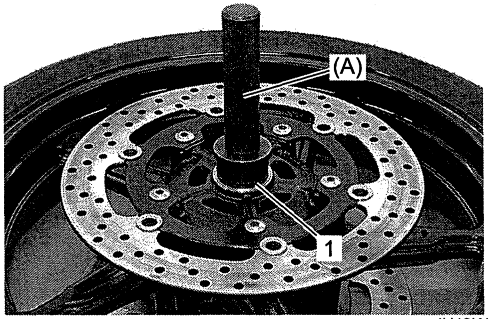


IH18K1240040-01

"a":	Clearance

3) Install the new dust seals (1) on both sides with the special tool.

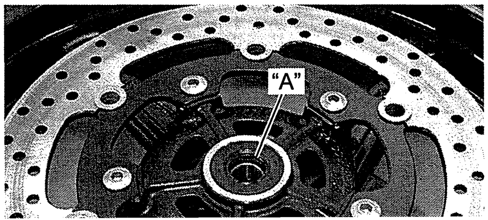
Special tool
(A): 09913–70210



IH18K1240015-02

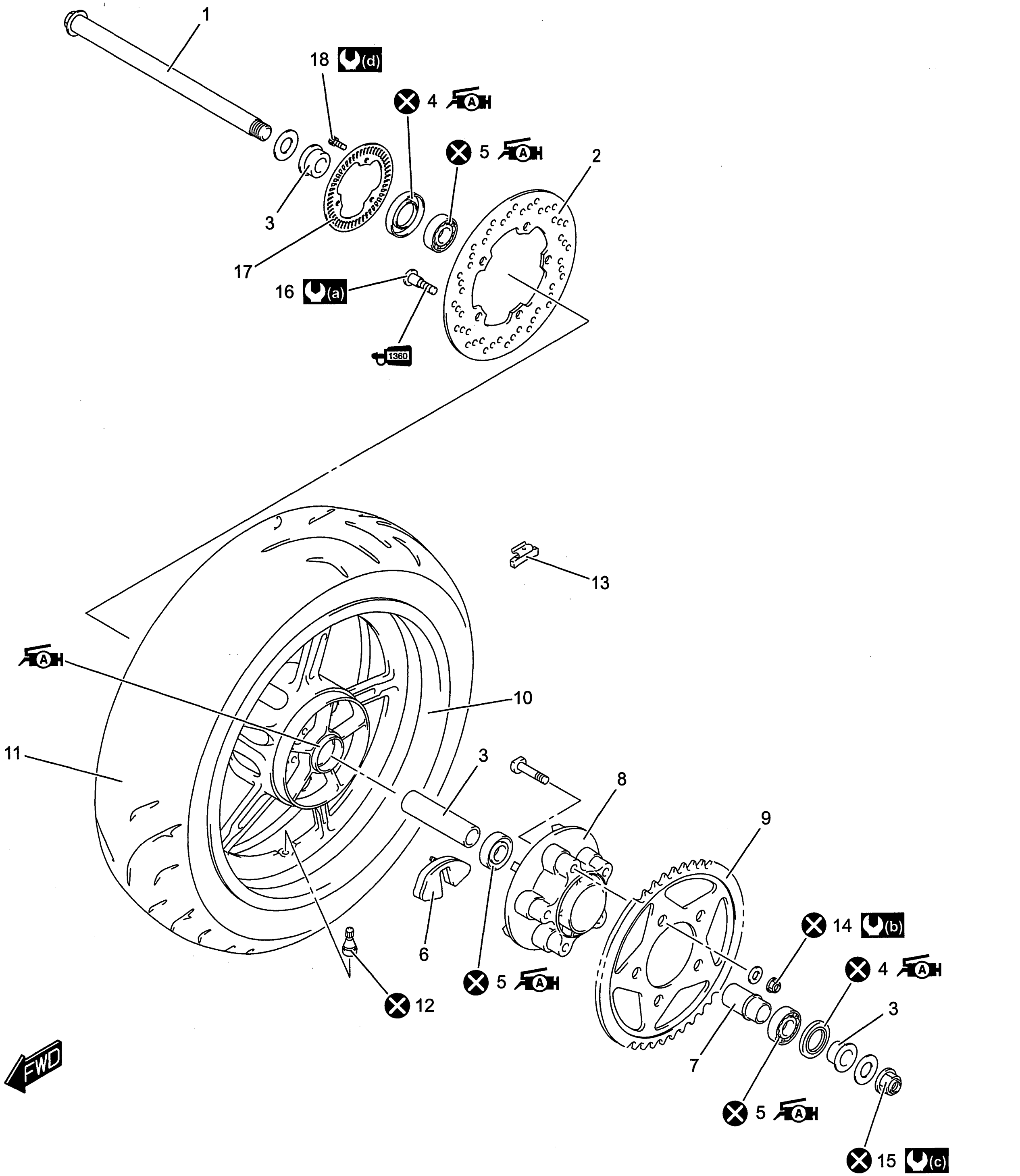
4) Apply grease to the lip of the dust seals.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



Rear Wheel Components

BENJ18K62406005

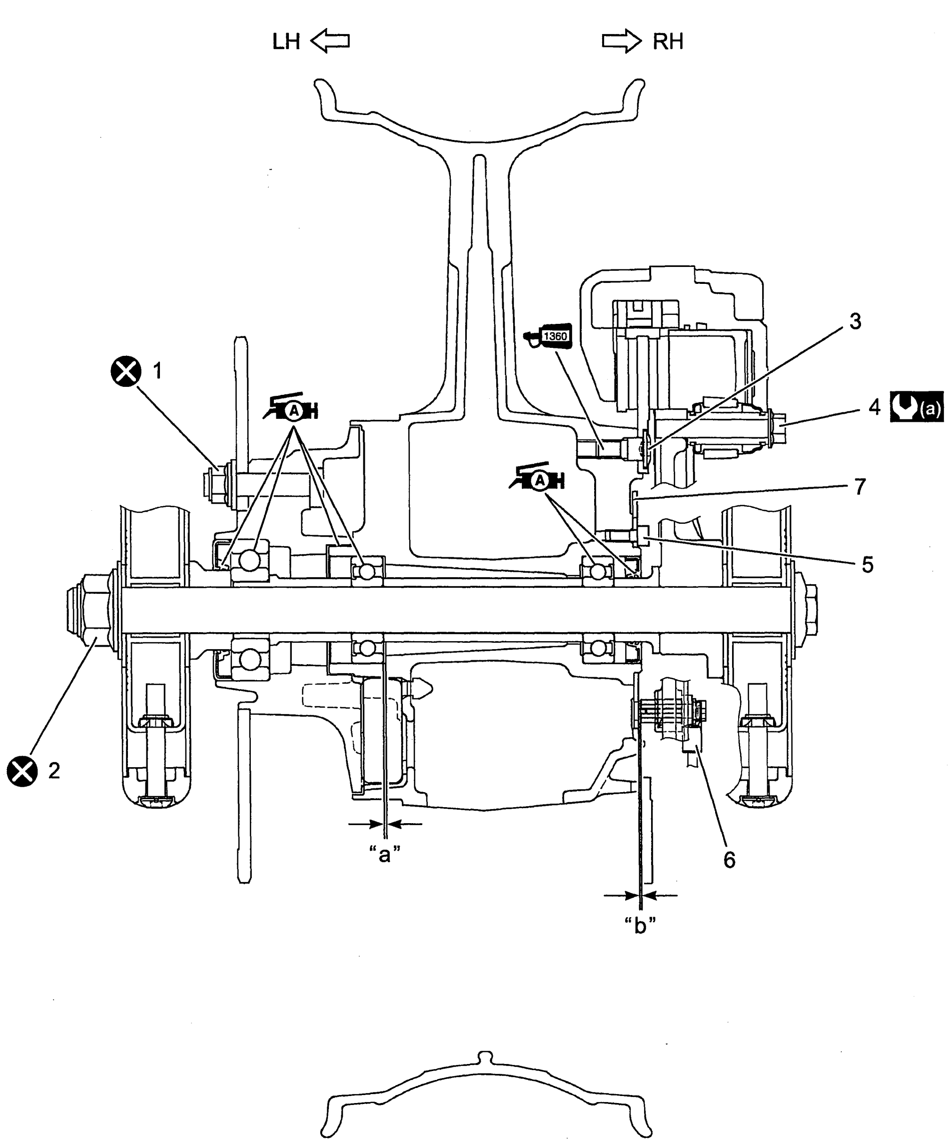


IH18K1240038-01

1. Rear axle	10. Rear wheel	(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Brake disc	11. Rear tire	(b) : 60 N·m (6.1 kgf-m, 44.5 lbf-ft)

Rear Wheel Assembly Construction

BENJ18K62406006



IH18K1240041-01

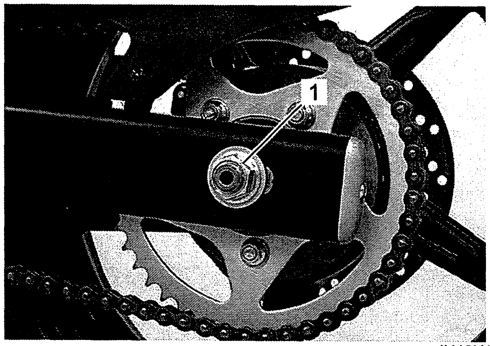
1. Rear sprocket nut	6. Rear wheel speed sensor (If equipped)	(A): Apply grease.
2. Rear axle nut	7. Rear wheel speed sensor rotor (If equipped)	1360: Apply thread lock to the thread part.
3. Rear brake disc bolt	"a": Clearance	⊗: Do not reuse.
4. Rear brake caliper mounting bolt	"b": 0.25 – 1.33 mm (0.0099 – 0.0523 in)	
5. Rear wheel speed sensor rotor bolt (If equipped)	(a): 22 N·m (2.2 kgf-m, 16.5 lbf-ft)	

Rear Wheel Assembly Removal and Installation

BENJ18K62406007

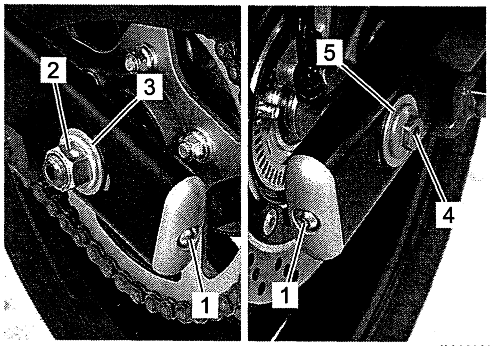
Removal

1) Remove the rear wheel speed sensor (If equipped). ☞(Page 4E-43)
2) Loosen the rear axle nut (1).



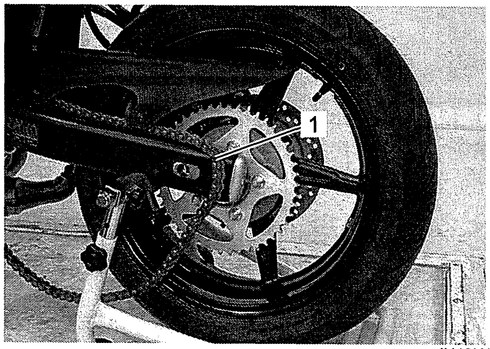
IH18K1240018-01

3) Raise the rear wheel off the ground and support the motorcycle with a jack.
4) Loosen the left and right chain adjuster bolts (1).
5) Remove the rear axle nut (2) and washer (3).
6) Draw out the rear axle (4) and washer (5).



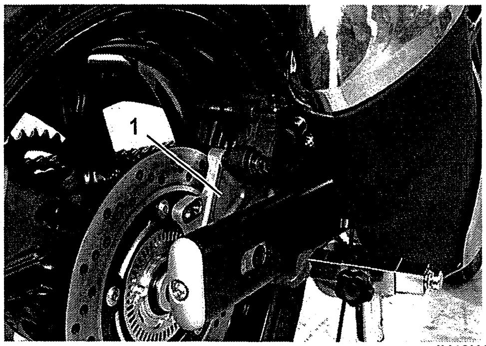
IH18K1240019-01

7) Remove the drive chain (1) from the rear sprocket.



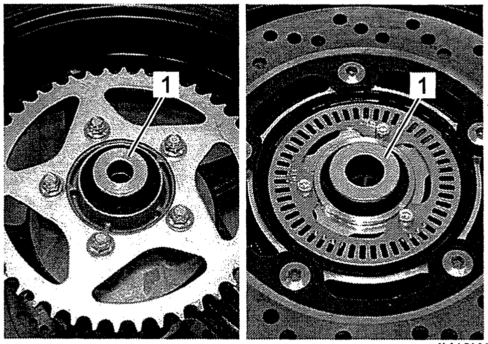
IH18K1240020-01

8) Remove the rear brake caliper bracket (1) from the swingarm.
9) Remove the rear wheel.



IH18K1240021-02

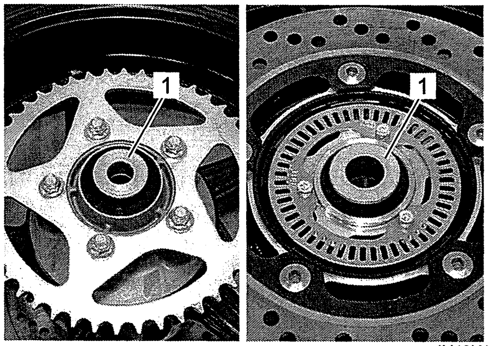
10) Remove the left and right spacers (1).



IH18K1240022-01

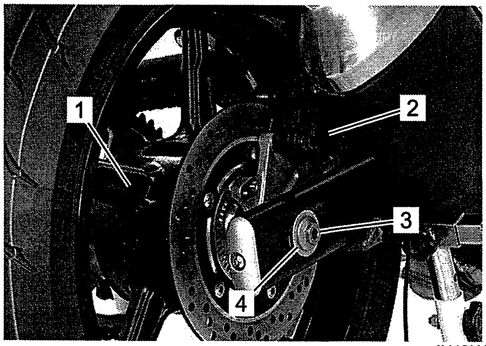
Installation

1) Install the left and right spacers (1).



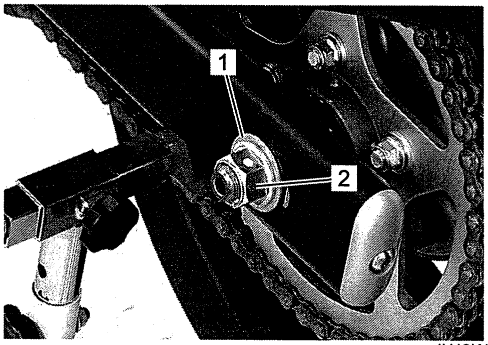
IH18K1240022-01

2) Engage the drive chain.
3) Install the rear wheel (1) and rear brake caliper (2).
4) Install the rear axle (3) and washer (4).



IH18K1240036-01

5) Install the washer (1) and tighten the new rear axle nut (2) temporarily.



IH18K1240023-02

6) Remove the jack.
7) Adjust the chain slack. Refer to “Drive Chain Inspection and Adjustment” in Section 3A (Page 3A-3).
8) Install the rear wheel speed sensor (If equipped). ☞(Page 4E-43)

Rear Wheel Dust Seal / Rear Wheel Bearing Removal and Installation

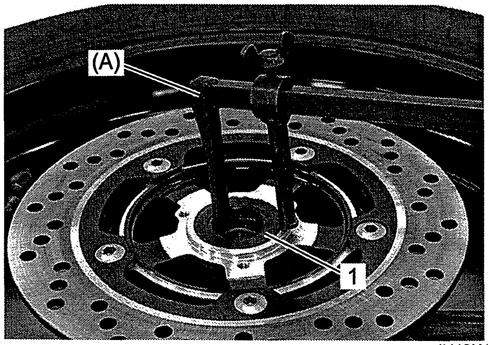
BENJ18K62406008

Refer to “Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation” in Section 3A (Page 3A-6).

Removal

1) Remove the rear wheel dampers. ☞(Page 2D-14)
2) Remove the rear wheel speed sensor rotor (If equipped). ☞(Page 4E-44)
3) Remove the dust seal (1) with the special tool.

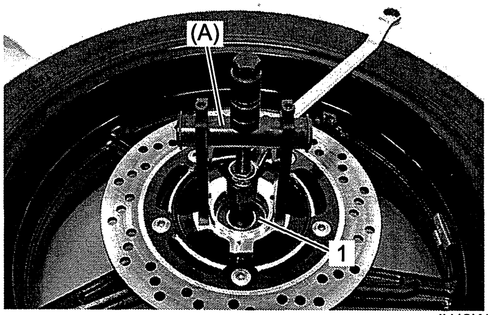
Special tool



IH18K1240024-01

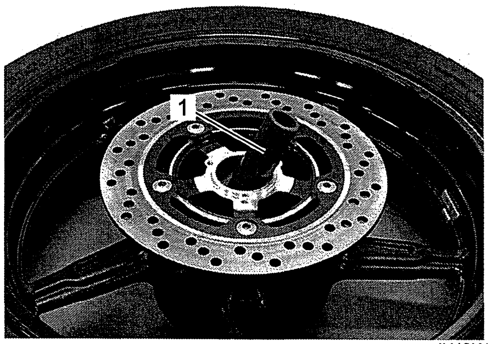
4) Remove the bearings (1) on both sides with the special tool.

Special tool
(A): 09921–20240



IH18K1240025-01

5) Remove the spacer (1).



IH18K1240026-01

Installation

1) Apply grease to the new wheel bearings.

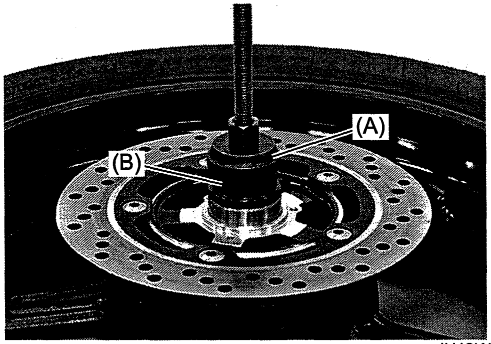
Grease 99000–25011 (SUZUKI SUPER GREASE A)

2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tools.

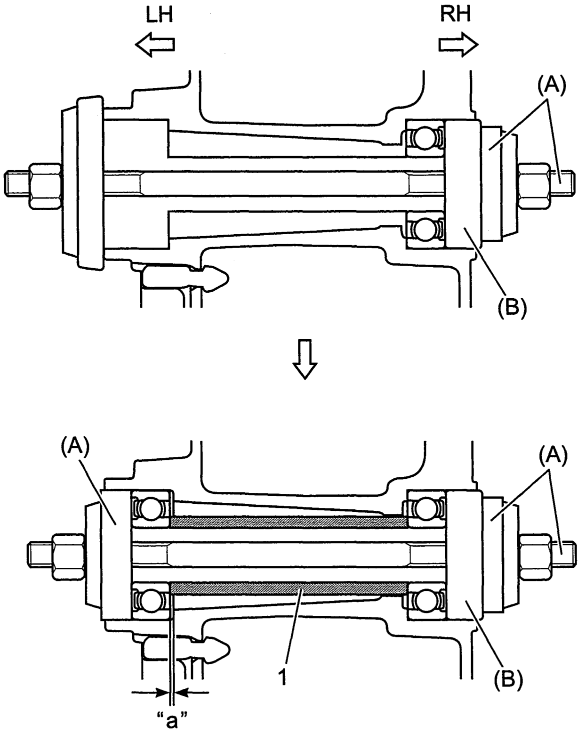
NOTICE

The sealed cover of the bearing must face outside.

Special tool
(A): 09941–34513
(B): 09913–70210



IH18K1240027-01

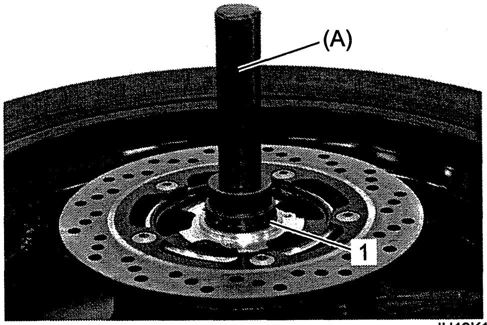


IH18K1240028-01

"a":	Clearance

3) Install a new dust seal (1) with the special tool.

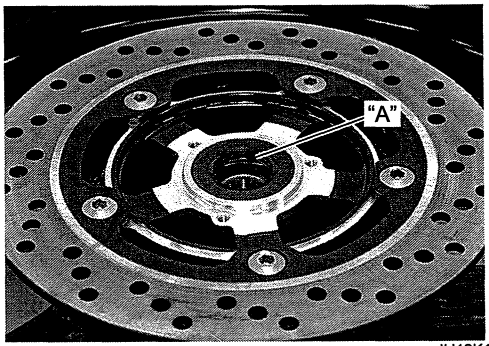
Special tool
(A): 09913–70210



IH18K1240029-01

4) Apply grease to the dust seal lip.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1240035-01

5) Install the rear wheel speed sensor rotor (If equipped). ☞(Page 4E-44)
6) Install the rear wheel dampers. ☞(Page 2D-14)

Wheel / Wheel Axle Inspection

BENJ18K62406009

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-5).
Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-10).

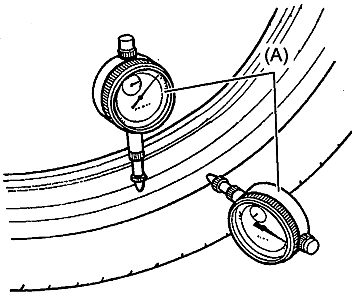
Wheel

1) Remove the brake pads.
   - Front: ☞(Page 4B-3)
   - Rear: ☞(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

If bearing replacement fails to reduce the runout, replace the wheel.

Wheel rim runout
Front
Axial & Radial [Limit]: 2.0 mm (0.08 in)
Rear
Axial & Radial [Limit]: 2.0 mm (0.08 in)

Special tool
(A): 09900–20607



ID26J1240033-01

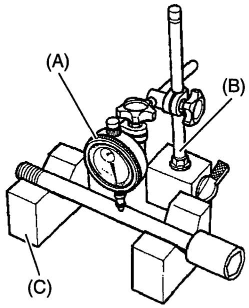
3) Install the brake pads.
   - Front: ☞(Page 4B-3)
   - Rear: ☞(Page 4C-2)

Wheel Axle

Using a dial gauge, check the wheel axle for runout, If the runout exceeds the limit, replace the wheel axle.

Wheel axle runout
Front & Rear [Limit]: 0.25 mm (0.010 in)

Special tool
(A): 09900–20607
(B): 09900–20701
(C): 09900–21304

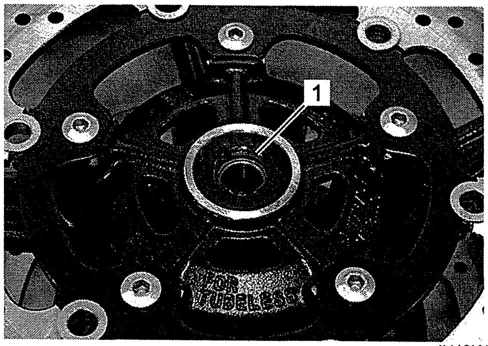


ID26J1240034-03

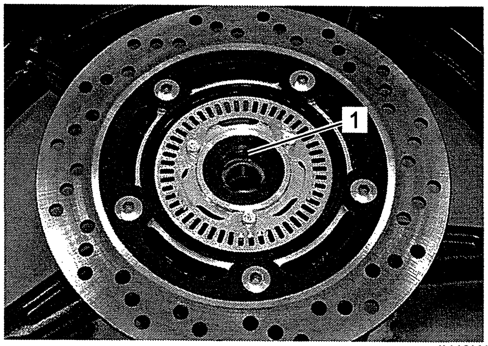
Dust Seal

Inspect the dust seals lip (1) for wear or damage. If any defects are found, replace the dust seals with new ones.

- Front: ☞(Page 2D-6)
- Rear: ☞(Page 2D-11)



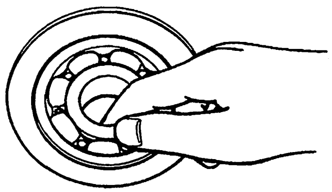
IH18K1240030-01



IH18K1240031-01

Wheel Bearing

1) Remove the rear sprocket mounting drum assembly. ☞(Page 3A-6)
2) 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.
   - Front: ☞(Page 2D-6)
   - Rear: ☞(Page 2D-11)



I649G1240015-02

3) Install the rear sprocket mounting drum assembly. ☞(Page 3A-6)

Brake Disc
Refer to “Front Brake Disc Inspection” in Section 4B (Page 4B-13).
Refer to “Rear Brake Disc Inspection” in Section 4C (Page 4C-7).

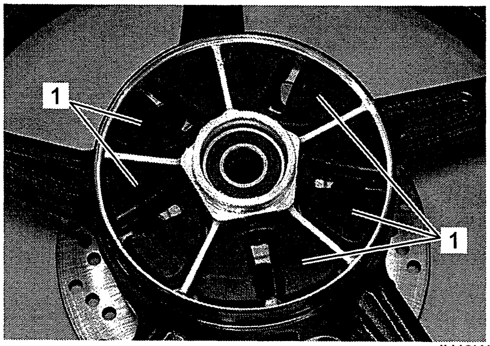
Wheel Speed Sensor Rotor
Refer to “Wheel Speed Sensor and Sensor Rotor Inspection” in Section 4E (Page 4E-44).

Rear Sprocket
Refer to “Rear Sprocket Mounting Drum / Sprocket Inspection” in Section 3A (Page 3A-7).

Rear Wheel Damper Removal and Installation
BENJ18K62406010

Refer to “Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation” in Section 3A (Page 3A-6).

Removal
Remove the rear wheel dampers (1).

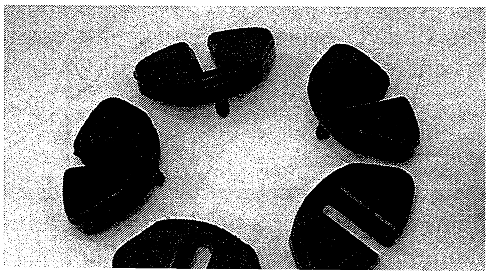


IH18K1240032-01

Installation
Install the rear wheel dampers in the reverse order of removal.

Rear Wheel Damper Inspection
BENJ18K62406011

Inspect the rear wheel dampers for wear and damage. Replace the damper if there is anything unusual.



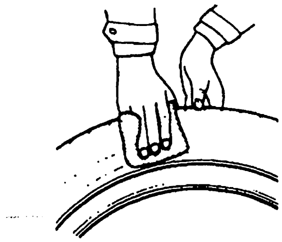
Tire Inspection and Cleaning
BENJ18K62406012

Tire
Wipe the tire clean and check for the following points:

- Nick and rupture on side wall
- Tread separation
- Abnormal, uneven wear on tread
- Surface damage on bead
- Localized tread wear due to skidding (Flat spot)
- Abnormal condition of inner liner

<u>Tire size</u>
Front [Standard]: 120/70ZR17M/C (58W)
Rear [Standard]: 160/60ZR17M/C (69W)

<u>Tire type</u>
Front
L7 [Standard]: DUNLOP/Qualifier J
L8 – [Standard]: DUNLOP/ROADSMART III J
Rear
L7 [Standard]: DUNLOP/Qualifier J
L8 – [Standard]: DUNLOP/ROADSMART III J

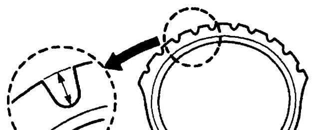


I649G1240042-02

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.

<u>Tire tread depth</u>
Recommend depth
Front [Standard]: 1.6 mm (0.062 in)
Rear [Standard]: 2.0 mm (0.078 in)

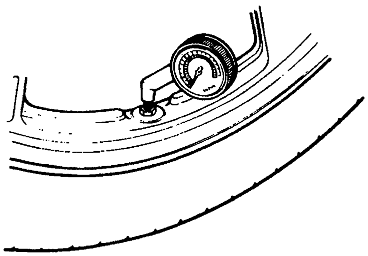
Special tool
09900–20805



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.

<u>Cold inflation tire pressure</u>
Solo riding
Front [Standard]: 225 kPa (2.25 kgf/cm^2, 33 psi)
Rear [Standard]: 250 kPa (2.50 kgf/cm^2, 36 psi)
Dual riding
Front [Standard]: 225 kPa (2.25 kgf/cm^2, 33 psi)
Rear [Standard]: 250 kPa (2.50 kgf/cm^2, 36 psi)



I310G1020069-02

Tire Removal and Installation

BENJ18K62406013

Refer to “Front Wheel Assembly Removal and Installation” (Page 2D-5).
Refer to “Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation” in Section 3A (Page 3A-6).

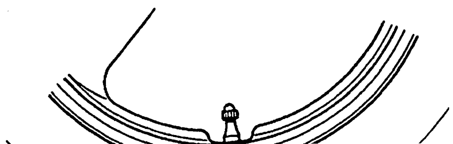
Removal

▲ CAUTION

For removal and installation procedure of tire, follow the instructions given 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.

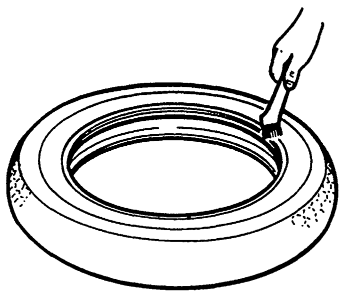


Installation

1) Apply tire lubricant to the tire bead.

NOTICE

- **Do not use oil, grease or gasoline in place of tire bead lubricant.**
- **Do not reuse the air valve which has been once removed.**

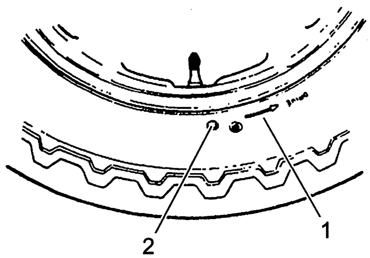


I649G1240038-02

2) Install the tire aligning the arrow (1) on the side wall with the direction of the wheel rotation.

NOTICE

- **When installing a repaired tire, align the chalk mark put on the tire at the time of removal with the valve position.**
- **When installing a new tire, align the light point mark (2) on the tire side wall with the valve position.**



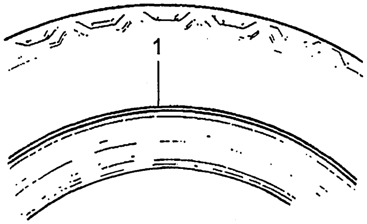
IF04K1240038-01

3) Bounce the tire several times while rotating. This makes the tire bead expand outward to contact the wheel, thereby facilitating air inflation.
4) Inflate the tire.

▲ WARNING

- **Do not stand over a tire being inflated. Tire bead may break when the bead snaps over**

5) Check the “rim line” (1) cast on the tire side walls. The line must be equidistant from the wheel rim all around. If the distance between the rim line (1) 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.



IE31J1240037-01

6) When the bead has been fitted properly, install the valve core and adjust the pressure to specification. ☞(Page 2D-14)
7) As necessary, adjust the tire balance. ☞(Page 2D-17)

Wheel Rim / Air Valve Inspection and Cleaning

BENJ18K62406014

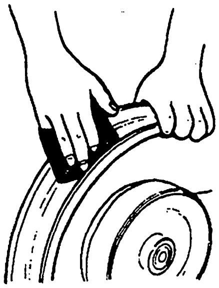
Refer to “Tire Removal and Installation” (Page 2D-15).
Refer to “Air Valve Removal and Installation” (Page 2D-16).

Wheel Rim

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. ☞(Page 2D-12)

<u>**Wheel rim size**</u>
Front [Standard]: 17 M/C x MT 3.50
Rear [Standard]: 17 M/C x MT 5.00



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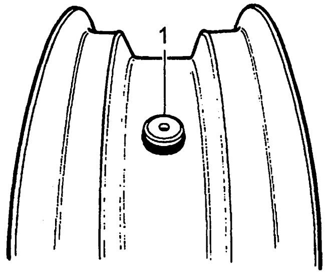
Air Valve

Inspect the air valve (1) for peeling and damage. If any defect is found, replace the air valve with a new one.



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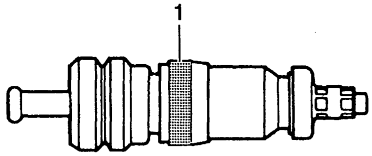
Inspect the valve core seal (1) for wear and damage. If any defect is found, replace the valve core with a new one.



IE31J1240039-01

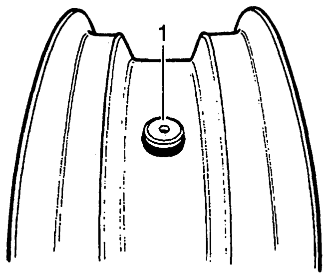
Air Valve Removal and Installation

BENJ18K62406015

Refer to “Tire Removal and Installation” (Page 2D-15).

Removal

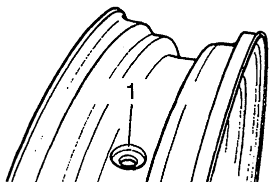
1) Remove the air valve (1) from the wheel.



IE31J1240040-01

Installation

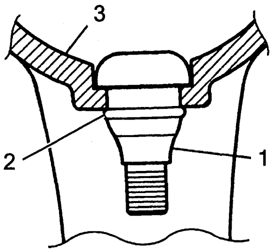
1) Clean off the dirt around the valve hole (1).



2) Install the new air valve (1) into the air valve hole with a special tire lubricant or neutral soapy liquid applied at the valve lip (2).

NOTICE

Be careful not to damage the valve lip of the air valve.



ID26J1240049-02

3. Wheel

Wheel Balance Check and Adjustment

BENJ18K62406016

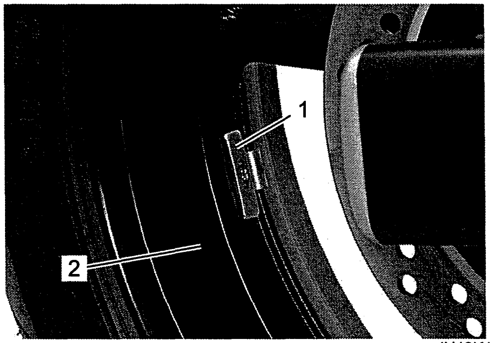
Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-5).
Refer to "Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation" in Section 3A (Page 3A-6).

1) Check the wheel balance using the balancer and adjust the wheel balance if necessary.

NOTICE

For operating procedures, refer to the instructions supplied by the wheel balancer manufacturer.

2) When installing the new balancer weight (1) to the wheel (2), set the balancer weight on center rib of wheel.



IH18K1240034-01

3) Recheck the wheel balance.

Specifications

Tightening Torque Specifications

BENJ18K62407001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Front axle	65	6.6	48.0	☞(Page 2D-6)
Front axle pinch bolt	23	2.3	17.0	☞(Page 2D-6)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Front Wheel Components" (Page 2D-2)
"Front Wheel Assembly Construction" (Page 2D-3)
"Rear Wheel Components" (Page 2D-8)
"Rear Wheel Assembly Construction" (Page 2D-9)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K62408001

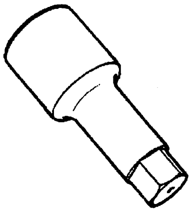
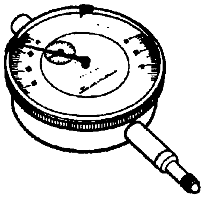
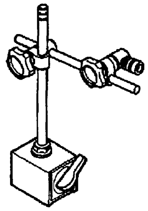
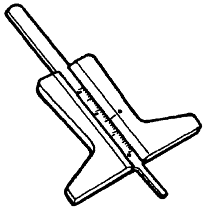
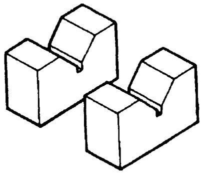
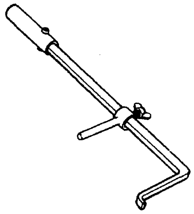
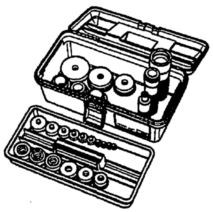
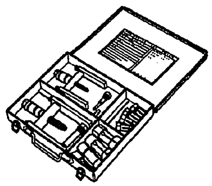
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 2D-7) / ☞(Page 2D-7) / ☞(Page 2D-11) / ☞(Page 2D-12)

NOTE

Required service material(s) is also described in:
“Front Wheel Components” (Page 2D-2)
“Front Wheel Assembly Construction” (Page 2D-3)
“Rear Wheel Components” (Page 2D-8)
“Rear Wheel Assembly Construction” (Page 2D-9)

Special Tool

BENJ18K62408002

09900–18710 Hexagon bit socket (12 mm: 1/2 sq.) ☞(Page 2D-5) / ☞(Page 2D-6) 	09900–20607 Dial gauge (10 x 0.01 mm) ☞(Page 2D-13) / ☞(Page 2D-13) 
09900–20701 Dial gauge chuck ☞(Page 2D-13) 	09900–20805 Tire depth gauge ☞(Page 2D-14) 
09900–21304 V blocks ☞(Page 2D-13) 	09913–50121 Oil seal remover ☞(Page 2D-6) / ☞(Page 2D-11) 
09913–70210 Bearing installer set ☞(Page 2D-7) / ☞(Page 2D-7) / ☞(Page 2D-12) / ☞(Page 2D-12) 	09921–20240 Bearing remover set ☞(Page 2D-6) / ☞(Page 2D-11) 
09941–34513 Bearing installer set ☞(Page 2D-7) / 	

Section 3

Driveline / Axle

CONTENTS

3

Precautions

Precautions for Driveline / Axle

BENJ18K63000001

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

⚠ WARNING

Never inspect or adjust the drive chain while the engine is running.

NOTICE

- **Do not use trichloroethylene, gasoline or any 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.**

Drive Chain / Drive Train / Drive Shaft

Diagnostic Information and Procedures

Drive Chain and Sprocket Symptom Diagnosis

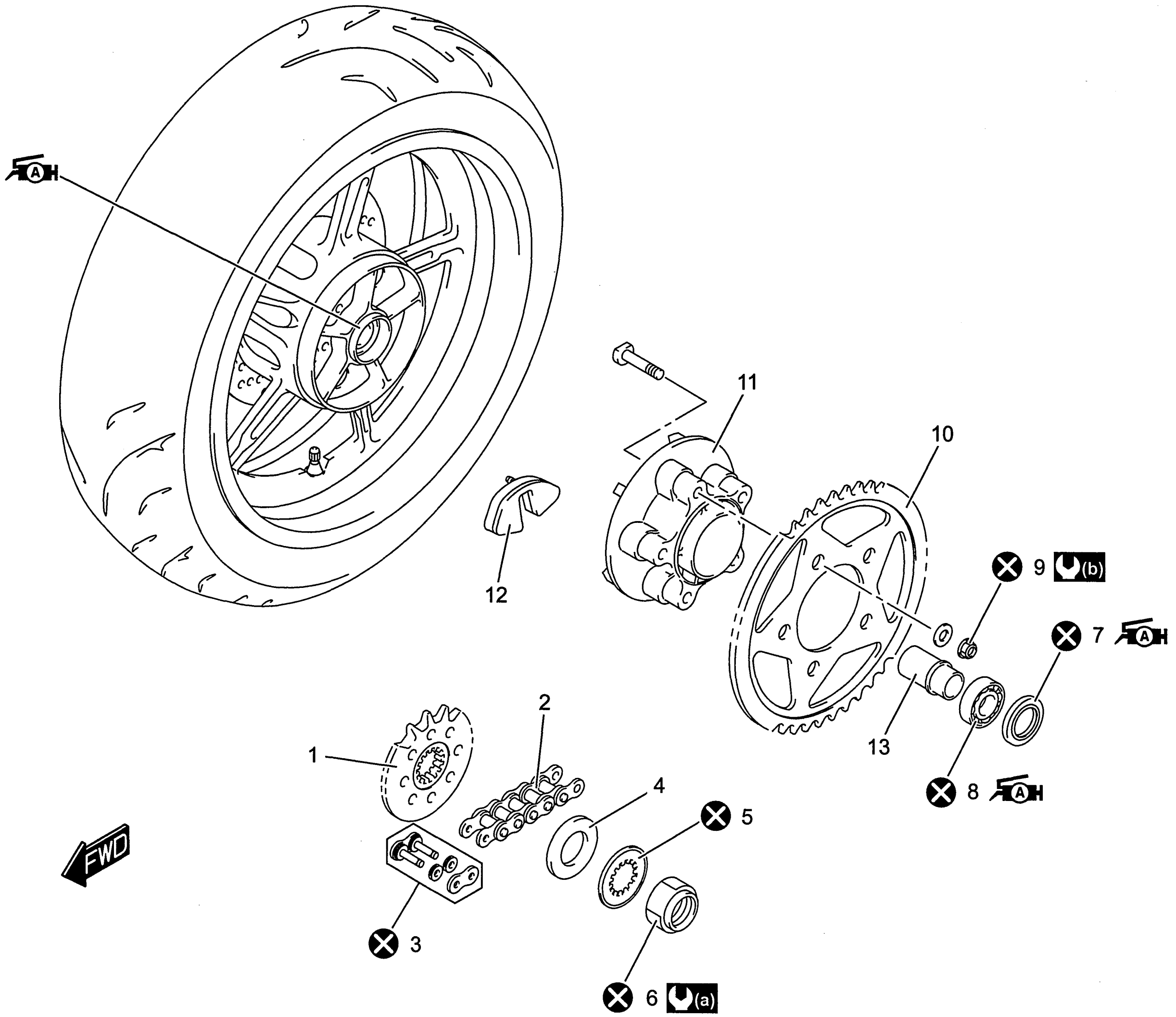
BENJ18K63104001

Condition	Possible cause	Correction / Reference Item
Noisy Drive Chain	Worn sprocket.	*Replace.* ☞*(Page 3A-4)* ☞*(Page 3A-6)*
	Worn drive chain.	*Replace.* ☞*(Page 3A-8)*
	Stretched drive chain.	*Replace.* ☞*(Page 3A-8)*
	Too large drive chain slack.	*Adjust.* ☞*(Page 3A-3)*
	Drive chain out of adjustment.	*Adjust.* ☞*(Page 3A-3)*

Repair Instructions

Drive Chain Related Components

BENJ18K63106001



IH18K1310026-01

1. Engine sprocket	7. Dust seal	13. Retainer
2. Drive chain	8. Bearing	(a) : 145 N·m (14.8 kgf-m, 107.0 lbf-ft)
3. Joint set	9. Rear sprocket nut	(b) : 60 N·m (6.1 kgf-m, 44.5 lbf-ft)
4. Washer	10. Rear sprocket	: Apply grease.
5. Lock washer	11. Rear sprocket mounting drum	: Do not reuse.
6. Engine sprocket nut	12. Rear wheel damper	

Drive Chain Inspection and Adjustment

BENJ18K63106002

Drive Chain Visual Check

1) With the transmission in neutral, support the motorcycle with a jack 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. ☞(Page 3A-8)

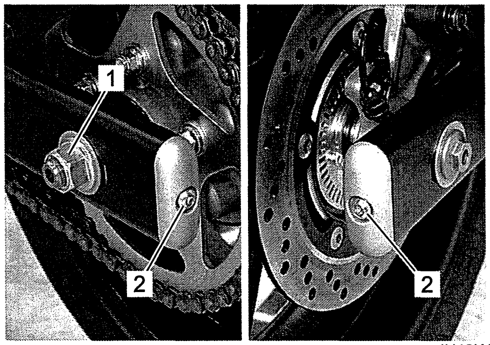
NOTE

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

- Loose pins
- Damaged rollers
- Dry or rusted links
- Kinked or binding links
- Excessive wear
- Improper chain adjustment
- Missing O-ring seals

Drive Chain Length Inspection

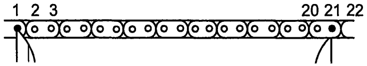
1) Place the motorcycle on the side-stand.
2) Loosen the rear axle nut (1).
3) Give tension to the drive chain fully by turning both chain adjuster bolts (2).



IH18K1310001-01

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. ☞(Page 3A-8)

Drive chain 20-pitch length
[Limit]: 319.4 mm (12.57 in)



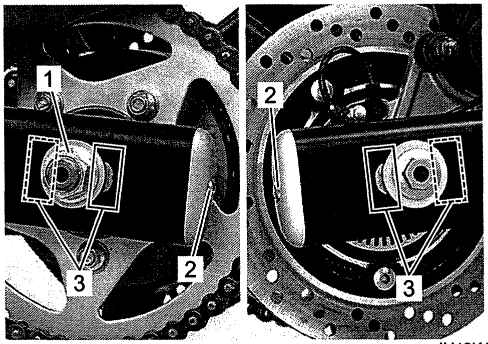
Drive Chain Slack Adjustment

1) Place the motorcycle on the side-stand.
2) Loosen the rear axle nut (1).
3) Loosen or tighten both chain adjuster bolts (2) until the slack "a" at the middle of the chain between the engine and rear sprockets becomes within the standard range.

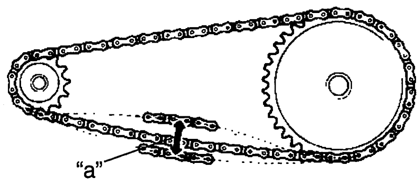
NOTICE

The reference marks (3) on both sides of the chain adjuster and the edge of each swingarm hole (rear side or front side) must be aligned to ensure that the front and rear wheels are correctly aligned.

Drive chain slack
On side-stand
[Standard]: 20 – 30 mm (0.79 – 1.18 in)



IH18K1310003-02



I649G1020036-02

4) After adjusting the drive chain, tighten the rear axle nut to the specified torque.

Tightening torque
Rear axle nut: 100 N·m (10.2 kgf-m, 74.0 lbf-ft)

5) Recheck the drive chain slack after tightening the rear axle nut.
6) Tighten the both chain adjuster bolts securely.

Drive Chain Cleaning and Lubricating

BENJ18K63106003

1) Place the motorcycle on the side-stand.
2) Remove dirt and dust from the drive chain (1). Be careful not to damage the seal ring.
3) Clean the drive chain (1) with a sealed drive chain cleaner, or water and neutral detergent.

NOTICE

Cleaning the drive chain improperly can damage seal rings and ruin the drive chain.

- **Do not use a volatile solvent such as paint thinner, kerosene and gasoline.**
- **Do not use high pressure cleaner to clean the drive chain.**
- **Do not use wire brush to clean the drive chain.**

4) Use a soft brush to clean the drive chain (1). Be careful not to damage the seal ring even through using a soft brush.
5) Wipe off water and neutral detergent.
6) Lubricate with a motorcycle sealed drive chain (1) lubricant or high viscosity oil.

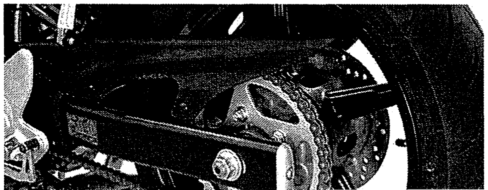
NOTICE

Some drive chain lubricant contains solvents and additives which could damage the seal rings in the drive chain.
Use sealed drive chain lubricant which is specifically intended for use with sealed drive chains.

7) Lubricate both front and back plates of the drive chain (1).
8) Wipe off excess lubricant after lubricating all around of the drive chain (1).

NOTE

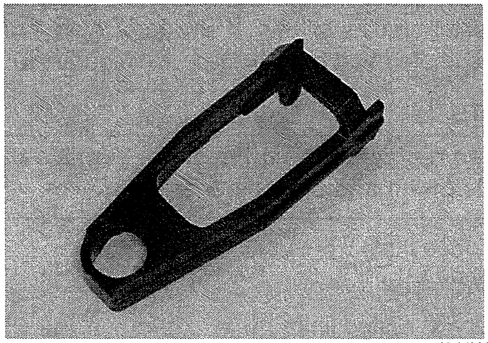
The standard drive chain is a DID520V0.
SUZUKI recommends to use this standard drive chain as a replacement.



Chain Buffer Inspection

BENJ18K63106004

Refer to "Swingarm Removal and Installation" in Section 2C (Page 2C-8).
Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.



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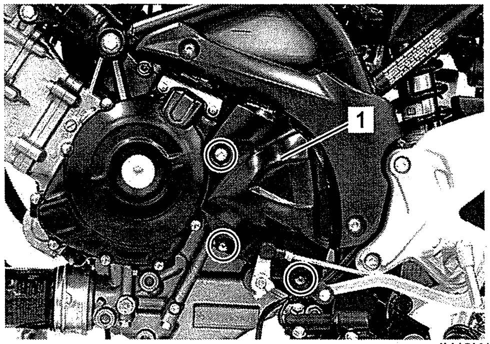
Engine Sprocket Removal and Installation

BENJ18K63106005

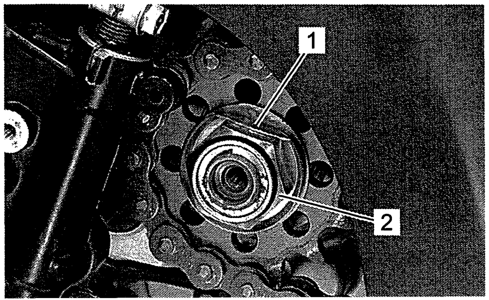
Removal

1) Remove the engine sprocket cover (1).

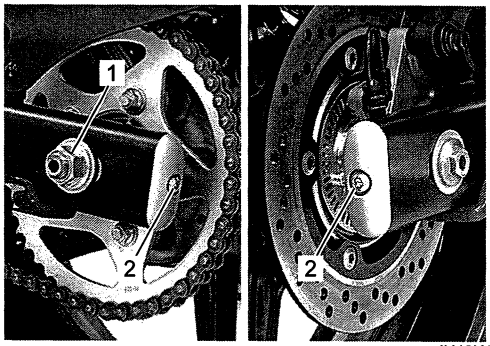


IH18K1310005-01

2) Flatten the lock washer (1).
3) Remove the engine sprocket nut (2) while depressing the rear brake pedal.
4) Remove the lock washer (1).

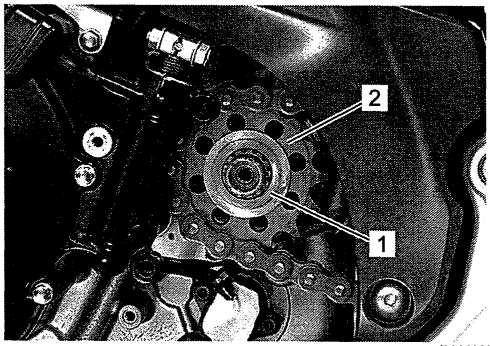


5) Loosen the rear axle nut (1).
6) Support the motorcycle with a jack.
7) Loosen the left and right chain adjuster bolts (2) to provide additional chain slack.



IH18K1310007-01

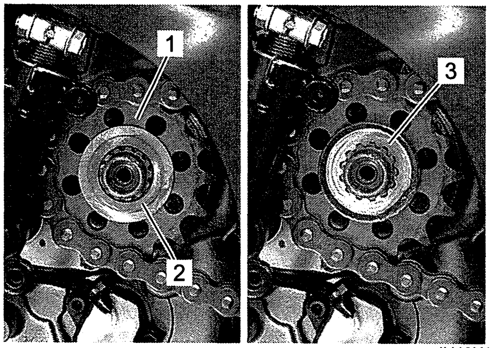
8) Remove the washer (1) and engine sprocket (2).



IH18K1310008-01

Installation

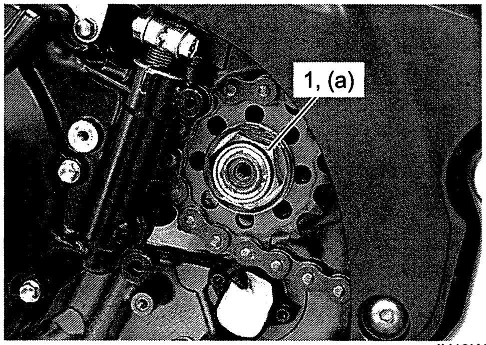
1) Install the engine sprocket (1) and washer (2).
2) Install the new lock washer (3).



IH18K1310009-02

3) Tighten the new engine sprocket nut (1) to the specified torque.

Tightening torque
Engine sprocket nut (a): 145 N·m (14.8 kgf-m, 107.0 lbf-ft)



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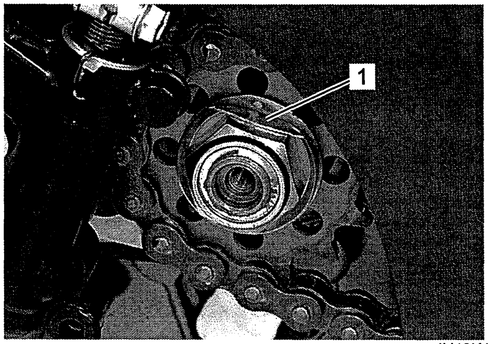
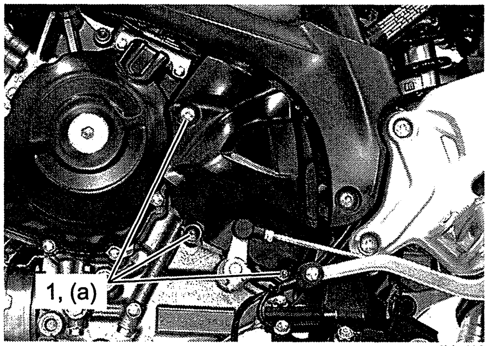
4) Bend the lock washer (1).



IH18K1310010-01

5) Tighten the engine sprocket cover bolts (1) to the specified torque.

Tightening torque
Engine sprocket cover bolt (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



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6) Adjust the drive chain slack. Refer to “Drive Chain Inspection and Adjustment” (Page 3A-3).

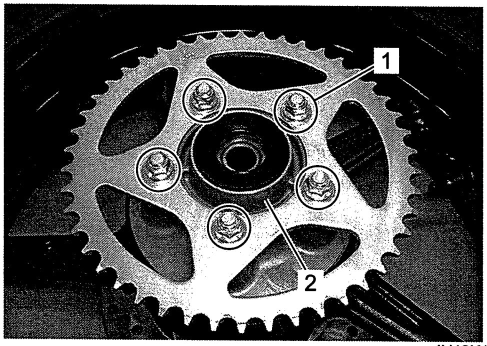
Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation

BENJ18K63106006

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

Removal

1) Loosen the rear sprocket nuts (1).
2) Remove the rear sprocket mounting drum assembly (2).



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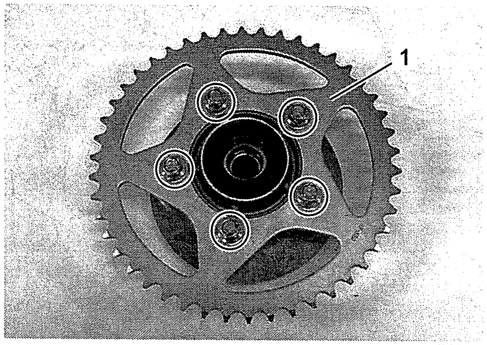
3) Remove the rear sprocket (1).



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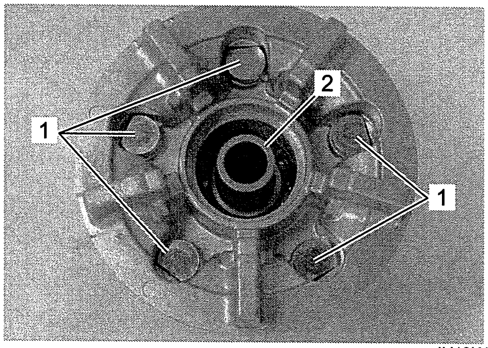
4) Remove the sprocket bolts (1) and retainer (2).

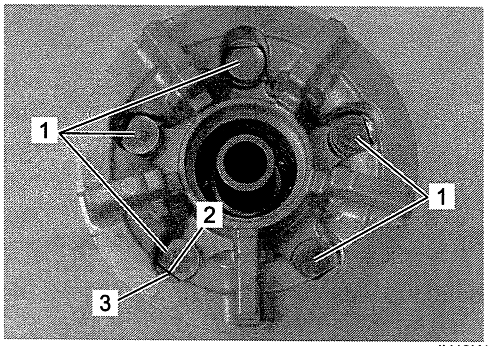


IH18K1310027-01

Installation

Install the rear sprocket and rear sprocket mounting drum in the reverse order of removal. Pay attention to the following points:

- Install the rear sprocket bolts (1), engage two flats (2) on the end of rear sprocket bolts face with the same shaped hole (3) on the rear sprocket mounting drum.



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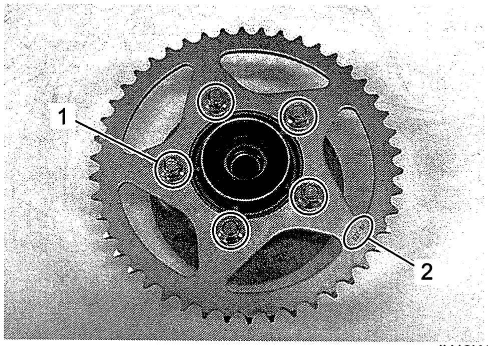
- Temporarily tighten the new rear sprocket nuts (1).

NOTE

The stamped mark (2) on the sprocket should face outside.



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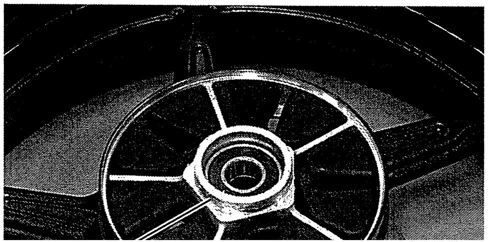
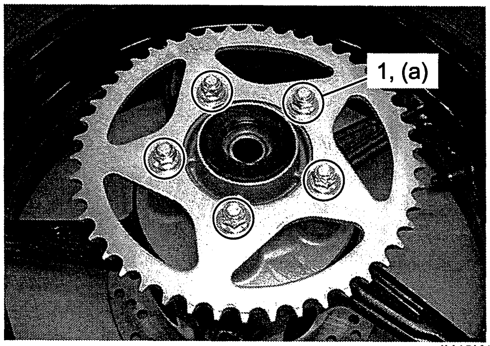
- Apply grease to the contacting surface between the rear wheel hub and the rear sprocket mounting drum.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



- Tighten the rear sprocket nuts (1) to the specified torque.

Tightening torque
Rear sprocket nut (a): 60 N·m (6.1 kgf-m, 44.5 lbf-ft)



IH18K1310018-01

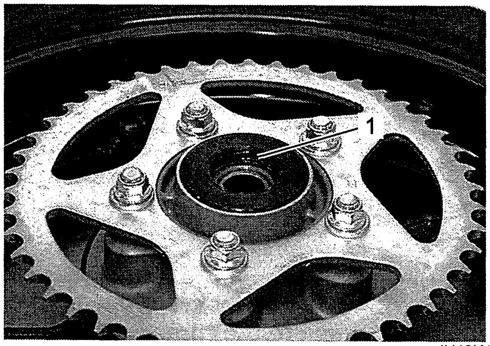
Rear Sprocket Mounting Drum / Sprocket Inspection

BENJ18K63106007

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

Dust Seal

Inspect the sprocket mounting drum dust seal lip (1) for wear or damage. If any damage is found, replace the dust seal with a new one. ☞(Page 3A-7)



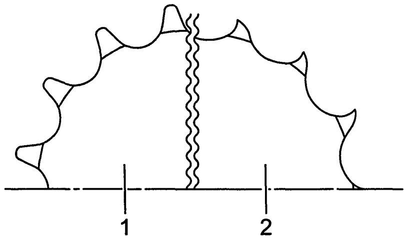
IH18K1310019-01

Bearing

Inspect the play of the sprocket mounting drum bearing by hand while they are in the drum. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. ☞(Page 3A-7)

Sprocket

1) Remove the engine sprocket cover. ☞(Page 3A-4)
2) Inspect the sprocket teeth for wear. If they are worn as shown, replace the engine sprocket, rear sprocket and drive chain as a set.
   - Engine: ☞(Page 3A-4)
   - Rear: ☞(Page 3A-6)
   - Drive chain: ☞(Page 3A-8)



IE31J1310022-02

1. Normal wear	2. Excessive wear

3) Install the engine sprocket cover. ☞(Page 3A-4)

Wheel Damper

Refer to "Rear Wheel Damper Inspection" in Section 2D (Page 2D-14).

Drive Chain

Refer to "Drive Chain Inspection and Adjustment" (Page 3A-3).

Rear Sprocket Mounting Drum Dust Seal / Bearing Removal and Installation

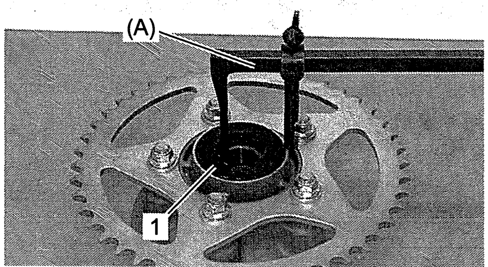
BENJ18K63106008

Refer to "Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation" (Page 3A-6).

Removal

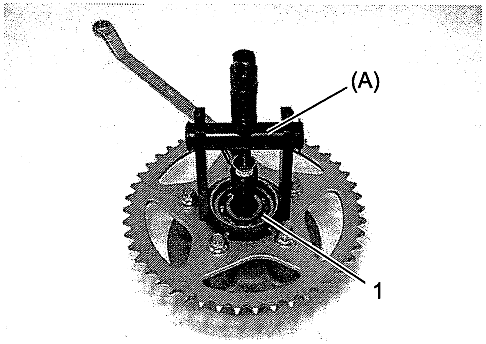
1) Remove the dust seal (1) with the special tool.

Special tool
(A): 09913–50121



2) Remove the bearing (1) with the special tool.

Special tool
(A): 09921–20240

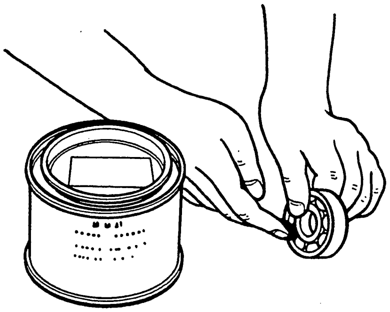


IH18K1310021-01

Installation

1) Apply grease to the new bearing.

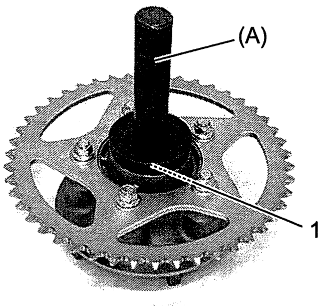
Grease 99000–25011 (SUZUKI SUPER GREASE A)



I649G1310020-02

2) Press the new bearing (1) with the special tool.

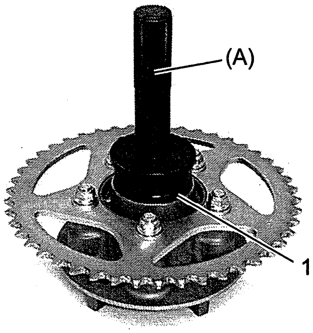
Special tool
(A): 09913–70210



IH18K1310022-01

3) Install a new dust seal (1) with the special tool.

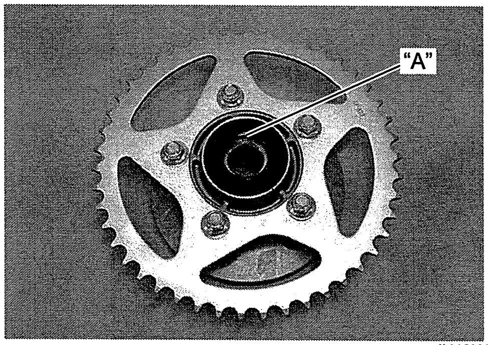
Special tool
(A): 09913–70210



IH18K1310023-01

4) Apply grease to the dust seal lip.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1310024-01

Drive Chain Replacement

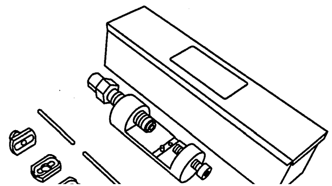
BENJ18K63106009

Use the special tool in the following procedure, to cut and rejoin the drive chain.

NOTE

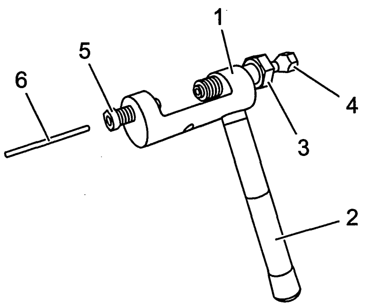
When using the special tool, apply a small quantity of grease to the threaded parts of the special tool.

Special tool
09922–22712



Drive Chain Cutting

1) Set up the special tool.

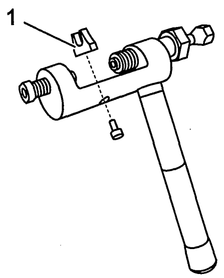


IF04K1310025-03

1. Tool body	4. Pressure bolt B
2. Grip handle	5. Adjuster bolt
3. Pressure bolt A	6. Cutting pin

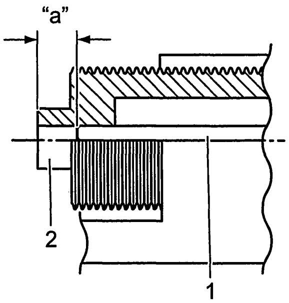
2) Select the correct guide plate (1) from table below, and mount it to the tool body.

Drive chain size	Guide plate
520, 525, 530 (50)	500
532	532



IF04K1310033-02

3) The tip of cutting pin (1) should be positioned inside "a" approximately 5 mm (0.2 in) from the end face of pressure bolt A (2).

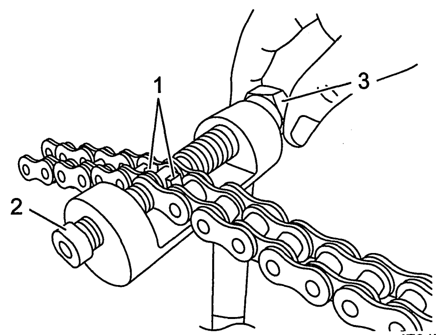


IE31J1310029-02

4) Place the drive chain link being disjointed on the guide plate (1) of the tool.

5) Turn in both the adjuster bolt (2) and pressure bolt A (3) so that each of their end hole fits over the chain joint pin properly.

6) Tighten the pressure bolt A (3).



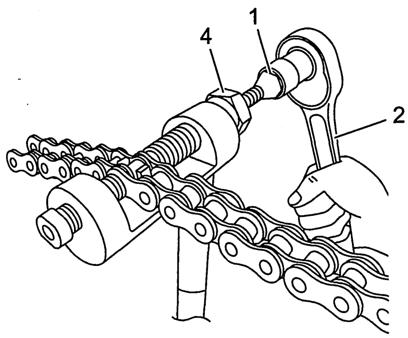
IF04K1310026-04

7) Turn in the pressure bolt B (1) with the wrench (2) and force out the drive chain joint pin (3).

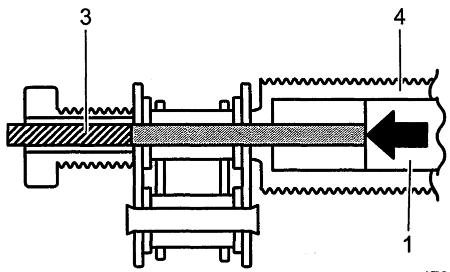
NOTE

Continue turning in the pressure bolt B (1) until the joint pin should been completely pushed out of the chain.

8) After the joint pin (3) is removed, loosen the pressure bolt B (1) and then pressure bolt A (4).



IF04K1310027-06



IE31J1310032-02

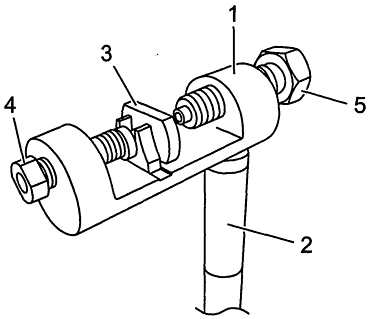
Drive Chain Connecting

⚠ 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.

Joint plate installation

1) Set up the special tool.



IF04K1310028-05

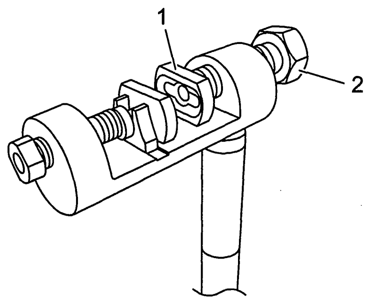
1. Tool body	4. Adjuster bolt
2. Grip handle	5. Pressure bolt A
3. Wedge holder	

2) Select the correct pressure holder (1) from table below, and set it to pressure bolt A (2).

Drive chain size / Type	Pressure holder
530 (50), 532 / Riveting type	F-50
520, 525 / Riveting type	F-520
530 (50), 532 / Clip type	C-50
520, 525 / Clip type	C-520

NOTE

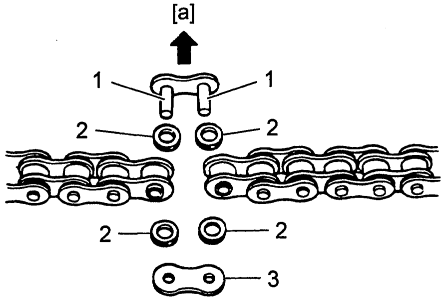
In case joint plate is too large to fit on "520 pressure holder". Please select "50 pressure holder".



IF04K1310034-02

3) Connect both ends of the drive chain with the joint pins (1) inserted from the wheel side [a] as installed on the motorcycle.

Joint set part number
27620 – 44H10



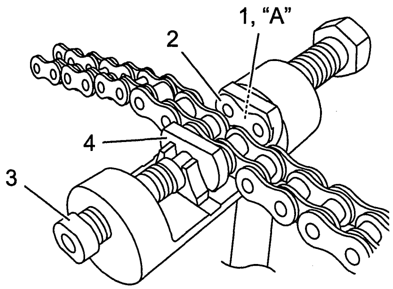
IF04K1310035-01

2. O-ring	3. Joint plate

4) Apply grease on the recessed portion of the pressure holder (1). Then install the joint plate (2) on the tool, its stamp mark must face the pressure holder (1) side.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

5) Set the drive chain on the tool as illustrated and turn in the adjuster bolt (3) to secure the wedge holder (4) with joint pin.



IF04K1310029-04

6) Turn in the pressure bolt A (1) and align two joint pins (2) properly with the respective holes of the joint plate (3).

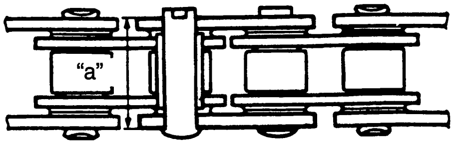
7) Turn in the pressure bolt A (1) further using the wrench (4) to press the joint plate over the joint pins.

8) Continue pressing the joint plate until the distance "a" between the two joint plates come to the specification.

Joint plate distance specification
[Standard]: 17.10 – 17.30 mm (0.6733 – 0.6811 in)

NOTICE

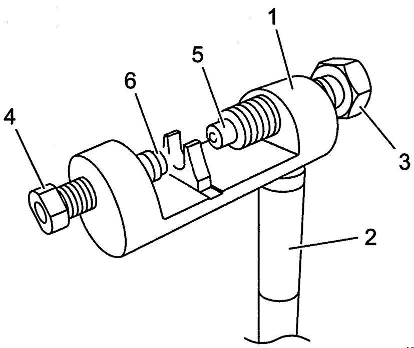
If pressing of the joint plate makes the dimension out of specification excessively, the work must be carried out again by using new joint parts.



I649G1310033-03

Joint pin staking

1) Set up the special tool.



IF04K1310031-03

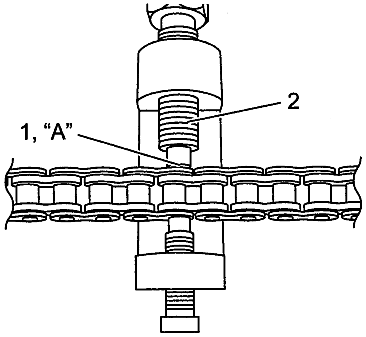
1. Tool body	4. Adjuster bolt
2. Grip handle	5. Flare pin
3. Pressure bolt A	6. Back-up pin

2) Apply grease to the flare pin (1).

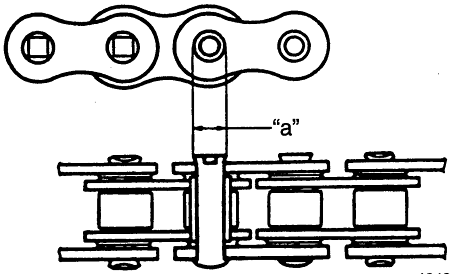
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

3) Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt A (2) until the pin end diameter "a" becomes the specified dimension.
4) After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.

Pin end diameter specification
[Standard]: 5.40 – 5.60 mm (0.213 – 0.220 in)



IF04K1310032-03



I649G1310036-03

5) Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment" (Page 3A-3).

Specifications

Tightening Torque Specifications

BENJ18K63107001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear axle nut	100	10.2	74.0	☞(Page 3A-3)
Engine sprocket nut	145	14.8	107.0	☞(Page 3A-5)
Engine sprocket cover bolt	5.5	0.56	4.05	☞(Page 3A-5)
Rear sprocket nut	60	6.1	44.5	☞(Page 3A-7)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Drive Chain Related Components" (Page 3A-2)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K63108001

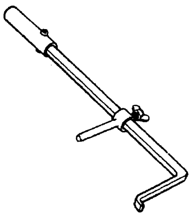
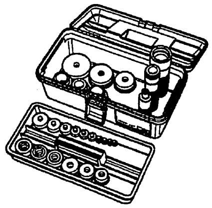
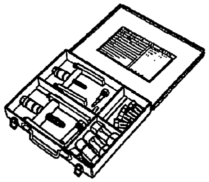
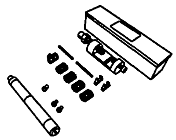
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 3A-6) / ☞(Page 3A-8) / ☞(Page 3A-8) / ☞(Page 3A-10) / ☞(Page 3A-11)

NOTE

Required service material(s) is also described in:
"Drive Chain Related Components" (Page 3A-2)

Special Tool

BENJ18K63108002

09913–50121 Oil seal remover ☞(Page 3A-7) 	09913–70210 Bearing installer set ☞(Page 3A-8) / ☞(Page 3A-8) 
09921–20240 Bearing remover set ☞(Page 3A-8) 	09922–22712 Drive chain cut / rivet tool set ☞(Page 3A-8) 

Section 4

Brakes

CONTENTS

Precautions

Precautions for Brake System

BENJ18K64000001

Refer to “General Precautions” in Section 00 (Page 00-1), “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2) and “Precautions for Circuit Tester” in Section 00 (Page 00-7).

Brake Fluid Information

BENJ18K64000002

⚠ 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.**
- **After removal and installation of the brake caliper, master cylinder, brake hose and ABS control unit/ HU (if equipped), be sure to carry out the air bleeding operation.**
- **Brake hose seal washers should be replaced with the new ones to prevent fluid leakage.**

NOTICE

The brake fluid is damaging to painted surfaces, plastics and rubber materials, and do not allow the fluid to spill on the surrounding parts.
If the fluid is spilled, flush it with water immediately.

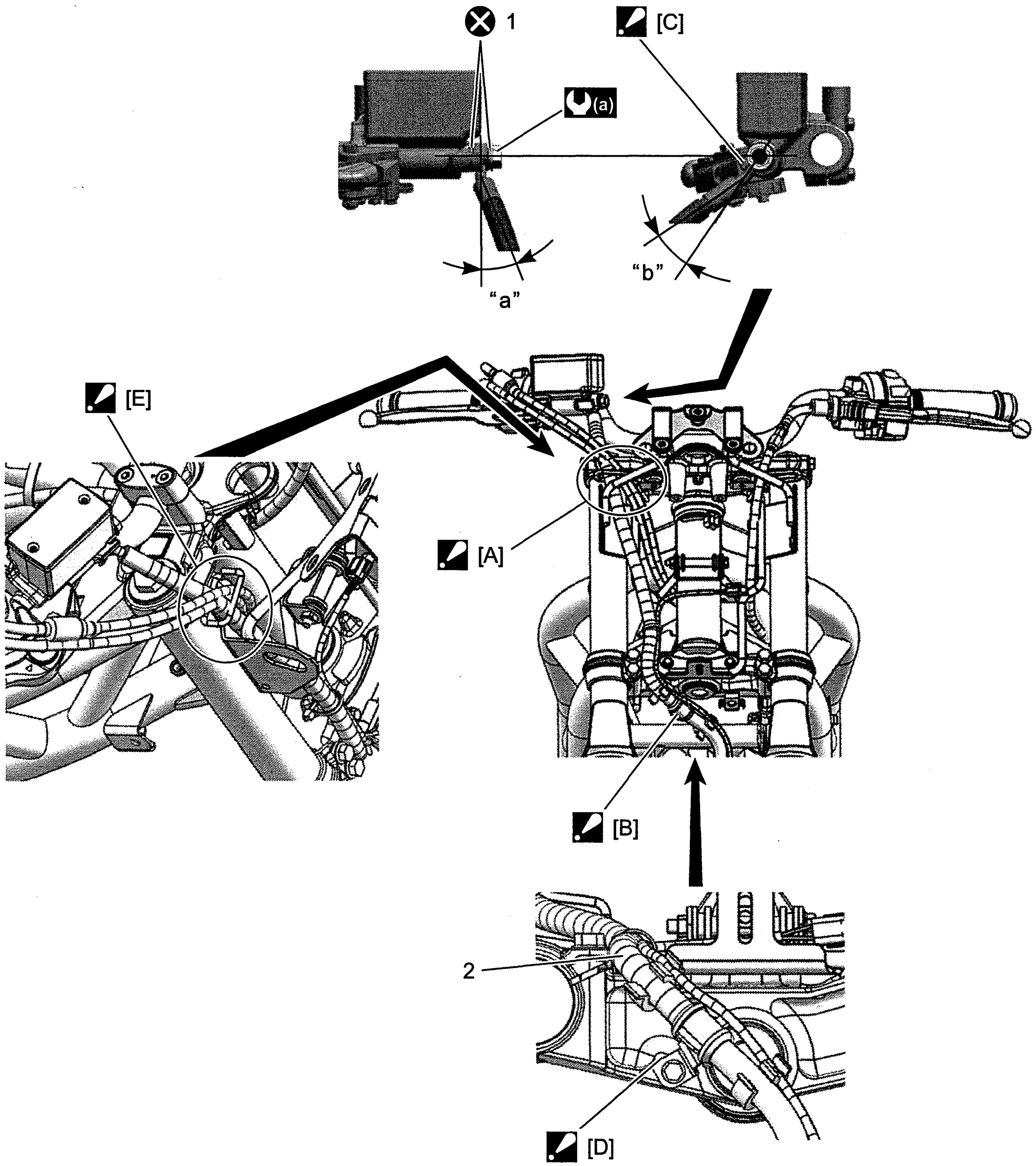
Brake Control System and Diagnosis

Schematic and Routing Diagram

Front Brake Hose Routing Diagram

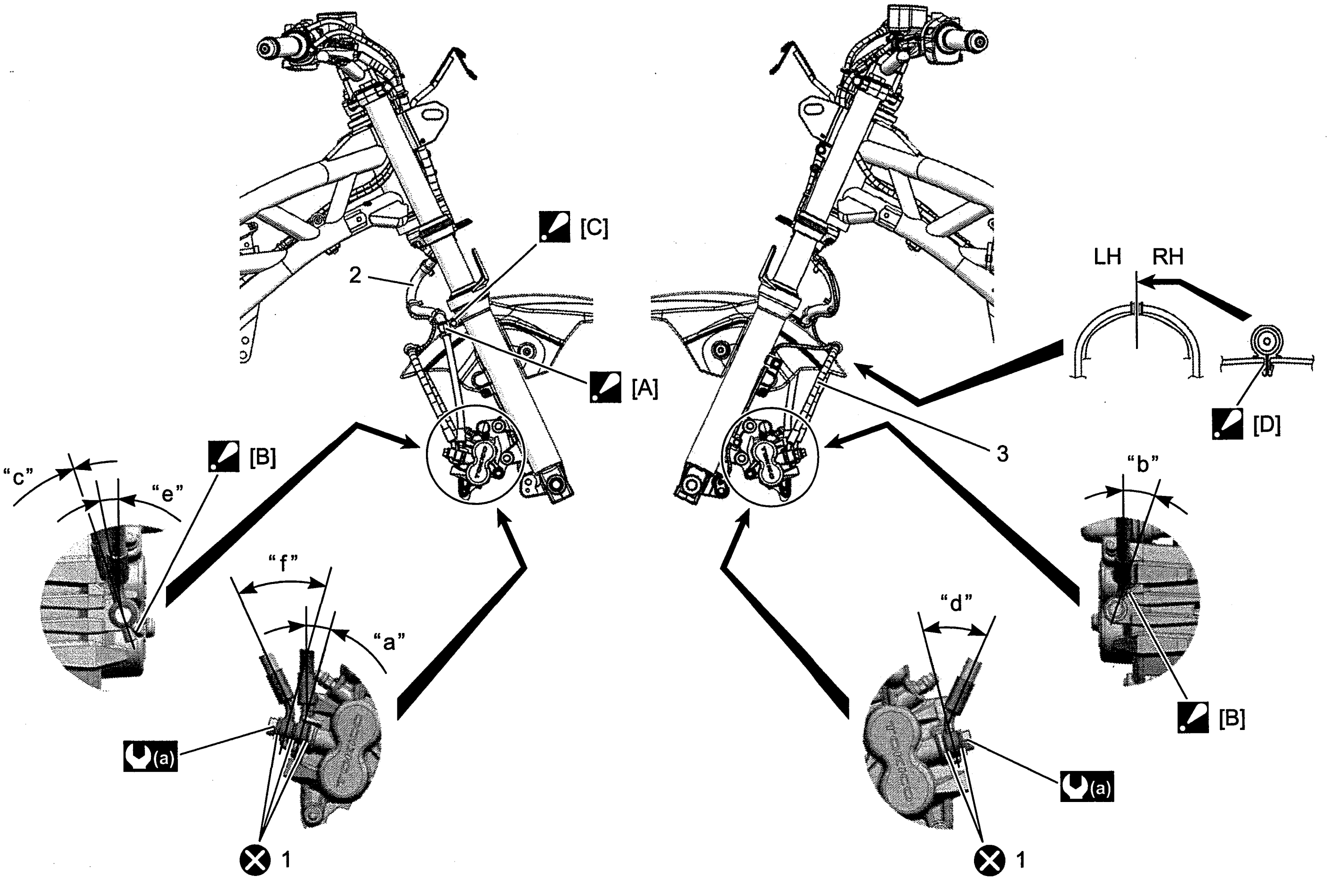
BENJ18K64102001

SV650/A
Without ABS
L7 – L8



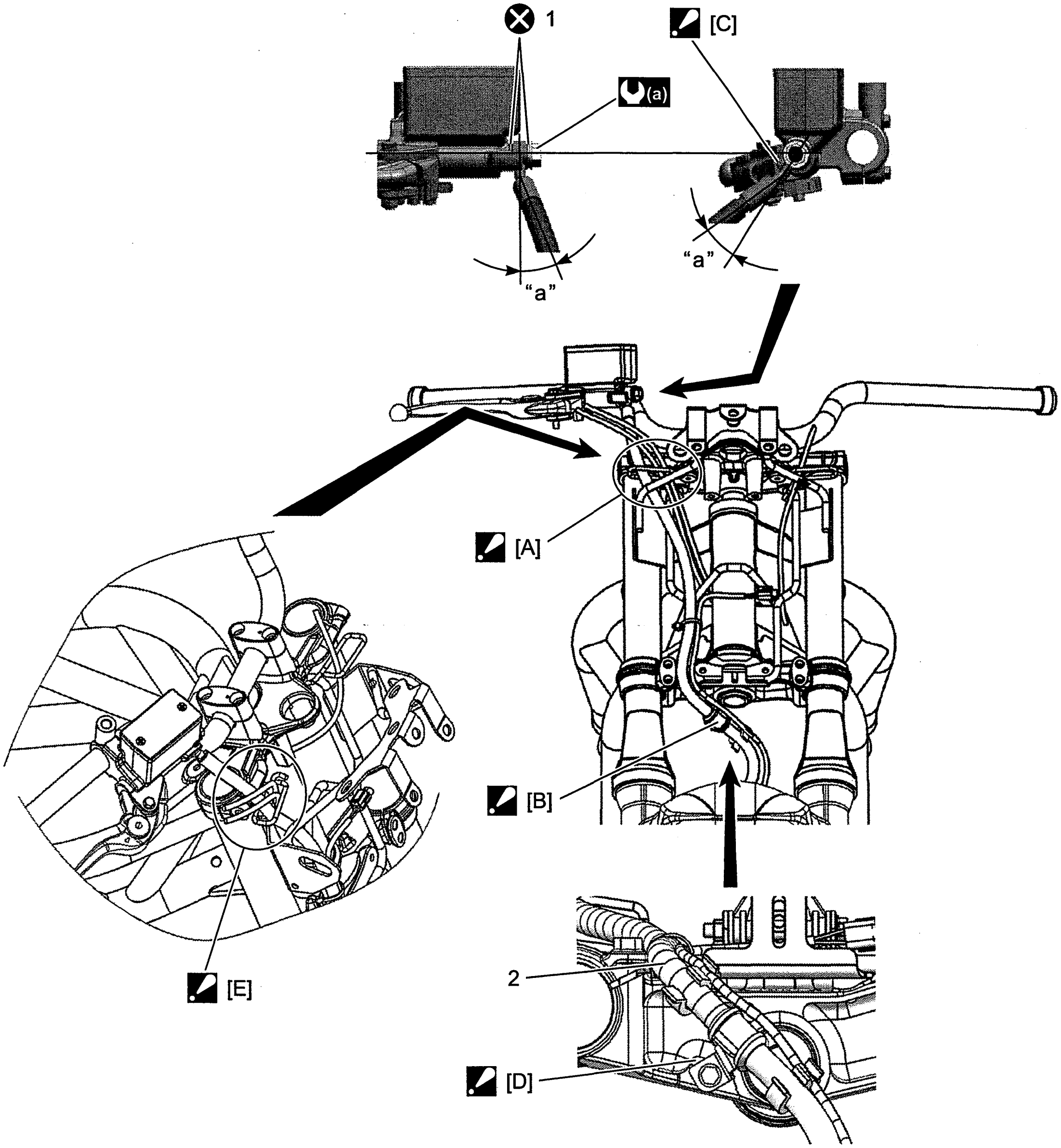
IH18K1410063-04

[A]: Pass the brake hose inside of the headlight brace as shown in the figure.	2. Front brake hose (master cylinder to brake caliper)
[B]: Fix the hose sleeve to the clamp.	"a": 14°



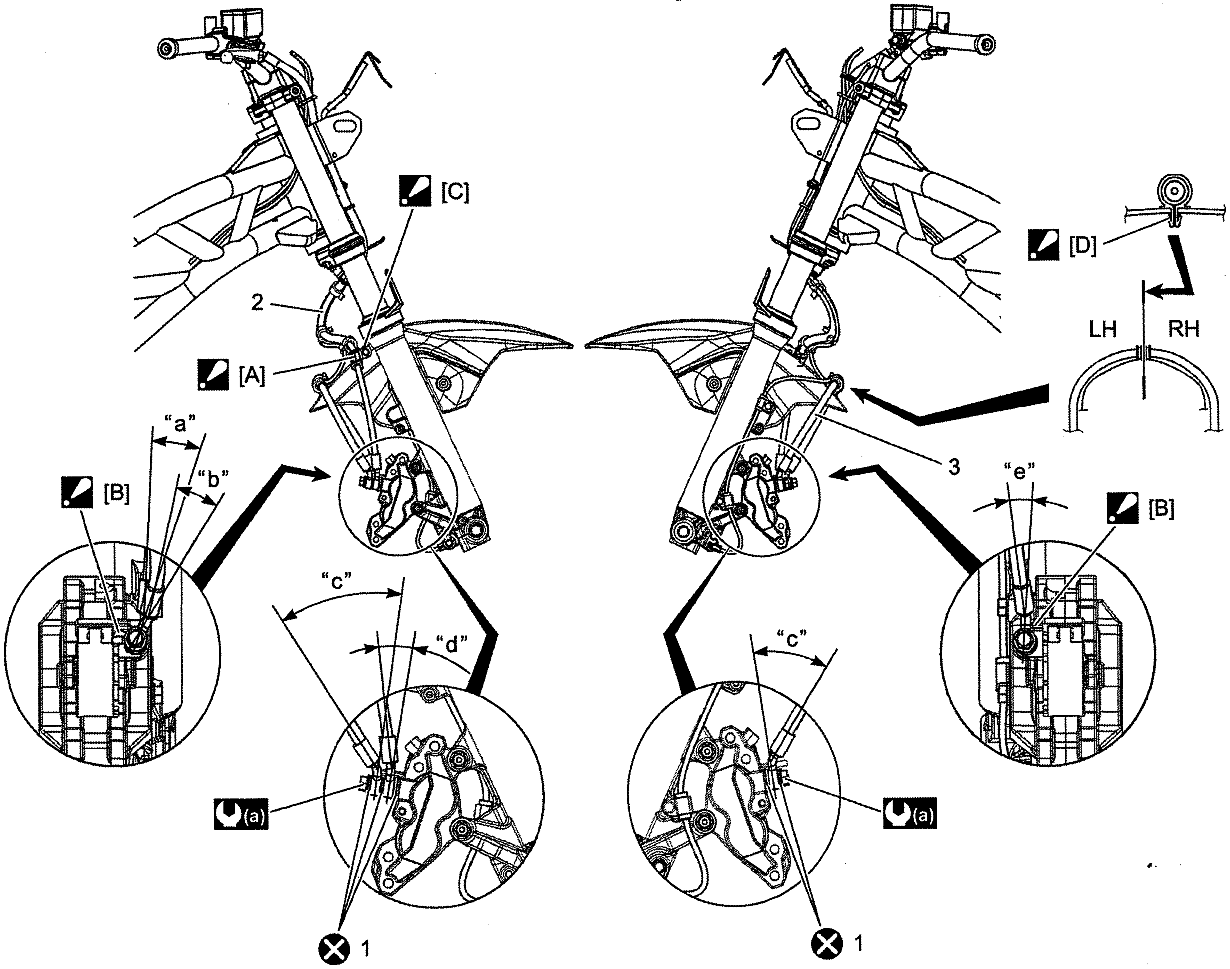
IH18K1410064-05

[A]: Fix the hose sleeve to the clamp.	"b": 21°
[B]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	"c": 0°
[C]: After the clamp has contacted the stopper, tighten the bolt.	"d": 42°
[D]: Clamp the hose sleeve and insert the clamp into the hole.	"e": 15°
1. Seal washer	"f": 30°
2. Front brake hose (master cylinder to brake caliper)	(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
3. Front brake hose (brake caliper to brake caliper)	: Do not reuse.
"a": 14°	



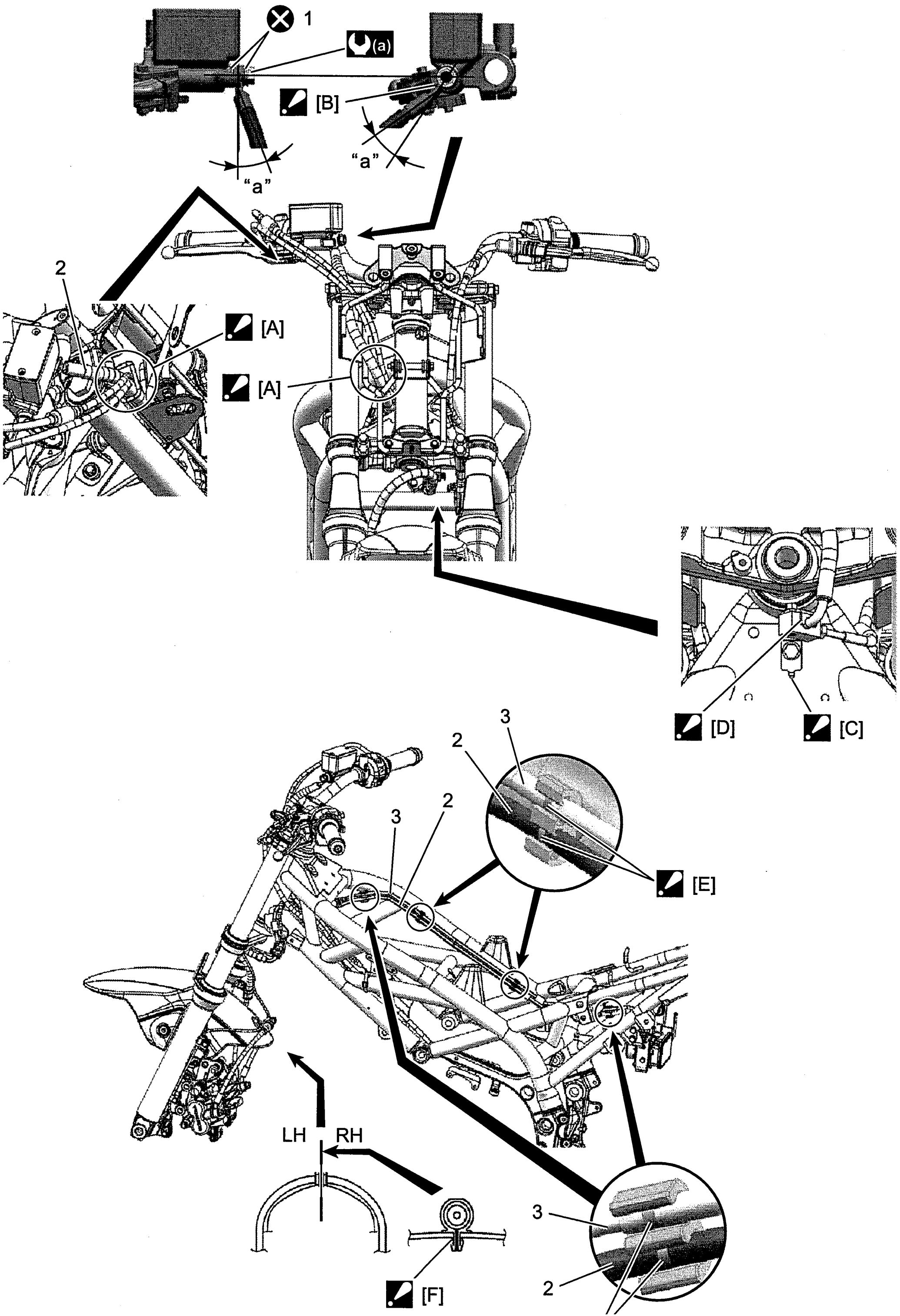
IJ18K5410001-02

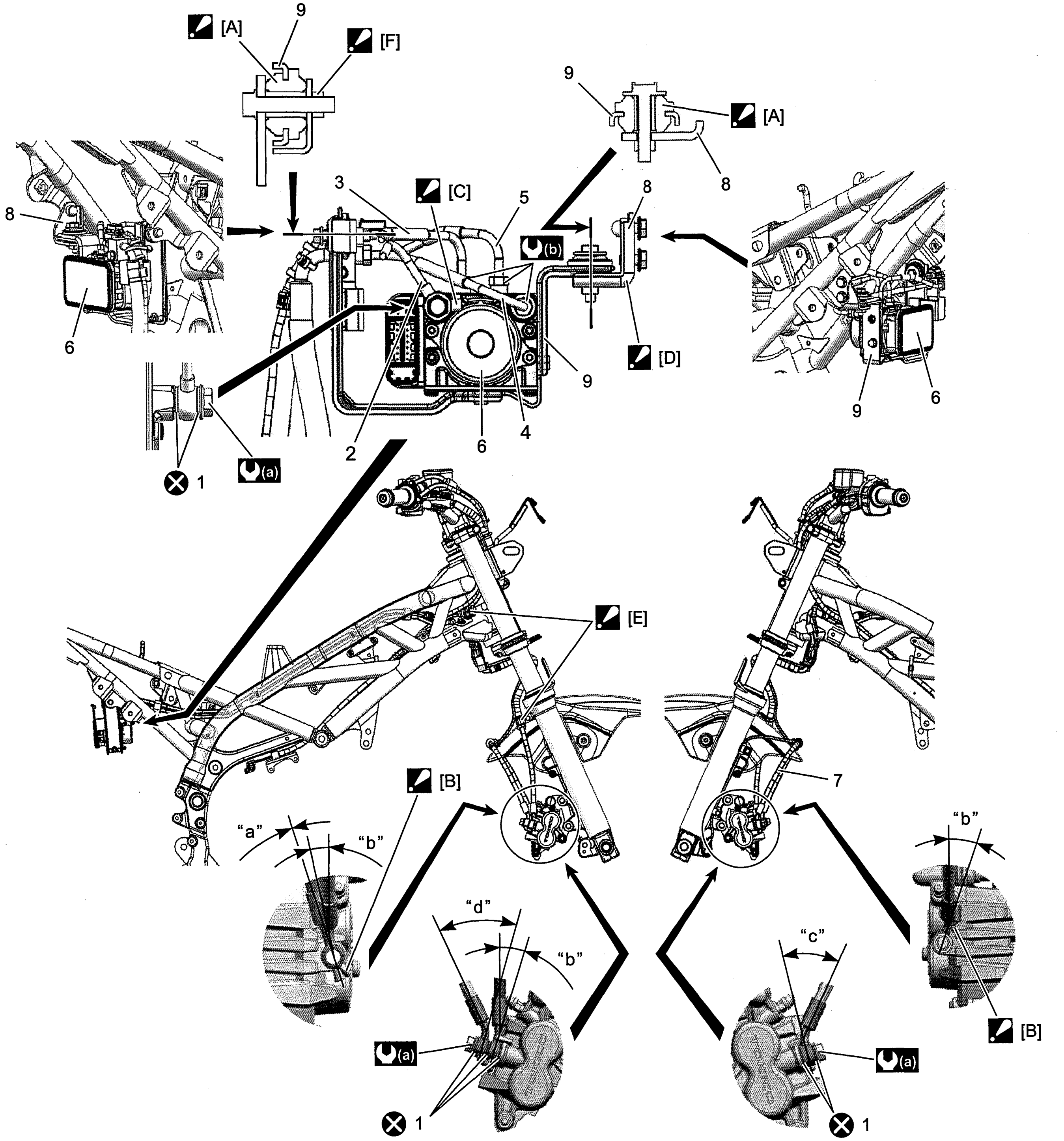
[A]:	Pass the brake hose inside of the headlight brace as shown in the figure.	1.	Seal washer
[B]:	Fix the hose sleeve to the clamp.	2.	Front brake hose (master cylinder to brake caliper)
[C]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	"a":	20°
[D]:	After the clamp has contacted the stopper, tighten the bolt.	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[E]:	Pass the brake hose as shown in the figure.	⊗ :	Do not reuse.



[A]:	Fix the hose sleeve to the clamp.	"a":	20°
[B]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	"b":	21°
[C]:	After the clamp has contacted the stopper, tighten the bolt.	"c":	42°
[D]:	Clamp the hose sleeve and insert the clamp into the hole.	"d":	15°
1.	Seal washer	"e":	14°
2.	Front brake hose (master cylinder to brake caliper)	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
3.	Front brake hose (brake caliper to brake caliper)	:	Do not reuse.

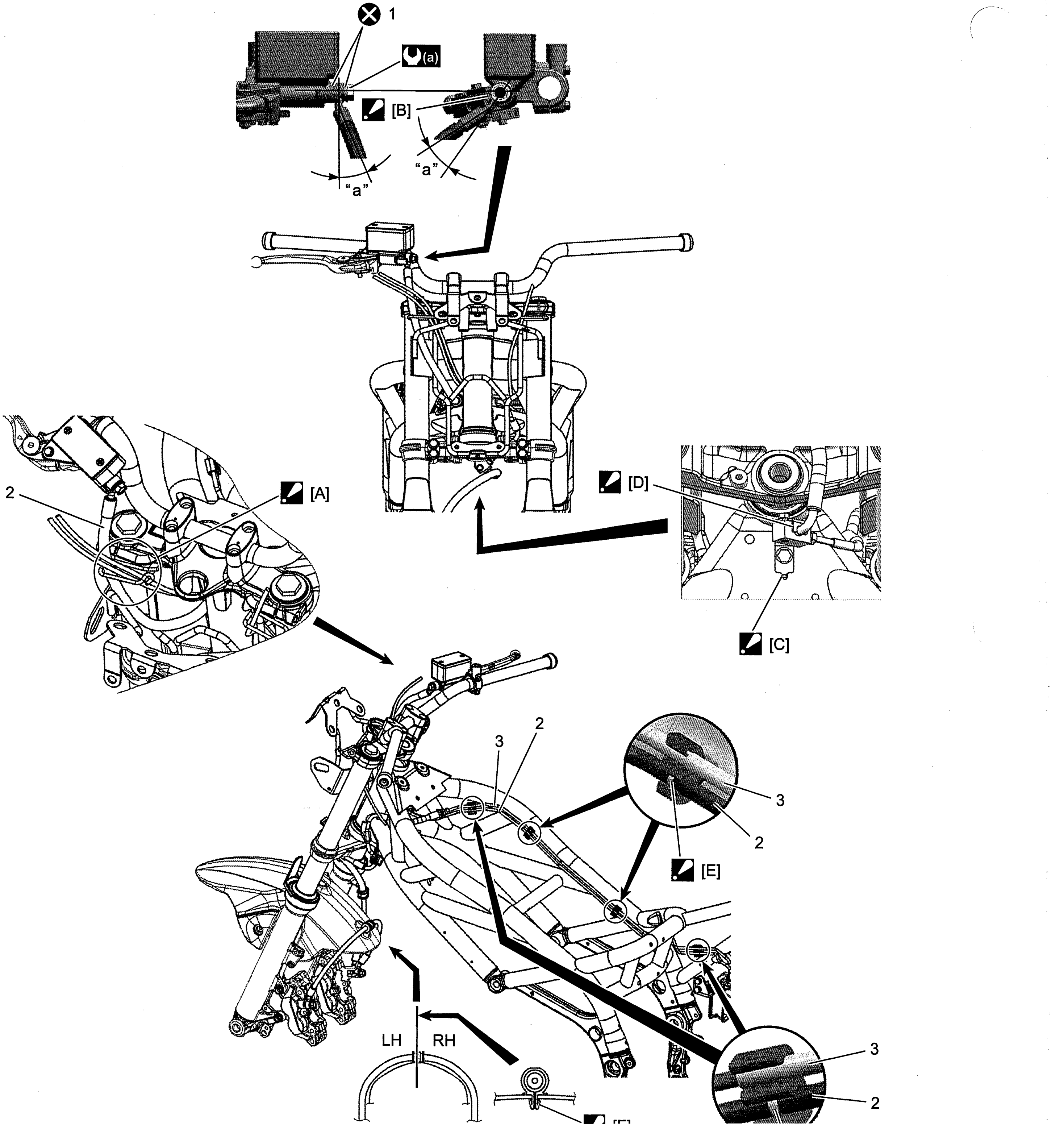
With ABS
L7 – L8



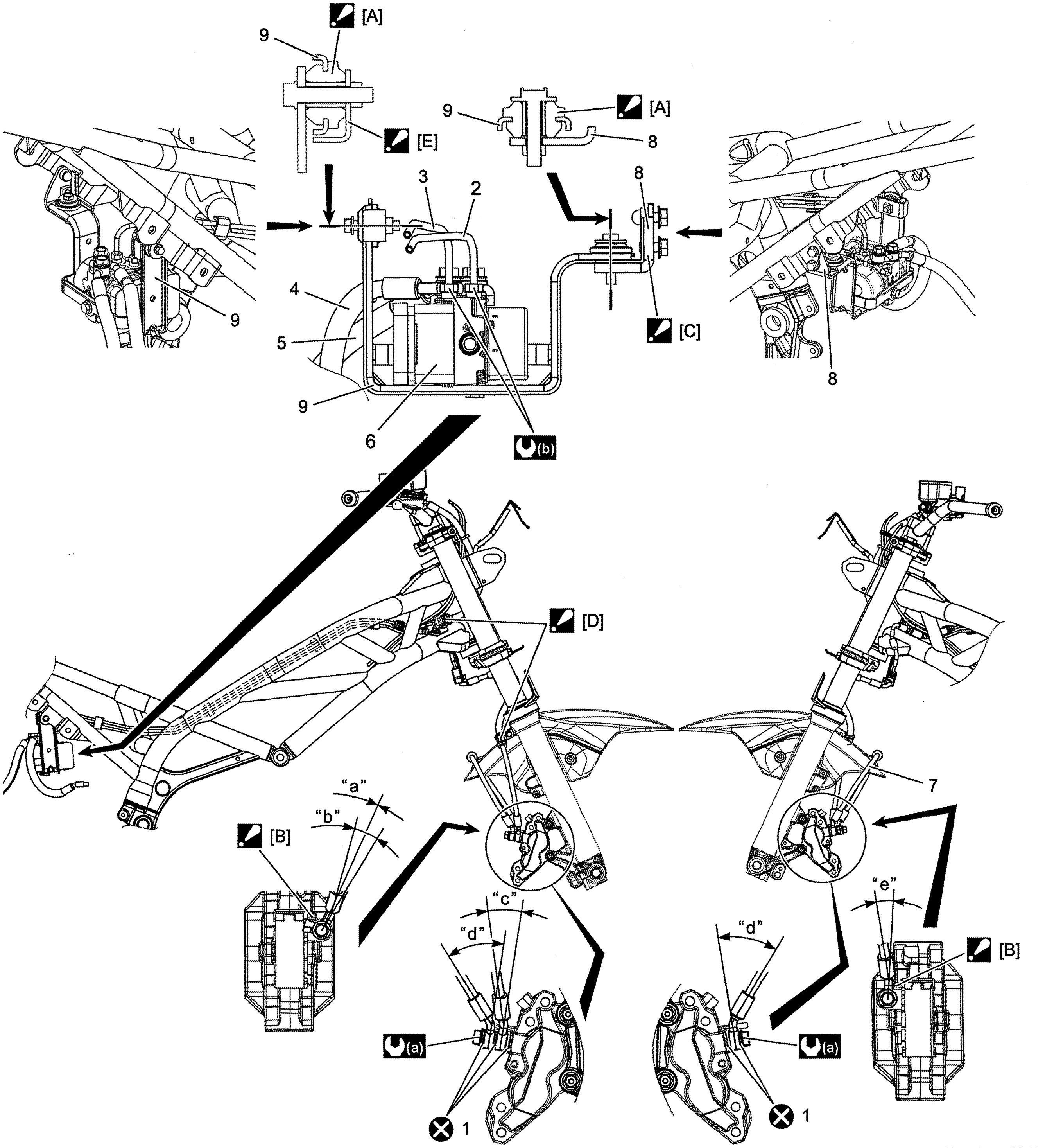


IH18K1410066-09

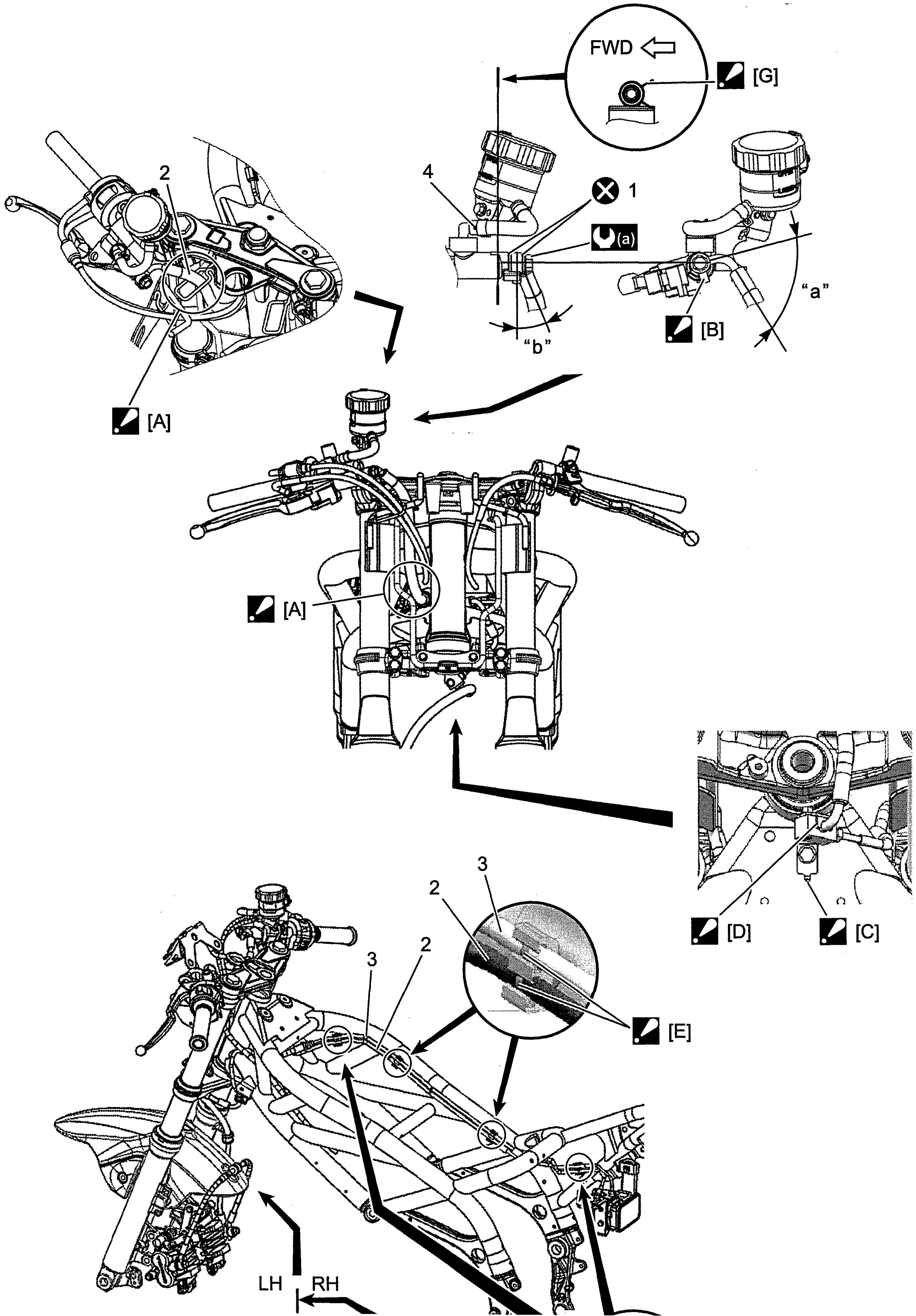
[A]: Install the rubber in the proper direction.	6. ABS control unit/HU
[B]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	7. Front brake hose (brake caliper to brake caliper)
[C]: After the brake hose union has contacted the ABS control unit/HU,	8. ABS control unit/HU holder bracket


1
(a)
[B]
"a"
"a"
2
[A]
[D]
[C]
3
2
3
2
[E]
LH
RH
3
2

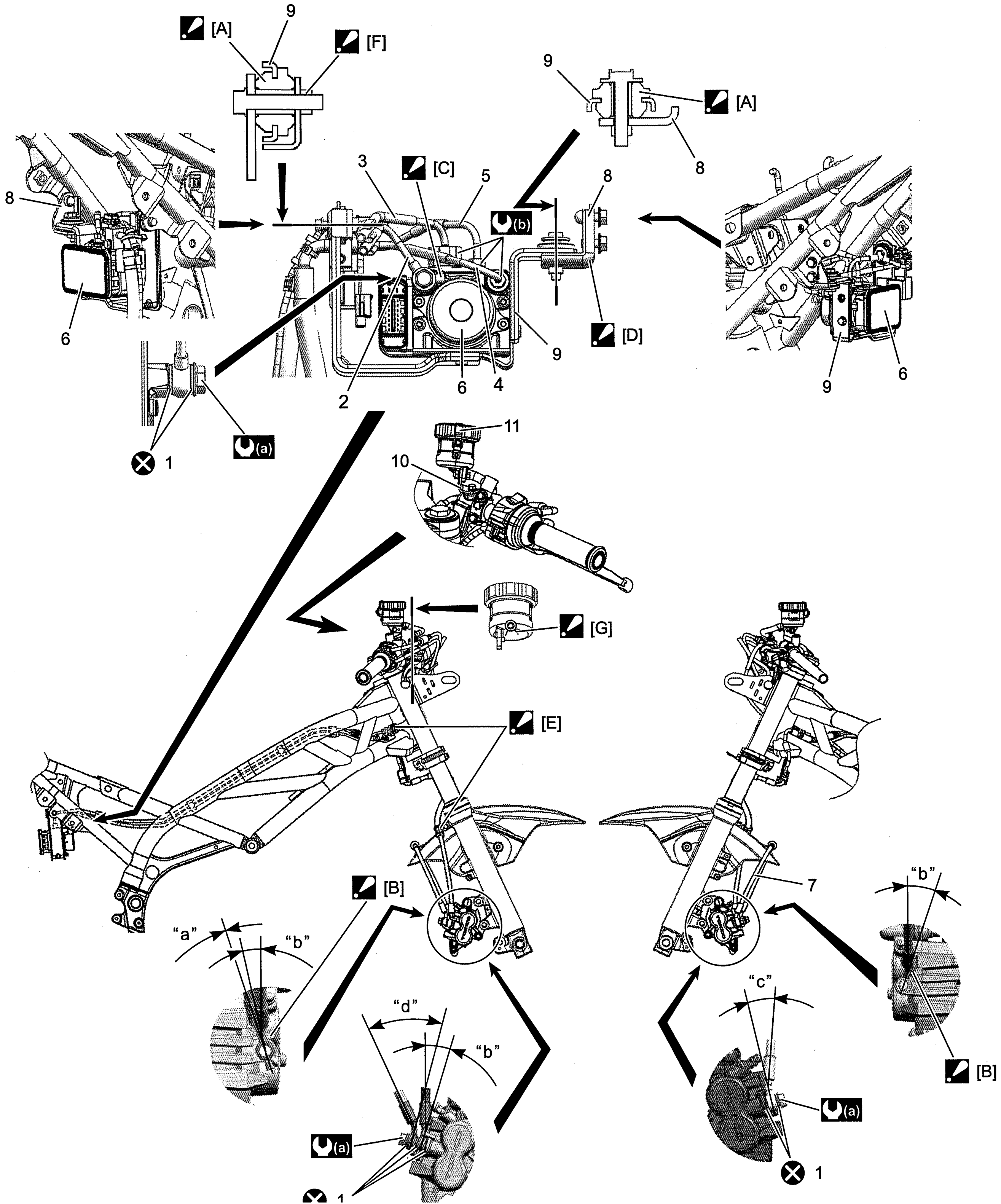
[A]: Pass the brake hose as shown in the figure.	1. Seal washer
[B]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	2. Front brake hose (master cylinder to ABS control unit/HU)
[C]: After inserting the stopper into the hole, tighten the bolt.	3. Front brake hose (ABS control unit/HU to brake caliper)
[D]: After the brake hose joint has contacted the stopper, tighten the bolt.	"a": 20°
[E]: Clamp the brake pipe at the marking portion.	(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[F]: Clamp the hose sleeve and insert the clamp into the hole.	: Do not reuse.



[A]: Install the rubber in the proper direction.	7. Front brake hose (brake caliper to brake caliper)
[B]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	8. ABS control unit/HU holder bracket

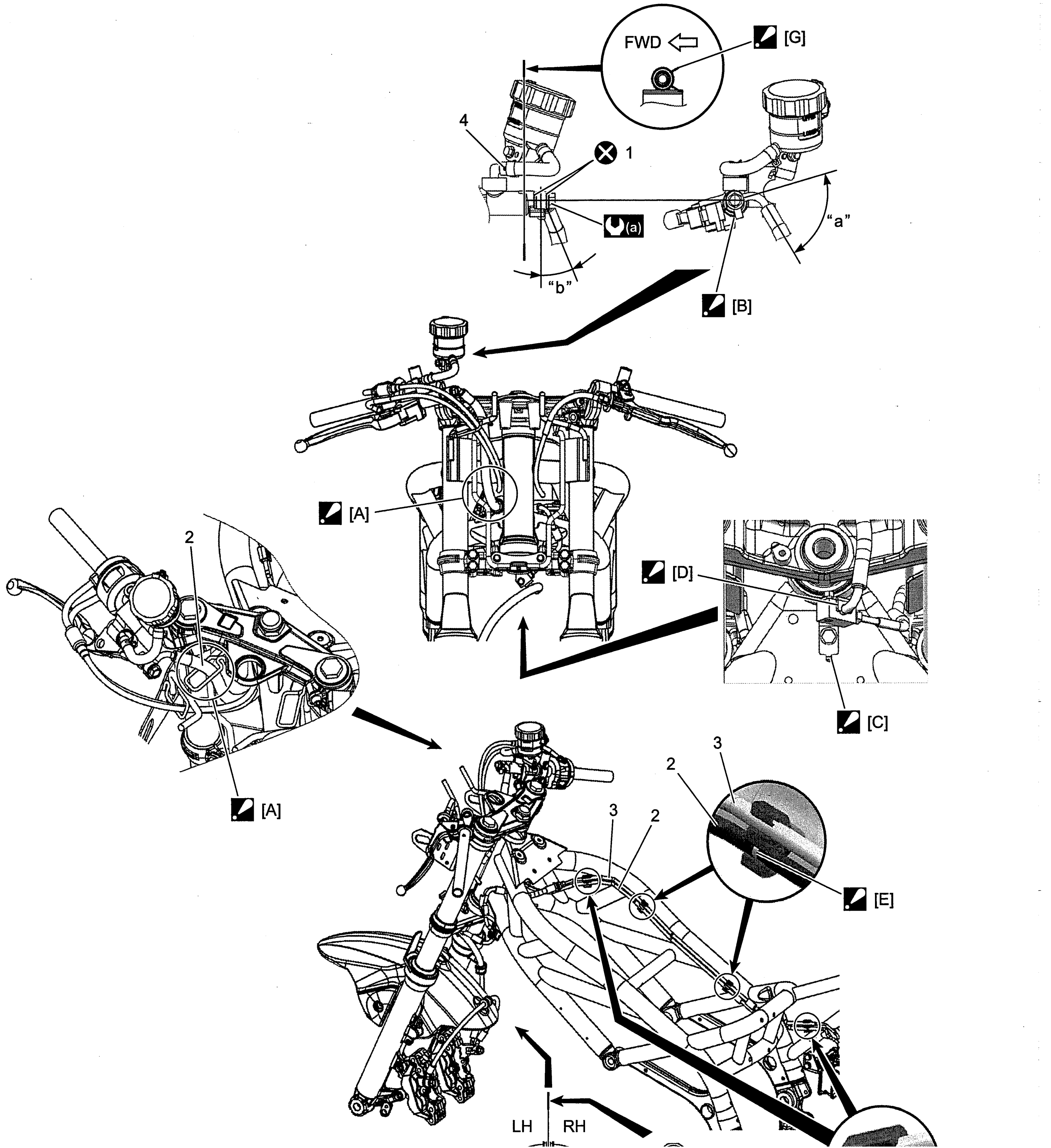

FWD
[G]
4
1
(a)
2
[A]
"a"
"b"
[B]
[A]
[D]
[C]
3
2
3
2
[E]
LH
RH

[A]:	Pass the brake hose as shown in the figure.	2.	Front brake hose (master cylinder to ABS control unit/HU)
[B]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	3.	Front brake hose (ABS control unit/HU to brake caliper)
[C]:	After inserting the stopper into the hole, tighten the bolt.	4.	White mark
[D]:	After the brake hose joint has contacted the stopper, tighten the bolt.	"a":	75°
[E]:	Clamp the brake pipe at the marking portion.	"b":	15°
[F]:	Clamp the hose sleeve and insert the clamp into the hole.	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[G]:	Face the clamp end as shown in the figure.	:	Do not reuse.
1.	Seal washer		

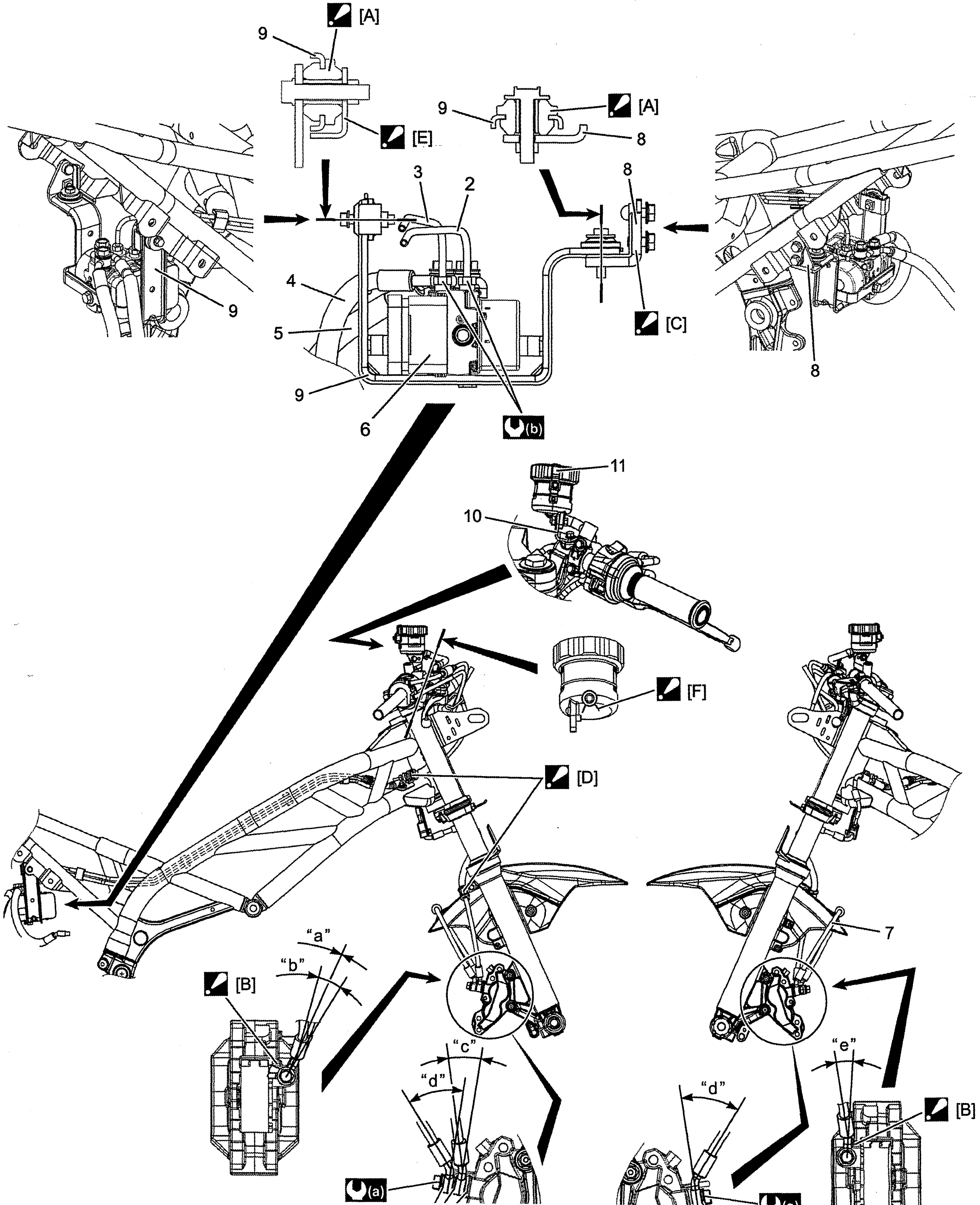


[A]
[F]
9
8
[C]
3
5
(b)
[D]
2
4
6
(a)
1
10
11
[G]
[E]
[B]
"a"
"b"
"c"
"d"
7

[A]:	Install the rubber in the proper direction.	7.	Front brake hose (brake caliper to brake caliper)
[B]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	8.	ABS control unit/HU holder bracket
[C]:	After the brake hose union has contacted the ABS control unit/HU, tighten the union bolt to the specified torque.	9.	ABS control unit/HU holder
[D]:	First install the ABS control unit/HU holder bracket to the frame and then ABS control unit/HU holder.	10.	Front reservoir tank bracket
[E]:	Fix the hose sleeve to the clamp.	11.	Front reservoir tank cap plate
[F]:	Install the rubber mounting nut as shown in the figure.	"a":	0°
[G]:	Face the clamp end as shown in the figure.	"b":	15°
1.	Seal washer	"c":	20°
2.	Front brake hose (master cylinder to ABS control unit/HU)	"d":	30°
3.	Front brake hose (ABS control unit/HU to brake caliper)	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
4.	Rear brake hose (master cylinder to ABS control unit/HU)	(b) :	16 N·m (1.6 kgf-m, 12.0 lbf-ft)
5.	Rear brake hose (ABS control unit/HU to brake caliper)	:	Do not reuse.
6.	ABS control unit/HU		


FWD
[G]
4
1
(a)
"a"
"b"
[B]
[A]
[D]
[C]
2
[A]
3
2
3
2
[E]
LH
RH

[A]:	Pass the brake hose as shown in the figure.	2.	Front brake hose (master cylinder to ABS control unit/HU)
[B]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	3.	Front brake hose (ABS control unit/HU to brake caliper)
[C]:	After inserting the stopper into the hole, tighten the bolt.	4.	White mark
[D]:	After the brake hose joint has contacted the stopper, tighten the bolt.	"a":	75°
[E]:	Clamp the brake pipe at the marking portion.	"b":	15°
[F]:	Clamp the hose sleeve and insert the clamp into the hole.	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[G]:	Face the clamp end as shown in the figure.	:	Do not reuse.
1.	Seal washer		



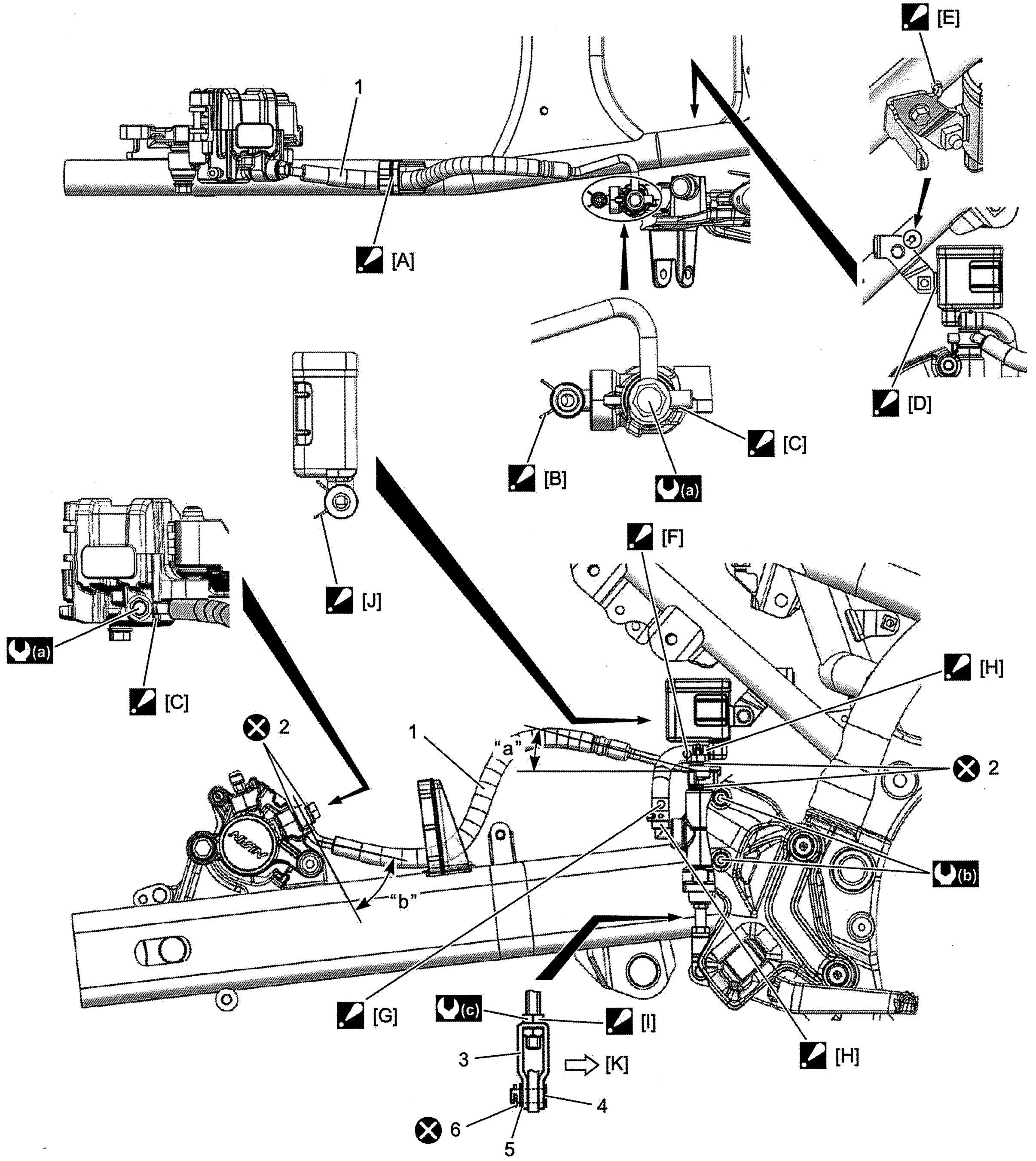
[A]
9
[E]
9
[A]
8
3
2
8
4
5
9
6
[C]
8
9
(b)
11
10
[F]
[D]
7
"a"
"b"
[B]
"c"
"d"
"d"
"e"
[B]
(a)

[A]:	Install the rubber in the proper direction.	8.	ABS control unit/HU holder bracket
[B]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	9.	ABS control unit/HU holder
[C]:	First install the ABS control unit/HU holder bracket to the frame and then ABS control unit/HU holder.	10.	Front reservoir tank bracket
[D]:	Fix the hose sleeve to the clamp.	11.	Front reservoir tank cap plate
[E]:	Install the rubber mounting nut as shown in the figure.	"a":	0°
[F]:	Face the clamp end as shown in the figure.	"b":	21°
1.	Seal washer	"c":	15°
2.	Front brake hose (master cylinder to ABS control unit/HU)	"d":	42°
3.	Front brake hose (ABS control unit/HU to brake caliper)	"e":	14°
4.	Rear brake hose (master cylinder to ABS control unit/HU)	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
5.	Rear brake hose (ABS control unit/HU to brake caliper)	(b) :	16 N·m (1.6 kgf-m, 12.0 lbf-ft)
6.	ABS control unit/HU	:	Do not reuse.
7.	Front brake hose (brake caliper to brake caliper)		

Rear Brake Hose Routing Diagram

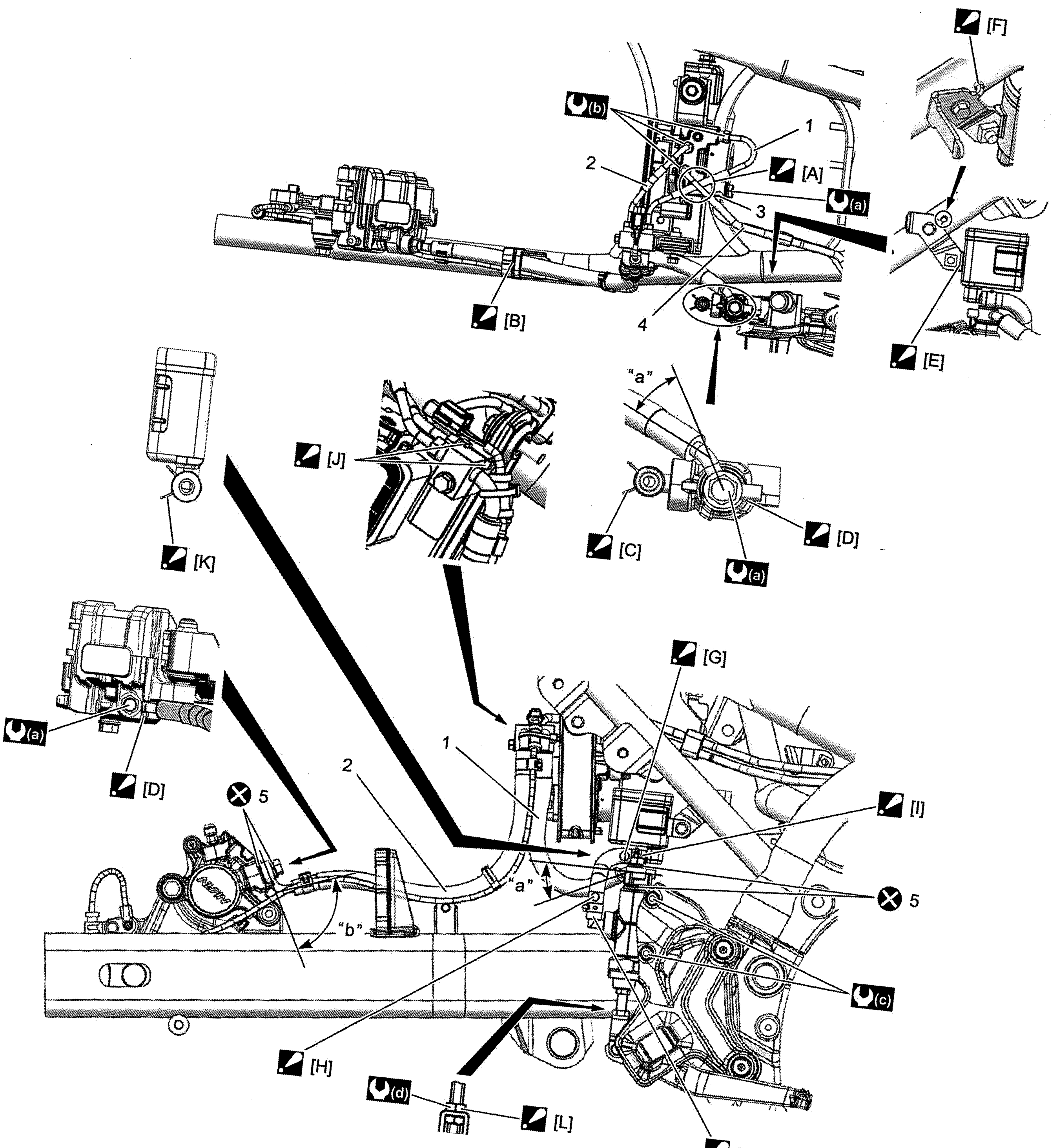
BENJ18K64102002

Without ABS



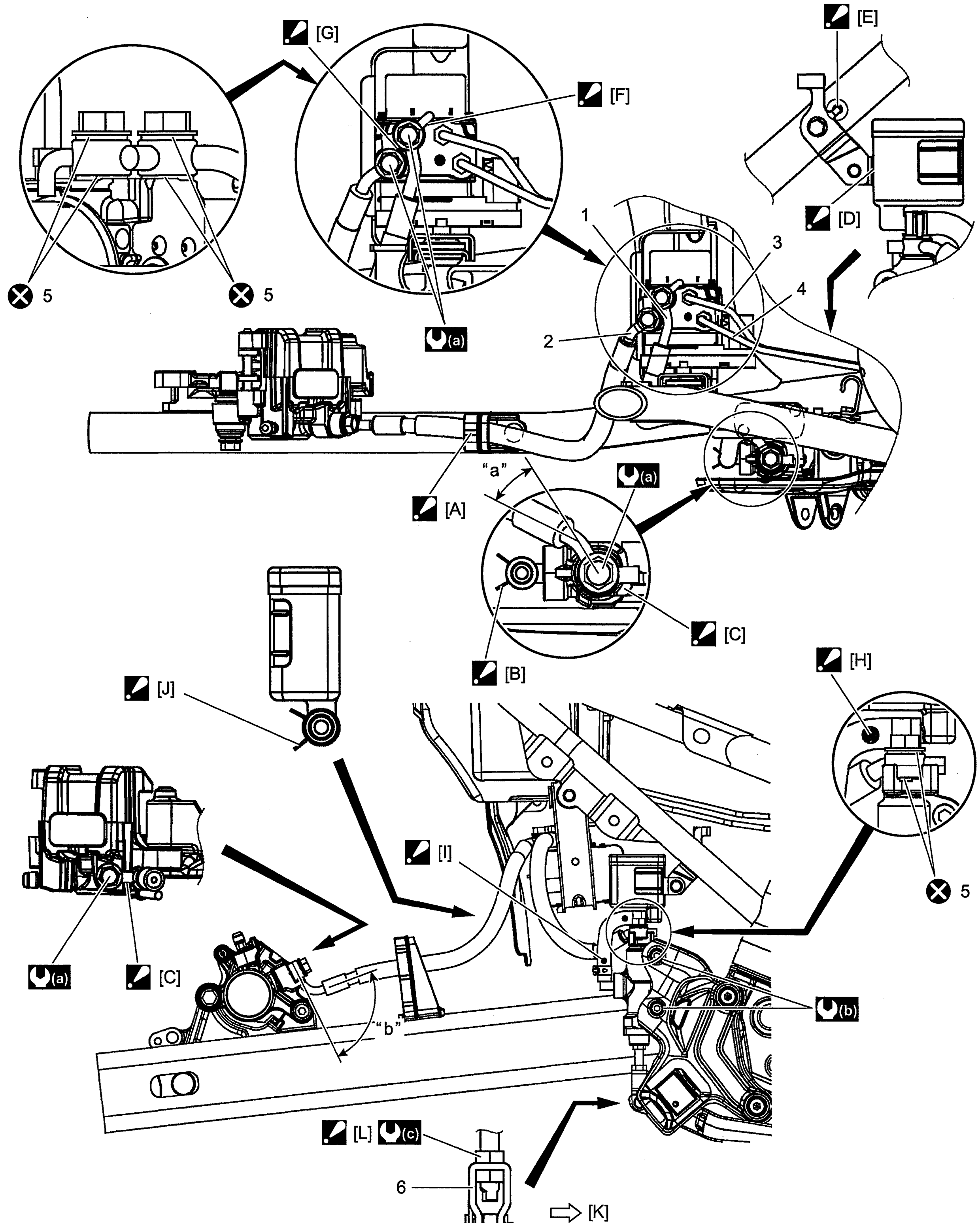
IH18K1410070-01

[A]: Pass the rear brake hose inside of the guide.	2. Seal washer
[B]: Face the clamp end backward.	3. Yoke
[C]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	4. Pin



[F]
(b)
1
2
[A]
(a)
3
[B]
4
[E]
"a"
[J]
[K]
[C]
[D]
(a)
[G]
(a)
[D]
5
2
1
[I]
"a"
5
"b"
(c)
[H]
(d)
[L]

[A]:	Pass the rear brake hose (master cylinder to ABS control unit/HU) under the front brake hose (ABS control unit/HU to brake caliper).	3.	Front brake hose (master cylinder to ABS control unit/HU)
[B]:	Pass the rear brake hose (ABS control unit/HU to brake caliper) inside of the guide.	4.	Front brake hose (ABS control unit/HU to brake caliper)
[C]:	Face the clamp end backward.	5.	Seal washer
[D]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	6.	Yoke
[E]:	After the stopper of rear brake reservoir tank has contacted the bracket, tighten the bolt.	7.	Pin
[F]:	After inserting the stopper into the hole, tighten the bolt.	8.	Washer
[G]:	Face the white paint making to outside.	9.	Cotter pin
[H]:	Face the yellow paint making to outside.	"a":	21°
[I]:	Insert the reservoir tank hose firmly.	"b":	84°
[J]:	After the brake hose joint has contacted the stopper, tighten the bolt.	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[K]:	Face the clamp end to inside.	(b) :	16 N·m (1.6 kgf-m, 12.0 lbf-ft)
[L]:	Hold the yoke and tighten the lock-nut to the specified torque.	(c) :	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
[M]:	Outside	(d) :	18 N·m (1.8 kgf-m, 13.5 lbf-ft)
1.	Rear brake hose (master cylinder to ABS control unit/HU)	:	Do not reuse.
2.	Rear brake hose (ABS control unit/HU to brake caliper)		


[G]
[F]
[E]
[D]
1
2
3
4
5
5
(a)
"a"
[A]
(a)
[C]
[B]
[J]
[H]
[I]
5
(a)
[C]
"b"
(b)
[L]
(c)
6
[K]

[A]:	Pass the rear brake hose (ABS control unit/HU to brake caliper) inside of the guide.	3.	Front brake hose (master cylinder to ABS control unit/HU)
[B]:	Face the clamp end backward.	4.	Front brake hose (ABS control unit/HU to brake caliper)
[C]:	After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	5.	Seal washer
[D]:	After the stopper of rear brake reservoir tank has contacted the bracket, tighten the bolt.	6.	Yoke
[E]:	After inserting the stopper into the hole, tighten the bolt.	7.	Pin
[F]:	After the brake hose union has contacted the ABS control unit/HU, tighten the union bolt to the specified torque.	8.	Washer
[G]:	After the brake hose union has contacted the other brake hose union, tighten the union bolt to the specified torque.	9.	Cotter pin
[H]:	Face the white paint making to outside.	"a":	35°
[I]:	Face the yellow paint making to outside.	"b":	84°
[J]:	Face the clamp end to inside.	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[K]:	Outside	(b) :	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
[L]:	Hold the yoke and tighten the lock-nut to the specified torque.	(c) :	18 N·m (1.8 kgf-m, 13.5 lbf-ft)
1.	Rear brake hose (master cylinder to ABS control unit/HU)	:	Do not reuse.
2.	Rear brake hose (ABS control unit/HU to brake caliper)		

Diagnostic Information and Procedures

Brake Symptom Diagnosis

BENJ18K64104001

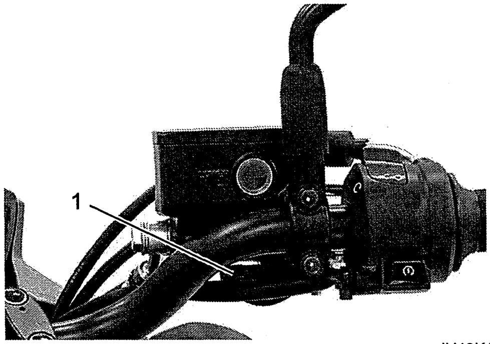
Condition	Possible cause	Correction / Reference Item
Insufficient brake power	Leakage of brake fluid from hydraulic system.	*Repair or replace.*
	Worn pads and/or disc.	*Replace. ☞(Page 4B-3)* *☞(Page 4C-2)* *☞(Page 4B-13)* *☞(Page 4C-7)*
	Oil adhesion on friction surface of pads.	*Clean disc and pads.*
	Air in hydraulic system.	*Bleed air. ☞(Page 4A-27)*
	Not enough brake fluid in the reservoir.	*Replenish. ☞(Page 4A-24)*
Brake squeaking	Carbon adhesion on pad surface.	*Repair surface with sandpaper.*
	Tilted pad.	*Correct pad fitting or replace. ☞(Page 4B-3)* *☞(Page 4C-2)*
	Damaged wheel bearing.	*Replace. ☞(Page 2D-6)* *☞(Page 2D-11)*
	Loose front wheel axle or rear wheel axle.	*Tighten to specified torque. ☞(Page 0B-4)*
	Worn pads and/or disc.	*Replace. ☞(Page 4B-3)* *☞(Page 4C-2)* *☞(Page 4B-13)* *☞(Page 4C-7)*
	Foreign material in brake fluid.	*Replace brake fluid. ☞(Page 4A-31)*
	Clogged return port of master cylinder.	*Disassemble and clean master cylinder.*
Excessive brake lever stroke	Air in hydraulic system.	*Bleed air. ☞(Page 4A-27)*
	Insufficient brake fluid.	*Replenish fluid to specified level. ☞(Page 4A-24)*
	Improper quality of brake fluid.	*Replace with correct fluid. ☞(Page 4A-31)*
Leakage of brake fluid	Insufficient tightening of connection joints.	*Tighten to specified torque. ☞(Page 0B-4)*
	Cracked hose.	*Replace. ☞(Page 4A-32)* *☞(Page 4A-33)*
	Worn master cylinder piston and/or cup.	*Replace master cylinder piston and/or cup.* *☞(Page 4A-37)* *☞(Page 4A-43)*
	Worn brake caliper piston seal and dust seal.	*Replace brake caliper piston seal and dust seal.* • *L7 – L8 model: ☞(Page 4B-7)* • *L9 – model: ☞(Page 4B-9)*
Brake drags	Rusty part.	*Clean and lubricate. ☞(Page 0B-6)*
	Insufficient front brake lever or rear brake pedal pivot lubrication.	*Lubricate. ☞(Page 0B-6)*

Repair Instructions

Front Brake Light Switch Inspection

BENJ18K64106001

1) Disconnect the front brake light switch lead wire coupler (1).



IH18K1410005-01

2) Inspect the switch for continuity with a circuit tester. If any abnormality is found, replace the front brake light switch with a new one.

Color / Position	Terminal (B/G)	Terminal (B)
OFF		
ON	O————	————O

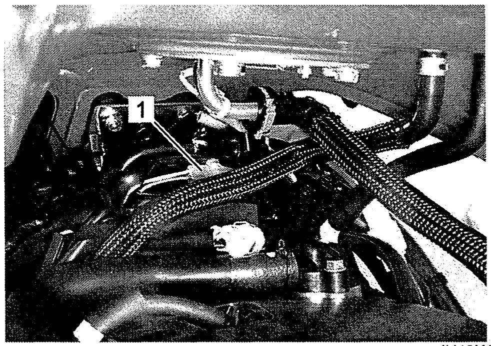
IH18K1410006-01

3) Connect the front brake light switch lead wire coupler.

Rear Brake Light Switch Inspection

BENJ18K64106002

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the rear brake light switch lead wire coupler (1).



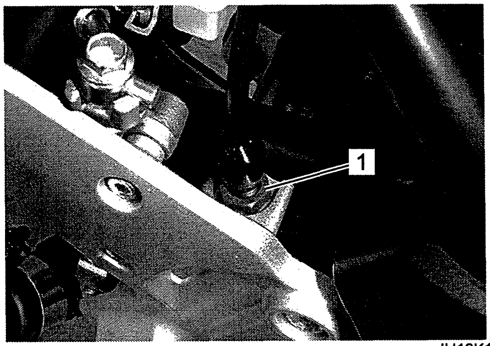
IH18K1410007-03

3) Inspect the switch for continuity with a circuit tester. If any abnormality is found, replace the rear brake light switch with a new one.
4) Connect the rear brake light switch lead wire coupler.
5) Install the fuel tank. ☞(Page 1G-9)

Rear Brake Light Switch Inspection and Adjustment

BENJ18K64106003

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.



IH18K1410008-01

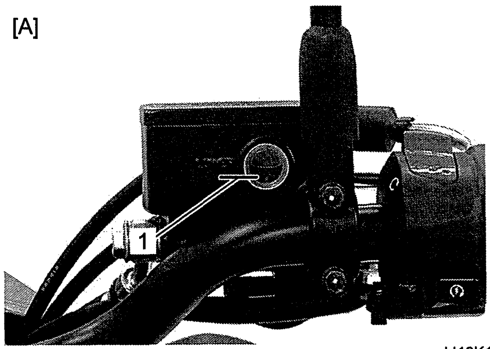
Brake Fluid Level Check

BENJ18K64106004

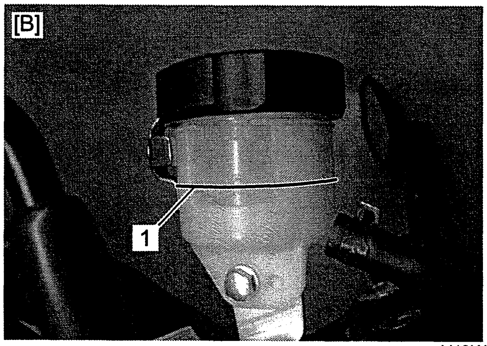
1) Keep the motorcycle upright and place the handlebars straight.
2) Check the brake fluid level by observing the lower limit lines (1) on the front and rear brake fluid reservoirs. When the brake fluid level is below the lower limit line, inspect for brake pad wear and leaks and replenish with brake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

Brake fluid (DOT 4)

[A]

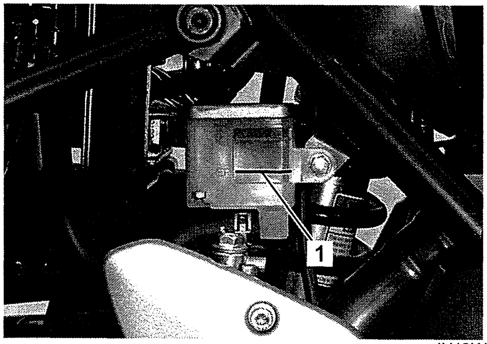


IJ18K1410003-01



IJ18K1410004-01

[A]: SV650/A	[B]: SV650XA



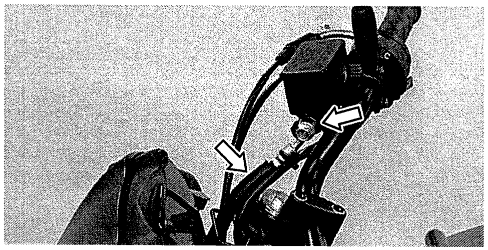
IH18K1410062-01

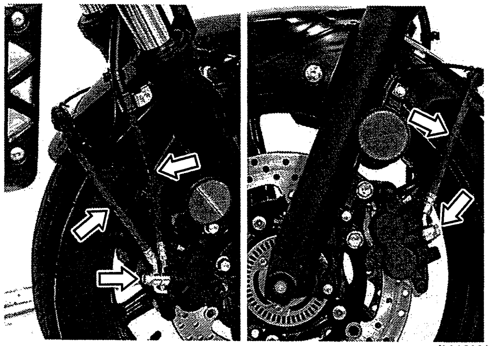
Brake Hose Inspection

BENJ18K64106005

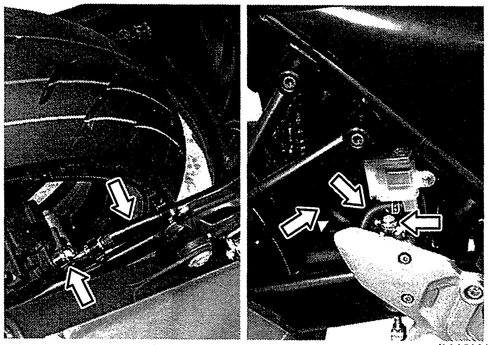
SV650/A

1) For ABS model, remove the air cleaner box and battery holder. Refer to “Air Cleaner Box Removal and Installation” in Section 1D (Page 1D-8) and “Battery Holder Removal and Installation” in Section 9D (Page 9D-26).
2) Inspect the brake hoses and hose joints for crack, damage or brake fluid leakage. If any defects are found, replace the brake hose with a new one.
   - Front: ☞(Page 4A-32)
   - Rear: ☞(Page 4A-33)

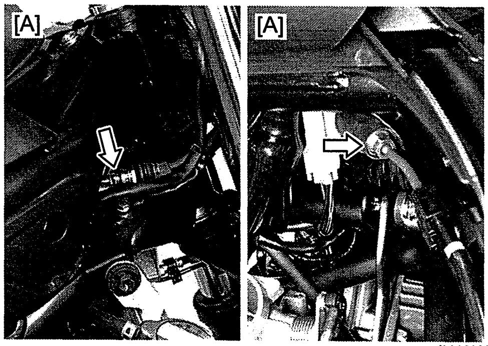




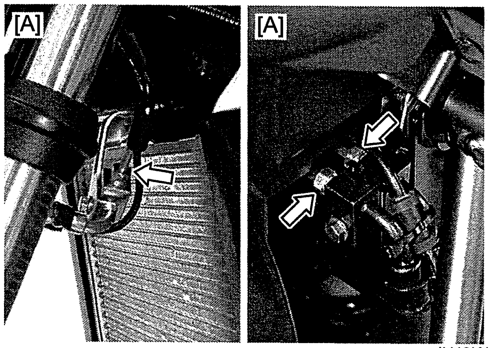
IH18K1410012-01



IH18K1410013-01

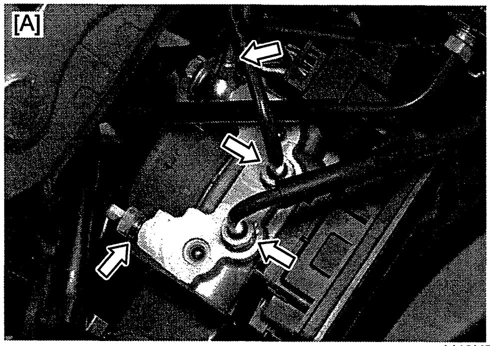


IH18K1410014-02



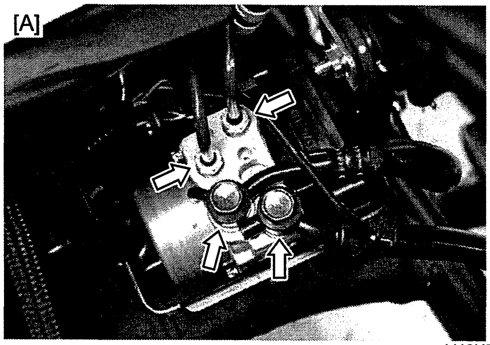
IH18K1410015-02

L7 – L8 model



IJ18K5410010-01

L9 – model



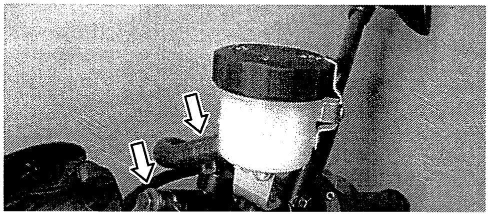
IJ18K5410011-02

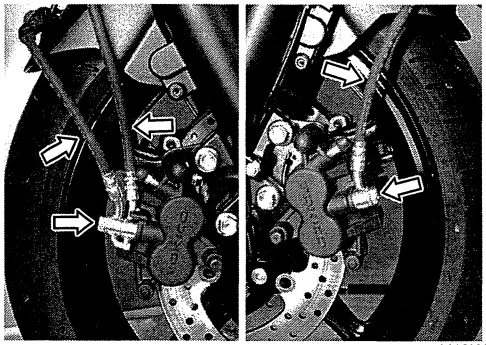
[A]: With ABS

3) Install the removed parts.

SV650XA

1) Remove the air cleaner box and battery holder. Refer to “Air Cleaner Box Removal and Installation” in Section 1D (Page 1D-8) and “Battery Holder Removal and Installation” in Section 9D (Page 9D-26).
2) Inspect the brake hoses and hose joints for crack, damage or brake fluid leakage. If any defects are found, replace the brake hose with a new one.
   - Front: ☞(Page 4A-32)
   - Rear: ☞(Page 4A-33)





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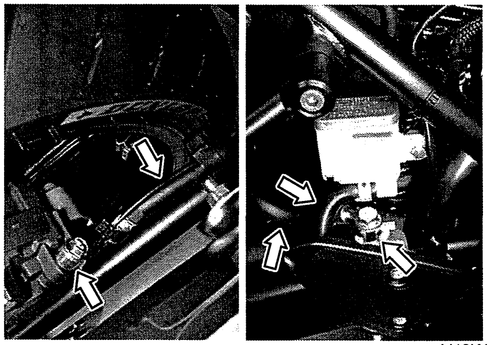
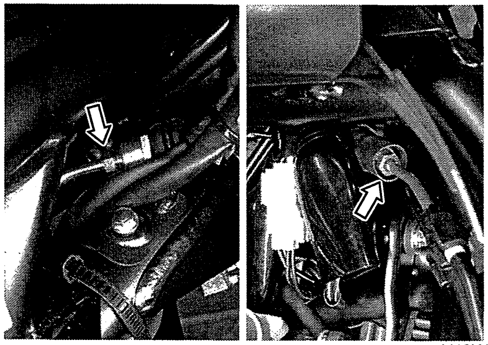


IJ18K1410007-01



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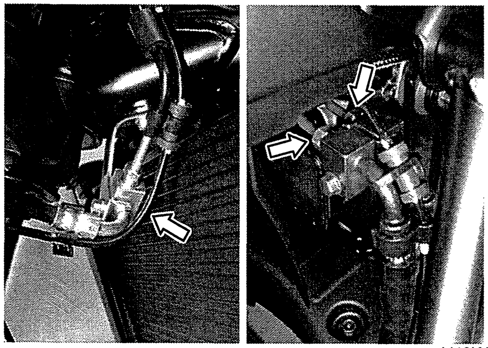
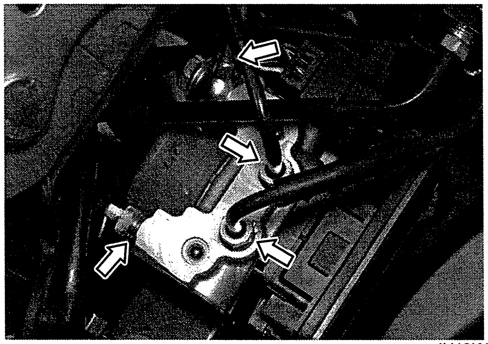


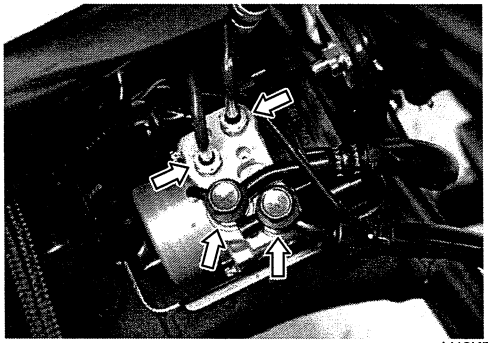
IJ18K1410009-01

L8 model



IH18K1410016-01

L9 – model



IJ18K5410013-02

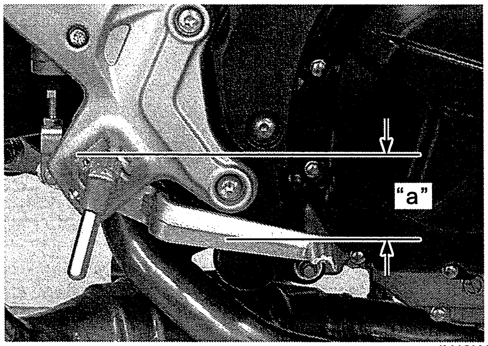
3) Install the removed parts.

Brake Pedal Height Inspection and Adjustment

BENJ18K64106006

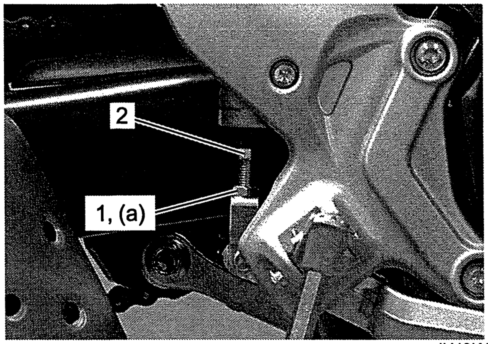
1) Inspect the brake pedal height “a” between the pedal top face and footrest.
   Adjust the brake pedal height if necessary.

   Rear brake pedal height
   [Standard]: 45 – 55 mm (1.8 – 2.1 in)



IH18K1410017-01

2) Loosen the lock-nut (1).



IH18K1410018-01

5) After finishing the brake pedal height inspection and adjustment, check the rear brake light switch.
   ☞(Page 4A-24)

Air Bleeding from Brake Line

BENJ18K64106007

Air trapped in the brake lines acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus greatly reduces the braking force. The presence of air bubbles is indicated by a “spongy” feel in the brake lever and low braking force. This condition is extremely dangerous, and therefore the air must be bled every time after replacing any parts in the brake lines in the following manner.

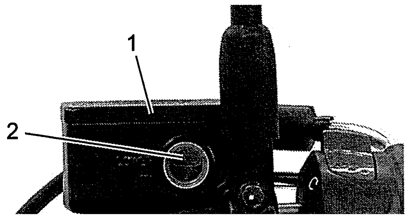
NOTE

It is essential to purge air from the fluid circuit before inspecting the function of the brake fluid pressure-decreasing mode. Without air bleeding, trapped air in the circuit will enter the HU.

Front Brake (SV650/A)

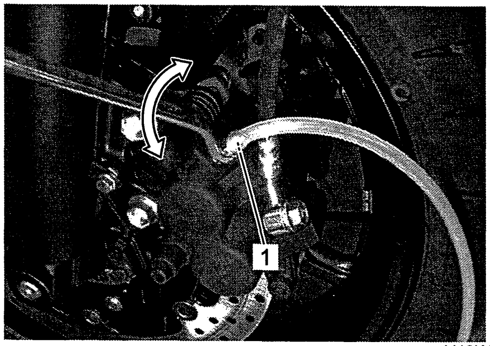
1) Place the motorcycle on a level surface and keep the handlebars straight.
2) Remove the reservoir cap (1) and diaphragm.
3) Fill the master cylinder reservoir with new brake fluid to the top of the inspection window (2). Place the reservoir cap to prevent dirt from entering.

   Brake fluid (DOT 4)



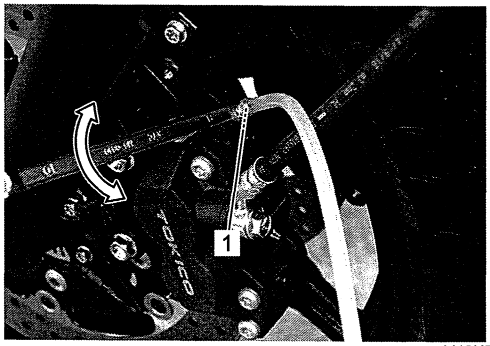
4) Attach a clear hose to the left side front brake caliper air bleeder valve (1), and insert the free end of the hose into a receptacle.
5) Operate the brake lever several times and, while holding the lever gripped, loosen the air bleeder valve (1) and drain the brake fluid into a receptacle.

L7 – L8 model



IJ18K1410011-01

L9 – model



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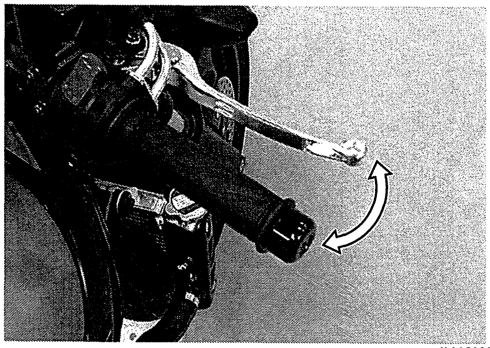


IH18K1410021-01

6) Tighten the air bleeder valve and release the brake lever slowly.
7) Repeat the steps 5) and 6) until the fluid is flowing out without bubbles.

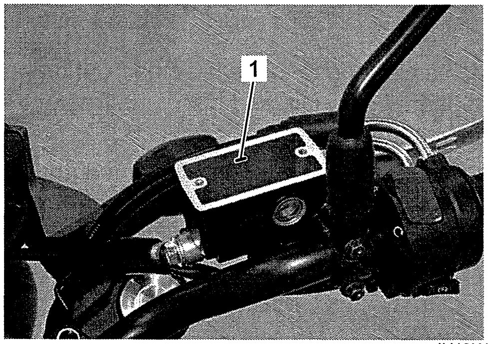
NOTE

While bleeding the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.

8) Tighten the air bleeder valve to the specified torque.

Tightening torque
Front brake air bleeder valve: 7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)

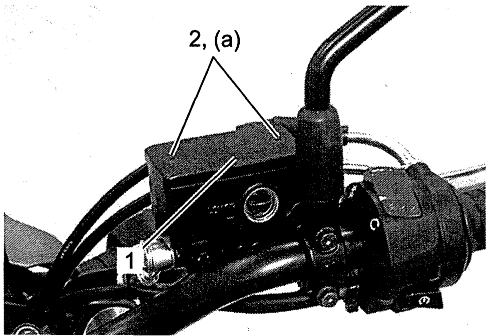
9) Bleed air from the right brake caliper side in the same manner as the left brake caliper side.
10) Fill the reservoir with new brake fluid to the upper line (1).



IH18K1410022-02

11) Install the diaphragm and reservoir cap (1).
12) Tighten the reservoir cap screws (2) to the specified torque.

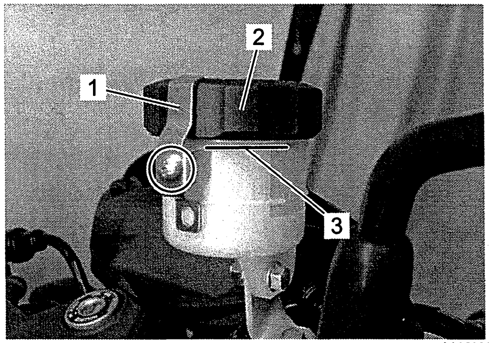
Tightening torque
Front reservoir cap screw (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)



Front Brake (SV650XA)

1) Place the motorcycle on a level surface and keep the handlebars straight.
2) Remove the reservoir tank cap plate (1).
3) Remove the reservoir cap (2) and diaphragm.
4) Fill the reservoir tank with new brake fluid to the upper line (3) of the reservoir tank. Place the reservoir cap to prevent dirt from entering.

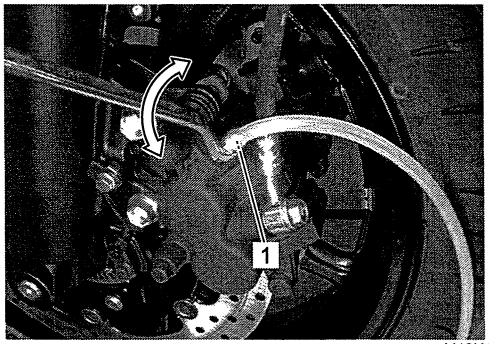
Brake fluid (DOT 4)



IJ18K1410010-01

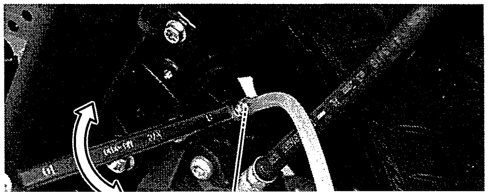
5) Attach a clear hose to the left side front brake caliper air bleeder valve (1), and insert the free end of the hose into a receptacle.
6) Operate the brake lever several times and, while holding the lever gripped, loosen the air bleeder valve (1) and drain the brake fluid into a receptacle.

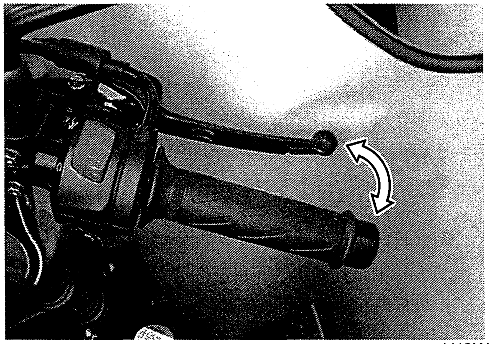
L8 model



IJ18K1410011-01

L9 – model




IJ18K1410012-01

7) Tighten the air bleeder valve and release the brake lever slowly.
8) Repeat the steps 6) and 7) until the fluid is flowing out without bubbles.

NOTE

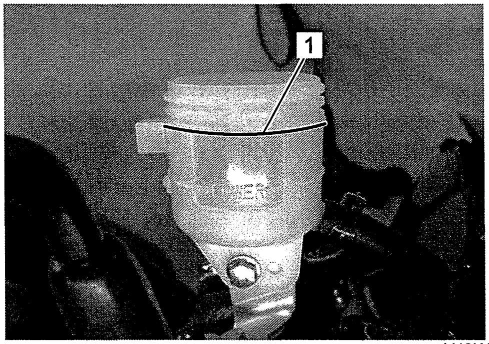
While bleeding the brake system, replenish the reservoir tank with the brake fluid as necessary to keep the fluid above the lower level.

---

9) Tighten the air bleeder valve to the specified torque.

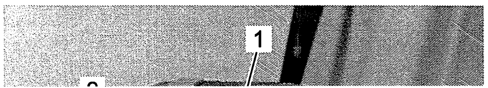
Tightening torque
Front brake air bleeder valve: 7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)

10) Bleed air from the right brake caliper side in the same manner as the left brake caliper side.
11) Fill the reservoir tank with new brake fluid to the upper line (1).



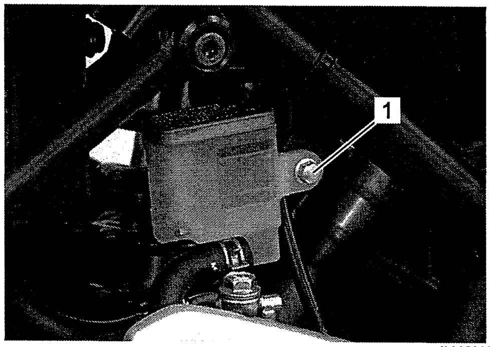
IJ18K1410013-01

12) Install the diaphragm, reservoir cap (1) and reservoir tank cap plate (2).



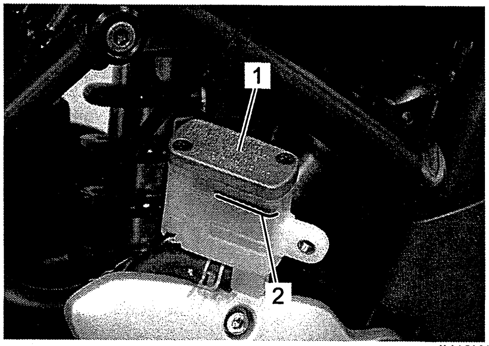
Rear Brake

1) Place the motorcycle on a level surface.
2) Remove the reservoir tank mounting bolt (1).



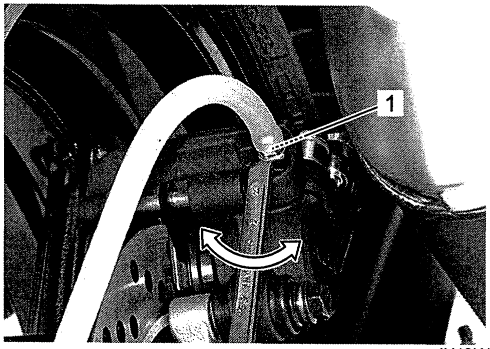
IH18K1410024-01

3) Remove the reservoir cap and diaphragm (1).
4) Fill the reservoir with new brake fluid up to the upper level (2) of the reservoir. Place the reservoir cap to prevent dirt from entering.

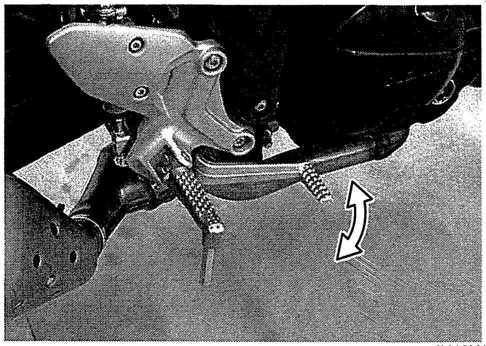


IH18K1410025-01

5) Attach a clear hose to the air bleeder valve (1), and insert the free end of the hose into a receptacle.
6) Operate the brake pedal several times and, while pushing the pedal, loosen the air bleeder valve (1) and drain the brake fluid into a receptacle.



IH18K1410026-01



IH18K1410027-01

7) Tighten the air bleeder valve and release the brake pedal slowly.
8) Repeat the steps 6) and 7) until the fluid is flowing out without bubbles.

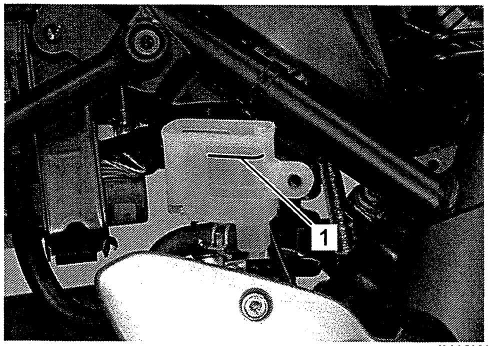
NOTE

While bleeding the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.

9) Tighten the air bleeder valve to the specified torque.

Tightening torque
Rear brake air bleeder valve: 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)

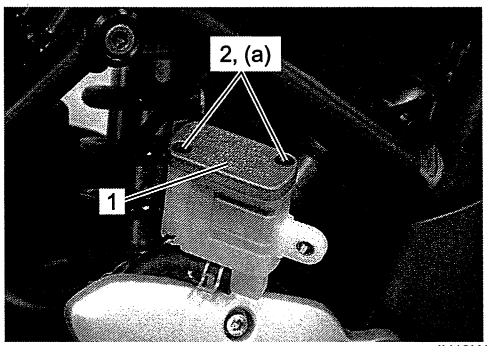
10) Fill the reservoir with new brake fluid to the upper level (1) of the reservoir.



IH18K1410028-01

11) Install the diaphragm and reservoir cap (1).
12) Tighten the reservoir cap screws (2) to the specified torque.

Tightening torque
Rear reservoir cap screw (a): 1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)



IH18K1410029-01

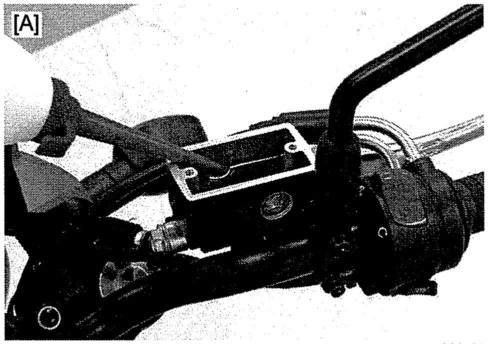
13) Install the reservoir tank. Refer to “Rear Brake Hose Routing Diagram” (Page 4A-18).

Brake Fluid Replacement

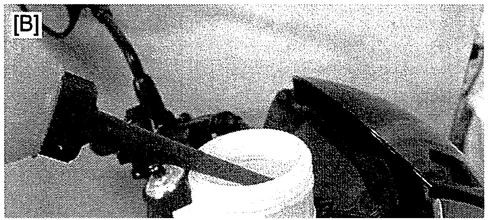
BENJ18K64106008

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.



IJ18K1410015-01



4) Fill the reservoir with new brake fluid.

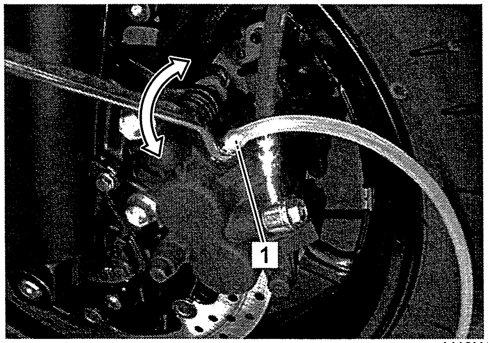
Brake fluid (DOT 4)

5) Attach a clear hose to the air bleeder valve (1) and insert the free end of the hose into a receptacle.
6) Loosen the air bleeder valve (1), squeeze and release the brake lever and drain the old brake fluid out of the brake system.

NOTE

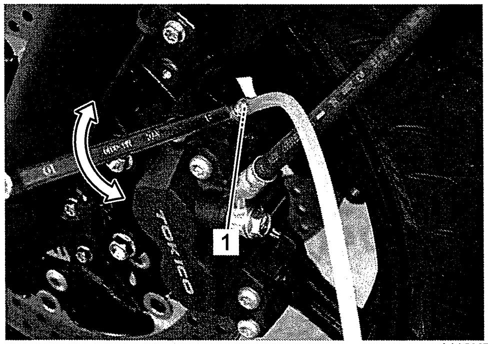
While replacement the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.

L7 – L8 model

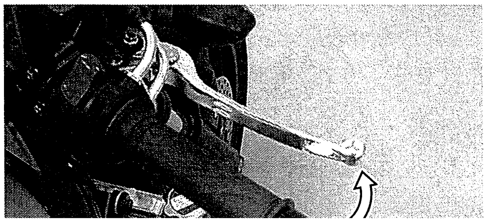


IJ18K1410011-01

L9 – model

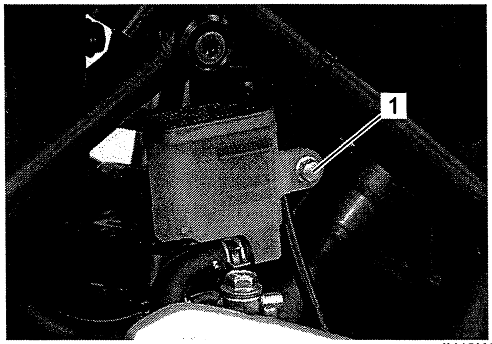


IJ18K5410012-02



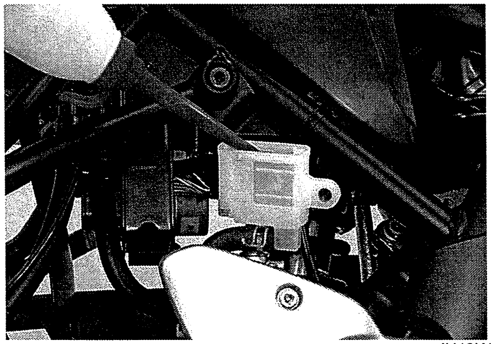
Rear Brake

1) Place the motorcycle on a level surface.
2) Remove the reservoir tank mounting bolt (1).



IH18K1410032-01

3) Remove the brake fluid reservoir cap and diaphragm.
4) Suck up the old brake fluid as much as possible.



IH18K1410033-01

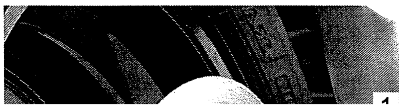
5) Fill the reservoir with new brake fluid.

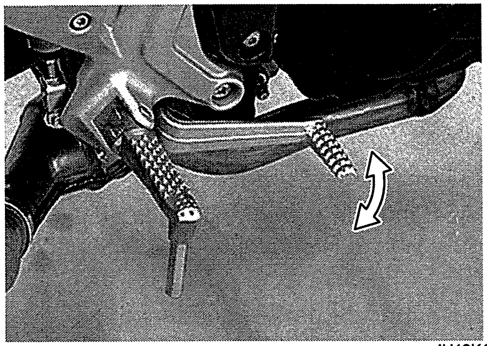
Brake fluid (DOT 4)

6) Attach a clear hose to the air bleeder valve (1) and insert the free end of the hose into a receptacle.
7) Loosen the air bleeder valve (1) and pump the brake pedal until the old brake fluid flows out of the brake system.

NOTE

While replacement the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.





IH18K1410035-02

8) Bleed the air from the rear brake system. ☞(Page 4A-27)

Front Brake Hose Removal and Installation

BENJ18K64106009

Refer to “Front Brake Hose Routing Diagram” (Page 4A-1).

Removal

1) Drain brake fluid. ☞(Page 4A-31)
2) For ABS model, remove the fuel tank. ☞(Page 1G-9)
3) For ABS model, remove the battery holder. Refer to “Battery Holder Removal and Installation” in Section 9D (Page 9D-26).
4) For ABS model, remove the air cleaner box. ☞(Page 1D-8)
5) For ABS model, remove the PAIR control solenoid valve (If equipped). ☞(Page 1B-12)
6) Remove the front brake hoses.

Installation

1) Install the front brake hoses.
2) Bleed air from the front brake system. ☞(Page 4A-27)
3) For ABS model, install the PAIR control solenoid valve (If equipped). ☞(Page 1B-12)
4) For ABS model, install the air cleaner box. ☞(Page 1D-8)
5) For ABS model, install the battery holder. Refer to “Battery Holder Removal and Installation” in Section 9D (Page 9D-26).
6) For ABS model, install the fuel tank. ☞(Page 1G-9)

Rear Brake Hose Removal and Installation

BENJ18K64106010

Refer to “Rear Brake Hose Routing Diagram” (Page 4A-18).

Removal

1) Drain brake fluid. ☞(Page 4A-31)
2) For ABS model, remove the battery holder. Refer to “Battery Holder Removal and Installation” in Section 9D (Page 9D-26).
3) Remove the rear brake hoses.

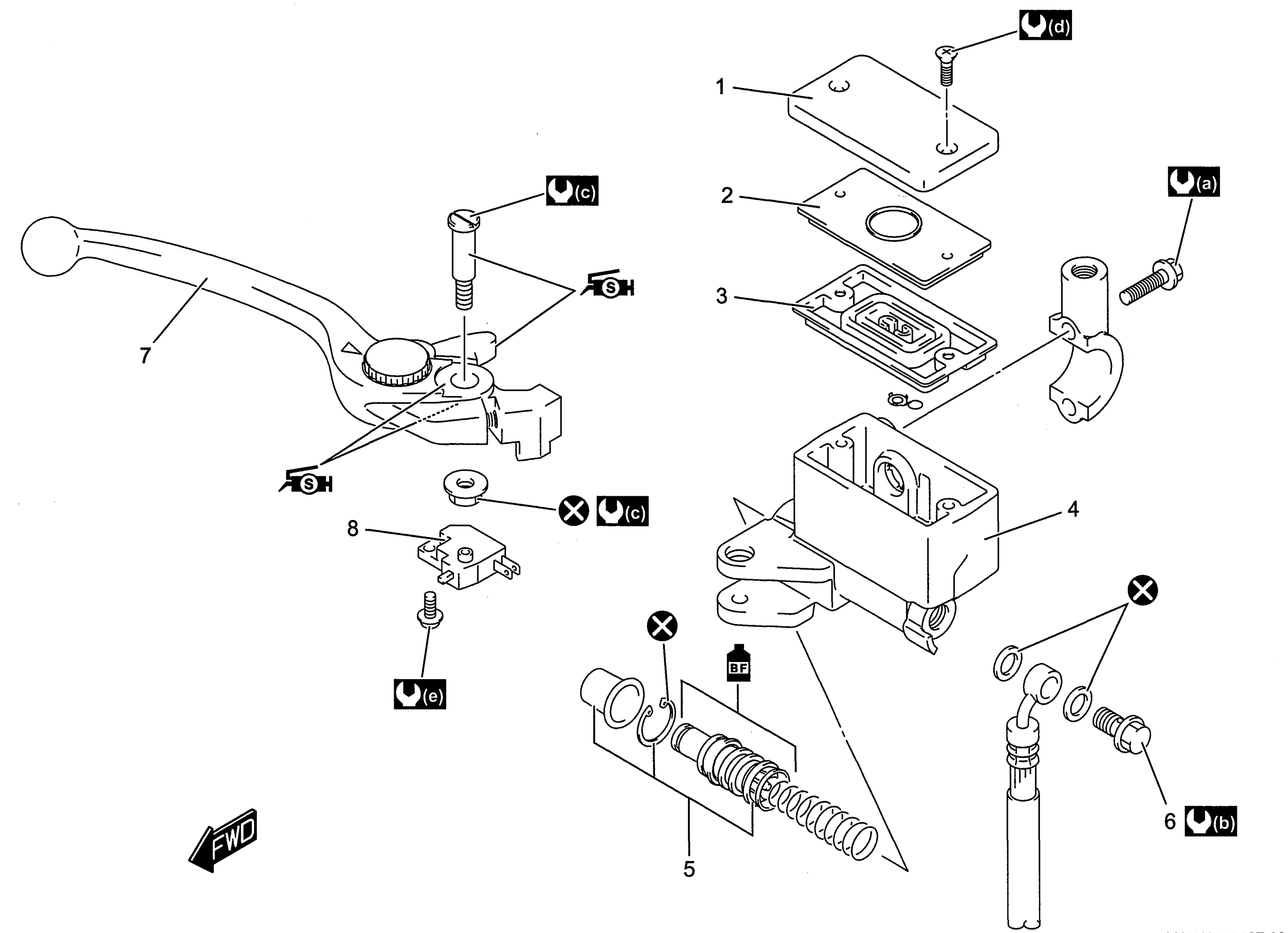
Installation

1) Install the rear brake hoses.
2) Bleed air from the rear brake system. ☞(Page 4A-27)
3) For ABS model, install the battery holder. Refer to “Battery Holder Removal and Installation” in Section 9D (Page 9D-26).

Front Brake Master Cylinder Assembly / Brake Lever Components

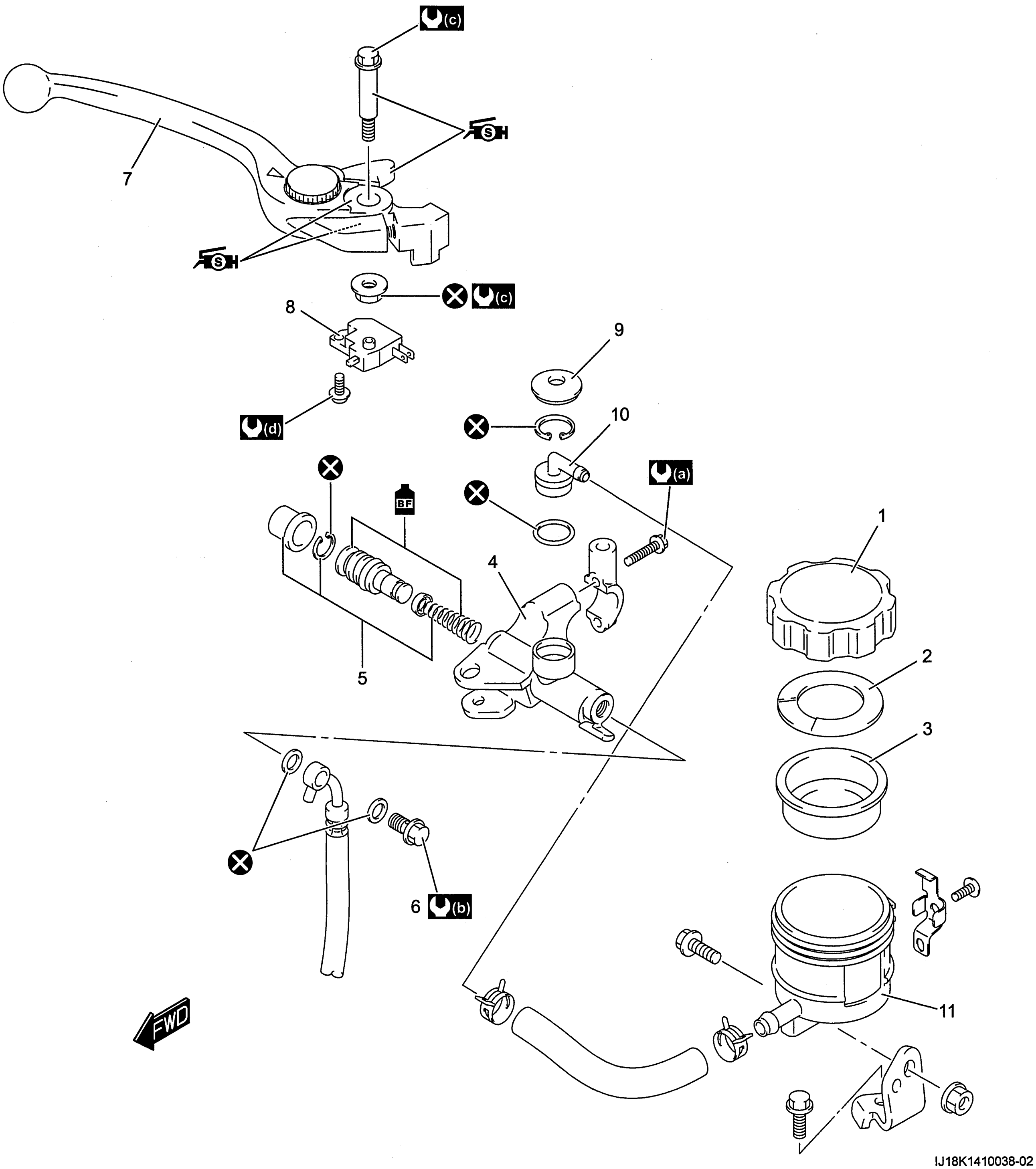
BENJ18K64106011

SV650/A



IJ18K1410037-02

1. Reservoir cap	7. Brake lever	(e) : 1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)
2. Plate	8. Brake light switch	SH : Apply silicone grease.
3. Diaphragm	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	BF : Apply brake fluid.
4. Master cylinder	[illegible]	[illegible]



1. Reservoir cap	7. Brake lever	(b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Plate	8. Brake light switch	(c): 5.9 N·m (0.60 kgf-m, 4.35 lbf-ft)
3. Diaphragm	9. Dust rubber	(d): 1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)

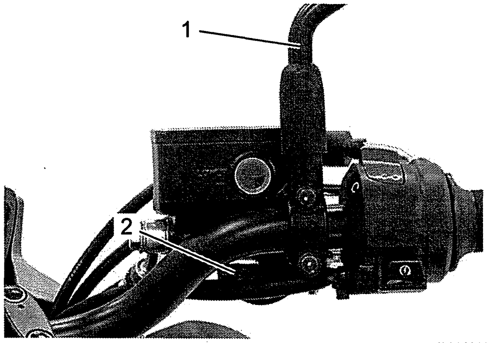
Front Brake Master Cylinder Assembly Removal and Installation

BENJ18K64106012

SV650/A

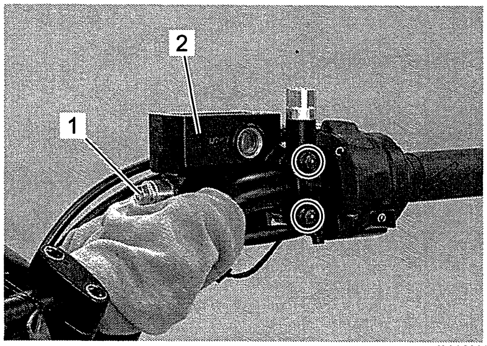
Removal

1) Remove the right rear view mirror (1).
2) Disconnect the front brake light switch lead wire coupler (2).
3) Drain brake fluid. ☞(Page 4A-31)



IH18K1410036-01

4) Place a clean rag underneath the brake hose union bolt (1) on the master cylinder to catch any spilt brake fluid.
5) Remove the brake hose union bolt (1) and disconnect the brake hose.
6) Remove the master cylinder assembly (2).



IH18K1410037-01

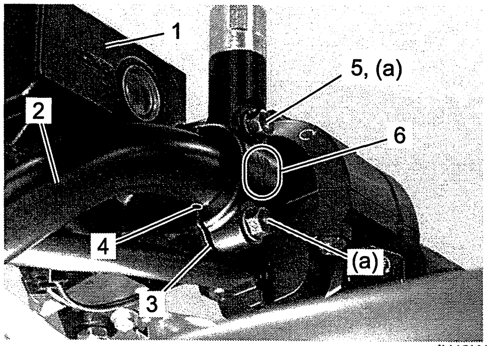
Installation

Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

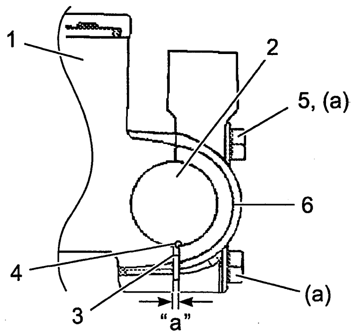
- When installing the master cylinder assembly (1) onto the handlebars (2), align the edge (3) of master cylinder with the punch mark (4) on the handlebars (2) and tighten the upper bolt (5) first.

NOTE

Tightening torque
Front brake master cylinder holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1410038-02

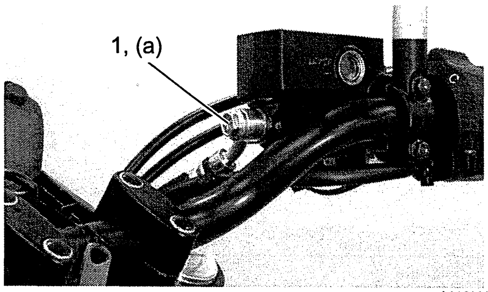


IF04K1410071-02

"a": Clearance

- Install the brake hose union bolt and new seal washers to brake hose.
- After the brake hose union has contacted the stopper, tighten the union bolt (1) to the specified torque.

Tightening torque
Brake hose union bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



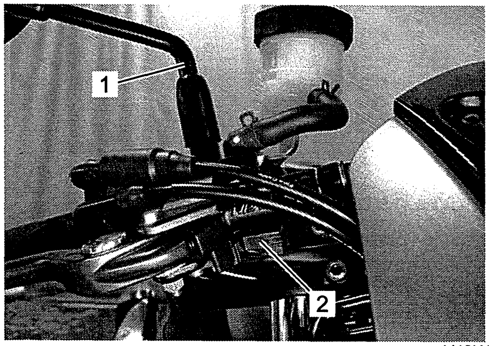
IJ18K1410017-01

- Bleed air from the brake system. ☞(Page 4A-27)

SV650XA

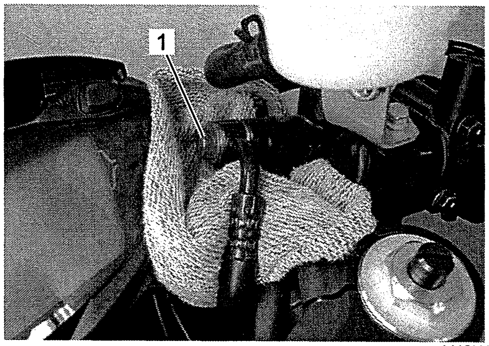
Removal

1) Remove the right rear view mirror (1). ☞(Page 9D-19)
2) Disconnect the front brake light switch lead wire coupler (2).
3) Drain brake fluid. ☞(Page 4A-31)



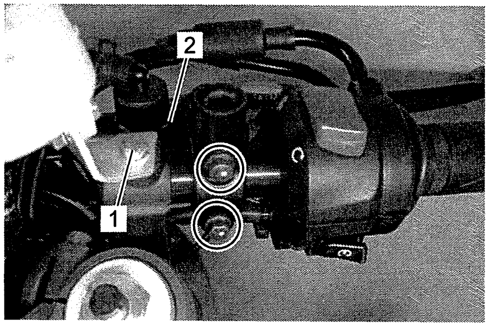
IJ18K1410018-01

4) Place a clean rag underneath the brake hose union bolt (1) on the master cylinder to catch any spilt brake fluid.
5) Remove the brake hose union bolt (1) and disconnect the brake hose.



IJ18K1410019-01

6) Remove the reservoir tank bolt (1) and master cylinder assembly (2).



Installation

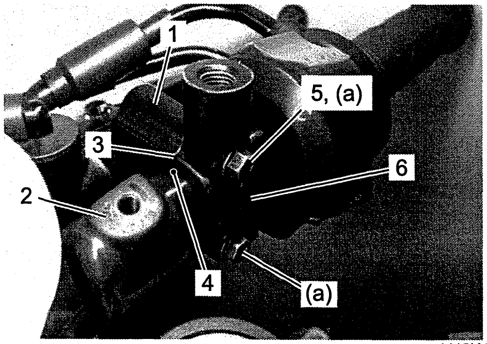
Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

- When installing the front brake master cylinder assembly (1) onto the right handlebar (2), align the edge (3) of master cylinder with the punch mark (4) on the right handlebar (2) and tighten the upper bolt (5) first.

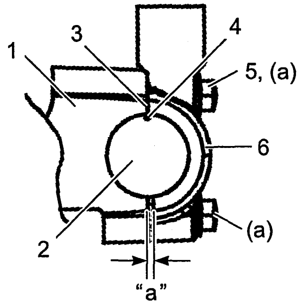
NOTE

Face the up mark (6) upward.

Tightening torque
Front brake master cylinder holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IJ18K1410021-01

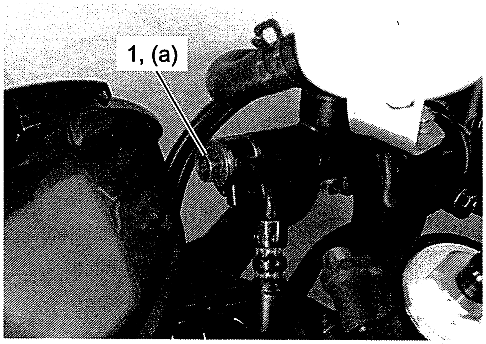


IJ18K1410022-02

"a": Clearance

- Install the brake hose union bolt and new seal washers to brake hose.
- After the brake hose union has contacted the stopper, tighten the union bolt (1) to the specified torque.

Tightening torque
Brake hose union bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IJ18K1410024-01

- Bleed air from the brake system. ☞(Page 4A-27)
- Install the right rear view mirror. ☞(Page 9D-19)

Front Brake Master Cylinder Assembly / Brake Lever Disassembly and Reassembly

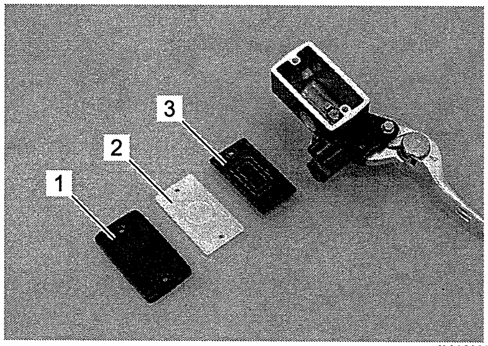
BENJ18K64106013

Refer to “Front Brake Master Cylinder Assembly Removal and Installation” (Page 4A-35).

SV650/A

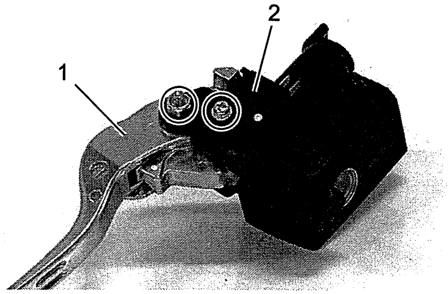
Disassembly

1) Remove the reservoir cap (1), plate (2) and diaphragm (3).



IH18K1410040-01

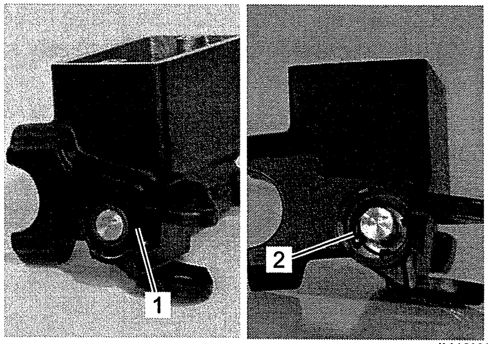
2) Remove the brake lever (1) and brake light switch (2).



IH18K1410041-01

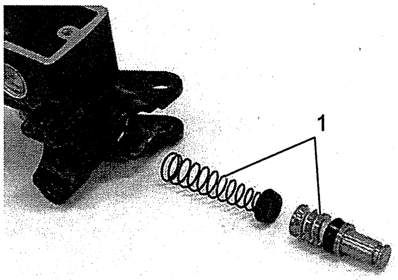
3) Remove the dust boot (1).
4) Remove the snap ring (2) with the special tool.

Special tool
09900–06108



IH18K1410042-01

5) Remove the piston/cup set (1) from the master cylinder.



IJ18K1410025-02

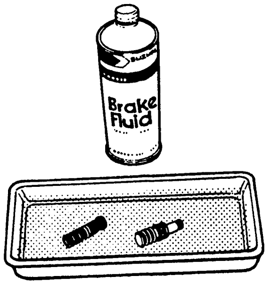
Reassembly

Reassemble the front brake master cylinder and brake lever in the reverse order of disassembly. Pay attention to the following points:

NOTICE

- **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.**

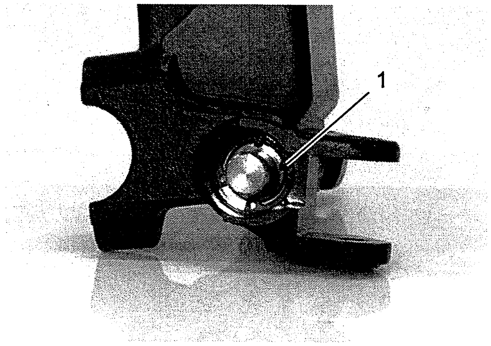
Brake fluid (DOT 4)



I649G1410024-02

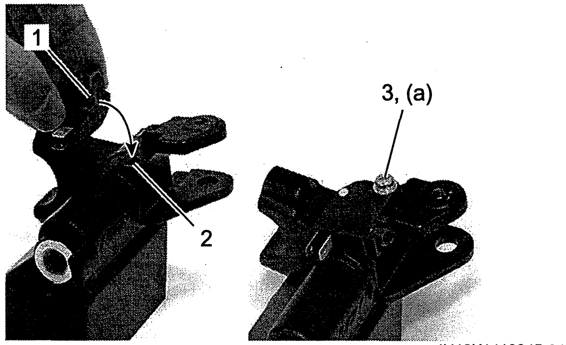
- Install the new snap ring (1) with the special tool.

Special tool
09900–06108



IH18K1410044-01

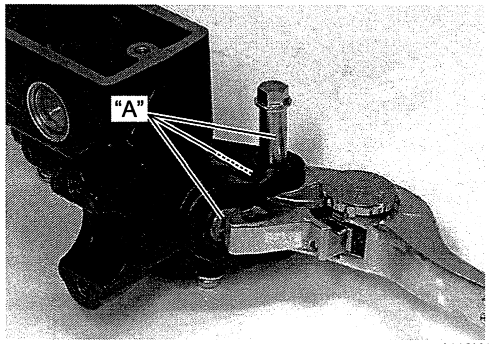
- When installing the brake light switch, align the projection (1) on the switch with the hole (2) in the master cylinder.
- Tighten the brake light switch screw (3) to the



IH18K1410045-01

- Apply grease to the contact point between push rod and brake lever.
- Apply grease to the brake lever pivot bolt and brake lever sliding surfaces.

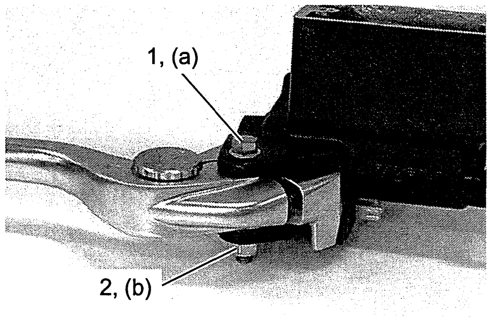
"A": Grease 99000–25100 (SUZUKI SILICONE GREASE)



IJ18K1410039-01

- Tighten the pivot bolt (1) and new lock-nut (2) to the specified torque.

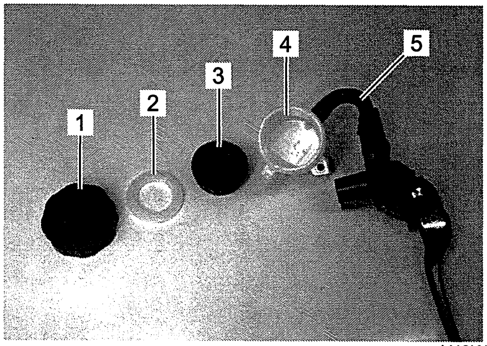
Tightening torque
Brake lever pivot bolt (a): 5.9 N·m (0.60 kgf-m, 4.35 lbf-ft)
Brake lever pivot bolt lock-nut (b): 5.9 N·m (0.60 kgf-m, 4.35 lbf-ft)



SV650XA

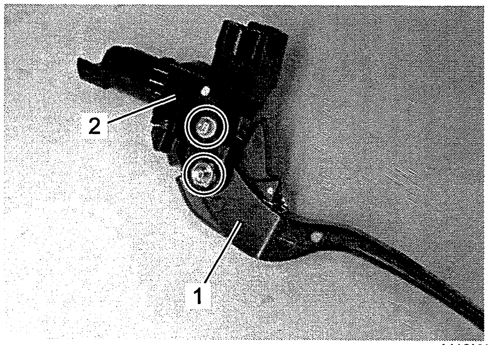
Disassembly

1) Remove the reservoir cap (1), plate (2), diaphragm (3), reservoir tank (4) and reservoir tank hose (5).



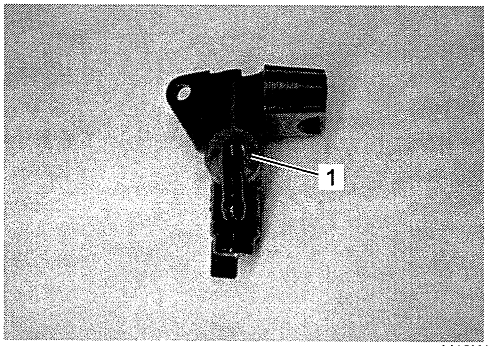
IJ18K1410026-01

2) Remove the brake lever (1) and brake light switch (2).



IJ18K1410027-01

3) Remove the dust rubber (1).

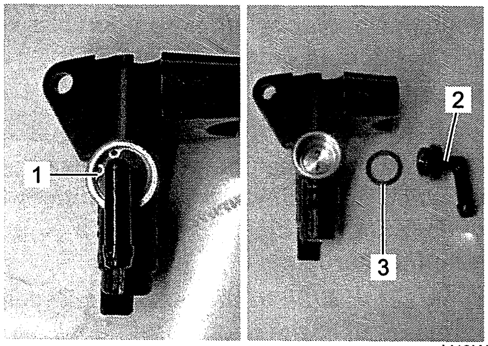


IJ18K1410028-01

4) Remove the snap ring (1) with the special tool.

Special tool
09900–06108

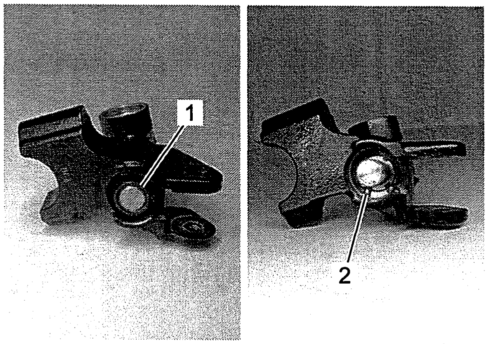
5) Remove the connector (2) and O-ring (3).



IJ18K1410029-01

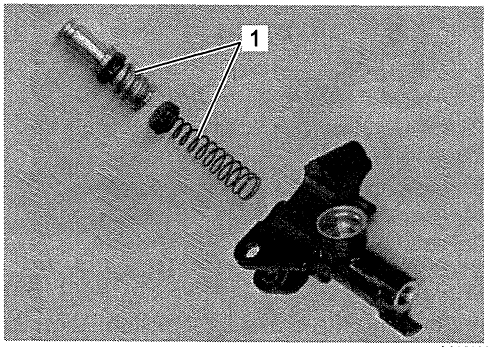
6) Remove the dust boot (1).
7) Remove the snap ring (2) with the special tool.

Special tool
09900–06108



IJ18K1410030-01

8) Remove the piston/cup set (1) from the master cylinder.



IJ18K1410031-02

Reassembly

Reassemble the front brake master cylinder and brake lever in the reverse order of disassembly. Pay attention to the following points:

NOTICE

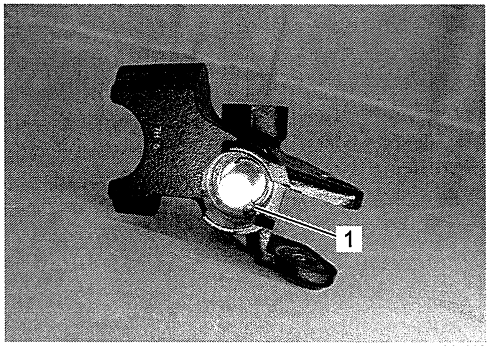
- **Wash the master cylinder components with new brake fluid before reassembly.**
- **Do not wipe the brake fluid off after washing the components.**
- **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
- **Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.**

Brake fluid (DOT 4)

I649G1410024-02

- Install the new snap ring (1) with the special tool.

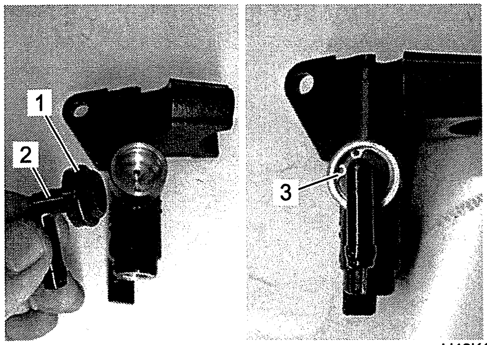
Special tool
09900–06108



IJ18K1410032-01

- Install the new O-ring (1) to the connector (2).
- Install the new snap ring (3) with the special tool.

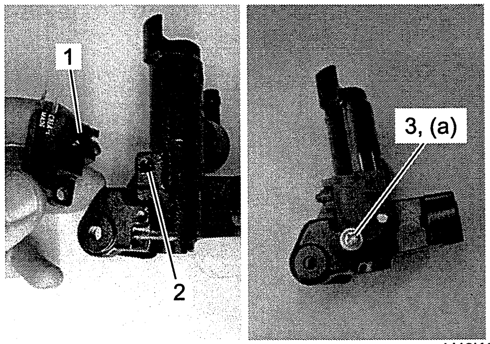
Special tool
09900–06108



IJ18K1410033-01

- When installing the brake light switch, align the projection (1) on the switch with the hole (2) in the master cylinder.
- Tighten the brake light switch screw (3) to the specified torque.

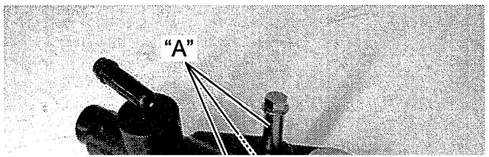
Tightening torque
Brake light switch screw (a): 1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)



IJ18K1410034-01

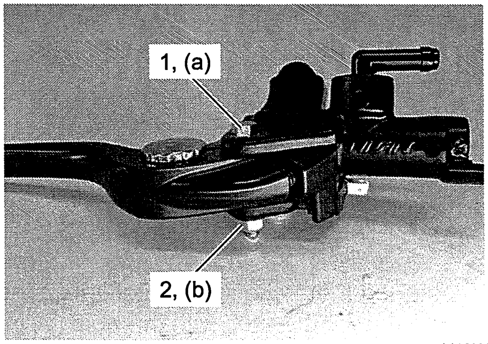
- Apply grease to the contact point between push rod and brake lever.
- Apply grease to the brake lever pivot bolt and brake lever sliding surfaces.

"A": Grease 99000–25100 (SUZUKI SILICONE GREASE)



- Tighten the pivot bolt (1) and new lock-nut (2) to the specified torque.

  Tightening torque
  Brake lever pivot bolt (a): 5.9 N·m (0.60 kgf-m, 4.35 lbf-ft)
  Brake lever pivot bolt lock-nut (b): 5.9 N·m (0.60 kgf-m, 4.35 lbf-ft)



IJ18K1410036-01

- Install the reservoir tank and reservoir tank hose. Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).

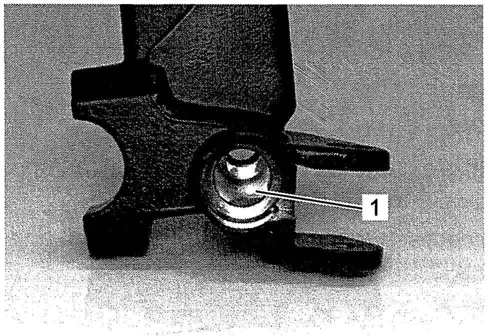
Front Brake Master Cylinder Parts Inspection

BENJ18K64106014

Refer to "Front Brake Master Cylinder Assembly / Brake Lever Disassembly and Reassembly" (Page 4A-37).

Master Cylinder

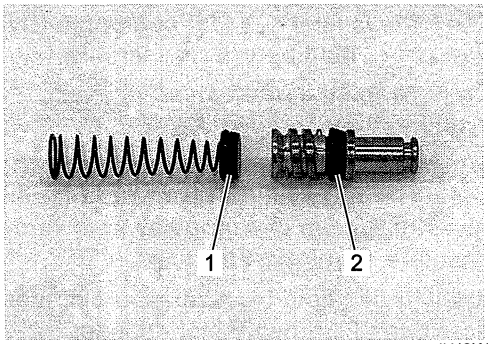
Inspect the master cylinder bore (1) for any scratches corrosion or other damage. If any damage is found, replace it with a new one.



IH18K1410048-01

Piston / Cup Set

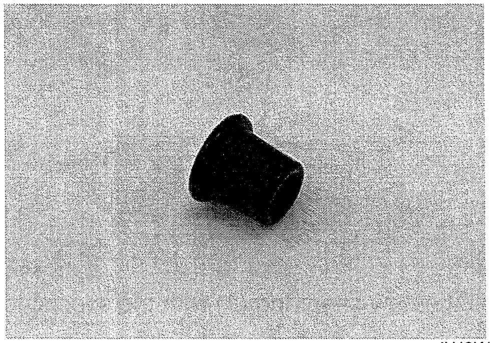
Inspect the piston/cup set surface for any scratches or other damage. Inspect the primary cup (1) and secondary cup (2) for wear or damage. If any damage is found, replace the piston/cup with new one.



IH18K1410049-01

Dust Boot

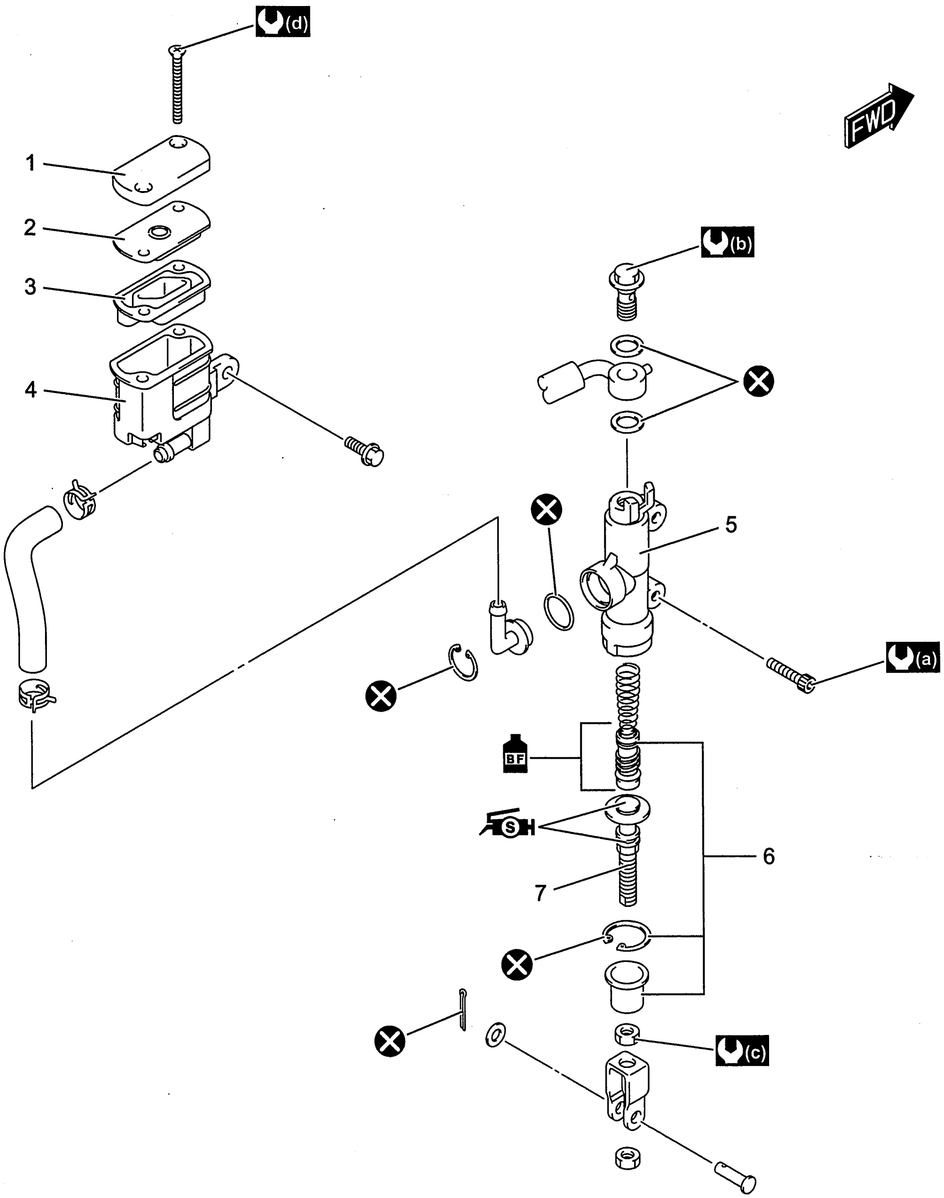
Inspect the dust boot for wear or damage. If any defects are found, replace it with a new one.



IH18K1410050-01

Rear Brake Master Cylinder Assembly Components

BENJ18K64106015



IH18K1410069-01

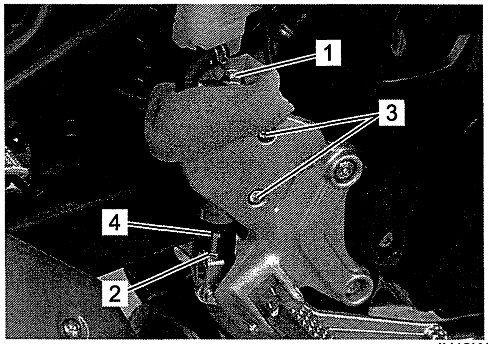
1. Reservoir cap	6. Piston/Cup set	(d) : 1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)
2. Plate	7. Push rod	S : Apply silicone grease.
3. Diaphragm	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	BF : Apply brake fluid.
4. Reservoir tank	(b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)	⊗ : Do not reuse.
5. Master cylinder	(c) : 18 N·m (1.8 kgf-m, 13.5 lbf-ft)	

Rear Brake Master Cylinder Assembly Removal and Installation

BENJ18K64106016

Removal

1) Drain brake fluid. ☞(Page 4A-31)
2) Place a clean rag underneath the brake hose union bolt (1) on the master cylinder to catch any spilt brake fluid.
3) Remove the brake hose union bolt (1) and disconnect the brake hose.
4) Loosen the lock-nut (2).
5) Remove the master cylinder mounting bolts (3).
6) Remove the master cylinder with the reservoir by turning the push rod (4).



IH18K1410051-02

Installation

Install the rear brake master cylinder in the reverse order of removal. Pay attention to the following points:

- Tighten the master cylinder mounting bolts (1) to the specified torque.

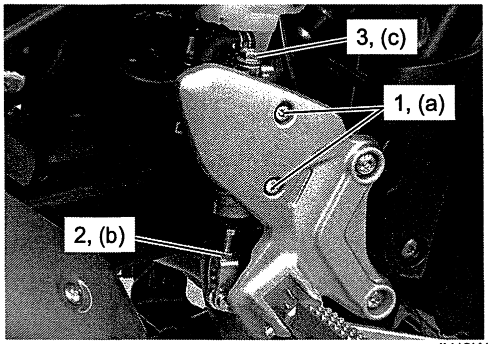
  Tightening torque
  Rear brake master cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- Tighten the lock-nut (2) to the specified torque.

  Tightening torque
  Rear brake master cylinder rod lock-nut (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)

- Install the brake hose union bolt (3) and new seal washers to the brake hose.
- After the brake hose union has contacted the stopper, tighten the union bolt (3) to the specified torque.

  Tightening torque
  Brake hose union bolt (c): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1410052-01

- Install the reservoir tank. Refer to “Rear Brake Hose Routing Diagram” (Page 4A-18).
- Bleed air from the system after installing the master cylinder. ☞(Page 4A-27)
- Adjust the brake pedal height. ☞(Page 4A-27)

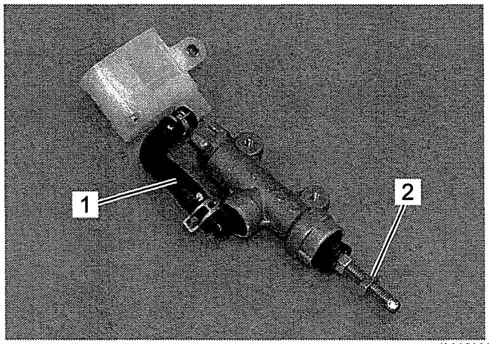
Rear Brake Master Cylinder Disassembly and Reassembly

BENJ18K64106017

Refer to “Rear Brake Master Cylinder Assembly Removal and Installation” (Page 4A-43).

Disassembly

1) Disconnect the reservoir hose (1).
2) Remove the lock-nut (2).

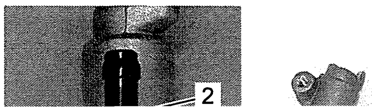


IH18K1410053-01

3) Remove the snap ring (1) with the special tool.

   Special tool
   09900–06108

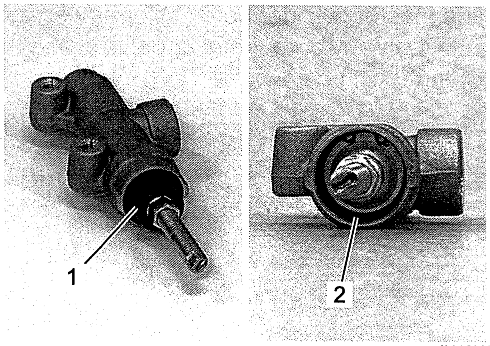
4) Remove the brake hose connector (2) and O-ring (3).



5) Remove the dust boot (1).

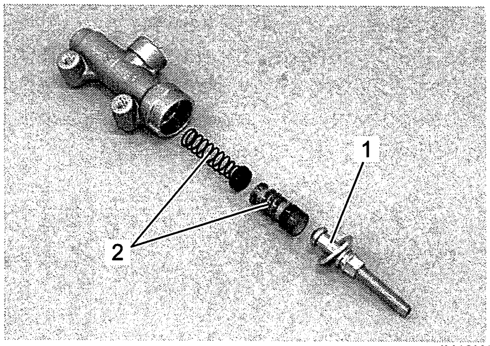
6) Remove the snap ring (2) with the special tool.

Special tool
09900–06108



IH18K1410055-01

7) Remove the following parts from the master cylinder.
   - Push rod (1)
   - Piston/cup set (2)



IH18K1410056-01

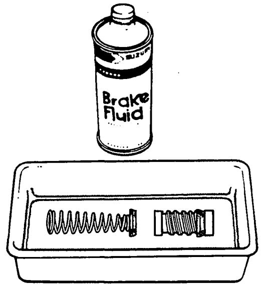
Reassembly

Reassemble the rear brake master cylinder in the reverse order of disassembly. Pay attention to the following points:

NOTICE

- **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**

Brake fluid (DOT 4)



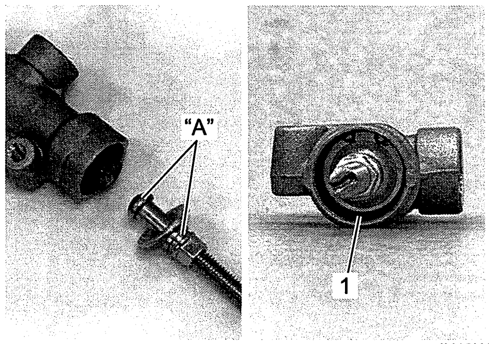
IB14J1410051-02

- Apply grease to the push rod.

  "A": Grease 99000–25100 (SUZUKI SILICONE GREASE)

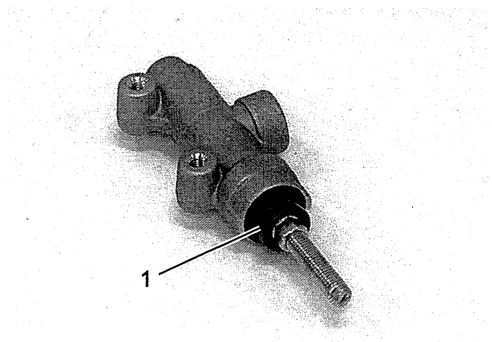
- Install the new snap ring (1) with the special tool.

  Special tool
  09900–06108



IH18K1410057-01

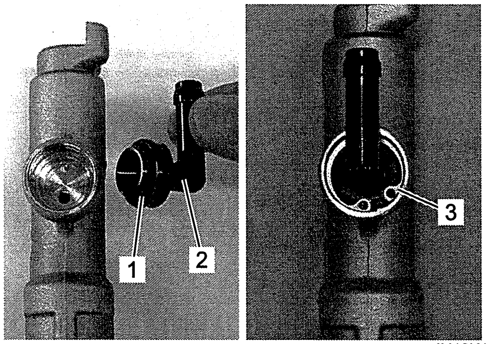
- Set the dust boot (1) to the master cylinder securely.



IH18K1410058-01

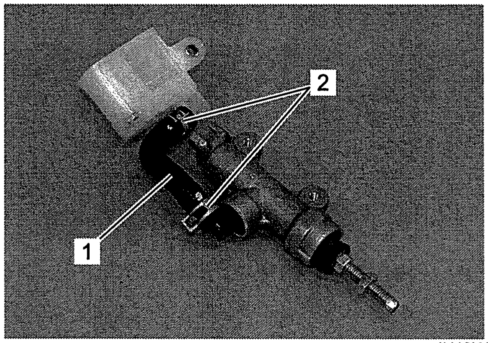
- Install the new O-ring (1) to the brake hose connector (2).
- Install the new snap ring (3) with the special tool.

Special tool
09900–06108



IH18K1410059-01

- Connect the reservoir hose (1) and set the clamps (2). Refer to “Rear Brake Hose Routing Diagram” (Page 4A-18).



IH18K1410060-01

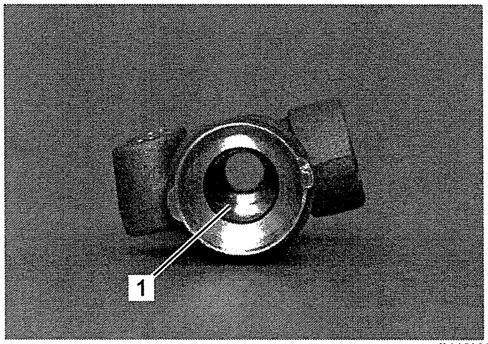
Rear Brake Master Cylinder Parts Inspection

BENJ18K64106018

Refer to “Rear Brake Master Cylinder Disassembly and Reassembly” (Page 4A-43).

Master Cylinder

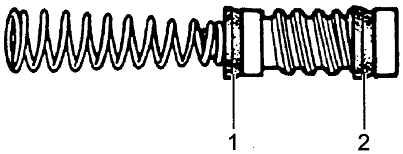
Inspect the master cylinder bore (1) for any scratches or other damage. If any damage is found, replace the master cylinder with a new one.



IH18K1410061-01

Piston / Cup Set

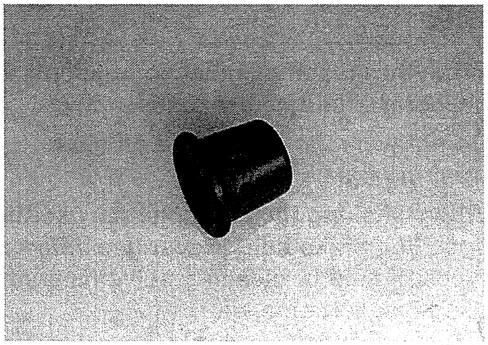
Inspect the piston surface for any scratches or other damage. Inspect the primary cup (1) and secondary cup (2) for wear or damage. If any damage is found, replace the piston/cup with new ones.



IF04K1410069-02

Dust Boot

Inspect the dust boot for wear or damage. If any defects are found, replace it with a new one.



IF04K1410070-01

Specifications

Tightening Torque Specifications

BENJ18K64107001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear brake master cylinder rod lock-nut	18	1.8	13.5	☞(Page 4A-27) / ☞(Page 4A-43)
Front brake air bleeder valve	7.5	0.76	5.55	☞(Page 4A-28) / ☞(Page 4A-29)
Front reservoir cap screw	1.5	0.15	1.10	☞(Page 4A-28)
Rear brake air bleeder valve	6.0	0.61	4.45	☞(Page 4A-30)
Rear reservoir cap screw	1.2	0.12	0.90	☞(Page 4A-31)
Front brake master cylinder holder bolt	10	1.0	7.5	☞(Page 4A-35) / ☞(Page 4A-36)
Brake hose union bolt	23	2.3	17.0	☞(Page 4A-35) / ☞(Page 4A-37) / ☞(Page 4A-43)
Brake light switch screw	1.2	0.12	0.90	☞(Page 4A-38) / ☞(Page 4A-40)
Brake lever pivot bolt	5.9	0.60	4.35	☞(Page 4A-38) / ☞(Page 4A-41)
Brake lever pivot bolt lock-nut	5.9	0.60	4.35	☞(Page 4A-38) / ☞(Page 4A-41)
Rear brake master cylinder mounting bolt	10	1.0	7.5	☞(Page 4A-43)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Front Brake Hose Routing Diagram" (Page 4A-1)
"Rear Brake Hose Routing Diagram" (Page 4A-18)
"Front Brake Master Cylinder Assembly / Brake Lever Components" (Page 4A-33)
"Rear Brake Master Cylinder Assembly Components" (Page 4A-42)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K64108001

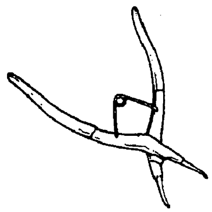
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4A-24) / ☞(Page 4A-27) / ☞(Page 4A-29) / ☞(Page 4A-31) / ☞(Page 4A-32) / ☞(Page 4A-38) / ☞(Page 4A-40) / ☞(Page 4A-44)
Grease	SUZUKI SILICONE GREASE	P/No.: 99000–25100	☞(Page 4A-38) / ☞(Page 4A-40) / ☞(Page 4A-44)

NOTE

Required service material(s) is also described in:

Special Tool

BENJ18K64108002

09900–06108 Snap ring pliers (Internal) ☞(Page 4A-37) / ☞(Page 4A-38) / ☞(Page 4A-39) / ☞(Page 4A-39) / ☞(Page 4A-40) / ☞(Page 4A-40) / ☞(Page 4A-43) / ☞(Page 4A-44) / ☞(Page 4A-44) / ☞(Page 4A-45) 	

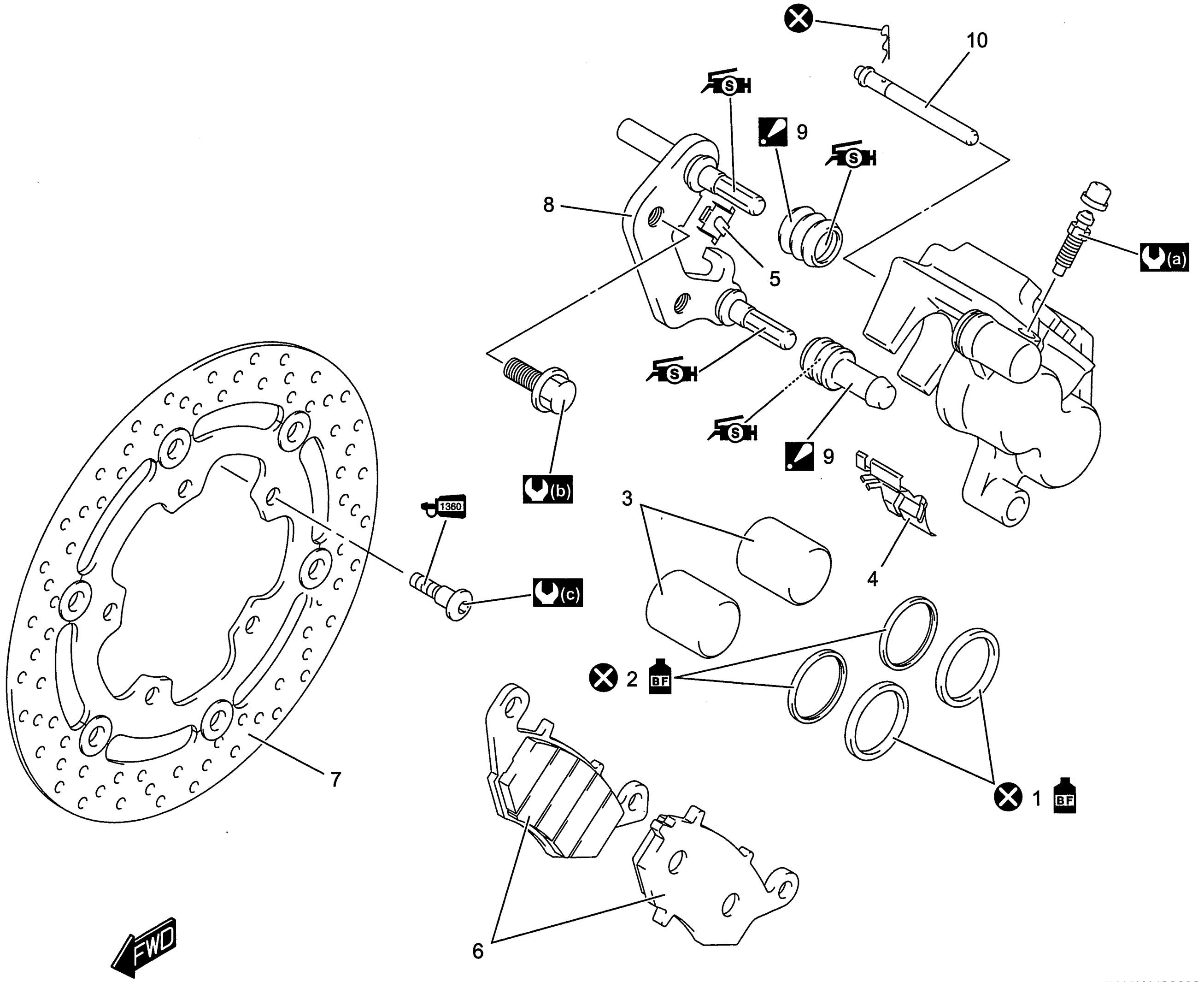
Front Brakes

Repair Instructions

Front Brake Components

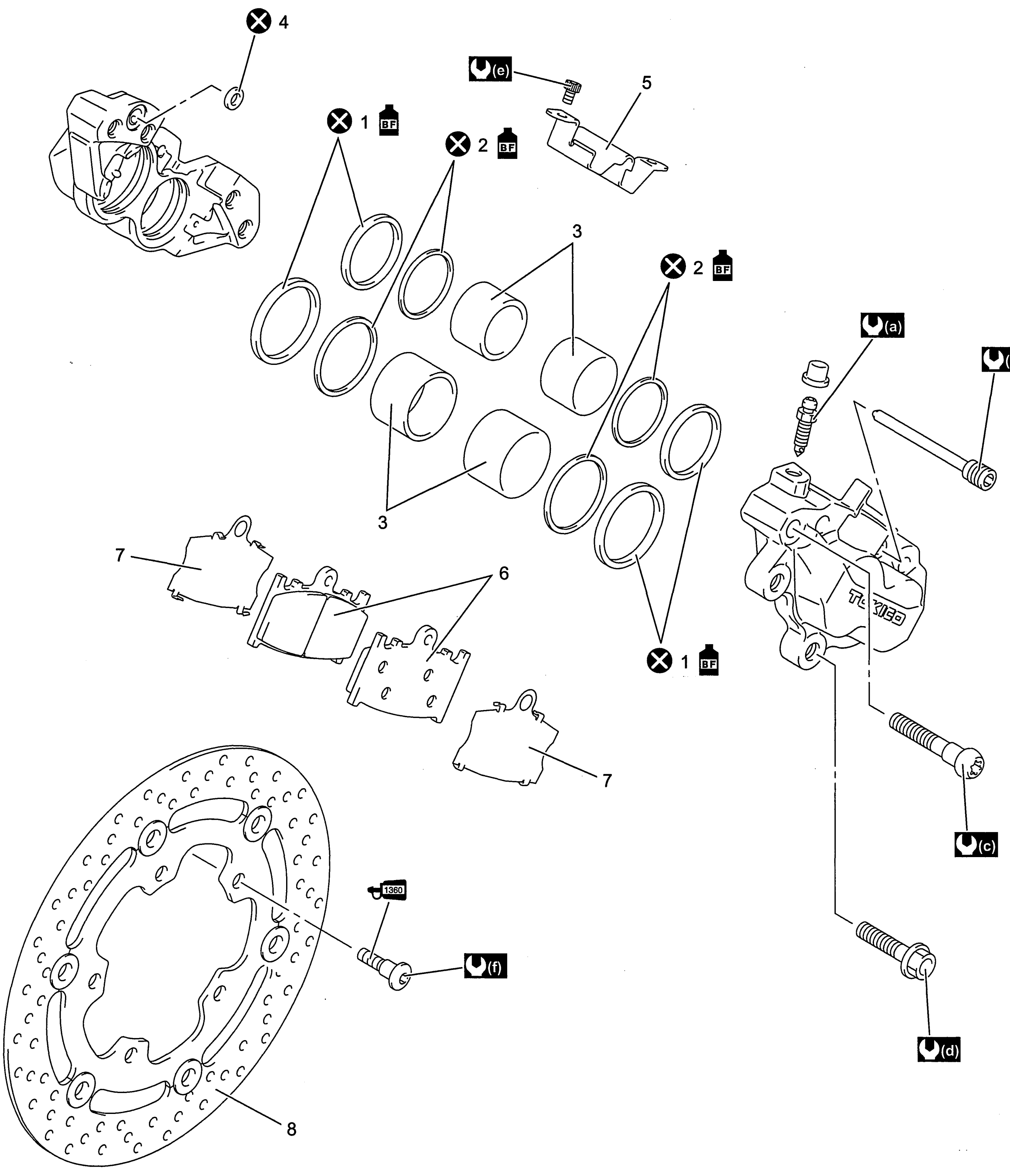
L7 – L8

BENJ18K64206001



IH18K1420023-01

1. Piston seal	7. Front brake disc	(c) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Dust seal	8. Caliper holder	: Apply grease.
3. Piston	9. Rubber boot : Apply silicone grease to the rubber boot inside.	1360 : Apply thread lock to the thread part.
4. Brake pad spring	10. Pad mounting pin	BF : Apply brake fluid.
5. Pad guide	(a) : 7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)	: Do not reuse.
6. Brake pad set	(b) : 39 N·m (4.0 kgf-m, 29.0 lbf-ft)	

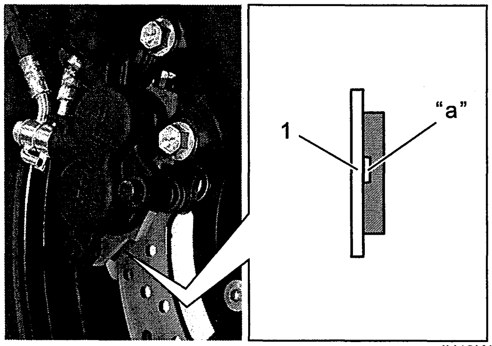

4
(e)
5
1 BF
2 BF
3
2 BF
(a)
(b)
3
7
6
1 BF
TOKICO
7
(c)
1360
(f)
8
(d)

Front Brake Pad Inspection

BENJ18K64206002

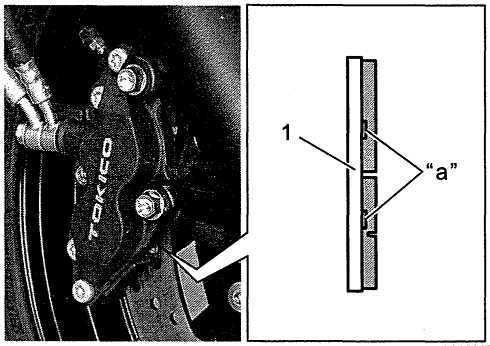
The extent of brake pads (1) wear can be checked by observing the grooved limit line “a” on the pads. When the wear exceeds the grooved limit line, replace the pads with new ones. ☞(Page 4B-3)

L7 – L8 model



IH18K1420001-02

L9 – model



IJ18K5420003-01

Front Brake Pad Replacement

BENJ18K64206003

NOTICE

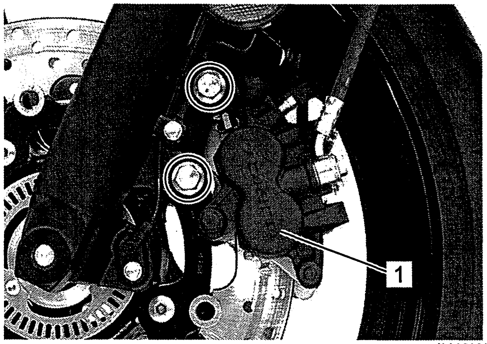
The right and left brake pads are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

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.

L7 – L8

1) Remove the brake caliper (1).

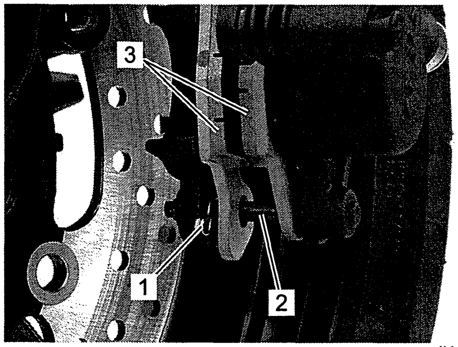


IH18K1420002-01

2) Remove the clip (1).
3) Remove the pad mounting pin (2) and brake pads (3).

NOTE

Do not operate the brake lever while removing the brake pads.



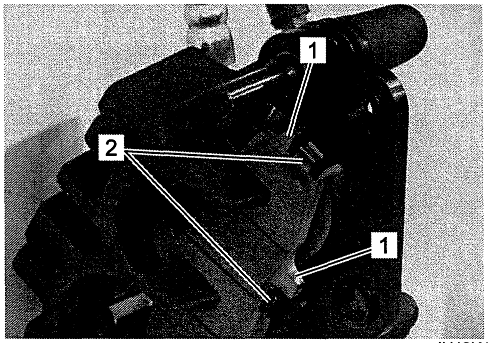
IH18K1420003-01

4) Clean up the caliper especially around the caliper pistons.
5) Install the new brake pads in the following procedures.

NOTE

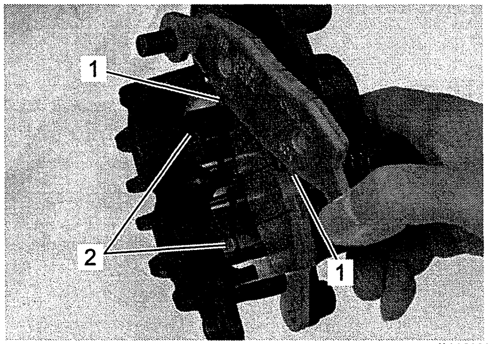
- **Replace the brake pads as a set.**
- **Pushing back the caliper pistons into the caliper will facilitate installation of the brake pads. At the time, observe the reservoir level not to exceed the upper level.**

a) Install the outer pad with the detentes (1) of pad fitted to the detentes (2) on the caliper holder.



IH18K1420004-01

b) Install the inner pad by aligning the projection (1) of the inner pad with plate (2) of the pad spring.

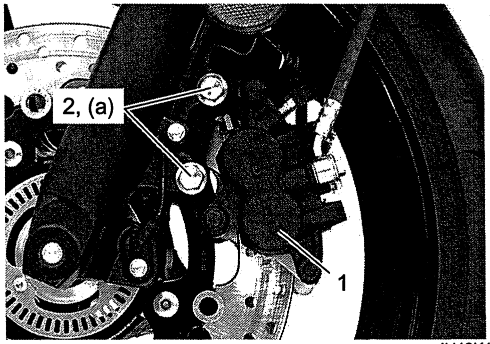


IH18K1420005-01

c) Install the pad mounting pin (1).
d) Install the new clip (2) securely.

6) Install the brake caliper (1).
7) Tighten the brake caliper mounting bolts (2) to the specified torque.

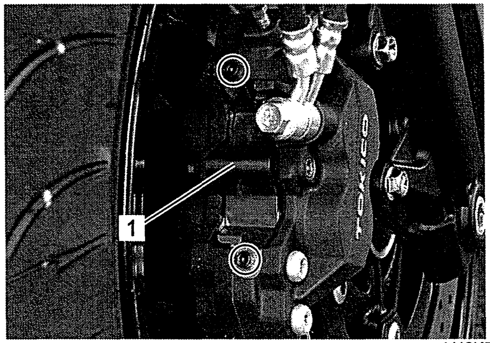
Tightening torque
Front brake caliper mounting bolt (a): 39 N·m (4.0 kgf-m, 29.0 lbf-ft) (L7 – L8)



IH18K1420007-01

L9 –

1) Remove the caliper housing dust cover (1).

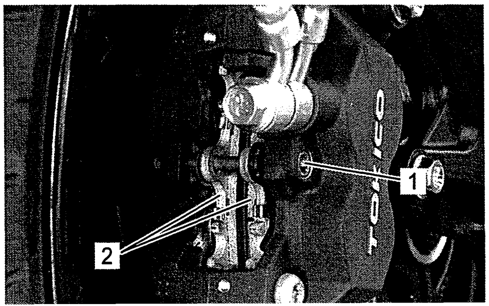


IJ18K5420004-01

2) Remove the pad set pin (1) and brake pads (2).

NOTE

Do not operate the brake lever while removing the brake pads.

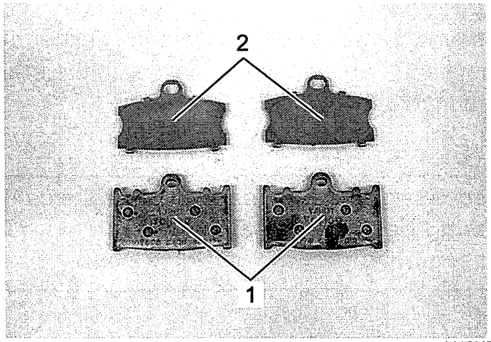


3) Clean up the caliper especially around the caliper pistons.

4) Assemble the new brake pads (1) and pad shims (2).

NOTE

- **Replace the brake pads as a set.**
- **Pushing back the caliper pistons into the caliper will facilitate installation of the brake pads. At the time, observe the reservoir level not to exceed the upper level.**

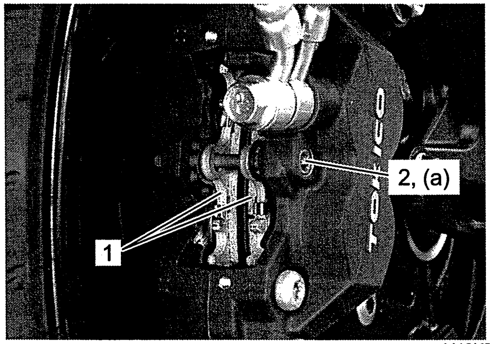


IJ18K5420006-01

5) Install the brake pads (1) and pad set pin (2).

6) Tighten the pad set pin (2) to the specified torque.

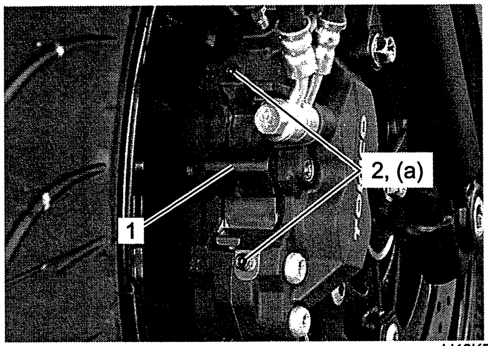
Tightening torque
Pad set pin (a): 15 N·m (1.5 kgf-m, 11.0 lbf-ft) (L9 –)



IJ18K5420007-01

7) Install the caliper housing dust cover (1) and tighten the caliper cover screws (2) to the specified torque.

Tightening torque
Caliper cover screw (a): 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft) (L9 –)



IJ18K5420008-01

Front Brake Caliper Removal and Installation (L7 – L8)

BENJ18K64206004

NOTE

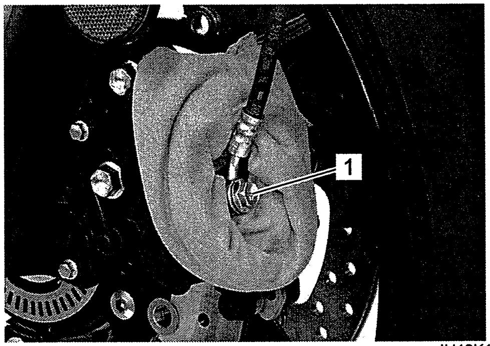
The right and left calipers are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

1) Drain brake fluid. ☞(Page 4A-31)

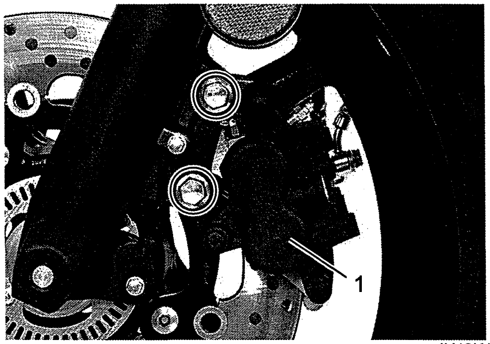
2) Place a clean rag underneath the union bolt (1) on the brake caliper to catch any spilt brake fluid.

3) Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.



IH18K1420008-01

4) Remove the brake caliper (1).



IH18K1420009-01

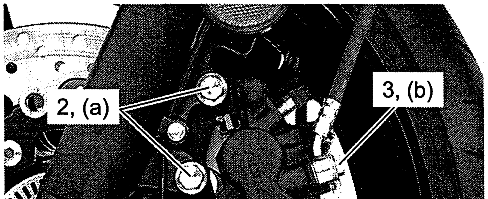
Installation

1) Install the brake caliper (1).
2) Tighten caliper mounting bolts (2) to the specified torque.

   Tightening torque
   Front brake caliper mounting bolt (a): 39 N·m (4.0 kgf-m, 29.0 lbf-ft) (L7 – L8)

3) Install the brake hose union bolt (3) and new seal washers to brake hose.
4) After the brake hose union has contacted the stopper, tighten the union bolt (3) to the specified torque.

   Tightening torque
   Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1420010-01

5) Bleed air from the brake system after installing the caliper. ☞(Page 4A-27)
6) Check the brake fluid leakage referring to "Brake Hose Inspection" in Section 4A (Page 4A-25) and brake operation.

Front Brake Caliper Removal and Installation (L9 –)

BENJ18K64206005

NOTE

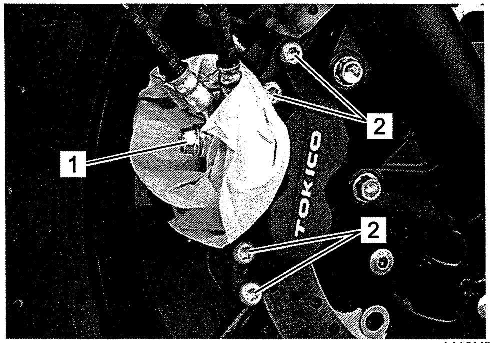
The right and left calipers are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

1) Drain brake fluid. ☞(Page 4A-31)
2) Place a clean rag underneath the union bolt (1) on the brake caliper to catch any spilt brake fluid.
3) Remove the brake hose(s) from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

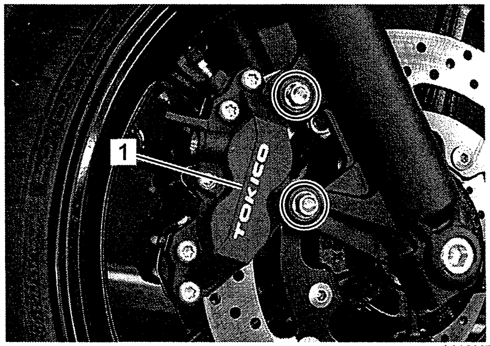
   NOTE

   If necessary, slightly loosen the brake caliper housing bolts (2) to facilitate later disassembly.



IJ18K5420009-01

4) Remove the brake caliper (1).

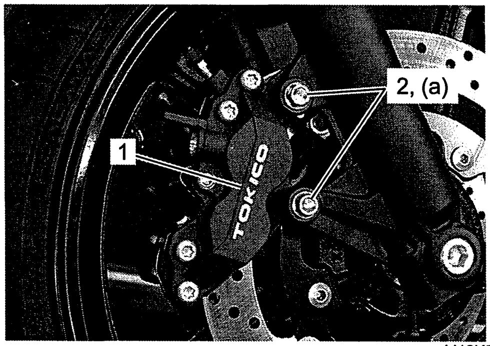


IJ18K5420010-01

Installation

1) Install the brake caliper (1).
2) Tighten the front brake caliper mounting bolts (2) to the specified torque.

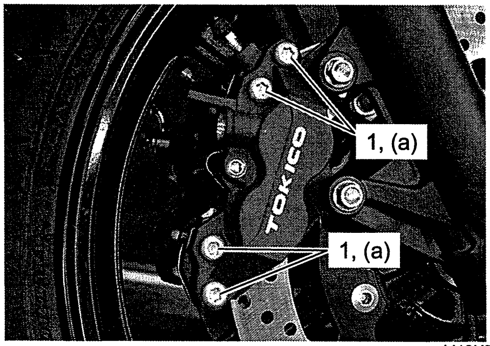
Tightening torque
Front brake caliper mounting bolt (a): 26 N·m (2.7 kgf-m, 19.5 lbf-ft) (L9 –)



IJ18K5420011-01

3) If loosened, tighten the brake caliper housing bolts (1) to the specified torque.

Tightening torque
Brake caliper housing bolt (a): 22 N·m (2.2 kgf-m, 16.5 lbf-ft) (L9 –)



IJ18K5420012-01

4) Install the brake hose union bolt (1) and new seal washers to brake hose(s).
5) After the brake hose union has contacted the stopper (2), tighten the brake hose union bolt (1) to the specified torque.

Tightening torque
Brake hose union bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

6) Bleed air from the brake system after installing the brake caliper. ☞(Page 4A-27)
7) Check the brake fluid leakage referring to "Brake Hose Inspection" in Section 4A (Page 4A-25) and brake operation.

Front Brake Caliper Disassembly and Reassembly (L7 – L8)

BENJ18K64206006

Refer to "Front Brake Caliper Removal and Installation (L7 – L8)" (Page 4B-5).

⚠ CAUTION

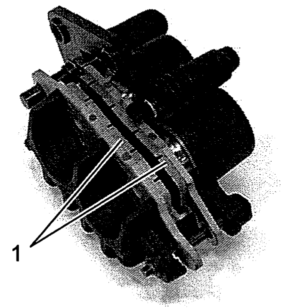
Take care not to damage piston and caliper cylinder of front brake caliper.

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.

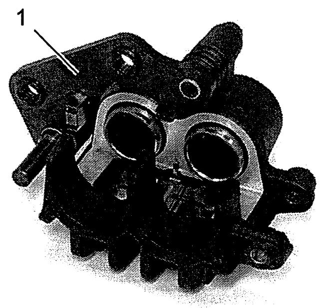
Disassembly

1) Remove the brake pads (1). ☞(Page 4B-3)



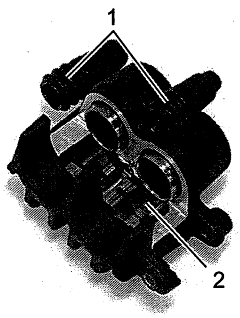
IH18K1420011-01

2) Remove the caliper holder (1).



IH18K1420012-01

3) Remove the rubber boots (1) and pad spring (2).

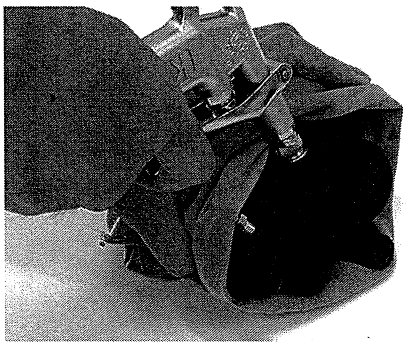


IH18K1420013-01

4) Remove the caliper pistons applying compressed air gradually from the hole for the brake hose.

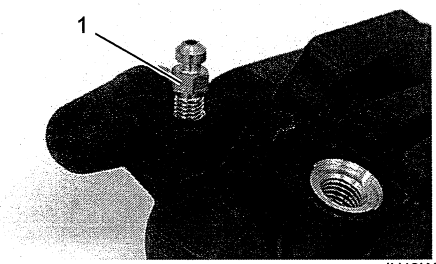
⚠ WARNING

Do not apply highly compressed air to the piston as it is. Place a cloth to prevent brake piston from jumping-out. Gradually apply compressed air. Do not place your fingers in front of brake piston while applying compressed air.



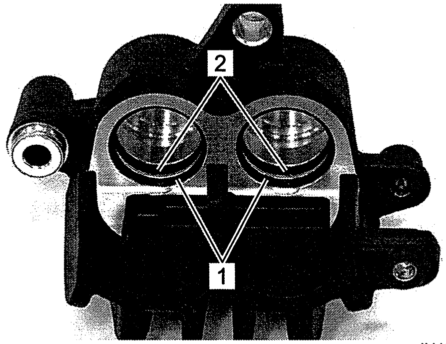
IH18K1420014-01

5) Remove the brake air bleeder valve (1).



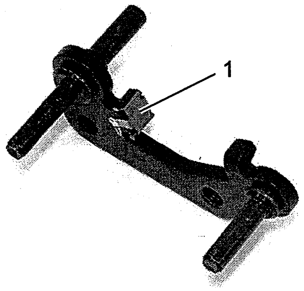
IH18K1420015-01

6) Remove the dust seals (1) and piston seals (2).



IH18K1420016-01

7) Remove the pad guide (1).



IH18K1420017-01

Reassembly

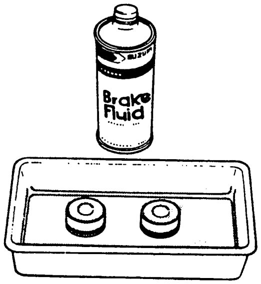
Reassemble the brake caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bores and pistons with specified brake fluid. Particularly wash the dust seal grooves and piston seal grooves.

NOTICE

- **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.**

Brake fluid (DOT 4)

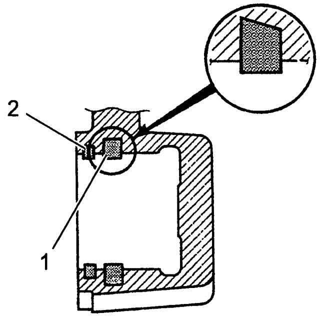


I649G1420012-02

- Apply the brake fluid to new piston seals (1) and new dust seals (2).

  Brake fluid (DOT 4)

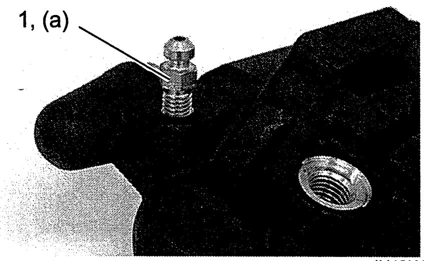
- Install the piston seals (1) and dust seals (2).



IE31J1420012-02

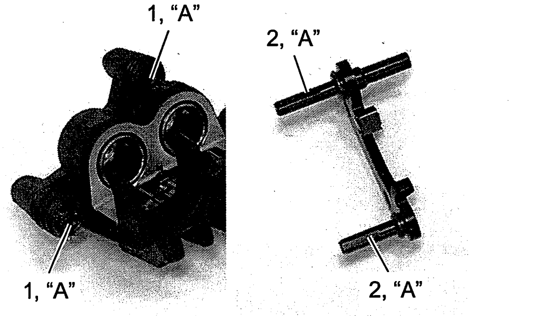
- Install the brake air bleeder valve (1) and tighten it to the specified torque.

  Tightening torque
  Front brake air bleeder valve (a): 7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)



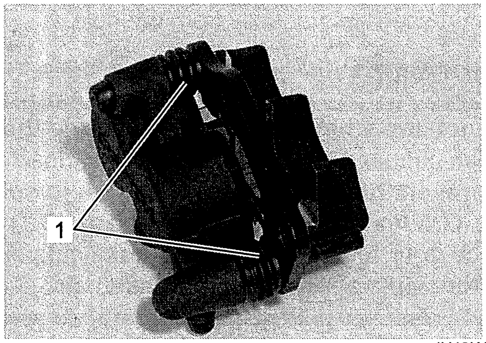
IH18K1420018-01

- Apply grease to the rubber boots inside (1) and caliper holder sliding pins (2).



IH18K1420019-02

- Set the rubber boots (1) onto the sliding pins securely.



IH18K1420020-01

Front Brake Caliper Disassembly and Reassembly (L9 –)

BENJ18K64206007

Refer to "Front Brake Caliper Removal and Installation (L9 –)" (Page 4B-6).

▲ CAUTION

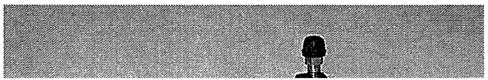
Take care not to damage piston and caliper cylinder of front brake caliper.

NOTE

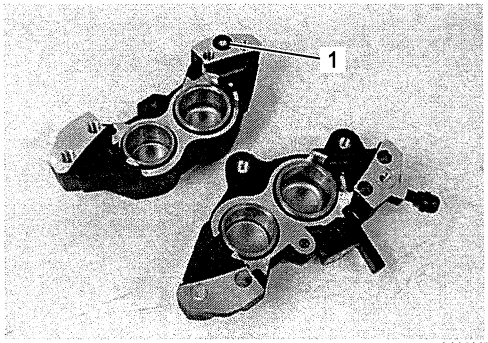
The right and left brake calipers are assembled symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

Disassembly

1) Remove the brake pads. ☞(Page 4B-3)
2) Separate the brake caliper halves by removing the brake caliper housing bolts (1).



3) Remove the seal (1).

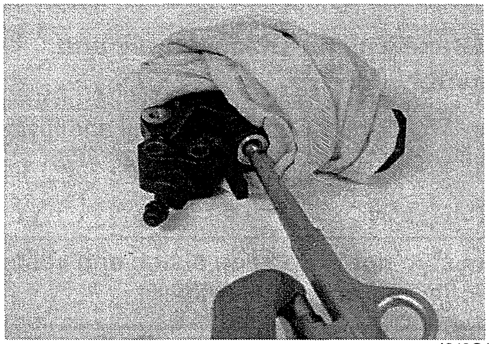


IJ18K5420015-01

4) Remove the brake caliper pistons applying compressed air gradually from the hole.

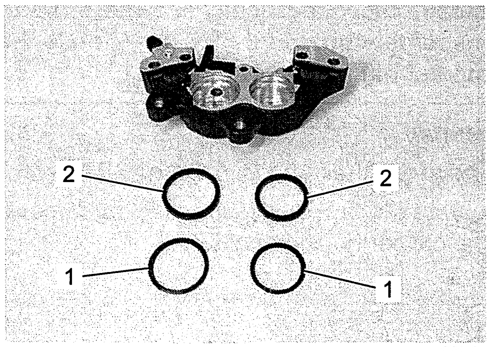
⚠ WARNING

Do not apply highly compressed air to the brake caliper piston as it is. Place a clean rag to prevent brake caliper piston from jumping-out. Gradually apply compressed air. Do not place your fingers in front of brake caliper piston while applying compressed air.



I649G1420010-02

5) Remove the dust seals (1) and piston seals (2).



IJ18K5420016-01

Reassembly

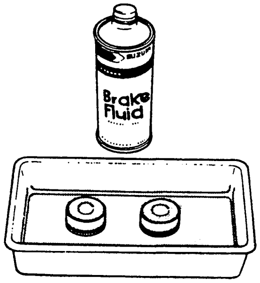
Reassemble the front brake caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the brake caliper bores and pistons with specified brake fluid. Particularly wash the dust seal grooves and piston seal grooves.

NOTICE

- **Wash the brake caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
- **Do not wipe brake fluid off after washing the components.**
- **When washing the components, use specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.**

Brake fluid (DOT 4)

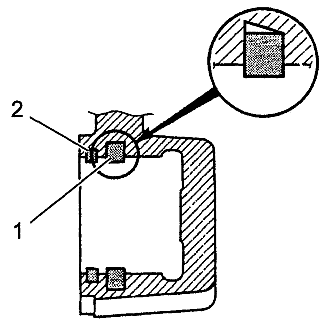


I649G1420012-02

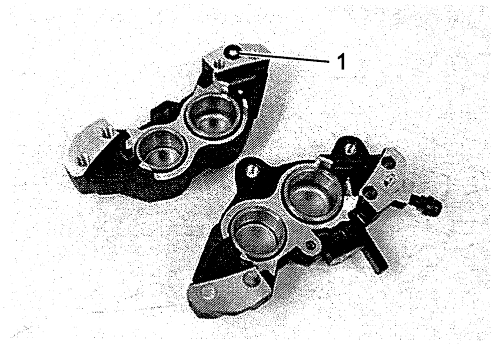
- Apply brake fluid to the new piston seals (1) and new dust seals (2).

Brake fluid (DOT 4)

- Install the piston seals (1) and dust seals (2).

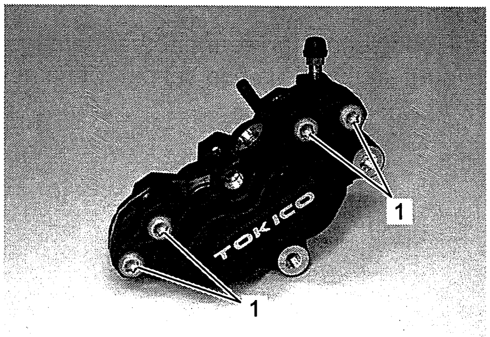


- Install the new seal (1) and assemble the brake caliper halves.



IJ18K5420017-01

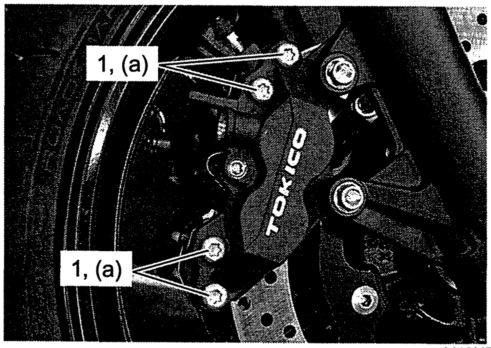
- Temporarily tighten the brake caliper housing bolts (1).



IJ18K5420014-01

- Install the brake pads. ☞(Page 4B-3)
- After installing the brake caliper to the front fork, tighten the front brake caliper housing bolts (1) to the specified torque. ☞(Page 4B-6)

Tightening torque
Brake caliper housing bolt (a): 22 N·m (2.2 kgf-m, 16.5 lbf-ft) (L9 –)



IJ18K5420018-01

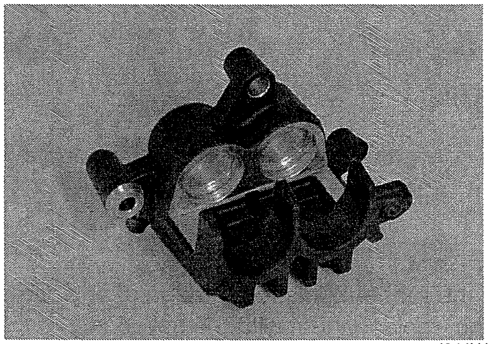
Front Brake Caliper Parts Inspection (L7 – L8)

BENJ18K64206008

Refer to "Front Brake Caliper Disassembly and Reassembly (L7 – L8)" (Page 4B-7).

Brake Caliper Cylinder

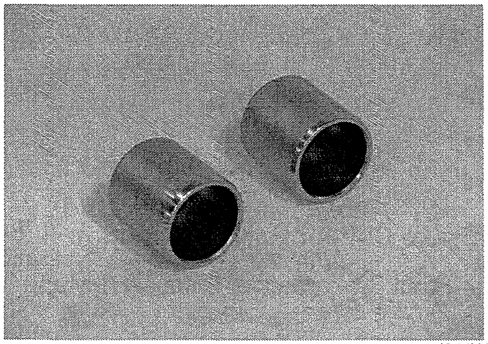
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.



I944H1420019-01

Brake Caliper Piston

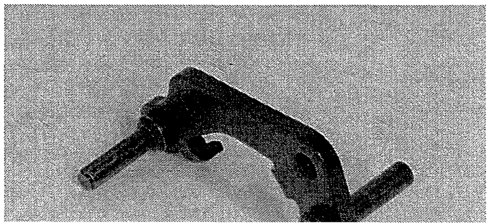
Inspect the brake caliper pistons surface for any scratches or other damage. If any damage is found, replace them with new ones.



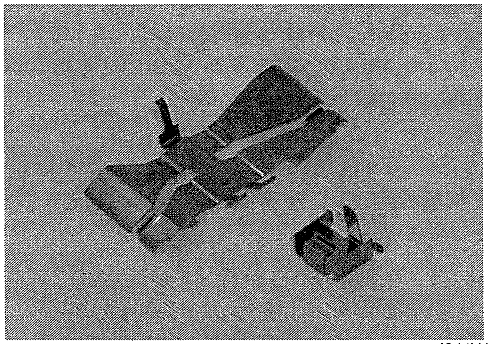
I944H1420020-01

Brake Caliper Holder Sliding Pin

Inspect the brake caliper holder sliding pins for wear and other damage. If any damage is found, replace the brake caliper holder with a new one.

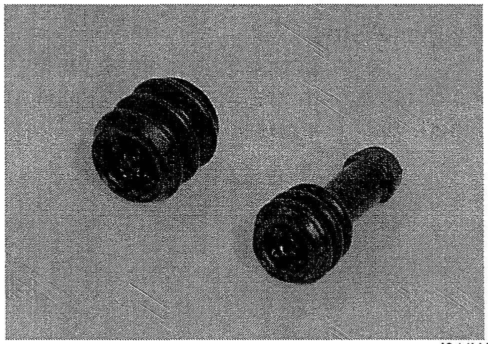


Brake Pad Spring and Pad Guide
Inspect the brake pad spring and pad guide for damage and excessive bend. If any defects are found, replace them with new ones.



I944H1420022-01

Rubber Boot
Inspect the rubber boots for damage. If any damages are found, replace them with the new ones.

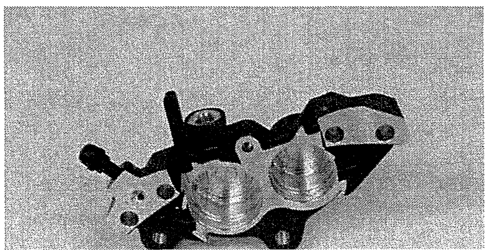


I944H1420023-01

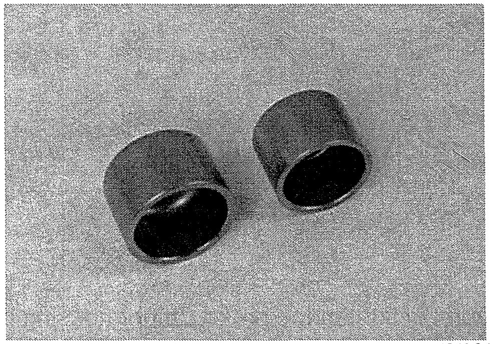
Front Brake Caliper Parts Inspection (L9 –)
BENJ18K64206009

Refer to "Front Brake Caliper Disassembly and Reassembly (L9 –)" (Page 4B-9).

Brake Caliper Cylinder
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any defect is found, replace the caliper with a new one.

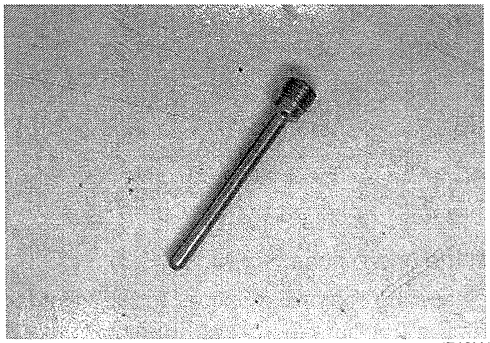


Brake Caliper Piston
Inspect the brake caliper piston surfaces for any scratches or other damage. If any defect is found, replace the brake caliper pistons with new ones.



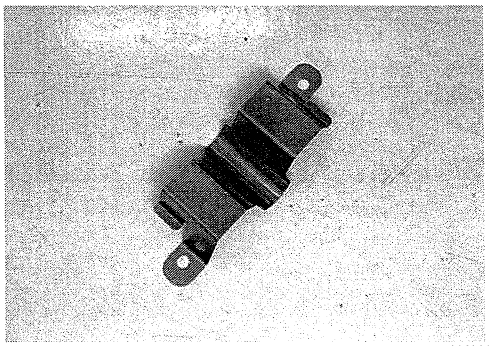
I649G1420016-02

Pad Set Pin
Inspect the pad set pin for wear or other damage. If any defect is found, replace the pad set pin with a new one.



I718H1420018-03

Caliper Housing Dust Cover
Inspect the caliper housing dust cover for damage or excessive bend. If any defect is found, replace the caliper housing dust cover with a new one.



I718H1420019-03

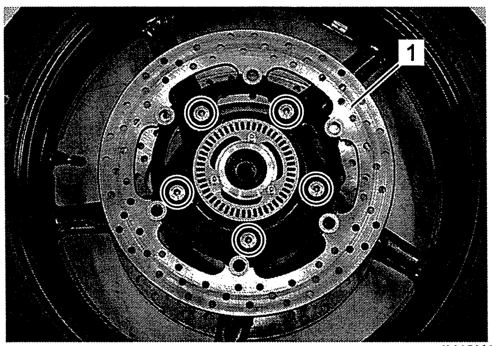
Front Brake Disc Removal and Installation

BENJ18K64206010

Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-5).

Removal

1) Remove the front brake disc (1).



IH18K1420021-01

Installation

1) Make sure that the brake disc is clean and free of any grease.
2) Install the front brake disc.

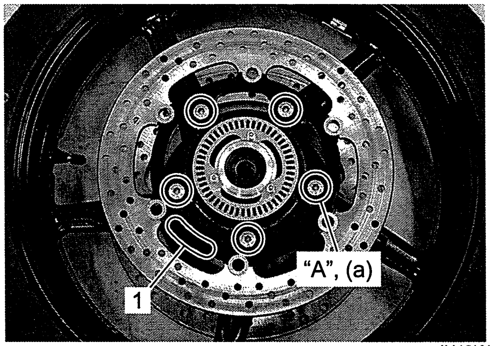
NOTE

The stamped mark (1) on the brake disc should face to the outside.

3) Apply thread lock to the front brake disc bolts and tighten them to the specified torque.

"A": Thread lock cement 99000–32130 (THREAD LOCK CEMENT 1360)

Tightening torque
Front brake disc bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1420022-01

Front Brake Disc Inspection

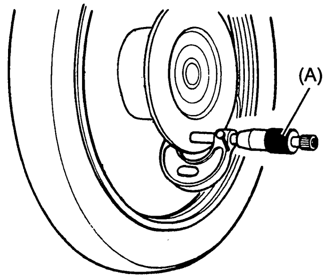
BENJ18K64206011

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.

Front brake disc thickness
[Limit]: 4.0 mm (0.16 in)

Special tool
(A): 09912–66310



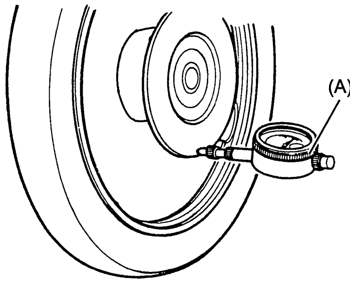
ID26J1420029-01

Brake Disc Runout

1) Dismount the front brake pads.
   Refer to "Front Brake Pad Replacement" (Page 4B-3).
2) Measure the runout using the dial gauge.
   Replace the disc if the runout exceeds the service limit.

Front brake disc runout
[Limit]: 0.3 mm (0.012 in)

Special tool
(A): 09900–20607
09900–20701



ID26J1420030-04

3) Remount the front brake pads.
   Refer to "Front Brake Pad Replacement" (Page 4B-3).

Specifications

Tightening Torque Specifications

BENJ18K64207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Front brake caliper mounting bolt	39	4.0	29.0	☞(Page 4B-4)(L7 – L8) ☞(Page 4B-6)
Pad set pin	15	1.5	11.0	☞(Page 4B-5)(L9 –)
Caliper cover screw	3.0	0.31	2.25	☞(Page 4B-5)(L9 –)
Brake hose union bolt	23	2.3	17.0	☞(Page 4B-6) / ☞(Page 4B-7)
Front brake caliper mounting bolt	26	2.7	19.5	☞(Page 4B-7)(L9 –)
Brake caliper housing bolt	22	2.2	16.5	☞(Page 4B-7)(L9 –) ☞(Page 4B-11)
Front brake air bleeder valve	7.5	0.76	5.55	☞(Page 4B-9)
Front brake disc bolt	23	2.3	17.0	☞(Page 4B-13)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Front Brake Components" (Page 4B-1)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K64208001

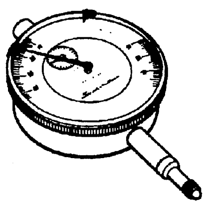
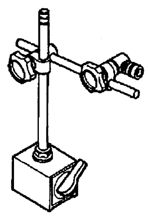
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4B-9) / ☞(Page 4B-9) / ☞(Page 4B-10) / ☞(Page 4B-10)
Grease	SUZUKI SILICONE GREASE	P/No.: 99000–25100	☞(Page 4B-9)
Thread lock cement	THREAD LOCK CEMENT 1360	P/No.: 99000–32130	☞(Page 4B-13)

NOTE

Required service material(s) is also described in:
"Front Brake Components" (Page 4B-1)

Special Tool

BENJ18K64208002

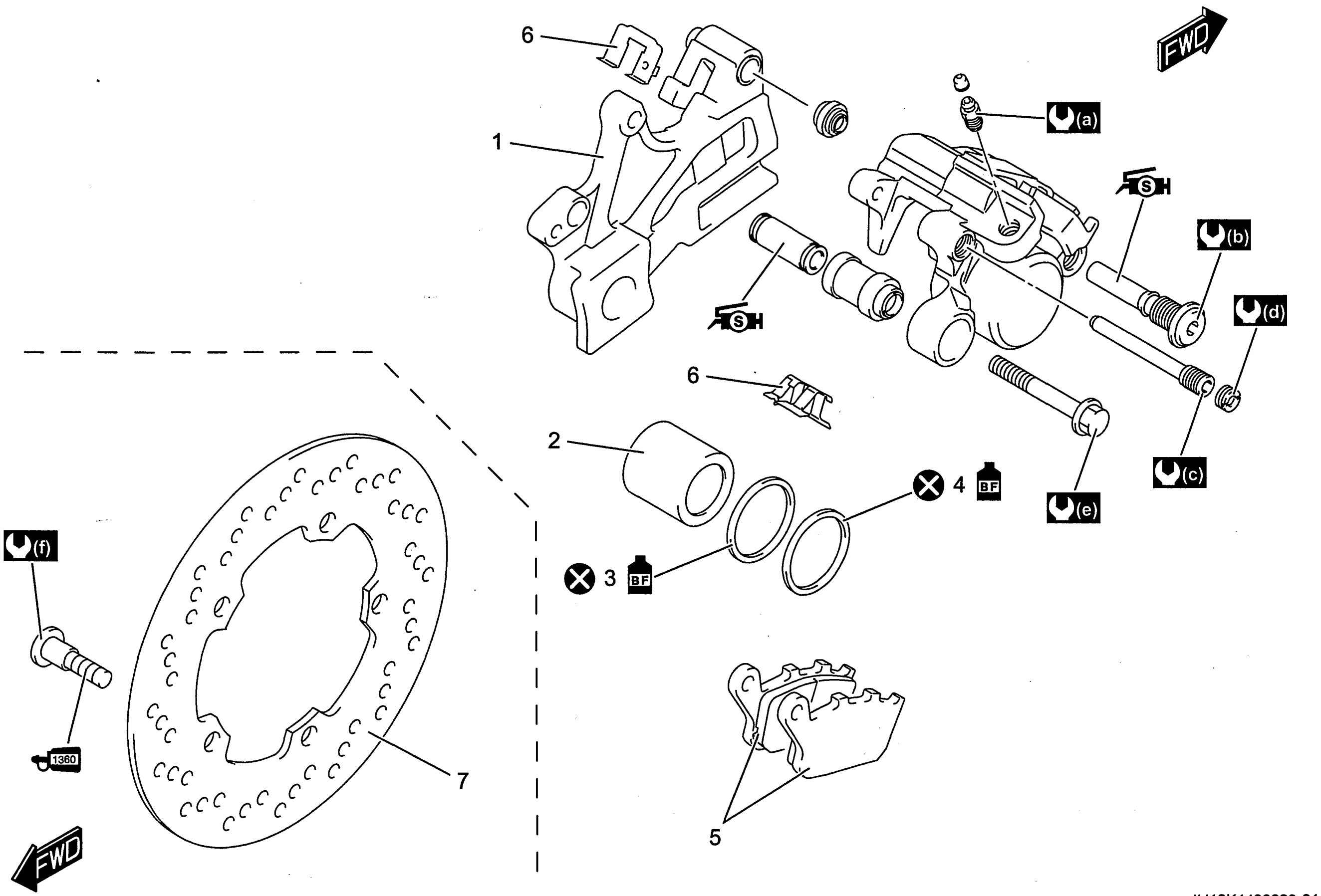
09900–20607 Dial gauge (10 x 0.01 mm) ☞(Page 4B-13) 	09900–20701 Dial gauge chuck ☞(Page 4B-13) 
09912–66310 Micrometer (0 - 25 mm) 	

Rear Brakes

Repair Instructions

Rear Brake Components

BENJ18K64306001



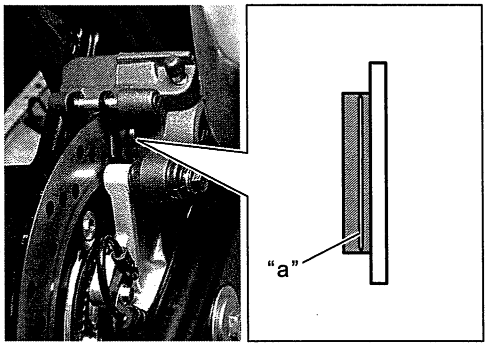
IH18K1430023-01

1. Caliper bracket	7. Rear brake disc	(f) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Piston	(a) : 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)	SH : Apply silicone grease to the sliding surface.
3. Piston seal	(b) : 27 N·m (2.8 kgf-m, 20.0 lbf-ft)	1360 : Apply thread lock to the thread part.
4. Dust seal	(c) : 17 N·m (1.7 kgf-m, 12.5 lbf-ft)	BF : Apply brake fluid.
5. Brake pad set	(d) : 2.5 N·m (0.25 kgf-m, 1.85 lbf-ft)	⊗ : Do not reuse.
6. Brake pad spring	(e) : 22 N·m (2.2 kgf-m, 16.5 lbf-ft)	

Rear Brake Pad Inspection

BENJ18K64306002

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. ☞(Page 4C-2)



IH18K1430001-01

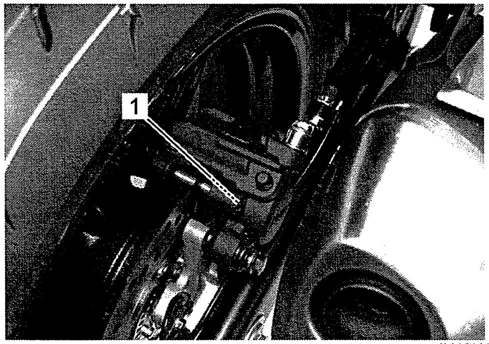
Rear Brake Pad Replacement

BENJ18K64306003

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.

1) Remove the pin plug (1).

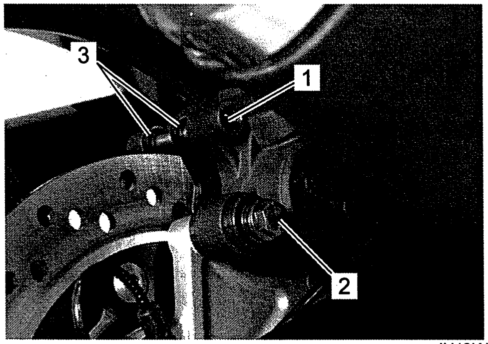


IH18K1430002-02

2) Remove the pad mounting pin (1).
3) Remove the caliper mounting bolt (2).
4) Remove the brake pads (3) with the rear caliper pivoted up.

NOTE

Do not operate the brake pedal while removing the brake pads.

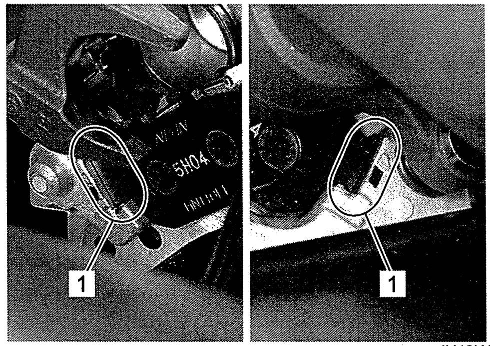


IH18K1430003-01

5) Clean up the caliper especially around the caliper piston.
6) Install the new brake pads.

NOTE

- **Replace the brake pads as a set.**
- **Pushing back the caliper piston into the caliper will facilitate installation of the brake pads. At the time, observe the reservoir level not to exceed the upper level.**
- **Check the pads end (1) for proper fit to the brake pad spring.**

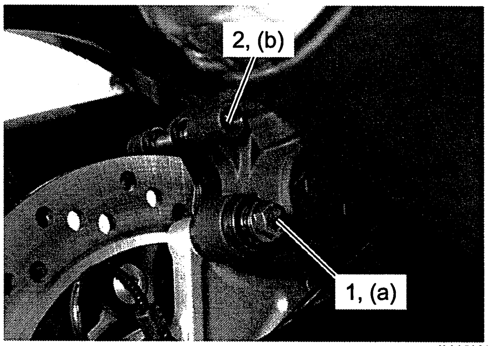


IH18K1430005-01

7) Install the caliper.

8) Tighten the caliper mounting bolt (1) and pad mounting pin (2) to the specified torque.

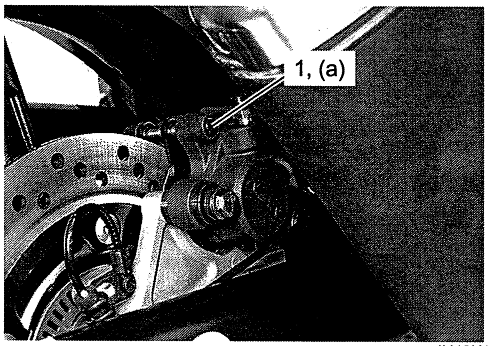
Tightening torque
Rear brake caliper mounting bolt (a): 22 N·m (2.2 kgf-m, 16.5 lbf-ft)
Rear brake pad mounting pin (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



IH18K1430006-01

9) Tighten the pin plug (1) to the specified torque.

Tightening torque
Rear brake pad pin plug (a): 2.5 N·m (0.25 kgf-m, 1.85 lbf-ft)



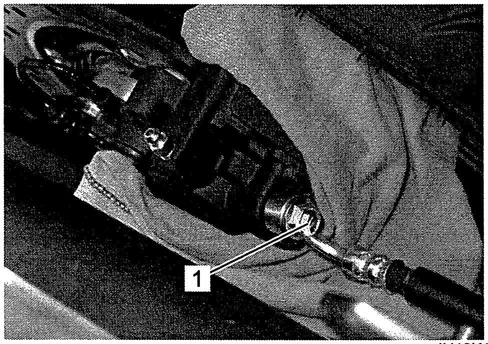
IH18K1430007-01

Rear Brake Caliper Removal and Installation

BENJ18K64306004

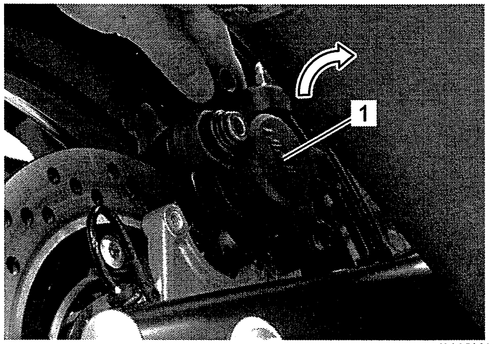
Removal

1) Drain brake fluid. ☞(Page 4A-31)
2) Remove the brake pads. ☞(Page 4C-2)
3) Place a rag underneath the union bolt on the brake caliper to catch any spilt brake fluid.
4) Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.



IH18K1430008-01

5) Pivot the caliper up and remove the caliper (1) from the caliper bracket.

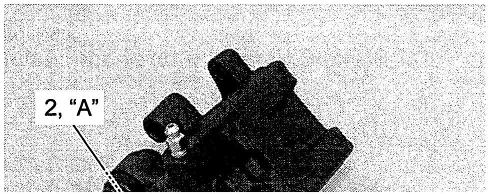


IH18K1430009-02

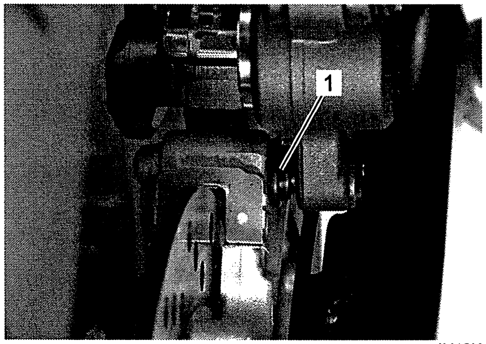
Installation

1) Apply grease to the sliding pin (1) and sleeve (2).

“A”: Grease 99000–25100 (SUZUKI SILICONE GREASE)



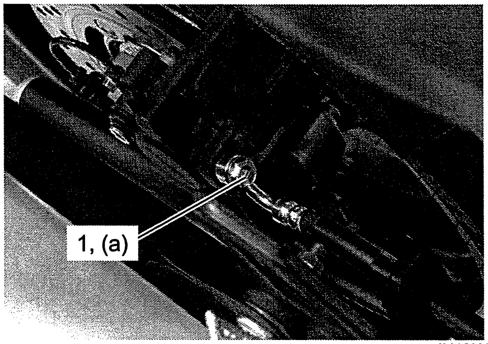
2) Install the caliper to the caliper bracket.
3) Set the boot (1) onto the sliding pin securely.



IH18K1430011-01

4) Install the brake pads. ☞(Page 4C-2)
5) Install the brake hose union bolt (1) and new seal washers to brake hose.
6) After the brake hose union has contacted the stopper, tighten the union bolt (1) to the specified torque.

Tightening torque
Brake hose union bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1430012-01

7) Bleed air from the brake system after installing the caliper. ☞(Page 4A-27)
8) Check the brake fluid leakage referring to “Brake Hose Inspection” in Section 4A (Page 4A-25) and brake operation.

Rear Brake Caliper Disassembly and Reassembly

BENJ18K64306005

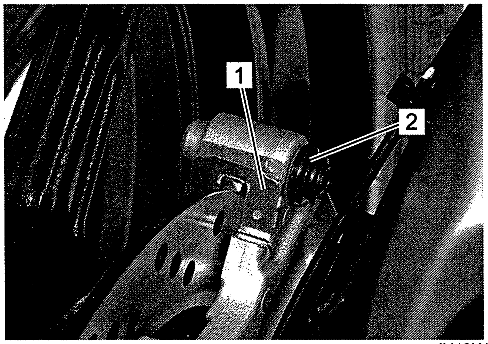
Refer to “Rear Brake Caliper Removal and Installation” (Page 4C-3).

⚠ CAUTION

Take care not to damage piston and caliper

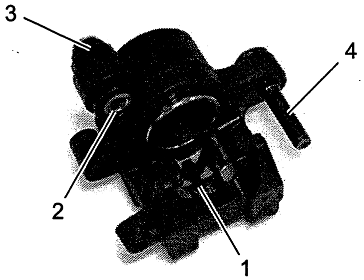
Disassembly

1) Remove the pad spring (1) and boot (2).



IH18K1430013-01

2) Remove the pad spring (1).
3) Remove the sleeve (2) and boot (3).
4) Remove the sliding pin (4).



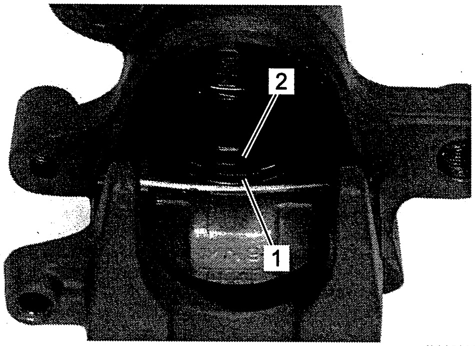
IH18K1430014-01

5) Remove the caliper piston applying compressed air gradually from the hole for the brake hose.

⚠ WARNING

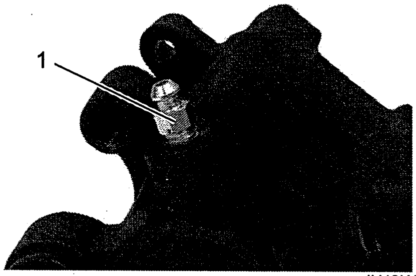
Do not apply highly compressed air to the piston as it is. Place a cloth to prevent brake piston from jumping-out. Gradually apply compressed air. Do not place your fingers in front of brake piston while applying compressed air.

6) Remove the dust seal (1) and piston seal (2).



IH18K1430016-01

7) Remove the brake air bleeder valve (1).



IH18K1430021-01

Reassembly

Reassemble 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.

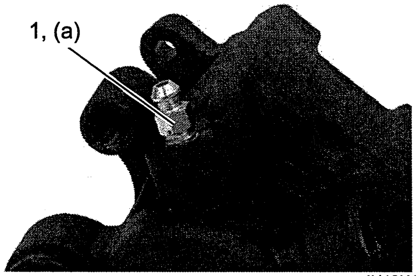
NOTICE

- **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.**

Brake fluid (DOT 4)

- Install the brake air bleeder valve (1) and tighten it to the specified torque.

Tightening torque
Rear brake air bleeder valve (a): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)

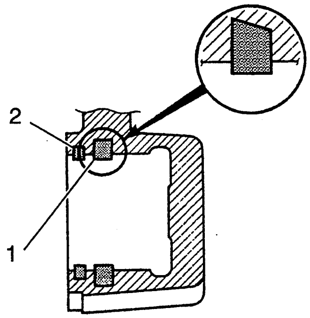


IH18K1430022-01

- Apply the brake fluid to new piston seal (1) and new dust seal (2).

Brake fluid (DOT 4)

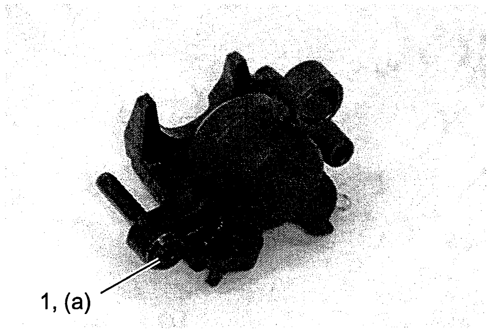
- Install the piston seal (1) and dust seal (2).



IE31J1430016-01

- Tighten the sliding pin (1) to the specified torque.

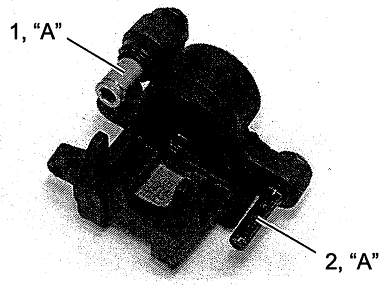
Tightening torque
Rear brake caliper sliding pin (a): 27 N·m (2.8 kgf-m, 20.0 lbf-ft)



- Apply grease to the sleeve (1) and sliding pin (2).

  "A": Grease 99000–25100 (SUZUKI SILICONE GREASE)

- Install the sleeve (1) into the boot.
- Set the boot to the sleeve securely.



IH18K1430018-01

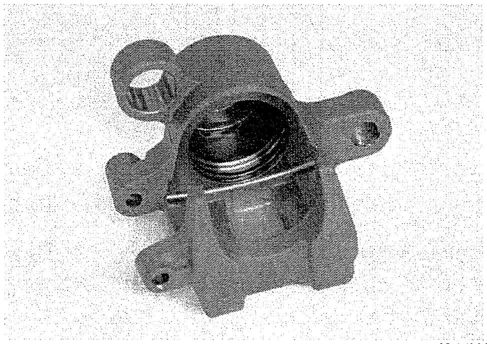
Rear Brake Caliper Parts Inspection

BENJ18K64306006

Refer to "Rear Brake Caliper Disassembly and Reassembly" (Page 4C-4).

Brake Caliper Cylinder

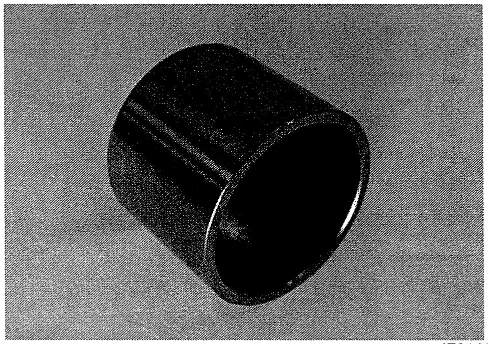
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.



I944H1430019-01

Brake Caliper Piston

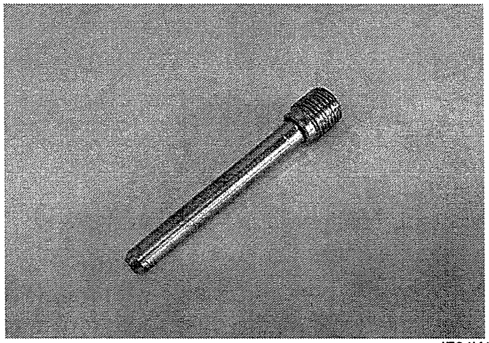
Inspect the brake caliper piston surface for any scratches or other damage. If any defects are found, replace the piston with a new one.



IE31J1430023-01

Brake Pad Mounting Pin

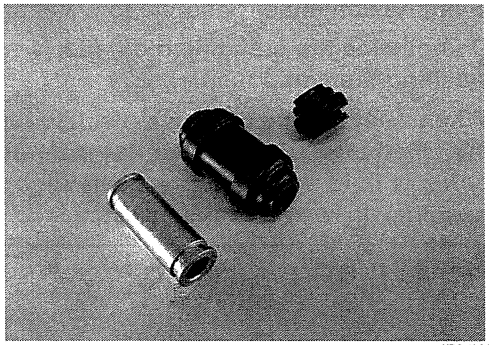
Inspect the brake pad mounting pin for wear and other damage. If any damage is found, replace the brake pad mounting pin with a new one.



IF04K1430018-01

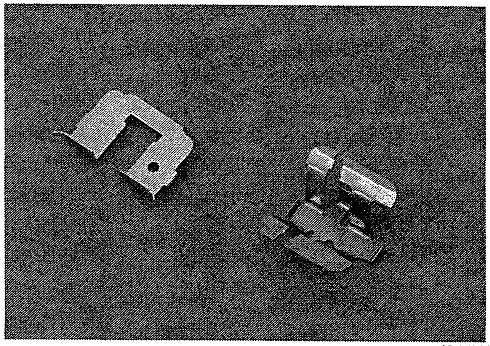
Boot and Sleeve

Inspect the boots and sleeve for damage and wear. If any defects are found, replace them with new ones.



IF04K1430019-01

Brake Pad Spring
Inspect the brake pad springs for damage and excessive bend. If any defects are found, replace them with new ones.



I944H1430023-02

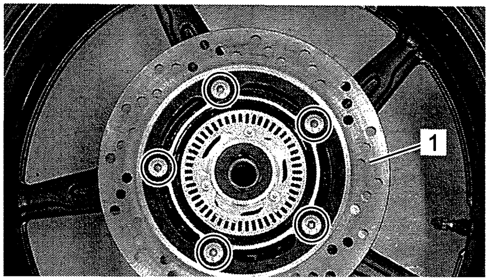
Brake Caliper Sliding Pin
Inspect the brake caliper sliding pin for wear and other damage. If any damage is found, replace the brake caliper sliding pin with a new one.

IF04K1430021-02

Rear Brake Disc Removal and Installation
BENJ18K64306007

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

Removal
1) Remove the rear brake disc (1).



Installation
1) Make sure that the brake disc (1) is clean and free of any grease.
2) Install the rear brake disc (1).

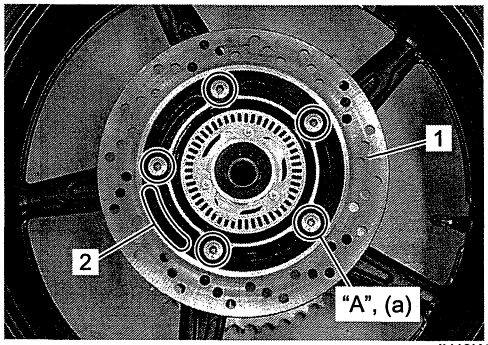
NOTE

The stamped mark (2) on the brake disc should face to the outside.

3) Apply thread lock to the rear brake disc bolts and tighten them to the specified torque.

"A": Thread lock cement 99000–32130 (THREAD LOCK CEMENT 1360)

Tightening torque
Rear brake disc bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



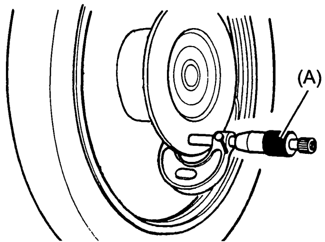
IH18K1430020-01

Rear Brake Disc Inspection
BENJ18K64306008

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.

Rear brake disc thickness
[Limit]: 4.5 mm (0.18 in)

Special tool
(A): 09912–66310

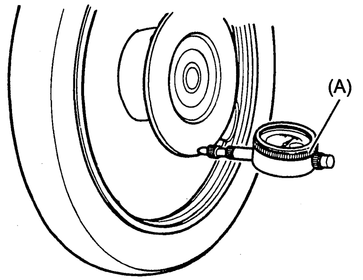


Brake Disc Runout

1) Dismount the rear brake pads.
   Refer to “Rear Brake Pad Replacement” (Page 4C-2).
2) Measure the runout using the dial gauge.
   Replace the disc if the runout exceeds the service limit.

   Rear brake disc runout
   [Limit]: 0.3 mm (0.012 in)

   Special tool
   (A): 09900–20607
   09900–20701



ID26J1430037-04

3) Remount the rear brake pads.
   Refer to “Rear Brake Pad Replacement” (Page 4C-2).

Specifications

Tightening Torque Specifications

BENJ18K64307001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear brake caliper mounting bolt	22	2.2	16.5	☞(Page 4C-3)
Rear brake pad mounting pin	18	1.8	13.5	☞(Page 4C-3)
Rear brake pad pin plug	2.5	0.25	1.85	☞(Page 4C-3)
Brake hose union bolt	23	2.3	17.0	☞(Page 4C-4)
Rear brake air bleeder valve	6.0	0.61	4.45	☞(Page 4C-5)
Rear brake caliper sliding pin	27	2.8	20.0	☞(Page 4C-5)
Rear brake disc bolt	23	2.3	17.0	☞(Page 4C-7)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
“Rear Brake Components” (Page 4C-1)
“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K64308001

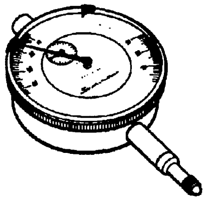
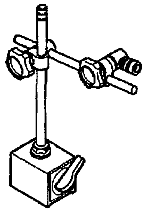
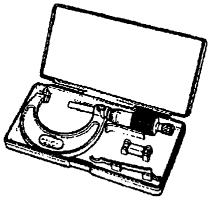
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4C-5) / ☞(Page 4C-5)
Grease	SUZUKI SILICONE GREASE	P/No.: 99000–25100	☞(Page 4C-3) / ☞(Page 4C-6)
Thread lock cement	THREAD LOCK CEMENT 1360	P/No.: 99000–32130	☞(Page 4C-7)

NOTE

Required service material(s) is also described in:
“Rear Brake Components” (Page 4C-1)

Special Tool

BENJ18K64308002

09900–20607 Dial gauge (10 x 0.01 mm) ☞(Page 4C-8) 	09900–20701 Dial gauge chuck ☞(Page 4C-8) 
09912–66310 Micrometer (0 - 25 mm) ☞(Page 4C-7) 	

Precautions

Precautions for ABS Service

BENJ18K64500001

- Battery voltage is always applied to the ABS control unit. Therefore, disconnect the battery (–) lead wire before disconnecting the ABS control unit coupler.
- When the ABS control unit coupler is connected, do not disconnect the sensor coupler(s) with the ignition switch turned ON. If the sensor coupler is disconnected with the ignition ON, DTC will be stored in the ABS control unit.

Precautions for Diagnosing Troubles

BENJ18K64500002

To ensure that the trouble diagnosis is done accurately and smoothly, observe the following and follow “ABS Check” (Page 4E-16).

- The information on the DTCs detected by the ABS control unit can be checked and cleared with the special tool.

NOTE

After repairing the trouble, clear the DTC with the special tool. ☞(Page 4E-23)

- If the motorcycle was operated in any of the following conditions, ABS indicator light may light but this does not indicate any fault in ABS.
  - The motorcycle is stuck in mud, sand, etc.
  - Wheel spins while driving.
  - Wheels are rotated while the motorcycle is jacked up.
- Be sure to follow the trouble diagnosis procedure described in “ABS Check” (Page 4E-16). If the trouble diagnosis procedure is not followed properly, incorrect diagnosis may result. (If the incorrect procedure is performed, other DTC may be stored in the ABS control unit.)

Precautions for ABS

BENJ18K64500003

Refer to “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2), “Precautions for Circuit Tester” in Section 00 (Page 00-7) and “Precautions for ABS Service” (Page 4E-1).

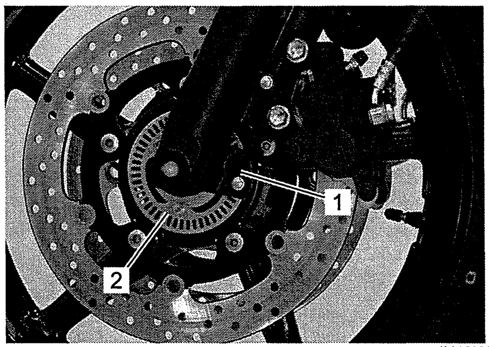
General Description

Wheel Speed Sensor Description

BENJ18K64501001

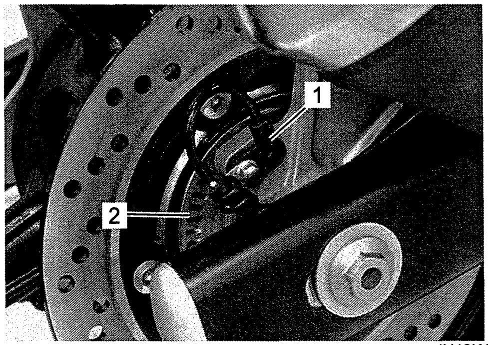
Wheel speed sensor consists of wheel speed sensor (1) and sensor rotor (2).

Front



IH18K1450001-01

Rear



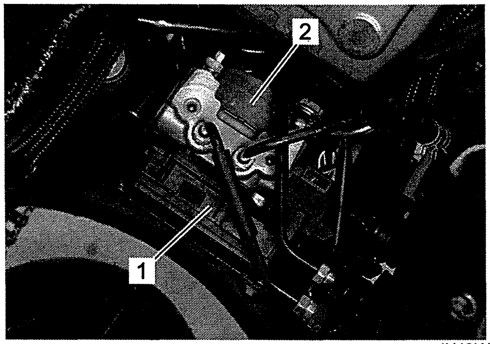
IH18K1450002-01

ABS Control Unit Description

BENJ18K64501002

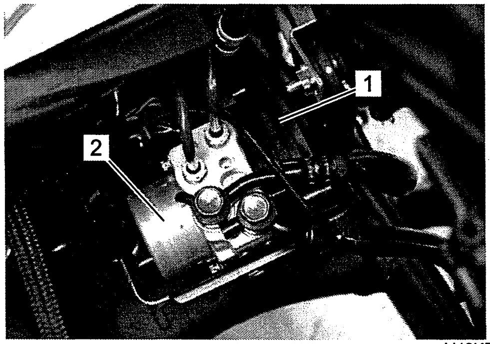
ABS control unit (1) calculates signals input from each one of front and rear wheel speed sensors, monitors the slipping conditions of the wheels and, at the same time, sends control signal to Hydraulic Unit (HU) (2).
This ABS control unit/HU can not be disassembled.

L7 – L8 model



IH18K1450003-01

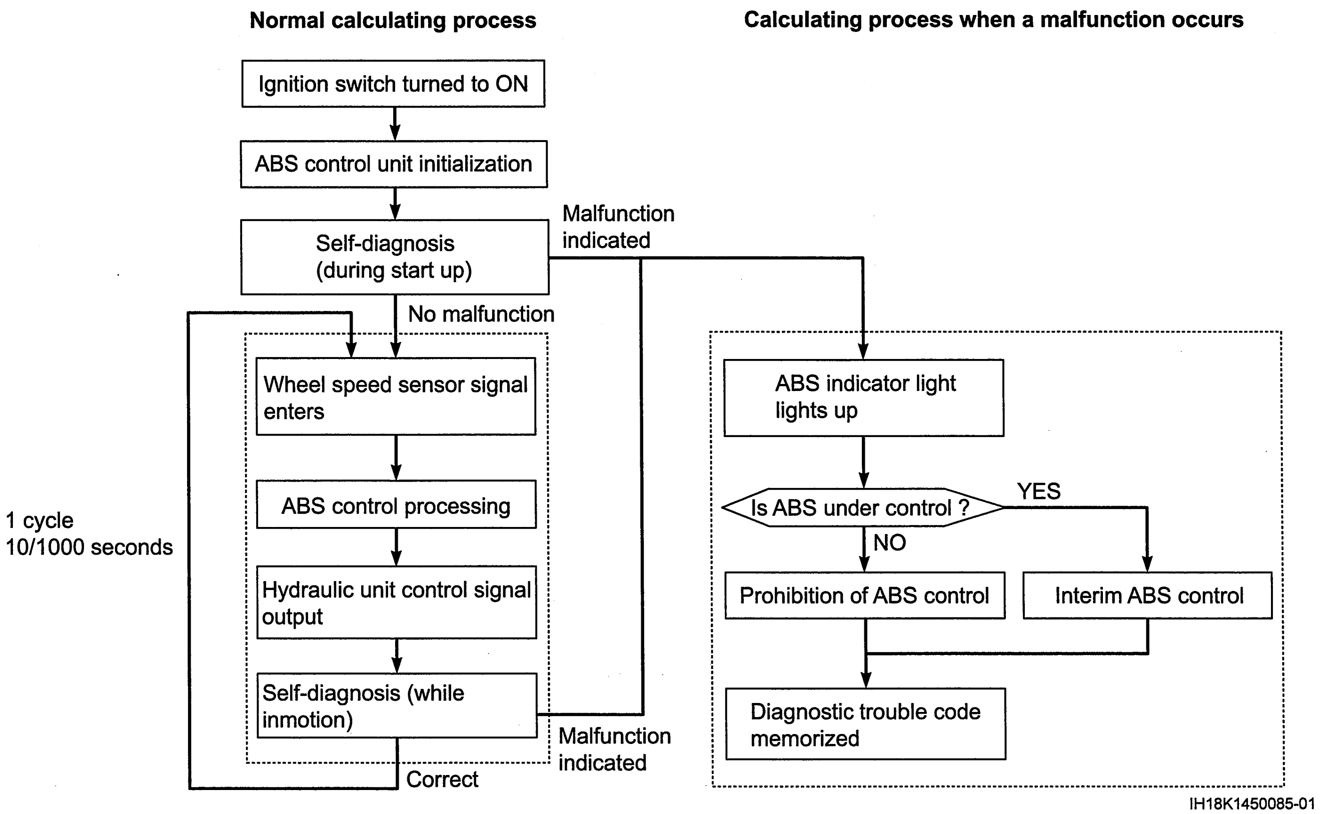
L9 – model



IJ18K5450001-03

ABS Control Unit Calculating Process

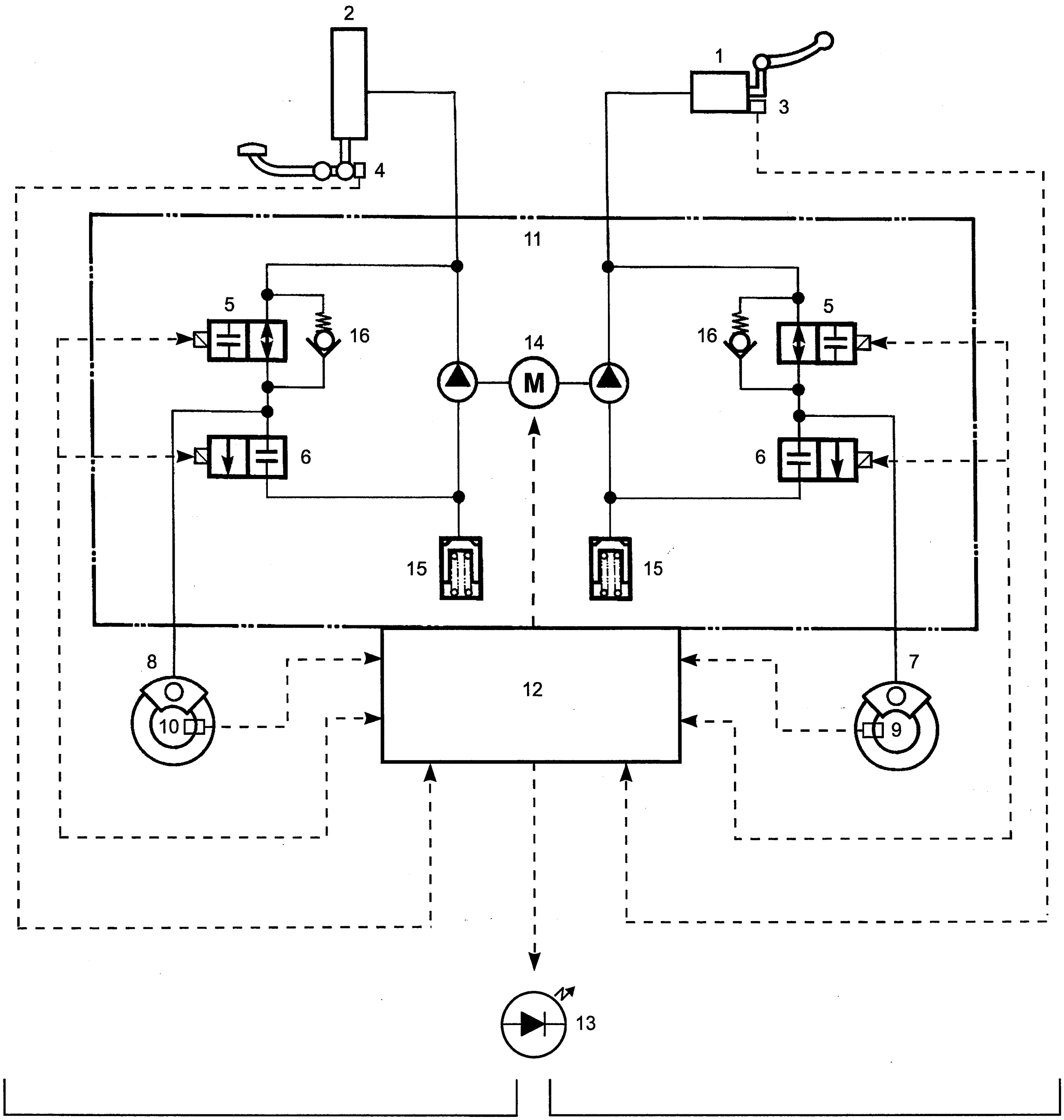
The ABS controls and its calculations, in addition to the self-diagnosing and the fail-safe processes, occur during the ABS control unit calculating process. ABS control is performed in one cycle every 10/1000 seconds. In addition, if a malfunction is detected by the self-diagnosis function, the brake stops being controlled by the ABS and a diagnostic trouble code is stored.


Normal calculating process
Calculating process when a malfunction occurs
Ignition switch turned to ON
ABS control unit initialization
Self-diagnosis (during start up)
Malfunction indicated
No malfunction
Wheel speed sensor signal enters
ABS control processing
Hydraulic unit control signal output
Self-diagnosis (while inmotion)
1 cycle 10/1000 seconds
Malfunction indicated
Correct
ABS indicator light lights up
Is ABS under control ?
YES
NO
Prohibition of ABS control
Interim ABS control
Diagnostic trouble code memorized
IH18K1450085-01

Hydraulic Unit (HU) Description

BENJ18K64501003

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.



IH18K1450082-01

Self-diagnosis Function and ABS Indicator Light Description

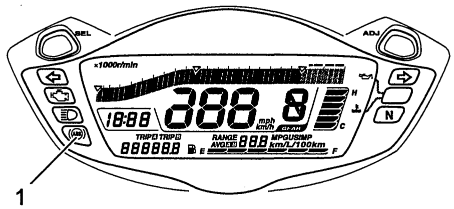
BENJ18K64501004

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 (2P), enables the ABS indicator light to display the diagnostic trouble codes.

ABS Indicator Light

The ABS indicator light (1) 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 LED is not burnt out. It will go off after the motorcycle is ridden at more than 10 km/h (6 mile/h).
- If an ABS malfunction has occurred, the ABS indicator light keeps lighting up.

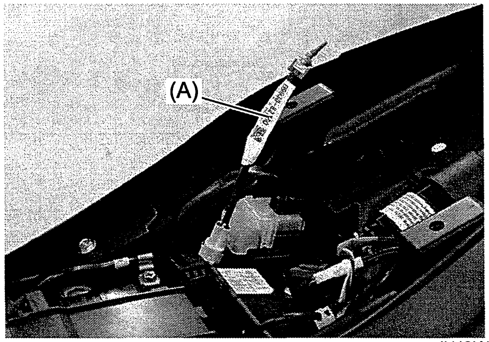


IH18K1450005-01

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. ☞(Page 4E-22)

Special tool
(A): 09930–82760

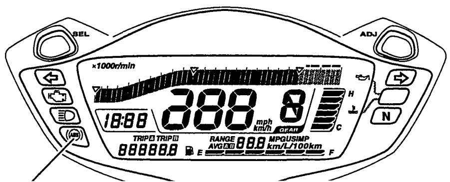


IH18K1450006-01

ABS Operation and ABS Indicator Light

The ABS indicator light (1) 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 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 (6 mile/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 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. ☞(Page 4E-19)

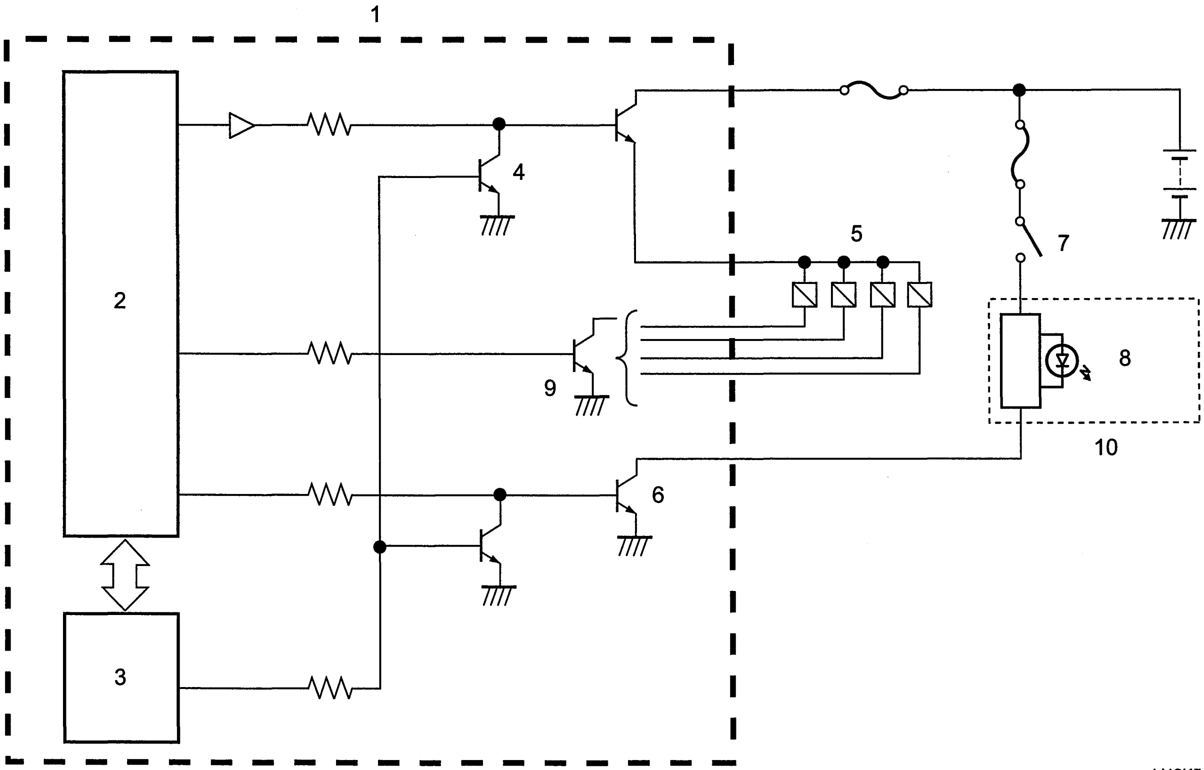


Stored DTCs (Diagnostic Trouble Codes)
As for the diagnostic trouble code, the code of the first malfunction occurred during one ignition ON period will be stored. Pay attention to the fact that even though there may occur several malfunctions in one ON period, only one code will be stored. Codes of 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

BENJ18K64501005

If the main CPU detects an occurrence of a malfunction in the ABS, the fail-safe relay is set OFF and ABS indicator light is turned ON. Consequently, no current will be applied to the solenoid valves and the ABS is not activated. In this case, the brake system functions as a conventional brake. The main and sub CPUs monitor each other and if a CPU detects a malfunction, the fail-safe relay is set OFF, ABS indicator light is turned ON and brake system is fixed in a conventional brake. However, if a malfunction occurs while the ABS is being activated and the main CPU judges that the ABS control can be continued, the ABS indicator light is turned ON and the provisional control of the ABS is set. Upon the moment when the ABS provisional control is over, the fail-safe relay will be set OFF.



IJ18K5450025-01

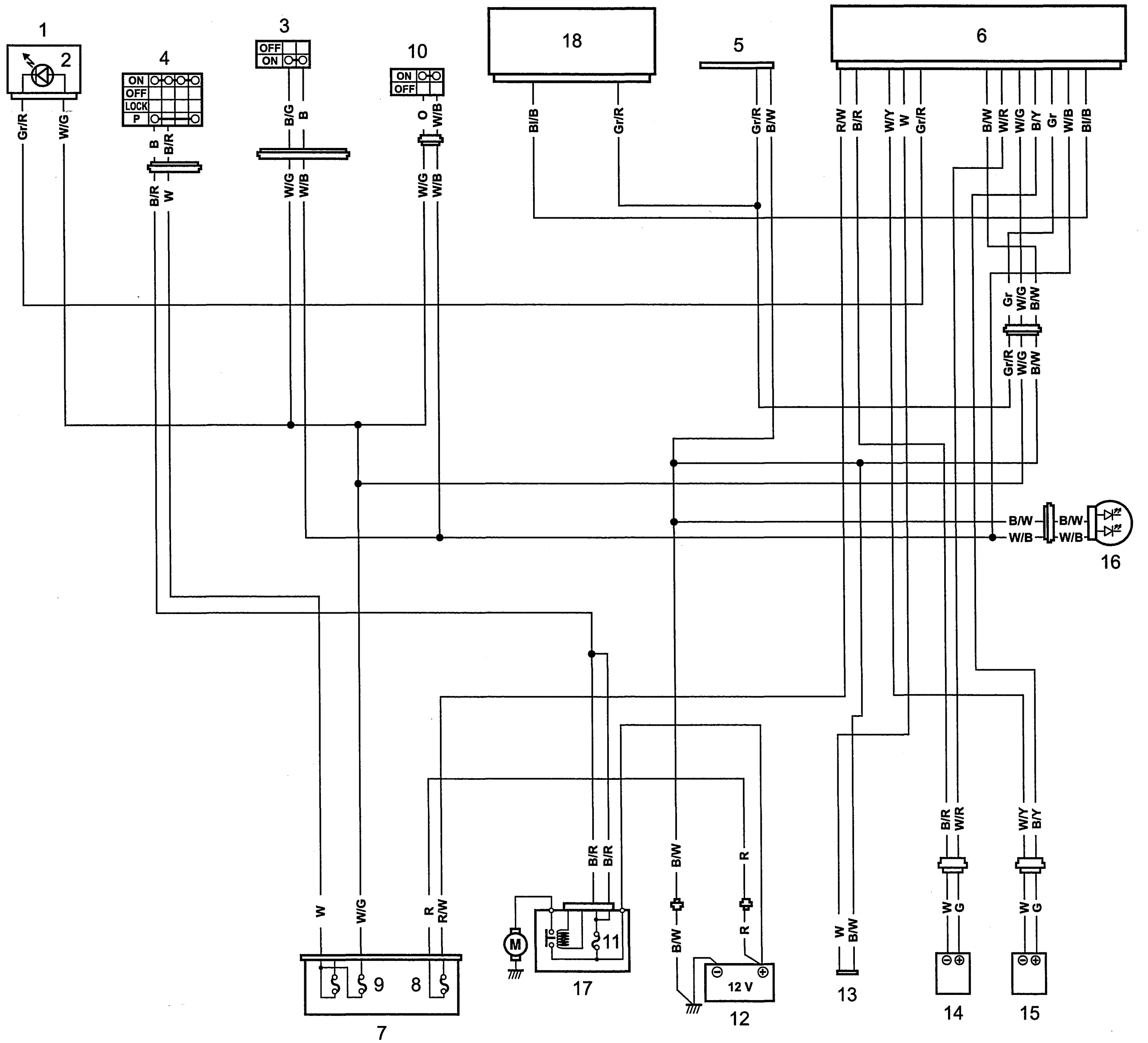
1. ABS control unit	5. Solenoid valves	9. Solenoid relay
2. Main CPU	6. Indicator relay	10. Combination meter
3. Sub CPU	7. Ignition switch	
4. Fail-safe relay	8. ABS indicator light	

Schematic and Routing Diagram

ABS Wiring Diagram

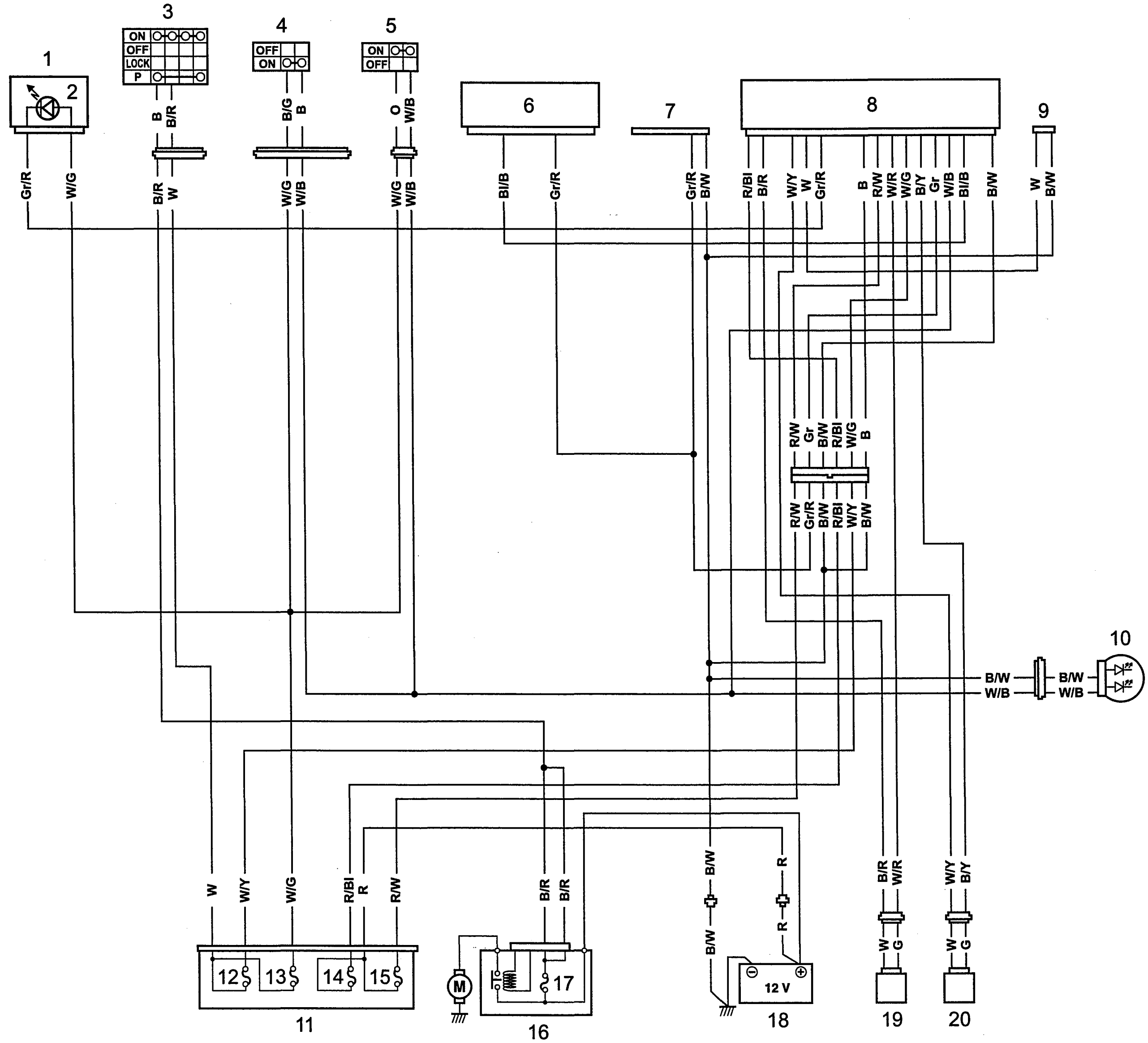
L7 – L8

BENJ18K64502001



IH18K1450008-02

1. Combination meter	7. Fuse box	13. Mode select coupler (2P)
2. ABS indicator light	8. ABS fuse (30 A)	14. Front wheel speed sensor
3. Front brake light switch	9. Signal fuse (15 A)	15. Rear wheel speed sensor
4. Ignition switch	10. Rear brake light switch	16. Rear combination light
5. Mode select coupler (6P)	11. Main fuse (30 A)	17. Starter relay
6. ABS control unit	12. Battery	18. ECM



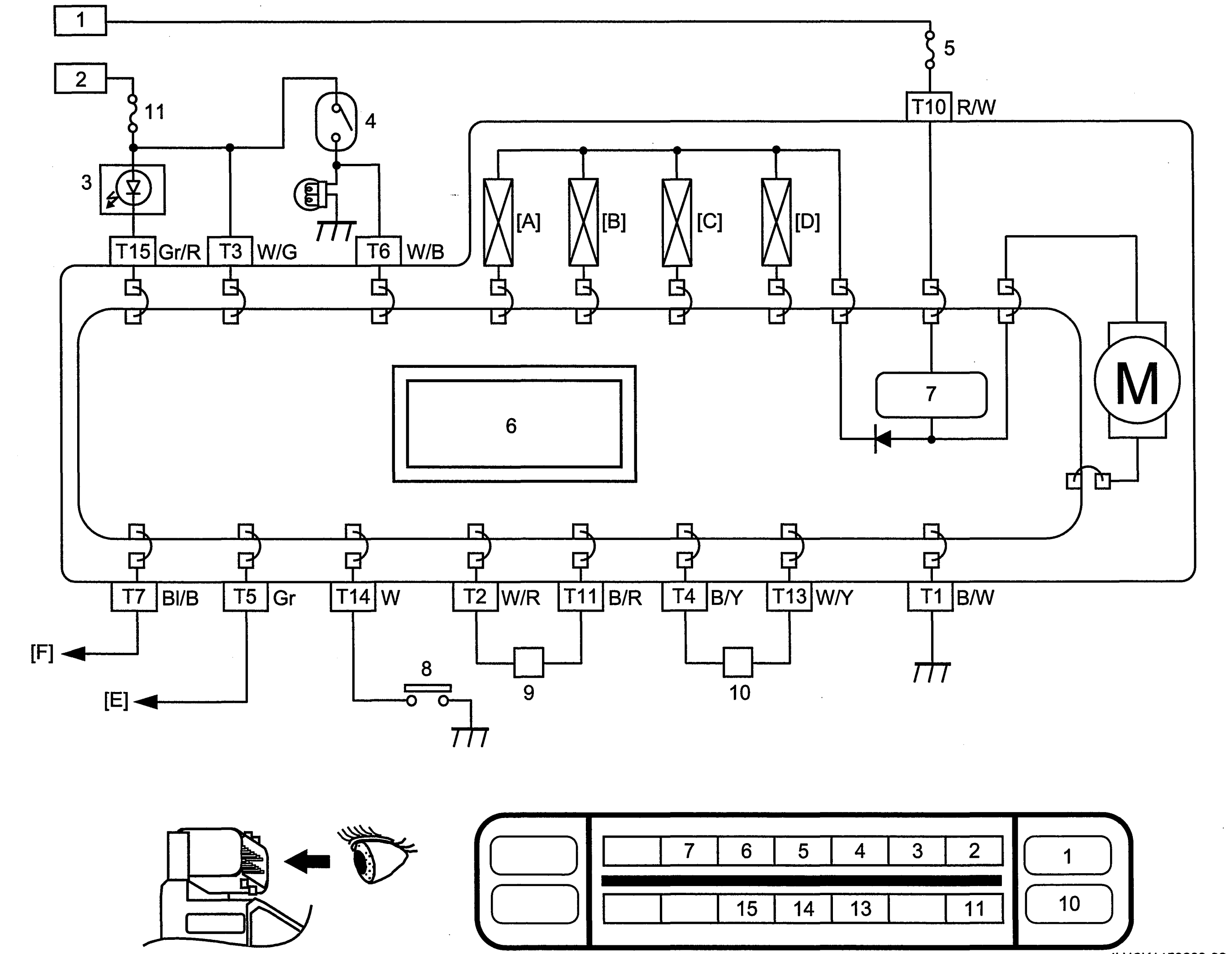
IJ18K5450002-01

1. Combination meter	8. ABS control unit	15. ABS motor fuse (20 A)
2. ABS indicator light	9. Mode select coupler (2P)	16. Starter relay
3. Ignition switch	10. Rear combination light	17. Main fuse (30 A)
4. Front brake light switch	11. Fuse box	18. Battery
5. Rear brake light switch	12. Ignition fuse (15 A)	19. Front wheel speed sensor
6. ECM	13. Signal fuse (15 A)	20. Rear wheel speed sensor
7. Mode select coupler (6P)	14. ABS valve fuse (15 A)	

ABS Control Unit / HU Diagram

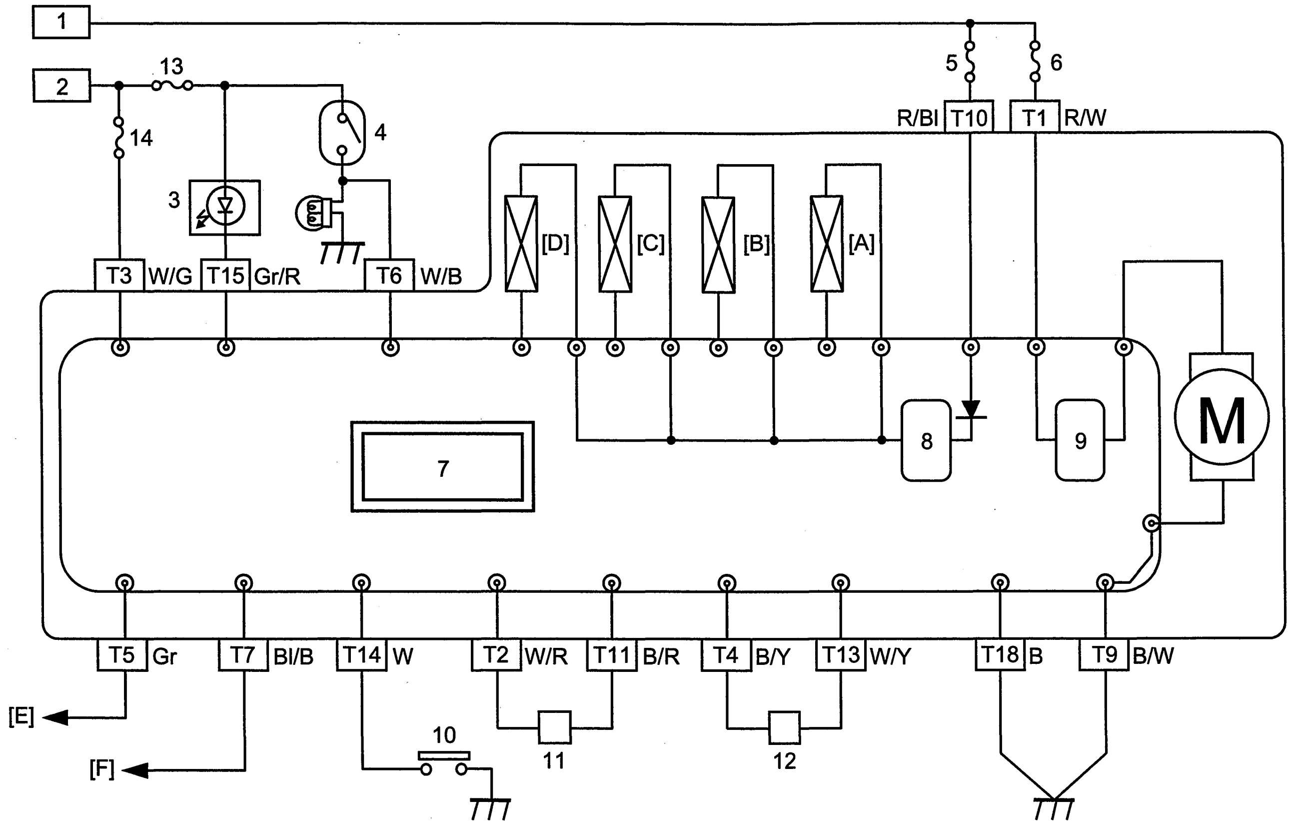
L7 – L8

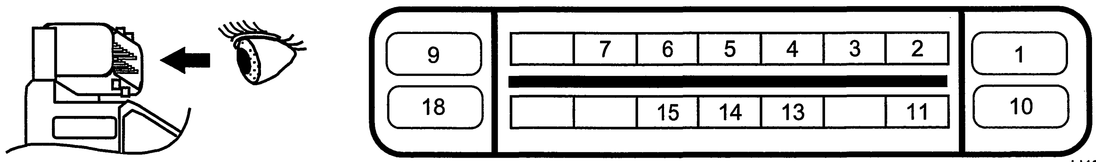
BENJ18K64502002



IH18K1450009-02

[A]:	Front brake solenoid inlet valve	1.	Battery	7.	Fail-safe relay
[B]:	Front brake solenoid outlet valve	2.	Ignition	8.	Mode select coupler (2P)
[C]:	Rear brake solenoid inlet valve	3.	ABS indicator light	9.	Front wheel speed sensor
[D]:	Rear brake solenoid outlet valve	4.	Brake light switch	10.	Rear wheel speed sensor
[E]:	To Mode select coupler (6P)	5.	ABS fuse (30 A)	11.	Signal fuse (15 A)
[F]:	To ECM (Front wheel speed sensor signal)	6.	ABS control unit		





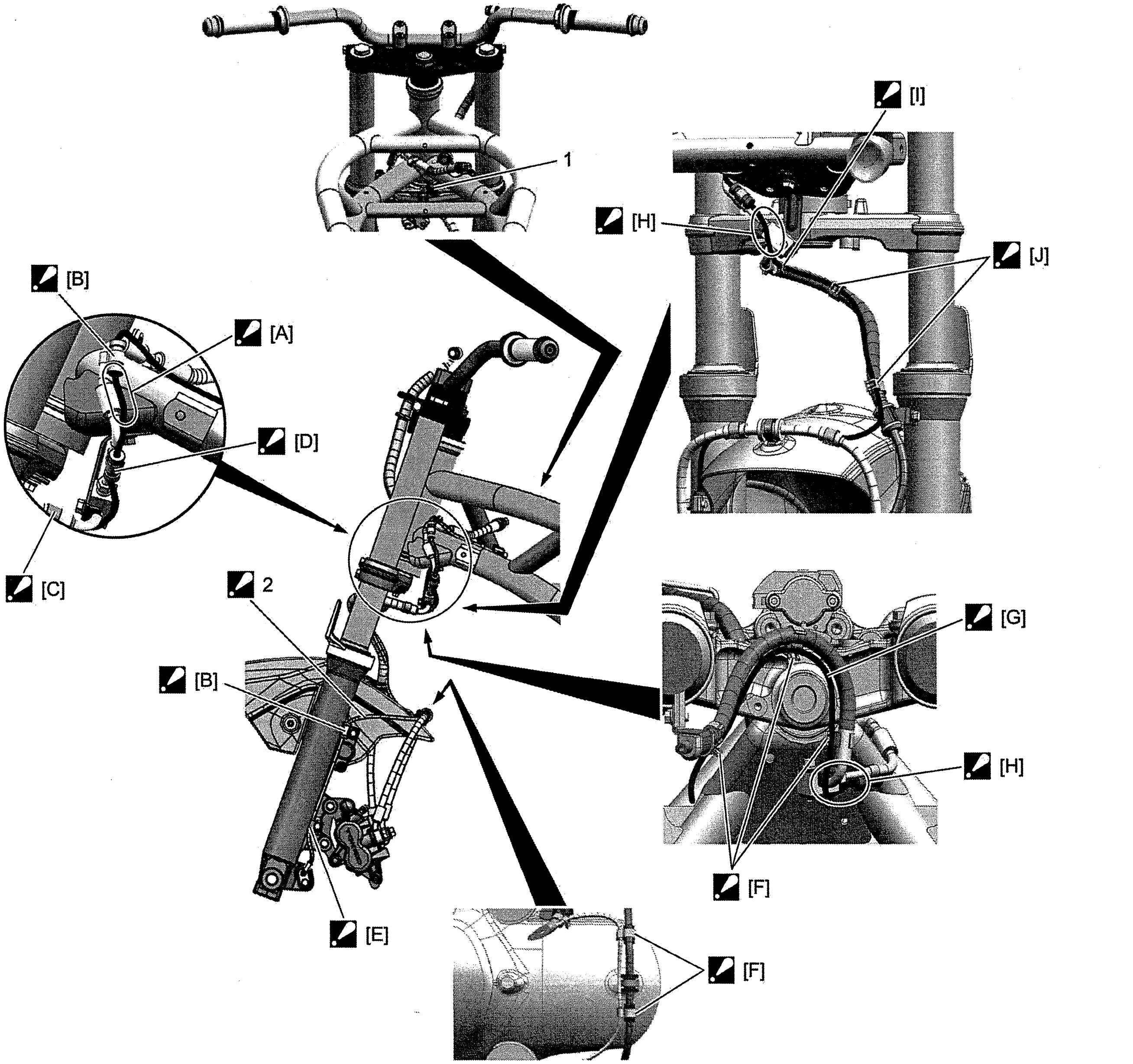
IJ18K5450003-02

[A]:	Front brake solenoid inlet valve	2.	Ignition	9.	Motor relay
[B]:	Front brake solenoid outlet valve	3.	ABS indicator light	10.	Mode select coupler (2P)
[C]:	Rear brake solenoid inlet valve	4.	Brake light switch	11.	Front wheel speed sensor
[D]:	Rear brake solenoid outlet valve	5.	ABS valve fuse (15 A)	12.	Rear wheel speed sensor
[E]:	To Mode select coupler (6P)	6.	ABS motor fuse (20 A)	13.	Signal fuse (15 A)
[F]:	To ECM (Front wheel speed sensor signal)	7.	ABS control unit	14.	Ignition fuse (15 A)
1.	Battery	8.	Fail-safe relay		

Front Wheel Speed Sensor Routing Diagram

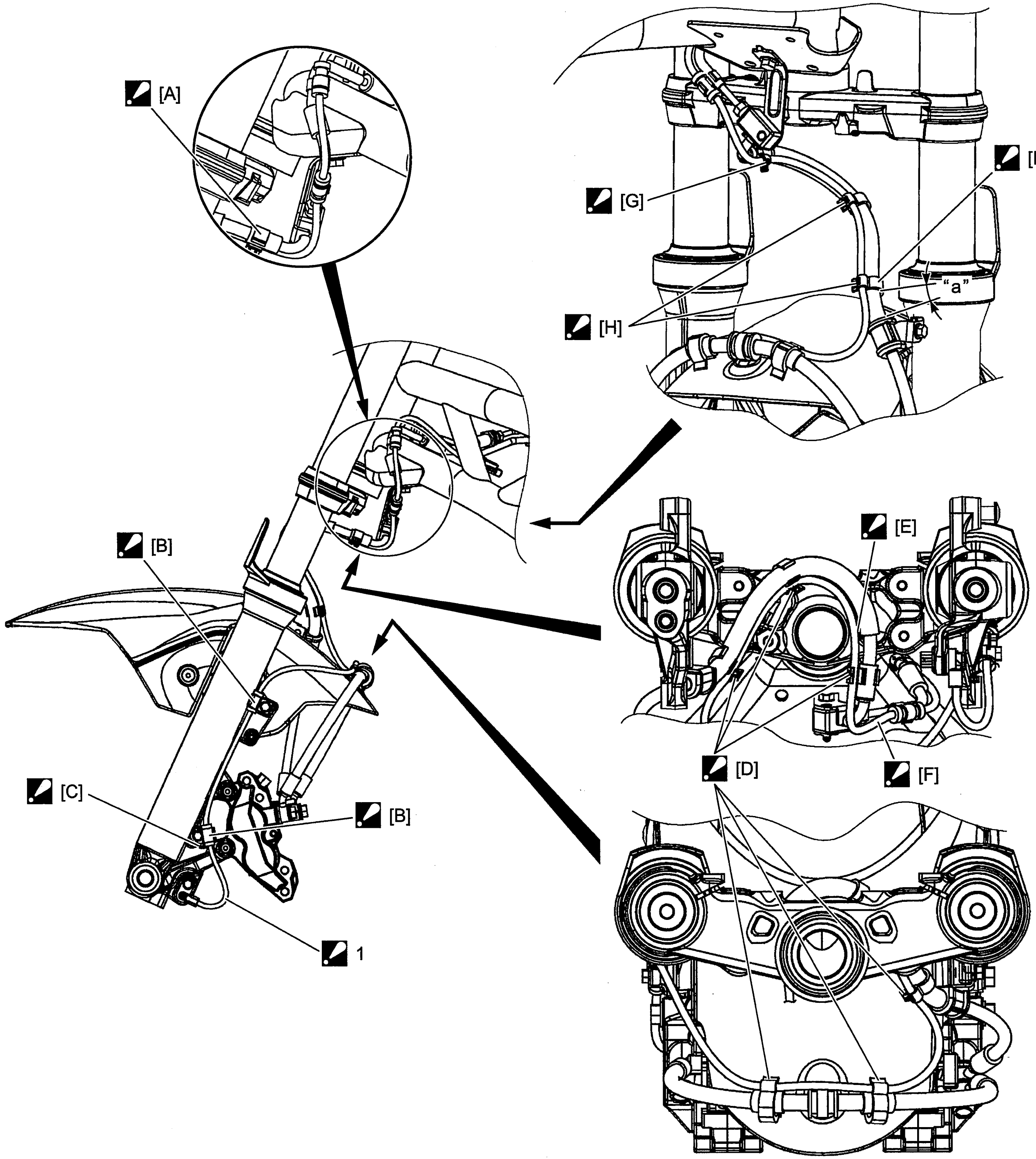
BENJ18K64502003

L7 – L8



IH18K1450086-01

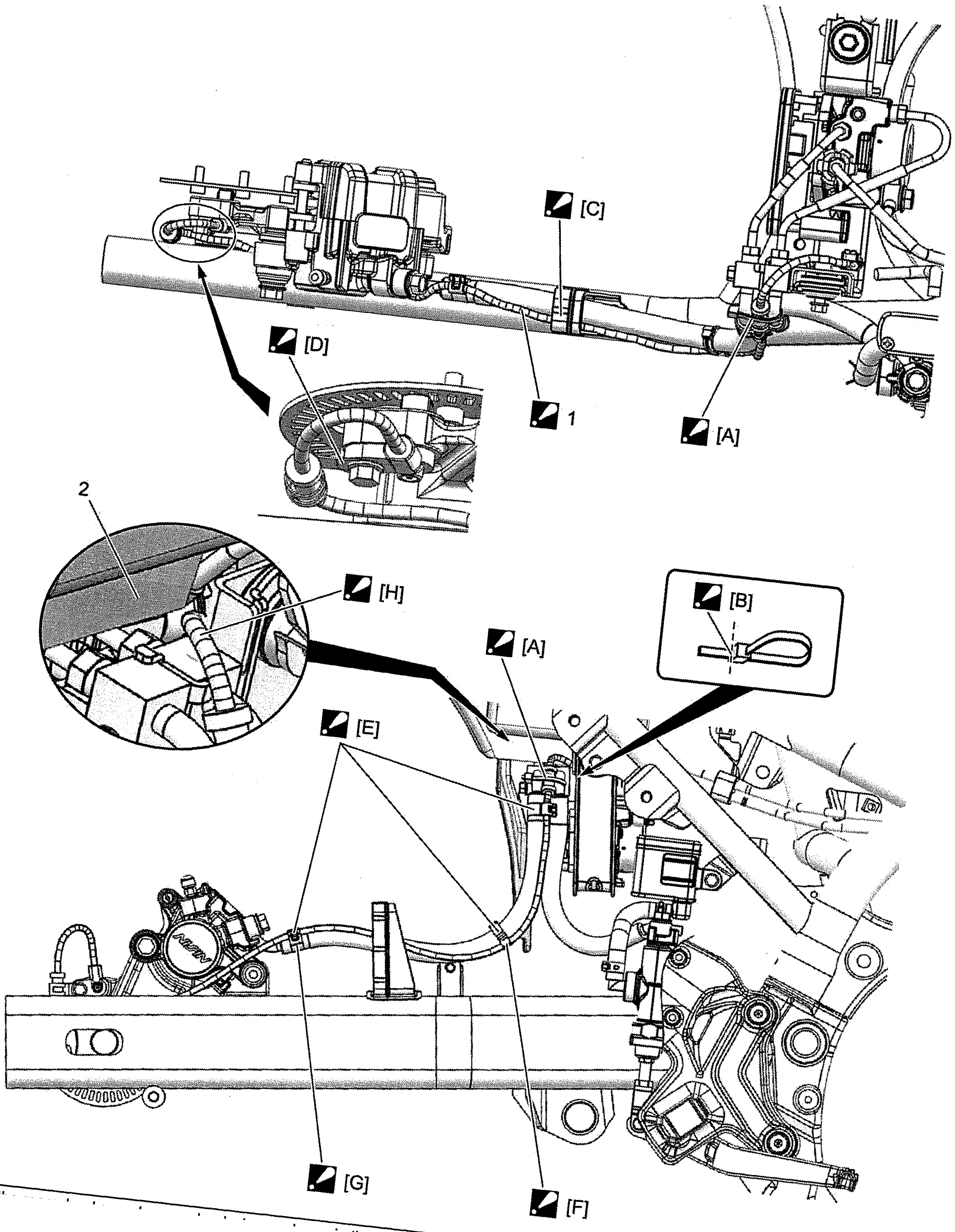
[A]:	Check that there is clearance of at least 5 mm (0.2 in) between the front wheel speed sensor lead wire and frame.	[G]:	Clamp the front wheel speed sensor lead wire along the inside of the brake hose.
[B]:	Fix the front wheel speed sensor lead wire sleeve to the clamp.	[H]:	Pass the front wheel speed sensor lead wire as shown in the figure.
[C]:	Fix the clamp to the brake hose end fitting.	[I]:	Clamp the front wheel speed sensor lead wire to right side of the brake hose.
[D]:	Fix the sensor lead wire sleeve to the clamp. Face the open end of the clamp downward.	[J]:	Clamp the front wheel speed sensor lead wire behind the brake hose.
[E]:	Pass the front wheel speed sensor lead wire between the guide	1.	Front wheel speed sensor coupler

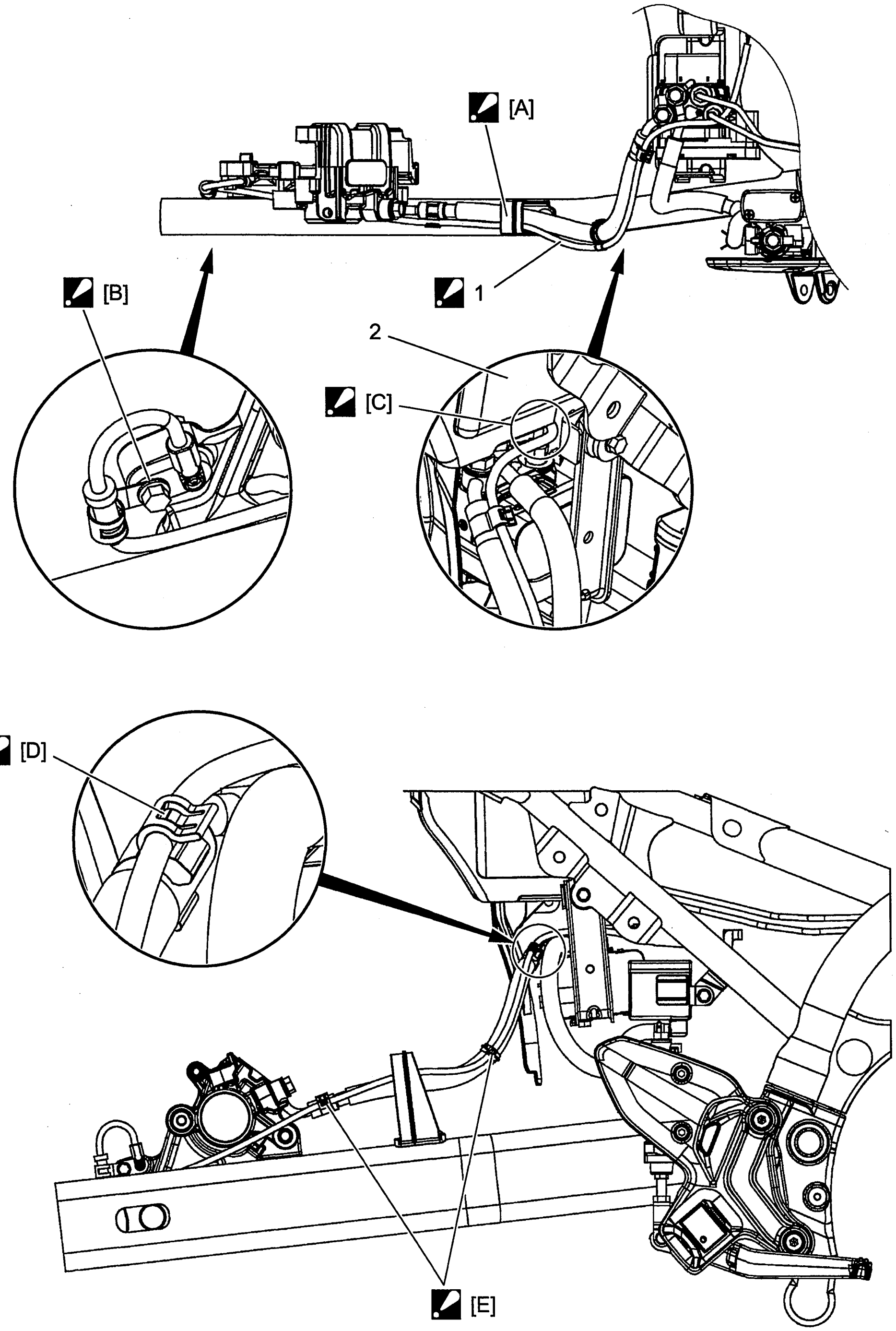


IJ18K5450004-04

[A]: Fix the clamp to the brake hose end fitting.	[G]: Clamp the front wheel speed sensor lead wire to right side of the brake hose.
[B]: Fix the front wheel speed sensor lead wire sleeve to the clamp.	[H]: Clamp the front wheel speed sensor lead wire behind the brake hose.

BENJ18K64502004





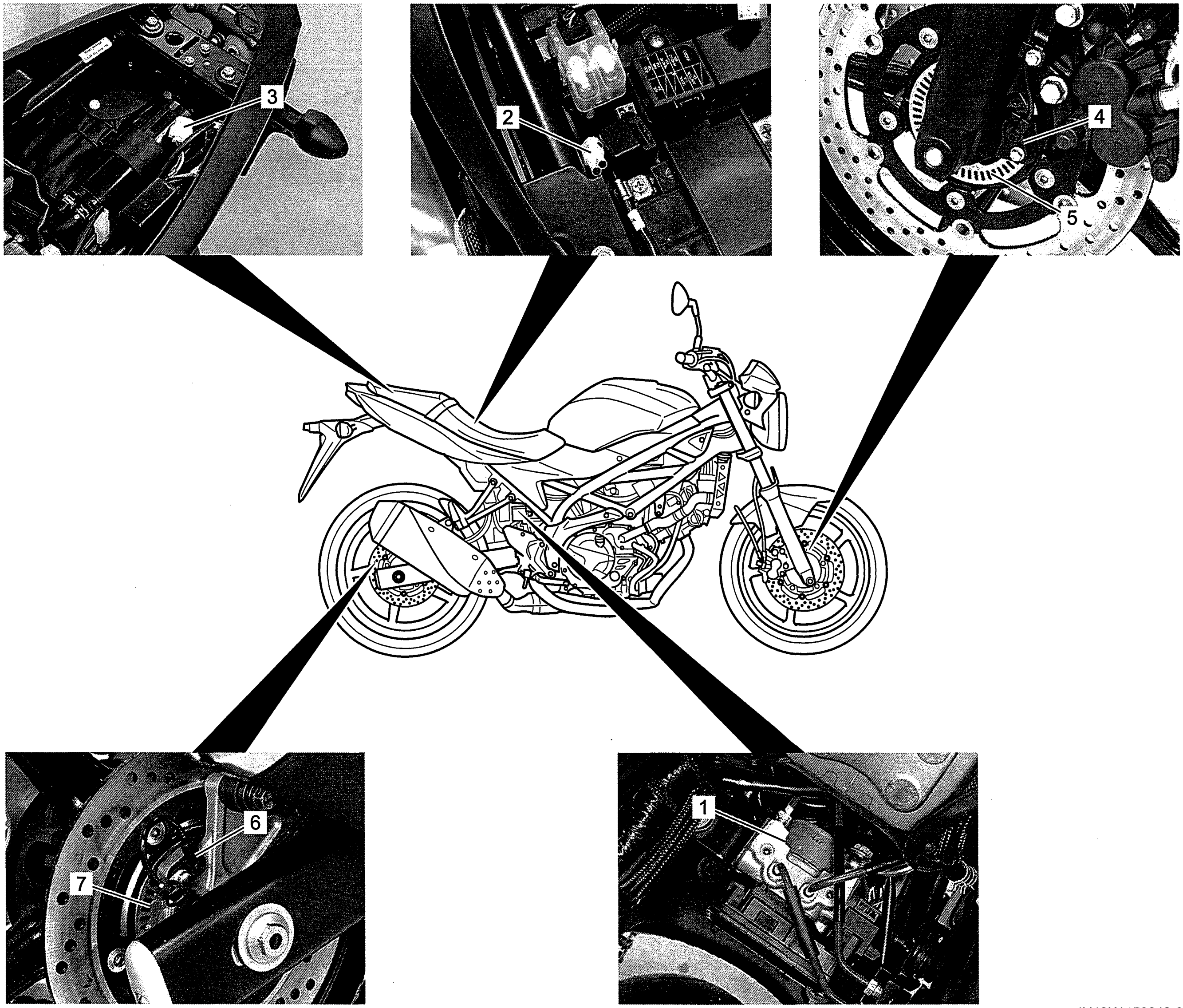
IJ18K5450005-02

[A]: Pass the rear wheel speed sensor lead wire inside of the guide.	[E]: Clamp the rear wheel speed sensor lead wire at white marking portion. Clamp the rear wheel speed sensor lead wire to outside of the brake hose.
[B]: Fix the clamp by tightening the bolt.	1. Rear wheel speed sensor lead wire

Component Location

ABS Components Location

BENJ18K64503001



IH18K1450012-03

1. ABS control unit/HU	3. Mode select coupler (6P)	5. Front wheel speed sensor rotor	7. Rear wheel speed sensor rotor
2. Mode select coupler (2P)	4. Front wheel speed sensor	6. Rear wheel speed sensor	

ABS Check

BENJ18K64504001

Refer to the description after the following general flow for details of each step.

Step 1

Malfunction analysis

1) Perform "Customer Complaint Analysis" (Page 4E-17).
2) Perform "Problem Symptom Confirmation" (Page 4E-18).
3) Perform "DTC Check, Record and Clearance" (Page 4E-18) and recheck DTC.

Is the same DTC detected again after performing the DTC clearance?

Yes Inspect and repair referring to the applicable DTC troubleshooting, and then go to Step 6.

No Go to Step 2.

Step 2

Visual inspection

1) Perform "Visual Inspection" (Page 4E-18).

Is there any faulty condition?

Yes Repair or replace the malfunction part, and then go to Step 6.

No Go to Step 3.

Step 3

Riding test

1) Perform "Riding Test" (Page 4E-18).

Is the malfunction detected?

Yes Repair or replace the malfunction part, and then go to Step 6.

No Go to Step 4.

Step 4

Brakes diagnosis

1) Inspect and repair the ABS. ☞(Page 4E-19)

Is the malfunction detected?

Yes Repair or replace the malfunction part, and then go to Step 6.

No Go to Step 5.

Step 5

Intermittent problem check

1) Check for intermittent troubles. ☞(Page 00-2)

Is the malfunction detected?

Yes Repair or replace the malfunction part, then go to Step 6.

No Go to Step 6.

Step 6

Final confirmation test

1) Perform "Final Confirmation Test" (Page 4E-18).

Does the trouble recur?

Yes Go to Step 4.

No End.

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 a questionnaire form as shown in the following table will facilitate collecting the information to the point required for the proper analysis and diagnosis.

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 OCCURRED	
ABS indicator light	**Riding conditions**
Does not light up	**While stopping**
Lights up **Goes off after running over 10 km/h (6 mile/h):** **Yes / No**	**Over 10 km/h (6 mile/h)** **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 lever and pedal**
Paved road: **Dry / Wet / Others**	**Too large brake lever and pedal strokes** **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 lever and pedal
NOTE:	

NOTE

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

Problem Symptom Confirmation

If a symptom in "Customer Questionnaire" is found or reproduced in the vehicle, confirm the symptom is problem or not. (This step should be done with the customer if possible.) Check the ABS indicator light. ☞(Page 4E-19)

DTC Check, Record and Clearance

Perform "DTC (Diagnostic Trouble Code) Output" (Page 4E-22) procedure, record it and then clear it. ☞(Page 4E-23)

Recheck DTC. ☞(Page 4E-22)

NOTE

After deleting the DTC, perform "Riding Test" (Page 4E-18) and then recheck the DTC.

Riding Test

Ride the motorcycle at more than 30 km/h (19 mile/h) and quickly apply the brakes to check that the ABS activates correctly.

Final Confirmation Test

Confirm that the problem symptom is not observed any more and ABS is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, clear the DTC referring to "DTC (Diagnostic Trouble Code) Deleting" (Page 4E-23) and perform test riding and confirm that the DTC is not indicated.

Visual Inspection

BENJ18K64504002

Check the following parts and systems visually.

Inspection Item		Referring Section
Connectors of electric wire harness	Disconnection, friction	"Precautions for Electrical Circuit Service" in Section 00 (Page 00-2)
Fuses	Burning	"Precautions for Electrical Circuit Service" in Section 00 (Page 00-2)
Brake pad	Worn	"Front Brake Pad Inspection" in Section 4B (Page 4B-3) and "Rear Brake Pad Inspection" in Section 4C (Page 4C-2)
Brake fluid	Level, leakage	"Brake Fluid Level Check" in Section 4A (Page 4A-24)
ABS indicator light	Operation	"ABS Indicator Light Inspection" (Page 4E-19)
Tire	Pressure	"Tire Inspection and Cleaning" in Section 2D (Page 2D-14)
	Type, size	"Tire Inspection and Cleaning" in Section 2D (Page 2D-14)
	Damage, wear	"Tire Inspection and Cleaning" in Section 2D (Page 2D-14)
Wheel	Runout, play	"Wheel / Wheel Axle Inspection" in Section 2D (Page 2D-12)
Other parts that can be checked visually		—

NOTICE

- **The standard tire fitted on this motorcycle is 120/70ZR17M/C (58W) for front and 160/60ZR17M/C (69W) 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 C1625 (25) may be stored.**

ABS Symptom Diagnosis

BENJ18K64504003

Condition	Possible cause	Correction / Reference Item
The ABS indicator light keeps lighting up even though the motorcycle is ridden at more than 10 km/h (6 mile/h).	Malfunctioning the ABS function	*Perform the ABS check. ☞(Page 4E-16)*
	Malfunctioning the ABS indicator light circuit	*Check the ABS indicator light circuit. ☞(Page 4E-19)*
The ABS indicator light does not light up when turning the ignition switch to ON.	Malfunctioning the ABS function	*Perform the ABS check. ☞(Page 4E-16)*
	Malfunctioning the ABS indicator light circuit	*Check the ABS indicator light circuit. ☞(Page 4E-19)*
	Malfunctioning the combination meter	*Check the combination meter. ☞(Page 9C-6)*

ABS Indicator Light Inspection

BENJ18K64504004

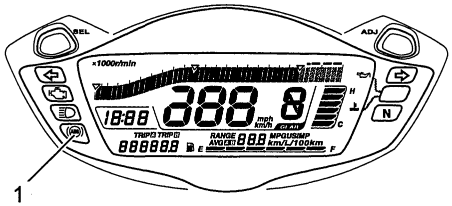
Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-9).

Troubleshooting

Step 1

1) Check if the ABS indicator light (1) lights up when turning the ignition switch ON.



IH18K1450005-01

Does the ABS indicator light lights up?

Yes Go to Step 2.

No Go to Step 3.

Step 2

(The ABS indicator light lights up)

1) Ride the motorcycle at more than 10 km/h (6 mile/h).

Does the ABS indicator light go off?

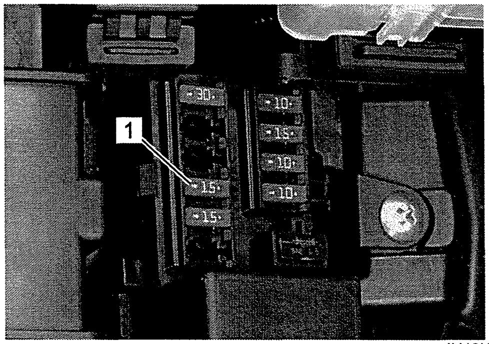
Yes Normal (No DTC exists)

No
- DTC output. ☞(Page 4E-22)
- If DTC can not be output (the ABS indicator light does not flash), go to Step 6.

3) Open the fuse box and inspect the signal fuse (15 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



IH18K1450013-01

Is the signal fuse OK?

Yes Go to Step 4.

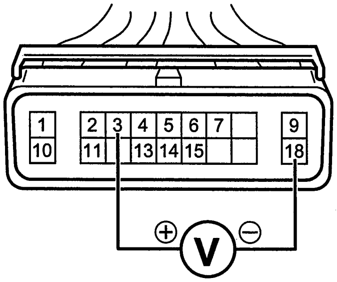
No Replace the signal fuse.

Step 4

1) Disconnect the ABS control unit coupler. ☞(Page 4E-42)
2) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: "T3" (W/G) and "T1" (B/W)
   - L9 – model: "T3" (W/G) and "T18" (B)

L7 – L8 model

L9 – model



IJ18K5450007-01

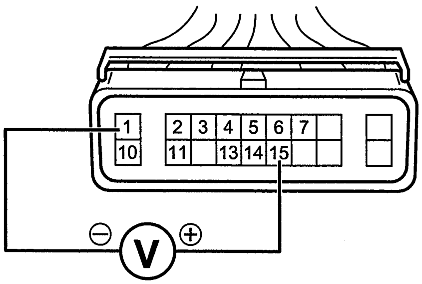
Is the voltage 12 V or more?

Yes	Go to Step 5.
No	Inspect the wire harness. (Faulty ignition wire or ground wire)

Step 5

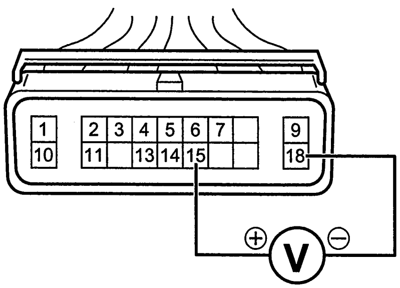
1) Measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: "T15" (Gr/R) and "T1" (B/W)
   - L9 – model: "T15" (Gr/R) and "T18" (B)

L7 – L8 model



IH18K1450055-01

L9 – model



IJ18K5450008-01

Is the voltage 7 V or more?

Yes Replace the ABS control unit/HU.

- L7 – L8 model: ☞(Page 4E-45)

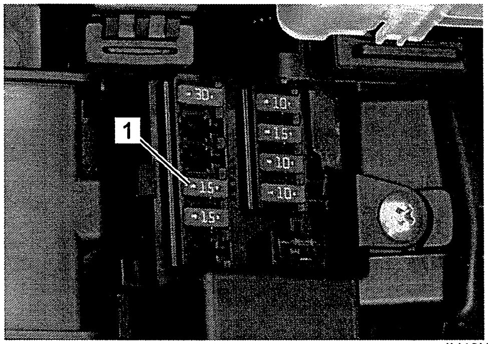
Step 6

(The ABS indicator light does not go off)

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Open the fuse box and inspect the signal fuse (15 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



IH18K1450014-01

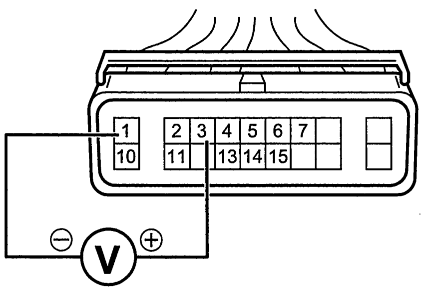
Is the signal fuse OK?

Yes	Go to Step 7.
No	Replace the signal fuse.

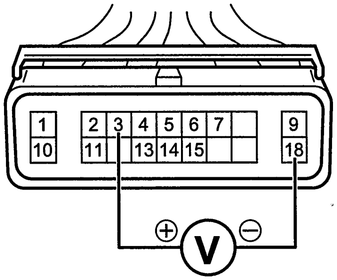
Step 7

1) Disconnect the ABS control unit coupler. ☞(Page 4E-42)
2) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: "T3" (W/G) and "T1" (B/W)
   - L9 – model: "T3" (W/G) and "T18" (B)

L7 – L8 model



L9 – model



IJ18K5450007-01

Is the voltage 12 V or more?

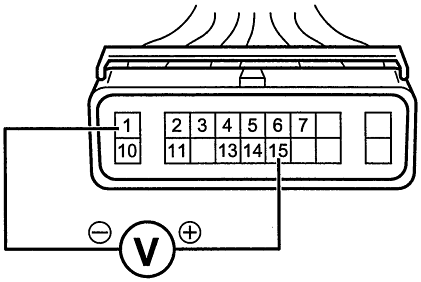
Yes Go to Step 8.

No Inspect the wire harness. (Faulty ignition wire or ground wire)

Step 8

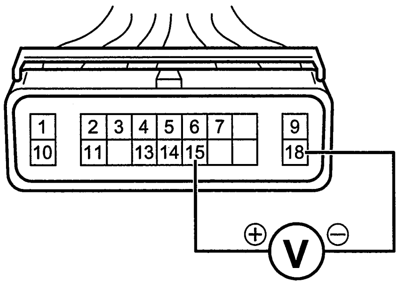
1) Measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: "T15" (Gr/R) and "T1" (B/W)
   - L9 – model: "T15" (Gr/R) and "T18" (B)

L7 – L8 model



IH18K1450057-01

L9 – model



IJ18K5450009-01

Is the voltage 7 V or more?

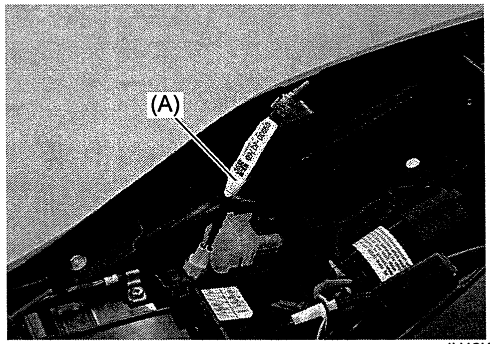
Yes Go to Step 9.

No Inspect the wire harness. (Faulty indicator

Step 9

1) Turn the ignition switch OFF.
2) Short the mode select coupler (2P) terminals using the special tool.

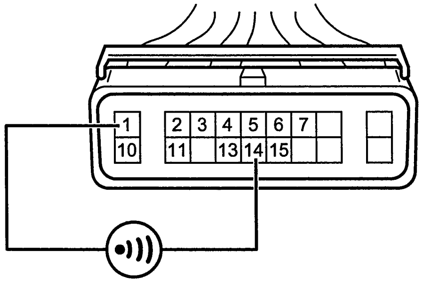
   Special tool
   (A): 09930–82760



IH18K1450015-01

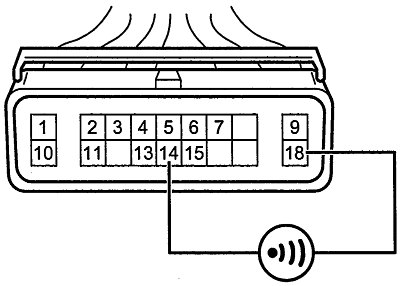
3) Check for continuity between the following terminals at the coupler.
   - L7 – L8 model: "T14" (W) and "T1" (B/W)
   - L9 – model: "T14" (W) and "T18" (B)

L7 – L8 model



IH18K1450058-01

L9 – model



IJ18K5450010-01

Is continuity indicated?

Yes Replace the ABS control unit/HU.

DTC (Diagnostic Trouble Code) Output

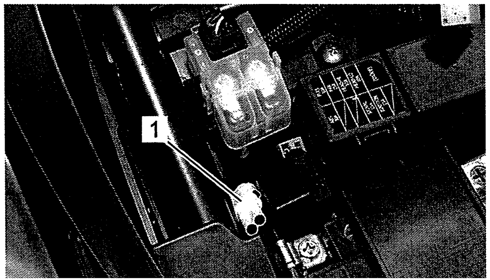
BENJ18K64504005

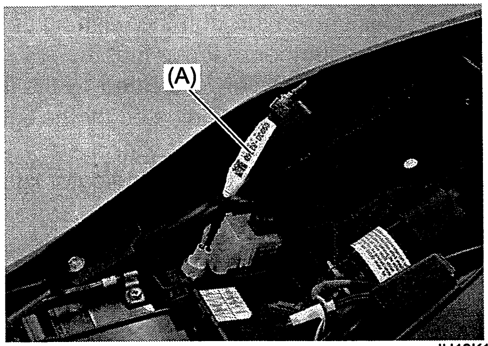
NOTE

- **If there is a DTC recorded, the ABS indicator light repeatedly flashes in a cyclic manner.**
- **If no DTC is recorded, the ABS indicator light keeps lighting.**
- **In the case that the mode select switch is turned OFF or the vehicle speed (both wheels) exceeds 2 km/h (1 mile/h), the output of DTC will be interrupted.**
- **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.**
- **Be sure to read "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) and "Precautions for ABS Service" (Page 4E-1) before inspection and observe what is written there.**
- **After carrying out DTC deleting and ABS operation check, explain to the customer that the ABS is operating correctly. ☞(Page 4E-23)**
- **DTC can be checked by using the SDS. Refer to the SDS operation manual for further details.**

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Connect the special tool to the mode select coupler (2P) (1).

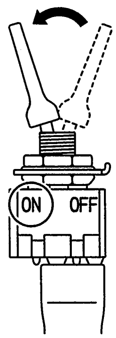
Special tool
(A): 09930–82760





IH18K1450017-01

4) Switch the special tool to ON.

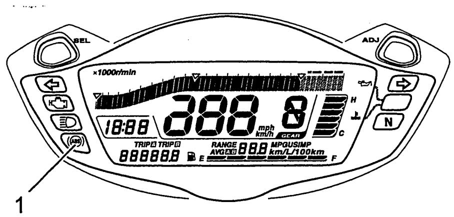


I718H1450040-03

5) Turn the ignition switch ON.
   The ABS indicator light (1) starts flashing to indicate the DTC. ☞(Page 4E-25)

NOTE

If the DTCs are to be output for a long time, remove the HEAD-LO fuse in order to prevent the battery from discharging.



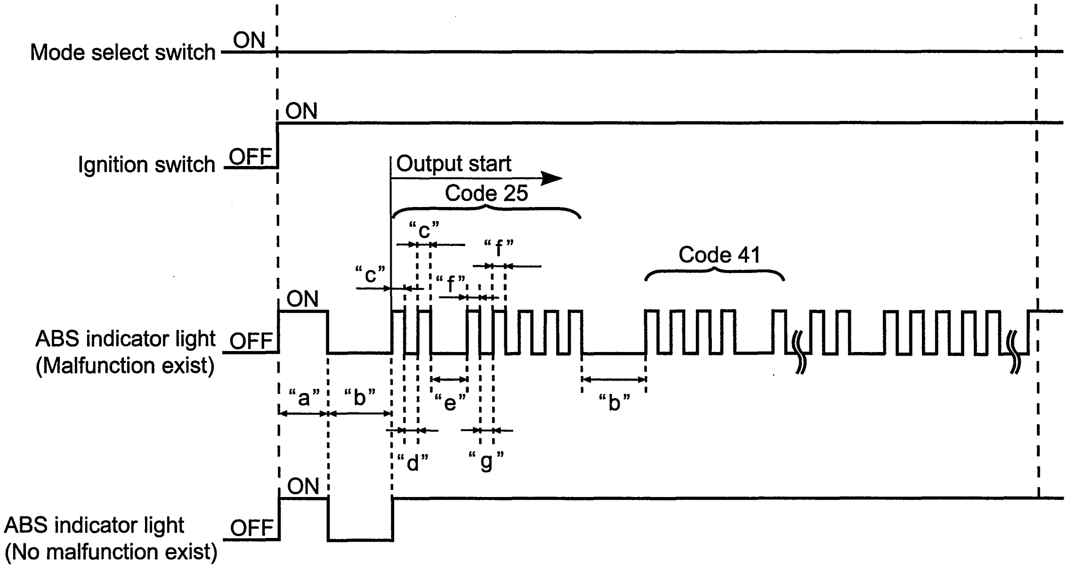
IH18K1450005-01

6) Turn the ignition switch OFF and disconnect the special tool.
7) Install the seat. ☞(Page 9D-18)

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.



IH18K1450018-01

"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)	

DTC (Diagnostic Trouble Code) Deleting

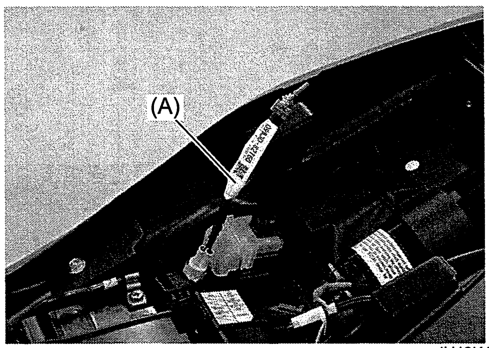
BENJ18K64504006

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 special tool.**
- **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.**
- **DTC can be checked by using the SDS. Refer to the SDS operation manual for further details.**

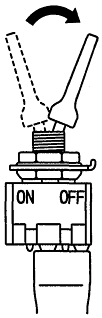
1) Connect the special tool to the mode select coupler (2P). ☞(Page 4E-22)

Special tool
(A): 09930–82760



IH18K1450019-01

2) Switch the special tool to ON and turn the ignition switch ON.
3) While the DTCs are being output, set the special tool to OFF. The DTC deletion mode is started after the switch is set to OFF.

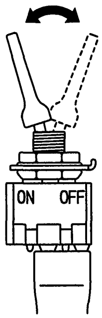


I718H1450050-02

4) In the DTC deletion mode, switch the special tool from OFF to ON three times within 12.5 seconds, each time leaving it at ON for more than 1 second.

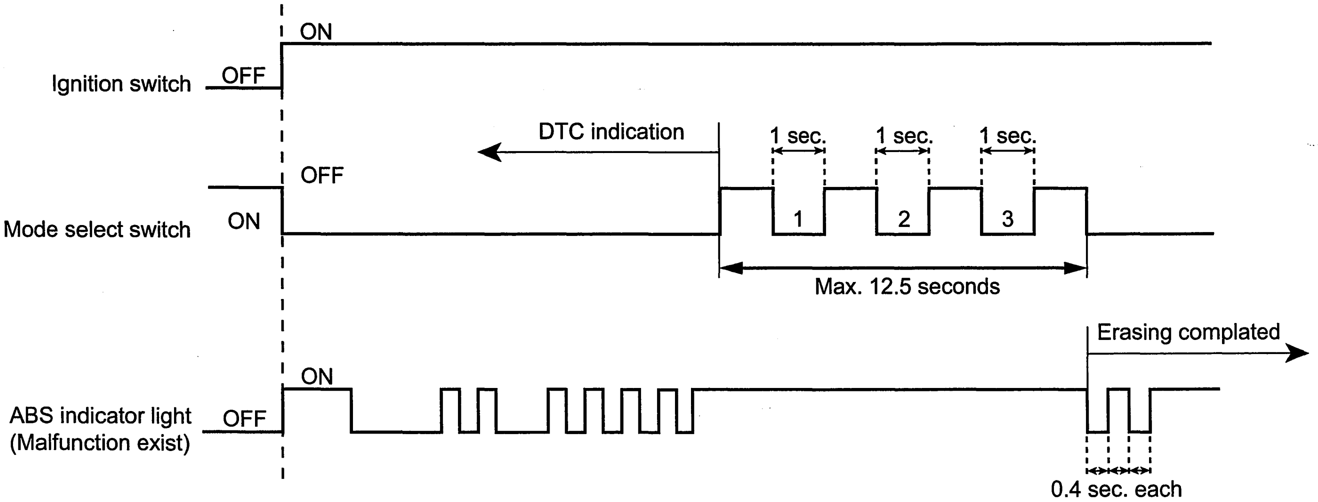
NOTE

After deleting DTC with the mode select switch in ON position, the system resumes the self-diagnosis mode again and outputs the DTC.



I718H1450051-02

DTC Deleting Diagram



IH18K1450053-04

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) Turn the ignition switch OFF and disconnect the special tool.
7) Install the removed parts.

DTC Table

BENJ18K64504007

DTC	Malfunction cause	Indicator status	Reference
None	Normal	ON *1	—
C1613 (13)	Wheel speed sensor rotor malfunction (F)	ON	☞(Page 4E-26)
C1614 (14)	Wheel speed sensor rotor malfunction (R)	ON	☞(Page 4E-27)
C1622 (22)	ABS actuator circuit malfunction (F)	ON	☞(Page 4E-28)
C1623 (23)	ABS actuator circuit malfunction (R)	ON	☞(Page 4E-28)
C1625 (25)	Wheel speed sensor related malfunction	ON	☞(Page 4E-29)
C1635 (35)	ABS motor malfunction	ON	• L7 – L8 model: ☞(Page 4E-30) • L9 – model: ☞(Page 4E-30)
C1641 (41)	Wheel speed sensor signal malfunction (F) *2	ON	☞(Page 4E-31)
C1642 (42)	Wheel speed sensor circuit open (F) *2	ON	☞(Page 4E-32)
C1643 (43)	Wheel speed sensor circuit short (F) *2	ON	☞(Page 4E-34)
C1644 (44)	Wheel speed sensor signal malfunction (R) *2	ON	☞(Page 4E-35)
C1645 (45)	Wheel speed sensor circuit open (R) *2	ON	☞(Page 4E-35)
C1646 (46)	Wheel speed sensor circuit short (R) *2	ON	☞(Page 4E-37)
C1647 (47)	Supply voltage (Increased)	ON	☞(Page 4E-38)
C1648 (48)	Supply voltage (Decreased)	ON	☞(Page 4E-38)
C1655 (55)	ABS control unit malfunction	ON	☞(Page 4E-39)
C1661 (61)	ABS solenoid malfunction	ON	• L7 – L8 model: ☞(Page 4E-40) • L9 – model: ☞(Page 4E-41)

*1: It goes off after running at more than 10 km/h (6 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.

NOTE

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 C1613 (13)

BENJ18K64504008

Possible Cause
C1613 (13): Wheel Speed Sensor Rotor Malfunction (F)
• Front wheel speed sensor rotor distortion
• Faulty front wheel speed sensor or wiring discontinuity, etc.

Troubleshooting

Step 1

1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. ☞(Page 4E-44)

Is the clearance OK?

Yes Go to Step 2.

No Adjust the clearance.

Step 2

1) Inspect the front wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings. ☞(Page 4E-44)

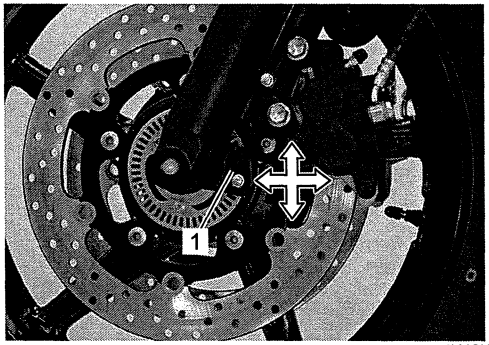
Is the sensor rotor OK?

Yes Go to Step 3.

No Clean or replace the sensor rotor. ☞(Page 4E-43)

Step 3

1) Check that the front wheel speed sensor (1) is mounted securely.



IH18K1450020-01

Is the sensor mounted securely?

Yes Go to Step 4.

No Tighten the mounting bolt.

Step 4

1) Inspect the front tire type, size, pressure and wheel runout. Refer to "Tire Inspection and Cleaning" in Section 2D (Page 2D-14) and "Wheel / Wheel Axle Inspection" in Section 2D (Page 2D-12).

Are the front tire type, size, pressure and wheel runout OK?

Yes Go to Step 5.

No Adjust or replace the front tire and wheel.

Step 5

1) Disconnect the front wheel speed sensor coupler. ☞(Page 4E-42)
2) Measure the front wheel speed sensor current. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection" (Page 4E-44).

Is check result OK?

Yes Replace the ABS control unit/HU.

- L7 – L8 model: ☞(Page 4E-45)
- L9 – model: ☞(Page 4E-46)

No Faulty front wheel speed sensor. ☞(Page 4E-42)

DTC C1614 (14)

BENJ18K64504009

Possible Cause
C1614 (14): Wheel Speed Sensor Rotor Malfunction (R)
• Rear wheel speed sensor rotor distortion
• Faulty rear wheel speed sensor or wiring discontinuity, etc.

Troubleshooting

Step 1

1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge. ☞(Page 4E-44)

Is the clearance OK?

Yes Go to Step 2.

No Adjust the clearance.

Step 2

1) Inspect the rear wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings. ☞(Page 4E-44)

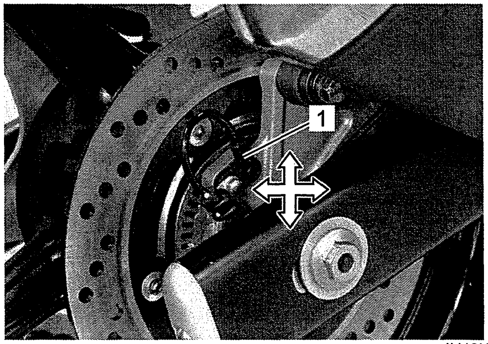
Is the sensor rotor OK?

Yes Go to Step 3.

No Clean or replace the sensor rotor. ☞(Page 4E-44)

Step 3

1) Check that the rear wheel speed sensor (1) is mounted securely.



IH18K1450021-01

Is the sensor mounted securely?

Yes Go to Step 4.

No Tighten the mounting bolt.

Step 4

1) Inspect the rear tire type, size, pressure and wheel runout. Refer to "Tire Inspection and Cleaning" in Section 2D (Page 2D-14) and "Wheel / Wheel Axle Inspection" in Section 2D (Page 2D-12).

Are the rear tire type, size, pressure and wheel runout OK?

Yes Go to Step 5.

No Adjust or replace the rear tire and wheel.

Step 5

1) Disconnect the rear wheel speed sensor coupler. ☞(Page 4E-43)
2) Measure the rear wheel speed sensor current. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection" (Page 4E-44).

Is check result OK?

Yes Replace the ABS control unit/HU.

- L7 – L8 model: ☞(Page 4E-45)
- L9 – model: ☞(Page 4E-46)

No Faulty rear wheel speed sensor. ☞(Page 4E-43)

DTC C1622 (22)

BENJ18K64504010

Possible Cause
C1622 (22): ABS actuator circuit malfunction (F)
• Wire harness discontinuity
• Front wheel locking, etc.

Troubleshooting

Step 1

1) Raise the front wheel off the ground and support the motorcycle with a jack.
2) Inspect the dragging of the front brake.

Is there any dragging in the front brake?

Yes Inspect the front brake master cylinder and the calipers.

No Go to Step 2.

Step 2

1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. ☞(Page 4E-44)

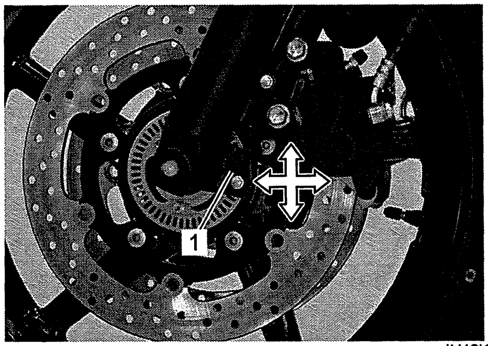
Is the clearance OK?

Yes Go to Step 3.

No Adjust the clearance.

Step 3

1) Check that the front wheel speed sensor (1) is mounted securely.



IH18K1450022-01

Is the sensor mounted securely?

Yes Replace the ABS control unit/HU.

- L7 – L8 model: ☞(Page 4E-45)
- L9 – model: ☞(Page 4E-46)

No Tighten the mounting bolt.

DTC C1623 (23)

BENJ18K64504011

Possible Cause
C1623 (23): ABS Actuator Circuit Malfunction (R)
• Wire harness discontinuity
• Rear wheel locking, etc.

Troubleshooting

Step 1

1) Raise the rear wheel off the ground and support the motorcycle with a jack.
2) Inspect the dragging of the rear brake.

Is there any dragging in the rear brake?

Yes Inspect the rear brake master cylinder and the caliper.

No Go to Step 2.

Step 2

1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge. ☞(Page 4E-44)

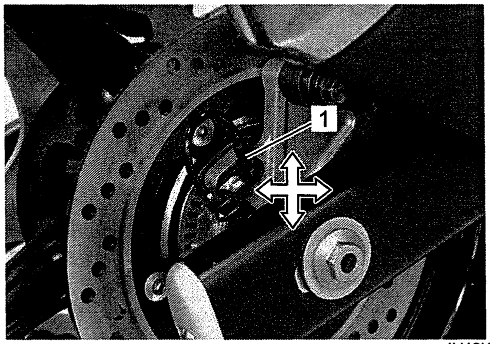
Is the clearance OK?

Yes Go to Step 3.

No Adjust the clearance.

Step 3

1) Check that the rear wheel speed sensor (1) is mounted securely.



IH18K1450023-01

Is the sensor mounted securely?

Yes	Replace the ABS control unit/HU. • L7 – L8 model: ☞(Page 4E-45) • L9 – model: ☞(Page 4E-46)
No	Tighten the mounting bolt.

DTC C1625 (25)

BENJ18K64504012

Possible Cause
C1625 (25): Wheel Speed Sensor Related Malfunction • Incorrect tire size, poor tire pressure • Deformed wheel, etc.

Troubleshooting

Step 1

1) Check that the specified tires are installed. ☞(Page 2D-14)

Are the tires OK?

Yes	Go to Step 2.
No	Use the specified tires.

Step 2

1) Make sure the tire pressure for each tire. ☞(Page 2D-14)

Is the tire pressure for each tire correct?

Yes	Go to Step 3.
No	Adjust the tire pressure.

Step 3

1) Inspect both wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings. ☞(Page 4E-44)

Are the rotors OK?

Yes	Go to Step 4.
No	Clean or replace the rotor. • Front wheel speed sensor rotor: ☞(Page 4E-43) • Rear wheel speed sensor rotor: ☞(Page 4E-44)

Step 4

1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge. ☞(Page 4E-44)

Are the clearances OK?

Yes	Replace the ABS control unit/HU. • L7 – L8 model: ☞(Page 4E-45) • L9 – model: ☞(Page 4E-46)
No	Adjust the clearance.

DTC C1635 (35) (L7 – L8)

BENJ18K64504013

Possible Cause
C1635 (35): ABS Motor Malfunction
Faulty HU motor

Troubleshooting

Step 1

1) Delete DTCs and repeat the code output procedure. Refer to “DTC (Diagnostic Trouble Code) Deleting” (Page 4E-23) and “DTC (Diagnostic Trouble Code) Output” (Page 4E-22).

Is the DTC C1635 (35) output again?

Yes Replace the ABS control unit/HU. ☞(Page 4E-45)

No Intermittent trouble.

DTC C1635 (35) (L9 –)

BENJ18K64504014

Possible Cause
C1635 (35): ABS Motor Malfunction
• HU motor power supply circuit open or short
• Faulty ABS control unit

Wiring Diagram

Refer to “ABS Control Unit / HU Diagram” (Page 4E-9).

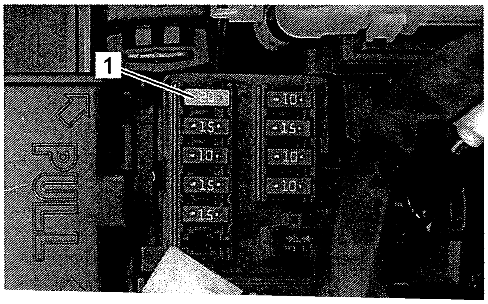
Troubleshooting

Step 1

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Open the fuse box and inspect the ABS motor fuse (20 A) (1).

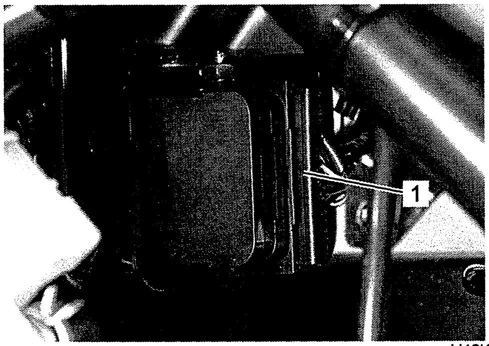
NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



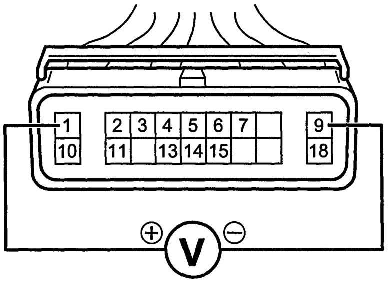
Step 2

1) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)



IJ18K5450016-01

2) Measure the voltage between "11" (R/W) and "19" (B/W) at the coupler.



IJ18K5450017-01

Is the voltage 12 V or more?

Yes Go to Step 3.

No Inspect the wire harness. (Faulty power supply or ground wire)

Step 3

1) Delete DTCs and repeat the code output procedure. Refer to "DTC (Diagnostic Trouble Code) Deleting" (Page 4E-23) and "DTC (Diagnostic Trouble Code) Output" (Page 4E-22).

Is the DTC C1635 (35) output again?

Yes Replace the ABS control unit/HU. ☞(Page 4E-46)

No Intermittent trouble.

DTC C1641 (41)

BENJ18K64504015

Possible Cause
C1641 (41): Wheel Speed Sensor Signal Malfunction (F)
• Poor contact in the front wheel speed sensor coupler • Faulty front wheel speed sensor, etc.

Troubleshooting

Step 1

1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. ☞(Page 4E-44)

Is the clearance OK?

Yes Go to Step 2.

No Adjust the clearance.

Step 2

1) Inspect the front wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings. ☞(Page 4E-44)

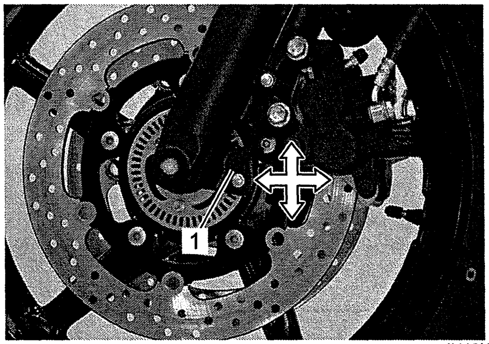
Is the sensor rotor OK?

Yes Go to Step 3.

No Clean or replace the sensor rotor. ☞(Page 4E-43)

Step 3

1) Check that the front wheel speed sensor (1) is mounted securely.



IH18K1450024-01

Is the sensor mounted securely?

Yes Go to DTC C1642 (42). ☞(Page 4E-32)

No Tighten the mounting bolt.

DTC C1642 (42)

BENJ18K64504016

Possible Cause
C1642 (42): Wheel Speed Sensor Circuit Open (F)
• Poor contact in the front wheel speed sensor coupler
• Faulty front wheel speed sensor

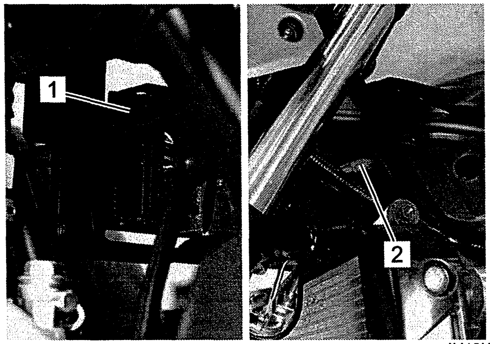
Wiring Diagram

Refer to “ABS Control Unit / HU Diagram” (Page 4E-9).

Troubleshooting

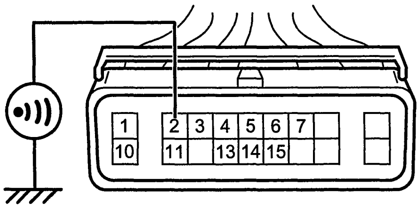
Step 1

1) Turn ignition switch OFF.
2) Check the ABS control unit coupler (1) and front wheel speed sensor coupler (2) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)



IH18K1450025-01

3) Check for continuity between “T2” (W/R) and ground at the ABS control unit coupler.



IH18K1450060-01

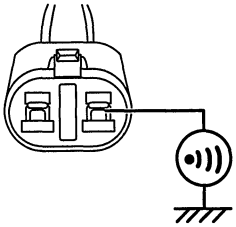
Is no continuity indicated?

Yes Go to Step 3.

No Go to Step 2.

Step 2

1) Disconnect the front wheel speed sensor coupler.
2) Check for continuity between Green wire and ground at the front wheel speed sensor coupler.



IH18K1450061-01

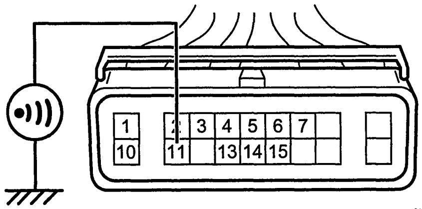
Is no continuity indicated?

Yes Inspect the wire harness. (Faulty W/R wire)

No Faulty front wheel speed sensor. ☞(Page 4E-42)

Step 3

1) Check for continuity between “T11” (B/R) and ground at the ABS control unit coupler.



IH18K1450062-01

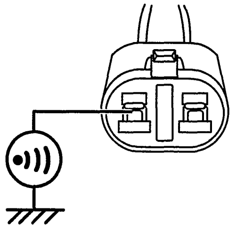
Is no continuity indicated?

Yes Go to Step 5.

No Go to Step 4.

Step 4

1) Disconnect the front wheel speed sensor coupler.
2) Check for continuity between White wire and ground at the front wheel speed sensor coupler.



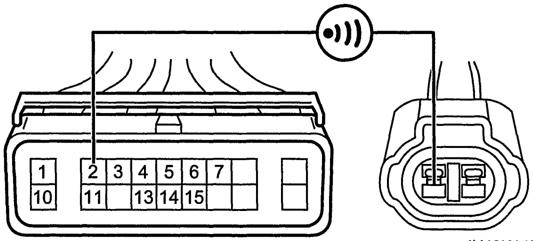
IH18K1450063-01

Is no continuity indicated?

Yes	Inspect the wire harness. (Faulty B/R wire)
No	Faulty front wheel speed sensor. ☞(Page 4E-42)

Step 5

1) Disconnect the front wheel speed sensor coupler.
2) Check for continuity between “T2” (W/R) on the ABS control unit coupler and W/R on the front wheel speed sensor coupler.



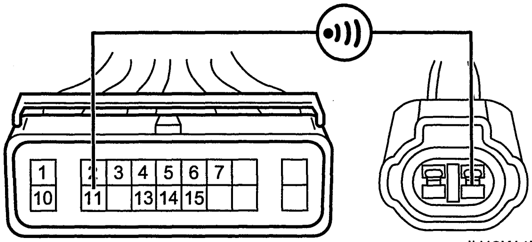
IH18K1450064-01

Is continuity indicated?

Yes	Go to Step 6.
No	Inspect the wire harness. (W/R wire open)

Step 6

1) Check for continuity between “T11” (B/R) on the ABS control unit coupler and B/R on the front wheel speed sensor coupler.



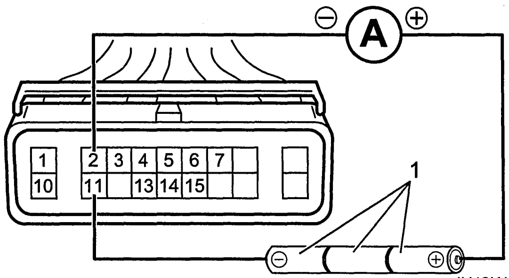
IH18K1450065-01

Is continuity indicated?

Yes	Go to Step 7.
No	Inspect the wire harness. (B/R wire open)

Step 7

1) Connect the front wheel speed sensor coupler.
2) Connect three 1.5 V dry cells (1) 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 “T2” (W/R) on the ABS control unit coupler.



IH18K1450066-01

Is current 3 – 17 mA?

Yes	Replace the ABS control unit/HU. • L7 – L8 model: ☞(Page 4E-45) • L9 – model: ☞(Page 4E-46)
No	Faulty front wheel speed sensor. ☞(Page 4E-42)

DTC C1643 (43)

BENJ18K64504017

Possible Cause
C1643 (43): Wheel Speed Sensor Circuit Short (F)
• Poor contact in the front wheel speed sensor coupler
• Faulty front wheel speed sensor, etc.

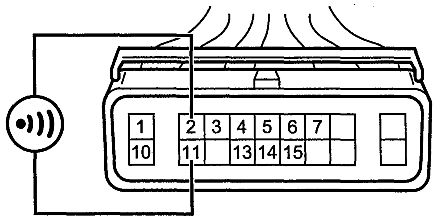
Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-9).

Troubleshooting

Step 1

1) Turn the ignition switch OFF.
2) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)
3) Check for continuity between "T11" (B/R) and "T2" (W/R) at the coupler.



IH18K1450067-01

Is continuity indicated?

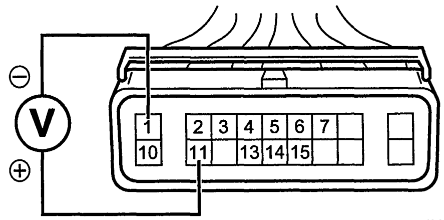
Yes
- Inspect the wire harness. (B/R or W/R wires short)
- Faulty front wheel speed sensor. ☞(Page 4E-42)

No
Go to Step 2.

Step 2

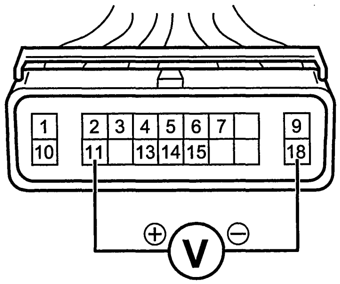
1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: "T11" (B/R) and "T1" (B/W)
   - L9 – model: "T11" (B/R) and "T18" (B)

L7 – L8 model



IH18K1450068-01

L9 – model



IJ18K5450011-01

Is the voltage 0 V?

Yes
Replace the ABS control unit/HU.
- L7 – L8 model: ☞(Page 4E-45)
- L9 – model: ☞(Page 4E-46)

No
Inspect the wire harness. (Faulty sensor signal or power supply wire)

DTC C1644 (44)

BENJ18K64504018

Possible Cause
C1644 (44): Wheel Speed Sensor Signal Malfunction (R)
• Poor contact in the rear wheel speed sensor coupler
• Faulty rear wheel speed sensor, etc.

Troubleshooting

Step 1

1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge. ☞(Page 4E-44)

Is the clearance OK?

Yes Go to Step 2.

No Adjust the clearance.

Step 2

1) Inspect the rear wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings. ☞(Page 4E-44)

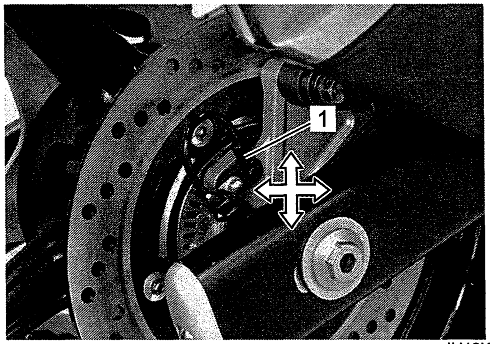
Is the sensor rotor OK?

Yes Go to Step 3.

No Clean or replace the sensor rotor. ☞(Page 4E-44)

Step 3

1) Check that the rear wheel speed sensor (1) is mounted securely.



IH18K1450026-01

Is the sensor mounted securely?

Yes Go to DTC C1645 (45). ☞(Page 4E-35)

No Tighten the mounting bolt.

DTC C1645 (45)

BENJ18K64504019

Possible Cause
C1645 (45): Wheel Speed Sensor Circuit Open (R)
• Poor contact in the rear wheel speed sensor coupler
• Faulty rear wheel speed sensor, etc.

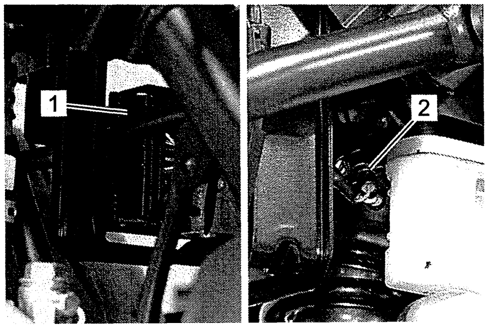
Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-9).

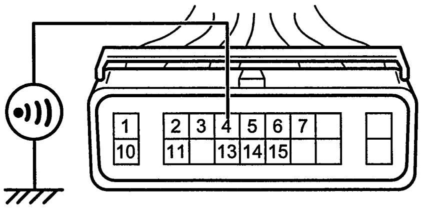
Troubleshooting

Step 1

1) Turn ignition switch OFF.
2) Check the ABS control unit coupler (1) and rear wheel speed sensor coupler (2) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)



3) Check for continuity between “T4” (B/Y) and ground at the ABS control unit coupler.



IH18K1450069-01

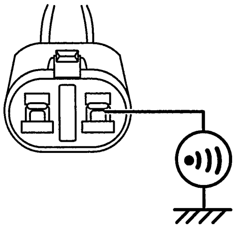
Is no continuity indicated?

Yes Go to Step 3.

No Go to Step 2.

Step 2

1) Disconnect the rear wheel speed sensor coupler.
2) Check for continuity between Green wire and ground at the rear wheel speed sensor coupler.



IH18K1450070-01

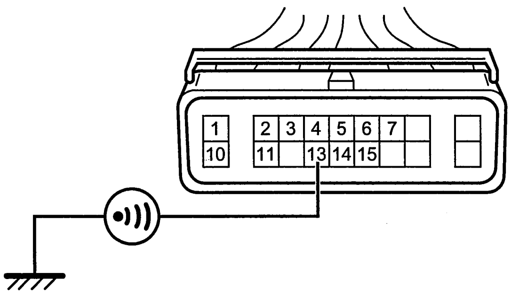
Is no continuity indicated?

Yes Inspect the wire harness. (Faulty B/Y wire)

No Replace the rear wheel speed sensor. ☞(Page 4E-43)

Step 3

1) Check for continuity between “T13” (W/Y) and ground at the ABS control unit coupler.

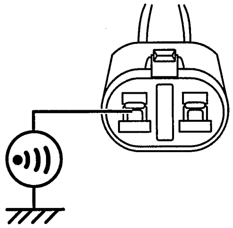


IH18K1450071-01

Is no continuity indicated?

Step 4

1) Disconnect the rear wheel speed sensor coupler.
2) Check for continuity between White wire and ground at the rear wheel speed sensor coupler.



IH18K1450072-01

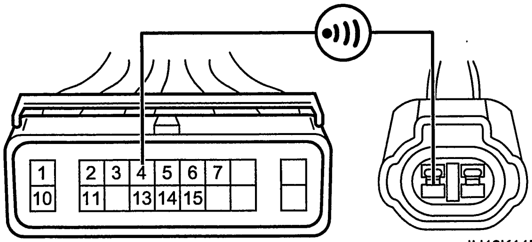
Is continuity indicated?

Yes Inspect the wire harness. (Faulty W/Y wire)

No Replace the rear wheel speed sensor. ☞(Page 4E-43)

Step 5

1) Check for continuity between “T4” (B/Y) on the ABS control unit coupler and B/Y on the rear wheel speed sensor coupler.



IH18K1450073-01

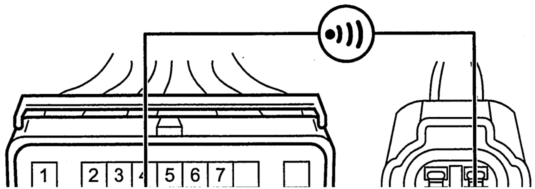
Is continuity indicated?

Yes Go to Step 6.

No Inspect the wire harness. (B/Y wire open)

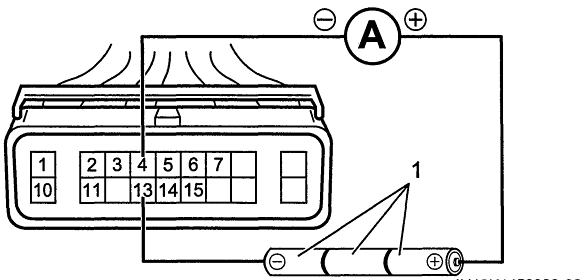
Step 6

1) Check for continuity between “T13” (W/Y) on the ABS control unit coupler and W/Y on the rear wheel speed sensor coupler.



Step 7

1) Connect the rear wheel speed sensor coupler.
2) Connect three 1.5 V dry cells (1) 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 "T4" (B/Y) on the ABS control unit coupler.



IH18K1450028-02

Is current 3 – 17 mA?

Yes — Replace the ABS control unit/HU.
- L7 – L8 model: ☞(Page 4E-45)
- L9 – model: ☞(Page 4E-46)

No Replace the rear wheel speed sensor. ☞(Page 4E-43)

DTC C1646 (46)

BENJ18K64504020

Possible Cause
C1646 (46): Wheel Speed Sensor Circuit Short (R)
• Poor contact in the rear wheel speed sensor coupler
• Faulty rear wheel speed sensor, etc.

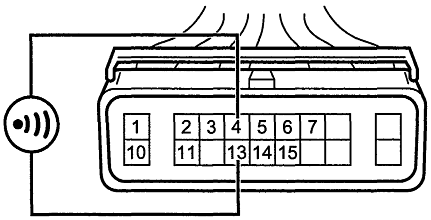
Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-9).

Troubleshooting

Step 1

1) Turn the ignition switch OFF.
2) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)
3) Check for continuity between "T4" (B/Y) and "T13" (W/Y) at the coupler.



IH18K1450075-01

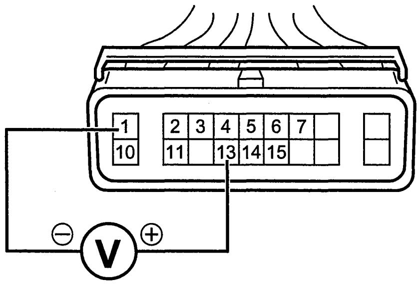
Is continuity indicated?

Yes • Inspect the wire harness. (B/Y or W/Y wires short)

Step 2

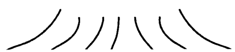
1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: "T13" (W/Y) and "T1" (B/W)
   - L9 – model: "T13" (W/Y) and "T18" (B)

L7 – L8 model



IH18K1450076-01

L9 – model



Is the voltage 0 V?

Yes — Replace the ABS control unit/HU.

- L7 – L8 model: ☞(Page 4E-45)
- L9 – model: ☞(Page 4E-46)

No — Inspect the wire harness. (Faulty sensor signal or power supply wire)

DTC C1647 (47) / C1648 (48)

BENJ18K64504021

Possible Cause
C1647 (47): Supply Voltage (Increased) **C1648 (48): Supply Voltage (Decreased)**
• Faulty generator or regulator/rectifier
• Faulty battery
• Faulty ABS control unit
• Faulty wire harness, etc.

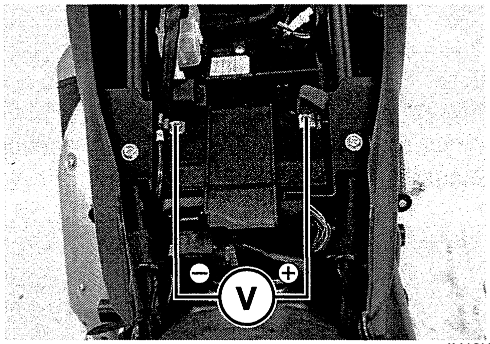
Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-9).

Troubleshooting

Step 1

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Measure the voltage between the (+) and (–) battery terminals.



IH18K1450029-01

Is the voltage 12 V or more?

Yes — Go to Step 2.

No — Charge or replace the battery.

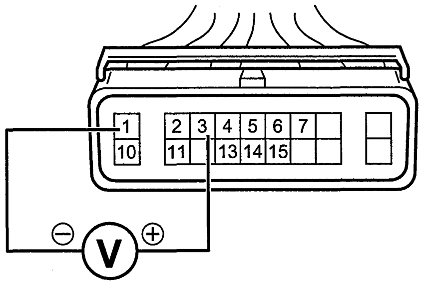
Step 2

1) Start the engine at 5000 r/min with the dimmer switch set to HI.
2) Measure the voltage between the (+) and (–) battery terminals.

Step 3

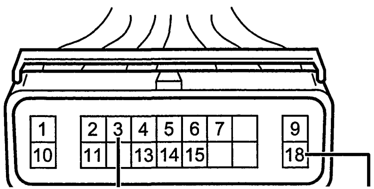
1) Turn the ignition switch OFF.
2) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)
3) Start the engine at 5000 r/min with the dimmer switch set to HI.
4) Measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: "T3" (W/G) and "T1" (B/W)
   - L9 – model: "T3" (W/G) and "T18" (B)

L7 – L8 model



IH18K1450077-01

L9 – model



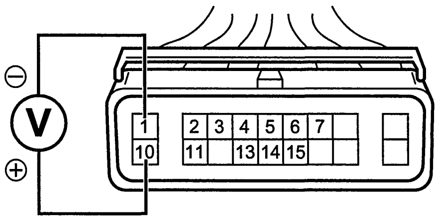
Is the voltage same as Step 2?

Yes	Go to Step 4.
No	Inspect the wire harness. (Faulty ignition or ground wire)

Step 4

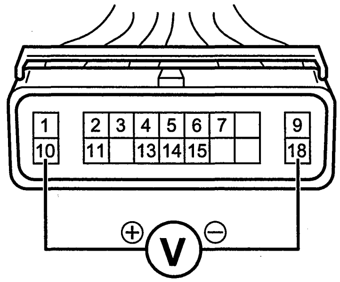
1) Start the engine at 5000 r/min with the dimmer switch set to HI.
2) Measure the voltage between the following terminals at the coupler.
   - L7 – L8 model: “T10” (R/W) and “T1” (B/W)
   - L9 – model: “T10” (R/W) and “T18” (B)

L7 – L8 model



IH18K1450078-01

L9 – model



IJ18K5450014-01

Is the voltage same as Step 2?

Yes	Replace the ABS control unit/HU. • L7 – L8 model: ☞(Page 4E-45) • L9 – model: ☞(Page 4E-46)
No	Inspect the wire harness. (Faulty power supply wire)

DTC C1655 (55)

BENJ18K64504022

Possible Cause
C1655 (55): ABS Control Unit Malfunction
Faulty ABS control unit

Troubleshooting

Step 1

1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge. ☞(Page 4E-44)

Are the clearances OK?

Yes	Go to Step 2.
No	Adjust the clearance.

Step 2

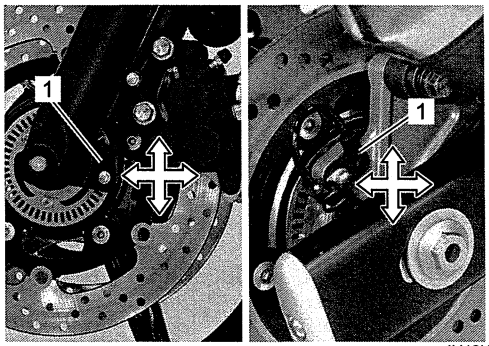
1) Inspect both of the wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings. ☞(Page 4E-44)

Are the rotors OK?

Yes	Go to Step 3.
No	Clean or replace the rotor.

Step 3

1) Check that the front and rear wheel speed sensors (1) are mounted securely.



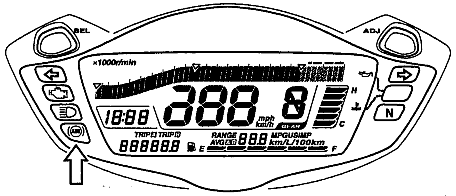
IH18K1450030-01

Are the sensors mounted securely?

Yes	Go to Step 4.
No	Tighten the mounting bolts.

Step 4

1) Delete DTCs ☞(Page 4E-23) and repeat the code output procedure. ☞(Page 4E-22)



IH18K1450031-01

Is the DTC C1655 (55) output again?

Yes	Replace the ABS control unit/HU. • L7 – L8 model: ☞(Page 4E-45) • L9 – model: ☞(Page 4E-46)
No	Intermittent trouble.

DTC C1661 (61) (L7 – L8)

BENJ18K64504023

Possible Cause
C1661 (61): ABS Solenoid Malfunction Faulty solenoid valve or relay

Wiring Diagram

Refer to “ABS Control Unit / HU Diagram” (Page 4E-9).

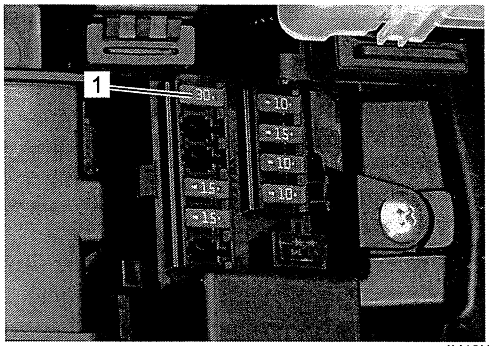
Troubleshooting

Step 1

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Open the fuse box and inspect the ABS fuse (30 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



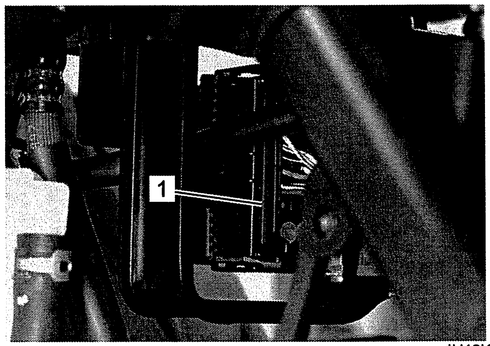
IH18K1450032-01

Is the ABS fuse OK?

Yes	Go to Step 2.
No	Replace the ABS fuse.

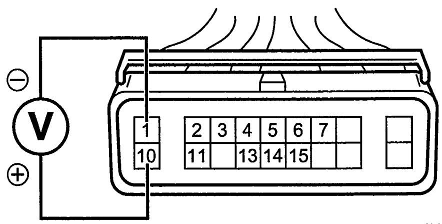
Step 2

1) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)



IH18K1450033-01

2) Measure the voltage between “T10” (R/W) and “T1” (B/W) at the coupler.



IH18K1450079-01

Is the voltage 12 V or more?

Yes	Replace the ABS control unit/HU. ☞(Page

DTC C1661 (61) (L9 –)

BENJ18K64504024

Possible Cause
C1661 (61): ABS Solenoid Malfunction
• Solenoid valve power supply circuit open or short
• Faulty ABS control unit

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-9).

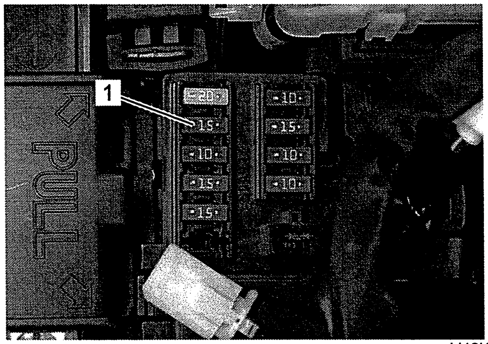
Troubleshooting

Step 1

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Open the fuse box and inspect the ABS valve fuse (15 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



IJ18K5450018-01

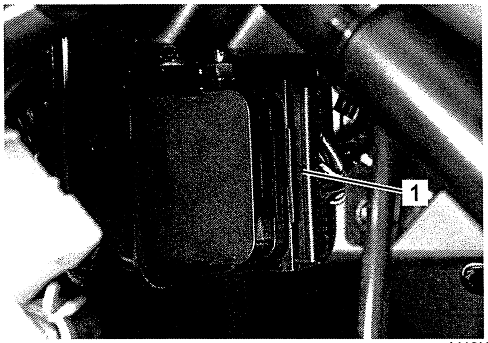
Is the ABS valve fuse OK?

Yes Go to Step 2.

No Replace the ABS valve fuse.

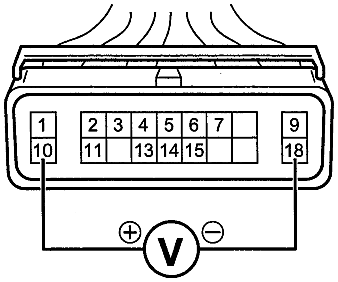
Step 2

1) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. ☞(Page 4E-42)



IJ18K5450016-01

2) Measure the voltage between "T10" (R/Bl) and "T18" (B) at the coupler.



IJ18K5450014-01

Is the voltage 12 V or more?

Yes Replace the ABS control unit/HU. ☞(Page 4E-46)

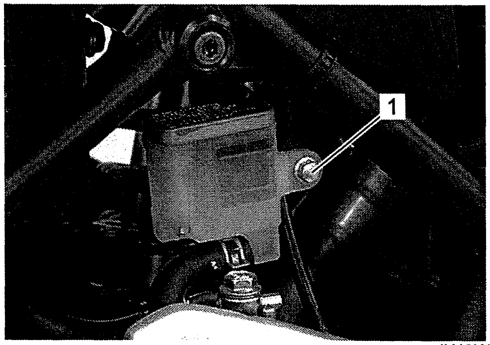
No Inspect the wire harness. (Faulty power supply or ground wire)

ABS Control Unit Coupler Disconnect and Connect

BENJ18K64506001

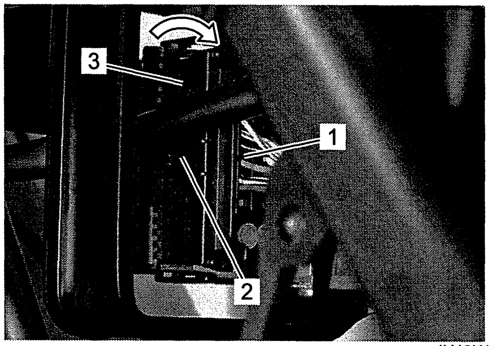
Disconnect

1) Turn the ignition switch OFF.
2) Remove the rear brake reservoir tank mounting bolt (1).



IH18K1450083-01

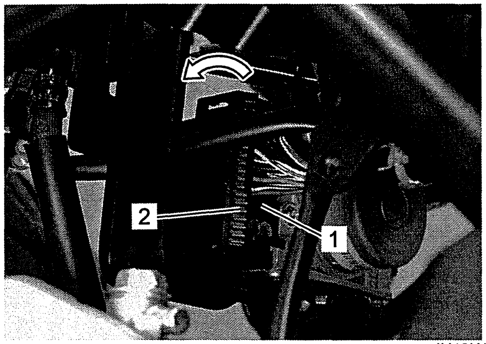
3) Disconnect the ABS control unit coupler (1) as follows:
   a) Push the lock (2) to release locking of the lock lever (3).
   b) Turn the lock lever in direction of arrow until it stops.



IH18K1450034-01

Connect

1) Connect the ABS control unit coupler (1) as follows:
   a) Make sure that lock lever (2) is in unlock position.
   b) Insert the coupler to ABS control unit it stop with lock lever in unlocked position.
   c) Turn the lock lever in direction of arrow to lock the coupler securely.



IH18K1450035-01

2) Install the rear brake reservoir tank. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).

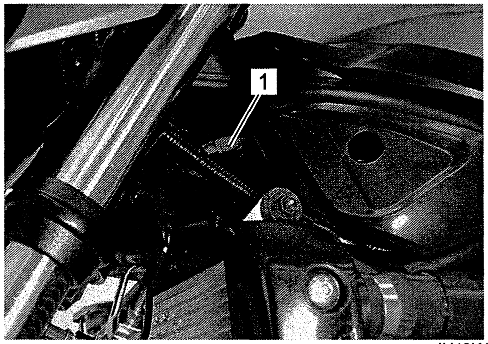
Front Wheel Speed Sensor Removal and Installation

BENJ18K64506002

Removal

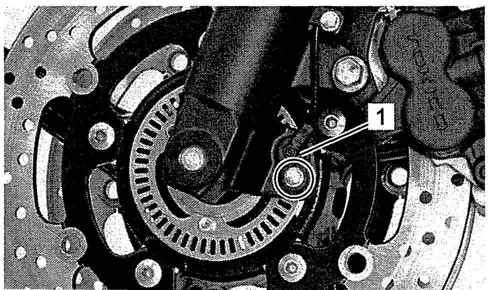
Refer to “Front Wheel Speed Sensor Routing Diagram” (Page 4E-11).

1) Turn the ignition switch OFF.
2) Disconnect the front wheel speed sensor lead wire coupler (1).



IH18K1450036-01

3) Remove the front wheel speed sensor (1).



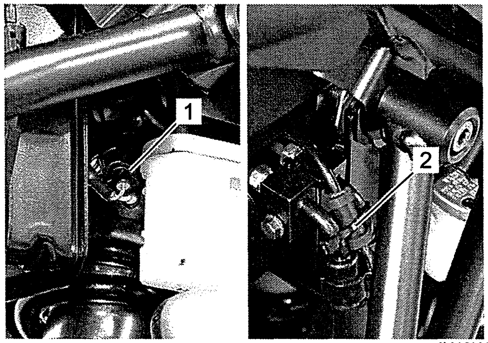
Installation
Install the front wheel speed sensor in the reverse order of removal. Pay attention to the following point:

- After installing the front wheel speed sensor, check the clearance between the front wheel speed sensor and sensor rotor. Refer to “Wheel Speed Sensor and Sensor Rotor Inspection” (Page 4E-44).

Rear Wheel Speed Sensor Removal and Installation
BENJ18K64506003

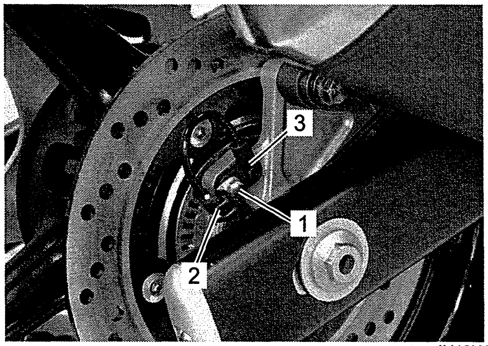
Refer to “Rear Wheel Speed Sensor Routing Diagram” (Page 4E-13).

Removal
1) Turn the ignition switch OFF.
2) Disconnect the rear wheel speed sensor lead wire coupler (1) and clamp (2).



IH18K1450080-01

3) Remove the rear wheel speed sensor mounting bolt (1) and disconnect the clamp (2).
4) Remove the rear wheel speed sensor (3).



IH18K1450039-01

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

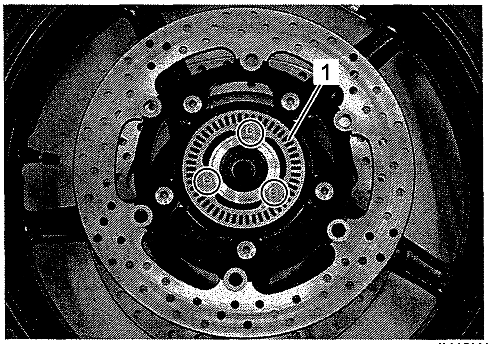
- After installing the rear wheel speed sensor, check the

Front Wheel Speed Sensor Rotor Removal and Installation
BENJ18K64506004

NOTICE

- **Do not hit the front wheel speed sensor rotor when dismounting the front wheel.**
- **When replacing the tire, make sure not to damage the sensor rotor.**

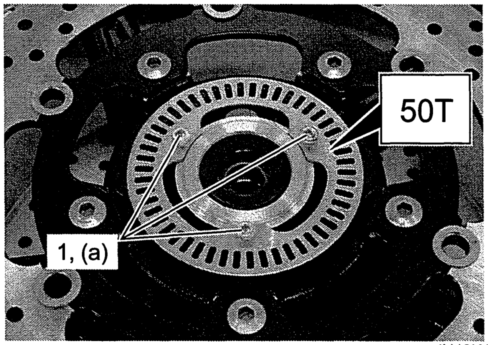
Removal
Refer to “Front Wheel Assembly Removal and Installation” in Section 2D (Page 2D-5).
Remove the front wheel speed sensor rotor (1).



IH18K1450040-01

Installation
1) Install the wheel speed sensor rotor as the letters “50T” face outside.
2) Tighten the front wheel speed sensor rotor bolts (1) to the specified torque.

   Tightening torque
   Front wheel speed sensor rotor bolt (a): 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)



IH18K1450041-01

3) Install the front wheel assembly. ☞(Page 2D-5)
4) Check the clearance between the front wheel speed sensor and sensor rotor. Refer to “Wheel Speed

Rear Wheel Speed Sensor Rotor Removal and Installation

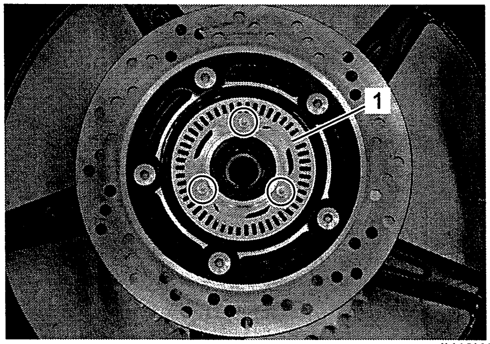
BENJ18K64506005

NOTICE

- **Do not hit the rear wheel speed sensor rotor when dismounting the rear wheel.**
- **When replacing the tire, make sure not to damage the sensor rotor.**

Removal

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).
Remove the rear wheel speed sensor rotor (1).

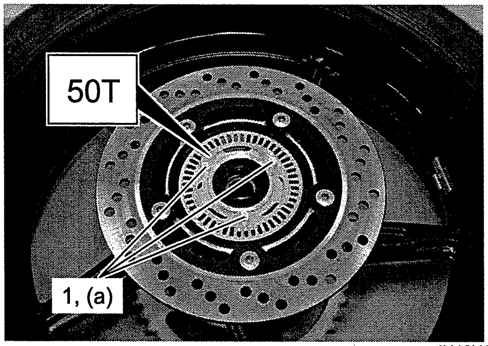


IH18K1450042-01

Installation

1) Install the wheel speed sensor rotor as the letters "50T" face outside.
2) Tighten the rear wheel speed sensor rotor bolts (1) to the specified torque.

Tightening torque
Rear wheel speed sensor rotor bolt (a): 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)

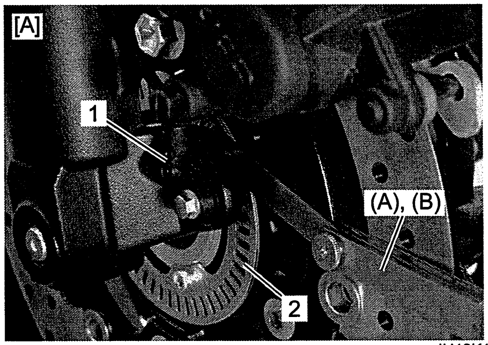


IH18K1450043-02

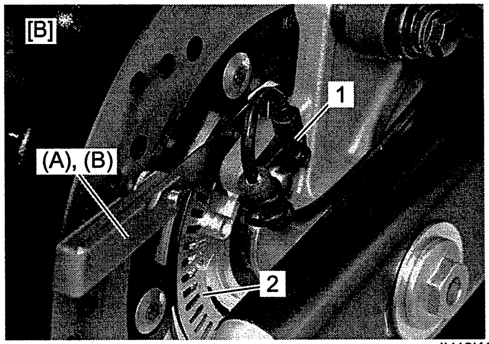
3) Install the rear wheel assembly. ☞(Page 2D-10)
4) Check the clearance between the rear wheel speed sensor and sensor rotor. Refer to "Wheel Speed

Wheel speed sensor – Sensor rotor clearance
Front [Standard]: 0.45 – 1.53 mm (0.0178 – 0.0602 in)
Rear [Standard]: 0.25 – 1.33 mm (0.0099 – 0.0523 in)

Special tool
(A): 09900–20803
(B): 09900–20806



IH18K1450044-01

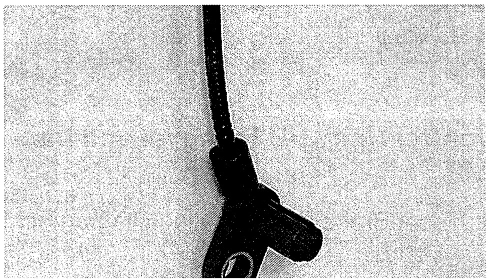


IH18K1450045-01

[A]: Front	[B]: Rear

Wheel Speed Sensor

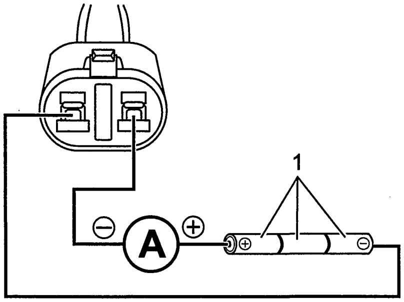
1) Remove the wheel speed sensor.
   - Front: ☞(Page 4E-42)
   - Rear: ☞(Page 4E-43)
2) Inspect the wheel speed sensor for damage.
   Clean the sensor if any metal particle or foreign material stuck on it.



Wheel Speed Sensor Current

1) Disconnect the wheel speed sensor coupler.
   - Front: ☞(Page 4E-42)
   - Rear: ☞(Page 4E-43)
2) Connect three 1.5 V dry cells (1) in series as shown and make sure that their total voltage is more than 4.5 V. Measure the current between (+) dry cells terminal and Green wire on the wheel speed sensor coupler.

   Normal value
   3 – 17 mA

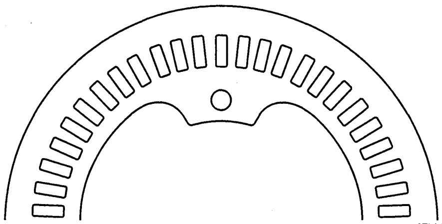


IH18K1450081-01

3) Install the removed parts.

Wheel Speed Sensor Rotor

1) Raise the wheel off the ground and support the motorcycle with a jack.
2) Check that no wheel speed sensor rotor teeth are broken and that no foreign objects are caught in the wheel speed sensor. If any defects are found, replace the wheel speed sensor rotor with a new one.
   - Front: ☞(Page 4E-43)
   - Rear: ☞(Page 4E-44)



I718H1450064-02

ABS Control Unit / HU Removal and Installation (L7 – L8)

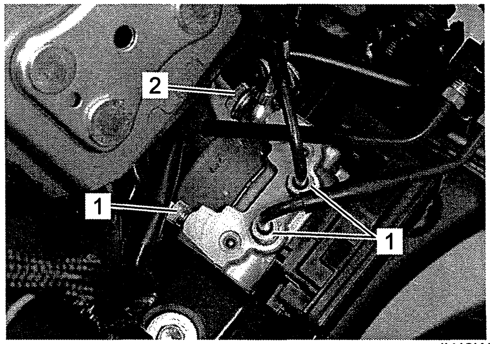
BENJ18K64506007

Refer to "Front Brake Hose Routing Diagram" in Section 4A (Page 4A-1).

NOTICE

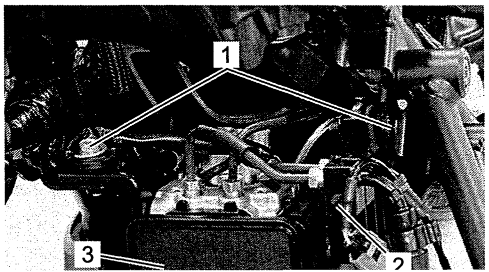
- **This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not mix different types of fluid such as silicone-based or petroleum-based.**
- **Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored 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 control unit/HU cannot be disassembled.**

1) Turn the ignition switch OFF.
2) Drain the brake fluid. ☞(Page 4A-31)
3) Remove the battery holder. ☞(Page 9D-26)
4) Disconnect the ABS control unit coupler. ☞(Page 4E-42)
5) Remove the flare nuts (1) and the brake hose union bolt (2).

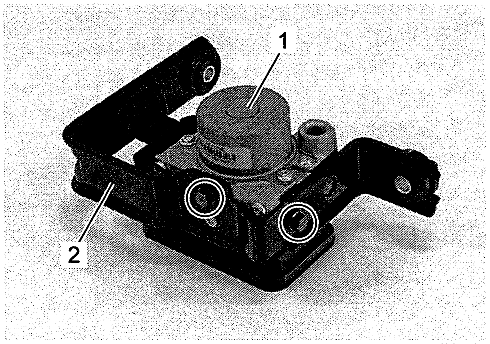


IH18K1450047-01

6) Remove the holder mounting bolts (1) and rear brake hose bolt (2).
7) Disconnect the brake pipes and remove the ABS control unit/HU assembly (3).



8) Remove the ABS control unit/HU (1) from the holder (2).



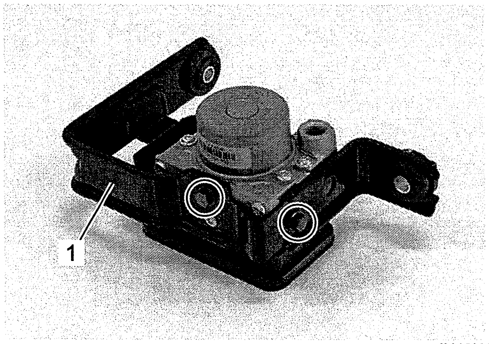
IH18K1450049-01

Installation

NOTE

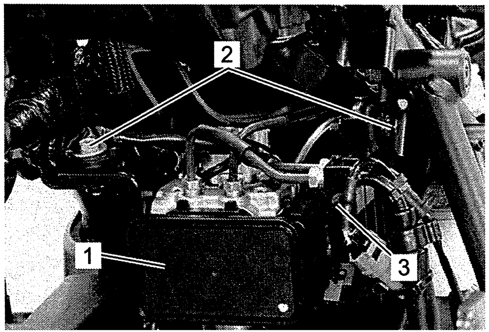
Make sure to hold the brake pipe when tightening the flare nut, or it may be misaligned.

1) Install the ABS control unit/HU holder (1).



IH18K1450050-01

2) Install the ABS control unit/HU assembly (1) and connect the brake pipes.
3) Temporarily tighten the holder mounting bolts (2) and rear brake hose bolt (3).

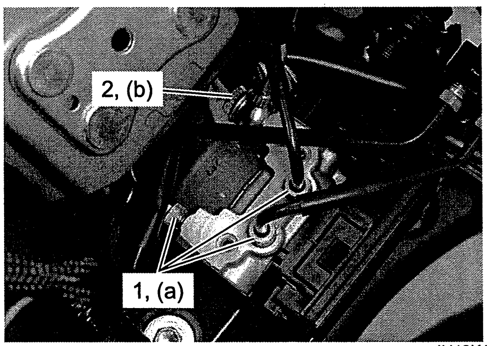


4) Tighten the brake pipe flare nuts (1) to the specified torque.

Tightening torque
Brake pipe flare nut (a): 16 N·m (1.6 kgf-m, 12.0 lbf-ft)

5) Install the brake hose union bolt (2) and new seal washers to brake hose.
6) After the brake hose union has contacted the ABS control unit/HU, tighten the union bolt (2) to the specified torque.

Tightening torque
Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1450052-01

7) Tighten the holder mounting bolts and rear brake hose bolt.
8) Connect the ABS control unit coupler. ☞(Page 4E-42)
9) Install the battery holder. ☞(Page 9D-26)
10) Bleed air from the brake fluid circuit. ☞(Page 4A-27)

ABS Control Unit / HU Removal and Installation (L9 –)

BENJ18K64506008

Refer to “Front Brake Hose Routing Diagram” in Section 4A (Page 4A-1) and “Rear Brake Hose Routing Diagram” in Section 4A (Page 4A-18).

Removal

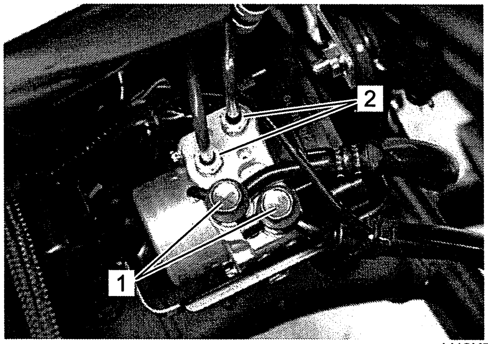
⚠ WARNING

When storing the brake fluid, seal the container completely and keep away from children.

NOTICE

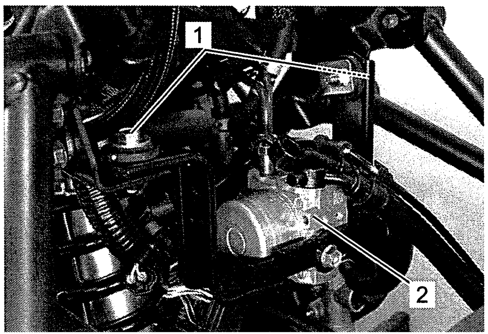
- **This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not mix different types of fluid such as silicone-based or petroleum-based.**
- **Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored 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 control unit/HU cannot be disassembled.**

1) Turn the ignition switch OFF.
2) Drain brake fluid. ☞(Page 4A-31)
3) Remove the battery holder. ☞(Page 9D-26)
4) Disconnect the ABS control unit coupler. ☞(Page 4E-42)
5) Remove the brake hose union bolts (1) and flare nuts (2).

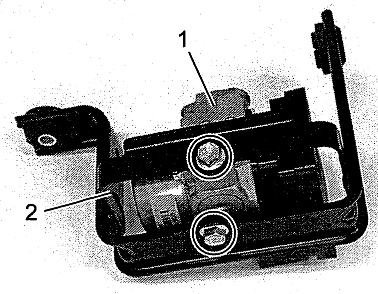


IJ18K5450019-02

6) Remove the holder mounting bolts (1) and nut.
7) Remove the ABS control unit/HU assembly (2).



8) Remove the ABS control unit/HU (1) from its holder (2).



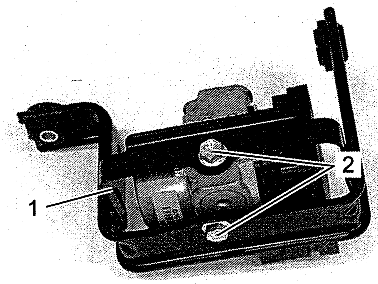
IJ18K5450021-01

Installation

NOTE

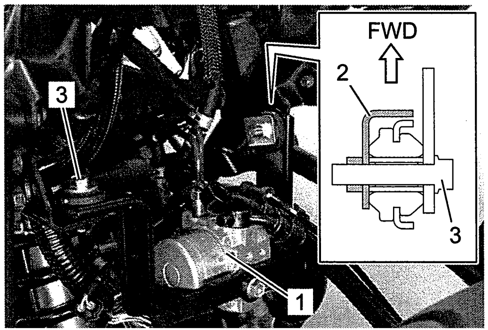
Make sure to hold the brake pipe when tightening the flare nut, or it may be misaligned.

1) Install the ABS control unit/HU holder (1) and tighten the bolts (2).



IJ18K5450022-01

2) Install the ABS control unit/HU assembly (1).
3) Set the nut (2) in correct direction and tighten the holder mounting bolts (3).

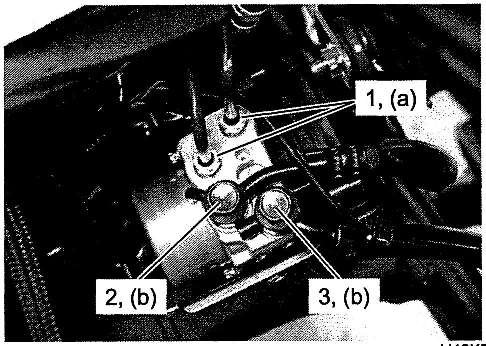


4) Tighten the brake pipe flare nuts (1) to the specified torque.

Tightening torque
Brake pipe flare nut (a): 16 N·m (1.6 kgf-m, 12.0 lbf-ft)

5) Install the brake hose union bolts (2), (3) and new seal washers to the brake hoses.
6) After the brake hose union has contacted the ABS control unit/HU, tighten the brake hose union bolt (2) to the specified torque.
7) After the brake hose union has contacted the other brake hose union, tighten the brake hose union bolt (3) to the specified torque.

Tightening torque
Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IJ18K5450024-02

8) Connect the ABS control unit coupler. ☞(Page 4E-42)
9) Install the battery holder. ☞(Page 9D-26)
10) Bleed air from the brake fluid circuit. ☞(Page 4A-27)

Specifications

Tightening Torque Specifications

BENJ18K64507001

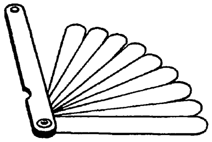
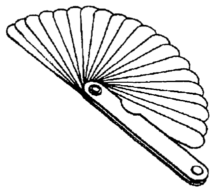
Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Front wheel speed sensor rotor bolt	6.5	0.66	4.80	☞(Page 4E-43)
Rear wheel speed sensor rotor bolt	6.5	0.66	4.80	☞(Page 4E-44)
Brake pipe flare nut	16	1.6	12.0	☞(Page 4E-46) / ☞(Page 4E-48)
Brake hose union bolt	23	2.3	17.0	☞(Page 4E-46) / ☞(Page 4E-48)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Special Tool

BENJ18K64508001

09900–20803 Thickness gauge ☞(Page 4E-44) 	09900–20806 Thickness gauge ☞(Page 4E-44) 
09930–82760 Mode selection switch	

Section 5

Transmission / Transaxle

CONTENTS

Precautions

Precautions for Transmission / Transaxle

BENJ18K65000001

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

Manual Transmission

Diagnostic Information and Procedures

Manual Transmission Symptom Diagnosis

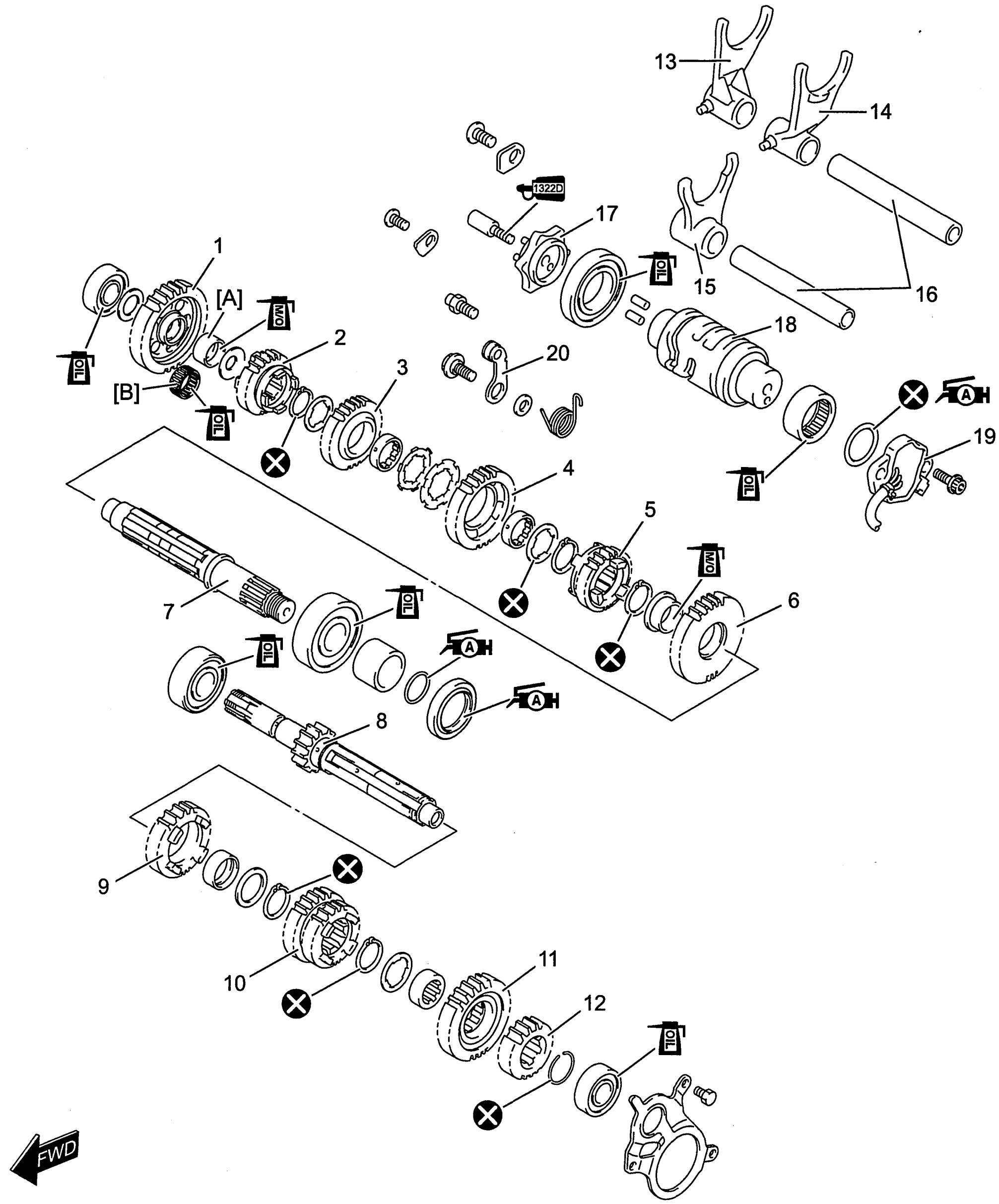
BENJ18K65204001

Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from the transmission)	Worn or rubbing gear.	*Replace.* ☞*(Page 5B-5)*
	Worn countershaft spline.	*Replace countershaft.* ☞*(Page 5B-5)*
	Worn driveshaft spline.	*Replace driveshaft.* ☞*(Page 5B-5)*
	Worn bearing.	*Replace.* ☞*(Page 5B-9)* ☞*(Page 5B-10)*
Transmission will not shift	Broken gearshift cam.	*Replace.* ☞*(Page 5B-3)*
	Distorted gearshift fork.	*Replace.* ☞*(Page 5B-3)*
	Worn gearshift pawl.	*Replace.* ☞*(Page 5B-13)*
Transmission will not shift back	Broken gearshift shaft return spring.	*Replace.* ☞*(Page 5B-13)*
	Rubbing or stuck gearshift shaft.	*Repair or replace.* ☞*(Page 5B-13)*
	Worn or distorted gearshift fork.	*Replace.* ☞*(Page 5B-3)*
Transmission jumps out of gear	Worn shifting gears on driveshaft or countershaft.	*Replace.* ☞*(Page 5B-5)*
	Worn or distorted gearshift fork.	*Replace.* ☞*(Page 5B-3)*
	Weakened gearshift cam stopper spring.	*Replace.* ☞*(Page 5B-13)*
	Worn gearshift cam plate.	*Replace.* ☞*(Page 5B-13)*

Repair Instructions

Transmission Components

BENJ18K65206001



IJ18K1520001-01

[A]: L7 model	8. Countershaft/1st drive gear	17. Gearshift cam plate
[B]: L8 – model	9. 5th drive gear	18. Gearshift cam
1. 1st driven gear	10. 3rd/4th drive gear	19. Gear position switch
2. 5th driven gear	11. 6th drive gear	20. Gearshift cam stopper plate
3. 4th driven gear	12. 2nd drive gear	OIL : Apply oil.
4. 3rd driven gear	13. Gearshift fork No. 1	M/O : Apply molybdenum oil solution.
5. 6th driven gear	14. Gearshift fork No. 2	: Apply grease to oil seal lip

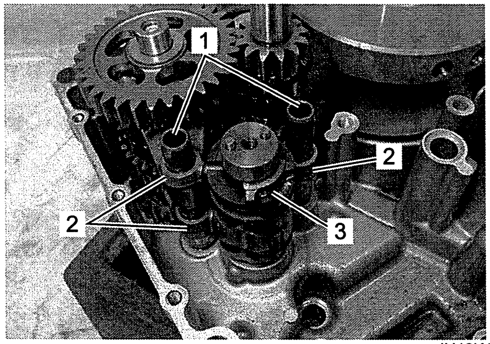
Transmission Removal and Installation

BENJ18K65206002

Refer to "Crankcase Assembly Disassembly" in Section 1D (Page 1D-61) and "Crankcase Assembly Reassembly" in Section 1D (Page 1D-64).

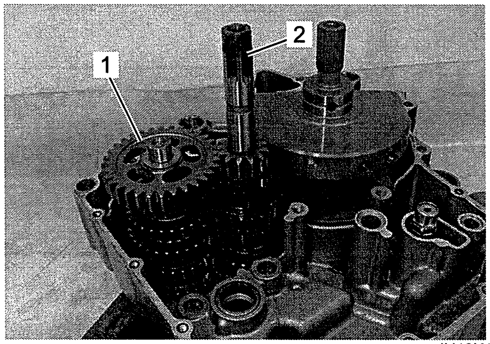
Removal

1) Remove the gearshift fork shafts (1), gearshift forks (2) and gearshift cam (3).



IH18K1520001-02

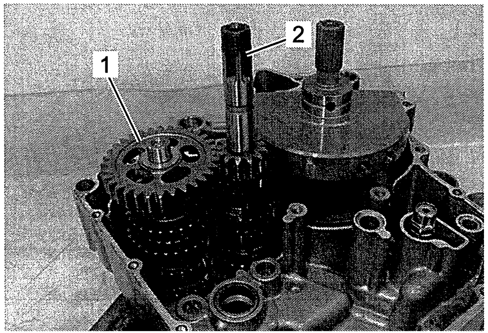
2) Remove the driveshaft assembly (1) with the countershaft assembly (2).



IH18K1520002-01

Installation

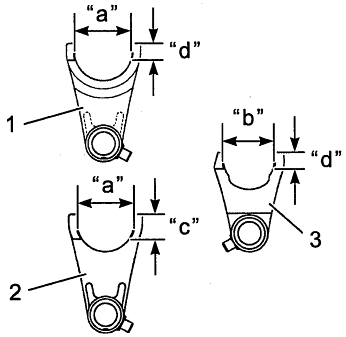
1) Install the driveshaft assembly (1) with the countershaft assembly (2).



2) Install the gearshift forks No. 1 (1), No. 2 (2) and No. 3 (3).

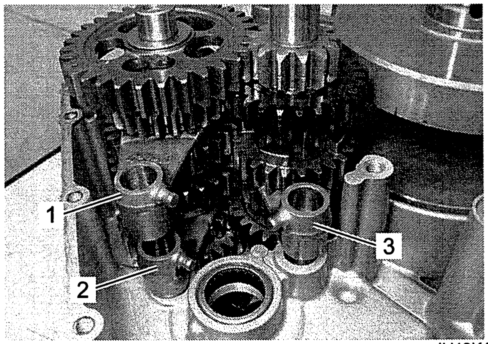
NOTE

The shape of gearshift forks No. 1, No. 2 and No. 3 is different.



IH18K1520064-01

"a": 35 mm (1.4 in)	"c": 15 mm (0.59 in)
"b": 31 mm (1.2 in)	"d": 10 mm (0.39 in)

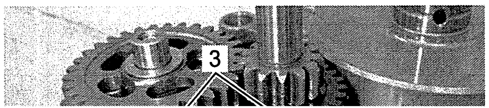


IH18K1520004-01

3) Install the gearshift cam (1) so that the pins (2) face upward.
4) Install the gearshift fork shafts (3).

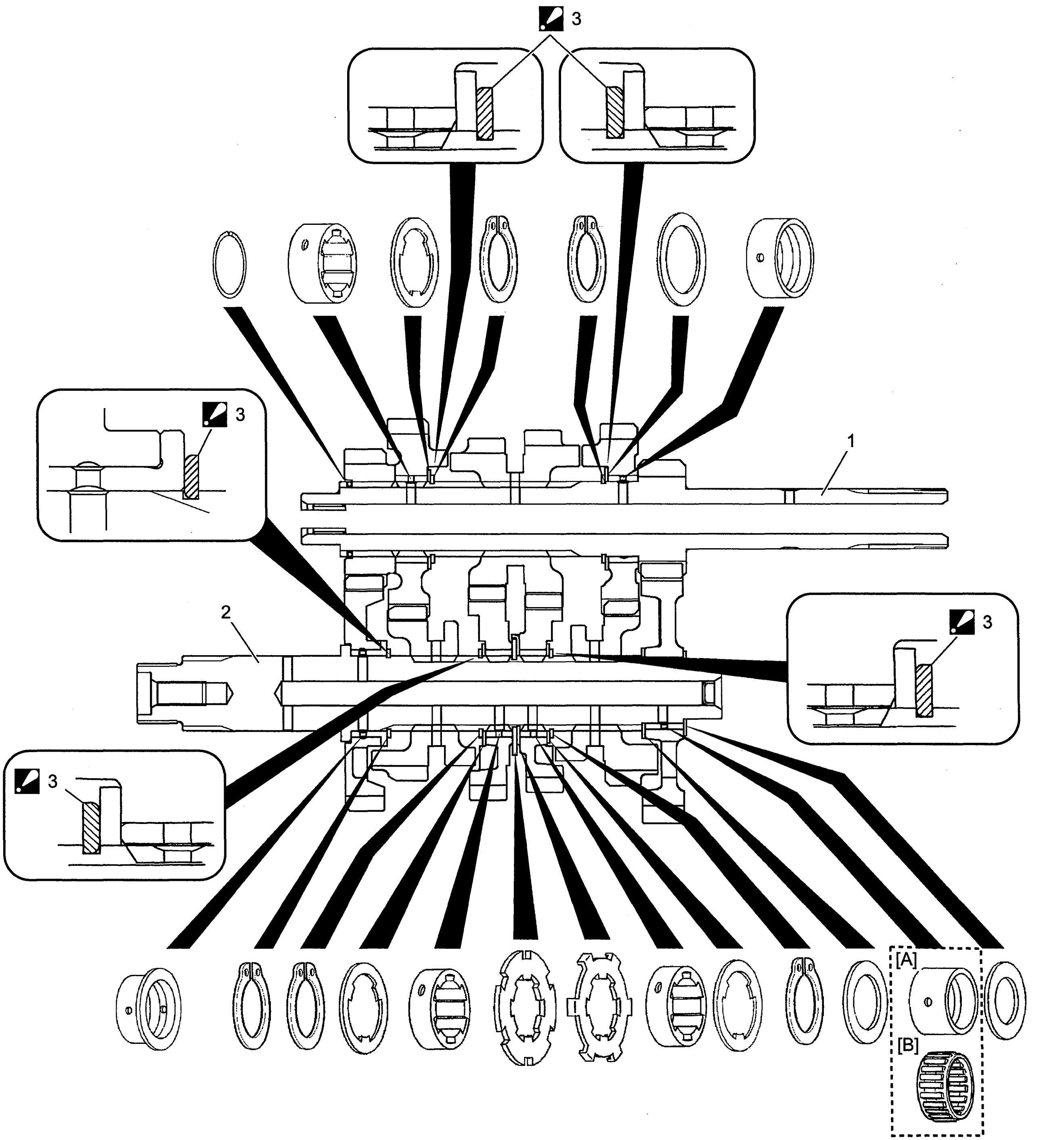
NOTE

- **After the gearshift fork shafts and gearshift forks have been fitted, make sure that the gears engage normally.**
- **Set the transmission gears to the neutral position.**



Transmission Construction

BENJ18K65206003



IJ18K1520002-03

[A]: L7 model	1. Countershaft	3. Snap ring : Face the sharp edge outside.
[B]: L8 – model	2. Driveshaft	

Countershaft Assembly / Driveshaft Assembly Disassembly and Reassembly

BENJ18K65206004

Refer to "Transmission Removal and Installation" (Page 5B-3).

Disassembly

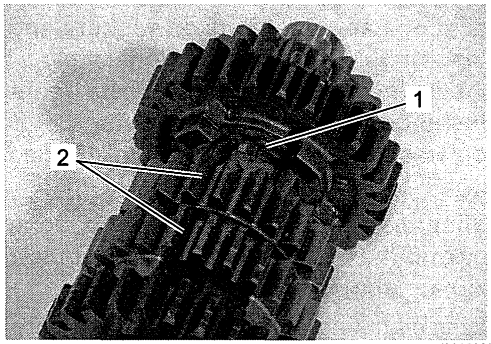
NOTE

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.

Countershaft

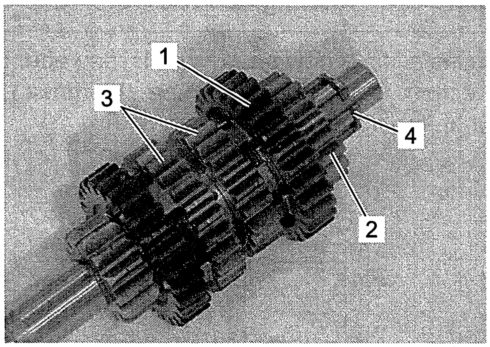
1) Remove the 6th drive gear snap ring (1) from its groove and slide it towards the 3rd/4th drive gears (2).

Special tool
09900–06104



IH18K1520007-02

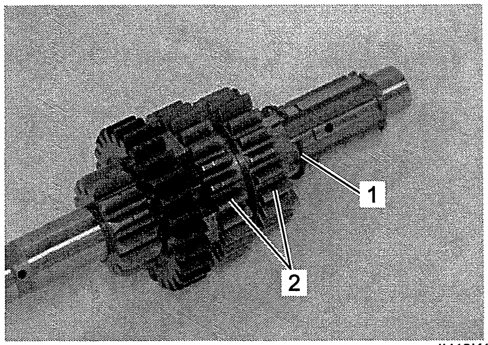
2) Slide the 6th drive gear (1) and 2nd drive gear (2) toward the 3rd/4th drive gears (3), then remove the 2nd drive gear circlip (4).
3) Remove the 2nd drive gear (2), 6th drive gear (1), 6th drive gear bushing and washer.



IH18K1520008-01

4) Remove the 6th drive gear snap ring (1) and 3rd/4th drive gears (2).

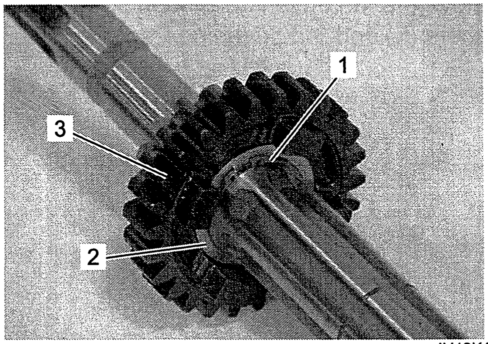
Special tool
09900–06107



IH18K1520009-01

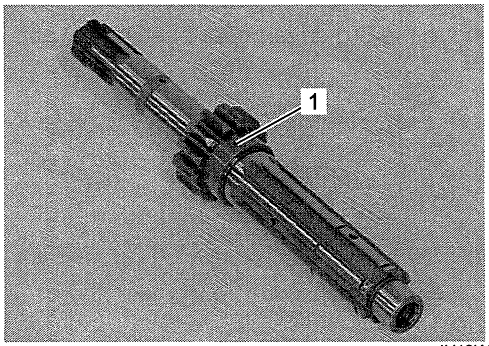
5) Remove the 5th drive gear snap ring (1), washer (2) and 5th drive gear (3).

Special tool
09900–06107



IH18K1520010-01

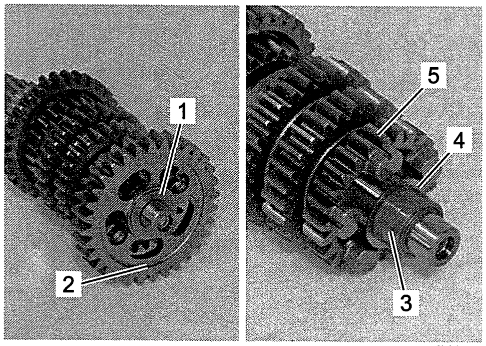
6) Remove the 5th drive gear bushing (1).



IH18K1520011-01

Driveshaft

1) Remove the washer (1) and 1st driven gear (2).
2) Remove the 1st driven gear bushing (3) or bearing, washer (4) and 5th driven gear (5).

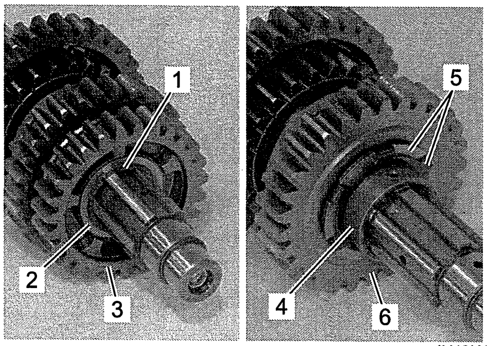


IH18K1520012-01

3) Remove the snap ring (1), washer (2) and 4th driven gear (3).

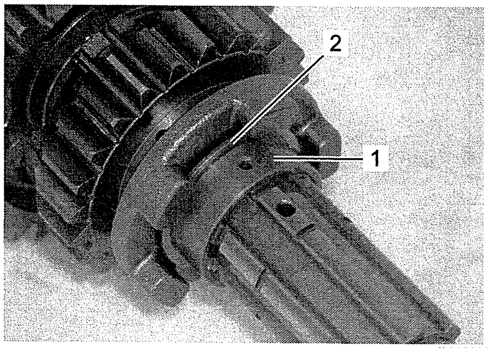
Special tool
09900–06107

4) Remove the 4th driven gear bushing (4), lock washers (5) and 3rd driven gear (6).

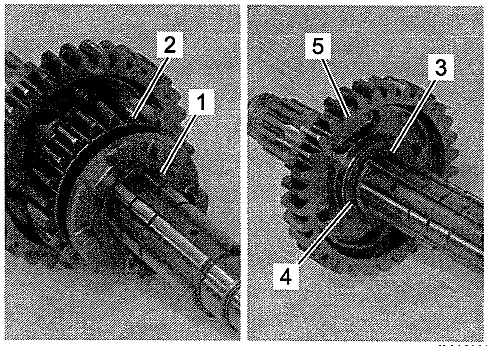


IH18K1520013-01

5) Remove the 3rd driven gear bushing (1) and washer (2).



IH18K1520014-01



IH18K1520015-01

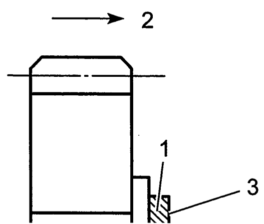
Reassembly

Reassemble the countershaft and driveshaft in the reverse order of disassembly. Pay attention to the following points:

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-4).**
- **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 a snap rings, make sure that it is completely seated in its groove and securely fitted.**
- **Rotate the bearing to inspect for abnormal noises and smooth rotation. Replace the bearing if there is anything unusual.**
- **Before installing the gears, apply engine oil to each rotating and sliding part.**

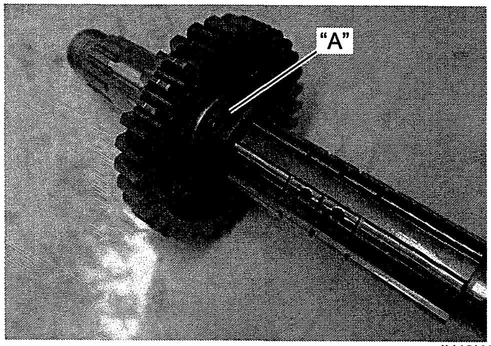
- When installing a new snap ring (1), pay attention to its direction. Fit it to the side where the thrust (2) is as shown in the figure.



Driveshaft

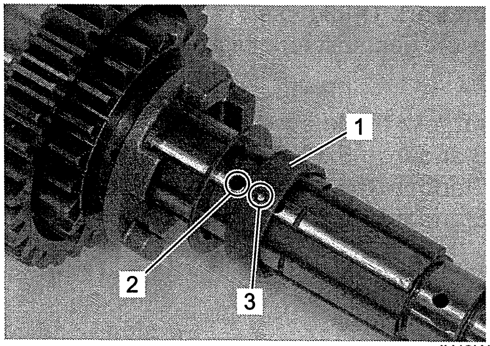
- Apply molybdenum oil solution to the 2nd driven gear bushing.

  "A": Assembly lubrication (Molybdenum oil solution)



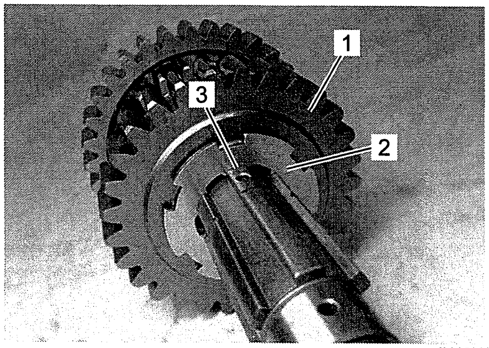
IH18K1520016-01

- When installing the 3rd driven gear bushing (1) onto the driveshaft, align the shaft oil hole (2) with the bushing oil hole (3).



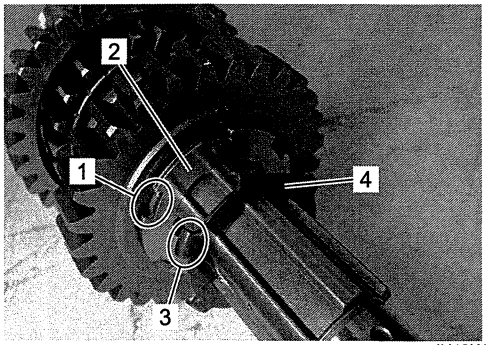
IH18K1520017-01

- After installing the 3rd driven gear (1) onto the driveshaft, install lock washer (2) onto the driveshaft, and turn it so it fits into the grooves (3).



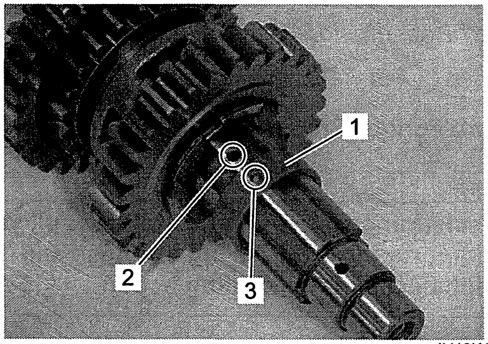
IH18K1520018-01

- Fit the grooves (1) of lock washer (2) into the claws (3) of lock washer (4).



IH18K1520019-02

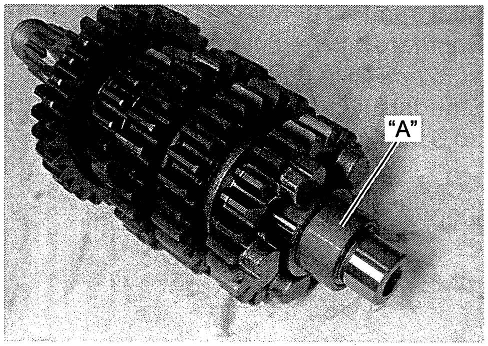
- When install the 4th driven gear bushing (1) onto the driveshaft, align the shaft oil hole (2) with the bushing oil hole (3).



IH18K1520020-01

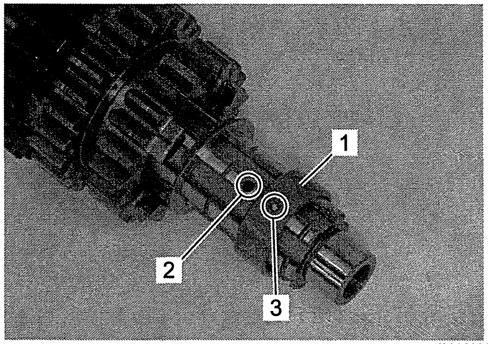
- Apply molybdenum oil solution to the 1st driven gear bushing.

  "A": Assembly lubrication (Molybdenum oil solution)



IH18K1520021-01

Countershaft
When installing the 6th drive gear bushing (1) onto the countershaft, align the shaft oil hole (2) with the bushing hole (3).



IH18K1520022-01

Gearshift Fork / Gearshift Cam Inspection

BENJ18K65206005

Refer to "Transmission Removal and Installation" (Page 5B-3).

Gearshift Fork to Groove Clearance

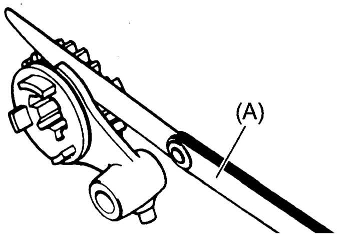
NOTE

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.

Gearshift fork to groove clearance
No. 1 [Standard]: 0.1 – 0.3 mm (0.004 – 0.011 in)
[Limit]: 0.5 mm (0.019 in)
No. 2 [Standard]: 0.1 – 0.3 mm (0.004 – 0.011 in)
[Limit]: 0.5 mm (0.019 in)
No. 3 [Standard]: 0.1 – 0.3 mm (0.004 – 0.011 in)
[Limit]: 0.5 mm (0.019 in)

Special tool
(A): 09900–20803

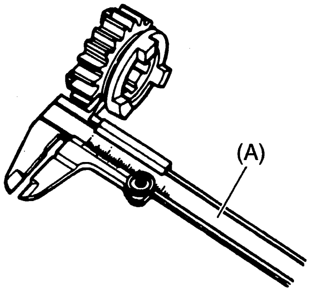


Gearshift Fork Groove Width

Measure the gearshift fork groove width using the vernier calipers.

Gearshift fork groove width
No. 1 [Standard]: 5.5 – 5.6 mm (0.217 – 0.220 in)
No. 2 [Standard]: 5.5 – 5.6 mm (0.217 – 0.220 in)
No. 3 [Standard]: 5.5 – 5.6 mm (0.217 – 0.220 in)

Special tool
(A): 09900–20102



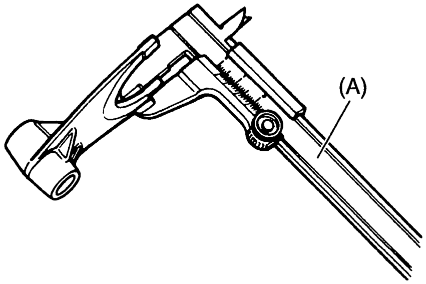
IE31J1520027-01

Gearshift Fork Thickness

Measure the gearshift fork thickness using the vernier calipers.

Gearshift fork thickness
No. 1 [Standard]: 5.3 – 5.4 mm (0.209 – 0.212 in)
No. 2 [Standard]: 5.3 – 5.4 mm (0.209 – 0.212 in)
No. 3 [Standard]: 5.3 – 5.4 mm (0.209 – 0.212 in)

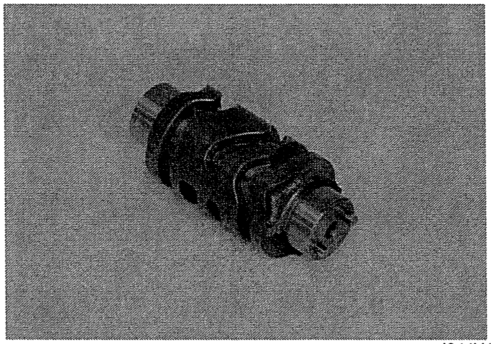
Special tool
(A): 09900–20102



IE31J1520028-01

Gearshift Cam

Inspect the gearshift cam groove for abnormal wear and damage. If any defects are found, replace the gearshift cam with a new one.



I944H1520027-01

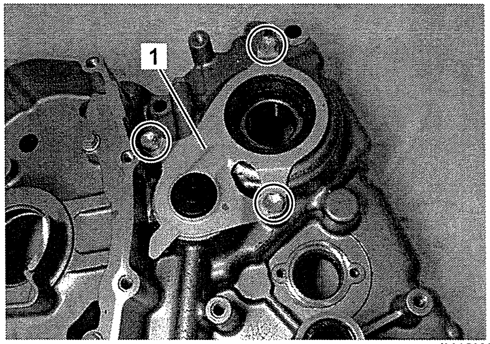
Left Crankcase Bearing / Oil Seal Removal and Installation

BENJ18K65206006

Refer to “Crankshaft Assembly Removal and Installation” in Section 1D (Page 1D-67) and “Transmission Removal and Installation” (Page 5B-3).

Removal

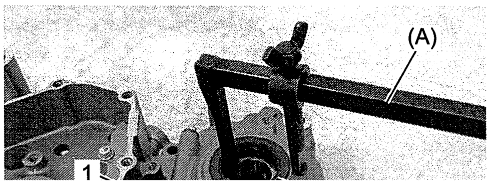
1) Remove the oil seal retainer (1).



IH18K1520023-01

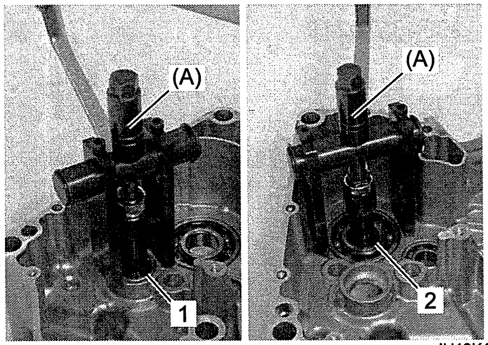
2) Remove the clutch push rod oil seal (1).
3) Remove the driveshaft oil seal (2) using the special tool.

Special tool
(A): 09913–50121

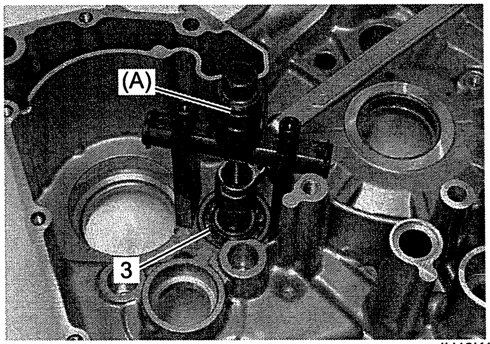


4) Remove the gearshift cam bearing (1), driveshaft bearing (2) and countershaft bearing (3) using the special tool.

Special tool
(A): 09921–20240



IH18K1520025-01



IH18K1520026-01

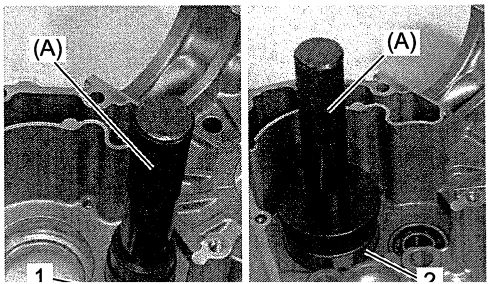
Installation

1) Install the new countershaft bearing (1) and new driveshaft bearing (2) using the special tool.

NOTE

The sealed side of the bearings faces outside.

Special tool
(A): 09913–70210

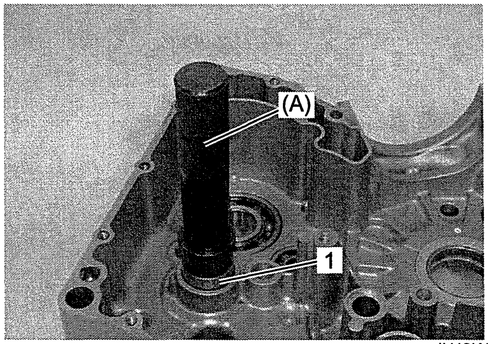


2) Install the new gearshift cam bearing (1).

NOTE

The stamped mark side of the bearing faces inside.

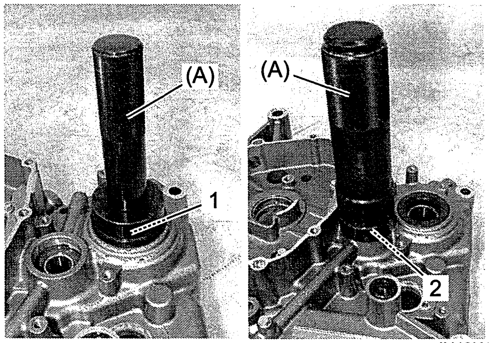
Special tool
(A): 09913–70210



IH18K1520028-01

3) Install the new driveshaft oil seal (1) and new clutch push rod oil seal (2) using the special tool.

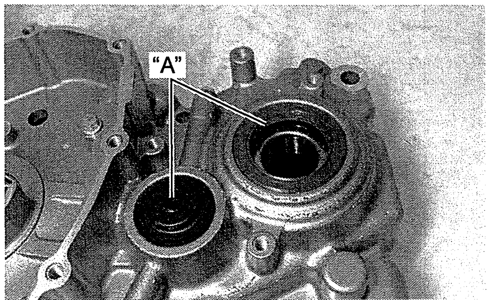
Special tool
(A): 09913–70210



IH18K1520029-01

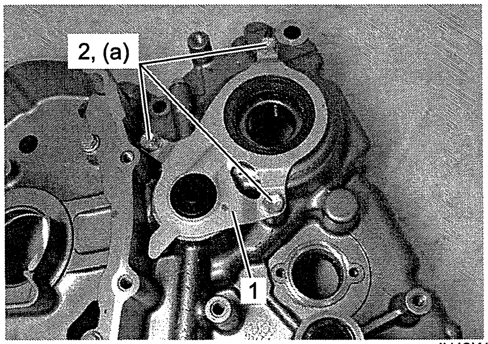
4) Apply grease to the oil seal lips.

“A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)



5) Install the oil seal retainer (1) and tighten its bolts (2) to the specified torque.

Tightening torque
Driveshaft oil seal retainer bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1520031-02

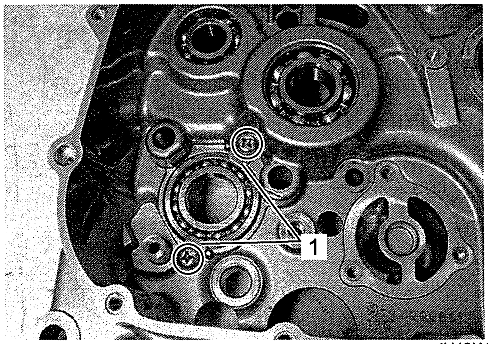
Right Crankcase Bearing Removal and Installation

BENJ18K65206007

Refer to “Crankcase Assembly Disassembly” in Section 1D (Page 1D-61) and “Crankcase Assembly Reassembly” in Section 1D (Page 1D-64).

Removal

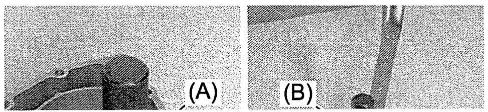
1) Remove the bearing retainers (1).

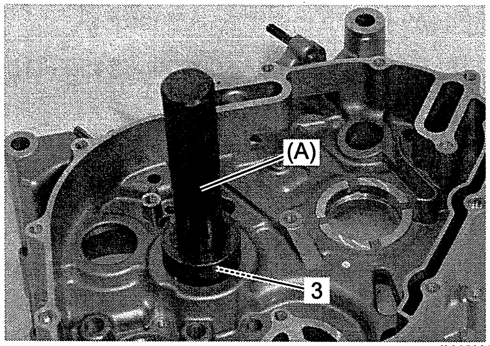


IH18K1520032-01

2) Remove the gearshift cam bearing (1), countershaft bearing (2) and driveshaft bearing (3) using the special tools.

Special tool
(A): 09913–70210
(B): 09921–20240



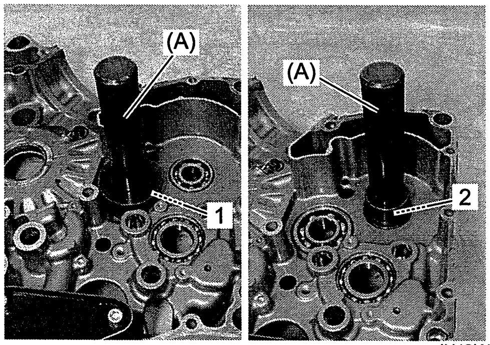


IH18K1520034-01

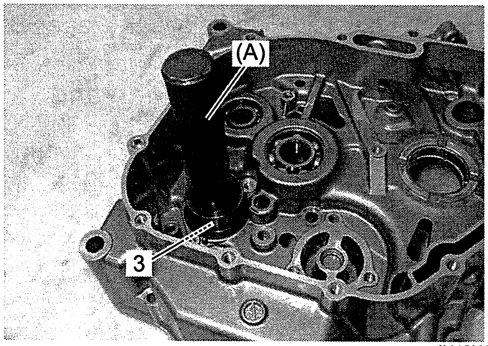
Installation

1) Install the new driveshaft bearing (1), new countershaft bearing (2) and gearshift cam bearing (3) using the special tool.

Special tool
(A): 09913–70210



IH18K1520035-01



IH18K1520036-01

Transmission Bearing / Oil Seal Inspection

BENJ18K65206008

Refer to “Crankcase Bearing / Oil Seal Inspection” in Section 1D (Page 1D-72).

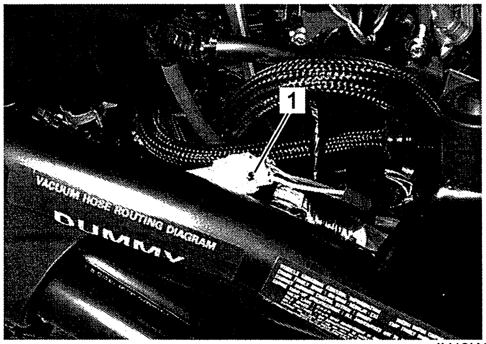
GP Switch Inspection

BENJ18K65206009

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank. ☞(Page 1G-9)
3) Disconnect the gear position switch lead wire coupler (1).

NOTICE

When disconnecting and connecting the gear position switch lead wire coupler, make sure to turn off the ignition switch, or electronic parts may get damaged.



IH18K1520069-01

4) Check the continuity between Bl and B/W lead wires with the transmission in “NEUTRAL”.

	Bl	B/W
ON (Neutral)	○	○
OFF (Except neutral)		

IH18K1520065-02

5) Connect the gear position switch lead wire coupler to the wiring harness.
6) Support the motorcycle with a jack or wooden block.
7) Turn the ignition switch ON and side-stand to upright position.
8) Measure the voltage between P ((+) probe) and B/W ((–) probe) lead wires when shifting the gearshift lever from low to top.

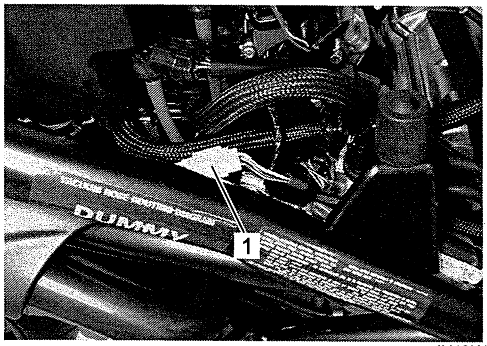
<u>GP switch voltage</u>
From 1st to Top [Standard]: 0.6 V or more

GP Switch Removal and Installation

BENJ18K65206010

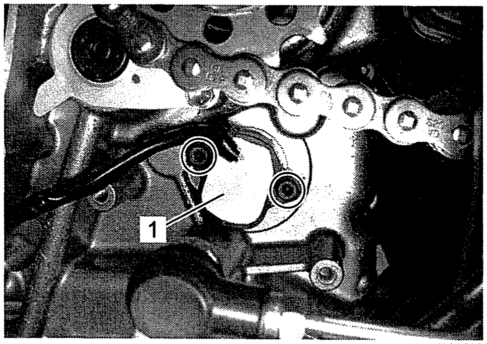
Removal

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank. ☞(Page 1G-9)
3) Disconnect the GP switch coupler (1).



IH18K1520037-01

4) Remove the generator cover. ☞(Page 1J-5)
5) Remove the GP switch (1).



IH18K1520038-01

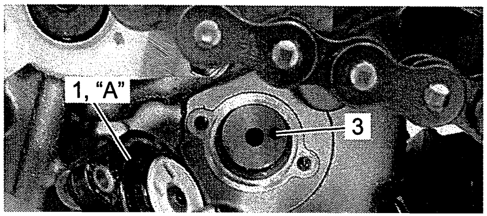
Installation

Install the GP switch in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring (1).

  "A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

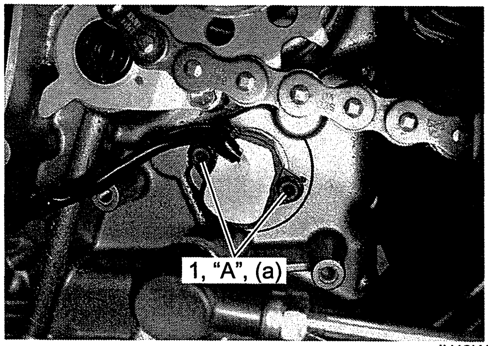
- Align the GP switch pin (2) with the gearshift cam hole (3).



- Apply thread lock to the GP switch mounting bolts (1) and tighten them to the specified torque.

  "A": Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)

  Tightening torque
  GP switch mounting bolt (a): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)



IH18K1520040-01

- Route the GP switch lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).

Gearshift Lever Removal and Installation

BENJ18K65206011

Refer to "Gearshift Lever Construction" (Page 5B-13).

Removal

Remove the gearshift lever.

Installation

1) Install the gearshift lever.
2) Check the gearshift lever height. ☞(Page 5B-12)

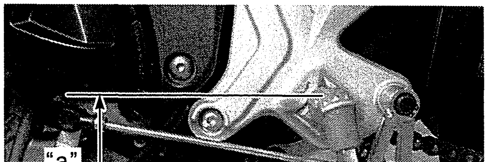
Gearshift Lever Height Inspection and Adjustment

BENJ18K65206012

Inspection

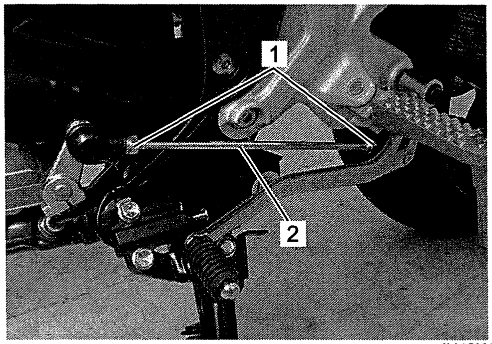
Inspect the gearshift lever height "a" between the pedal top face and footrest.
Adjust the gearshift lever height if necessary.

<u>**Gearshift lever height**</u>
[Standard]: 45 – 55 mm (1.8 – 2.1 in)



Adjustment

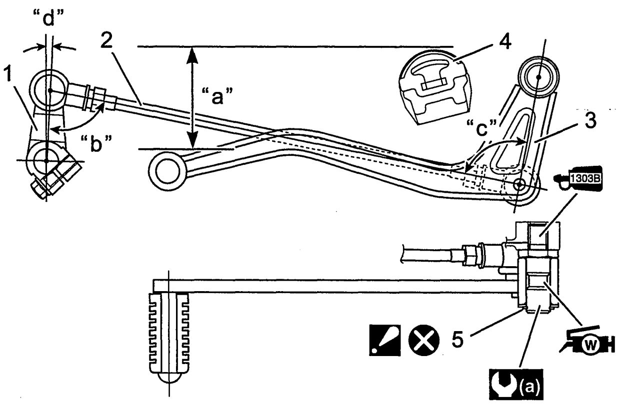
1) Loosen the lock-nuts (1).
2) Turn the gearshift link rod (2) in or out until the gearshift lever height is within the specification. ☞(Page 5B-12)
3) Tighten the lock-nuts (1) securely.



IH18K1520042-02

Gearshift Lever Construction

BENJ18K65206013

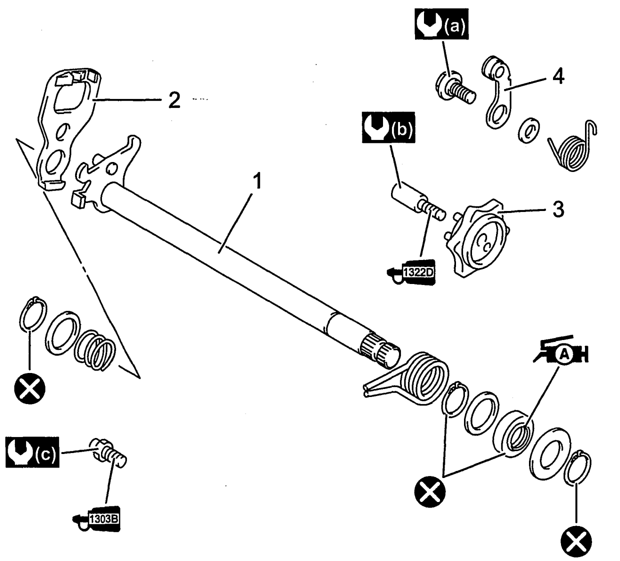


IH18K1520043-03

1.	Gearshift link arm	"c":	Approx. 89°
2.	Gearshift link rod	"d":	Approx. 3°
3.	Gearshift lever	(a) :	40 N·m (4.1 kgf-m, 29.5 lbf-ft)
4.	Footrest	1303B :	Apply thread lock to the thread part.
5.	Snap ring : Face the sharp edge outside.	:	Apply grease.
"a":	45 – 55 mm (1.8 – 2.1 in)	⊗ :	Do not reuse.
"b":	82°		

Gearshift Shaft / Gearshift Cam Plate Components

BENJ18K65206014



IH18K1520066-02

1.		Gearshift shaft
2.		Gearshift cam drive plate
3.		Gearshift cam plate
4.		Gearshift cam stopper
(a)	:	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
(b)	:	13 N·m (1.3 kgf-m, 9.5 lbf-ft)
(c)	:	19 N·m (1.9 kgf-m, 14.0 lbf-ft)
1303B	:	Apply thread lock to the thread part.
1322D	:	Apply thread lock to the thread part.
A H	:	Apply grease to the oil seal lip.
⊗	:	Do not reuse.

Gearshift Shaft / Gearshift Cam Plate Removal and Installation

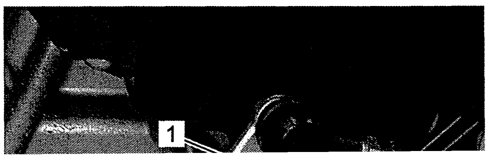
BENJ18K65206015

Removal

1) Remove the gearshift lever link arm (1).

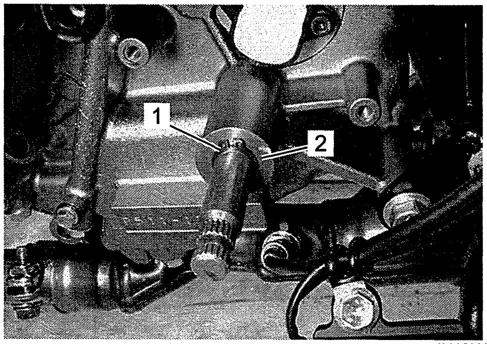
NOTE

Mark the position of the gearshift link arm on the gearshift shaft (2) before removing the link arm.



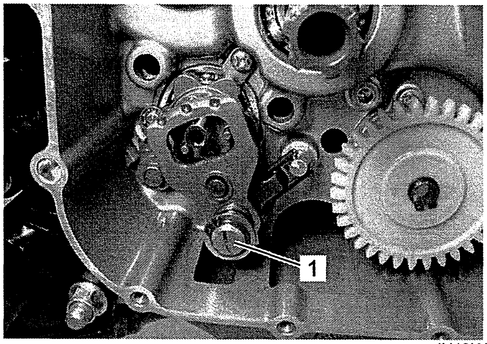
2) Remove the engine sprocket cover. ☞(Page 3A-4)
3) Remove the clutch components. ☞(Page 5C-10)
4) Remove the snap ring (1) and washer (2).

Special tool
09900–06107



IH18K1520045-01

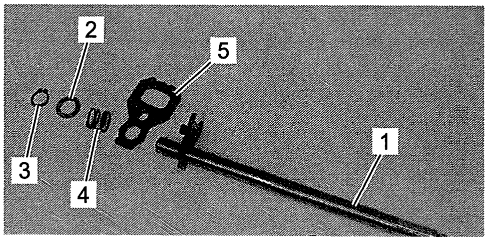
5) Remove the gearshift shaft assembly (1).



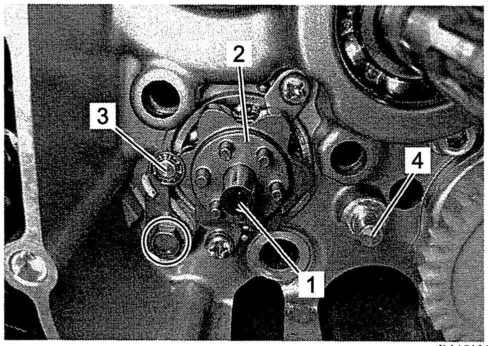
IH18K1520046-01

6) Remove the following parts from the gearshift shaft (1).
   - Washer (2)
   - Snap ring (3)
   - Gearshift plate return spring (4)
   - Gearshift cam drive plate (5)
   - Gearshift shaft return spring (6)

Special tool
09900–06107



7) Remove the gearshift cam plate bolt (1) and gearshift cam plate (2).
8) Remove the gearshift cam stopper (3).
9) Remove the gearshift arm stopper (4).



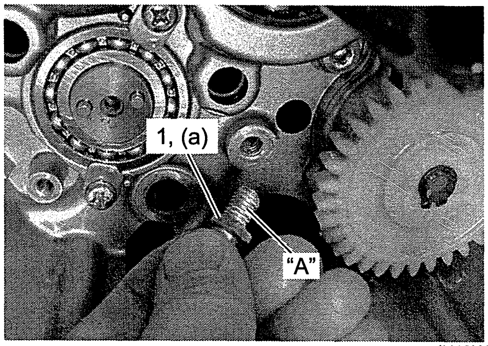
IH18K1520048-01

Installation

1) Apply a small quantity of thread lock to the gearshift arm stopper (1) and tighten it to the specified torque.

"A": Thread lock cement 99000–32030 (THREAD LOCK CEMENT 1303B)

Tightening torque
Gearshift arm stopper (a): 19 N·m (1.9 kgf-m, 14.0 lbf-ft)



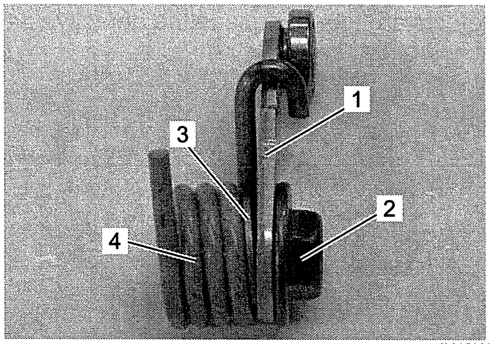
IH18K1520049-01

2) Install the gearshift cam stopper (1), bolt (2), washer (3) and spring (4).
3) Tighten the gearshift cam stopper bolt (2) to the specified torque.

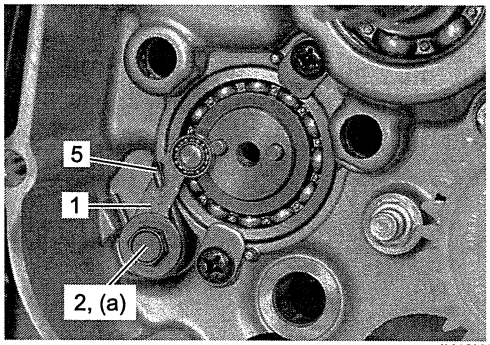
NOTE

Hook the return spring end (5) to the gearshift cam stopper (1).

Tightening torque
Gearshift cam stopper bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1520050-03

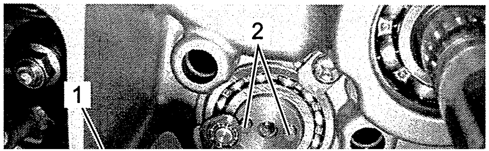


IH18K1520051-01

4) Check the gearshift cam stopper moves smoothly.
5) Locate the gearshift cam in the neutral position.
6) Install the gearshift cam plate (1).

NOTE

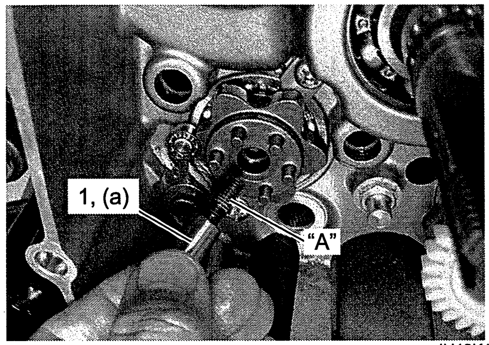
Align the gearshift cam pins (2) with the gearshift cam plate holes (3).



7) Apply a small quantity of thread lock to the gearshift cam plate bolt (1) and tighten it to the specified torque.

"A": Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)

Tightening torque
Gearshift cam plate bolt (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)

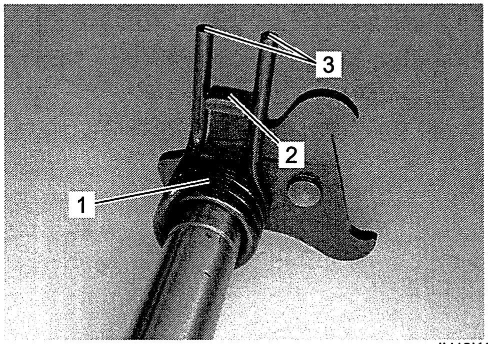


IH18K1520053-01

8) Install the gearshift shaft return spring (1).

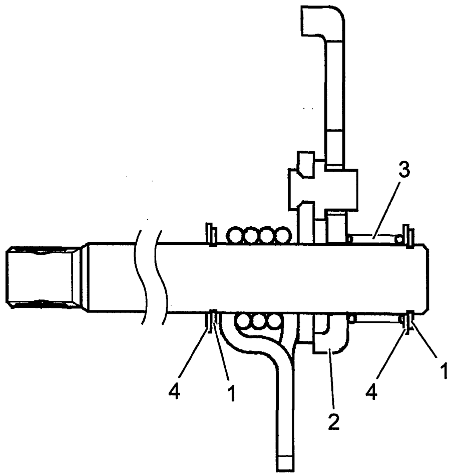
NOTE

Position the stopper (2) of gearshift arm between the gearshift shaft return spring ends (3).



IH18K1520054-01

9) Install the following parts.
- New snap ring (1)
- Gearshift cam drive plate (2)
- Gearshift plate return spring (3)
- Washer (4)

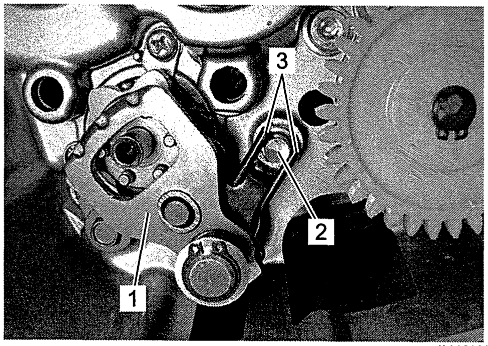


IH18K1520067-01

10) Install the gearshift shaft assembly (1).

NOTE

Pinch the gearshift arm stopper (2) with gearshift shaft return spring ends (3).



IH18K1520056-01

11) Install the washer (1) and new snap ring (2).

Special tool
09900–06107

12) Install the clutch components. ☞(Page 5C-12)
13) Install the engine sprocket cover. ☞(Page 3A-4)
14) Install the gearshift lever link arm and check the gearshift lever height. ☞(Page 5B-12)

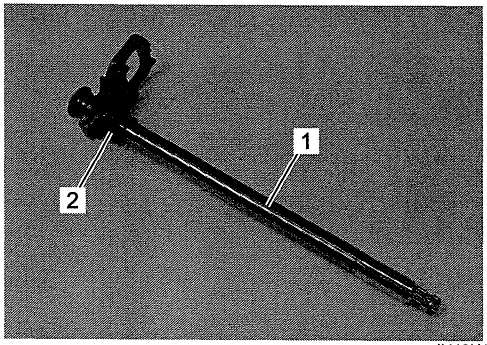
Gearshift Linkage Inspection

BENJ18K65206016

Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation” (Page 5B-13).

Gearshift Shaft

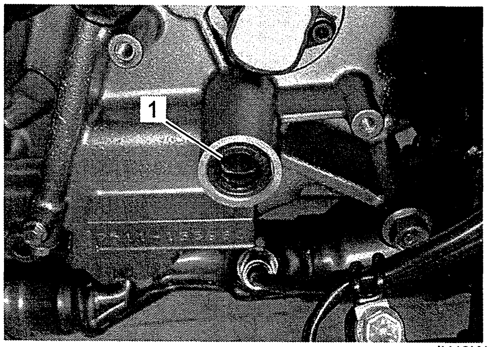
Check the gearshift shaft (1) for bend or wear.
Check the return spring (2) for damage or fatigue.
If any defects are found, replace the defective part(-s).



IH18K1520058-01

Gearshift Shaft Oil Seal

Inspect the gearshift shaft oil seal lip (1) for damage or wear. If any defect is found, replace the oil seal with a new one.



IH18K1520059-01

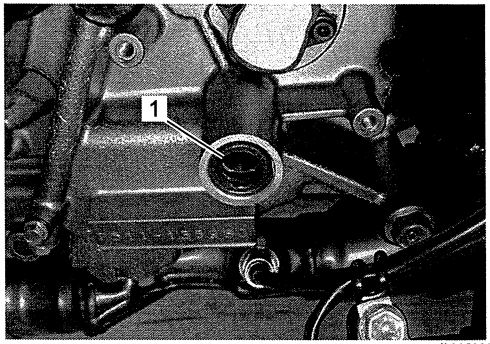
Gearshift Shaft Oil Seal Removal and Installation

BENJ18K65206017

Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation” (Page 5B-13).

Removal

Remove the gearshift shaft oil seal (1).



IH18K1520060-01

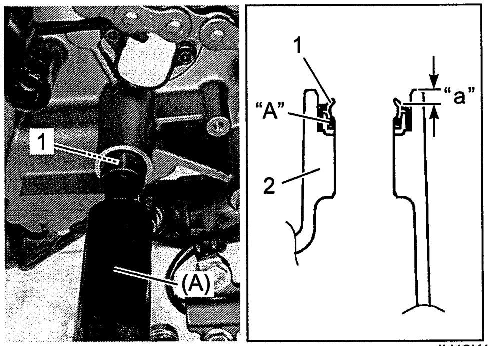
Installation

1) Install the new oil seal (1) with the special tool.

Special tool
(A): 09913–70210

2) Apply grease to the oil seal lip.

“A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1520061-01

2. Crankcase	“a”: 1.5 – 2.5 mm (0.060 – 0.098 in)

Specifications

Tightening Torque Specifications

BENJ18K65207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Driveshaft oil seal retainer bolt	10	1.0	7.5	☞(Page 5B-10)
GP switch mounting bolt	6.0	0.61	4.45	☞(Page 5B-12)
Gearshift arm stopper	19	1.9	14.0	☞(Page 5B-14)
Gearshift cam stopper bolt	10	1.0	7.5	☞(Page 5B-15)
Gearshift cam plate bolt	13	1.3	9.5	☞(Page 5B-15)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
“Gearshift Lever Construction” (Page 5B-13)
“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-13)
“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K65208001

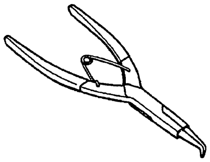
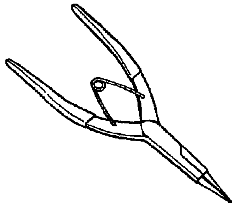
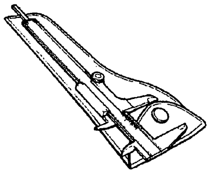
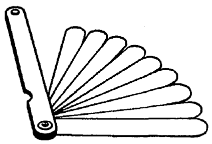
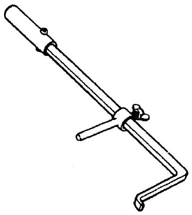
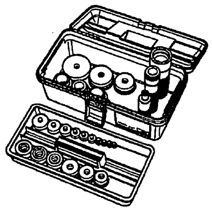
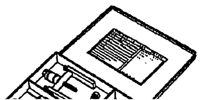
Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞(Page 5B-7) / ☞(Page 5B-7)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 5B-10) / ☞(Page 5B-12) / ☞(Page 5B-17)
Thread lock cement	THREAD LOCK CEMENT 1303B	P/No.: 99000–32030	☞(Page 5B-14)
	THREAD LOCK CEMENT 1322D	P/No.: 99000–32150	☞(Page 5B-12) / ☞(Page 5B-15)

NOTE

Required service material(s) is also described in:
"Transmission Components" (Page 5B-2)
"Gearshift Lever Construction" (Page 5B-13)
"Gearshift Shaft / Gearshift Cam Plate Components" (Page 5B-13)

Special Tool

BENJ18K65208002

09900–06104 Snap ring pliers (External: Bent nose) ☞(Page 5B-5) 	09900–06107 Snap ring pliers (External) ☞(Page 5B-5) / ☞(Page 5B-5) / ☞(Page 5B-6) / ☞(Page 5B-6) / ☞(Page 5B-14) / ☞(Page 5B-14) / ☞(Page 5B-16) 
09900–20102 Vernier calipers (200 mm) ☞(Page 5B-8) / ☞(Page 5B-8) 	09900–20803 Thickness gauge ☞(Page 5B-8) 
09913–50121 Oil seal remover ☞(Page 5B-9) 	09913–70210 Bearing installer set ☞(Page 5B-9) / ☞(Page 5B-10) / ☞(Page 5B-10) / ☞(Page 5B-10) / ☞(Page 5B-11) / ☞(Page 5B-17) 
09921–20240 Bearing remover set ☞(Page 5B-9) / ☞(Page 5B-10) 	

Clutch

Precautions

Precautions for Clutch System

BENJ18K65300001

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

Schematic and Routing Diagram

Clutch Cable Routing Diagram

BENJ18K65302001

Refer to “Throttle Cable Routing Diagram” in Section 1D (Page 1D-2).

Diagnostic Information and Procedures

Clutch System Symptom Diagnosis

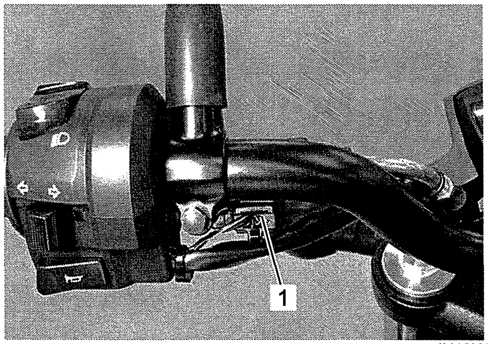
BENJ18K65304001

Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from the clutch)	Worn countershaft spline.	*Replace countershaft. ☞(Page 5B-5)*
	Worn clutch sleeve hub spline.	*Replace clutch sleeve hub. ☞(Page 5C-10) ☞(Page 5C-12)*
	Worn clutch plate teeth.	*Replace clutch plate. ☞(Page 5C-10) ☞(Page 5C-12)*
	Distorted clutch plates, driven and drive.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*
	Worn clutch release bearing.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*
	Weakened clutch damper springs.	*Replace primary driven gear. ☞(Page 5C-10) ☞(Page 5C-12)*
Clutch slips	Clutch cable play out of adjustment.	*Adjust. ☞(Page 5C-2)*
	Weakened clutch springs.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*
	Worn or distorted clutch pressure plate.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*
	Distorted clutch plates, driven and drive.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*
Clutch drags	Clutch cable play out of adjustment.	*Adjust. ☞(Page 5C-2)*
	Some clutch springs are weak, while others are not.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*
	Worn or distorted clutch pressure plate.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*
	Distorted clutch plates, driven and drive.	*Replace. ☞(Page 5C-10) ☞(Page 5C-12)*

Clutch Lever Position Switch Inspection

BENJ18K65306001

1) Disconnect the clutch lever position switch coupler (1).



IH18K1530001-01

2) Inspect the clutch lever position switch for continuity with the circuit tester.
   If any abnormality is found, replace the clutch lever position switch with a new one. Refer to “Clutch Lever Removal and Installation” (Page 5C-5).

Color / Position	Terminal (B)	Terminal (B)
FREE		
•	○	○

IH18K1530002-02

3) Connect the clutch lever position switch coupler.

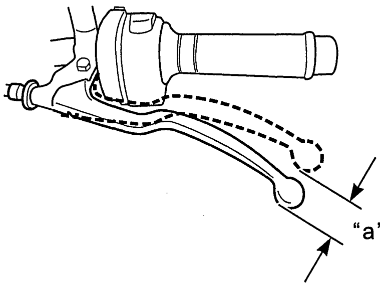
Clutch Cable Play On-Vehicle Inspection and Adjustment

BENJ18K65306002

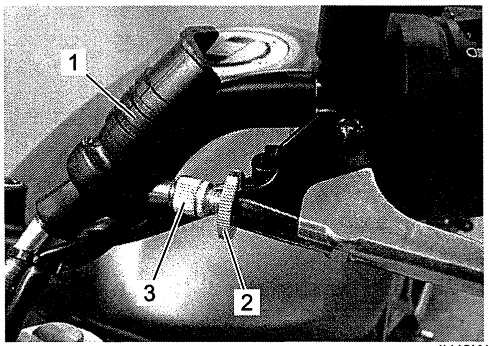
Inspection

Inspect the clutch cable play “a”. Adjust the clutch cable play if necessary.

<u>Clutch cable play</u>
[Standard]: 10 – 15 mm (0.4 – 0.6 in)

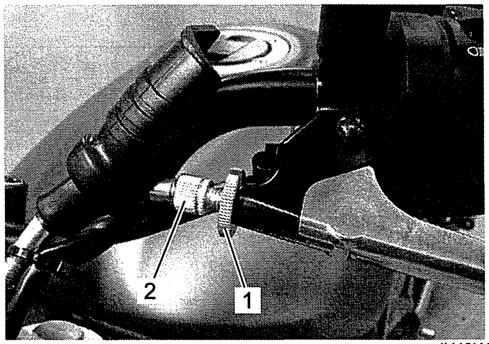


IH18K1530068-01



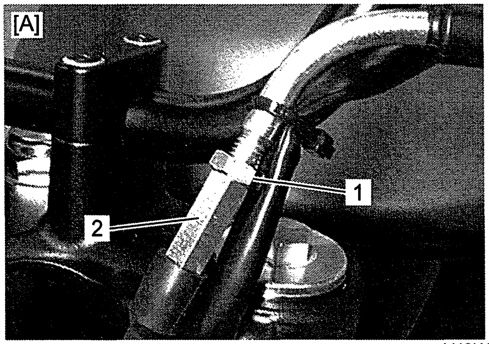
IH18K1530003-01

3) If the clutch cable play is not within the standard, adjust the clutch push rod screw as follows.
   a) Loosen the lock-nut (1) and turn in the adjuster (2) all the way into the clutch lever.



IH18K1530069-01

   b) Loosen the lock-nut (1) and turn the adjuster (2) clockwise as far as it will go.



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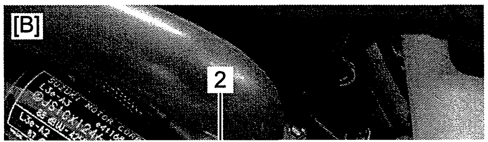


c) Drain the engine oil. ☞(Page 1E-5)

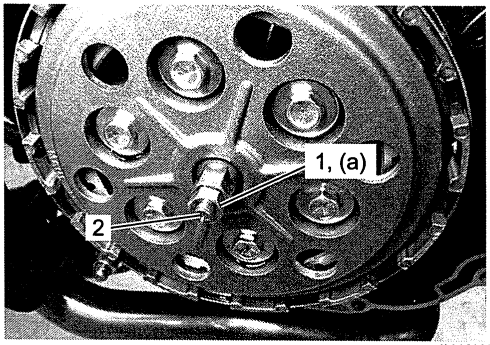
d) Remove the clutch cover. ☞(Page 5C-10)

e) Loosen the clutch release adjuster nut (1) and turn out the clutch push rod screw (2) two or three rotations.

f) From that position, slowly turn in the clutch push rod adjuster screw (2) until resistance is felt.

g) From that position, turn out the clutch push rod adjuster screw (2) 1 rotation, and tighten the clutch release adjuster nut (1) while holding the clutch push rod screw (2).

Tightening torque
Clutch release adjuster nut (a): 5.0 N·m (0.51 kgf-m, 3.70 lbf-ft)



IH18K1530004-01

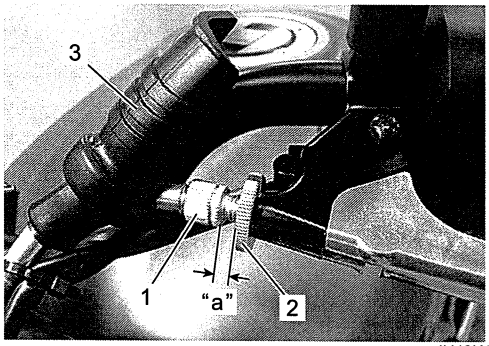
h) Install the clutch cover. ☞(Page 5C-12)

i) Pour engine oil. ☞(Page 1E-5)

4) Turn out the adjuster (1) to obtain "a" at the threads of adjuster.

5) Tighten the lock-nut (2).

6) Install the clutch lever cover (3).

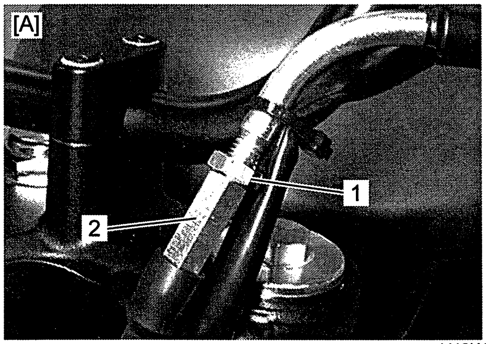


IH18K1530072-01

"a":	3 – 5 mm (0.12 – 0.19 in) (SV650/A) 2 – 6 mm (0.08 – 0.23 in) (SV650XA)

7) Adjust the clutch cable play by turning the adjuster (1) to obtain free play at the clutch lever end. ☞(Page 5C-2)

8) Tighten the lock-nut (1) while holding the adjuster (2).



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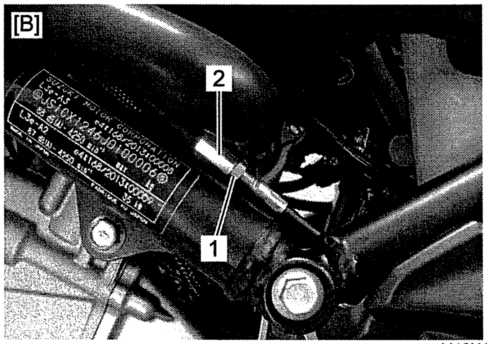
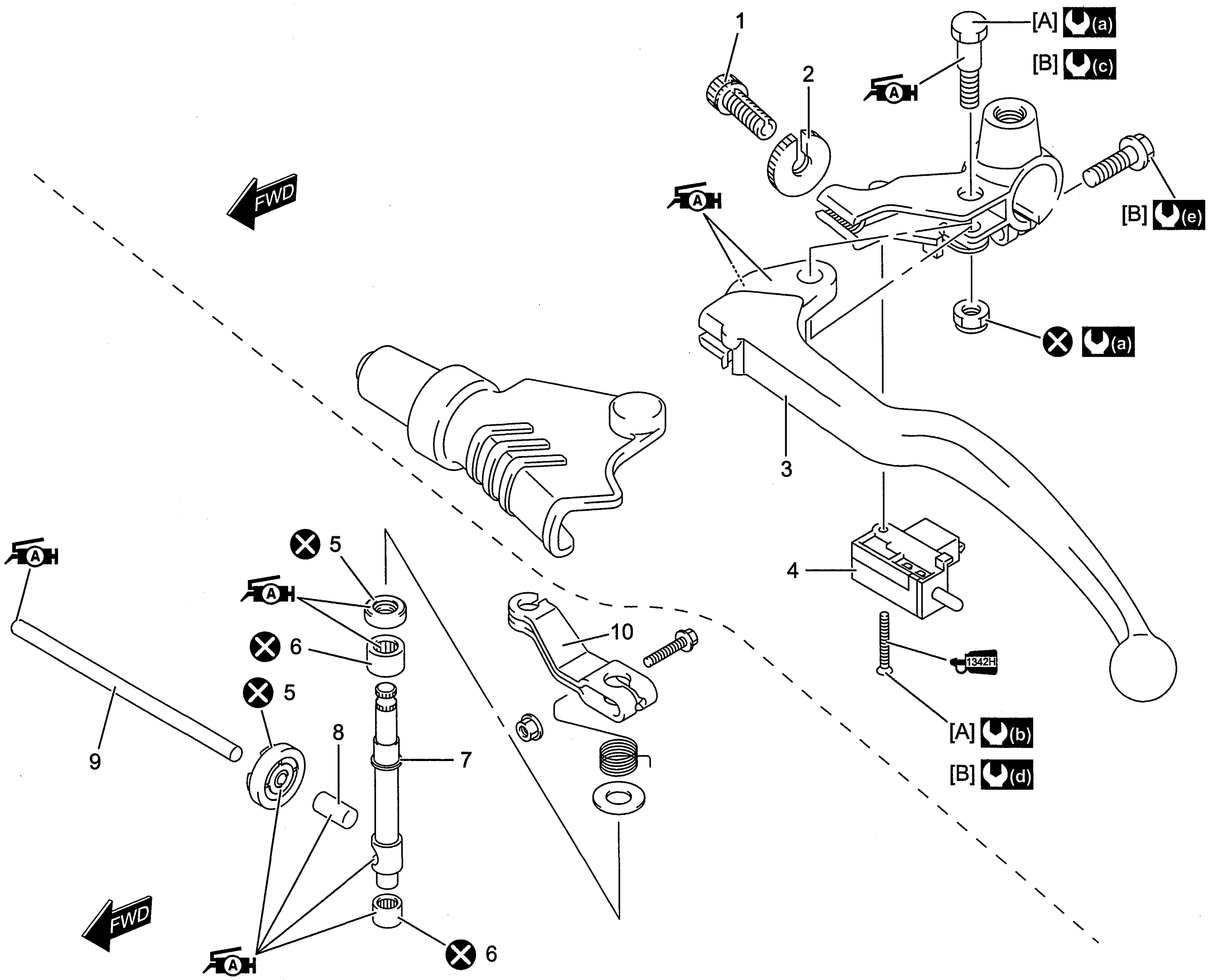


IJ18K1530002-02

[A]: SV650/A	[B]: SV650XA

Clutch Control System Components

BENJ18K65306003



IJ18K1530005-02

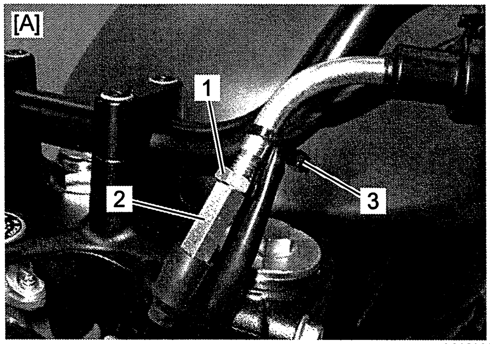
[A]: SV650/A	6. Bearing	(c) : 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)
[B]: SV650XA	7. Clutch release camshaft	(d) : 0.6 N·m (0.06 kgf-m, 0.45 lbf-ft)
1. Adjuster	8. Clutch push rod cap	(e) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
2. Lock-nut	9. Clutch push rod (left)	: Apply grease.
3. Clutch lever	10. Clutch release arm	1342H : Apply thread lock to the thread part.
4. Clutch lever position switch	(a) : 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)	: Do not reuse.
5. Clutch push rod oil seal	(b) : 1.0 N·m (0.10 kgf-m, 0.75 lbf-ft)	

Clutch Cable Removal and Installation

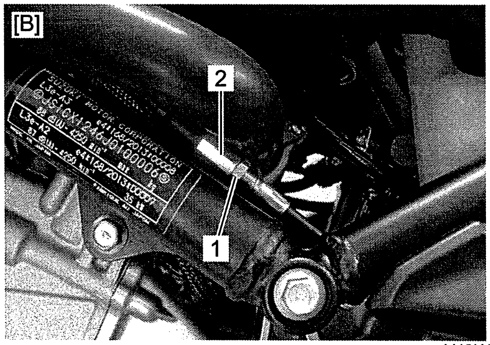
BENJ18K65306004

Removal

1) Remove the following parts.
   - Left frame head cover (SV650/A): ☞(Page 9D-21)
   - Left frame front cover assembly (SV650XA): ☞(Page 9D-23)
2) Remove the left frame body rear cover. ☞(Page 9D-22)
3) Remove the left frame lower cover. ☞(Page 9D-22)
4) Full loosen the lock-nut (1) and adjuster (2).
5) Disconnect the clamp (3).



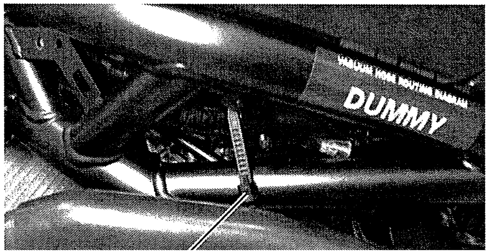
IJ18K1530006-01



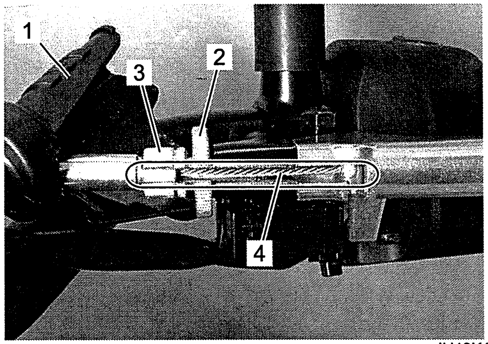
IJ18K1530002-02

[A]: SV650/A	[B]: SV650XA

6) Disconnect the clamp (1).

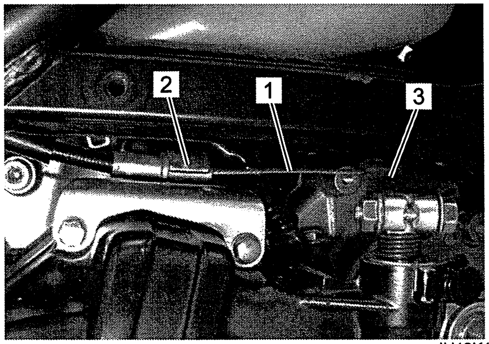


7) Remove the clutch lever cover (1) and loosen the lock-nut (2).
8) Align the lock-nut (2) and adjuster (3) with the cutaway.
9) Disconnect the clutch cable (4) from the clutch lever side.



IH18K1530008-01

10) Remove the clutch cable (1) from the clutch cable stopper (2).
11) Disconnect the clutch cable (1) from the clutch release arm (3).



IH18K1530009-02

12) Remove the clutch cable.

Installation

Install the clutch cable in the reverse order of removal. Pay attention to the following points:

- Install the clutch cable. Refer to "Clutch Cable Routing Diagram" (Page 5C-1).
- After install the removed parts, adjust the clutch cable play. ☞(Page 5C-2)

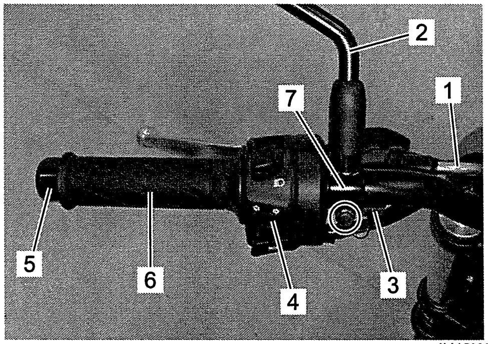
Clutch Lever Removal and Installation

BENJ18K65306005

Removal

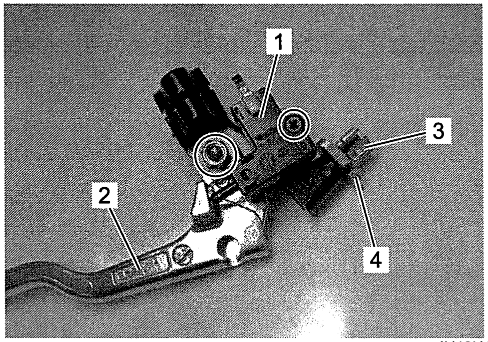
1) Disconnect the clutch cable (1) from the clutch lever

d) Handlebar balancer assembly (5)
e) Left handlebar grip (6)
f) Clutch lever assembly (7)



IH18K1530010-02

3) Remove the clutch lever position switch (1) and clutch lever (2).
4) Remove the adjuster (3) and lock-nut (4).

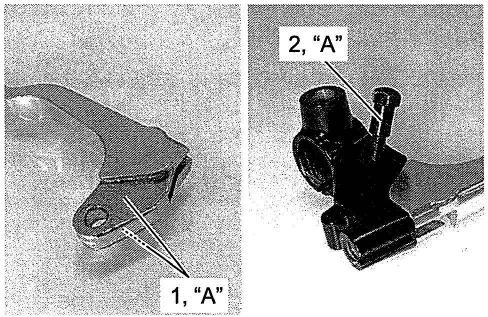


IH18K1530011-01

Installation
Install the clutch lever in the reverse order of removal. Pay attention to the following points:

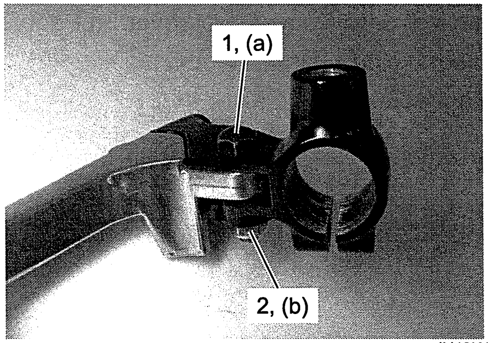
- Apply grease to the clutch lever sliding surfaces (1) and clutch lever pivot bolt (2).

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



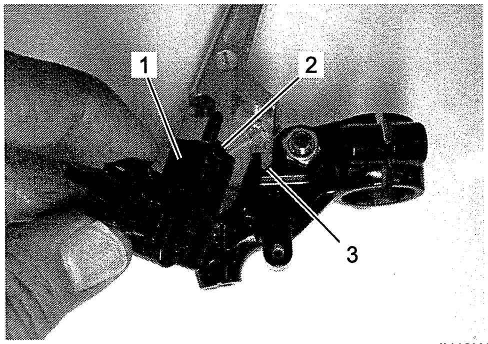
- Tighten the clutch lever pivot bolt (1) and new pivot nut (2) to the specified torque.

Tightening torque
Clutch lever pivot bolt (a): 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft) (SV650/A)
Clutch lever pivot bolt (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft) (SV650XA)
Clutch lever pivot nut (b): 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)



IH18K1530013-01

- When installing the clutch lever position switch (1), align the projection (2) on the clutch lever position switch with the groove (3) in the clutch lever holder.

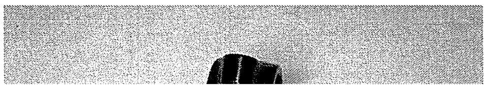


IH18K1530014-01

- Apply a small quantity of thread lock to the clutch switch screw (1) and tighten it to the specified torque.

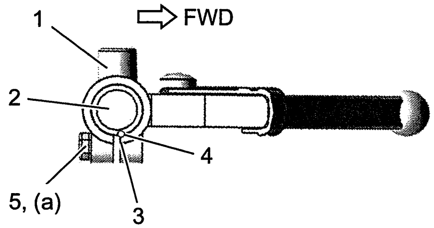
"A": Thread lock cement 99000–32160 (THREAD LOCK CEMENT 1342H)

Tightening torque
Clutch switch screw (a): 1.0 N·m (0.10 kgf-m, 0.75 lbf-ft) (SV650/A)
Clutch switch screw (a): 0.6 N·m (0.06 kgf-m, 0.45 lbf-ft) (SV650XA)



- When installing the clutch lever assembly (1) onto the left handlebar (2), align the clutch lever holder front surface end (3) with the punch mark (4) on the left handlebar and tighten the clutch lever holder bolt (5).

Tightening torque
Clutch lever holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft) (SV650XA)



IJ18K1530007-02

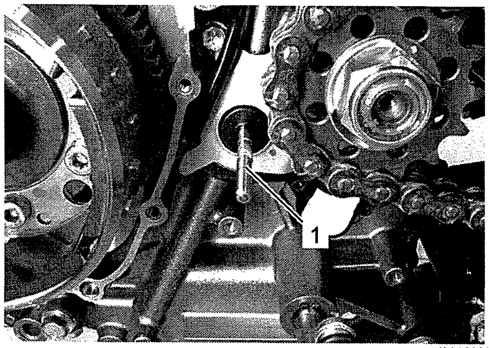
- Install the removed parts to the left side of the handlebar. Refer to “Handlebar Removal and Installation (SV650/A)” in Section 6B (Page 6B-5) or “Handlebar Removal and Installation (SV650XA)” in Section 6B (Page 6B-7).
- Adjust the clutch cable play. ☞(Page 5C-2)

Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation

BENJ18K65306006

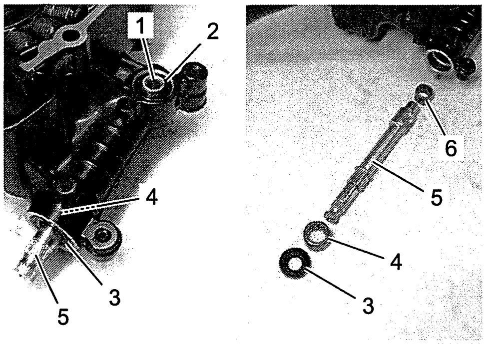
Removal

1) Remove the generator cover. ☞(Page 1J-5)
2) Remove the clutch push rod (Left) (1).



IH18K1530017-01

3) Remove the clutch push rod cap (1) and oil seal (2).
4) Remove the clutch release camshaft oil seal (3) and upper bearing (4) together with clutch release camshaft (5).
5) Remove the clutch release camshaft lower bearing (6).



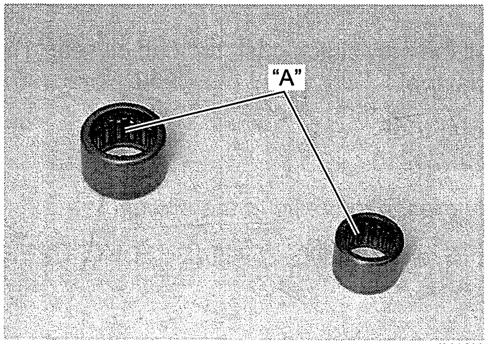
IH18K1530067-01

Installation

Install the clutch push rod (left) and clutch release camshaft in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new bearings.

“A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1530018-01

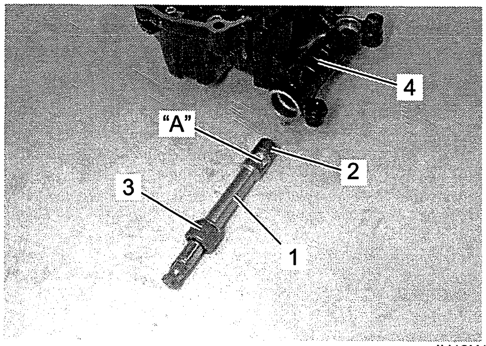
- Apply grease to the contact position of clutch release camshaft (1).

“A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)

- Install the clutch release camshaft lower bearing (2) and upper bearing (3) together with the clutch release camshaft (1) into the generator cover (4).

NOTE

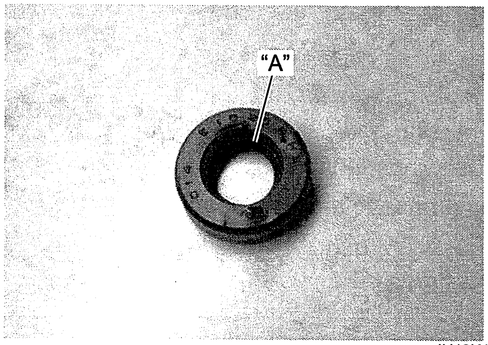
The stamped mark side of bearings faces



IH18K1530019-02

- Apply grease to the new clutch release camshaft oil seal lip.

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



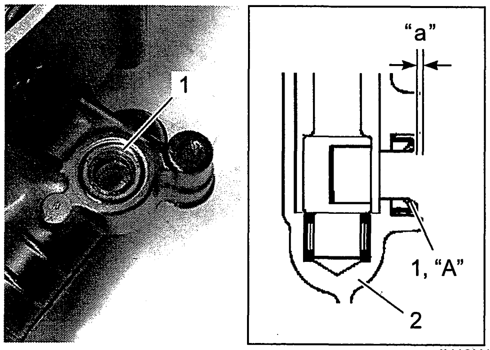
IH18K1530020-01

- Install the new clutch push rod cap oil seal (1) with the special tool.

Special tool
09913–70210

- Apply grease to the lip of the oil seal.

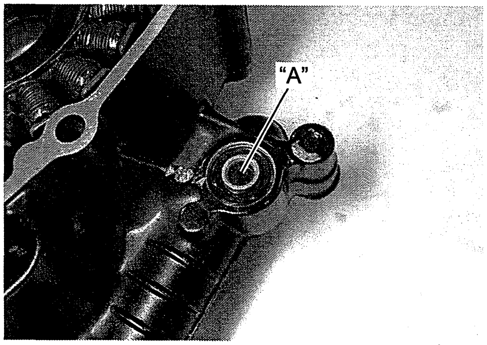
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1530021-01

- Apply grease to the clutch push rod cap inner surface.

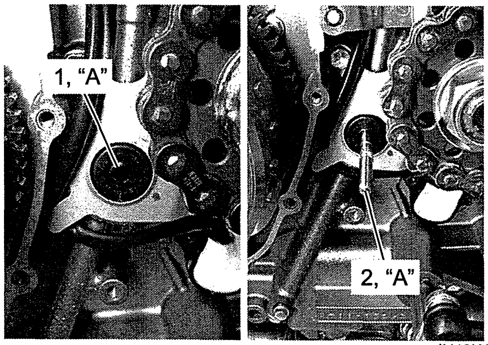
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1530022-01

- Apply a small quantity of grease to clutch push rod oil seal lip (1) and the clutch push rod end (2).

"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)

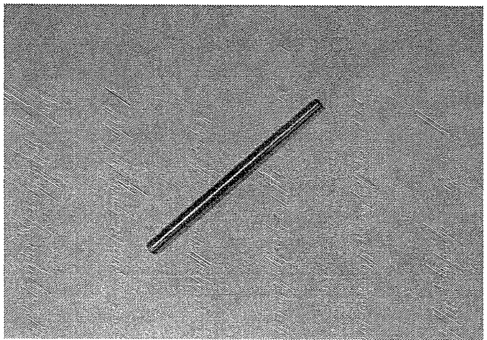


IH18K1530023-02

Clutch Push Rod (Left) Inspection

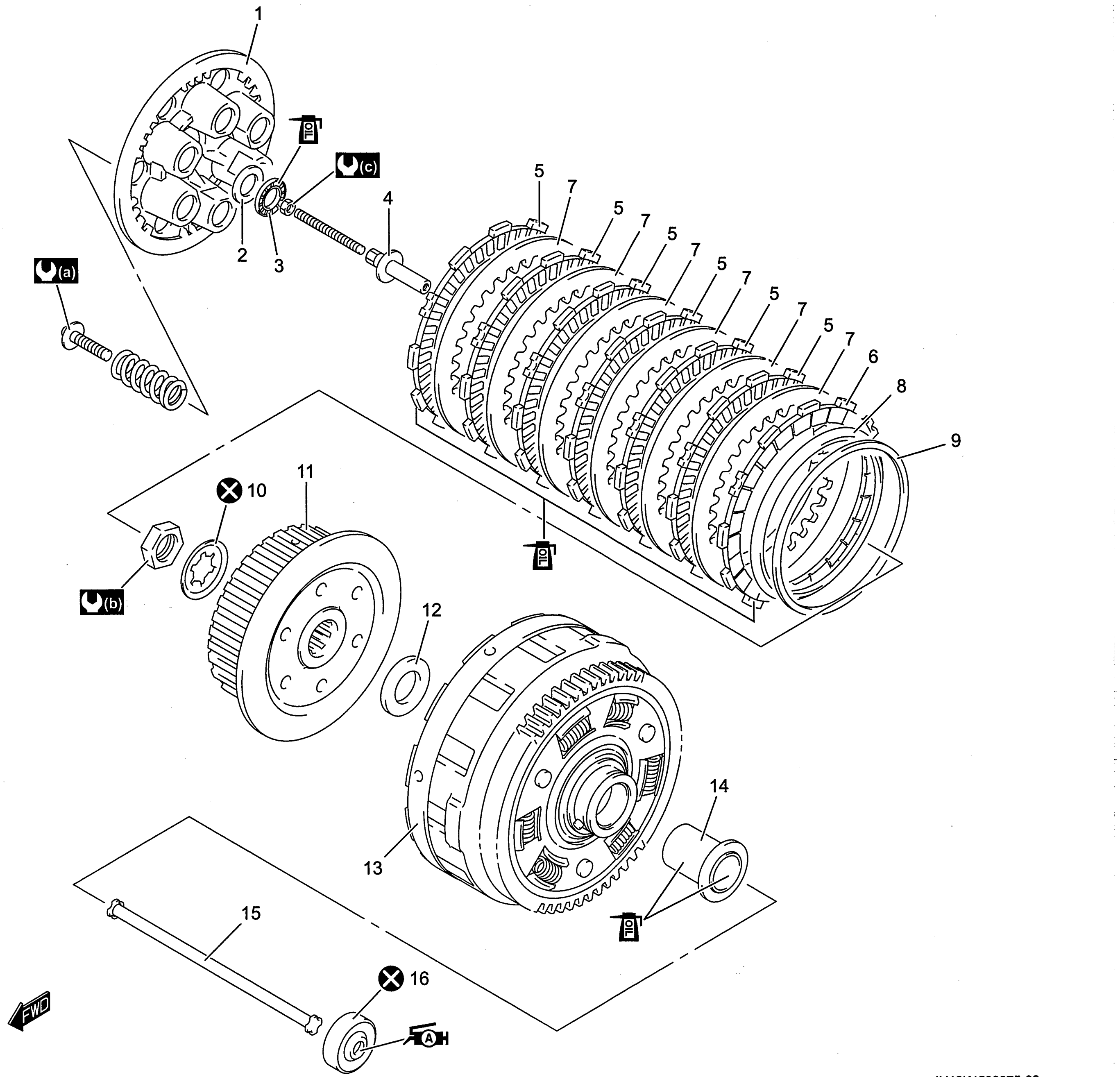
BENJ18K65306007

Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" (Page 5C-7).
Inspect the push rod for wear or bend. If any defects are found, replace it with a new one.



Clutch Components

BENJ18K65306008



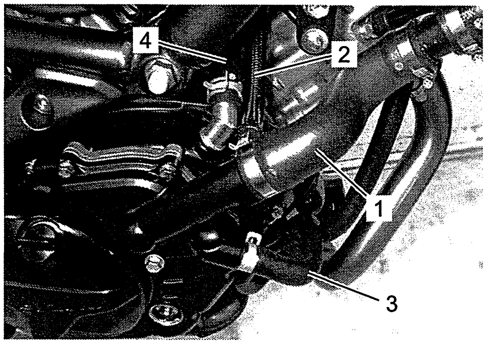
IH18K1530075-03

1. Clutch pressure plate	9. Wave washer seat	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
2. Thrust washer	10. Clutch sleeve hub lock washer	(b) : 50 N·m (5.1 kgf-m, 37.0 lbf-ft)
3. Bearing	11. Clutch sleeve hub	(c) : 5.0 N·m (0.51 kgf-m, 3.70 lbf-ft)
4. Clutch push piece	12. Clutch sleeve hub thrust washer	: Apply engine oil.
5. Drive plate No. 1	13. Primary driven gear assembly	: Apply grease.
6. Drive plate No. 2	14. Primary driven gear spacer	: Do not reuse.

Clutch Removal

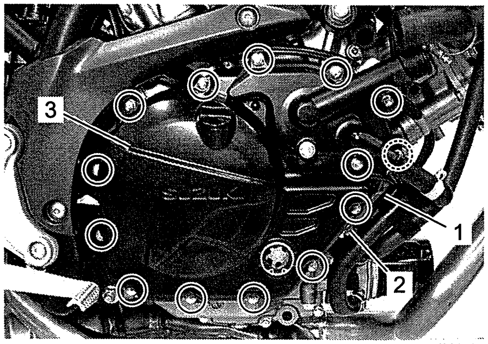
BENJ18K65306009

1) Drain engine oil. ☞(Page 1E-5)
2) Drain engine coolant. ☞(Page 1F-6)
3) Disconnect the radiator outlet hose (1), water bypass hose (2), oil cooler outlet hose (3) and PCV hose (4).



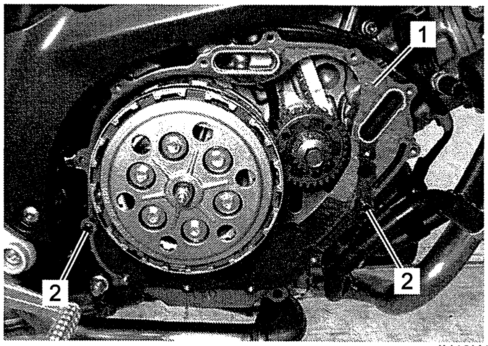
IH18K1530024-01

4) Release the water pump drain hose (1) from the clamp (2).
5) Remove the clutch cover (3).



IH18K1530025-02

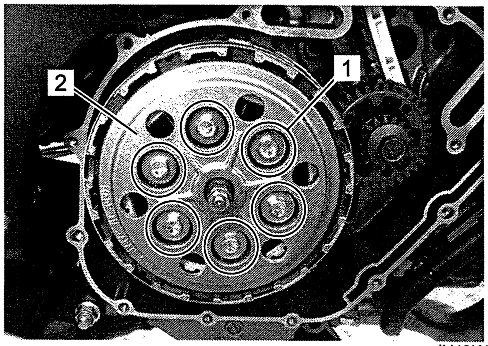
6) Remove the gasket (1) and dowel pins (2).



IH18K1530026-01

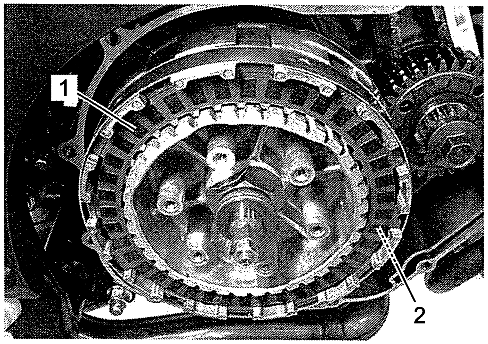
7) Remove the clutch spring bolts (1), clutch springs and clutch pressure plate (2).

NOTE



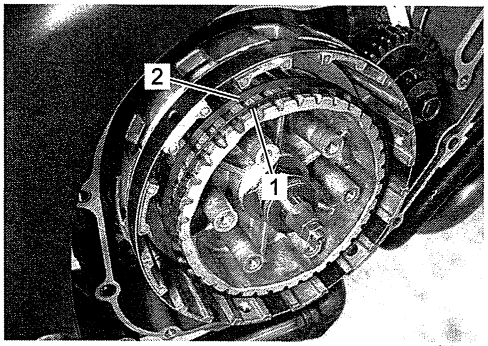
IH18K1530027-01

8) Remove the clutch drive plates (1) and driven plates (2).



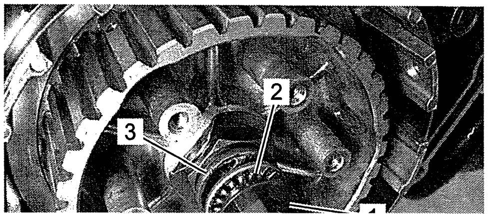
IH18K1530028-01

9) Remove the clutch plate wave washer (1) and wave washer seat (2).



IH18K1530029-01

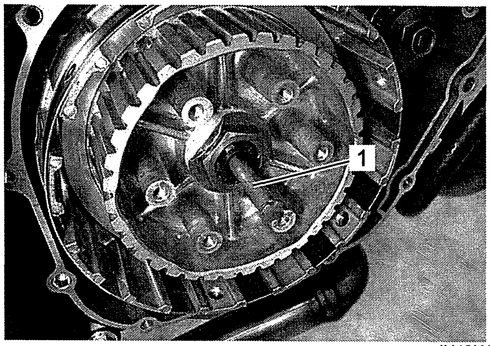
10) Remove the thrust washer (1), bearing (2) and clutch push piece (3).



11) Remove the clutch push rod (right) (1).

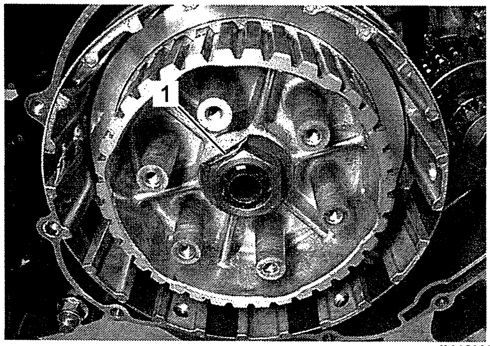
NOTE

If it is difficult to pull out the clutch push rod (right) (1), use a magnetic hand or wire.



IH18K1530031-01

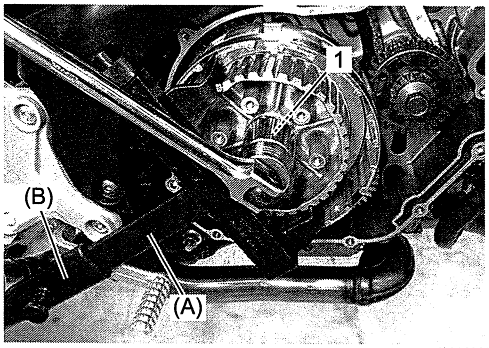
12) Flatten the clutch sleeve hub lock washer (1).



IH18K1530032-01

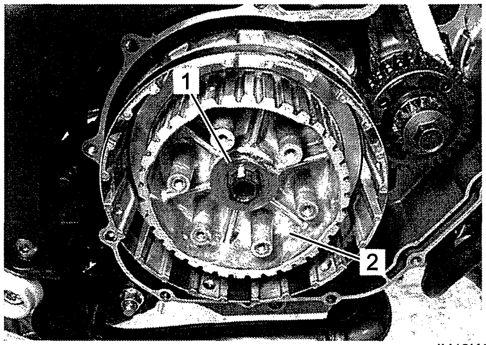
13) Hold the clutch sleeve hub with the special tools and remove the clutch sleeve hub nut (1).

Special tool
(A): 09920–53740
(B): 09920–31020



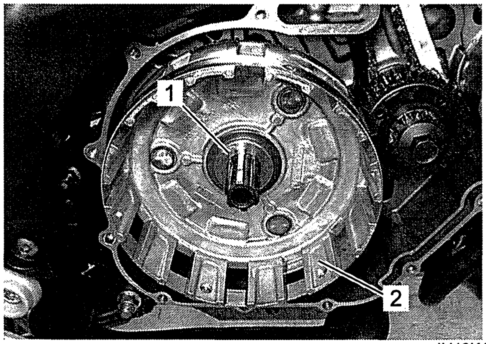
IH18K1530033-01

14) Remove the clutch sleeve hub lock washer (1) and clutch sleeve hub (2).



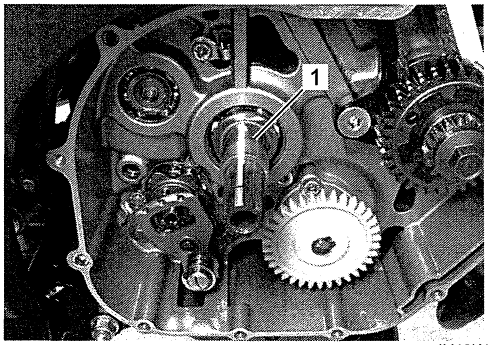
IH18K1530034-02

15) Remove the clutch sleeve hub thrust washer (1) and primary driven gear assembly (2).



IH18K1530035-02

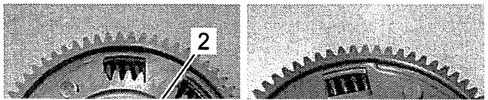
16) Remove the primary driven gear spacer (1).



IH18K1530036-01

17) Remove the snap ring (1), oil pump drive gear (2) and pin (3).

Special tool
09900–06107



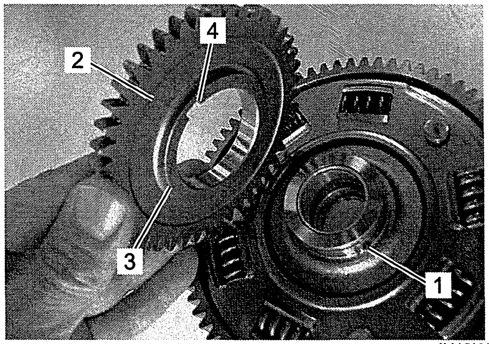
Clutch Installation

BENJ18K65306010

1) Install the pin (1).
2) Install the oil pump drive gear (2) with the flange side (3) facing the primary driven gear assembly.

NOTE

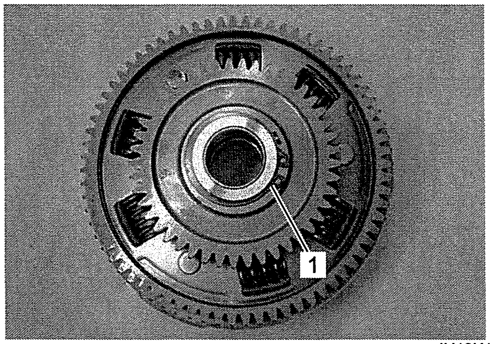
When installing the oil pump drive gear (2), align the pin (1) with the slot (4).



IH18K1530038-02

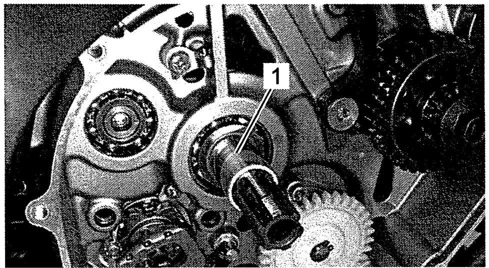
3) Install the new snap ring (1).

Special tool
09900–06107



IH18K1530039-01

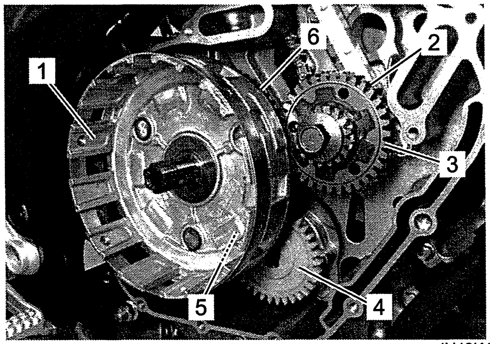
4) Apply engine oil to the primary driven gear spacer (1) inside and outside.
5) Install the primary driven gear spacer (1).



6) Install the primary driven gear assembly (1).

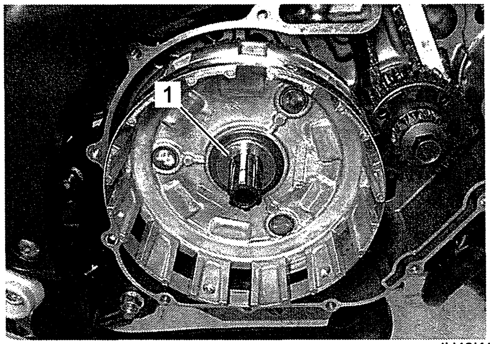
NOTE

- **When installing the primary driven gear assembly, align the teeth of the primary drive gears (2) and primary drive scissors gears (3) by turning the primary drive gears (2) clockwise.**
- **Be sure to engage the oil pump driven gears (4) and oil pump drive gears (5), primary drive gears (2) and primary driven gears (6).**



IH18K1530041-02

7) Install the clutch sleeve hub thrust washer (1).

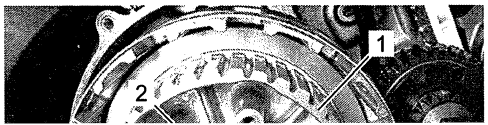


IH18K1530042-01

8) Install the clutch sleeve hub (1), new clutch sleeve hub lock washer (2) and clutch sleeve hub nut (3).

NOTE

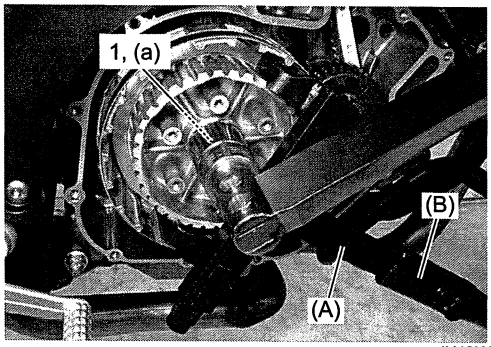
The conical curve side of clutch sleeve hub nut (3) faces outside.



9) Hold the clutch sleeve hub with the special tools and tighten the clutch sleeve hub nut (1) to the specified torque.

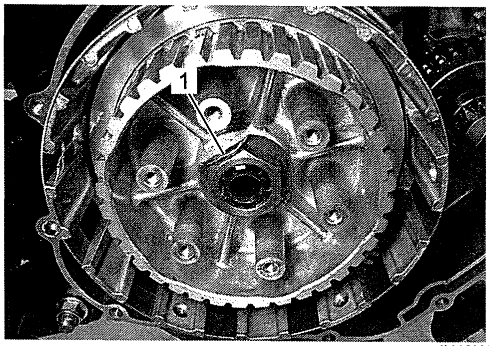
Special tool
(A): 09920–53740
(B): 09920–31020

Tighening torque
Clutch sleeve hub nut (a): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)



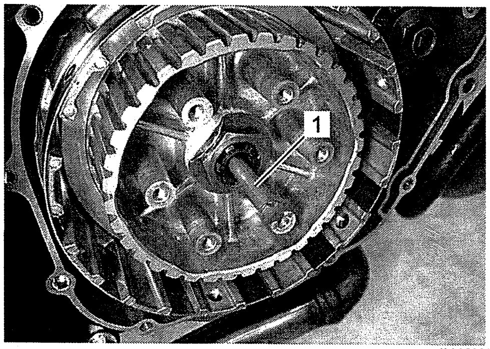
IH18K1530044-01

10) Bend the clutch sleeve hub lock washer (1).



IH18K1530045-01

11) Install the clutch push rod (right) (1) into the countershaft.

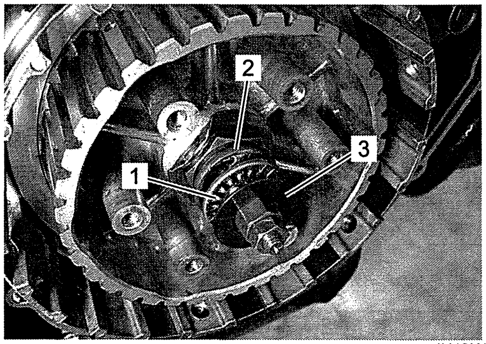


IH18K1530046-01

12) Apply engine oil to the bearing (1).
13) Install the clutch push piece (2), bearing (1) and thrust washer (3) to the countershaft.

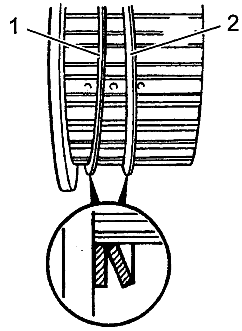
NOTE

Thrust washer (3) is located between the clutch pressure plate and bearing (1).



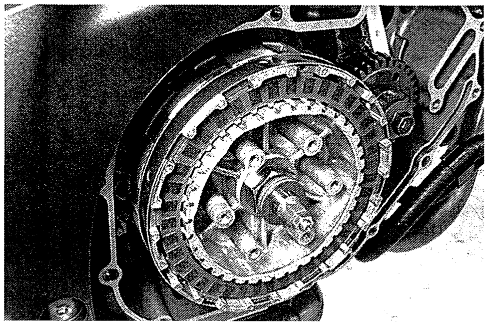
IH18K1530047-01

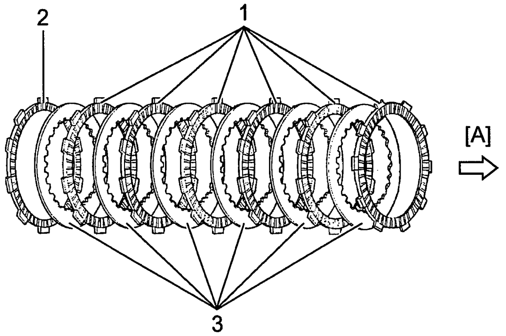
14) Install the wave washer seat (1) and wave washer (2) onto the clutch sleeve hub correctly.



IF04K1530056-01

15) Apply engine oil to the clutch drive plates and driven plates.
16) Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order.



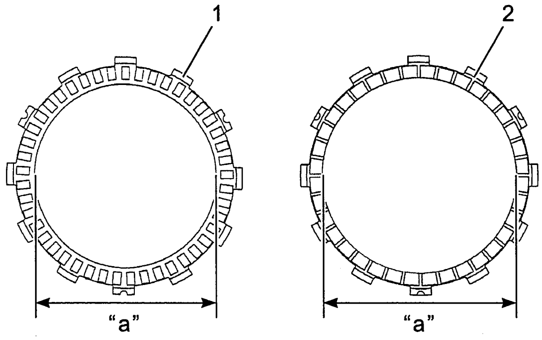


IH18K1530076-01

[A]:	Direction of outside (Clutch pressure plate side)
1.	Drive plate No. 1
2.	Drive plate No. 2
3.	Driven plate

NOTE

The clutch system is equipped with two kinds of the drive plate. They can be distinguished by the inside diameter.



IH18K1530077-04

	Inside diameter "a"
Drive plate No. 1 (1)	116 mm (4.57 in)
Drive plate No. 2 (2)	122.5 mm (4.823 in)

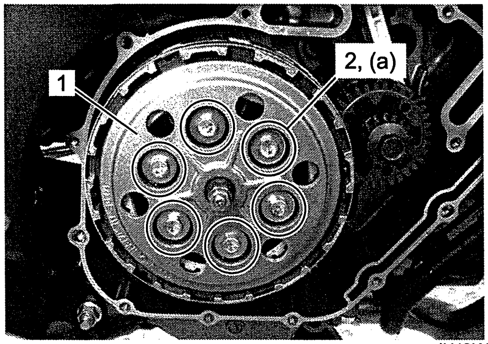
17) Install the clutch pressure plate (1), clutch springs and bolts (2).

18) Tighten the clutch spring bolts (2) to the specified torque.

NOTE

Tighten the clutch spring bolts little by little and diagonally.

Tightening torque
Clutch spring bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-



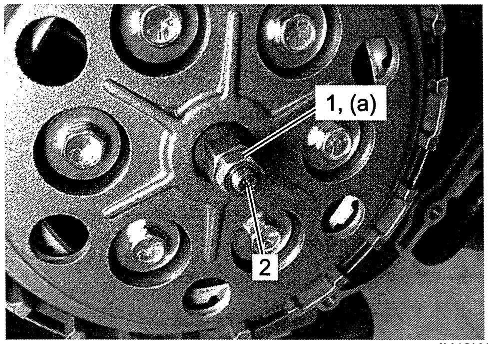
IH18K1530051-02

19) Loosen the clutch release adjuster nut (1) and turn out the clutch push rod screw (2) two or three rotations.

20) From that position, slowly turn in the clutch push rod adjuster screw (2) until resistance is felt.

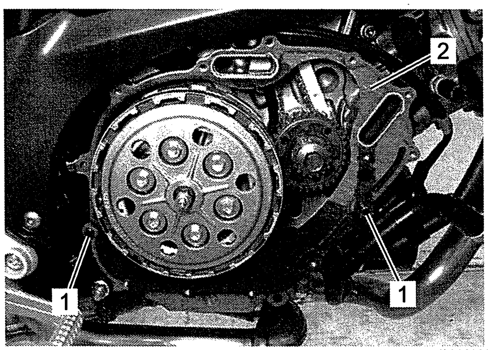
21) From that position, turn out the clutch push rod adjuster screw (2) 1 rotation, and tighten the clutch release adjuster nut (1) while holding the clutch push rod screw (2).

Tightening torque
Clutch release adjuster nut (a): 5.0 N·m (0.51 kgf-m, 3.70 lbf-ft)



IH18K1530052-02

22) Install the dowel pins (1) and new gasket (2).

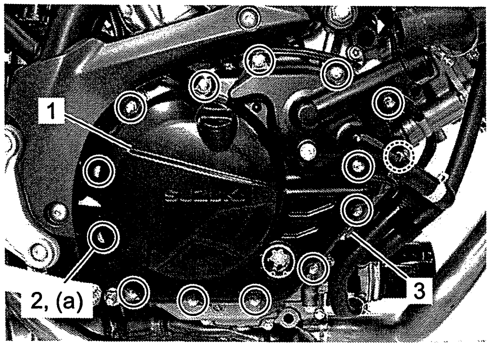


IH18K1530053-01

23) Install the clutch cover (1) and tighten the clutch cover bolts (2) to the specified torque.

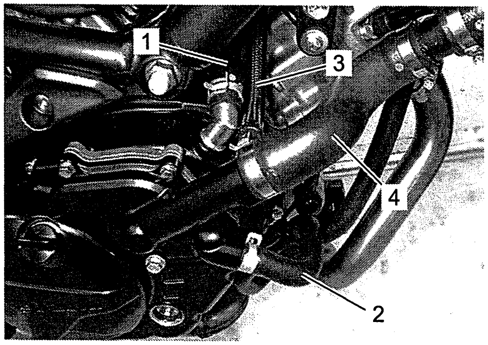
Tightening torque
Clutch cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

24) Route the water pump drain hose (3). Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-2).



IH18K1530054-01

25) Connect the PCV hose (1), oil cooler outlet hose (2), water bypass hose (3) and radiator outlet hose (4) securely. Refer to "PCV Hose Routing Diagram" in Section 1B (Page 1B-7) and "Water Hose Routing Diagram" in Section 1F (Page 1F-2).



IH18K1530055-01

26) Pour engine oil. ☞(Page 1E-5)
27) Pour engine coolant and bleed air from the cooling system. ☞(Page 1F-6)
28) Adjust the clutch cable play. ☞(Page 5C-2)

Clutch Parts Inspection

BENJ18K65306011

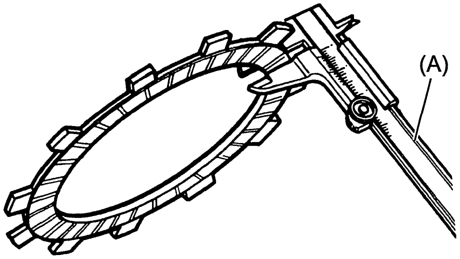
Refer to "Clutch Removal" (Page 5C-10) and "Clutch Installation" (Page 5C-12).

Clutch Drive and Driven Plate

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.

Drive plate thickness
[Limit]: 2.62 mm (0.104 in)

Special tool
(A): 09900–20102

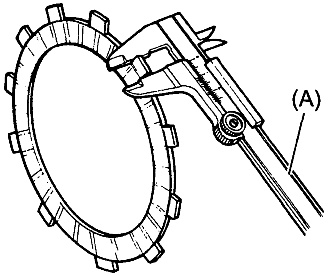


IF04K1530064-01

Measure the claw width of drive plates with a vernier calipers. Replace the drive plates found to have worn down to the limit.

Drive plate claw width
[Limit]: 13.2 mm (0.520 in)

Special tool
(A): 09900–20102

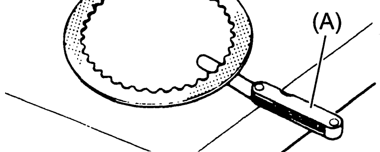


IF04K1530065-01

Measure each driven plate for distortion with a thickness gauge and surface plate.
Replace driven plates which exceed the limit.

Driven plate distortion
[Limit]: 0.10 mm (0.004 in)

Special tool
(A): 09900–20803

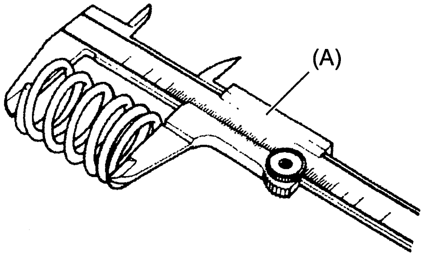


Clutch Spring

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.

Clutch spring free length
[Limit]: 50.5 mm (1.99 in)

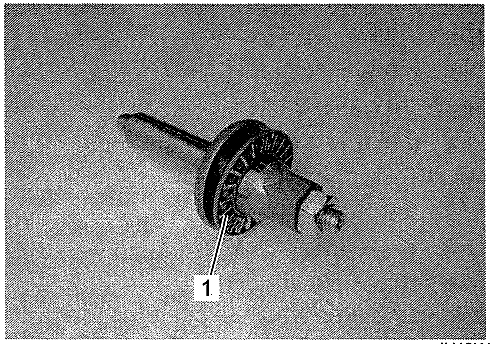
Special tool
(A): 09900–20102



IF04K1530067-01

Clutch Release Bearing

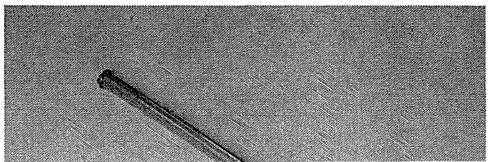
Inspect the clutch release bearing (1) for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.
Smooth engagement and disengagement of the clutch depends on the condition of this bearing.



IH18K1530056-01

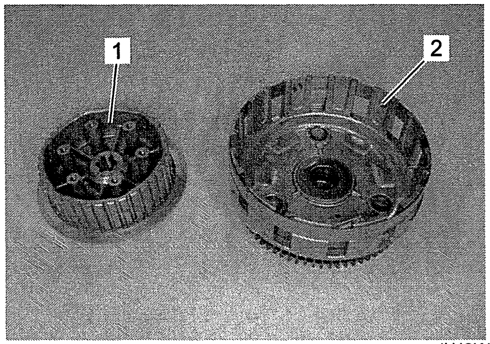
Clutch Push Rod (Right)

Inspect the push rod for wear and damage.
If any defects are found, replace the push rod with a new one.



Clutch Sleeve Hub and Primary Driven Gear Assembly

Inspect the slot of the clutch sleeve hub (1) and primary driven gear assembly (2) for damage or wear caused by the clutch plates. If necessary, replace it with a new one.
Inspect the primary driven gear bushing for any damage.
Inspect the spring of primary driven gear for any damages. If necessary, replace primary driven gear assembly with a new one.



IH18K1530057-01

Primary Drive Gear Removal and Installation

BENJ18K65306012

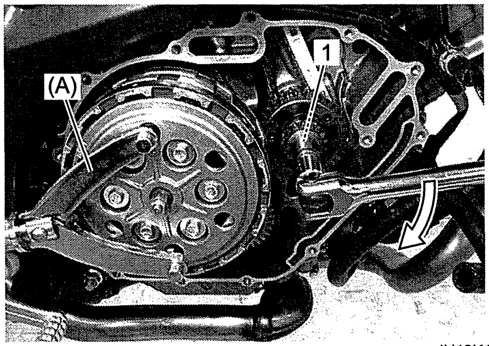
Removal

1) Remove the clutch cover. ☞(Page 5C-10)
2) Hold the clutch pressure plate with the special tool and loosen the primary drive gear bolt (1).

NOTE

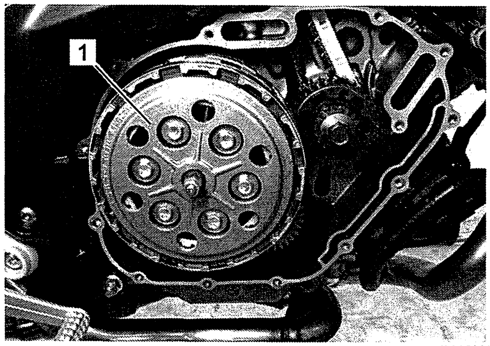
This primary drive gear bolt has left-hand threads.

Special tool
(A): 09930–40113



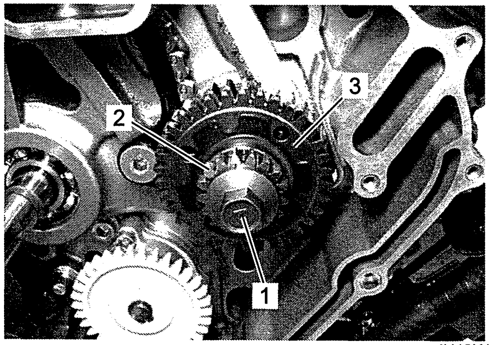
IH18K1530058-03

3) Remove the clutch components (1). ☞(Page 5C-10)



IH18K1530059-01

4) Remove the primary drive gear bolt (1), water pump drive gear (2) and primary drive gear assembly (3).



IH18K1530060-01

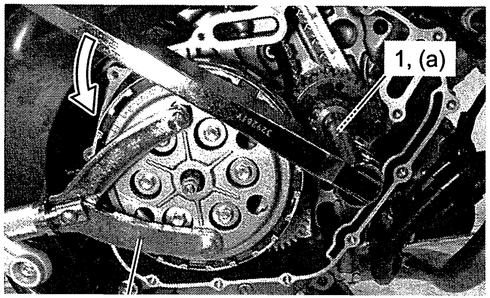
Installation

Install the primary dive gear in the reverse order of removal. Pay attention to the following point:

- Hold the clutch pressure plate with the special tool and tighten the primary drive gear bolt (1) to the specified torque.

Special tool
(A): 09930–40113

Tightening torque
Primary drive gear bolt (a): 70 N·m (7.1 kgf-m, 52.0 lbf-ft)

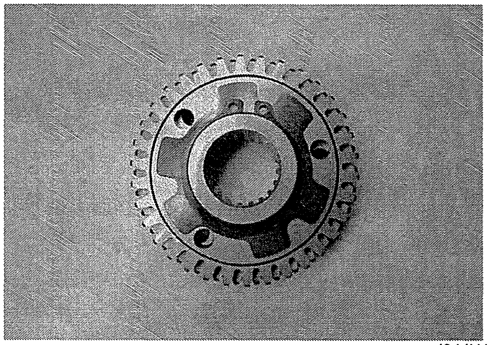


Primary Drive Gear Inspection

BENJ18K65306013

Refer to "Primary Drive Gear Removal and Installation" (Page 5C-16).

Visually inspect the gear teeth for wear and damage. If they are worn, replace the gear with a new one. Refer to "Primary Drive Gear Disassembly and Assembly" (Page 5C-17).



I944H1530059-01

Primary Drive Gear Disassembly and Assembly

BENJ18K65306014

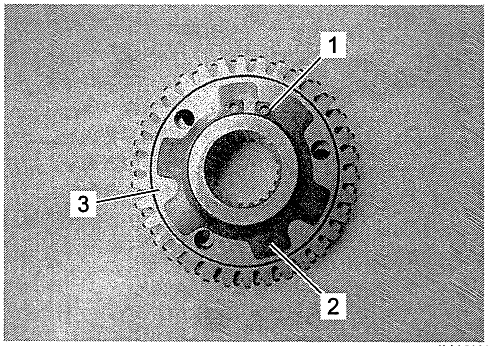
Refer to "Primary Drive Gear Removal and Installation" (Page 5C-16).

Disassembly

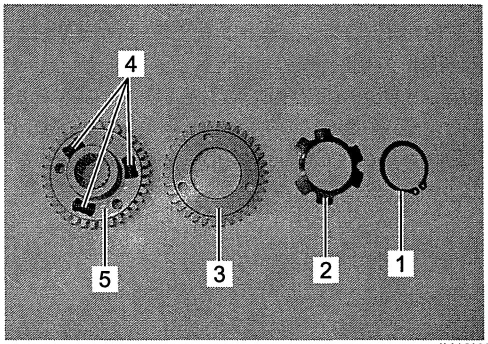
Remove the following parts from the primary drive gear.

- Snap ring (1)
- Wave washer (2)
- Primary drive scissors gear (3)
- Springs (4)
- Primary drive gear (5)

Special tool
09900–06107



IH18K1530062-01



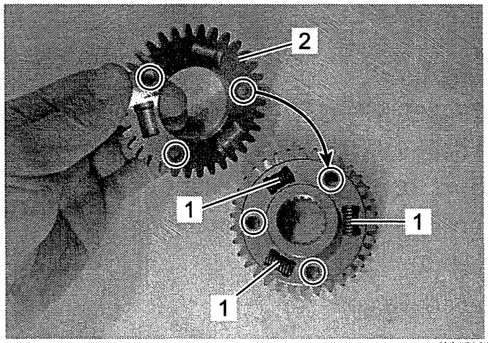
IH18K1530063-01

Reassembly

1) Set the springs (1) into the grooves of the primary drive gear.
2) Install the primary drive scissors gear (2).

NOTE

Align the hole of the primary drive gear with the hole of the primary drive scissors gear.

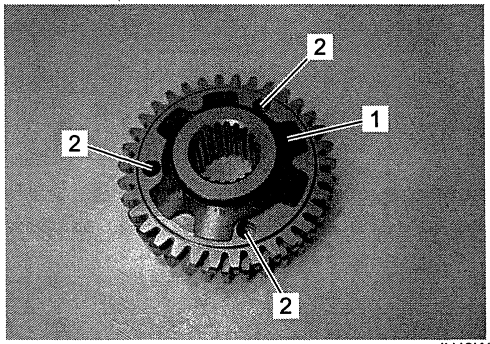


IH18K1530064-01

3) Install the wave washer (1) not to cover the holes (2) of the primary drive gear.

NOTE

The convex side of wave washer faces upward.



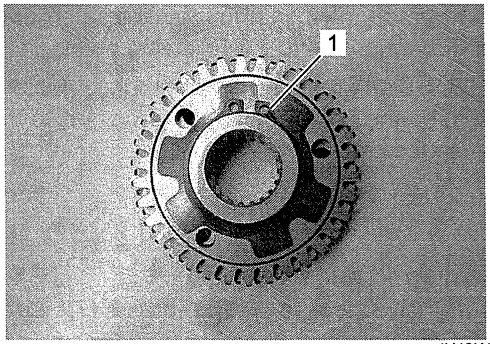
IH18K1530065-01

4) Install the new snap ring (1).

Special tool
09900–06107

NOTE

After installing a snap ring, always insure that it is completely seated in its groove and securely fitted.



IH18K1530066-01

Specifications

Tightening Torque Specifications

BENJ18K65307001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Clutch release adjuster nut	5.0	0.51	3.70	☞(Page 5C-3) / ☞(Page 5C-14)
Clutch lever pivot bolt	6.5	0.66	4.80	☞(Page 5C-6)(SV650/A)
Clutch lever pivot bolt	1.5	0.15	1.10	☞(Page 5C-6)(SV650XA)
Clutch lever pivot nut	6.5	0.66	4.80	☞(Page 5C-6)
Clutch switch screw	1.0	0.10	0.75	☞(Page 5C-6)(SV650/A)
Clutch switch screw	0.6	0.06	0.45	☞(Page 5C-6)(SV650XA)
Clutch lever holder bolt	10	1.0	7.5	☞(Page 5C-7)(SV650XA)
Clutch sleeve hub nut	50	5.1	37.0	☞(Page 5C-13)
Clutch spring bolt	10	1.0	7.5	☞(Page 5C-14)
Clutch cover bolt	10	1.0	7.5	☞(Page 5C-15)
Primary drive gear bolt	70	7.1	52.0	☞(Page 5C-17)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Clutch Control System Components" (Page 5C-4)
"Clutch Components" (Page 5C-9)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K65308001

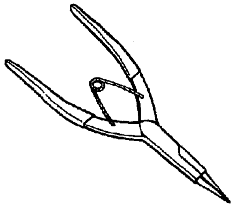
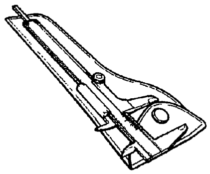
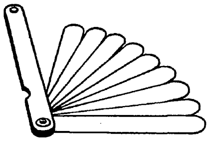
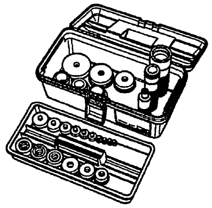
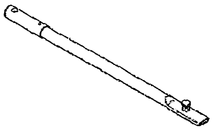
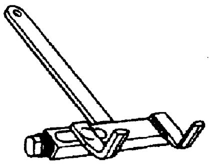
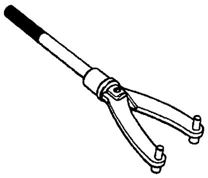
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 5C-6) / ☞(Page 5C-7) / ☞(Page 5C-7) / ☞(Page 5C-8) / ☞(Page 5C-8) / ☞(Page 5C-8) / ☞(Page 5C-8)
Thread lock cement	THREAD LOCK CEMENT 1342H	P/No.: 99000–32160	☞(Page 5C-6)

NOTE

Required service material(s) is also described in:
"Clutch Control System Components" (Page 5C-4)
"Clutch Components" (Page 5C-9)

Special Tool

BENJ18K65308002

09900–06107 Snap ring pliers (External) ☞(Page 5C-11) / ☞(Page 5C-12) / ☞(Page 5C-17) / ☞(Page 5C-18) 	09900–20102 Vernier calipers (200 mm) ☞(Page 5C-15) / ☞(Page 5C-15) / ☞(Page 5C-16) 
09900–20803 Thickness gauge ☞(Page 5C-15) 	09913–70210 Bearing installer set ☞(Page 5C-8) 
09920–31020 Extension handle ☞(Page 5C-11) / ☞(Page 5C-13) 	09920–53740 Clutch sleeve hub holder ☞(Page 5C-11) / ☞(Page 5C-13) 
09930–40113 Rotor holder ☞(Page 5C-16) / ☞(Page 5C-17) 	

Section 6

Steering

CONTENTS

Precautions

Precautions for Steering

BENJ18K66000001

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

Steering General Diagnosis

Diagnostic Information and Procedures

Steering Symptom Diagnosis

BENJ18K66104001

Condition	Possible cause	Correction / Reference Item
Heavy steering	Over tightened steering stem adjust-nut.	*Adjust. ☞(Page 6B-13)*
	Broken bearing in steering stem.	*Replace. ☞(Page 6B-23)*
	Distorted steering stem.	*Replace.* • *SV650/A: ☞(Page 6B-17)* • *SV650XA: ☞(Page 6B-20)*
	Not enough pressure in tires.	*Adjust. ☞(Page 2D-14)*
Wobbly handlebar	Loss of balance between right and left front forks.	*Replace fork, adjust fork oil level or replace fork spring. ☞(Page 2B-3) ☞(Page 2B-7)*
	Distorted front fork.	*Repair or replace. ☞(Page 2B-3)*
	Distorted front axle or crooked tire.	*Replace. ☞(Page 2D-5) ☞(Page 2D-15)*
	Loose steering stem adjust-nut.	*Adjust. ☞(Page 6B-13)*
	Worn or incorrect tire.	*Replace. ☞(Page 2D-15)*
	Incorrect tire pressure.	*Adjust. ☞(Page 2D-14)*
	Worn bearing/race in steering stem.	*Replace. ☞(Page 6B-23)*

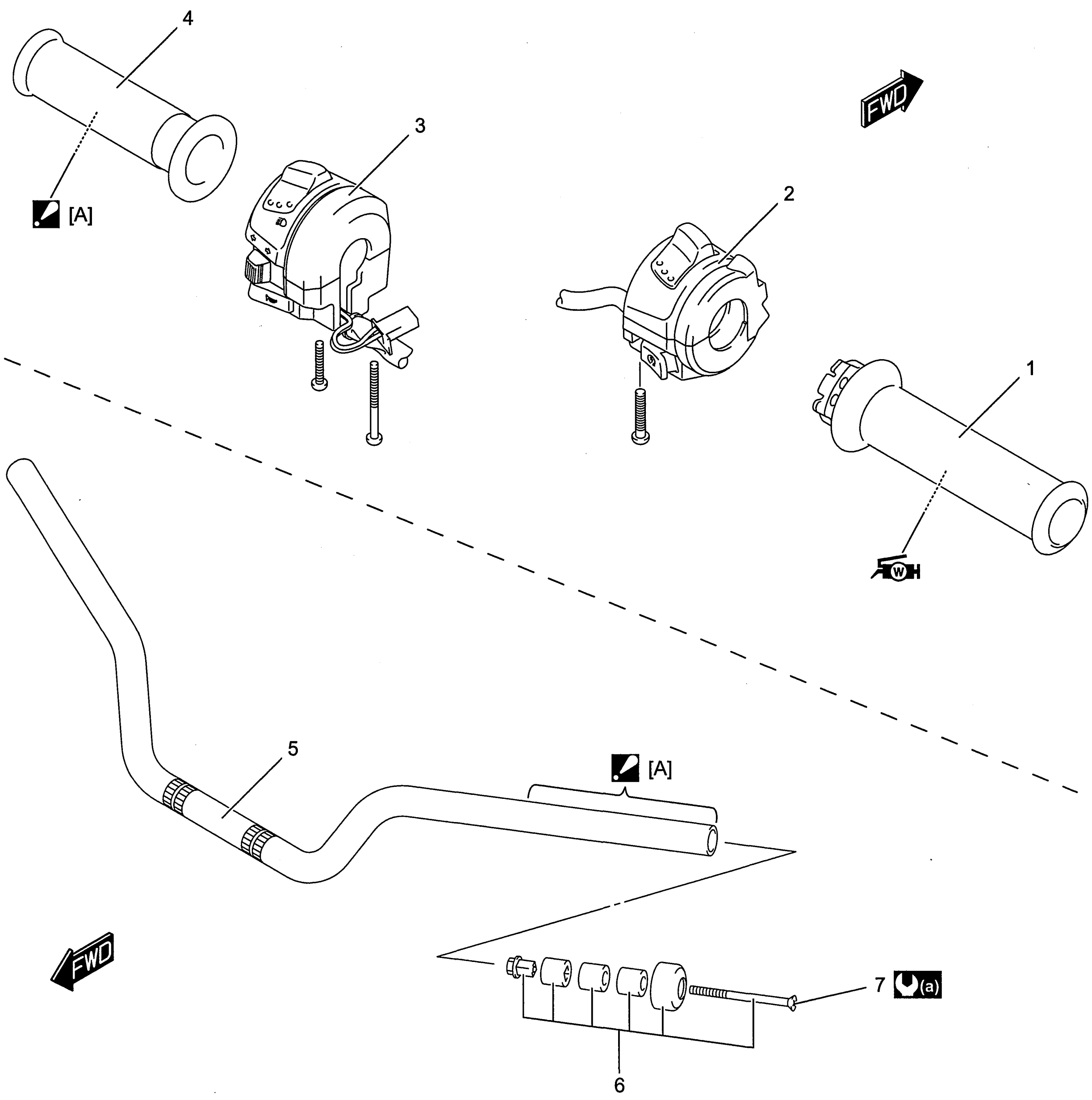
Steering / Handlebar

Repair Instructions

Handlebar Components

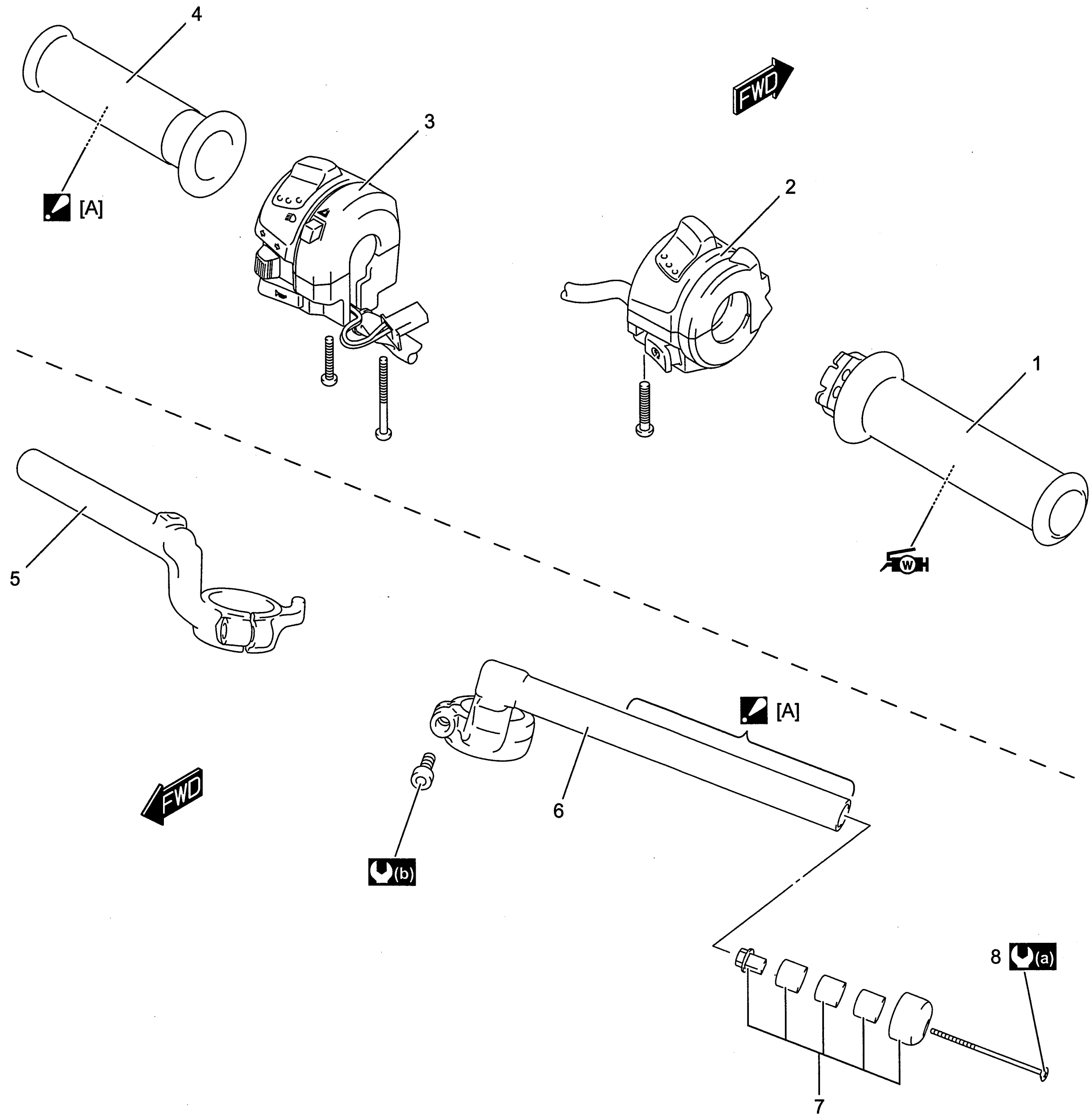
SV650/A

BENJ18K66206001



IH18K1620048-01

[A]: Apply handle grip glue.	4. Left handlebar grip	(a) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
1. Throttle grip	5. Handlebars	WH : Apply a small quantity grease into the throttle grip.
2. Right handle switch	6. Handlebar balancer set	



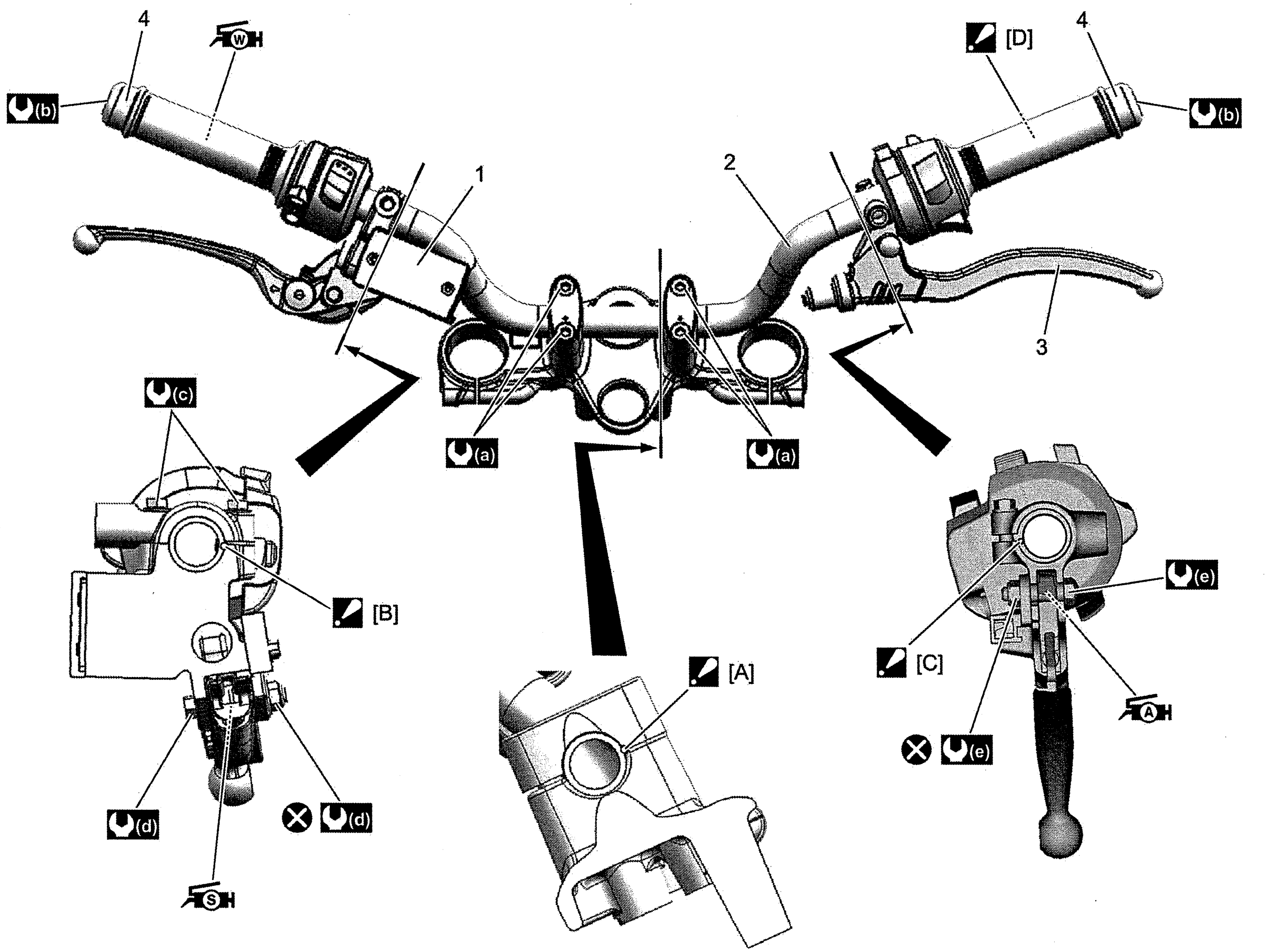
IJ18K1620038-02

[A]: Apply handle grip glue.	4. Left handlebar grip	8. Handlebar balancer screw
1. Throttle grip	5. Right handlebar	(a) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
2. Right handle switch	6. Left balancer	(b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
3. Left handle switch	7. Handlebar balancer set	WH : Apply a small quantity grease into the throttle grip.

Handlebar Construction

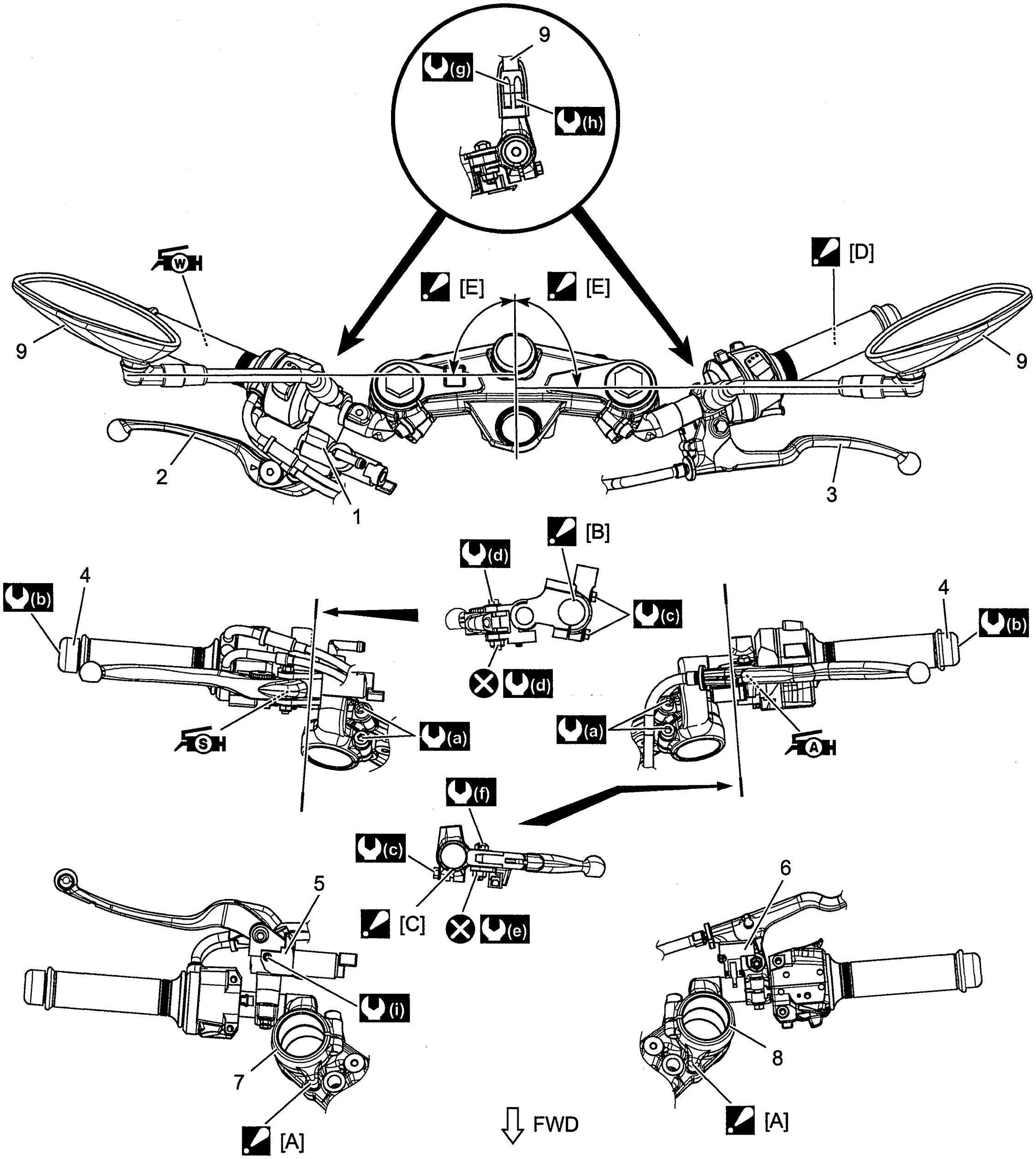
BENJ18K66206002

SV650/A



IH18K1620055-01

[A]: Align the matching surface of handlebar holder with punch mark of handlebars.	3. Clutch lever	(e) : 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)
[B]: Align the punch mark of handlebars with the edge of master cylinder.	4. Handlebar balancer	A : Apply grease.
[C]: Align the punch mark of handlebars with the edge of clutch lever holder front.	(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)	S : Apply silicone grease.
[D]: Apply handle grip glue.	(b) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)	W : Apply a small quantity grease into the throttle grip.
1. Front brake master cylinder	(c) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	⊗ : Do not reuse.
2. Handlebars	(d) : 5.9 N·m (0.60 kgf-m, 4.35 lbf-ft)	



IJ18K1620001-03

[A]: Insert the protrusion of the handlebar into the hole of the steering stem upper bracket firmly.	5.	Front brake light switch	(e) :	6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)
[B]: Align the edge of front brake master cylinder with the punch mark center on the right handlebar.	6.	Clutch lever position switch	(f) :	1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)
[C]: Align the center of clutch lever holder slit with the punch mark center on the left handlebar.	7.	Right handlebar	(g) :	18 N·m (1.8 kgf-m, 13.5 lbf-ft)
[D]: Apply handle grip glue.	8.	Left handlebar	(h) :	30 N·m (3.1 kgf-m, 22.5 lbf-ft)
[E]: Set the center line of the rear view mirror stay at 90° from the center line of the motorcycle.	9.	Rear view mirror	(i) :	1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)

Handlebar Removal and Installation (SV650/A)

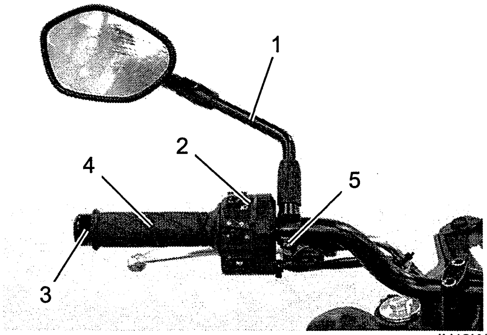
BENJ18K66206003

Removal

NOTE

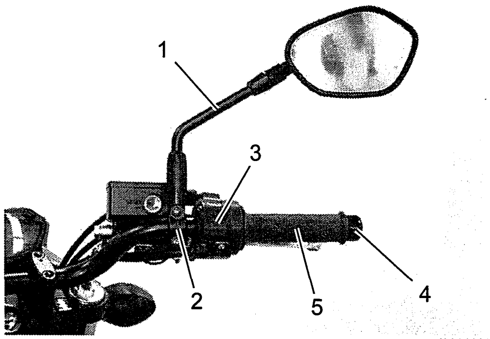
Do not turn the master cylinder upside down.

1) Remove the following parts from the left side of the handlebar.
   a) Rear view mirror (1)
   b) Left handle switch (2)
   c) Handlebar balancer assembly (3)
   d) Left handlebar grip (4)
2) Loosen the clutch lever holder bolt (5).



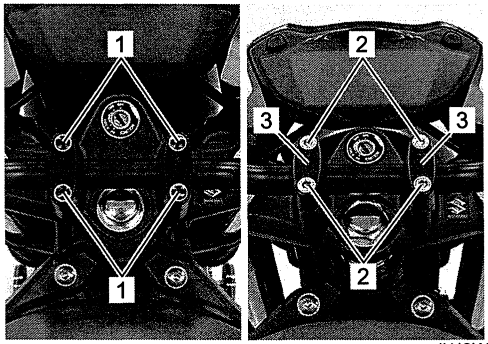
IH18K1620002-02

3) Remove the following parts from the right side of the handlebar.
   a) Rear view mirror (1)
   b) Front brake master cylinder assembly (2)
   c) Right handle switch (3)
   d) Handlebar balancer assembly (4)
   e) Throttle grip (5)



IH18K1620003-01

4) Remove the caps (1), bolts (2) and handlebar holders (3).

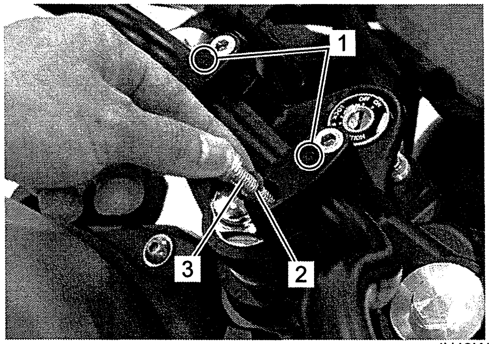


IH18K1620004-01

5) Remove the handlebars.

Installation

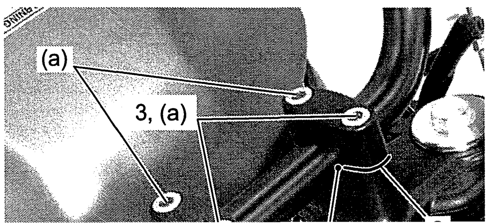
1) Install the handlebars.
2) Set the handlebar holders with their punch marks (1) forward.
3) Install the washers (2) and bolts (3) so that their conical side of washer faces outside.

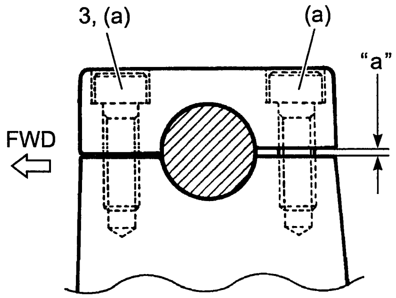


IH18K1620038-02

4) Set the handlebars so that its punch mark (1) aligns with the mating surface (2) of the left handlebar holder and tighten the front side of the handlebar clamp bolts (3) first.

Tightening torque
Handlebar clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



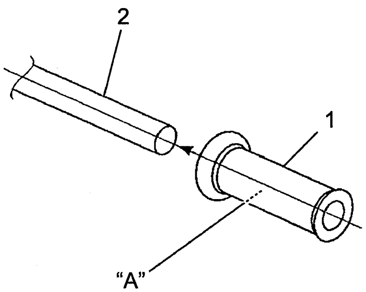


IH18K1620041-03

"a": Clearance

5) Install the caps.
6) Install the front brake master cylinder assembly. ☞(Page 4A-35)
7) Apply a small quantity grease into the throttle grip (1) before installing the throttle grip to the handlebars (2).

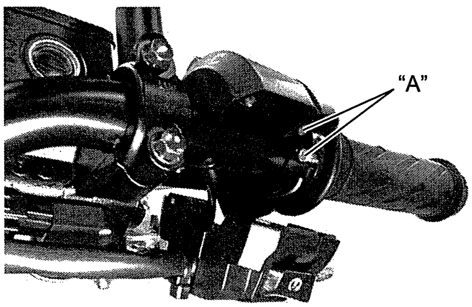
"A": Grease 99000–25350 (SUZUKI WATER RESISTANT GREASE EP2)



IH18K1620007-01

8) Apply grease to the end of the throttle cables and cable pulley.

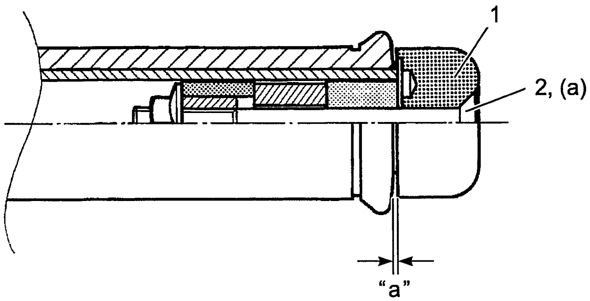
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1620008-01

9) Install the right handlebar balancer assembly (1) and tighten the handlebar balancer screw (2).

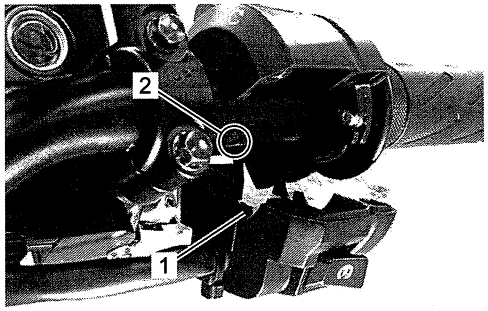
Tightening torque
Handlebar balancer screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IH18K1620049-01

"a": 0.5 – 1.5 mm (0.020 – 0.059 in)

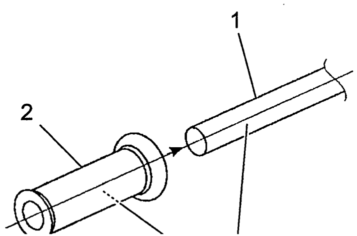
10) Insert the projection (1) of the right handle switch into the hole (2) of the handlebars.



IH18K1620010-01

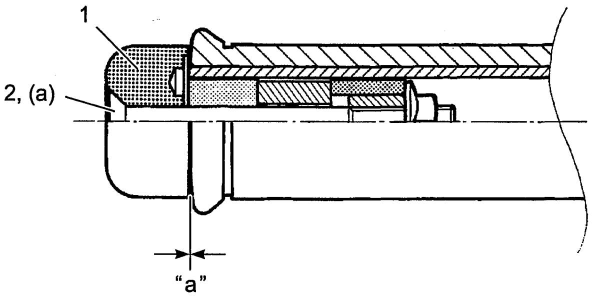
11) Install the right rear view mirror.
12) Clean, degrease and dry both the left handlebar outer surface (1) on which the grip is being fitted and internal surface of the left handlebar grip (2).
13) Apply handle grip glue to both the left handlebar outer surface (1) on which the grip is being fitted and internal surface of the left handlebar grip (2) evenly.

"A": Adhesive (Handle grip glue)



14) Install the left handlebar balancer assembly (1) and tighten the handlebar balancer screw (2).

Tightening torque
Handlebar balancer screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

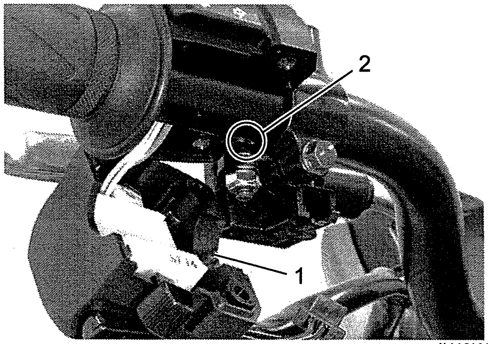


IH18K1620050-01

"a":	No clearance

15) Install the clutch lever assembly. ☞(Page 5C-5)

16) Insert the projection (1) of the left handle switch into the hole (2) of the handlebars.



IH18K1620012-03

17) Install the left rear view mirror.

18) Check to make sure that the wire harnesses, cables and hoses are properly routed.
- Wire harness: ☞(Page 9A-15)
- Cable: ☞(Page 1D-2)
- Hose: ☞(Page 4A-1)

19) Check the throttle cable for the play and smooth operation. ☞(Page 1D-10)

Handlebar Removal and Installation (SV650XA)

BENJ18K66206004

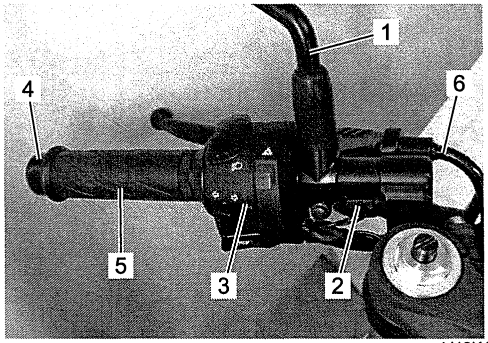
Removal

NOTE

Do not turn the master cylinder upside down.

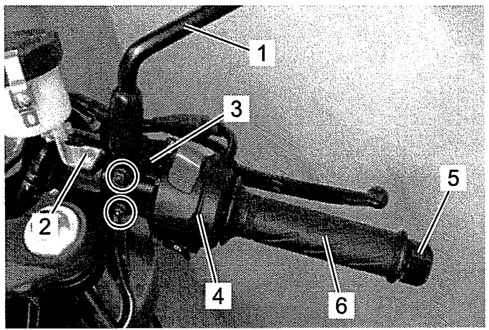
1) Remove the following parts from the left side of the handlebar.
   a) Rear view mirror (1) ☞(Page 9D-19)
   b) Clutch lever position switch coupler (2)
   c) Left handle switch (3)
   d) Handlebar balancer assembly (4)
   e) Left handlebar grip (5)

2) Disconnect the clutch cable (6) from the clutch lever side. ☞(Page 5C-5)

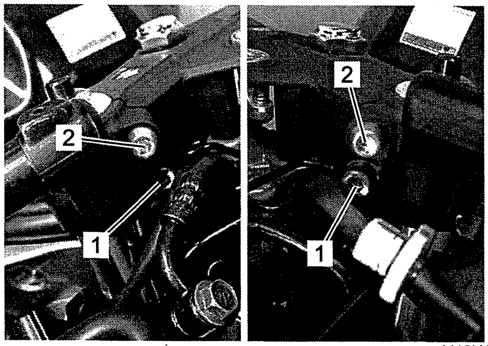


IJ18K1620002-01

3) Remove the following parts from the right side of the handlebar.
   a) Rear view mirror (1) ☞(Page 9D-19)
   b) Reservoir tank bolt (2)
   c) Front brake master cylinder assembly (3)
   d) Right handle switch (4)
   e) Handlebar balancer assembly (5)
   f) Throttle grip (6)



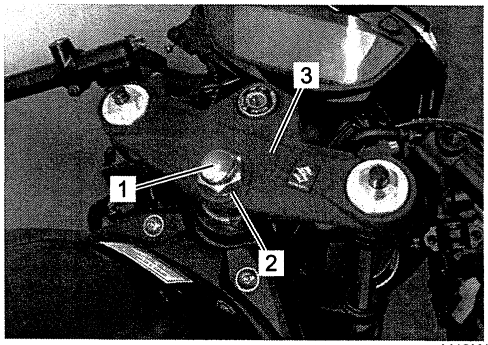
4) Loosen the handlebar clamp bolts (1) and front fork upper clamp bolts (2).



IJ18K1620004-01

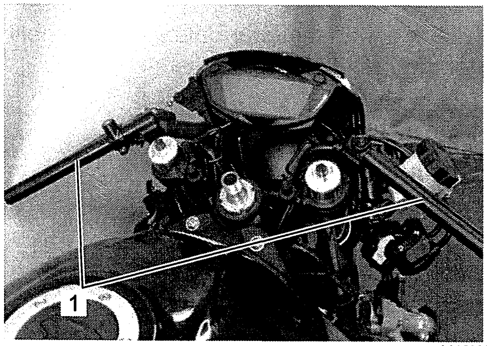
5) Remove the steering stem head nut (1) and washer (2).

6) Remove the steering stem upper bracket assembly (3).



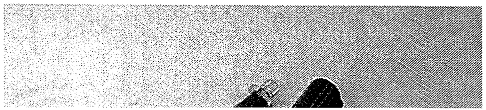
IJ18K1620005-01

7) Remove the handlebars (1).



IJ18K1620006-01

8) Remove the clutch lever assembly (1) from the left handlebar.



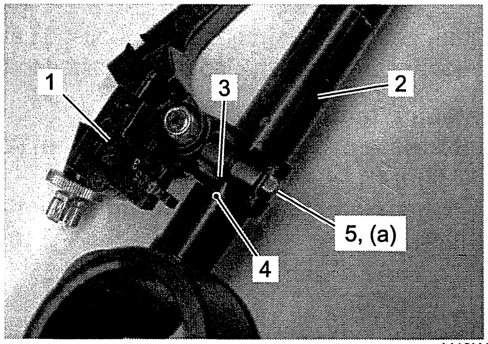
Installation

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

1) Install the clutch lever assembly (1) onto the left handlebar (2), align the center of clutch lever holder slit (3) with the punch mark center (4) on the left handlebar.

2) Tighten the clutch lever holder bolt (5) to the specified torque.

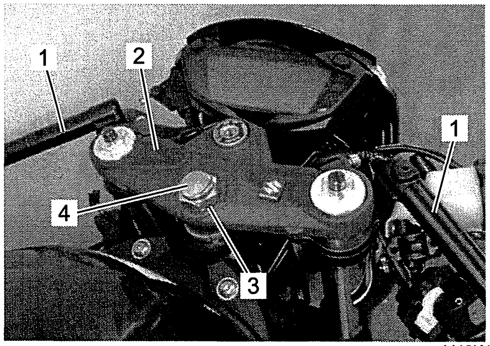
Tightening torque
Clutch lever holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IJ18K1620008-01

3) Install the handlebars (1) temporarily to the front forks.

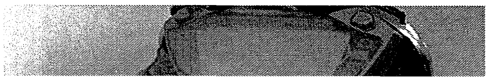
4) Install the steering stem upper bracket assembly (2), washer (3) and steering stem head nut (4).



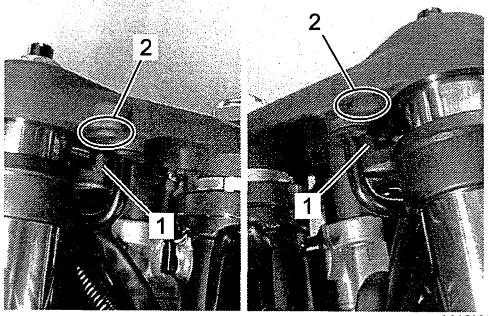
IJ18K1620009-01

5) Tighten the steering stem head nut (1) to the specified torque.

Tightening torque
Steering stem head nut (a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)



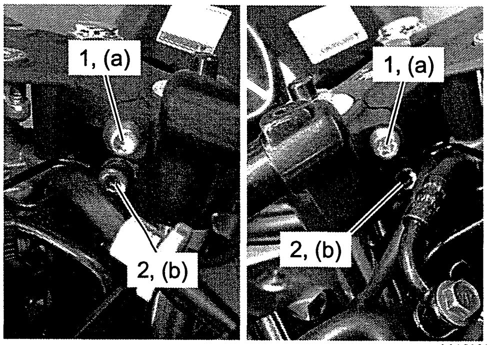
6) Insert the protrusions (1) of the handlebars into the holes (2) of the steering stem upper bracket firmly.



IJ18K1620011-01

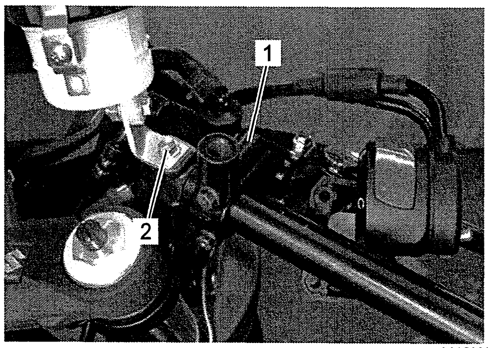
7) Tighten the front fork upper clamp bolts (1) and handlebar clamp bolts (2) to the specified torque.

Tightening torque
Front fork upper clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
Handlebar clamp bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IJ18K1620012-01

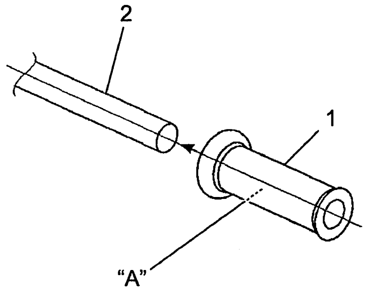
8) Install the front brake master cylinder assembly (1) and reservoir tank bolt (2). ☞(Page 4A-35)



IJ18K1620013-01

9) Apply a small quantity grease into the throttle grip (1) before installing the throttle grip to the right handlebar (2).

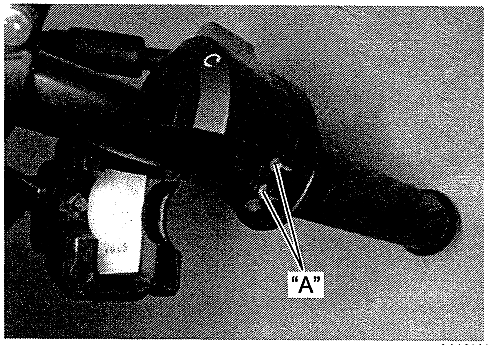
"A": Grease 99000–25350 (SUZUKI WATER RESISTANT GREASE EP2)



IH18K1620007-01

10) Apply grease to the end of the throttle cables and cable pulley.

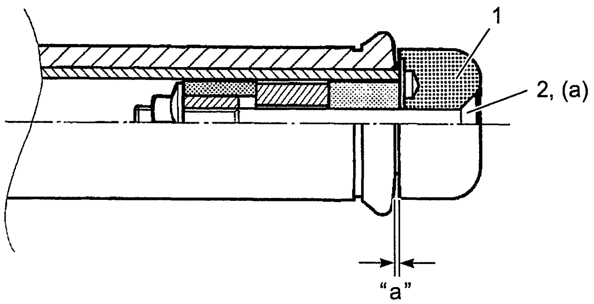
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IJ18K1620014-01

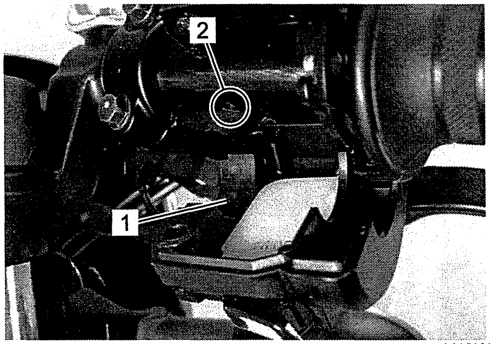
11) Install the right handlebar balancer assembly (1) and tighten the handlebar balancer screw (2).

Tightening torque
Handlebar balancer screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IH18K1620049-01

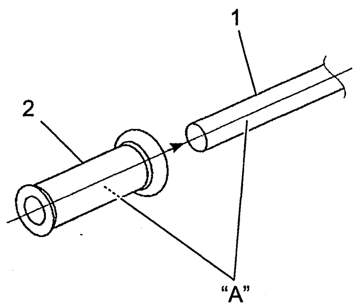
12) Insert the projection (1) of the right handle switch into the hole (2) of the right handlebar.



IJ18K1620015-01

13) Install the right rear view mirror. ☞(Page 9D-19)
14) Clean, degrease and dry both the left handlebar outer surface (1) on which the grip is being fitted and internal surface of the left handlebar grip (2).
15) Apply handle grip glue to both the left handlebar outer surface (1) on which the grip is being fitted and internal surface of the left handlebar grip (2) evenly.

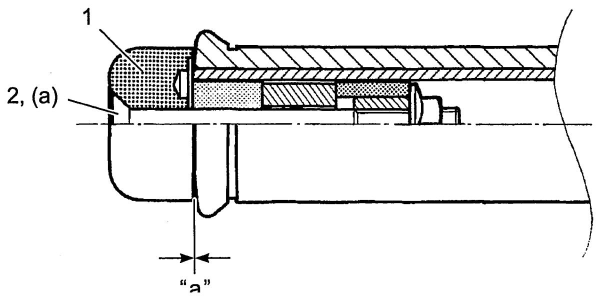
"A": Adhesive (Handle grip glue)



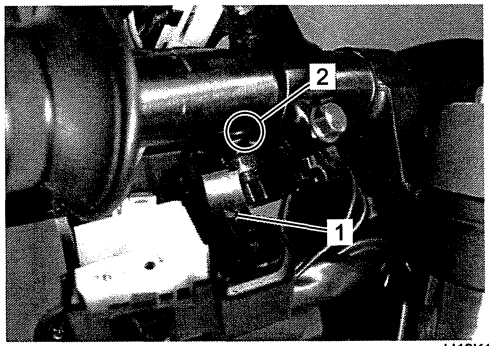
IE31J1620012-01

16) Install the left handlebar balancer assembly (1) and tighten the handlebar balancer screw (2).

Tightening torque
Handlebar balancer screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



17) Connect the clutch cable to the clutch lever holder. ☞(Page 5C-5)
18) Connect the clutch lever position switch coupler.
19) Insert the projection (1) of the left handle switch into the hole (2) of the left handlebar.



IJ18K1620016-01

20) Install the left rear view mirror. ☞(Page 9D-19)
21) Check to make sure that the wire harnesses, cables and hoses are properly routed.
    - Wire harness: ☞(Page 9A-15)
    - Cable: ☞(Page 1D-2)
    - Hose: ☞(Page 4A-1)
22) Check the throttle cable for the play and smooth operation. ☞(Page 1D-10)
23) Check the clutch cable for the play and smooth operation. ☞(Page 5C-2)

Handlebar Inspection

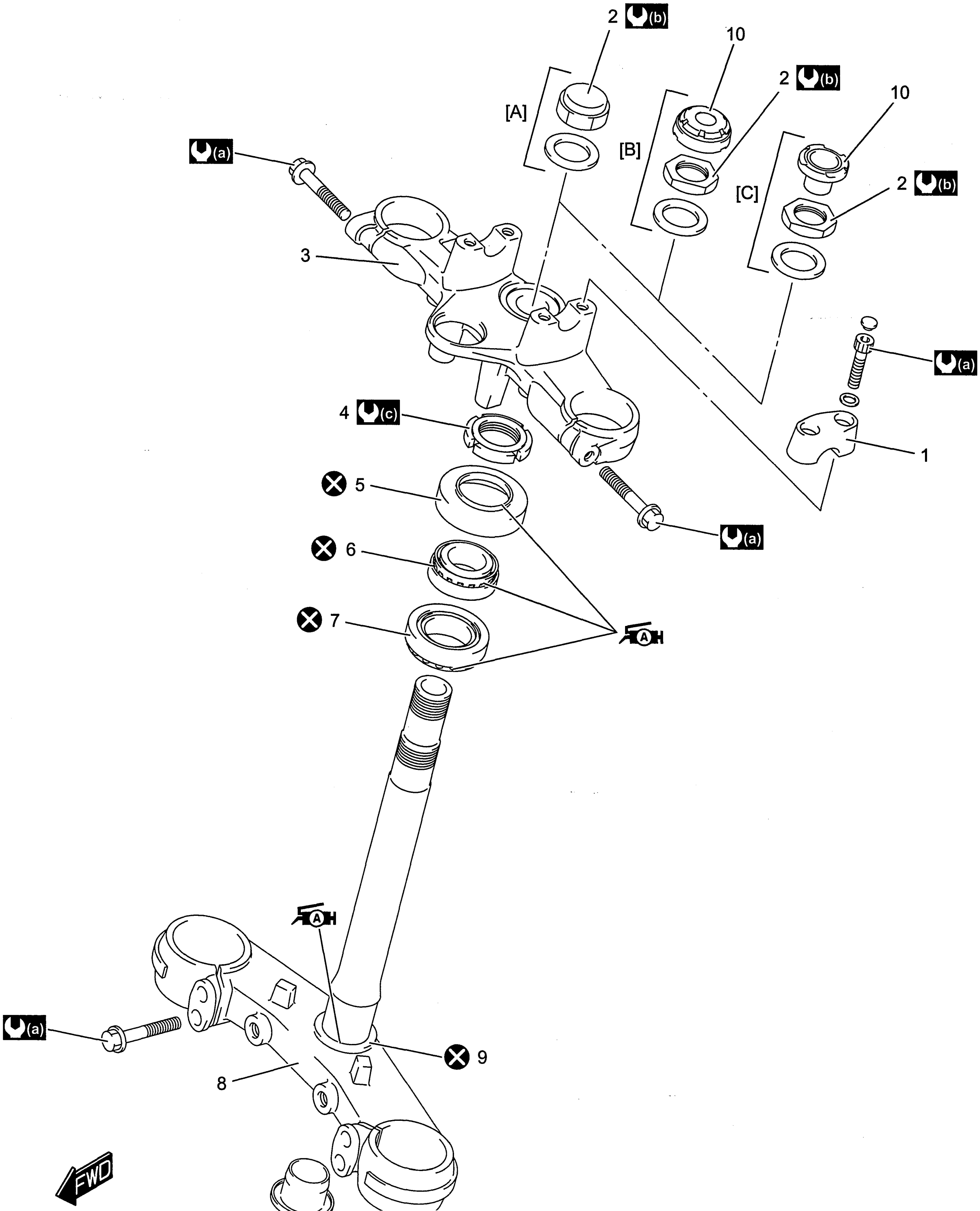
BENJ18K66206005

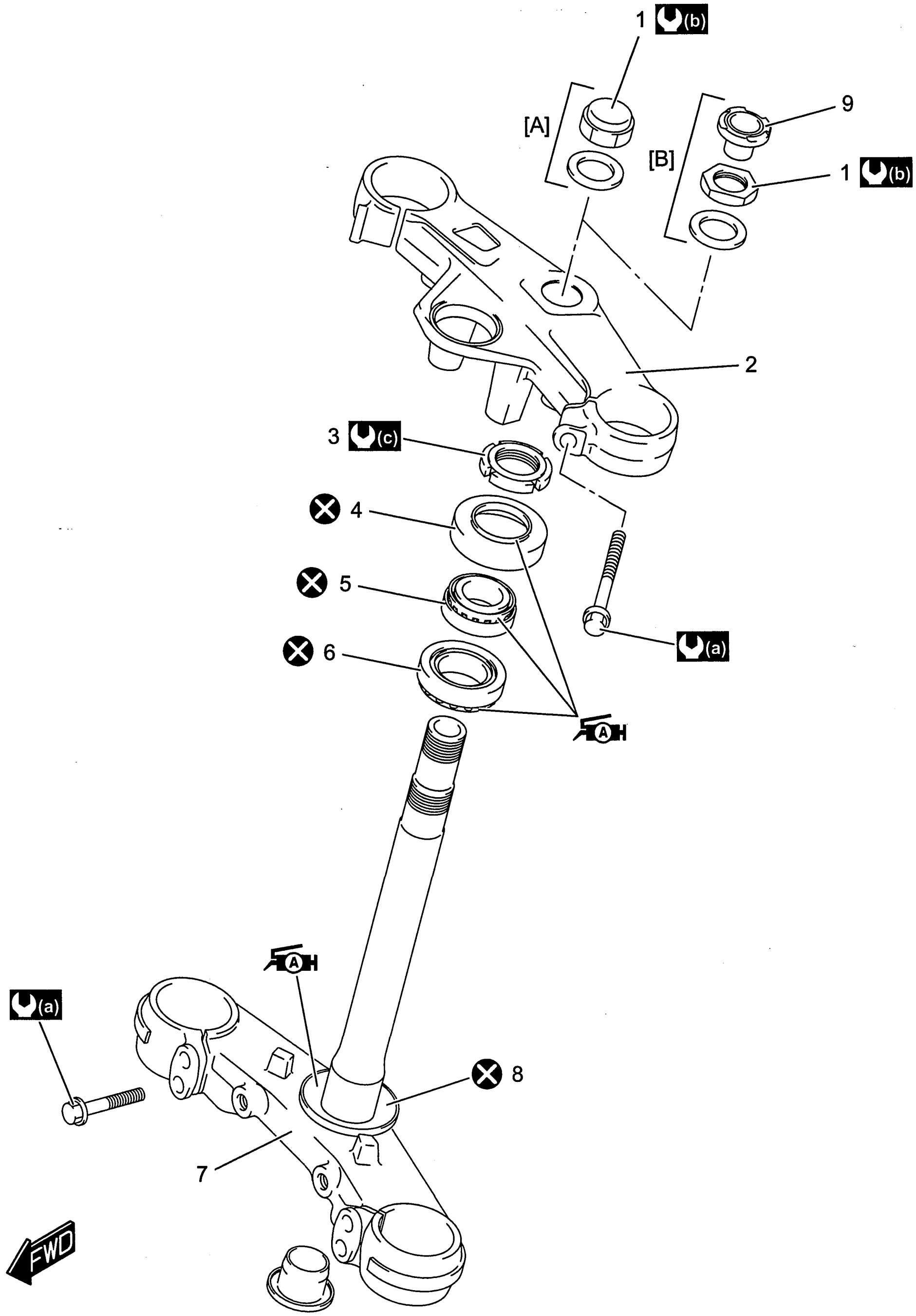
Refer to "Handlebar Removal and Installation (SV650/A)" (Page 6B-5) or "Handlebar Removal and Installation (SV650XA)" (Page 6B-7).
Inspect the handlebars for distortion and damage.
If any defect is found, replace it with a new one.

Steering Stem Components

SV650/A

BENJ18K66206006





IJ18K5620001-02

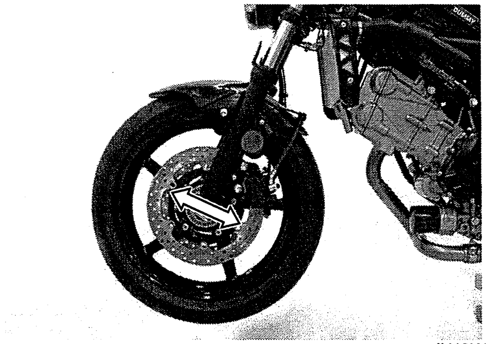
[A]: L8 model	5. Steering stem upper bearing	(b) : 90 N·m (9.2 kgf-m, 66.5 lbf-ft)
[B]: L9 – model	6. Steering stem lower bearing	(c) : 20 N·m (2.0 kgf-m, 15.0 lbf-ft) → turn counterclockwise 0 – 1/4
1. Steering stem head nut	7. Steering stem lower bracket	A H : Apply grease.
2. Steering stem upper bracket	8. Lower seal	: Do not reuse.
3. Steering stem nut	9. Steering stem head nut cap	

Steering On-Vehicle Inspection

BENJ18K66206007

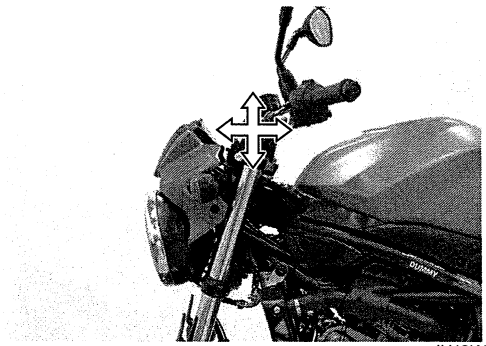
Steering should be adjusted properly for smooth turning of handlebars and safe running. Overtighten steering prevents smooth turning of the handlebars and too loose steering will cause poor stability.

1) Check that there is no play in the front fork.
   a) Support the motorcycle with its front wheel off the ground, grasp the bottoms of the front forks and move the forks back-and-forth to check there is no play in the stem bearings.



IH18K1620013-01

   b) With the front wheel on the ground and applying the front brake(s), move the handlebar back-and-forth and up-and-down to check there is no play in the stem bearings.



IH18K1620039-01

2) If play is found, readjust the steering. ☞(Page 6B-13)

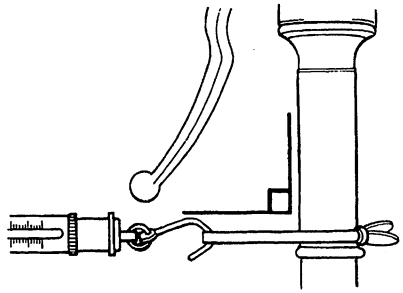
Steering Tension Inspection and Adjustment

BENJ18K66206008

SV650/A

1) By supporting the motorcycle with a jack, lift the front wheel until it is off the floor 20 – 30 mm (0.79 – 1.18 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 on one handlebar grip end as shown in the figure and read the graduation when the handlebars start moving.

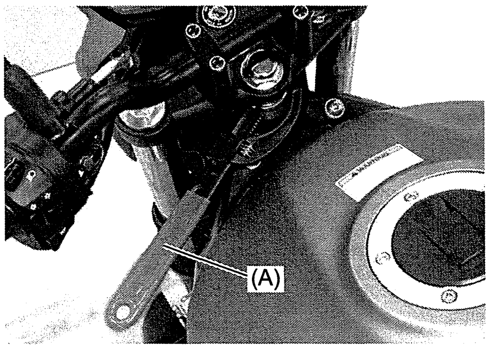
<u>Steering tension initial force</u>
[Standard]: 2 – 5 N (0.21 – 0.50 kgf, 0.45 – 1.12 lbf)



IF04K1620033-01

4) Do the same on the other grip end.
5) If the initial force reading on the scale when the handlebars start turning is either too heavy or too light, adjust the tension until it satisfies the specification as follows.
   a) Remove the steering stem head nut cap. (If equipped)
   b) First, loosen the front fork upper clamp bolts and steering stem head nut, and then adjust the steering stem nut by loosening or tightening it.

Special tool
(A): 09910–60620

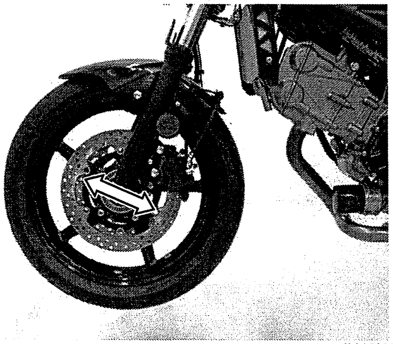


c) Tighten the steering stem head nut, front fork upper clamp bolts to the specified torque, and recheck the initial force with the spring scale according to the previously described procedure.

Tightening torque
Steering stem head nut: 90 N·m (9.2 kgf-m, 66.5 lbf-ft)
Front fork upper clamp bolt: 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

d) Install the steering stem head nut cap. (If equipped)

e) Make sure that the initial force is within the specified range and the steering is not loose.

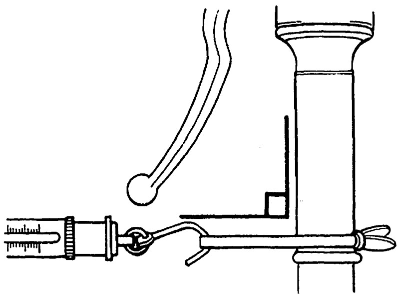


IH18K1620015-01

SV650XA

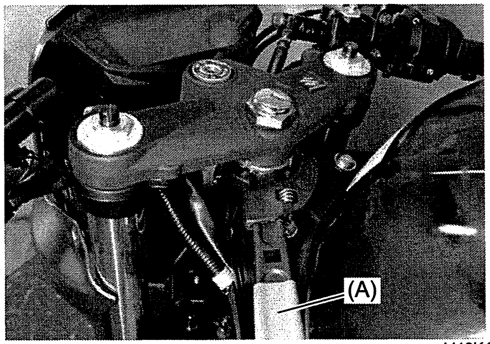
1) By supporting the motorcycle with a jack, lift the front wheel until it is off the floor 20 – 30 mm (0.79 – 1.18 in).
2) Check to make sure that the cables and wire harnesses are properly routed.
3) With the front wheel in the straight ahead state, hitch the spring scale on one handlebar grip end as shown in the figure and read the graduation when the handlebars start moving.

<u>**Steering tension initial force**</u>
[Standard]: 2 – 5 N (0.21 – 0.50 kgf, 0.45 – 1.12 lbf)



4) Do the same on the other grip end.
5) If the initial force reading on the scale when the handlebars start turning is either too heavy or too light, adjust the tension until it satisfies the specification as follows.
   a) Remove the steering stem head nut cap. (If equipped)
   b) First, loosen the front fork upper clamp bolts, handlebar clamp bolts and steering stem head nut, and then adjust the steering stem nut by loosening or tightening it.

Special tool
(A): 09910–60620



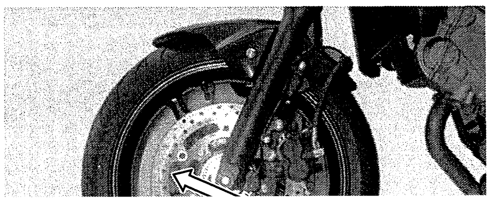
IJ18K1620019-01

c) Tighten the steering stem head nut, handlebar clamp bolts and front fork upper clamp bolts to the specified torque, and recheck the initial force with the spring scale according to the previously described procedure.

Tightening torque
Steering stem head nut: 90 N·m (9.2 kgf-m, 66.5 lbf-ft)
Handlebar clamp bolt: 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
Front fork upper clamp bolt: 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

d) Install the steering stem head nut cap. (If equipped)

e) Make sure that the initial force is within the specified range and the steering is not loose.



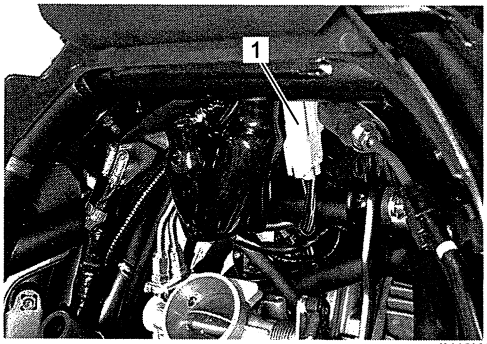
Steering Stem Upper Bracket Removal and Installation

BENJ18K66206009

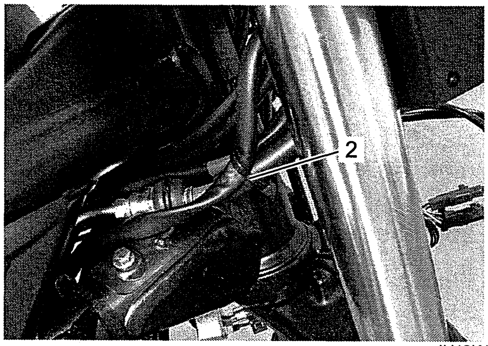
SV650/A

Removal

1) Support the motorcycle with a jack.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the ignition switch lead wire coupler (1) and remove the clamp (2).

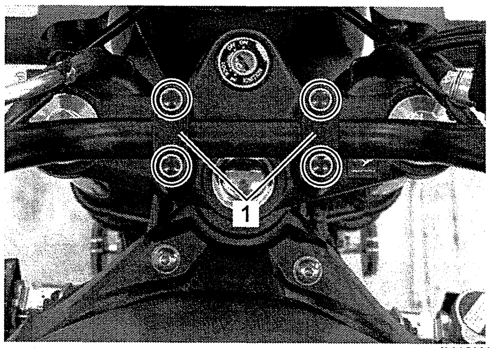


IH18K1180021-02



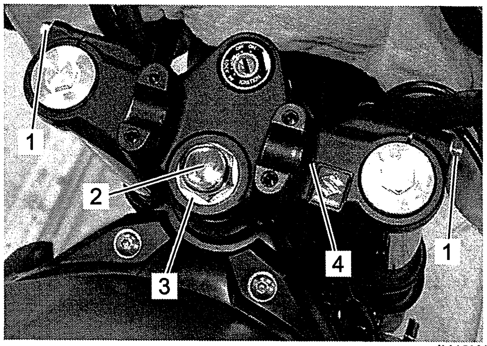
IH18K1620042-01

4) Remove the handlebar holders (1).



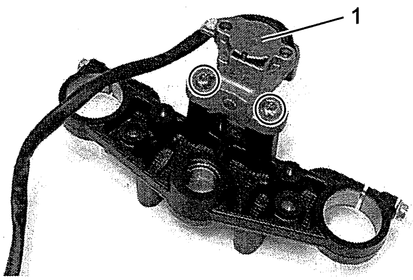
IH18K1620017-01

5) Place a rag on the combination meter to prevent the handlebars scratched.
6) Remove the handlebars forward.
7) Loosen the front fork upper clamp bolts (1).
8) Remove the steering stem head nut cap. (If equipped)
9) Remove the steering stem head nut (2), washer (3) and steering stem upper bracket assembly (4).



IH18K1620018-01

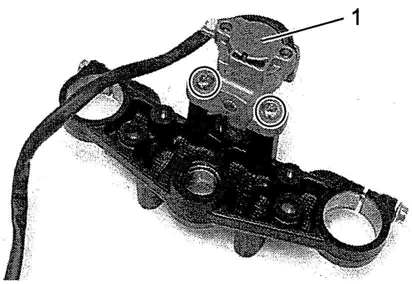
10) Remove the ignition switch (1). ☞(Page 1H-11)



IH18K1620019-01

Installation

1) Install the ignition switch (1). ☞(Page 1H-11)

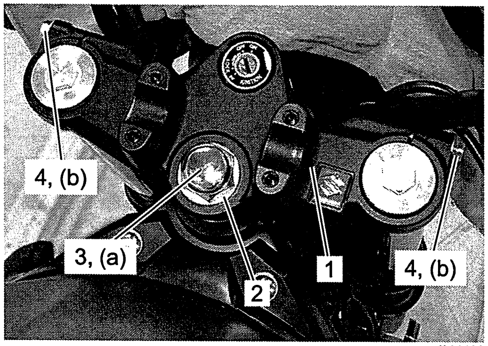


IH18K1620020-01

2) Install the steering stem upper bracket assembly (1), washer (2) and steering stem head nut (3).

3) Tighten the steering stem head nut (3) and front fork upper clamp bolts (4) to the specified torque.

Tightening torque
Steering stem head nut (a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)
Front fork upper clamp bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IH18K1620021-01

4) Install the steering stem head nut cap. (If equipped)

5) Install the handlebars. ☞(Page 6B-5)

6) Connect the ignition switch lead wire coupler and clamp. ☞(Page 9A-15)

7) Install the air cleaner box. ☞(Page 1D-8)

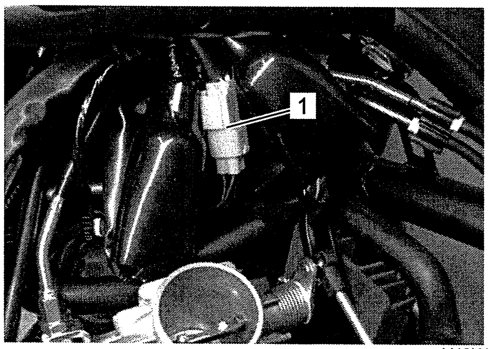
SV650XA

Removal

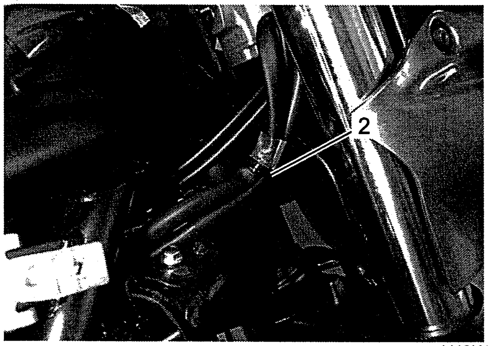
1) Support the motorcycle with a jack.

2) Remove the air cleaner box. ☞(Page 1D-8)

3) Disconnect the ignition switch lead wire coupler (1) and remove the clamp (2).

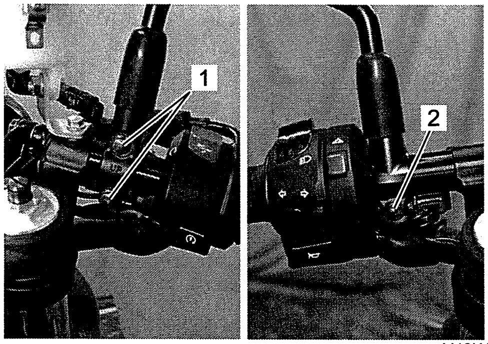


IJ18K1620021-01



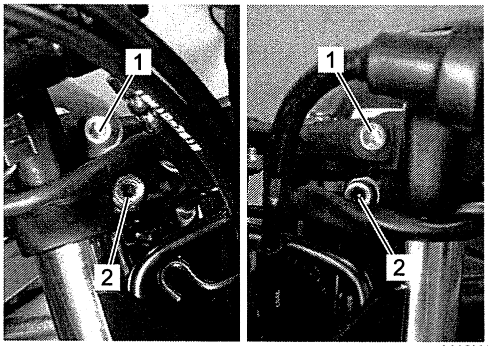
IJ18K1620022-01

4) Loosen the front brake master cylinder holder bolts (1) and clutch lever holder bolt (2).



IJ18K1620023-01

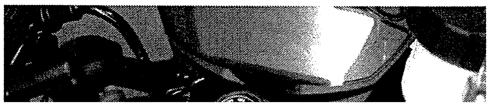
5) Move the front brake master cylinder assembly and clutch lever assembly, and then loosen the front fork upper clamp bolts (1) and handlebar clamp bolts (2).



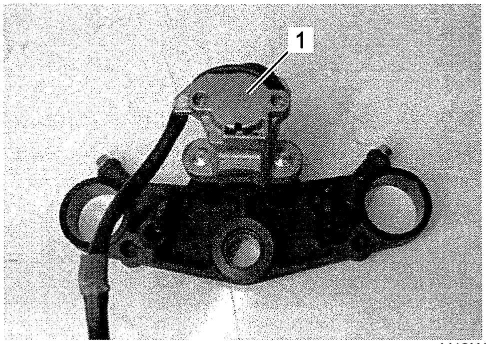
IJ18K1620024-01

6) Remove the steering stem head nut cap. (If equipped)

7) Remove the steering stem head nut (1), washer (2) and steering stem upper bracket assembly (3).



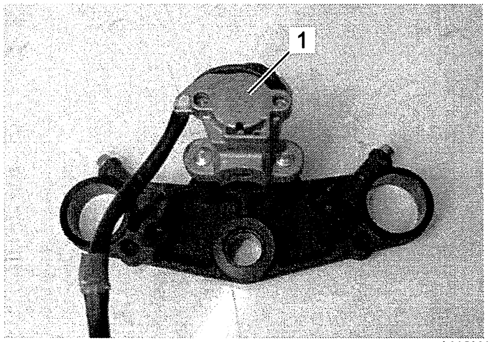
8) Remove the ignition switch (1). ☞(Page 1H-11)



IJ18K1620026-01

Installation

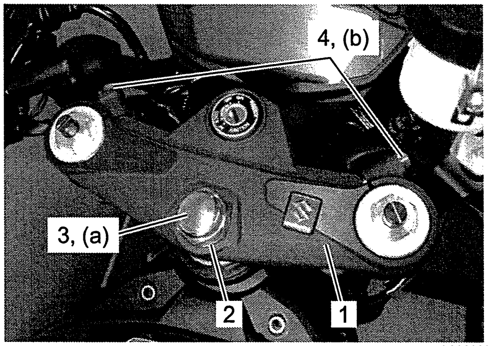
1) Install the ignition switch (1). ☞(Page 1H-11)



IJ18K1620026-01

2) Install the steering stem upper bracket assembly (1), washer (2) and steering stem head nut (3).
3) Tighten the steering stem head nut (3) and front fork upper clamp bolts (4) to the specified torque.

Tightening torque
Steering stem head nut (a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)
Front fork upper clamp bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IJ18K1620027-02

9) Install the air cleaner box. ☞(Page 1D-8)

Steering Stem Removal and Installation (SV650/A)

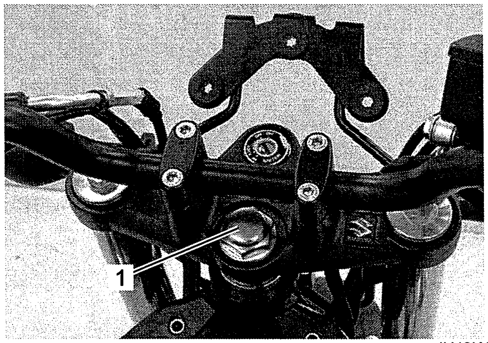
BENJ18K66206010

Removal

1) Remove the headlight cover. ☞(Page 9D-20)
2) Remove the combination meter. ☞(Page 9C-7)
3) Remove the front forks. ☞(Page 2B-3)

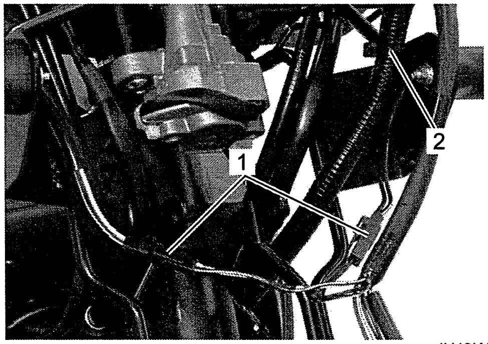
NOTE

Slightly loosen the steering stem head nut (1) to facilitate later removing.

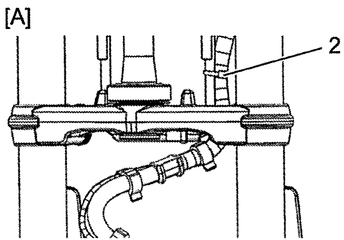


IH18K1620022-01

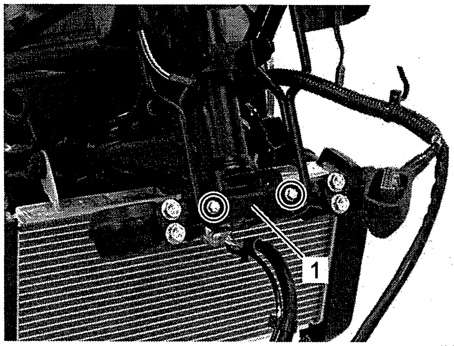
4) Disconnect the front turn signal light couplers (1) and clamp(s) (2).



IH18K1620023-01



5) Remove the headlight brace assembly (1).



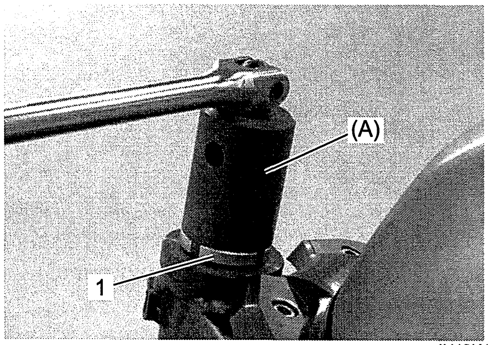
IH18K1620024-02

6) Remove the steering stem upper bracket assembly.
☞(Page 6B-15)

7) While holding the steering stem lower bracket, remove the steering stem nut (1) with the special tool.

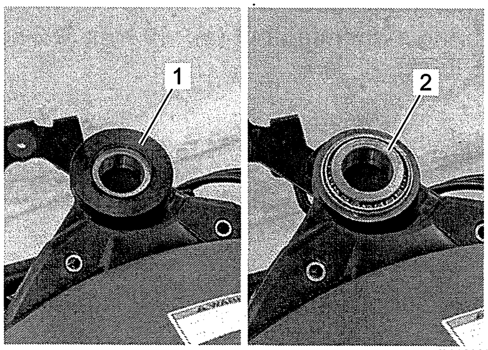
Special tool
(A): 09940–14911

8) Remove the steering stem lower bracket.



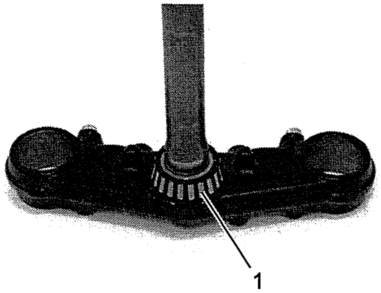
IH18K1620025-01

9) Remove the dust seal (1) and steering stem upper bearing (2).



IH18K1620026-01

10) Remove the steering stem lower bearing (1).
☞(Page 6B-23)

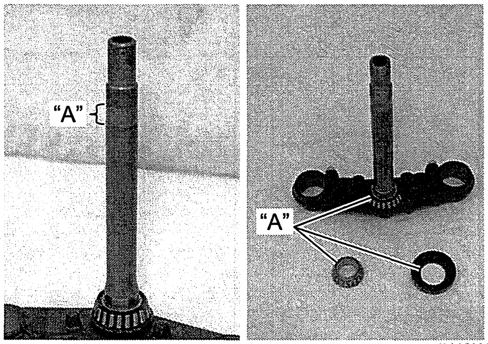


IH18K1620027-01

Installation

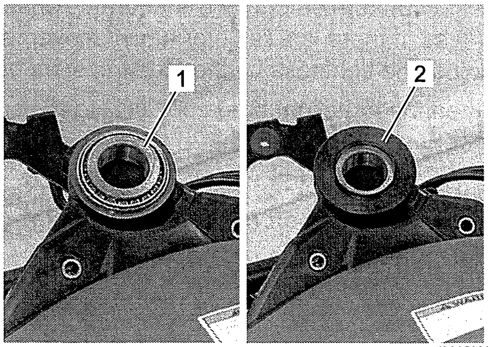
1) Apply grease to the following parts.
   - Upper bearing contact surface on steering stem shaft
   - Lip of new dust seal
   - Upper and lower bearings

   “A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1620028-03

2) Install the steering stem upper bearing (1), dust seal (2) and steering stem lower bracket.

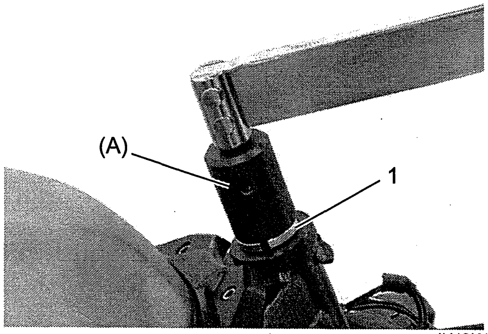


3) Install the steering stem nut (1) and temporarily tighten it to the specified torque (20 N·m (2.0 kgf-m, 15.0 lbf-ft)) with the special tool.

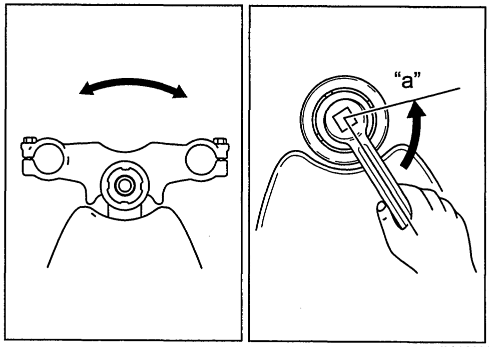
Special tool
(A): 09940–14911

4) Turn the steering stem lower bracket to the left and right about five or six times so that the taper roller bearings seat properly.
5) Loosen the steering stem nut 0 – 1/4 turn "a".

Tightening torque
Steering stem nut: 20 N·m (2.0 kgf-m, 15.0 lbf-ft) → turn counterclockwise 0 – 1/4



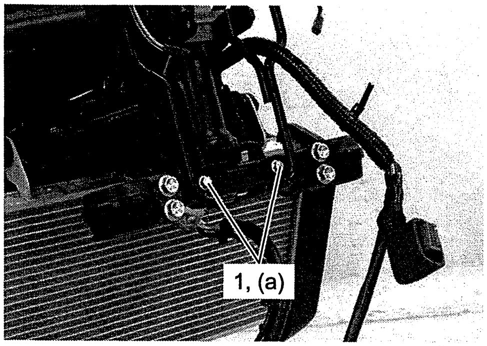
IH18K1620029-01



IH18K1620030-03

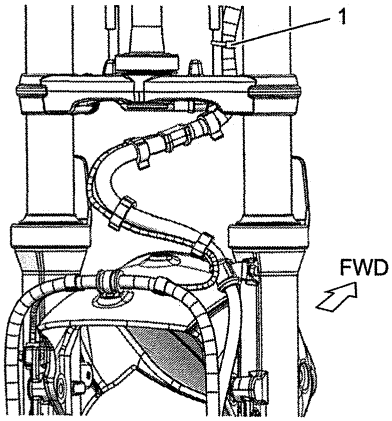
6) In this condition, check that the steering stem lower bracket can turn smoothly without rattle and stiffness. If there is a rattle or heavy movement, readjust the tightness by the steering stem nut.
7) Tighten the headlight brace bolts (1) to the specified torque.

Tightening torque
Headlight brace bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IH18K1620031-02

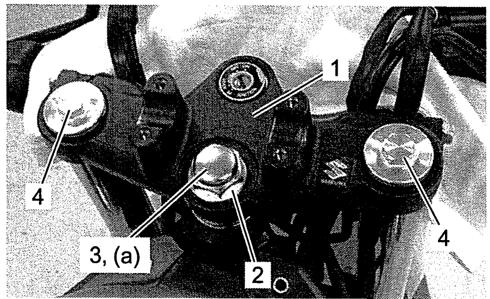
8) Connect the clamp (1) (Without ABS). Refer to "Speed Sensor Routing Diagram (Without ABS)" in Section 9C (Page 9C-2).



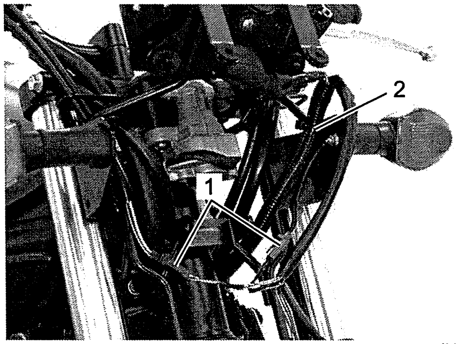
IH18K1620054-01

9) Install the steering stem upper bracket assembly (1), washer (2) and steering stem head nut (3) temporarily.
10) Install the front forks (4) temporarily.
11) Tighten the steering stem head nut (3) to the specified torque.

Tightening torque
Steering stem head nut (a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)



12) Install the steering stem head nut cap. (If equipped)
13) Install the front forks. ☞(Page 2B-3)
14) Install the handlebars. ☞(Page 6B-5)
15) Install the combination meter. ☞(Page 9C-7)
16) Connect the front turn signal light couplers (1) and clamp (2). Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).



IH18K1620032-01

17) Connect the ignition switch lead wire coupler and clamp. ☞(Page 9A-15)
18) Install the air cleaner box. ☞(Page 1D-8)
19) Install the fuel tank. ☞(Page 1G-9)
20) Install the headlight cover. ☞(Page 9D-20)
21) Check the steering tension. ☞(Page 6B-13)

Steering Stem Removal and Installation (SV650XA)

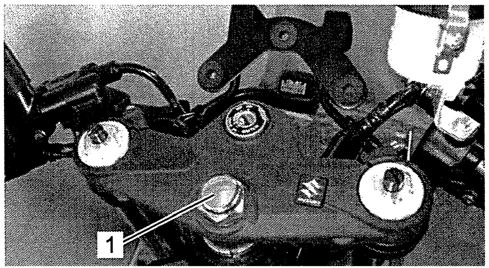
BENJ18K66206011

Removal

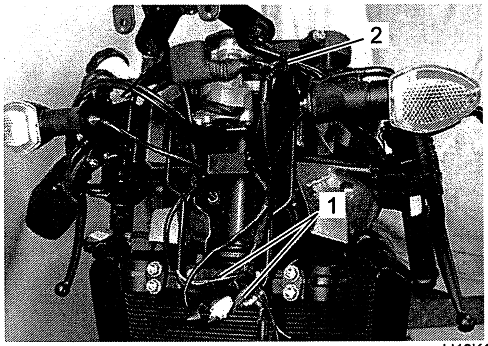
1) Remove the headlight cover. ☞(Page 9D-20)
2) Remove the combination meter. ☞(Page 9C-7)
3) Remove the front forks. ☞(Page 2B-3)

NOTE

Slightly loosen the steering stem head nut (1) to facilitate later removing.

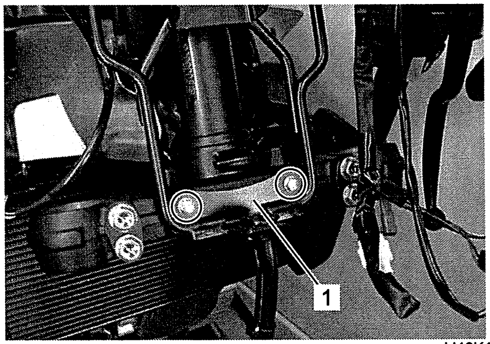


4) Disconnect the front turn signal light couplers (1) and clamp (2).



IJ18K1620029-01

5) Remove the headlight brace assembly (1).

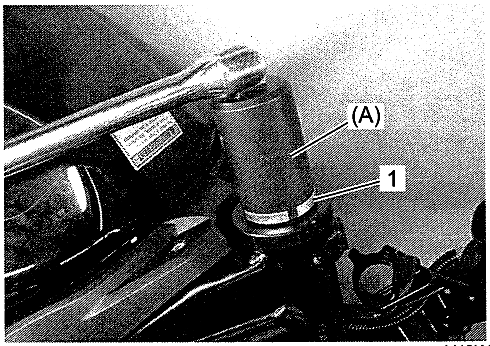


IJ18K1620030-01

6) Remove the steering stem upper bracket assembly. ☞(Page 6B-15)
7) While holding the steering stem lower bracket, remove the steering stem nut (1) with the special tool.

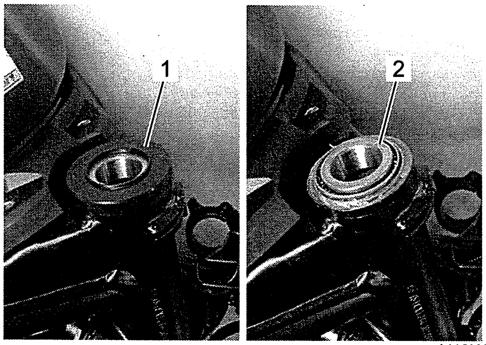
Special tool
(A): 09940–14911

8) Remove the steering stem lower bracket.



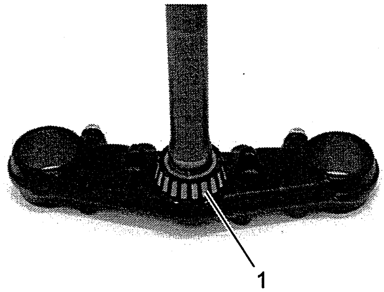
IJ18K1620031-01

9) Remove the dust seal (1) and steering stem upper bearing (2).



IJ18K1620032-02

10) Remove the steering stem lower bearing (1).
☞(Page 6B-23)

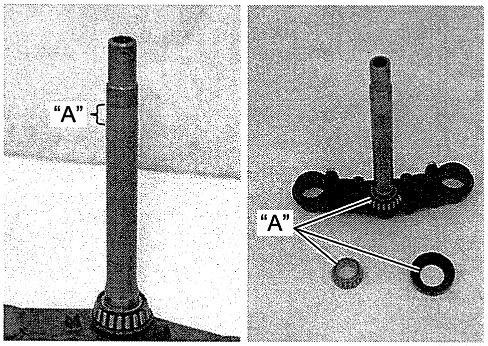


IH18K1620027-01

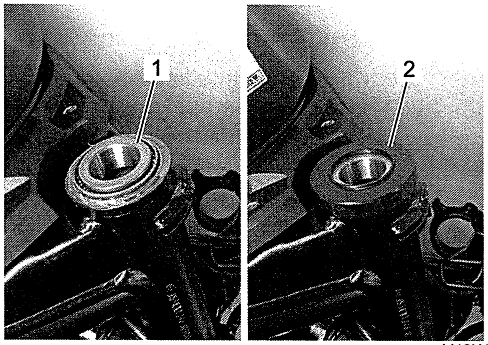
Installation

1) Apply grease to the following parts.
   - Upper bearing contact surface on steering stem shaft
   - Lip of new dust seal
   - Upper and lower bearings

   “A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)



2) Install the steering stem upper bearing (1), dust seal (2) and steering stem lower bracket.



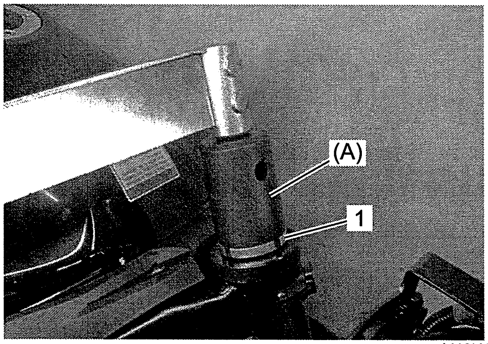
IJ18K1620033-02

3) Install the steering stem nut (1) and temporarily tighten it to the specified torque (20 N·m (2.0 kgf-m, 15.0 lbf-ft)) with the special tool.

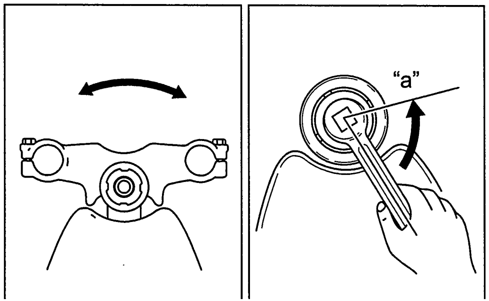
   Special tool
   (A): 09940–14911

4) Turn the steering stem lower bracket to the left and right about five or six times so that the taper roller bearings seat properly.
5) Loosen the steering stem nut 0 – 1/4 turn “a”.

   Tightening torque
   Steering stem nut: 20 N·m (2.0 kgf-m, 15.0 lbf-ft) → turn counterclockwise 0 – 1/4

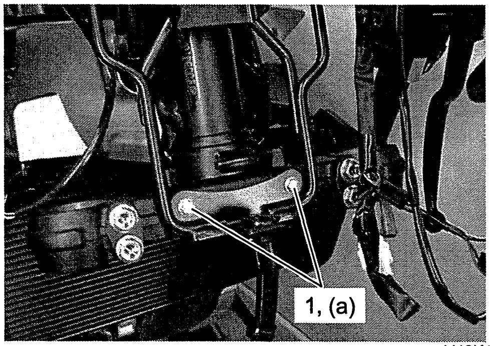


IJ18K1620034-01



7) Tighten the headlight brace bolts (1) to the specified torque.

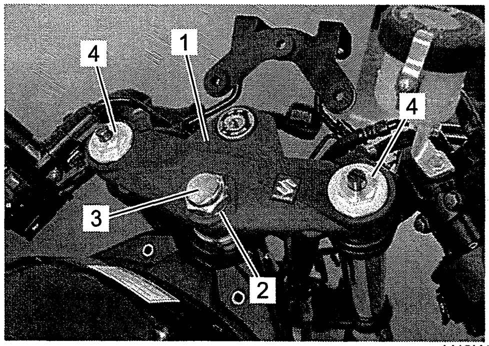
Tightening torque
Headlight brace bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IJ18K1620035-01

8) Install the steering stem upper bracket assembly (1), washer (2) and steering stem head nut (3) temporarily.
9) Install the front forks (4) temporarily.
10) Tighten the steering stem head nut (3) to the specified torque.

Tightening torque
Steering stem head nut (a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)



IJ18K1620036-01

11) Install the steering stem head nut cap. (If equipped)
12) Install the front forks. ☞(Page 2B-3)
13) Install the combination meter. ☞(Page 9C-7)
14) Connect the front turn signal light couplers (1) and clamp (2). Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).

15) Connect the ignition switch lead wire coupler and clamp. ☞(Page 9A-15)
16) Install the air cleaner box. ☞(Page 1D-8)
17) Install the fuel tank. ☞(Page 1G-9)
18) Install the headlight cover. ☞(Page 9D-20)
19) Check the steering tension. ☞(Page 6B-13)

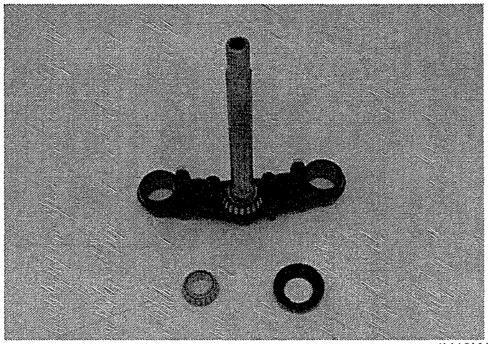
Steering Stem Inspection

BENJ18K66206012

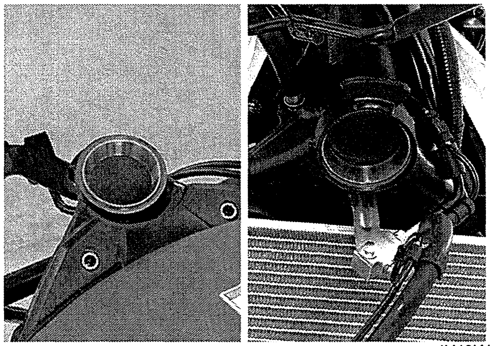
Refer to "Steering Stem Removal and Installation (SV650/A)" (Page 6B-17) or "Steering Stem Removal and Installation (SV650XA)" (Page 6B-20).
Inspect the removed parts for the following abnormalities:

- Distortion of the steering stem
- Bearing wear or damage
- Abnormal bearing noise
- Race wear or damage
- Bearing lower seal damage
- Dust seal wear or damage

If any abnormal points are found, replace defective parts with new ones.



IH18K1620033-01



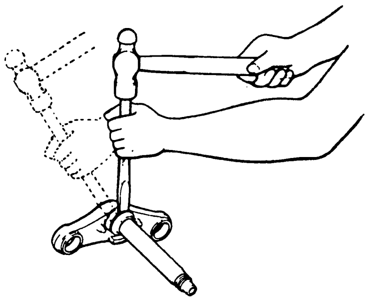
IH18K1620034-01

Steering Stem Bearing Removal and Installation

BENJ18K66206013

Removal

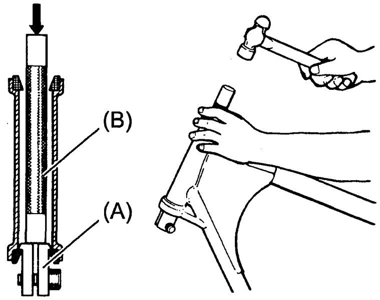
1) Remove the steering stem upper bearing. Refer to "Steering Stem Removal and Installation (SV650/A)" (Page 6B-17) or "Steering Stem Removal and Installation (SV650XA)" (Page 6B-20).
2) Remove the steering stem lower bearing and lower seal with a chisel.



I649G1620033-02

3) Remove the steering stem upper and lower bearing inner races with the special tools.

Special tool
(A): 09941–54911
(B): 09941–74911

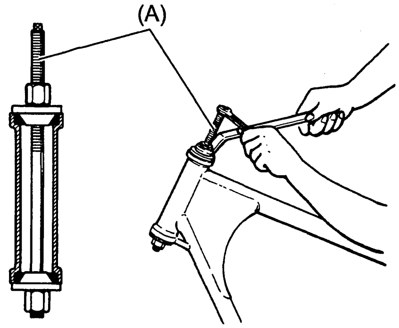


IH18K1620046-01

Installation

1) Press in the new upper and lower inner races with the special tool.

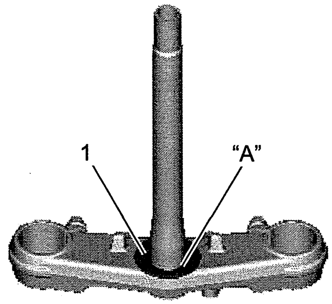
Special tool
(A): 09941–34513



IH18K1620035-01

2) Apply a small quantity of grease to the lip of new lower seal (1) and install the lower seal.

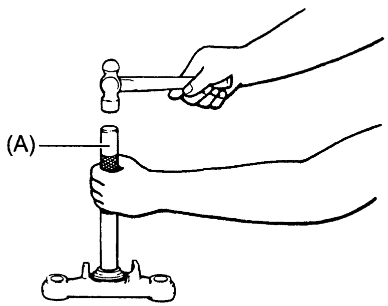
"A": Grease 99000–25011 (SUZUKI SUPER GREASE A)



IH18K1620037-02

3) Press in the new steering stem lower bearing with the special tool.

Special tool
(A): 09941–74911



IH18K1620047-01

Specifications

Tightening Torque Specifications

BENJ18K66207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Handlebar clamp bolt	23	2.3	17.0	☞(Page 6B-5) / ☞(Page 6B-9) / ☞(Page 6B-14)
Handlebar balancer screw	5.5	0.56	4.05	☞(Page 6B-6) / ☞(Page 6B-7) / ☞(Page 6B-9) / ☞(Page 6B-10)
Clutch lever holder bolt	10	1.0	7.5	☞(Page 6B-8)
Steering stem head nut	90	9.2	66.5	☞(Page 6B-8) / ☞(Page 6B-14) / ☞(Page 6B-14) / ☞(Page 6B-16) / ☞(Page 6B-17) / ☞(Page 6B-19) / ☞(Page 6B-22)
Front fork upper clamp bolt	23	2.3	17.0	☞(Page 6B-9) / ☞(Page 6B-14) / ☞(Page 6B-14) / ☞(Page 6B-16) / ☞(Page 6B-17)
Steering stem nut	20 N·m (2.0 kgf-m, 15.0 lbf-ft) → turn counterclockwise 0 – 1/4			☞(Page 6B-19) / ☞(Page 6B-21)
Headlight brace bolt	10	1.0	7.5	☞(Page 6B-19) / ☞(Page 6B-22)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Handlebar Components" (Page 6B-1)
"Handlebar Construction" (Page 6B-3)
"Steering Stem Components" (Page 6B-11)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ18K66208001

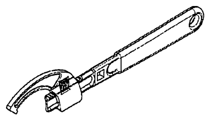
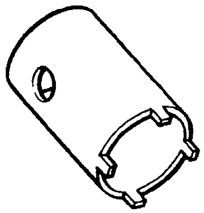
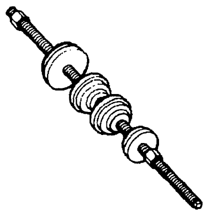
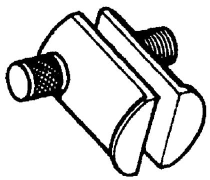
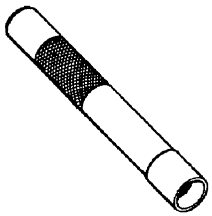
Material	SUZUKI recommended product or Specification		Note
Adhesive	Handle grip glue	—	☞(Page 6B-6) / ☞(Page 6B-10)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞(Page 6B-6) / ☞(Page 6B-9) / ☞(Page 6B-18) / ☞(Page 6B-21) / ☞(Page 6B-23)
	SUZUKI WATER RESISTANT GREASE EP2	P/No.: 99000–25350	☞(Page 6B-6) / ☞(Page 6B-9)

NOTE

Required service material(s) is also described in:
"Handlebar Components" (Page 6B-1)
"Handlebar Construction" (Page 6B-3)
"Steering Stem Components" (Page 6B-11)

Special Tool

BENJ18K66208002

09910–60620 Adjustable wrench ☞(Page 6B-13) / ☞(Page 6B-14) 	09940–14911 Steering stem nut socket ☞(Page 6B-18) / ☞(Page 6B-19) / ☞(Page 6B-20) / ☞(Page 6B-21) 
09941–34513 Bearing installer set ☞(Page 6B-23) 	09941–54911 Bearing outer race remover ☞(Page 6B-23) 
09941–74911 Steering stem bearing installer ☞(Page 6B-23) / ☞(Page 6B-23) 	

Section 9

Body and Accessories

CONTENTS

Precautions

Precautions for Electrical System

BENJ18K69000001

Refer to “General Precautions” in Section 00 (Page 00-1), “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2) and “Precautions for Circuit Tester” in Section 00 (Page 00-7).

Component Location

Electrical Components Location

BENJ18K69003001

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

Wiring Systems

General Description

Abbreviations

BENJ18K69101001

Refer to the “Abbreviations” in Section 0A (Page 0A-1) for the general abbreviations.

Wire / Connector Color Symbols

BENJ18K69101002

Refer to “Wire Color Symbols” in Section 0A (Page 0A-4).

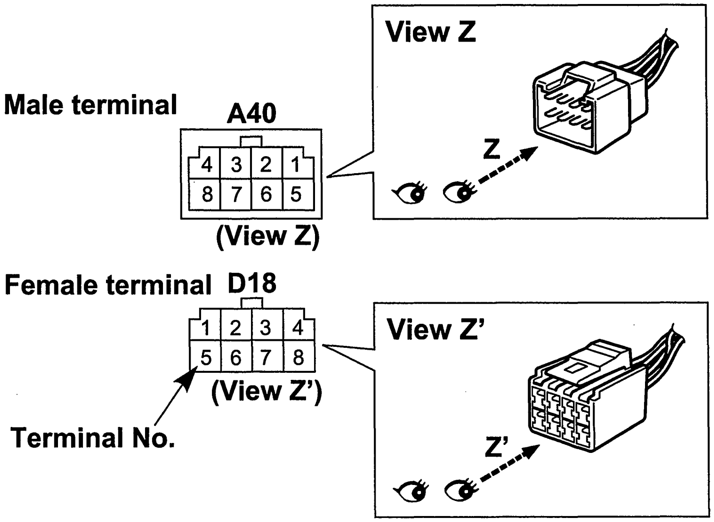
How to Read Terminal Nos.

BENJ18K69101003

The connector shape and terminal layout shown in this manual are those when viewed from “Z” in the illustration.

NOTE

- **Molded terminal numbers that are different from the above can be found on some connectors in rare cases.**
- **These molded numbers are not applied in this manual.**



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Glossary

BENJ18K69101004

English	
2WD/4WD/DIFF-LOCK ACTUATOR	
2WD/4WD/DIFF-LOCK SWITCH	
4WD POSITION DIODE	
ABS	
ABS CONTROL UNIT	
ABS FUSE	
ABS MOTOR	
ABS VALVE	
ACCELERATOR POSITION SENSOR	
ALARM	
AP SENSOR	
AMBIENT AIR TEMP SENSOR	
AUXILIARY HEADLIGHT	
BATTERY	
BRAKE LIGHT SWITCH	
CAP	
CARBURETOR SWITCH	
CDI UNIT	
CKP SENSOR	
CLUTCH LEVER POSITION SWITCH	
CLUTCH SWITCH	
CMP SENSOR	
COMBINATION METER	
COOLING FAN MOTOR	
COOLING FAN RELAY	
COOLING FAN THERMO-SWITCH	
DIFFERENTIAL DIODE	
DIFF-LOCK RELAY	
DIMMER	
DIMMER SWITCH	
DIMMER/PASSING LIGHT SWITCH	
DIODE	
DRIVE RELAY (2WD)	
DRIVE RELAY (DIFF-LOCK)	
ECM	
ECT SENSOR	
EMERGENCY SWITCH	
ENGINE STOP SWITCH	
ENGINE STOP/STARTER SWITCH	
EPS CONTROL UNIT	
EPS MOTOR	
ET SENSOR	
EVAP SYSTEM PURGE CONTROL SOLENOID VALVE	
EXCV ACTUATOR	
FAN	
FAN RELAY	
FI INDICATOR LIGHT	
FRONT BRAKE LIGHT SWITCH	
FRONT TURN SIGNAL LIGHT	

English	
GEARSHIFT SENSOR	
GENERATOR	
GP SENSOR	
GP SWITCH	
HANDLE SWITCH	
HANDLEBAR SWITCH	
HAZARD SWITCH	
HEADLIGHT	
HEADLIGHT HI	
HEADLIGHT LO	
HI BEAM INDICATOR LIGHT	
HIGH BEAM INDICATOR LIGHT	
HIGH BEAM RELAY	
HIGH POSITION DIODE	
HO2 SENSOR	
HORN	
HORN BUTTON	
HORN SWITCH	
IAP SENSOR	
IAP/TP SENSOR	
IAP/TP/IAT SENSOR	
IAT SENSOR	
IF EQUIPPED	
IGNITER	
IGNITION	
IGNITION COIL	
IGNITION SWITCH	
ILLUMINATION LIGHT	
IMMOBILIZER ANTENNA	
IMU	
INSTRUMENT PANEL LIGHT	
ISC VALVE	
LICENSE PLATE LIGHT	
LIGHTING SWITCH	
LIGHT/HORN RELAY	
LOW BEAM RELAY	
LOW POSITION DIODE	
MAIN FUSE	
MALFUNCTION INDICATOR LAMP	
MODE SELECT COUPLER	
MODE SWITCH	
NEUTRAL INDICATOR LIGHT	
NEUTRAL POSITION DIODE	
NEUTRAL RELAY	
NEUTRAL SWITCH	
O2 SENSOR	
OIL PRESSURE SWITCH	
OPTION	
OVERRIDE SWITCH	
PASSING LIGHT SWITCH	

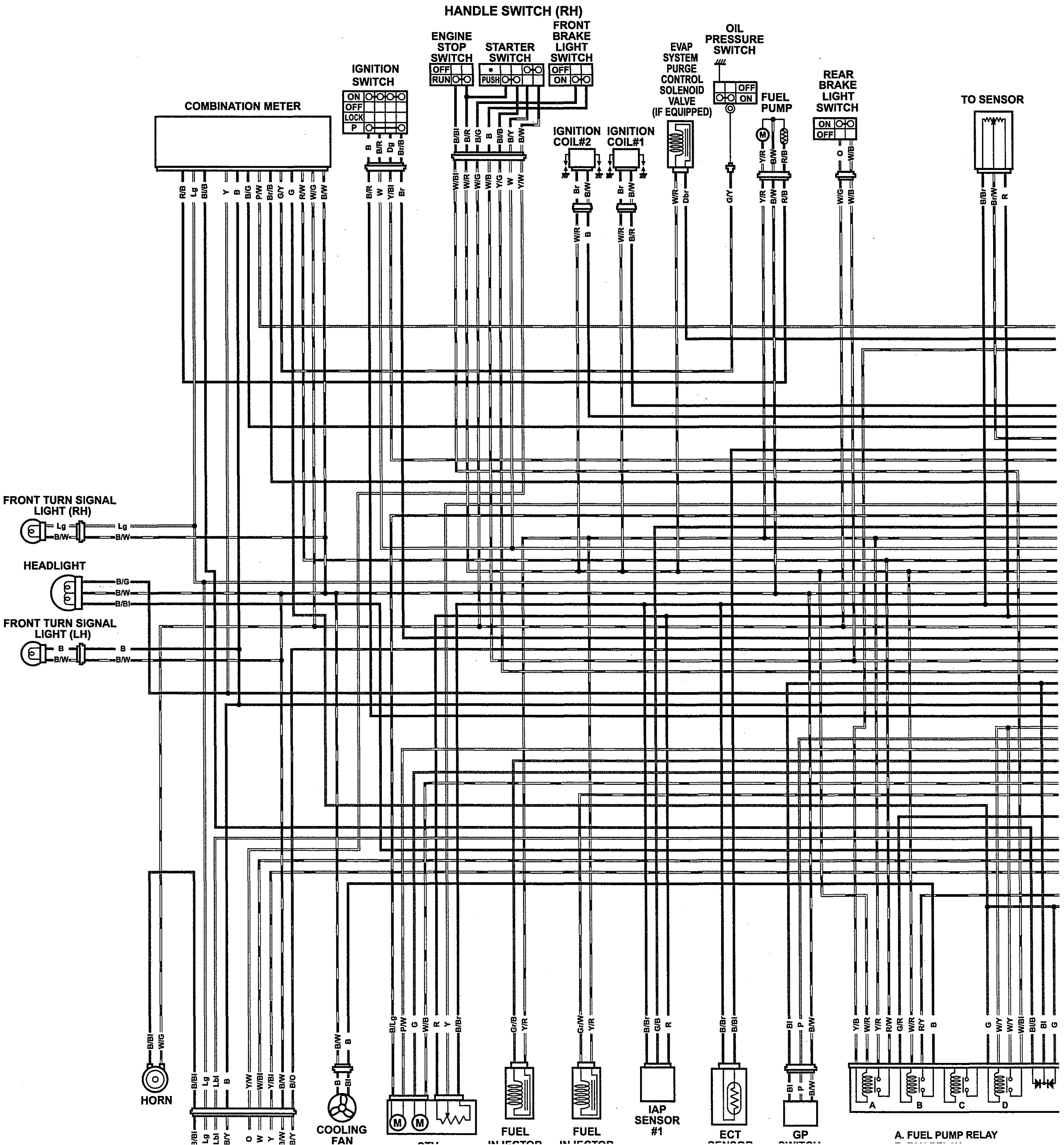
English	
POWER SOURCE FUSE	
PRIMARY FUEL INJECTOR	
REAR BRAKE LIGHT SWITCH	
REAR COMBINATION LIGHT	
REAR TURN SIGNAL LIGHT	
REAR WHEEL SPEED SENSOR	
REGULATOR/RECTIFIER	
RESISTOR	
SECONDARY FUEL INJECTOR	
SELECT SWITCH	
S-HAC	
SIDE-STAND DIODE	
SIDE-STAND RELAY	
SIDE-STAND SWITCH	
SIGNAL	
SPEED SENSOR	
SPEEDOMETER	
SPEEDOMETER LIGHT	
STARTER BUTTON	
STARTER SUB RELAY	
STARTER SWITCH	
STARTER MOTOR	
STARTER RELAY	
STEERING DAMPER SOLENOID VALVE	
STP SENSOR	
STV ACTUATOR	
SUB FUSE	
THROTTLE VALVE MOTOR	
TO SENSOR	
TORQUE SENSOR	
TP SENSOR	
TRACTION CONTROL SYSTEM SWITCH	
TRACTION CONTROL SYSTEM SELECT SWITCH	
TURN SIGNAL INDICATOR LIGHT	
TURN SIGNAL RELAY	
TURN SIGNAL SWITCH	
WITH IMMOBILIZER SYSTEM	
WITHOUT EVAP SYSTEM	
WITHOUT EVAP CONTROL SYSTEM	
WITHOUT EVAP SYSTEM PURGE CONTROL SOLENOID VALVE	
WITHOUT IMMOBILIZER SYSTEM	
WITHOUT POSITION LIGHT	

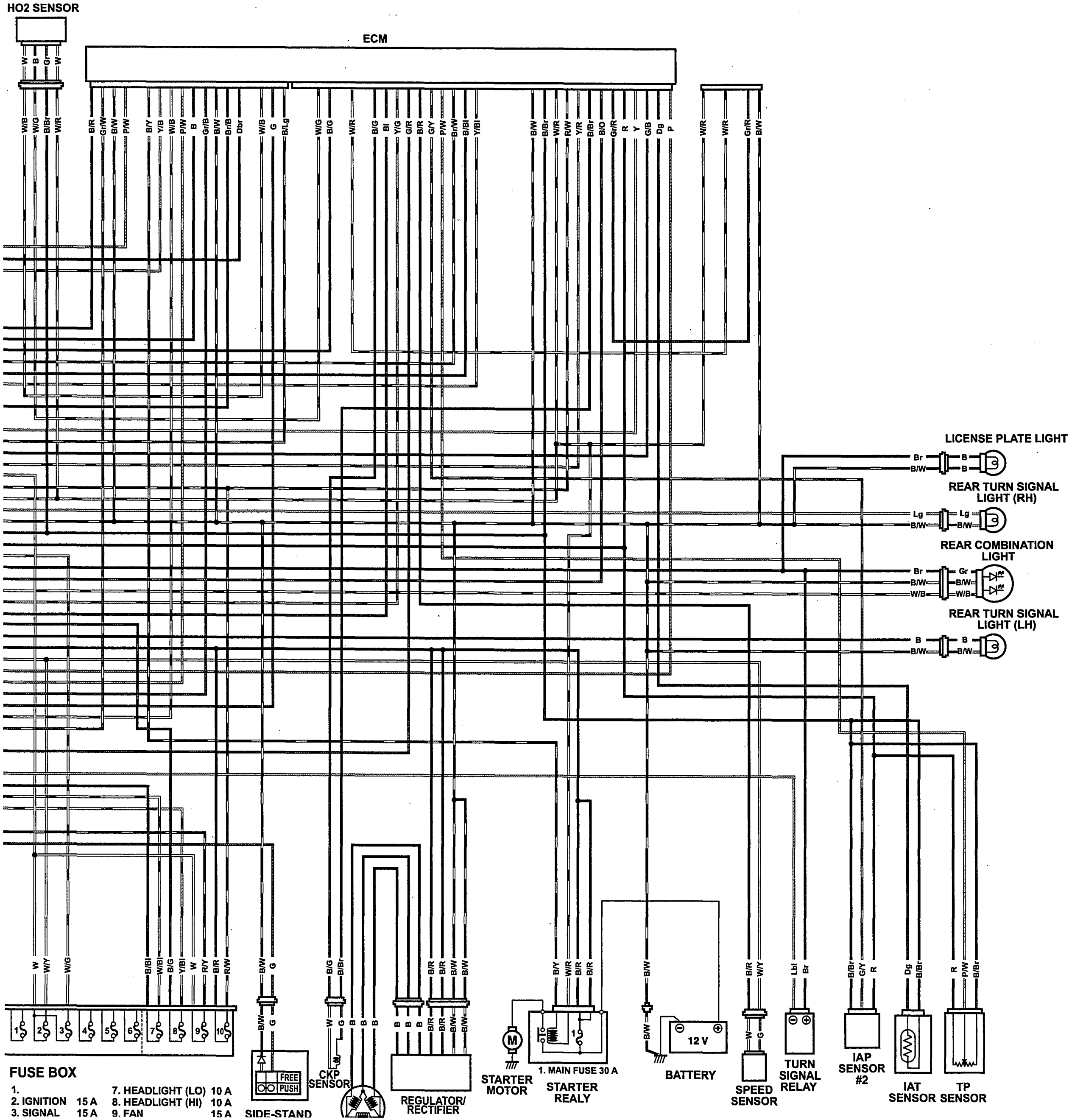
Schematic and Routing Diagram

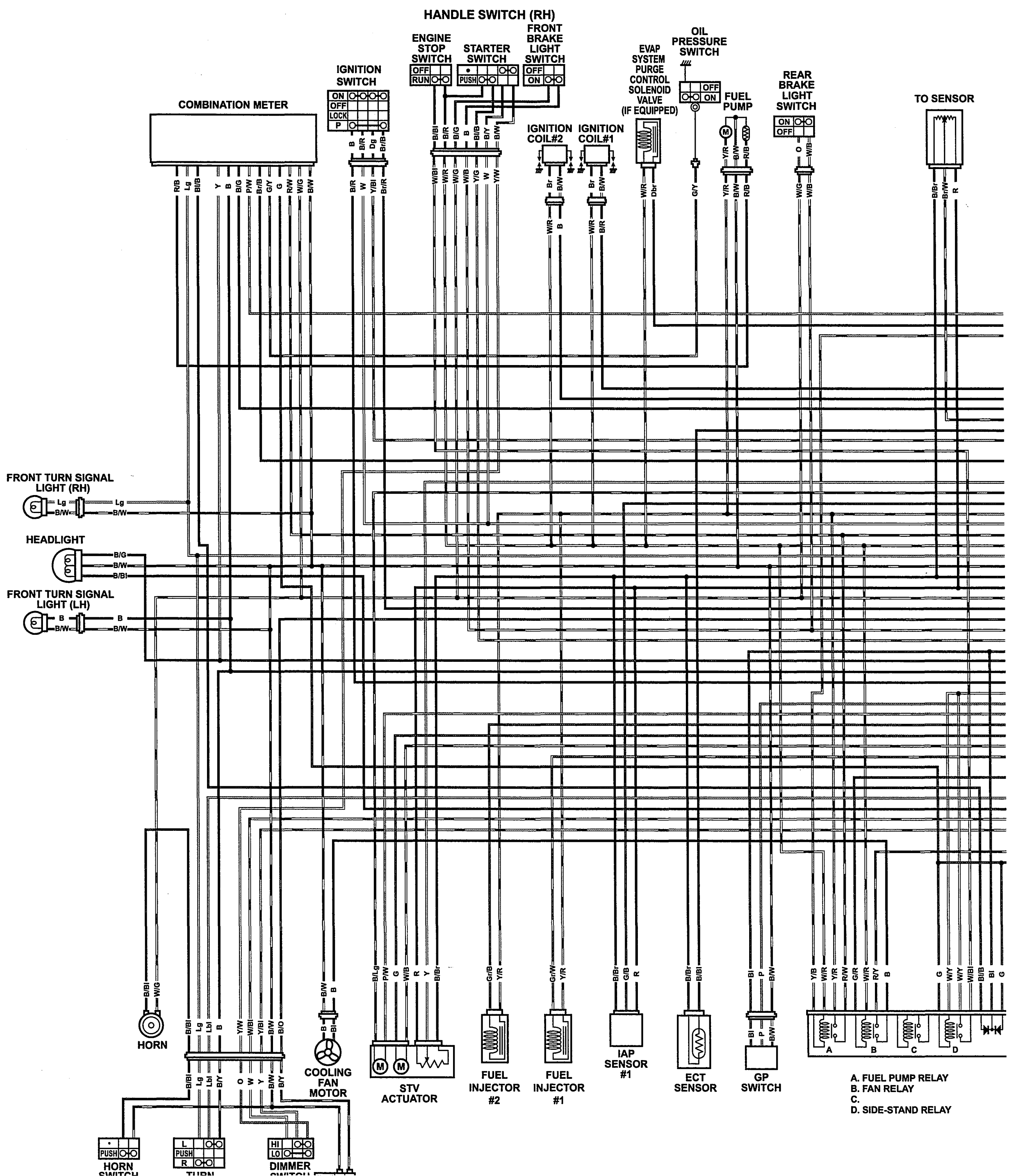
Wiring Diagram (SV650)

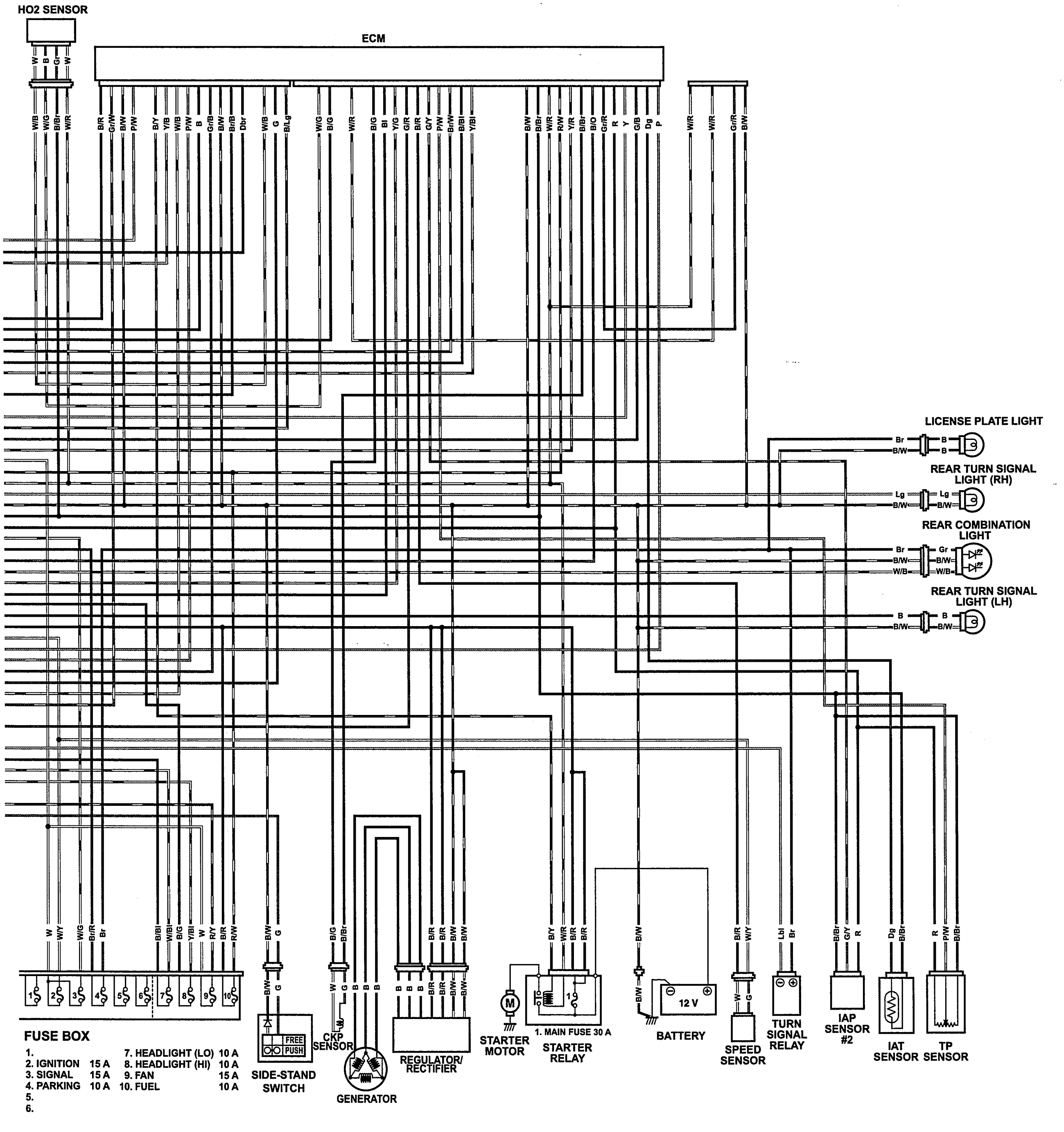
L7 – L8

BENJ18K69102001




HO2 SENSOR
ECM
LICENSE PLATE LIGHT
REAR TURN SIGNAL LIGHT (RH)
REAR COMBINATION LIGHT
REAR TURN SIGNAL LIGHT (LH)
FREE
PUSH
CKP SENSOR
SIDE-STAND
REGULATOR/ RECTIFIER
M
STARTER MOTOR
1. MAIN FUSE 30 A
STARTER REALY
12 V
BATTERY
SPEED SENSOR
TURN SIGNAL RELAY
IAP SENSOR #2
IAT SENSOR
TP SENSOR
FUSE BOX
1.
2. IGNITION 15 A
3. SIGNAL 15 A
7. HEADLIGHT (LO) 10 A
8. HEADLIGHT (HI) 10 A
9. FAN 15 A

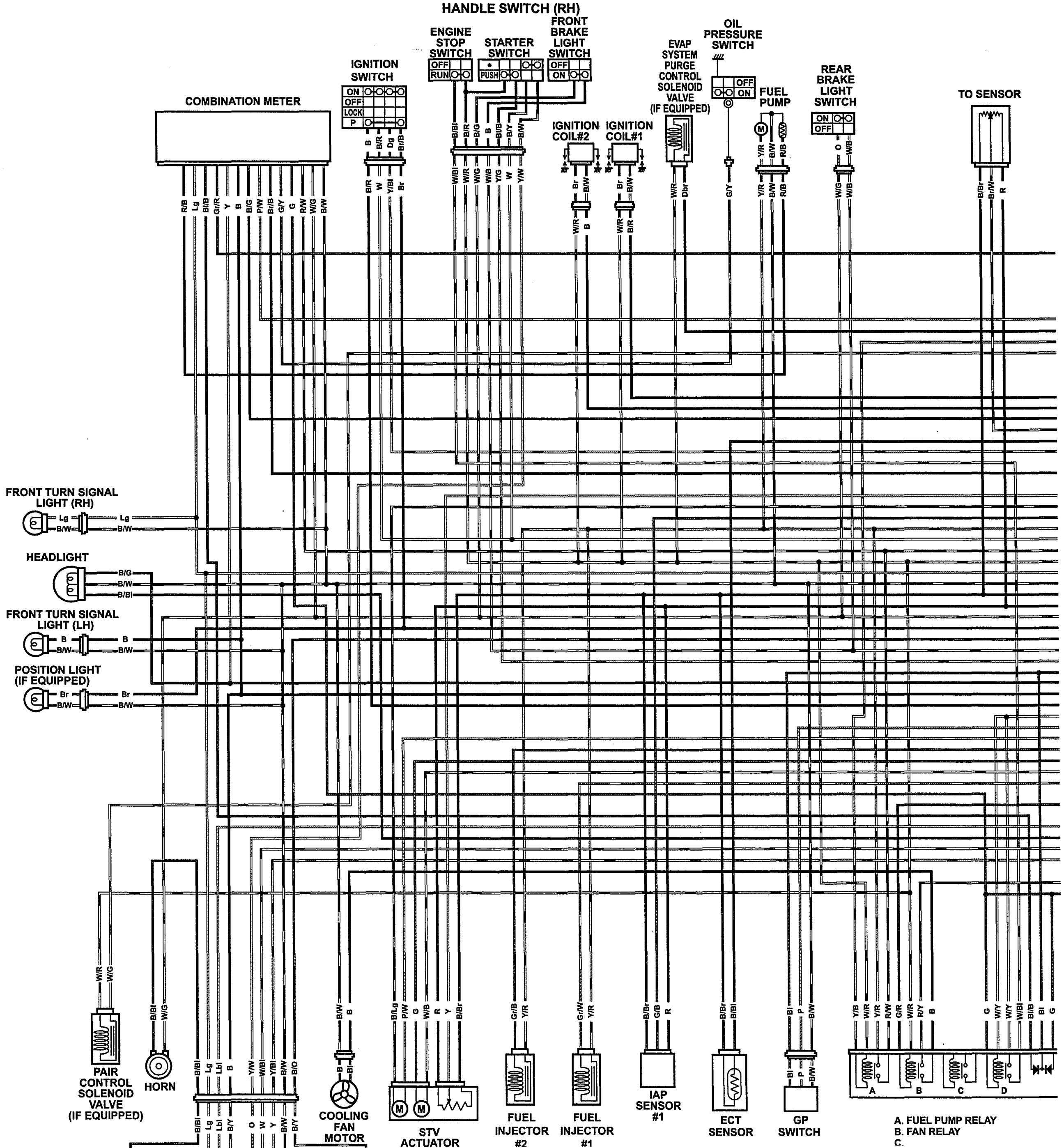

HANDLE SWITCH (RH)
ENGINE STOP SWITCH
OFF
RUN
STARTER SWITCH
PUSH
FRONT BRAKE LIGHT SWITCH
OFF
ON
IGNITION SWITCH
ON
OFF
LOCK
P
COMBINATION METER
EVAP SYSTEM PURGE CONTROL SOLENOID VALVE (IF EQUIPPED)
OIL PRESSURE SWITCH
OFF
ON
FUEL PUMP
REAR BRAKE LIGHT SWITCH
ON
OFF
TO SENSOR
IGNITION COIL#2
IGNITION COIL#1
FRONT TURN SIGNAL LIGHT (RH)
HEADLIGHT
FRONT TURN SIGNAL LIGHT (LH)
HORN
COOLING FAN MOTOR
STV ACTUATOR
FUEL INJECTOR #2
FUEL INJECTOR #1
IAP SENSOR #1
ECT SENSOR
GP SWITCH
A
B
C
D
A. FUEL PUMP RELAY
B. FAN RELAY
C.
D. SIDE-STAND RELAY
HORN SWITCH
PUSH
TURN
L
PUSH
R
DIMMER SWITCH
HI
LO

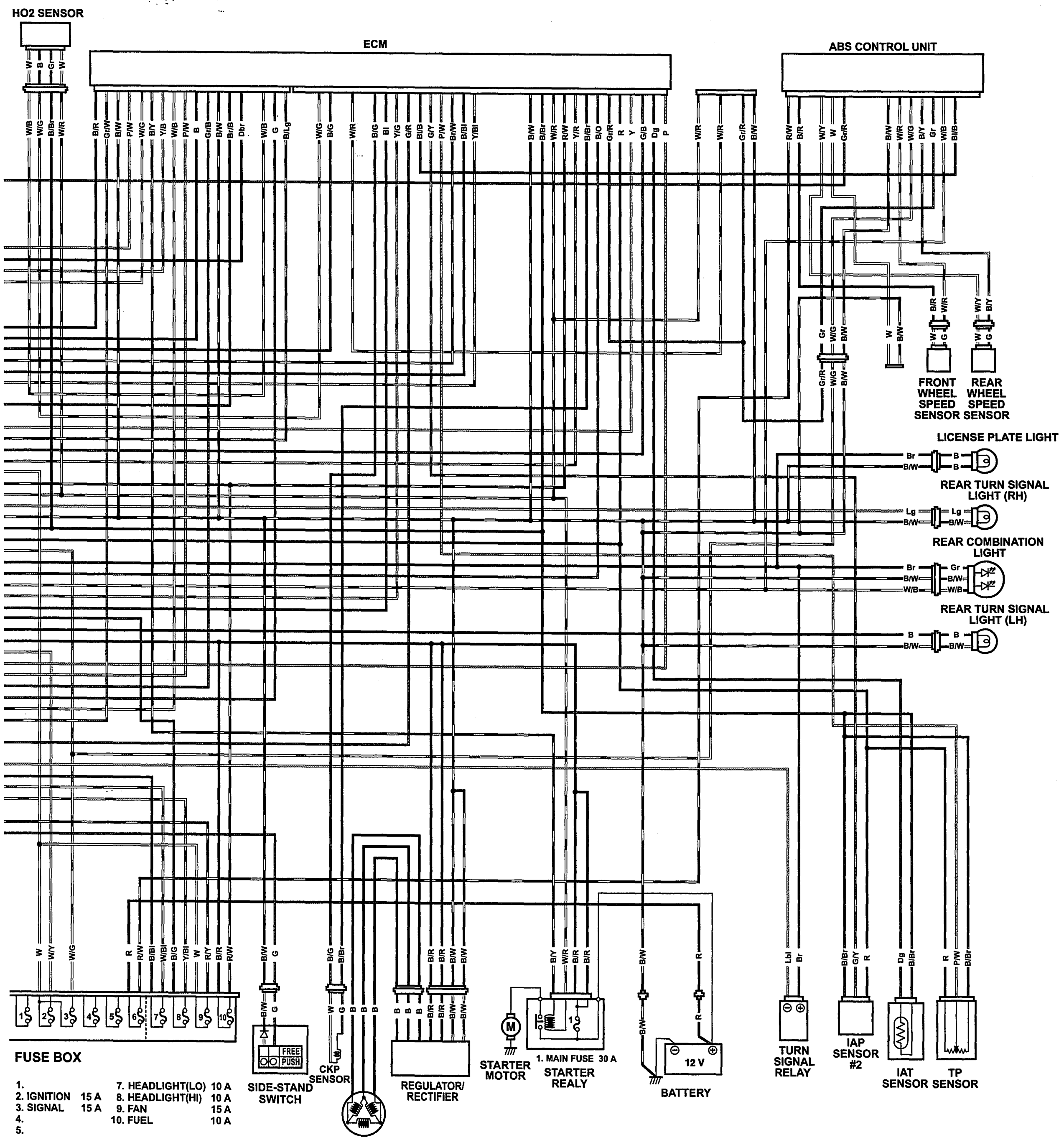

HO2 SENSOR
ECM
LICENSE PLATE LIGHT
REAR TURN SIGNAL LIGHT (RH)
REAR COMBINATION LIGHT
REAR TURN SIGNAL LIGHT (LH)
FUSE BOX
1.
2. IGNITION 15 A
3. SIGNAL 15 A
4. PARKING 10 A
5.
6.
7. HEADLIGHT (LO) 10 A
8. HEADLIGHT (HI) 10 A
9. FAN 15 A
10. FUEL 10 A
FREE
PUSH
SIDE-STAND SWITCH
CKP SENSOR
GENERATOR
REGULATOR/RECTIFIER
STARTER MOTOR
1. MAIN FUSE 30 A
STARTER RELAY
12 V
BATTERY
SPEED SENSOR
TURN SIGNAL RELAY
IAP SENSOR #2
IAT SENSOR
TP SENSOR

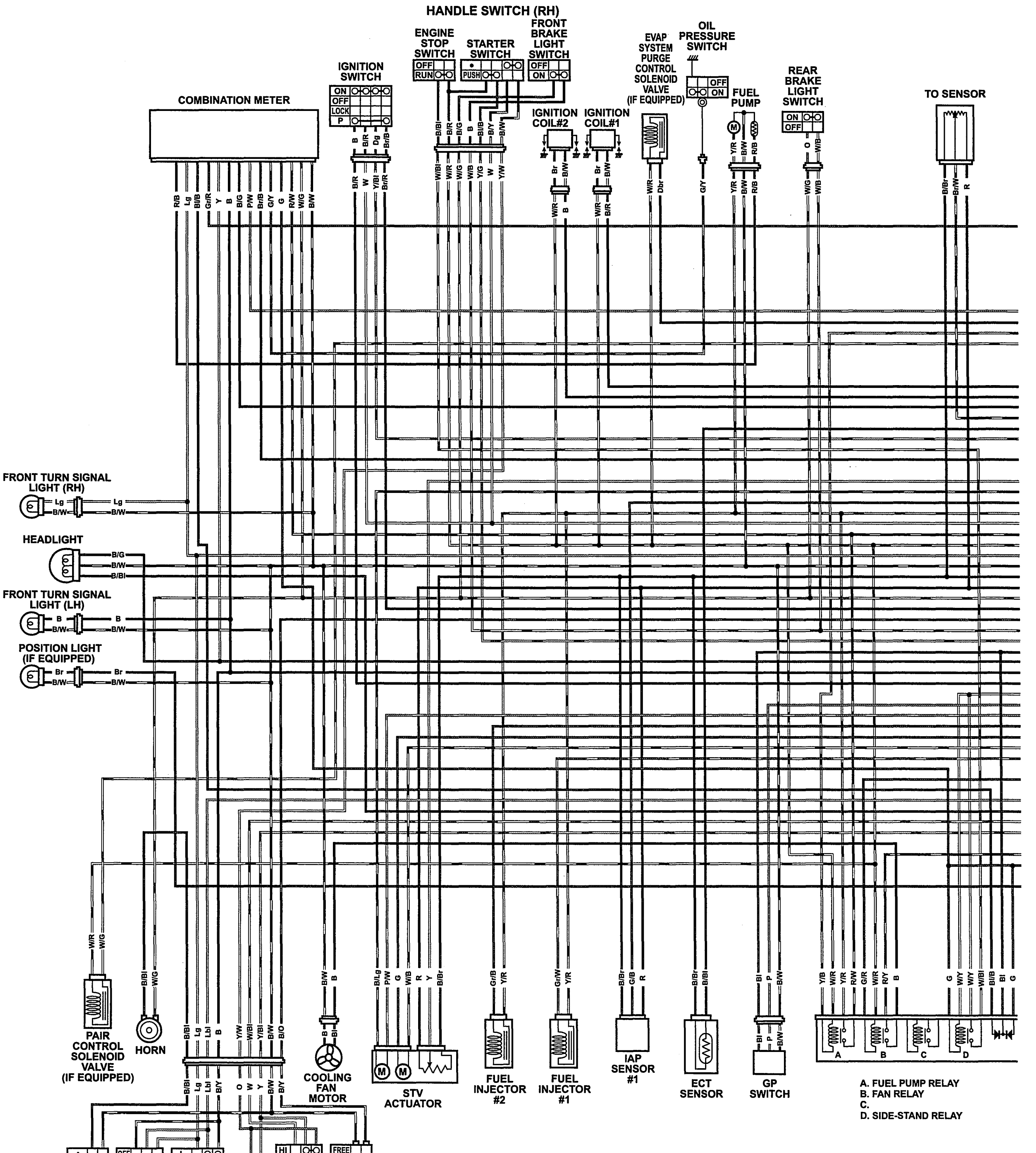
Wiring Diagram (SV650A)

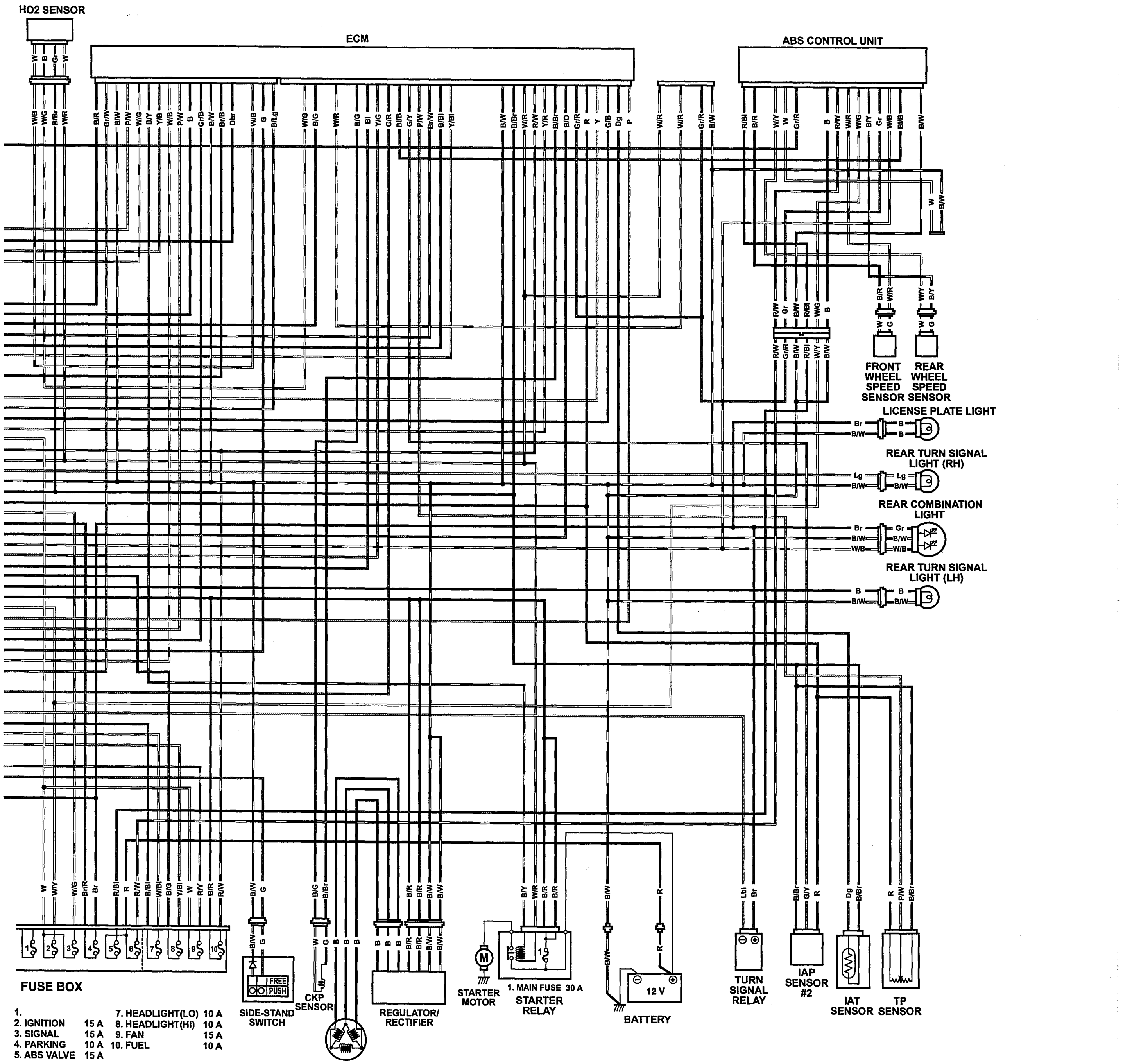
L7 – L8

BENJ18K69102002



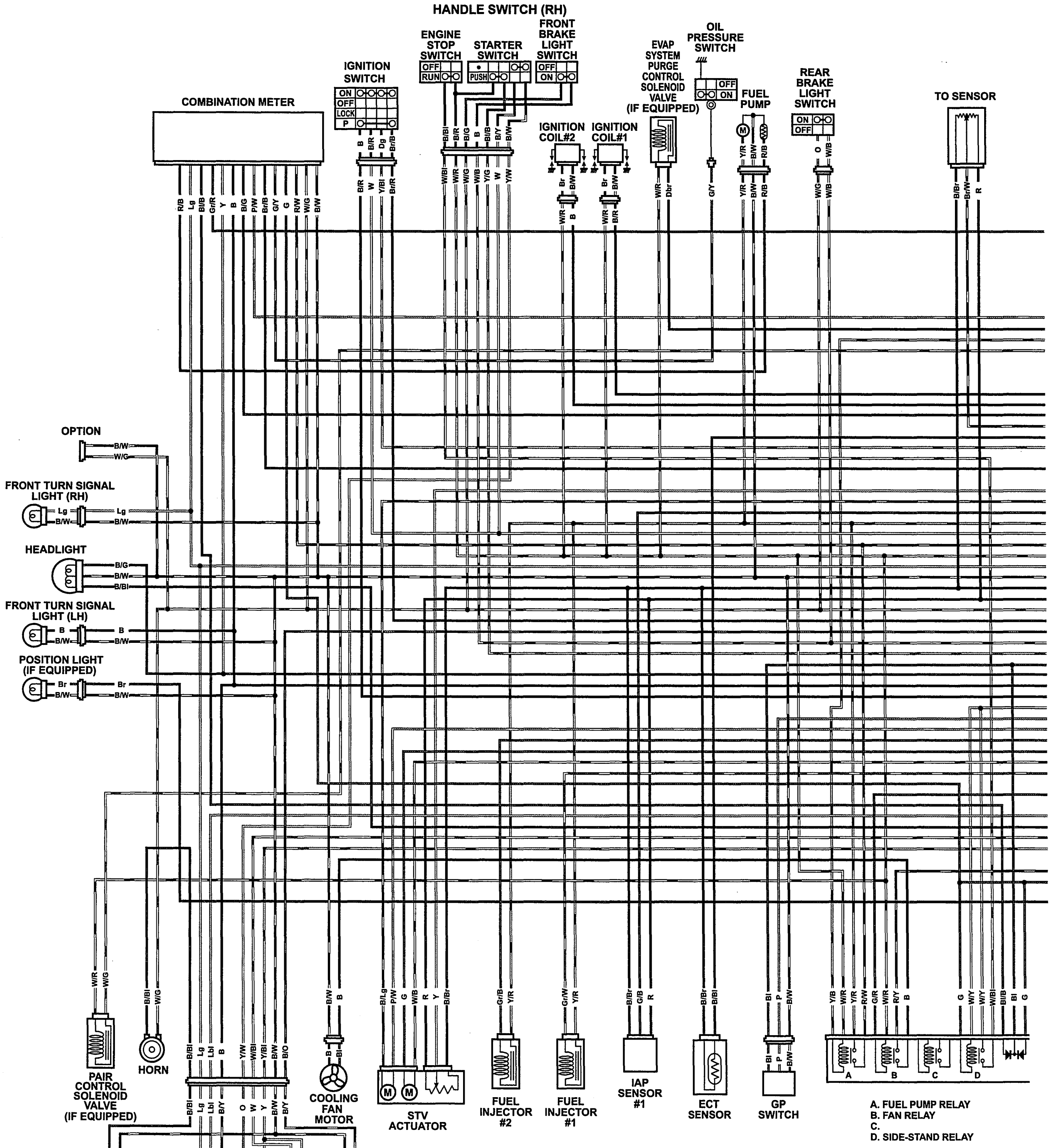

HO2 SENSOR
ECM
ABS CONTROL UNIT
FRONT WHEEL SPEED SENSOR
REAR WHEEL SPEED SENSOR
LICENSE PLATE LIGHT
REAR TURN SIGNAL LIGHT (RH)
REAR COMBINATION LIGHT
REAR TURN SIGNAL LIGHT (LH)
FUSE BOX
1.
2. IGNITION 15 A
3. SIGNAL 15 A
4.
5.
7. HEADLIGHT(LO) 10 A
8. HEADLIGHT(HI) 10 A
9. FAN 15 A
10. FUEL 10 A
SIDE-STAND SWITCH
FREE
PUSH
CKP SENSOR
REGULATOR/ RECTIFIER
STARTER MOTOR
1. MAIN FUSE 30 A
STARTER REALY
12 V
BATTERY
TURN SIGNAL RELAY
IAP SENSOR #2
IAT SENSOR
TP SENSOR

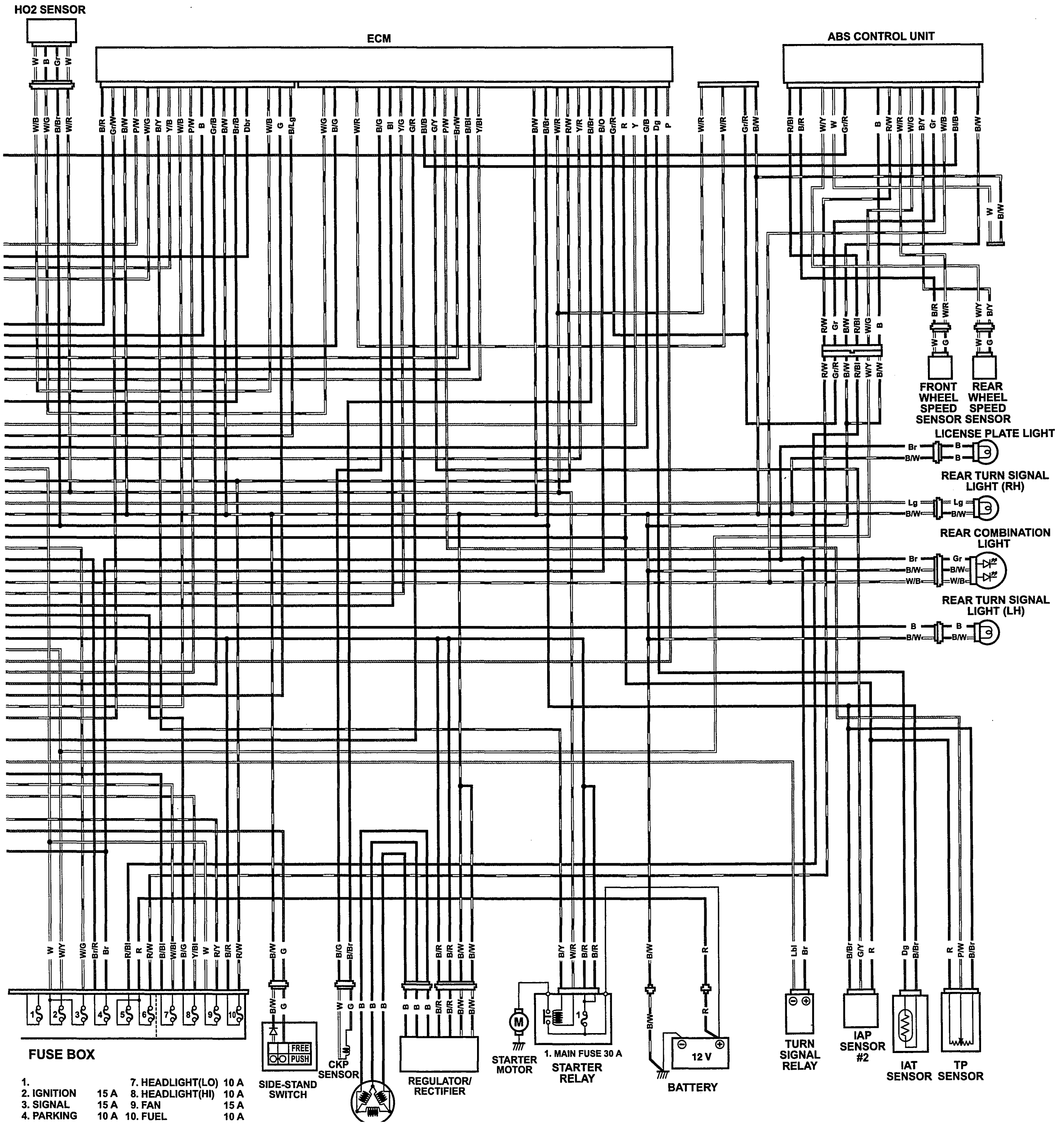

HANDLE SWITCH (RH)
ENGINE STOP SWITCH
STARTER SWITCH
FRONT BRAKE LIGHT SWITCH
IGNITION SWITCH
COMBINATION METER
EVAP SYSTEM PURGE CONTROL SOLENOID VALVE (IF EQUIPPED)
OIL PRESSURE SWITCH
FUEL PUMP
IGNITION COIL#2
IGNITION COIL#1
REAR BRAKE LIGHT SWITCH
TO SENSOR
FRONT TURN SIGNAL LIGHT (RH)
HEADLIGHT
FRONT TURN SIGNAL LIGHT (LH)
POSITION LIGHT (IF EQUIPPED)
PAIR CONTROL SOLENOID VALVE (IF EQUIPPED)
HORN
COOLING FAN MOTOR
STV ACTUATOR
FUEL INJECTOR #2
FUEL INJECTOR #1
IAP SENSOR #1
ECT SENSOR
GP SWITCH
A. FUEL PUMP RELAY
B. FAN RELAY
C.
D. SIDE-STAND RELAY


HO2 SENSOR
ECM
ABS CONTROL UNIT
FRONT WHEEL SPEED SENSOR
REAR WHEEL SPEED SENSOR
LICENSE PLATE LIGHT
REAR TURN SIGNAL LIGHT (RH)
REAR COMBINATION LIGHT
REAR TURN SIGNAL LIGHT (LH)
FUSE BOX
FREE
PUSH
SIDE-STAND SWITCH
CKP SENSOR
REGULATOR/ RECTIFIER
STARTER MOTOR
1. MAIN FUSE 30 A
STARTER RELAY
12 V
BATTERY
TURN SIGNAL RELAY
IAP SENSOR #2
IAT SENSOR
TP SENSOR
1.
2. IGNITION 15 A
3. SIGNAL 15 A
4. PARKING 10 A
5. ABS VALVE 15 A
7. HEADLIGHT(LO) 10 A
8. HEADLIGHT(HI) 10 A
9. FAN 15 A
10. FUEL 10 A

Wiring Diagram (SV650XA)

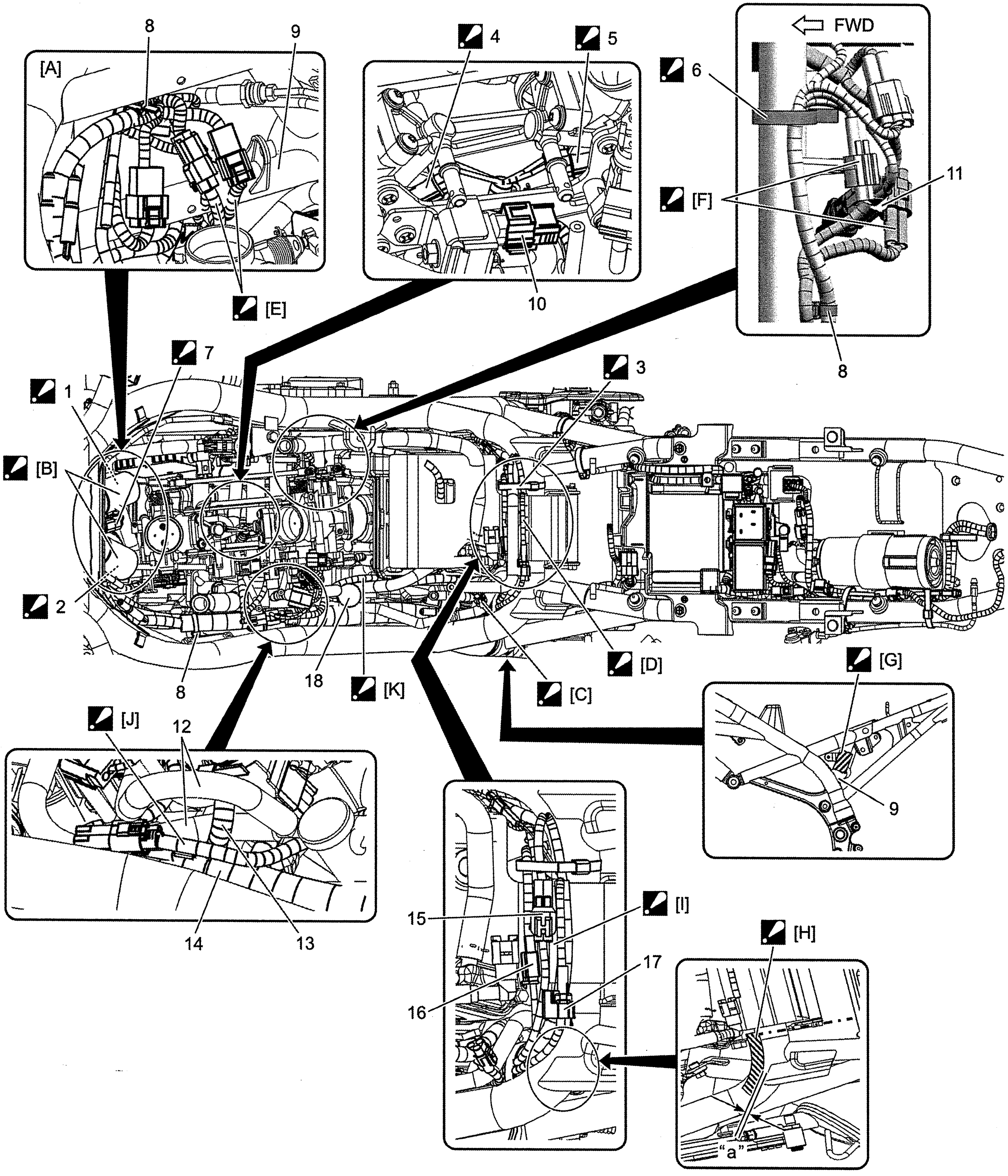
BENJ18K69102003




HO2 SENSOR
ECM
ABS CONTROL UNIT
FRONT WHEEL SPEED SENSOR
REAR WHEEL SPEED SENSOR
LICENSE PLATE LIGHT
REAR TURN SIGNAL LIGHT (RH)
REAR COMBINATION LIGHT
REAR TURN SIGNAL LIGHT (LH)
FUSE BOX
1.
2. IGNITION 15 A
3. SIGNAL 15 A
4. PARKING 10 A
7. HEADLIGHT(LO) 10 A
8. HEADLIGHT(HI) 10 A
9. FAN 15 A
10. FUEL 10 A
SIDE-STAND SWITCH
FREE
PUSH
CKP SENSOR
REGULATOR/ RECTIFIER
STARTER MOTOR
1. MAIN FUSE 30 A
STARTER RELAY
12 V
BATTERY
TURN SIGNAL RELAY
IAP SENSOR #2
IAT SENSOR
TP SENSOR

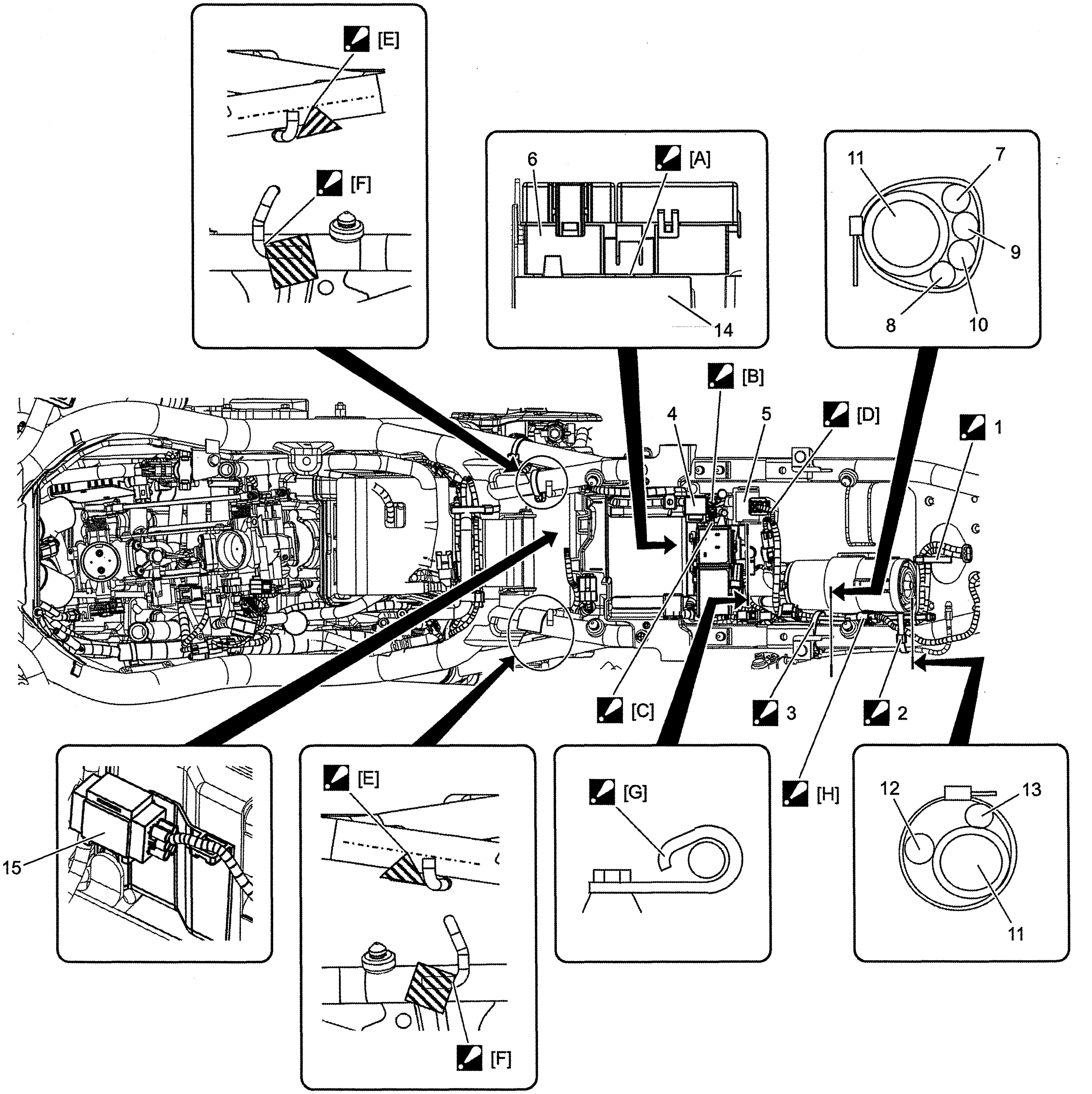
Wiring Harness Routing Diagram

BENJ18K69102004

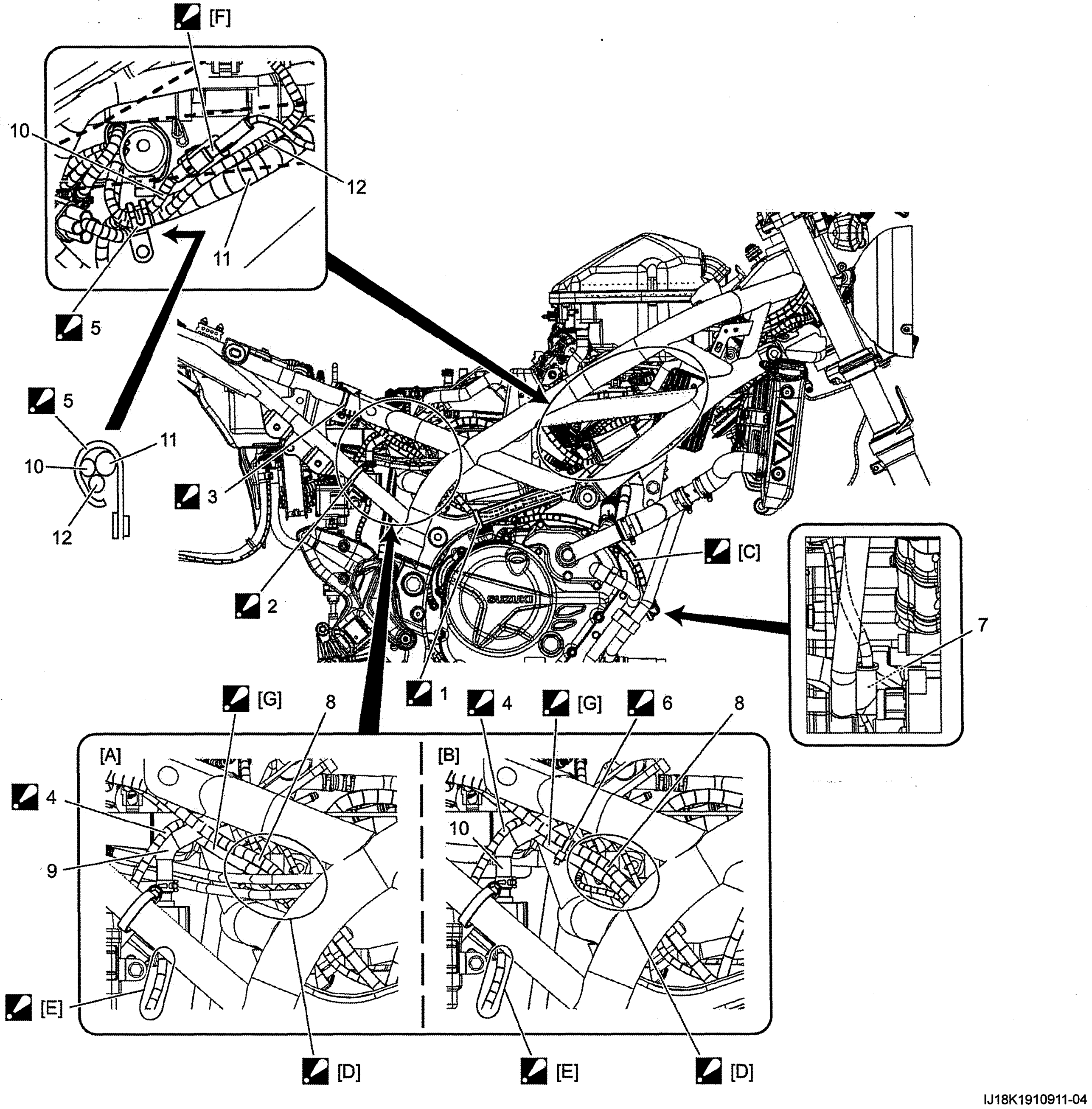


IH18K1910919-03

[A]:	Figure of connector covers non display.	5.	Fuel injector #2 coupler : The coupler color is gray.
[B]:	After connecting of the handle switch couplers, install the connector cover. The cover opening must be below the horizontal plane and must point to the back of the vehicle.	6.	Clamp : Clamp the wiring harness (ignition coil, ECT sensor, PAIR control solenoid valve (If equipped), generator and regulator/rectifier). Do not touch the throttle body. Clamp end should face downward. Face the tip of clamp backward.
[C]:	Pass the fuel pump lead wire inside of the main harness.	7.	Ignition switch coupler : The coupler color is green.
[D]:	Connect the lead wires on the heat shield and clamp them not to contact the fuel tank.	8.	Fixed clamp
[E]:	Pass the ignition switch lead wire and right handle switch lead wire under the frame bridge.	9.	Frame bridge
[F]:	Pass the generator coupler under the ECT sensor. Pass the CKP sensor coupler over the ECT sensor.	10.	EVAP system purge control solenoid valve coupler (If equipped)
[G]:	With the frame bridge as the base point, stick the wiring harness protector within a gap of 5 mm (0.19 in).	11.	ECT sensor coupler
[H]:	With the fuel tank bracket as the base point, stick the wiring harness protector.	12.	Fuel feed hose
[I]:	Connect the lead wires on the frame bridge and offset them not to pile up the couplers as shown in the illustration.	13.	Wiring harness
[J]:	Pass the GP switch lead wire outside of the wiring harness between the fuel feed hose and main harness.	14.	Main harness
[K]:	Pass the GP switch lead wire inside of the reservoir tank.	15.	HO2 sensor coupler
1.	Right handle switch coupler : The coupler color is black.	16.	Rear brake light switch coupler
2.	Left handle switch coupler : The coupler color is yellow. Pass the left handle switch lead wire over the clutch cable and under the throttle cables.	17.	Side-stand switch coupler
3.	Clamp : Clamp the wiring harness (battery (–) lead wire, oil pressure switch lead wire, HO2 sensor lead wire, ignition coil #2 lead wire and rear brake light switch lead wire). Clamp end should face upward. Face the tip of clamp forward. Clamp the branch lead wire for HO2 sensor by turning it down.	18.	Reservoir tank
4.	Fuel injector #1 coupler : The coupler color is brown.	"a":	10 – 15 mm (0.40 – 0.59 in)


[E]
[F]
6
[A]
14
11
7
9
8
10
[B]
4
5
[D]
1
[C]
3
2
[H]
15
[E]
[F]
[G]
12
13
11
IH18K1910920-03

[A]: There must be a clearance of 0 – 5 mm (0 – 0.19 in) within between the battery holder and fuse box.	5. Starter relay
[B]: Put the alarm coupler and mode select coupler (2P) (With ABS) between the starter motor relay and turn signal relay.	6. Fuse box
[C]: Pass the wiring harness under the fuse box.	7. Wiring harness (Rear combination light lead wire)
[D]: Set the starter relay bare wire behind starter relay.	8. Wiring harness (License plate light lead wire)
[E]: Fit the edge of the wiring harness protector to center of the frame and stick it.	9. Wiring harness (Left rear turn signal light lead wire)
[F]: Fit the edge of the wiring harness protector to welding of the hook bottom and stick it.	10. Wiring harness (Right rear turn signal light lead wire)
[G]: Bend the clamp so that mode select coupler (2P) lead wire (With ABS) is clamped securely. Bend the clamp so that starter relay lead wire (Without ABS) is clamped securely.	11. Frame
[H]: Set the rear combination light coupler to the inside of the frame.	12. Seat lock cable
1. Clamp : Clamp the license plate light lead wire, left turn signal lead wire and right turn signal lead wire. Clamp end should face upward. Face the tip of clamp backward.	13. Rear combination light lead wire
2. Clamp : Clamp the rear combination light lead wire and seat lock cable behind the reinforce. Clamp end should face upward. Face the tip of clamp inside.	14. Battery holder
3. Clamp : Clamp the wiring harness (rear combination light lead wire, license plate light lead wire, left rear turn signal light lead wire and right rear turn signal light lead wire). Clamp end should face outside. Face the tip of clamp downward.	15. TO sensor
4. Turn signal relay	



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[C]
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[G]
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[G]
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[E]
[D]
[E]
[D]
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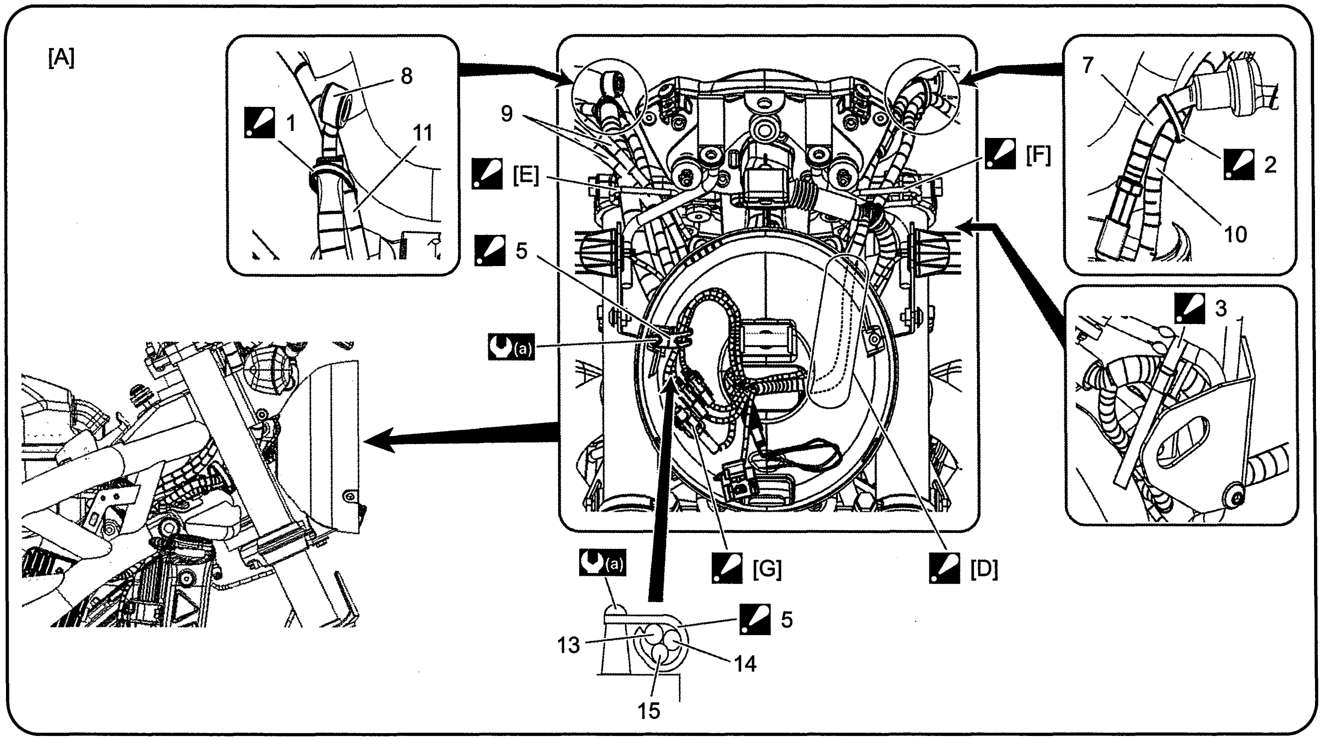
[A]: With ABS	4. Rear brake light switch lead wire : Pass the rear brake light switch lead wire inside of the battery (–) lead wire.
[B]: Without ABS	5. Clamp : Clamp the ignition coil #2 lead wire, PAIR control solenoid valve lead wire (If equipped) and regulator/rectifier lead wire. Do not slacken the ignition coil #2 lead wire. Bend the clamp outside and clamp it. Do not touch the clamp to the ignition coil. Do not clamp the bare wire.
[C]: Pass the starter motor lead wire under the water hose and PCV hose.	6. Clamp : Clamp the battery (–) lead wire and starter motor lead wire. Clamp end should face outside. Cut off the excess of the clamp.
[D]: Route each lead wire not to come apart.	7. Starter motor lead wire
[E]: Do not slacken the rear brake light switch lead wire in this area.	8. Battery (–) lead wire
[F]: After connecting the coupler, set the ignition coil #2 coupler inside of frame.	9. Fuel tank breather hose
[G]: Pass the starter motor lead wire inside of the fuel tank breather hose.	10. Ignition coil #2 lead wire
1. Clamp : Clamp the ignition coil #1 lead wire, starter motor lead wire and oil pressure switch lead wire. Clamp the clamp at the vertical position in the middle of the two clutch cover bolts. Clamp end should face inside. Face the tip of clamp downward.	11. Regulator/rectifier lead wire
2. Clamp : Clamp the rear brake light switch lead wire. Pass the rear brake light switch lead wire outside of the rear brake reservoir tank. Clamp end should face inside.	12. PAIR control solenoid valve branch lead wire (If equipped)
3. Clamp : Clamp the battery (–) lead wire and frame. Clamp end should face outside. Face the tip of clamp downward.	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[D]
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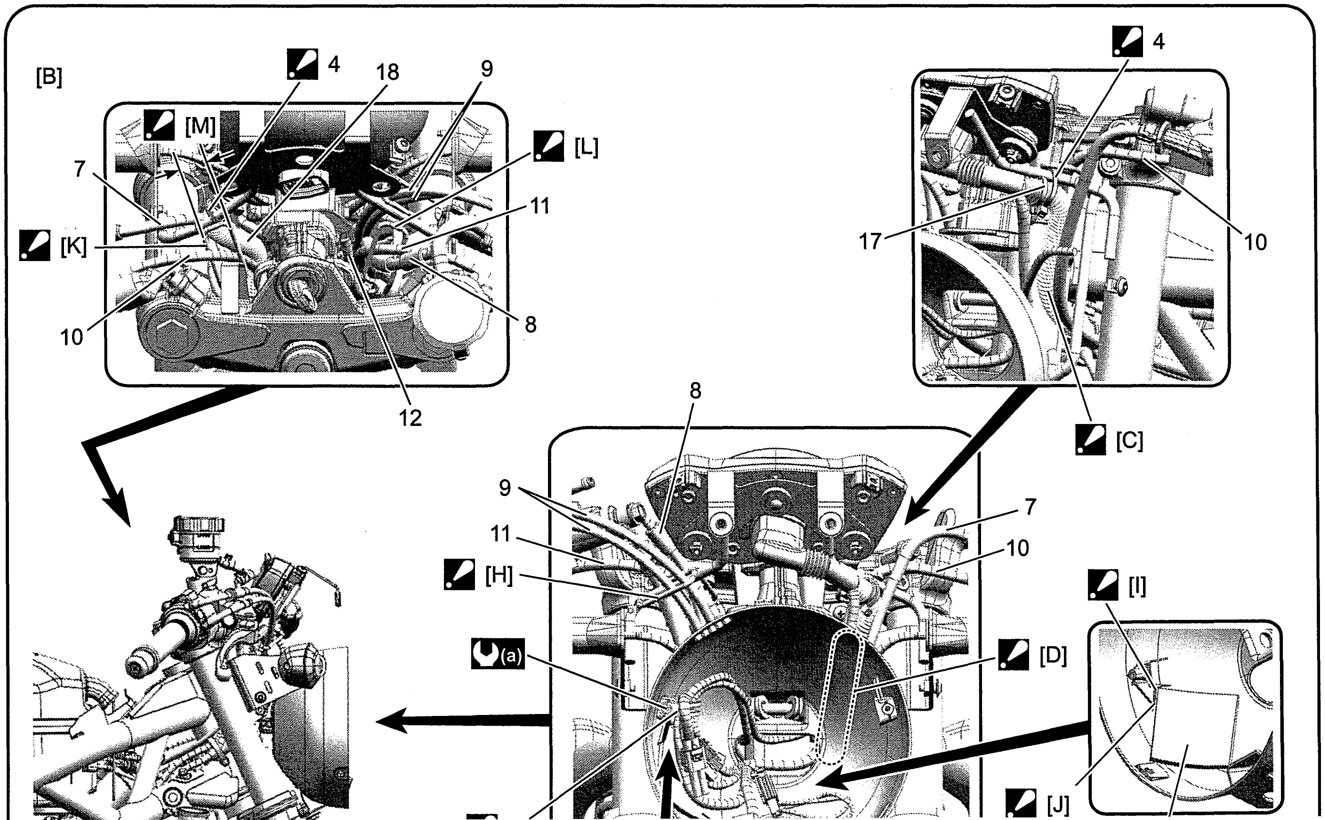
(a)


[B]
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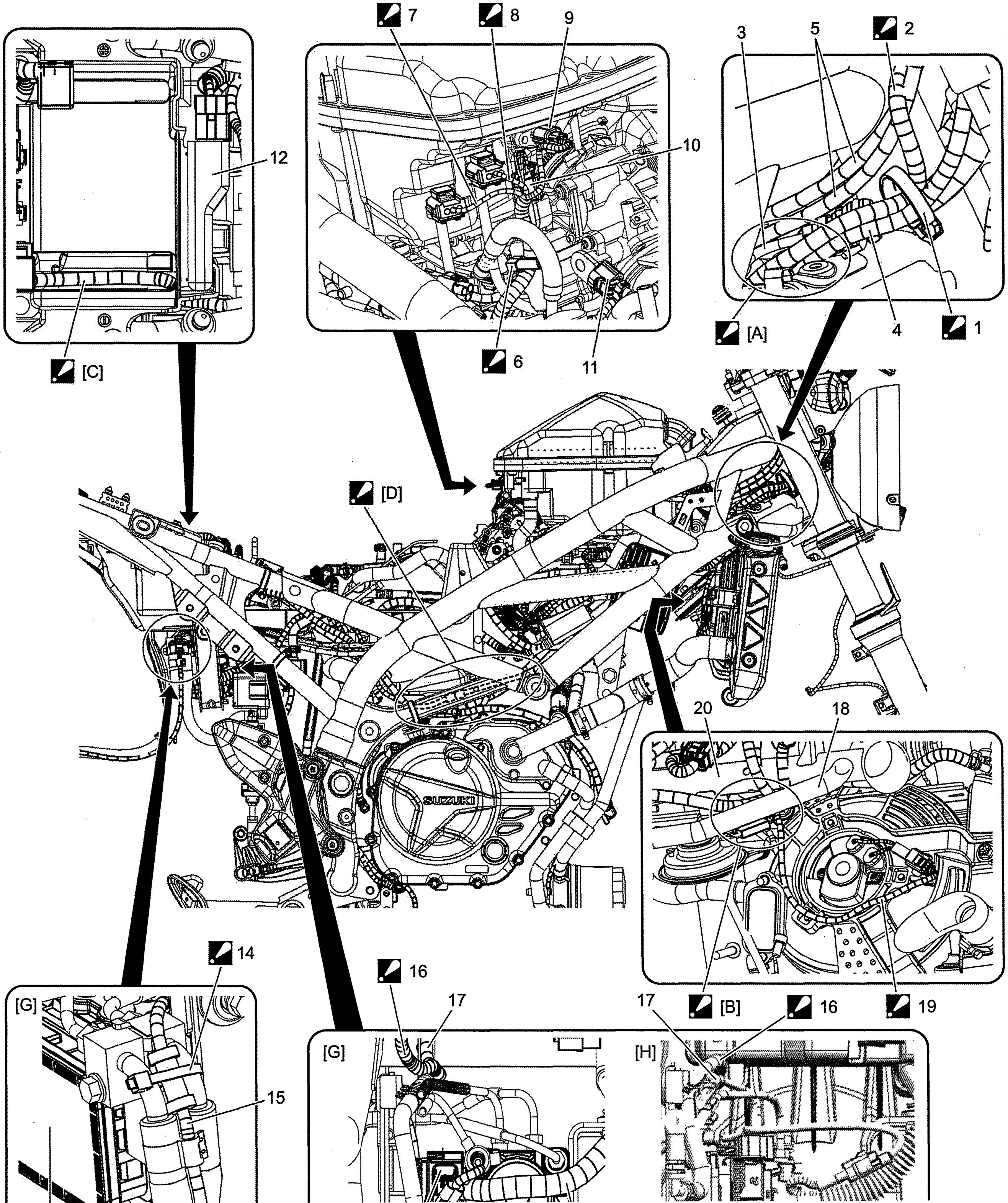
[C]
[D]
[H]
[I]
[J]
[K]
[L]
[M]
(a)

[A]:	SV650/A	4.	Clamp : Clamp the wiring harness and headlight brace. Set the clamp within 0 – 10 mm (0 – 0.39 in) from the rear side of the fixed clamp. Face the locked part of clamp downward. Cut off the tip of the clamp leaving 0 – 3 mm (0 – 0.1 in)
[B]:	SV650XA	5.	Clamp : After connecting the couplers, clamp the left turn signal light lead wire, right turn signal light lead wire and speed sensor lead wire (Without ABS) or option lead wire (SV650XA). Bend the clamp to inside and clamp it. Do not clamp bare wire.
[C]:	Pass the wiring harness inside of the guide.	6.	Cushion : Clean the adhesive surface before sticking the cushion. Press the cushion after sticking it.
[D]:	Pass the wiring harness in front of the headlight brace.	7.	Clutch cable
[E]:	Pass the front brake hose and throttle cables into the guide. Pass the right handle switch lead wire inside of the front brake hose.	8.	Front brake hose
[F]:	Pass the clutch cable into the guide. Pass the left handle switch lead wire outside of the clutch cable.	9.	Throttle cable
[G]:	Connect the speed sensor coupler in the headlight cover. (Without ABS)	10.	Left handle switch lead wire
[H]:	Pass the throttle cables into the guide.	11.	Right handle switch lead wire
[I]:	Match the edge of cushion to the edge of headlight cover rib. Stick the cushion from the rib within 5 mm (0.2 in).	12.	Ignition switch lead wire
[J]:	Stick the cushion aligning with the rib.	13.	Speed sensor lead wire (Without ABS)
[K]:	Pass the left handle switch lead wire into the guide. Pass the left handle switch lead wire inside of the wiring harness.	14.	Left front turn signal light lead wire
[L]:	Pass the front brake hose and right handle switch lead wire into the guide. Pass the right handle switch lead wire inside of the front brake hose.	15.	Right front turn signal light lead wire
[M]:	Set the clamp in this area.	16.	Option lead wire (SV650XA)
1.	Clamp : Clamp the front brake hose and right handle switch lead wire. Clamp the clamp in the dent position of the front brake hose. Face the locked part of clamp backward. Cut off the excess of the clamp.	17.	Fixed clamp
2.	Clamp : Clamp the clutch cable and left handle switch lead wire. Fasten the clamp at the top of circumference part of the clutch cable. Face the locked part of clamp backward. Cut off the excess of the clamp.	18.	Wiring harness
3.	Clamp : Clamp the headlight brace and wiring harness. Locate and fasten the clamp between the punched portion of the headlight brace and wiring harness clamp. Face the locked part of clamp forward. Face the tip of clamp downward.	(a) :	1.0 N·m (0.10 kgf-m, 0.75 lbf-ft)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[C]
[D]
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[B]
19
16
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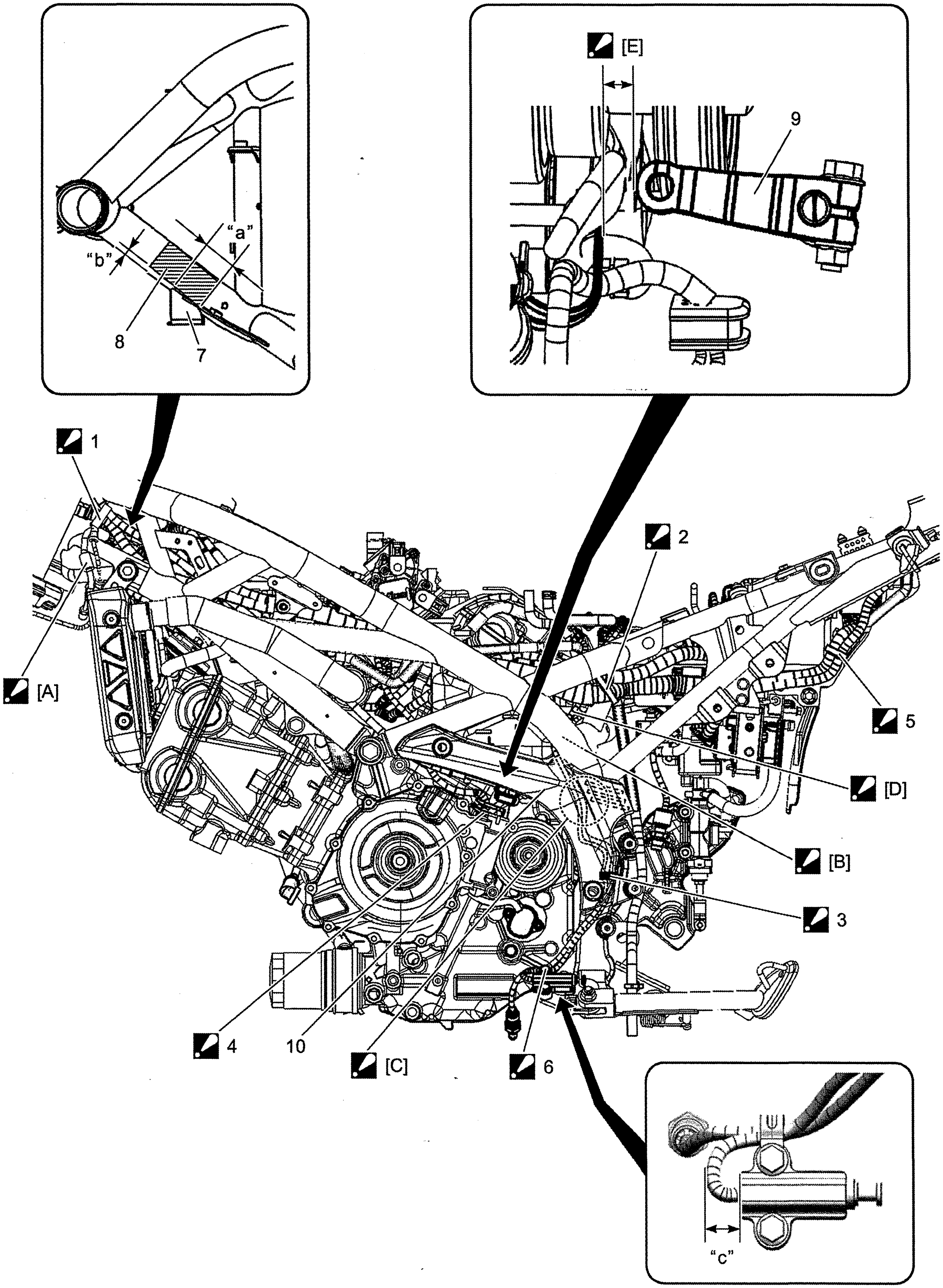
15
[G]
[H]
SUZUKI

[A]:	Pass the ignition switch lead wire and right handle switch lead wire under the front brake hose. (With ABS)	7.	IAP sensor #1 lead wire : The lead wire with tube.
[B]:	Pass the cooling fan motor lead wire and horn lead wire between the PAIR hose (If equipped) and frame.	8.	IAP sensor #2 lead wire : The lead wire is bare wire.
[C]:	Before installing the battery, pass the starter motor lead wire under the battery.	9.	IAT sensor coupler
[D]:	After connecting the coupler, set the ignition coil #1 coupler inside of frame. Do not slacken the ignition coil #1 lead wire.	10.	STP sensor coupler
[E]:	Pass the ABS control unit/HU lead wire under the brake pipes. (With ABS)	11.	TP sensor coupler
[F]:	Do not connect the ABS control unit/HU coupler diagonally.	12.	ECM
[G]:	L7 – L8 model	13.	ABS control unit/HU (With ABS)
[H]:	L9 – model	14.	Clamp : Clamp the rear wheel speed sensor lead wire and rear brake hoses. Face the tip of clamp backward. Cut off the excess of the clamp.
1.	Clamp : Clamp the ignition switch lead wire, right handle switch lead wire and front brake hose (With ABS) at the gray tape and blue tape position. Clamp end should face downward. Cut off the excess of the clamp.	15.	Rear wheel speed sensor lead wire (With ABS)
2.	Ignition switch lead wire : Pass the ignition switch lead wire outside of the throttle cables.	16.	Starter motor lead wire : Pass the starter motor lead wire inside of surge hose No. 2 (If equipped).
3.	Front brake hose (With ABS)	17.	Surge hose No. 2 (If equipped)
4.	Right handle switch lead wire	18.	PAIR hose (If equipped)
5.	Throttle cable	19.	Cooling fan motor lead wire : Do not pull the cooling fan motor lead wire but keep it loose.
6.	Clamp : Clamp the STVA and wiring harness at the taping position. Clamp end should face outside. Face the tip of clamp backward.	20.	Frame



[E]
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"a"
"b"
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[A]
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[D]
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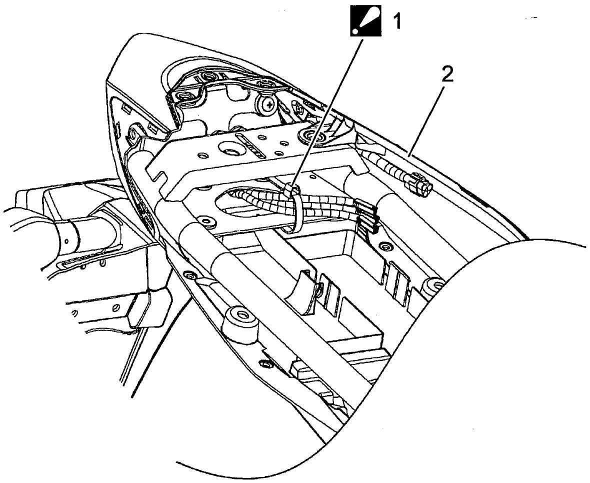
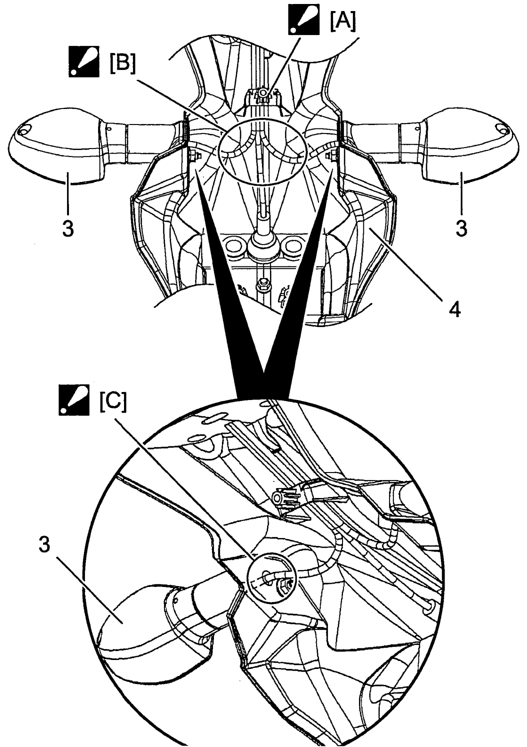
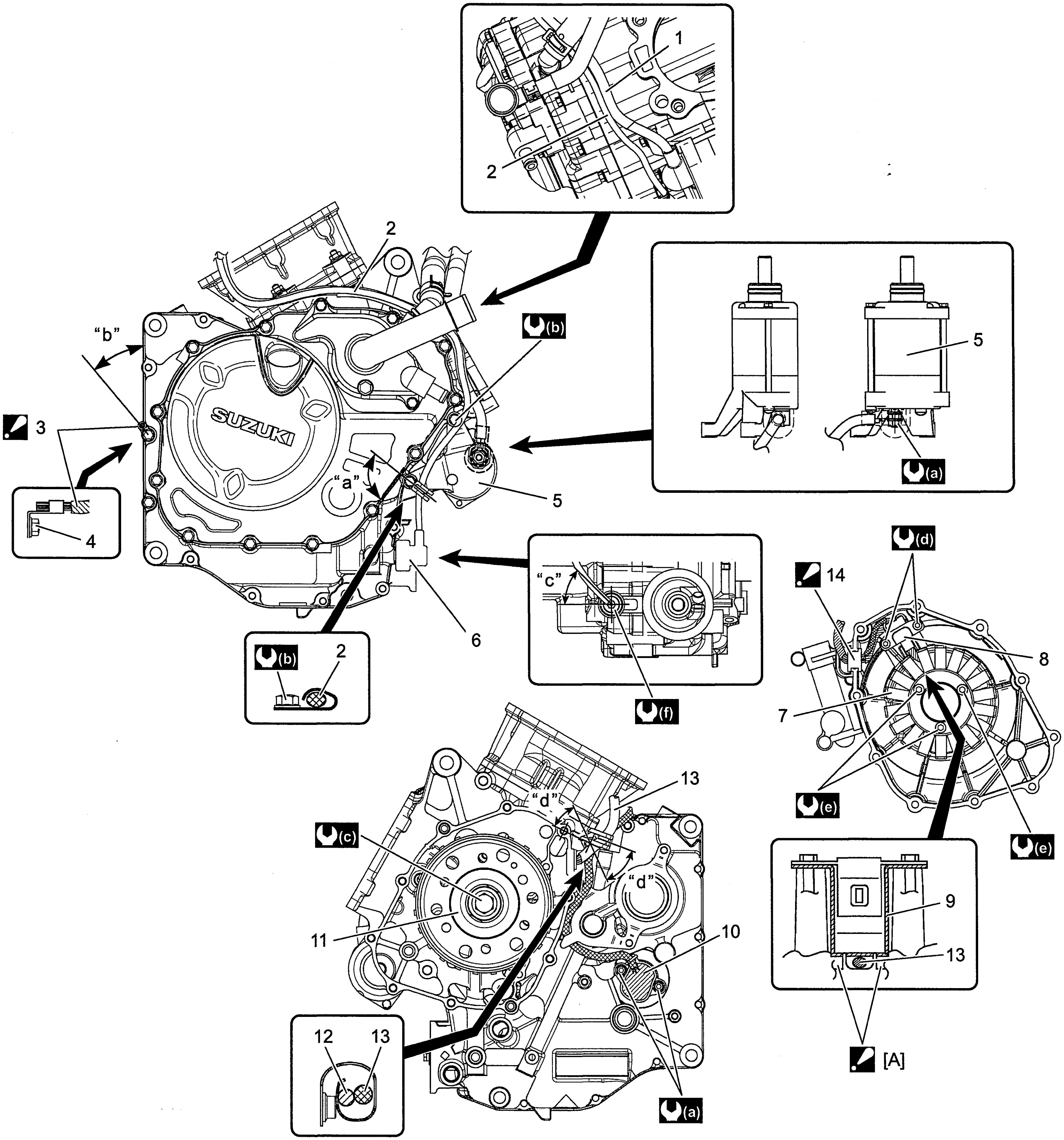
[C]
6
"c"

[A]: Pass the front wheel speed sensor lead wire (With ABS) over the throttle cables and under the clutch cable. Put the front wheel speed sensor coupler (With ABS) into the frame, after connecting the front wheel speed sensor coupler (With ABS) outside of the frame.	5. Clamp : Clamp the fuse box lead wire and rear combination light lead wire. Cut off the excess tip of the clamp. Clamp the lead wires as the fuse box doesn't come loose.
[B]: Pass the side-stand switch lead wire and HO2 sensor lead wire to the inside of the frame.	6. Clamp : Clamp the HO2 sensor lead wire and side-stand switch lead wire. Do not touch the gearshift holder with the clamp.
[C]: Pass the side-stand switch lead wire and HO2 sensor lead wire by avoiding the rib of inside of frame lower cover.	7. Radiator
[D]: Pass the side-stand switch lead wire and HO2 sensor lead wire inside of the main harness. Pass the side-stand switch lead wire and HO2 sensor lead wire outside of the reservoir tank bracket.	8. Wiring harness protector
[E]: Bend the clamp securely. There must be a clearance of 10 mm (0.4 in) or more between the clutch release arm and the clamp when the clutch grasp.	9. Clutch release arm
1. Clamp : Clamp the main harness and left handle switch lead wire. Clamp the main harness at the taping position. Set the left handle switch lead wire to the inside of the main harness. Clamp end should face inside. Cut off the excess tip of the clamp.	10. Frame lower cover
2. Clamp : Clamp the main harness, ECM lead wire, ignition coil lead wire, side-stand switch lead wire and HO2 sensor lead wire. For L7 – L8 model, face the tip of clamp upward. For L7 – L8 model, clamp end should face inside. For L9 – model, face the tip of clamp to right side. For L9 – model, clamp end should face upward.	"a": 15 – 25 mm (0.60 – 0.98 in)
3. Clamp : Clamp the side-stand switch lead wire and HO2 sensor lead wire.	"b": 5 – 15 mm (0.20 – 0.59 in)
4. Clamp : Clamp the generator lead wire and GP switch lead wire.	"c": Max. 20 mm (0.78 in)







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[A]:	Pass the generator lead wire between the ribs of the generator cover. Do not pinch the generator lead wire between the ribs and generator lead wire clamp.	13.	Generator lead wire
1.	Starter motor lead wire	14.	Grommet : Install the grommet to the generator cover.
2.	Oil pressure switch lead wire	"a":	70° – 110°
3.	Battery (–) lead wire : The crimped portion of the battery (–) lead wire must face upward, and the lead wire must not sit on the crankcase.	"b":	Max. 60°
4.	Crankcase bolt	"c":	35° – 55°
5.	Starter motor	"d":	30° – 50°
6.	Oil pressure switch	(a) :	6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)
7.	Generator stator	(b) :	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
8.	CKP sensor	(c) :	140 N·m (14.3 kgf-m, 103.5 lbf-ft)
9.	Generator lead wire clamp	(d) :	6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)
10.	Gear position switch	(e) :	11 N·m (1.1 kgf-m, 8.5 lbf-ft)
11.	Generator rotor	(f) :	13 N·m (1.3 kgf-m, 9.5 lbf-ft)
12.	Gear position switch lead wire		

Component Location

Electrical Components Location

BENJ18K69103001

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

Specifications

Tightening Torque Specifications

BENJ18K6910S001

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Wiring Harness Routing Diagram" (Page 9A-15)
"Fasteners Information" in Section 0C (Page 0C-11)

Lighting Systems

Precautions

Precautions for Lighting Systems

BENJ18K69200001

NOTICE

- **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.**
- **Do not use the bulb of a wattage other than specification.**

Diagnostic Information and Procedures

Headlight Symptom Diagnosis

BENJ18K69204001

Condition	Possible cause	Correction / Reference Item
Low beam does not light up	Circuit fuse blown.	*Replace fuse and check short circuit.*
	Bulb blown.	*Replace bulb. ☞(Page 9B-4)*
	Faulty wiring or ground.	*Repair wiring.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Faulty dimmer switch.	*Check dimmer switch. ☞(Page 9B-16)*
High beam does not light up	Circuit fuse blown.	*Replace fuse and check short circuit.*
	Bulb blown.	*Replace bulb. ☞(Page 9B-4)*
	Faulty wiring or ground.	*Repair wiring.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Faulty dimmer switch.	*Check dimmer switch. ☞(Page 9B-16)*
	Faulty passing switch.	*Check passing switch. ☞(Page 9B-15)*

Turn Signal Light and Hazard Light (If Equipped) Symptom Diagnosis

BENJ18K69204002

Condition	Possible cause	Correction / Reference Item
Flash rate high or one side only flashes	Bulb blown.	*Replace bulb. ☞(Page 9B-14)*
	Incorrect bulb.	*Replace bulb. ☞(Page 9B-14)*
	Faulty turn signal relay.	*Check turn signal relay. ☞(Page 9B-14)*
	Open circuit or high resistance existing either; between turn signal switch and non lighting bulb, or between hazard switch and non lighting bulb. (If equipped)	*Repair wiring.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Faulty hazard switch. (If equipped)	*Check hazard switch. ☞(Page 9B-15)*
Flash rate low	Supply voltage low or high resistance.	*Check charging system. ☞(Page 1J-4)* *Repair wiring.*

Rear Combination Light Symptom Diagnosis

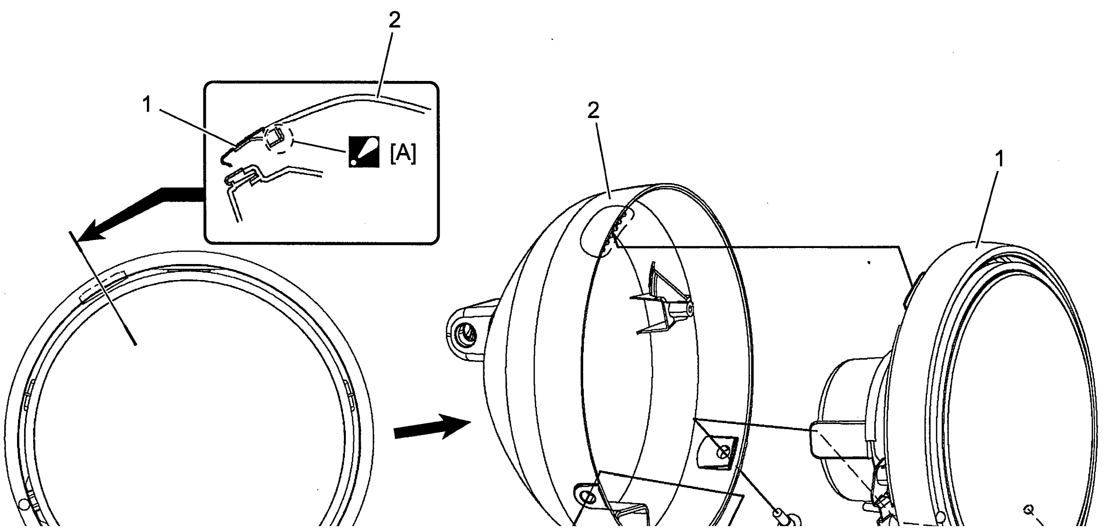
BENJ18K69204003

Condition	Possible cause	Correction / Reference Item
All lights do not light up	Faulty wiring or grounding.	*Repair wiring.* • *SV650/A: ☞(Page 9A-5)* *☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
Some lights do not light up	Bulbs (LED) blown.	*Replace rear combination light assembly and check short circuit. ☞(Page 9B-7)*
	Faulty wiring or grounding.	*Repair wiring.* • *SV650/A: ☞(Page 9A-5)* *☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
Brake light do not light up	Faulty front brake light switch.	*Check front brake light switch. ☞(Page 4A-24)*
	Faulty rear brake light switch.	*Check rear brake light switch. ☞(Page 4A-24)*
	Faulty wiring or grounding.	*Repair wiring.* • *SV650/A: ☞(Page 9A-5)* *☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Faulty rear combination light bulbs (LED).	*Replace rear combination light assembly.*
Brake light stay on	Faulty front brake light switch.	*Check front brake light switch. ☞(Page 4A-24)*
	Faulty rear brake light switch.	*Check rear brake light switch. ☞(Page 4A-24)*
	Faulty rear combination light bulbs (LED).	*Replace rear combination light assembly. ☞(Page 9B-7)*

Repair Instructions

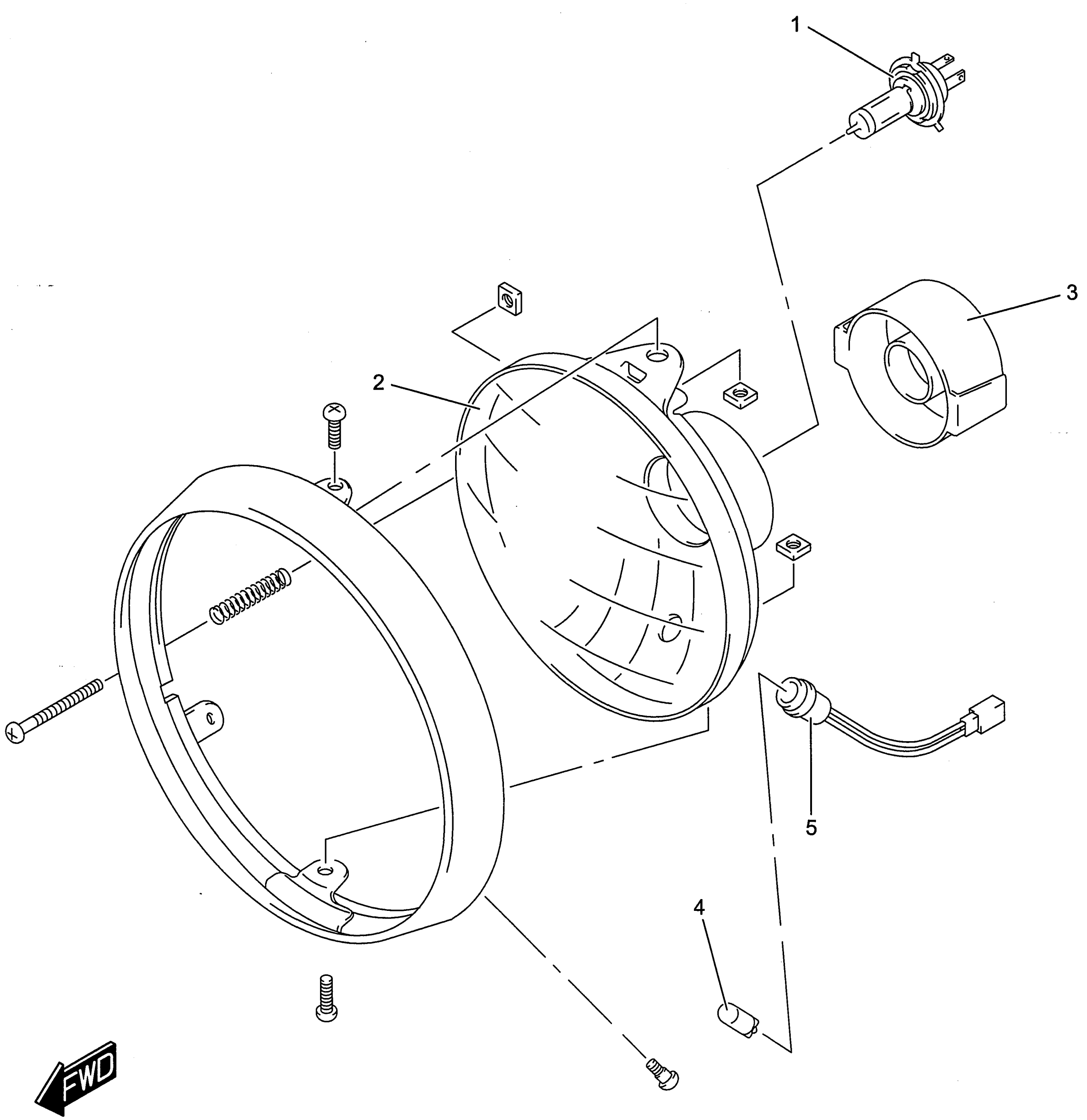
Headlight Construction

BENJ18K69206001



Headlight Components

BENJ18K69206002



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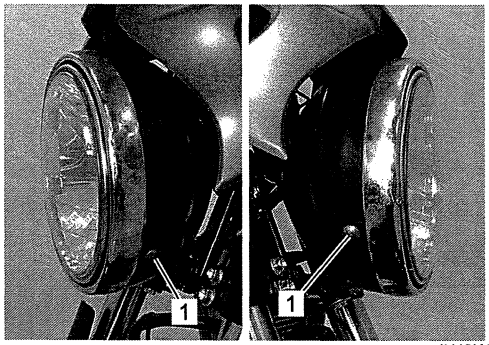
1. Headlight bulb (12 V 60/55 W, H4)	4. Position light bulb (12 V 5 W) (If equipped)
2. Headlight lens	5. Position light socket (If equipped)
3. Bulb socket rubber cap	

Headlight Removal and Installation

BENJ18K69206003

Removal

1) Remove the headlight mounting screws (1).



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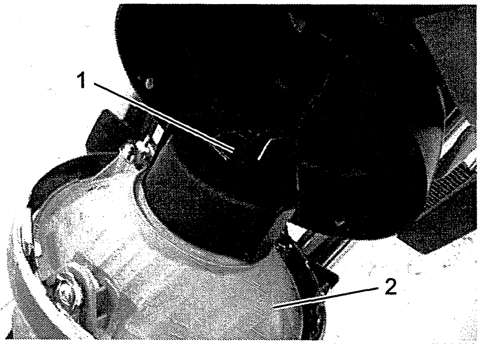
2) Disconnect the headlight coupler (1).
3) Disconnect the position light coupler (If equipped).
4) Remove the headlight assembly (2).



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Installation

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

- Install the headlight assembly. Refer to “Headlight Construction” (Page 9B-2).
- Tighten the headlight mounting screws (1) to the specified torque.

  Tightening torque
  Headlight mounting screw (a): 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)

Headlight Bulb / Position Light Bulb Replacement

BENJ18K69206004

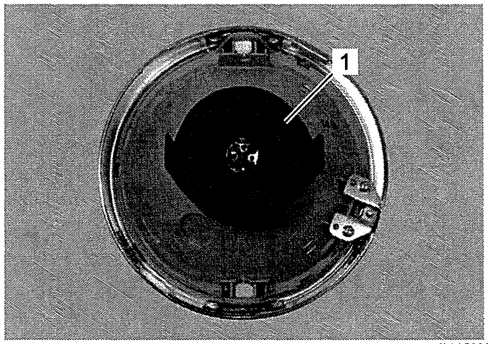
Refer to “Headlight Removal and Installation” (Page 9B-4).

⚠ CAUTION

As the headlight bulb operates at a high temperature, handle the bulb after sufficiently cooled.

Headlight Bulb

1) Remove the bulb socket rubber cap (1).



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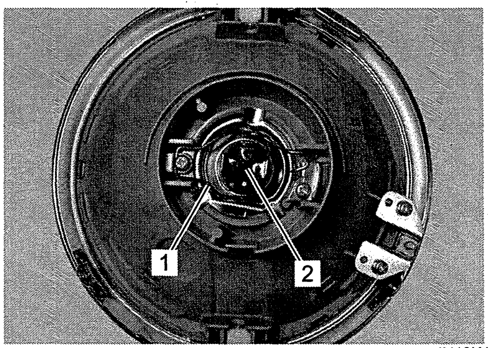
2) Unhook the bulb holder spring (1) and replace the headlight bulb (2) with a new one.



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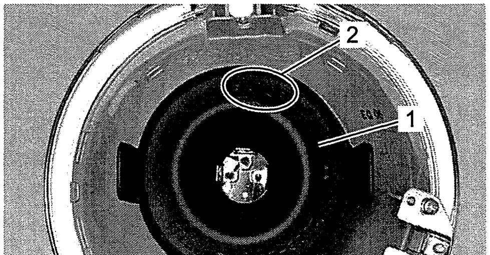
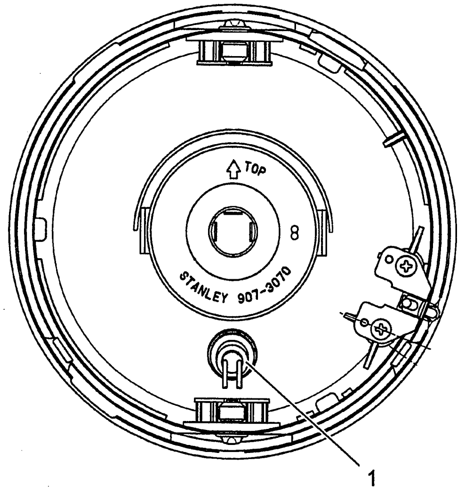
3) When installing the bulb socket rubber cap (1), bring the TOP letters (2) upward.



Position Light (If Equipped)

Remove the position light socket (1) and replace the position light bulb with a new one.



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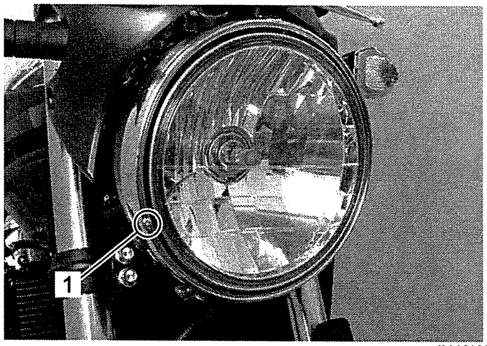
Headlight Beam Adjustment

BENJ18K69206005

1) Turn the screw (1), adjust the headlight beam horizontally.



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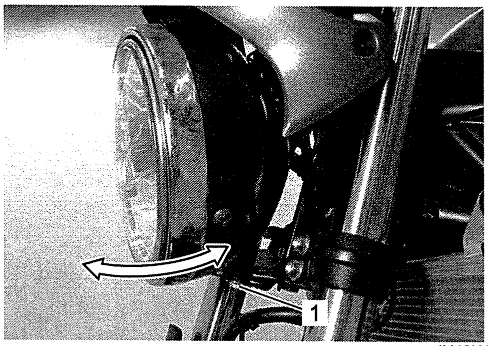
2) Loosen the headlight cover screw (1).
3) Moving the headlight forward or backward, adjust the headlight beam vertically.



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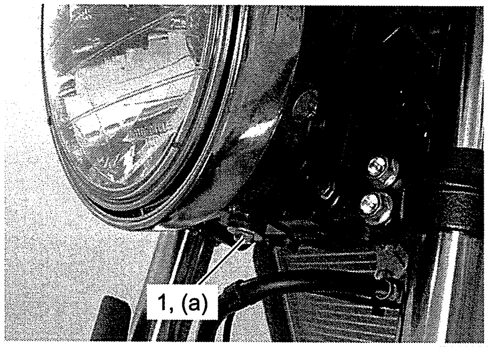
4) Tighten the headlight cover screw (1) to the specified torque.

Tightening torque
Headlight cover screw (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



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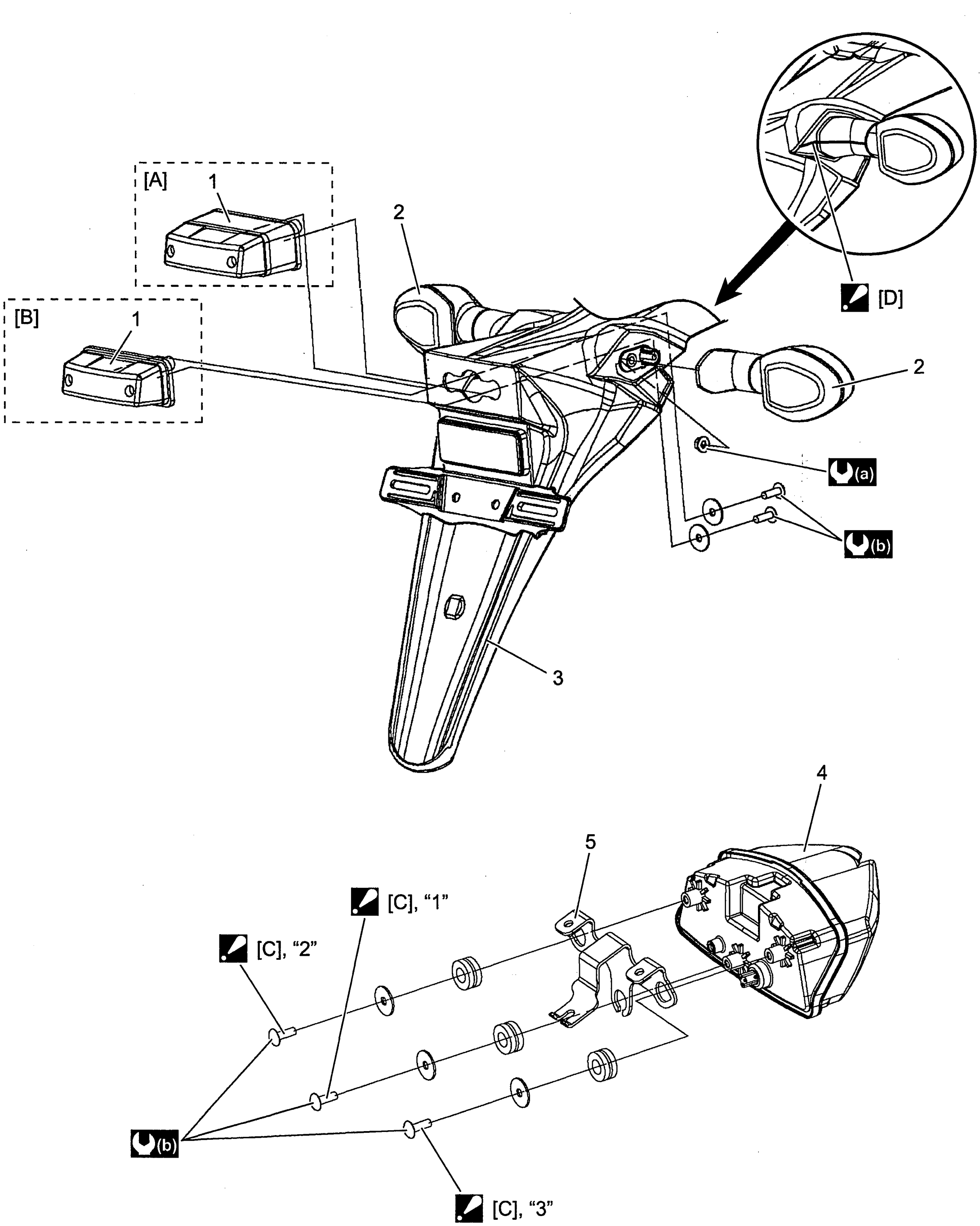
Rear Lighting System Construction

BENJ18K69206006



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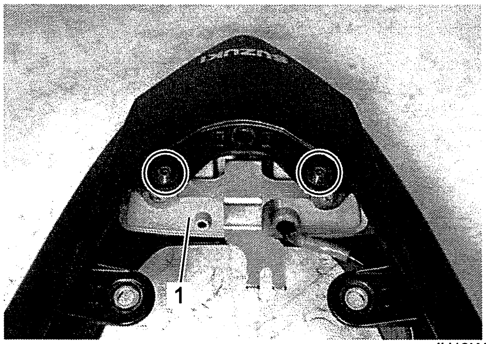
[A]:	For U.S.A., Canada and California state	3.	Rear fender rear
[B]:	Except for U.S.A., Canada and California state	4.	Rear combination light
[C]:	Tighten the screws in order of "1" → "2" → "3".	5.	Rear combination light bracket
[D]:	Set the line of rear turn signal stay under the ruled line of rear fender rear.	(a) :	1.8 N·m (0.18 kgf-m, 1.35 lbf-ft)
1.	License plate light	(b) :	2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)

Rear Combination Light Removal and Installation

BENJ18K69206007

Removal

1) Remove the frame rear covers. ☞(Page 9D-24)
2) Remove the rear combination light (1).



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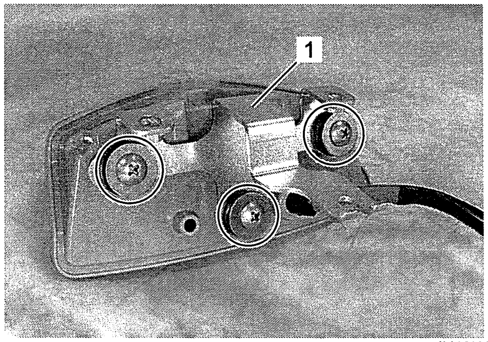
3) Remove the combination light bracket (1).



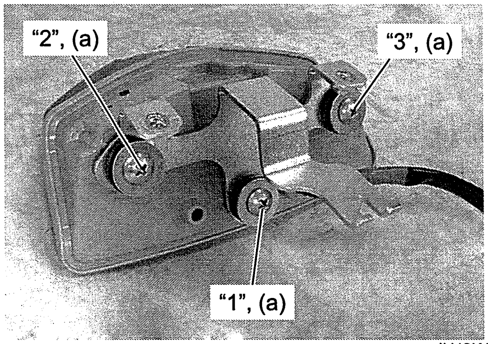
IH18K1920013-03

Installation

Install the rear combination light in the reverse order of removal. Pay attention to the following points:

- Tighten the combination light bracket screws to the specified torque in order of “1” → “2” → “3”.

  Tightening torque
  Rear combination light bracket screw (a): 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)



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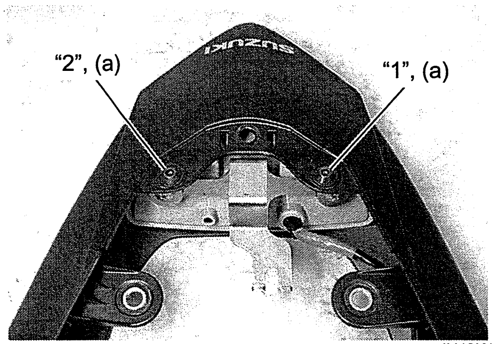
- Tighten the rear combination light screws to the specified torque in order of “1” → “2”.

  Tightening torque
  Rear combination light screw (a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)



IH18K1920015-03

Rear Combination Light LED Replacement

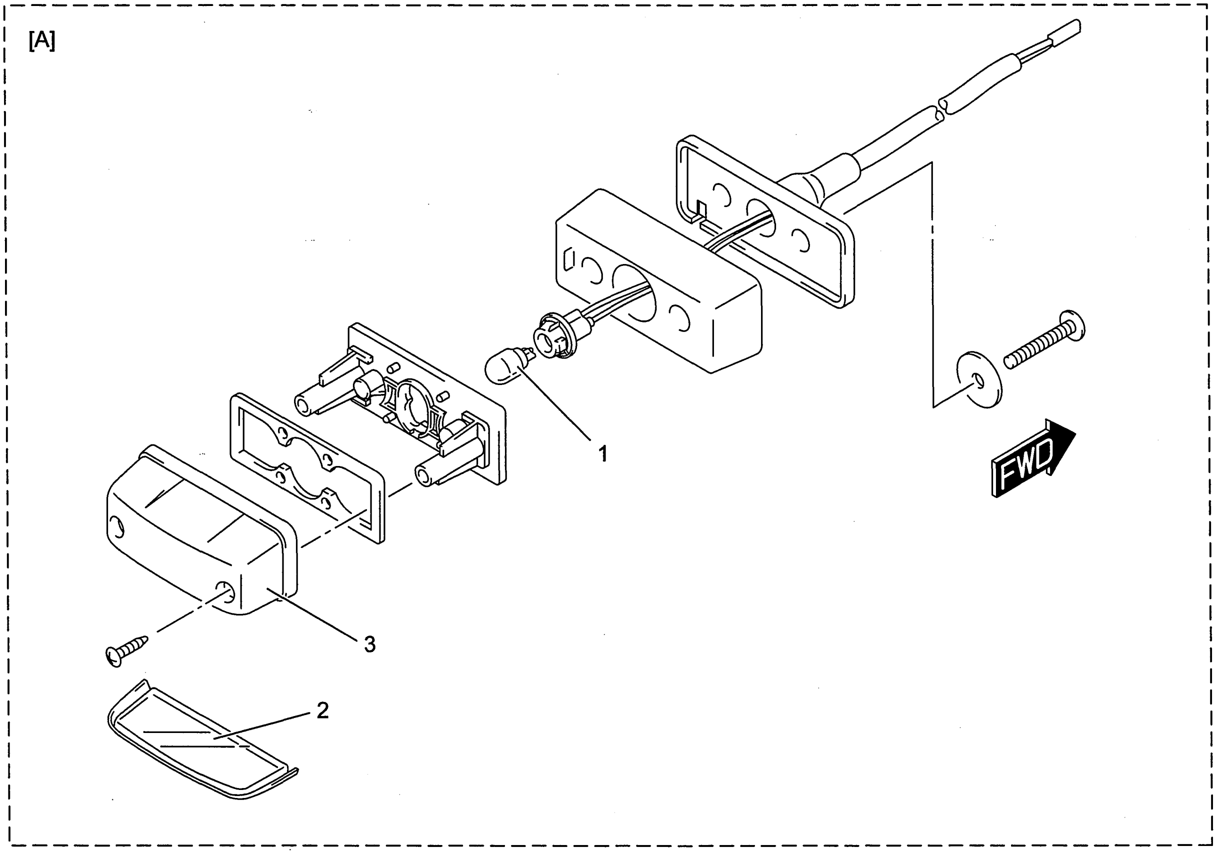
BENJ18K69206008

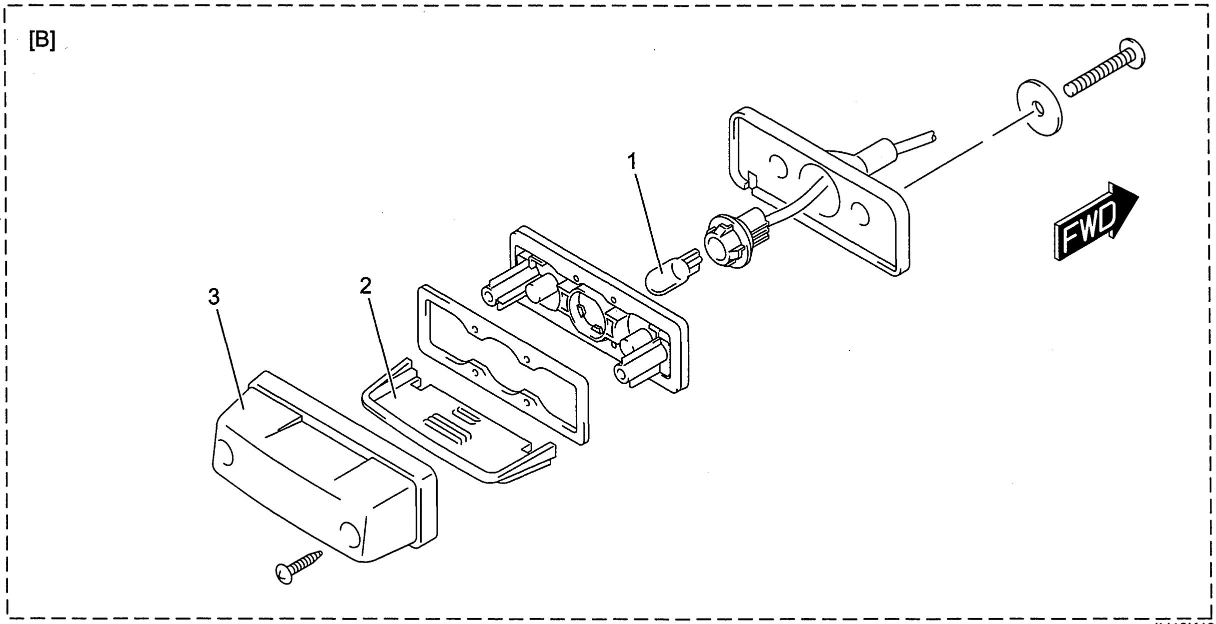
NOTE

If LED operation is abnormal, replace the rear combination light with a new one. ☞(Page 9B-7)

License Plate Light Components

BENJ18K69206009





IH18K1920046-01

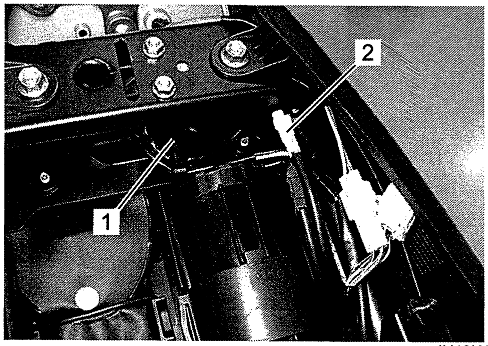
[A]: For U.S.A., Canada and California state	2. Lens

License Plate Light Removal and Installation

BENJ18K69206010

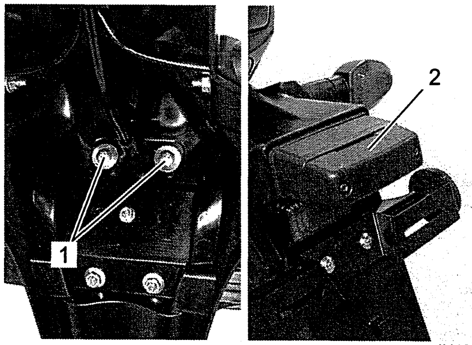
Removal

1) Remove the seat. ☞(Page 9D-18)
2) Disconnect the clamp (1) and license plate light coupler (2).



IH18K1920016-02

3) Remove the screws (1) and license plate light assembly (2).



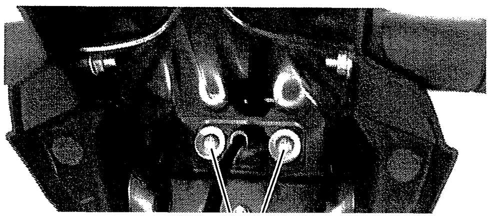
IH18K1920017-01

Installation

Install the license plate light in the reverse order of removal. Pay attention to the following points:

- Tighten the license plate light screws (1) to the specified torque.

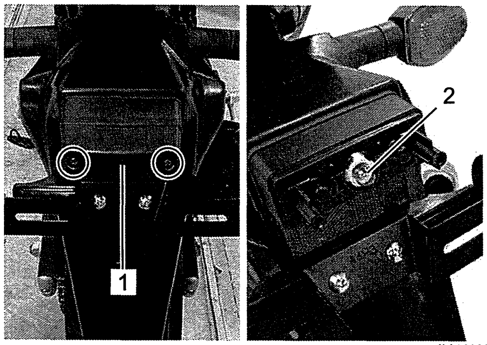
  Tighting torque
  License plate light screw (a): 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)



License Plate Light Bulb Replacement

BENJ18K69206011

1) Remove the license plate light cover (1).
2) Replace the license plate light bulb (2) with a new one.



IH18K1920019-01

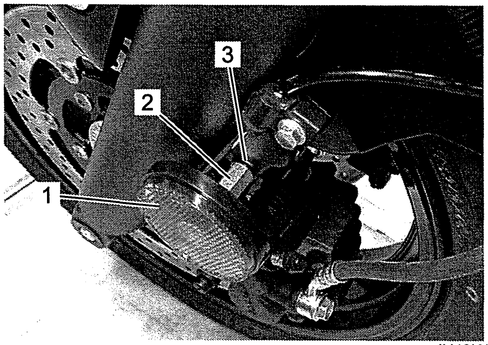
3) Install the license plate light cover.

Front Reflex Reflector Removal and Installation (If Equipped)

BENJ18K69206012

Removal

Remove the front side reflex reflector (1), bolt (2) and washer (3).



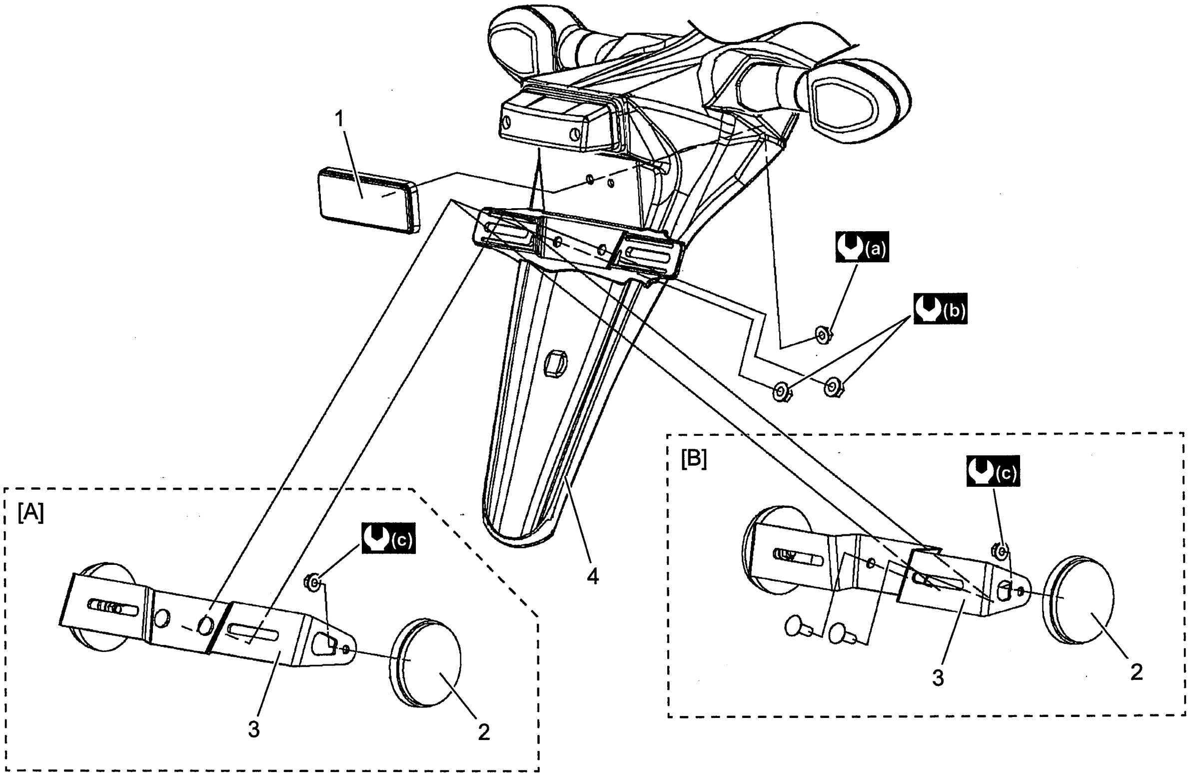
IH18K1920020-01

Installation

Install the front reflex reflector in the reverse order of removal.

Rear Reflex Reflector Construction

BENJ18K69206013



IH18K1920047-01

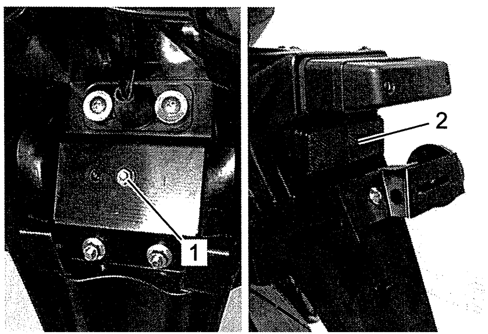
[A]: For U.K., E.U., Australia, Taiwan and China	4. Rear fender rear
[B]: For U.S.A., Canada and California state	(a) : 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)
1. Rear reflex reflector	(b) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
2. Rear side reflex reflector (If equipped)	(c) : 1.8 N·m (0.18 kgf-m, 1.35 lbf-ft)
3. License plate bracket (If equipped)	

Rear Reflex Reflector Removal and Installation

BENJ18K69206014

Removal

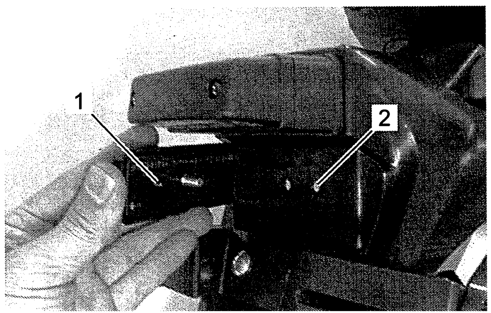
Remove the nut (1) and rear reflex reflector (2).



Installation

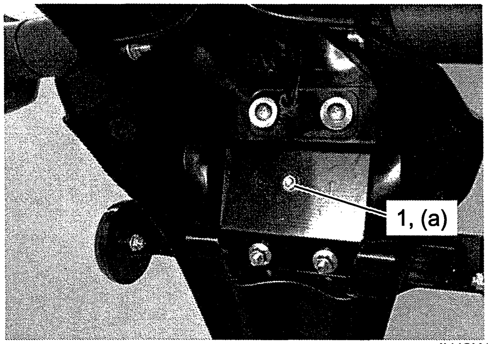
Install the rear reflex reflector in the reverse order of removal. Pay attention to the following points:

- Insert the protrusion (1) of the rear reflex reflector into the hole (2) of the rear fender rear.



- Tighten the rear reflex reflector nut (1) to the specified torque.

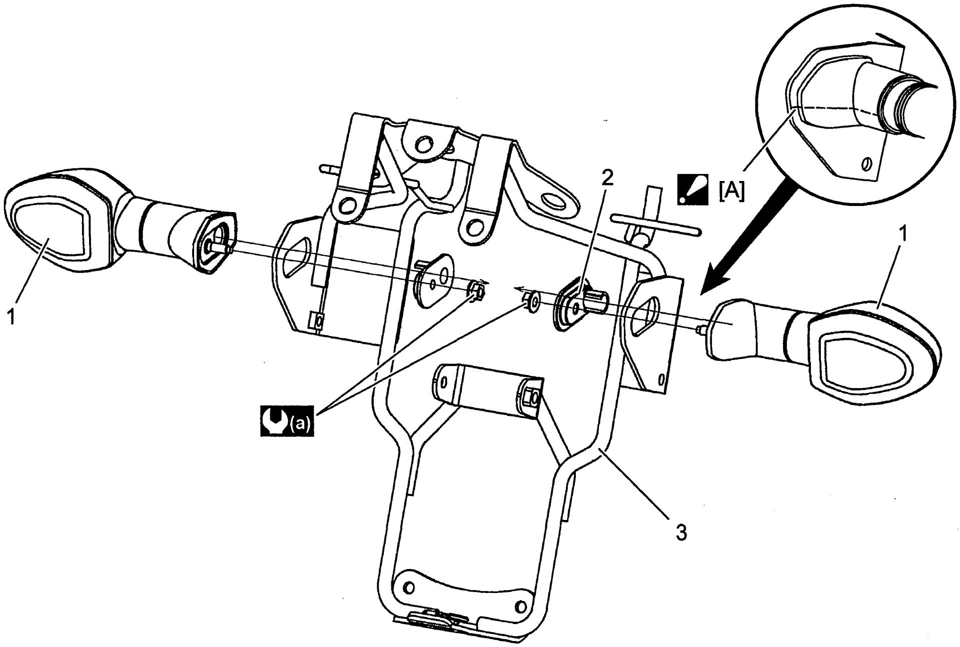
  Tightening torque
  Rear reflex reflector nut (a): 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)



IH18K1920024-01

Front Turn Signal Light Construction

BENJ18K69206015

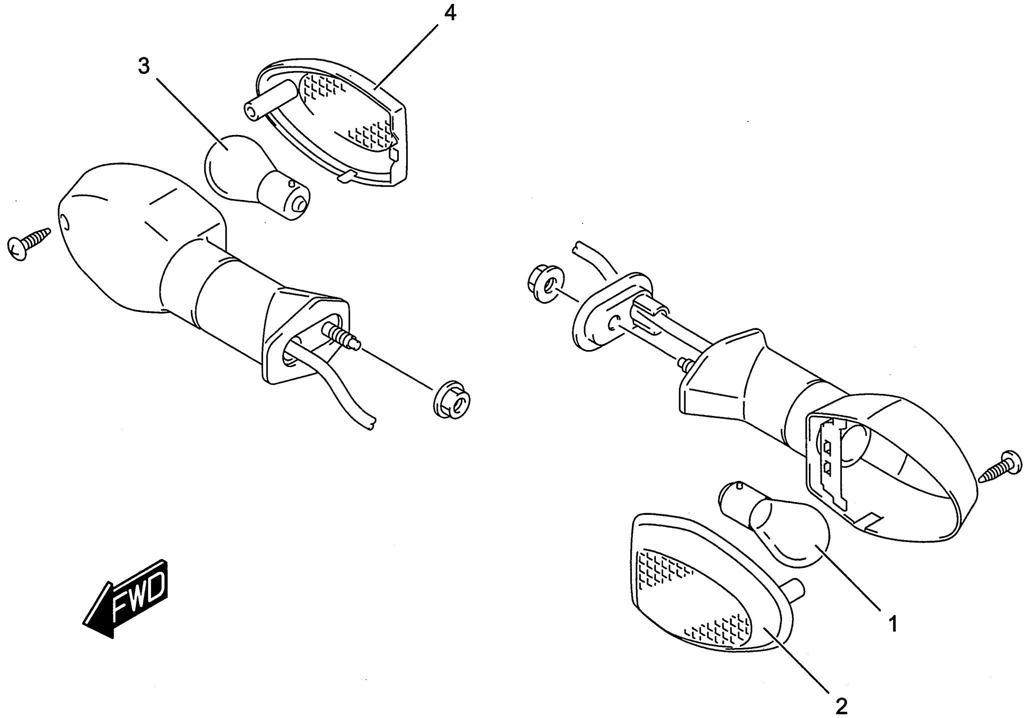


IH18K1920048-01

[A]: Set the line of front turn signal stay under the ruled line of headlight brace.	3. Headlight brace
1. Front turn signal light	(a) : 1.3 N·m (0.13 kgf-m, 0.95 lbf-ft)
2. Front turn signal plate	

Turn Signal Light Components

BENJ18K69206016



IH18K1920049-01

1. Front turn signal light bulb (12 V 21 W x 2)	3. Rear turn signal light bulb (12 V 21 W x 2)
2. Front turn signal light lens	4. Rear turn signal light lens

Front Turn Signal Light Removal and Installation

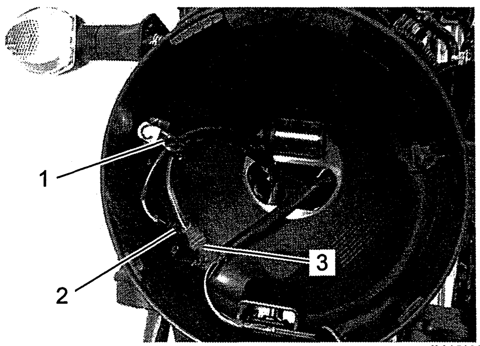
BENJ18K69206017

NOTE

The same procedures are applicable to both the right and left lights.

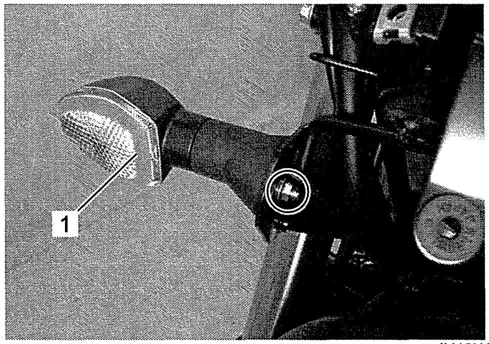
Removal

1) Remove the meter cover assembly. ☞(Page 9D-20)
2) Remove the headlight assembly. Refer to “Headlight Removal and Installation” (Page 9B-4).
3) Release the clamp (1) from the front turn signal light lead wires.
4) Disconnect the right front turn signal light coupler (Black) (2) and left front turn signal coupler (Gray) (3).



IH18K1920041-01

5) Remove the front turn signal light (1).

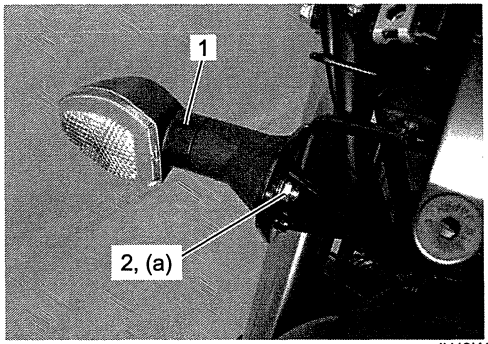


IH18K1920026-02

Installation

Install the front turn signal light in the reverse order of removal. Pay attention to the following points:

- Install the front turn signal light (1). Refer to “Front Turn Signal Light Construction” (Page 9B-11).
- Tighten the front turn signal light mounting nut (2) to the specified torque.



IH18K1920027-03

- Clamp the front turn signal light lead wires. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).

Rear Turn Signal Light Removal and Installation

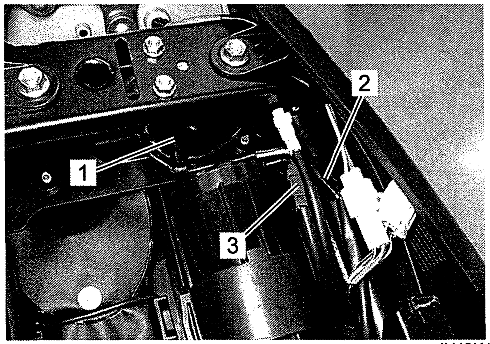
BENJ18K69206018

NOTE

The same procedures are applicable to both the right and left lights.

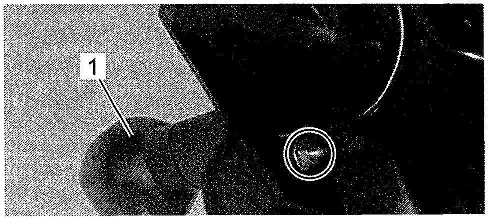
Removal

1) Remove the seat. ☞(Page 9D-18)
2) Disconnect the clamp (1).
3) Disconnect the right rear turn signal light coupler (Black) (2) and left rear turn signal light coupler (Gray) (3).



IH18K1920028-02

4) Remove the rear turn signal light (1).

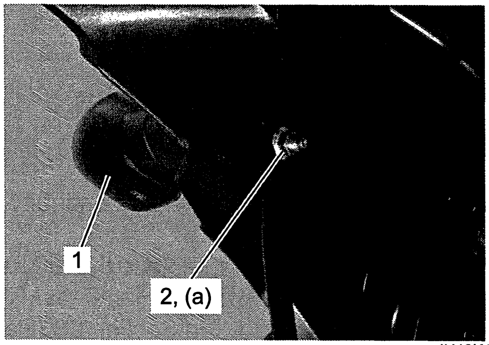


Installation

Install the rear turn signal light in the reverse order of removal. Pay attention to the following points:

- Install the rear turn signal light (1). Refer to "Rear Lighting System Construction" (Page 9B-6).
- Tighten the rear turn signal light mounting nut (2) to the specified torque.

  Tightening torque
  Rear turn signal light mounting nut (a): 1.8 N·m (0.18 kgf-m, 1.35 lbf-ft)



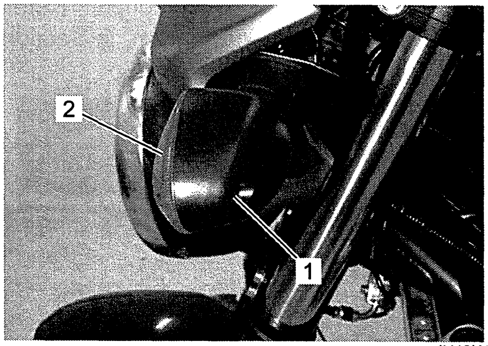
IH18K1920030-02

- Route the rear turn signal light lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).

Turn Signal Light Bulb Replacement

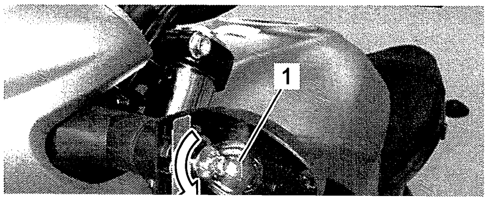
BENJ18K69206019

1) Remove the screw (1) and lens (2).



IH18K1920031-01

2) Replace the turn signal light bulb (1) with a new one.



Turn Signal Relay Inspection

BENJ18K69206020

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

NOTE

Make sure that the battery is fully charged.

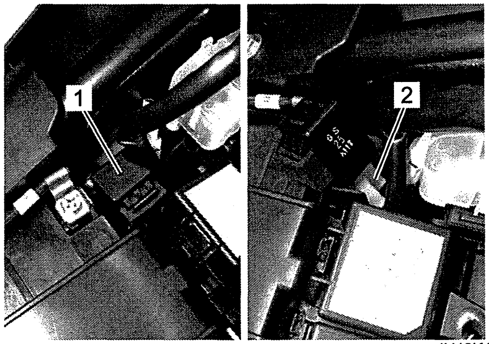
Before removing the turn signal relay, check the operation of the turn signal light.
If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection.
If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal relay with a new one. ☞(Page 9B-14)

Turn Signal Relay Removal and Installation

BENJ18K69206021

Removal

1) Turn the ignition switch OFF.
2) Remove the seat. ☞(Page 9D-18)
3) Remove the turn signal relay (1) from the bracket and disconnect the coupler (2).



IH18K1920033-01

Installation

Install the turn signal relay in the reverse order of removal.

Turn Signal Switch Inspection

BENJ18K69206022

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the left handle switch coupler (1).

4) Inspect the turn signal switch for continuity with a multi circuit tester. If any abnormality is found, replace the left handle switch with a new one. Refer to “Handlebar Removal and Installation (SV650/A)” in Section 6B (Page 6B-5) or “Handlebar Removal and Installation (SV650XA)” in Section 6B (Page 6B-7).

Color / Position	Lg	Lbl	B/Y
L		O	O
PUSH			
R	O	O	

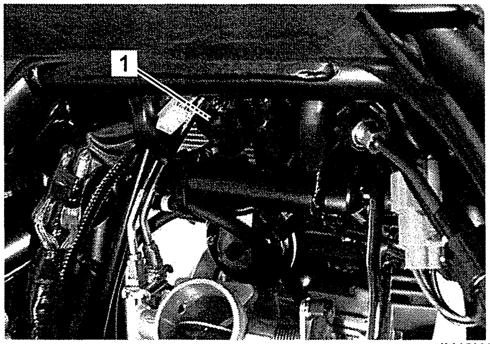
IH18K1920035-02

5) Connect the left handle switch coupler. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).
6) Install the air cleaner box. ☞(Page 1D-8)

Hazard Switch Inspection (If Equipped)

BENJ18K69206023

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the left handle switch coupler (1).



IH18K1920034-03

4) Inspect the hazard switch for continuity with a multi circuit tester.
If any abnormality is found, replace the left handle switch with a new one. Refer to “Handlebar Removal and Installation (SV650/A)” in Section 6B (Page 6B-5) or “Handlebar Removal and Installation (SV650XA)” in Section 6B (Page 6B-7).

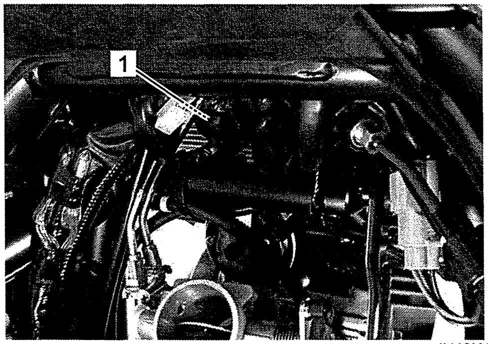
Color / Position	B/Y	Lbl	Lg
OFF			
ON	O	O	O

IH18K1920050-01

Passing Light Switch Inspection (If Equipped)

BENJ18K69206024

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the left handle switch coupler (1).



IH18K1920034-03

4) Inspect the passing light switch for continuity with a multi circuit tester.
If any abnormality is found, replace the left handle switch with a new one. Refer to “Handlebar Removal and Installation (SV650/A)” in Section 6B (Page 6B-5) or “Handlebar Removal and Installation (SV650XA)” in Section 6B (Page 6B-7).

Color / Position	O	Y
•		
PUSH	O	O

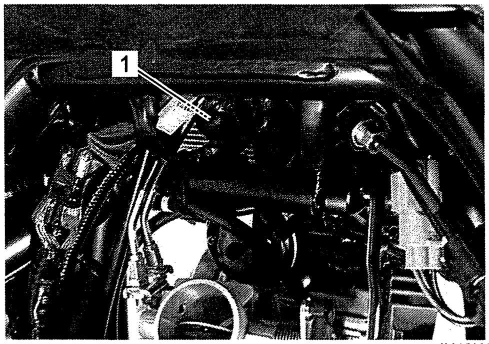
IH18K1920038-01

5) Connect the left handle switch coupler. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).
6) Install the air cleaner box. ☞(Page 1D-8)

Dimmer Switch Inspection

BENJ18K69206025

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the left handle switch coupler (1).



IH18K1920034-03

4) Inspect the dimmer switch for continuity with a multi circuit tester.
   If any abnormality is found, replace the left handle switch with a new one. Refer to "Handlebar Removal and Installation (SV650/A)" in Section 6B (Page 6B-5) or "Handlebar Removal and Installation (SV650XA)" in Section 6B (Page 6B-7).

Position \ Color	W	Y	O
HI		O	O
LO	O		O

IH18K1920040-01

5) Connect the left handle switch coupler. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
6) Install the air cleaner box. ☞(Page 1D-8)

Specifications

Tightening Torque Specifications

BENJ18K69207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Headlight mounting screw	3.0	0.31	2.25	☞(Page 9B-4)
Headlight cover screw	10	1.0	7.5	☞(Page 9B-5)
Rear combination light bracket screw	2.0	0.20	1.50	☞(Page 9B-7)
Rear combination light screw	4.5	0.46	3.35	☞(Page 9B-7)
License plate light screw	2.0	0.20	1.50	☞(Page 9B-9)
Rear reflex reflector nut	3.0	0.31	2.25	☞(Page 9B-11)
Front turn signal light mounting nut	1.3	0.13	0.95	☞(Page 9B-13)
Rear turn signal light mounting nut	1.8	0.18	1.35	☞(Page 9B-14)

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Headlight Construction" (Page 9B-2)
"Rear Lighting System Construction" (Page 9B-6)
"Rear Reflex Reflector Construction" (Page 9B-10)
"Front Turn Signal Light Construction" (Page 9B-11)
"Fasteners Information" in Section 0C (Page 0C-11)

Combination Meter / Fuel Meter / Horn

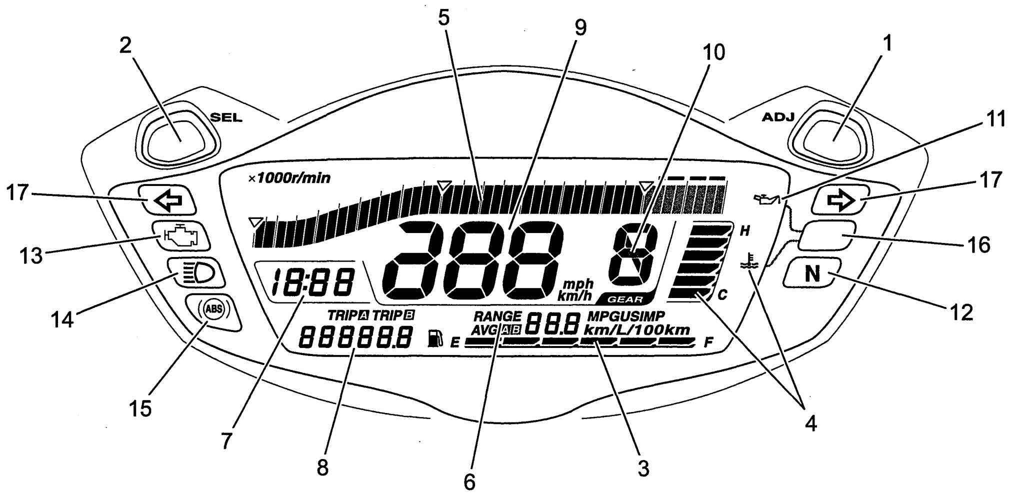
General Description

Combination Meter System Description

BENJ18K69301001

This combination meter mainly consists of LCD (Liquid Crystal Display) and LED (Light Emitting Diode).
The LCD indicates, Fuel level indicator (3), Engine coolant temperature indicator (4), Tachometer (5), Fuel consumption / Driving range meter (6), Clock (7), Odo / Trip A / Trip B / FI (DTC) / Instrument panel light brightness indicator (8), Speedometer (9), Gear position indicator (10) and Oil pressure indicator (11) 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 compared to the bulb.



IH18K1930001-01

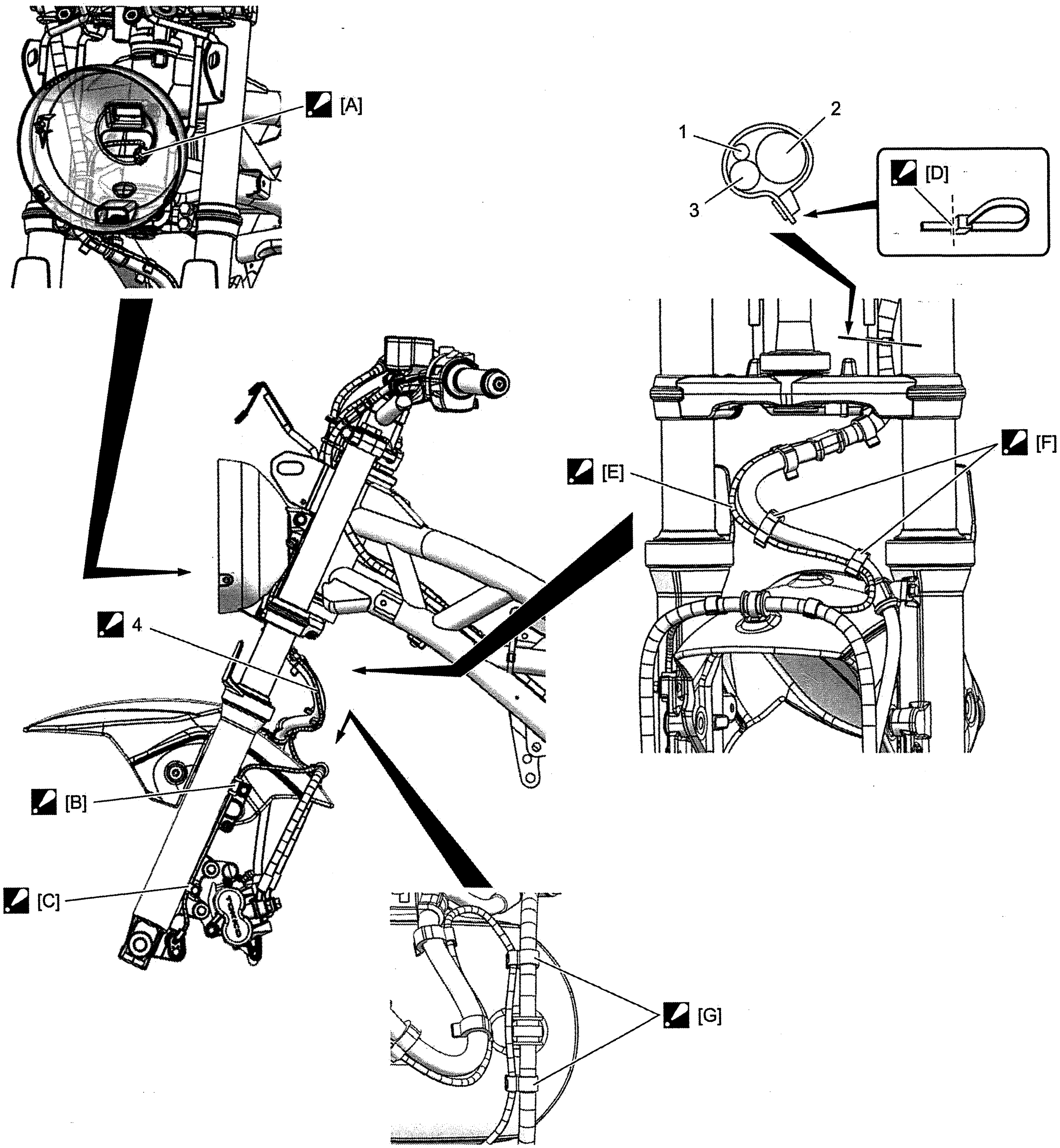
1. Adjust switch	14. LED (Hi beam indicator light)
2. Select switch	15. LED (ABS indicator light) (With ABS)
12. LED (Neutral indicator light)	16. LED (Engine coolant temperature indicator light / Oil pressure indicator light)
13. LED (Malfunction Indicator light)	17. LED (Turn signal indicator light)

Schematic and Routing Diagram

Speed Sensor Routing Diagram (Without ABS)

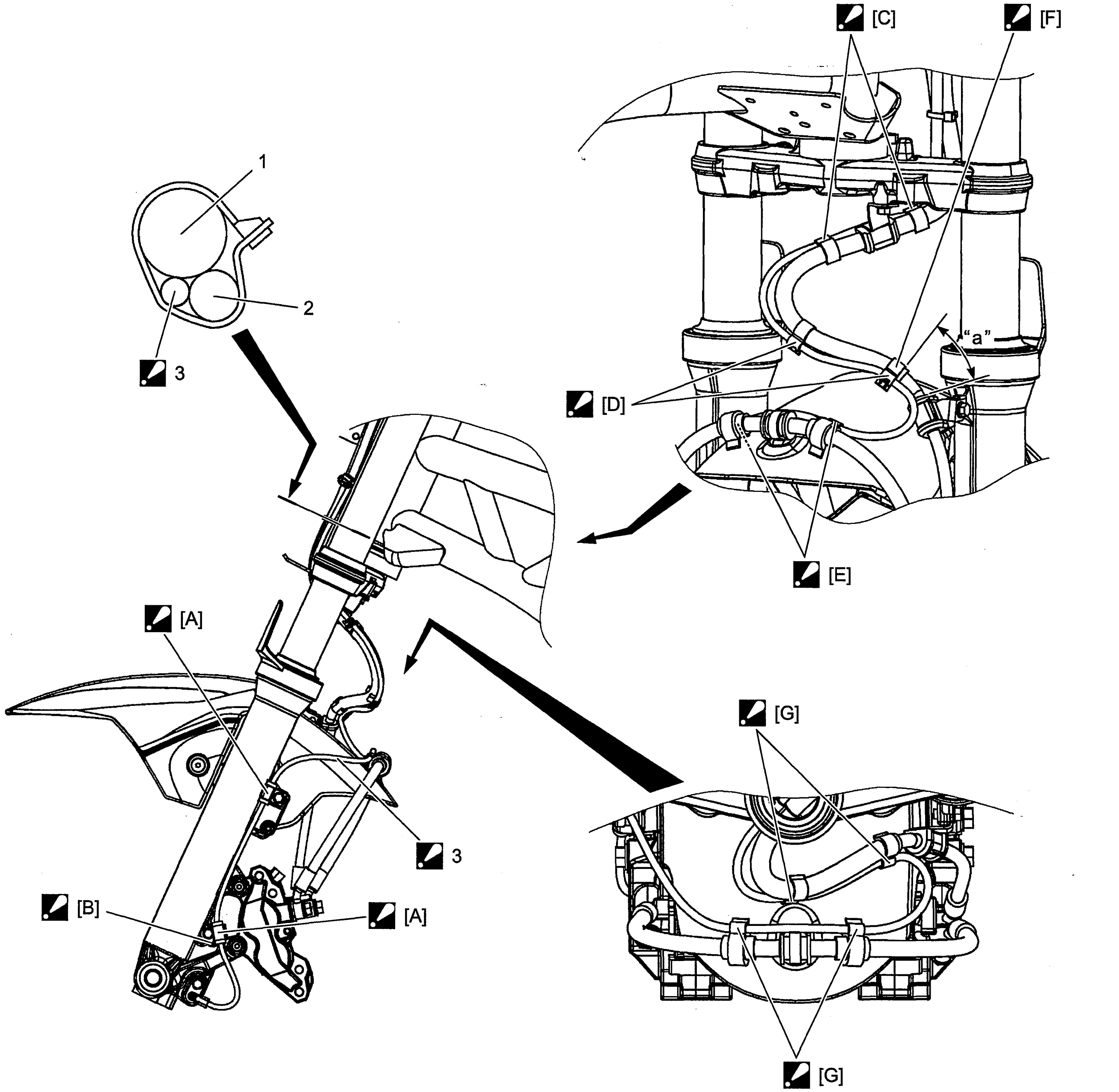
BENJ18K69302001

L7 – L8



IH18K1930018-02

[A]: After connecting the sensor coupler, put it into the headlight cover.	[G]: Clamp the sensor lead wire at the marking portion.



[A]:	Fix the sensor lead wire sleeve to the clamp.	[G]:	Clamp the sensor lead wire at the marking portion.
[B]:	After the clamp has contacted the stopper, tighten the bolt.	1.	Front brake hose
[C]:	Clamp the sensor lead wire to left side of the brake hose.	2.	Headlight brace
[D]:	Clamp the sensor lead wire behind the brake hose.	3.	Speed sensor lead wire : When installing the sensor lead wire, be careful not to twist it. After clamping the sensor lead wire, be careful not to slacken it.
[E]:	Clamp the sensor lead wire in front of the brake hose.	"a":	20 – 30 mm (0.79 – 1.18 in)
[F]:	Set the clamp in correct position.		

Diagnostic Information and Procedures

Combination Meter Symptom Diagnosis

BENJ18K69304001

1) Check combination meter power and ground circuit.
2) Check DTC. ☞(Page 1A-15)
   - If some DTC appears during inspection in Step 2), go to applicable DTC diag. flow.
   - If any of troubles described in table below has occurred independently even though DTC display is normal during inspection is Step 2), inspect subject place according to instructions in table below.

Condition	Possible cause	Correction / Reference Item
Speedometer does not operate	Defective front wheel speed sensor (with ABS)	*Check front wheel speed sensor. ☞(Page 4E-44)*
	Defective speed sensor (without ABS)	*Check speed sensor. ☞(Page 4E-44)*
	Defective speedometer	*Check speedometer. ☞(Page 9C-10)*
	Faulty speedometer circuit	*Repair circuit.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Faulty front wheel speed sensor circuit (with ABS)	*Repair circuit.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
	Faulty speed sensor (without ABS)	*Repair circuit.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
Fuel level indicator does not operate	Faulty fuel level gauge	*Check fuel level gauge. ☞(Page 9C-10)*
	Faulty fuel level indicator	*Check fuel level indicator. ☞(Page 9C-9)*
	Faulty wiring or grounding	*Repair circuit.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
Oil pressure indicator light does not operate	Faulty oil pressure switch	*Check oil pressure switch. ☞(Page 9C-10)*
	Faulty oil pressure indicator	*Check oil pressure indicator. ☞(Page 9C-10)*
	Faulty oil pressure switch circuit	*Repair circuit.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*
Engine coolant temperature indicator light does not operate	Defective ECT sensor	*Check ECT sensor. ☞(Page 1C-6)*
	Faulty engine coolant temperature indicator	*Check engine coolant temperature indicator/ engine coolant temperature indicator light indicator. ☞(Page 9C-7)*
	Faulty ECT sensor circuit	*Repair circuit.* • *SV650/A: ☞(Page 9A-5) ☞(Page 9A-9)* • *SV650XA: ☞(Page 9A-13)*

Horn Symptom Diagnosis

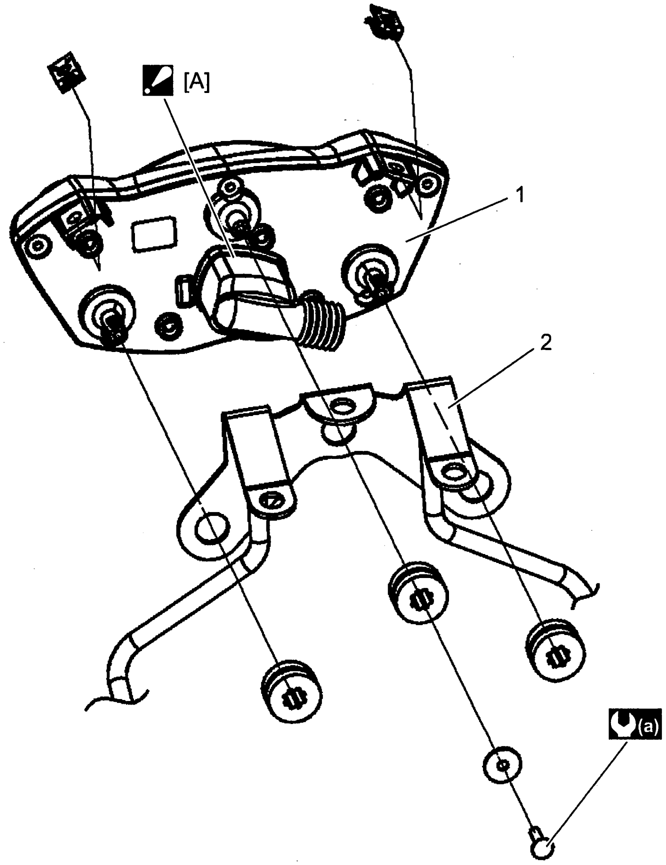
BENJ18K69304002

Condition	Possible cause	Correction / Reference Item
Horn does not operate	Faulty horn switch	*Check horn switch.* ☞*(Page 9C-11)*
	Faulty wiring or grounding	*Repair wiring.* • *SV650/A:* ☞*(Page 9A-5)* ☞*(Page 9A-9)* • *SV650XA:* ☞*(Page 9A-13)*
	Faulty horn	*Check horn.* ☞*(Page 9C-11)*

Repair Instructions

Combination Meter Construction

BENJ18K69306001

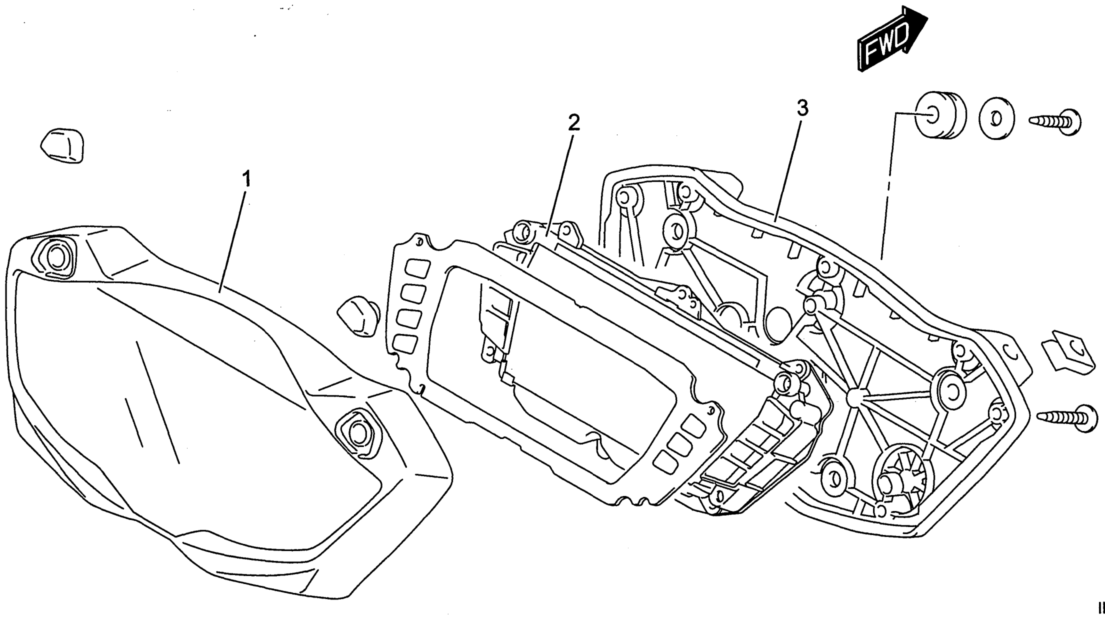


IH18K1930019-01

[A]: Install the coupler boot to the combination meter securely.	2. Headlight brace
1. Combination meter	(a) : 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)

Combination Meter Components

BENJ18K69306002



IH18K1930020-01

1. Upper case	3. Lower case
2. Combination meter unit	

Combination Meter On-Vehicle Inspection

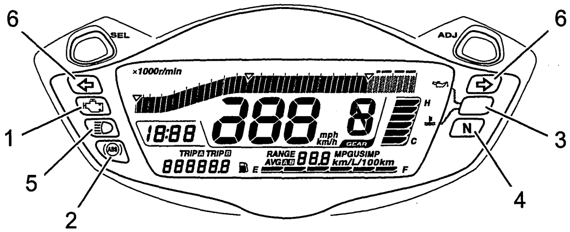
BENJ18K69306003

LED Inspection

Check that the LEDs (Malfunction indicator light (1), ABS indicator light (2) (With ABS) and Engine coolant temperature indicator light / Oil pressure indicator light (3)) immediately light up when the ignition switch is turned to ON.

Check that other LED's (Neutral indicator light (4), Hi beam indicator light (5) and Turn signal indicator lights (6)) light up/go off by operating the gearshift lever, dimmer and turn signal switches.

If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/ coupler. ☞(Page 9C-7)



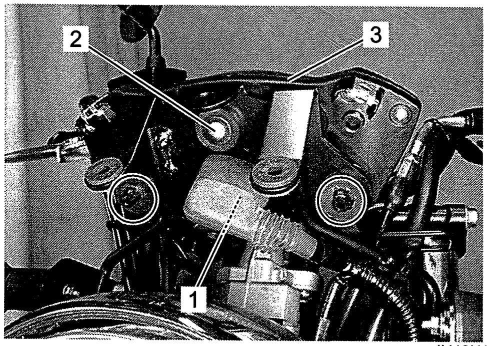
IH18K1930004-01

Combination Meter Removal and Installation

BENJ18K69306004

Removal

1) Remove the meter cover assembly. ☞(Page 9D-20)
2) Disconnect the coupler (1) and remove the combination meter screw (2).
3) Remove the combination meter (3).



IH18K1930005-02

Installation

Install the combination meter in the reverse order of removal. Pay attention to the following points:

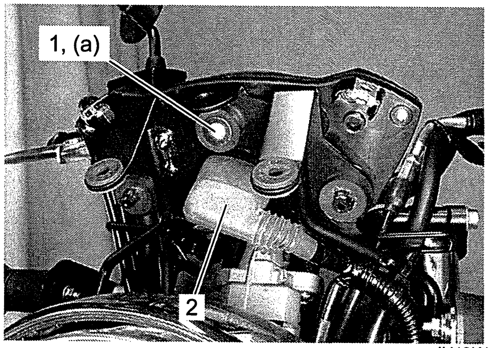
- Tighten the combination meter screw (1) to the specified torque.

  Tightening torque
  Combination meter screw (a): 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)

- Install the coupler boot (2).

NOTE

Fix the boot (2) of the combination meter coupler firmly.



IH18K1930006-02

Combination Meter Disassembly and Reassembly

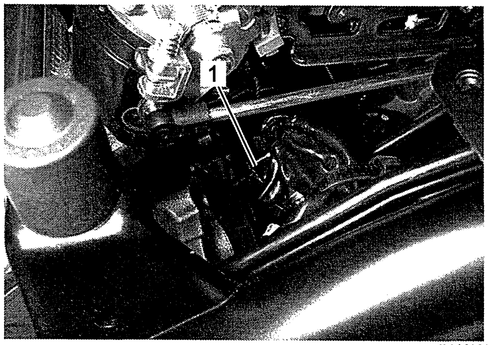
BENJ18K69306005

Refer to "Combination Meter Removal and Installation" (Page 9C-7).
Disassemble/reassemble the combination meter. Refer to "Combination Meter Components" (Page 9C-6).

Engine Coolant Temperature Indicator / Engine Coolant Temperature Indicator Light Inspection

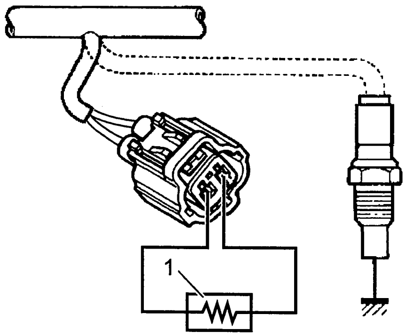
BENJ18K69306006

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the ECT sensor coupler (1).



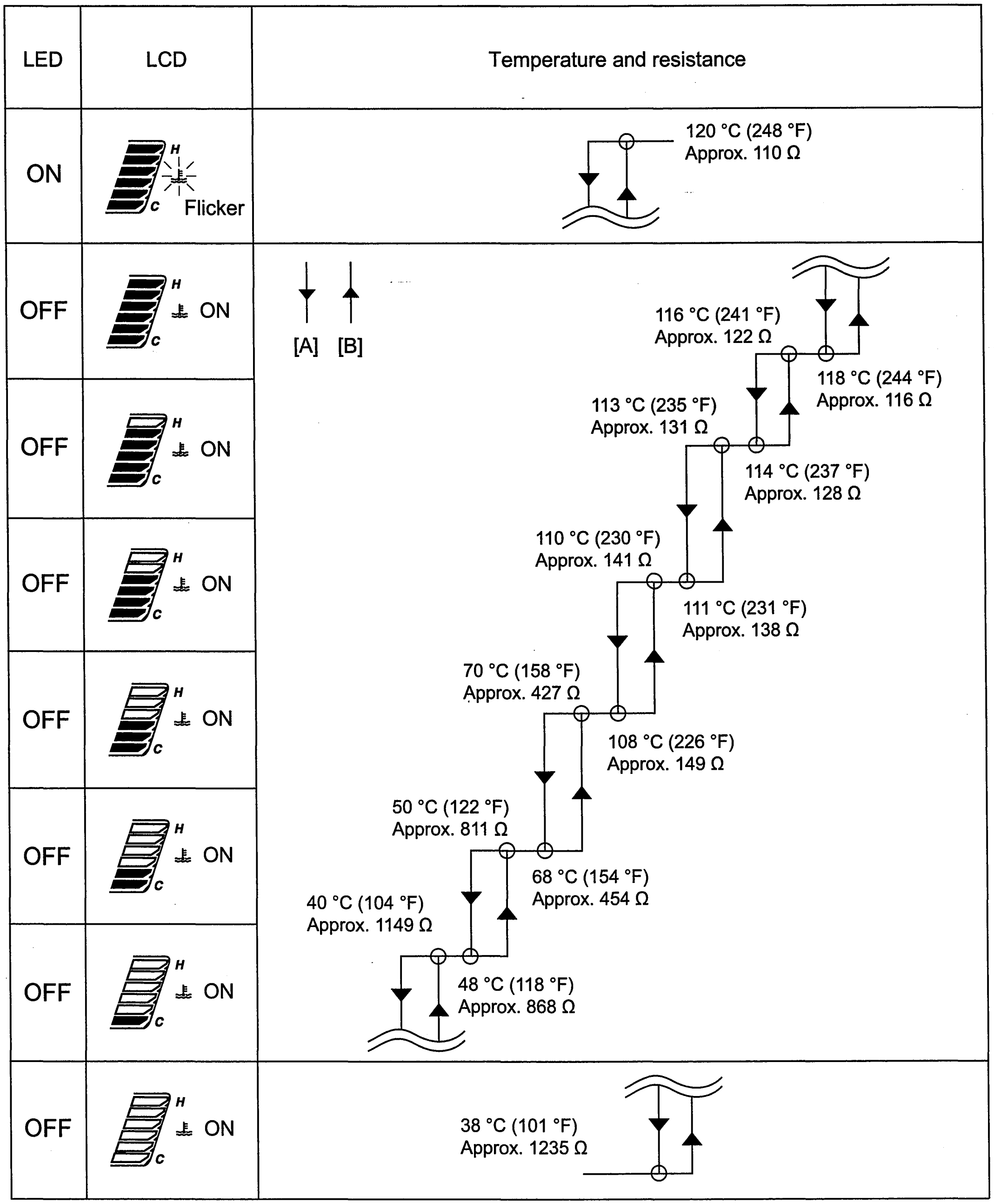
IH18K1930007-01

3) Connect a variable resistor (1) between the terminals.



ID26J1930009-01

4) Turn the ignition switch ON.
5) Check the engine coolant temperature indicator (LCD) and engine coolant temperature indicator light (LED) operations when the resistance is adjusted to the specified values.
If either one or both indications are abnormal, replace the combination meter with a new one. ☞(Page 9C-7)



IH18K1930008-06

[A]: When decreasing the temperature	[B]: When increasing the temperature

6) Install the removed parts.

ECT Sensor Removal and Installation

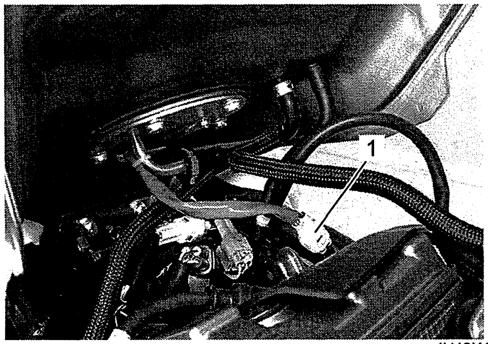
BENJ18K69306007

Refer to “ECT Sensor Removal and Installation” in Section 1C (Page 1C-6).

Fuel Level Indicator Inspection

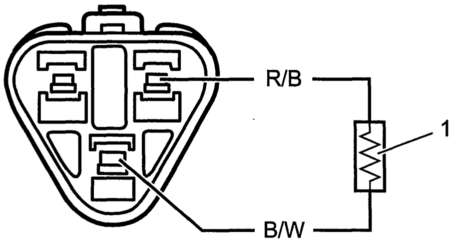
BENJ18K69306008

1) Lift and support the fuel tank. ☞(Page 1G-9)
2) Disconnect the fuel pump coupler (1).



IH18K1930009-01

3) Connect a variable resistor (1) between the R/B and B/W lead wires of the wire harness side coupler.

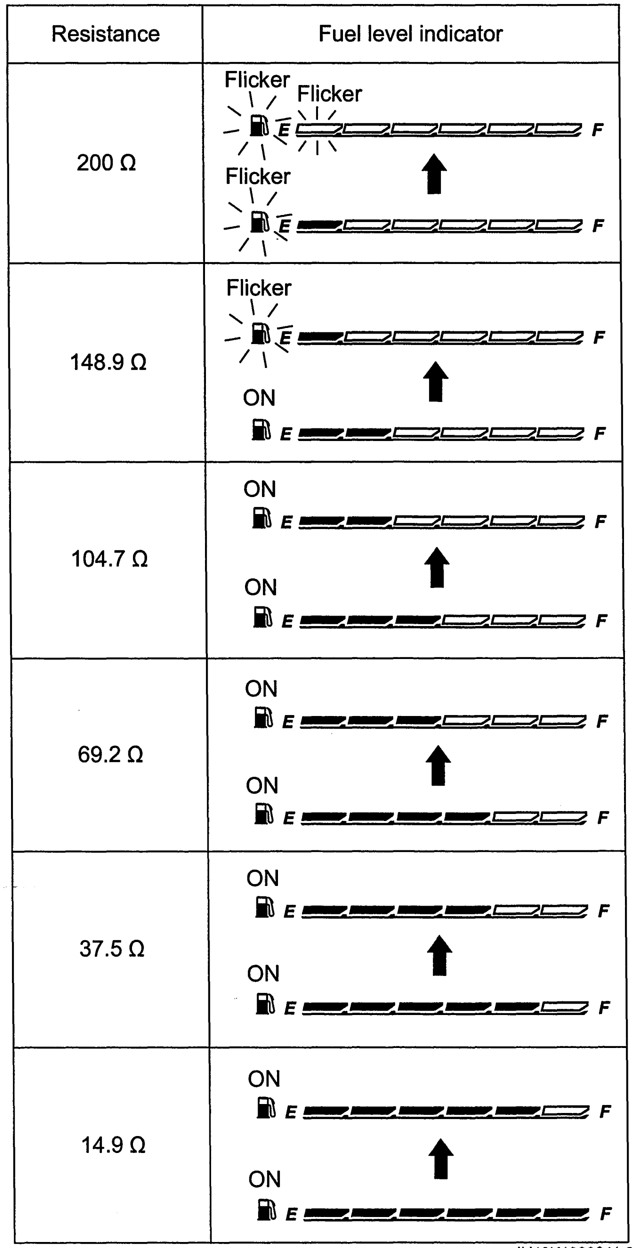


IH18K1930010-01

4) Turn the ignition switch ON.
5) Check the display of fuel level indicator (LCD).
   If any abnormality is found, replace the combination meter with a new one. ☞(Page 9C-7)

NOTE

It takes approx. 40 seconds that the fuel level indicator indicates the detected fuel level.



IH18K1930011-01

6) Install the removed parts.

Fuel Level Gauge Inspection

BENJ18K69306009

Refer to "Fuel Level Gauge Inspection" in Section 1G (Page 1G-15).

Speedometer On-Vehicle Inspection

BENJ18K69306010

If the speedometer, odometer or tripmeter does not function properly, inspect the front wheel speed sensor (with ABS) or speed sensor (without ABS) and the coupler connection. If the front wheel speed sensor (with ABS) or speed sensor (without ABS) and coupler connection are OK, replace the combination meter with a new one. ☞(Page 9C-7)

Speed Sensor Removal and Installation

BENJ18K69306011

Removal

With ABS

Refer to "Front Wheel Speed Sensor Removal and Installation" in Section 4E (Page 4E-42).

Without ABS

1) Remove the headlight. ☞(Page 9B-4)
2) Remove the front wheel speed sensor mounting bolt. ☞(Page 4E-42)
3) Remove the speed sensor. Refer to "Speed Sensor Routing Diagram (Without ABS)" (Page 9C-2) and "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).

Installation

Install the speed sensor in the reverse order of removal.

Speed Sensor Rotor Removal and Installation

BENJ18K69306012

Refer to "Front Wheel Speed Sensor Rotor Removal and Installation" in Section 4E (Page 4E-43).

Speed Sensor and Sensor Rotor Inspection

BENJ18K69306013

Inspect the front wheel speed sensor (with ABS) or speed sensor (without ABS).
Inspect the sensor rotor.
Refer to "Wheel Speed Sensor and Sensor Rotor Inspection" in Section 4E (Page 4E-44).

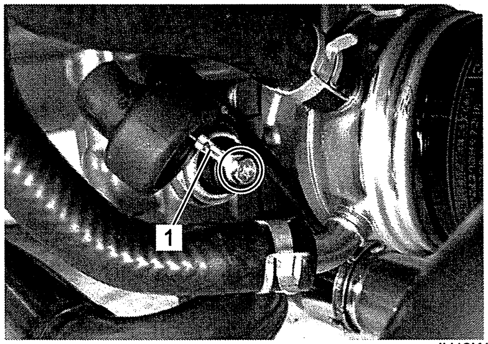
Oil Pressure Indicator / Oil Pressure Indicator Light Inspection

BENJ18K69306014

NOTE

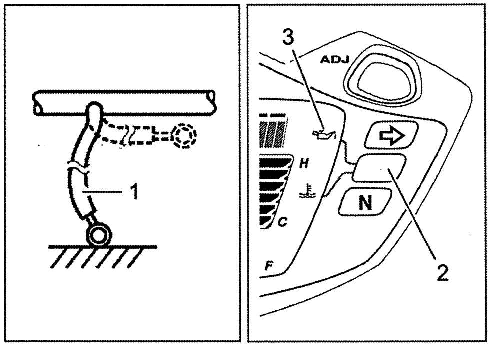
Before inspecting the oil pressure switch, check if the engine oil level is correct. Refer to "Engine Oil Inspection" in Section 1E (Page 1E-5).

1) Disconnect the oil pressure switch lead wire (1).



IH18K1930012-01

2) Turn the ignition switch ON.
3) Check if the oil pressure indicator light (LED) (2) and indicator (LCD) (3) will light up when grounding the lead wire (1).
   If the oil pressure indicator does not light up, replace the combination meter with a new one after checking the connection of couplers.



IH18K1930021-01

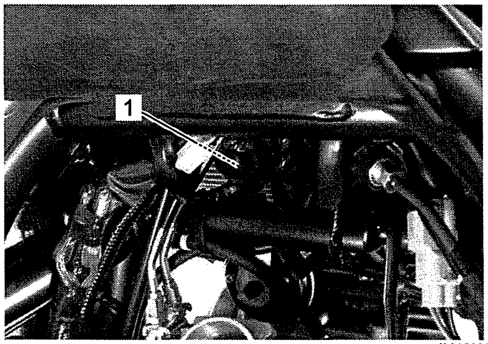
4) Connect the oil pressure switch lead wire. Refer to "Oil Pressure Switch Removal and Installation" in Section 1E (Page 1E-8).

Horn Inspection

BENJ18K69306015

Horn Switch Inspection

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. ☞(Page 1D-8)
3) Disconnect the left handle switch coupler (1).



IH18K1930014-01

4) Inspect the horn switch for continuity with a multi circuit tester.
   If any abnormality is found, replace the left handle switch with a new one. Refer to “Handlebar Removal and Installation (SV650/A)” in Section 6B (Page 6B-5) or “Handlebar Removal and Installation (SV650XA)” in Section 6B (Page 6B-7).

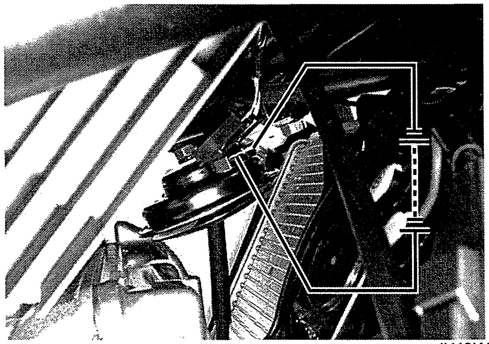
Color / Position	B/Bl	B/W
•		
PUSH	O	O

IH18K1930017-02

5) Connect the left handle switch coupler. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).
6) Install the air cleaner box. ☞(Page 1D-8)

Horn Inspection

Disconnect the horn couplers and connect a 12 V battery to the terminals of horn. If the sound is not heard from the horn, replace the horn with a new one.



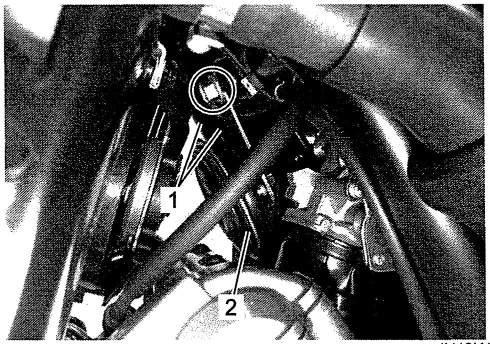
IH18K1930015-01

Horn Removal and Installation

BENJ18K69306016

Removal

1) Disconnect the horn couplers (1).
2) Remove the horn (2).



IH18K1930016-01

Installation

Install the horn. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).

Specifications

Tightening Torque Specifications

BENJ18K69307001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Combination meter screw	2.0	0.20	1.50	☞(Page 9C-7)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

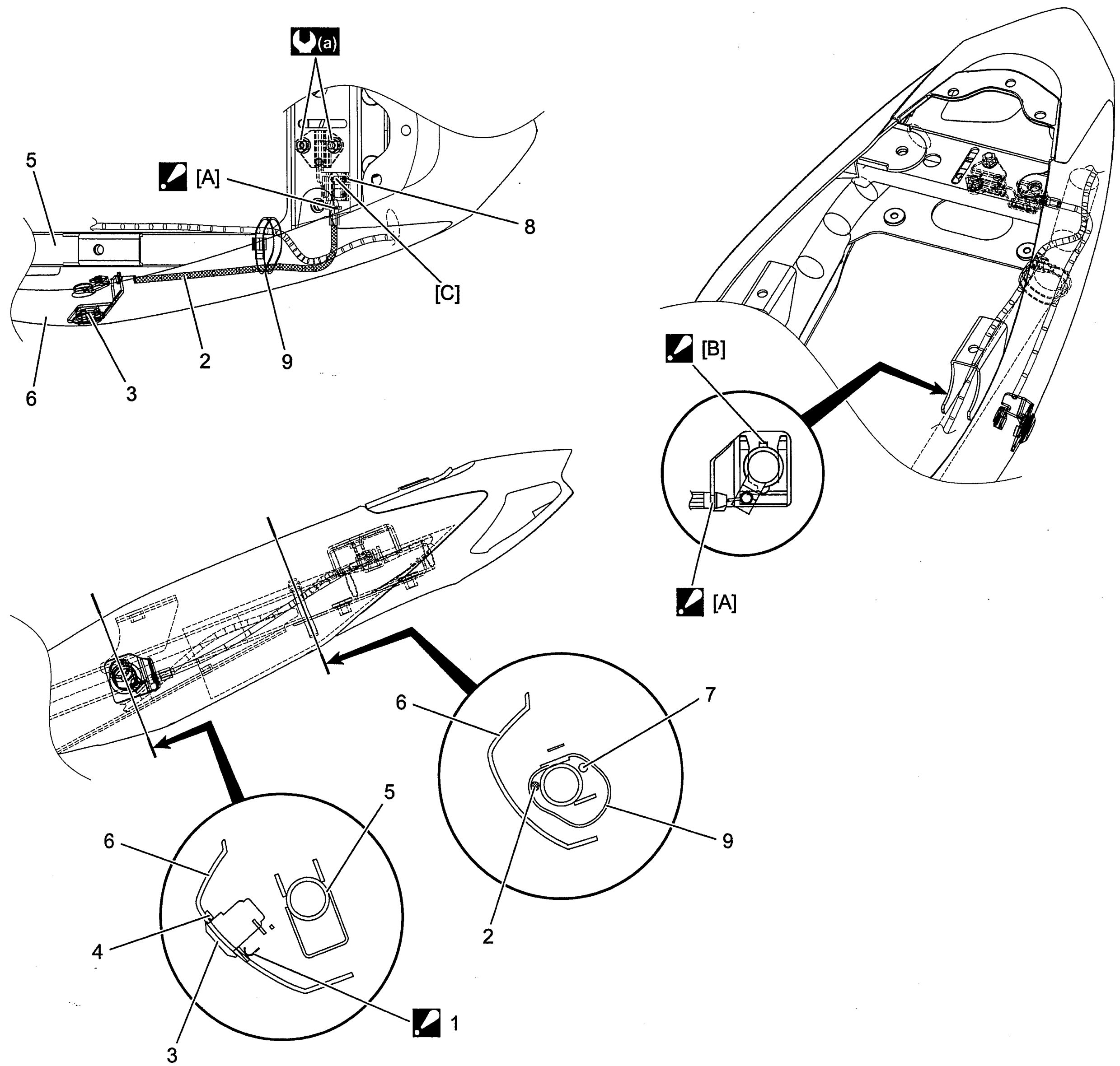
“Combination Meter Construction” (Page 9C-5)

Exterior Parts

Schematic and Routing Diagram

Seat Lock Cable Routing Diagram

BENJ18K69402001



IH18K1940053-02

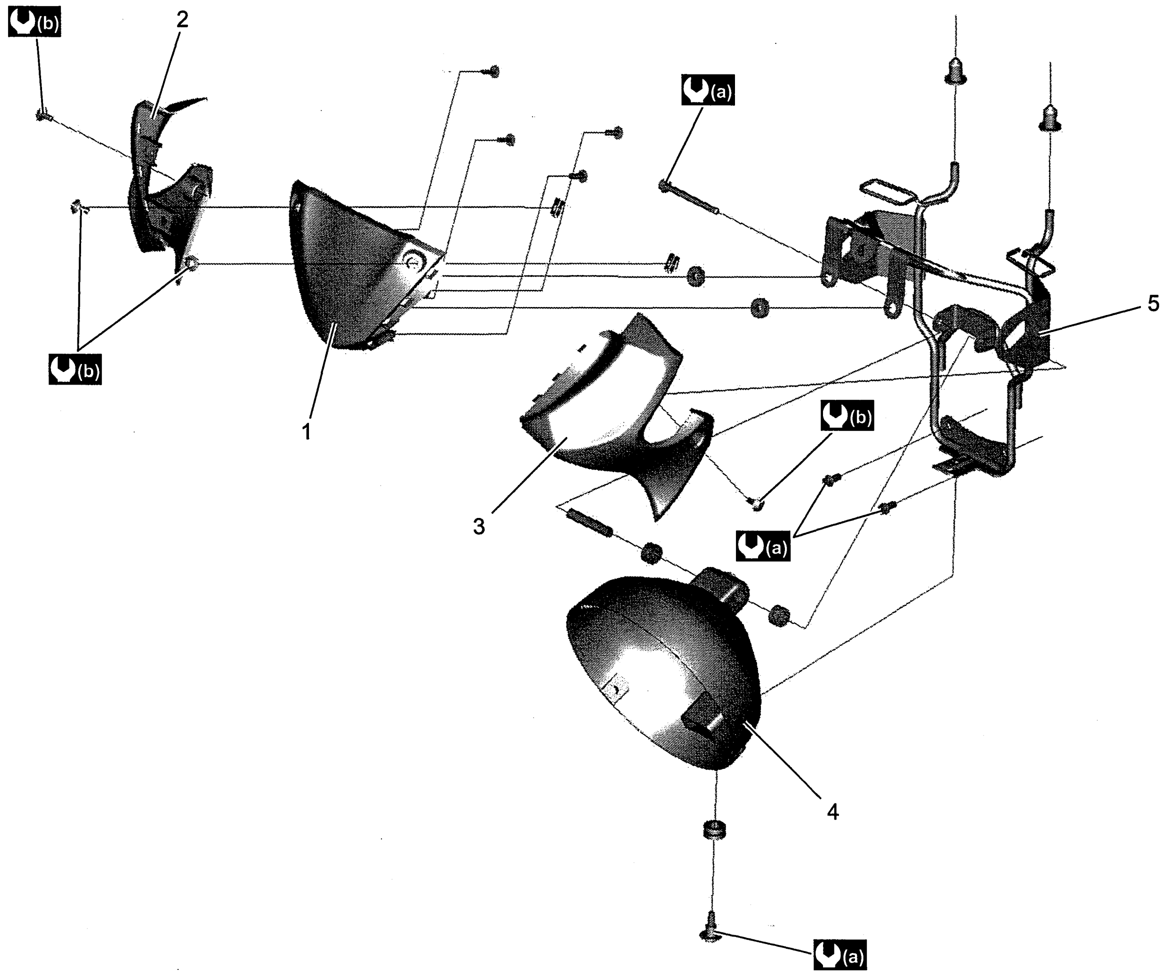
[A]:	Set the seat lock cable firmly.	5. Seat rail
[B]:	Align the rib of seat lock assembly and groove of seat lock cable guide.	6. Left frame rear cover
[C]:	Spherical cable end	7. Rear combination light lead wire
1.	Seat lock plate : Install the seat lock plate behind of the seat lock cable guide.	8. Striker support bracket

Repair Instructions

Meter Cover / Headlight Cover Construction

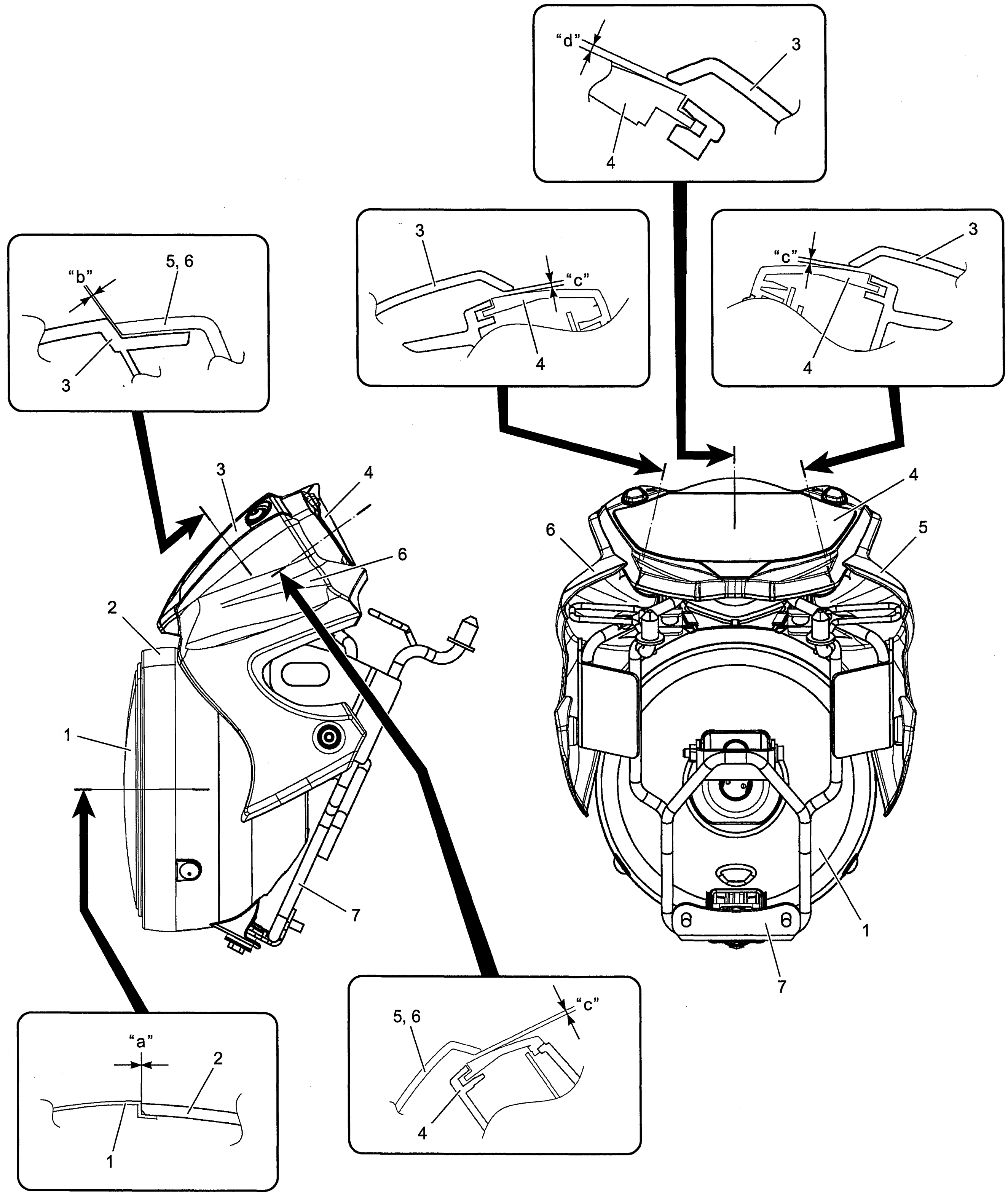
BENJ18K69406001

SV650/A



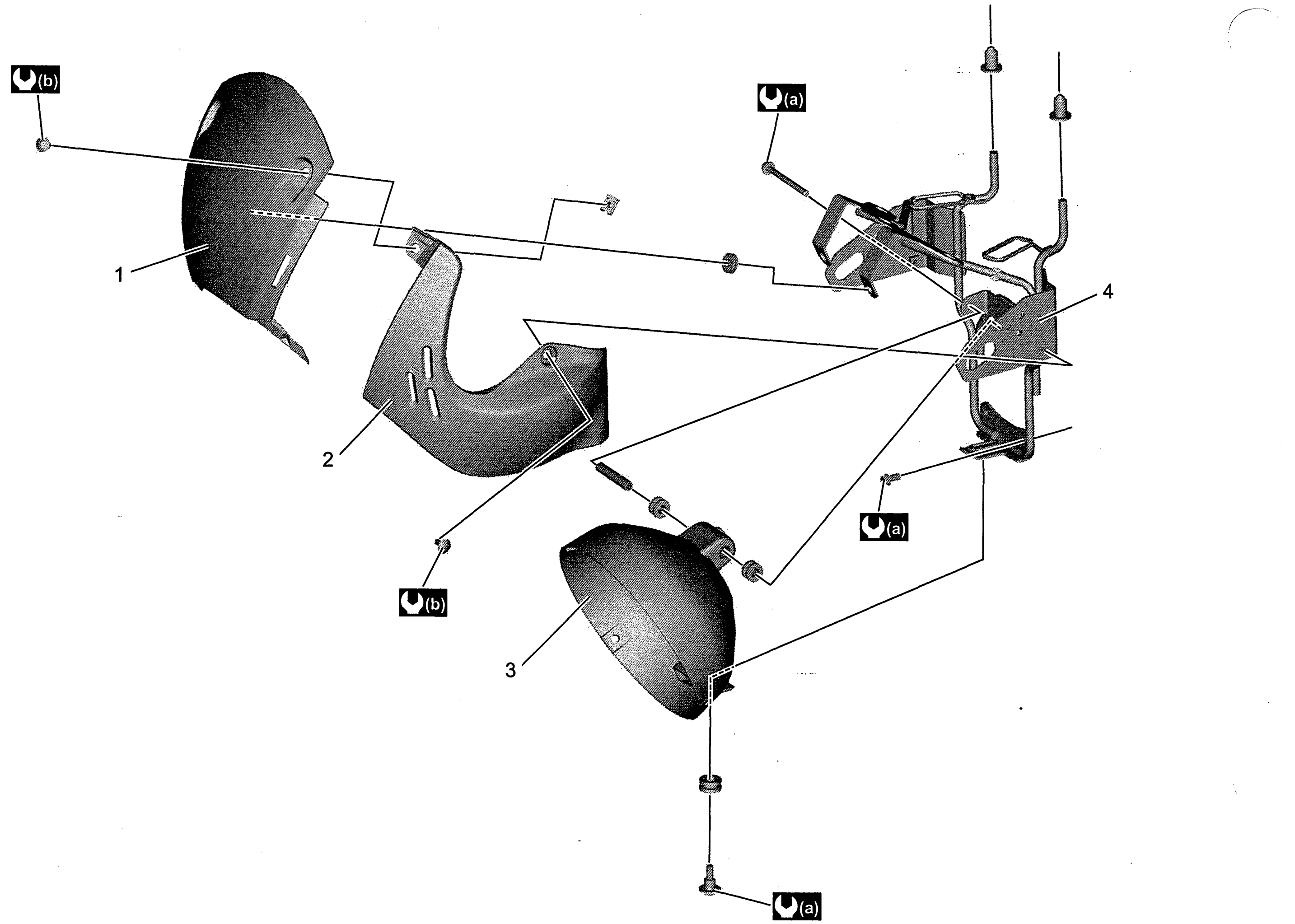
IJ18K1940001-01

1. Meter center cover	4. Headlight cover	(b) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
2. Meter cover (RH)	5. Headlight brace	
3. Meter cover (LH)	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	



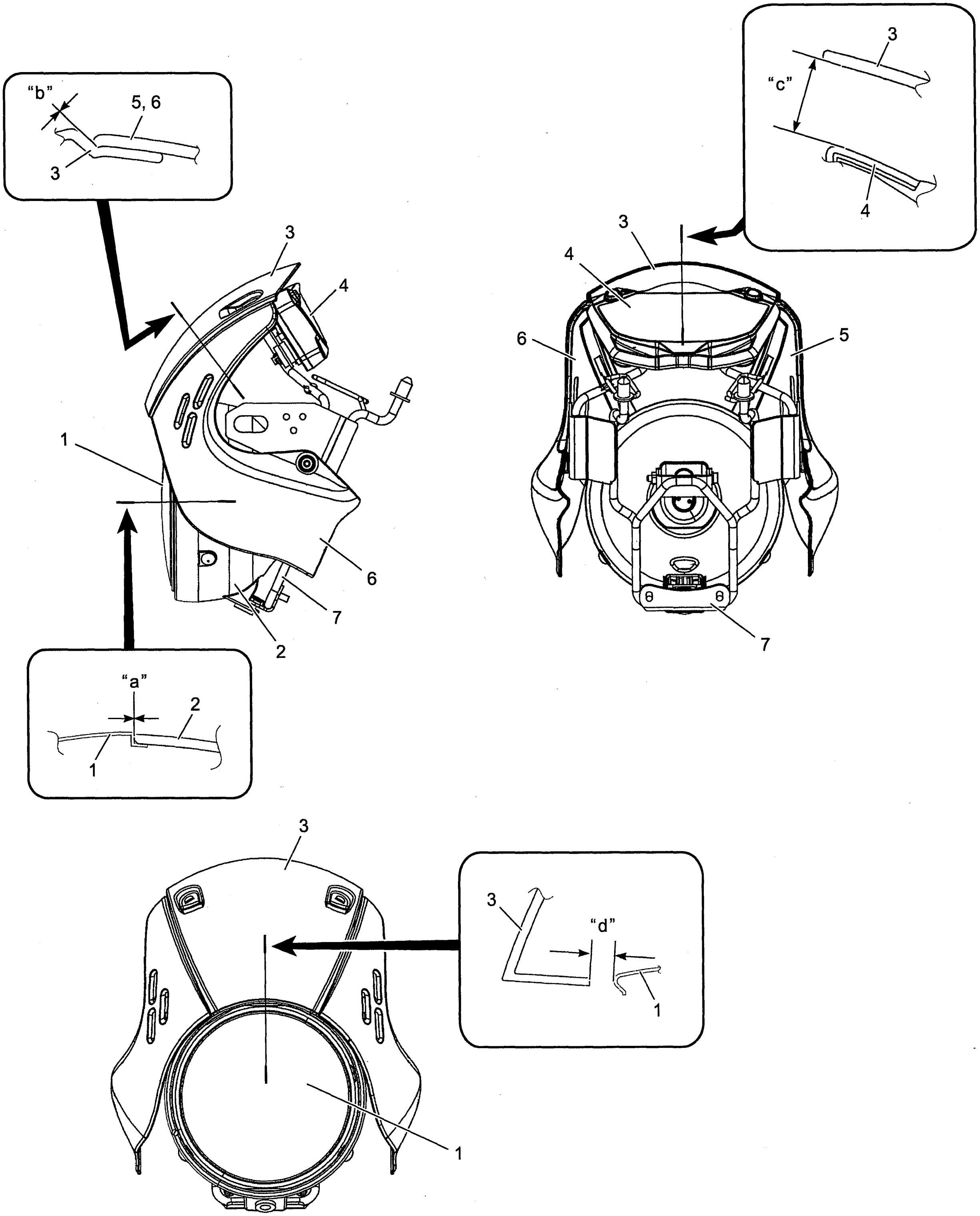
I18K1940021-01

SV650XA



IJ18K1940002-01

1. Meter center cover	3. Headlight cover	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
2. Meter cover	4. Headlight brace	(b) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

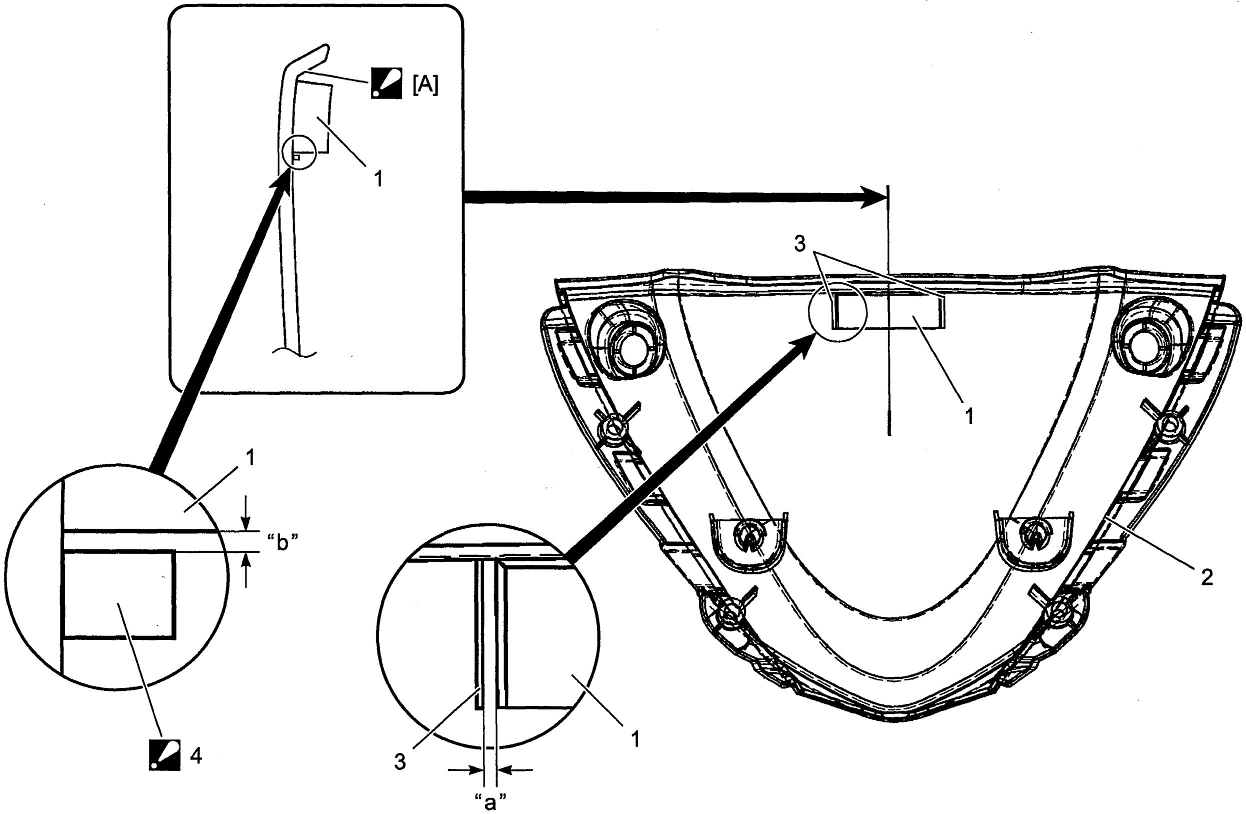


IJ18K1940022-02

1. Headlight assembly	5. Meter cover (RH)	"b": 0 – 1.5 mm (0 – 0.059 in)

Meter Center Cover Cushion Construction (SV650/A)

BENJ18K69406002

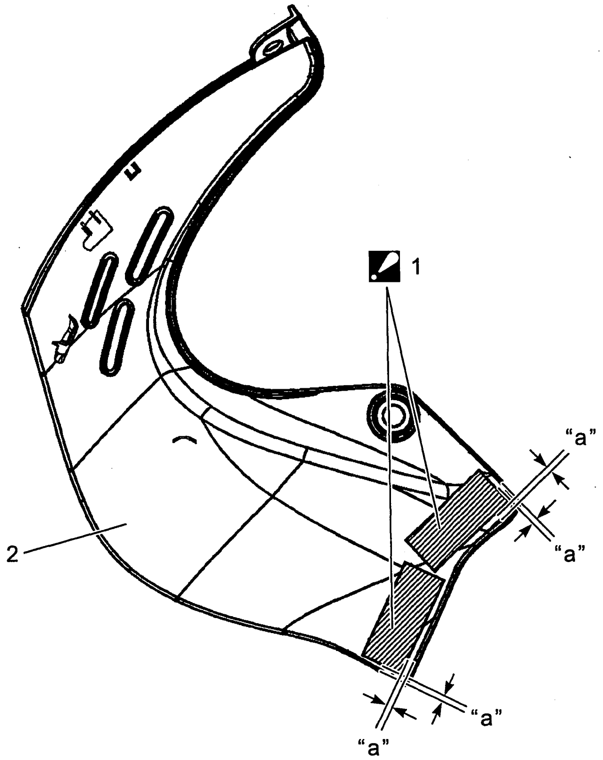


IH18K1940058-08

[A]:	Do not stick to the cushion wall face. But it can be sticking on the curved wall face.	4.	Calender line : Meter cover cushion can be sticking on the calender line between 0 – 1.0 mm (0 – 0.039 in) from the calender line end.
1.	Meter cover cushion	"a":	0 – 1.5 mm (0 – 0.059 in)
2.	Meter center cover	"b":	0 – 0.5 mm (0 – 0.019 in)
3.	Emboss line		

Meter Cover Cushion Construction (SV650XA)

BENJ18K69406003

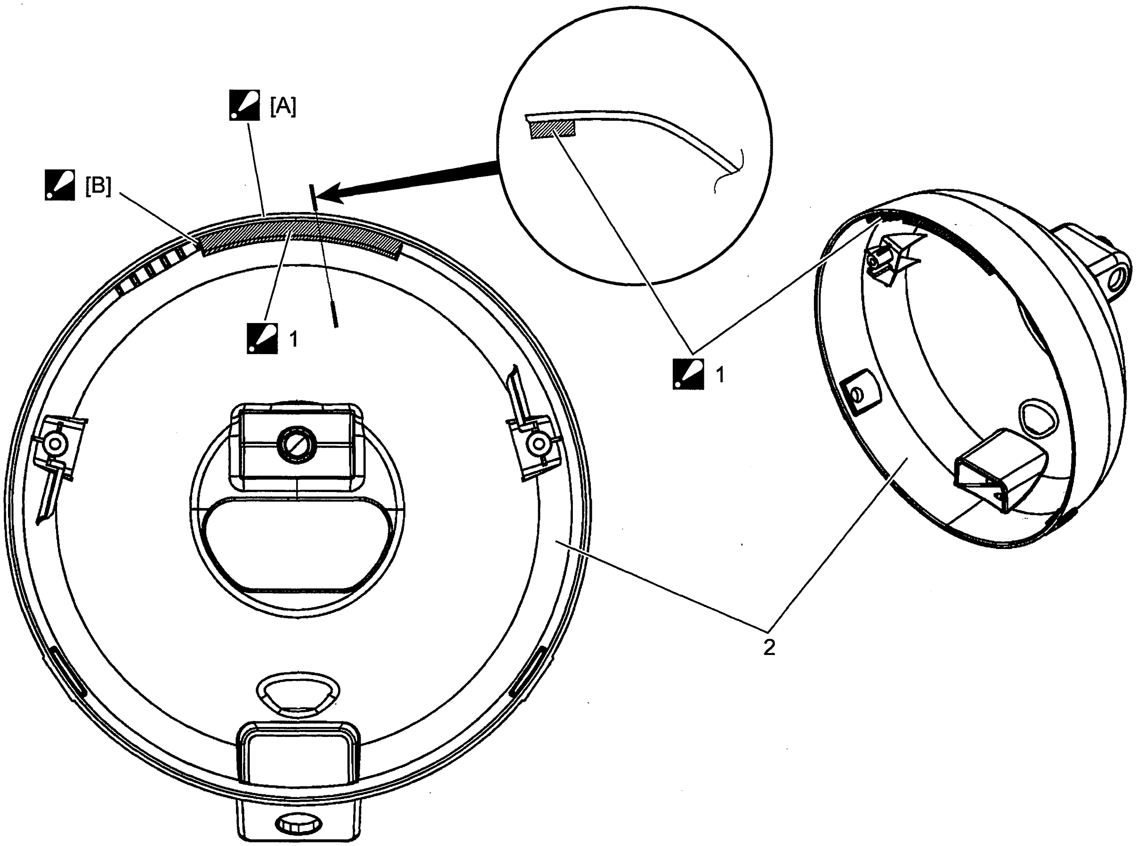


IJ18K1940003-02

1. Meter cover cushion : Clean the adhesive surface before sticking the cushion. Press the cushion after sticking it.	"a": 2 mm (0.08 in)
2. Meter cover	

Headlight Cover Cushion Construction

BENJ18K69406004



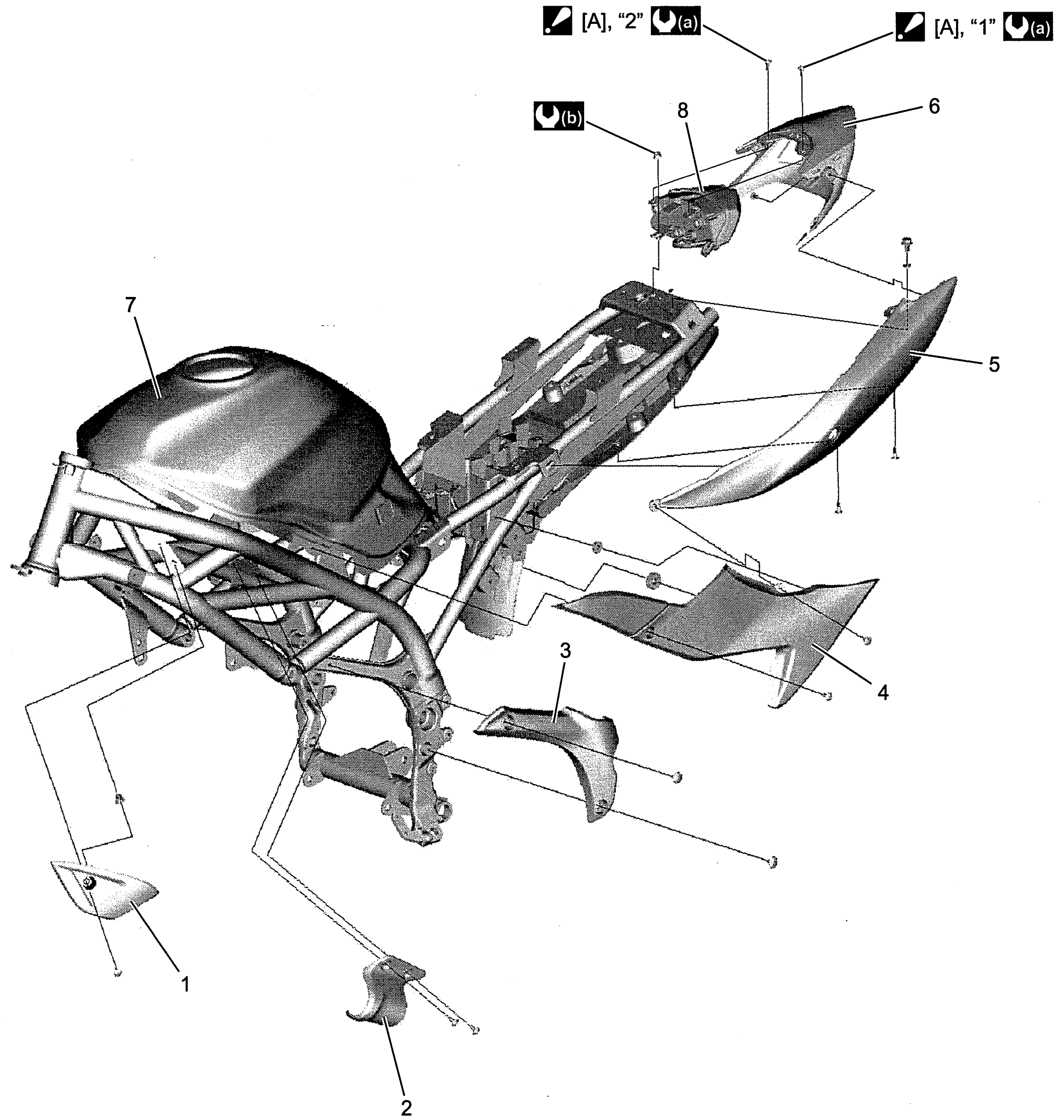
IJ18K1940023-01

[A]: Sticking the cushion to the edge of the housing.	1. Headlight cover cushion : Clean the adhesive surface before sticking the cushion. Press the cushion after sticking it.
[B]: Sticking the cushion to the end of the rib.	2. Headlight cover

Frame Cover Construction

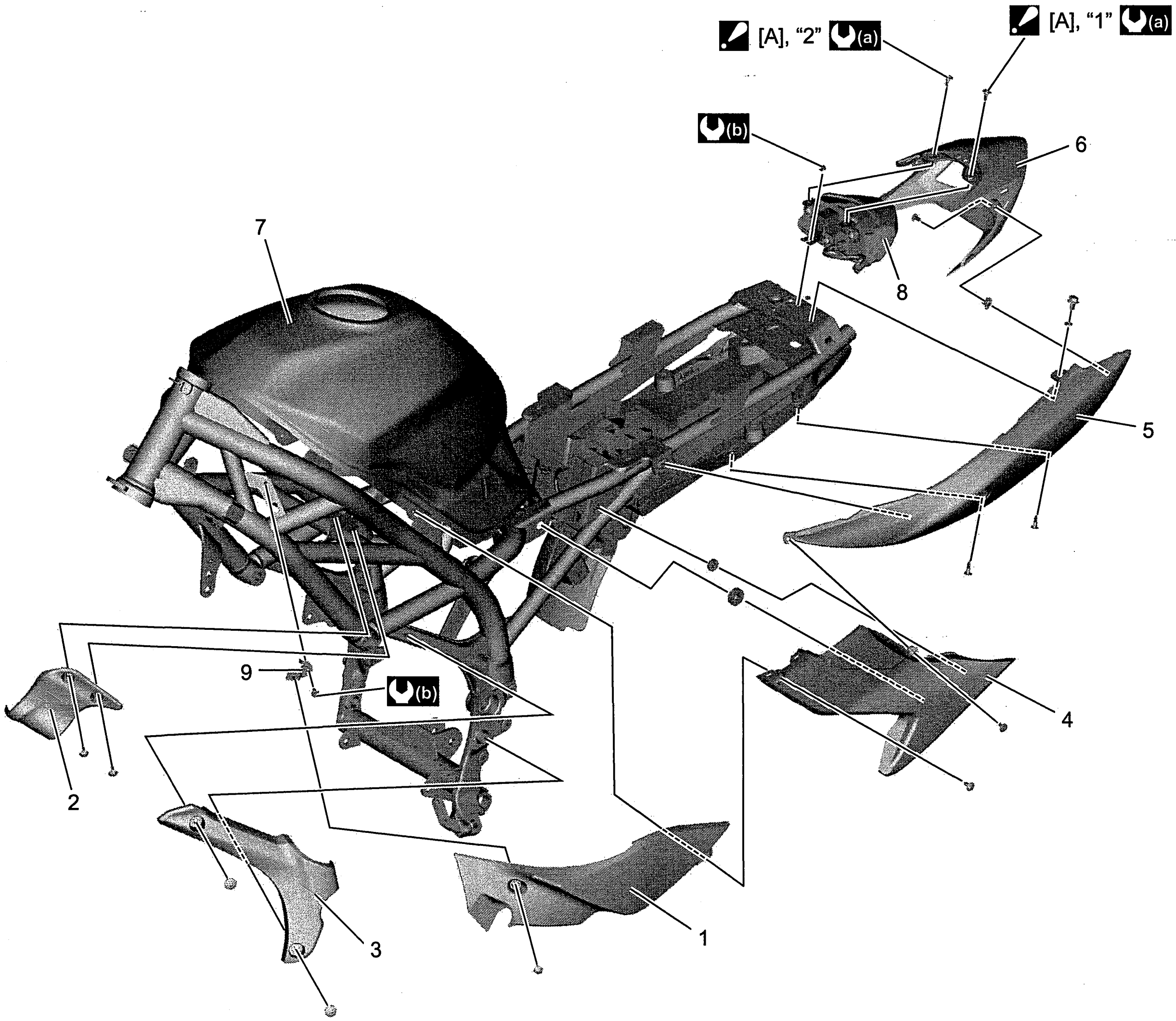
BENJ18K69406005

SV650/A



IJ18K1940020-01

[A]: Tighten the screws in order of "1" → "2".	6. Frame center cover
1. Frame head cover	7. Fuel tank
2. Left frame body rear cover	8. Rear combination light
3. Frame lower cover	(a) : 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)
4. Frame front cover	(b) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
5. Frame rear cover	



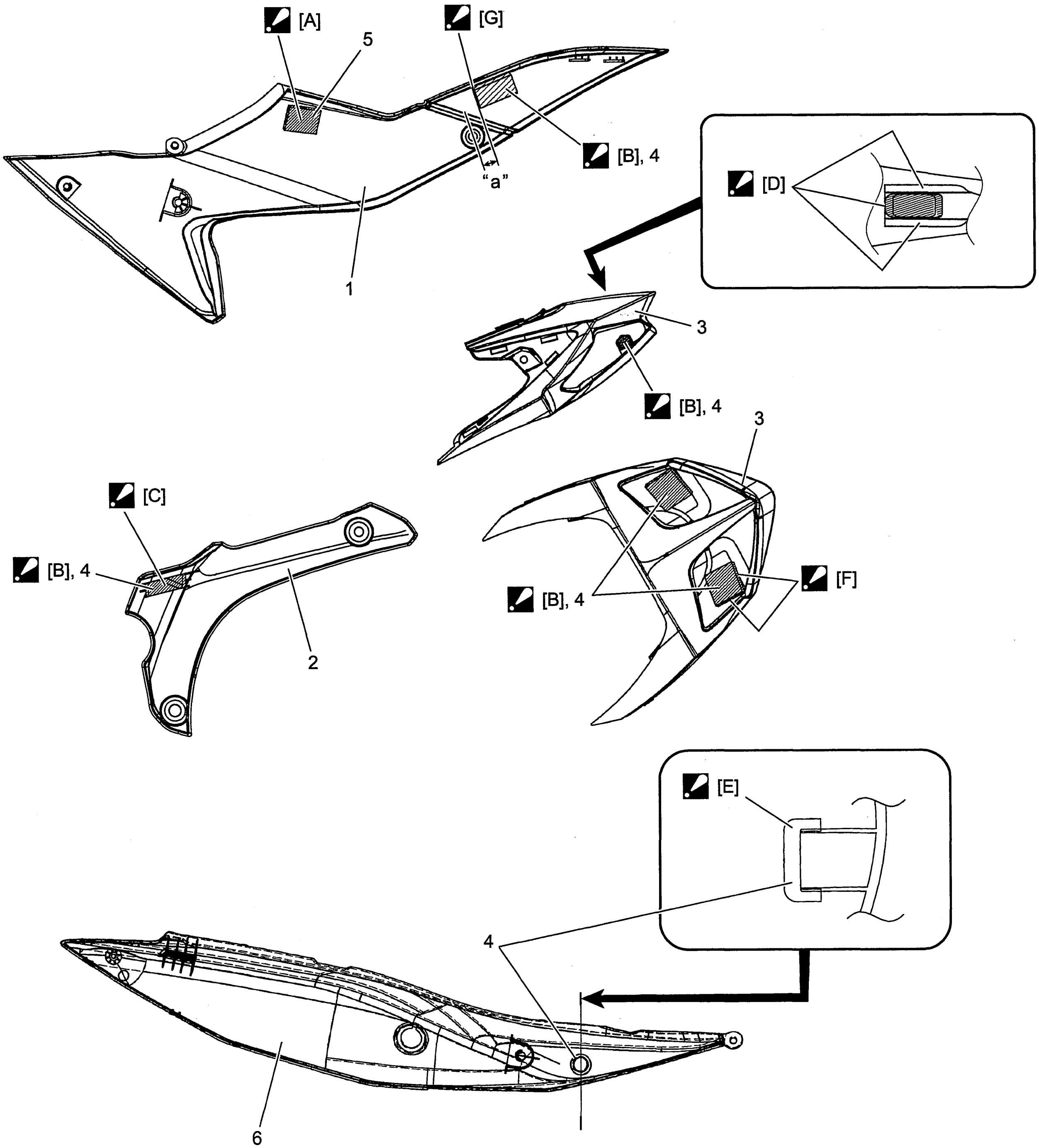
IJ18K1940004-01

[A]: Tighten the screws in order of "1" → "2".	6. Frame center cover
1. Frame upper cover	7. Fuel tank
2. Left frame body rear cover	8. Rear combination light
3. Frame lower cover	9. Frame cover bracket
4. Frame front cover	(a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)
5. Frame rear cover	(b): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

Frame Cover Cushion Construction

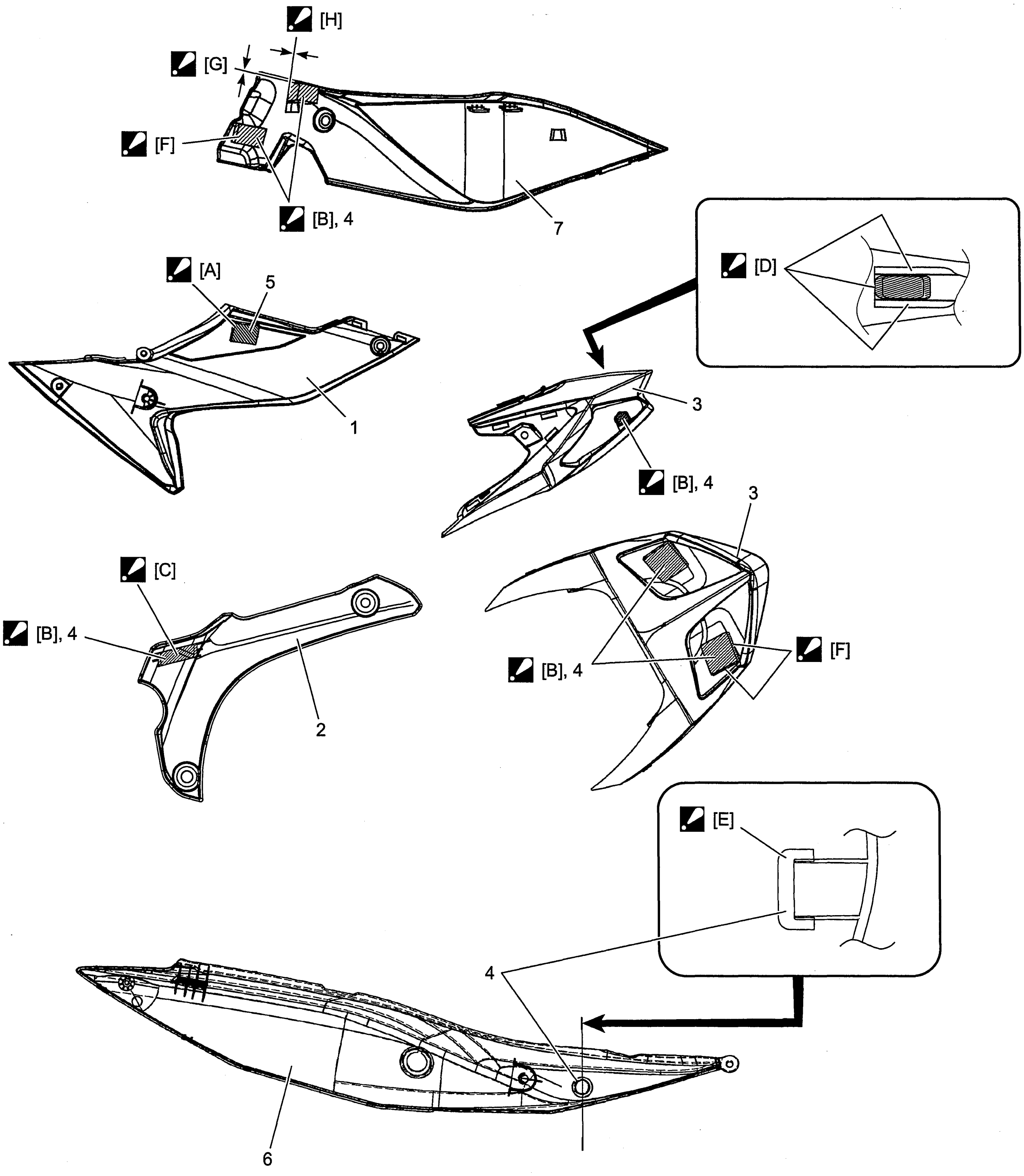
BENJ18K69406006

SV650/A



IJ18K1940024-03

[A]: Clean the adhesive surface before sticking the velcro fastening. Press the velcro fastening after sticking it.	1. Frame front cover

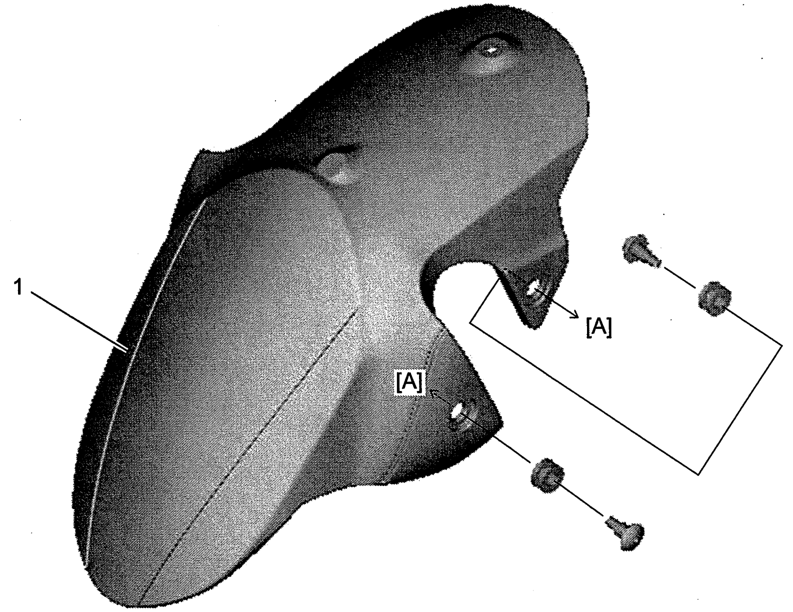


IJ18K1940005-08

[A]: Clean the adhesive surface before sticking the velcro fastening. Press the velcro fastening after sticking it.	1. Frame front cover

Front Fender Construction

BENJ18K69406007

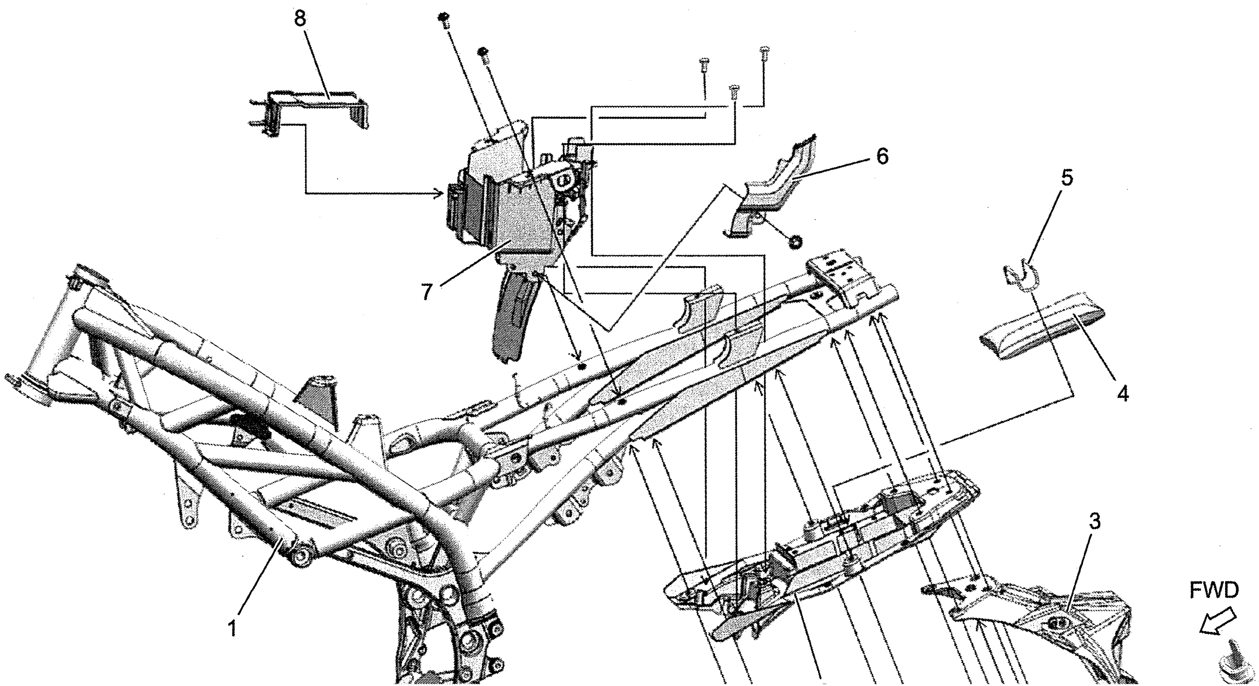


IH18K1940007-02

[A]: To front fork	1. Front fender

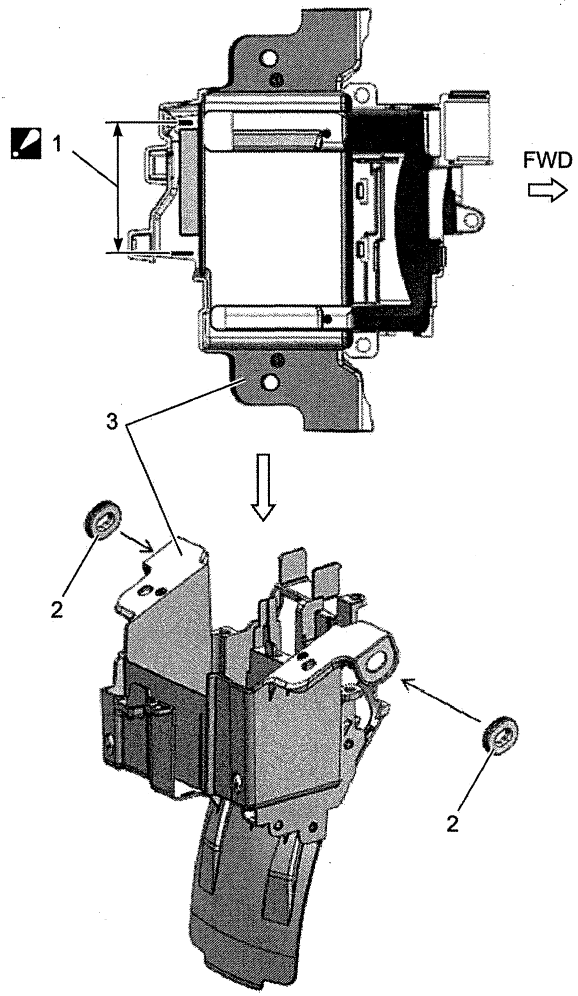
Rear Fender Construction

BENJ18K69406008



Battery Holder Cushion Construction

BENJ18K69406009

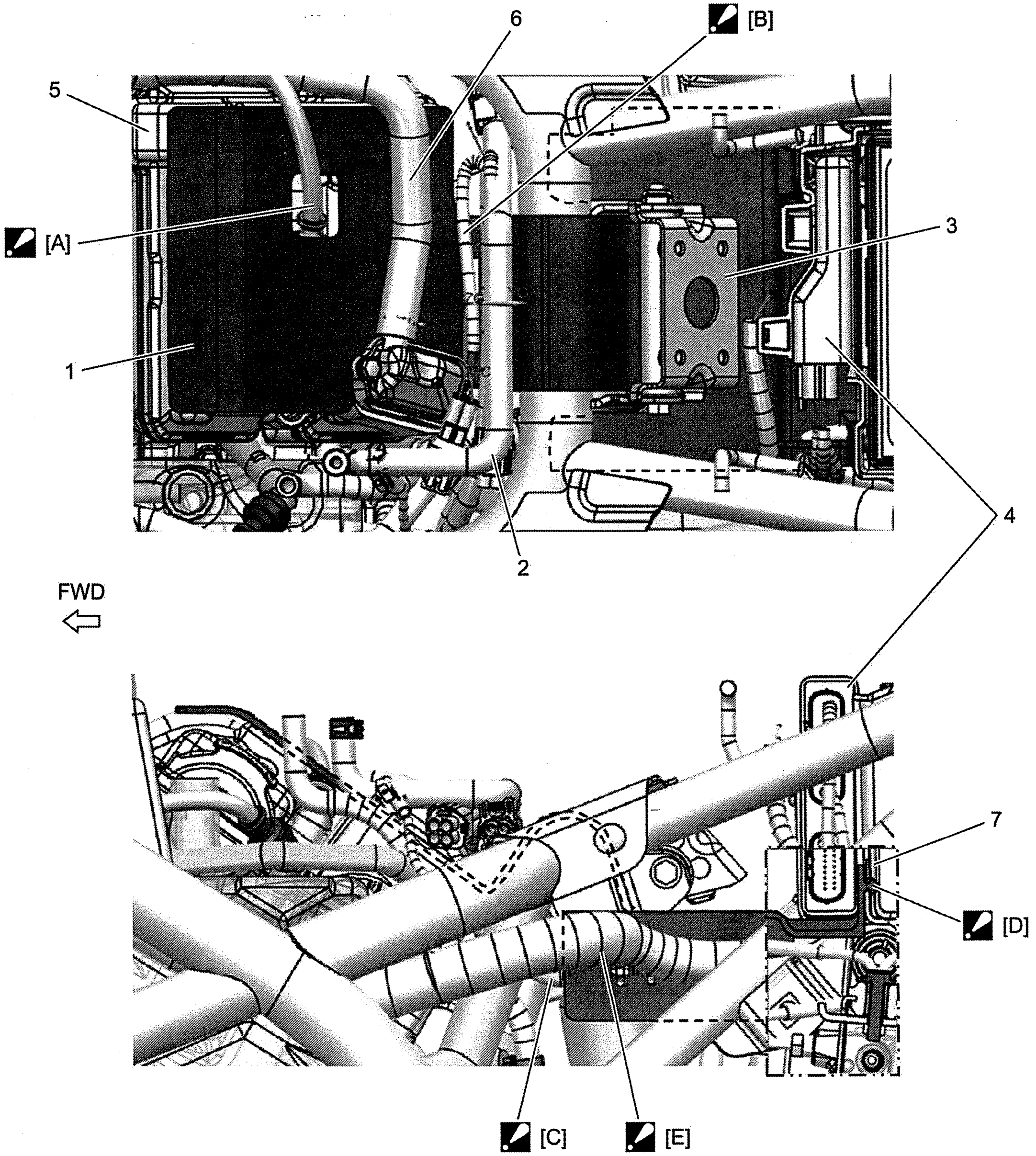


IH18K1940062-01

1.	Battery holder No. 1 cushion : Sticking a cushion between the projection.
2.	Battery holder No. 2 cushion
3.	Battery holder

Heat Shield Rubber Sheet Construction

BENJ18K69406010

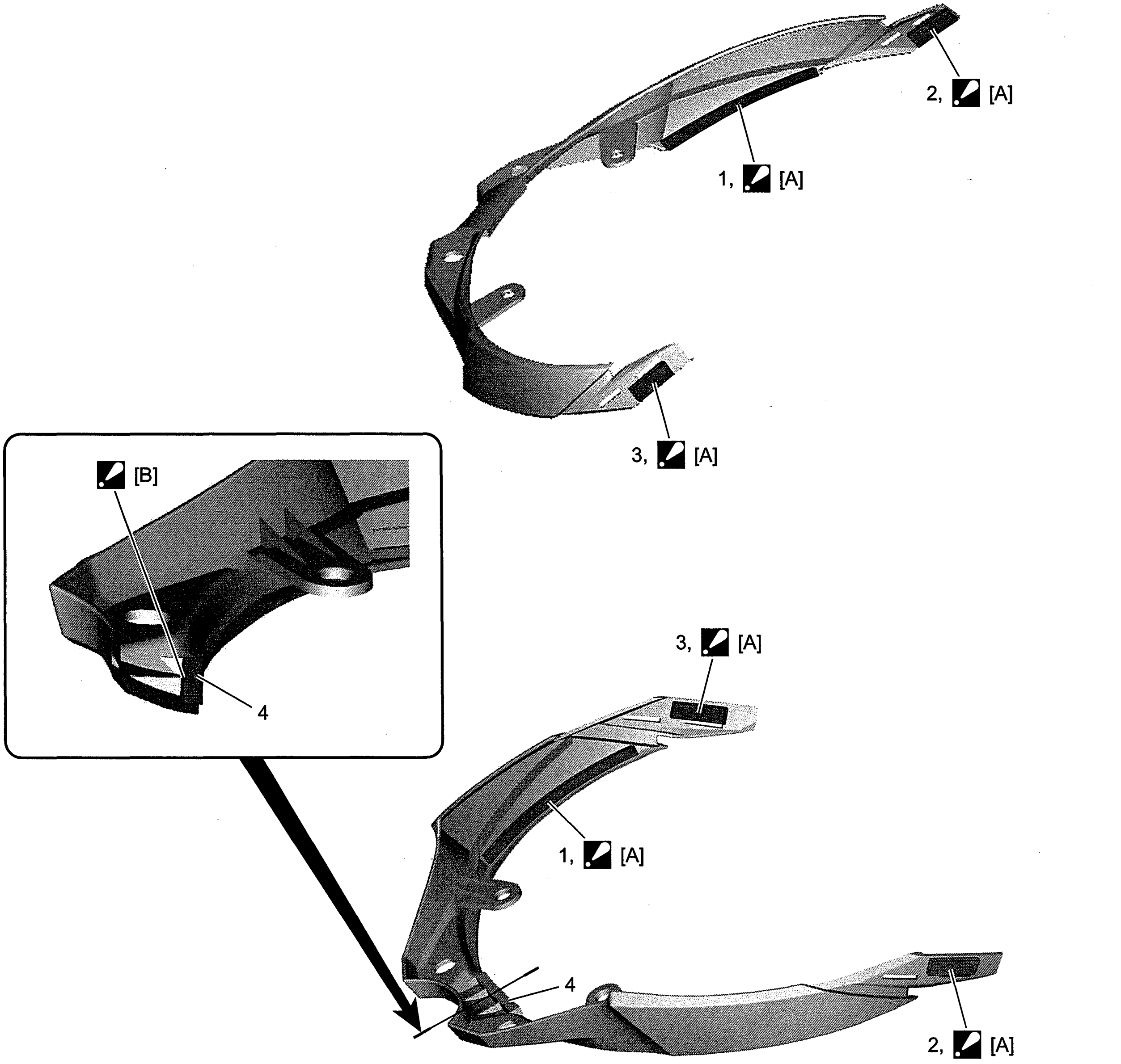


IH18K1940063-01

[A]:	Pass the high-tension cord (center) of ignition coil #2 into the hole of the heat shield rubber sheet.	2.	Fuel tank breather hose
[B]:	Pass the wiring harness over the heat shield rubber sheet.	3.	Fuel tank rear bracket
[C]:	Pass the heat shield rubber sheet inside of the purge hose No. 2 (If equipped).	4.	ECM
[D]:	Fix the bosses of the heat shield rubber sheet into the holes of the battery holder both side firmly.	5.	Rear cylinder
[E]:	Pass the wiring harness outside of the heat shield rubber sheet.	6.	PAIR hose (If equipped)
1.	Heat shield rubber sheet	7.	Battery holder

Fuel Tank Front Cover Cushion Construction

BENJ18K69406011



IH18K1940064-03

[A]: Sticking the cushion aligning with the emboss line of upper.	2. Fuel tank front cover cushion No. 2
[B]: Sticking the cushion aligning with the rib.	3. Fuel tank front cover cushion No. 3
1. Fuel tank front cover cushion No. 1	4. Fuel tank front cover cushion No. 4

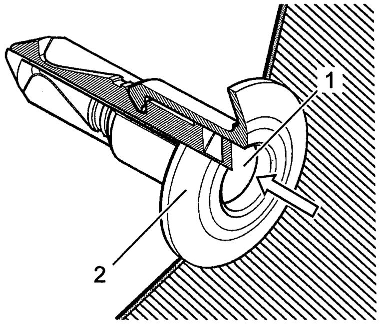
Fastener Removal and Installation

BENJ18K69406012

Type 1

Removal

1) Depress the head of fastener center piece (1).
2) Pull out the fastener (2).



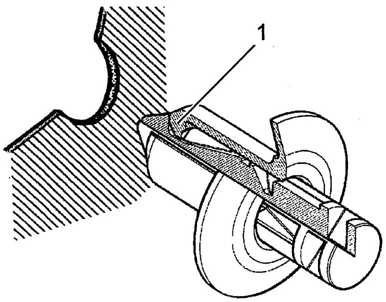
ID26J1940192-01

Installation

1) Let the center piece stick out toward the head so that the pawls (1) closes.
2) Insert the fastener into the installation hole.

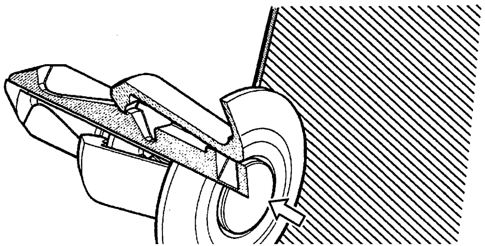
NOTE

To prevent the pawls (1) from damage, insert the fastener all the way into the installation hole.



ID26J1940160-01

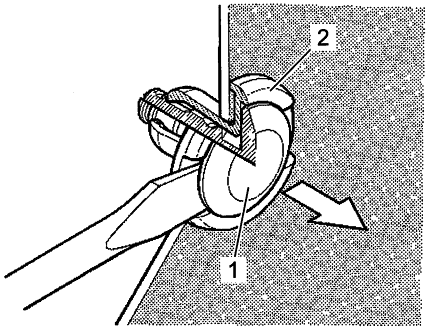
3) Push in the head of center piece until it becomes flush with the fastener outside face.



Type 2

Removal

1) Pry up the head of fastener center piece (1) with a screw driver.
2) Pull out the fastener (2).



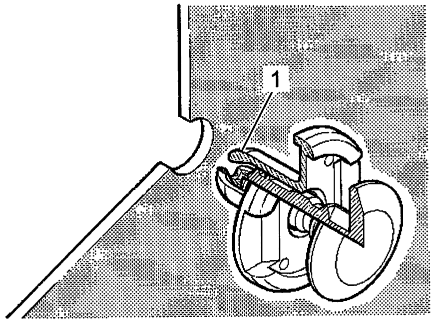
IF04K1940004-01

Installation

1) Insert the fastener into the installation hole.

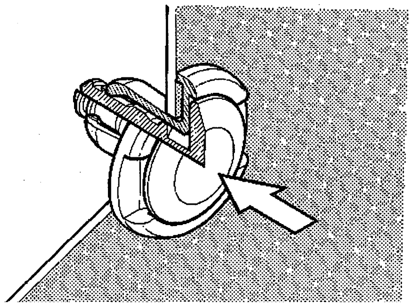
NOTE

To prevent the pawls (1) from damage, insert the fastener all the way into the installation hole.



IF04K1940005-03

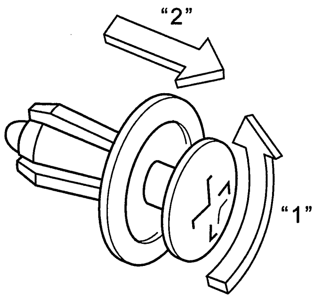
2) Push in the head of center piece.



Type 3

Removal

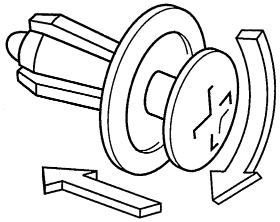
1) Turn the center piece and pull it out in numerical order ("1" – "2").
2) Remove the clip.



IJ19K1940088-01

Installation

1) Keep the pin pulled out to close the claws.
2) Set the clip into the fitting hole.
3) Push in the center piece by turning it.



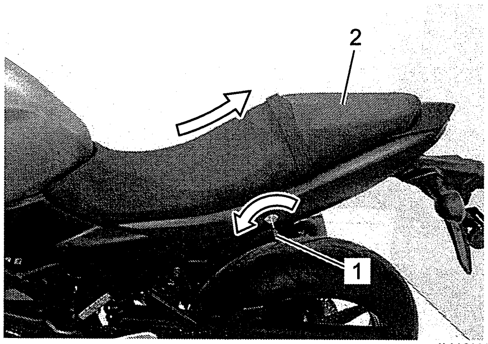
ID26J1940167-01

Seat Removal and Installation

BENJ18K69406013

Removal

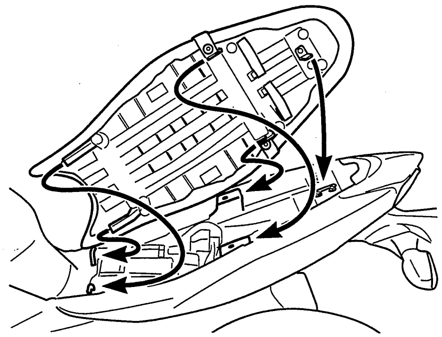
1) Unlock the seat with the ignition key (1).
2) Remove the seat (2).



IH18K1940010-01

Installation

Slide the seat hooks into the seat hook retainers and push down firmly until the seat snaps into the locked position.



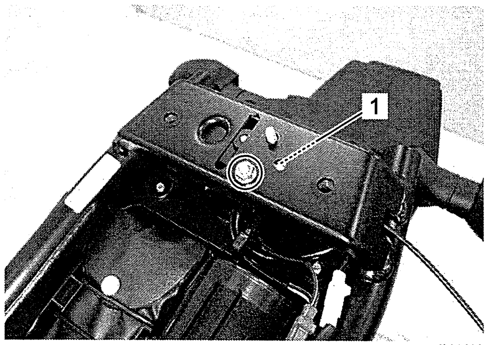
IH18K1940050-01

Seat Lock Cable / Seat Lock Assembly Removal and Installation

BENJ18K69406014

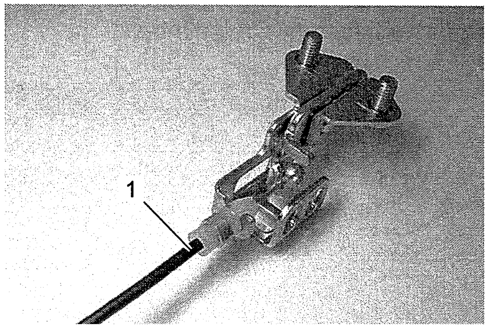
Removal

1) Remove the frame rear covers. Refer to "Frame Rear Cover / Frame Center Cover Removal and Installation" (Page 9D-24).
2) Remove the striker support bracket (1).

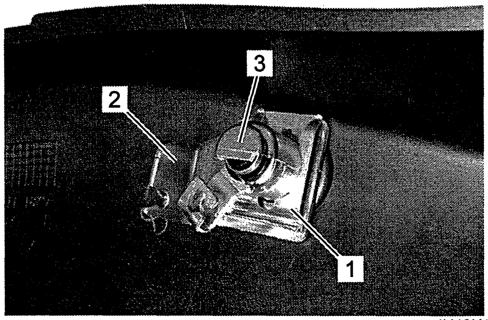


IH18K1940012-02

3) Disconnect the seat lock cable (1) from the striker support bracket.



4) Remove the seat lock assembly plate (1), seat lock cable guide (2) and seat lock assembly (3).

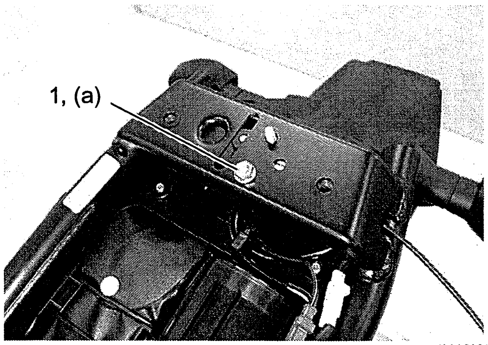


IH18K1940014-01

Installation

1) Install the seat lock assembly and seat lock cable. Refer to "Seat Lock Cable Routing Diagram" (Page 9D-1).
2) Tighten the striker support bracket nut (1) to the specified torque.

Tightening torque
Striker support bracket nut (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IH18K1940015-02

3) Install the frame rear covers. Refer to "Frame Rear Cover / Frame Center Cover Removal and Installation" (Page 9D-24).

Rear View Mirror Removal and Installation (SV650XA)

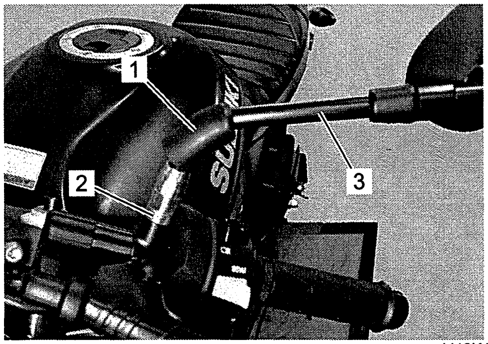
BENJ18K69406015

NOTE

The same procedures are applicable to both right and left parts.

Removal

1) Remove the boot (1).
2) Loosen the adapter (2) and remove the rear view mirror (3).



IJ18K1940006-02

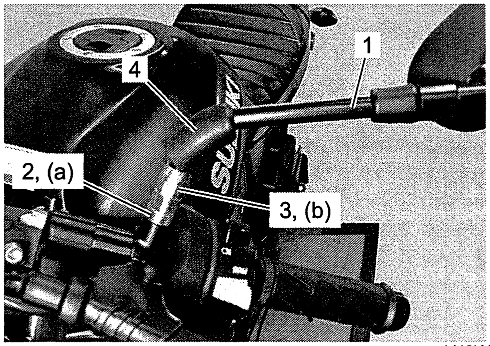
Installation

1) Install the rear view mirror (1) and tighten the adapter (2) and adapter nut (3) to the specified torque. Refer to "Handlebar Construction" in Section 6B (Page 6B-3).

NOTE

The adapter nut (3) has left-hand threads.

Tightening torque
Rear view mirror adapter (a): 30 N·m (3.1 kgf-m, 22.5 lbf-ft)
Rear view mirror adapter nut (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



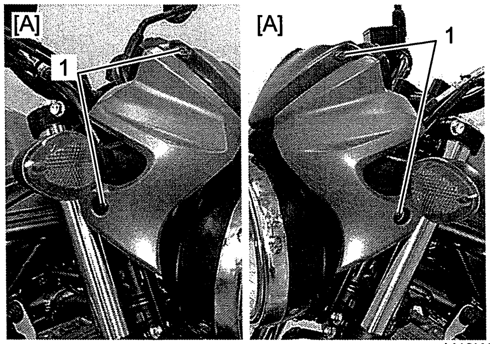
IJ18K1940007-01

Meter Cover / Headlight Cover Removal and Installation

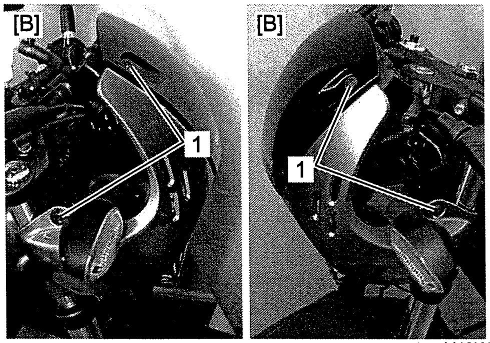
BENJ18K69406016

Removal

1) Remove the meter cover screws (1).



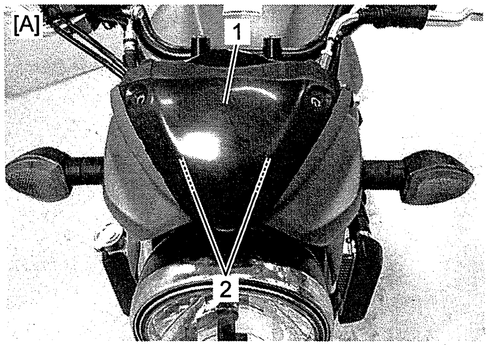
IJ18K1940008-02



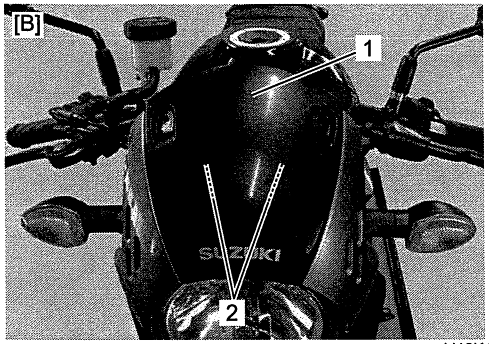
IJ18K1940009-02

[A]: SV650/A	[B]: SV650XA

2) Remove the meter cover assembly (1).



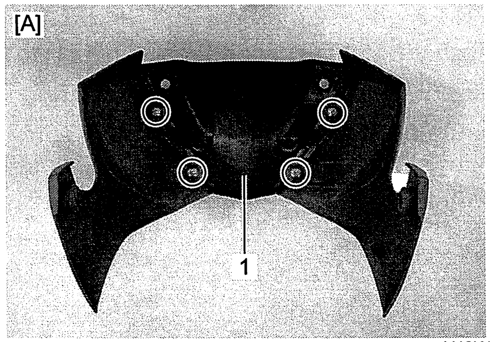
IJ18K1940010-01



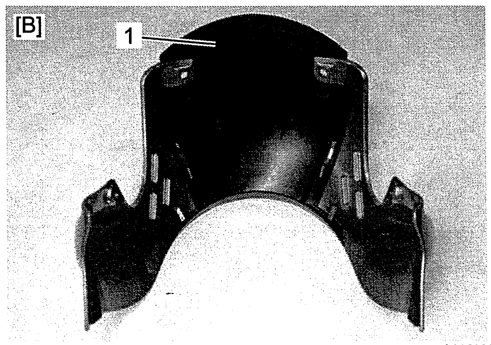
IJ18K1940011-01

[A]: SV650/A	[B]: SV650XA
2. Hooked point	

3) Remove the meter center cover (1) from meter covers.



IJ18K1940012-01

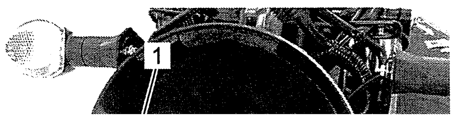


IJ18K1940013-01

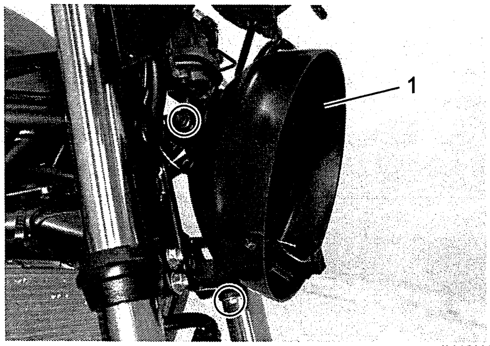
[A]: SV650/A	[B]: SV650XA

4) Remove the headlight. ☞(Page 9B-4)

5) Release the clamp (1) from the lead wires.



6) Remove the headlight cover (1).



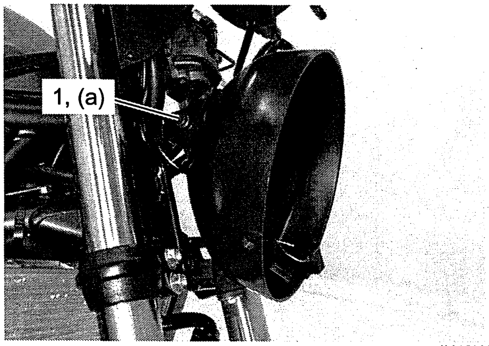
IH18K1940019-01

Installation

Install the meter cover and headlight cover in the reverse order of removal. Pay attention to the following points:

- Pass the headlight lead wire, position light lead wire (if equipped), speed sensor (without ABS) and front turn signal light lead wires into the headlight cover. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).
- Tighten the headlight cover bolt (1) to the specified torque.

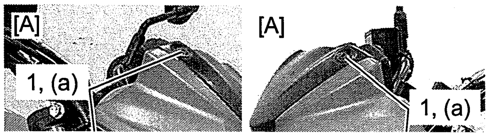
Tightening torque
Headlight cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

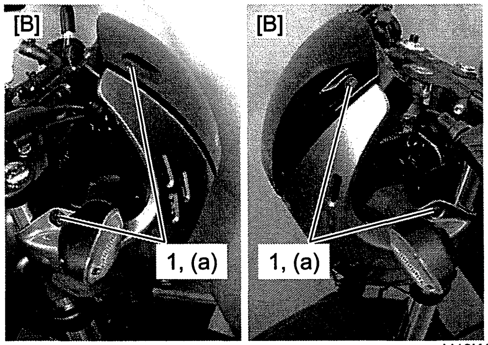


IH18K1940021-01

- Tighten the meter cover screws (1) to the specified torque.

Tightening torque
Meter cover screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)





IJ18K1940015-02

[A]: SV650/A	[B]: SV650XA

- After installing, be sure to adjust the headlight beam. ☞(Page 9B-5)

Frame Head Cover Removal and Installation (SV650/A)

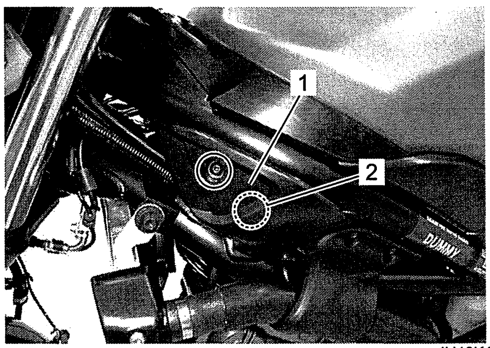
BENJ18K69406017

NOTE

To removal and installation the frame head cover, the same procedures are applicable to both the right and left parts.

Removal

Remove the frame head cover (1).



IH18K1940023-02

2. Hooked point

Installation

Install the frame head cover in the reverse order of removal.

Left Frame Body Rear Cover Removal and Installation

BENJ18K69406018

Removal

1) For SV650XA, remove the left frame front cover assembly. ☞(Page 9D-23)
2) Remove the left frame body rear cover (1).

IH18K1940024-01

Installation

Install the left frame body rear cover in the reverse order of removal.

Frame Lower Cover Removal and Installation

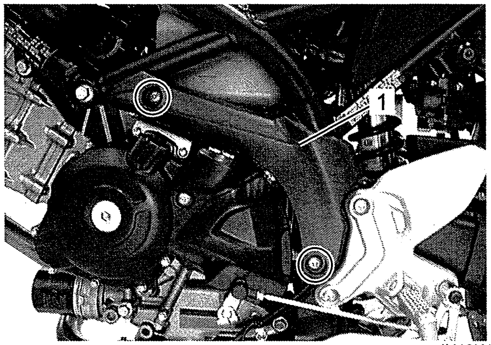
BENJ18K69406019

NOTE

To removal and installation the frame lower cover, the same procedures are applicable to both the right and left parts.

Removal

Remove the frame lower cover (1).



IH18K1940025-01

Installation

Install the frame lower cover in the reverse order of removal. Pay attention to the following point.

Frame Front Cover Removal and Installation (SV650/A)

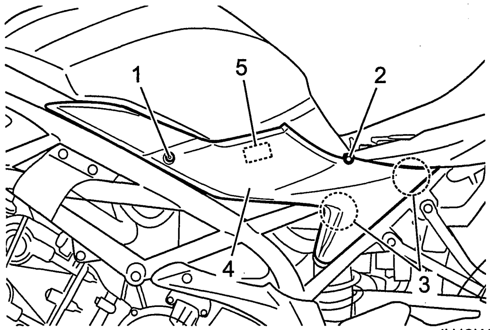
BENJ18K69406020

NOTE

To removal and installation the frame front cover, the same procedures are applicable to both the right and left parts.

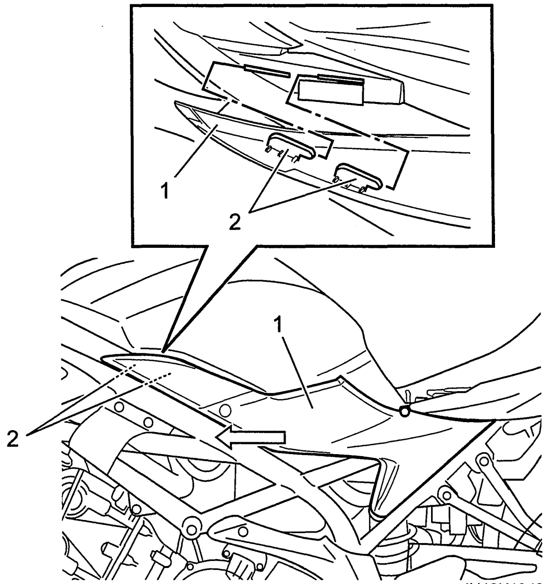
Removal

1) Remove the seat. ☞(Page 9D-18)
2) Remove the screw (1) and clip (2).
3) Pull off the hooks (3).
4) Pull up the frame front cover (4) to unfasten the fastener (5).



IH18K1940026-03

5) Move the frame front cover (1) to the arrowed direction to unhook the hooks (2).
6) Remove the frame front cover (1).

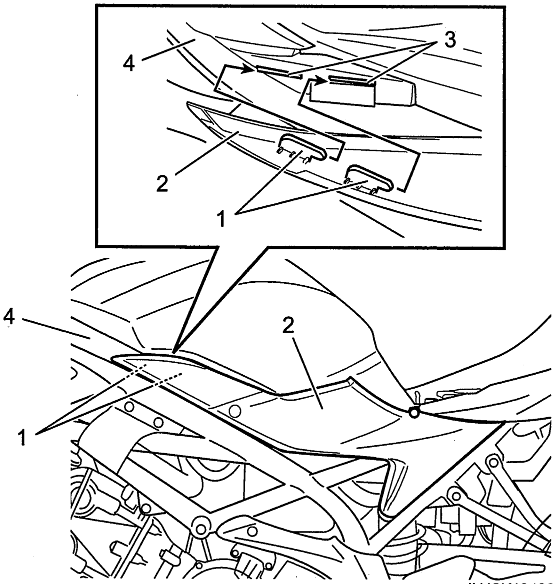


IH18K1940027-03

Installation

Install the frame front cover in the reverse order of removal. Pay attention to the following point:

- Insert the hooks (1) of the frame front cover (2) into the holes (3) of the fuel tank front cover (4).



IH18K1940028-02

Frame Front Cover / Frame Upper Cover Removal and Installation (SV650XA)

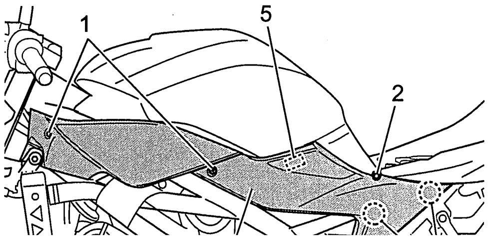
BENJ18K69406021

NOTE

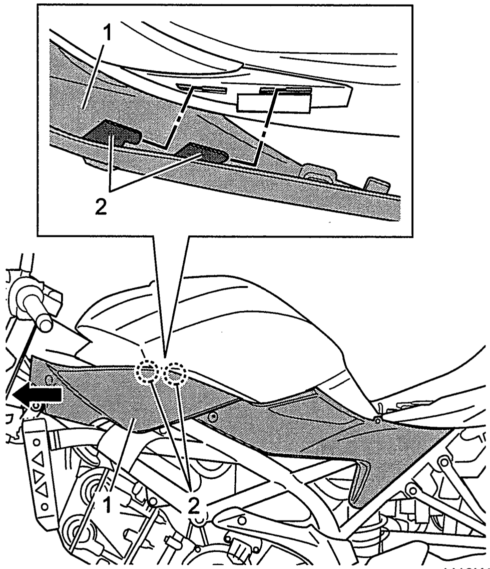
To removal and installation the frame front cover and frame upper cover, the same procedures are applicable to both the right and left parts.

Removal

1) Remove the seat. ☞(Page 9D-18)
2) Remove the screws (1) and clip (2).
3) Pull off the hooks (3).
4) Pull up the frame front cover assembly (4) to unfasten the fastener (5).

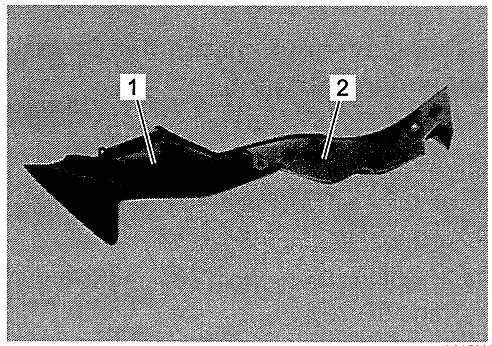


5) Move the frame front cover assembly (1) to the arrowed direction to unhook the hooks (2).
6) Remove the frame front cover assembly (1).



IJ18K1940017-03

7) Remove the frame front cover (1) from the frame upper cover (2).

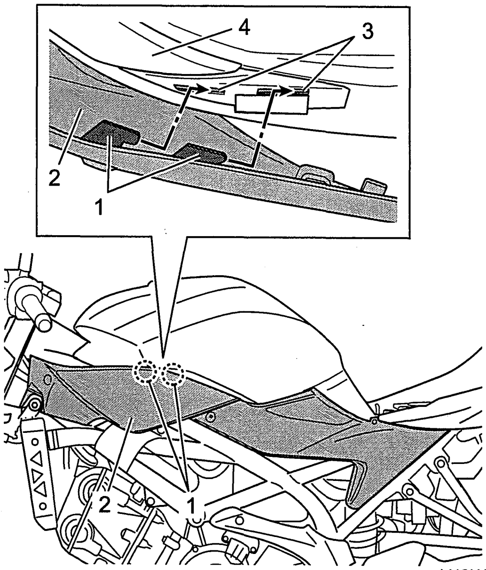


IJ18K1940018-01

Installation

Install the frame front cover and frame upper cover in the reverse order of removal. Pay attention to the following point:

- Insert the hooks (1) of the frame front cover assembly (2) into the holes (3) of the fuel tank front cover (4).



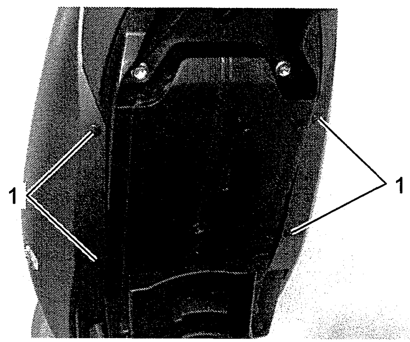
IJ18K1940019-01

Frame Rear Cover / Frame Center Cover Removal and Installation

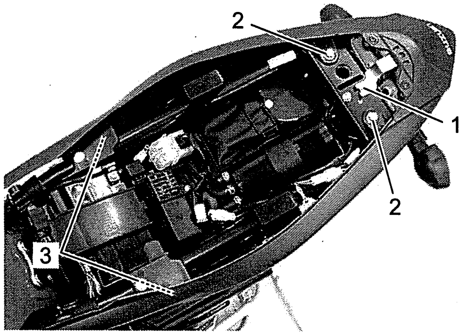
BENJ18K69406022

Removal

1) Remove the seat. ☞(Page 9D-18)
2) Remove the following parts.
   - Right and left frame front covers (SV650/A): ☞(Page 9D-22)
   - Right and left frame front cover assemblies (SV650XA): ☞(Page 9D-23)
3) Remove the fasteners (1). ☞(Page 9D-17)

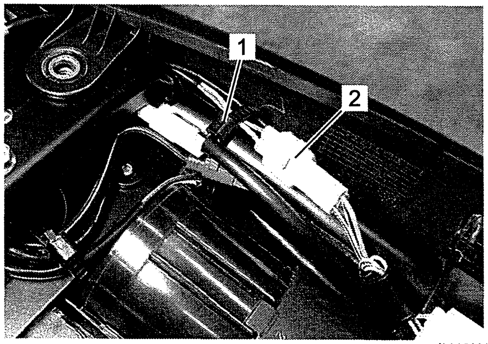


4) Remove the striker support bracket nut (1) and frame rear cover bolts (2).
5) Pull off the hooks (3) of frame rear cover.



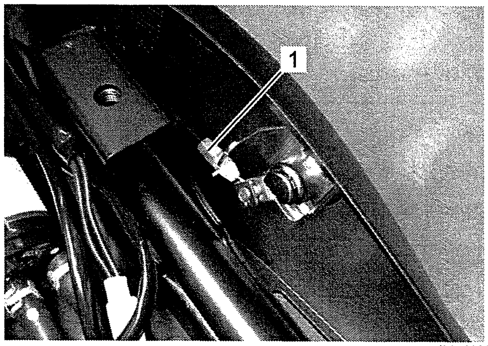
IH18K1940030-03

6) Disconnect the clamp (1) and rear combination light coupler (2).



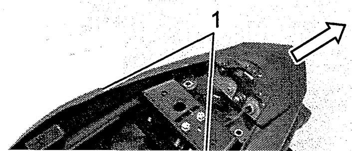
IH18K1940031-03

7) Remove the seat lock cable (1).



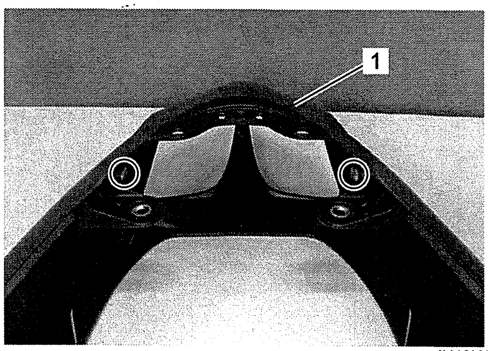
IH18K1940032-01

8) Remove the frame rear covers (1) to backward.



9) Remove the rear combination light. ☞(Page 9B-7)

10) Remove the frame center cover (1) from the frame rear covers.



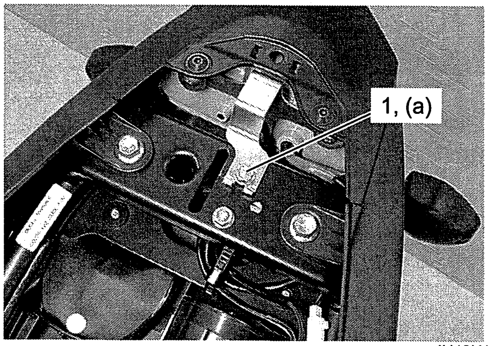
IH18K1940034-01

Installation

Install the frame rear cover and frame center cover in the reverse order of removal. Pay attention to the following point:

- Tighten the striker support bracket nut (1) to the specified torque.

  Tightening torque
  Striker support bracket nut (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IH18K1940065-01

Front Fender Removal and Installation

BENJ18K69406023

Refer to “Front Fork Assembly Removal and Installation” in Section 2B (Page 2B-3).

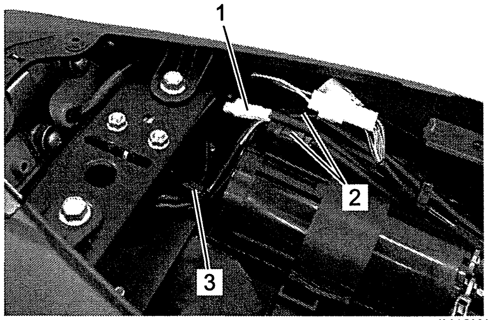
Rear Fender Removal and Installation

BENJ18K69406024

Removal

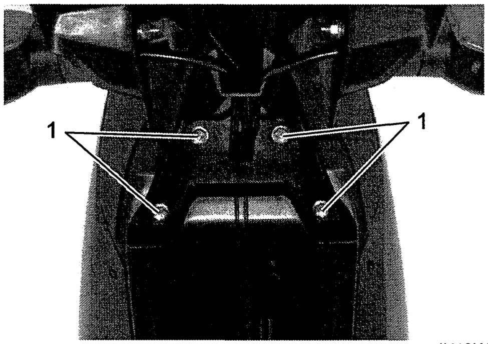
1) Remove the seat. ☞(Page 9D-18)

2) Disconnect the license plate light lead wire coupler (1) and rear turn signal light lead wire couplers (2)



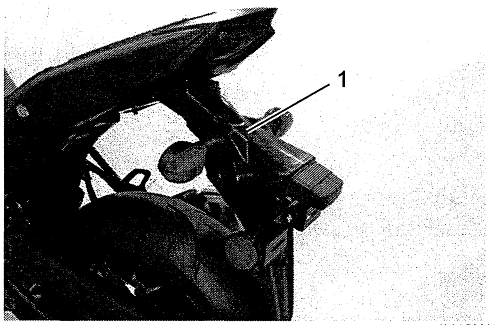
IH18K1940035-04

4) Remove the bolts (1).



IH18K1940036-01

5) Remove the rear fender rear (1).



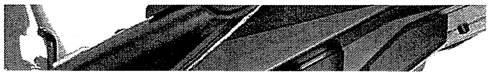
IH18K1940037-01

6) Remove the following parts from the rear fender rear.
   - Rear turn signal lights: ☞(Page 9B-13)
   - License plate light: ☞(Page 9B-9)
   - Rear reflex reflector: ☞(Page 9B-10)

7) Remove the frame rear covers. ☞(Page 9D-24)

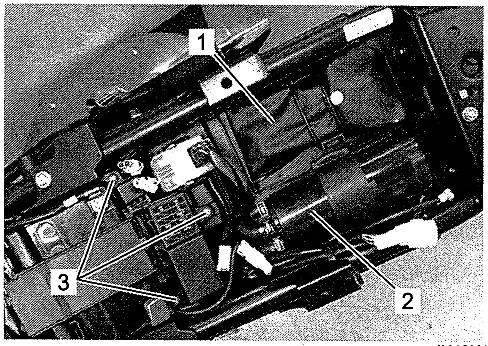
8) Remove the fastener (1). ☞(Page 9D-17)

9) Remove the battery holder cover (2).



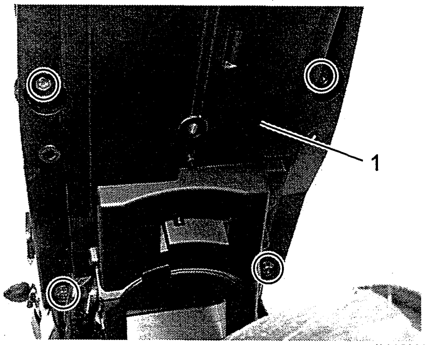
10) Remove the tool assembly (1) and EVAP canister (2) (if equipped) from the rear fender front.

11) Remove the screws (3).



IH18K1940038-02

12) Remove the rear fender front (1).



IH18K1940039-02

Installation

Install the rear fender in the reverse order of removal.
Pay attention to the following point:

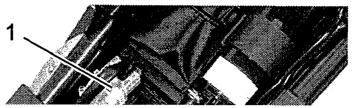
- Route the rear turn signal light lead wires and license plate light lead wire correctly. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-15).

Battery Holder Removal and Installation

BENJ18K69406025

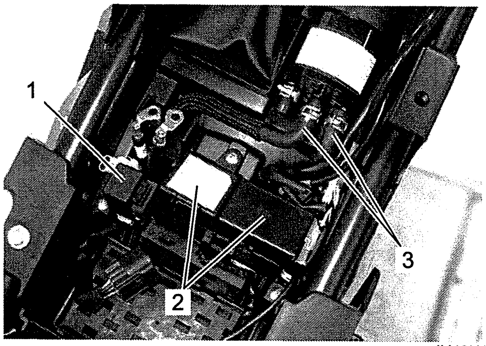
Removal

1) Remove the battery. ☞(Page 1J-13)
2) Remove the frame rear covers. ☞(Page 9D-24)
3) Remove the starter relay (1). ☞(Page 1I-6)
4) Remove the ECM (2). ☞(Page 1C-4)



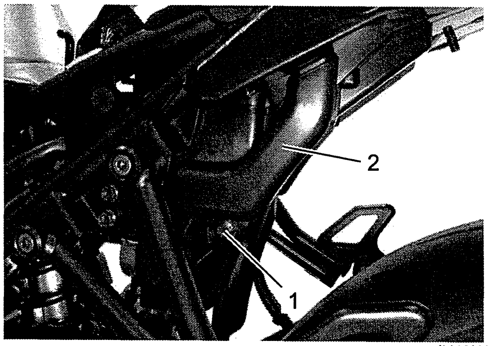
5) Remove the turn signal relay (1) and fuse box/relay box (2).

6) Disconnect the purge hoses (3) (If equipped).



IH18K1940041-02

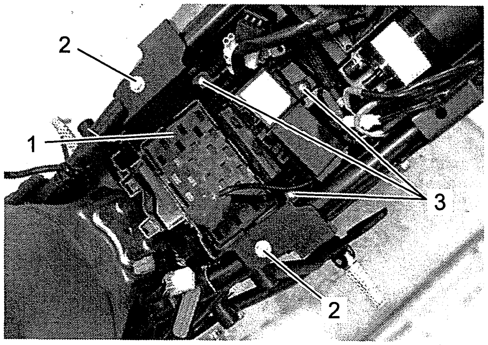
7) Remove the fastener (1) and battery holder cover (2).



IH18K1940042-01

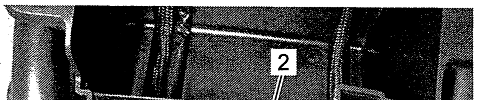
8) Remove the battery protector (1).

9) Remove the bolts (2) and screws (3).

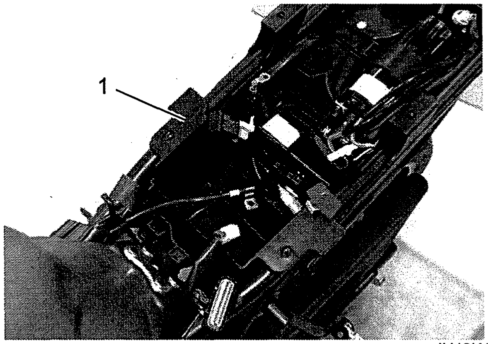


IH18K1940044-01

10) Remove the boss (1) of the heat shield rubber sheet from the battery holder (2).



11) Remove the battery holder (1).

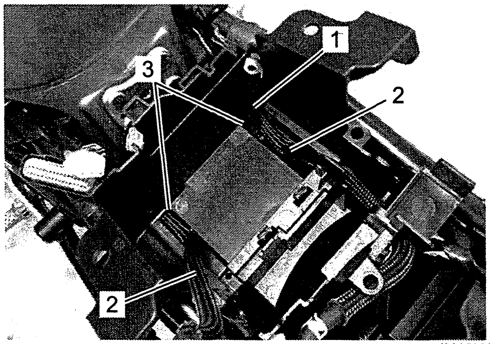


IH18K1940048-01

Installation

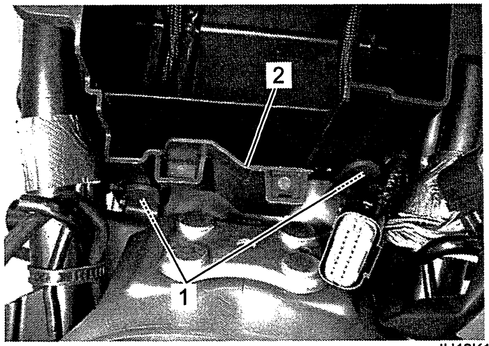
Install the battery holder in the reverse order of removal. Pay attention to the following points:

- Pass the starter motor lead wire (1) and purge hoses (2) (if equipped) into the holes (3) of battery holder. Refer to "EVAP Canister Hose Routing Diagram (If Equipped)" in Section 1B (Page 1B-8).



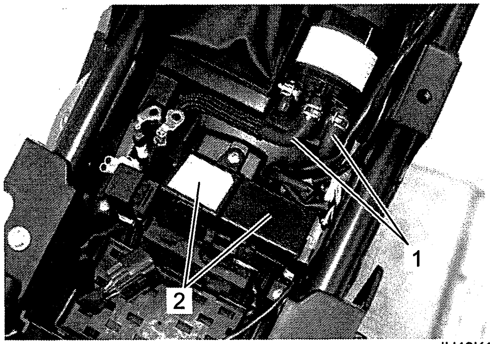
IH18K1940046-02

- Fix the boss (1) of the heat shield rubber sheet to the battery holder (2) firmly. Refer to "Heat Shield Rubber Sheet Construction" (Page 9D-15).



IH18K1940047-02

- Connect purge hoses (1) (If equipped). Refer to "EVAP Canister Hose Routing Diagram (If Equipped)" in Section 1B (Page 1B-8).
- Pass the wiring harness under the fuse box/relay box (2). Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-15).



IH18K1940049-03

Specifications

Tightening Torque Specifications

BENJ18K69407001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Striker support bracket nut	5.5	0.56	4.05	☞(Page 9D-19) / ☞(Page 9D-25)
Rear view mirror adapter	30	3.1	22.5	☞(Page 9D-19)
Rear view mirror adapter nut	18	1.8	13.5	☞(Page 9D-19)
Headlight cover bolt	10	1.0	7.5	☞(Page 9D-21)
Meter cover screw	5.5	0.56	4.05	☞(Page 9D-21)

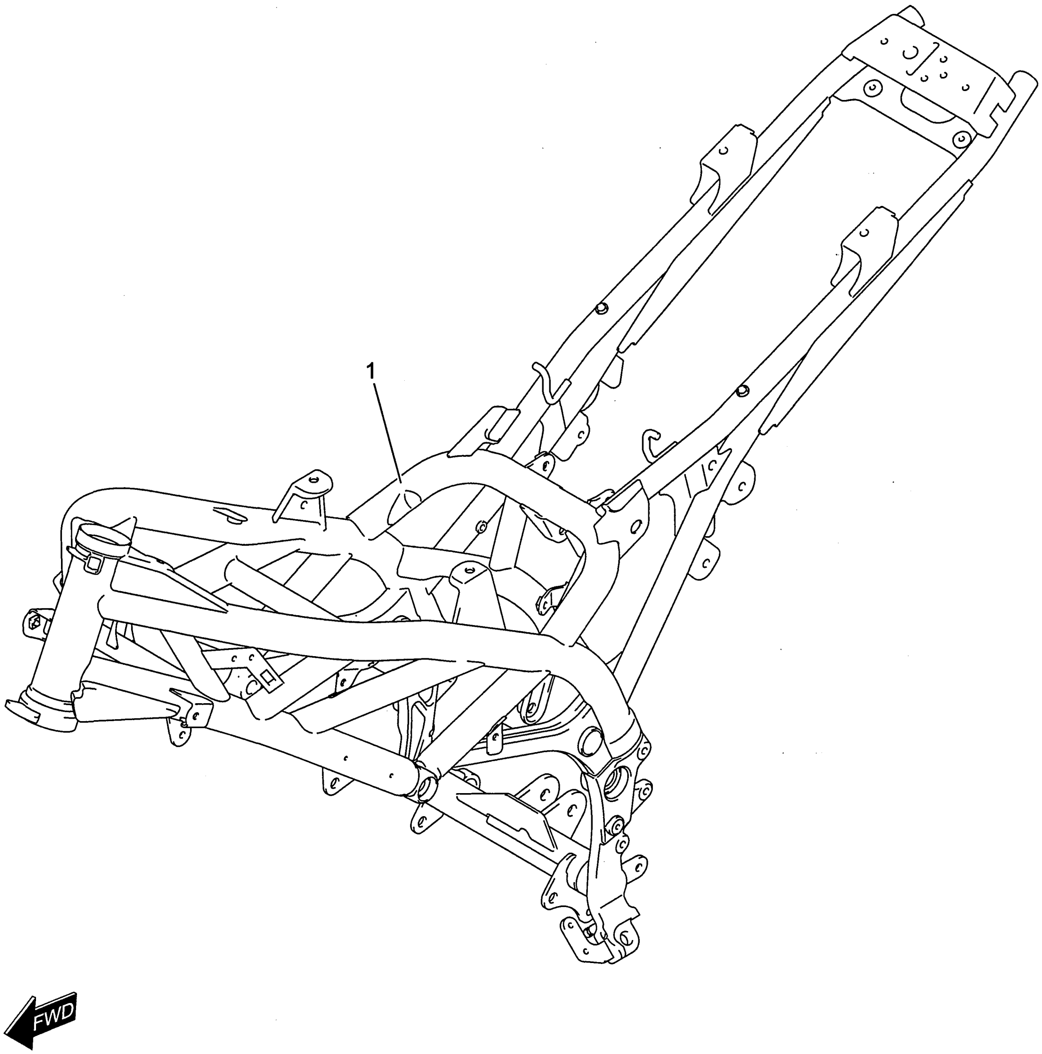
Reference:
For the tightening torques of fasteners not specified in this page, refer to:

Body Structure

Repair Instructions

Body Frame Construction

BENJ18K69506001

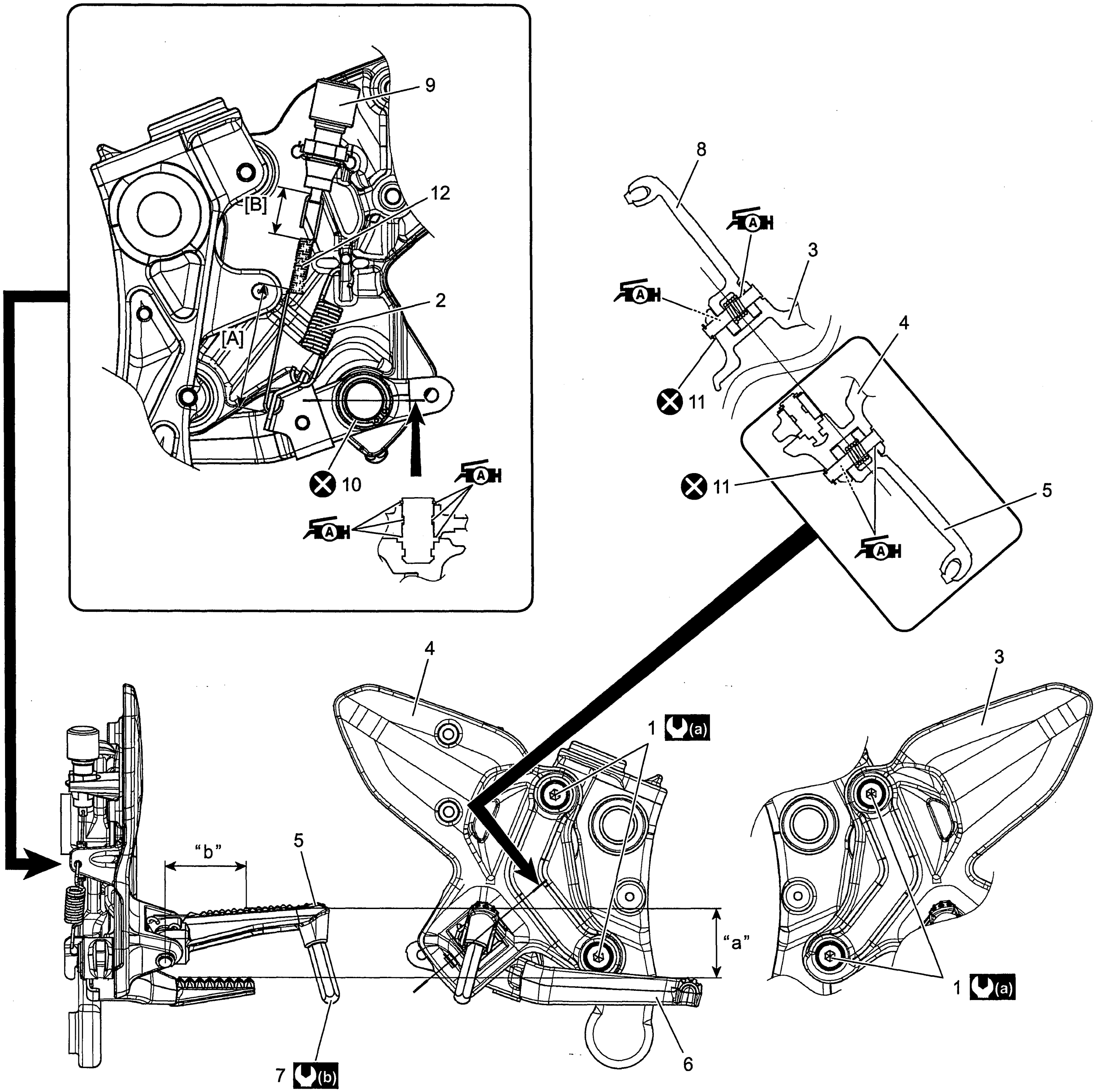


IH18K1950004-01

1.	Frame

Front Footrest Construction

BENJ18K69506002

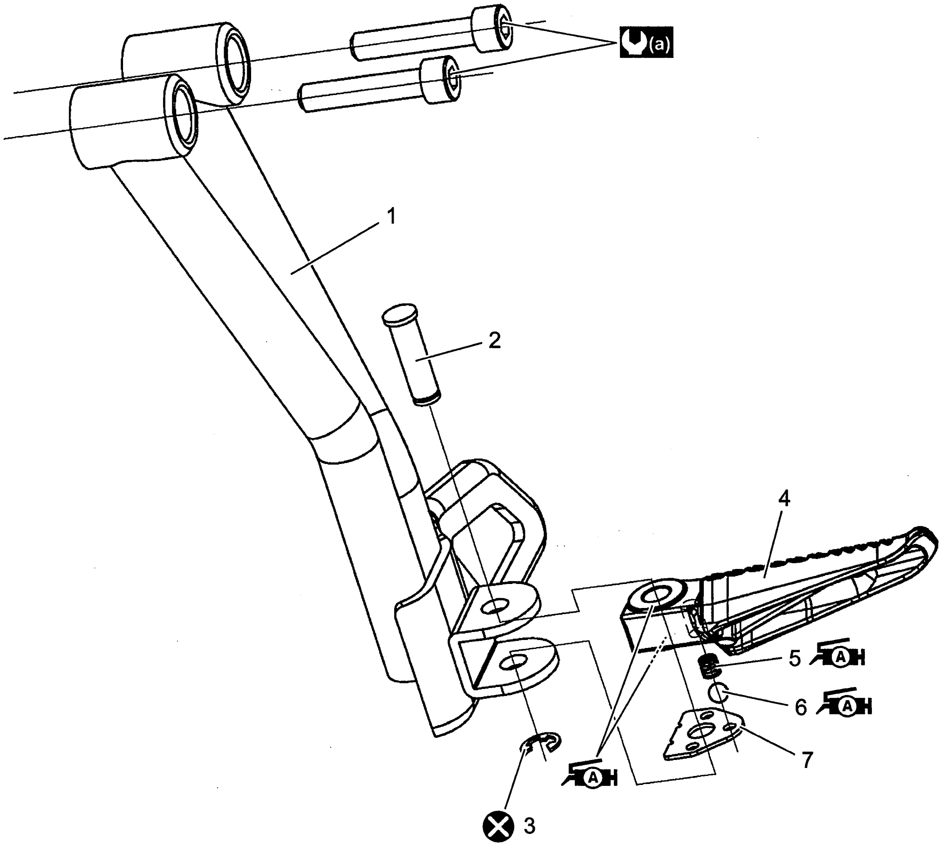


IH18K1950005-01

[A]:	Long	6.	Rear brake pedal	"a":	45 – 55 mm (1.8 – 2.1 in)
[B]:	Short	7.	Bank sensor bolt	"b":	51.5 mm (2.03 in)
1.	Front footrest bracket mounting bolt	8.	Front footrest bar (Left)	(a) :	23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2.	Rear brake pedal spring	9.	Rear brake light switch	(b) :	18 N·m (1.8 kgf-m, 13.5 lbf-ft)
3.	Front footrest bracket (Left)	10.	Snap ring	AH :	Apply grease to the sliding surface.
4.	Front footrest bracket (Right)	11.	E-ring	⊗ :	Do not reuse.
5.	Front footrest bar (Right)	12.	Rear brake light switch spring		

Pillion Footrest Construction

BENJ18K69506004



IH18K1950006-01

1. Pillion footrest bracket	6. Ball
2. Pillion footrest pin	7. Plate
3. E-ring	(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
4. Pillion footrest bar	AH : Apply grease.
5. Spring	: Do not reuse.

Pillion Footrest Removal and Installation

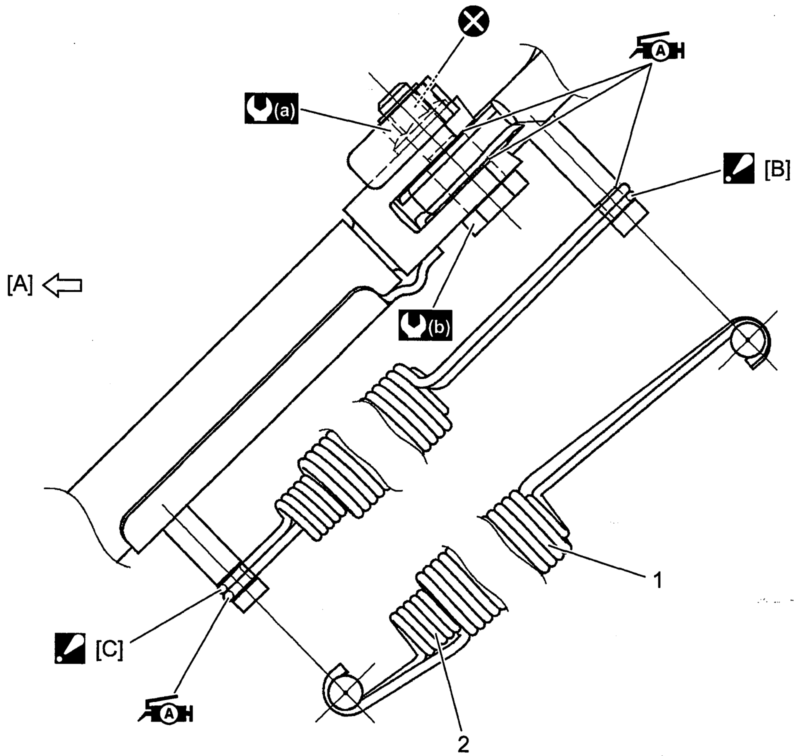
BENJ18K69506005

Refer to “Pillion Footrest Construction” (Page 9E-3).

Side-stand Construction

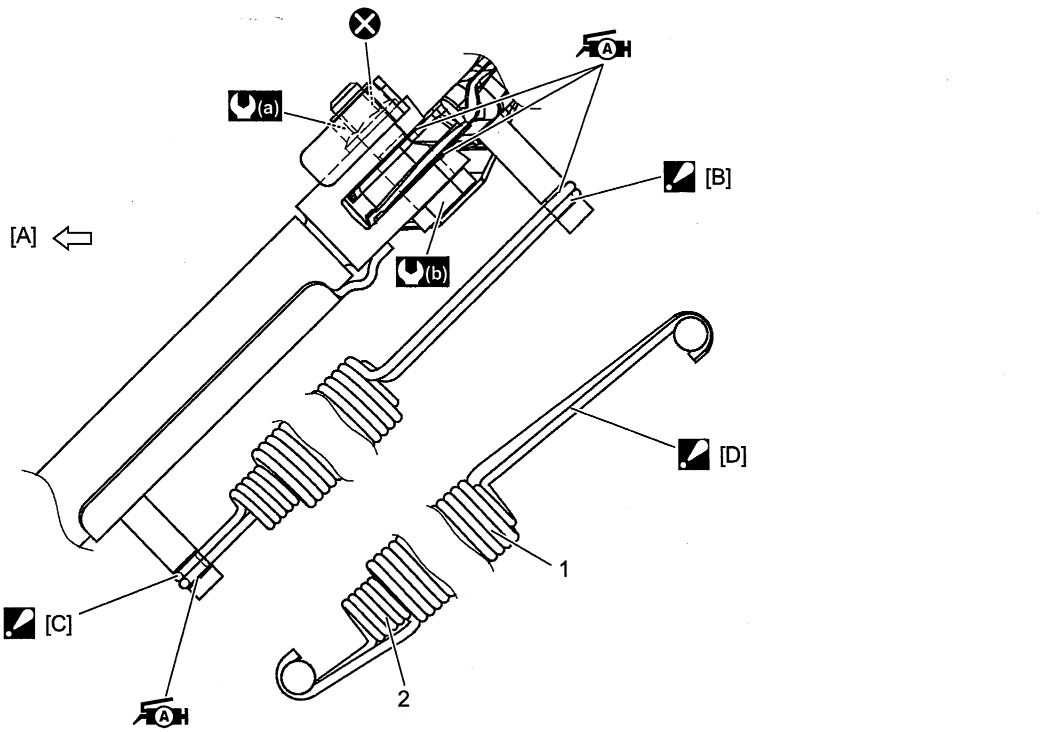
BENJ18K69506006

L7



IH18K1950007-01

[A]:	Outside	1.	Outer spring	(b) :	10 N·m (1.0 kgf-m, 7.5 lbf-ft)
[B]:	Set the inner spring in the inside of motorcycle.	2.	Inner spring	:	Apply grease to the sliding surface.
[C]:	Set the inner spring in the outside of motorcycle.	(a) :	40 N·m (4.1 kgf-m, 29.5 lbf-ft)	:	Do not reuse.



[A]:	Outside	1.	Outer spring	A :	Apply grease to the sliding surface.
[B]:	Set the inner spring in the inside of motorcycle.	2.	Inner spring	⊗ :	Do not reuse.
[C]:	Set the inner spring in the outside of motorcycle.	(a) :	50 N·m (5.1 kgf-m, 37.0 lbf-ft)		
[D]:	Install the springs in correct direction.	(b) :	40 N·m (4.1 kgf-m, 29.5 lbf-ft)		

Side-stand Removal and Installation

BENJ18K69506007

Refer to “Side-stand Construction” (Page 9E-4).

Removal

1) Support the motorcycle with a jack.

NOTE

- **Do not support the motorcycle with the center exhaust pipes.**
- **Make sure that the motorcycle is supported securely.**

2) Remove the side-stand.

Installation

Install the side-stand.

Specifications

Tightening Torque Specifications

BENJ18K69507001

Reference:
For the tightening torques of fasteners not specified in this page, refer to:
"Front Footrest Construction" (Page 9E-2)
"Pillion Footrest Construction" (Page 9E-3)
"Side-stand Construction" (Page 9E-4)
"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

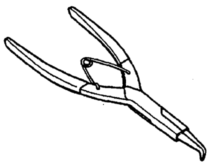
BENJ18K69508001

NOTE

Required service material(s) is also described in:
"Front Footrest Construction" (Page 9E-2)
"Pillion Footrest Construction" (Page 9E-3)
"Side-stand Construction" (Page 9E-4)

Special Tool

BENJ18K69508002

09900–06104 Snap ring pliers (External: Bent nose) ☞(Page 9E-2) 	

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